STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

5	STP 2023(602)HESG					
CONT	SECT	SECT JOB HIGHNAY				
0914	05	05 213 CHANDLER F			RD	
DIST		COUNTY S			NO.	
14	WIL	WILLIAMSON				

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENTS

FEDERAL-AID PROJECT NO: STP 2023(602)HESG CSJ 0914-05-213

WILLIAMSON COUNTY CHANDLER ROAD

PROJECT LENGTH: 45,375.75 FT = 8.594 MI ROADWAY- 45,375.75 FT = 8.594 MI BRIDGE- 0.00 FT = 0.000 MI

LIMITS OF WORK: CHANDLER ROAD BETWEEN SH 130 AND OLD CR 366

DESIGN SPEED 60 MPH

FOR HSIP ELEMENTS ONLY

ADT 2021=7,448 VPD 2041=10,427 VPD



END PROJECT

(30.6099, -97.4520







•	PPROXED gnEOBy: LETTING:	

2/6/2023

DIRECTOR 180 F5 ATRANSPORTATION PLANNING AND DEVELOPMENT

RECOMMENDED FOR LETTING 2/6/2023

ARE A896 NG 18048E92

TYPE OF WORK:

FOR THE CONSTRUCTION OF TRAFFIC CONTROL DEVICES CONSISTING OF INSTALLING PROFILE EDGELINE MARKINGS AND PROFILE CENTERLINE MARKINGS

FINAL PLANS

DATE OF LETTING _______

DATE WORK BEGAN: _____

DATE WORK COMPLETED AND ACCEPTED: _____

FINAL CONTRACT COST: _____

CONTRACTOR: _____

LIST OF APPROVED CHANGE ORDERS:

> VICINITY MAP NTS

NOTIFICATION WAS SUBMITTED TO THE WILLIAMSON COUNTY FLOODPLAIN ADMINISTRATOR ON DECEMBER 12, 2022.

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON 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 2022)

Texas Department of Transportation

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GENERAL ITEMS

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4	ESTIMATED QUANTITIES
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STANDARD DETAILS

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CHANDLER ROAD

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SCALE: PROJECT NO.							
DWN: APC	CKD:∆	TG	STP	2023 (60)2)HESG		
STATE	STATE DISTRICT	FED. DIV.	RD. NO.	COUNTY			
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CONTROL	SECTION	JOB		HWY. NO.	SHEET NO.		
0914	05	213			2		

County: WilliamsonSheet: 3Highway: Chandler RoadControl: 0914-05-213

GENERAL NOTES: Version: September 22, 2021

GENERAL

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

Georgetown
Georgetown

Jason.Hudson@txdot.gov

John.Peters@txdot.gov

Questions and requests for documents will be accepted via the Letting Pre-Bid Q&A web page. All questions and any corresponding responses that are generated will be posted through the same 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

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.

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

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Intelligent Transportation Systems (ITS) Infrastructure may exist within the limits of this project and that the system must remain operational throughout construction. The exact location of ITS Infrastructure is not known. Contact the TxDOT Area Engineer's or Inspection Team's Office for the location(s) at least 48 hours before commencing any work that might affect present ITS Infrastructure. Use caution if working in these areas to avoid damaging or interfering with existing facilities. Repair any damage to this system within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify TxDOT/CTECC at (512) 974-0883 within one hour of occurrence. Failure of the Contractor to repair damage to any infrastructure that conveys any corridor information to TxDOT/CTECC will result in the Contractor being billed for the full cost of emergency repairs.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

County: Williamson

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During evacuation periods for Hurricane events the Contractor will cooperate with Department for the restricting of Lane Closures and arranging for Traffic Control to facilitate Coastal Evacuation Efforts.

ITEM 6 - CONTROL OF MATERIALS

For Federally Funded Contracts, comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, by submitting 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, located at the following link, for clarification on material categorization. Buy America material classification sheet (txdot.gov)

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

When any abandoned well is encountered, cease construction operations in this area and notify the Engineer who will coordinate the proper plugging procedures. A water well driller licensed in the State of Texas must be used to plug a well.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

PSL in Edwards Aquifer Recharge and Contributing Zone.

Obtain written approval from the Engineer for all on or off right of way PSLs not specifically addressed in the plans. Provide a signed sketch of the location 30 business days prior to use of the PSL. Include a list of materials, equipment and portable facilities that will be stored at the PSL. TxDOT will coordinate with the necessary agencies. Approval of the PSL is not guaranteed. Un approved PSL is not a compensable impact.

General Notes Sheet A General Notes Sheet B

County: Williamson

Sheet: 3A

Highway: Chandler Road

Control: 0914-05-213

Work within a USACE Jurisdictional Area.

Do not initiate activities within a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Obtain written approval from the Engineer for activities not specifically addressed in the plans. Provide a signed sketch and description of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Un approved work is not a compensable impact.

Work over or near Bodies of Water (lakes, rivers, ponds, creeks, dry waterways, etc.).

Keep on site a universal spill kit adequate for the body of water and the work being performed. Debris is not allowed to fall into the ordinary high-water level (OHWL). Debris that falls into the OHWL must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. Install and maintain traffic control devices to maintain a navigable corridor for water traffic, except during bridge demo and beam placement. This work is subsidiary.

Obtain written approval from the Engineer for temporary fill or crossings not specifically addressed in the plans. Provide a signed sketch of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Unapproved work is not a compensable impact.

Migratory Birds and Bats.

Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to TxDOT 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

Law Enforcement Personnel.

Submit charge summary and invoices using the Department forms.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed.

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Payment is for work performed. If the Contractor has a field office, provide an office location for a supervisory officer when event requires a supervising officer. This work is subsidiary.

A maximum combined rate of \$70 per hour for the law enforcement personnel and the patrol vehicle will be allowed. Any scheduling fee is subsidiary per Standard Specification 502.4.2.

Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or "show up" fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual "show up" time to the event site due to cancellation will be on a case by case basis at a maximum of 2 hours per officer.

Alterations to the cancellation and maximum rate must be approved by the Engineer or predetermined by official policy of the officers governing authority.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

	<u>l'able l</u>	
Roadway	Limits	Allowable Closure Time
All	Within 200' of a signalized intersection	9 P to 5 A
All	All (Full Closure, see allowable work below)	11 P to 4 A

	Table 2 (Mobile Operations)	
Roadway	Allowable Sun Night thru Fri Noon	Allowable Sat thru Sun Morn
Outside Austin City Limits	9 A to 3 P and 7 P to 7 A	6 P to 11 A

For roadways without defined allowable closure times, nighttime lane closures will be allowed from 7 P to 6 A. Unless stated, daytime or Friday night lane closures will not be allowed and one lane in each direction will remain open at all times for all roadways.

To account for directional traffic volumes, begin and end times of closures may be shifted equally by the Engineer. The closure duration will remain. Added compensation is not allowed.

Submit an emailed request for a lane closure (LCN) to TxDOT. The email will be submitted in the format provided. Receive concurrence prior to implementation. Submit a cancellation of lane closures a minimum of 18 hours prior to implementation. Blanket requests for extended periods are not allowed. Max duration of a request is 2 weeks prior to requiring resubmittal.

Provide 2 hour notice prior to implementation and immediately upon removal of the closure.

For roadways listed in Table 1: Submit the request 96 hours prior to implementation.

For roadways not listed in Table 1: Submit the request a minimum of 48 hours prior to the closure and by the following deadline immediately prior to the closure: 11A on Tuesday or 11A on Friday. For all roadways: Submit request for traffic detours and full roadway closures 168

General Notes Sheet C General Notes Sheet D

County: Williamson

Sheet: 3B

Highway: Chandler Road

Control: 0914-05-213

hours prior to implementation. Submit request for nighttime work 96 hours to implementation date.

Cancellations of accepted closures (not applicable to full closures or detours) due to weather will not require resubmission in accordance with the above restrictions if the work is completed during the next allowable closure time.

Closures that conflict with adjacent contractor will be prioritized according to critical path work per latest schedule. Conflicting critical path or non-critical work will be approved for first LCN submitted. Denial of a closure due to prioritization or other reasons will not be reason for time suspension, delay, overhead, etc.

Cover, relocate or remove existing signs that conflict with traffic control. Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.

Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify traffic control, if at any time the queue becomes greater than 20 minutes. Have a contingency plan of how modification will occur. Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.

Place a 28-inch cone, meeting requirements of BC (10), on top of foundations that have protruding studs. This work is subsidiary.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

To determine a speed limit or an advisory speed limit, submit a request to TxDOT 60 business days prior to manufacture of the sign.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS

The project is exempt from the Texas Pollutant Discharge Elimination System (TPDES) General Permit (TXR15000). Exempt projects are those that disturb less than one acre or routine maintenance activities that maintain the original line and grade, hydraulic capacity, or original

County: Williamson

Sheet: 3B

Highway: Chandler Road

Control: 0914-05-213

purposes of the site. No temporary erosion control measures or Storm Water Pollution Prevention Plan (SW3P) have been included in the plans.

If SW3P plan sheets are not provided, place the control measures as directed.

Install, maintain, remove control measures in areas of the right of way utilized by the Contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

Erosion control measures must be initiated immediately in areas where construction activities have ceased and will not resume for a period exceeding 14 calendar days. Vertical track all exposed soil, stockpiles, and slopes. Re-track after each rain event or every 14 days, whichever occurs first. Sheep foot roller is allowed for vertical tracking. This work is subsidiary.

Unless a specific pay item is provided in the plans, the installation of the 6:1 or flatter for RFD side slopes in the safety zone will be subsidiary to pertinent bid items.

ITEM 600s & 6000s – ITS, LIGHTING, SIGNING, MARKINGS, AND SIGNALS

Meet the requirements of the NEC, Texas MUTCD, TxDOT standards, and TxDOT Standard Specifications. Notify the Engineer if existing elements to remain do not meet code or specification.

Contractor shall provide all service, equipment and material required to provide a functional item and interface with existing equipment and software.

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS

Notify the Engineer at least 24 hr. before beginning work.

When the raised portion of a profile marking is placed as a separate operation from the pavement marking, the raised portion must be placed first then covered with TY I.

ITEM 677 - ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Dispose of removed materials and debris at locations off the right of way.

Elimination using a pavement marking will not be allowed in lieu of methods listed in specification.

Remove pavement markings on concrete surfaces by a blasting method. Flail milling will be allowed when total quantity of removal on concrete surfaces is less than 1000 ft.

Strip seal is only method allowed on seal coat surface unless project includes placement of a new surface. If total quantity of removal on a seal coat surface is less than 2000 ft., elimination using a pavement marking is allowed if a test section is approved by the Engineer. Test section shall demonstrate the thermo marking color matches the existing pavement color.

Remove pavement markings outside the limits of the new surface by a blasting method.

General Notes Sheet E General Notes Sheet F

County: Williamson

Sheet: 3C

Highway: Chandler Road

Control: 0914-05-213

Use a TRAIL or a non-retroreflective paint to cover stripe remnants that remain after elimination. The test requirements for these materials are waived. The paint color shall be adjusted to resemble the existing pavement color. Installation and maintenance is subsidiary.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN

Provide 2 PCMS. Provide a replacement within 12 hours. PCMS will be available for traffic control, event notices, roadway conditions, service announcements, etc.

Place PCMS 10 calendar days prior to begin work stating "Road Work Begin Soon, Contact 832-7000 For Info".

Place PCMS at time of LCN request. Place the PCMS at the expected end of queue caused by the closure. When the closure is active, revise the message to reflect the actual condition during the closure, such as "RIGHT LN CLOSED XXX FT".

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA/TA required for the work. TMA/TAs paid by the day is full compensation for all worksite locations during an entire day.

TMA/TAs used to protect damaged attenuators will be paid by the day using the force account item for the repair.

In addition to the TMA/TA required per the TCP plans and standards, provide 2 additional TMA/TA for Mobile Operations related to Pavement Marking installation (see TCP standards for details).

General Notes Sheet G



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-05-213

DISTRICT Austin **HIGHWAY** CHANDLER RD

COUNTY Williamson

Report Created On: Feb 3, 2023 11:19:01 AM

		CONTROL SECTION	N JOB	0914-0	5-213		
		7382					
	COUNTY				nson	TOTAL EST.	TOTAL FINAL
		HIG	HWAY	CHANDL	ER RD		1110/12
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	МО	3.000		3.000	
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	666-6345	REF PROF PAV MRK TY I(Y)4"(SLD)(100MIL)	LF	63,449.000		63,449.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	787.000		787.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	44.000		44.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	44.000		44.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	



DISTRICT	COUNTY	CCSJ	SHEET
Austin	Williamson	0914-05-213	4





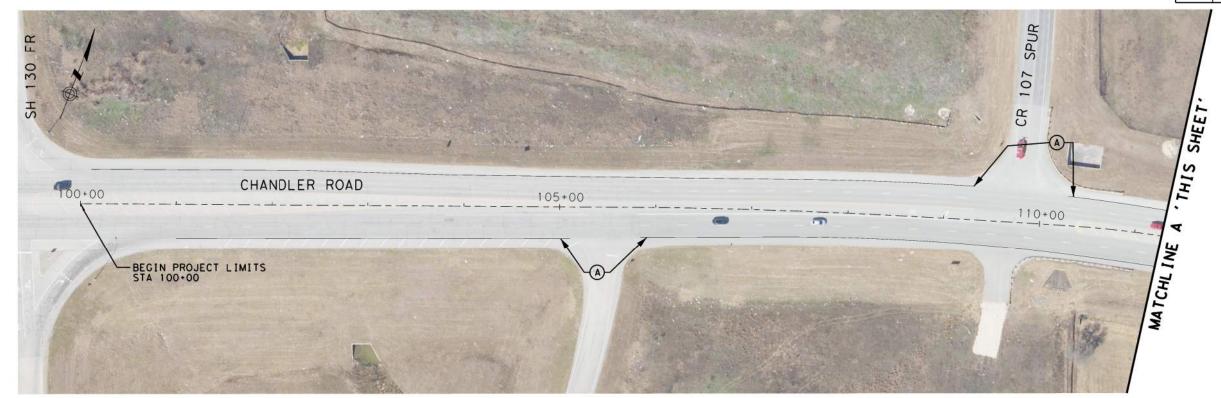
CHANDLER ROAD

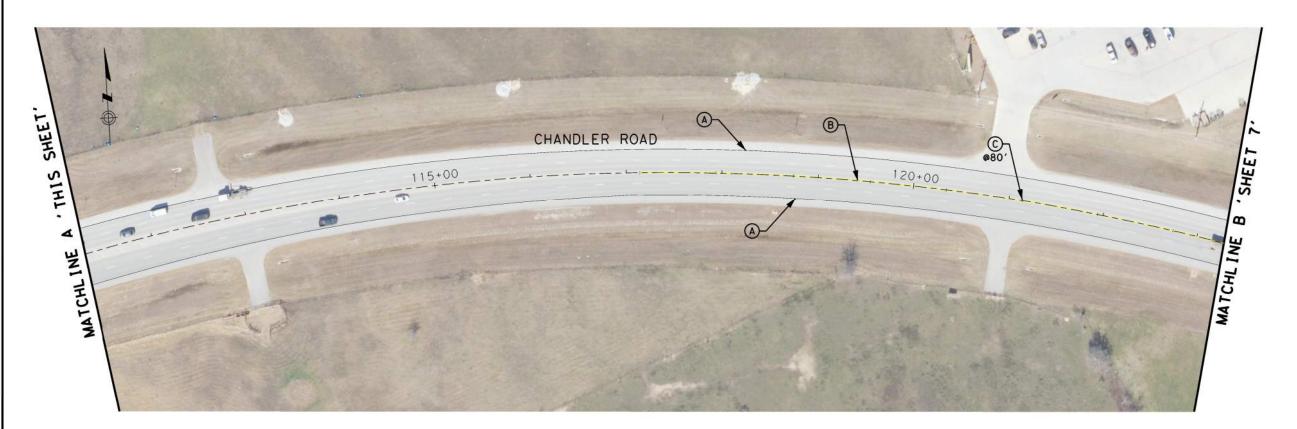
SUMMARY OF QUANTITIES

(SHEET 1 OF 1)

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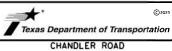












(SHEET 1 OF 19)

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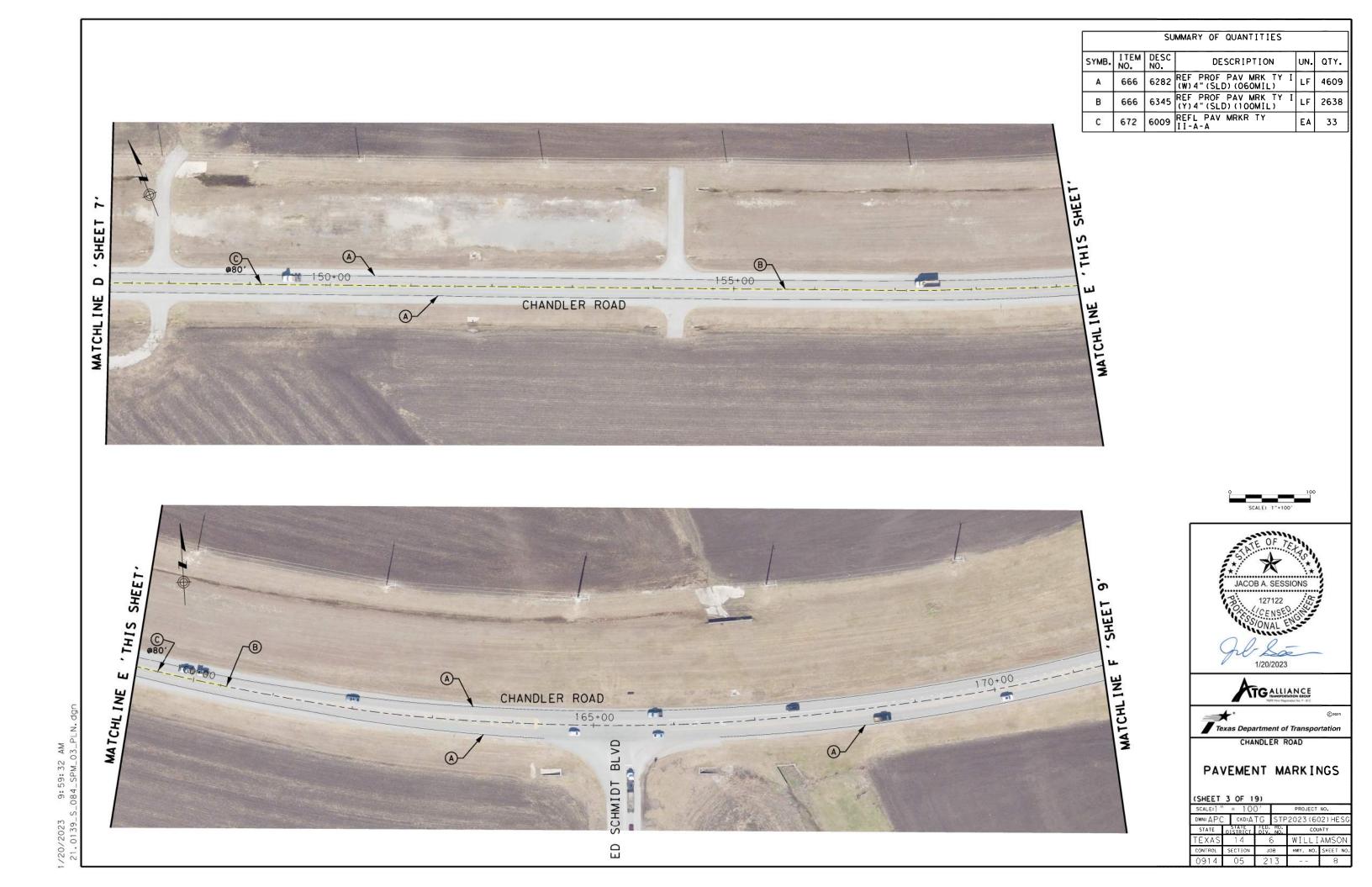
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PAVEMENT MARKINGS

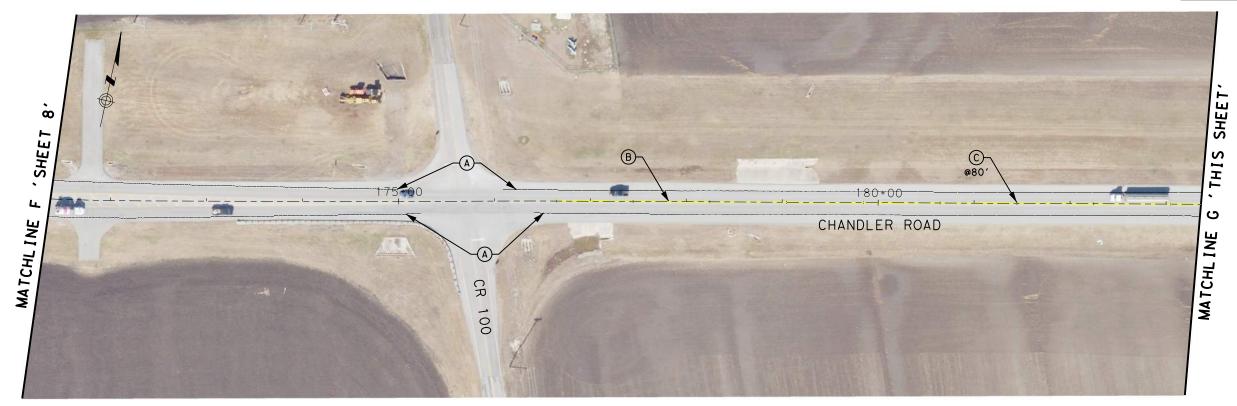
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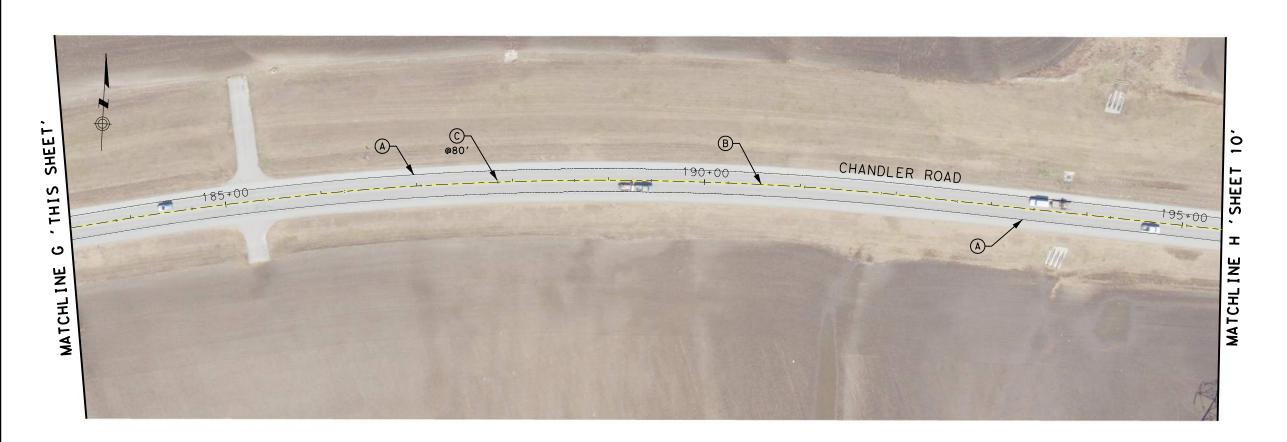
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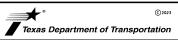












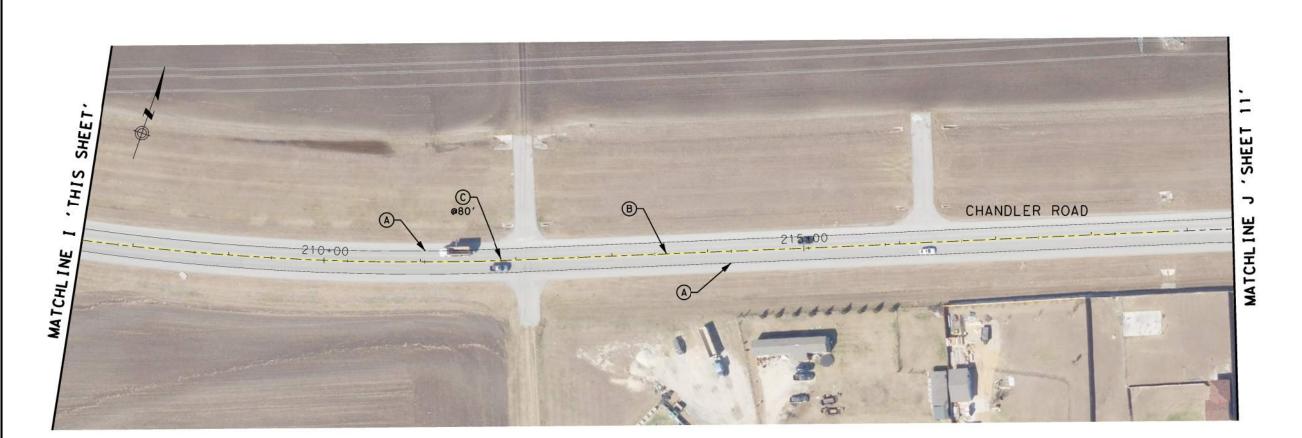
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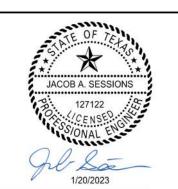
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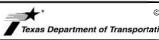








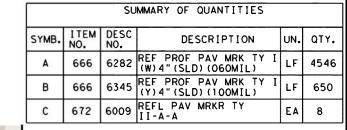




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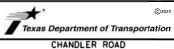












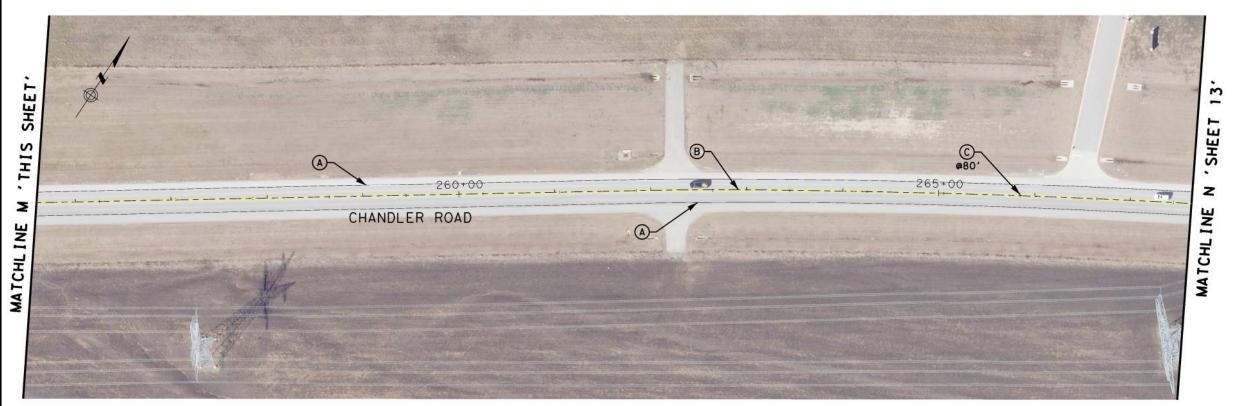
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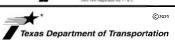












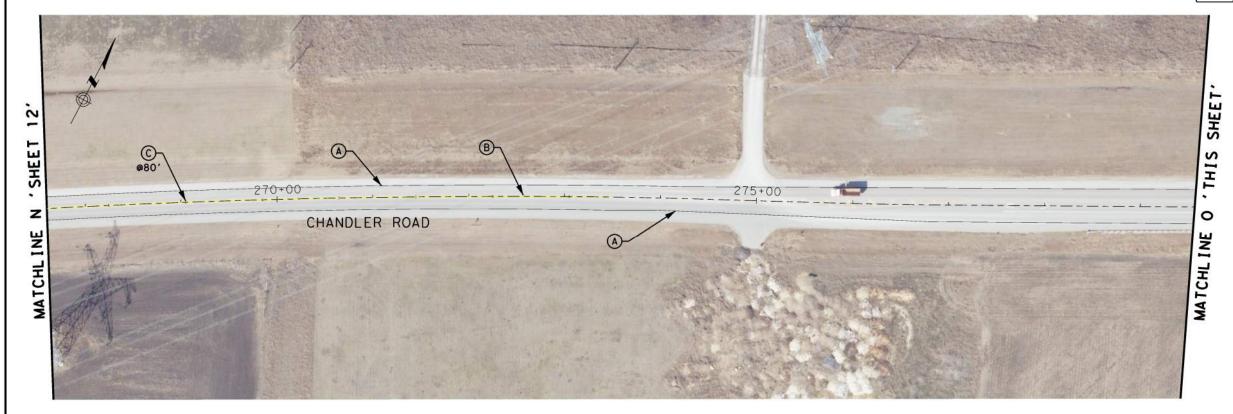
CHANDLER ROAD

PAVEMENT MARKINGS

(2HFF)	7 OF 1	9)				
SCALE: 1 '	= 10	0'	PROJECT NO.			
DWN: AP(CKD:A	TG	G STP2023 (602) H			
STATE	STATE	FED, RD, DIV, NO.		COUNTY		
TEXAS	14	(0)	WILLI	AMSON	
CONTROL	SECTION	J	98	HWY, NO,	SHEET NO.	
0914	05	2	13		12	

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SUMMARY OF QUANTITIES											
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.						
Α	666	6282	REF PROF PAV MRK TY I (W) 4"(SLD)(O6OMIL)	LF	4549						
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	1332						
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	16						











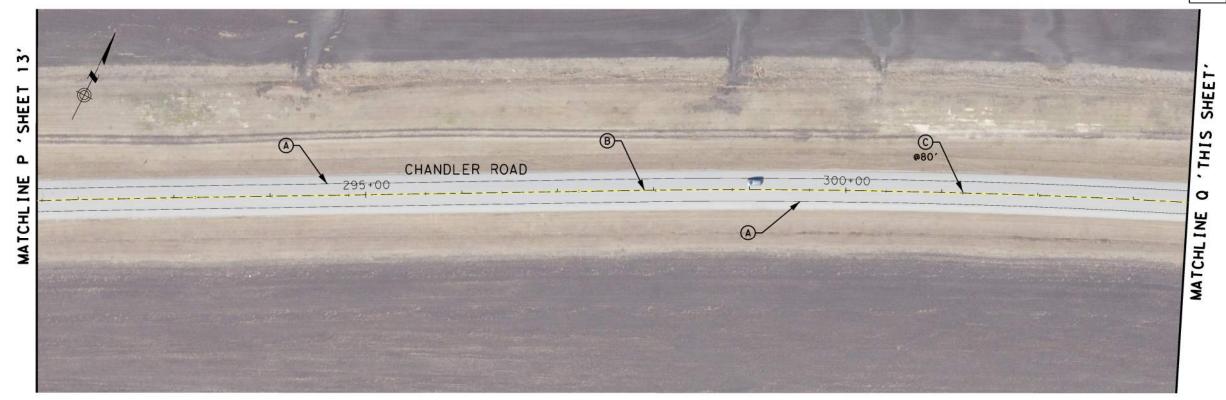


(SHEET 8 OF 19)

ı	SCALE: 1 '	٠.	= 100)′		PROJECT	NO.
DWN: APC			ckd:A	TG	STP	2023 (60)2) HESG
	STATE	0	STATE ISTRICT	FED. DIV.	RD. COUNTY		
	TEXAS		14	(0)	WILLI	AMSON
	CONTROL	S	ECTION	J	ЭВ	HWY, NO,	SHEET NO.
	0914		05 2		13		13

/20/2023 10:06:52 AM 21.0139_S_084_SPM_08_PLN.dgn

SUMMARY OF QUANTITIES											
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.						
Α	666	6282	REF PROF PAV MRK TY I (W) 4"(SLD)(060MIL)	LF	4803						
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	4804						
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	60						

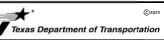












(SHEET	9	OF	19)
			001

SCALE: 1	1	= 100	0'	PROJECT NO.			
DWN: APC		CKD:ATG		STP2023 (602) HESO			
STATE D		STATE ISTRICT	FED, DIV.	RD.	COUNTY		
TEXAS		14	(0)	WILLIAMSO		
CONTROL	S	ECTION	JC)B	HWY, NO,	SHEET NO.	
0914	Г	05	2.	13		14	

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	SUMMARY OF QUANTITIES										
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.						
Α	666	6282	REF PROF PAV MRK TY I (W) 4" (SLD) (O60MIL)	LF	4811						
В	666	6345	REF PROF PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	4812						
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	60						

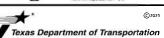












CHANDLER ROAD

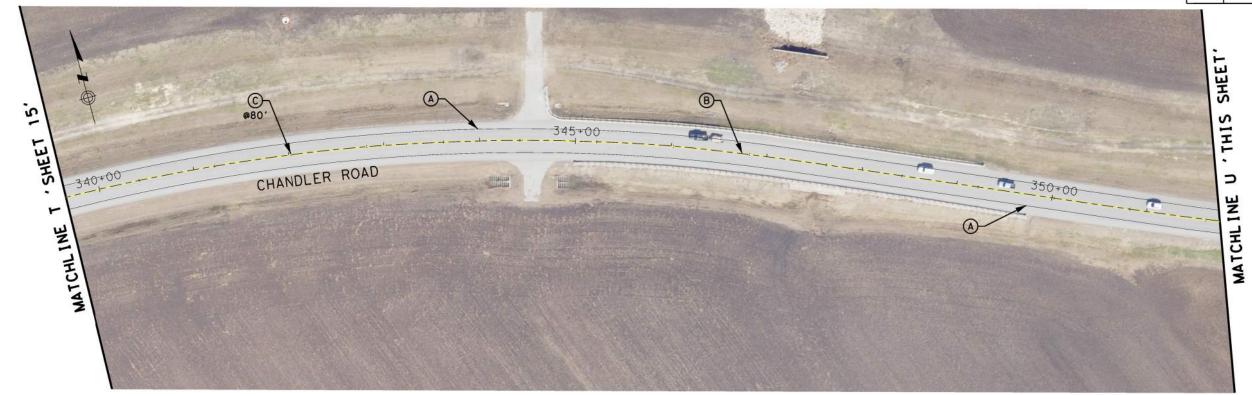
PAVEMENT MARKINGS

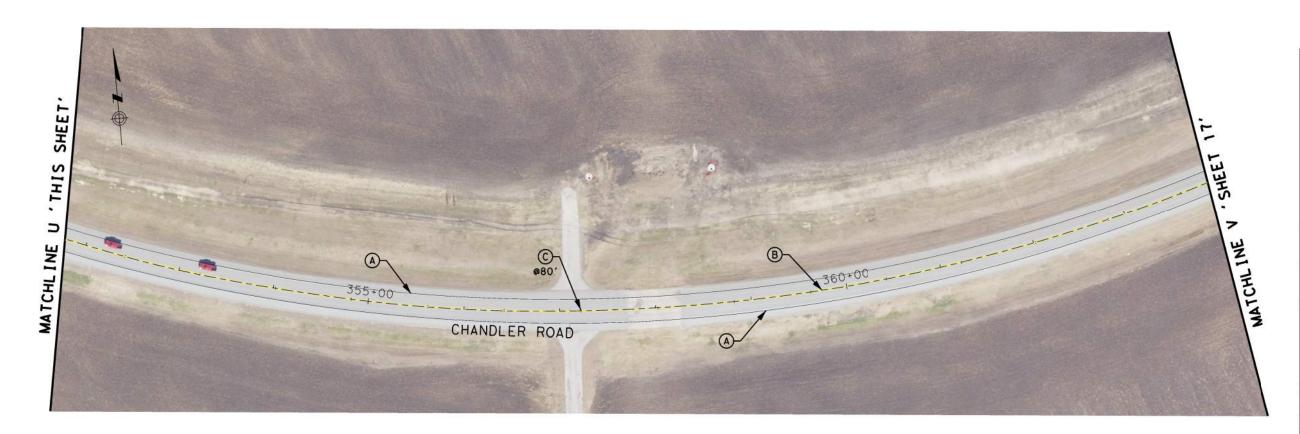
(SHEET 10 OF 19)

SCALE: 1 "	'n.,	= 100	PROJECT NO.				
DWN: APC		CKD:ATG		STP2023 (602) HESC			
STATE	STATE		FED, DIV.	RD.	INTY		
TEXAS		1.4		0)	WILLIAMSO		
CONTROL	S	ECTION	JC	98	HWY, NO,	SHEET NO.	
0914		05	213			15	
	STATE TEXAS	DWN: APC STATE D TEXAS	DWN: APC CKD: A STATE DISTRICT TEXAS 14 CONTROL SECTION	DWN: APC CKD: ATG STATE DISTRICT DIV. TEXAS 14 CONTROL SECTION JC	DWN: APC CKD: ATG STP STATE DISTRICT PED. RD. TEXAS 14 6 CONTROL SECTION JOB	DNN: APC	

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	SUMMARY OF QUANTITIES										
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.						
Α	666	6282	REF PROF PAV MRK TY I (W) 4" (SLD) (060MIL)	LF	4858						
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	4858						
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	60						

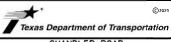












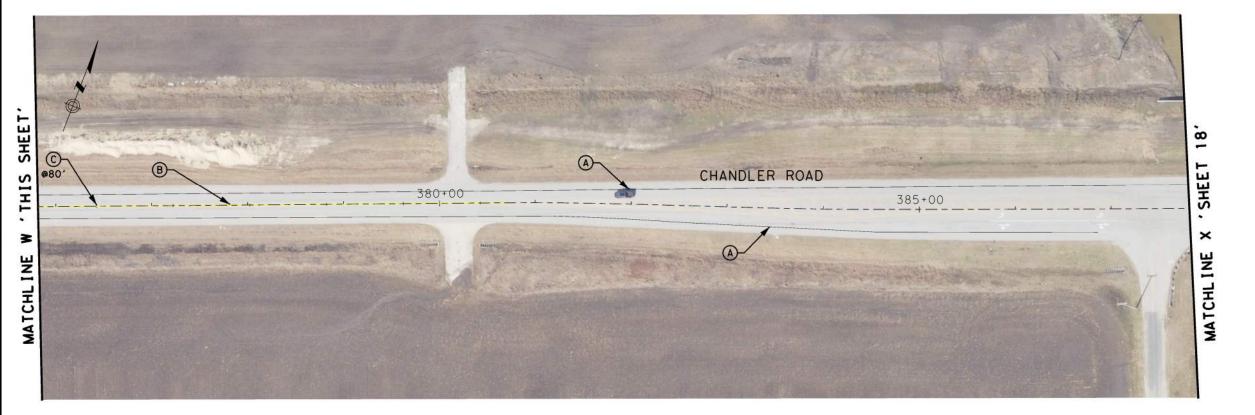
(SHEET 11 OF 19)

SCALE: 1 '	5	= 100)′	PROJECT NO.				
DWN: APC CKD: AT(TG	STP2023 (602) HESG				
STATE	DISTRICT		FED. RD. DIV. NO.		COUNTY			
TEXAS		14	14 6		WILLI	AMSON		
CONTROL	SI	ECTION	JOB		HWY. NO.	SHEET NO.		
0914		05	2	13	7.7	16		

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	SUMMARY OF QUANTITIES										
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.						
Α	666	6282	REF PROF PAV MRK TY I (W) 4" (SLD) (O6OMIL)	LF	4682						
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	3360						
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	40						

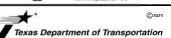












CHANDELIN NOAD

PAVEMENT MARKINGS

(SHEET	12	OF	19)	
SCALE: 1 "	=	10	00'	Π
DWN: APC		CKD: Z	TG	S

J	SCALE:] '	= 10	001	PROJECT NO.				
ĺ	DWN: APC	CKD:	ckb:ATG		STP2023 (602) HESC			
1	STATE	STATE	FED T DIV	RD.	COUNTY			
	TEXAS	14		6	WILLIAMSON			
	CONTROL	SECT10	Į J	ов	HWY, NO,	SHEET NO.		
	0914	05	2	13		17		

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		SU	MMARY OF QUANTITIES		
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.
Α	666	6282	REF PROF PAV MRK TY I (W) 4"(SLD)(O6OMIL)	LF	4667
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	2862
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	36







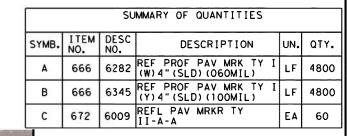




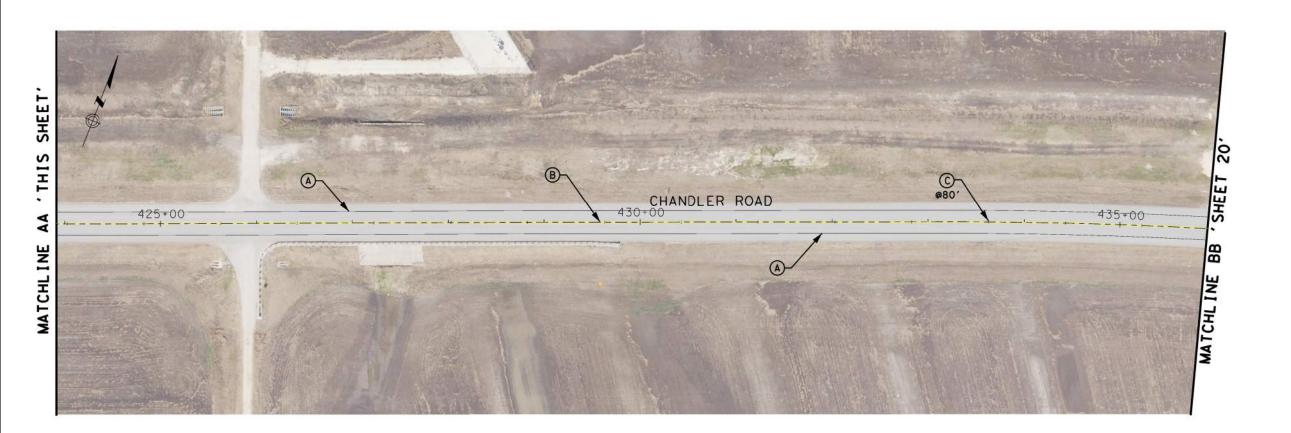
(SHEET	13 OF	19)				
SCALE: 1 "	= 10	0′		PROJECT	NO.	
DWN: APC	TG	STP2023 (602) HESC				
STATE	DISTRICT	ATE FED, RICT DIV.		cou	NTY	
TEXAS	1.4	4 6		WILLIAMSO		
CONTROL	SECTION	JOB		HWY, NO,	SHEET NO.	
0014	05	2	1 7		10	

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MA		MA

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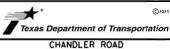






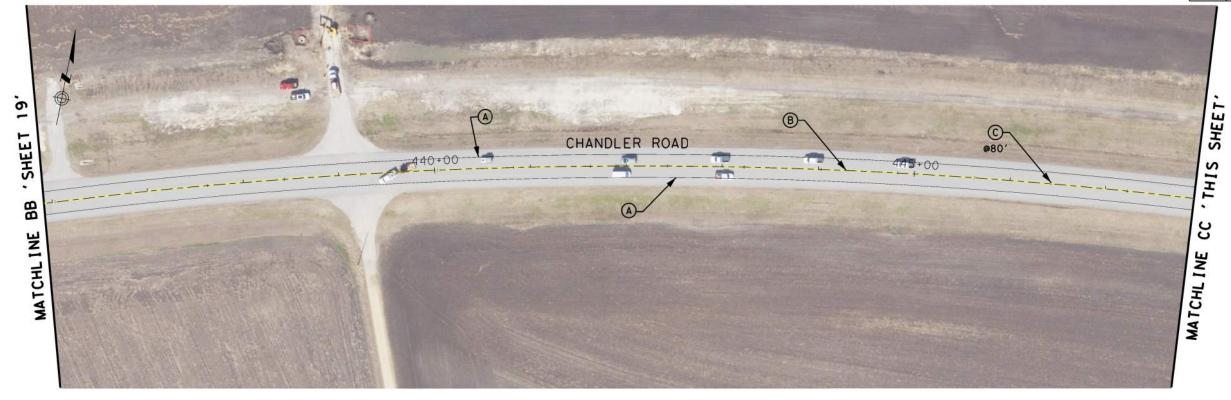






ı	(SHEET	14 OF	19)				
	SCALE:1" = 100'				PROJECT NO.		
ı	DWN: APC CKD: AT			STP2023 (602) HESC			
ı	STATE STATE		FED.	RD.	COU	NTY	
	TEXAS	14		6	WILLI	AMSON	
ı	CONTROL	SECTION	J	98	HWY, NO,	SHEET NO.	
	0914	05	2	13		19	

		SL	MMARY OF QUANTITIES		
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.
Α	666	6282	REF PROF PAV MRK TY I (W) 4" (SLD) (O6OMIL)	LF	4809
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	4810
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	60

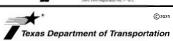






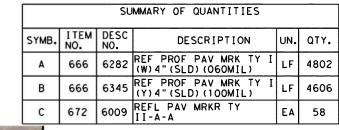


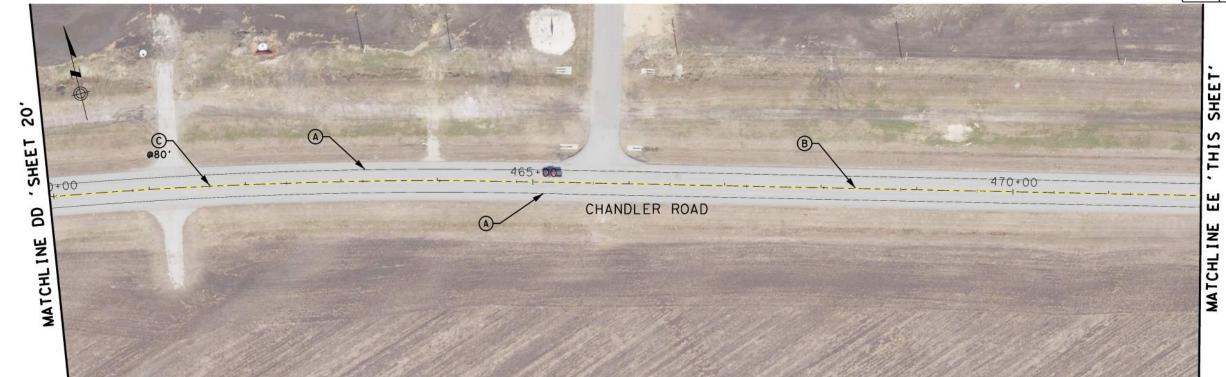




(SHEET	15	OF	19)
SCALE: 1 "	=	10	00'

SCALE: 1	"	= 100	0'	PROJECT NO.			
DWN: APC CKD:		ckd:A	ATG ST		TP2023 (602) HES		
STATE	STATE		FED, DIV.	, RD. COUNTY		NTY	
TEXAS		14	(0)	WILLI	AMSON	
CONTROL	S	ECTION	JC)B	HWY, NO,	SHEET NO.	
0914		05	5.	13		20	



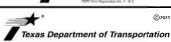












CHANDLER ROAD

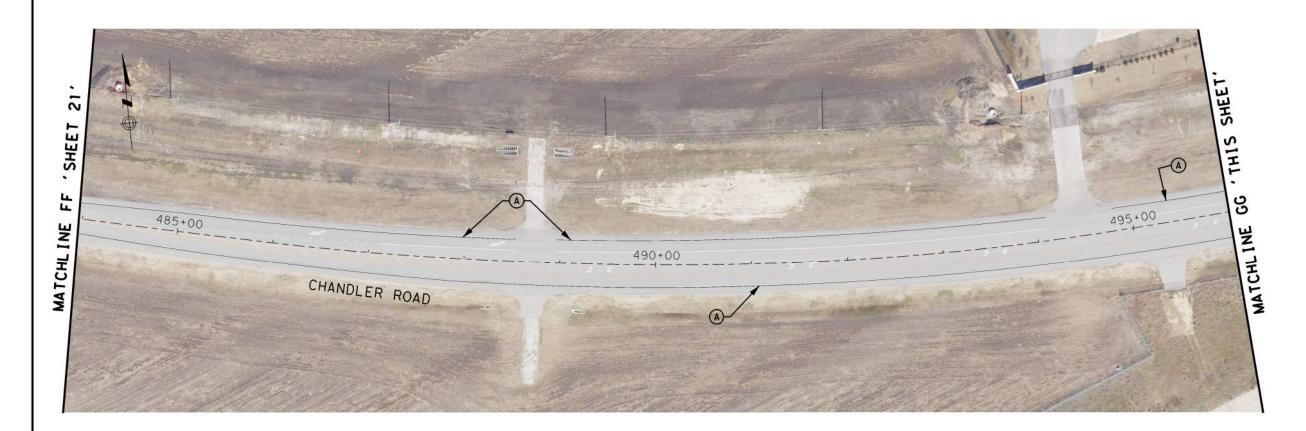
PAVEMENT MARKINGS

(SHEET 16 OF 19)

١	SCALE: 1" = 100'				PROJECT NO.			
l	DWN: APC CKD: A		TG	G STP2023(602) H				
1	STATE D		STATE ISTRICT	FED. DIV.	RD.	COU	NTY	
	TEXAS		14		6 WILLIAMS		AMSON	
	CONTROL S		ECTION	JC)B	HWY, NO,	SHEET NO.	
	0914		05	5.	13		21	

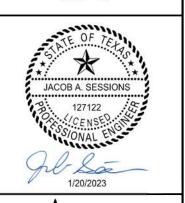
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		SL	MMARY OF QUANTITIES		
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.
Α	666	6282	REF PROF PAV MRK TY I (W) 4" (SLD) (O6OMIL)	LF	4583

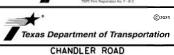












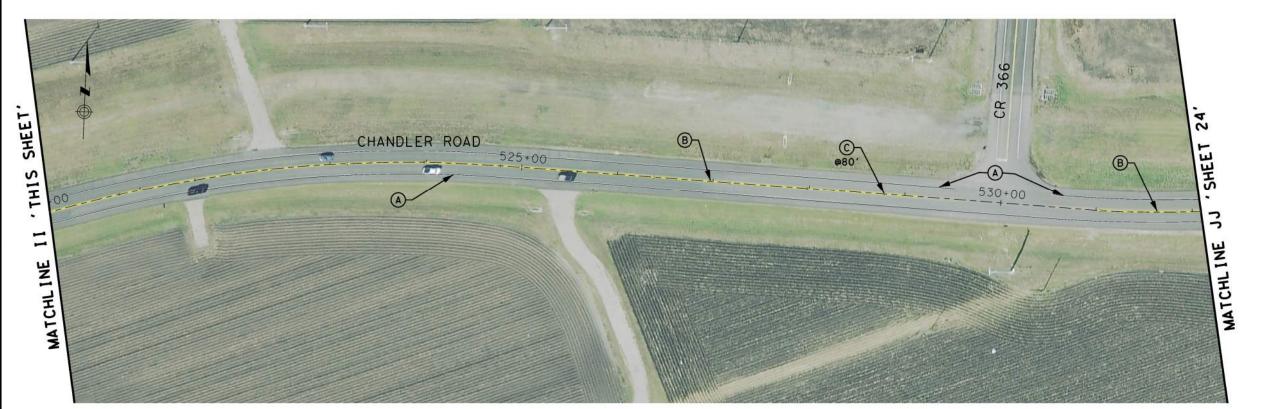
(SHEET 17 OF 19)

SCALE:1 '	= 10	0′	PROJECT NO.			
DWN: APC CKD: ATG			STP2023 (602) HESG			
STATE	STATE	FED. DIV.	RD. NO.	COL	INTY	
TEXAS	1.4	(5	WILLI	AMSON	
CONTROL	SECTION	J	ЭВ	HWY. NO,	SHEET NO.	
0914	05	2	13		22	

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SUMMARY OF QUANTITIES										
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.					
Α	666	6282	REF PROF PAV MRK TY I (W) 4"(SLD)(060MIL)	LF	4594					
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	2692					
С	672	6009	REFL PAV MRKR TY II-A-A	ΕA	34					













CHANDLEN HOAD

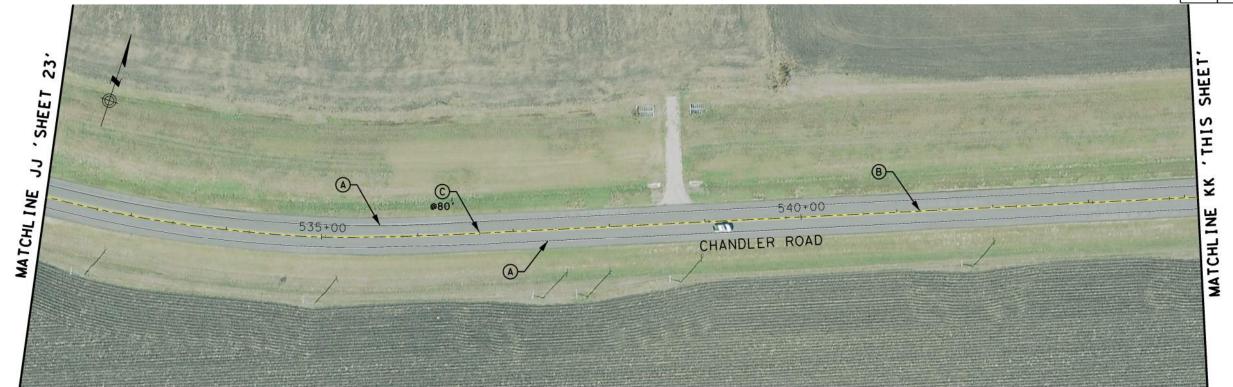
PAVEMENT MARKINGS

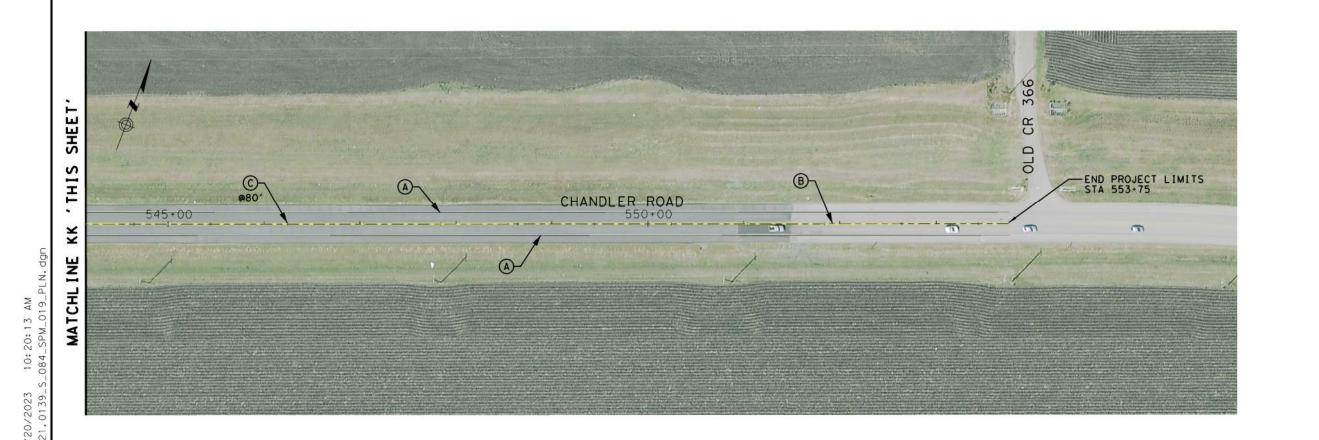
(SHEET 18 OF 19)

SCALE:1" = 100'		PROJECT NO.					
DWN: APC CKD: AT		TG	STP2023 (602) HESG				
STATE STATE		FED. DIV.	FED, RD. COUNTY		NTY		
TEXAS	1.4	(0)	WILLI	AMSON		
CONTROL	SECTION	J	98	HWY, NO,	SHEET NO.		
0914	05	2	13		23		

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		SL	MMARY OF QUANTITIES		
SYMB.	ITEM NO.	DESC NO.	DESCRIPTION	UN.	QTY.
Α	666	6282	REF PROF PAV MRK TY I (W) 4"(SLD)(060MIL)	LF	4335
В	666	6345	REF PROF PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	4334
С	672	6009	REFL PAV MRKR TY II-A-A	EΑ	54

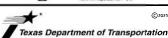












(SHEET	19	OF	19)	
SCALE: 1 "	=	10	0'	Γ
DWN: APC		ckD:/	TG	S

SCALE:1" = 100'			PROJECT NO.			
DWN: APC CKD: ATG		TG	STP2023 (602) HESG			
STATE	STATE	FED. DIV.	RD. COUNTY		NTY	
TEXAS	14	6		WILLIAMSON		
CONTROL	SECTION	J	DB	HWY, NO,	SHEET NO.	
0914	05	2	13		24	

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.
- 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.
- 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

- Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
- 2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

SHEET 1 OF 12

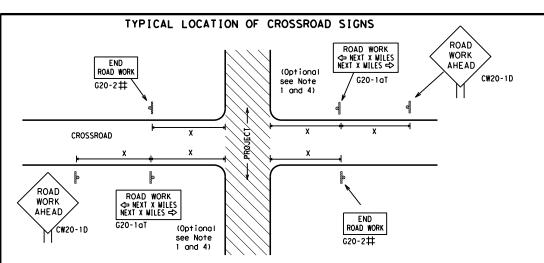


BARRICADE AND CONSTRUCTION
GENERAL NOTES
AND REQUIREMENTS

BC(1)-21

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C)TxDOT November 2002	CONT	SECT	JOB			HIGHWAY	
4-03 7-13	0914	05	213		CHAI	NDLER	RD
9-07 8-14	DIST		COUNTY			SHEET	NO.
5-10 5-21	14	1	WILLIAM	1021	١ .	25	

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- \sharp May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer.
- 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.
- 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.
- 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.

BEGIN T-INTERSECTION WORK ZONE **X X** G20-9TP **X X** R20-5T FINES DOUBLE X R20-5aTP NORKERS ARE PRESENT ROAD WORK ⟨⇒ NEXT X WILES END * + G20-26T WORK ZONE G20-1bTI INTERSECTED 1000'-1500' - Hwy 1 Block - City 1000' - 1500' - Hwy 1 Block - City ROADWAY \Rightarrow ROAD WORK G20-1bTR NEXT X MILES => WORK ZONE G20-2bT * * Limit BEGIN G20-5T * * G20-9TP ZONE TRAFFI G20-6T * * R20-5T I FINES IDOUBLE END ROAD WORK X X R20-5aTP #HEN HORKERS G20-2

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.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING 1.5.6

SIZE

	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
l	*	* 3

SPACING

Sign Number or Series	Conventional Road	Expressway/ Freeway	Poste Spee
CW20 ⁴			MPH
CW21 CW22	48" × 48"	48" × 48"	30
CW23	40		35
CW25			40
CW1, CW2,			45
CW7, CW8,	36" × 36"	48" × 48"	50
CW9, CW11,			55
CW14			60
CW3, CW4,			65
CW5, CW6,	48" × 48"	48" × 48"	70
CW8-3,			75
CW10, CW12			80
	•		*

* 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.

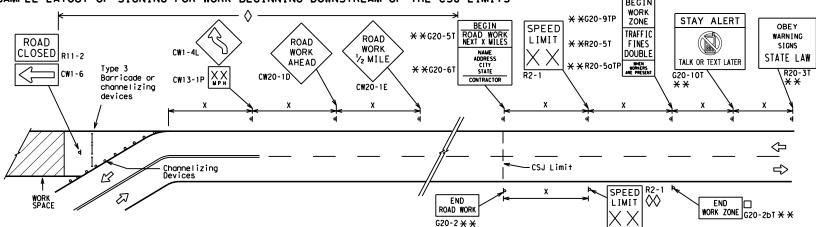
 \triangle Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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

WORK AREAS IN MULTIPLE LOCA	ATIONS WITHIN CSJ LIMITS	JAMEL LATOR OF	A MOINT DECIMALING	0 A: IIIE 050 EIWII5	
CW20-1D ROAD WORK WORK	ROAD WORK AHF AD	* * G20-5T BEGIN CWI-4L * * G20-6T NAMES CWI3-1P MPH * * G20-6T CWI3-1P MPH CWI3-1P MPH CWI3-1P CW	R4-1 DO WORK AHEAD LIN	* * * * * * * * * * * * * * * * * * *	OBEY WARNING SIGNS STATE LAW 0-31 **
AHEAD AREA 3X	CW20-1D XX	Type 3 Barricade or channelizing devices	X X X X	x	d d
\	, d			\	
⇒					
	Channelizing Devices	WORK SPACE CSJ Limit PEND	Beginning of NO-PASSING R2-1 LIMIT coordinate	END WORK ZONE G20-2bT	**
When extended distances occur between m "ROAD WORK AHEAD"(CW20-1D)signs are plo within the project limits. See the appl channelizina devices.	aced in advance of these work areas	to remind drivers they are still G20-2 **	with sign location	NOTES	
indinelizing devices.				The Contractor shall determine the a	appropric

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



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" (G20-2b1 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 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
- Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

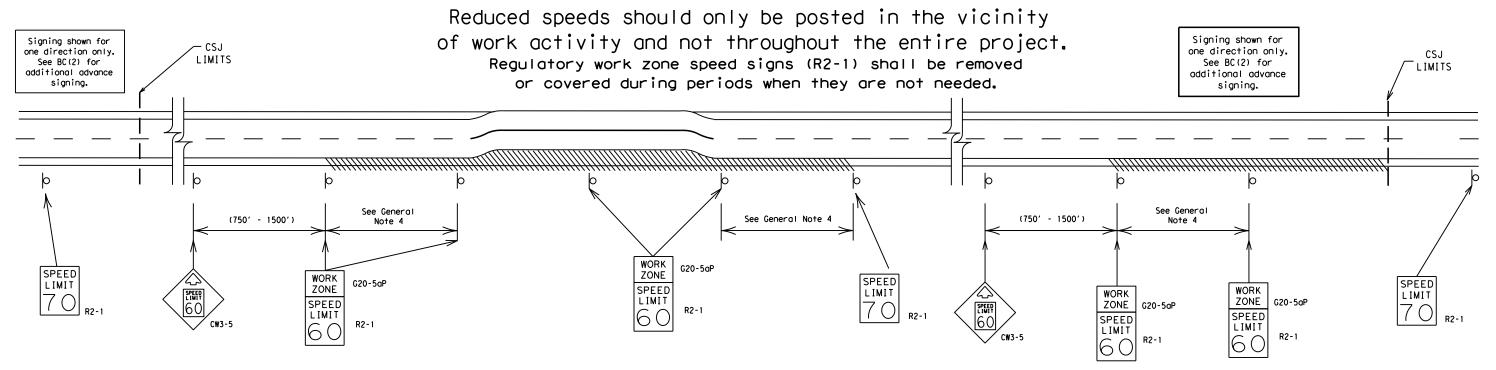
BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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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.



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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- 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

- 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.
- 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.

SHEET 3 OF 12

Traffic Safety Division Standard

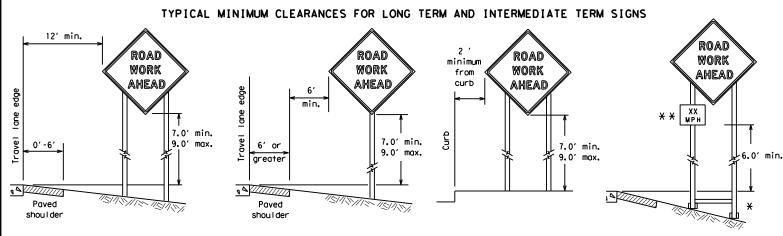


BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

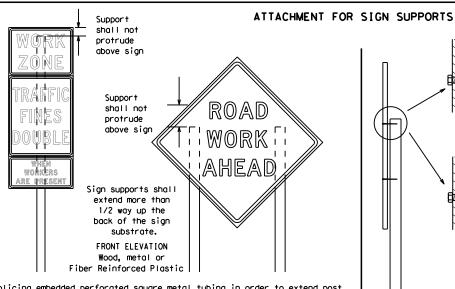
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* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

* * 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.



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

Attachment to wooden supports

will be by bolts and nuts

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

STOP/SLOW paddles shall be retroreflectorized when used at night.

- 24"-

Background - Orange Legend & Border - Black

SIGN FACE MATERIAL

TYPE B OR C SHEETING

TYPE BFL OR CFL SHEETING

TYPE B OR C SHEETING

ACRYLIC NON-REFLECTIVE FILM

STOP/SLOW PADDLES

3. STOP/SLOW paddles may be attached to a staff with a minimum

4. Any lights incorporated into the STOP or SLOW paddle faces

shall only be as specifically described in Section 6E.03

SHEETING REQUIREMENTS (WHEN USED AT NIGHT)

length of 6' to the bottom of the sign.

Hand Signaling Devices in the TMUTCD.

- 24"-

Background - Red Legend & Border - White

BACKGROUND

BACKGROUND

LEGEND & BORDER

LEGEND & BORDER

COLOR

RFD

ORANGE

WHITE

BL ACK

SIDE ELEVATION Wood of at least the same gauge material.

1. STOP/SLOW paddles are the primary method to control traffic WITHIN THE PROJECT LIMITS by flaggers. The STOP/SLOW paddle size should be 24" x 24".

- 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.
- 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.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- 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.
- 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.

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS

When permanent regulatory or warning signs conflict with work zone conditions,

If permanent signs are to be removed and relocated using temporary supports

Any sign or traffic control device that is struck or damaged by the Contractor

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- 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.
- 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.
- 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.
- 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.
- 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.
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

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

- 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.
- 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.
- Short-term stationary daytime work that occupies a location for more than 1 hour in a single daylight period.
- Short, duration work that occupies a location up to 1 hour.
- Mobile work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- 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 plagues mounted below other signs.
- 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. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- 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.
- 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

- 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.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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).
- 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

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- 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.
- 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.
- 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 shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face. 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. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.

- Rock, concrete, iron, steel or other solid objects shall not be permitted
- for use as sign support weights. 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. 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. 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.
- 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. SHEET 4 OF 12



BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

Traffic Safety Division Standard

BC(4)-21

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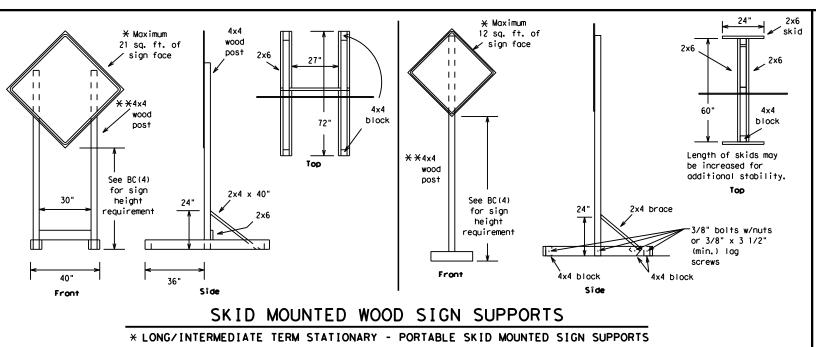
Welds to start on

back fill puddle.

weld starts here

opposite sides going in opposite directions. Minimum

weld, do not



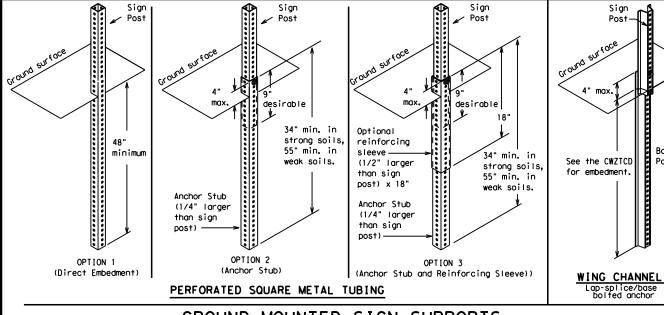
-2" x 2"

12 ga. upright

2"

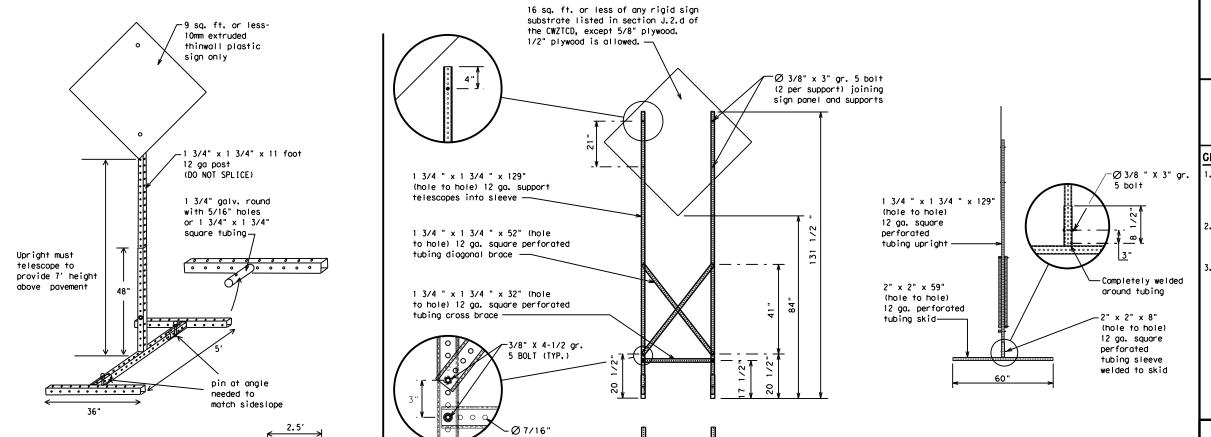
SINGLE LEG BASE

Side View



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.



32'

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

- 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
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- 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.

SHEET 5 OF 12



Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

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SKID MOUNTED PERFORATED	SQUARE STEEL	TUBING SIGN	N SUPPORTS
* LONG/INTERMEDIATE TERM STA	TIONARY - PORTABLE SI	KID MOUNTED SIGN S	UPPORTS

99

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).
- 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.
- 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
- 4. Use the word "EXIT" to refer to an exit ramp on a freeway: i.e., "EXIT CLOSED," Do not use the term "RAMP,"
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- 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.
- Do not use the word "Danger" in message.
 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	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	мі
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	F	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
	EMER	Slippery	SL IP
Emergency Emergency Vehicle	EMER VEH	South	S
	ENT ENT	Southbound	(route) S
Entrance, Enter	EXP LN	Speed	SPD
Express Lane	EXP LIN	Street	ST
Expressway XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
	FRWY. FWY	Temporary	TEMP
Freeway	FWY BLKD	Thursday	THURS
Freeway Blocked	FRI	To Downtown	TO DWNTN
Friday		Traffic	TRAF
Hazardous Driving		Travelers	TRVLRS
Hazardous Material	HAZMA I HOV	Tuesday	TUES
High-Occupancy Vehicle	HOV	Time Minutes	TIME MIN
	HWY	Upper Level	UPR LEVEL
Highway	HR. HRS	Vehicles (s)	VEH, VEHS
Hour (s)		Warning	WARN
Information	INFO	Wed∩esday	WED
It Is	ITS	Weight Limit	WT LIMIT
Junction	JCT	West	W
Left	LFT	Westbound	(route) W
Left Lane	LFT LN	Wet Pavement	WET PVMT
Lane Closed	LN CLOSED	Will Not	WONT
Lower Level	LWR LEVEL	-	
Maintenance	MAINT		

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

MERGE

RIGHT

DETOUR

X EXITS

EXIT XXX

STAY ON

IIS XXX

SOUTH

TRUCKS

USF

US XXX N

WATCH

TRUCKS

EXPECT

DELAYS

REDUCE

SPEED

XXX FT

USE

OTHER

ROUTES

STAY

LANE

Action to Take/Effect on Travel

List

FORM

X LINES

RIGHT

USE

XXXXX

RD EXIT

USE EXIT

I-XX

NORTH

USE

I-XX F

TO I-XX N

WATCH

FOR

TRUCKS

EXPECT

DELAYS

PREPARE

ΤO

STOP

END

SHOULDER

USE

WATCH

FOR

WORKERS

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

Phase 1: Condition Lists

FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT
	ROAD CLOSED SHOULDER CLOSED XXX FT RIGHT LN CLOSED XXX FT RIGHT X LANES OPEN DAYTIME LANE CLOSURES I-XX SOUTH EXIT CLOSED X MILE RIGHT LN TO BE CLOSED X LANES CLOSED	ROAD CLOSED SHOULDER CLOSED XXX FT RIGHT LN CLOSED XXX FT RIGHT X LANES CLOSURES LANE CLOSURES EXIT CLOSED XXXX FT RIGHT X LANE CLOSED XXXX FT RIGHT X LANE CLOSED XXXX FT RIGHT X MERGING TRAFFIC XXXX FT LOOSE GRAVEL XXXX FT DETOUR X MILE ROADWORK PAST X MILE RIGHT LN TO BE CLOSED X LANES CLOSED TRAFFIC SIGNAL

APPLICATION GUIDELINES

Phase Lists".

1. Only 1 or 2 phases are to be used on a PCMS.

2. The 1st phase (or both) should be selected from the

is not included in the first phase selected.

and should be understandable by themselves.

no more than one week prior to the work.

"Road/Lane/Ramp Closure List" and the "Other Condition List".

a minimum of 1000 ft. Each PCMS shall be limited to two phases.

of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for

6. For advance notice, when the current date is within seven days

3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice

4. A Location Phase is necessary only if a distance or location

5. If two PCMS are used in sequence, they must be separated by

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

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.

Phase 2: Possible Component Lists

Location

List

ΔΤ

FM XXXX

BEFORE

RAILROAD

CROSSING

NEXT

MILES

PAST

US XXX

EXIT

XXXXXXX

TO

XXXXXXX

US XXX

TΩ

FM XXXX

- 2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- 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.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed. 6. AHEAD may be used instead of distances if necessary.
- 7. FI 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.

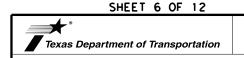
PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC. THE FOUR DRUMS SHOULD BE PLACED WITH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

FULL MATRIX PCMS SIGNS

BLVD

CLOSED

- 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.



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

* * Advance

Notice List

TUE-FRI

XX AM-

X PM

APR XX-

X PM-X AM

BEGINS

MONDAY

BEGINS

ΜΔΥ ΧΧ

MAY X-X

XX PM -

XX AM

NFXT

FRI-SUN

XX AM

TO

XX PM

NEXT

TUE

AUG XX

TONIGHT

XX PM-

XX AM

Warning

List

SPEED

LIMIT

XX MPH

MAXIMUM

SPEED

XX MPH

MINIMUM

SPEED

XX MPH

ADVISORY

SPEED

XX MPH

RIGHT

IANE

EXIT

USF

CAUTION

DRIVE

SAFELY

DRIVE

WITH

CARE

* * See Application Guidelines Note 6.

BC(6)-21

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© TxD0T	November 2002	CONT	SECT	JOB			HIGHWAY
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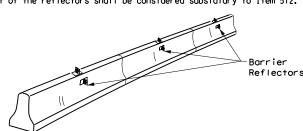
Warning reflector may be round

or square. Must have a yellow

reflective surface area of at least

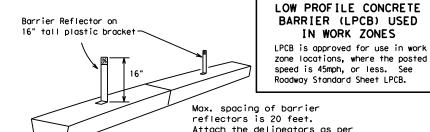
30 square inches

- 1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of pregualified 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.



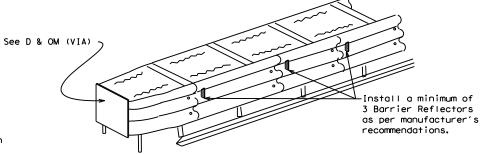
CONCRETE TRAFFIC BARRIER (CTB)

- 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
- 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.



LOW PROFILE CONCRETE BARRIER (LPCB)

manufacturer's recommendations.



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

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

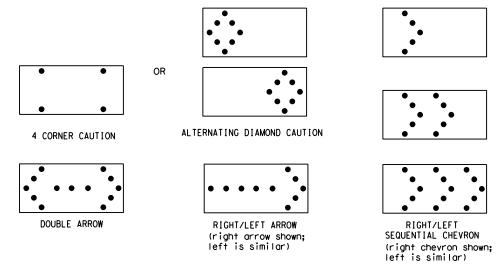
- 1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- 2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- 3. A series of sequential flashing warning lights placed 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
- 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.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it
- 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.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- 4. The Flashing Arrow Board should be able to display the following symbols:



- 5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
 A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
 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						
В	30 × 60	13	3/4 mile						
С	48 × 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.

Traffic Safety Division Standard

FLASHING ARROW BOARDS

SHEET 7 OF 12

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).

 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 n the plans.
- 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.



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

BC(7) - 21

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GENERAL NOTES

- 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" (CMYTCD).
- 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.
- 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:

- 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.
- 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
- 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.
- to be held down while separating the drum body from the base.

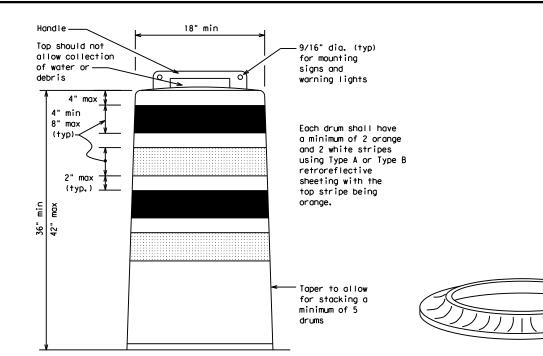
 8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- 9. Drum body shall have a maximum unballasted weight of 11 lbs.
- 10. Drum and base shall be marked with manufacturer's name and model number.

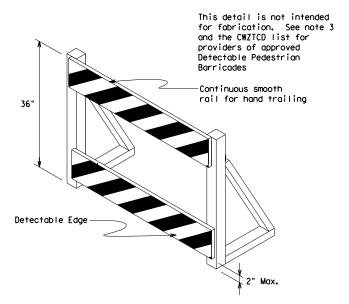
RETROREFLECTIVE SHEETING

- 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.
- 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

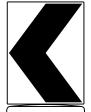
- 1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other 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.
- 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.
- 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.
- 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

- When existing pedestrian facilities are disrupted, closed, or relocated in a TIC 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.
- 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.
- 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
- 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 shorp 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

See Ballast



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

- 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 $B_{\rm FL}$ or Type $C_{\rm FL}$ Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- 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.
- 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.

SHEET 8 OF 12

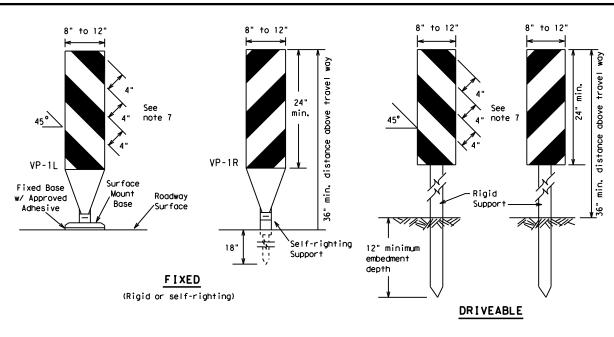


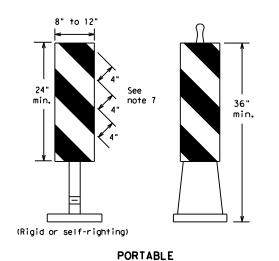
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

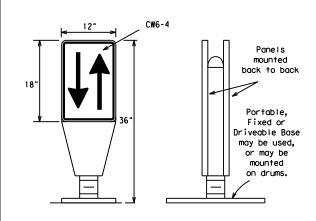
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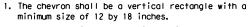
- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation 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.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base.
 See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- 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 povement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- 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 $B_{\rm FL}$ or Type $C_{\rm FL}$ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

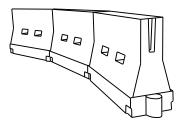


- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- 3. Chevrons, when used, shall be erected on the outside of a sharp curve 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.
- 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

- 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).
- 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.
- 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)

36"

Fixed Base w/ Approved Adhesive

(Driveable Base, or Flexible

Support can be used)

- 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

- 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.
- 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.
- 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	D	esirab er Len **	le	Suggested Maximum Spacing of Channelizing Devices			
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	2	150′	165′	180′	30'	60′		
35	L = \frac{WS^2}{60}	2051	2251	245′	35′	70′		
40	8	265′	2951	3201	40`	80′		
45		450′	495′	540′	45′	90′		
50		500′	550′	600′	50°	100′		
55	L=WS	550′	6051	660′	55`	110′		
60	L # 3	600'	660′	720′	60′	120′		
65		650′	715′	780′	65 <i>°</i>	130′		
70		7001	770′	840′	70′	140′		
75		750′	825′	900′	75′	150′		
80		800′	880′	960′	80′	160′		

**X*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



Traffic Safety Division Standard

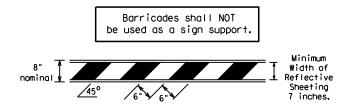
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

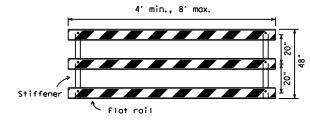
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TYPE 3 BARRICADES

- 1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
- 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.
- 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.
- 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.
- Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

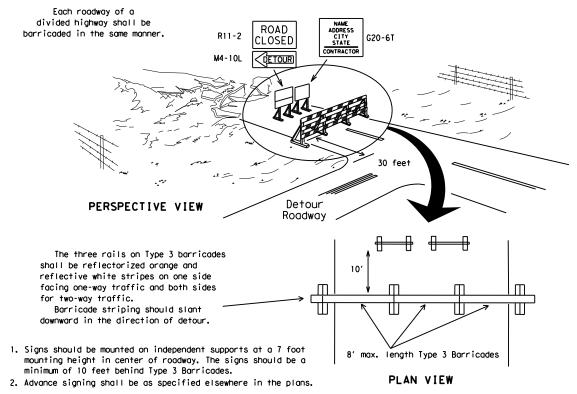


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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



TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

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 Typical shoulder width is less than 4 feet. Plastic Drum 4. When the shoulder width is greater than 12 feet, steady-burn lights PERSPECTIVE VIEW may be omitted if drums are used. 5. Drums must extend the length These drums are not required of the culvert widening. on one-way roadway LEGEND Plastic drum Plastic drum with steady burn light A minimum of two drums be used across the work or yellow warning reflector teady burn warning light or yellow warning reflector Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums) PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

CONES 4" min. orange 1 2" min. white 2" min. <u></u>_6" min. 4" min. orange _2" min. 2" min. 4" min. white 42" min. 28' min.

Two-Piece cones

Alternate

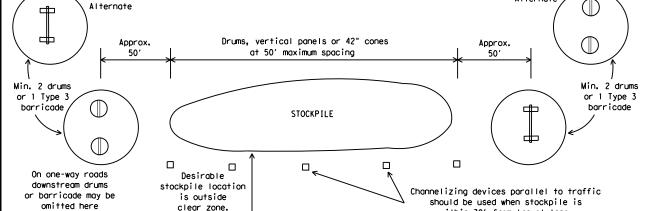
within 30' from travel lane.

Z" min

2" to 6 3" min.

One-Piece cones

Tubular Marker



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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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.

SHEET 10 OF 12



Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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

- Raised pavement markers are to be placed according to the patterns on BC(12).
- 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

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

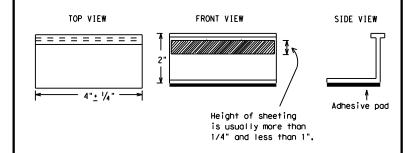
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- 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.
- Removal of raised pavement markers shall be as directed by the Fnaineer.
- 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

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
- 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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 SPECIFICATIO	NS
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).

SHEET 11 OF 12



Traffic Safety Division Standard

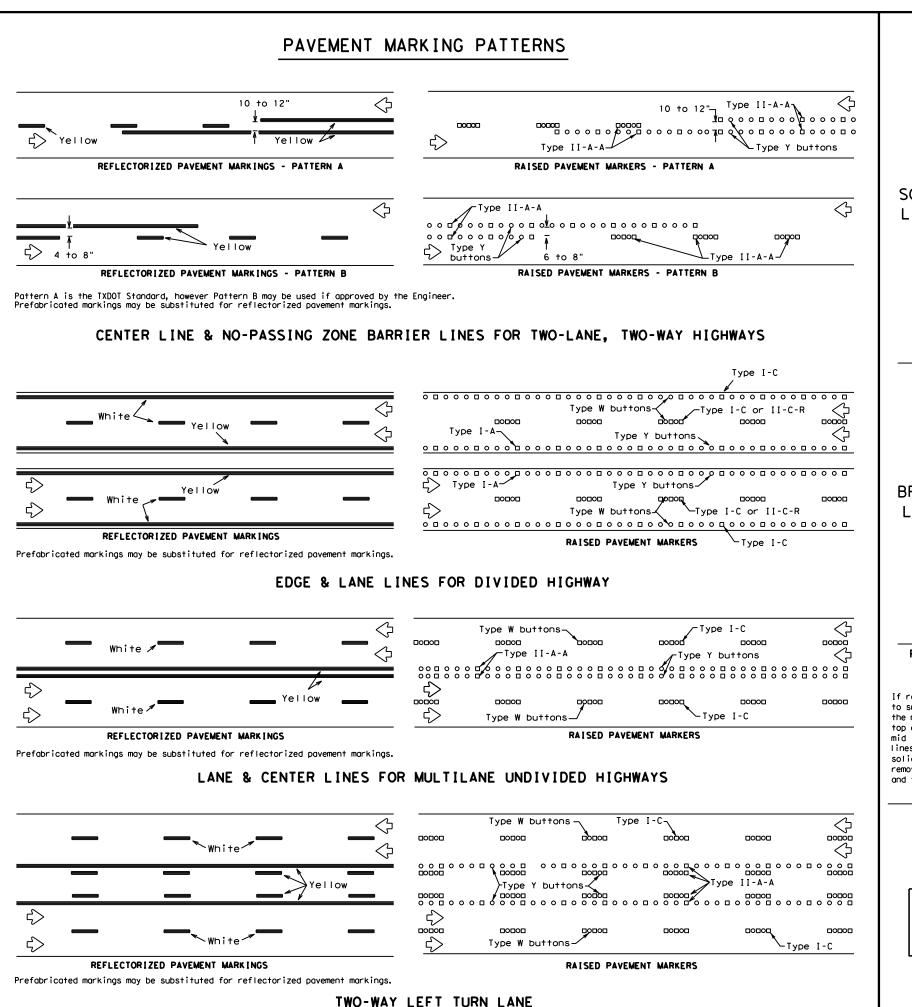
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

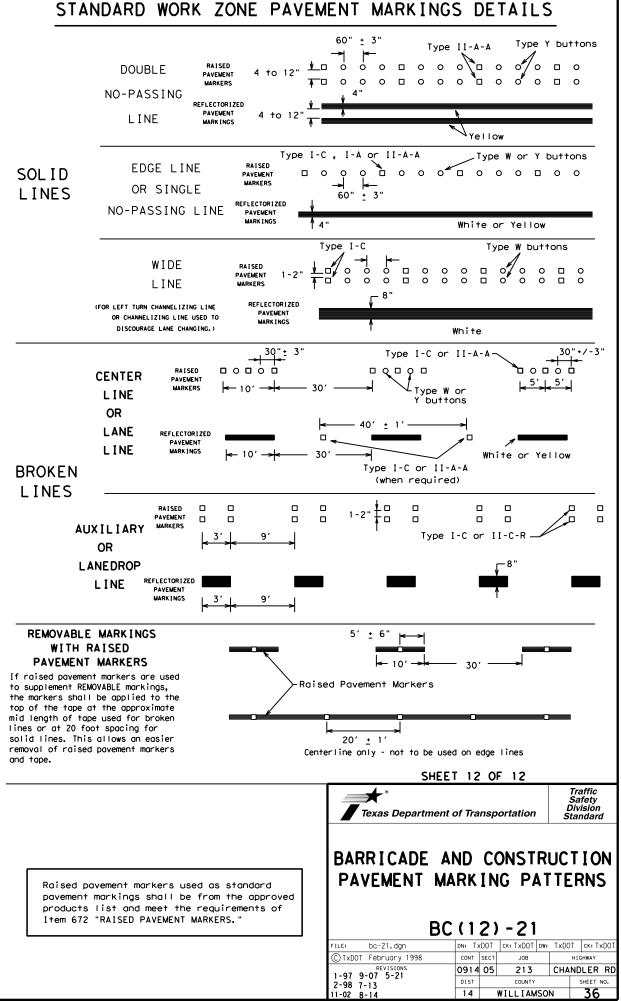
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Shou I der

4" Solid

Edge Line-

ONE-WAY ROADWAY

WITH OR WITHOUT SHOULDERS

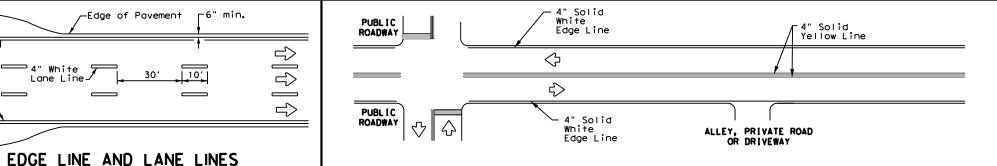
FOUR LANE TWO-WAY ROADWAY

WITH OR WITHOUT SHOULDERS

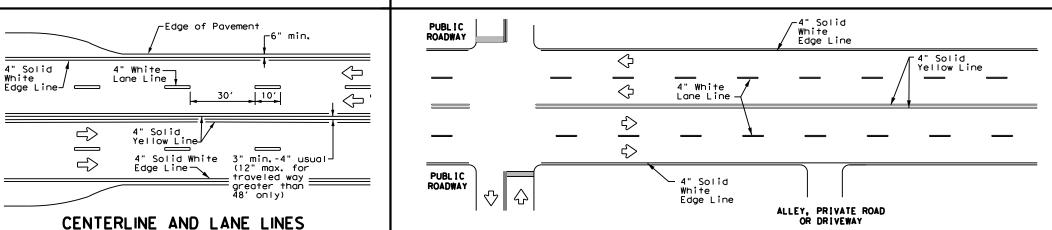
4" Solid

White Edge Line-

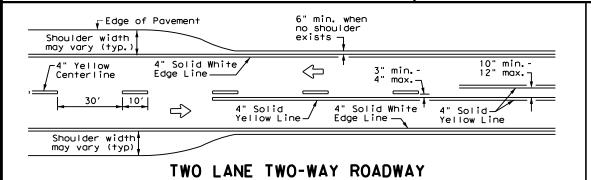
Yellow



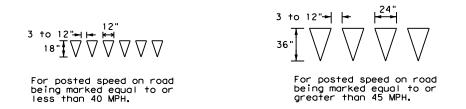
TYPICAL TWO-LANE. TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



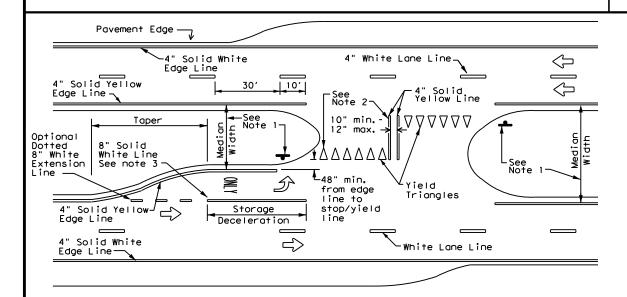
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

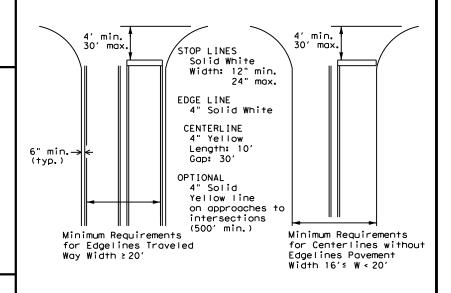
- 1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
- 2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.
- 3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

- 1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
- 2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

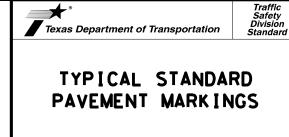
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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



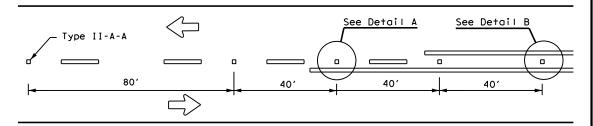
GUIDE FOR PLACEMENT OF STOP LINES. EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

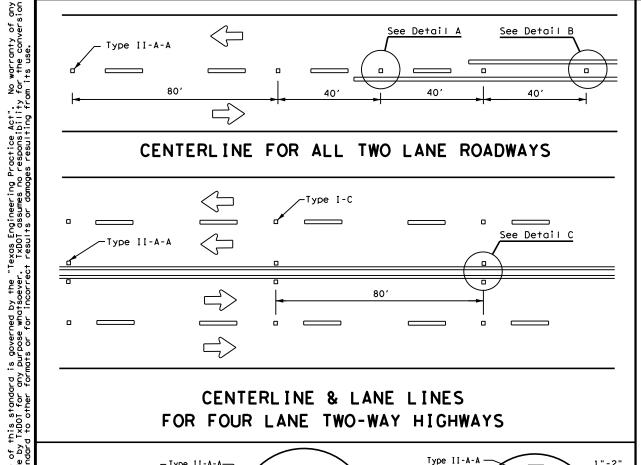


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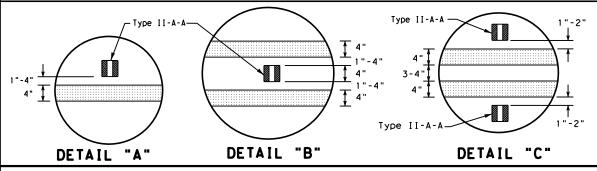
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CENTERLINE FOR ALL TWO LANE ROADWAYS

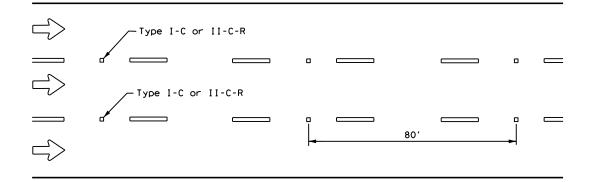


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



Centerline \ Symmetrical around centerline Continuous two-way left turn lane Type II-A-A 401 80' Type I-C

CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

CENTER OR EDGE LINE | 12"<u>+</u> 1" 10' BROKEN LANE LINE REFLECTORIZED PROFILE PATTERN DETAIL USING REFLECTIVE PROFILE PAVEMENT MARKINGS 18"<u>+</u> 1" -300 to 500 mil in height 12"<u>+</u> 1" 51/2" ± 1/2" 31/4 "± 3/4 "\$ A quick field check for the thickness 2 to 3"-of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters. 2 to 3"--OPTIONAL 6" EDGE 4" EDGE LINE. LINE, CENTER LINE CENTER LINE NOTE OR LANE LINE OR LANE LINE

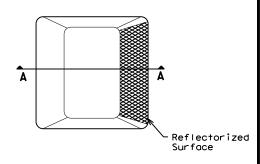
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

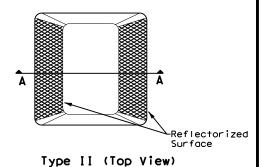
- All raised pavement markers placed in broken lines shall be placed in line with and midway between
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal

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

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



Type I (Top View)



35° max-25° min-Adhesive Roadway Surface SECTION A

RAISED PAVEMENT MARKERS



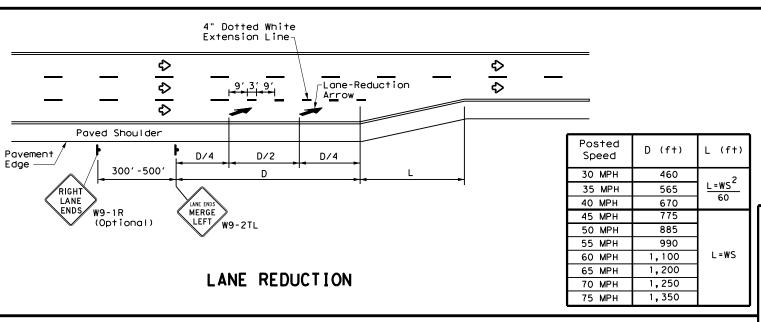
Traffic Safety Division Standard

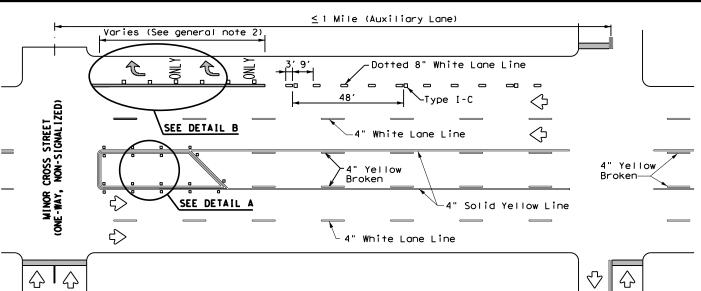
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE **MARKINGS** PM(2) - 20

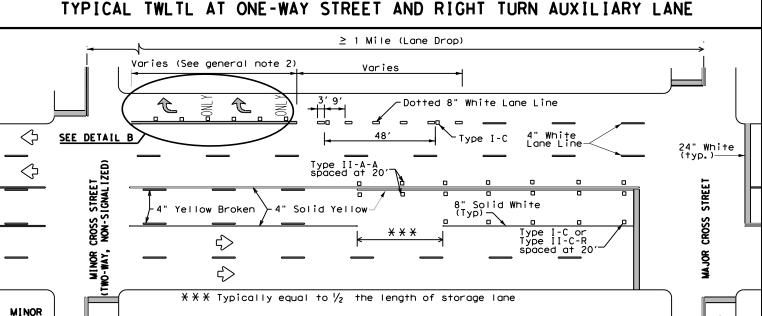
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TWO-WAY





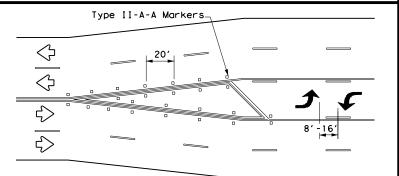


TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP

NOTES

 \Diamond

- 1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- 2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
- 3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

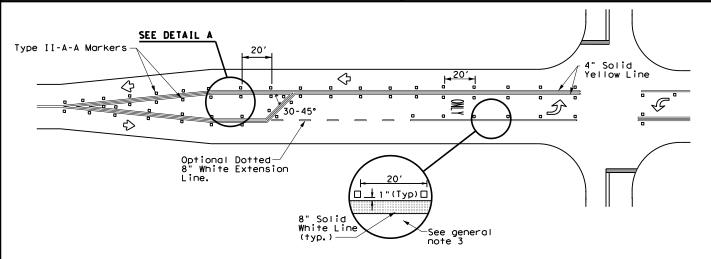
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

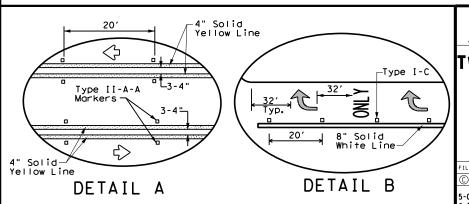
- 1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- 2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
- Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

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



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS

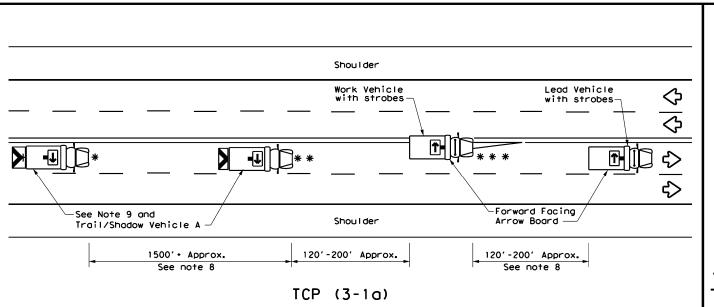




Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20, dgn	DN:		CK:	DW:		CK:
©TxDOT April 1998	CONT	SECT	JOB		HIGHWAY	
5-00 2-10 REVISIONS	0914	05	213 CHA		IANE	DLER RD
8-00 2-12	DIST		COUNTY			SHEET NO.
3-03 6-20	14		WILLIAM	SON		39

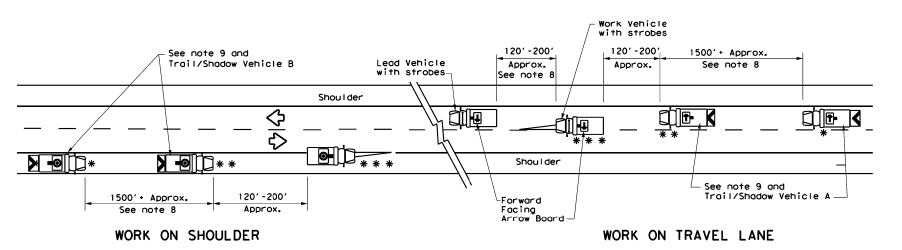


UNDIVIDED MULTILANE ROADWAY

X VEHICLE WORK OR CONVOY CONVOY CW21-10cT CW21-10aT 60" X 36" 72" X 36" ••••• X VEHICLE CONVOY

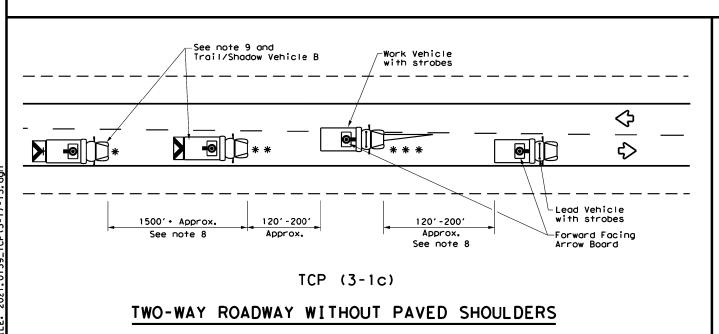
TRAIL/SHADOW VEHICLE A

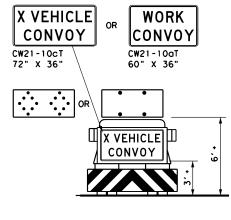
with RIGHT Directional display Flashing Arrow Board



TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS





TRAIL/SHADOW VEHICLE B

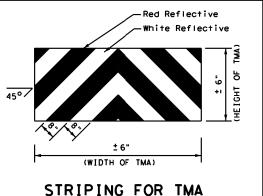
with Flashing Arrow Board in CAUTION display

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

TYPICAL USAGE							
	MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY		
	4						

GENERAL NOTES

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



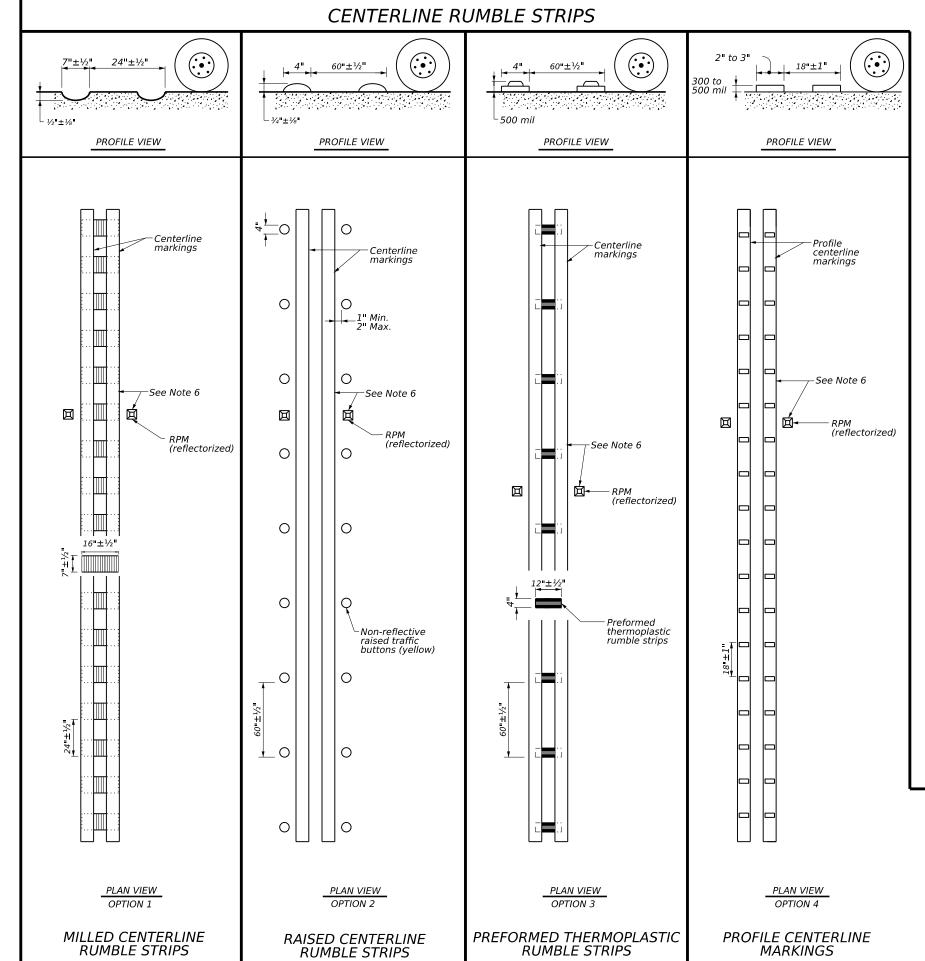


Traffic Operations

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP (3-1)-13

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8-95 7-1		DIST		COUNTY			SHEET	NO.
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GENERAL NOTES

- 1. This standard sheet provides guidelines for installing centerline rumble strips on multilane undivided highways.
- 2. Centerline and edge line rumble strips or profile markings shall not be placedon roadways with a posted speed limit of 45 MPH or less.
- Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
- 4. See dimensions for milled rumble strips. Other shapes and dimensions may beused if approved by the Traffic Safety Division.
- Breaks in milled centerline rumble strips shall occur at least 50 feet and nomore than 150 feet in advance of bridges, railroad crossing, intersections ordriveways with high usage of large trucks.
- Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
- Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
- 8. Pavement markings must be applied over milled centerline rumble strips for normal centerline spacing. For wider medians, specify in the plans the exact placement of the rumble strips. Place the rumble strips under each centerline marking or centered in the middle of the median.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

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

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

12. See standard sheet RS(2).



Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON MULTILANE UNDIVIDED HIGHWAYS RS(3)-23

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MILLED CENTERLINE

RUMBLE STRIPS

RAISED CENTERLINE

RUMBLE STRIPS

GENERAL NOTES

18"±½"

centerline markings

-See Note 6 RPM

(reflectorized)

-Preformed

thermoplastic

PROFILE VIEW

Centerline

markings

PREFORMED THERMOPLASTIC

RUMBLE STRIPS

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

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

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

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

13. See standard sheet RS(2).



Traffic Safety Division Standard

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

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PLAN VIEW

OPTION 4

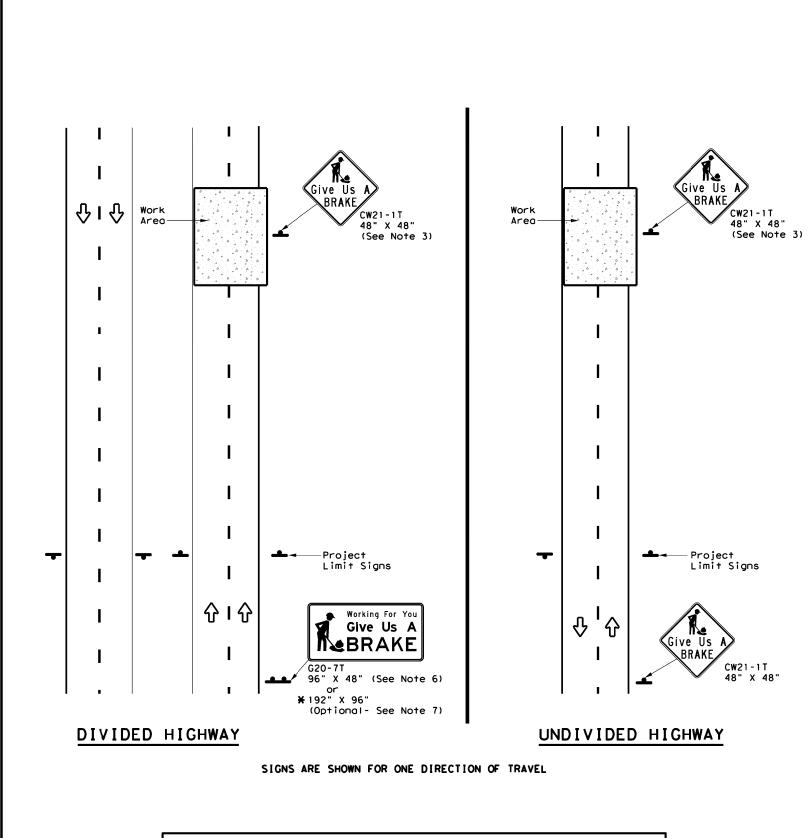
PROFILE CENTERLINE MARKINGS

AND PREFORMED THERMOPLASTIC

RUMBLE STRIPS

TWO LANE TWO-WAY

HIGHWAYS



* 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 **GALVANIZED** DRILLED SHAFT STRUCTURAL REFLECTIVE **BACKGROUND** SIGN SIGN STEEL SQ FT SIGN DIMENSIONS SHEETING COLOR DESIGNATION 24" DIA. (LF) (LF) Size ① ② GIVE US A G20-7T \blacktriangle Orange 96" X 48" Type B_{FL} or C_{FL} 32 lackGive Us A BRAKE G20-7T Orange 192" X 96" 16 Type B_{FL} or C_{FL} 128 W8×18 17 12

▲ See Note 6 Below

LEGEND					
♣ Sign					
4	Large Sign				
Ą	Traffic Flow				

DEPARTMENTAL MATERIAL SPEC	IFICATIONS
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.
- 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.
- 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.



Traffic Operations Division Standard

WORK ZONE
"GIVE US A BRAKE"
SIGNS

WZ (BRK) - 13

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©TxDOT August 1995		CONT	SECT	JOB		HIGHWAY		
REVISIONS 6-96 5-98 7-13		0914	05	213		CHANDLER RD		
		DIST	COUNTY		SHEET NO.			
8-96 3-03		14	WILLIAMSO		N 43			

. STORMWATER POLLUTION	PREVENTION-CLEAN WATER	R ACT SECTION 402	III. CULTURAL RESOURCES		VI. HAZARDOUS MATERIALS OR	CONTAMINATION ISSUES	
TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.		archeological artifacts are f archeological artifacts (bone	fications in the event historical issues or and during construction. Upon discovery of s, burnt rock, flint, pottery, etc.) cease and contact the Engineer immediately.	General (applies to all projects): Comply with the Hazard Communication Act (the Act) for person hazardous materials by conducting safety meetings prior to be making workers aware of potential hazards in the workplace. If provided with personal protective equipment appropriate for			
	may receive discharges from ied prior to construction ac		57	□ Post to a Austra	Obtain and keep on-site Material		
1.			No Action Required	Required Action	used on the project, which may inc Paints, acids, solvents, asphalt (
			Action No.		compounds or additives. Provide p	rotected storage, off bare g	
2.			1.		products which may be hazardous. Maintain an adequate supply of on	•	
No Action Required	Required Action				In the event of a spill, take act	ions to mitigate the spill o	
Action No.			2.		in accordance with safe work prac- immediately. The Contractor shall	· ·	
 Prevent stormwater pol accordance with TPDES 	lution by controlling erosion Permit TXR 150000	n and sedimentation in	3.		of all product spills.		
Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.		4. IV. VEGETATION RESOURCES		Contact the Engineer if any of the * Dead or distressed vegetation * Trash piles, drums, canisten * Undesirable smells or odors	on (not identified as normal		
3. Post Construction Site Notice (CSN) with SW3P information on or near		Preserve native vegetation to		* Evidence of leaching or seepage of substances			
the site, accessible to the public and TCEQ, EPA or other inspectors.4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.		164, 192, 193, 506, 730, 751,	estruction Specification Requirements Specs 162, 752 in order to comply with requirements for landscaping, and tree/brush removal commitments.	Does the project involve any bridge class structure rehability replacements (bridge class structures not including box on the control of the			
I WORK IN OR NEAR STREAMS WATERPORTES AND WETLANDS OF TAN WATER		No Action Required	☐ Required Action	If "No", then no further acti			
I. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404		No Action Required	Required Action	Are the results of the asbesto	•		
USACE Permit required for filling, dredging, excavating or other work in any		Action No.		☐ Yes ☒ No			
water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and conditions associated with the following permit(s):		1.		If "Yes", then TxDOT must ret the notification, develop abat			
		2.		activities as necessary. The	notification form to DSHS m		
					15 working days prior to sched	luled demolition.	
No Permi⁺ Required		3.		If "No", then TxDOT is still scheduled demolition.	required to notify DSHS 15 w		
Nationwide Permit 14 wetlands affected)	- PCN not Required (less than	n 1/10th acre waters or	4.		In either case, the Contractor activities and/or demolition w	-	
☐ Nationwide Permit 14	- PCN Required (1/10 to <1/2	acre, 1/3 in tidal waters)			asbestos consultant in order t	o minimize construction delo	
☐ Individual 404 Permit	- 4-		1	D THREATENED, ENDANGERED SPECIES,	Any other evidence indicating on site. Hazardous Materials		
☐ Other Nationwide Perm	it Required: NWP#		AND MIGRATORY BIRDS.	LISTED SPECIES, CANDIDATE SPECIES	No Action Required	Required Action	
Required Actions: List wo	aters of the US permit applie	es to, location in project			Action No.	quin de memori	
and check Best Management and post-project TSS.	t Practices planned to contro	ol erosion, sedimentation	No Action Required	Required Action	ACTION NO.		
			Action No.		1.		
1,			ACTION NO.		2.		
2.			1.		3.		
3.		2.		VII. OTHER ENVIRONMENTAL ISSUES			
4.			3.		(includes regional issues s	uch as Edwards Aquifer Distr	
The elevation of the ordi	inary high water marks of any	, orang rapulation work			No Action Required	Required Action	
	oters of the US requiring the		4.		Action No.		
Best Management Practices:			observed, cease work in the immediate area,	2.			
Erosion Sedimentation Post-Construction TSS		work may not remove active nests	from bridges and other structures during				
☐ Temporary Vegetation	Silt Fence	Vegetative Filter Strips	nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the		3.	*	
☐ Blankets/Matting	Rock Berm	Retention/Irrigation Systems	Engineer immediately.			Texas Department	
Mulch	☐ Triangular Filter Dike —	Extended Detention Basin			_	ENVIRONME	
Sodding	Sand Bag Berm	Constructed Wetlands	LIST OF	ABBREVIATIONS			
☐ Interceptor Swale	Strow Bale Dike	Wet Bosin	BMP: Best Management Practice	SPCC: Spill Prevention Control and Countermeasure		ISSUES AN	
☐ Diversion Dike ☐ Erosion Control Compost	☐ Brush Berms ☐ Erosion Control Compost	☐ Erosion Control Compost ☐ Mulch Filter Berm and Socks	CCP: Construction General Permit DSHS: Texas Department of State Health Services Library Administration				
Mulch Filter Berm and Socks			FHWA: Federal Highway Administration MOA: Memorandum of Agreement	PSL: Project Specific Location TCEO: Texas Commission on Environmental Quality			
<u>_</u>	cks Compost Filter Berm and Soc	=	MOU: Memorandum of Understanding MS4: Municipal Separate Stormwater Sewer			FILE: epic.dgn (C)TxDOT: February 2015	
	Stone Outlet Sediment Traps	Sand Filter Systems	MBTA: Migratory Bird Treaty Act NOT: Notice of Termination	TxDOT: Texas Department of Transportation T&E: Threatened and Endangered Species		REVISIONS 12-12-2011 (DS)	
	Sediment Basins	Grassy Swales	NMP: Nationwide Permit NOI: Notice of Intent	USACE: U.S. Army Corps of Engineers USFWS: U.S. Fish and Wildlife Service		05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 112 TO ITEM 506, ADDED GRASSY SWALES.	

nnel who will be working with eginning construction and Ensure that all workers are any hazardous materials used. or all hazardous products to the following categories: s, fuels and concrete curing ground and covered, for as required by the Act. als, as indicated in the MSDS. as indicated in the MSDS, rict Spill Coordinator per containment and cleanup

oilitation or culverts)?

os assessment/inspection.

sbestos present)?

s consultant to assist with and perform management nust be postmarked at least

working days prior to any

ng the date(s) for abatement tween the Engineer and ays and subsequent claims.

or contamination discovered cific to this Project:

rict, etc.)

nt of Transportation

ENTAL PERMITS, ND COMMITMENTS

EPIC

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TxDOT: February 2015	CONT	SECT	JOB			HIGHWAY		
REVISIONS 2-2011 (DS)	0914	05	213 CHA		CHAN	NDLER RD		
7-14 ADDED NOTE SECTION IV.	DIST	COUNTY				SHEET NO.		
3-2015 SECTION I (CHANGED ITEM 1122 TEM 506, ADDED GRASSY SWALES.	14	WILLIAMSON				44		