SEE SHEET 2 FOR INDEX OF SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	STP 2024(139)TP	VARIOUS
STATE	DISTRICT	COUNTY
TEXAS	HOU	MONTGOMERY
CONTROL	SECTION	JOB / SHEET NO.
0912	37	237 / 1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO. : STP 2024(139)TP

CSJ: 0912-37-237

HIGHWAY(S): VARIOUS

MONTGOMERY COUNTY

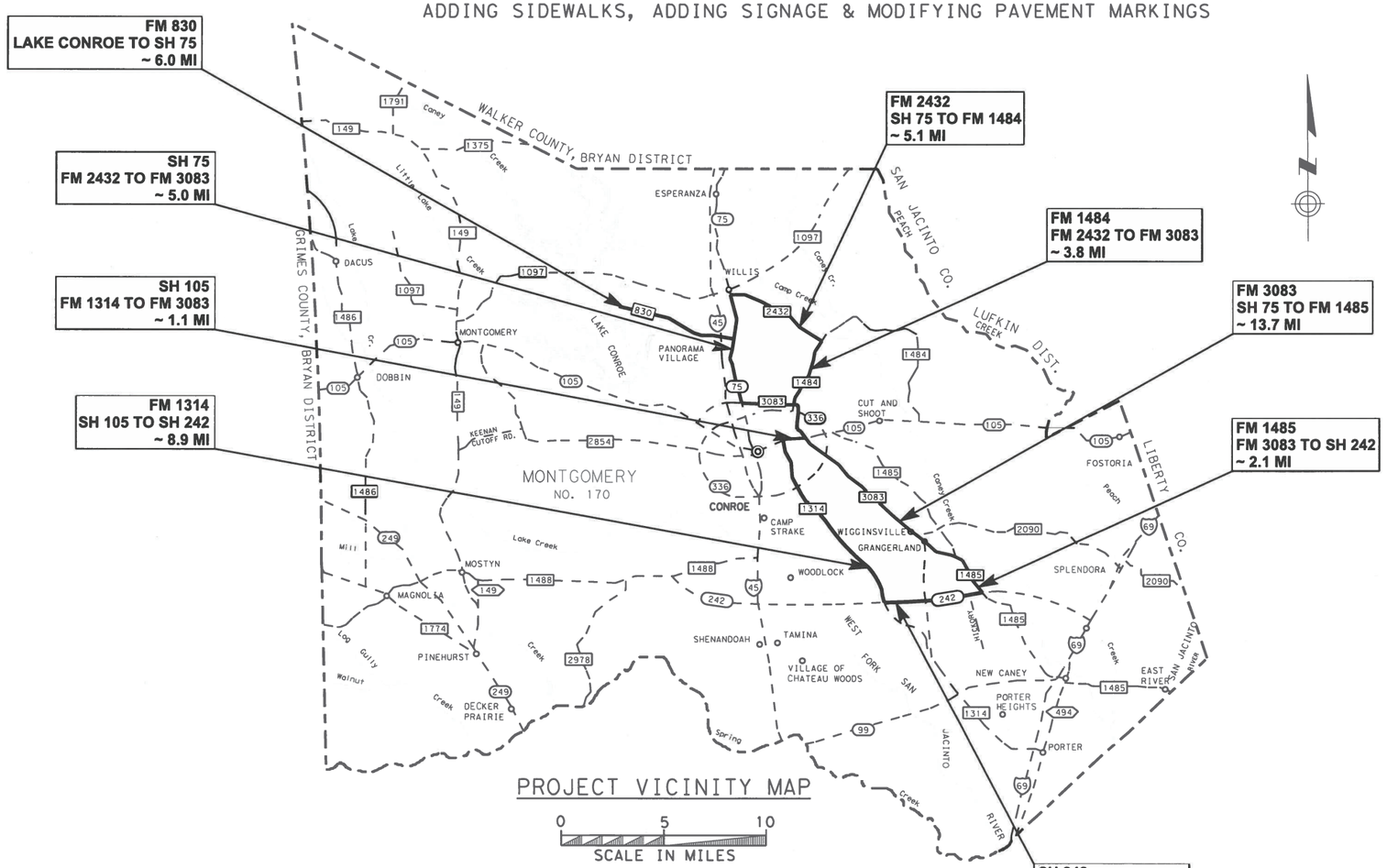
LIMITS: VARIOUS FM ROADS 1314, 1484, 1485, 2432, 3083, 830 &
VARIOUS STATE HIGHWAYS 75, 105, & 242

FOR THE CONSTRUCTION OF MONTGOMERY COUNTY BICYCLE LOOP BY
WIDENING SHOULDERS, OVERLAYING WITH HOT MIX ASPHALT, CONCRETE WIDENING,
ADDING SIDEWALKS, ADDING SIGNAGE & MODIFYING PAVEMENT MARKINGS

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

REGISTERED ACCESIBILTY (RAS) INSPECTION REQUIRED
TDLR NO. TABS2023023407

ROADWAY	LIMITS	ADT 2023	ADT 2043	DESIGN SPEED (MPH)	LENGTH (MILES)
FM 1484	FM 2432 TO FM 3083	12,800	18,100	45	3.8
FM 2432	SH 75 TO FM 1484	10,000	14,100	50	5.1
FM 830	LAKE CONROE TO SH 75	14,300	20,200	40	6.0
SH 75	FM 2432 TO FM 3083	12,000	16,900	45	5.0
FM 3083	SH 75 TO FM 1485	21,200	29,800	45-55	13.7
FM 1485	FM 3083 TO SH 242	9,300	13,000	55	2.1
SH 242	FM 1314 TO FM 1485	15,100	21,200	60	4.7
FM 1314	SH 105 TO SH 242	12,500	17,400	40	8.9
SH 105	FM 1314 TO FM 3083	15,600	19,500	45	1.1
				TOTAL:	50.4



PROJECT VICINITY MAP

0 5 10
SCALE IN MILES

NOTES:

1. SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND THE SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273 JULY 5, 2022)

COUNTY MONTGOMERY PROJ. NO. STP 2024(139)TP
HWY. NO. VARIOUS LETTING DATE 10/23
CONTRACTOR NAME
CONTRACT BEGIN DATE
WORK COMPLETED DATE
DATE OF ACCEPTANCE

CSJ: 1986-01-066

Texas Department of Transportation

SUBMITTED FOR LETTING: 8/1/2023
for AREA ENGINEER

APPROVED FOR LETTING: 8/2/2023
DocuSigned by:
Larry W. Blackburn, P.E.
For DISTRICT ENGINEER
B9928A69E03E42F...

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.30.23

INDEX OF SHEETS

THE STANDARD SHEET (#) SPECIFICALLY IDENTIFIED ABOVE, HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		2

DATE: 08/28/2023 11:44 AM
FILE: pw:\txdot.projectwiseonline.com:TXDOT3\Documents*- HOU\Design Projects\091237237Δ- DesignPlan Set*. Roadway*INDEX SHEET.dgn

ROUTE 1	FM 830 FROM LAKE CONROE TO SH 75 ~ 6.0 MI
ROUTE 2	NORTH LOOP ~ 15.7 MI
ROUTE 3	FM 3083 FROM FM 1484 TO SH 105 ~ 2.7 MI
ROUTE 4	SOUTH LOOP ~ 26.0 MI

FM 830
FROM LAKE CONROE TO SH 75
~ 6.0 MI

FM 2432
FROM SH 75 TO FM 1484
~ 5.1 MI

SH 75
FROM FM 2432 TO FM 3083
~ 5.0 MI

FM 1484
FROM FM 2432 TO FM 3083
~ 3.8 MI

FM 3083
FROM FM 1484 TO SH 105
~ 2.7 MI

FM 3083
FROM SH 105 TO FM 1485
~ 9.2 MI

FM 1485
FROM FM 3083 TO SH 242
~ 2.1 MI

FM 3083
FROM SH 75 TO FM 1484
~ 1.8 MI

SH 105
FROM FM 1314 TO FM 3083
~ 1.1 MI

FM 1314
FROM SH 105 TO SH 242
~ 8.9 MI

SH 242
FROM FM 1314 TO FM 1485
~ 4.7 MI

GRIMES COUNTY
WALKER COUNTY
BRYAN DISTRICT
LUFKIN DISTRICT
SAN JACINTO COUNTY
PEACH CREEK
BEAUMONT DIST.
LIBERTY COUNTY
WALLER COUNTY
HOUSTON DISTRICT
HARRIS COUNTY
HOUSTON DISTRICT

ESPERANZA
WILLIS
DACUS
MONTGOMERY
LAKE CONROE
DOBBIN
CONROE
CUT AND SHOOT
FOSTORIA
WIGGINS-VILLE
GRANGERLAND
SPLENDORA
MOSTYN
EGYPT
WOODLOCK
MAGNOLIA
PINEHURST
SHENANDOAH
TAMINA
VILLAGE OF CHATEAU WOODS
NEW CANEY
PORTER HEIGHTS
PORTER
DECKER PRAIRIE
SPRING CREEK

SCALE IN MILES 0 2.5 5

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
06.30.23

MONTGOMERY CO.
PROPOSED
BIKE LOOP

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		3

DATE: 06/23/2023 09:38 PM
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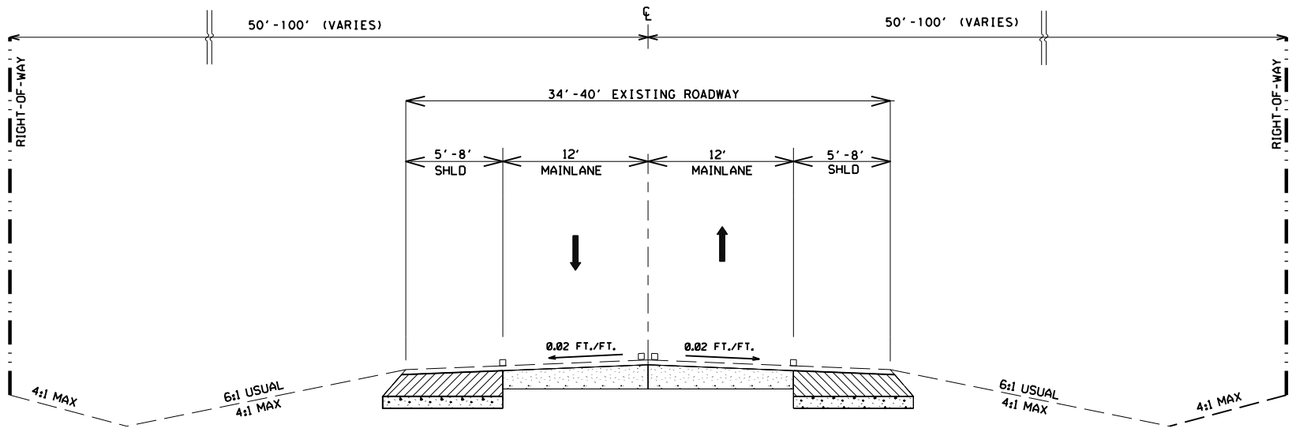
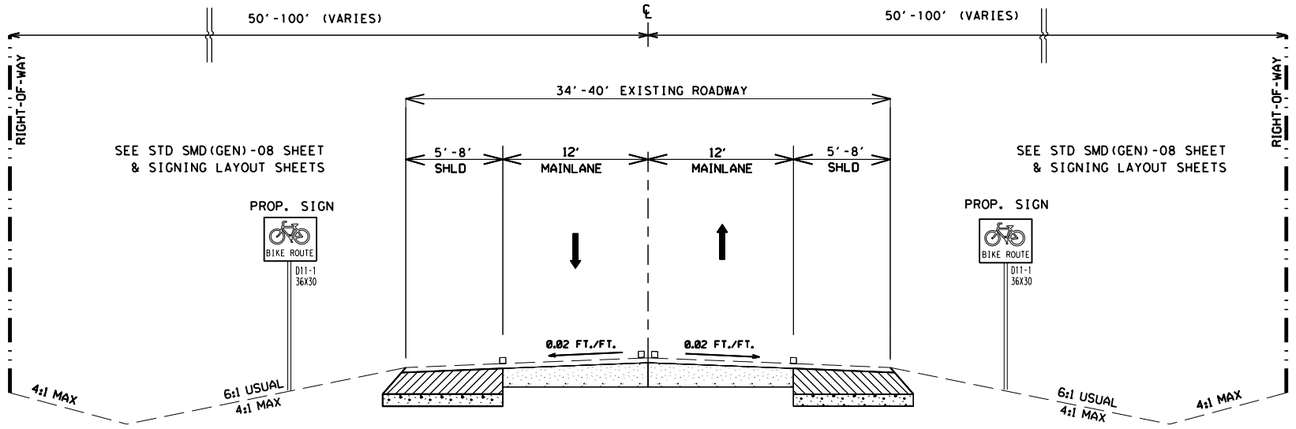


EXIST. TYPICAL SECTION

FM 3083 FROM FM 1485 TO SH 75
SH 75 FROM FM 3083 FROM FM 2432
FM 1485 FROM FM 3083 TO SH 242
FM 2432 FROM SH 75 FROM FM 1484
FM 1314 FROM SH 242 FROM SH 105



PROP. TYPICAL SECTION

FM 3083 FROM FM 1485 TO SH 75
SH 75 FROM FM 3083 FROM FM 2432
FM 1485 FROM FM 3083 TO SH 242
FM 2432 FROM SH 75 FROM FM 1484
FM 1314 FROM SH 242 FROM SH 105

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

BIKE LOOP SIGNAGE TYPICAL SECTIONS

SHEET 1 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		3A

N.T.S.

DATE: 07/28/2023 09:30 AM
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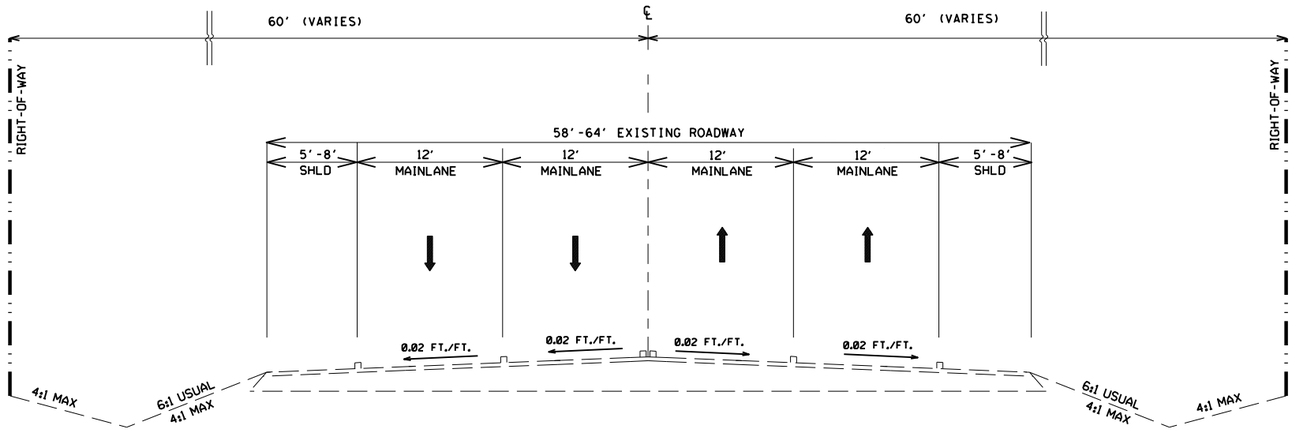
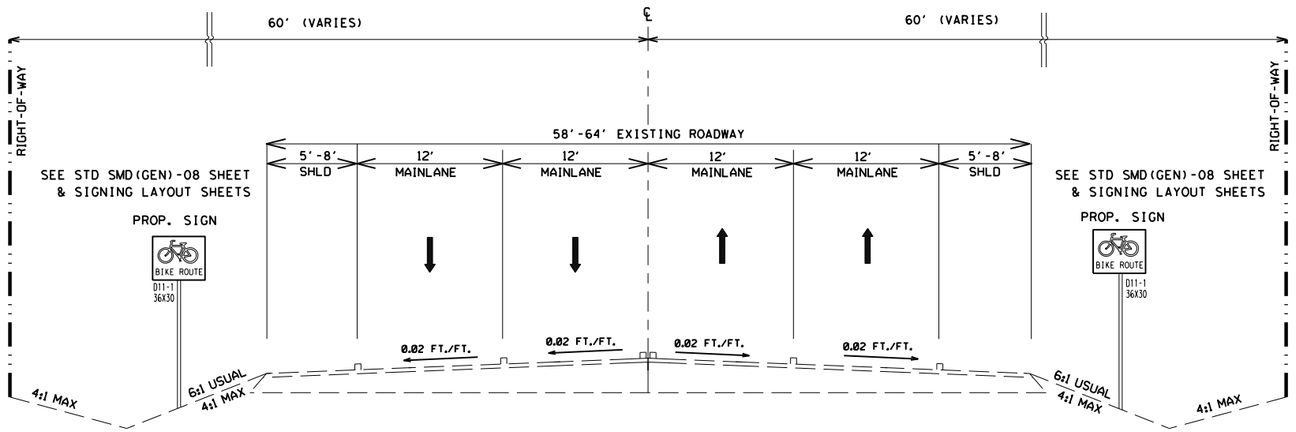


EXIST. TYPICAL SECTION

SH 105 FROM FM 1314 TO FM 3083
SH 242 FROM FM 1485 TO FM 1314



PROP. TYPICAL SECTION

SH 105 FROM FM 1314 TO FM 3083
SH 242 FROM FM 1485 TO FM 1314

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.

08.01.23

BIKE LOOP SIGNAGE TYPICAL SECTIONS

SHEET 2 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		3B

N.T.S.

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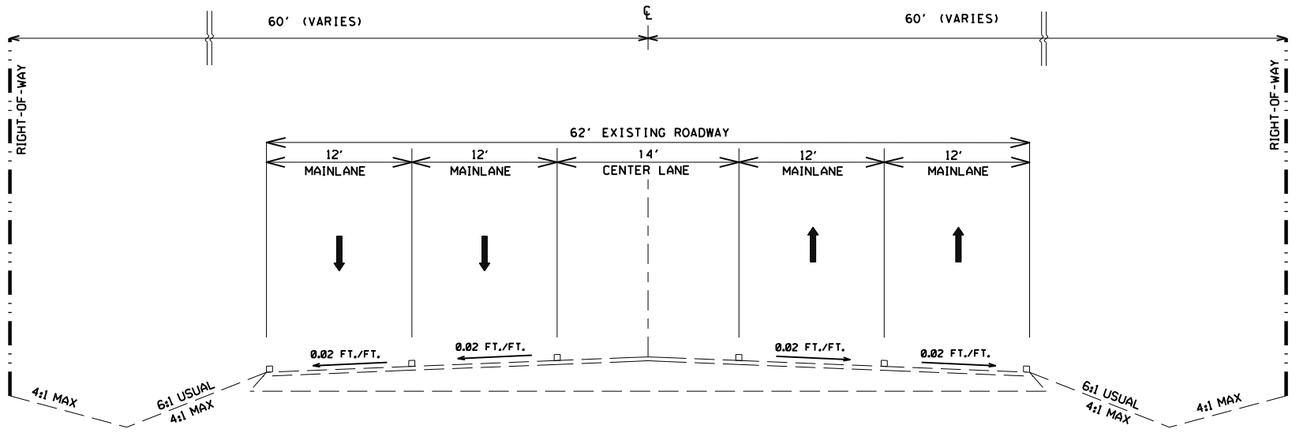
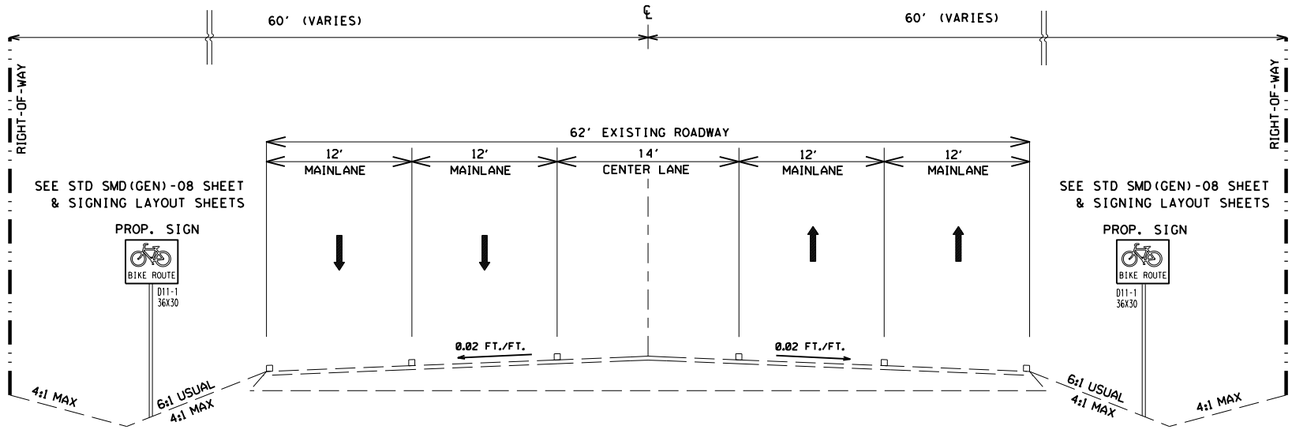


EXIST. TYPICAL SECTION

FM 1484 FROM FM 2432 TO FM 3083



PROP. TYPICAL SECTION

FM 1484 FROM FM 2432 TO FM 3083

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.

08.01.23

BIKE LOOP SIGNAGE TYPICAL SECTIONS

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		3C

N. T. S.

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General:

Area Engineer contact information for this project follows:

Abraham M. Guzman, P.E. *(936) 538-3300* *Abe.Guzman@txdot.gov*
Matthew M. Connelly, P.E. *(936) 538-3300* *Matthew.Connelly@txdot.gov*

Submit any questions about this project via the Letting Pre-Bid Q&A web page, located at:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

Large files with relevant project documentation, such as Geotech reports, As-Built plans, and cross-sections will continue to be provided on the following FTP site:

Index of /pub/txdot-info/Pre-Letting Responses/Houston District (state.tx.us) or
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/Houston%20District/

Unless otherwise shown on the plans, RAP generated by this project will become the property of the Contractor for use in the current construction project or in future projects.

If fixed features require, the governing slopes shown may vary between the limits shown and to the extent determined by the Engineer.

Superelevate the curves to match the existing surface.

Notify the Engineer immediately if discrepancies are discovered in the horizontal control or the benchmark data.

The following standard detail sheets are modified:

Modified Standards

TCP(1-2)-18 (MOD)
TCP(2-2)-18 (MOD)
TCP(7-1)-13 (MOD)

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality,

Sheet 4

County: Montgomery **Control:** 0912-37-237

Highway: Various Locations

comply with the specifications for this project, and are approved, except for roadway illumination, electrical, and traffic signal items.

The cost for materials, labor, and incidentals to provide for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.2.4 of the standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

Grade street intersections and median openings for surface drainage.

If a foundation is to be placed where a riprap surface or an asphalt concrete surface presently exists, use caution in breaking out the existing surface for placement. Break out no greater area than is required to place the foundation. After placing the foundation, wrap the periphery with 0.5 in. pre-molded mastic expansion joint. Then replace the remaining portion of the broken-out surface with Class A or Class C concrete or cold mix asphalt concrete to the exact slope, pattern, and thickness of the existing riprap or asphalt. Payment for breaking out the existing surface, wrapping the foundation, and replacing the surface is subsidiary to the various bid items.

The lengths of the posts for ground mounted signs and the tower legs for the overhead sign supports are approximate. Verify the lengths before ordering these materials to meet the existing field conditions and to conform to the minimum sign mounting heights shown in the plans.

Furnish aluminum Type A signs instead of plywood signs for signs shown on the Summary of Small Signs sheet.

Clearly mark or highlight on the shop drawings, the items being furnished for this project. Submit required shop drawings in accordance with the shop drawing distribution list shown in the note for Item 5 for review and distribution.

Make requests for additional soil information for this project at the Area Engineer's office.

Unless otherwise shown on the plans or otherwise directed, commence work after sunrise and ensure construction equipment is off the road by sunset.

Procure permits and licenses, which are to be issued by the City, County, or Municipal Utility District.

General: Site Management

Mow the grass and weeds within the project limits a maximum of 3 times a year as directed. This work is subsidiary to the various bid items.

Mark stations every 100 ft. and maintain the markings for the project duration. Remove the station markings at the completion of the project. This work is subsidiary to the various bid items.

Do not mix or store materials, or store or repair equipment, on top of concrete pavement or bridge decks unless authorized by the Engineer. Permission will be granted to store materials on surfaces if no damage or discoloration will result.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the District Engineer.

Control the dust caused by construction operations. For sweeping the base material in preparation for laying asphalt and for sweeping the finished concrete pavement, use one of the following types of sweepers or approved equal:

Tricycle Type	**Truck Type - 4 Wheel**
Wayne Series 900	M-B Cruiser II
Elgin White Wing	Wayne Model 945
Elgin Pelican	Mobile TE-3
	Mobile TE-4
	Murphy 4042

General: Traffic Control and Construction

Schedule construction operations such that preparing individual items of work follows in close sequence to constructing storm drains in order to provide as little inconvenience as practical to the businesses and residents along the project.

Schedule work so that the base placement operations follow the subgrade work as closely as practical to reduce the hazard to the traveling public and to prevent undue delay caused by wet weather.

This project requires extensive grading operations in an environmentally sensitive area.

If relocating mailboxes, place them with the post firmly in the ground at nearby locations. Upon completing the project, the Engineer will locate the final mailbox placement. Perform this work in accordance with the requirements of the Item, "Mailbox Assemblies," except for measurement and payment. This work is subsidiary to the various bid items.

If fences cross construction easements shown on the plans and work is required beyond the fences, remove and replace the fences as directed. This work and the materials are subsidiary to the various bid items.

Sheet 4A

County: Montgomery **Control:** 0912-37-237

Highway: Various Locations

When design details are not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

General: Utilities

Consider the locations of underground utilities depicted in the plans as approximate and employ responsible care to avoid damaging utility facilities. Depending upon scope and magnitude of planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities.

If the Contractor damages or causes damage (breaks, leaks, nicks, dents, gouges, etc.) to the utility, contact the utility facility owner or operator immediately.

At least 72 hours before starting work, make arrangements for locating existing Department-owned above ground and underground fiber optic, communications, power, illumination, and traffic signal cabling and conduit. Do this by calling the Department's Houston District Traffic Signal Operations Office at 713-802-5662, or by e-mailing the Department's Houston District Traffic Signal Operations Office at: HOU-LocateRequest@txdot.gov, to schedule marking of underground lines on the ground. Use caution if working in these areas to avoid damaging or interfering with existing facilities.

Notify the Engineer at least 48 hours before constructing junction boxes at storm drain and utility intersections.

Install or remove poles and luminaires located near overhead or underground electrical lines using established industry and utility safety practices. Consult the appropriate utility company before beginning such work.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Costs associated with de-energizing the power lines or other protective measures required are at no expense to the Department.

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Perform electrical work in conformance with the National Electrical Code (NEC) and Department's standard sheets.

Before beginning any underground work, notify the City of Conroe's Chief Inspector, Public Works and Engineering, to establish the locations of any existing electrical systems for lighting facilities within the limits of this project.

County: Montgomery **Control:** 0912-37-237

Highway: Various Locations

Before beginning near the TX Eastern Pipeline Company, contact their representative Bryan Schone at (903) 736-6696. A representative of TX Eastern Pipeline Company must be on site when work is being conducted around the pipeline. Additional gas utilities need to be contacted for additional roadways prior to construction.

Item 5: Control of Work

Submit shop drawings electronically for the fabrication of items as documented in Table 1 below. Information and requirements for electronic submittals can be viewed in the "Guide to Electronic Shop Drawing Submittal" which can be accessed through the following web link, ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf. References to 11 in. x 17 in. sheets in individual specifications for structural items imply electronic CAD sheets.

Table 1

2014 Construction Specification Required Shop/Working Drawing Submittals - TxDOT Generated Plans

Spec Item No.'s	Product	Submittal Required	Approval Required (Y/N)	Contractor/ Fabricator P.E. Seal Required	Reviewing Party	Shop or Working Drawing (Note 1)
7.16.1&.2	Construction Load Analyses	Y	Y	Y	B	WD
400	Excavation and Backfill for Structures (cofferdams)	Y	N	Y	A	WD
403	Temporary Special Shoring	Y	N	Y	C	WD
420	Formwork/Falsework	Y	N	Y	A	WD
423	Retaining Walls, (calcs req'd.)	Y	Y	Y	C	SD
425	Optional Design Calculations (Prstrs Bms)	Y	Y	Y	B	SD
425	Prestr Concr Sheet Piling	Y	Y	N	B	SD
425	Prestr Concr Beams	Y	Y	N	B	SD
425	Prestr Concr Bent	Y	Y	N	B	SD
426	Post Tension Details	Y	Y	N	B	SD
434	Elastomeric Bearing Pads (All)	Y	Y	N	B	SD
441	Bridge Protective Assembly	Y	Y	N	B	SD
441	Misc Steel (various steel assemblies)	Y	Y	N	B	SD
441	Steel Pedestals (bridge raising)	Y	Y	N	B	SD
441	Steel Bearings	Y	Y	N	B	SD
441	Steel Bent	Y	Y	N	B	SD
441	Steel Diaphragms	Y	Y	N	B	SD
441	Steel Finger Joint	Y	Y	N	B	SD
441	Steel Plate Girder	Y	Y	N	B	SD
441	Steel Tub-Girders	Y	Y	N	B	SD
441	Erection Plans, including Falsework	Y	N	Y	A	WD
449	Sign Structure Anchor Bolts	Y	Y	N	T	SD
450	Railing	Y	Y	N	A	SD
462	Concrete Box Culvert	Y	Y	N	C	SD
462	Concrete Box Culvert (Alternate Designs Only,calcs reqd.)	Y	Y	Y	B	SD

Sheet 4B

County: Montgomery **Control:** 0912-37-237

Highway: Various Locations

464	Reinforced Concrete Pipe (Jack and Bore only; ONLY when requested)	Y	Y	Y	A	SD
465	Pre-cast Junction Boxes, Grates, and Inlets	Y	Y	N	A	SD
465	Pre-cast Junction Boxes, Grates, and Inlets (Alternate Designs Only, calcs req'd.)	Y	Y	Y	B	SD
466	Pre-cast Headwalls and Wingwalls	Y	Y	N	A	SD
467	Pre-cast Safety End Treatments	Y	Y	N	A	SD
495	Raising Existing Structure (calcs reqd.)	Y	Y	Y	B	SD
610	Roadway Illumination Supports (Non-Standard only, calcs reqd.)	Y	Y	Y	BRG	SD
613	High Mast Illumination Poles (Non-standard only, calcs reqd.)	Y	Y	Y	BRG	SD
627	Treated Timber Poles	Y	Y	N	T	SD
644	Special Non-Standard Supports (Bridge Mounts, Barrier Mounts, Etc.)	Y	Y	Y	T	SD
647	Large Roadside Sign Supports	Y	Y	Y	T	SD
650	Cantilever Sign Structure Supports - Alternate Design Calcs.	Y	Y	Y	T	SD
650	Sign Structures	Y	Y	N	T	SD
680	Installation of Highway Traffic Signals	Y	Y	N	T	SD
682	Vehicle and Pedestrian Signal Heads	Y	Y	N	T	SD
684	Traffic Signal Cables	Y	Y	N	T	SD
685	Roadside Flashing Beacon Assemblies	Y	Y	N	T	SD
686	Traffic Signal Pole Assemblies (Steel) (Non-Standard only)	Y	Y	Y	T	SD
687	Pedestal Pole Assemblies	Y	Y	N	T	SD
688	Detectors	Y	Y	N	A	SD
784	Repairing Steel Bridge Members	Y	Y	Y	B	WD
SS	Prestr Concr Crown Span	Y	Y	N	B	SD
SS	Sound Barrier Walls	Y	Y	Y	A	SD
SS	Camera Poles	Y	Y	Y	TMS	SD
SS	Pedestrian Bridge (Calcs req'd.)	Y	Y	Y	B	SD
SS	Screw-In Type Anchor Foundations	Y	Y	N	T	SD
SS	Fiber Optic/Communication Cable	Y	Y	N	TMS	SD
SS	Spread Spectrum Radios for Signals	Y	Y	N	T	SD
SS	VIVDS System for Signals	Y	Y	N	T	SD
SS	CTMS Equipment	Y	Y	N	TMS	SD

Notes:

1. Document flow for Working Drawings differs from Shop Drawings in that Working Drawings must be submitted to the Engineer rather than the Engineer of Record and they are for the information of the Engineer only; an approval stamp and distribution to all project offices is not required.

County: Montgomery **Control:** 0912-37-237

Highway: Various Locations

Key to Reviewing Party

A - Area Office	
Area Office	**Email Address**
Montgomery Area Office	HOU-MONTAShpDrwgs@txdot.gov
B - Houston Bridge Engineer	
Bridge Design (Houston TxDOT)	HOU-BrgShpDrwgs@txdot.gov
BRG - Austin Bridge Division	
Bridge Design (Austin TxDOT)	BRG_ShopPlanReview@txdot.gov
C - Construction Office	
Construction	HOU-ConstrShpDrwgs@txdot.gov
Laboratory	HOU-LabShpDrwgs@txdot.gov
T - Traffic Engineer	
Traffic Operations	HOU-TrfShpDrwgs@txdot.gov
TMS – Traffic Management System	
Computerized Traffic Management Systems (CTMS)	HOU-CTMSShpDrwgs@txdot.gov

Item 6: Control of Materials

To comply with the latest provisions of the Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the Contractor must submit a notarized original of the TxDOT Construction Material Buy America Certification Form for items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.
The Buy America Material Classification Sheet is located at the below link.

https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

Item 7: Legal Relations and Responsibilities

Do not initiate activities in a Project Specific Location (PSL), associated with a U.S. Army Corps of Engineers (USACE) permit area, that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include those pertaining to, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The permit area includes the waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Assume responsibility for consultations with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of consultations or approvals from the USACE before initiating activities.

Sheet 4C

County: Montgomery **Control:** 0912-37-237

Highway: Various Locations

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

Document and coordinate with the USACE, if required, before hauling any excavation from or hauling any embankment to a USACE permit area by either 1 or 2 below:

1. **Restricted Use of Materials for the Previously Evaluated Permit Areas.**
   Document both the Project Specific Locations (PSL) and their authorization. Maintain copies for review by the Department or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
   a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in the Item, “Excavation” is used for permanent or temporary fill (under the Item, “Embankment”) within a USACE permit area.
   b. Suitable embankment (under the Item, “Embankment”) from within the USACE permit area is used as fill within a USACE evaluated area.
   c. Unsuitable excavation or excess excavation, “Waste” (under the Item, “Excavation”), that is disposed of at a location approved within a USACE evaluated area.

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

The total area disturbed for this project is 31.33 acre. The disturbed area in this project, the project locations in the Contract, and Contractor project specific locations (PSLs) within 1 mile of the project limits for the Contract, will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a

copy of the Contractor NOI for PSLs on the ROW to the Engineer (to the appropriate MS4 operator when on an off-state system route) and to the local government that operates a separate storm drain system.

This project does not require a U.S. Army Corps of Engineers (USACE) Section 404 Permit before letting, but if a permit is needed during construction, assume responsibility for preparing the permit application. Submit the permit application to the Department's District Environmental Section for approval. Once the permit application is approved, the Department will submit it to the USACE. Assume responsibility for the requested revisions, in coordination with the Department's District Environmental Section.

Maintain the roadway slope stability. Maintaining slope stability is subsidiary to the various bid items.

If the work is on or in the vicinity of an at-grade railroad crossing, involves incidental work on railroad right of way, or involves construction of a railroad grade separation structure, notify the railroad company's Division Engineer and the Department's Project Engineer at least 30 days before performing any work on the railroad right of way and make arrangements for railroad flaggers unless otherwise shown in the contract. Obtain the required Railroad Right of Entry Permit from the railroad company. Payment of applicable permit fees is the responsibility of the Contractor. Acquiring the Railroad Right of Entry Permit is a lengthy process, allow sufficient time for this.

The nesting / breeding season for migratory birds is February 15 through September 30.

Conduct any tree removal outside of the migratory bird nesting season. If this is not possible due to scheduling, then exercise caution to remove only those trees with no active nests. Do not destroy nests on structures or in trees within the project limits during the nesting / breeding season.

Take measures to prevent the building of nests on any structures or trees within the project limits throughout the duration of the construction if work / removal will be performed during the nesting / breeding season. This can be accomplished by application of bird repellent gel, netting by hand every 3 to 4 days, or any other non-threatening method approved by the Houston District Environmental Section. Obtain this approval well in advance of the planned use. Contact the Houston District Environmental Section at 713-802-5244. The cost of this work is subsidiary to the various bid items.

No significant traffic generator events have been identified.

Item 8: Prosecution and Progress

The road-user cost liquidated damages are listed below. After the project is substantially complete, the liquidated damages become those based on contract administration costs.

FM 830: $28,799 per day	FM 3083: $91,510 per day
FM 1314: $35,901 per day	SH 75: $23,215 per day
FM 1484: $18,437 per day	SH 105: $6,737 per day
FM 1485: $6,240 per day	SH 242: $20,910 per day
FM 2432: $17,441 per day	

The Department will not adjust the number of days for the project and milestones, if any, due to differences in opinion regarding any assumptions made in the preparation of the schedule or for errors, omissions, or discrepancies found in the time determination schedule.

Working days will be computed and charged based on a standard workweek in accordance with Section 8.3.3.2.2.

The maximum number of days the time charges on this contract may be suspended due to contractor mobilization, and material fabrication/accumulation or processing delays is 60 days. The Engineer and the Contractor may mutually agree, in writing, to decrease this maximum number of days.

The Lane Closure Assessment Fee are as follows:

FM 3083: $1900.00	FM 1314: $750.00
FM 830: $600.00	SH 75: $500.00

This fee applies to the Contractor for closures or obstructions that overlap into restricted hour traffic for each hour or portion thereof, per lane, regardless of the length of lane closure or obstruction. For Restricted Hours subject to Lane Assessment Fee refer to the Item, "Barricades, Signs, and Traffic Handling." The time increment for the Lane Closure Assessment fee for this project is one hour.

Item 100: Preparing Right of Way

Obtain a City of Conroe plumbing permit and a demolishing permit or removing permit before demolishing or removing existing houses or commercial buildings.

Clean existing ditches under fill sections of undesirable materials including grass, muck, and trash. Perform this work in accordance with the Construction section of the Item, "Preparing Right of Way." This work is subsidiary to this bid Item.

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The Item, “Preparing Right of Way” will be measured for payment only in those designated areas shown on the plans. Preparing right of way necessary to perform construction that is outside designated areas is subsidiary to this bid Item.

Remove abandoned utilities that are in conflict with the new utilities, at no expense to the Department.

Reestablish and maintain right of way stakes after completing the right of way preparation activities and until the new utilities are in place.

Remove and assume ownership of the existing ground mounted signs within the limits of roadway construction unless otherwise noted or directed. This work is subsidiary to the Item, “Preparing Right of Way.”

Item 104: Removing Concrete

Removing concrete curb is paid as a separate bid item if the existing pavement on which it rests is not removed at the same time.

Item 105: Removing Treated and Untreated Base and Asphalt Pavement

Removing curb on cement-treated and untreated base or on cement treatment being removed at the same time is subsidiary to this bid Item.

Obtain a secured site for the stockpile of the treated material to be salvaged from this project. Haul and stockpile the unused material as directed. This work is subsidiary to this bid Item.

Item 104: Removing Concrete
Item 105: Removing Treated and Untreated Base and Asphalt Pavement

Case 1 - ACP over asphalt treatment
Removing the Asphalt Concrete Pavement (ACP) and the asphalt treatment/asphalt stabilized base are paid for under the Item, “Salvaging, Hauling, and Stockpiling Reclaimable Asphalt Pavement.”

Remove the ACP separately from the asphalt treatment/asphalt stabilized base. Make the removed depth as uniform as possible during each removal pass if the pavement depth being removed is composed of different asphalt layers. Unless otherwise approved, stockpile Reclaimable Asphalt Pavement (RAP) of differing types of quality separately by its intended use such as for the asphalt treatment, cement treatment, lime treatment, or asphalt concrete pavement. Break, crush, or mill the stockpiled materials so that 100 percent pass the 2-in. sieve.

Case 2 - ACP over cement or lime treatment
Removing the Asphalt Concrete Pavement (ACP) material is paid under the Item, “Salvaging, Hauling, and Stockpiling Reclaimable Asphalt Pavement.”

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Highway: Various Locations

Removing the cement or lime treatment is paid under the Item, “Removing Treated and Untreated Base and Asphalt Pavement.”

Remove the ACP separately from the cement or lime treatment. Make the removed depth as uniform as possible during each removal pass if the pavement depth being removed is composed of different asphalt layers. Unless otherwise approved, stockpile the RAP of differing types of quality separately by its intended use such as for the asphalt treatment, cement treatment, lime treatment, or asphalt concrete pavement. Break, crush, or mill the stockpiled materials so that 100 percent pass the 2-in. sieve.

Case 3 - ACP over concrete pavement
The removal of the Asphalt Concrete Pavement (ACP) material is paid under the Item, “Salvaging, Hauling, and Stockpiling Reclaimable Asphalt Pavement.”

Removing the concrete pavement material is paid under the Item, “Removing Concrete.”

Case 4 - ACP over concrete pavement over base
Removing the Asphalt Concrete Pavement (ACP) material is paid under the Item, “Salvaging, Hauling, and Stockpiling Reclaimable Asphalt Pavement.”

Removing the concrete pavement material is paid under the Item, “Removing Concrete.”

Removing the base material is paid under the Item, “Removing Treated and Untreated Base and Asphalt Pavement.”

Remove the ACP separately from the base. The removed depth is as uniform as possible during each removal pass if the pavement depth being removed is composed of different asphalt layers. Stockpile the RAP of differing types of quality separately by its intended use such as for asphalt treatment, cement treatment, lime treatment, or asphalt concrete pavement. Break, crush, or mill the stockpiled materials so that 100 percent pass the 2-in. sieve.

Case 5 - Concrete pavement over base
Removing the concrete pavement material is paid under the Item, “Removing Concrete.”

Removing the base material and any asphalt bondbreaker material is paid under the Item, “Removing Treated and Untreated Base and Asphalt Pavement.”

Item 110: Excavation

If manipulating the excavated material requires moving the same material more than once to accomplish the desired results, the excavation is measured and paid for only once regardless of the manipulation required.

Transition the ditch grades and channel bottom widths at structure locations. Use only approved channel excavation in the embankment.

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Highway: Various Locations

Item 132: Embankment

If salvaged base is used for the embankment material, break it into small pieces to achieve the required density and to facilitate placing in the embankment. Obtain approval of the material before placing in the embankment.

Furnish Type C material with a maximum Liquid Limit (LL) of 65, a minimum Plasticity Index (PI) of 5, and composed of suitable earth material such as loam, clay, or other materials that form a suitable embankment.

The embankment material used on the project which has a Liquid Limit exceeding 45 will be tested for Liquid Limits at the rate of one test per 20,000 cu. yd. or per total quantity less than 20,000 cu. yd., unless otherwise directed. Only use material that passes the above tests.

For unpaved areas, provide a finished grade with the top 4 in. capable of sustaining vegetation. Use fertile soil that is easily cultivated, free from objectionable material and highly resistant to erosion.

Furnish material with a maximum Liquid Limit (LL) of 65.

Item 134: Backfilling Pavement Edges

Quantity by station includes both sides of the roadway.

The Contractor has the option of selecting the type of backfill material consisting of Reclaimable Asphalt Pavement (RAP), Flex Base, or Crushed Concrete provided that it meets the requirements listed below.

For Permeable Friction Courses (PFC), the backfill material chosen must meet the requirements of Department Test Method Tex-246-F.

If using salvaged asphalt concrete pavement, size it so that all the material, passes the 2-in. sieve. Use RAP that does not contain deleterious material such as clay or organic material.

Flex Base must meet the requirements of Item 247, Type A, Grade 1-2. Department Test Method Tex-117-E will not be required.

Crushed concrete must meet the requirements of Item 247, Grade 1-2. Department Test Methods Tex-116-E and Tex-117-E will not be required.

Place emulsified asphalt (SS-1, CSS-1, or CSS-1H) at an application rate of 0.25 gal/sq. yard.

Item 162: Sodding for Erosion Control
Item 166: Fertilizer
Item 168: Vegetative Watering

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Highway: Various Locations

Refer to the “Fertilizer, Seed, Sod, Straw, Compost, and Water” plan sheet for material specifications, application rates, and for watering requirements.

Item 204: Sprinkling

Perform subsidiary sprinkling as required under various other items in accordance with the Item, “Sprinkling.”

Sprinkling for dust control is subsidiary to the various bid items.

Item 210: Rolling

Use a medium pneumatic roller meeting the requirements of Item 210 as directed. This work is subsidiary to the various bid items. On every asphalt shot, use a minimum of 3 pneumatic rollers or as directed. Use approved rolling patterns. Successive asphalt shots will not be allowed until acceptable rolling has been accomplished on the preceding asphalt shot.

Item 260: Lime Treatment (Road-Mixed)

For slurry placing, before discharging through the distributors, sufficiently agitate or mix the lime and water to place the lime in suspension and to obtain a uniform mixture.

The Engineer will observe the lime treatment that the Contractor elects to open to construction traffic immediately after compaction. If the construction traffic damages the subgrade, route the traffic off the damaged section in accordance with the standard specification. If the construction traffic does not damage the subgrade, cure the subgrade until other courses of material cover it. Apply these courses within 14 days with a maximum curing period of 7 days.

Place the hydrated and the commercial lime as a water suspension or slurry according to the slurry placing method shown in Section 260.4.3.2, “Slurry Placement.”

Use the type of lime at particular locations as directed.

Place the quicklime dry or as a slurry.

For the dry quicklime, a spreader box is not required if the lime material is evenly distributed.

In limited areas, the Contractor may construct the lime slurry subgrade under a sequence of work in which the application, mixing, and compaction are completed in the same working day, if approved by the Engineer.

Provide documentation from certified public scales showing gross, tare, and net weights. Provide producer’s delivery tickets also showing gross, tare, and net weights. Completely empty the lime trailers at the project site. The Engineer may direct the Contractor to reweigh any shipment of lime on certified scales. The cost of this operation is subsidiary to the Item, “Lime Treatment (Road-Mixed).”

The percentage of lime shown on the plans is estimated on the basis of engineering tests. If soil tests made during construction indicate properties different than those originally anticipated, the Engineer may vary the percentage of the lime to provide soil characteristics similar to those of the preliminary tests.

Mix the lime with the new base material in an approved pug mill type stationary mixer.

If using Type A aggregate in accordance with the Item, "Flexible Base," use only crushed stone, Grade 1.

Item 276: Cement Treatment (Plant-Mixed)

Before placing the new base, wet and coat the vertical construction joints between the new base and the previously placed base with dry cement.

If the total thickness of the cement treatment is greater than 8 in., compact it in multiple lifts in accordance with Section 276.4.3, "Compaction." Place the courses in the same working day unless otherwise approved.

Use Class N Cement Treatment containing 4.5 percent cement based on the dry weight of the aggregate. There is no minimum compressive strength requirement for this Item.

The requirement for core drilling to determine the thickness of cement treatment is waived if using less than 500 sq. yd. at one location.

For widening the existing pavement, the Engineer may waive the requirements for preparing the subgrade by scarifying and compacting if the as-cut subgrade can be maintained to the density of the natural ground and to a uniform consistency when placing the base course. Keep the subgrade wet.

Compact in accordance with the standard specifications and complete the finishing operations within a period of 5 hours after adding the cement to the base material.

Cure the final course of cement treatment using an asphalt distributor that distributes the approved curing material and water mixture material at a rate of 0.25 gallons per square-yard evenly and smoothly or as recommended by the manufacturer at the recommended dilution rate, under a pressure necessary for proper distribution. Provide a curing material meeting the requirements of the Item, "Asphalts, Oils, and Emulsions" for curing the cement treatment. Use the following materials for curing the courses of cement treatment:

Curing Material	Application
Water	All courses, except final course
PCE	Final course

Continue curing until placing another course or opening the finished section to traffic.

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Highway: Various Locations

Spread the material so that the layers of base are uniform in depth and in loose density before compacting.

Type E material consists of Type A material, crushed concrete (except under flexible pavement), or Reclaimed Asphalt Pavement (RAP) meeting the requirements of the Item, "Flexible Base." If approved, the 50 percent maximum RAP limitation may be waived.

Unless otherwise directed, place the next pavement layer within 7 working days of placing the base.

If using crushed stone for the Type E material under this Item, ensure it meets the requirements for the Item, "Flexible Base," Type A, Grade 1-2. Texas Test Method TEX-117-E is not required for this Item.

If using Recycled Type E cement treatment under proposed flexible pavement, produce it using the existing base salvaged from within this project or from other approved Department projects and salvaged asphalt concrete pavement. Do not use crushed concrete under flexible pavement.

If using Recycled Type E cement treatment under proposed concrete pavement, produce it using the existing base salvaged from within this project or from other approved Department projects, salvaged asphalt concrete pavement, or crushed concrete. If using crushed concrete as an aggregate, meet the requirements of Grade 3.

If using salvaged existing base and asphalt concrete pavement as described above, size it so that all the material, except the existing individual aggregate, passes the 2-in. sieve and is of a gradation that allows satisfactory compaction. Provide salvaged material that does not contain deleterious material such as clay or organic material. Provide material passing the No. 40 sieve, defined as soil binder, with a maximum Plasticity Index of 10 and a maximum Liquid Limit of 35 when tested in accordance with test method TEX-106-E.

Meet the following additional requirements if the base and ACP are salvaged from other Department projects:

1. Obtain written approval before using the material.
2. Salvage and stockpile by approved methods.
3. Stockpile the material for exclusive use by the Department.

Item 305: Salvaging, Hauling, and Stockpiling Reclaimable Asphalt Pavement

Unless otherwise shown on the plans, RAP generated by this project will become the property of the Contractor for use in the current construction project or in future projects.

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Highway: Various Locations

Item 354: Planing and Texturing Pavement

Schedule planing operations such that no inclement weather is forecast while the milled surface is open to traffic. Schedule asphalt operations such that the overlay occurs within one week of planing.

Unless otherwise shown on the plans, RAP generated by this project will become the property of the Contractor for use in the current construction project or in future projects.

Item 360: Concrete Pavement

Where the pavement curb is left off for a later tie, provide the dowels or the tie bars as indicated on the paving detail sheets. The dowel bars and tie bars are subsidiary to the various bid items.

Repair portions of the concrete pavement surfaces that are damaged while in a plastic state before that area receives permanent pavement markings and opens to traffic. Perform repairs that are structurally equivalent to and cosmetically uniform with the adjacent undamaged areas. Do not repair by grouting onto the surface.

On pavement widening, hand finishing in place of the longitudinal float will be permitted.

Where existing pavement is widened with new pavement, place the new pavement a minimum of 2 ft. wide.

Equip the batching plants to proportion by weight, aggregates and bulk cement, using approved proportioning devices and approved automatic scales.

For mono curb, the curb height transitions will be paid at the contract unit price of the larger curb height in the transition. The 2.5-in. laydown curbs for driveways will be paid at the unit price bid for the Item, “Conc Curb (Mono) (Ty II).”

High-early strength cement may be used for frontage road and city street intersection construction.

Do not use limestone dust of fracture as fine aggregate.

If the concrete design requires greater than 5.5 sacks of cementitious material per cubic yard, obtain written approval. If placing concrete pavement mixes from April 1 to October 31, inclusive, use Mix Design Option 1 as specified in Section 421.4.2.6.1.

Perform saw cutting as shown on the plans in accordance with Section 360.4.10, “Sawing Joints.” This saw cutting is subsidiary to this bid Item.

Complete the entire Fast Track Concrete construction process, from the time the Fast Track Work Area is closed to traffic, to the time the Fast Track Work Area is opened to traffic. The Fast Track operation includes, but is not limited to, traffic control, existing pavement and

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Highway: Various Locations

subgrade removal, preparation of subgrade, placement of steel, placement of Fast Track concrete pavement, cure time, striping, etc. Perform work in the Fast Track Work Area in an expeditious manner, within the allowable time period for any area shown below:

Fast Track Work Area	Allowable Duration
1. FM 3083 at S Loop 336 E <STA. 161+02.00 to 161+60.00 and STA. 162+53.00 to 163+11.00>	3 week days maximum
2. SH 242 at FM 1485 <STA. 859+18.00 to 866+44.00>	3 week days maximum
3. SH 242 at Artavia Parkway <STA. 663+38.00 to 667+36.00>	3 week days maximum
4. FM 1314 at S Loop 336 E <STA. 117+15.00 to 117+38.00>	3 week days maximum

Failure to perform any Fast Track Work Area construction within the above time frames will be cause for the Engineer to require the Contractor to shut down all other construction operations to ensure all resources are directed toward the completion of the Fast Track operation. This shutdown will remain in force until the Fast Track operation is complete. Such a shutdown will not warrant additional time, time suspension, or any additional costs to the Department.

Unless otherwise directed in writing, provide Class HES concrete with a minimum average flexural strength of 425 psi or a minimum average compressive strength of 3,000 psi in 16 hours.

When directed in writing, open the pavement to traffic before the minimum requirements have been attained.

When needed, place and remove forms in accordance with Section 360.4.5, except do not remove forms until at least 6 hours after concrete has been placed. The time for the form removal may be extended with the direction of the Engineer if weather or other conditions make it advisable.

Sprinkling and rolling, required for the compaction of the rough subgrade in advance of fine grading are subsidiary to this Item. Maintenance of a moist condition of the subgrade in advance of fine-grading and concrete is subsidiary work, as provided above.

Items 496: Removing Structures

Assume ownership and remove from the project site, items salvaged.

Do not permit debris resulting from the structure removal or construction activities to enter a natural or manmade waterway such as drainage channels, rivers, streams, bays, etc. Remove debris which falls into such waterways. This work is subsidiary to the Item, “Removing Structures.”

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Highway: Various Locations

Item 502: Barricades, Signs, and Traffic Handling

Use a traffic control plan for handling traffic through the various phases of construction. Follow the phasing sequence unless otherwise agreed upon by the Area Engineer and the Project Manager. Ensure this plan conforms to the latest "Texas Manual on Uniform Traffic Control Devices" and the latest Barricade and Construction (BC) Standard Sheets. The latest versions of Work Zone Standard Sheets WZ (BTS-1) and WZ (BTS-2) are the traffic control plan for the signal installations.

Submit changes to the traffic control plan to the Area Engineer. Provide a layout showing the construction phasing, signs, striping, and signalizations for changes to the original traffic control plan.

Furnish and maintain the barricades and warning signs, including the necessary temporary and portable traffic control devices, during the various phases of construction. Place and construct these barricades and warning signs in accordance with the latest "Texas Manual on Uniform Traffic Control Devices" for typical construction layouts.

Cover work zone signs when work related to the signs is not in progress, or when any hazard related to the signs no longer exists.

Keep the delineation devices, signs, and pavement markings clean. This work is subsidiary to the Item, "Barricades, Signs, and Traffic Handling."

If a section is not complete before the end of the workday, pull back the base material to the existing pavement edge on a 6H: 1V slope. Edge drop-offs during the hours of darkness are not permitted.

Before detouring traffic onto the mainlane shoulders, remove dirt, debris, vegetation, and other deleterious material from the surface of the shoulders. Appropriately sign the detour in an approved manner. This work is subsidiary to the various bid items.

Coordinate and schedule the work with the appropriate Metro representative if requiring access to the High Occupancy Vehicle lanes.

Cover or remove the permanent signs and construction signs that are incorrect or that do not apply to the current situation for a particular phase.

Replace the overhead signs, informational signs, and exit signs to be removed, with temporary signs providing the correct information to the traveling public. Size the replacement signs and include them in the traffic control plan.

Do not mount signs on drums or barricades, except those listed in the latest Barricades and Construction standard sheets.

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Highway: Various Locations

Use traffic cones for daytime work only. Replace the cones with plastic drums during nighttime hours.

Place positive barriers to protect drop-off conditions greater than 2 ft. within the clear zone that remain overnight.

Do not reduce the existing number of lanes open to traffic except as shown on the following time schedule:

One Lane Closure

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	8:30 AM – 3:30 PM	9:00 PM – 12:00 AM	5:00 AM – 8:30 AM 3:30 PM – 9:00 PM
Tuesday	8:30 AM – 3:30 PM	12:00 AM – 5:00 AM 9:00 PM – 12:00 AM	5:00 AM – 8:30 AM 3:30 PM – 9:00 PM
Wednesday	8:30 AM – 3:30 PM	12:00 AM – 5:00 AM 9:00 PM – 12:00 AM	5:00 AM – 8:30 AM 3:30 PM – 9:00 PM
Thursday	8:30 AM – 3:30 PM	12:00 AM – 5:00 AM 9:00 PM – 12:00 AM	5:00 AM – 8:30 AM 3:30 PM – 9:00 PM
Friday	8:30 AM – 3:30 PM	12:00 AM – 5:00 AM 9:00 PM – 12:00 AM	5:00 AM – 8:30 AM 3:30 PM – 11:59 PM
Saturday	Engineer Approval	Engineer Approval	Engineer Approval
Sunday	No Closures	9:00 PM – 11:59 PM	12:00 AM – 9:00 PM

The above times are approved for the traffic control conditions listed. The Area Engineer may approve other closure times if traffic counts warrant. The Area Engineer may reduce the above times for special events.

Law enforcement assistance will be required for this project and is expected to be required for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement as directed or agreed by the Engineer. Before payment will be made, complete the "Daily Report on Law Enforcement Force Account Work" (Form 318), provided by the Department and submit daily invoices that agree with this form for any day during the month in which approved services were provided.

Provide full-time, off-duty, uniformed, certified peace officers, as part of traffic control operations. The peace officers must be able to show proof of certification by the Texas Commission on Law Enforcement Officers Standards. The cost of the officers is paid for on a force account basis.

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.

Item 506: Temporary Erosion, Sedimentation and Environmental Controls

The use of hay bales is not permitted as Storm Water Pollution Prevention Plan (SWP3) measures.

Use appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. Remove and dispose of materials in compliance with State and Federal laws.

Before starting construction, review with the Engineer the SWP3 used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SWP3.

Schedule the seeding or sodding work as soon as possible. The project schedule provides for a vegetation management plan.

After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control.

Implement temporary and permanent erosion control measures to comply with the National Pollution Discharge Elimination System (NPDES) general permit under the Clean Water Act.

Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

Item 529: Concrete Curb, Gutter, and Combined Curb and Gutter
Item 530: Intersections, Driveways, and Turnouts
Item 531: Sidewalks

An air-entraining admixture is not required.

For concrete curbs, use Grade 7 aggregate conforming to Section 421.2.6 of the Item, "Hydraulic Cement Concrete."

For driveways and turnouts, coarse aggregate Grade No. 3 through No. 8 conforming to the gradation requirements specified in the Item, "Hydraulic Cement Concrete" will be permitted.

For reinforcing steel in sidewalks and pedestrian ramps, use No. 4 bars at a maximum 18 in. spacing center-to-center in both directions.

Item 540: Metal Beam Guard Fence

Painting the timber posts is not required.

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Highway: Various Locations

Use timber posts for galvanized steel metal beam guard fence, except for anchorage at turned down ends.

Furnish and install wood blocks between the rail elements and the timber posts as detailed on the plans. These block-outs are subsidiary to this bid Item.

The quantity of the metal beam guard fence is subject to change.

Provide a mow strip as shown on the plans, at metal beam guard fence locations, including any guardrail end treatments.

Galvanize the rail elements supplied for this project by using a Type II Zinc Coating.

At locations requiring attachment of Metal Beam Guard Fence (MBGF) to concrete railing or concrete traffic barrier, repair and fill any existing holes in the railing or barrier that are not in the correct location for attaching the new MBGF. Perform this work in accordance with the Item, "Concrete Structure Repair." Existing anchor bolt holes that cannot be utilized must be filled with an epoxy grout before drilling new holes. Then core-drill new holes in the correct locations and repair any resulting spalls at no expense to the Department. This work is considered subsidiary to the MBGF transition section (Item 540).

Item 585: Ride Quality for Pavement Surfaces

To eliminate the need for corrective action due to excessive deviations in the final surface layers, exercise caution to ensure satisfactory profile results in the intermediate paving layers (mixture).

Milling will not be allowed as a corrective action for excessive deviations in the final surface layer of hot-mix asphalt.

Item 636: Signs

For design details not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

Item 644: Small Roadside Sign Assemblies

Sign locations shown on the plans are approximate. Before placing them, obtain approval of and then stake the exact locations for these signs.

Use the Texas Universal Triangular Slip Base with the concrete foundation for small ground mounted signs, unless otherwise shown in the plans.

Remove existing street name signs from existing stop signs and re-install them above the new stop signs. Removing and re-installing existing street name signs is subsidiary to the Item, "Small Roadside Sign Assemblies."

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Highway: Various Locations

When design details are not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

Use Type E Super High Specific Intensity (Fluorescent Prismatic) yellow green reflective sheeting background to fabricate school signs (S1-1, S3-1, S4-3, S5-1, W16-2, SW16-9p, and SW16-7pL(R)).

Assume ownership of the removed existing signposts. Store removed sign panels at the Contractor's field office, to be picked up by the maintenance office. This work is subsidiary to this item.

Locations of the relocated signs are approximate. Before placing them, obtain approval of and then stake the exact locations for these signs.

Replace existing signs that become damaged during relocation at no expense to the Department.

Item 662: Work Zone Pavement Markings

At the end of each workday, mark roadways that remain open to traffic during construction operations with standard pavement markings, in accordance with the latest "Texas Manual on Uniform Traffic Control Devices."

Using raised markers for removable work zone pavement markings on final concrete surfaces is optional.

Do not use raised pavement markers as optional work zone pavement markings on final asphalt surfaces.

For transition lane lines and detour lane lines, use raised pavement markers as shown for solid lines on the latest Barricade and Construction standard sheet for "Work Zone Pavement Marking Details."

Item 662: Work Zone Pavement Markings
Item 666: Reflectorized Pavement Markings
Item 6038: Multipolymer Pavement Markings (MPM)

Use Type III glass beads for thermoplastic and multipolymer pavement markings.

Use a 0.100 in. (100 mil) thickness for thermoplastic pavement markings, measured to the top of the thermoplastic, not including the exposed glass beads.

Use a 0.022 in. (22 mil) thickness for multipolymer pavement markings, measured to the top of the multipolymer, not including the exposed glass beads.

For roadways with asphalt surfaces to be striped with work zone or permanent thermoplastic markings, the Contractor has the option to apply paint and beads markings for a maximum 30-

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day period until placing the thermoplastic markings, or until starting the succeeding phase of work on the striped area. Maintain the paint and beads markings, at no expense to the Department, until placing the thermoplastic markings or starting the succeeding phase of work on the striped area. The work zone markings, whether paint and beads or thermoplastic, are paid under the Item, "Work Zone Pavement Markings" and the markings are paid for only once for the given phase of construction.

If using paint and bead markings as described above, purchase the traffic paint from the open market.

If the Type II markings become dirty and require cleaning by washing, brushing, compressed air, or other approved methods before applying the Type I thermoplastic markings, this additional cleaning is subsidiary to the Item, "Reflectorized Pavement Markings."

Establish the alignment and layout for work zone striping and permanent striping.

Stripe all roadways before opening them to traffic.

Place pavement markings under these items in accordance with details shown on the plans, the latest "Texas Manual on Uniform Traffic Control Devices," or as directed.

When design details are not shown on the plans, provide pavement markings for arrows, words, and symbols conforming to the latest "Standard Highway Sign Designs for Texas" manual.

Item 672: Raised Pavement Markers

If other operations are complete on the project and if the curing time period is not yet elapsed, the contract time will be suspended until the curing is done.

Before placing the raised pavement markers on concrete pavement, blast clean the surface using an abrasive-blasting medium. This work is subsidiary to the Item, "Raised Pavement Markers."

Provide epoxy adhesive that is machine-mixed or nozzle-mixed and dispensed. Equip the machine or nozzle with a mechanism to ensure positive mix measurement control.

Item 677: Eliminating Existing Pavement Markings and Markers

Remove existing pavement markings on concrete or asphalt surfaces by flail milling or as directed.

Item 678: Pavement Surface Preparation for Markings

Do not blast clean asphalt concrete pavement. Clean asphalt concrete pavement as required under the applicable specifications or as directed.

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On new concrete pavement or on existing concrete pavement when placing a new stripe on a new location, remove the curing compounds and contamination from the pavement surface by flail milling or as directed. In addition, air-blast the surface with compressed air just before placing the new stripe.

On existing concrete pavement when placing a new stripe on an existing location, after removing the existing stripe under the Item, "Eliminating Existing Pavement Markings and Markers," air-blast the surface with compressed air just before placing the new stripe.

Do not clean concrete pavement by grinding.

Item 3076: Dense-Graded Hot Mix Asphalt

Taper the asphalt concrete pavement at the beginning and ending points.

Use a maximum 6H:1V slope for the asphalt concrete pavement edge.

Where the 6H:1V ACP edge taper extends over onto the unsurfaced shoulders, blade off the loose existing shoulder material to provide a solid base for the outside taper edge. After placing the ACP overlay, blade this material back against the edge taper. This work is subsidiary to the various bid items.

The stockpile will be the point of sampling of coarse aggregate for test method TEX-217-F (Part II, decantation).

Place the asphalt concrete pavement in courses as shown on the typical sections.

Do not use petroleum-based solvents in the beds of hot mix asphalt delivery vehicles.

Dilution of tack coat is not allowed.

Do not use Surface Aggregate Classification (SAC) C for this project.

For determining the Asphalt Content, only ignition ovens will be allowed.

The tack coat rate shown on the "Basis of Estimate" is an average rate for calculating tack coat quantities. Vary the rate based on the pavement conditions and other factors such as manufacturer's recommendations and weather.

Item 3085: Underseal Course

Clean roadway surface before Underseal is placed.

Roadway must be free of moisture unless otherwise approved.

A uniform coat is required. No streaking will be accepted.

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Highway: Various Locations

Provide access to at least one instrument that accurately displays gallons used or remaining throughout the operation.

If there are signs of Underseal bleeding through the asphalt course, reduction in the Underseal Rate may be permitted.

Item 6185: Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

A shadow vehicle with Truck Mounted Attenuators (TMAs) or Trailer Attenuators (TAs) is required as shown on the appropriate Traffic Control Plan (TCP) sheets. TMAs/TAs must meet the requirements of the Compliant Work Zone Traffic Control Device List.

Level 3 Compliant TMAs/TAs are required for this project.

A total of one (1) shadow vehicle with a TMA/TA is required for the work with the exception of Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

A total of three (3) shadow vehicles with a TMA/TA are required for Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

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Highway: Various Locations

Basis of Estimate

Item	Description	Limit and Rate	Unit
134	Backfilling Pavement Edges • Asphalt Emulsion	 0.25 Gal. / Sq. Yd.	STA
260	Lime Treatment (Road-Mixed) For materials used as subgrade * • Lime(HYD, COM, or QK)(SLRY) or QK(DRY)	 6 % by weight based on 100 Lb. / Cu. Ft. subgrade	SY TON
275	Cement Treatment (Road-Mixed) For materials used as subgrade * • Cement	 6 % by weight based on 100 Lb. / Cu. Ft. subgrade	SY TON
3076	Dense-Graded Hot Mix Asphalt • Asphalt • Aggregate Tack Coat • Applied on new HMA • Applied on Existing HMA • Applied on Milled HMA	110 Lb. / Sq. Yd.-In. 6 % by weight 94 % by weight 0.06 Gal. / Sq. Yd. 0.09 Gal. / Sq. Yd. 0.11 Gal. / Sq. Yd.	TON GAL
3085	Underseal Course	0.2 Gal./ Sq. Yd.	GAL

* If used in existing roadway base, rate will be determined on a case-by-case basis.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0912-37-237 **DISTRICT** Houston **COUNTY** Montgomery
HIGHWAY Various

			CONTROL SECTION JOB		**0912-37-237**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00124707**		
			COUNTY		**Montgomery**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	9.000		9.000	
	104-6001	REMOVING CONC (PAV)	SY	67.000		67.000	
	104-6015	REMOVING CONC (SIDEWALKS)	SY	7.000		7.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	553.000		553.000	
	104-6021	REMOVING CONC (CURB)	LF	401.000		401.000	
	105-6062	REMOVING STAB BASE AND ASPH PAV(4"-16")	SY	2,656.000		2,656.000	
	110-6001	EXCAVATION (ROADWAY)	CY	2,680.000		2,680.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	2,607.000		2,607.000	
	134-6001	BACKFILL (TY A)	STA	119.000		119.000	
	162-6002	BLOCK SODDING	SY	16,462.000		16,462.000	
	166-6001	FERTILIZER	AC	3.400		3.400	
	168-6001	VEGETATIVE WATERING	MG	408.150		408.150	
	260-6012	LIME(HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	72.000		72.000	
	260-6079	LIME TRT (SUBGRADE)(6")	SY	5,339.000		5,339.000	
	275-6001	CEMENT	TON	72.000		72.000	
	275-6002	CEMENT TREAT (EXIST MATL) (6")	SY	5,339.000		5,339.000	
	276-6238	CEM TRT(PLNT MX) (CL N)(TYE)(GR 4)(12")	SY	2,868.000		2,868.000	
	276-6239	CEM TRT(PLNT MX) (CL N)(TYE)(GR 4)(14")	SY	5,457.000		5,457.000	
	276-6240	CEM TRT(PLNT MX) (CL N)(TYE)(GR 4)(10")	SY	1,048.000		1,048.000	
	305-6015	SALV, HAUL & STKPL RCL APH PV (1 1/2")	SY	17,517.000		17,517.000	
	305-6018	SALV,HAUL & STKPL RCL APH PV (2")	SY	2,656.000		2,656.000	
	354-6041	PLANE ASPH CONC PAV (1.5")	SY	46,850.000		46,850.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	15,837.000		15,837.000	
	360-6057	CONC PVMT (CONT REINF)(FAST TRK)(14")	SY	605.000		605.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	23.000		23.000	
	466-6172	WINGWALL (PW - 1) (HW=11 FT)	EA	2.000		2.000	
	467-6394	SET (TY II) (24 IN) (RCP) (6: 1) (C)	EA	1.000		1.000	
	496-6004	REMOV STR (SET)	EA	9.000		9.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	23.000		23.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	6,504.000		6,504.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	6,504.000		6,504.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	344.000		344.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	344.000		344.000	
	529-6009	CONC CURB (DOWEL)(SLOTTED)	LF	100.000		100.000	
	529-6011	CONC CURB (DOWEL)	LF	183.000		183.000	
	530-6025	DRIVEWAYS (CONC) (FAST TRACK)	SY	477.000		477.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0912-37-237 **DISTRICT** Houston **COUNTY** Montgomery
HIGHWAY Various

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0912-37-237**			
		PROJECT ID		**A00124707**			
		COUNTY		**Montgomery**			
		HIGHWAY		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	531-6001	CONC SIDEWALKS (4")	SY	3,200.000		3,200.000	
	531-6010	CURB RAMPS (TY 7)	EA	6.000		6.000	
	536-6003	CONC DIRECTIONAL ISLAND	LF	130.000		130.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	275.000		275.000	
	540-6014	SHORT RADIUS	LF	35.000		35.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1.000		1.000	
	540-6035	MTL BM GD FEN TRANS (31"-28")	EA	2.000		2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	3.000		3.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	309.000		309.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	43.000		43.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	10.000		10.000	
	658-6073	INSTL OM ASSM (OM-2Y)(WC)GND(BI)	EA	2.000		2.000	
	662-6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	1,440.000		1,440.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	40,792.000		40,792.000	
	662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	7,768.000		7,768.000	
	662-6016	WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF	1,100.000		1,100.000	
	662-6017	WK ZN PAV MRK NON-REMOV (W)(ARROW)	EA	100.000		100.000	
	662-6029	WK ZN PAV MRK NON-REMOV(W)(WORD)	EA	62.000		62.000	
	662-6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	2,840.000		2,840.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	52,250.000		52,250.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	7,041.000		7,041.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	880.000		880.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	80.000		80.000	
	666-6057	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA	1.000		1.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	59.000		59.000	
	666-6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA	1.000		1.000	
	666-6105	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL)	EA	308.000		308.000	
	666-6111	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)	EA	323.000		323.000	
	666-6117	REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)	EA	532.000		532.000	
	666-6162	RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL)	LF	1,250.000		1,250.000	
	666-6224	PAVEMENT SEALER 4"	LF	202.000		202.000	
	666-6225	PAVEMENT SEALER 6"	LF	92,997.000		92,997.000	
	666-6226	PAVEMENT SEALER 8"	LF	11,377.000		11,377.000	
	666-6228	PAVEMENT SEALER 12"	LF	225.000		225.000	
	666-6230	PAVEMENT SEALER 24"	LF	2,088.000		2,088.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA	105.000		105.000	
	666-6232	PAVEMENT SEALER (WORD)	EA	76.000		76.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0912-37-237 **DISTRICT** Houston **COUNTY** Montgomery
HIGHWAY Various

			CONTROL SECTION JOB		**0912-37-237**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00124707**		
			COUNTY		**Montgomery**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6234	PAVEMENT SEALER (DBL ARROW)	EA	1.000		1.000	
	666-6242	PAVEMENT SEALER (RR XING)	EA	1.000		1.000	
	666-6244	PAVEMENT SEALER (BIKE ARROW)	EA	308.000		308.000	
	666-6245	PAVEMENT SEALER (BIKE SYMBOL)	EA	323.000		323.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1,250.000		1,250.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	33,315.000		33,315.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	1,620.000		1,620.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	40,333.000		40,333.000	
	672-6007	REFL PAV MRKR TY I-C	EA	443.000		443.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	1,795.000		1,795.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	76.000		76.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	18,636.000		18,636.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	4,029.000		4,029.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	640.000		640.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	614.000		614.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	47.000		47.000	
	677-6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	1.000		1.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	37.000		37.000	
	677-6016	ELIM EXT PAV MRK & MRKS (RR XING)	EA	1.000		1.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	92,997.000		92,997.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	11,377.000		11,377.000	
	678-6006	PAV SURF PREP FOR MRK (12")	LF	225.000		225.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	2,088.000		2,088.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	105.000		105.000	
	678-6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	1.000		1.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	76.000		76.000	
	678-6020	PAV SURF PREP FOR MRK (RR XING)	EA	1.000		1.000	
	678-6026	PAV SURF PREP FOR MRK (BIKE ARROW)	EA	308.000		308.000	
	678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	323.000		323.000	
	678-6030	PAV SURF PREP FOR MRK (BIKE DOT)	EA	532.000		532.000	
	3076-6041	D-GR HMA TY-D SAC-A PG70-22	TON	6,095.000		6,095.000	
	3076-6043	D-GR HMA TY-D PG70-22 (LEVEL-UP)	TON	705.000		705.000	
	3076-6066	TACK COAT	GAL	405.000		405.000	
	3085-6001	UNDERSEAL COURSE	GAL	13,606.000		13,606.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	90.000		90.000	
	6038-6004	MULTIPOLYMER PAV MRK (W)(6")(SLD)	LF	6,836.000		6,836.000	
	6038-6005	MULTIPOLYMER PAV MRK (W)(6")(BRK)	LF	1,130.000		1,130.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0912-37-237 **DISTRICT** Houston **COUNTY** Montgomery
HIGHWAY Various

			CONTROL SECTION JOB		**0912-37-237**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00124707**		
			COUNTY		**Montgomery**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	6038-6006	MULTIPOLYMER PAV MRK (W)(6")(DOT)	LF	54.000		54.000	
	6038-6007	MULTIPOLYMER PAV MRK (W)(8")(SLD)	LF	4,336.000		4,336.000	
	6038-6011	MULTIPOLYMER PAV MRK (W)(12")(SLD)	LF	225.000		225.000	
	6038-6013	MULTIPOLYMER PAV MRK (W)(24")(SLD)	LF	1,208.000		1,208.000	
	6038-6017	MULTIPOLYMER PAV MRK (Y)(6")(SLD)	LF	6,023.000		6,023.000	
	6038-6018	MULTIPOLYMER PAV MRK (Y)(6")(BRK)	LF	110.000		110.000	
	6038-6024	MULTIPOLYMER PAV MRK (BLK)(6")(BRK)	LF	1,130.000		1,130.000	
	6038-6025	MULTIYPOLYMER PAV MRK (W) (ARROW)	EA	25.000		25.000	
	6038-6027	MULTIPOLYMER PAV MRK (W) (WORD)	EA	17.000		17.000	
	6185-6002	TMA (STATIONARY)	DAY	99.000		99.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	768.000		768.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

CSJ 0912-37-237 REMOVAL	104 6001 REMOVING CONC (PAV)	104 6015 REMOVING CONC (SIDEWALKS)	104 6017 REMOVING CONC (DRIVEWAYS)	104 6021 REMOVING CONC (CURB)	305 6015 SALV, HAUL & STKPL RCL APH PV (1 1/2")	305 6018 SALV,HAUL & STKPL RCL APH PV (2")	496 6004 REMOV STR (SET)	677 6002 ELIM EXT PAV MRK & MRKS (6")	677 6003 ELIM EXT PAV MRK & MRKS (8")	677 6005 ELIM EXT PAV MRK & MRKS (12")	677 6007 ELIM EXT PAV MRK & MRKS (24")	677 6008 ELIM EXT PAV MRK & MRKS (ARROW)	677 6009 ELIM EXT PAV MRK & MRKS (DBL ARROW)	677 6012 ELIM EXT PAV MRK & MRKS (WORD)	677 6016 ELIM EXT PAV MRK & MRKS (RR XING)
	SY	SY	SY	LF	SY	SY	EA	LF	LF	LF	LF	EA	EA	EA	EA
FM 3083 AT N SL 336 E	0	0	0	0	0	0	0	595	171	0	21	11	0	7	0
FM 3083 AT CISD SCHOOL RD	0	0	0	0	0	1362	0	150	0	0	74	0	0	0	0
FM 3083 AT S SL 336 E	34	0	0	0	0	183	0	564	82	0	166	6	0	0	0
FM 3083 AT FM 1485	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
FM3083 AT GRANGER PINES WAY	0	0	0	0	0	0	0	3035	570	0	24	5	0	5	0
SH 242 AT FM 1485 LEFT TURN	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
SH 242 AT ARTAVIA PARKWAY	0	0	0	0	0	0	0	1080	820	210	0	4	0	4	0
FM 1314 AT SL 336 E	0	0	0	101	7063	123	0	1112	433	0	24	5	0	5	0
FM 1314 AT SILVERDALE DR	16	0	0	50	0	713	2	6715	450	0	110	4	0	4	0
FM 1484 SIDEWALKS	0	0	553	150	0	0	0	0	0	0	31	0	0	0	0
FM 1484 AT FM 2432	0	0	0	0	222	0	0	3612	911	430	30	4	0	4	0
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 2432 AT SH 75	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
SH 75 AT KINGLET DR	0	0	0	0	0	0	0	375	335	0	0	2	0	2	0
SH 75 AT FM 830	17	7	0	0	5828	137	0	536	0	0	0	0	0	0	0
FM 830 EVERGREEN PINES	0	0	0	0	0	0	0	320	227	0	0	2	0	2	0
FM 830 AT IH 45 EAST	0	0	0	0	0	76	4	50	0	0	0	0	0	0	0
FM 830 AT IH 45 WEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 830 AT TERALYN WOODS	0	0	0	0	0	0	0	442	0	0	0	2	0	2	0
SH75 AT LEAGUE LINE RD	0	0	0	0	4404	62	3	50	30	0	134	0	0	0	0
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**67**	**7**	**553**	**401**	**17517**	**2656**	**9**	**18636**	**4029**	**640**	**614**	**47**	**1**	**37**	**1**

CSJ 0912-37-237 TCP QUANTITIES	662 6001 WK ZN PAV MRK NON-REMOV (W)4"(BRK)	662 6004 WK ZN PAV MRK NON-REMOV (W)4"(SLD)	662 6012 WK ZN PAV MRK NON-REMOV (W)8"(SLD)	662 6016 WK ZN PAV MRK NON-REMOV (W)24"(SLD)	662 6017 WK ZN PAV MRK NON-REMOV (W)(ARROW)	662 6029 WK ZN PAV MRK NON-REMOV(W)(WORD)	662 6032 WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	662 6034 WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	6001 PORTABLE CHANGEABLE MESSAGE SIGN	6185 6002 TMA (STATIONARY)	6185 6003 TMA (MOBILE OPERATION)
	LF	LF	LF	LF	EA	EA	LF	LF	DAY	DAY	HR
FM 3083 AT N SL 336 E	0	0	0	0	0	0	0	0			
FM 3083 AT CISD SCHOOL RD	0	17032	3060	148	58	14	2740	17090			
FM 3083 AT S SL 336 E	0	9430	1080	0	8	16	0	13316			
FM 3083 AT FM 1485	0	0	0	0	0	0	0	0			
FM3083 AT GRANGER PINES WAY	0	0	0	0	0	0	0	0			
SH 242 AT FM 1485 LEFT TURN	0	0	0	0	0	0	0	0			
SH 242 AT ARTAVIA PARKWAY	0	0	0	0	0	0	0	0			
FM 1314 AT SL 336 E	1440	3762	498	0	6	6	0	5788			
FM 1314 AT SILVERDALE DR	0	0	0	0	0	0	0	0			
FM 1484 SIDEWALKS	0	0	0	0	0	0	0	0			
FM 1484 AT FM 2432	0	3130	1160	500	12	12	0	5588			
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0			
FM 2432 AT SH 75	0	0	0	0	0	0	0	0			
SH 75 AT KINGLET DR	0	0	0	0	0	0	0	0			
SH 75 AT FM 830	0	3378	738	184	8	6	100	4828			
FM 830 EVERGREEN PINES	0	0	0	0	0	0	0	0			
FM 830 AT IH 45 EAST	0	0	0	0	0	0	0	0			
FM 830 AT IH 45 WEST	0	0	0	0	0	0	0	0			
FM 830 AT TERALYN WOODS	0	0	0	0	0	0	0	0			
SH75 AT LEAGUE LINE RD	0	4060	1232	268	8	8	0	5640			
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	0	0			
TOTALS	**1440**	**40792**	**7768**	**1100**	**100**	**62**	**2840**	**52250**	**90**	**99**	**768**

BIKE LOOP REMOVAL & TCP QUANTITY SUMMARY

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		6

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CSJ 0912-37-237 ROADWAY	100	110	132	134	260	260	275	275	276	276	276	360	432	529	529	530	531	531	536	658	658
	6002	6001	6005	6001	6012	6079	6001	6002	6238	6239	6240	6057	6045	6009	6011	6025	6001	6010	6003	6062	6073
	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(ORD COMP)(TY C)	BACKFILL (TY A)	LIME(HYD,COM OR OK)(SLRY)(OR OK(DRY)	LIME TRT (SUBGRADE)(6")	CEMENT	CEMENT TREAT (EXIST MATL) (6")	CEM TRT(PLNT MX) (CLN)(TYE)(GR 4)(12")	CEM TRT(PLNT MX) (CLN)(TYE)(GR 4)(14")	CEM TRT(PLNT MX) (CLN)(TYE)(GR 4)(10")	CONC PVMT (CONT REINF)(FAST TRK)(14")	RIPRAP (MOW STRIP)(4 IN)	CONC CURB (DOWEL)(SLOTTED)	CONC CURB (DOWEL)	DRIVEWAYS (CONC) (FAST TRACK)	CONC SIDEWALKS (4")	CURB RAMPS (TY 7)	CONC DIRECTIONAL ISLAND	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	INSTL OM ASSM (OM-2Y)(WC) GND(BI)
	STA	CY	CY	STA	TON	SY	TON	SY	SY	SY	SY	SY	CY	LF	LF	SY	SY	EA	LF	EA	EA
FM 3083 AT N SL 336 E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 3083 AT CISD SCHOOL RD	0	435	290	36	37	2759	37	2759	0	4720	0	0	0	0	0	0	0	0	0	0	0
FM 3083 AT S SL 336 E	3	207	345	19	6	411	6	411	0	737	0	100	0	0	0	0	0	0	0	0	0
FM 3083 AT FM 1485	0	0	0	17	0	0	0	0	0	0	0	0	0	100	0	0	0	0	130	0	0
FM3083 AT GRANGER PINES WAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SH 242 AT FM 1485 LEFT TURN	0	117	59	8	0	0	0	0	0	0	0	302	0	0	0	0	0	0	0	0	0
SH 242 AT ARTAVIA PARKWAY	0	67	34	4	0	0	0	0	0	0	0	173	0	0	0	0	0	0	0	0	0
FM 1314 AT SL 336 E	0	116	58	10	2	150	2	150	271	0	0	30	0	0	101	0	0	0	0	0	0
FM 1314 AT SILVERDALE DR	6	1538	1313	8	20	1450	20	1450	2596	0	0	0	23	0	0	0	0	0	0	10	0
FM 1484 SIDEWALKS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	477	3200	6	0	0	0
FM 1484 AT FM 2432	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 2432 AT SH 75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SH 75 AT KINGLET DR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SH 75 AT FM 830	0	97	146	6	4	297	4	297	0	0	558	0	0	0	0	0	0	0	0	0	0
FM 830 EVERGREEN PINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 830 AT IH 45 EAST	0	27	32	2	2	131	2	131	0	0	234	0	0	0	0	0	0	0	0	0	2
FM 830 AT IH 45 WEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 830 AT TERALYN WOODS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SH 75 AT LEAGUE LINE RD	0	76	331	9	2	140	2	140	0	0	255	0	0	0	0	0	0	0	0	0	0
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**9**	**2680**	**2607**	**119**	**72**	**5339**	**72**	**5339**	**2868**	**5457**	**1048**	**605**	**23**	**100**	**183**	**477**	**3200**	**6**	**130**	**10**	**2**

CSJ 0912-37-237 ROADWAY	540	540	540	540	544	3076	3076	3076	3085	354	354	105
	6001	6014	6016	6035	6001	6041	6043	6066	6001	6041	6045	6062
	MTL W-BEAM GD FEN (TIM POST)	SHORT RADIUS	DOWNSTREAM ANCHOR TERMINAL SECTION	MTL BM GD FEN TRANS (31"-28")	GUARDRAIL END TREATMENT (INSTALL)	D-GR HMA TY-D SAC-A PG70-22	D-GR HMA TY-D PG70-22 (LEVEL-UP)	TACK COAT	UNDERSEAL COURSE	PLANE ASPH CONC PAV (1.5")	PLANE ASPH CONC PAV (2")	REMOVING STAB BASE AND ASPH PAV(4"-16")
	LF	LF	EA	EA	EA	TON	TON	GAL	GAL	SY	SY	SY
FM 3083 AT N LOOP 336 E	0	0	0	0	0	0	0	0	0	0	0	0
FM 3083 AT CISD SCHOOL RD	0	0	0	0	0	1802	394	215	4369	19105	0	1362
FM 3083 AT S LOOP 336 E	0	0	0	0	0	889	67	48	2155	10228	0	183
FM 3083 AT FM 1485	0	0	0	0	0	1060	0	0	1927	0	9636	0
FM3083 AT GRANGER PINES WAY	0	0	0	0	0	0	0	0	0	0	0	0
SH 242 AT FM 1485 LEFT TURN	0	0	0	0	0	0	0	0	0	0	0	0
SH 242 AT ARTAVIA PARKWAY	0	0	0	0	0	0	0	0	0	0	0	0
FM 1314 AT SL 336 E	0	0	0	0	0	599	25	14	1451	7063	0	123
FM 1314 AT SILVERDALE DR	275	35	1	2	3	756	172	94	1375	0	5313	713
FM 1484 SIDEWALKS	0	0	0	0	0	0	0	0	0	0	0	0
FM 1484 AT FM 2432	0	0	0	0	0	18	0	0	44	222	0	0
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0	0	0	0	0
FM 2432 AT SH 75	0	0	0	0	0	0	0	0	0	0	0	0
SH 75 AT KINGLET DR	0	0	0	0	0	0	0	0	0	0	0	0
SH 75 AT FM 830	0	0	0	0	0	481	17	12	1166	5828		137
FM 830 EVERGREEN PINES	0	0	0	0	0	0	0	0	0	0	0	0
FM 830 AT IH 45 EAST	0	0	0	0	0	114	16	12	208	0	888	76
FM 830 AT IH 45 WEST	0	0	0	0	0	0	0	0	0	0	0	0
FM 830 AT TERALYN WOODS	0	0	0	0	0	0	0	0	0	0	0	0
SH75 AT LEAGUE LINE RD	0	0	0	0	0	376	15	11	911	4404	0	62
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	0	0	0	0	0	0
	275	**35**	**1**	**2**	**3**	**6035**	**765**	**405**	**13606**	**46850**	**15837**	**2656**

BIKE LOOP ROADWAY QUANTITY SUMMARY

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		6A

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CSJ 0912-37-237 PAVEMENT MARKINGS	666 6036 REFL PAV MRK TY I (W)8"(SLD)(100MIL) LF	666 6048 REFL PAV MRK TY I (W)24"(SLD)(100MIL) LF	666 6054 REFL PAV MRK TY I (W)(ARROW)(100MIL) EA	666 6057 REFL PAV MRK TY I(W)(DBL ARROW)(100MIL) EA	666 6078 REFL PAV MRK TY I (W)(WORD)(100MIL) EA	666 6093 REFL PAV MRK TY I (W)(RR XING)(100MIL) EA	666 6105 REFL PAV MRK TY I (W)(BIKE ARW)(100MIL) EA	666 6111 REFL PAV MRK TY I(W)(BIKE SYML)(100MIL) EA	666 6117 REFL PAV MRK TY I (W)(BIKE DOT)(100MIL) EA	666 6162 RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL) LF	666 6224 PAVEMENT SEALER 4" LF	666 6225 PAVEMENT SEALER 6" LF	666 6226 PAVEMENT SEALER 8" LF	666 6228 PAVEMENT SEALER 12" LF	666 6230 PAVEMENT SEALER 24" LF	666 6231 PAVEMENT SEALER (ARROW) EA	666 6232 PAVEMENT SEALER (WORD) EA	666 6234 PAVEMENT SEALER(DBL ARROW) EA	666 6242 PAVEMENT SEALER(RR XING) EA	666 6244 PAVEMENT SEALER(BIKE ARROW) EA	666 6245 **PAVEMENT SEALER (BIKE SYMBOL)** EA
FM 3083 AT N SL 336 E	441	12	7	0	3	0	5	5	28	110	10	7586	1761	0	502	12	9	0	0	5	5
FM 3083 AT CISD SCHOOL RD	1530	74	29	0	7	0	12	12	35	0	24	18431	1530	0	74	29	7	0	0	12	12
FM 3083 AT S SL 336 E	540	0	4	0	8	0	8	8	106	0	16	12111	622	0	166	10	8	0	0	8	8
FM 3083 AT FM 1485	672	136	4	0	4	0	6	6	24	0	12	7386	672	0	136	4	4	0	0	6	6
FM3083 AT GRANGER PINES WAY	570	24	5	0	5	0	6	6	50	0	12	3480	570	0	24	5	5	0	0	6	6
SH 242 AT FM 1485 LEFT TURN	0	0	0	0	0	0	7	7	0	0	14	1299	544	0	66	2	2	0	0	7	7
SH 242 AT ARTAVIA PARKWAY			4	0	4	0	12	12	90	0	24	1880	981	225	0	4	4	0	0	12	12
FM 1314 AT SL 336 E	249		3	0	3	0	2	2	0	720	4	9677	682	0	170	8	8	0	0	2	2
FM 1314 AT SILVERDALE DR	450	110	2	0	2	0	0	4	0	0	8	6715	450	0	110	2	2	0	0	0	4
FM 1484 SIDEWALKS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	162	0	0	0	0	0	0
FM 1484 AT FM 2432	580	250	6	0	6	0	5	5	19	0	10	7492	1491	0	328	10	10	0	0	5	5
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 2432 AT SH 75	50	48	1	1	2	1	1	1		0	2	780	50	0	48	1	2	1	1	1	1
SH 75 AT KINGLET DR	335		2	0	2	0	4	4	25	0	8	756	335	0	0	2	2	0	0	4	4
SH 75 AT FM 830	369	92	4	0	3	0	6	6	55	0	12	4153	369	0	92	4	3	0	0	6	6
FM 830 EVERGREEN PINES	227		2	0	2	0	5	5	34	0	10	544	227	0	0	2	2	0	0	5	5
FM 830 AT IH 45 EAST	0	0	0	0	0	0	2	2	0	0	4	884	0	0	0	0	0	0	0	2	2
FM 830 AT IH 45 WEST	149	0	1	0	2	0	4	4	0	420	8	4300	214	0	76	4	2	0	0	4	4
FM 830 AT TERALYN WOODS	263		2	0	2	0	4	4	28	0	8	673	263	0	0	2	2	0	0	4	4
SH 75 AT LEAGUE LINE RD	616	134	4	0	4	0	8	8	38	0	16	4850	616	0	134	4	4	0	0	8	8
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	222	222	0	0	0	0	0	0	0	0	0	0	0	222	222
TOTALS	**7041**	**880**	**80**	**1**	**59**	**1**	**308**	**323**	**532**	**1250**	**202**	**92997**	**11377**	**225**	**2088**	**105**	**76**	**1**	**1**	**308**	**323**

CSJ 0912-37-237 PAVEMENT MARKINGS	666 6306 RE PM W/RET REQ TY I (W)6"(BRK)(100MIL) LF	666 6309 RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) LF	666 6318 RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL) LF	666 6321 RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) LF	672 6007 REFL PAV MRKR TY I-C EA	672 6009 REFL PAV MRKR TY II-A-A EA	672 6010 REFL PAV MRKR TY II-C-R EA	678 6002 PAV SURF PREP FOR MRK (6") LF	678 6004 PAV SURF PREP FOR MRK (8") LF	678 6006 PAV SURF PREP FOR MRK (12") LF	678 6008 PAV SURF PREP FOR MRK (24") LF	678 6009 PAV SURF PREP FOR MRK (ARROW) EA	678 6010 PAV SURF PREP FOR MRK (DBL ARROW) EA	678 6016 PAV SURF PREP FOR MRK (WORD) EA	678 6020 PAV SURF PREP FOR MRK (RR XING) EA	678 6026 PAV SURF PREP FOR MRK (BIKE ARROW) EA	678 6028 PAV SURF PREP FOR MRK (BIKE SYMBOL) EA	678 6030 PAV SURF PREP FOR MRK (BIKE DOT) EA
FM 3083 AT N SL 336 E	110	1550	0	1815	80	185	0	7586	1761	0	502	12	0	9	0	5	5	28
FM 3083 AT CISD SCHOOL RD	0	8516	1370	8545	77	266	0	18431	1530	0	74	29	0	7	0	12	12	35
FM 3083 AT S SL 336 E	0	4715	0	6658	32	154	0	12111	622	0	166	10	0	8	0	8	8	106
FM 3083 AT FM 1485	0	3076	0	4310	34	216	0	7386	672	0	136	4	0	4	0	6	6	24
FM3083 AT GRANGER PINES WAY	0	1900	200	1380	29	56	0	3480	570	0	24	5	0	5	0	6	6	50
SH 242 AT FM 1485 LEFT TURN	0	0	0	0	0	0	27	1299	544	0	66	2	0	2	0	7	7	0
SH 242 AT ARTAVIA PARKWAY	0	0	0	0	0	0	49	1880	981	225	0	4	0	4	0	12	12	90
FM 1314 AT SL 336 E	720	1881	0	2894	35	246	0	9677	682	0	170	8	0	8	0	2	2	0
FM 1314 AT SILVERDALE DR	0	2855	0	3860	0	0	0	6715	450	0	110	2	0	2	0	0	4	0
FM 1484 SIDEWALKS	0	0	0	0	0	0	0	0	0	0	162	0	0	0	0	0	0	0
FM 1484 AT FM 2432	0	1565	0	2794	52	186	0	7492	1491	0	328	10	0	10	0	5	5	19
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FM 2432 AT SH 75	0	350	0	430	2	0	0	780	50	0	48	1	1	2	1	1	1	0
SH 75 AT KINGLET DR	0	756	0	0	17	0	0	756	335	0	0	2	0	2	0	4	4	25
SH 75 AT FM 830	0	1689	50	2414	19	66	0	4153	369	0	92	4	0	3	0	6	6	55
FM 830 EVERGREEN PINES	0	544	0	0	12	0	0	544	227	0	0	2	0	2	0	5	5	34
FM 830 AT IH 45 EAST	0	300	0	584	0	32	0	884	0	0	0	0	0	0	0	2	2	0
FM 830 AT IH 45 WEST	420	915	0	1829	11	106	0	4300	214	0	76	4	0	2	0	4	4	0
FM 830 AT TERALYN WOODS	0	673	0	0	13	0	0	673	263	0	0	2	0	2	0	4	4	28
SH 75 AT LEAGUE LINE RD	0	2030	0	2820	30	282	0	4850	616	0	134	4	0	4	0	8	8	38
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222	222	0
TOTALS	**1250**	**33315**	**1620**	**40333**	**443**	**1795**	**76**	**92997**	**11377**	**225**	**2088**	**105**	**1**	**76**	**1**	**308**	**323**	**532**

BIKE LOOP PAVEMENT MARKING QUANTITY SUMMARY

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		6B

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CK1: DW1: CK2: DN1:

CSJ 0912-37-237 PAVEMENT MARKINGS	6038 6004 MULTIPOLYMER PAV MRK (W)(6")(SLD)	6038 6005 MULTIPOLYMER PAV MRK (W)(6")(BRK)	6038 6006 MULTIPOLYMER PAV MRK (W)(6")(DOT)	6038 6007 MULTIPOLYMER PAV MRK (W)(8")(SLD)	6038 6011 MULTIPOLYMER PAV MRK (W)(12")(SLD)	6038 6013 MULTIPOLYMER PAV MRK (W)(24")(SLD)	6038 6017 MULTIPOLYMER PAV MRK (Y)(6")(SLD)	6038 6018 MULTIPOLYMER PAV MRK (Y)(6")(BRK)	6038 6024 MULTIPOLYMER PAV MRK (BLK)(6")(BRK)	6038 6025 MULTIYPOLYMER PAV MRK (W) (ARROW)	6038 6027 MULTIPOLYMER PAV MRK (W) (WORD)
	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA
FM 3083 AT N LOOP 336 E	1016	140	0	1320	0	490	2705	0	140	5	6
FM 3083 AT CISD SCHOOL RD	0	0	0	0	0	0	0	0	0	0	0
FM 3083 AT S LOOP 336 E	564	0	0	82	0	166	174	0	0	6	0
FM 3083 AT FM 1485	0	0	0	0	0	0	0	0	0	0	0
FM3083 AT GRANGER PINES WAY	0	0	0	0	0	0	0	0	0	0	0
SH 242 AT FM 1485 LEFT TURN	544	0	54	544	0	66	755	0	0	2	2
SH 242 AT ARTAVIA PARKWAY	1880	0	0	981	225	0	0	0	0	0	0
FM 1314 AT SL 336 E	1112	670	0	433	0	170	1010	0	670	5	5
FM 1314 AT SILVERDALE DR	0	0	0	0	0	0	0	0	0	0	0
FM 1484 SIDEWALKS	0	0	0	0	0	162	0	0	0	0	0
FM 1484 AT FM 2432	1531	190	0	911	0	78	1112	110	190	4	4
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0	0	0	0
FM 2432 AT SH 75	0	0	0	0	0	0	0	0	0	0	0
SH 75 AT KINGLET DR	0	0	0	0	0	0	0	0	0	0	0
SH 75 AT FM 830	0	0	0	0	0	0	0	0	0	0	0
FM 830 EVERGREEN PINES	0	0	0	0	0	0	0	0	0	0	0
FM 830 AT IH 45 EAST	0	0	0	0	0	0	0	0	0	0	0
FM 830 AT IH 45 WEST	189	130	0	65	0	76	267	0	130	3	0
FM 830 AT TERALYN WOODS	0	0	0	0	0	0	0	0	0	0	0
SH75 AT LEAGUE LINE RD	0	0	0	0	0	0	0	0	0	0	0
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	0	0	0	0	0
	6836	**1130**	**54**	**4336**	**225**	**1208**	**6023**	**110**	**1130**	**25**	**17**

BIKE LOOP PAVEMENT MARKING QUANTITY SUMMARY

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		6C

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CSJ 0912-37-237 SWP3 & DRAINAGE	162	166	168	466	467	506	506	506	506
	6002	6001	6001	6172	6394	6038	6039	6040	6043
	BLOCK SODDING	FERTILIZER	VEGETATIVE WATERING	WINGWALL (PW - 1) (HW=11 FT)	SET (TY II) (24 IN) (RCP) (6: 1) (C)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	AC	MG	EA	EA	LF	LF	LF	LF
FM 3083 AT N SL 336 E	0	0	0	0	0	0	0	0	0
FM 3083 AT CISD SCHOOL RD	3078	0.64	76.31	0	0	670	670	0	0
FM 3083 AT S SL 336 E	842	0.17	20.88	0	0	390	390	0	0
FM 3083 AT FM 1485	0	0	0	0	0	0	0	0	0
FM3083 AT GRANGER PINES WAY	0	0	0	0	0	0	0	0	0
SH 242 AT FM 1485 LEFT TURN	798	0.16	19.79	0	0	45	45	0	0
SH 242 AT ARTAVIA PARKWAY	458	0.09	11.36	0	0	65	65	0	0
FM 1314 AT SL 336 E	380	0.08	9.42	0	0	145	145	0	0
FM 1314 AT SILVERDALE DR	2897	0.60	71.83	2	0	2940	2940	0	0
FM 1484 SIDEWALKS	6679	1.38	165.60	0	0	1034	1034	344	344
FM 1484 AT FM 2432	0	0	0	0	0	0	0	0	0
FM 2432 AT COUNTY LINE RD	0	0	0	0	0	0	0	0	0
FM 2432 AT SH 75	0	0	0	0	0	0	0	0	0
SH 75 AT KINGLET DR	0	0	0	0	0	0	0	0	0
SH 75 AT FM 830	853	0.18	21.15	0	0	635	635	0	0
FM 830 EVERGREEN PINES	0	0	0	0	0	0	0	0	0
FM 830 AT IH 45 EAST	176	0.04	4.36	0	1	180	180	0	0
FM 830 AT IH 45 WEST	0	0	0	0	0	0	0	0	0
FM 830 AT TERALYN WOODS	0	0	0	0	0	0	0	0	0
SH 75 AT LEAGUE LINE RD	301	0.06	7.46	0	0	400	400	0	0
BIKE LOOP SIGNING LAYOUT	0	0	0	0	0	0	0	0	0
TOTALS	**16462**	**3.40**	**408.15**	**2**	**1**	**6504**	**6504**	**344**	**344**

BIKE LOOP SWP3 & DRAINAGE QUANTITY SUMMARY

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		6D

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SUMMARY OF SMALL SIGNS

SIGNING LAYOUTS

							644-INS SM RD SN SUP & AM																		636	
PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	PLYWOOD TYPE A	ALUMINUM TYPE A	6001 TY 10BWG (1) SA (P)	6002 TY 10BWG (1) SA (P-BM)	6004 TY 10BWG (1) SA (T)	6005 TY 10BWG (1) SA (T-2EXT)	6007 TY 10BWG (1) SA (U)	6009 TY 10BWG (1) SB (P)	6012 TY 10BWG (1) SB (T)	6027 TY S80 (1) SA (P)	6028 TY S80 (1) SA (P-BM)	6030 TY S80 (1) SA (T)	6031 TY S80 (1) SA (T-2EXT)	6033 TY S80 (1) SA (U)	6036 TY S80 (1) SA (U-BM)	6044 TY S80 (1) SB (U)	6050 TY S80 (2) SA (P)	6068 RELOCATE SM RD SN SUP&AM TY 10BWG	6070 RELOCATE SM RD SN SUP&AM TY S80	6076 REMOVE SM RD SN SUP & AM	6001 ALUM SIGNS (TY A)	6007 REPLACE EXT ALUM SIGNS (TY A)
							EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	SF	SF
38			FM 3083 AT SL 336 N																							
	1	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	2	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	3	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	1A	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
	2A	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
39			FM 3083 AT CISD SCHOOL RD																							
	4	S5-1 S7-1T	SCHOOL SPEED LIMIT WHEN FLASHING CELL PHONE USE PROHIBITED UP TO $200 FINE	24X48 24X18		X																1				
	5	S5-2aTP R2-1	END SCHOOL ZONE (Plaque) SPEED LIMIT	24X10 18X24		X																1				
	6	S1-1	SCHOOL CROSSING (Symbol)	30X30		X																1				
39A																										
	7	R3-7R	MANDATORY TURN SIGN	30X30		X																1				
	8	S1-1	SCHOOL CROSSING (Symbol)	30X30		X																1				
	9	S1-1	SCHOOL CROSSING (Symbol)	30X30		X																1				
	10	S1-1	SCHOOL CROSSING (Symbol)	30X30		X																1				
	11	S1-1	SCHOOL CROSSING (Symbol)	30X30		X																1				
	12	R3-7R	MANDATORY TURN SIGN	30X30		X																1				
	13	W1-2R	RIGHT CURVE AHEAD	30X30		X																1				
	13A	R3-7R	MANDATORY TURN SIGN	30X30		X																1				
39B																										
	14	W2-7R	Offset Crossroad	24X24		X																1				
	15	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	15A	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
	16	S5-1 S7-1T	SCHOOL SPEED LIMIT WHEN FLASHING CELL PHONE USE PROHIBITED UP TO $200 FINE	24X48 24X18		X																1				
	17	S5-2ATP R2-1	END SCHOOL ZONE SPEED LIMIT	24X10 18X24		X																1				
	18	M2-1 M1-6TB	JCT Business Route Marker Assembly (Independent)	21X15 24X24		X																1				
	19	S4-3P R2-5C	SCHOOL SPEED ZONE AHEAD	24X8 24X10		X																1				
			SHEET TOTAL				7															16				

NOTE:

1. Sign support 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 Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).
3. Speed Limit with "XX" shall be provided after Speed Study. For futher clarification, refer General Notes item# 644.

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

SUMMARY OF SMALL SIGNS

SHEET 1 OF 6

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT NO.			SHEET
12	6				7
COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.
MONTGOMERY		0912	37	237	VARIOUS

SUMMARY OF SMALL SIGNS

SIGNING LAYOUTS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	PLYWOOD TYPE A	ALUMINUM TYPE A	644-INS SM RD SN SUP & AM																		636	
							6001	6002	6004	6005	6007	6009	6012	6027	6028	6030	6031	6033	6036	6044	6050	6068	6070	6076	6001	6007
							TY 10BWG (1) SA (P)	TY 10BWG (1) SA (P-BM)	TY 10BWG (1) SA (T)	TY 10BWG (1) SA (T-2EXT)	TY 10BWG (1) SA (U)	TY 10BWG (1) SB (P)	TY 10BWG (1) SB (T)	TY S80 (1) SA (P)	TY S80 (1) SA (P-BM)	TY S80 (1) SA (T)	TY S80 (1) SA (T-2EXT)	TY S80 (1) SA (U)	TY S80 (1) SA (U-BM)	TY S80 (1) SB (U)	TY S80 (2) SA (P)	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY S80	REMOVE SM RD SN SUP & AM	ALUM SIGNS (TY A)	REPLACE EXT ALUM SIGNS (TY A)
							EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	SF	SF
40			FM 3083 AT SL 336 E																							
	20	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	21	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
	22	R3-7R	MANDATORY TURN SIGN	30X30		X	1																			
	23	M1-6F	Texas Farm Road Route Marker (Independent)	24X24		X																1				
		M6-3	Directional Arrow - Single Head Vertical	21X15																						
		M1-6L	LOOP Route Marker (Independent)	24X24																						
		M6-4	Directional Arrow - Double Head Vertical	21X15																						
	24	M1-6F	Texas Farm Road Route Marker (Independent)	24X24		X																1				
		M6-3	Directional Arrow - Single Head Vertical	21X15																						
		M1-6L	LOOP Route Marker (Independent)	24X24																						
		M6-4	Directional Arrow - Double Head Vertical	21X15																						
40A																										
	25	R3-7R	MANDATORY TURN SIGN	30X30		X	1																			
	26	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	26A	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
41			FM 3083 AT FM 1485																							
	27	W11-1	Bicycle Crossing (Symbol)	24X24		X	1																			
		W16-1P	SHARED THE ROAD (Plaque)	18X24																						
	28	R4-11	(Bicycle) MAY USE FULL LANE	30x30		X	1																			
	29	R3-7R	MANDATORY TURN SIGN	30x30		X	1																			
41A																										
	30	R2-1	SPEED LIMIT	18X24		X																1				
	31	W11-1	Bicycle Crossing (Symbol)	24X24		X	1																			
42			FM 3083 AT GRANGER PINES																							
	32	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	32A	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
	33	R3-7R	MANDATORY TURN SIGN	48X48		X	1																			
43			SH 242 AT FM 1485 LEFT TURN																							
	34	W11-1	Bicycle Crossing (Symbol)	24X24		X	1																			
		W16-1P	SHARED THE ROAD (Plaque)	18X24																						
	35	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
			SHEET TOTAL				15															3				

NOTE:

1. Sign support 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 Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).
3. Speed Limit with "XX" shall be provided after Speed Study. For futher clarification, refer General Notes Item# 644.

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
Greater than 15	0.100"
7.5 to 15	0.125"

SUMMARY OF SMALL SIGNS

DISTRICT	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	SHEET
12	MONTGOMERY	0912	37	237	VARIOUS	7A
FEDERAL AID PROJECT NO.						

SUMMARY OF SMALL SIGNS

SIGNING LAYOUTS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	PLYWOOD TYPE A	ALUMINUM TYPE A	644-INS SM RD SN SUP & AM																		636	
							6001	6002	6004	6005	6007	6009	6012	6027	6028	6030	6031	6033	6036	6044	6050	6068	6070	6076	6001	6007
							TY 10BWG (1) SA (P)	TY 10BWG (1) SA (P-BM)	TY 10BWG (1) SA (T)	TY 10BWG (1) SA (T-2EXT)	TY 10BWG (1) SA (U)	TY 10BWG (1) SB (P)	TY 10BWG (1) SB (T)	TY S80 (1) SA (P)	TY S80 (1) SA (P-BM)	TY S80 (1) SA (T)	TY S80 (1) SA (T-2EXT)	TY S80 (1) SA (U)	TY S80 (1) SA (U-BM)	TY S80 (1) SB (U)	TY S80 (2) SA (P)	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY S80	REMOVE SM RD SN SUP & AM	ALUM SIGNS (TY A)	REPLACE EXT ALUM SIGNS (TY A)
							EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	SF	SF
44			SH 242 AT ARTAVIA																							
	36	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	37	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
	38	W13-2	EXIT SPEED LIMIT	24X30		X																1				
	39	R3-7R	MANDATORY TURN SIGN	30x30		X	1																			
44A																										
	40	R3-7R	MANDATORY TURN SIGN	30x30		X	1																			
	41	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	42	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
45			FM 1314 AT S LOOP 336 E																							
	43	M1-6F	Texas Farm Road Route Marker (Independent)	24X24		X																1				
		M6-3	Directional Arrow - Single Head Vertical	21X15																						
		M1-6L	LOOP Route Marker (Independent)	24X24																						
		M6-4	Directional Arrow - Double Head Vertical	21X15																						
47			FM 1484 SIDEWALKS																							
	44	M1-6F	Texas Farm Road Route Marker (Independent)	24X24		X																1				
		M6-4	Directional Arrow - Double Head Vertical	21X15																						
		M4-5	TO	24X12																						
		M1-1	Interstate Route Markers	36X36																						
		M6-1R	Directional Arrow - Single Head Horizontal	21X15																						
	45	M4-14	BEGIN	24X12		X																1				
		R3-9B	Two-Way Left Turn Only (Post-Mounted)	24X36																						
	46	M1-6F	Texas Farm Road Route Marker (Independent)	24X24		X																1				
	47	E22-1T	FM 3083 NEXT SIGNAL	VARX24		X																1				
	48	W3-3	Signal Ahead (Symbol)	30X30		X																1				
	49	R2-1	SPEED LIMIT	18X24		X																1				
	50	W1-2L	Curve	36X36		X																1				
		W13-1P	Advisory Speed (Plaque)	18X18																						
	51	M2-1	JCT	21X15		X																1				
		M1-6F	Texas Farm Road Route Marker (Independent)	24X24																						
	52	R3-9B	Two-Way Left Turn Only (Post-Mounted)	24X36		X																1				
			SHEET TOTAL				6															11				

NOTE:

1. Sign support 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 Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).
3. Speed Limit with "XX" shall be provided after Speed Study. For futher clarification, refer General Notes item# 644.

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

SUMMARY OF SMALL SIGNS

SHEET 3 OF 6

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT NO.		SHEET
12	6			7B
COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
MONTGOMERY	0912	37	237	VARIOUS

SUMMARY OF SMALL SIGNS

SIGNING LAYOUTS

Item	Code	Description	Unit															SHEET TOTAL
636	6007	REPLACE EXT ALUM SIGNS (TY A)	SF															
636	6001	ALUM SIGNS (TY A)	SF															
644-INS SM RD SN SUP & AM	6076	REMOVE SM RD SN SUP & AM	EA															
	6070	RELOCATE SM RD SN SUP&AM TY S80	EA															
	6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	1											1	1		3
	6050	TY S80 (2) SA (P)	EA															
	6044	TY S80 (1) SB (U)	EA															
	6036	TY S80 (1) SA (U-BM)	EA															
	6033	TY S80 (1) SA (U)	EA															
	6031	TY S80 (1) SA (T-2EXT)	EA															
	6030	TY S80 (1) SA (T)	EA															
	6028	TY S80 (1) SA (P-BM)	EA															
	6027	TY S80 (1) SA (P)	EA															
	6012	TY 10BWG (1) SB (T)	EA															
	6009	TY 10BWG (1) SB (P)	EA															
	6007	TY 10BWG (1) SA (U)	EA															
	6005	TY 10BWG (1) SA (T-2EXT)	EA															
	6004	TY 10BWG (1) SA (T)	EA															
	6002	TY 10BWG (1) SA (P-BM)	EA															
	6001	TY 10BWG (1) SA (P)	EA		1	1	1	1	1	1	1	1	1	1			1	11
		ALUMINUM TYPE A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		PLYWOOD TYPE A																
		SIGN DIMENSIONS		36X36 18X18	36x36 18x24	24X18 24X8	30x30	30x30	36x36 18x24	36x36 18x24	30x30	36X30	24X18 24X8	24X24 18X24	24X24 21X15 24X24 21X15	24X24 21X15 24X24 21X15	30X30	
		SIGN TEXT		FM 1484 SIDEWALK Curve Advisory Speed (Plaque)	FM 1484 AT FM 2432 Bicycle Crossing (Symbol) SHARED THE ROAD (Plaque)	BIKE LANE (with Symbol) AHEAD (Plaque)	FM 2432 AT COUNTY LINE ROAD (Bicycle) MAY USE FULL LANE	(Bicycle) MAY USE FULL LANE	Bicycle Crossing (Symbol) SHARED THE ROAD (Plaque)	FM 2432 AT SH 75 Bicycle Crossing (Symbol) SHARE THE ROAD (Plaque)	(Bicycle) MAY USE FULL LANE	SH 75 AT KINGSLET BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	SH 75 AT FM 830 Bicycle Crossing (Symbol) SHARE THE ROAD (Plaque)	Texas Route Marker (Independent) Directional Arrow - Single Head Vertical Texas Farm Road Route Marker (Independent) Directional Arrow - Single Head Horizontal	Texas Route Marker (Independent) Directional Arrow - Single Head Vertical Texas Farm Road Route Marker (Independent) Directional Arrow - Single Head Horizontal	MANDATORY TURN SIGN	SHEET TOTAL
		SIGN TYPE		W1-2R W13-1P	W11-1 W16-1P	R3-17 R3-17aP	R4-11	R4-11	W11-1 W16-1P	W11-1 W16-1P	R4-11	R4-4	R3-17 R3-17aP	W11-1 W16-1P	M1-6T M6-3 M1-6F M6-1L	M1-6T M6-3 M1-6F M6-1R	R3-7R	
		SIGN NO.		53	44	45	46	47	48	49	50	51	52	53	54	55	56	
		PLAN SHEET NO.		47A	48		49		49A	50		51		52				

NOTE:

1. Sign support 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 Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).
3. Speed Limit with "XX" shall be provided after Speed Study. For futher clarification, refer General Notes item# 644.

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

SUMMARY OF SMALL SIGNS

SHEET 4 OF 6

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT NO.		SHEET
12	6			7C
COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
MONTGOMERY	0912	37	237	VARIOUS

SUMMARY OF SMALL SIGNS

SIGNING LAYOUTS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	PLYWOOD TYPE A	ALUMINUM TYPE A	644-INS SM RD SN SUP & AM																		636	
							6001	6002	6004	6005	6007	6009	6012	6027	6028	6030	6031	6033	6036	6044	6050	6068	6070	6076	6001	6007
							TY 10BWG (1) SA (P)	TY 10BWG (1) SA (P-BM)	TY 10BWG (1) SA (T)	TY 10BWG (1) SA (T-2EXT)	TY 10BWG (1) SA (U)	TY 10BWG (1) SB (P)	TY 10BWG (1) SB (T)	TY S80 (1) SA (P)	TY S80 (1) SA (P-BM)	TY S80 (1) SA (T)	TY S80 (1) SA (T-2EXT)	TY S80 (1) SA (U)	TY S80 (1) SA (U-BM)	TY S80 (1) SB (U)	TY S80 (2) SA (P)	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY S80	REMOVE SM RD SN SUP & AM	ALUM SIGNS (TY A)	REPLACE EXT ALUM SIGNS (TY A)
							EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	SF	SF
52			SH 75 AT FM 830																							
	56	R3-7R	MANDATORY TURN SIGN	30X30		X	1																			
	56A	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	56B	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X18 24X8		X	1																			
53			FM 830 AT EVERGREEN PINES																							
	57	R2-1	SPEED LIMIT	18X24		X																1				
	58	R3-7R	MANDATORY TURN SIGN	30x30		X																1				
	59	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	60	R3-17	BIKE LANE (with Symbol)	24x18		X	1																			
		R3-17aP	AHEAD (Plaque)	24x8																						
54			FM 830 AT IH 45 EAST																							
	61	M3-3B	(Blue) SOUTH	24X12		X																1				
		M1-1T	Interstate Route Markers (Attachment)	24X24																						
		M6-3B	Directional Arrow - Single Head Vertical	21X15																						
		M3-1B	(Blue) NORTH	24X12																						
		M1-1T	Interstate Route Markers (Independent)	24X24																						
		M6-1B	Directional Arrow - Single Head Horizontal	21X15																						
55			FM 830 AT IH 45 WEST																							
	62	W11-1	Bicycle Crossing (Symbol)	24X24		X																1				
		W16-1P	SHARE THE ROAD (Plaque)	18X24																						
	63	R4-11	(Bicycle) MAY USE FULL LANE	30x30		X	1																			
56			FM 830 AT TERALYN PKWY																							
	68	R3-7R	MANDATORY TURN SIGN	30X30		X	1																			
	69	R2-1	SPEED LIMIT	18X24		X																1				
		S5-2aTP	END SCHOOL ZONE (Plaque)	24X10																						
	70	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	71	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X30 24X8		X	1																			
57			SH 75 AT LEAGUE LINE RD																							
	72	R3-17	BIKE LANE (with Symbol)	24x18		X	1																			
		R3-17aP	AHEAD (Plaque)	24x8																						
	73	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	74	R3-7R	MANDATORY TURN SIGN	30x30		X	1																			
	75	R4-4	BEGIN RIGHT TURN LANE YIELD TO BIKES (Arrow)	36X30		X	1																			
	75A	R3-17 R3-17aP	BIKE LANE (WITH SYMBOL) AHEAD PLAQUE	24X30 24X8		X	1																			
			SHEET TOTAL				11															5				

NOTE:

1. Sign support 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 Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).
3. Speed Limit with "XX" shall be provided after Speed Study. For futher clarification, refer General Notes item# 644.

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

SUMMARY OF SMALL SIGNS

SHEET 5 OF 6

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT NO.		SHEET
12	6			7D
COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
MONTGOMERY	0912	37	237	VARIOUS

SUMMARY OF SMALL SIGNS

SIGNING LAYOUTS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	PLYWOOD TYPE A	ALUMINUM TYPE A
63			SIGNING LAYOUT			
	1	W11-1	Bicycle Crossing (Symbol)	24X24		X 2
		W16-1P	SHARE THE ROAD (Plaque)	18X24		
	2	D11-1	BIKE ROUTE	30X24		X 15
	4	D11-1	BIKE ROUTE	30X24		X 5
		M6-1GL	(Green) Directional Arrow - Single Head Horizontal	12X9		
	5	D11-1	BIKE ROUTE	30X24		X 6
		M6-1GR	(Green) Directional Arrow - Single Head Horizontal	12X9		
	8	M6-1GL	(Green) Directional Arrow - Single Head Horizontal	12X9		X 1
	9	M6-3G	(Green) Directional Arrow - Single Head Vertical	12X9		X 9
	10	D11-1	BIKE ROUTE	30X24		X 9
		M6-3G	(Green) Directional Arrow - Single Head Vertical	12X9		
	11	D11-1	BIKE ROUTE	30X24		X 79
		M6-4G	(Green) Directional Arrow - Single Head Vertical	12X9		
64			SIGNING LAYOUT			
	4	D11-1	BIKE ROUTE	30X24		X 6
		M6-1GL	(Green) Directional Arrow - Single Head Horizontal	12X9		
	5	D11-1	BIKE ROUTE	30X24		X 7
		M6-1GR	(Green) Directional Arrow - Single Head Horizontal	12X9		
	9	M6-3G	(Green) Directional Arrow - Single Head Vertical	12X9		X 8
	10	D11-1	BIKE ROUTE	30X24		X 2
		M6-3G	(Green) Directional Arrow - Single Head Vertical	12X9		
	11	D11-1	BIKE ROUTE	30X24		X 99
		M6-4G	(Green) Directional Arrow - Single Head Vertical	12X9		
					SHEET TOTAL	248
					GRAND TOTAL	309

644-INS SM RD SN SUP & AM					
6076	REMOVE SM RD SN SUP & AM	EA			
6070	RELOCATE SM RD SN SUP&AM TY S80	EA			
6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA			43
6050	TY S80 (2) SA (P)	EA			
6044	TY S80 (1) SB (U)	EA			
6036	TY S80 (1) SA (U-BM)	EA			
6033	TY S80 (1) SA (U)	EA			
6031	TY S80 (1) SA (T-2EXT)	EA			
6030	TY S80 (1) SA (T)	EA			
6028	TY S80 (1) SA (P-BM)	EA			
6027	TY S80 (1) SA (P)	EA			
6012	TY 10BWG (1) SB (T)	EA			
6009	TY 10BWG (1) SB (P)	EA			
6007	TY 10BWG (1) SA (U)	EA			
6005	TY 10BWG (1) SA (T-2EXT)	EA			
6004	TY 10BWG (1) SA (T)	EA			
6002	TY 10BWG (1) SA (P-BM)	EA			
6001	TY 10BWG (1) SA (P)	EA			

636					
6007	REPLACE EXT ALUM SIGNS (TY A)	SF			
6001	ALUM SIGNS (TY A)	SF			

NOTE:

1. Sign support 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 Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).
3. Speed Limit with "XX" shall be provided after Speed Study. For futher clarification, refer General Notes item# 644.

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

SUMMARY OF SMALL SIGNS

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT NO.			SHEET
12	6				7E
COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.
MONTGOMERY		0912	37	237	VARIOUS

DATE: 05/02/2023 03:35 PM
FILE: DOCUMENT NAME

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

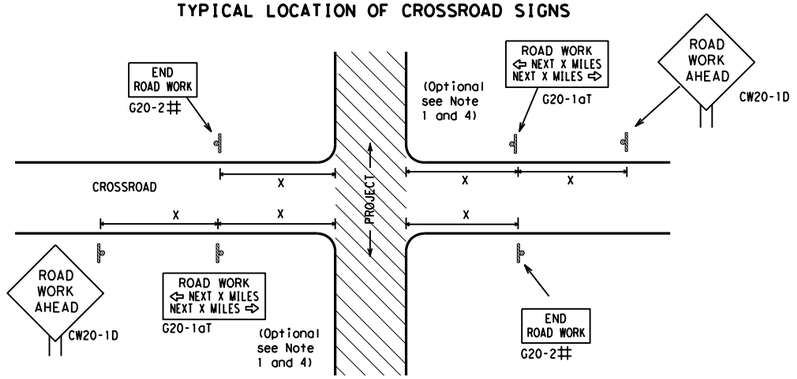
Traffic Safety Division Standard

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	0912	37	237	VARIOUS
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	HOU	MONTGOMERY		8
5-10 5-21				

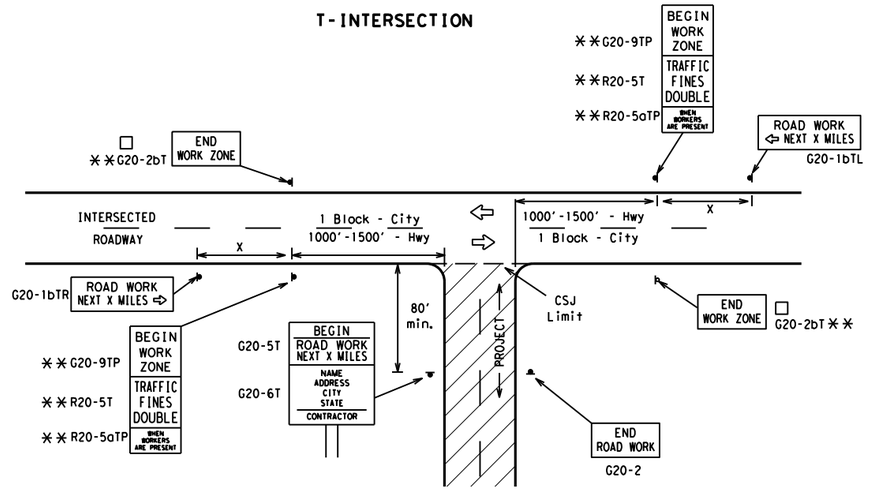
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

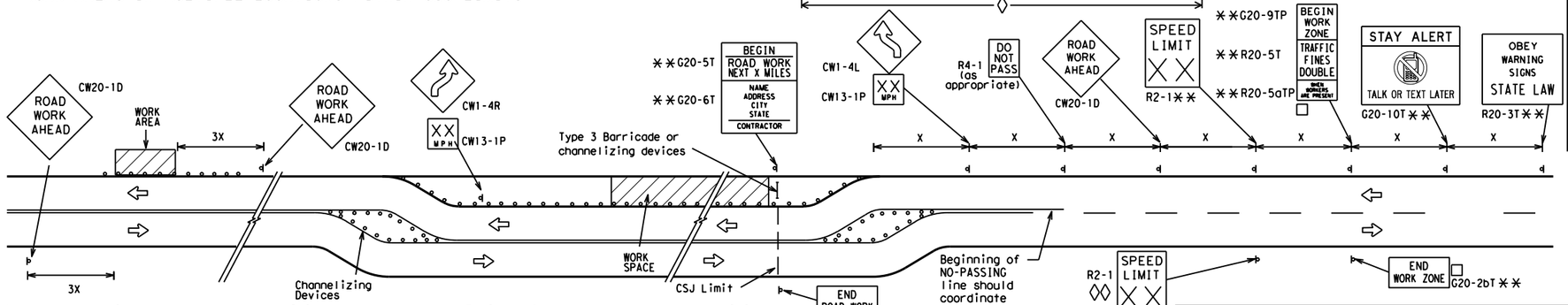
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

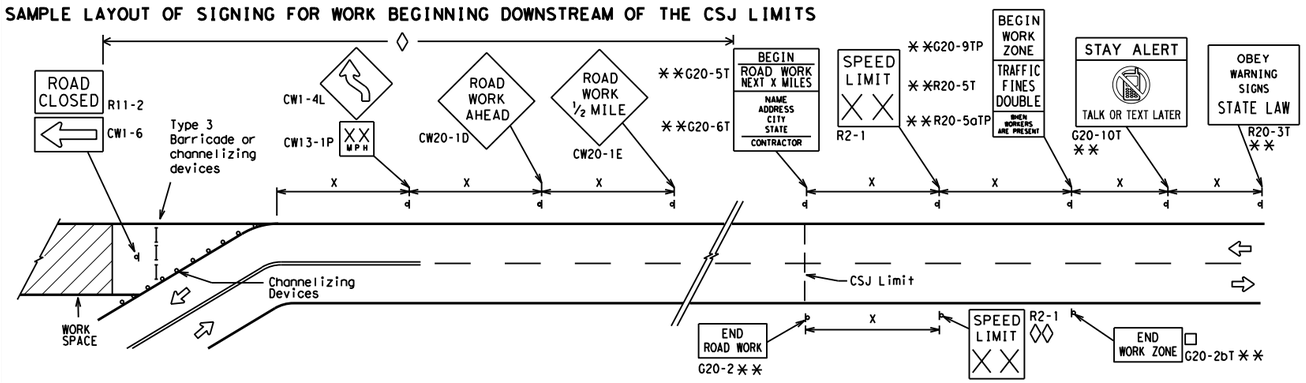
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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	0912	37	237	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	MONTGOMERY		9

DATE: 05/02/2023 03:35 PM
FILE: DOCUMENT NAME

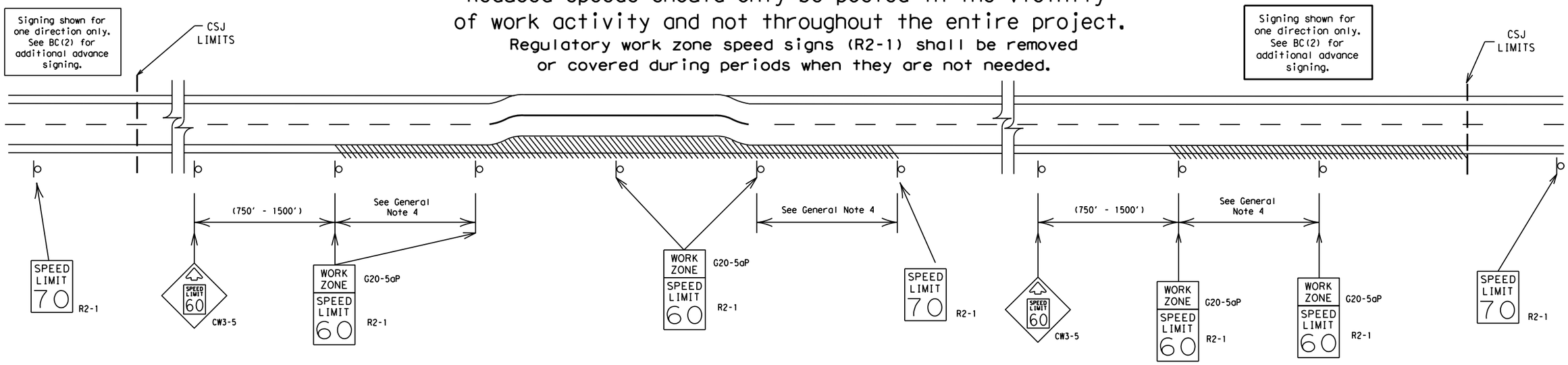
DATE: 05/02/2023 03:35 PM
FILE: DOCUMENT NAME

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

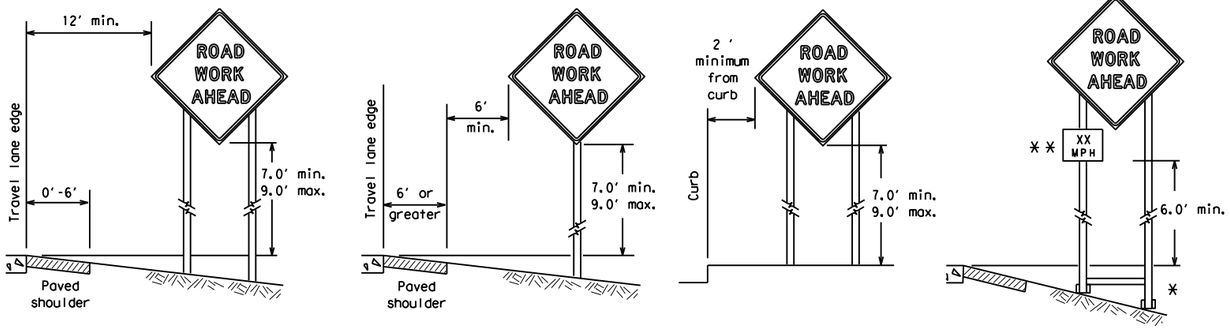
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	MONTGOMERY		10

DATE: 05/02/2023 03:35 PM
FILE: DOCUMENT NAME

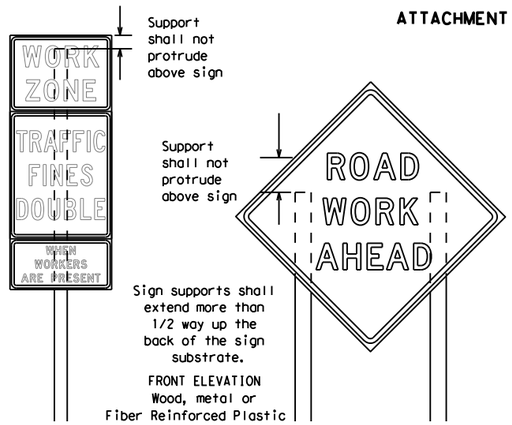
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

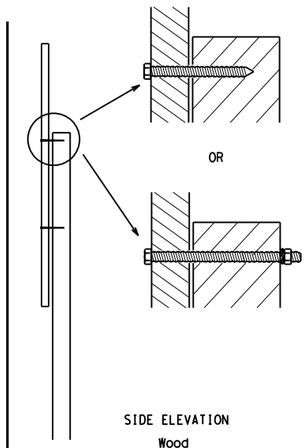


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





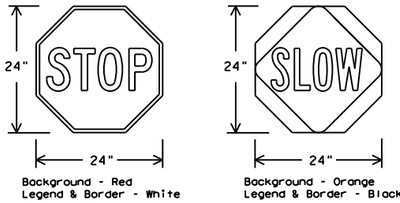
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

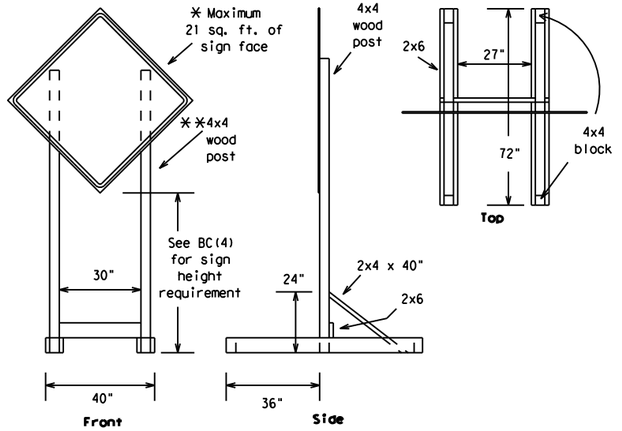
1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

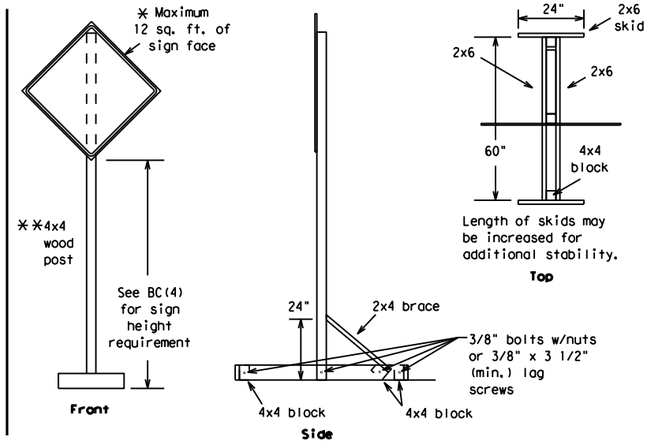
Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

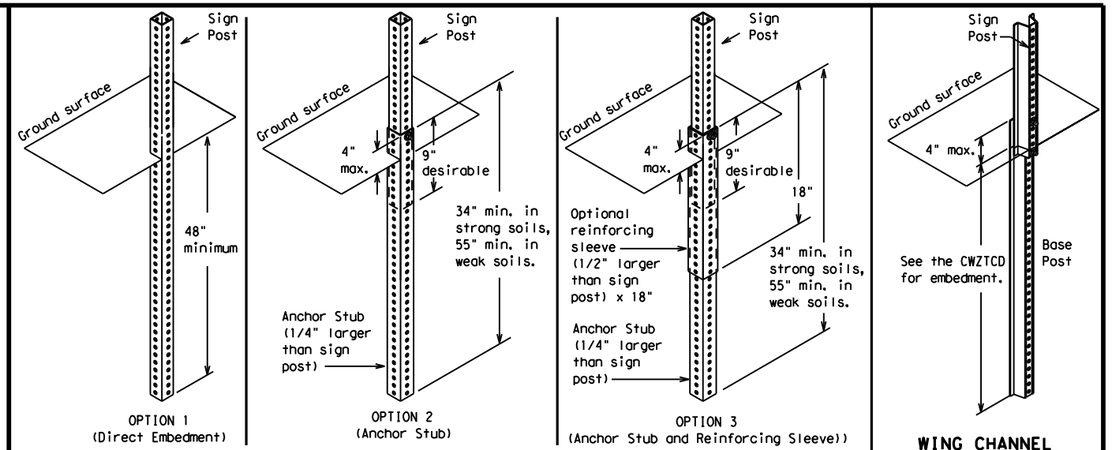
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	MONTGOMERY		11





SKID MOUNTED WOOD SIGN SUPPORTS

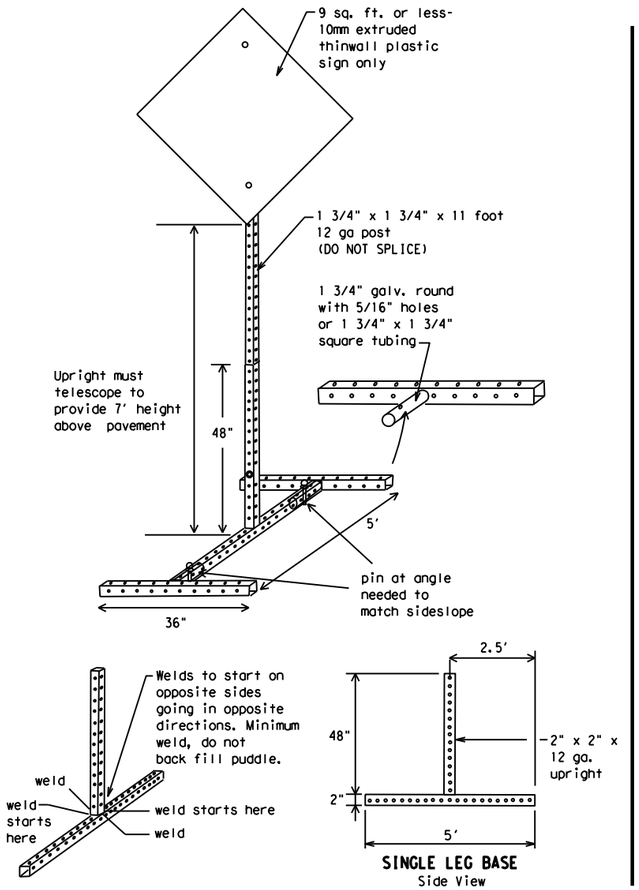
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

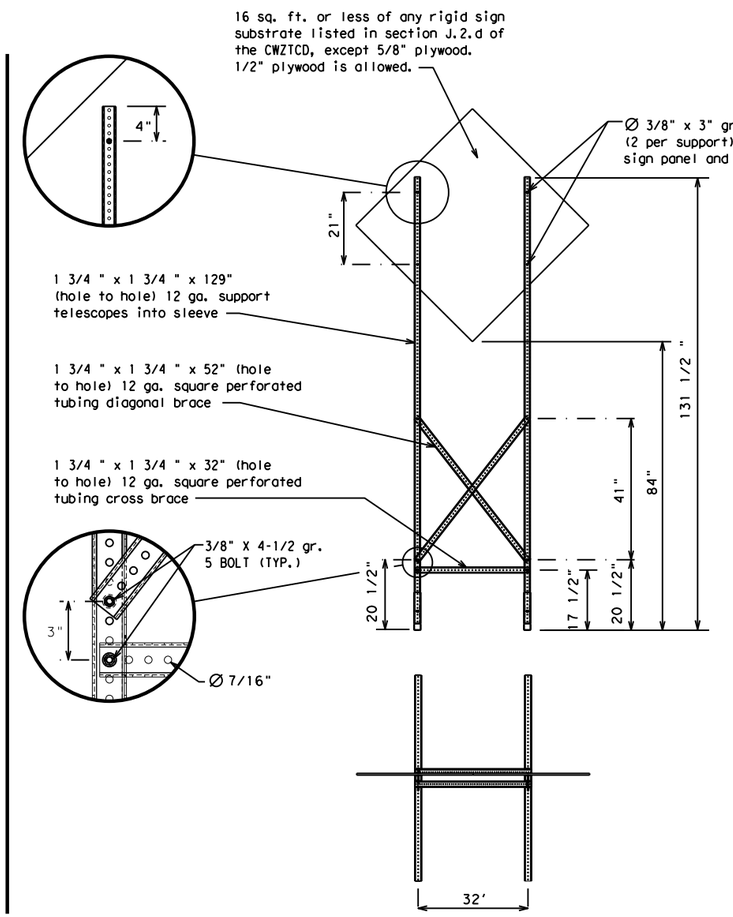


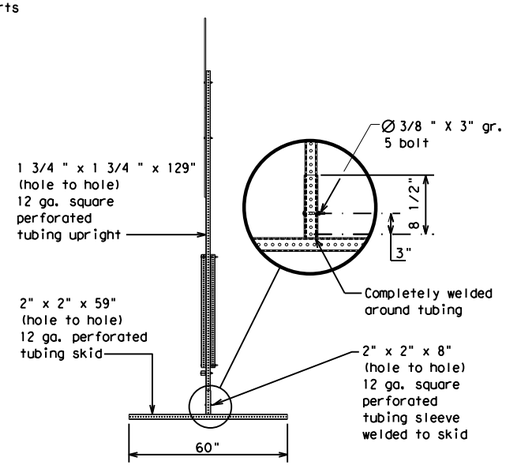
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	MONTGOMERY		12

DATE: 05/02/2023 03:35 PM
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FILE: DOCUMENT NAME

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	MONTGOMERY		13

100

DATE: 05/02/2023 03:35 PM
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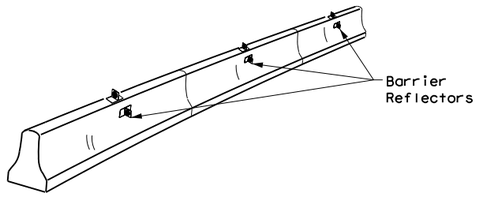
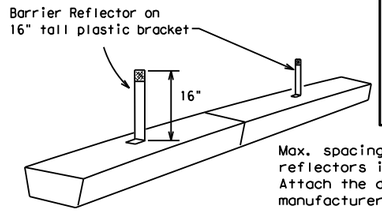
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

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

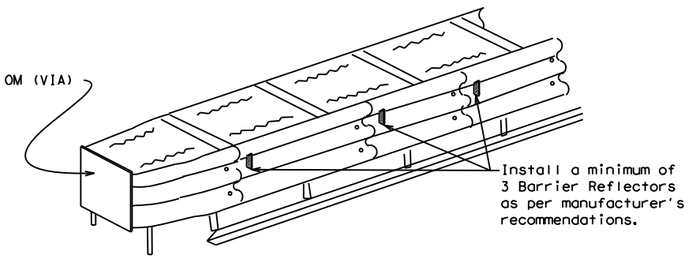


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

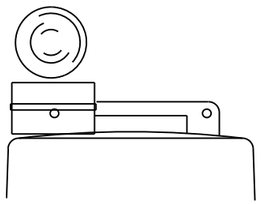


DELINEATION OF END TREATMENTS

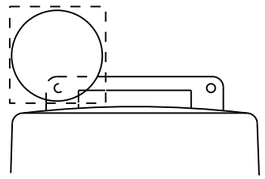
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

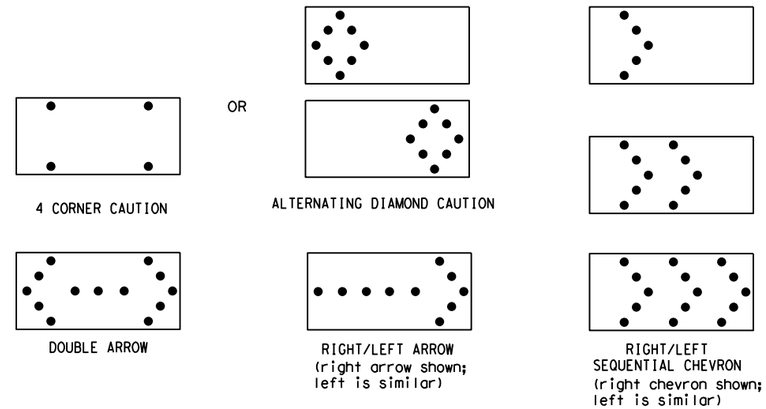
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

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
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	MONTGOMERY		14

DATE: 05/02/2023 03:35 PM
FILE: DOCUMENT NAME

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:

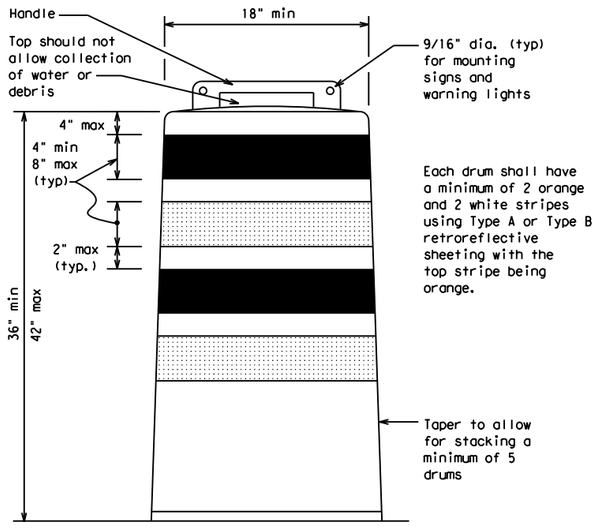
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

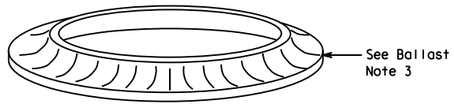
RETROREFLECTIVE SHEETING

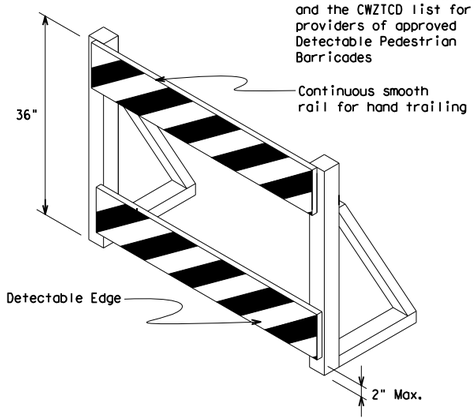
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

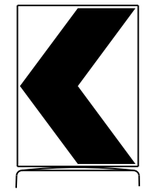




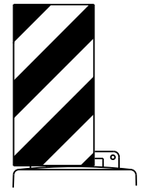


DETECTABLE PEDESTRIAN BARRICADES

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	0912	37	237	VARIOUS
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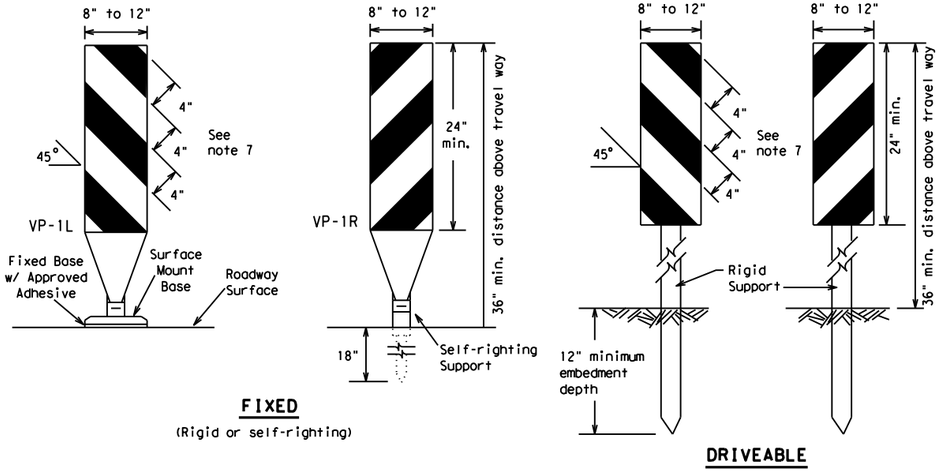
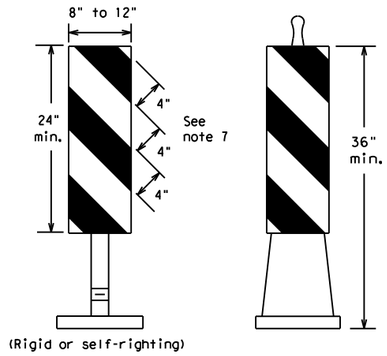
9-07 5-21	HOU	MONTGOMERY		15
7-13				

102



FIXED
(Rigid or self-righting)

DRIVEABLE

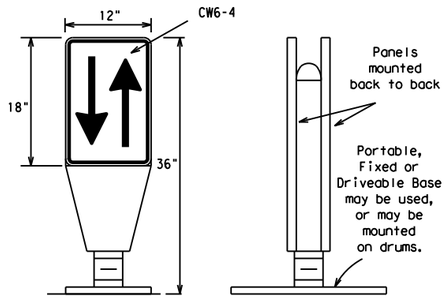


(Rigid or self-righting)

PORTABLE

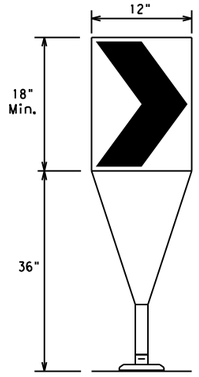
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



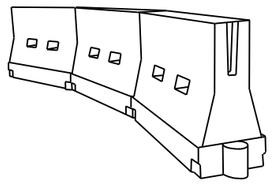
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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
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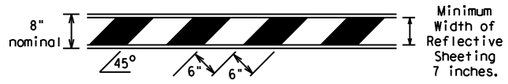
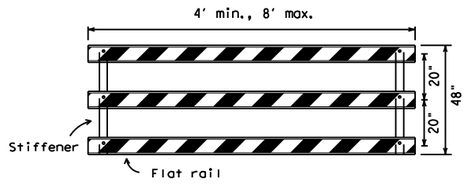
TYPE 3 BARRICADES

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.



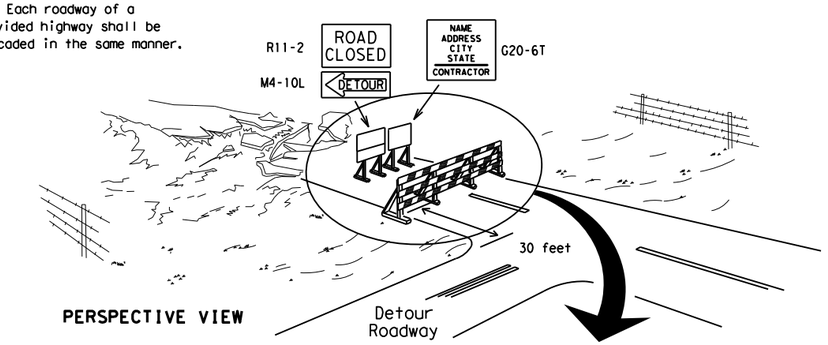
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

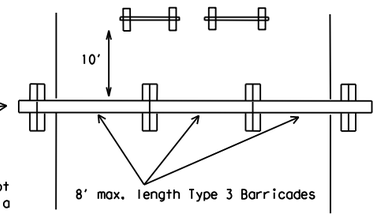
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

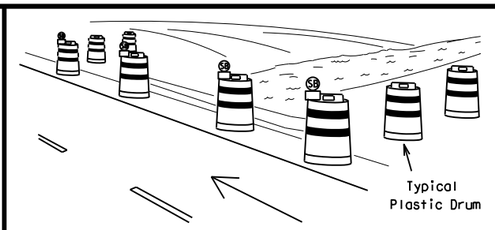
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

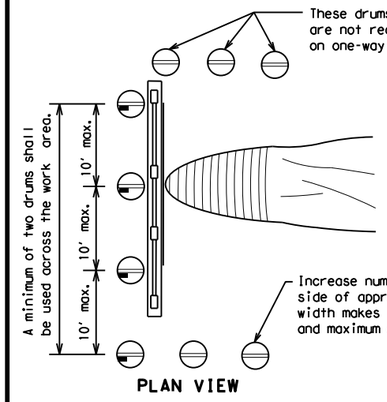
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

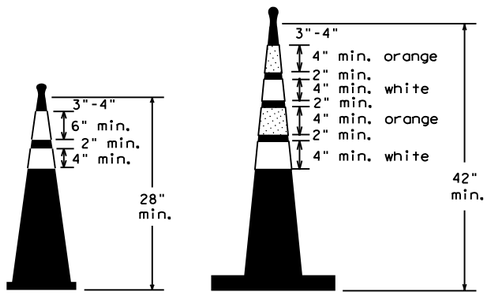
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

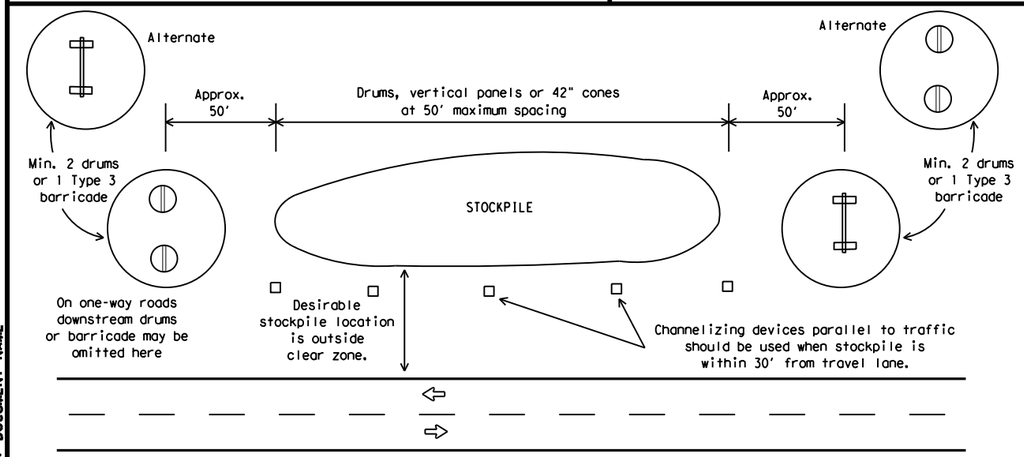
PLAN VIEW

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

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Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

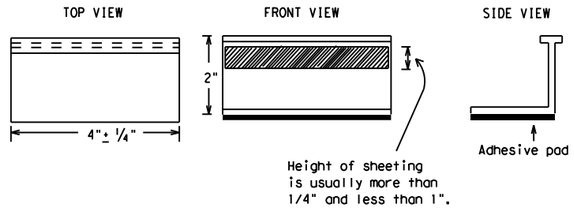
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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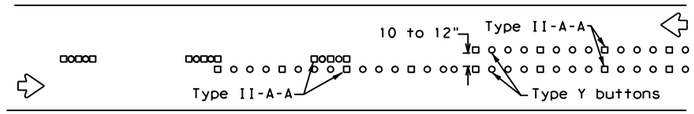
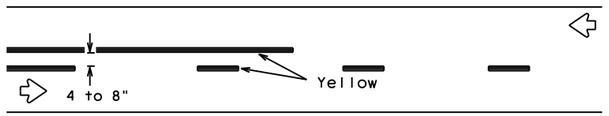
PAVEMENT MARKING PATTERNS

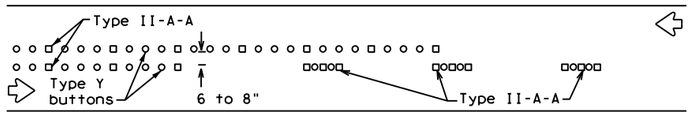
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



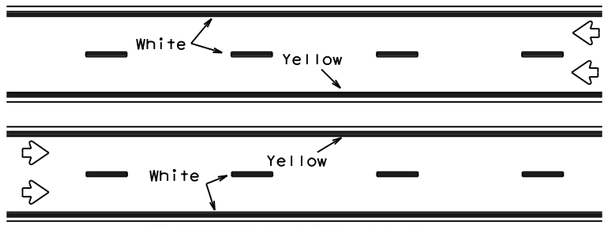
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



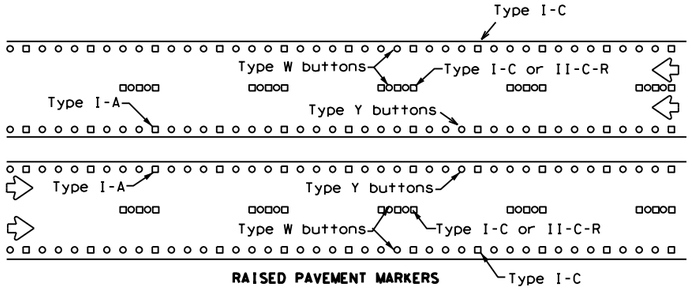
RAISED PAVEMENT MARKERS - PATTERN B

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

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



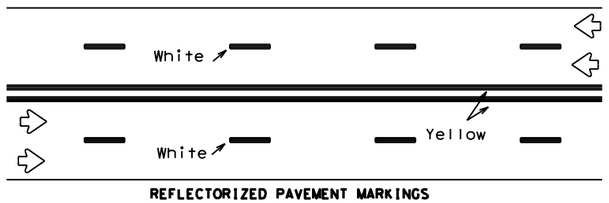
REFLECTORIZED PAVEMENT MARKINGS



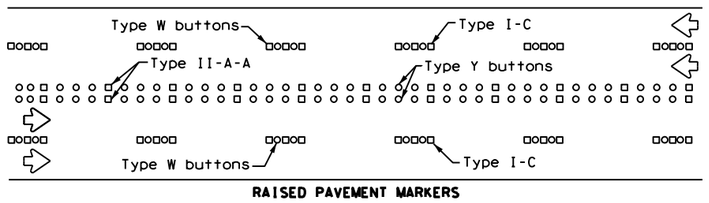
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



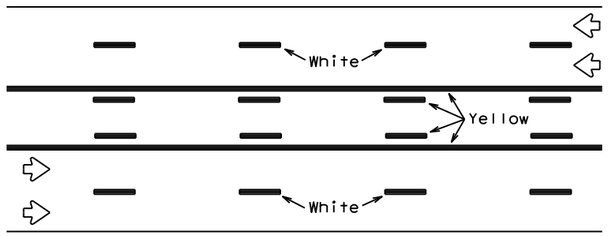
REFLECTORIZED PAVEMENT MARKINGS



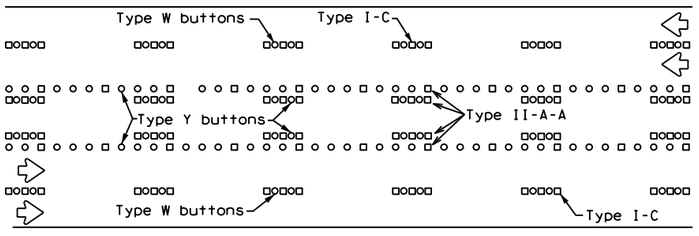
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

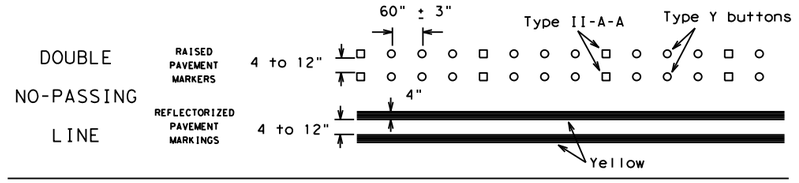
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

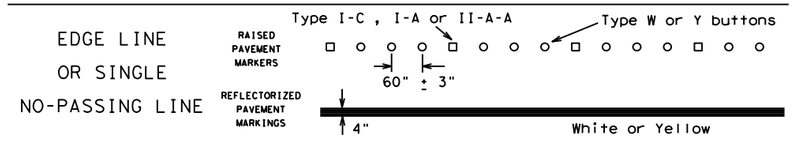
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

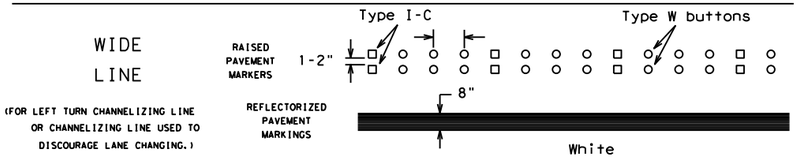


EDGE LINE OR SINGLE NO-PASSING LINE



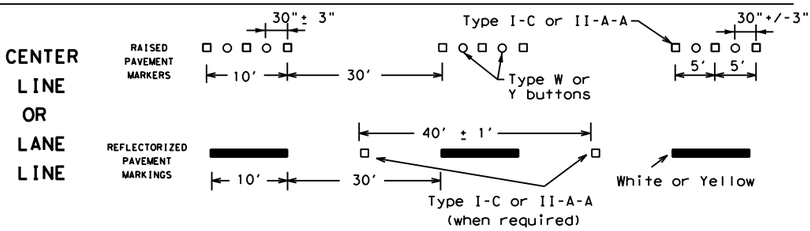
WIDE LINE

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

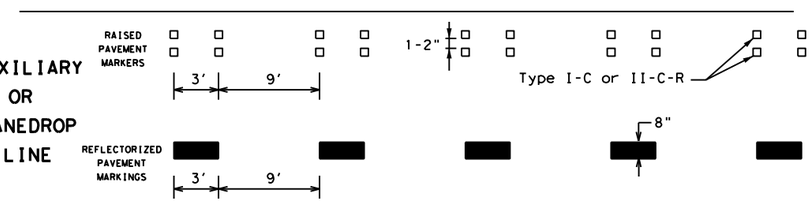


BROKEN LINES

CENTER LINE OR LANE LINE

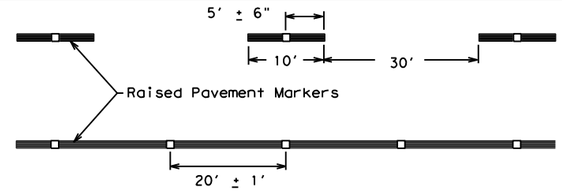


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		19

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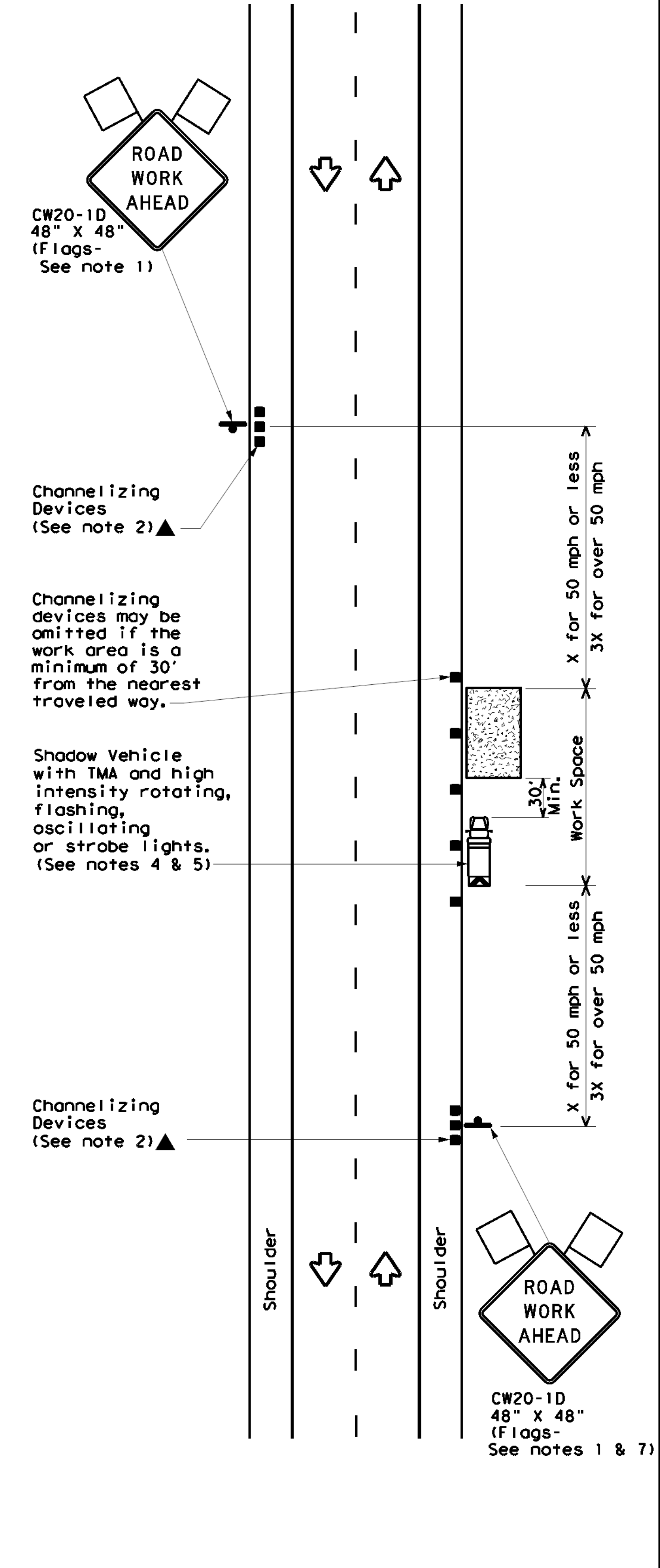
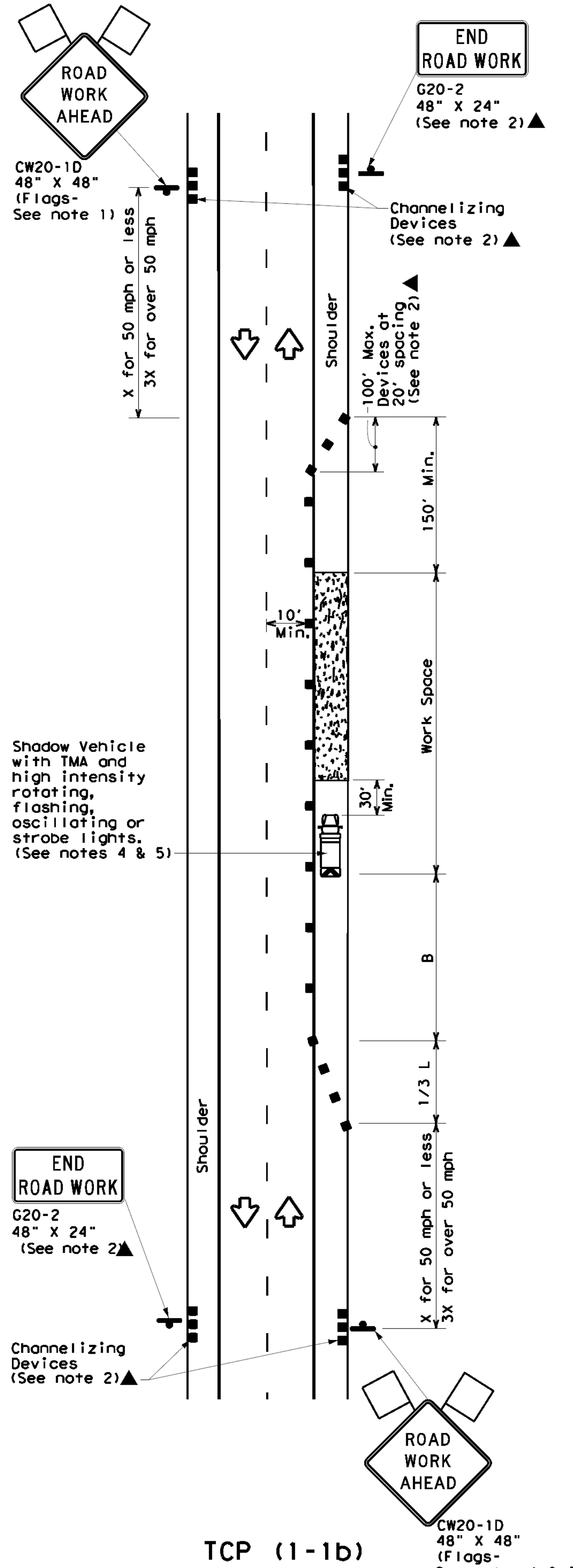


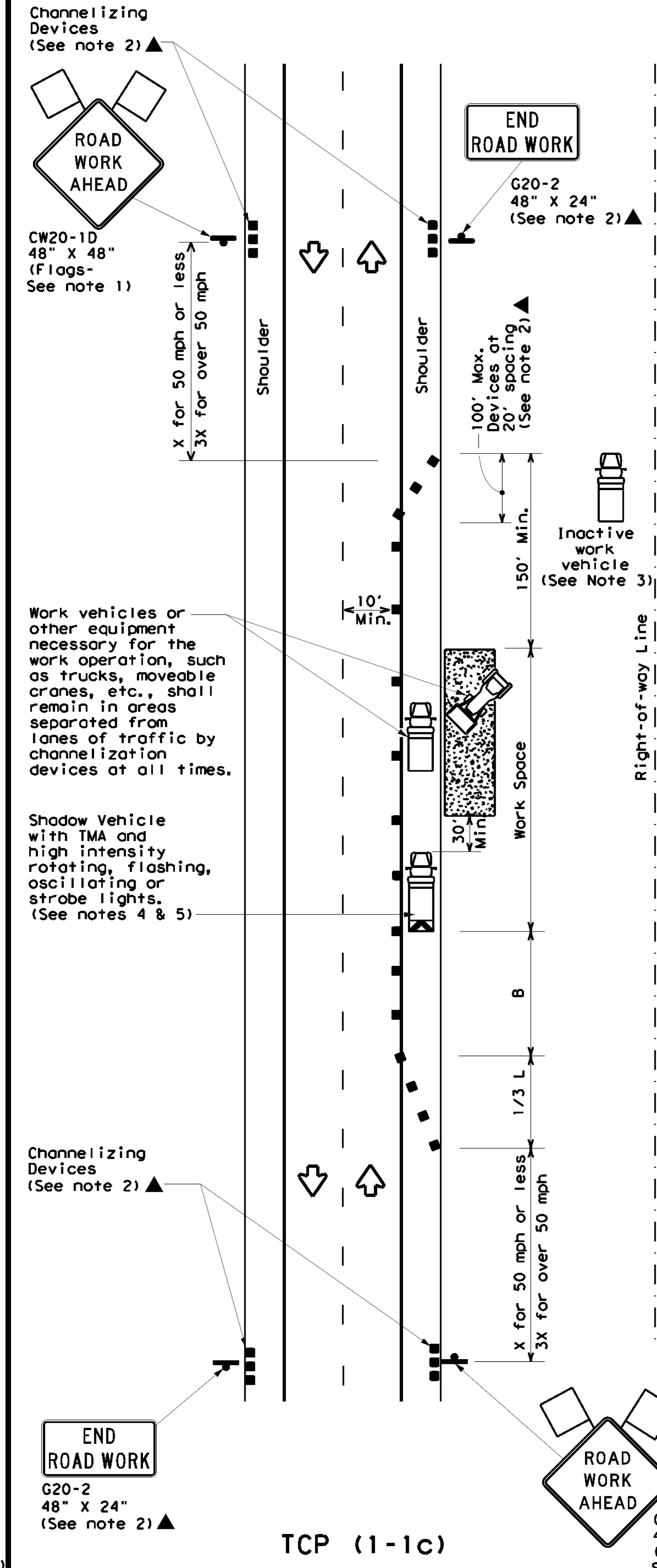
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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.

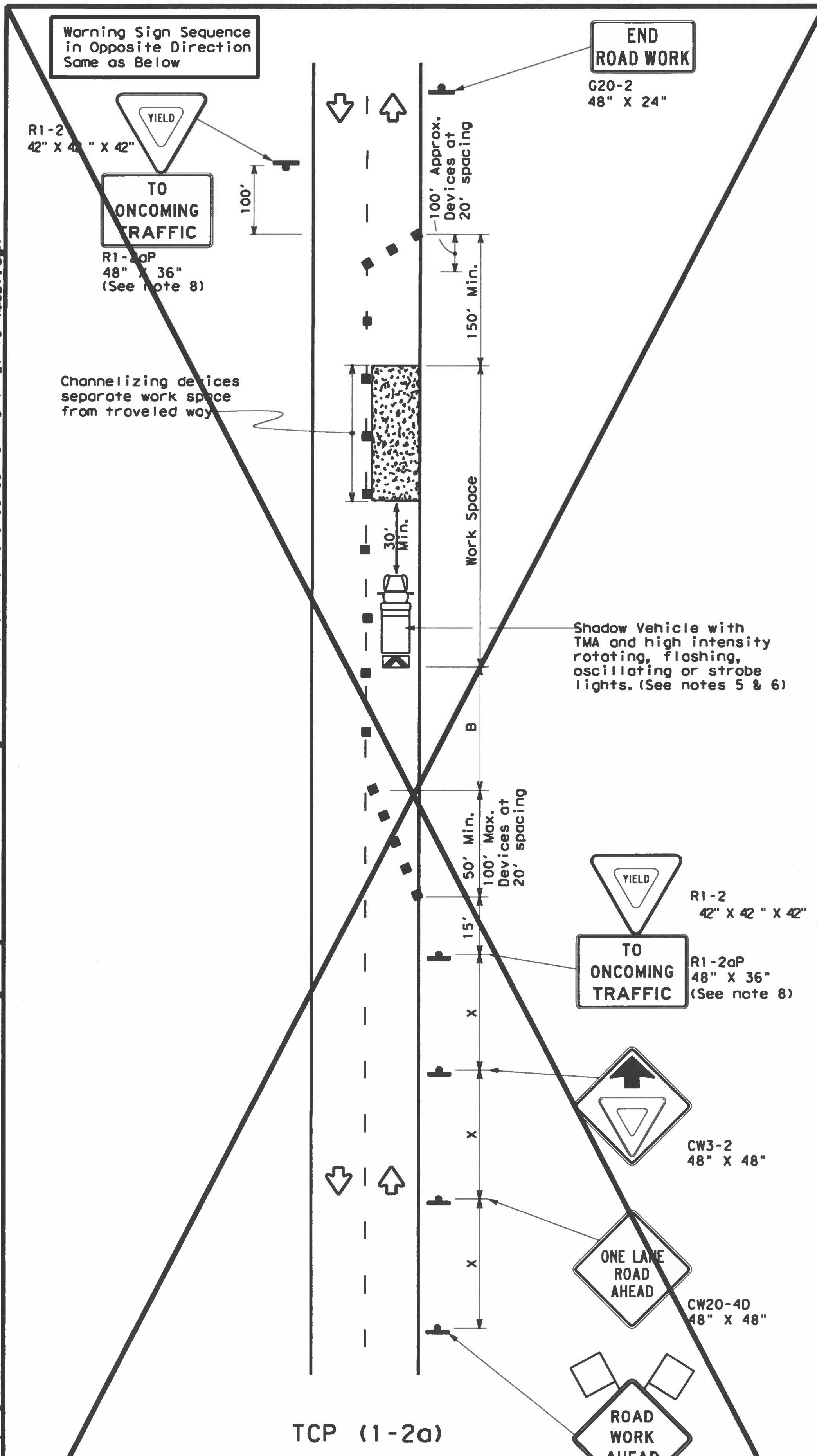
Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT 0912	SECT 37	JOB 237	HIGHWAY VARIOUS
REVISIONS 2-94 4-98, 8-95 2-12, 1-97 2-18	DIST HOU		COUNTY MONTGOMERY	SHEET NO. 20

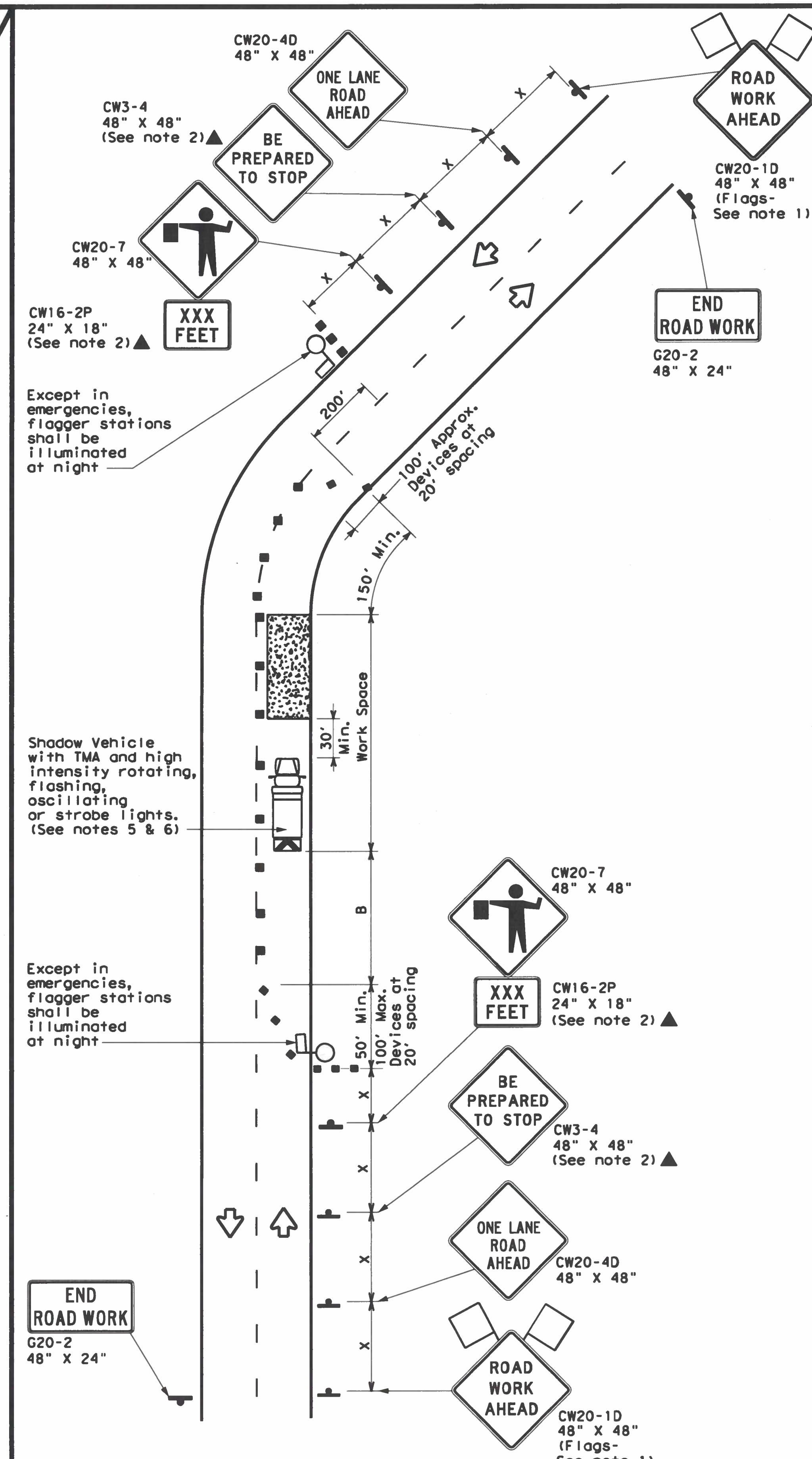
151



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

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"	Stopping Sight Distance
		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'	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.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER
Micah J. Schluter P.E.
06/30/2023

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18 (MOD)

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
4-90 4-98	DIST	COUNTY		SHEET NO.
2-94 2-12 / 1-97 2-18	HOU	MONTGOMERY		21

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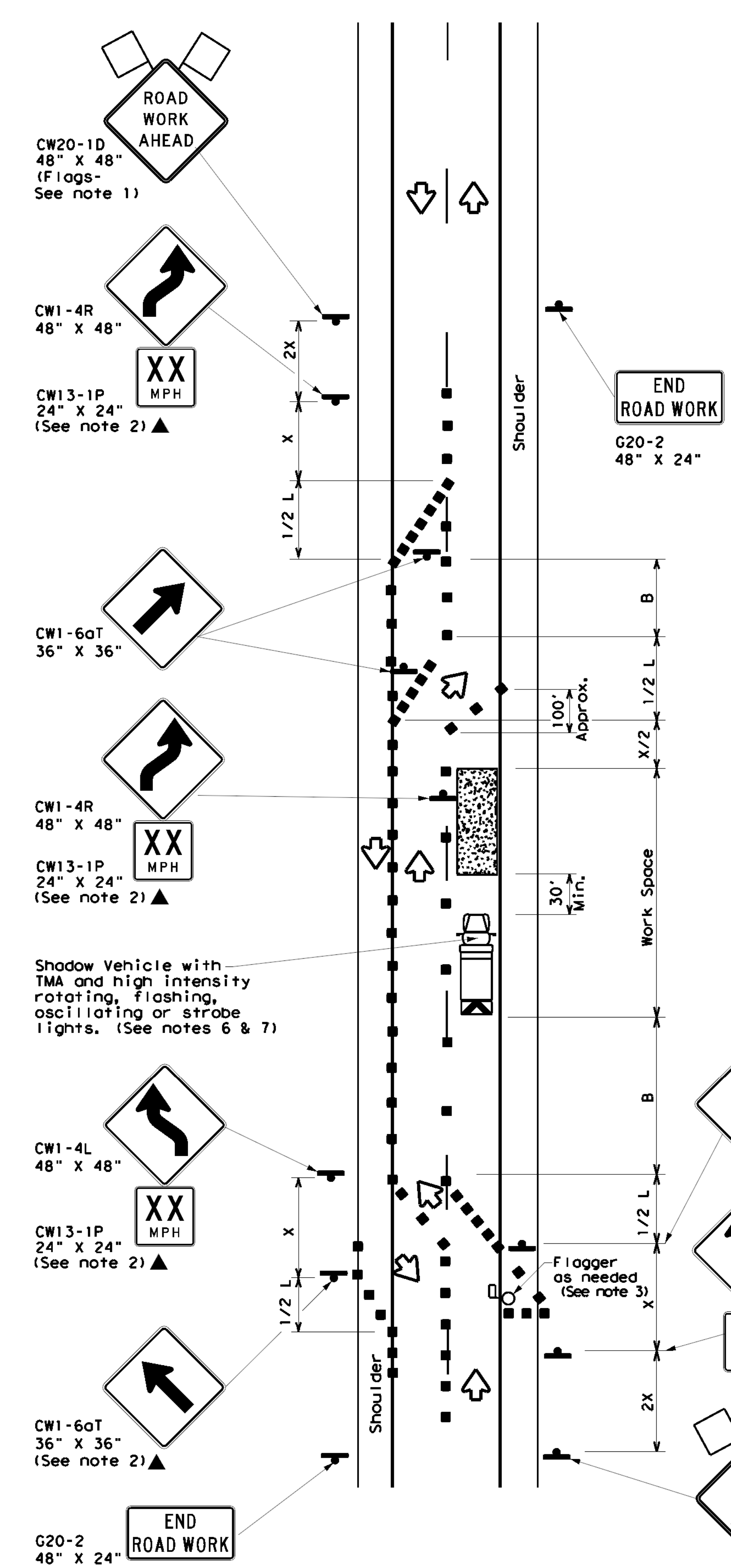


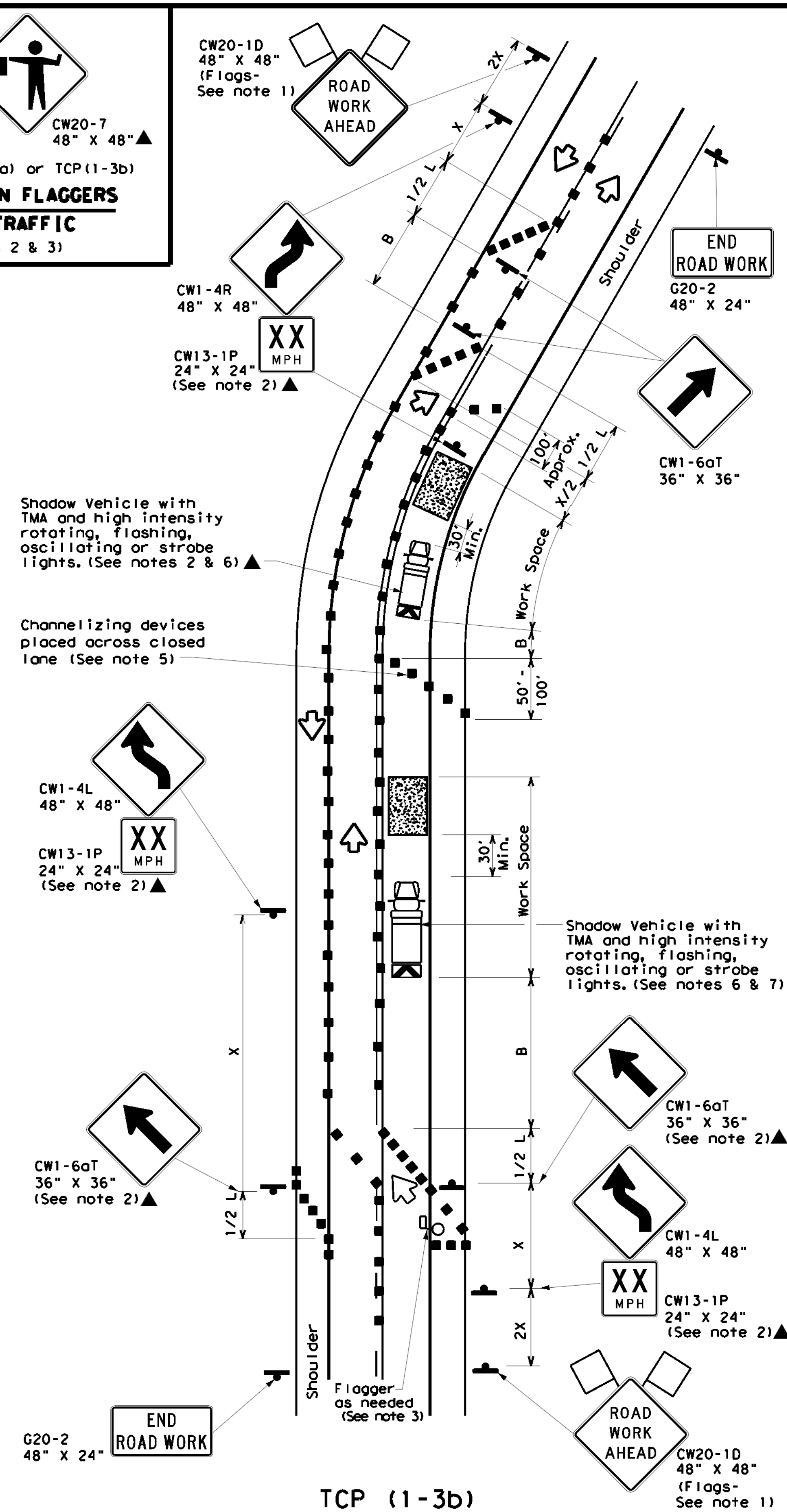
TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC

(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
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 wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY	
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0912	37	237	VARIOUS	
	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		22	

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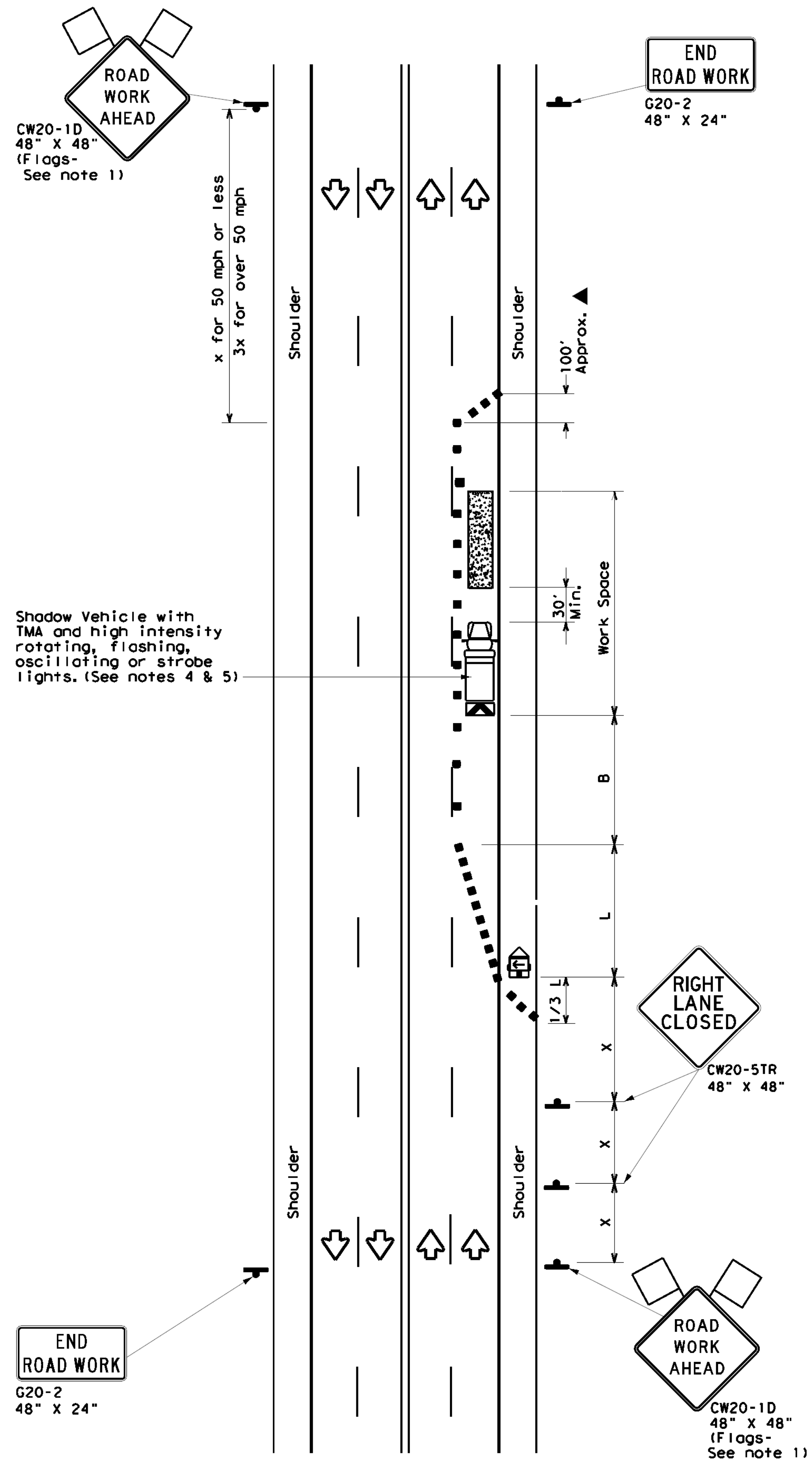
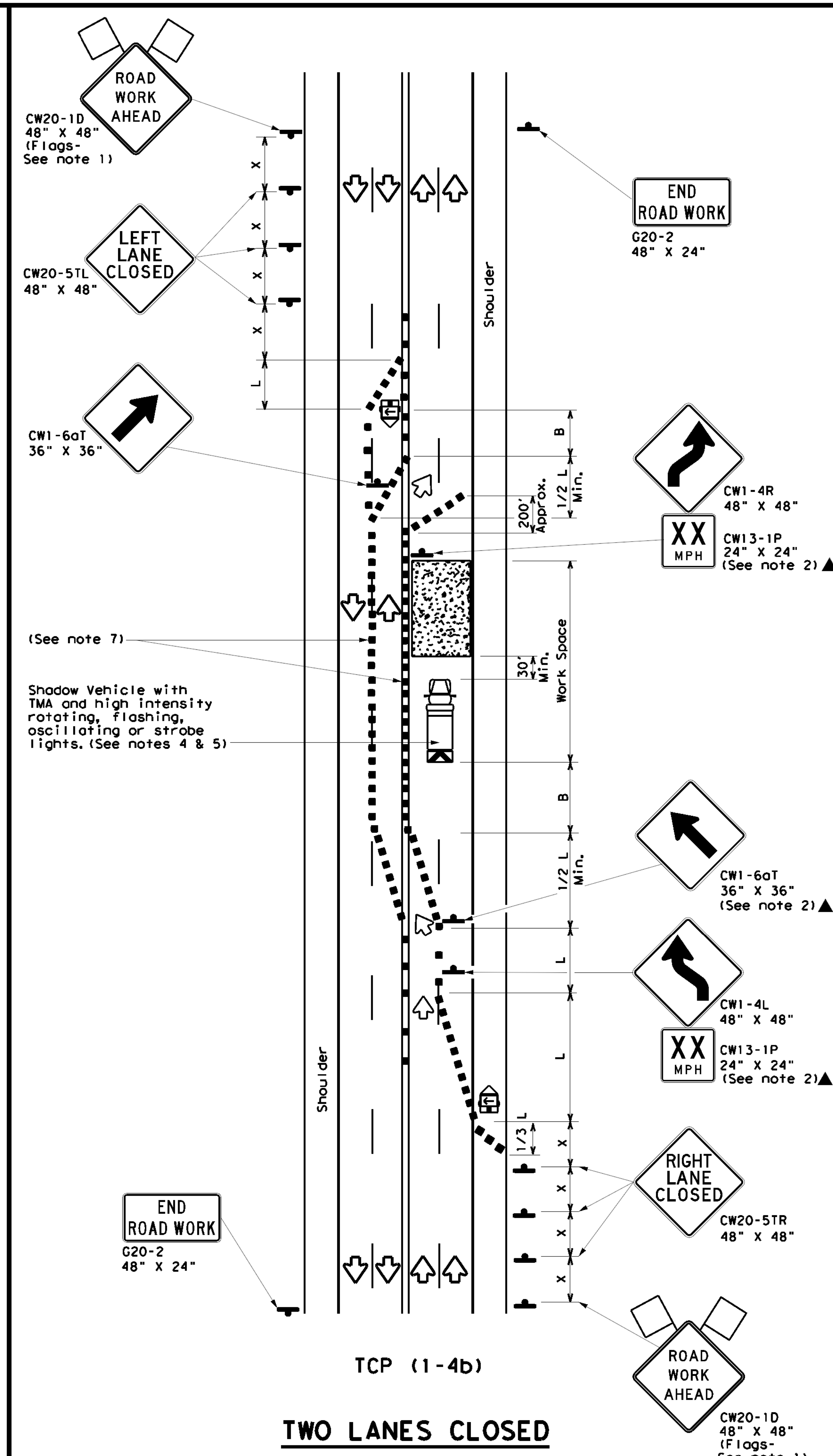


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

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© TxDOT December 1985		CONT	SECT	JOB		HIGHWAY	
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18		0912	37	237		VARIOUS	
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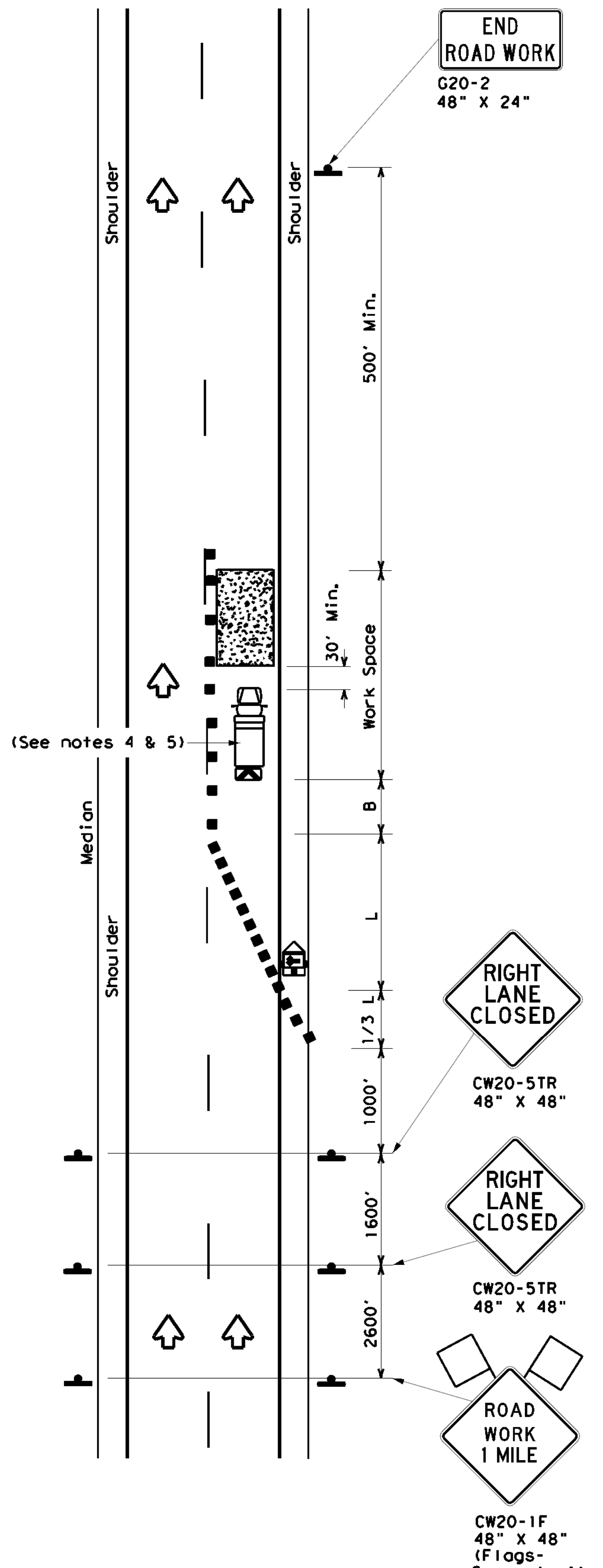
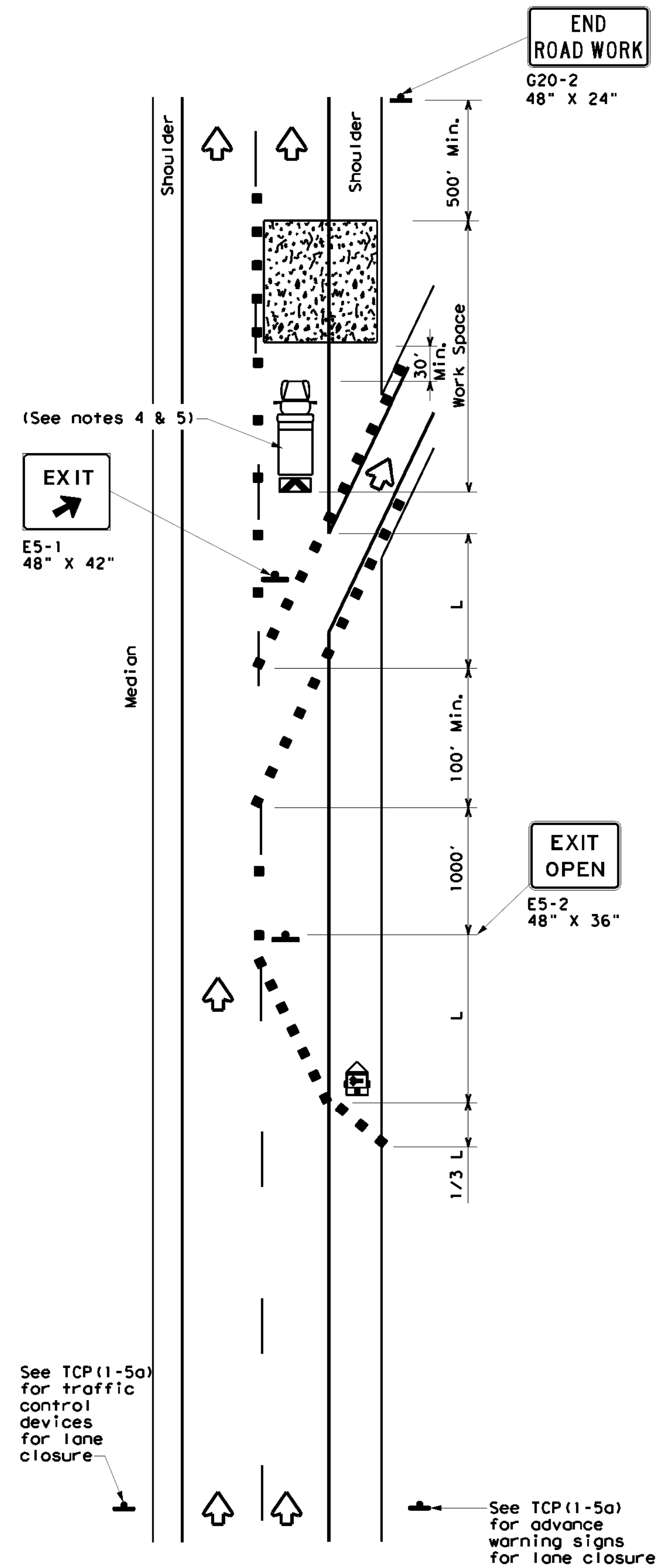
		HOU		MONTGOMERY		23	

154



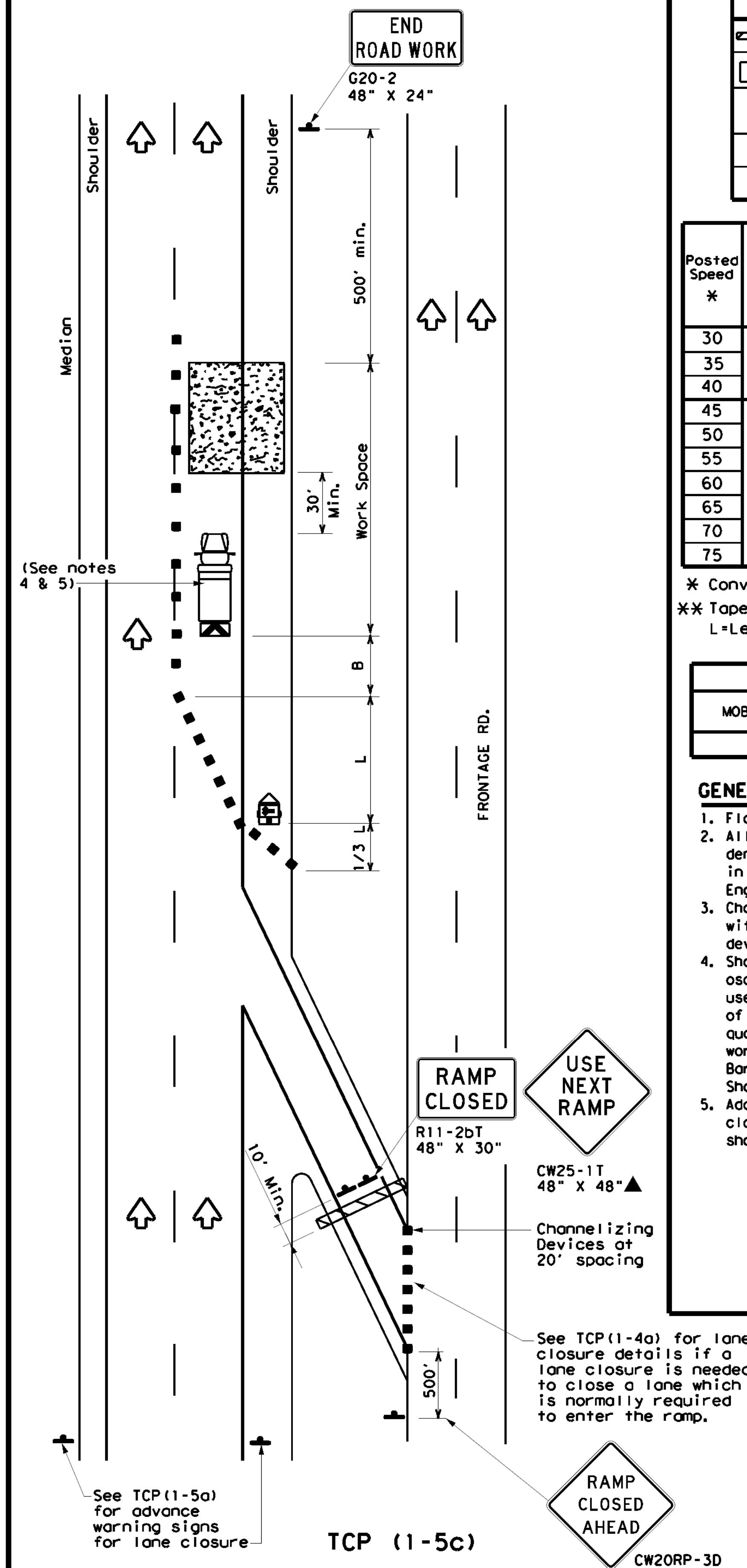
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND

(symbol)	Type 3 Barricade	(symbol)	Channelizing Devices
(symbol)	Heavy Work Vehicle	(symbol)	Truck Mounted Attenuator (TMA)
(symbol)	Trailer Mounted Flashing Arrow Board	(symbol)	Portable Changeable Message Sign (PCMS)
(symbol)	Sign	(symbol)	Traffic Flow
(symbol)	Flag	(symbol)	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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn		DN:	CK:	DW:	CK:
© TxDOT February 2012		CONT	SECT	JOB	HIGHWAY
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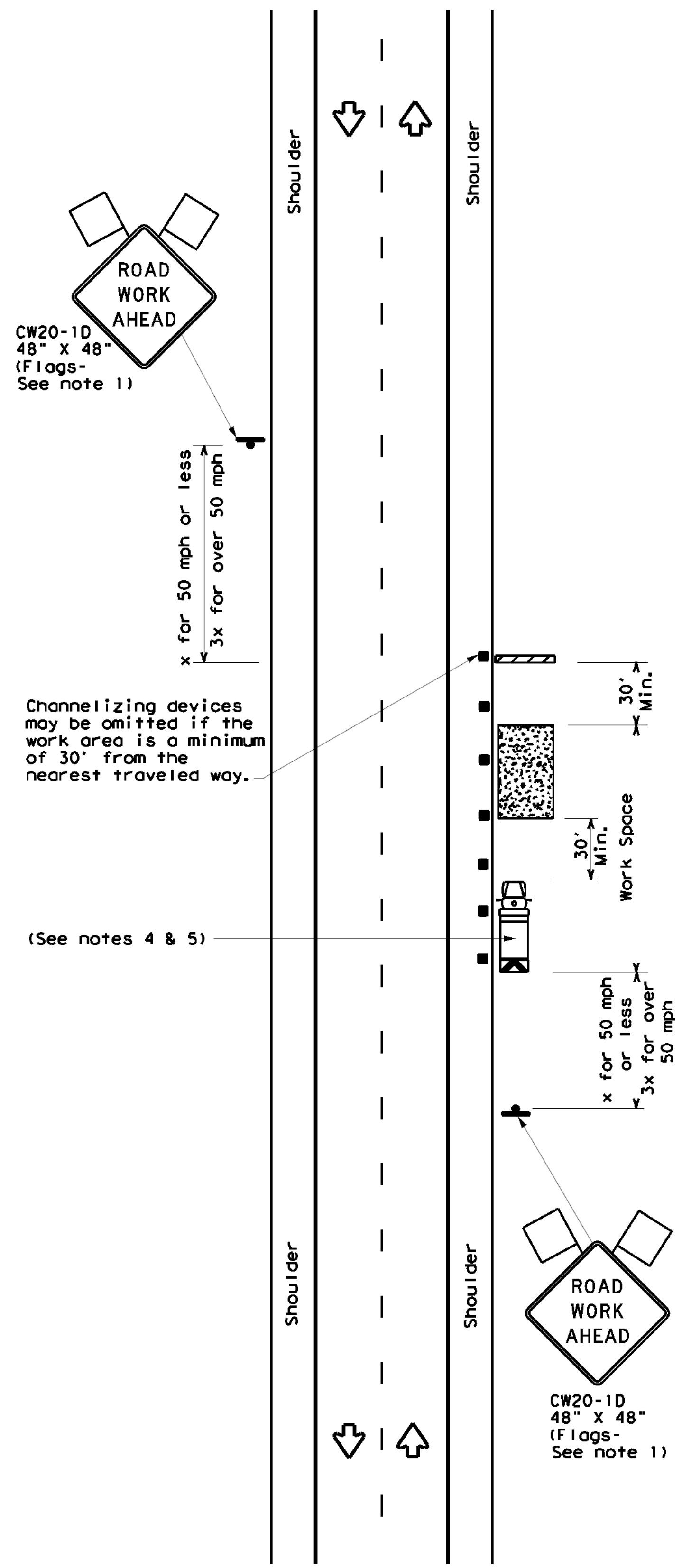
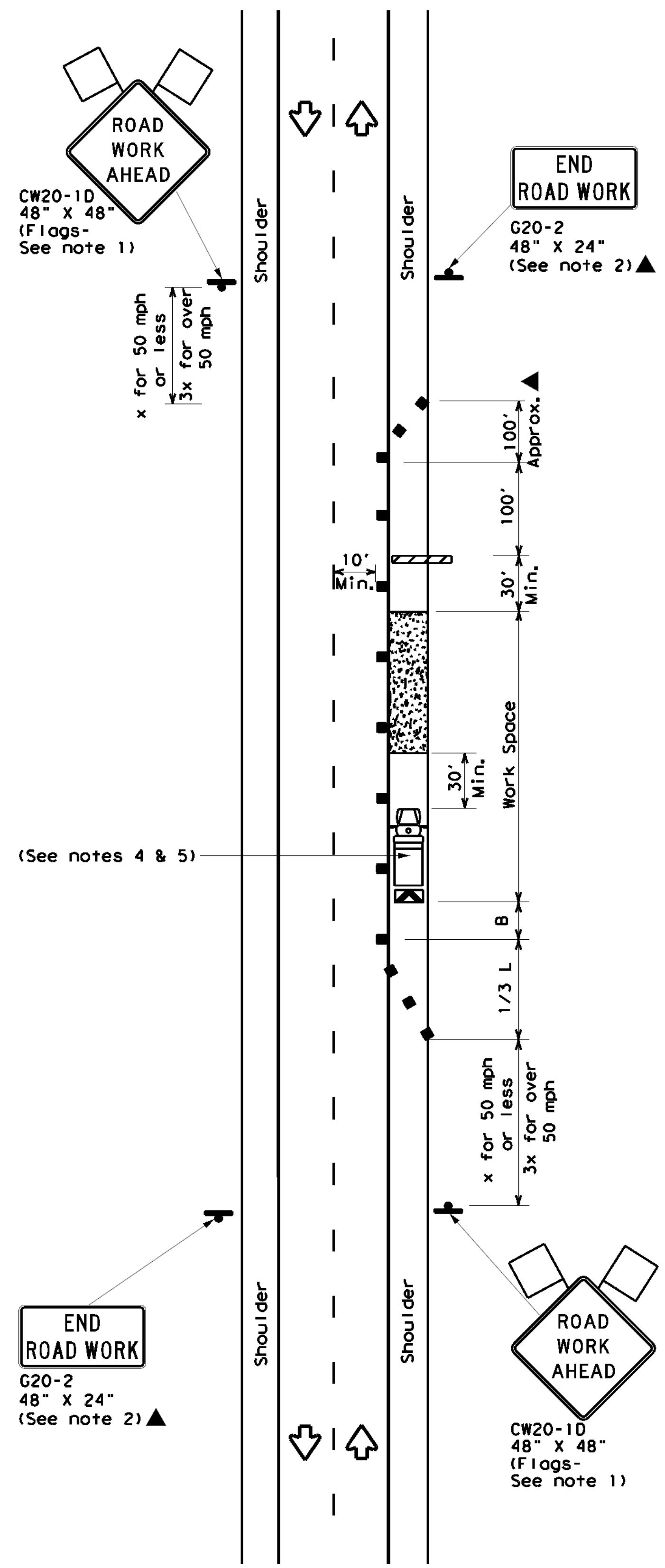
		DIST	COUNTY		SHEET NO.
		HOU	MONTGOMERY		24



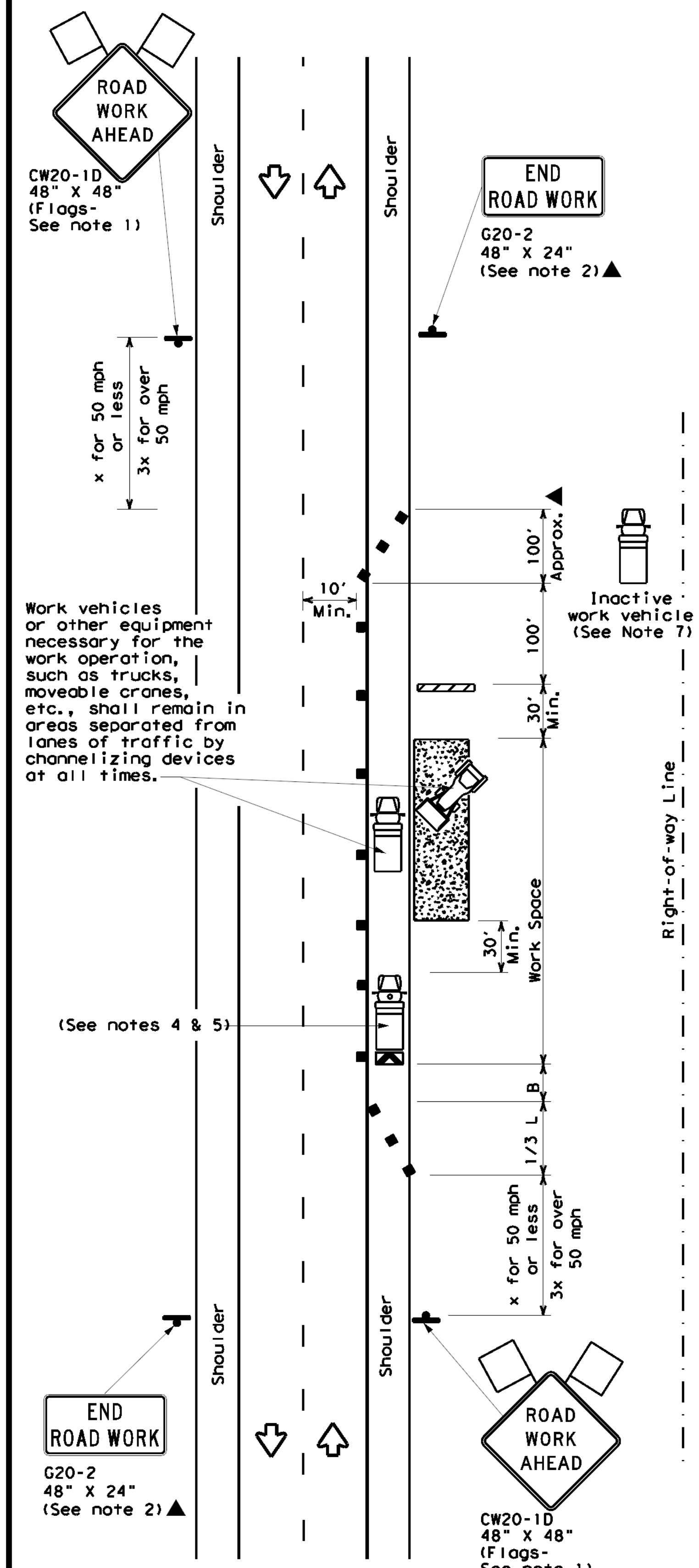
TCP (2-1a)

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

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation

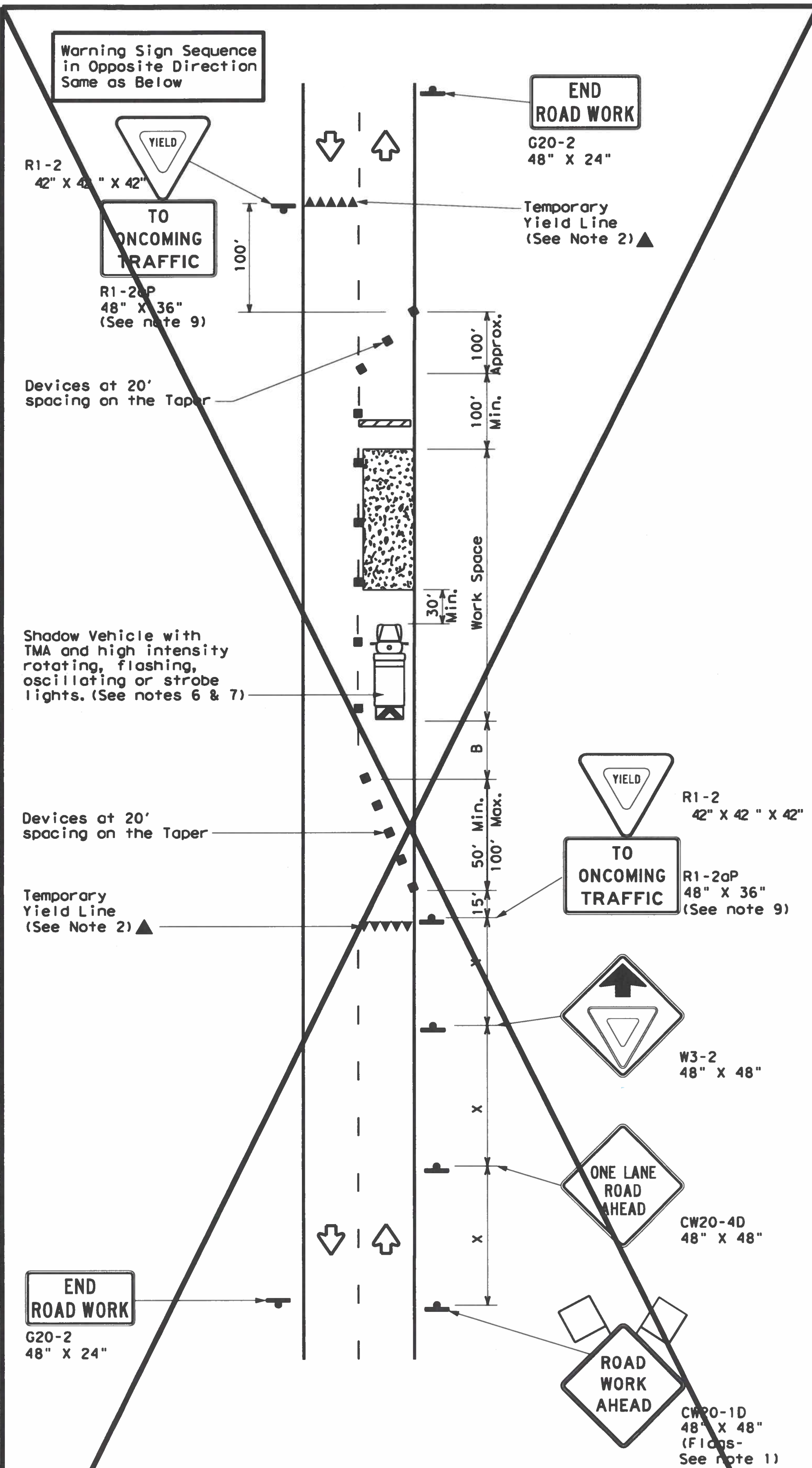
Traffic Operations Division Standard

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	0912	37	237	VARIOUS
	DIST		COUNTY	SHEET NO.
	HOU		MONTGOMERY	25

161



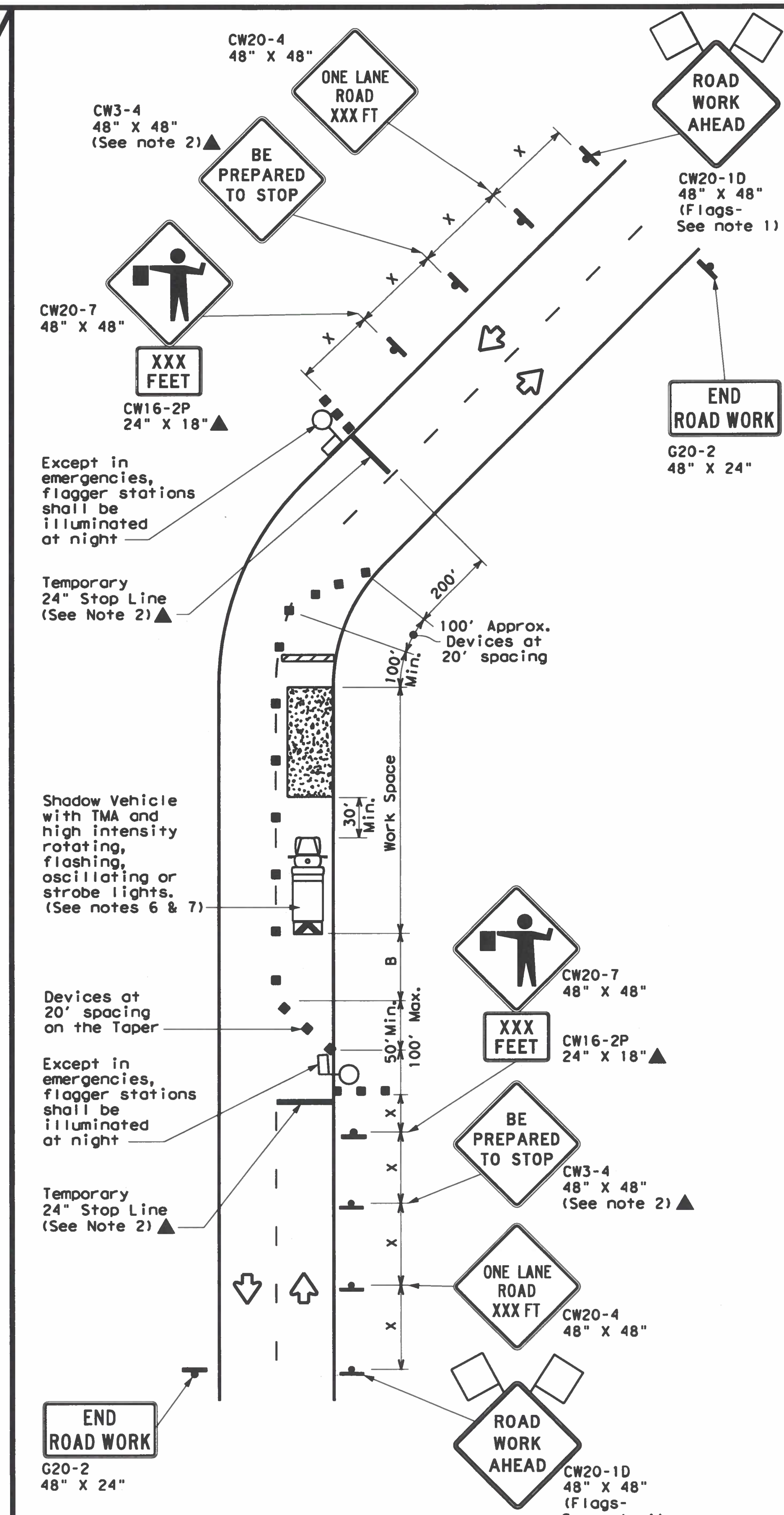
TCP (2-2a)

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 **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		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'	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.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
06/30/2023

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18 (MOD)

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0912	37	237	VARIOUS
	DIST		COUNTY	SHEET NO.
	HOU		MONTGOMERY	26

162

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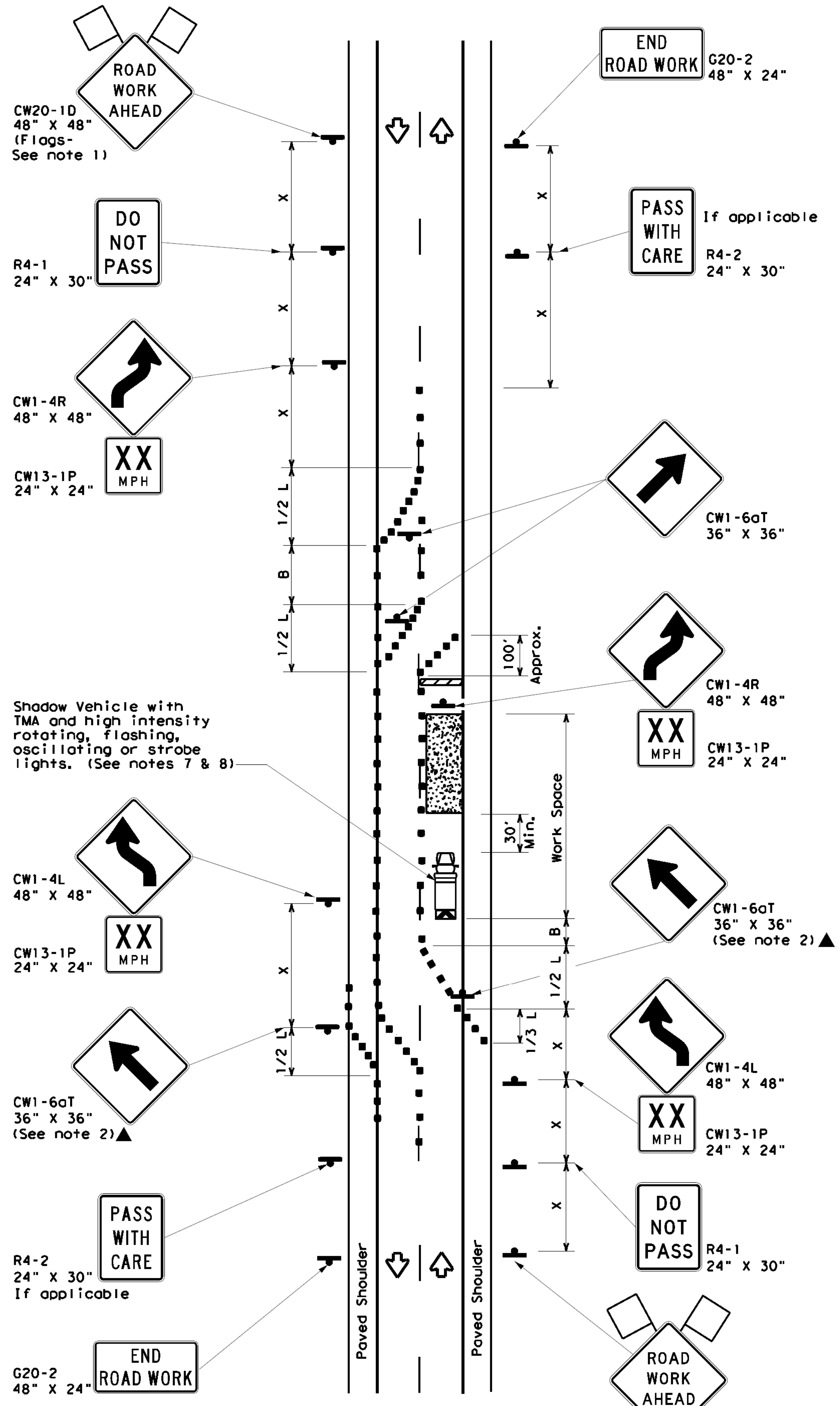
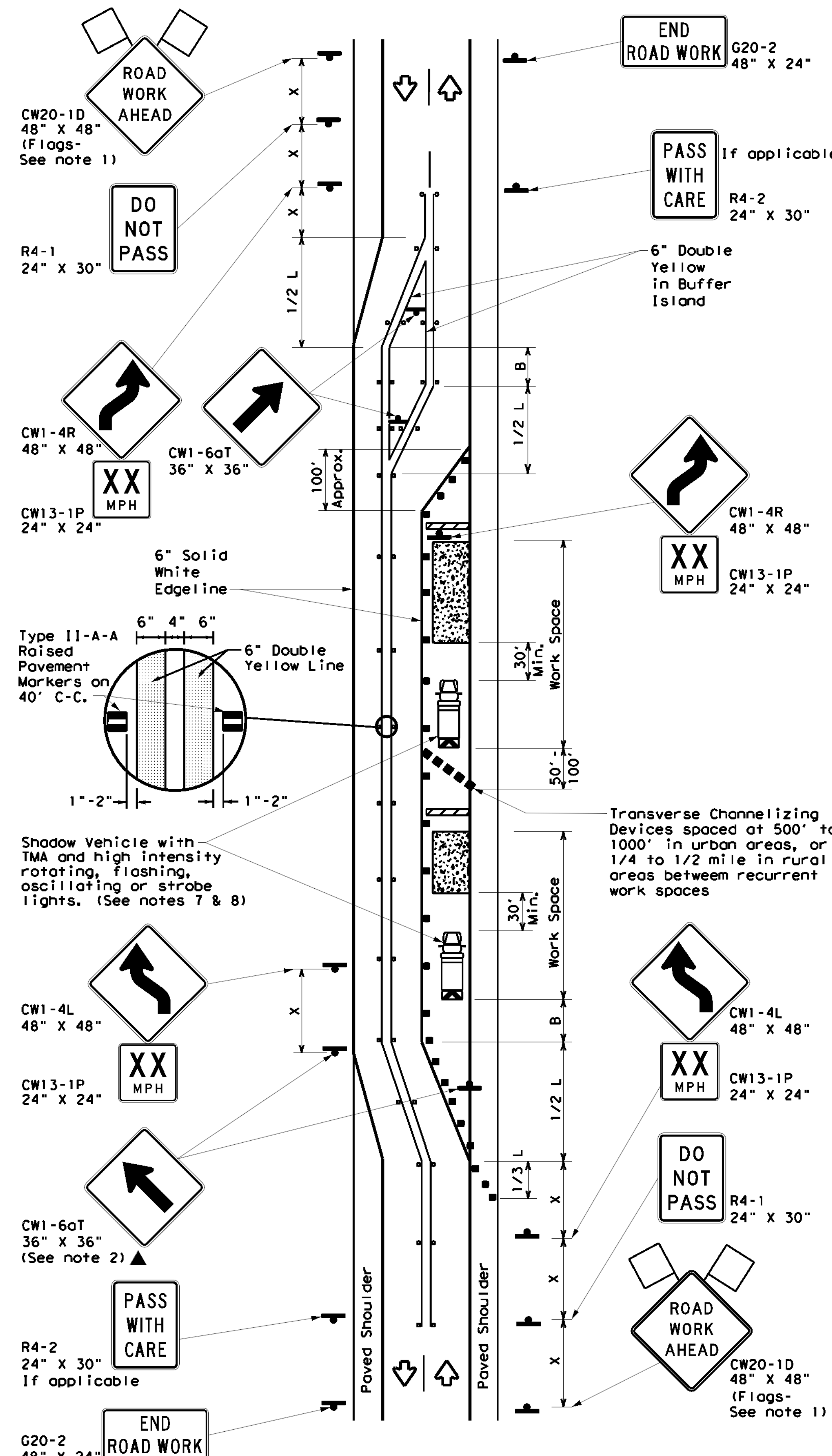


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	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 TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. 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 (2-3a)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-23

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© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	0912	37	237	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		27

163

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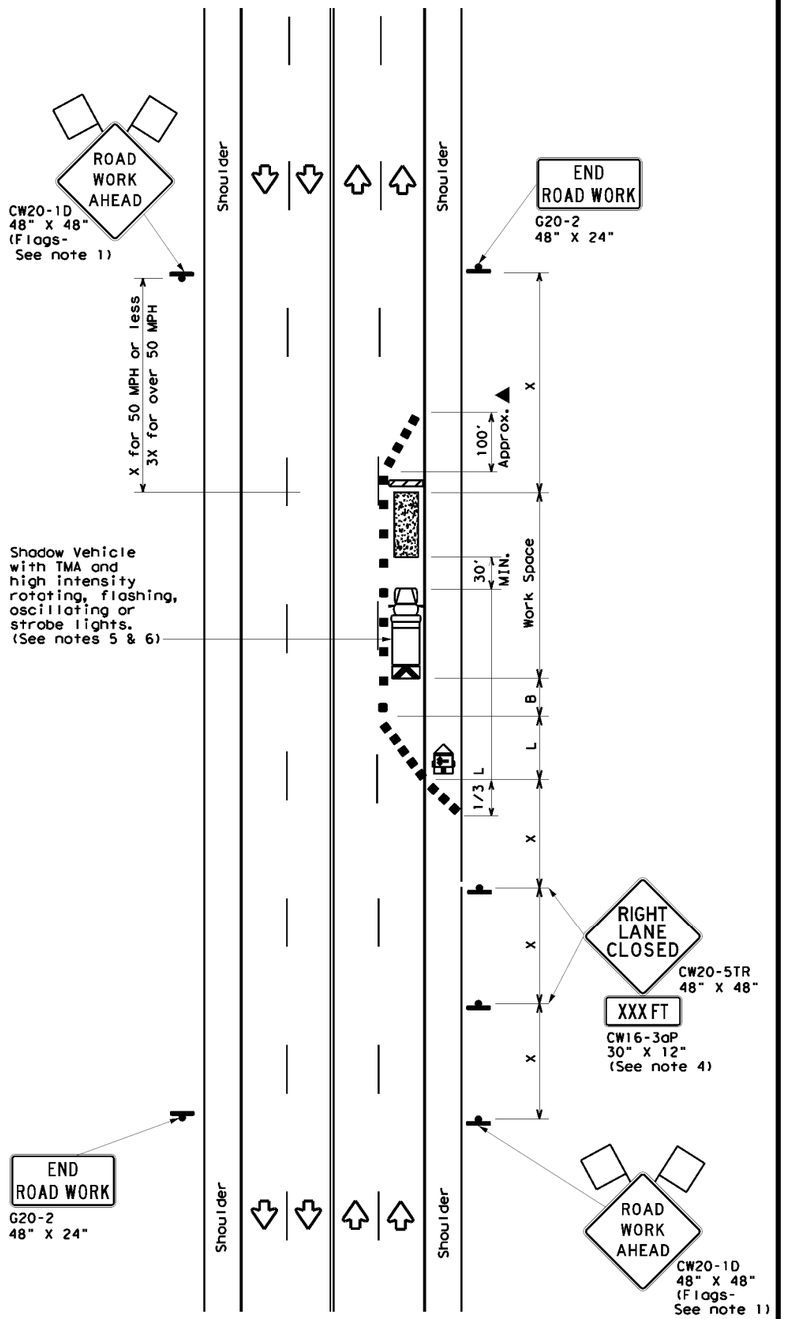
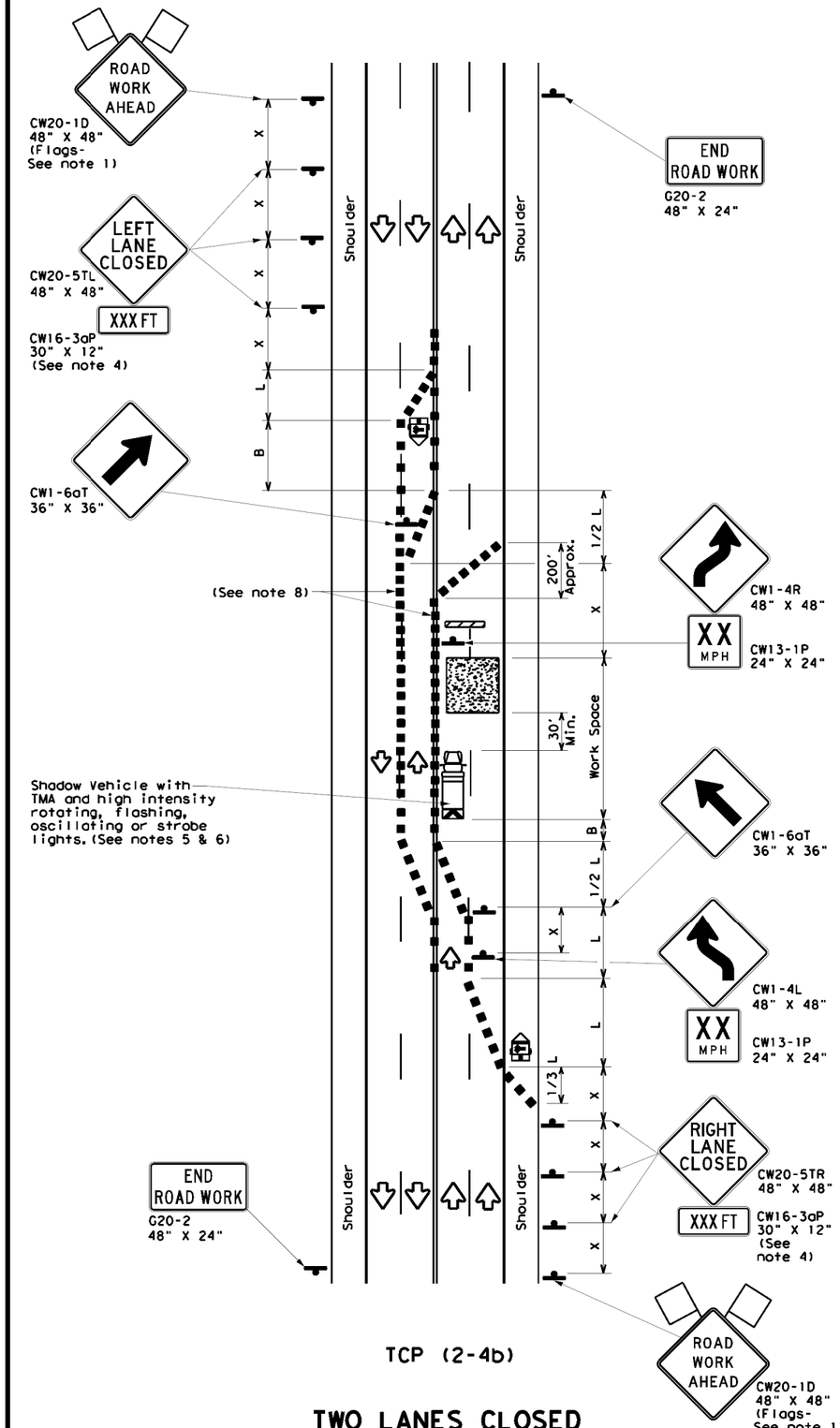


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	MONTGOMERY		28

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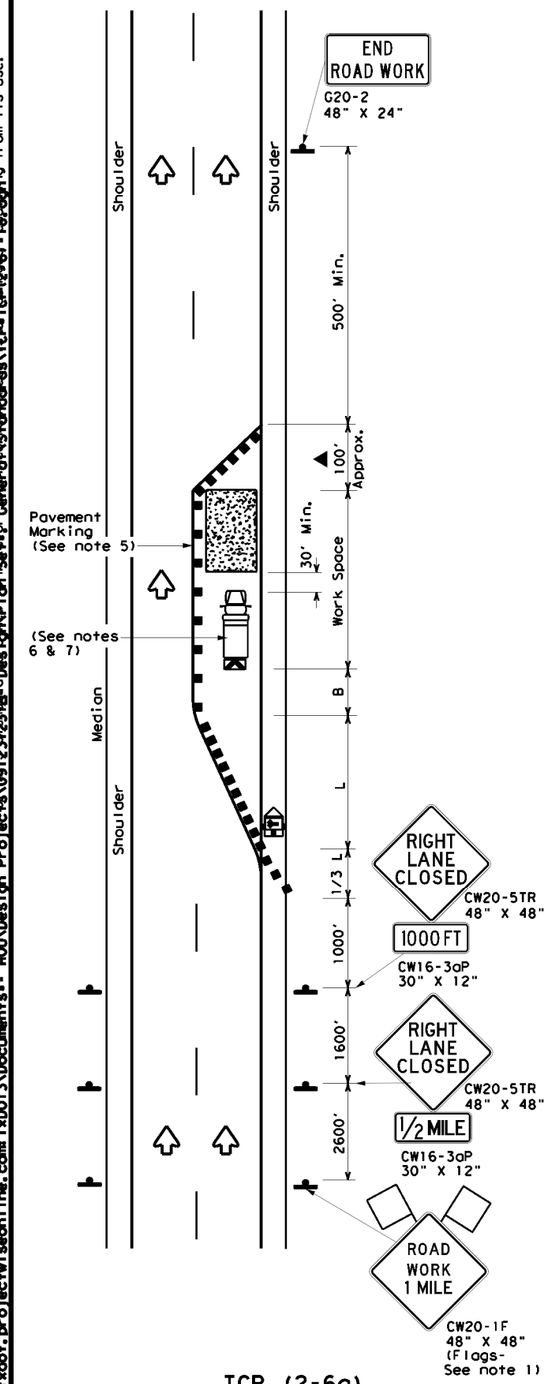
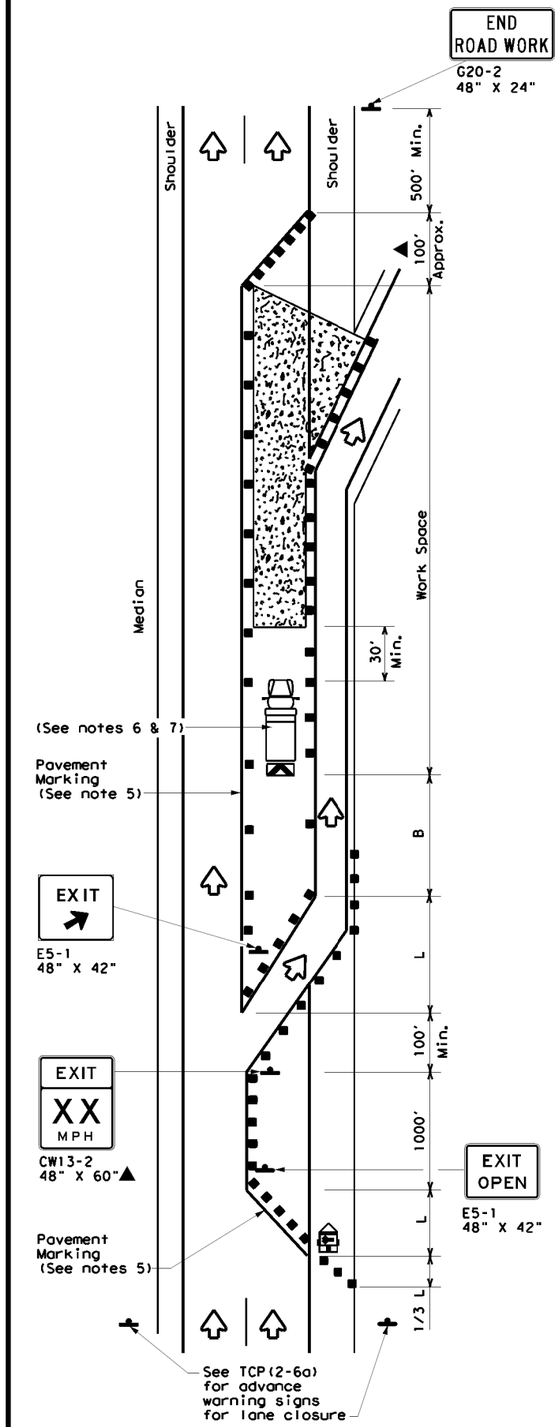


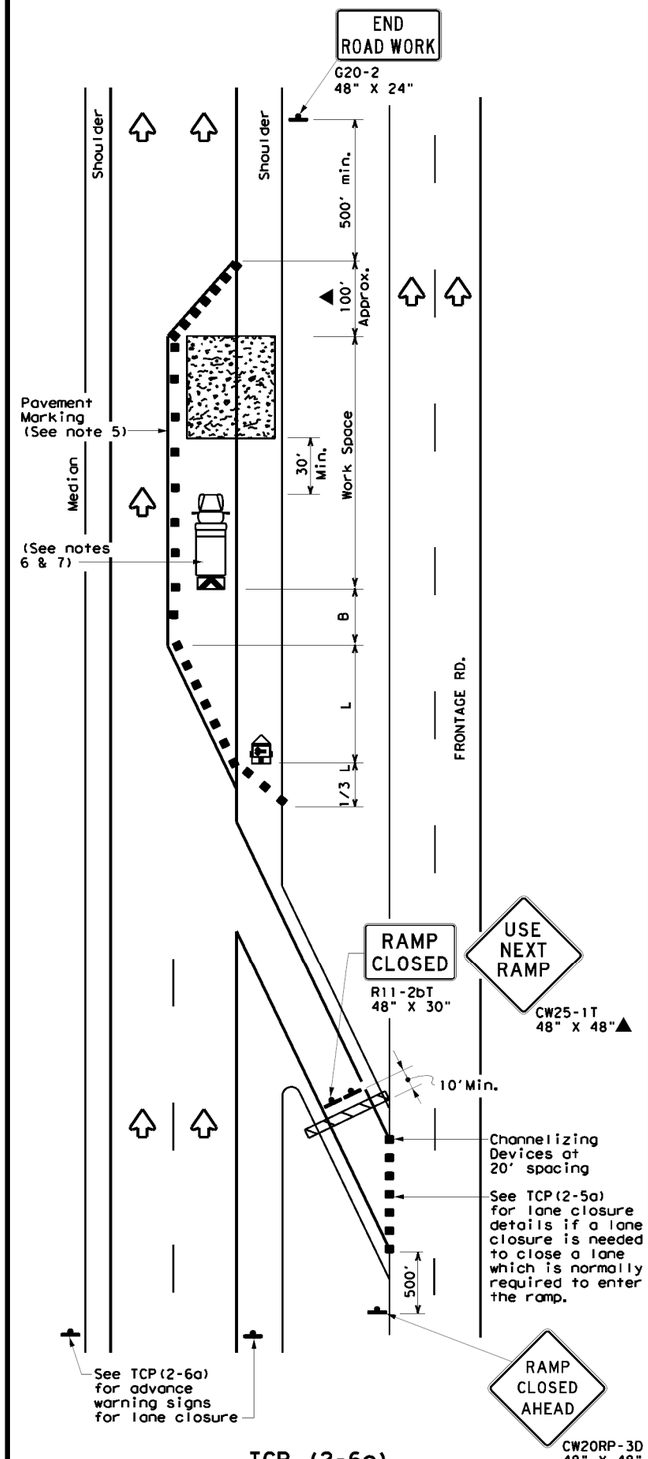
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. 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.
7. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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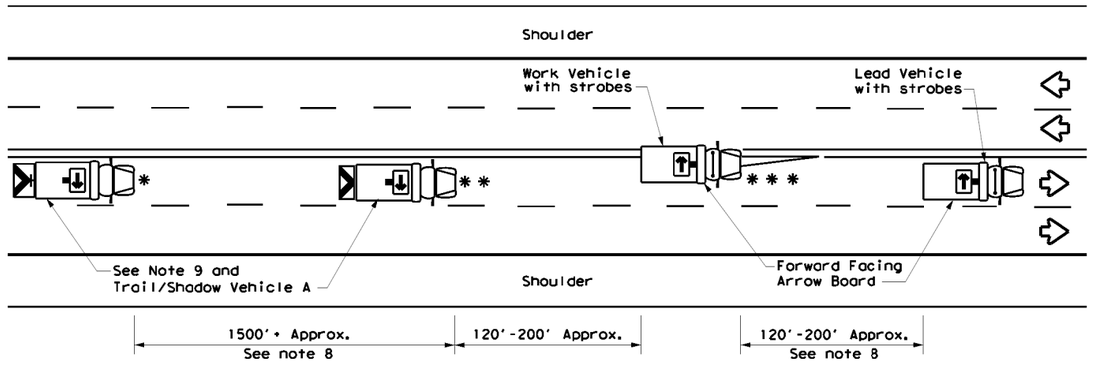
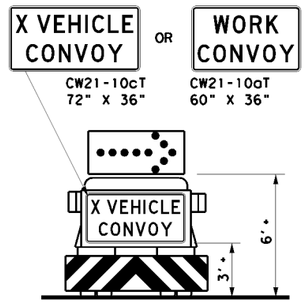


TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

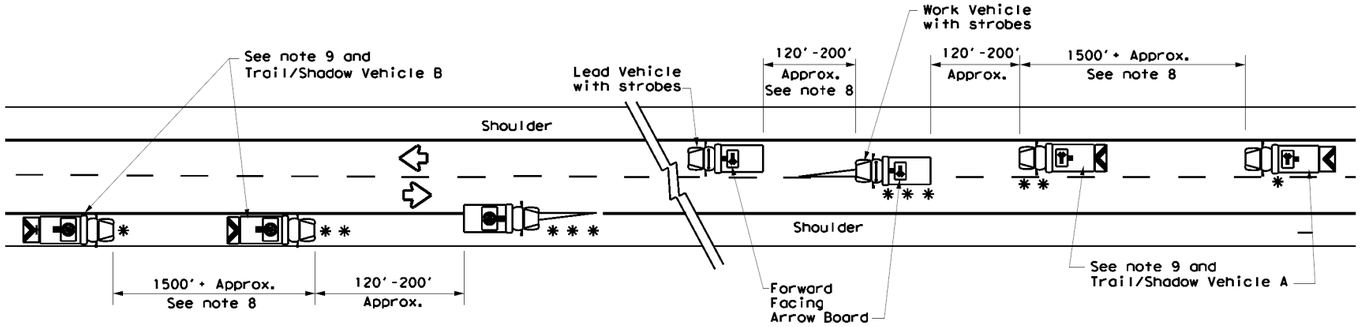
with RIGHT Directional display Flashing Arrow Board

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

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

GENERAL NOTES

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

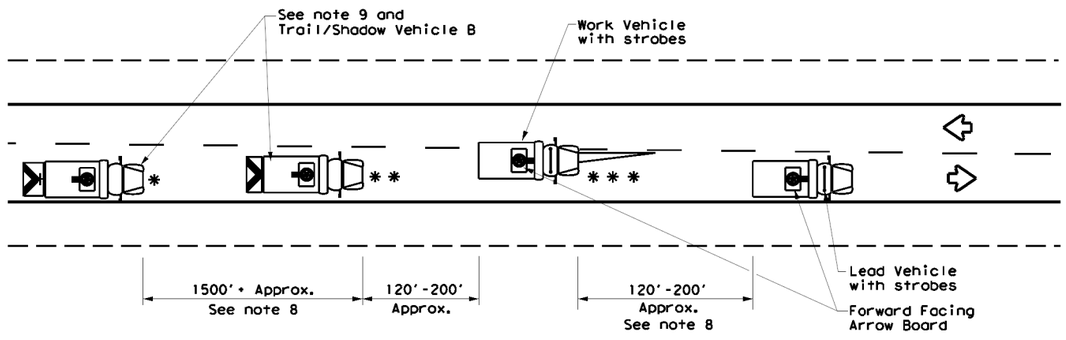


WORK ON SHOULDER

WORK ON TRAVEL LANE

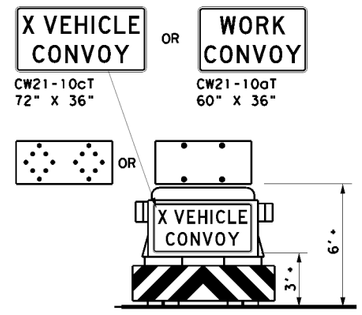
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



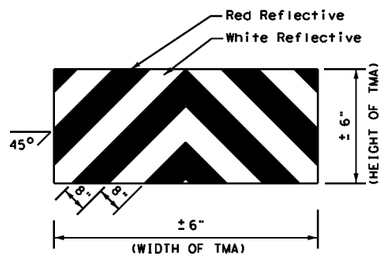
TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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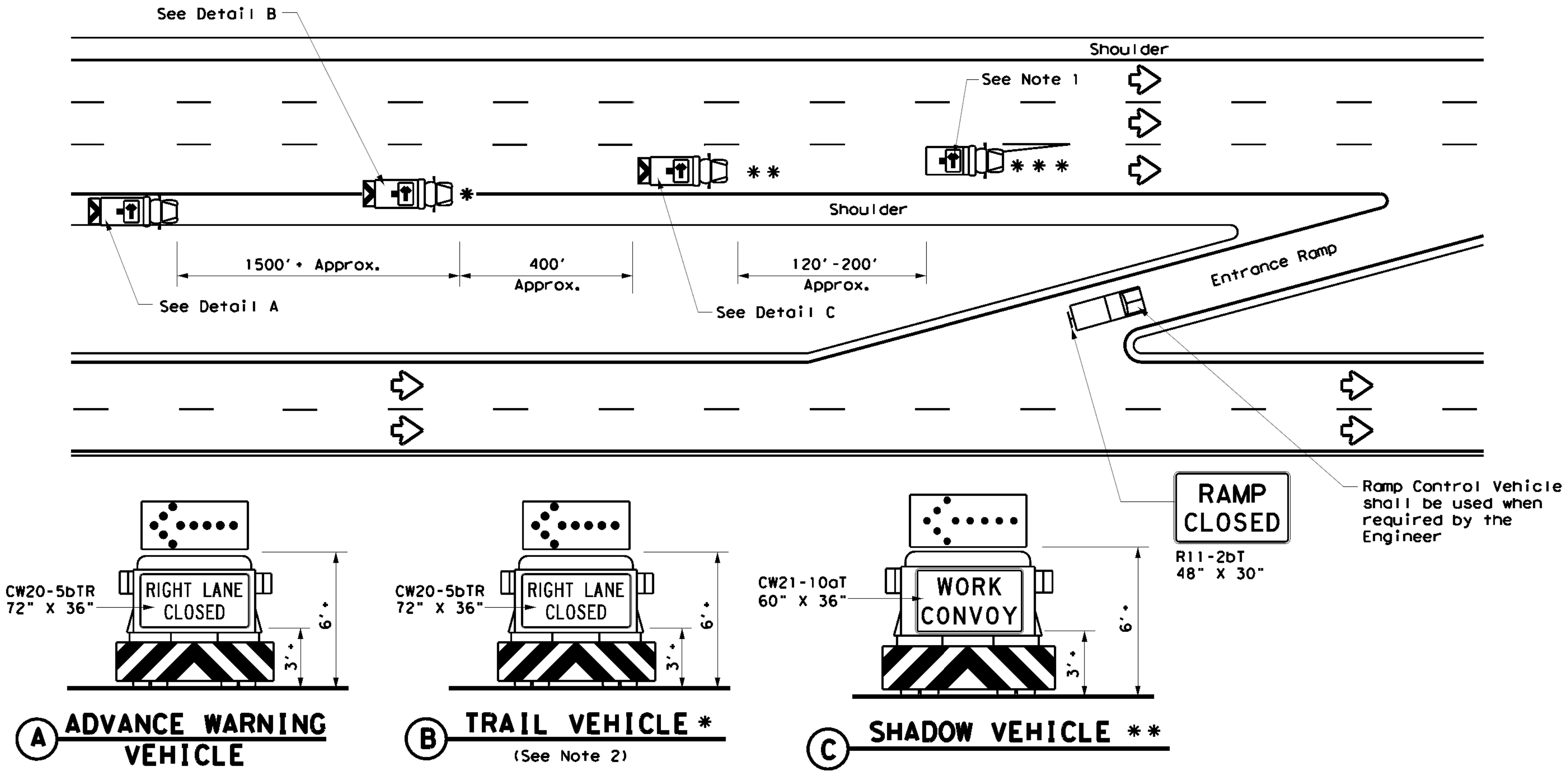
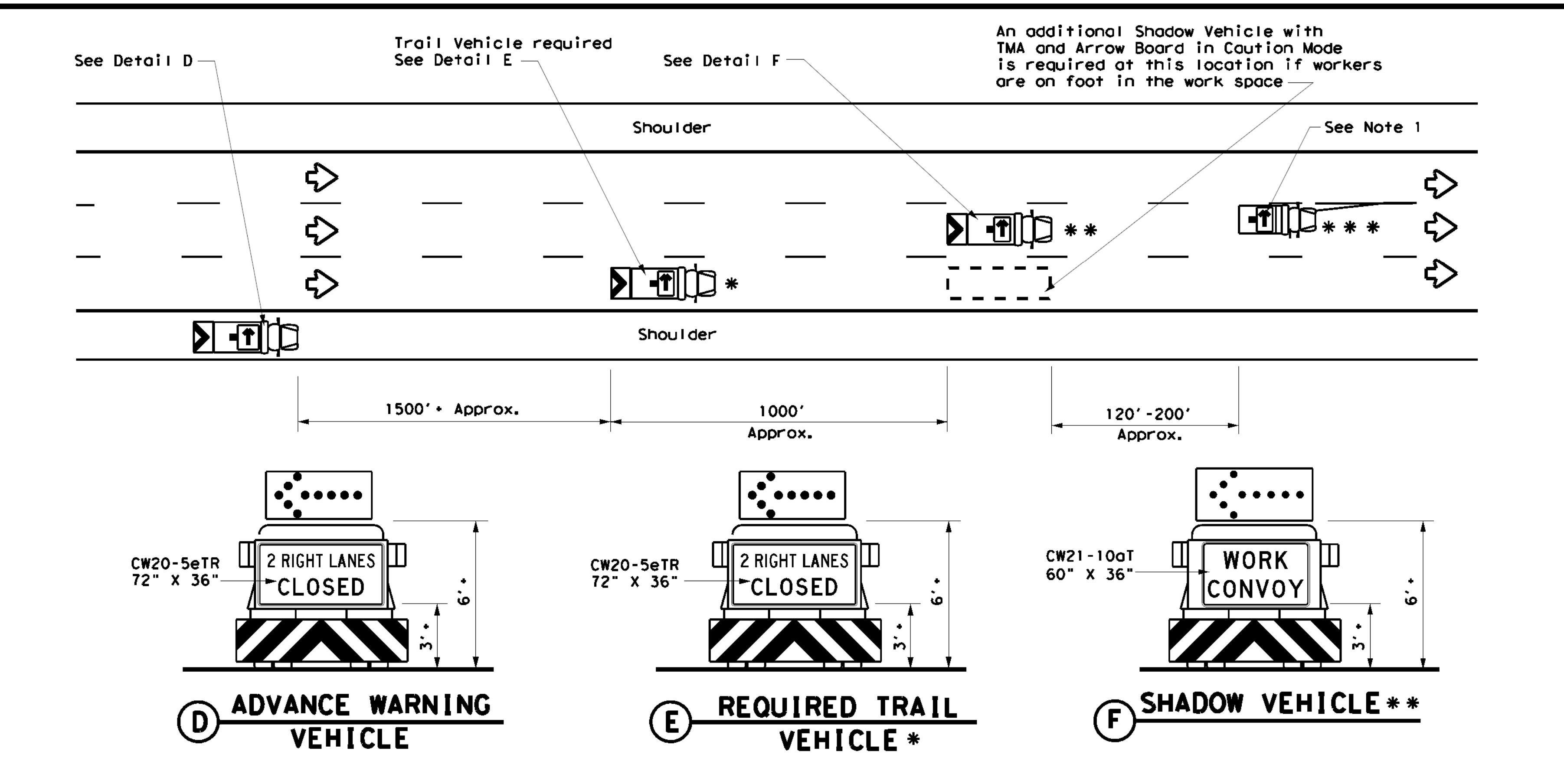
	HOU	MONTGOMERY		30



RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

LEGEND

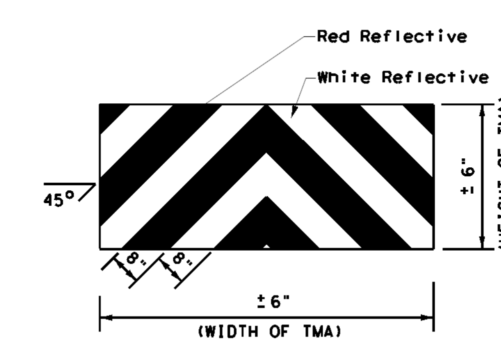
Symbol	Description	Arrow Board Symbol	ARROW BOARD DISPLAY
*	Trail Vehicle		
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. 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.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
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 may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a 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, must 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. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0912	37	237	VARIOUS
	DIST		COUNTY	SHEET NO.
	HOU		MONTGOMERY	31

176

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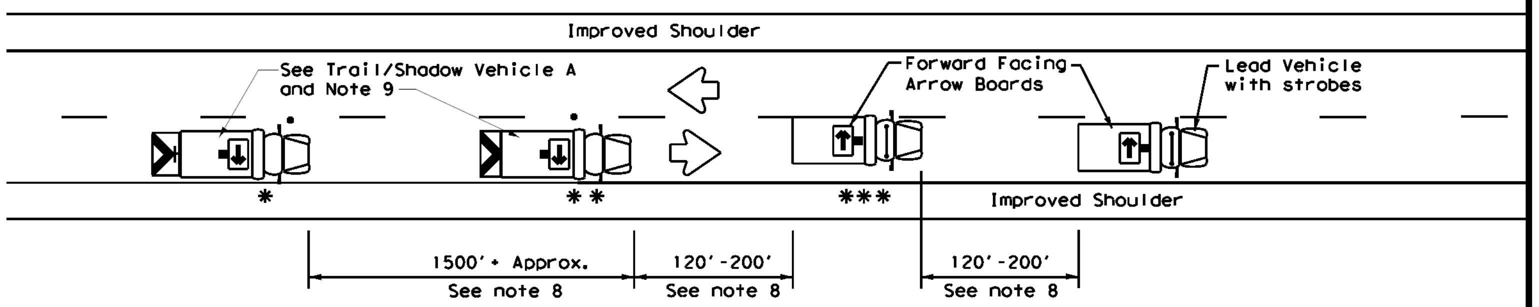
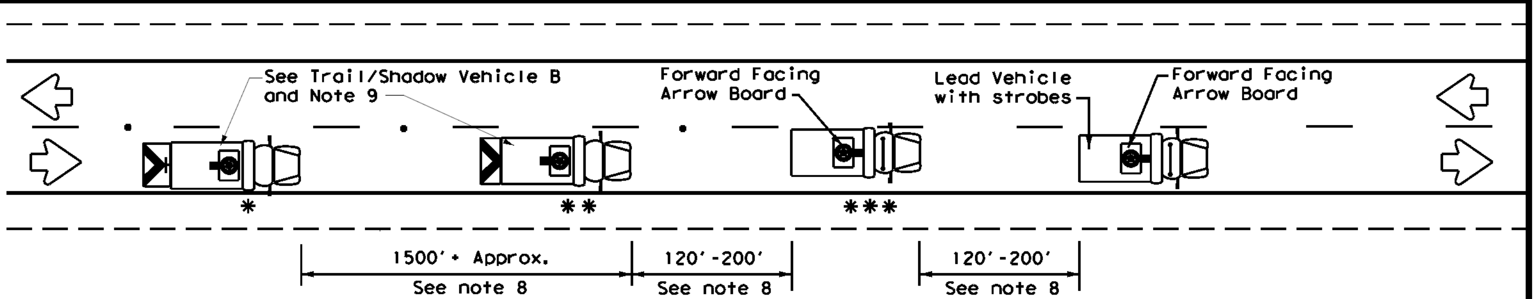


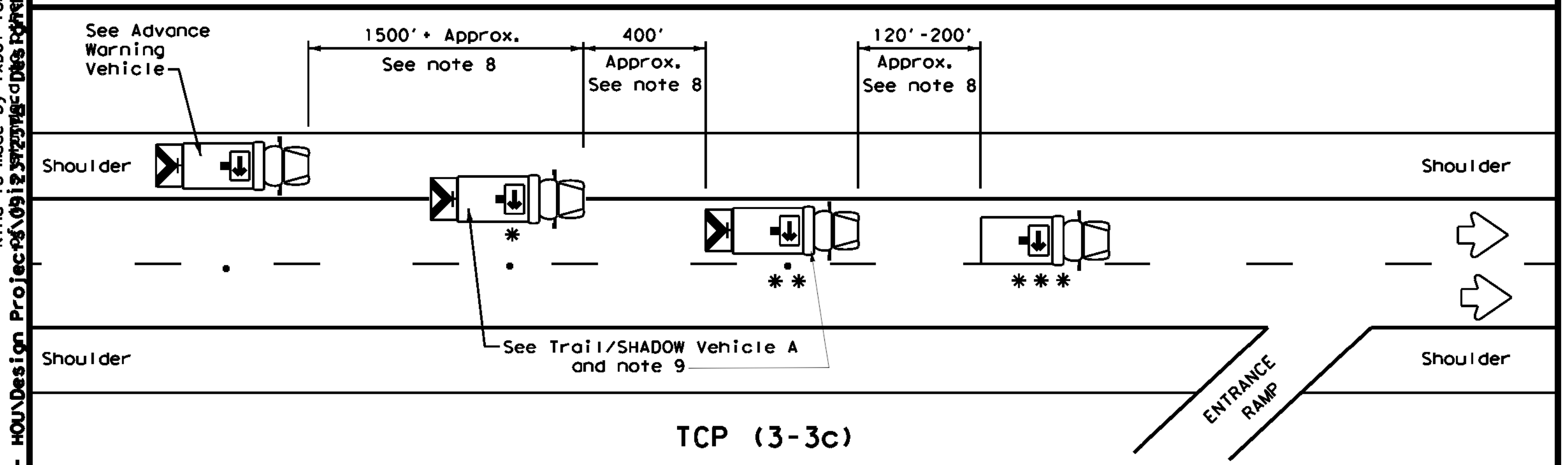
TCP (3-3a)

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



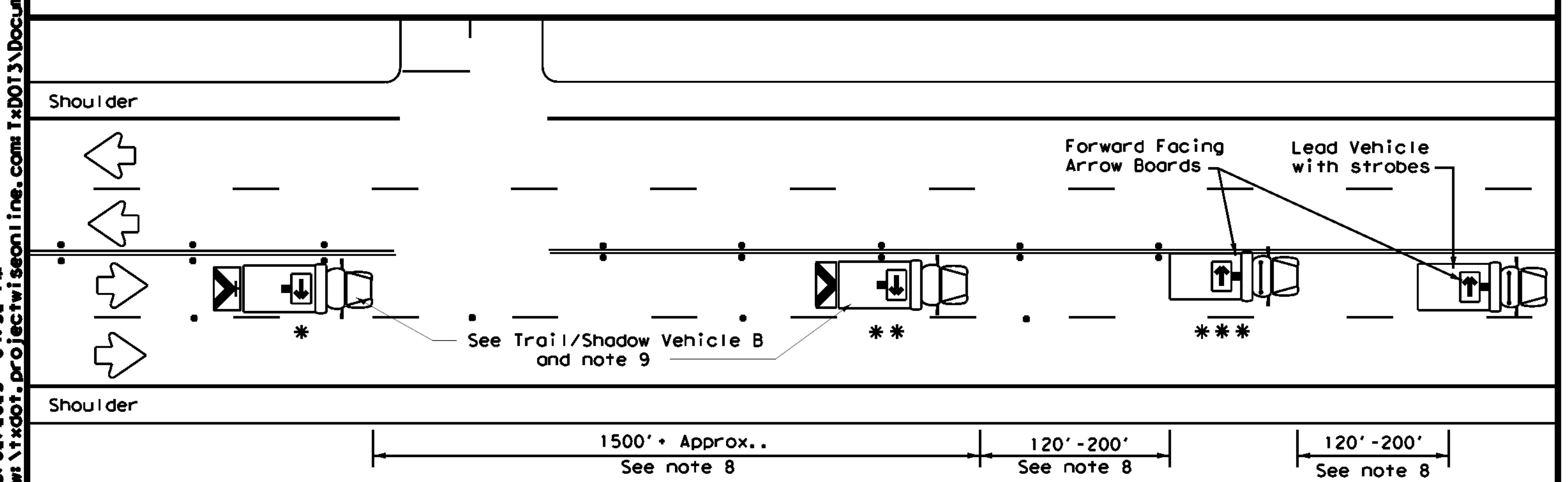
TCP (3-3b)

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



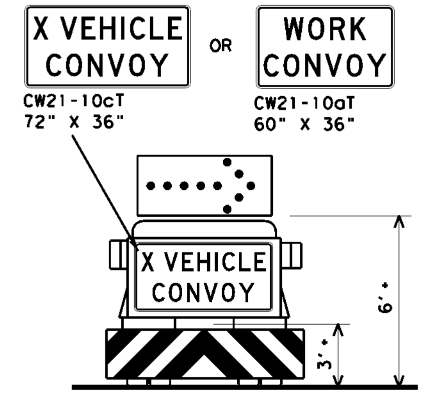
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



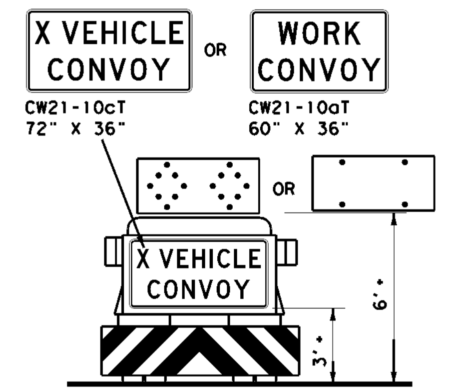
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



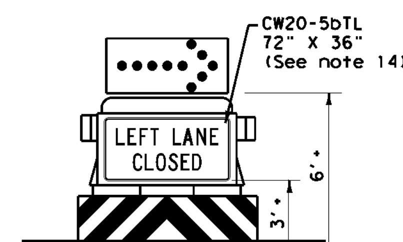
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

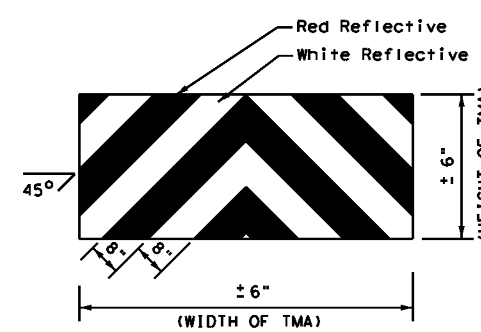


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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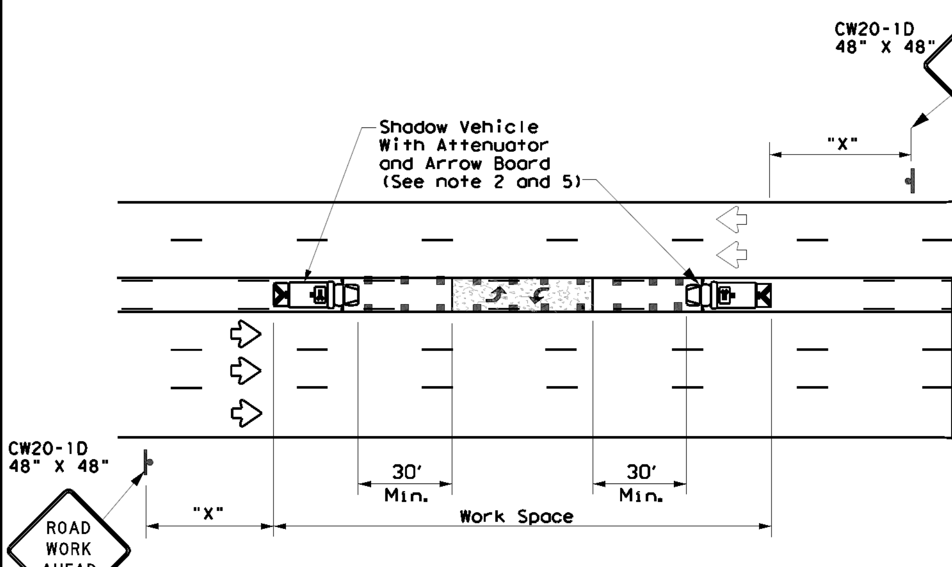
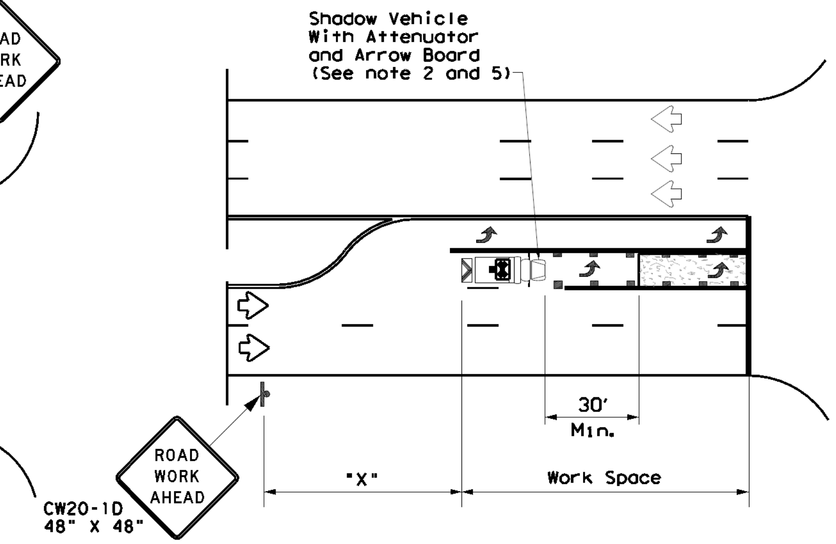
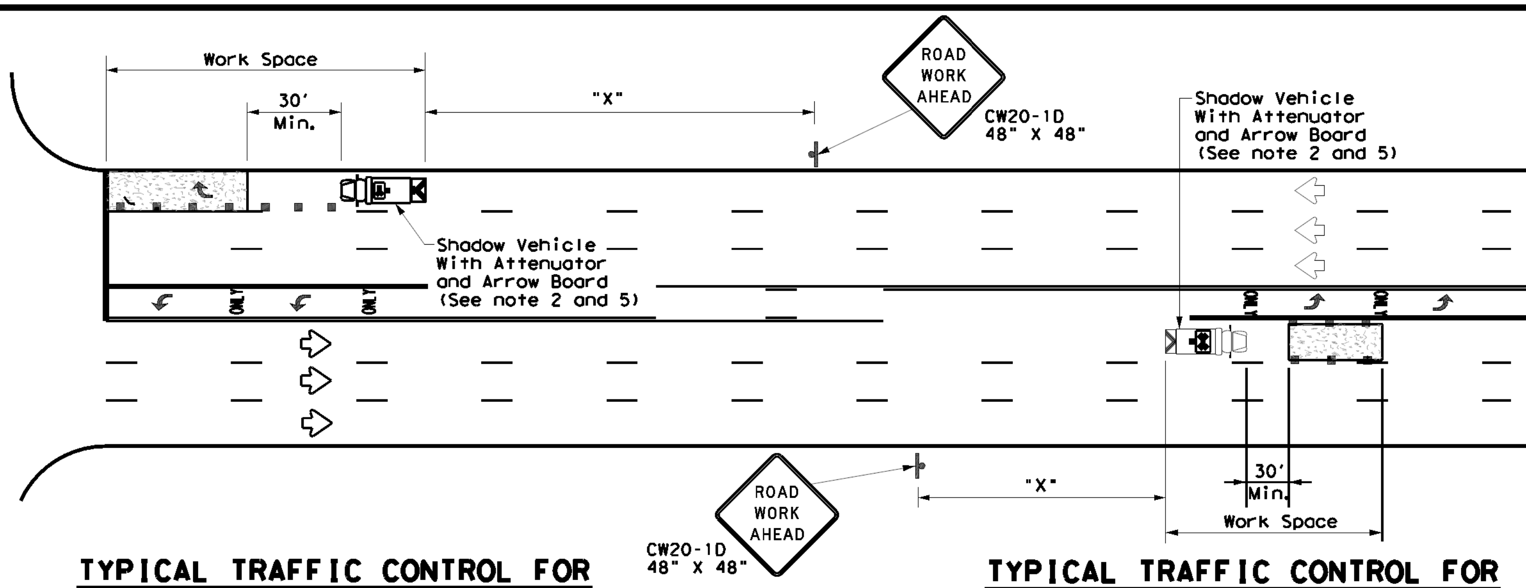
REVISIONS 2-94 4-98 8-95 7-13 1-97 7-14	DIST HOU	COUNTY MONTGOMERY		SHEET NO. 32



TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

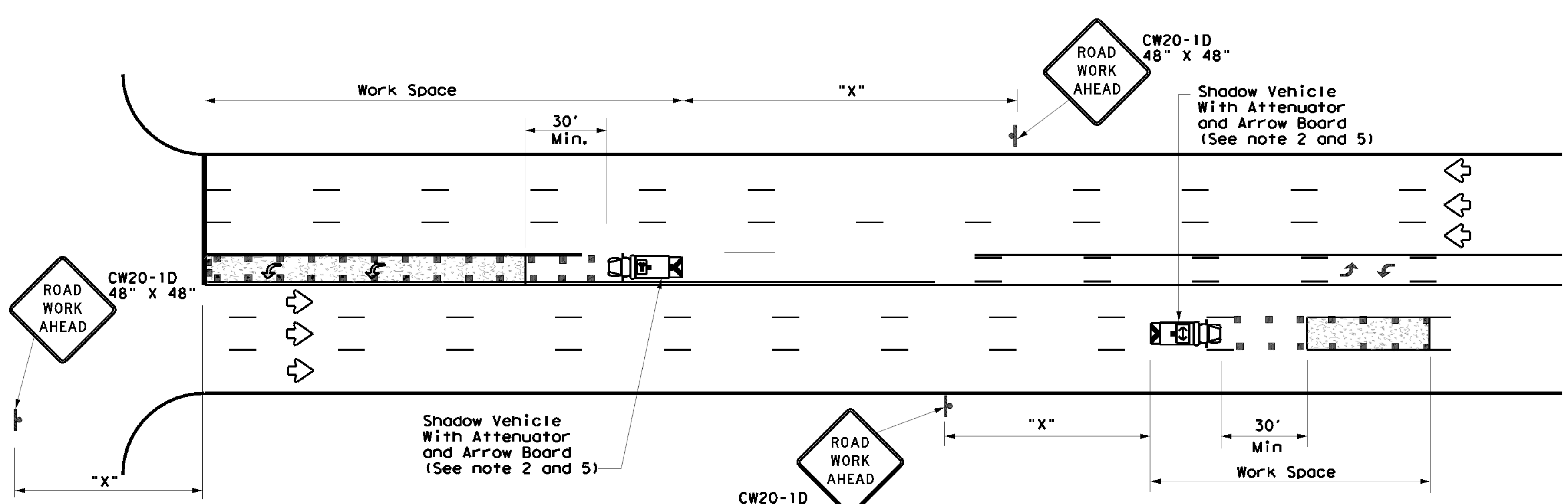


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

LEGEND

*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow	▪ ▪ ▪	Channelizing Devices

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

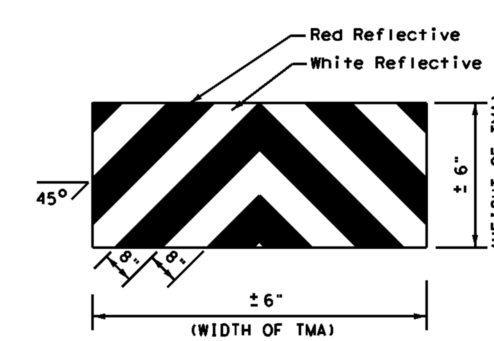
* Conventional Roads Only

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

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

GENERAL NOTES

1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

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©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY			
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	DIST	COUNTY		SHEET NO.			
	HOU	MONTGOMERY		33			

178

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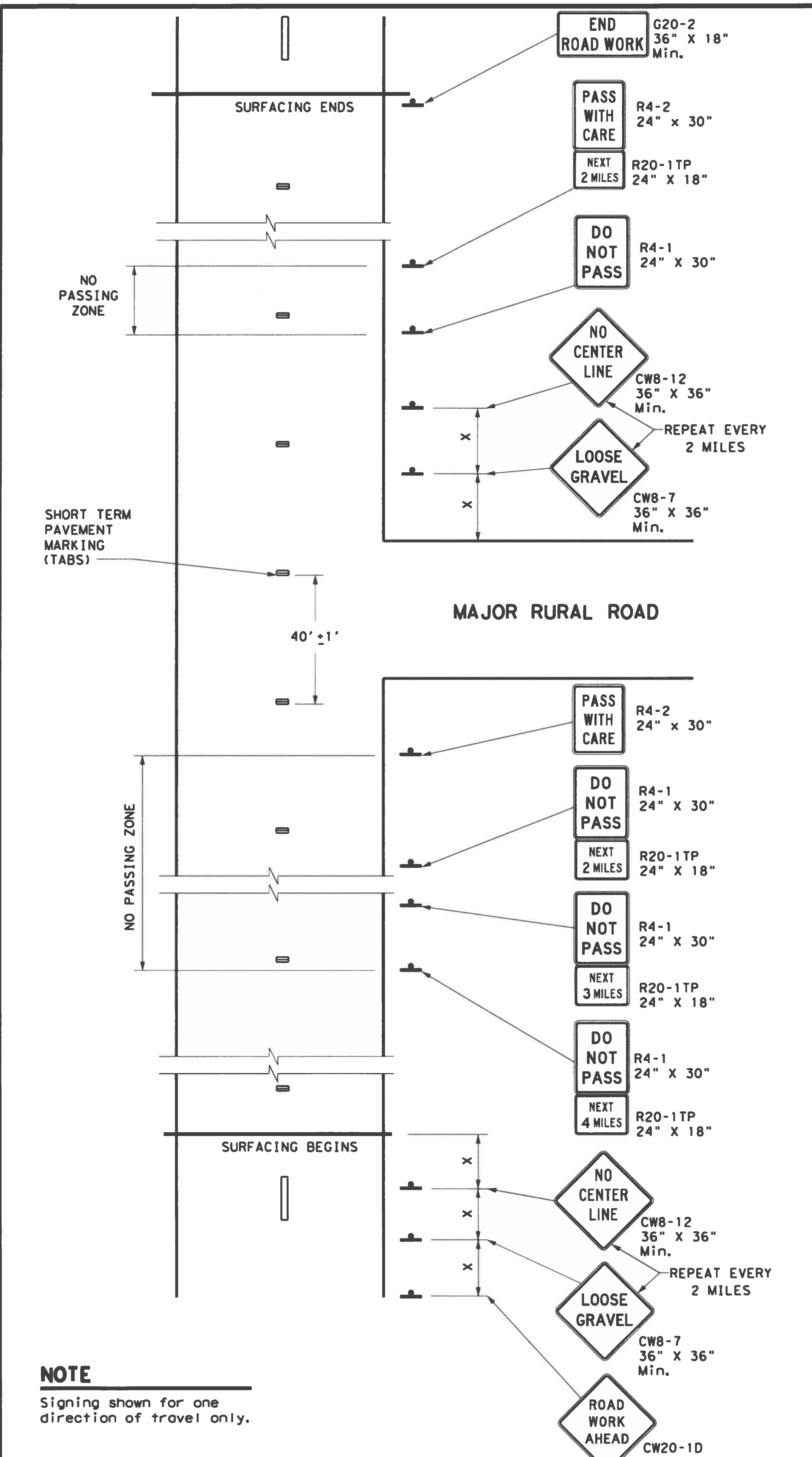
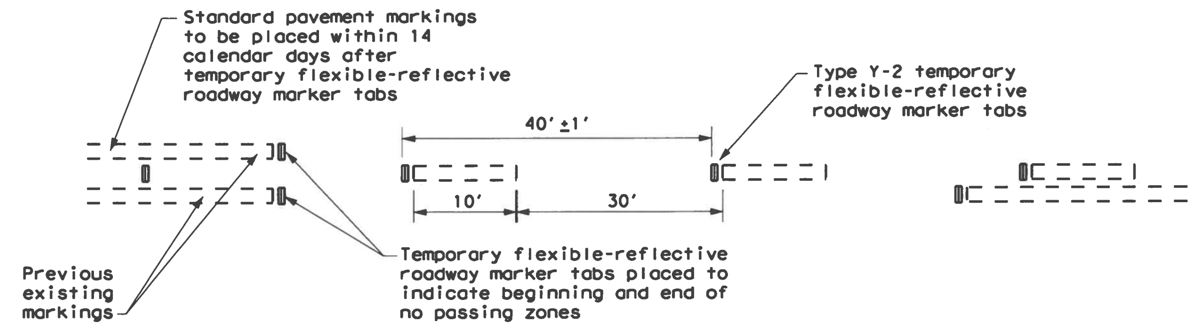


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS (FOR EMERGENCY USE ONLY) ⚠1

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

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

* Conventional Roads Only

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

GENERAL NOTES

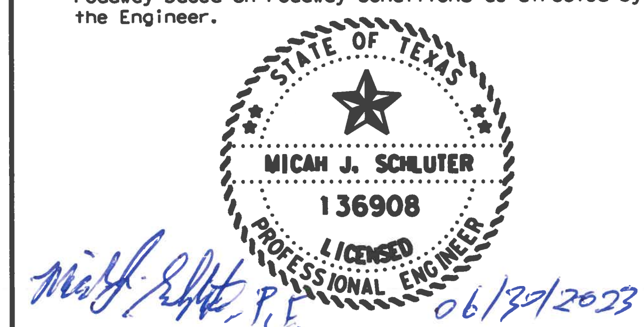
1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.

2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.

3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.

4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".

5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.



⚠1 CHANGED VERBAGE FOR PAVEMENT MARKINGS

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13 (MOD)

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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4-92 4-98	DIST		COUNTY	SHEET NO.
1-97 7-13	HOU		MONTGOMERY	34

210

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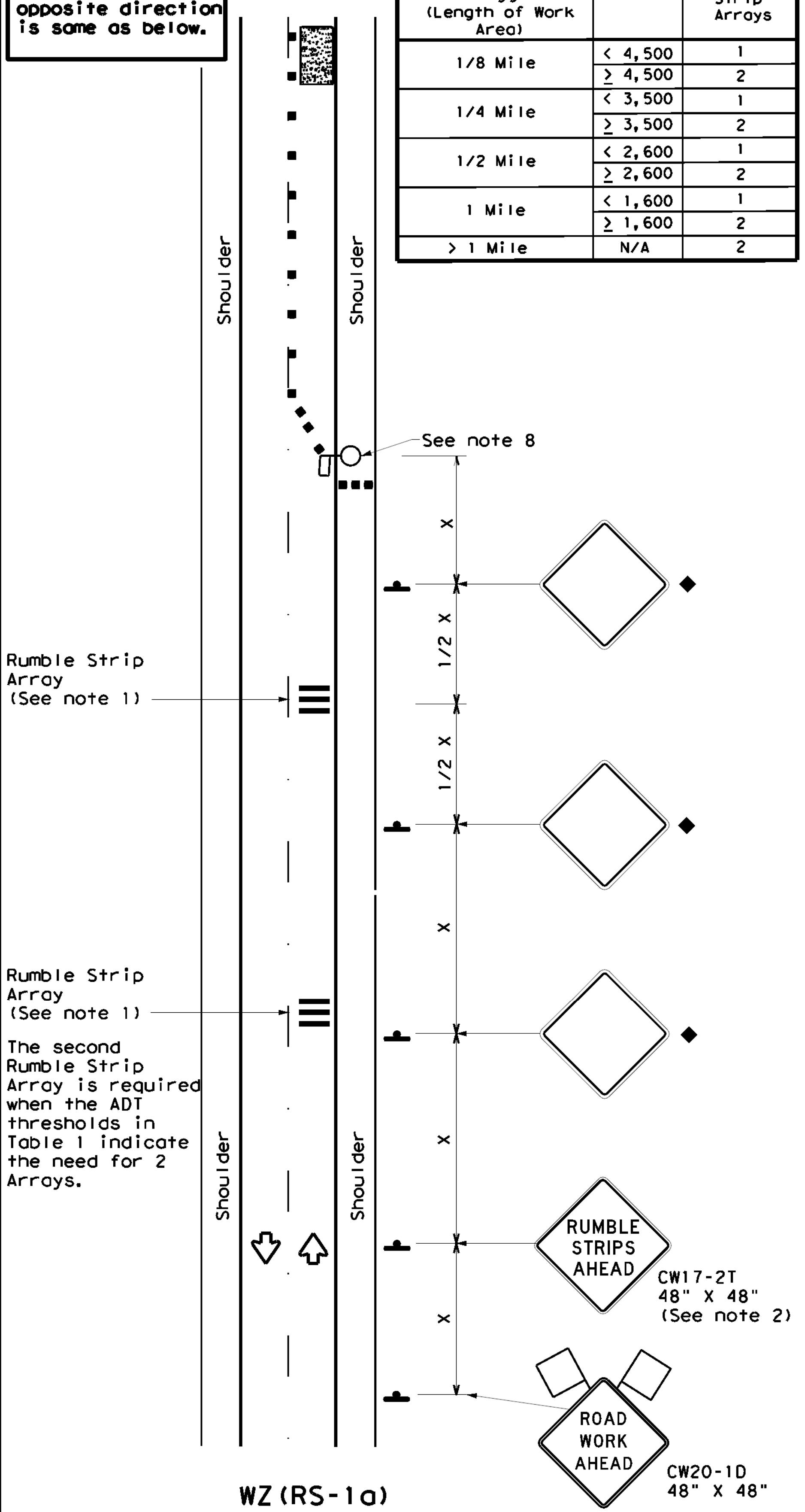
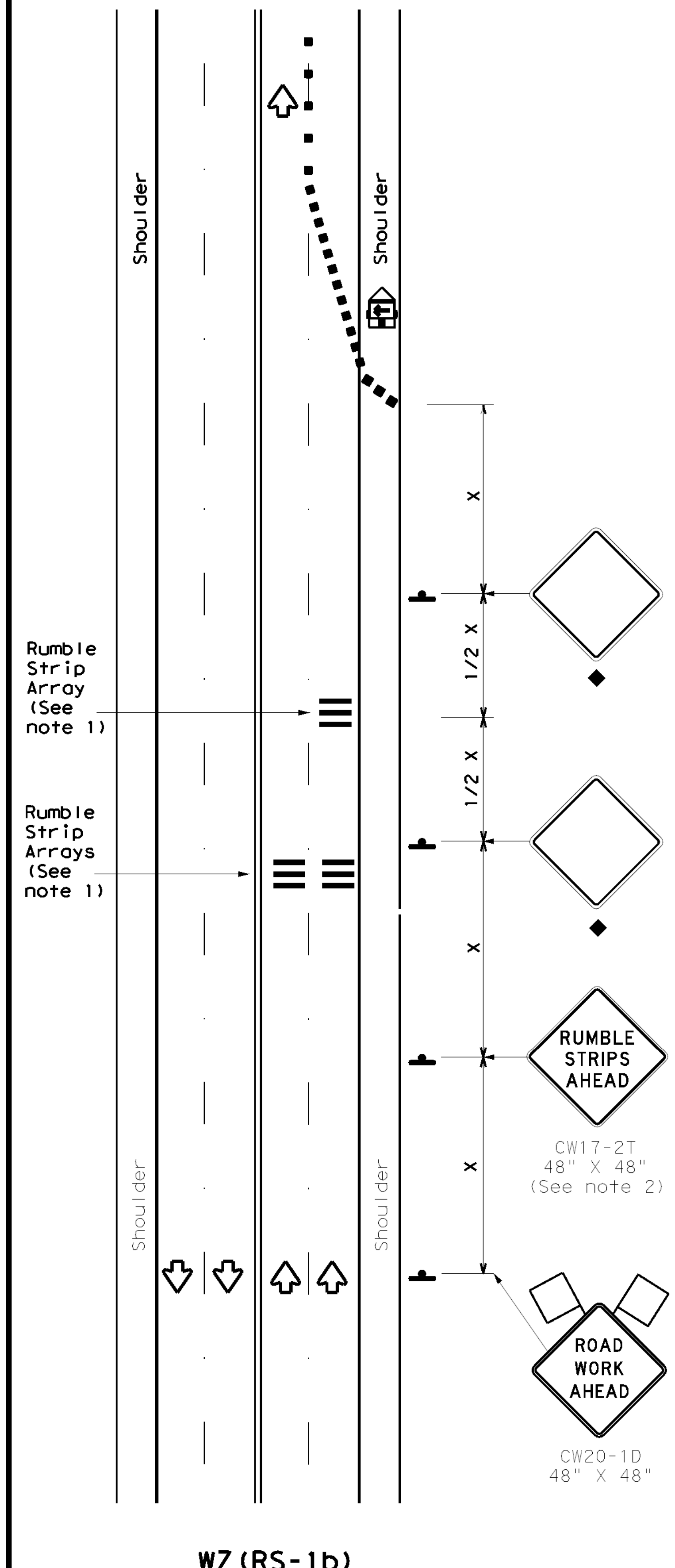
Warning sign and rumble strip sequence in opposite direction is same as below.

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

◆ **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

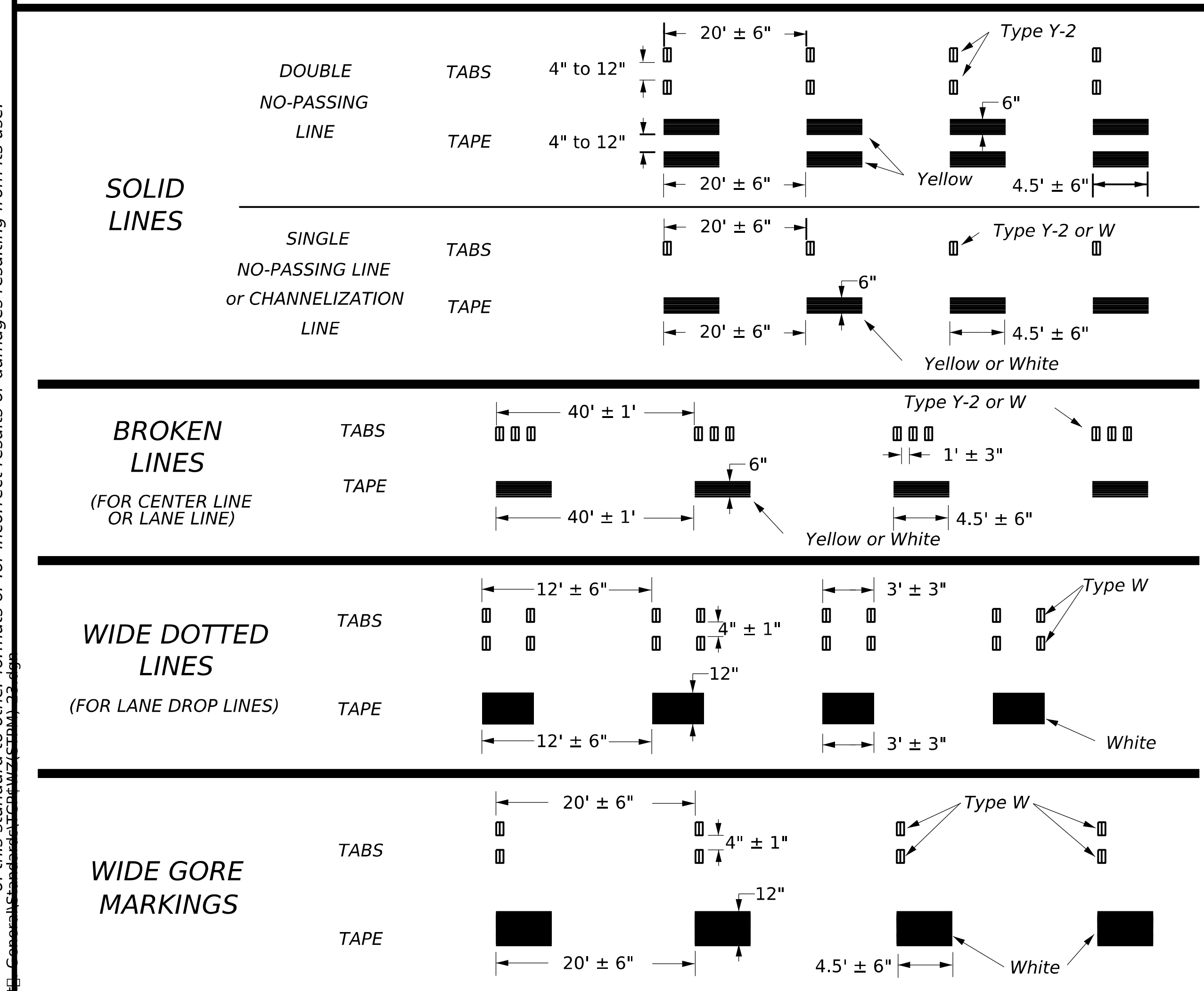
TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
2-14 1-22 4-16	DIST		COUNTY	SHEET NO.
	HOU		MONTGOMERY	35

DATE: 05/02/2023 04:40 PM
FILE:

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



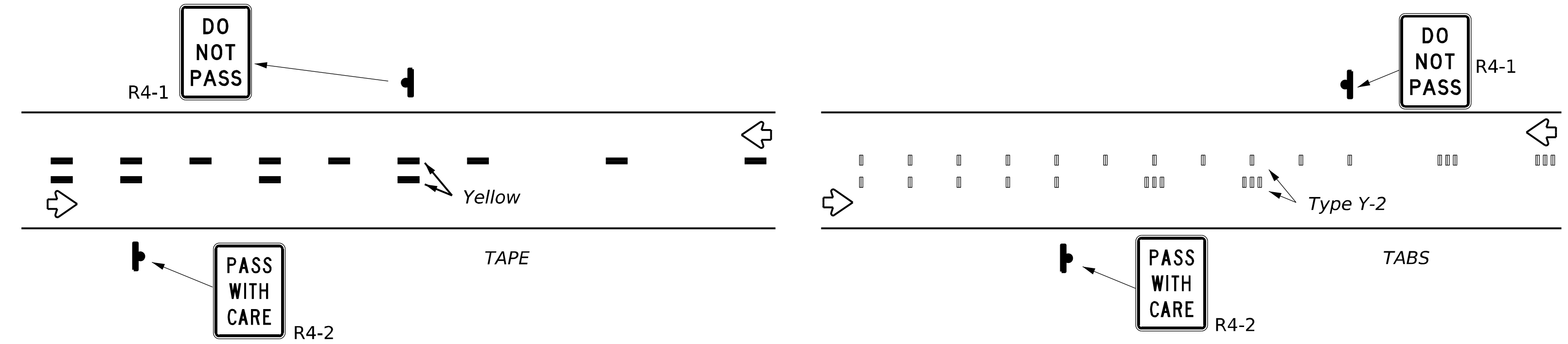
NOTES:

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.

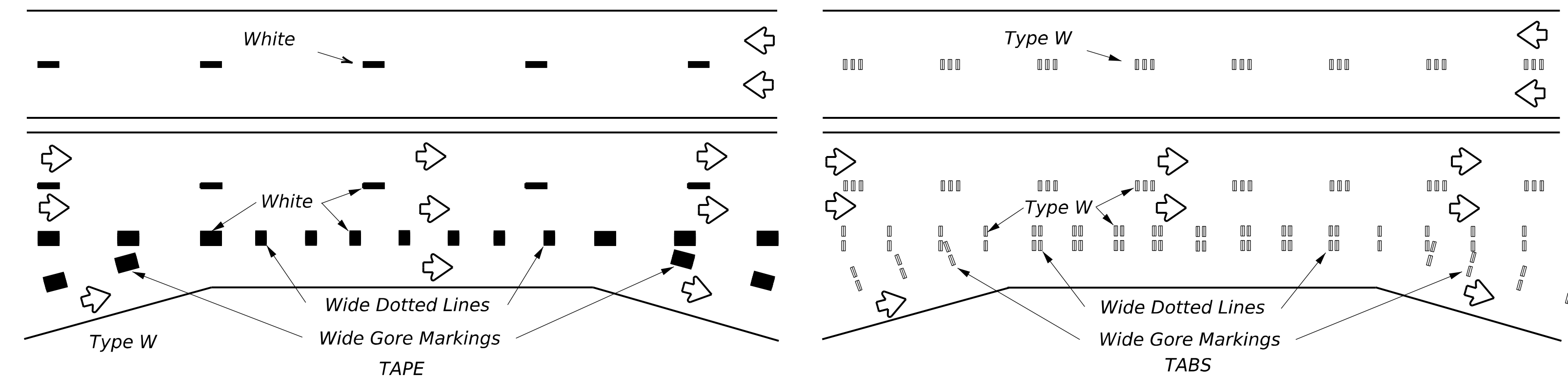
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

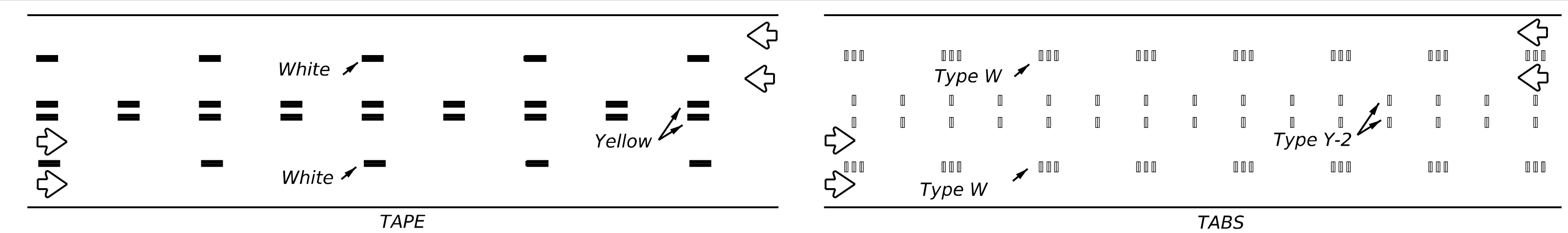
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



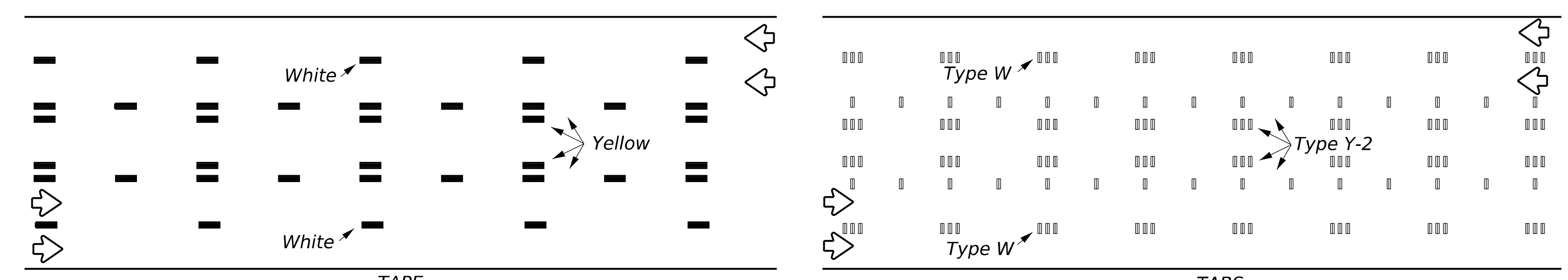
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



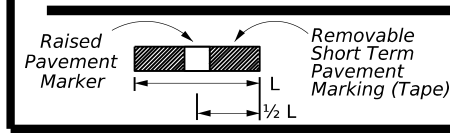
LANE LINES FOR DIVIDED HIGHWAY



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/texas_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
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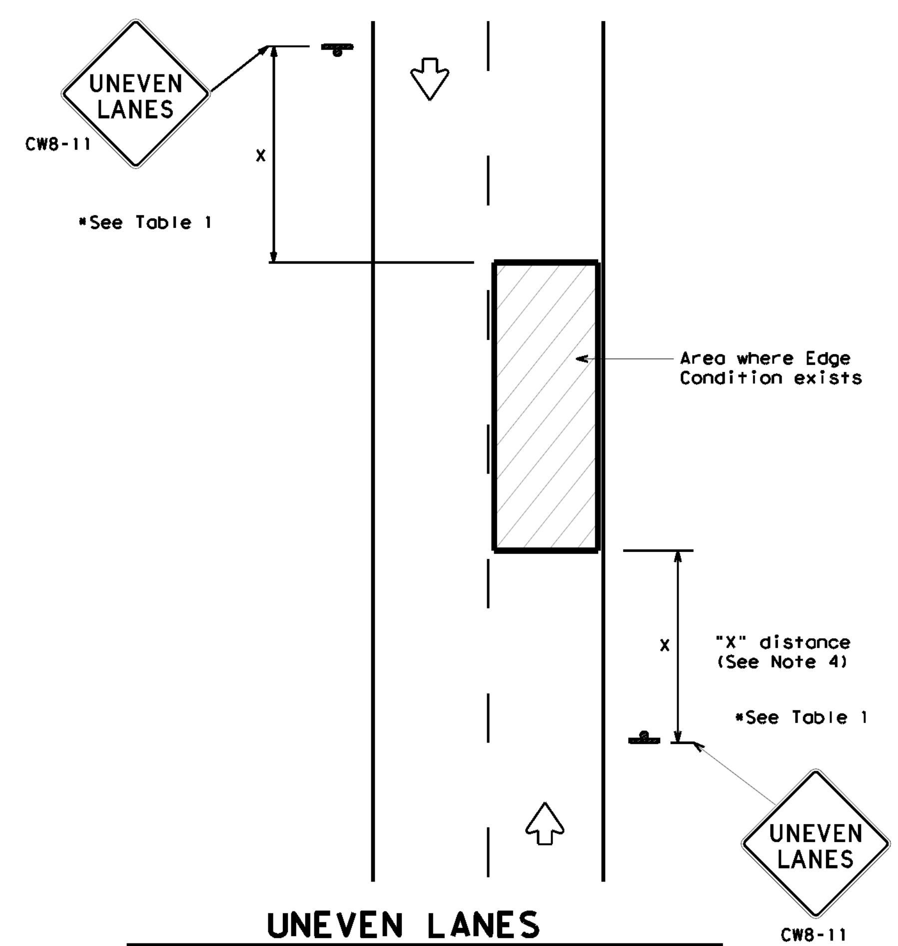
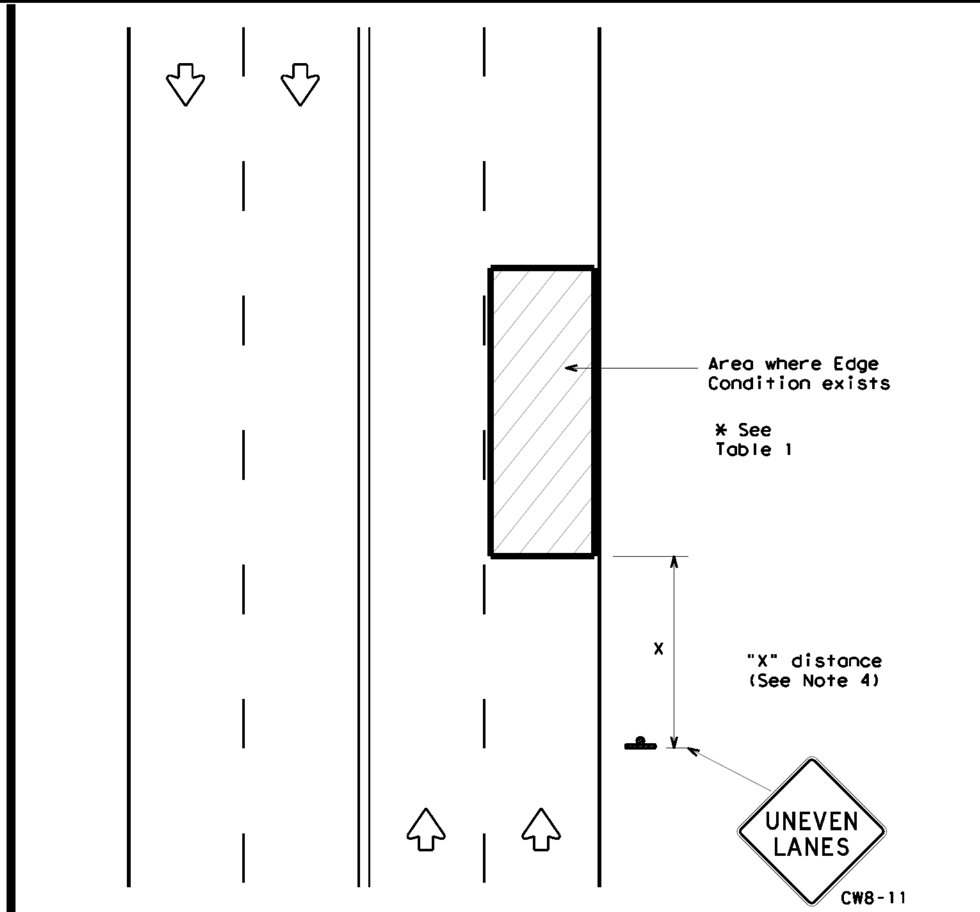
4-92 7-13		DIST		COUNTY	SHEET NO.
1-97 2-23 3-03		HOU		MONTGOMERY	36

111



UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



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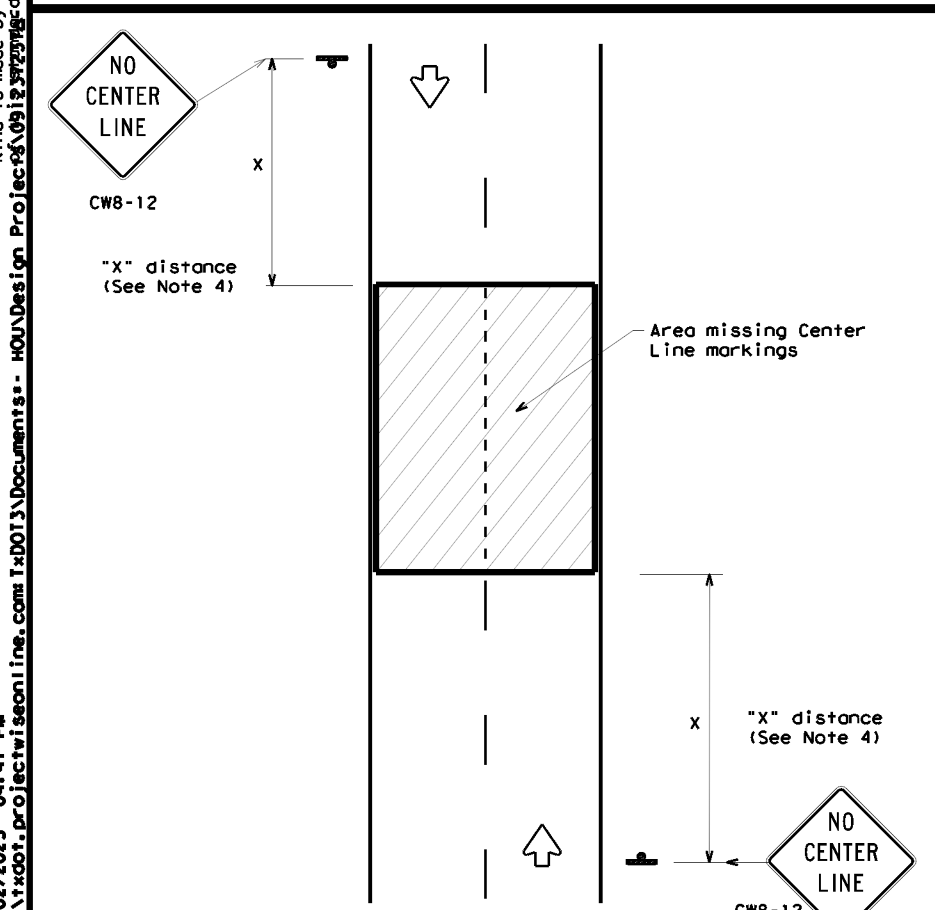
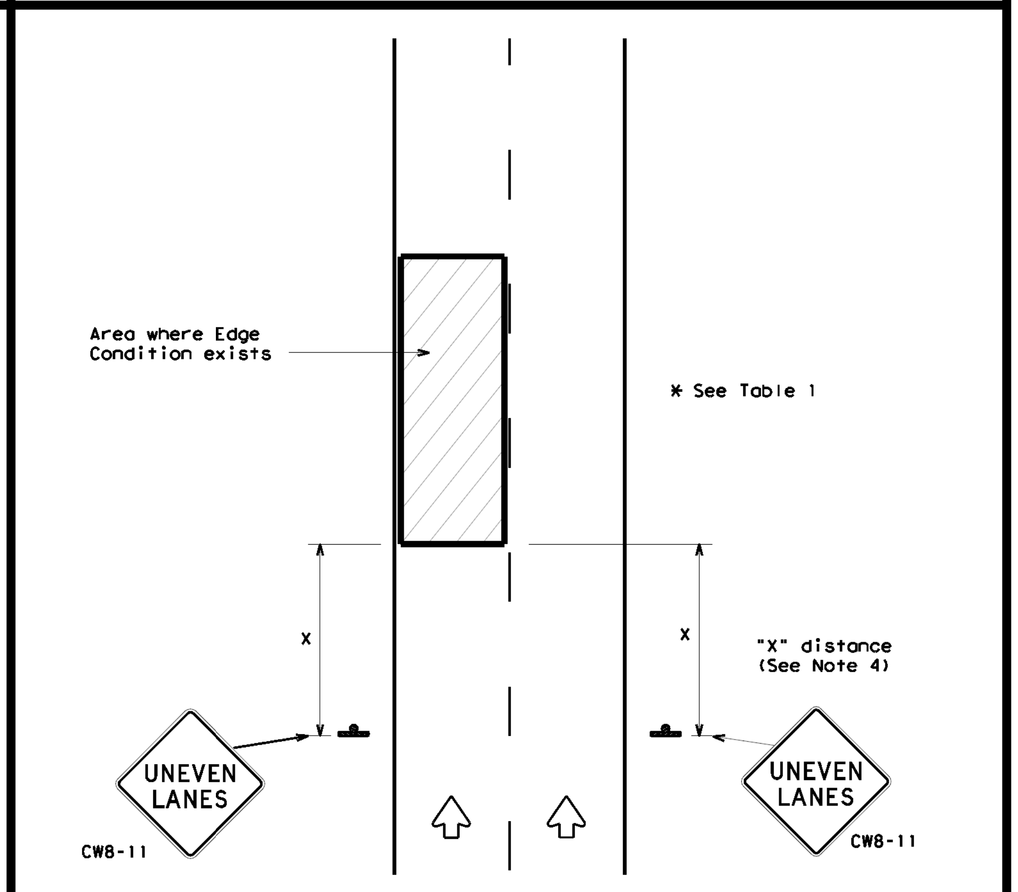
FOUR LANE CONVENTIONAL ROAD



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 0912	SECT 37	JOB 237	HIGHWAY VARIOUS
REVISIONS 8-95 2-98 7-13 1-97 3-03	DIST HOU		COUNTY MONTGOMERY	SHEET NO. 37

112

DATE: 05/02/2023 04:41 PM
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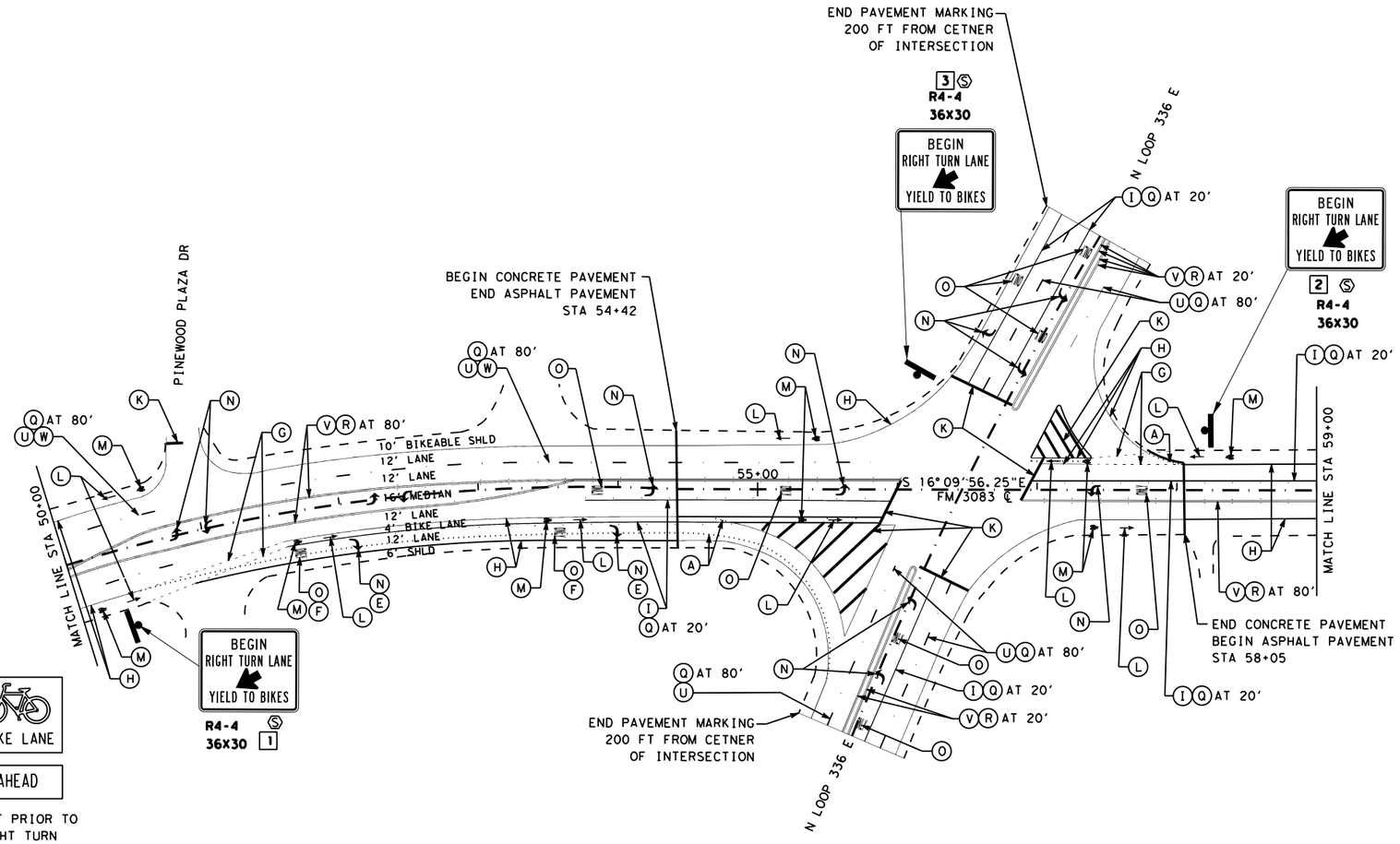
NOTES:

NO OVERLAY REQUIRED
PAVEMENT MARKINGS & SIGNAGE ONLY

REFL PAV MRK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACE ON CONCRETE SURFACES.



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT N SL 336 E
INTERSECTION
LAYOUT

SHEET 1 OF 1

®2023
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		38

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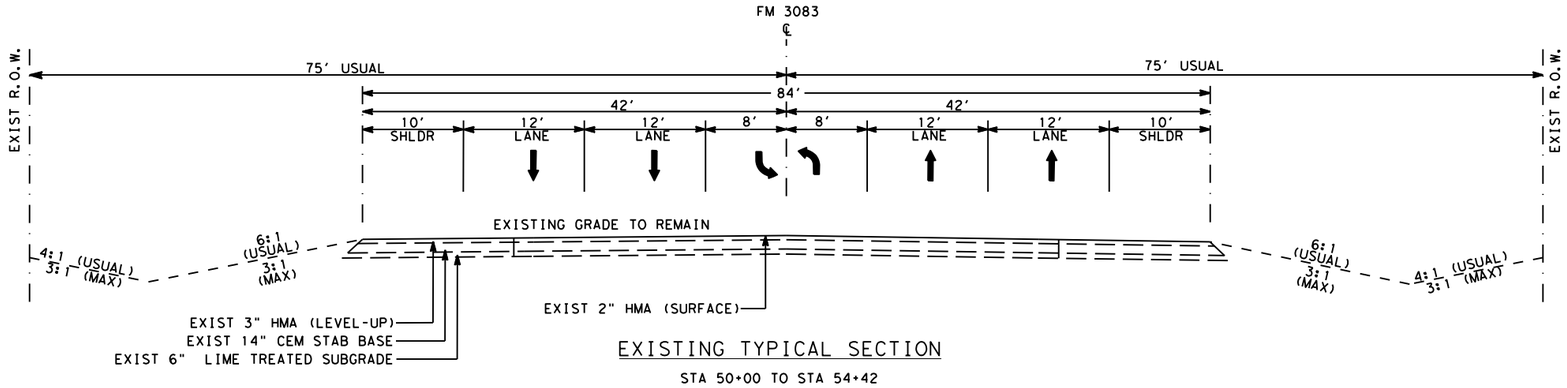

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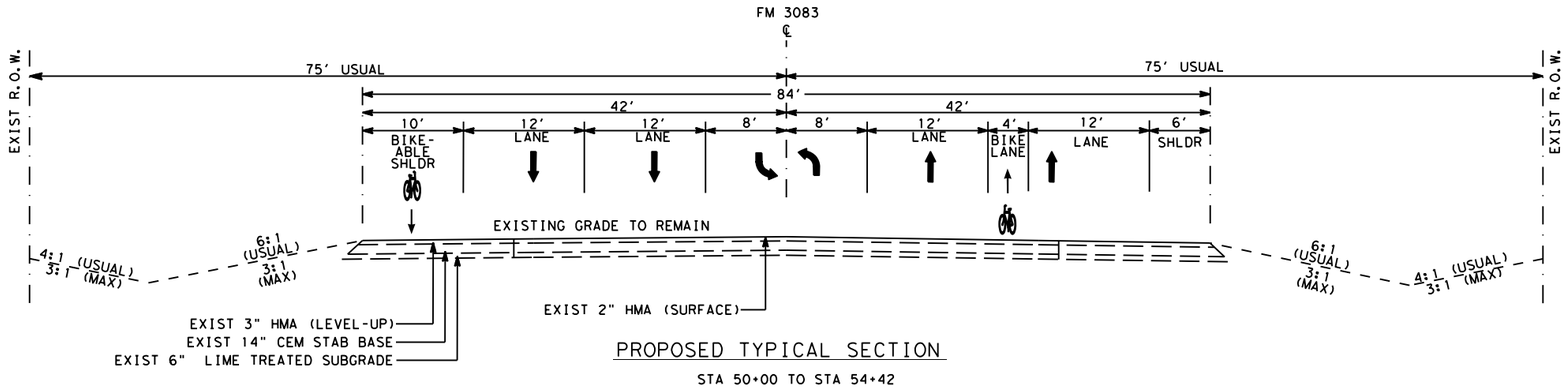

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N. T. S.

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136908
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PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 3083
AT N SL 336 E
TYPICAL SECTIONS

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
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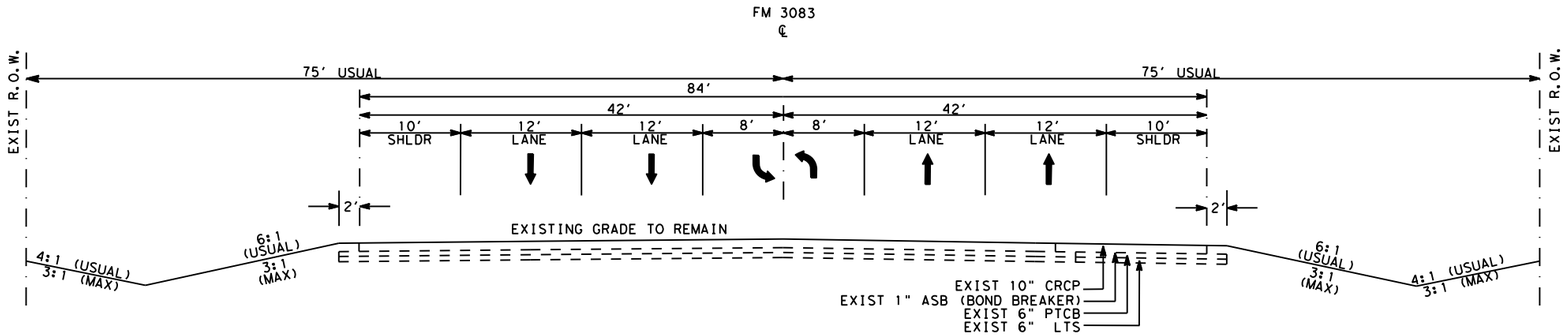

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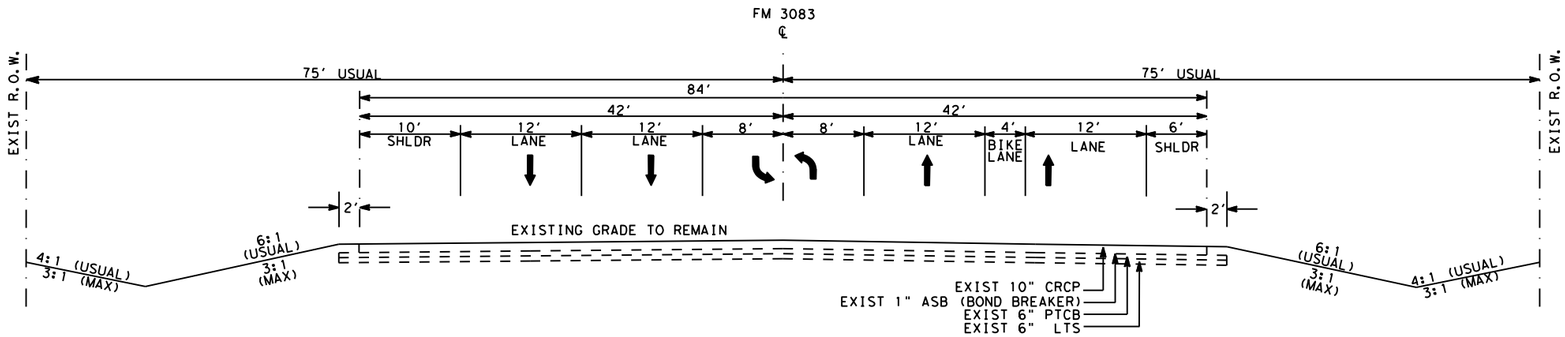

PROPOSED TYPICAL SECTION

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Micah J. Schluter, P.E.

08.01.23

FM 3083
AT N SL 336 E
TYPICAL SECTIONS

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		38B

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CK:

NOTES:

ELIMINATION OF EXISTING PAVEMENT MARKINGS WILL BE SUBSIDIARY TO ASPHALT PAVEMENT PLANING

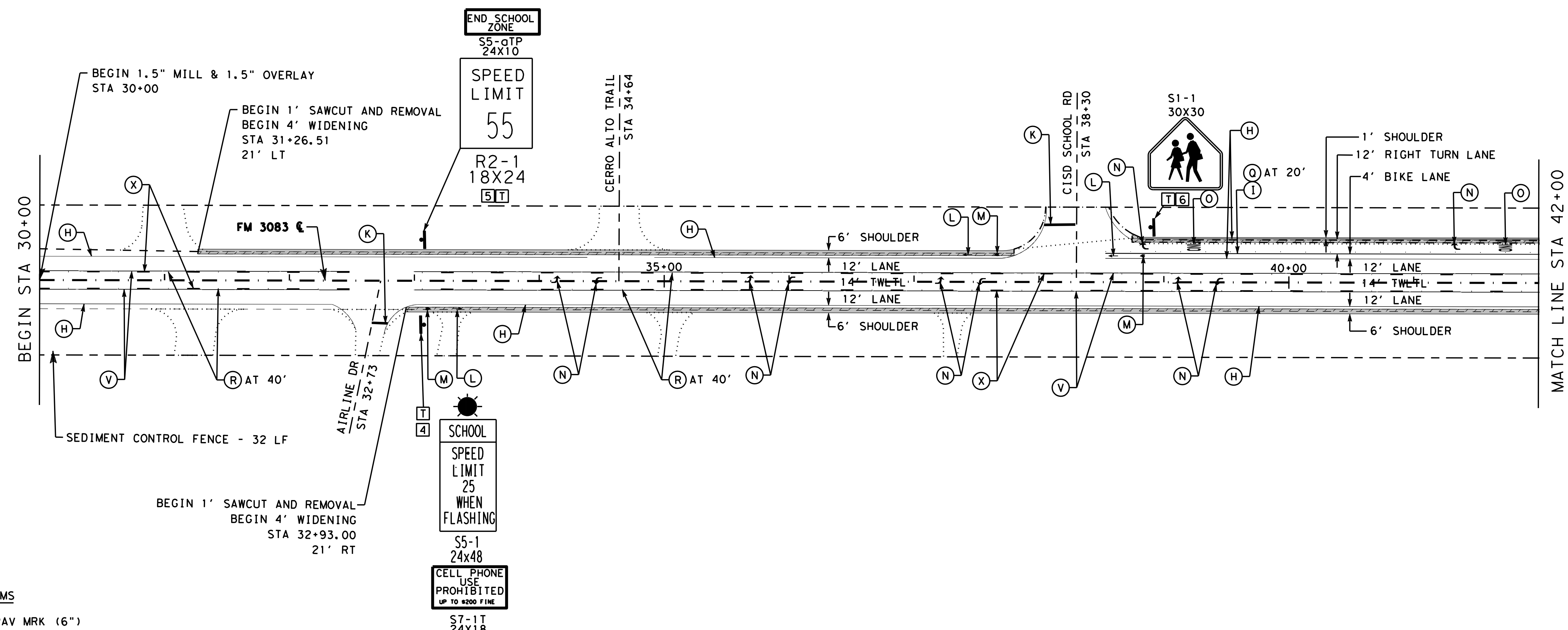
SAW CUTTING WILL BE SUBSIDIARY TO ASPHALT & BASE REMOVAL

OVERLAY OF EXISTING DRIVEWAYS NOT REQUIRED

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED ASPHALT WIDENING
- PROPOSED REMOVAL



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT CISD SCHOOL RD
INTERSECTION LAYOUT

SHEET 1 OF 3

0 50 100
SCALE IN FEET

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST		COUNTY	SHEET NO.
HOU		MONTGOMERY	39

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NOTES:

ELIMINATION OF EXISTING PAVEMENT MARKINGS WILL BE SUBSIDIARY TO ASPHALT PAVEMENT PLANING

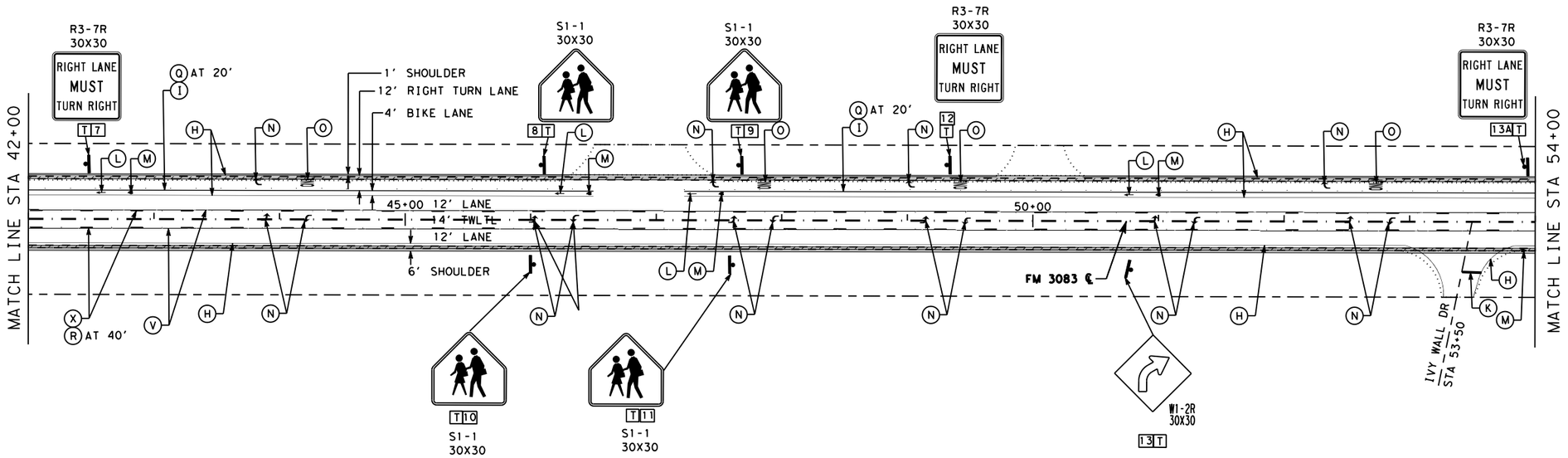
SAW CUTTING WILL BE SUBSIDIARY TO ASPHALT & BASE REMOVAL

OVERLAY OF EXISTING DRIVEWAYS NOT REQUIRED

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED ASPHALT WIDENING
- PROPOSED REMOVAL



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
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- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083 AT CISD SCHOOL RD INTERSECTION LAYOUT

SHEET 2 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		39A

DATE: 07/24/2023 02:14 PM
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NOTES:

ELIMINATION OF EXISTING PAVEMENT MARKINGS WILL BE SUBSIDIARY TO ASPHALT PAVEMENT PLANING

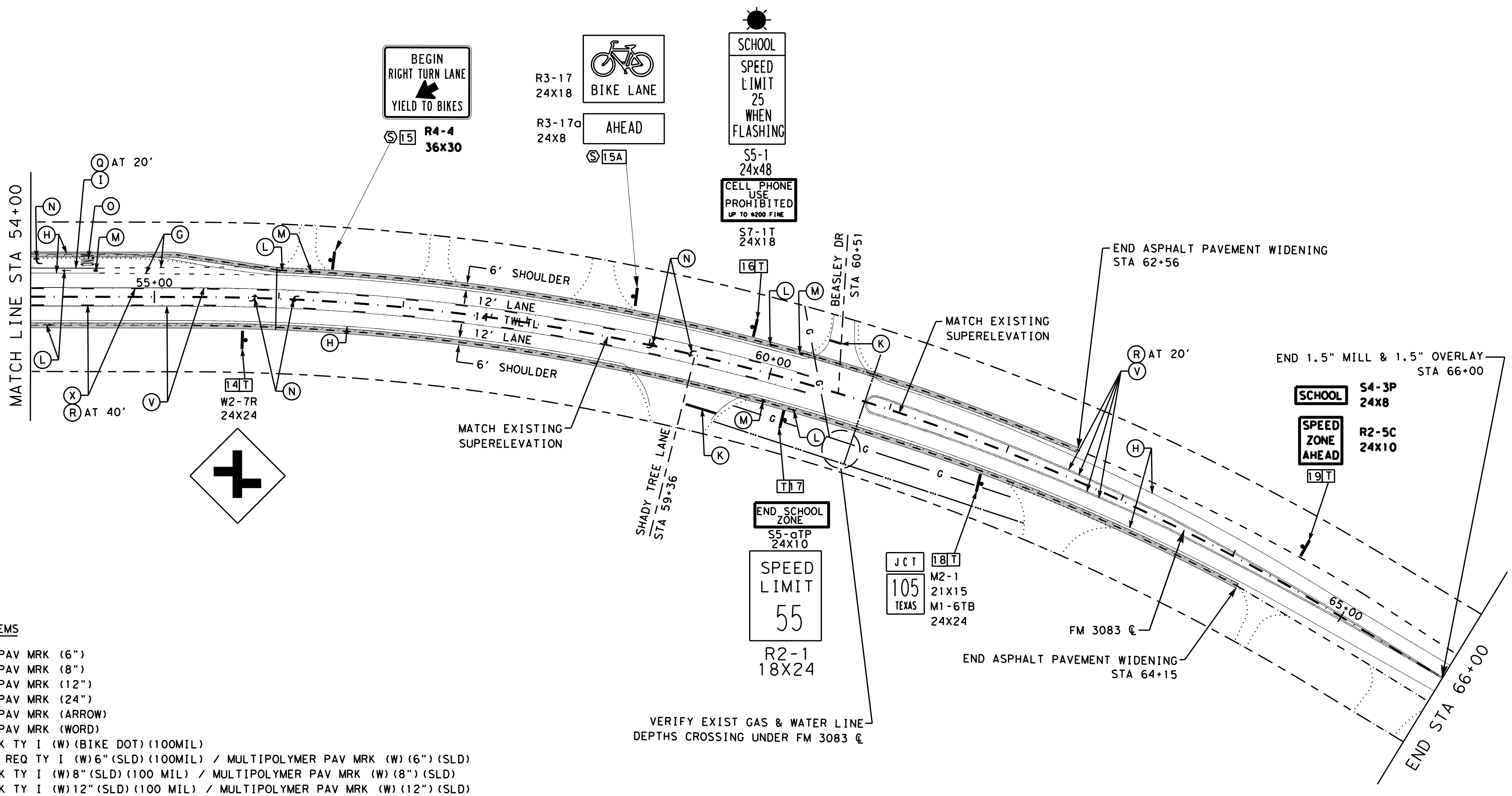
SAW CUTTING WILL BE SUBSIDIARY TO ASPHALT & BASE REMOVAL

OVERLAY OF EXISTING DRIVEWAYS NOT REQUIRED

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED ASPHALT WIDENING
- PROPOSED REMOVAL
- EXIST GAS LINE
- EXIST WATER LINE



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT CISD SCHOOL RD INTERSECTION LAYOUT

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST		COUNTY	SHEET NO.
HOU		MONTGOMERY	39B

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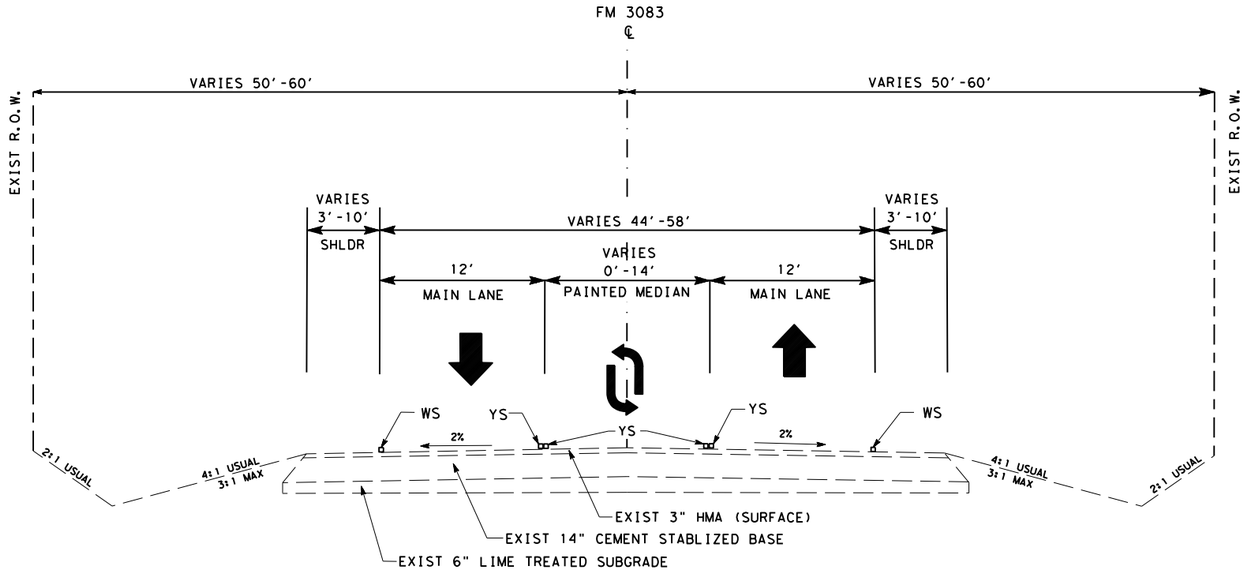
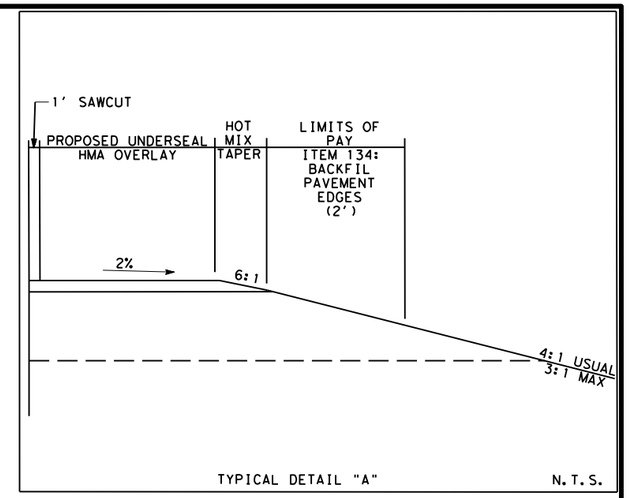
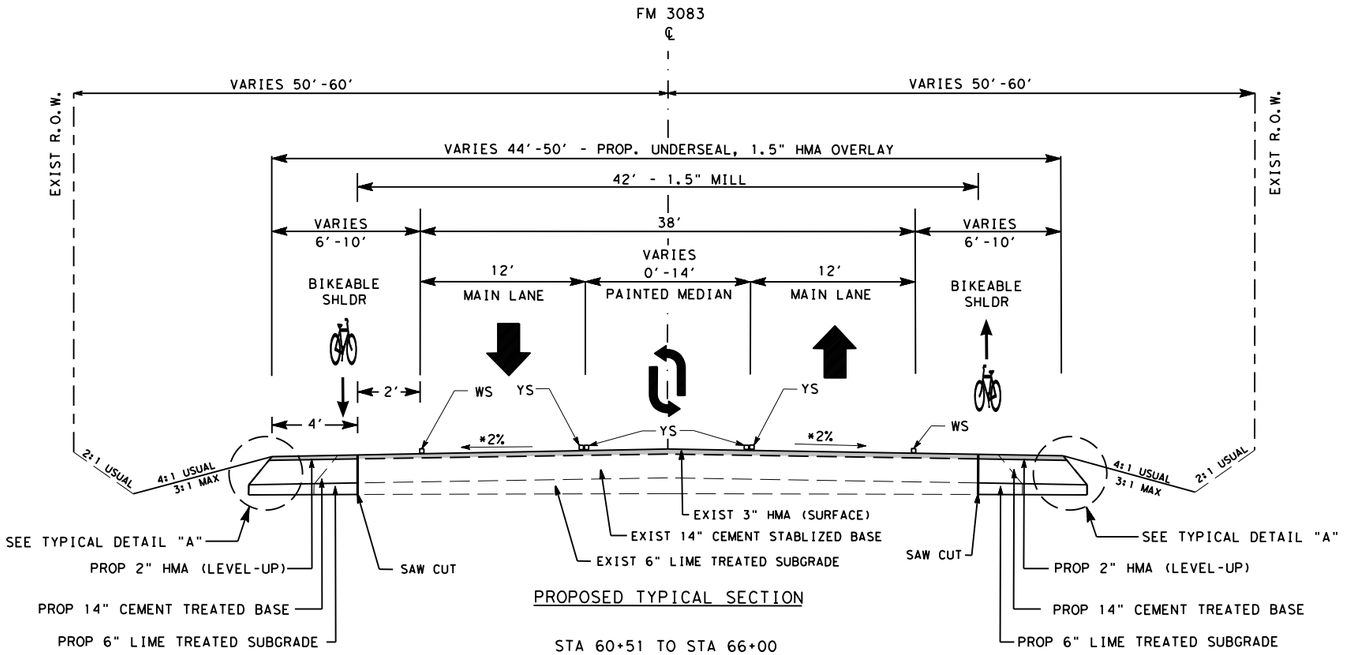


EXISTING TYPICAL SECTION

STA 60+51 TO STA 66+00



TYPICAL DETAIL "A" N.T.S.



PROPOSED TYPICAL SECTION

STA 60+51 TO STA 66+00

* MATCH EXISTING SUPERELEVATION

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.

08.01.23

FM 3083 AT CISD SCHOOL RD TYPICAL SECTIONS

SHEET 1 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		39C

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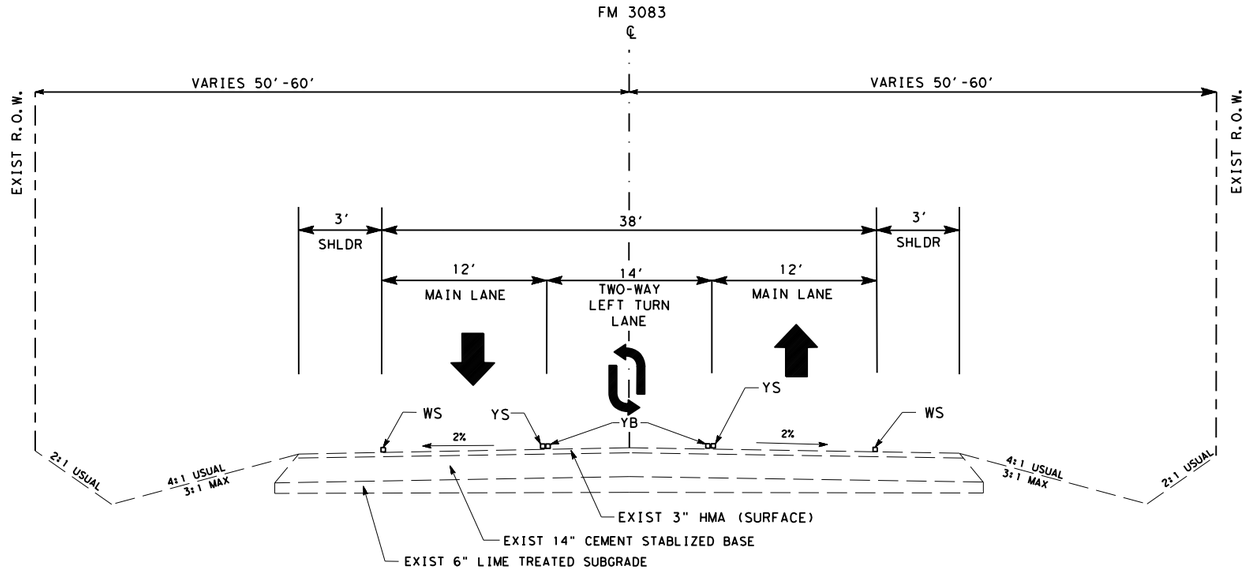
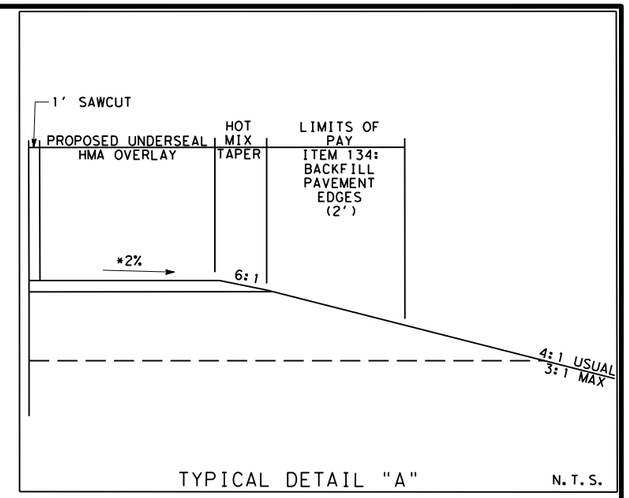


EXISTING TYPICAL SECTION

STA 30+00 TO STA 38+30
STA 56+00 TO STA 60+51



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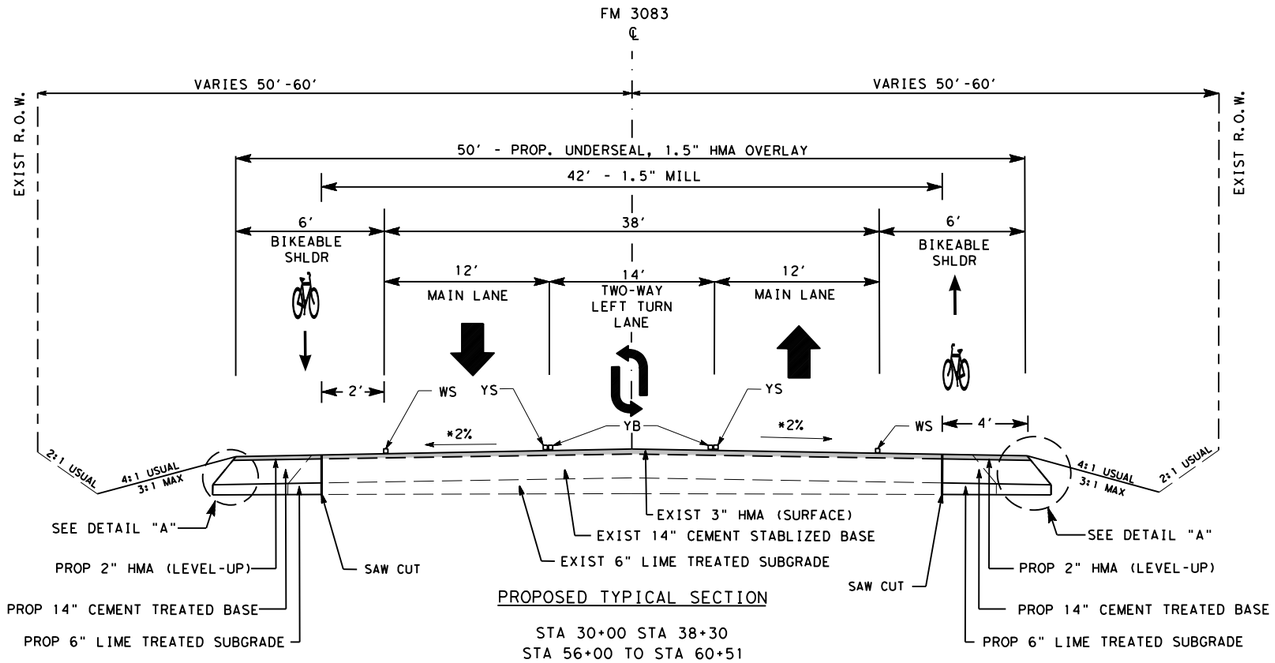

PROPOSED TYPICAL SECTION

STA 30+00 STA 38+30
STA 56+00 TO STA 60+51

* MATCH EXISTING SUPERELEVATION

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.01.23

FM 3083
AT CISD SCHOOL RD
TYPICAL
SECTIONS

SHEET 2 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		39D

DATE: 08/01/2023 10:22 AM
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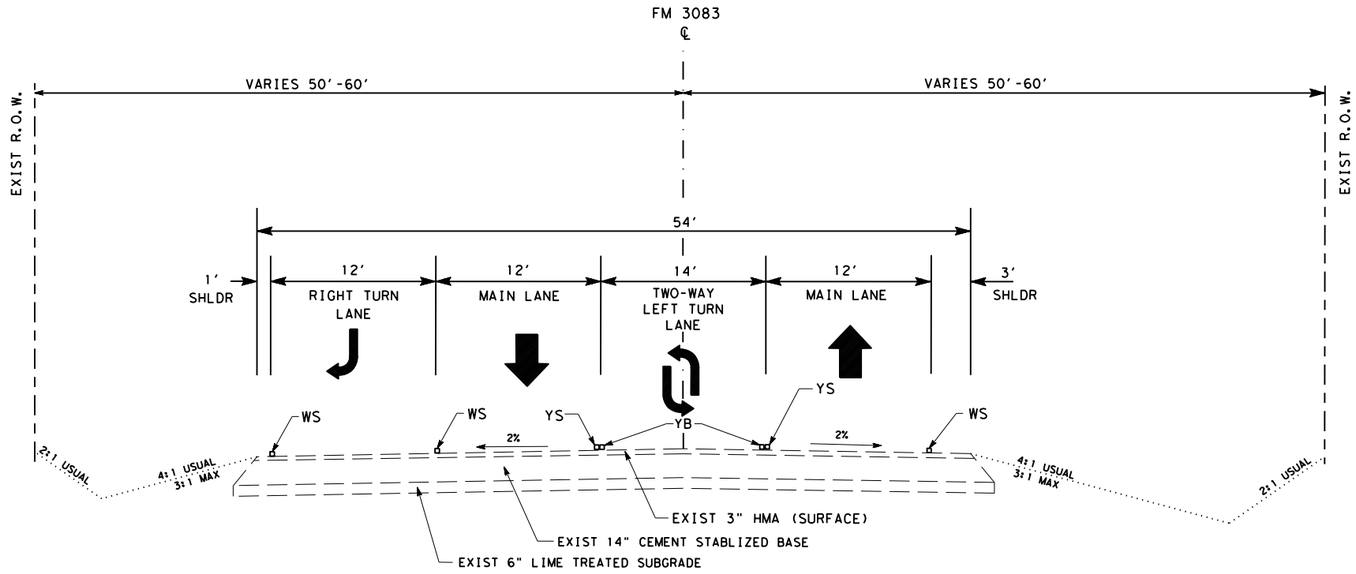
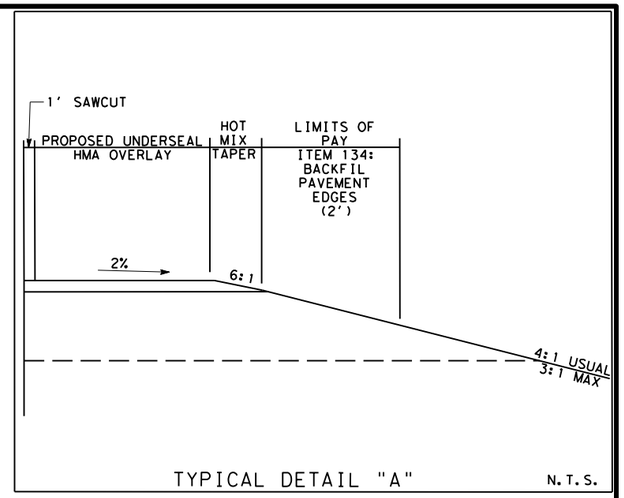


EXISTING TYPICAL SECTION

STA 38+30 TO STA 56+00



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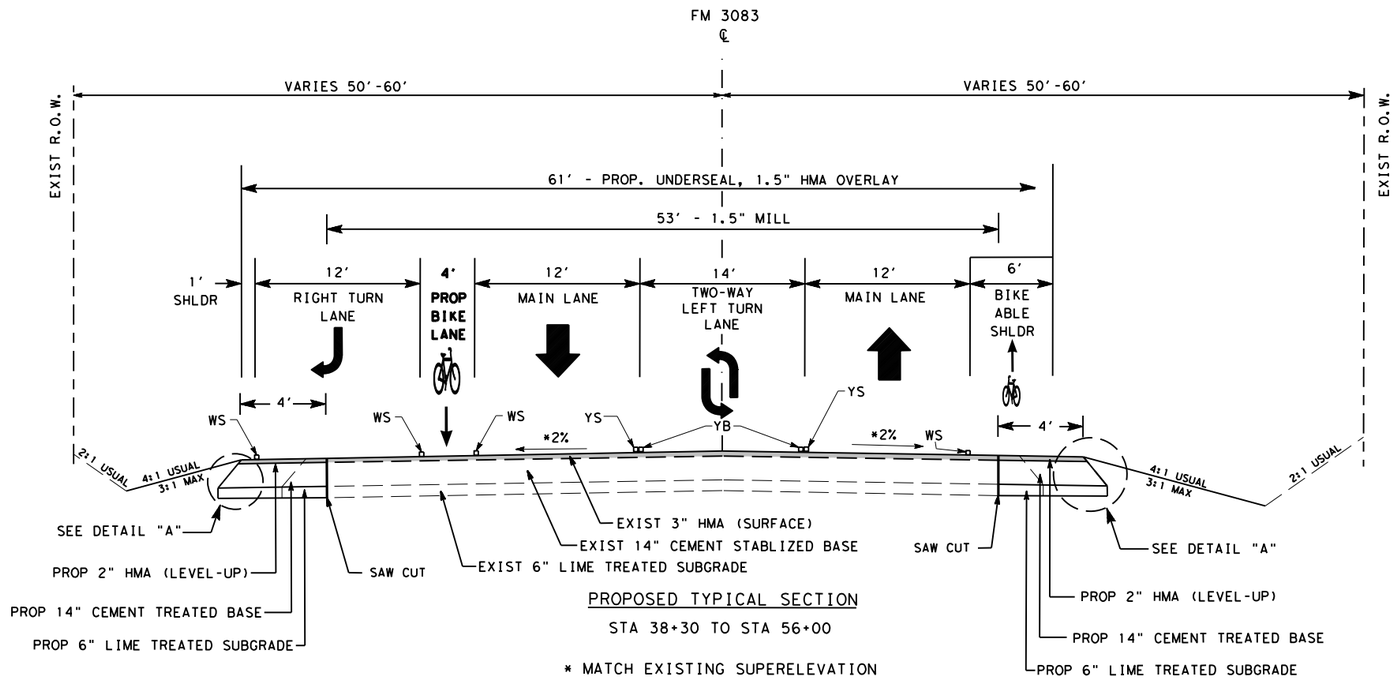

PROPOSED TYPICAL SECTION

STA 38+30 TO STA 56+00

* MATCH EXISTING SUPERELEVATION

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 3083 AT CISD SCHOOL RD TYPICAL SECTIONS

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		39E

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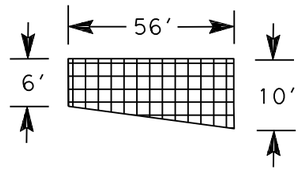
NOTES:

ELIMINATION OF EXISTING PAVEMENT MARKINGS
IS SUBSIDIARY TO PLANING OF ASPHALT PAVEMENT
SAWCUTTING IS SUBSIDIARY TO APHALT PAVEMENT AND BASE REMOVAL

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

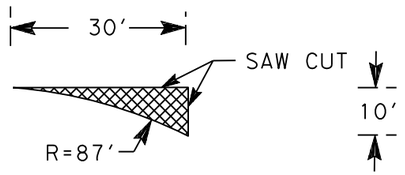
*** **CONTACT BRYAN SCHONE AT (903) 736-6696 WITH TX EASTERN PIPELINE CO. BEFORE BEGINNING CONSTRUCTION**

PROP CONCRETE WIDENING DETAIL



50 SY + 50 SY = 100 SY

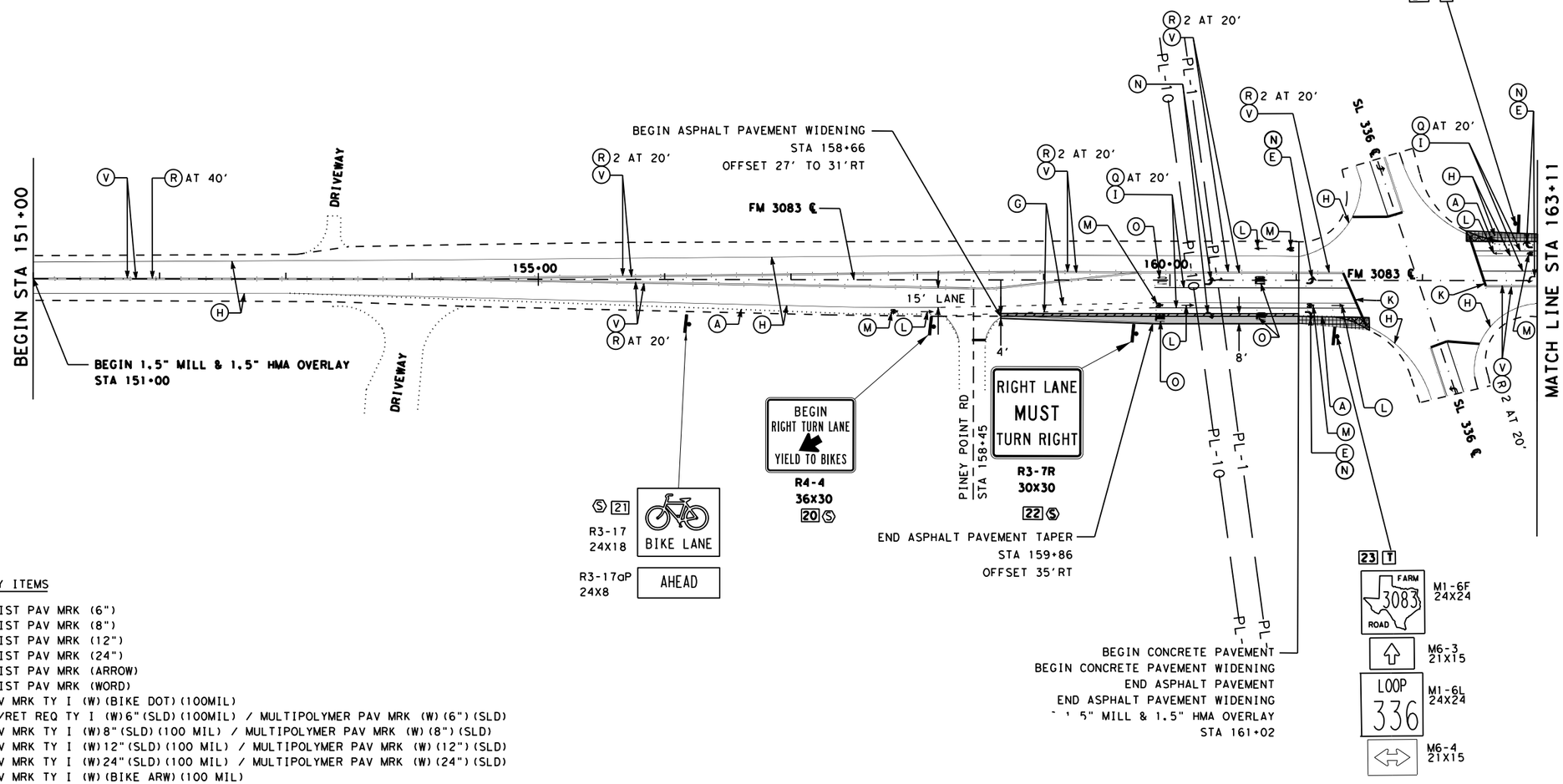
PROP CONCRETE REMOVAL DETAIL



17 SY + 17 SY = 34 SY

LEGEND

- EXISTING EDGE OF PAVEMENT
- PROP ASPHALT PAVEMENT
- PROP ASPHALT PAVEMENT/ DRIVEWAY REMOVAL
- PROP CONCRETE WIDENING
- PROP CONCRETE REMOVAL
- PL-1 EXIST PIPELINE***
- PL-10 EXIST PIPELINE***



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 3083 AT S SL 336 E INTERSECTION LAYOUT

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		40

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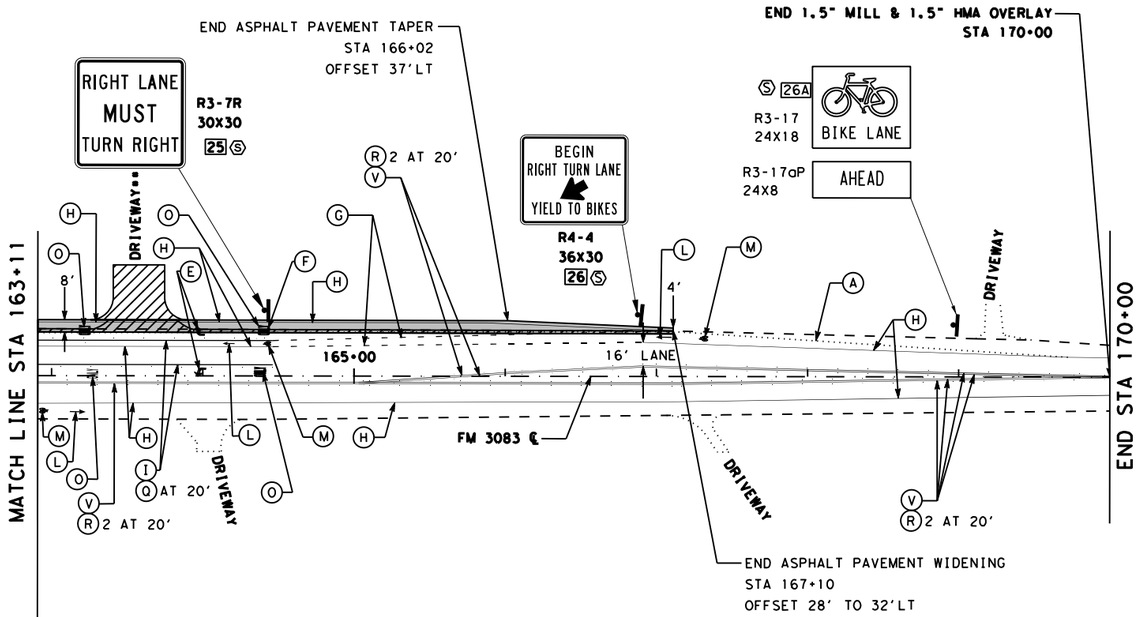
NOTES:

ELIMINATION OF EXISTING PAVEMENT MARKINGS
IS SUBSIDIARY TO PLANING OF ASPHALT PAVEMENT
SAWCUTTING IS SUBSIDIARY TO APHALT PAVEMENT AND BASE REMOVAL

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

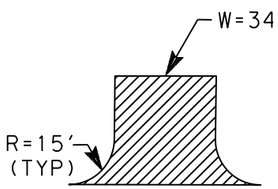
- EXISTING EDGE OF PAVEMENT
- PROP ASPHALT PAVEMENT
- PROP ASPHALT PAVEMENT/ DRIVEWAY REMOVAL
- PROP CONCRETE WIDENING
- PROP CONCRETE REMOVAL



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

**PROP ASPHALT DRIVEWAY DETAIL



PROP ASPHALT DRIVEWAY AREA: 148 SY

REMOVE AND CONSTRUCT ASPHALT DRIVEWAY

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT S SL 336 E
INTERSECTION
LAYOUT

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		40A

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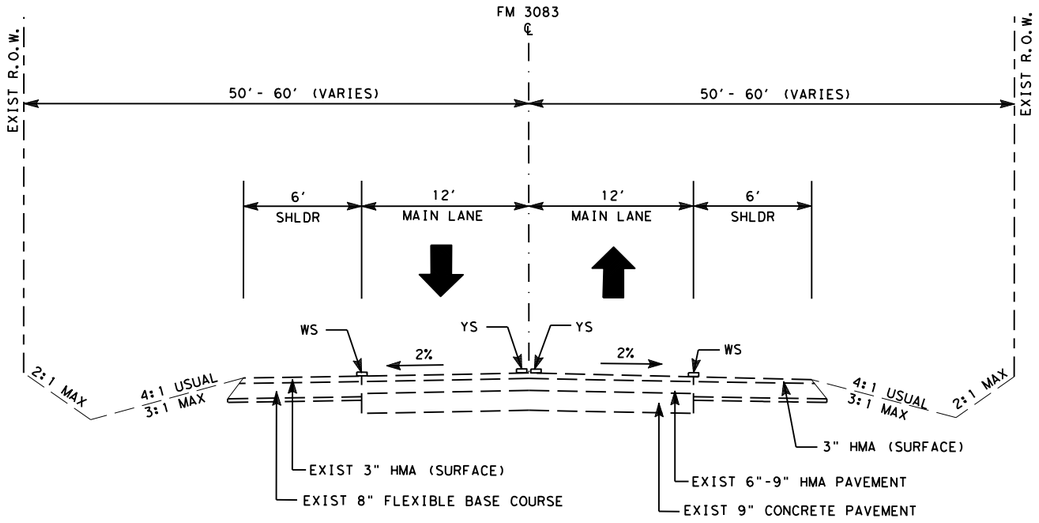
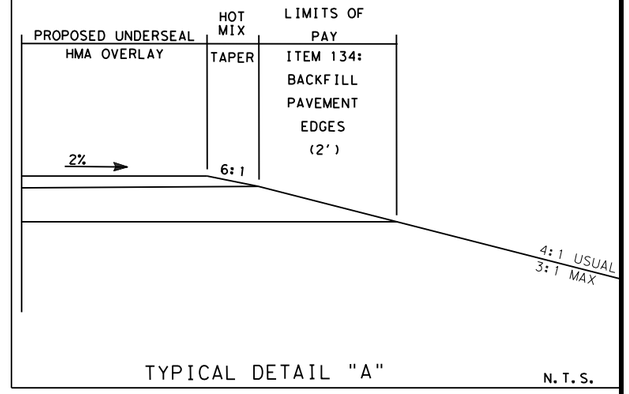
CK:
DW:



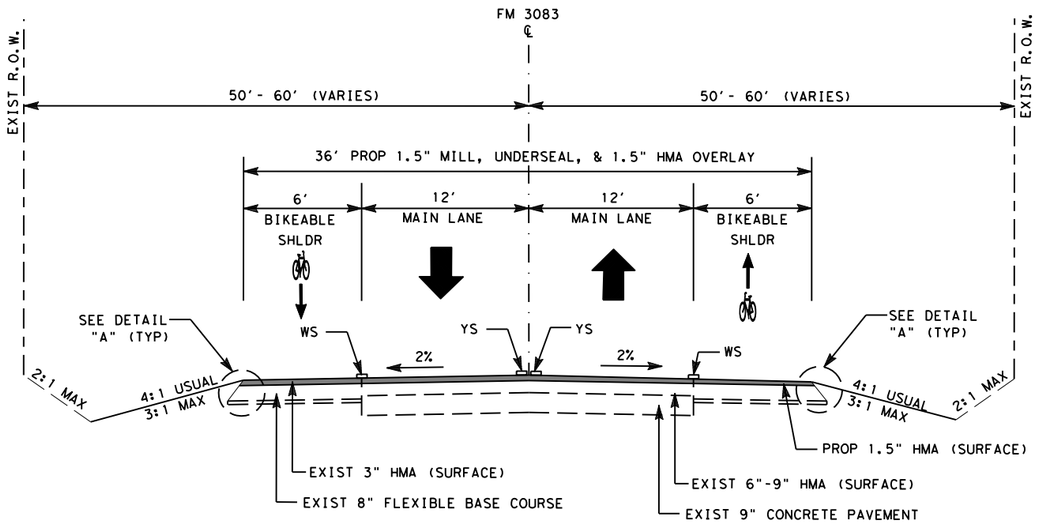
EXISTING TYPICAL SECTION

STA 151+25 TO STA 154+00



TYPICAL DETAIL "A"

N.T.S.



PROPOSED TYPICAL SECTION

STA 151+25 TO STA 154+00

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 3083
AT S SL 336 E
TYPICAL SECTIONS

SHEET 1 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		40B

DATE: 07/24/2023 09:46 AM
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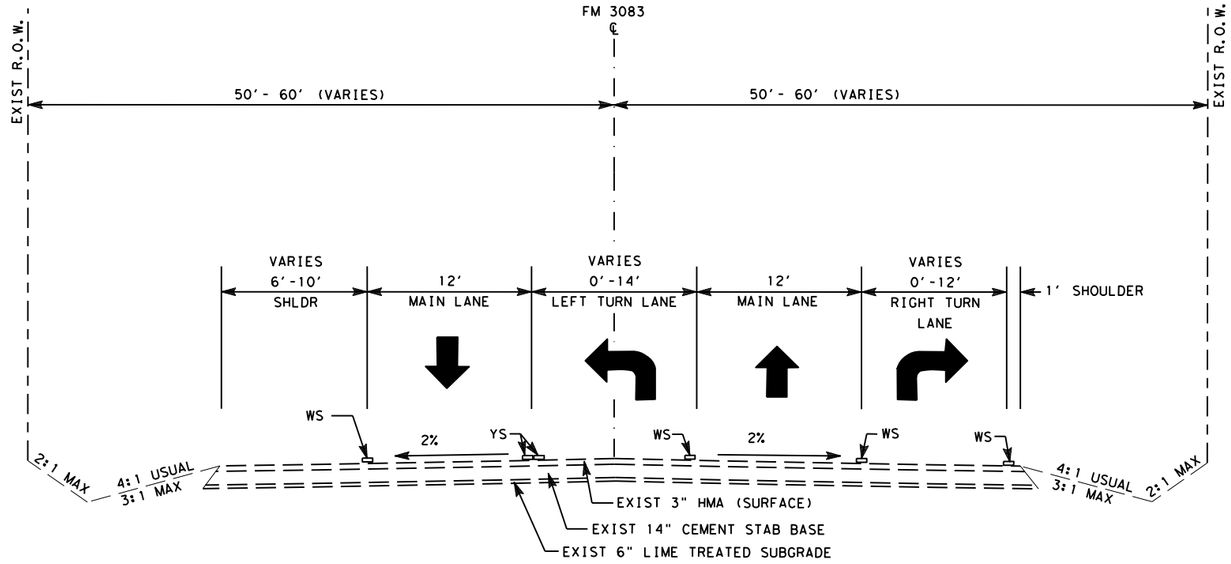
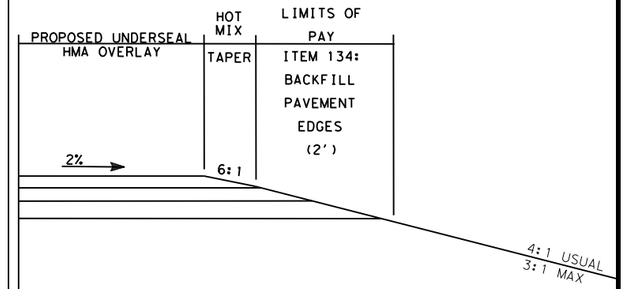


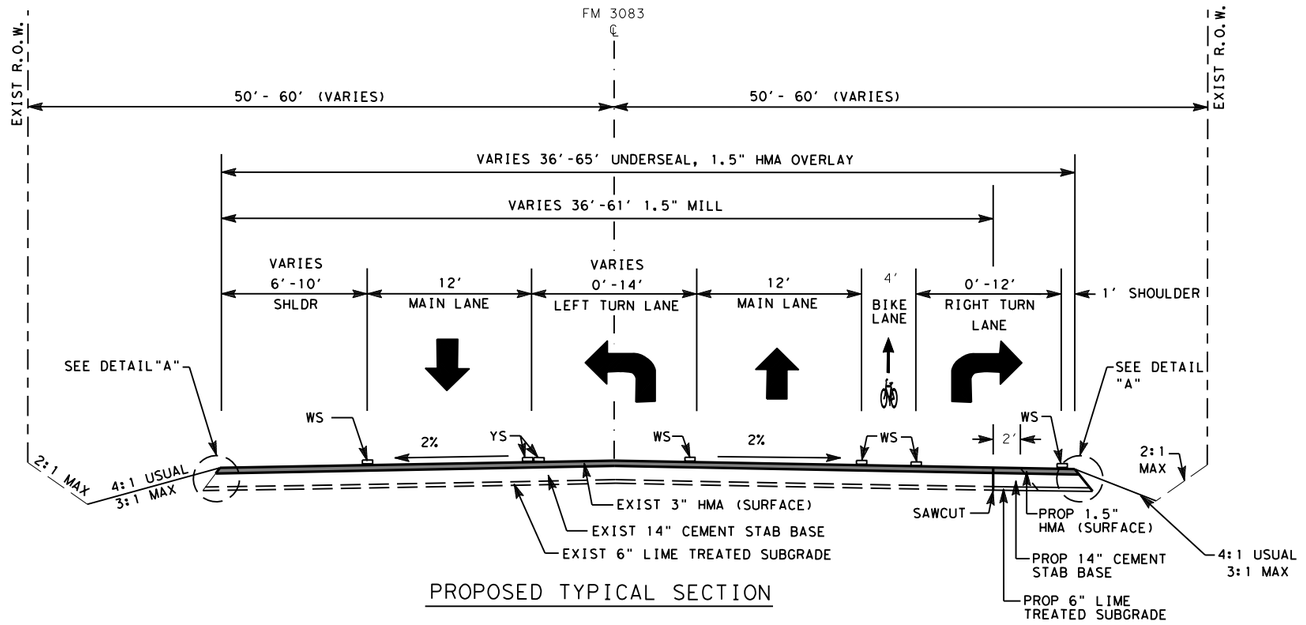
EXISTING TYPICAL SECTION

STA 154+00 TO STA 161+03



TYPICAL DETAIL "A"

N.T.S.



PROPOSED TYPICAL SECTION

STA 158+25 TO STA 161+02

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 3083
AT S SL 336 E
TYPICAL SECTIONS

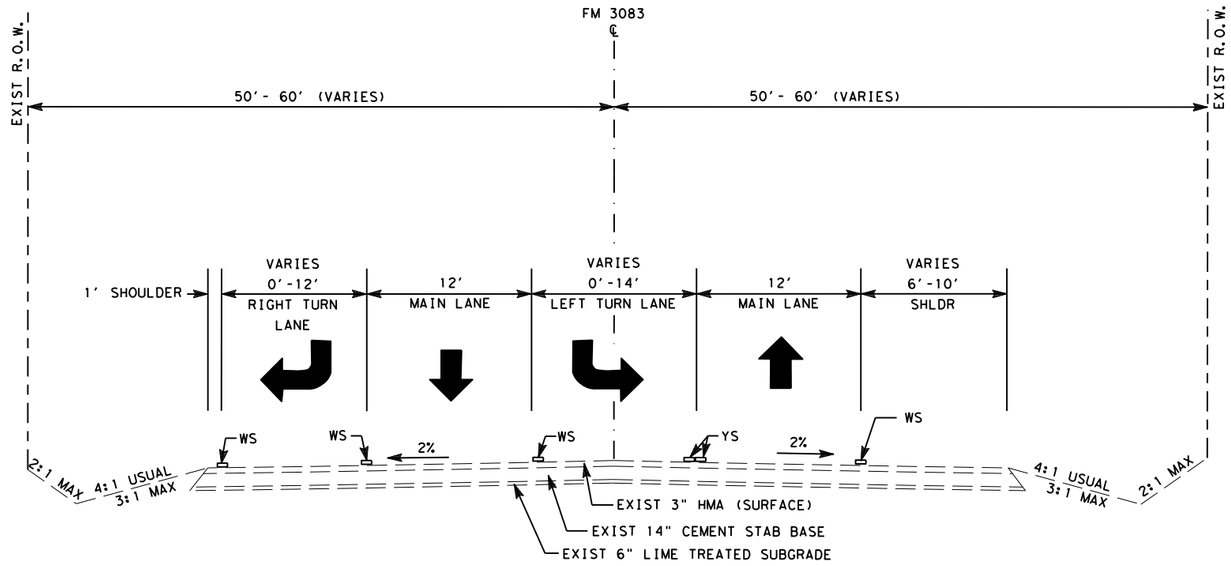
SHEET 2 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		40C

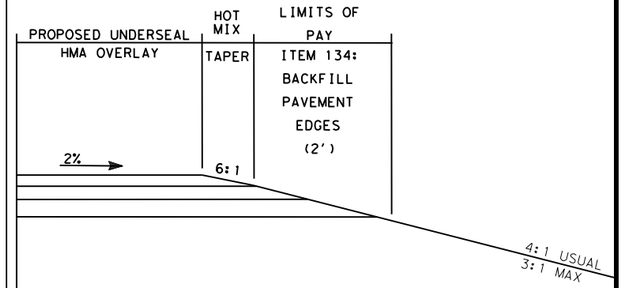
DATE: 07/24/2023 09:46 AM
FILE: pw:\txdot.projectwiseonline.com:TXDOT3\Documents*- HOU\Design Projects\091237237A- Design\Plan Set*. Roadway (FM 3083 AT S SL 336 E INTERSECTION)_LAYOUT.dgn

CK:
DW:



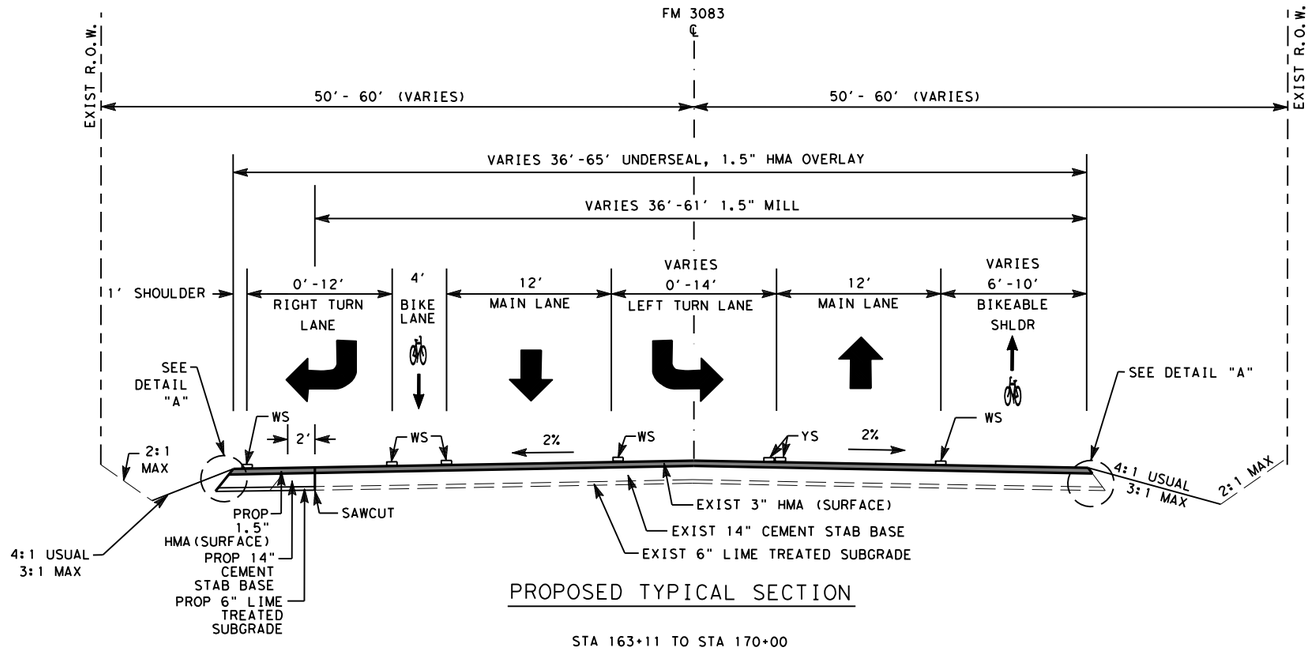
EXISTING TYPICAL SECTION

STA 163+11 TO STA 170+00



TYPICAL DETAIL "A"

N.T.S.



PROPOSED TYPICAL SECTION

STA 163+11 TO STA 170+00

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 3083
AT S SL 336 E
TYPICAL SECTIONS

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		400

DATE: 07/24/2023 09:46 AM
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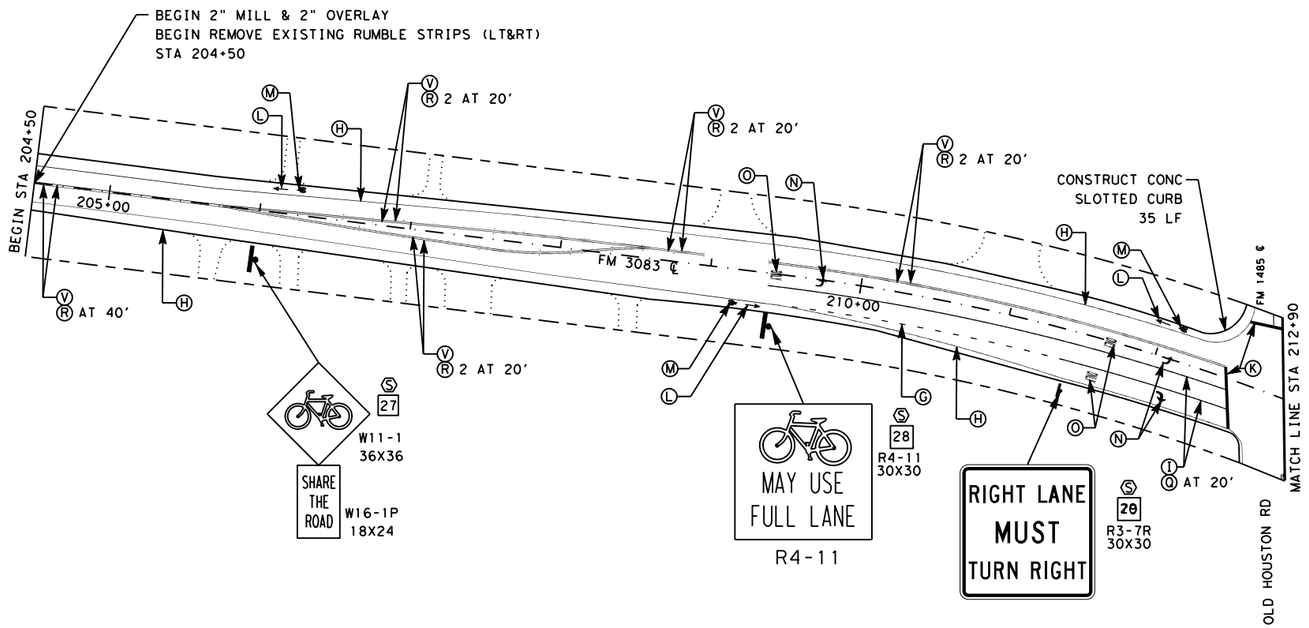
DES: | DW: | CK:

NOTE: REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



LEGEND

——— EXISTING EDGE OF PAVEMENT
— — — EXISTING ROW

PAY ITEMS

Ⓐ ELIM EXIST PAV MRK (6")
Ⓑ ELIM EXIST PAV MRK (8")
Ⓒ ELIM EXIST PAV MRK (12")
Ⓓ ELIM EXIST PAV MRK (24")
Ⓔ ELIM EXIST PAV MRK (ARROW)
Ⓕ ELIM EXIST PAV MRK (WORD)
Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
Ⓠ REFL PAV MRKR TY I-C
Ⓡ REFL PAV MRKR TY II-A-A
Ⓢ IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
Ⓣ RELOCATE SM RD SN SUP&AM TY 10BWG
Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
Ⓧ RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.01.23

FM 3083 AT FM 1485 INTERSECTION LAYOUT

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		41

DATE: 07/24/2023 09:49 AM
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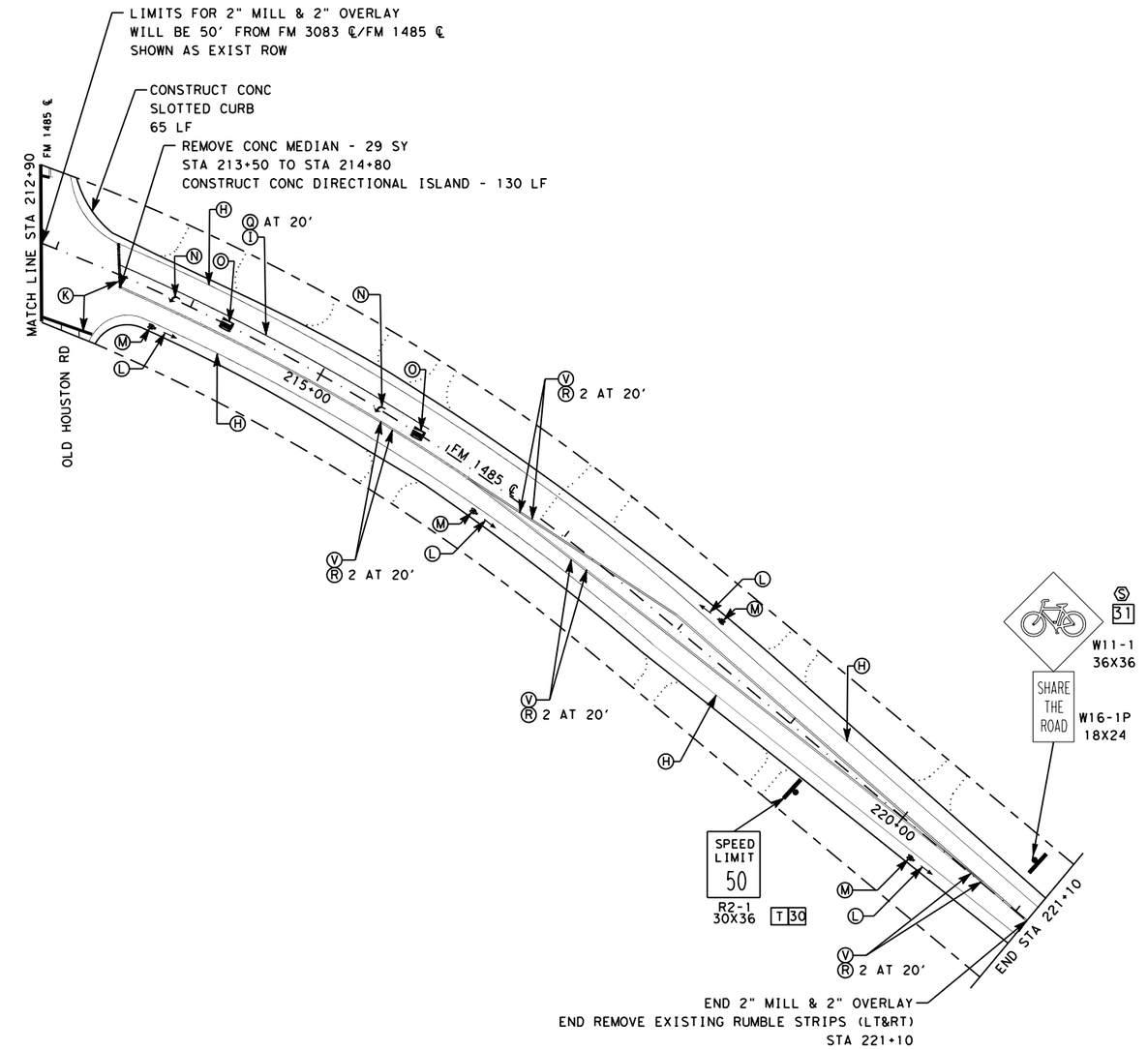
NOTE: REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



LEGEND

——— EXISTING EDGE OF PAVEMENT

— — — EXISTING ROW

PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083 AT FM 1485 INTERSECTION LAYOUT

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		41A

DATE: 07/24/2023 09:49 AM
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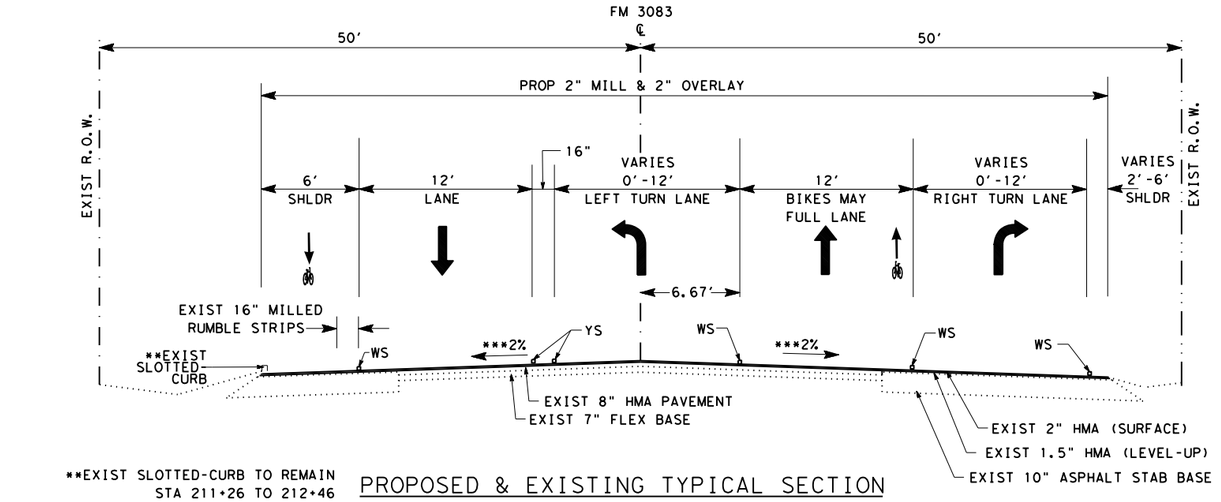
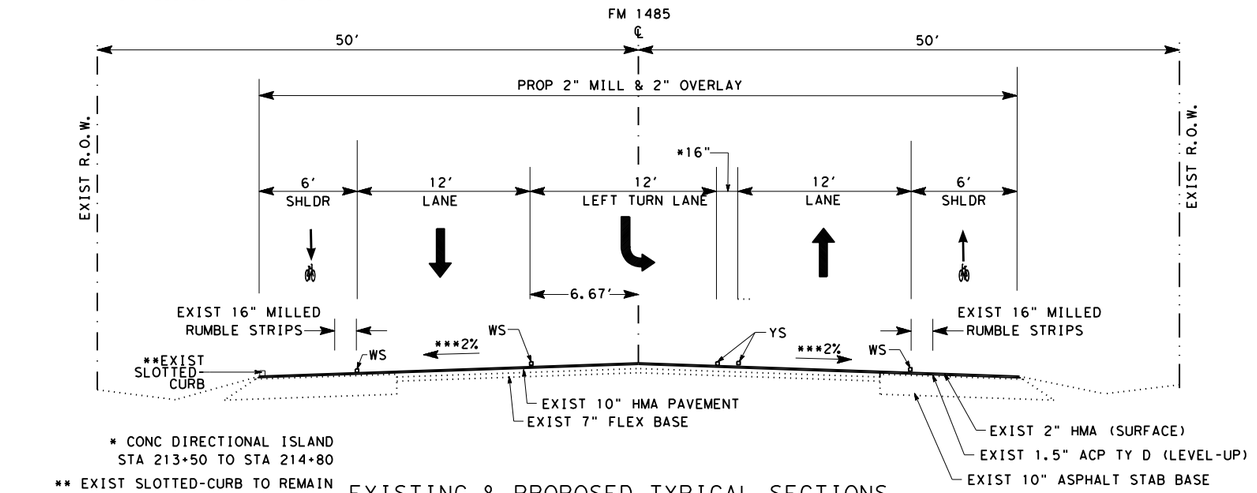


**EXIST SLOTTED-CURB TO REMAIN
STA 211+26 TO 212+46
OFFSET 24.67′ LT

*** MATCH EXISTING 4% SUPERELEVATION
STA 209+50 TO STA 212+90

PROPOSED & EXISTING TYPICAL SECTION

FM 3083 STA 205+75 TO STA 212+90



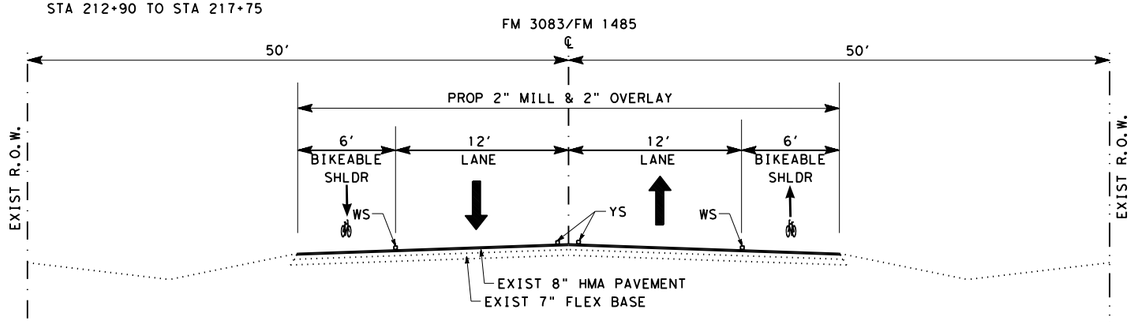
* CONC DIRECTIONAL ISLAND
STA 213+50 TO STA 214+80

** EXIST SLOTTED-CURB TO REMAIN
STA 213+31 TO 216+80
OFFSET 24.67′ LT

*** MATCH EXISTING 4% SUPERELEVATION
STA 212+90 TO STA 217+75

EXISTING & PROPOSED TYPICAL SECTIONS

FM 1485 STA 212+90 TO STA 221+10



EXISTING & PROPOSED TYPICAL SECTIONS

FM 3083 STA 204+50 TO STA 205+75
FM 1485 STA 220+60 TO STA 221+10

N. T. S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083 AT FM 1485 TYPICAL SECTIONS

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		41B

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DW:
CK:

NOTES:

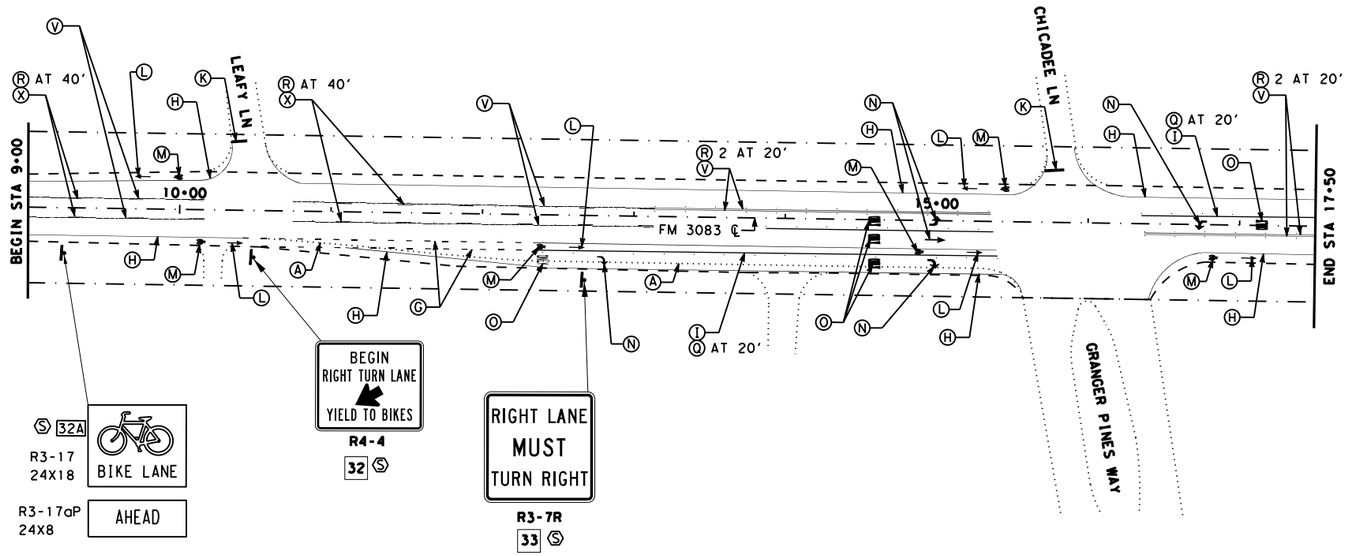
NO OVERLAY REQUIRED
PAVEMENT MARKINGS & SIGNAGE ONLY

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

EXISTING EDGE OF PAVEMENT

EXISTING ROW



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT GRANGER PINES WAY
INTERSECTION
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		42

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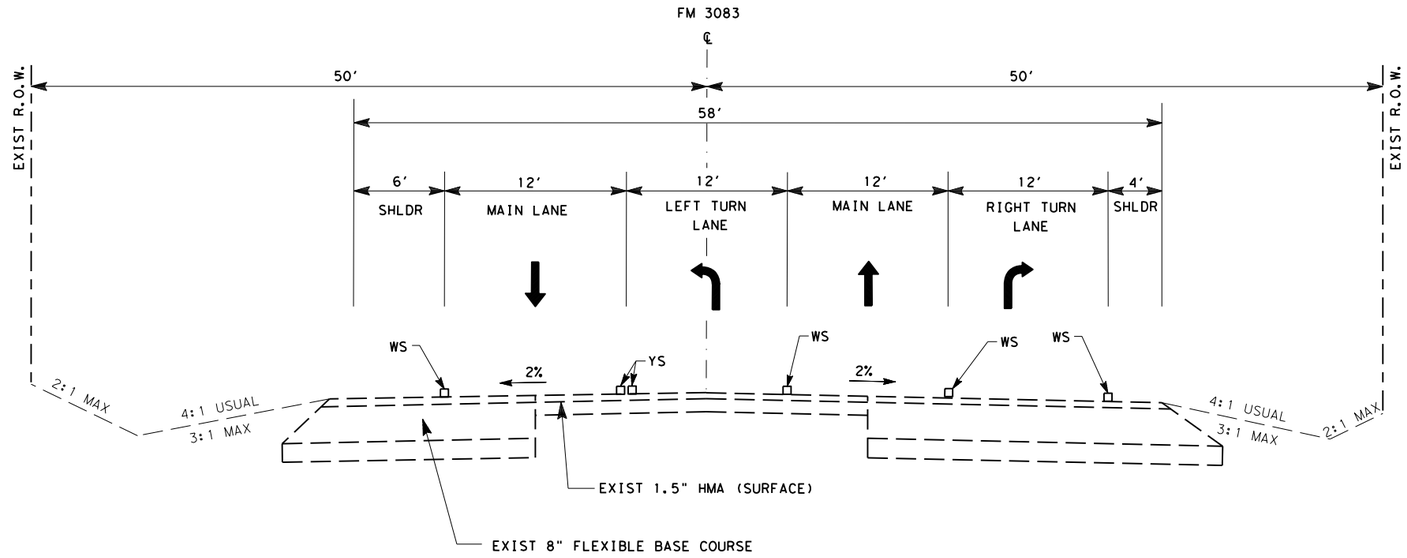
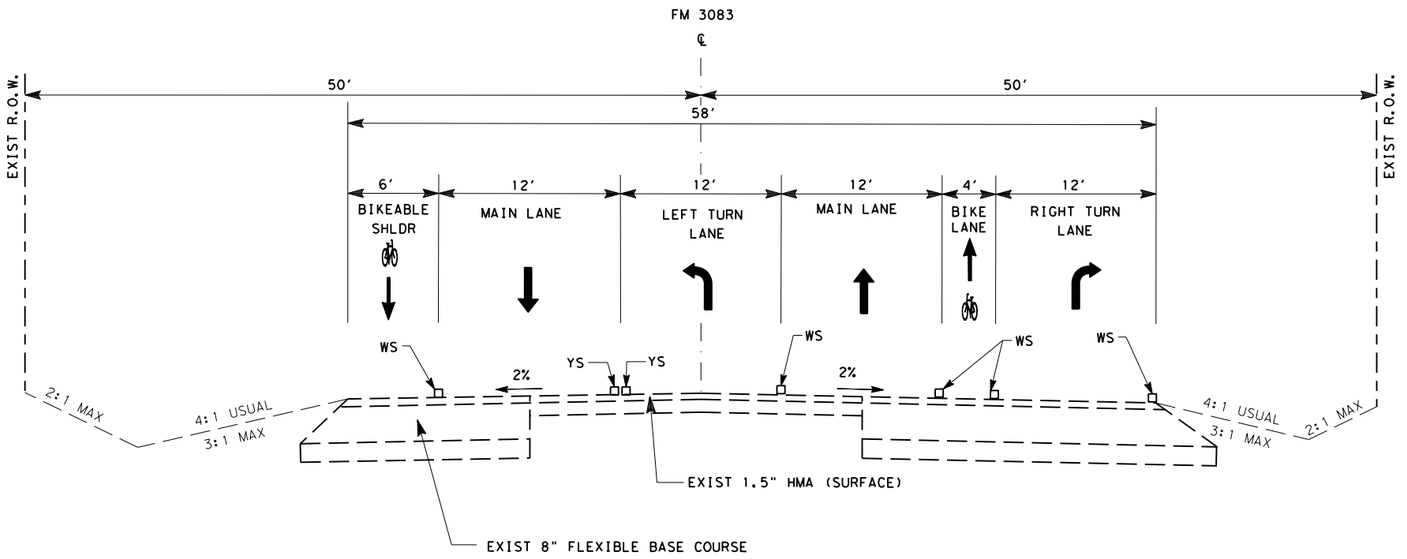


EXISTING TYPICAL SECTION

STA 10+00 TO 15+50



PROPOSED TYPICAL SECTION

STA 10+00 TO 15+50

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.

08.01.23

FM 3083
AT GRANGER PINES WAY INTERSECTION TYPICAL SECTIONS

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		42A

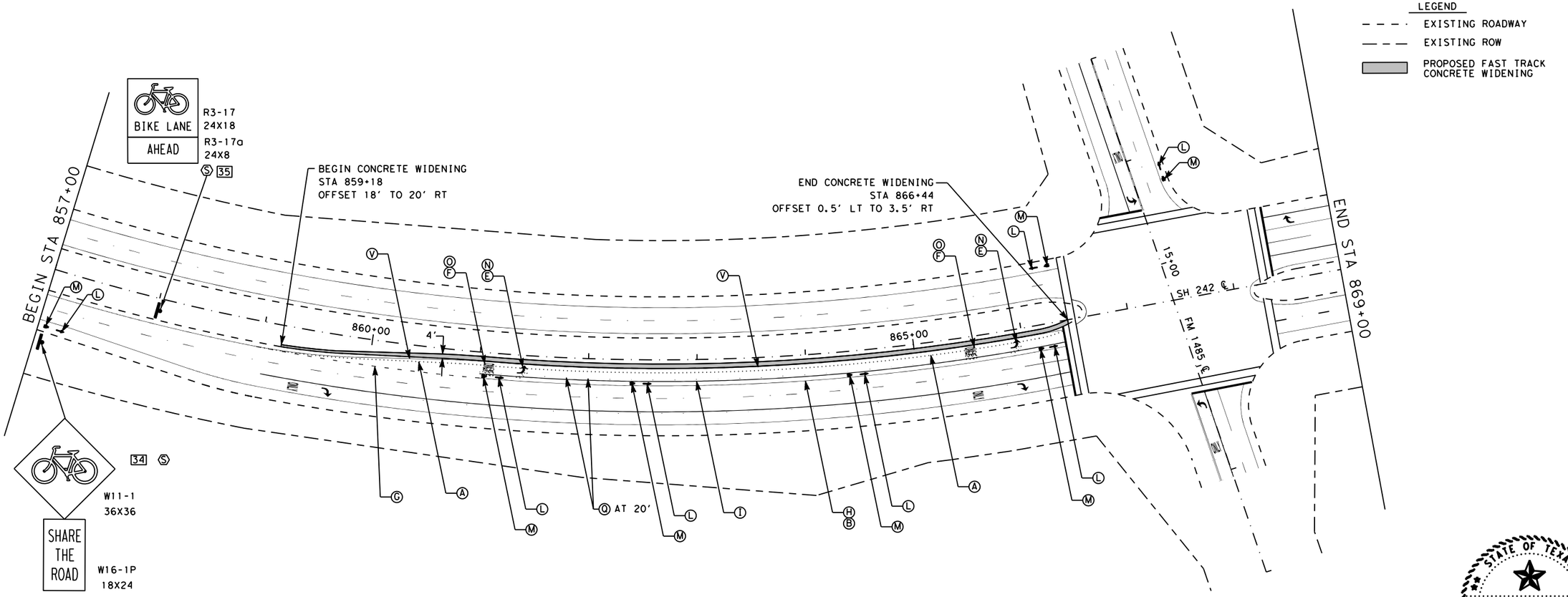
N. T. S.

DATE: 07/24/2023 08:52 AM
FILE: pw:\txdot.projectwiseonline.com:TXDOT3\Documents\- HOU\Design Projects\0912372 37Δ- Design\Plan Set\. Roadway*FM 3083 AT GRANGER PINES WAY INTERSECTION @AYOUT.dgn

WIDENING REQUIRED IN UNPAVED MEDIAN
ALL EXISTING SIGNS NOT SHOWN ARE TO REMAIN

4' SHOULDER TO BE RESTORED TO ACCOMODATE
PROPOSED 4' BIKE TURN LANE

NOTE: REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) MULTIPOLYMER PAV MRK (W)(6")(DOT)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY II-C-R
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 242 AT FM 1485 INTERSECTION LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		43

DATE: 06/30/2023 11:22 AM
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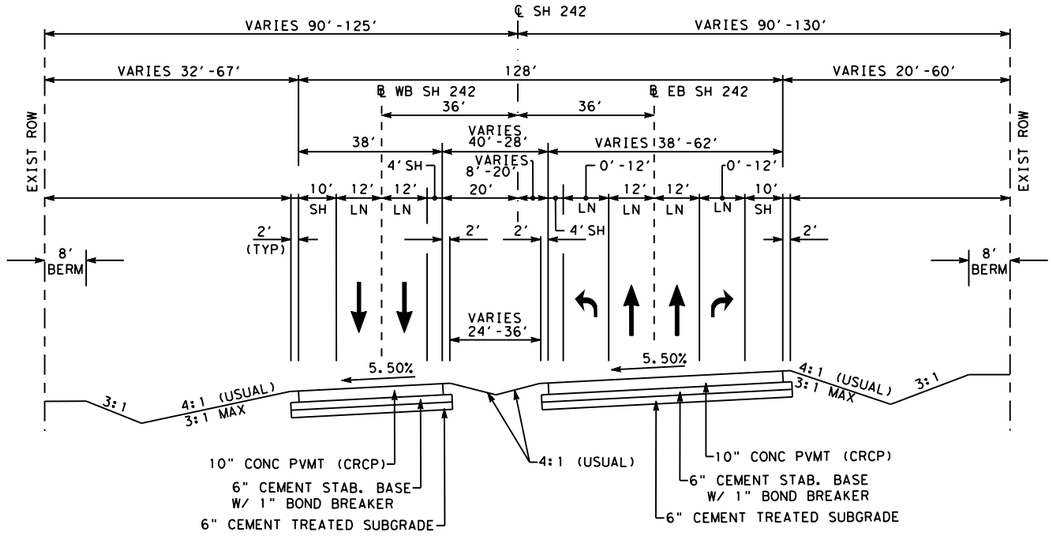
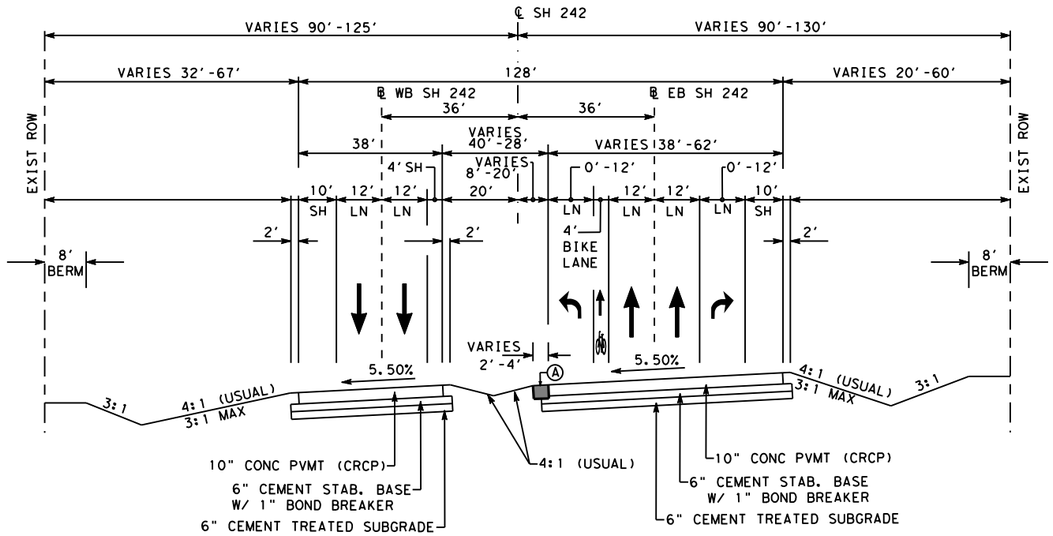


EXISTING TYPICAL SECTION WITH LEFT/RIGHT TURN LANES

STA 857+11 TO STA 866+35



PROPOSED TYPICAL SECTION WITH LEFT/RIGHT TURN LANES

STA 857+11 TO STA 866+35

WIDENING LEGEND

Ⓐ PROP. 14" FAST TREACK CONCRETE PAVEMENT (CRCP)

LN = LANE
SH = SHOULDER

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 242 AT FM 1485 TYPICAL SECTIONS

SHEET 1 OF 1

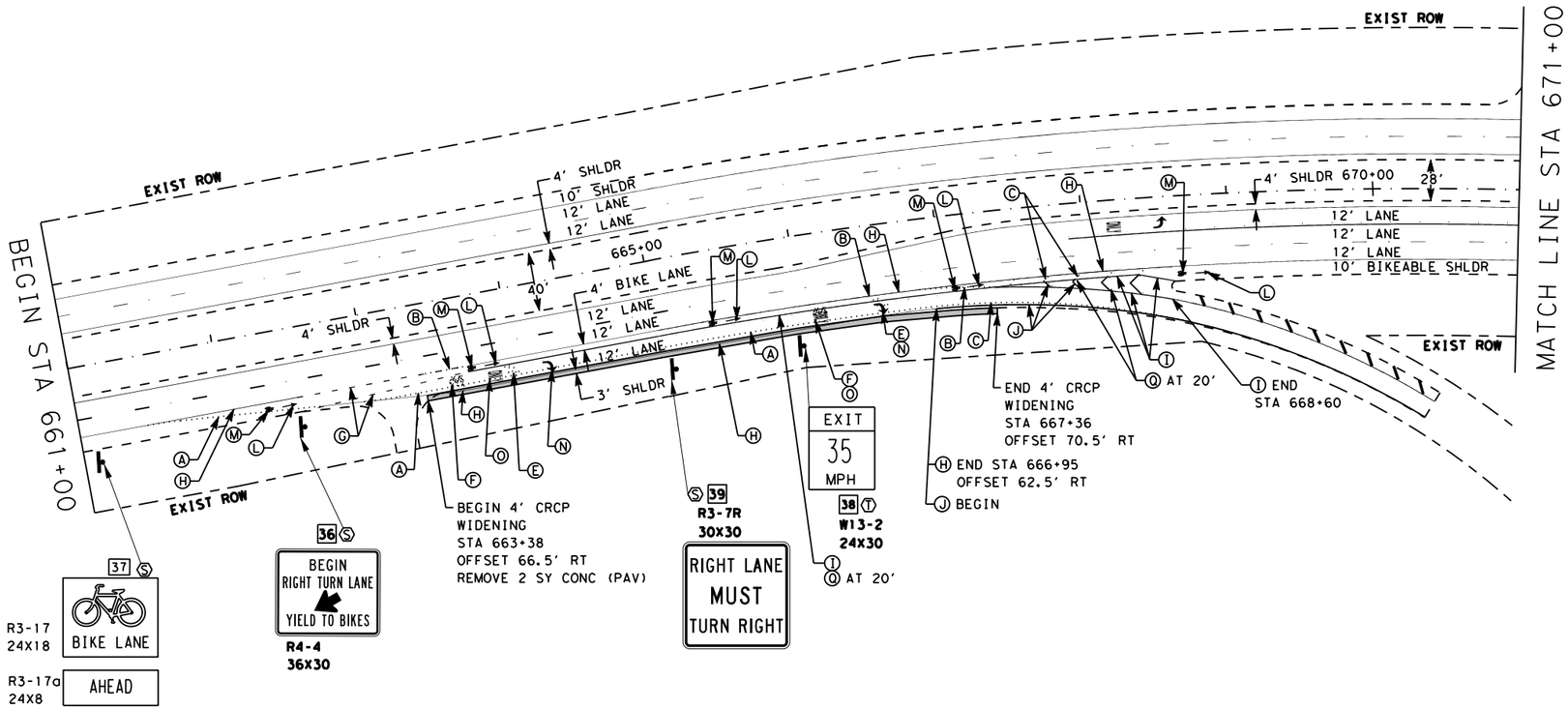
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		43A

N. T. S.

ALL EXISTING SIGNS NOT SHOWN ARE TO REMAIN
MATCH EXISTING SUPERELEVATION - SEE CSJ 3558-01-055

NOTE: REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROP FAST TRACK CONCRETE WIDENING

PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY II-C-R
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 242 AT ARTAVIA PKWY & SUMMERSET ESTATES BLVD INTERSECTION LAYOUT

SHEET 1 OF 2

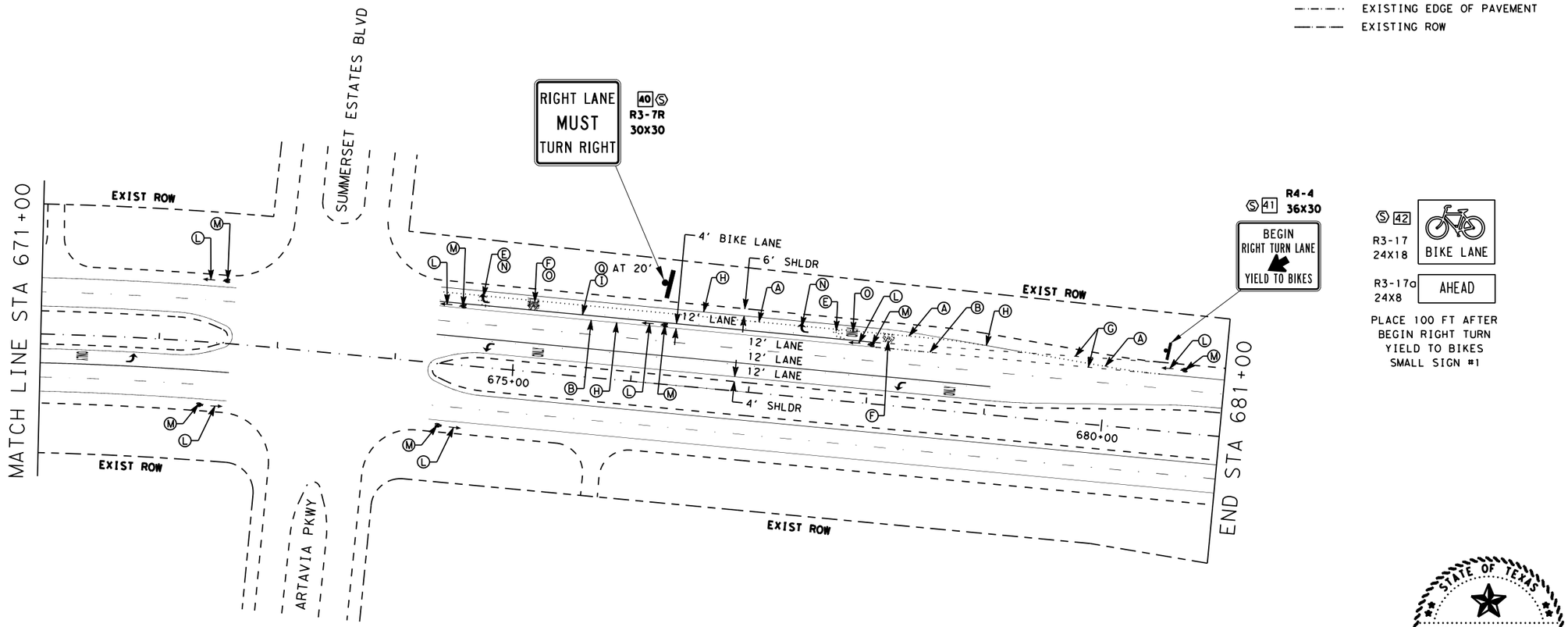
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		44

DATE: 06/30/2023 11:22 AM
FILE: pw:\txdot.projectwiseonline.com:TXDOT3\Documents\- HOU\Design Projects\0912372 37\- Design\Plan Set*. Roadway, SH 242 AT ARTAVIA PARKWAY & SUMMERSET ESTATES BLVD INTERSECTION L

ALL EXISTING SIGNS NOT SHOWN ARE TO REMAIN
MATCH EXISTING SUPERELEVATION - SEE CSJ 3558-01-055

NOTE: REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY II-C-R
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY 10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

SH 242 AT ARTAVIA PKWY & SUMMERSET ESTATES BLVD INTERSECTION LAYOUT

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		44A

DATE: 06/30/2023 11:22 AM
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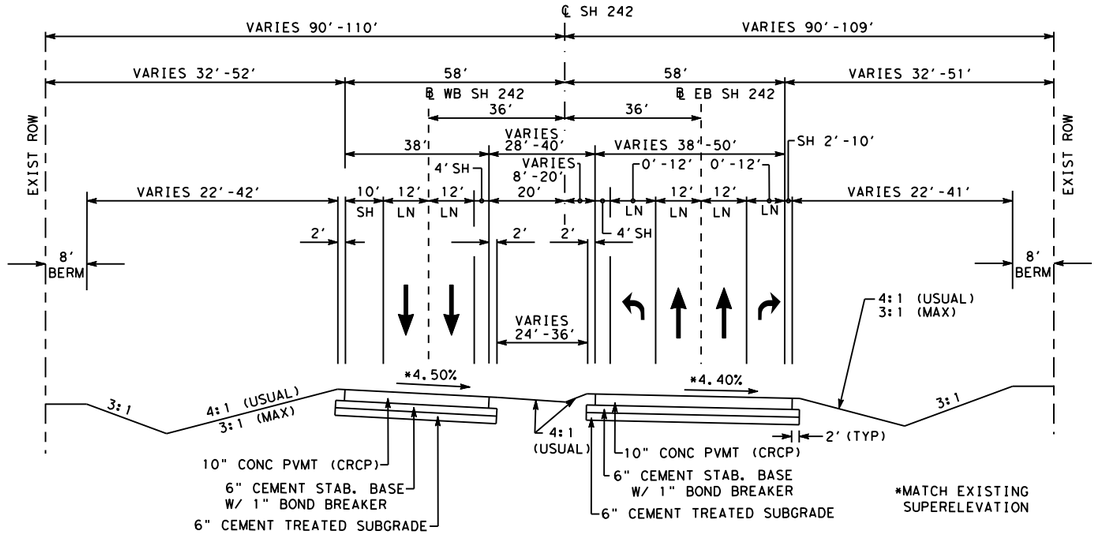
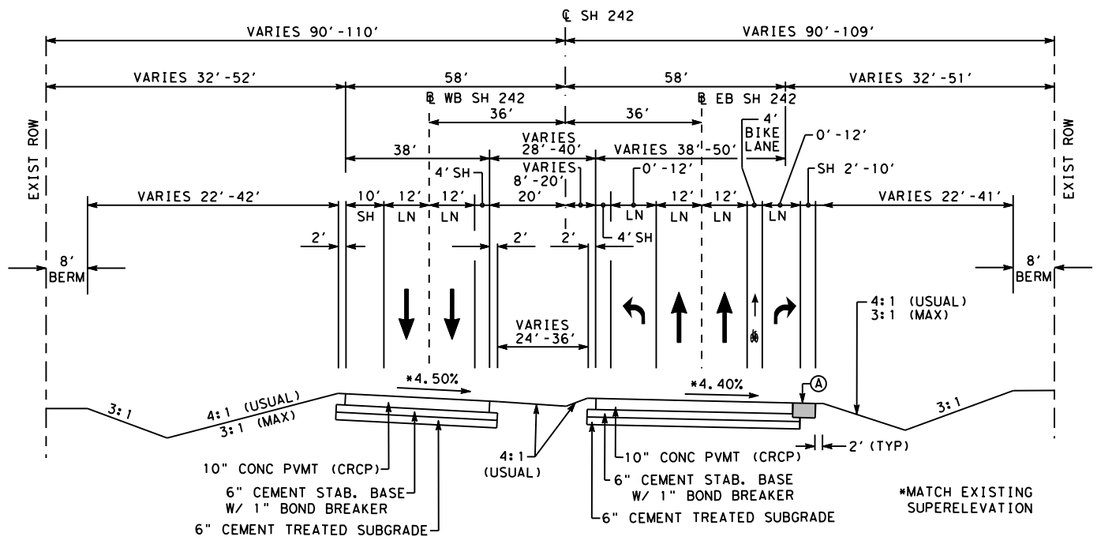


EXISTING TYPICAL SECTION WITH LEFT/RIGHT TURN LANES

STA 663+68 TO STA 673+42



PROPOSED TYPICAL SECTION WITH LEFT/RIGHT TURN LANES

STA 663+68 TO STA 673+42

WIDENING LEGEND

Ⓐ PROP. CONC PVMT (CONT REINF) (FAST TRK)(14")

LN = LANE
SH = SHOULDER

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Micah J. Schluter, P.E.

08.01.23

SH 242 AT ARTAVIA PKWY & SUMMERSET ESTATES BLVD TYPICAL SECTIONS

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		44B

DATE: 08/01/2023 08:38 AM
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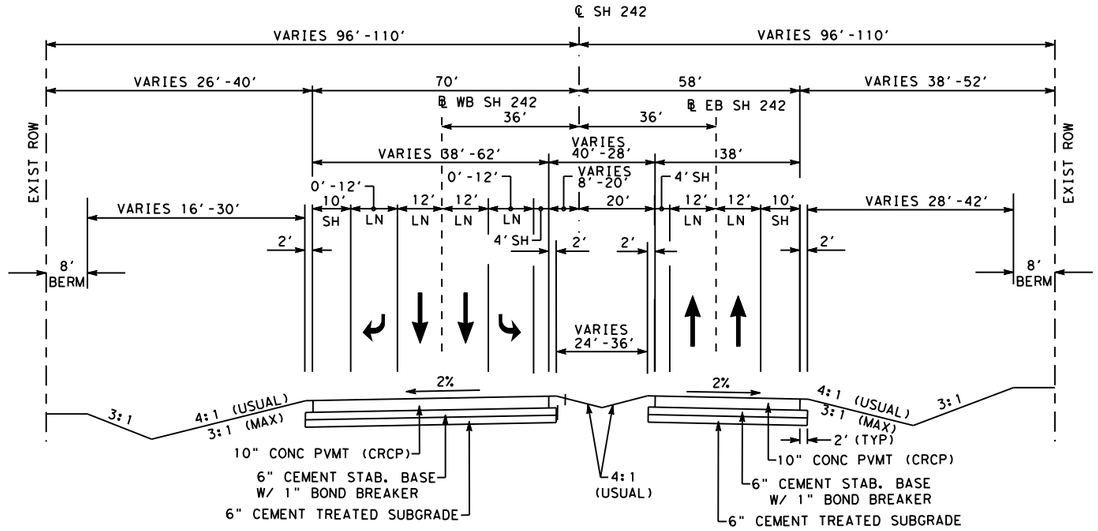
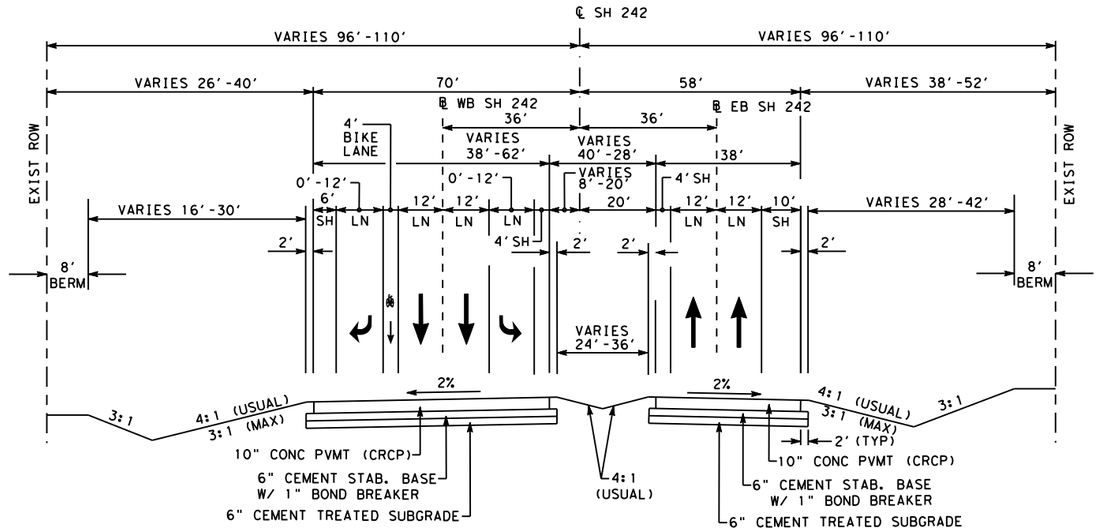


EXISTING TYPICAL SECTION WITH LEFT/RIGHT TURN LANES

STA 673+42 TO STA 680+93



PROPOSED TYPICAL SECTION WITH LEFT/RIGHT TURN LANES

STA 673+42 TO STA 680+93

WIDENING LEGEND

LN = LANE
SH = SHOULDER

STATE OF TEXAS
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Micah J. Schluter, P.E.

08.01.23

SH 242 AT ARTAVIA PKWY & SUMMERSET ESTATES BLVD TYPICAL SECTIONS

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		44C

N. T. S.

DATE: 08/01/2023 08:38 AM
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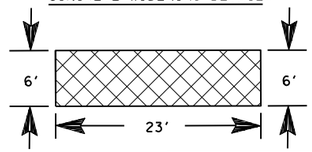
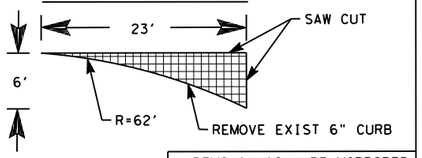
CONCRETE WIDENING DETAIL*



* CONSTRUCTION WILL BE MIRRORED ACROSS FM 1314 ℄

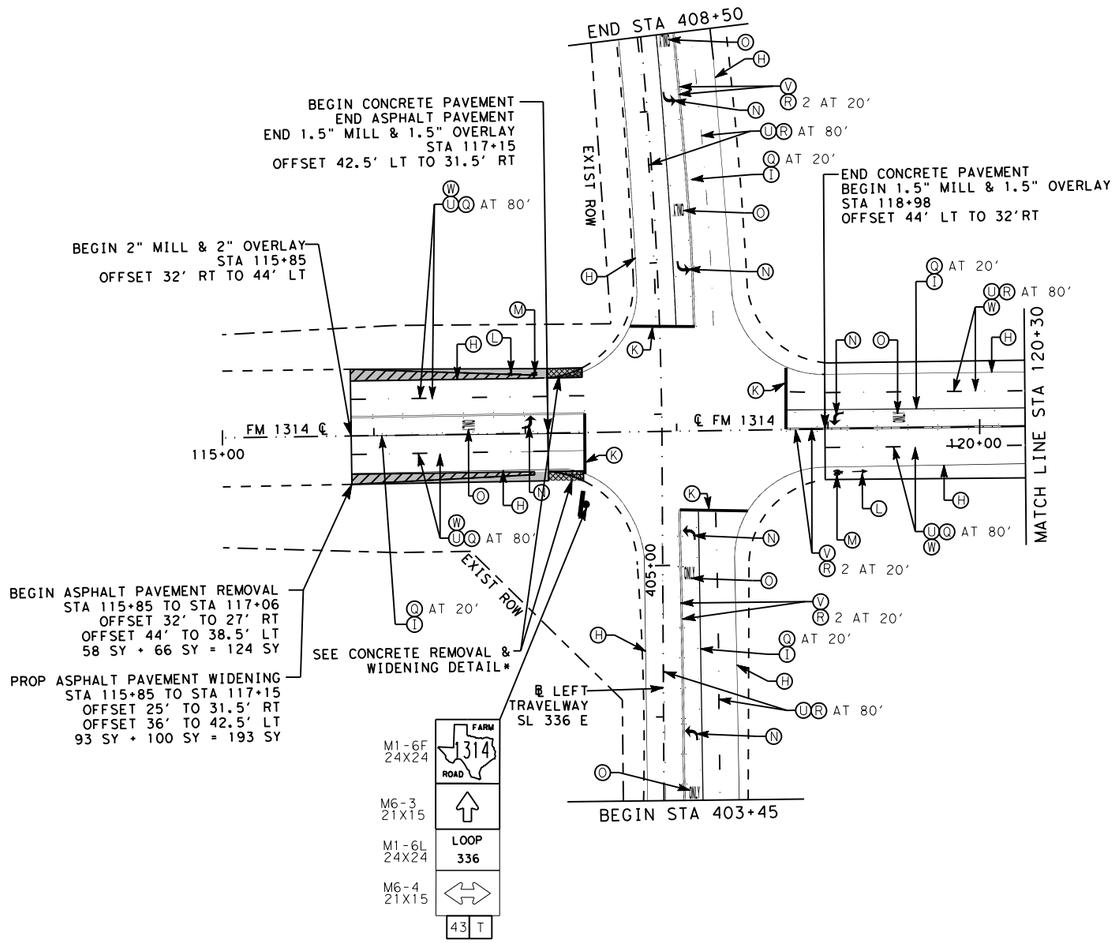
CONCRETE REMOVAL DETAIL*



* REMOVAL WILL BE MIRRORED ACROSS FM 1314 ℄

NOTES:

REFL PAV MRK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACE ON CONCRETE SURFACES.



LEGEND

- EXIST EDGE OF PAVEMENT
- EXIST ROW
- PROP 14" FAST TRACK CONCRETE
- CONCRETE PAVEMENT REMOVAL
- PROP ASPHALT PAVEMENT WIDENING
- ASPHALT PAVEMENT REMOVAL

PAY ITEMS

(A)	ELIM EXIST PAV MRK (6")
(B)	ELIM EXIST PAV MRK (8")
(C)	ELIM EXIST PAV MRK (12")
(D)	ELIM EXIST PAV MRK (24")
(E)	ELIM EXIST PAV MRK (ARROW)
(F)	ELIM EXIST PAV MRK (WORD)
(G)	REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
(H)	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
(I)	REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
(J)	REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
(K)	REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
(L)	REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
(M)	REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
(N)	REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
(O)	REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
(P)	REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
(Q)	REFL PAV MRKR TY I-C
(R)	REFL PAV MRKR TY II-A-A
(S)	IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
(T)	RELOCATE SM RD SN SUP&AM TY 10BWG
(U)	RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
(V)	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
(W)	RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
(X)	RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 1314 AT S SL 336 E INTERSECTION LAYOUT

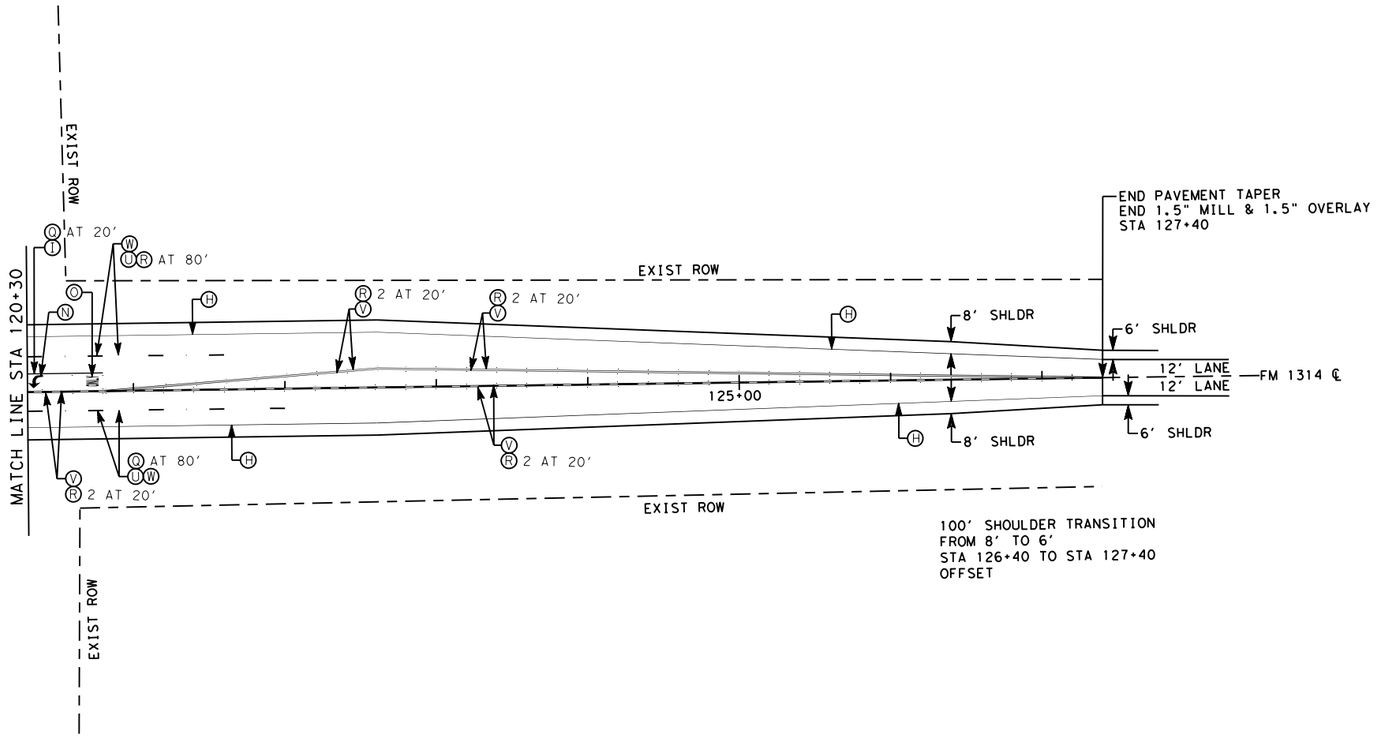
SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		45

NOTE:

REFL PAV MRK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACE ON CONCRETE SURFACES.



LEGEND

- EXIST EDGE OF PAVEMENT
- EXIST ROW
- PROP 14" CONCRETE FAST TRACK
- CONCRETE PAVEMENT REMOVAL
- PROP ASPHALT PAVEMENT WIDENING
- ASPHALT PAVEMENT REMOVAL

PAY ITEMS

- Ⓐ ELIM EXIST PAV MRK (6")
- Ⓑ ELIM EXIST PAV MRK (8")
- Ⓒ ELIM EXIST PAV MRK (12")
- Ⓓ ELIM EXIST PAV MRK (24")
- Ⓔ ELIM EXIST PAV MRK (ARROW)
- Ⓕ ELIM EXIST PAV MRK (WORD)
- Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- Ⓠ REFL PAV MRKR TY I-C
- Ⓡ REFL PAV MRKR TY II-A-A
- Ⓢ IN SM RD SN SUP&AM TY 10BWG (1)SA(P)
- Ⓣ RELOCATE SM RD SN SUP&AM TY 10BWG
- Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- Ⓧ RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 1314
AT S SL 336 E
INTERSECTION
LAYOUT

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		45A

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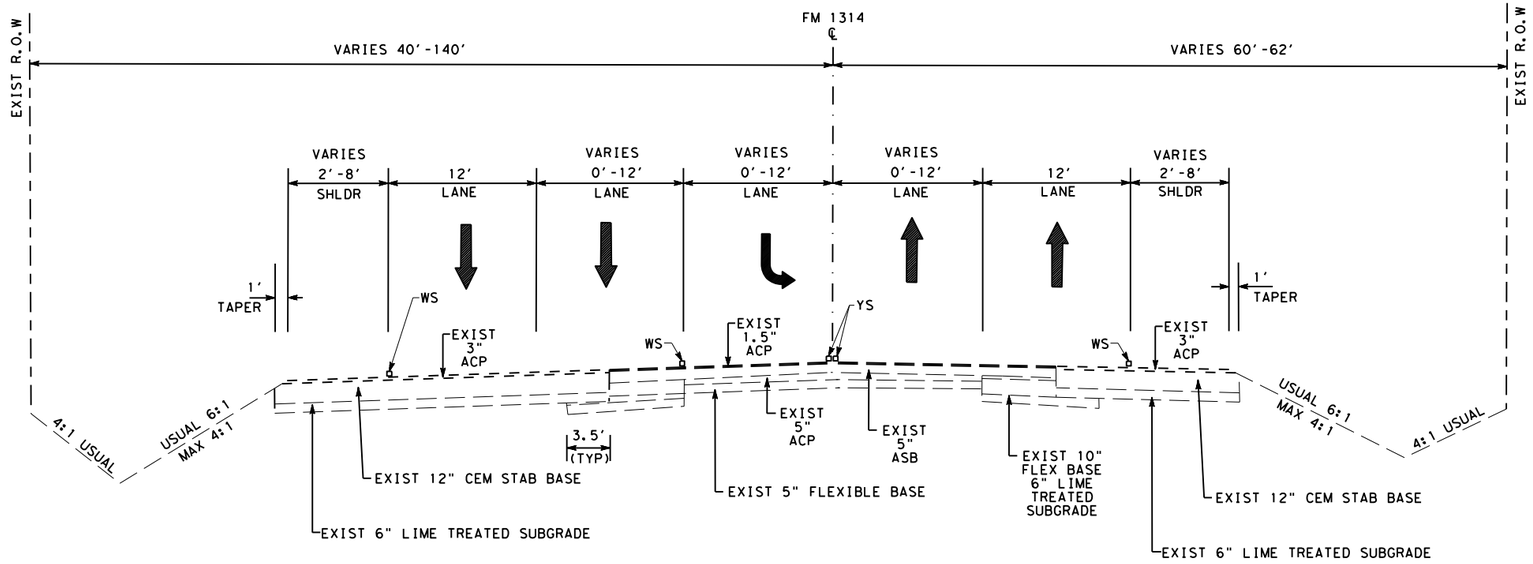
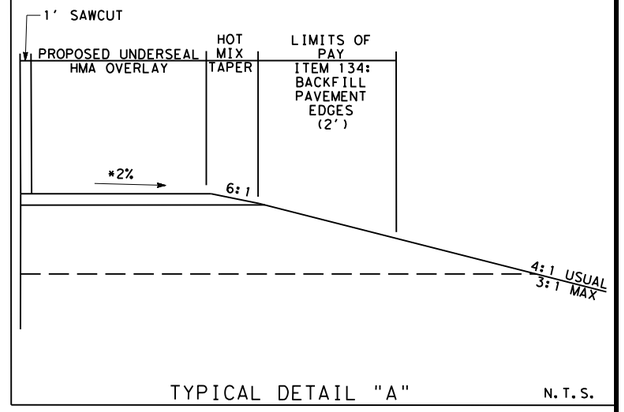
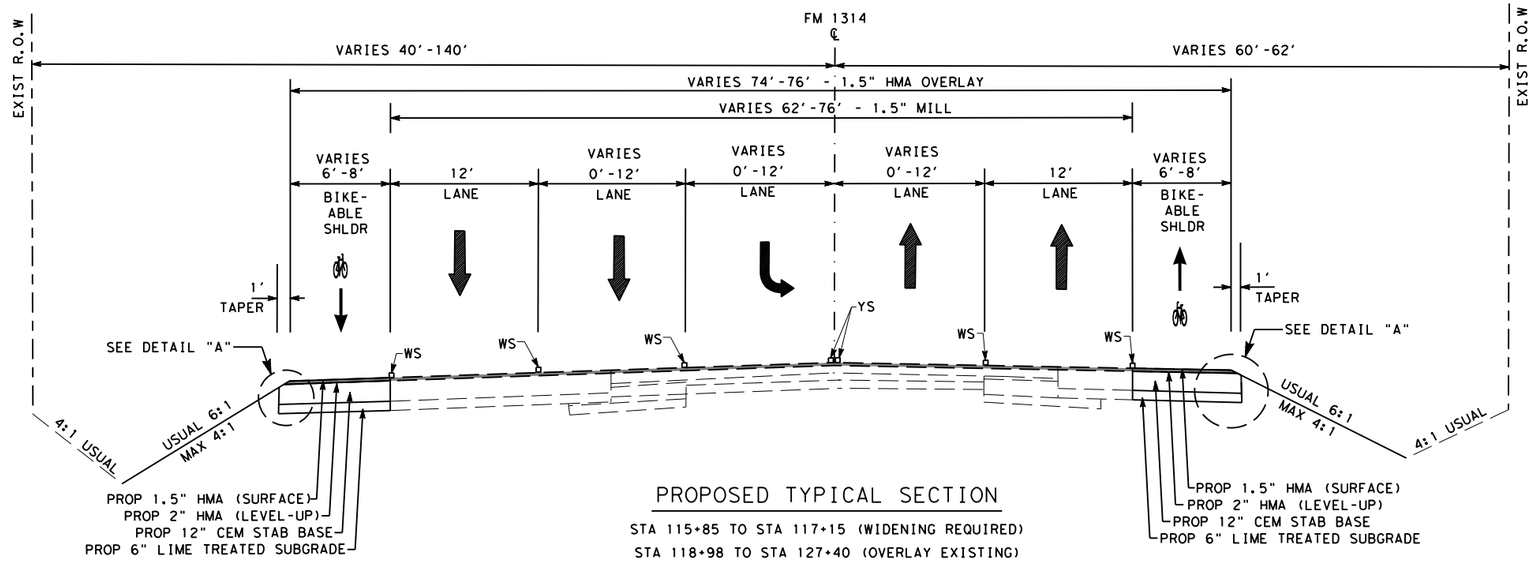


EXISTING TYPICAL SECTION

STA 115+85 TO STA 117+15
*STA 118+98 TO STA 127+40





PROPOSED TYPICAL SECTION

STA 115+85 TO STA 117+15 (WIDENING REQUIRED)
STA 118+98 TO STA 127+40 (OVERLAY EXISTING)

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MICAH J. SCHLUTER
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Micah J. Schluter, P.E.
08.01.23

FM 1314 AT S SL 336 E TYPICAL SECTIONS

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		45B

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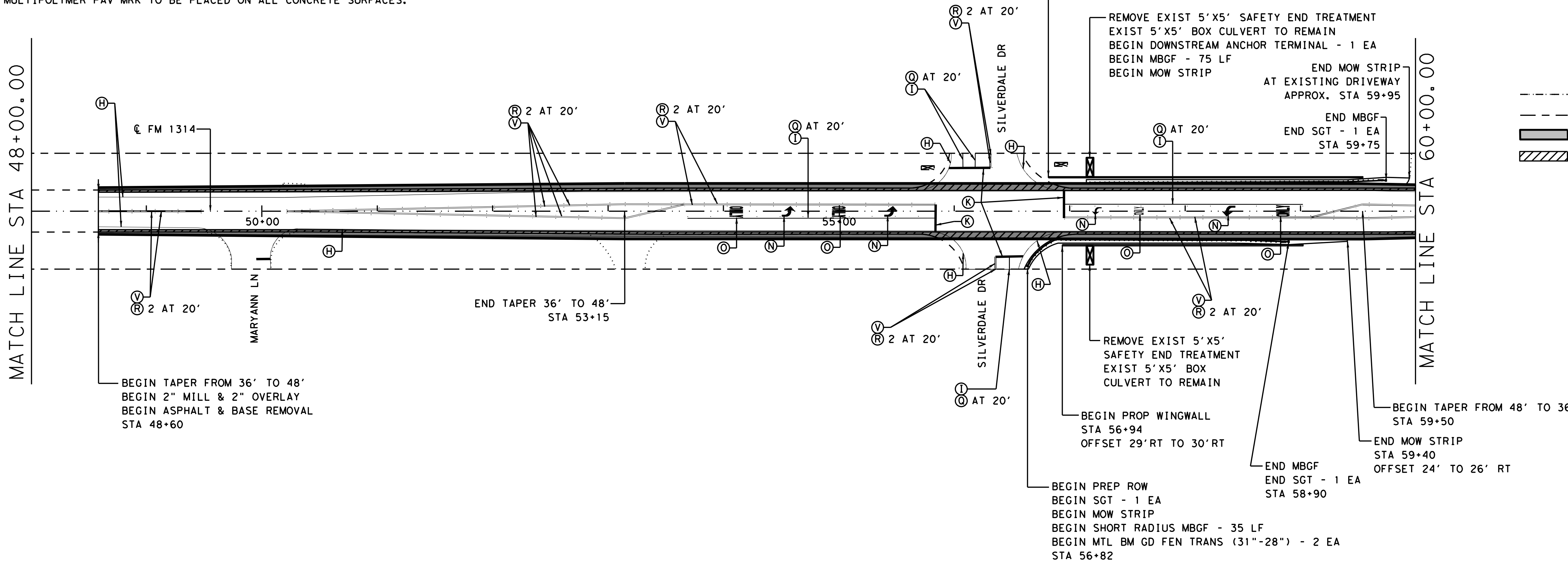
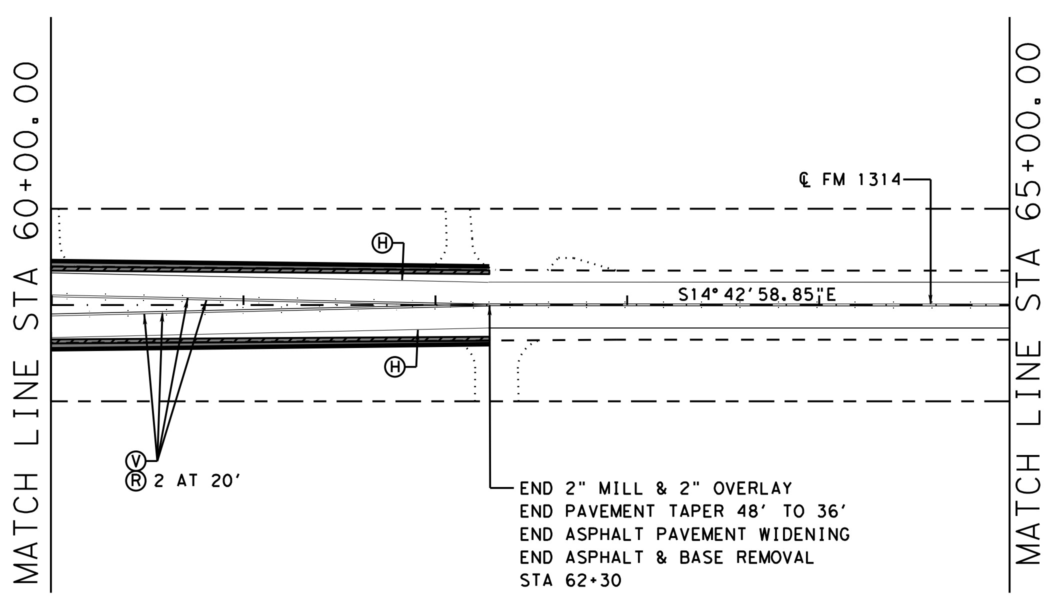
NOTES:

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



LEGEND

- EXIST EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED ASPHALT PAVEMENT
- PROPOSED ASPHALT & BASE REMOVAL



PAY ITEMS

- Ⓐ ELIM EXIST PAV MRK (6")
- Ⓑ ELIM EXIST PAV MRK (8")
- Ⓒ ELIM EXIST PAV MRK (12")
- Ⓓ ELIM EXIST PAV MRK (24")
- Ⓔ ELIM EXIST PAV MRK (ARROW)
- Ⓕ ELIM EXIST PAV MRK (WORD)
- Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- Ⓠ REFL PAV MRKR TY I-C
- Ⓡ REFL PAV MRKR TY II-A-A
- Ⓢ IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- Ⓣ RELOCATE SM RD SN SUP&AM TY10BWG
- Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- Ⓧ RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

STATE OF TEXAS
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PROFESSIONAL ENGINEER
Micah J. Schluter, P.E.
08.01.23

FM 1314
AT SILVERDALE DR
INTERSECTION
LAYOUT

SHEET 1 OF 1

0 50 100
SCALE IN FEET

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		46

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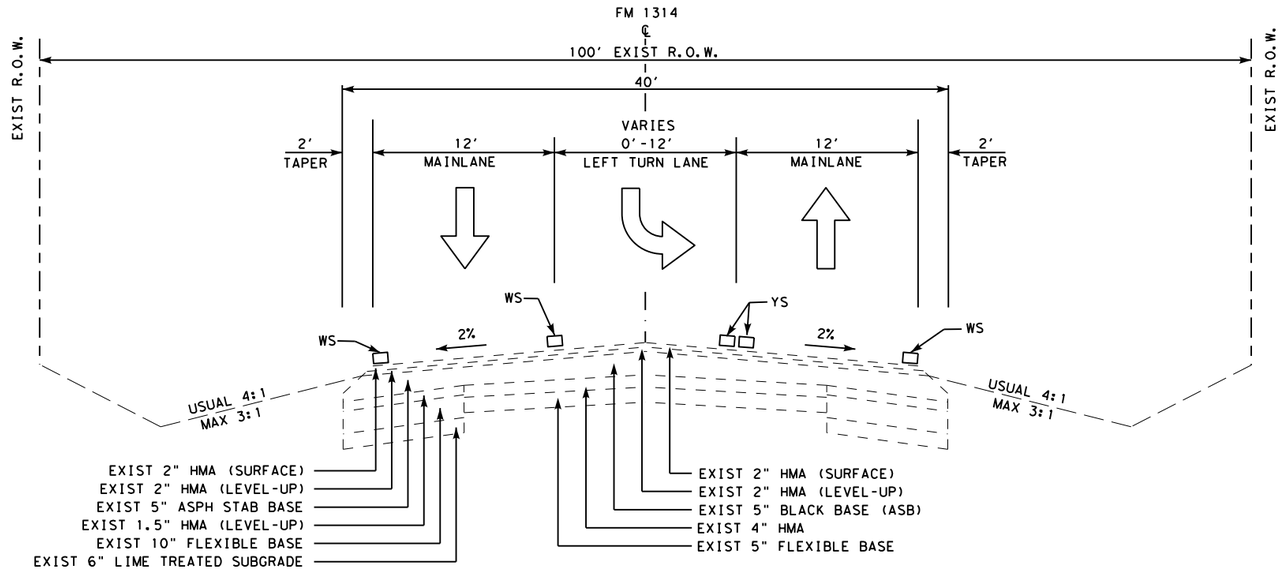
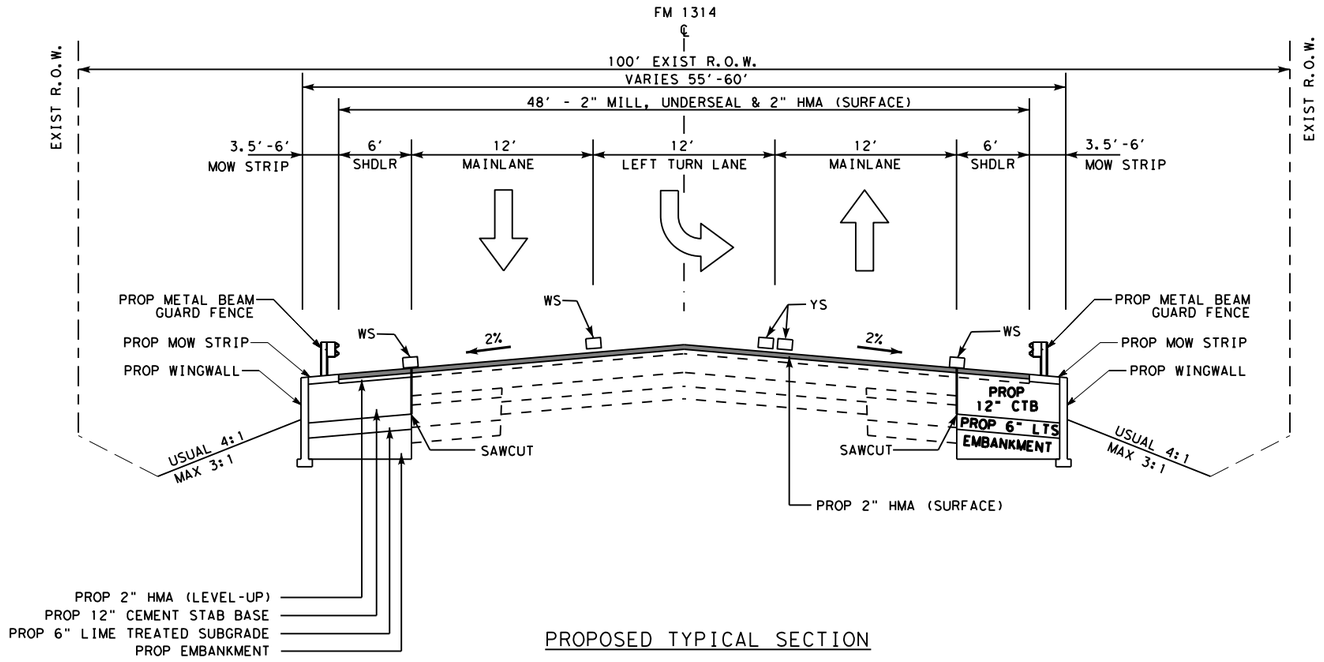


EXISTING TYPICAL SECTION

FROM STA 48+60 TO STA 53+15
FROM STA 59+50 TO STA 62+30



PROPOSED TYPICAL SECTION

FROM STA 56+82 TO STA 62+30

N. T. S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 1314 AT SILVERDALE DR TYPICAL SECTIONS

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		46A

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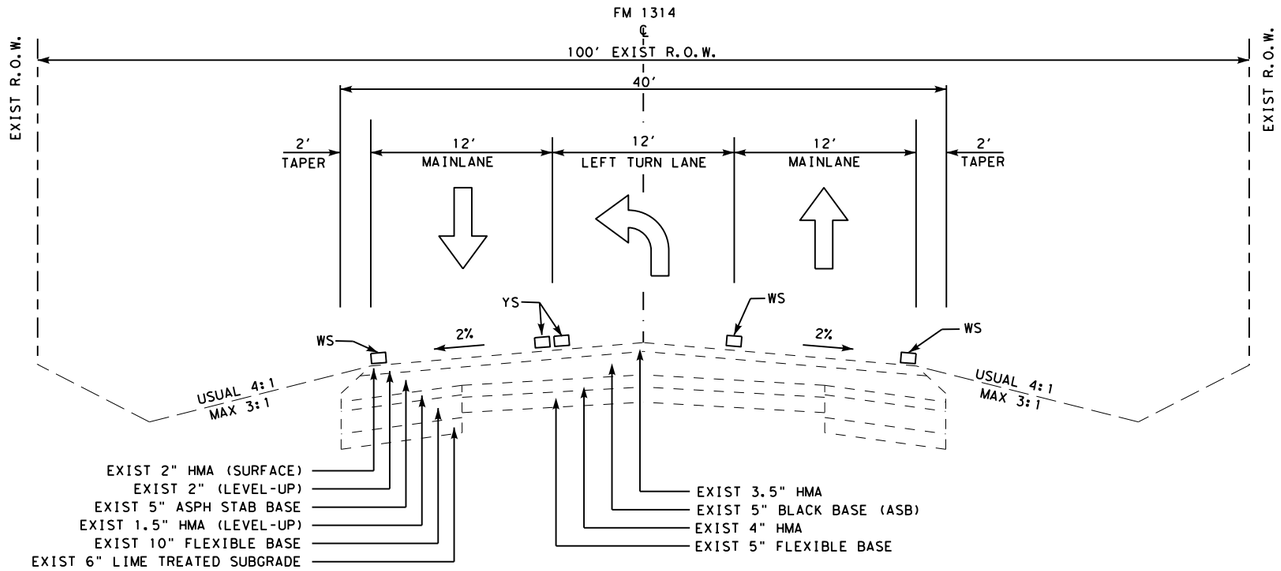
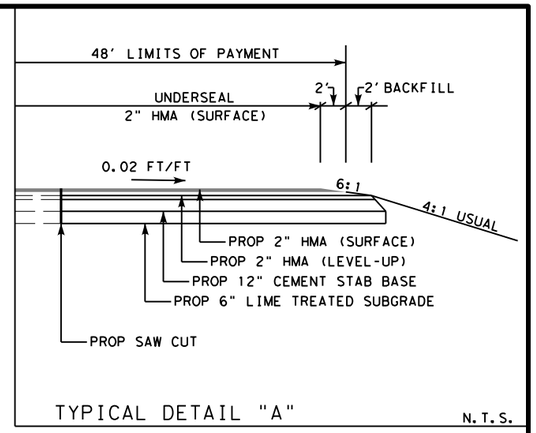
DN: CK: DW: CK:



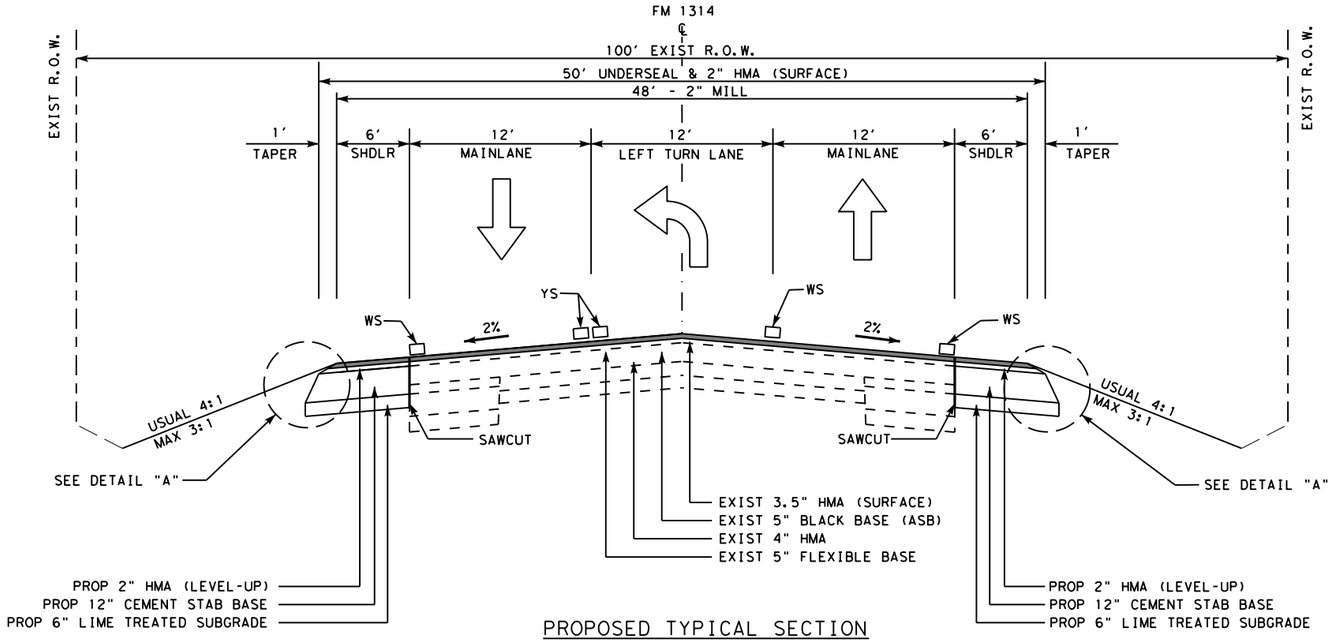
EXISTING TYPICAL SECTION

FROM STA 48+60 TO STA 62+30



TYPICAL DETAIL "A"

N.T.S.



PROPOSED TYPICAL SECTION

FROM STA 48+60 TO STA 56+82

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 1314 AT SILVERDALE DR TYPICAL SECTIONS

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		46B

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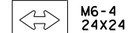
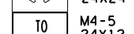
NOTE:

REFER TO THE PEDESTRIAN FACILITYES CURB RAMP STANDARD FOR MORE INFORMATION

M1-6F 24X24



M6-4 24X24



M4-5 24X12

M1-1 36X36

M6-1R 21X15

44 T

47 T

E22-1T MATCH EXIST

FM 3083 NEXT SIGNAL

48 T

W3-3 30X30

CONROE PARK N DR

EXIST ROW

FOR REMOVAL ONLY 76 SY

108 SY

76 SY

95 SY

143 SY

258 SY

105+00

110+00

FM 1484 ℄ N 19° 35' 19.00" E

FM 3083 ℄

EXIST ROW

221 SY

PC 102+45.29

99 SY

125 SY

233 SY

250 SY

46 T

M1-6F 24X24

49 T

SPEED LIMIT 55

R2-1 18X24

PRC 109+94.64

MATCH LINE STA 111+00

EXIST ROW

BEGIN

CENTER LANE

45 T

M4-14 24X12

R3-9B 24X36

50 T

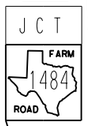
W1-2L 36X36

45 M.P.H.

W13-1P 18X18

51 T

J C T



M2-1 21X15

M1-6F 24X24

MATCH LINE STA 111+00

MATCH LINE STA 123+00

EXIST ROW

762 SY

115+00

120+00

FM 1484 ℄

353 SY

327 SY

70 SY

49 SY

52 T

CENTER LANE

R3-9B 24X36

LEGEND

- EXISTING DRIVEWAY/INTERSECTION
- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED SIDEWALK
- PROPOSED CURB RAMP
- PROP CONC DRIVEWAY REMOVAL & CONSTRUCT DRIVEWAY WITH SIDEWALK TREATMENT WITH 9" FAST TRACK CONC PAV

PAY ITEMS

(K) MULTIPOLYMER PAV MRK (W)(24")(SLD)
(T) RELOCATE SM RD SN SUP&AM TY 10BWG

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 1484 SIDEWALKS LAYOUT

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		47

DATE: 07/13/2023 11:37 AM
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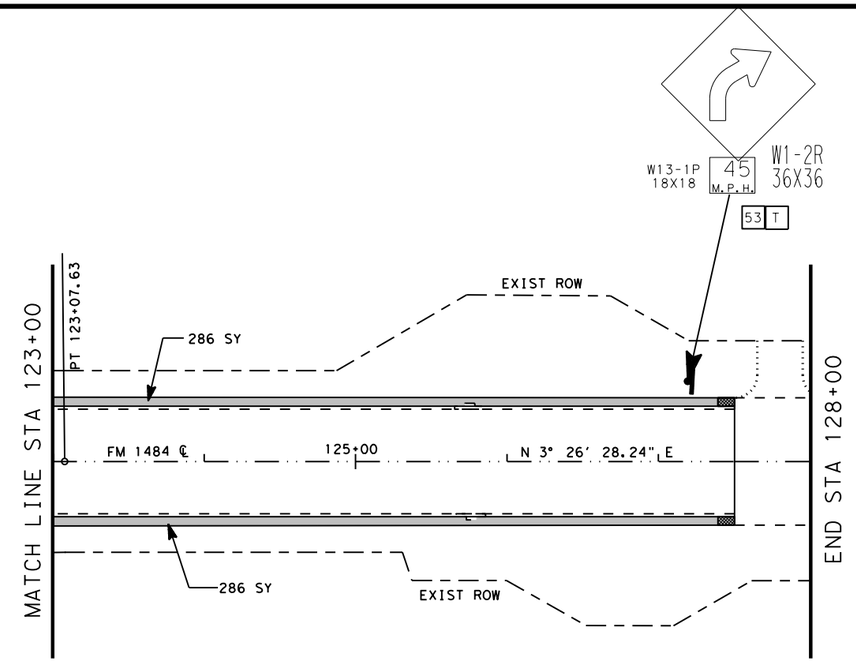
CK: DW: CK: DN:

NOTE:

REFER TO THE PEDESTRIAN
FACILITYES CURB RAMP
STANDARD FOR MORE INFORMATION



LEGEND

- EXISTING DRIVEWAY/INTERSECTION
- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED SIDEWALK
- PROPOSED CURB RAMP
- PROP CONC DRIVEWAY REMOVAL & SIDEWALK TREATMENT AT DRIVEWAYS WITH 9" FAST TRACK

PAY ITEMS

(K) MULTIPOLYMER PAV MRK (W)(24")(SLD)
(T) RELOCATE SM RD SN SUP&AM TY 10BWG

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.01.23

FM 1484
SIDEWALKS LAYOUT

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		47A

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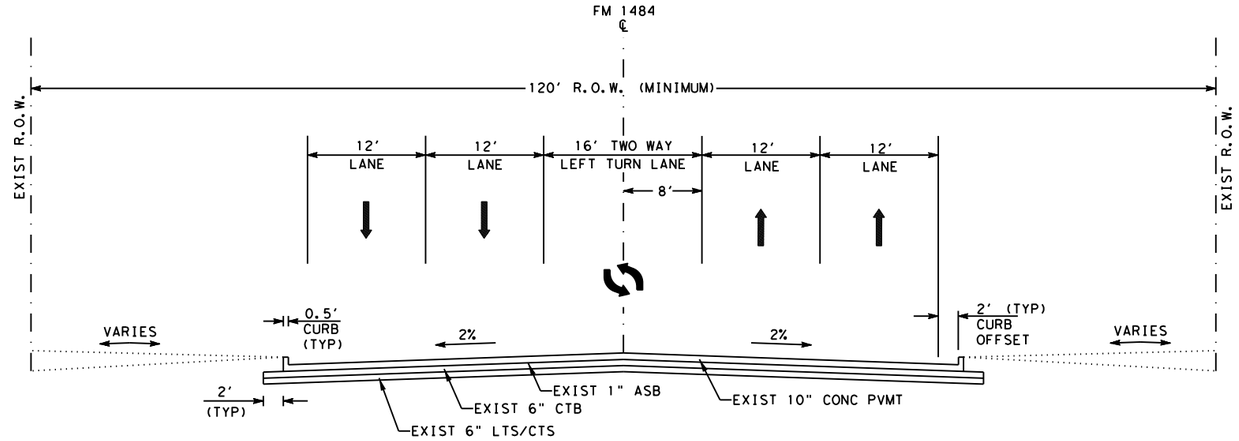

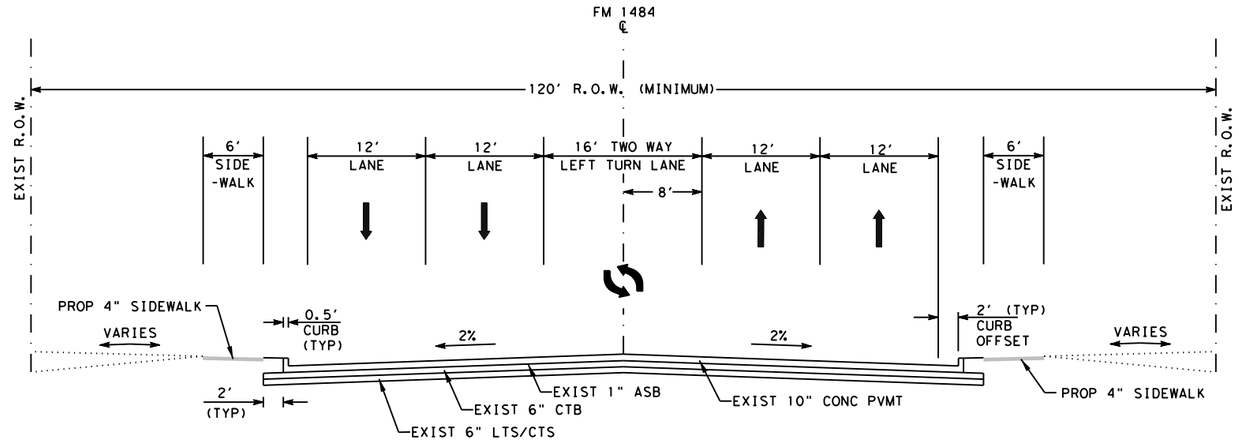

STATE OF TEXAS
MICAH J. SCHLUTER
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Micah J. Schluter, P.E.
08.01.23

FM 1484 SIDEWALKS TYPICAL SECTIONS

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		47B

N. T. S.

DATE: 07/13/2023 11:37 AM
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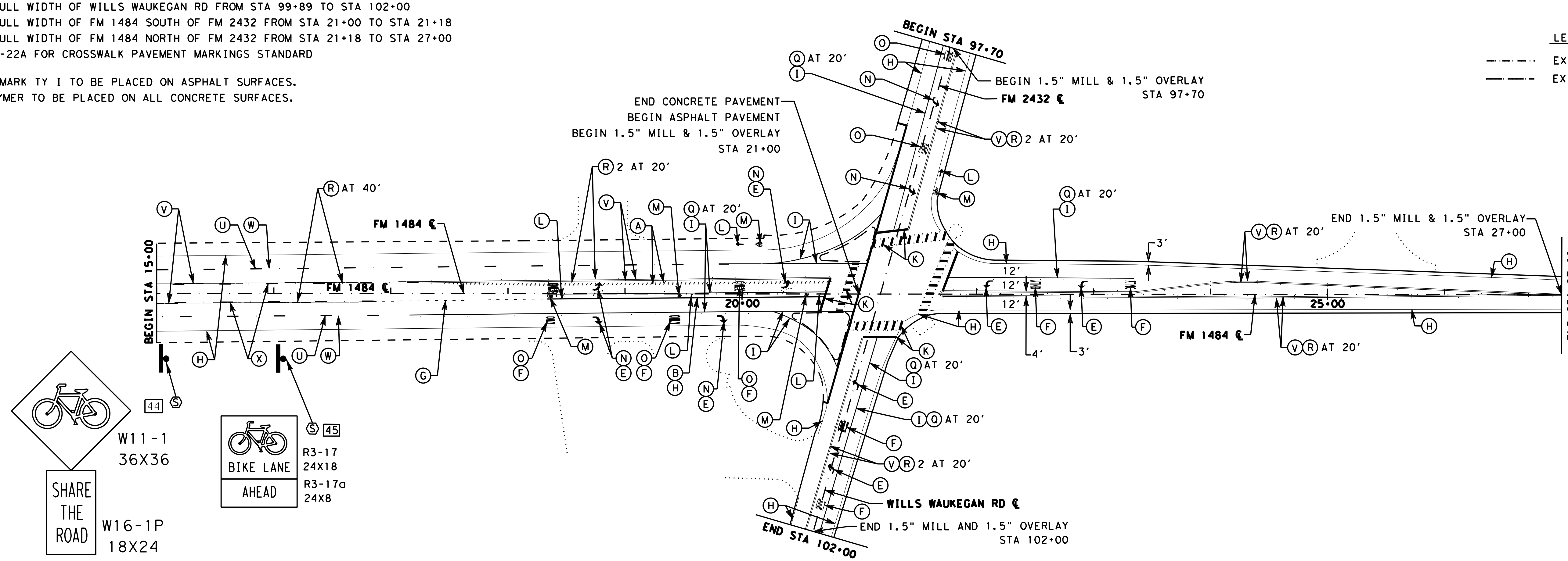
DN: | CK: | DW: | CK:

NOTES:

NO WIDENING REQUIRED
ALL EXISTING SIGNS NOT SHOWN ARE TO REMAIN
2" MILL & 2" OVERLAY FOR THE FOLLOWING ROADS/STATIONS:
OVERLAY FULL WIDTH OF FM 2432 FROM STA 97+70 TO STA 99+89
OVERLAY FULL WIDTH OF WILLS WAUKEGAN RD FROM STA 99+89 TO STA 102+00
OVERLAY FULL WIDTH OF FM 1484 SOUTH OF FM 2432 FROM STA 21+00 TO STA 21+18
OVERLAY FULL WIDTH OF FM 1484 NORTH OF FM 2432 FROM STA 21+18 TO STA 27+00
SEE PM(4)-22A FOR CROSSWALK PAVEMENT MARKINGS STANDARD

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND
EXISTING EDGE OF PAVEMENT
EXISTING RAISED CURB



PAY ITEMS

- Ⓐ ELIM EXIST PAV MRK (6")
- Ⓑ ELIM EXIST PAV MRK (8")
- Ⓒ ELIM EXIST PAV MRK (12")
- Ⓓ ELIM EXIST PAV MRK (24")
- Ⓔ ELIM EXIST PAV MRK (ARROW)
- Ⓕ ELIM EXIST PAV MRK (WORD)
- Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- Ⓠ REFL PAV MRKR TY I-C
- Ⓡ REFL PAV MRKR TY II-A-A
- Ⓢ IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- Ⓣ RELOCATE SM RD SN SUP&AM TY10BWG
- Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- Ⓧ RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 1484 AT FM 2432 INTERSECTION LAYOUT

SHEET 1 OF 1

0 50 100
SCALE IN FEET

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST		COUNTY	SHEET NO.
HOU		MONTGOMERY	48

DATE: 07/24/2023 11:22 AM
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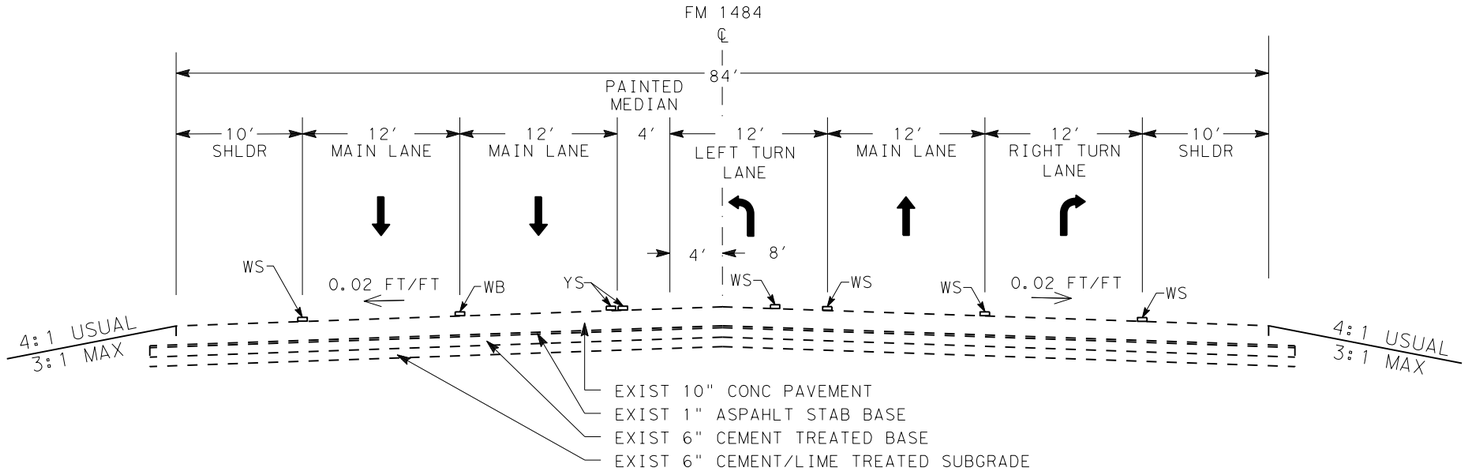
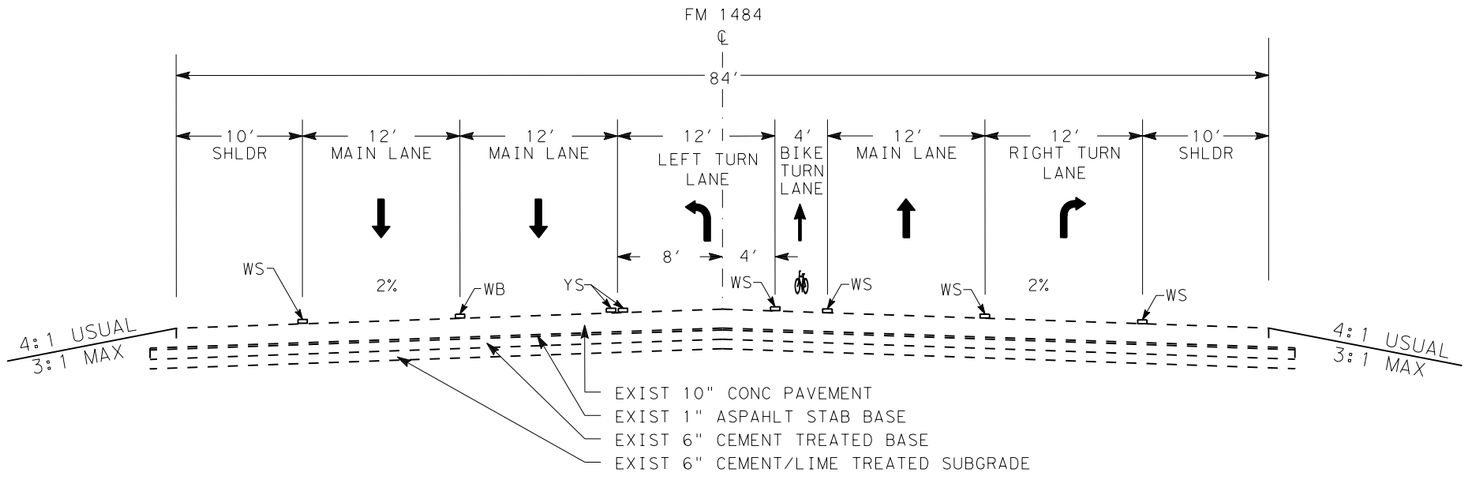


EXISTING TYPICAL SECTION

FROM 15+00 TO 21+00



PROPOSED TYPICAL SECTION

FROM 15+00 TO 21+00

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 1484
AT FM 2432
TYPICAL
SECTIONS

SHEET 1 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		48A

N. T. S.

DATE: 07/24/2023 03:28 PM
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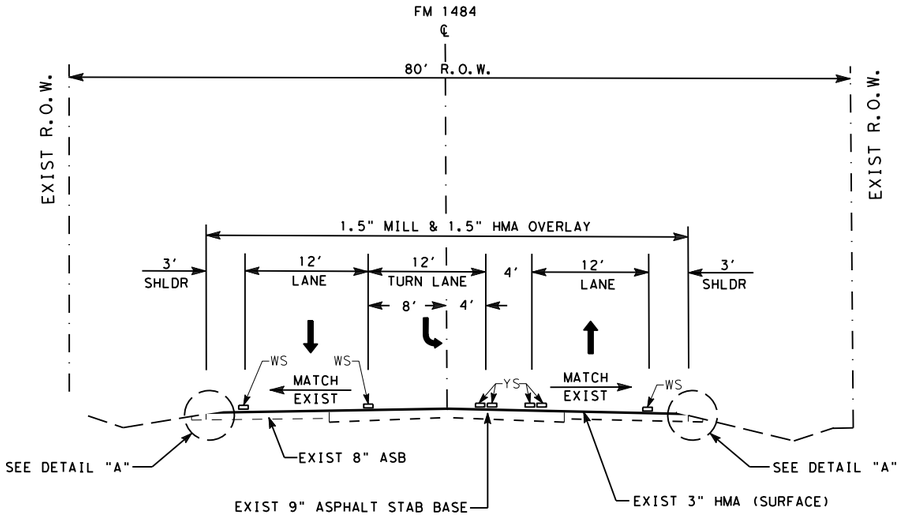
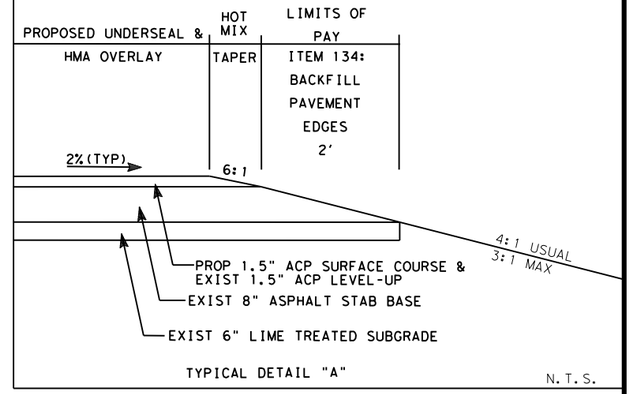
CK:

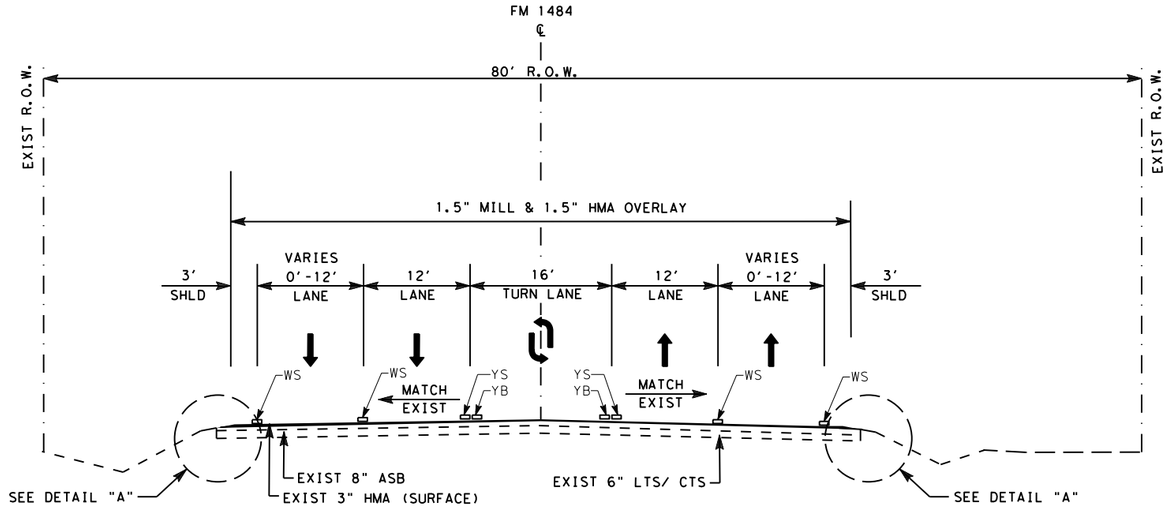


EXISTING & PROPOSED TYPICAL SECTION

FM 1484 NORTH OF FM 2432

FROM STA 21+18 TO STA 27+00





EXISTING & PROPOSED FM 1484 INTERSECTION

SOUTH OF FM 2432

FROM STA 21+00 TO STA 21+18

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

FM 1484
AT FM 2432
TYPICAL SECTIONS

SHEET 2 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		48B

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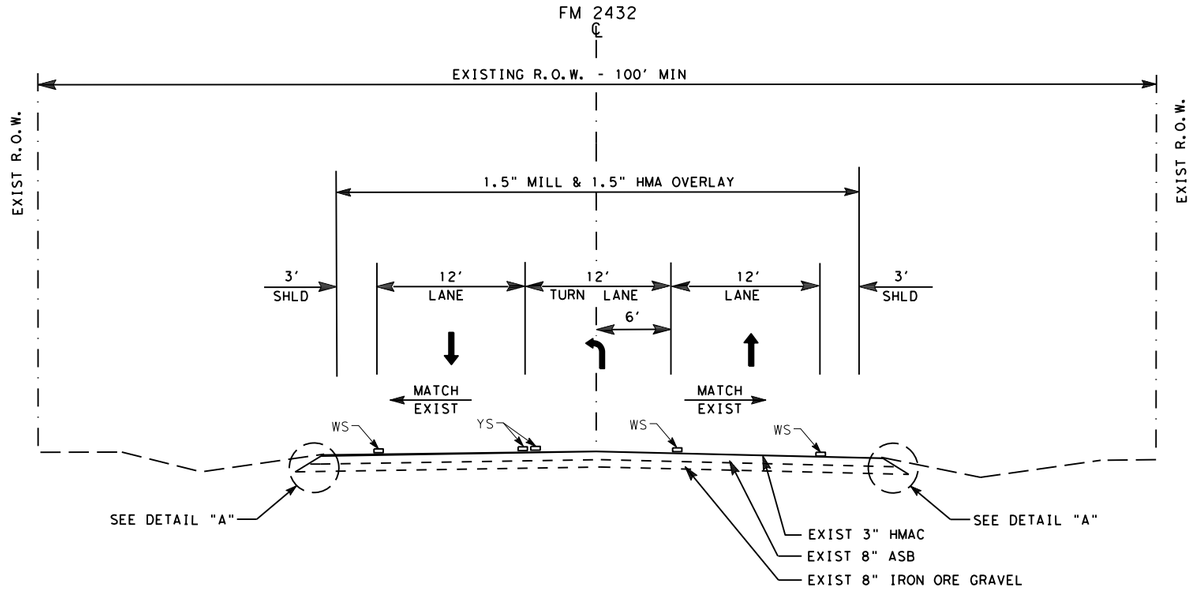
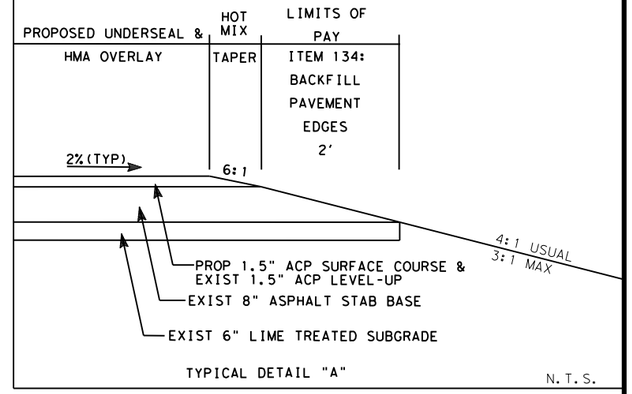
CK:



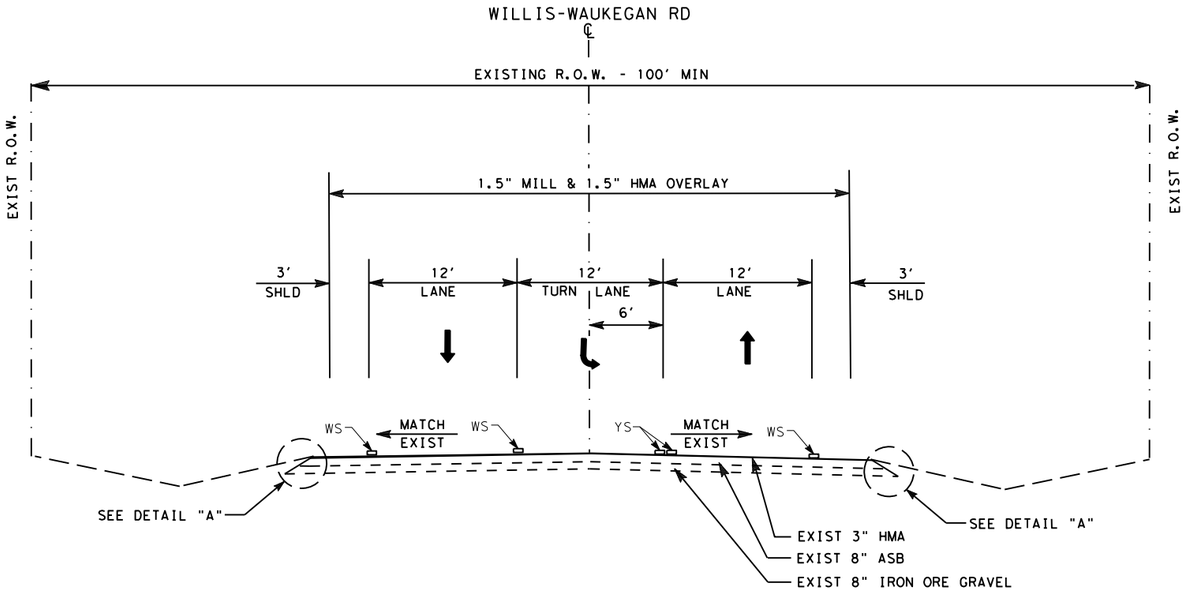
EXISTING & PROPOSED FM 2432 TYPICAL SECTION

EAST OF FM 1484

STA 97+70 TO STA 99+89



TYPICAL DETAIL "A" N.T.S.



EXISTING & PROPOSED TYPICAL SECTION WILLIS-WAUKEGAN RD

WEST OF FM 1484

STA 99+98 TO STA 102+00

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.

08.01.23

FM 1484
AT FM 2432
TYPICAL SECTIONS

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		48C

DATE: 07/24/2023 03:28 PM
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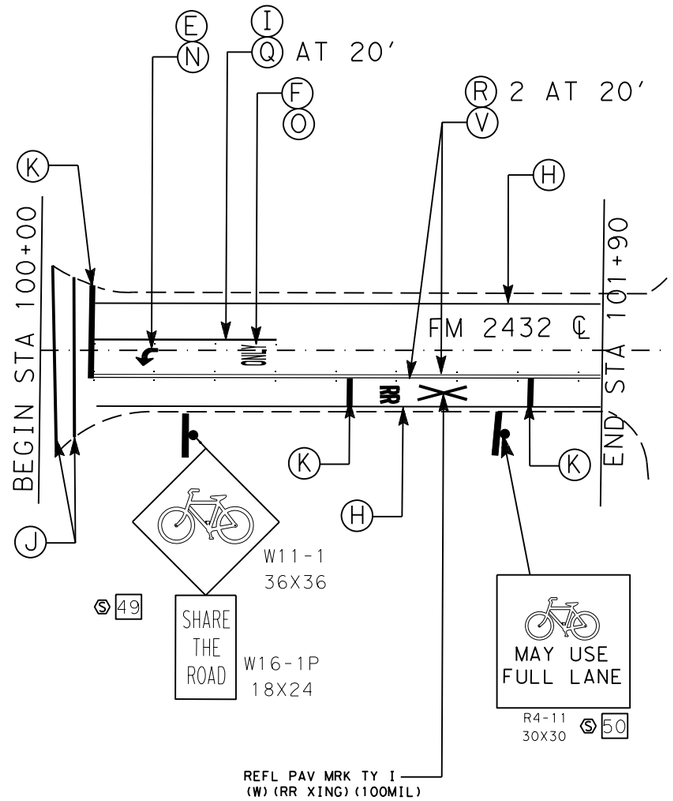
NOTES:

1. REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES. MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

2. ENSURE NO PAVEMENT MARKINGS ARE PLACED WITHIN 50' OF RAILROAD ROW AND TCP DOES NOT ENTER RAILROAD ROW.



LEGEND

EXISTING EDGE OF PAVEMENT

PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 25 50
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.30.23

FM 2432
AT SH 75
INTERSECTION
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		50

DATE: 08/30/2023 09:54 AM
FILE: pw:\txdot.projectwiseonline.com:TXDOT3\Documents*- HOU\Design Projects\0912372374- Design\Plan Set*. Roadway\SH 75 AT FM 2432.dgn

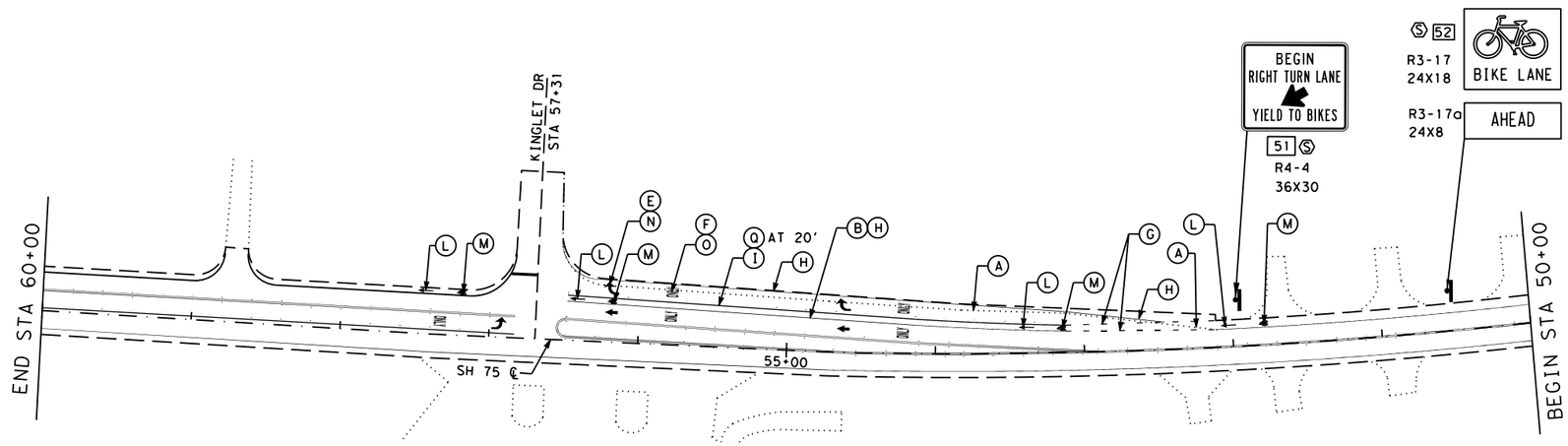
NOTES:

NO OVERLAY REQUIRED
PAVEMENT MARKINGS & SIGNAGE ONLY

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

—·—·— EXISTING EDGE OF PAVEMENT



PAY ITEMS

Ⓐ ELIM EXIST PAV MRK (6")
Ⓑ ELIM EXIST PAV MRK (8")
Ⓒ ELIM EXIST PAV MRK (12")
Ⓓ ELIM EXIST PAV MRK (24")
Ⓔ ELIM EXIST PAV MRK (ARROW)
Ⓕ ELIM EXIST PAV MRK (WORD)
Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL)
Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL)
Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL)
Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL)
Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL)
Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
Ⓠ REFL PAV MRKR TY I-C
Ⓡ REFL PAV MRKR TY II-A-A
Ⓢ IN SM RD SN SUP&AM TY10BWG(1)SA(P)
Ⓣ RELOCATE SM RD SN SUP&AM TY10BWG
Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL)
Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL)
Ⓧ RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 75
AT KINGLET DR
INTERSECTION
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		51

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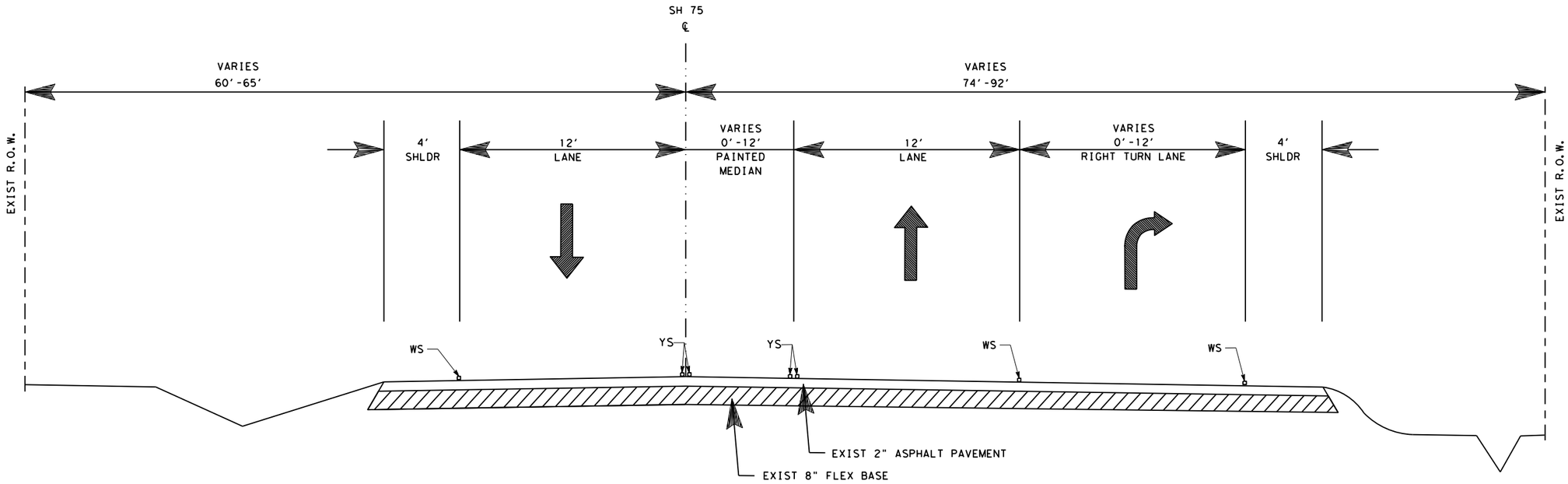
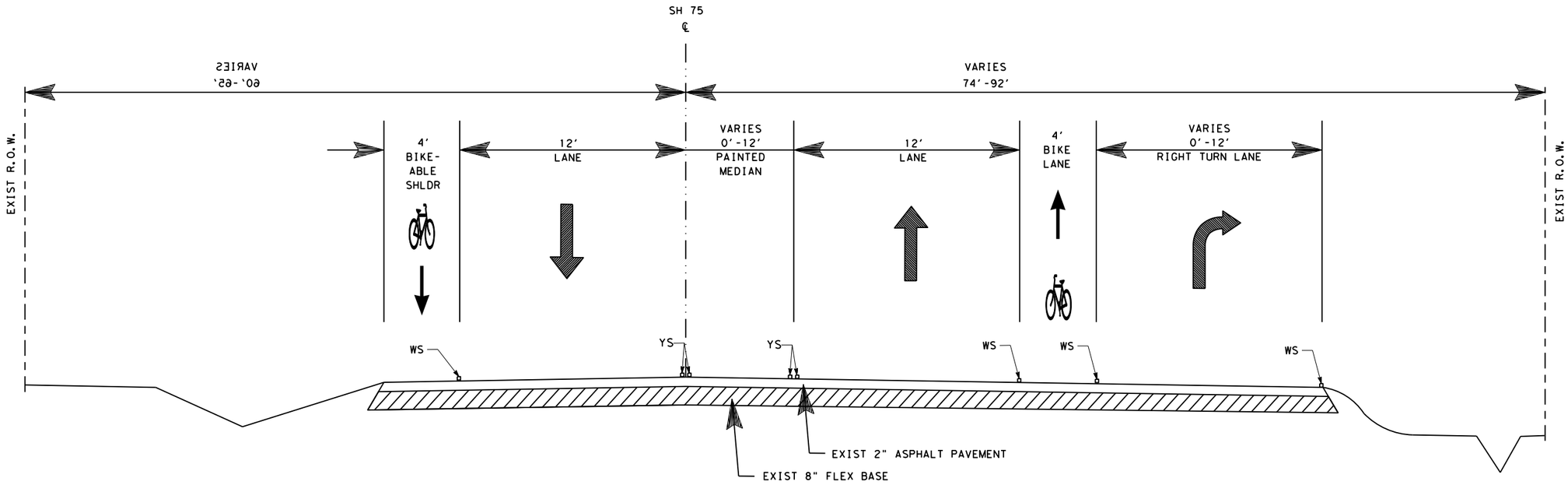
LEGEND

YS = YELLOW SOLID
WS = WHITE SOLID



EXISTING TYPICAL SECTION

STA 50+00 TO STA 57+31



PROPOSED TYPICAL SECTION

STA 50+00 TO STA 57+31

N. T. S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.

08.01.23

SH 75
AT KINGLET DR
TYPICAL SECTIONS

SHEET 1 OF 1

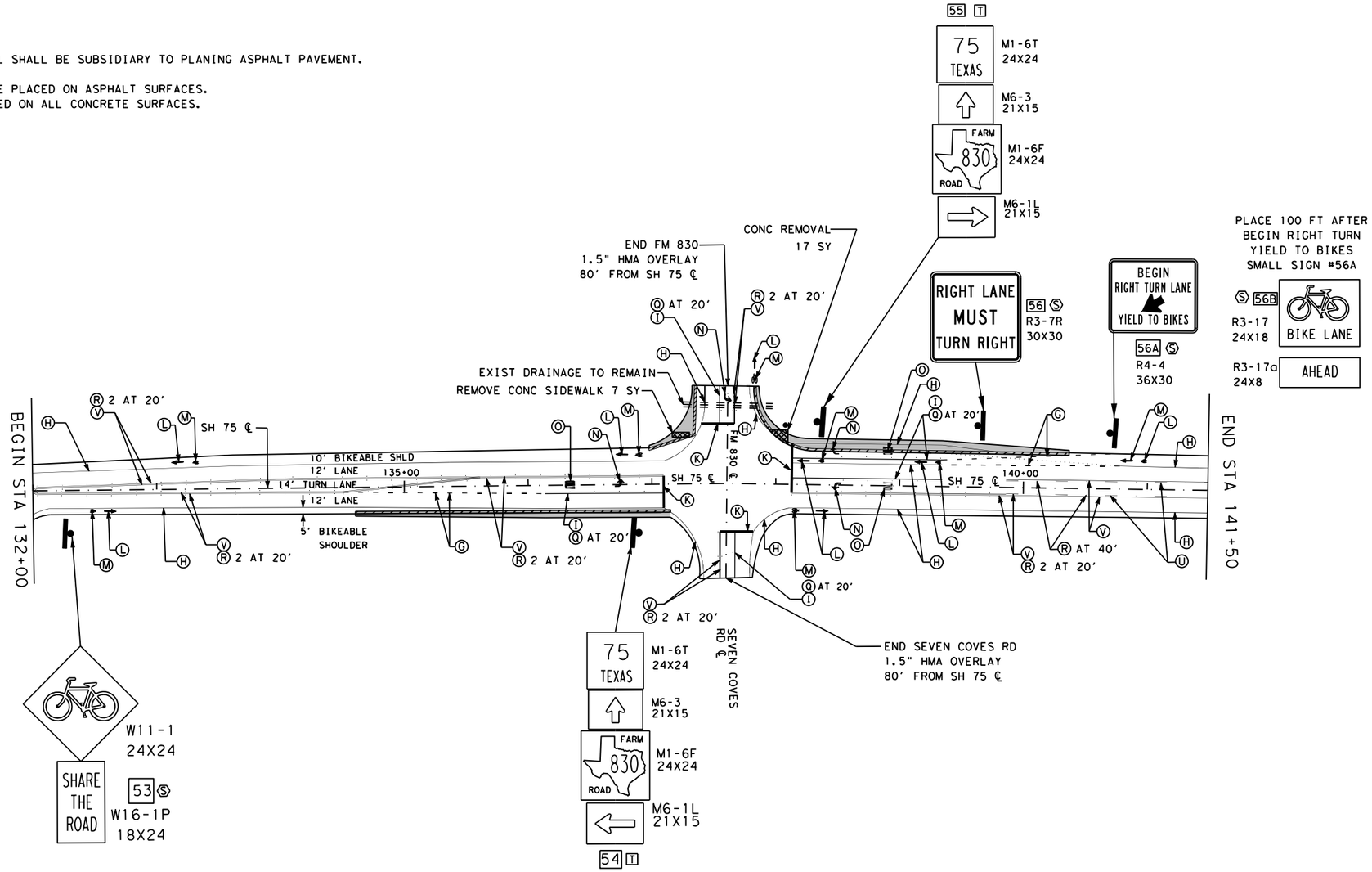
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		51A

NOTES:

PAVEMENT MARKING REMOVAL SHALL BE SUBSIDIARY TO PLANING ASPHALT PAVEMENT.

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER TO BE PLACED ON ALL CONCRETE SURFACES.



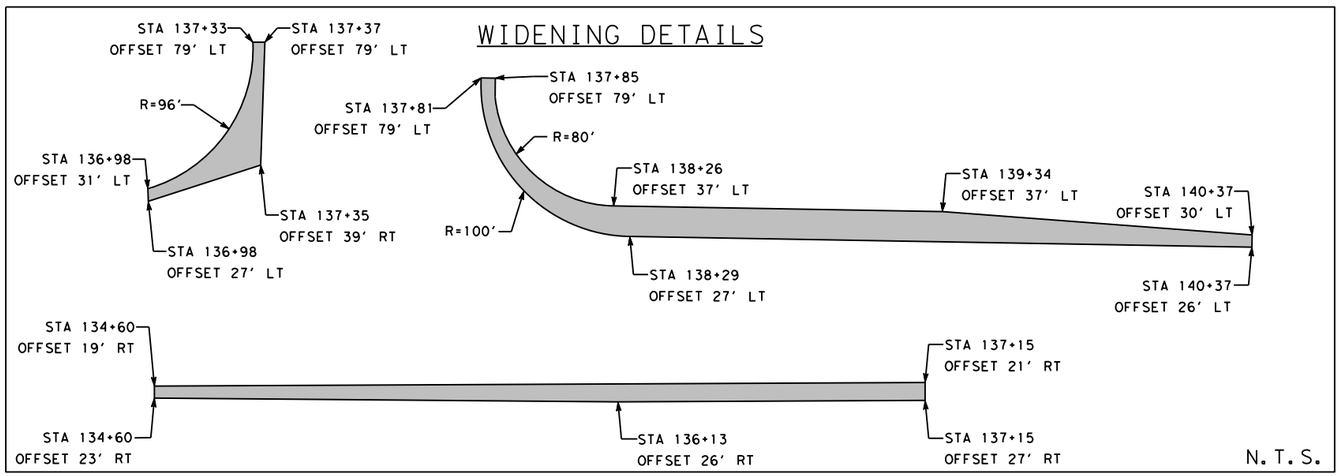
ROADWAY LEGEND

- EXIST EDGE OF PAVEMENT
- EXIST R.O.W.
- PROP ASPHALT REMOVAL
- PROP ASPHALT PAVEMENT
- PROP CONCRETE REMOVAL

PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)(6")(SLD)(100 MIL)
- (I) REFL PAV MRK TY I (W)(8")(SLD)(100 MIL)
- (J) REFL PAV MRK TY I (W)(12")(SLD)(100 MIL)
- (K) REFL PAV MRK TY I (W)(24")(SLD)(100 MIL)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) PREFAB PAV MRK TY C (W)(ARROW)(100 MIL)
- (O) PREFAB PAV MRK TY C (W)(WORD)(100 MIL)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TYS80(1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY S80
- (U) RE PM W/RET REQ TY I (Y)(6")(BRK)(100 MIL)
- (V) RE PM W/RET REQ TY I (Y)(6")(SLD)(100 MIL)
- (W) RE PV MARK TY I(BLACK)(4")(SHADOW)(100 MIL)

WIDENING DETAILS



N.T.S.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 75 AT FM 830 INTERSECTION LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		52

DATE: 07/28/2023 09:37 AM
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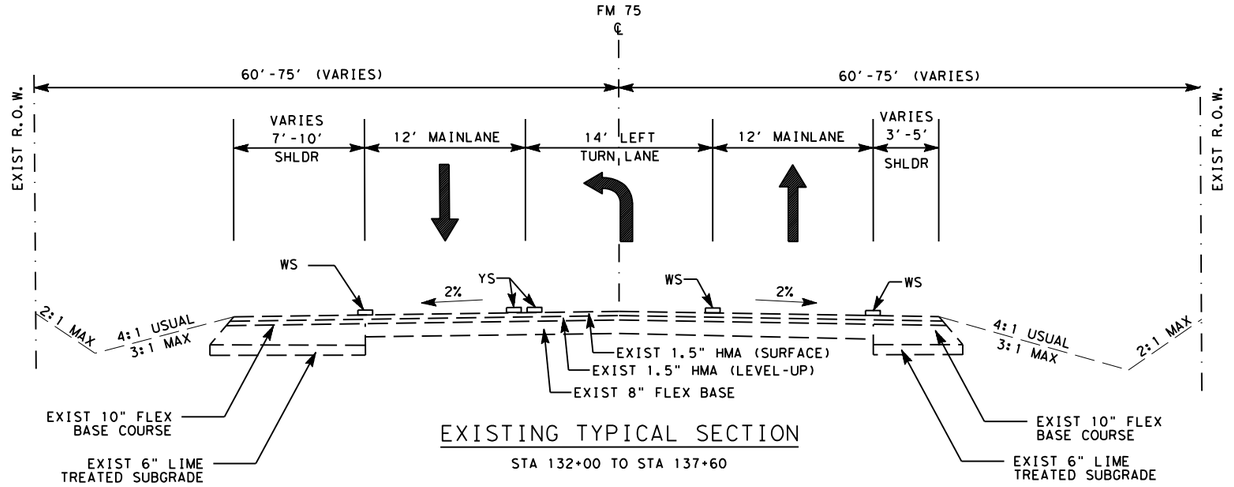
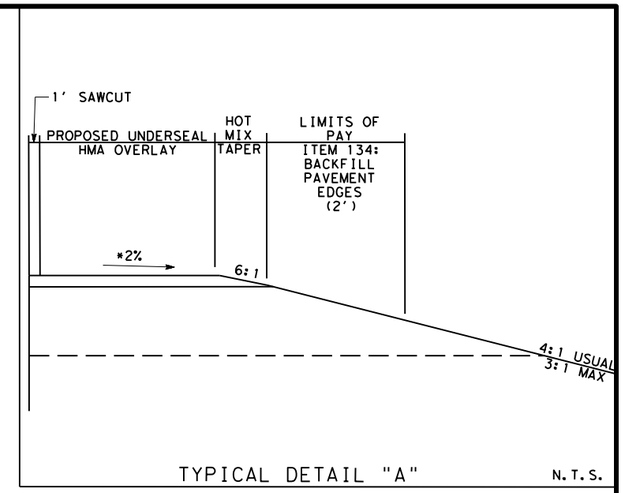
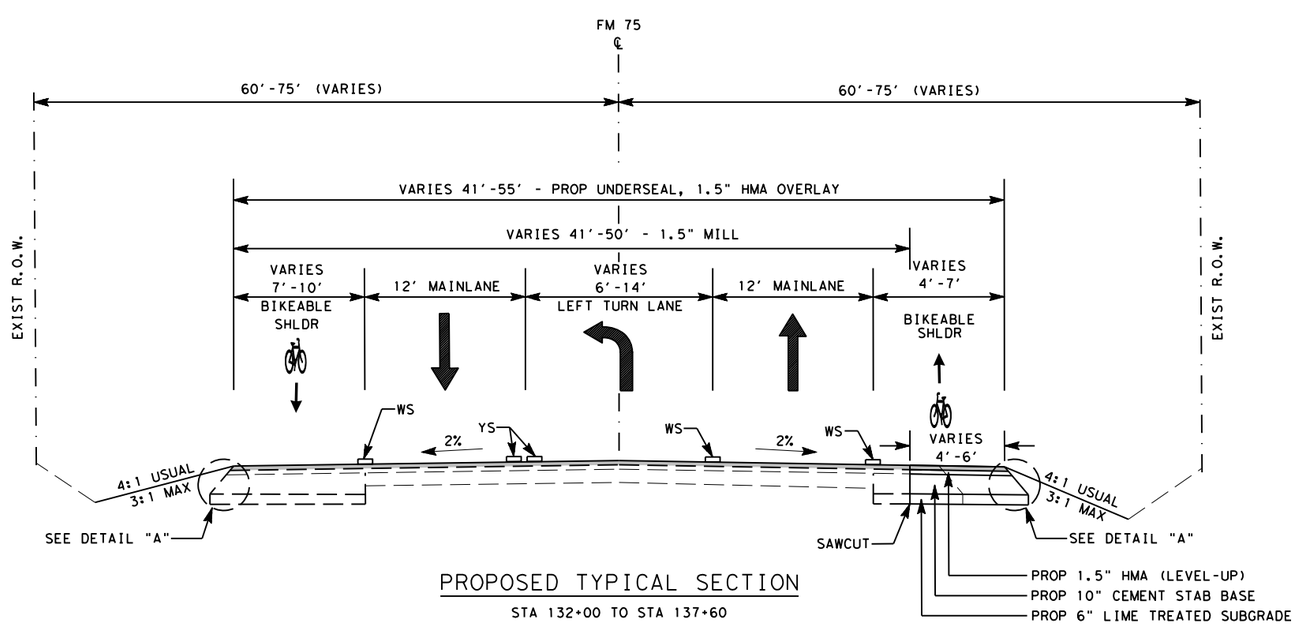


EXISTING TYPICAL SECTION

STA 132+00 TO STA 137+60



TYPICAL DETAIL "A" N.T.S.



PROPOSED TYPICAL SECTION

STA 132+00 TO STA 137+60

N. T. S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.

08.01.23

SH 75
AT FM 830
TYPICAL
SECTIONS

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		52A

DATE: 07/25/2023 04:01 PM
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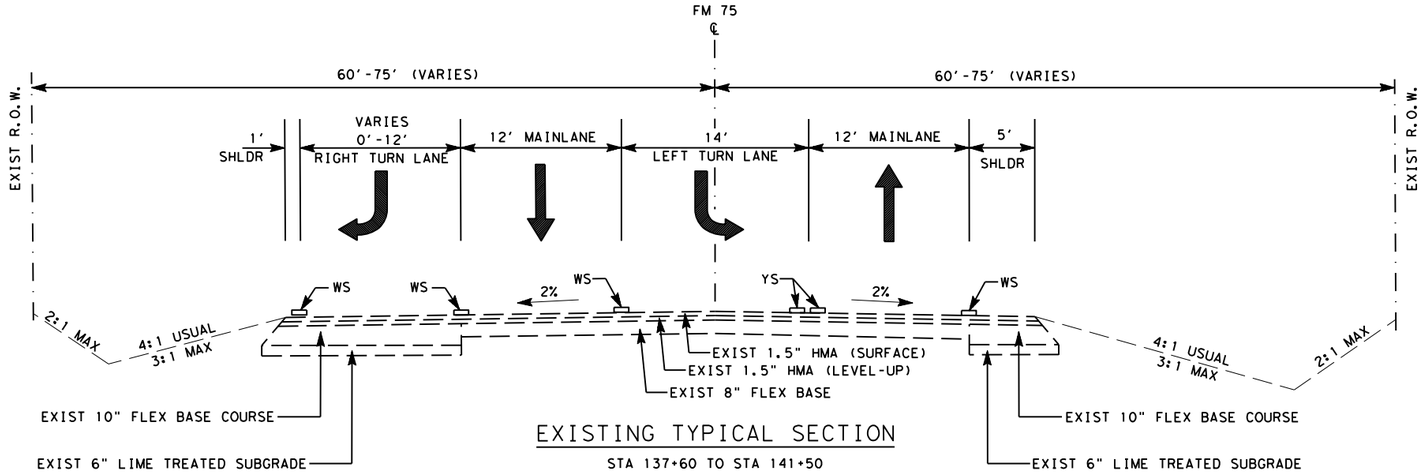
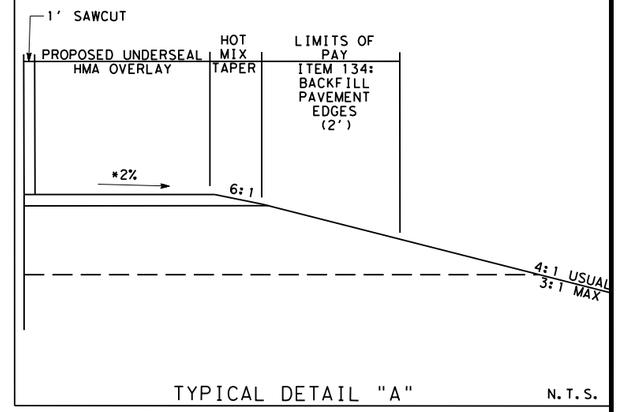
CK: | DW: | CK: | CK:

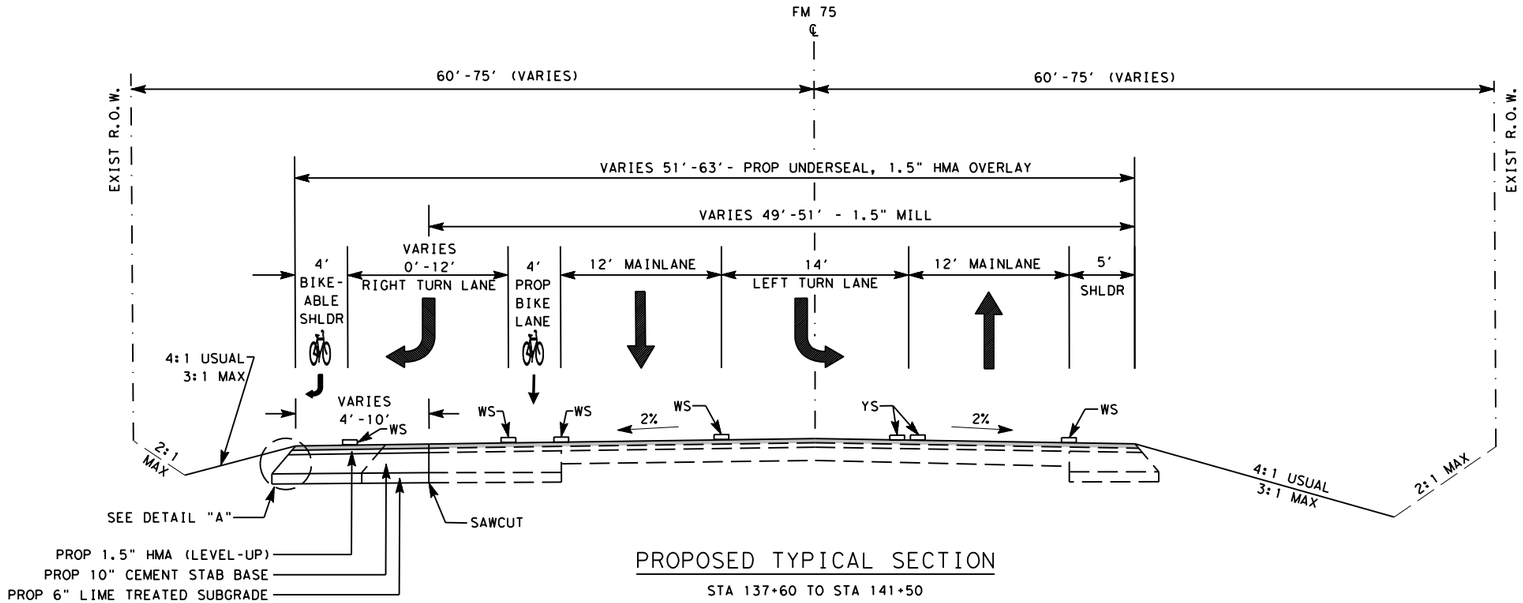


EXISTING TYPICAL SECTION

STA 137+60 TO STA 141+50



TYPICAL DETAIL "A" N.T.S.



PROPOSED TYPICAL SECTION

STA 137+60 TO STA 141+50

N.T.S.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.

08.01.23

SH 75 AT FM 830 TYPICAL SECTIONS

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		52B

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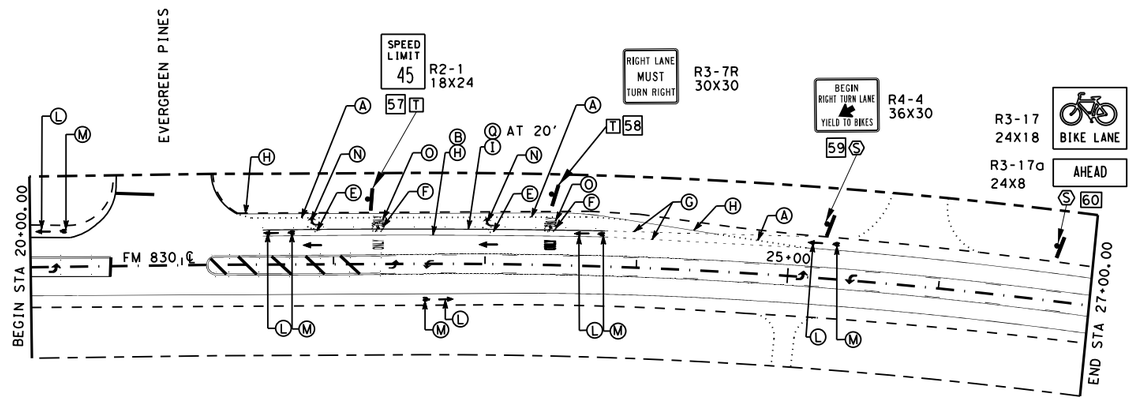
NOTES:

NO OVERLAY REQUIRED
PAVEMENT MARKINGS & SIGNAGE ONLY

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

EXISTING ROADWAY
EXISTING R.O.W.



PAY ITEMS

Ⓐ ELIM EXIST PAV MRK (6")
Ⓑ ELIM EXIST PAV MRK (8")
Ⓒ ELIM EXIST PAV MRK (12")
Ⓓ ELIM EXIST PAV MRK (24")
Ⓔ ELIM EXIST PAV MRK (ARROW)
Ⓕ ELIM EXIST PAV MRK (WORD)
Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL)
Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL)
Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL)
Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL)
Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL)
Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
Ⓠ REFL PAV MRKR TY I-C
Ⓡ REFL PAV MRKR TY II-A-A
Ⓢ IN SM RD SN SUP&AM TY10BWG(1)SA(P)
Ⓣ RELOCATE SM RD SN SUP&AM TY10BWG
Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) /
Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) /
Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) /

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 830
AT EVERGREEN PINES INTERSECTION LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		53

DATE: 08/21/2023 8:21:48 PM
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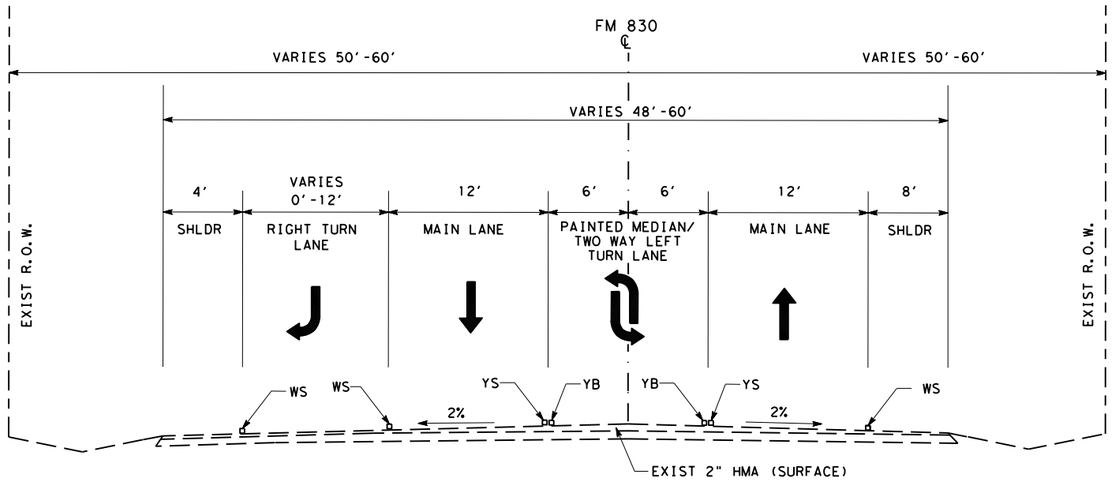
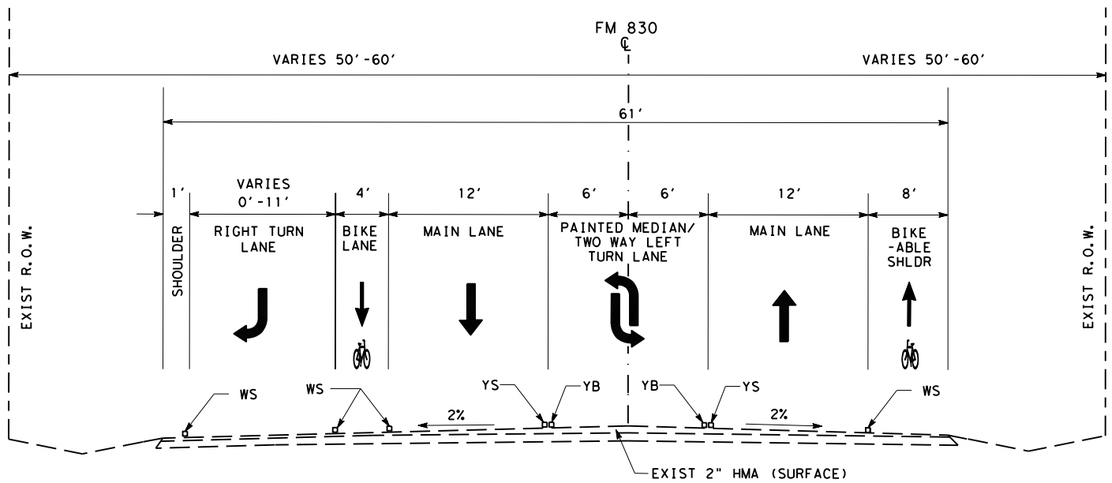


EXISTING TYPICAL SECTION

STA 21+00 TO STA 26+00

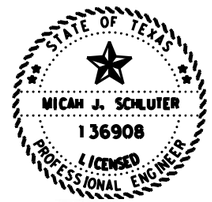


PROPOSED TYPICAL SECTION

STA 21+00 TO STA 26+00

LEGEND

WS = WHITE SOLID
YB = YELLOW BROKEN
YS = YELLOW SOLID



Micah J. Schluter, P.E.

08.01.23

FM 830
AT EVERGREEN PINES
TYPICAL SECTIONS

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	FM 830
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		53A

N.T.S.

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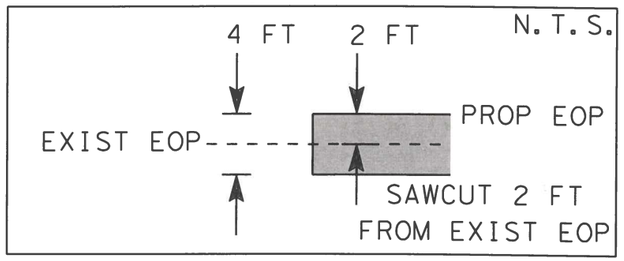
CK:

DETAIL A



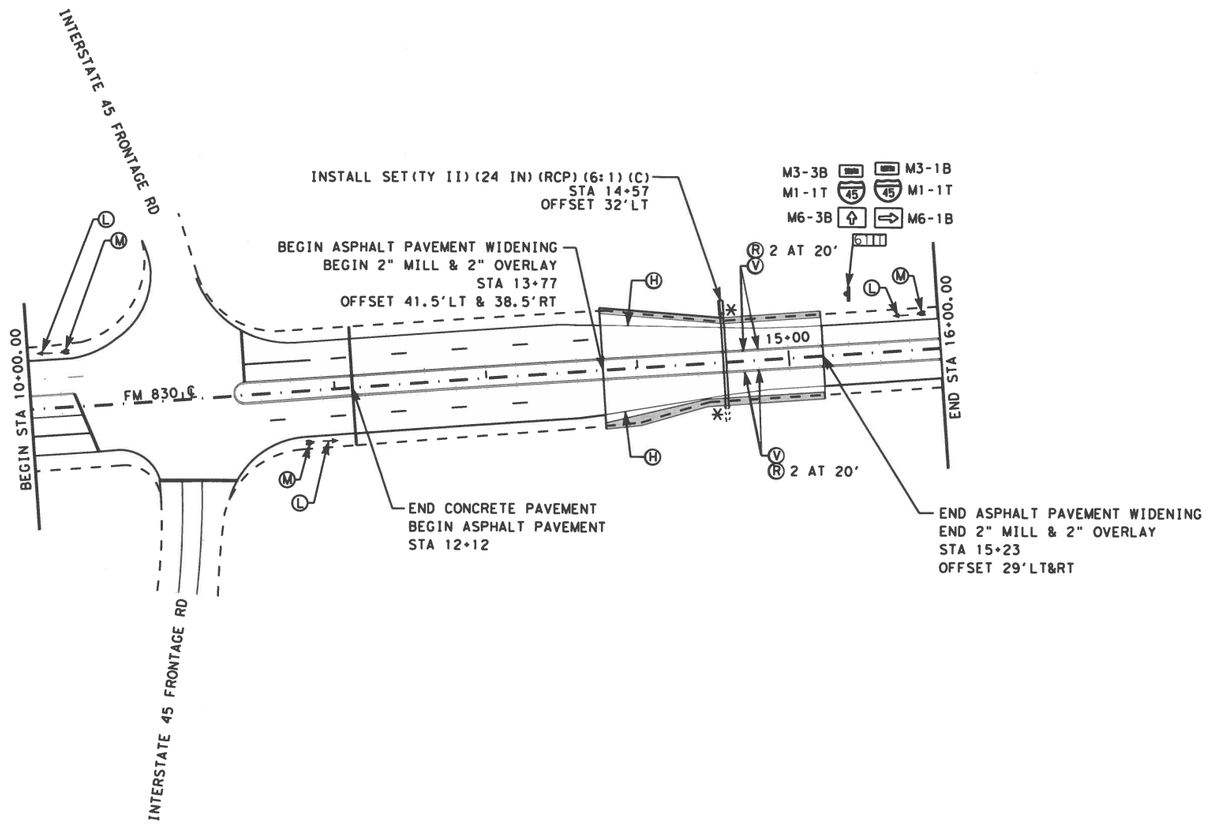
NOTES:

*INSTALL OBJECT MARKERS ON BOTH ENDS OF EXISTING CROSS-CULVERT

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING R.O.W.
- PROPOSED ASPHALT PAVEMENT



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-I-C-R
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah Schluter P.E.
08/01/2023

FM 830 AT IH 45 EAST INTERSECTION LAYOUT

SHEET 1 OF 1

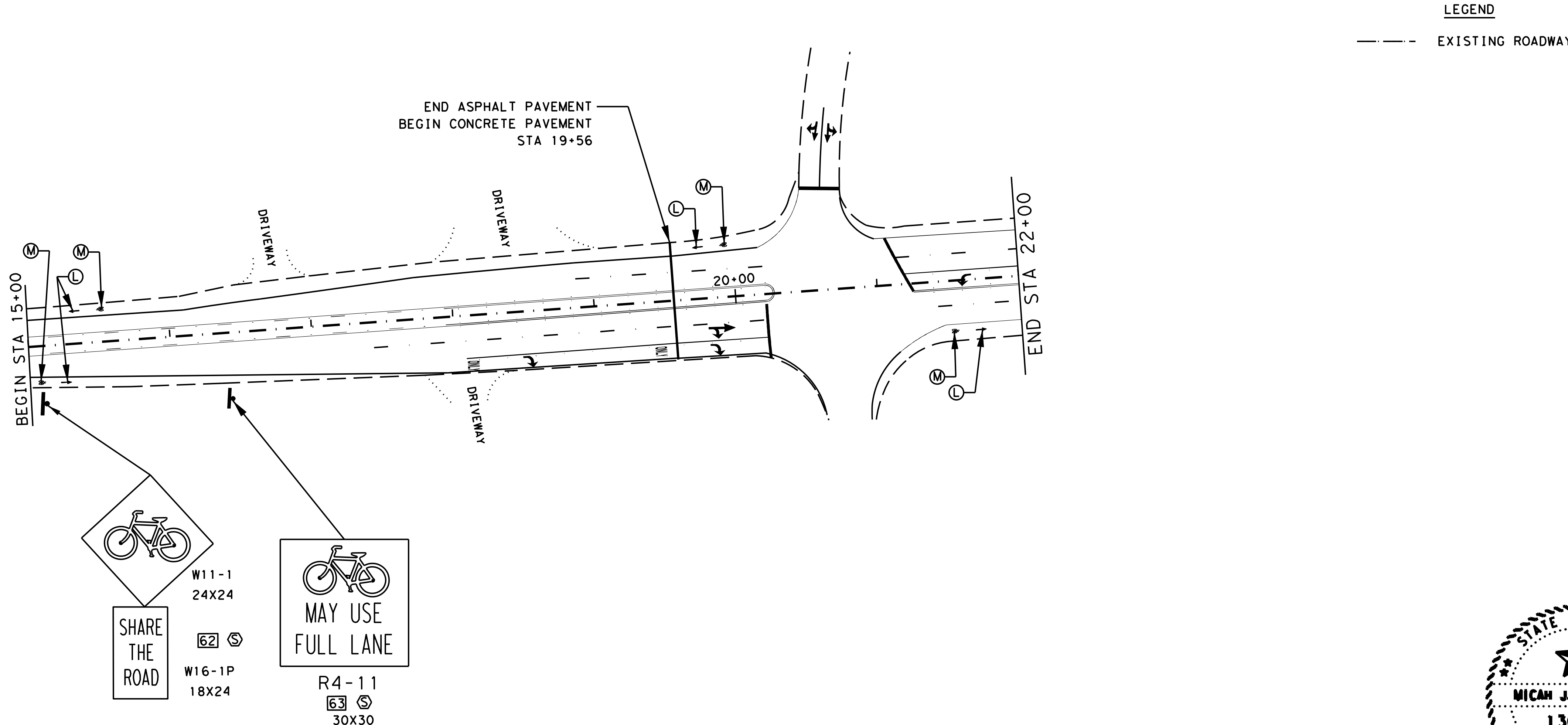
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		54

NOTES:

NO OVERLAY REQUIRED
PAVEMENT MARKINGS & SIGNAGE ONLY

REFL PAV MRK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACE ON CONCRETE SURFACES.



PAY ITEMS

- Ⓐ ELIM EXIST PAV MRK (6")
- Ⓑ ELIM EXIST PAV MRK (8")
- Ⓒ ELIM EXIST PAV MRK (12")
- Ⓓ ELIM EXIST PAV MRK (24")
- Ⓔ ELIM EXIST PAV MRK (ARROW)
- Ⓕ ELIM EXIST PAV MRK (WORD)
- Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- Ⓠ REFL PAV MRKR TY I-C
- Ⓡ REFL PAV MRKR TY II-A-A
- Ⓢ IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- Ⓣ RELOCATE SM RD SN SUP&AM TY10BWG
- Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- Ⓧ RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 830 AT IH 45 WEST INTERSECTION LAYOUT

SHEET 1 OF 1

0 50 100
SCALE IN FEET

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST		COUNTY	SHEET NO.
HOU		MONTGOMERY	55

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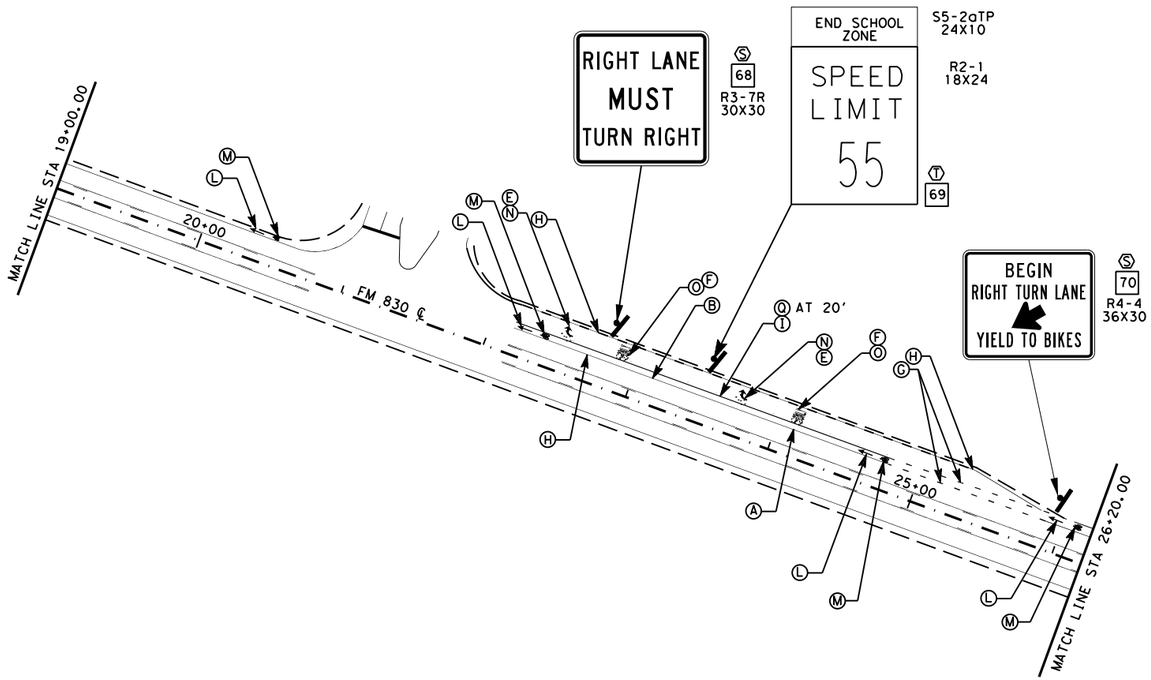
NOTES:

NO OVERLAY REQUIRED

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER TO BE PLACED ON ALL CONCRETE SURFACES.

LEGEND

EXISTING ROADWAY



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)(6")(SLD)(100 MIL)
- (I) REFL PAV MRK TY I (W)(8")(SLD)(100 MIL)
- (J) REFL PAV MRK TY I (W)(12")(SLD)(100 MIL)
- (K) REFL PAV MRK TY I (W)(24")(SLD)(100 MIL)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) PREFAB PAV MRK TY C (W)(ARROW)(100 MIL)
- (O) PREFAB PAV MRK TY C (W)(WORD)(100 MIL)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY10BWG
- (U) RE PM W/RET REQ TY I (W)(6")(BRK)(100 MIL)
- (V) RE PM W/RET REQ TY I (Y)(6")(SLD)(100 MIL)
- (W) RE PV MARK TY I(BLACK)(4")(SHADOW)(100 MIL)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 830 AT TERALYN WOODS PKWY INTERSECTION LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		56

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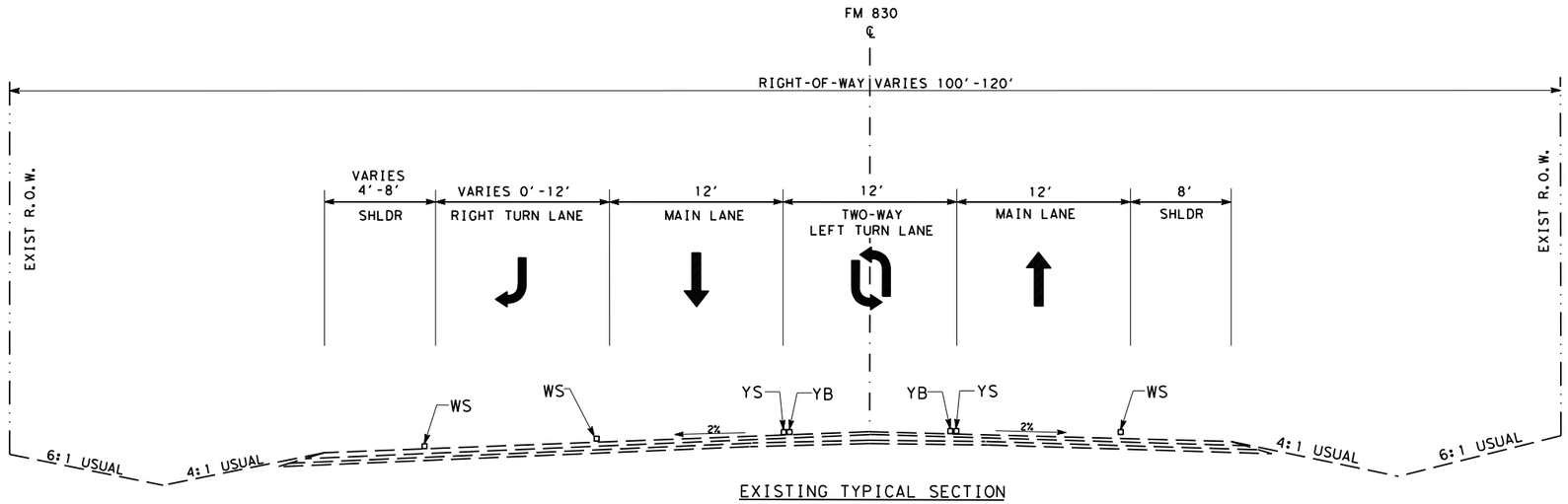
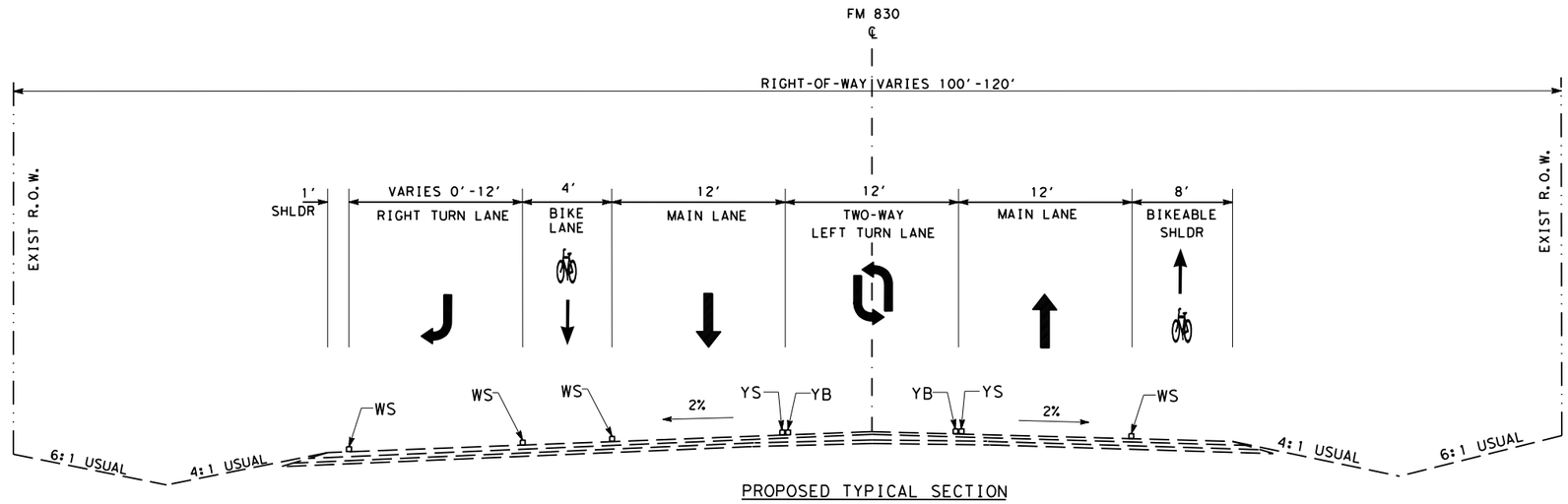


EXISTING TYPICAL SECTION

STA 22+15 TO STA 26+20



PROPOSED TYPICAL SECTION

STA 22+15 TO STA 26+20

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136908
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PROFESSIONAL ENGINEER

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08.01.23

FM 830 AT TERALYN WOODS PKWY TYPICAL SECTIONS

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		56A

N. T. S.

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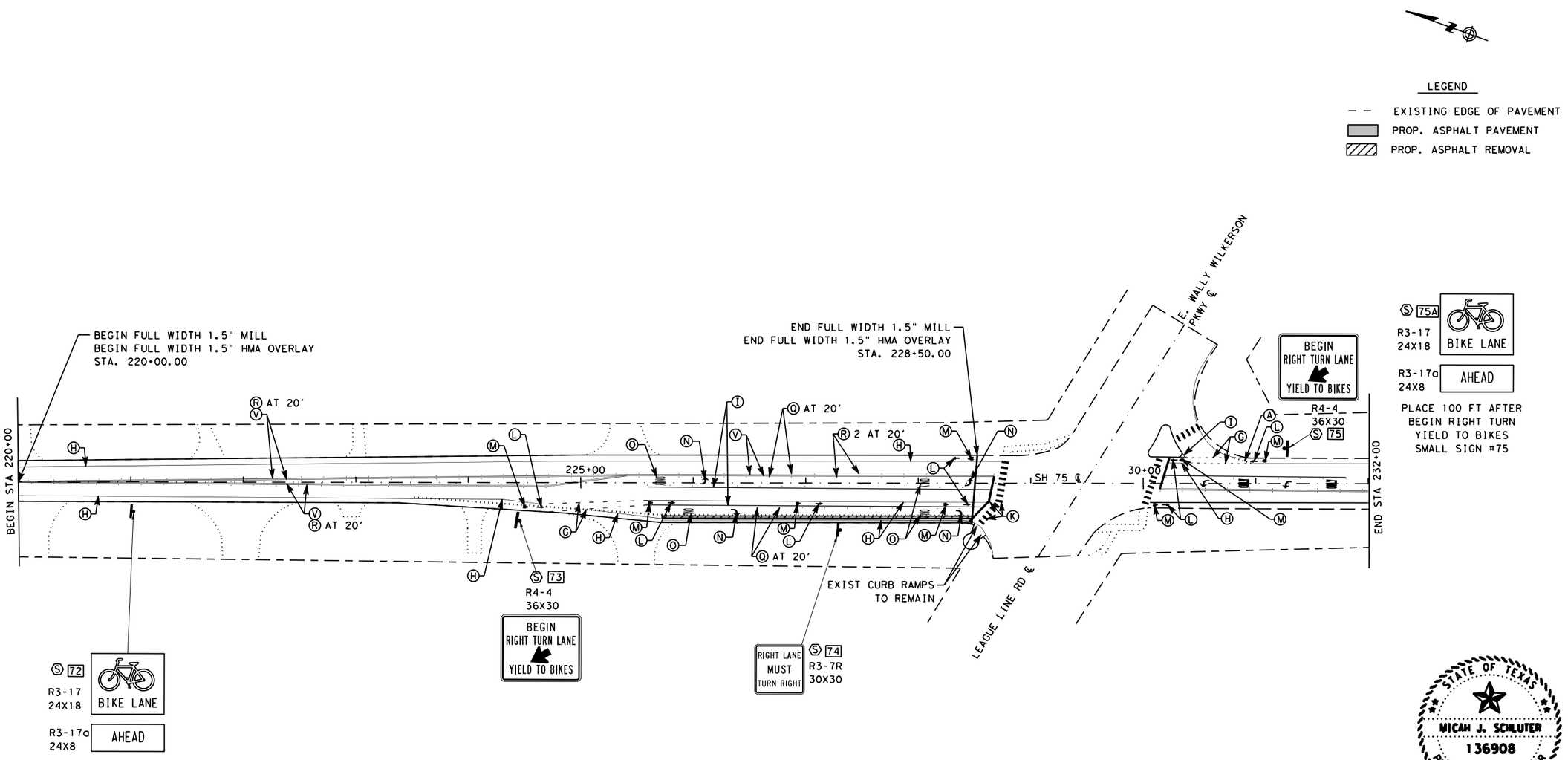
NOTES:

REFL PAV MARK TY I TO BE PLACE ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-C
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY10BWG(1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 75 AT LEAGUE LINE RD INTERSECTION LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		57

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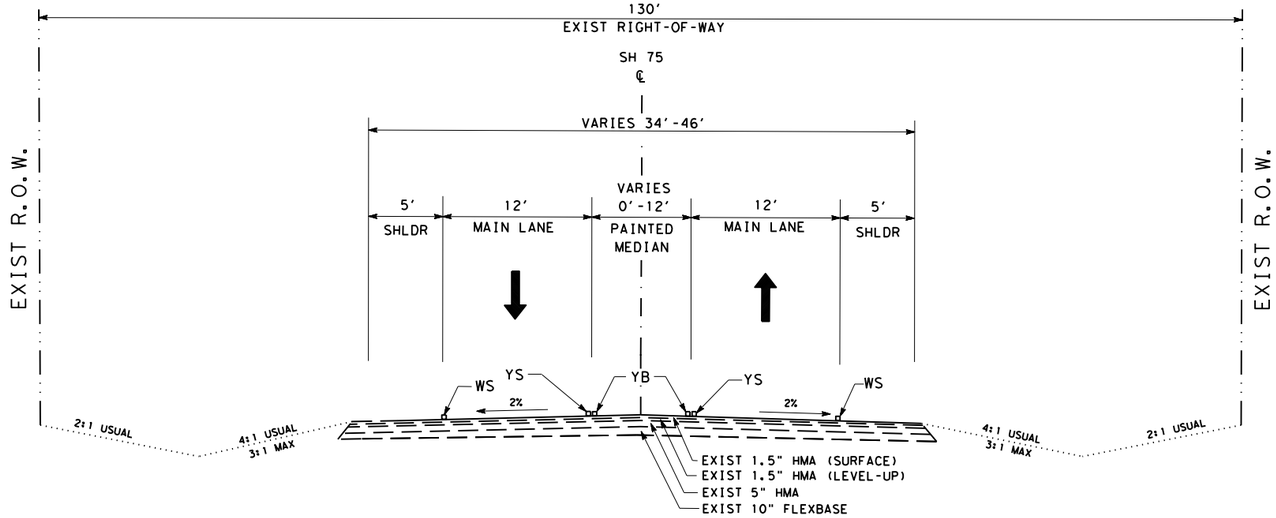
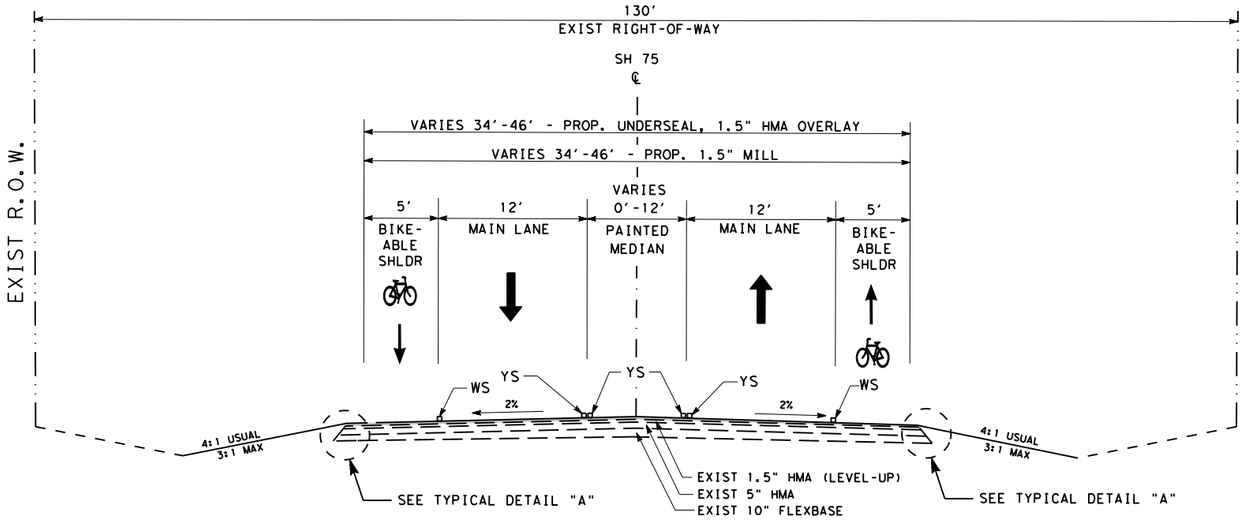


EXISTING TYPICAL SECTION

STA 220+00.00 TO STA 225+59.00



PROPOSED TYPICAL SECTION

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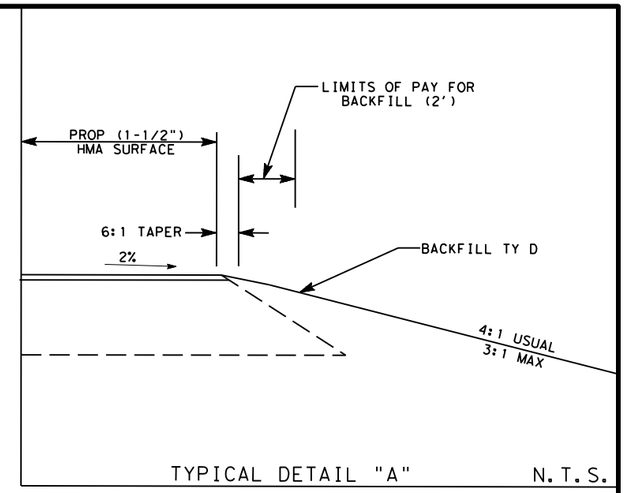

TYPICAL DETAIL "A" N.T.S.

N.T.S.

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Micah J. Schluter, P.E.

08.01.23

SH 75
AT LEAGUE LINE RD
TYPICAL
SECTIONS

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		57A

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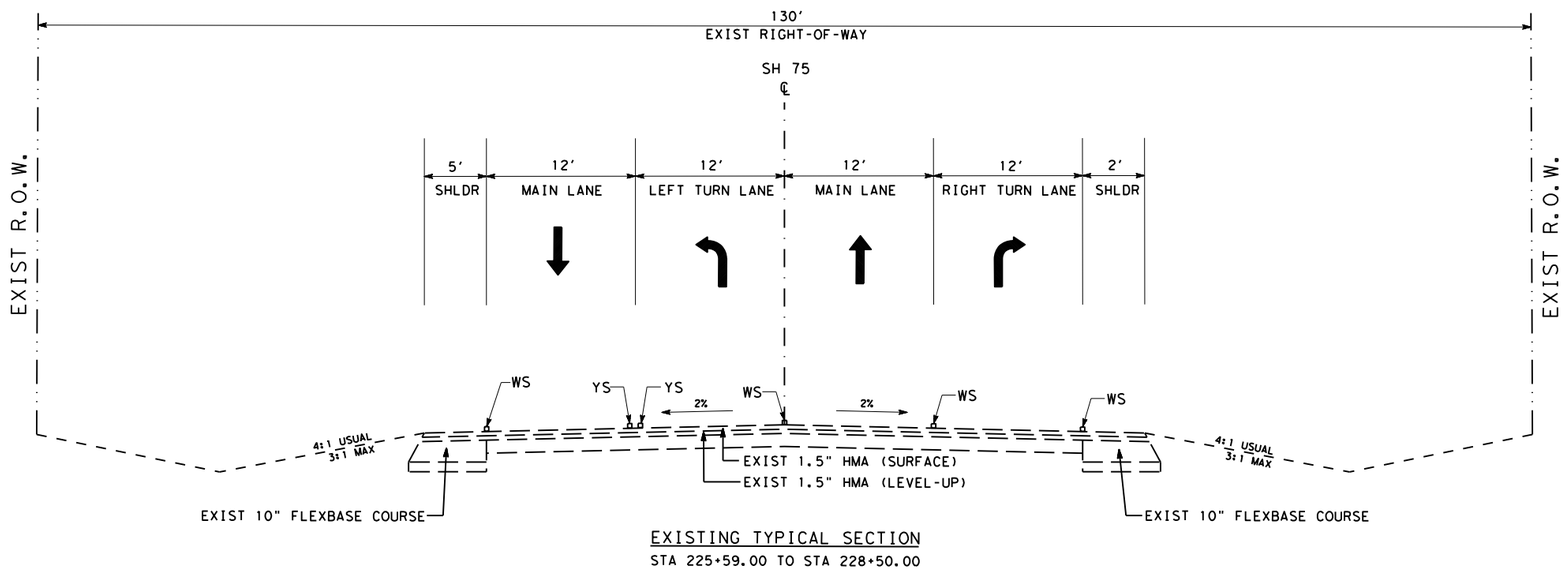
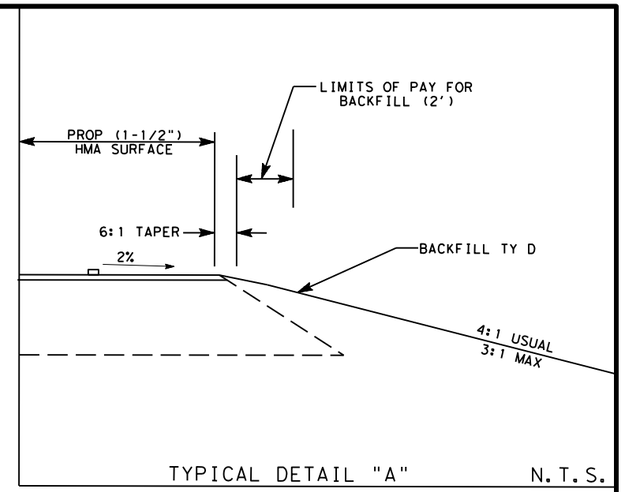
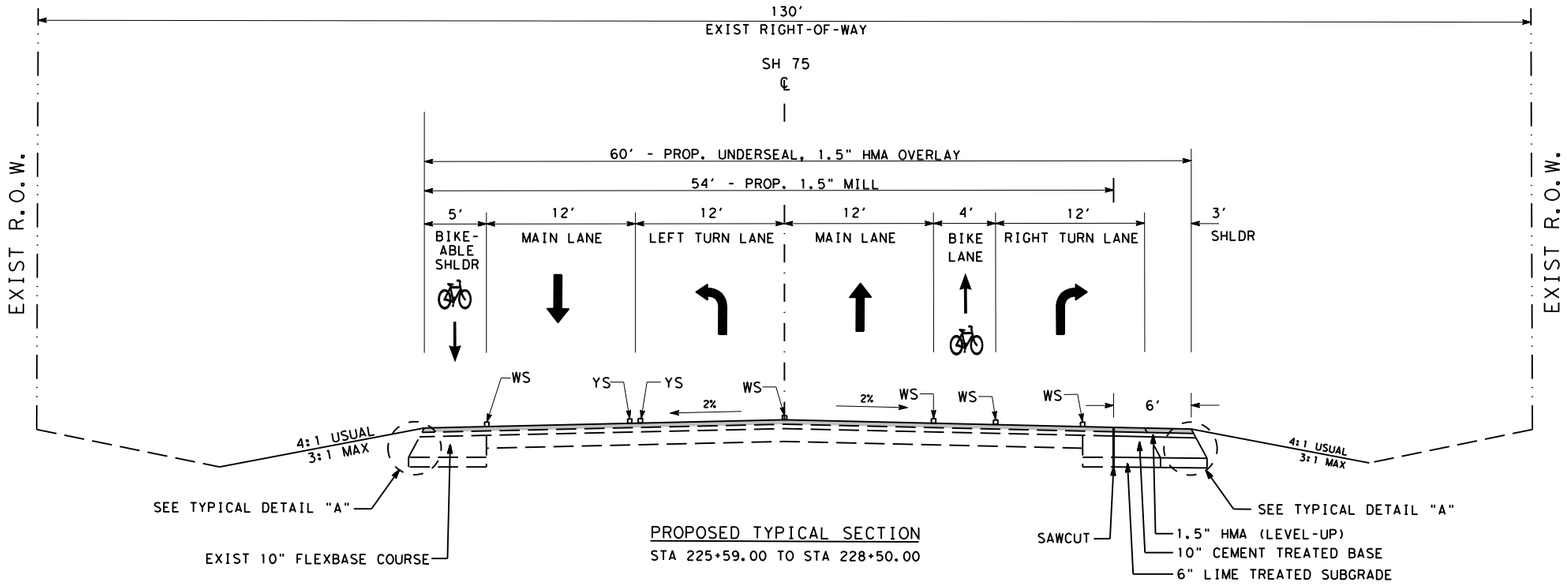


EXISTING TYPICAL SECTION

STA 225+59.00 TO STA 228+50.00



TYPICAL DETAIL "A" N.T.S.



PROPOSED TYPICAL SECTION

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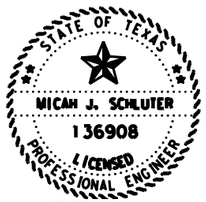

Micah J. Schluter, P.E.

08.01.23

SH 75
AT LEAGUE LINE RD
TYPICAL
SECTIONS

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
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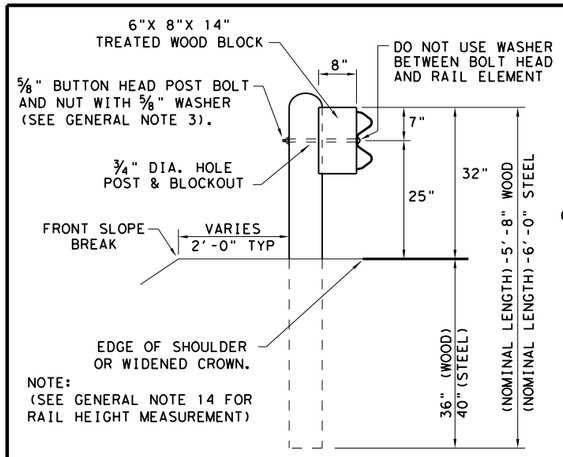
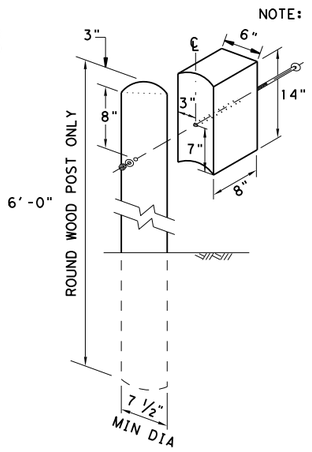
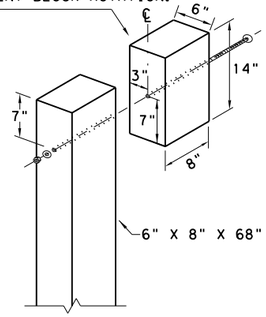


TYPICAL POST PLACEMENT

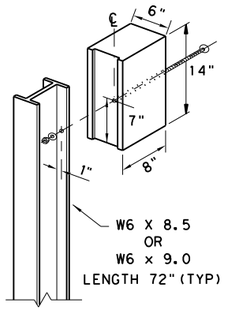


WOOD BLOCK TO ROUND WOOD POST

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

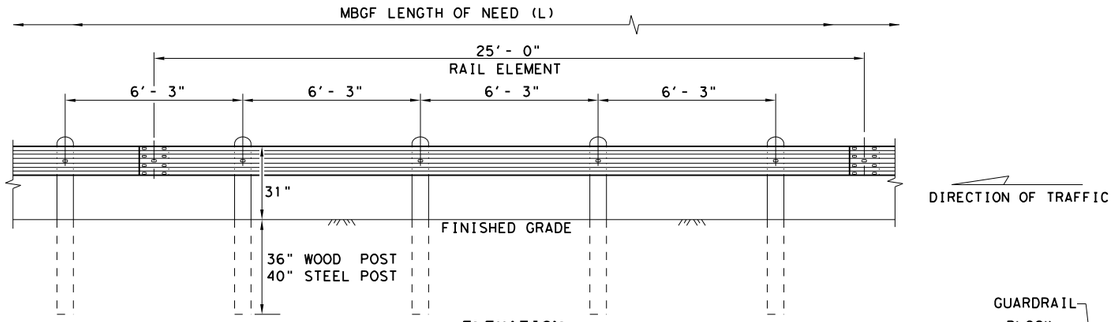


WOOD BLOCK TO RECTANGULAR WOOD POST



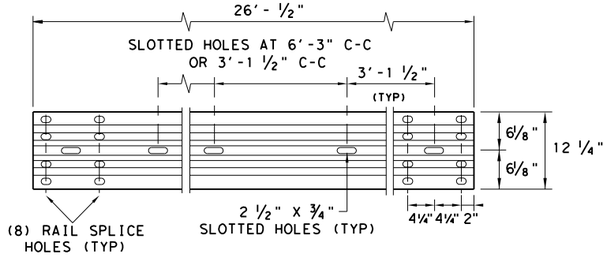
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

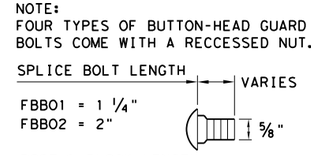
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

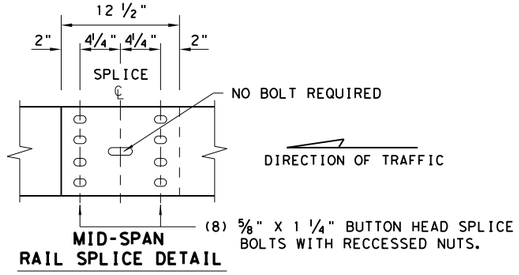
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



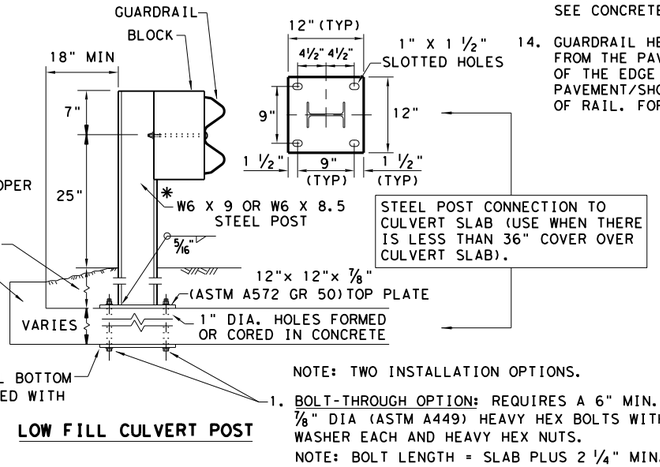
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

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

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

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation

Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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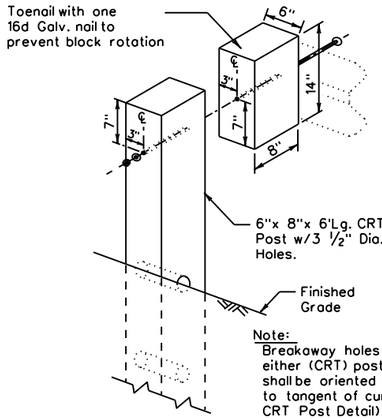
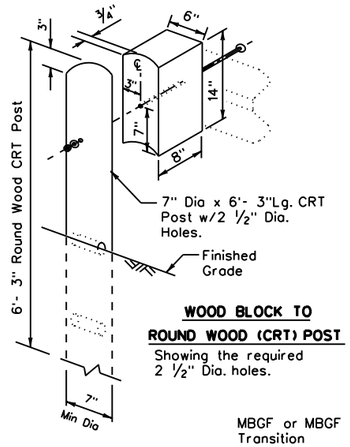
	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		58	



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

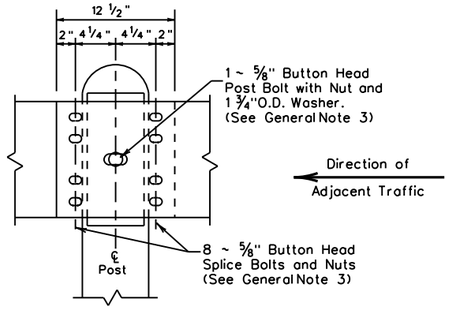
WOOD BLOCK TO RECTANGULAR WOOD (CRT) POST

Showing the required 3 ½" Dia. holes.

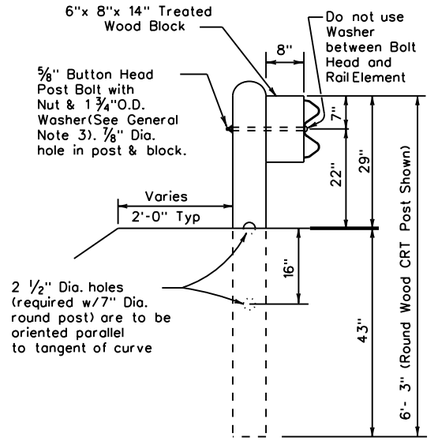


WOOD BLOCK TO ROUND WOOD (CRT) POST

Showing the required 2 ½" Dia. holes.

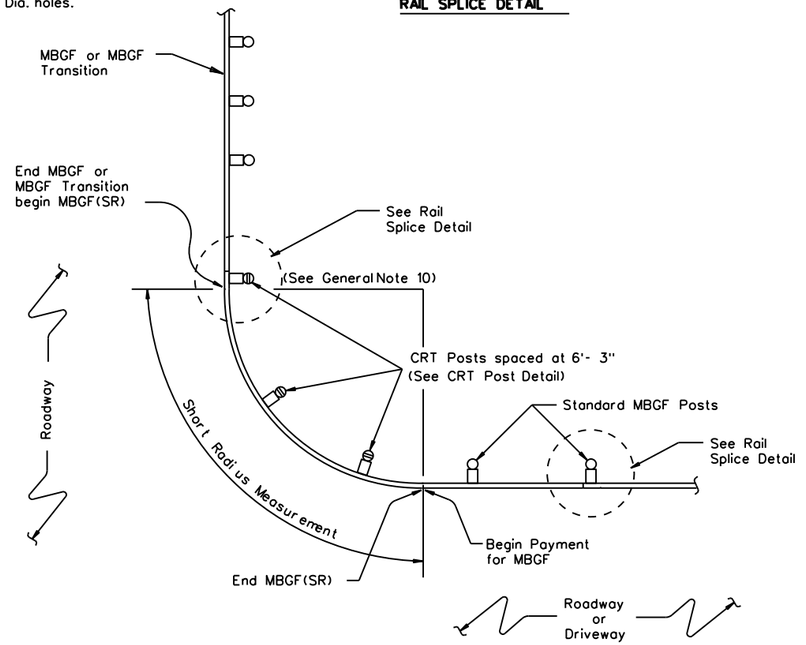


RAIL SPLICE DETAIL



(CRT) POST DETAIL
CONTROLLED RELEASE TERMINAL POST

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



PLAN VIEW
SHOWING TYPICAL RADIUS

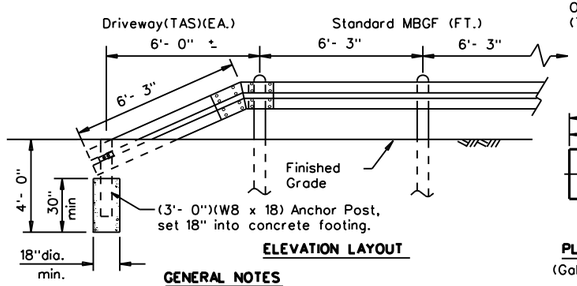
The required radius is shown elsewhere on the plans.

GENERAL NOTES

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

"DRIVEWAY" TERMINAL ANCHOR SECTION

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



ELEVATION LAYOUT

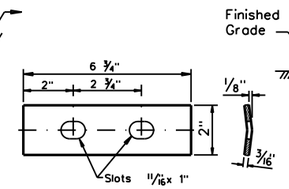
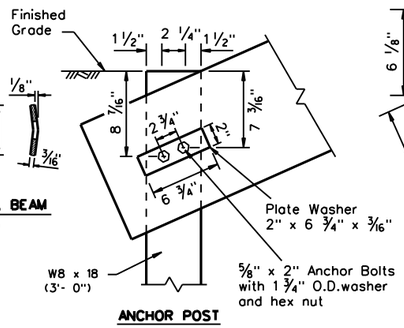
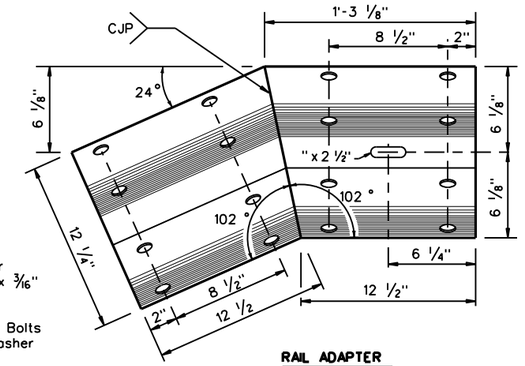


PLATE WASHER FOR METAL BEAM
(Galvanized after fabrication)



ANCHOR POST



RAIL ADAPTER
Rail - 10 gauge
(Galvanized after fabrication)

GENERAL NOTES

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

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

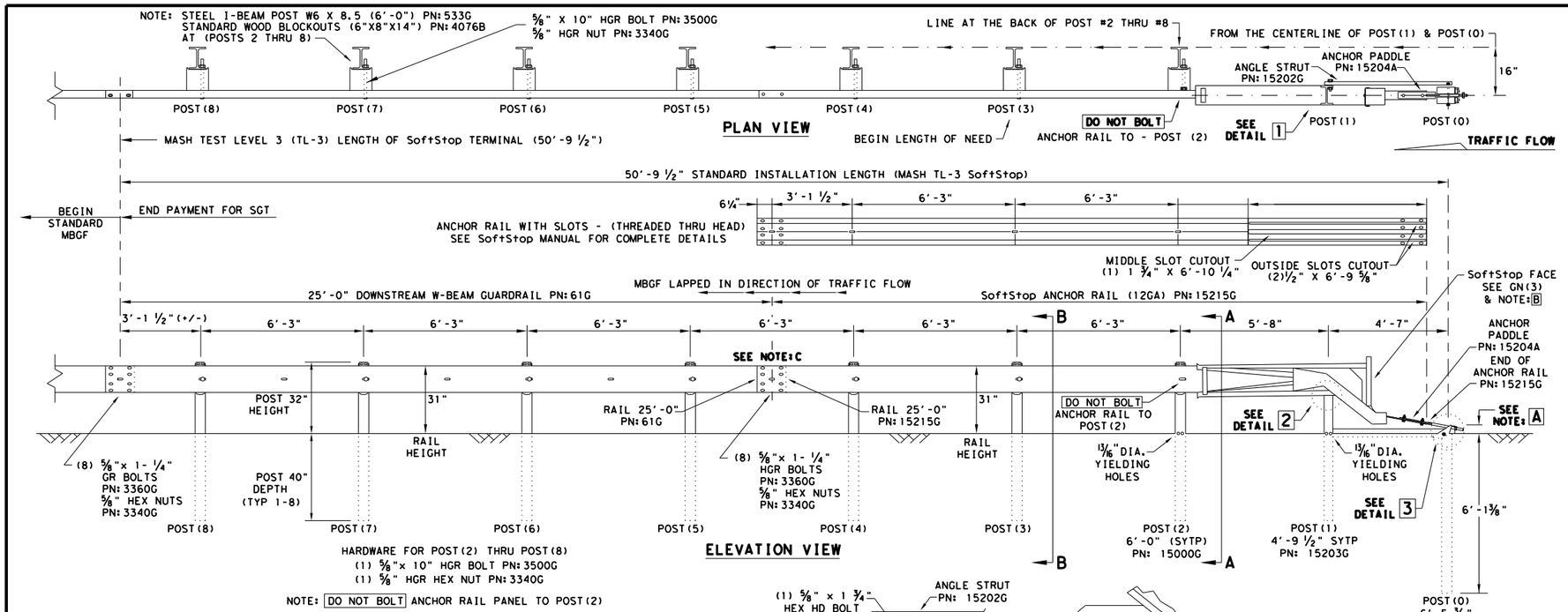
Texas Department of Transportation

Design Division Standard

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

FILE: mbgfsr19.dgn	DN: TxDOT		CK: KM	DW: BD		CK: VP
©TxDOT NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0912	37	237		VARIOUS	
	DIST	COUNTY			SHEET NO.	
	HOU	MONTGOMERY			58A	

DATE: $DATE$
FILE: $FILE$



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	
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	DIST	COUNTY				SHEET NO.
	HOU	MONTGOMERY				59

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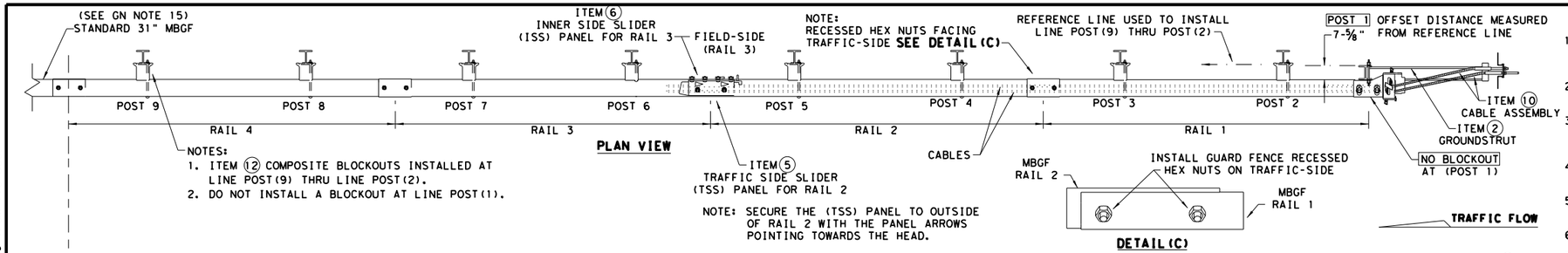

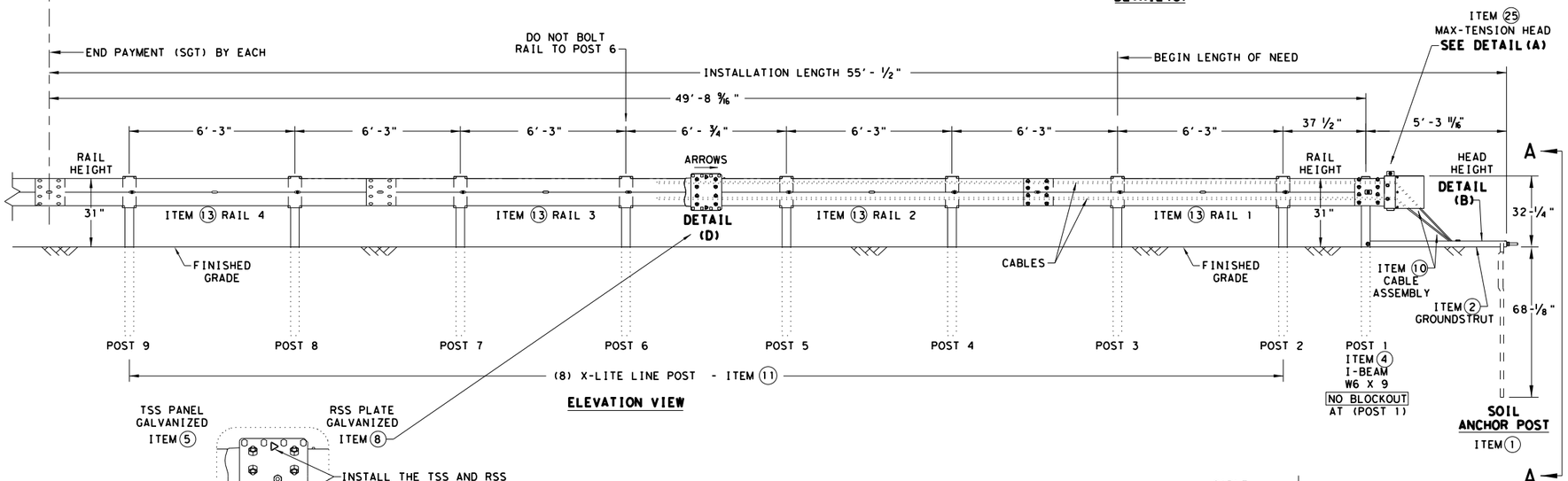

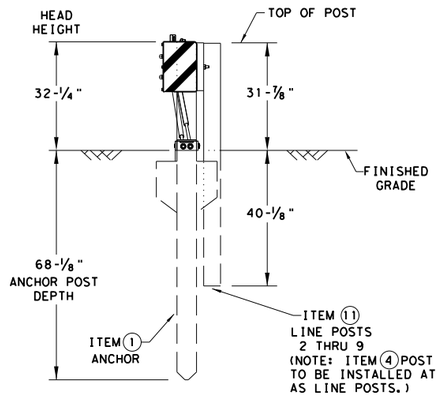

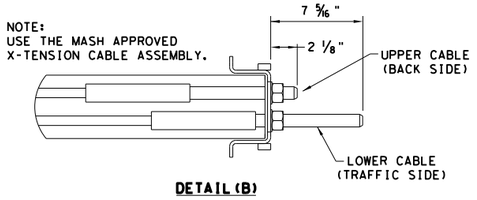

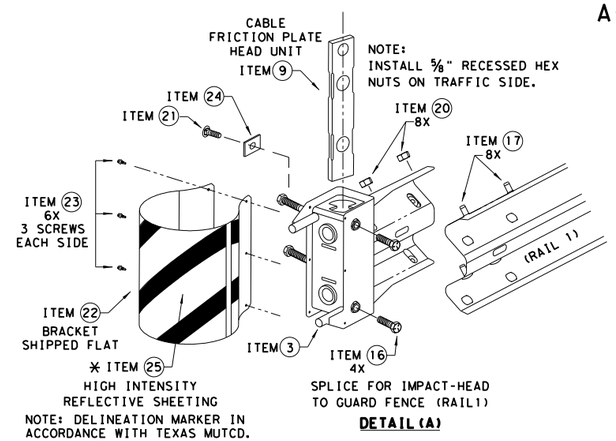

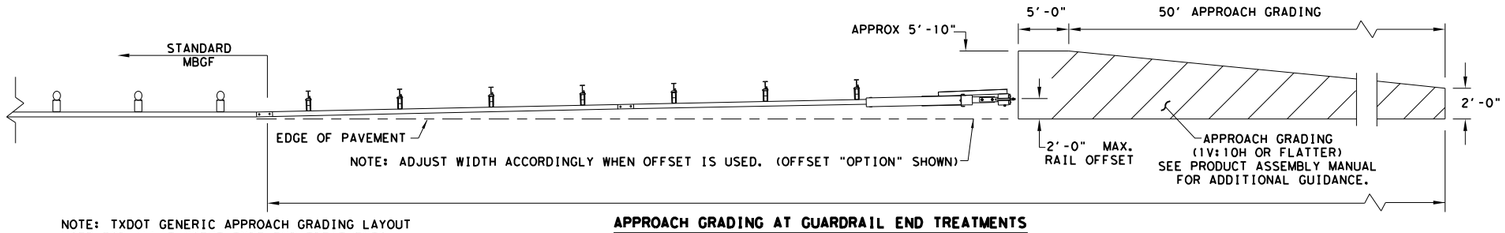

GENERAL NOTES

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

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL	
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		60	

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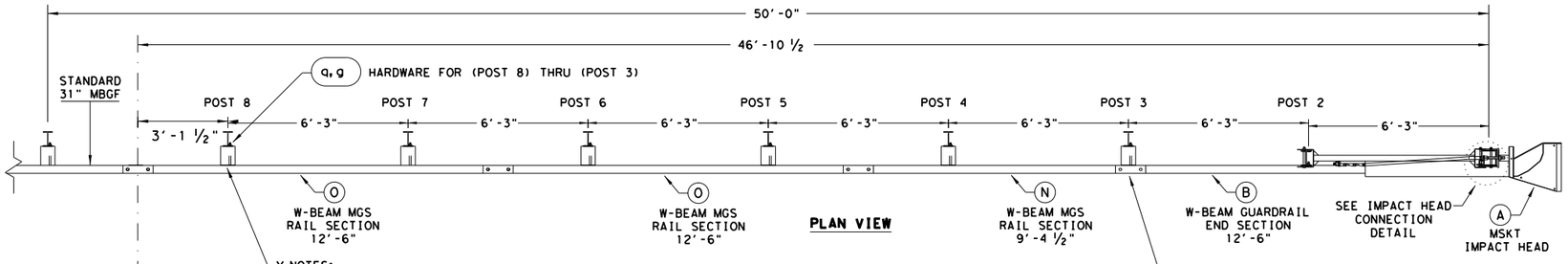
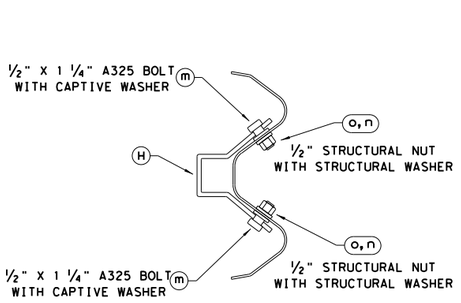
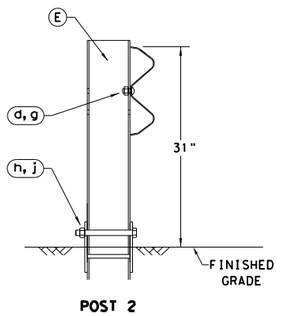


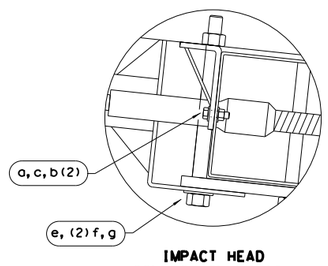
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



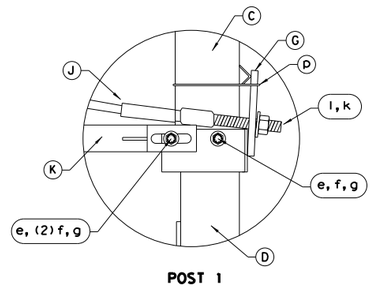
SECTION B-B
ANCHOR BRACKET



POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

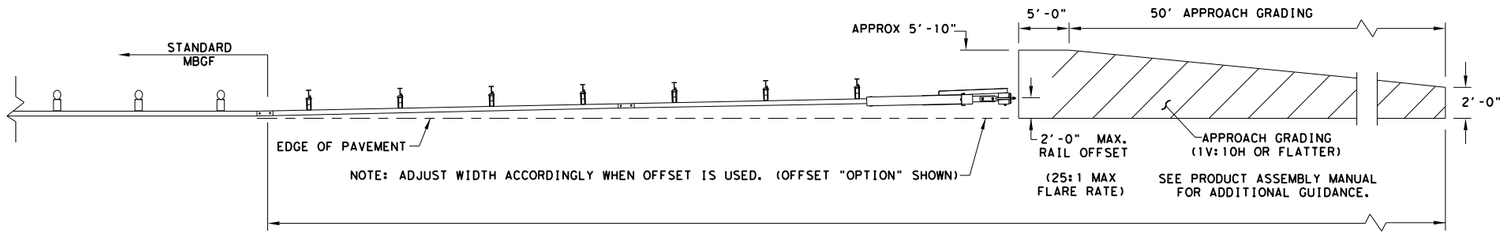
SEE NOTES: *

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

GENERAL NOTES

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

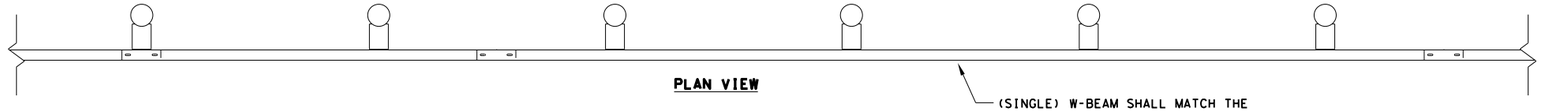
SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

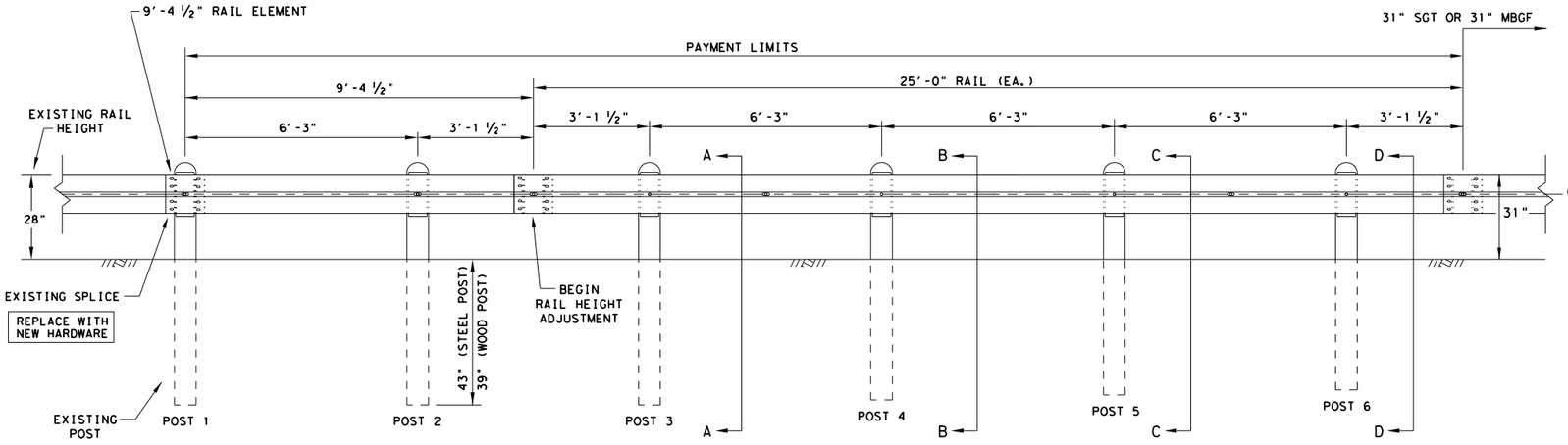
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0912	37	237	VARIOUS	
	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		61	

DATE: $DATE$
FILE: $FILE$

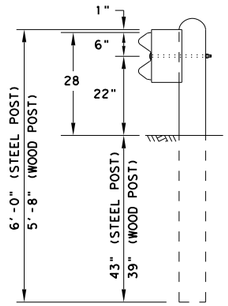


PLAN VIEW

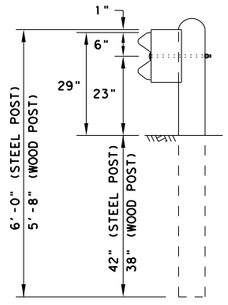


ELEVATION VIEW

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



SECTION A-A



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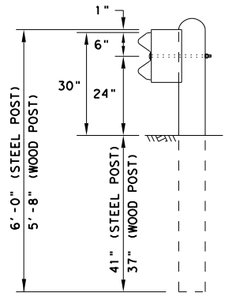

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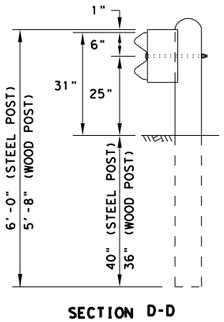

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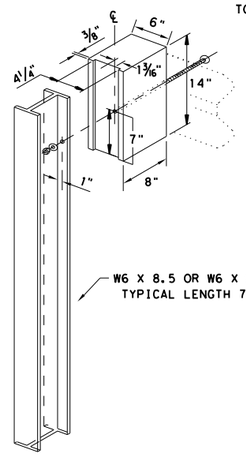
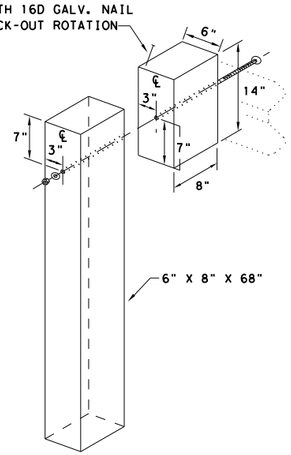
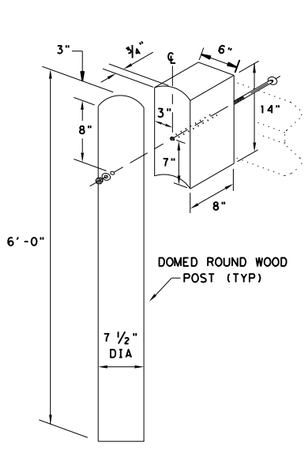


ROUTED WOOD BLOCK-OUT TO STEEL POST



WOOD BLOCK TO RECTANGULAR WOOD POST



WOOD BLOCK-OUT TO DOMED ROUND WOOD POST

POST AND BLOCK-OUT TYPES AVAILABLE

FOR WOOD POST

FOR STEEL POST

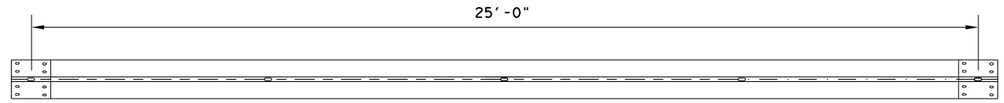
HARDWARE LIST	
QTY	DESCRIPTION
1	9'-4 ½" W-BEAM RAIL ELEMENT 12GA.
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
6	7 ½" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
6	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
6	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
6	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
6	⅝" X 18"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

NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.

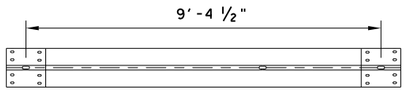
GUARDRAIL POST BOLTS (ASTM A307 GR.A)
GUARDRAIL ROUND WASHERS (ASTM F436)
GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
GUARDRAIL SPLICE BOLTS (ASTM A307 GR.A)
GUARDRAIL SPLICE NUTS (ASTM A563)

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND ⅝" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE ⅝" X 1-¼" WITH ⅝" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.



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



9'-4 ½" (NOM.) W-BEAM RAIL ELEMENT

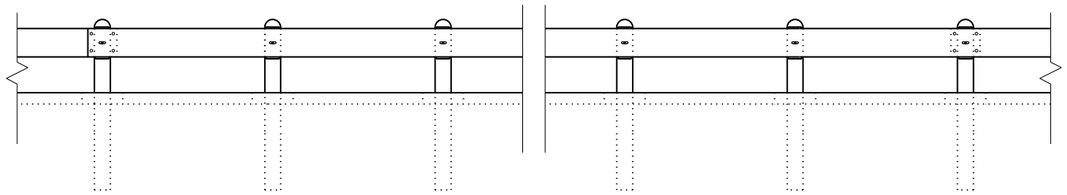
Texas Department of Transportation

Design Division Standard

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

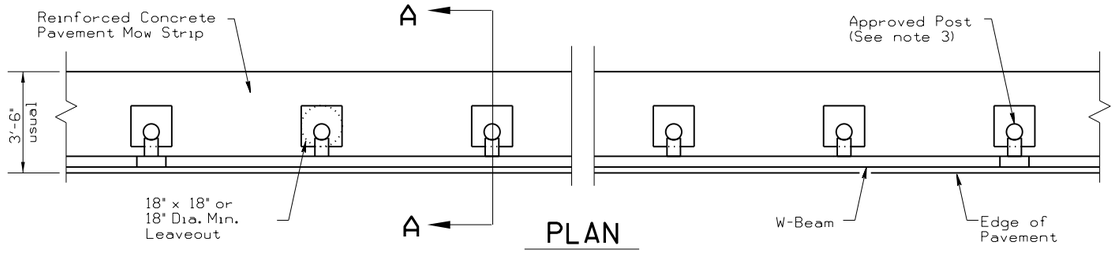
RAIL-ADJ(A)-19

FILE: railadja19	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0912	37	237	VARIOUS	
	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		61A	

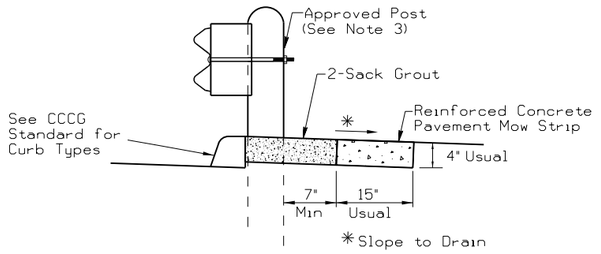


ELEVATION

TRAFFIC

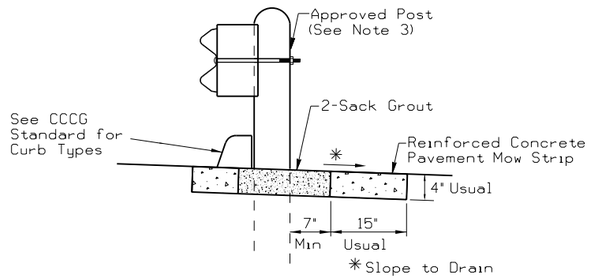


PLAN



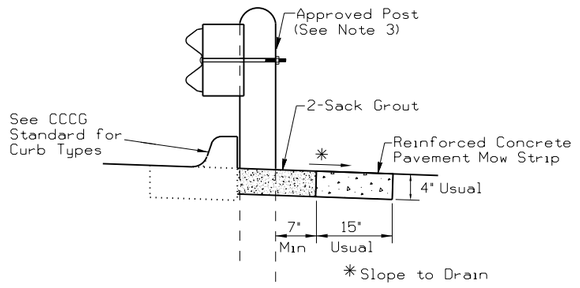
CURB OPTION (1)

Shown at Curbed Location

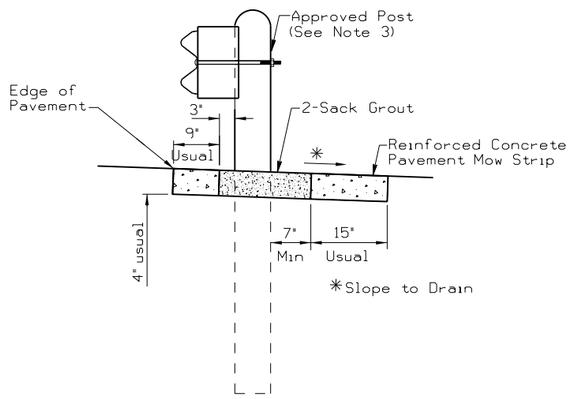


CURB OPTION (2)

Curb Shown on Top of Mow Strip

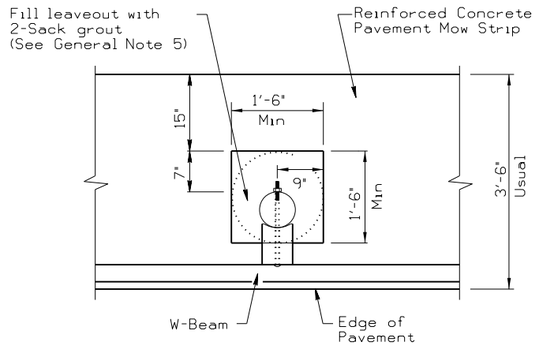


CURB OPTION (3)



SECTION A-A

Typical



MOW STRIP DETAIL

Reinforced Concrete Pavement
Mow Strip with 18" x 18"or 18"
dia. minimum leaveout.

GENERAL NOTES

1. Place concrete riprap mow strips at all Metal Beam Guard Fence locations, and in accordance with Item 432, "Riprap". Use Class B Concrete, reinforced with No. 3 bars spaced at 18 in. centers each direction and 2 in. below the surface.
2. Provide a minimum of 7 in. leave out behind the post. Do not place concrete in the leave out.
3. The type of approved post is shown elsewhere on the plans. See the applicable standard sheets for additional details and information.
4. Other curb placement options may be used. Curbs are not considered part of the mow strip and are paid for under other pertinent bid items.
5. Fill the leave outs with no more than a 2-sack grout mixture and place in accordance with Section 421.2.7, ""Mortar and Grout." Payment for furnishing and placing the grout mixture is subsidiary to the Item 432, "RIPRAP."
6. Place the mow strip the entire length of the guard fence plus any Terminal Anchor Section (TAS) or Single Guardrail Terminal (SGT) to 2 ft. beyond the face of the object marker at the end of the SGT. Do not allow concrete to adhere to the ground line strut shown on the SGT standard sheet.

Texas Department of Transportation
Houston District

MOW STRIP

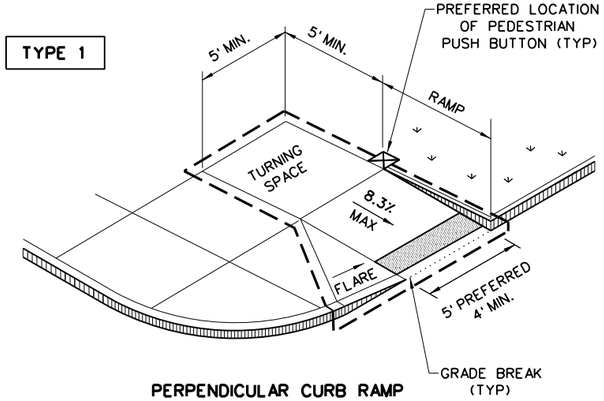
MS

FILE:	DN:	CK:	DW:	CK:	
© TxDOT 2014	DIST	FED REG	PROJECT NO.		SHEET
REVISIONS	HOU	6			62
03/15 2014 SPECS	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	MONTGOMERY		0912	37	237	VARIOUS

STDE5.DGN

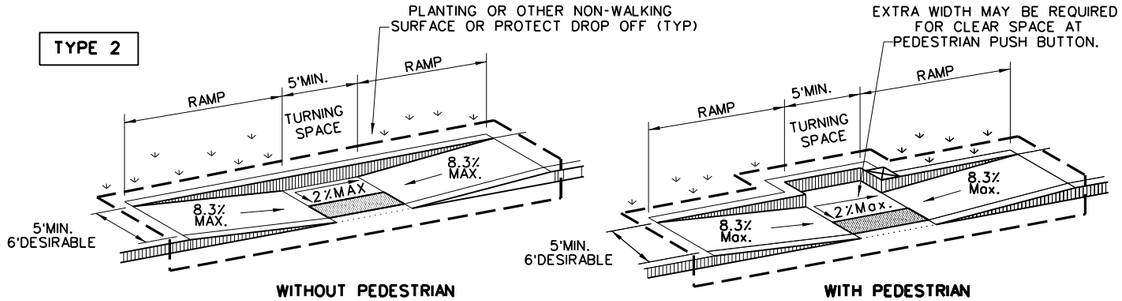
DATE:
FILE:

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

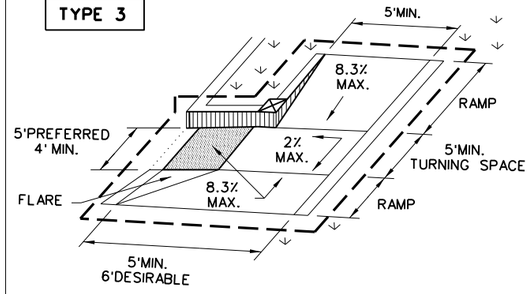


WITHOUT PEDESTRIAN PUSH BUTTON

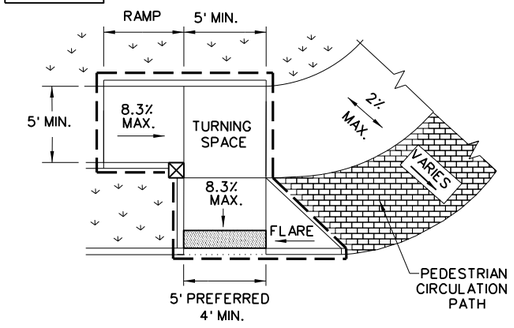
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

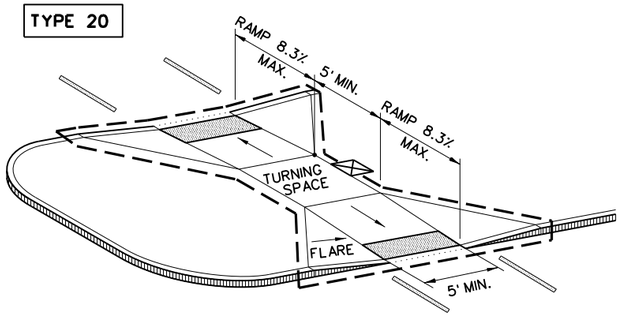


TYPE 6



COMBINATION CURB RAMPS

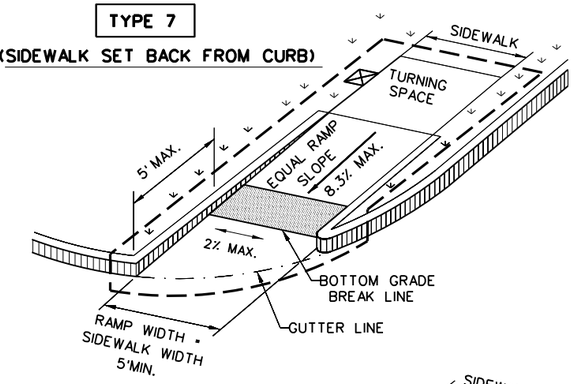
TYPE 20



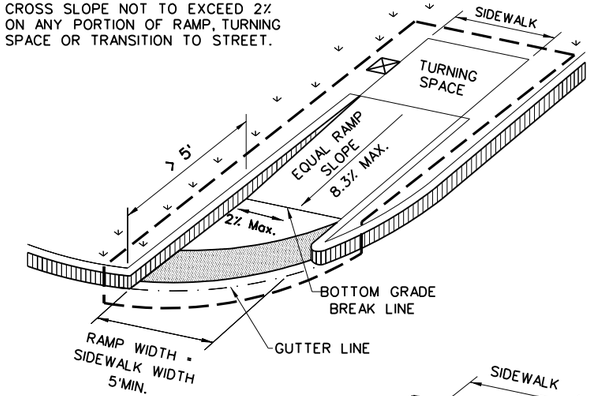
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

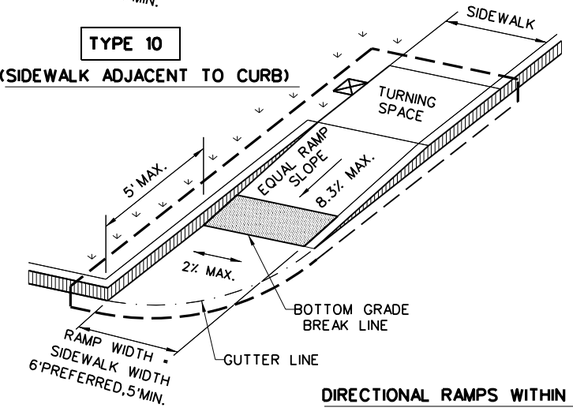


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

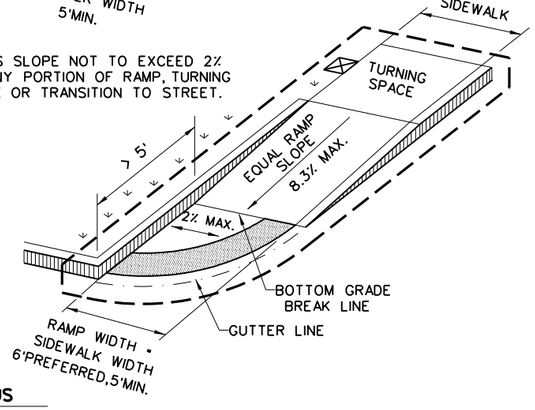


TYPE 10

(SIDEWALK ADJACENT TO CURB)

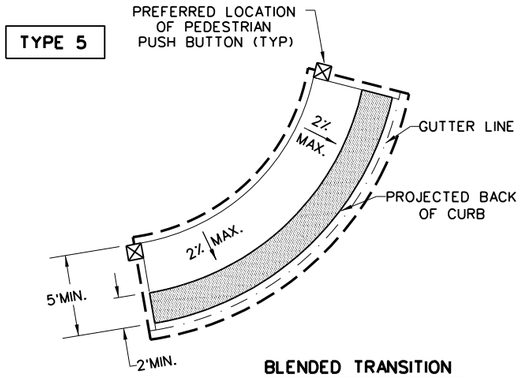


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



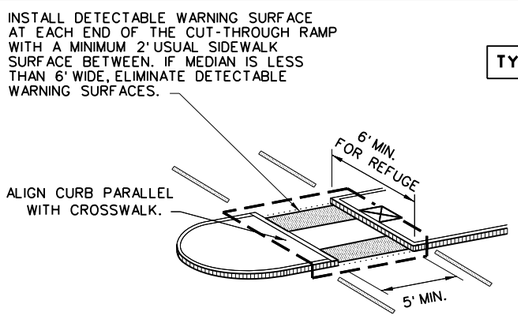
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 5



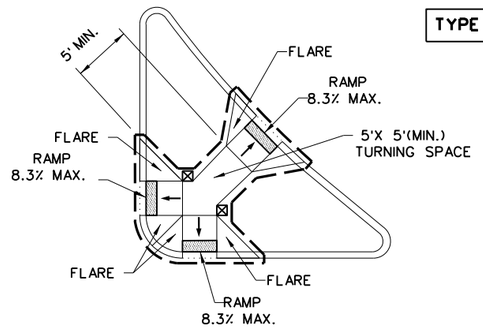
BLENDED TRANSITION
(FLUSH LANDING)

TYPE 21

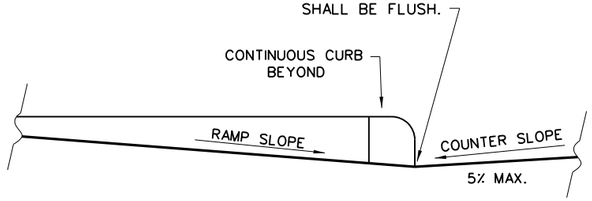


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK .....

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		62A

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.

2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.

3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.

4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.

5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.

6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.

7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.

8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).

9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.

10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.

11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.

12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.

13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".

14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.

15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.

16. Provide a smooth transition where the curb ramps connect to the street.

17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.

18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

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

20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.

21. Detectable warning surfaces must be firm, stable and slip resistant.

22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.

23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.

24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.

26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.

28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.

29. Street grades and cross slopes shall be as shown elsewhere in the plans.

30. Changes in level greater than 1/4 inch are not permitted.

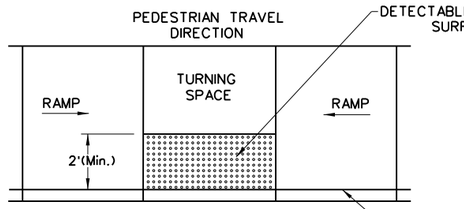
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.

32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.

33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".

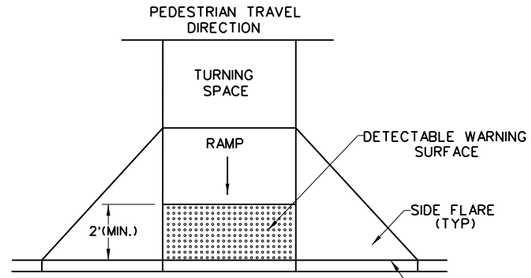
34. Sidewalk details are shown elsewhere in the plans.

DETECTABLE WARNING SURFACE DETAILS



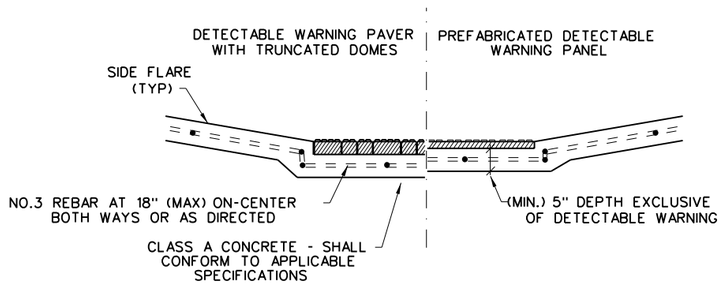
PARALLEL CURB RAMP

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



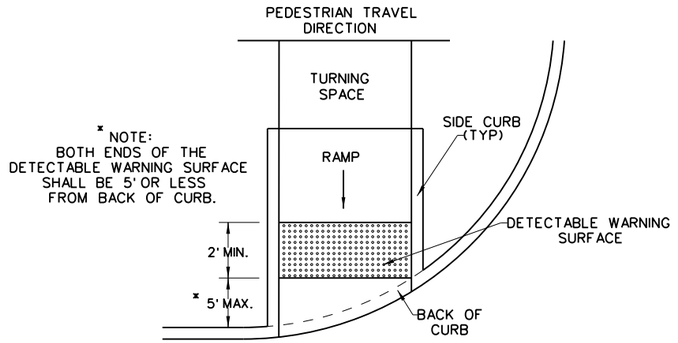
PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



SECTION VIEW DETAIL

CURB RAMP AT DETECTIBLE WARNINGS



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

DATE:
FILE:

Texas Department of Transportation

Design Division Standard

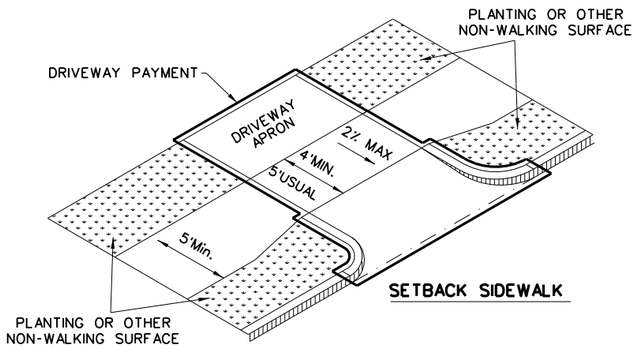
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

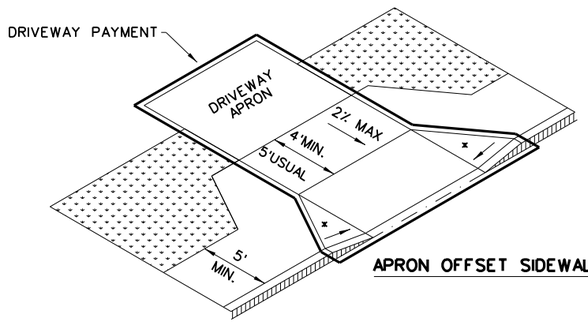
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		62B

DATE:
FILE:

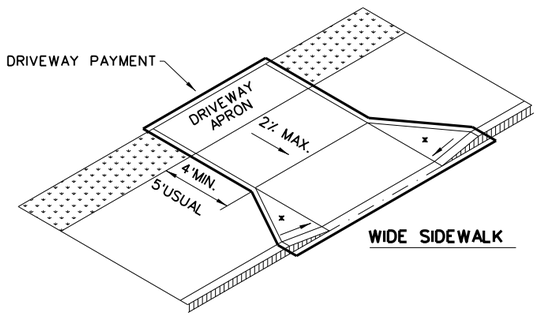
SIDEWALK TREATMENT AT DRIVEWAYS



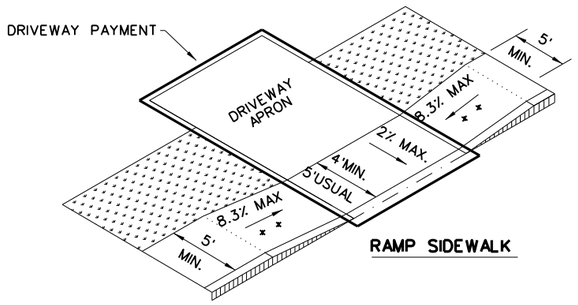
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

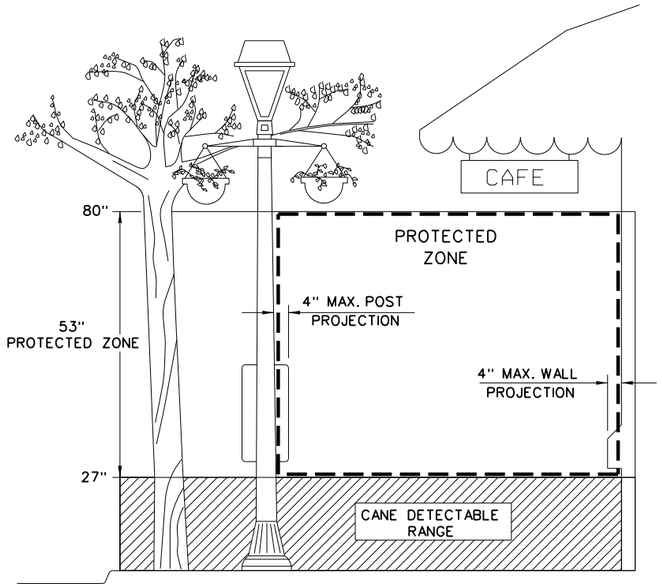


RAMP SIDEWALK

NOTES:

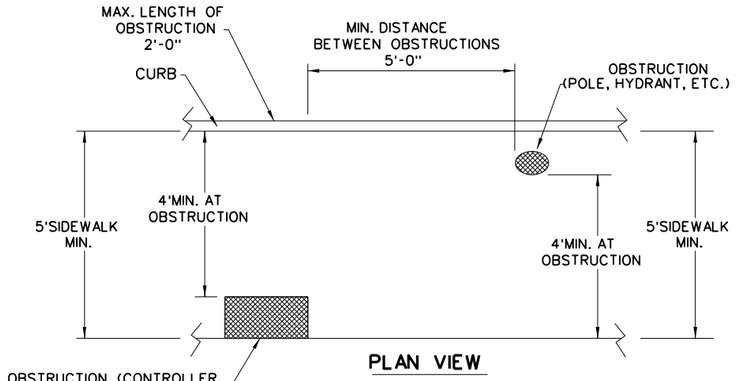
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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



PROTECTED ZONE

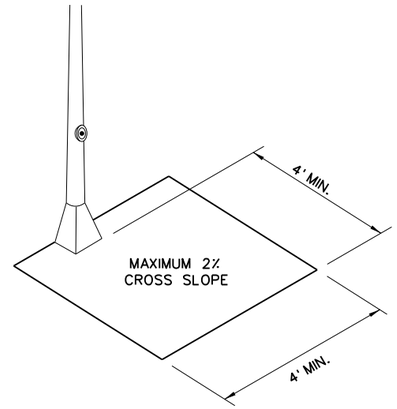
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



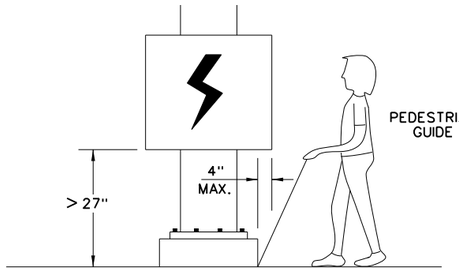
PLAN VIEW

PLACEMENT OF STREET FIXTURES

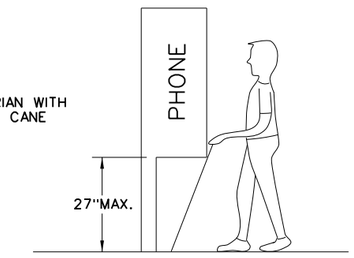
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE <80"

Texas Department of Transportation

Design Division Standard

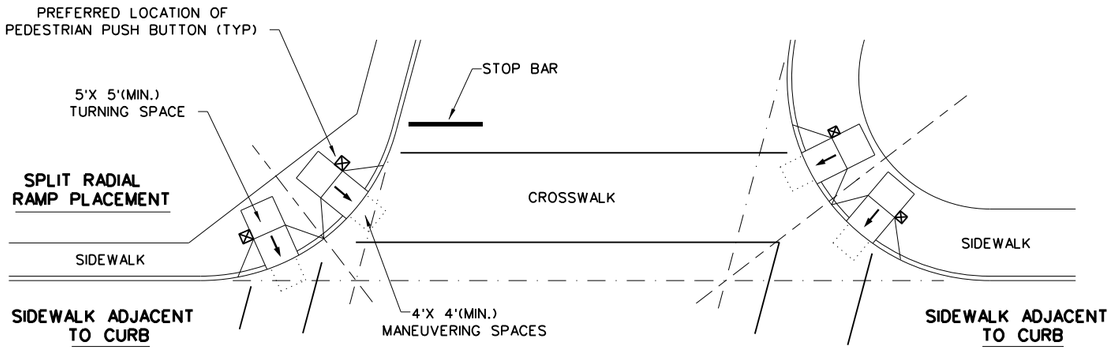
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

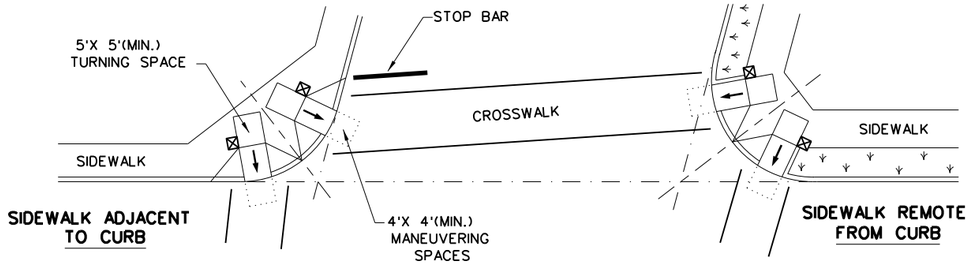
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		62C

DATE:
FILE:

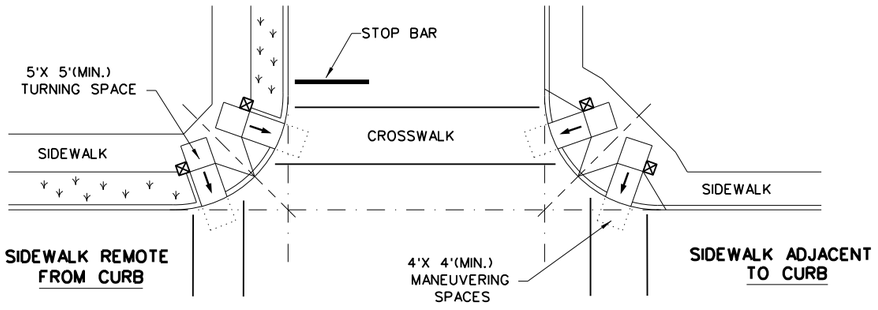
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



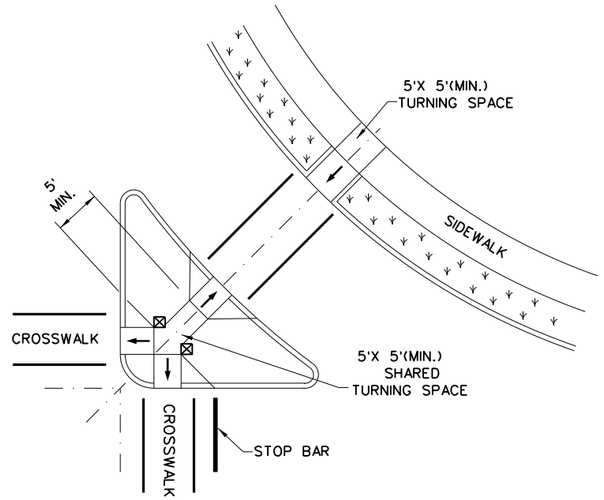
SKEWED INTERSECTION WITH "LARGE" RADIUS



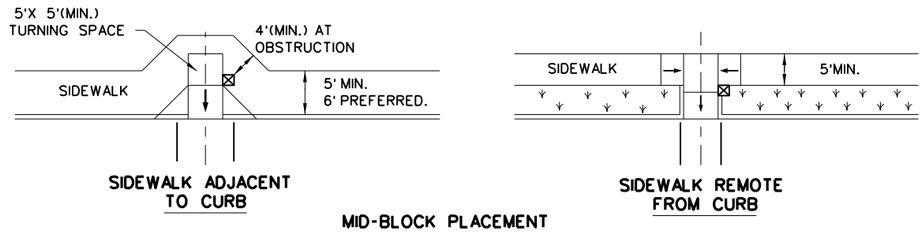
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

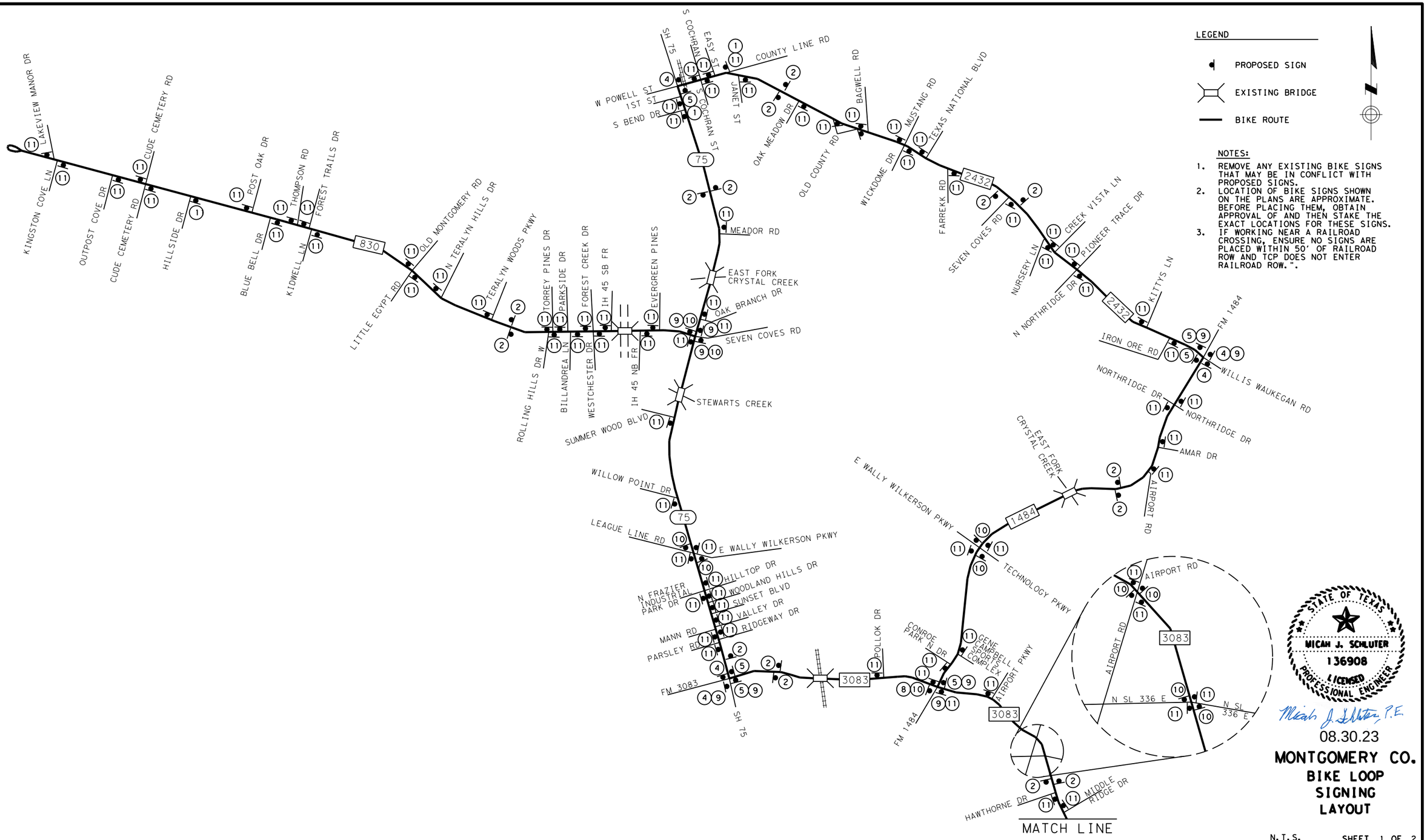
Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		62D



① W11-1 30X30 SHARE THE ROAD W16-1P 18X24	② D11-1 30X24 BIKE ROUTE	④ D11-1 30X24 BIKE ROUTE M6-1GL 12X9	⑤ D11-1 30X24 BIKE ROUTE M6-1GR 12X9	⑧ M6-1L 12X9 / ⑨ M6-3G 12X9	⑩ D11-1 30X24 BIKE ROUTE M6-3G 12X9	⑪ D11-1 30X24 BIKE ROUTE M6-4G 12X9

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER
Micah J. Schluter, P.E.
08.30.23

MONTGOMERY CO. BIKE LOOP SIGNING LAYOUT

N.T.S.

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		63

DATE: 07/29/2023 01:06 PM
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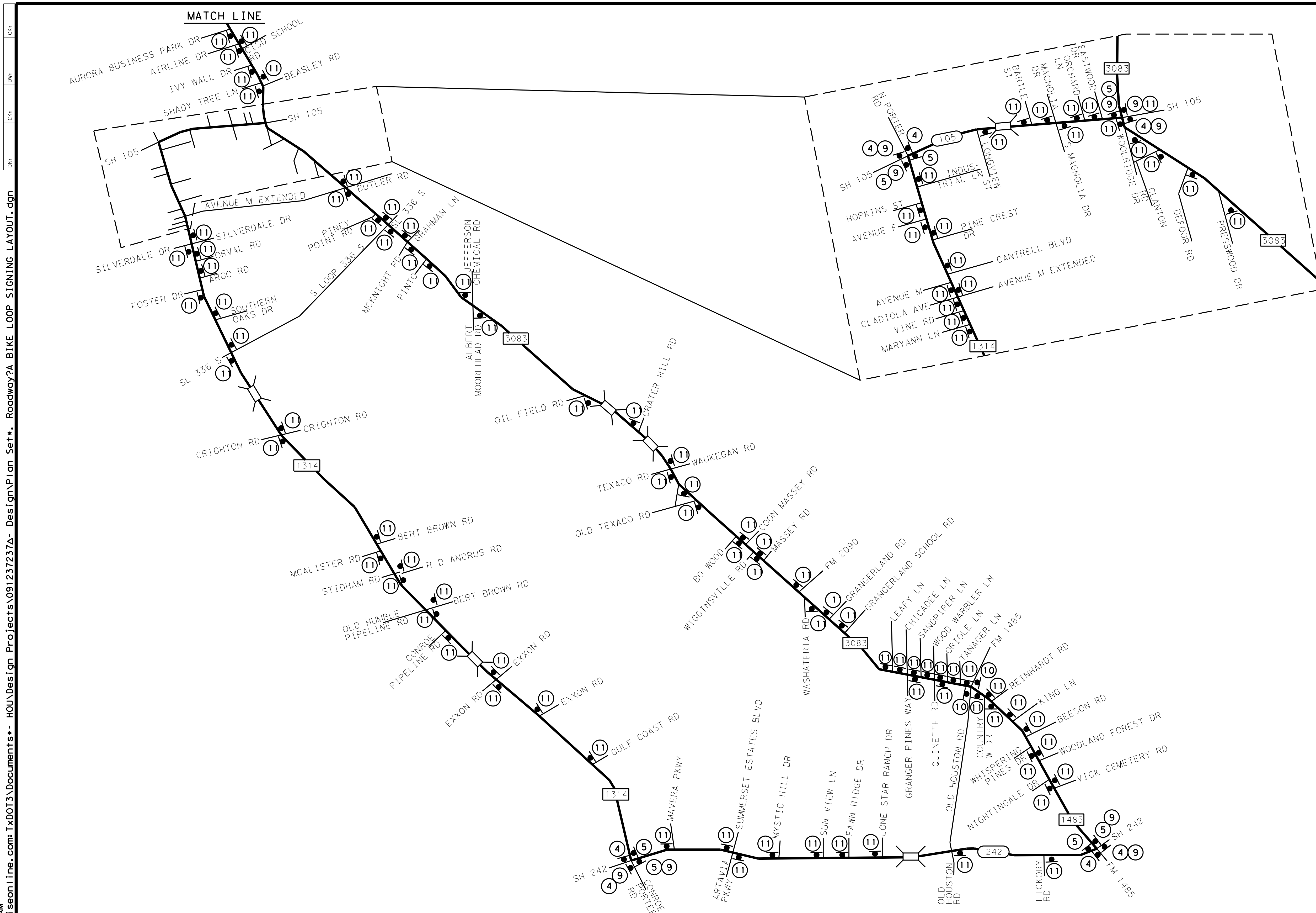
DN: | CK: | DW: | CK:



LEGEND

- PROPOSED SIGN
- EXISTING BRIDGE
- BIKE ROUTE

NOTES:

1. REMOVE ANY EXISTING BIKE SIGNS THAT MAY BE IN CONFLICT WITH PROPOSED SIGNS.
2. LOCATION OF BIKE SIGNS SHOWN ON THE PLANS ARE APPROXIMATE. BEFORE PLACING THEM, OBTAIN APPROVAL OF AND THEN STAKE THE EXACT LOCATIONS FOR THESE SIGNS.
3. IF WORKING NEAR A RAILROAD CROSSING, ENSURE NO SIGNS ARE PLACED WITHIN 50' OF RAILROAD ROW AND TCP DOES NOT ENTER RAILROAD ROW.".

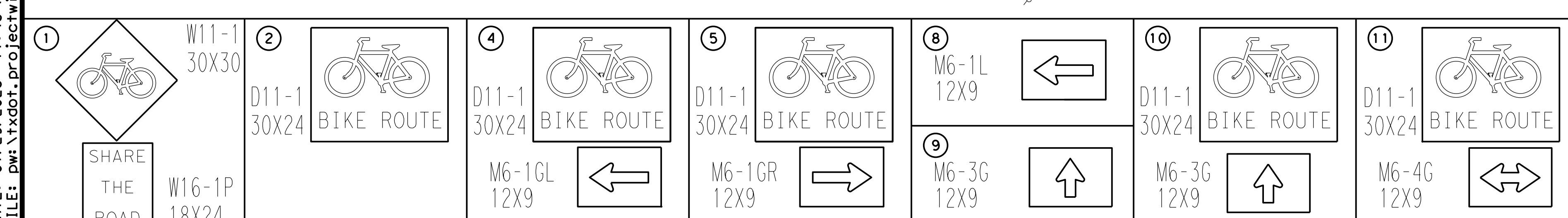
STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.30.23

MONTGOMERY CO. BIKE LOOP SIGNING LAYOUT

N.T.S.

SHEET 2 OF 2



Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST		COUNTY	SHEET NO.
HOU		MONTGOMERY	63A

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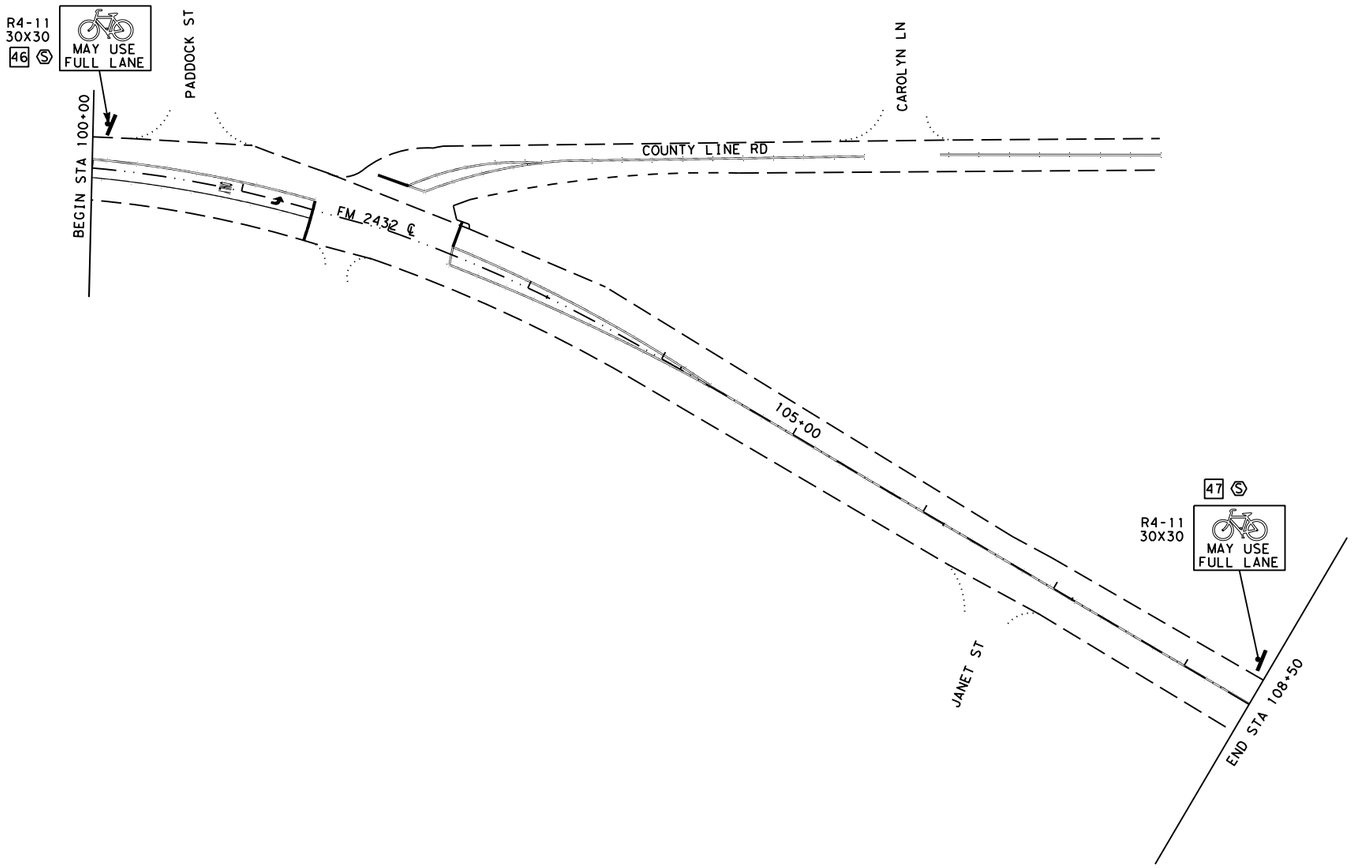
NOTES:

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



LEGEND

EXISTING EDGE OF PAVEMENT

PAY ITEMS

Ⓐ ELIM EXIST PAV MRK (6")
Ⓑ ELIM EXIST PAV MRK (8")
Ⓒ ELIM EXIST PAV MRK (12")
Ⓓ ELIM EXIST PAV MRK (24")
Ⓔ ELIM EXIST PAV MRK (ARROW)
Ⓕ ELIM EXIST PAV MRK (WORD)
Ⓖ REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
Ⓗ RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
Ⓘ REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
Ⓙ REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
Ⓚ REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
Ⓛ REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
Ⓜ REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
Ⓝ REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
Ⓞ REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
Ⓟ REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
Ⓠ REFL PAV MRKR TY I-I-C-R
Ⓡ REFL PAV MRKR TY II-A-A
Ⓢ IN SM RD SN SUP&AM TYS80(1)SA(P)
Ⓣ RELOCATE SM RD SN SUP&AM TY S80
Ⓤ RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
Ⓥ RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
Ⓦ RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
Ⓧ RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 2432
AT COUNTY LINE RD
SIGNAGE
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		64

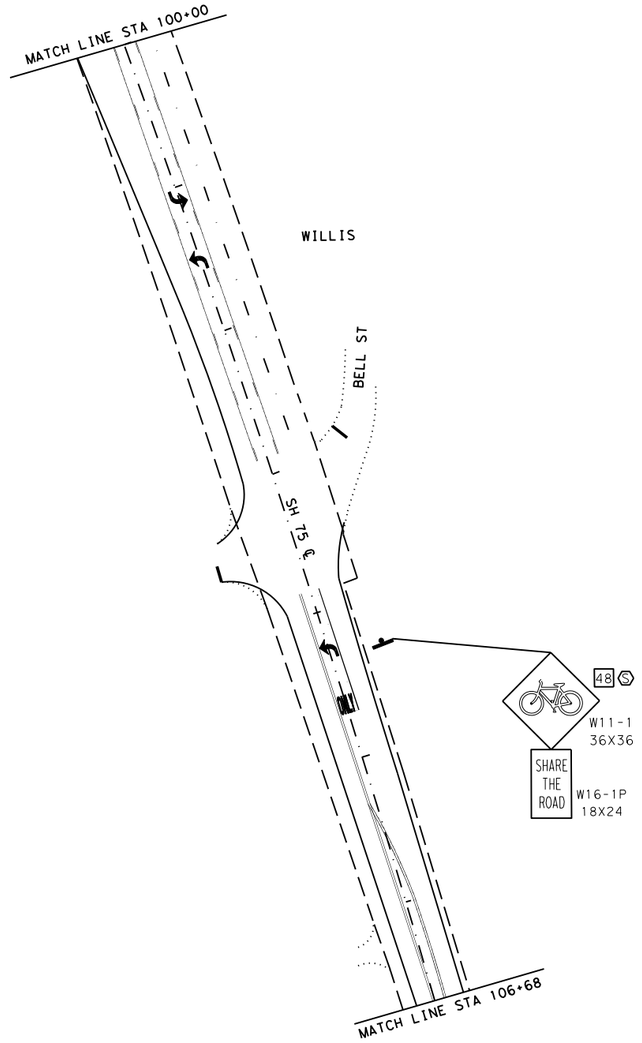
DATE: 08/01/2023 08:49 AM
FILE: pw:\txdot.projectwiseonline.com:TXDOT3\Documents\- HOU\Design Projects\0912372370- Design\Plan Set\. Roadway@FM 2432 AT COUNTY LINE RD SIGNAGE LAYOUT.dgn

CK: DW:

NOTES:

TO BE PLACED AT SAME TIME AS BIKE LOOP SIGNING LAYOUT

REFL PAV MARK TY I TO BE PLACED ON ASPHALT SURFACES.
MULTIPOLYMER PAV MRK TO BE PLACED ON ALL CONCRETE SURFACES.



LEGEND

EXISTING EDGE OF PAVEMENT

PAY ITEMS

- (A) ELIM EXIST PAV MRK (6")
- (B) ELIM EXIST PAV MRK (8")
- (C) ELIM EXIST PAV MRK (12")
- (D) ELIM EXIST PAV MRK (24")
- (E) ELIM EXIST PAV MRK (ARROW)
- (F) ELIM EXIST PAV MRK (WORD)
- (G) REFL PAV MRK TY I (W)(BIKE DOT)(100MIL)
- (H) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (I) REFL PAV MRK TY I (W)8"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (J) REFL PAV MRK TY I (W)12"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (K) REFL PAV MRK TY I (W)24"(SLD)(100 MIL) / MULTIPOLYMER PAV MRK (W)(24")(SLD)
- (L) REFL PAV MRK TY I (W)(BIKE ARW)(100 MIL)
- (M) REFL PAV MRK TY I (W)(BIKE SYML)(100 MIL)
- (N) REFL PAV MRK TY I (W)(ARROW)(100MIL) / MULTIPOLYMER PAV MRK (W) (ARROW)
- (O) REFL PAV MRK TY I (W)(WORD)(100MIL) / MULTIPOLYMER PAV MRK (W) (WORD)
- (P) REFL PAV MRK TY I (W)(18")(YLD TRI)(100 MIL)
- (Q) REFL PAV MRKR TY I-I-C-R
- (R) REFL PAV MRKR TY II-A-A
- (S) IN SM RD SN SUP&AM TY10BWF(1)SA(P)
- (T) RELOCATE SM RD SN SUP&AM TY10BWG
- (U) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (V) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) / MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (W) RE PV MARK TY I(BLACK)(6")(SHADOW)(100 MIL) / MULTIPOLYMER PAV MRK (BLK)(6")(BRK)
- (X) RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) / MULTIPOLYMER PAV MRK (Y)(6")(BRK)

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 75 AT BELL ST SIGNAGE LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		64A

DATE: 06/30/2023 02:44 PM
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DN: | CK: | DW: | CK:

DATE: 06/21/2023 11:30 AM
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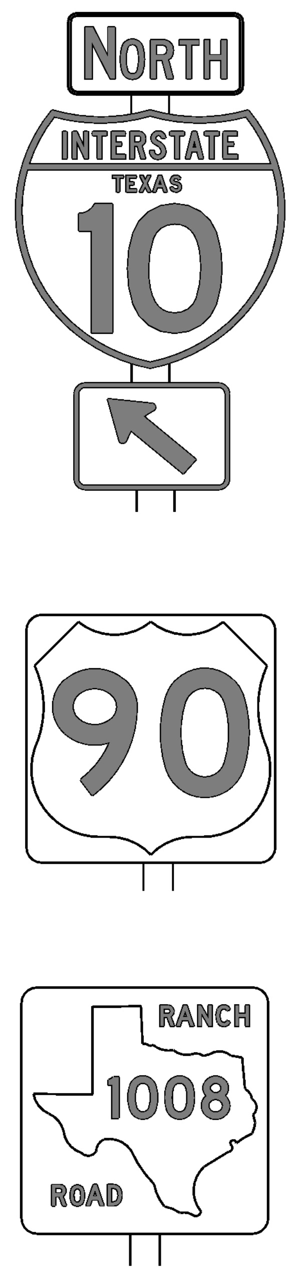
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

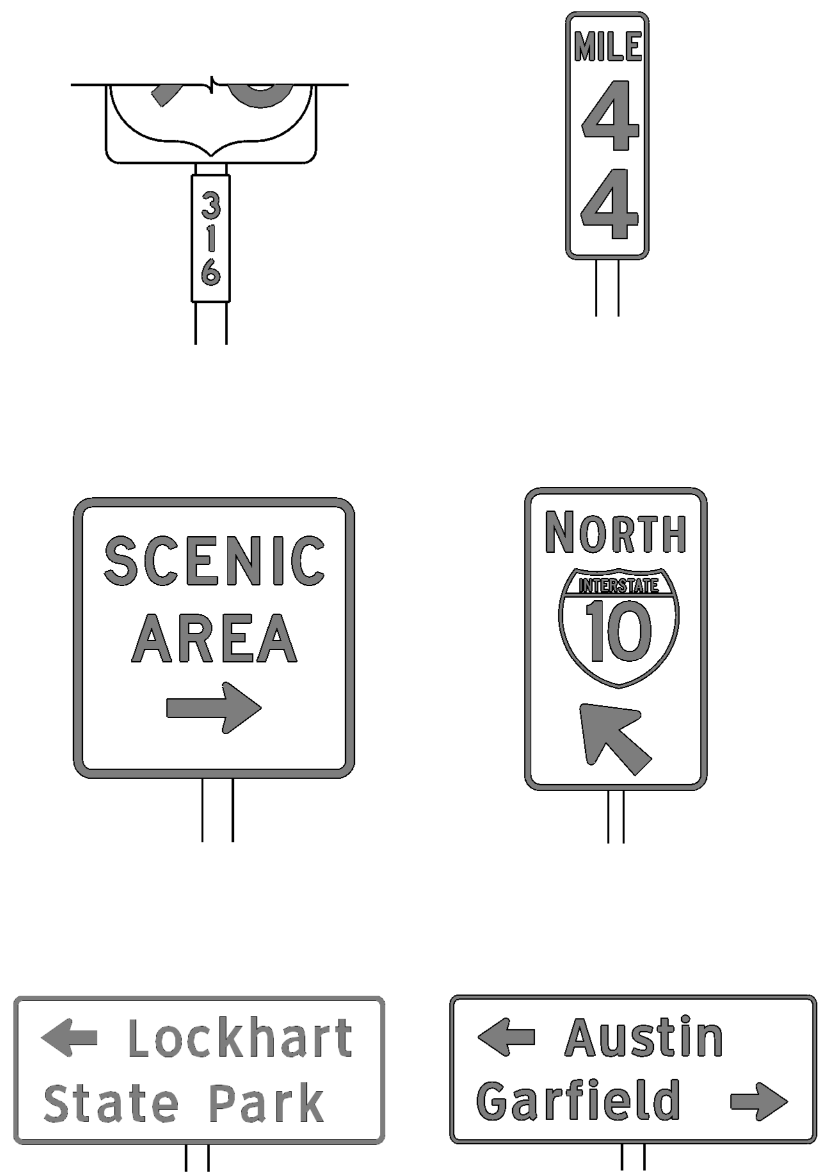
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

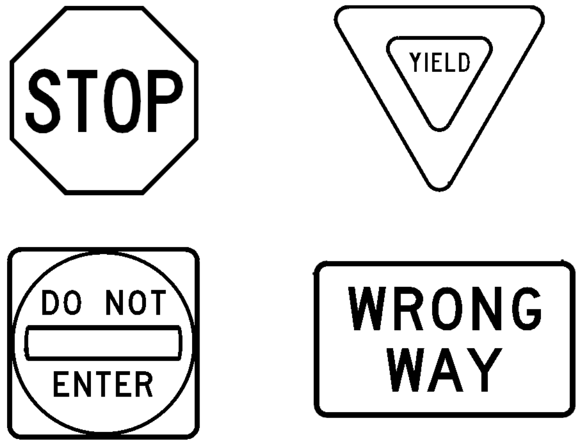
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		65

3

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

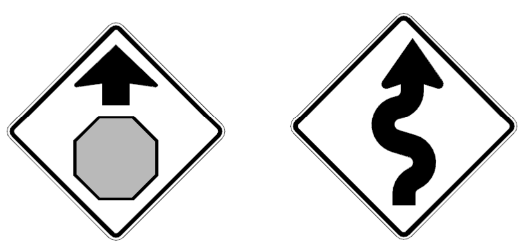
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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

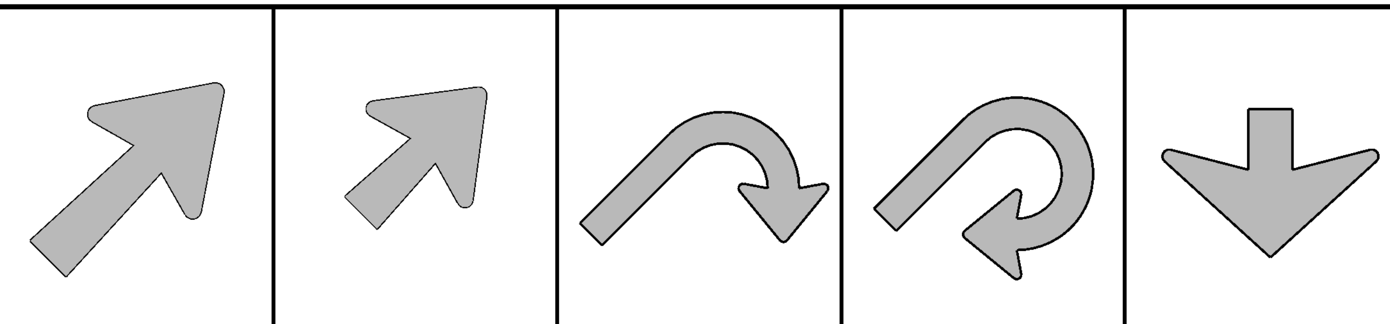
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT 0912	SECT 37	JOB 237	HIGHWAY VARIOUS
REVISIONS 12-03 7-13 9-08	DIST HOU	COUNTY MONTGOMERY		SHEET NO. 66

DATE: 06/21/2023 11:32 AM
FILE: pw:\txdot.projectwiseonline.com:TxDOT3\Documents\- HOU\Design Projects\0912...

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



Type A | Type B | E-3 | E-4 | Down Arrow

TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

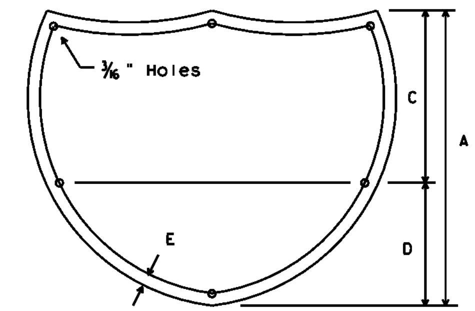
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

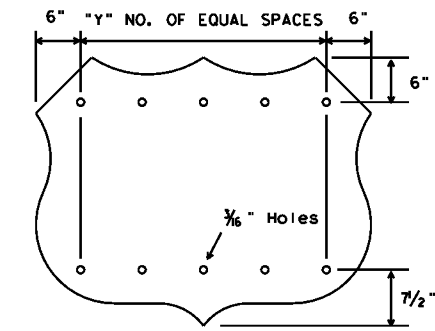
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)



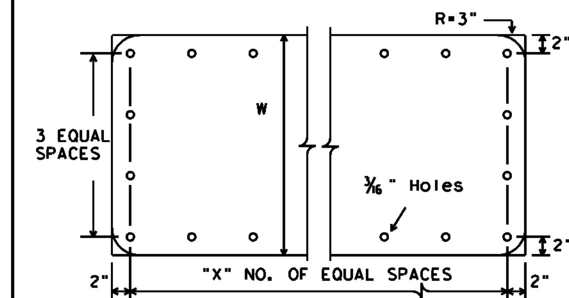
INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4



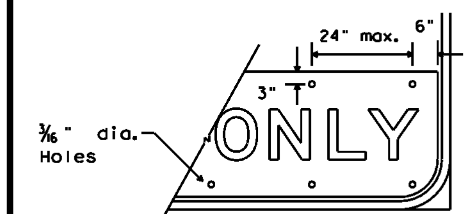
U.S. ROUTE MARKERS

Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



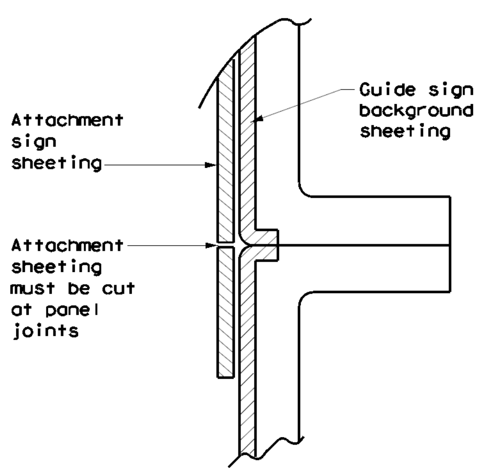
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

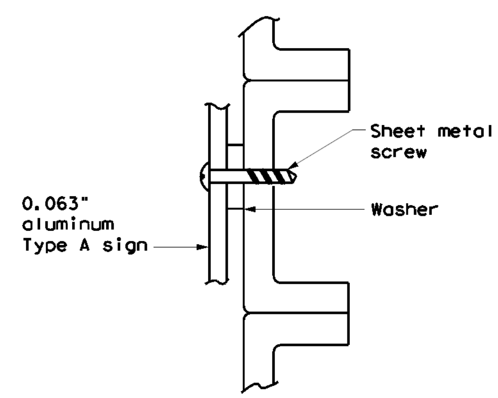


EXIT ONLY PANEL

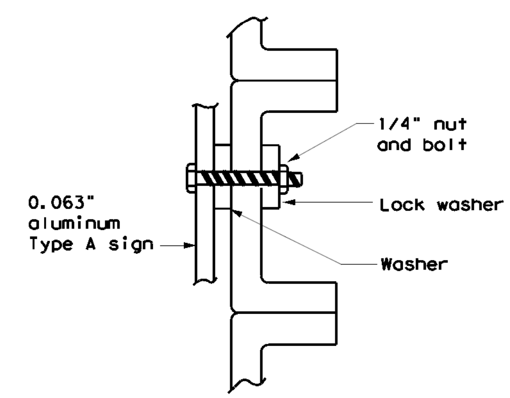
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

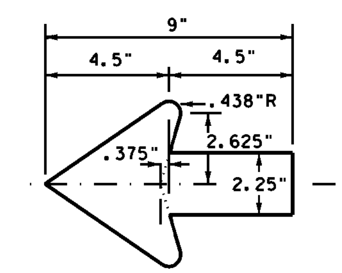
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

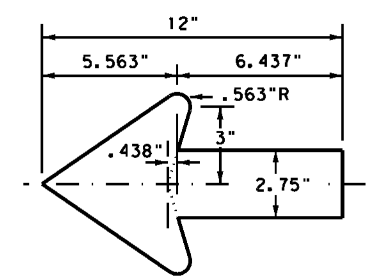
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

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 0912	SECT 37	JOB 237	HIGHWAY VARIOUS
REVISIONS 12-03 7-13 9-08	DIST HOU	COUNTY MONTGOMERY		SHEET NO. 67

DATE: 06/21/2023 11:33 AM
FILE: pw:\txdot.projectwiseonline.com:TxDOT13\Documents\- HOU\Design Projects\0912-37-237

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

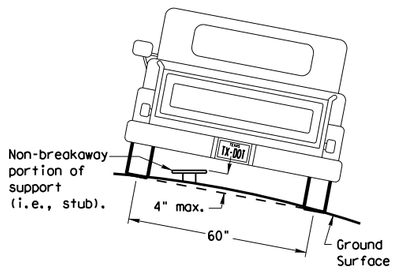
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

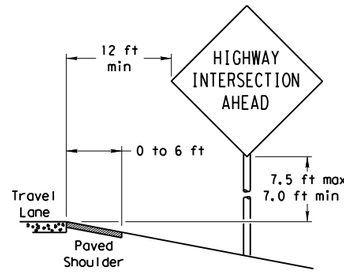
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

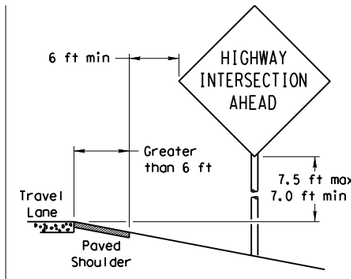
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

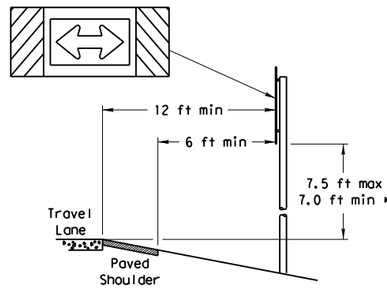
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



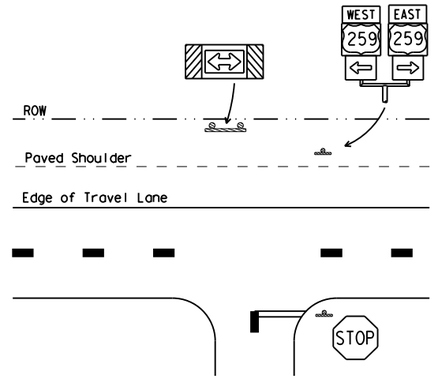
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

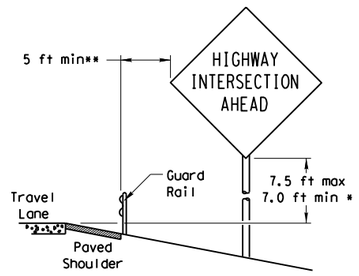
T-INTERSECTION



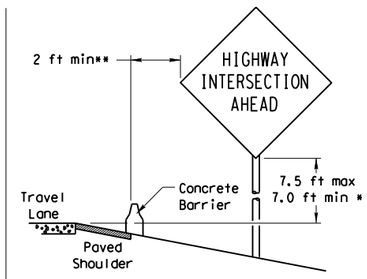
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

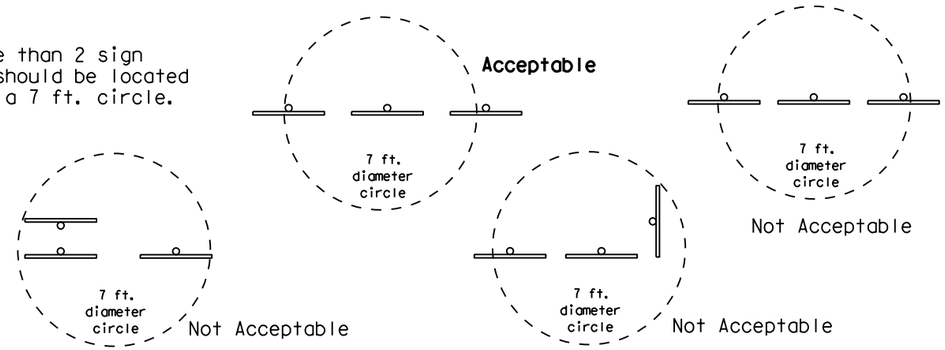
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

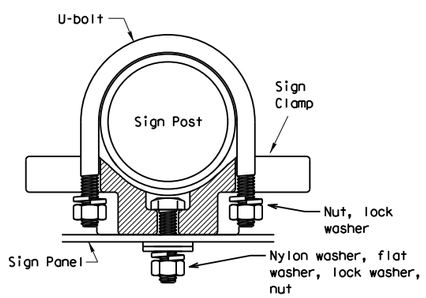
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

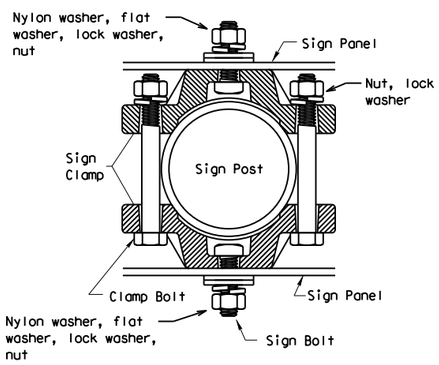


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

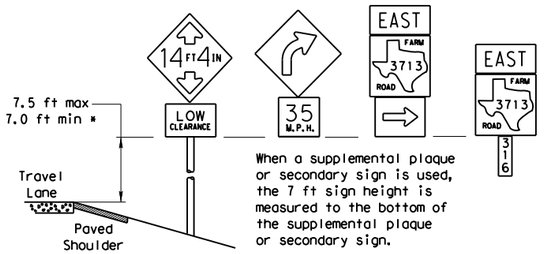
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



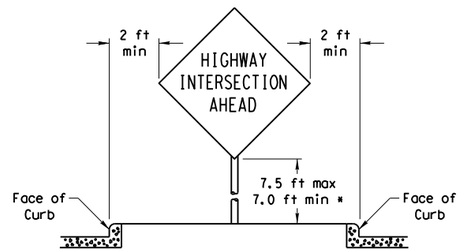
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



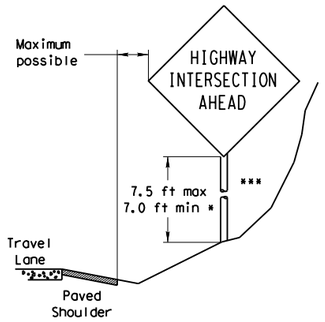
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

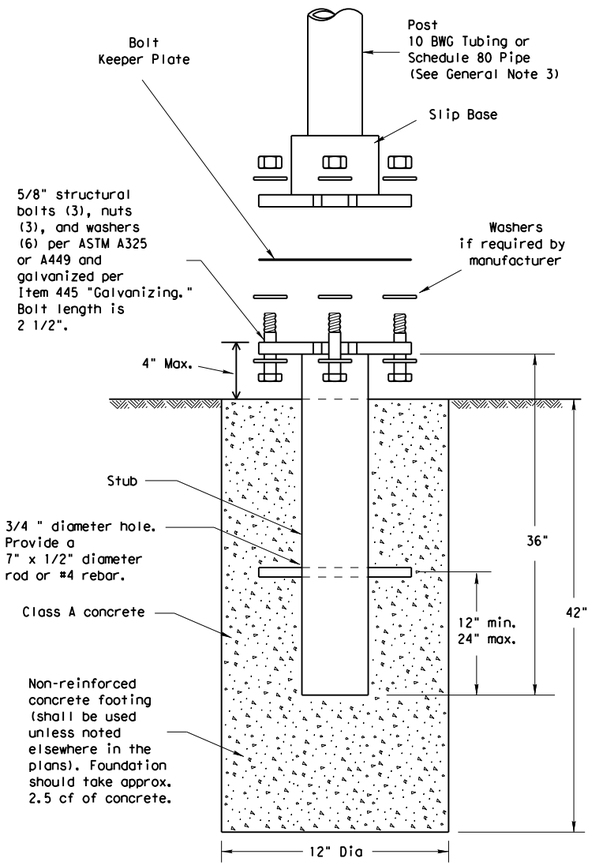
SMD(GEN)-08

9-08 REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		68

DATE:
FILE:

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.

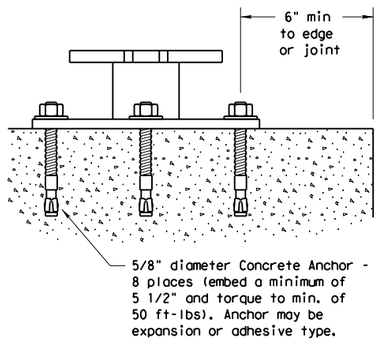
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

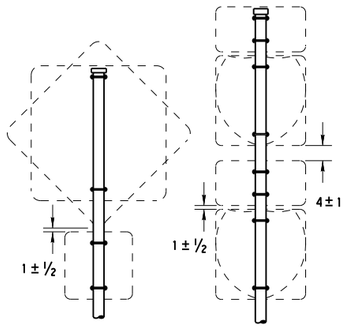
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

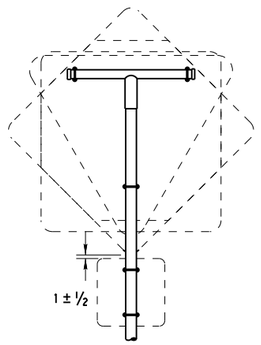
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS			
9-08			

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		69

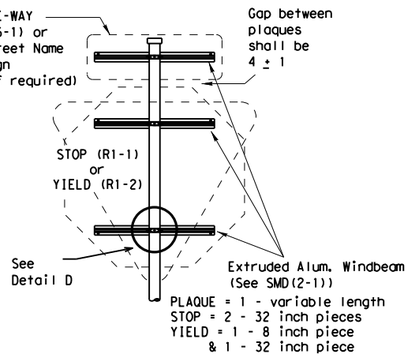
DATE:
FILE:



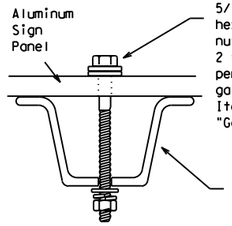
SM RD SGN ASSM TY XXXXX(1)XX(P)



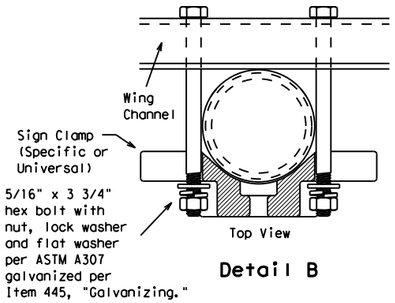
SM RD SGN ASSM TY XXXXX(1)XX(T)



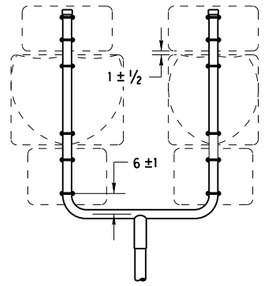
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



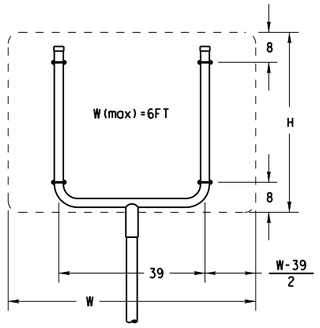
Detail A



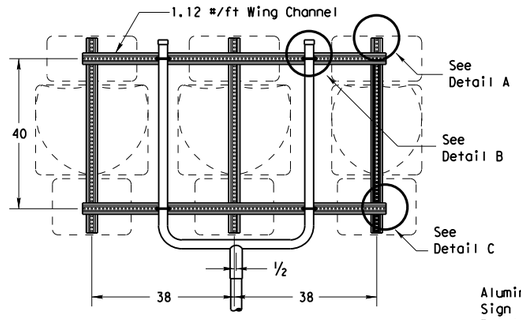
Detail B



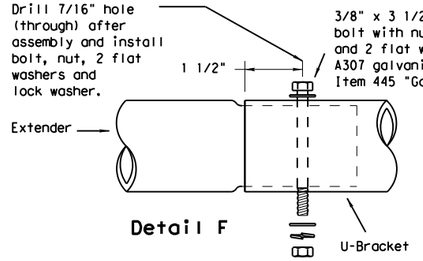
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

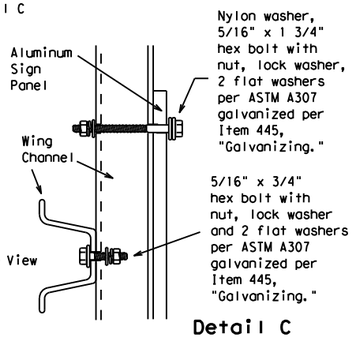


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



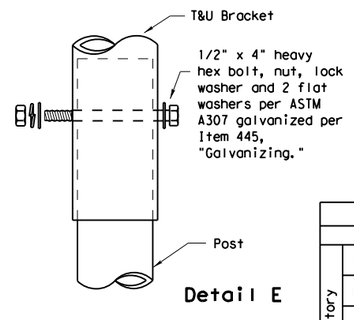
Detail F

Splices shall only be allowed behind the sign substrate.

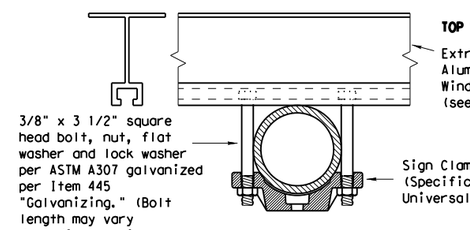


SIDE VIEW

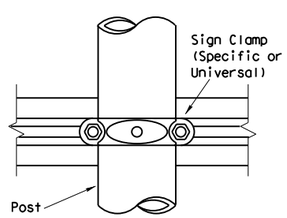
Detail C

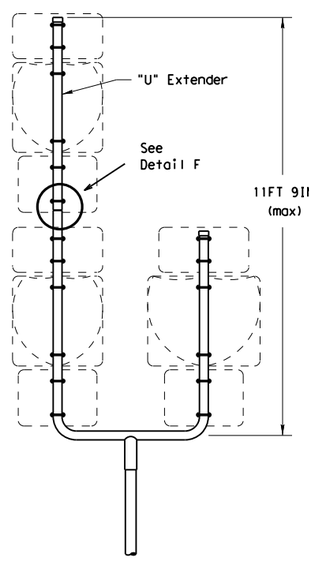


Detail E

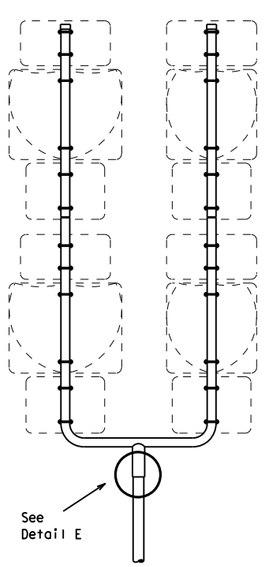


Detail D

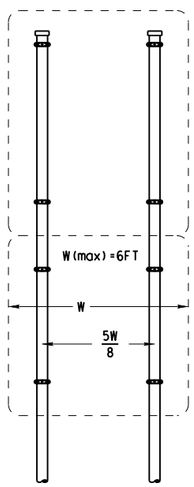




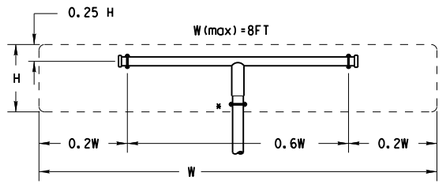
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



SM RD SGN ASSM TY S80(1)XX(U-2EXT)



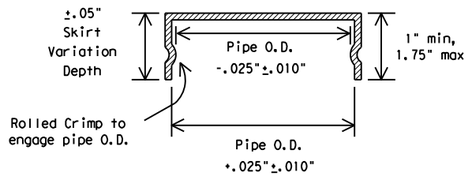
SM RD SGN ASSYM TY XXXXX(2)XX(P)



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

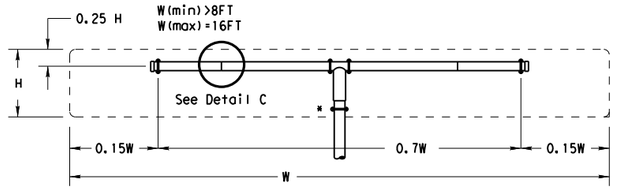
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

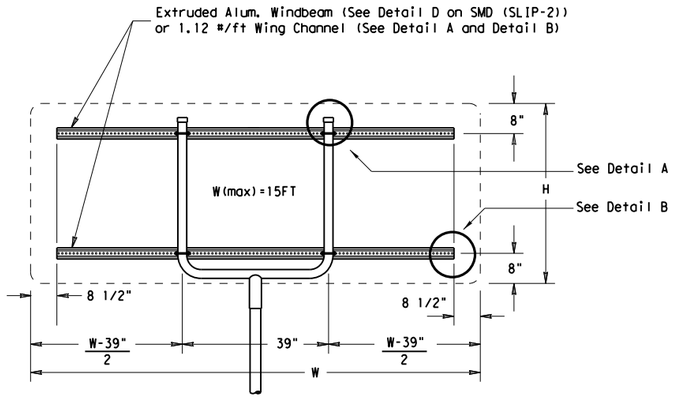
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0912	37	237	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		70

DATE:
FILE:

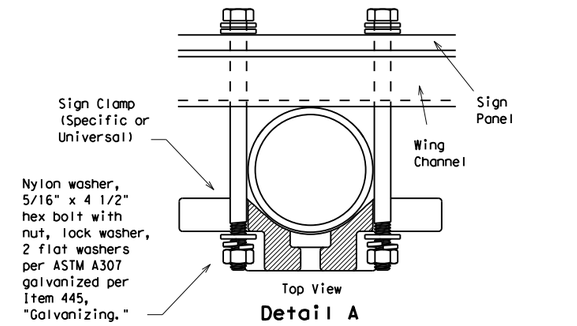
DATE:
FILE:



SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)

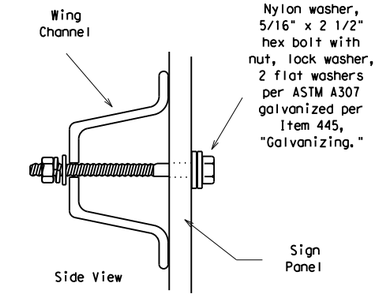


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

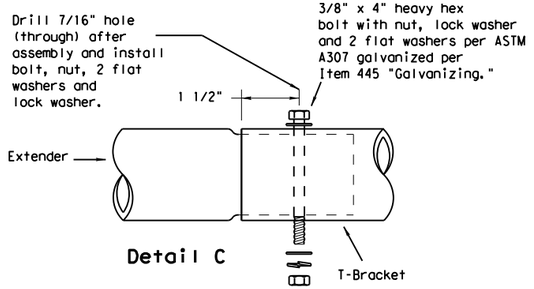


Top View

Detail A

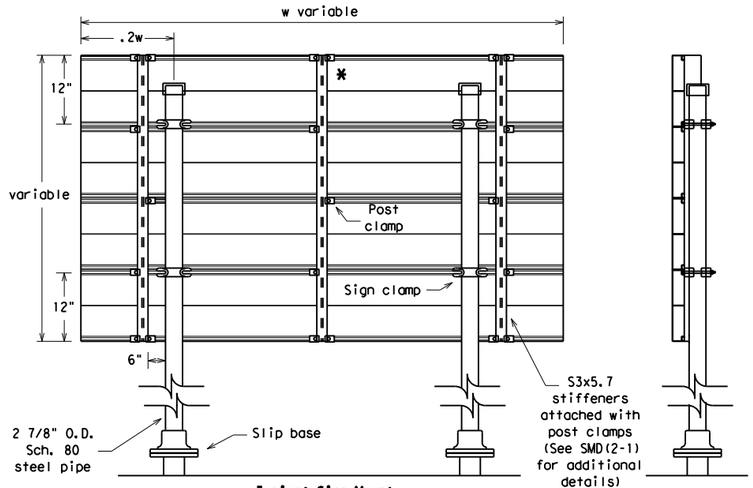


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

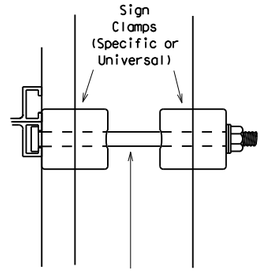


Typical Sign Mount

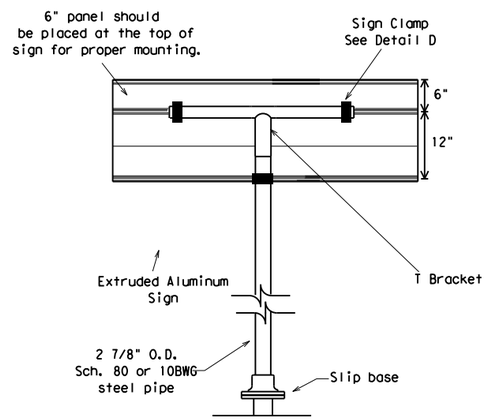
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

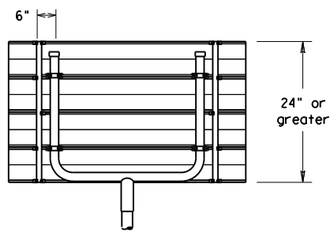
See Detail E
for clamp installation



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

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

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. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		71

DATE: 06/21/2023 12:03 PM
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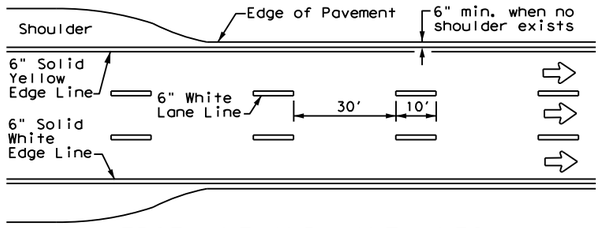
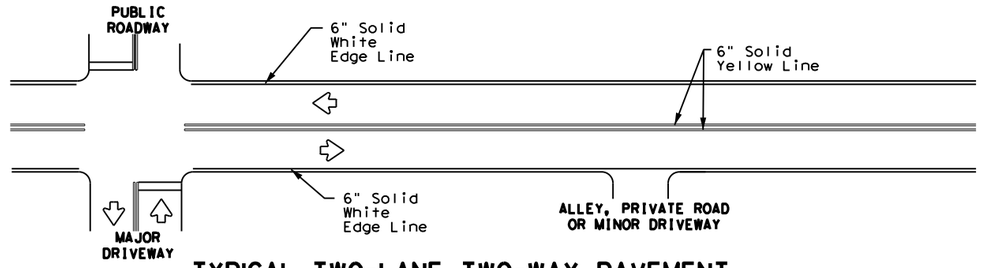
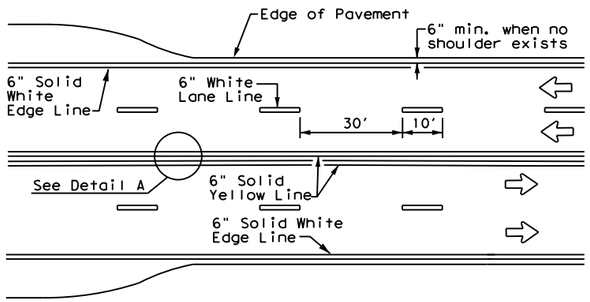
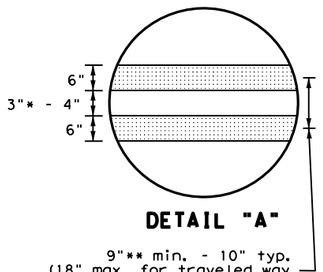


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





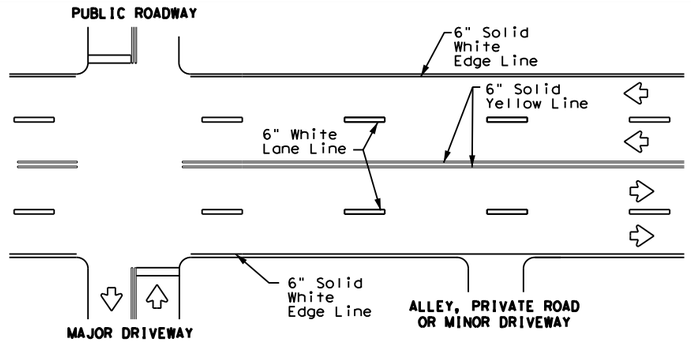
DETAIL "A"

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

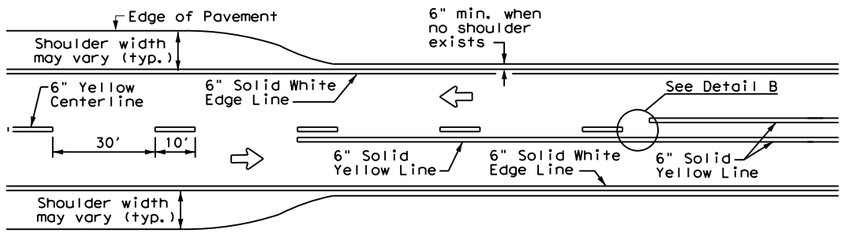
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

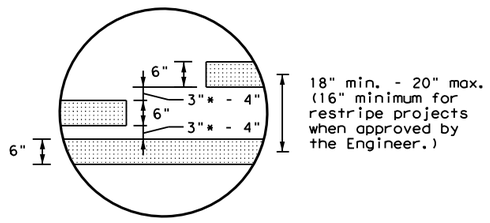
** 8" minimum for restripe projects when approved by the Engineer.



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

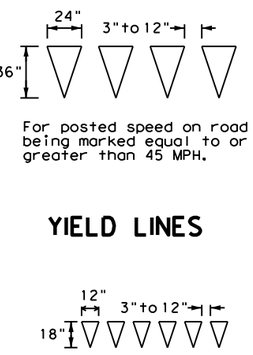


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



DETAIL "B"

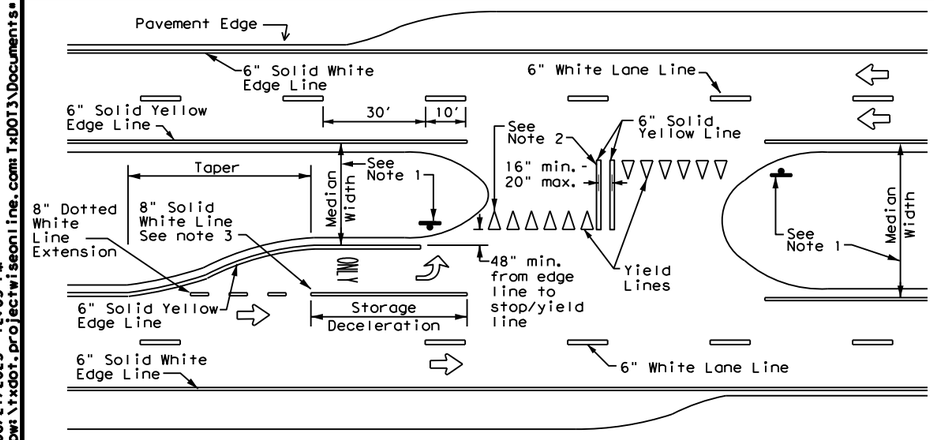
* 2" minimum for restripe projects when approved by the Engineer.



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

YIELD LINES

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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

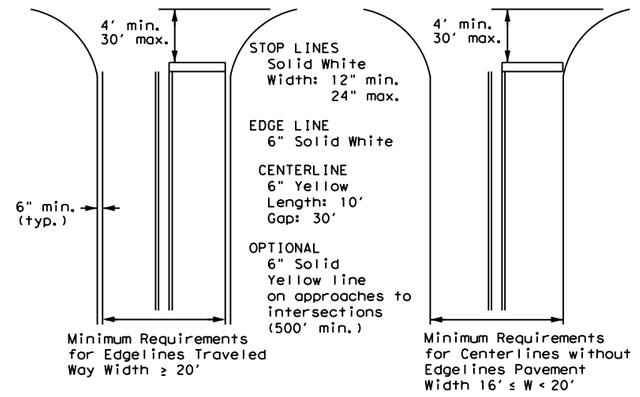
GENERAL NOTES

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

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

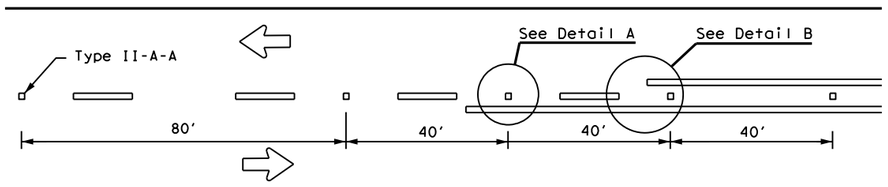
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

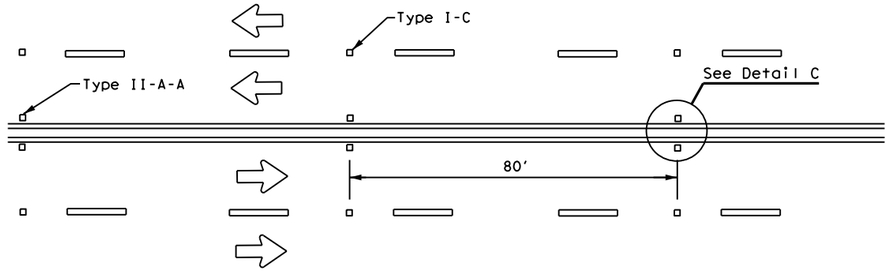
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	HOU	MONTGOMERY		72
5-00 2-12				

22A

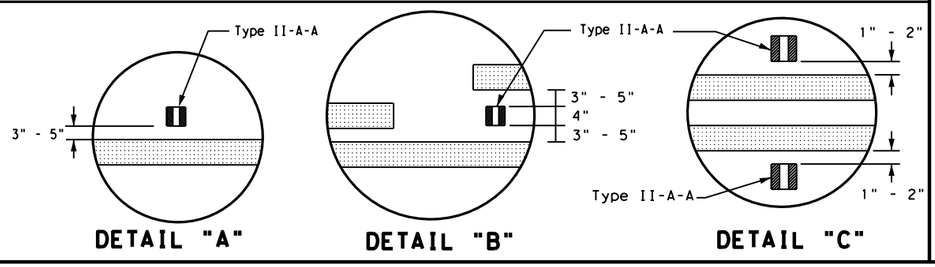
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



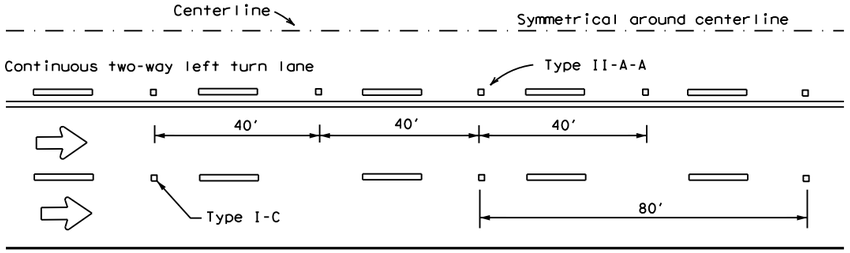
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



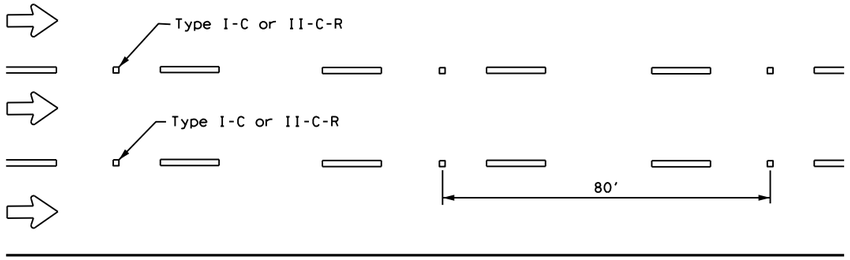
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



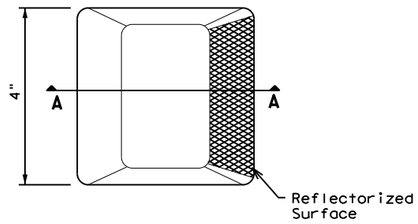
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

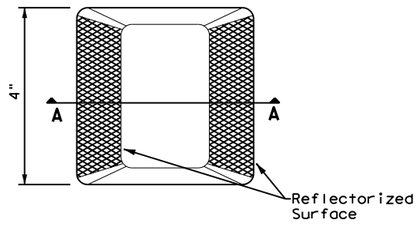
See Note 3.

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

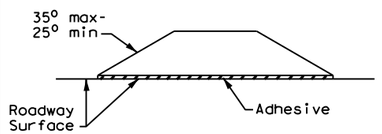
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

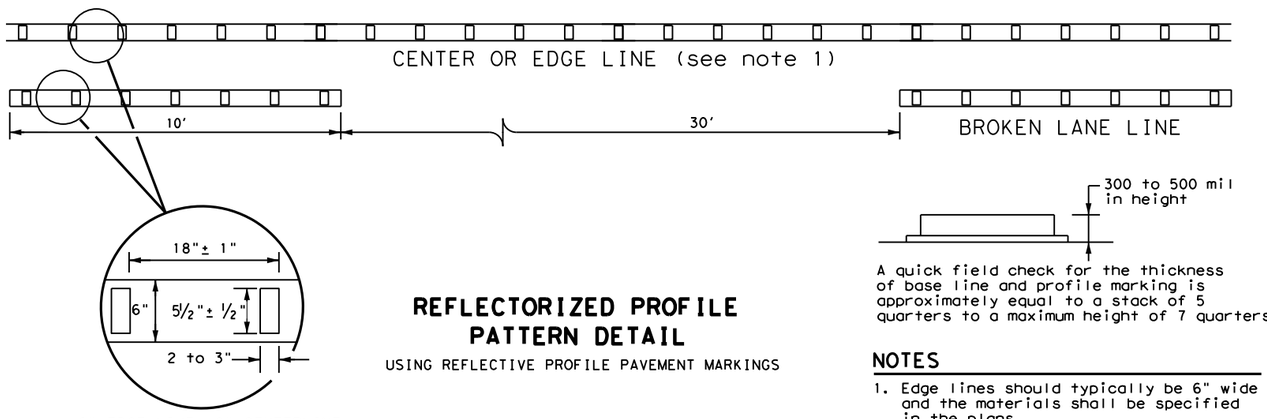


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

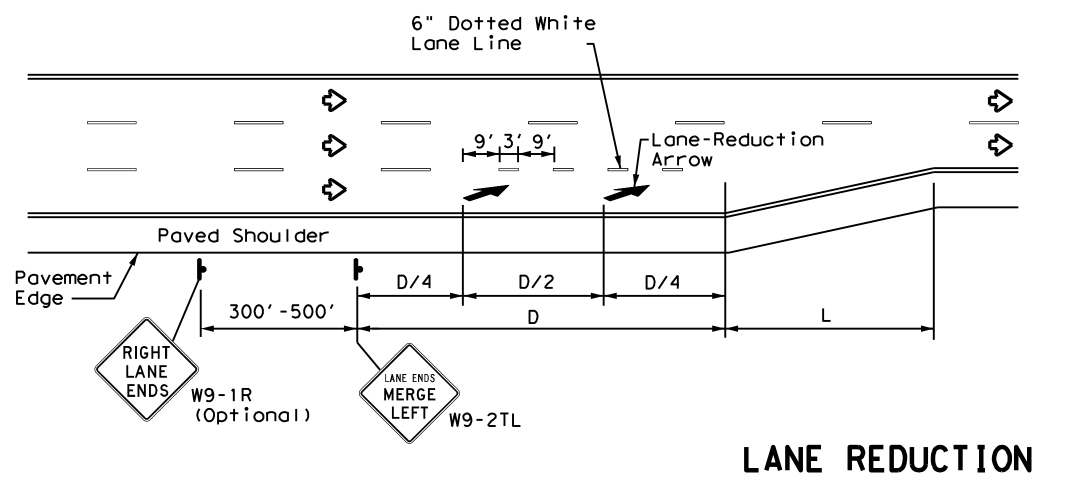
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0912	37	237	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		73

22B

DATE: 06/21/2023 01:21 PM
FILE: D:\rxdot.projectwiseonline.com\TxDOT3\Documents\-- HOU\Design Projects\0912 37 237\PM2-22.dgn



LANE REDUCTION

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

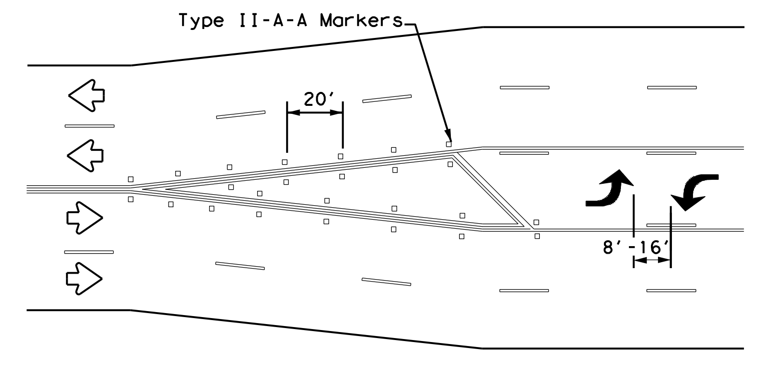
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

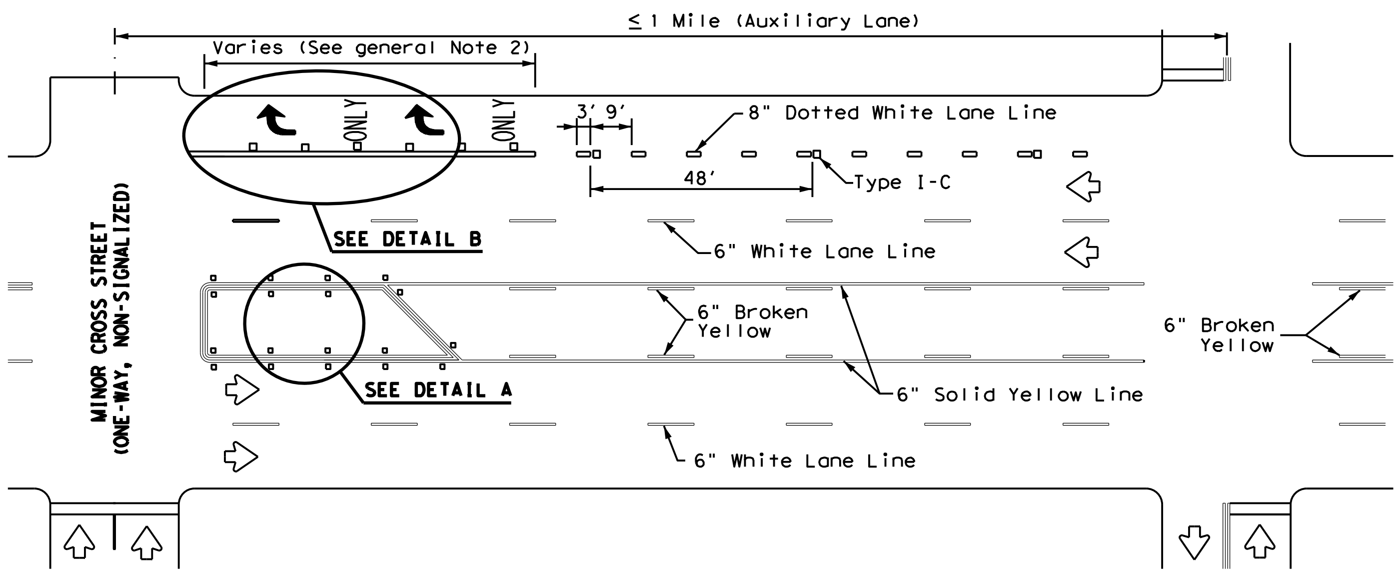
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

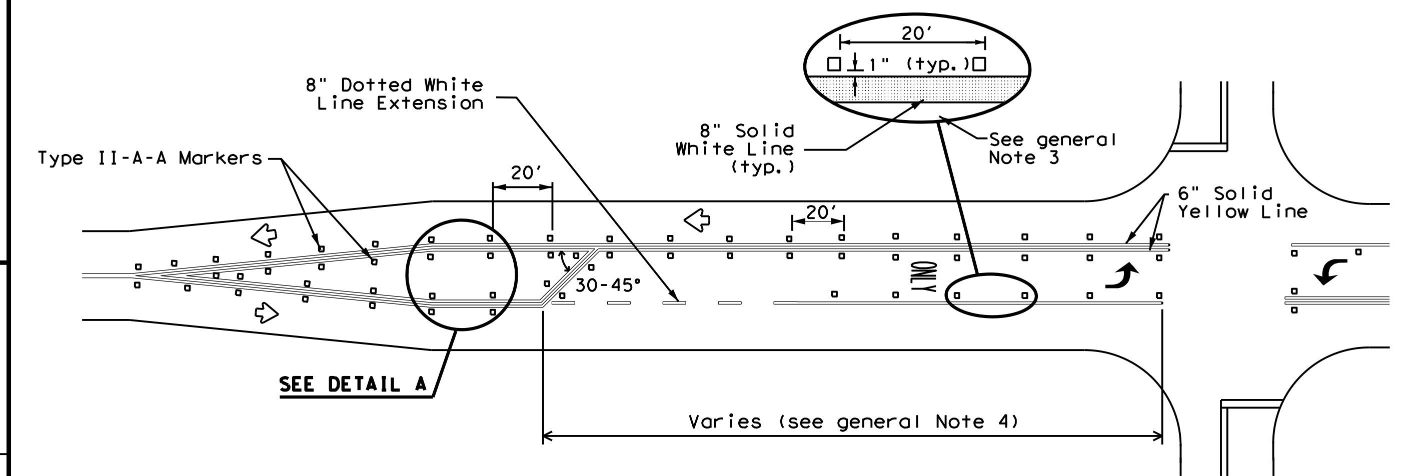


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

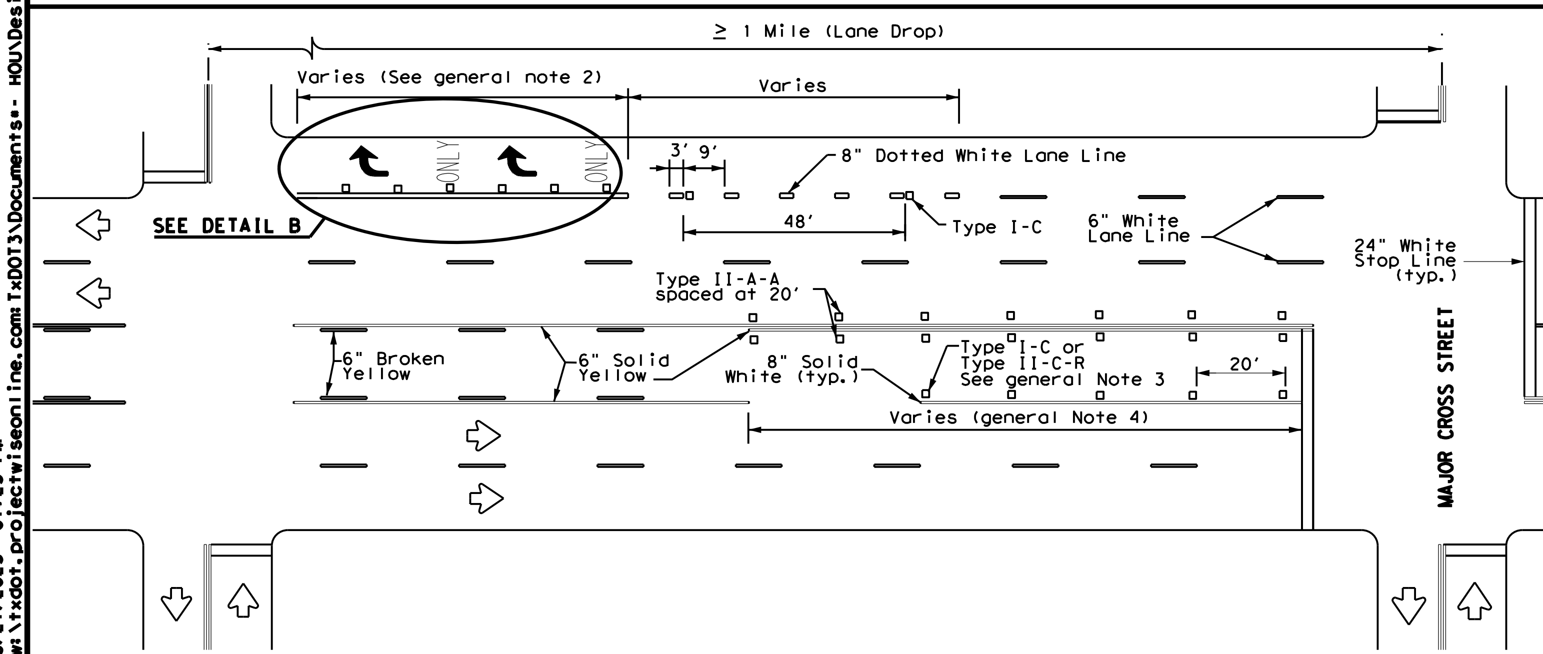
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



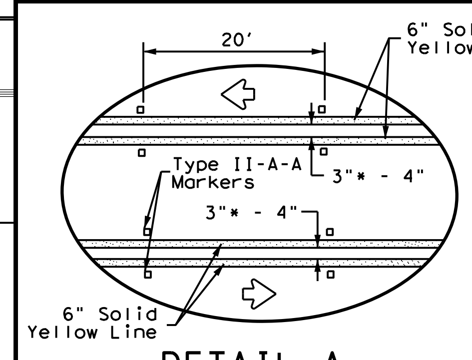
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



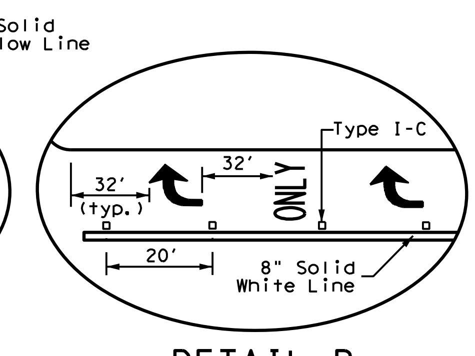
TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



DETAIL A



DETAIL B

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

Texas Department of Transportation

Traffic Safety Division Standard

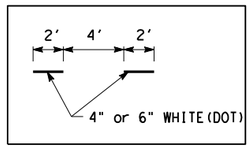
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0912	37	237	VARIOUS
	DIST		COUNTY	SHEET NO.
	HOU		MONTGOMERY	74

22C

DATE: 06/21/2023 01:23 PM
FILE: pw:\txdot.projectwiseonline.com:TxDOT13\Documents\- HOU\Design Projects\...



DETAIL "A"

4"or 6" WHITE(DOT)(TO INTERSECTING ROADWAY WITHOUT MANDATORY TURN LANES). SEE DETAIL "A"

4" or 6" WHITE(DOT)(TO INTERSECTING ROADWAY WITH ONE EXCLUSIVE AND ONE OPTIONAL TURN LANE). SEE DETAIL "A"

4"or 6" WHITE(DOT) SEE DETAIL "A"

8" WHITE SOLID W/ RAISED REFLECTIVE PAVEMENT MARKERS @ 20' SPA.

℄ MAINLANES

290+00

4"or 6" WHITE (DOT)(TO INTERSECTING ROADWAY W/ TWO EXCLUSIVE LEFT TURN LANES). SEE DETAIL "A"

4"or 6" WHITE(DOT)(TO INTERSECTING ROADWAY WITHOUT MANDATORY TURN LANES). SEE DETAIL "A"

*4"or 6" WHITE(SLD) 40 LF EA.

TYPICAL PLACEMENT OF DOTTED EXTENSION AT INTERSECTIONS

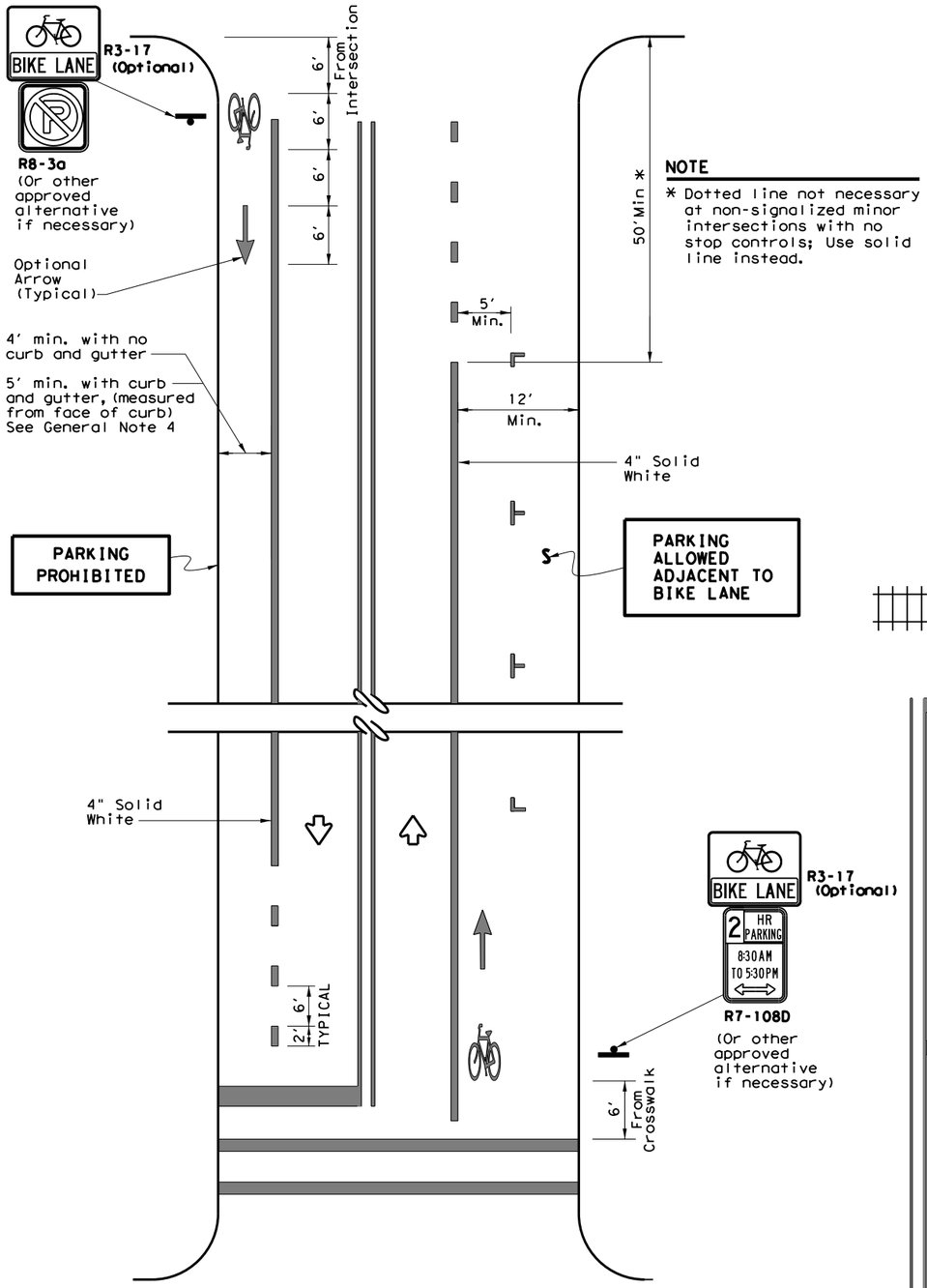
Texas Department of Transportation
Houston District

PAVEMENT MARKINGS
(DOTTED EXTENSION DETAILS)

PM(DOT)-11

FILE:	DN:	CK:	DW:	CK:	
© TxDOT 2010	DIST	FED REG	PROJECT NO.		SHEET
REVISIONS 4/2010 4/2011	HOU	6			75
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	MONTGOMERY	0912	37	237	VARIOUS

STD N-28



NOTE

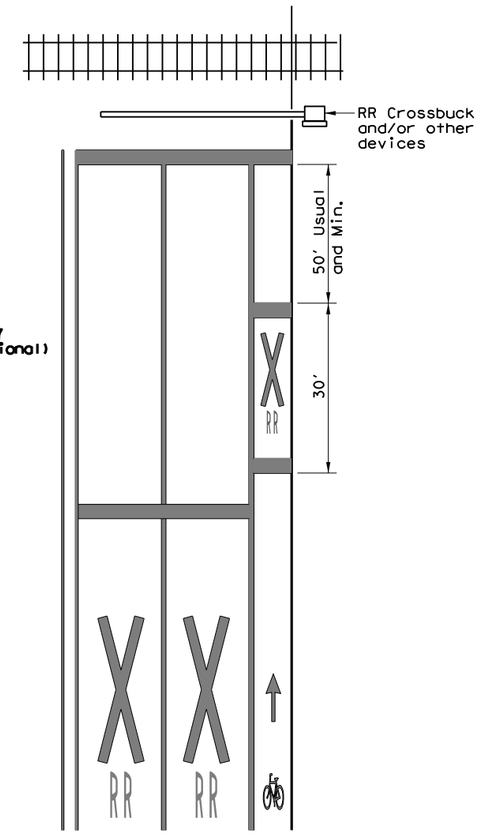
* Dotted line not necessary at non-signalized minor intersections with no stop controls; Use solid line instead.

NOTES

1. Bicycle lane pavement markings typically repeated after each intersection or signalized driveway.
2. On uninterrupted sections of roadway, bicycle lane pavement markings typically repeated as follows:

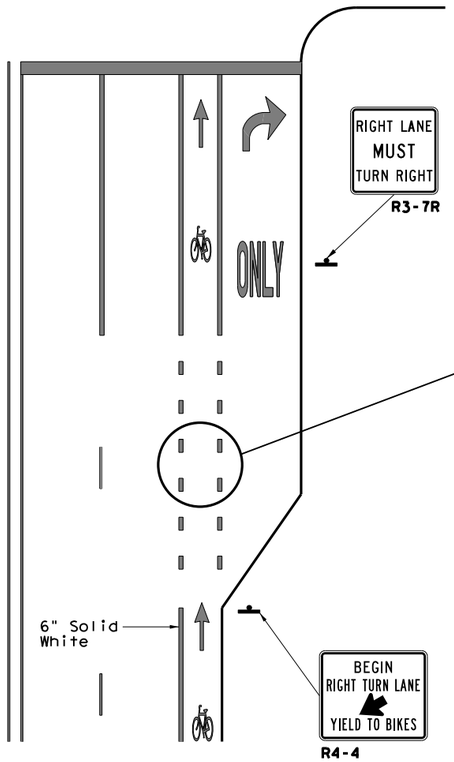
   -1200' for 45 MPH or less roads
   -2500' for 50 MPH and greater roads.

TWO-WAY STREET

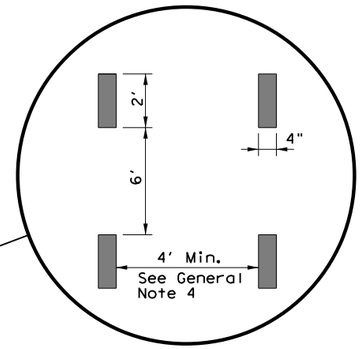


(See RCPM Standard for travel lane details)

RAILROAD CROSSING APPROACH



RIGHT TURN ONLY LANE



DETAIL "A"

LEGEND	
	Sign
	Traffic Flow

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290

Texas Department of Transportation
Traffic Operations Division

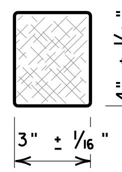
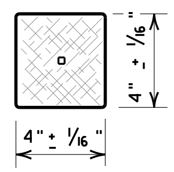
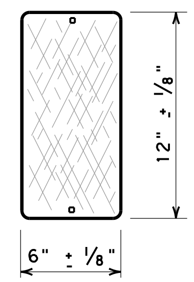
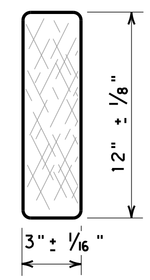
BICYCLE LANE PAVEMENT MARKINGS

BLPM-10

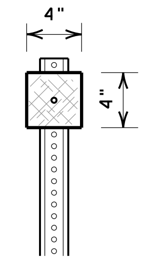
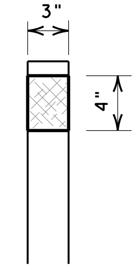
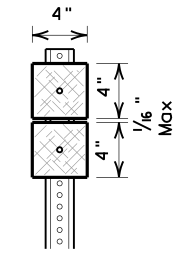
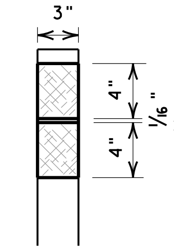
© TxDOT May 2010	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
	0912	37	237	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		76

DATE: $DATE$ $TIME$
FILE: $FILE$

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

	SINGLE		DOUBLE	
DEVICE	 1-Size 2 reflector unit	 1-Size 1 reflector unit	 2-Size 2 reflector units	 2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

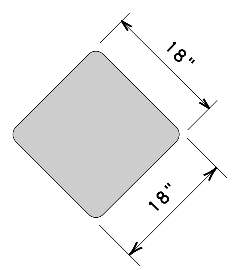
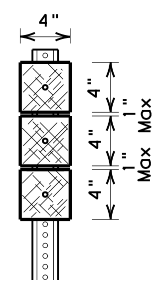
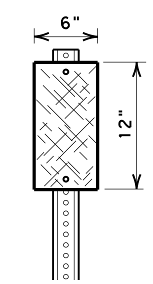
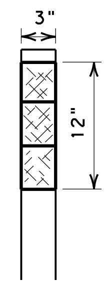
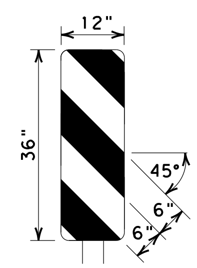
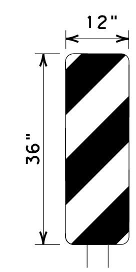
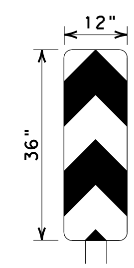
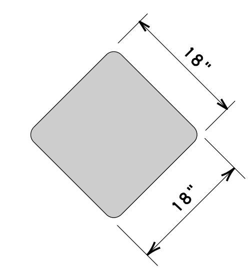
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

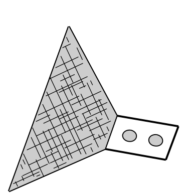
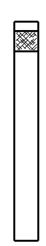
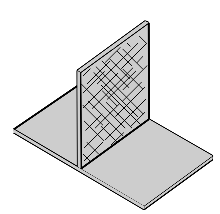
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		 3-Size 2 reflector units	 1-Size 3 reflector unit	 3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

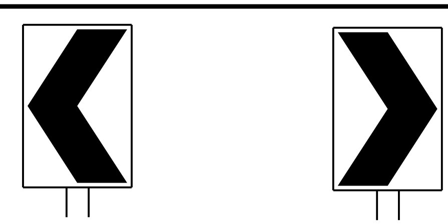
DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

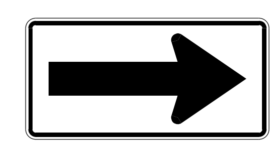
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE

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).

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
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REVISIONS 10-09 3-15 4-10 7-20	DIST HOU	COUNTY MONTGOMERY		SHEET NO. 77

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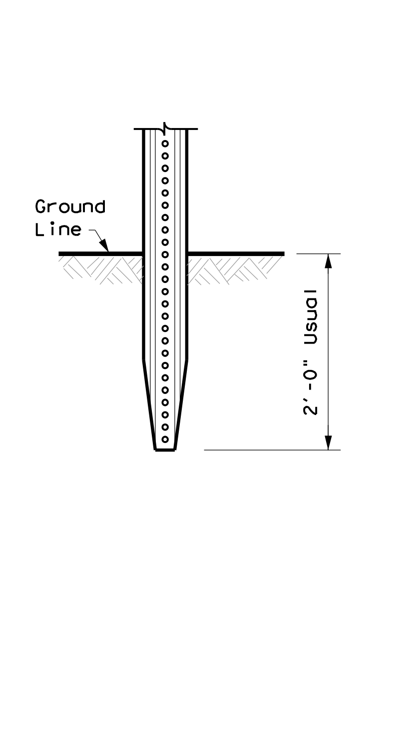
POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

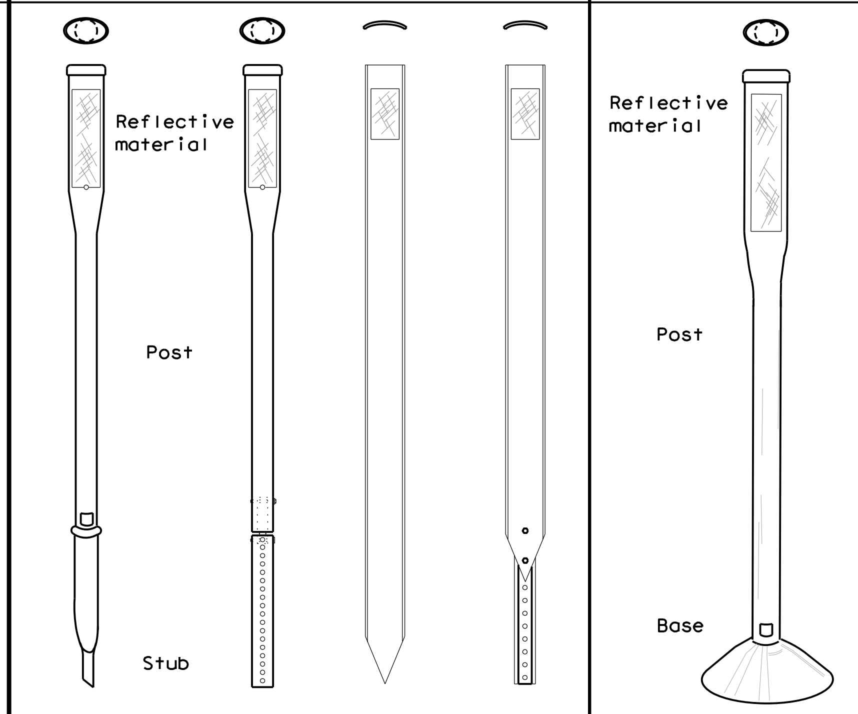


NOTES

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



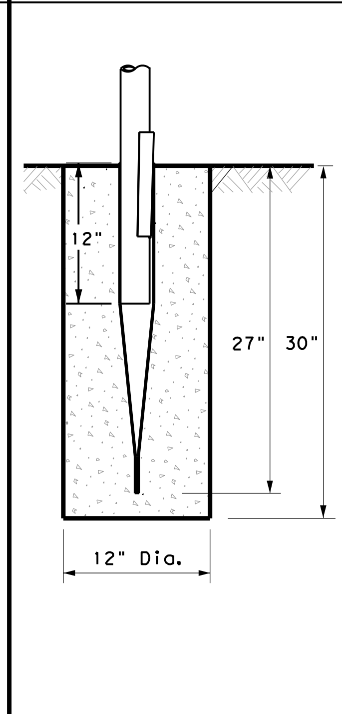
EMBEDDED | SURFACE MOUNT

NOTES

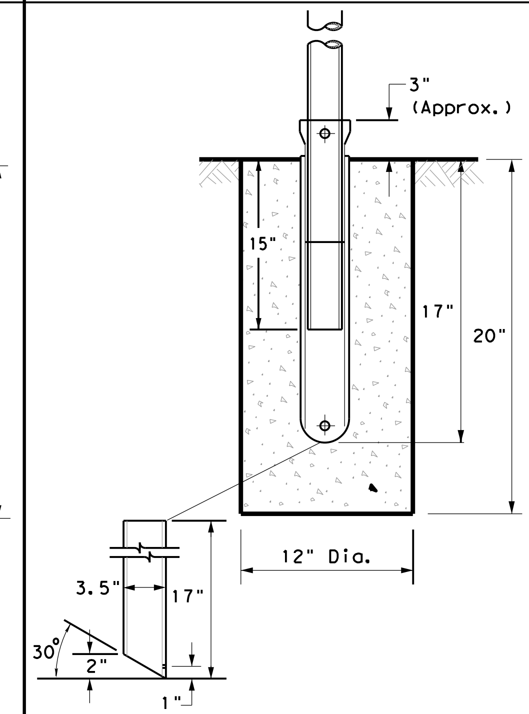
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL | PLASTIC

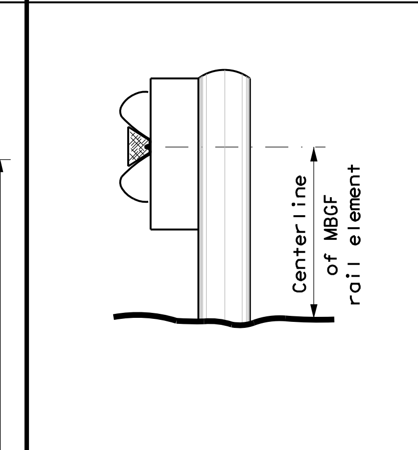
NOTE

1. Install per manufacturer's recommendations.

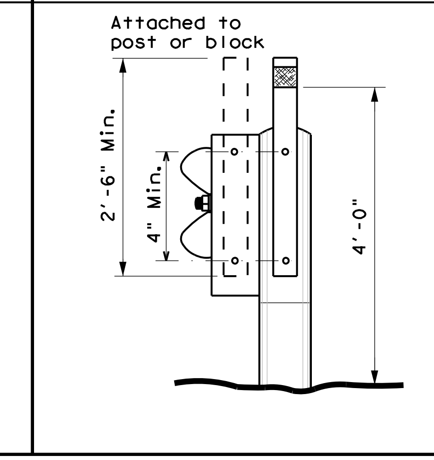
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

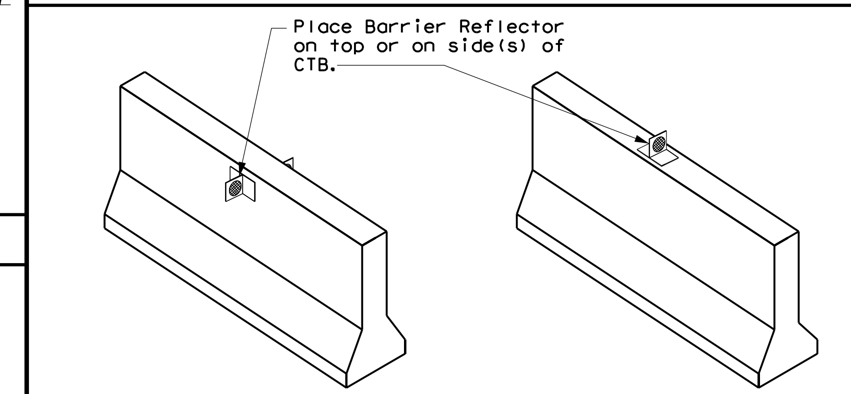
GF1



GF2



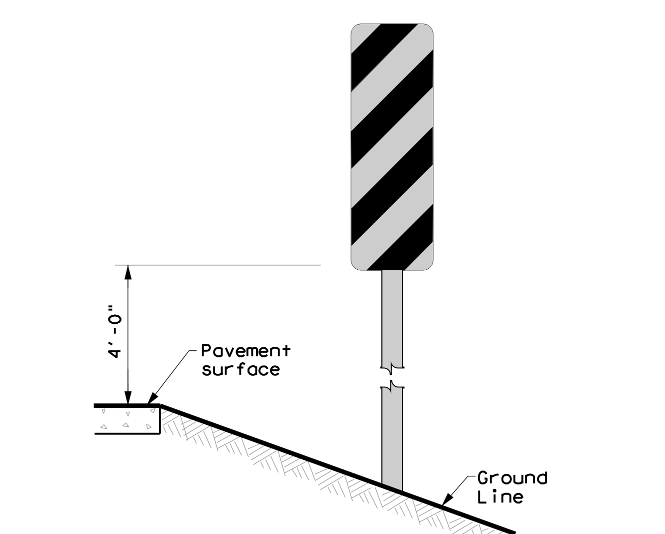
CONCRETE TRAFFIC BARRIER (CTB)



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.

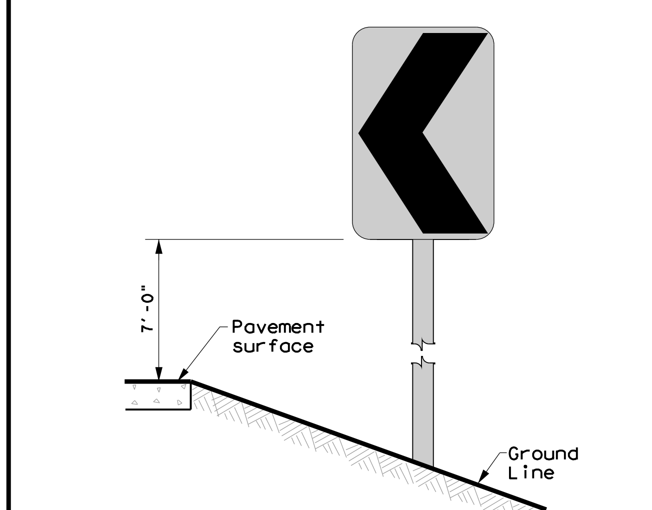
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

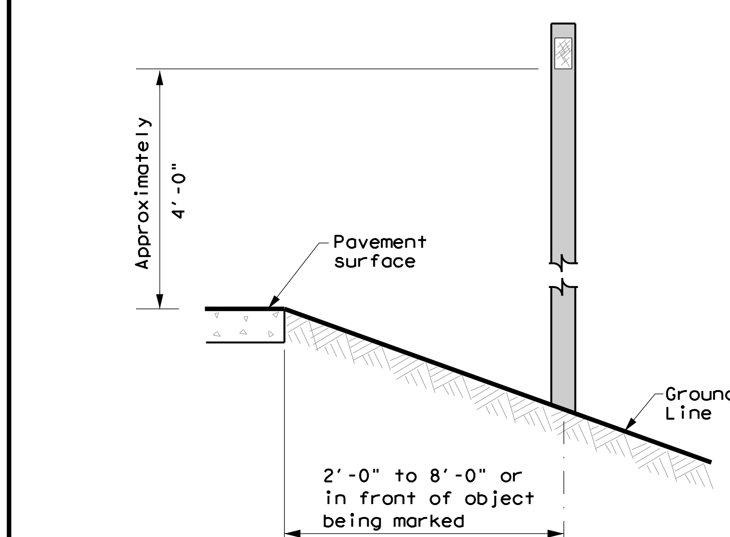
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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.

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DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

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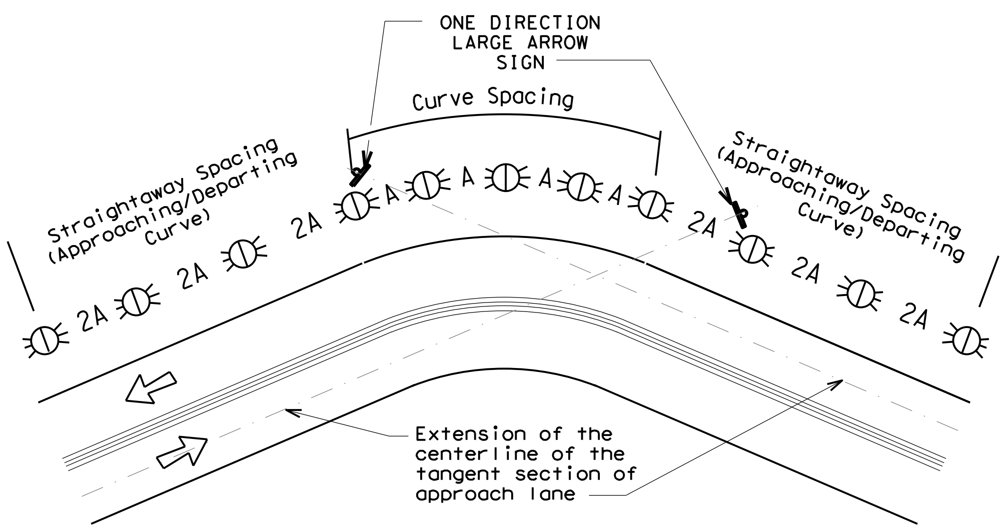
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

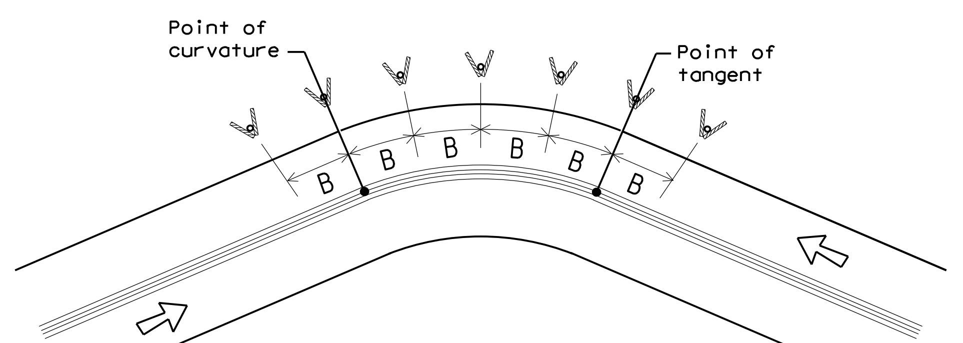
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

(symbol)	Bi-directional Delineator
(symbol)	Delineator
(symbol)	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	0912	37	237	VARIOUS
3-15 8-15	DIST		COUNTY	SHEET NO.
8-15 7-20	HOU		MONTGOMERY	79

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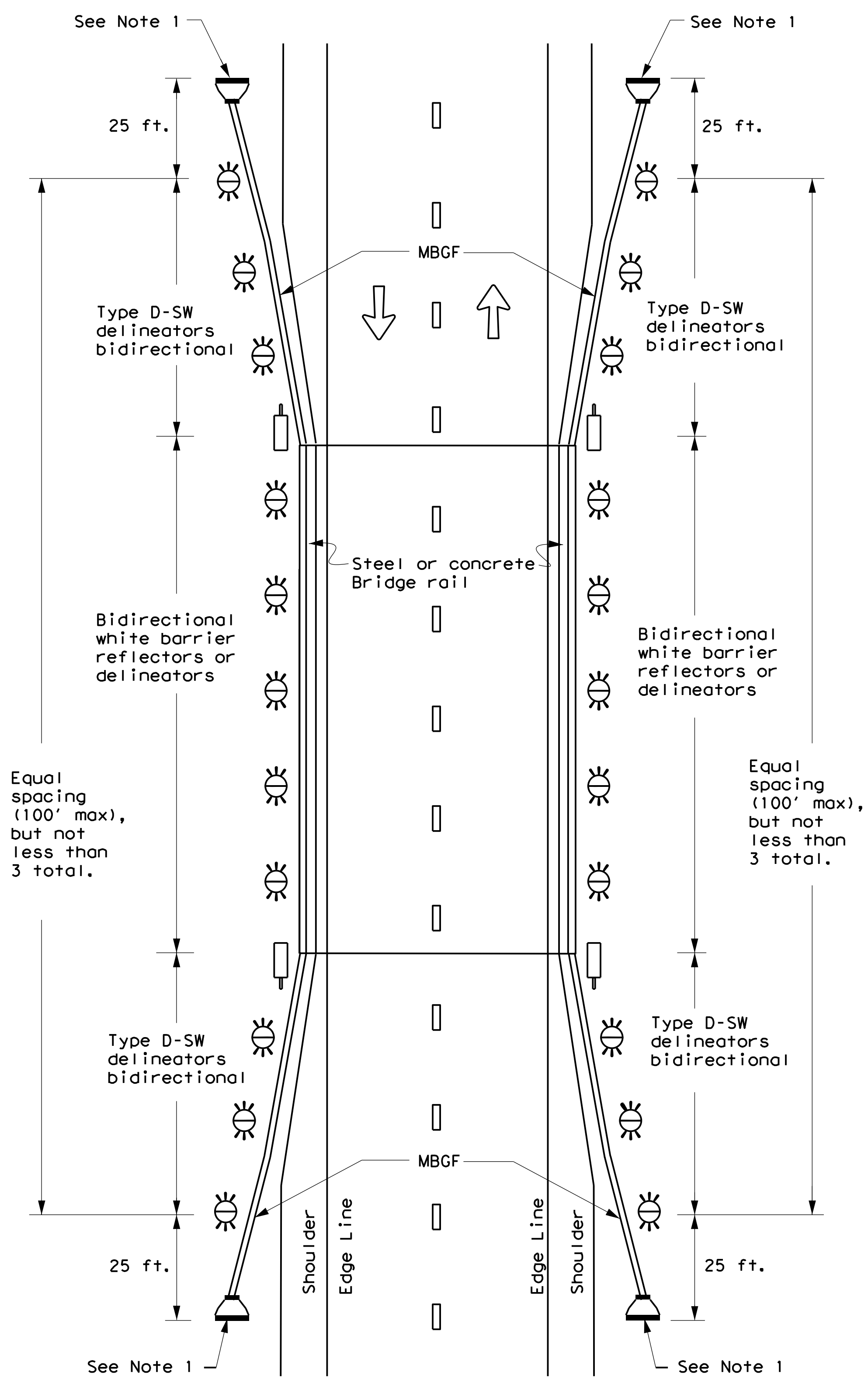
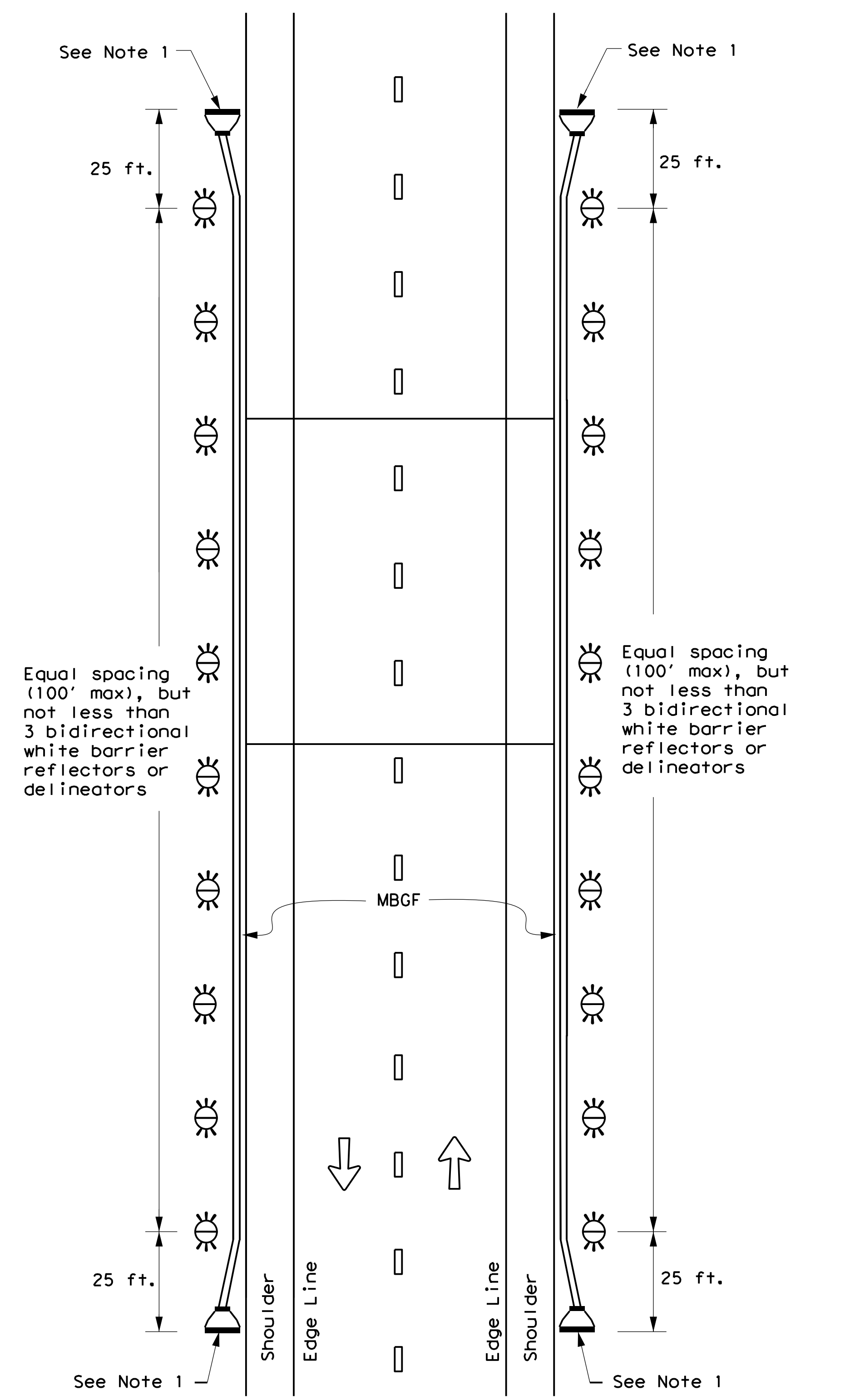
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

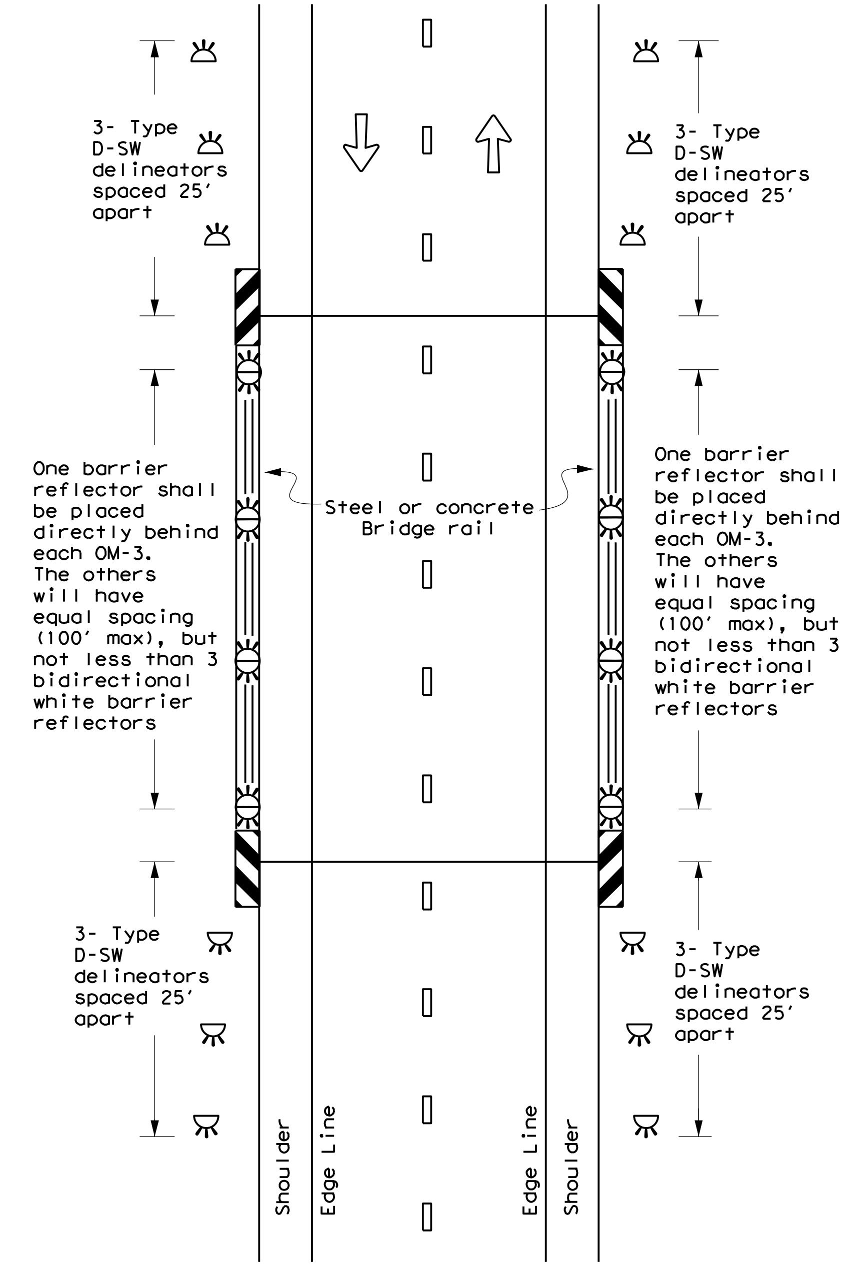
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

Symbol	Description
	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

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REVISIONS 7-20	DIST HOU		COUNTY MONTGOMERY	SHEET NO. 80

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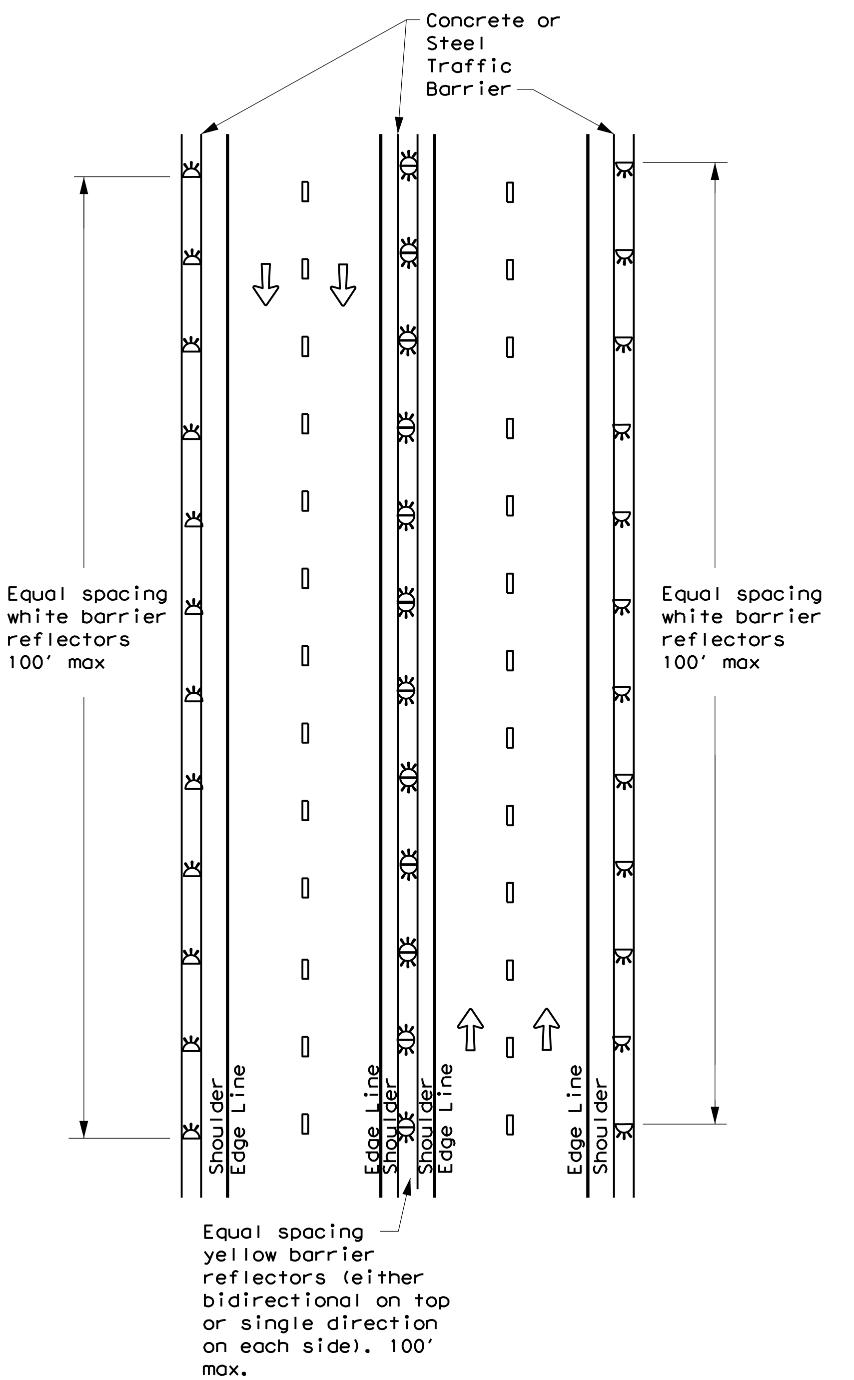
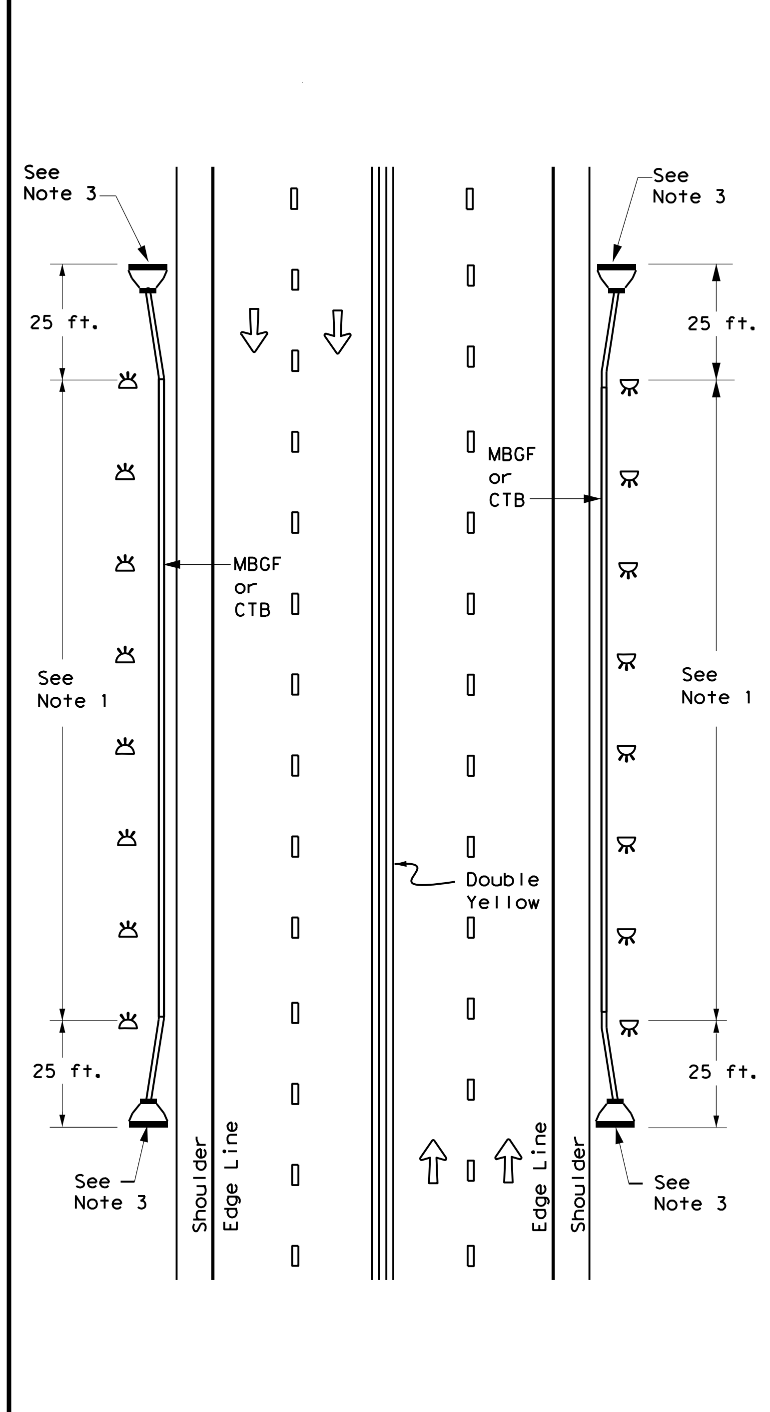
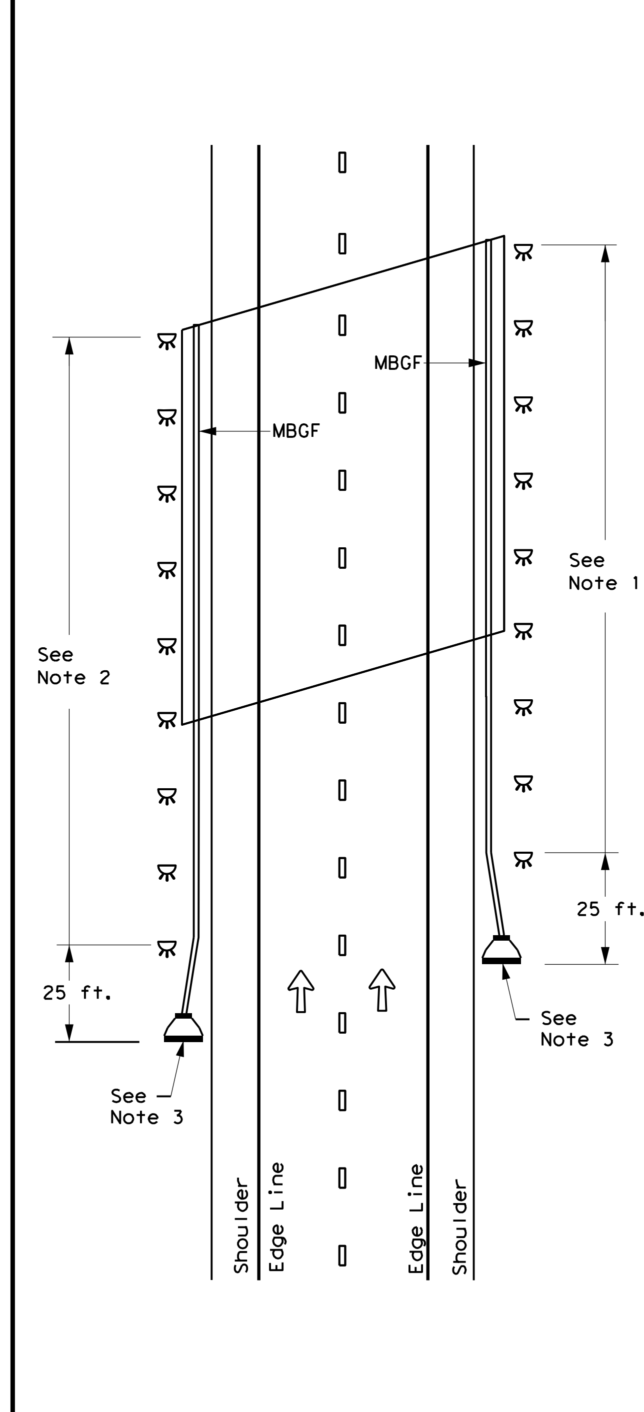
CONTINUOUS CONCRETE OR STEEL BARRIER



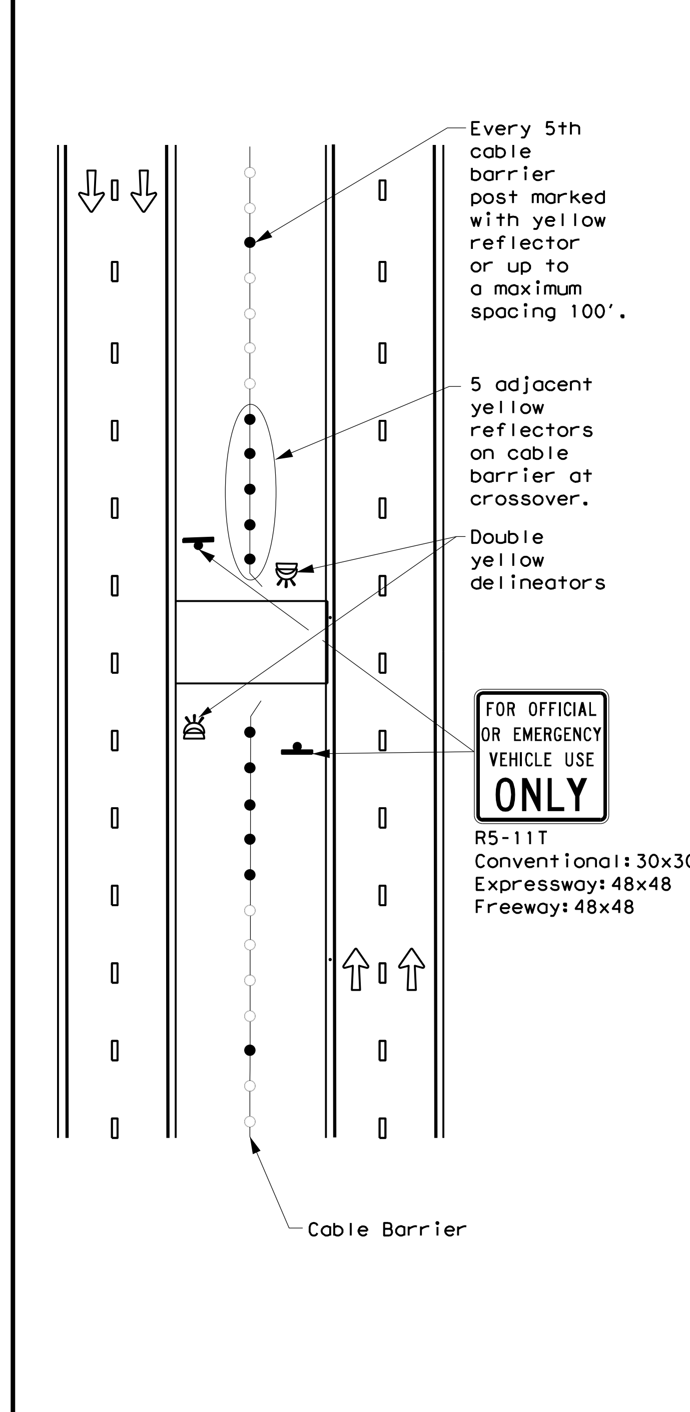
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)

2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.

3. 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.

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(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-20	DIST		COUNTY	SHEET NO.
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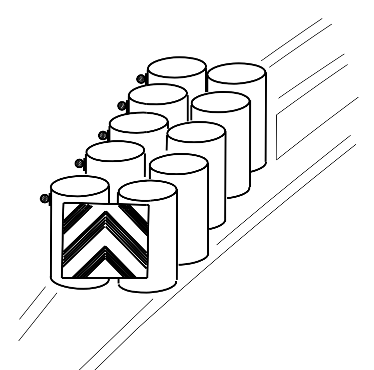
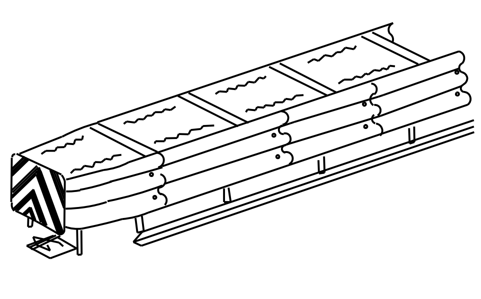
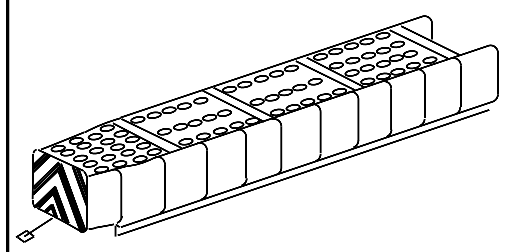
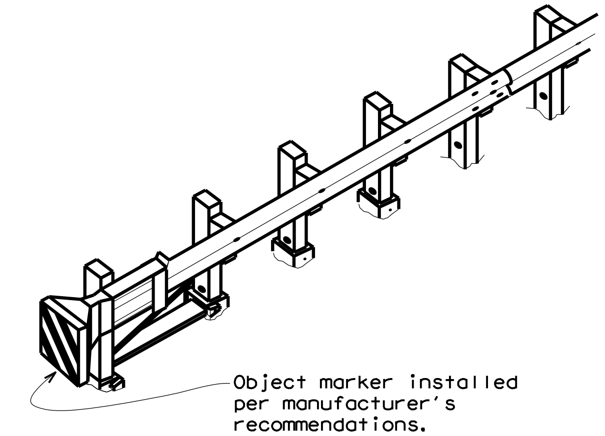
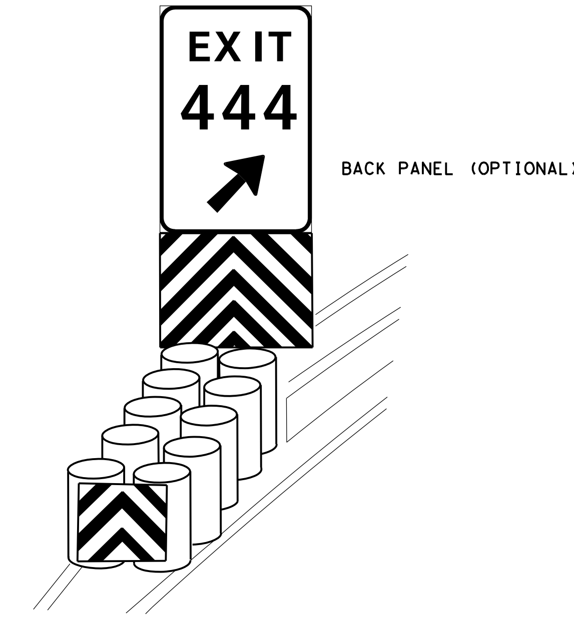
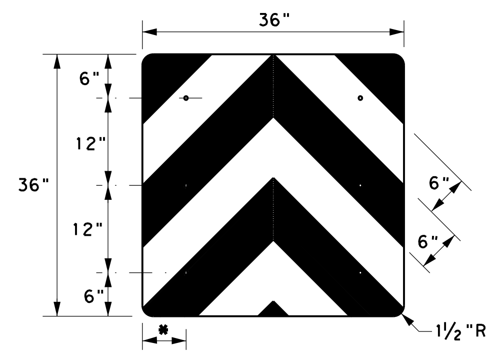
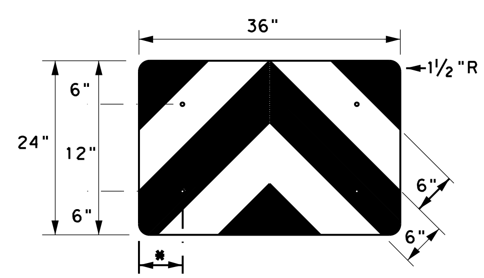
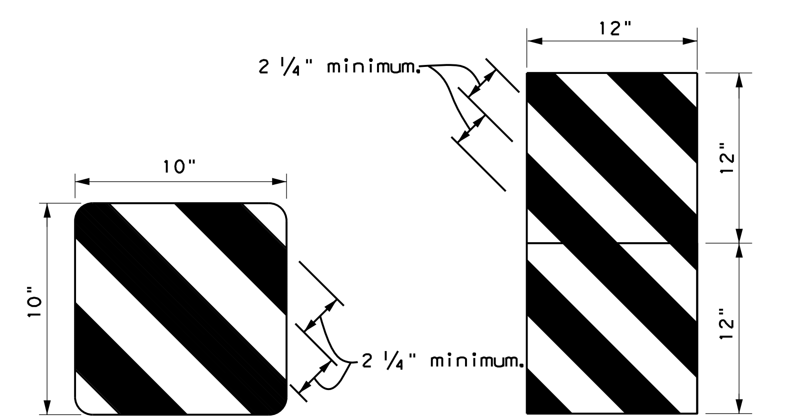







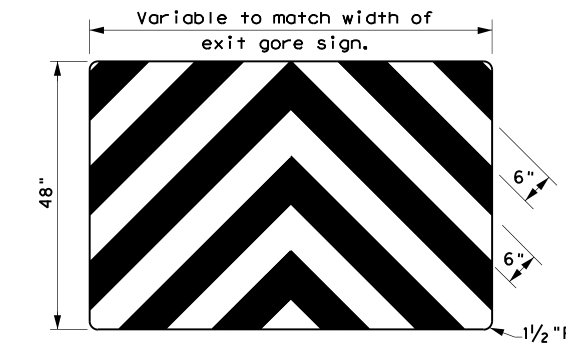


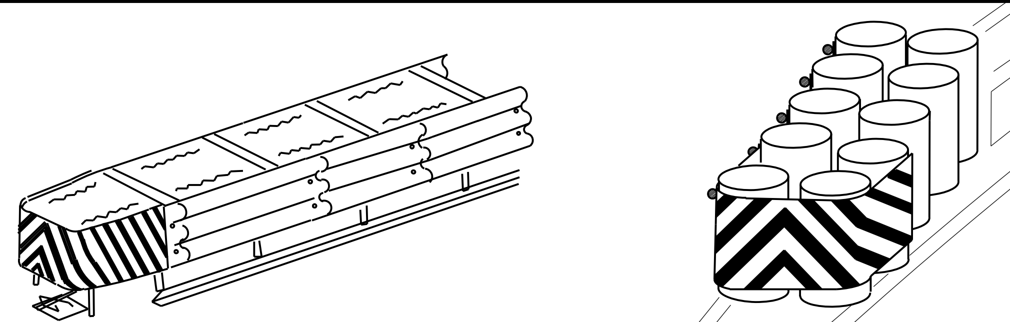


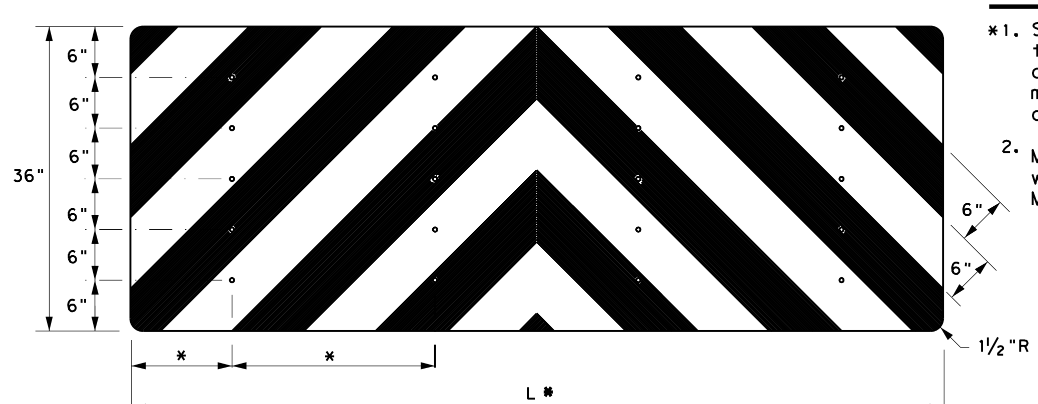
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

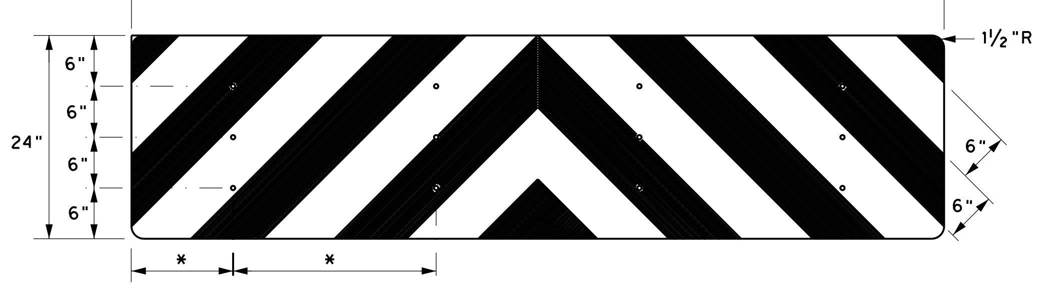


OBJECT MARKERS SMALLER THAN 3 FT^2









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.

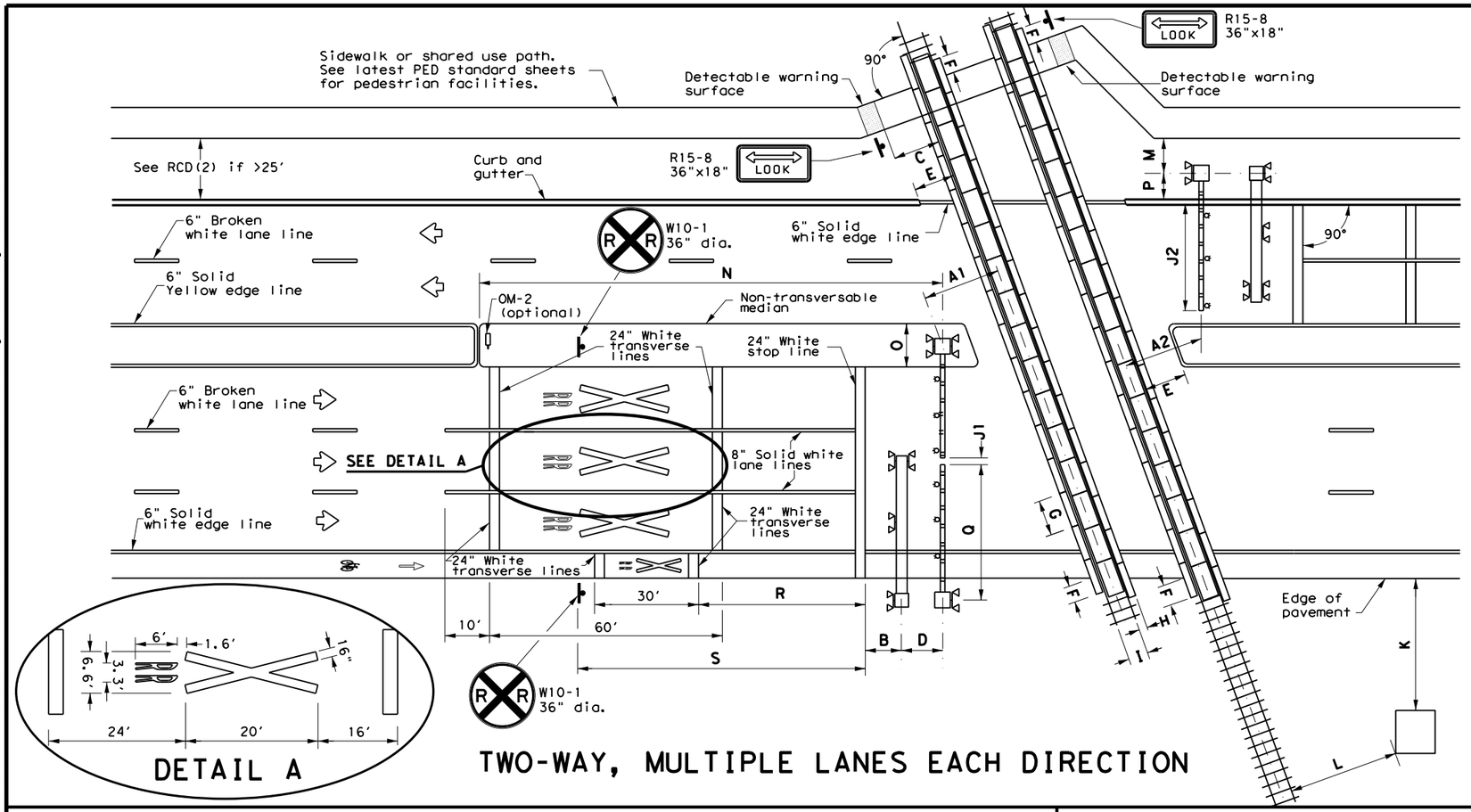
Texas Department of Transportation — Traffic Safety Division Standard

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	0912	37	237	VARIOUS
4-92 8-04 / 8-95 3-15 / 4-98 7-20	DIST		COUNTY	SHEET NO.
	HOU		MONTGOMERY	82

20G



NOTES

A1: Center of RR mast to center of rail: 12' minimum, 15' typical.

A2: Tip of gate to center of rail: 12' minimum, 15' typical.

B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).

C: Near edge of detectable warning surface to nearest rail: 12' minimum.

D: Center of gate mast to center of cantilever mast: 6' typical.
NOTE: Cantilever may be located in front or behind gates.

E: Edge of median or curb to nearest rail: 10' typical.
NOTE: Design median edge to be parallel with rail.

F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum.
NOTE: Field panels need not be in line with gauge panels.

G: Length of panels along rail: 8' typical.

H: Width of field panel: 2' typical (check with railroad company).

I: Distance between rails: 4'- 8'1/2".

J1: Tip of gate to tip of gate: 2' maximum.

J2: 90% of traveled roadway to be covered by gate.

K: Nearest edge of RR cabinet from edge of pavement: 30' typical.
NOTE: Cabinet not required to be parallel to edge of pavement.

L: Nearest edge of RR cabinet from nearest rail: 25' typical.

M: Center of RR mast to edge of sidewalk: 6' minimum.

N: Center of gate mast to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60'will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.

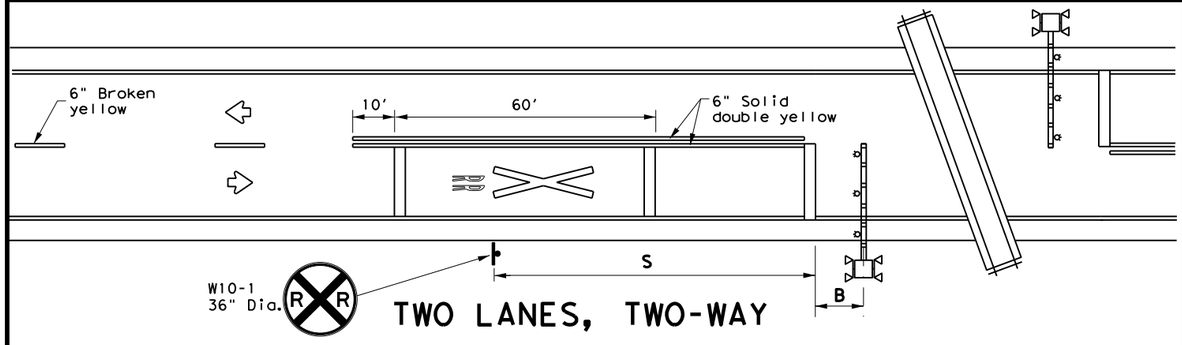
O: Width of median for RR gate assembly: 8'-6" minimum, 10' typical when using median gates. NOTE: Center of gate mast minimum 4'-3" from face of curb.

P: Center of RR mast to face of curb: 5'-3" minimum.
Center of RR mast to edge of pavement (with shoulder): 7' minimum.
Center of RR mast to edge of pavement (no shoulder): 9'-3" minimum.
NOTE: Final location determined by the railroad company.

Q: Gate length: 28' or less typical, but railroad company may allow up to 32' under special circumstances.

R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.

S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.



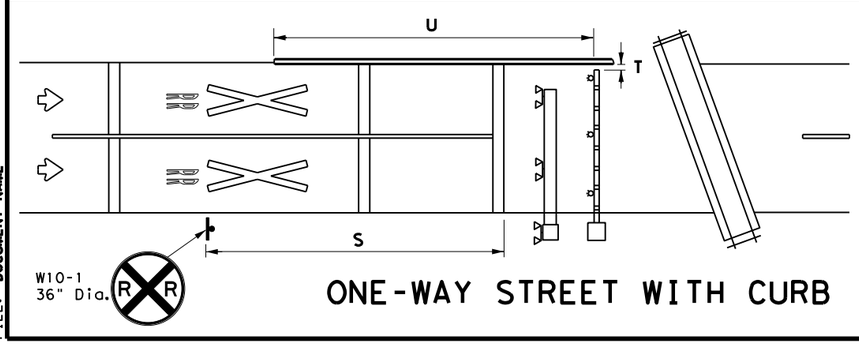
TWO LANES, TWO-WAY

TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

LEGEND	
	Sign
	Object Marker
	Traffic Flow
	Cantilever
	Gate Assembly
	Mast Flasher Pair

GENERAL NOTES

1. Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
2. Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
3. Medians preferred whenever possible to prevent vehicles from driving around gates.
4. Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
5. See SMD standard sheets for sign mounting details.
6. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

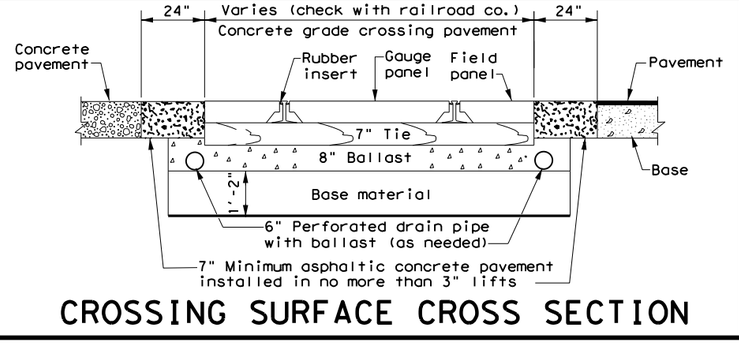


ONE-WAY STREET WITH CURB

NOTES

T: Tip of gate to edge of curb: 1' maximum for Quiet Zone SSM, 90% of traveled way covered by gates for all other locations.

U: Non-traversable curb length from gate: 100' minimum for a Quiet Zone SSM, 10' minimum for all other locations.



CROSSING SURFACE CROSS SECTION

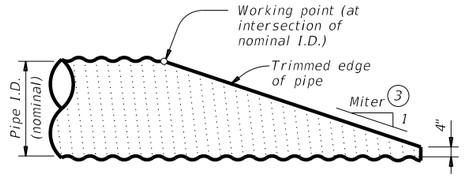
Texas Department of Transportation

Traffic Safety Division Standard

RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT RCD(1)-22

FILE: rcd1-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
2-16	DIST	COUNTY		SHEET NO.
11-22	HOU	MONTGOMERY		82A

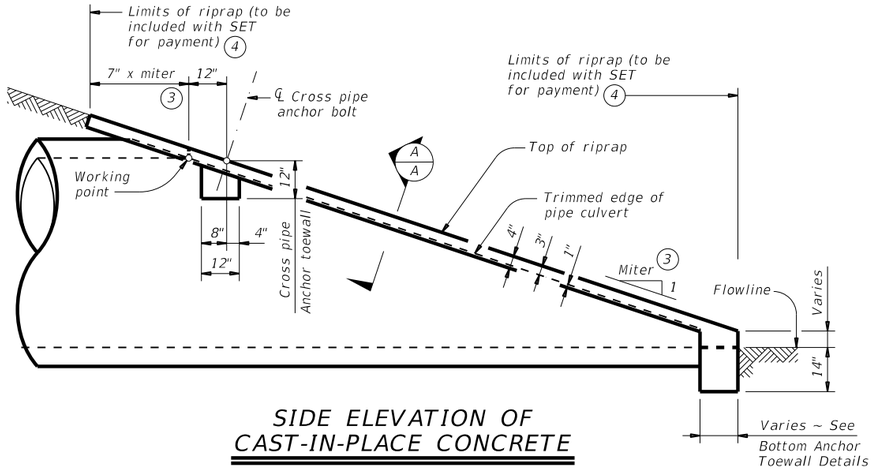
DATE: DATE TIME
FILE: DOCUMENT NAME



NOTE: All pipe runners, 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.

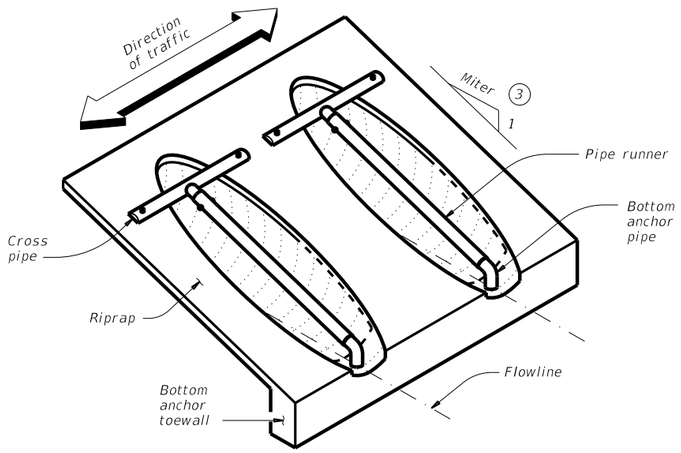
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

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



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

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

(5) 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.

DATE:
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SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		83

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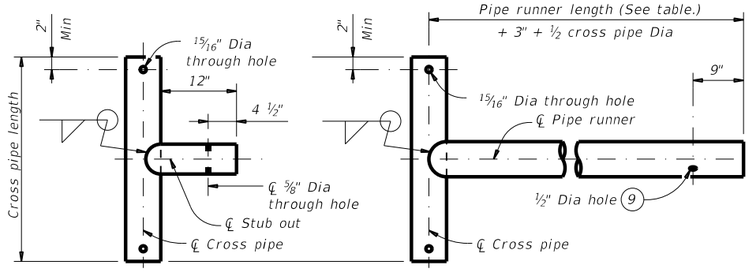
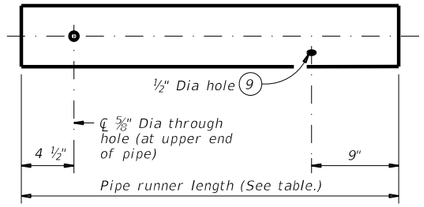


OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS

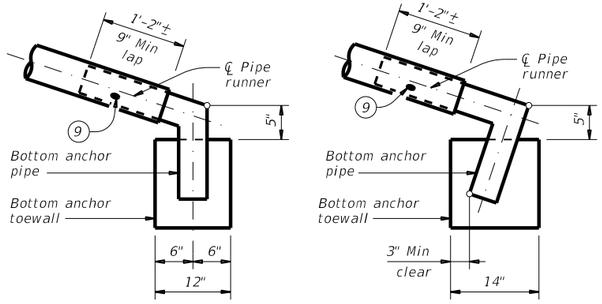


NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

OPTION B1 OPTION B2

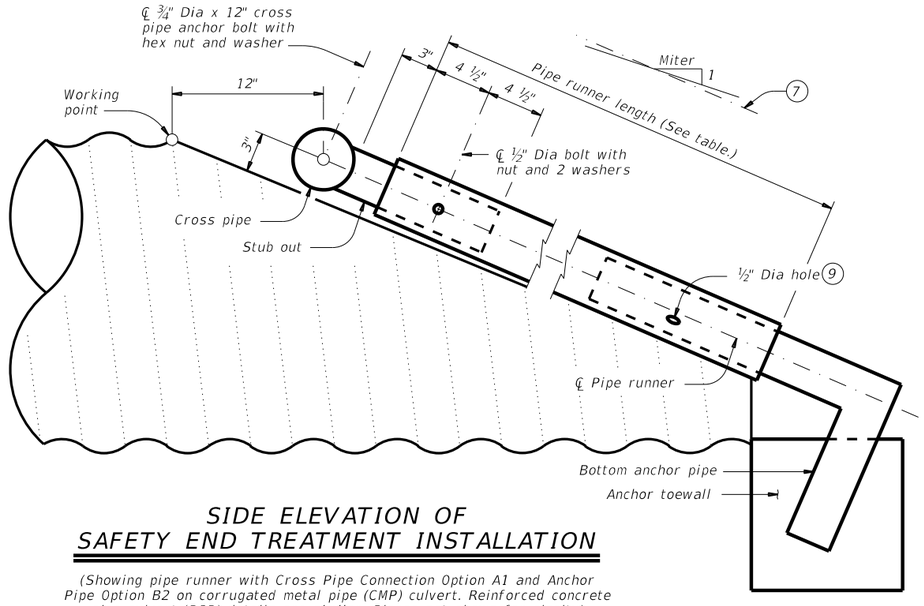
BOTTOM ANCHOR PIPE DETAILS (10)



OPTION B1 OPTION B2

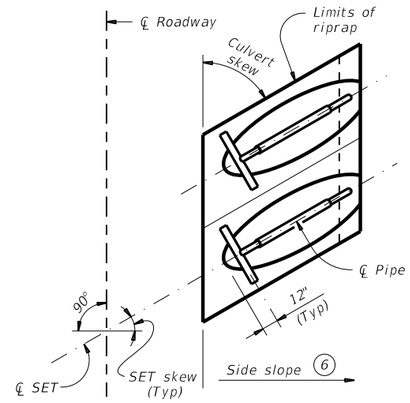
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)

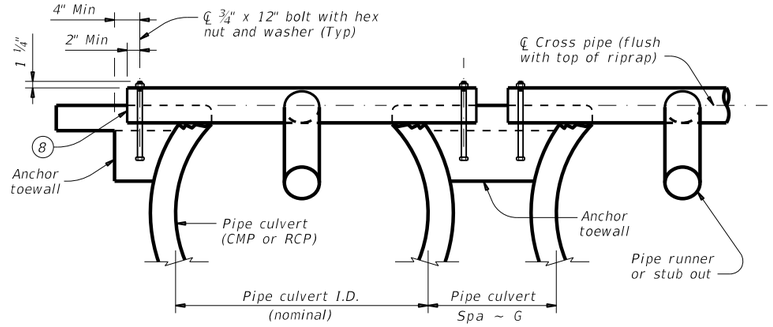


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

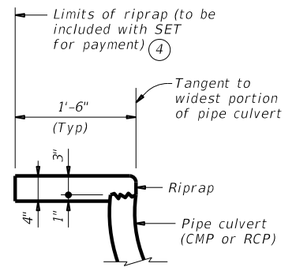
(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)



PLAN OF SKEWED INSTALLATION



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

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

(6) Recommended values of side 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.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) 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.

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, cross pipes, and anchor pipes conforming to 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:

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.

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.

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

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

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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REVISIONS	0912	37	237	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		83A

DATE: 06/27/2023 10:56 AM
FILE: DOCUMENT NAME

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

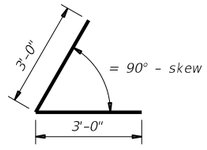
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2–wings) (4)		Estimated Quantities per ft of Toewall (1–toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'–6"	2'–10"	10"	1'–0"	7"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

TABLE OF WINGWALL REINFORCING
(2–wings)

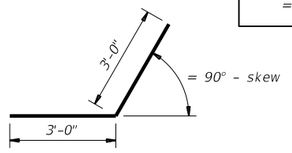
Bar	Size	No.	Spa
D1	#6	~	1'–0"
D2	#6	~	1'–0"
E1	#4	~	1'–0"
F	#4	~	1'–0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'–0"
V	#4	~	1'–0"

TABLE OF TOEWALL REINFORCING

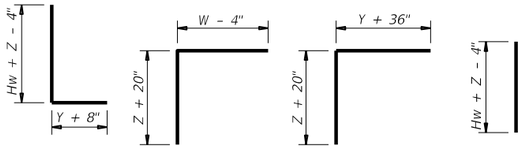
Bar	Size	No.	Spa
J3	#4	~	1'–0"
M2	#4	2	~
E2	#4	~	1'–0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

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

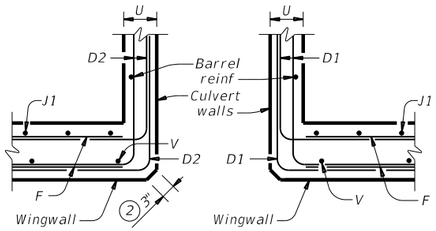
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW–1
= (Hw – 1') (SL) ÷ cosine (θ) for Type PW–2 and Hw ≥ 4'
= (Hw – 0.5') (SL) ÷ cosine (θ) for Type PW–2 and Hw < 4'

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

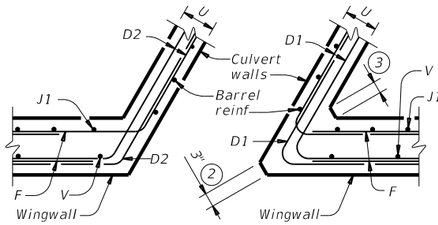
For precast culverts:
Ltw = [(N) (2 U + S) + (N – 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW–1
= (2)(Hw)(Lw) – 6 SF for Type PW–2 and Hw ≥ 4'
= (2)(Hw)(Lw) – 1.5 SF for Type PW–2 and Hw < 4'

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

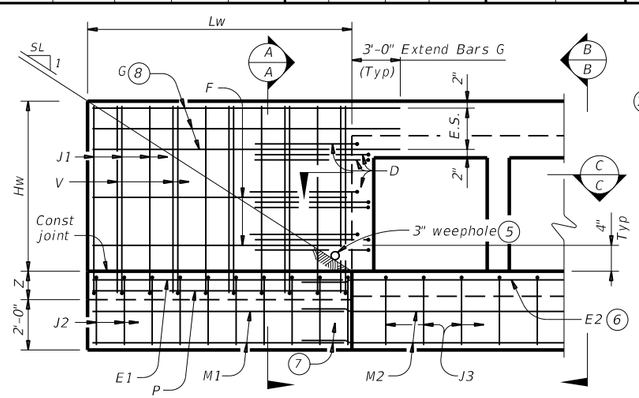
See applicable box culvert standard sheet for S, H, T, and U values.



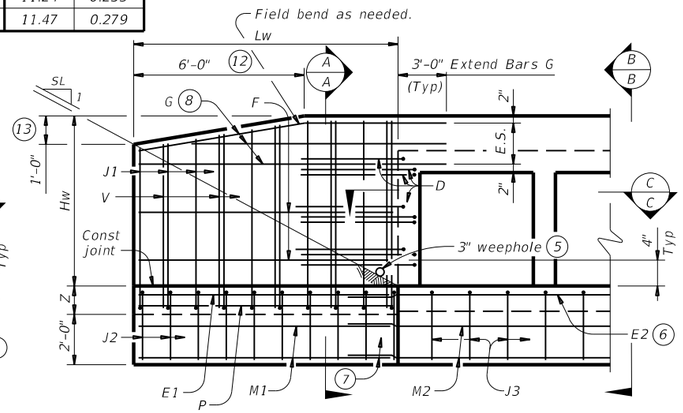
SECTION C-C - PW-1



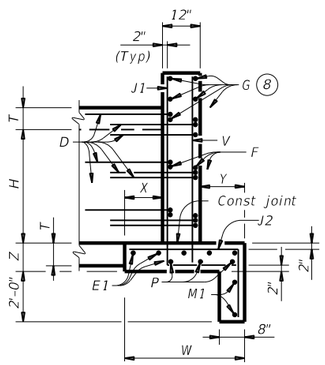
SECTION C-C - PW-2



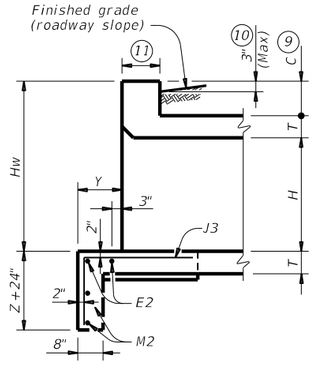
PARTIAL ELEVATION - PW-1



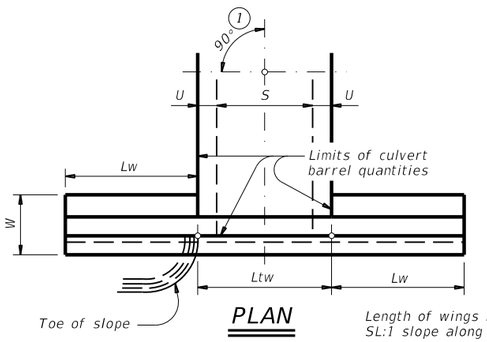
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

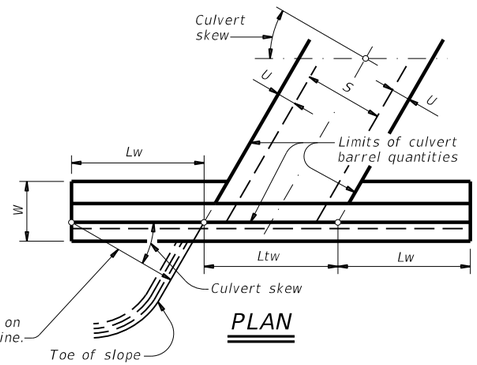


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

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

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

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

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

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

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

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

Texas Department of Transportation
Bridge Division Standard

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

PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		84

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):
0912-37-237

1.2 PROJECT LIMITS:
From: VARIOUS LOCATIONS ON SH 75, SH 242,

To: FM 1484, FM 2432, FM 3083 & FM 830

1.3 PROJECT COORDINATES:
BEGIN: (Lat) VA ,(Long) VA

END: (Lat) VA ,(Long) VA

1.4 TOTAL PROJECT AREA (Acres): 36.85

1.5 TOTAL AREA TO BE DISTURBED (Acres): 31.33

1.6 NATURE OF CONSTRUCTION ACTIVITY:
WIDENING SHOULDERS, ADDING SIGNAGE AND INTERSECTION IMPROVEMENTS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Bibb Soils	95% Bibb, poorly drained, high rate of runoff,
Garner Clay	100% Garner, moderately well drained, high rate of runoff,
Woodville Fine Sandy Loam 1% to 5% slopes	90% Woodville, somewhat poorly drained, very high rate of runoff,
Woodville Fine Sandy Loam, 5% to 12% slopes	95% Bibb, poorly drained, high rate of runoff,
Fetzer Loamy Fine Sand 1% to 5% slopes	95% Bibb, poorly drained, high rate of runoff,

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☒ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement
☒ Grading operations, excavation, and embankment
☒ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☒ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody

* 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

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
06/30/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			85
STATE	STATE DIST.	COUNTY	
TEXAS	HOU	MONTGOMERY	
CONT.	SECT.	JOB	HIGHWAY NO.
0912	37	237	VA

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☒ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☒ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☒ Excess dirt/mud on road removed daily
- ☒ Haul roads dampened for dust control
- ☒ Loaded haul trucks to be covered with tarpaulin
- ☒ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☒ Chemical Management
- ☒ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☒ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

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:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
06/30/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			85A
STATE	STATE DIST.	COUNTY	
TEXAS	HOU	MONTGOMERY	
CONT.	SECT.	JOB	HIGHWAY NO.
0912	37	237	VA

I. STORMWATER POLLUTION PREVENTION

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit is 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. Refer to the TxDOT SWP3 Summary Sheets, SWP3 Binder Template, and Form 2118.

No Additional Comments

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS

United States Army Corps of Engineers (USACE) Permit is required for filling, dredging, excavating or other work in water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and general conditions associated with the following permit(s). If additional work not represented in the plans is required, contact the Engineer immediately.

☒ No United States Army Corps (USACE) Permit Required

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) without a Pre-Construction Notification (PCN). Project specific permit was not issued by USACE, therefore is not in the plan set. The USACE general conditions are in the “General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) with a Pre-Construction Notification (PCN). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set. The USACE general conditions are in the “General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Individual Permit (IP). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set.

☐ Work would be authorized by the United States Army Corps of Engineers (USACE) permit. The project specific permit issued by the USACE will be provided to the contractor.

United States Coast Guard (USCG) Permit is required for projects that involve the construction or modification (including changes to lighting) of a bridge or causeway across a water body determined to be navigable by the United States Coast Guard (USCG) under Section 9 of the Rivers and Harbors Act. If additional work not represented in the plans is required, contact the Engineer immediately.

☒ No United States Coast Guard (USCG) Coordination Required

☐ United States Coast Guard (USCG) Permit

☐ United States Coast Guard (USCG) Exemption

No Additional Comments

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 area and contact the Engineer immediately.

No Additional Comments

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Refer to TxDOT Standard Specifications in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal.

No Additional Comments

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS

If any of the listed species below are observed, cease work in the area, do not disturb species or habitat and contact the Engineer immediately.

The work may not remove active nests (from bridges, structures, or vegetation adjacent to the roadway, etc.) during nesting season (February 15 to October 1). If removal of structures or vegetation is necessary during the nesting season, the Contractor shall conduct a bird survey no more than 3 days in advance of the clearing/demolish start date. All bird surveys shall be conducted by a Field Biologist and adhere to the guidance document “Avoiding Migratory Birds and Handling Potential Violations” found in the TxDOT Environmental Compliance Toolkits at the time of the survey. (See below for Field Biologist and Ornithologist qualifications)

No Additional Comments

Field Biologist, Ornithologist – a field biologist is defined as an individual qualified to perform field investigations, presence/absence surveys and habitat surveys for protected avian species or species of concern. A mandatory bachelor’s degree in biology or a related science is required. At a minimum, the Field Biologist, Ornithologist, shall have completed and reported a minimum of three presence/absence and habitat surveys for protected avian species in the past five years. A minimum of three projects must have been conducted in Texas. Surveys shall have been performed for documentation of species in accordance with a protocol approved by USFWS or TPWD, or following generally accepted methodologies.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

Refer to TxDOT Standard Specifications in the event potentially contaminated materials are observed, such as dead or distressed vegetation, trash disposal areas, drums, canisters, barrels, leaching or seepage of substances, unusual smells or odors, or stained soil, cease work in the area and contact the Engineer immediately.

No Additional Comments

VII. OTHER ENVIRONMENTAL ISSUES

Comments:

DATE: Mar 09, 2023
FILE:

Version 2.2

Texas Department of Transportation

TxDOT Houston District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

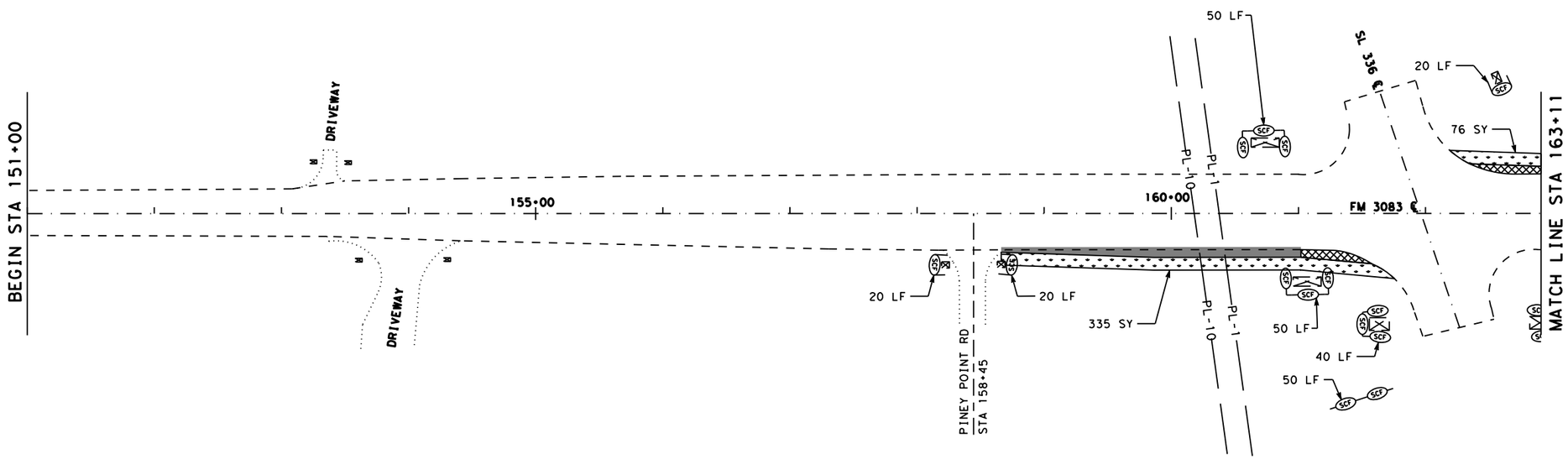
EPIC

FILE: EPIC Sheet.dgn	DN:	CK:	DW:	CK:
© TxDOT: March 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	Various
UPDATED section V. text and added definition (10/17) ADDED USCG and USACE notes in Section VII (04/18)	DIST	COUNTY		SHEET NO.
	HOU	Montgomery		86

- CONTACT BRYAN SCHONE AT (903) 736-6696 WITH TX EASTERN PIPELINE CO. BEFORE STARTING CONSTRUCTION

LEGEND

- - - - EXISTING EDGE OF PAVEMENT
EXISTING SAFETY END TREATMENT
SCF SEDIMENT CONTROL FENCE
BLOCK SOD
PL-1 *EXISTING PROPANE PIPELINE
PL-10 *EXISTING PROPYLENE PIPELINE



SEDIMENT CONTROL FENCE

SHEET TOTAL:	270 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	411 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT S SL 336 E
SWP3
LAYOUT

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		87

DATE: 07/02/2023 10:30 AM
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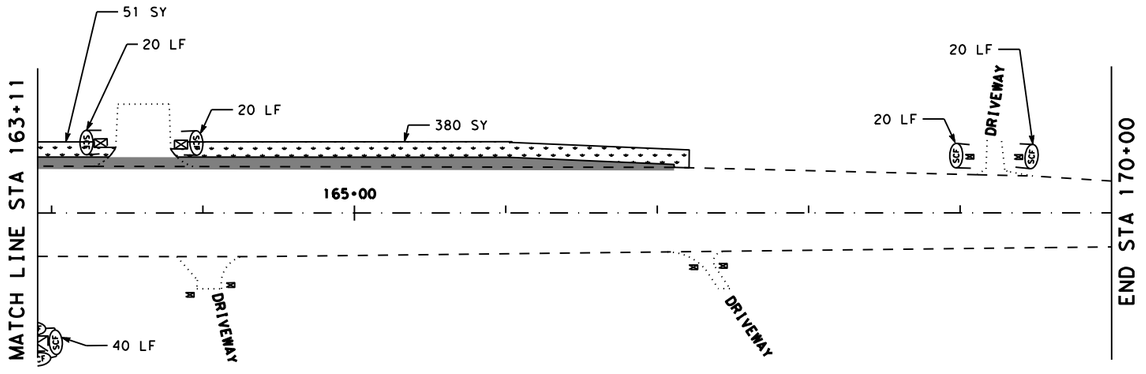

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING SAFETY END TREATMENT
- SCF SEDIMENT CONTROL FENCE
- BLOCK SOD

SEDIMENT CONTROL FENCE

SHEET TOTAL:	120 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	431 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT S SL 336 E
SWP3
LAYOUT

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		88

DATE: 07/02/2023 10:30 AM
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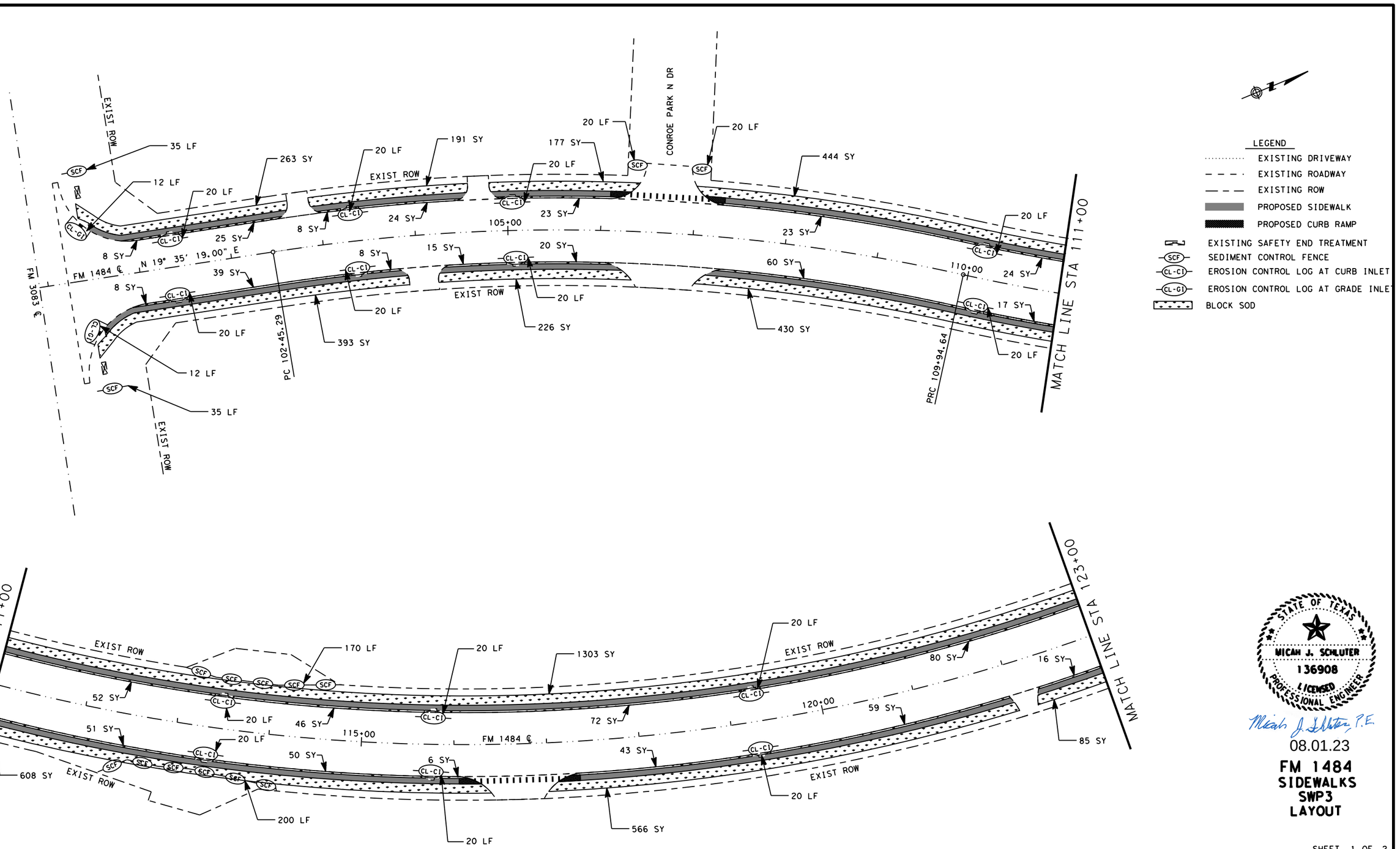

LEGEND

- EXISTING DRIVEWAY
- EXISTING ROADWAY
- EXISTING ROW
- PROPOSED SIDEWALK
- PROPOSED CURB RAMP
- EXISTING SAFETY END TREATMENT
- SCF — SEDIMENT CONTROL FENCE
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT GRADE INLET
- BLOCK SOD

SEDIMENT CONTROL FENCE

SHEET TOTAL:	504 LF
DATE INSTALLED:	
DATE REMOVED:	

EROSION CONTROL LOGS

SHEET TOTAL:	304 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	5463 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 1484
SIDEWALKS
SWP3
LAYOUT

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		89

DATE: 07/02/2023 10:42 AM
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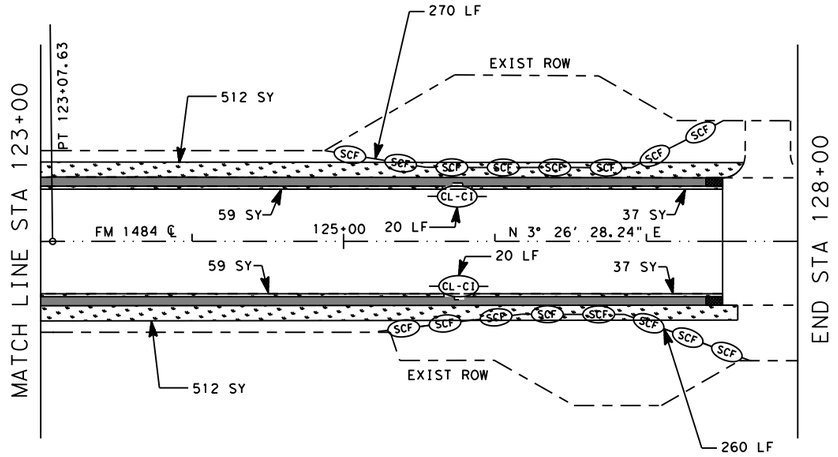

LEGEND

- EXISTING DRIVEWAY
- EXISTING ROADWAY
- EXISTING ROW
- PROPOSED SIDEWALK

- EXISTING SAFETY END TREATMENT
- SCF — SEDIMENT CONTROL FENCE
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT GRADE INLET
- BLOCK SOD

SEDIMENT CONTROL FENCE

SHEET TOTAL:	530 LF
DATE INSTALLED:	
DATE REMOVED:	

EROSION CONTROL LOGS

SHEET TOTAL:	40 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	1216 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 1484
SIDEWALKS
SWP3
LAYOUT

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		90

DATE: 07/02/2023 10:42 AM
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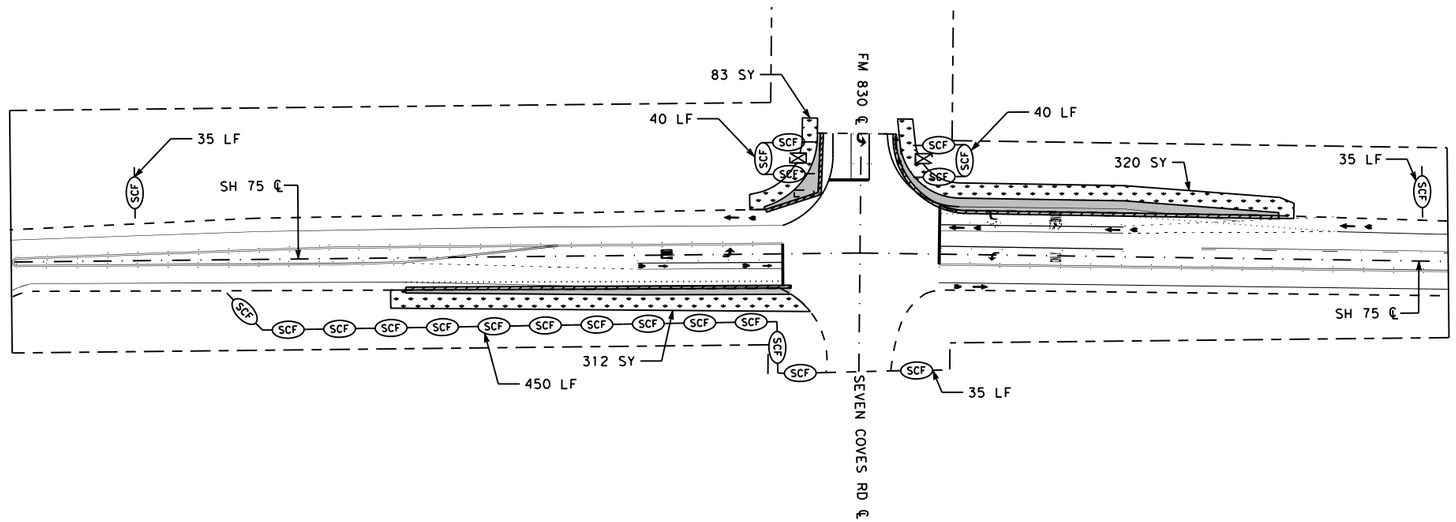

ROADWAY LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING R.O.W.
- EXISTING SAFETY END TREATMENT
- SCF — SEDIMENT CONTROL FENCE
- BLOCK SOD

SEDIMENT CONTROL FENCE

SHEET TOTAL:	635 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	853 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.01.23

SH 75 AT FM 830 SWP3 LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		91

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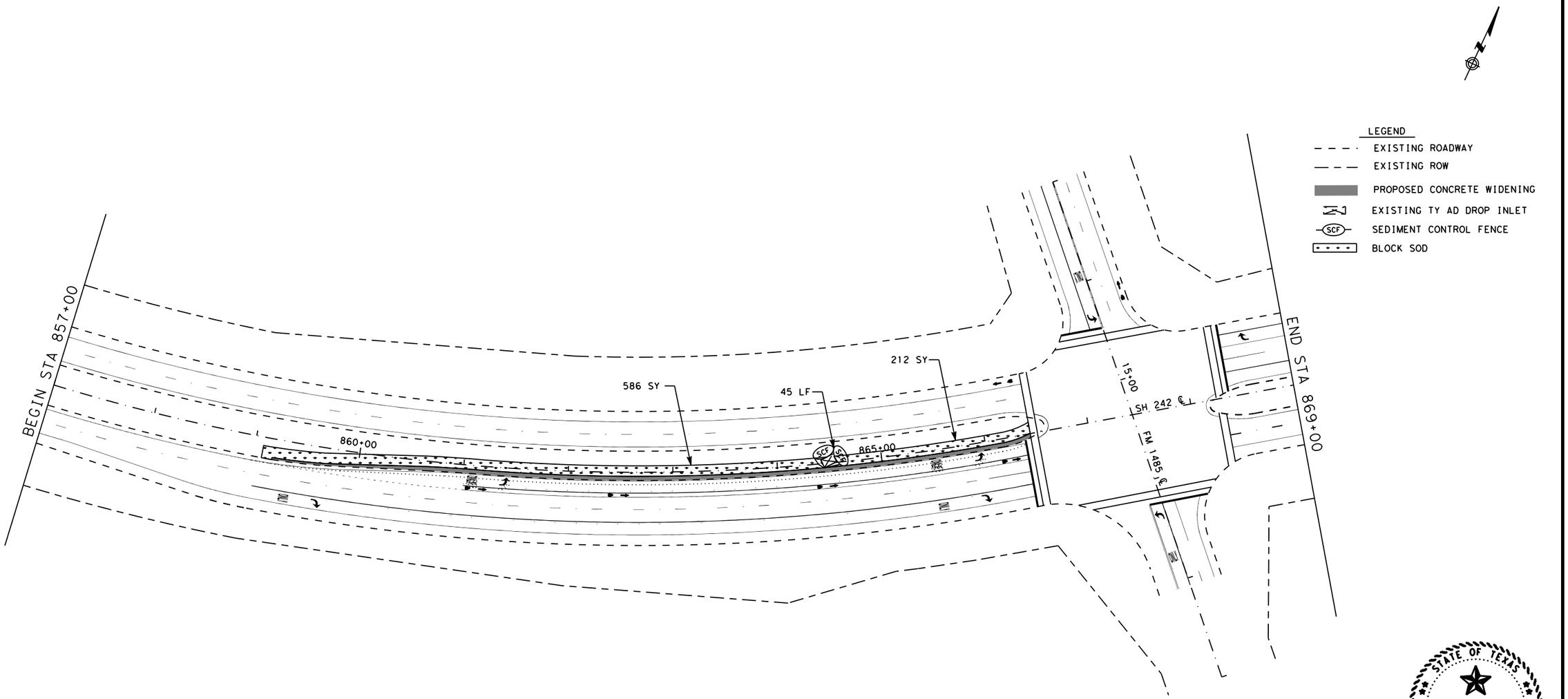


LEGEND

- EXISTING ROADWAY
- EXISTING ROW
- PROPOSED CONCRETE WIDENING
- EXISTING TY AD DROP INLET
- SCF — SEDIMENT CONTROL FENCE
- BLOCK SOD

SEDIMENT CONTROL FENCE	
SHEET TOTAL:	45 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD	
SHEET TOTAL:	798 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

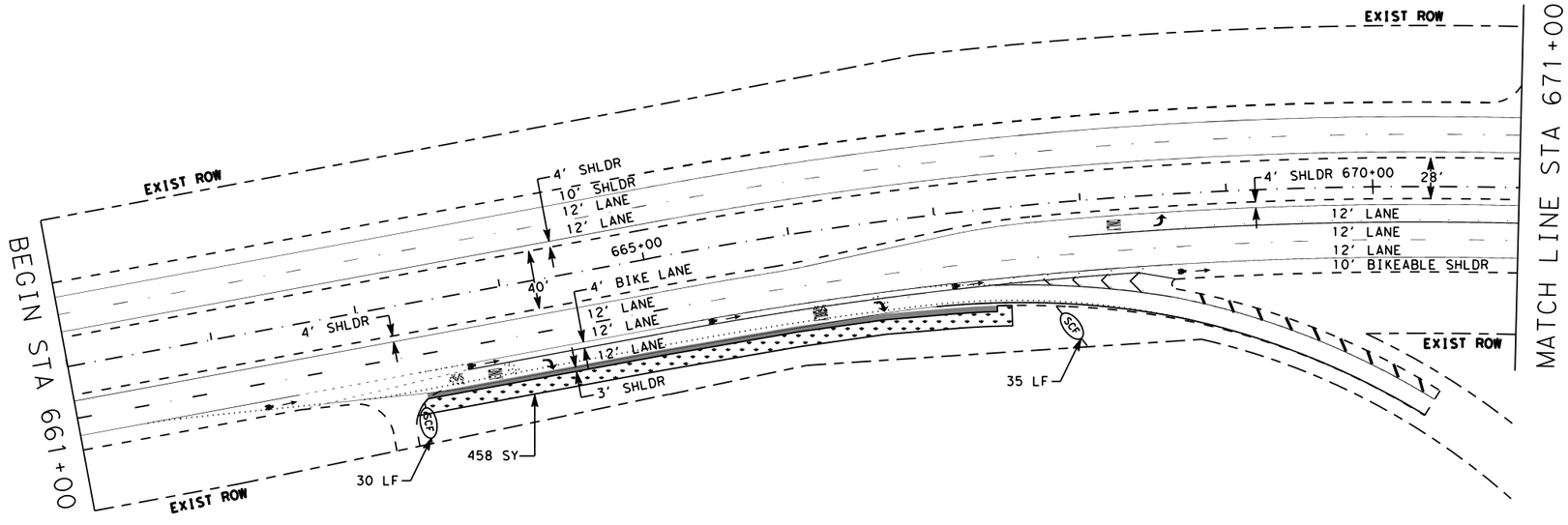
Micah J. Schluter, P.E.
08.01.23

SH 242
AT FM 1485
SWP3
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		92



LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- EXISTING SAFETY END TREATMENT
- SCF — SEDIMENT CONTROL FENCE
- BLOCK SOD

SEDIMENT CONTROL FENCE	
SHEET TOTAL:	65 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD	
SHEET TOTAL:	458 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

SH 242 AT ARTAVIA PKWY & SUMMERSET ESTATES BLVD SWP3 LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		93

DATE: 07/03/2023 09:51 AM
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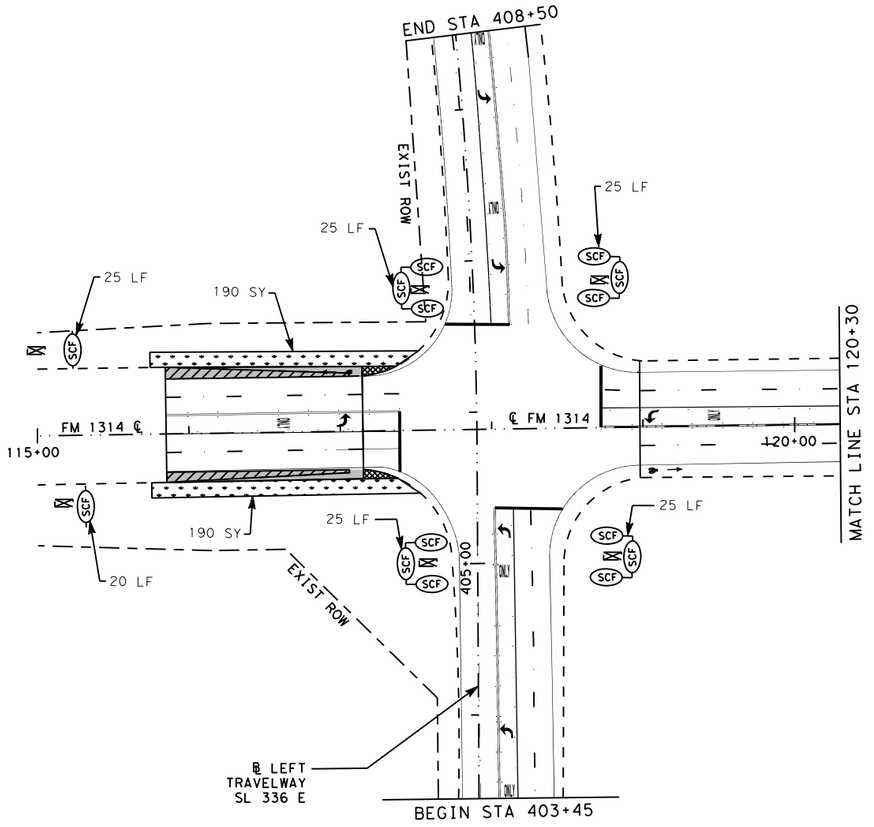


LEGEND

- EXIST EDGE OF PAVEMENT
- EXIST ROW
- EXISTING SAFETY END TREATMENT
- SCF — SEDIMENT CONTROL FENCE
- BLOCK SOD

SEDIMENT CONTROL FENCE

SHEET TOTAL:	145 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	380 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

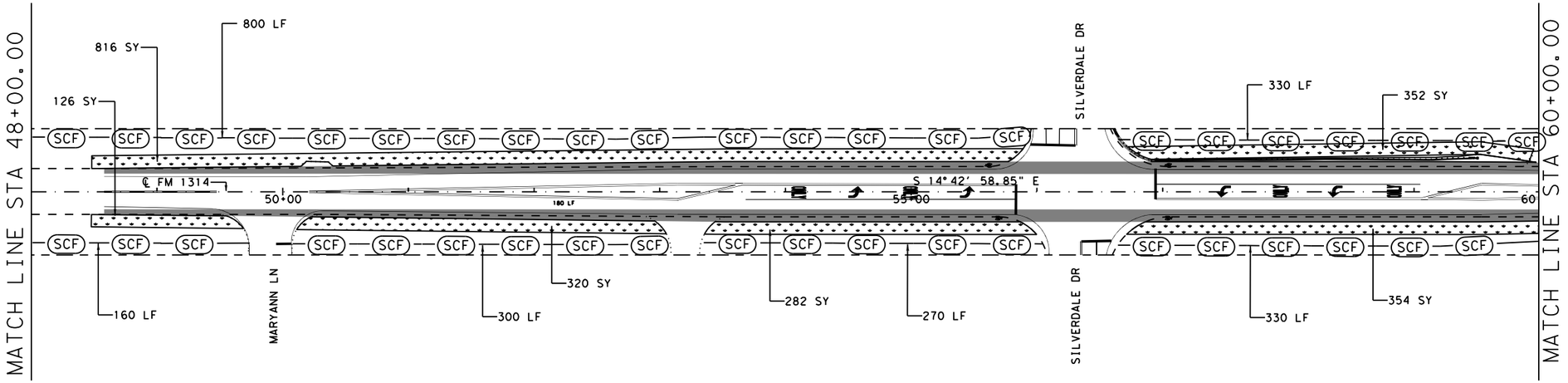
Micah J. Schluter, P.E.
08.01.23

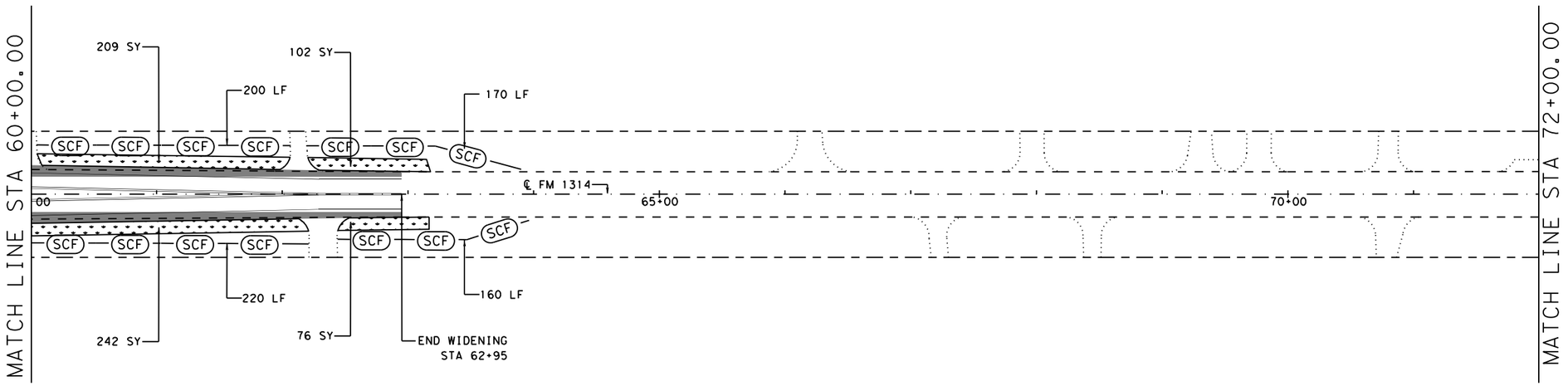
FM 1314
AT S SL 336 E
SWP3
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		94





LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED WIDENING
- BLOCK SOD
- (SCF) – SEDIMENT CONTROL FENCE

SEDIMENT CONTROL FENCE

SHEET TOTAL:	2940 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	2897 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.01.23

FM 1314
AT SILVERDALE DR
SWP3
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		95

DATE: $DATE$2023 $TIME$ AM
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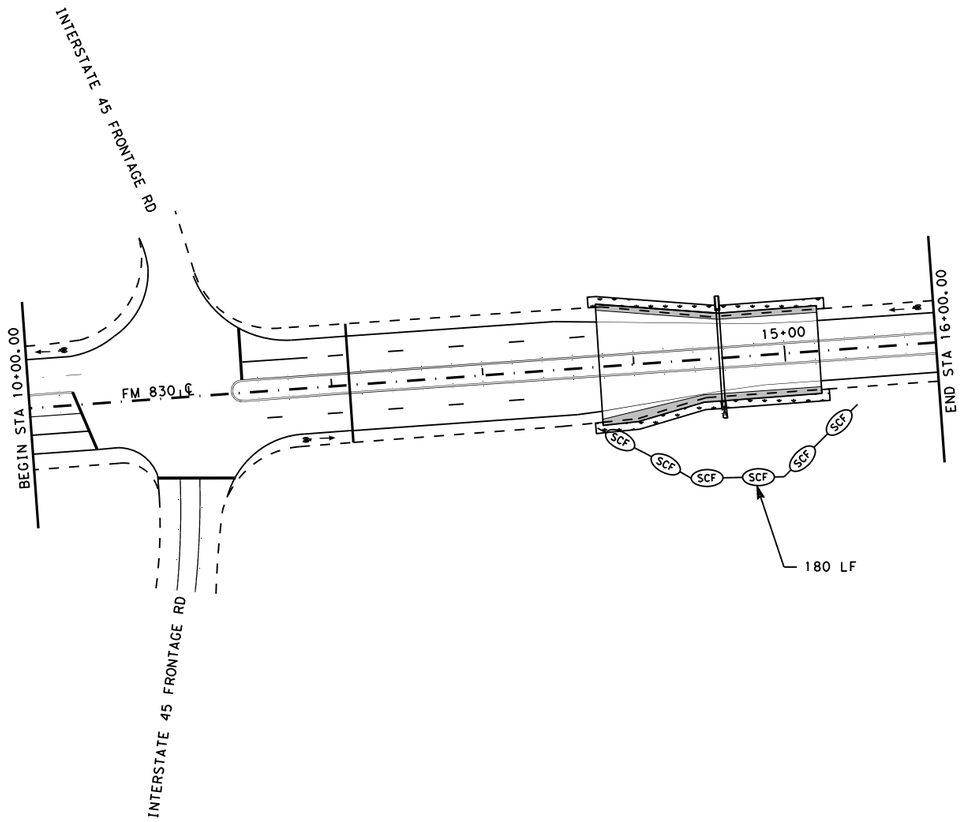


LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED WIDENING
- EXISTING SAFETY END TREATMENT
- SCF — SEDIMENT CONTROL FENCE
- BLOCK SOD

SEDIMENT CONTROL FENCE	
SHEET TOTAL:	180 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD	
SHEET TOTAL:	176 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

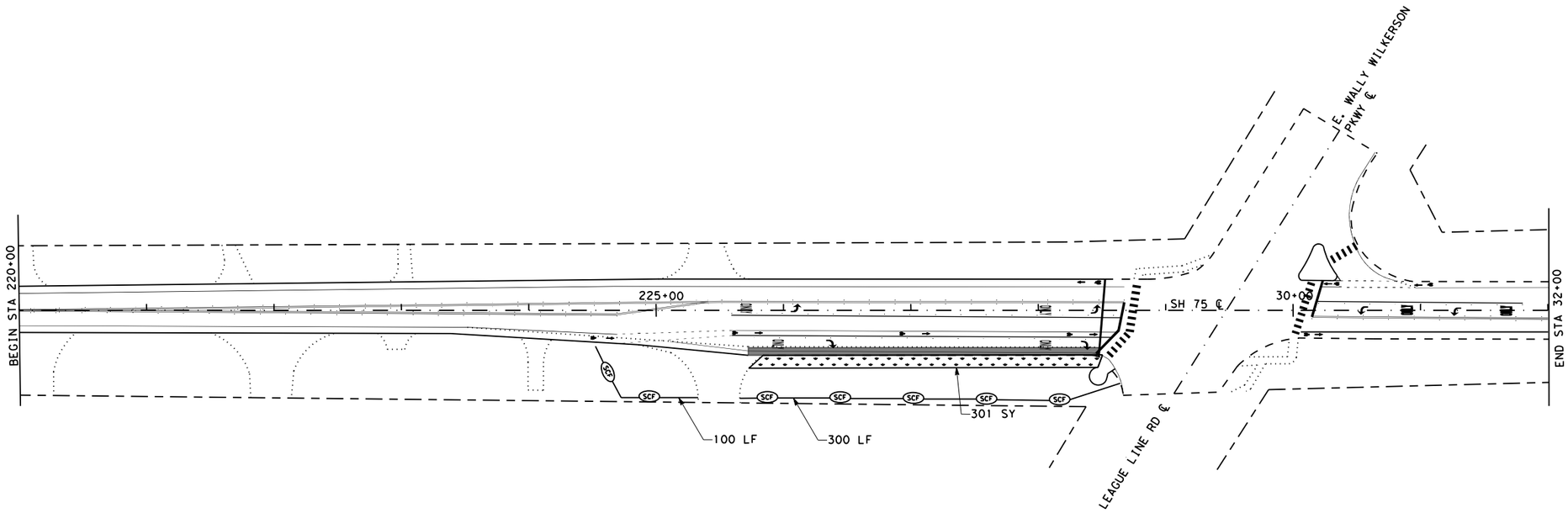
Micah J. Schluter, P.E.
08.01.23

FM 830
AT IH 45 EAST
SWP3
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		96



SEDIMENT CONTROL FENCE

SHEET TOTAL:	400 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	301 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.01.23

SH 75
AT LEAGUE LINE RD
SWP3
LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		97

FULL WIDTH OVERLAY REQUIRED

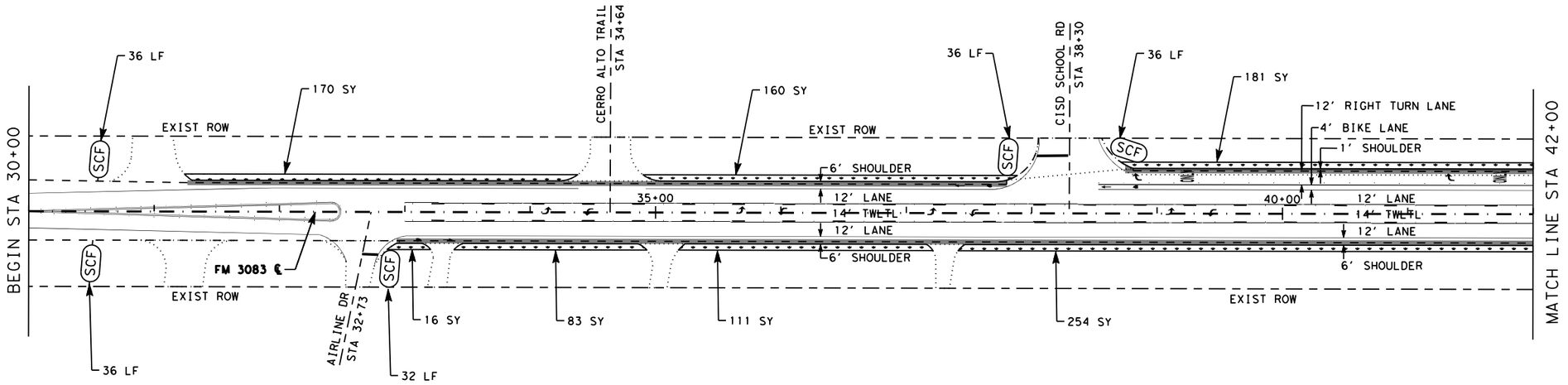
ELIMINATION OF EXISTING PAVEMENT MARKINGS WILL BE SUBSIDIARY TO ASPHALT PAVEMENT PLANING

SAW CUTTING WILL BE SUBSIDIARY TO ASPHALT & BASE REMOVAL

OVERLAY OF EXISTING DRIVEWAYS NOT REQUIRED

LEGEND

- EXIST EDGE OF PAVEMENT
- EXIST ROW
- PROPOSED WIDENING
- (SCF) SEDIMENT CONTROL FENCE
- BLOCK SOD



SEDIMENT CONTROL FENCE

SHEET TOTAL:	176 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	975 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter P.E.
08.01.23

FM 3083
AT CISD SCHOOL RD
SWP3
LAYOUT

SHEET 1 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		98

DATE: 07/02/2023 04:17 PM
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FULL WIDTH OVERLAY REQUIRED

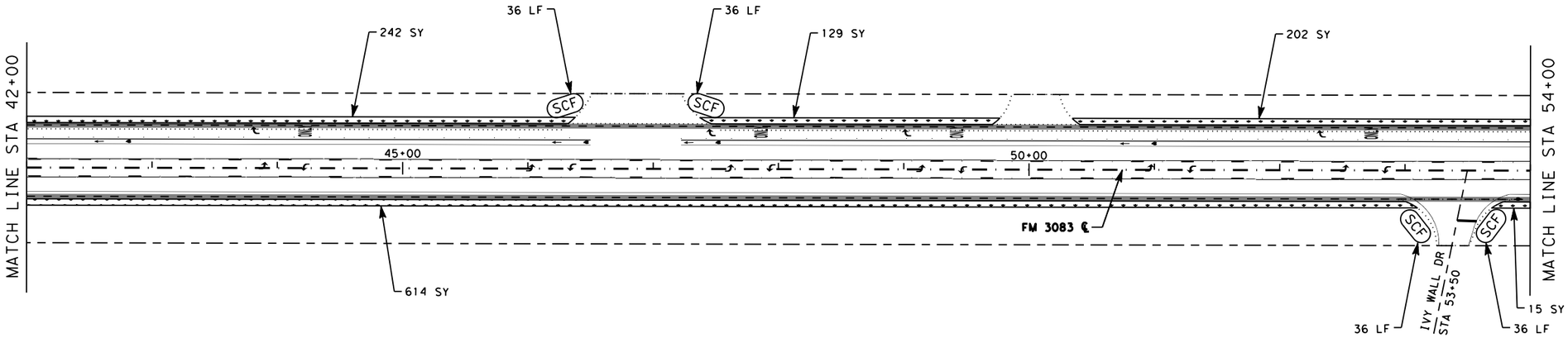
ELIMINATION OF EXISTING PAVEMENT MARKINGS WILL BE SUBSIDIARY TO ASPHALT PAVEMENT PLANING

SAW CUTTING WILL BE SUBSIDIARY TO ASPHALT & BASE REMOVAL

OVERLAY OF EXISTING DRIVEWAYS NOT REQUIRED

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED WIDENING
- (SCF) SEDIMENT CONTROL FENCE
- BLOCK SOD



SEDIMENT CONTROL FENCE

SHEET TOTAL:	144 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	1202 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT CISD SCHOOL RD
SWP3
LAYOUT

SHEET 2 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		99

DATE: 07/02/2023 04:17 PM
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FULL WIDTH OVERLAY REQUIRED

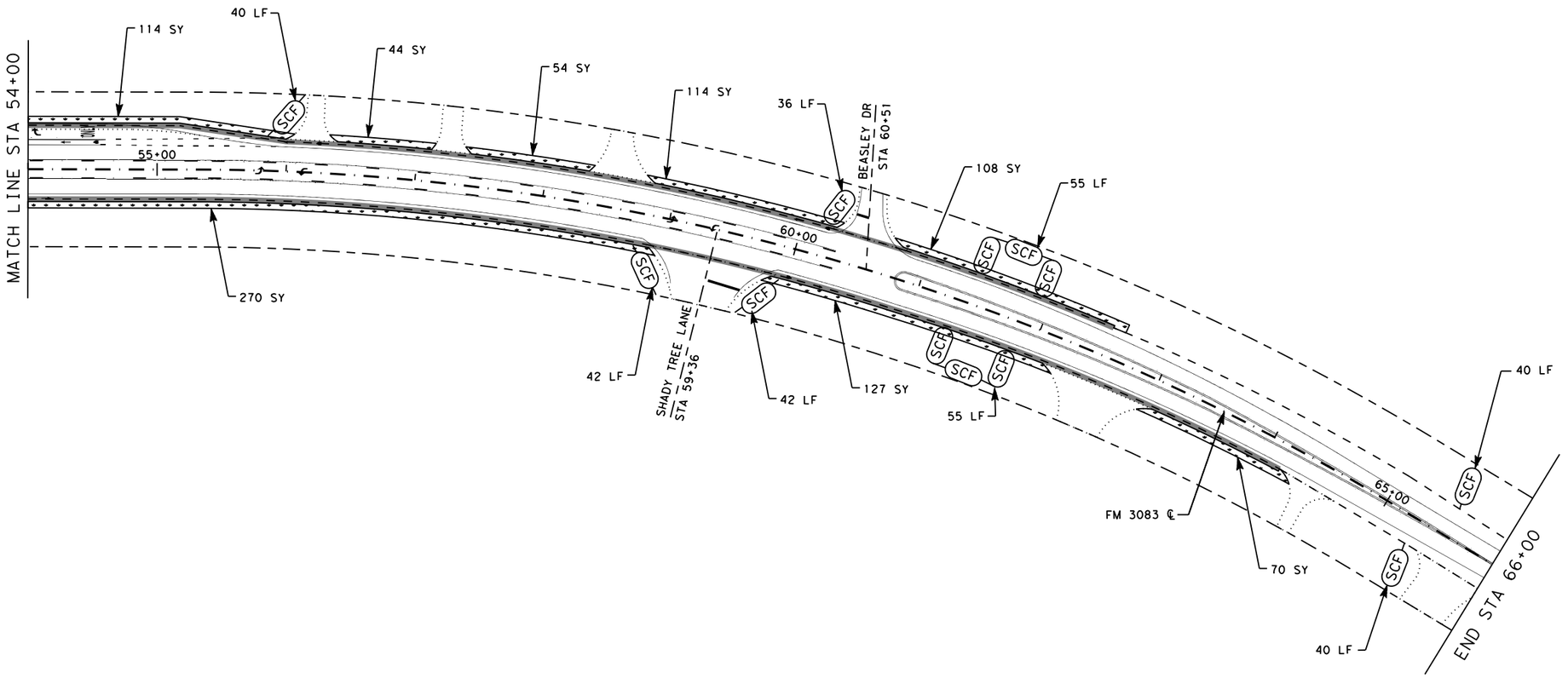
ELIMINATION OF EXISTING PAVEMENT MARKINGS WILL
BE SUBSIDIARY TO ASPHALT PAVEMENT PLANING

SAW CUTTING WILL BE SUBSIDIARY TO
ASPHALT & BASE REMOVAL

OVERLAY OF EXISTING DRIVEWAYS NOT REQUIRED

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING ROW
- PROPOSED WIDENING
- (SCF) SEDIMENT CONTROL FENCE
- BLOCK SOD



SEDIMENT CONTROL FENCE

SHEET TOTAL:	350 LF
DATE INSTALLED:	
DATE REMOVED:	

BLOCK SOD

SHEET TOTAL:	901 SY
DATE INSTALLED:	

0 50 100
SCALE IN FEET

STATE OF TEXAS
MICAH J. SCHLUTER
136908
LICENSED
PROFESSIONAL ENGINEER

Micah J. Schluter, P.E.
08.01.23

FM 3083
AT CISD SCHOOL RD
SWP3
LAYOUT

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	37	237	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	MONTGOMERY		100

DATE: 07/02/2023 04:17 PM
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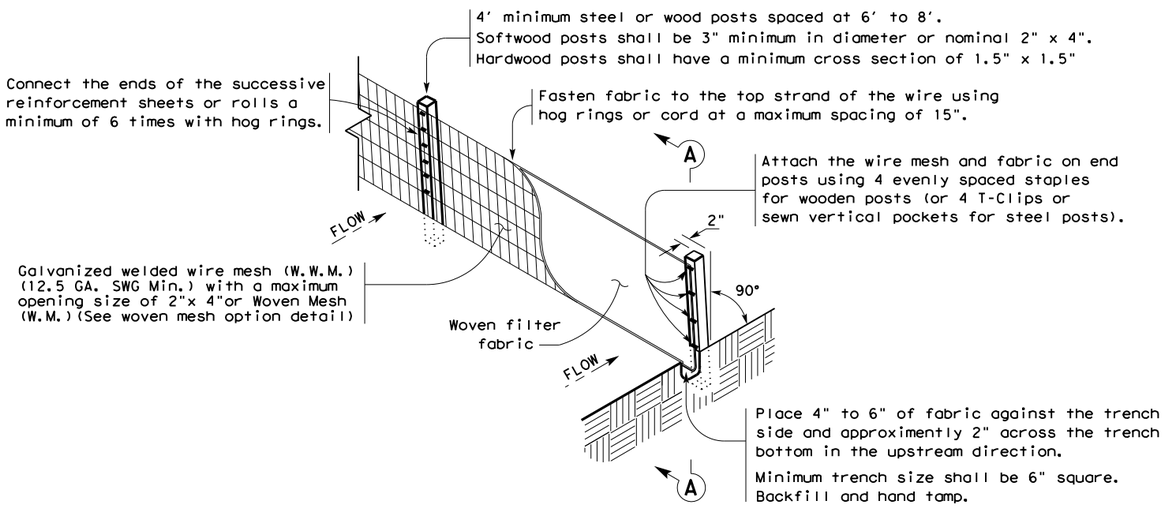
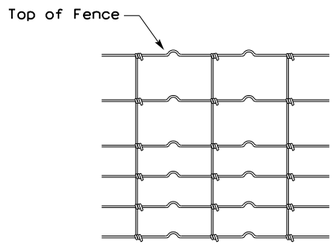
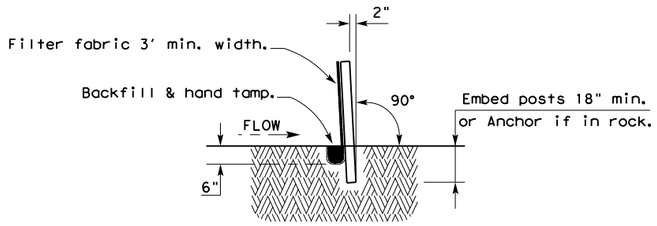


TEMPORARY SEDIMENT CONTROL FENCE

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

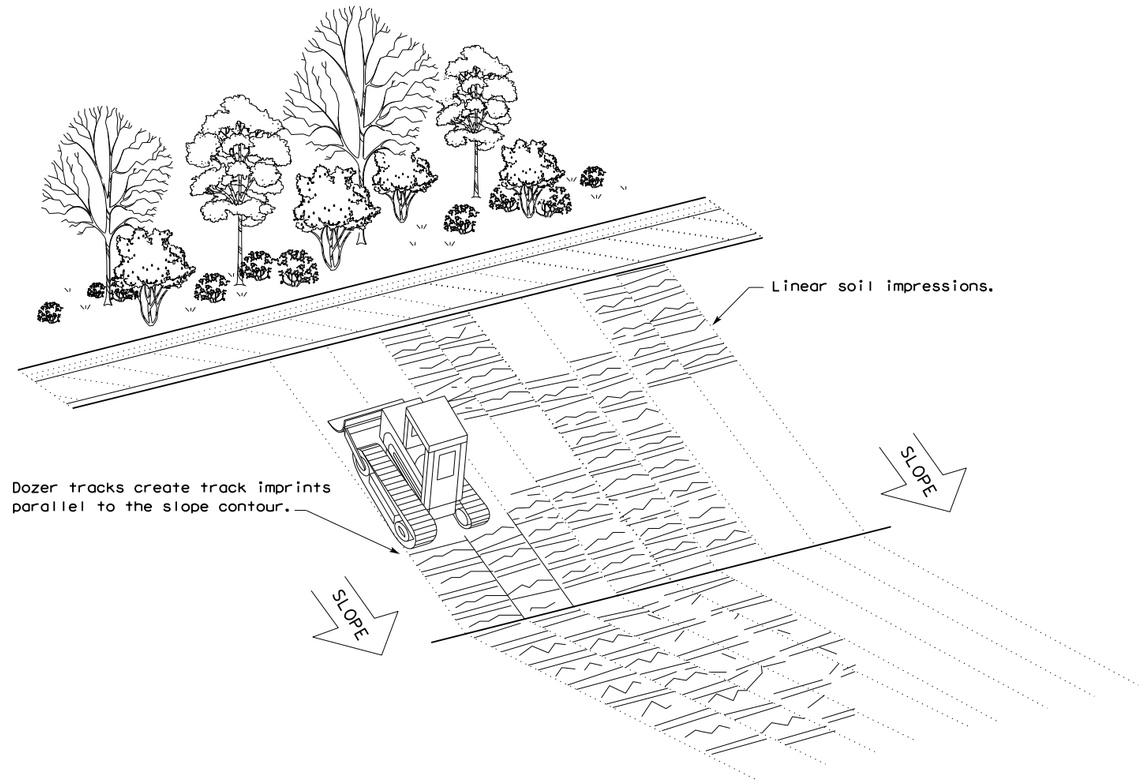
Sediment Control Fence

SCF

DATE
FILE

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

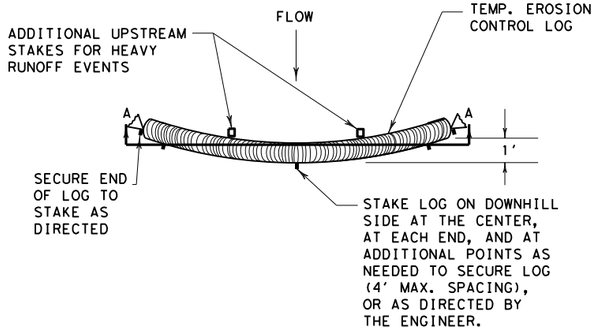
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

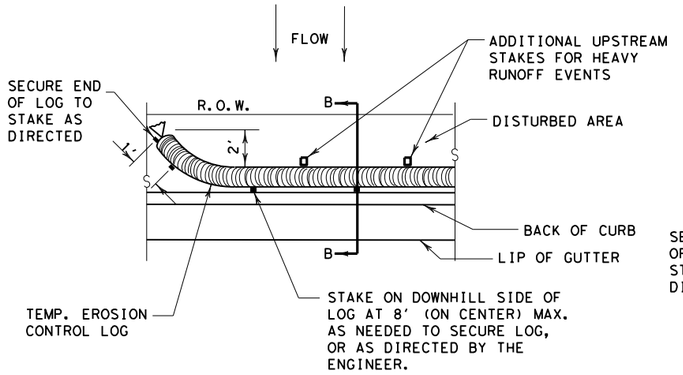
FENCE & VERTICAL TRACKING

EC(1)-16

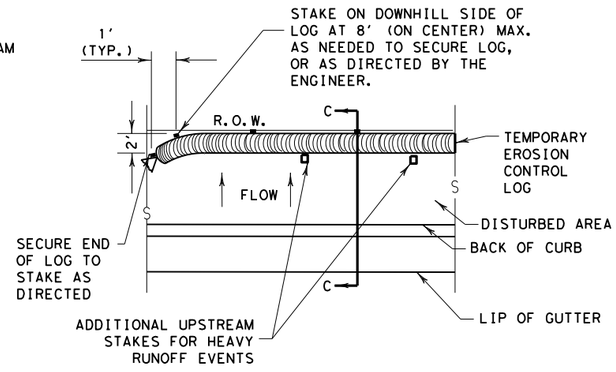
FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0912	37	237		VARIOUS	
	DIST	COUNTY			SHEET NO.	
	HOU	MONTGOMERY			101	



PLAN VIEW



PLAN VIEW



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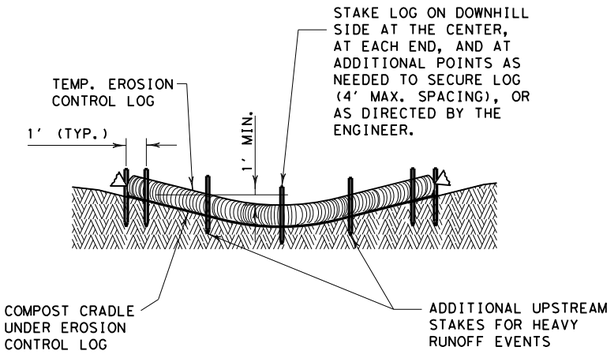
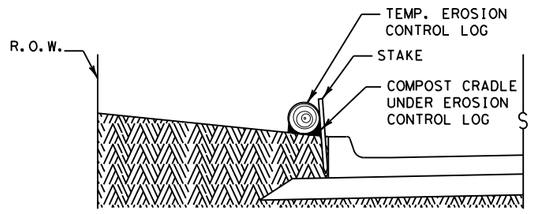


SECTION A-A

EROSION CONTROL LOG DAM

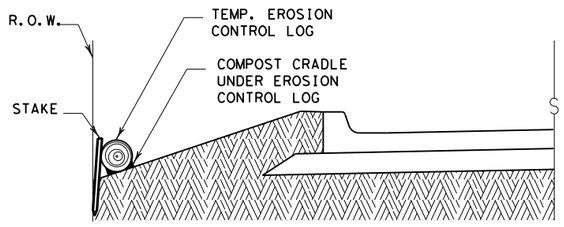
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

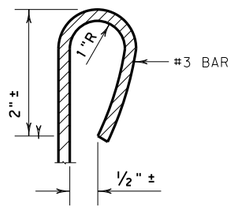
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

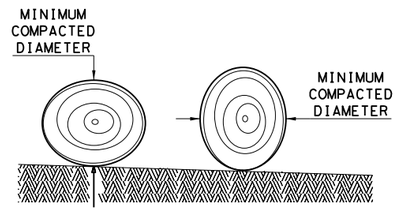
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

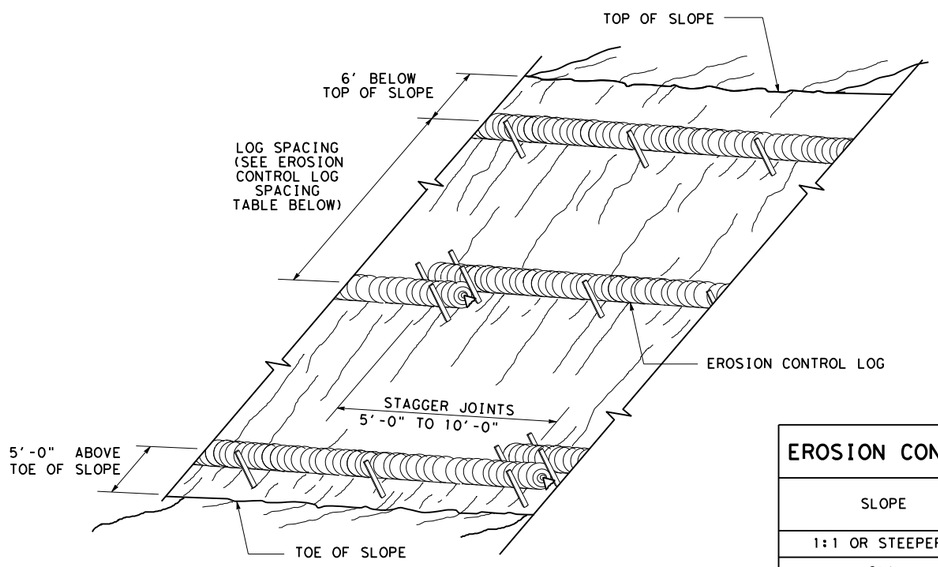
EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0912	37	237		VARIOUS		
	DIST	COUNTY				SHEET NO.	
	HOU	MONTGOMERY				102	

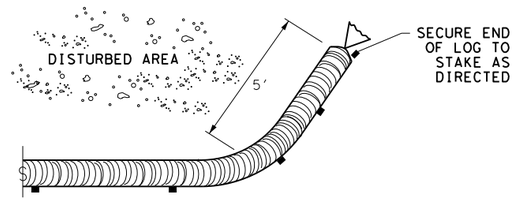
DATE: $DATE$
FILE: $FILE$

DATE: $DATE$
FILE: $FILE$



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

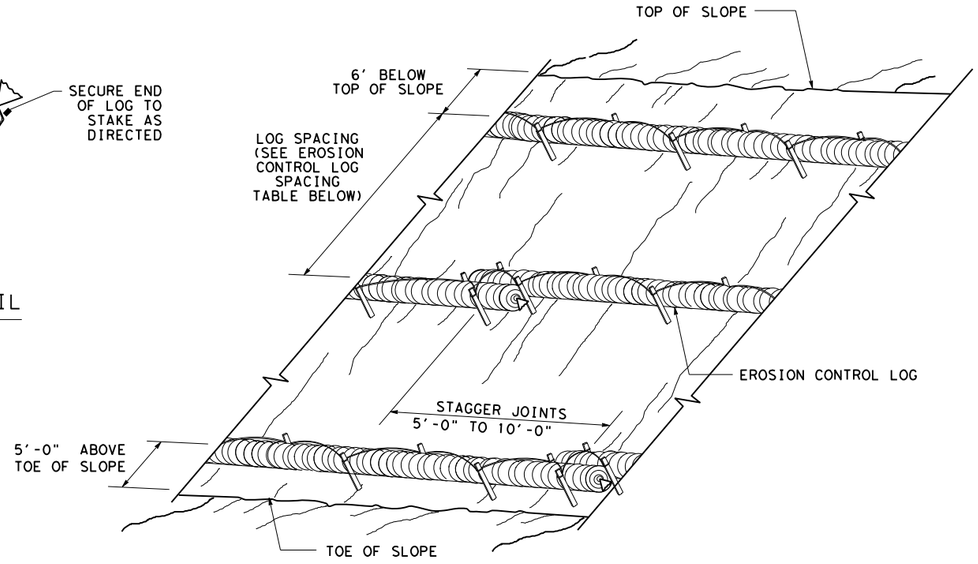
CL-SST



END SECTION RAP DETAIL

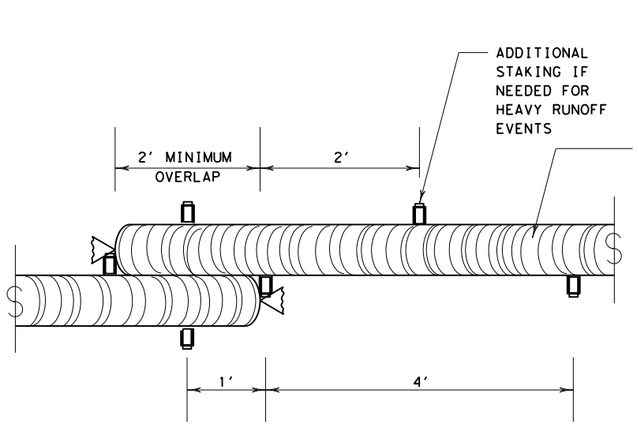
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

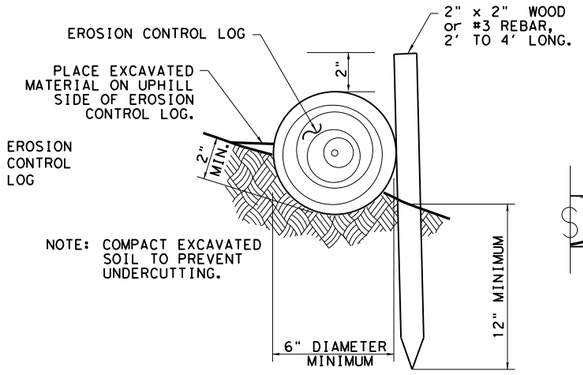
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

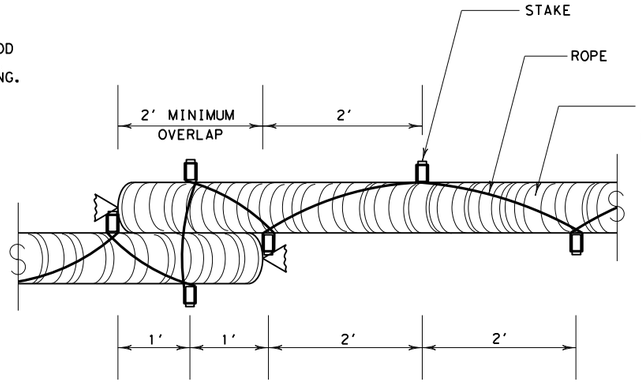


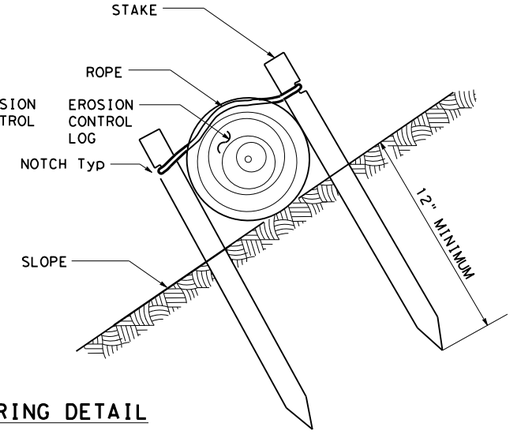


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

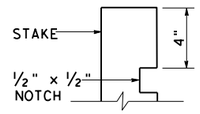
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

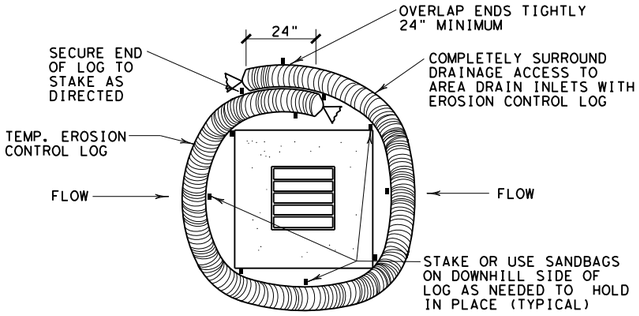
SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

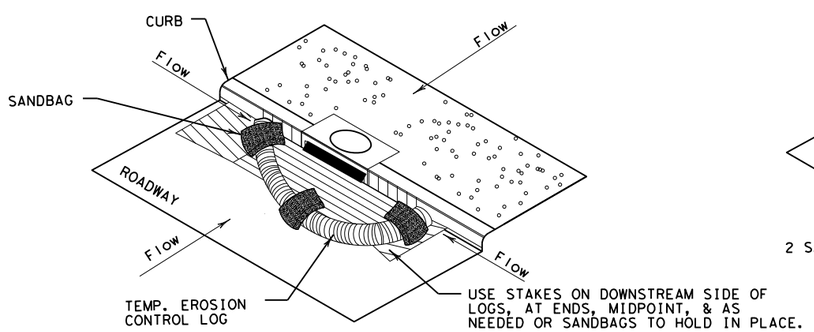
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0912	37	237		VARIOUS	
	DIST	COUNTY				SHEET NO.
	HOU	MONTGOMERY				103



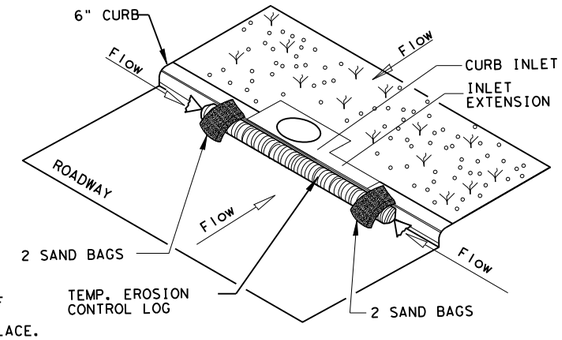
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

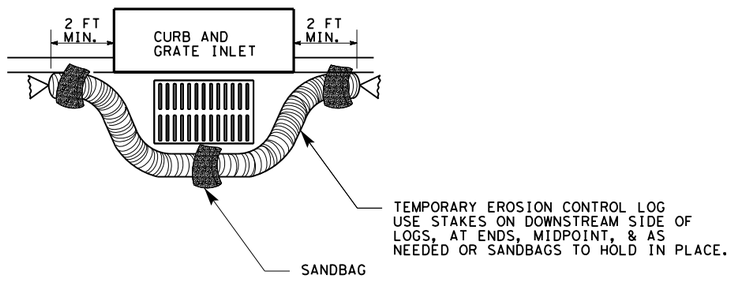
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

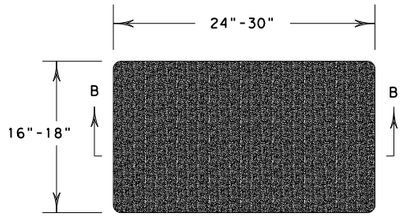
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	237	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		104

DATE: $DATE$
FILE: $FILE$

TYPE OF WORK — ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK

SODDING	PERMANENT SEEDING	TEMPORARY SEEDING	Reference Item 161, 162, 164, 166, 168 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Use latest Houston District, Special Provisions for those items indicated.		
	✓		**161-6017 COMPOST MANUF TOPSOIL (BIP)(4") SY**	APPLICATION RATE Item 161.2.1. Compost Manufactured Topsoil (CMT)	Item 161.2. Materials. Submit quality control (QC) documentation to the Engineer. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days per STA requirements). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.
✓			**162-6002 BLOCK SODDING SY**	GRASS SPECIES Item 162.2. Materials. Common Bermuda (Cynodon Dactylon)	Item 162.2.1. Block Sod. Use block palletized or roll type sod. **REMOVE PLASTIC BACKING FROM ROLL TYPE SOD.** Place sod within 48 hours of delivery to site. No exceptions. Place sod with joints alternating on each row to prevent continuous joint lines. Peg sod as needed with wood pegs to hold sod in place. Pegging sod is subsidiary to Item 162.
	✓		**164-6066 DRILL SEEDING(PERM)(WARM OR COOL) SY** Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH / SEED MIX March, April, May, June, July, August, September, October: Hulled - Bermudagrass (Cynodon dactylon) - 40.0 lbs PLS/acre Foxtail Millet (Setaria italica) - 34.0 lbs PLS/acre Green Sprangletop (Leptochloa dubia) - 4.0 lbs PLS/acre Sideoats Grama (Bouteloua curtipendula) - 3.2 lbs PLS/acre Little Bluestem (Schizachyrium scoparium) - 1.4 lbs PLS/acre November, December, January, February,: Unhulled - Bermudagrass (Cynodon dactylon) - 40.0 lbs PLS/acre Oats (Avena sativa) - 72.0 lbs PLS/acre Green Sprangletop (Leptochloa dubia) - 4.0 lbs PLS/acre Sideoats Grama (Bouteloua curtipendula) - 3.2 lbs PLS/acre Little Bluestem (Schizachyrium scoparium) - 1.4 lbs PLS/acre	PLS (Pure Live Seed) Provide documentation of PLS requirements per Item 164.2.1. CONSTRUCTION. Cultivate the area to a depth of 4 inches before placing the seed unless otherwise directed. When performing permanent seeding after an established temporary seeding, cultivate the seedbed to a depth of 4 inches or mow the area before placement of the permanent seed. Plant the seed and place the straw or hay mulch after the area has been completed to lines and grades as shown on the plans. Drill Seeding. Plant seed or seed mixture uniformly over the area shown on the plans at a depth of 1/4 to 1/3 inch using a cultipacker(turfgrass) type seeder. Plant seed along the contour of the slopes. Use broadcast seeding method where site conditions prevent drill seeding method. Broadcast Seeding. Distribute the dry seed or dry seed mixture uniformly over the areas shown on the plans using hand or mechanical distribution on top of soil.
	✓		**164-6052 BROADCAST SEED(PERM)(SPECIAL MIX) SY** Item 164.1. Description Provide and install seeding as shown on District Standard		
		✓	**164-6051 DRILL SEED(TEMP)(WARM OR COOL) SY** Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH / SEED MIX March, April, May, June, July, August, September, October: Foxtail Millet (Setaria italica) - 34.0 lbs PLS/acre November, December, January, February,: Oats (Avena sativa - 72.0 lbs PLS/acre	
		✓	**164-6009 BROADCAST SEED(TEMP)(WARM) SY** Item 164.1. Description Provide and install seeding as shown on District Standard		
	✓	✓	**162-6003 STRAW OR HAY MULCH SY**	APPLICATION RATE Immediately after planting the seed or seed mixture, apply straw or hay mulch uniformly over the seeded area. Apply straw or hay mulch at 2 tons per acre. Use tacking agent with straw or hay mulch as described on this sheet.	Use straw or hay mulch in conformance with Article 162.2.5, "Mulch." Use biodegradable tacking agents only applied at a rate in accordance with manufacturer's recommendations. Use the following products or an approved equal(see note this sheet): Conweb/Contac Guar Gum, Profile Products Corporation, (307) 655-9565, Ramtec/Procol/Viscol Guar Gum, Ramtec Corporation, (800) 366-1180
✓	✓	✓	**166-6001 FERTILIZER AC** Item 166.2. Materials Use fertilizer as shown on District Standard	APPLICATION RATE Deliver and evenly distribute fertilizer at a rate of 4000 lbs/acre.	Use a **NON-CHEMICAL** fertilizer which meets all the following criteria: (1) BRAND NAME must be registered with the Texas State Chemist as a commercial fertilizer. (2) Meets USEPA guidelines for unrestricted use. (3) Derived from biological sources such as, but not limited to: sewage sludge, manures, vegetation, etc. (4) In granular form and essentially dust free. Submit proof of registration and nutrient source to Engineer. Use the following products or an approved equal(see note this sheet): Sigma, SIGMA AgriScience, 281-851-6749 Sustanite-standard grade, Automation Nation, Inc., 713-675-4999 Milorganite, MMSD, 800-287-9645 Agricultural Organic P/L, Ag Org, INC., 713-523-4396
✓	✓	✓	**168-6001 VEGETATIVE WATERING MG**	APPLICATION RATE Item 168.3 Construction. 6000 gallons/acre per working day x 20 consecutive working days = 120,000 gallons total/acre	Begin watering immediately after installation of seed or sod. Replace, fertilize, and water any seed or sod in poor condition due to the failure to apply the specified amount of water within the time allowed at no expense to the Department.

SEQUENCE OF WORK

BLOCK SOD	PERMANENT SEEDING	TEMPORARY SEEDING
1. FERTILIZER 2. CULTIVATE SOIL (ITEM 162.3) 3. SOD 4. VEGETATIVE WATERING	1. FERTILIZER 2. COMPOST MANUFACTURED TOPSOIL 3. CULTIVATE SOIL (ITEMS 164.3 AND 161.3.1) 4. PERMANENT SEEDING 5. STRAW OR HAY MULCH 6. VEGETATIVE WATERING	1. FERTILIZER 2. CULTIVATE SOIL (PER ITEM 164.3) 3. TEMPORARY SEEDING 4. STRAW OR HAY MULCH 5. VEGETATIVE WATERING

Texas Department of Transportation

HOUSTON DISTRICT

FERTILIZER, SEED, SOD, STRAW, COMPOST, AND WATER

FSSSCW-15

REVISIONS
10/2014 UPDATED TO 2014 SPECS 3/2015 MINOR CORRECTIONS 3/2023 ADDED SHEET ABBREVIATION

FILE: OCT 2014

ORIGINAL:

FED DIV	STATE	PROJECT NUMBER			SHEET
6	TEXAS				105
DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
12	MONTGOMERY	0912	37	237	VARIOUS