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**STATE OF TEXAS**  
**DEPARTMENT OF TRANSPORTATION**  
**PLANS OF PROPOSED**  
**HIGHWAY ROUTINE MAINTENANCE CONTRACT**

**TYPE OF WORK:**

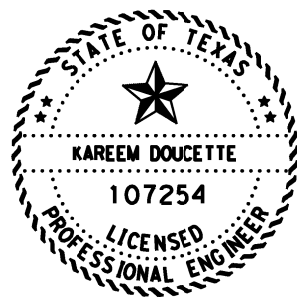
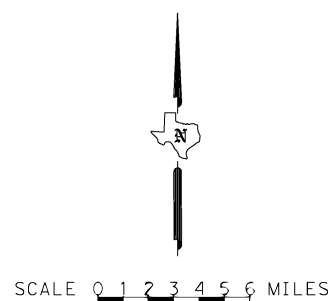
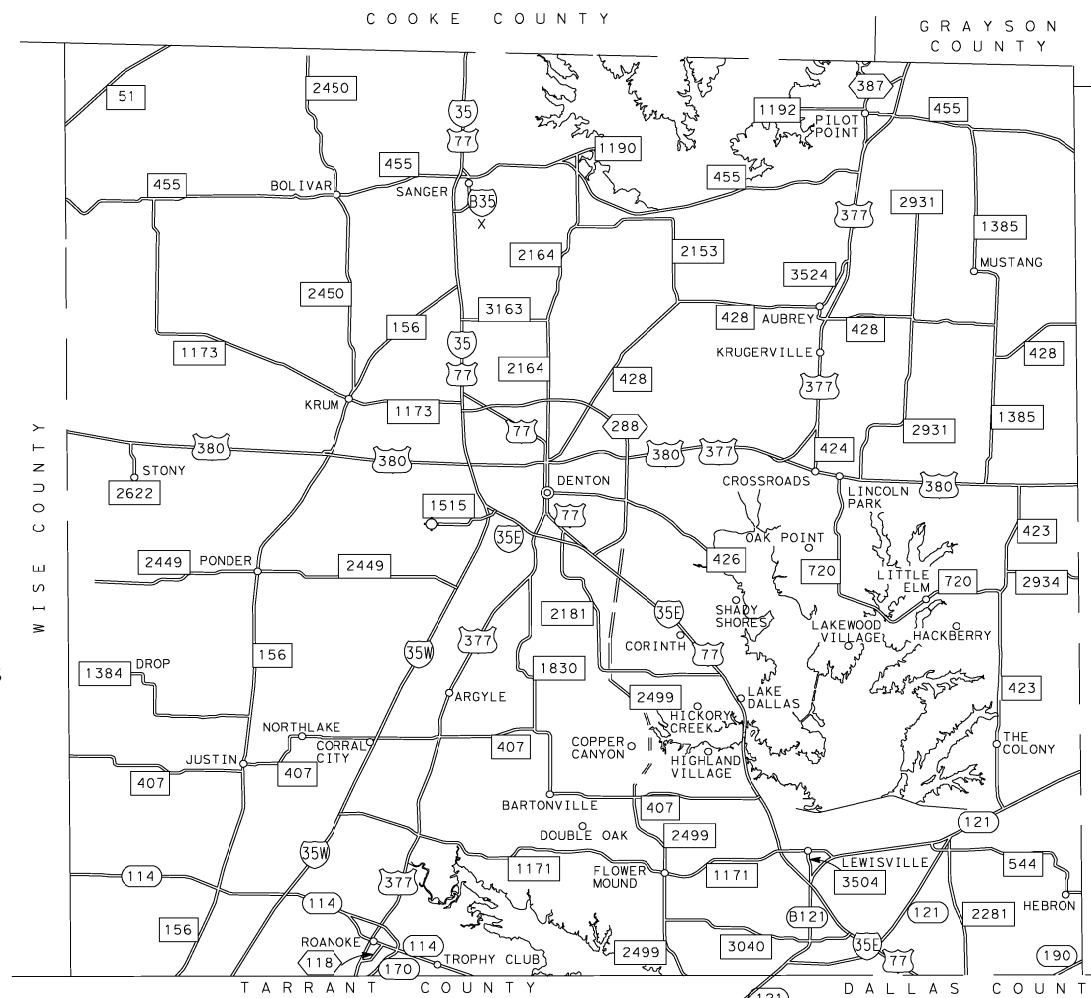
BRIDGE JOINT CLEANING AND SEALING

PROJECT NO. : BPM-646961001

HIGHWAY : IH0035W

LIMITS : VARIOUS ROADWAYS IN THE DENTON COUNTY MAINTENANCE SECTION

GRAPHICS FILE	MAINTENANCE PROJECT NUMBER		SHEET NO.
	BPM-646961001		1
CHECKED	STATE	STATE DIST.	COUNTY
AT	TEXAS	DALLAS	DENTON
CHECKED	CONT.	SECT.	JOB
KD	6469	61	001
			HIGHWAY NO.
			IH0035W



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

DocuSigned by:  
**Kareem Doucette** 9/18/2024  
 51C8F8A7FBD948C... , PE DATE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION SEPTEMBER 1, 2024 AND SPECIAL SPECIFICATION ITEMS INCLUDED IN THE CONTRACT SHALL GOVERN ON THIS PROJECT.



RECOMMENDED FOR LETTING

DocuSigned by:  
**Amanda Miller** 9/18/2024  
 01F881A42AA240C...  
 AREA ENGINEER

RECOMMENDED FOR LETTING

DocuSigned by:  
**David Momen, P.E.** 9/25/2024  
 72258D0350B04E4...  
 DISTRICT MAINTENANCE ENGINEER

RECOMMENDED FOR LETTING

DocuSigned by:  
**JEFFREY BUSH** 9/25/2024  
 345B765EB03F406...  
 DIRECTOR OF OPERATIONS

LEVELS DISPLAYED	
1	
4	



# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6469-61-001

DISTRICT Dallas  
HIGHWAY IH0035W

COUNTY Denton

CONTROL SECTION JOB				6469-61-001		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00210572			
COUNTY				Denton			
HIGHWAY				IH0035W			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	438-7004	CLEANING AND SEALING EXIST JOINTS (CL3)	LF	304.000		304.000	
	438-7007	CLEANING AND SEALING EXIST JOINTS (CL7)	LF	2,800.000		2,800.000	
	438-7012	CLEAN AND SEAL JNTS (PAN GIRDERS) (CL7)	LF	114.000		114.000	
	438-7013	CLEANING & SEALING EXISTING JOINT (SEJ)	LF	582.000		582.000	
	500-7001	MOBILIZATION	LS	1.000		1.000	
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000	
	503-7002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	505-7001	TMA (STATIONARY)	DAY	87.000		87.000	
	713-7003	JT CLEANING AND SEALING (EXPANSION JTS)	LF	638.000		638.000	



**Project Number:** BPM- 646961001

**Control:** 6469-61-001

**County:** Denton

**Highway:** IH0035W

**GENERAL NOTES:**

**General:**

This project consists of performing “Bridge Joint Cleaning and Sealing” on various roadways in the Denton County Maintenance Section.

Work to be performed under this contract is Site Specific.

TABLE 1

REF NO.	HIGHWAY	LOCATION	NBI#
1	IH 35W NB ML	DENTON CRK SLOUGH	180610008113119
2	IH 35W SB ML	DENTON CRK SLOUGH	180610008113118
3	IH 35 SBML	MOORES BRANCH	180610019502059
4	IH 35W NB ML	DENTON CREEK	180610008113117
5	IH 35W SB ML	DENTON CREEK	180610008113116
6	IH 35E	FM 2181	180610019503137
7	US 377/380 WB	ELM FK TRINITY RIV REL1	180610013510128
8	FM 2499 SB	POINDEXTER CREEK	180610268101012
9	IH 35E NBML	TIMBER CREEK	180610019602079
10	IH 35E NBML	ELM FORK TRINITY RIVER	180610019602026
11	IH 35E NBML	TIMBER CREEK RELIEF	180610019602250
12	IH 35E SBML	SH 121 BUS	180610019602213
13	JOHN PAINE ROAD	IH 35W	180610008113102
14	US 380 EB	DRY FORK HICKORY CRK	180610013409133
15	FM 1515	KCS RAILROAD	180610195101003
16	FM 2450	CLEAR CREEK	180610235302002

The Department reserves the right to revise schedule as it deems necessary.

Provide and maintain a dedicated email address for receipt of work orders and correspondence throughout the term of this contract. Acknowledgement of emailed work order/callouts is required no more than 12 hr. from notification.

Contractor’s attention is called to the fact that all adjoining pavement sections will be protected during all phases of construction and any damages incurred due to Contractor’s operation will be repaired and replaced at the Contractor’s expense.

**Project Number:** BPM- 646961001

**Control:** 6469-61-001

**County:** Denton

**Highway:** IH0035W

Coordinate work through:

Wayne Powell  
2624 W Prairie  
Denton, Texas 76201  
940-387-1414

Bids will be received at 4777 E. Hwy 80, Mesquite, Texas 75150-6643.

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

Amanda Miller, P.E. [Amanda.Moser@txdot.gov](mailto:Amanda.Moser@txdot.gov)  
Wayne Powell [Wayne.Powell@txdot.gov](mailto:Wayne.Powell@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.

Attention is directed to the possible presence of underground utilities owned by the Texas Department of Transportation (irrigation, signal, illumination and surveillance, communication, and control) on the right of way. Call the Department for locates at 214-320-6682 48 hr. in advance of excavation. Contact the appropriate department of the local city or town a minimum of 48 hr. in advance of excavation.

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

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

**Project Number:** BPM- 646961001

**Control:** 6469-61-001

**County:** Denton

**Highway:** IH0035W

**Item 2 – Instructions to Bidders:**

This project includes plan sheets that are not part of the bid proposal.

View or download plans at:

<http://www.dot.state.tx.us/business/plansonline/agreement.htm>

**Item 7 – Legal Relations and Responsibilities:**

Pre-construction safety meeting will be conducted with Contractor’s personnel prior to work beginning on a continuously prosecuted contract or before each callout work request.

Attendance of this meeting will not be paid directly but considered subsidiary to the various bid items.

Do not obtain law enforcement personnel without requesting in writing 48 hr. prior to need and the Engineer’s written approval. The Department may compensate the Contractor for providing full time, off-duty, uniformed, law enforcement personnel, and patrol car. The law enforcement personnel may be required for assistance with traffic control for lane or ramp closures or other situations that dictate the need for law enforcement officers as directed. Off-duty law enforcement personnel will have transportation jurisdiction and full police powers. Law enforcement personnel will show proof of certification by the Texas Commission on Law Enforcement (TCOLE).

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

Holiday restrictions – the Engineer may decide that no lane closures or construction operations will be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No additional compensation will be allowed for these restricted closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

- New Year’s Eve and Day (noon on December 31 thru 10 P.M. January 1)
- Easter Holiday weekend (noon on Friday thru 10 P.M. Sunday)
- Memorial Day weekend (noon on Friday thru 10 P.M. Monday)
- Independence Day (noon on July 3 thru 10 P.M. on July 5)
- Labor Day weekend (noon on Friday thru 10 P.M. Monday)
- Thanksgiving Holiday (noon on Wednesday thru 10 P.M. Sunday)

**Project Number:** BPM- 646961001

**Control:** 6469-61-001

**County:** Denton

**Highway:** IH0035W

- Christmas Holiday (noon on December 23 thru 10 P.M. December 26)

Holiday restrictions for Independence Day, Thanksgiving Holiday, and the Christmas Holiday may be extended for the “week of” due to the nature of work being performed and the work location at the discretion of the Engineer for safety of the traveling public.

Roadway closures during the following key dates and/or special events are prohibited.

- The University of Texas vs. University of Oklahoma football game (no lane closures beginning 4 hr. prior to the event and ending 3 hr. following event completion).
- Texas Motor Speedway – NASCAR Series Races – April and November
- Texas Motor Speedway – INDY Series Races – June and September

The Contractor will plan his work such that no work is ongoing and all lanes of traffic are available for the NASCAR series races at the Texas Motor Speedway starting the Thursday of race week through Sunday. These races are run usually in early April and Mid-November. The Contractor will not be allowed to have any lane closures on the day of the INDY car races, one of which is usually scheduled during the beginning of June and the other is usually scheduled during Mid-September. Scheduled events at Texas Motor Speedway may be reviewed at their website: <http://www.texasmotorspeedway.com>. All incomplete work activities will need to be shaped up prior to the race events as to pose no hazard to traffic. The above is applicable to each year the work is ongoing. Time will not be charged on these days.

**Item 8 – Prosecution and Progress:**

Working days will be charged in accordance with Section 8.3.1.4, “Standard Workweek”.

Nighttime work is allowed in accordance with Section 8.3.3.2.2.

Contractor will submit a bar chart or CPM chart for progress of schedule. Present work to begin no later than 7 calendar days from the work order letter unless otherwise approved.

**Project Number:** BPM- 646961001

**Control:** 6469-61-001

**County:** Denton

**Highway:** IH0035W

The Lane Closure Assessment Fee is shown on the following table. The fee applies to the Contractor for closures or obstructions that overlap into restricted hour traffic for each hour or portion thereof, regardless of the duration of the lane closure or obstruction.

**Table 2**  
**Lane Closure Assessment Fee Table**

Roadway	Amount Per Lane Per Hour
Applicable Roadway	\$ 5,000

Perform work during the shaded months presented in the "Schedule of Work" Table.

**TABLE 2**  
**SCHEDULE OF WORK**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Site-Specific Work												

**Item 9 – Measurement and Payment:**

Submit invoices for material on hand (MOH) in accordance with this item.

Payment for police officer hours under force account method will not exceed the duration of the lane closure. Time will begin when set up operations commence and end when the closure is removed. TxDOT Form 318 will be utilized.

**Item 502 – Barricades, Signs, and Traffic Handling:**

All work on traveled roadways surfaces will generally be performed at night.

If closing a lane is necessary, closure times will be Sunday through Thursday, 9:00 P.M. to 4:00 A.M. Close no more than one lane at a time, unless otherwise approved. Provide proposed lane closure information to the Engineer by 1 P.M. on the day prior to the proposed closures. Furnish information for Monday closures or closures following a national or state holiday on the last office workday prior to the closures. Do not close lanes if the above reporting requirements have not been met.

Weekend work will be allowed with prior approval, except for emergency work.

**Project Number:** BPM- 646961001

**Control:** 6469-61-001

**County:** Denton

**Highway:** IH0035W

Maximum length of lane closure will be 2 miles.

Traffic Control Plans with a lane closure causing backups of 10 minutes or greater in duration will be modified by the Engineer.

Erect barricades and signs in locations not obstructing the traveling public’s view of the normal roadway signing or necessary sight distance.

Trailer all slow-moving vehicles (designed to operate 25 mph or less) crossing freeway main lanes.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

Equipment and materials will not be left within 30 ft. of the travel lane during non-working hours.

**Item 503 – Portable Changeable Message Sign:**

Provide Portable Changeable Message Signs (PCMS) units as approved.

PCMS will be placed as directed.

**Item 505 – Truck Mounted Attenuator (TMA):**

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

TCP 1 Series	Scenario	Required TMA/TA	
(1-1)-18 / (1-2)-18	All	1	
(1-3)-18	A   B	1	2
(1-4)-18 / (1-5)-18 / (1-6)-18	All	1	

TCP 2 Series	Scenario	Required TMA/TA	
(2-1)-18 / (2-2)-18 / (2-4)-18 / (2-5)-18 / (2-6)-18	All	1	
(2-3)-23	A   B	1	2

TCP 5 Series	Scenario	Required TMA/TA
(5-1)-18	A   B	1

**Project Number:** BPM- 646961001

**Control:** 6469-61-001

**County:** Denton

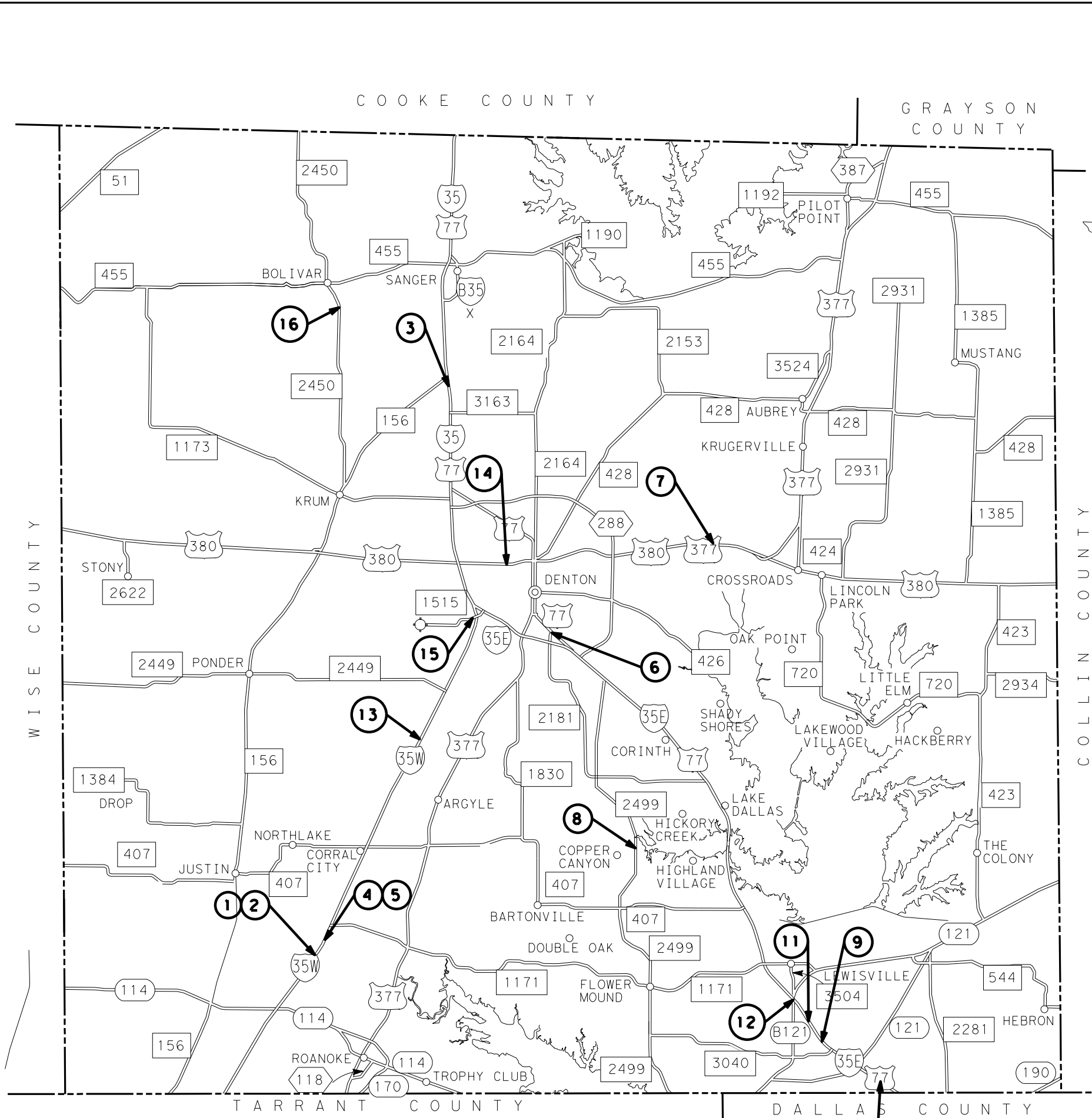
**Highway:** IH0035W

TCP 6 Series	Scenario		Required TMA/TA	
(6-1)-12	A	B	1	2
(6-2)-12 / (6-3)-12	All		1	
(6-4)-12	A	B	1	2
(6-5)-12	A	B	1	2
(6-6)-12 / (6-7)-12	All		1 Per Lane	
(6-8)-14	All		1	

Shadow vehicles equipped for truck mounted attenuators (TMA) for mobile and stationary operations must be available for use at any time as determined by the Engineer.

The Contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA needed for the project for those times per plan requirements. Additional TMAs used that are not specified in the plans in which the Contractor expects compensation will require prior approval from the Engineer.

When TMA's are paid by the hour or day, "ready for operation" is defined as all equipment, material, personnel, etc. are present on the project ready to begin work.



REF #	NBI	HWY	LOCATION	LATITUDE/LONGITUDE	ADT
1	180610008113119	IH 35W NBML	DENTON CREEK SLOUGH	33.05015973/-97.25264689	25,007
2	180610008113118	IH 35W SBML	DENTON CREEK SLOUGH	33.04996974/-97.2530909	24,816
3	180610019502059	IH 35 SBML	MOORES BRANCH	33.3112775/-97.17906415	35,585
4	180610008113117	IH 35W NBML	DENTON CREEK	33.05238168/-97.25083886	25,007
5	180610008113116	IH 35W SBML	DENTON CREEK	33.05222868/-97.25123087	24,816
6	180610019503137	IH 35E	FM 2181	33.19342364/-97.12419826	96,067
7	180610013510128	US 377/380 WB	ELM FK TRINITY RIV REL 1	33.23817447/-97.03679303	17,898
8	180610268101012	FM 2499 SB	POINDEXTER CREEK	33.1049863/-97.07905387	15,000
9	180610019602079	IH 35E NBML	TIMBER CREEK	33.01050849/-96.9769735	74,860
10	180610019602026	IH 35E NBML	ELM FORK TRINITY RIVER	32.99386376/-96.94871654	74,860
11	180610019602250	IH 35E NBML	TIMBER CREEK RELIEF	33.01477343/96.98056462	74,860
12	180610019602213	IH 35E SBML	SH 121 BUS	33.03009722/98.99294606	76,761
13	180610008113102	JOHN PAINE RD	IH 35W	33.153472/-97.191742	40,070
14	180610013409133	US 380 EB	DRY FORK HICKORY CREEK	33.23177961/-97.21756488	11,908
15	180610195101003	FM 1515	KCS RAILROAD	33.2050172-97.16574073	13,811
16	180610235302002	FM 2450	CLEAR CREEK	33.35030327-97.23943722	1,607



## LOCATION SHEET

DESIGN AT	FED. RD. DIV. NO.	MAINTENANCE PROJECT NUMBER		HIGHWAY NO.
GRAPHICS AT	6	BPM-646961001		IHO035W
CHECK KD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	4
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	

**SUMMARY OF BRIDGE ITEMS**

REF #	NBI	HWY	LOCATION	438 7004	438 7007	438 7012	438 7013	713 * 7003	NUMBER OF DAYS ALLOWED TO WORK
				CLEANING AND SEALING EXIST JOINTS (CL3)	CLEANING AND SEALING EXIST JOINTS (CL7)	CLEAN AND SEAL JNTS (PAN GIRDERS) (CL7)	CLEANING AND SEALING EXIST JOINTS (SEJ)	JT CLEANING AND SEALING (EXPANSION JTS)	
				LF	LF	LF	LF	LF	
1	180610008113119	IH 35W NBML	DENTON CRK SLOUGH		74				
2	180610008113118	IH 35W SBML	DENTON CRK SLOUGH		74				
3	180610019502059	IH 35 SBML	MOORES BRANCH			114		76	
4	180610008113117	IH 35W NBML	DENTON CREEK	152	76				
5	180610008113116	IH 35W SBML	DENTON CREEK	152	76				
6	180610019503137	IH 35E	FM 2181		234				
7	180610013510128	US 377/380 WB	ELM FK TRINITY RIV REL 1				138	92	
8	180610268101012	FM 2499 SB	POINDEXTER CREEK				320	80	
9	180610019602079	IH 35E NBML	TIMBER CREEK		821			186	
10	180610019602026	IH 35E NBML	ELM FORK TRINITY RIVER		284				
11	180610019602250	IH 35E NBML	TIMBER CREEK RELIEF		791				
12	180610019602213	IH 35E SBML	SH 121 BUS		174				
13	180610008113102	JOHN PAINE ROAD	IH 35W		60				
14	180610013409133	US 380 EB	DRY FORK HICKORY CREEK				124	124	
15	180610195101003	FM 1515	KCS RAILROAD		80			80	
16	180610235302002	FM 2450	CLEAR CREEK		56				
<b>PROJECT TOTALS</b>				<b>304</b>	<b>2800</b>	<b>114</b>	<b>582</b>	<b>638</b>	<b>29</b>

\* - USE JS-14 FOR REFERENCE



**SUMMARY**

DESIGN AT	FED. RD. DIV. NO.	MAINTENANCE PROJECT NUMBER		HIGHWAY NO.
GRAPHICS AT	6	BPM-646961001		IH0035W
CHECK KD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	5
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	



NBI	HWY	LOCATION	438 7007	REPAIRTYPE
			CLEANING AND SEALING EXIST JOINTS(CL7)	DETAIL C
			LF	LF
18061008113119	IH 35W NBML	BNT 3	37	37
		BNT 6	37	37
<b>PROJECT TOTAL</b>			<b>74</b>	<b>74</b>

NBI: 18-061-0081-13-119

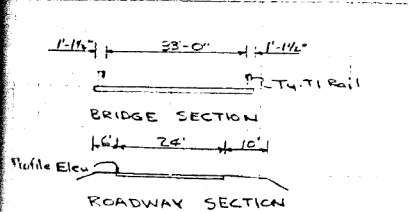
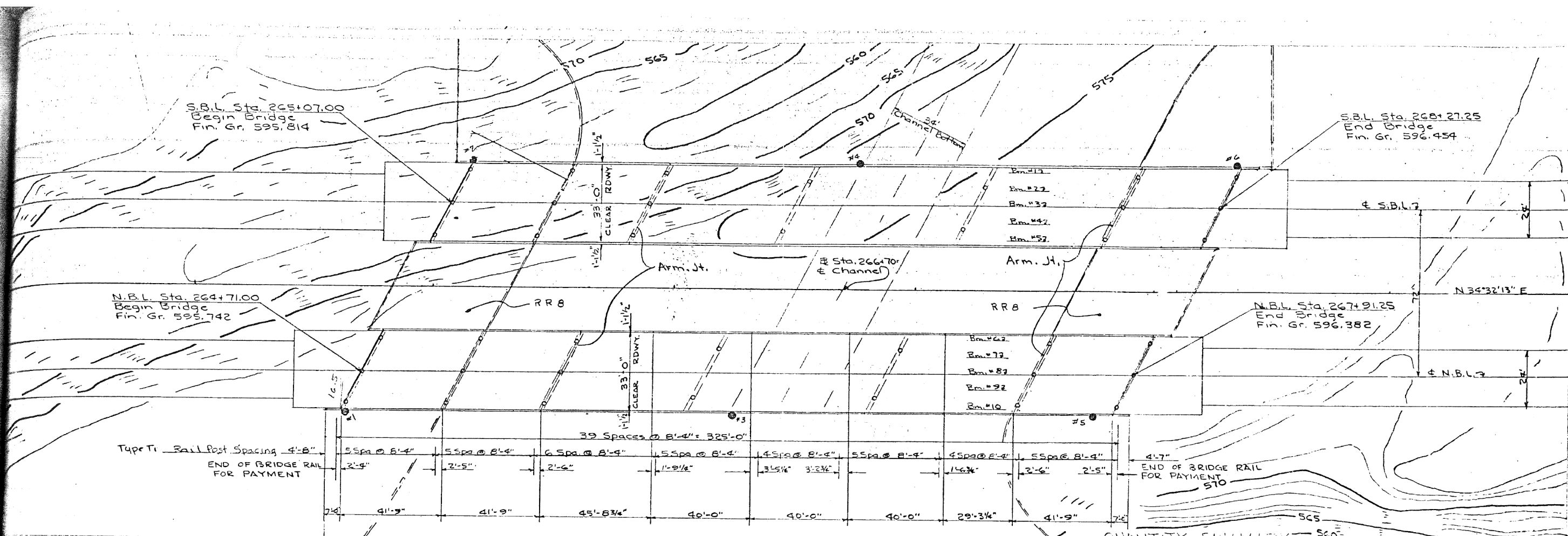


**IH 35W NBML  
AT DENTON CREEK SLOUGH  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 6
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	

9/4/2024 10:07:51 AM T:\DENMANT\Maint Projects\BPM\BPM FY 2025\BPM 6469-61-001 Cleaning and Sealing Joints\PLANS\05-40-SUMMARY.dgn



**BEARING SEAT ELEVATIONS**

Bent No.	1	2	3	4	5	6	7	8	9	10
3	591.224	591.201	591.206	591.412	591.417	591.443	591.340	591.224	591.129	591.023
4	592.521	591.026	591.122	591.233	591.244	591.272	591.166	591.040	590.959	590.870
5	591.071	591.176	591.282	591.382	591.434	591.432	591.316	591.210	591.104	590.999
6	591.450	591.556	591.692	591.797	591.804	591.824	591.725	591.620	591.514	591.410

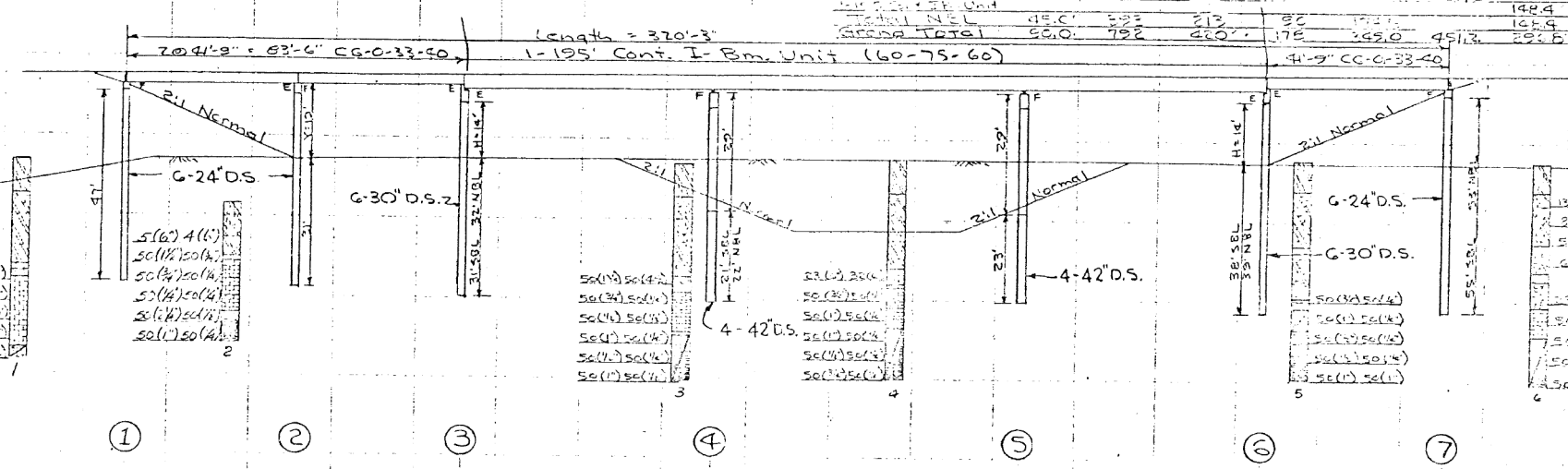
**QUANTITY SUMMARY**

Item	Exc. (Bn) C.Y.	Drilled Shafts 24" L.F. C.Y.	Drilled Shafts 42" L.F. C.Y.	Cast-in-Place Concrete C.Y.	Reinforcing Steel (Tn) Lb.	Formwork (Sq Ft)	Steel Decking (Sq Ft)	Ballast (Cu Yd)	Gravel (Cu Yd)	Clay (Cu Yd)	Clay w/Gravel (Cu Yd)	Clay w/Sand & Gravel (Cu Yd)	Lime Stone w/Shale Layers (Cu Yd)	Shale (Cu Yd)	Shale w/Limestone Layers (Cu Yd)
<b>SOUTHBOUND LANE</b>															
Abut. Bents 157	240	306		220	2808										
Int. Bent 2		23		13.7	2126										
Int. Bents 316			227	42.2	6562										
Int. Bents 445	210			25	266										
3-41'-5" Slab Spans				225.6	4473								260.0	491	
1-125' Cont. Jct. Unit					5506			5900	159,300	390.0	763				
<b>Total SBL</b>	<b>450</b>	<b>329</b>	<b>227</b>	<b>283</b>	<b>1745</b>	<b>22516</b>	<b>148.4</b>	<b>5900</b>	<b>159,300</b>	<b>390.0</b>	<b>763</b>				
<b>NORTHBOUND LANE</b>															
Abut. Bents 157	240	306		220	2808										
Int. Bent 2		23		13.7	2126										
Int. Bents 316			213	42.2	6562										
Int. Bents 445	210			25	266										
3-41'-5" Slab Spans				225.6	4473								260.0	491	
1-125' Cont. Jct. Unit					5506			5900	159,300	390.0	763				
<b>Total NBL</b>	<b>450</b>	<b>329</b>	<b>227</b>	<b>283</b>	<b>1745</b>	<b>22516</b>	<b>148.4</b>	<b>5900</b>	<b>159,300</b>	<b>390.0</b>	<b>763</b>				
<b>Grand Total</b>	<b>900</b>	<b>658</b>	<b>454</b>	<b>566</b>	<b>3490</b>	<b>45132</b>	<b>296.8</b>	<b>11800</b>	<b>318,600</b>	<b>780.0</b>	<b>1526</b>				

**NOTE:**  
All shafts shall be founded at the depths shown or lower if necessary to penetrate sound rock and/or shale three (3) feet.

Hydrolic data -  $Q_{50} = 20,000 \text{ cfs}$ ,  $V_{50} = 4.0 \text{ f/s}$

- CORE LEGEND**
- Gravel
  - Clay, Silty
  - Clay, Sandy
  - Clay w/ gravel
  - Clay w/ sand & gravel
  - Lime stone w/ shale layers
  - Shale
  - Shale w/ limestone layers



NBI: 18-061-0081-13-119

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**IH 35W NBML  
AT DENTON CREEK SLOUGH  
BRIDGE LAYOUT**


SCALE: NTS SHEET 2 OF 2

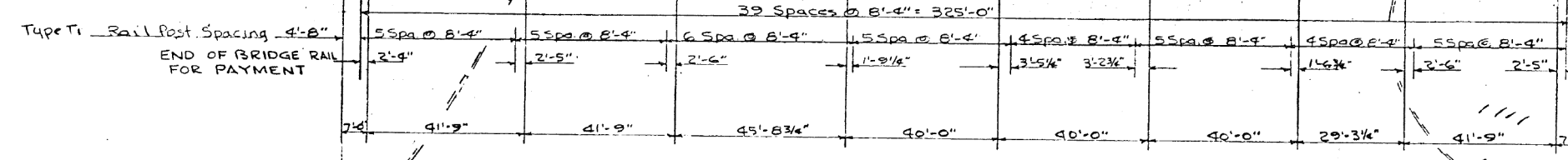
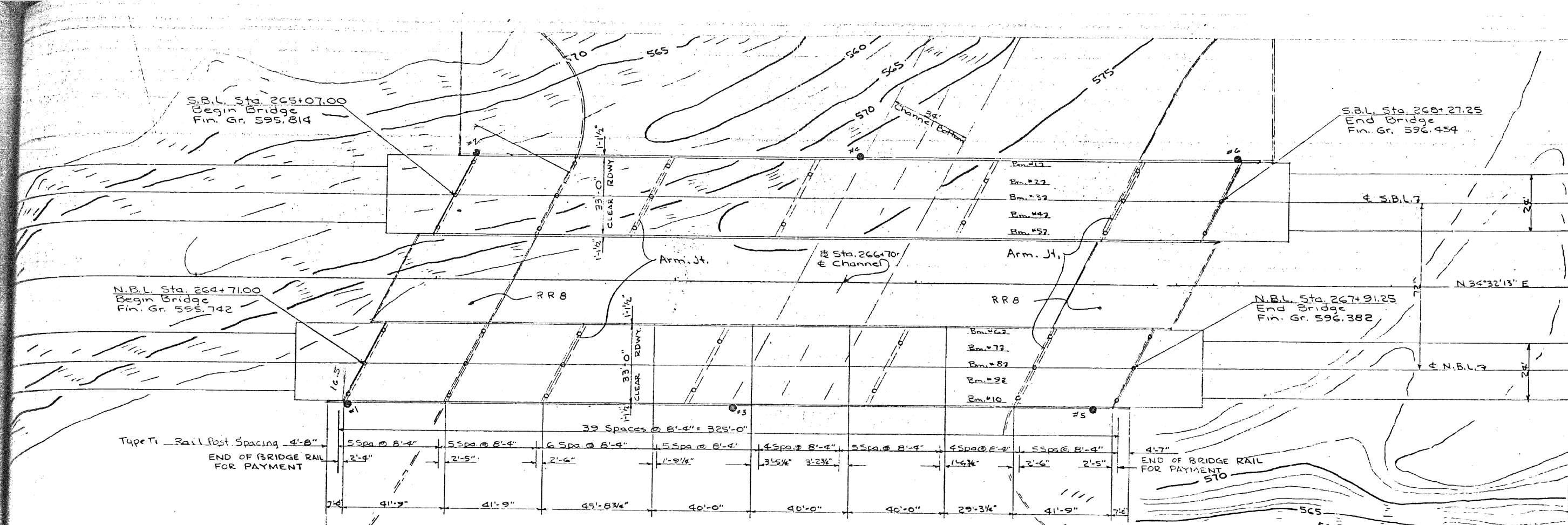
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	7
CHECK KD	CONTROL	SECTION	JOB	
CHECK KD	6469	61	001	

FOR CONTRACTOR INFORMATION ONLY

NBI	HWY	LOCATION	438 7007	REPAIRTYPE
			CLEANING AND SEALING EXIST JOINTS(CL7)	DETAIL C
			LF	LF
18061008113118	IH 35W SBML	BNT 3	37	37
		BNT 6	37	37
<b>PROJECT TOTAL</b>			74	74

NBI: 18-061-0081-13-118

				
<b>IH 35W SBML AT DENTON CREEK SLOUGH SUMMARY</b>				
SHEET 1 OF 2				
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 8
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	



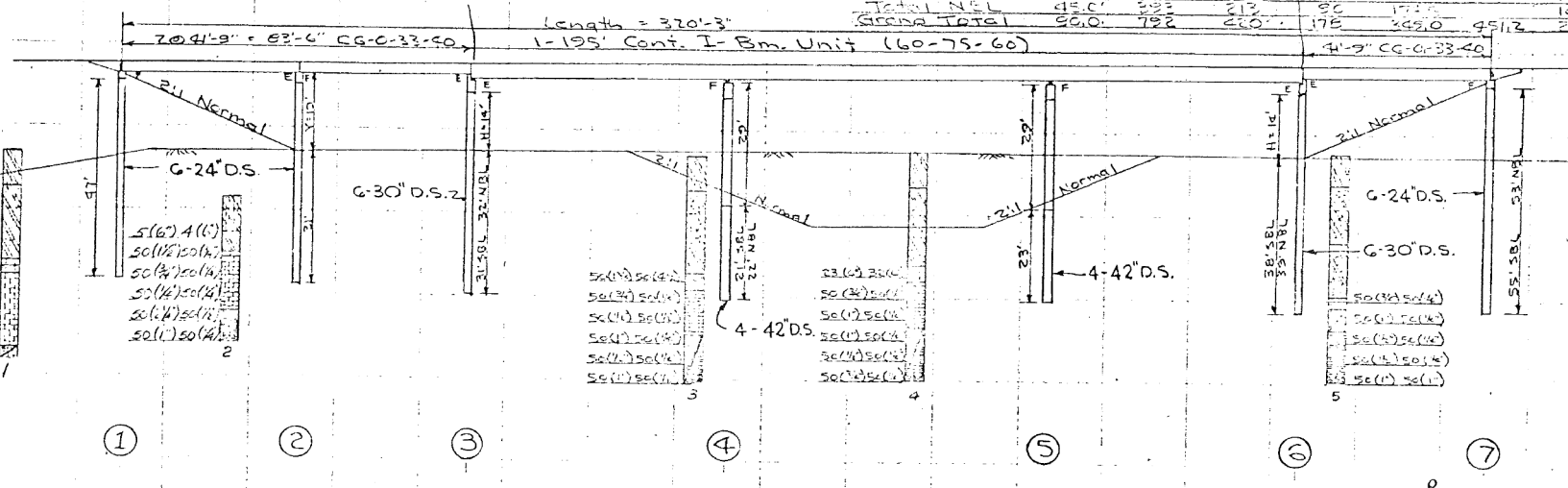
**BEARING SEAT ELEVATIONS**

Bent No.	1	2	3	4	5	6	7	8	9	10
3	591.024	591.201	591.206	591.412	591.517	591.418	591.240	591.234	591.129	591.023
4	590.931	591.026	591.132	591.238	591.344	591.272	591.166	591.060	590.954	590.848
5	591.071	591.176	591.282	591.388	591.494	591.422	591.316	591.210	591.104	590.998
6	591.460	591.586	591.632	591.737	591.842	591.634	591.725	591.620	591.514	591.410

**QUANTITY SUMMARY**

Item	Exc. (CY)	Drilled Shafts (CY)	Gravel (CY)	Clay (CY)	Concrete Slab (CY)	Reinforcing Steel (LB)	Formwork (SQ FT)	Other
<b>SOUTHBOUND LANE</b>								
Abut. Bent 1	24.0	306				2808		
Int. Bent 2		93				2126		
Int. Bent 3		227				6536		
Int. Bent 4	21.0					17568		
13-41'5" Spans					225.6	44573		
1-125' Cont. I-Bm. Unit					148.4	59006	5900	59300
<b>Total SBL</b>	<b>45.0</b>	<b>399</b>	<b>207</b>	<b>88</b>	<b>174.5</b>	<b>225.6</b>	<b>148.4</b>	<b>260.0</b>
<b>NORTHBOUND LANE</b>								
Abut. Bent 1	24.0	300				2808		
Int. Bent 2		93				2126		
Int. Bent 3		213				6566		
Int. Bent 4	21.0					17568		
13-41'5" Spans					225.6	44573		
1-125' Cont. I-Bm. Unit					148.4	59006	5900	59300
<b>Total NBL</b>	<b>45.0</b>	<b>392</b>	<b>213</b>	<b>88</b>	<b>174.5</b>	<b>225.6</b>	<b>148.4</b>	<b>260.0</b>
<b>Grand Total</b>	<b>90.0</b>	<b>792</b>	<b>220</b>	<b>176</b>	<b>349.0</b>	<b>451.2</b>	<b>296.8</b>	<b>520.0</b>

**NOTE:**  
 All shafts shall be founded at the depths shown or lower if necessary to penetrate sound rock and/or shale three (3) feet.



**CORE LEGEND**

- Gravel
- Clay, Silty
- Clay, Sandy
- Clay w/ gravel
- Clay w/ sand & gravel
- Limestone w/ shale layers
- Shale
- Shale w/ limestone layers

FOR CONTRACTOR INFORMATION ONLY

NBI: 18-061-0081-13-118

Texas Department of Transportation  
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IH 35W SBML  
 AT DENTON CREEK SLOUGH  
 BRIDGE LAYOUT


SCALE: NTS SHEET 2 OF 2

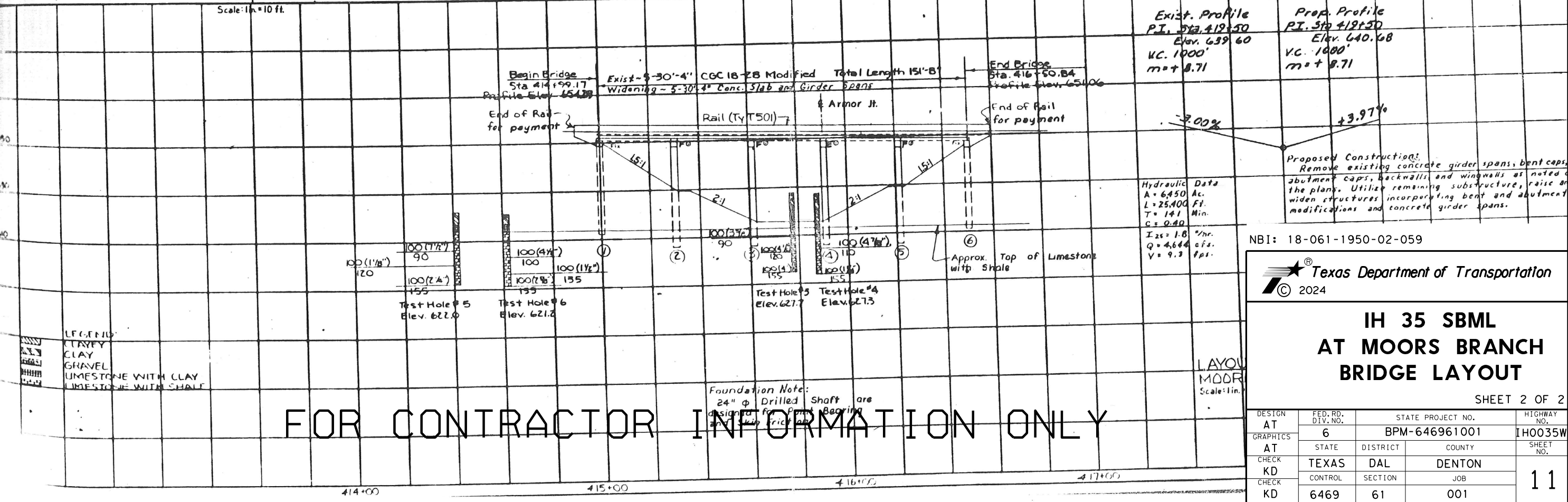
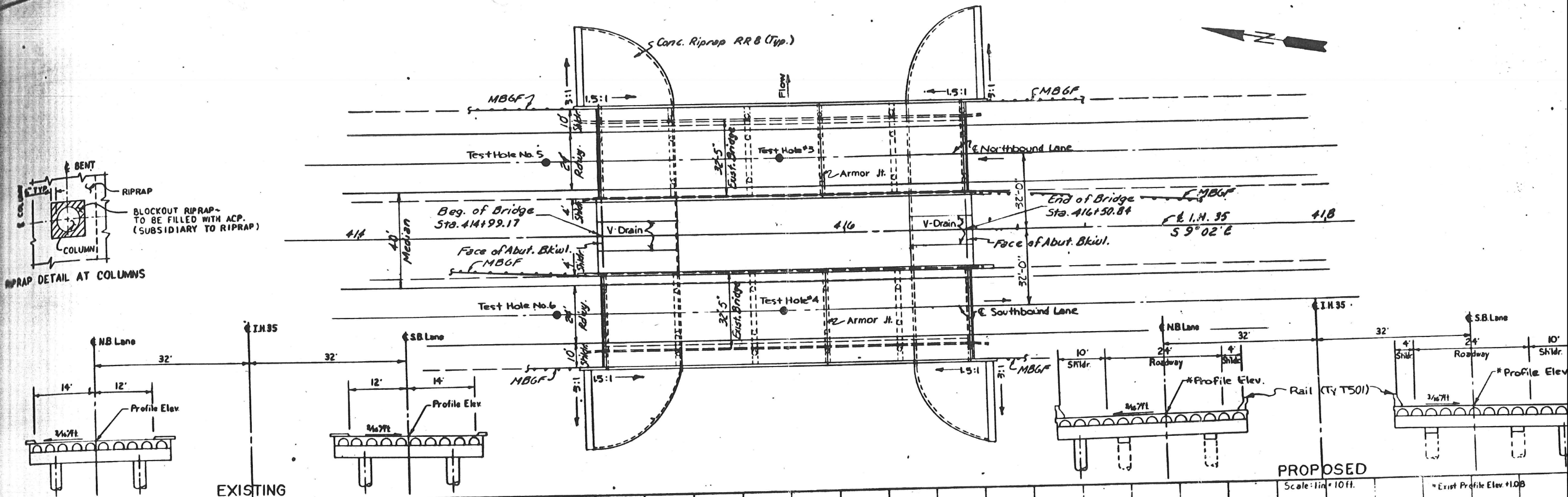
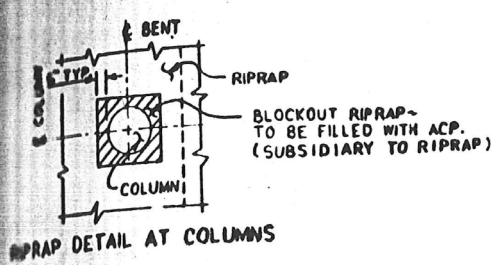
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT DAL	COUNTY DENTON	SHEET NO. 9
CHECK KD	TEXAS	SECTION	JOB	
CHECK KD	6469	61	001	

NBI	HWY	LOCATION	438 7012	REPAIR TYPE		713 * 7003
			CLEANING AND SEALING JOINTS (PAN GIRDERS)(CL 7)	DETAIL A	DETAIL C FOR AJ	JT CLEANING AND SEALING (EXP JTS)
			LF	LF	LF	LF
18061019502058	IH 35 NBML	ABT 1	38	38		38
		BNT 4	38		38	
		ABT 6	38	38		38
<b>PROJECT TOTALS</b>			<b>114</b>	<b>76</b>	<b>38</b>	<b>76</b>

\* - USE JS-14 FOR REFERENCE

NBI: 18-061-1950-02-059

 <b>Texas Department of Transportation</b> © 2024				
<b>IH 35 SBML AT MOORS BRANCH SUMMARY</b>				
SHEET 1 OF 2				
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 10
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	



FOR CONTRACTOR INFORMATION ONLY

**PROPOSED**  
Scale: 1 in = 10 ft. \* Exist Profile Elev +10.8

Exist. Profile P.I. Sta. 419+50 Elev. 639.60 KC. 1000' m + 8.71	Prop. Profile P.I. Sta. 419+50 Elev. 640.68 VC. 1080' m + 8.71
---	--

Proposed Construction:  
Remove existing concrete girder spans, bent caps, abutment caps, backwalls and wingwalls as noted on the plans. Utilize remaining substructure, raise or widen structures incorporating bent and abutment modifications and concrete girder spans.

Hydraulic Data  
A = 6450 Ac.  
L = 25400 Ft.  
T = 141 Min.  
C = 0.40  
I<sub>zs</sub> = 1.8 "/>

NBI: 18-061-1950-02-059

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IH 35 SBML  
AT MOORS BRANCH  
BRIDGE LAYOUT

SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 11
CHECK KD	CONTROL	SECTION	JOB	
CHECK KD	6469	61	001	



NBI	HWY	LOCATION	438 7004	438 7007	REPAIR TYPE	
			CLEANING AND SEALING EXIST JOINTS(CL3)	CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL B	DETAIL C
			LF	LF	LF	LF
18061008113117	IH 35W NBML	ABT 1	38		38	
		BNT 2		38		38
		BNT 3	38		38	
		BNT 4	38		38	
		BNT 5		38		38
		ABT 6	38		38	
<b>PROJECT TOTALS</b>			<b>152</b>	<b>76</b>	<b>152</b>	<b>76</b>

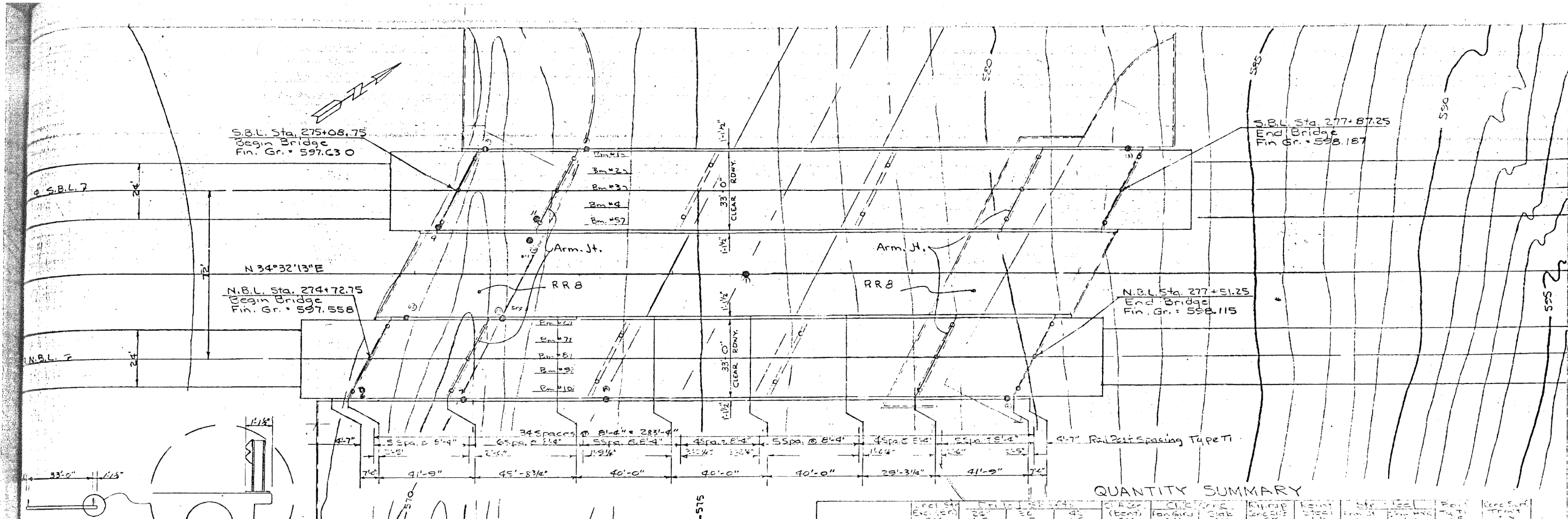
NBI: 18-061-0081-13-117



**IH 35W NBML  
AT DENTON CREEK  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 12
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	

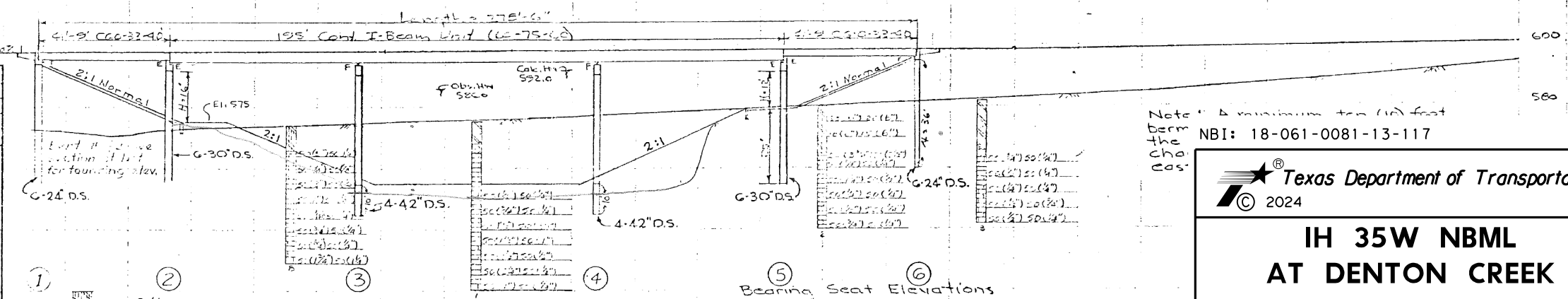
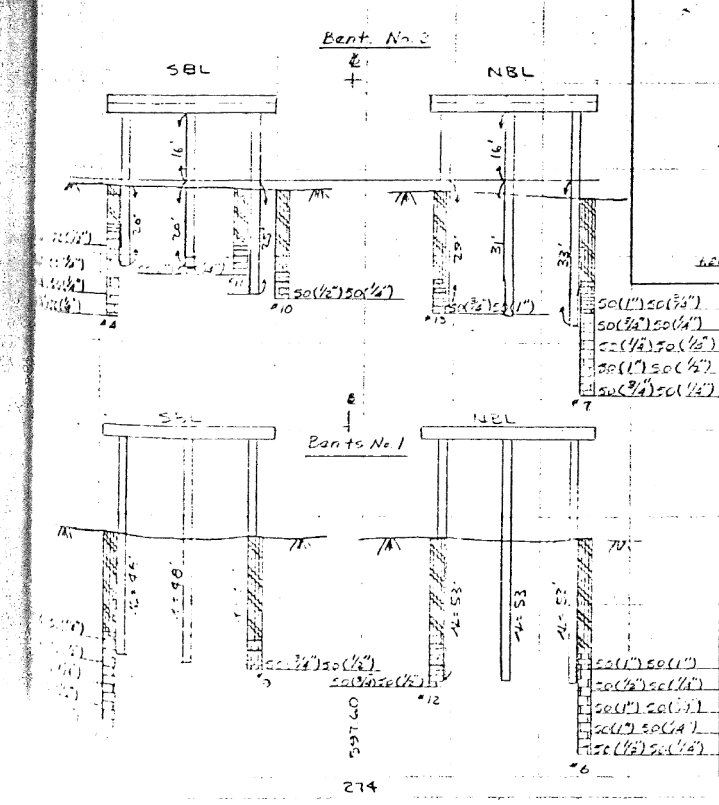


**QUANTITY SUMMARY**

Item	Excavation	Concrete	Reinforcing Steel	Formwork	Other	Notes
<b>SOUTHBOUND LANE</b>						
Abut Bents 1&6	240	253	140	220		2808'
Int. Bents 2&5			140	42.2		6565'
Int. Span 214	210		40	120.8		18440'
2-41/2" Slab				150.4		23782'
1-1/2" Cont. I-Beam				148.4		35908'
Total S.B.L.	450	253	140	40	155.0	152.4
<b>NORTHBOUND LANE</b>						
Abut Bents 1&6	240	267	140	220		2808'
Int. Bents 2&5			140	42.2		6565'
Int. Span 214	210		40	120.8		18440'
2-41/2" Slab				150.4		23782'
1-1/2" Cont. I-Beam				148.4		35908'
Total N.B.L.	450	267	140	40	155.0	152.4
<b>Grand Total</b>	<b>900</b>	<b>520</b>	<b>280</b>	<b>80</b>	<b>310.0</b>	<b>300.8</b>

**NOTE:**  
All shafts shall be founded at the depths shown or lower if necessary to penetrate sound rock and/or shale three (3) feet.

Hydraulic data  $Q_{50} = 29,000$  cfs.  $V_{50} = 5.7$  fps.



- ① Clay, Silty
- ② Clay, Sandy
- ③ Gravel
- ④ Limestone, loose particles
- ⑤ Limestone, hard, w/ shale layers
- ⑥ Shale

Bent No.	1	2	3	4	5	6	7	8	9
Span No.	1	2	3	4	5	6	7	8	9

Note: A maximum top (10) feet  
NBI: 18-061-0081-13-117



**IH 35W NBML  
AT DENTON CREEK  
BRIDGE LAYOUT**

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
AT	6	BPM-646961001		IHO035W
GRAPHICS				
AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	DENTON	
KD	CONTROL	SECTION	JOB	
CHECK	6469	61	001	

**FOR CONTRACTOR INFORMATION ONLY**

NBI	HWY	LOCATION	438 7004	438 7007	REPAIRTYPE	
			CLEANING AND SEALING EXIST JOINTS(CL3)	CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL B	DETAIL C
			LF	LF	LF	LF
18061008113116	IH 35W SBML	ABT 1	38		38	
		BNT 2		38		38
		BNT 3	38		38	
		BNT 4	38		38	
		BNT 5		38		38
		ABT 6	38		38	
<b>PROJECT TOTALS</b>			<b>152</b>	<b>76</b>	<b>152</b>	<b>76</b>

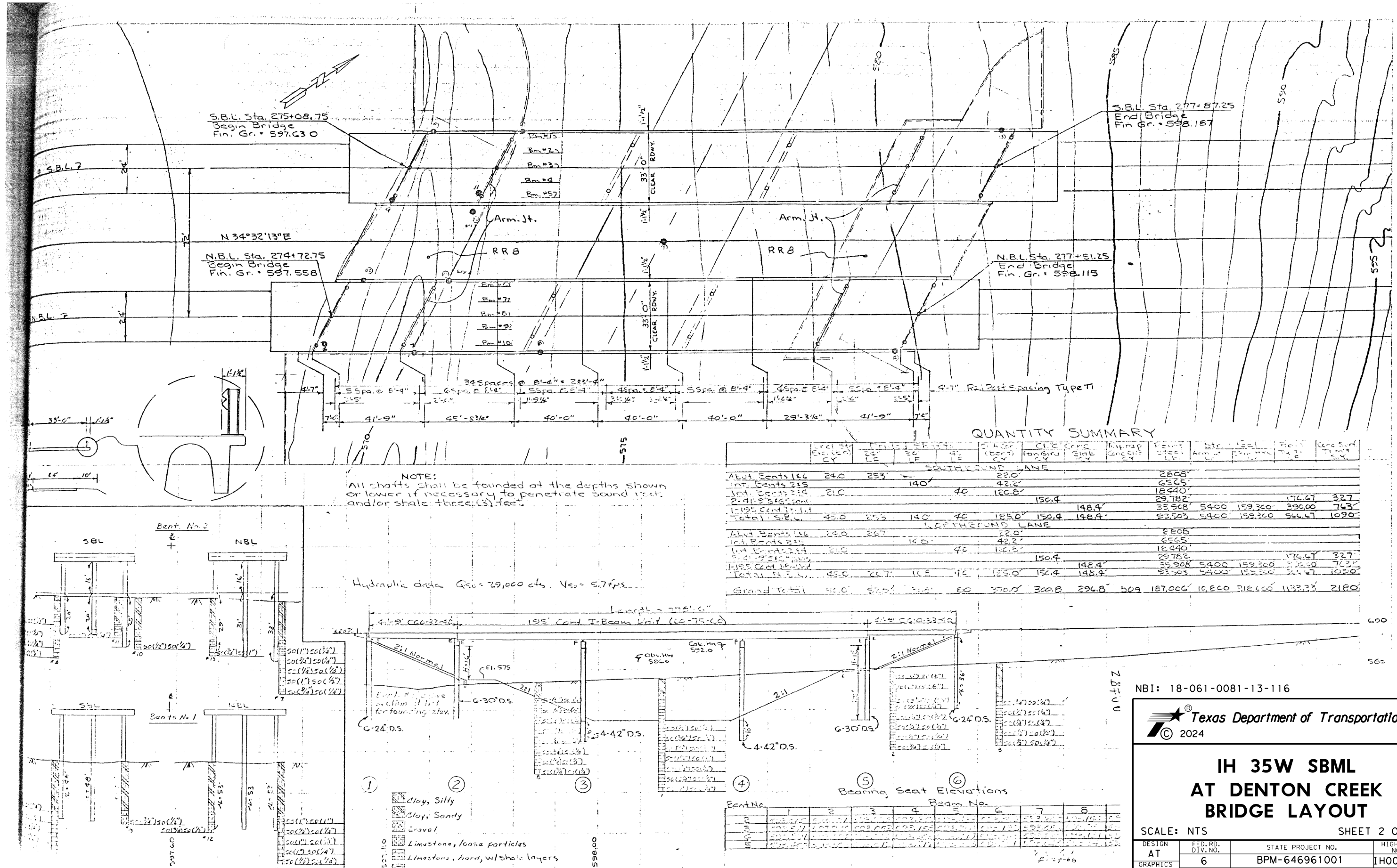
NBI: 18-061-0081-13-116



**IH 35W SBML  
AT DENTON CREEK  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 14
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	



QUANTITY SUMMARY

Item	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit
SOUTHBOUND LANE																			
Abut. Bents 1&6	24.0	253'		220'		2808'													
Int. Bents 2&5			140'		42.3'	6565'													
Int. Bents 3&4	21.0		40'		120.8'	18440'													
2-dia. 8" Sigsbee					150.4'	29782'													
1-1/2" Cent. I-Beam					148.4'	35308'	5400	159300'	390.00	763'									
Total S.B.L.	45.0	253'	140'	40'	155.0'	150.4'	148.4'												
NORTHBOUND LANE																			
Abut. Bents 1&6	24.0	267'		220'		2808'													
Int. Bents 2&5			145'		42.3'	6565'													
Int. Bents 3&4	21.0		40'		120.8'	18440'													
2-dia. 8" Sigsbee					150.4'	29782'													
1-1/2" Cent. I-Beam					148.4'	35308'	5400	159300'	390.00	763'									
Total N.B.L.	45.0	267'	145'	40'	155.0'	150.4'	148.4'												
Grand Total	90.0	520'	285'	80'	310.0'	300.8'	296.8'	509	187,000'	10,800	718,600'	1132.33	2180'						

NOTE: All shafts shall be founded at the depths shown or lower if necessary to penetrate sand rock and/or shale three (3) feet.

Hydraulic data:  $Q_{50} = 29,000$  cfs.  $V_{50} = 5.7$  fps.

Bearing Seat Elevations

Bent No.	1	2	3	4	5	6	7	8
Beam No.	1	2	3	4	5	6	7	8
Elevation	527.10	527.10	527.10	527.10	527.10	527.10	527.10	527.10

FOR CONTRACTOR INFORMATION ONLY

NBI: 18-061-0081-13-116

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### IH 35W SBML AT DENTON CREEK BRIDGE LAYOUT

SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT DAL	COUNTY DENTON	SHEET NO.
CHECK KD	TEXAS	SECTION	JOB	15
CHECK KD	CONTROL	SECTION	JOB	

NBI	HWY	LOCATION	438 7007	REPAIRTYPE
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C
			LF	LF
18061195003137	IH 35E NBML	ABT 1	117	117
		ABT2	117	117
<b>PROJECT TOTALS</b>			<b>234</b>	<b>234</b>

NBI: 18-061-1950-03-137

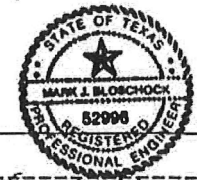
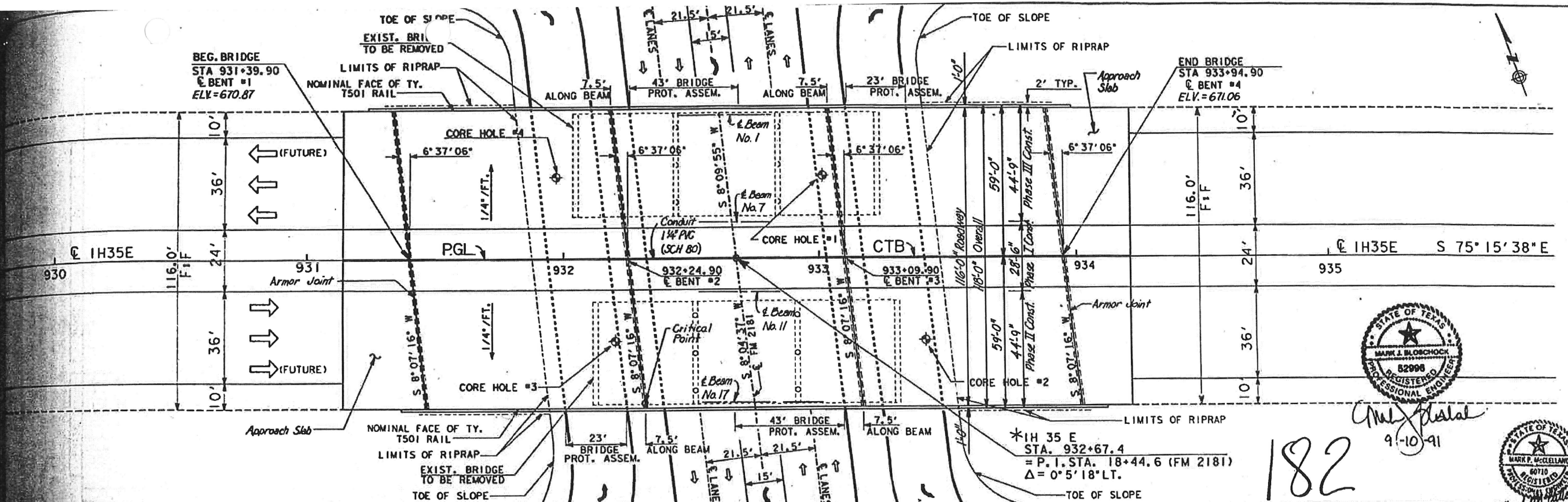


**IH 35E  
AT FM 2181  
SUMMARY**

SHEET 1 OF 2

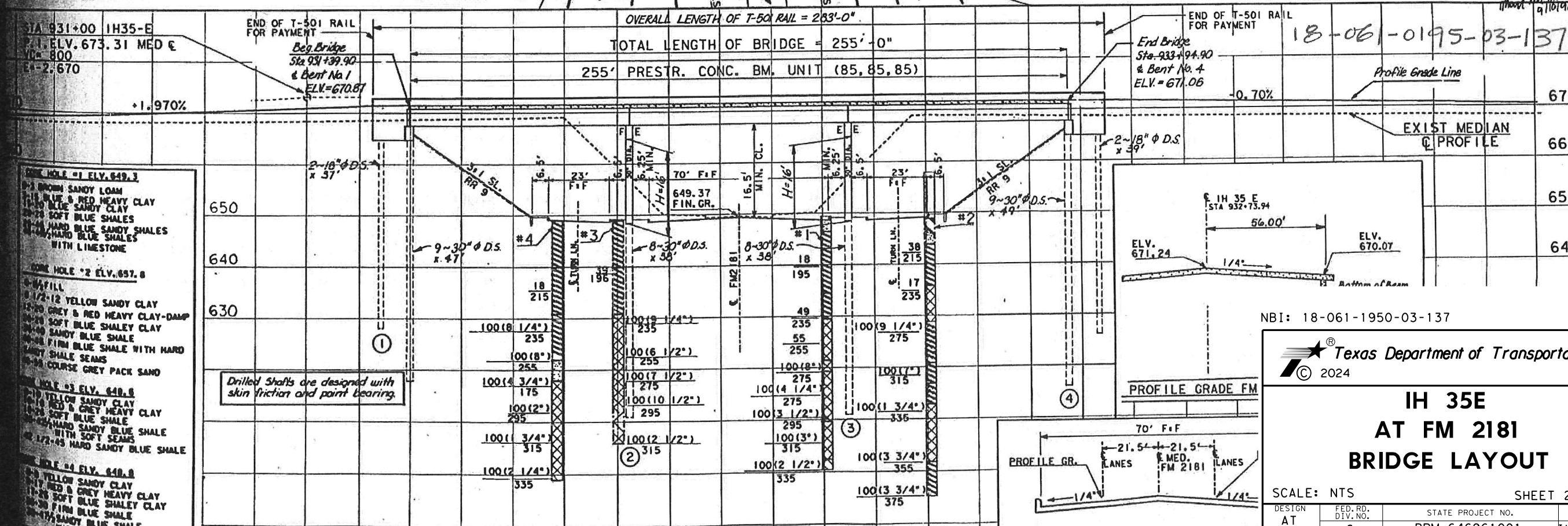
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	16
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	





182

9-10-91



FOR CONTRACTOR INFORMATION ONLY

NBI: 18-061-1950-03-137

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### IH 35E AT FM 2181 BRIDGE LAYOUT

SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001	HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT DAL	COUNTY DENTON
CHECK KD	TEXAS	SECTION	JOB
CHECK KD	CONTROL	SECTION 61	JOB 001

17



NBI	HWY	LOCATION	438	713 *
			7013	7003
			CLEANING AND SEALING EXIST JOINTS (SEJ)	JT CLEANING AND SEALING (EXPANSION JTS)
			LF	LF
18061013510128	US 377/US 380 WB	ABT 1	46	46
		BNT 4	46	
		ABT 6	46	46
<b>PROJECT TOTALS</b>			<b>138</b>	<b>92</b>

\* - USE JS-14 FOR REFERENCE

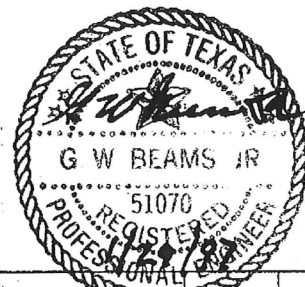
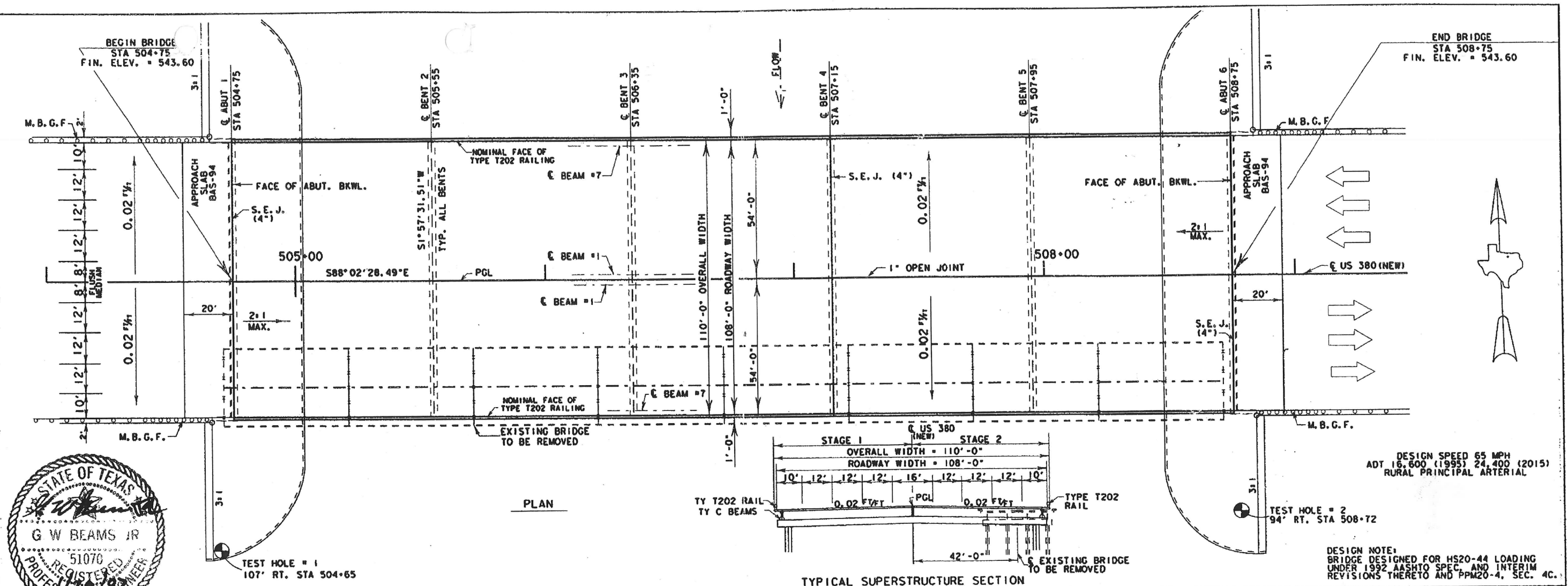
NBI: 18-061-0135-10-128



**US 377/US 380 WB  
AT ELM FK TRINITY RIV  
REL 1  
SUMMARY**

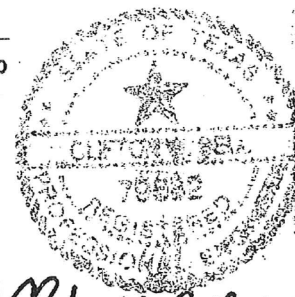
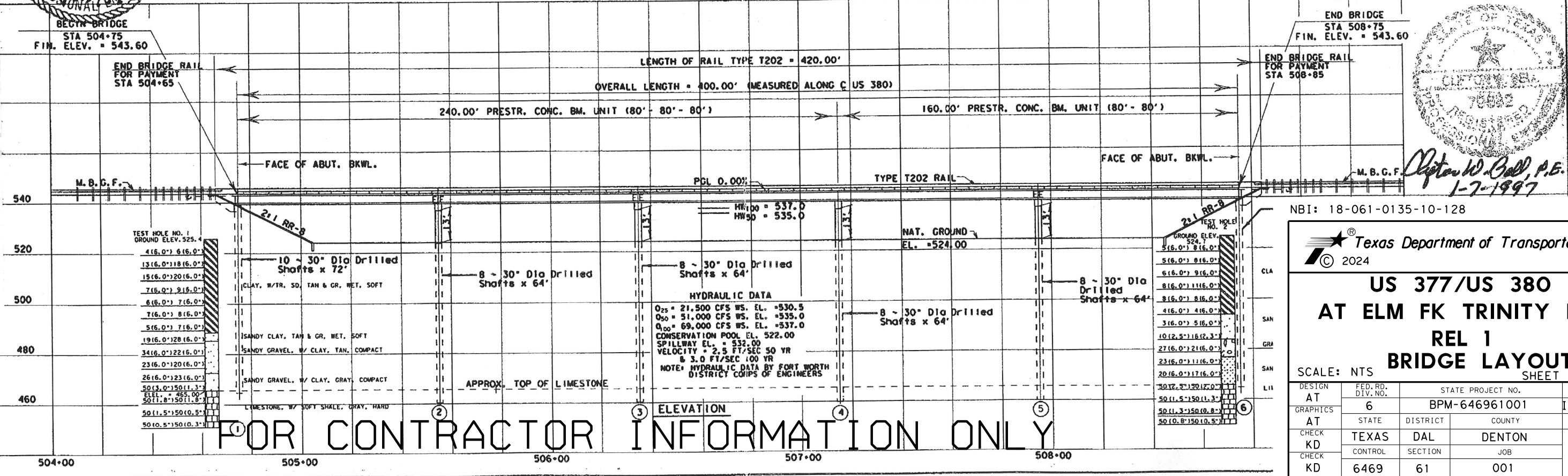
SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
AT	6	BPM-646961001		I H0035W
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AT	TEXAS	DAL	DENTON	
CHECK	CONTROL	SECTION	JOB	18
KD	6469	61	001	



DESIGN SPEED 65 MPH  
ADT 16,600 (1995) 24,400 (2015)  
RURAL PRINCIPAL ARTERIAL

DESIGN NOTE:  
BRIDGE DESIGNED FOR HS20-44 LOADING  
UNDER 1992 AASHTO SPEC. AND INTERIM  
REVISIONS THERETO AND PPM20-4, SEC. 4C.



*D. W. Ball, P.E.*  
1-7-1997

**FOR CONTRACTOR INFORMATION ONLY**

END BRIDGE STA 508+75 FIN. ELEV. = 543.60

END BRIDGE RAIL FOR PAYMENT STA 508+85

NBI: 18-061-0135-10-128

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**US 377/US 380  
AT ELM FK TRINITY RIV  
REL 1  
BRIDGE LAYOUT**


SCALE: NTS SHEET 2 OF 2

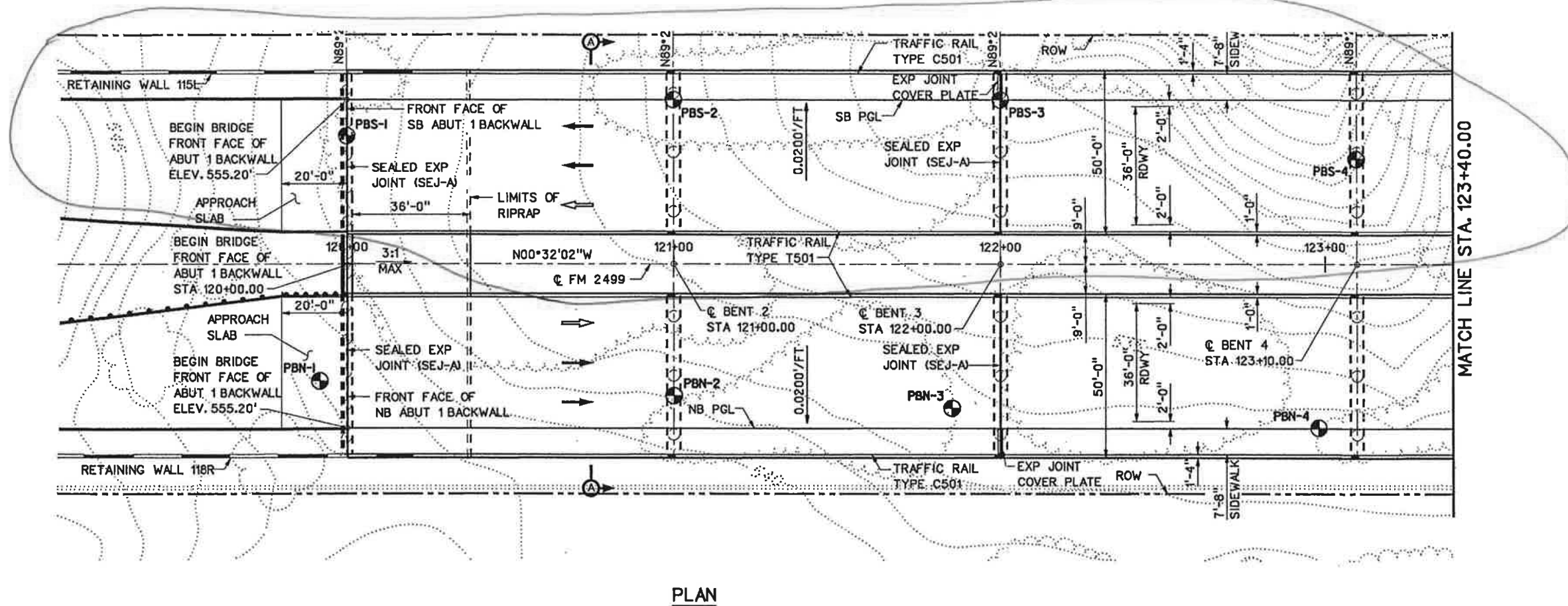
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	19
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	

NBI	HWY	LOCATION	438	713 *
			7013	7003
			CLEANING AND SEALING EXIST JOINTS (SEJ)	JT CLEANING AND SEALING (EXPANSION JTS)
			LF	LF
18061268101012	FM 2499	ABT 1	40	40
		BNT 3	40	
		BNT 5	40	
		BNT 7	40	
		BNT 9	40	
		BNT 11	40	
		BNT 13	40	
		ABT 15	40	40
<b>PROJECT TOTALS</b>			<b>320</b>	<b>80</b>

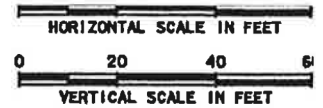
\* - USE JS-14 FOR REFERENCE

NBI: 18-061-2681-01-012

 <b>Texas Department of Transportation</b> © 2024				
<b>FM 2499 SB AT PONDEXTER CREEK SUMMARY</b>				
SHEET 1 OF 5				
DESIGN	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
AT	6	BPM-646961001		IH0035W
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AT	TEXAS	DAL	DENTON	
CHECK	CONTROL	SECTION	JOB	20
KD	6469	61	001	

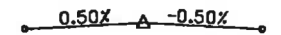


PLAN



VERTICAL CURVE DATA

AT PGL, NB & SB



PVI STA 127+50.00  
 ELEV = 558.95'  
 VC = 120.00'  
 E = -0.15'

NOTES:

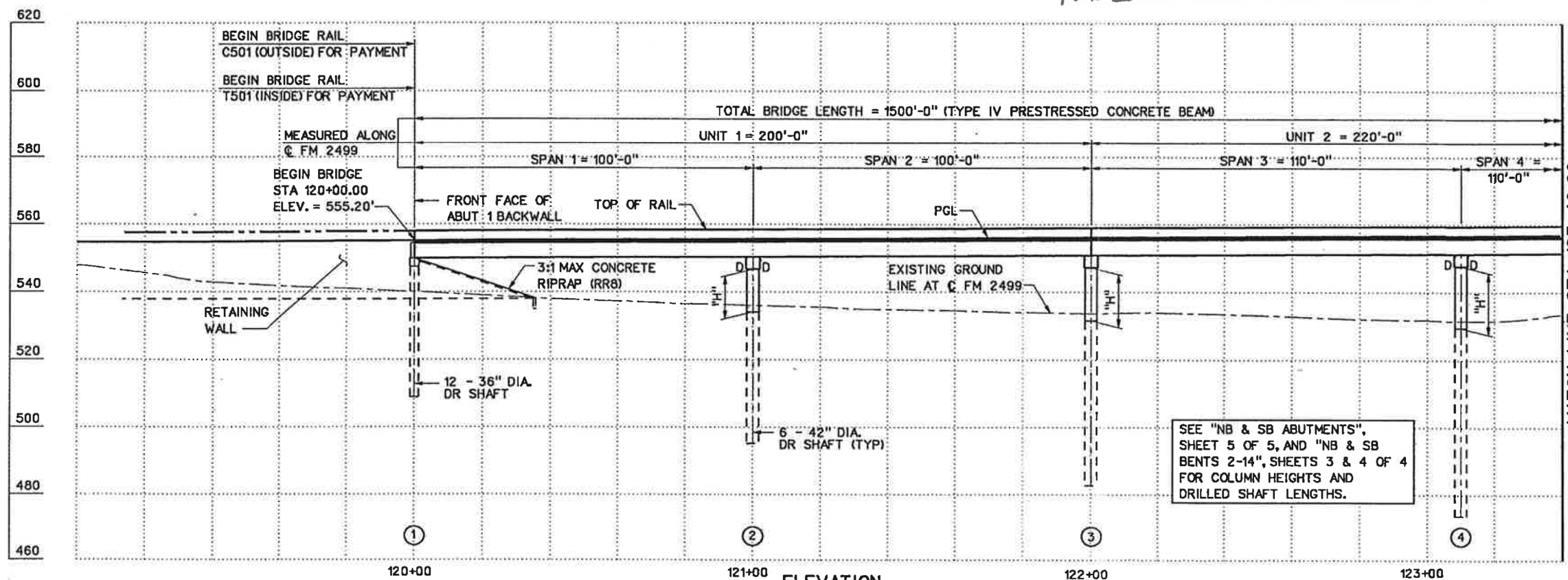
- FOR GENERAL NOTES SEE "GENERAL NOTES & ESTIMATED QUANTITIES" SHEET.
- SEE SHEET 5 OF 5 FOR SECTION A-A.
- ⊕ DENOTES BORING LOCATIONS.
- FOR SOIL BORING INFORMATION SEE BOR LOG SHEETS.
- DESIGN SPEED = 40 MPH  
 ADT 2005 = 17,100 VPD  
 ADT 2025 = 34,100 VPD  
 FUNCTION CLASS = URBAN ARTERIAL

NB INO. 18-061-2681-01-012(SB)

NB POINDEXTER NB: 18-061-0-2681-01-011  
 SB POINDEXTER NB: 18-061-0-2681-01-012



*René J. Tullier*  
 7-11-2007

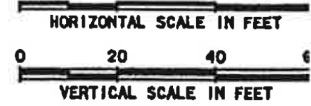
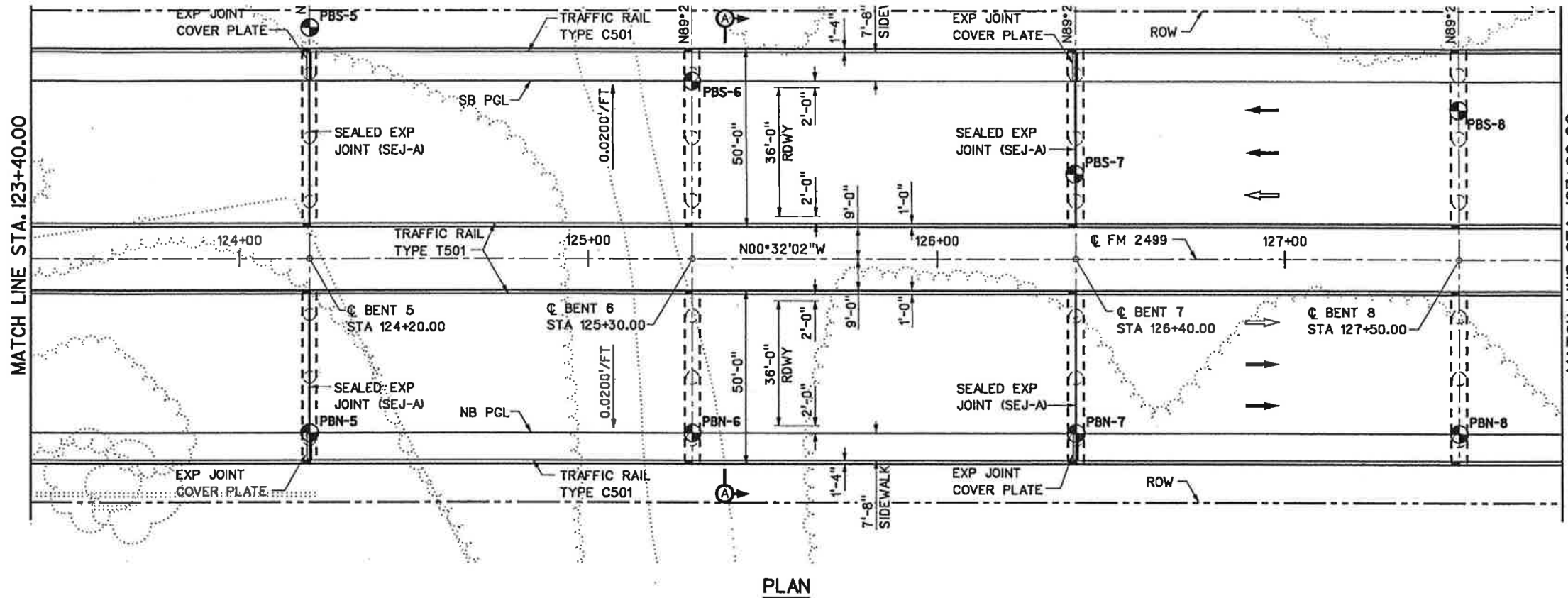


ELEVATION

FOR CONTRACTOR INFORMATION ONLY

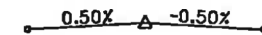
HNTB Corporation  
 NBI: 18-061-2681-01-012

<b>FM 2499 SB                  AT PONDEXTER CREEK                  BRIDGE LAYOUT</b>				
SCALE: NTS		SHEET 2 OF 5		
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	21
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	



**VERTICAL CURVE DATA**

AT PGL, NB & SB



PVI STA 127+50.00  
 ELEV = 558.95'  
 VC = 120.00'  
 E = -0.15'

NOTE:  
 SEE SHEET 5 OF 5 FOR SECTION A-

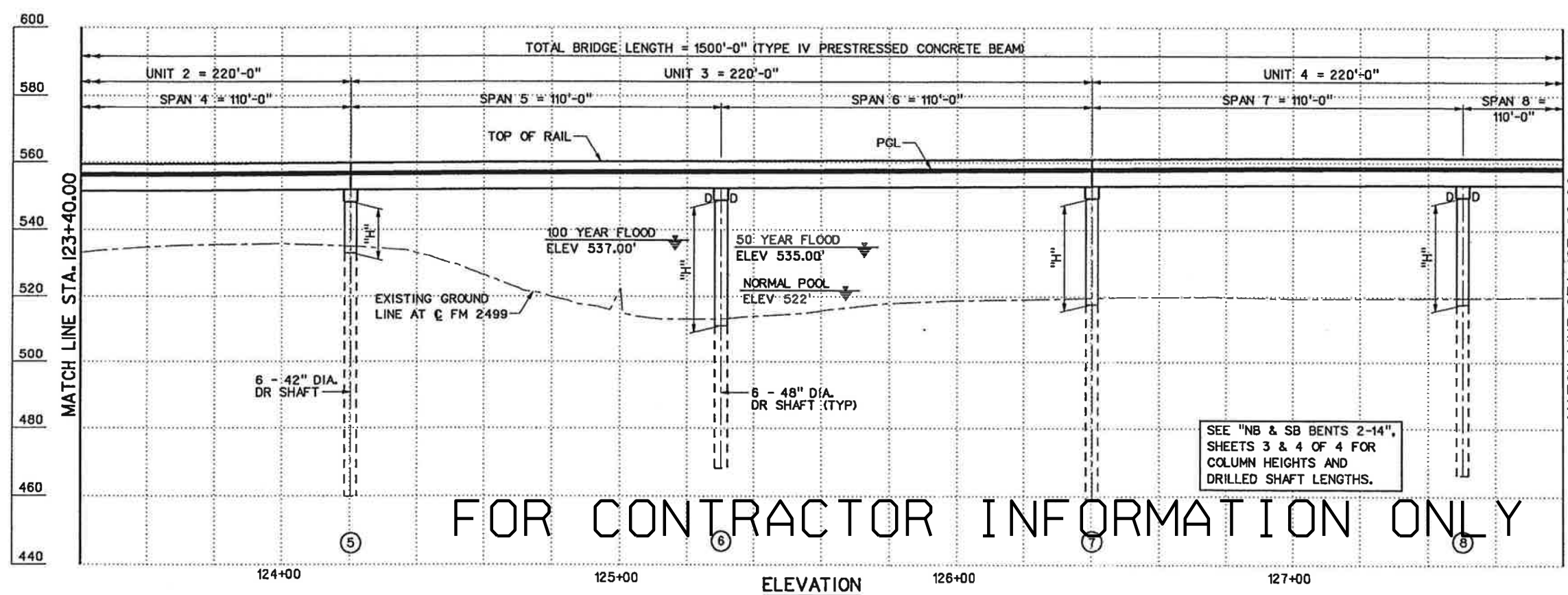
**POINDEXTER CREEK HYDRAULIC DAT**

(100 YR FLOOD)  
 V = 6.3 FPS  
 Q = 6,270 CFS



*René J. Tullier*  
 7-11-2007

NBI: 18-061-2681-01-012

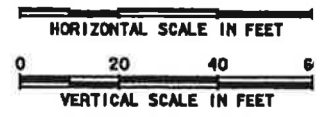
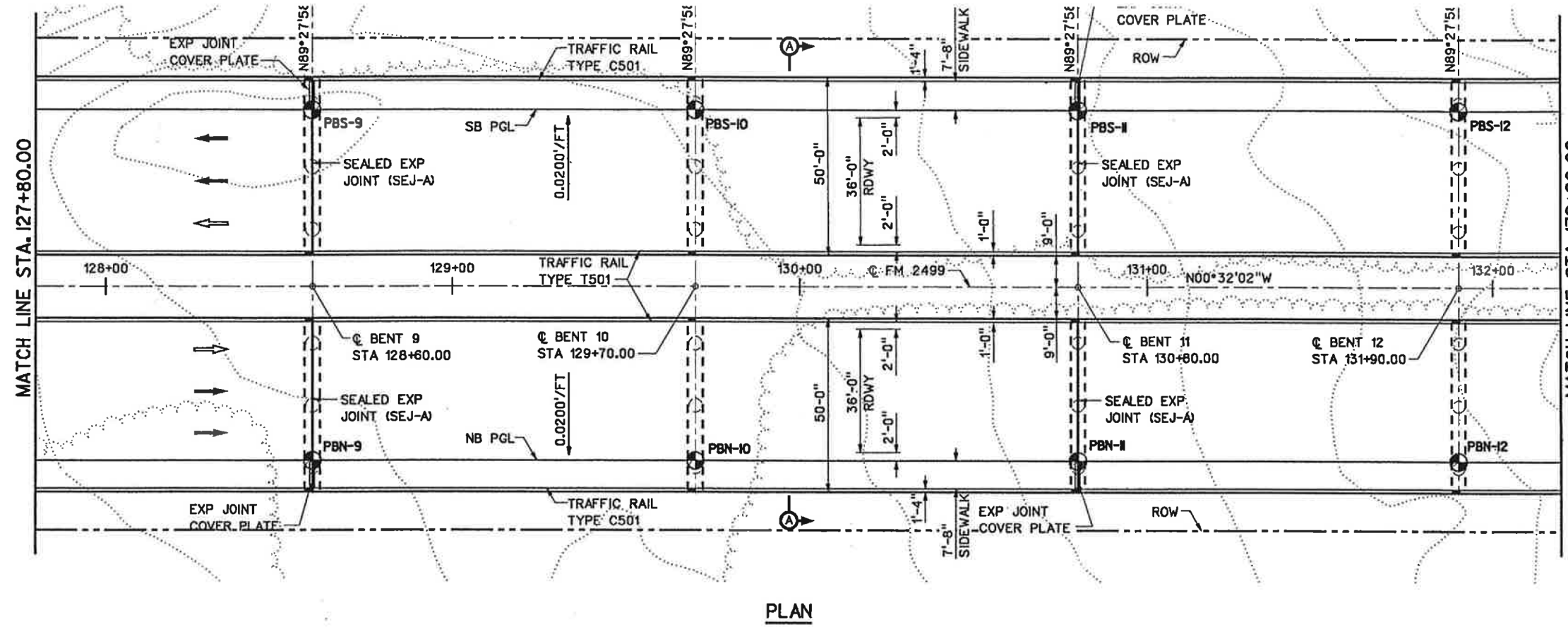


**FOR CONTRACTOR INFORMATION ONLY**

SEE "NB & SB BENTS 2-14", SHEETS 3 & 4 OF 4 FOR COLUMN HEIGHTS AND DRILLED SHAFT LENGTHS.

SCALE: NTS		SHEET 3 OF 5		
DESIGN AT	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
GRAPHICS AT	6	BPM-646961001		IHO035W
CHECK KD	TEXAS	DAL	DENTON	22
CHECK KD	CONTROL	SECTION	JOB	
CHECK KD	6469	61	001	



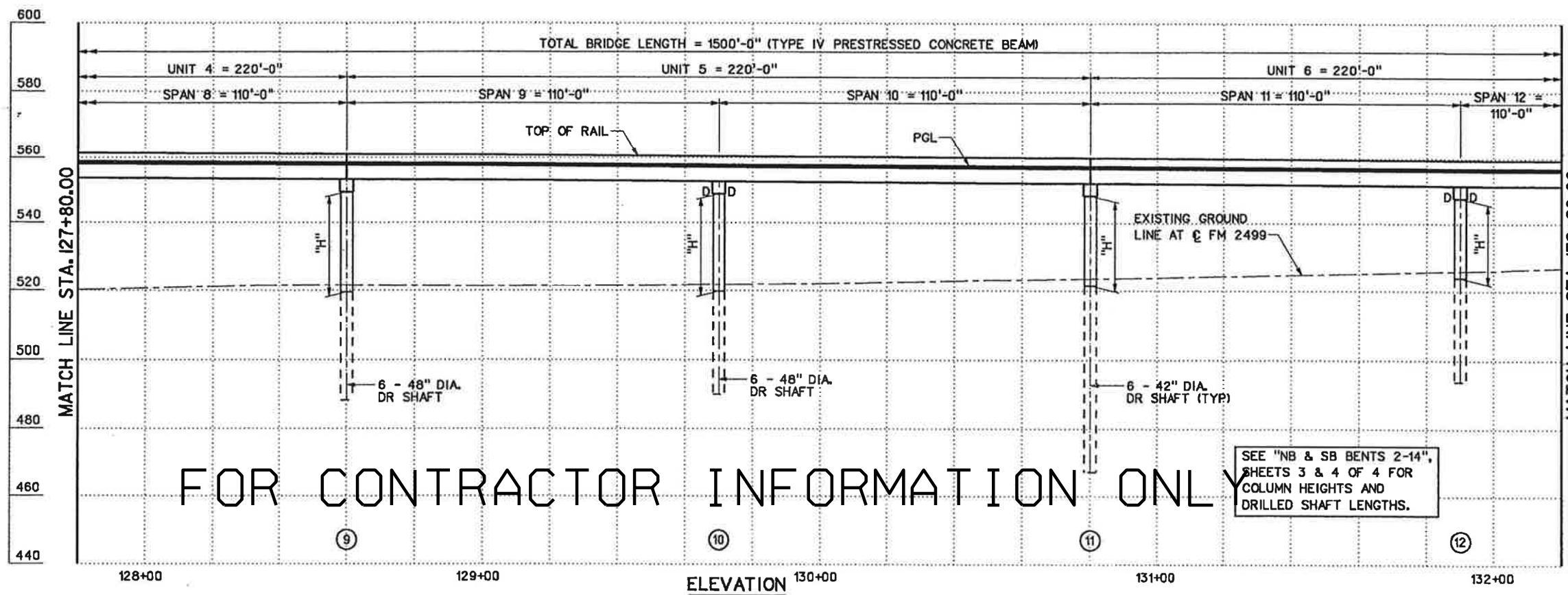


**VERTICAL CURVE DATA**  
AT PGL, NB & SB

0.50%    -0.50%

PVI STA 127+50.00  
ELEV = 558.95'  
VC = 120.00'  
E = -0.15'

NOTE:  
SEE SHEET 5 OF 5 FOR SECTION A-



NBI: 18-061-2681-01-012



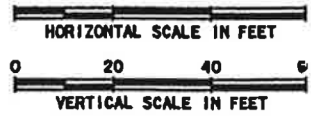
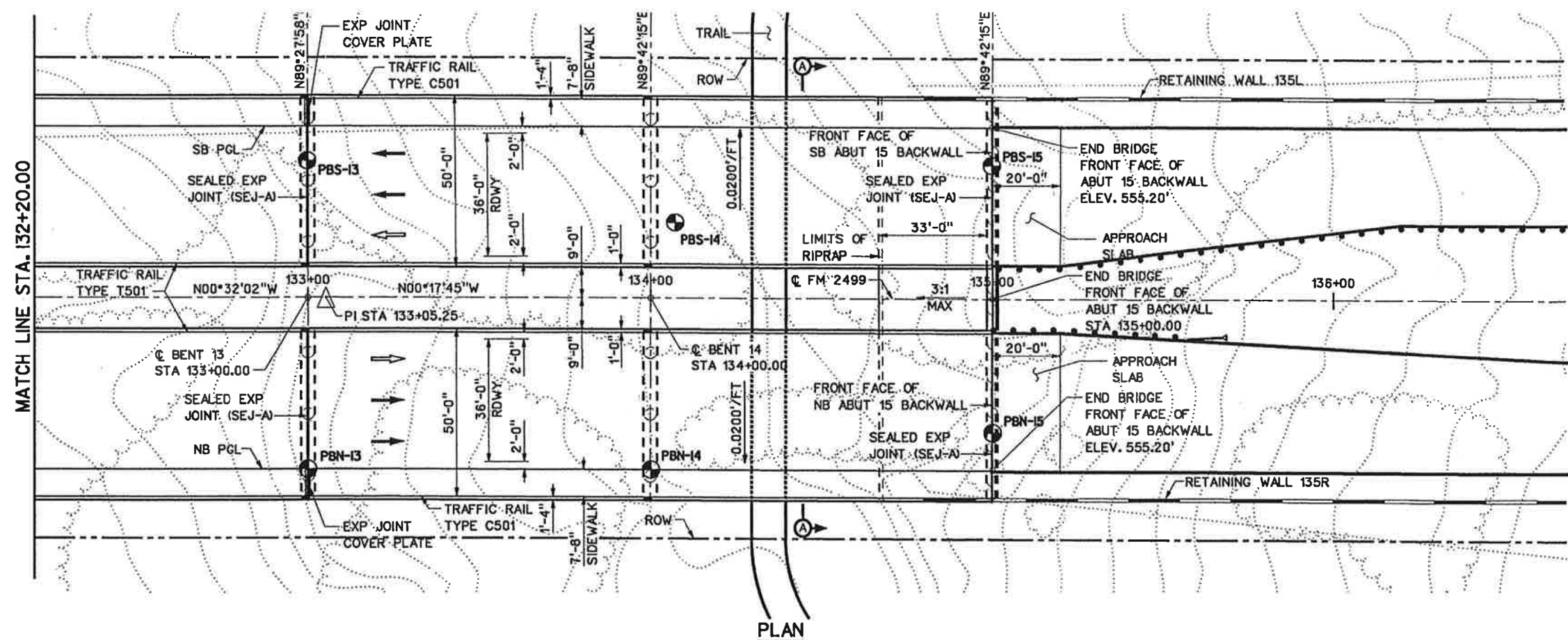
**FM 2499 SB  
AT PONDEXTER CREEK  
BRIDGE LAYOUT**

SCALE: NTS SHEET 4 OF 5

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 23
CHECK KD	CONTROL	SECTION	JOB	
CHECK KD	6469	61	001	



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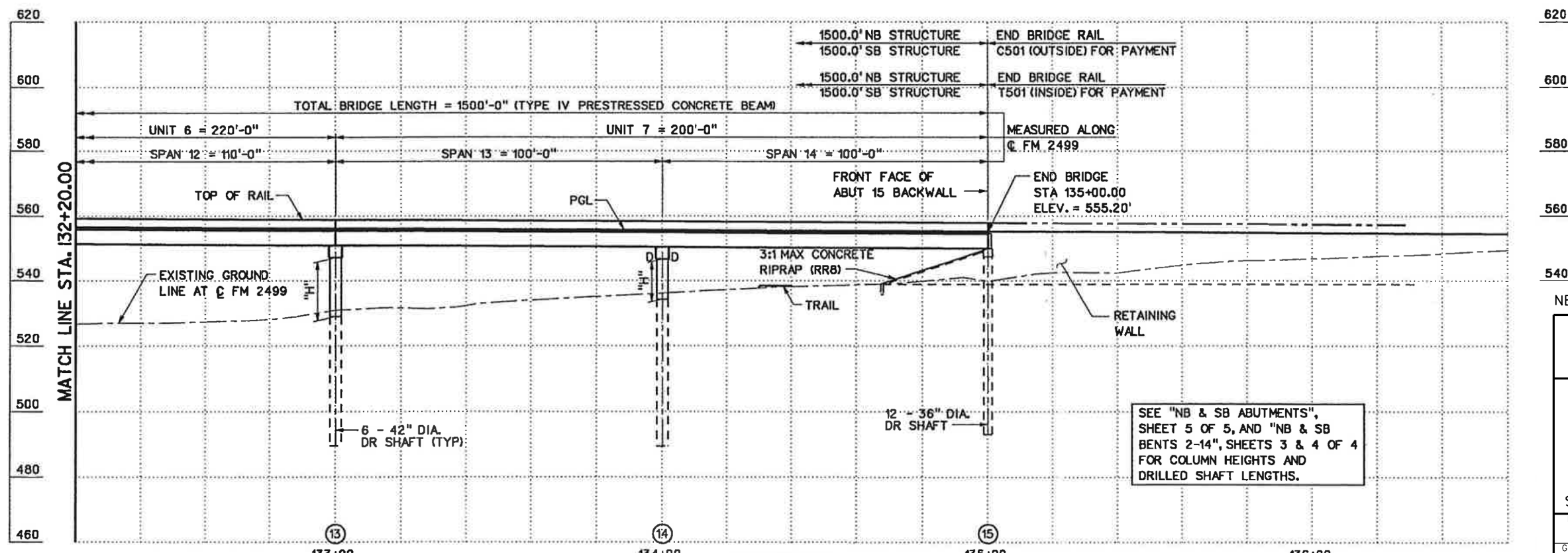
**HORIZONTAL CURVE DATA**

@ F.M. 2499  
 PI STA 133+05.25  
 $\Delta = 00^\circ 14' 17''$  LT  
 L = 0.00'

**VERTICAL CURVE DATA**

AT PGL, NB & SB  
 0.50%  $\Delta$  -0.50%  
 PVI STA 127+50.00  
 ELEV = 558.95'  
 VC = 120.00'  
 E = -0.15'

NOTE:  
SEE SHEET 5 OF 5 FOR SECTION A-



René J. Tullier  
 7-11-2007

NBI: 18-061-2681-01-012

Texas Department of Transportation  
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**FM 2499 SB**  
**AT PONDEXTER CREEK**  
**BRIDGE LAYOUT**

SCALE: NTS SHEET 5 OF 5

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT DAL	COUNTY DENTON	SHEET NO. 24
CHECK KD	TEXAS	SECTION	JOB	
CHECK KD	6469	61	001	

FOR CONTRACTOR INFORMATION ONLY

NBI	HWY	LOCATION	438 7007	REPAIRTYPE	713 * 7003
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C	JT CLEANING AND SEALING (EXPANSION JTS)
			LF	LF	LF
18061019602079	IH 35E NBML	ABT 1	98	98	98
		BNT 2	94	94	
		BNT 3	93	93	
		BNT 4	92	92	
		BNT 5	91	91	
		BNT 6	90	90	
		BNT 7	88	88	
		BNT 8	87	87	
		ABT 9	88	88	88
<b>PROJECT TOTALS</b>			<b>821</b>	<b>821</b>	<b>186</b>

\* - USE JS-14 FOR REFERENCE

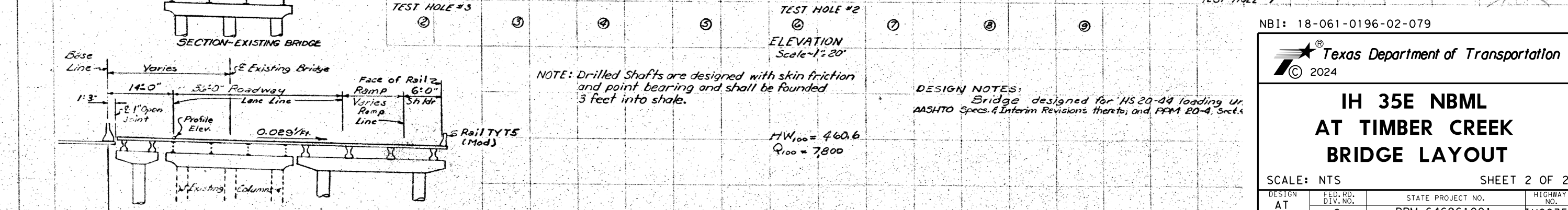
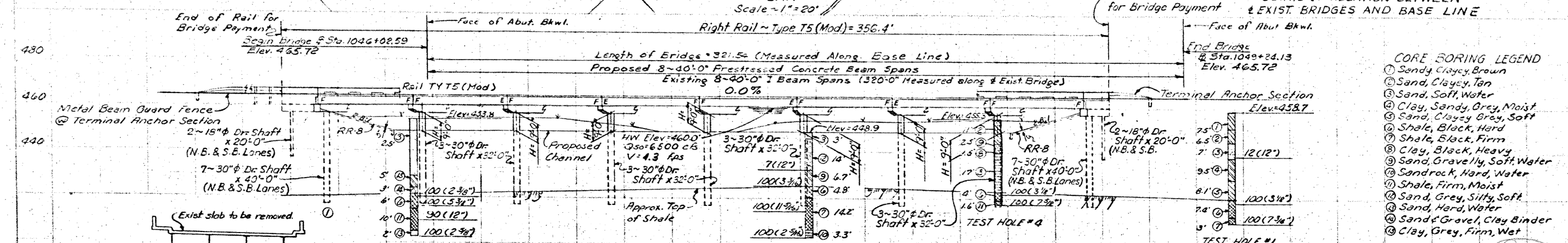
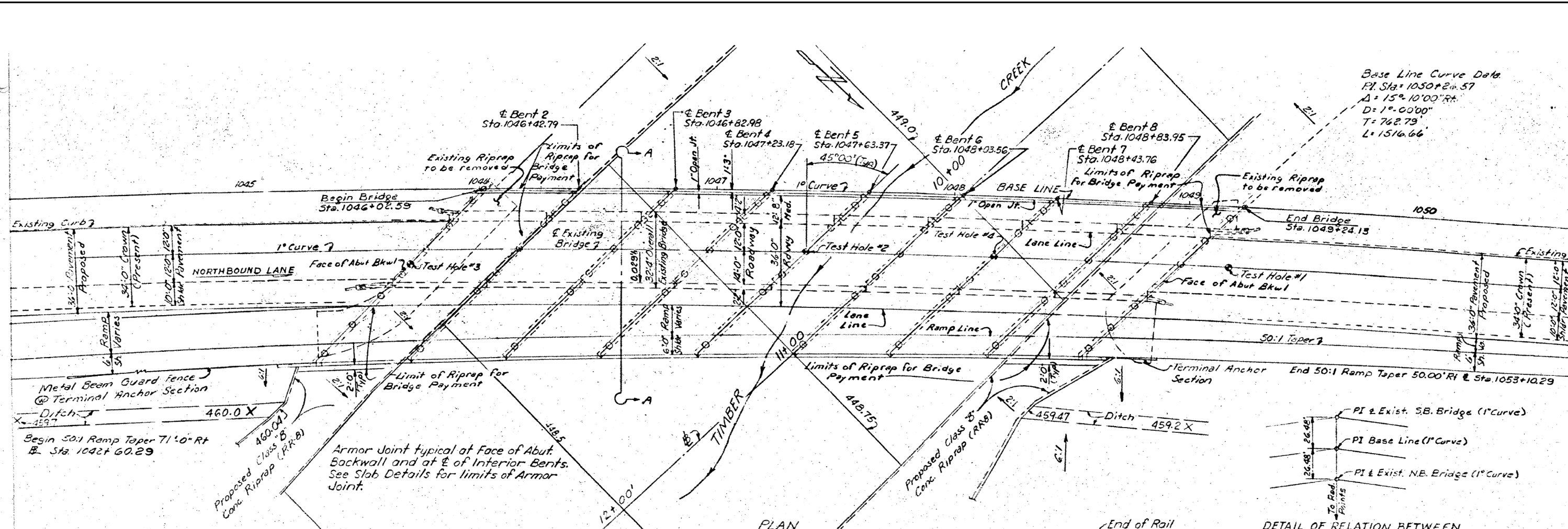
NBI: 18-061-0196-02-079



**IH 35E NBML  
AT TIMBER CREEK  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	25
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	



FOR CONTRACTOR INFORMATION ONLY

NBI: 18-061-0196-02-079

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### IH 35E NBML AT TIMBER CREEK BRIDGE LAYOUT

SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
GRAPHICS AT	6	BPM-646961001		IH0035W
CHECK KD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	26
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	

NBI	HWY	LOCATION	438 7007	REPAIRTYPE
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C
			LF	LF
1806101199602026	IH 35E NBML	ABT 1	71	71
		BNT 3	71	71
		BNT 6	71	71
		ABT 9	71	71
<b>PROJECT TOTALS</b>			<b>284</b>	<b>284</b>

NBI: 18-061-0196-02-026

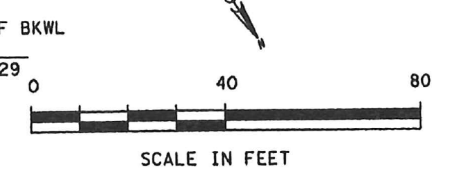
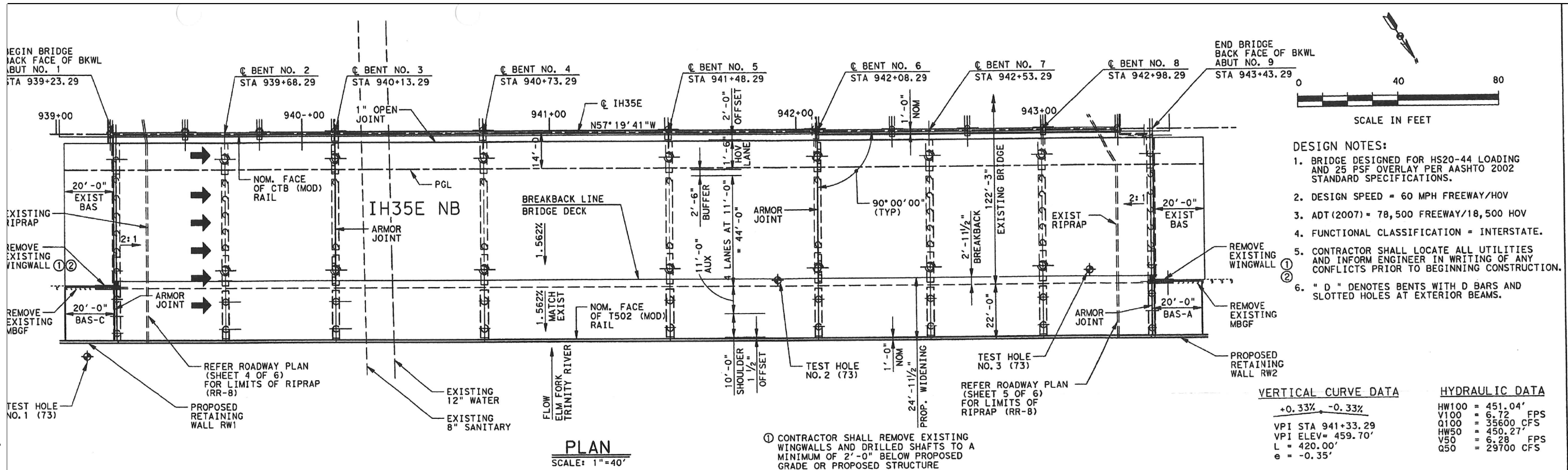


**IH 35E NBML  
AT ELM FRK TRINITY RVR  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 27
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	

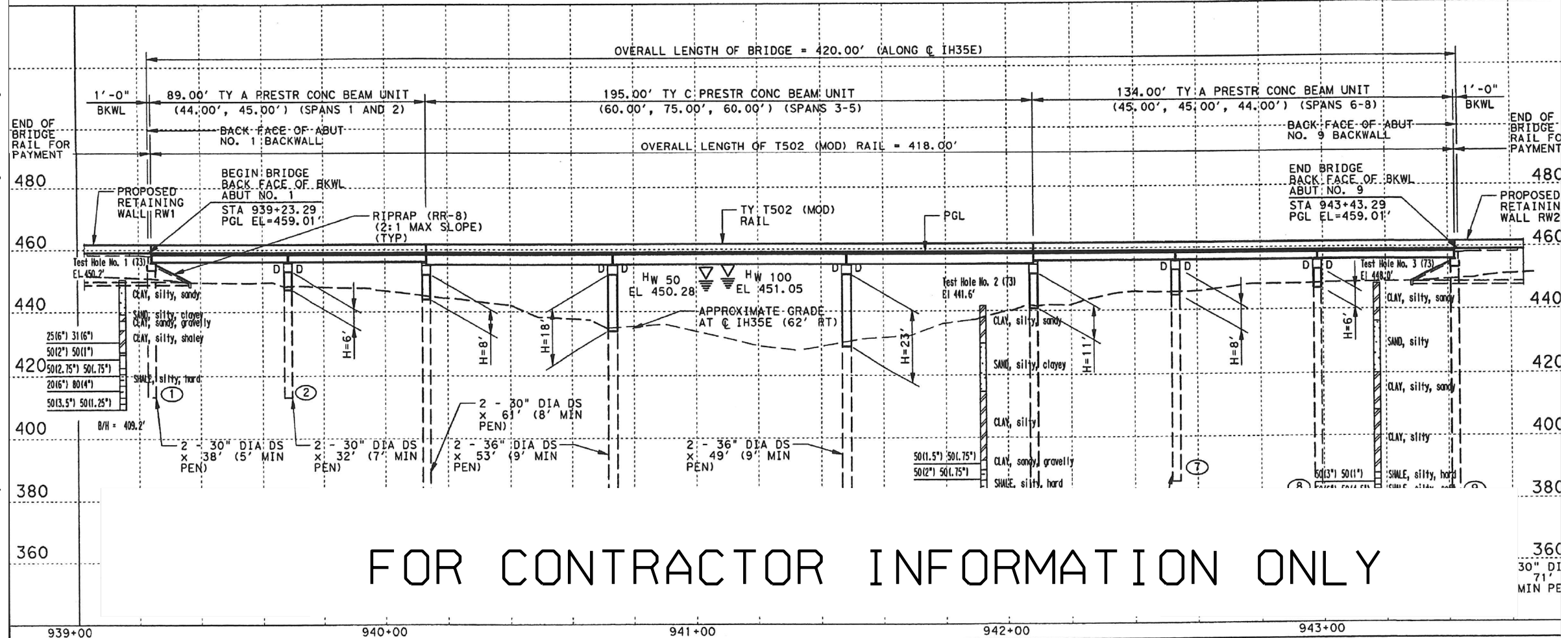




- DESIGN NOTES:**
- BRIDGE DESIGNED FOR HS20-44 LOADING AND 25 PSF OVERLAY PER AASHTO 2002 STANDARD SPECIFICATIONS.
  - DESIGN SPEED = 60 MPH FREEWAY/HOV
  - ADT(2007) = 78,500 FREEWAY/18,500 HOV
  - FUNCTIONAL CLASSIFICATION = INTERSTATE.
  - CONTRACTOR SHALL LOCATE ALL UTILITIES AND INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
  - "D" DENOTES BENTS WITH D BARS AND SLOTTED HOLES AT EXTERIOR BEAMS.

VERTICAL CURVE DATA		HYDRAULIC DATA
+0.33%	-0.33%	HW100 = 451.04'
VPI STA 941+33.29		V100 = 6.72 FPS
VPI ELEV= 459.70'		Q100 = 35600 CFS
L = 420.00'		HW50 = 450.27'
e = -0.35'		V50 = 6.28 FPS
		Q50 = 29700 CFS

ALL ABUTMENTS AND BENTS ARE ON BEARING N32° 40' 19" E



FOR CONTRACTOR INFORMATION ONLY

NBI: 18-061-0196-02-026

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**IH 35E NBML AT ELM FRK TRINITY RVR BRIDGE LAYOUT**

SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	28
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	

NBI	HWY	LOCATION	438 7007	REPAIRTYPE
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C
			LF	LF
18061019602250	IH 35 NBFR	ABT 1	73	73
		BNT 2	69	69
		BNT 3	73	73
		BNT 4	79	79
		BNT 5	89	89
		BNT 6	92	92
		BNT 7	99	99
		BNT 8	105	105
		ABT 9	112	112
<b>PROJECT TOTALS</b>			<b>791</b>	<b>791</b>

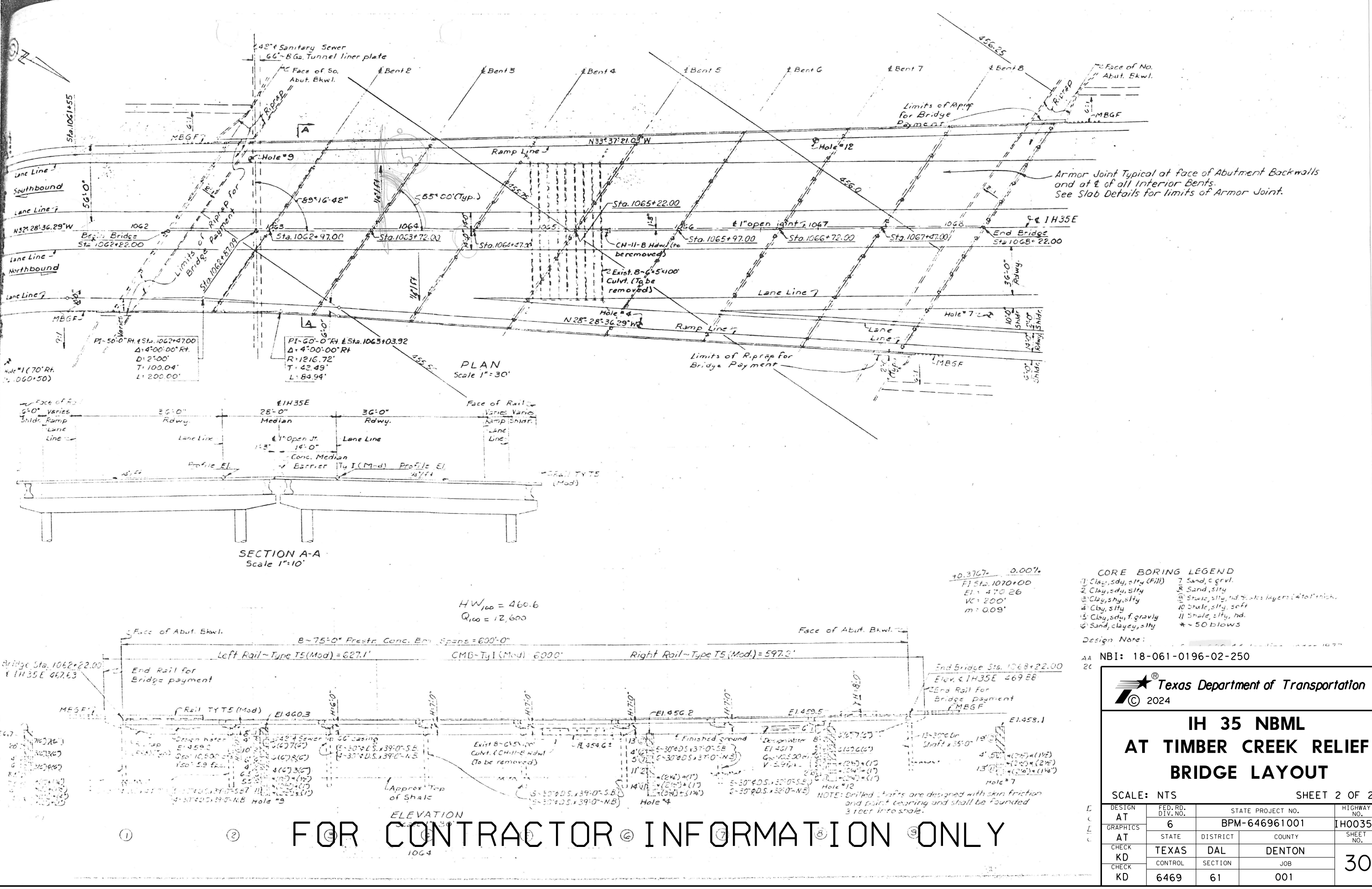
NBI: 18-061-0196-02-250



**IH 35 NBML  
AT TIMBER CREEK RELIEF  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KD	TEXAS	DAL	DENTON	29
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	



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**IH 35 NBML  
AT TIMBER CREEK RELIEF  
BRIDGE LAYOUT**


SCALE: NTS SHEET 2 OF 2

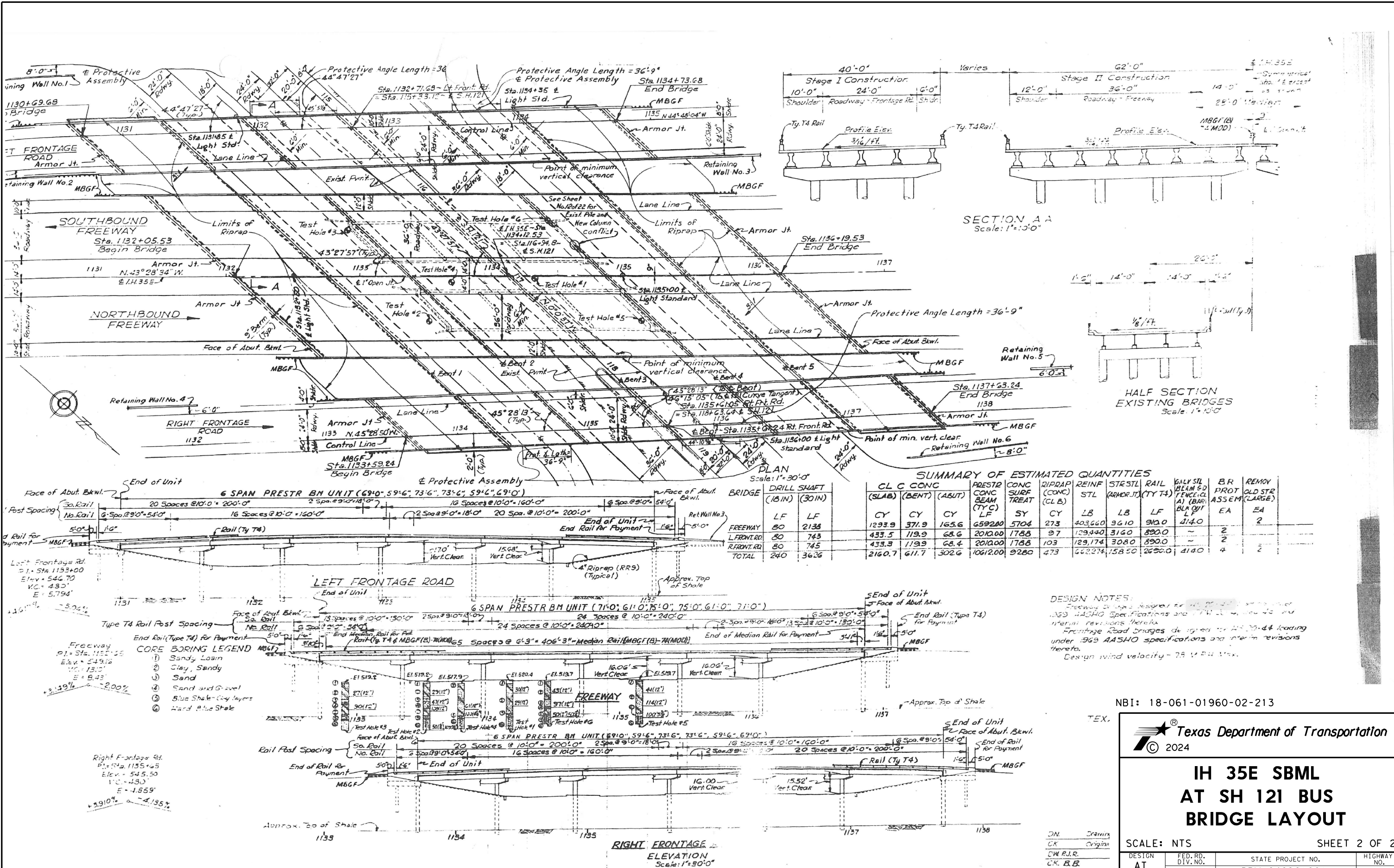
DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 30
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	



NBI	HWY	LOCATION	438 7007	REPAIRTYPE
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C
			LF	LF
18061019602213	IH 35E SBML	ABT 1	87	87
		ABT 2	87	87
<b>PROJECT TOTALS</b>			<b>174</b>	<b>174</b>

NBI: 18-061-0196-02-213

 <b>Texas Department of Transportation</b> © 2024				
<b>IH 35E SBML                  AT SH 121 BUS                  SUMMARY</b>				
SHEET 1 OF 2				
DESIGN AT	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
GRAPHICS AT	6	BPM-646961001		IH0035W
CHECK KD	TEXAS	DAL	DENTON	
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	
				<b>31</b>



SECTION A-A Scale: 1"=10'0"

HALF SECTION EXISTING BRIDGES Scale: 1"=10'0"

BRIDGE

DRILL SHAFT (18 IN)	DRILL SHAFT (30 IN)
LF	LF
80	2138
80	743
80	745
TOTAL	3626

SUMMARY OF ESTIMATED QUANTITIES

CL C CONC (SLAB)	PRESTR CONC BEAM (TY C)	CONC SURF TREAT	RIPRAP (CONC)	REINF STL	STRETL (ARMOR JT)	RAIL (TY T4)	GAUL STL BEAM ED FENCE (A) (BARR BLK OPT L)	BR PROT ASSEM	REMOV OLD STR (LARGE)
CY	CY	SY	CY	LB	LB	LF	EA	EA	EA
1293.9	371.9	165.6	659220	5704	273	403660	9610	3160	890.0
433.5	119.9	68.6	201000	1788	97	129440	3160	890.0	-
433.3	119.9	68.4	201000	1788	103	129174	3080	890.0	-
TOTAL	2160.7	611.7	3026	1061200	9280	473	662374	15850	2650.0

DESIGN NOTES:  
 Freeway Bridge designed per 1999 AASHTO Specifications and 1993 AASHTO Specifications and 1993 AASHTO Specifications and interim revisions thereto.  
 Frontage Road bridges designed per 1999 AASHTO Specifications and interim revisions thereto.  
 Design wind velocity - 75 MPH Max.

NBI: 18-061-01960-02-213



# IH 35E SBML AT SH 121 BUS BRIDGE LAYOUT

SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 32
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	

FOR CONTRACTOR INFORMATION ONLY

DN: Drawing  
 CK: Original  
 CW: P.L.R.  
 CK: B.B.

NBI	HWY	LOCATION	438 7007	REPAIRTYPE
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C
			LF	LF
18061008113102	JOHN PAVER RD	BNT 2	30	30
		BNT 3	30	30
<b>PROJECT TOTALS</b>			<b>60</b>	<b>60</b>

NBI: 18-061-0081-13-102

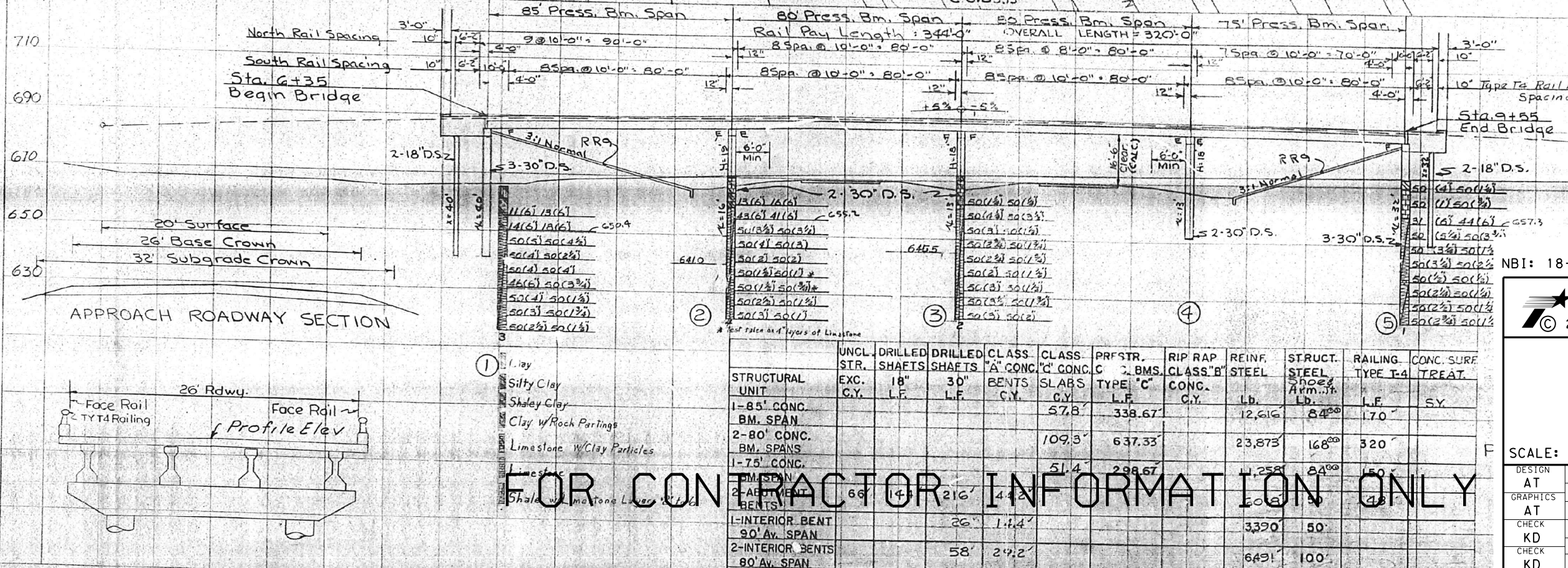
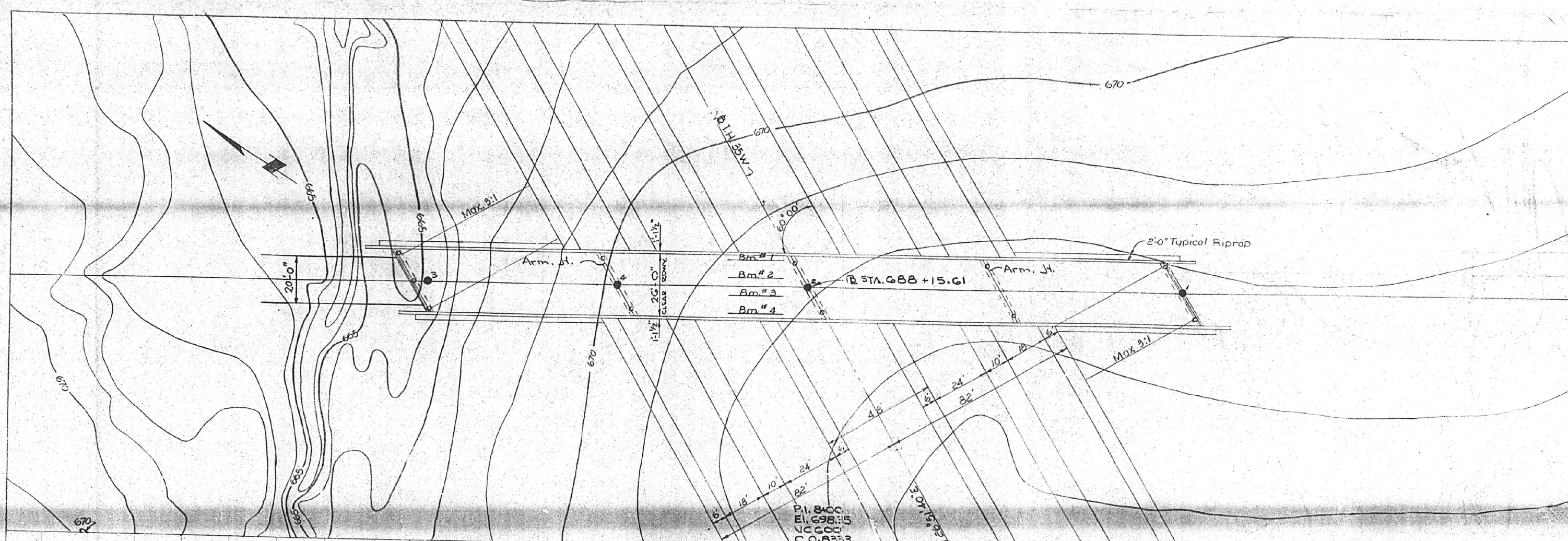


**JOHN PAINE RD  
AT IH 35W  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
GRAPHICS AT	6	BPM-646961001		IH0035W
CHECK KD	TEXAS	DAL	DENTON	33
CHECK KD	CONTROL	SECTION	JOB	
	6469	61	001	





BEARING SEAT ELEVATIONS					
Bent	Beam	1	2	3	4
1	Bk	684.346	684.465	684.581	684.694
2	Bk	686.142	686.201	686.259	686.312
2	Abd.	686.165	686.224	686.280	686.333
3	Bk.	686.773	686.777	686.777	686.775
3	Abd.	686.775	686.777	686.777	686.773
4	Bk.	686.333	686.280	686.224	686.165
4	Abd.	686.333	686.263	686.212	686.152
5		684.959	684.853	684.744	684.632

DESIGN NOTE: Bridge designed for H 15

NBI: 18-061-0081-13-102



## JOHN PAINE RD AT IH 35W BRIDGE LAYOUT

SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 34
CHECK KD	CONTROL	SECTION	JOB	
CHECK KD	6469	61	001	


STRUCTURAL UNIT	UNCL. STR. EXC. C.Y.	DRILLED SHAFTS 18" L.F.	DRILLED SHAFTS 30" L.F.	CLASS. "A" CONG. BENTS C.Y.	CLASS. "C" CONG. SLABS G.Y.	PRF STR. TYPE "C" L.F.	RIP RAP CLASS "B" CONC. C.Y.	REINF. STEEL Lb.	STRUCT. STEEL Shoes Arm. Jt. Lb.	RAILING TYPE T-4 L.F.	CONC. SURF. TREAT. SY
1-85' CONC. BM. SPAN					57.8	338.67		12,616	84 <sup>00</sup>	1.70	
2-80' CONC. BM. SPANS					109.3	637.33		23,873	168 <sup>00</sup>	3.20	
1-75' CONC. BM. SPAN					51.4	298.67		11,258	84 <sup>00</sup>	1.50	
2-ABUTMENT BENTS	66	14	216	44.2				20,616	50	2.8	
1-INTERIOR BENT 90' Av. SPAN			26	14.4				3,390	50		
2-INTERIOR BENTS 80' Av. SPAN			58	24.2				6,491	100		
TOTAL											

FOR CONTRACTOR INFORMATION ONLY

NBI	HWY	LOCATION	438	713 *
			7013	7003
			CLEANING AND SEALING EXIST JOINTS (SEJ)	JT CLEANING AND SEALING (EXPANSION JTS)
			LF	LF
18061013409133	US 380 EB	ABT 1	62	62
		ABT 4	62	62
<b>PROJECT TOTALS</b>			<b>124</b>	<b>124</b>

\* - USE JS-14 FOR REFERENCE

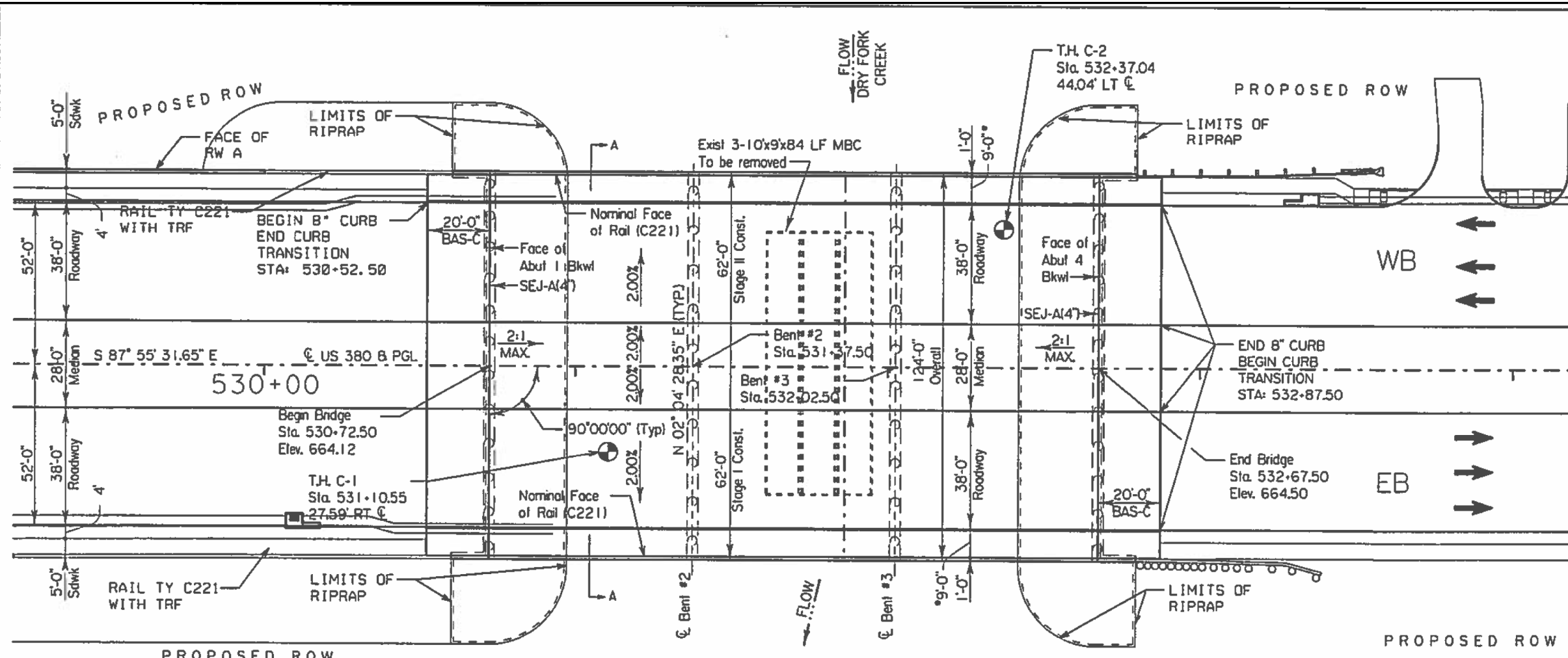
NBI: 18-061-0134-09-133

 Texas Department of Transportation © 2024				
<b>US 380 EB AT DRY FORK HYCKORY CREEK</b>				
<b>SUMMARY</b>				
SHEET 1 OF 2				
DESIGN	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
AT	6	BPM-646961001		IH0035W
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AT	TEXAS	DAL	DENTON	35
CHECK	CONTROL	SECTION	JOB	
KD	6469	61	001	



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DESIGN SPEED = 45 MPH  
2012 ADT = 19,200 VPD  
2032 ADT = 27,800 VPD  
FUNC. CLASS. = URBAN PRINCIPAL ARTERIAL

**Notes:**  
BRIDGE DESIGNED FOR HL-93 LOADING UNDER 2010 AASHTO. LRFD SPECIFICATIONS AND INTERIM REVISIONS THERETO.

REFER TO RETAINING WALL PLAN AND PROFILE SHEETS FOR LIMITS OF MSE WALLS.

REFER TO CORE BORING SHEETS FOR CORE HOLE INFORMATION.

SEE ROADWAY PLANS FOR RIPRAP LIMITS AND QUANTITIES.

SEE SHEET 4 OF 4 FOR SECTION A-A.

SAWCUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS NOT REQUIRED.

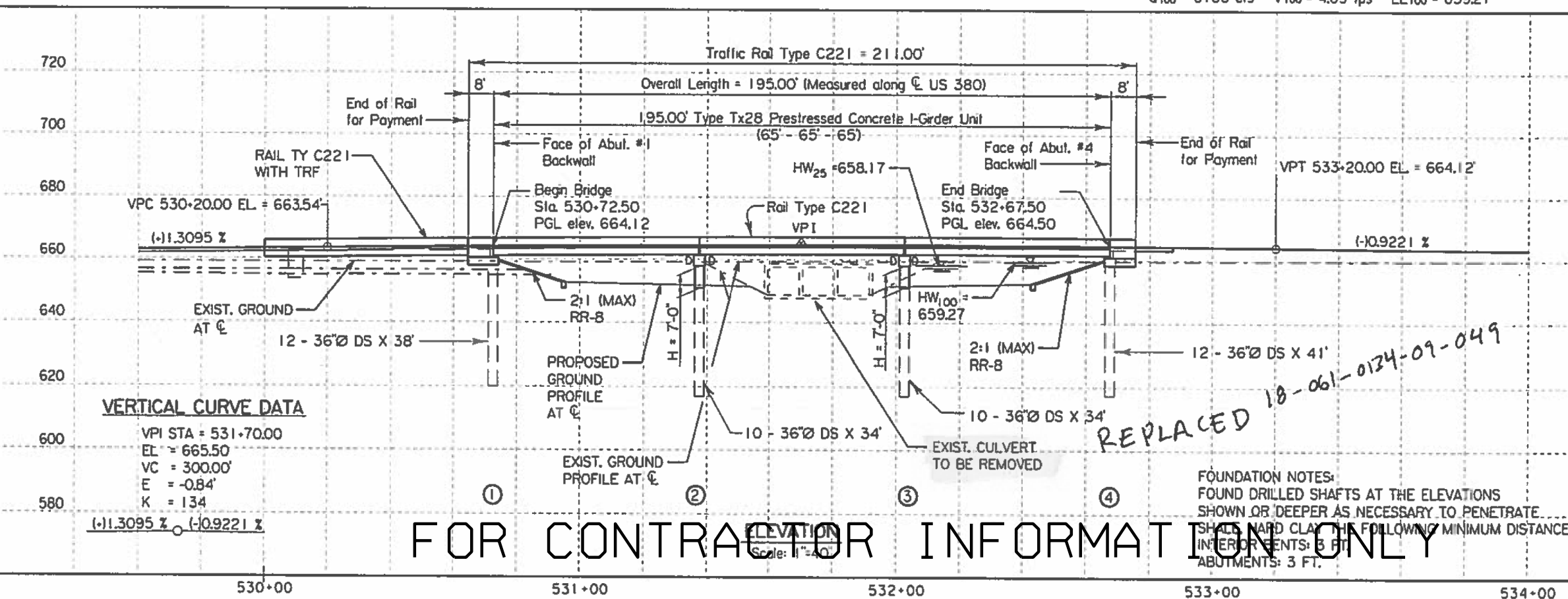
SIDEWALK TRANSITION IS REQUIRED FROM BRIDGE APPROACH SLAB SIDEWALK TO ROADWAY SIDEWALK. REFERENCE ROADWAY PLANS FOR MORE DETAILS.

SEE ROADWAY PLANS FOR STORM SEWER AND INLET DETAILS NOT SHOWN.

\* INCLUDES 5' SIDEWALK

**HYDRAULIC DATA**

Q<sub>25</sub> = 4800 cfs    V<sub>25</sub> = 3.69 fps    EL<sub>25</sub> = 658.17  
Q<sub>100</sub> = 6100 cfs    V<sub>100</sub> = 4.69 fps    EL<sub>100</sub> = 659.27



NBI: 18-061-0134-09-133



**US 380 EB AT DRY FORK HYCKORY CREEK BRIDGE LAYOUT**


SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 36
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	

NBI	HWY	LOCATION	438 7007	REPAIRTYPE	713 * 7003
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C	JT CLEANING AND SEALING (EXPANSION JTS)
			LF	LF	LF
18061195101003	FM 1515	ABT 1			40
		BNT 2	40	40	
		BNT 3	40	40	
		ABT 4			40
<b>PROJECT TOTALS</b>			<b>80</b>	<b>80</b>	<b>80</b>

\*- USE JS-14 FOR REFERENCE

NBI: 18-061-1951-01-003



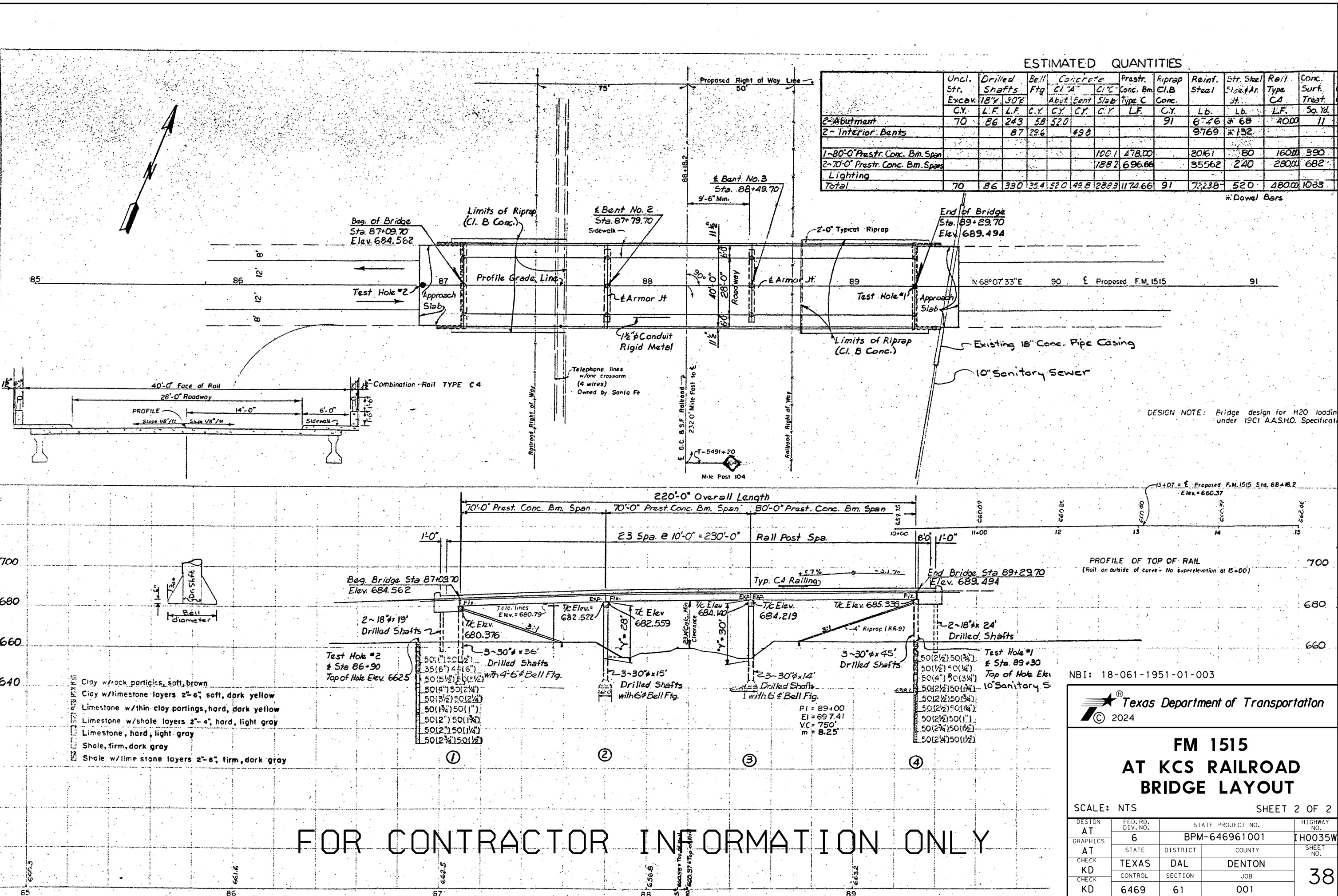
**FM 1515  
AT KCS RAILROAD  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 37
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	



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**ESTIMATED QUANTITIES**

	Uncl. Str. Excav. C.Y.	Drilled Shafts		Bell Ftg. C.Y.	Concrete		Prestr. Conc. Bm. Type C L.F.	Riprap Cl. B Conc. C.Y.	Reinf. Steel Lb.	Str. Steel Sigs. Ar. Lb.	Rail Type CA L.F.	Conc. Surf. Treat. Sq. Yd.	
		18" L.F.	30" L.F.		Abut. C.Y.	Bent C.Y.							Slab C.Y.
2- Abutment	70	86	243	58	520			91	6,746	3,688	40,000	11	
2- Interior Bents			87	296	498				9,769	1,132			
1- 80'-0" Prestr. Conc. Bm. Span						100.1	478.00		2061	80	1600	390	
2- 70'-0" Prestr. Conc. Bm. Spans						188.2	696.66		35562	240	2800	682	
Lighting													
<b>Total</b>	<b>70</b>	<b>86</b>	<b>330</b>	<b>35.4</b>	<b>520</b>	<b>49.8</b>	<b>2283.3</b>	<b>1174.66</b>	<b>91</b>	<b>7,238</b>	<b>520</b>	<b>480.0</b>	<b>1083</b>

#: Dowel Bars

DESIGN NOTE: Bridge design for H2O loading under 19C1 A.A.S.H.O. Specifications

- Clay w/rock particles, soft, brown
- Clay w/limestone layers 2'-6", soft, dark yellow
- Limestone w/thin clay partings, hard, dark yellow
- Limestone w/shale layers 2'-4", hard, light gray
- Limestone, hard, light gray
- Shale, firm, dark gray
- Shale w/limestone layers 2'-6", firm, dark gray

FOR CONTRACTOR INFORMATION ONLY

Texas Department of Transportation  
 © 2024  
 FM 1515  
 AT KCS RAILROAD  
 BRIDGE LAYOUT  
 SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 38
CHECK KD	CONTROL	SECTION	JOB	
CHECK KD	6469	61	001	

NBI	HWY	LOCATION	438 7007	REPAIR TYPE
			CLEANING AND SEALING EXIST JOINTS (CL 7)	DETAIL C
			LF	LF
18061235302002	FM 2450	BNT 4	28	28
		BNT 7	28	28
<b>PROJECT TOTALS</b>			<b>56</b>	<b>56</b>

NBI: 18-061-2353-02-002



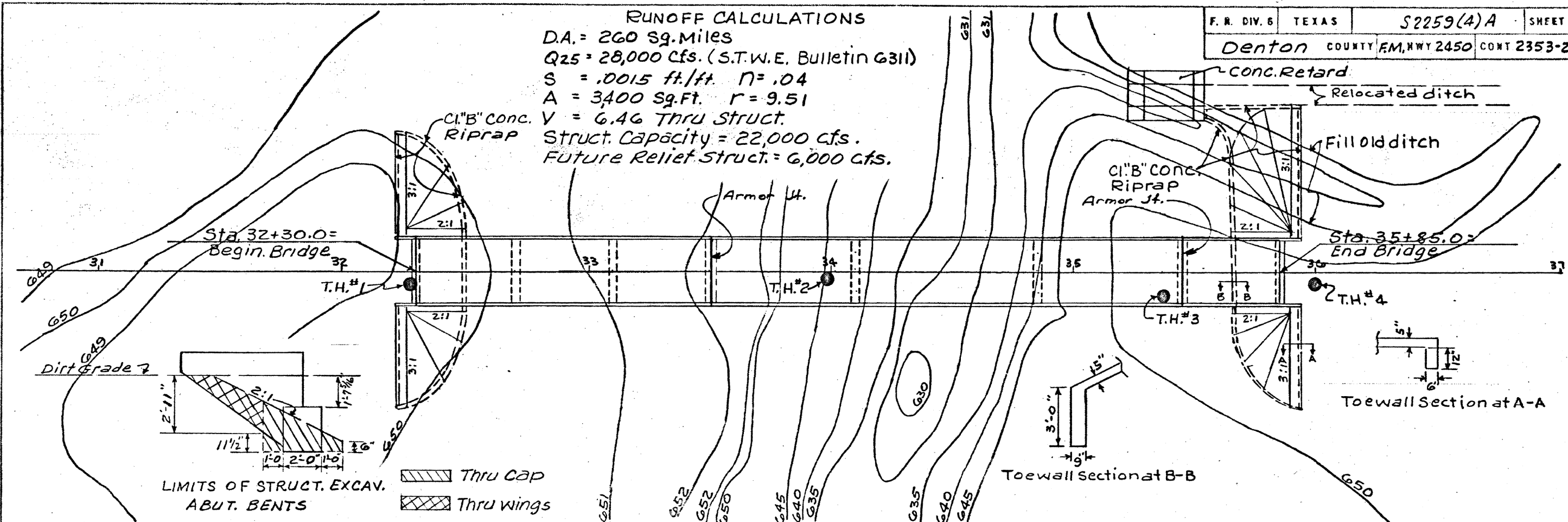
**FM 2450  
AT CLEAR CREEK  
SUMMARY**

SHEET 1 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001		HIGHWAY NO. IH0035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON	SHEET NO. 39
CHECK KD	CONTROL 6469	SECTION 61	JOB 001	

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**RUNOFF CALCULATIONS**  
 D.A. = 260 Sq. Miles  
 Q<sub>25</sub> = 28,000 cfs. (S.T.W.E. Bulletin G31I)  
 S = .0015 ft./ft. N = .04  
 A = 3,400 Sq. Ft. r = 9.51  
 V = 6.46 THRU STRUCT.  
 Struct. Capacity = 22,000 cfs.  
 Future Relief Struct. = 6,000 cfs.



LIMITS OF STRUCT. EXCAV. ABUT. BENTS  
 Thru cap  
 Thru wings

670	PI. = 30+75 Elev. = 661.97 V.C. = 300' C = 0.5278	Beg. Br. Sta. 32+30.0	3-40'-0" CG-0-26'-40" (15) = 120'-0"	Overall Length = 355'-0"	195' Cont. I-Beam Unit (60'-75'-60')	1-40' CG-0-26'-40" = 40'-0"	End Br. Sta. 35+85.0	PI. = 38+85 Elev. = 663.65 V.C. = 300' C = 0.4720
660	+0.208% H.W. = 655.5 (1942-1957)	Fin. Grade = 662.96 = 0.57' above Profile Elev.	RAIL POST 6 Spac. @ 7'-9" = 46'-6"	RAILING POST SPAC. = 38 SPAC. @ 8'-4" = 316'-8"	SEE SHEET NO. 47 FOR ADD'L. SPAC. INFOR.	4'-2"	Fin. Grade = 663.70 = 0.67' above Profile Elev.	+0.208%
650	EI. = 649.87	TC = 660.18	TC = 660.27	TC = 660.35	TC = 660.43	TC = 659.86	TC = 660.09	TC = 660.24
640	18(6") 24(6")	X = 40'	X = 52'	X = 32'	X = 33'	X = 21'	X = 23'	EI. = 649.6
630	26(6") 26(6")	X = 6.5'	X = 10.9'	X = 1.5'	X = 1.5'	X = 1.5'	X = 1.5'	EI. = 650.4
620	50(1") 50(1/4")	X = 3'	X = 5.5'	X = 1'	X = 1'	X = 1'	X = 1'	
610	50(1/2") 50(1/4")	X = 5.5'	X = 6'	X = 1'	X = 1'	X = 1'	X = 1'	
600	50(1/4") 50(1/4")	X = 6'	X = 6'	X = 1'	X = 1'	X = 1'	X = 1'	
		Bent No. → ①	Bottom of Shaft Elevation	Min. Depth Penn. into Rock *				
		2	617.27	4.0'				
		3	618.35	4.0'				
		4	617.86	4.0'				
		5	618.99	5.0'				
		6	620.27	5.0'				
		7	622.27	4.0'				

**FOR CONTRACTOR INFORMATION ONLY**

\* Depths required below top of rock elevation and below the bottom of any casing used during construction.  
 Note: The sides of drilled shafts below rock elevation shall be roughened to increase frictional resistance.

NBI: 18-061-2353-02-002

Texas Department of Transportation  
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**FM 2450  
 AT CLEAR CREEK  
 BRIDGE LAYOUT**

SCALE: NTS SHEET 2 OF 2

DESIGN AT	FED. RD. DIV. NO. 6	STATE PROJECT NO. BPM-646961001	HIGHWAY NO. IHO035W
GRAPHICS AT	STATE TEXAS	DISTRICT DAL	COUNTY DENTON
CHECK KD	CONTROL	SECTION	JOB
CHECK KD	6469	61	001

40

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

- 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).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
- 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.
- 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.
- When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
- The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
- 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.
- 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.
- 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.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- 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:**



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

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

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

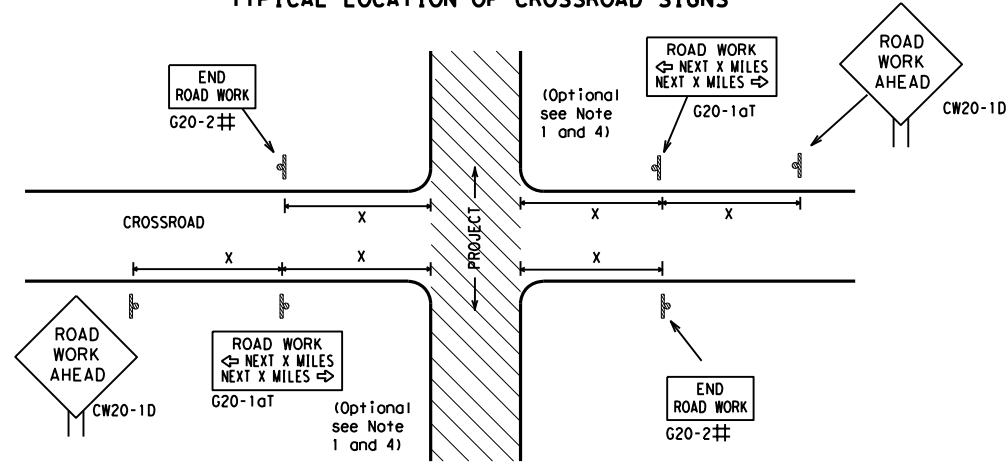
<b>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT</b> <a href="http://www.txdot.gov">http://www.txdot.gov</a>
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD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

SHEET 1 OF 12

 Texas Department of Transportation		 Traffic Safety Division Standard	
<b>BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS</b>			
<b>BC (1) -21</b>			
FILE:	bc-21.dgn	DN:	TxDOT
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	DAL	DENTON	41

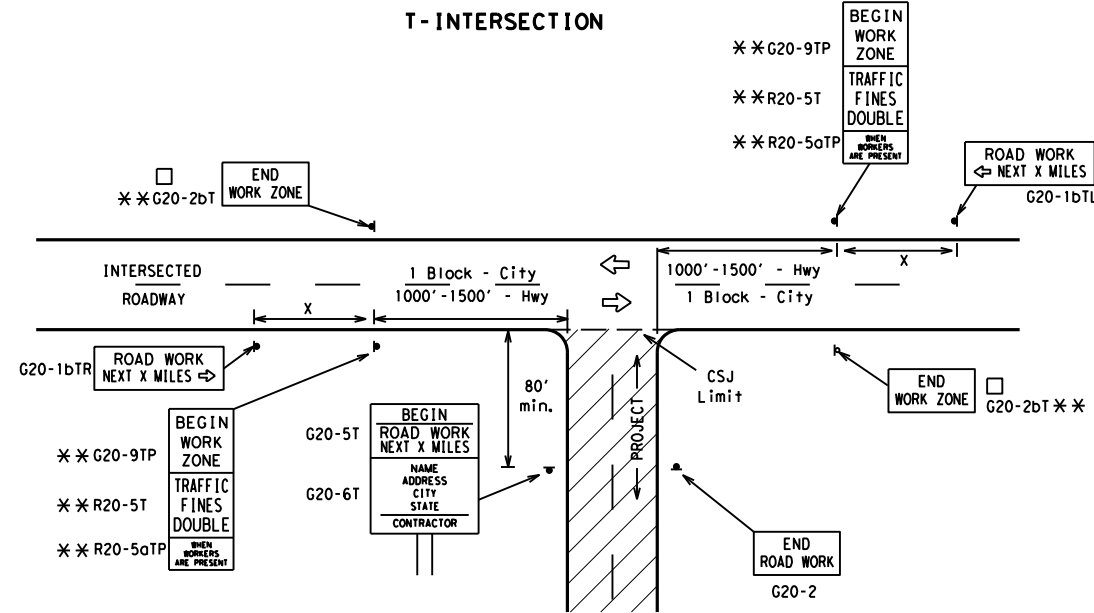
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**TYPICAL LOCATION OF CROSSROAD SIGNS**



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

- 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.
- 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<sup>1,5,6</sup>**

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 <sup>4</sup>	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 <sup>2</sup>
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
			80	1000 <sup>2</sup>
			*	* <sup>3</sup>

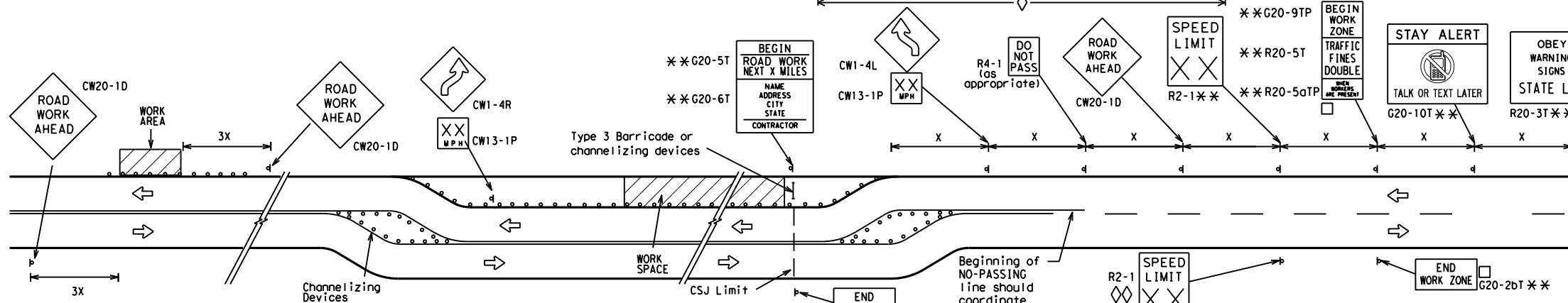
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

**GENERAL NOTES**

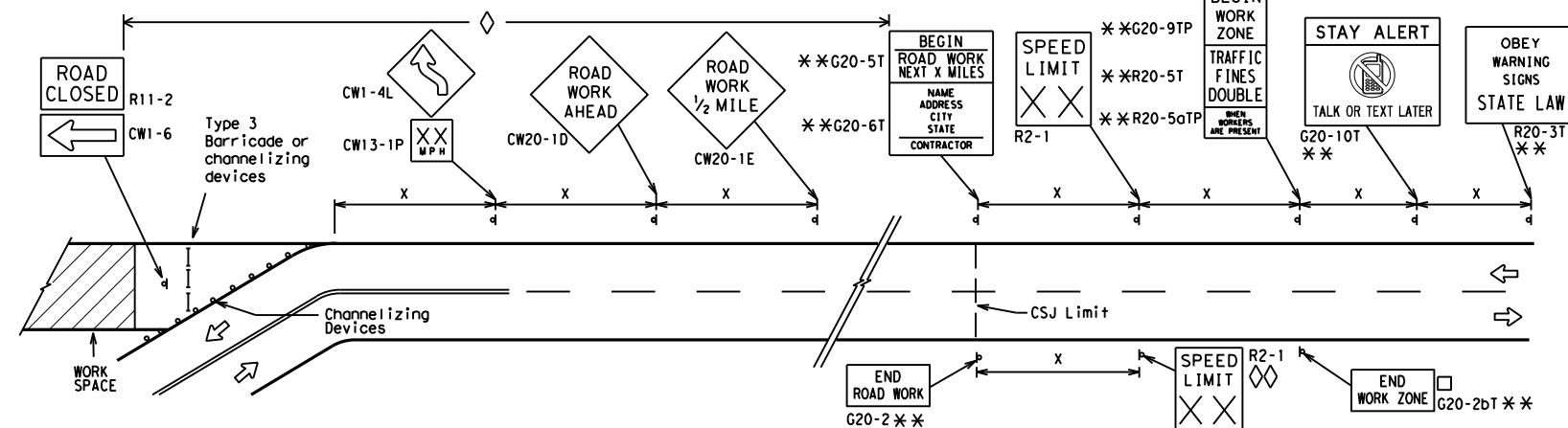
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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".
- Only diamond shaped warning sign sizes are indicated.
- 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**

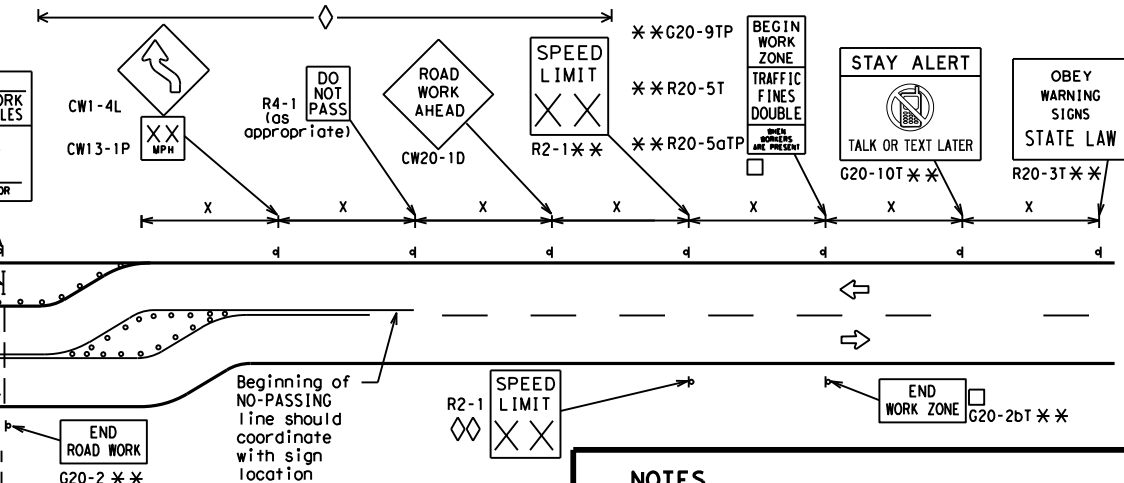


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



**SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT 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



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

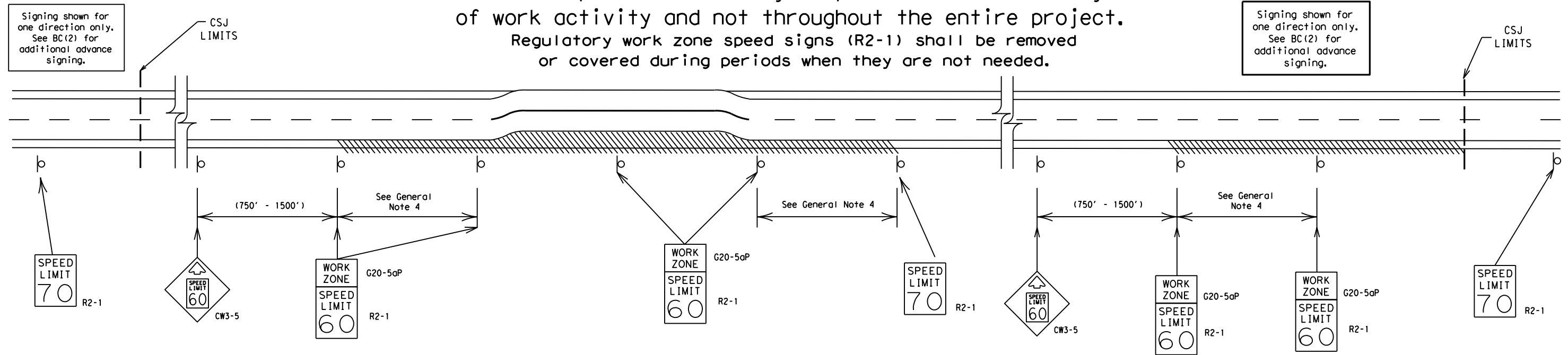
**BC(2)-21**

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REVISIONS	6469	61	001	IH0035W
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	DAL	DENTON	42	

# 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:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

## GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:
 

40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
  - Law enforcement.
  - Flagger stationed next to sign.
  - Portable changeable message sign (PCMS).
  - Low-power (drone) radar transmitter.
  - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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.

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SHEET 3 OF 12

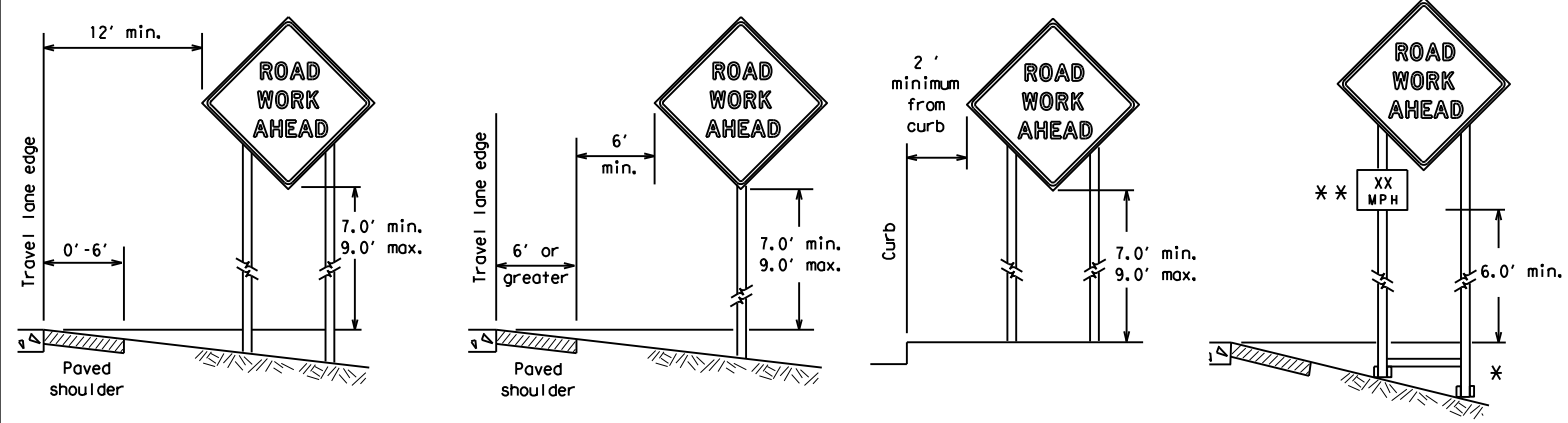
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<h3>BC (3) - 21</h3>			
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© TxDOT	November 2002	CONT	SECT
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9-07 8-14		HIGHWAY	IH0035W
7-13 5-21		DIST	COUNTY
		DAL	DENTON
		SHEET NO.	43



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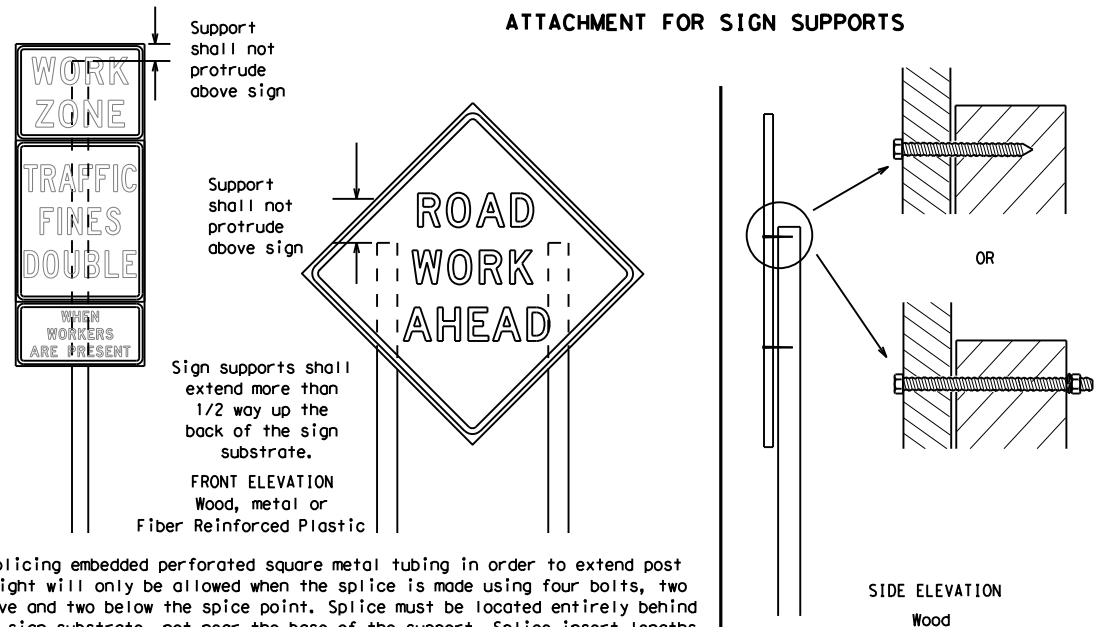
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



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

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

**ATTACHMENT FOR SIGN SUPPORTS**



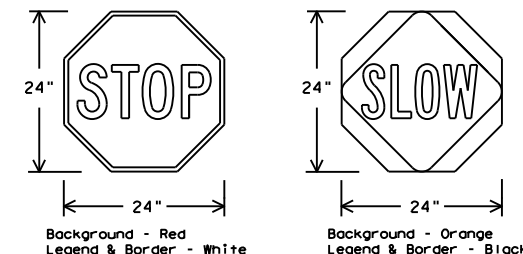
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

**STOP/SLOW PADDLES**

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B <sub>FL</sub> OR C <sub>FL</sub> 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<sub>FL</sub> or Type C<sub>FL</sub>, shall be used for rigid signs with orange backgrounds.

**SIGN LETTERS**

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

**REMOVING OR COVERING**

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

**SIGN SUPPORT WEIGHTS**

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

**FLAGS ON SIGNS**

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

SHEET 4 OF 12



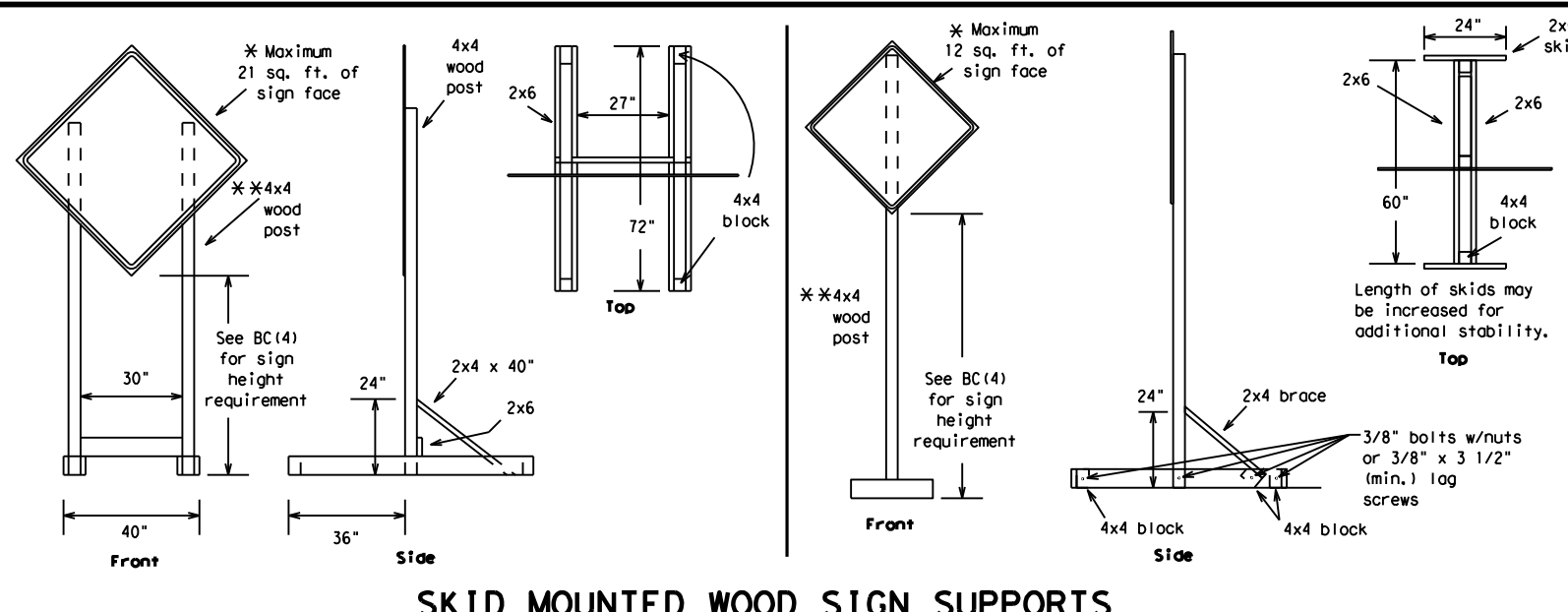
**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

BC (4) -21

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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		6469	61	001	IH0035W				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	DAL	DENTON	44					

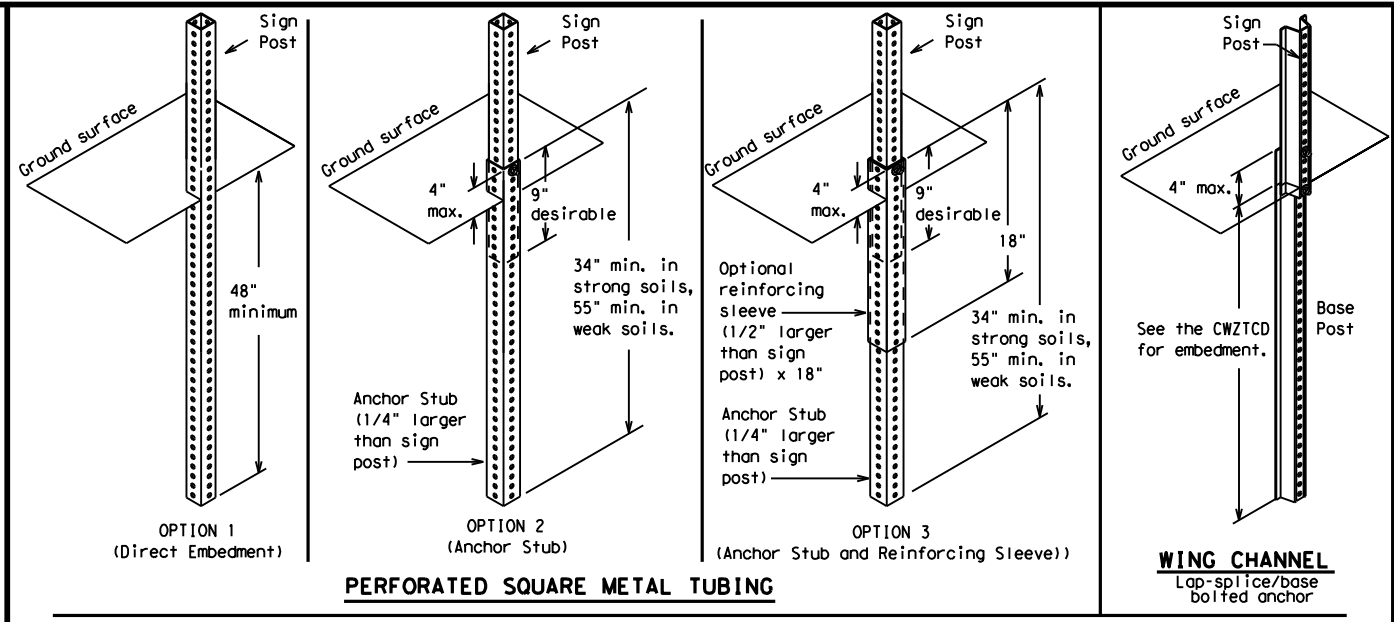
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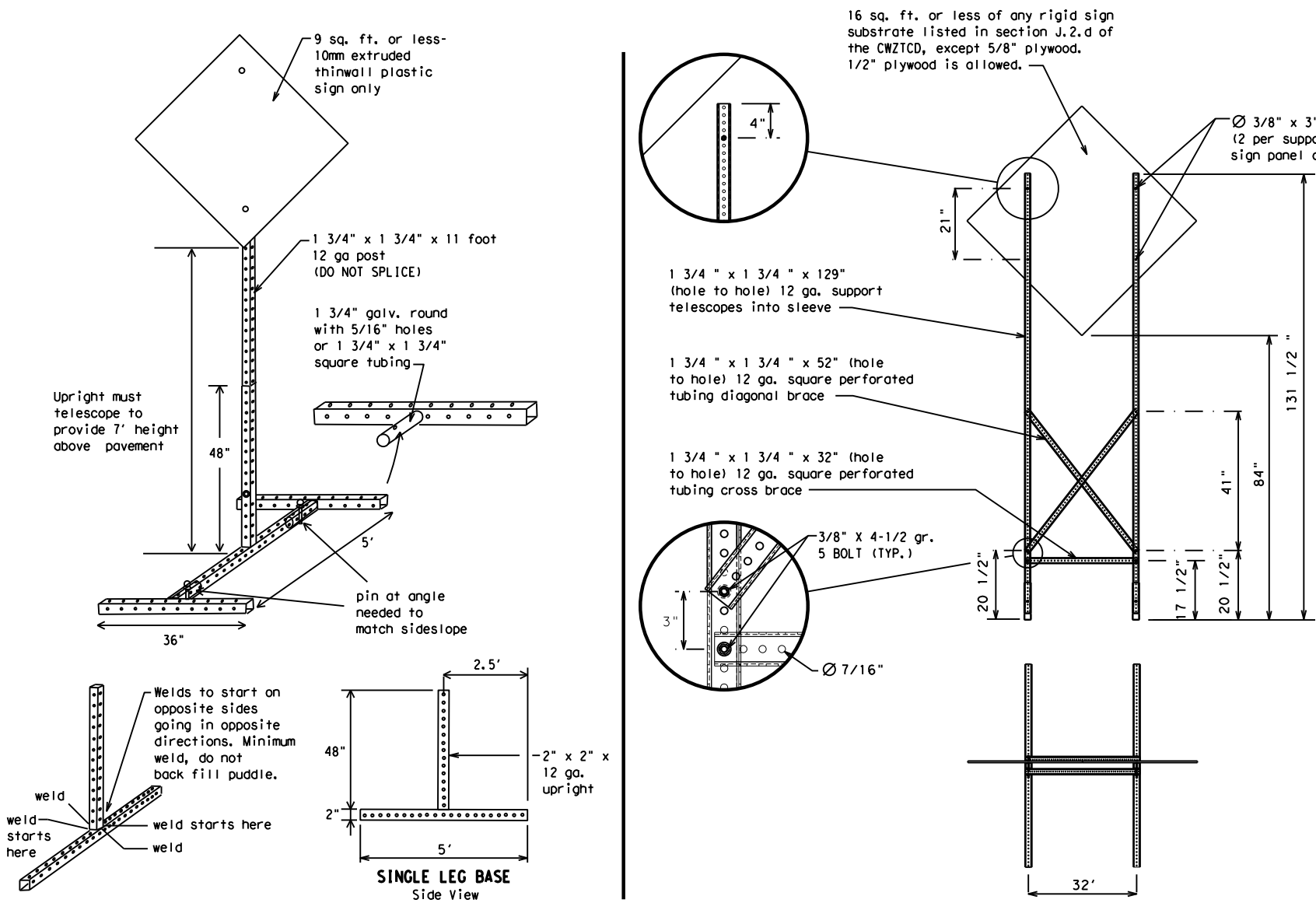
**SKID MOUNTED WOOD SIGN SUPPORTS**

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



**GROUND MOUNTED SIGN SUPPORTS**

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



**SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS**

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

**WEDGE ANCHORS**

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

**OTHER DESIGNS**

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

**GENERAL NOTES**

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

- \* See BC(4) for definition of "Work Duration."
- \*\* Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



**BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT**

**BC(5) - 21**

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	DAL	DENTON	45	

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

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

## 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

### Other Condition List

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

ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
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 *

### Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXX
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

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

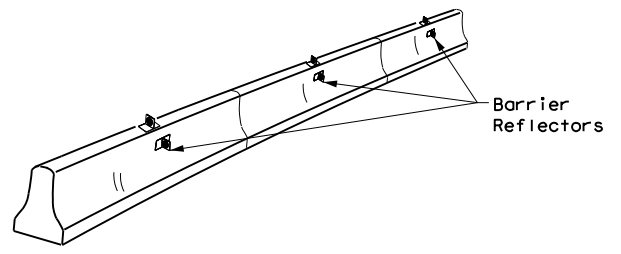
SHEET 6 OF 12

<h3>BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)</h3>			
<h2>BC (6) - 21</h2>			
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© TxDOT	November 2002	CONT:	SECT:
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7-13	5-21	DAL	DENTON
HIGHWAY			SHEET NO.
			46

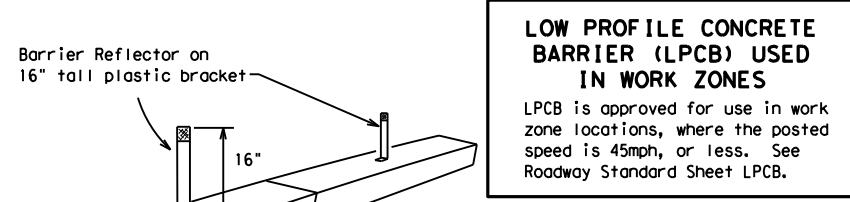
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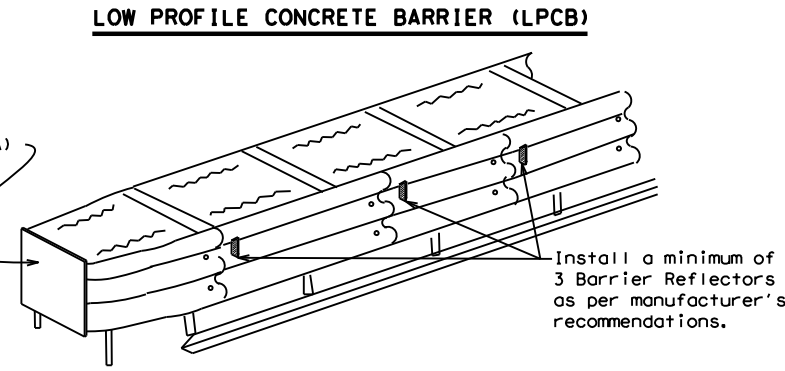
- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



- 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- 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.



## BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

### WARNING LIGHTS

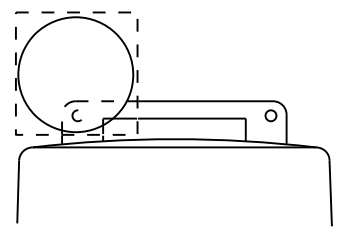
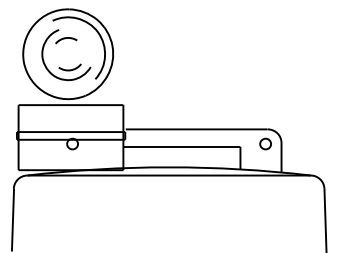
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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<sub>FL</sub> or C<sub>FL</sub> Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

### WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

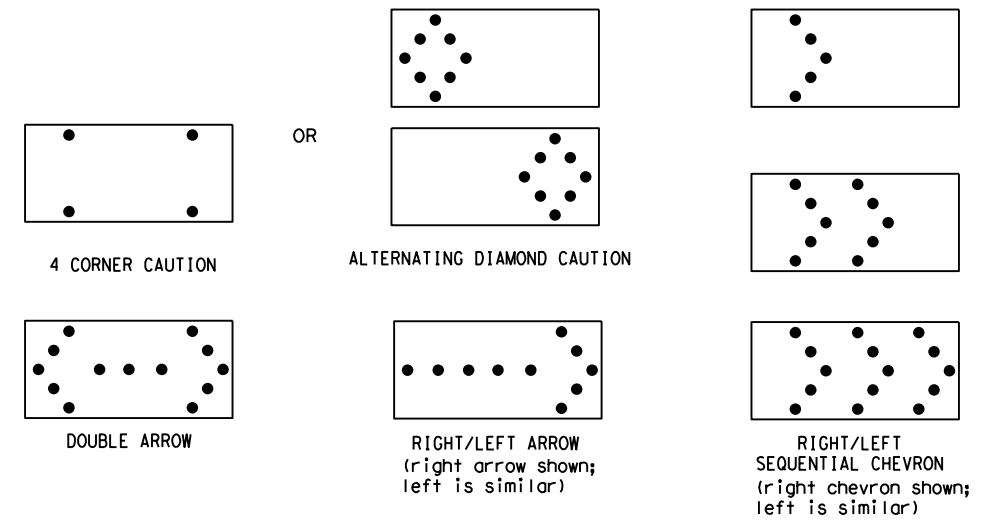
### WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- 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.

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



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- 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

SHEET 7 OF 12

### TRUCK-MOUNTED ATTENUATORS

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



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

**BC (7) -21**

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	OW:	TxDOT	CK:	TxDOT
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REVISIONS		6469	61	001	IH0035W				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	DAL	DENTON	47					

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**GENERAL NOTES**

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

**GENERAL DESIGN REQUIREMENTS**

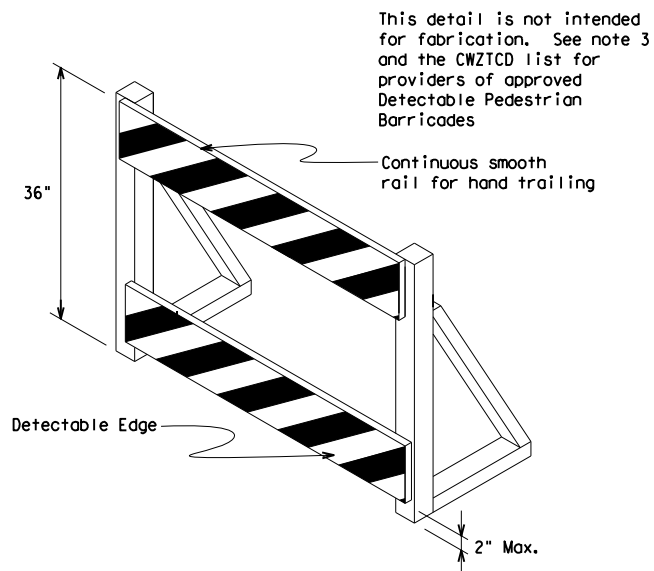
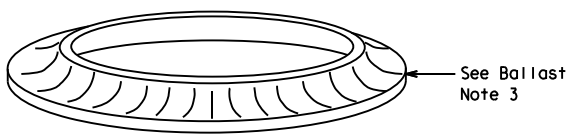
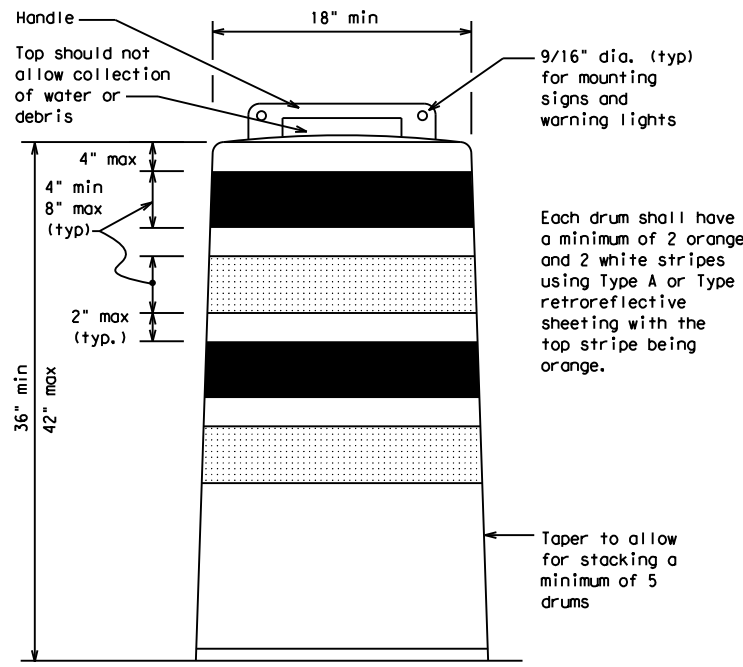
- Pre-qualified plastic drums shall meet the following requirements:
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
  - The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
  - Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
  - 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.
  - 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.
  - 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.
  - 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.
  - Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
  - Drum body shall have a maximum unballasted weight of 11 lbs.
  - Drum and base shall be marked with manufacturer's name and model number.

**RETROREFLECTIVE SHEETING**

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

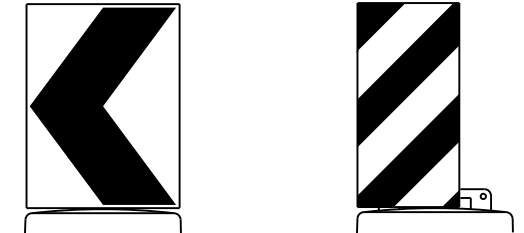
**BALLAST**

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



**DETECTABLE PEDESTRIAN BARRICADES**

- When existing pedestrian facilities are disrupted, closed, or relocated in a 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.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- 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.
- Warning lights shall not be attached to detectable pedestrian barricades.
- 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**

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

SHEET 8 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

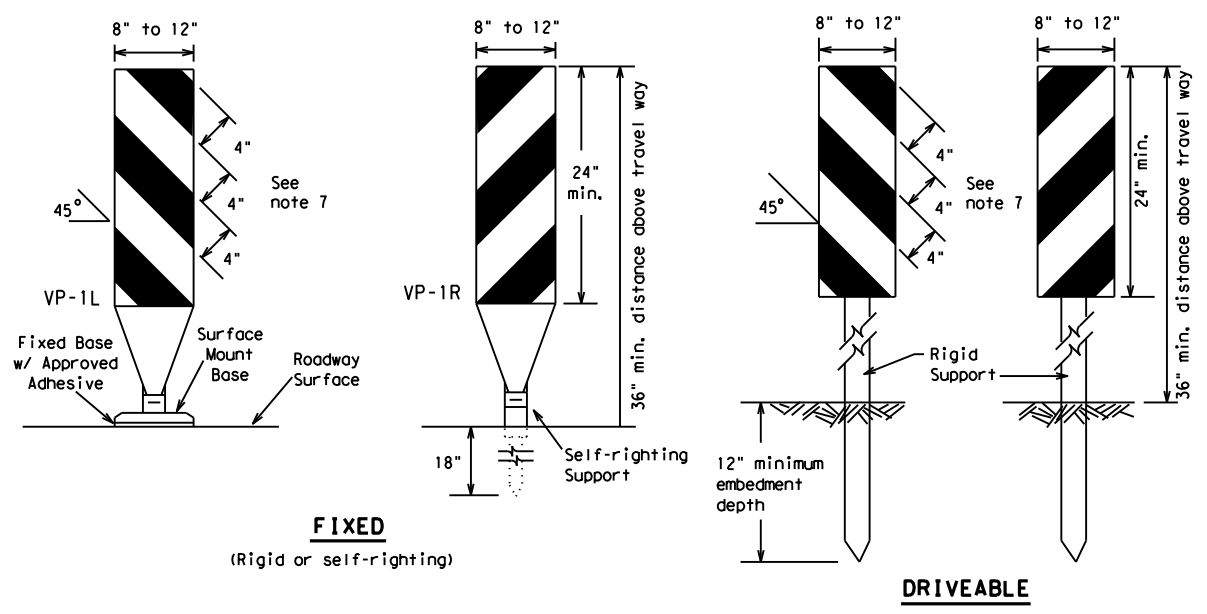
**BC (8) - 21**

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7-13									



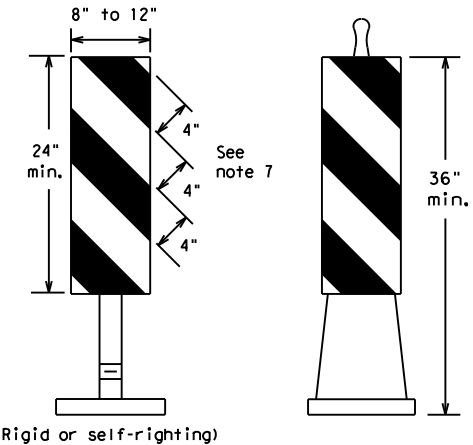
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**FIXED**  
(Rigid or self-righting)

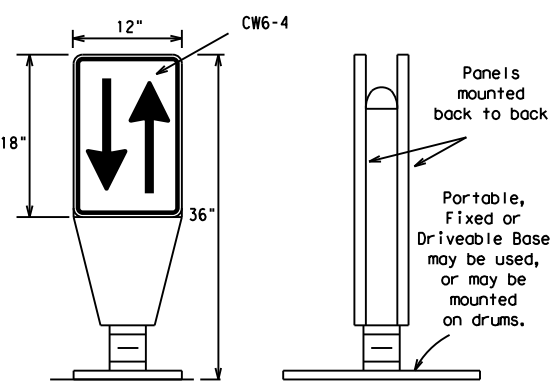
**DRIVEABLE**



**PORTABLE**

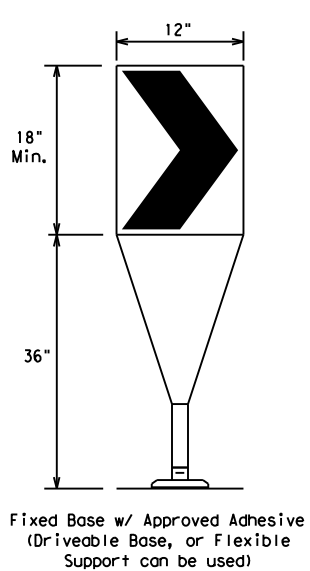
**VERTICAL PANELS (VPs)**

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 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.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



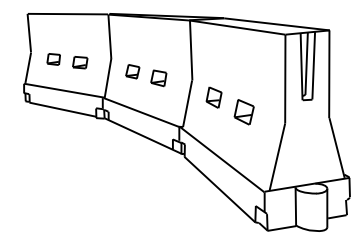
**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**

- 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.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

**CHEVRONS**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

**WATER BALLASTED SYSTEMS USED AS BARRIERS**

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- 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.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

**GENERAL NOTES**

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- 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).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

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

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

**SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS**

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (9) - 21**

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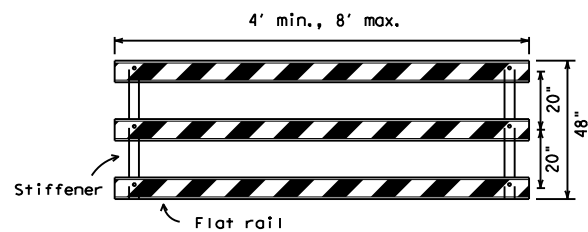
**TYPE 3 BARRICADES**

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
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.

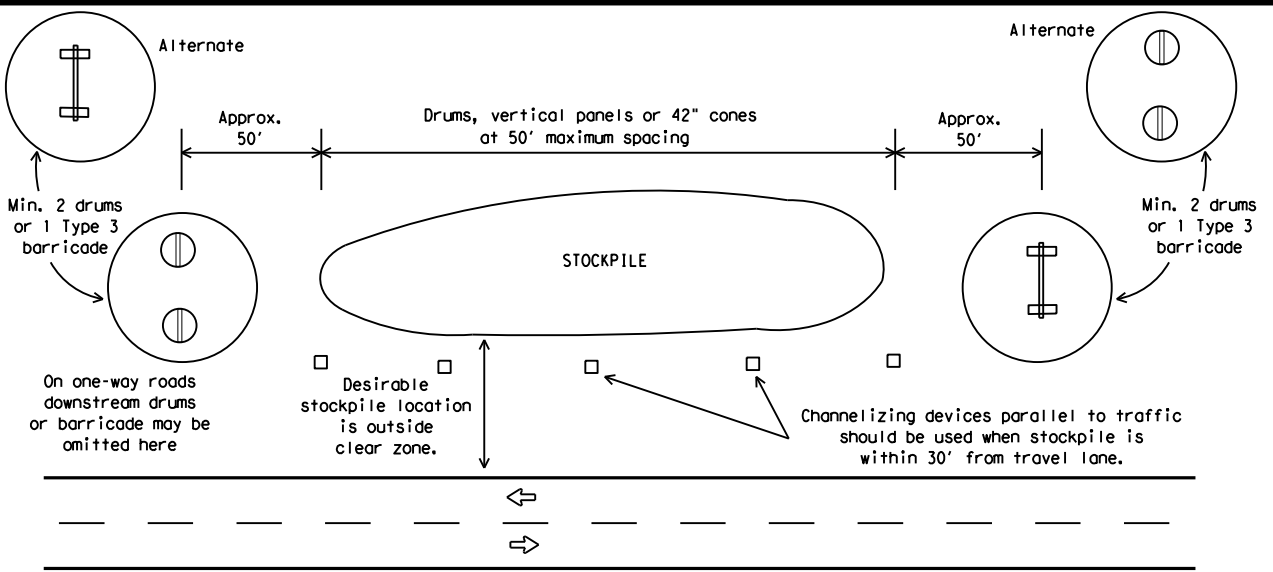


**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



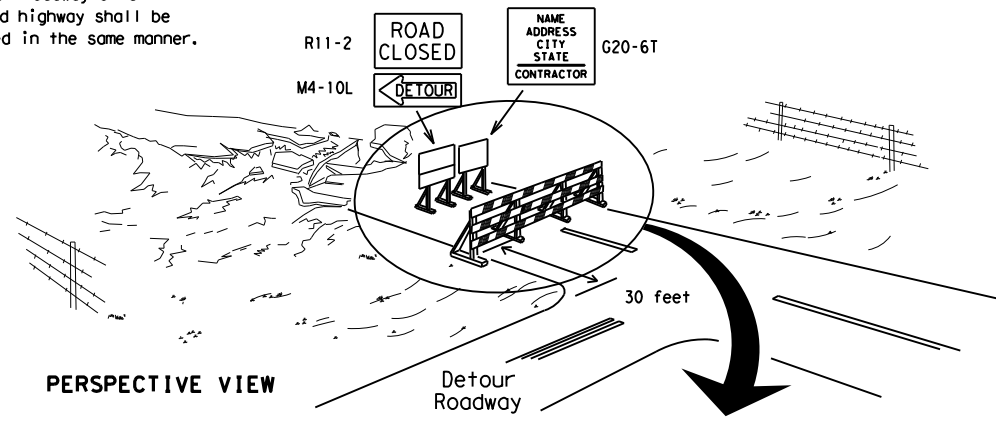
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**



**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**

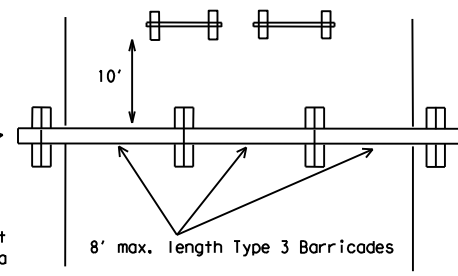
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

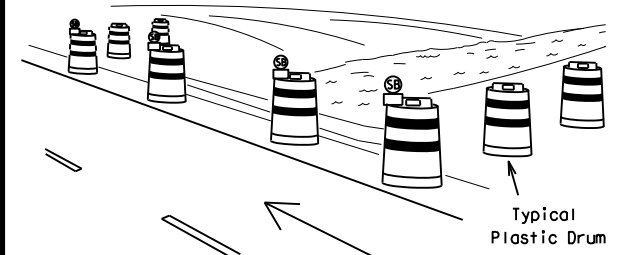
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.

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.

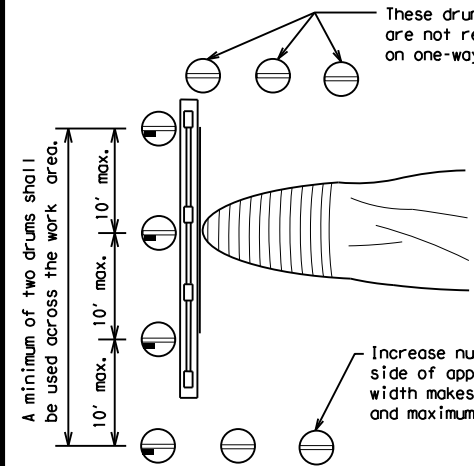


PLAN VIEW

**TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION**



PERSPECTIVE VIEW

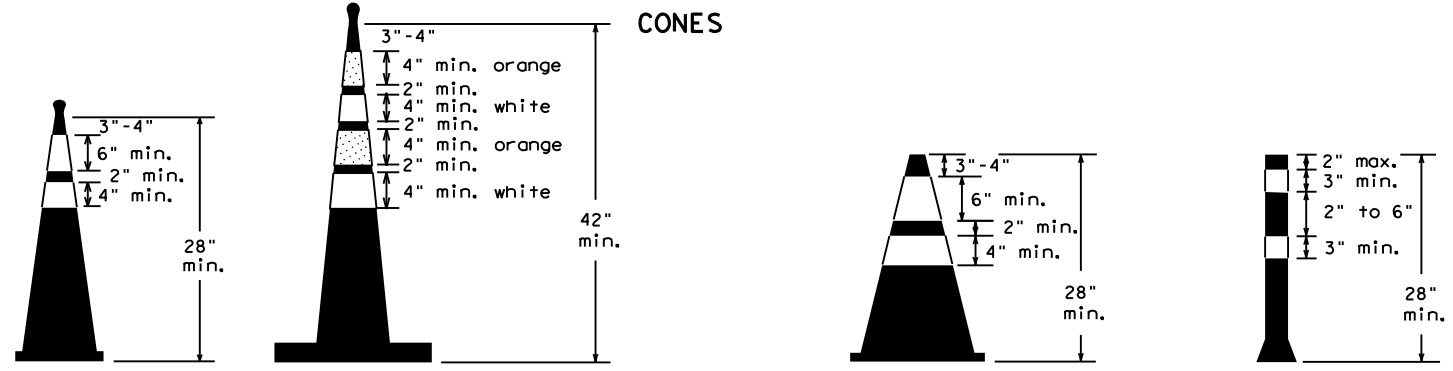


PLAN VIEW

**CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS**

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

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



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.



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (10) -21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	DAL	DENTON	50	

## WORK ZONE PAVEMENT MARKINGS

### GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

### RAISED PAVEMENT MARKERS

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

### PREFABRICATED PAVEMENT MARKINGS

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

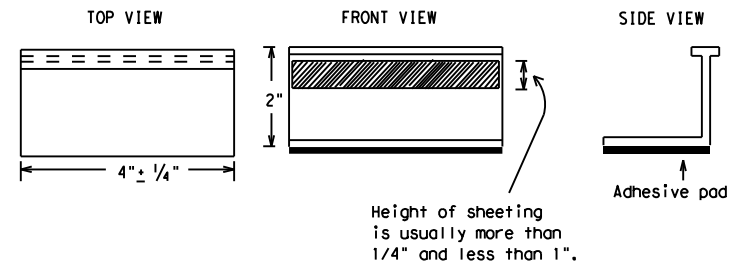
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

### REMOVAL OF PAVEMENT MARKINGS

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

## Temporary Flexible-Reflective Roadway Marker Tabs



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

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
  - 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.
  - 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.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

### RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

DEPARTMENTAL MATERIAL 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).

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

**BC(11)-21**

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS		6469	61	001
2-98	9-07	5-21		
1-02	7-13			
11-02	8-14			
	DIST	COUNTY	SHEET NO.	
	DAL	DENTON	<b>51</b>	

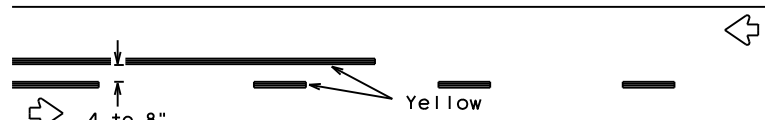
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DATE: 9/5/2024 11:43:45 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM.FY.2025\BPM.6469-61-001.Cleaning and Sealing Joints\PLANS\41-52-bc-21.dgn

## PAVEMENT MARKING PATTERNS

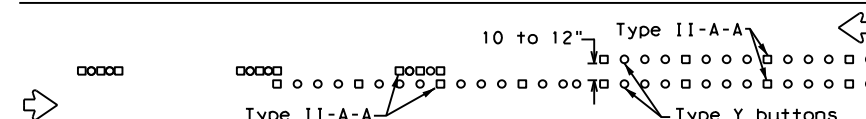


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

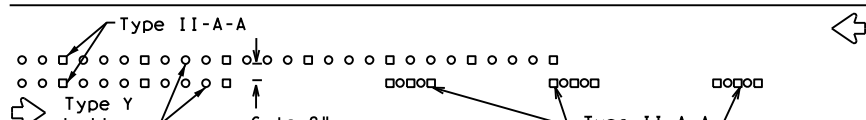


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.



RAISED PAVEMENT MARKERS - PATTERN A



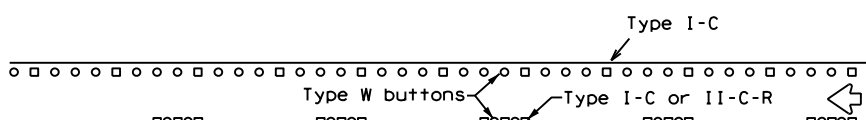
RAISED PAVEMENT MARKERS - PATTERN B

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



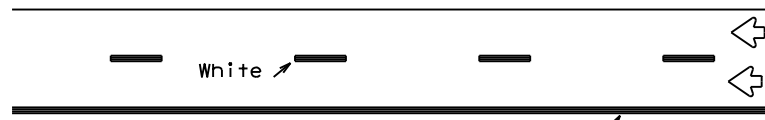
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



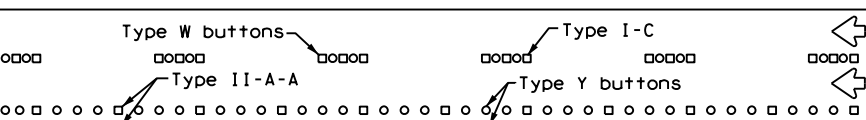
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



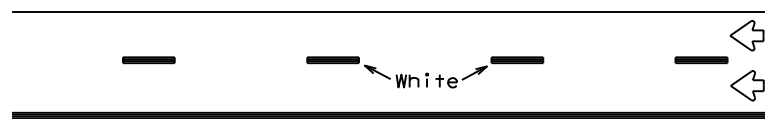
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



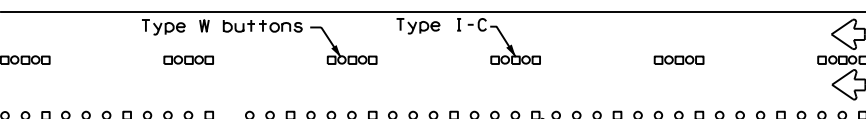
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

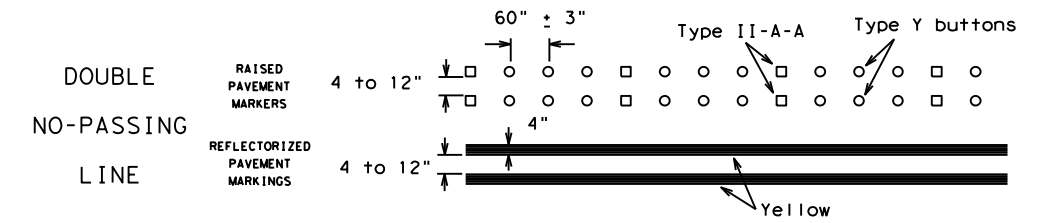
Prefabricated markings may be substituted for reflectORIZED pavement markings.



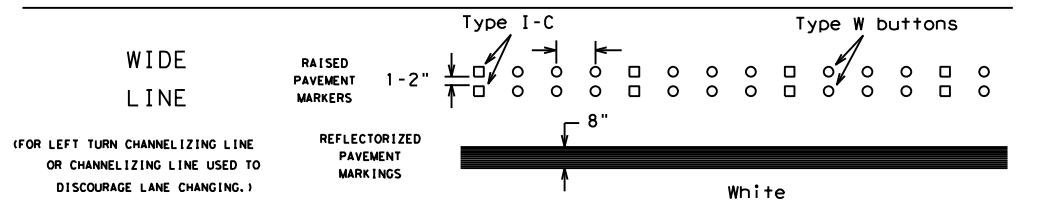
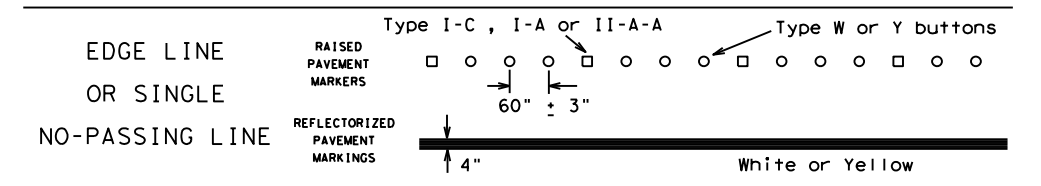
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

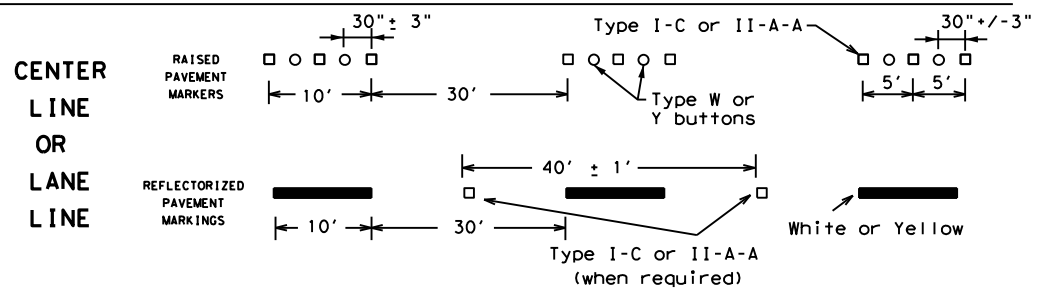
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



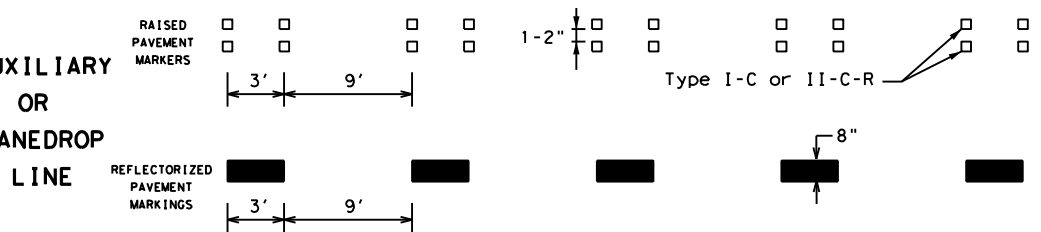
### SOLID LINES



### BROKEN LINES

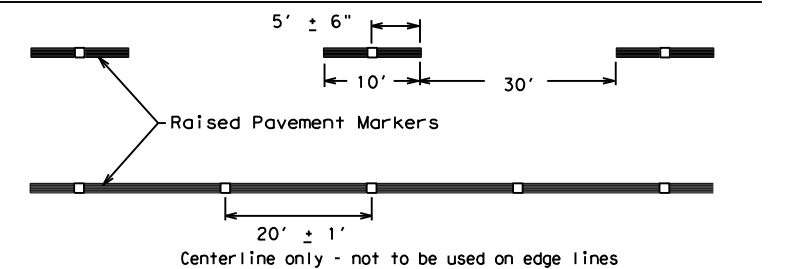


### AUXILIARY OR LANEDROP LINE



### 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.



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

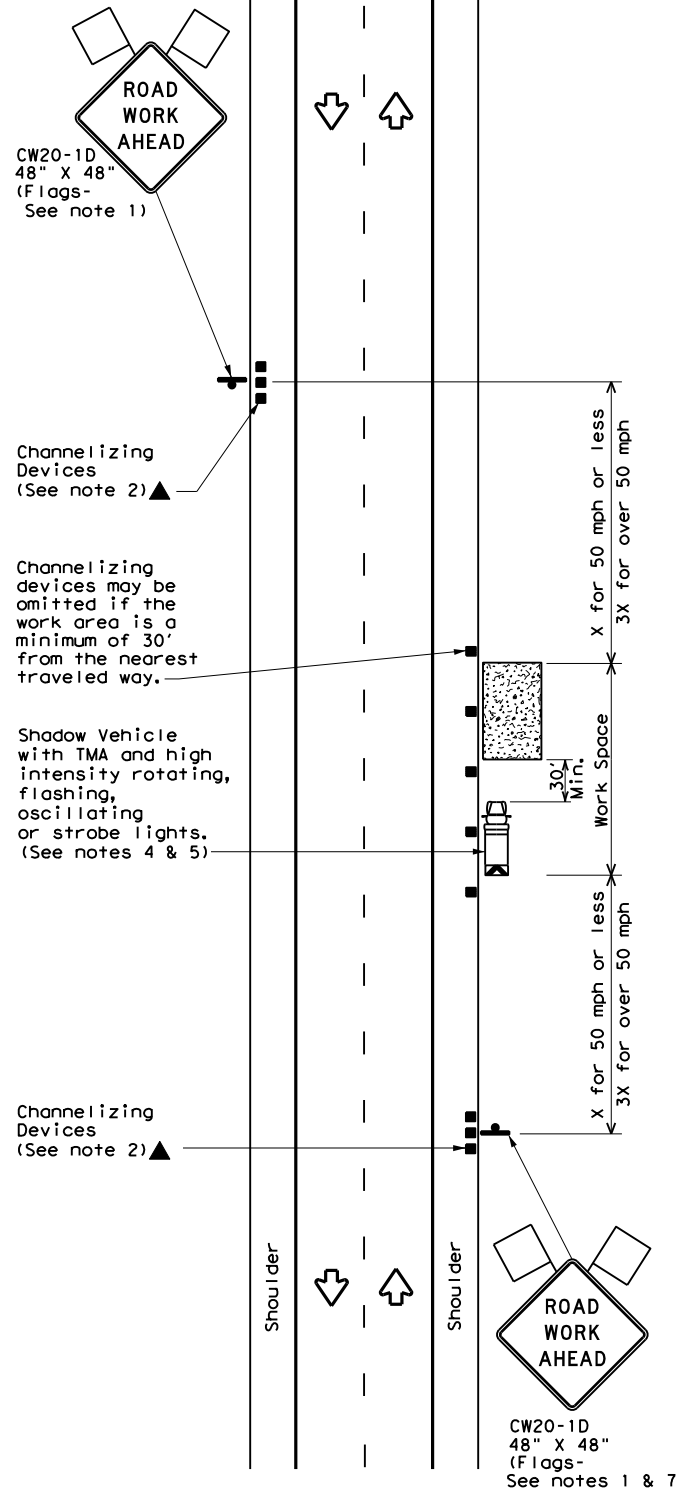
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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	DAL	DENTON	52	
11-02 8-14				

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DATE: 9/5/2024 11:43:46 AM  
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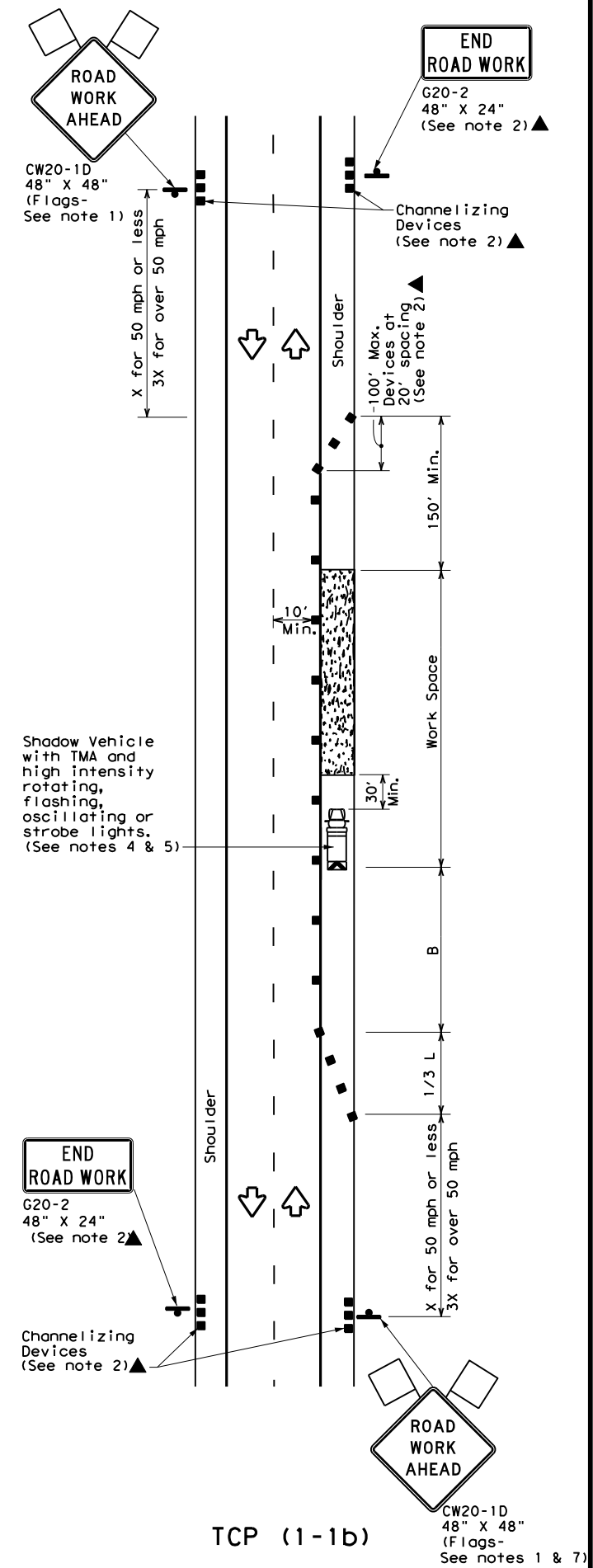
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

DATE: 9/4/2024 9:02:33 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM\_FY\_2025\BPM\_6469-61-001\_Cleaning and Sealing of PAVES\Signs\Signs\TCP (1-1a).dgn  
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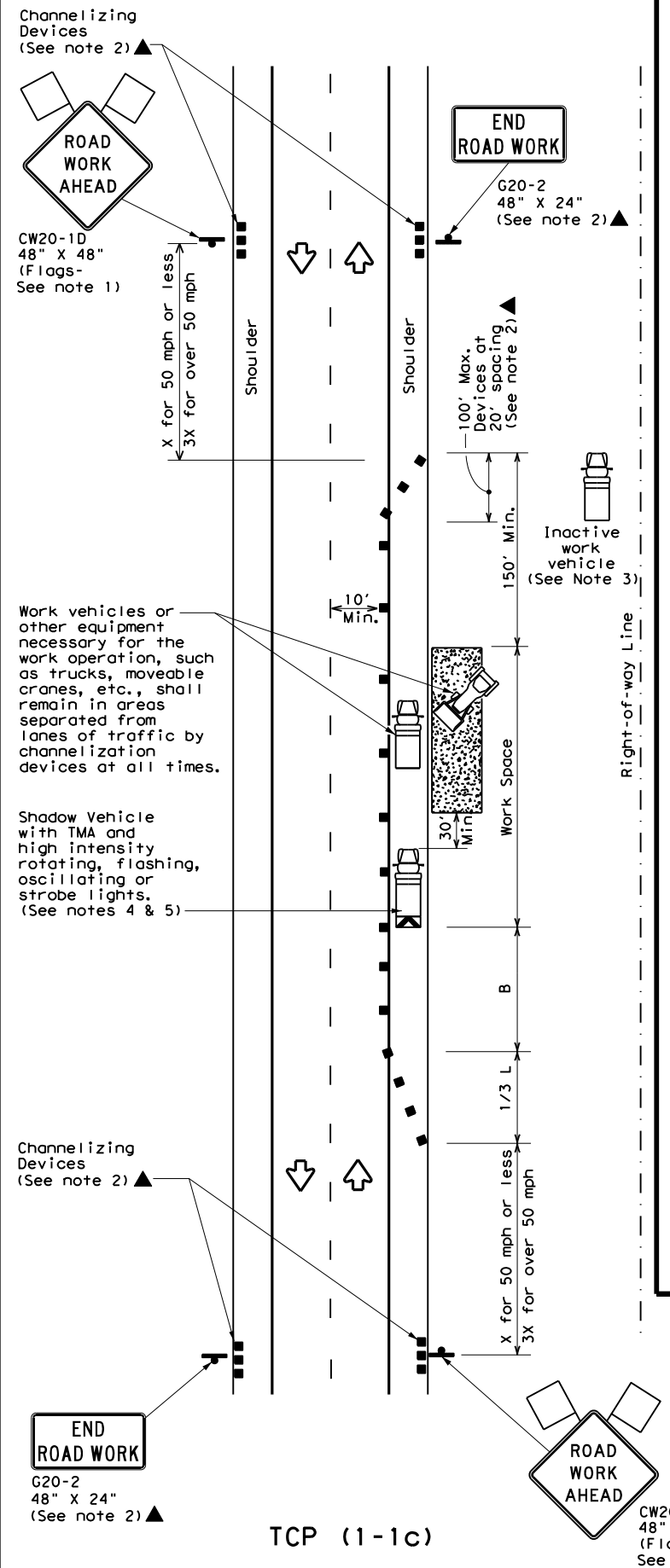
TCP (1-1a)

**WORK SPACE NEAR SHOULDER**  
 Conventional Roads



TCP (1-1b)

**WORK SPACE ON SHOULDER**  
 Conventional Roads



TCP (1-1c)

**WORK VEHICLES ON SHOULDER**  
 Conventional Roads

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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
  - 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.
  - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
  - 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.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
  - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
  - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

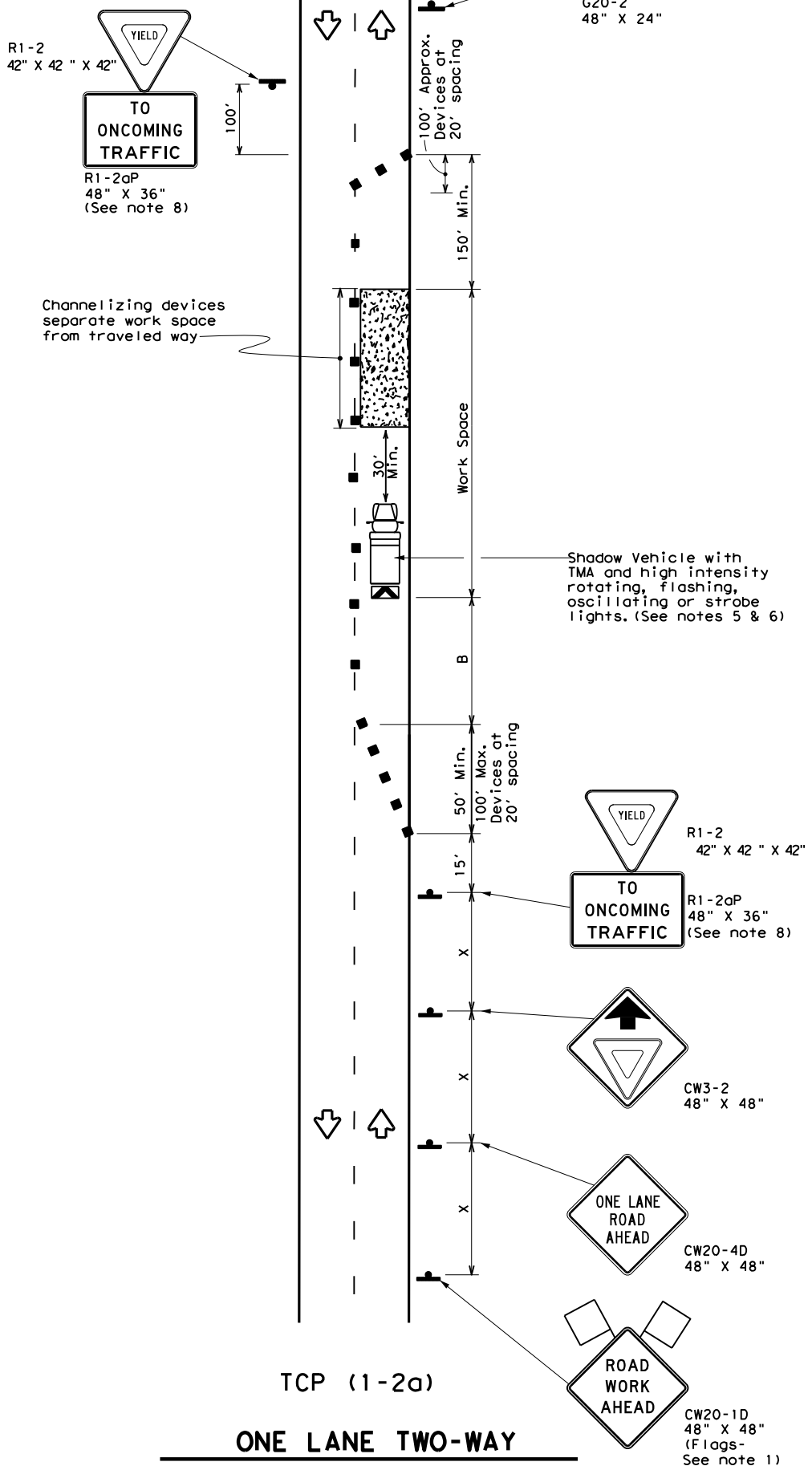
**TRAFFIC CONTROL PLAN**  
**CONVENTIONAL ROAD**  
**SHOULDER WORK**

**TCP (1-1) - 18**

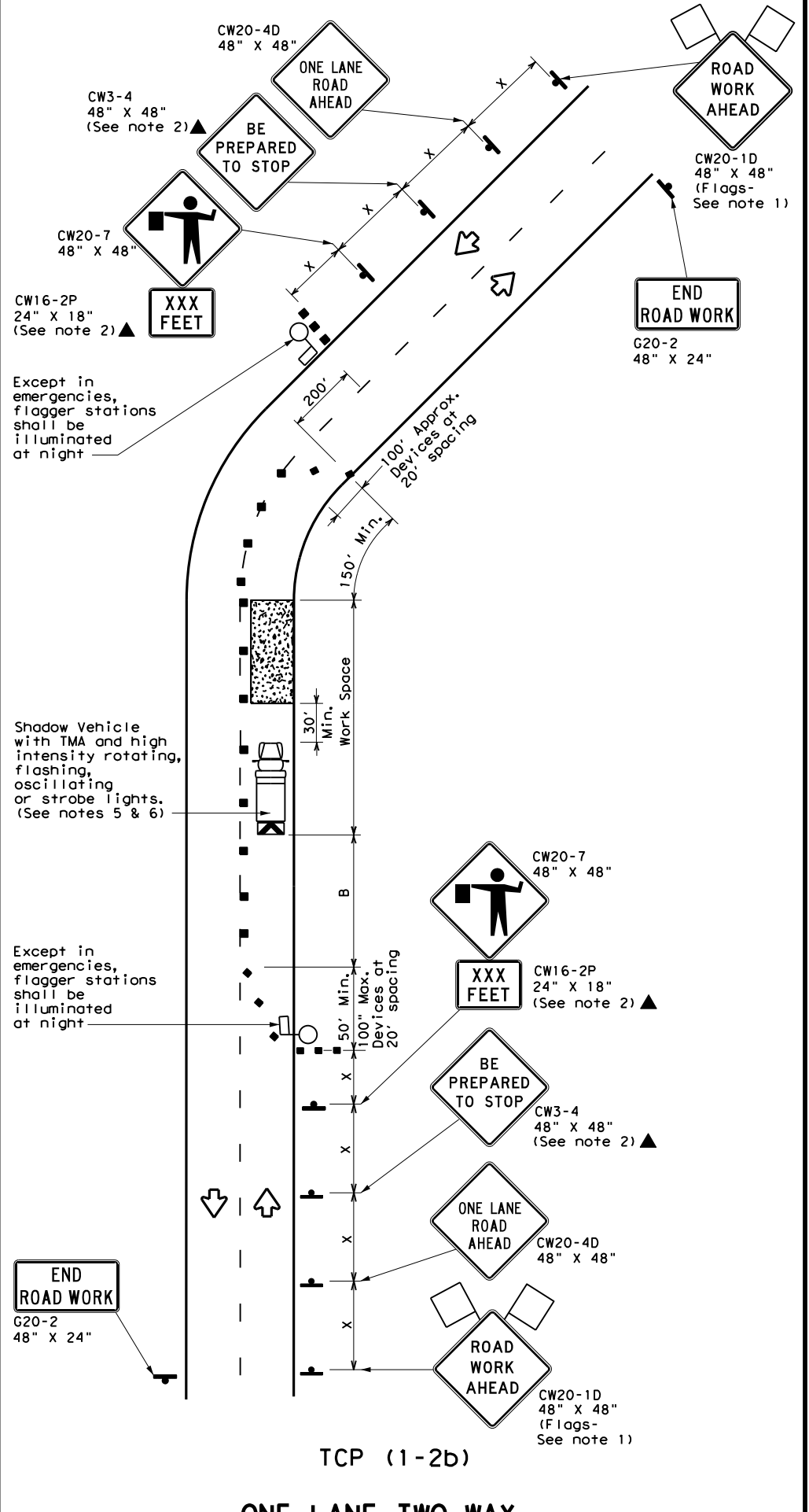
FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	DAL	DENTON	53	
1-97 2-18				

DATE: 9/4/2024 9:02:33 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM\_FY\_2025\BPM\_6469-61-001\_Cleaning and Sealing\Signs\Signs.dgn  
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Warning Sign Sequence in Opposite Direction Same as Below



**TCP (1-2a)**  
**ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS**  
 (Less than 2000 ADT - See note 7)



**TCP (1-2b)**  
**ONE LANE TWO-WAY CONTROL WITH FLAGGERS**

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

Posted Speed * X	Formula L = WS <sup>2</sup> / 60	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = WS <sup>2</sup> / 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		450'	495'	540'	45'	90'	320'	195'	360'
50	L = WS	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**

- Flags attached to signs where shown are REQUIRED.
- 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.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 150 feet.
- 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.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

**TCP (1-2a)**

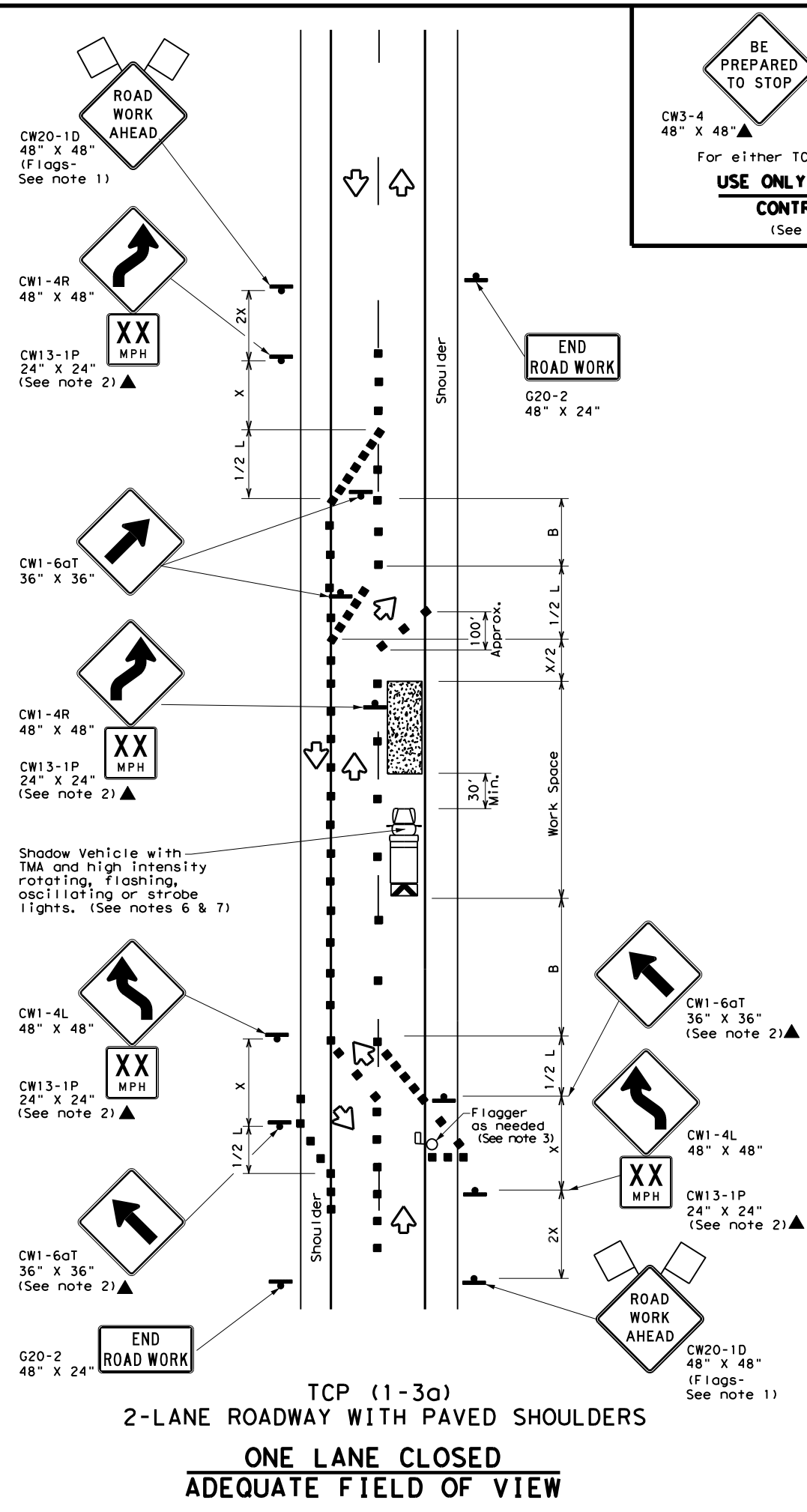
- R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
- R1-2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

**TCP (1-2b)**

- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
- Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

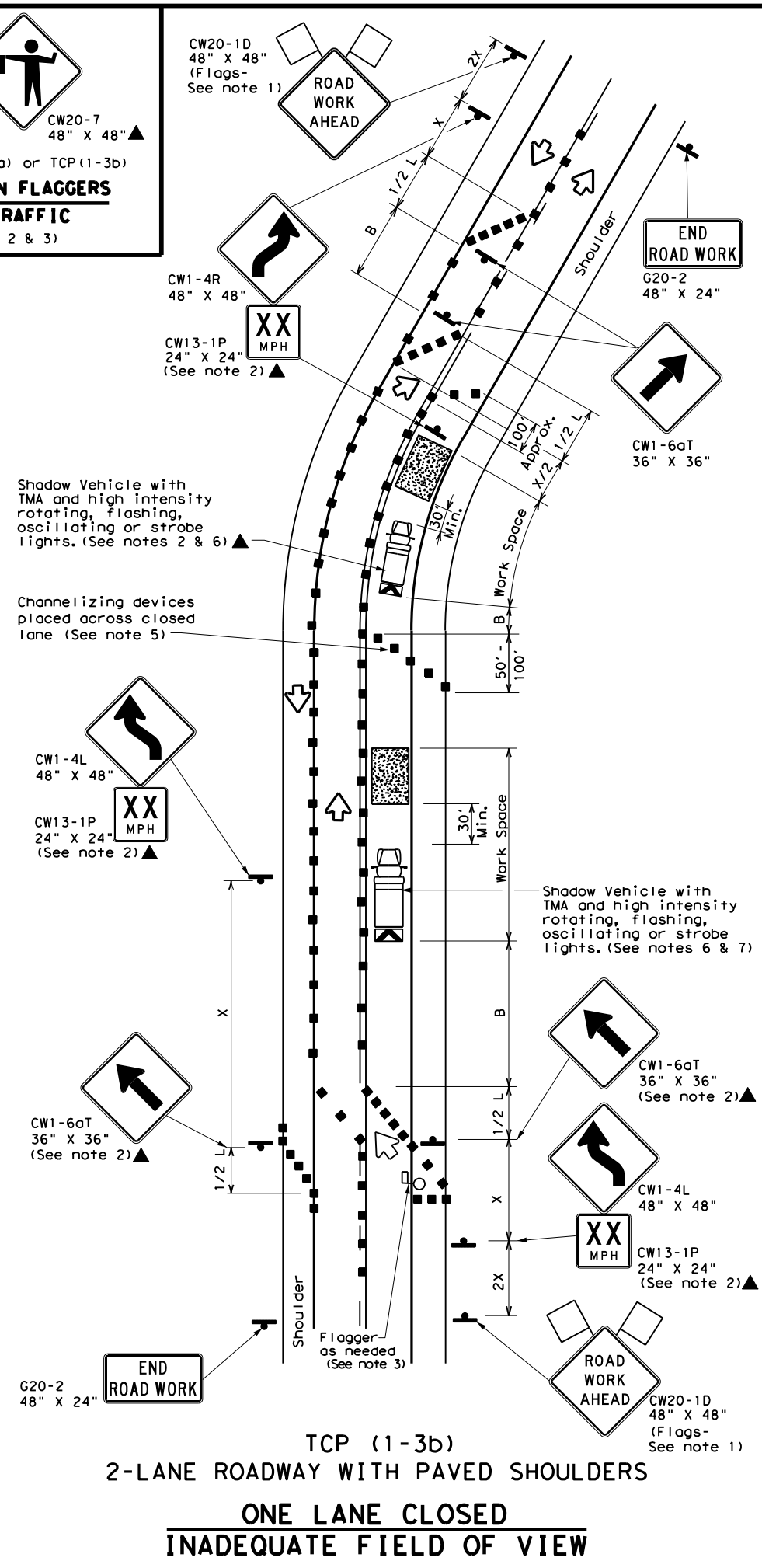
		Traffic Operations Division Standard	
<b>TRAFFIC CONTROL PLAN</b>			
<b>ONE-LANE TWO-WAY TRAFFIC CONTROL</b>			
<b>TCP (1-2) - 18</b>			
FILE: tcp1-2-18.dgn	DN:	CK:	DW:
© TxDOT December 1985	CON:	SECT:	JOB:
REVISIONS	6469	61	001
4-90 4-98			
2-94 2-12			
1-97 2-18			
	DIST:	COUNTY:	SHEET NO.:
	DAL	DENTON	54

DATE: 9/4/2024 9:02:33 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM.FY.2025\BPM.6469-61-001.Cleaning and S&S\Signage\Signage\TCP(1-3)18.dgn  
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TCP (1-3a)  
 2-LANE ROADWAY WITH PAVED SHOULDERS  
**ONE LANE CLOSED**  
 ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP  
 CW3-4 48" X 48"  
 CW20-7 48" X 48"  
 For either TCP(1-3a) or TCP(1-3b)  
**USE ONLY WHEN FLAGGERS CONTROL TRAFFIC**  
 (See Notes 2 & 3)



TCP (1-3b)  
 2-LANE ROADWAY WITH PAVED SHOULDERS  
**ONE LANE CLOSED**  
 INADEQUATE FIELD OF VIEW

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS / 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**
- Flags attached to signs where shown are REQUIRED.
  - 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.
  - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
  - DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
  - When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
  - 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.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
  - Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

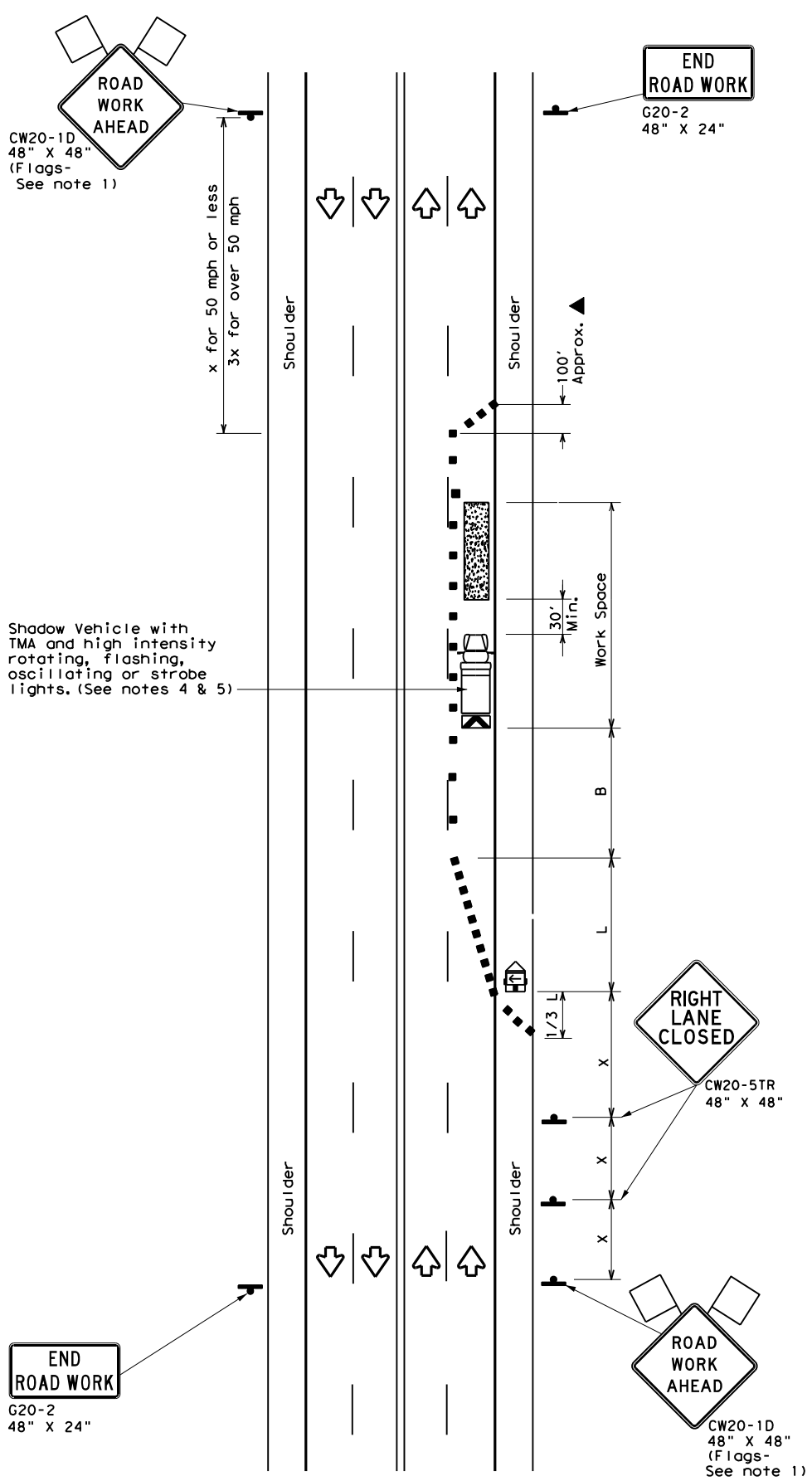
Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN**  
**TRAFFIC SHIFTS ON**  
**TWO LANE ROADS**  
**TCP(1-3)-18**

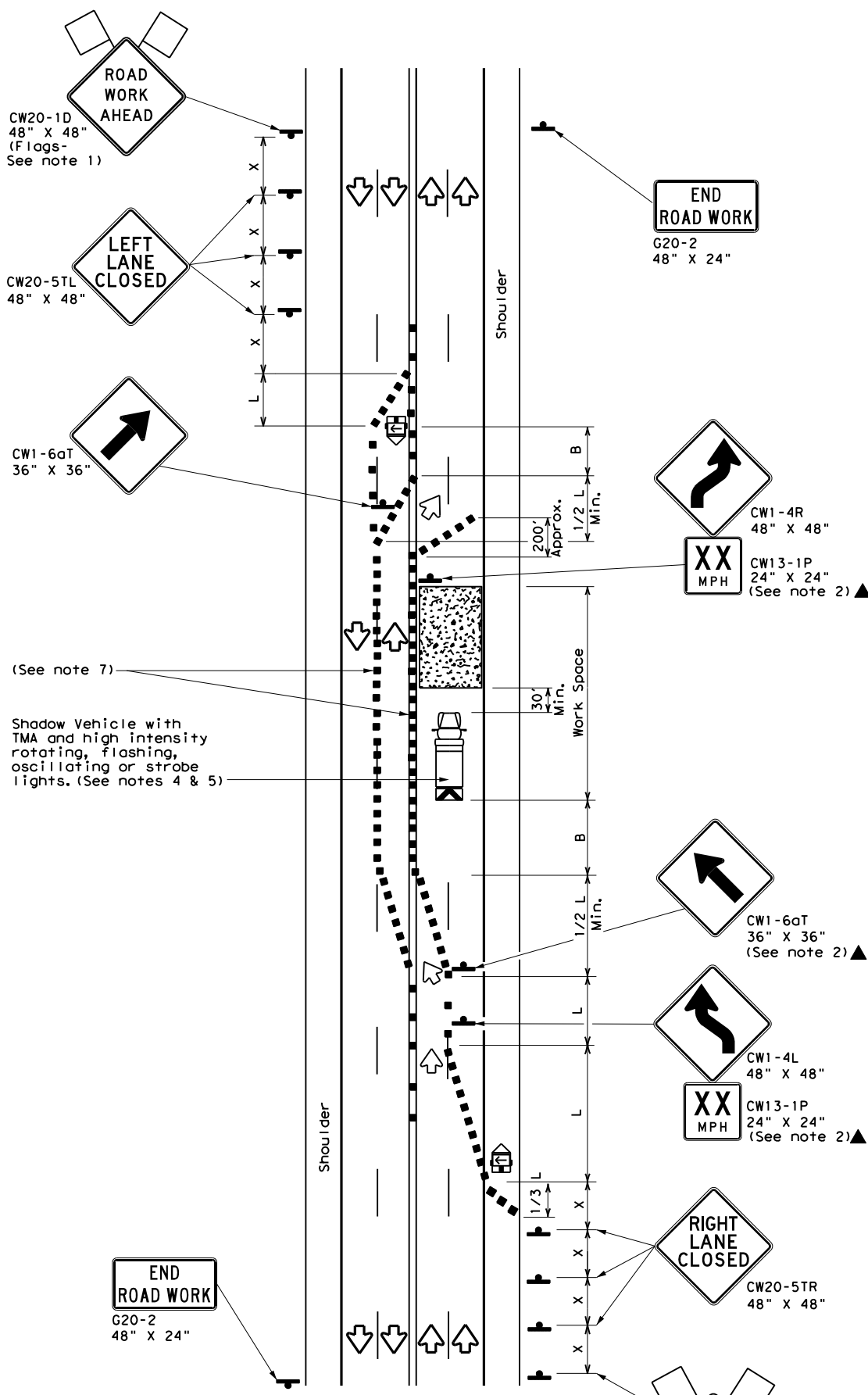
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	DAL	DENTON	55	
1-97 2-18				



DATE: 9/4/2024 9:02:34 AM  
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TCP (1-4a)  
**ONE LANE CLOSED**



TCP (1-4b)  
**TWO LANES CLOSED**

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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
  - 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.
  - The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
  - 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.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

**TCP (1-4a)**

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

**TCP (1-4b)**

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

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 Traffic Operations Division Standard

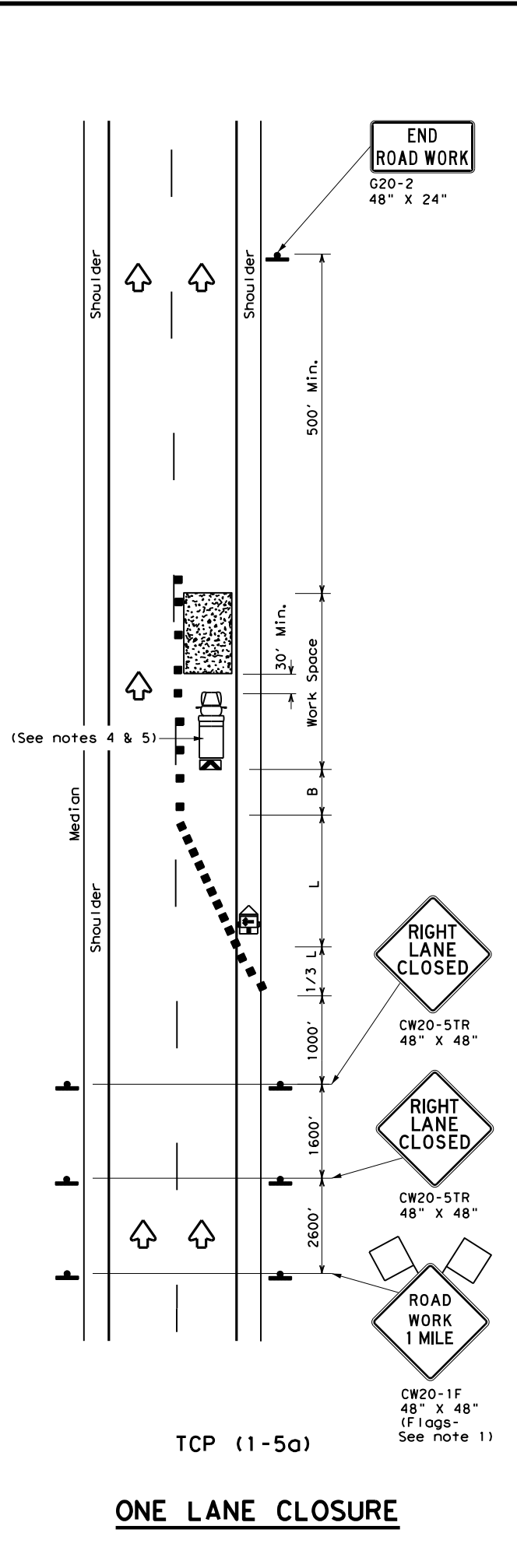
## TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

### TCP (1-4) - 18

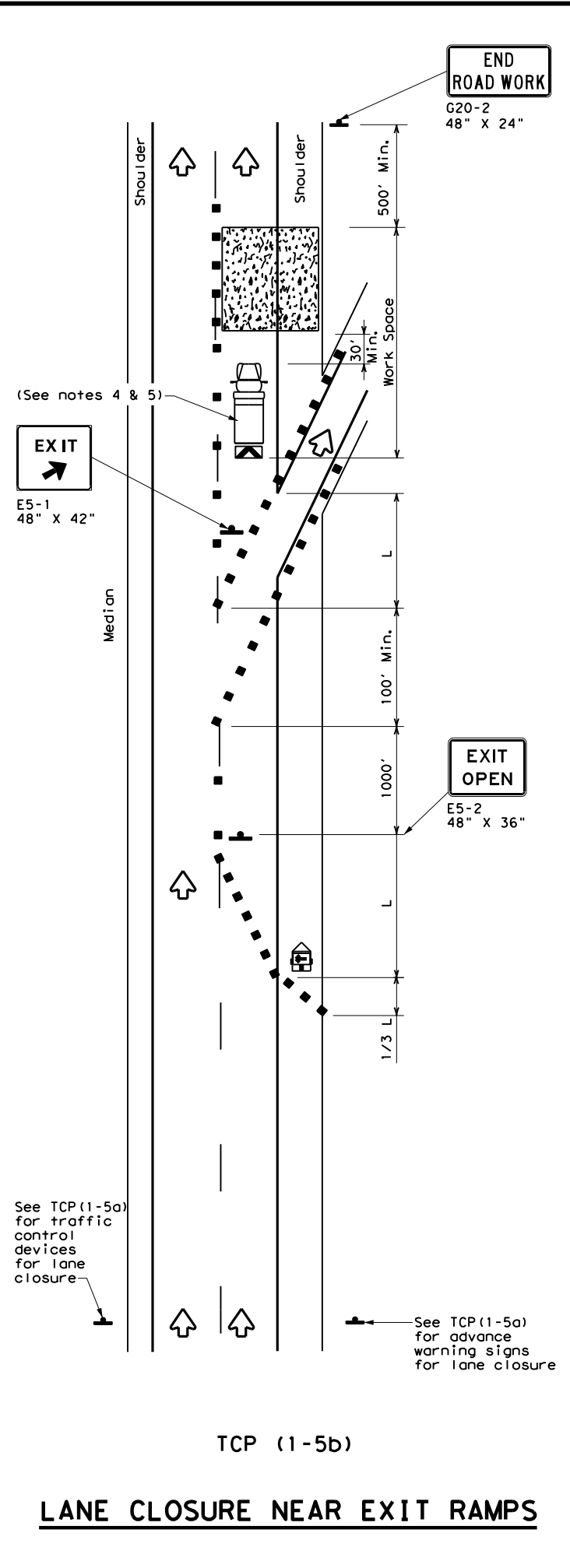
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
2-94 4-98				
8-95 2-12				
1-97 2-18				
	DIST	COUNTY	SHEET NO.	
	DAL	DENTON	56	

154

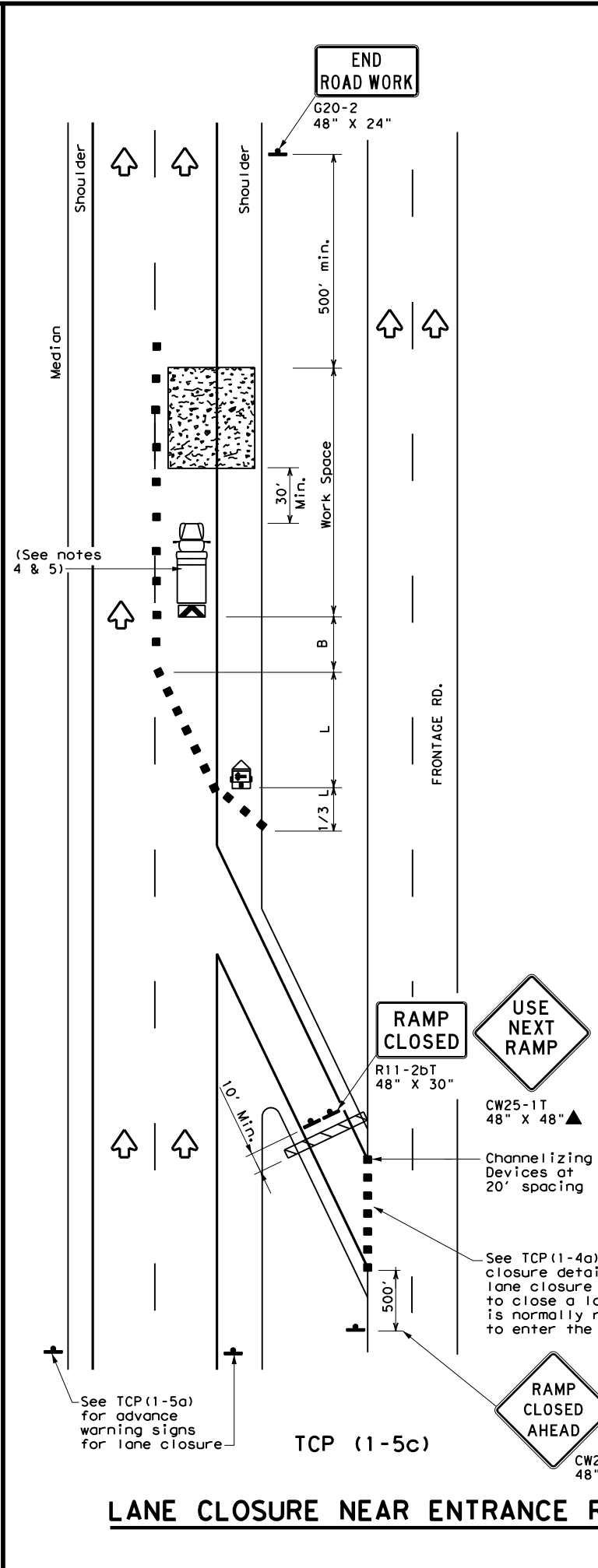
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**ONE LANE CLOSURE**



**LANE CLOSURE NEAR EXIT RAMP**



**LANE CLOSURE NEAR ENTRANCE RAMP**

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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - 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.
  - 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.
  - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

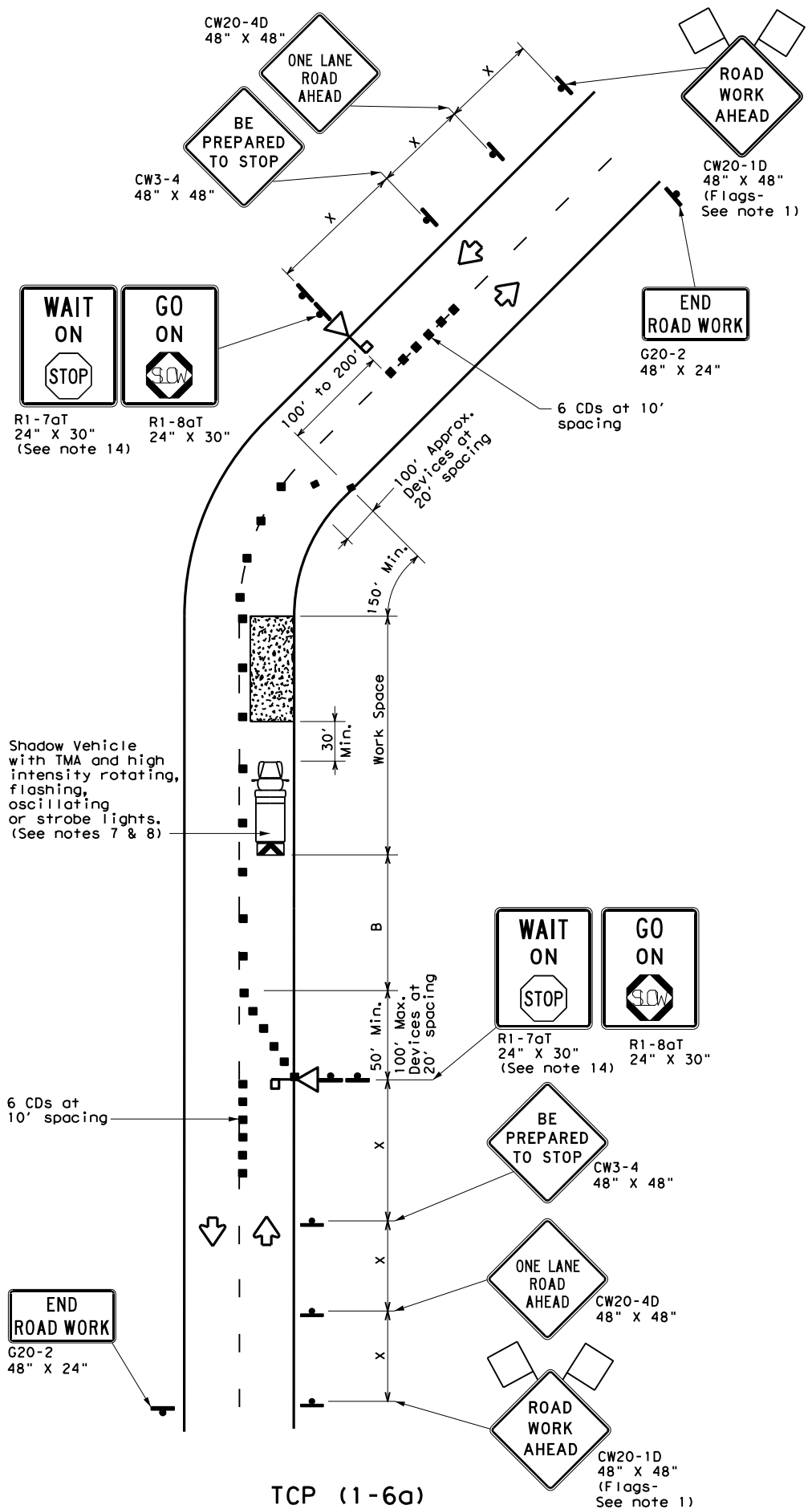
Texas Department of Transportation  
 Traffic Operations Division Standard

## TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

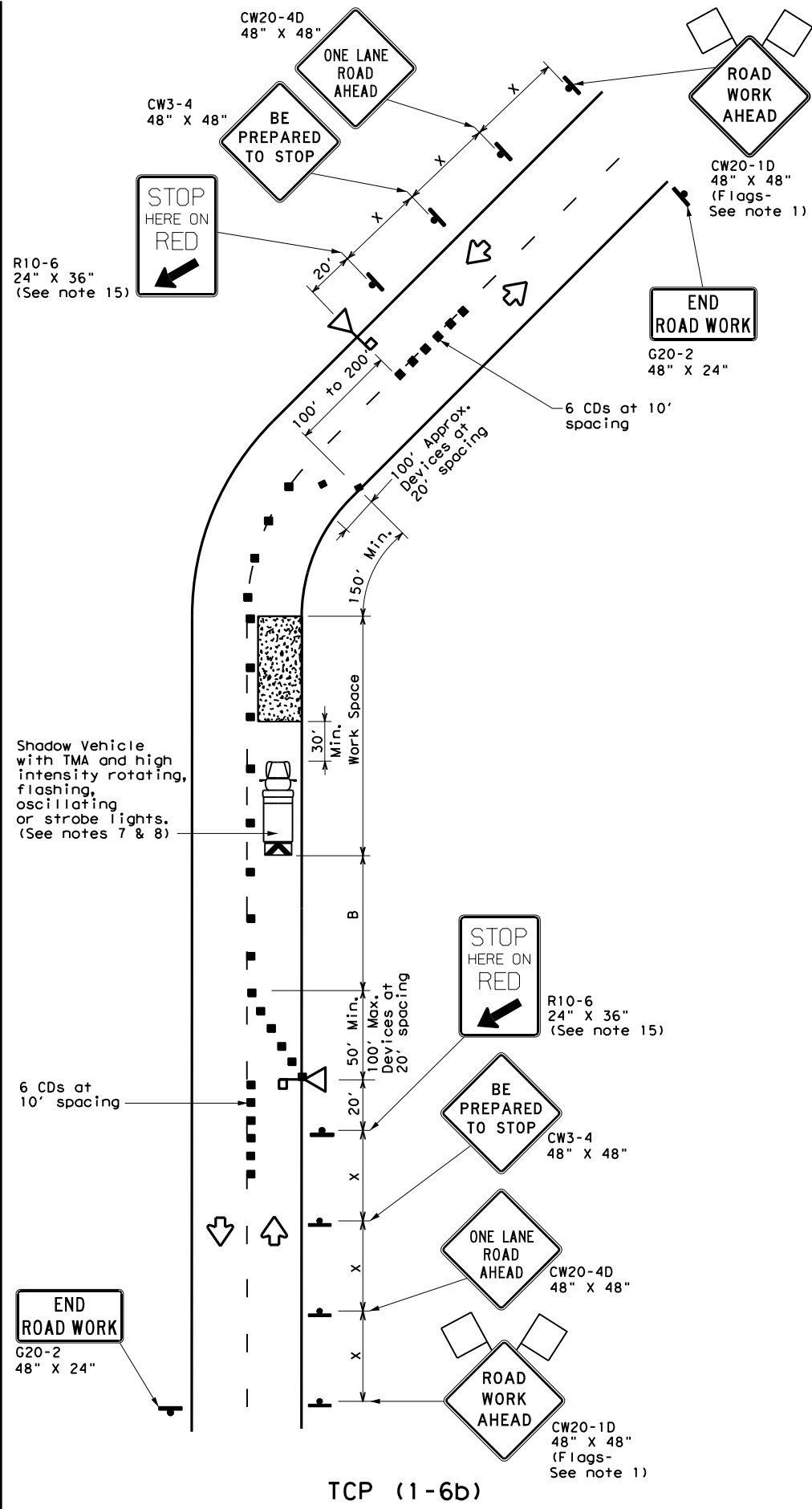
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© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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REVISIONS	DIST	COUNTY	SHEET NO.	
	DAL	DENTON	57	

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TCP (1-6a)  
**ONE LANE TWO-WAY CONTROL WITH STOP/SLOW AFADs**



TCP (1-6b)  
**ONE LANE TWO-WAY CONTROL WITH RED/YELLOW LENS AFADs**

LEGEND					
	Type 3 Barricade		Channelizing Devices (CDs)		Truck Mounted Attenuator (TMA)
	Heavy Work Vehicle		Automated Flagger Assistance Device (AFAD)		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow		Flagger
	Flag				

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

- Flags attached to signs where shown are REQUIRED.
- AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
- Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
- Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
- One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
- When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
- All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
- 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.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- 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 AFAD.
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
- The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

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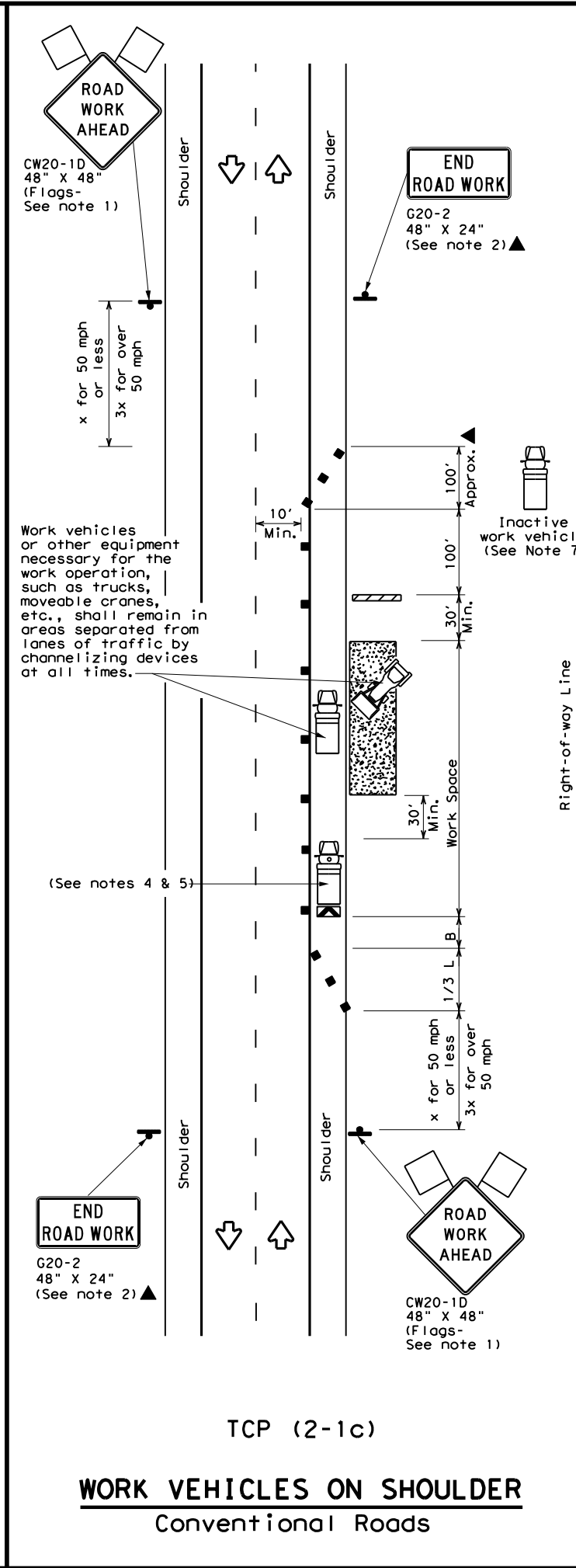
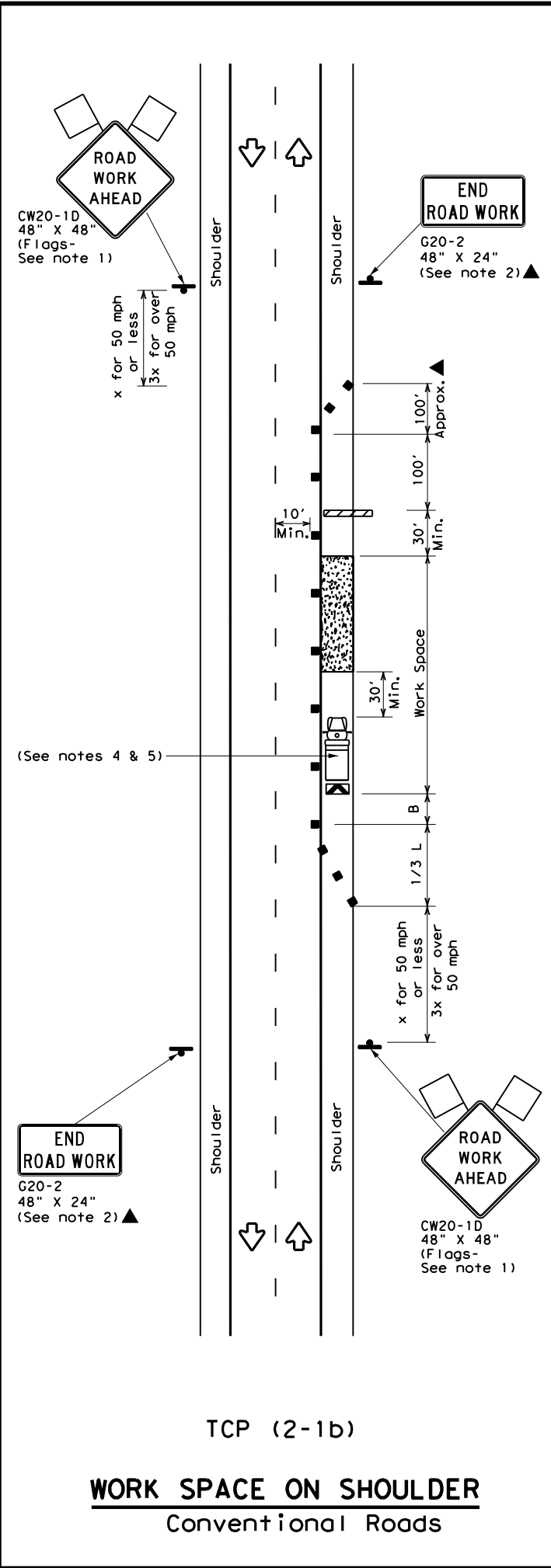
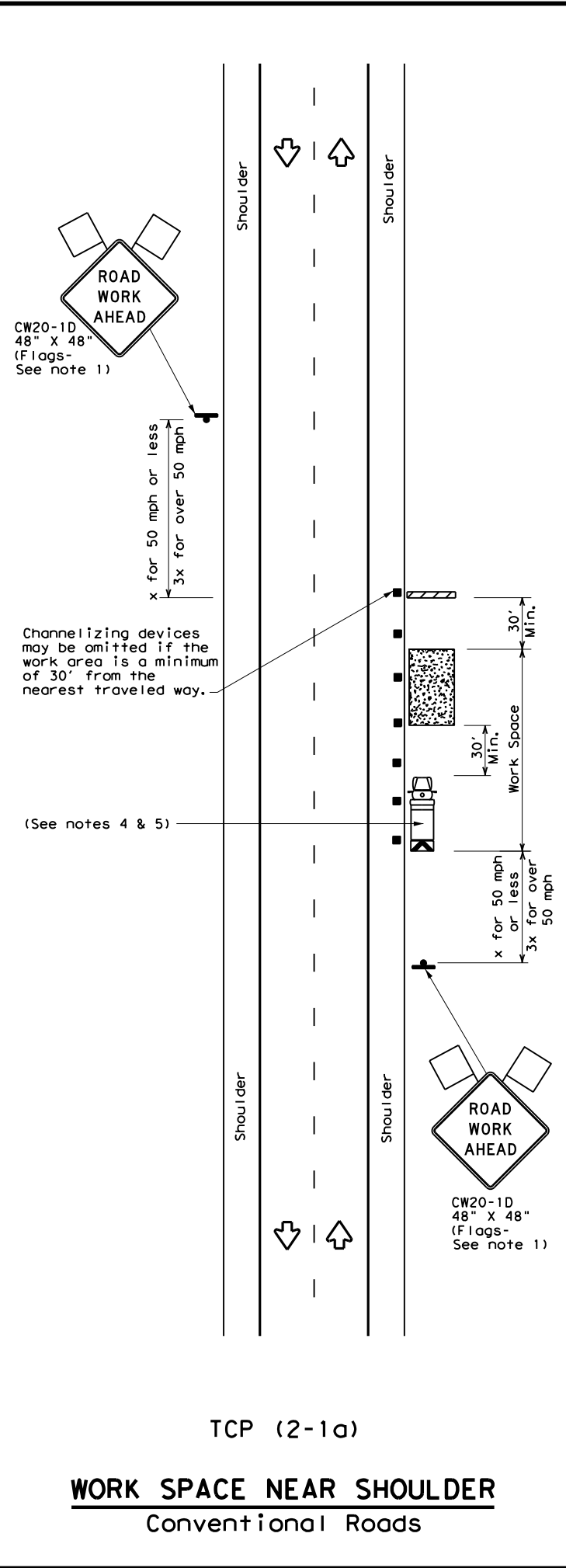
## TRAFFIC CONTROL PLAN AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs)

### TCP (1-6) - 18

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© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY	SHEET NO.	
	DAL	DENTON	58	

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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
  - 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.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
  - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
  - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
  - 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

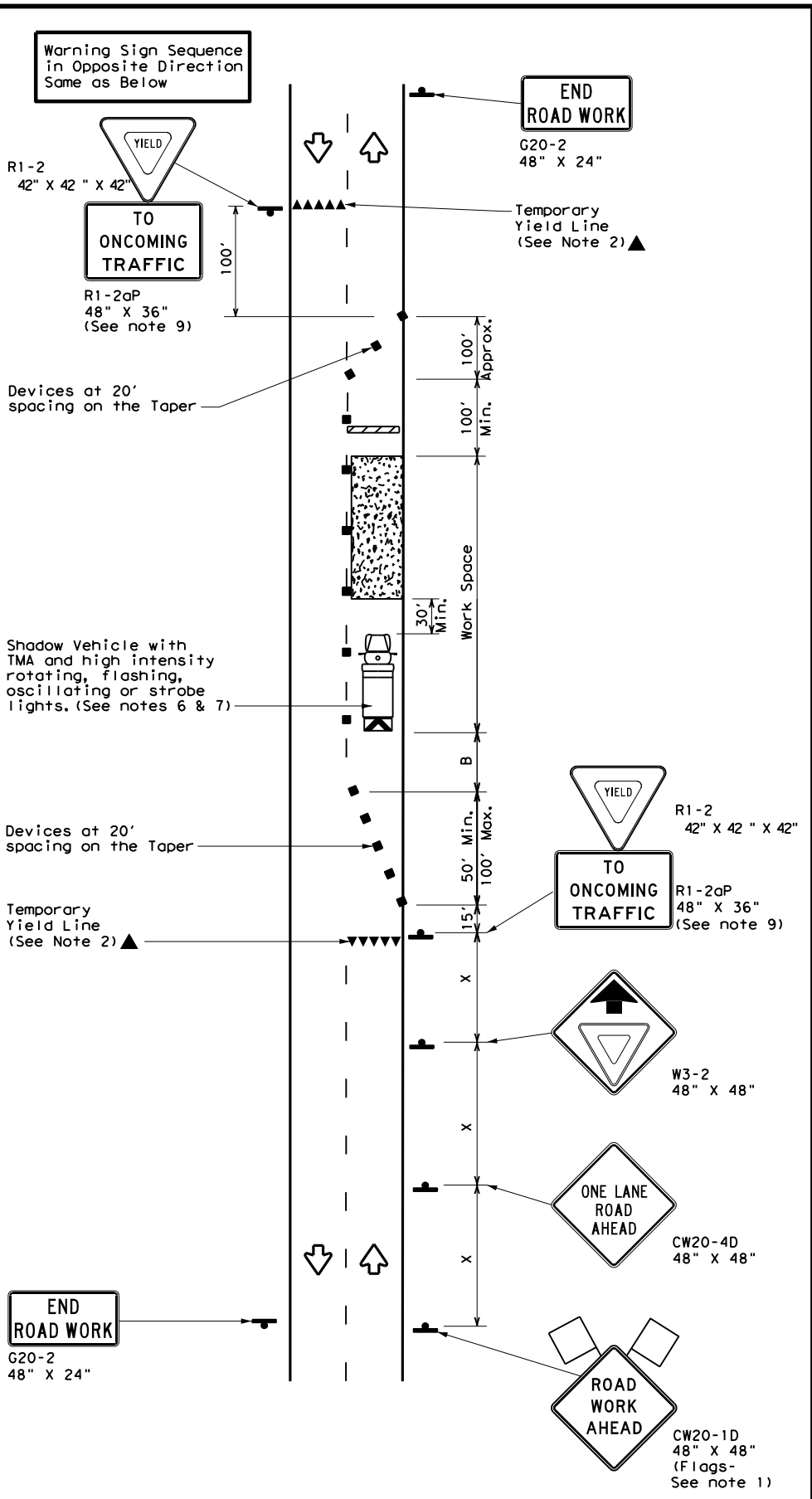
**TRAFFIC CONTROL PLAN**  
**CONVENTIONAL ROAD**  
**SHOULDER WORK**

**TCP (2-1) - 18**

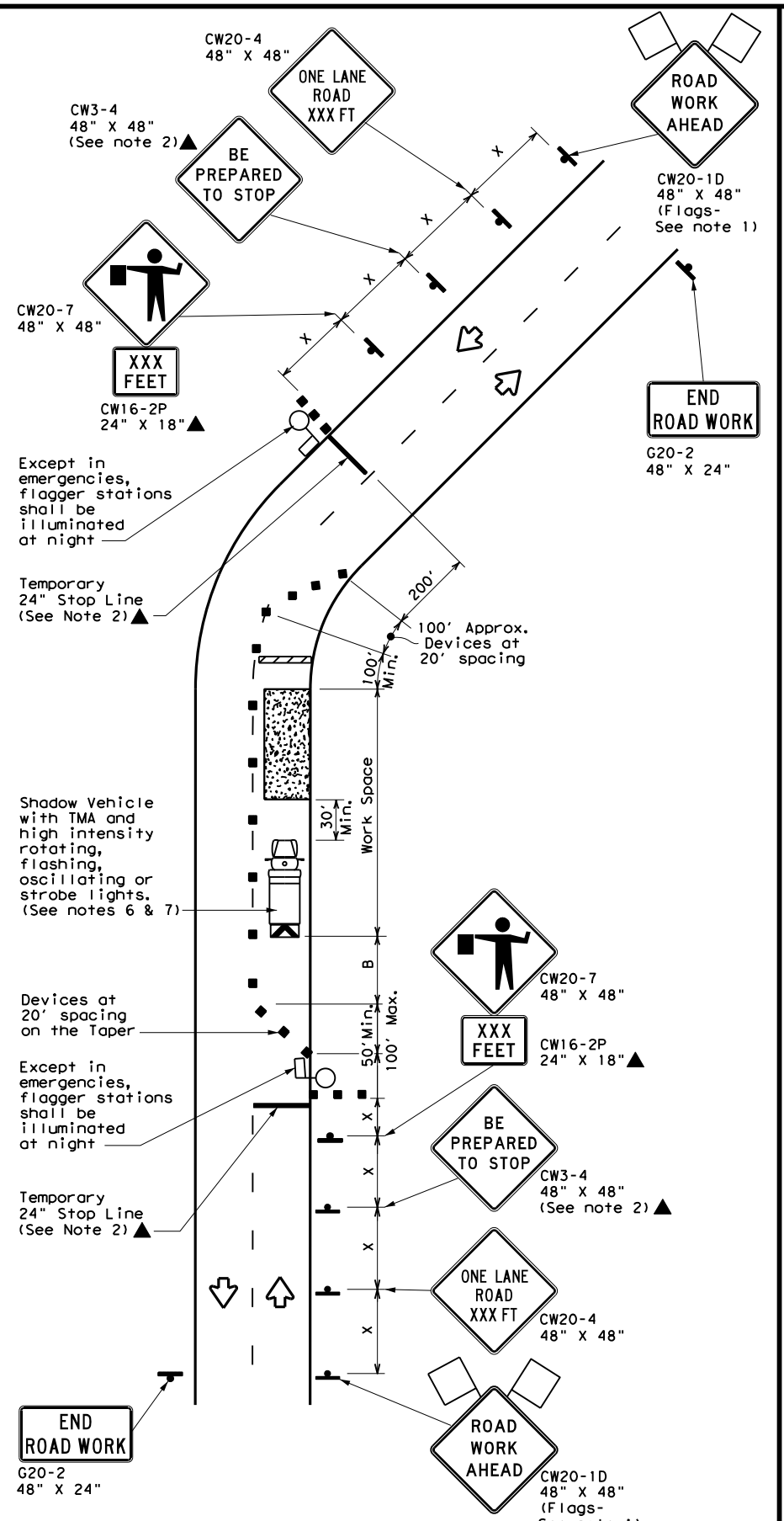
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© TxDOT December 1985	CON:	SECT:	JOB:	HIGHWAY:
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2-94 4-98	DIST:	COUNTY:	SHEET NO.:	
8-95 2-12	DAL	DENTON	59	
1-97 2-18				

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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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = WS <sup>2</sup> / 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)

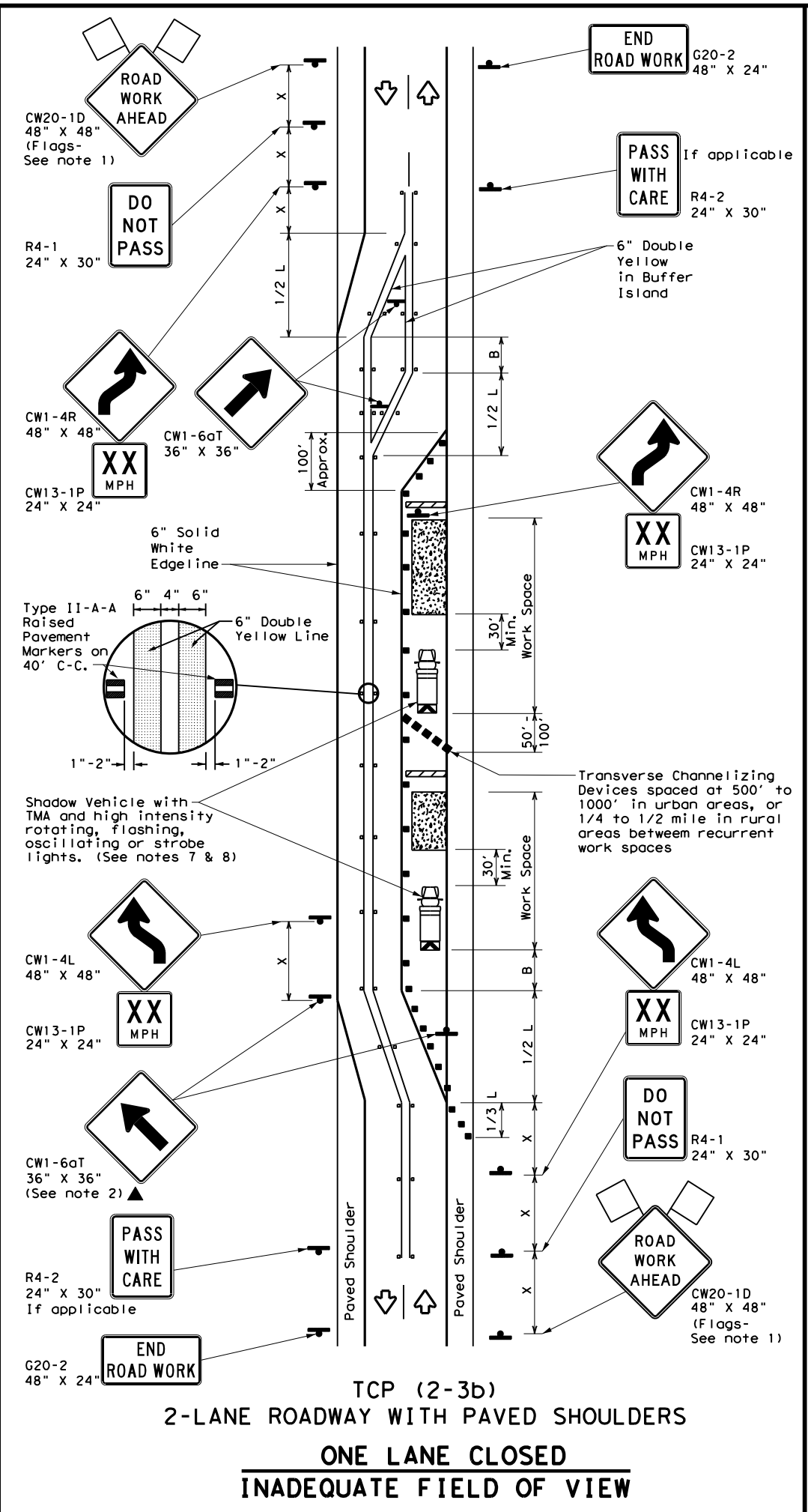
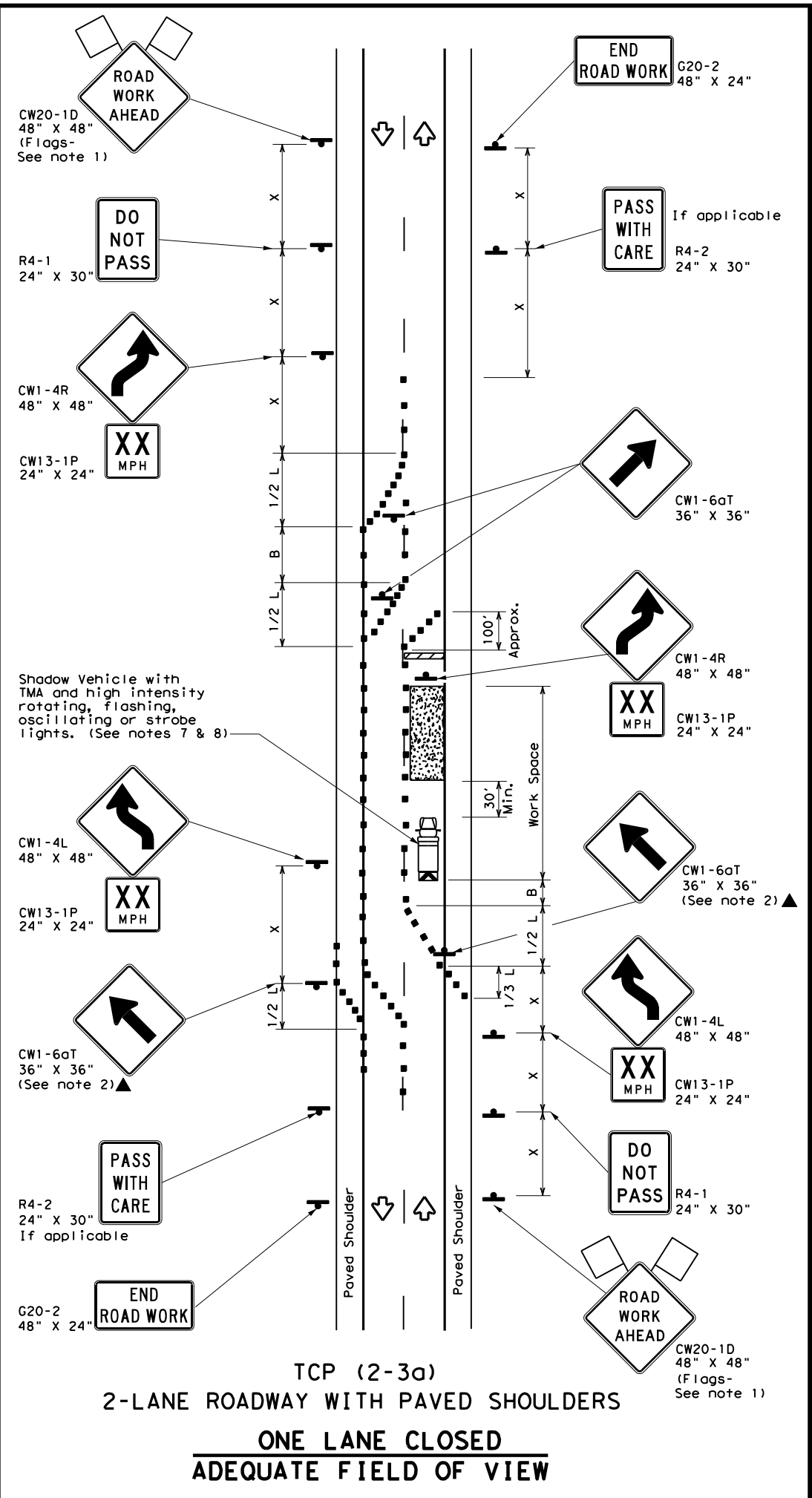
TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - 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.
  - Flaggers should use two-way radios or other methods of communication to control traffic.
  - Length of work space should be based on the ability of flaggers to communicate.
  - 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.
  - 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)**
- 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.
  - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)**
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
  - 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).
  - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

		Traffic Operations Division Standard	
<b>TRAFFIC CONTROL PLAN</b> <b>ONE-LANE TWO-WAY</b> <b>TRAFFIC CONTROL</b>			
<b>TCP (2-2) - 18</b>			
FILE:	tcp2-2-18.dgn	DN:	CK:
© TxDOT	REVISIONS	CON:	SECT:
8-95	3-03	6469	61
1-97	2-12		
4-98	2-18		
		DIST:	COUNTY:
		DAL	DENTON
		JOB:	HIGHWAY:
		001	IH0035W
			SHEET NO.
			60

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS <sup>2</sup> / 60	150'	165'	180'	30'	70'	120'	90'
35		205'	225'	245'	35'	80'	160'	120'
40		265'	295'	320'	40'	90'	240'	155'
45	L = WS	450'	495'	540'	45'	100'	320'	195'
50		500'	550'	600'	50'	110'	400'	240'
55		550'	605'	660'	55'	120'	500'	295'
60		600'	660'	720'	60'	130'	600'	350'
65		650'	715'	780'	65'	140'	700'	410'
70		700'	770'	840'	70'	150'	800'	475'
75		750'	825'	900'	75'	160'	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**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - 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.
  - 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.
  - 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.
  - Conflicting pavement marking shall be removed for long term projects.
  - 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.
  - 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)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation  
Traffic Safety Division Standard

## TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

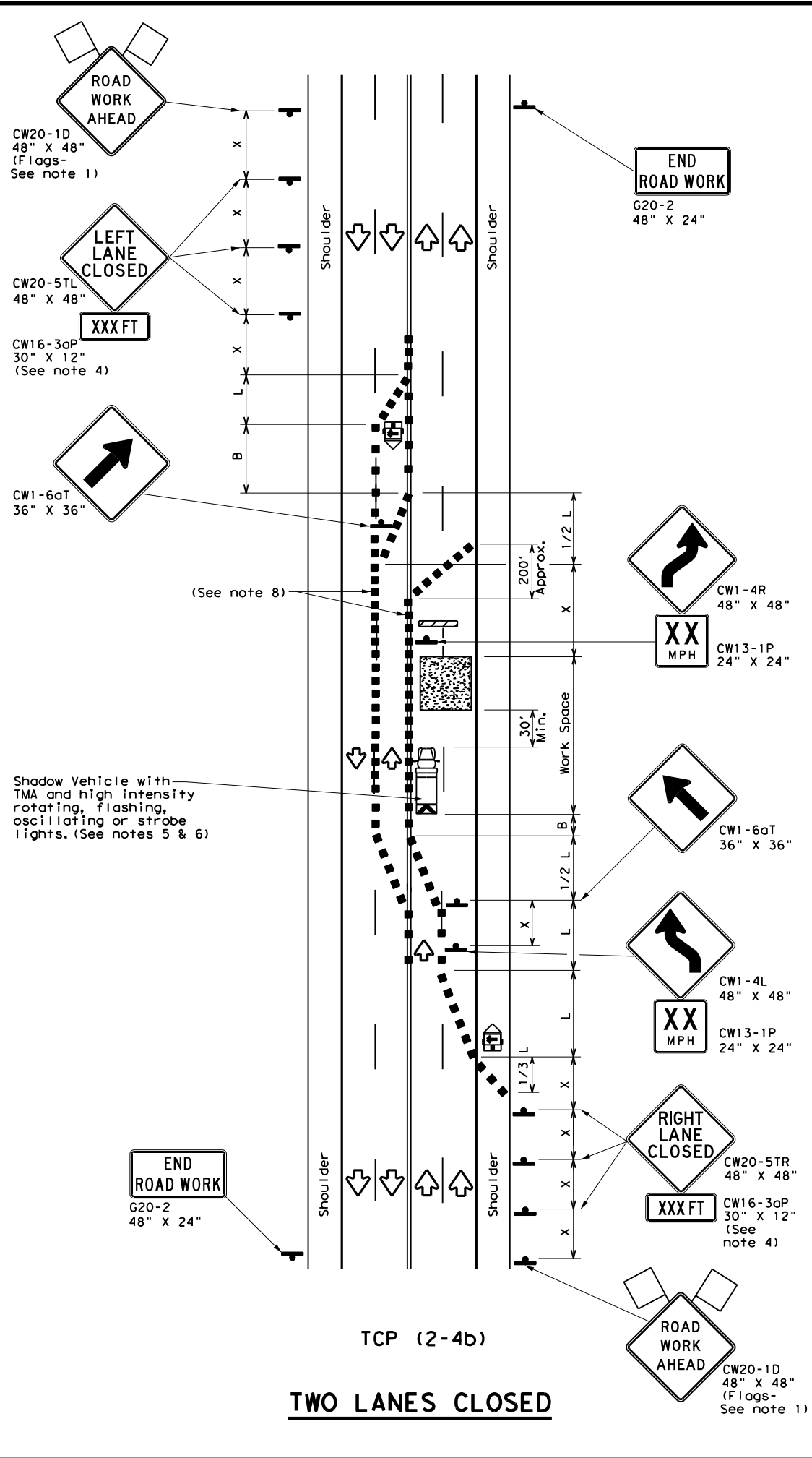
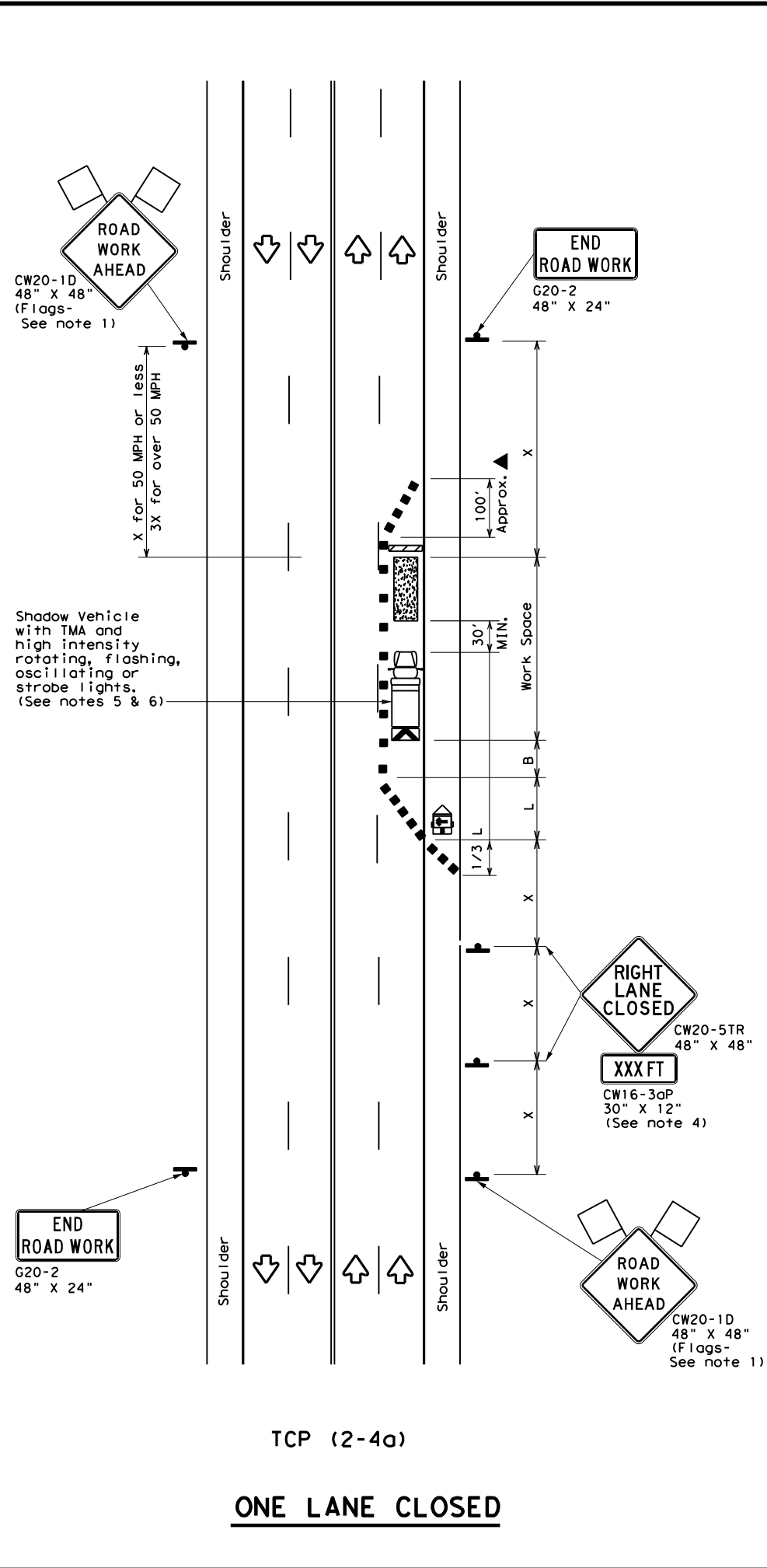
### TCP (2-3) - 23

FILE: tcp(2-3)-23.dgn	DW: CK:	CK:	CK:
© TxDOT April 2023	CON: 61	SECT: 001	HIGHWAY: IH0035W
REVISIONS			
12-85 4-98 2-18			
8-95 3-03 4-23			
1-97 2-12	DIST: DAL	COUNTY: DENTON	SHEET NO.: 61



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 DATE: 9/4/2024 9:02:37 AM  
 FILE: I:\DENMANT\Maint Projects\BPM\BPM\_FY\_2025\BPM\_6469-61-001\_Cleaning and Sealing\BPM\_6469-61-001\_Cleaning and Sealing\TRAFFIC CONTROL\TRAFFIC CONTROL PLAN\TRAFFIC CONTROL PLAN - ONE LANE CLOSED.dgn



**LEGEND**

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS <sup>2</sup> / 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**

- Flags attached to signs where shown, are REQUIRED.
- 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.
- The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
- 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.
- 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.
- 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)**

- 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)**

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

Traffic Operations Division Standard

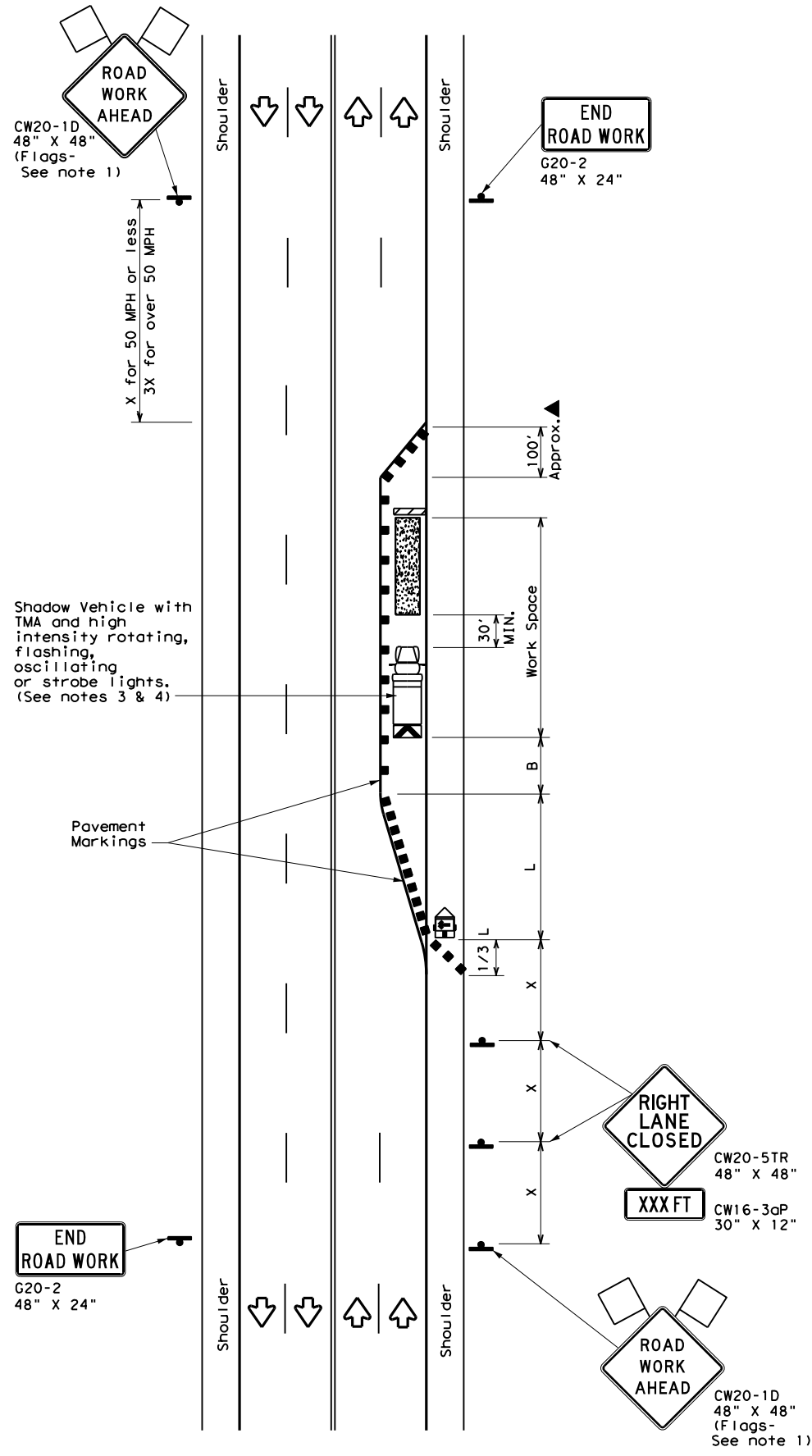
TRAFFIC CONTROL PLAN  
LANE CLOSURES ON MULTILANE  
CONVENTIONAL ROADS

TCP (2-4) - 18

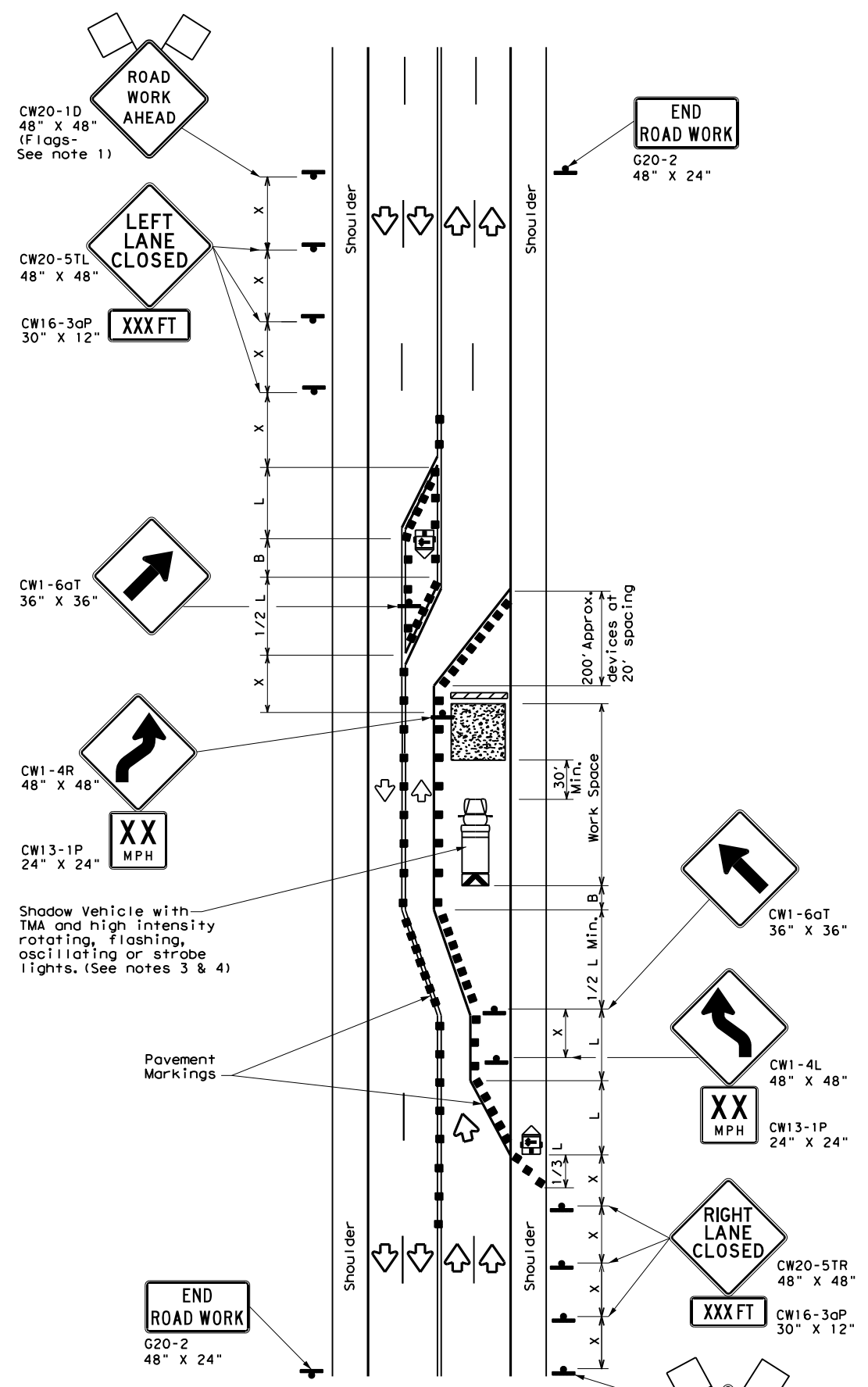
FILE: tcp2-4-18.dgn	DWG: 6469	CK: 61	DW: 001	CK: IHO035W
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IHO035W
8-95 3-03	DIST	COUNTY	SHEET NO.	
1-97 2-12	DAL	DENTON	62	
4-98 2-18				

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DATE: 9/4/2024 9:02:37 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM\_FY\_2025\BPM\_6469-61-001\_Cleaning and Sealing of Pavement



TCP (2-5a)  
**ONE LANE CLOSED**



TCP (2-5b)  
**TWO LANES CLOSED**

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS <sup>2</sup> / 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**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - 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.
  - 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.
  - The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

- TCP (2-5a)**
- 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 (2-5b)**
- Conflicting pavement markings shall be removed for long-term projects.

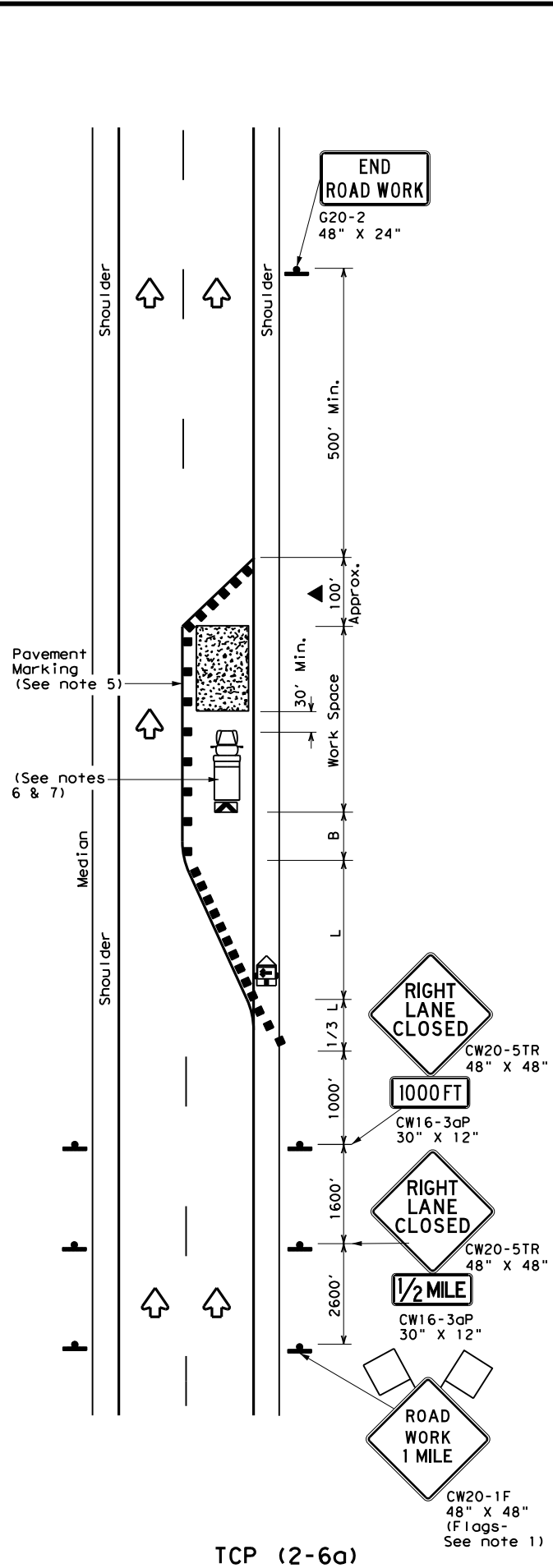
Texas Department of Transportation  
 Traffic Operations Division Standard

## TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

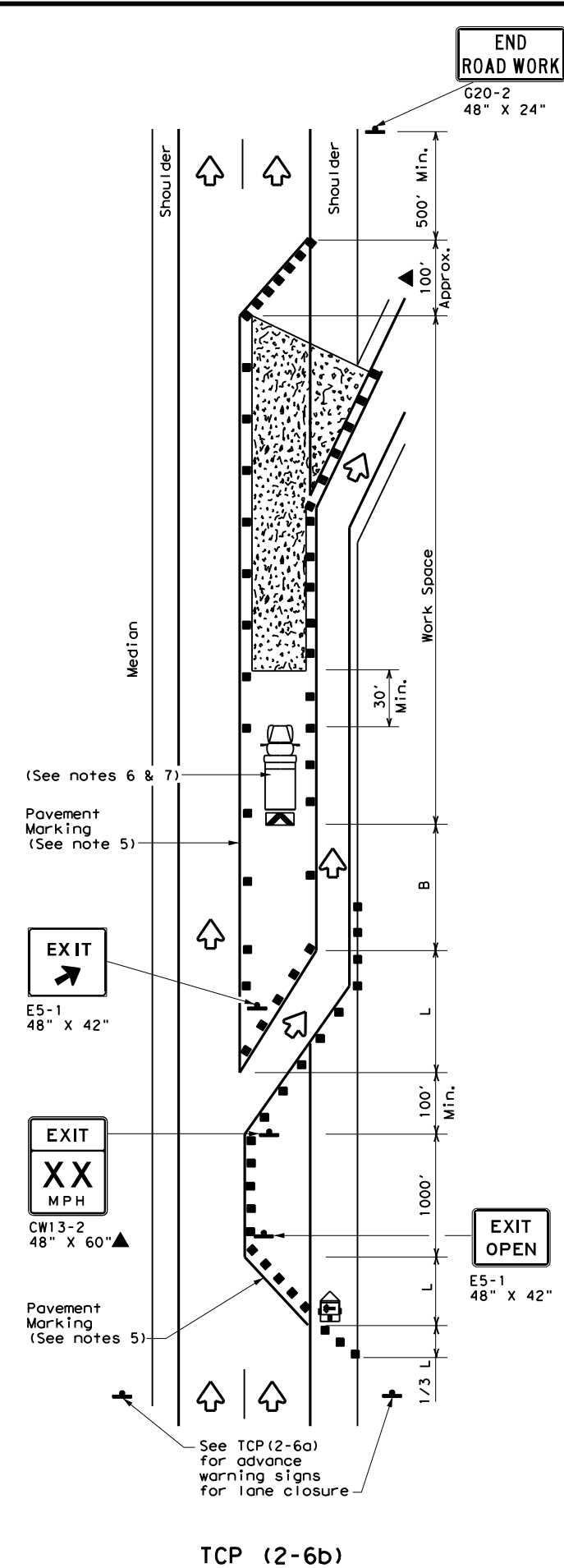
### TCP (2-5) - 18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
8-95 2-12 REVISIONS	6469	61	001	IHO035W
1-97 3-03	DIST	COUNTY	SHEET NO.	
4-98 2-18	DAL	DENTON	63	

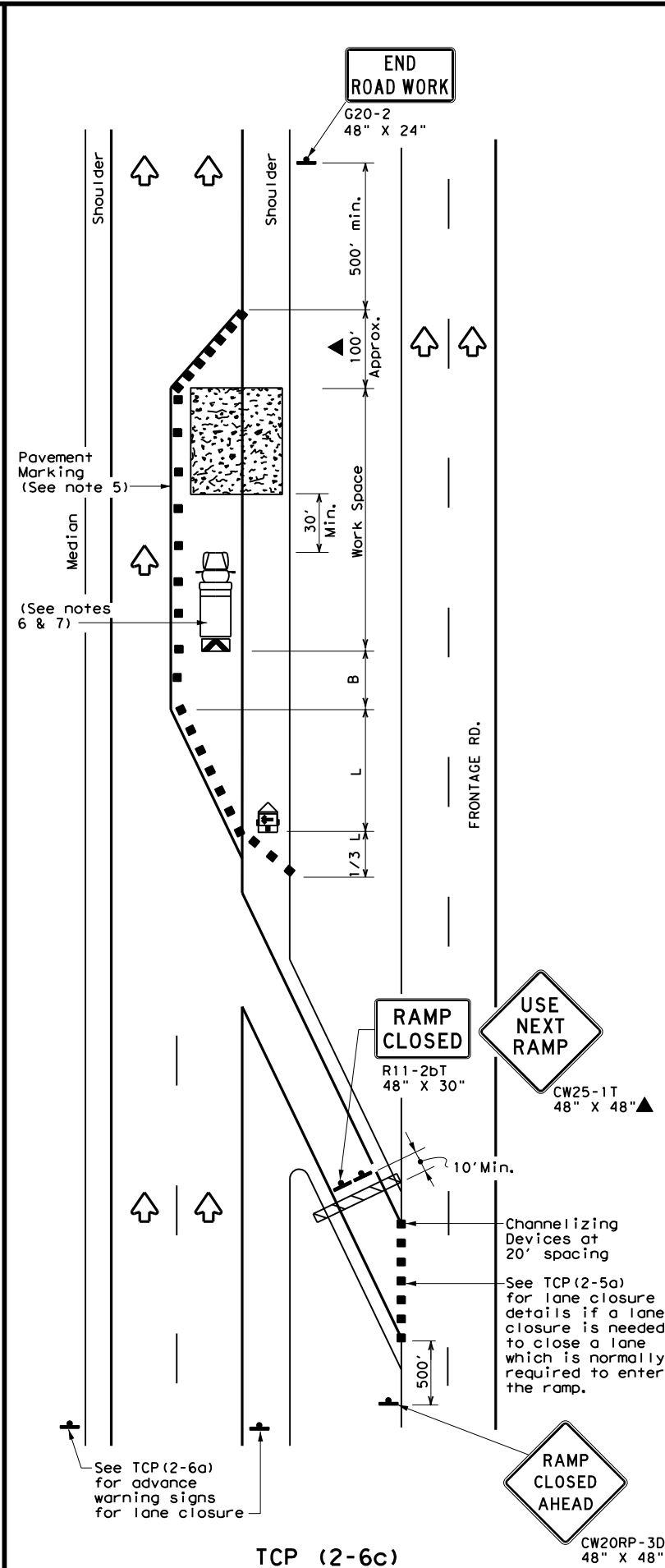
DATE: 9/4/2024 9:02:37 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM.FY.2025\BPM.6469-61-001.Cleaning and S&S of I-30\BPM\BPM.TCP(2-6) for lane closure.dgn  
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TCP (2-6a)  
**ONE LANE CLOSURE**



TCP (2-6b)  
**LANE CLOSURE NEAR EXIT RAMP**



TCP (2-6c)  
**LANE CLOSURE NEAR ENTRANCE RAMP**

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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - 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.
  - Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on every other channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
  - The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.
  - 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.
  - 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.

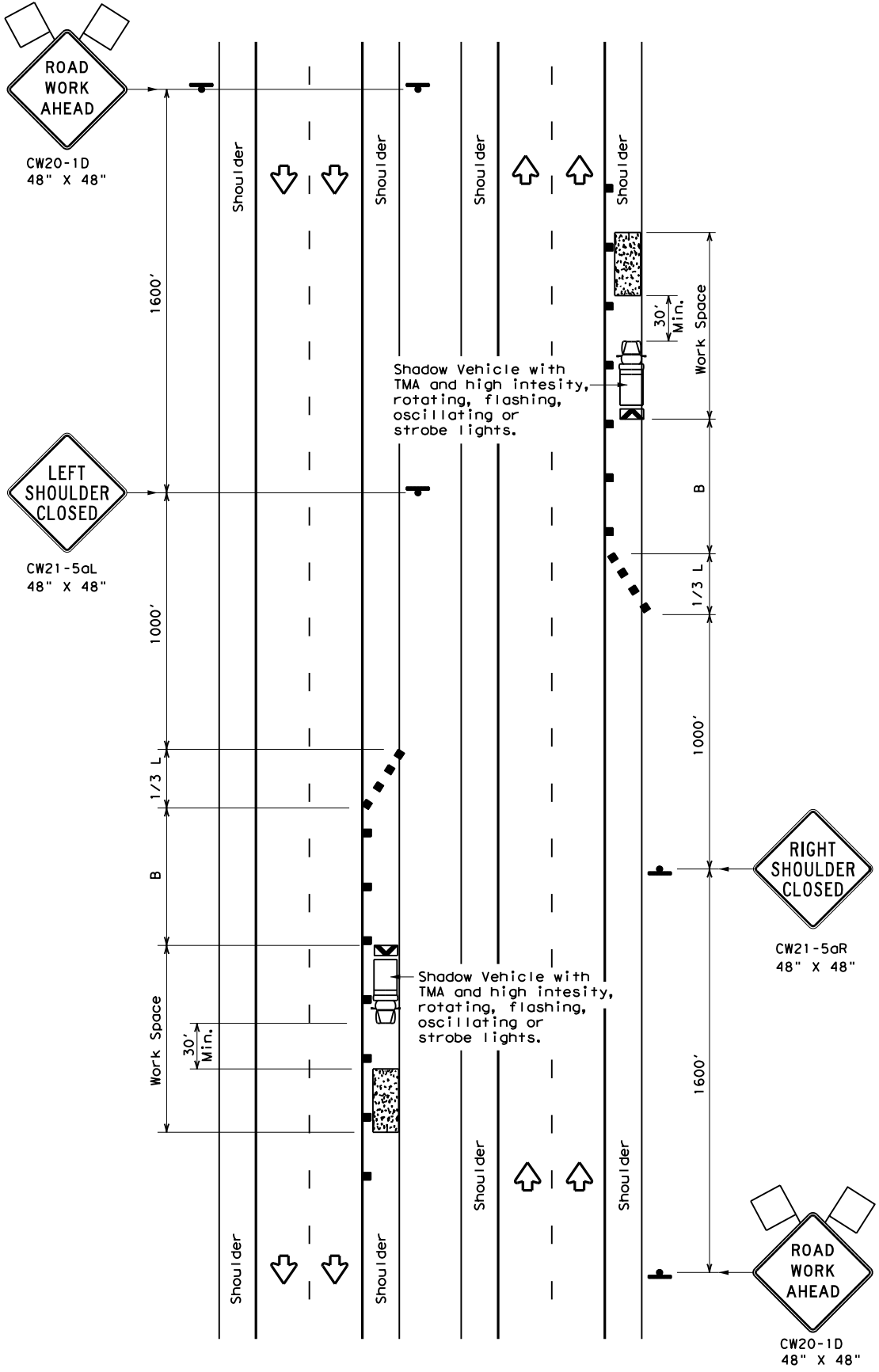
Texas Department of Transportation  
 Traffic Operations Division Standard

## TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

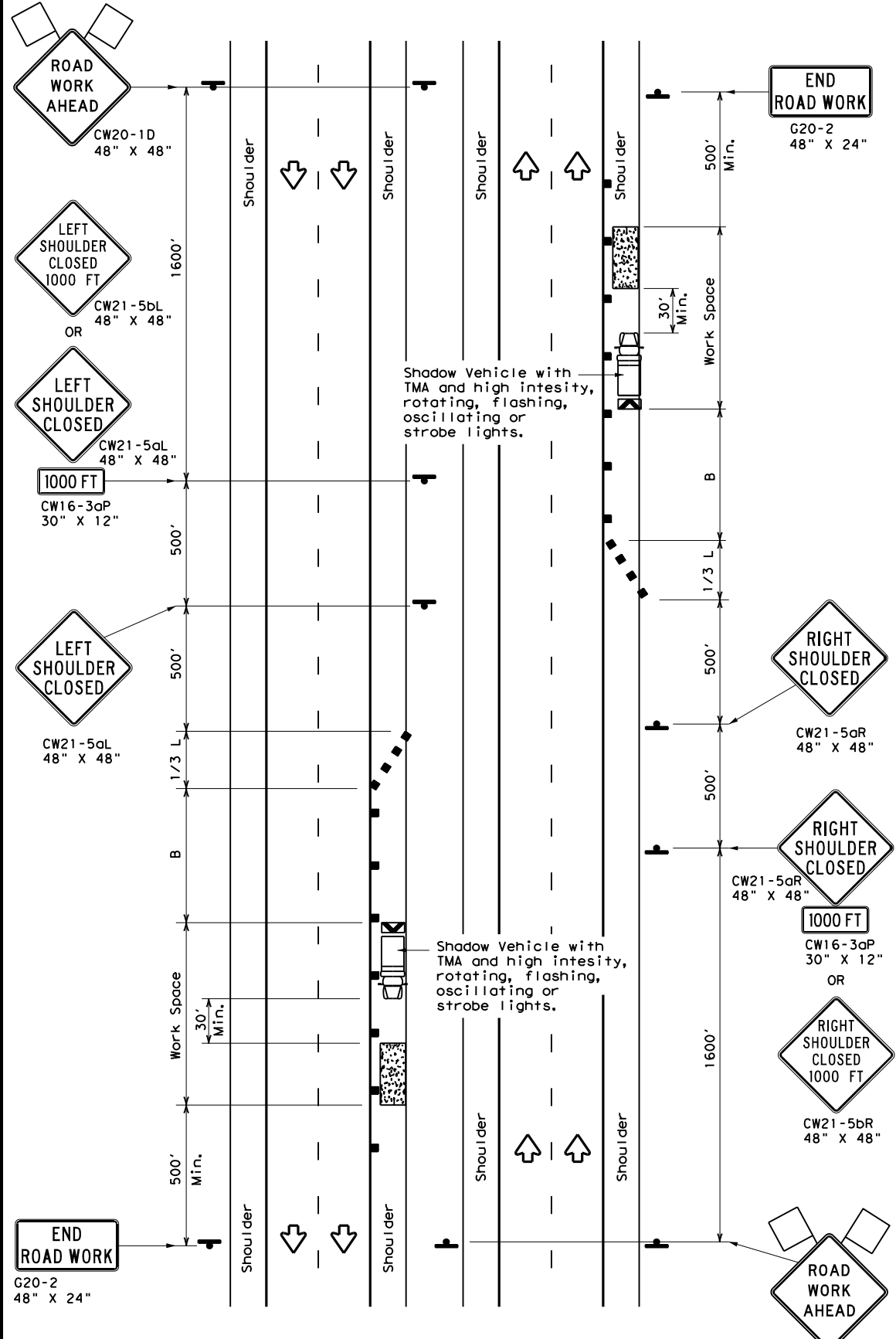
### TCP (2-6) - 18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	DAL	DENTON	64	
1-97 2-18				

DATE: 9/4/2024 9:02:38 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM.FY.2025\BPM.6469-61-001.Cleaning and S&S\Signage\Signage\TCP (5-1) - 18.dgn  
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TCP (5-1a)  
**WORK AREA ON SHOULDER**



TCP (5-1b)  
**WORK AREA ON SHOULDER**

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	L = WS <sup>2</sup> / 60	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L = WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70	700'	770'	840'	70'	140'	475'	
75	750'	825'	900'	75'	150'	540'	
80	800'	880'	960'	80'	160'	615'	

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

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

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

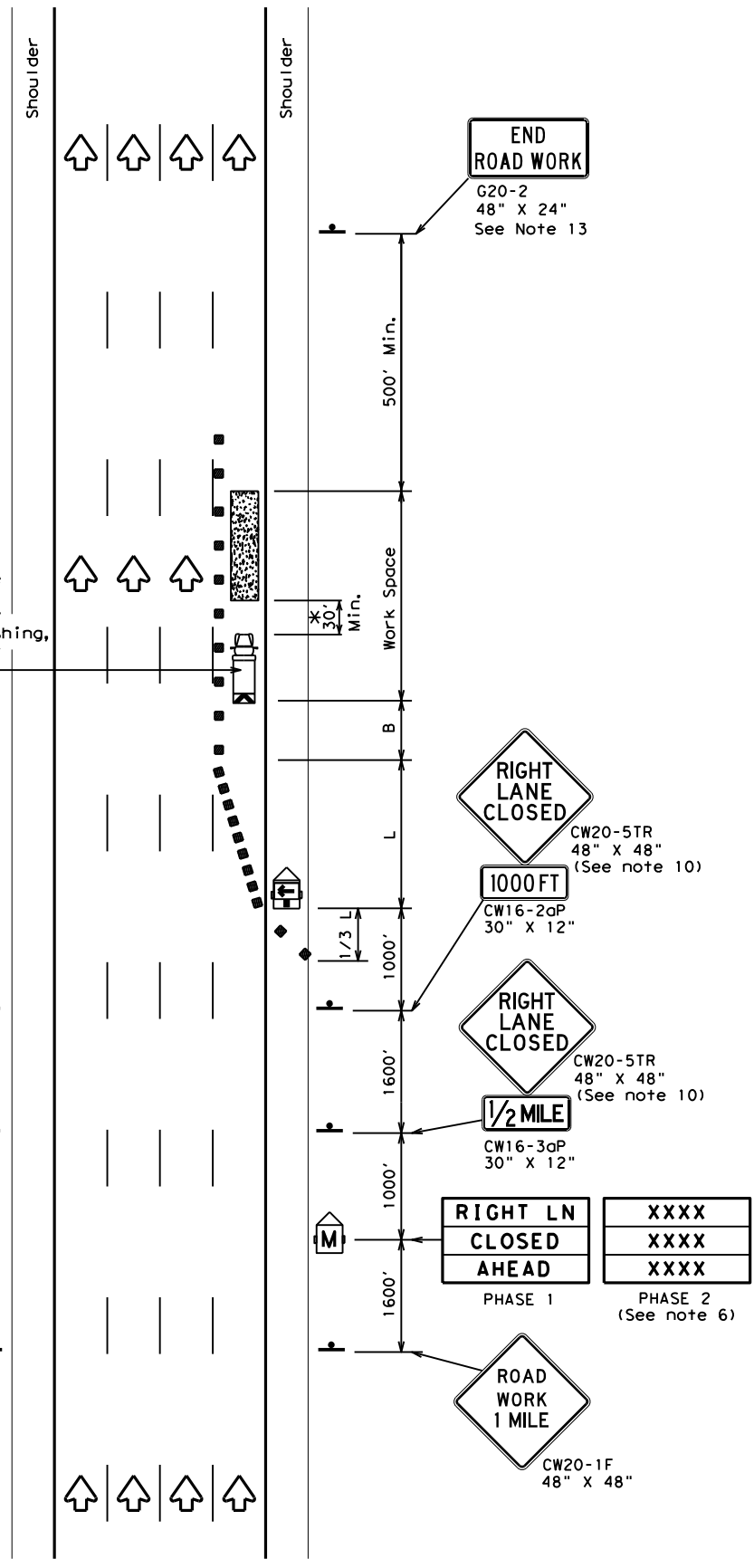


**TRAFFIC CONTROL PLAN  
 SHOULDER WORK FOR  
 FREEWAYS / EXPRESSWAYS**

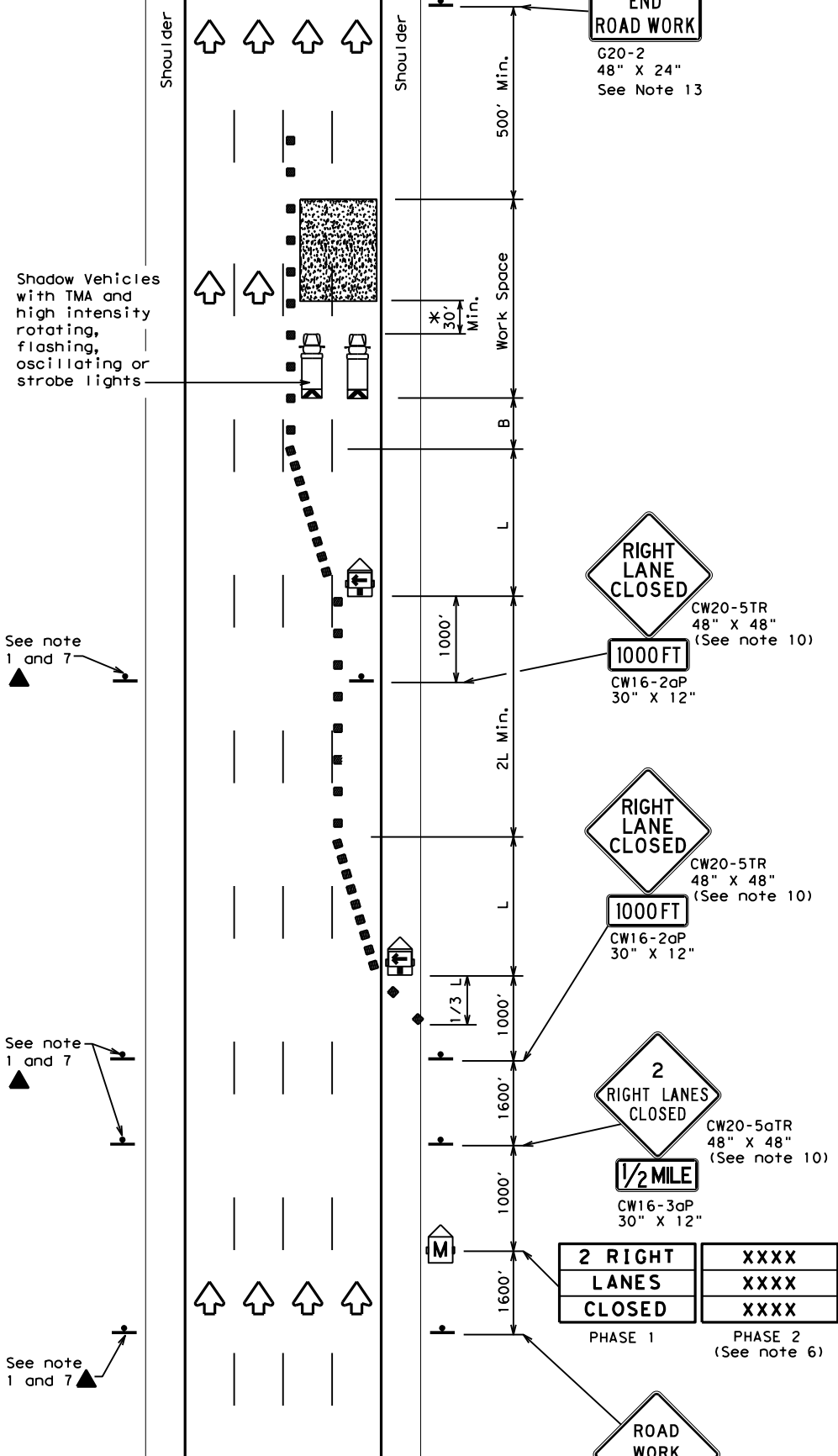
**TCP (5-1) - 18**

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
2-18	REVISIONS	6469 61	001	IH0035W
	DIST	COUNTY	SHEET NO.	
	DAL	DENTON	65	

DATE: 9/4/2024 9:02:38 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\FY 2025\BPM 6469-61-001 Cleaning and Sealing of Interchange and Bridge Deck\BPM 6469-61-001.dgn  
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TCP (6-1a)  
**TYPICAL FREEWAY ONE LANE CLOSURE**



TCP (6-1b)  
**TYPICAL FREEWAY TWO LANE CLOSURE**

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

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- Drums or 42" cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
- Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
- For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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



**TRAFFIC CONTROL PLAN  
 FREEWAY LANE CLOSURES**

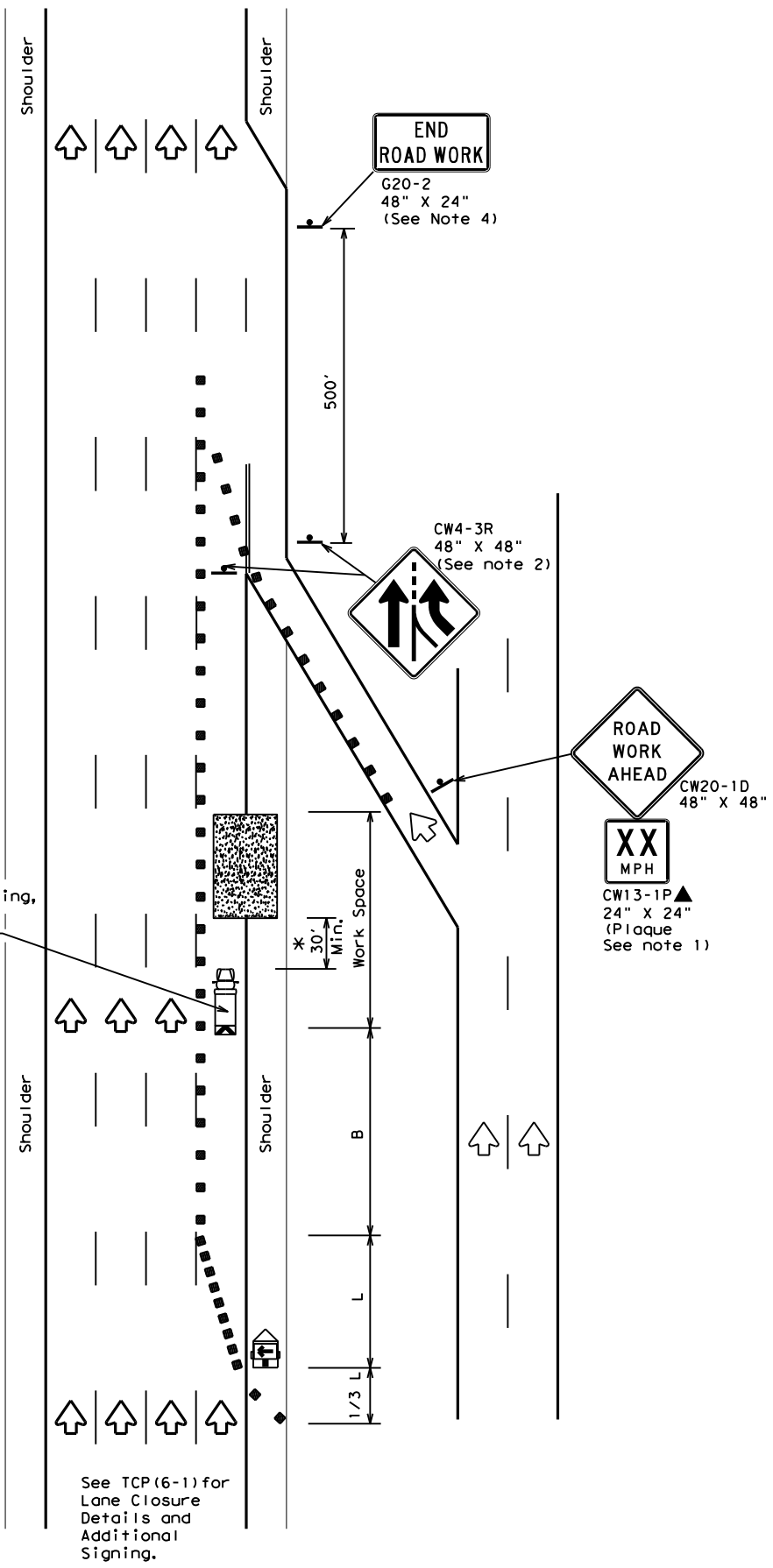
**TCP (6-1) - 12**

FILE:	tcp6-1.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
8-12	REVISIONS	6469	61	001	IH0035W				
		DIST	COUNTY	SHEET NO.					
		DAL	DENTON	66					

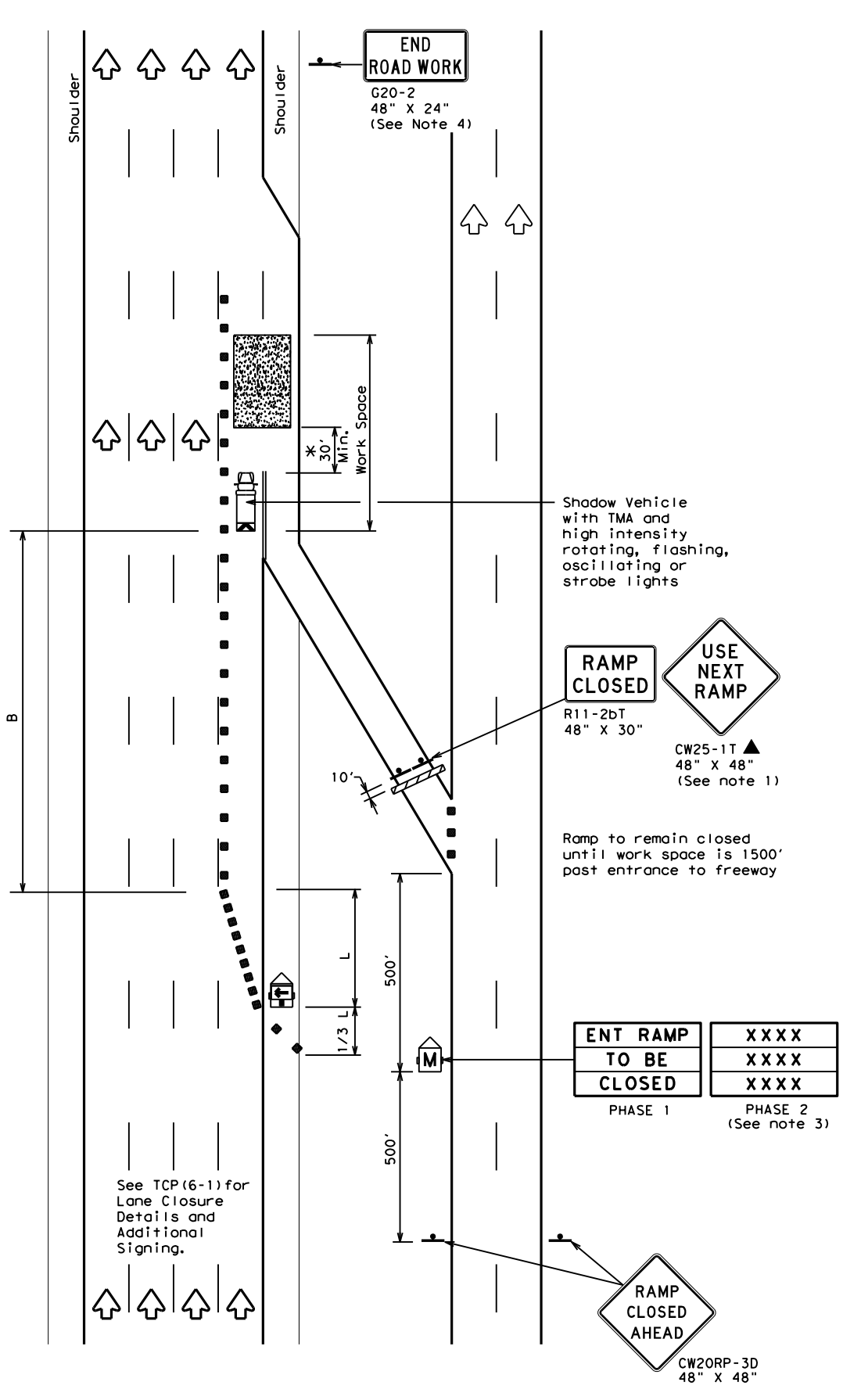


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DATE: 9/4/2024 9:02:39 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM\_FY\_2025\BPM\_6469-61-001\_Cleaning and SBUS Repair\BPM\_6469-61-001.dgn



TCP (6-2a)  
**ENTRANCE RAMP OPEN**  
**WORK WITHIN 500' OF RAMP**



TCP (6-2b)  
**ENTRANCE RAMP CLOSED**

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

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainline can be seen from both roadways.
- See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

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



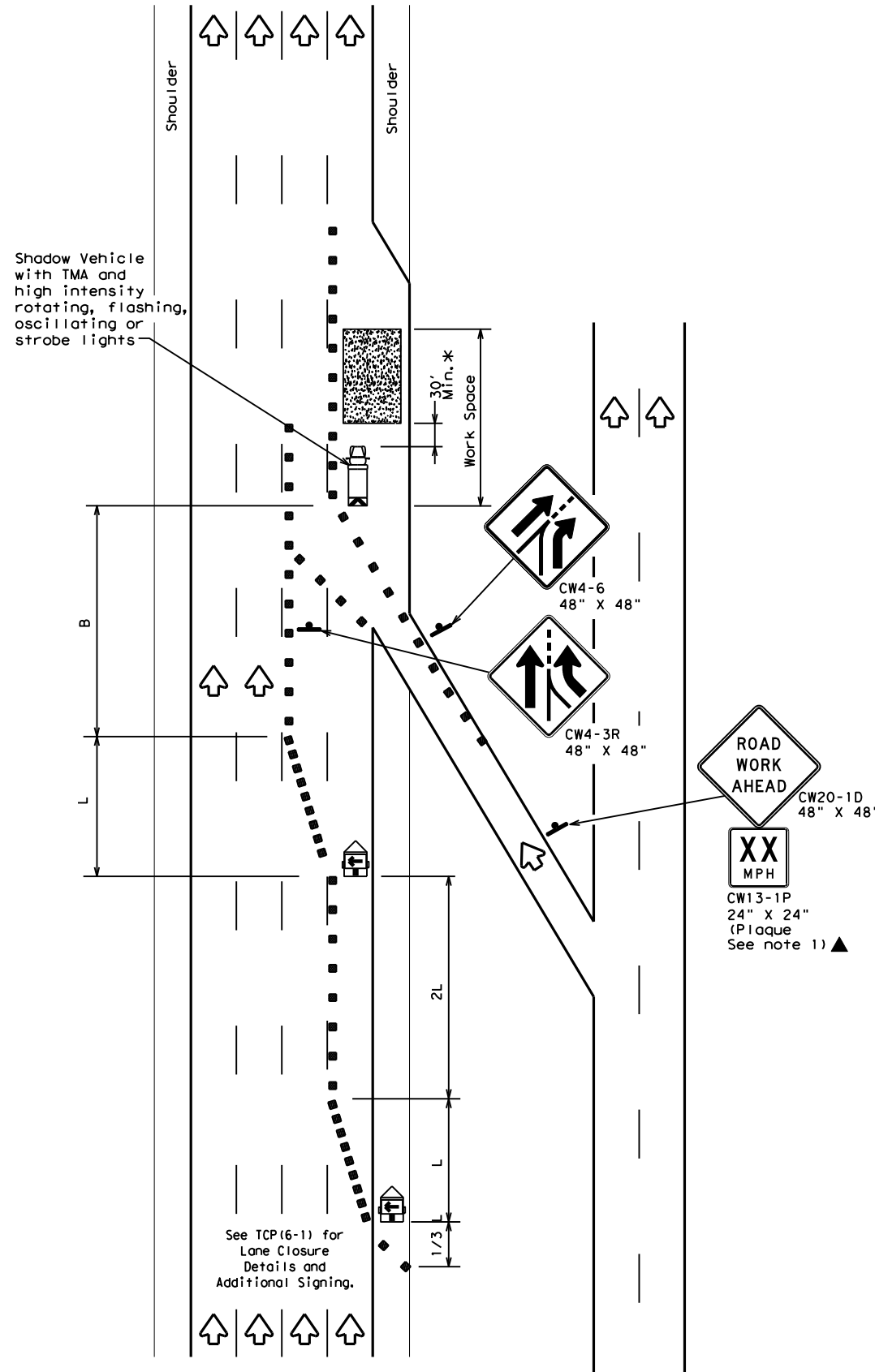
**TRAFFIC CONTROL PLAN**  
**WORK AREA NEAR RAMP**

**TCP (6-2) - 12**

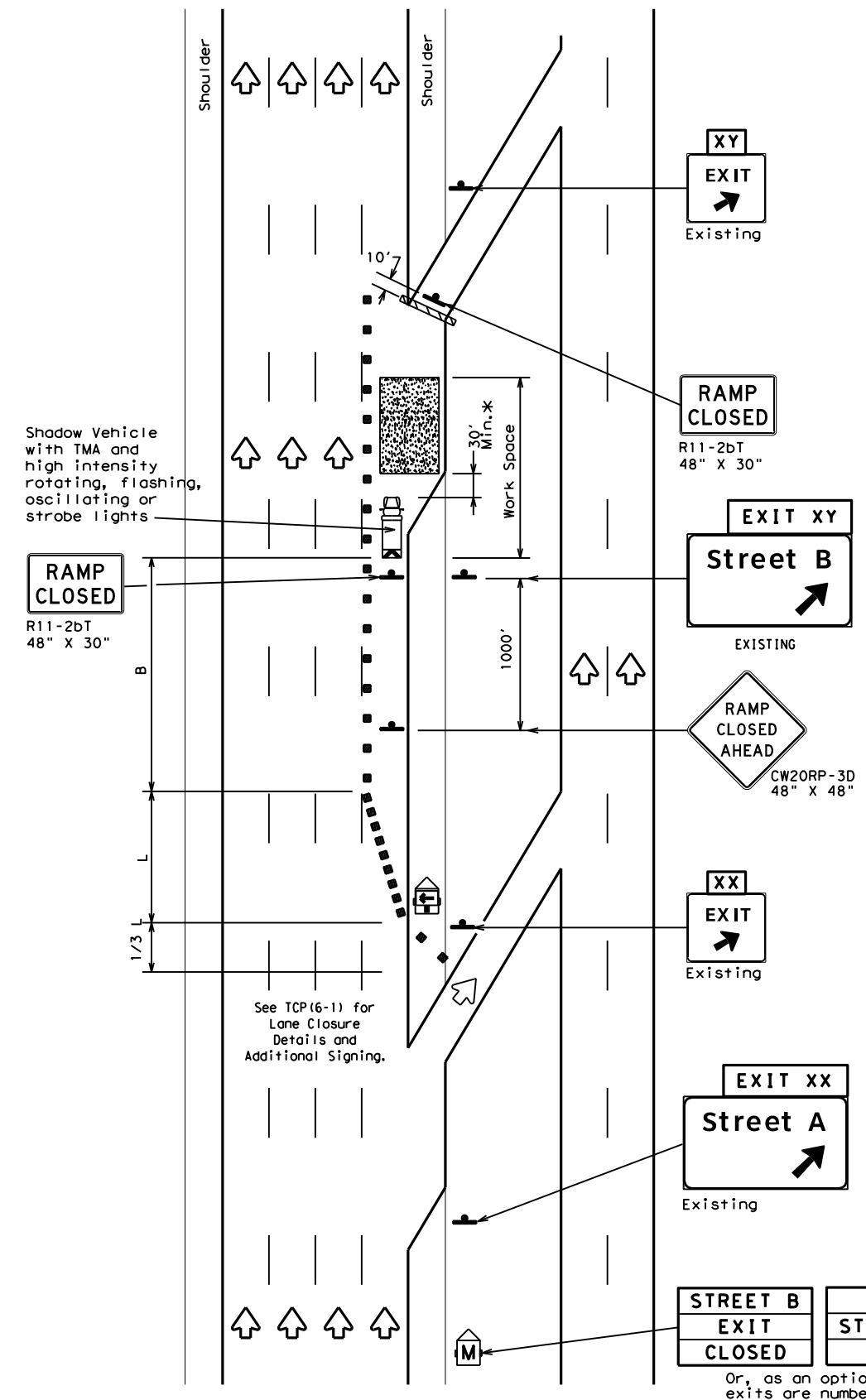
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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	DAL	DENTON	67	

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DATE: 9/4/2024 9:02:39 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM\_FY\_2025\BPM\_6469-61-001\_Cleaning\_and\_SBS\_Installation.dwg



TCP (6-3a)  
**ENTRANCE RAMP OPEN**



TCP (6-3b)  
**EXIT RAMP CLOSED**  
**TRAFFIC EXITS PRIOR TO CLOSED RAMP**

STREET B  
 EXIT  
 CLOSED

USE  
 STREET A  
 EXIT

EXIT XY  
 CLOSED

USE  
 EXIT XX

Or, as an option when exits are numbered

Place 1 mile (approx.) in advance of Street A exit.

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

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

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

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

GENERAL NOTES:

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

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

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

Texas Department of Transportation  
 Traffic Operations Division Standard

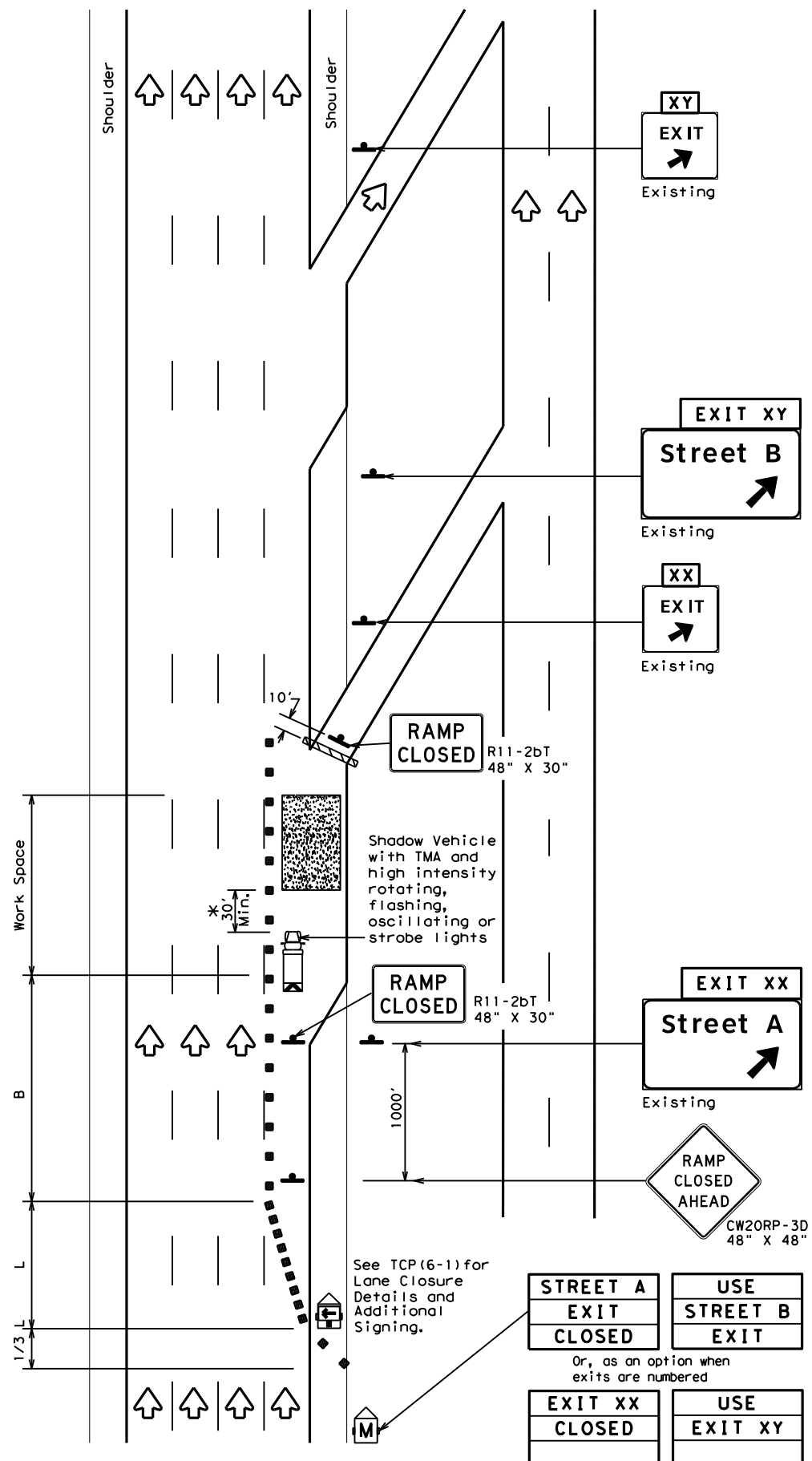
**TRAFFIC CONTROL PLAN**  
**WORK AREA BEYOND RAMP**

**TCP (6-3) - 12**

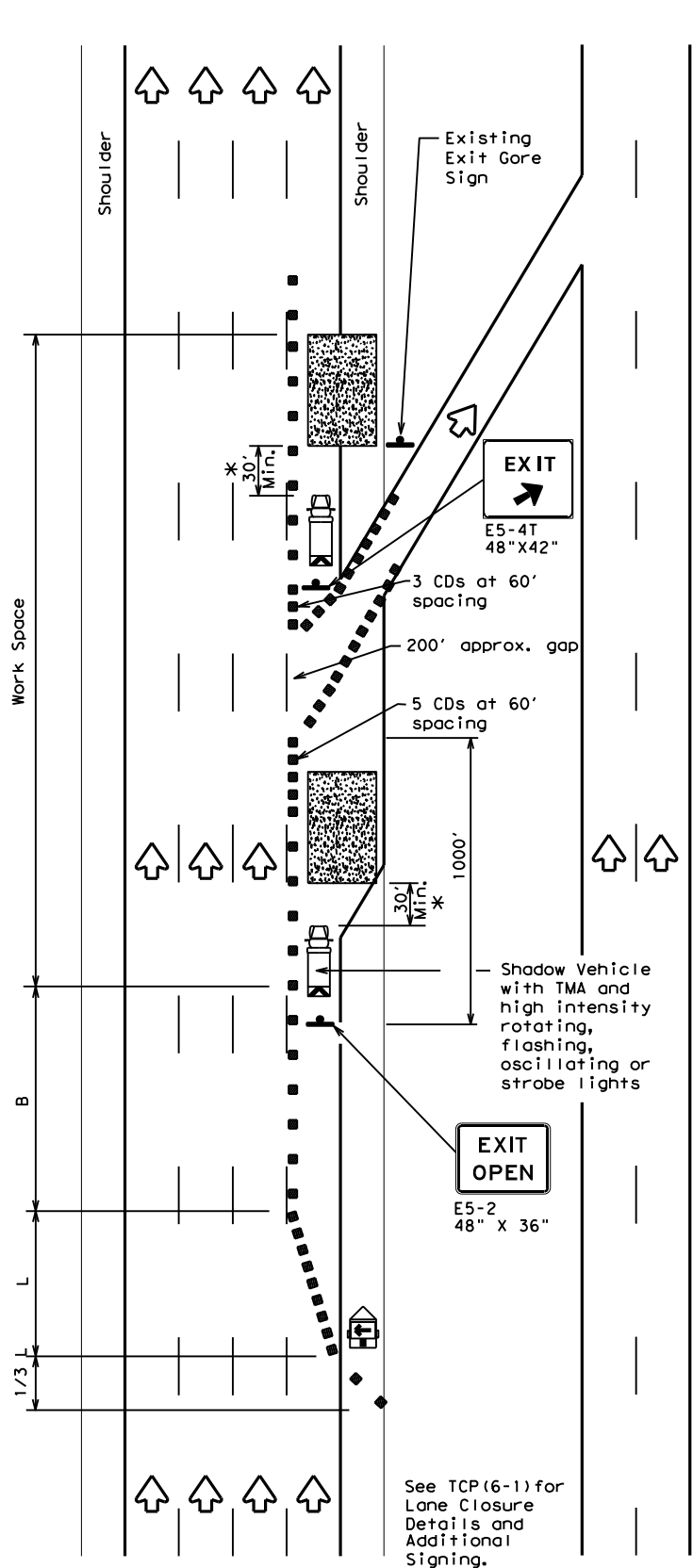
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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	DAL	DENTON	68	

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DATE: 9/4/2024 9:02:39 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM.FY.2025\BPM.6469-61-001.Cleaning and SBUS\CP6-4.dgn



TCP (6-4a)  
**EXIT RAMP CLOSED**  
**TRAFFIC EXITS PAST CLOSED RAMP**



TCP (6-4b)  
**EXIT RAMP OPEN**

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

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

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

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

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

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

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



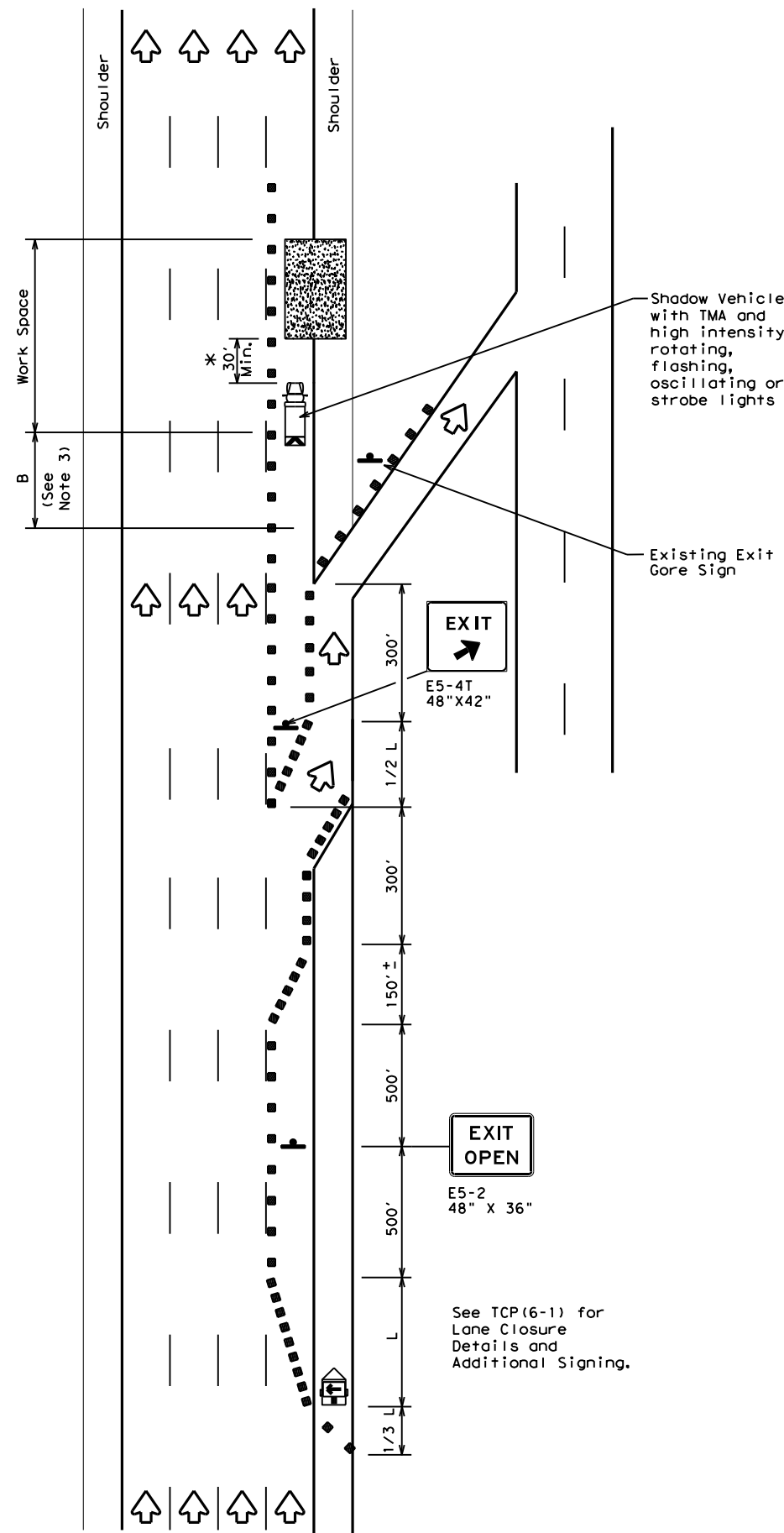
**TRAFFIC CONTROL PLAN**  
**WORK AREA AT EXIT RAMP**

TCP (6-4) - 12

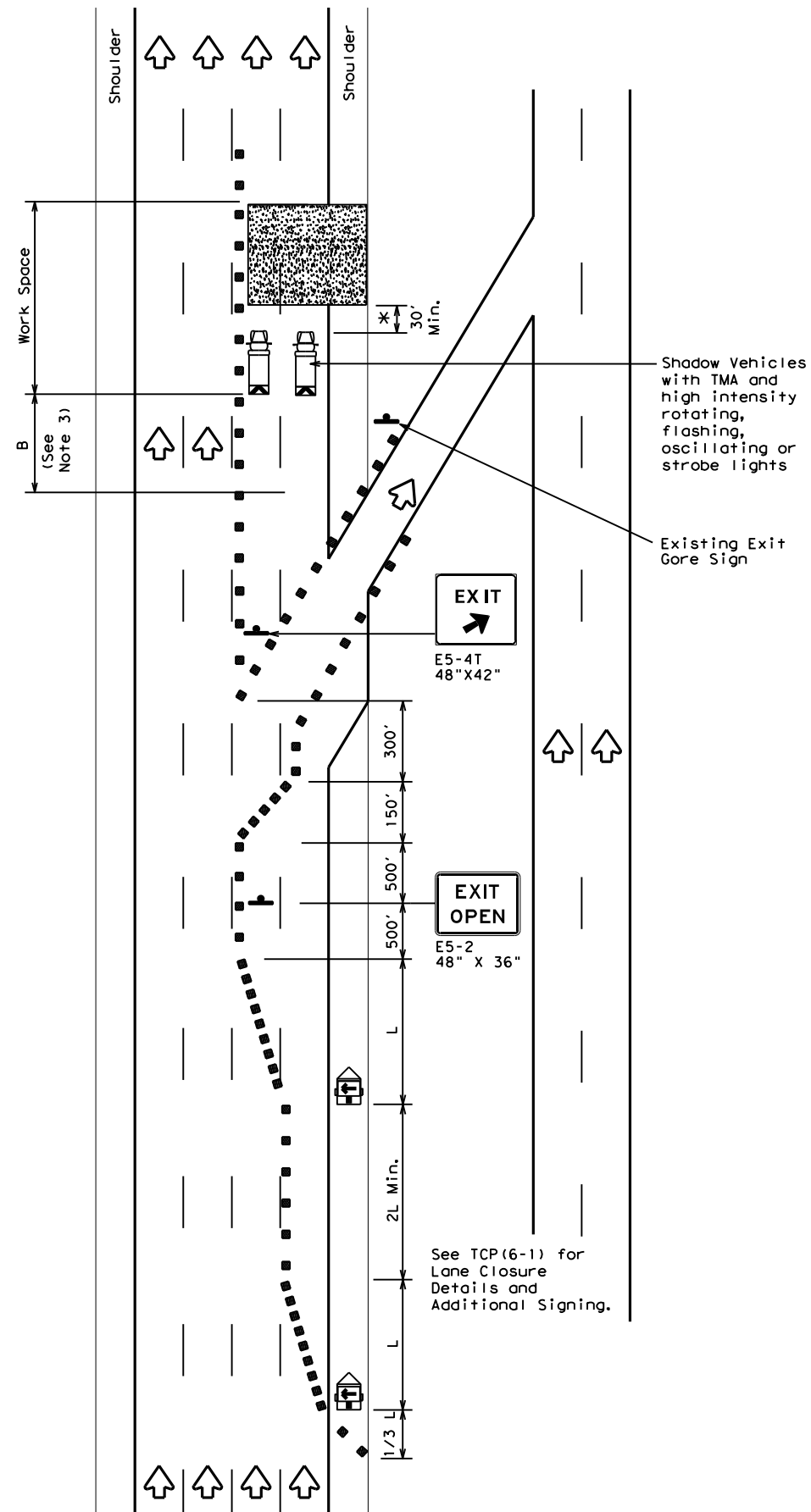
FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	DAL	DENTON	69	

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DATE:  
FILE:



TCP (6-5a)  
**EXIT RAMP OPEN**



TCP (6-5b)  
**EXIT RAMP OPEN  
TWO LANE CLOSURE WITHIN  
1500' PAST EXIT RAMP**

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

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- See BC standards for sign details.
- If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

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

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



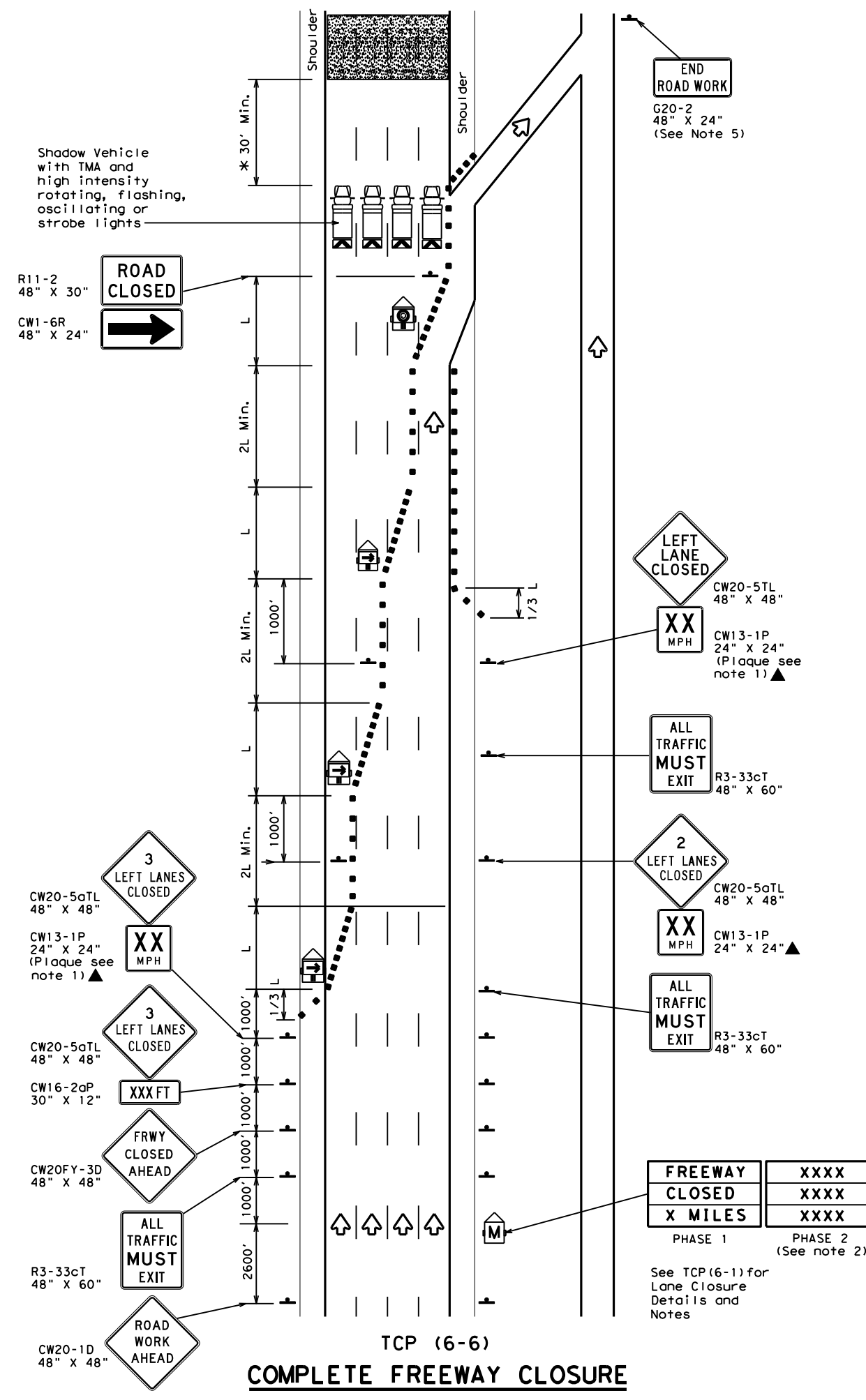
**TRAFFIC CONTROL PLAN  
WORK AREA BEYOND EXIT RAMP**

**TCP (6-5) - 12**

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© TxDOT	February 1998	CONT:	6469	SECT:	61	JOB:	001	HIGHWAY:	IH0035W
REVISIONS		DIST:	DAL	COUNTY:	DENTON	SHEET NO.:	70		
1-97	8-98								
4-98	8-12								

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DATE: 9/4/2024 9:02:40 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\FY 2025\BPM 6469-61-001 Cleaning and Sealing of I-35\TMS\forms\TCP6-6.dgn



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

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

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

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

- GENERAL NOTES**
- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
  - Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE RIGHT," recommended speed, delay, exit information, or other specific warnings.
  - Where queuing is anticipated beyond signing shown, additional PCMS signs, other warning signs, devices or Law Enforcement Officers should be available to warn approaching high speed traffic of the end of the queue, as directed by the Engineer.
  - Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
  - The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

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

**Texas Department of Transportation**  
 Traffic Operations Division Standard

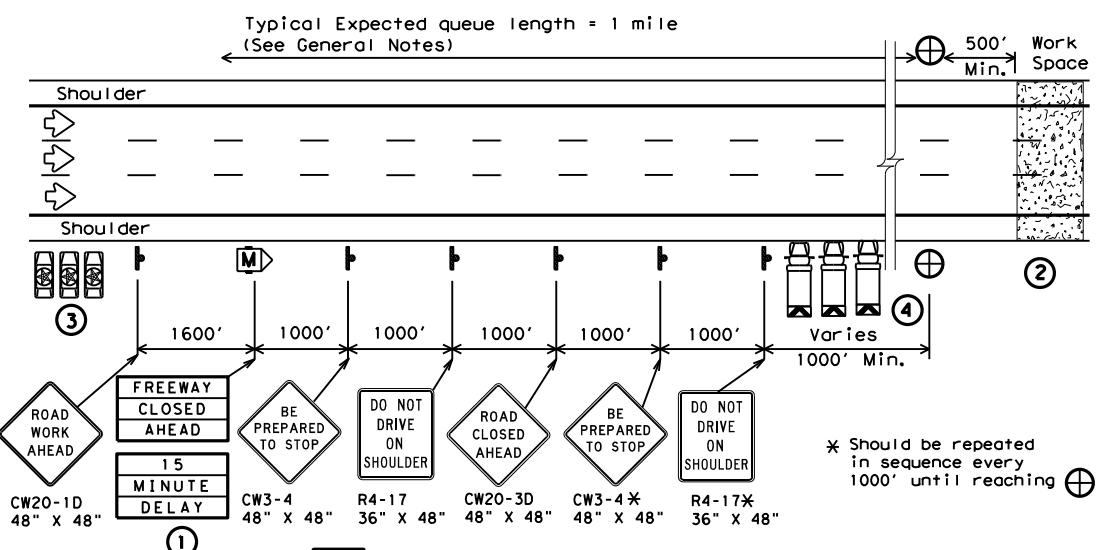
## TRAFFIC CONTROL PLAN FREEWAY CLOSURE

### TCP (6-6) - 12

FILE: tcp6-6.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	DAL	DENTON	71	

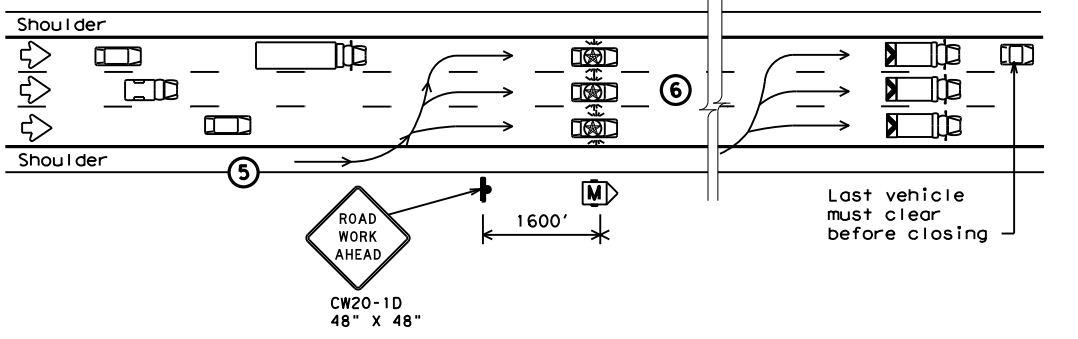


DATE: 9/4/2024 9:02:40 AM  
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 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for the accuracy of any information derived from this standard.  
 207



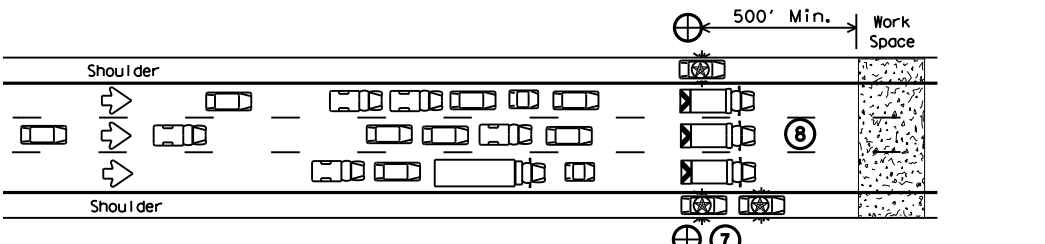
### 1 STARTING POSITION

- 1 Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.
- 2 Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.
- 3 There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.
- 4 One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



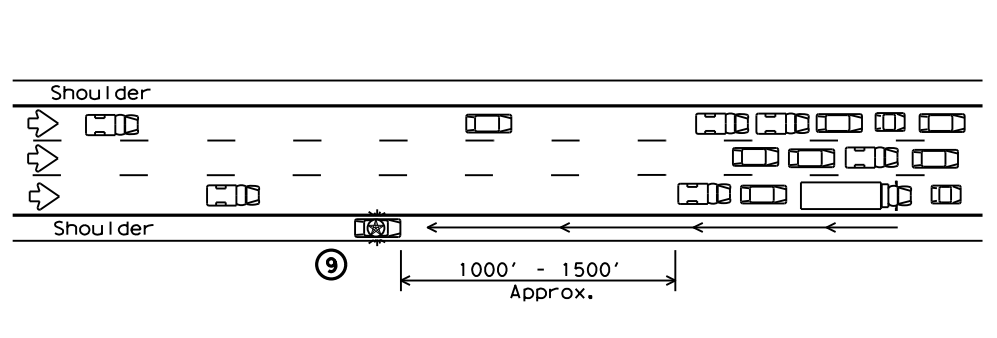
### 2 REDUCING SPEED OPERATION

- 5 Starting position of the LEOVs should be in advance of the most distant warning signs.
- 6 Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.



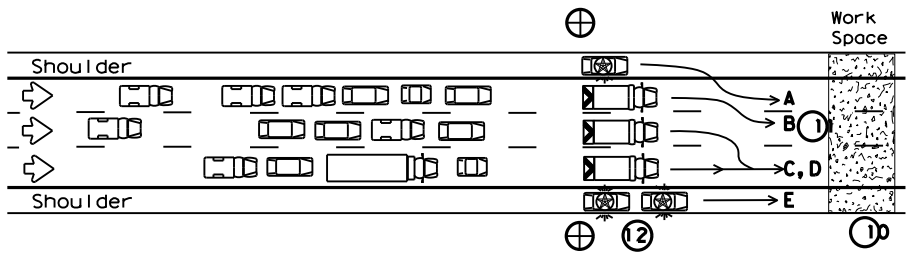
### 3 ALL TRAFFIC STOPPED AT CP

- 7 Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.
- 8 The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.



### 4 WARNING THE TRAFFIC QUEUE

- 9 The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed 1/4 mile or more in advance of the queue.



### 5 RELEASING STOPPED TRAFFIC

- 10 All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.
- 11 When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.
- 12 The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.
- 13 LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

LEGEND			
■	Channelizing Devices	⊕	Control Position (CP)
M	Portable Changeable Message Sign (PCMS)	⊠	Barrier Vehicle with Truck Mounted Attenuator
Ⓛ	Law Enforcement Officer's Vehicle (LEOV)	←	Traffic Flow

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

### GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.
2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.
3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9).
4. The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.
5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.
6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.
7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

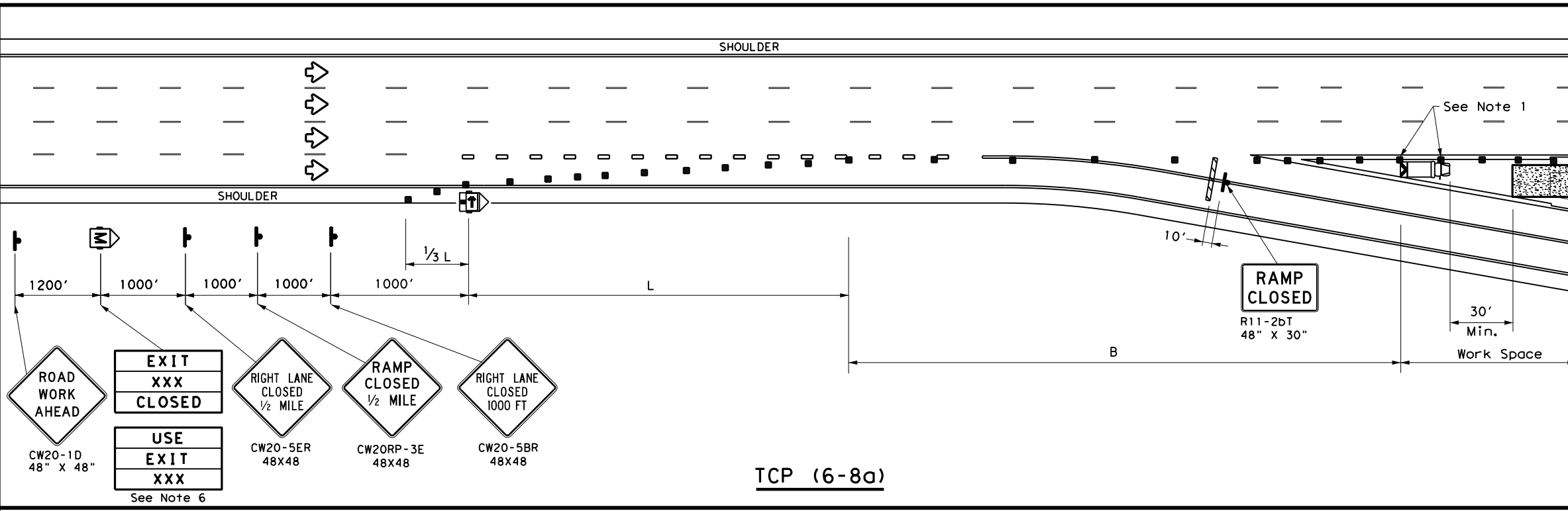
**Texas Department of Transportation**  
Traffic Operations Division Standard

## TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

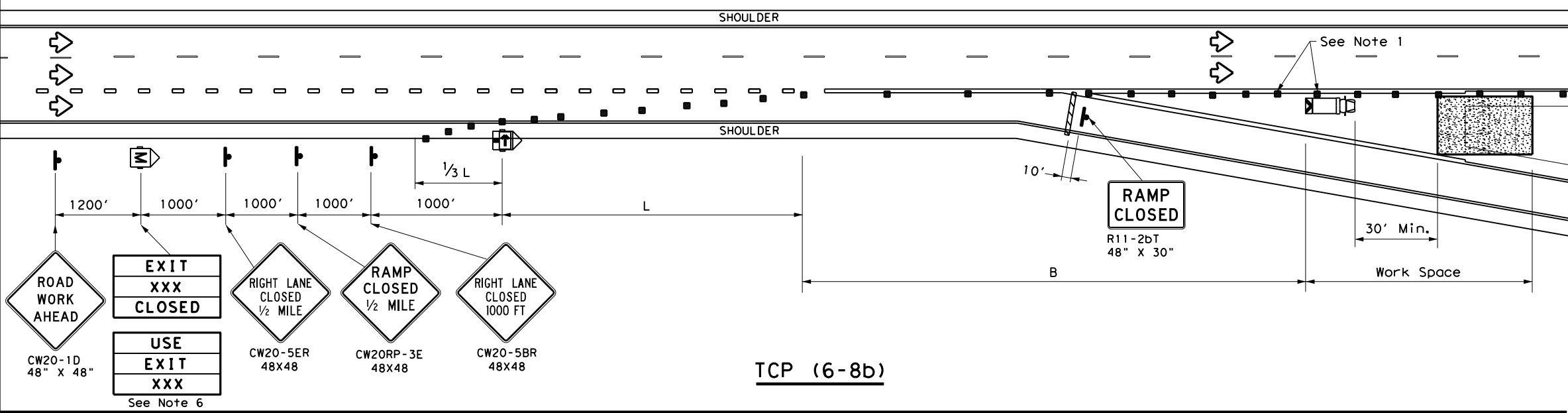
### TCP (6-7) - 12

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©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
REVISIONS		6469	61	001	IH0035W				
1-97	8-12	DIST	COUNTY	SHEET NO.					
4-98		DAL	DENTON	72					

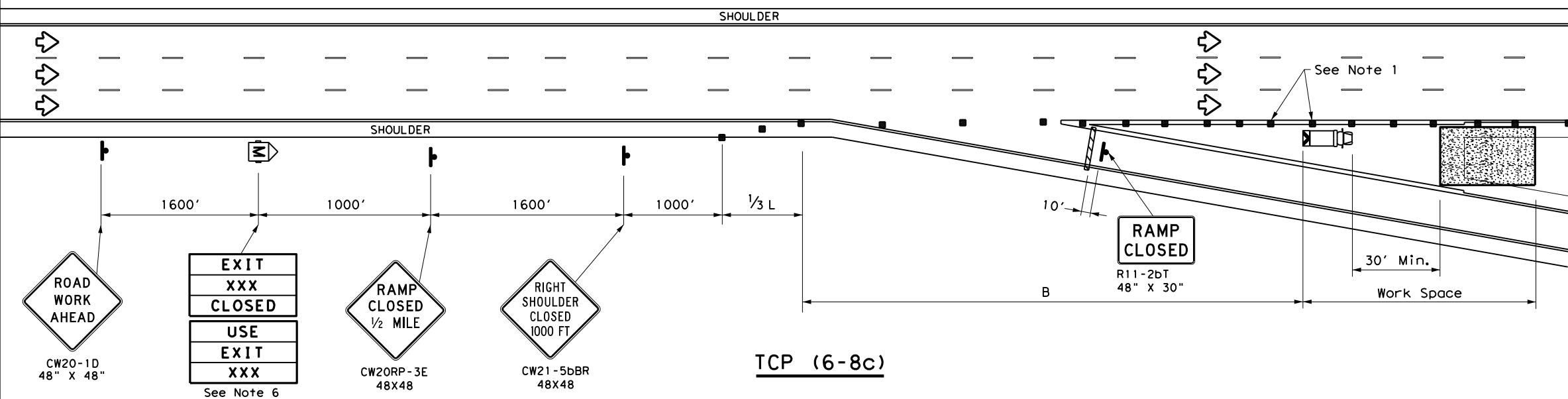
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TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

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

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

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

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

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

Texas Department of Transportation  
 Traffic Operations Division Standard

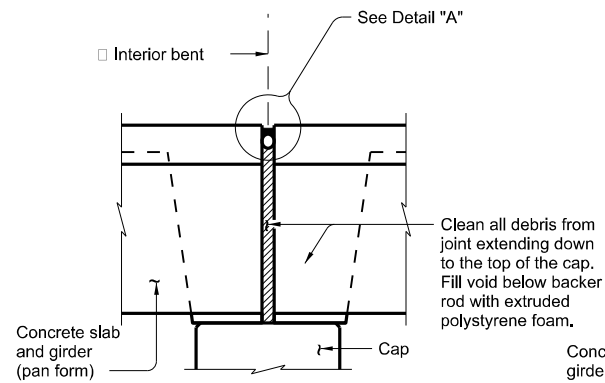
**WORK IN EXIT GORE FOR ADT GREATER THAN 10,000**

**TCP (6-8) - 14**

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	IH0035W
	DIST	COUNTY	SHEET NO.	
	DAL	DENTON	73	

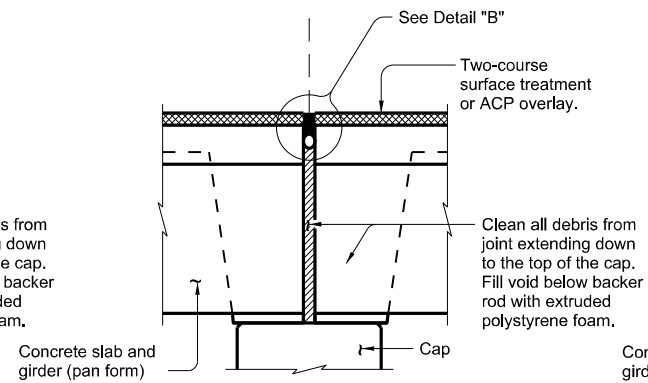
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DATE: 9/4/2024  
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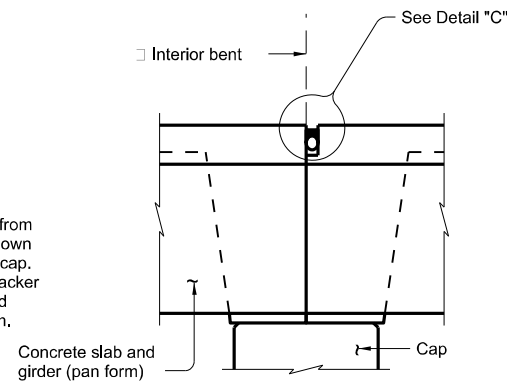
**JOINT WITH SILICONE SEAL**

(Used without ACP overlay)

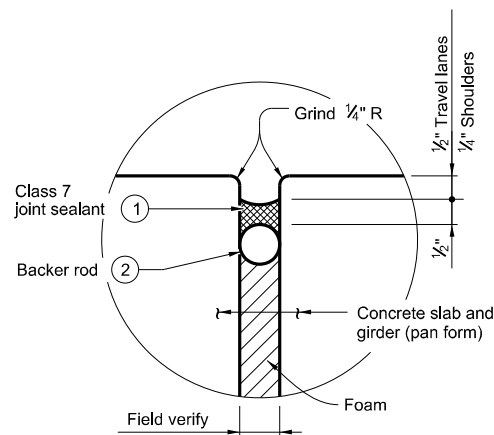


**JOINT W/ HOT-POURED RUBBER SEAL**

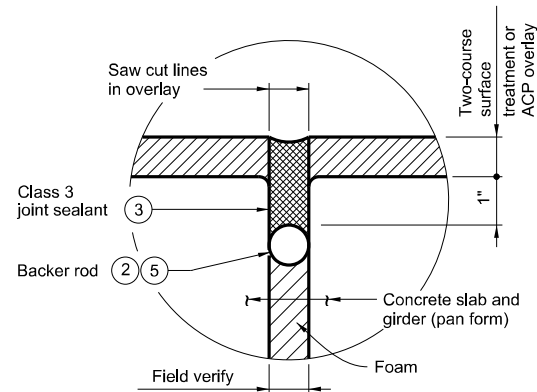
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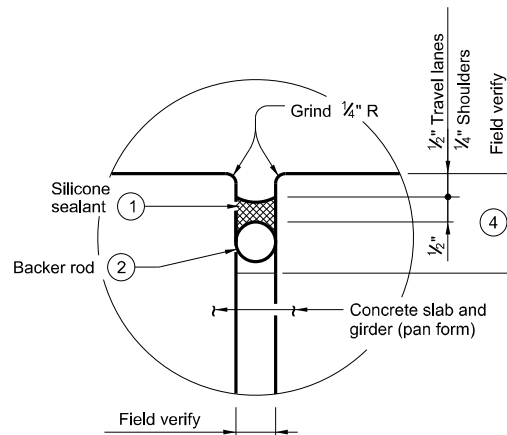
**FIXED JOINT**



**DETAIL "A"**



**DETAIL "B"**



**DETAIL "C"**

**PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH SILICONE SEAL:**

- 1) Clean joint opening of all existing expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Fill void with extruded polystyrene foam.
- 4) Place backer rod into joint opening 1" below the top of concrete.
- 5) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.

**PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH HOT POURED RUBBER SEAL:**

- 1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a 1/2" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Fill void with extruded polystyrene foam.
- 4) Place backer rod into joint opening 1" below the top of concrete.
- 5) Seal the joint opening with a Class 3 joint sealant. Seal flush to the top of the asphaltic concrete pavement.

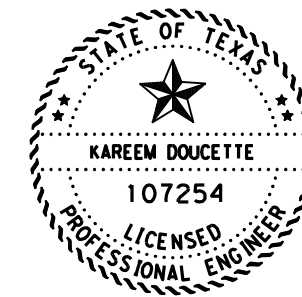
**PROCEDURE FOR CLEANING AND SEALING EXISTING FIXED JOINTS:**

- 1) Remove existing seal and debris from recess.
- 2) Abrasive blast clean existing surfaces where silicone seal is to be placed.
- 3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 4) Place backer rod into joint opening 1" below the top of concrete.
- 5) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.

- 1) Use Class 7 joint sealant. Prepare joint and seal in accordance with Item 438, "Cleaning and Sealing Joints."
- 2) Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- 3) Use Class 3 joint sealant. Prepare joint and seal in accordance with Item 438, "Cleaning and Sealing Joints."
- 4) Backer rod may be omitted if existing joint depth is less than 1 1/2".
- 5) Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

**GENERAL NOTES:**

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting asphalt overlay, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the linear foot. Obtain approval for all tools, equipment, materials and techniques proposed to clean and seal the joint. Provide Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay. Provide Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete. Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 joint sealant cannot be effectively placed in the vertical position, a Class 4 joint sealant compatible with the Class 7 joint sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with Manufacturer's specifications.



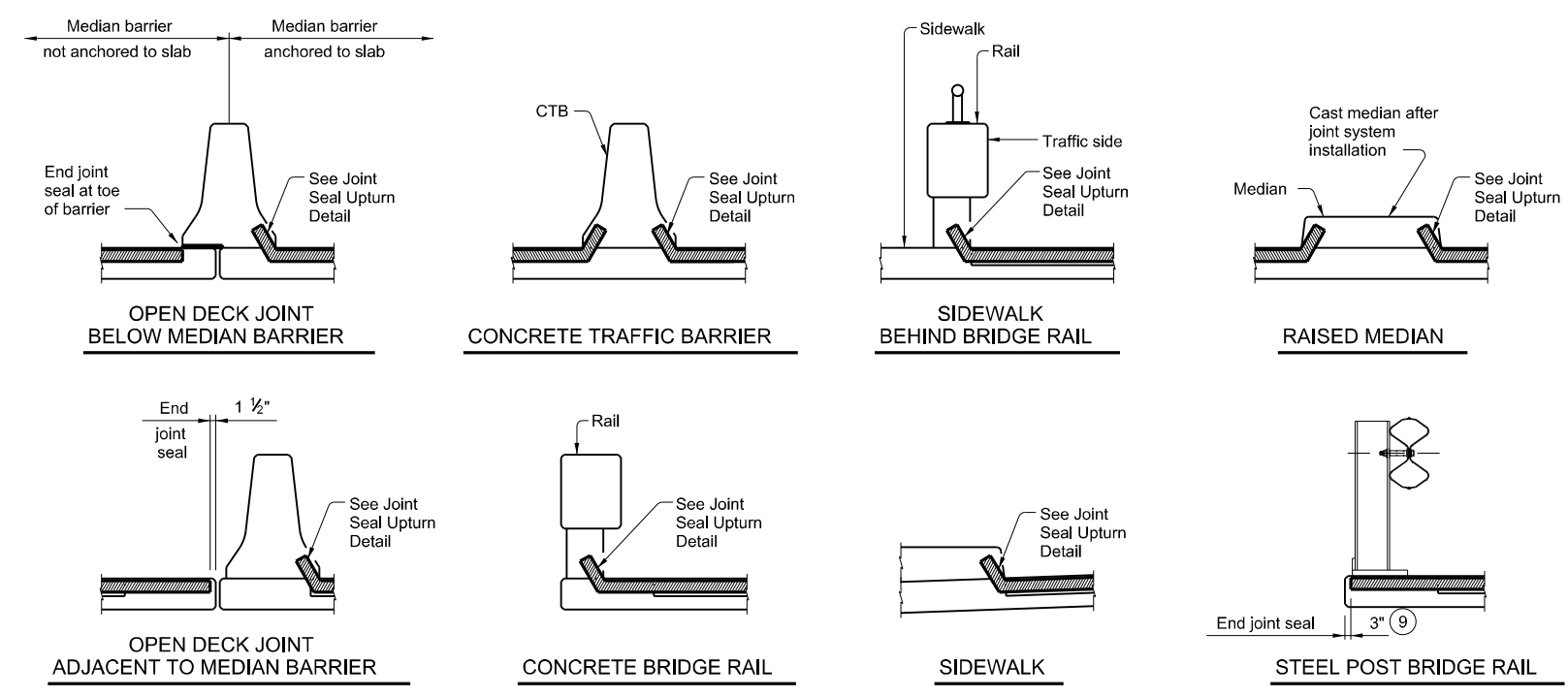
DocuSigned by:  
 Kareem Doucette 9/18/2024  
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SHEET 1 OF 2

<b>CLEANING AND SEALING EXISTING BRIDGE JOINTS</b> (PAN GIRDER BRIDGES) (Not to be used as a standard)				
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	6469	61	001	IH0035W
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		74

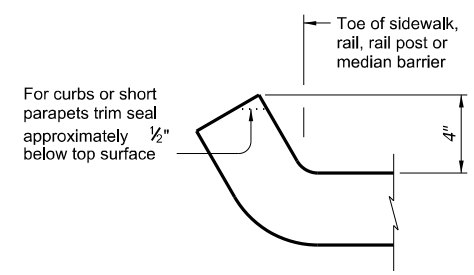
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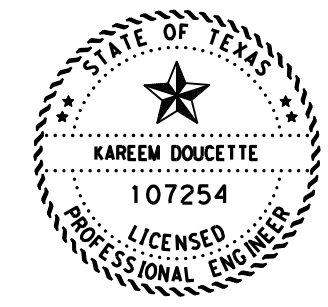


**JOINT SEALANT TERMINATION DETAILS**

(9) 1 1/2" for precompressed foam and silicone seal



**JOINT SEAL UPTURN DETAIL**



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*Kareem Doucette* 9/18/2024  
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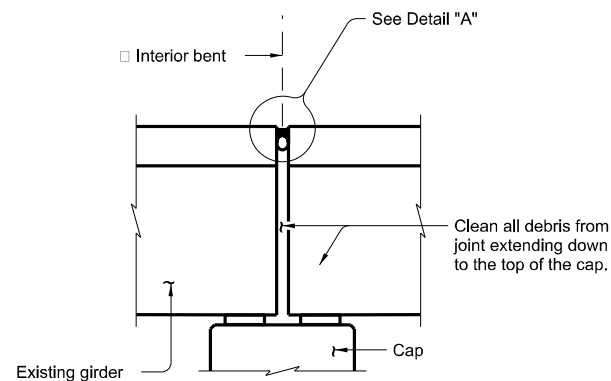
**CLEANING AND SEALING EXISTING BRIDGE JOINTS (PAN GIRDER BRIDGES)**

(Not to be used as a standard)

FILE:	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024 REVISIONS	CONT 6469	SECT 61	JOB 001	HIGHWAY IH0035W
	DIST DAL	COUNTY DENTON	SHEET NO. 75	

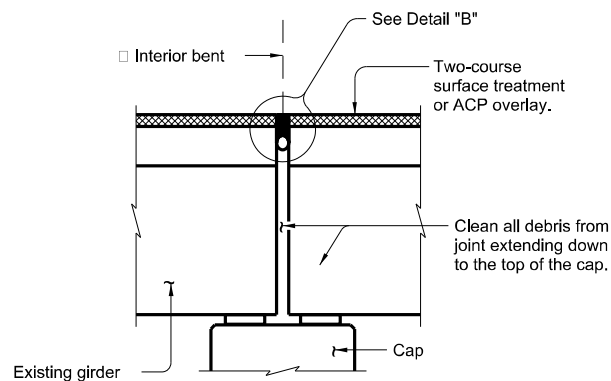
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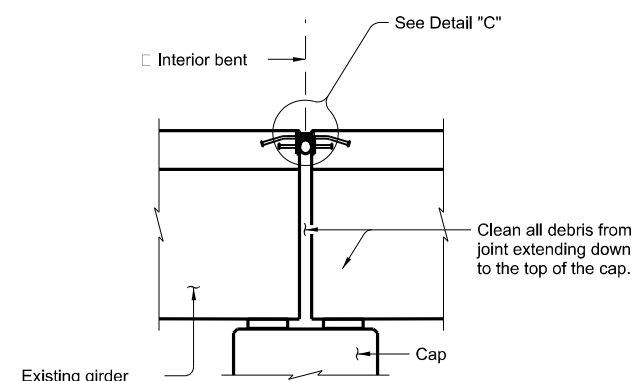
**JOINT WITH SILICONE SEAL**

(Used without ACP overlay)



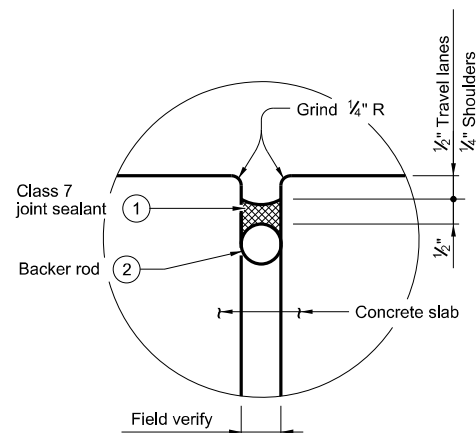
**JOINT W/ HOT-POURED RUBBER SEAL**

(Used with ACP overlay)

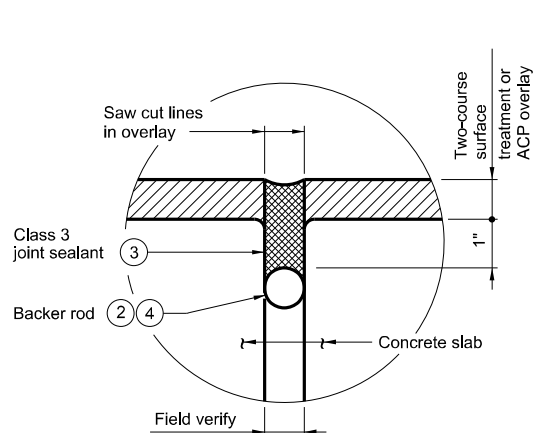


**ARMOR JOINT**

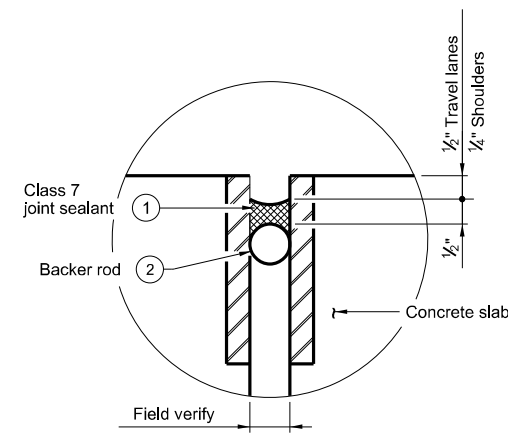
(Used without ACP overlay)



**DETAIL "A"**



**DETAIL "B"**



**DETAIL "C"**

(Stud anchors not shown for clarity.)

- 1 Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
- 2 Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- 3 Use Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
- 4 Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

**GENERAL NOTES:**

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting asphalt overlay, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the linear foot. Obtain approval for all tools, equipment, materials and techniques proposed to clean and seal the joint. Provide Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay. Provide Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete. Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 joint sealant cannot be effectively placed in the vertical position, a Class 4 joint sealant compatible with the Class 7 joint sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with Manufacturer's specifications.

SHEET 1 OF 3

<p><b>CLEANING AND SEALING EXISTING BRIDGE JOINTS</b></p> <p>(Not to be used as a standard)</p>				
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REVISIONS	6469	61	001	IH0035W
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		76

**PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH SILICONE SEAL:**

- 1) Clean joint opening of all existing expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 4) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.

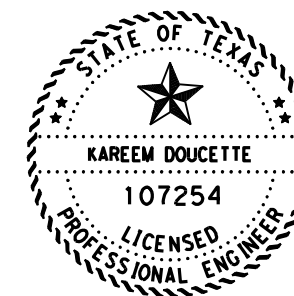
**PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH HOT-POURED RUBBER SEAL:**

- 1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a 1/2" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 4) Seal the joint opening with a Class 3 joint sealant. Seal flush to the top of the asphaltic concrete pavement.

**PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS:**

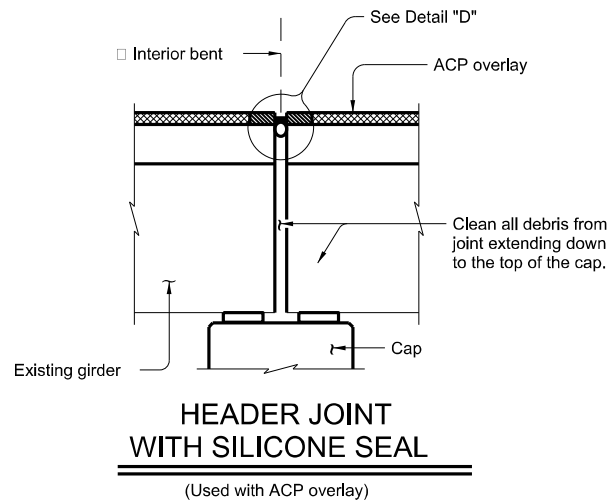
- 1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Abrasive blast clean existing steel surface where silicone seal is to be placed.
- 3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 4) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 5) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.

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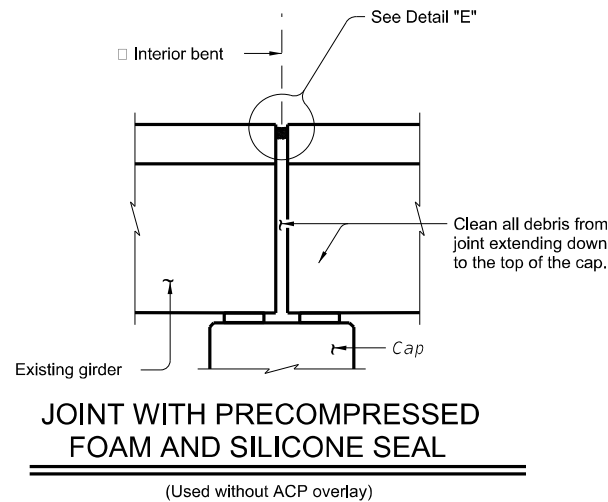


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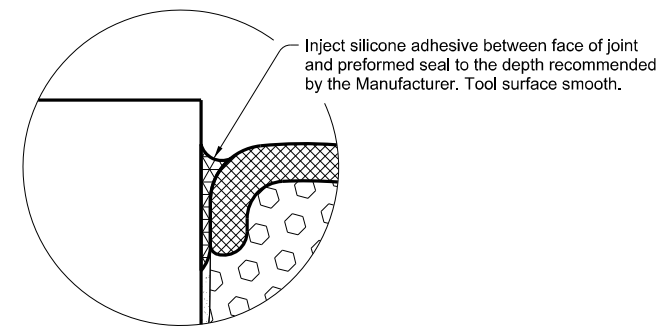
**HEADER JOINT WITH SILICONE SEAL**

(Used with ACP overlay)

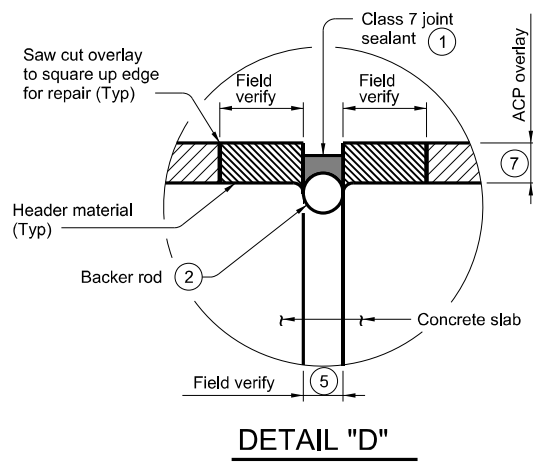


**JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL**

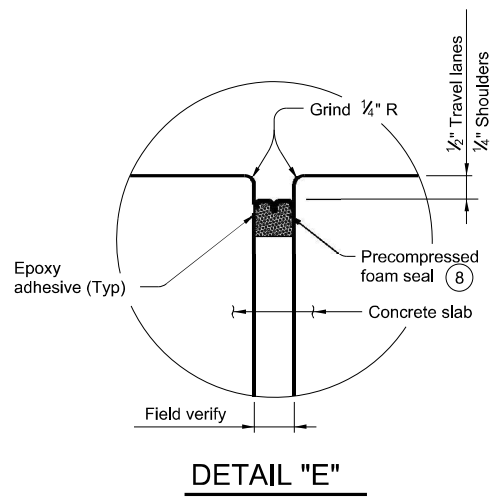
(Used without ACP overlay)



**SILICONE INJECTION**



**DETAIL "D"**



**DETAIL "E"**

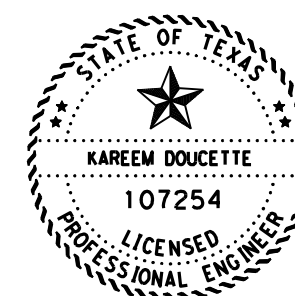
**PROCEDURE FOR CLEANING AND SEALING HEADER JOINT WITH SILICONE SEAL AND HEADER JOINT REPAIR (6)**

- 1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
- 2) Saw cut and remove damaged portions of existing header material to neat lines. Repair deck joint spalls greater than 2" deep in accordance with Item 785, "Bridge Joint Repair or Replacement." Shallower spalls may be filled with header material.
- 3) Clean the voided region of all materials that could inhibit the bond between header material and concrete or steel.
- 4) Form the joint opening to the required width and place header material to fill voided region. Repair header material in accordance with Item 785, "Bridge Joint Repair or Replacement."
- 5) Place backer rod into joint opening 1" below the top of header material. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 6) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of header in travel lanes and 1/4" below top of header in shoulders.

**PROCEDURE FOR CLEANING AND SEALING JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL**

- 1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." When sealing joints for slab spans, slab beam spans, pan girder spans, or box beam spans, fill void below proposed seal with extruded polystyrene foam.
- 2) Correctly size joint seal based on field measurement and in accordance with Manufacturer's specifications. Multiple seal widths may be required. Ensure proper seal is selected for each joint.
- 3) Abrasive blast clean existing joint surfaces where seal is to be applied.
- 4) Wipe down joint surfaces to remove contaminants.
- 5) Mask areas adjacent to joint opening sufficiently to keep epoxy off deck surface.
- 6) Apply epoxy to joint opening side surfaces.
- 7) While epoxy is still tacky, remove shrink wrap from seal and install in joint opening.
- 8) Recess top of joint seal 1/2" in travel lanes and 1/4" in shoulders.
- 9) Inject silicone adhesive along top interface of seal with joint side surface according to Manufacturer's recommendations. Tool to spread adhesive as necessary. See Silicone Injection detail.

- 1) Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
- 2) Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- 5) Match existing joint opening or set at a minimum:
  - a. 1" at 70°F when the distance between joints is 150 ft or less
  - b. 2" at 70°F when the distance between joints is greater than 150 ft.
  - c. As directed by the Engineer.
- 6) Cleaning and sealing existing header joints does not necessitate replacement of existing header material. If replacement of header material is necessary, as determined by the Engineer, use header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems." Match the thickness of the header material with the thickness of the overlay as shown in the plans, but do not exceed 3". Place header material flush with roadway surface. Do not cantilever header material over the joint opening. Repair of header material will be paid for in accordance with Item 785-6006, "Bridge Joint Repair (Header)."
- 7) Maximum thickness is 3".
- 8) See table of Approved Precompressed Foam Seal Manufacturers on Sheet 3 of 3.



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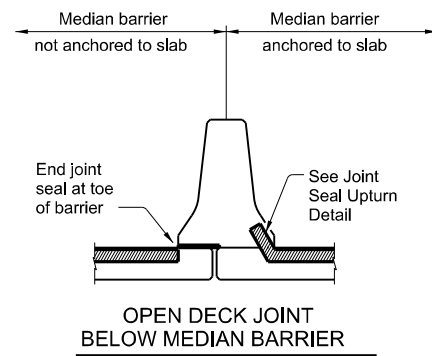
		Bridge Division	
<b>CLEANING AND SEALING EXISTING BRIDGE JOINTS</b>			
(Not to be used as a standard)			
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT	February 2024	CONTRACT NO. 6469	SECTION 61
REVISIONS		JOB NO. 001	HIGHWAY I-10035W
		DIST. COUNTY	SHEET NO.
		DAL DENTON	77



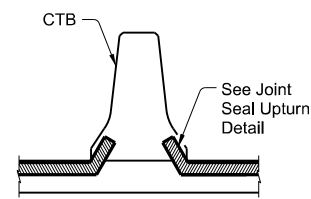
**APPROVED PRECOMPRESSED  
FOAM SEAL MANUFACTURERS**

MANUFACTURER	SEAL TYPE
Watson Bowman Acme	Wabo FS
SSI	Silspec SES
Sealite	Sealite 50N
EMSEAL	BEJS
TuffTex	RepJoint PF-UV

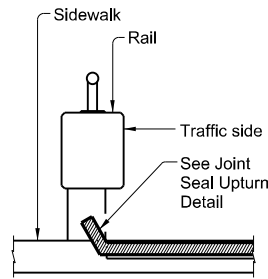
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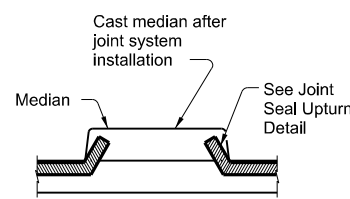
**OPEN DECK JOINT  
BELOW MEDIAN BARRIER**



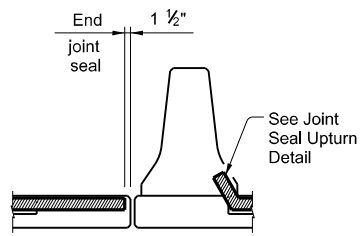
**CONCRETE TRAFFIC BARRIER**



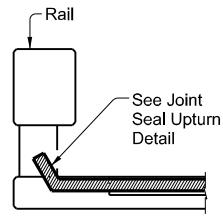
**SIDEWALK  
BEHIND BRIDGE RAIL**



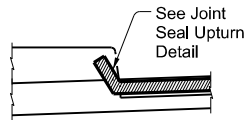
**RAISED MEDIAN**



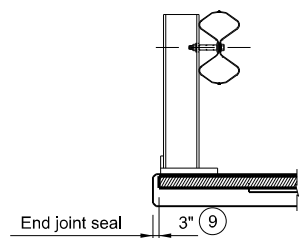
**OPEN DECK JOINT  
ADJACENT TO MEDIAN BARRIER**



**CONCRETE BRIDGE RAIL**



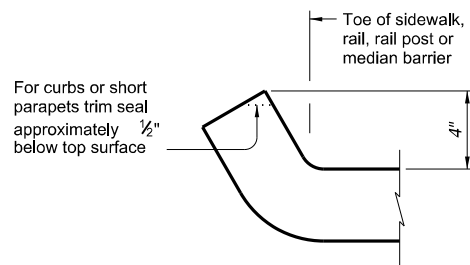
**SIDEWALK**



**STEEL POST BRIDGE RAIL**

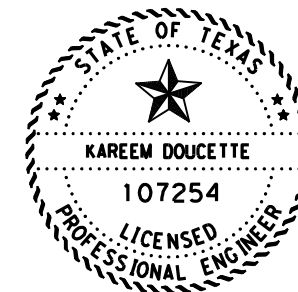
**JOINT SEALANT TERMINATION DETAILS**

⑨ 1 1/2" for precompressed foam and silicone seal



**JOINT SEAL UPTURN DETAIL**

DATE: 9/4/2024 9:43:27 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM FY 2025\BPM 6469-61-001 Cleaning and Sealing Joints\PLANS\76-78-WD-CSB-24 (2).dgn

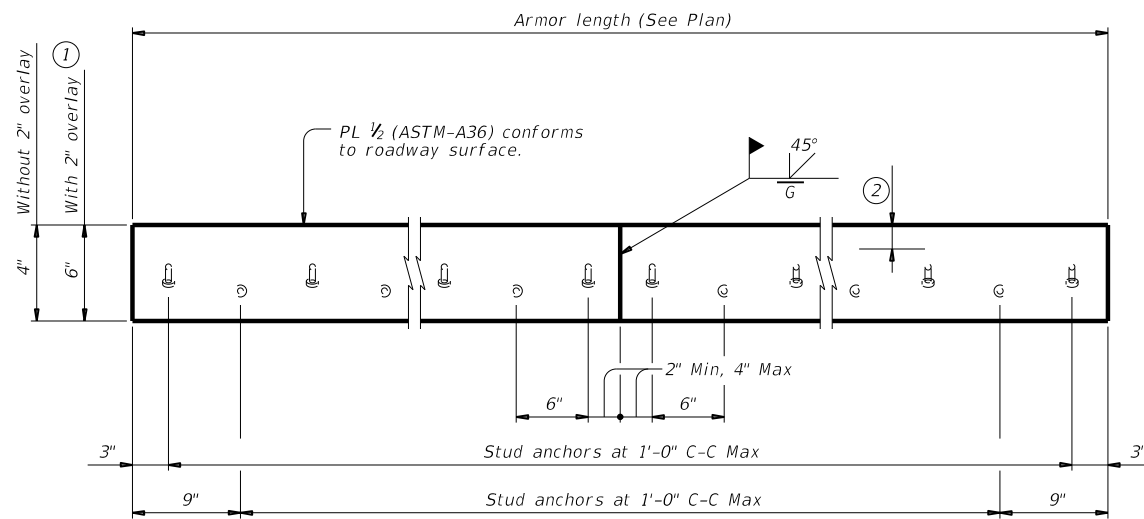
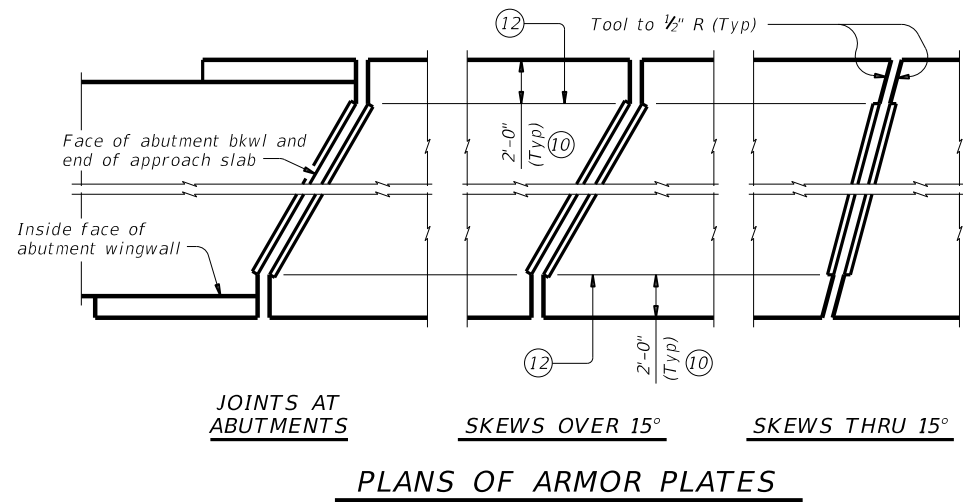


DocuSigned by:  
*Kareem Doucette* 9/18/2024  
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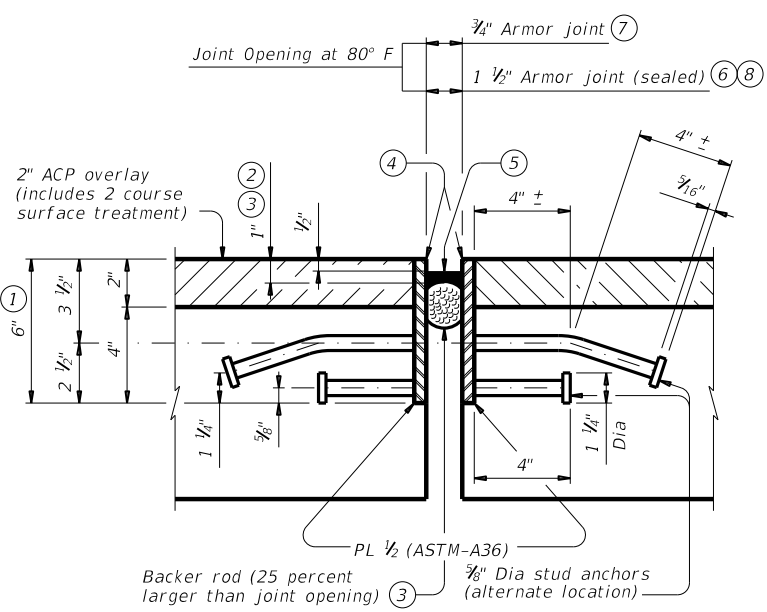
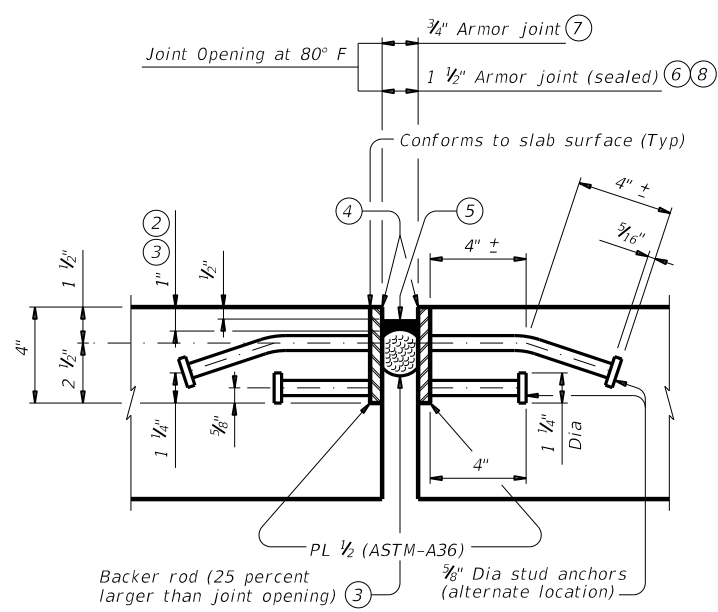
SHEET 3 OF 3

		Bridge Division	
<b>CLEANING AND SEALING EXISTING BRIDGE JOINTS</b>			
(Not to be used as a standard)			
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT February 2024	CONT: 6469	SECT: 61	JOB: 001
REVISIONS:	DIST: COUNTY		SHEET NO.
	DAL DENTON		78

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- ① Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each 1/2" variation in thickness.
- ② Do not paint top 1/2" of plate if using sealed armor joint.
- ③ Set top of backer rod 1" below top of armor plate. Backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ④ Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
- ⑤ Use Class 7 joint sealant that conforms to DMS-6310.
- ⑥ Place sealant while ambient temperature is between 55°F and 80°F and is rising.
- ⑦ Armor joint does not include joint sealant or backer rod.
- ⑧ Armor joint (sealed) includes Class 7 joint sealant and backer rod.
- ⑨ Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
- ⑩ Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
- ⑪ See "Plans of Armor Plates".
- ⑫ At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
- ⑬ Align shipping angle perpendicular to joint.

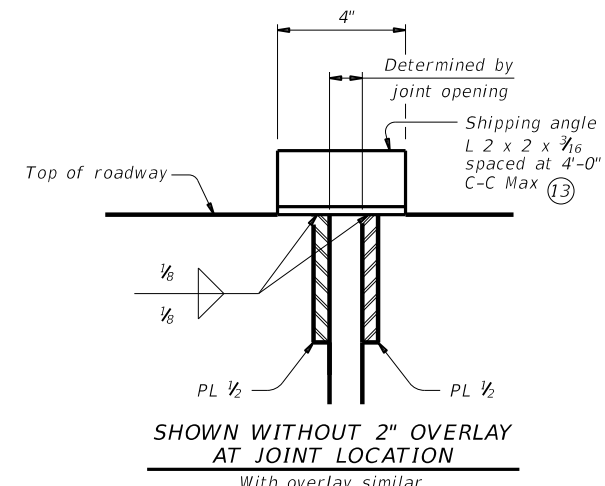
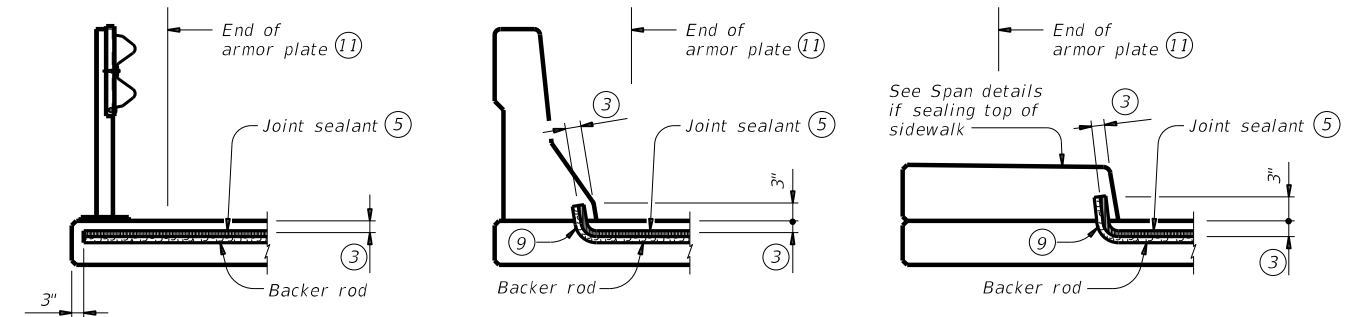


**FABRICATION NOTES:**  
 Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts.  
 Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.  
 Weld studs in accordance with AWS D1.1.  
 Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.  
 Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4.  
 Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

**CONSTRUCTION NOTES:**  
 Secure armor joints in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Armor Joint.  
 Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

**GENERAL NOTES:**  
 Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans.  
 These joint details accommodate a joint movement range of 1 3/8" ( 3/8" opening movement and 3/8" closure movement).  
 Payment for armor joint, with or without seal, is based on length of armor plate.

WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY ①	22.90 plf



Texas Department of Transportation  
 Bridge Division Standard

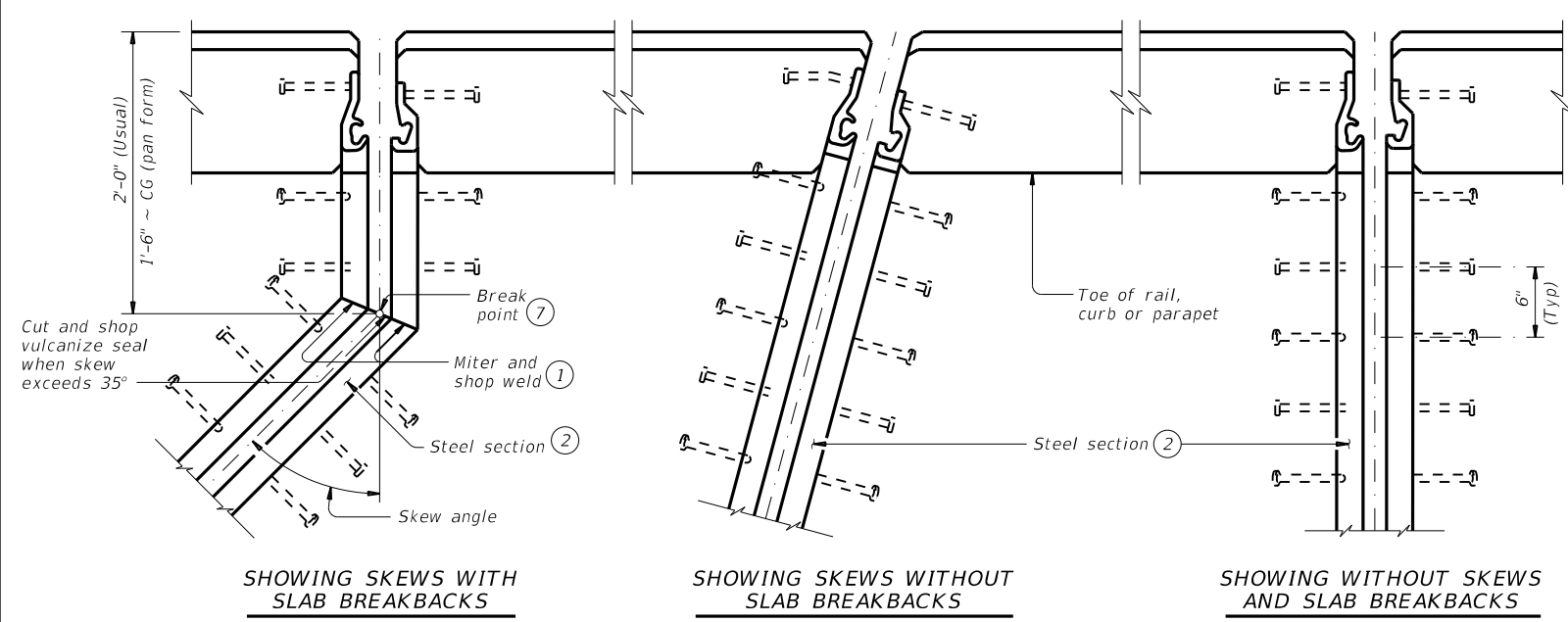
## ARMOR JOINT DETAILS

AJ

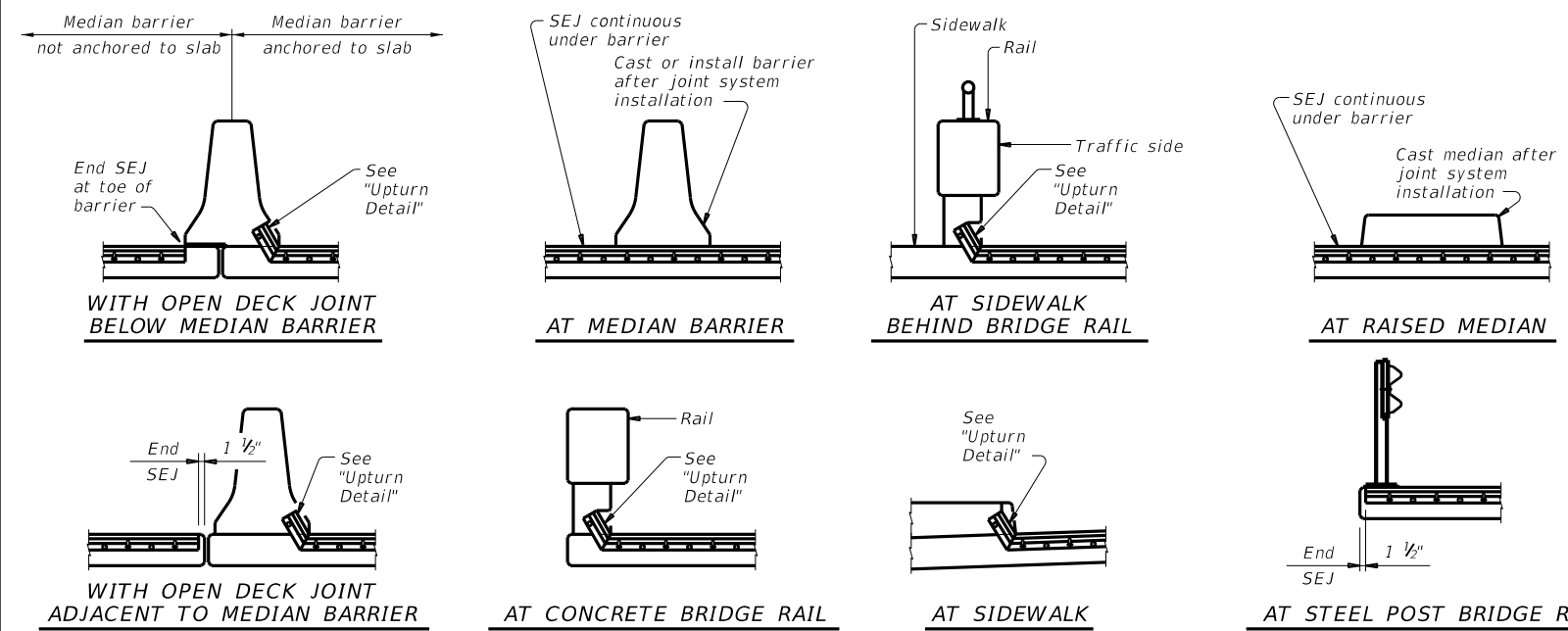
FILE: NS-AJ-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	61	001	1H0035W
	DIST	COUNTY	SHEET NO.	
	DAL	DENTON	79	

DATE: FILE:

DATE: 9/4/2024 9:02:49 AM  
 FILE: T:\DENMANT\Maint Projects\BPM\BPM.FY.2025\BPM.6469-61-001.Cleaning and Sealing Joints\PLANS\80-MS-SEJ-M-19.dgn  
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**PLANS OF END CONDITIONS**



**TYPICAL SECTIONS**

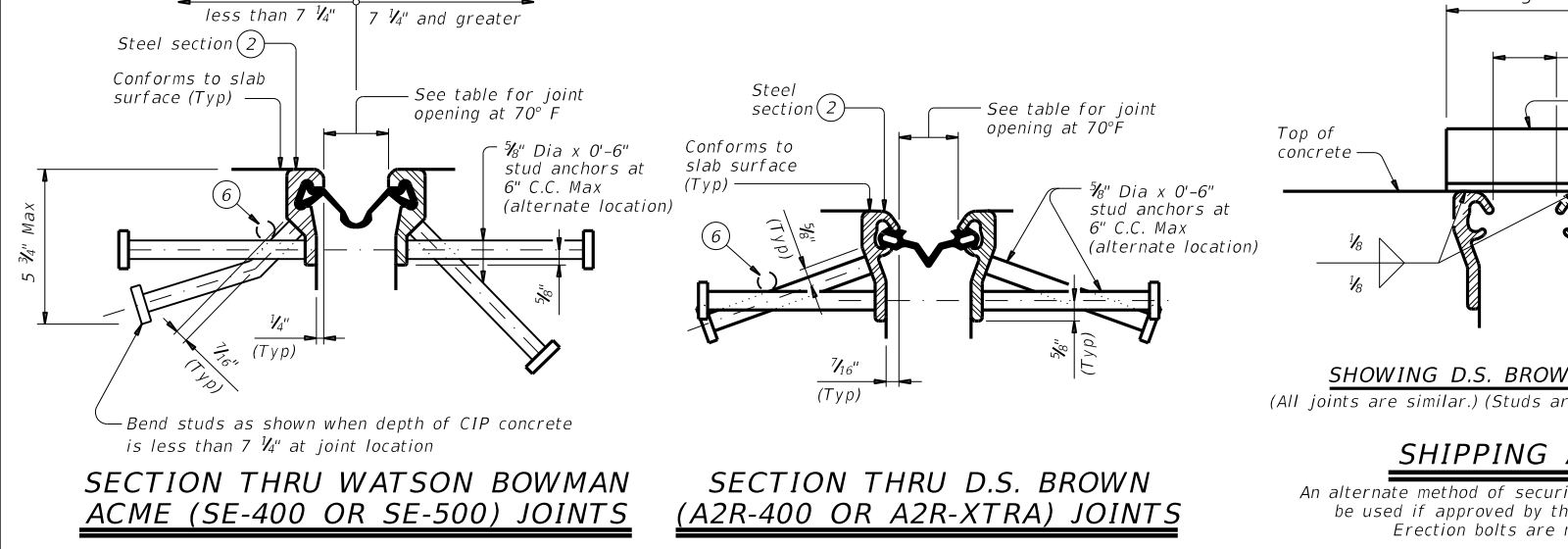
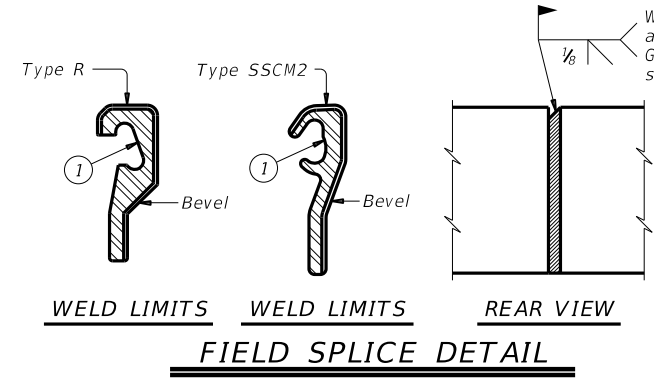


TABLE OF SEALED EXPANSION JOINT INFORMATION					
MANUFACTURER	STEEL SECTION ②	STRIP SEAL			
		4" JOINT		5" JOINT	
Seal Type	Joint Opening ③	Seal Type	Joint Opening ③		
D.S. Brown	Type SSCM2	A2R-400	1 3/4"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 3/4"	SE-500	2"

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

**DESIGN NOTES:**  
 Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations. For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

- Remove all burrs which will be in contact with seal prior to making splice.
- Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
- These openings are also the recommended minimum installation openings.
- Reduce for sidewalk or parapet heights less than 6".
- Other conditions affecting the joint profile should be noted elsewhere.
- Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
- See Span details for location of break point.
- Align shipping angle perpendicular to joint.



**FABRICATION NOTES:**  
 Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint. Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

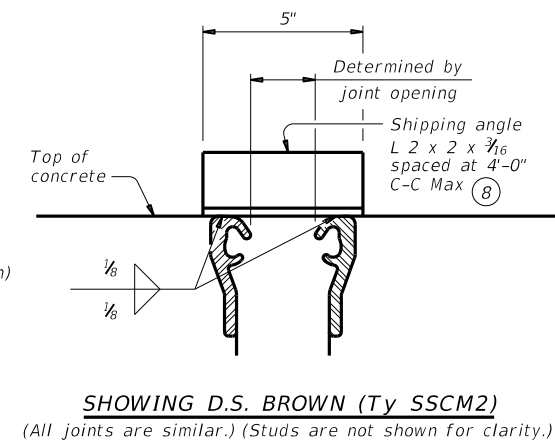
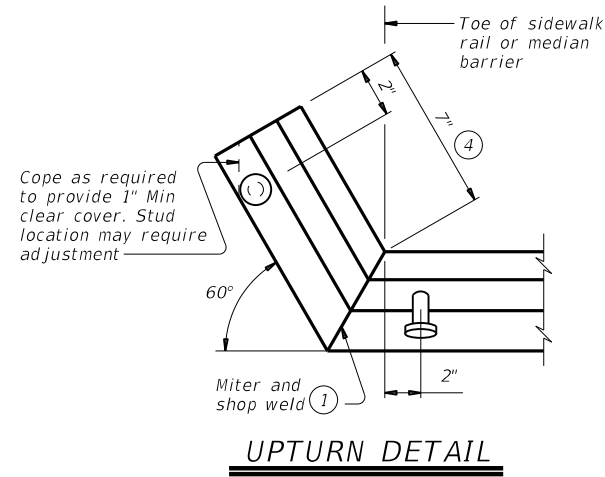
Weld studs in accordance with AWS D1.1. Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Field Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.7.3 and 446.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

**CONSTRUCTION NOTES:**  
 Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint. Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint. Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

**GENERAL NOTES:**  
 Provide sealed expansion joints in the size and at locations shown on the plans. Minimum slab and overhang thickness required for the use of SEJ-M is 6 1/2".

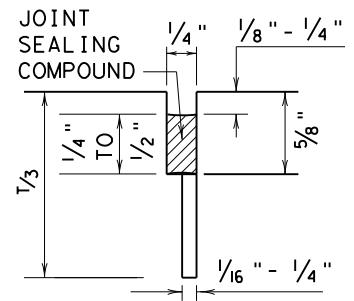


**SHIPPING ANGLE**  
 An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

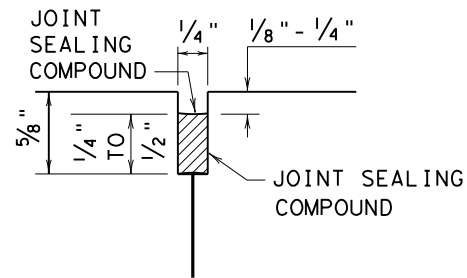
		<b>Bridge Division Standard</b>	
<b>SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY</b>			
<b>SEJ-M</b>			
FILE:	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT	APRIL 2019	CONTRACT NO. 6469 61	JOB NO. 001
REVISIONS		HIGHWAY	1H0035W
DIST.	COUNTY	SHEET NO.	
DAL	DENTON	80	

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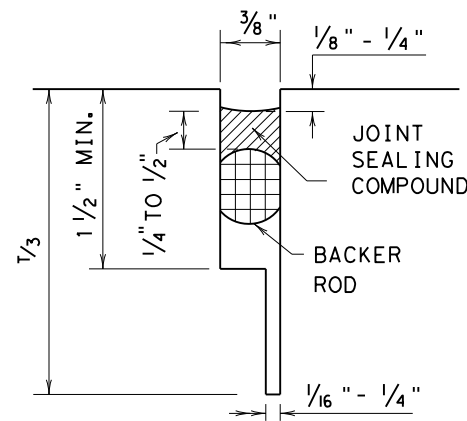
### METHOD B: JOINT SEALING COMPOUND



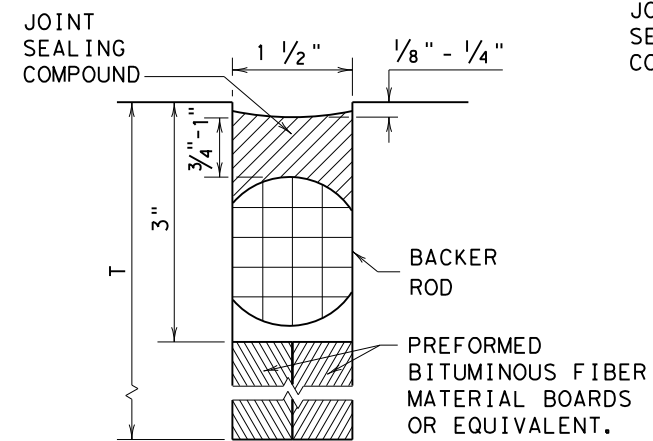
LONGITUDINAL SAWED CONTRACTION JOINT



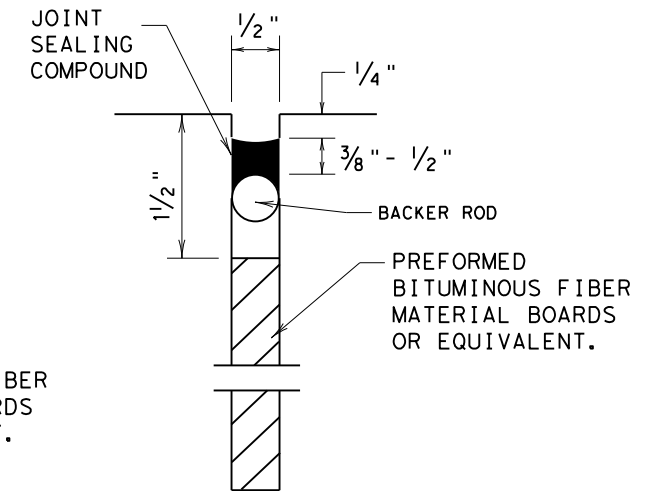
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

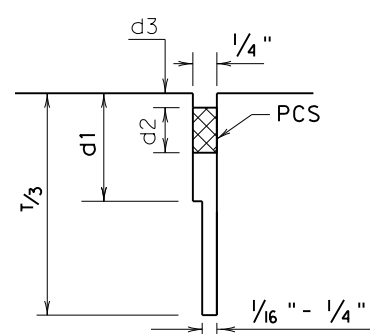


TRANSVERSE FORMED EXPANSION JOINT

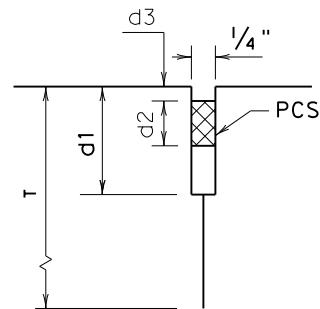


FORMED ISOLATION JOINT

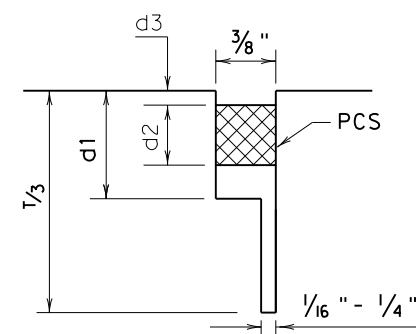
### METHOD A: PREFORMED COMPRESSION SEALS (PCS) (DMS-6310 CLASS 6)



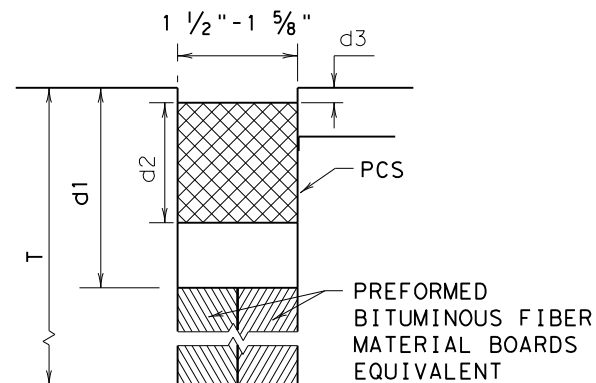
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

### GENERAL NOTES

- UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
- THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
- THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
- DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
- REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
- FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
- FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4, 5, 7, OR 8 FOR MAINTAINING EXISTING JOINTS.
- THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
- ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

DATE:  
FILE:

		Design Division Standard	
<b>CONCRETE PAVING DETAILS</b> <b>JOINT SEALS</b> <b>JS-14</b>			
FILE: js14.dgn	DN: TxDOT	DN: HC	CK: AN
© TxDOT: DECEMBER 2014	CONT	SECT	HIGHWAY
REVISIONS	6469	61	001
DIST	COUNTY		SHEET NO.
DAL	DENTON		81