STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE MAINTENANCE CONTRACT

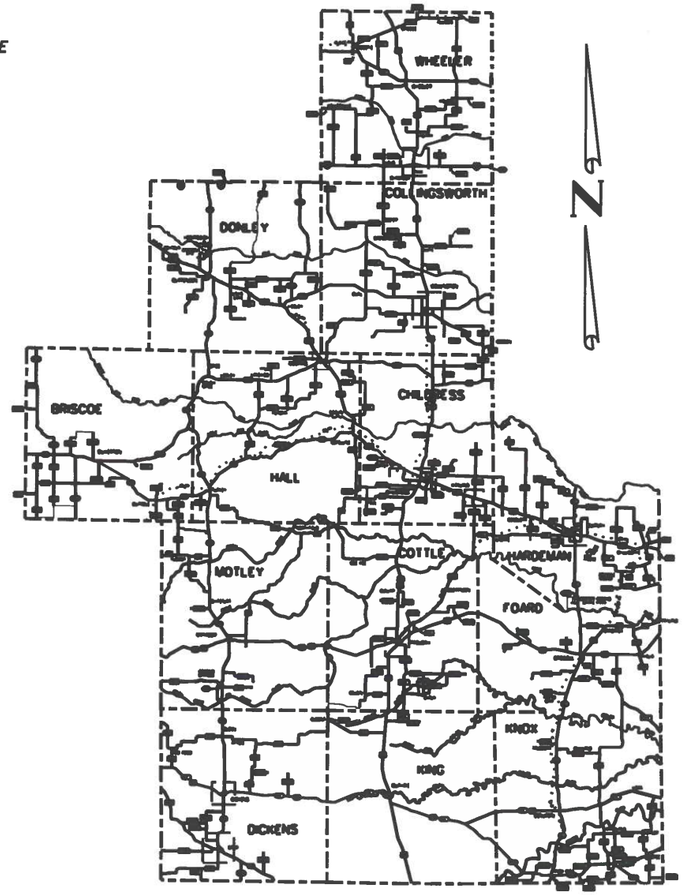
MAINTENANCE PROJECT NO.BPM 646907001
CSJ 6469-07-001

DISTRICT WIDE BRIDGE REPAIR AND MAINTENANCE WORK

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 646907001		1
STATE	STATE DIST.NO.	COUNTY	
TEXAS	CHS	DONLEY,ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6469	07	001	US 287,ETC.

AREA OF DISTURBED SOIL = 0 ACRES

INDEX OF SHEETS



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

Matthew J. Herbstritt, P.E. 09/05/24
MATTHEW J.HERBSTRITT,P.E. DATE

STATE OF TEXAS
MATTHEW J. HERBSTRITT
121647
REGISTERED
PROFESSIONAL ENGINEER

COUNTY DONLEY,ETC.
HWY.NO. US 287,ETC.
PROJ.NO. BPW 646907001
CONTRACTOR
LETTING DATE
DATE ACCEPTED

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT:

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

FINAL PLANS

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

I, _____ P.E. DO HEREBY CERTIFY THAT THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, CONTRACT, AND CHANGES THERETO.

_____ AREA ENGINEER _____ DATE

TEXAS DEPARTMENT OF TRANSPORTATION

APPROVED FOR LETTING: 09/25/24
Matthew J. Herbstritt, P.E.
DIRECTOR OF OPERATIONS

General Notes:

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

Matthew Herbstritt P.E
Director of Operations
940-937-7283 – Office
806-204-1695 - Cell
Matthew.Herbstritt@txdot.gov

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

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

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

The plans may be viewed at the Contract Administration Office, Childress District Office, 7599 US 287, Childress, Texas, 79201

The contractor shall designate an on-site representative who has full authority to speak and make decisions on his behalf.

General Requirements:
This contract provides for preventative maintenance work on bridges in the following counties of the Childress District: Cottle, Dickens, Donley, Hall, Hardeman, Knox, King, and Motley.

Item 2 – Instruction to Bidders
View the plans on-line or download from the web at:
https://www.txdot.gov/business/letting-bids/plans-online.html.

Order plans from any of the plan reproduction companies shown on the web at:
http://www.dot.state.tx.us/business/contractors_consultants/repro_companies.htm

Item 6 – Control of Materials
Use materials from pre-qualified producers. A list of producers pre-qualified by the Construction Division (CST) of the Texas Department of Transportation (TxDOT) can be found at the following website:
https://www.txdot.gov/business/resources/materials/material-producer-list.html

Project: BPM 646907001 **Control:** 6469-07-001
County: DONLEY, Etc. **Highway:** US 287, Etc.

Item 8 - Prosecution and Progress
Working days will be computed and charged in accordance with Article 8.3.A.4 Standard workweek.

Item 502 – Barricades, Signs and Traffic Handling
Maintain traffic control according to the Traffic Control Plan Sheets and in accordance with the Texas Manual on Uniform Traffic Control Devices.

On those bridges requiring a lane closure, one-way traffic control shall be used according to the Traffic Control Plan Sheets.

No night-time lane closures will be allowed. The contractor shall make repairs so that traffic will be returned to normal 30 minutes before dusk.

The contractor shall submit a one-way traffic control plan for consideration, and the Engineer will approve lane closures prior to implementation.

One-way traffic control shall be considered subsidiary to Item 502.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6469-07-001

DISTRICT Childress
HIGHWAY US0287

COUNTY Donley

				CONTROL SECTION JOB	6469-07-001		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00210414			
				COUNTY	Donley			
				HIGHWAY	US0287			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL			
	104-7033	REMOV CONC (PILE ENCASEMENT)	CY	5.600		5.600		
	420-7060	CL C CONC (PILE ENCASEMENT)	CY	11.000		11.000		
	420-7067	CL C CONC (MISC)	CY	2.000		2.000		
	429-7007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	3,128.000		3,128.000		
	434-7002	ELASTOMERIC BEARING (LAMINATED)	EA	6.000		6.000		
	438-7008	CLEANING EXISTING JOINTS	LF	40.000		40.000		
	442-7010	STR STEEL (PEDESTAL)	LB	869.000		869.000		
	446-7007	CLEAN & PAINT EXIST PILING (SYSTEM I)	LS	1.000		1.000		
	480-7001	CLEAN EXIST CULVERTS	EA	6.000		6.000		
	495-7001	RAISING EXIST STRUCT	LS	1.000		1.000		
	496-7040	REMOVING ROCK RIPRAP	LF	30.000		30.000		
	500-7001	MOBILIZATION	LS	1.000		1.000		
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6.000		6.000		
	784-7002	REP STL BRIDGE MEMBER (BEAM)	EA	1.000		1.000		
	4010-7001	STEEL BRIDGE ZONE PAINTING REF STR #1	EA	1.000		1.000		

QUANTITY SUMMARY

REF NO.	COUNTY/ROADWAY/FEATURE CROSSED	NBI NUMBER	0104 7033	0420 7060	0420 7067	0429 7007	0434 7002	0438 7008	0442 7010	0446 7007	0480 7001	0495 7001	0496 7040	0784 7002	4010 7001	PROJECT DESCRIPTION
			ROMOVE CONC (PILE ENCASEMENT)	CL C CONC (STEEL PILE ENCASEMENT)	CL C CONC (MISC)	CONC.STR REPAIR (VERTICAL & OVERHEAD)	ELASTOMERIC BEARING (LAMINATED)	CLEAN AND SEAL EXIST. JOINTS	STR STEEL (PEDESTAL)	CLEAN & PAINT EXIST. PILING (SYSTEM 1)	CLEAN EXISTING CULVERTS	RAISE EXISTING STR	REMOVE ROCK RIPRAP	REP.STEEL BRIDGE MEMBER (BEAM)	STEEL BRIDGE ZONE PAINTING	
			CY	CY	CY	SF	EA	LF	LB	LS	EA	LS	LF	EA	EA	
1	HALL/SH 70/ABANDONED RR	0311-03-010	~	~	~	15	6	40	869	~	~	1	~	1	1	REPLACE ROCKER BEARINGS AT WEST ABUTMENT.REPAIR STEEL GIRDER.PAINT STEEL BEAM ENDS. REPAIR SPALLING ON BACKWALLS.CLEAN AND SEAL WEST ABUTMENT JOINT.
2	COTTLE/US 62/RICHARDS CANYON	0146-02-010	~	~	~	135	~	~	~	~	1	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT,WALLS,HEADWALLS AND WINGWALLS.REMOVE SEDIMENT FROM CULV.BARRELS.
3	COTTLE/US 62/DRAW	0146-02-028	~	~	~	105	~	~	~	~	1	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT,WALLS,HEADWALLS AND WINGWALLS.REMOVE SEDIMENT FROM CULV.BARRELS.
4	COTTLE/US 70/SHORTY CREEK	0146-03-011	~	~	~	50	~	~	~	~	~	~	~	~	~	REPAIR SPALLING AT NORTHWEST WIDENING JOINT.
5	COTTLE/FM 104/DRAW	0711-02-008	~	~	~	85	~	~	~	~	1	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT,WALLS AND HEADWALLS.REMOVE SEDIMENT FROM CULV.BARRELS.
6	COTTLE/FM 104/DRAW	0711-02-021	~	~	~	70	~	~	~	~	1	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT. REMOVE SEDIMENT FROM CULV.BARRELS.
7	COTTLE/FM 2564/DRAW	2546-01-001	~	~	~	90	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT,HEADWALLS AND CULVERT WALLS.
8	DICKENS/US 82 WB/DUCK	0131-06-015	~	~	~	175	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON BENT CAP AND GIRDERS.
9	DICKENS/US 82 EB/S.WICHITA RIVER	0132-02-029	~	~	~	85	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON ENDS OF GIRDERS.
10	DICKENS/US 82 EB/DAVIDSON CREEK	0132-02-030	~	~	~	6	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON BENT CAP #3.
11	DICKENS/FM 836/DRAW	0651-04-004	~	~	~	5	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON END OF INTERIOR WALL.
12	DICKENS/FM 193/DRAW	0950-05-013	~	~	~	70	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT, NORTH HEADWALL AND WINGWALLS.
13	DICKENS/FM 2565/DOCKUM CREEK	2543-01-002	~	~	~	320	~	~	~	~	~	~	~	~	~	REPAIR CRACKS,SPALLING AND HONEYCOMBING ON BENT CAPS,COLUMNS AND GIRDERS.
14	DONLEY/US 287/DRAW	0042-06-073	~	~	2	25	~	~	~	~	~	~	~	~	~	REPLACE NORTH HEADWALL.REPAIR SPALLING ON WALLS.
15	HALL/SH 70/TURKEY CREEK	0311-03-015	~	~	~	170	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON ENDS OF GIRDERS OVER BENT #2.REPAIR DELAMINATION/SPALLING ON RAILS/RAIL POSTS.
16	HALL/SH 256/DRAW	0541-02-032	~	~	~	155	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT,WALLS AND HEADWALLS.
17	HALL/SH 256/DRAW	0541-02-037	~	~	~	240	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON ALONG DECK EDGES.
18	HALL/SH 256/OAKS CREEK	0541-02-038	~	~	~	375	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON BENT CAPS AND GIRDERS.
19	HARDEMAN/US 287/DRAW	0043-04-009	~	~	~	40	~	~	~	~	~	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT AND WALLS AT WIDENING JOINT OF EAST BARREL.
20	HARDEMAN/FM 680/N.GROESBECK CRK.	1701-01-002	21	5.5	~	~	~	~	~	~	~	~	30	~	~	REPLACE EXISTING CONCRETE ENCASEMENTS AT BENT #4.
21	HARDEMAN/FM 2363/S.GROESBECK CRK.	1701-02-004	~	~	~	305	~	~	~	~	~	~	~	~	~	REPAIR FAILING PATCHES ON GIRDER STEMS.REPAIR SPALLING ON NORTHEAST WINGWALL.
22	HARDEMAN/FM 2006/WANDERERS CRK.	1916-01-001	3.5	5.5	~	~	~	~	~	~	~	~	~	~	~	REPLACE EXISTING CONCRETE ENCASEMENTS AT BENT #4.
23	KING/US 83/DRAW	0032-05-021	~	~	~	~	~	~	~	~	1	~	~	~	~	REMOVE SEDIMENT FROM CULV.BARRELS.
24	KING/US 82/NEWMAN CREEK	0133-01-020	~	~	~	125	~	~	~	~	~	~	~	~	~	REPAIR WIDE CRACKS ON SLAB SOFFIT AT WIDENING JOINTS,REPAIR SPALLING ON WALLS.
25	KING/FM 2569/DRAW	0711-04-025	~	~	~	185	~	~	~	~	~	~	~	~	~	REPAIR DELAMINATIONS AND SPALLS ON SLAB SOFFIT,WALLS AND HEADWALLS.
26	KING/FM 2569/EIGHTEEN CREEK	0711-04-026	~	~	~	155	~	~	~	~	~	~	~	~	~	REPAIR DELAMINATIONS AND SPALLS ON SLAB SOFFIT,WALLS AND HEADWALLS.
27	KNOX/SH 222/LAKE CREEK	1512-01-004	~	~	~	~	~	~	~	1	~	~	~	~	~	CLEAN & PAINT 10 STEEL PILES.
28	MOTLEY/LP 42/DRAW	0105-07-036	~	~	~	130	~	~	~	~	1	~	~	~	~	REPAIR SPALLING ON SLAB SOFFIT AND WALLS.REMOVE SEDIMENT FROM CULV.BARRELS.
29	MOTLEY/FM 656/NORTH PEASE RIVER	0311-06-017	~	~	~	12	~	~	~	~	~	~	~	~	~	REPAIR CRACKS AND SPALLS ON EDGE OF GIRDER 1 IN SPAN 8 AND THE EDGE OF GIRDER 4 OVER BENTS #3 AND #5.
	TOTALS		5.6	11	2	3,128	6	40	869	1	6	1	30	1	1	

NOTES

REF #14: ITEM 0420 QUANTITY WILL COMPENSATE FOR REPLACEMENT OF ENTIRE HEADWALL. HEADWALL DIMENSIONS: APPROXIMATELY 2' HIGH x 1' WIDE x 27' LONG. EXISTING REINFORCING STEEL DETERMINED TO BE IN GOOD CONDITION.

REF #20: ITEM 0496 QUANTITY WILL COMPENSATE FOR REMOVING AND RE-INSTALLING EXISTING ROCK RIPRAP IN ORDER TO CONSTRUCT PILE ENCASEMENTS.

REF #27: NUMBER OF PILES: 10 / APPROXIMATELY 7' EA./ PILE SIZE: HP12x53.

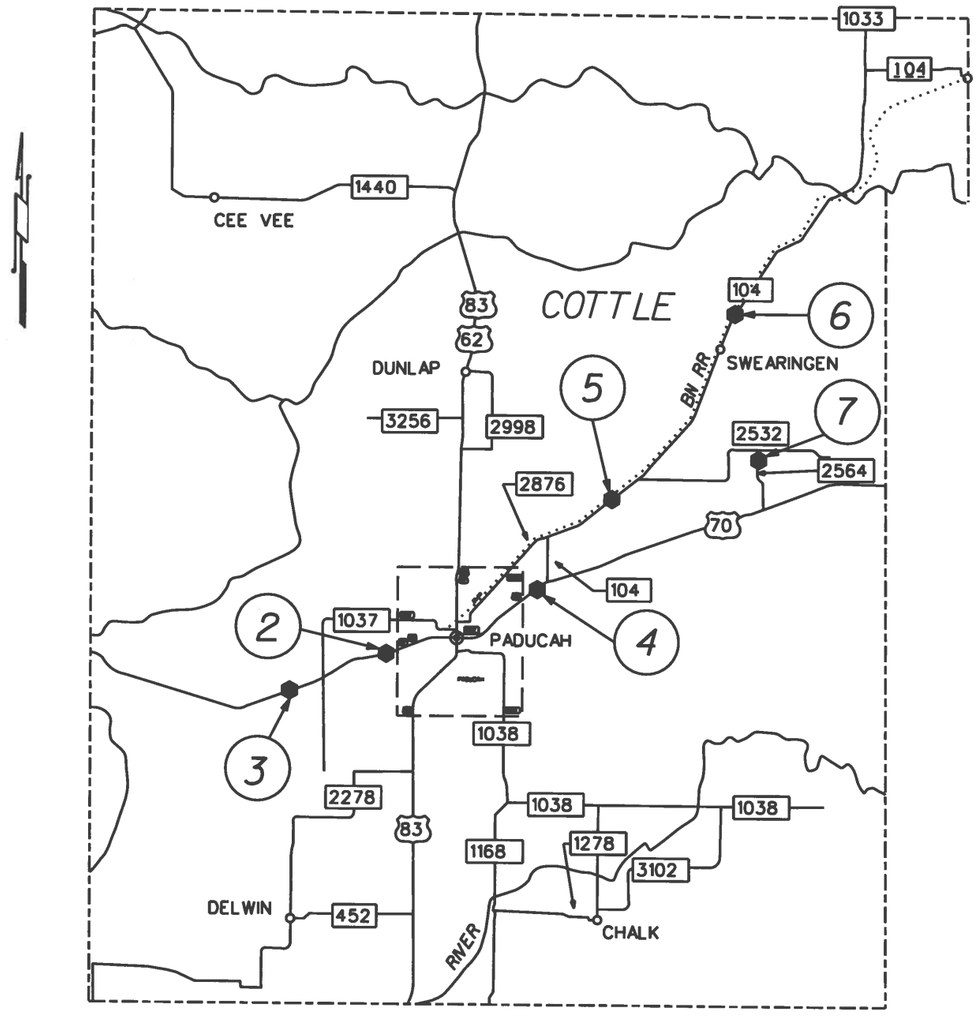
BRIDGE TYPE/GPS DATA

REF NO.	COUNTY/ROADWAY/FEATURE CROSSED	NBI NUMBER	STRUCTURE TYPE	COORDINATES	
1	HALL/SH 70/ABANDONED RR	0311-03-010	3 SPAN STEEL GIRDER	34.40589749	-100.89426737
2	COTTLE/US 62/RICHARDS CANYON	0146-02-010	5-6'X6' MBC	34.010829	-100.325
3	COTTLE/US 62/DRAW	0146-02-028	4-7'X4' MBC	33.988685	-100.393325
4	COTTLE/US 70/SHORTY CREEK	0146-03-011	4-10'X10' MBC	34.032478	-100.261099
5	COTTLE/FM 104/DRAW	0711-02-008	3-10'X5.5' MBC	34.081112	-100.209279
6	COTTLE/FM 104/DRAW	0711-02-021	2-10'X5' MBC	34.184571	-100.124741
7	COTTLE/FM 2564/DRAW	2546-01-001	5-5'X2' MBC	34.090698	-100.123142
8	DICKENS/US 82 WB/DUCK	0131-06-015	2 SPAN PAN GIRDER	33.637486O1	-100.9006705
9	DICKENS/US 82 EB/S.WICHITA RIVER	0132-02-029	4 SPAN PAN GIRDER	33.610717	-100.575339
10	DICKENS/US 82 EB/DAVIDSON CREEK	0132-02-030	4 SPAN PAN GIRDER	33.603568	-100.535736
11	DICKENS/FM 836/DRAW	0651-04-004	6-9'X5' MBC	33.559124	-101.007638
12	DICKENS/FM 193/DRAW	0950-05-013	2-10'X6' MBC	33.773766	-100.596477
13	DICKENS/FM 2565/DOCKUM CREEK	2543-01-002	3 SPAN PAN GIRDER	33.543741	-100.94766
14	DONLEY/US 287/DRAW	0042-06-073	5-5'X3' MBC	34.94060135	-100.89354335
15	HALL/SH 70/TURKEY CREEK	0311-03-015	3 SPAN P/S GIRDER	34.521458	-100.928177I3
16	HALL/SH 256/DRAW	0541-02-032	4-10'X8' MBC	34.677581S7	-100.78219183
17	HALL/SH 256/DRAW	0541-02-037	4 SPAN FLAT SLAB	34.67457629	-100.69782882
18	HALL/SH 256/OAKS CREEK	0541-02-038	8 SPAN P/S GIRDER	34.674543Z7	-100.6911485
19	HARDEMAN/US 287/DRAW	0043-04-009	3-8'X6' MBC	34.273835O5	-99.66891527
20	HARDEMAN/FM 680/N.GROESBECK CRK.	1701-01-002	7 SPAN FLAT SLAB	34.399072	-99.895973
21	HARDEMAN/FM 2363/S.GROESBECK CRK.	1701-02-004	5 SPAN PAN GIRDER	34.31135	-99.880166
22	HARDEMAN/FM 2006/WANDERERS CRK.	1916-01-001	10 SPAN PAN GIRDER	34.271807	-99.524451
23	KING/US 83/DRAW	0032-05-021	4-5'X5' MBC	33.65247634	-100.33576321
24	KING/US 82/NEWMAN CREEK	0133-01-020	2-10'X10' MBC	33.56440014	-100.17604979
25	KING/FM 2569/DRAW	0711-04-025	5-8'X5' MBC	33.827851Z8	-100.51632492
26	KING/FM 2569/EIGHTEEN CREEK	0711-04-026	5-8'X5' MBC	33.826022	-100.516279
27	KNOX/SH 222/LAKE CREEK	1512-01-004	3 SPAN PAN GIRDER	33.42051597	-99.57742066
28	MOTLEY/LP 42/DRAW	0105-07-036	8-5'X5' MBC	33.902578	-100.853225
29	MOTLEY/FM 656/NORTH PEASE RIVER	0311-06-017	8 SPAN P/S GIRDER	34.29559336	-100.63389112

DATE: $DATE$ $TIME$
FILE: $FILE$

QUANTITY SUMMARY

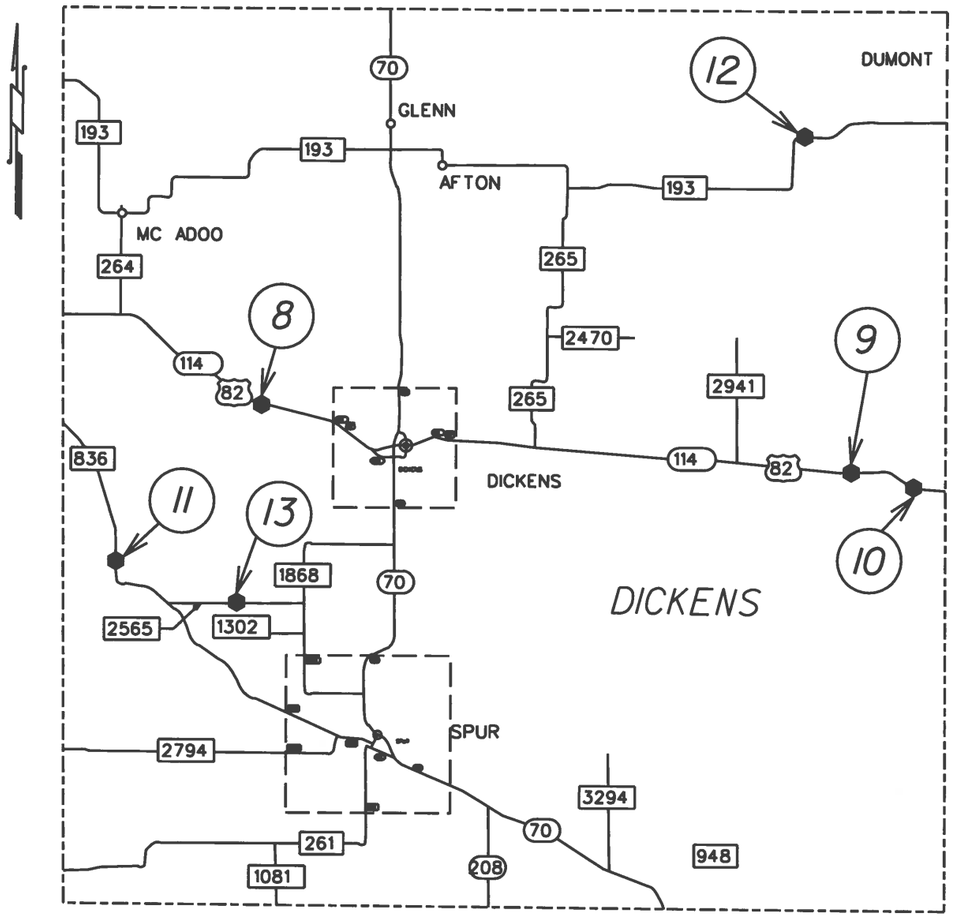
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			
6	BPM 646907001			
CONT	SECT	JOB	HIGHWAY	
6469	07	001	US 287, etc.	
DIST	COUNTY		SHEET NO.	
25	DONLEY, etc.		4	



Texas Department of Transportation

PROJECT LOCATION MAP
COTTLE COUNTY

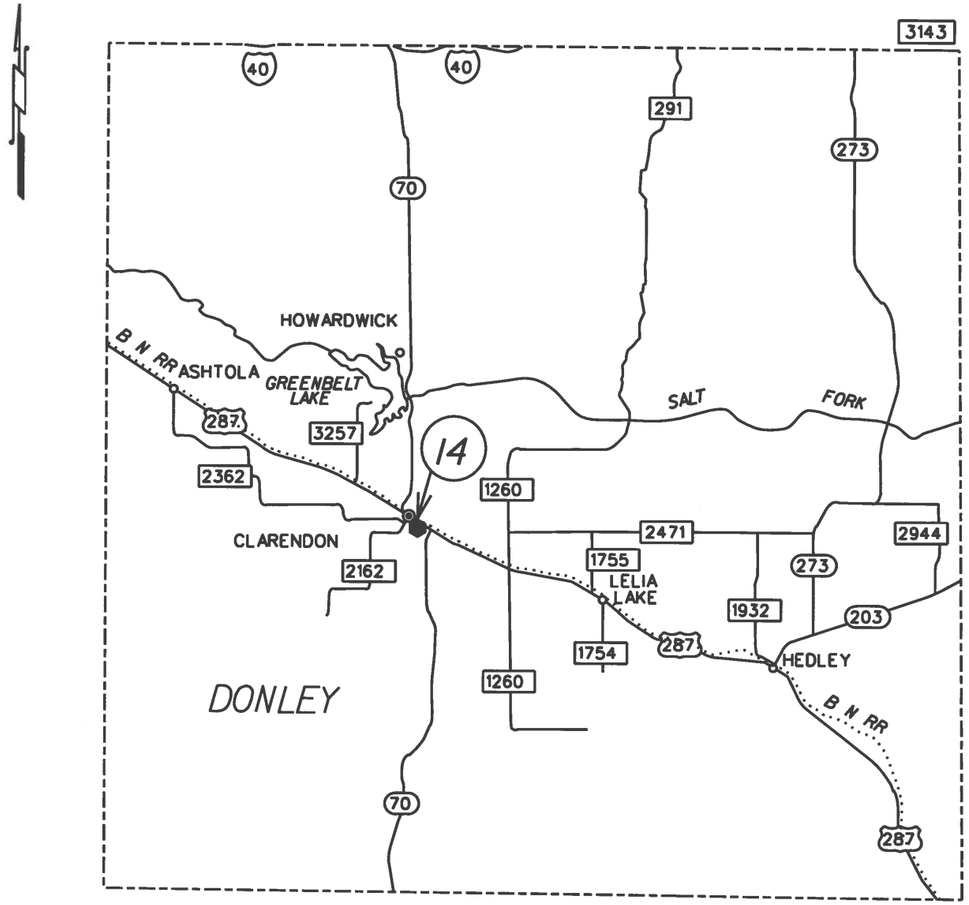
DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		5
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY, etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287, etc.



Texas Department of Transportation

PROJECT LOCATION MAP
DICKENS COUNTY

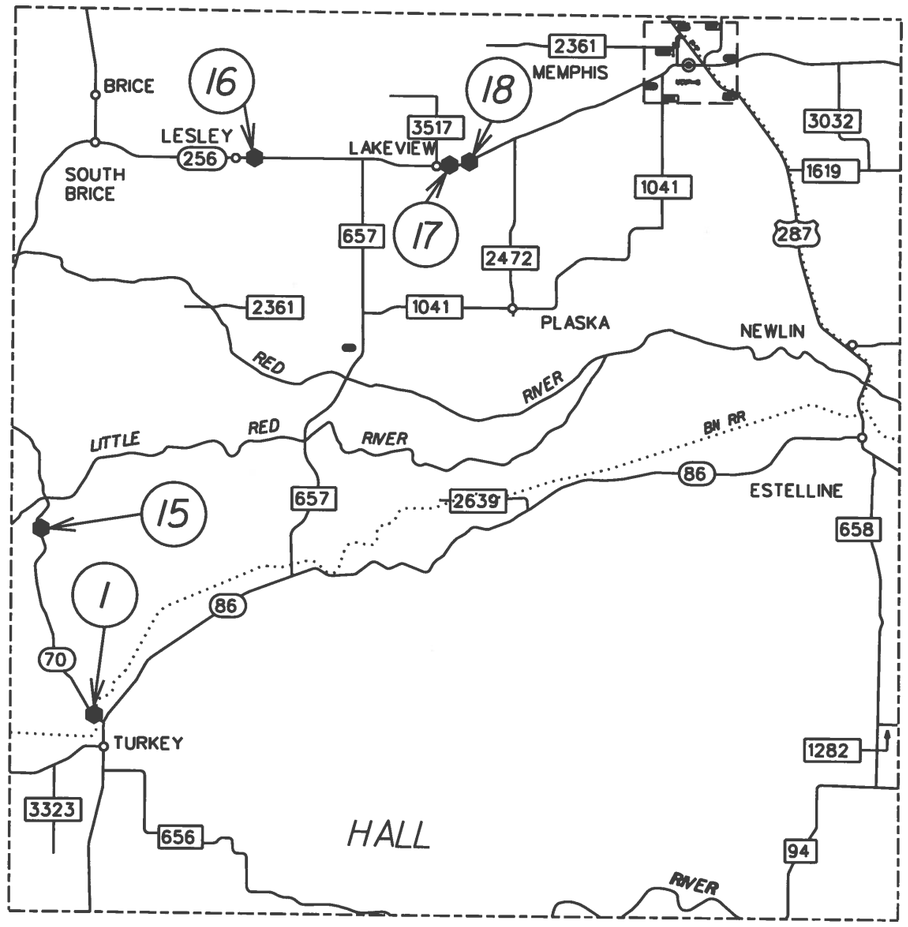
DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		6
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY,etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287,etc.



Texas Department of Transportation

PROJECT LOCATION MAP
DONLEY COUNTY

DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		7
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY,etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287,etc.



Texas Department of Transportation

PROJECT LOCATION MAP
HALL COUNTY

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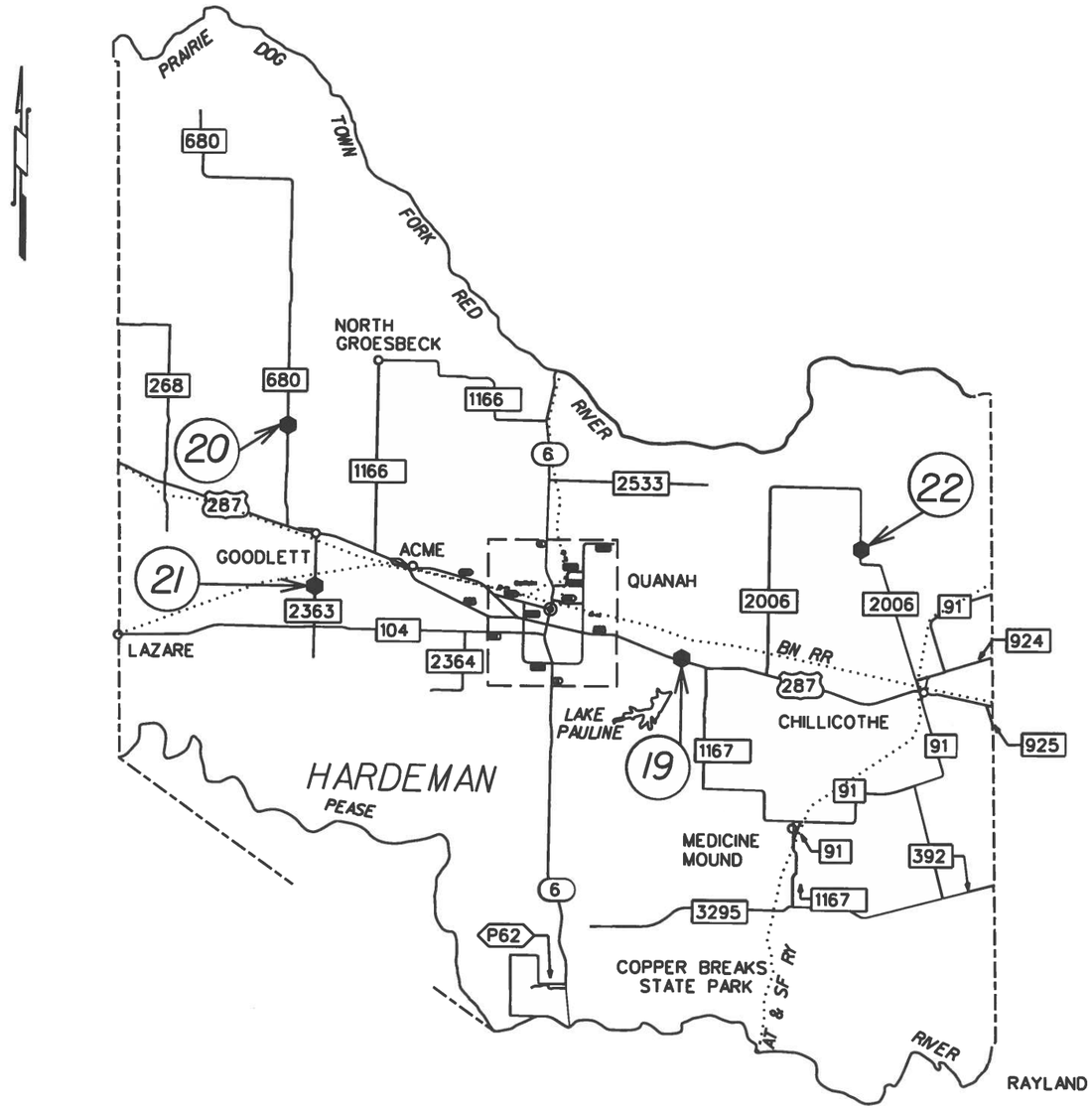
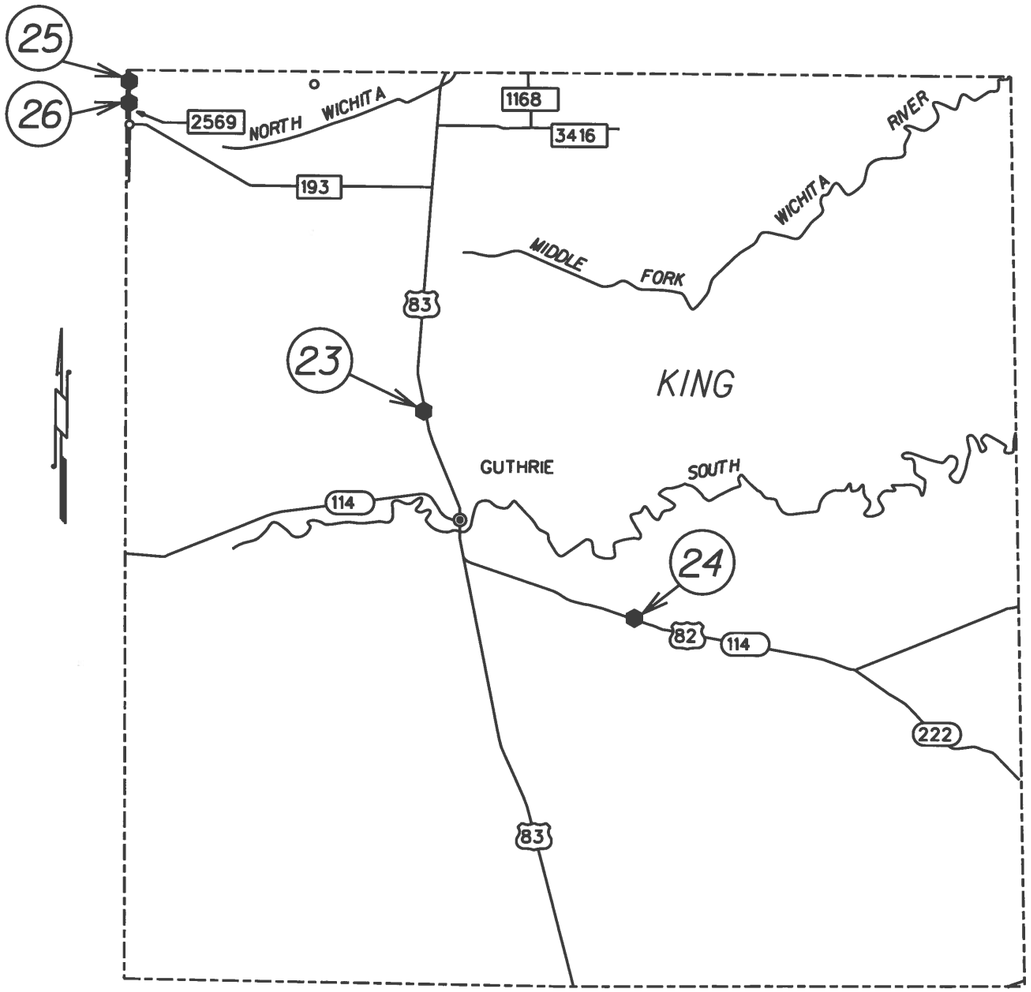
DATE:	6	BPM 646907001		8
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY, etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287, etc.



Texas Department of Transportation

PROJECT LOCATION
HARDEMAN COUNTY

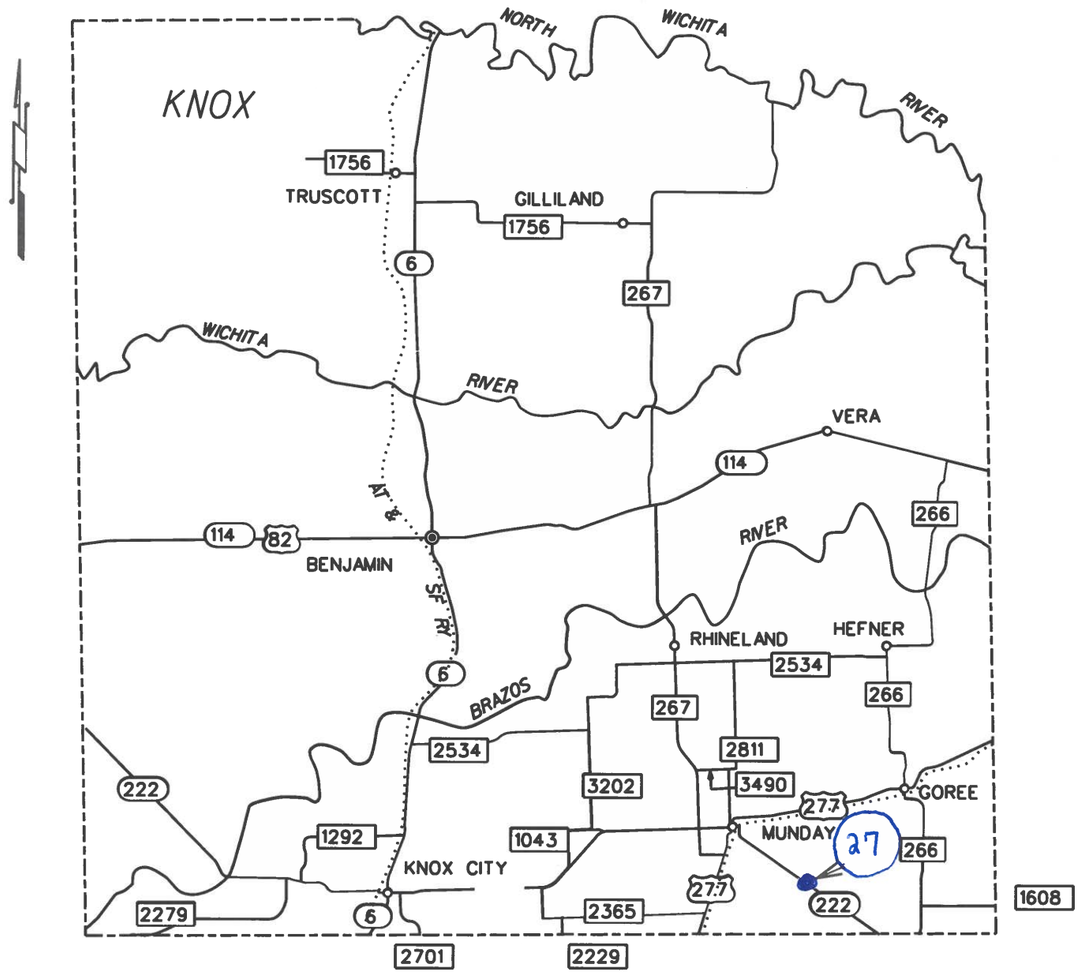
DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		9
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY, etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287, etc.



Texas Department of Transportation

PROJECT LOCATION MAP
KING COUNTY

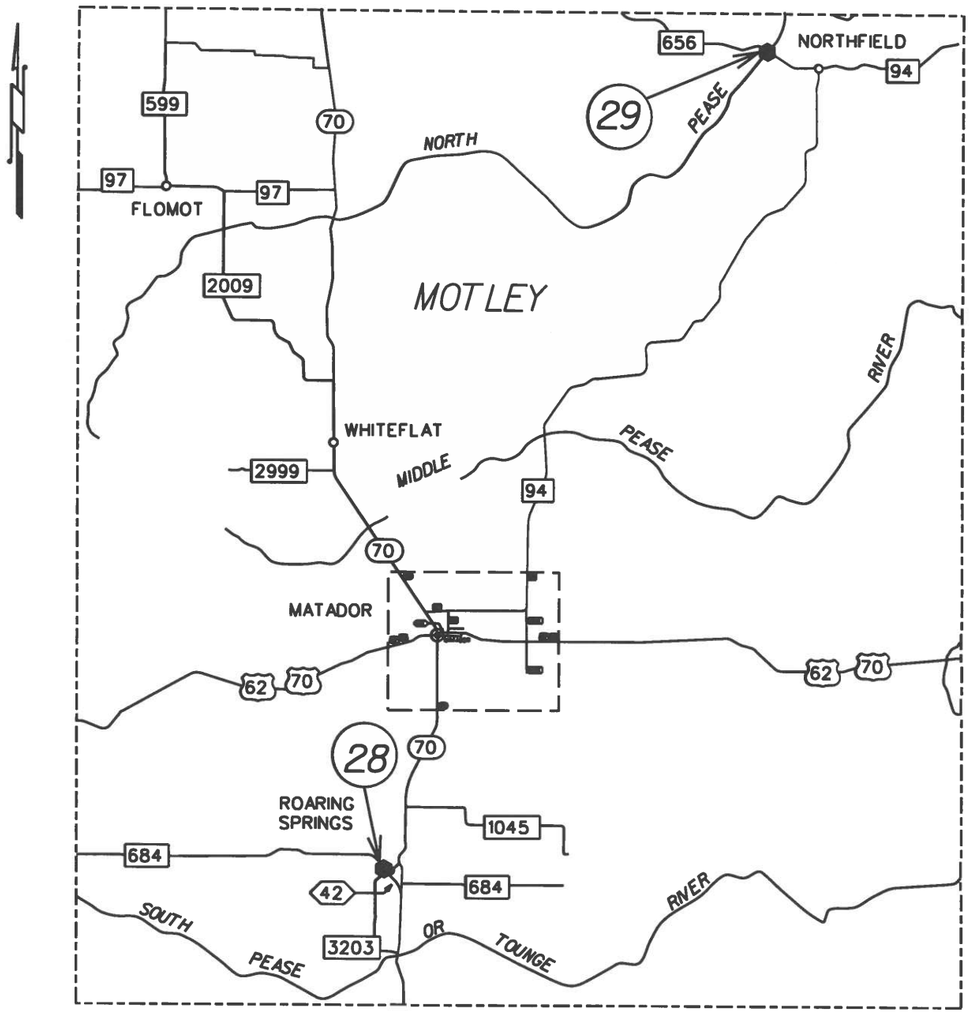
DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		10
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY, etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287, etc.



Texas Department of Transportation

PROJECT LOCATION MAP
KNOX COUNTY

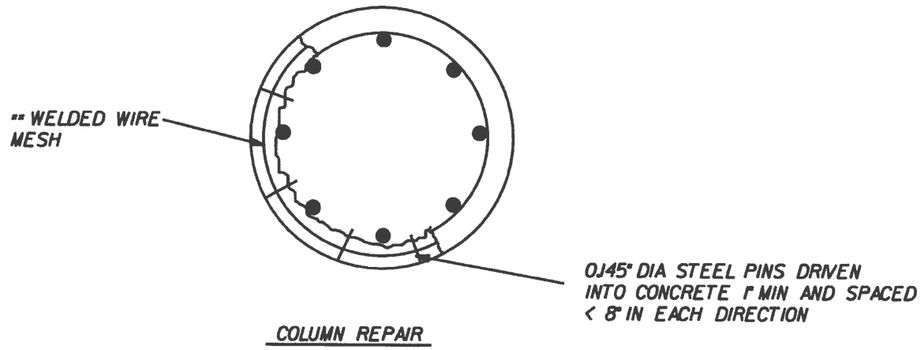
DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		11
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY,etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287,etc.



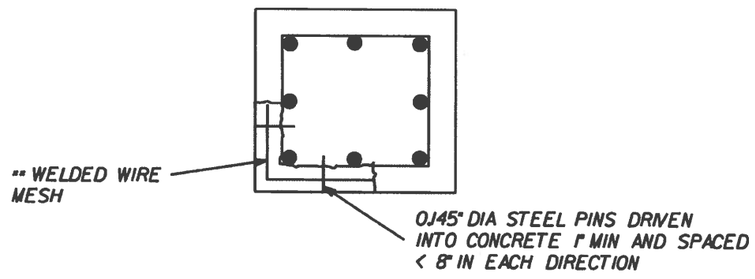
Texas Department of Transportation

PROJECT LOCATION MAP
MOTLEY COUNTY

DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		12
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY, etc.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287, etc.



COLUMN REPAIR



CAP OR PILING REPAIR

** AS DIRECTED BY THE ENGINEER

CONSTRUCTION NOTES:

REPAIRS SHALL BE MADE IN ACCORDANCE WITH ITEM 429,CONCRETE STRUCUTRE REPAIR AND THE 2021 TxDOT CONCRETE REPAIR MANUAL.

SAW CUT PERIMETER OF REPAIR SITE 1/2" LARGER THAN REPAIR SITE.

REMOVE ALL LOOSE CONCRETE.

REMOVE SUFFICIENT CONCRETE AROUND REINFORCING STEEL TO OBTAIN A MINIMUM 3/4" COVER WITH REPAIR MATERIAL.

REPLACE SEVERLY CORRODED REBAR AS DIRECTED BY THE ENGINEER.

INSTALL PINS AND WIRE MESH AS DIRECTED BY THE ENGINEER.

CLEAN CORRODED REINFORCING STEEL AND ENTIRE PATCH AREA BY SAND BLASTING.

CLEAN ENTIRE PATCH AREA WITH HIGH PRESSURE WATER.

INSTALL FORMS AND FALSE WORK IN ORDER TO REPAIR BRIDGE ELEMENTS TO ORIGINAL LINES AND SURFACES.DO NOT ATTACH FALSE WORK/FORMS TO PRESTRESSED BRIDGE ELEMENTS.ALL HOLES DRILLED INTO BRIDGE ELEMENTS TO ATTACH FALSE WORK/FORMS SHALL BE PATCHED WITH GROUT MATERIAL.

INSTALL FELT PAPER BETWEEN BRIDGE ELEMENTS AS DIRECTED BY THE EINGINEER AS A BOND BREAKER BEFORE INSTALLING PATCH MATERIAL.

PATCHES SHALL BE CURED USING CURING BLANKETS.CURING COMPOUND MAY BE USED WHEN INSTRUCTED BY THE EINGINEER.

PATCHES WILL BE SUBJECT TO SOUNDING WITH A HAMMER TO DETERMINE THEIR ADEQUACY.

NOTES:

1.) WORK SITE(S) SHALL BE KEPT CLEAN AND NEAT AT ALL TIMES. ALL TRASH/CONSTRUCTION DEBRIS SHALL BE COLLECTED AT THE END OF EACH DAY AND DISPOSED OF PROPRERLY.CONTRACTOR SHALL NOT PARK VEHICLES/EQUIPMENT ON OR NEAR ROADWAYS/SHOULDERS OF LIVE LANES OF TRAFFIC. AT NO TIME SHALL MATERIALS OR EQUIPMENT BE STORED NEAR LIVE LANES OF TRAFFIC.

2.) TRAFFIC CONTROL SIGNS/DEVICES SHALL BE MAINTAINED DAILY.

3.) DO NOT STORE COMBUSTABLE/FLAMMABLE CONSTRUCTION MATERIALS UNDERNEATH BRIDGE STRUCTURES.

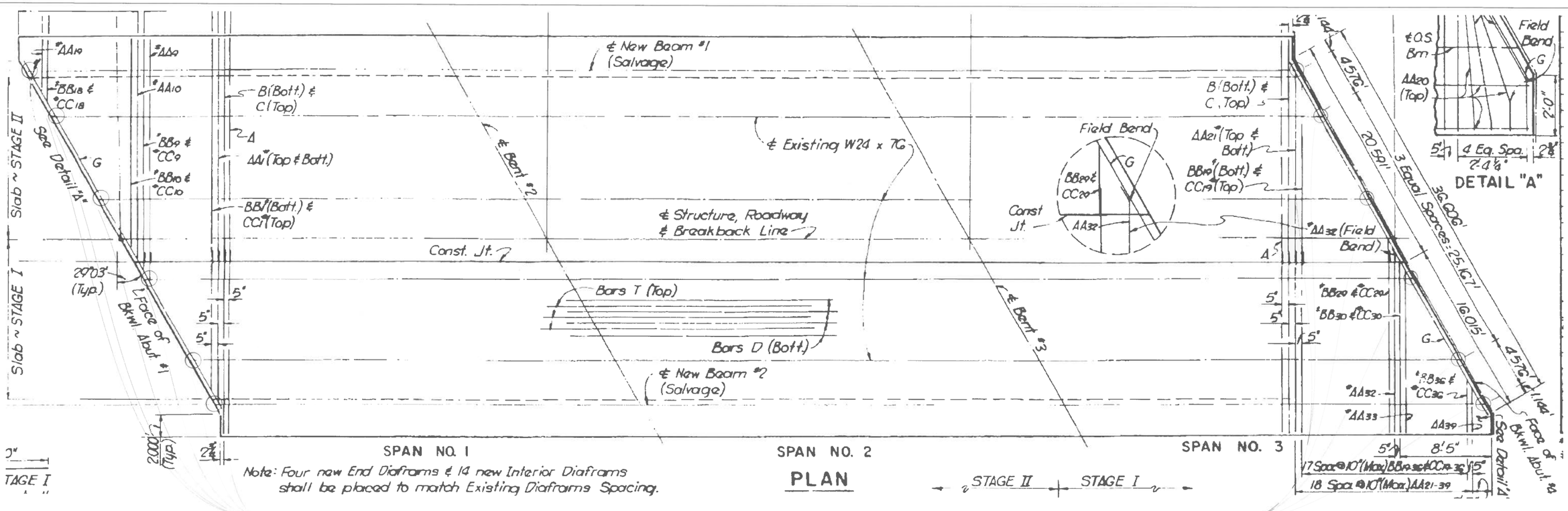
Matthew J. Herbstritt, P.E.
09-05-24

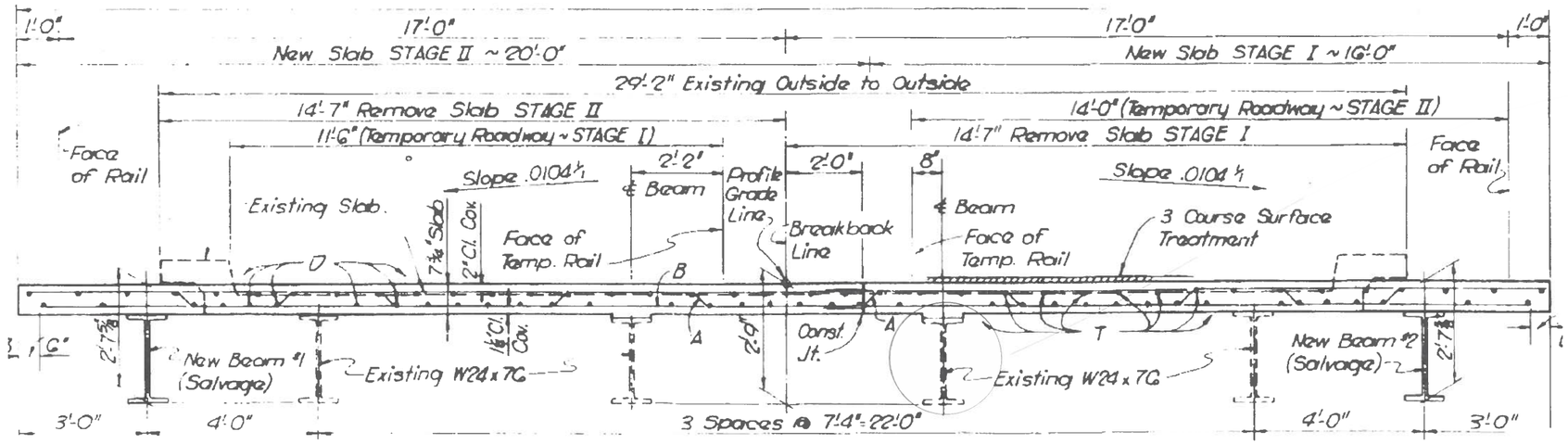
STATE OF TEXAS
MATTHEW J. HERBSTRITT
121647
REGISTERED
PROFESSIONAL ENGINEER

Texas Department of Transportation

BENT REPAIR DETAILS

DRAWN:	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DATE:	6	BPM 646907001		13
CHECKED:	STATE	STATE DIST.NO.	COUNTY	
DATE:	TEXAS	CHS	DONLEY,ETC.	
REVISED:	CONT.	SECT.	JOB	HIGHWAY NO.
DATE:	6469	07	001	US 287,ETC.





BRIDGE LAYOUT - AS-BUILT

Beam #3 Repair Location

GENERAL NOTES:

1. Structure is a 3 span continuous steel I-beam bridge on a concrete substructure (29° skew).
2. 6 continuous 24WF76 steel I-beams
3. INV Rating: HS18.9
   OPR Rating: HS33.9

TABLE OF ESTIMATED QUANTITIES			
ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY
0434-7002	ELASTOMERIC BEARING (LAMINATED)	EA	6
0442-7010	STR STEEL (PEDESTAL)	LB	869
0495-7001	RAISING EXIST STRUCT	LS	1
0784-7002	REP STL BRIDGE MEMBER (BEAM)	EA	1
4010-7001	STEEL BRIDGE ZONE PAINTING REF STR #1	EA	1

STATE OF TEXAS
CHRISTOPHER R. GOMEZ
147007
LICENSED PROFESSIONAL ENGINEER

08/02/2024

Texas Department of Transportation — Bridge Division

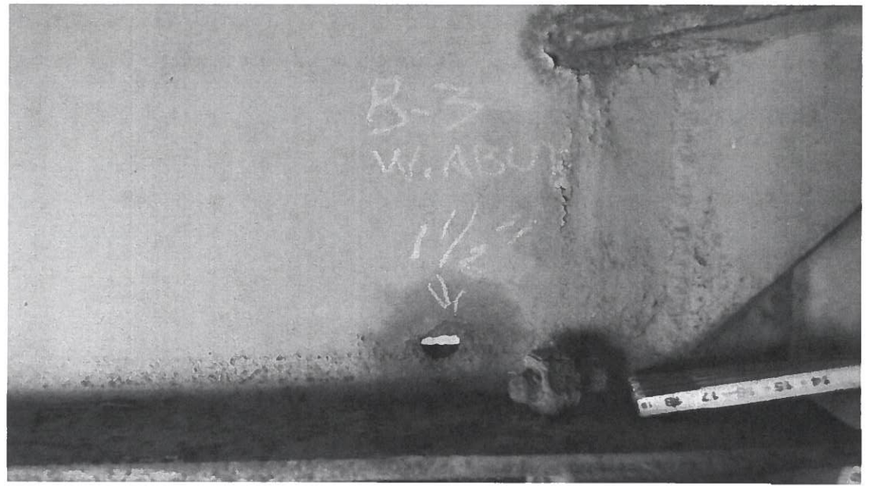
STEEL BEAM AND BEARING REPAIR LAYOUT

NBI: 250970031103010

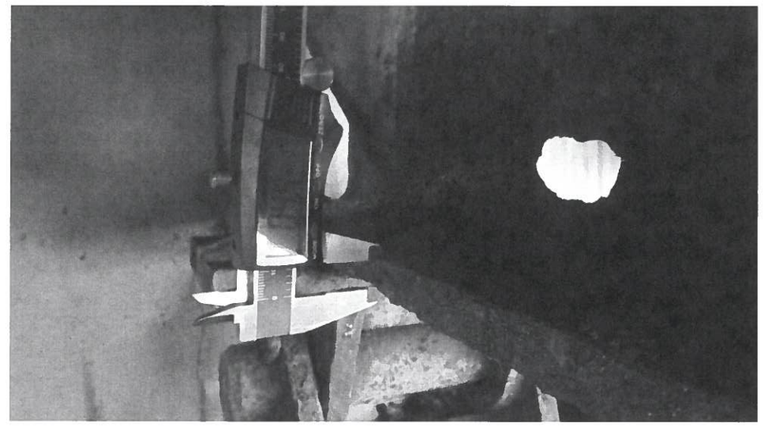
SH 70 AT
Abandoned RR

FILE: CHS_SH70@RR_Repairs.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT July 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	SH 70
	DIST	COUNTY		SHEET NO.
	CHS	Hall/Donley		14

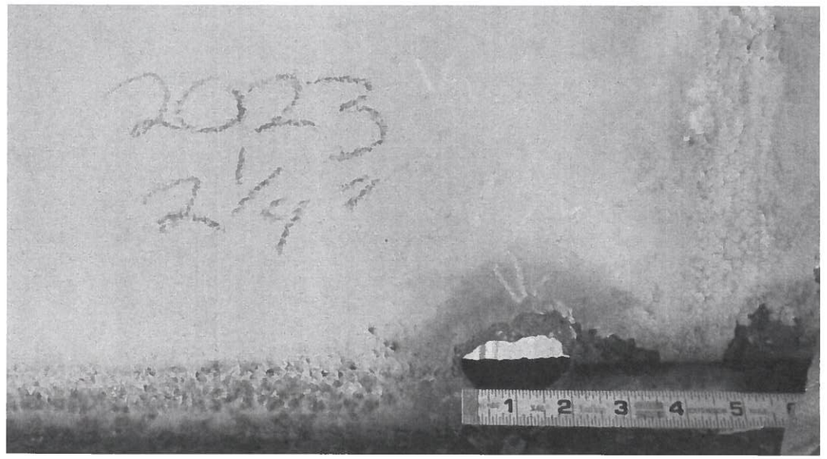
DATE:
FILE:



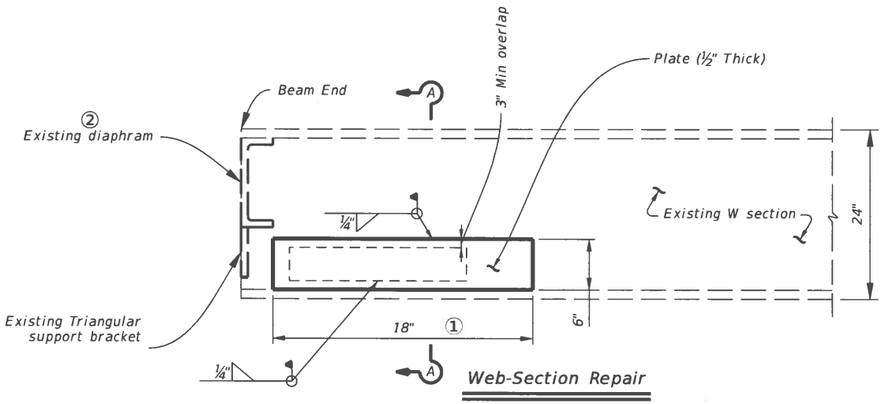
REPAIR LOCATION NO. 2 ~ BEAM END 3 FROM WEST



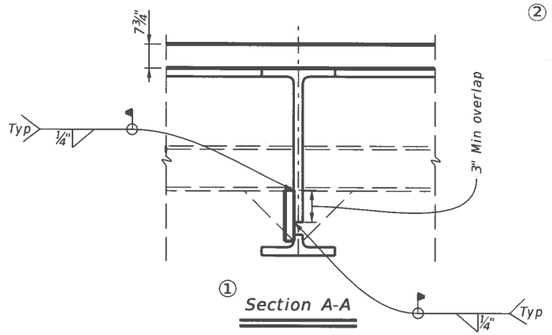
REPAIR LOCATION ~ BEAM 3 AT NORTHWEST ABUTMENT



REPAIR LOCATION NO. 2 ~ BEAM END 3 FROM WEST



Web-Section Repair



① Remove corroded section of web by grinding. Adjust plate dimensions based on eld conditions.

② Verify condition of diaphragm connection. Alert Engineer if additional repairs are needed and perform repairs as directed by Engineer.

GENERAL NOTES:

Provide ASTM A709 Gr. 50, or ASTM A36 for web repair in accordance with Item 442, "Metal for Structures."

Radiographic inspection of flange and web welds are required.

WEB-SECTION REPAIR PROCEDURE:

1. Verify limits of corroded steel. Remove section as necessary, creating a clean edge for new plate to be welded.
2. Clean in accordance with Item 446, "General Preparation" and clean down to bare metal.
3. Place the plate over the portion of web with section loss and weld as shown, in accordance with Item 448, "Structural Field Welding".
4. Back weld the opposite side of repair plate where any existing material is removed to seal the repair against moisture.
5. Clean and paint the repair area as directed by the Engineer.

Note: Condition may have changed. Field verify all repair locations and extents prior to beginning work.

Repairs performed in accordance with the details shown will result in a load rating that meets or exceeds the original load rating of this structure.

STATE OF TEXAS
CHRISTOPHER R. GOMEZ
147007
LICENSED PROFESSIONAL ENGINEER

08/02/2024

DATE:

Texas Department of Transportation — Bridge Division

STEEL BEAM REPAIR PHOTOS AND DETAILS

NBI: 250970031103010

SH 70 AT
Abandoned RR

FILE: CHS_SH70@RR_Repairs.dgn	TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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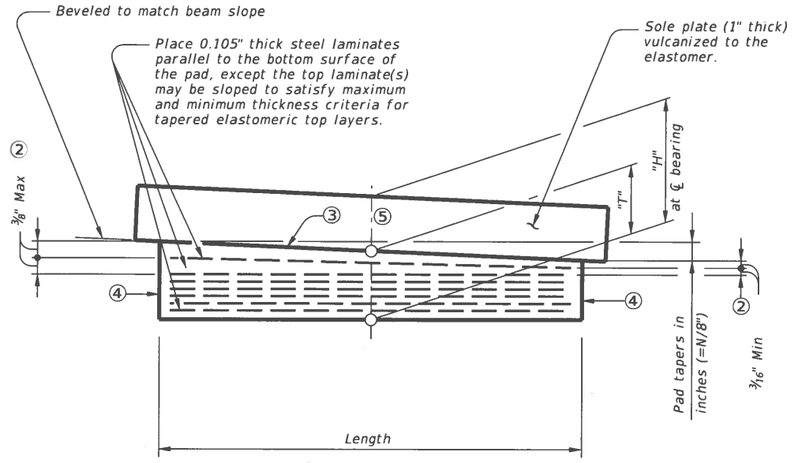
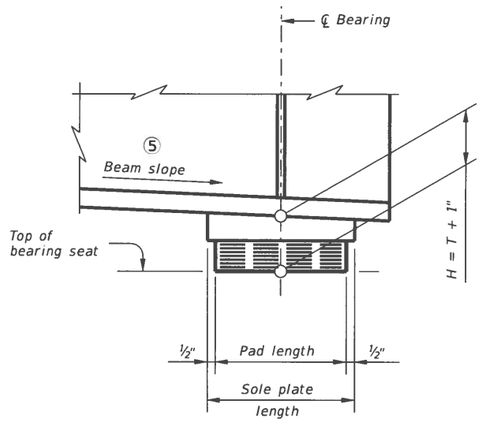
REVISIONS	6469	07	001	SH 70
	DIST	COUNTY		SHEET NO.
	CHS	Hall/Dooley		15



FOR BEAM SLOPES ≤ 3%

(Max Taper = ¼")

BEARING AT BEAM 3 AT NORTHWEST ABUTMENT



SIDE ELEVATION

BEARING PAD SUMMARY TABLE								
NBI	Abut/ Bent No.	Bearing Pad Dimensions			Sole Plate Dimensions		H (inch) (H=T+1")	Quantity
		L (inch)	W (inch)	T (inch)	L (inch)	W (inch)		
2509700311103010	Abut #4	7	10	2½	7½	11	3½	6

TABLE OF SOLE PLATE SLOPES (FT/FT) NBI: 2509700311103010						
Location	Beam 1	Beam 2	Beam 3	Beam 4	Beam 5	Beam 6
Abut #4	0.0023	0.0051	0.0052	0.0052	0.0053	0.0012

① 1" Dia threaded rod (ASTM A 193 Gr B7 or F 1554 Gr 105) with heavy hex nut and plate washer. Hot-dip galvanize rod, nut and washer. Sizing, drilling and cleaning rod roles must follow the adhesive manufacturer's directions. Embed using a Type III (Class C, D, E or F) adhesive meeting the requirements of DMS-6100, "Epoxies and Adhesives." Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system.

② Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

③ Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. Include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan beam slope by more than $\left(\frac{0.0625"}{\text{Length}}\right)$ IN/IN.

④ Locate permanent mark here.

⑤ See TABLE OF SOLE PLATE SLOPES (FT/FT) for beam grade (slope) at bearing locations.

GENERAL NOTES:

Raise structure per Item 495, "Raising Existing Structures" to facilitate bearing pad replacement. Costs of furnishing and installing elastomeric bearing pads, sole plates, and anchor rod assembly are paid for in accordance with Item 434, "Bridge Bearings". Material for permanent steel pedestals will be measured and paid for in accordance with Item 442, "Metal for Structures".

The bearing fabricator is required to develop a bearing layout which identifies location and orientation of all bearings. A copy of the bearing layout is to be provided to the Engineer. Permanently mark each bearing in accordance with the bearing layout.

Provide shop drawings for approval.

MATERIAL NOTES:

Provide sole plates conforming to ASTM A588.

Provide anchor bolts conforming to ASTM F1554 Grade 105 or ASTM A193 Grade B7. Provide nuts conforming to ASTM A563 Grade DH, heavy hex or A194 Grade 2H, heavy hex. Provide washers conforming to ASTM F436.

Hot dip galvanize rod, nut, and washer as per Item 445, "Galvanizing". Sizing, drilling, and cleaning rod holes must follow the epoxy Manufacturer's directions. Use a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

STATE OF TEXAS
CHRISTOPHER R. GOMEZ
147007
LICENSED PROFESSIONAL ENGINEER

08/02/2024

DATE:

Texas Department of Transportation — Bridge Division

ROCKER BEARING REPLACEMENT PHOTOS AND DETAILS

NBI: 250970031103010

SH 70 AT
Abandoned RR

FILE: CHS_SH70@RR_Repairs.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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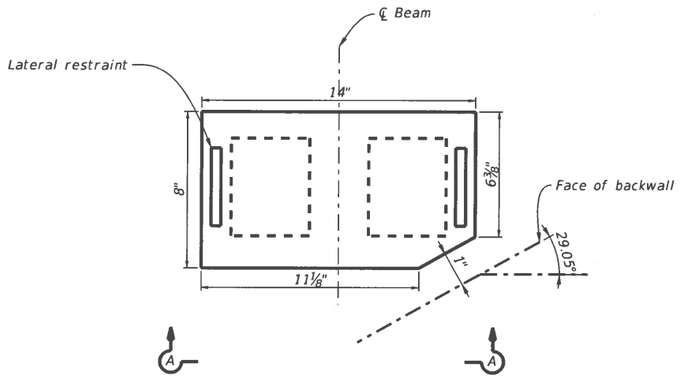
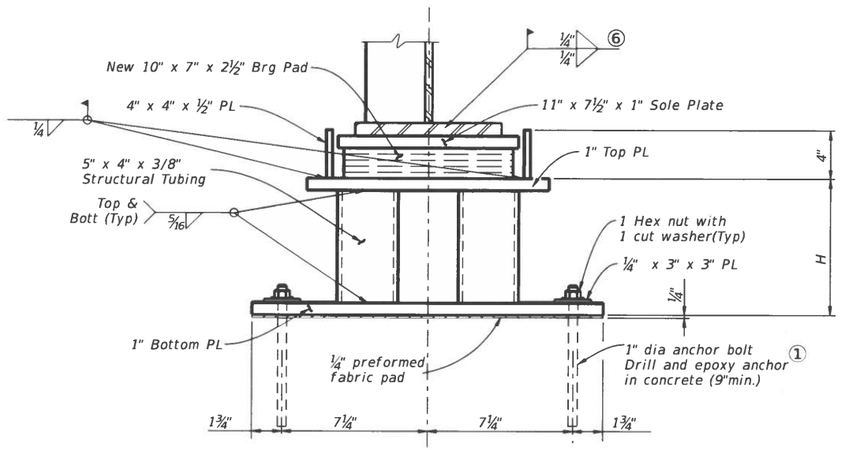
REVISIONS	0469	07	001	SH 70
	DIST	COUNTY		SHEET NO.
	CHS	Hall	10-9-24	16



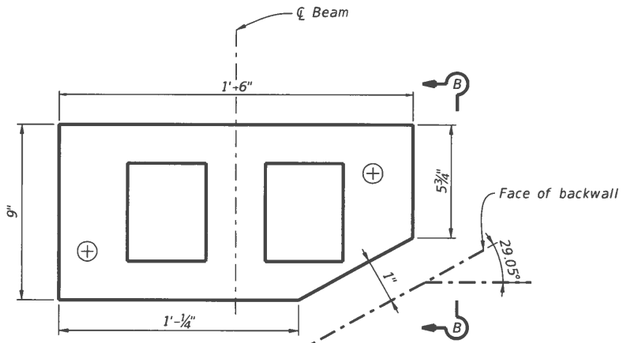
TOP PLATE (INTERIOR AND EXTERIOR BEAMS)

(For outer and inner beams)



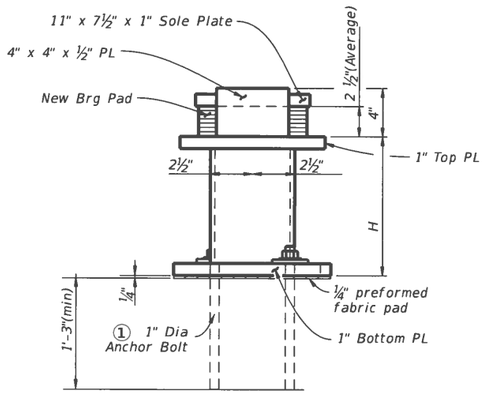
Section A-A

(Section shown is for exterior beams)

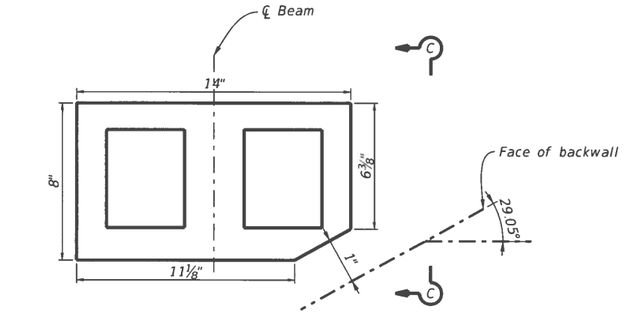


BOTTOM PLATE (EXTERIOR BEAMS)

(For outer beams only)

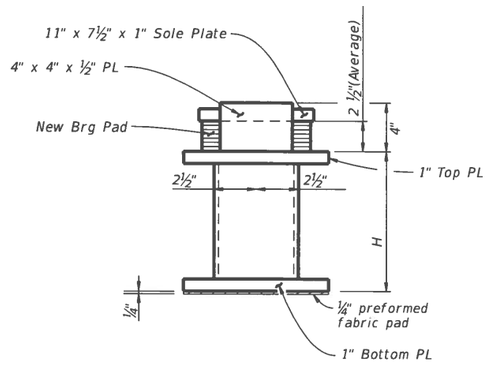


SECTION B-B



BOTTOM PLATE (INTERIOR BEAMS)

(For inner beams only)



SECTION C-C

Lifting Notes:

1. *All work and materials for bearing pad replacement must be performed and paid for in accordance with Item 495, "Raising Existing Structures," Item 434, "Bridge Bearings," and Item 442 "Metal for Structures". Verify all locations and beam slopes prior to ordering materials.*

2. *Submit lifting plans and calculations to the Engineer for approval. Design lifting device and supports for live load and dead load with appropriate load factors in accordance with Item 495, "Raising Existing Structures."*
   Unfactored loads are as follows:
   DL = 17 kips per beam end
   LL = 49 kips per beam end
   (including impact)

3. *Limit lifting to ½" maximum to allow for pad replacement. Note that anchor bolts may restrain existing bearings. Do not damage deck, beams, or cap during any stage of bearing replacement.*

4. *Supporting falsework on existing bent caps is permitted following requirements of Lifting Note 2 above.*

5. *Jacking against the slab is not allowed. Jacking from existing bent cap is permitted following requirements of Lifting Note 2 above.*

6. *Place new bearing pads and lower beams back onto pads. Ensure that all new bearing pads compress when jacking force is removed. If load is not transferred as intended, place steel shims under pad or use epoxy injection or grout mixture as speci ied in Article 784.4.3 to properly engage bearing pad and transfer load.*

① *1" Dia threaded rod (ASTM A 193 Gr B7 or F 1554 Gr 105) with heavy hex nut and plate washer. Hot-dip galvanize rod, nut and washer. Sizing, drilling and cleaning rod roles must follow the adhesive manufacturer's directions. Embed using a Type III (Class C, D, E or F) adhesive meeting the requirments of DMS-6100, "Epoxies and Adhesives." Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system.*

⑥ *Prepare beam flange and top of sole plate for welding. Weld sole plate to bottom flange of girders in accordance with item 448 Structural Field Welding in the TxDOT Standard Specification*

GENERAL NOTES:

Raise structure per Item 495, "Raising Existing Structures" to facilitate bearing pad replacement. Costs of furnishing and installing elastomeric bearing pads, sole plates, and anchor rod assembly are paid for in accordance with Item 434, "Bridge Bearings". Material for permanent steel pedestals will be measured and paid for in accordance with Item 442, "Metal for Structures".

The bearing fabricator is required to develop a bearing layout which identifies location and orientation of all bearings. A copy of the bearing layout is to be provided to the Engineer. Permanently mark each bearing in accordance with the bearing layout.

Provide shop drawings for approval.

MATERIAL NOTES:

Provide sole plates conforming to ASTM A588.

Provide anchor bolts conforming to ASTM F1554 Grade 105 or ASTM A193 Grade B7. Provide nuts conforming to ASTM A563 Grade DH, heavy hex or A194 Grade 2H, heavy hex. Provide washers conforming to ASTM F436.

Hot dip galvanize rod, nut, and washer as per Item 445, "Galvanizing". Sizing, drilling, and cleaning rod holes must follow the epoxy Manufacturer's directions. Use a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

STATE OF TEXAS
CHRISTOPHER R. GOMEZ
147007
LICENSED
PROFESSIONAL ENGINEER

08/02/2024

Texas Department of Transportation — Bridge Division

ROCKER BEARING REPLACEMENT PHOTOS AND DETAILS

NBI: 250970031103010

SH 70 AT
Abandoned RR

FILE: CHS_SH70@RR_Repairs.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT July 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	46907	001		SH 70
	DIST	COUNTY		SHEET NO.
	CHS	Hall / Donley		17

DATE:
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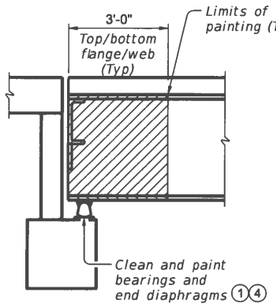
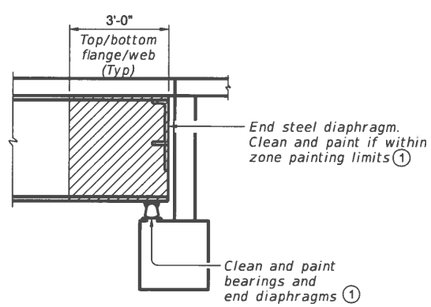


ABUTMENTS WITH EXPANSION JOINTS



ABUTMENTS WITHOUT EXPANSION JOINTS

PARTIAL STEEL BEAM ELEVATION (3)

Dimensions shown are basis of paint estimate but do not define exact limits of repainting. Address deteriorated paint as directed by the Engineer. Painting perimeter does not need to be a vertical plane except on exterior surfaces of exterior beams.

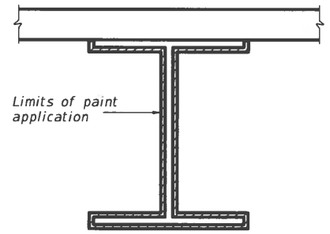
STRUCTURE NOTES:

Ref Str #1: Clean beam ends, bearings, and steel diaphragms at abutments. Apply default special protection system. Address other areas along flanges and webs as directed.

SPECIAL PROTECTION SYSTEM:

Default:
- Apply 0.5 - 1.0 mil DFT of penetrating seal to specifed surfaces.
- Apply minimum 4.0 mils DFT topcoat to specifed surfaces
- Apply an additional 14-18 WFT protection coat of HRCSA to all exposed bearing surfaces after other coats have cured and in accorance with manufacturer recommendations.

TABLE OF ESTIMATED QUANTITIES		
STRUCTURE NUMBER (& FEATURE CROSSED)	REFERENCE NUMBER	QUANTITY PER STRUCTURE (SF)
250970031103010	1	558



STEEL BEAM CROSS SECTION WITH ZONE PAINT LIMITS

(1) Bearings and diaphragms may vary from what is shown.

(2) Paint quantities shown include allowance for bearings, diaphragms and other minor areas as determined by the Engineer.

(3) Showing minimum areas of paint application. Spot clean and paint other locations on the bridge as directed by the Engineer.

(4) See "Cleaning at Expansion Bearings" detail.

ZONE PAINTING NOTES:

Prepare the surfaces to be cleaned by using hand tools, vacuuming, and water blasting as described in Special Specification 4010, "Steel Bridge Zone Painting" for Default Special Protection System.

Water blast all bearings for a minimum of 1 minute each while moving nozzle to thoroughly clean all surfaces. Keep nozzle no further than 6 inches from the surface. Blast concealed surfaces of end diaphragms below bridge expansion joints.

Use oil-free compressed air to blow out tightly confined locations.

Probe around edges of remaining paint with hand scraper to ensure all delaminated paint is removed.

GENERAL NOTES:

Clean and paint the structure in accordance with Special Specification 4010, "Steel Bridge Zone Painting."

Provide potable water for water blasting steel. Water from municipal supplies approved by the Texas Department of Health will not require testing. When water is provided from another source, test for chlorides and provide water with a maximum chloride concentration of 500 ppm (500 mg/L).

The default Special Protection System includes:
- Penetrating Sealer (DMS-8101)
- Top Coat (DMS-8105)

Provide a High Ratio Calcium Sulfonate (HRCSA) top coat for bearings.

Provide compatible penetrating sealer and top coat from the same manufacturer.

Tint the proposed paint system to match the existing bridge paint color. Select the proposed paint color from the Federal Standard Colors list. Submit proposed paint color samples to the Engineer for approval before paint purchase.

STATE OF TEXAS
CHRISTOPHER R. GOMEZ
147007
LICENSED PROFESSIONAL ENGINEER

08/02/2024

DATE:

Texas Department of Transportation | Bridge Division

STEEL BEAM END ZONE PAINTING DETAILS

NBI: 250970031103010

SH 70 AT
Abandoned RR

FILE: CHS_SH70@RR_Repairs.dgn		TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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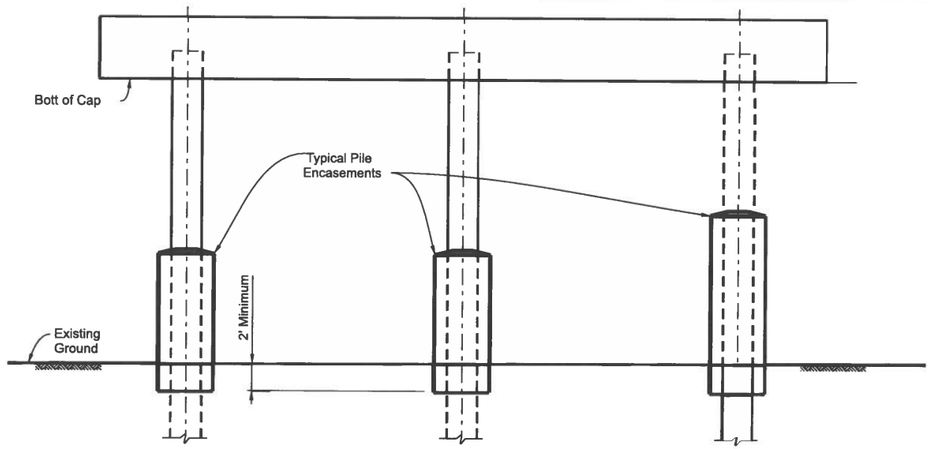
	DIST	COUNTY		SHEET NO.	
	CHS	Hall/Donley		18	



TYPICAL BENT ELEVATION

GENERAL NOTES:

1. Verify channel ground line elevation at each bent pile before ordering and fabricating the steel reinforcement and forms. Encasement Length "H" may be adjusted by the Engineer based on the actual channel Ground Line elevation.

2. Existing conditions may be underwater. Contractor will be responsible for dewatering. Payment for dewatering will be included in the price bid for Item 420 piling encasements. If the contractor can submit a plan and adequately demonstrate the ability to perform the repairs to the engineer for approval, dewatering may not be necessary. Obtain approval for the mix design and the construction procedures before the beginning of the work. If underwater placement is approved, concrete mix should be designed for underwater placement and may require the use of anti-washout admixtures. Provide concrete for the H-piling encasements with a strength of 3,000 psi in 24 hours and coarse aggregate grades not greater than No. 5 (3/4"). Provide a concrete mix with 2 gallons of corrosion inhibitor per CY. Concrete shall be Class "C". All steel reinforcing shall be Grade 60.

3. Construction of concrete encasement will be paid for at the unit price bid of "cubic yard" of Class "C" concrete pile encasement placed in water under Item 420. As an option the contractor may construct the Encasement in square section as shown in Section A-A (Optional).

4. Reinforcing steel shall be considered subsidiary to Class "C" concrete.

5. Where existing pile encasements exist, remove only one existing encasement at a time until new encasement reaches 3000psi. Work on non-adjacent bents is permitted.

CONSTRUCTION PROCEDURE:

1. Verify channel line elevations and report to the Engineer for possible adjustments.

2. Submit mix design and procedures for placing concrete encasement in water for approval.

3. Carefully excavate and remove the mud with a dredge pump around the H-piles of the first interior bent approximately 2 foot deep for setting the steel reinforcement and forming as shown in the plan. Clean mud, paint, grease, loose rust, and dirt on the H-pile with hand tools and pressure water wash.

4. Place steel reinforcement and install forms. Seal and tighten the forms.

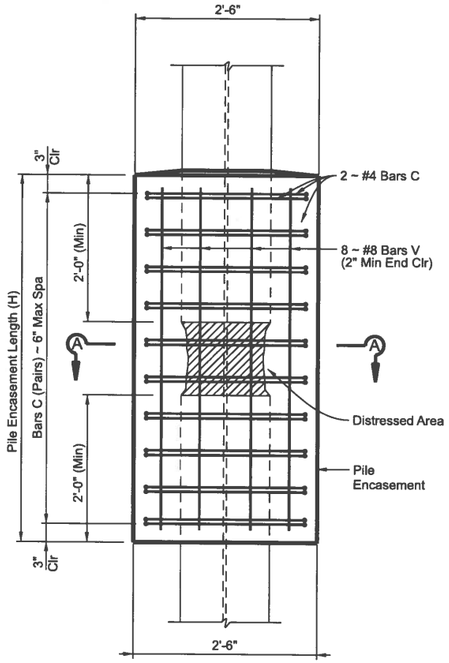
5. Place the concrete in the encasement in water per approved procedures and in accordance with Item 420.

6. Moist cure the concrete for at least 4 days and remove the form.

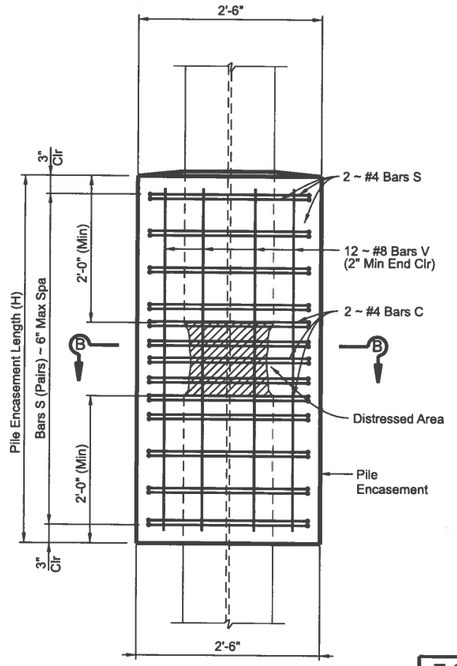
7. Construct the encasement of the next bents repeating the procedures 3 to 7 only after Concrete has reached 3000psi.

8. Seal joints between the H-pile steel and concrete at the top of the encasements with an approved silicone caulk.

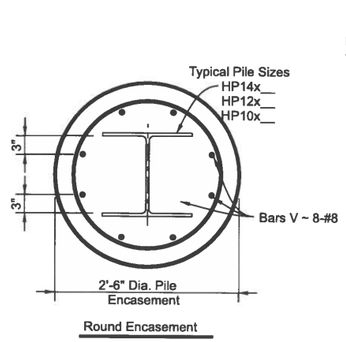
9. Backfill around completed encasement.



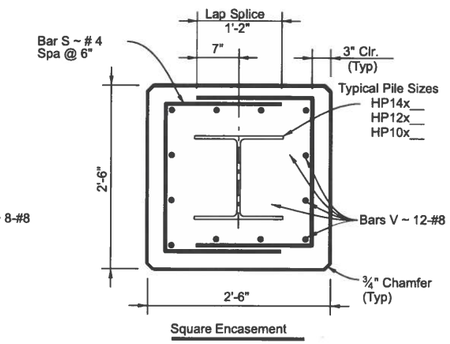
ELEVATION OF ROUND ENCASEMENT



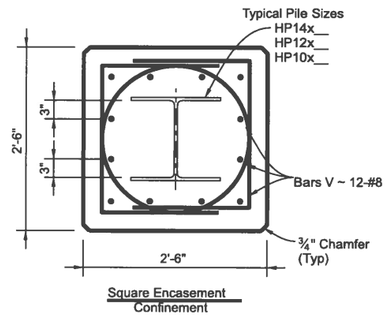
ELEVATION OF SQUARE ENCASEMENT



Round Encasement



Square Encasement



Square Encasement Confinement

SECTIONS SHOWING REINFORCING AND CONCRETE ENCASEMENT

SECTION A-A

SHOWING REINFORCING NEAR DISTRESSED AREA

SECTION B-B

PILE ENCASEMENT DETAILS

Note: The contractor shall provide an ACI Certified Technician to perform concrete testing, including making 4" x 8" cylinders. The contractor shall supply all materials needed to make the cylinders. TxDOT will break the cylinders.

① Remove mud to locate the bottom of concrete encasement about 2'-0" below the existing channel line or as directed by the engineer.

② For every 1' +/- encasement length change adjust concrete volume by
0.23 CY-Rectangular
0.18 CY-Circular

③ Seal joints around HP with silicone caulk.

TABLE OF ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6030	REMOVING CONC (PILE ENCASEMENT)	CY	5.6
420 6070	CLASS "C" CONC PILE ENCASEMENT PLACED IN WATER ④	CY	11.0
420 6070 (Optional)	CLASS "C" CONC PILE ENCASEMENT PLACED IN WATER ②	CY	

*Quantity may be adjusted by the Engineer. See General Note 1.

Matthew J. Herbstritt, P.E. 09-05-24

STATE OF TEXAS · MATTHEW J. HERBSTRITT · 121647 · REGISTERED PROFESSIONAL ENGINEER

Texas Department of Transportation
Bridge Division

COLUMN ENCASEMENT DETAILS

Various Structures

2024 by Texas Department of Transportation

FILE: CHSpilerepair.dgn	DN: LBF	CK: DY	DW: LBF	CK: DY
© TxDOT DEC. 2023	DISTRICT	RMC PROJECT		SHEET
REVISIONS	CHS	6469-07-001		19
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	DONLEY, ETC.	6469	07	001	US 287, ETC.

PATH: BRG-SDZIEKAN-1

LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	

HARDEMAN CO.
FM 680/BRIDGE #1701-01-002

NORTH GROESBECK CREEK	
Bent No.	4
Encasement* Length "H"	8'
No. of Piles	3
Concrete Volume (CY)	5.5
TOTAL Concrete Volume (CY)	5.5
Remove Conc Pile Encasement Total (CY)	2.1

*See General Note 1 Below.

Existing Encasement Dimensions
H = 3'
Rectangular (2' - 6")

HARDEMAN CO.
FM 2006/BRIDGE #1916-01-001

WANDERERS CREEK	
Bent No.	4
Encasement* Length "H"	8'
No. of Piles	3
Concrete Volume (CY)	5.5
TOTAL Concrete Volume (CY)	5.5
Remove Conc Pile Encasement Total (CY)	3.5

*See General Note 1 Below.

Existing Encasement Dimensions
H = 5'
Rectangular (2' - 6")

① Volume Quantities for Encasements are based on the rectangular dimensions shown in the plans.
0.18 CY-CIRCULAR/LF
0.23 CY-RECTANGULAR/LF

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
7 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

PATH: BRG-SDZIEKAN-1

Matthew J. Herbstritt P.E. 09-05-24

STATE OF TEXAS
MATTHEW J. HERBSTRITT
121647
REGISTERED PROFESSIONAL ENGINEER

Texas Department of Transportation

COLUMN ENCASEMENT LOCATION DETAILS

Various Structures

2024 by Texas Department of Transportation

FILE: CHSpilerepair.dgn	DN: JLB	CK:	DW: JLB	CK:	
©TxDOT DEC. 2023	DISTRICT	RMC PROJECT			SHEET
REVISIONS	CHS	6469-07-001			20
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	DONLEY, ETC.	6469	07	001	US 287, ETC.

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	US 287,ETC.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	25	DONLEY, ETC.		2
5-10 5-21				

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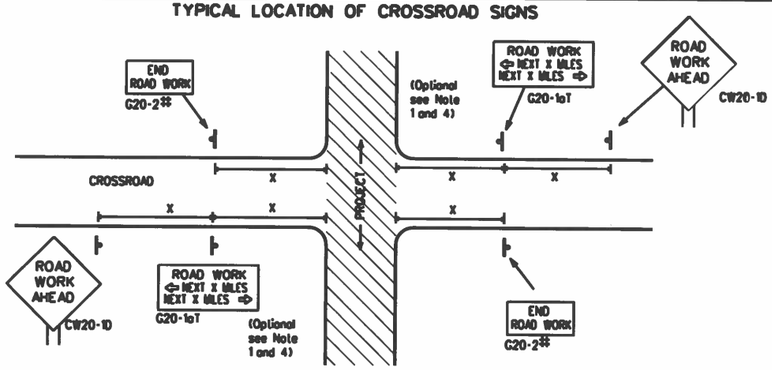
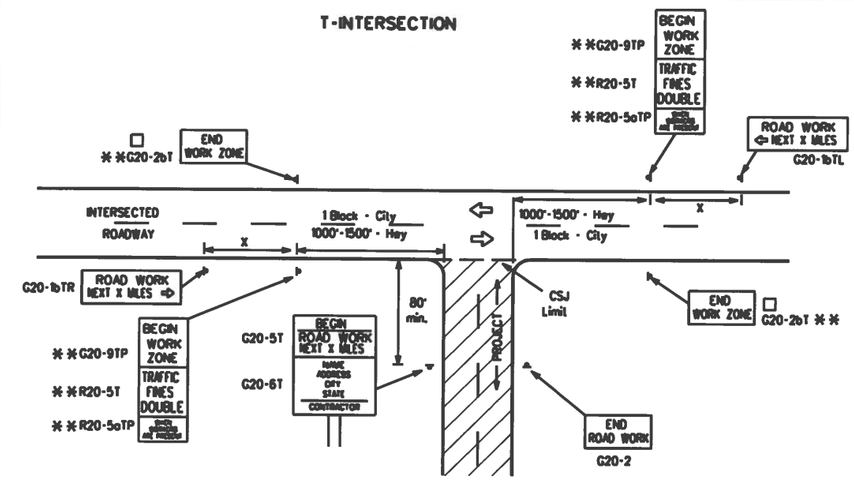
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

1.5.6

SIZE

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

SPACING

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

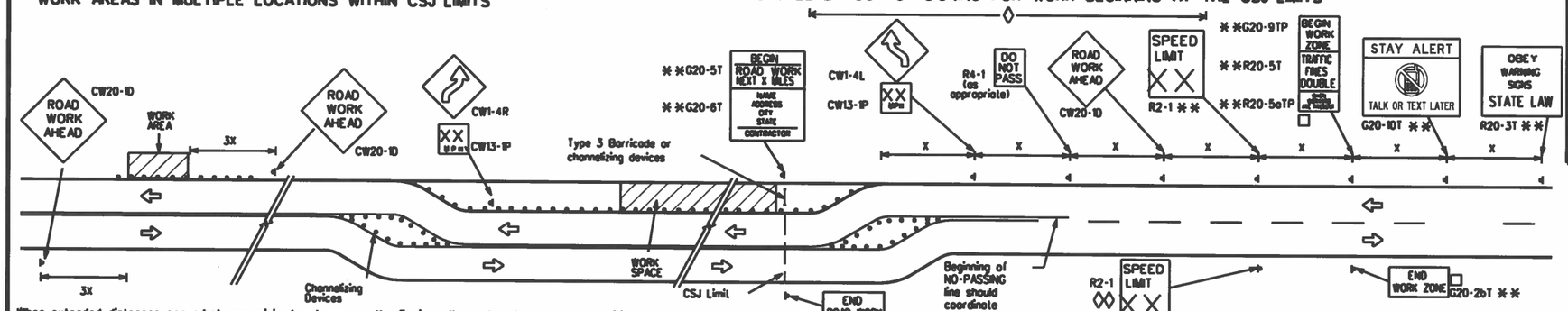
● For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

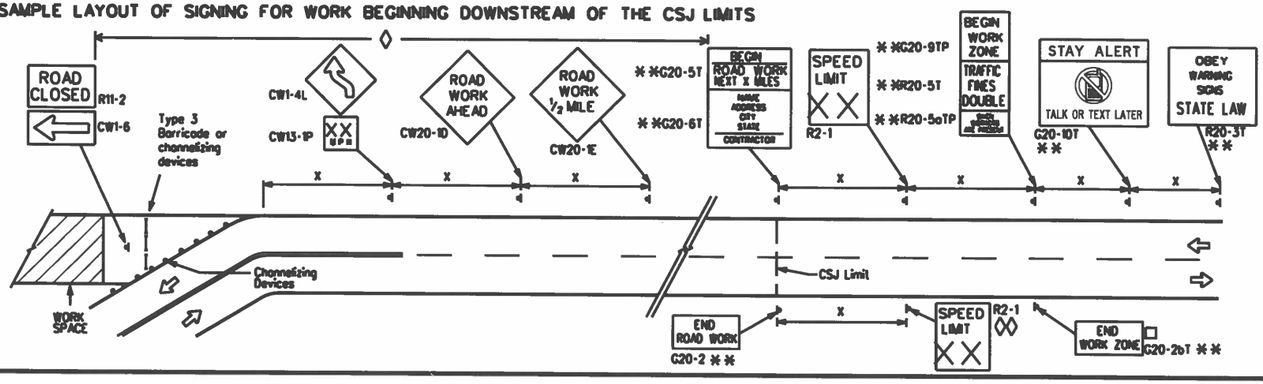
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	US 287,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	25	DONLEY,ETC.		22

96

DATE:
FILE:

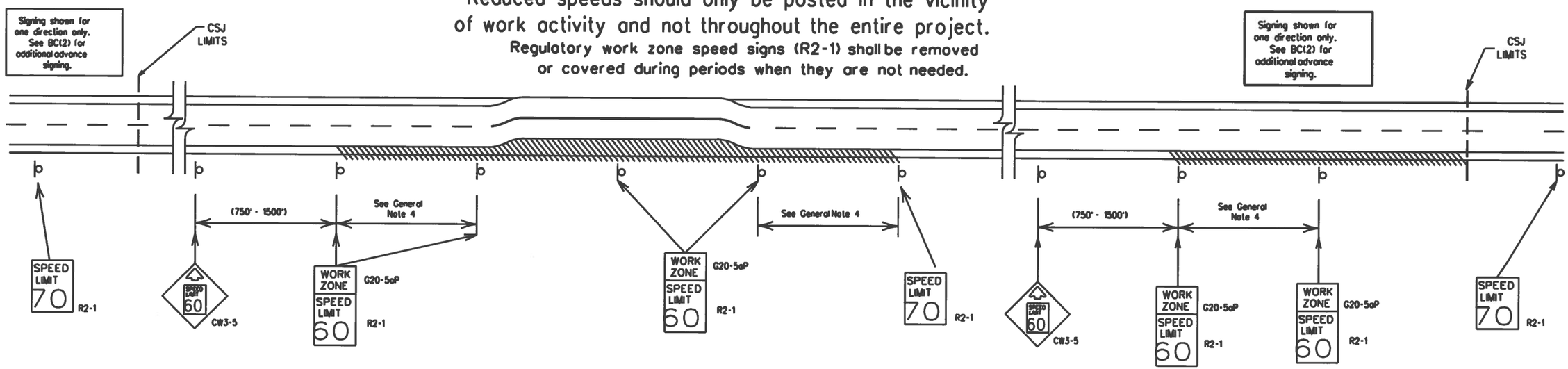
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	US 287,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	25	DONLEY, ETC.		23

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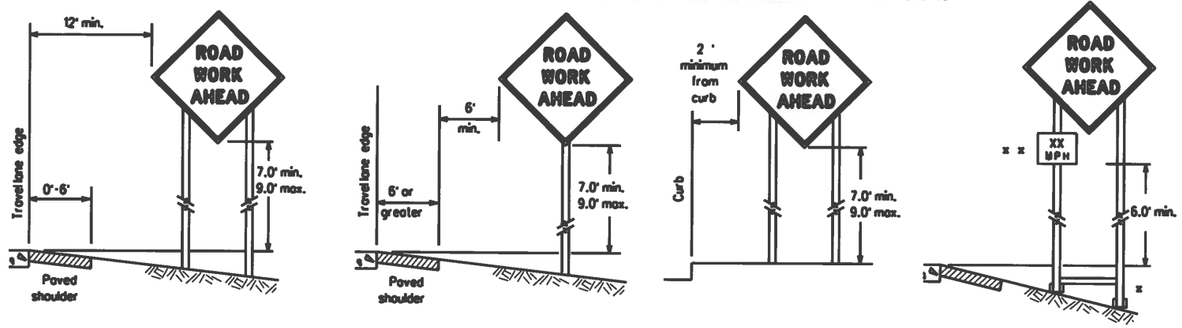
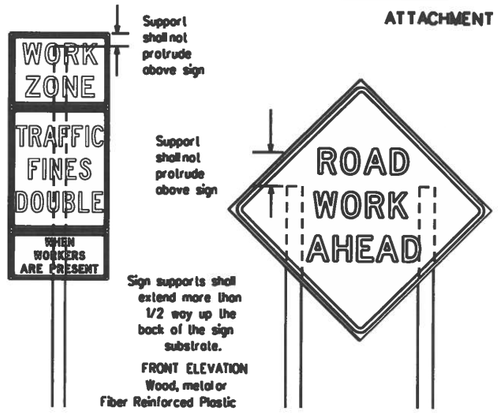
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



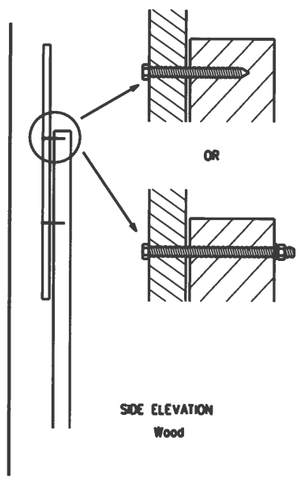
x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



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

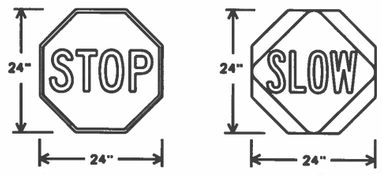


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 15 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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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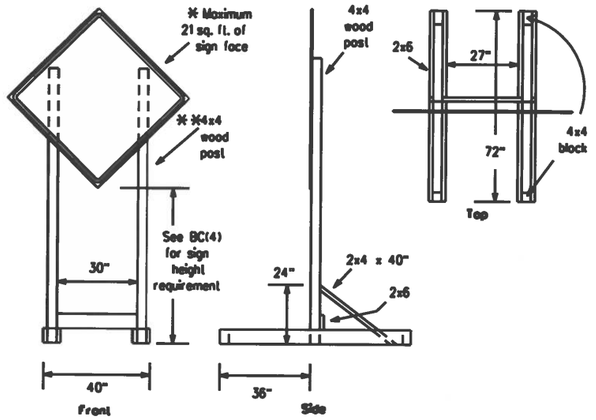
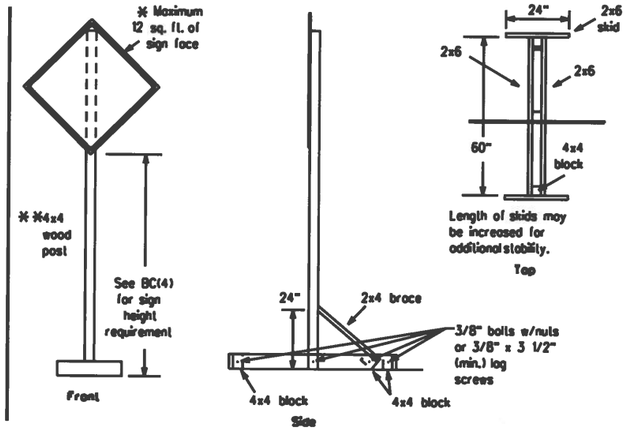
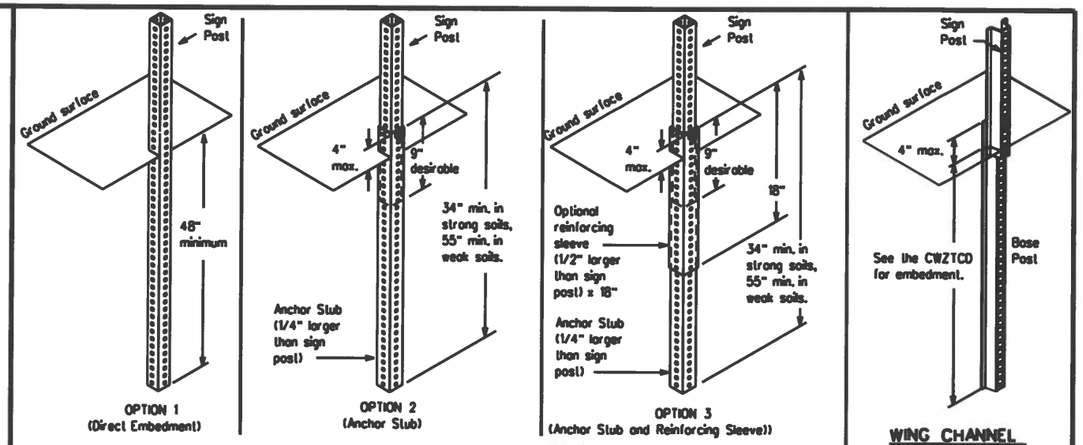




SKID MOUNTED WOOD SIGN SUPPORTS

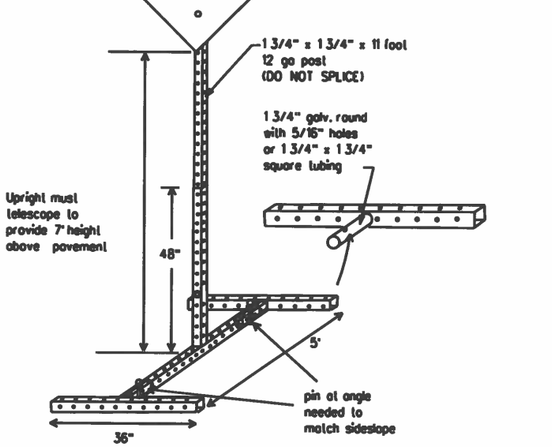
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

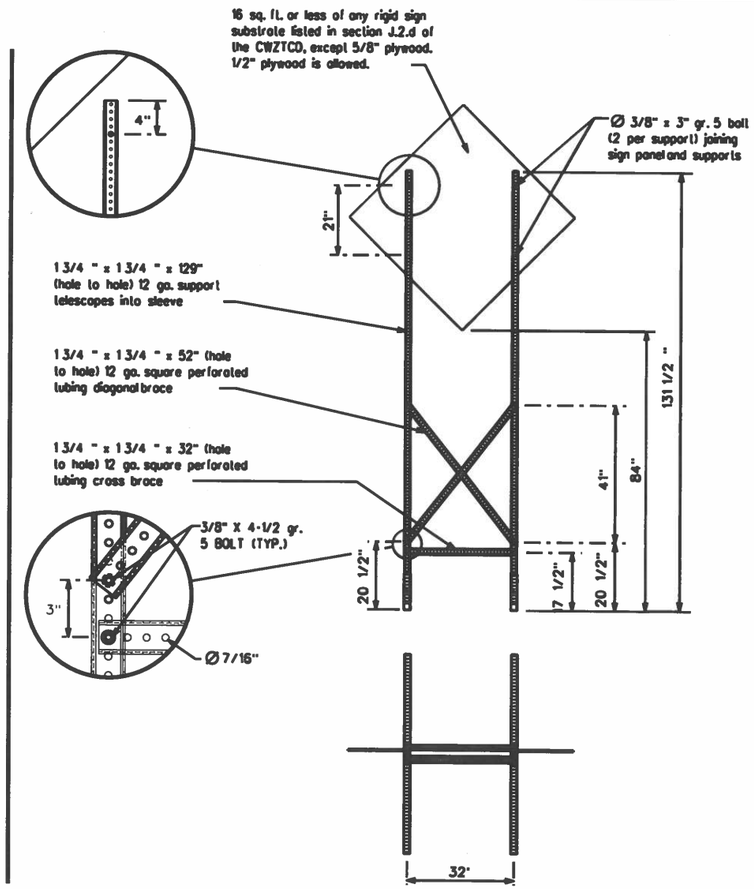


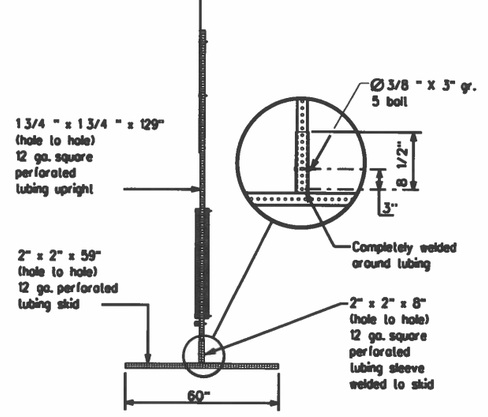
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

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

Location List

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

Warning List

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

* * Advance Notice List

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

* * See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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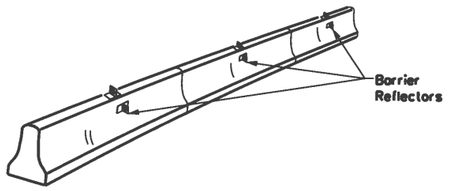
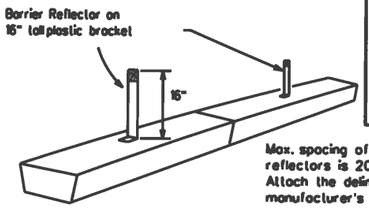
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

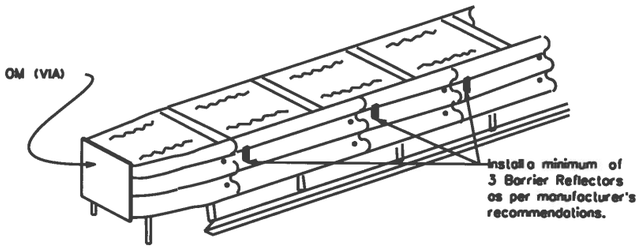


Max. spacing of barrier reflectors is 20 feet.
Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

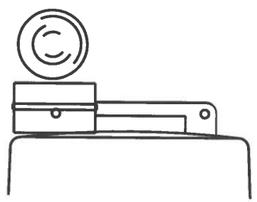


DELINEATION OF END TREATMENTS

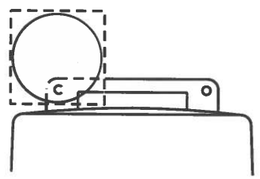
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

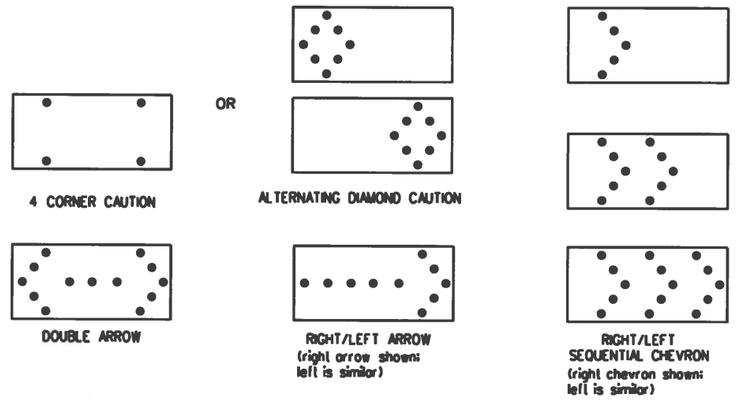
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	US 287,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	25	DONLEY, ETC.		27

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DATE:
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

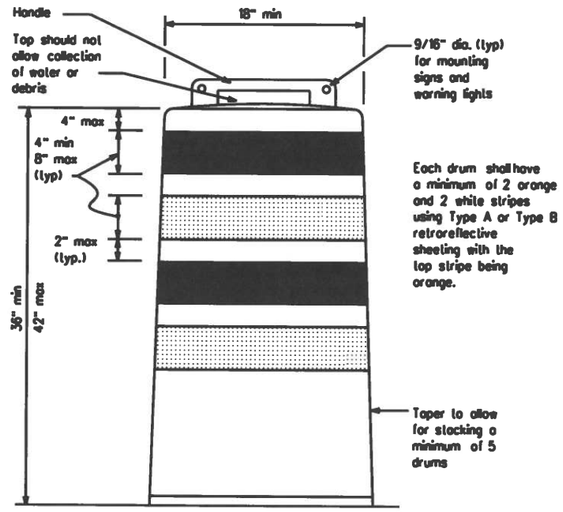
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

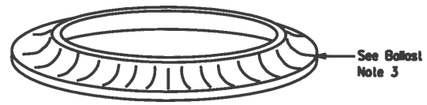
RETROREFLECTIVE SHEETING

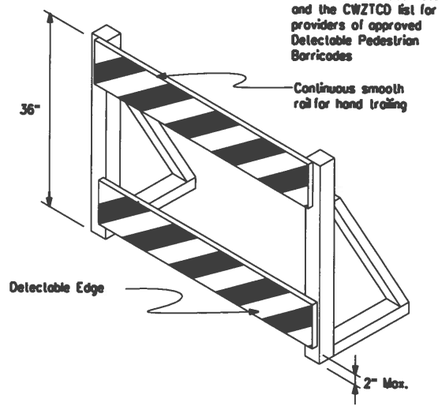
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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







DETECTABLE PEDESTRIAN BARRICADES

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

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

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	US 287,ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
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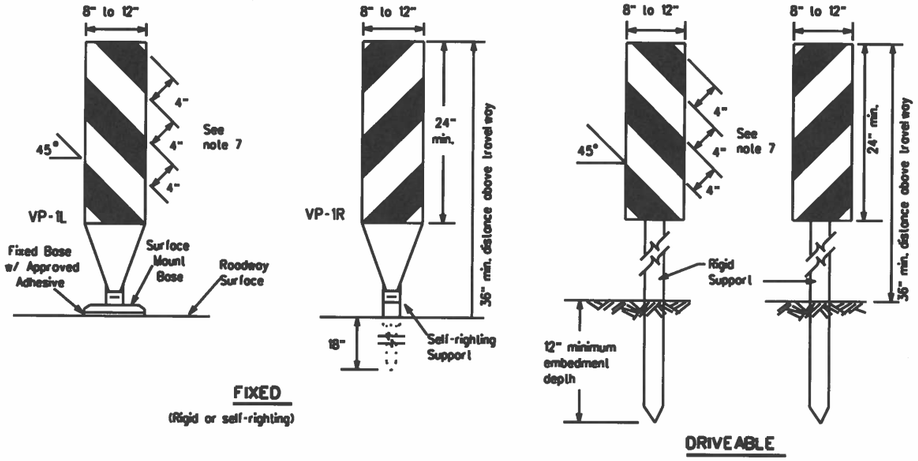
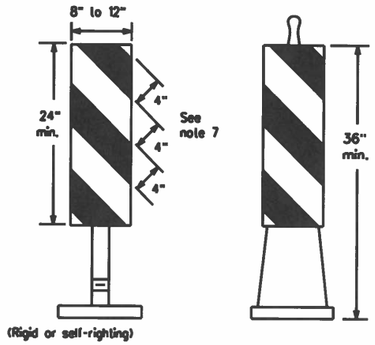


FIXED
(Rigid or self-righting)

DRIVEABLE

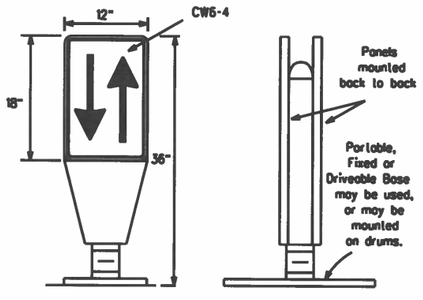


(Rigid or self-righting)

PORTABLE

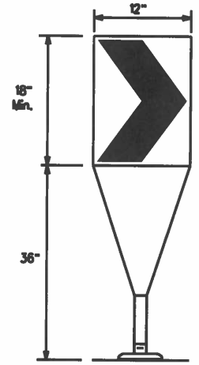
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



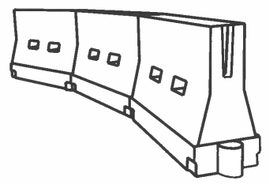
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	US 287,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	25	DONLEY, ETC.		29

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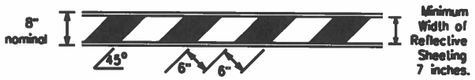
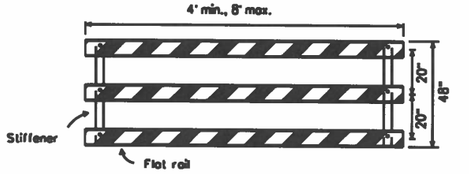
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



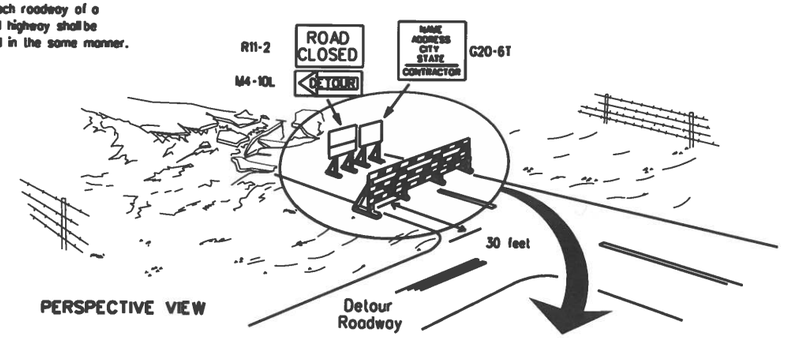
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

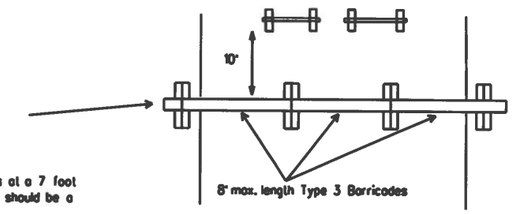
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

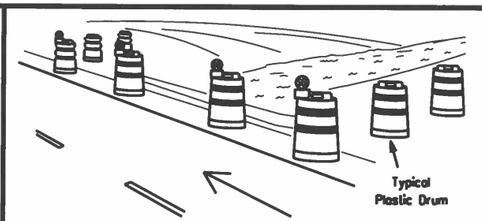
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

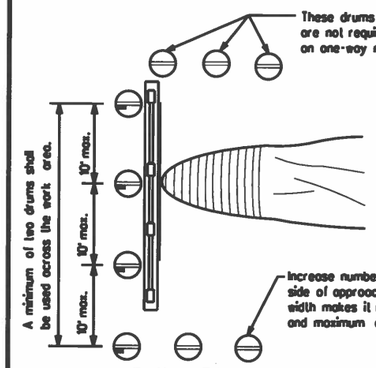
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

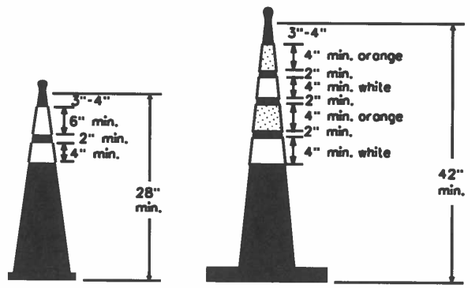
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

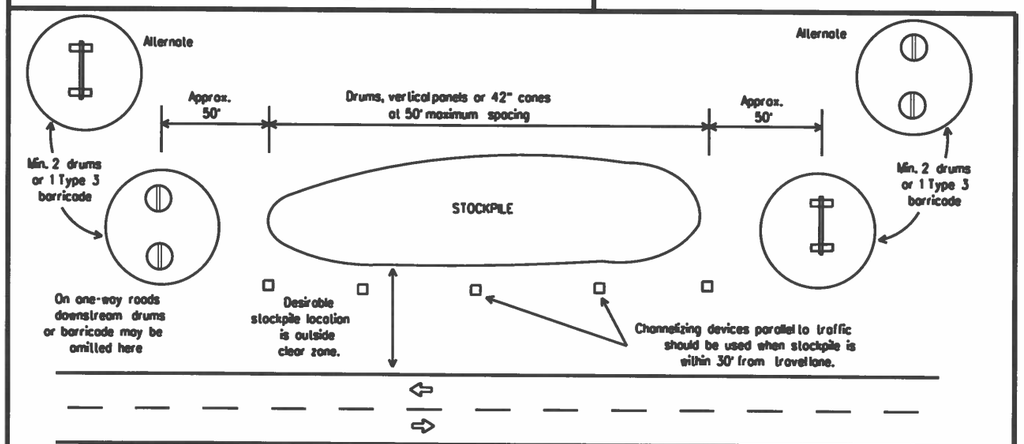
One-Piece cones

Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

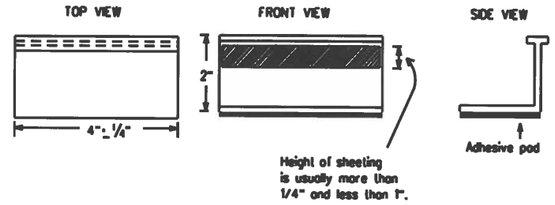
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 150 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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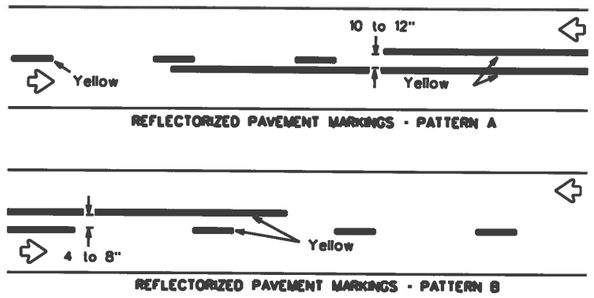
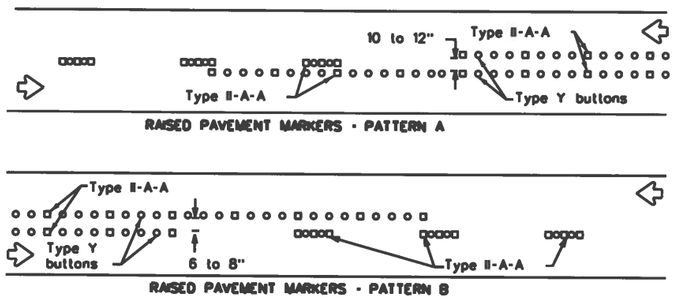
PAVEMENT MARKING PATTERNS



REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

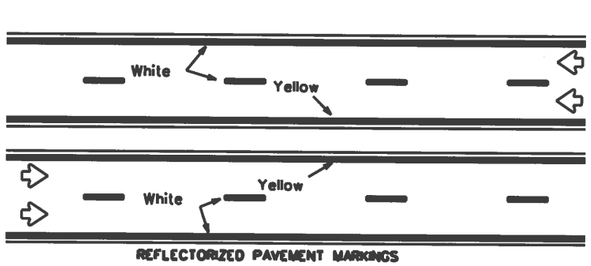


RAISED PAVEMENT MARKERS - PATTERN A

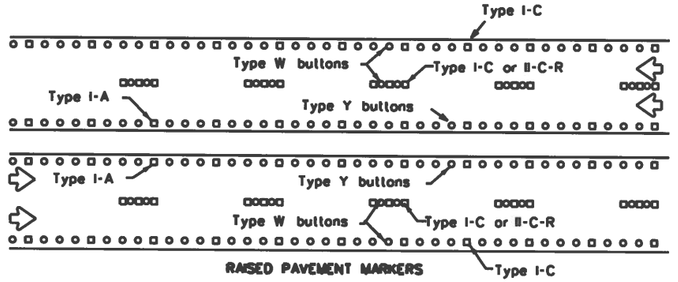
RAISED PAVEMENT MARKERS - PATTERN B

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

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



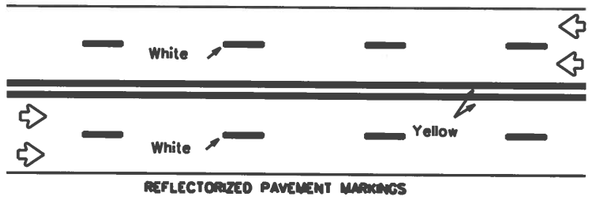
REFLECTORIZED PAVEMENT MARKINGS



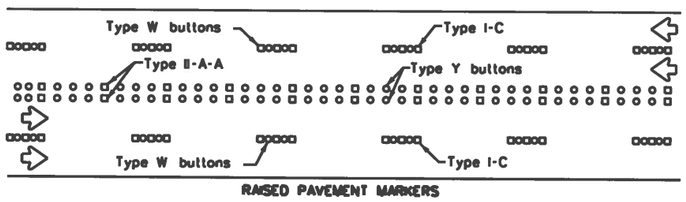
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



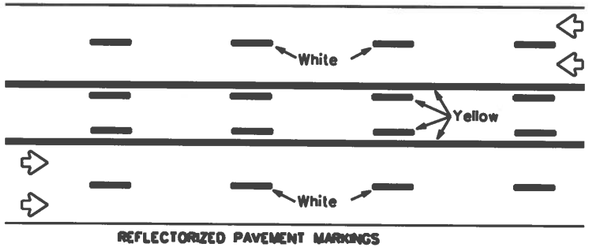
REFLECTORIZED PAVEMENT MARKINGS



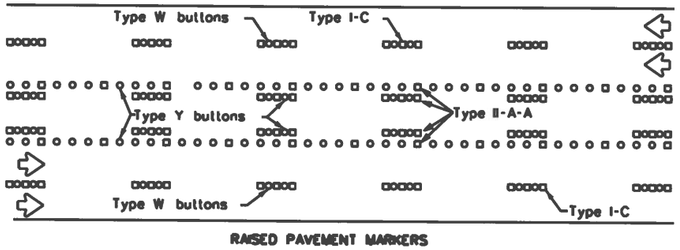
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

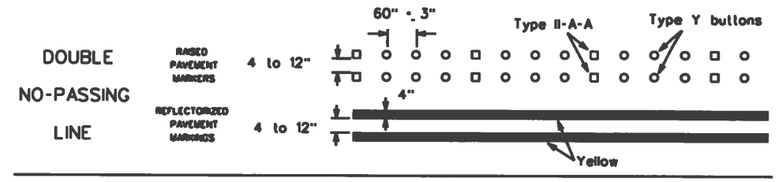
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

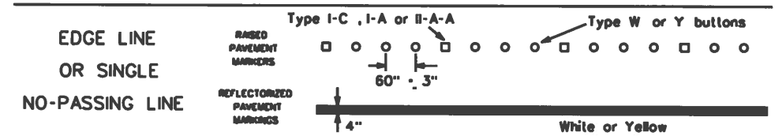
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

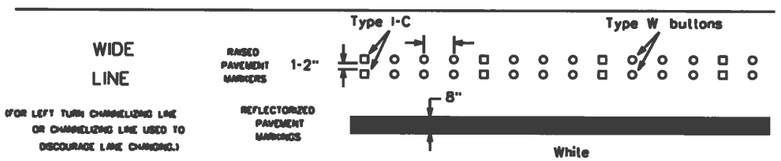


EDGE LINE OR SINGLE NO-PASSING LINE



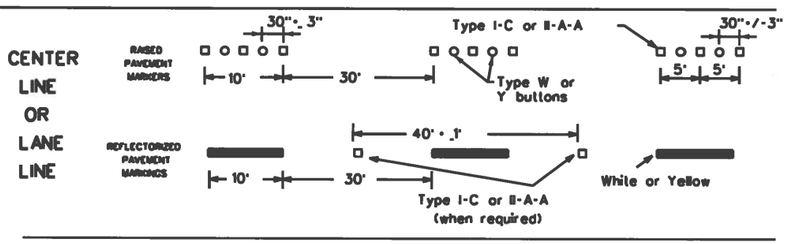
WIDE LINE

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

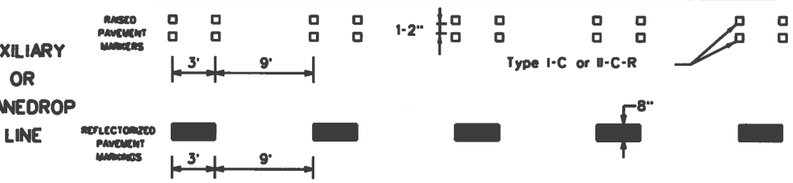


BROKEN LINES

CENTER LINE OR LANE LINE

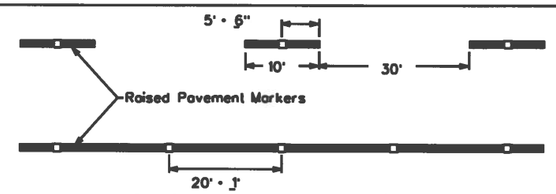


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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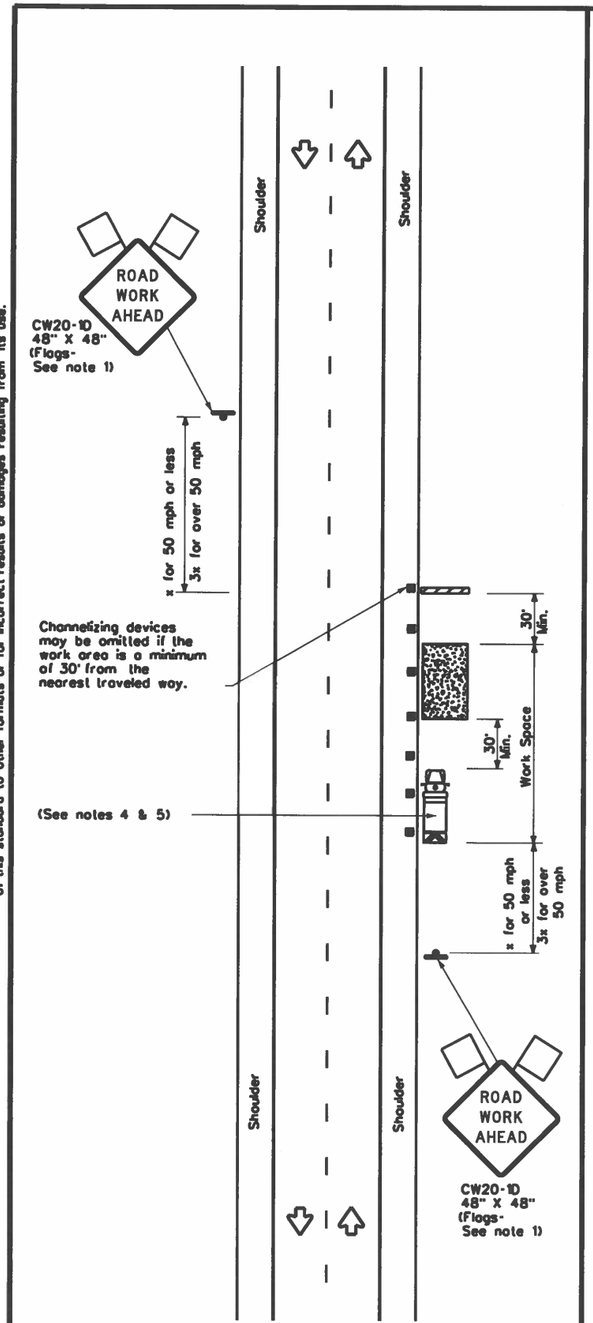
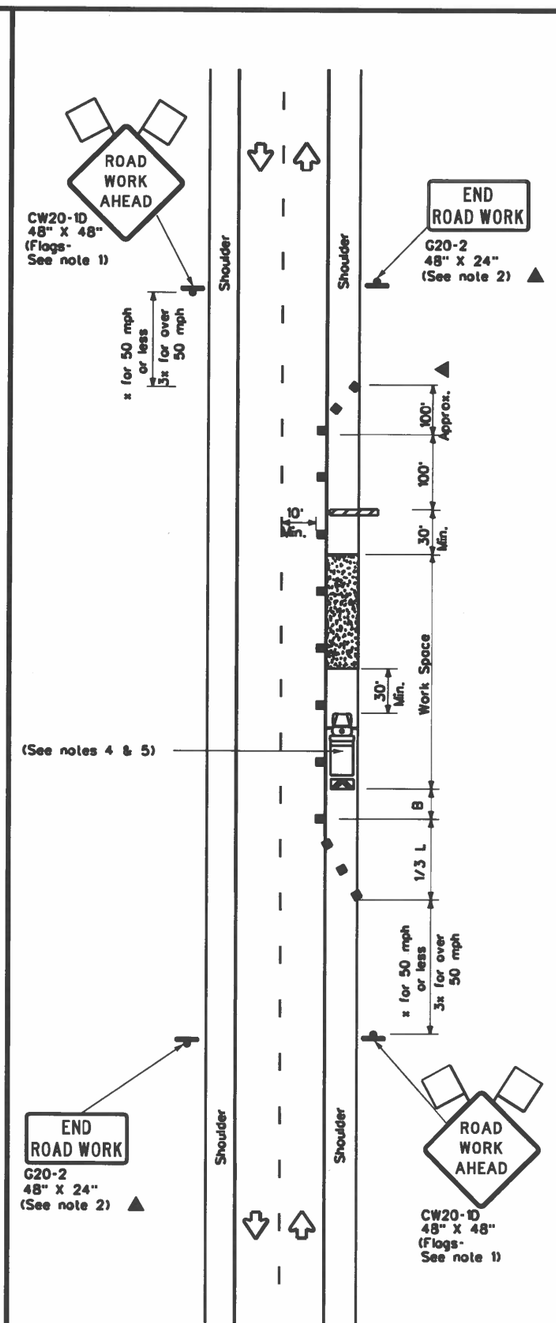


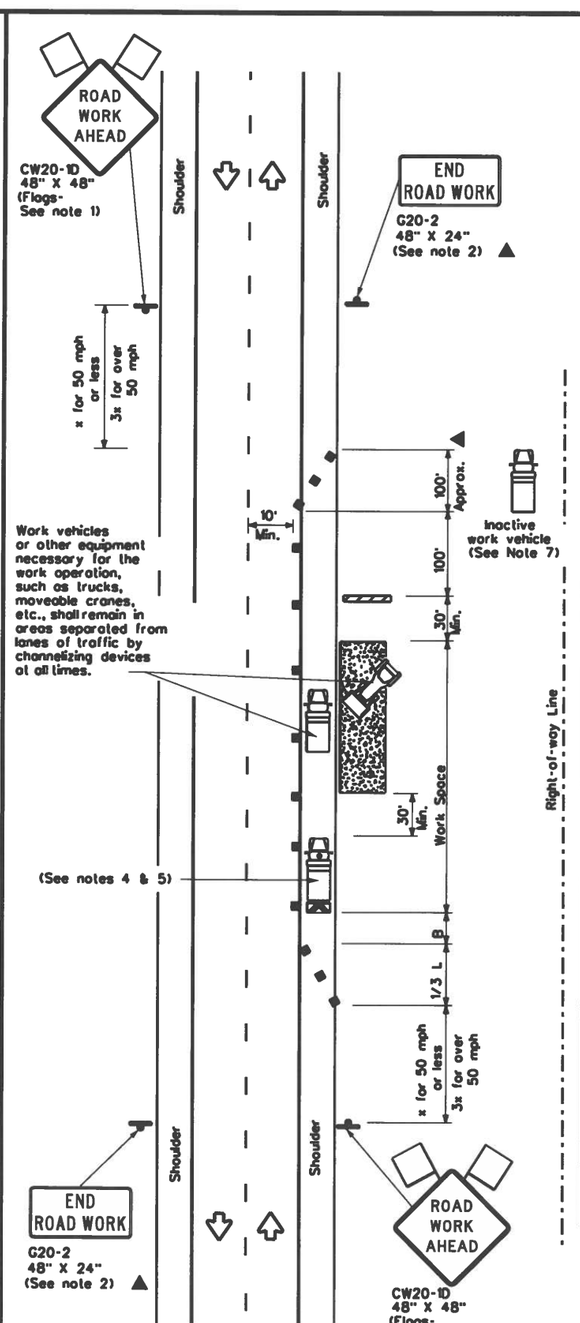
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

x Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

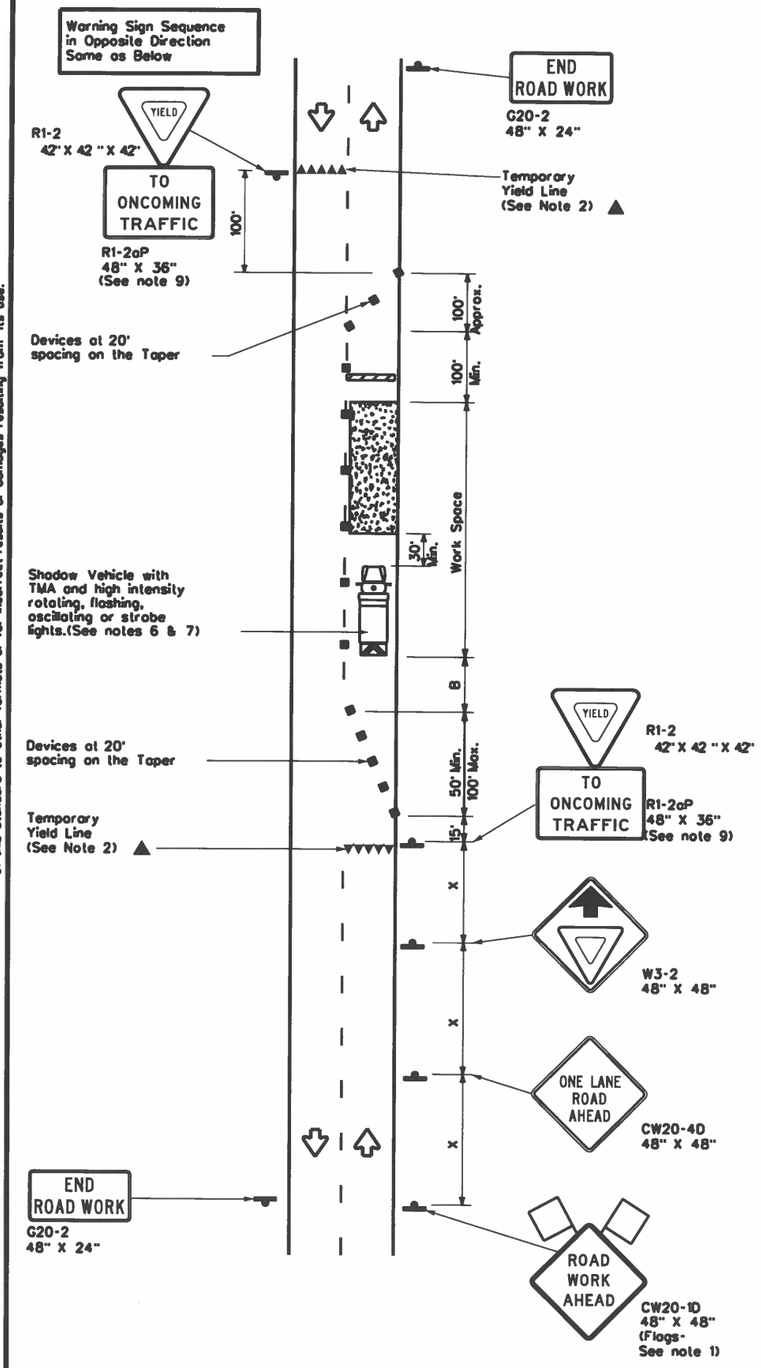
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

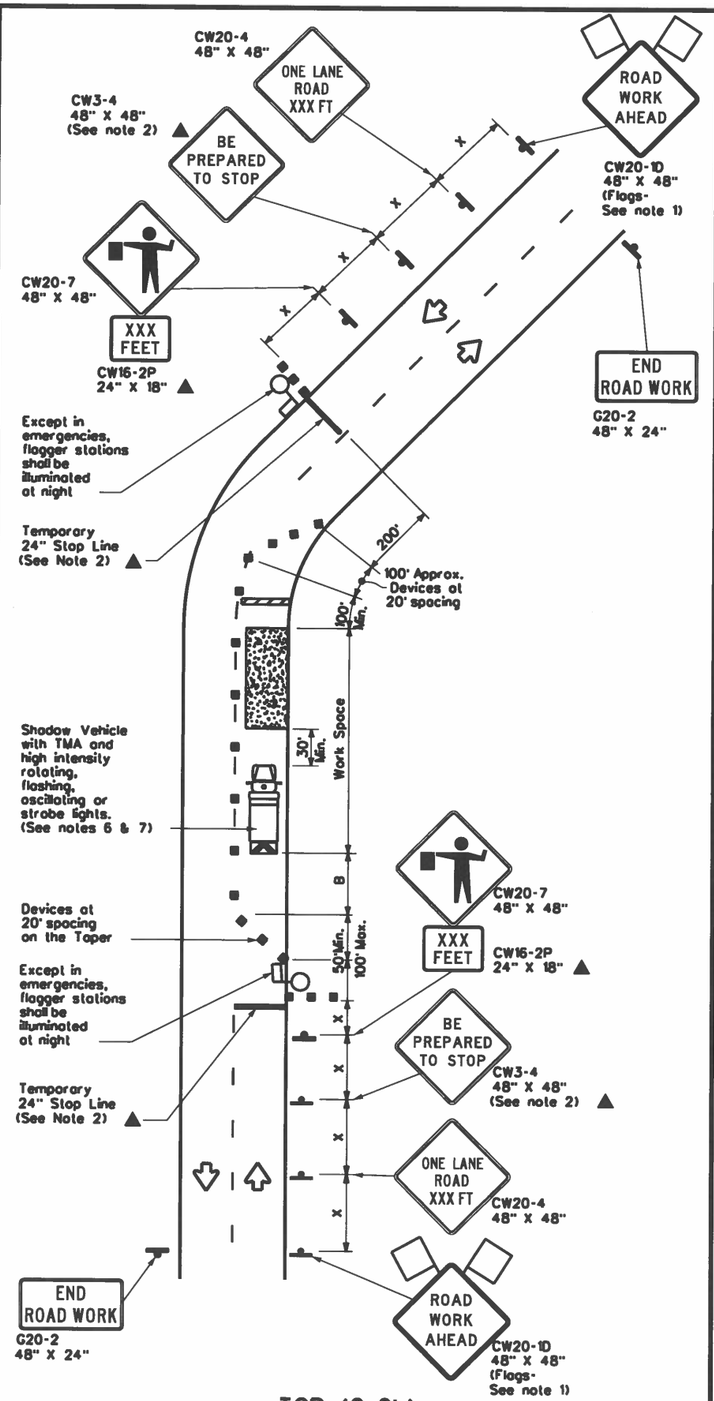
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	07	001	US 287,ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	25	DONLEY,ETC.		33
1-97 2-18				

161

DATE:
FILE:



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



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

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

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

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	6469	07	001	US287,ETC.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	25	DONLEY,ETC.		34

162

DATE:
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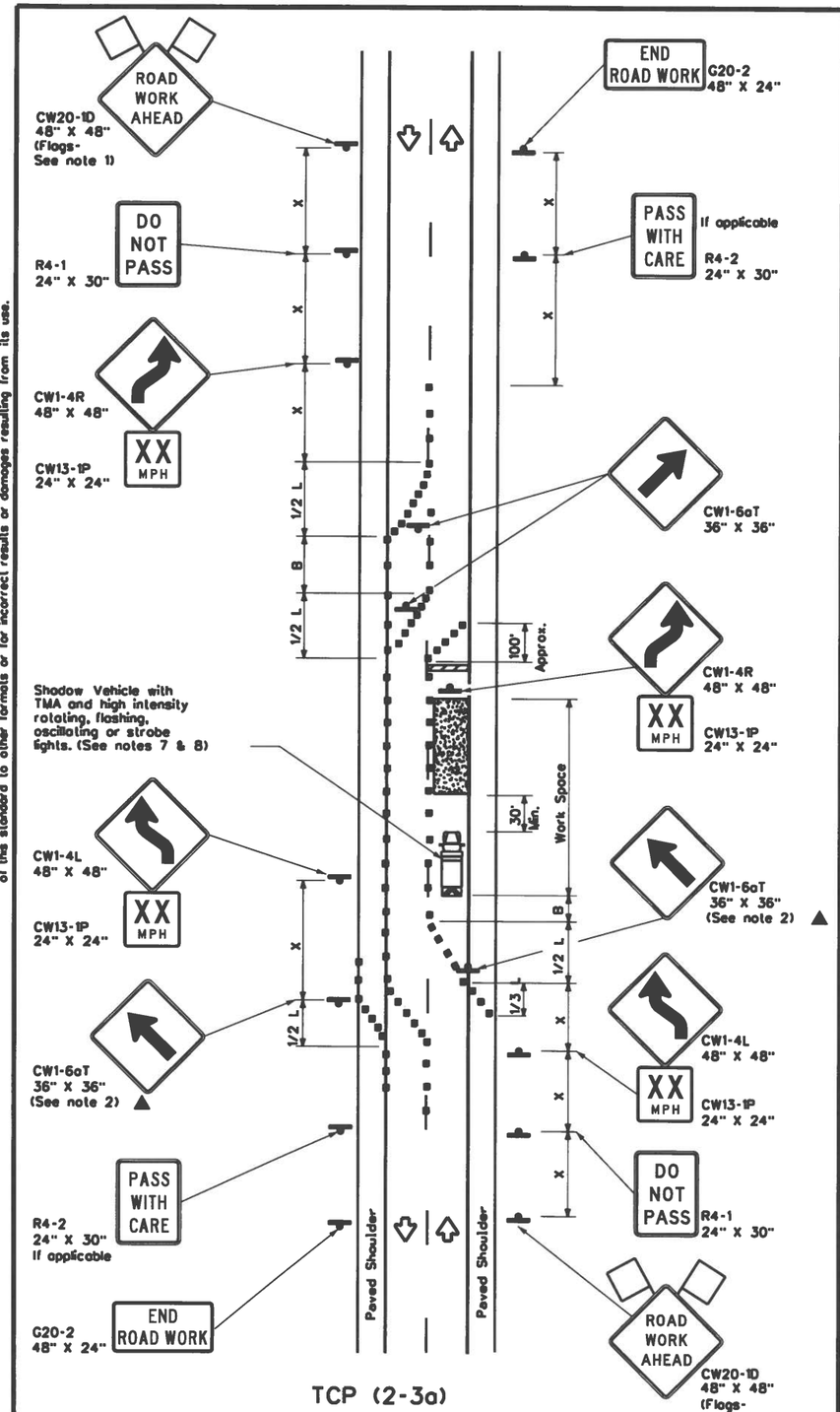
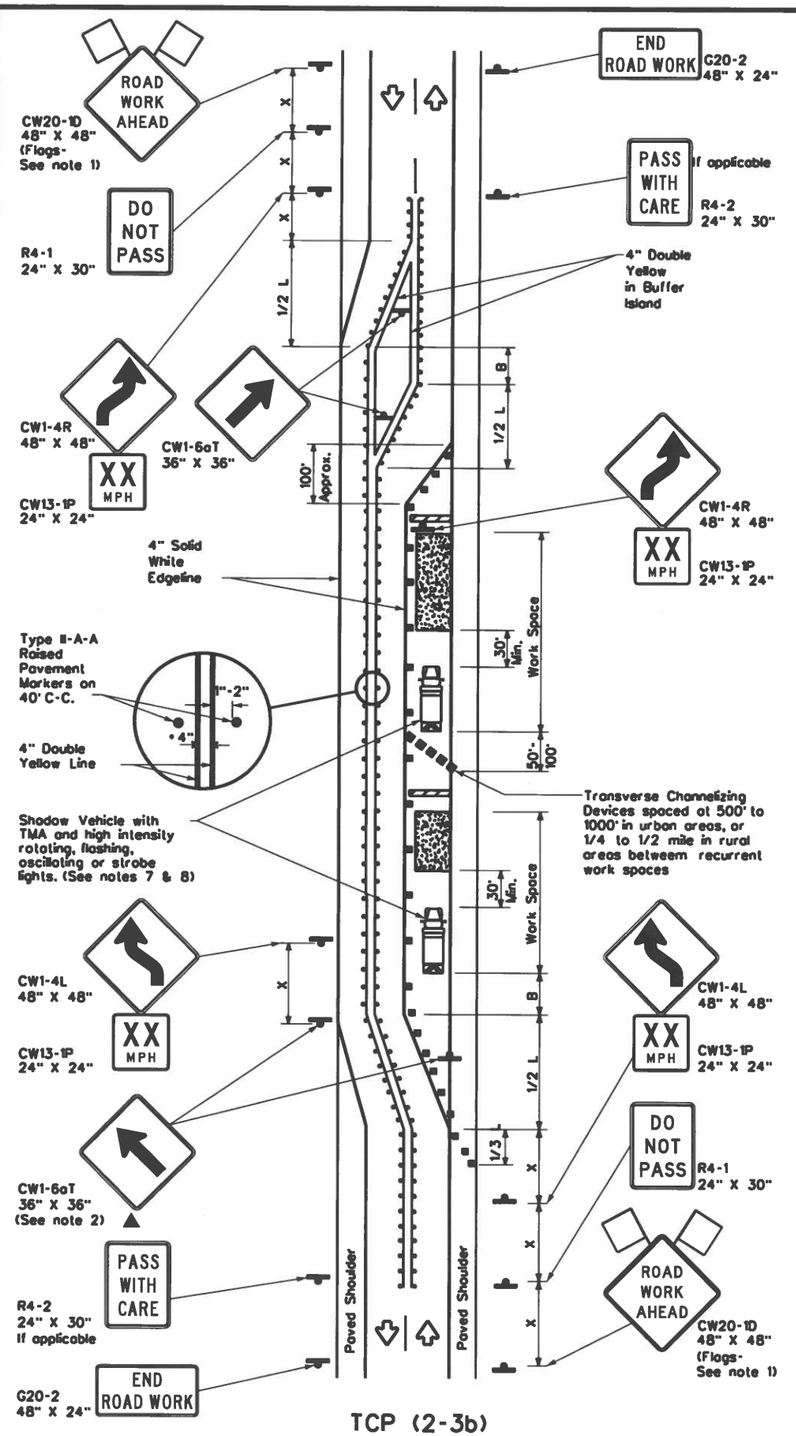


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

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

* Conventional Roads Only

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

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	6469	07	001	US287,ETC.
	DIST	COUNTY		SHEET NO.
	25	DONLEY,ETC.		35

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DATE:
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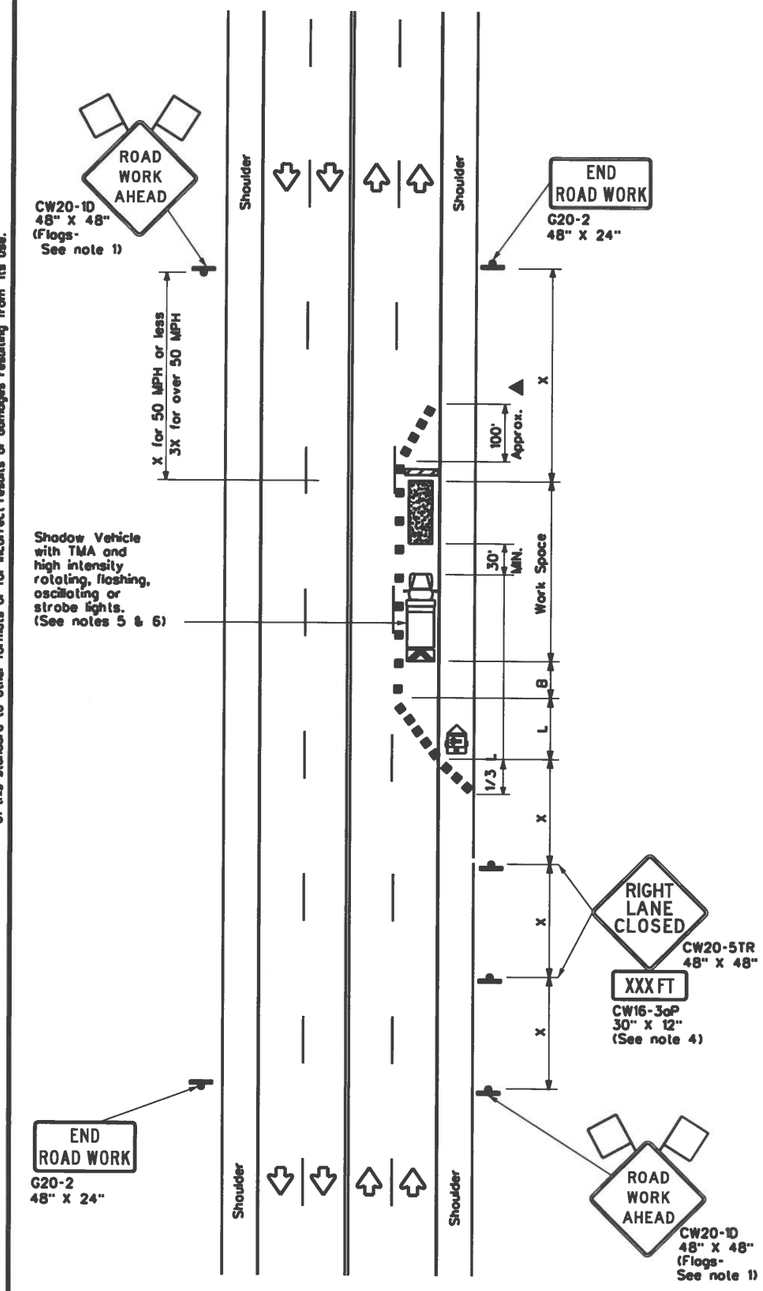
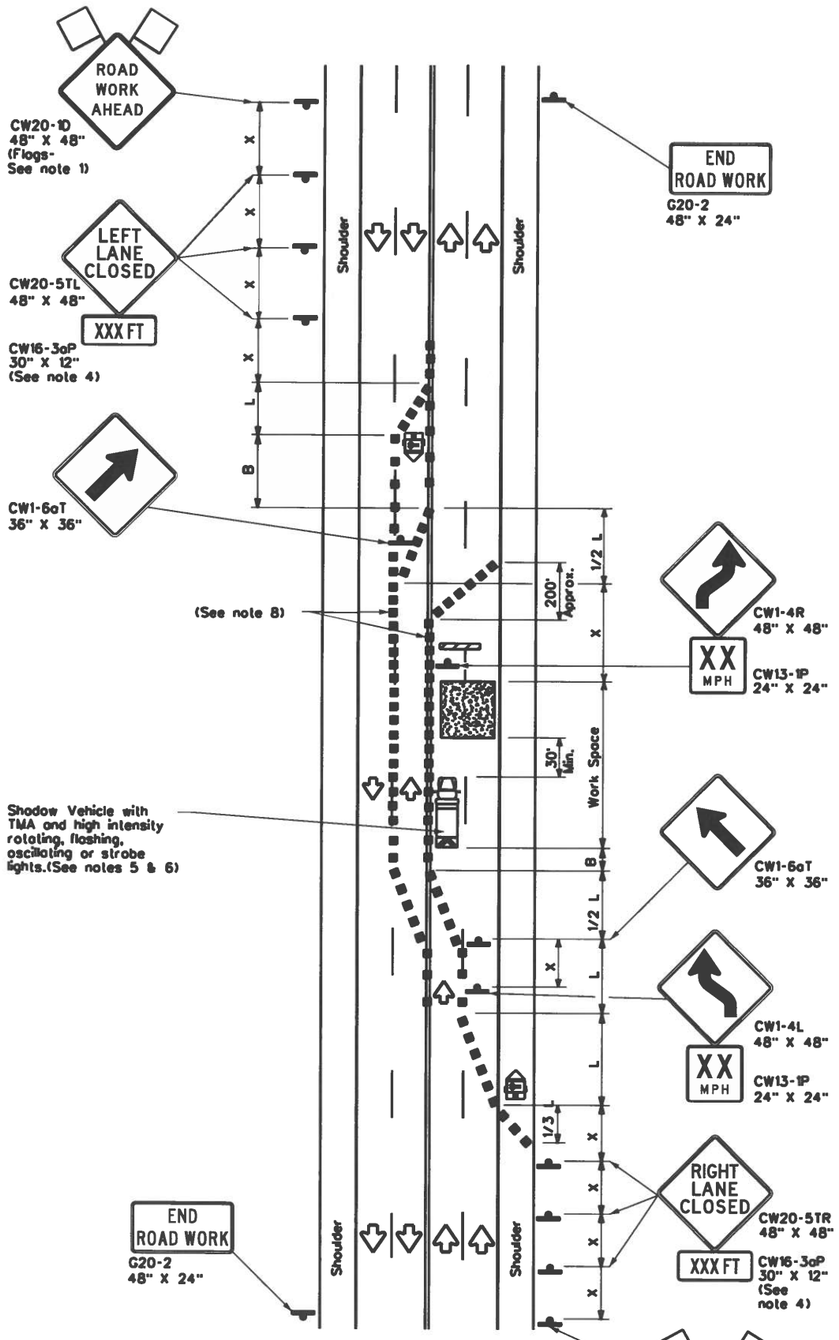


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roods Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	6469	07	001	US287,ETC.
	DIST	COUNTY		SHEET NO.
	25	DONLEY,ETC.		36

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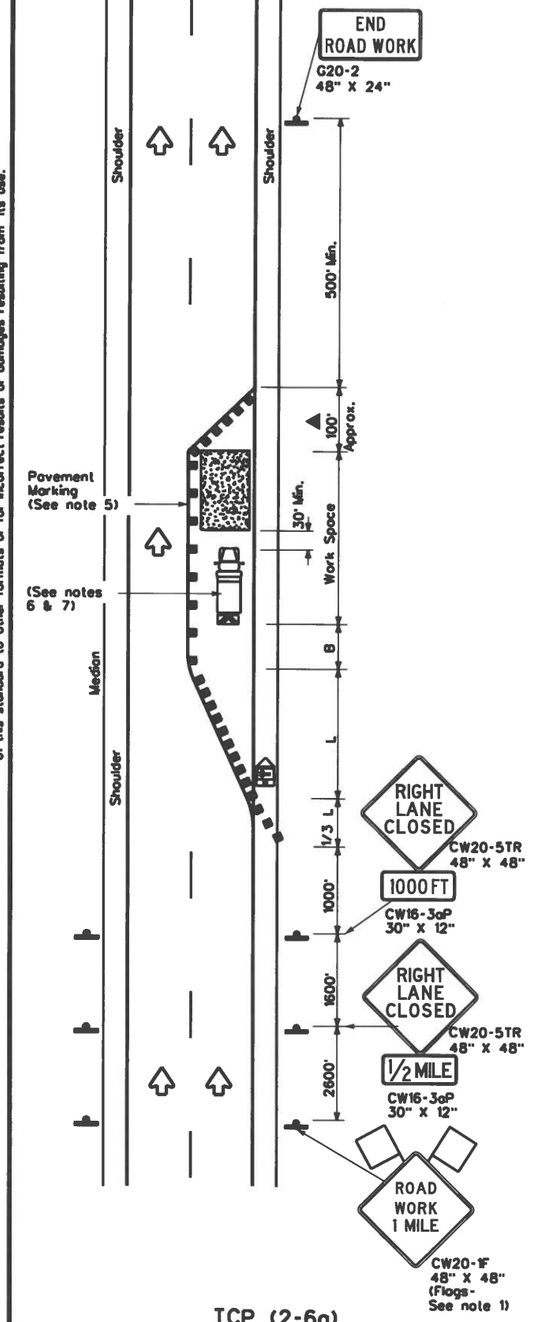
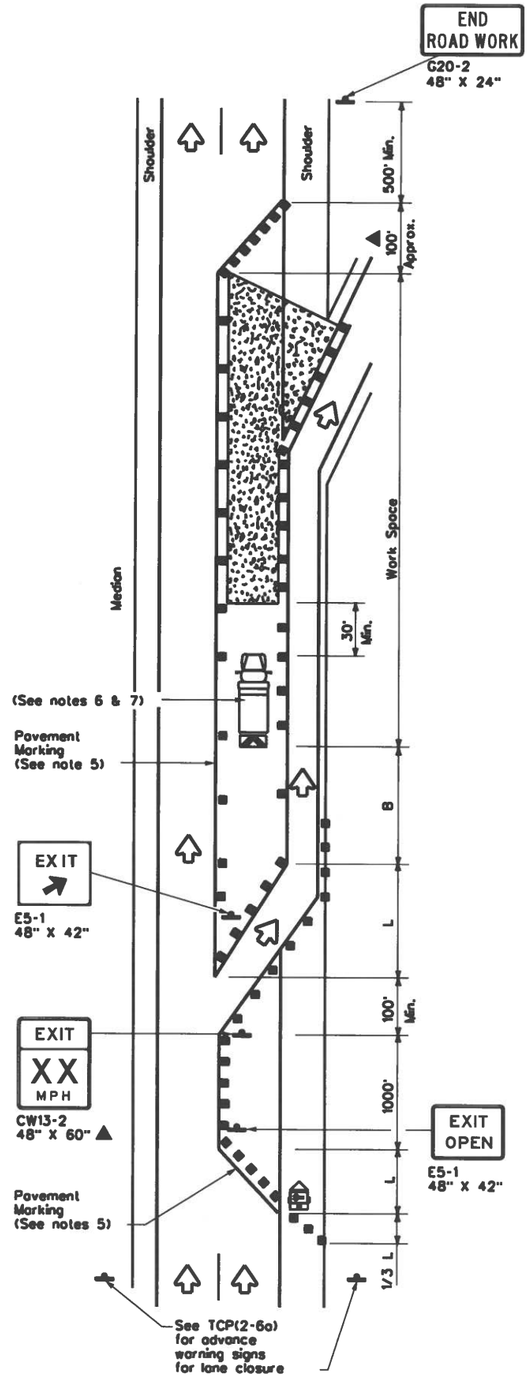


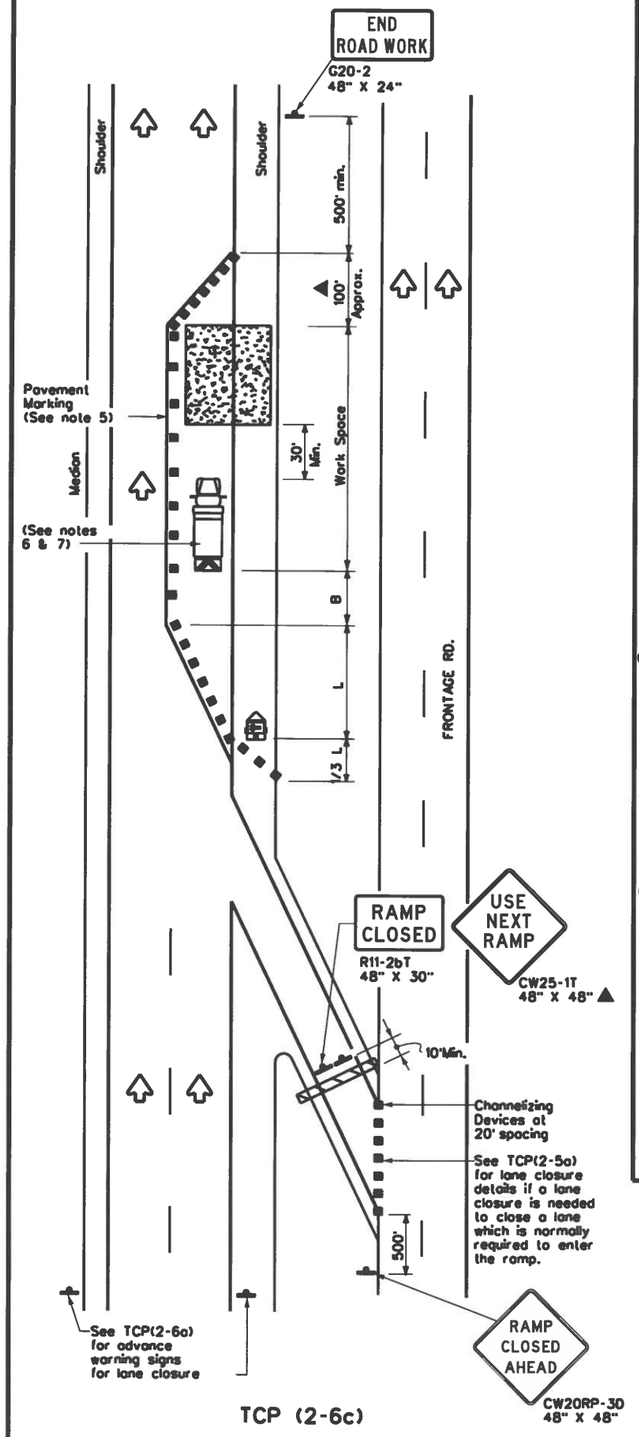
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS	6469	06	001	US 287, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12				
1-97 2-18	25	DONLEY, ETC.		37

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