FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
PROJECT NO.: STP2023(502)HES
CSJ: 0025-02-225,ETC

BEXAR COUNTY
VA

INSTALLATION OF WRONG WAY DRIVER ADVANCED TECHNOLOGIES AT OFF RAMPS ALONG:

CSJ 0025-02-225: IH-10 FROM IH-37 TO IH-410 = 34056 FT = 6.45 MI
CSJ 0073-08-201: IH-37 FROM IH-10 TO IH-410 = 22440 FT = 4.25 MI
CSJ 0521-06-149: IH-410 FROM IH-37 TO IH-10 = 46992 FT = 8.90 MI
NET LENGTH OF PROJECT = 103,488 FT = 19.60 MI

Design Speed; N/A
Area of Disturbed Soil: < 1 Acre
ADT: N/A

INDEX OF SHEETS

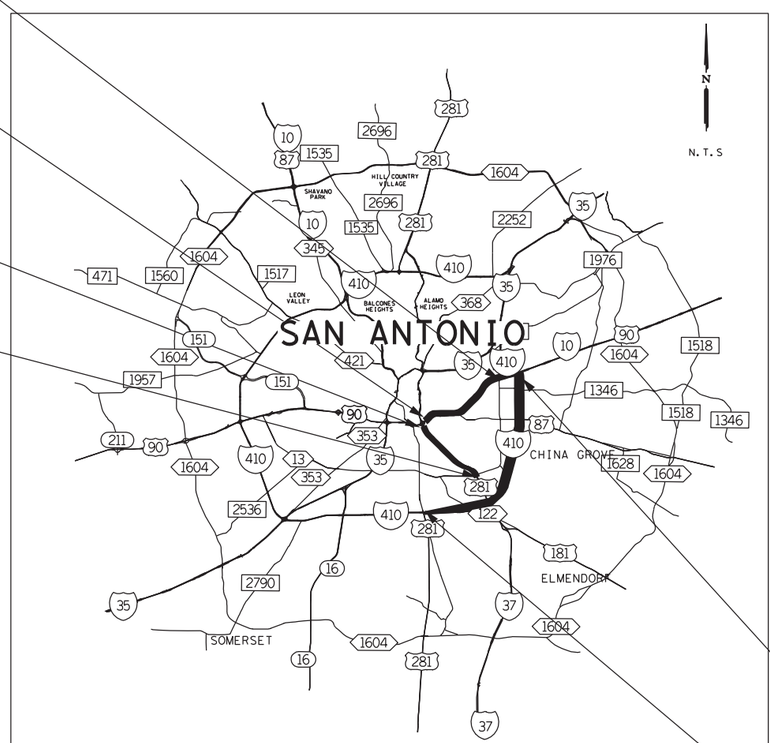
SEE SHEET 2 FOR INDEX OF SHEETS

END PROJECT IH-10
CSJ 0025-02-225

BEGIN PROJECT IH-10
CSJ 0025-02-225

BEGIN PROJECT IH-37
CSJ 0073-08-201

END PROJECT IH-37
CSJ 0073-08-201



END PROJECT IH-410 AT US 87
CSJ 0521-06-149

BEGIN PROJECT IH-410 AT US 281
CSJ 0521-06-149

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

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

AECOM
AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210-296-2002

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

_____ P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 11/16/2022
DocuSigned by: John Giarotti
C9AECF5EA6534A2... DISTRICT ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 11/16/2022
DocuSigned by: JCRogers, P.E.
F29100BAA508499... DISTRICT DIVISION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 11/16/2022
DocuSigned by: Clayton Kipps, P.E.
74F59ACB883D4EB... TEXAS DEPARTMENT OF TRANSPORTATION
PLANNING & DEVELOPMENT

APPROVED FOR LETTING 11/16/2022
DocuSigned by: Gina E. Gallegos, P.E.
124372CCDF604F5... DISTRICT ENGINEER

FILE LOCATION
https://www.txdot.gov/inside-txdot/district/san-antonio/specinfo.html

LEVELS DISPLAYED
1

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

INDEX OF SHEETS

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

Carlos Duran P.E. — 10/28/2022

PROJECT MANAGER — DATE

STATE OF TEXAS
CARLOS DURAN
125531
PROFESSIONAL ENGINEER
REGISTERED
Carlos Duran P.E.
10/28/2022

AECOM
AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION

INDEX OF SHEETS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		2
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225, ETC	VA

10/28/2022 3:10:08 PM
c:\pwworking\ustx\dms04641\SA*WWD*INDEX.dgn

County: Bexar, Tx.

Highway: IH-10, IH-37, IH-410

**********GENERAL NOTES**********
2014 Specification Book

--General--
Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

City of San Antonio: (210) 207-8642

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

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

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

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

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

Hurricane Evacuation

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

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Highway: IH-10, IH-37, IH-410

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

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

The Contractor should be aware that the "City Public Service" (CPS) will be consulted by the Engineer in matters concerning the execution of the work, materials and testing related to the CPS work. As such, a CPS employee may be observing the construction and related operations as they progress.

Contractor questions on this project are to be addressed to the following individual(s):
Dale Picha, Dale.Picha@txdot.gov
John Gianotti, John.Gianotti@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

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

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination

County: Bexar, Tx.

Highway: IH-10, IH-37, IH-410

Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and back feed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

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

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

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

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

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Excavation within 5 feet of an existing CPS Energy pole will require pole bracing. Contact CPS Energy utility coordination to request pole bracing (Customer Engineering 210-353-4050). The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

Steel Wrapped or Asbestos Utility Lines:

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

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

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

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

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

--Item 7--
The total disturbed area within the project is anticipated at less than one (1) acre. Due to this type of construction, the project qualifies for exclusion under the Construction General Permit (CGP) issued by the Texas Commission on Environmental Quality (TCEQ). However, should the sum of the Engineer's anticipated disturbances and the Contractor's (On ROW and off ROW) PSL's equal or exceed the one (1) acre threshold; both TxDOT and the Contractor have project responsibilities under the CGP that reverts to non-exclusion status. Obtain approval for all non-depicted areas of disturbance that increases the initial soil and vegetation disturbed area estimates before work starts at these locations.

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

Roadway closures during the following key dates and/or special event are prohibited.
See the general notes under Item 502 for these dates.

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

A Special Provision to Item 8 for a delayed authorized date to begin work has been included in the contract. The reason for including the Special Provision is for material processing or contractor mobilization.

Create and maintain a Bar Chart schedule.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

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--Item 421—
Use an automated ticket that contains the same information as shown in the standard specification. Submit the ticket for approval prior to use. The concrete producer will contact the District Laboratory or the Engineer's Office (outside the San Antonio area) to inform TxDOT of scheduled structural concrete batching. The Engineer may suspend concrete operations if ticket information is incomplete/incorrect.

Entrained air is allowed for Class P and Class HES concrete only. Air content testing is waived for all classes of concrete.

The curing facilities and strength testing equipment is not required for this project.

Poly-fiber reinforced concrete may be used as an option, with the approval by the Engineer, for riprap, sidewalk, curb/gutter, and mow strip. Use a TxDOT approved manufacturer or producer for the poly-fiber. The poly-fibers shall be combined with the concrete in proportions as recommended by the manufacturer. A concrete mix design must be approved by the Engineer.

Item 432--
In all riprap slopes, provide 3-inch diameter weep holes at 10 foot maximum spacing and backed with loose graded gravel or crushed stone and galvanized hardware cloth.

Match the slope of the Riprap (Mow Strip) to the slope of the adjacent roadway.

--Item 502--
General

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

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

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

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

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic

County: Bexar, Tx.

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Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

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

Item 502.
Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

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

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

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

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

Lane and Ramp Closures and Detours

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

For closures not listed in the TCP; the lane closures are limited to between the hours of 9am to 4pm for daytime lane closure and 9pm to 5am for nighttime closures, and at least one lane must remain open at all times.

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

At no time shall two consecutive ramps be closed at one time during construction or overlay operations.

County: Bexar, Tx.

Highway: IH-10, IH-37, IH-410

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

Nighttime: 9 PM to 5 AM Sunday night thru Friday night, when approve by the engineer with notification in advance.
(With uniformed off duty law enforcement officers)

Weekend closures when approved by the Engineer: when approve by the engineer with notification in advance.

No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Fiesta Week and Sales Tax Holidays (Bexar County Only)
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Election days (Bexar County Only)
During major events at the AT&T Center (Spurs home games, Rodeo, concerts, etc.)
Alamodome, and/or Convention Center (Bexar County Only)

--Item 506--
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. An Inspector will perform a regularly scheduled SW3P inspection every 7 calendar days if erosion control measures are installed.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

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

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

Triangular Slip base Systems with set screws are not allowed.

--Item 686 & 687--
Provide all signal poles from the same manufacturer. Pedestrian poles may be from a different manufacturer.

County: Bexar, Tx.

Highway: IH-10, IH-37, IH-410

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

TMS Notes:
"TMS" is abbreviation for Traffic Management System. "ITS" is abbreviation for Intelligent Transportation System. For this project the acronyms "TMS" and "ITS" are synonymous.

All references to the TransGuide mainframe are references to the TransGuide Lonestar computer network.

The location of utilities (including TMS), either underground or overhead, if shown within the right of way are approximate and must be verified by the Contractor before beginning construction operations. TransGuide will provide the approximate location of TMS equipment; however, it is the responsibility of the Contractor to determine the depth of the Traffic Management conduit.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 1-800-545-6005. It is the Contractor's responsibility to make arrangements for utility locators as needed.

TxDOT (Traffic Management) (210)731-5109
TxDOT (Sign Lighting) (210)615-6995
TxDOT (Traffic Signal) (210)615-5975

--Item 6414-
This price is full compensation for furnishing and installing the complete installation of the Wireless WWD System as shown on the plans; all labor, tools, equipment, mounting hardware, cables, any required equipment required for a standalone solar power system, documentation, warranty, and incidentals necessary to complete the work including traffic handling during testing.

In addition, any ethernet cable, power source cables, batteries, solar panels, Wrong Way R5-1a signs, Wrong Way R5-1a signs with LEDs, Thermal Camera, confirmation cameras, LED illuminator, ITS pole mounted cabinet, local wireless communication devices, primary logic controller, system integration used in the installation of the Wireless WWD System will be included in this bid price.

County: Bexar, Tx.

Highway: IH-10, IH-37, IH-410

Furnish and install pedestal pole assemblies for vehicle and pedestrian signals will be paid under item 687 and furnish and install conduit will be paid under item 618. The cost of these items should not be reflected in the 6416 unit cost.

Any cabinet installed in the project should be set up on the pole so the cabinet door is open and maintenance person can be facing incoming traffic.

Some existing Wrong Way (WW) signs will require removal and replacement with new LED WW signs. Any removed WW signs shall be returned to TxDOT yard, please contact Traffic section, and follow project layout sheets for the removal plan at each location.

Testing of the equipment will consist of the following procedure: once the equipment has been installed and activated, the exit ramp will be closed to traffic. A test vehicle will then be driven the wrong way down the ramp a minimum of ten times. Once a maximum of ten successful detections and notifications of the wrong way vehicle are received at TransGuide, the equipment will be accepted as fully tested and ready for operation. To be accepted the last five successful tests must be consecutive.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0025-02-225 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY IH 10, IH 37, IH 410

			CONTROL SECTION JOB	**0025-02-225**		**0073-08-201**		**0521-06-149**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00177375**		**A00177380**		**A00177381**			
			COUNTY	**Bexar**		**Bexar**		**Bexar**			
			HIGHWAY	**IH 10**		**IH 37**		**IH 410**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	432-6001	RIPRAP (CONC)(4 IN)	CY					1.000		1.000	
	432-6006	RIPRAP (CONC)(CL B)	CY	4.000		1.000				5.000	
	500-6001	MOBILIZATION	LS	0.300		0.400		0.300		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000		2.000		6.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	275.000		275.000		350.000		900.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	24.000						24.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	8.000		12.000				20.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA					1.000		1.000	
	644-6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	7.000				11.000		18.000	
	687-6001	PED POLE ASSEMBLY	EA	16.000		12.000		12.000		40.000	
	6185-6002	TMA (STATIONARY)	DAY	24.000		18.000		18.000		60.000	
	6414-6001	WIRELESS WWD SYSTEM	EA	8.000		6.000		6.000		20.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		1.000		3.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		1.000		3.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS			1.000		1.000		2.000	
		ENVIRONMENTAL: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000						1.000	

SUMMARY OF PROPOSED ITEMS (CSJ-0025-02-225)

ITEM	432	500	502	618	636	644	644	687	6185	6414	*	*	*	*
CODE	6006	6001	6001	6023	6001	6033	6078	6001	6002	6001	*	*	*	*
DESCRIPTION	RIPRAP (CONC)(CL B)	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONDT (PVC) (SCH 40) (2")	ALUMINUM SIGNS (TY A)	IN SM RD SN SUP&AM TYS80(1)SA (U)	REMOVE SM RD SN SUP&AM (SIGN ONLY)	PED POLE ASSEMBLY	TMA/TA STATIONARY	WIRELESS WRONG WAY DRIVER SYSTEM	WWD LED SIGNS	WWD CELLULAR MODEM	WWD SOLAR POWER SYSTEM	ETHERNET CABLE AND CONNECTORS
IH-10	CY	LS	MO	LF	SF	EA	EA	EA	DAY	EA	EA	EA	EA	LF
SHEET 1 OF 20	2			25			2	2	3	1	2	1	1	55
SHEET 2 OF 20				30			1	2	3	1	2	1	1	50
SHEET 3 OF 20				40			2	2	3	1	2	1	1	70
SHEET 4 OF 20				30	24	2	2	2	3	1	2	1	1	60
SHEET 5 OF 20				40		2		2	3	1	2	1	1	70
SHEET 6 OF 20				35		2		2	3	1	2	1	1	65
SHEET 7 OF 20	2			40				2	3	1	2	1	1	70
SHEET 8 OF 20				35		2		2	3	1	2	1	1	65
CSJ TOTALS	**4**	**1**	**2**	**275**	**24**	**8**	**7**	**16**	**24**	**8**	**16**	**8**	**8**	**505**

SUMMARY OF PROPOSED ITEMS (CSJ-0073-08-201)

ITEM	432	500	502	618	644	687	6185	6414	*	*	*	*
CODE	6006	6001	6001	6023	6033	6001	6002	6001	*	*	*	*
DESCRIPTION	RIPRAP (CONC)(CL B)	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONDT (PVC) (SCH 40) (2")	IN SM RD SN SUP&AM TYS80(1)SA (U)	PED POLE ASSEMBLY	TMA/TA STATIONARY	WIRELESS WRONG WAY DRIVER SYSTEM	WWD LED SIGNS	WWD CELLULAR MODEM	WWD SOLAR POWER SYSTEM	ETHERNET CABLE AND CONNECTORS
IH-37	CY	LS	MO	LF	EA	EA	DAY	EA	EA	EA	EA	LF
SHEET 9 OF 20				40	2	2	3	1	2	1	1	40
SHEET 10 OF 20				55	2	2	3	1	2	1	1	55
SHEET 11 OF 20				40	2	2	3	1	2	1	1	40
SHEET 12 OF 20				40	2	2	3	1	2	1	1	40
SHEET 13 OF 20				60	2	2	3	1	2	1	1	60
SHEET 14 OF 20				40	2	2	3	1	2	1	1	40
CSJ TOTALS	**1**	**0**	**2**	**275**	**12**	**12**	**18**	**6**	**12**	**6**	**6**	**275**

SUMMARY OF PROPOSED ITEMS (CSJ-0521-06-149)

ITEM	432	500	502	618	636	644	644	644	687	6185	6414	*	*	*	*
CODE	6006	6001	6001	6023	6001	6033	6068	6078	6001	6002	6001	*	*	*	*
DESCRIPTION	RIPRAP (CONC)(CL B)	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONDT (PVC) (SCH 40) (2")	ALUMINUM SIGNS (TY A)	IN SM RD SN SUP&AM TYS80(1)SA (U)	RELOCATE SM RD SN SUP&AM TY 10BWG	REMOVE SM RD SN SUP&AM (SIGN ONLY)	PED POLE ASSEMBLY	TMA/TA STATIONARY	WIRELESS WRONG WAY DRIVER SYSTEM	WWD LED SIGNS	WWD CELLULAR MODEM	WWD SOLAR POWER SYSTEM	ETHERNET CABLE AND CONNECTORS
IH-410	**CY**	LS	MO	LF	SF	EA	EA	EA	EA	DAY	EA	EA	EA	EA	LF
SHEET 15 OF 20				55				2	2	3	1	2	1	1	95
SHEET 16 OF 20				45				1	2	3	1	2	1	1	85
SHEET 17 OF 20				60				2	2	3	1	2	1	1	100
SHEET 18 OF 20				70				2	2	3	1	2	1	1	110
SHEET 19 OF 20				55			1	2	2	3	1	2	1	1	95
SHEET 20 OF 20				65				2	2	3	1	2	1	1	100
CSJ TOTALS	**1**	**0**	**2**	**350**	**0**	**0**	**1**	**11**	**12**	**18**	**6**	**12**	**6**	**6**	**585**
PROJECT TOTALS	**6**	**1**	**6**	**900**	**24**	**20**	**1**	**18**	**40**	**60**	**20**	**40**	**20**	**20**	**1365**

***FOR INFORMATION ONLY, ITEMS ARE SUBSIDARY TO ITEM 6414-6001**

STATE OF TEXAS
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125531
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10/28/2022

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210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION

SUMMARY OF QUANTITIES

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		5
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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HIGHWAY	LOCATION ID.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	6185 6002 TMA/TA (STATIONARY)
			SHEET NUMBER - EXIT NUMBER - CROSSING STREET	EA	DAYS PER TMA/TA	DAY
IH-10	1	N/A	SHEET 12 - EXIT 575 EB, PINE ST	1	3	3
	2	N/A	SHEET 13 - EXIT 576 EB, NEW BRAUNFELS AVE	1	3	3
	3	N/A	SHEET 14 - EXIT 575 WB, PINE ST	1	3	3
	4	N/A	SHEET 15 - EXIT 576 WB, S GEVERS ST	1	3	3
	5	N/A	SHEET 16 - EXIT 577 EB, ROLAND RD	1	3	3
	6	N/A	SHEET 17 - EXIT 577 WB, ROLAND RD	1	3	3
	7	N/A	SHEET 18 - EXIT 578 EB, PECAN VALLEY DR	1	3	3
	8	N/A	SHEET 19 - EXIT 578 WB, MARTIN LUTHER KING DR	1	3	3
IH-37	9	N/A	SHEET 26 - EXIT 137 SB, HOT WELLS BLVD	1	3	3
	10	N/A	SHEET 27 - EXIT 137 NB, HOT WELLS BLVD	1	3	3
	11	N/A	SHEET 28 - EXIT 136 SB, PECAN VALLEY DR	1	3	3
	12	N/A	SHEET 29- EXIT 136 NB, PECAN VALLEY DR	1	3	3
	13	N/A	SHEET 30 - EXIT 135 SB, MILITARY DR	1	3	3
	14	N/A	SHEET 31 - EXIT 135 NB, MILITARY DR	1	3	3
IH-410	15	N/A	SHEET 32 - EXIT 42 NB, SOUTHON RD	1	3	3
	16	N/A	SHEET 33 - EXIT 42 SB, SOUTHON RD	1	3	3
	17	N/A	SHEET 34 - EXIT 39 NB, WW WHITE RD	1	3	3
	18	N/A	SHEET 35 - EXIT 39 SB, WW WHITE RD	1	3	3
	19	N/A	SHEET 36 - EXIT 37 NB, SOUTHCROSS BLVD	1	3	3
	20	N/A	SHEET 37 - EXIT 37 SB, SOUTHCROSS BLVD	1	3	3
			TOTALS	-	60	60

*ONE TMA AND ONE TA WILL BE USED AT EACH LOCATION, THE CLOSURES SHOULD BE SCHEDULED ONE AT A TIME SO THE EQUIPMENT CAN BE RELOCATED TO EACH RAMP AS SCHEDULED BY THE CONTRACTOR.

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WRONG WAY DETECTION

TRUCK MOUNTED ATTENUATOR SUMMARY

SHEET 1 OF 1

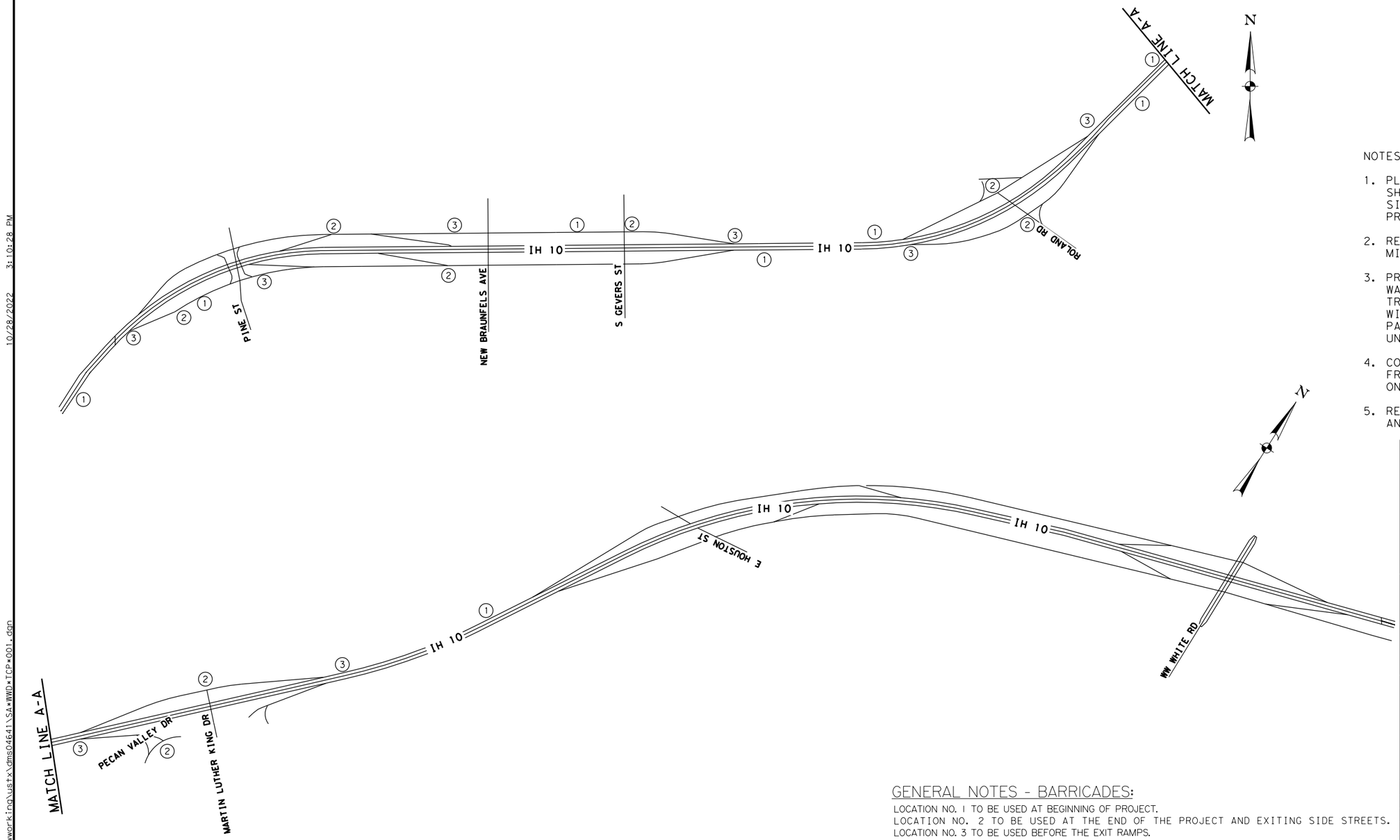
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	5A

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225, ETC	VA

TRAFFIC CONTROL DEVICES - IH 10

LOCATION	Give Us A BRAKE	END ROAD WORK	NAME ADDRESS CITY STATE / CONTRACTOR	WORK ZONE	OBEY WARNING SIGNS STATE LAW	BEGIN WORK ZONE	TRAFFIC FINES DOUBLE	BEGIN ROAD WORK NEXT MILES	WHEN WORKERS ARE PRESENT	END WORK ZONE	ROAD WORK AHEAD	STAY ALERT / TALK OR TEXT LATER			SHOULDER WORK	
	CW21-1T	G20-2	G20-6T	G20-5aP	R20-3T	G20-9TP	R20-5T	G20-5T	R20-5aTP PLAQUE	G20-2bT	CW20-1D	G20-10T	TRAILER MOUNTED FLASHING ARROW PANEL	PORT CHNGBLE MESSAGE SIGN	CW21-5	BARRELS
1	X		X		X	X	X	X	X		X	X				
2		X								X						
3				X									X	X	X	X



NOTES:

1. PLACE PROJECT LIMIT SIGNS AT LOCATION SHOWN AS FIELD CONDITIONS PERMIT. SIGNS TO REMAIN FOR THE DURATION OF THE PROJECT OR AS DIRECTED.
2. REFER TO BC AND WZ (BRK) STANDARDS FOR MINIMUM SPACING.
3. PROVIDE AND MAINTAIN ALL BARRICADES, WARNING SIGNS, FLASHLIGHTS AND TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH TXDOT BC AND TCP STANDARDS, AND PART VI OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
4. CONTRACTORS CAN WORK IN MULTIPLE FREEWAYS AT A TIME, BUT CAN ONLY CLOSE ONE RAMPS AT A TIME PER DIRECTION.
5. REFER TO TCP(5-1)-18, TCP(6-4)-12, AND TCP(6-8)-14 FOR RAMP CLOSURES.

GENERAL NOTES - BARRICADES:

LOCATION NO. 1 TO BE USED AT BEGINNING OF PROJECT.
LOCATION NO. 2 TO BE USED AT THE END OF THE PROJECT AND EXITING SIDE STREETS.
LOCATION NO. 3 TO BE USED BEFORE THE EXIT RAMPS.

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WRONG WAY DETECTION

TRAFFIC CONTROL PLAN
1-IH 10

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		6
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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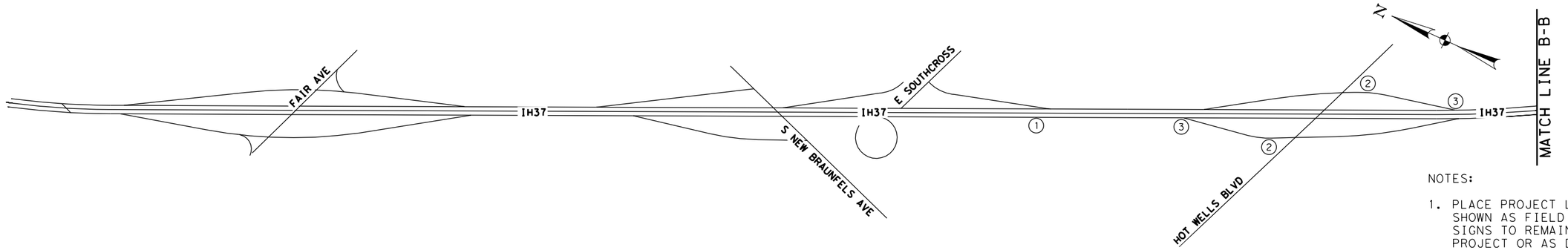
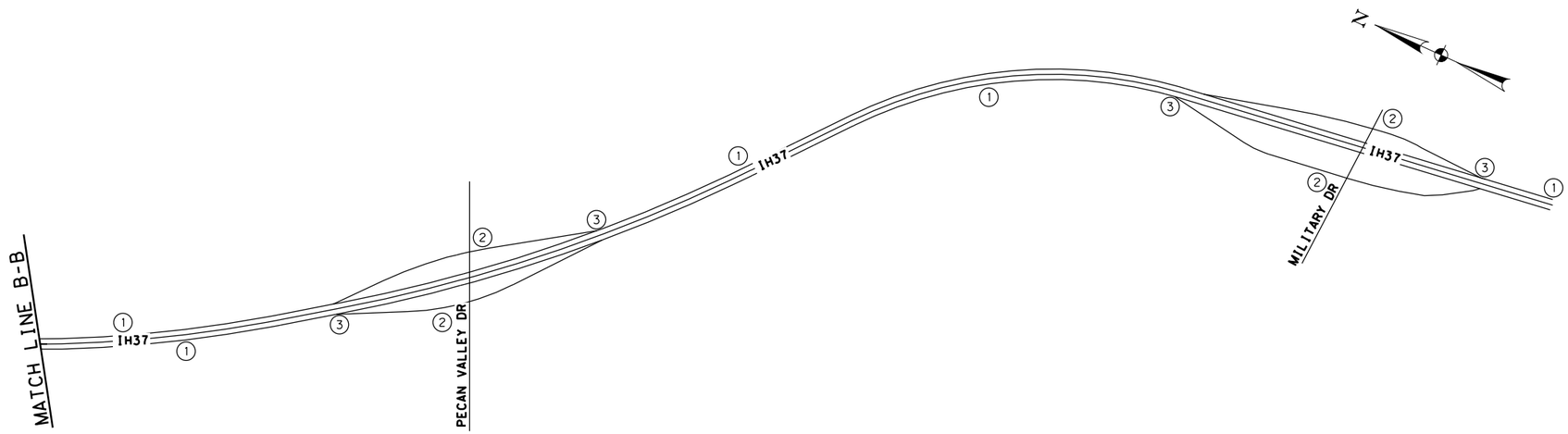
TRAFFIC CONTROL DEVICES - IH 37

LOCATION	Give Us A BRAKE	END ROAD WORK	NAME ADDRESS CITY STATE CONTRACTOR	WORK ZONE	OBEY WARNING SIGNS STATE LAW	BEGIN WORK ZONE	TRAFFIC FINES DOUBLE	BEGIN ROAD WORK NEXT MILES	WHEN WORKERS ARE PRESENT	END WORK ZONE	ROAD WORK AHEAD	STAY ALERT TALK OR TEXT LATER			SHOULDER WORK	
	CW21-1T	G20-2	G20-6T	G20-5aP	R20-3T	G20-9TP	R20-5T	G20-5T	R20-5aTP PLAQUE	G20-2bT	CW20-1D	G20-10T	TRAILER MOUNTED FLASHING ARROW PANEL	PORT CHNGBLE MESSAGE SIGN	CW21-5	BARRELS
1	X		X		X	X	X	X	X		X	X				
2		X								X						
3				X									X	X	X	X





NOTES:

1. PLACE PROJECT LIMIT SIGNS AT LOCATION SHOWN AS FIELD CONDITIONS PERMIT. SIGNS TO REMAIN FOR THE DURATION OF THE PROJECT OR AS DIRECTED.
2. REFER TO BC AND WZ (BRK) STANDARDS FOR MINIMUM SPACING.
3. PROVIDE AND MAINTAIN ALL BARRICADES, WARNING SIGNS, FLASHLIGHTS AND TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH TXDOT BC AND TCP STANDARDS, AND PART VI OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
4. CONTRACTORS CAN WORK IN MULTIPLE FREEWAYS AT A TIME, BUT CAN ONLY CLOSE ONE RAMPS AT A TIME PER DIRECTION.
5. REFER TO TCP(5-1)-18, TCP(6-4)-12, AND TCP(6-8)-14 FOR RAMP CLOSURES.

GENERAL NOTES - BARRICADES:

LOCATION NO. 1 TO BE USED AT BEGINNING OF PROJECT.
LOCATION NO. 2 TO BE USED AT THE END OF THE PROJECT AND EXITING SIDE STREETS.
LOCATION NO. 3 TO BE USED BEFORE THE EXIT RAMPS.

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WRONG WAY DETECTION

TRAFFIC CONTROL PLAN
2-IH 37

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		7
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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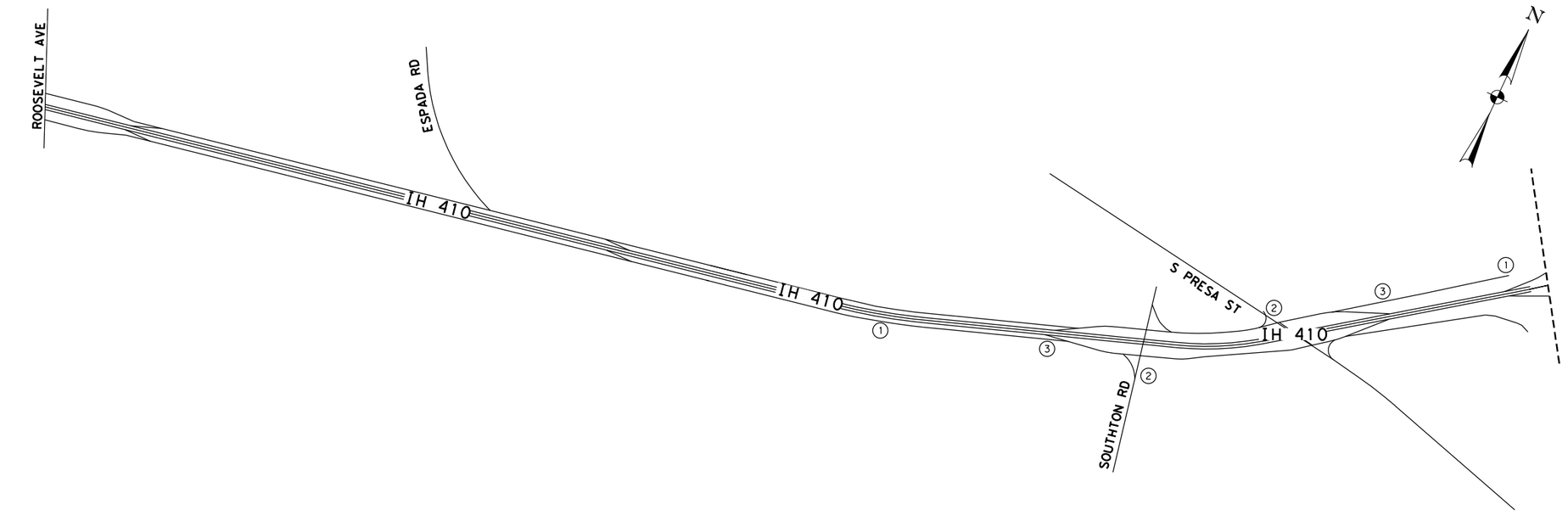
TRAFFIC CONTROL DEVICES - IH 410

LOCATION	Give Us A BRAKE	END ROAD WORK	NAME ADDRESS CITY STATE CONTRACTOR	WORK ZONE	OBEY WARNING SIGNS STATE LAW	BEGIN WORK ZONE	TRAFFIC FINES DOUBLE	BEGIN ROAD WORK NEXT MILES	WHEN WORKERS ARE PRESENT	END WORK ZONE	ROAD WORK AHEAD	STAY ALERT TALK OR TEXT LATER	TRAILER MOUNTED FLASHING ARROW PANEL	PORT CHNGBLE MESSAGE SIGN	SHOULDER WORK	BARRELS
	CW21-1T	G20-2	G20-6T	G20-5aP	R20-3T	G20-9TP	R20-5T	G20-5T	R20-5aTP PLAQUE	G20-2bT	CW20-1D	G20-10T			CW21-5	
1	X		X		X	X	X	X	X		X	X				
2		X								X						
3				X									X	X	X	X



NOTES:

1. PLACE PROJECT LIMIT SIGNS AT LOCATION SHOWN AS FIELD CONDITIONS PERMIT. SIGNS TO REMAIN FOR THE DURATION OF THE PROJECT OR AS DIRECTED.
2. REFER TO BC AND WZ (BRK) STANDARDS FOR MINIMUM SPACING.
3. PROVIDE AND MAINTAIN ALL BARRICADES, WARNING SIGNS, FLASHLIGHTS AND TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH TXDOT BC AND TCP STANDARDS, AND PART VI OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
4. CONTRACTORS CAN WORK IN MULTIPLE FREEWAYS AT A TIME, BUT CAN ONLY CLOSE ONE RAMPS AT A TIME PER DIRECTION.
5. REFER TO TCP(5-1)-18, TCP(6-4)-12, AND TCP(6-8)-14 FOR RAMP CLOSURES.

GENERAL NOTES - BARRICADES:

LOCATION NO. 1 TO BE USED AT BEGINNING OF PROJECT.
LOCATION NO. 2 TO BE USED AT THE END OF THE PROJECT AND EXITING SIDE STREETS.
LOCATION NO. 3 TO BE USED BEFORE THE EXIT RAMPS.

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WRONG WAY DETECTION

TRAFFIC CONTROL PLAN 3-IH 410

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	8

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225, ETC	VA

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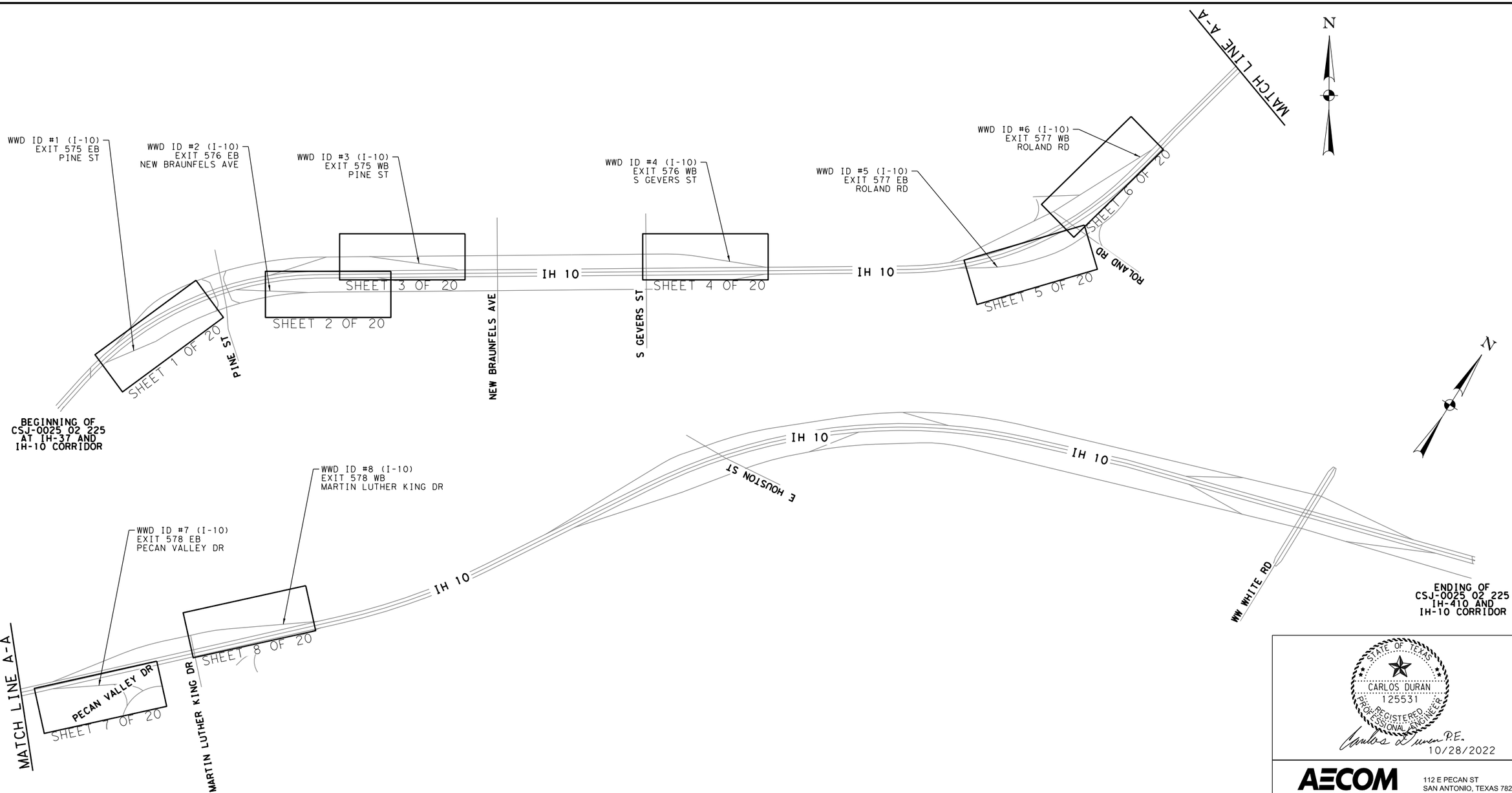

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WRONG WAY DETECTION

PROJECT LAYOUT

IH-10

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		9
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225, ETC	VA

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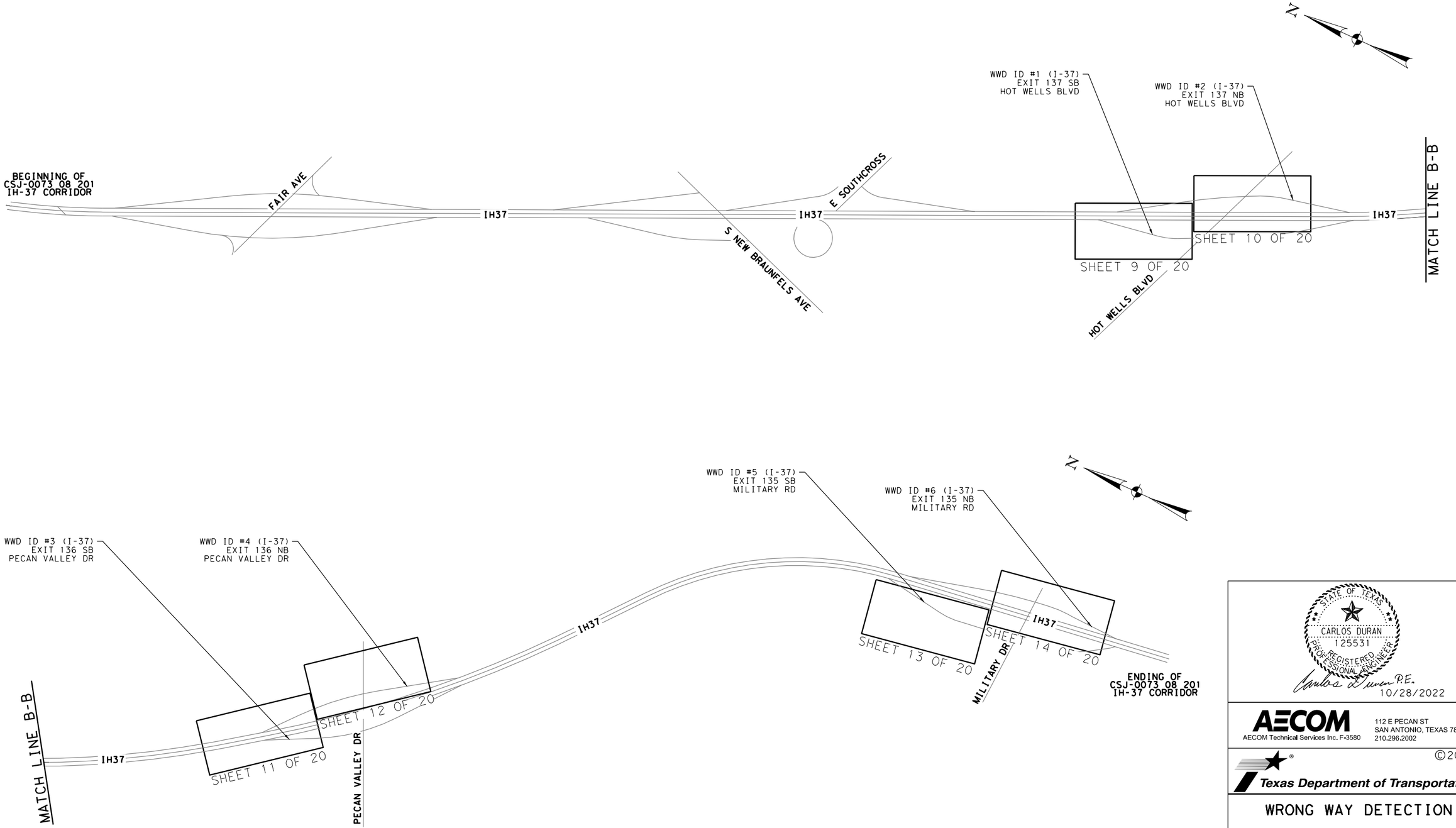

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WRONG WAY DETECTION

PROJECT LAYOUT

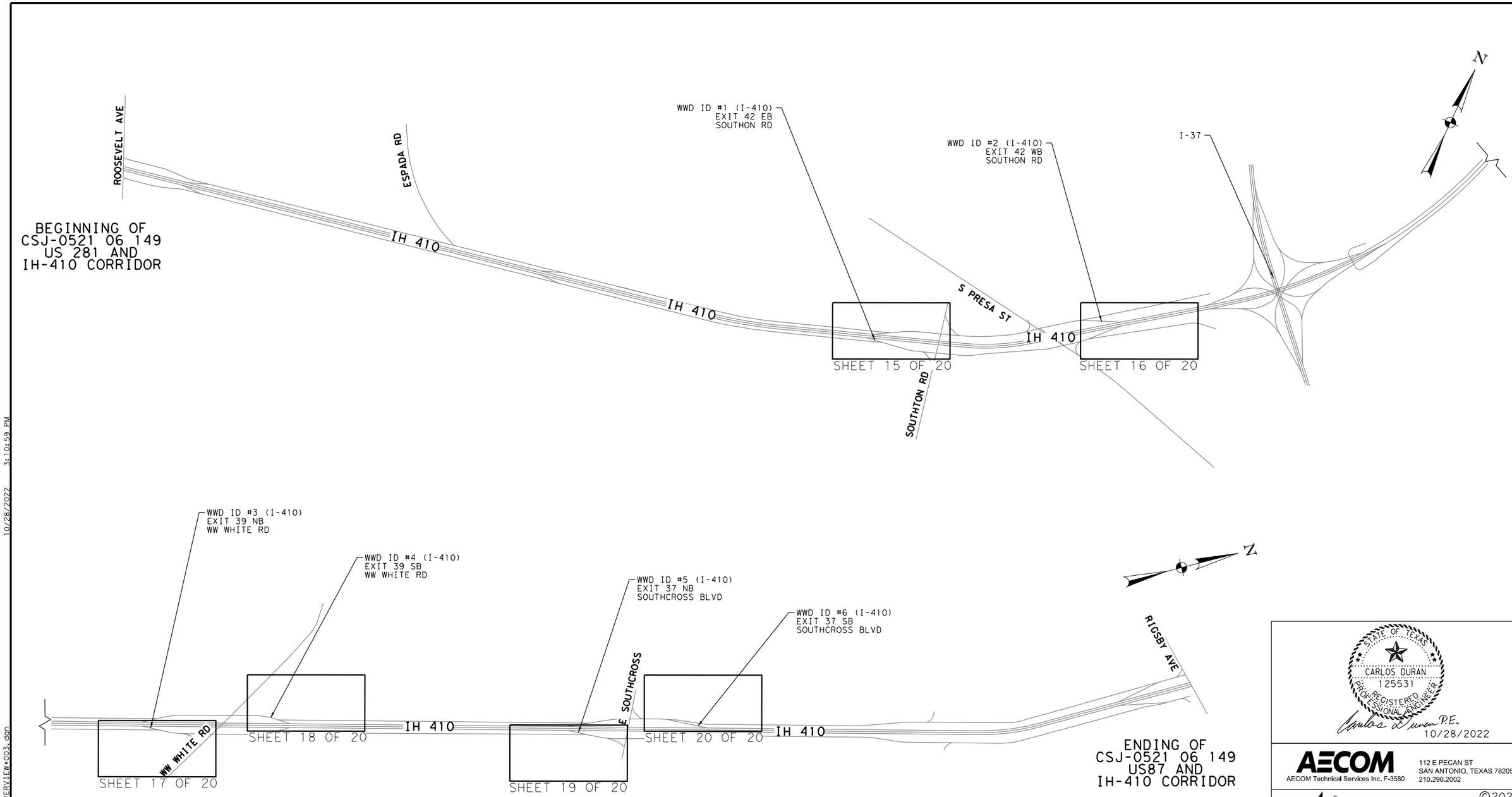
IH-37

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	10

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA



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WRONG WAY DETECTION

PROJECT LAYOUT

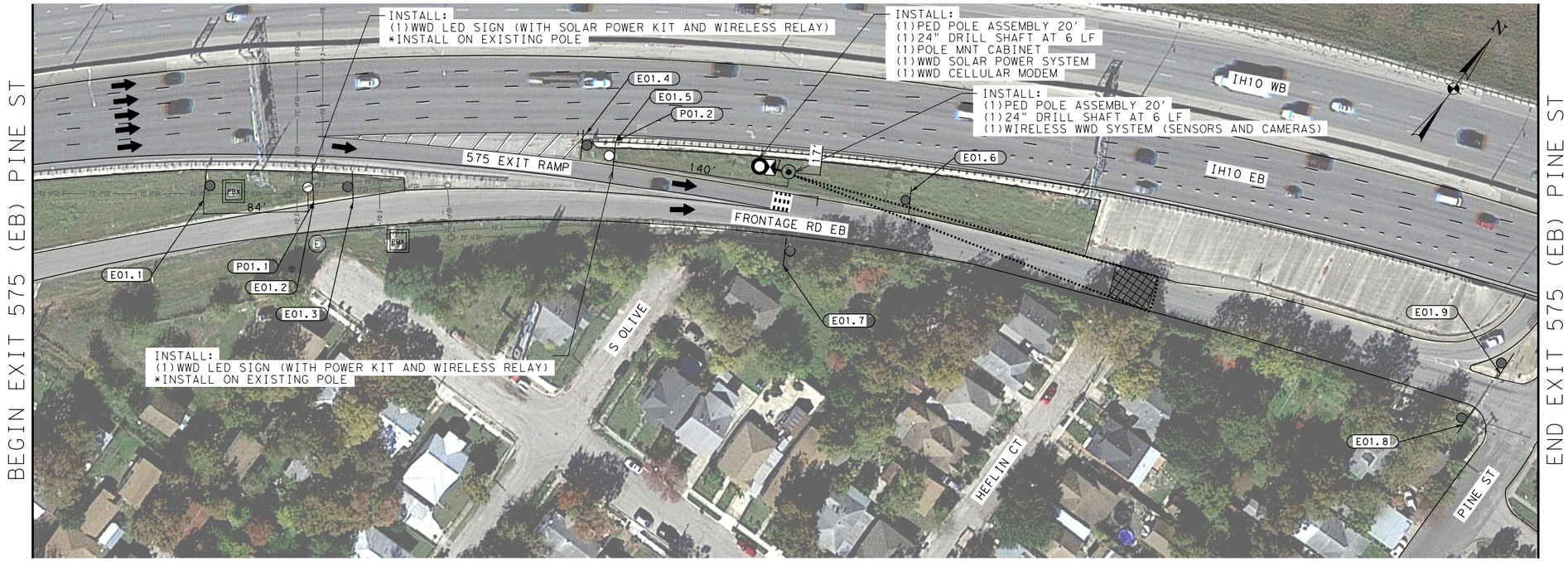
IH-410

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	11

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

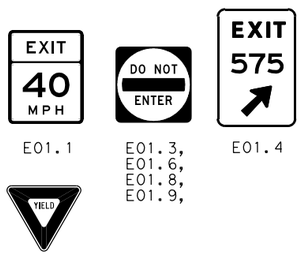
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # — PROPOSED SIGN LABEL
- E#. # — EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)



E01.1 — E01.3, E01.6, E01.8, E01.9, — E01.4 — E01.7

EXISTING SIGNS (TO BE REMOVED)

E01.2, E01.5

PROPOSED SIGNS

P01.1, P01.2

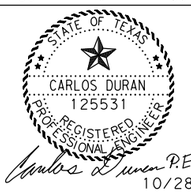
ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
432	6006	RIPRAP (CONC)(CL B)	CY	2
618	6023	CONDT (PVC) (SCH 40) (2")	LF	25
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	55

* FOR INFORMATION ONLY, ITEM SUBSIDARY TO ITEM 6416-6001

NOTES:

1. EXISTING FIBER OPTICS, WATER, SAN. SEWER, STORM SEWER, TELEPHONE, GAS AND ELECTRICAL SYSTEMS WITHIN PROJECT AREA ARE NOT SHOWN IN THE PLANS. BEFORE DIGGING, DRILLING, OR BORING IN THE PROJECT AREA, THE CONTRACTOR SHALL PERFORM A "ONE CALL" AND NOTIFY THE UTILITY COMPANIES 72 HOURS PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR SHALL HAVE THE MANUFACTURER'S REPRESENTATIVE ON SITE TO ASISST WITH THE INSTALLATION OF ALL EQUIPMENT BEFORE ANY WORK BEGINS.
3. DAMAGE TO ANY EQUIPMENT IDENTIFIED TO REMAIN OR DURING RELOCATION TO BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE.
4. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE NOTED ON THE PLANS.
5. CONTRACTOR TO PROVIDE ASTRO BRAC CLAMP KIT TO INSTALL WRONG WAY LED SIGNS TO SIGN POLES.
6. THE CONTRACTOR SHALL GET APPROVAL OF ALL NEW SIGN LOCATIONS BEFORE INSTALLING GROUND MOUNTS.

SCALE: 1" = 100'
50 0 50



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210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION
ID #1 (I-10)
EXIT 575 EB
PINE ST

SHEET 1 OF 20

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	12

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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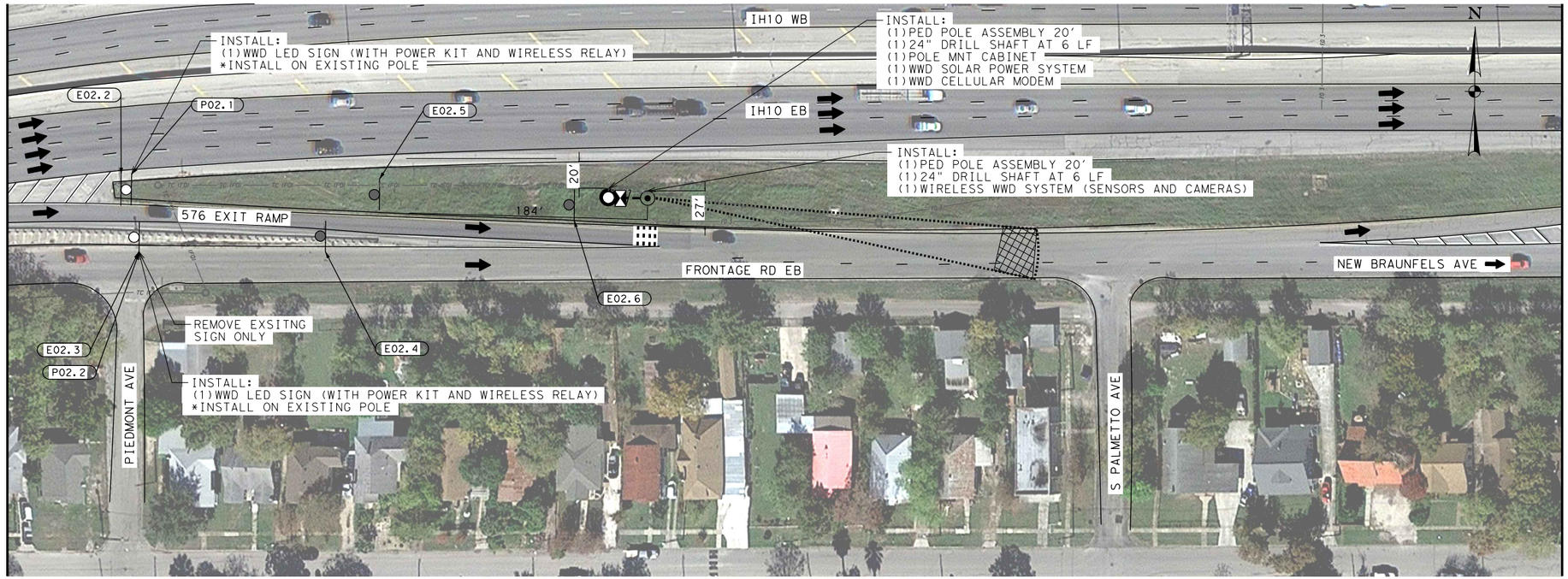
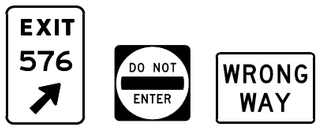


LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # PROPOSED SIGN LABEL
- E#. # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)



E02.1 E02.4, E02.6 E02.5

EXISTING SIGNS (TO BE REMOVED)

E02.3

PROPOSED SIGNS

P02.1, P02.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH 40) (2")	LF	30
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	1
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	50

* FOR INFORMATION ONLY, ITEM SUBSIDARY TO ITEM 6416-6001

NOTES:

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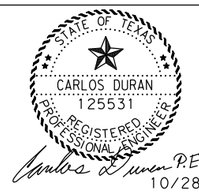
6. THE CONTRACTOR SHALL GET APPROVAL OF ALL NEW SIGN LOCATIONS BEFORE INSTALLING GROUND MOUNTS.

SCALE: 1" = 100'
50 0 50



AECOM
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112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION
ID #2 (I-10)
EXIT 576 EB
NEW BRAUNFELS AVE

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		13
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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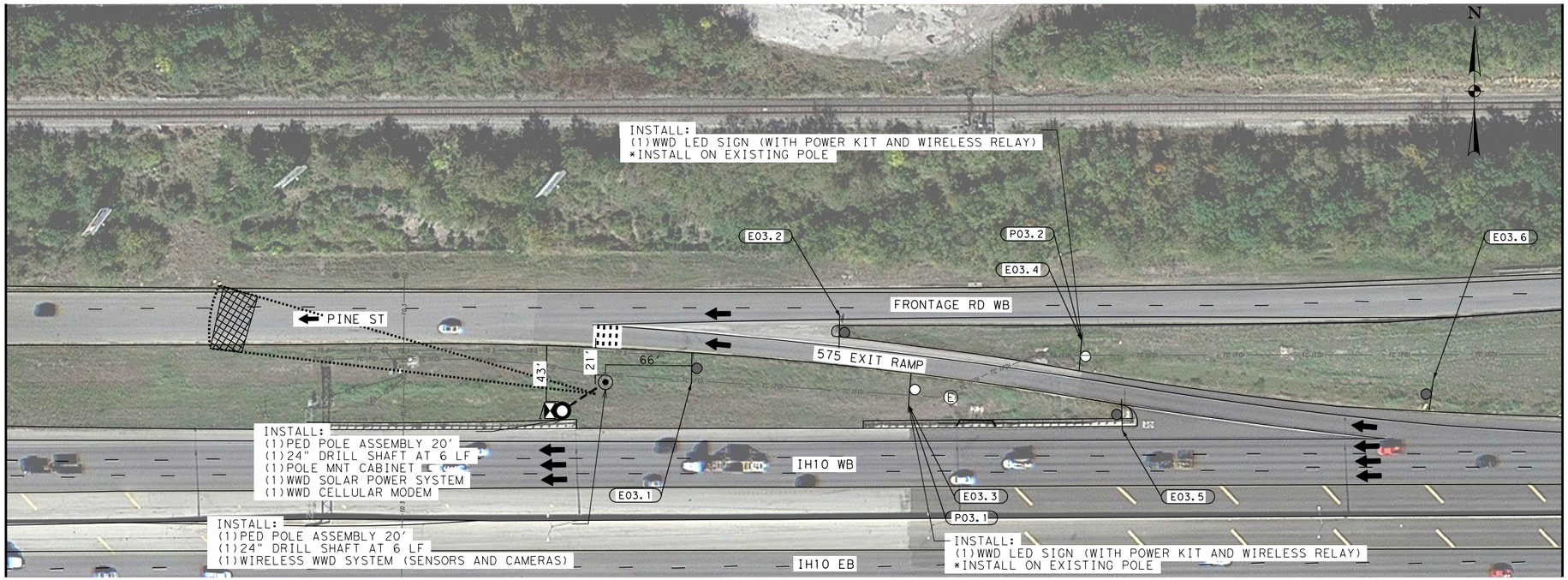

LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # PROPOSED SIGN LABEL
- E#. # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E03.1, E03.2 E03.5 E03.6

EXISTING SIGNS (TO BE REMOVED)

E03.3, E03.4

PROPOSED SIGNS

P03.1, P03.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH 40) (2")	LF	40
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	70

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NOTES:

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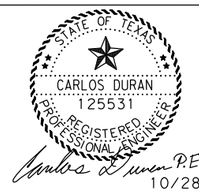
SCALE: 1" = 100'
50 0 50



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Texas Department of Transportation

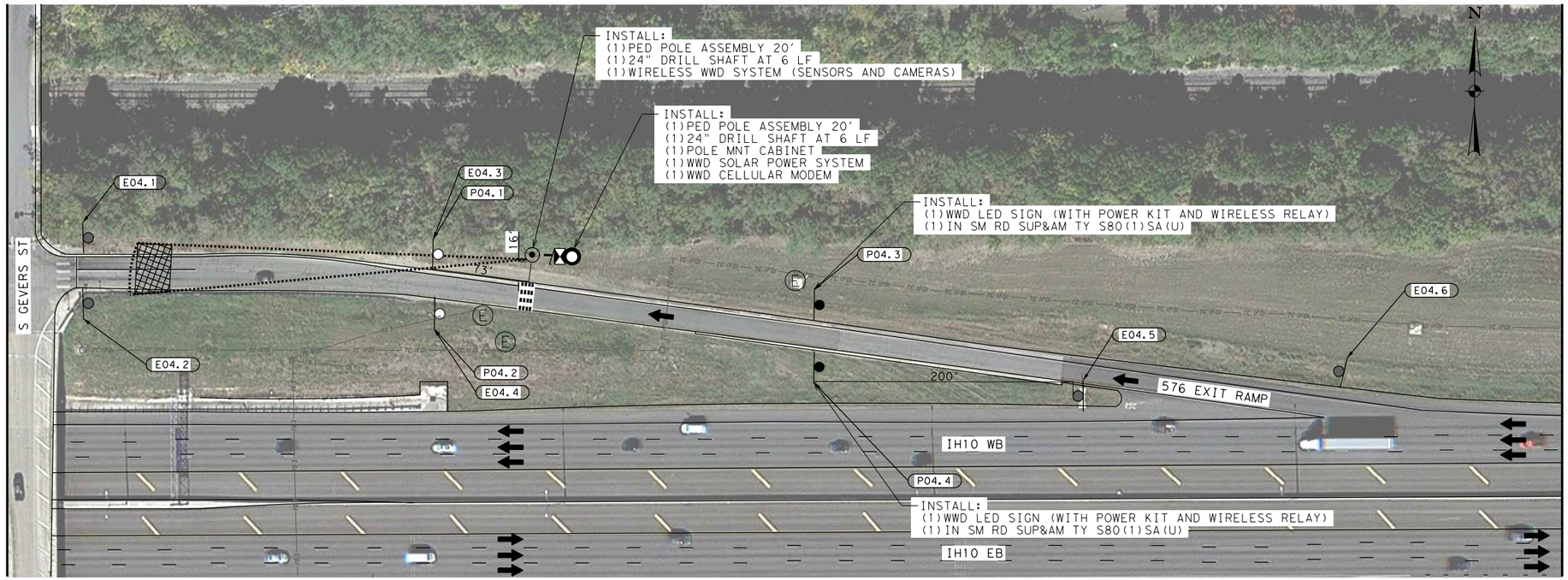
WRONG WAY DETECTION
ID #3 (I-10)
EXIT 575 WB
PINE ST

SHEET 3 OF 20

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	14

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # PROPOSED SIGN LABEL
- E#. # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E04.1, E04.2 — E04.5 — E04.6

EXISTING SIGNS (TO BE REMOVED)

E04.3, E04.4

PROPOSED SIGNS

P04.1, P04.2 — P04.3, P04.4

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH 40) (2")	LF	30
636	6001	ALUMINUM SIGNS (TY A)	SF	24
644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	60

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NOTES:

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SCALE: 1" = 100'
50 0 50

STATE OF TEXAS
CARLOS DURAN
125531
REGISTERED PROFESSIONAL ENGINEER
Carlos Duran P.E.
10/28/2022

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112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION
ID #4 (I-10)
EXIT 576 WB
S GEVERS ST

SHEET 4 OF 20

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		15
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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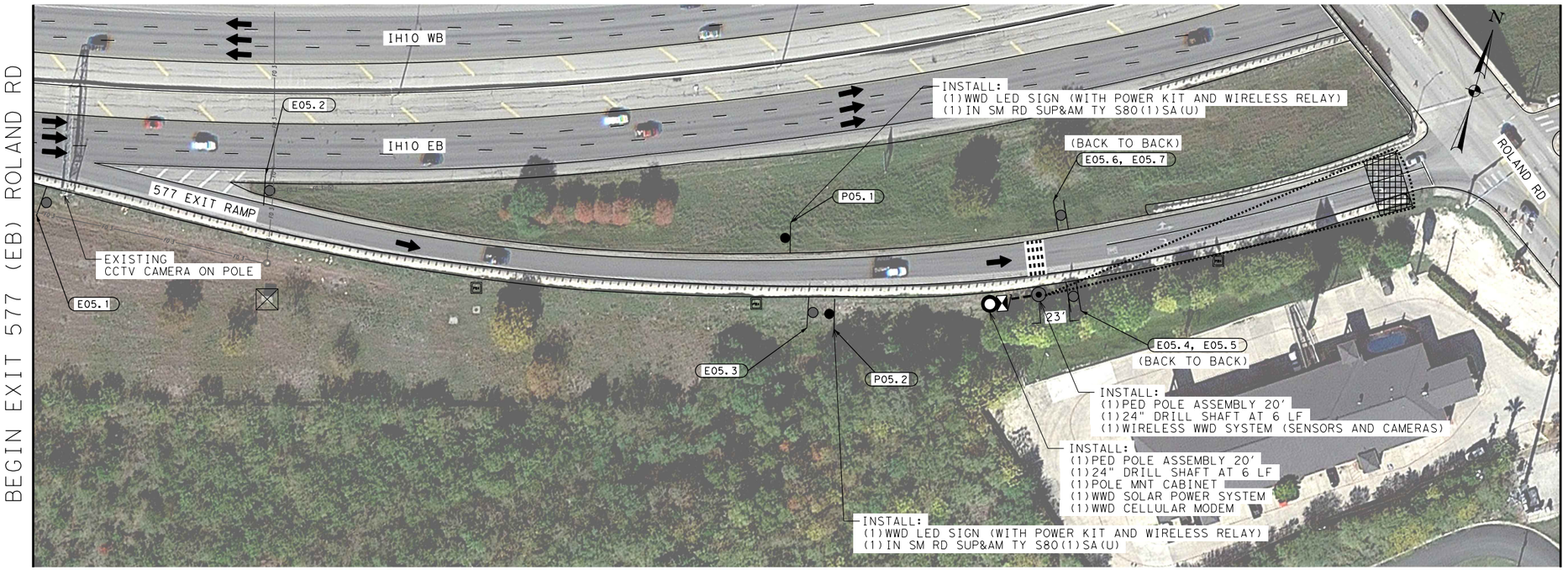


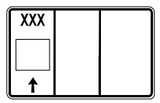
LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # — PROPOSED SIGN LABEL
- E#. # — EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E05.1

E05.2



E05.3

E05.4
(BACK TO BACK)

E05.5

E05.6
(BACK TO BACK)

E05.7

EXISTING SIGNS (TO BE REMOVED)

PROPOSED SIGNS

P05.1,
P05.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH 40) (2")	LF	40
644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	70

* FOR INFORMATION ONLY, ITEM SUBSIDARY TO ITEM 6416-6001

NOTES:

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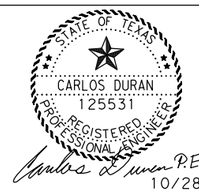
SCALE: 1" = 100'
50 0 50



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AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

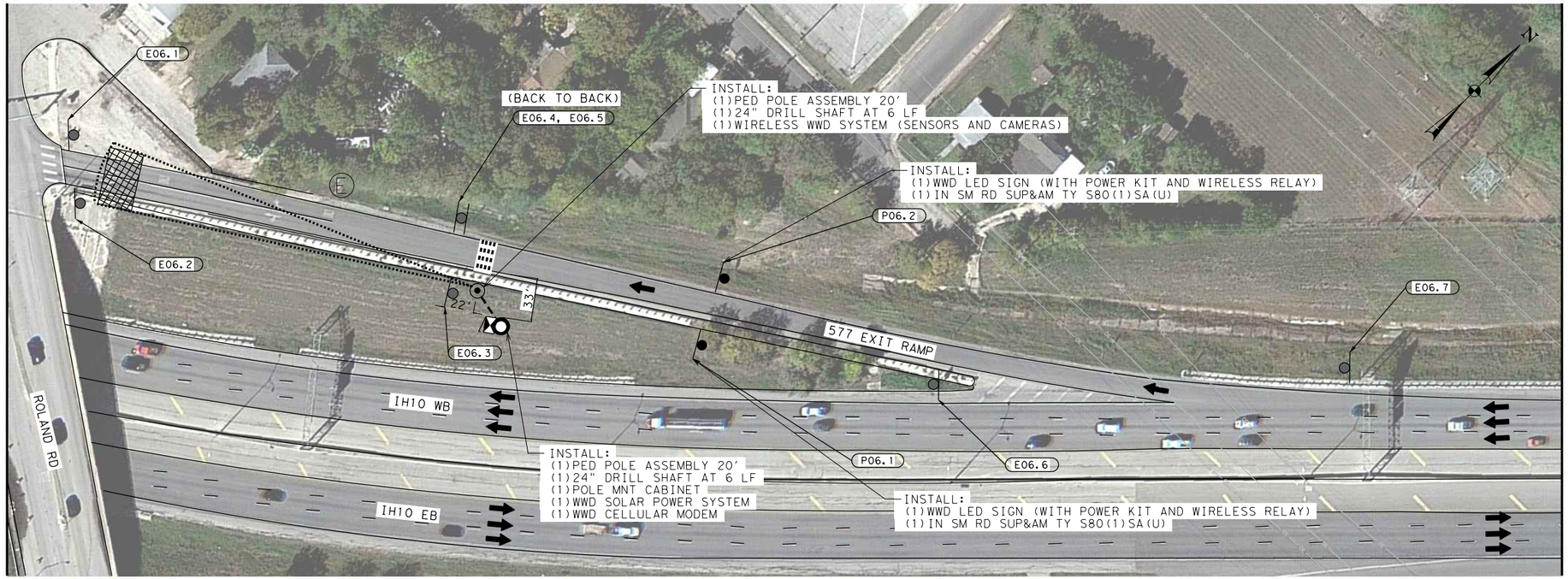
WRONG WAY DETECTION
ID #5 (I-10)
EXIT 577 EB
ROLAND RD

SHEET 5 OF 20

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	16

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA



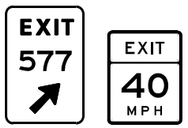
LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # — PROPOSED SIGN LABEL
- E#. # — EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E06.1, E06.2 — E06.3 — E06.4 — E06.5

(BACK TO BACK)



E06.6 — E06.7

EXISTING SIGNS (TO BE REMOVED)

PROPOSED SIGNS

P06.1, P06.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH 40) (2")	LF	35
644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	65

* FOR INFORMATION ONLY, ITEM SUBSIDARY TO ITEM 6416-6001

NOTES:

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SCALE: 1" = 100'
50 0 50

STATE OF TEXAS
CARLOS DURAN
125531
PROFESSIONAL REGISTERED ENGINEER
Carlos Duran P.E.
10/28/2022

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112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION
ID #6 (I-10)
EXIT 577 WB
ROLAND RD

SHEET 6 OF 20

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	17

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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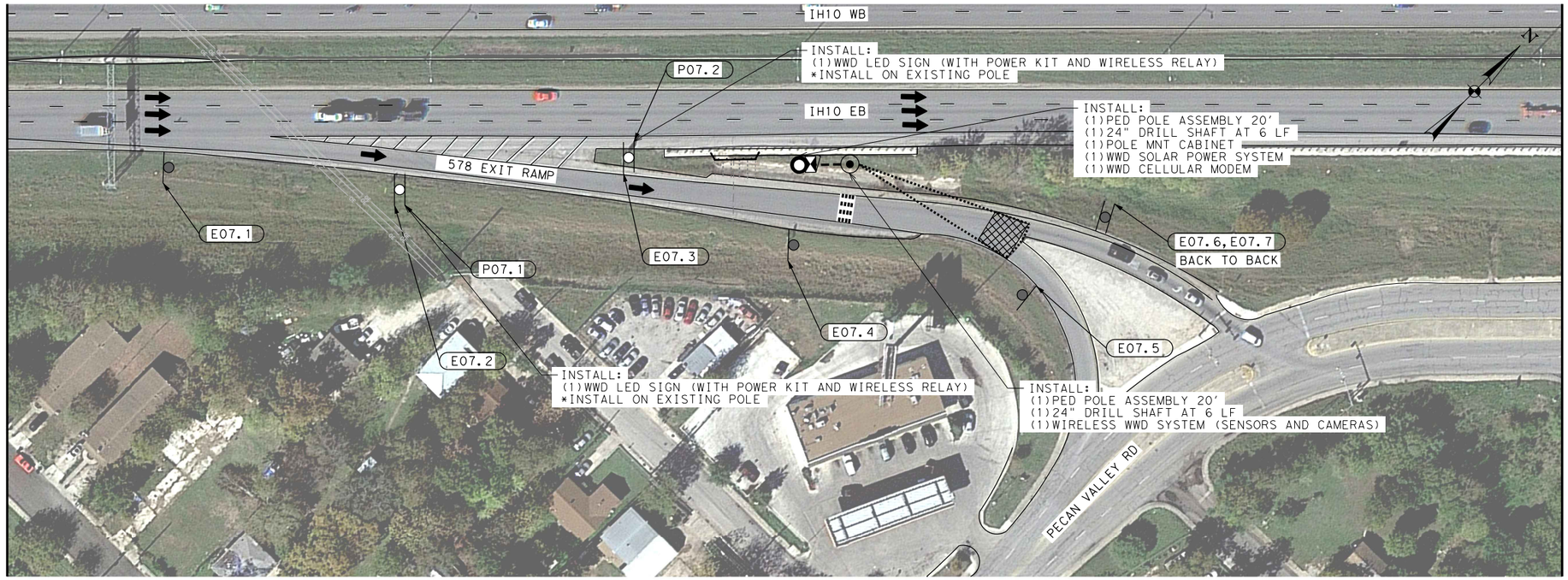
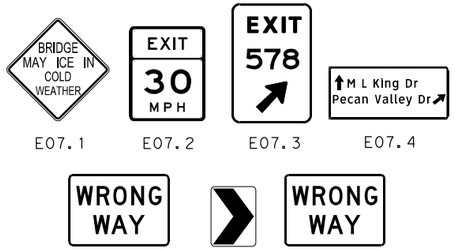


LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # PROPOSED SIGN LABEL
- E#. # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)



E07.1 E07.2 E07.3 E07.4 E07.5 E07.6 E07.7

(BACK TO BACK)

EXISTING SIGNS (TO BE REMOVED)

PROPOSED SIGNS

P07.1, P07.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
432	6006	RIPRAP (CONC)(CL B)	CY	2
618	6023	CONDT (PVC) (SCH 40) (2")	LF	40
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	70

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SCALE: 1" = 100'

50 0 50

STATE OF TEXAS
CARLOS DURAN
125531
PROFESSIONAL REGISTERED ENGINEER
Carlos Duran P.E.
10/28/2022

AECOM
AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION
ID #7 (I-10)
EXIT 578 EB
PECAN VALLEY DR

SHEET 7 OF 20

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		18
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

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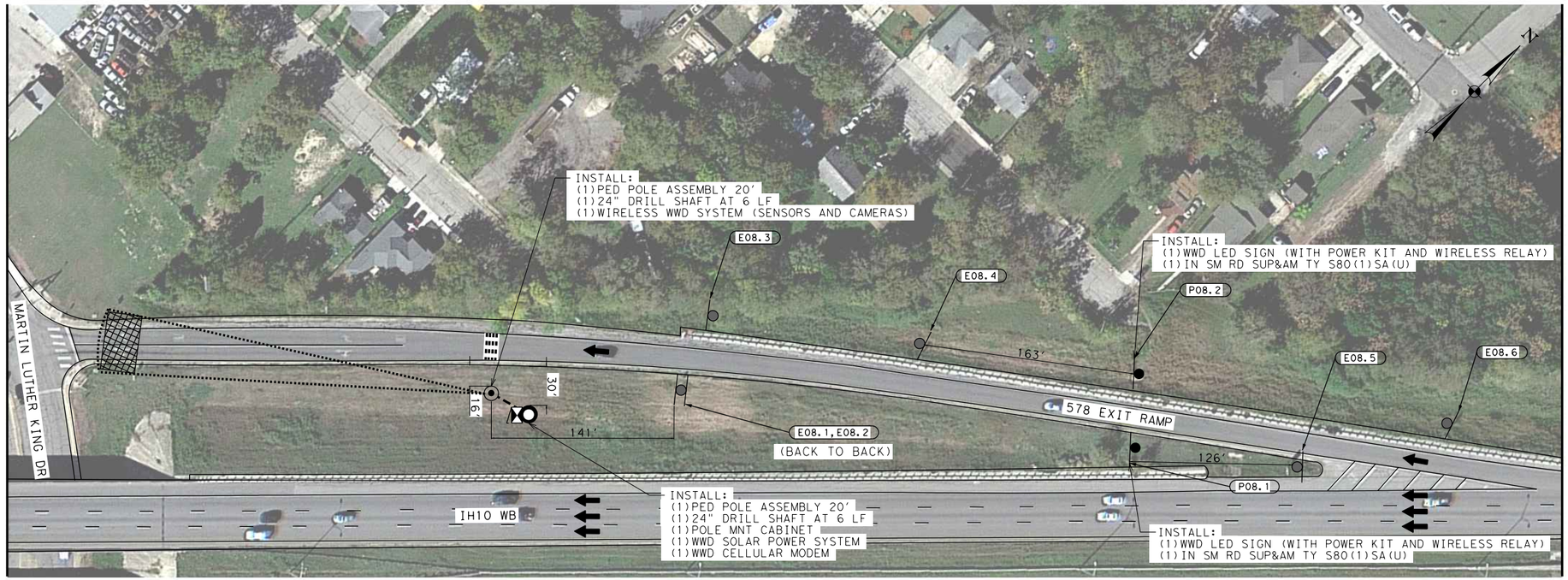

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EXISTING SIGNS (TO REMAIN)

E08.1 (BACK TO BACK)

E08.2

E08.3

E08.4

E08.5

E08.6

EXISTING SIGNS (TO BE REMOVED)

PROPOSED SIGNS

P08.1, P08.2

ESTIMATED QUANTITIES

BID CODE		DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH 40) (2")	LF	35
644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6185	6002	TMA/TA STATIONARY	DAY	3
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	65

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NOTES:

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3. DAMAGE TO ANY EQUIPMENT IDENTIFIED TO REMAIN OR DURING RELOCATION TO BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE.
4. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE NOTED ON THE PLANS.
5. CONTRACTOR TO PROVIDE ASTRO BRAC CLAMP KIT TO INSTALL WRONG WAY LED SIGNS TO SIGN POLES.
6. THE CONTRACTOR SHALL GET APPROVAL OF ALL NEW SIGN LOCATIONS BEFORE INSTALLING GROUND MOUNTS.

SCALE: 1" = 100'
50 0 50

STATE OF TEXAS
CARLOS DURAN
125531
PROFESSIONAL REGISTERED ENGINEER
Carlos Duran P.E.
10/28/2022

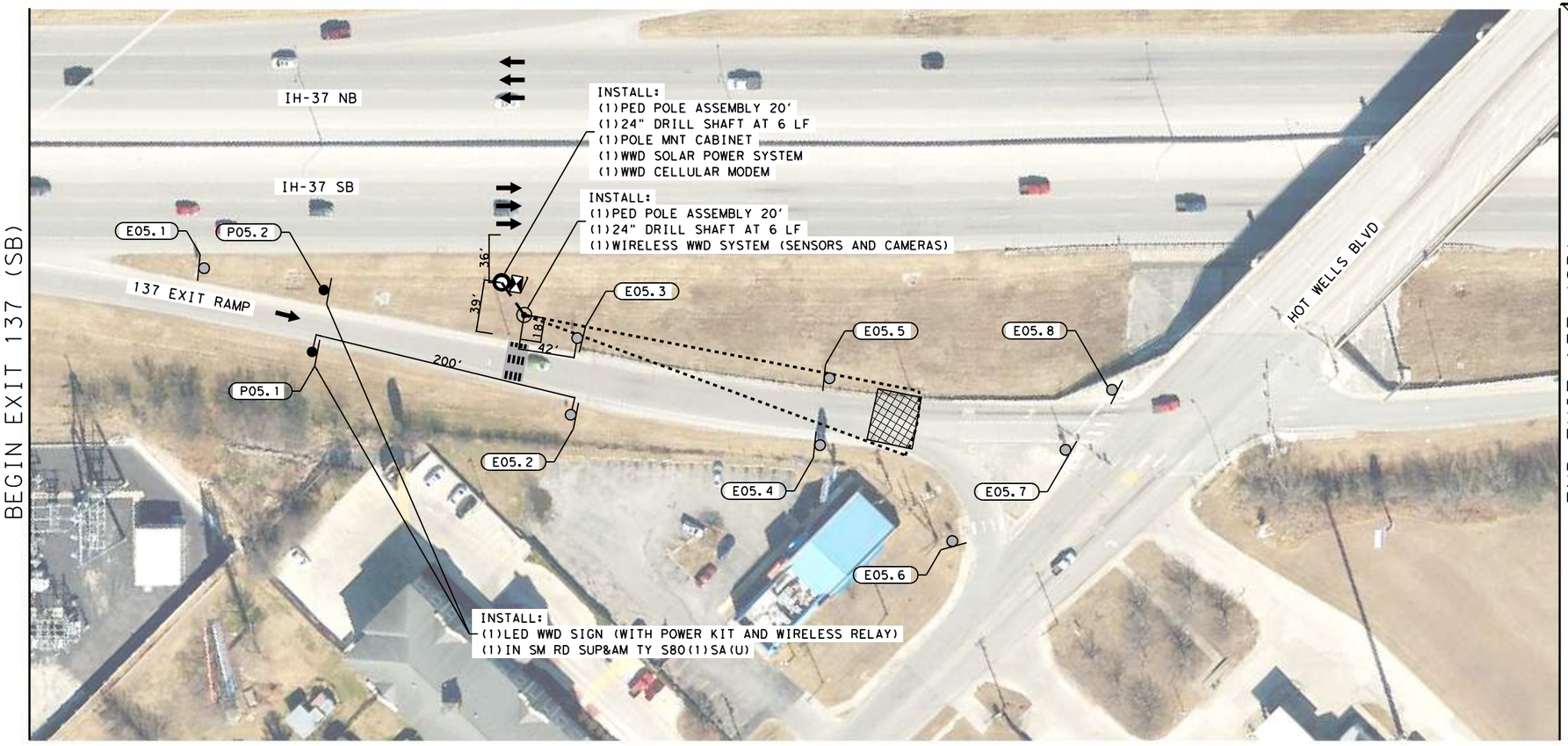
AECOM
AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION
ID #8 (I-10)
EXIT 578 WB
MARTIN LUTHER KING DR

SHEET 8 OF 20

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		19
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # PROPOSED SIGN LABEL
- E#. # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- PROPOSED GROUND BOX (TY A)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E05.1

E05.2, E05.3

E05.4, E05.5

E05.6, E05.7, E05.8

PROPOSED SIGNS

P05.1, P05.2

SCALE 1 100
50 0 50

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	40
0644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
0687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	40

* FOR INFORMATION ONLY, ITEM SUBSIDARY TO ITEM 6414-6001

NOTES:

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4. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE NOTED ON THE PLANS.
5. CONTRACTOR TO PROVIDE ASTRO BRAC CLAMP KIT TO INSTALL WRONG WAY LED SIGNS TO SIGN POLES.

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED
PROFESSIONAL ENGINEER
6.28.22

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
8000 West IH 10 | Suite 600 | San Antonio, TX 78230
Phone: 210-610-6177 | Fax: 512-821-2085

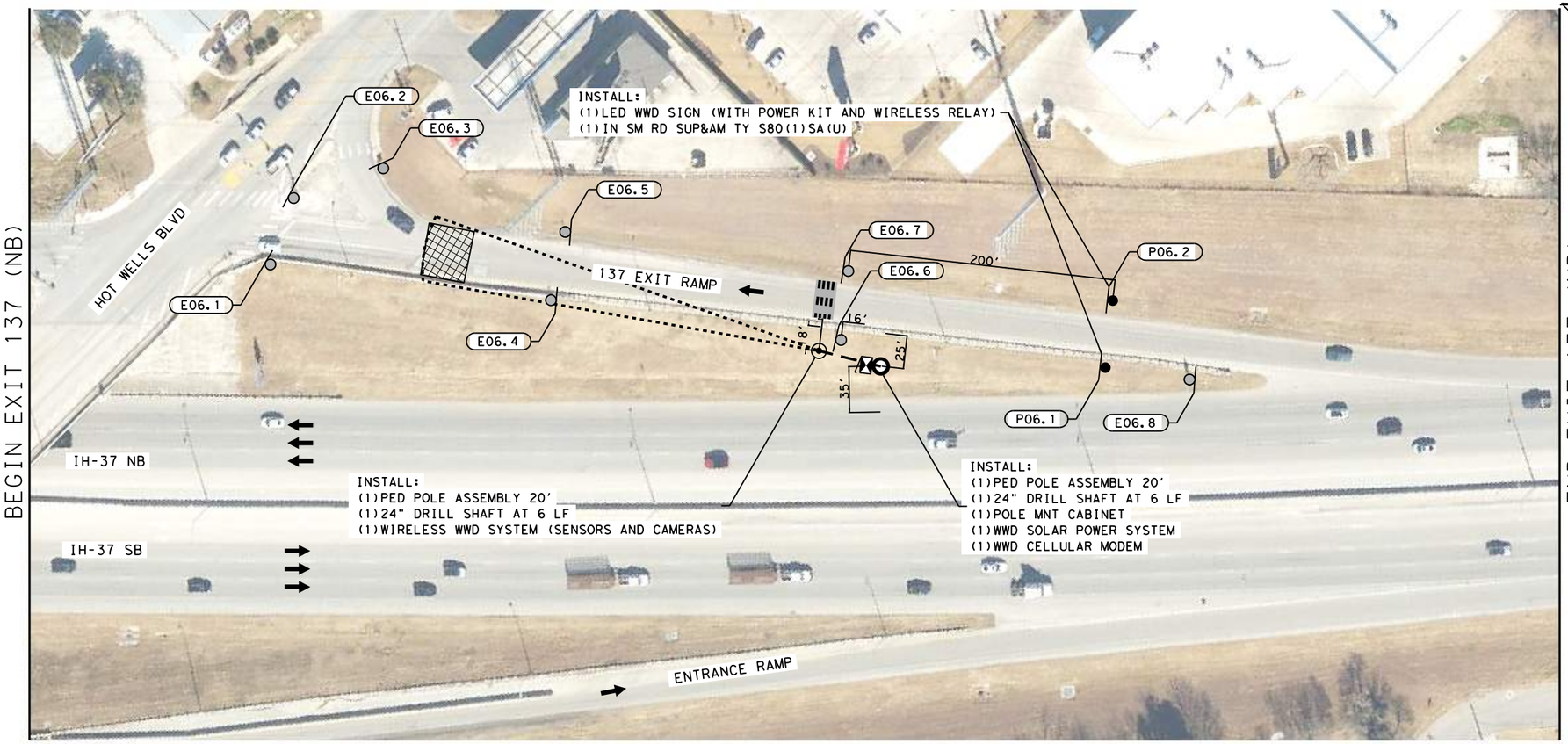
Texas Department of Transportation

WRONG WAY DETECTION

ID #1 (I-37)
EXIT 137 SB
HOT WELLS BLVD

SHEET 9 OF 20

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		20
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	08	201,ETC	VA



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#, # PROPOSED SIGN LABEL
- E#, # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- PROPOSED GROUND BOX (TY A)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E06.1, E06.2, E06.3

E06.4, E06.5

E06.6, E06.7

E06.8

PROPOSED SIGNS

P06.1, P06.2

SCALE 1 100
50 0 50

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	55
0644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
0687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	55

* FOR INFORMATION ONLY, ITEM SUBSIDARY TO ITEM 6414-6001

NOTES:

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STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED
PROFESSIONAL ENGINEER
8.28.22

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
8000 West IH 10 | Suite 600 | San Antonio, TX 78230
Phone: 210-610-6177 | Fax: 512-821-2085

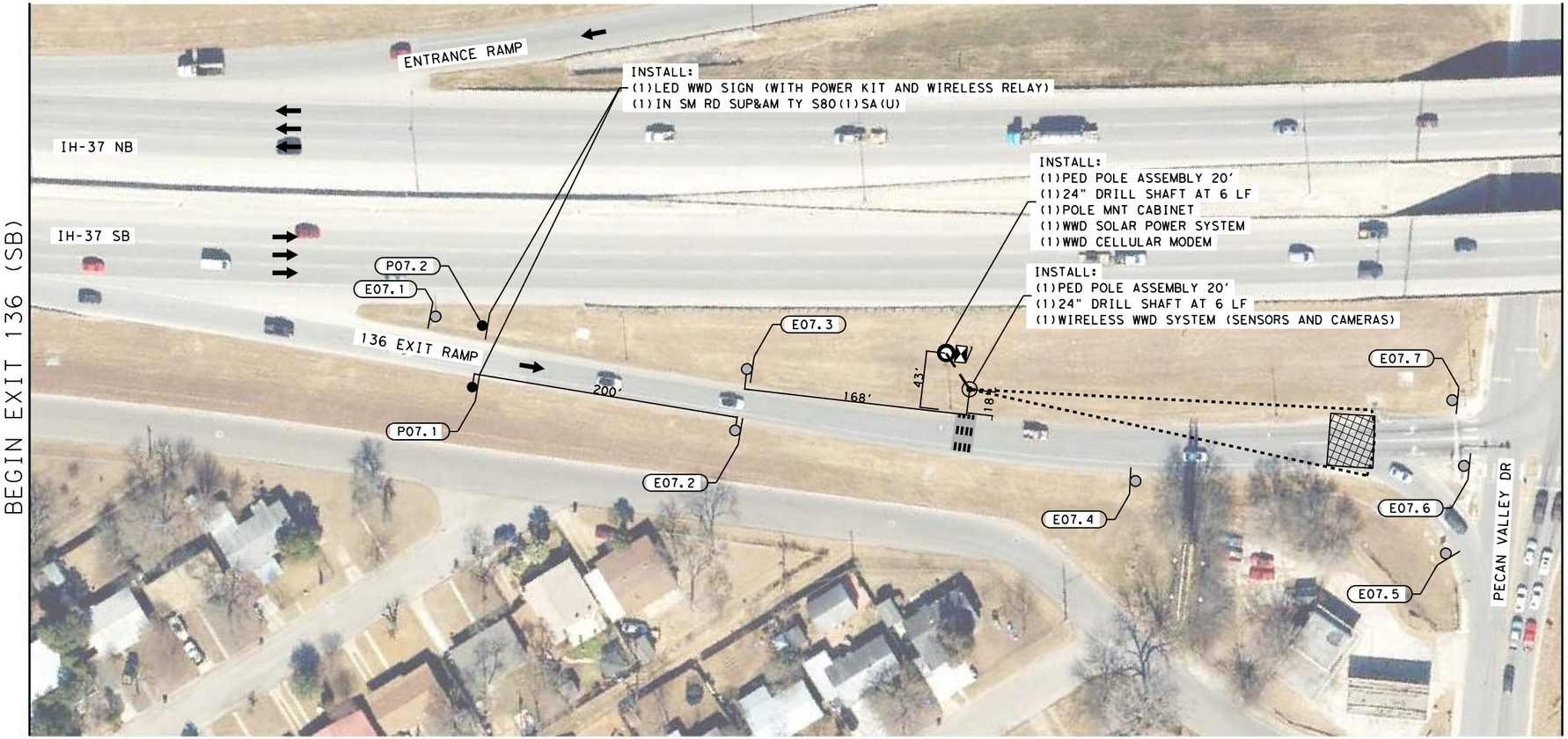
Texas Department of Transportation

WRONG WAY DETECTION

ID #2 (I-37)
EXIT 137 NB
HOT WELLS BLVD

SHEET 10 OF 20

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		21
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	08	201,ETC	VA



N

LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#, # PROPOSED SIGN LABEL
- E#, # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- PROPOSED GROUND BOX (TY A)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E07.1

E07.2, E07.3

E07.4

E07.5, E07.6, E07.7

PROPOSED SIGNS

P07.1, P07.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	40
0644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
0687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	40

* FOR INFORMATION ONLY, ITEM SUBSIDARY TO ITEM 6414-6001

NOTES:

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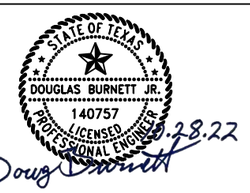
5. CONTRACTOR TO PROVIDE ASTRO BRAC CLAMP KIT TO INSTALL WRONG WAY LED SIGNS TO SIGN POLES.

SCALE 1 100
50 0 50



ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
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Phone: 210-610-6177 | Fax: 512-821-2085

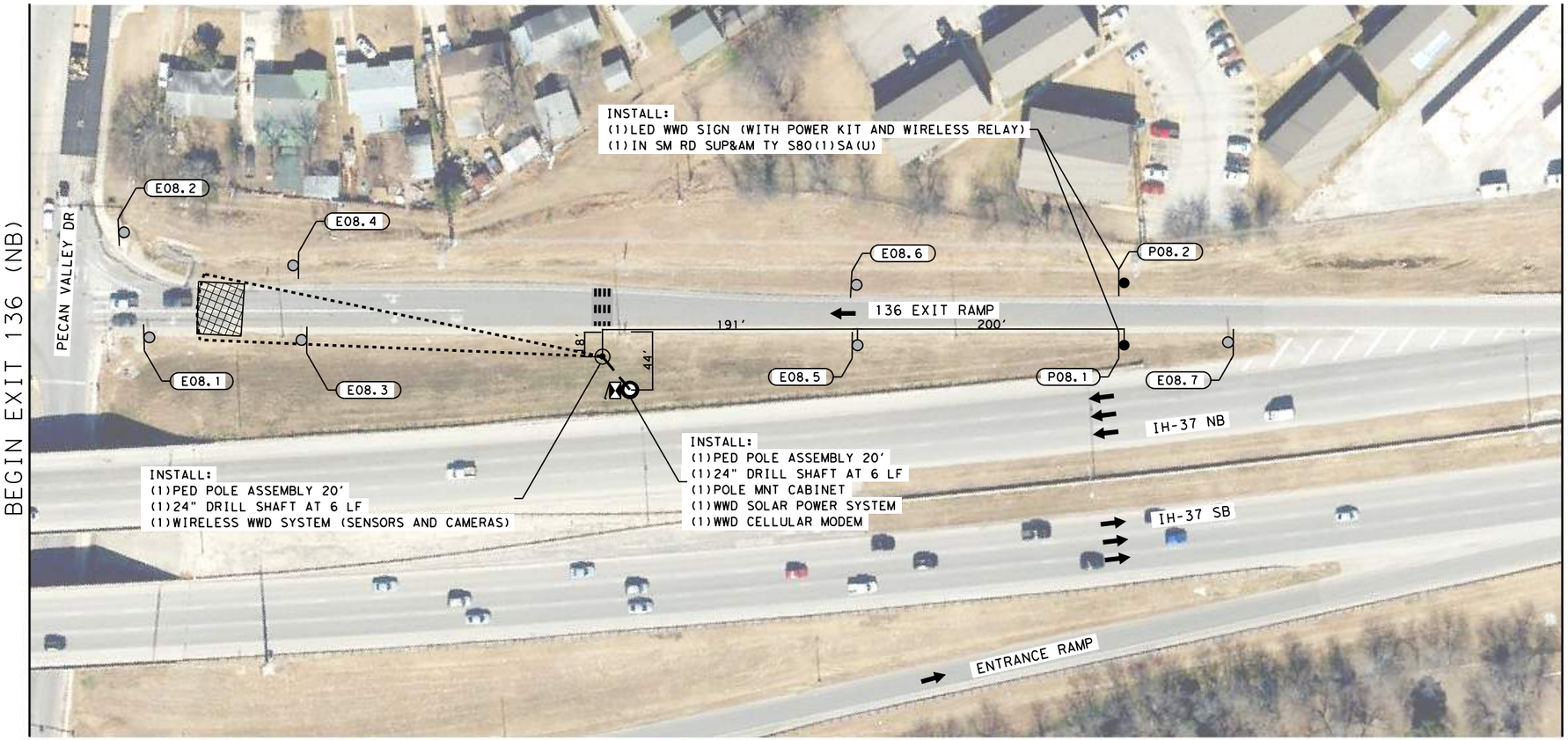
Texas Department of Transportation

WRONG WAY DETECTION

ID #3 (I-37)
EXIT 136 SB
PECAN VALLEY DR

SHEET 11 OF 20

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		22
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	08	201,ETC	VA



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#, # PROPOSED SIGN LABEL
- E#, # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- PROPOSED GROUND BOX (TY A)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E08.1, E08.2

E08.3, E08.4

E08.5, E08.6

E08.7

PROPOSED SIGNS

P08.1, P08.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	40
0644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
0687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	40

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NOTES:

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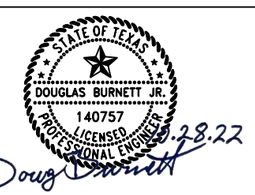
SCALE 1 100
50 0 50



ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
8000 West IH 10 | Suite 600 | San Antonio, TX 78230
Phone: 210-610-6177 | Fax: 512-821-2085

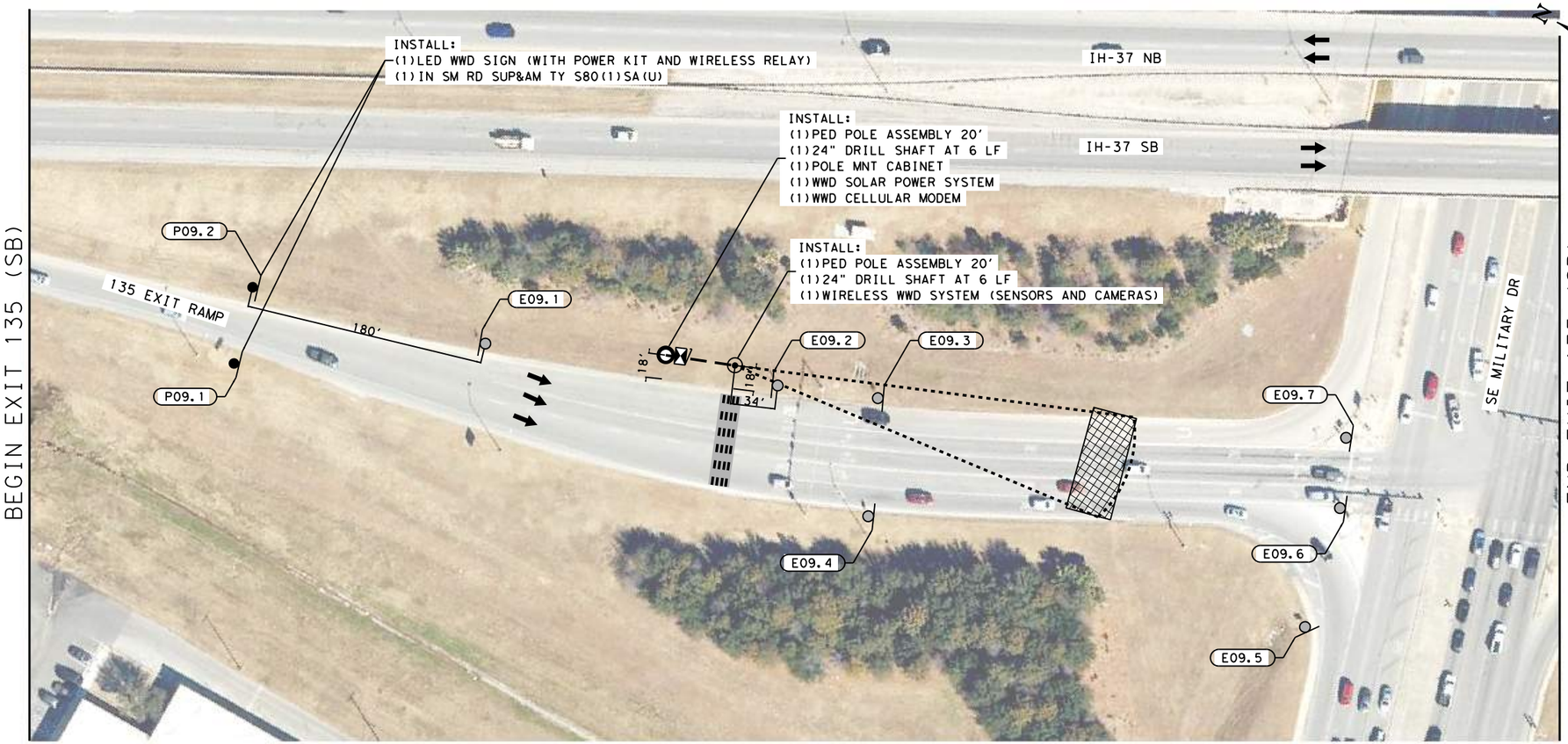
Texas Department of Transportation

WRONG WAY DETECTION

ID #4 (I-37)
EXIT 136 NB
PECAN VALLEY DR

SHEET 12 OF 20

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		23
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	08	201,ETC	VA



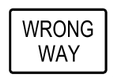
LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#. # PROPOSED SIGN LABEL
- E#. # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- PROPOSED GROUND BOX (TY A)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E09.1

E09.2



E09.3, E09.4

E09.5, E09.6, E09.7

PROPOSED SIGNS

P09.1, P09.2

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	60
0644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
0687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	60

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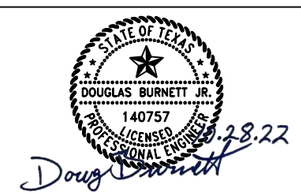
SCALE 1 100
50 0 50



ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
8000 West IH 10 | Suite 600 | San Antonio, TX 78230
Phone: 210-610-6177 | Fax: 512-821-2085

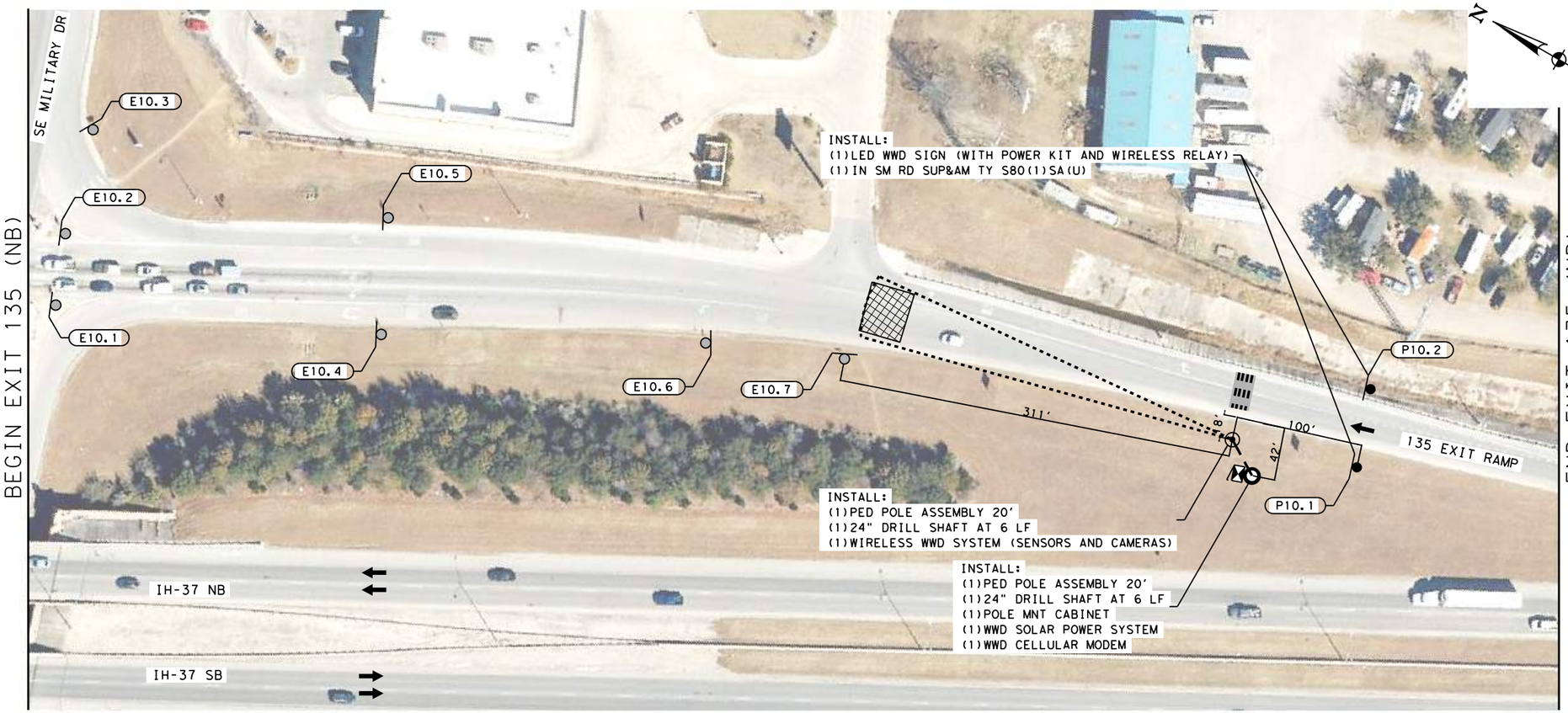
Texas Department of Transportation

WRONG WAY DETECTION

ID #5 (I-37)
EXIT 135 SB
MILITARY DR

SHEET 13 OF 20

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		24
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	08	201,ETC	VA

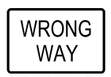


LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P#, # PROPOSED SIGN LABEL
- E#, # EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- PROPOSED GROUND BOX (TY A)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E10.1, E10.2, E10.3



E10.4, E10.5

E10.6

E10.7

PROPOSED SIGNS

P10.1, P10.2, P10.3

SCALE 1 100
50 0 50

ESTIMATED QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	40
0644	6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2
0687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWD SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTORS	LF	40

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NOTES:

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STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED
PROFESSIONAL ENGINEER
10.28.22

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TBPE Firm Registration No. F-812
8000 West IH 10 | Suite 600 | San Antonio, TX 78230
Phone: 210-610-6177 | Fax: 512-821-2085

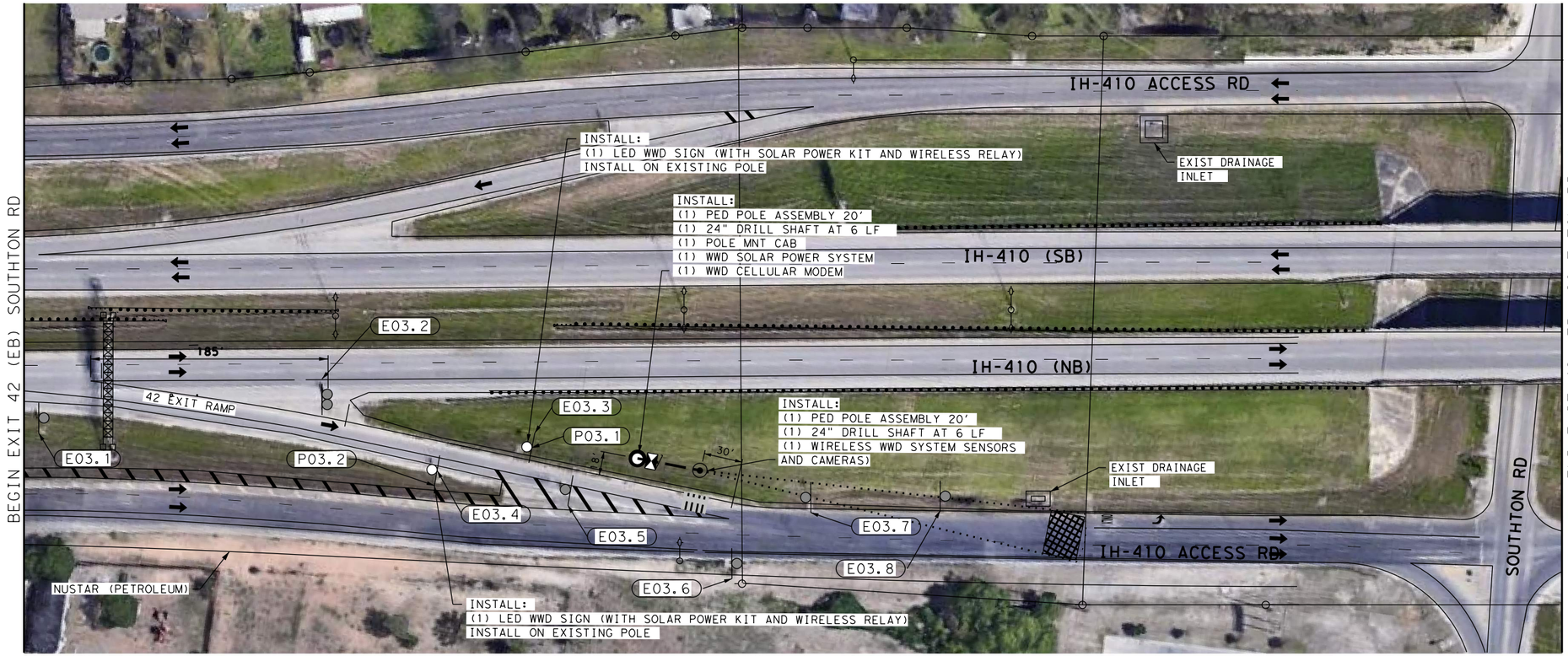
Texas Department of Transportation

WRONG WAY DETECTION

ID #6 (I-37)
EXIT 135 NB
MILITARY DR

SHEET 14 OF 20

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		25
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	08	201,ETC	VA



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P=. = PROPOSED SIGN LABEL
- E=. = EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E03.1 E03.2 E03.5 E03.7 E03.6 E03.8

EXISTING SIGNS (TO BE REMOVED)

E03.3
E03.4

PROPOSED SIGNS

P03.1
P03.2

ESTIMATED QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC)(SCH40)(2")	LF	55
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWS SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTIONS	LF	95

* FOR INFORMATION ONLY, ITEM SUBSIDIARY TO ITEM 6416-6001

NOTES:

1. EXISTING FIBER OPTICS, WATER, SAN. SEWER, STORM SEWER, TELEPHONE, GAS AND ELECTRICAL SYSTEMS WITHIN PROJECT AREA ARE NOT SHOWN IN THE PLANS. BEFORE DIGGING, DRILLING, OR BORING IN THE PROJECT AREA, THE CONTRACTOR SHALL PERFORM A "ONE CALL" AND NOTIFY THE UTILITY COMPANIES 72 HOURS PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR SHALL HAVE THE MANUFACTURER'S REPRESENTATIVE ON SITE TO ASISST WITH THE INSTALLATION OF ALL EQUIPMENT BEFORE ANY WORK BEGINS.
3. DAMAGE TO ANY EQUIPMENT IDENTIFIED TO REMAIN OR DURING RELOCATION TO BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE.
4. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE NOTED ON THE PLANS.
5. CONTRACTOR TO PROVIDE ASTRO BRAC CLAMP KIT TO INSTALL WRONG WAY LED SIGNS TO SIGN POLES.
6. THE CONTRACTOR SHALL GET APPROVAL OF ALL NEW SIGN LOCATIONS BEFORE INSTALLING GROUND MOUNTS.

0 50 100
SCALE: 1"=100'

STATE OF TEXAS
LIDEANA LABOY RODRIGUEZ
140078
LICENSED PROFESSIONAL ENGINEER
10/28/2022

TRANSCEND engineers + planners
TBPELS FIRM REG. NO. 19299
23410 Grand Reserve Dr
Suite 101
Katy, TX 77494

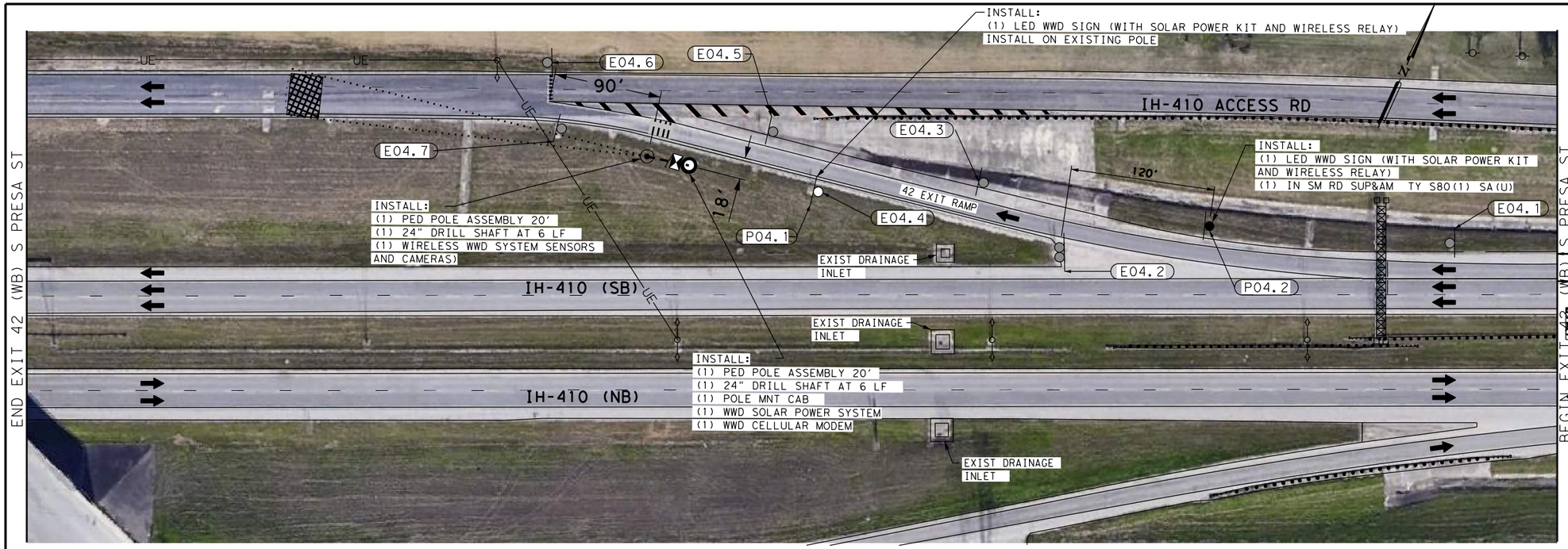
Texas Department of Transportation

WRONG WAY DETECTION

ID #1 (I-410)
EXIT 42 (EB)
TO SOUTHTON RD/
S PRESA ST/SPUR 122

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		26
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

10/28/2022
...\Ramp 3-Exit 42 EB to SOUTHTON RD.dgn

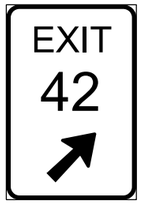


LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P=. = PROPOSED SIGN LABEL
- E=. = EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E04.1



E04.2

E04.3

E04.5
E04.7

E04.6

EXISTING SIGNS (TO BE REMOVED)

E04.4

PROPOSED SIGNS

P04.1
P04.2

ESTIMATED QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH40) (2")	LF	45
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	1
687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWS SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTIONS	LF	85

* FOR INFORMATION ONLY, ITEM SUBSIDIARY TO ITEM 6416-6001

NOTES:

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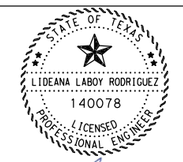
6. THE CONTRACTOR SHALL GET APPROVAL OF ALL NEW SIGN LOCATIONS BEFORE INSTALLING GROUND MOUNTS.

0 50 100
SCALE: 1"=100'



10/28/2022

TRANSCEND engineers + planners
TBPELS FIRM REG. NO. 19299
23410 Grand Reserve Dr
Suite 101
Katy, TX 77494

Texas Department of Transportation

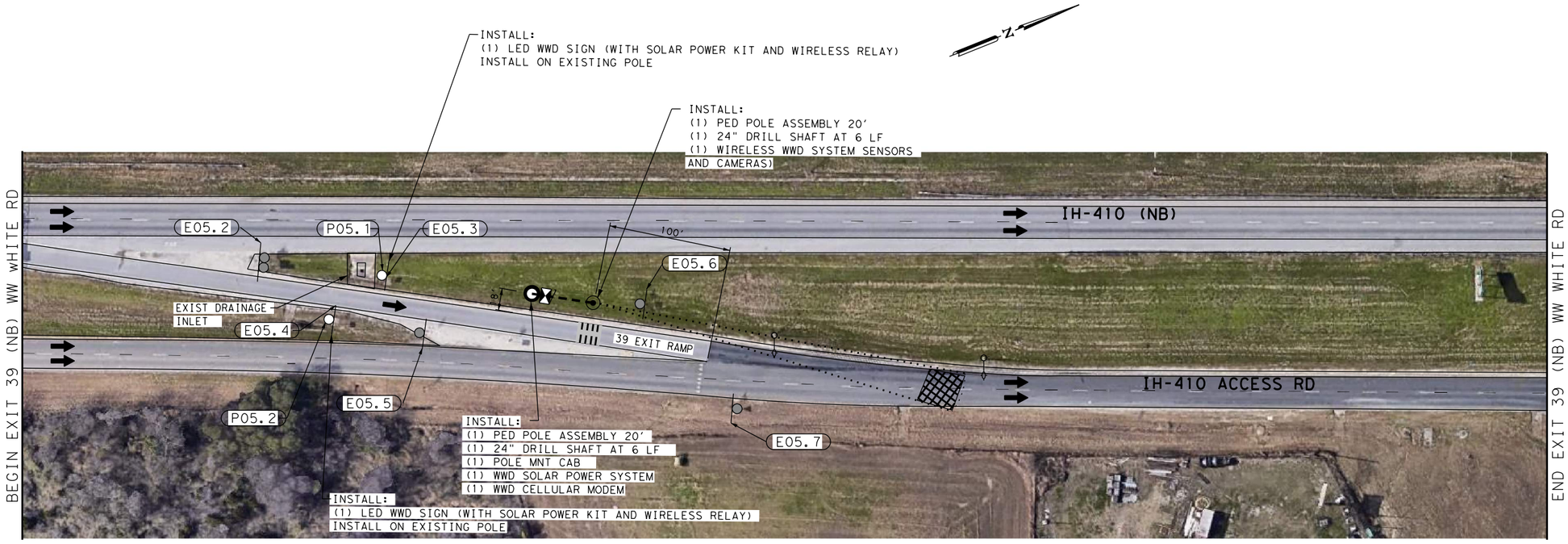
WRONG WAY DETECTION

ID #2 (I-410)
EXIT 42 (WB)
TO S PRESA ST/
SOUTHTON RD/SPUR 122

SHEET 16 OF 20

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		27
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

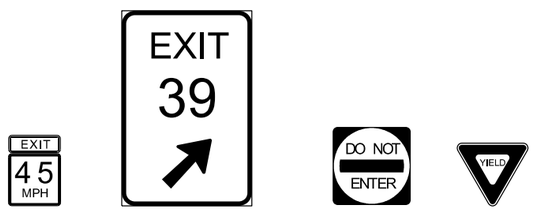
10/28/2022
...\Ramp 4-EXIT 42 WB TO S PRESA ST.dgn



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P■. ■ PROPOSED SIGN LABEL
- E■. ■ EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)



E05.1 E05.2 E05.5 E05.6 E05.7

EXISTING SIGNS (TO BE REMOVED)

E05.3
E05.4

PROPOSED SIGNS

P05.1
P05.2

ESTIMATED QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC)(SCH40)(2")	LF	60
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWS SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTIONS	LF	100

* FOR INFORMATION ONLY, ITEM SUBSIDIARY TO ITEM 6416-6001

NOTES:

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3. DAMAGE TO ANY EQUIPMENT IDENTIFIED TO REMAIN OR DURING RELOCATION TO BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE.
4. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE NOTED ON THE PLANS.
5. CONTRACTOR TO PROVIDE ASTRO BRAC CLAMP KIT TO INSTALL WRONG WAY LED SIGNS TO SIGN POLES.
6. THE CONTRACTOR SHALL GET APPROVAL OF ALL NEW SIGN LOCATIONS BEFORE INSTALLING GROUND MOUNTS.

0 50 100
SCALE: 1"=100'

STATE OF TEXAS
LIDEANA LABOY RODRIGUEZ
140078
LICENSED
PROFESSIONAL ENGINEER
10/28/2022
TRANSCEND engineers + planners
TBPELS FIRM REG. NO. 19299
23410 Grand Reserve Dr
Suite 101
Katy, TX 77494

Texas Department of Transportation

WRONG WAY DETECTION

ID #3 (I-410)
EXIT 39 (NB)
TO SPUR 117/WW WHITE RD

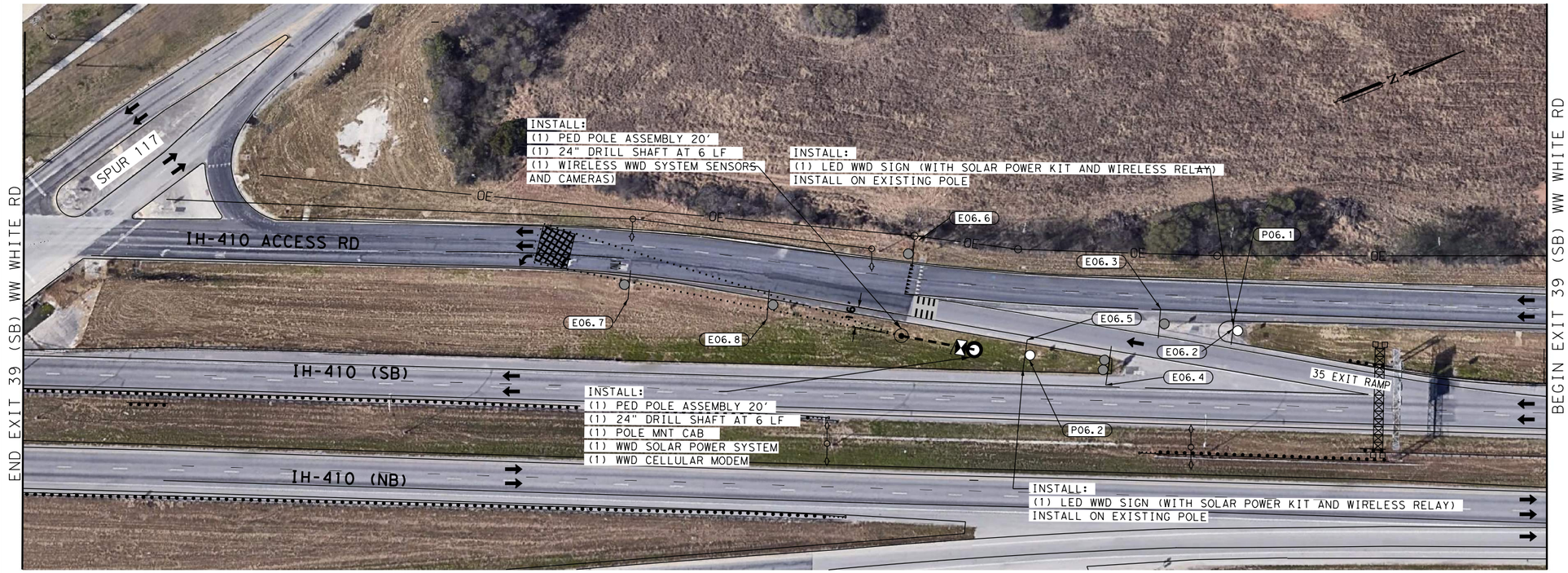
SHEET 17 OF 20

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	28

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

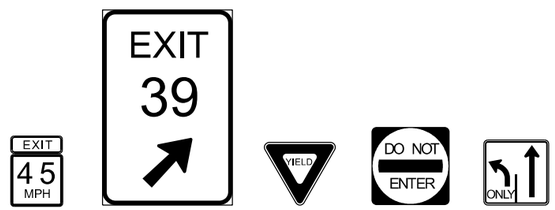
10/28/2022
...\Ramp 5-EXIT 39 NB TO SPUR 117-B.dgn



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P=. = PROPOSED SIGN LABEL
- E=. = EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)



E06.1 E06.4 E06.6 E06.8 E06.3 E06.7

EXISTING SIGNS (TO BE REMOVED)

E06.2
E06.5

PROPOSED SIGNS

P06.1
P06.2

ESTIMATED QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC)(SCH40)(2")	LF	70
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWS SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTIONS	LF	110

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NOTES:
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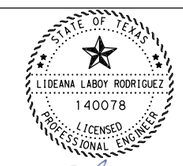
0 50 100
SCALE: 1"=100'



10/28/2022

TRANSCEND engineers + planners
TBPELS FIRM REG. NO. 19299
23410 Grand Reserve Dr
Suite 101
Katy, TX 77494

Texas Department of Transportation

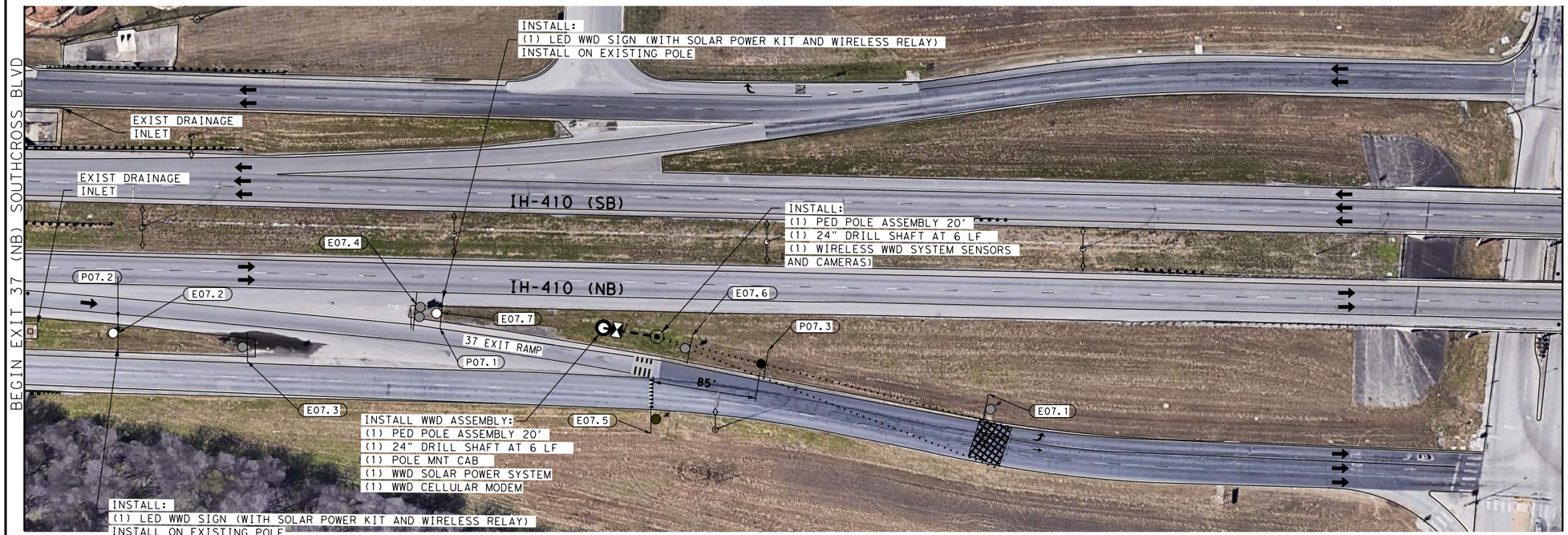
WRONG WAY DETECTION

ID #4 (I-410)
EXIT 39 (SB)
TO SPUR 117/WW WHITE RD

SHEET 18 OF 20

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		29
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

10/28/2022
...\Ramp 6-EXIT 39 SB TO SPUR 117.dgn



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
- PED POLE WITH SOLAR PANEL
- PROP SIGN MOUNTED ON EXIST POLE
- PROP SIGN MOUNTED ON PROP POLE
- EXISTING GROUND MOUNTED SIGN
- ITS POLE MNT CAB (TY 1)
- P=. = PROPOSED SIGN LABEL
- E=. = EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E07.3

E07.4

E07.5

E07.1

EXISTING SIGNS (TO BE REMOVED)

E07.2
E07.7

EXISTING SIGNS (TO BE RELOCATED)

E07.6
P07.3

PROPOSED SIGNS

P07.1
P07.2

ESTIMATED QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC) (SCH40) (2")	LF	55
644	6068	RELOCATE SM RD SN SUP&AM TY 10 BWG	EA	1
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWS SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTIONS	LF	95

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NOTES:

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0 50 100
SCALE: 1"=100'

STATE OF TEXAS
LIDEANA LABOY RODRIGUEZ
140078
LICENSED PROFESSIONAL ENGINEER

10/28/2022

TRANSCEND engineers + planners
TBPELS FIRM REG. NO. 19299
23410 Grand Reserve Dr
Suite 101
Katy, TX 77494

Texas Department of Transportation

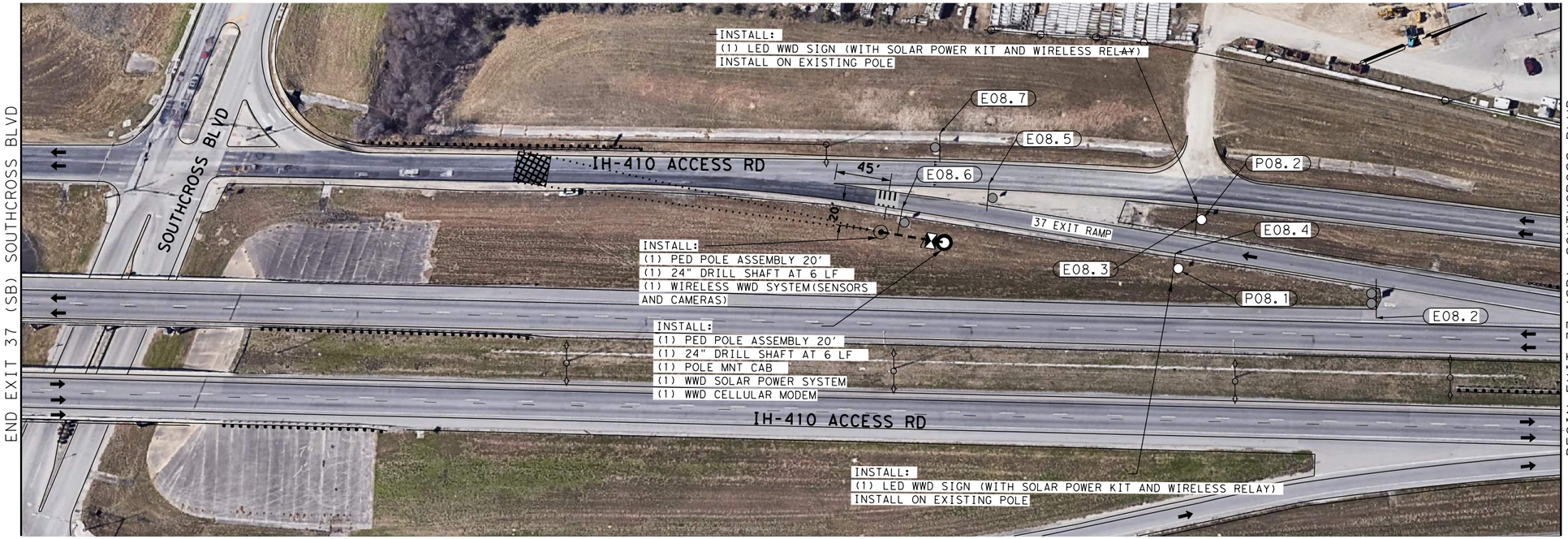
WRONG WAY DETECTION

ID #5 (I-410)
EXIT 37 (NB)
TO SOUTHCROSS BLVD/
SINCLAIR RD

SHEET 19 OF 20

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		30
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

10/28/2022
...\Ramp 7-EXIT 37 NB TO SOUTHCROSS BLVD.dgn



LEGEND

- DETECTION ZONE
- PED POLE WITH WWD SENSORS
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- PROP SIGN MOUNTED ON EXIST POLE
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- E=. = EXISTING SIGN LABEL
- ACTIVATION ZONE
- CONFIRMATION ZONE
- PROPOSED CONDUIT (TRENCH)
- TRAFFIC FLOW

EXISTING SIGNS (TO REMAIN)

E08.1 E08.2 E08.5 E08.6 E08.7

EXISTING SIGNS (TO BE REMOVED)

E08.3
E08.4

PROPOSED SIGNS

P08.1
P08.2

ESTIMATED QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
618	6023	CONDT (PVC)(SCH40)(2")	LF	65
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	2
687	6001	PED POLE ASSEMBLY	EA	2
6414	6001	WIRELESS WRONG WAY DRIVER SYSTEM	EA	1
*	*	WWD LED SIGNS	EA	2
*	*	WWD CELLULAR MODEM	EA	1
*	*	WWS SOLAR POWER SYSTEM	EA	1
*	*	ETHERNET CABLE AND CONNECTIONS	LF	100

* FOR INFORMATION ONLY, ITEM SUBSIDIARY TO ITEM 6416-6001

NOTES:

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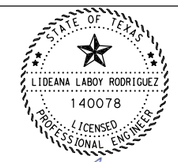
0 50 100
SCALE: 1"=100'



10/28/2022

TRANSCEND engineers + planners
TBPELS FIRM REG. NO. 19299
23410 Grand Reserve Dr
Suite 101
Katy, TX 77494

Texas Department of Transportation

WRONG WAY DETECTION

ID #6 (I-410)
EXIT 37 (SB)
TO SOUTHCROSS BLVD

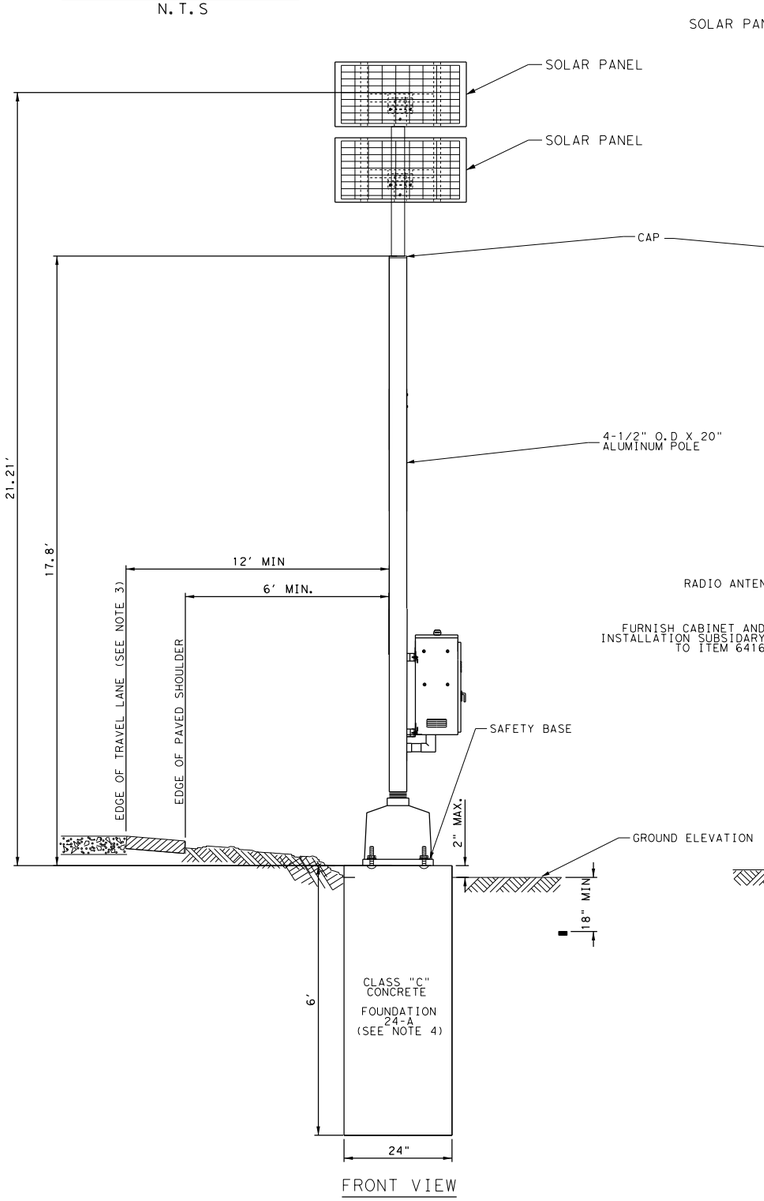
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	31

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

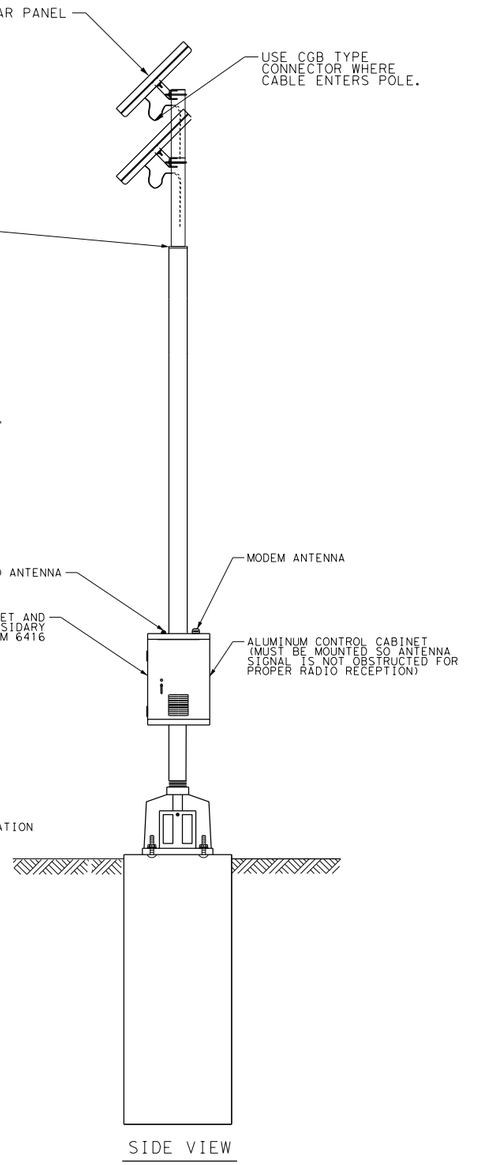
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

10/28/2022
...\Ramp 8-EXIT 37 SB TO SOUTHCROSS BLVD.dgn

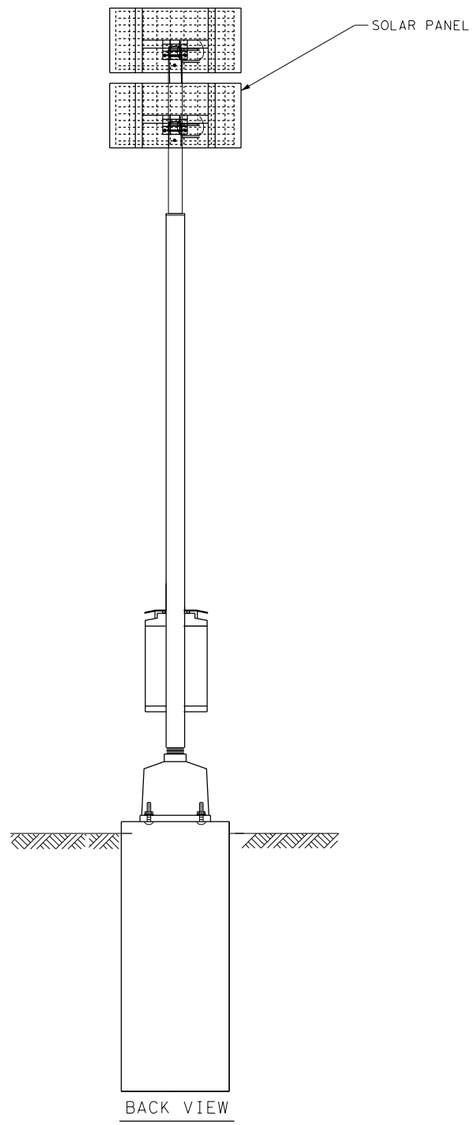
WWD ASSEMBLY MASTER DETAIL
DETECTOR POLE TYPICAL
N. T. S



FRONT VIEW



SIDE VIEW



BACK VIEW

NOTES:

1. FOR INSTALLATION LOCATIONS, SEE PLAN SHEETS.
2. ORIENTATION OF THE THERMAL AND CCTV CAMERAS MAY VARY BY LOCATION. SEE PLAN SHEETS FOR DETAILS. THERMAL CAMERA SHALL BE FACING OFF RAMPS OF I-10, I-37, I-410. QUANTITY OF THERMAL AND CCTV MAY VARY BY PROVIDER AND LOCATION.
3. REFER TO STANDARD SHEET TS-FD FOR ADDITIONAL FOUNDATION DETAILS.
4. SEE ITEM 687, "PEDESTAL POLE ASSEMBLIES" FOR FURTHER REQUIREMENTS.
5. PER MANUFACTURER'S RECOMMENDATIONS, ENGAGE ALL THREADS ON THE PEDESTAL POLE BASE AND PIPE UNLESS THE PIPE IS FULLY SEATED INTO BASE. USE A POLE AND BASE COLLAR ASSEMBLY TO ADD STRENGTH AND PREVENT LOOSENING ON CONNECTION.
6. SEE STANDARD SHEET ELECTRICAL DETAILS (ED) FOR ADDITIONAL REQUIREMENTS REGARDING THE INSTALLATION OF CONDUITS, CONDUCTORS, AND CABINETS.
7. UNLESS OTHERWISE SHOWN ON THE PLANS, POLE SHAFT SHALL BE ONE PIECE, SCHEDULE 40 ALUMINUM PIPE, ASTM B429 OR B221 (ALLOY 6061-T6 ONLY). ALUMINUM CONDUIT WILL NOT DEVELOP THE NECESSARY STRENGTH AND WILL NOT BE ALLOWED.
8. INSTALL BATTERIES IN THE CABINET. WIRE BATTERIES ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

STATE OF TEXAS
CARLOS DURAN
125531
PROFESSIONAL REGISTERED ENGINEER
Carlos Duran P.E.
10/28/2022

AECOM
AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

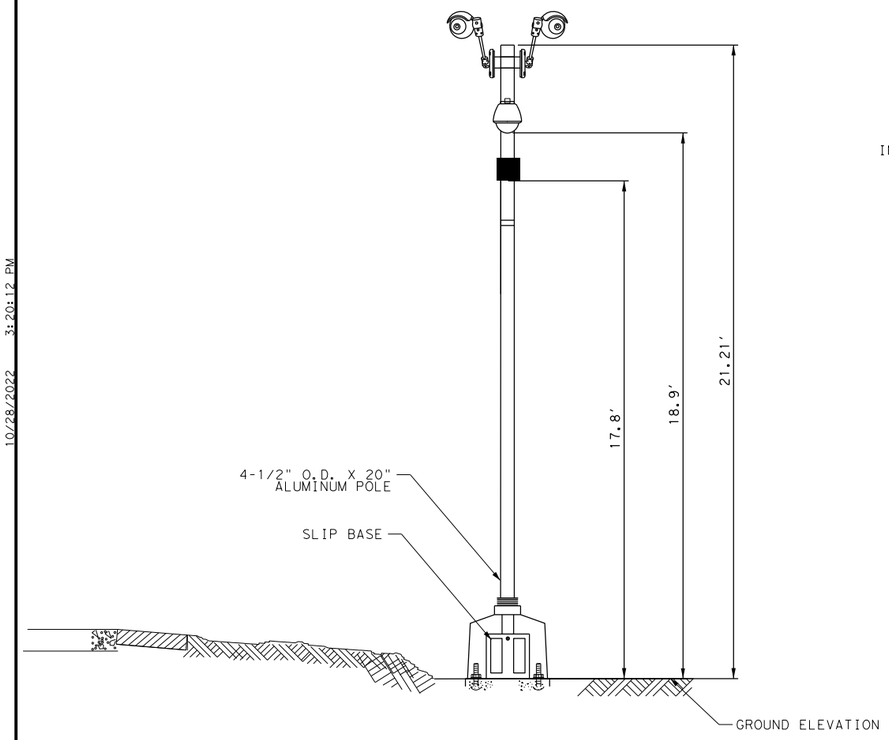
WRONG WAY DETECTION

WRONG WAY DETECTION SYSTEM DETAIL

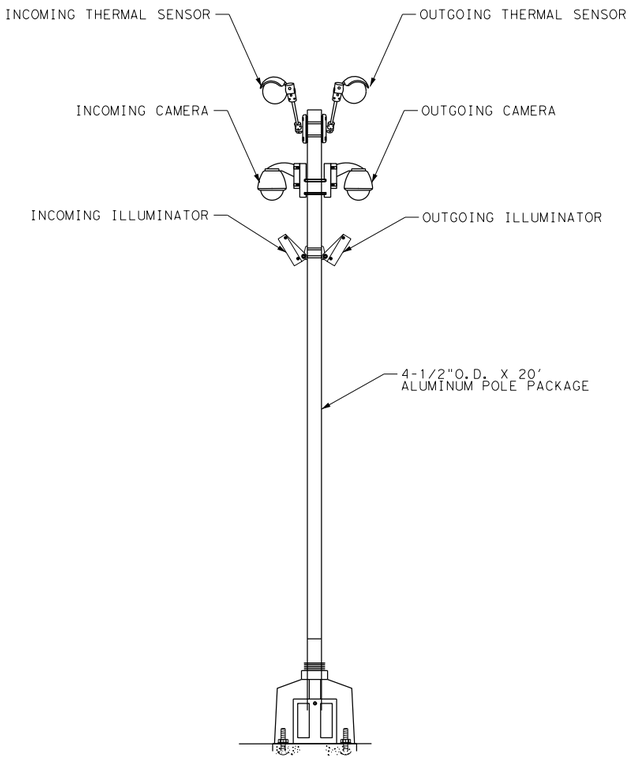
SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		32
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225, ETC	VA

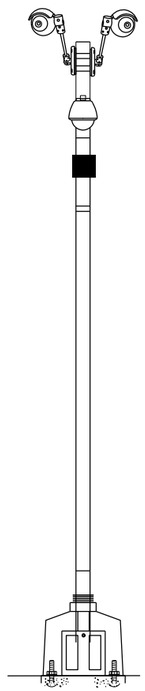
WWD POST DETAIL
N.T.S



SIDE VIEW



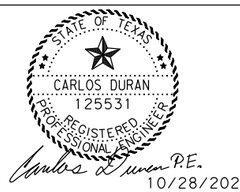
FRONT VIEW



REAR VIEW

NOTES:

1. DETAILS SHOW A TYPICAL LED WRONG WAY SIGN WITH A SOLAR POWER INSTALLATION.
2. FOR SIGN INSTALLATION LOCATIONS, SEE PLAN SHEETS.
3. WHEN THE SHOULDER IS 6' OR LESS IN WIDTH, THE SIGN MUST BE PLACED AT LEAST 12' FROM THE EDGE OF THE TRAVEL LANE. WHEN THE SHOULDER IS GREATER THAN 6' IN WIDTH, THE SIGN MUST BE PLACED AT LEAST 6' FROM THE EDGE OF THE SHOULDER.
4. SEE SMD STANDARD SHEETS FOR LATERAL AND VERTICAL CLEARANCES AND SIGN MOUNTING DETAILS. INSTALL SIGNS AS SHOWN ON THE PLAN SHEETS.
5. ORIENT SOLAR PANEL FOR OPTIMUM EXPOSURE TO SUNLIGHT (FACE TO THE SOUTH). PRIOR TO INSTALLATION, CHECK THE LOCATION TO ENSURE THERE IS NO OVERHEAD OBSTRUCTION THAT WOULD BLOCK THE SOLAR PANEL FROM RECEIVING FULL SUNLIGHT. UNLESS SPECIFIED ELSEWHERE, MOUNT A MINIMUM OF 14' ABOVE GRADE.
6. CONTRACTOR SHALL VERIFY ALL ELEVATIONS SHOWN



AECOM
AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION

WRONG WAY DETECTION SYSTEM DETAIL

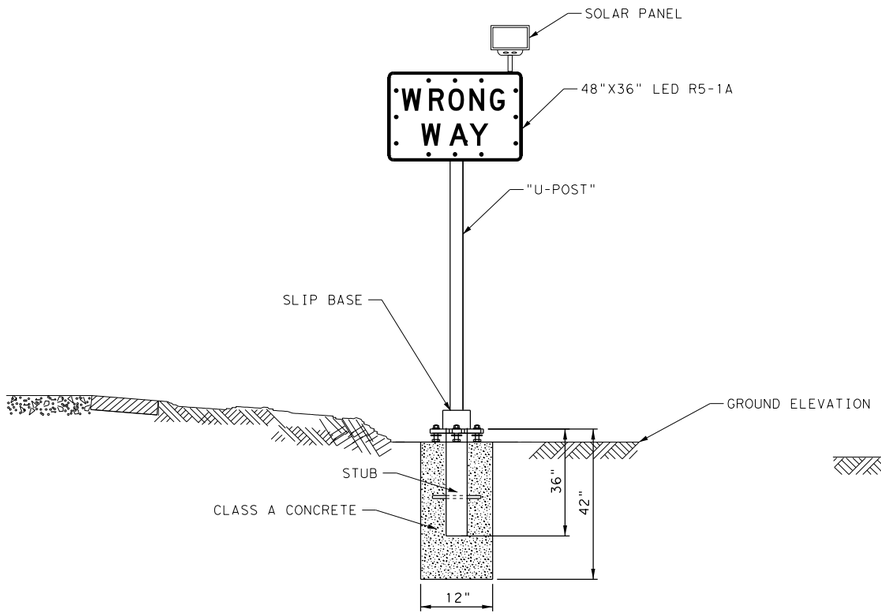
SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP2023(502)HES		33
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

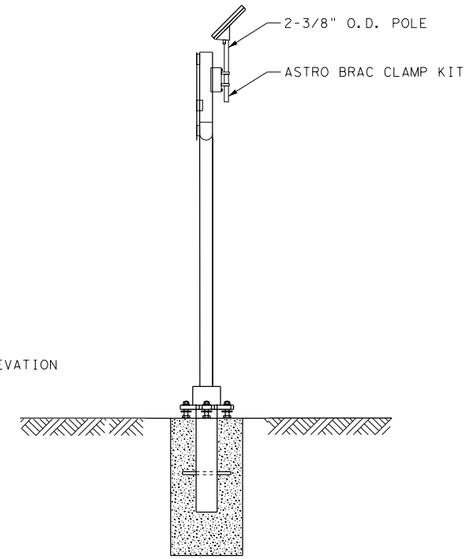
10/28/2022 3:20:12 PM
c:\pwworking\ustx\dms0614\WH10*002.dgn

WWD EXISTING POST DETAIL

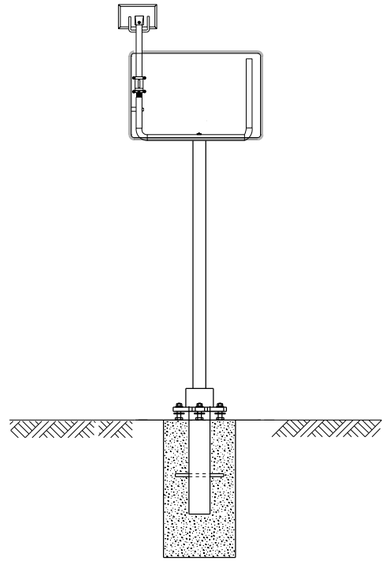
N.T.S



FRONT VIEW



SIDE VIEW



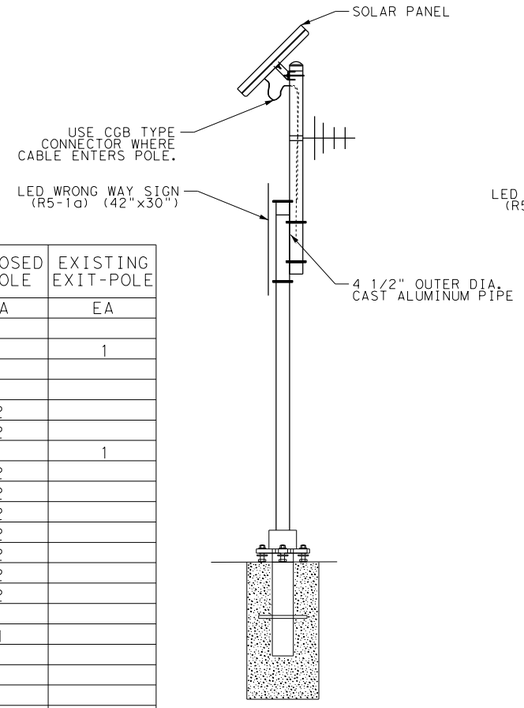
REAR VIEW

NOTES:

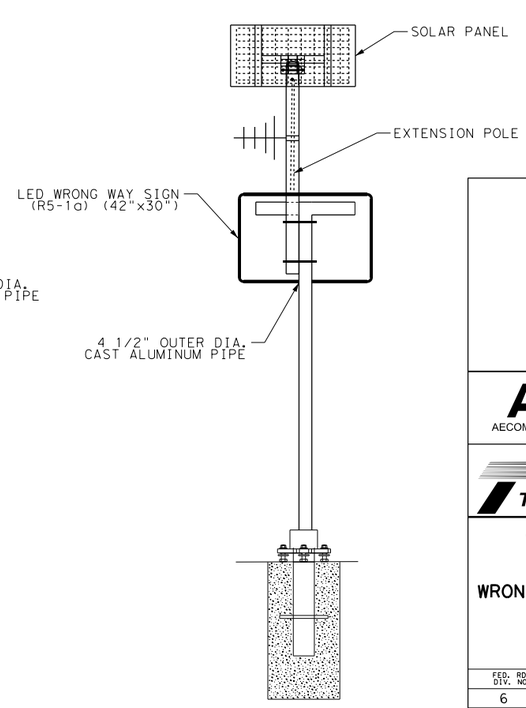
1. DETAILS SHOW A TYPICAL LED WRONG WAY SIGN WITH A SOLAR POWER INSTALLATION.
2. FOR SIGN INSTALLATION LOCATIONS, SEE PLAN SHEETS.
3. WHEN THE SHOULDER IS 6′ OR LESS IN WIDTH, THE SIGN MUST BE PLACED AT LEAST 12′ FROM THE EDGE OF THE TRAVEL LANE. WHEN THE SHOULDER IS GREATER THAN 6′ IN WIDTH, THE SIGN MUST BE PLACED AT LEAST 6′ FROM THE EDGE OF THE SHOULDER.
4. SEE SMD STANDARD SHEETS FOR LATERAL AND VERTICAL CLEARANCES AND SIGN MOUNTING DETAILS. INSTALL SIGNS AS SHOWN ON THE PLAN SHEETS.
5. ORIENT SOLAR PANEL FOR OPTIMUM EXPOSURE TO SUNLIGHT (FACE TO THE SOUTH). PRIOR TO INSTALLATION, CHECK THE LOCATION TO ENSURE THERE IS NO OVERHEAD OBSTRUCTION THAT WOULD BLOCK THE SOLAR PANEL FROM RECEIVING FULL SUNLIGHT. UNLESS SPECIFIED ELSEWHERE, MOUNT A MINIMUM OF 14′ ABOVE GRADE.
6. CONTRACTOR SHALL VERIFY ALL ELEVATIONS SHOWN

PROPOSED U-SHAPE POLE

HIGHWAY	LOCATION ID.	SHEET NUMBER - EXIT NUMBER - CROSSING STREET	EXISTING T-POLE	PROPOSED U-POLE	EXISTING EXIT-POLE
			EA	EA	EA
IH-10	1	SHEET 12 - EXIT 575 EB, PINE ST	2		
	2	SHEET 13 - EXIT 576 EB, NEW BRAUNFELS AVE	1		1
	3	SHEET 14 - EXIT 575 WB, PINE ST	2		
	4	SHEET 15 - EXIT 576 WB, S GEVERS ST	2		
	5	SHEET 16 - EXIT 577 EB, ROLAND RD		2	
	6	SHEET 17 - EXIT 577 WB, ROLAND RD		2	
	7	SHEET 18 - EXIT 578 EB, PECAN VALLEY DR	1		1
	8	SHEET 19 - EXIT 578 WB, MARTIN LUTHER KING DR		2	
IH-37	1	SHEET 26 - EXIT 137 SB, HOT WELLS BLVD		2	
	2	SHEET 27 - EXIT 137 NB, HOT WELLS BLVD		2	
	3	SHEET 28 - EXIT 136 SB, PECAN VALLEY DR		2	
	4	SHEET 29- EXIT 136 NB, PECAN VALLEY DR		2	
	5	SHEET 30 - EXIT 135 SB, MILITARY DR		2	
	6	SHEET 31 - EXIT 135 NB, MILITARY DR		2	
IH-410	1	SHEET 32 - EXIT 42 NB, SOUTHON RD	2		
	2	SHEET 33 - EXIT 42 SB, SOUTHON RD	1	1	
	3	SHEET 34 - EXIT 39 NB, WW WHITE RD	2		
	4	SHEET 35 - EXIT 39 SB, WW WHITE RD	2		
	5	SHEET 36 - EXIT 37 NB, SOUTHCROSS BLVD	2		
	6	SHEET 37 - EXIT 37 SB, SOUTHCROSS BLVD	2		
		TOTALS	**19**	**19**	**2**



SIDE VIEW



REAR VIEW

EXISTING T-SHAPE POLE

STATE OF TEXAS
CARLOS DURAN
125531
REGISTERED PROFESSIONAL ENGINEER
Carlos Duran P.E.
10/28/2022

AECOM
AECOM Technical Services Inc. F-3580
112 E PECAN ST
SAN ANTONIO, TEXAS 78205
210.296.2002

Texas Department of Transportation

WRONG WAY DETECTION

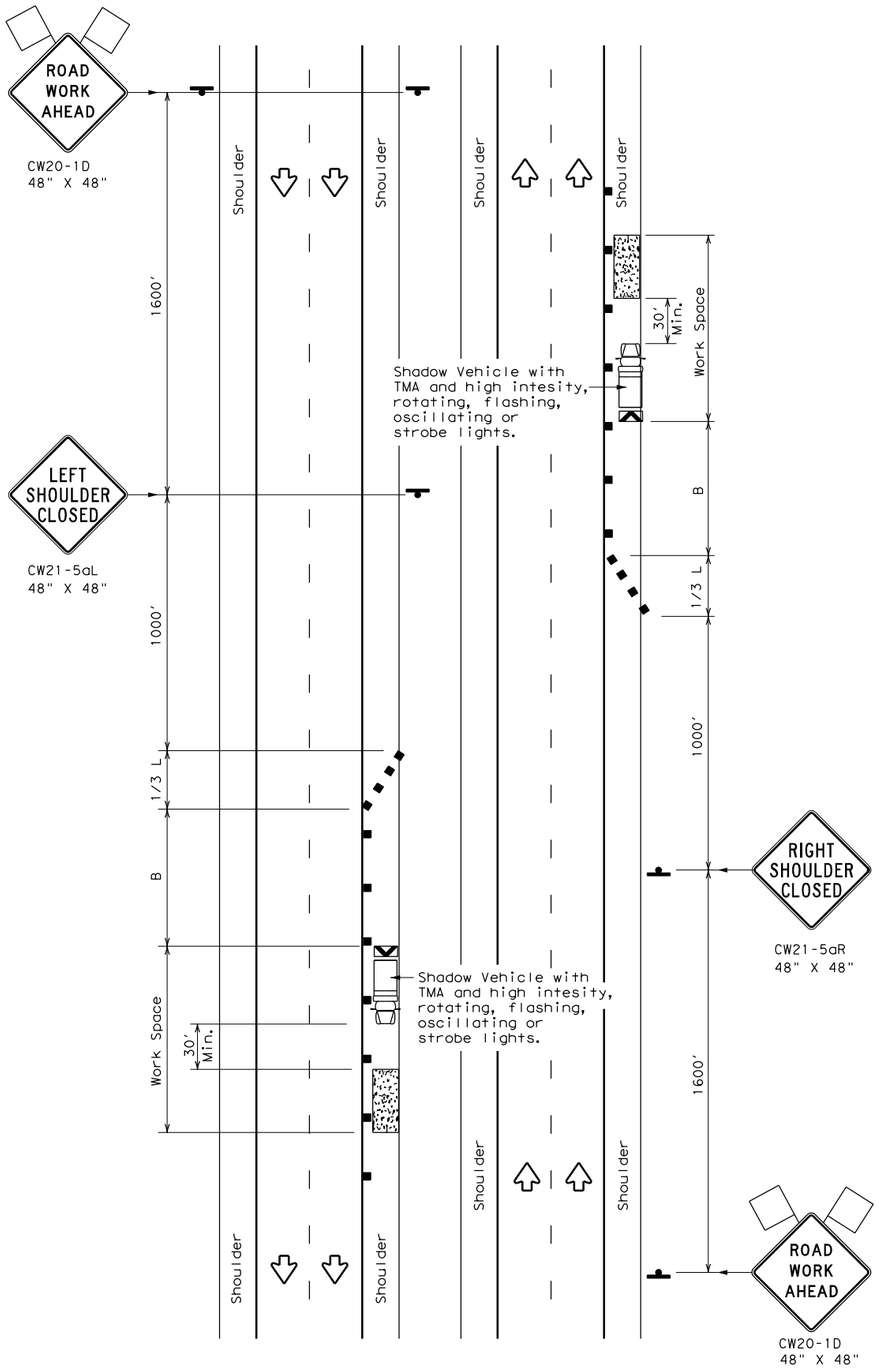
WRONG WAY DETECTION SYSTEM DETAIL

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP2023(502)HES	34

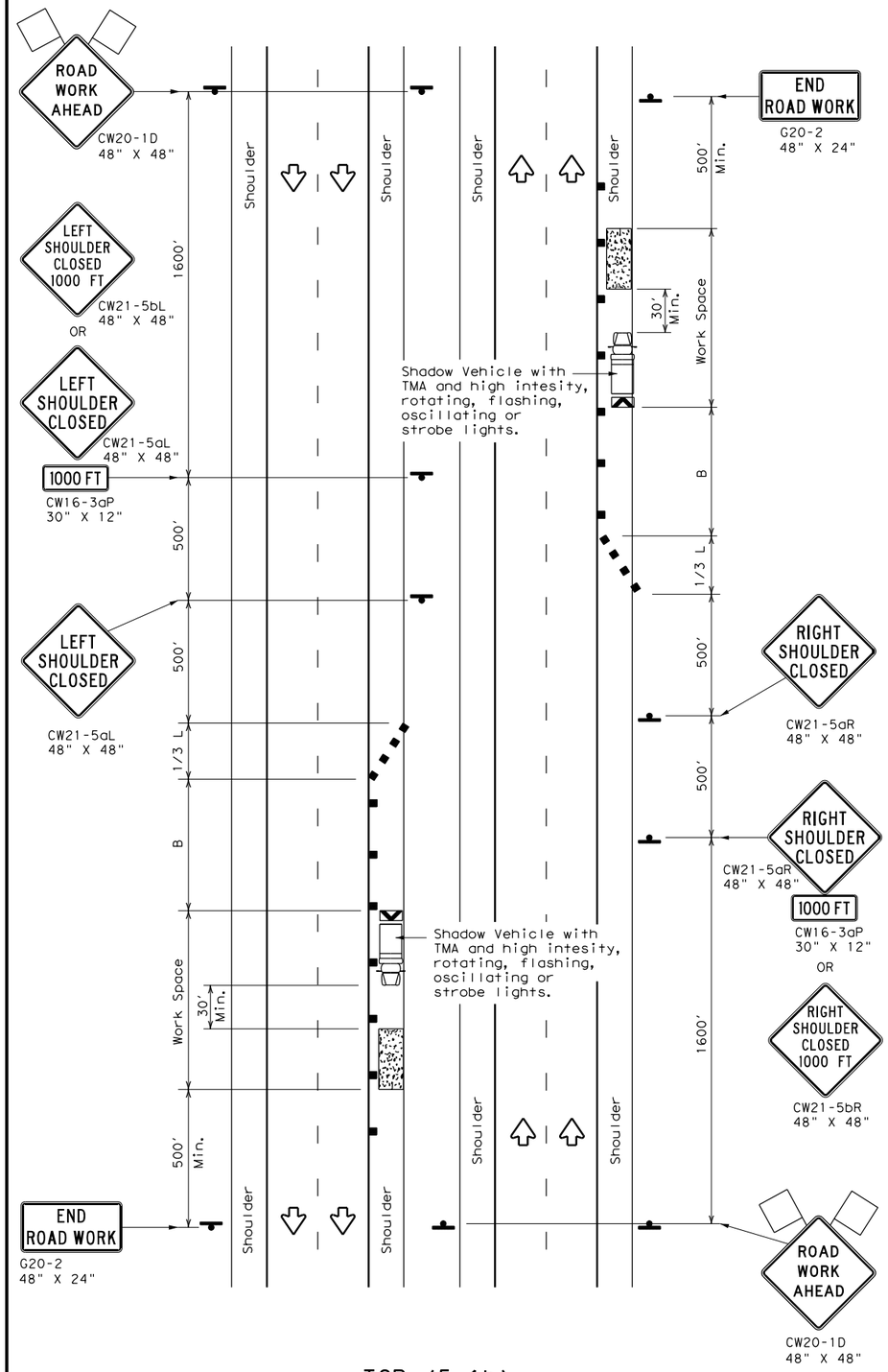
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	02	225,ETC	VA

DATE:
FILE:



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

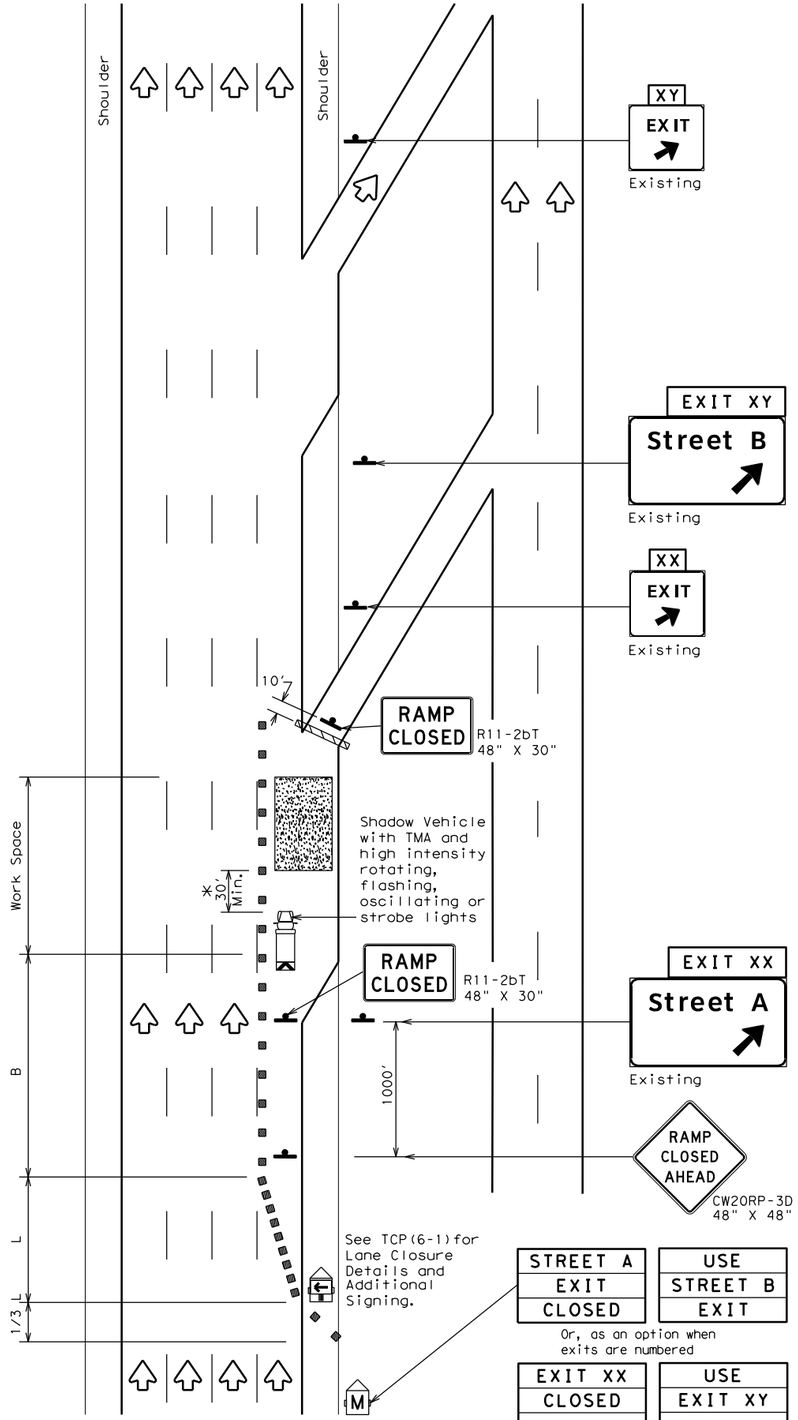
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

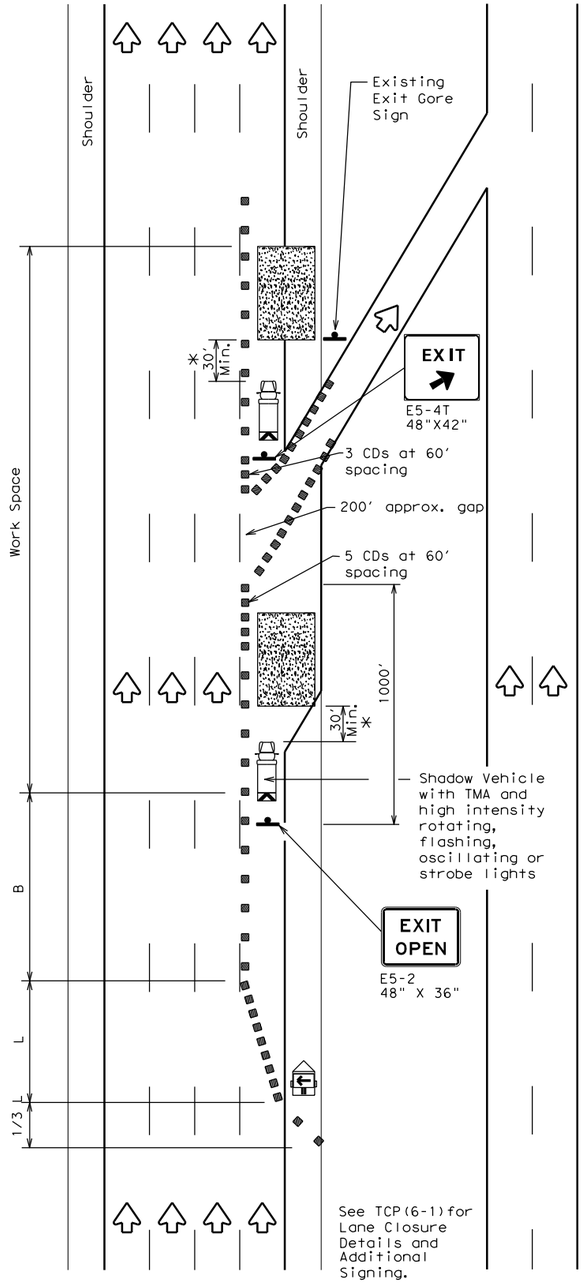
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		35

DATE:
FILE:



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

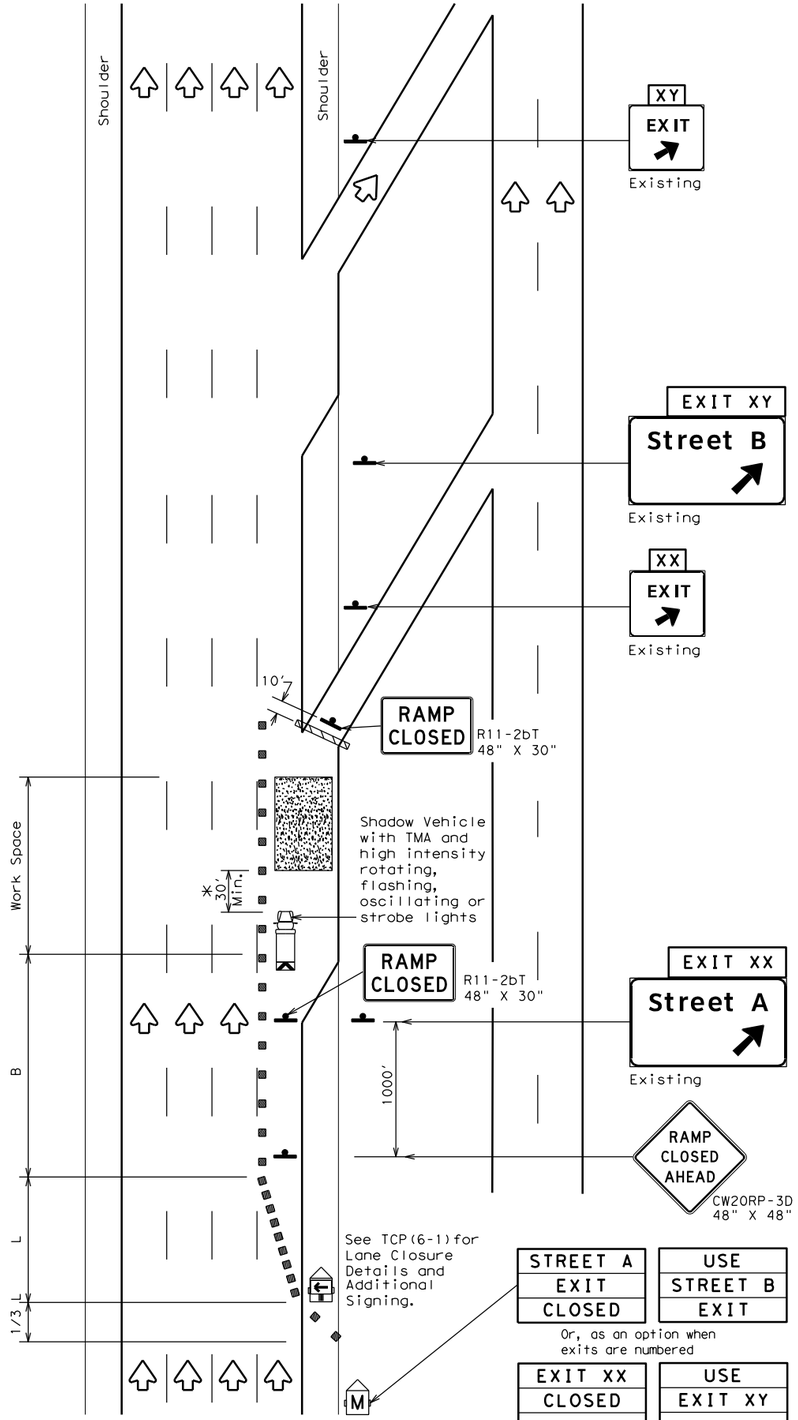
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

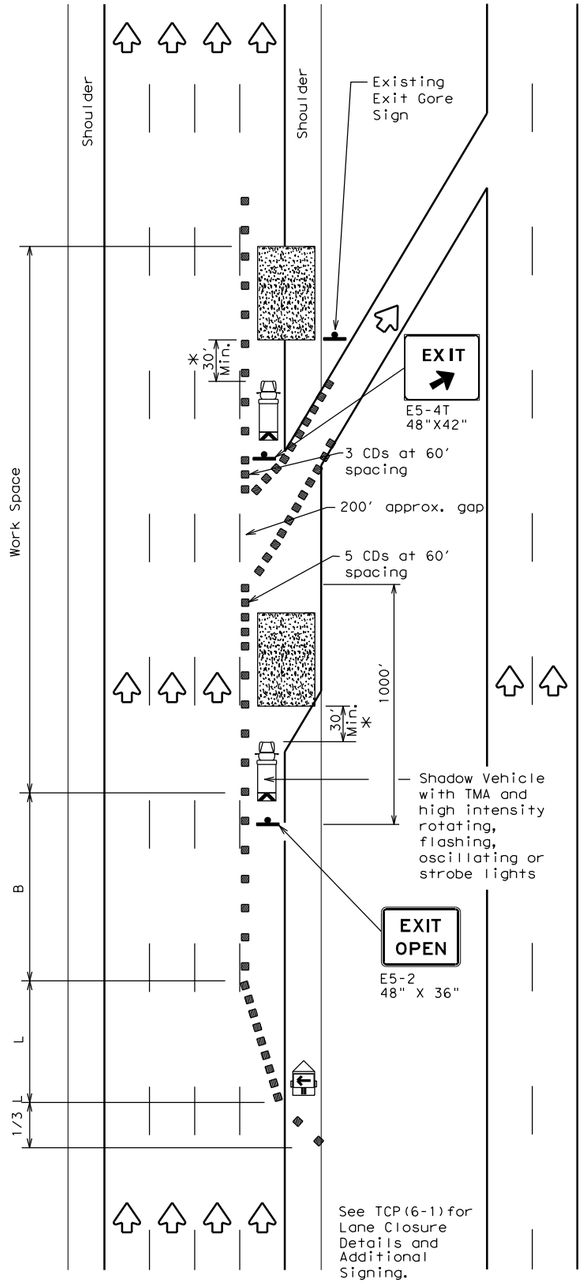
FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	BEXAR		36

DATE:
FILE:



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

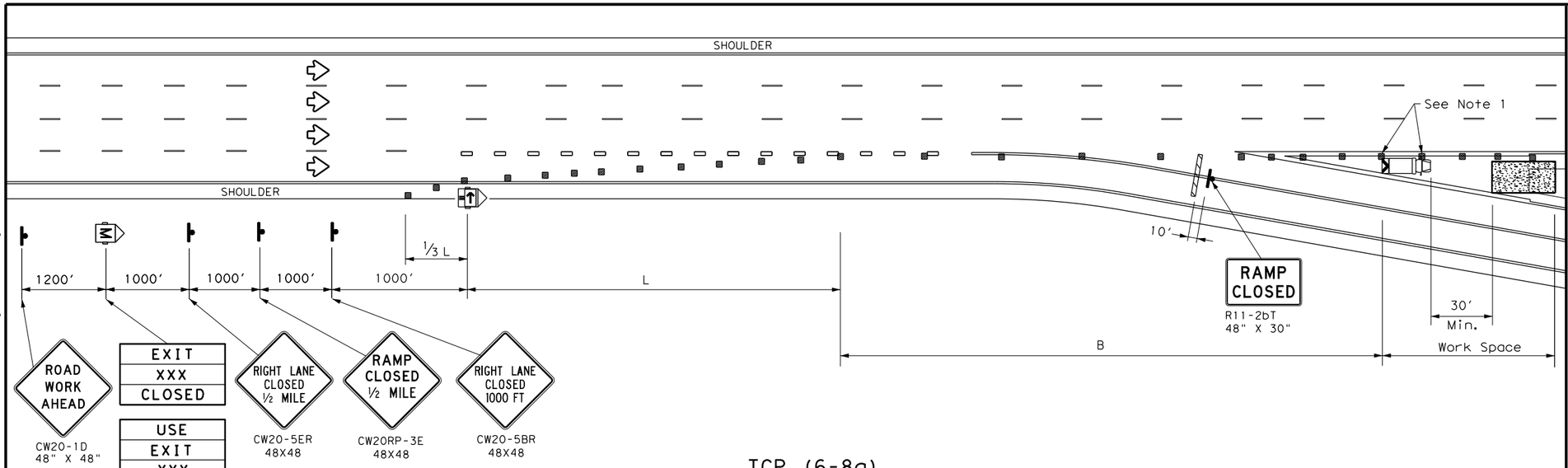
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

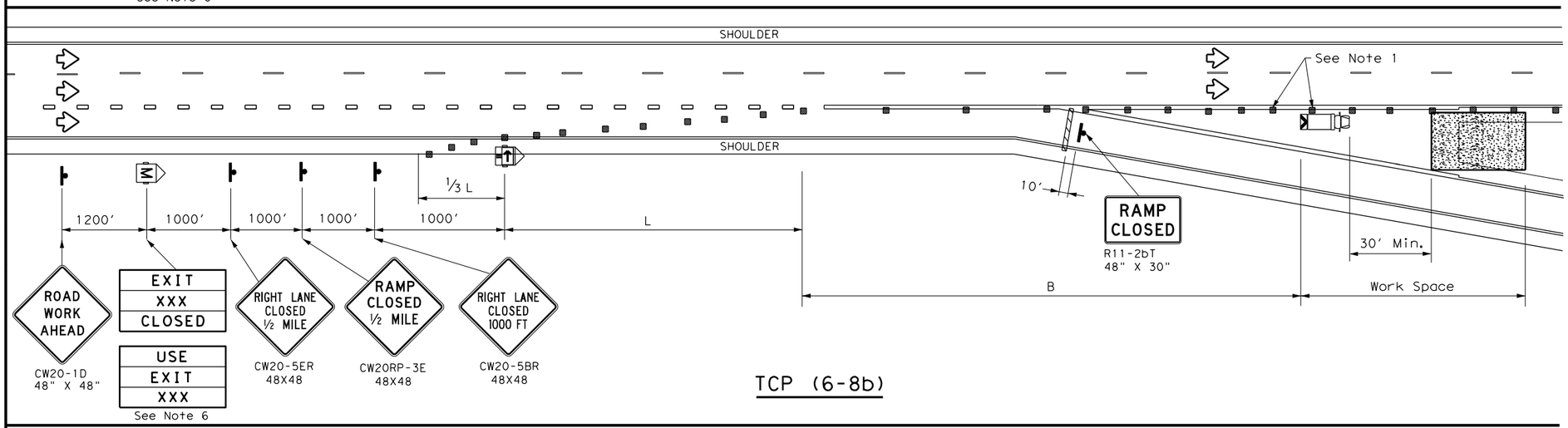
TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

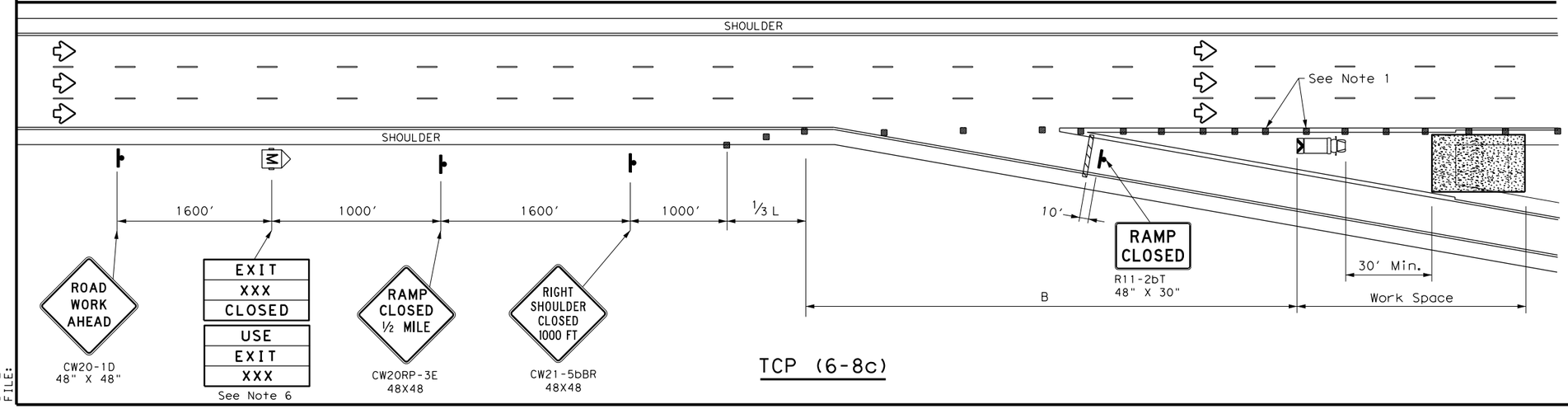
FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	BEXAR		36



TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

DATE:
FILE:

LEGEND

	Type 3 Barricade		Channelizing Devices (CDs)
	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 "L" ** 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450′	495′	540′	45′	90′	195′
50		500′	550′	600′	50′	100′	240′
55		550′	605′	660′	55′	110′	295′
60		600′	660′	720′	60′	120′	350′
65		650′	715′	780′	65′	130′	410′
70		700′	770′	840′	70′	140′	475′
75		750′	825′	900′	75′	150′	540′
80		800′	880′	960′	80′	160′	615′

** 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. Place channelizing devices in the gore at 20′ spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		37

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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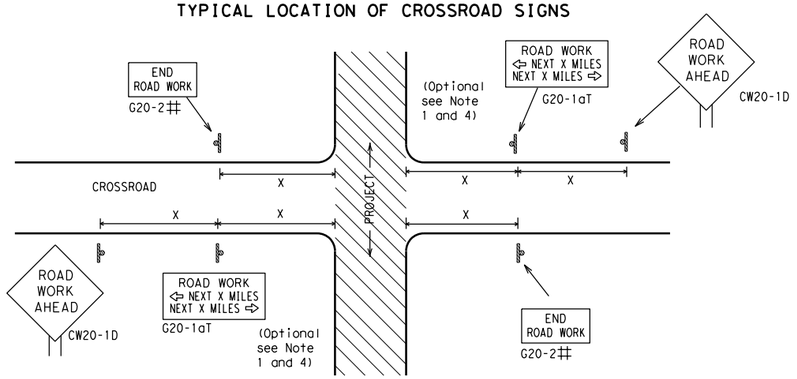
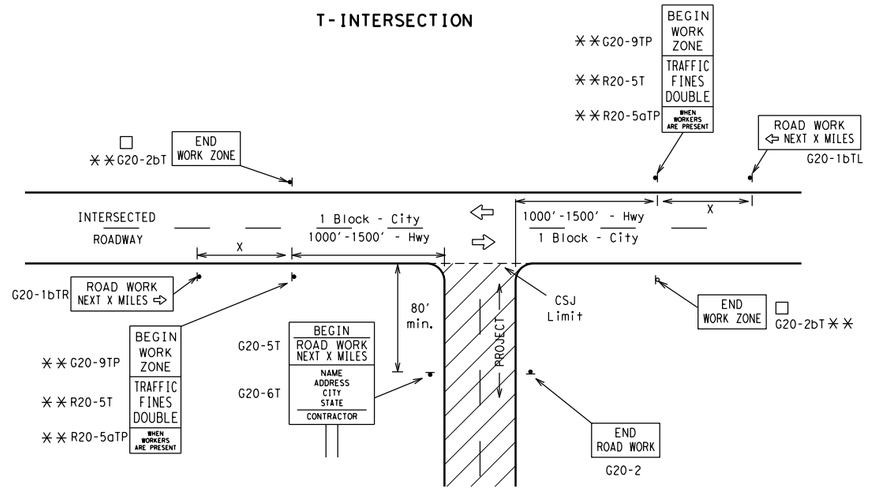
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

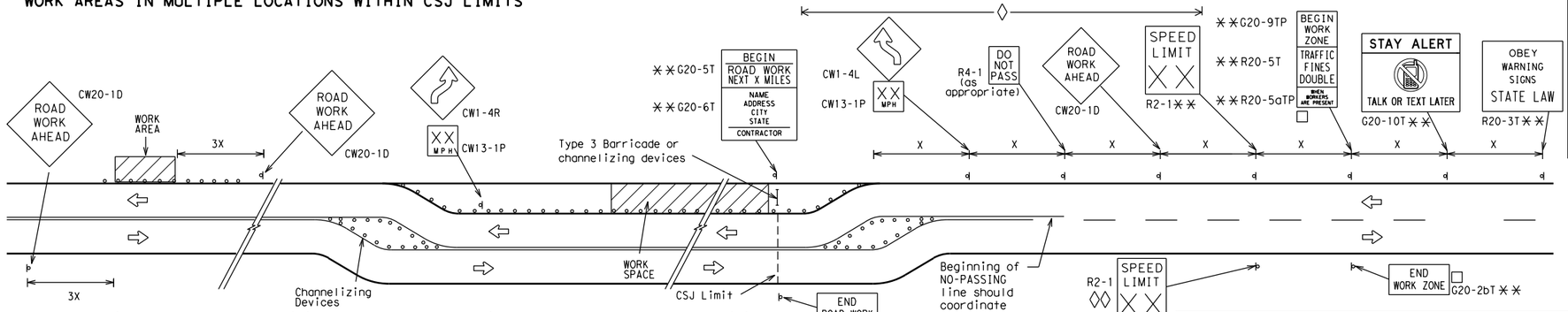
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

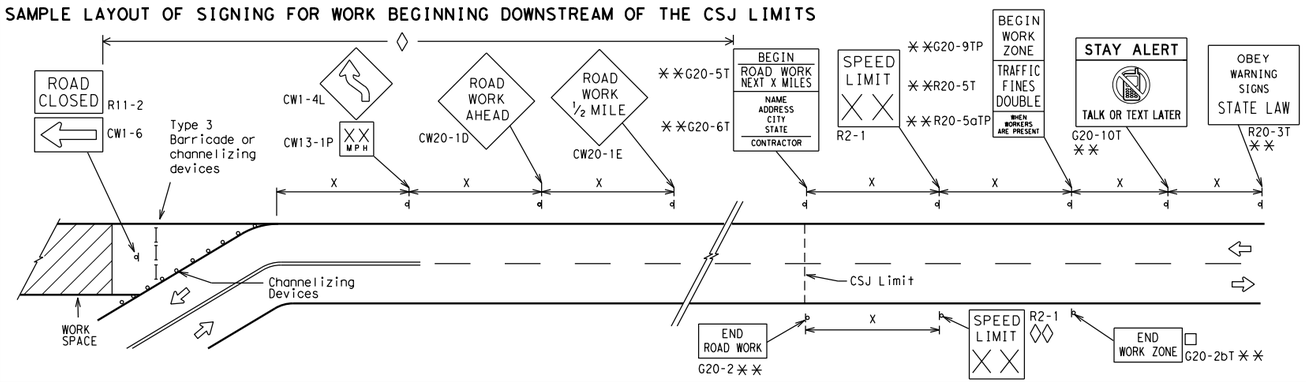
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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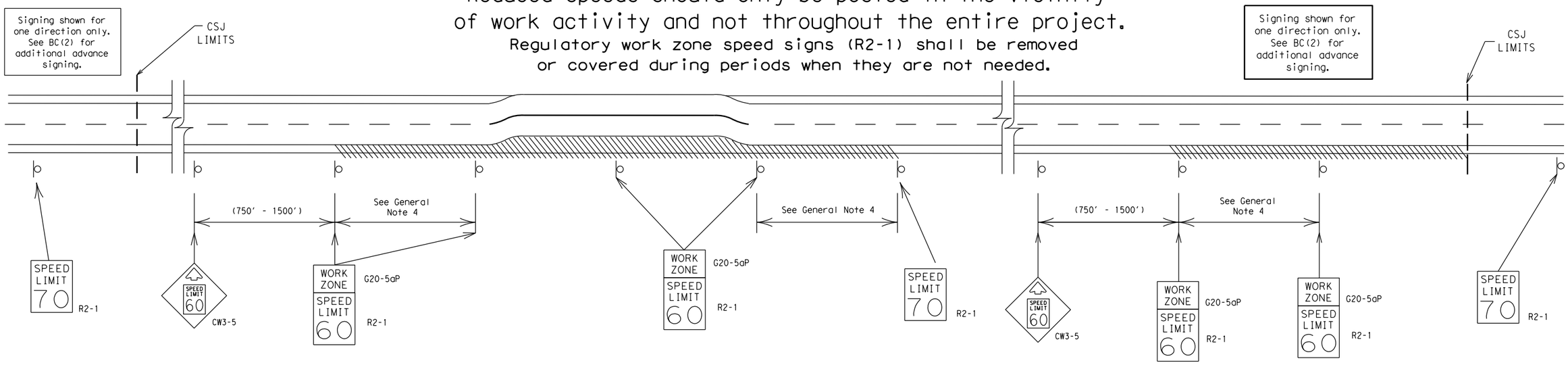
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

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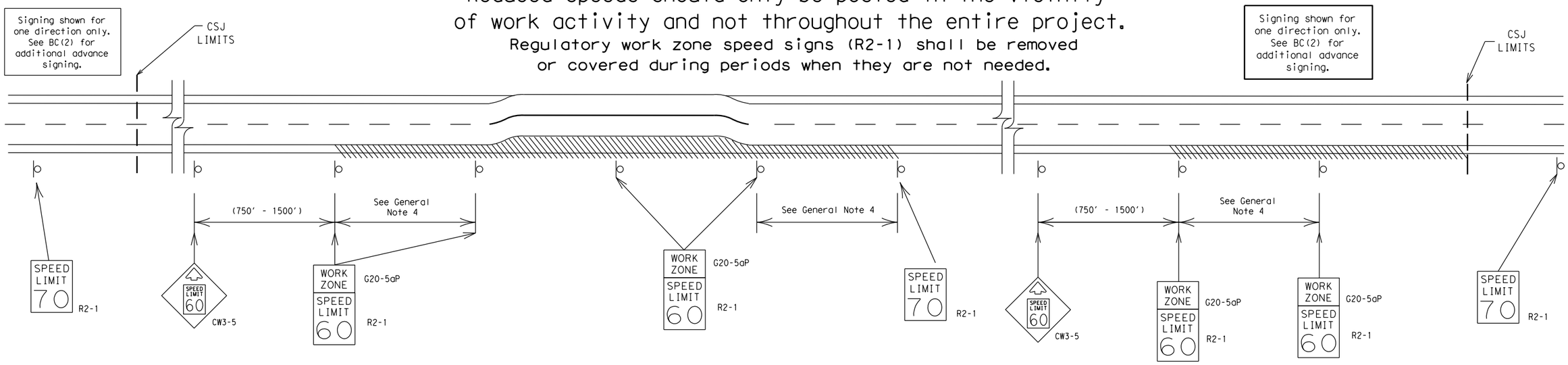

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7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
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   A. Law enforcement.
   B. Flagger stationed next to 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.
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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

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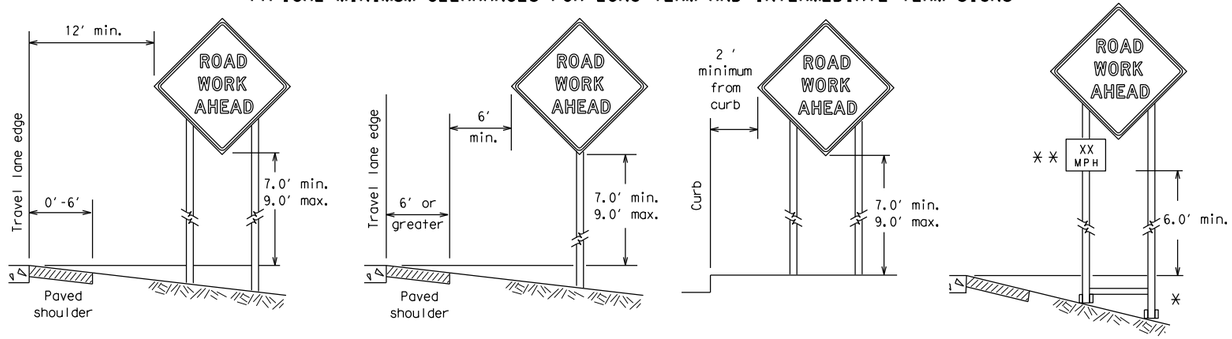
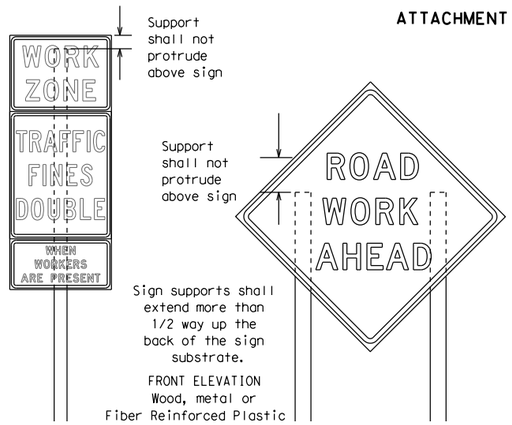
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

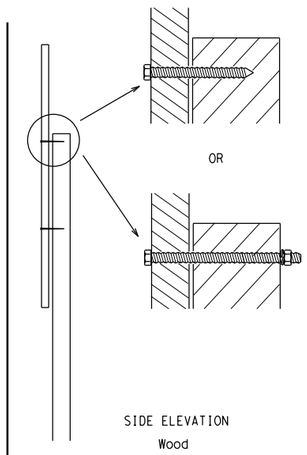


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





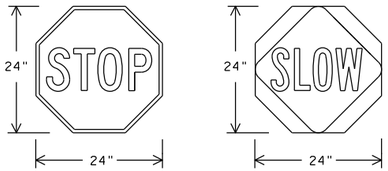
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		41

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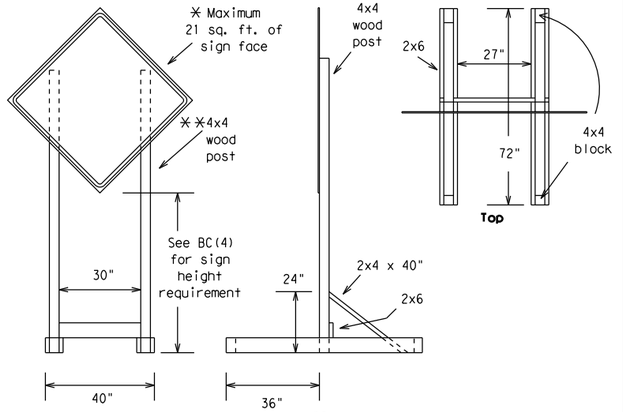
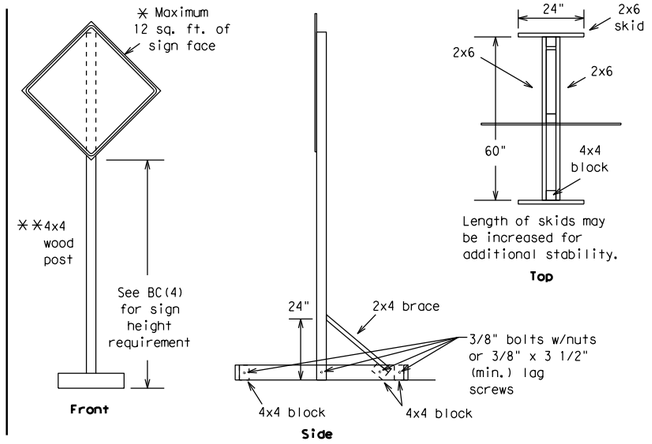
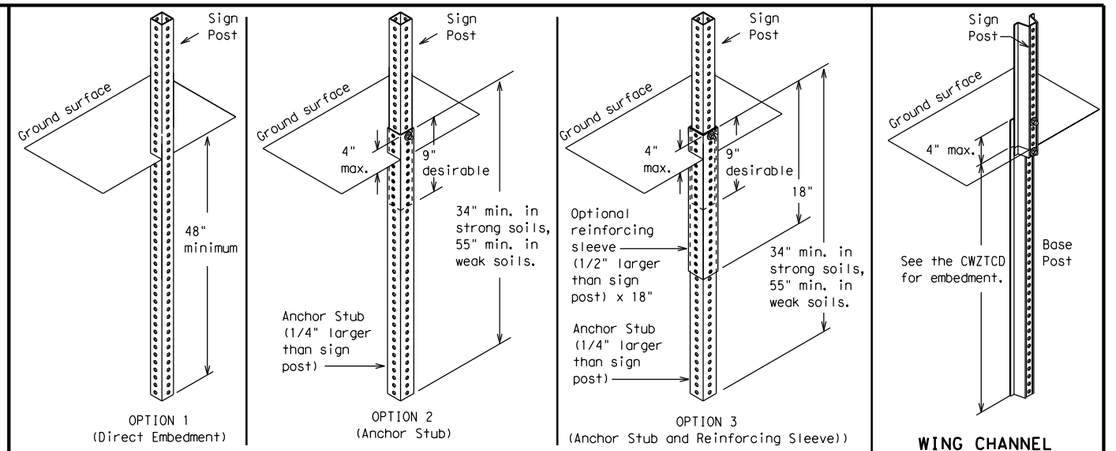




SKID MOUNTED WOOD SIGN SUPPORTS

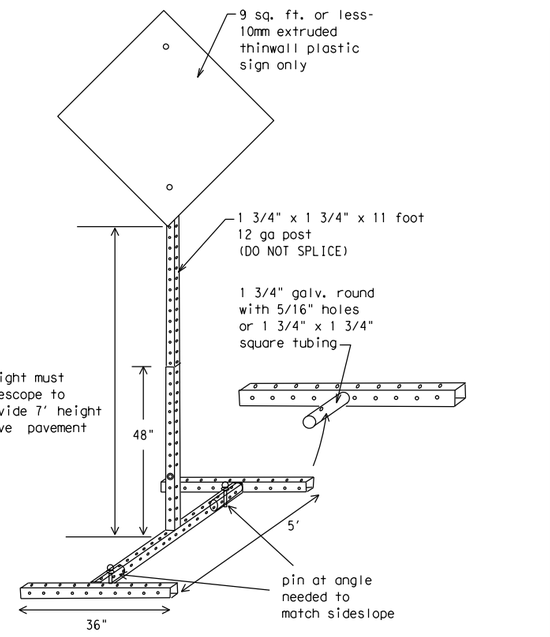
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

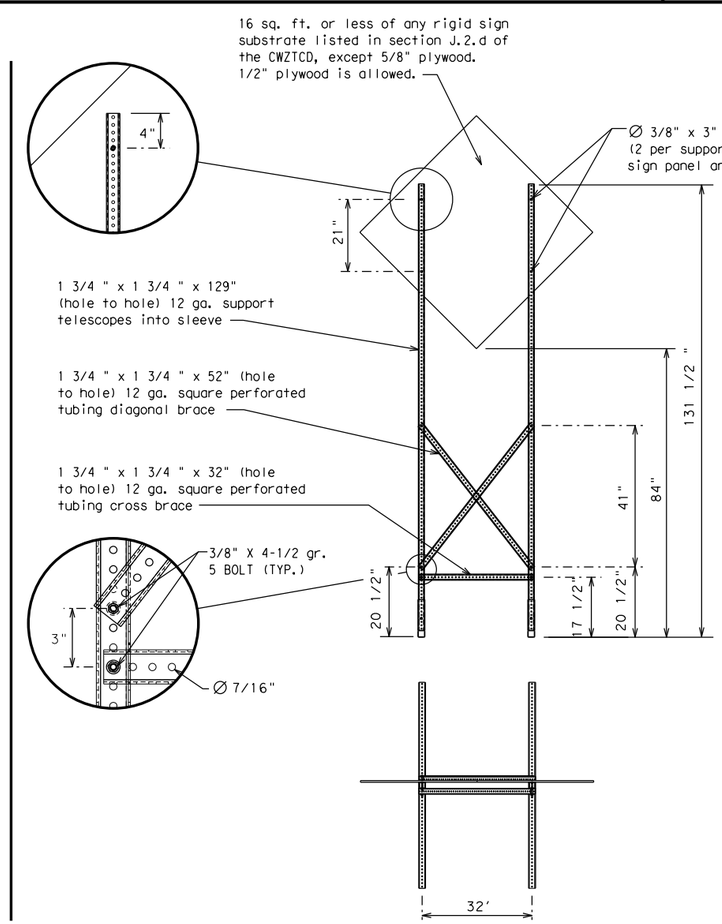


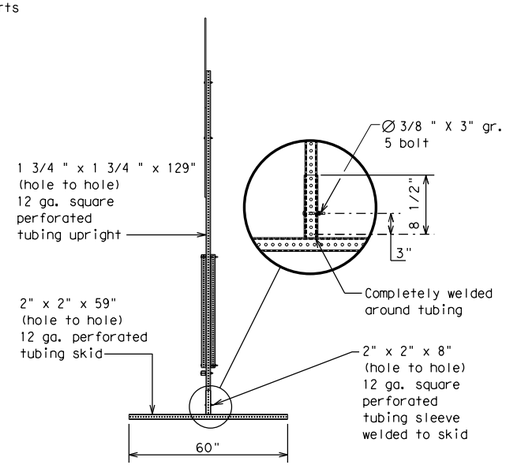
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		42

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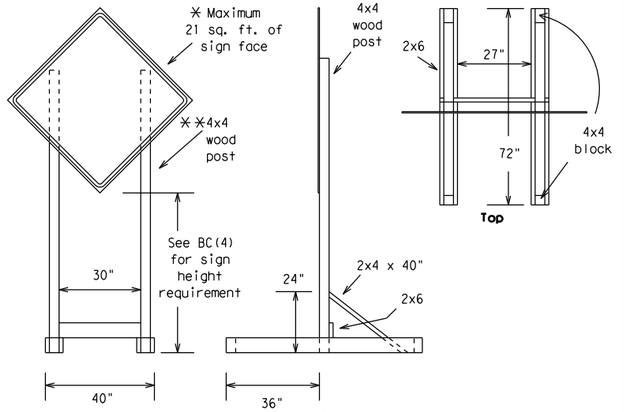
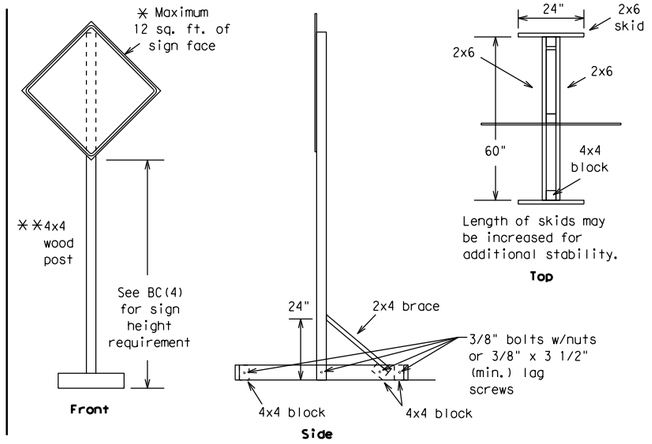
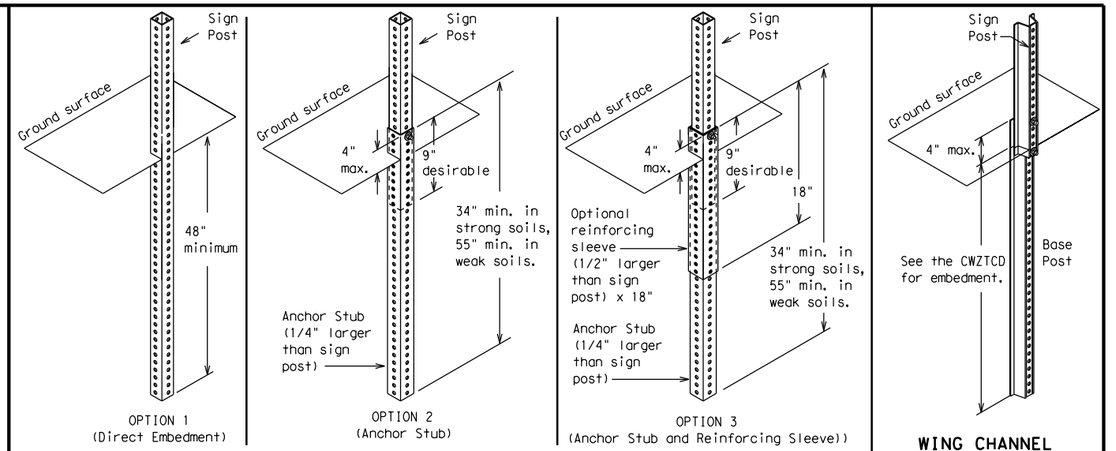




SKID MOUNTED WOOD SIGN SUPPORTS

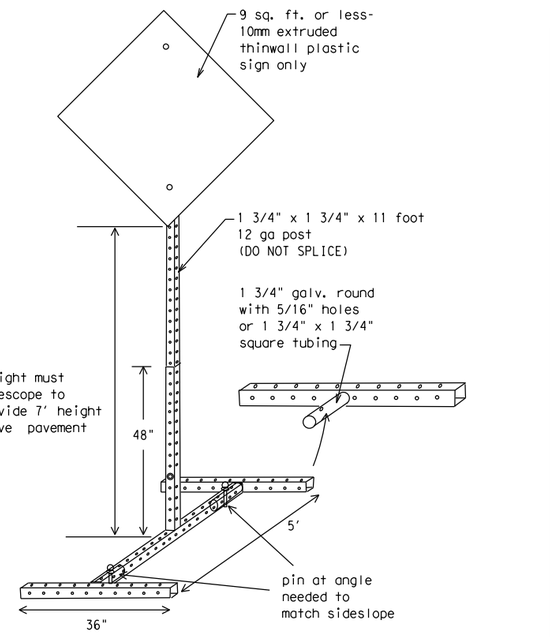
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

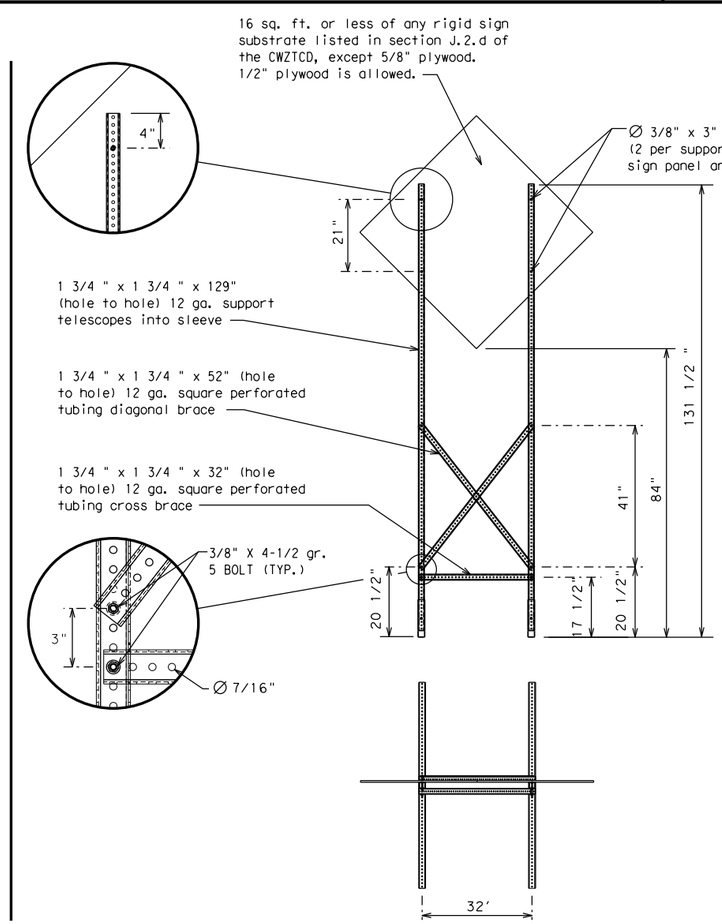


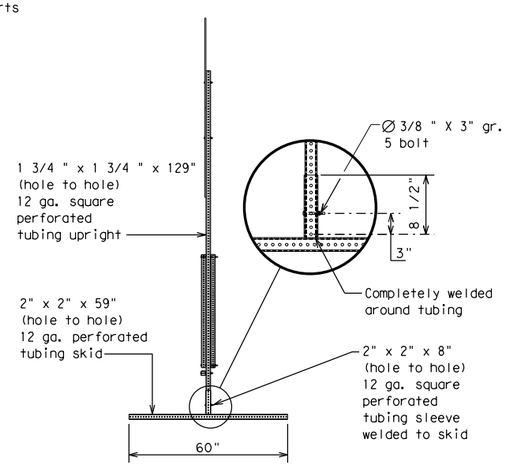
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		42

DATE: 10/28/2022 3:20:48 PM
FILE: c:\pwworking\ustx\dms06295\IH10_TCPS_031.dgn

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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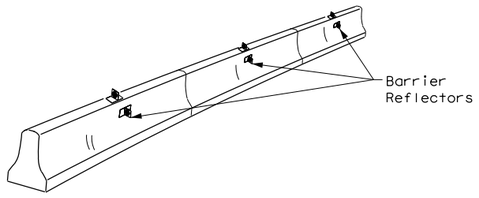
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		43

100

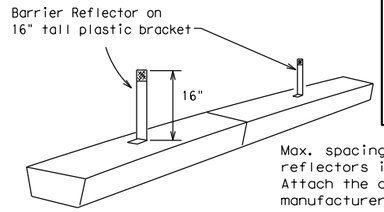
DATE: 10/28/2022 3:20:52 PM
FILE: c:\pwworking\ustx\dms06295\IH10_TCPS_032.dgn

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



CONCRETE TRAFFIC BARRIER (CTB)

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

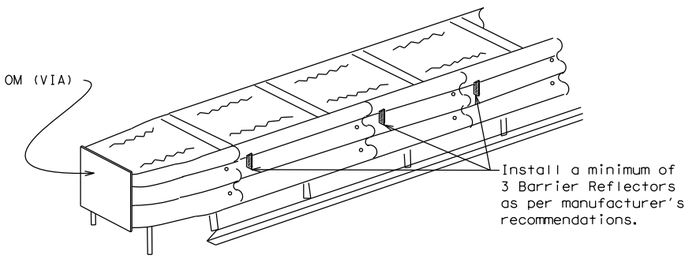


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

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.

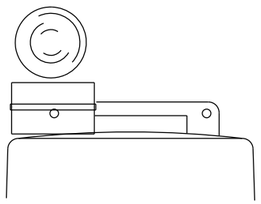


DELINEATION OF END TREATMENTS

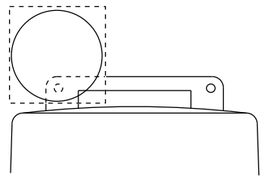
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

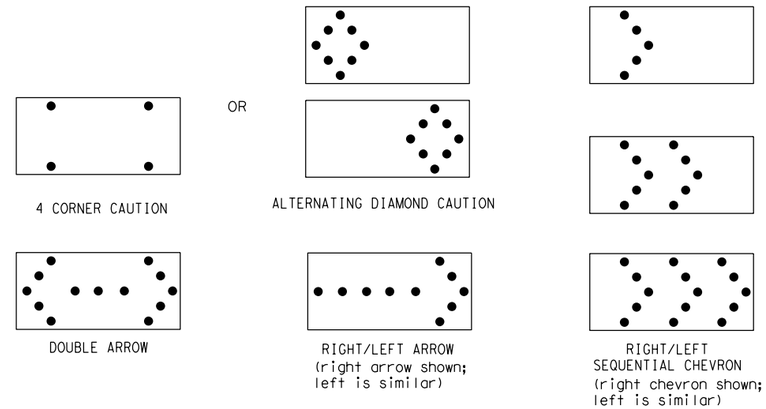
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW
(right arrow shown;
left is similar)

RIGHT/LEFT
SEQUENTIAL CHEVRON
(right chevron shown;
left is similar)

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		44

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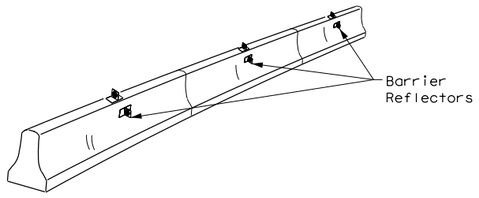
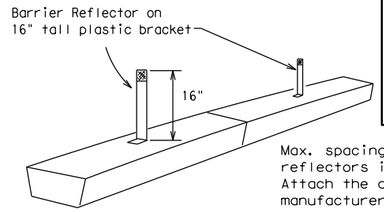
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

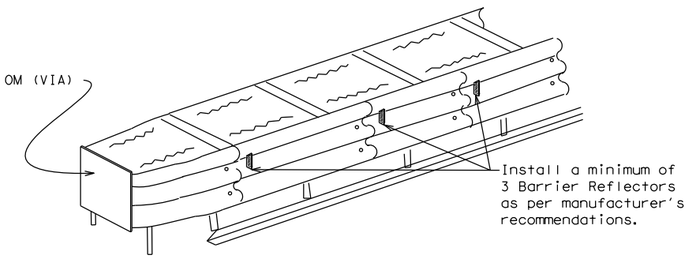


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

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.

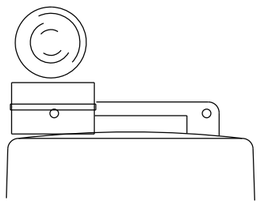


DELINEATION OF END TREATMENTS

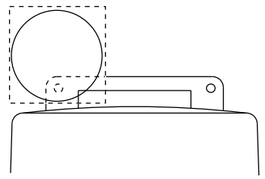
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

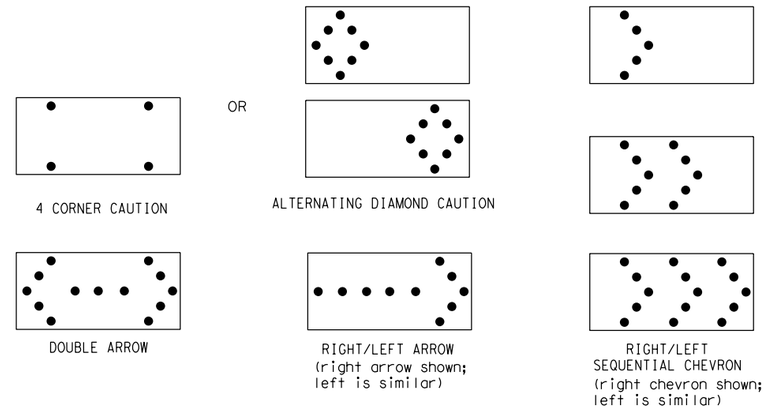
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW
(right arrow shown;
left is similar)

RIGHT/LEFT
SEQUENTIAL CHEVRON
(right chevron shown;
left is similar)

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

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

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

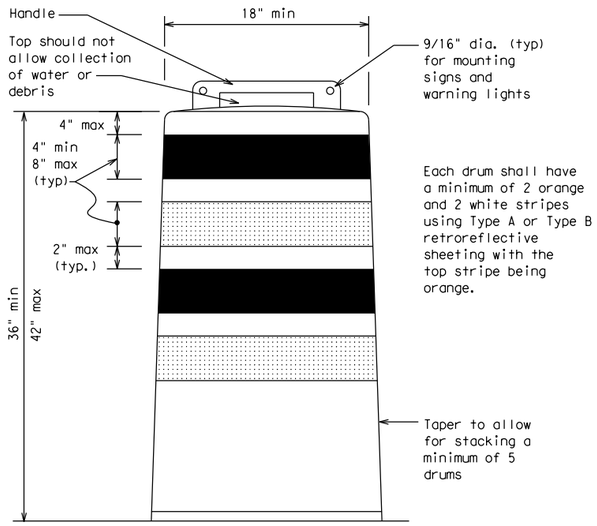
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

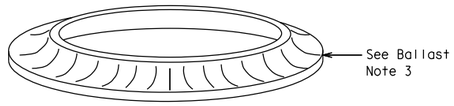
RETROREFLECTIVE SHEETING

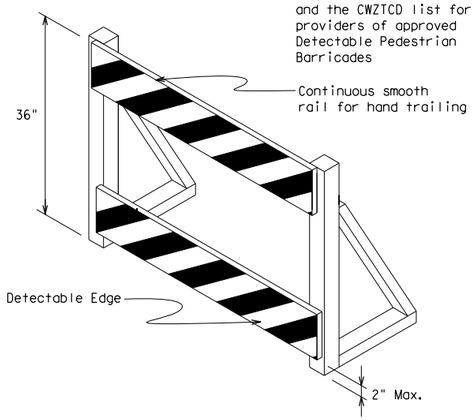
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

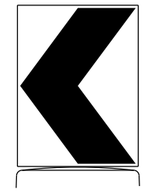




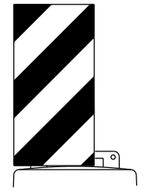


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	SAT	BEXAR		45
7-13				

102

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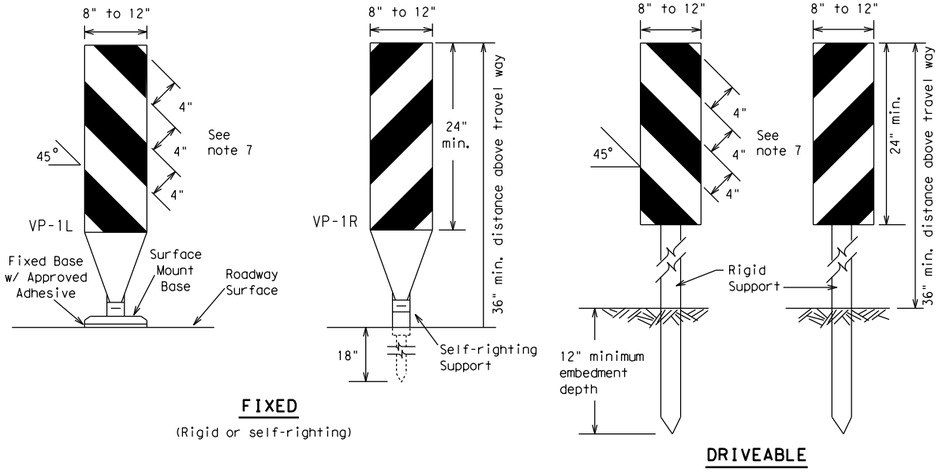
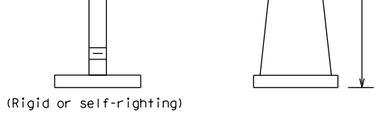


FIXED
(Rigid or self-righting)

DRIVEABLE

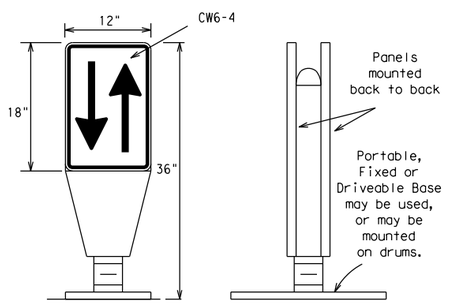


(Rigid or self-righting)

PORTABLE

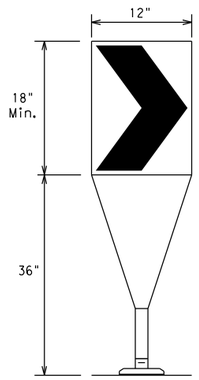
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



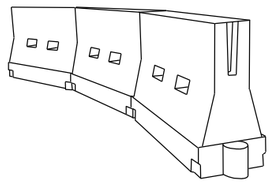
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		46

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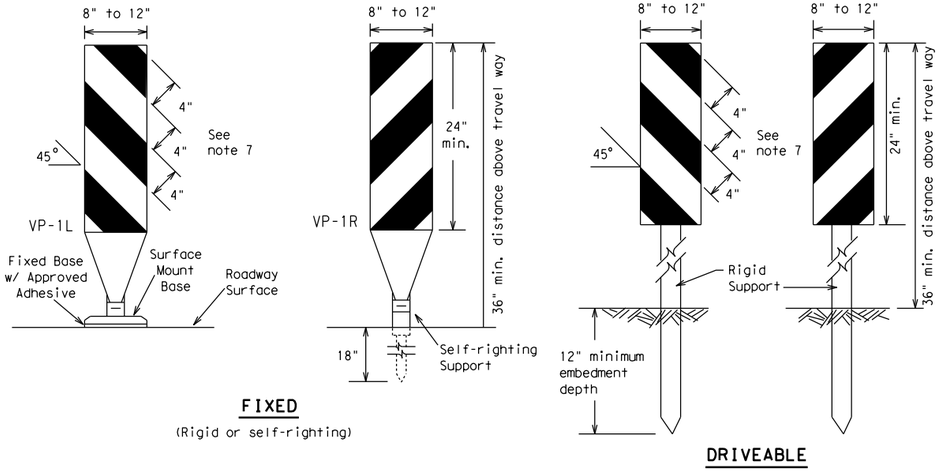
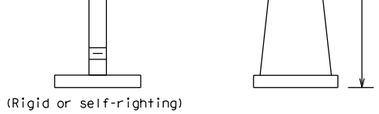


FIXED
(Rigid or self-righting)

DRIVEABLE



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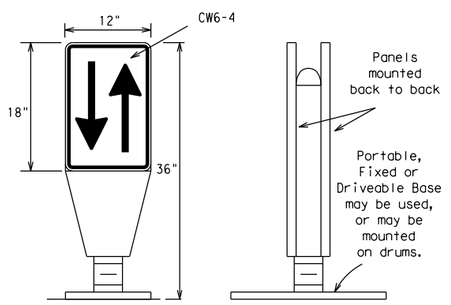

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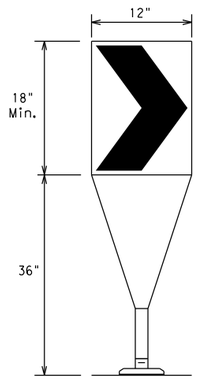

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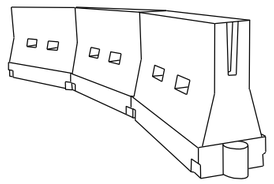

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SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		46

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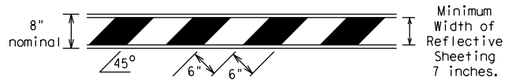
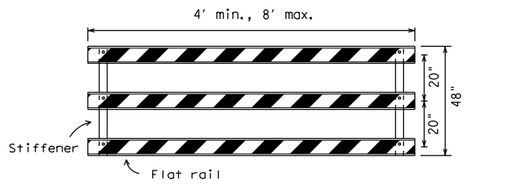
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



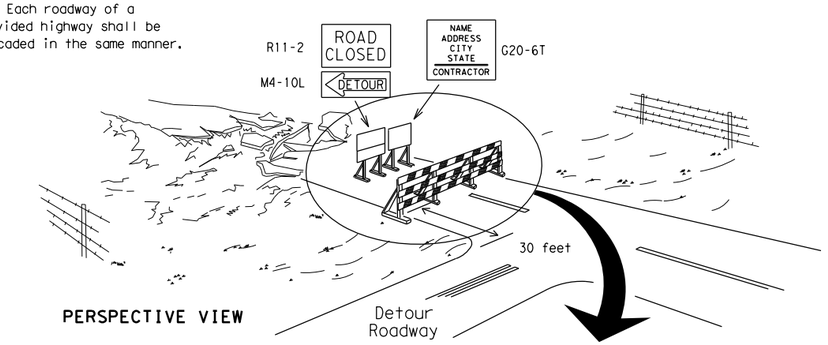
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

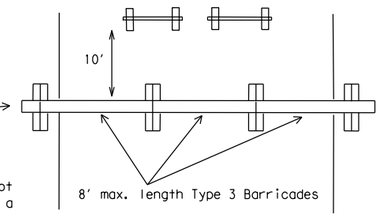
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

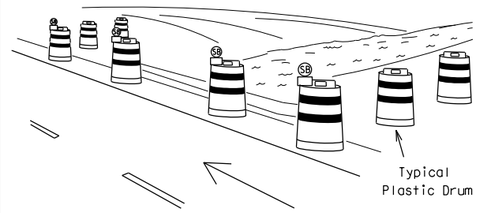
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

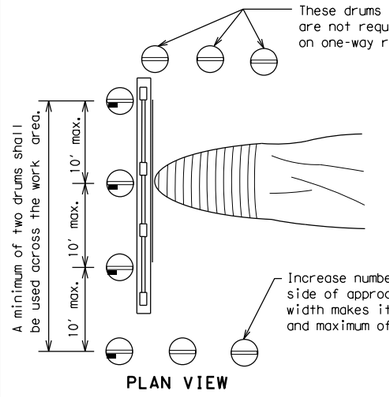
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

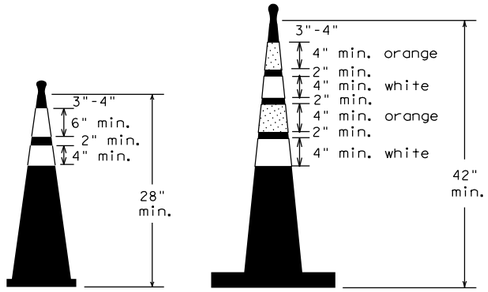
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

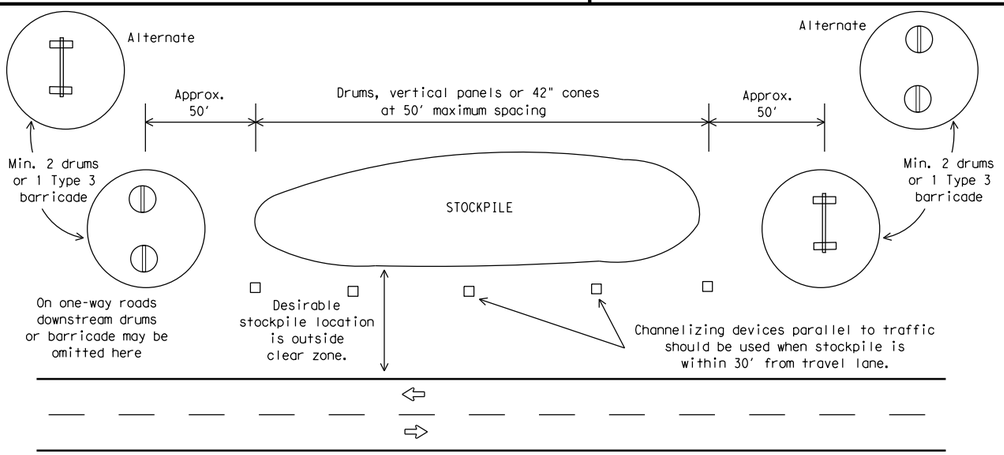
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		47

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

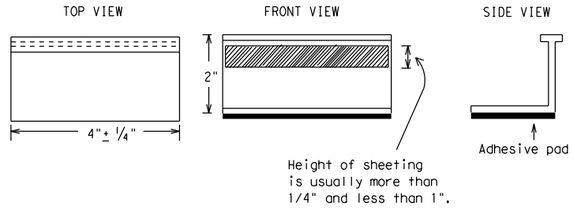
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0025	02	225,ETC	VA
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	SAT	BEXAR		48
11-02 8-14				

105

DATE: 10/28/2022 3:21:11 PM
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WORK ZONE PAVEMENT MARKINGS

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3. Additional supplemental pavement marking details may be found in the plans or specifications.
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RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
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PREFABRICATED PAVEMENT MARKINGS

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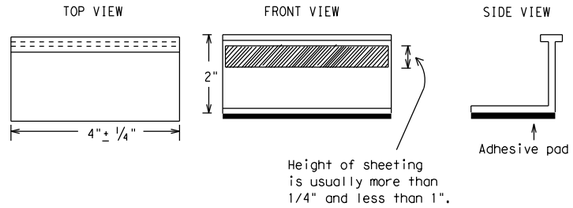
Temporary Flexible-Reflective Roadway Marker Tabs



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   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.
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RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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11-02 8-14				

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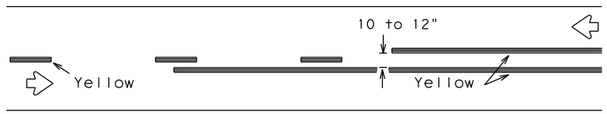
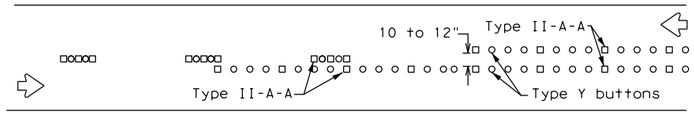
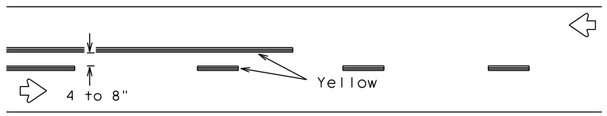
PAVEMENT MARKING PATTERNS



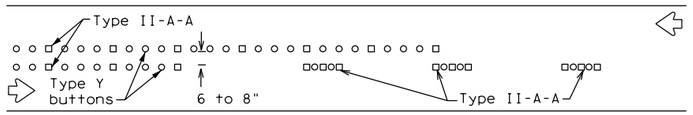
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



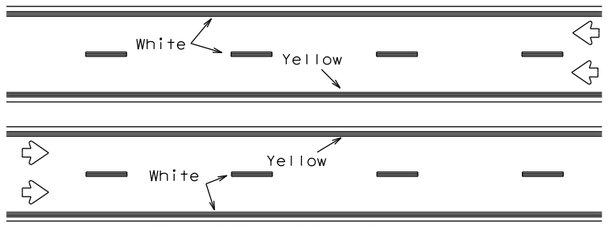
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



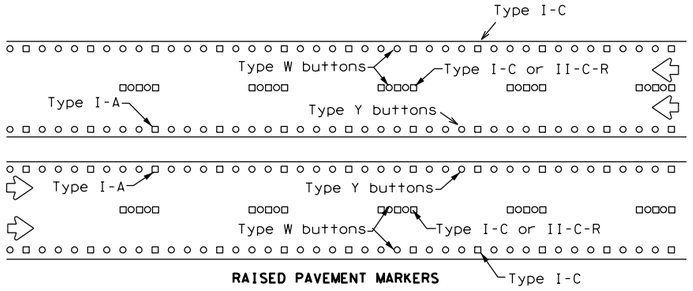
RAISED PAVEMENT MARKERS - PATTERN B

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

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



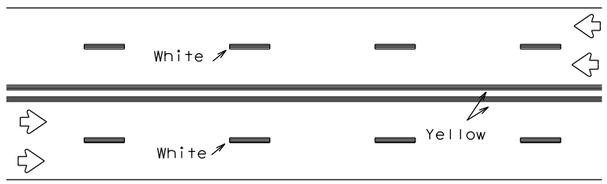
REFLECTORIZED PAVEMENT MARKINGS



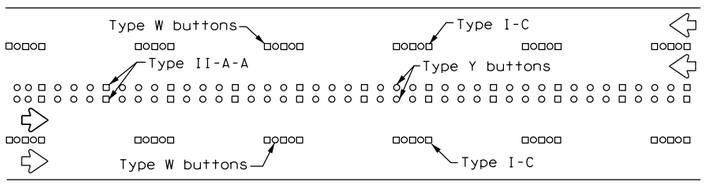
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



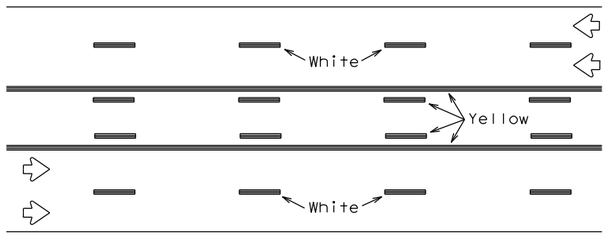
REFLECTORIZED PAVEMENT MARKINGS



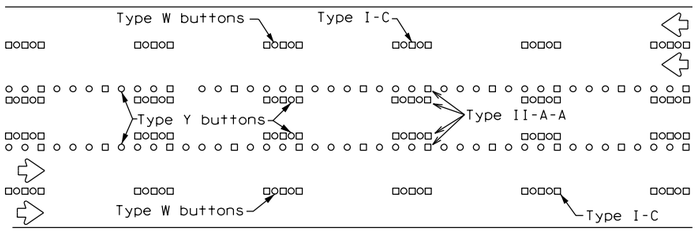
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

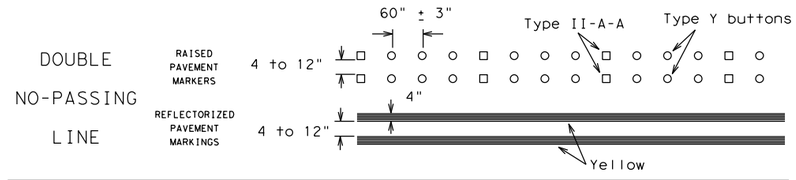
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

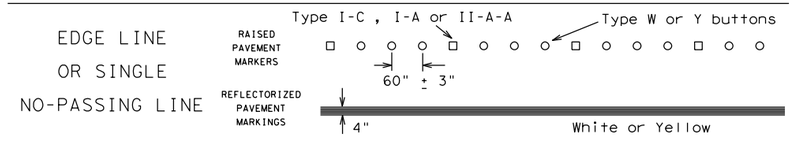
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

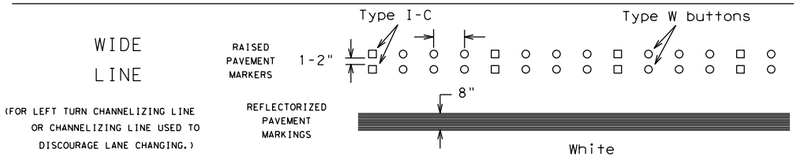


EDGE LINE OR SINGLE NO-PASSING LINE



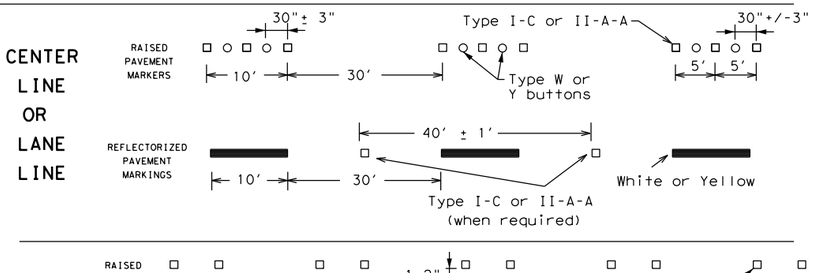
WIDE LINE

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

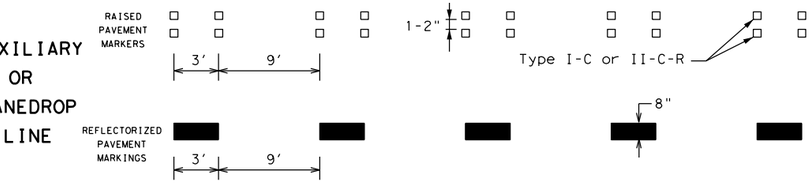


BROKEN LINES

CENTER LINE OR LANE LINE

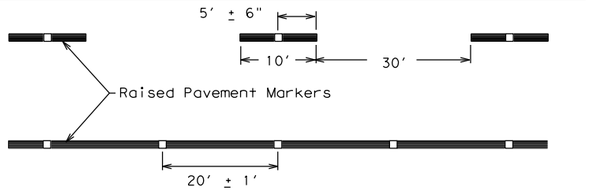


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		49

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DATE:
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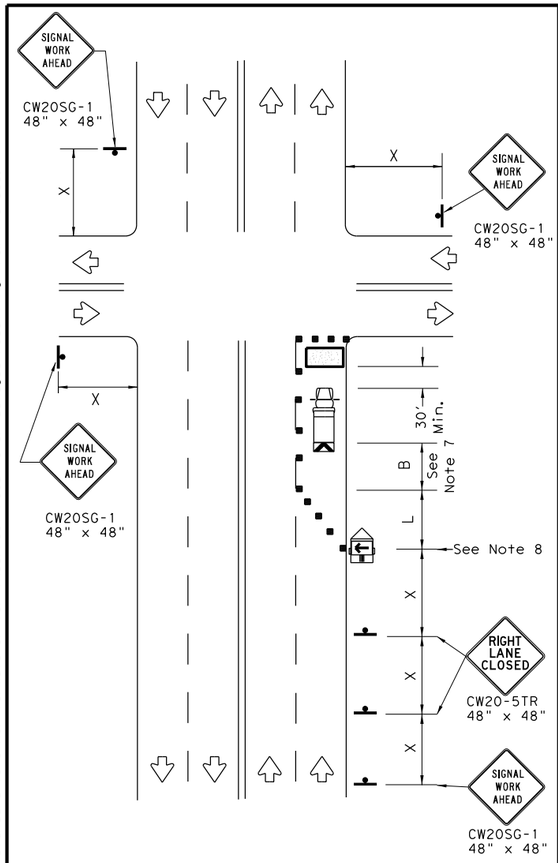
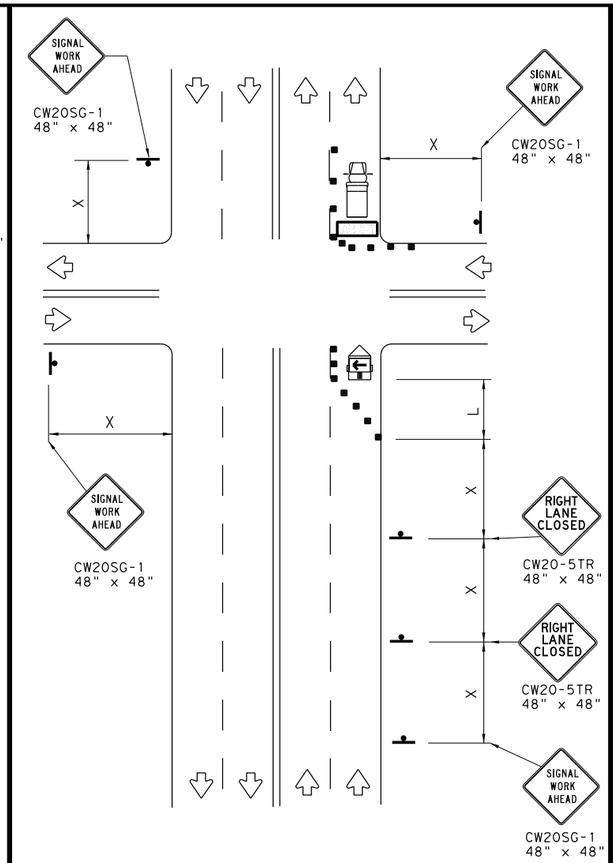


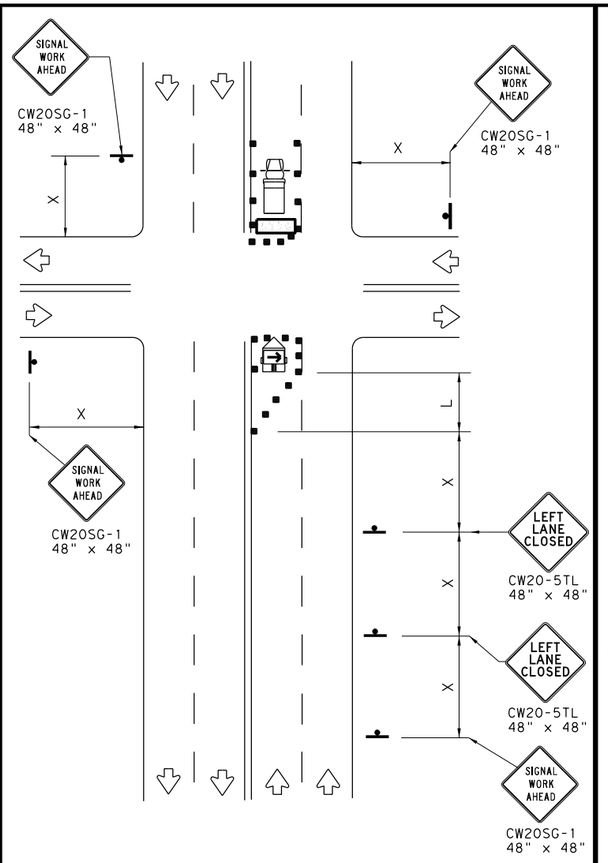
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



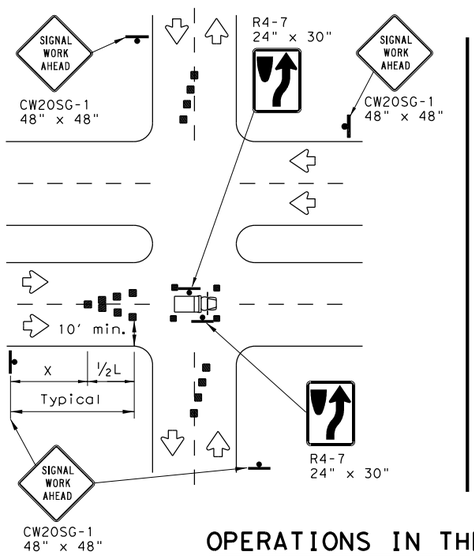
FAR SIDE RIGHT LANE CLOSURE

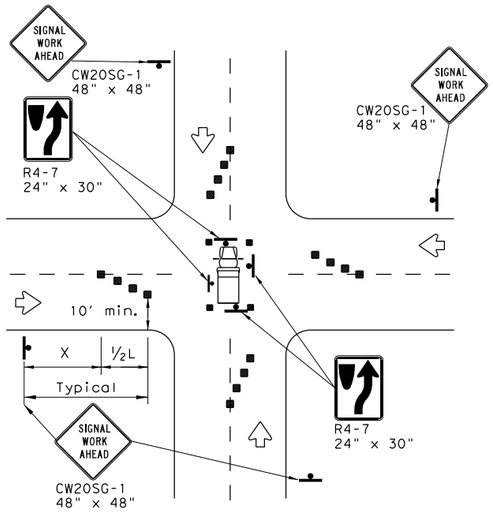
SHORT DURATION OR SHORT TERM STATIONARY



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"
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)

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

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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	SAT	BEXAR		50

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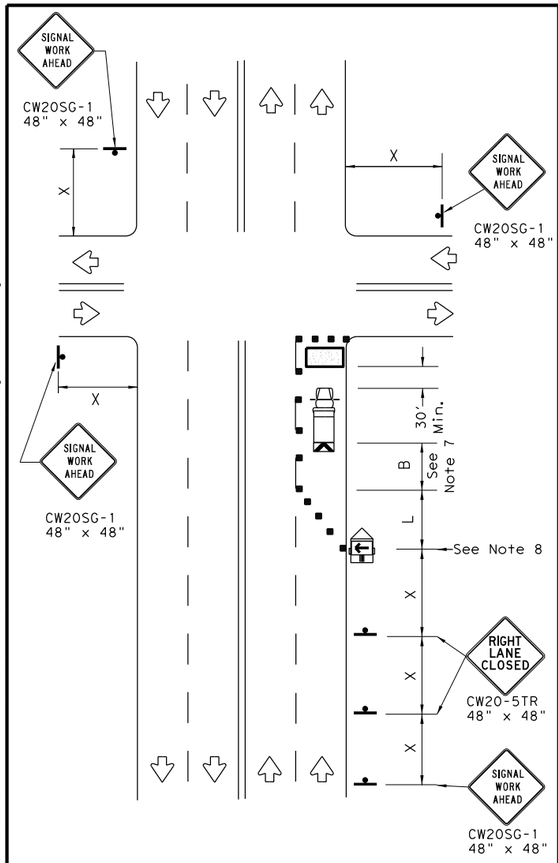
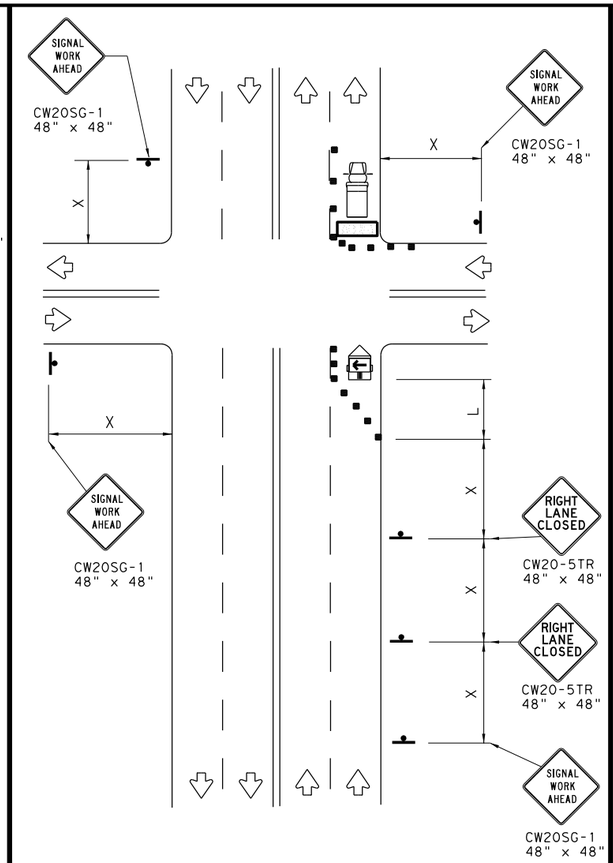


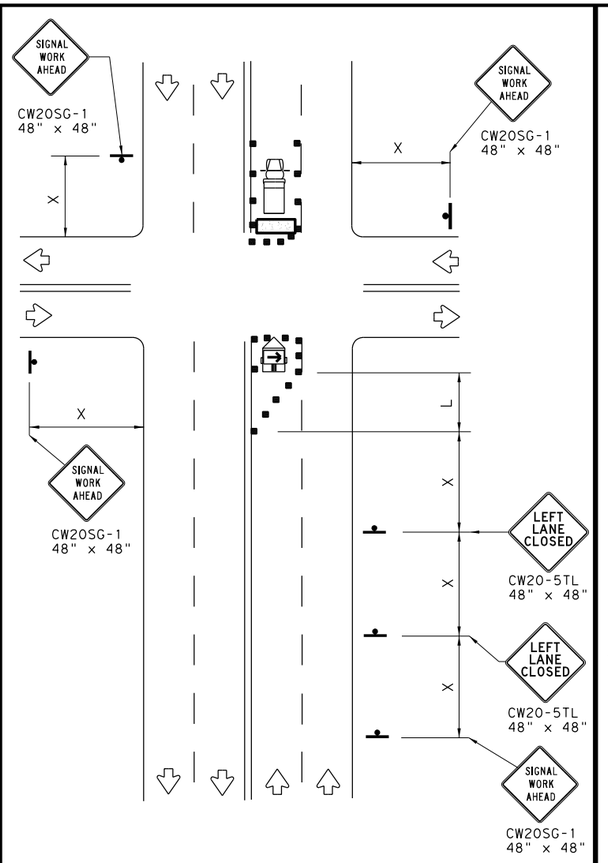
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



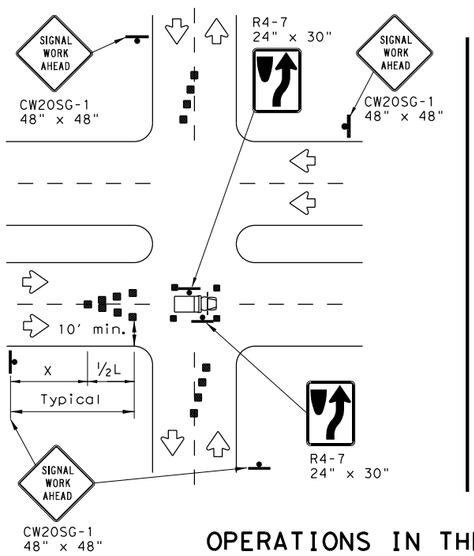
FAR SIDE RIGHT LANE CLOSURE

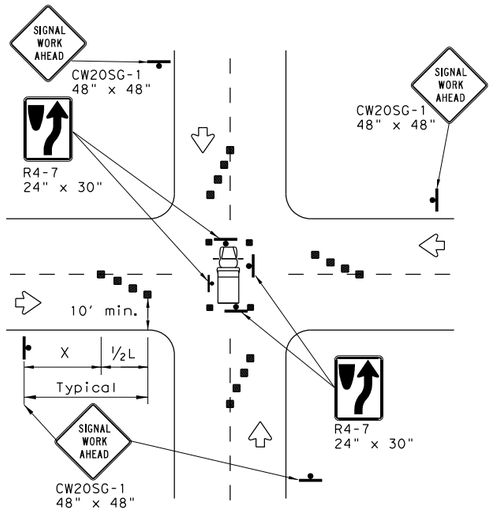
SHORT DURATION OR SHORT TERM STATIONARY



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.
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LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
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	Sign		Traffic Flow
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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

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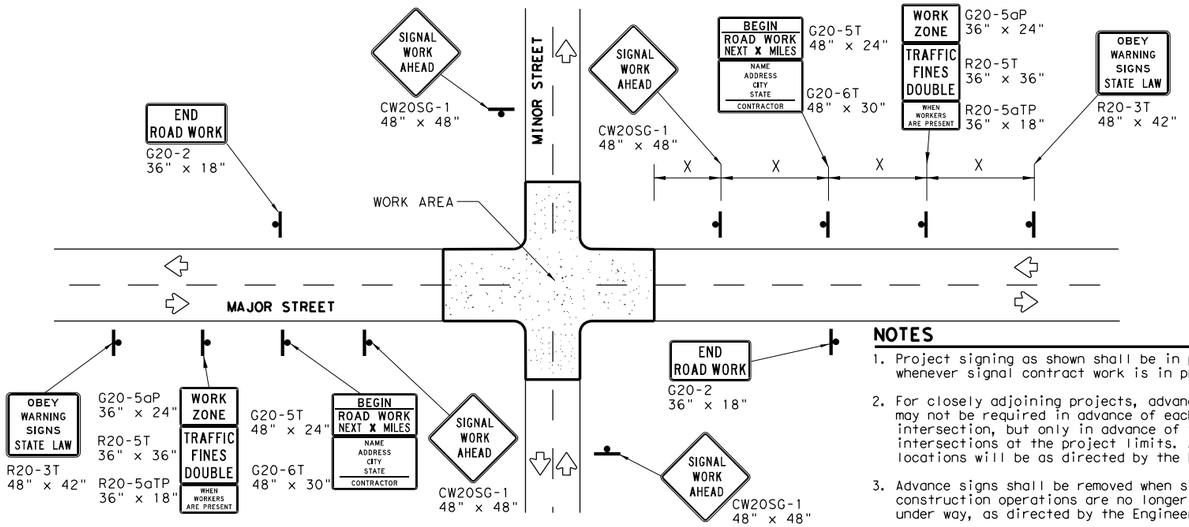


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

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

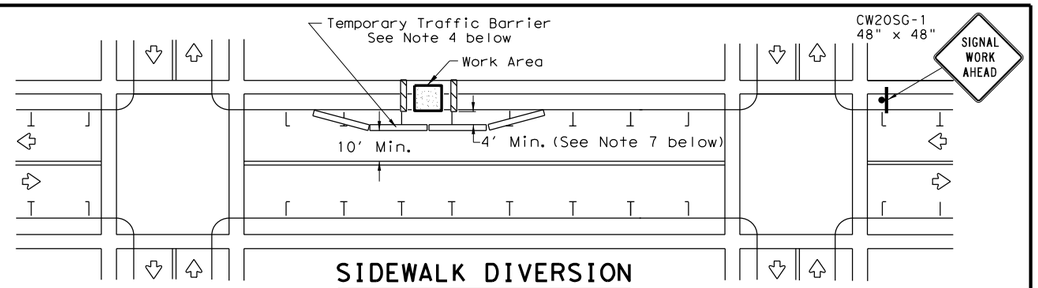
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

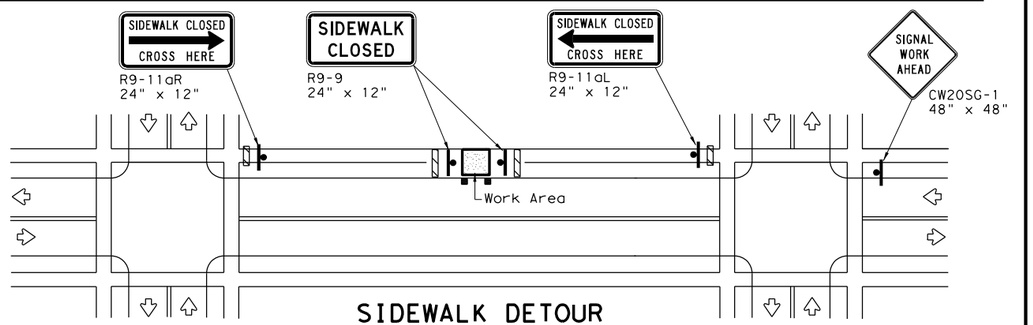
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

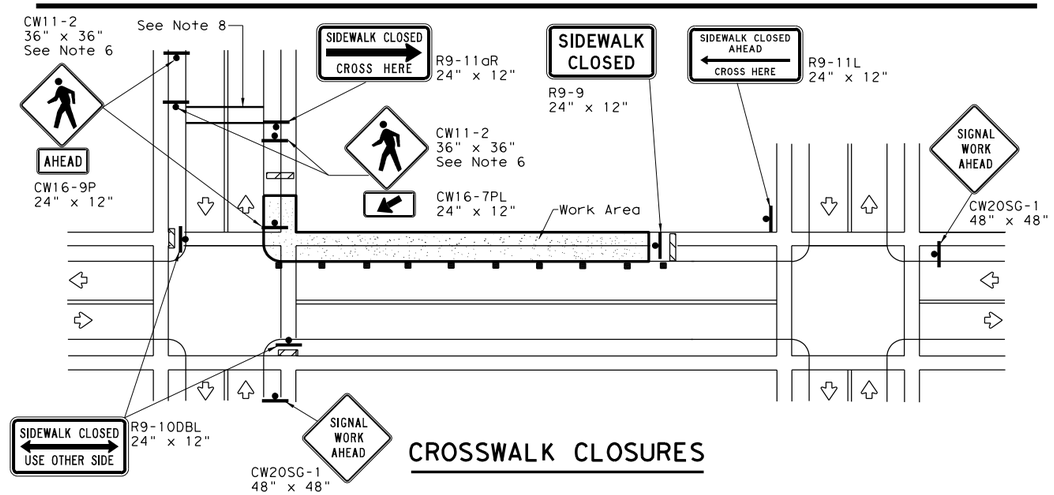
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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

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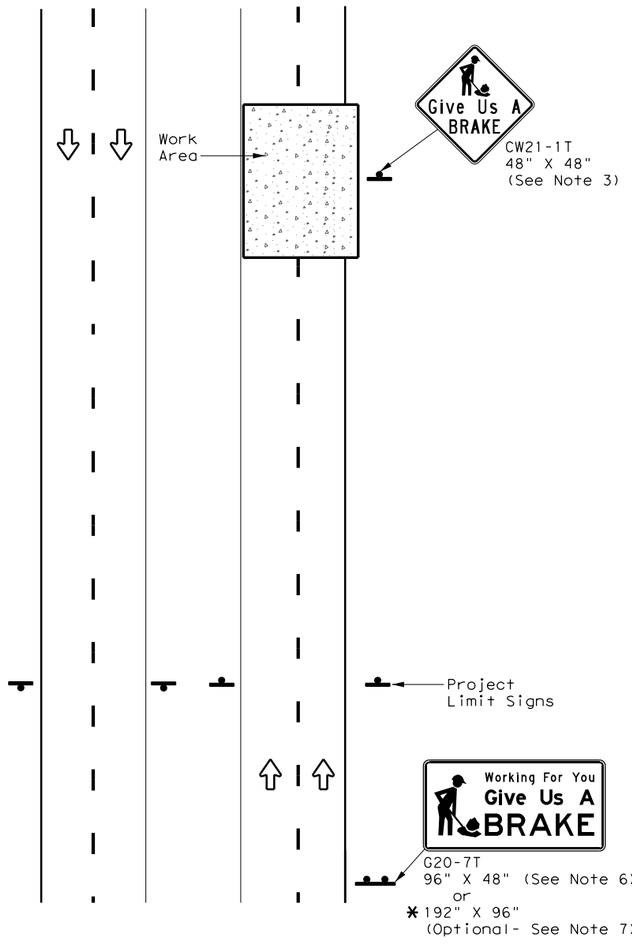
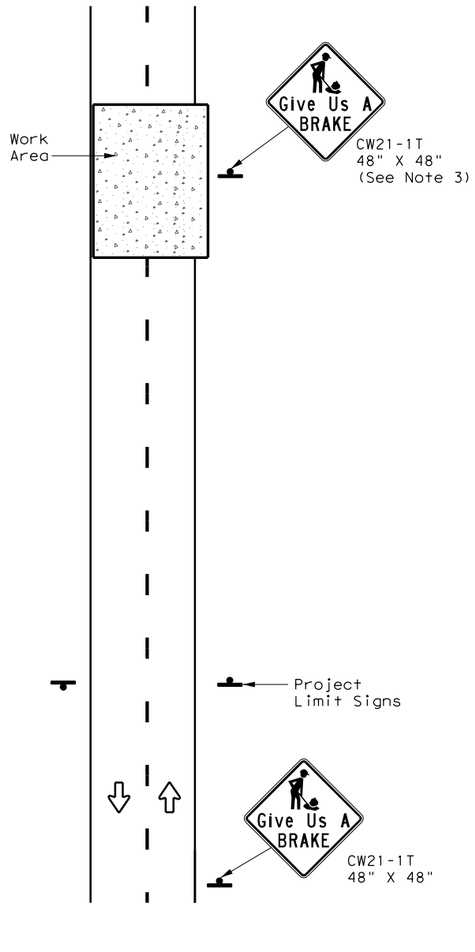


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

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

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

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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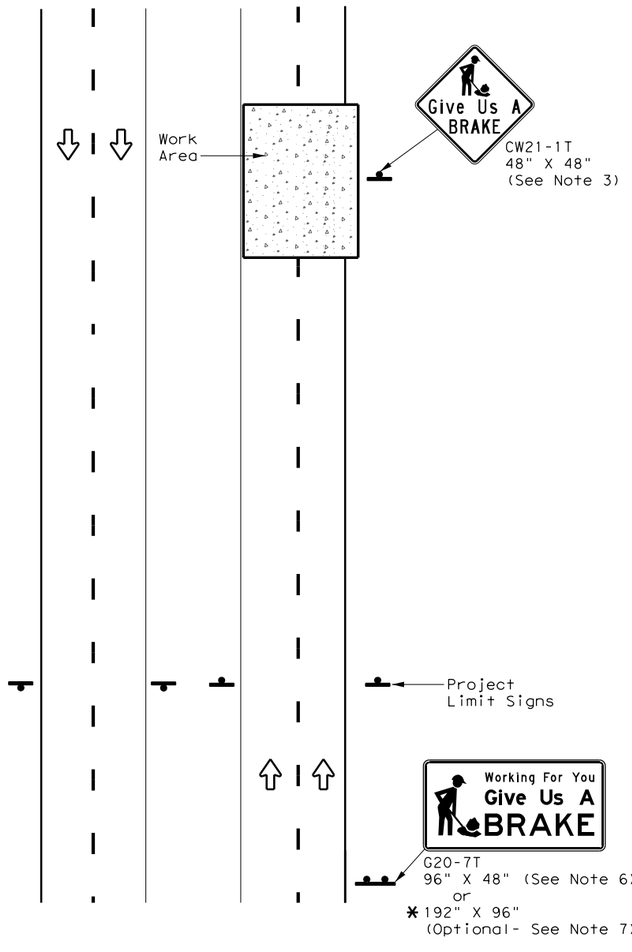
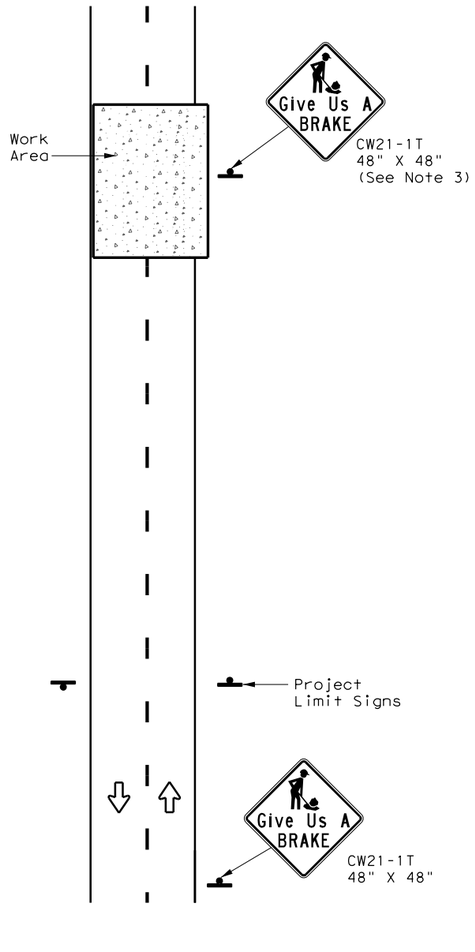


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
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▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

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

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

GENERAL NOTES

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

WORK ZONE "GIVE US A BRAKE" SIGNS

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FILE:

GENERAL NOTES:

1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.

2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.

3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.

4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.

5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".

6. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.

7. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."

8. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.

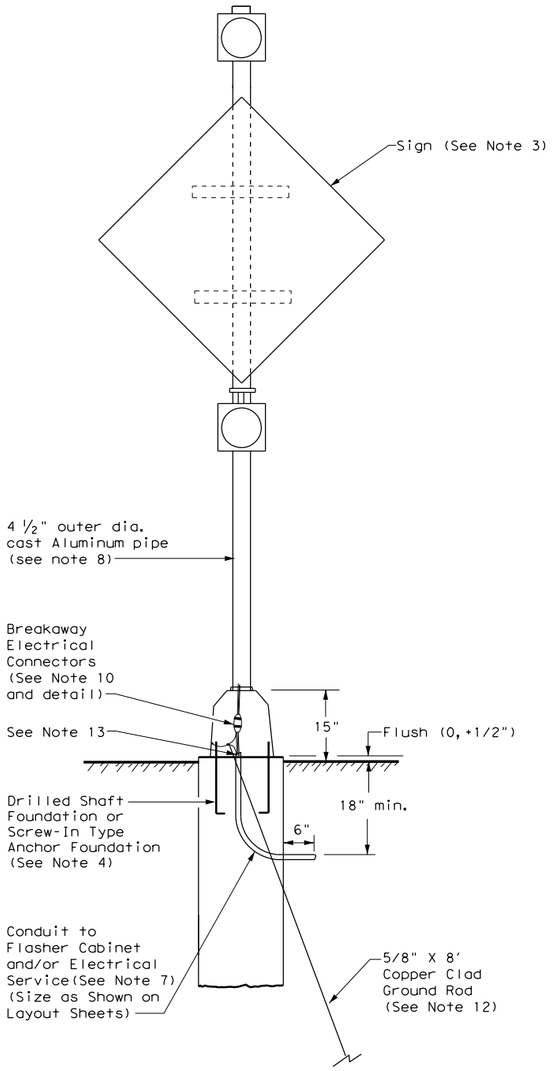
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening of connection.

10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

11. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.

12. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.

13. Ensure height of conduit and ground rod is below top of anchor bolts.



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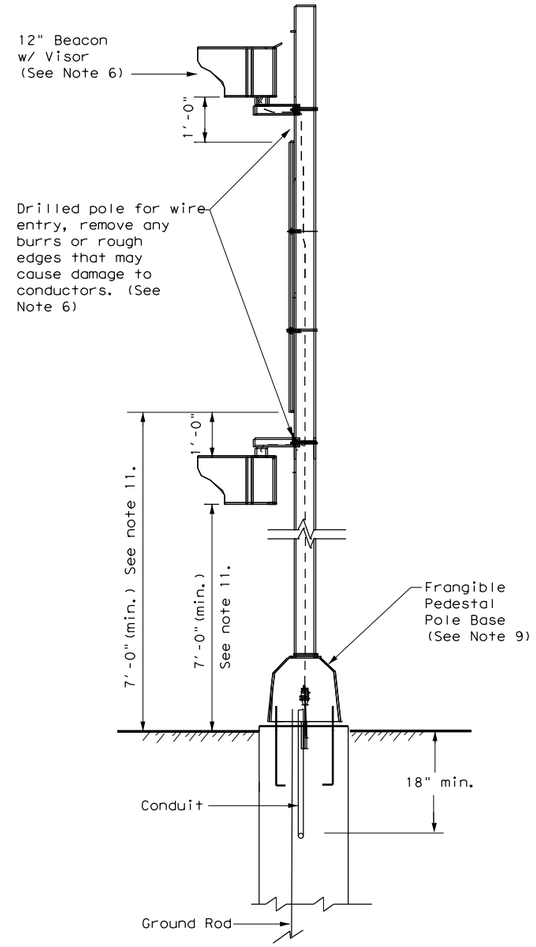

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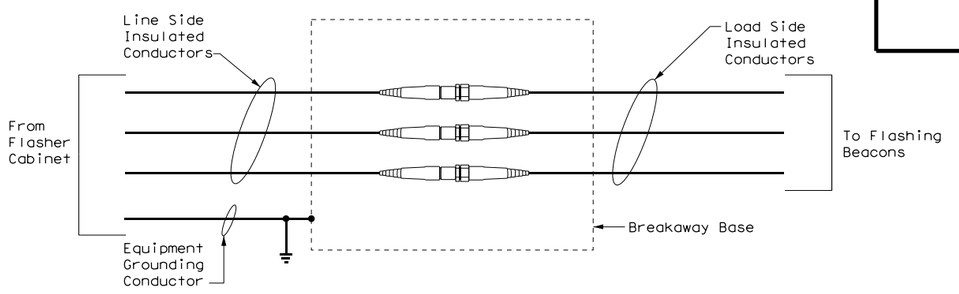
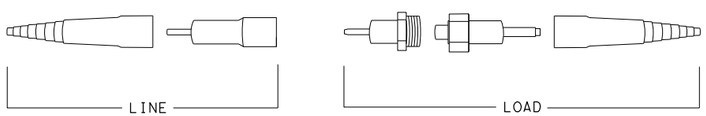


NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

ROADSIDE FLASHING BEACON ASSEMBLY

RFBA-13

FILE: rfba-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225, ETC	VA
5-93 12-04	DIST	COUNTY		SHEET NO.
10-93 3-13	SA	BEXAR		53
4-98				

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

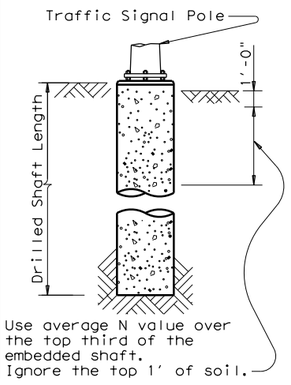
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
40 PED POLES	10	24- A	40	5.7				
TOTAL DRILLED SHAFT LENGTHS				228				

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'



ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

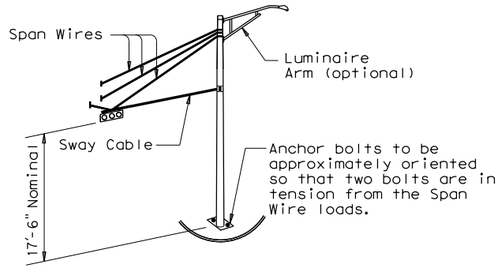
Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

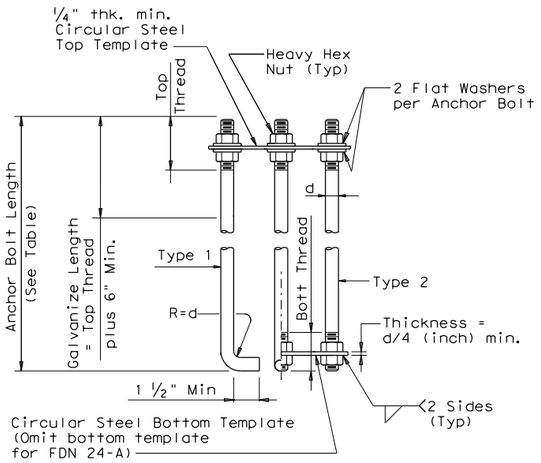
Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



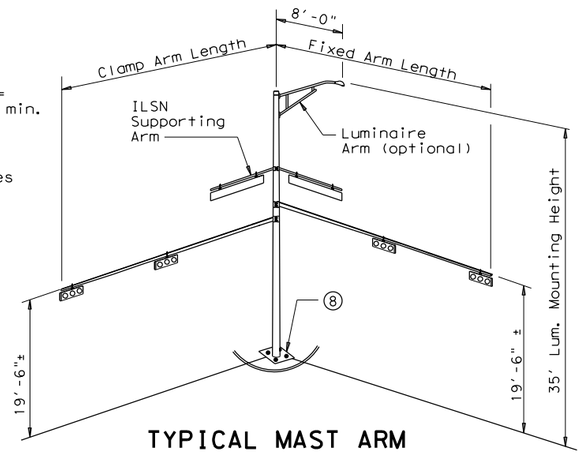
TYPICAL STRAIN POLE ASSEMBLY



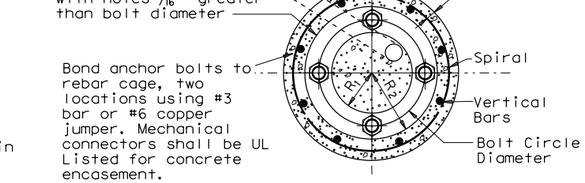
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

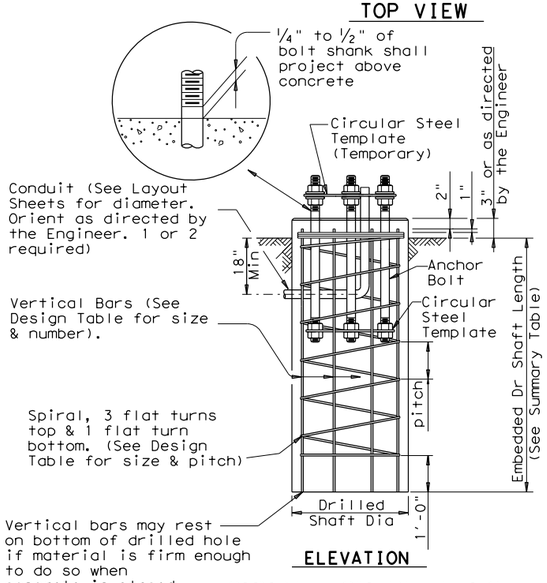
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

STATE OF TEXAS
CARLOS DURAN
125531
REGISTERED PROFESSIONAL ENGINEER
10/28/2022

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		54

DATE: 10/28/2022 3:21:34 PM
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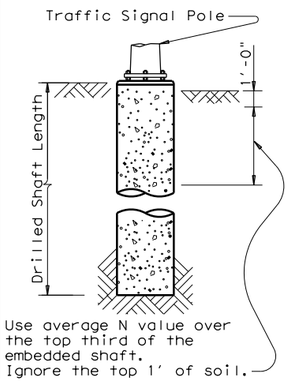

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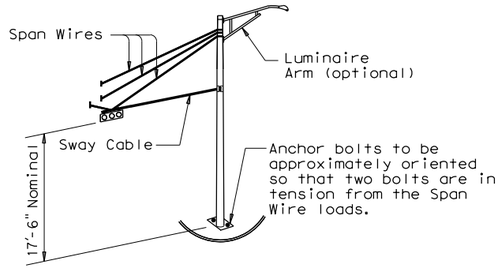
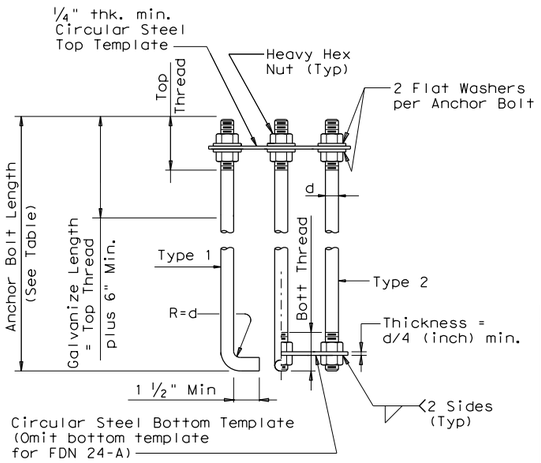


TYPICAL STRAIN POLE ASSEMBLY



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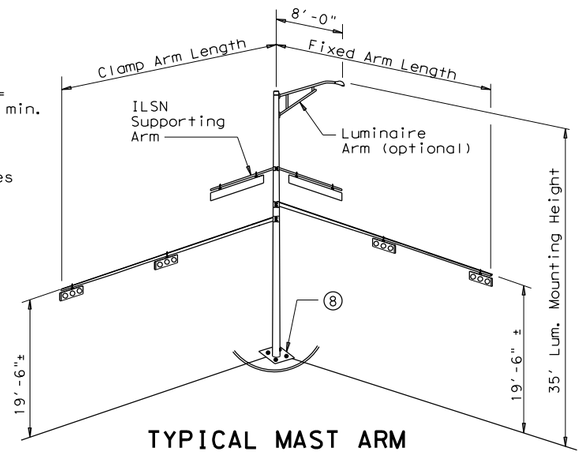

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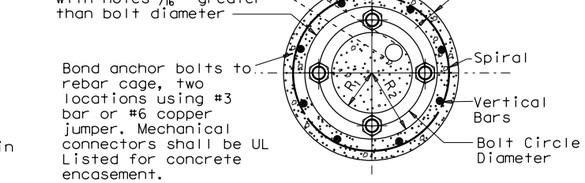
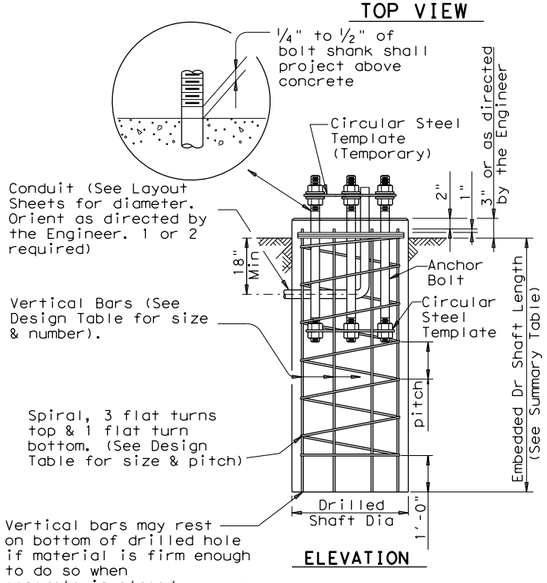


TOP VIEW



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TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
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	SAT	BEXAR		54

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

DATE: DATE TIME
FILE: DOCUMENT NAME

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE: ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		55

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))
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Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
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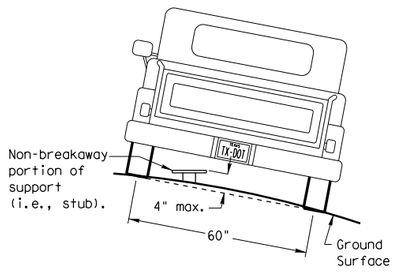
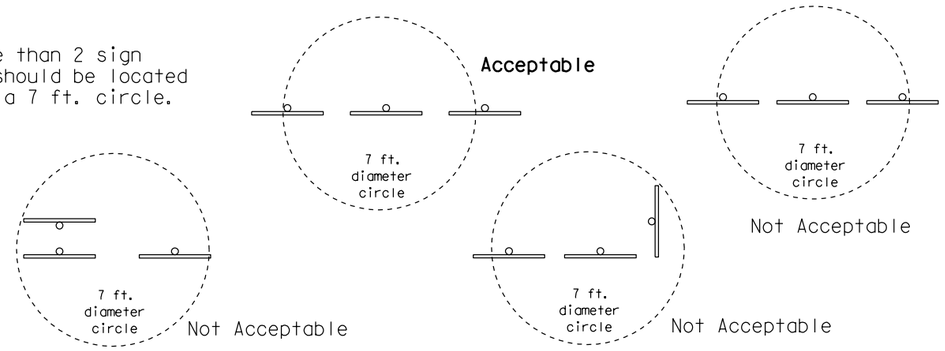
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



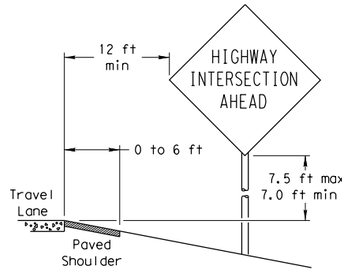
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

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



SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

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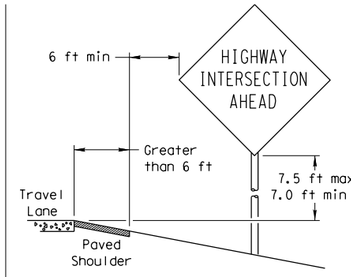

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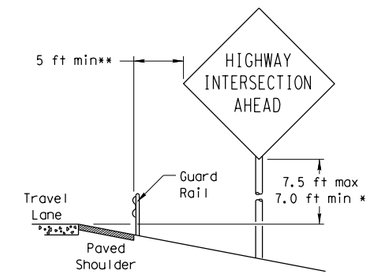
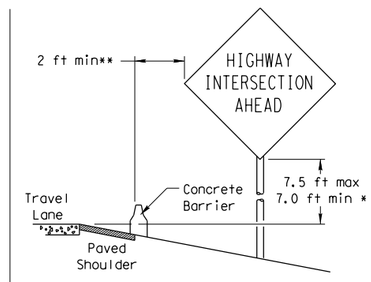
BEHIND BARRIER



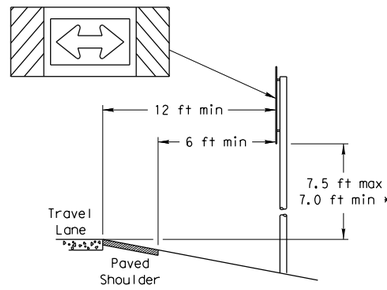
BEHIND GUARDRAIL



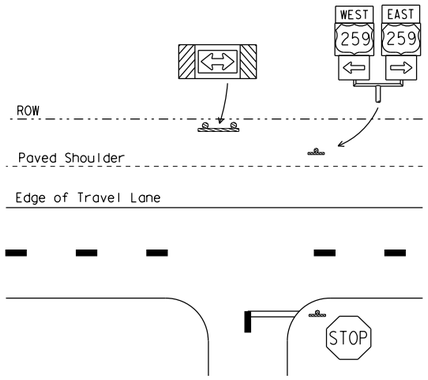
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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.



* 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:
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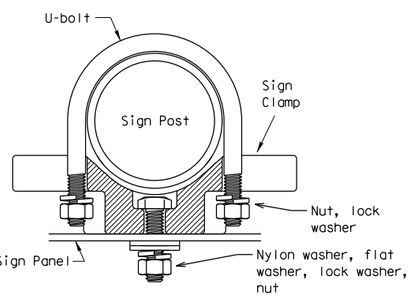
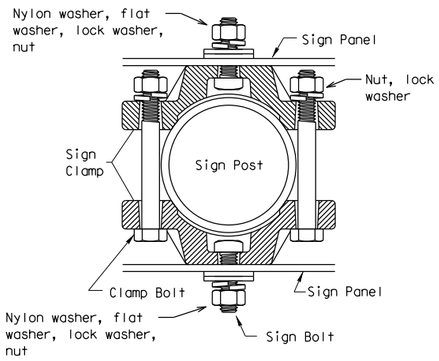
TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



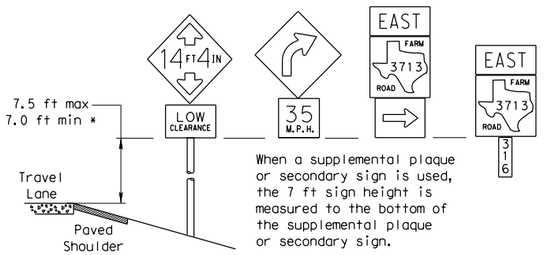
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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



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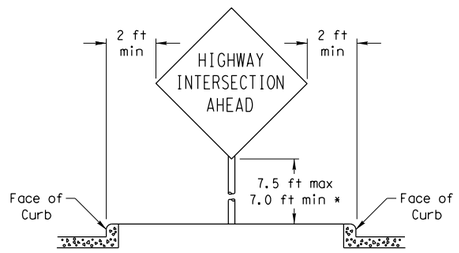
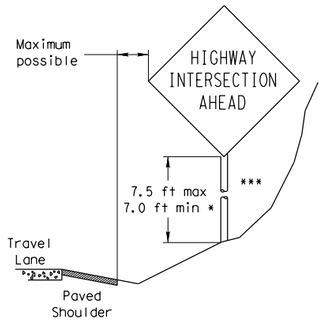


RESTRICTED RIGHT-OF-WAY

(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.

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Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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

9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		56

DATE: 10/28/2022 3:21:42 PM
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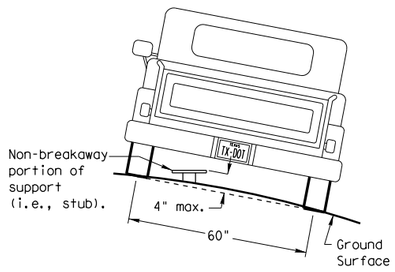

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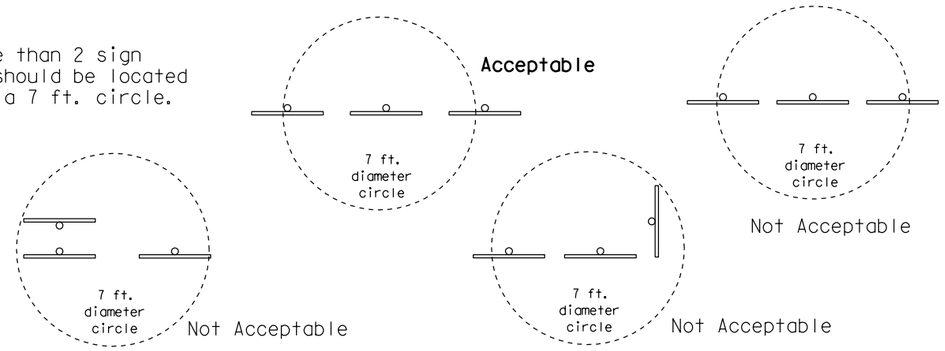
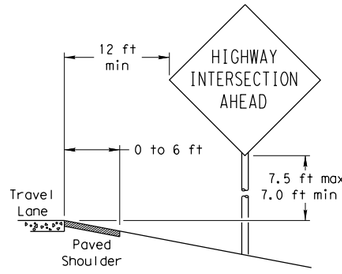


SIGN LOCATION

PAVED SHOULDERS



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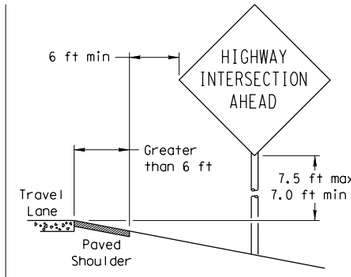

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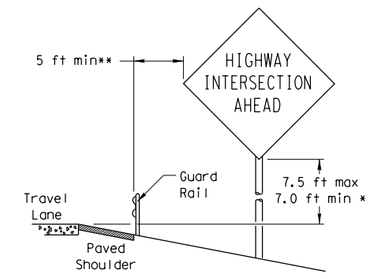
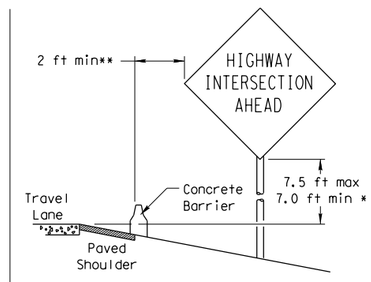


BEHIND GUARDRAIL



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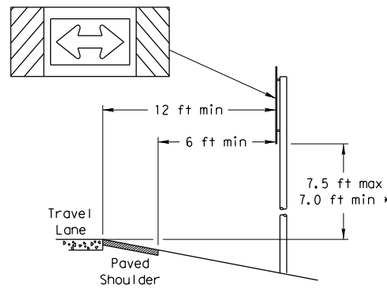
T-INTERSECTION



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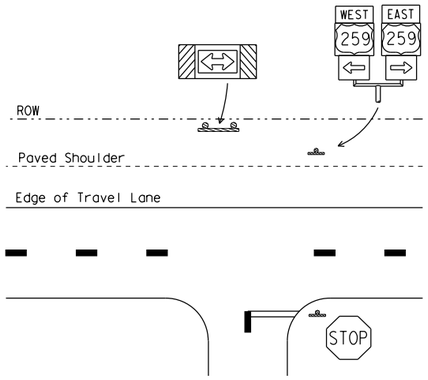

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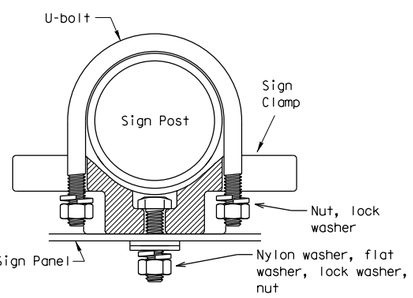
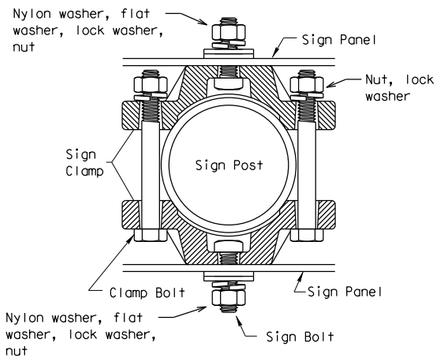


Back-to-Back Signs



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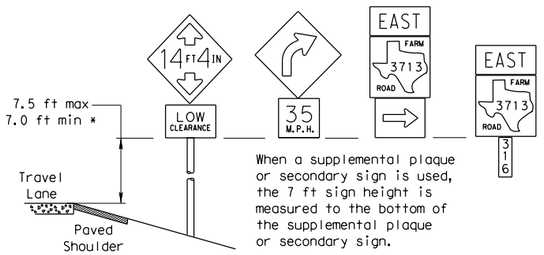

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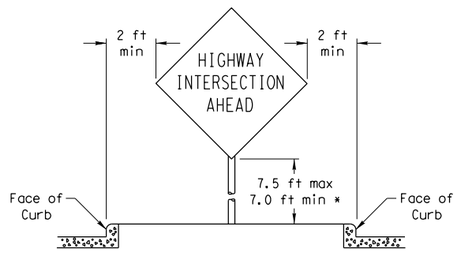

RESTRICTED RIGHT-OF-WAY

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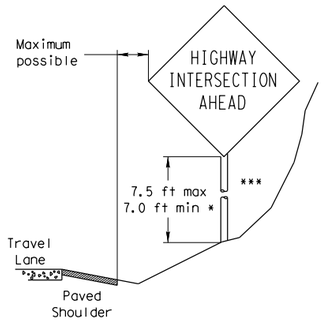

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Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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

9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		56

DATE: 10/28/2022 3:21:42 PM
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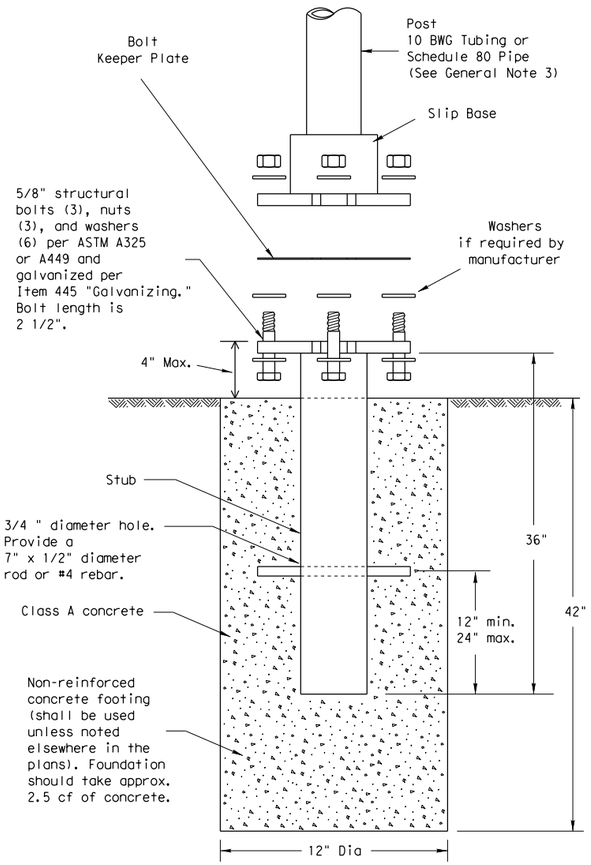
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

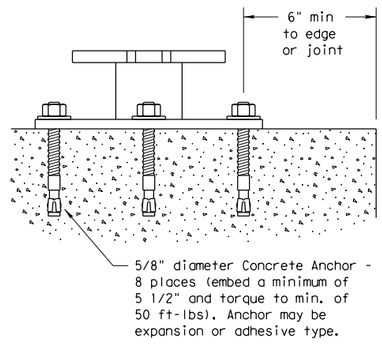
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS			
9-08			

CONT	SECT	JOB	HIGHWAY
0025	02	225,ETC	VA
DIST	COUNTY		SHEET NO.
SAT	BEXAR		57

DATE: 10/28/2022 3:21:45 PM
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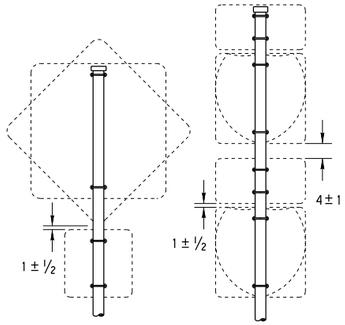
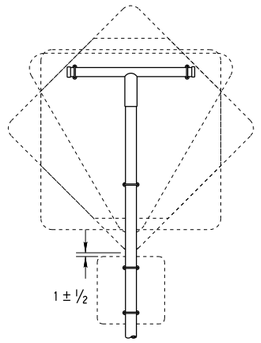


SM RD SGN ASSM TY XXXXX(1)XX(P)



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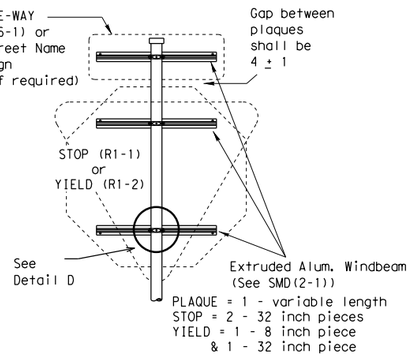
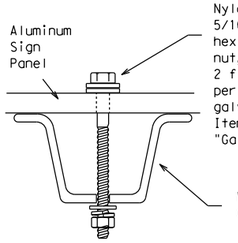
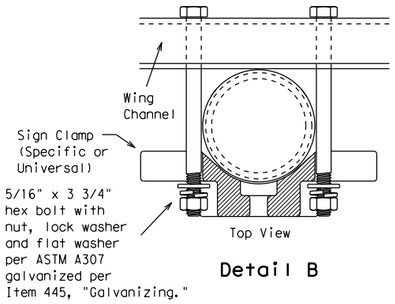


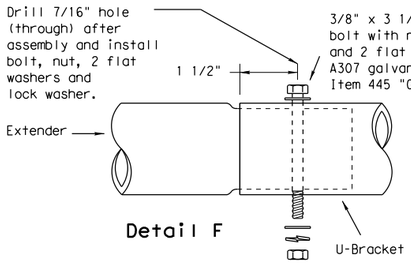
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A

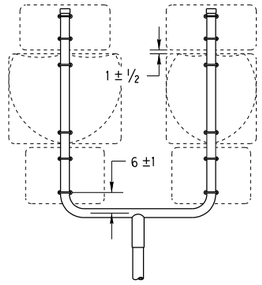


Detail B

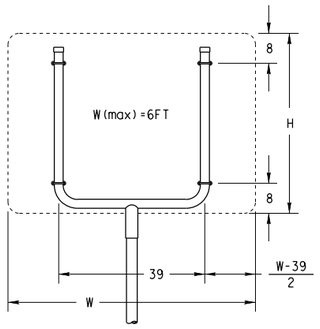


Detail F

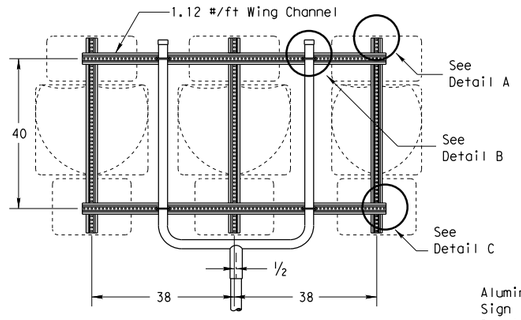
Splices shall only be allowed behind the sign substrate.



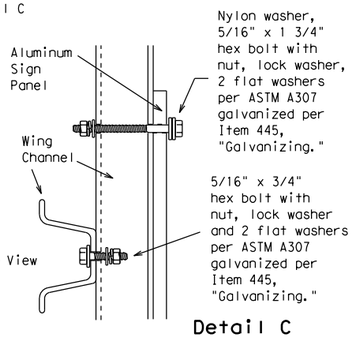
SM RD SGN ASSM TY XXXXX(1)XX(U)



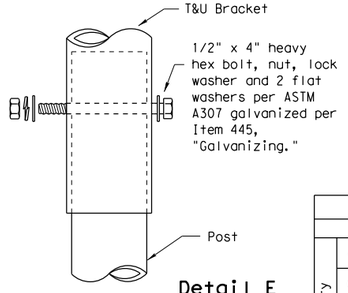
SM RD SGN ASSM TY XXXXX(1)XX(U)



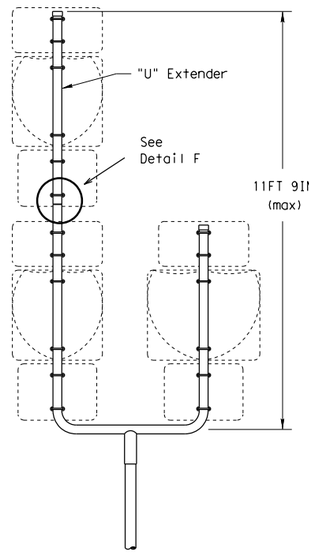
SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



Detail C



Detail E



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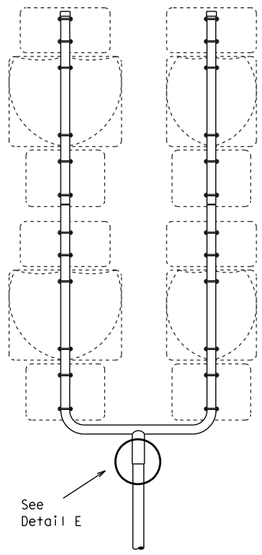

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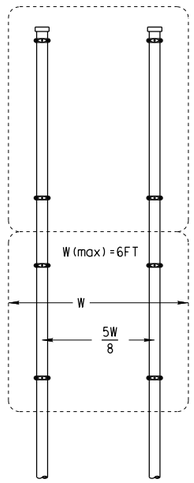
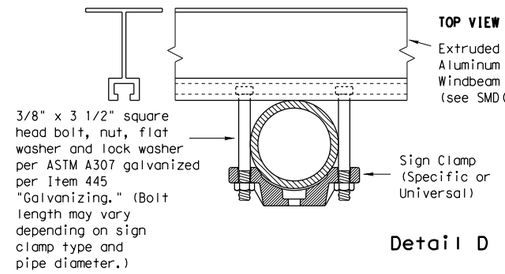
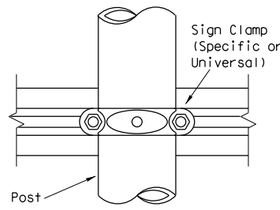


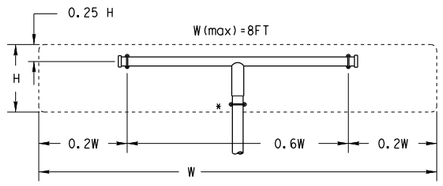
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

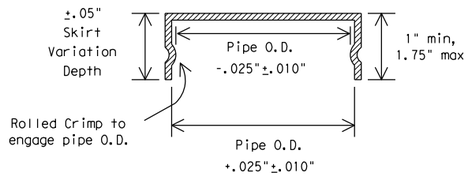




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

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

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

REQUIRED SUPPORT

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		58

26C

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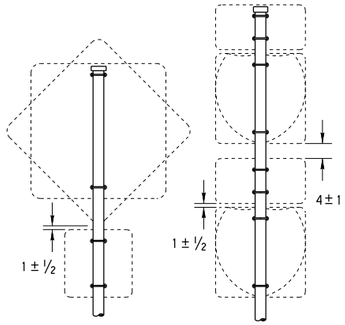
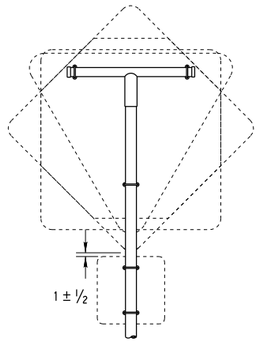
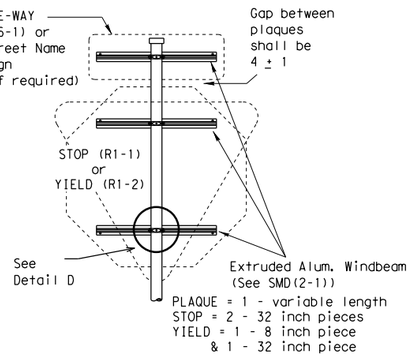


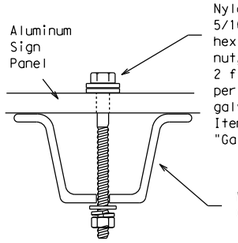
SM RD SGN ASSM TY XXXXX(1)XX(P)



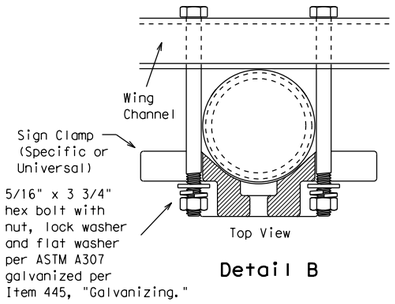
SM RD SGN ASSM TY XXXXX(1)XX(T)



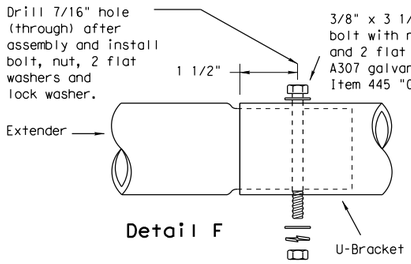
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A

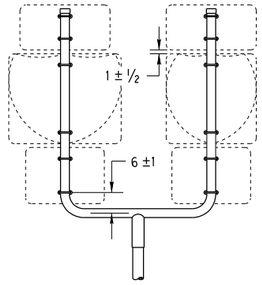


Detail B

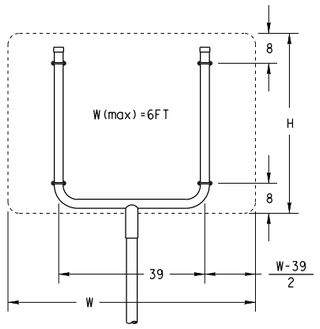


Detail F

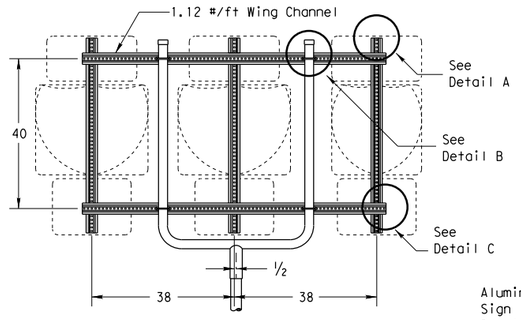
Splices shall only be allowed behind the sign substrate.



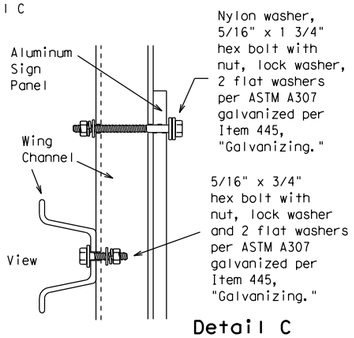
SM RD SGN ASSM TY XXXXX(1)XX(U)



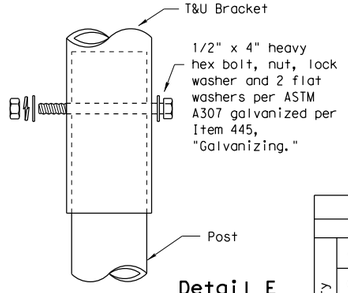
SM RD SGN ASSM TY XXXXX(1)XX(U)



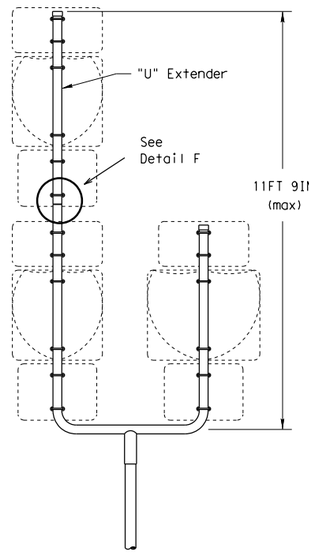
SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



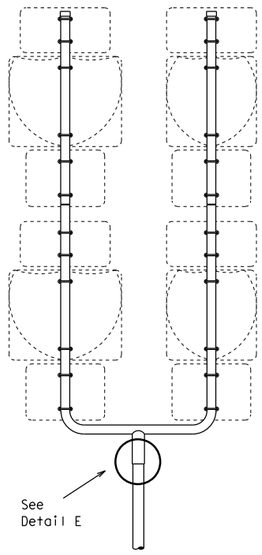
Detail C



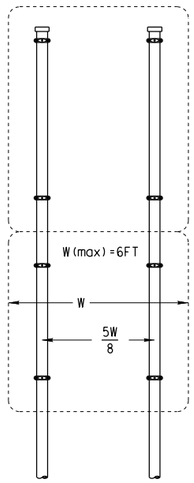
Detail E



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

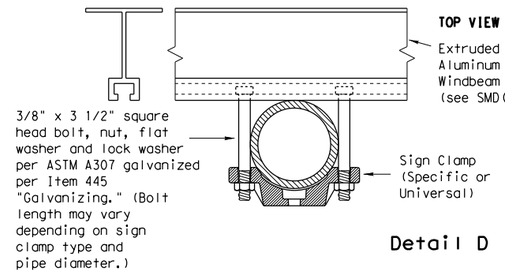


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

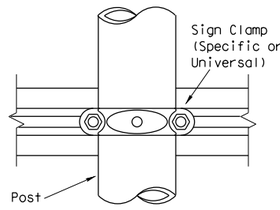


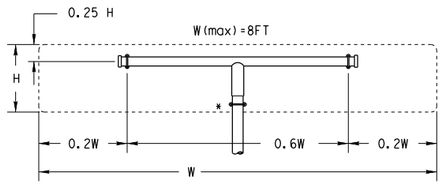
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

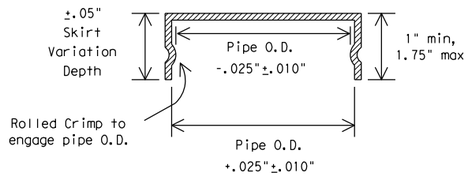




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



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GENERAL NOTES:

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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."
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	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
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Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

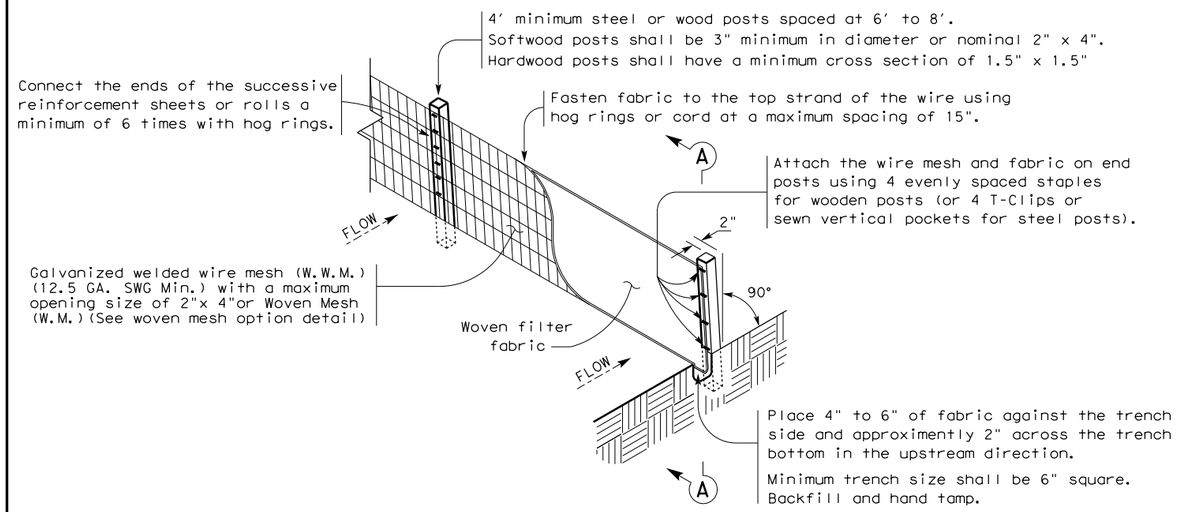
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0025	02	225,ETC	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		58

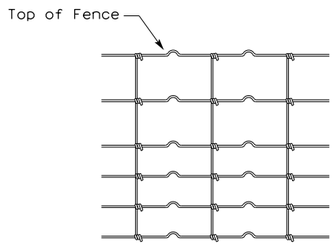
26C

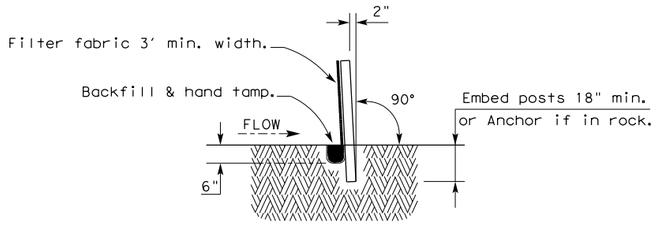
DATE: 10/28/2022 3:21:49 PM
FILE: c:\pwworking\ustx\dms06295\lh10*tcps*023.dgn



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

LEGEND

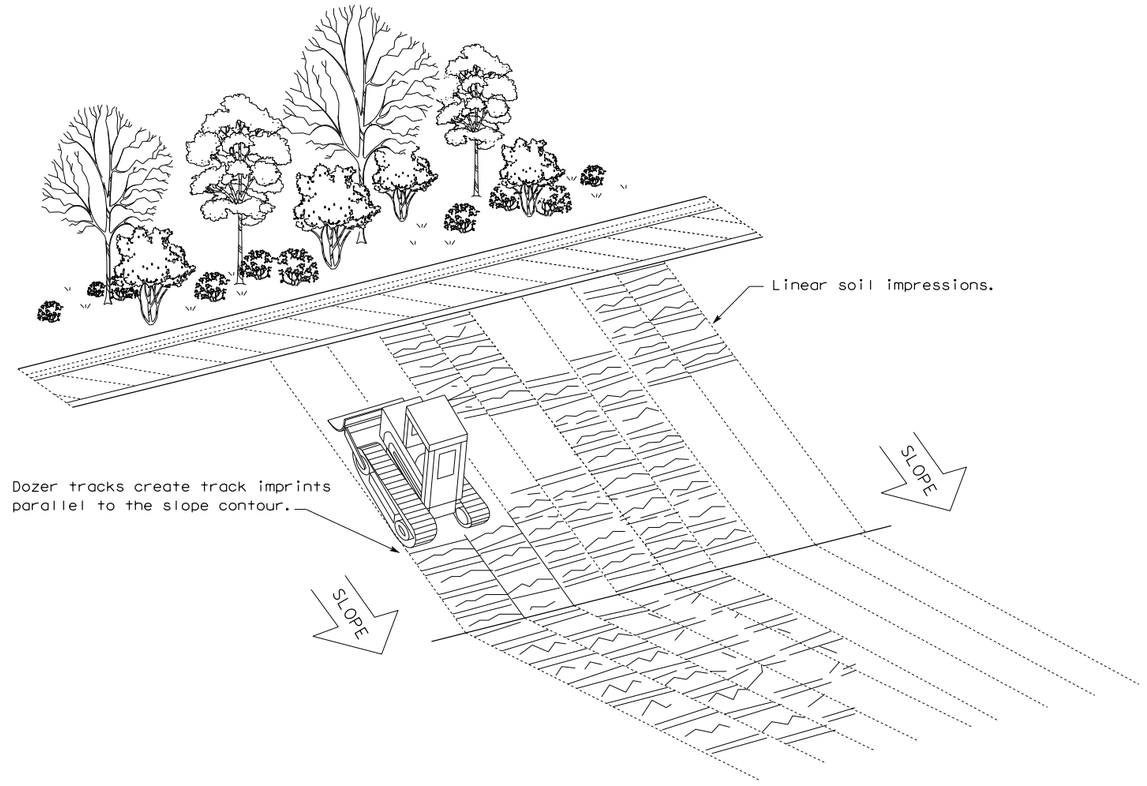
Sediment Control Fence

SCF

DATE
FILE

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB			HIGHWAY	
REVISIONS	0025	02	225,ETC			VA	
	DIST	COUNTY				SHEET NO.	
	SAT	BEXAR				59	

Note To Designer:
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A. GENERAL SITE DATA

1. PROJECT LIMITS: *Same as stated on the Title Sheet*

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- *Project Latitude VARIES Project Longitude VARIES*
- *Project Location Map: Shown on Title Sheet*
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- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections (Sheets X-Y)*
- *Major Controls and Locations of Stabilization Practices: Shown on SW3P Sheets (Sheets X-Y)*
- *Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.*
- *Surface Waters and Discharge Locations: Shown on Drainage and Culvert Layout Sheets (Sheets X-Y)*

3. PROJECT DESCRIPTION:

Installation of Wrong Way Driver Advanced Technologies at off ramps along IH-10, IH-37, and IH-410.

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

1. *Install controls down-slope of work area and initiate inspection and maintenance activities.*
2. *Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the Engineer.*
3. *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):*

___ *Placement of road base*
___ *Exstensive ditch grading*
___ *Upgrading or replacing culverts or bridges*
___ *Temporary detour road(s)*
_X_ *Other: POLE FOUNDATION*

5. EXISTING AND PROPOSED CONDITIONS:

Description of existing vegetative cover: N/A
Percentage of existing vegetative cover: N.A
Existing vegetative cover:(mark one)
___ *Thick or uniformly established*
___ *Thin and Patchy*
_X_ *None or minimal cover*
Description of soils: N/A
Site Acreage: _____ *Acreage disturbed:* _____
Site runoff coefficient (pre-construction): _____ *Site runoff coefficient (post-construction):* _____

6. RECEIVING WATERS: *(Mark all that apply)*

_X_ *A classified stream does not pass through project.*
___ *A classified stream passes through project. Name* _____ *Segment Number* _____
Name of receiving waters that will receive discharges from disturbed areas of the project: _____

Site is in a Municipal Separate Storm Sewer System (MS4).
MS4 Operator (name): _____

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

___ SEEDING
___ MULCHING (Hay or Straw)
___ BUFFER ZONES
___ PLANTING
___ COMPOST/MULCH FILTER BERM
___ SODDING
___ PRESERVATION OF NATURAL RESOURCES
___ FLEXIBLE CHANNEL LINER
___ RIGID CHANNEL LINER
___ SOIL RETENTION BLANKET
___ COMPOST MANUFACTURED TOPSOIL
___ OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

___ SILT FENCES
___ HAY BALES
___ ROCK FILTER DAMS
___ 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
___ OTHER: *(Specify Practice)*

3. STORM WATER MANAGEMENT:

The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include:(mark all that apply)

___ *Existing or new vegetation provides natural filtration.*
___ *The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
___ *Project includes permanent sedimentation controls (other than grass).*
___ *Velocities do not require dissipation devices.*
___ *Velocity-dissipation devices included in the design.*
___ *Other :* _____
_____

4. NON-STORM WATER DISCHARGES:

Off-site discharges are prohibited except as follows:

1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
3. *Plain water used to control dust.*
4. *Plain water originating from potable water sources.*
5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
7. *Other:* _____

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An Inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

See the EPIC sheet for additional environmental information.

Design Consultant Logo here - delete block if not applicable

STATE OF TEXAS
CARLOS DURAN
125531
PROFESSIONAL REGISTERED ENGINEER
Carlos Duran P.E.
10/28/2022
, P.E.
Signature of Registrant & Date

REVISION DATE: 02/22

 Texas Department of Transportation

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	-------		VA
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	SHEET NO.
0025	02	225, ETC	60

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STATE OF TEXAS
CARLOS DURAN
125531
PROFESSIONAL ENGINEER
Carlos Duran P.E.
10/28/2022
, P.E.
Signature of Registrant & Date

REVISION DATE: 02/22

 Texas Department of Transportation

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	STP2023(502)HES		VA
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	SHEET NO.
0025	02	225,ETC	60

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☒ No Action Required ☐ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐ Yes ☒ No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required
☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☐ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW		CK: GAG	
©TxDOT OCTOBER 2015	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0025	02	225, ETC		VA	
	DIST	COUNTY			SHEET NO.	
	SAT	BEXAR			61	