INDEX TO SHEETS

SEE SHEET NO. 2

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY
6	TEXAS	F2022(876)			VARIOUS
STATE DISTRICT	COUNTY	CONTROL	SECTION	JOB	SHEET NO.
HOU	HARRIS	0912	72	650	1

DESIGN SPEED: VARIOUS
FUNCTIONAL CLASS: VARIOUS
ADT: VARIOUS

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

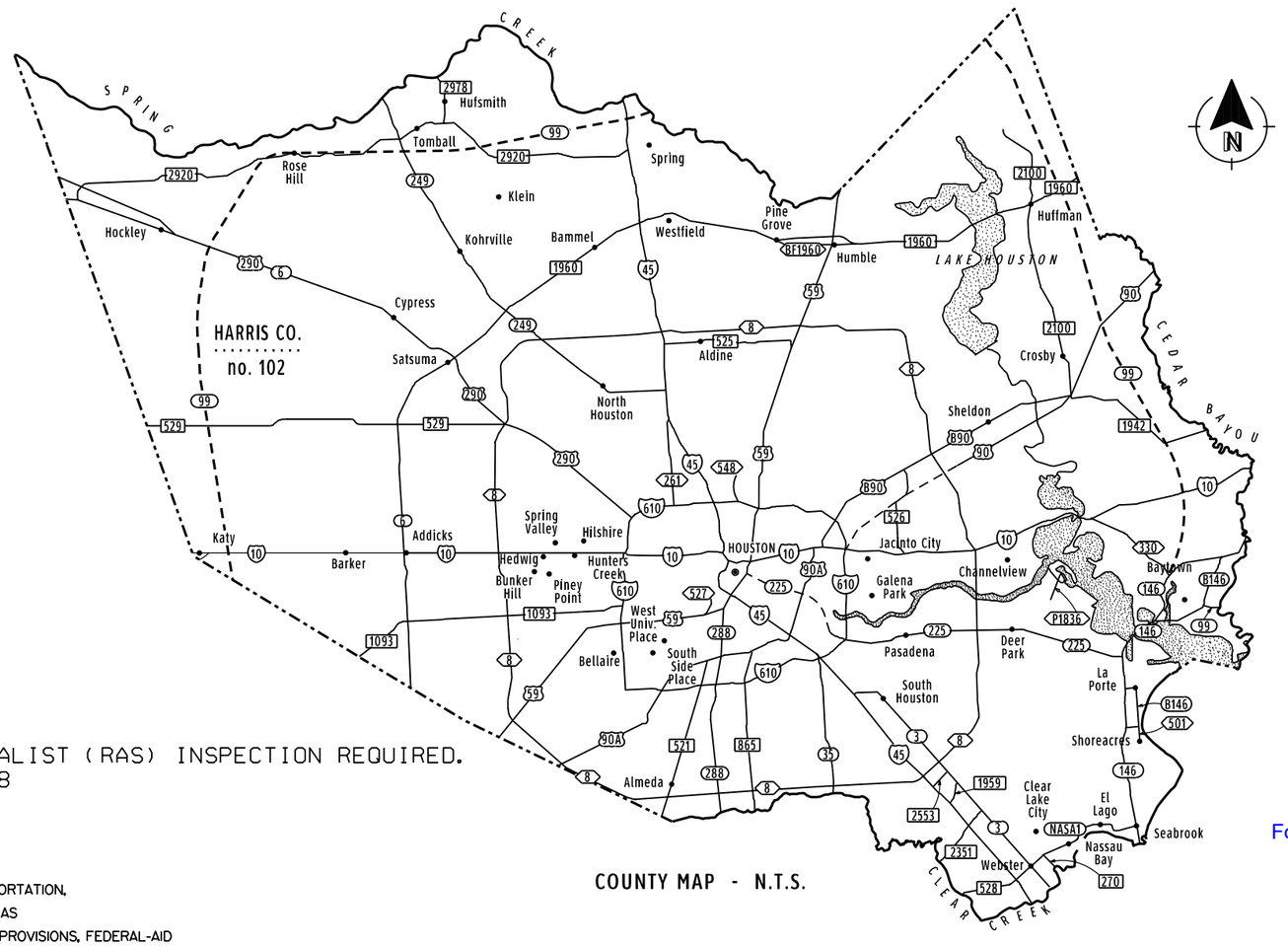
PROJECT NO. F 2022(876)

HIGHWAY: VARIOUS

HARRIS COUNTY, ETC.

CONTROL: 0912-72-650, ETC.

LIMITS: VARIOUS LOCATIONS ON IH 610, SL 8, & ETC.
FOR THE INSTALLATION OF REFLECTIVE BACKPLATES, CONTINENTAL CROSSWALKS, AND STOP FOR PEDESTRIAN SIGNING AT VARIOUS INTERSECTIONS



COUNTY MAP - N.T.S.

NO EXCEPTIONS
NO RAILROAD CROSSINGS
NO EQUATIONS

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED.
TDLR PROJECT NO: TABS2022014728

NOTES:

1. SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS, FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012).

2. FOR BARRICADES AND SIGNING AT INDIVIDUAL INTERSECTIONS UNDER SIGNAL CONSTRUCTION, REFER TO STANDARD SHEETS, WZ(BTS-1)-13 & WZ(BTS-2)-13.

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 05/05/2022

P.E.

For DISTRICT TRAFFIC ENGINEER

APPROVED FOR LETTING 5/26/2022

DocuSigned by:
Larry W. Blackburn, P.E.
B0228A69E03E42F...

For DISTRICT ENGINEER

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	VICINITY MAP BRAZORIA COUNTY
4	VICINITY MAP FORT BEND COUNTY
5	VICINITY MAP GALVESTON COUNTY
6-6E	GENERAL NOTES
7	ESTIMATE AND QUANTITY SHEET
8-8M	SUMMARY OF QUANTITIES
	INTERSECTIONS
9	TYPICAL PLACEMENT PAVEMENT MARKINGS AND SIGNING DIAMOND INTERCHANGE
10	TYPICAL PLACEMENT PAVEMENT MARKINGS AND SIGNING INTERSECTION
	TRAFFIC SIGNAL STANDARD
11	* TS-BP-20 - TRAFFIC SIGNAL HEAD WITH BACKPLATE
	SIGNING & PAVEMENT MARKING STANDARDS
12	* PM(4)-22 - CROSSWALK PAVEMENT MARKINGS
13	* SMD(GEN)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS
14	* SMD(SLIP-1)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM
15	* SMD(SLIP-2)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM
16	* SMD(SLIP-3)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM
17	* SMD(TWT)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST
18	* SMD(FRP)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST
	TRAFFIC CONTROL STANDARD
19	* BC(1)-21 - BARRICADE AND CONSTRUCTION - GENERAL NOTES AND REQUIREMENTS
20	* BC(2)-21 - BARRICADE AND CONSTRUCTION - PROJECT LIMIT
21	* BC(3)-21 - BARRICADE AND CONSTRUCTION - WORK ZONE SPEED LIMIT
22	* BC(4)-21 - BARRICADE AND CONSTRUCTION - TEMPORARY SIGN NOTES
23	* BC(5)-21 - BARRICADE AND CONSTRUCTION - TYPICAL SIGN SUPPORT
24	* BC(6)-21 - BARRICADE AND CONSTRUCTION - PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
25	* BC(7)-21 - BARRICADE AND CONSTRUCTION - ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR
26	* BC(8)-21 - BARRICADE AND CONSTRUCTION - CHANNELIZING DEVICES
27	* BC(9)-21 - BARRICADE AND CONSTRUCTION - CHANNELIZING DEVICES
28	* BC(10)-21 - BARRICADE AND CONSTRUCTION - CHANNELIZING DEVICES
29	* BC(11)-21 - BARRICADE AND CONSTRUCTION - PAVEMENT MARKINGS
30	* BC(12)-21 - BARRICADE AND CONSTRUCTION - PAVEMENT MARKING PATTERNS
31	* TCP(2-1)-18 - TRAFFIC CONTROL PLAN - CONVENTIONAL ROAD SHOULDER WORK
32	* TCP(2-4)-18 - TRAFFIC CONTROL PLAN - LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS
33	* WZ(BTS-1)-13 - TRAFFIC SIGNAL WORK TYPICAL DETAILS
34	* WZ(BTS-2)-13 - TRAFFIC SIGNAL WORK BARRICADES AND SIGNS
	ENVIRONMENTAL ISSUES
35	* EPIC - ENVIRONMENTAL PERMITS ISSUES AND COMMITMENTS
36	* SWP3 - TxDOT STORM WATER POLLUTION PREVENTION PLAN (HOU)
37	* EC (1)-16 - TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING
38	* ECL - 12 - EROSION CONTROL LOG (HOU)

DATE: 5/24/2022
FILE: H:\Traffic Signals\06 PROJECTS\CSJs 0912-72-650 and 0912-00-628 Systemic Safety\Plans and Documents\DGN files\Index.dgn

STATE OF TEXAS
MICHAEL A. OLIVO
108793
LICENSED
PROFESSIONAL ENGINEER

P.E.

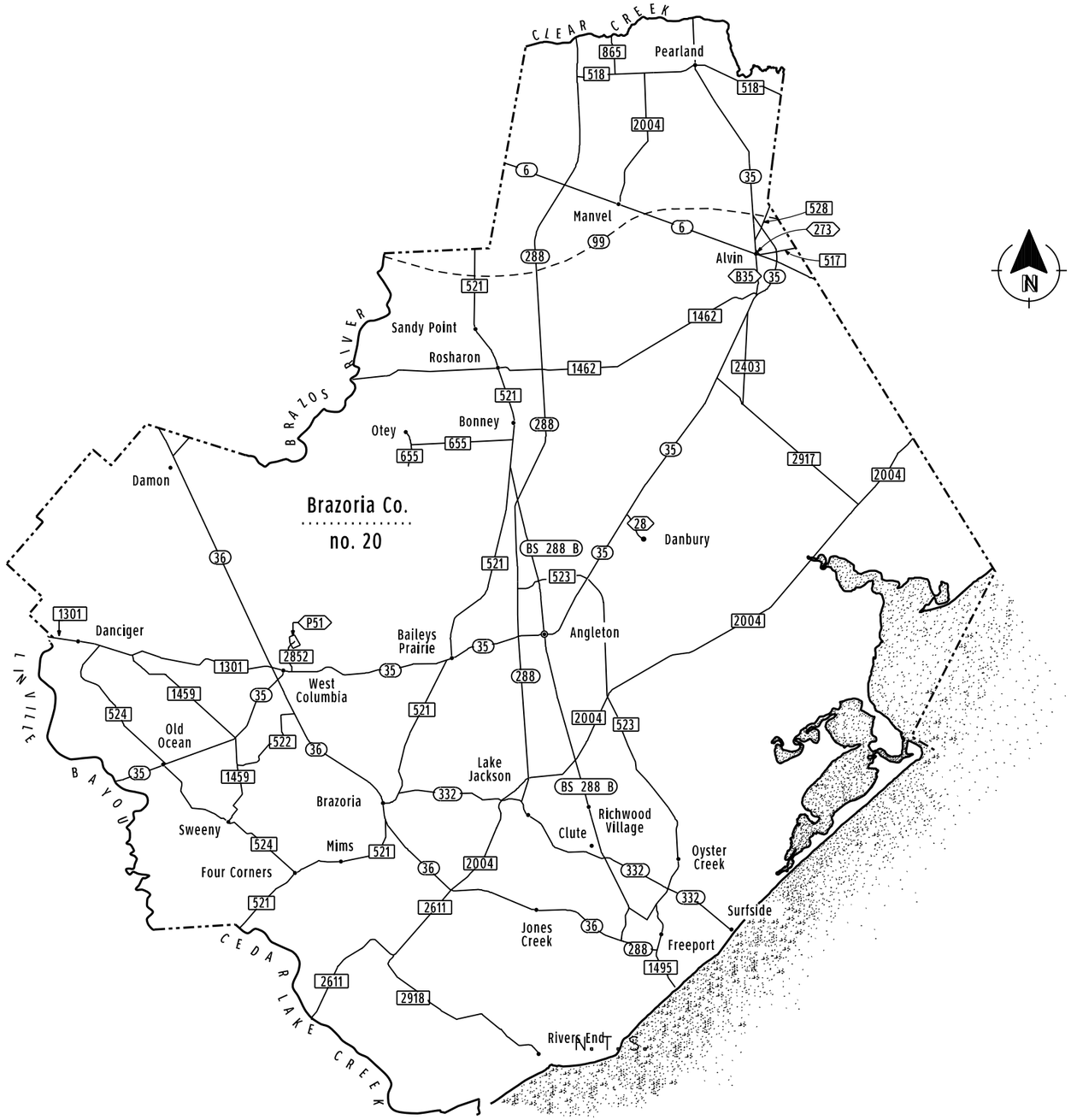
05/24/2022

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY (*) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

INDEX OF SHEETS

Texas Department of Transportation

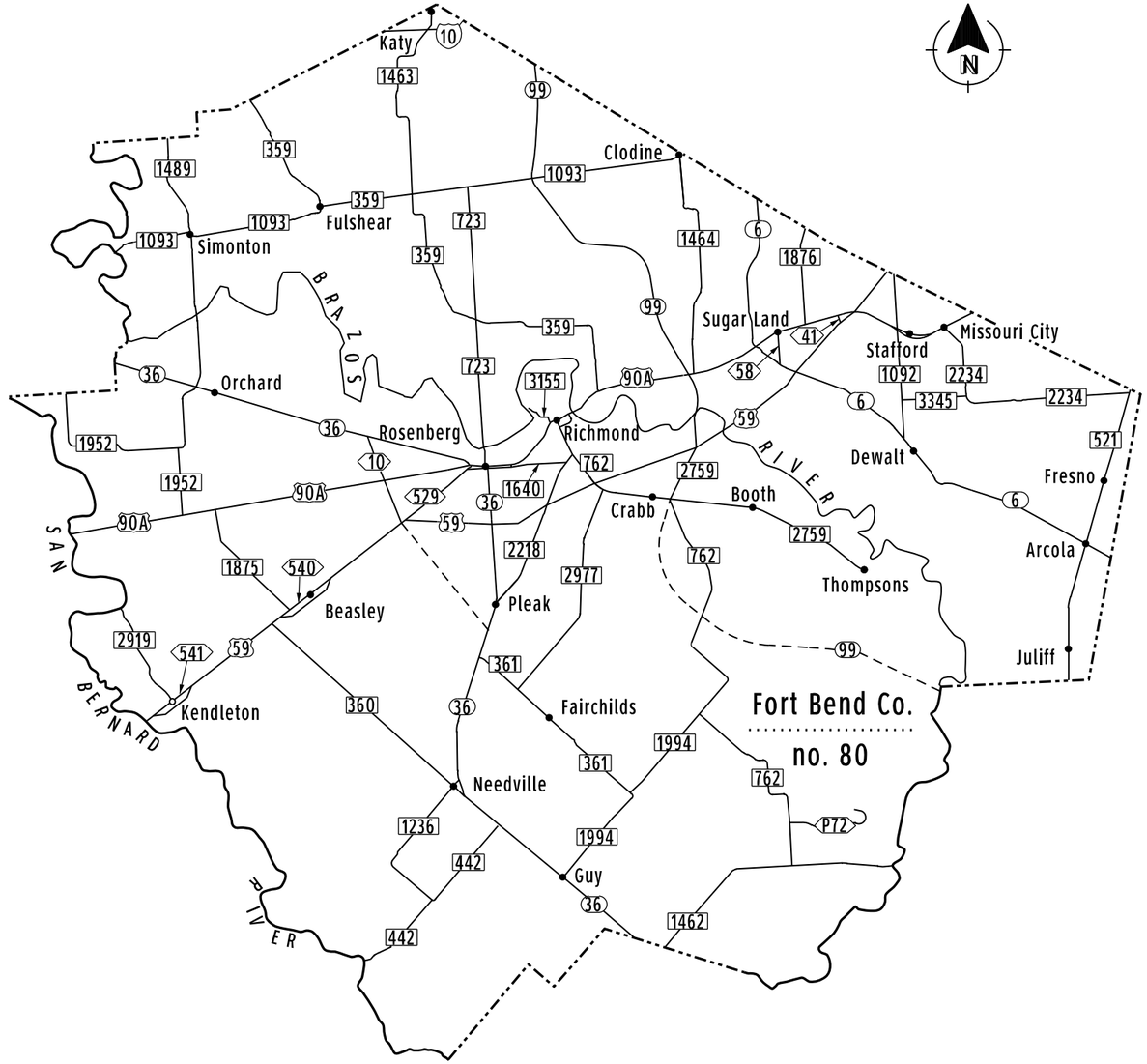
CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		2



TEXAS DEPARTMENT OF TRANSPORTATION
HOUSTON DISTRICT

BRAZORIA COUNTY

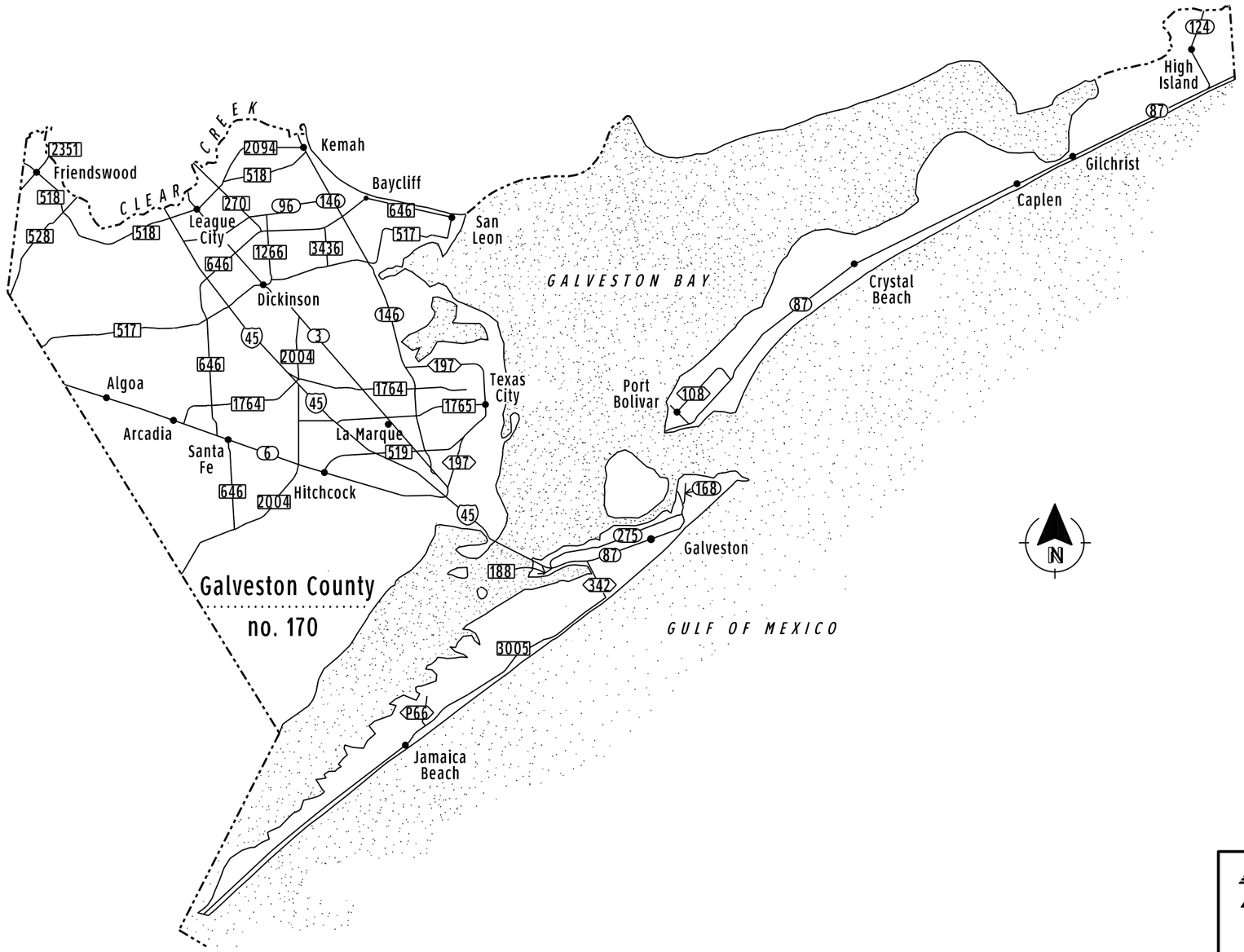
SCALE	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY
N.T.S.	6	TEXAS	F 2022(876)			VARIOUS
REVISIONS	STATE DISTRICT	COUNTY	CONTROL	SECTION	JOB	SHEET NO.
	HOU	HARRIS	0912	72	650	3



TEXAS DEPARTMENT OF TRANSPORTATION
HOUSTON DISTRICT

FORT BEND COUNTY

SCALE	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY
N.T.S.	6	TEXAS	F 2022(876)			VARIOUS
REVISIONS	STATE DISTRICT	COUNTY	CONTROL	SECTION	JOB	SHEET NO.
	HOU	HARRIS	0912	72	650	4



TEXAS DEPARTMENT OF TRANSPORTATION
HOUSTON DISTRICT

GALVESTON COUNTY

SCALE	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY
N.T.S.	6	TEXAS	F 2022(876)			VARIOUS
REVISIONS	STATE DISTRICT	COUNTY	CONTROL	SECTION	JOB	SHEET NO.
	HOU	HARRIS	0912	72	650	5

County: HARRIS
Highway: VARIOUS

General Notes:

General:

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

Dock Gee, P.E. Project Engineer, (713) 802-5405 *Dock.Gee@txdot.gov*
Yannick Dwatie, P.E. Assistant Project Engineer, (713) 802-5378 *Yannick.Dwatie@txdot.gov*

Contractor questions will be accepted through email, phone, and in person by the above individuals. Contractor questions will be reviewed by the Area Engineer or Assistant Area Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

Questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, and CCSJ/Project Name.

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, 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.

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.

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

General: Site Management

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.

County: HARRIS
Highway: VARIOUS

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.

General: Traffic Control and Construction

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 to schedule marking of underground lines on the ground. Use caution if working in these areas to avoid damaging or interfering with existing facilities.

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 Houston'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.

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
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.

Key to Reviewing Party

A - Area Office

Area Office	Email Address
Brazoria Area Office	HOU-BRZAShpDrwgs@txdot.gov
Fort Bend Area Office	HOU-FBAShpDrwgs@txdot.gov
Galveston Area Office	HOU-GALVAShpDrwgs@txdot.gov
Montgomery Area Office	HOU-MONTAShpDrwgs@txdot.gov
North Harris Area Office	HOU-NHAShpDrwgs@txdot.gov
Southeast Area Office	HOU-SEHAShpDrwgs@txdot.gov
Traffic Systems Construction Office	HOU-TSCShpDrwgs@txdot.gov
West/Central Harris Area Office	HOU-WWCHAOShpDrwgs@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 7: Legal Relations and Responsibilities

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.

No significant traffic generator events have been identified.

Item 8: Prosecution and Progress

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 8.3.1.4

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 120 days. The Engineer and the Contractor may mutually agree, in writing, to decrease this maximum number of days.

The Lane Closure Assessment Fee table depends on the current A.D.T. 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." For the current A.D.T, see link to Statewide Planning Map: https://www.txdot.gov/apps/statewide_mapping/StatewidePlanningMap.html. Contractor must verify the A.D.T with the area office as work orders are being issued for each site location.

CURRENT A.D.T.	LANE ASSESSMENT AMOUNT PER LANE / PER HOUR	CURRENT A.D.T.	LANE ASSESSMENT AMOUNT PER LANE / PER HOUR
2,500 – 4,999	100.00	140,000 – 159,999	3,500.00
5,000 – 9,999	200.00	160,000 – 179,999	4,000.00
10,000 – 14,999	300.00	180,000 – 199,999	4,500.00
15,000 – 19,999	400.00	200,000 – 219,999	5,000.00
20,000 – 39,999	500.00	220,000 – 239,999	5,500.00
40,000 – 59,999	1,000.00	240,000 – 259,999	6,000.00
60,000 – 79,999	1,500.00	260,000 – 279,999	6,500.00
80,000 – 99,999	2,000.00	280,000 – 299,999	7,000.00
100,000 – 119,999	2,500.00	300,000 +	7,500.00
120,000 – 139,999	3,000.00		

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."

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.

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.

Use shadow vehicles with Truck Mounted Attenuators (TMA) for lane and shoulder closures.

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	9:00 AM – 3:00 PM	N/A	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Tuesday	9:00 AM – 3:00 PM	N/A	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Wednesday	9:00 AM – 3:00 PM	N/A	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Thursday	9:00 AM – 3:00 PM	N/A	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Friday	9:00 AM – 3:00 PM	N/A	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Saturday	N/A	N/A	N/A
Sunday	N/A	N/A	N/A

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.

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. Since the disturbed area is less than 5 acres, a "Notice of Intent" (NOI) is not required.

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.

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

Item 636: Signs

Furnish and install signs shown on the traffic signal "Summary of Traffic Signal Materials" sheet. Ensure that the legend on these sign panels is in accordance with the latest "Standard Highway Sign Designs for Texas" manual.

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.

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

Assume ownership of the removed existing signs.

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

Item 666: Reflectorized Pavement Markings

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.

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 air-blast the surface with compressed air just before placing the new stripe.

Do not clean concrete pavement by grinding.

County: HARRIS **Control: 0912-72-650**
Highway: VARIOUS

Item 682: Vehicle and Pedestrian Signal Heads

Furnish black vehicle signal head back plates with 2 in. retroreflective yellow borders.

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-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.

Place the pedestrian crosswalk pavement markings only after the pedestrian signals and push buttons are installed and operating.

County: HARRIS
Highway: VARIOUS

Control: 0912-72-650

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.

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.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0912-72-650 **DISTRICT** Houston **COUNTY** Harris
HIGHWAY Various

			CONTROL SECTION JOB	**0912-00-628**		**0912-72-650**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00135915**		**A00183467**			
			COUNTY	**Harris**		**Harris**			
			HIGHWAY	**Various**		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	500-6001	MOBILIZATION	LS			1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO			47.000		47.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	3,929.250		3,740.500		7,669.750	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	573.000		511.000		1,084.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	67,965.000				67,965.000	
	666-6230	PAVEMENT SEALER 24"	LF	213,009.500		133,410.000		346,419.500	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	45,698.500		75,600.000		121,298.500	
	678-6049	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	SF	669,272.500		368,148.000		1,037,420.500	
	682-6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	602.000		207.000		809.000	
	682-6050	BACKPLATE W/REFL BRDR(5 SEC)	EA	40.000		32.000		72.000	
	682-6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	2,042.000		2,029.000		4,071.000	
	6038-6013	MULTIPOLYMER PAV MRK (W)(24")(SLD)	LF	143,809.000		133,410.000		277,219.000	
	6185-6002	TMA (STATIONARY)	DAY			693.000		693.000	
	14	PUBLIC UTILITY FORCE ACCT WORK (PARTICIPATING)	LS			1.000		1.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS			1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS			1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS			1.000		1.000	

RD TO ZERO LOCATIONS BW 8

LOCATION	636-6001		644-6001	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP& AM TY10BWG(1)SA (P)	PAVEMENT SEALER (24")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK(BLST CLN) X-WALK	BACKPLATE W/ REFL BRDR (3 SEC)	BACKPLATE W/ REFL BRDR (4 SEC)	BACKPLATE W/ REFL BRDR (5 SEC)	MULTIPOLYER PAV MRK(W)(24") (SLD)
	R1-5bR	R10-15aR								
	SF	SF	EA	LF	LF	SF	EA	EA	EA	LF
MESA DR	18		2	1,633.0	350.0	5,130.0	14	2		1,633.0
WILSON RD	36		4	1,648.0	405.0	5,370.0	15	2		1,648.0
RALSTON RD	18		2	1,655.0	320.0	5,340.0	14	2		1,655.0
WOODLAND HILLS DR	18	6.25	3	1,738.0	380.0	5,430.0	14	2		1,738.0
WEST LAKE HOUSTON PKWY		18.75	3	1,668.0	310.0	5,430.0	16	2	1	1,668.0
NORTH LAKE HOUSTON PKWY				1,708.0	305.0	5,610.0	16			1,708.0
SOUTH LAKE HOUSTON PKWY				1,610.0	275.0	5,340.0	16			1,610.0
GARRETT RD				2,225.0	455.0	7,080.0	16	2		2,225.0
TIDWELL RD	18		2	1,178.0	255.0	3,690.0	12	1		1,178.0
BU 90				680.0	230.0	1,800.0	10	1		680.0
US 90				1,800.0	435.0	5,460.0	16			1,800.0
WALLISVILLE RD	18	12.5	4	1,710.0	270.0	5,760.0	12	2		1,710.0
WOODFOREST BLVD				1,480.0	310.0	4,680.0	12	2		1,480.0
IH 10 EAST FREEWAY				1,700.0	335.0	5,460.0	16			1,700.0
JACINTOPORT BLVD				65.0	65.0		6			65.0
SH 225				475.0	475.0		26			475.0
GREENSHADOW DR				180.0	180.0		11	3	2	180.0
SAN AUGUSTINE AVENUE		18.75	3	965.0	170.0	3,180.0	12	2	2	965.0
RED BLUFF RD		25	4	1,490.0	320.0	4,680.0	11	4	1	1,490.0
PASADENA BLVD		25	4	1,555.0	340.0	4,860.0	10	4	1	1,555.0
PINE ST.				185.0	185.0		12		2	185.0
SPENCER HIGHWAY		25	4	1,558.0	350.0	4,830.0	15	2		1,558.0
VISTA RD		25	4	1,345.0	235.0	4,440.0	10		2	1,345.0
FAIRMONT PKWY		25	4	420.0	420.0		11	7		420.0
CRENSHAW RD		25	4	1,655.0	1,655.0	5,220.0	12	4		1,655.0
PRESTON AVENUE		18.75	3	940.0	295.0	2,580.0	13	4		940.0
GENOA RED BLUFF RD				375.0	375.0		12	2		375.0
GALVESTON RD/ SH 3	36		4	1,510.0	310.0	4,800.0	12	2		1,510.0
IH 45 GULF FREEWAY				395.0	395.0		16			395.0
HUGHES RD		25	4	1,920.0	375.0	6,180.0	12	2		1,920.0
BEAMER RD		25	4	2,573.0	360.0	8,850.0	12	2		2,573.0
TELEPHONE RD/ SH 35	36		4	786.0	786.0	2,088.0	12	2		786.0
CULLEN BLVD/ FM 865	36		4	666.0	666.0	1,800.0	12	2		666.0
SUBTOTAL	234	275	70	41,491.0	12,592.0	125,088.0	436	60	11	41,491.0

DATE: 5/3/2022
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SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8

RD TO ZERO LOCATIONS BW 8

LOCATION	636-6001		644-6001	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP& AM TY10BWG(1)SA (P)	PAVEMENT SEALER (24")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK(BLST CLN) X-WALK	BACKPLATE W/ REFL BRDR (3 SEC)	BACKPLATE W/ REFL BRDR (4 SEC)	BACKPLATE W/ REFL BRDR (5 SEC)	MULTIPOLYER PAV MRK(W)(24") (SLD)
	R1-5bR	R10-15aR								
	SF	SF	EA	LF	LF	SF	EA	EA	EA	LF
FELLOWS RD	36		4	684.0	684.0	1,872.0	12	2		684.0
SH 288	36		4	882.0	882.0	2,232.0	21			882.0
KIRBY DR	36		4	768.0	768.0	2,160.0	12	4		768.0
ALMEDA RD/ FM 521	18	18.75	5	252.0	252.0		10	2		252.0
SOUTH POST OAK RD	9	18.75	4	876.0	876.0	2,304.0	12	2		876.0
WEST FUQUA ST.	18	12.5	4	756.0	756.0	2,016.0	12	2		756.0
ROCKWELL BLVD	36		4	804.0	804.0	2,160.0	12	2		804.0
HILLCROFT AVENUE/ FORT BEND TOLL RD	27	6.25	4	828.0	828.0	2,016.0	17			828.0
FONDREN RD	36		4	786.0	786.0	2,088.0	12	2		786.0
US 90A	18	12.5	4	756.0	756.0	1,872.0	16			756.0
SOUTH GESSNER RD	36		4	804.0	804.0	2,160.0	12	2		804.0
WEST AIRPORT BLVD	36		4	756.0	756.0	2,016.0	12	2		756.0
WEST BELLFORT AVENUE	36		4	768.0	768.0	2,016.0	12	2		768.0
IH 69 SOUTHWEST FREEWAY		25	4	876.0	876.0	1,872.0	17	1		876.0
BISSONNET ST.	18	12.5	4	852.0	852.0	2,304.0	12	2		852.0
BEECHNUT ST.	36		4	864.0	864.0	2,304.0	12	2		864.0
BELLAIRE BLVD	36		4	888.0	888.0	2,304.0	24			888.0
HARWIN DR		12.5	2	600.0	600.0	1,440.0	14	1		600.0
WESTPARK TOLLWAY		18.75	3	288.0	288.0		17			288.0
WESTPARK DR	9	18.75	4	960.0	960.0	2,592.0	19	1		960.0
RICHMOND AVENUE		25	4	984.0	984.0	2,592.0	12	2		984.0
WESTHEIMER RD/ FM 1093	18	6.25	3	996.0	996.0	2,592.0	28			996.0
BRIAR FOREST DR		25	4	828.0	828.0	2,160.0	12	2		828.0
FIRE STATION NO. 69				36.0	36.0		4			36.0
BRIAR HILL DR	9	12.5	3	84.0	84.0	144.0	6			84.0
BOHEME DR		25	4	444.0	444.0	1,200.0	14			444.0
MEMORIAL DR		25	4	708.0	708.0	1,872.0	11	3		708.0
KIMBERLEY LN		25	4	528.0	528.0	1,440.0	9	1	1	528.0
IH 10 KATY FREEWAY	36		4	768.0	768.0	1,728.0	22			768.0
WESTVIEW DR	18	12.5	4	913.0	913.0	2,610.0	12	2		913.0
HAMMERLY BLVD	36		4	845.0	845.0	2,400.0	20			845.0
KEMPWOOD DR	36		4	898.0	898.0	2,352.0	20			898.0
CLAY RD	36		4	963.0	963.0	2,490.0	14	2		963.0
SUBTOTAL	666	312.5	124	24,043.0	24,043.0	61,308.0	471	41	1	24,043.0

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SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8A

RD TO ZERO LOCATIONS BW 8

LOCATION	636-6001		644-6001	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP& AM TY10BWG(1)SA (P)	PAVEMENT SEALER (24")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK(BLST CLN) X-WALK	BACKPLATE W/ REFL BRDR (3 SEC)	BACKPLATE W/ REFL BRDR (4 SEC)	BACKPLATE W/ REFL BRDR (5 SEC)	MULTIPOLYER PAV MRK(W)(24") (SLD)
	R1-5bR	R10-15aR								
	SF	SF	EA	LF	LF	SF	EA	EA	EA	LF
TANNER RD	36		4	860.0	860.0	2,160.0	12	2		860.0
WEST LITTLE YORK RD	18	12.5	4	1,225.0	1,225.0	2,580.0	13	2		1,225.0
US 290	27	6.25	4	990.0	990.0	2,160.0	19			990.0
WEST GULF BANK RD	36		4	983.0	983.0	2,490.0	12	4		983.0
PHILIPPINE ST.		25	4	803.0	803.0	2,250.0	12		2	803.0
WEST RD	18	12.5	4	1,270.0	1,270.0	3,480.0	16	2		1,270.0
FALLBROOK DR	18	12.5	4	1,050.0	1,050.0	2,880.0	12	2		1,050.0
NORTH GESSNER RD		25	4	1,120.0	1,120.0	3,120.0	13	2		1,120.0
FAIRBANKS NORTH HOUSTON RD	18	12.5	4	915.0	915.0	2,580.0	12	1	1	915.0
SH 249	18	12.5	4	1,308.0	1,308.0	3,150.0	24			1,308.0
HOLLISTER RD	18	12.5	4	1,088.0	1,118.0	3,030.0	12	2		1,088.0
BAMMEL NORTH HOUSTON RD	36		4	953.0	953.0	2,370.0	12		2	953.0
ANTOINE DR	36		4	953.0	953.0	2,370.0	14		2	953.0
VETERANS MEMORIAL DR	18	12.5	4	1,060.0	1,060.0	2,880.0	14		2	1,060.0
T. C. JESTER BLVD		12.5	2	790.0	790.0	2,160.0	12	2		790.0
ELLA BLVD	27	6.25	4	1,210.0	1,210.0	3,240.0	22			1,210.0
GREENS CROSSING BLVD		25	4	925.0	925.0	2,460.0	19			925.0
IH 45		6.25	1	585.0	585.0	1,620.0	24			585.0
GREENSPOINT DR		25	4	850.0	850.0	2,280.0	14	2		850.0
IMPERIAL VALLEY DR		25	4	580.0	580.0	1,200.0	13	4		580.0
HARDY ST./ W. HARDY RD		25	4	835.0	835.0	2,220.0	12		2	835.0
HARDY TOLL RD/ E. HARDY RD		25	4	965.0	965.0	2,460.0	18			965.0
ALDINE WESTFIELD RD		25	4	860.0	860.0	2,400.0	12	2		860.0
JFK BLVD	36		4	965.0	965.0	2,100.0	17			965.0
VICKERY DR		25	4	900.0	900.0	2,400.0	14	2		900.0
LEE RD		25	4	900.0	900.0	2,400.0	12	2		900.0
IH 69 EASTEX FREEWAY	24	12.5	4	910.0	910.0	1,800.0	18			910.0
SUBTOTAL	384	381.25	103	25,853.0	25,883.0	66,240.0	404	31	11	25,853.0

SUMMARY
OF
QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8B

DATE: 5/3/2022
FILE: H:\Traffic Signals\06 PROJECTS\CSJs 0912-72-650 and 0912-00-628 Systemic SafetyPlans and Documents\DGN files\Summaries and diamond .dgn

ROAD TO ZERO LOCATIONS IH 610

LOCATION	636-6001		644-6001	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP& AM TY10BWG(1) SA(P)	PAVEMENT SEALER (24")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/ REFL BRDR (3 SEC)	BACKPLATE W/ REFL BRDR (4 SEC)	BACKPLATE W/ REFL BRDR (5 SEC)	MULTIPOLYER PAV MRK(W)(24") (SLD)
	R1-5bL	R10-15aR								
	SF	SF	EA	LF	LF	SF	EA	EA	EA	LF
N. WAYSIDE DR		25	4	668.0	227.0	1,764.0	12	2		668.0
HOMESTREAD RD		25	4	865.0	271.0	2,370.0	12		2	865.0
LOCKWOOD DR	24	12.5	4	843.0	255.0	2,352.0	12	2		843.0
HIRSCH RD	12	18.75	4	639.0	219.0	1,686.0	12	2		639.0
ELISYAN ST		12.5	2	407.0	173.0	936.0	9			407.0
HARDY ST		12.5	2	415.0	157.0	1,020.0	10			415.0
IRVINGTON BLVD		25	4	834.0	252.0	2,328.0	12	2		834.0
FULTON ST		25	4	807.0	189.0	2,460.0	13	1		807.0
AIRLINE DR		25	4	711.0	231.0	1,920.0	12	2		711.0
N. MAIN ST		25	4	668.0	200.0	1,866.0	12	2		668.0
YALE ST		25	4	608.0	200.0	1,620.0	12	2		608.0
N. SHEPHERD DR		18.75	3	615.0	183.0	1,716.0	10			615.0
N. DURHAM DR	12	12.5	3	660.0	186.0	1,890.0	11			660.0
ELLA BLVD		25	4	844.0	274.0	2,268.0	14	2		844.0
E. T.C. JESTER BLVD		25	4	1,110.0	342.0	3,060.0	16	2		1,110.0
T.C. JESTER BLVD		25	4	1,146.0	342.0	3,216.0	16	2		1,146.0
W. 18th ST	9	18.75	4	893.0	263.0	2,520.0	15	2		893.0
HEMPSTEAD RD	9	12.5	3	543.0	165.0	1,506.0	10	1		543.0
OLD KATY RD		31.25	5	1,119.0	381.0	2,958.0	19	4		1,119.0
MEMORIAL DR		31.25	5	718.0	190.0	2,118.0	15	1		718.0
WOODWAY	36		4	1,040.0	284.0	3,030.0	20			1,040.0
POST OAK BLVD	9	18.75	4	676.0	190.0	1,932.0	15			676.0
SAN FELIPE ST	18	12.5	4	905.0	305.0	2,388.0	19			905.0
WESTHEIMER RD	9	18.75	5	864.0	324.0	2,148.0	20		1	864.0
RICHMOND AVE		25	4	1,134.0	366.0	3,072.0	24	2		1,134.0
WESTPARK DR	18	12.5	4	726.0	186.0	2,148.0	12		2	726.0
FOURNACE PLACE		25	4	610.0	190.0	1,686.0	11		2	610.0
BISSONNET ST	18	12.5	4	868.0	238.0	2,514.0	13	2		868.0
BELLAIRE ST	36		4	930.0	276.0	2,616.0	13	2		930.0
EVERGREEN ST		25	4	535.0	151.0	1,536.0	10		2	535.0
BEECHNUT ST		25	4	760.0	244.0	2,052.0	14	2		760.0
N. BRAESWOOD BLVD		25	4	659.0	221.0	1,746.0	12	2		659.0
GREENWILLOW ST (SB)		25	4	348.0	102.0	984.0				348.0
SUBTOTAL	210	656.25	128	25,168.0	7,777.0	69,426.0	437	39	9	25,168.0

SUMMARY
OF
QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8C

DATE: 5/3/2022
FILE: H:\Traffic Signals\06 PROJECTS\CSJs 0912-72-650 and 0912-00-628 Systemic SafetyPlans and Documents\DGN files\Summaries and diamond .dgn

ROAD TO ZERO LOCATIONS IH 610

LOCATION	636-6001		644-6001	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP& AM TY10BWG(1) SA(P)	PAVEMENT SEALER (24")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/ REFL BRDR (3 SEC)	BACKPLATE W/ REFL BRDR (4 SEC)	BACKPLATE W/ REFL BRDR (5 SEC)	MULTIPOLYER PAV MRK(W)(24") (SLD)
	R1-5bL	R10-15aR								
	SF	SF	EA	LF	LF	SF	EA	EA	EA	LF
STELLA LINK RD		25	4	778.0	256.0	2,076.0	14	2		778.0
S MAIN ST	36		4	1,173.0	387.0	3,144.0	24			1,173.0
BUFFALO SPEEDWAY		25	4	716.0	248.0	1,866.0	12	2		716.0
KIRBY DR	18	12.5	6	808.0	244.0	2,244.0	12	2		808.0
FANNIN ST	9	18.75	4	624.0	198.0	1,698.0	13	2		624.0
ALMEDA RD	9	18.75	4	922.0	298.0	2,496.0	14			922.0
E ALMEDA RD				396.0	84.0	1,242.0				396.0
SCOTT ST		25		754.0	304.0	1,800.0	16	2		754.0
CULLEN BLVD	9	18.75	4	629.0	191.0	1,752.0	12	2		629.0
CALAIS RD		18.75	3	387.0	105.0	1,116.0	9	1		387.0
MARTIN LUTHER KING BLVD		25	4	761.0	251.0	2,034.0	12	2		761.0
CRESMONT ST		25	4	521.0	155.0	1,470.0	12	2		521.0
MYKAWA RD		12.5	2	271.0	157.0	462.0	8	1		271.0
LONG DR	18	12.5	4	803.0	239.0	2,262.0	12	2		803.0
S WAYSIDE DR		25	4	703.0	235.0	1,872.0	12	2		703.0
BROADWAY ST (SB)		25	4	533.0	149.0	1,524.0				533.0
TELEPHONE RD	9	18.75	4	818.0	242.0	2,304.0	12	2		818.0
WOODRIDGE DR	18	12.5	4	688.0	202.0	1,938.0	15			688.0
BROADWAY ST	36		4	743.0	197.0	2,172.0	12	2		743.0
GALVESTON RD				168.0	30.0	540.0				168.0
CLINTON DR	27		3	496.0	172.0	1,302.0	12	2		496.0
MARKET ST		25	4	669.0	213.0	1,812.0	12	2		669.0
GELLHORN DR		25	4	749.0	233.0	2,058.0	12	2		749.0
WALLISVILLE RD	9	18.75	4	866.0	254.0	2,442.0	12	2		866.0
N McCARTY ST	36		4	879.0	261.0	2,460.0	12	2		879.0
SUBTOTAL	234	387.5	86	16,855.0	5,305.0	46,086.0	281	36	0	16,855.0
CSJ 0912-72-650: TOTAL	3,740.5		511.0	133,410.0	75,600.0	368,148.0	2,029.0	207.0	32.0	133,410.0

DATE: 5/3/2022
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SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8D

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
FM 1960 AT SH 249	36		4		1,732.5	480.0	5,010.0	18			1,732.5
FM 1960 AT WILLOWBROOK MALL		18.75	3		1,577.0	392.0	4,740.0	7	4		1,577.0
FM 1960 AT BRETON RIDGE ST		25	4		1,553.0	377.0	4,704.0	10	4		1,553.0
FM 1960 AT WILLOW CENTER DR							0.0	6	2	2	
FM 1960 AT CUTTEN RD					1,282.0	301.0	3,924.0	8	4		1,282.0
FM 1960 AT HAYNES RD		6.25	1		538.0	126.0	1,648.5	6	1		538.0
FM 1960 AT CHAMPIONS DR		18.75	3		1,129.0	267.0	3,446.5	8	2		1,129.0
FM 1960 AT HOLLISTER ST		6.25	1		594.0	140.0	1,815.5	6		1	594.0
FM 1960 AT PARADISE VALLEY DR		25	4		1,115.5	261.5	3,416.5	8		2	1,115.5
FM 1960 AT CHAMPION FOREST DR		25	4		1,376.5	323.0	4,214.5	8	4		1,376.5
FM 1960 AT GLEN ERICA DR		25	4		1,113.0	259.5	3,414.0	6	4		1,113.0
FM 1960 AT GREENWOOD FOREST DR		25	4		1,043.5	246.5	3,187.5	8		2	1,043.5
FM 1960 AT WUNDERLICH DR		25	4		719.5	168.0	2,206.0	6	2	2	719.5
FM 1960 AT BRECK ST		25	4		1,025.5	245.5	3,119.0	8	2		1,025.5
FM 1960 AT STUEBNER AIRLINE RD/ VETERANS		25	4		1,303.5	308.0	3,982.0	8	4		1,303.5
FM 1960 AT TORREY CHASE BLVD		25	4		978.5	235.0	2,973.5	8		2	978.5
FM 1960 AT GLADEBROOK DR		18.75	3		881.5	210.0	2,687.5	8		2	881.5
FM 1960 AT FALLING CREEK DR		25	4		1,238.5	294.0	3,777.5	6	4		1,238.5
FM 1960 AT WALTERS RD		25	4		1,247.5	302.0	3,782.5	6	4		1,247.5
FM 1960 AT TC JESTER BLVD		18.75	3		1,003.5	238.5	3,059.0	8	4		1,003.5
FM 1960 AT TERRACE OAKS DR		6.25	1		239.0	49.0	761.0	8		1	239.0
FM 1960 AT NORTH GATE FOREST/		12.5	2		1,060.5	247.5	3,251.0	8	4		1,060.5
FM 1960 AT FRITZ OAKS PL		12.5	2		507.0	119.0	1,553.5	8		2	507.0
FM 1960 AT KUYKENDAHL RD	18	12.5	4		1,806.0	438.5	5,469.5	20	1		1,806.0
FM 1960 AT SUGAR PINE DR		25	4		1,252.5	294.5	3,831.0	6	4		1,252.5
FM 1960 AT BUTTE CREEK RD		18.75	3		744.5	175.0	2,279.0	8		2	744.5
FM 1960 AT ROLLING CREEK DR		18.75	3		670.0	161.0	2,037.0	8		2	670.0
FM 1960 AT ELLA BLVD		25	4		1,160.5	266.0	3,577.5	6	4		1,160.5
FM 1960 AT NANES DR		18.75	3		901.0	208.5	2,770.0	8		2	901.0
FM 1960 AT RED OAK DR		25	4		1,056.0	255.0	3,204.5	6	4		1,056.0
FM 1960 AT CALI DR/HAFER RD		25	4		1,112.5	266.5	3,385.5	6	4		1,112.5
FM 1960 AT CYPRESS STATION DR		25	4		1,620.0	381.5	4,953.5	8	4		1,620.0
FM 1960 AT BAMMEL WESTFIELD RD		18.75	3		936.0	225.0	2,844.5	9	4		936.0
FM 1960 AT IH 45	36		4		1,661.0	407.0	5,016.0	20			1,661.0
SUBTOTAL	90	606.25	107	0.0	36,178.5	8,674.5	110,041.5	286	74	22	36,178.5

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SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8E

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
HIGHWAY 6 AT WESTPARK TOLLWAY		25	4		1,080.0	225.0	3,420.0	12	1	1	1,080.0
HIGHWAY 6 AT BELLAIRE BLVD		25	4		1,930.0	469.0	5,844.0	8	4		1,930.0
HIGHWAY 6 AT EMPANADA DR					1,242.0	294.0	3,792.0	6	4		1,242.0
HIGHWAY 6 AT BEECHNUT ST								8	4		
HIGHWAY 6 AT CHARLMONT DR		18.75	3		1,495.5	360.0	4,542.0	8	4		1,495.5
HIGHWAY 6 AT BISSONNET ST		12.5	2		1,677.0	402.0	5,100.0	8	4		1,677.0
HIGHWAY 6 AT OLD RICHMOND RD								8	2		
HIGHWAY 6 AT W BELLFORT AVE		12.5	2		1,323.0	312.0	4,044.0	8	4		1,323.0
HIGHWAY 6 AT WOODBRIDGE DR								8	4		
HIGHWAY 6 AT W AIRPORT BLVD		25	4		1,725.0	414.0	5,244.0	8	4		1,725.0
HIGHWAY 6 AT VOSS RD		25	4		1,284.0	300.0	3,936.0	8	4		1,284.0
HIGHWAY 6 AT HULL LN		12.5	2		1,575.0	378.0	4,788.0	10	5		1,575.0
HIGHWAY 6 AT IMPERIAL BLVD		12.5	2		1,824.0	438.0	5,544.0	10	5		1,824.0
HIGHWAY 6 AT 90-ALT	36		4		1,413.0	342.0	4,284.0	19	4		1,413.0
HIGHWAY 6 AT PINE FOREST		6.25	1					7	4		
HIGHWAY 6 AT CLAY RD		12.5	2					8	2		
HIGHWAY 6 AT CAIRNWAY DR		12.5	2					8	5		
HIGHWAY 6 AT LOCH KATRINE LN								6			
HIGHWAY 6 AT KEITH HARROW BLVD		12.5	2					5	3		
HIGHWAY 6 AT ADDICKS SATSUMA RD		25	4					12	2		
HIGHWAY 6 AT TIMBER CREEK PLACE LN								13	4		
HIGHWAY 6 AT YORKTOWN CROSSING BLVD								7	4		
HIGHWAY 6 AT W LITTLE YORK RD								8	4		
HIGHWAY 6 AT KINGFIELD DR								6	2		
HIGHWAY 6 AT SMITHSTONE DR								8	2		
HIGHWAY 6 AT HOME DEPOT								8	2		
HIGHWAY 6 AT 529		25	4					8	4		
HIGHWAY 6 AT GLEN CHASE DR								10	2		
HIGHWAY 6 AT SUGAR RIDGE DR								7	4		
HIGHWAY 6 AT RIDGE PARK DR								8	2		
HIGHWAY 6 AT LOGENBOUGH/ CHERRY PARK								8	5		
HIGHWAY 6 AT SERVICE CENTER DR								6			
HIGHWAY 6 AT WILLOW RIVER DR								5	3		
HIGHWAY 6 AT FOREST TRLS DR								12	2		
SUBTOTAL	36	263	46	0.0	16,568.5	3,934.0	50,538.0	289	109	1	16,568.5

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SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8F

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
HIGHWAY 6 AT WEST RD		25	4					13	4		
HIGHWAY 6 AT PEBBLE LAKE DR								7	4		
HIGHWAY 6 AT HUFFMEISTER RD								8	4		
HIGHWAY 6 AT 290	36		4					6	2		
HIGHWAY 6 AT PARK ROW DR		25	4		990.0	240.0	3,000.0	19	2		730.0
HIGHWAY 6 AT OLD KATY RD FRNTG WEST	18		2		130.5	30.0	402.0	9	2		465.0
HIGHWAY 6 AT I-10 FRNTG RD EAST	18		2		1,420.0	460.0	3,840.0	10		1	485.0
HIGHWAY 6 AT FORTSMITH											
HIGHWAY 6 AT GRISBY RD					345.0	120.0	900.0				220.0
HIGHWAY 6 AT BARKERS POINT LN					140.0	35.0	420.0				85.0
HIGHWAY 6 AT MEMORIAL DR		12.5	2		895.0	220.0	2,700.0	8	4		700.0
HIGHWAY 6 AT BRIARHILLS PKWY				130.0	130.0	130.0		8	2		
HIGHWAY 6 AT EAGLE VISTA DR				145.0	145.0	145.0	0.0	6	2		
HGIWAHY 6 AT WESTWAY LN				10.0	10.0	10.0	0.0				
HIGHWAY 6 AT BRIAR FORREST				130.0	130.0	130.0	0.0	6	2		
HIGHWAY 6 AT CHILIS PRIVATE DR		6.25	1	295.0	295.0	130.0	660.0	8	2		
HIGHWAY 6 AT BARKER OAKS				35.0	35.0	35.0					
HIGHWAY 6 AT PIPING ROCK LN		6.25	1	485.0	485.0	140.0	1,380.0	12			
HIGHWAY 6 AT WESTHEIMER		25	4	990.0	990.0	240.0	3,000.0	12	2		
HIGHWAY 6 AT PARKHOLLOW DR				150.0	150.0	150.0		8	2		
HIGHWAY 6 AT RICHMOND AVE				190.0	190.0	190.0	0.0	8	4		
HIGHWAY 6 AT WEST OAKS PLAZA DR				40.0	40.0	40.0	0.0				
HIGHWAY 6 AT PRIVATE (SHELL)		6.25	1	320.0	320.0	140.0	720.0	6	2		
HIGHWAY 6 AT BRANCH FORREST DR				30.0	30.0	30.0					
HIGHWAY 6 AT PRIVATE (SHELL 2ND DRIVEWAY)				30.0	30.0	30.0	0.0				
HIGHWAY 6 AT WESTPARK DR		12.5	2	470.0	470.0	140.0	1,320.0	8	2		
HIGHWAY 6 AT SHILLER RD					120.0	120.0		8	1		120.0
HIGHWAY 6 AT WEST BEND DR					30.0	30.0	0.0				30.0
HIGHWAY 6 AT ALIEF CLODINE		25	4		650.0	200.0	1,800.0	12	1	1	650.0
HIGHWAY 6 AT VIA DEL NORTE DR					20.0	20.0					20.0
HIGHWAY 6 AT BELLAIRE		25	4	1,025.0	1,025.0	230.0	3,180.0	10	3		
HIGHWAY 6 AT RANCHO MISSION DR				70.0	70.0	70.0					
HGIHWAY 6 AT EMPANADA BLVD				850.0	850.0	160.0	2,760.0	6	4		
HIGHWAY 6 AT LINDITA DR				20.0	20.0	20.0					
SUBTOTAL	72	169	35	5,415.0	10,155.5	3,635.0	26,082.0	198	51	2	3,505.0

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SUMMARY OF QUANTITIES

SHEET 8 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8G

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
HIGHWAY 6 AT BEECHNUT				185.0	185.0	185.0		8	4		
HIGHWAY 6 AT AUTO PARK WAY				20.0	20.0	20.0					
HIGHWAY 6 AT LATERNA LN				15.0	15.0	15.0					
HIGHWAY 6 AT BERRINGTON DR				25.0	25.0	25.0					
HIGHWAY 6 AT CHARLMONT DR/PARKSGATE DR		12.5	2	1,320.0	1,320.0	180.0	4,560.0	8	2		
HIGHWAY 6 AT STANBRIDGE DR				25.0	25.0	25.0					
HIGHWAY 6 AT BISSONNET ST		12.5	2	1,461.0	1,461.0	200.0	5,045.0	8	4		
HIGHWAY 6 AT ATTERBURY DR				25.0	25.0	25.0					
HIGHWAY 6 AT DELAMERE DR				30.0	30.0	30.0					
HIGHWAY 6 AT ALDERWICK DR				25.0	25.0	25.0					
HIGHWAY 6 AT OLD RICHMOND RD				165.0	165.0	165.0		8	2		
HIGHWAY 6 AT PARADISE BRIDGE LN				15.0	15.0	15.0					
HIGHWAY 6 AT W. BELLFORT ST		12.5	2	1,212.5	1,212.5	200.0	4,050.0	8	4		
HIGHWAY 6 AT WOODBRIDGE DR				180.0	180.0	180.0		8	2		
HIGHWAY 6 AT MC KASKIE RD				15.0	15.0	15.0					
HIGHWAY 6 AT W AIRPORT BLVD		25	4	1,505.0	1,505.0	215.0	5,160.0	8	4		
HIGHWAY 6 AT VOSS RD		25	4	1,200.0	1,200.0	225.0	3,900.0	8	4		
HIGHWAY 6 AT PARK POINTE D				20.0	20.0	20.0					
HIGHWAY 6 AT CULLINAN PARK				10.0	10.0	10.0					
HIGHWAY 6 AT HULL LN/CROWN GDN TRL		12.5	2	1,390.0	1,390.0	180.0	4,840.0	10	5		
HIGHWAY 6 AT TERMINAL LN				20.0	20.0	20.0					
HIGHWAY 6 AT IMPERIAL BLVD		25	4	1,622.5	1,622.5	205.0	5,670.0	10	5		
HIGHWAY 6 AT SUGARLAND REGIONAL AIRPORT					10.0	10.0					10.0
HIGHWAY 6 AT SUGARLAND REGIONAL					25.0	25.0					25.0
HIGHWAY 6 AT SMITHVILLE ST					25.0	25.0					25.0
HIGHWAY 6 AT US 90 ALT	36		4		1,292.5	220.0	4,290.0	21	3		1,292.5
HIGHWAY 6 ACCESS AT SUMNTER CRT					30.0	30.0					30.0
HIGHWAY 6 ACCESS AT UNIVERSITY BLVD		25	4		1,497.5	290.0	4,830.0	15	2	1	1,497.5
HIGHWAY 6 AT HILTON DRIVEWAY					15.0	15.0					15.0
HIGHWAY 6 AT FIRST COLONY/BROOKS ST	18	12.5	4		1,102.5	210.0	3,570.0	10	8		1,102.5
HIGHWAY 6 AT PRIVATE DR (ENTERPRISE RENT-A-CAR)		25	4		1,455.0	255.0	4,800.0	9	5		1,455.0
HIGHWAY 6 AT FLUOR DANIEL DR		12.5	2		1,800.0	255.0	6,180.0	8	5		1,800.0
HIGHWAY 6 AT PRIVATE DR (STRIP CNTR)					447.5	170.0	1,110.0	10	5		447.5
HIGHWAY 6 AT KENSINGTON DR		25.0	4		1,662.5	220.0	5,770.0	13	4		1,662.5
SUBTOTAL	54	225	42	10,301.0	19,663.5	3,720.0	63,775.0	162	64	1	9,362.5

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SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8H

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
HIGHWAY 6 AT STRIP CNTR (PANERA BRD)					50.0	50.0					50.0
HIGHWAY 6 AT US 59	18	12.5	4		2,005.0	400.0	6,420.0	14	2	2	2,005.0
HIGHWAY 6 AT TOWN CENTER DR		12.5	2		1,520.0	215.0	5,220.0	13	6	1	1,520.0
HIGHWAY 6 PRIVATE EXIT (MIRACLE EAR)					20.0	20.0					20.0
HIGHWAY 6 AT BOSTON MARKET					15.0	15.0					15.0
HIGHWAY 6 AT LEXINGTON BLVD		12.5	2		1,555.0	235.0	5,280.0	10	7	2	1,555.0
HIGHWAY 6 AT HIGHLAND HILLS					292.5	30.0	1,050.0				292.5
HIGHWAY 6 AT GRANTS LAKE BLVD					1,080.0	150.0	3,720.0	6	1		1,080.0
HIGHWAY 6 AT FIRST CROSSING BLVD					330.0	30.0	1,200.0				330.0
HIGHWAY 6 AT WILLIAMS TRACE		12.5	2		1,565.0	215.0	5,400.0	8	4		1,565.0
HIGHWAY 6 AT SETTLERS WAY		12.5	2		1,558.5	210.0	5,395.0	8	4		1,558.5
HIGHWAY 6 AT PRIVATE (10 MINUTE OIL CHANGE)					267.5	35.0	930.0				267.5
HGIWHAY 6 AT FROST PASS					1,290.0	165.0	4,500.0	8	2		1,290.0
HIGHWAY 6 AT AUSTIN PKWY/DULLIES AVE		12.5	2		1,822.5	290.0	6,130.0	11	8		1,822.5
HIGHWAY 6 AT HEB					10.0	10.0					10.0
HIGHWAY 6 AT AUTOZONE					20.0	20.0					20.0
HIGHWAY 6 AT AMERICAS FIRST BANK					20.0	20.0					20.0
HIGHWAY 6 AT COLONIAL LAKE DR/LAKE COLONY		12.5	2		1,465.0	190.0	5,100.0	8	4		1,465.0
HIGHWAY 6 AT WHITE WING LN					72.5	30.0	170.0				72.5
HIGHWAY 6 AT RIVERSTONE BLVD		12.5	2		1,512.5	200.0	5,250.0	7	4		1,512.5
HIGHWAY 6 AT WENDYS					15.0	15.0					15.0
HIGHWAY 6 AT PNC BANK		12.5	2		1,302.5	170.0	4,530.0	6	4		1,302.5
HIGHWAY 6 AT SONIC DR IN					20.0	20.0					20.0
HIGHWAY 6 AT TOWNSHIP LN		12.5	2		195.0	195.0					195.0
HIGHWAY 6 UNIVERSITY BLVD/FM 1092	9	18.75	4		1,610.0	245.0	5,460.0	11	5		1,610.0
HIGHWAY 6 AT GLENN LAKES LN		25	4		1,470.0	195.0	5,100.0	8	4		1,470.0
HIGHWAY 6 AT FBISD BUS TRANSPORTATION					15.0	15.0					15.0
HIGHWAY 6 AT OILFIELD RD/LAKE OLYMPIA PHWY		25	4		855.0	235.0	2,480.0	8	6		855.0
HIGHWAY 6 AT KNIGHTS CT					205.0	205.0		6	4		205.0
HIGHWAY 6 AT HOUSTON FEDERAL CREDIT UNION					10.0	10.0					10.0
HIGHWAY 6 AT SIENNA RANCH RD/OYSTER CREK PL		25	4		1,652.5	225.0	5,710.0	8	7		1,652.5
HIGHWAY 6 AT COPPER CREEK LN					15.0	15.0					15.0
HIGHWAY 6 AT NAVY FEDERAL CREDIT UNION		18.75	3		1,115.0	200.0	3,660.0	8	4		1,115.0
HIGHWAY 6 AT SIENNA PKWY		25	4		1,645.0	205.0	5,760.0	6	6	2	1,645.0
SUBTOTAL	27	263	45	0.0	26,596.0	4,480.0	88,465.0	154	82	7	26,596.0

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SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		81

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
HIGHWAY 6 AT SIENNA CROSSING DR					915.0	180.0	2,940.0	10	2		915.0
HIGHWAY 6 AT PRIVATE (IHOP)					20.0	20.0					20.0
HIGHWAY 6 AT KITTY HOLLOW PARK DR					20.0	20.0					20.0
HIGHWAY 6 AT PRIVATE DR (DAVITA)					25.0	25.0					25.0
HIGHWAY 6 AT TRAMMEL FRESNO RD		25	4		1,515.0	225.0	5,160.0	7	5	1	1,515.0
HIGHWAY 6 AT OAKWICK FOREST DR					10.0	10.0					10.0
HIGHWAY 6 AT VICKSBURG BLVD					155.0	155.0		6	1		155.0
HIGHWAY 6 AT PRIVATE (FIRESTONE)					35.0	35.0					35.0
HIGHWAY 6 AT KROGER FUEL CENTER					20.0	20.0					20.0
HIGHWAY 6 AT SUBWAY (KORGER SHOPPING CNTR)					15.0	15.0					15.0
HIGHWAY 6 AT FORT BEND TOLL RD	9	18.75	4		1,455.0	315.0	4,560.0	20			1,455.0
HIGHWAY 6 AT WATTS PLANTATION DR					647.5	85.0	2,250.0				647.5
HIGHWAY 6 AT NORTH /SOUTHCREEKMONT DR		12.5	2		1,627.5	225.0	5,610.0	10	4		1,627.5
HIGHWAY6 AT WESTENFELDT					15.0	15.0					15.0
HIGHWAY 6 AT DARBYLN/TEAL BEND BLVD					210.0	210.0		8	3		210.0
HIGHWAY 6 AT S. POST OAK BLVD					205.0	205.0		8	4		205.0
HIGHWAY 6 AT MCKEEVER RD					15.0	15.0					15.0
HIGHWAY 6 AT FM 521	36		4		905.0	200.0	2,820.0	12	2		905.0
HIGHWAY 6 AT GREEN GROVE LN					15.0	15.0					15.0
HIGHWAY 6 AT SAVANNAH PKWY					826.0	150.0	2,705.0	8	2		826.0
HIGHWAY 6 AT PRIVATE (CVS)					20.0	20.0					20.0
HIGHWAY 6 AT IOWA COLONY/OLD ALDINE RD					240.0	240.0		10	4		240.0
HIGHWAY 6 AT 288	36	12.5	4		1,377.5	275.0	4,410.0	13	4	1	1,377.5
HIGHWAY 6 AT POLLARD BLVD					177.5	20.0	630.0	8	2		177.5
HIGHWAY 6 AT MCCOY RD	9	6.25	2		825.0	150.0	2,700.0	8	4		825.0
HIGHWAY 6 AT WILSON DR					35.0	35.0					35.0
HIGHWAY 6 AT PALMETTO					30.0	30.0					30.0
HIGHWAY 6 AT MASTERS		25	4		1,305.0	195.0	4,440.0	8	4		1,305.0
HIGHWAY 6 AT RUSSEL					30.0	30.0					30.0
HIGHWAY 6 AT ELM ST					15.0	15.0					15.0
HIGHWAY 6 AT CEMETARY RD					30.0	30.0					30.0
HIGHWAY 6 AT MISSISSIPPI RD					20.0	20.0					20.0
HIGHWAY 6 AT PINE ST					20.0	20.0					20.0
HIGHWAY 6 AT PEARLAND SITES RD					160.0	160.0		8	2		160.0
SUBTOTAL	90	100	24	0.0	12,936.0	3,380.0	38,225.0	144	43	2	12,936.0

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SUMMARY OF QUANTITIES

SHEET 11 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8J

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
HIGHWAY 6 AT COX LN					35.0	35.0					35.0
HIGHWAY 6 AT FM 146					150.0	150.0		8	2		150.0
HIGHWAY 6 AT FM 147					15.0	15.0					15.0
HIGHWAY 6 AT FROBERG DR					15.0	15.0					15.0
HIGHWAY 6 AT AARON DR					15.0	15.0					15.0
HIGWHAY 6 AT NEWTON DR					15.0	15.0					15.0
HIGHWAY 6 AT HEIGHTS MANVEL RD		12.5	2		1,310.0	170.0	4,560.0	8	2		1,310.0
HIGHWAY 6 AT MCCORMICK ST					50.0	50.0					50.0
HIGHWAY 6 AT BRAZOS ST/ N 2ND ST		12.5	2		1,345.0	190.0	4,620.0	11	4		1,345.0
HIGHWAY 6 AT AVENUE E 1/2 SOUTH					20.0	20.0					20.0
HIGHWAY 6 AT AVNUE E 1/2 NORTH					15.0	15.0					15.0
HIGHWAY 6 AT PERRY ST/AVENUE C					70.0	70.0					70.0
HIGHWAY 6 AT N GORDON	18	12.5	4		1,450.0	205.0	4,980.0	9	4		1,450.0
HIGHWAY 6 AT DILLING ST				25.0	25.0	25.0					
HIGHWAY 6 AT N SHIRLEY ST				30.0	30.0	30.0					
HIGHWAY 249 AT IH 45	36		4		1,460.0	350.0	4,440.0	6		1	1,460.0
HIGHWAY 249 AT SUNNYWOOD DR		12.5	2		1,105.0	265.0	3,360.0				1,105.0
HIGHWAY 249 AT DEER TRL DR	9		1		585.0	150.0	1,740.0	6	1		585.0
HIGHWAY 249 AT VETERANS MEMORIAL DR		25	4		1,935.0	465.0	5,880.0	8	4		1,935.0
HIGHWAY 249 AT ELLA BLVD		12.5	2		835.0	205.0	2,520.0	6	1		835.0
HIGHWAY 249 AT ROSSLYN RD					825.0	195.0	2,520.0	10	2		825.0
HIGHWAY 249 AT OLD HICKORY					890.0	215.0	2,700.0	8	2		890.0
HIGHWAY 249 AT MOONGLOW DR					1,080.0	270.0	3,240.0	8	2		1,080.0
HIGHWAY 249 AT TC JESTER BLVD		6.25	1		910.0	220.0	2,760.0	8	2		910.0
HIGHWAY 249 AT BREEN DR					1,030.0	235.0	3,180.0	8	2		1,030.0
HIGHWAY 249 AT UPLAND WILLOW AVE					0.0			6	1		
HIGHWAY 249 AT OLD FOLTIN RD					0.0			8	4		
HIGHWAY 249 AT MOSILEE ST					0.0			8	1		
HIGHWAY 249 AT ANTOINE DR		25	4		2,115.0	510.0	6,420.0	8	4		2,115.0
HIGHWAY 249 AT WEST RD	18	12.5	4		1,795.0	445.0	5,400.0	12	4		1,795.0
HIGHWAY 249 AT SMILING WOOD LN		12.5	2		1,270.0	310.0	3,840.0	8	4		1,270.0
HIGHWAY 249 AT N HOUSTON ROSSLYN RD		25	4		1,825.0	445.0	5,520.0	6	4	1	1,825.0
HIGHWAY 249 AT OLD BAMMEL N HOUSTON		12.5	2		1,590.0	345.0	4,980.0	7	4		1,590.0
HIGHWAY 249 AT FALLBROOK DR		12.5	2		1,720.0	400.0	5,280.0	6	6		1,720.0
SUBTOTAL	81	194	40	55.0	25,530.0	6,045.0	77,940.0	173	60	2	25,475.0

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SUMMARY OF QUANTITIES

SHEET 12 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8K

LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
HIGHWAY 249 AT SETTON LAKE DR		12.5	2		1,255.0	310.0	3,780.0	8	4		1,255.0
HIGHWAY 249 AT HOLLISTER RD		12.5	2		1,872.5	335.0	6,150.0	8	4		1,872.5
HIGHWAY 249 AT BW 8	18	12.5	4		965.0	245.0	2,880.0	12			965.0
WESTHEIMER AT BRIARGREEN DR		12.5	2		1,392.5	185.0	4,830.0	8	2		1,392.5
WESTHEIMER AT WESTHOLLOW DR		12.5	2		1,100.0	155.0	3,780.0	10	2		1,100.0
WESTHEIMER AT WINDCHASE BLVD		12.5	2		1,265.0	170.0	4,380.0	13			1,265.0
WESTHEIMER AT ELDRIDGE		25	4		1,445.0	185.0	5,040.0	14			1,445.0
WESTHEIMER AT SYNOTT RD		25	4		1,197.5	170.0	4,110.0	12			1,197.5
WESTHEIMER AT ASHFORD OAK DR		25	4		1,290.0	180.0	4,440.0	8	2		1,290.0
WESTHEIMIER AT DAIRY ASHFORD		25	4		1,405.0	220.0	4,740.0	18			1,405.0
WESTHEIMER AT SHADOWBRIAR DR		25	4	1,235.0	1,235.0	170.0	4,260.0	13			
WESTHEIMER AT GRAY FALLS DR		25	4	1,170.0	1,170.0	180.0	3,960.0	6	3	1	
WESTHEIMER AT S. KIRKWOOD RD		25	4	1,430.0	1,430.0	215.0	4,860.0	10	6		
WESTHEIMER AT CRESCENT PARK DR		25	4	1,390.0	1,390.0	190.0	4,800.0	10	2		
WESTHIEMER AT WOODLAND DR		25	4	1,440.0	1,440.0	195.0	4,980.0	8	2		
WESTHEIIMER AT HAYNES		25	4	1,135.0	1,135.0	175.0	3,840.0	11	1		
WESTHIEMER AT WILCREST DR		25	4	1,557.5	1,557.5	230.0	5,310.0	18			
WESTHEIMER AT WALNUT BEND DR		25	4	1,490.0	1,490.0	170.0	5,280.0	12			
WESTHEIMER AT BLUE WILLOW DR		25	4	1,190.0	1,190.0	170.0	4,080.0	8	3		
WESTHEIMER AT RODGERDALE RD		25	4	1,250.0	1,250.0	185.0	4,260.0	13	2	1	
WESTHEIMER AT W. SAM HOUSTON FRNTG PKWY	27	6.25	4	1,355.0	1,355.0	350.0	4,020.0	11			
WESTHEIMER AT SEAGLER RD		25	4	1,280.0	1,280.0	185.0	4,380.0	8	2		
WESTHEIMER AT BRIARPARK DR		25	4	1,150.0	1,150.0	175.0	3,900.0	10	2		
WESTHEIMER AT ELMSIDE		12.5	2	965.0	965.0	140.0	3,300.0	7	3		
WESTHEIMER AT S GESSNER RD		25	4	1,455.0	1,455.0	225.0	4,920.0	21			
WESTHEIMER AT TANGLEWILDE AVE		25	4	1,180.0	1,180.0	175.0	4,020.0	12			
WESTHEIMER AT WESTERLAND DR		25	4	1,135.0	1,135.0	175.0	3,840.0	10	2		
WESTHEIMER AT JEANETTA ST		25	4	1,145.0	1,145.0	170.0	3,900.0	6	4		
WESTHEIMER AT FONDREN RD		25	4	1,375.0	1,375.0	205.0	4,680.0	16			
WESTHEIMER AT LAZY HOLLOW DR		25	4	762.5	762.5	170.0	2,370.0	10	1		
WESTHEIEMR AT DUNVALE		25	4	1,145.0	1,145.0	155.0	3,960.0	8	3		
WESTHEIMER AT OLD FARM RD		18.75	3	835.0	835.0	175.0	2,640.0	8	1		
WESTHEIMER AT STONEY BROOK DE		25	4	1,070.0	1,070.0	155.0	3,660.0	12			
WESTHEIMER AT HILLCROFT/VOSS	9	18.75	4	1,440.0	1,440.0	225.0	4,860.0	9	3		
SUBTOTAL	54	731	123	29,580.0	42,767.5	6,715.0	144,210.0	368	54	2	13,187.5

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SUMMARY OF QUANTITIES

SHEET 13 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8L

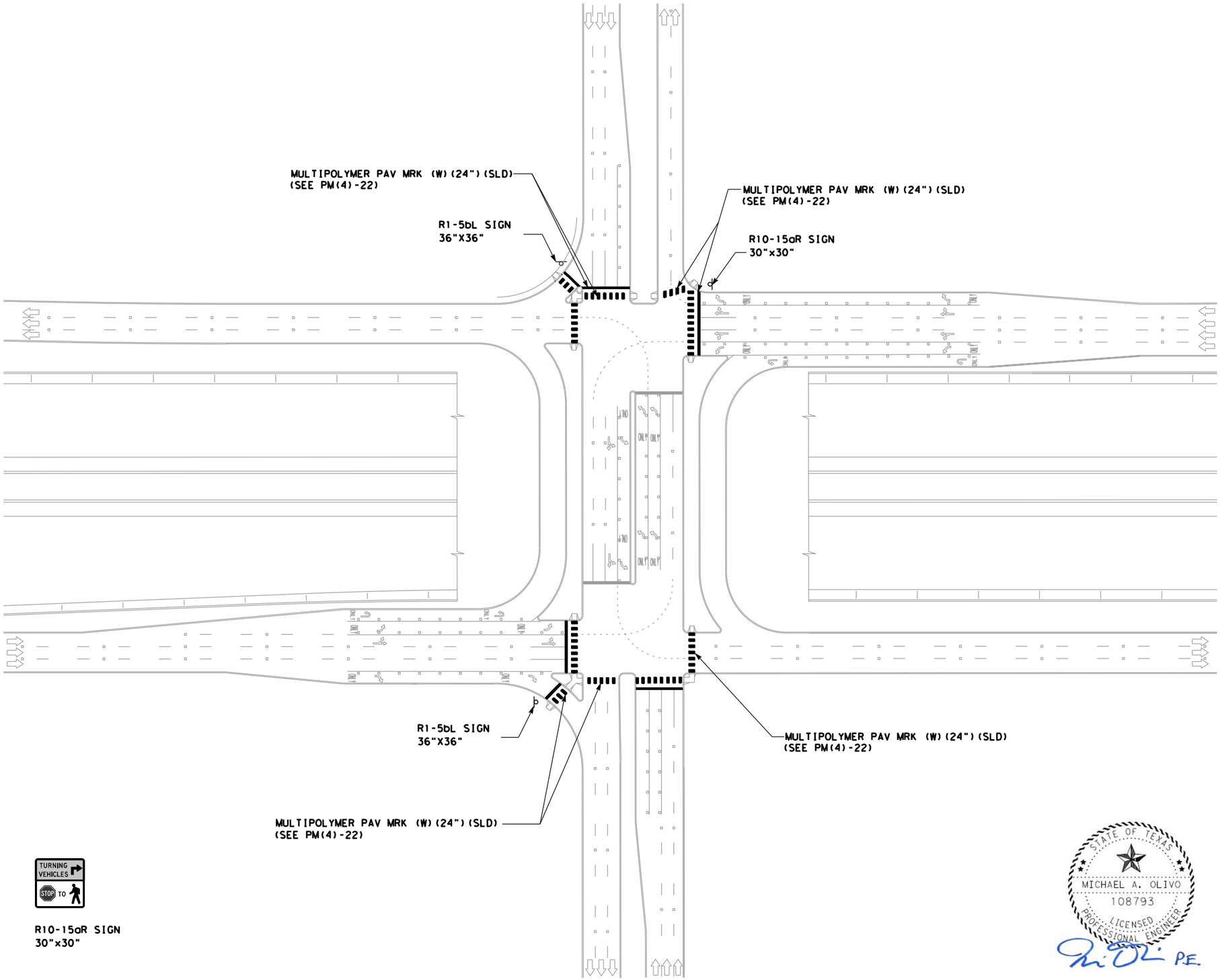
LOCATION	636-6001		644-6001	666-6048	666-6230	678-6008	678-6049	682-6060	682-6049	682-6050	6038-6013
	ALUMINUM SIGNS (TY A)		IN SM RD SN SUP&AM TY10BWG(1)SA (P)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	PAVEMENT SEALER 24"	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (BLST CLN) X-WALK	BACKPLATE W/REFL BRDR(3 SEC)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(5 SEC)	MULTIPOLYMER PAV MRK (W)(24")(SLD)
	R1-5bL	R10-15aR									
	SF	SF	EA	LF	LF	LF	SF	EA	EA	EA	LF
WESTHEIEMR AT WINROCK BLVD		12.5	2	1,085.0	1,085.0	155.0	3,720.0	8	2		
WESTHEIEMR AT BRIARHURST DR		25	4	940.0	940.0	130.0	3,240.0	12			
WESTHERIMER AT GREENRIDGE DR		18.75	3	940.0	940.0	145.0	3,180.0	11			
WESTHEIMER AT FOUNTAIN VIEW DR		25	4	1,290.0	1,290.0	195.0	4,380.0	12	2		
WESTHEIMER AT BERING DR		18.75	3	970.0	970.0	130.0	3,360.0	9	1		
WESTHEIMER AT CHIMNEY ROCK RD		25	4	1,245.0	1,245.0	195.0	4,200.0	12	2		
WESTHEIMER AT YORKTOWN ST		25	4	1,032.5	1,032.5	185.0	3,390.0	8	2		
WESTHEIMER AT SAGE RD		18.75	3	965.0	965.0	170.0	3,180.0	8	4		
WESTHEIMER RD AT MCRUE RD		25	4	1,025.0	1,025.0	155.0	3,480.0	8	2		
WESTHEIMER AT POST OAK BLVD	9	18.75	4	1,675.0	1,675.0	220.0	5,820.0	20			
WESTHEIMER AT WEST LOOP S	9	18.75	4	890.0	890.0	170.0	2,880.0	11		1	
FM 528 AT BS 35C	36	25	8	1,129.0	1,129.0	355.0	3,096.0	14	3		
FM 528 AT VICTORY LN	36		4	140.0	140.0	140.0		8	2		
FM 528 AT MOORE RD/LUNDY LN	36		4	465.0	465.0	135.0	1,320.0	8	2		
FM 528 AT SUN MEADOW BLVD	36		4	715.0	715.0	160.0	2,220.0	8	2		
FM 528 AT CYPRESS POINT/SAN JOAQUIN	36		4	610.0	610.0	145.0	1,860.0	6	4		
FM 528 AT DESOTA ST	18		2	85.0	85.0	85.0		6	1		
FM 528 AT FRIENDSWOOD LAKE BLVD	18		2	505.0	505.0	145.0	1,440.0	8	2		
FM 528 AT WHITAKER DR	36		4	130.0	130.0	130.0		8	2		
FM 528 AT FALCON RIGE BLVD	36		4	682.5	682.5	150.0	2,130.0	6	4		
FM 528 AT SUNSET DR	36		4	607.5	607.5	165.0	1,770.0	6	4		
FM 528 AT FM 518/S FRIENDS WOOD DR	36		4	1,110.0	1,110.0	255.0	3,420.0	8	4		
FM 528 AT WINDING WAY DR	36		4	717.5	717.5	170.0	2,190.0	6	4		
FM 528 AT BLACKHAWK BLVD	18		2	405.0	405.0	120.0	1,140.0	6	1		
FM 528 AT BAY AREA BLVD	36		4	780.0	780.0	195.0	2,340.0	8	4		
FM 528 AT PLYMOUTH COLONY DR	18		2	200.0	200.0	110.0	360.0	6	1		
FM 528 AT W NASA BLVD	36		4	547.5	547.5	165.0	1,530.0	8	2		
FM 528 AT NASA VALUE CENTER/GENESIS BLVD	36		4	502.5	502.5	150.0	1,410.0	9	2		
FM 528 AT IH45	36	25	8	780.0	780.0	195.0	2,340.0	12	2		
FM 528 AT TOWNES RD				180.0	180.0	30.0	600.0				
FM 528 AT FRIENDSWOOD TRL/CNTRY CLUB				40.0	40.0	40.0					
FM 528 AT PARKWOOD VILLAGE DR				40.0	40.0	40.0					
SUBTOTAL	594	281	111	22,429.0	22,429.0	4,930.0	69,996.0	260	61	1	0.0
CSJ 0912-00-628: TOTAL	3,929.3		573	67,780.0	212,824.5	45,513.5	669,272.5	2,034.0	598	40	143,809.0

DATE: 5/24/2022
FILE: H:\TrfSignals\ProjectS\CSJs 0912-72-650 and 0912-00-628 Systemic SafetyXPlans and Documents\PGL files\SYSTEMIC SAFETY - Greg.dgn

SUMMARY OF QUANTITIES

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8M



R1-5bL SIGN
36"X36"

R10-15aR SIGN
30"x30"

TYPICAL PLACEMENT PAVEMENT MARKINGS AND SIGNING FOR DIAMOND INTERCHANGE

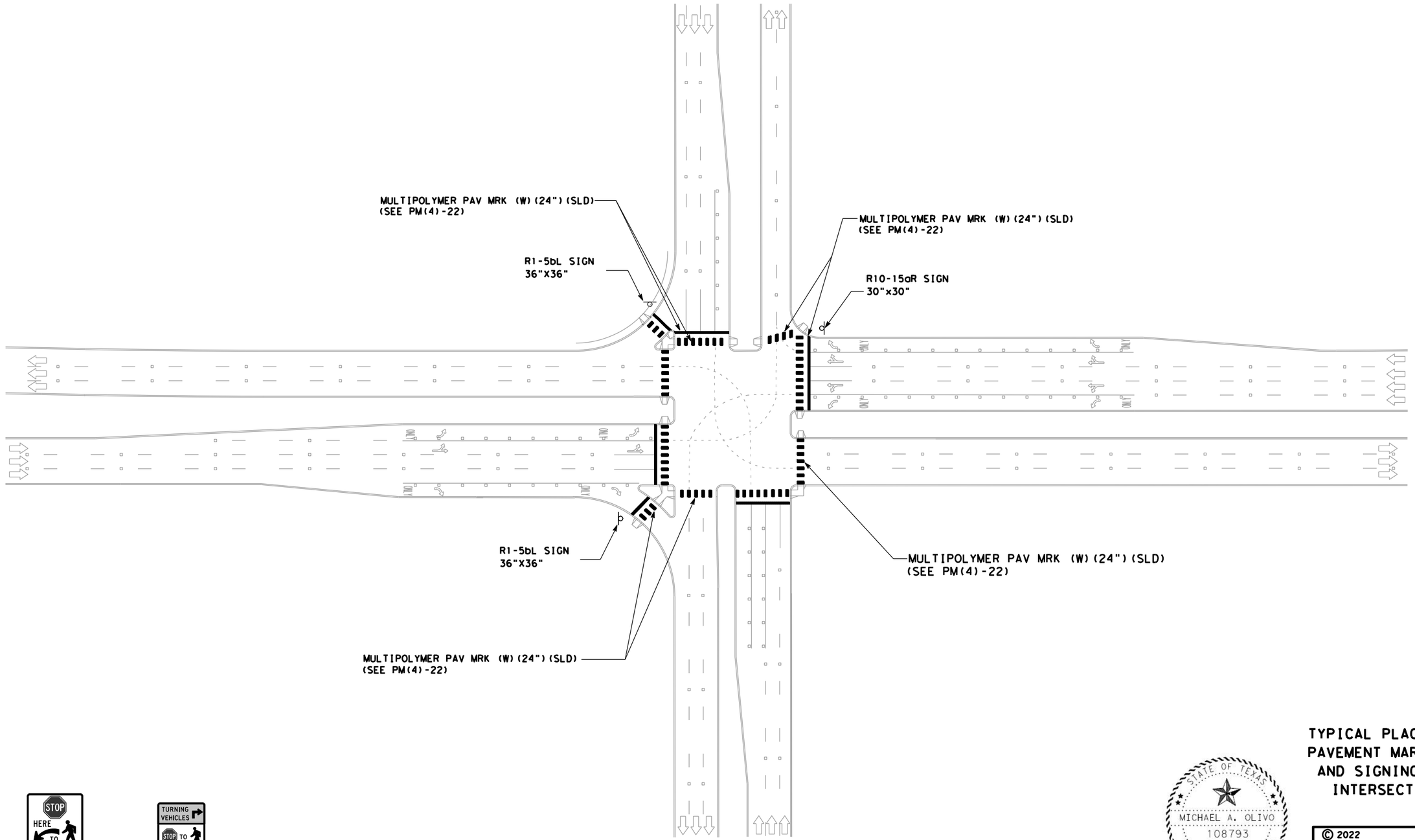
STATE OF TEXAS
MICHAEL A. OLIVO
108793
LICENSED
PROFESSIONAL ENGINEER
P.E.

05/05/2022

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		9

DATE: 5/2/2022
FILE: H:\Trf\Signals\06 PROJECTS\CSJs 0912-72-650 and 0912-00-628 Systemic Safety\Plans and Documents\DGN files\Summaries and diamond .dgn



R1-5bL SIGN
36"X36"

R10-15aR SIGN
30"x30"

P.E.

05/05/2022

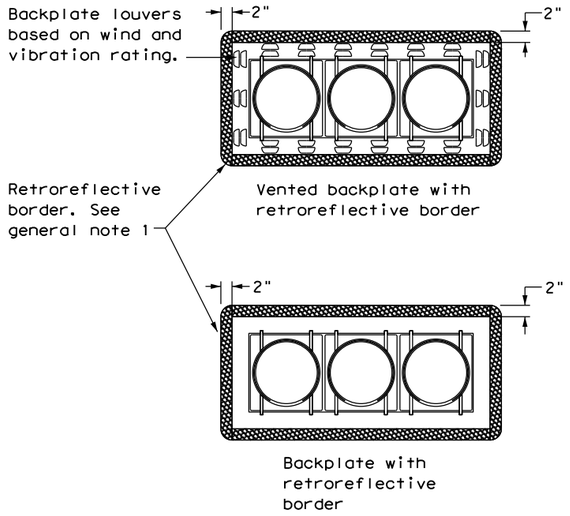
TYPICAL PLACEMENT PAVEMENT MARKINGS AND SIGNING FOR INTERSECTION

Texas Department of Transportation

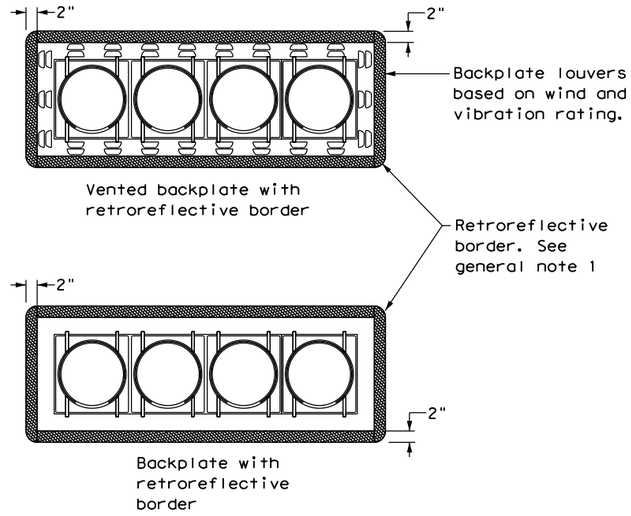
CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		10

DATE: 5/2/2022
FILE: H:\Traffic Signals\06 PROJECTS\CSJs 0912-72-650 and 0912-00-628 Systemic Safety Plans and Documents\DGN files\Summaries and diamond .dgn

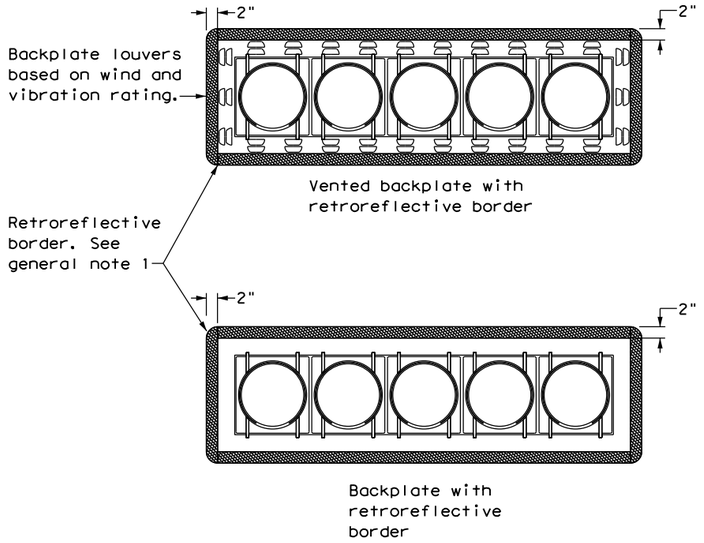
DATE:
FILE:



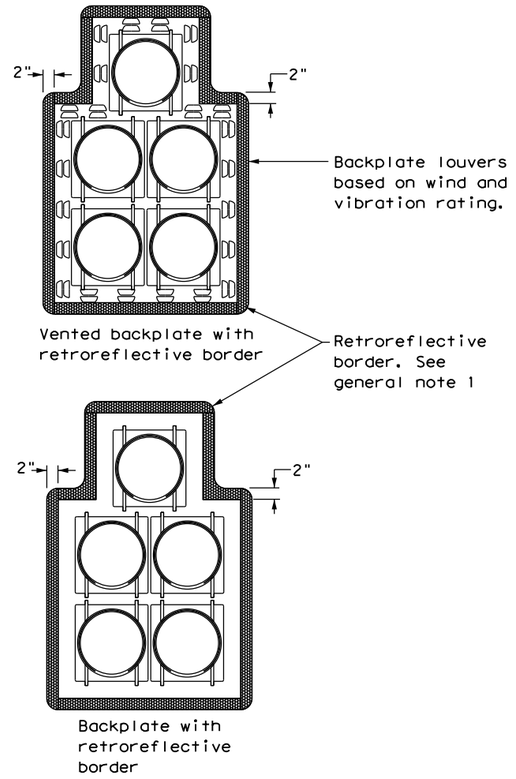
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



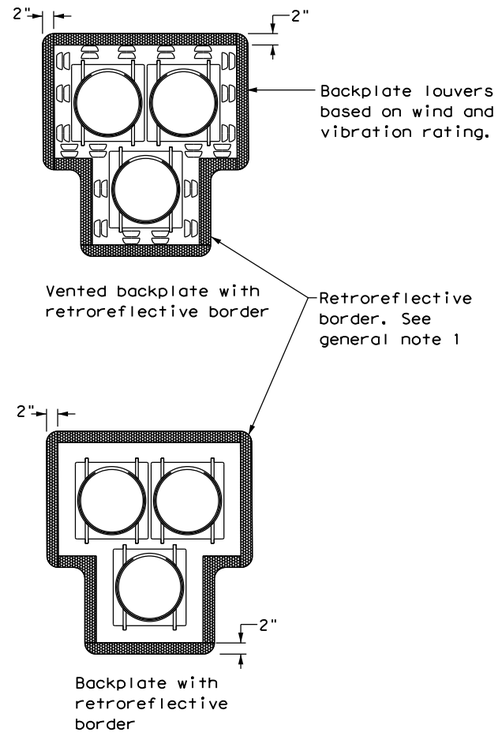
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

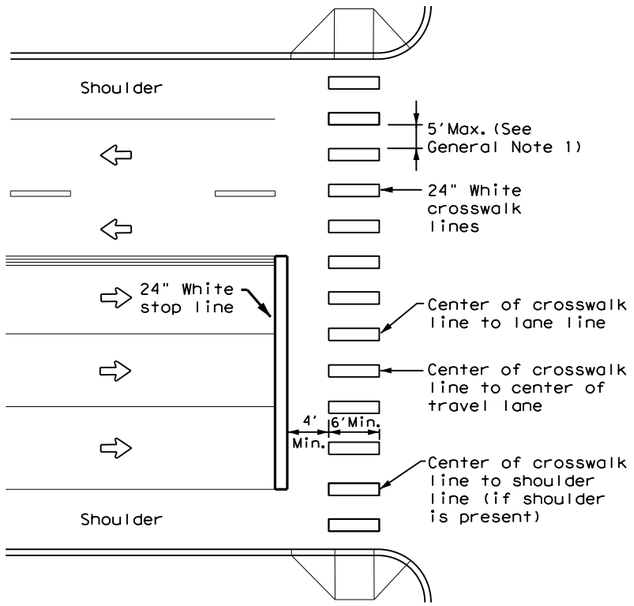
Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE
TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	72	650	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		11

DATE:
FILE:



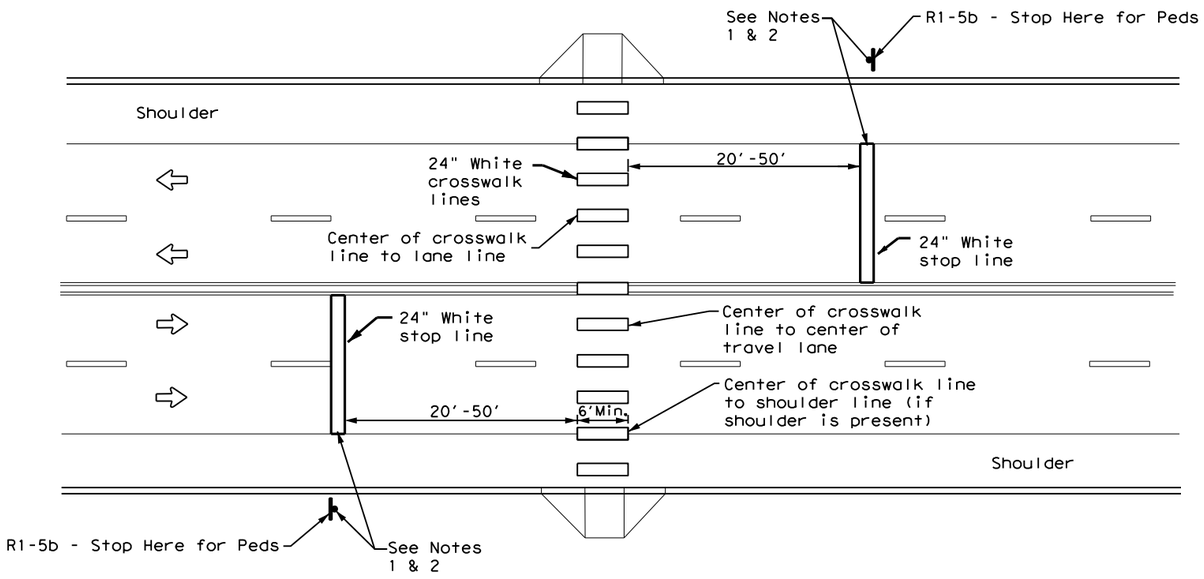
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with "Stop Here for Pedestrians" signs at unsignalized mid block cross walks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22

FILE: pm4-22.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-22	0912	72	650	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		12

22D

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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)

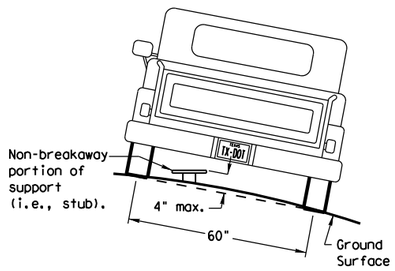
Anchor Type

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

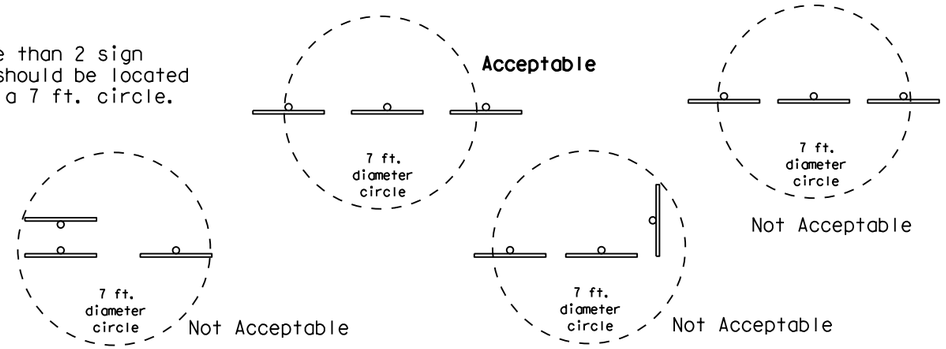
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
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



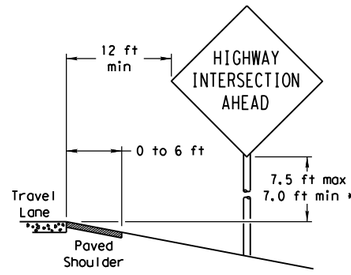
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



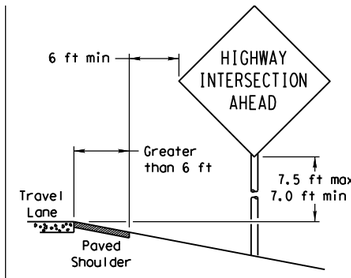
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

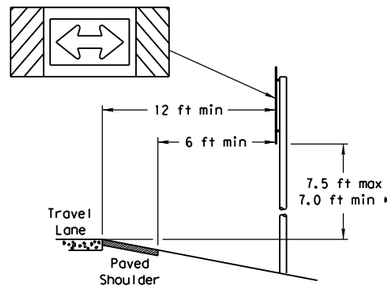
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



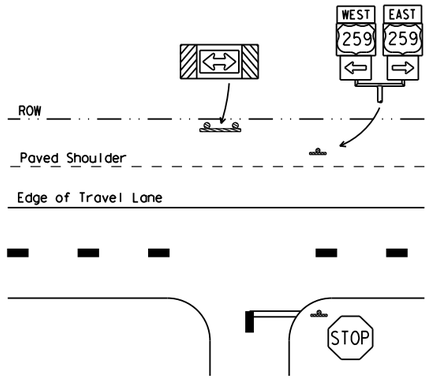
GREATER THAN 6 FT. WIDE

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.

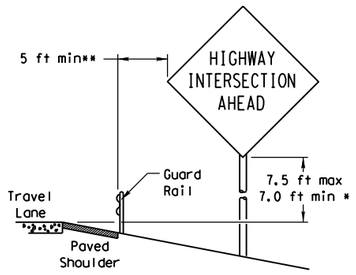
T-INTERSECTION



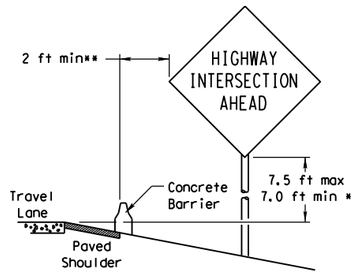
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



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.

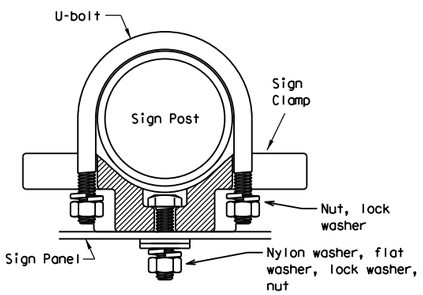
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

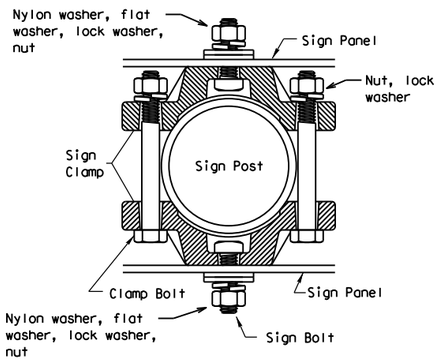
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



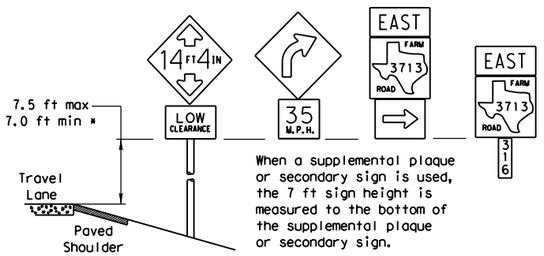
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

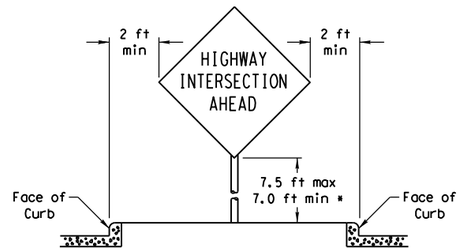
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



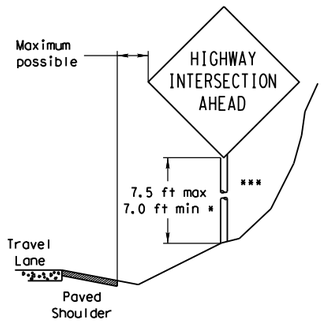
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

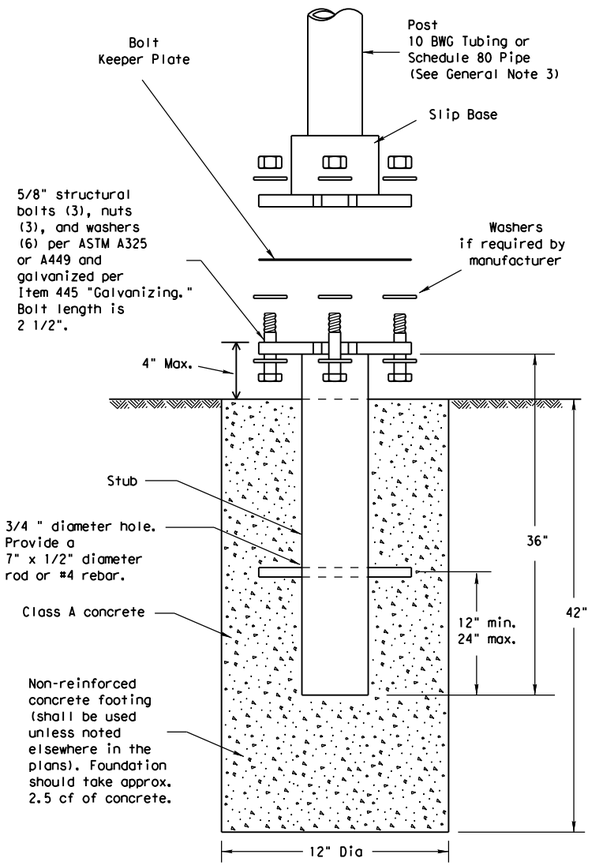
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0912	72	650	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		13

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.

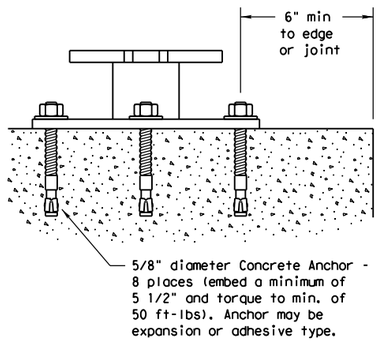
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

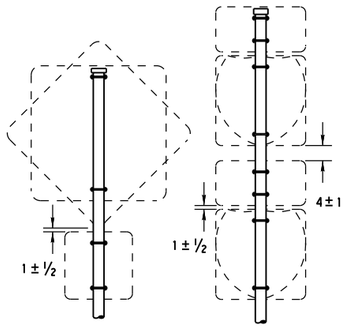
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS

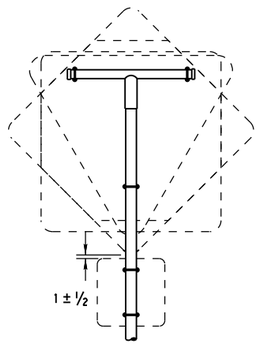
DIST	COUNTY	SHEET NO.
HOU	HARRIS	14

DATE:
FILE:

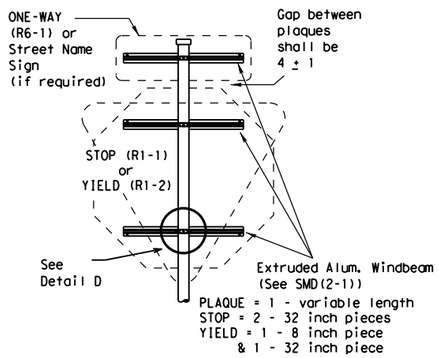
DATE:
FILE:



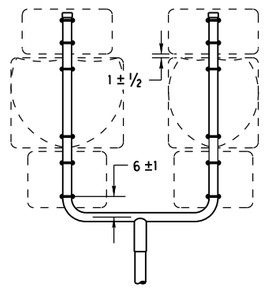
SM RD SGN ASSM TY XXXXX(1)XX(P)



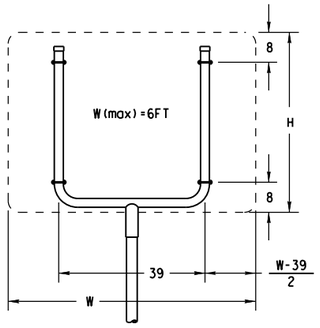
SM RD SGN ASSM TY XXXXX(1)XX(T)



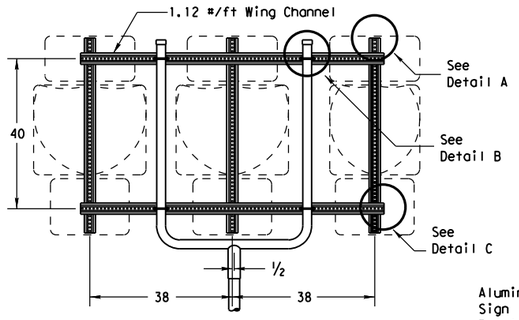
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



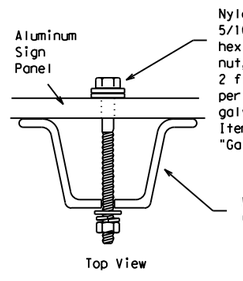
SM RD SGN ASSM TY XXXXX(1)XX(U)



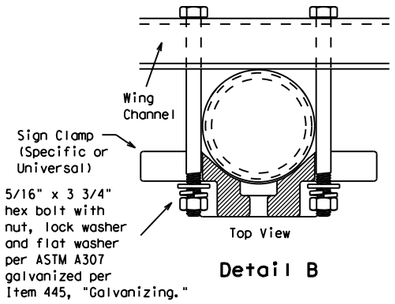
SM RD SGN ASSM TY XXXXX(1)XX(U)



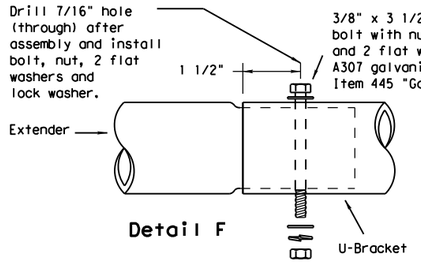
SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



Detail A

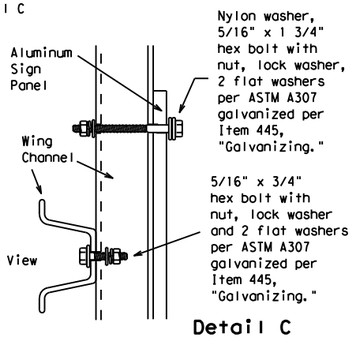


Detail B

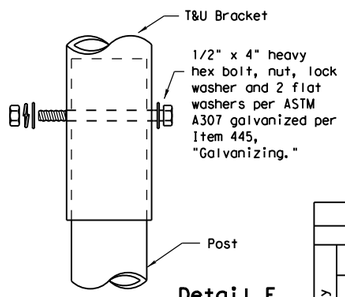


Detail F

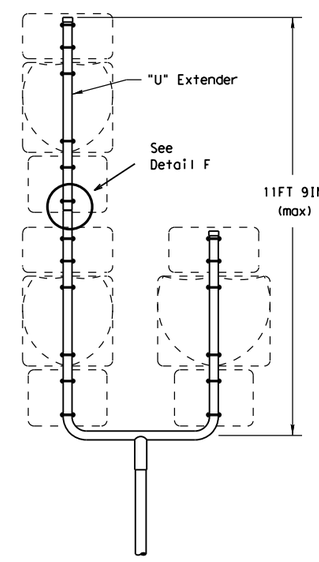
Splices shall only be allowed behind the sign substrate.



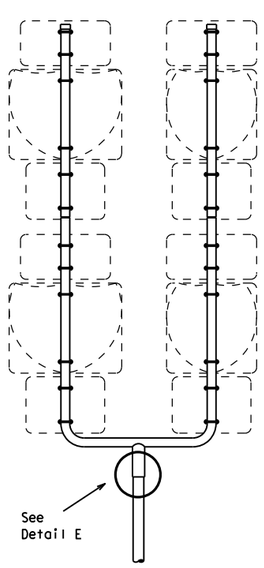
Detail C



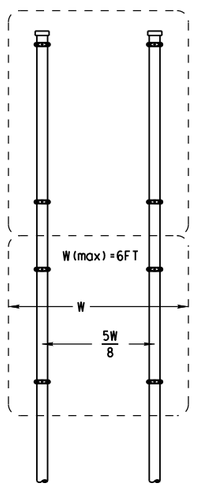
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

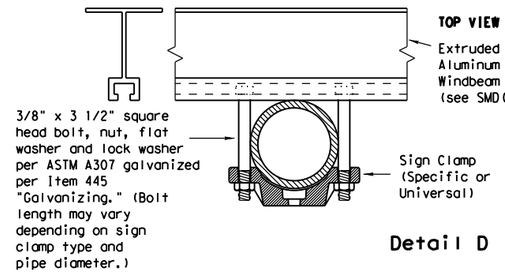


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

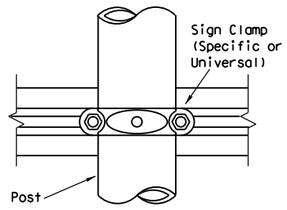


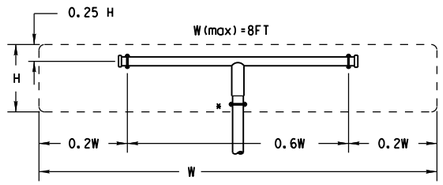
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

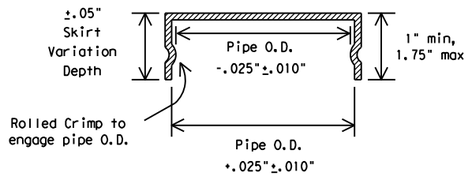




All dimensions are in english unless detailed otherwise.

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

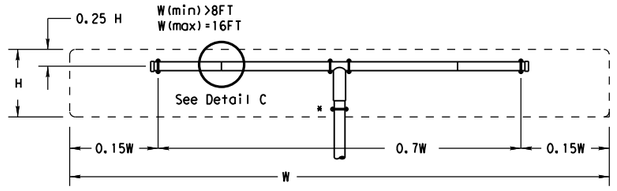
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

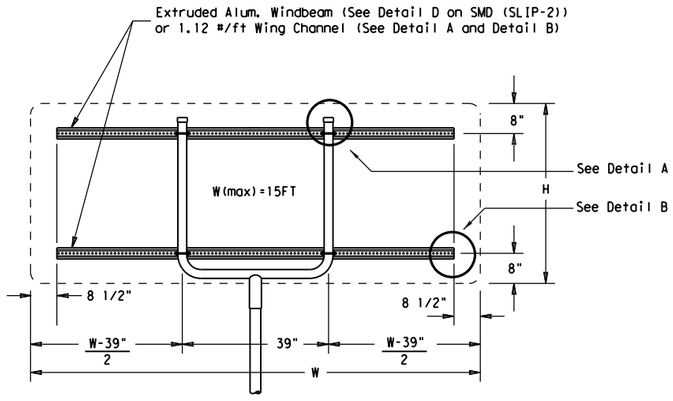
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0912	72	650	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		15

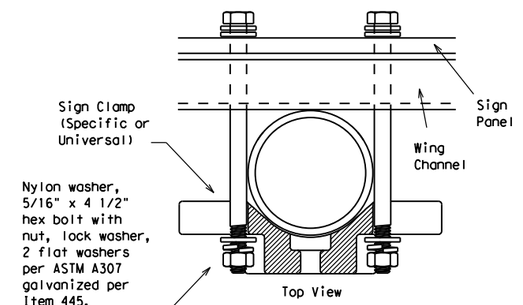
DATE:
FILE:



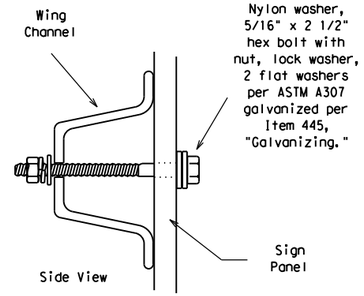
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



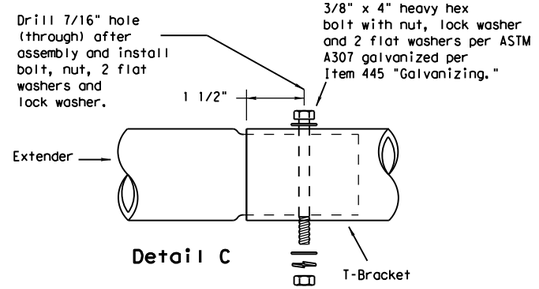
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



Detail A

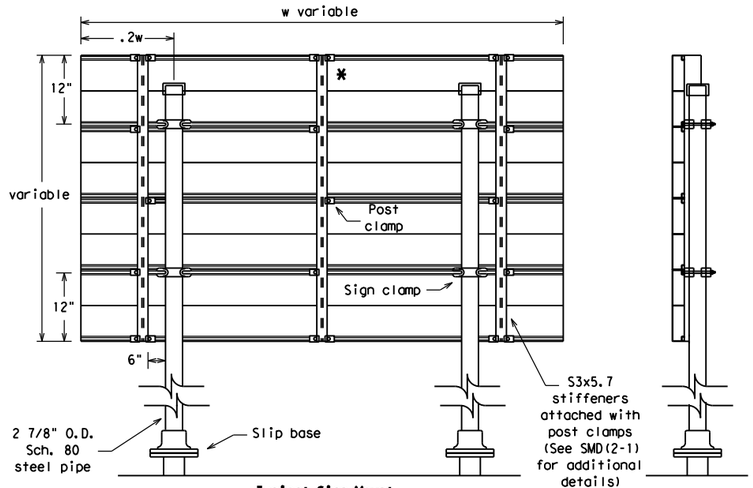


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

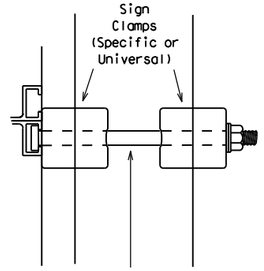


Typical Sign Mount

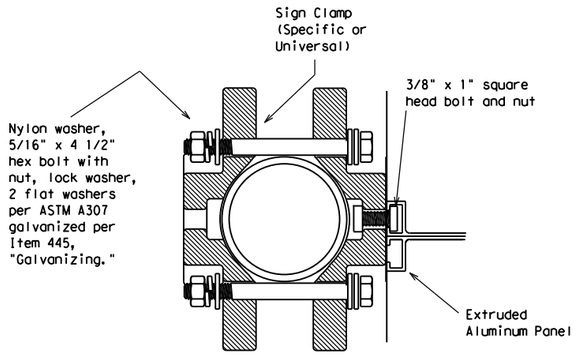
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

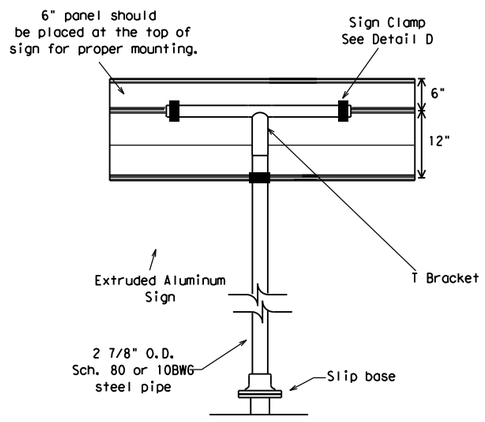
See Detail E
for clamp installation



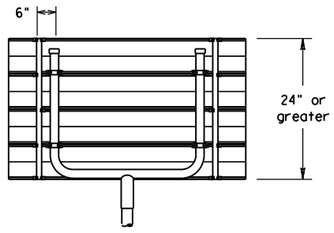
Detail E



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

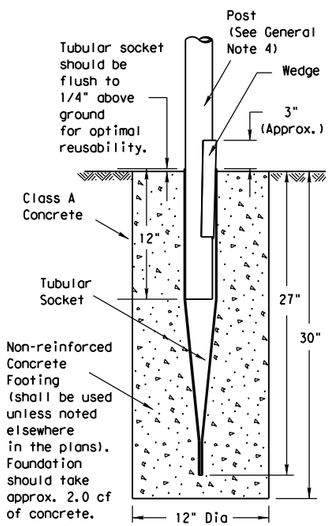
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0912	72	650	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		16

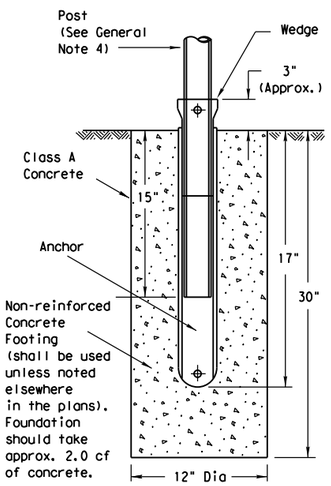
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

Wedge Anchor Steel System



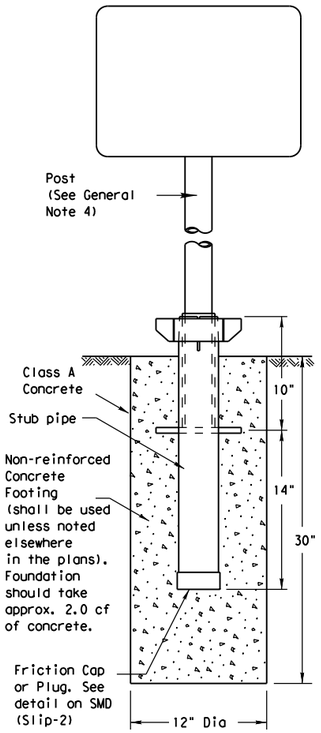
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

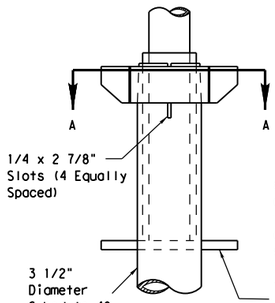


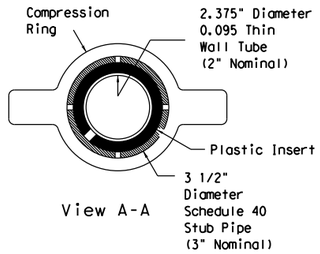
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



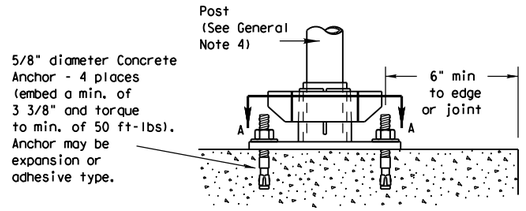
SM RD SGN ASSM TY TWT(X)UA(P)



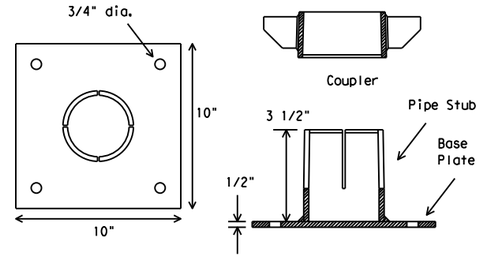


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

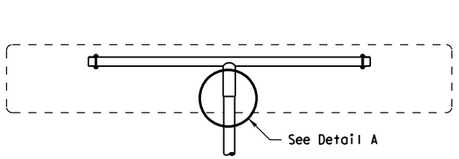


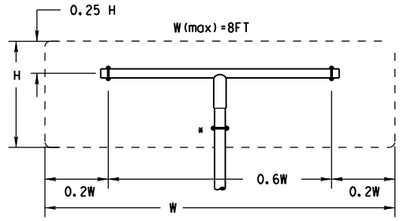
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



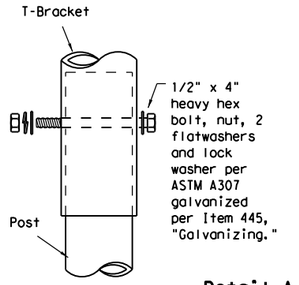
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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

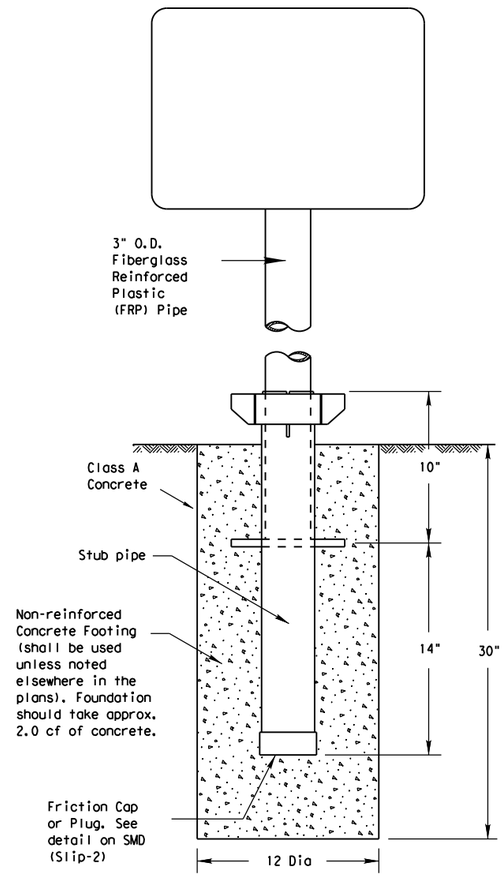
9-08 REVISIONS

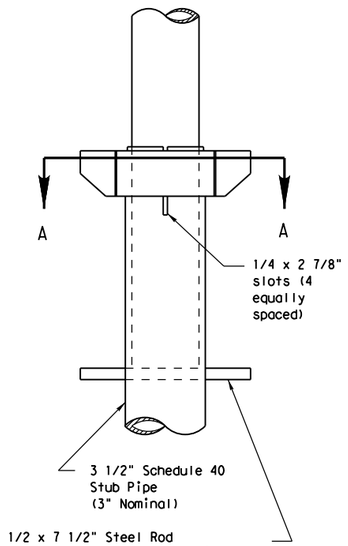
CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		17

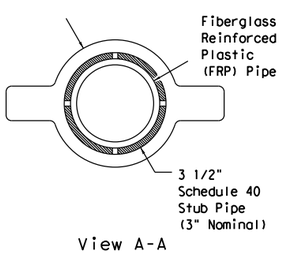
26E

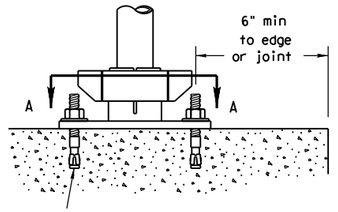
DATE:
FILE:

Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post



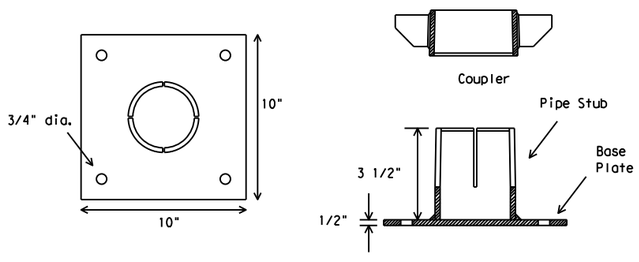






Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.

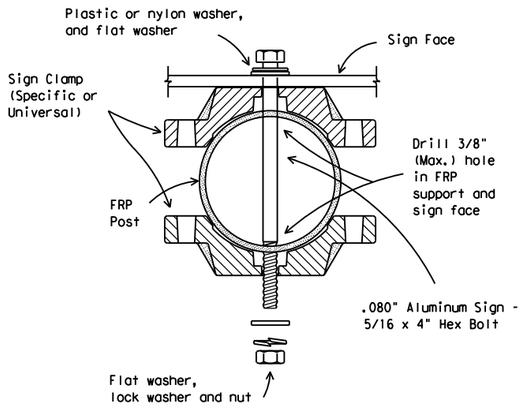
BOLT-DOWN DETAILS



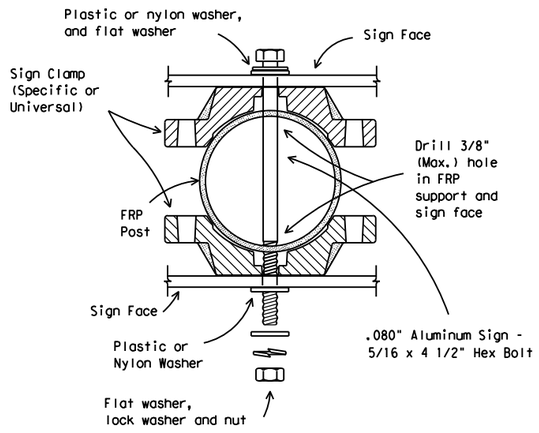
SM RD SGN ASSM TY FRP(X)UA(P)

SM RD SGN ASSM TY FRP(X)UB(P)

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert base post in foundation hole to depths shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
4. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
5. Attach sign to FRP post.
6. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
7. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
8. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

BOLT DOWN SIGN SUPPORT

1. Position base plate with coupler on existing concrete.
2. Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
3. Attach sign to FRP post.
4. Insert bottom of sign post into pipe stub.
5. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
6. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST

SMD(FRP)-08

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

REVISIONS

9-08

CONT	SECT	JOB	HIGHWAY
0912	72	650	VARIOUS
DIST	COUNTY		SHEET NO.
HOU	HARRIS		018

DATE:
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

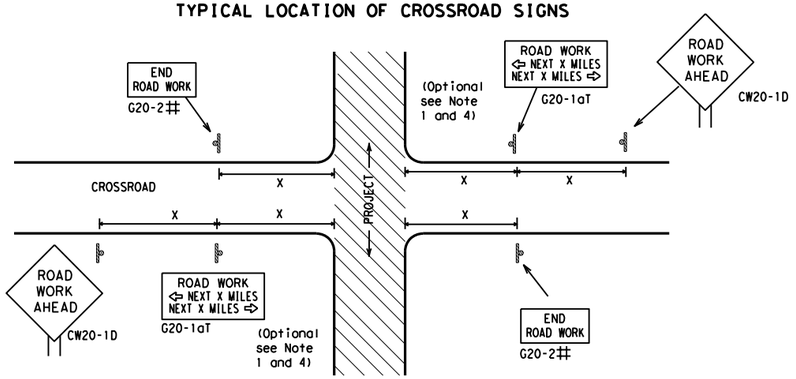
Traffic Safety Division Standard

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	72	650	VARIOUS
4-03 7-13	DIST	COUNTY		SHEET
9-07 8-14	HOU	HARRIS		19
5-10 5-21				

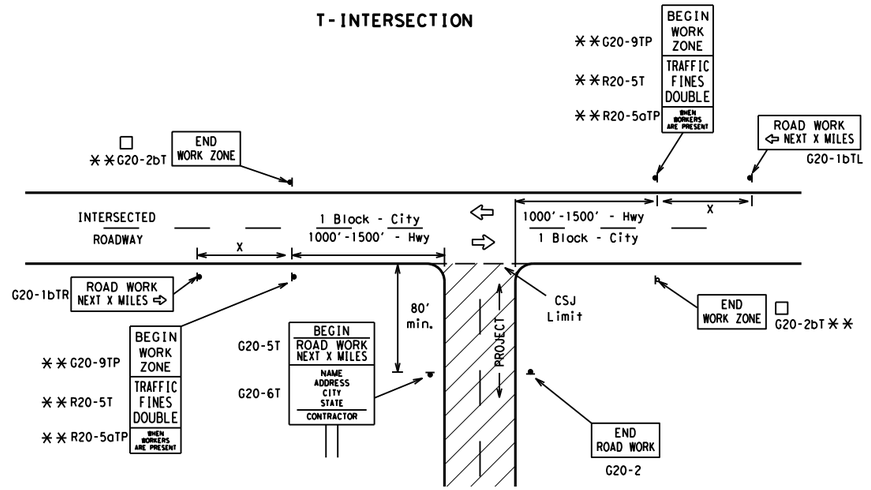
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

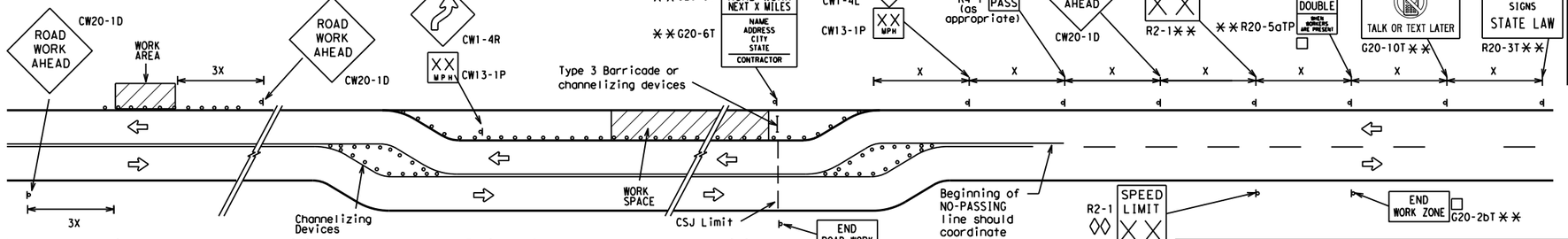
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

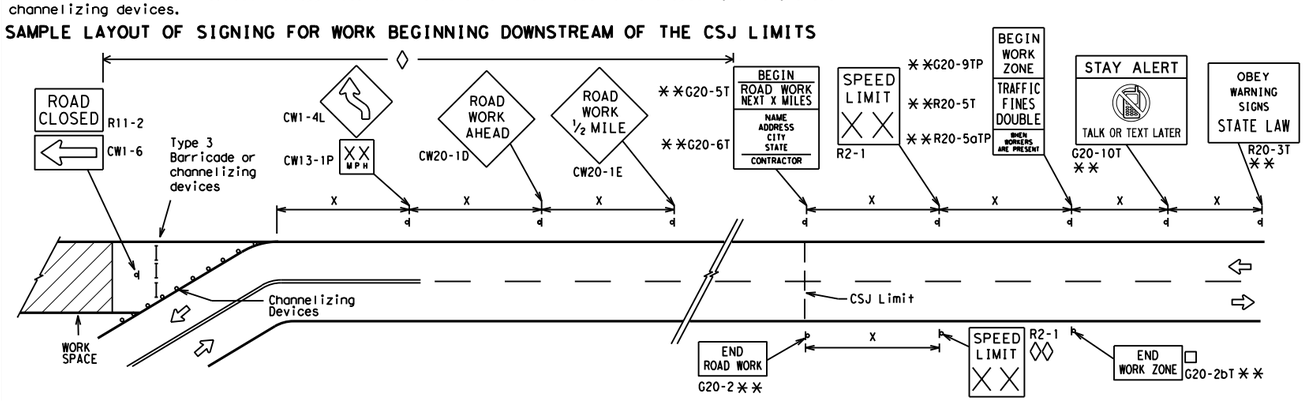
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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.

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	72	650	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		20

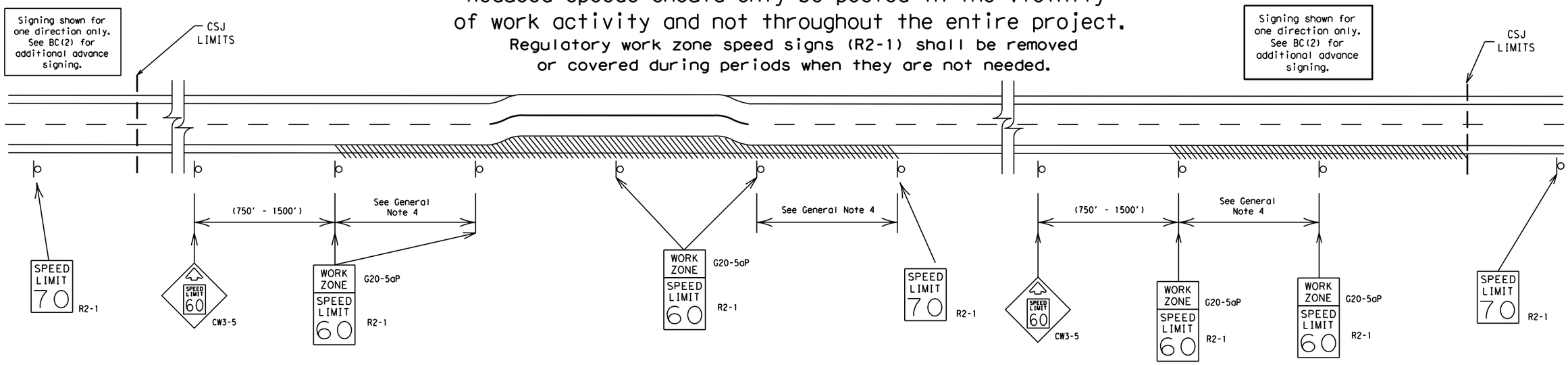
DATE:
FILE:

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

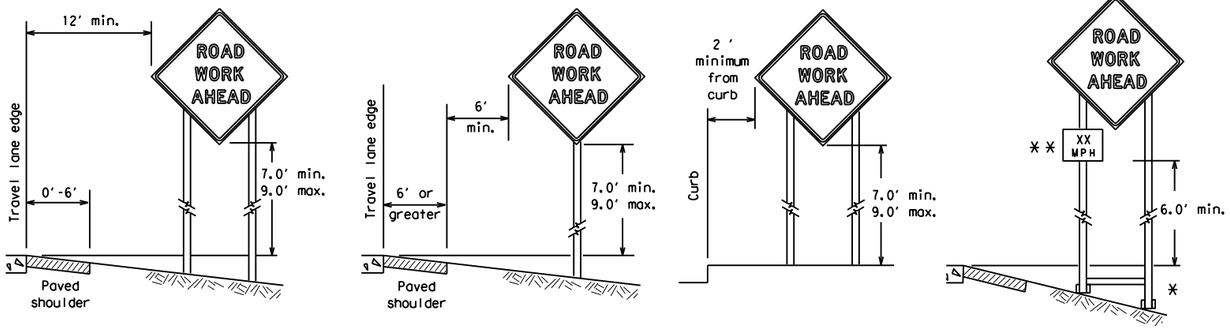
BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	72	650	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		21

DATE:
FILE:

DATE:
FILE:

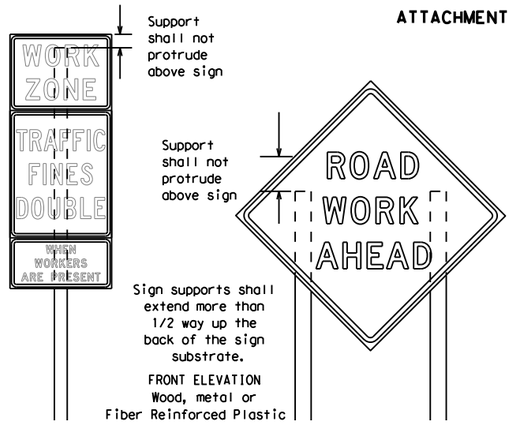
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

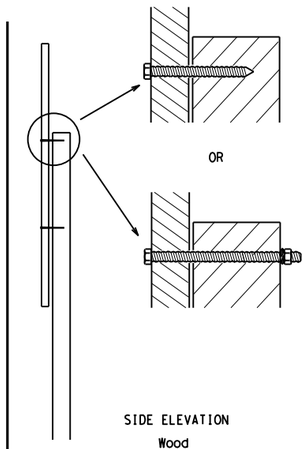


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

* * 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





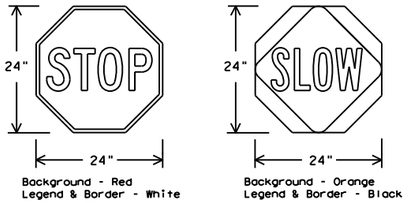
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

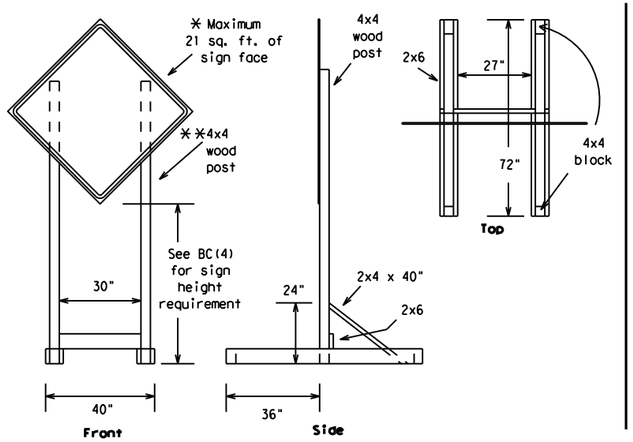
Texas Department of Transportation | Traffic Safety Division Standard

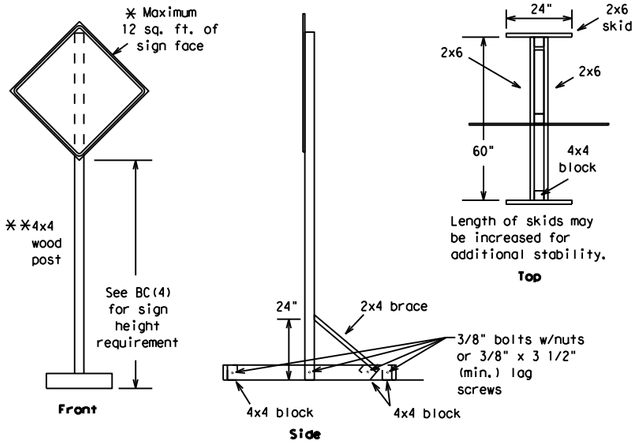
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	72	650	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		22

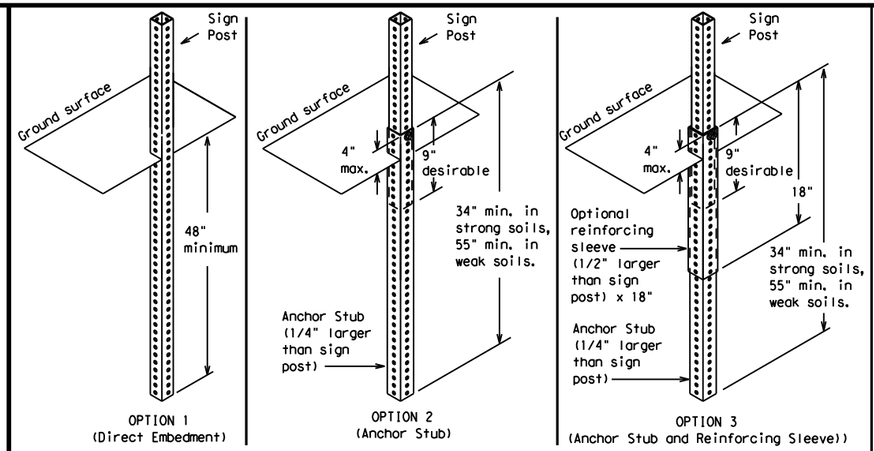
DATE:
FILE:





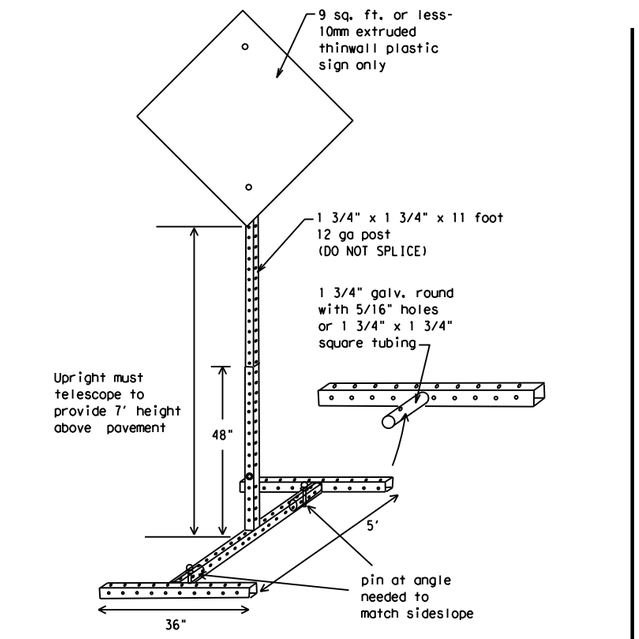
SKID MOUNTED WOOD SIGN SUPPORTS

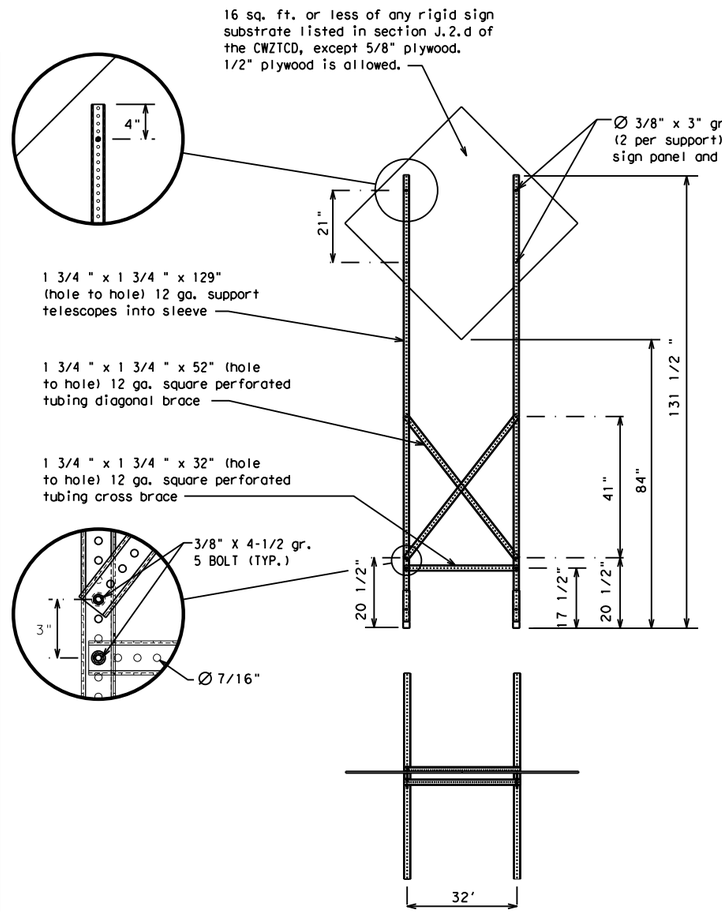
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

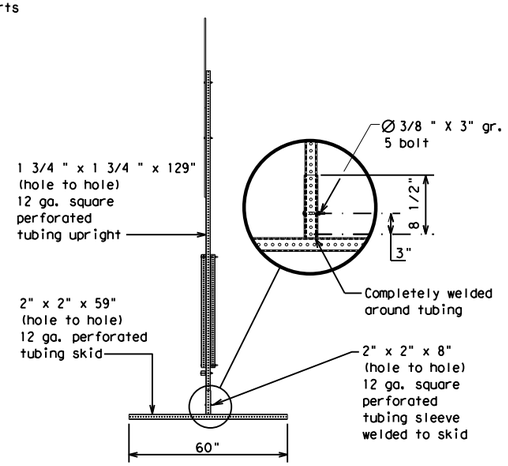


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	72	650	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		23

DATE:
FILE:

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
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

** 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
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REVISIONS	0912	72	650	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		24

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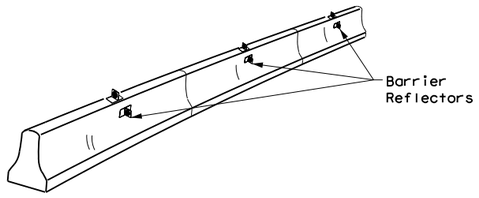
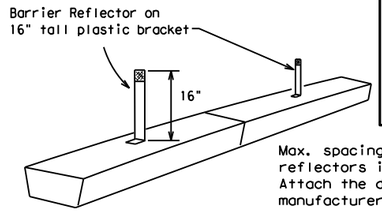
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

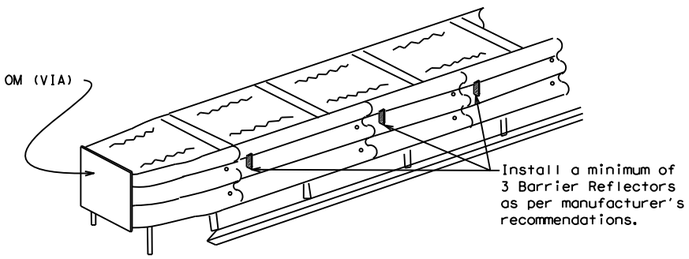


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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)

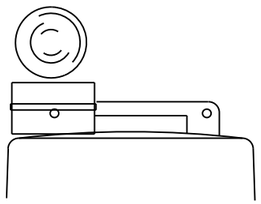


DELINEATION OF END TREATMENTS

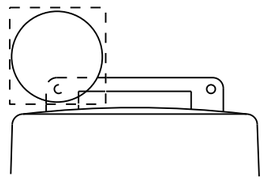
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

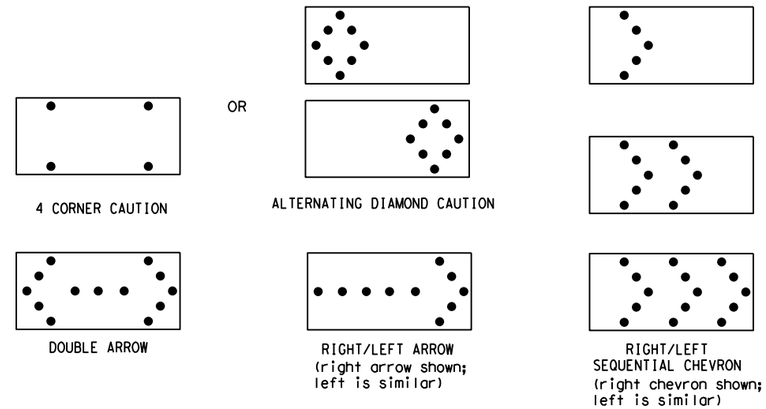
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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	72	650	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		25

101

DATE:
FILE:

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:

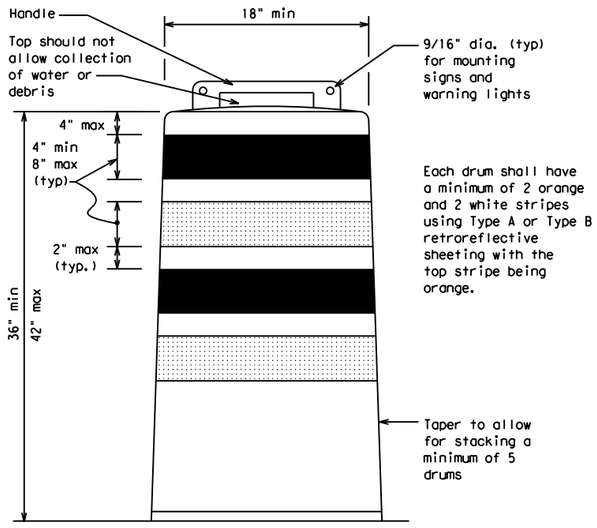
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

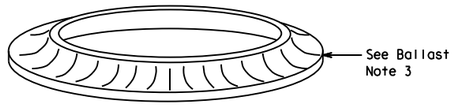
RETROREFLECTIVE SHEETING

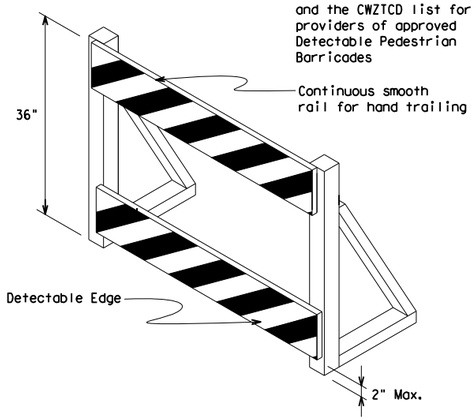
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

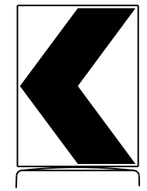




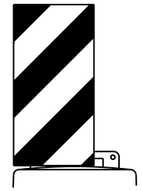


DETECTABLE PEDESTRIAN BARRICADES

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

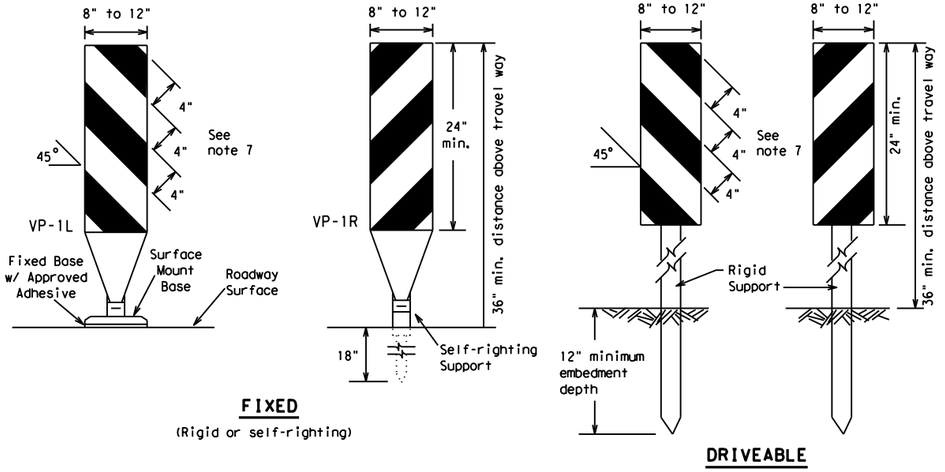
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	72	650	VARIOUS
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	HOU	HARRIS		26
7-13				

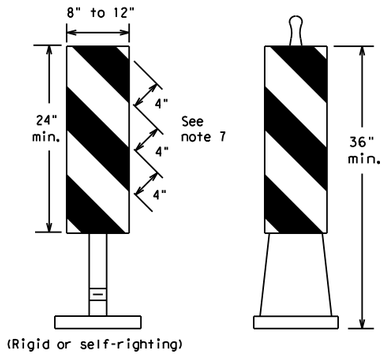
102

DATE:
FILE:



FIXED
(Rigid or self-righting)

DRIVEABLE

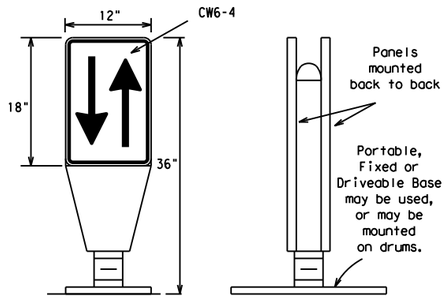


(Rigid or self-righting)

PORTABLE

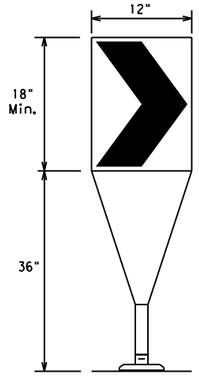
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

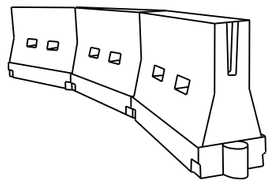
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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



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

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.

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

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7-13 5-21	HOU	HARRIS		27

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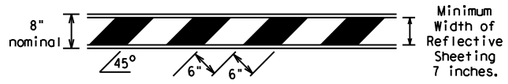
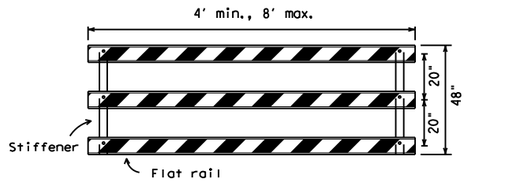
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



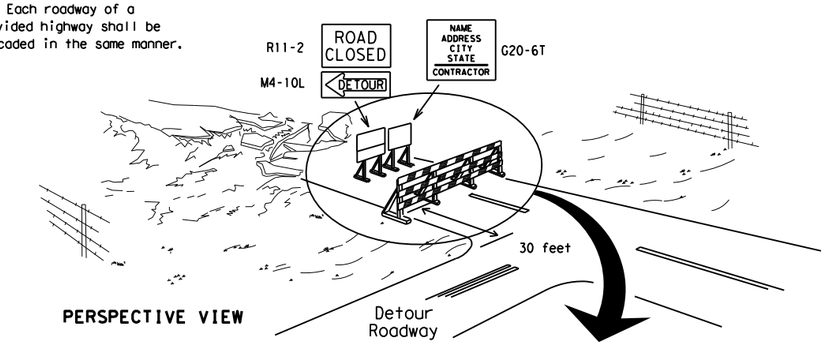
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

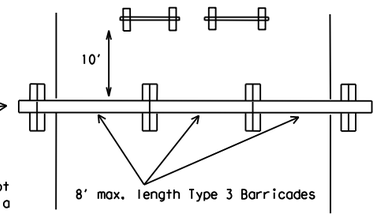
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

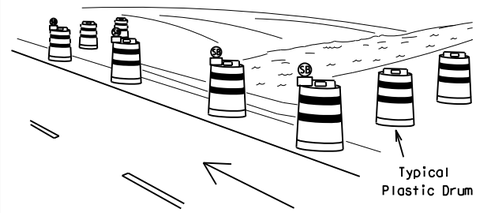
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

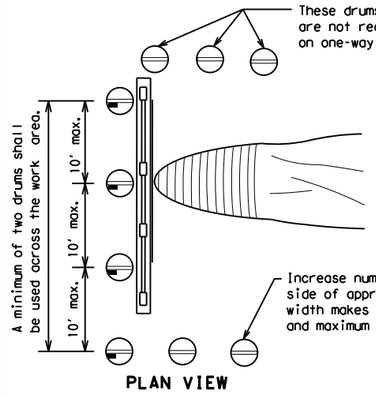
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

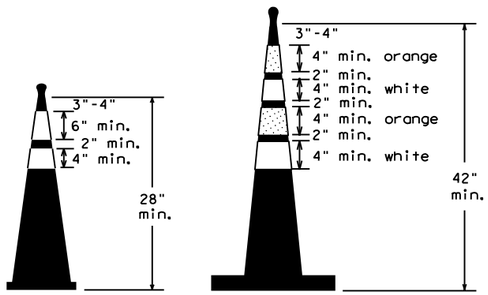
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

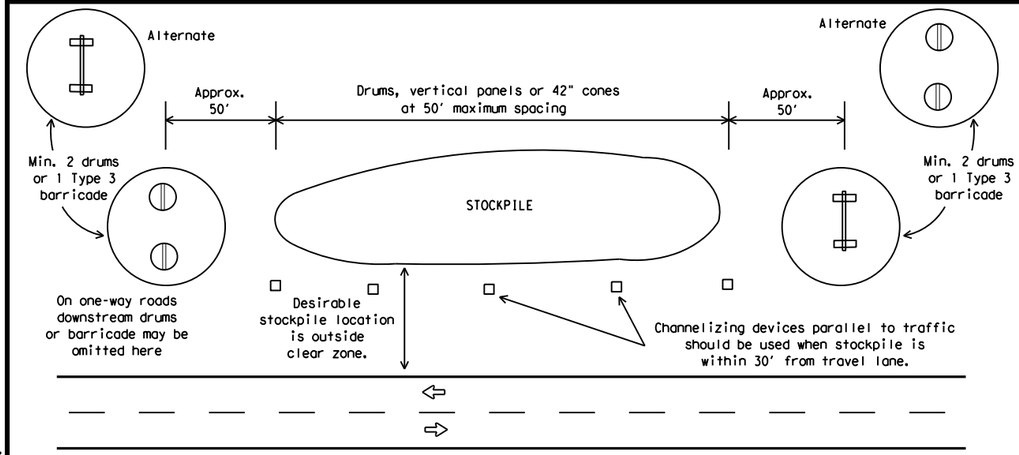
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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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.

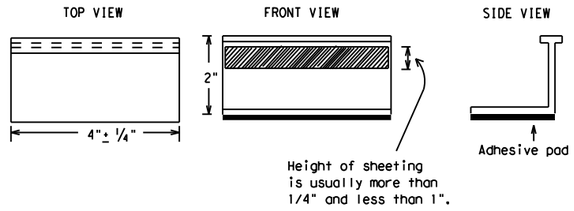
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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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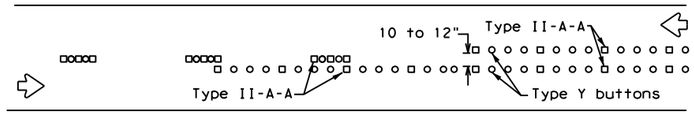
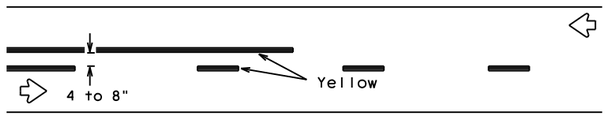
PAVEMENT MARKING PATTERNS

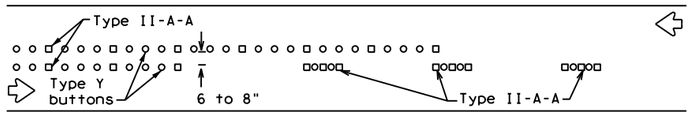
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



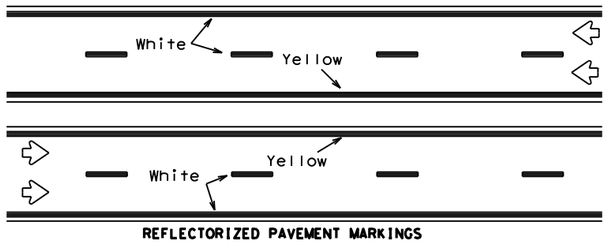
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



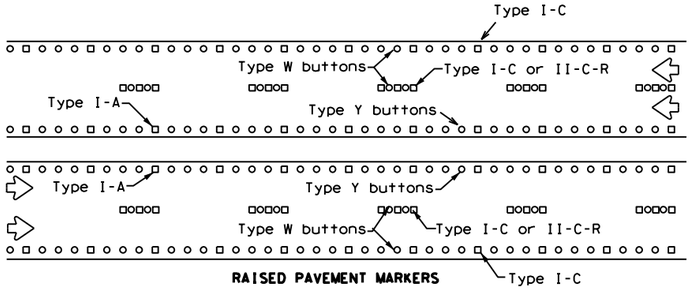
RAISED PAVEMENT MARKERS - PATTERN B

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



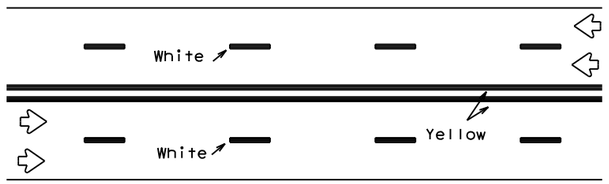
REFLECTORIZED PAVEMENT MARKINGS



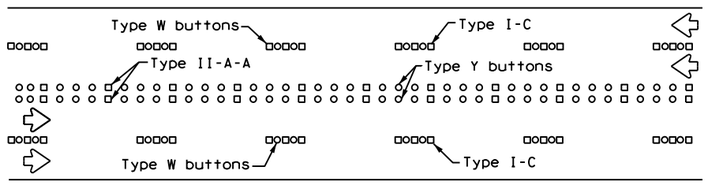
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



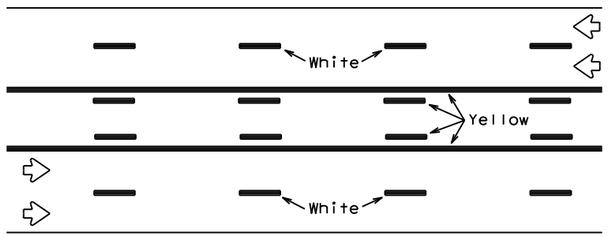
REFLECTORIZED PAVEMENT MARKINGS



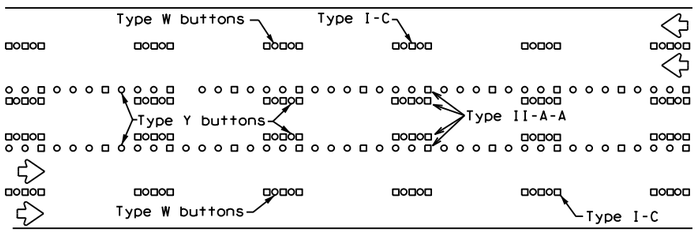
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

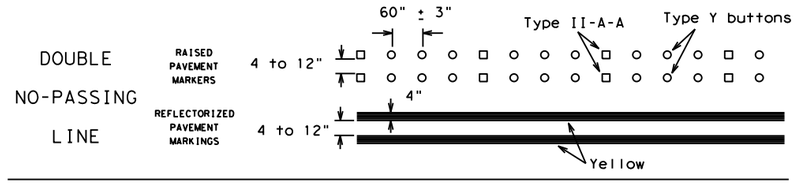
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

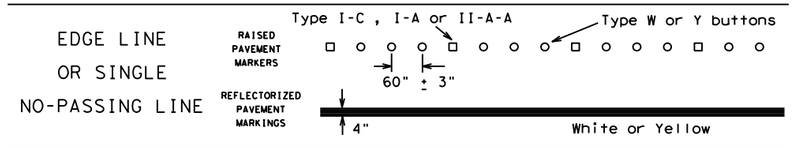
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

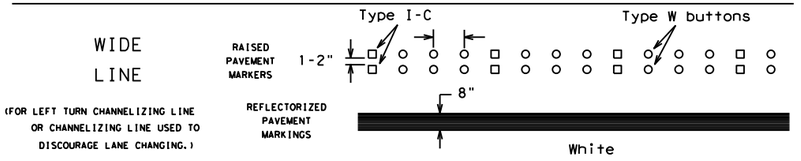


EDGE LINE OR SINGLE NO-PASSING LINE



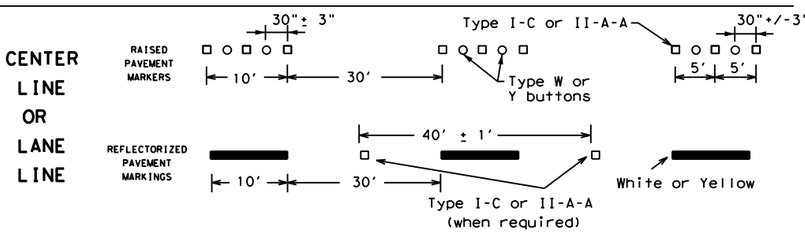
WIDE LINE

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

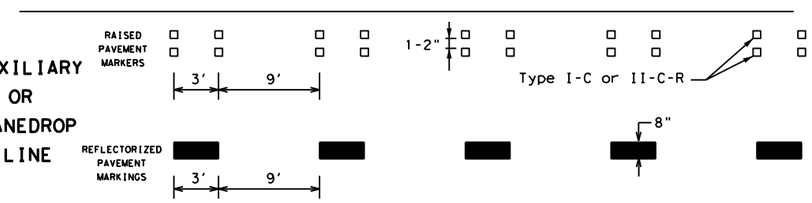


BROKEN LINES

CENTER LINE OR LANE LINE

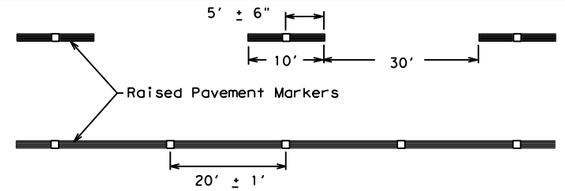


AUXILIARY OR LANEDROP LINE



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."

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Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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DATE:
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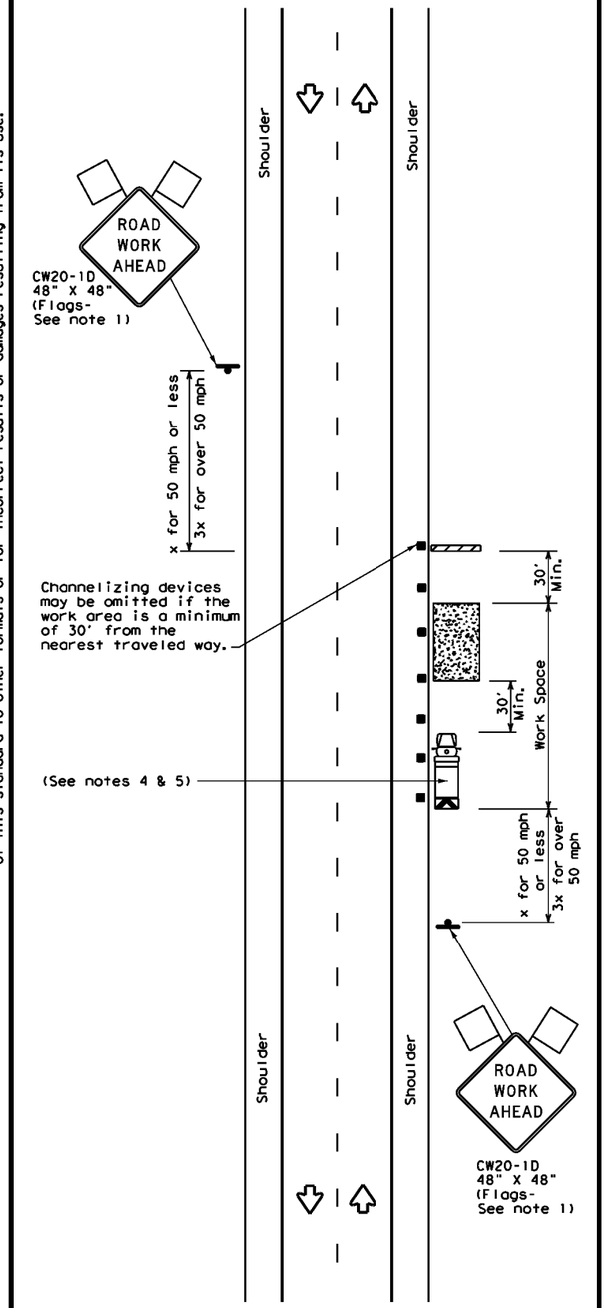
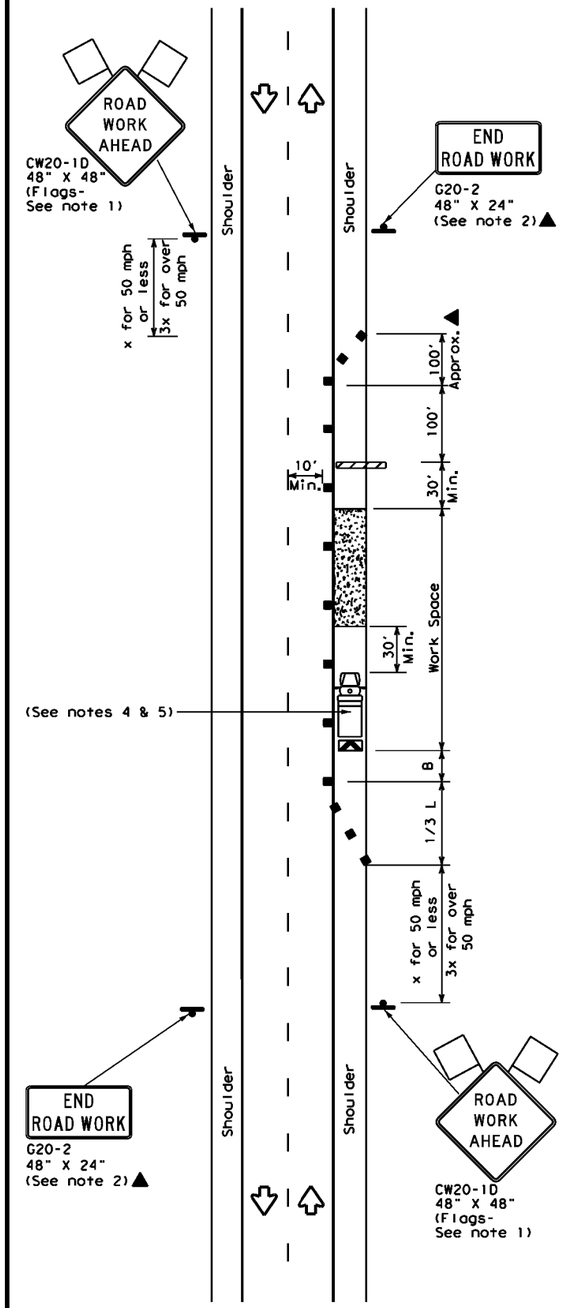


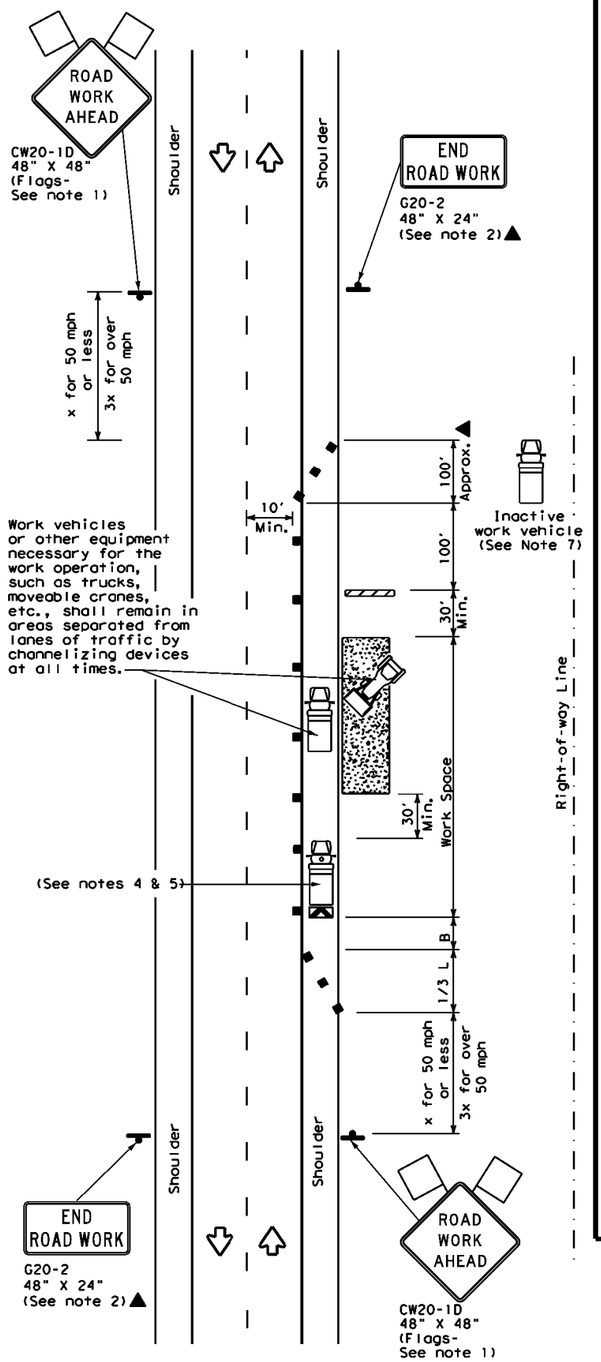
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

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	72	650	VARIOUS
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		31

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DATE:
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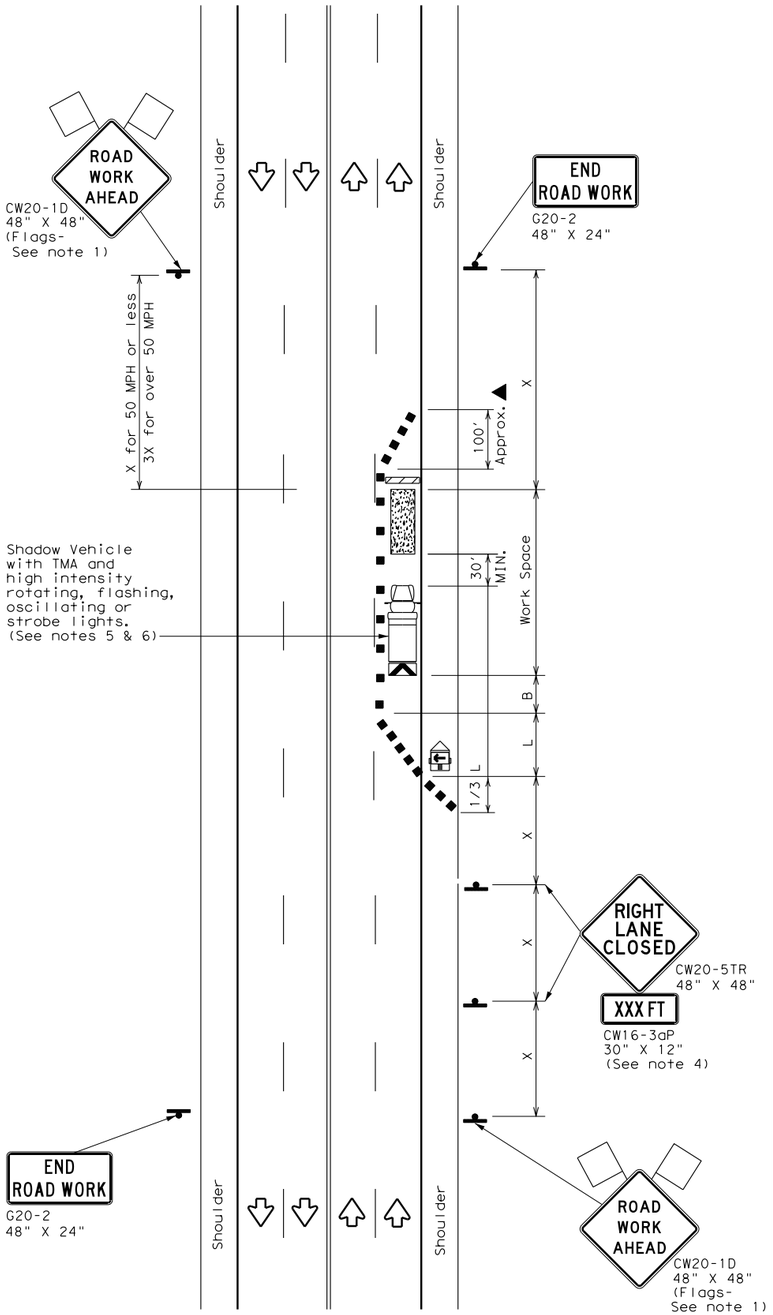
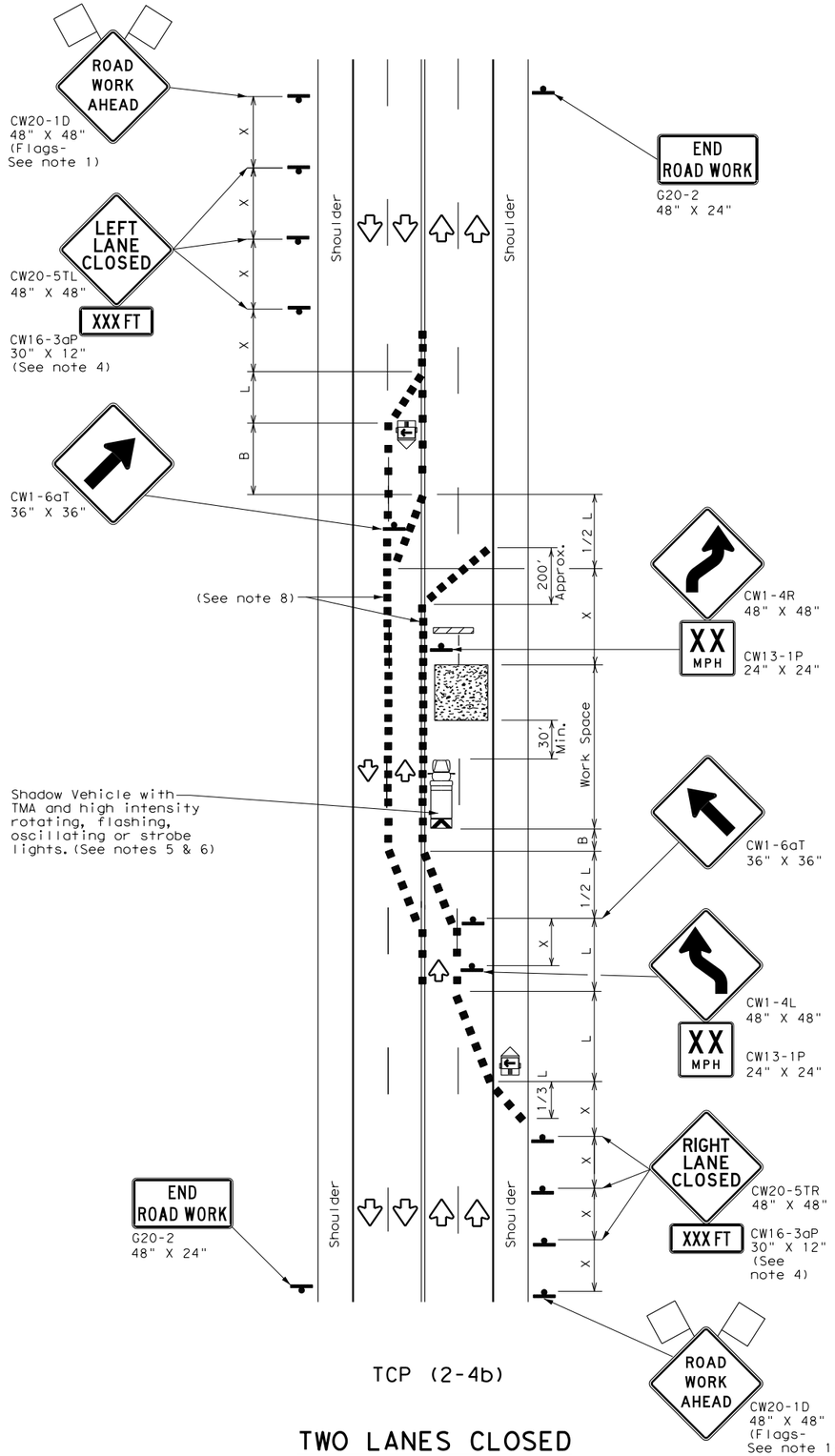


TCP (2-4a)

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

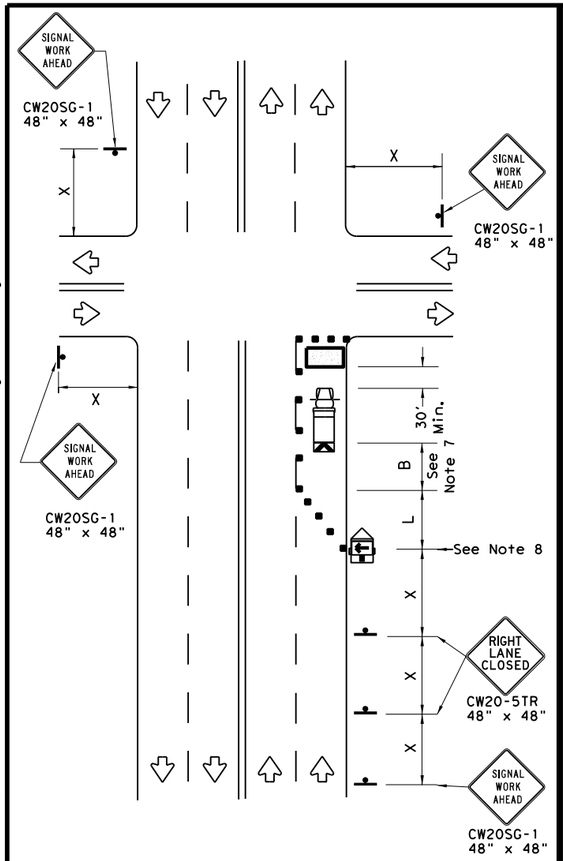
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

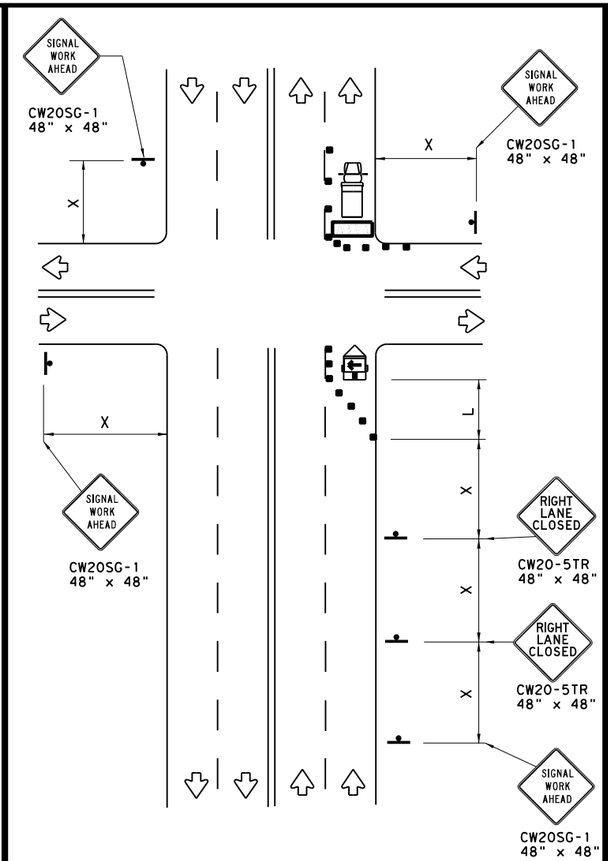
FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0912	72	650	VARIOUS
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	HARRIS		32

DATE:
FILE:



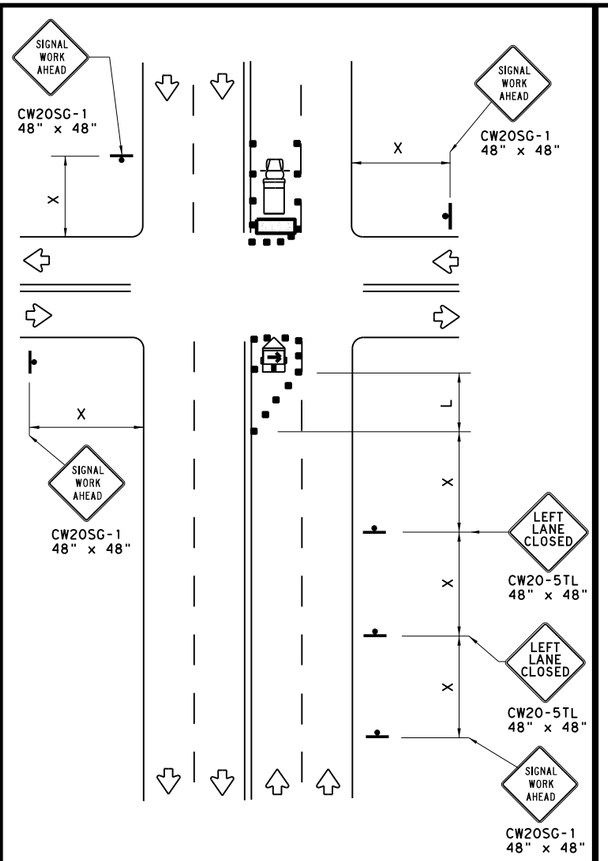
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



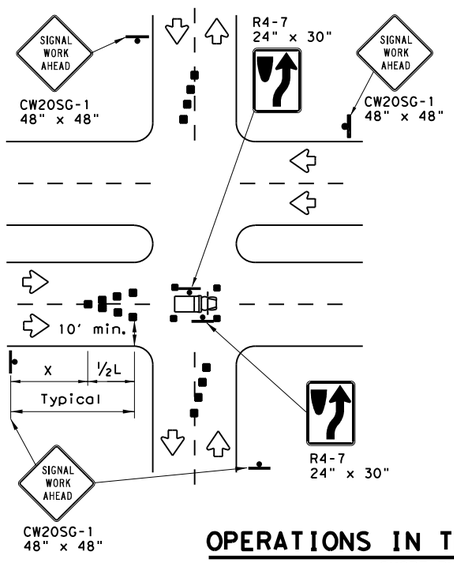
FAR SIDE RIGHT LANE CLOSURE

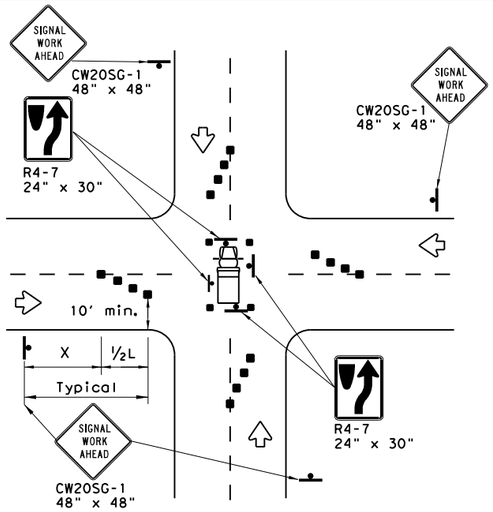
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

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"
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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)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.

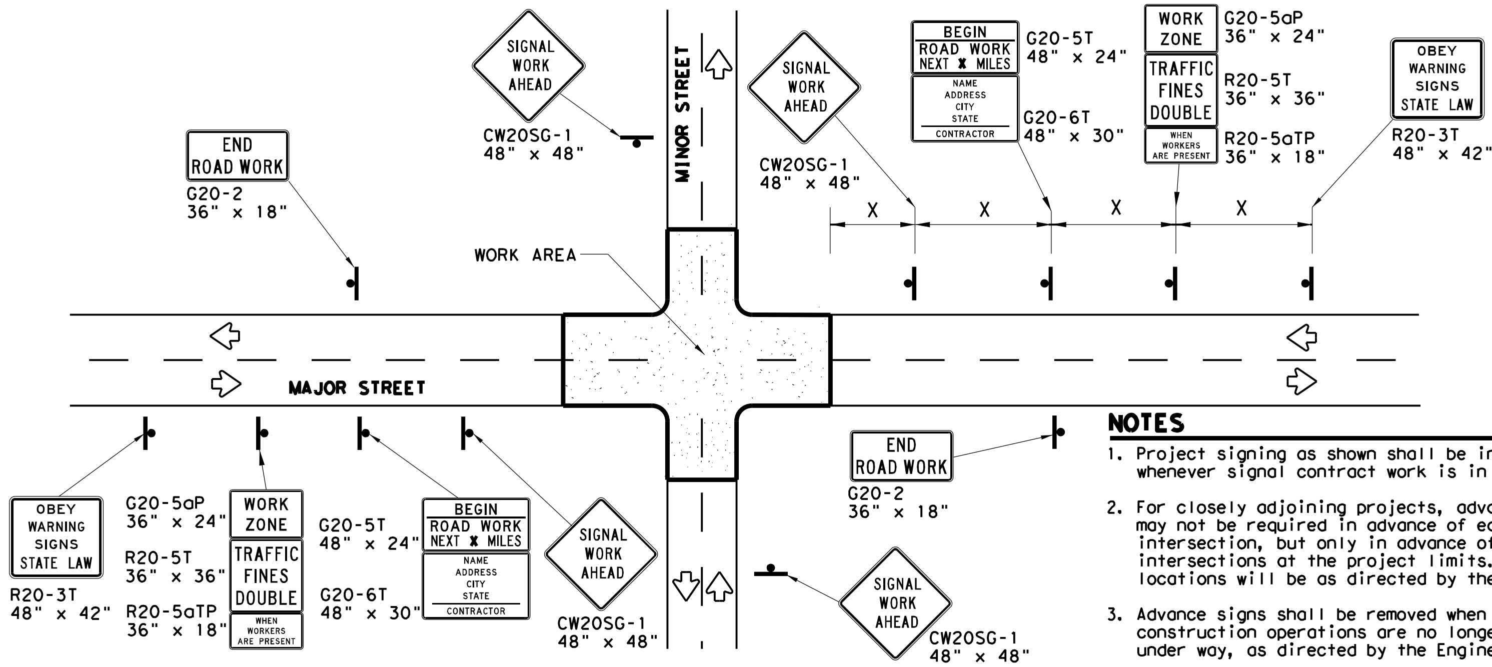
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	72	650	VARIOUS
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	HOU	HARRIS		33



TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

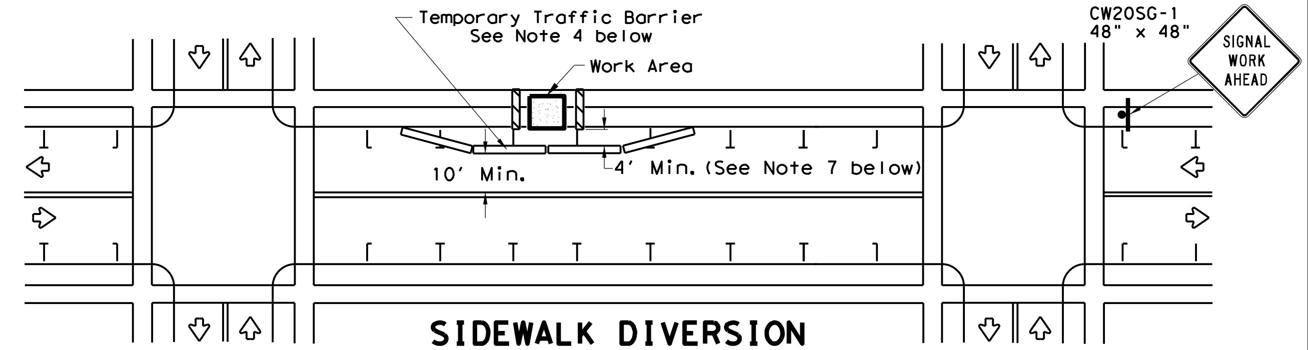
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 fastners. 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.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

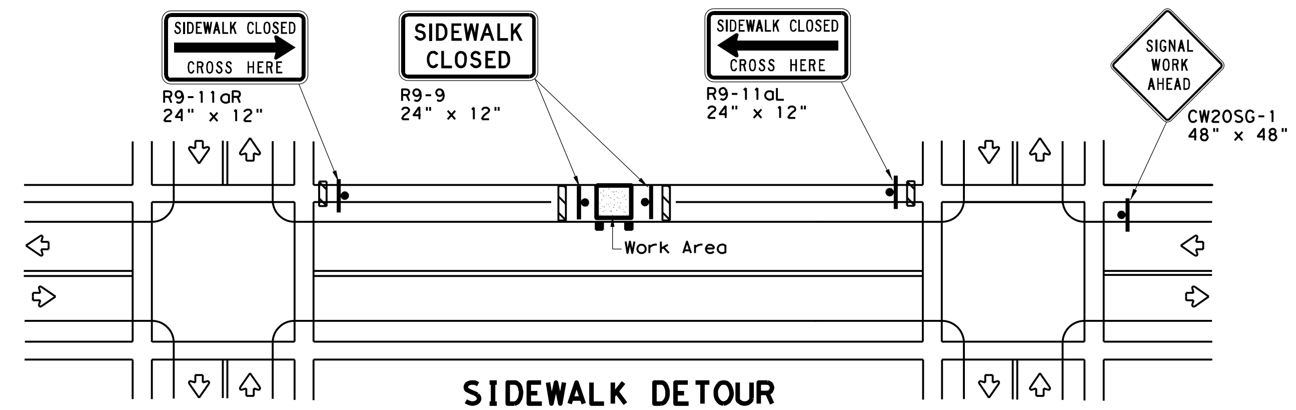
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

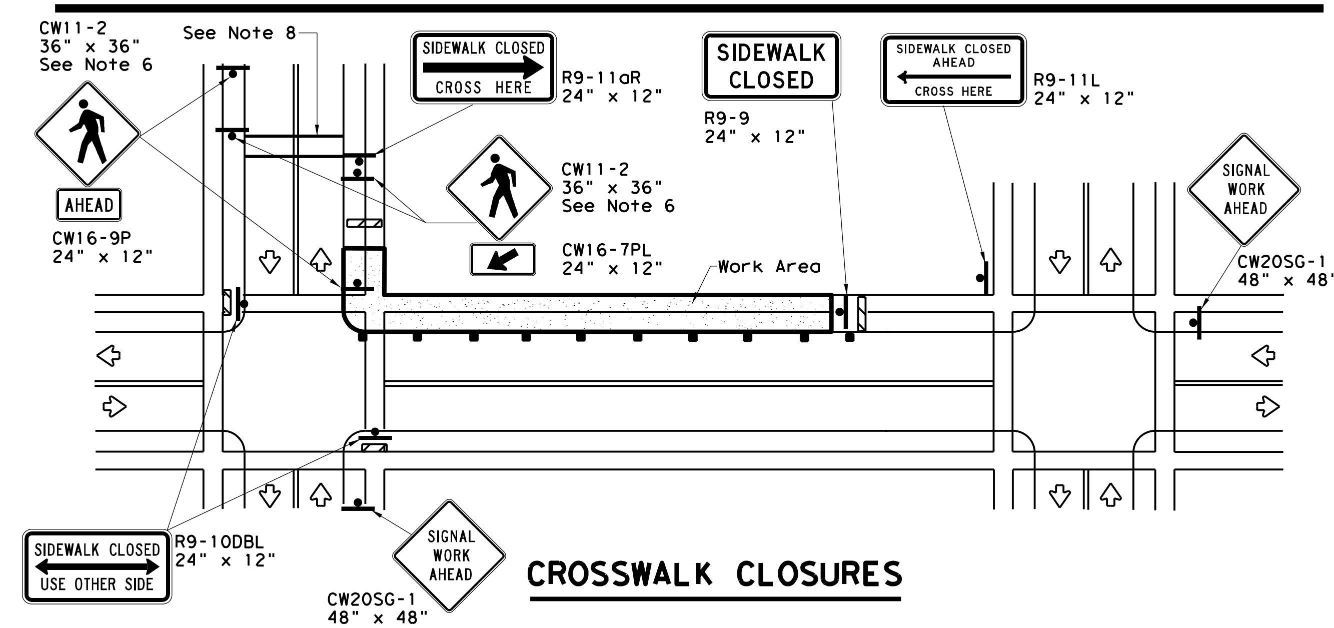
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

FILE: wzbts-13.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992		CONT	SECT	JOB	HIGHWAY
REVISIONS		0912	72	650	VARIOUS
2-98 10-99 7-13		DIST	COUNTY		SHEET NO.
4-98 3-03		HOU	HARRIS		34

DATE:
FILE:

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 Storm Water Pollution Prevention Plan (SWP3) Houston District standard plan.

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: Feb 24, 2022
FILE:

Version 2.1

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	72	650	Variuos Locations
UPDATED section V. text and added definition (10/17) ADDED USCG and USACE notes in Section VII (04/18)	DIST	COUNTY		SHEET NO.
	HOU	Harris		35

SITE DESCRIPTION

PROJECT LIMITS: ((List Project Location))

PROJECT DESCRIPTION: ((Provide Description of work proposed))

MAJOR SOIL DISTURBING ACTIVITIES: ((List soil disturbing activities))

TOTAL PROJECT AREA: ((List project area in acres))

TOTAL AREA TO BE DISTURBED: ((List area to be disturbed in acres))

WEIGHTED RUNOFF COEFFICIENT:
(AFTER CONSTRUCTION): ((Provide combined runoff coeff.))

EXISTING CONDITION OF SOIL & VEGETATIVE
COVER AND % OF EXISTING VEGETATIVE COVER: ((List existing soil types based on soil mapping and estimated vegetative cover))

NAME OF RECEIVING WATERS: ((Name and identification number of the receiving outfall facility as listed in the Segment Identification Maps for Texas Rivers and Coastal Basins))

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

____ TEMPORARY SEEDING
____ PERMANENT PLANTING, SODDING, OR SEEDING
____ MULCHING
____ SOIL RETENTION BLANKET
____ BUFFER ZONES
____ PRESERVATION OF NATURAL RESOURCES

OTHER:

STRUCTURAL PRACTICES:

____ SILT FENCES
____ HAY BALES
____ ROCK BERMS
____ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
____ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
____ DIVERSION DIKE AND SWALE COMBINATIONS
____ PIPE SLOPE DRAINS
____ PAVED FLUMES
____ ROCK BEDDING AT CONSTRUCTION EXIT
____ TIMBER MATTING AT CONSTRUCTION EXIT
____ CHANNEL LINERS
____ SEDIMENT TRAPS
____ SEDIMENT BASINS
____ STORM INLET SEDIMENT TRAP
____ STONE OUTLET STRUCTURES
____ CURBS AND GUTTERS
____ STORM SEWERS
____ VELOCITY CONTROL DEVICES
____ EROSION CONTROL LOGS

OTHER:

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

((Provide narrative of construction sequencing))

STORM WATER MANAGEMENT: ((State manner in which storm water runoff will be adequately conveyed during construction))

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: All erosion and sediment controls will be maintained in good working order. If a repair is necessary it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The area adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

INSPECTION: All inspections will be performed by a TxDOT inspector per one of the options below as directed by the Area Engineer
1. At least every 7 calendar days
2. At least every 14 days or after 0.5 inches or more of rainfall
An inspection and maintenance report should be made for each inspection. Based on the inspection results, the controls shall be revised according to the inspection report.

WASTE MATERIALS: The dumpster used to store all waste material will meet all state and local city solid waste management regulations. All trash and construction debris will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulation and the trash will be hauled to a local dump. No construction waste material will be buried on site.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): In the event of a spill which may be considered hazardous, the Houston District Safety Office shall be contacted immediately at 713-802-5962.

SANITARY WASTE: All Sanitary Waste will be collected from the portable units as necessary or as required by local regulations by a licensed sanitary waste management contractor.

OFFSITE VEHICLE TRACKING:

____ HAUL ROADS DAMPENED FOR DUST CONTROL
____ LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
____ EXCESS DIRT ON ROAD REMOVED DAILY
____ STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the sediment that may enter receiving waterways. Disposal areas shall not be located in any waterway, waterbody or streambed. Construction staging areas and vehicle maintenance areas shall be constructed by the contractor in a manner which minimizes the runoff of all pollutants. All waterways shall be cleared as soon as practical of temporary embankments, temporary bridges, matting, falsework, piling, debris, and other obstructions placed during construction operations that are not part of the finished work.

STATE OF TEXAS
MICHAEL A. OLIVO
108793
LICENSED
PROFESSIONAL ENGINEER
P.E.

05/05/2022

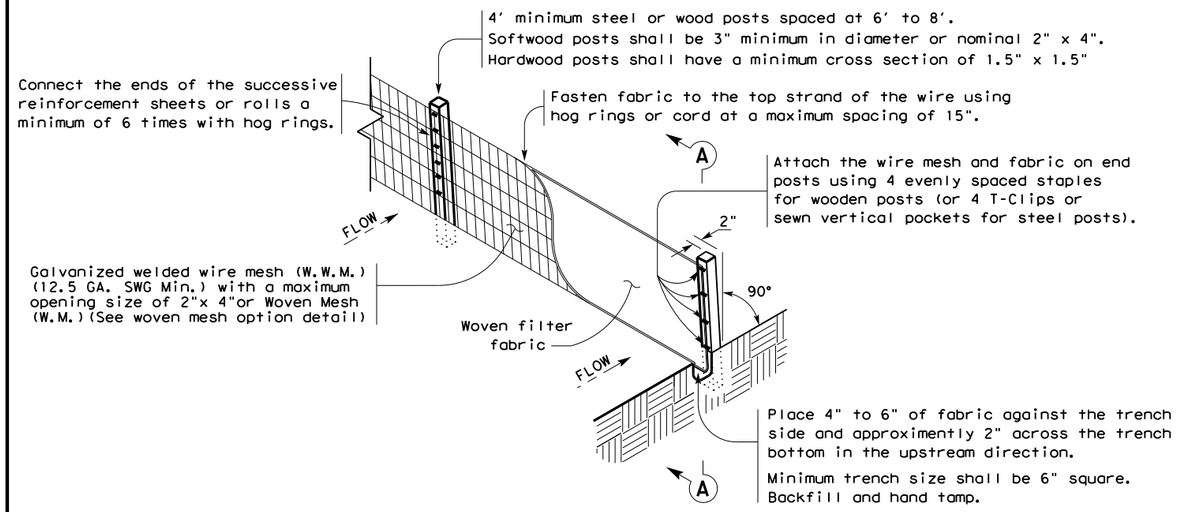
Texas Department of Transportation
Houston District

TxDOT STORM WATER POLLUTION PREVENTION PLAN

SWP3

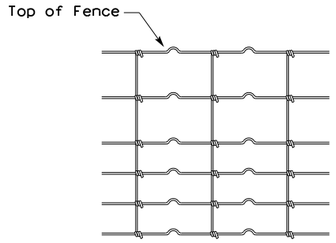
FILE: STDG1.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
©TxDOT JANUARY 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6	F 2022(876)	36
9/2010 INSPECTION NOTE 9/2013 INSPECTION NOTE 11/2013 SW3P TO SWP3 03/2015 2014 SPECS	COUNTY		CONTROL / SECT / JOB / HIGHWAY	
	HARRIS		0912 / 72 / 650 / VA	

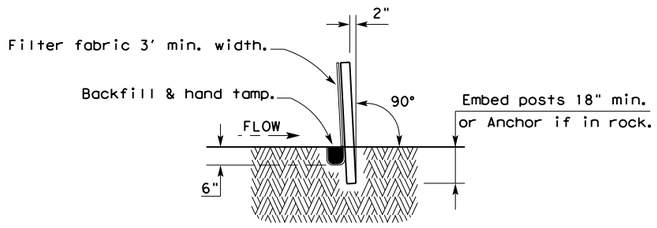
STD G-1



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

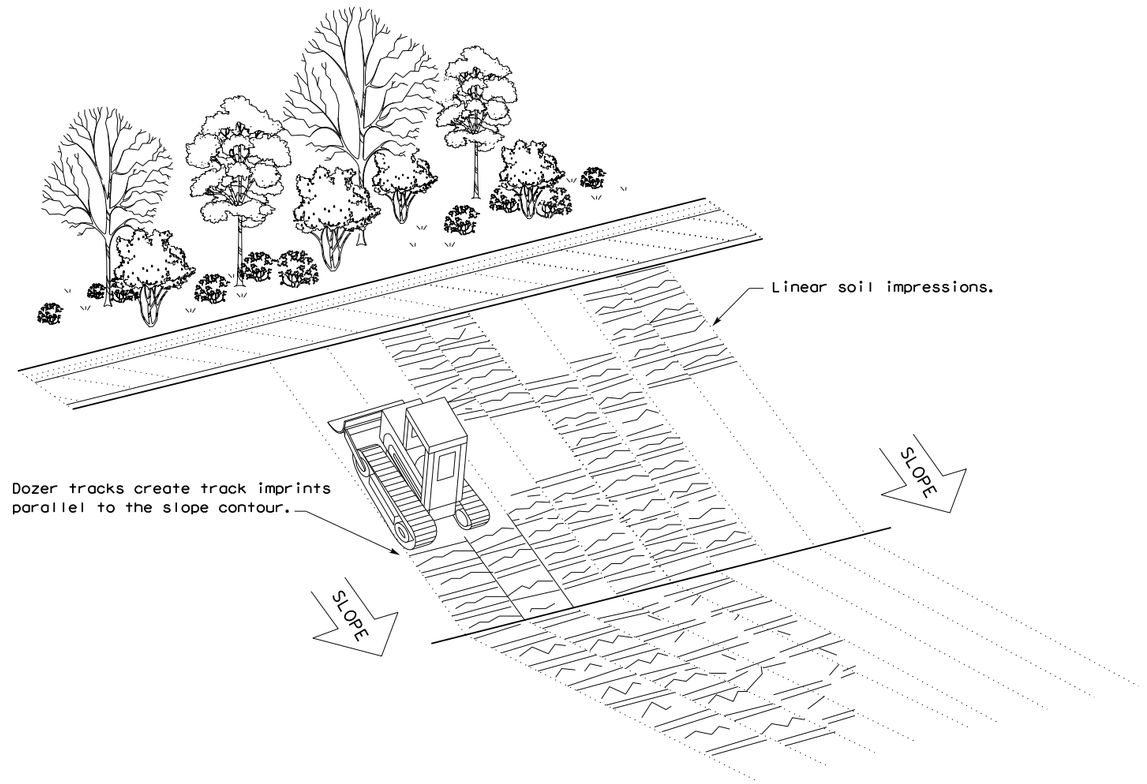
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

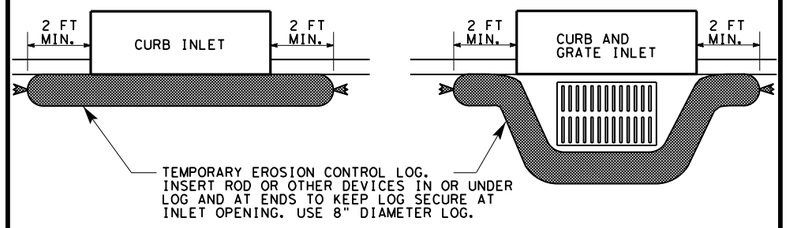
EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM	DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0912	72	650		VARIOUS	
	DIST	COUNTY				SHEET NO.
	HOU	HARRIS				37

DATE
FILE

CURB INLETS
8" DIAMETER LOGS

ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8")



MATERIAL REQUIREMENTS

FILL:

Use 100% shredded mulch or other non-compost biodegradable material as fill for logs. No compost or fines.

DO NOT USE MATERIAL WHICH PROHIBITS WATER INFILTRATION.

LOG MESH:
Use mesh with 1/4" openings or larger. Mesh must allow water infiltration but also hold fill material in place.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

A sediment trap (erosion control log) may be used to filter sediment out of runoff draining from an unstabilized area.

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).

Sediment traps should be placed in the following locations:
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way

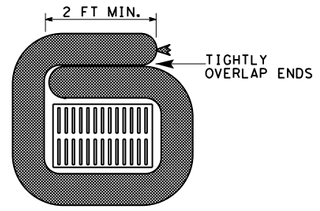
The trap should be cleaned when the capacity has been reduced by 1/2 or the sediment has accumulated to a depth of 1', whichever is less.

REQUIRED ITEMS:

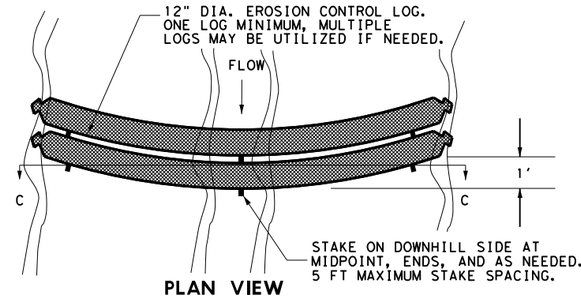
- ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8") LF
- ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL) (12") LF
- ITEM 506-6043 BIODEG EROSN CONT LOGS (REMOVE) LF

DROP INLETS AND OTHER LOCATIONS
12" DIAMETER LOGS

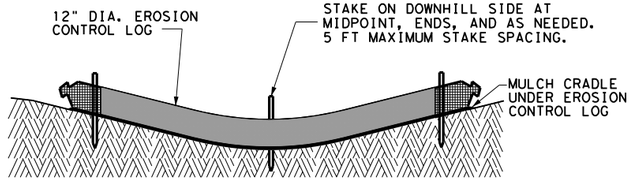
ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL)(12")



DROP INLETS

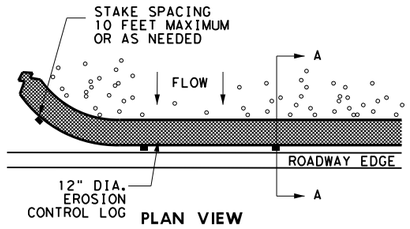


PLAN VIEW

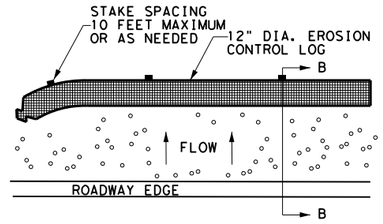


SECTION C-C

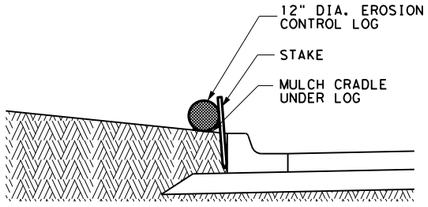
DRAINAGE SWALE OR DITCH



PLAN VIEW

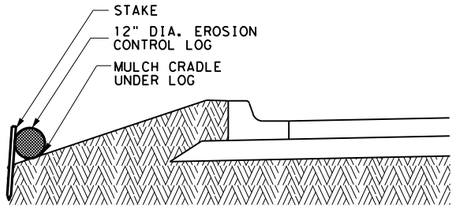


PLAN VIEW



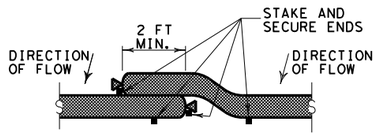
SECTION A-A

SLOPE TO ROADWAY EDGE

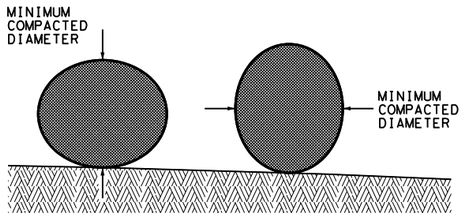


SECTION B-B

SLOPE AWAY FROM ROADWAY EDGE



END OF LOG OVERLAP



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation
Houston District

EROSION CONTROL LOG

ECL-12

FILE: STDG4a.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot			
©TxDOT 2014	DISTRICT	FED REG	PROJECT NUMBER				SHEET
REVISIONS 3/15 MINOR CORRECTIONS	HOU	6	F 2022(876)				38
	COUNTY		CONTROL	SECT	JOB		HIGHWAY
	HARRIS		0912	72	650		VAR

STD G-4A