FED.RD. DIV.NO.	STATE PROJECT NO.		SHEET NO.
6	SFPNS		1
STATE	STATE DIST.	COUNTY	
TEXAS	AMA	POTTER, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6461	70	001	VARIES

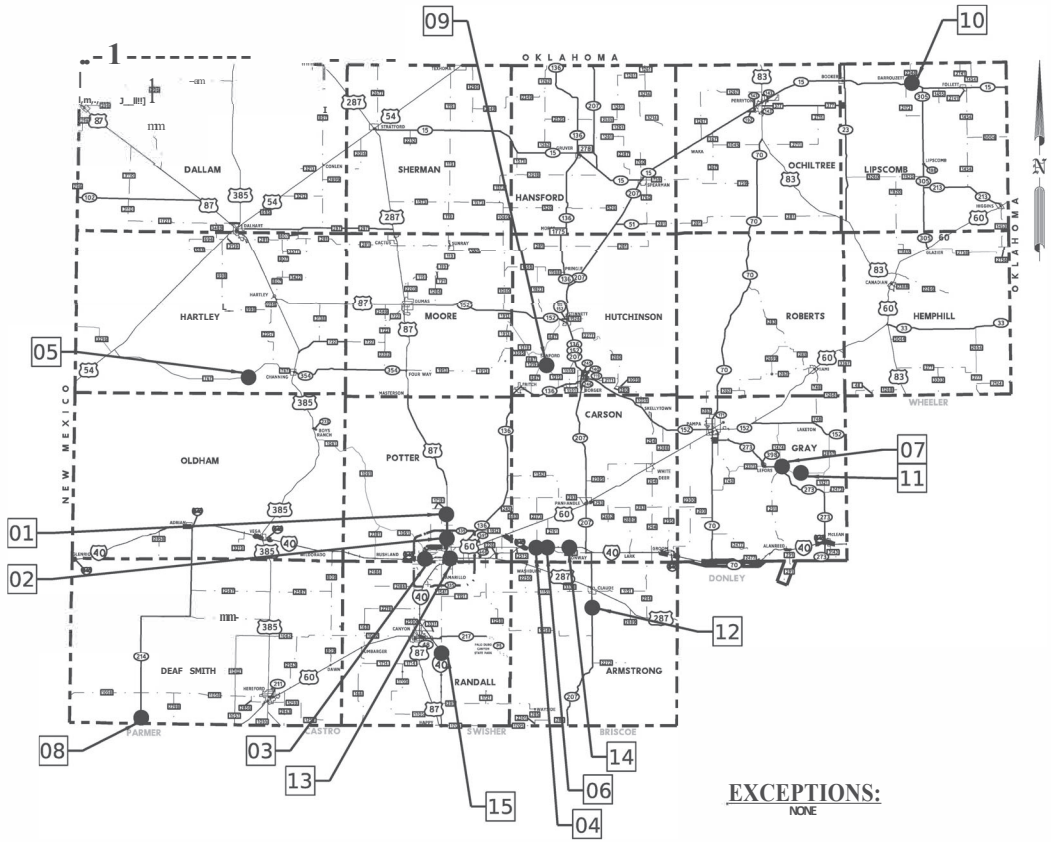
STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION
==========::J O C==========-

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
STATE PROJECT: SFPNS
HIGHWAY - VARIES
POTTER, ETC COUNTY

RMC: 6461-70-001
FOR THE CONSTRUCTION OF BRIDGE REPAIR TYPE WORK

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS



LOCATION SUMMARY				
LOCATION	COUNTY	NBI NUMBER	ROADWAY	CROSSING
REF01	POTTER	04-188-0-0041-07-093	MOBLEY AVE	US87
REF02	POTTER	04-188-0-0041-07-083	SL434	US87
REF03	POTTER	04-188-0-0275-01-177	BELL ST	IH40
	POTTER	04-188-0-0275-01-160	TURNAROUND	IH40
REF04	CARSON	04-033-0-0275-02-186	RM 2373	IH40
REF05	HARTLEY	04-104-0-1108-01-004	FM767	PUNTA DE AGUA
REF06	CARSON	04-033-0-0275-02-053	RM 2161	IH40
REF07	GRAY	04-091-0-1861-02-011	RM 1321	CABIN CREEK
REF08	DEAF SMITH	04-059-0-1491-02-004	SH214	TIERRA BLANCA CREEK
REF09	HUTCHINSON	04-118-0-2437-01-003	RM 1319	ANTELOPE CREEK
REF 10	LIPSCOMB	04-148-0-0355-01-019	SH 15	PLUMMER CREEK
REF 11	GRAY	04-091-0-1861-02-015	RM 1321	SANDCREEK
REF 12	ARMSTRONG	04-006-0-0357-03-002	SH207	MULBERRY CREEK
REF 13	POTTER	04-188-0-0275-01-019	CULVERT	IH40
REF 14	CARSON	04-033-0-0275-03-056	CRK	IH40
REF 15	RANDALL	04-191-0-0067-17-108	CEMETERY RD	IH27

EXCEPTIONS:
NONE

RAILROADS:
NONE

EQUATIONS:
NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000-008).

Texas Department of Transportation

RECOMMENDED FOR LETTING: DATE: 10/17/2024

Signed by: Zachary Mayer
3719DE174B2A4C6...
AREA ENGINEER

DATE: 10/17/2024

DocuSigned by: Wes Kimmell
4091D73729A34DC...
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: DATE: 10/18/2024

DocuSigned by: Blair Johnson
8B80E3AEB2BC43A...
DISTRICT ENGINEER

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	GENERAL NOTES
4	ESTIMATE & QUANTITY
5	PROJECT SUMMARIES
	TRAFFIC CONTROL PLAN STANDARDS
6-17	BC(1)-21 THRU BC(12)-21
18-22	TCP(1-1)-18 THRU TCP(1-5)-18
23-24	TCP(2-1)-18 THRU TCP(2-2)-18
25	TCP(2-3)-23
26-28	TCP(2-4)-18 THRU TCP(2-6)-18
29-30	TCP(3-1)-13 THRU TCP(3-2)-13
31	TCP(3-3)-14
32	TCP(3-4)-13
33-39	TCP(6-1)-12 THRU TCP(6-7)-12
40-41	TCP(6-8)-14 THRU TCP(6-9)-14
42	TCP(7-1)-13
43	WZ(RCD)-13
44	WZ(RS)-22
45	WZ(STPM)-23
46	WZ(TD)-17
	ROADWAY STANDARDS
47	CCCG-22
	BRIDGE DETAILS
48	WATERPROOFING DETAILS
49-51	BRIDGE JOINT DETAILS
52	BRIDGE JOINT SUMMARY
53	MOBLEY AVE AT US 87 QUANTITY SUMMARY
54	MOBLEY AVE AT US 87 TYPICAL SECTIONS
55	MOBLEY AVE AT US 87 BRIDGE REPAIR DETAIL
56	SL 434 AT US 87 QUANTITY SUMMARY
57	SL 434 AT US 87 TYPICAL SECTIONS
58	SL 434 AT US 87 BRIDGE REPAIR DETAIL
59	BELL ST AT IH 40 QUANTITY SUMMARY
60	BELL ST AT IH 40 TCP NARRATIVE
61	BELL ST DETOUR LAYOUT
62	BELL ST AT IH 40 TYPICAL SECTIONS
63	BELL ST AT IH 40 BRIDGE REPAIR DETAIL
64	TURN AROUND AT IH 40 BRIDGE REPAIR DETAIL
65	FM 2373 AT IH 40 QUANTITY SUMMARY
66	FM 2373 AT IH 40 TYPICAL SECTIONS
67	FM 2373 AT IH 40 BRIDGE REPAIR DETAIL
68	FM 767 AT PUNTA DE AGUA QUANTITY SUMMARY
69	FM 767 AT PUNTA DE AGUA TYPICAL SECTIONS
70	FM 767 AT PUNTA DE AGUA BRIDGE REPAIR DETAIL
71	FM 2161 AT IH 40 QUANTITY SUMMARY
72	FM 2161 AT IH 40 TYPIICAL SECTIONS
73	FM 2161 AT IH 40 BRIDGE REPAIR DETAIL
74	RM 1321 AT CABIN CREEK QUANTITY SUMMARY
75	RM 1321 AT CABIN CREEK TYPICAL SECTIONS
76	RM 1321 AT CABIN CREEK BRIDGE REPAIR DETAIL
77	RM 1321 AT CABIN CREEK PILE ENCASEMENT DETAILS
78	SH 214 AT TIERRA BLANCA CREEK QUANTITY SUMMARY
79	SH 214 AT TIERRA BLANCA CREEK TYPICAL SECTIONS
80	SH 214 AT TIERRA BLANCA CREEK BRIDGE REPAIR DETAIL
81	RM 1319 AT ANTELOPE CREEK QUANTITY SUMMARY
82	RM 1319 AT ANTELOPE CREEK TYPICAL SECTIONS
83	RM 1319 AT ANTELOPE CREEK BRIDGE REPAIR DETAIL
84	RM 1319 AT ANTELOPE CREEK PILE ENCASEMENT DETAILS
85	SH 15 AT PLUMMER CREEK QUANTITY SUMMARY
86	SH 15 AT PLUMMER CREEK TYPICAL SECTIONS
87	SH 15 AT PLUMMER CREEK BRIDGE REPAIR DETAIL
88	RM 1321 AT SAND CREEK QUANTITY SUMMARY
89	RM 1321 AT SAND CREEK TYPICAL SECTIONS
90	RM 1321 AT SAND CREEK BRIDGE REPAIR DETAIL
91	SH 207 AT MULBERRY CREEK QUANTITY SUMMARY
92	SH 207 AT MULBERRY CREEK BRIDGE REPAIR DETAIL
93	IH 40 CULVERT CROSSING QUANTITY SUMMARY
94	IH 40 CULVERT CROSSING INLET REPAIR DETAIL
95	IH 40 CULVERT CROSSING OUTFALL REPAIR DETAIL
96	IH 40 CULVERT CROSSING RIPRAP DETAIL
97	IH 40 CULVERT CROSSING GABION TYPICAL SECTION
98	CR K AT IH 40 QUANTITY SUMMARY
99	CR K AT IH 40 TYPICAL SECTIONS
100	CR K AT IH 40 BRIDGE REPAIR DETAIL
101	CEMETERY RD AT IH 27 QUANTITY SUMMARY
102	CEMETERY RD AT IH 27 TYPICAL SECTIONS
103-104	CEMETERY RD AT IH 27 BRIDGE REPAIR DETAIL
105	CEMETERY RD AT IH 27 RAIL TRANSITION DETAIL
	BRIDGE STANDARDS
106	CRR
107-108	TYPE T221
109	TRF
	PAVMENT MARKING STANDARDS
110-112	PM(1)-22 THRU PM(3)-22
113-117	FPM(1)-22 THRU FPM(5)-22

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

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED PROFESSIONAL ENGINEER

09-12-2024

AMA FY 25 BPM

INDEX OF SHEETS

Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		2

DATE: 9/12/2024 9:56:45 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMX4 - DesignPlan Set\1. General\INDEX OF SHEETS.dgn

County: POTTER

Highway: VARIES

Sheet: 3

RMC: 6461-70-001

GENERAL NOTES

General

Q&A on Proposal or Contractor questions on this project are to be addressed to the Amarillo AE office navigate to:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

Use 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 of the project you want to view the Q&A for and click on the link in the window that pops up.

All manufactured material used on the project must come from MPL located here:
https://www.txdot.gov/business/resources/materials/material-producer-list.html
Alternate materials are noted in this contract.

There are no "reference markers" within the project limits.

See Railroad Scope of Work sheet for insurance and/or other requirements.

Remove all excess material from bridge substructure resulting from all construction including planing, seal coat and ACP overlays. This work will not be paid for directly, but will be considered subsidiary to various bid items in the contract.

If portions of the right-of-way is used to store materials, equipment, and other uses with the approval of the Engineer, materials, equipment, etc., must either be located outside the 30 feet traffic safety clearance zone or be adequately protected.

Contractor facilities, such as asphalt plants, concrete plants, rock crushers, etc. are not allowed to be located within Department right of way.

Do not store any equipment or material under any bridge.

Dust caused by construction operations is to be controlled by applying water in conformance with the requirements of Item 204, "Sprinkling". Sprinkling for dust control will not be paid for directly, but will be considered as subsidiary work to the various bid items.

Any work necessary to provide temporary ingress and egress during construction (such as building gravel ramps, etc.) Will not be paid for directly, but will be considered as subsidiary work to the various bid items.

Item 6 Control of Materials

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

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

Item 7 Legal Relations and Responsibilities

Lane closures during the following key dates and/or special events are prohibited:

Mobley Ave at US 87 no work or lane closure on top of bridge will be permitted during school days.

FM 2373 at IH 40 no lane closure will be permitted before 8:00 AM due to traffic access to Pantex.

Special Event	City/Location	Highway/Ref #	Start Date	End Date
SCHOOL	AMARILLO	MOBLEY AVE AT US 87	School Start Weekday	School End Weekend

Item 427 Surface Finishes for Concrete

Allowable substitutes for TY X waterproofing materials include:

- Macropoxy® 646 Fast Cure | Protective & Marine Coatings (sherwin-williams.com). Two coats at maximum coverage rate of 200 SF/Gal per coat
- Si-Prime + Si-Rex03 - Klaas Coatings North America (klaascoatings-northamerica.com). One coat of Si-Prime at maximum coverage rate of 200 SF/Gal and two coats Si-Rex03 at maximum coverage rate of 300 SF/Gal per coat
- Sikagard®-550 W Elastic (G) | Concrete Protection. Two coats at maximum coverage rate of 100 SF/Gal per coat
- Loxon® XP LX11-50 Series | Waterproofing Masonry Coating-Flat | Sherwin Williams. Two coats at maximum coverage rate of 100 SF/Gal per coat

Item 432 Riprap

All concrete riprap in contact with bridge abutments is to have joints made with a 6" fiber expansion joint material and be sealed with a joint sealer as approved by the Engineer. Afterward, use Cap Option A with 20 GA metal flashing for concrete riprap in contact with the abutment and wingwalls.

24" tie bars (#3 bars at 18" c-c) are to be used across all construction joints. Tie bars should be 12'' into each side of the construction joint. When tying new riprap into existing riprap drill and epoxy grout 8" minimum into existing concrete. This is to be considered subsidiary to the payment for riprap.

Item 439 Bridge Deck Overlays

Mask existing joints and deck drains.

Traffic will not be allowed to drive on the bridge deck once the surface has been prepared for the overlay and cannot be reopened to traffic until both layers of the polymer overlay have been applied.

Reapply roadway striping to match the original striping.

Item 446 Cleaning and Painting Steel

The existing coating to be removed may contain lead or other hazardous materials.

Item 459 Gabions and Gabion Mattresses

Net Rock Bags are an allowed substitution to Gabion Mattresses pay item if the following conditions are met:

This Item uses the following Items:

- **2 Ton Net Rock Bag**. A polyester net bag, filled with stone, with a height of 1.5 ft. per layer. Can be stacked for multiple layers.
- **2 Ton Net Rock Bag Mattress**. Polyester net bag, filled with stone, with a height of 1.5 ft per layer installed adjacent to another polyester net bag to achieve desired area coverage. Wood or metal anchors can hold separate polyester net bags together. Can be stacked for multiple layers.

Furnish polyester net bags and polyester net bag mattresses in accordance with specified rock bag properties as follows in Table 1.

Table 1
Key Polyester Net Bag Performance Properties

Single Polyester Net Tensile Strength	24 or 1,675	kN/m or lb./ft.	ASTM D4595
Single Polyester Net Static Puncture Strength	1.6 or 359.7	kN or lbs-Force	ASTM D6241
Single Polyester Net Tearing Strength	0.9 or 202.3	kN or lbs-Force	ASTM D2261
Elongation at Maximum Load	30	Percent	ASTM D4595
Mass/unit area	325	grams/m^2	ASTM 2261
Iron Ring Tensile Strength	>5.5	Metric Ton	Lab & Factory Test

Material

A. The material is preferably virgin polyester as it is eco-friendlier and more durable than alternatives (like recycled). It is ideal for hydraulic works as it is rust-proof, non-corrosive, rot proof, and weather resistant. It can withstand exposure to ultraviolet, salt water and fresh water.

B. The rope should be 3-ply polyester rope. The weave structure is a raschel mesh which prevents the mesh thread from unraveling if there is a break.

C. A net bag should include a **double layer** of mesh net bags supported with lifting and neck tying ropes (wrap ropes). The mesh ropes are 2.5mm/.098" thick, the neck tying rope are 7mm /028" thick and the lifting ropes are 11mm/.043" thick. Each mesh net bags should consist of a minimum of 4 lifting ropes and 2 wrap ropes.

D. The mesh size is 0.98 inch.

E. A polyester net bags should provide the most abrasion resistant and UV resistant materials available, ensuring the highest performance levels, greatest longevity, and lowest risk to the natural environment.

F. Provide filler stone consisting of clean, hard, durable stone that does not contain shale, caliche, or other soft particles. Stone appearing to contain such particles will be tested for soundness. Stone with 5-cycle magnesium sulfate soundness of more than 18% when tested in accordance with Tex-411-A will be rejected. Use stones that are between 2 and 8 in. in their least dimension. Prevent contamination when storing and handling stone. Use stone with a minimum bulk specific gravity of 2.50 as determined by Tex-403-A.

At the start of construction, the net bag manufacturer must have a qualified representative available (remotely or onsite) for consultation as needed throughout filling and placement process.

1.1. **Net Rock Bag Filling Process.** The following process follows the external reference: The filling process is permissible to be completed in the contractor's yard and transported to the site for placing or filled directly onsite in a production-type process.

After the frame is constructed by the contractor/agency the net bag is draped over the frame. The rock fill is loaded into the polyester net bag. After the net bag is full of fill rock in the frame, the lifting ropes are used to attach the ring to the net bag. The tying ropes are tightly looped around the neck of the net bag and then tied off. The frame is lifted off the net bag and then the net bag is lifted by the ring to the staging location.

2 Ton Texas Tuff Rock Bag Filling Frame Internal dimensions.

	Length	Width	Height
2 Ton	3'-11"	3'-11"	2'-11"

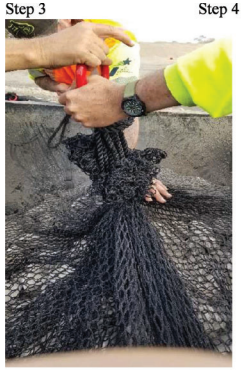
County: POTTER

Highway: VARIES

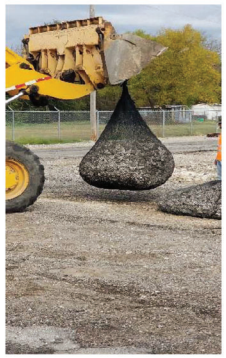
Step 1

Step 2

Step 3



Step 4



1.2. **Foundation Preparation**. Site preparation is generally NOT required to install the Net Rock Bags. Remove any buried debris protruding from the foundation that will impede the proper installation and final appearance of the net bags. Removal of existing channel materials for site preparation should be directed and approved by the Engineer, particularly for the application at scour critical bridges. Have the Engineer inspect the surface immediately before net bag placement.

1.3. **Transport**.

When a net bag is being moved / loaded, the bag must be lifted using the lifting ring and not dragged across surfaces. Stacked net bags can be loaded onto a flatbed for transport. Upon arrival at site, the net bags can be offloaded and staged, or loaded onto a barge for further transport and staging.

1.4. **Installation**. A filled Net bag must be safely lifted by the lifting ring allowing a single point of control to lift and place the Net bag into position.

The net bags can be placed on level or sloping banks, in still water, moving water, fresh water or saline water, with or without a diver.

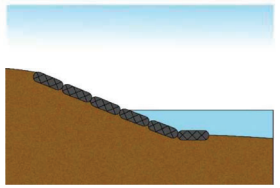
Place the initial line of net bags on the lowest surface according to the plan. Place the next net bags adjacent in line to provide a uniform alignment.

Subsequent rows of net bags can move higher towards the top of the slope or the back of the structure. The net bags should be carefully placed adjacent to the previous row and follow the format below for the appropriate slope of the bank.

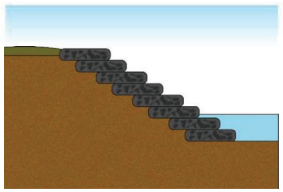
The placement of each net bag should be tight in alignment with the surrounding net bags below, to the side and above.

Formats 1 and 2 for placement of net bags on sloping banks.

1. Bank slope less than 40 degrees (H:V less than 1.2:1), the net bags can be placed side by side adjacent to each subsequent row of net bags.



2. Bank slope 40 degrees or greater (H:V greater than 1.2:1), the net bags should be placed stair step on one another with some overlapping of subsequent rows of net bags. When the net bags are placed in a stair step fashion, a reduction in the sq. yardage coverage per net bag is required.



Net Rock Bags will be measured in place by one of two methods:

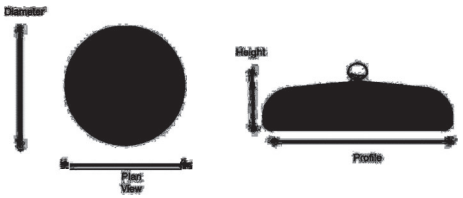
1) the quantity of rock bags required or

2) the cubic yard of stone-filled net bags. The Engineer should consider the volume of overlapping for cases used in Format 2.

The following parameters can be used for planning and calculations.

- One net bag covers area = 37.21 Sq. Feet or 4.13 Sq. Yards. Note: This changes when installed in a stair step fashion.
- Each net bag is 1.6 feet of 0.53 yard high.
- One net bag is 59.54 cubic feet, or 2.21 cubic yard of stone filled net bag.

Example, if a project required 1000 sq. yards net bag coverage 0.53 high, one would plan on 242 net bags plus 5% flexibility 12 net bags for total of 254 net bags for the project.



For payment: The work performed and materials furnished in accordance with Net Rock Bag will be paid for at the unit price bid for quantity of Gabion Mattresses.

The price bid is full compensation for the Net Rock Bag, stone fill, fasteners, shear resistance devices, grading and backfill, materials, tools, equipment, labor (include diver operation if required), and incidentals. Filter fabric and filter material, if used, will not be paid for directly but will be considered subsidiary to this Item.

The acceptable manufacturer is FES Solutions
Address: 5900 Balcones Drive STE 4781 Austin Texas 78731
Phone +1 512-766-6608
Contact email: info@fessolutions.net

Item 483 Shot Blasting

The intent of this item is to act as surface preparation for Item 439 Multi-Layer Polymer Overlay. It is not subsidiary and will be paid for directly as defined by the spec book. See plans for specific limits of work.

Item 502 Barricades, Signs, and Traffic Handling

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

Temporary rumble strips will be required as shown on WZ(RS)-22 regardless of loose gravel, and/or soft or bleeding asphalt. Adjust the traffic control setup such that rumble strips are not placed in areas of heavily rutted pavements, unpaved surfaces, or horizontal curves. Temporary rumble strips will not be allowed on interstate highway.

The Contractor is to have the option of using either plastic drums, vertical panels, grabber cones or a combination where drums are shown as channelizing devices, as approved by the Engineer. Plastic drums are to be used in all transition areas in accordance with BC(8)-21 and WZ(TD)-17.

Item 540 Metal Beam Guard Fence

Drive steel posts for metal beam guard fence a minimum of 1/3 of the post length to final specified depth.

Item 542 Removing Metal Beam Guard Fence

All MBGF, GET & TAS materials will remain property of the Contractor.

Item 544 Guardrail End Treatments

Use Single Guardrail End Treatment (Ty III)(Steel Post).

Item 666 Reflectorized Pavement Markings

Retroreflectivity Measurements: Mobile or portable retroreflectometers may be used at the Contractor's discretion.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6461-70-001 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY IH0040

				CONTROL SECTION JOB	6461-70-001		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00206078			
				COUNTY	Potter			
				HIGHWAY	IH0040			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL			
	104-7006	REMOV CONC (RIPRAP)	SY	28.000		28.000		
	104-7016	REMOV CONC (CURB)	LF	8.000		8.000		
	132-7037	EMBANK (FNL)(DC)(TY E)(CSBE_FND IMPR)	CY	12.000		12.000		
	401-7001	FLOWABLE BACKFILL	CY	5.000		5.000		
	420-7052	CL C CONC (RAIL FOUNDATION)	CY	18.000		18.000		
	420-7059	CL C CONC(PILE ENCASEMENT)	LF	142.000		142.000		
	427-7005	EPOXY WATERPROOF FINISH (TY X)	SF	1,540.000		1,540.000		
	428-7001	PENETRATING CONCRETE SURFACE TREATMENT	SY	2,338.000		2,338.000		
	429-7003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	257.000		257.000		
	429-7007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	108.000		108.000		
	432-7002	RIPRAP (CONC)(5 IN)	CY	93.000		93.000		
	438-7007	CLEANING AND SEALING EXIST JOINTS (CL7)	LF	518.000		518.000		
	438-7008	CLEANING EXISTING JOINTS	LF	967.000		967.000		
	439-7014	MULTI-LAYER POLYMER OVERLAY	SY	16,822.000		16,822.000		
	450-7004	RAIL (TY T221)	LF	90.000		90.000		
	459-7001	GABIONS (GALV)	CY	14.000		14.000		
	483-7016	SHOT BLASTING	SY	16,422.000		16,422.000		
	500-7001	MOBILIZATION	LS	1.000		1.000		
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.000		5.000		
	529-7002	CONC CURB (TY II)	LF	40.000		40.000		
	540-7002	MTL W-BEAM GD FEN (STEEL POST)	LF	375.000		375.000		
	540-7005	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000		
	542-7001	REMOVE METAL BEAM GUARD FENCE	LF	975.000		975.000		
	544-7001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000		
	544-7003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000		
	662-7112	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	41.000		41.000		
	662-7114	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	299.000		299.000		
	666-7289	TY I HIGH PERF PM (W)6"(BRK)(090MIL)	LF	120.000		120.000		
	666-7292	TY I HIGH PERF PM (W)6"(SLD)(090MIL)	LF	2,584.000		2,584.000		
	666-7304	TY I HIGH PERF PM (Y)6"(SLD)(090MIL)	LF	5,548.000		5,548.000		
	668-7089	PREFAB PM TY C (W)(24")(SLD)	LF	36.000		36.000		
	668-7091	PREFAB PM TY C (W)(ARROW)	EA	1.000		1.000		
	668-7103	PREFAB PM TY C (W)(WORD)	EA	2.000		2.000		
	752-7005	TREE REMOVAL (4" - 12" DIA)	EA	7.000		7.000		
	752-7006	TREE REMOVAL (12" - 18" DIA)	EA	2.000		2.000		

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6461-70-001 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY IH0040

			CONTROL SECTION JOB		**6461-70-001**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00206078**			
			COUNTY		**Potter**			
			HIGHWAY		**IH0040**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL			
	785-7002	BRIDGE JOINT REPAIR (HEADER)	LF	31.000		31.000		
	7001-7002	BENT CAP/ABUTMENT CAP CLEANING	EA	61.000		61.000		

SUMMARY OF BRIDGE ITEMS

LOCATION	104	104	132	401	420	420	427	428	429	429	432	438	438	439	450	459	483	529
	7007	7016	7037	7001	7052	7059	7005	7001	7003	7007	7002	7007	7008	7014	7004	7001	7016	7002
	REMOVING CONC (RIPRAP)	REMOVING CONC(CURB)	EMBANK (FNL)(DC) (TYE) (CSBE_FND IMPR)	FLOWABLE BACKFILL	CLCCONC (RAIL FOUNDATION)	CL C CONC (PILE ENCASEMENT)	EPOXY WATERPROOF FINISH (TY X)	PENETRATING CONCRETE SURFACE TREATMENT	CONCSTR REPAIR(DECK REP(PART DEPTH))	CONCSTR REPAIR (VERTICAL& OVERHEAD)	RIPRAP (CONC) (SIN)	CLEANING AND SEALING EXIST JOINTS (CL 7)	CLEANING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	RAIL (TYT221)	GABIONS (GALV)	SHOT BLASTING	CONC CURB (TYII)(?)
	SY	LF	CY	CY	CY	LF	SF	SY	SF	SF	CY	LF	LF	SY	LF	CY	SY	LF
MOBLEY AVE AT US 87							255	300				188		839			439	
SL 434 AT US 87								163					144	720			720	
BELL ST AT H 40								454					315	2,795			2,795	
FM 2373 AT IH40								120					90	1,081			1,081	
FM 767 AT PUNTA DE AGUA								614					204	6,100			6,100	
FM 2161 AT H 40								148		7			56	732			732	
RM 1321 AT CABIN CREEK						52		62				72		571			571	
SH 214AT TIERRA BLANCA CREEK								78				72		665		2	665	
RM 1319 AT ANTELOPE CREEK						90						102		1,280			1,280	
SH 15AT PLUMMER CREEK		8	12					165					90	684			684	40
RM 1321 AT SAND CREEK								118					68	782			782	
SH 207 AT MULBERRY CREEK											89							
H 40 CULVERT CROSSING	28			5			138			101	4					12		
CRKATIH40							1,447	116	257			84		573			573	
CEMETERY RD AT H 27					18										90			
PROJECT TOTALS:	**28**	**8**	**12**	**5**	**18**	**142**	**1,840**	**2,338**	**257**	**108**	**93**	**518**	**967**	**16,822**	**90**	**14**	**16,422**	**40**

SUMMARY OF BRIDGE ITEMS (CONT.)

LOCATION	540	540	542	544	544	752 (1)	752	785	7001
	7002	7005	7001	7001	7003	7005	7006	7002	7002
	MTLW-BEAM GD FEN (STEEL POST)	MTLBEAMGD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	TREE REMOVAL (4"-12" DIA)	TREE REMOVAL (12"-18" DIA)	BRIDGE JOINT REPAIR (HEADER)	BENT CAP/ABUTMENT CAP CLEANING
	EA	EA	LF	EA	EA	EA	EA	LF	EA
MOBLEY AVE AT US 87								10	5
SL 434 AT US 87								6	5
BELL ST AT H 40									10
FM 2373 AT IH40								5	3
FM 767 AT PUNTA DE AGUA									14
FM 2161 AT H 40									5
RM 1321 AT CABIN CREEK									4
SH 214AT TIERRA BLANCA CREEK									5
RM 1319 AT ANTELOPE CREEK						7	2		3
SH 15AT PLUMMER CREEK								5	2
RM 1321 AT SAND CREEK								5	
SH 207 AT MULBERRY CREEK									
H 40 CULVERT CROSSING									
CRKATIH40									5
CEMETERY RD AT H 27	375	4	975	4	4				
PROJECT TOTALS:	**375**	**4**	**975**	**4**	**4**	**7**	**2**	31	**61**

(1) QUANTITIES CALCULATED AT 5% OF TOTAL FOR ESTIMATING.

(?) SEE GENERAL NOTES FOR ALTERNATIVES.

SUMMARY OF PAVEMENT MARKINGS ITEMS

LOCATION	666	666	666	668	668	668
	7289	7292	7304	7089	7091	7103
	TY I HIGH PERF PM (W)6"(BRK) (090MIL)	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	PREFAB PAV MRK TYC(W) (24")(SLD)	PREFAB PAV PRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)
	LF	LF	LF	LF	EA	EA
MOBLEY AVE AT US 87			400			
SL 434 AT US 87			219			
BELL ST AT H 40	120	100	595	36	1	2
FM 2373 AT H 40		360	360			
FM 767 AT PUNTA DE AGUA			1,850			
FM 2161 AT H 40		424				
RM 1321 AT CABIN CREEK		220	220			
SH 214AT TIERRA BLANCA CREEK		280	280			
RM 1319 AT ANTELOPE CREEK		640	640			
SH 15AT PLUMMER CREEK		200	200			
RM 1321 AT SAND CREEK		360	360			
CRKATIH40			424			
PROJECT TOTALS:	**120**	**2,584**	**5,548**	**36**	**1**	**2**

SUMMARY OF PAVEMENT MARKINGS ITEMS

LOCATION	662	662
	7112	7114
	WK ZN PAV MRKSHT TERM (TAB)TYW	WK ZN PAV MRKSHT TERM (TAB)TYY-2
	EA	EA
MOBLEY AVE AT US 87		20
SL 434 AT US 87		11
BELL ST AT H 40	41	30
FM2373ATIH40		18
FM 767 AT PUNTA DE AGUA		93
FM 2161 AT IH40		21
RM 1321AT CABIN CREEK		11
SH 214AT TIERRA BLANCA CREEK		14
RM 1319AT ANTELOPE CREEK		32
SH 15 AT PLUMMER CREEK		10
RM 1321 AT SAND CREEK		18
CR KAT IH40		21
PROJECT TOTALS:	**41**	**299**

AMA FY 25 8PM

PROJECT SUMMARIES

Texas Dllpartm11nt of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	701	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		5

BARRICADE AND CONSTRUCTION <BC> STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets CBC sheets> ore 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'' CTMUTCDJ.

2. The development and design of the Traffic Control Pion (TCP) is the responsibi Iity of the Engineer.

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

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

5. Geometric design of lone shifts and detours should, when possible, meet the opp Iicoble design criteria contained in manuals such as the American Association of State Highway and Transportation Officials CAASHTO>, "A Pol icy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shol I 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 shol I be revised to show appropriate work zone distance.

7. The Engineer may require dupl icote warning signs on the median side of divided highways where median width wi II permit and traffic volumes justify the signing.

8. Al I signs shol I be constructed in accordance with the detoi Is found in the "Standard Highway Sign Designs for Texas,'' latest edition. Sign detoi Is not shown in this manual shol I be shown in the plans or the Engineer shol I provide o detoi I to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the iIlustrotions of the BC sheets ore examples. As necessary, the Engineer wi II determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ Iimit signs ore required. CSJ Iimit signs ore shown on BCC21. The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shol I be erected in advance of the CSJ Iimits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shol I be erected at or near the CSJ Iimits. For mobile operations, CSJ Iimit signs ore not required.

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

12. The Engineer hos the final decision on the location of al I traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way Iine as possible, or located behind o barrier or guordroi 1, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who ore exposed to traffic or to construction equipment within the right-of-way shol I wear high-visibi Iity safety apparel meeting the requirements of !SEA "American Notional Standard for High-Visibi Iity Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Closs 2 or 3 risk exposure. Closs 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flogger stations shol I be iIluminoted when flogging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-quo Iified products shol I be used. The "Campi iont Work Zone Traffic Control Devices List" CCWZTCD> describes pre-quo Iified products and their sources.

2. Work zone traffic control devices shol I be comp Iiont with the Manual for Assessing safety Hardware CMASH>.

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

Texas Department of Transportation

Traffic Safety Division Standard

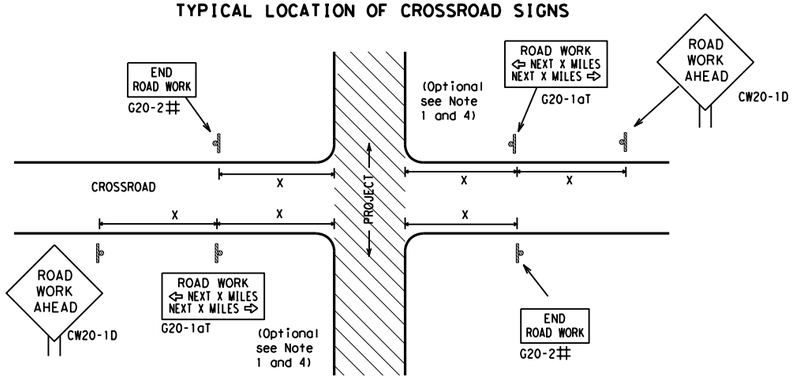
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 9-07 8-14	6461	101	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC.		

DATE: 9/12/2024 10:31:07 AM
FILE: I:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\2. TCP & STANDARDS\BC(1)-21_THROUGH_BC(12)-21.dgn

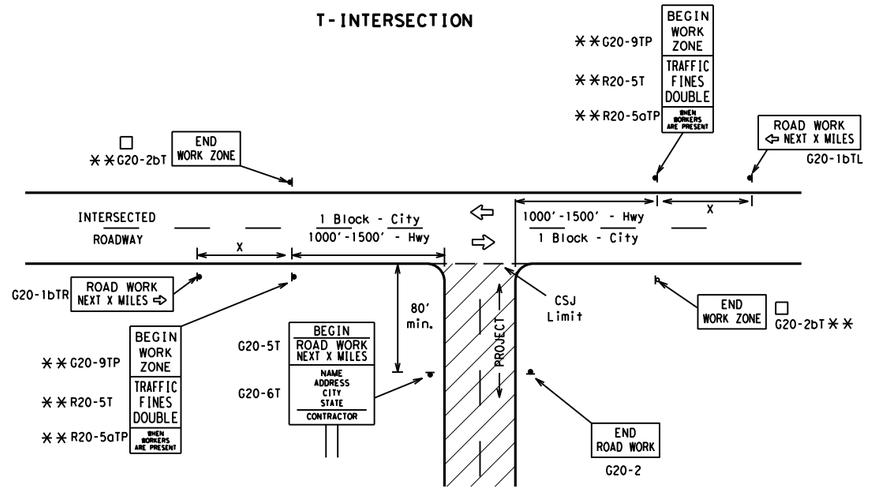
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

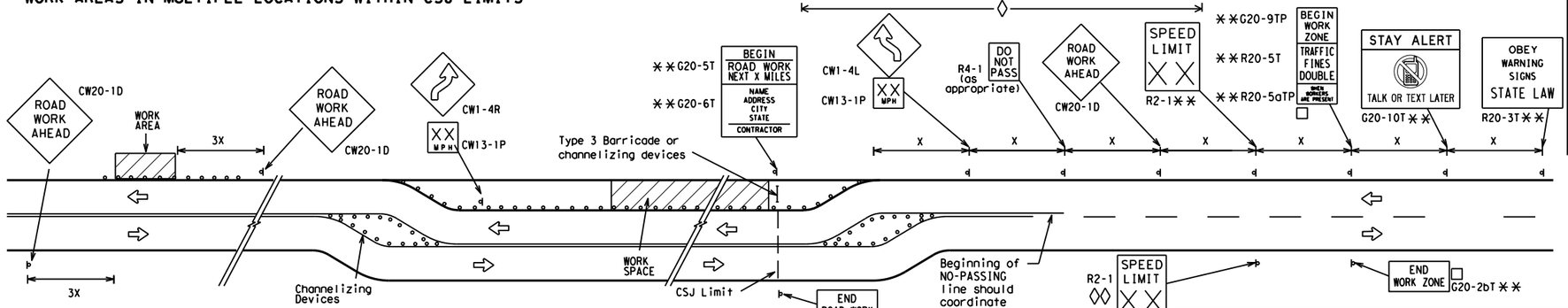
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

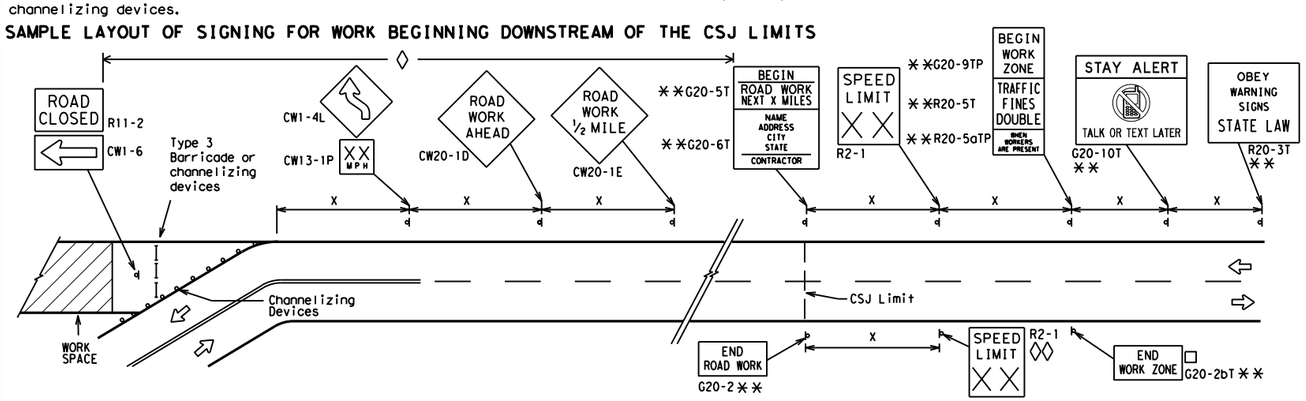
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER, ETC		7

DATE: 9/12/2024 10:31:07 AM
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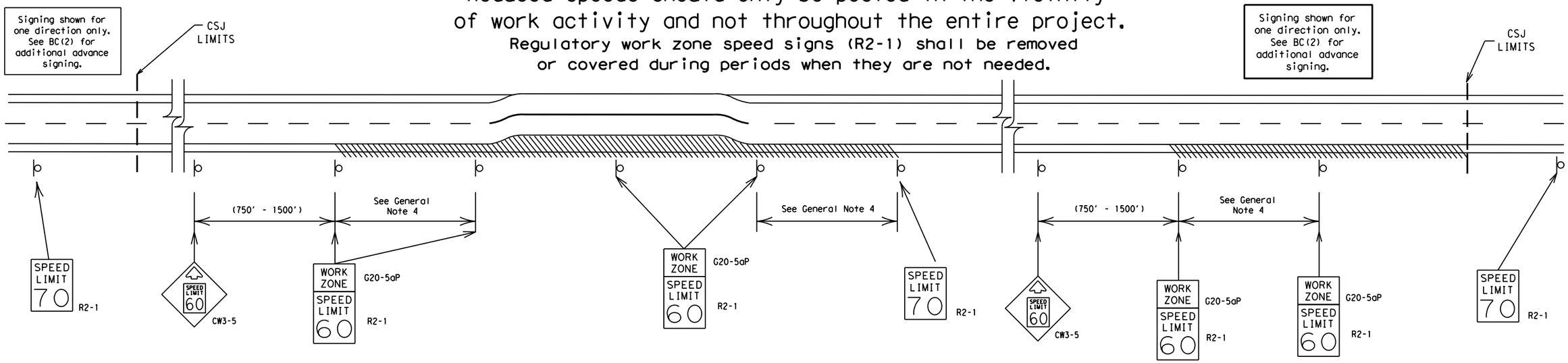
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER, ETC		8

DATE: 9/12/2024 10:31:08 AM
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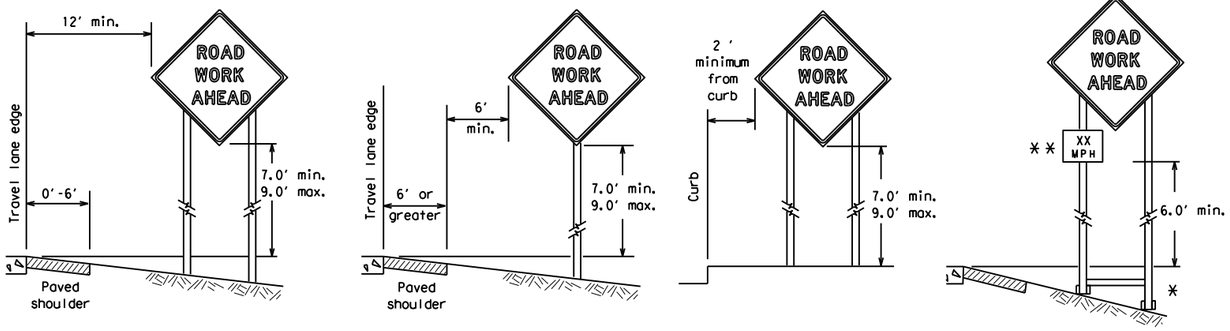
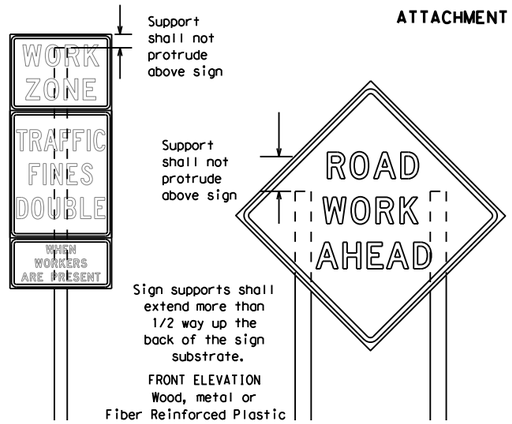
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

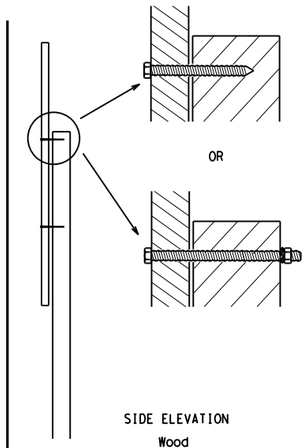


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





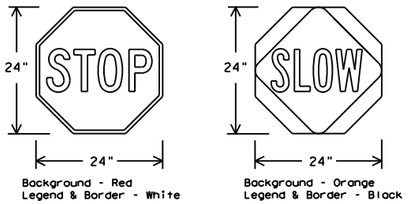
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER, ETC		9

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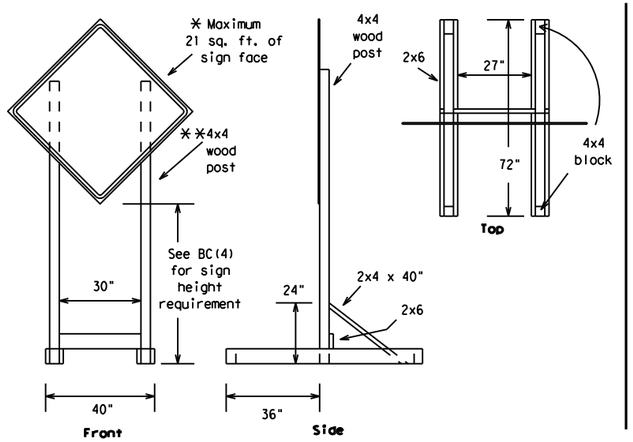
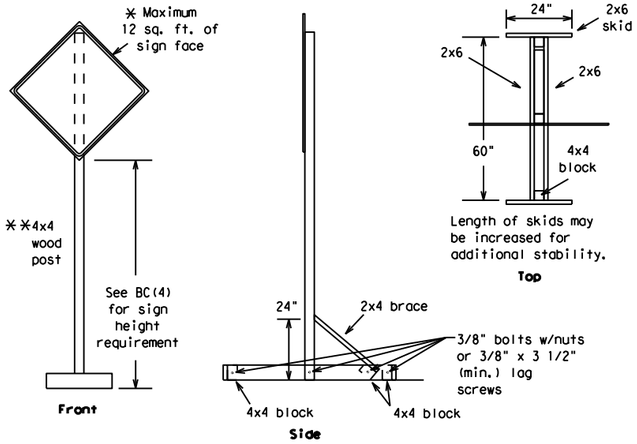
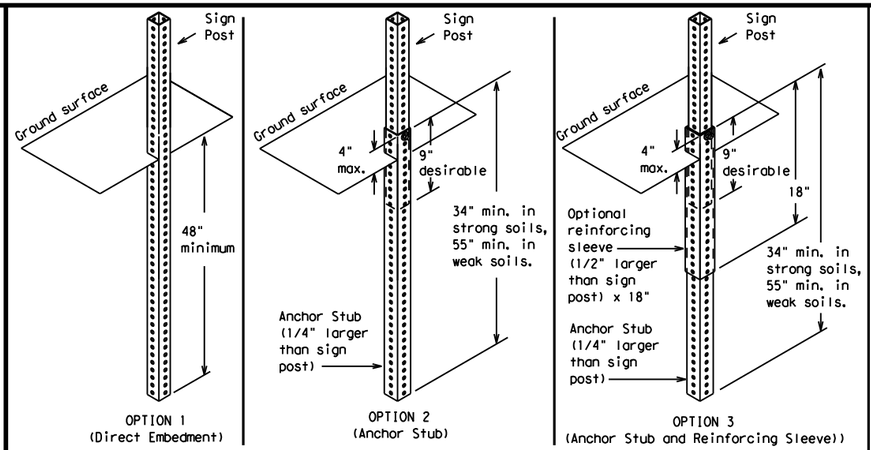




SKID MOUNTED WOOD SIGN SUPPORTS

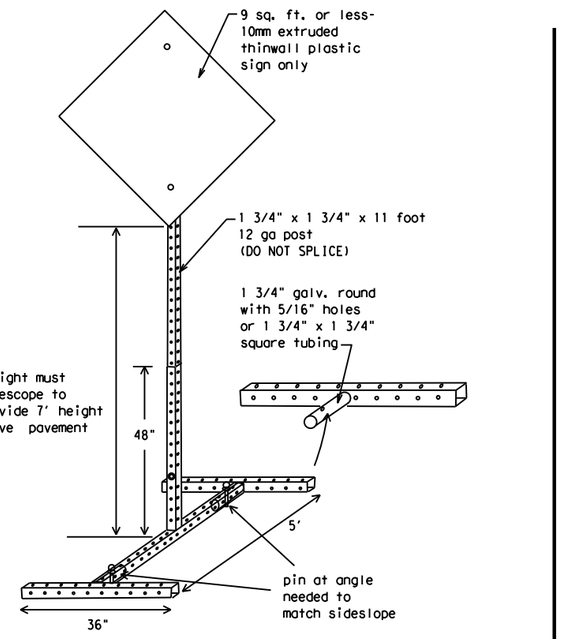
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

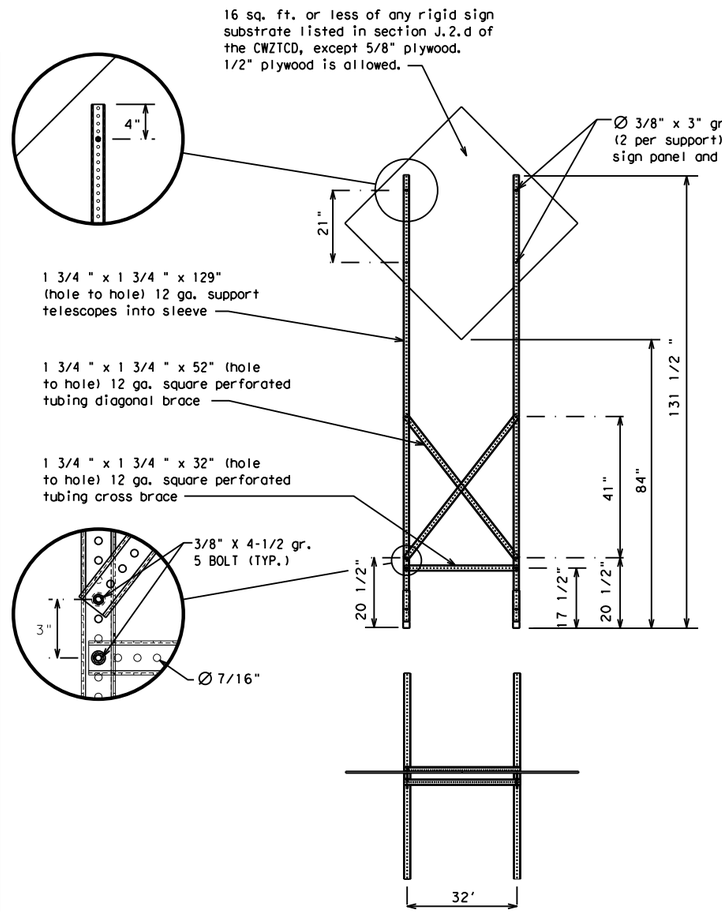


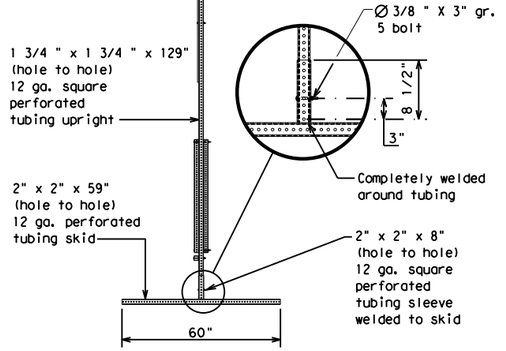
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER, ETC		10

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER, ETC		11

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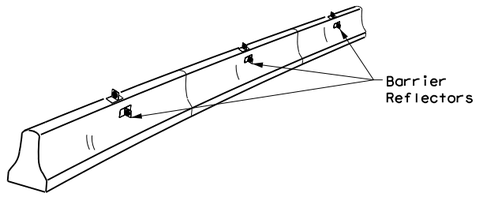
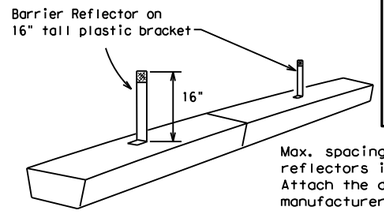
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

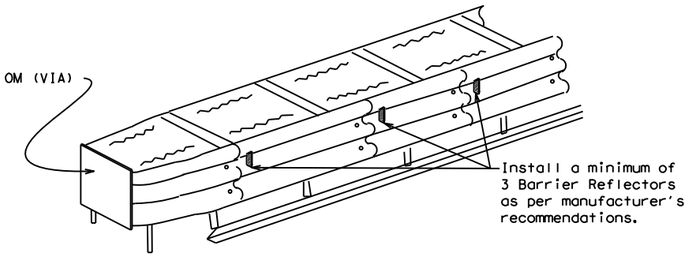


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

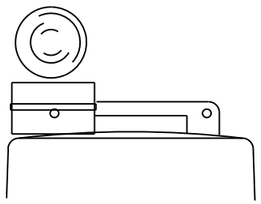


DELINEATION OF END TREATMENTS

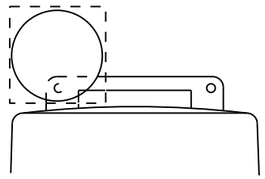
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

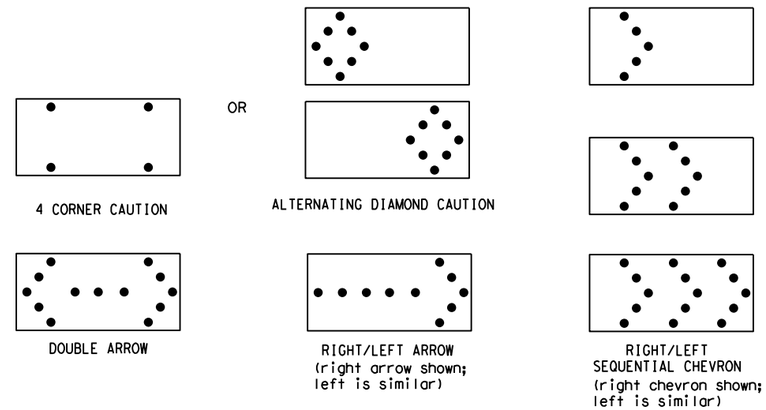
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER, ETC		12

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

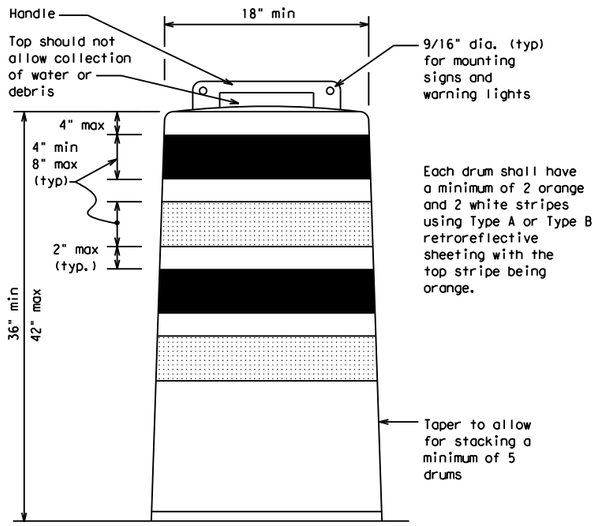
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

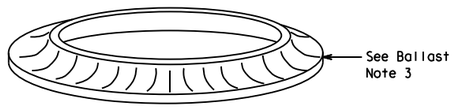
RETROREFLECTIVE SHEETING

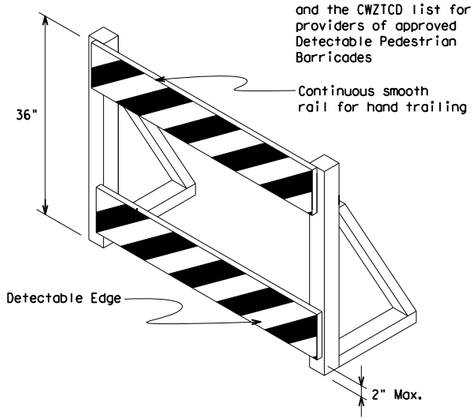
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

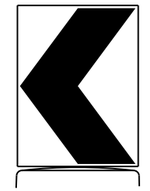




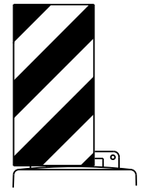


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	AMA	POTTER, ETC		13
7-13				

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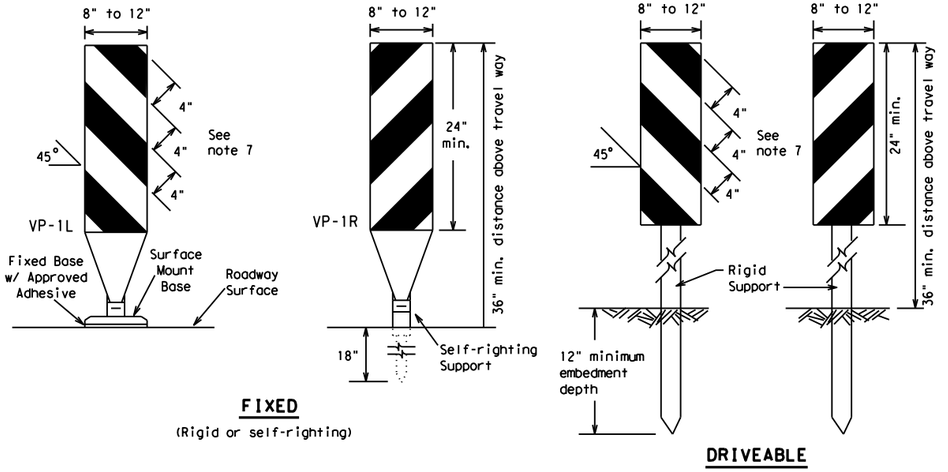
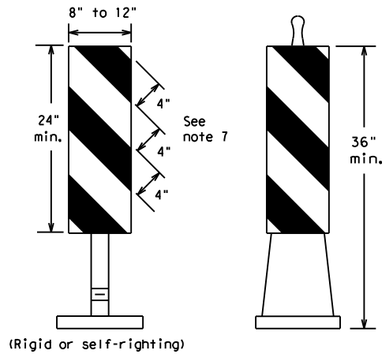


FIXED
(Rigid or self-righting)

DRIVEABLE

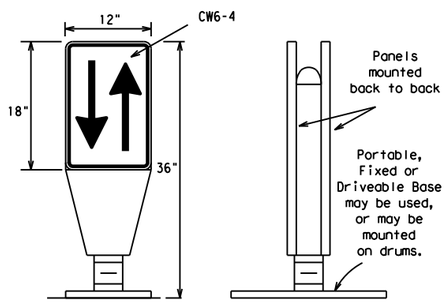


(Rigid or self-righting)

PORTABLE

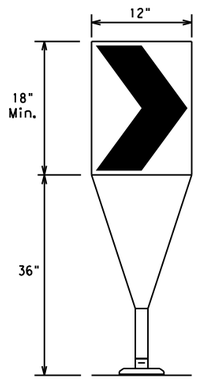
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



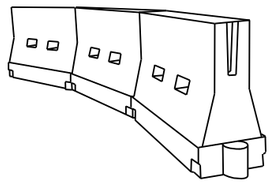
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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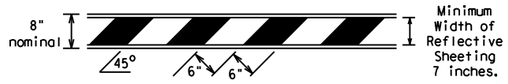
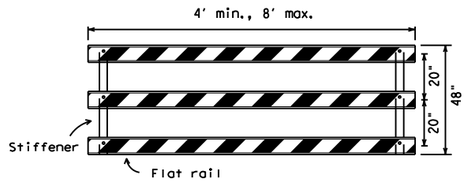
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



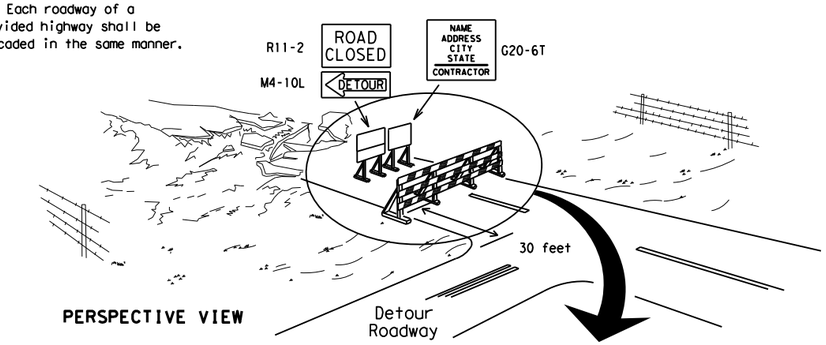
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

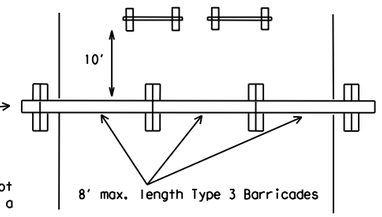
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

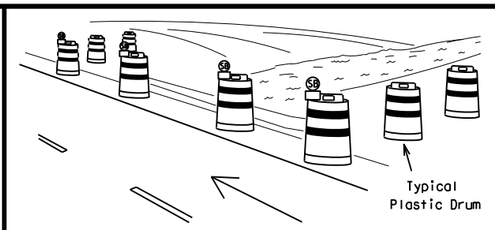
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

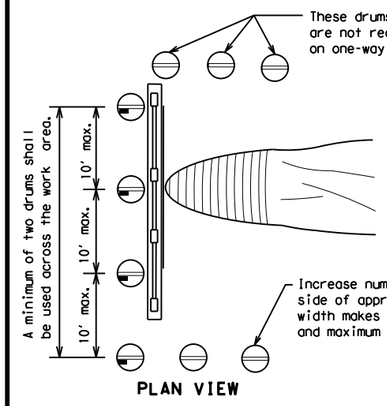
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

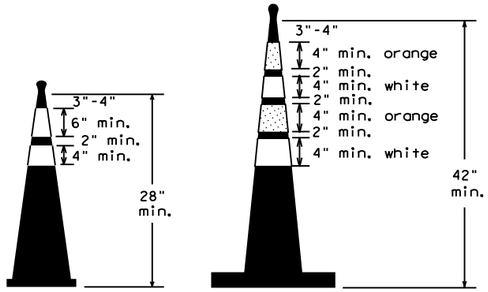
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



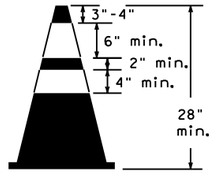
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

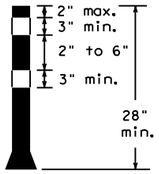
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

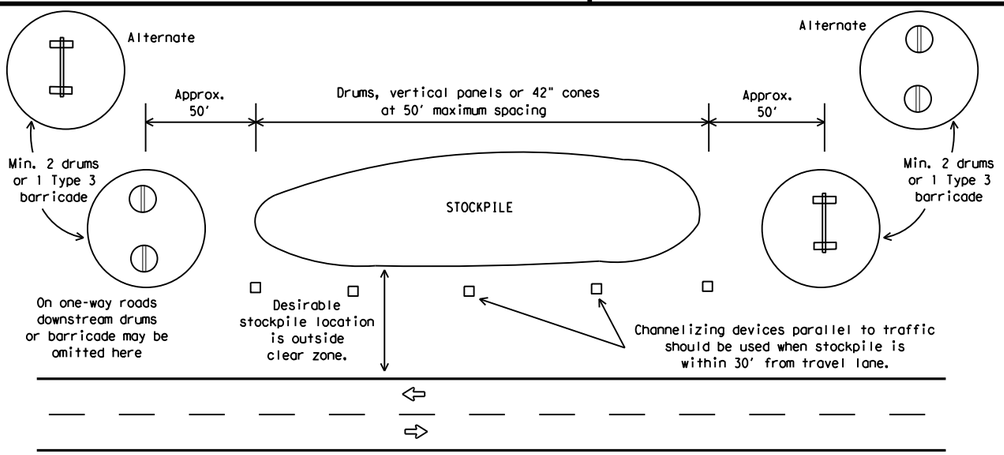


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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7-13 5-21	AMA	POTTER, ETC		15

104

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

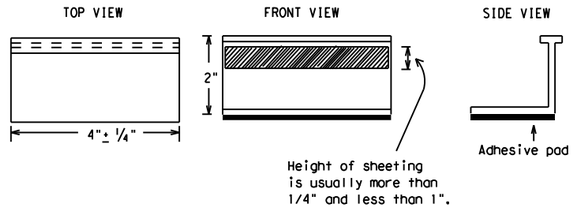
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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105

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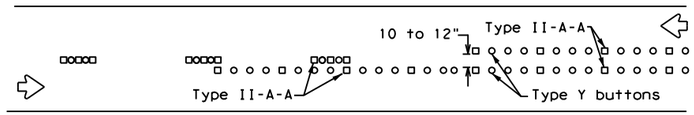
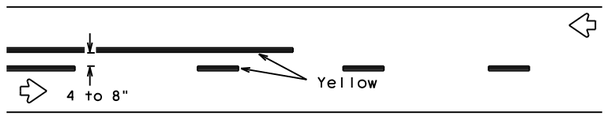
PAVEMENT MARKING PATTERNS

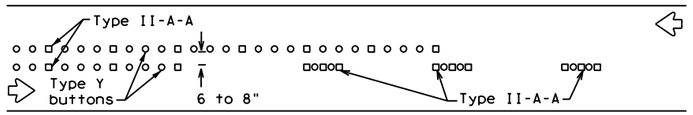
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



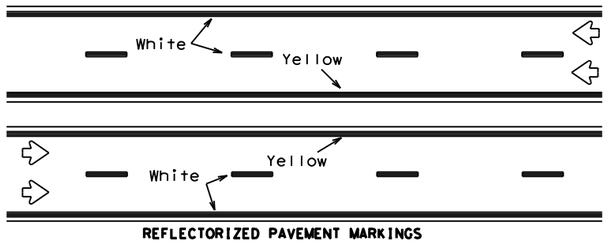
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



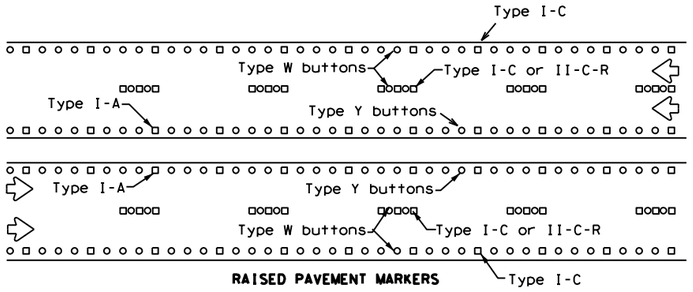
RAISED PAVEMENT MARKERS - PATTERN B

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

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



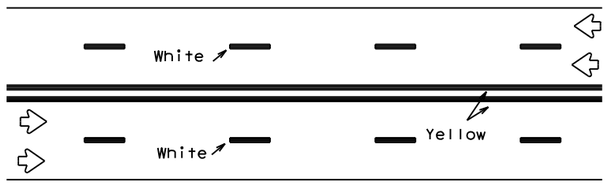
REFLECTORIZED PAVEMENT MARKINGS



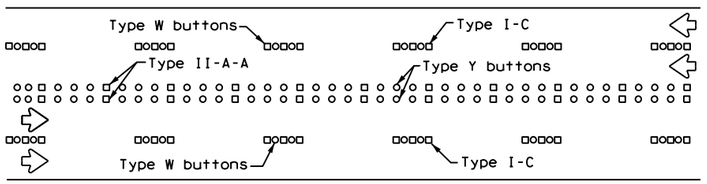
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



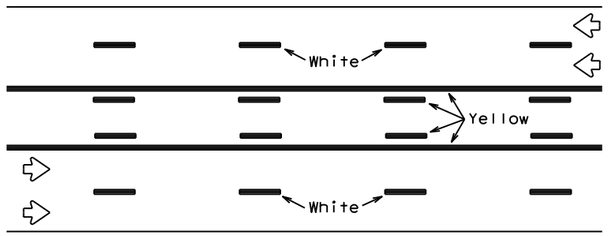
REFLECTORIZED PAVEMENT MARKINGS



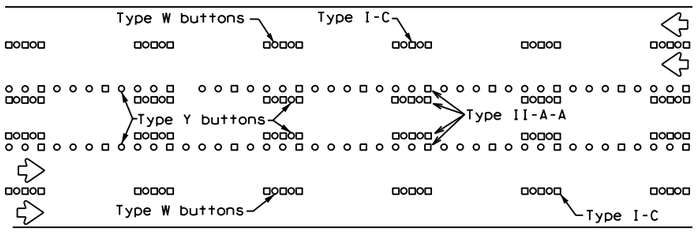
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

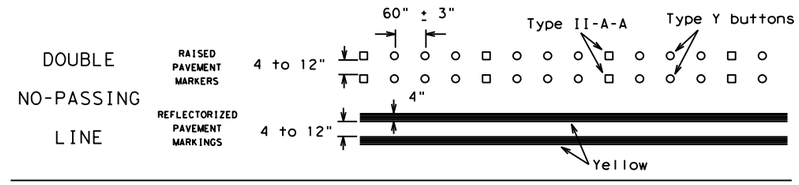
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

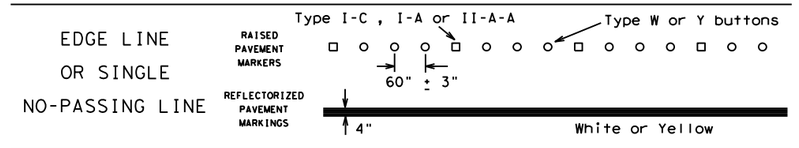
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

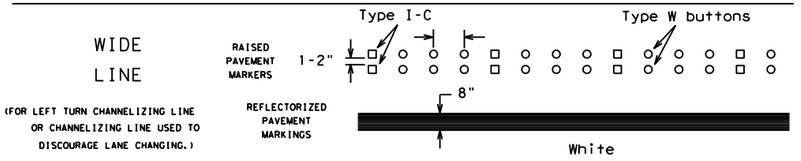


EDGE LINE OR SINGLE NO-PASSING LINE



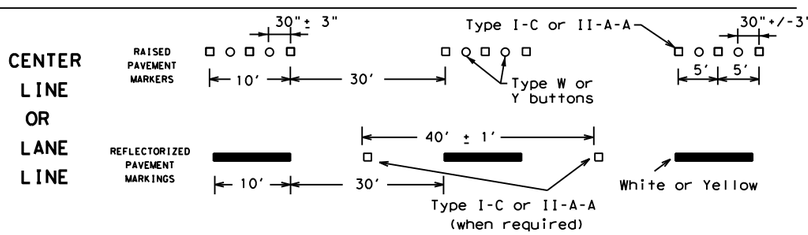
WIDE LINE

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

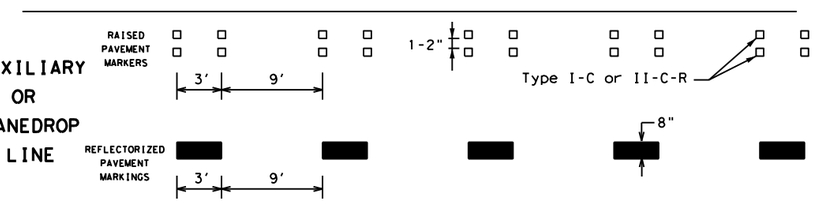


BROKEN LINES

CENTER LINE OR LANE LINE

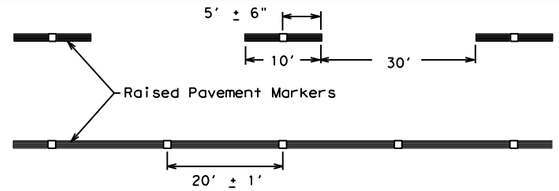


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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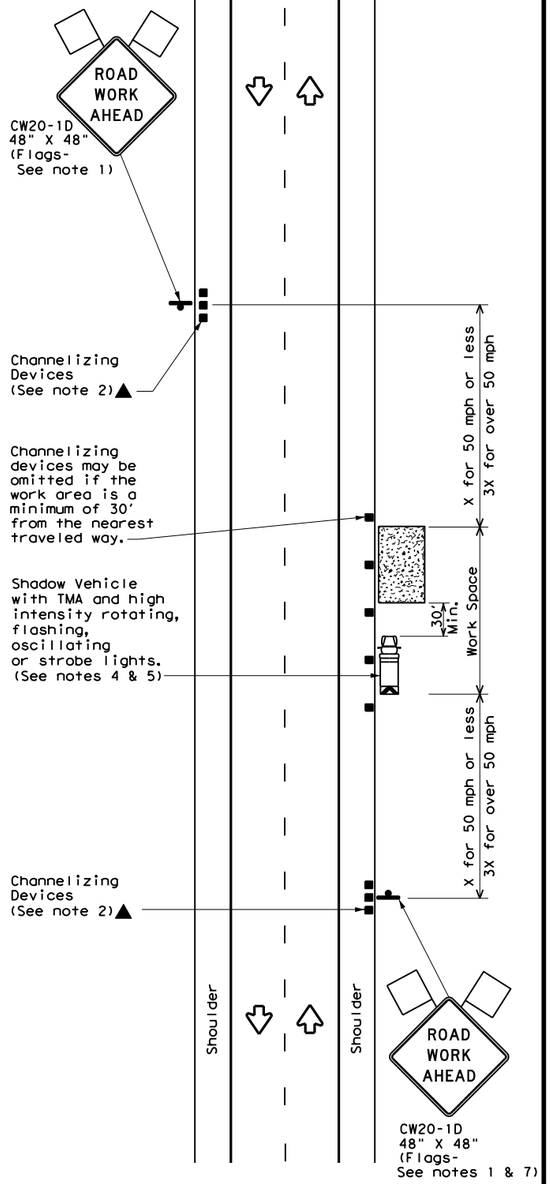
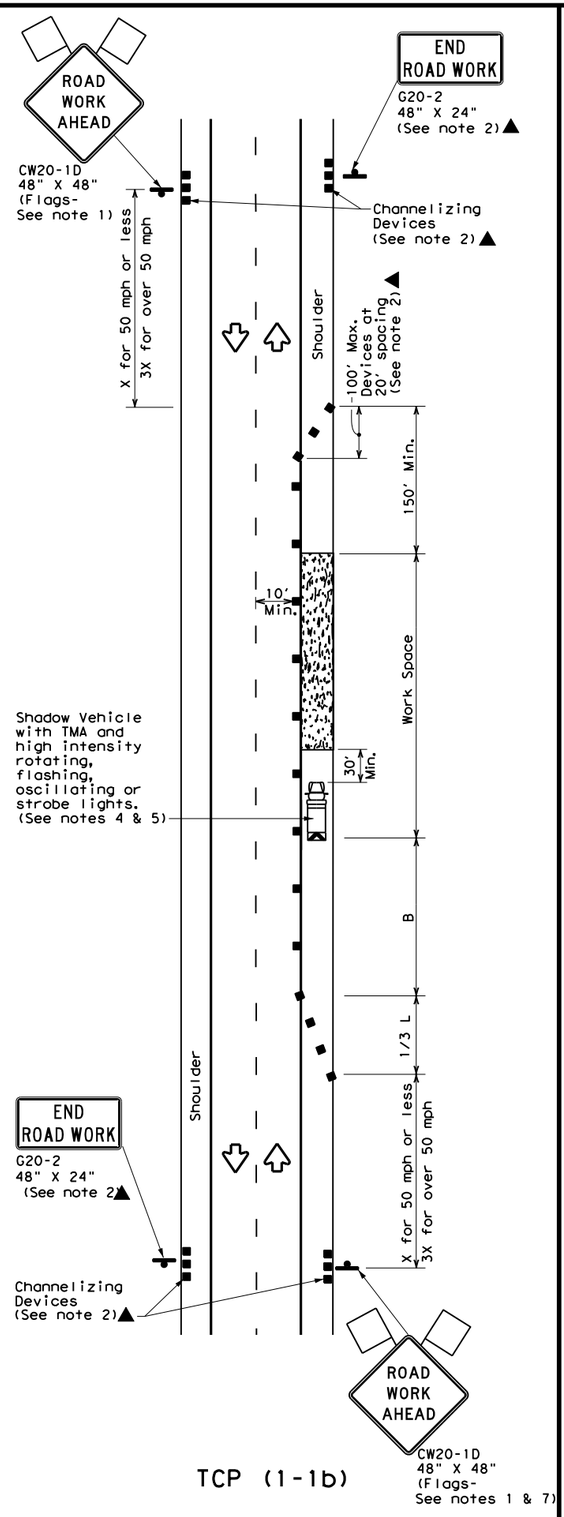


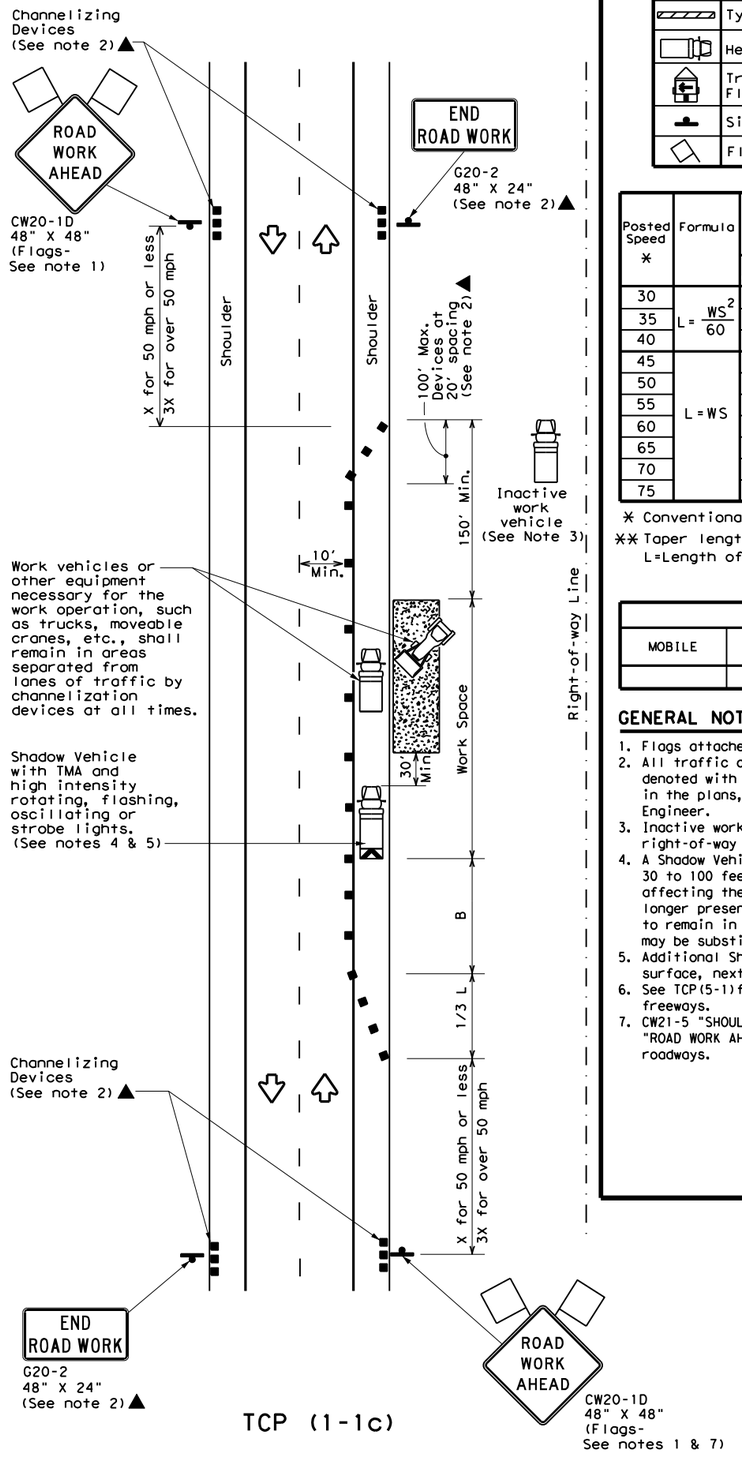
TCP (1-1a)

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. 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(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	6461	70	001	VARIES
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	AMA	POTTER, ETC		18

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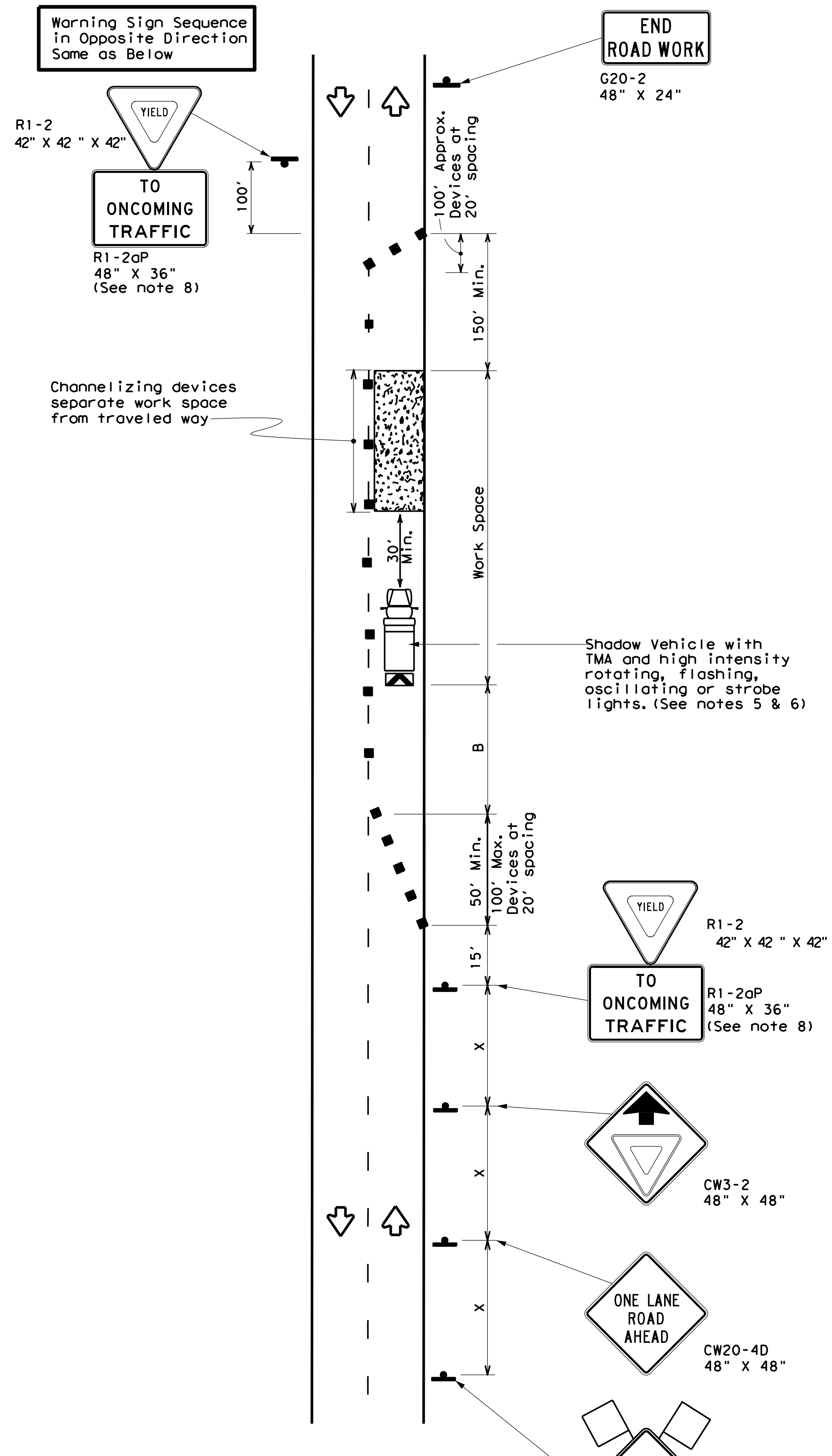
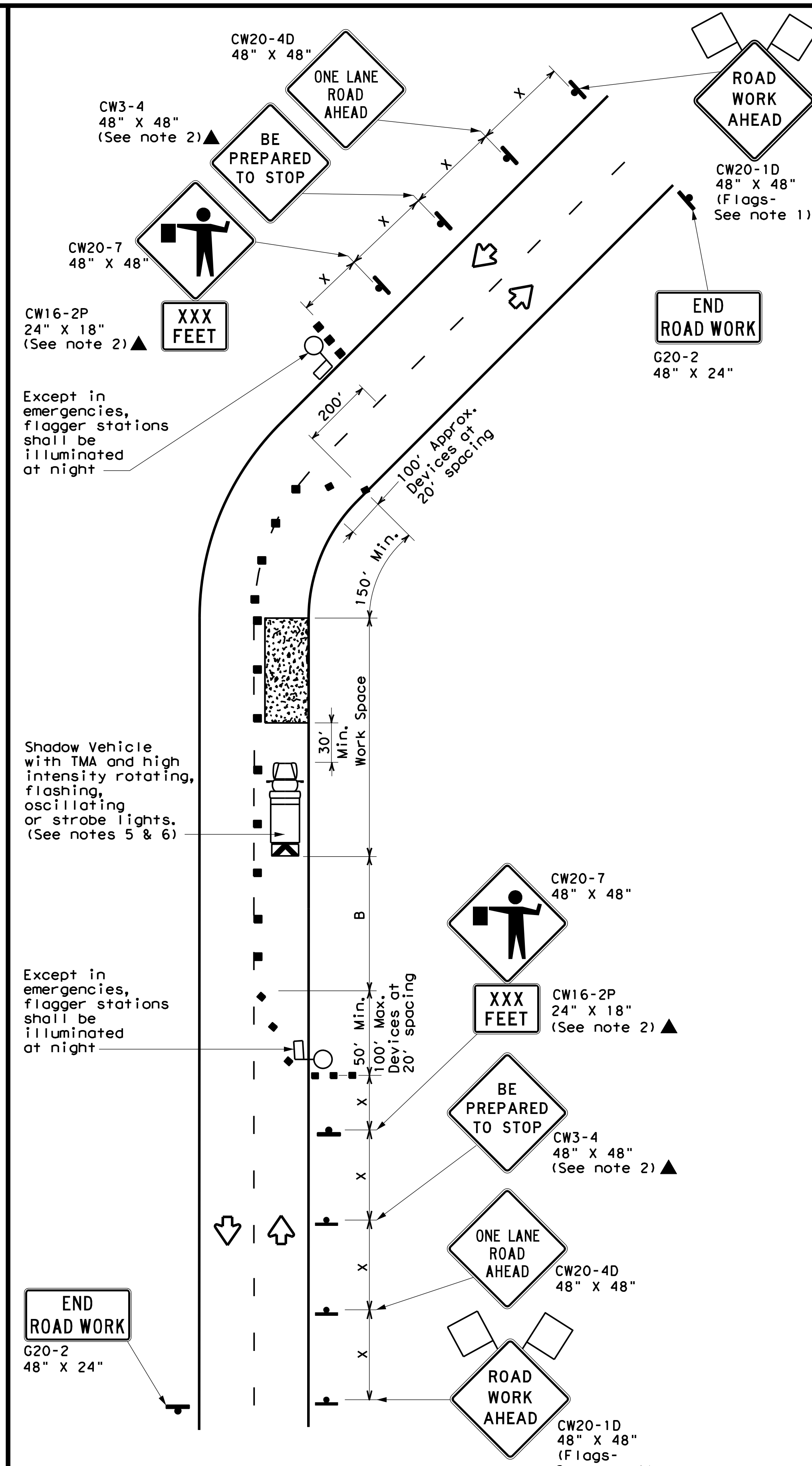


TCP (1-2a)

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	M	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	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. 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 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. 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.
8. 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)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. 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).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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4-90 4-98 2-94 2-12 1-97 2-18	DIST		COUNTY	SHEET NO.
	AMA		POTTER, ETC	19

152

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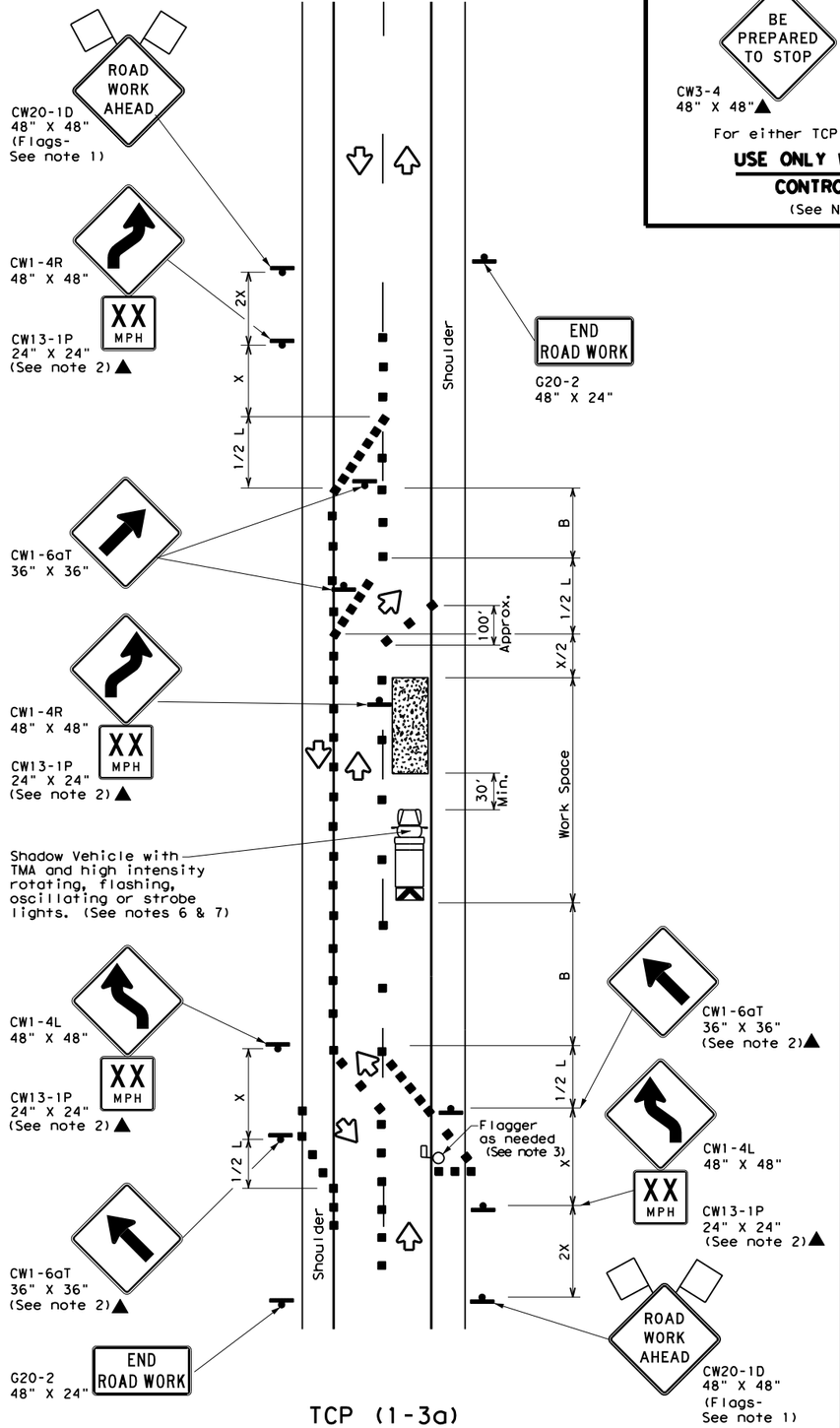
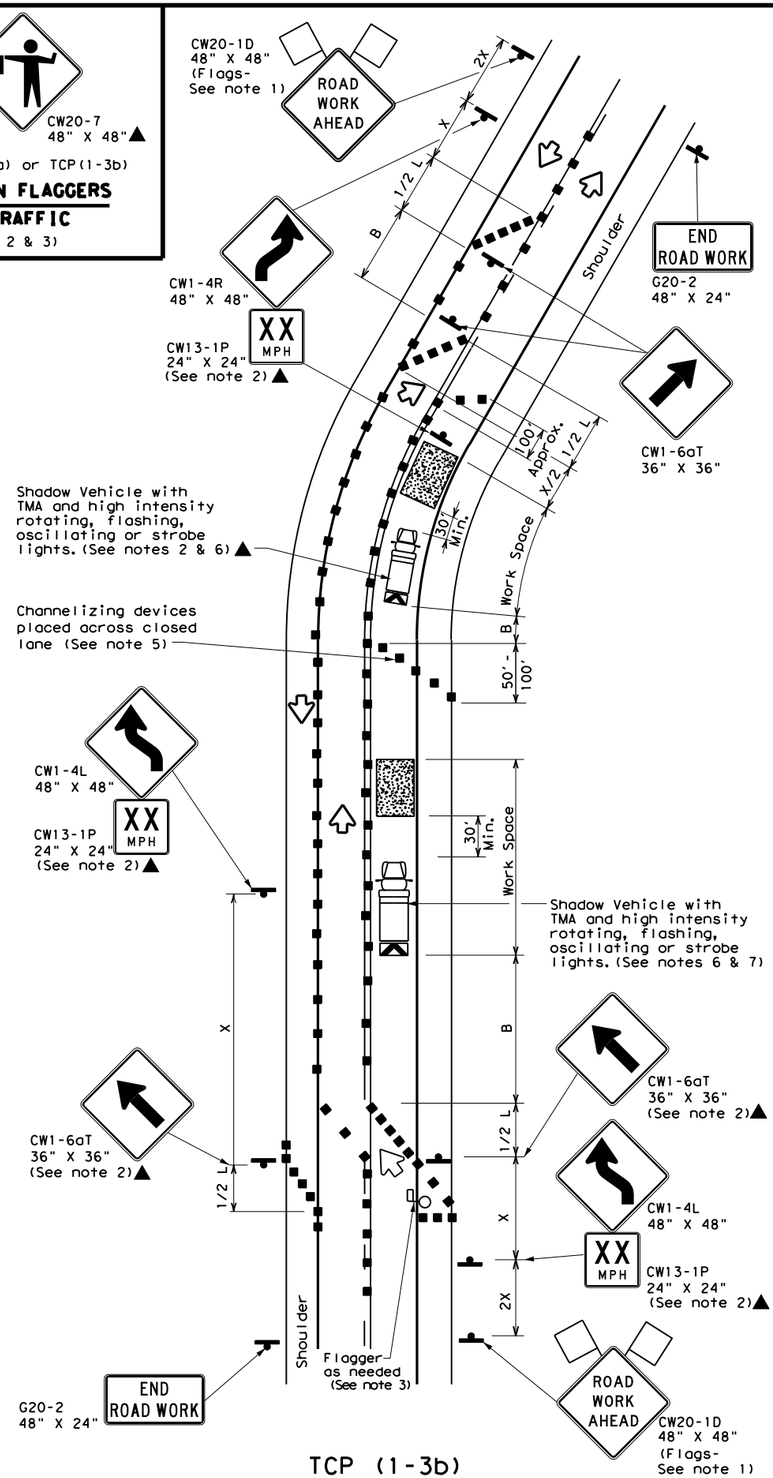


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. 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.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. 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.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. 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	6461	70	001	VARIES
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AMA	POTTER, ETC		20
1-97 2-18				

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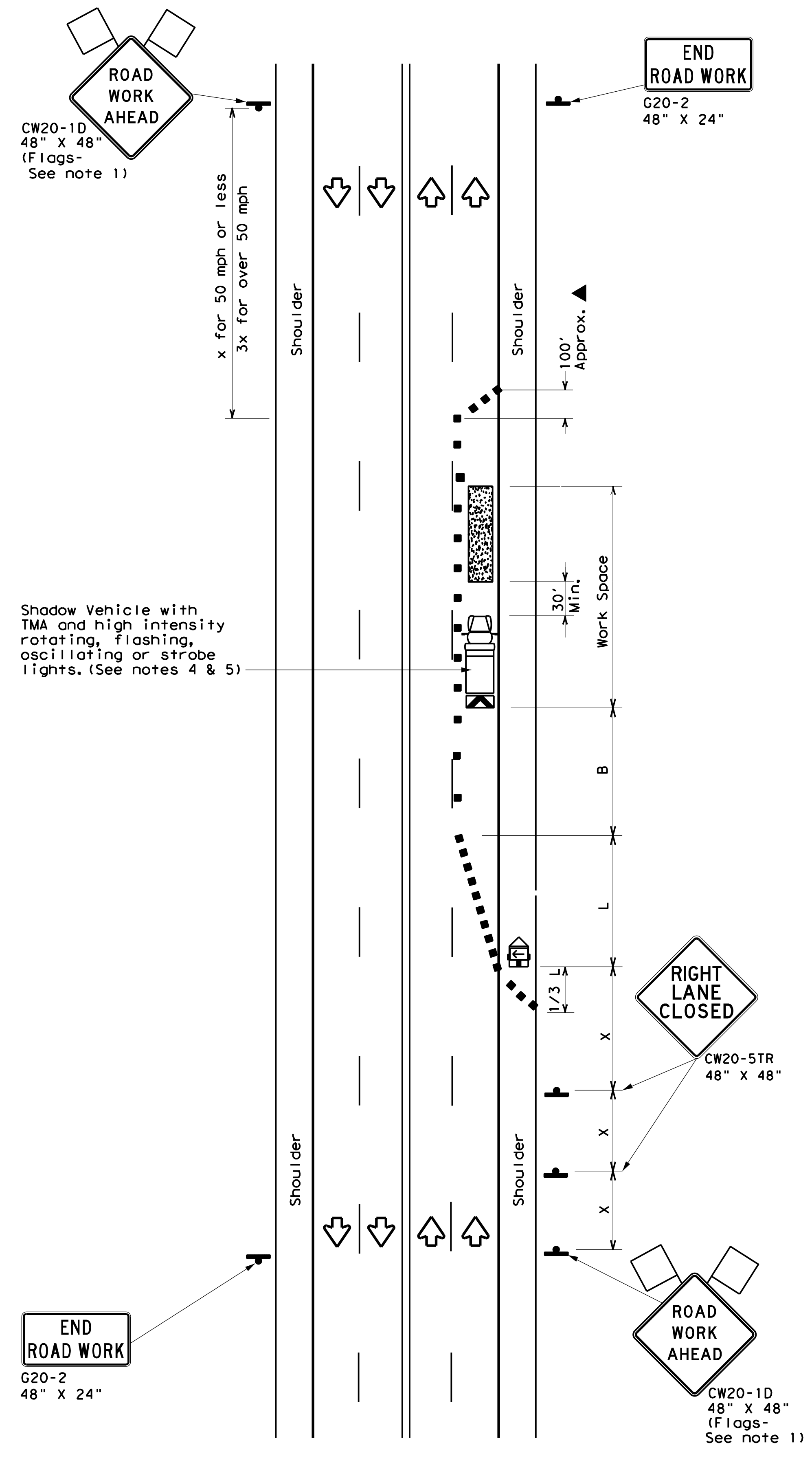
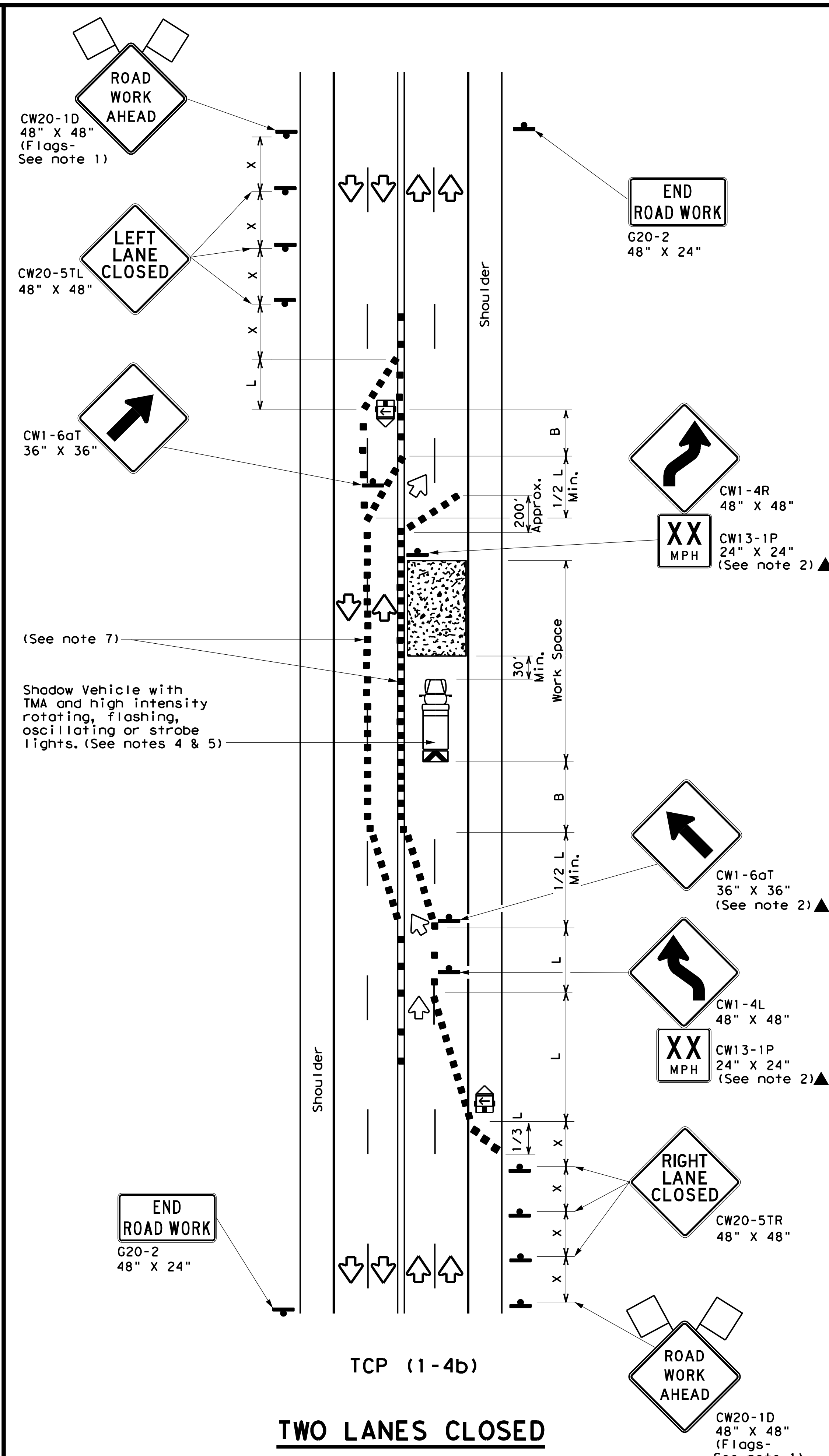


TCP (1-4a)

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

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. 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)

7. 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.

Texas Department of Transportation
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
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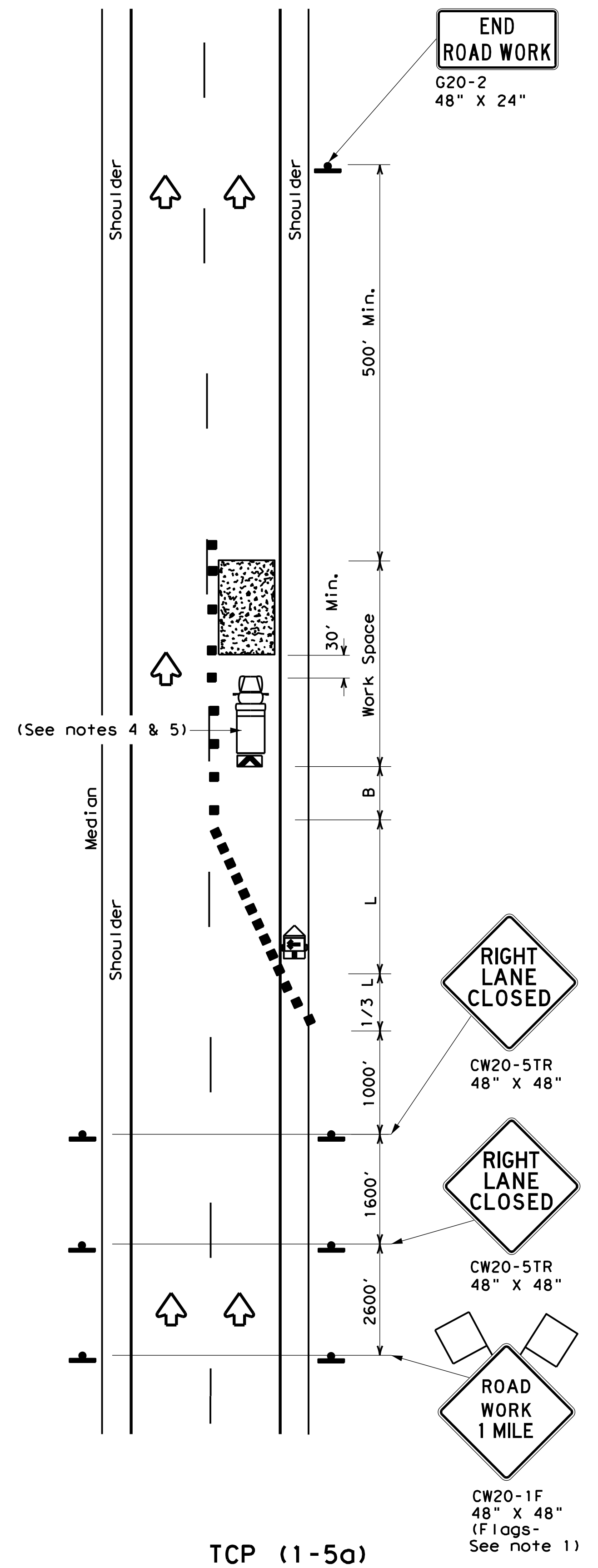
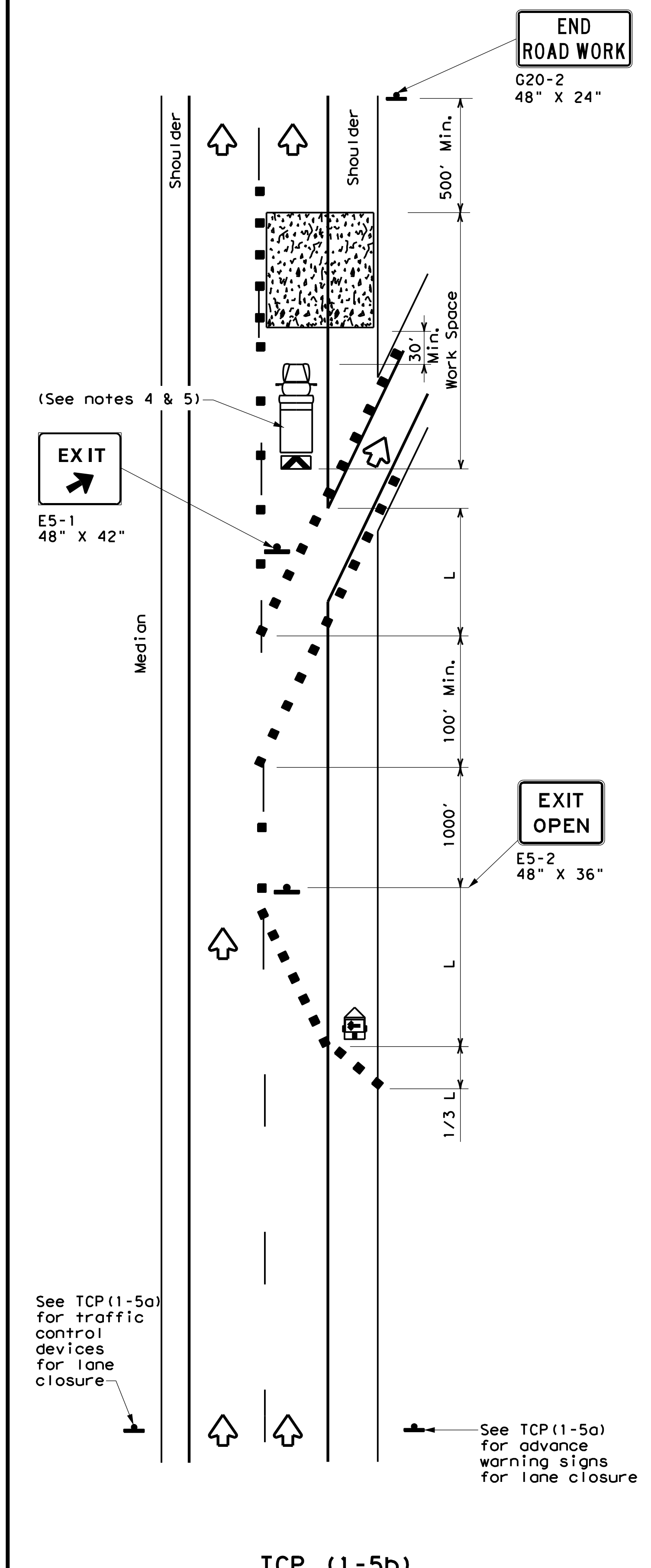
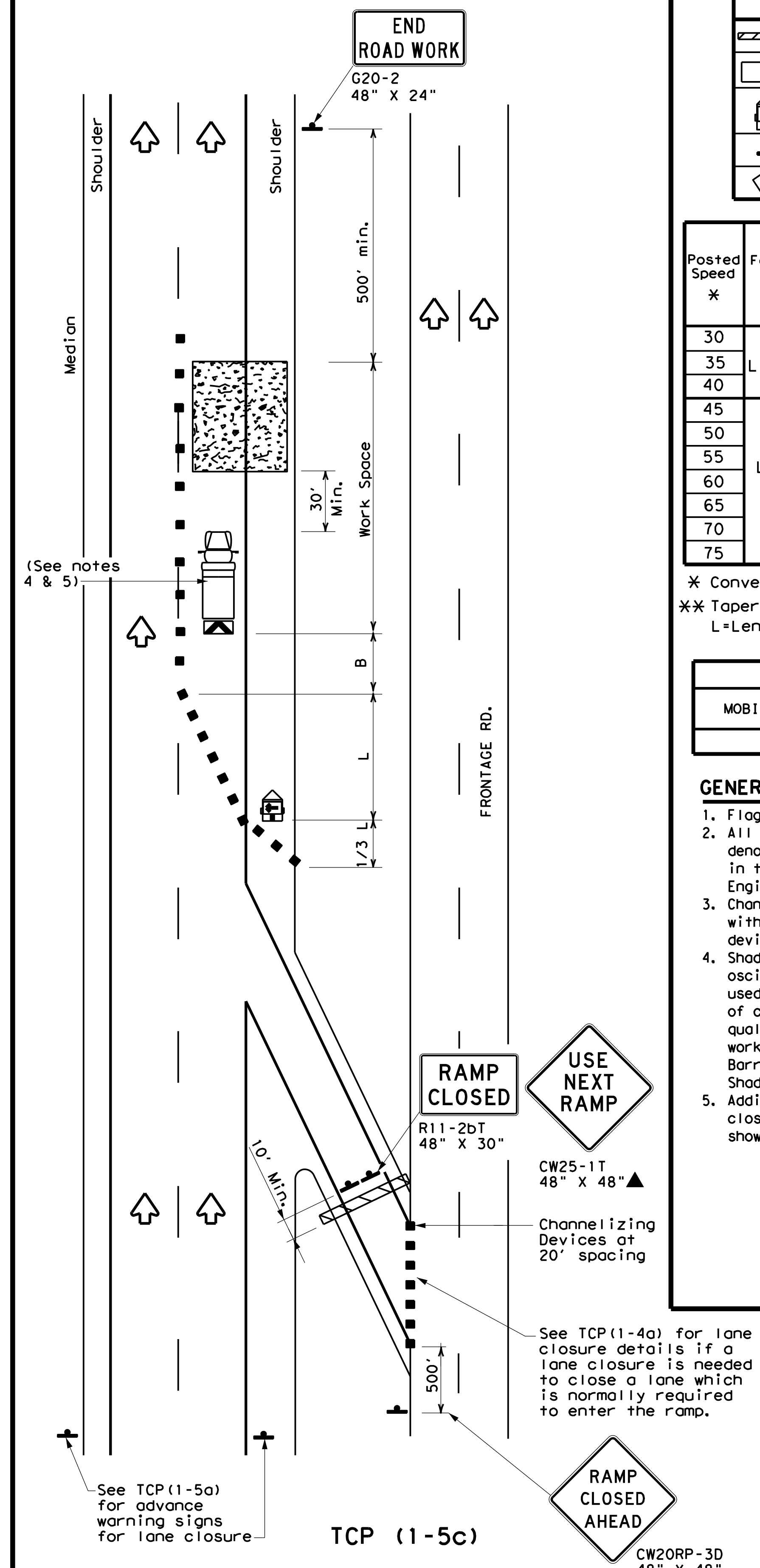
	AMA	POTTER, ETC		21



ONE LANE CLOSURE



LANE CLOSURE NEAR EXIT RAMPS



LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned 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

TCP(1-5)-18

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©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	AMA		POTTER, ETC	22

155

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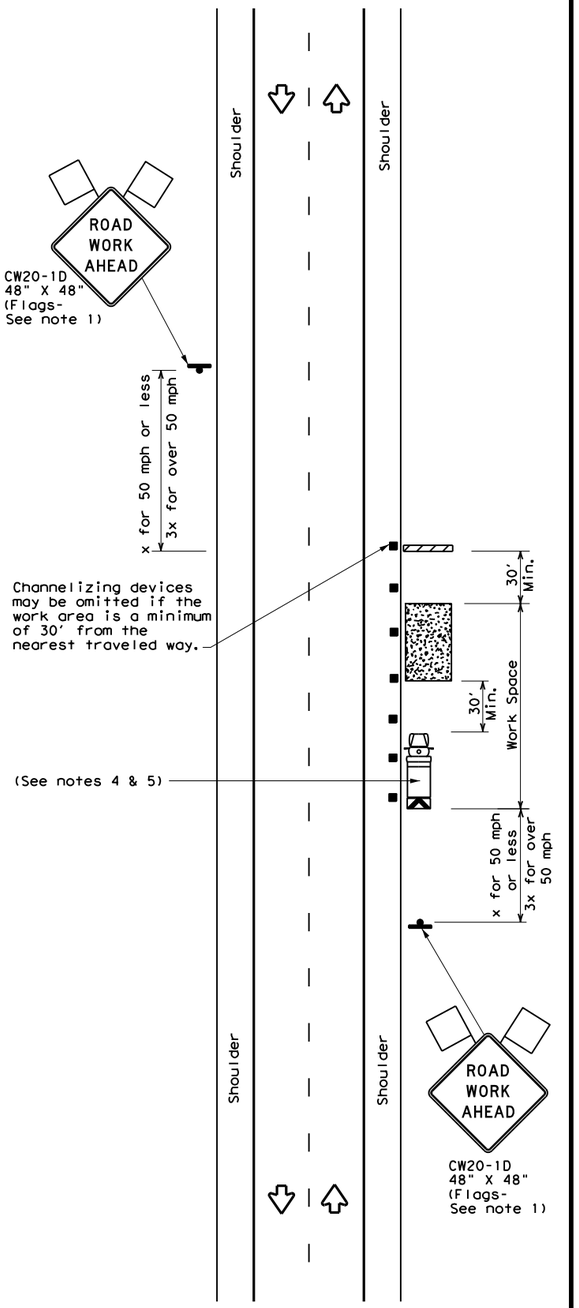
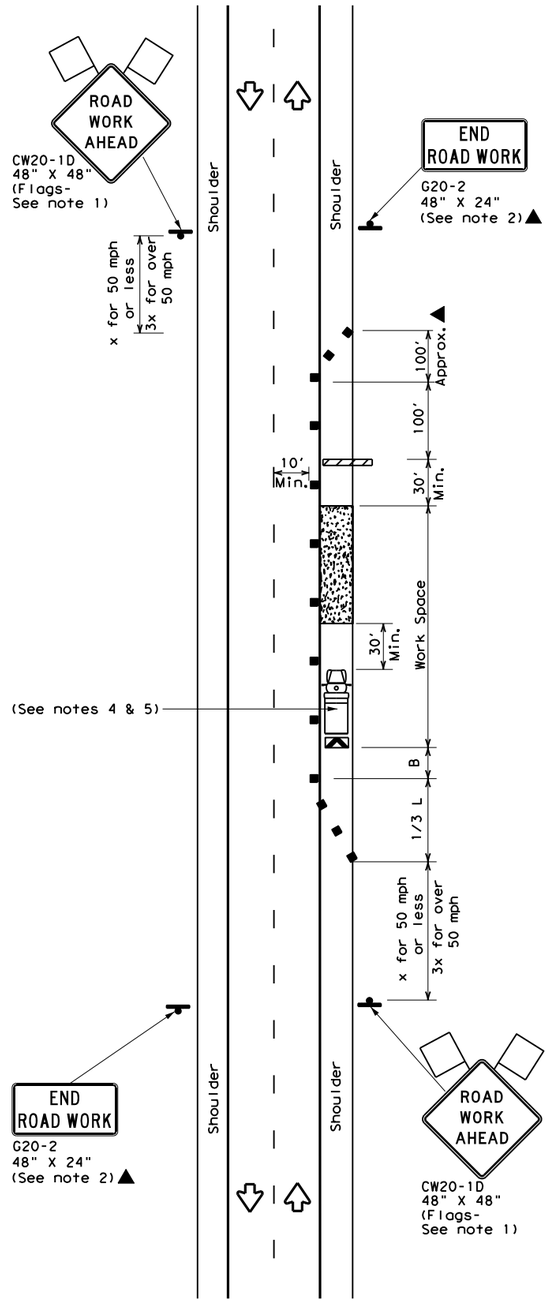


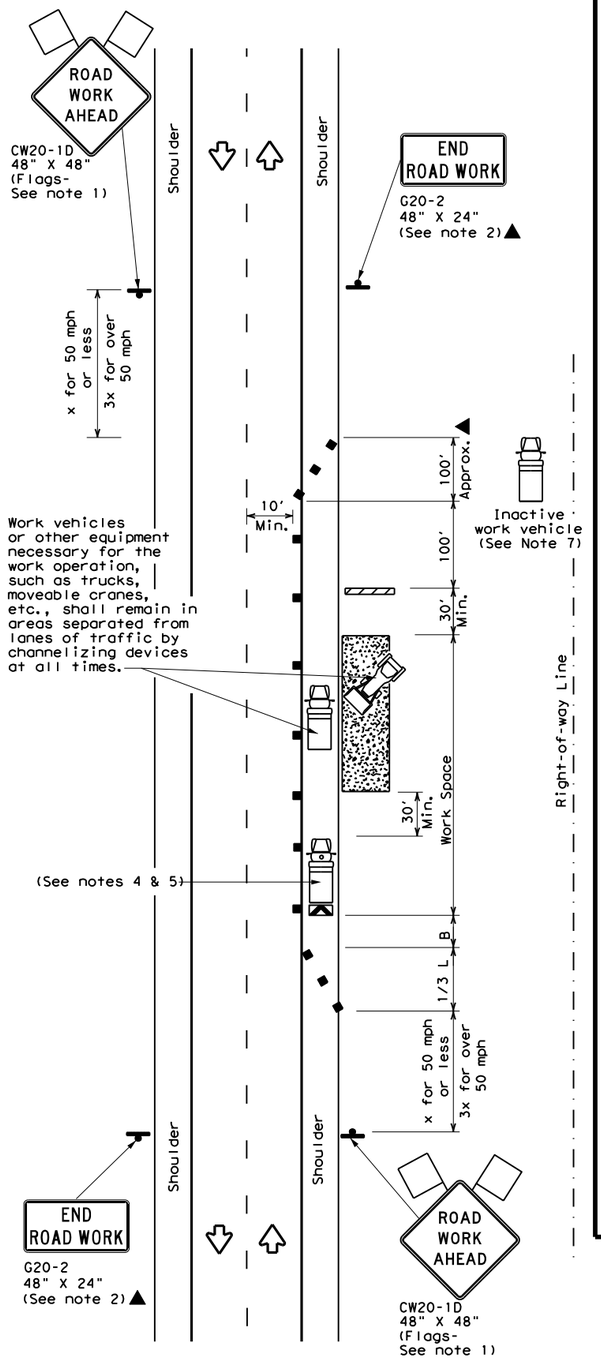
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AMA	POTTER, ETC		23
1-97 2-18				

DATE: 9/12/2024 10:28:51 AM
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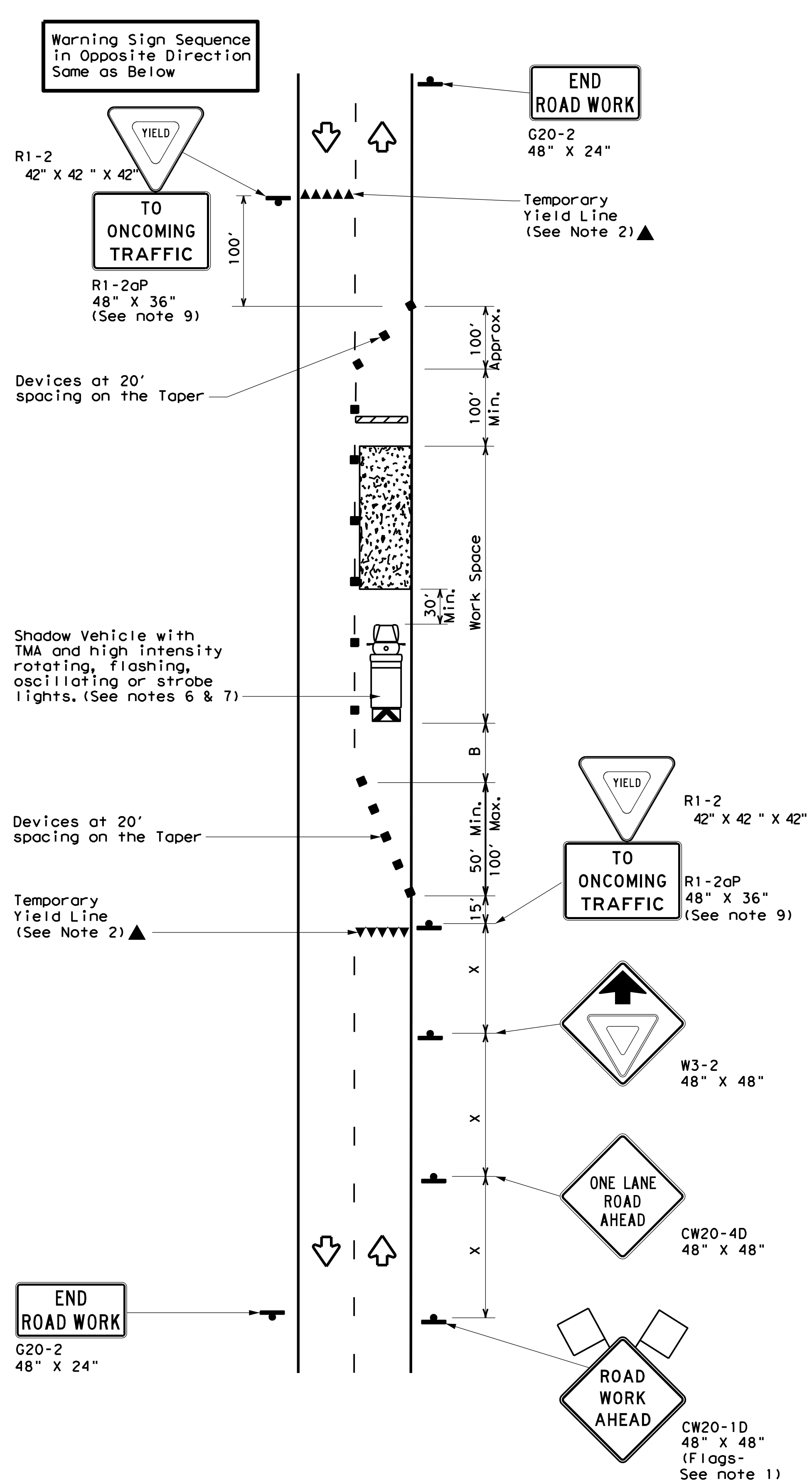


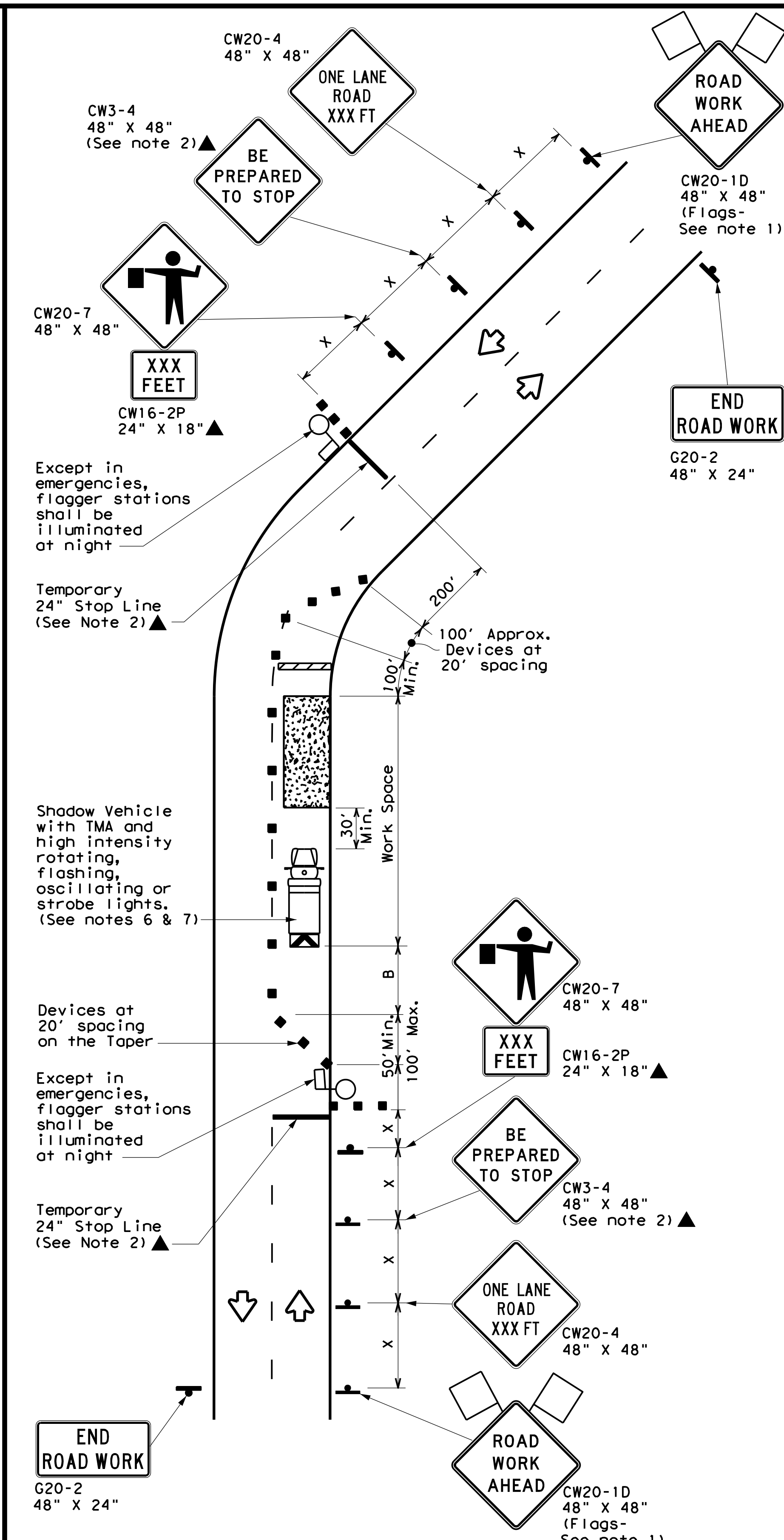
TCP (2-2a)

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	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
8-95 3-03 / 1-97 2-12 / 4-98 2-18	DIST		COUNTY	SHEET NO.
	AMA		POTTER, ETC	24

DATE: 9/12/2024 10:28:53 AM
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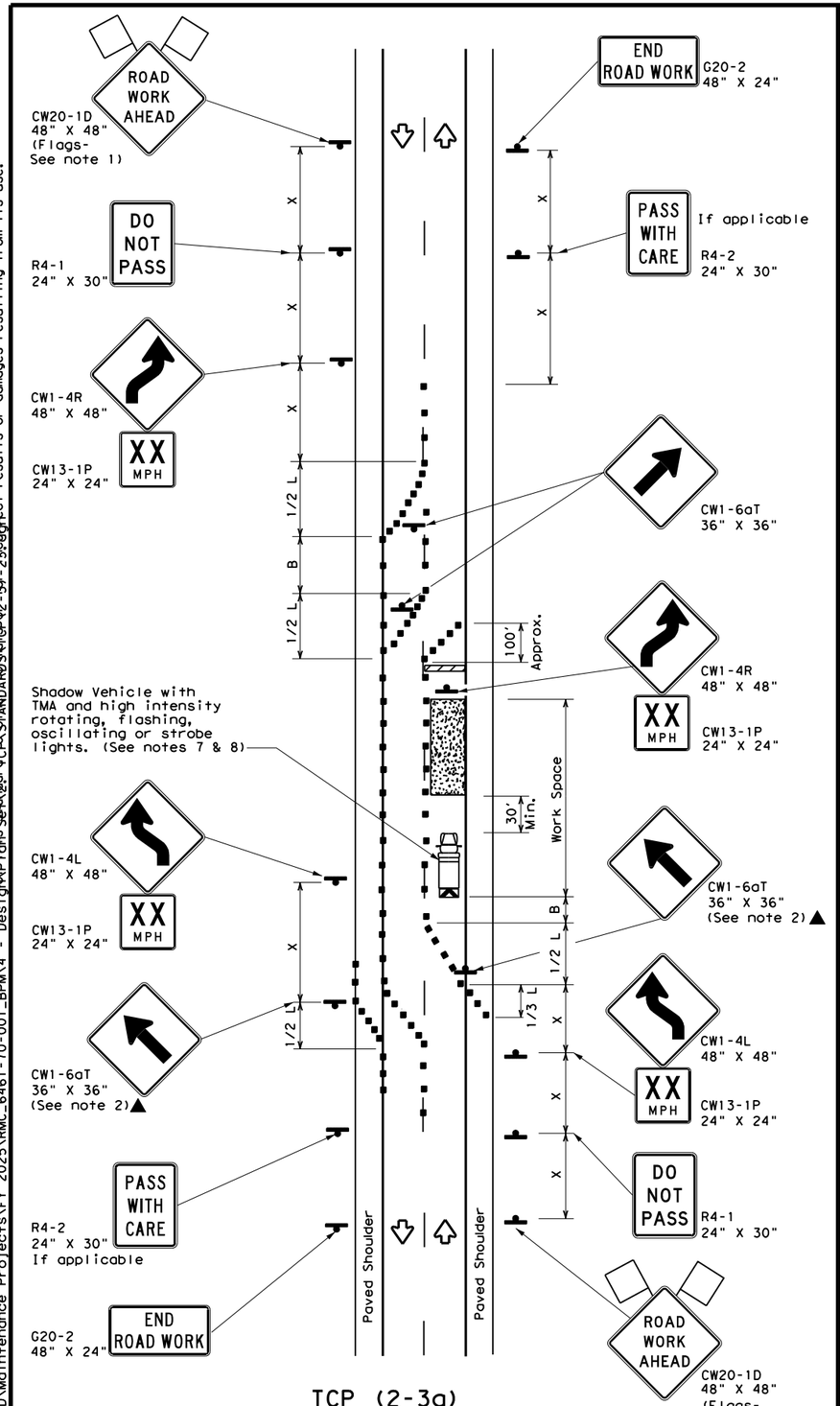
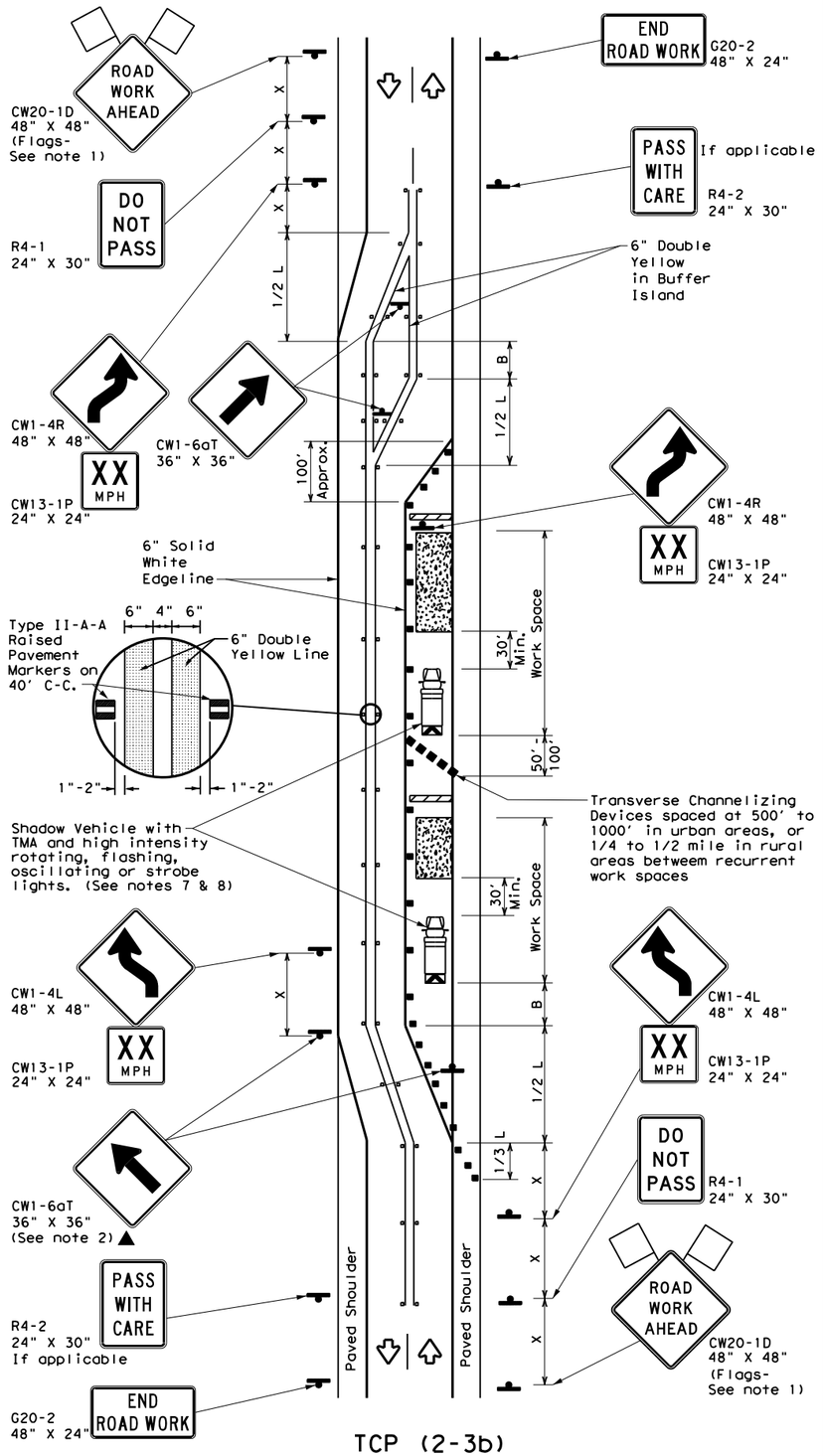


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This 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

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© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
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8-95 3-03 4-23	DIST	COUNTY		SHEET NO.
1-97 2-12	AMA	POTTER, ETC		25

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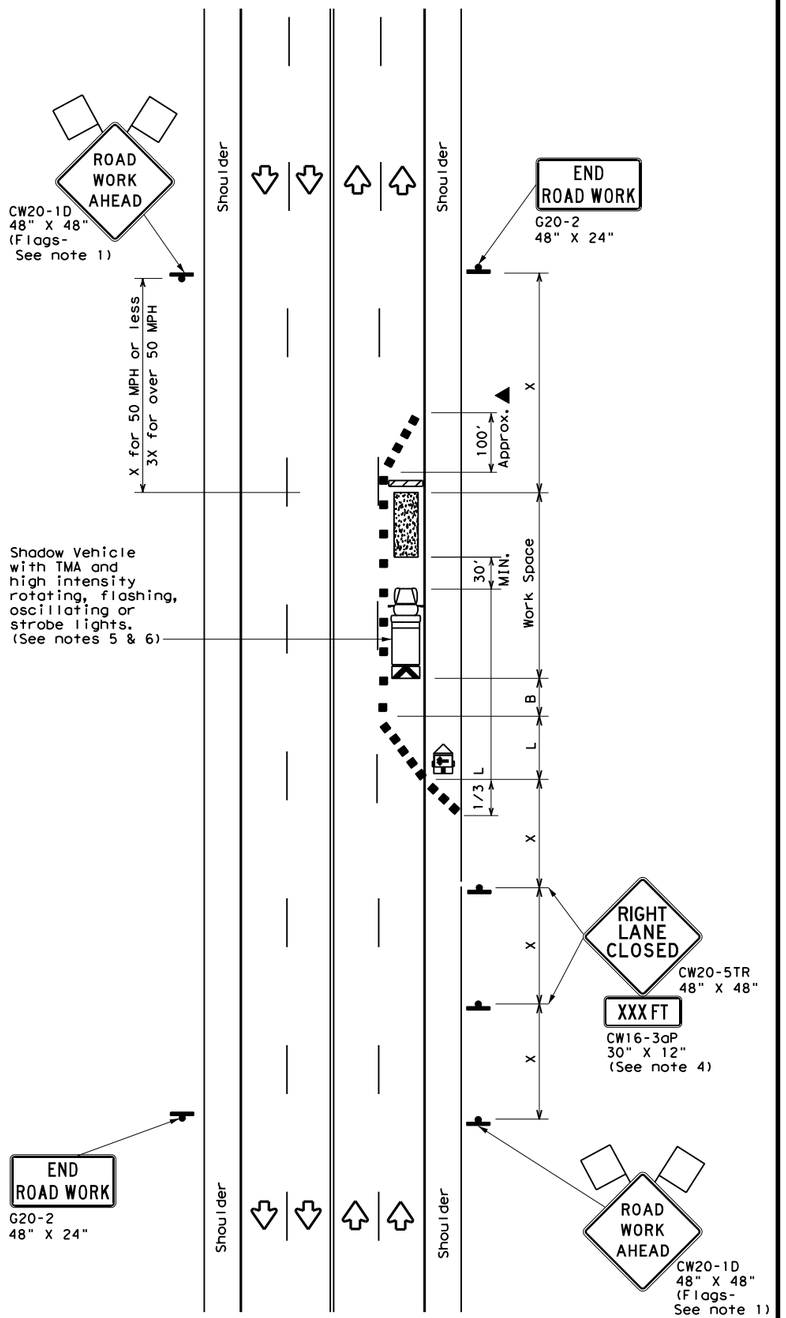
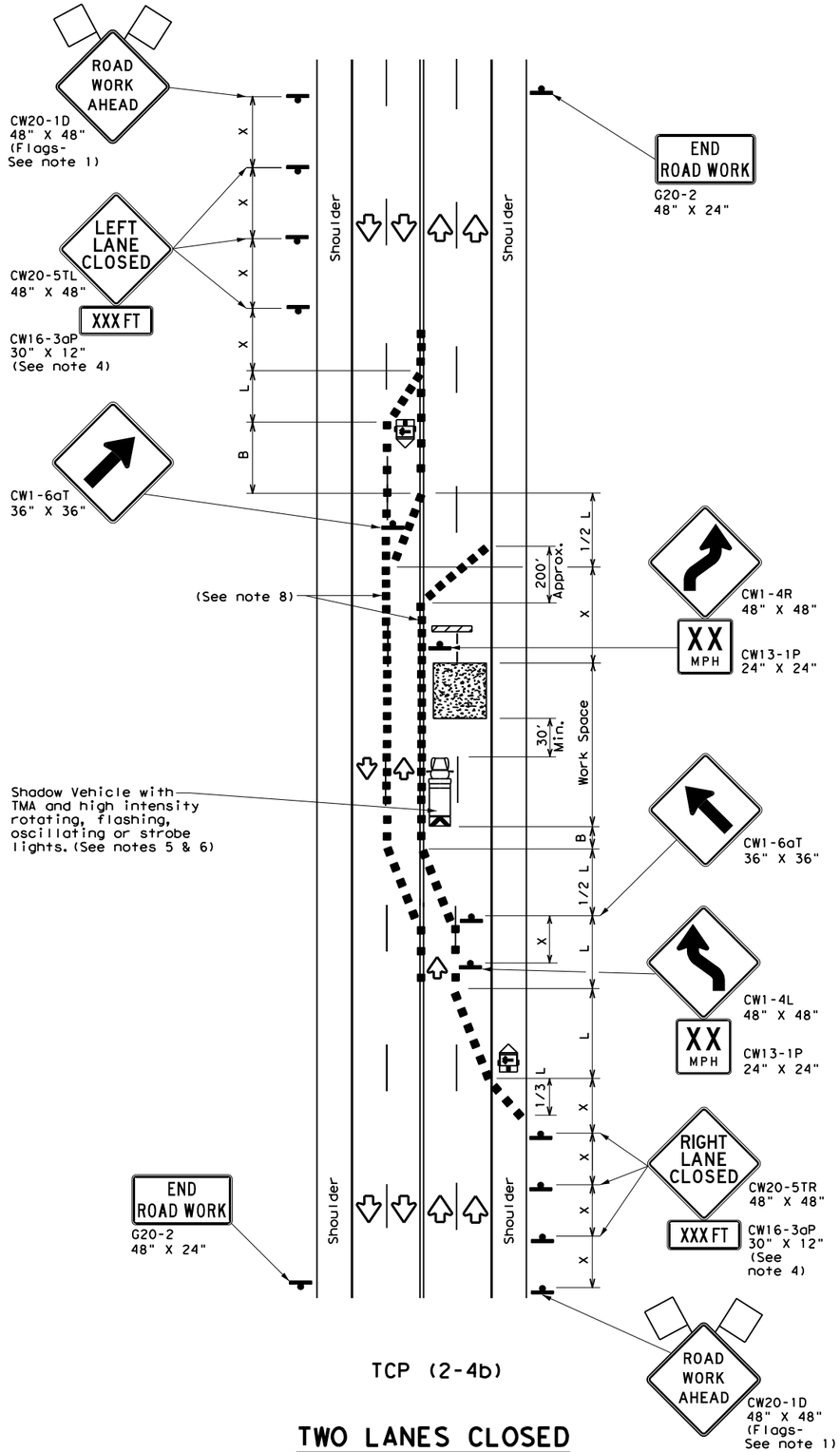


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	AMA	POTTER, ETC		26

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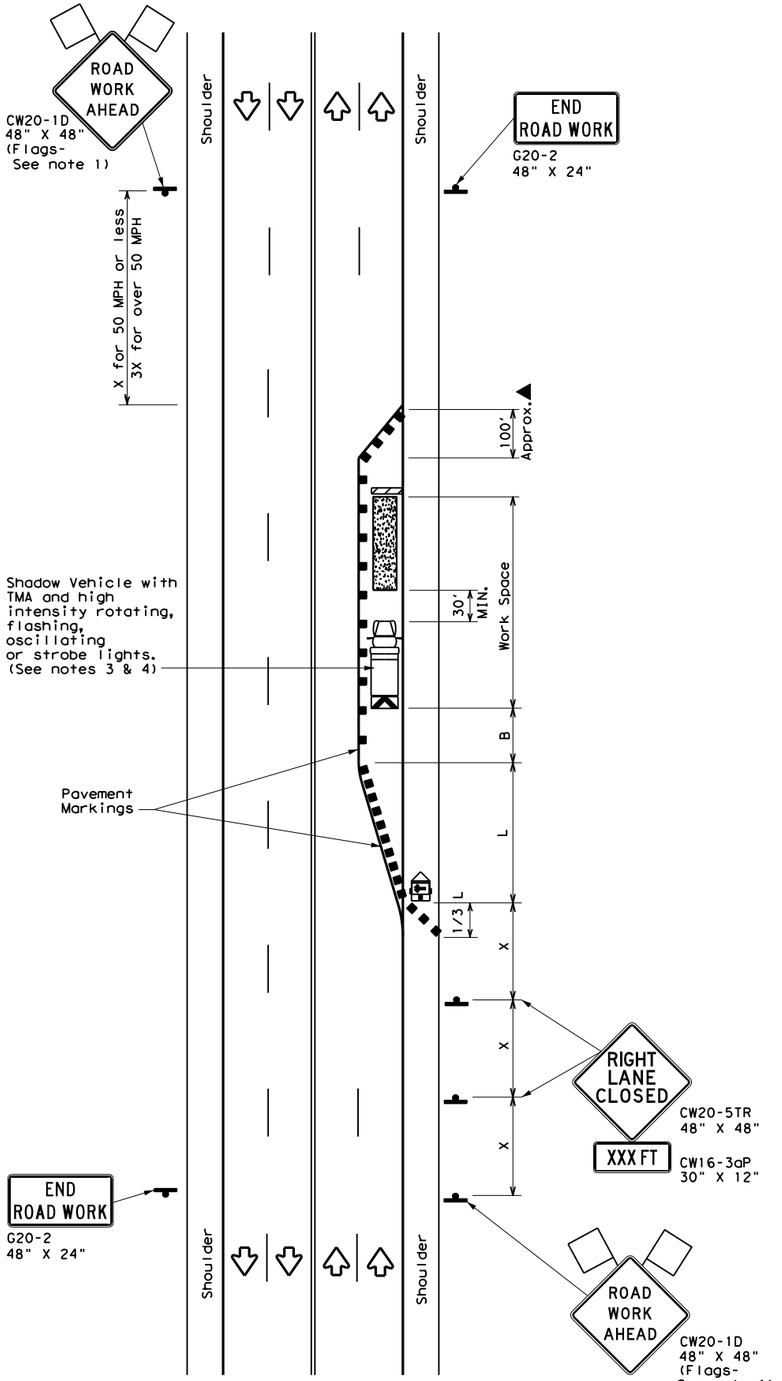
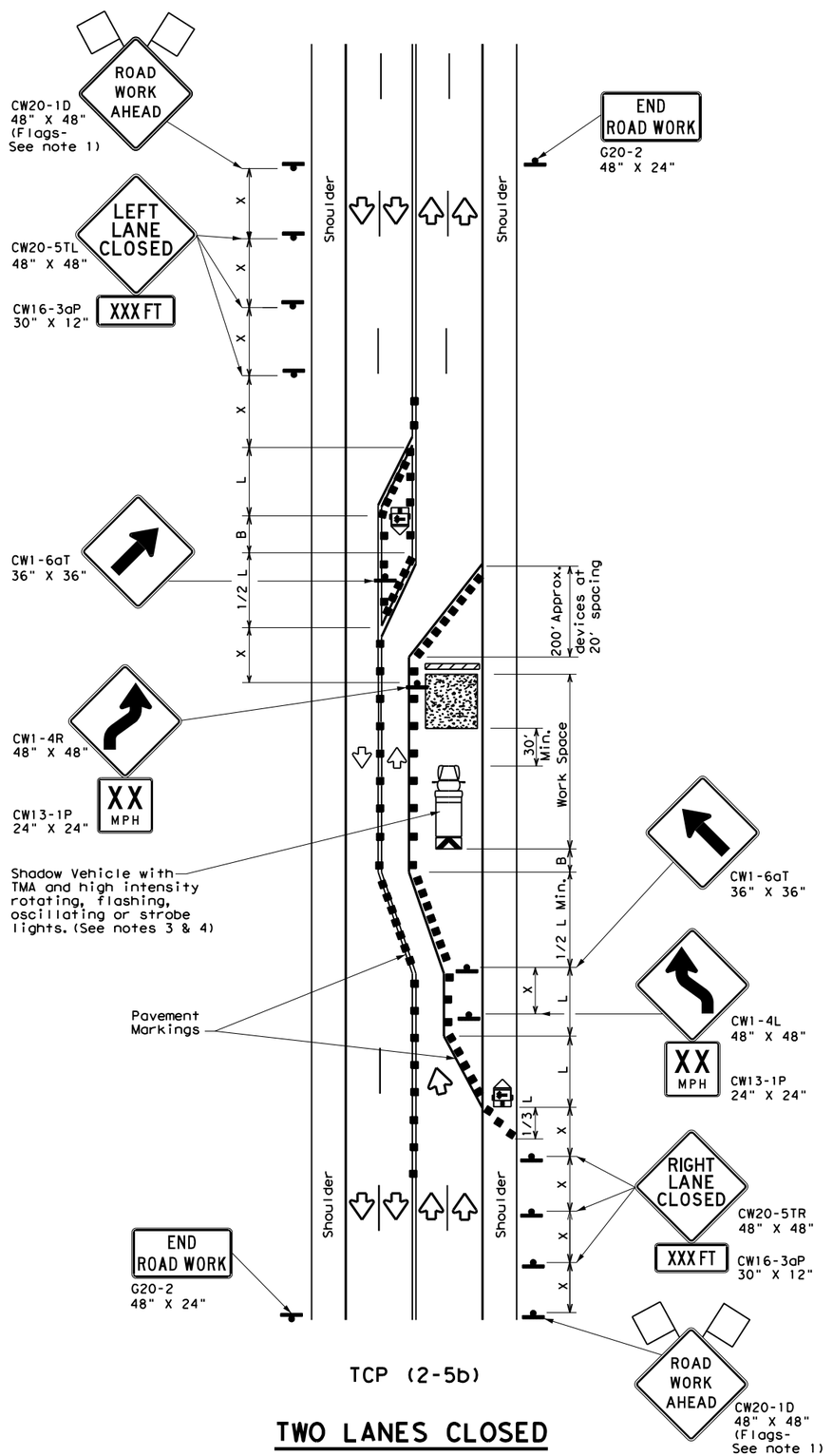


TCP (2-5a)

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. 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.
5. 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)

6. 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)

7. 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

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	AMA	POTTER, ETC		27

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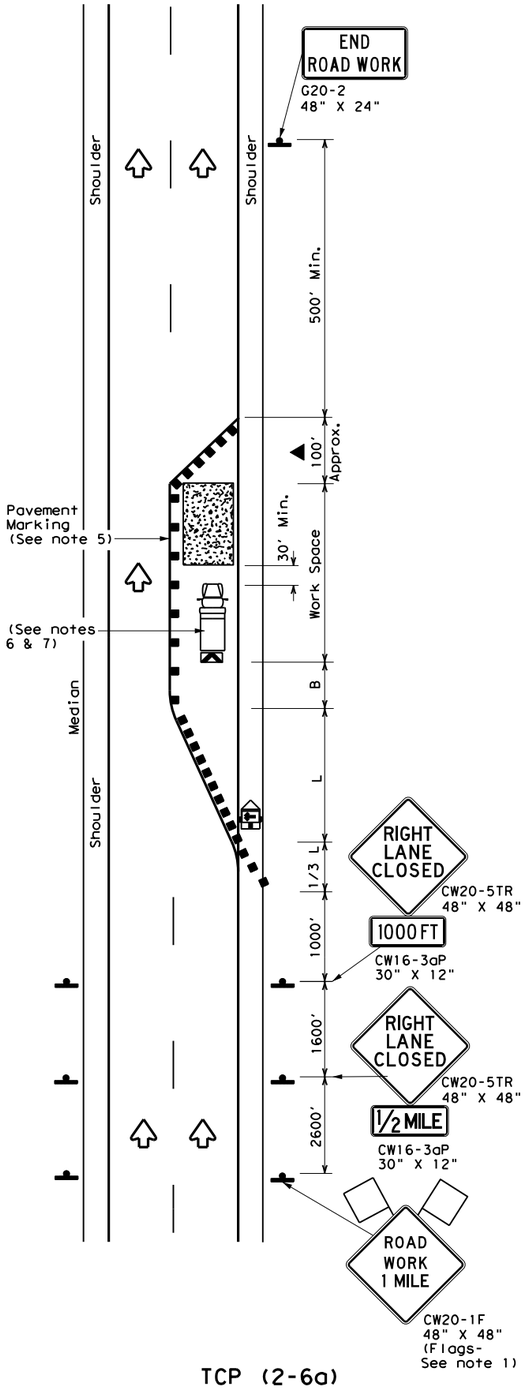
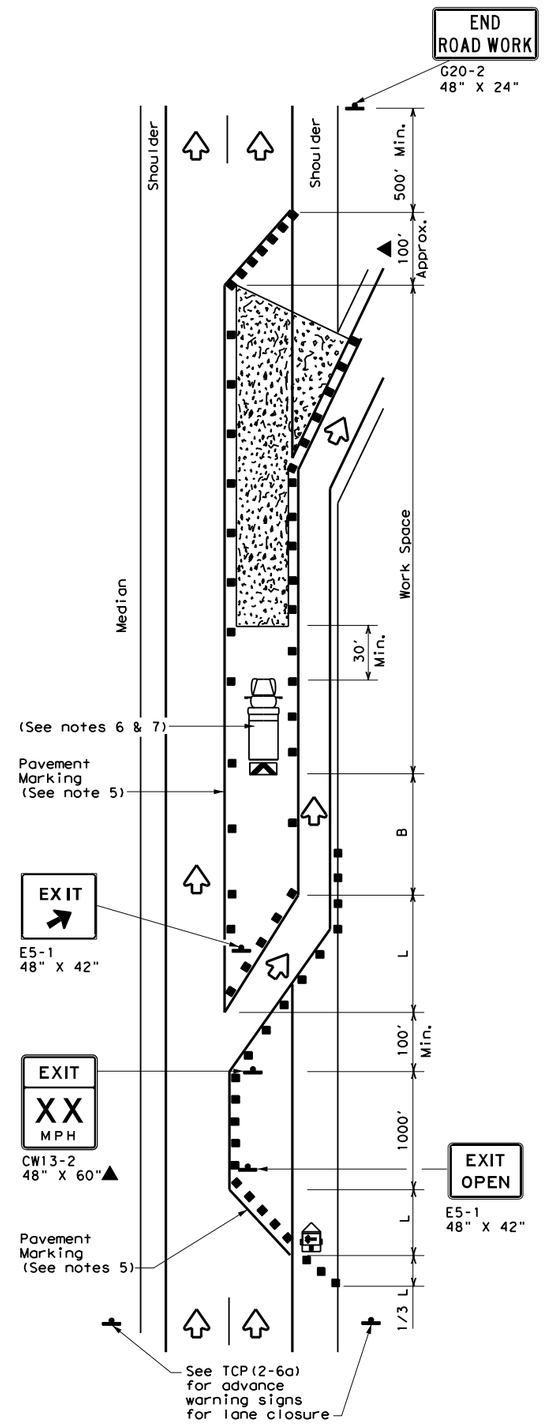


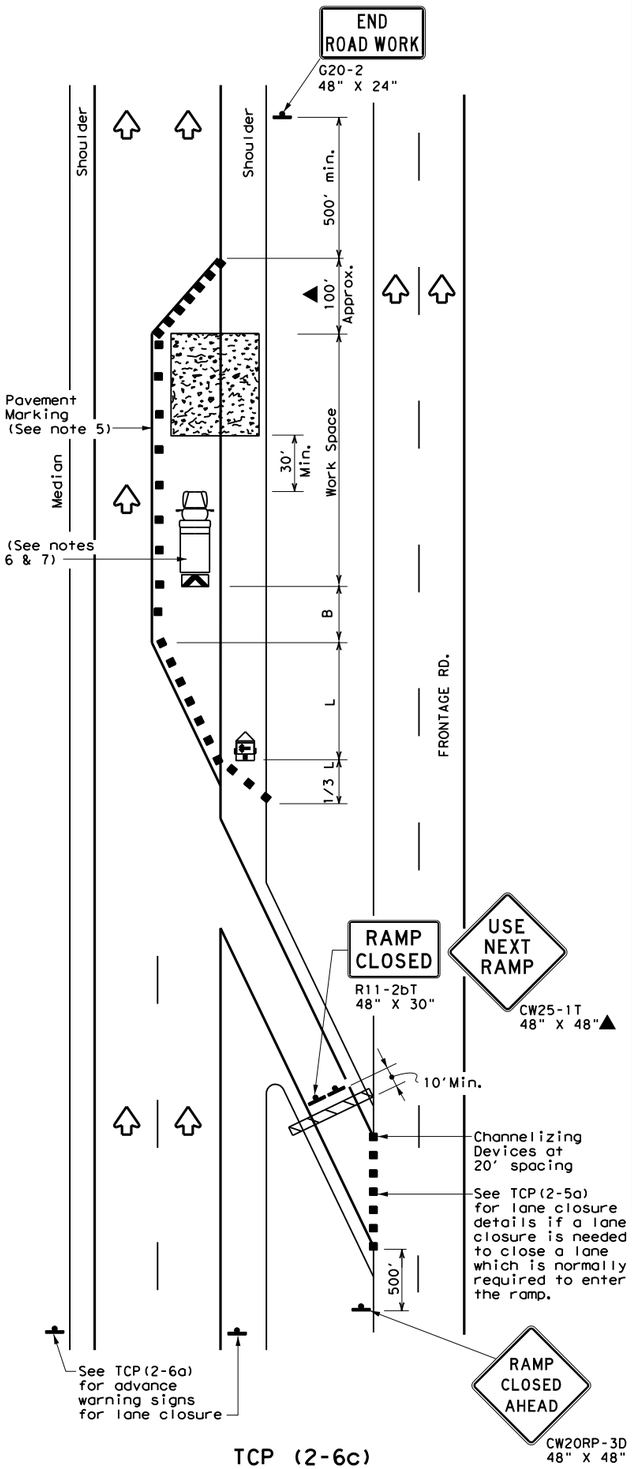
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	6461	70	001	VARIES
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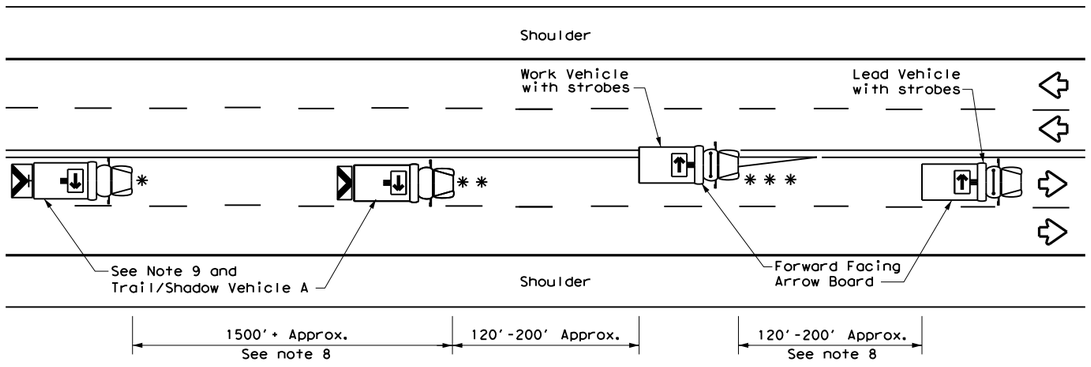
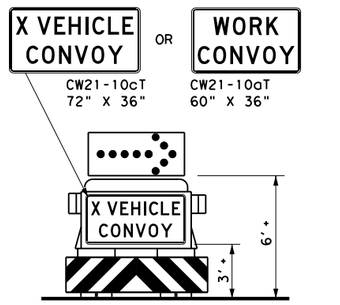


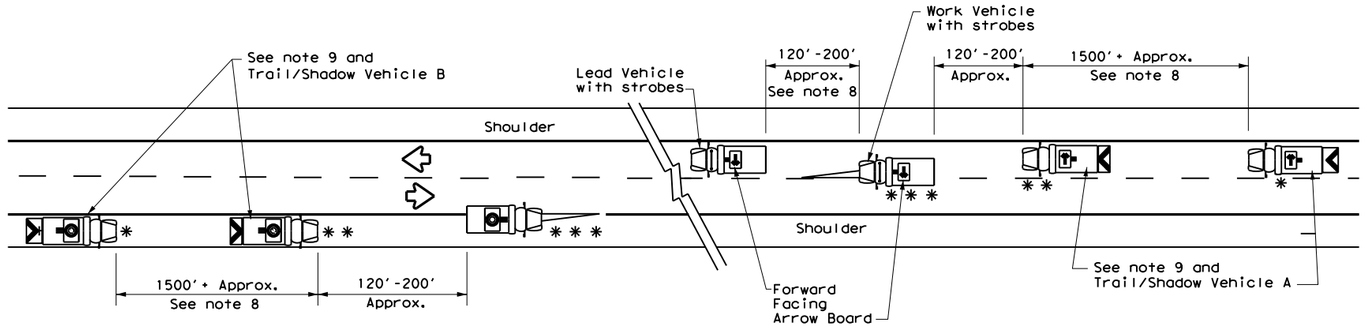
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

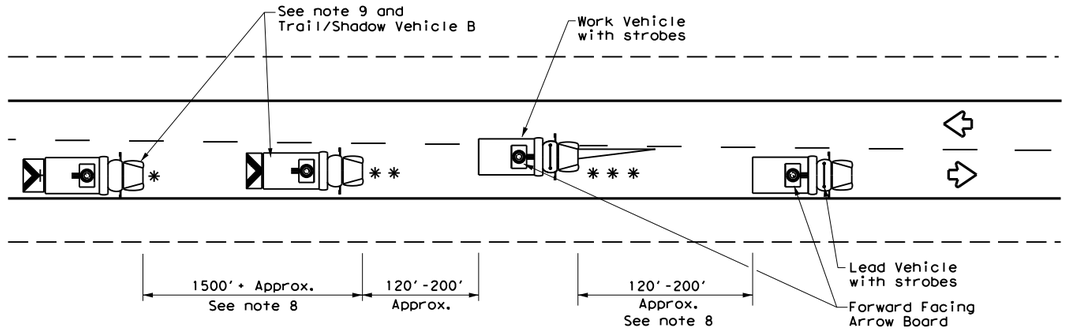


WORK ON SHOULDER

WORK ON TRAVEL LANE

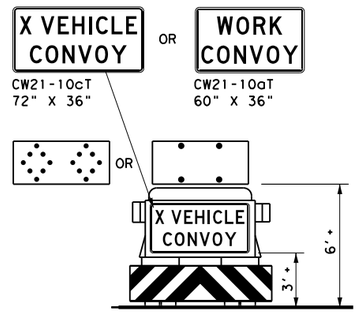
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

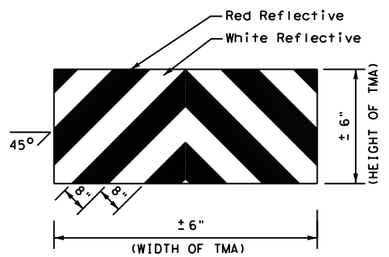
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	6461	70	001	VARIES
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	AMA	POTTER, ETC		29

DATE: 9/12/2024 10:29:01 AM
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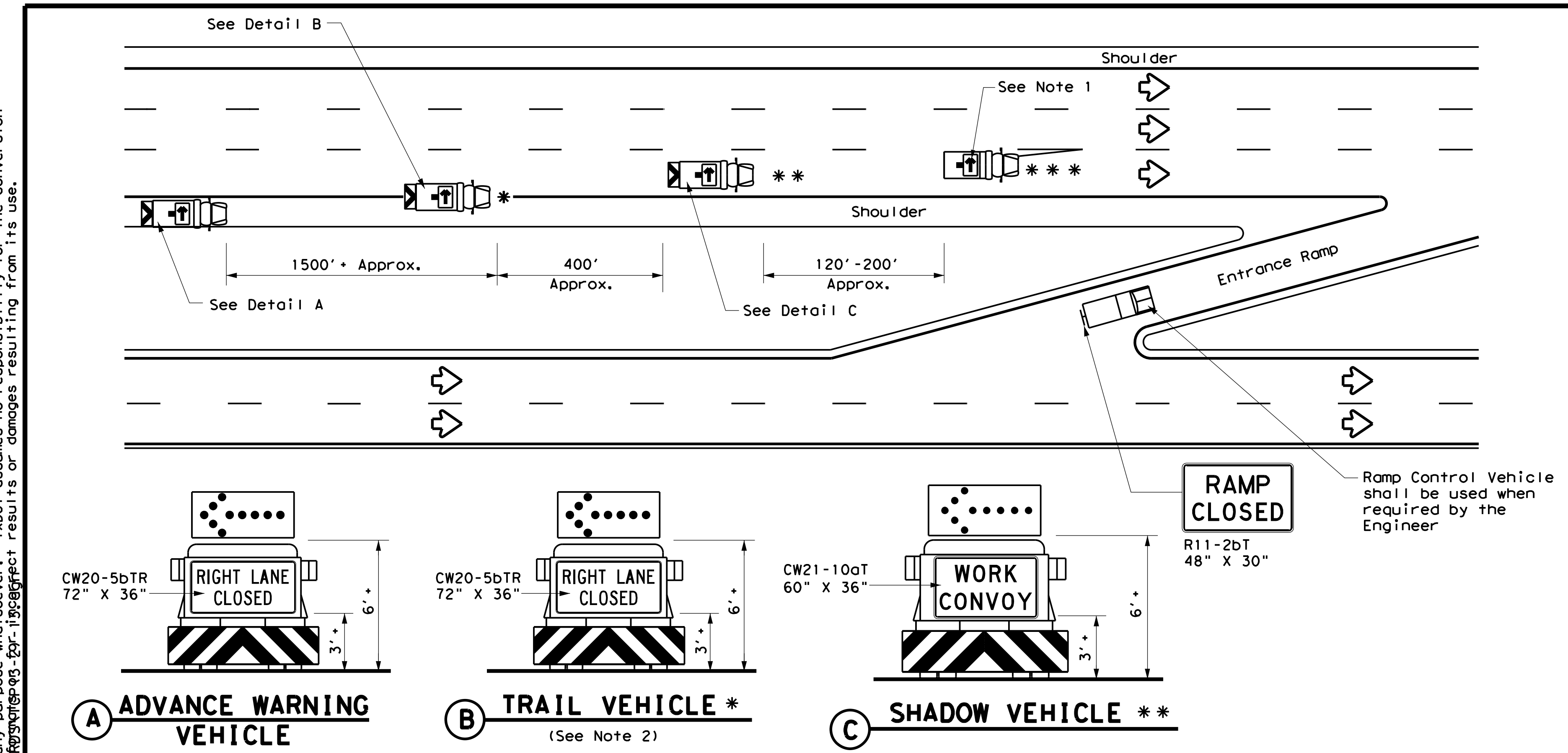
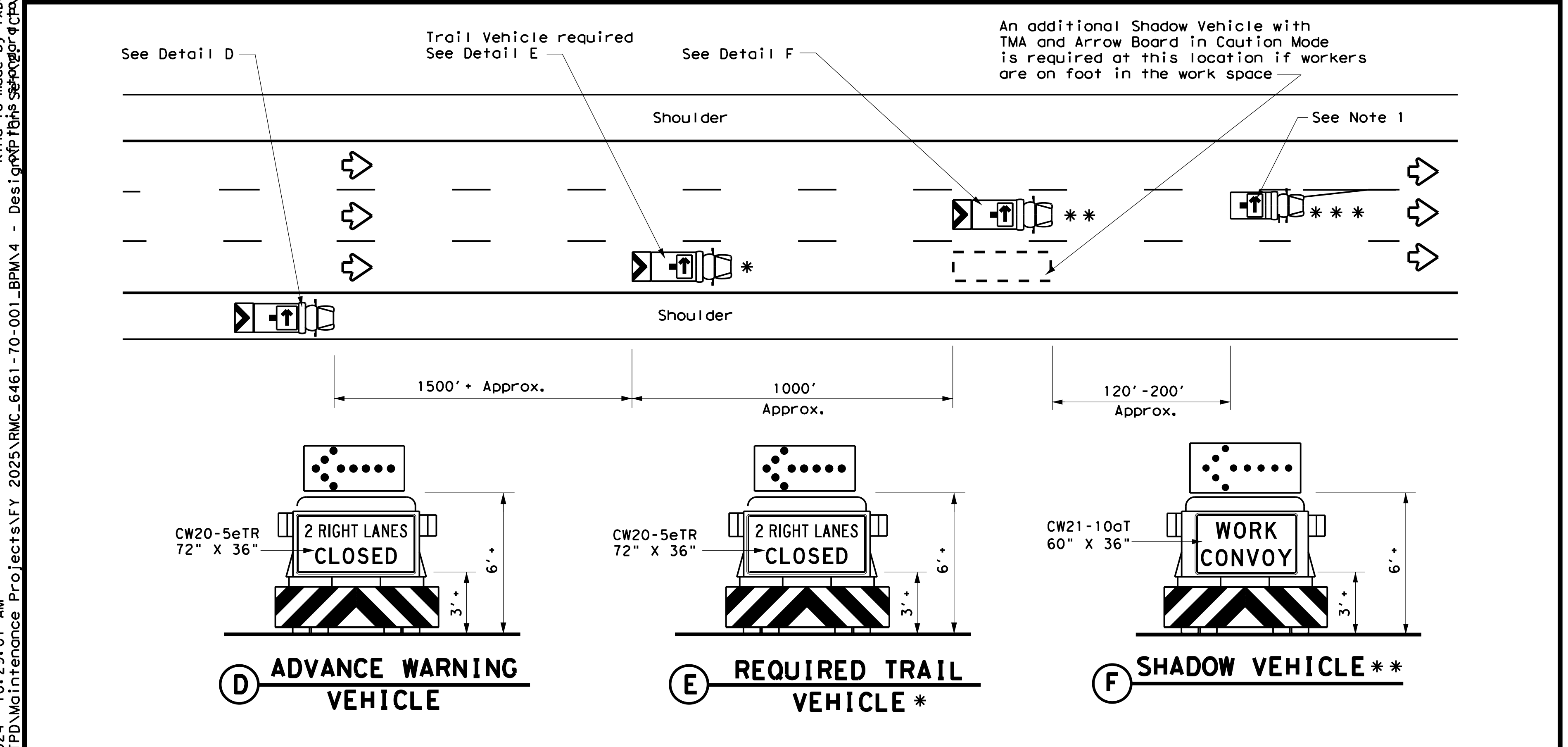


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

LEGEND

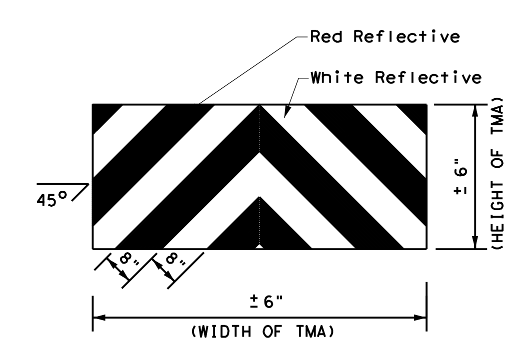
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	6461	70	001	VARIES
	DIST		COUNTY	SHEET NO.
	AMA		POTTER, ETC	30

176

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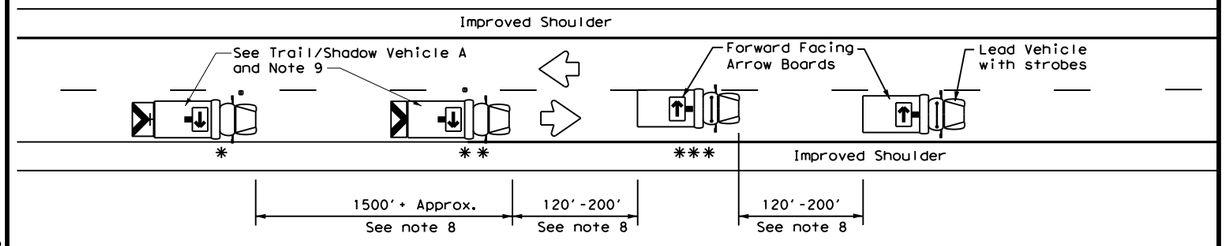
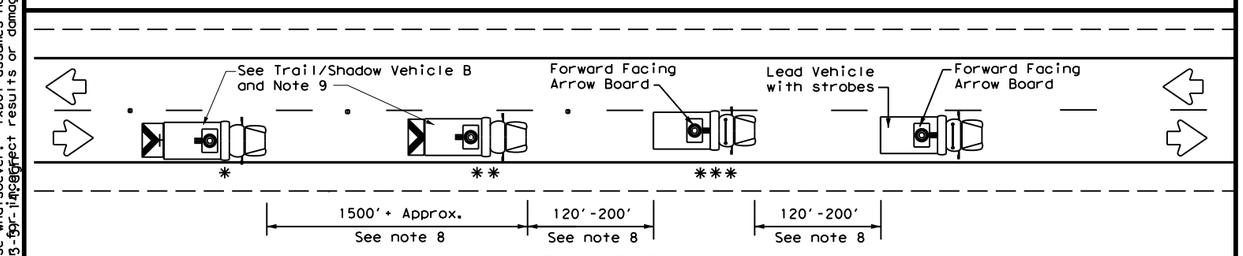


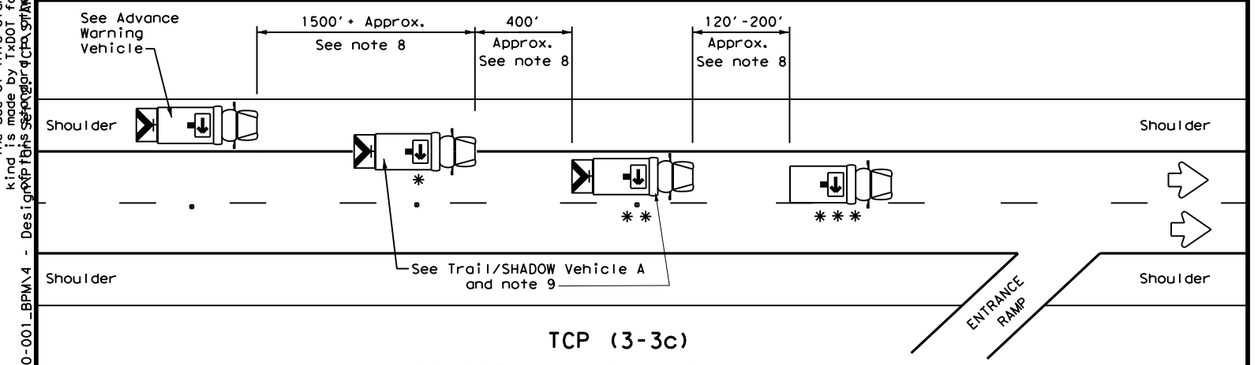
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



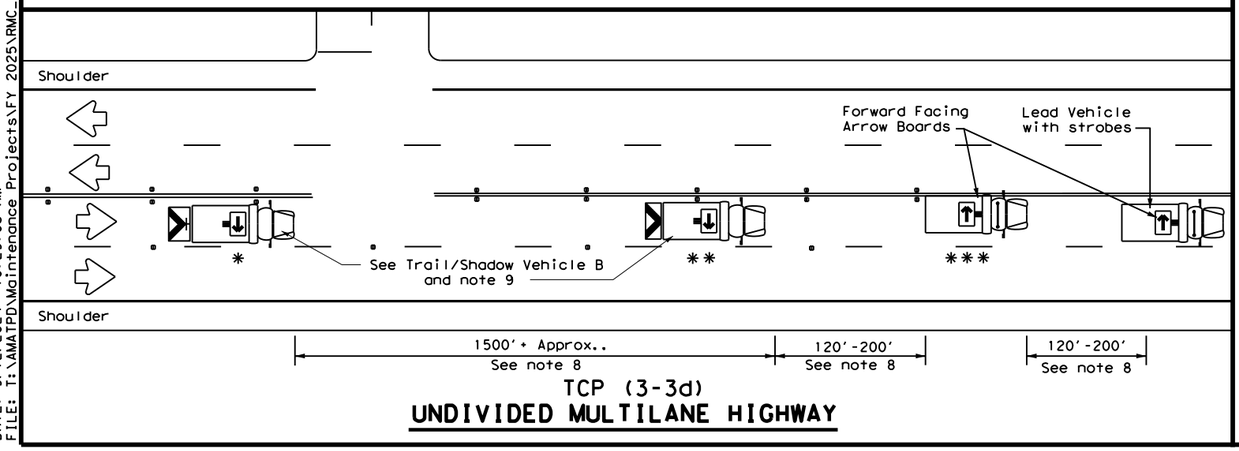
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



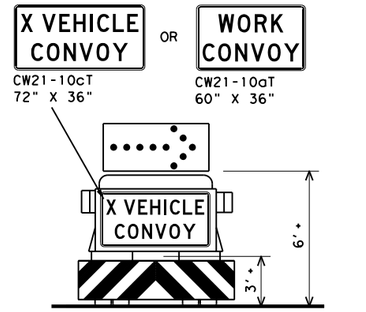
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



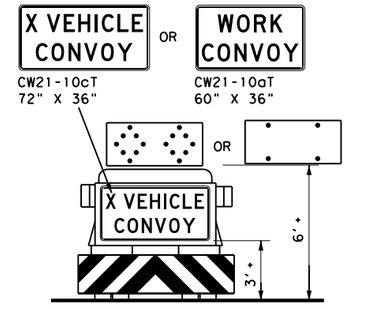
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



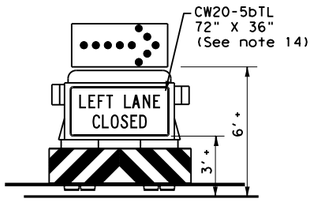
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

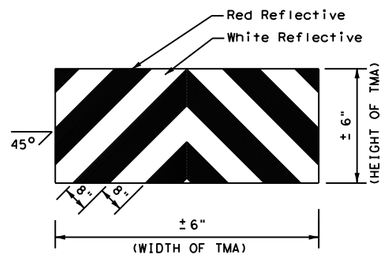


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

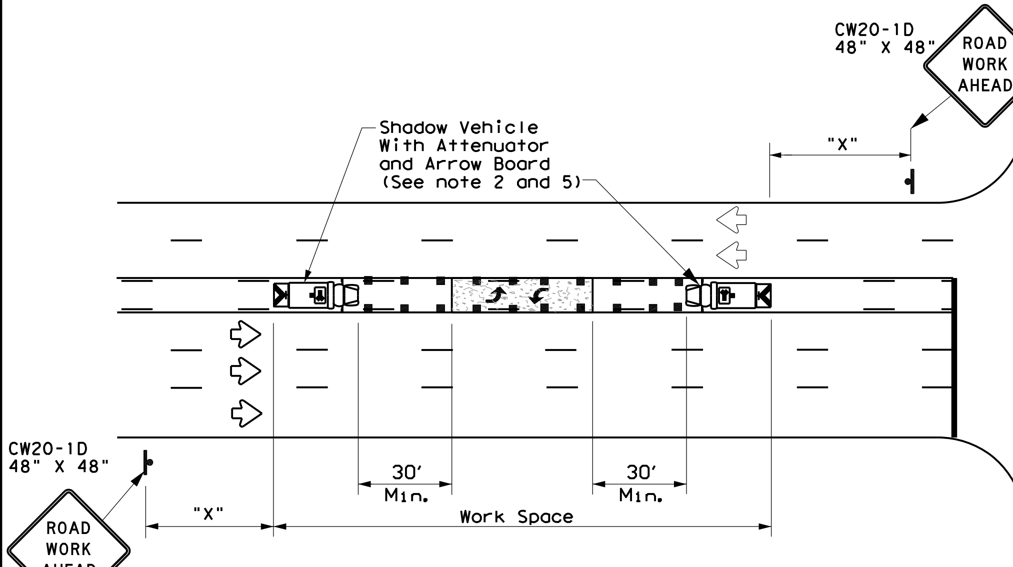
Texas Department of Transportation

Traffic Operations Division Standard

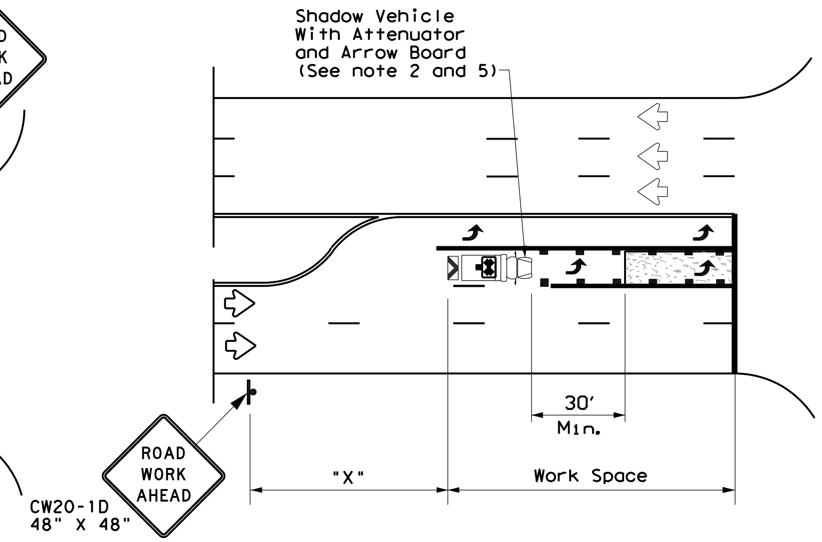
TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

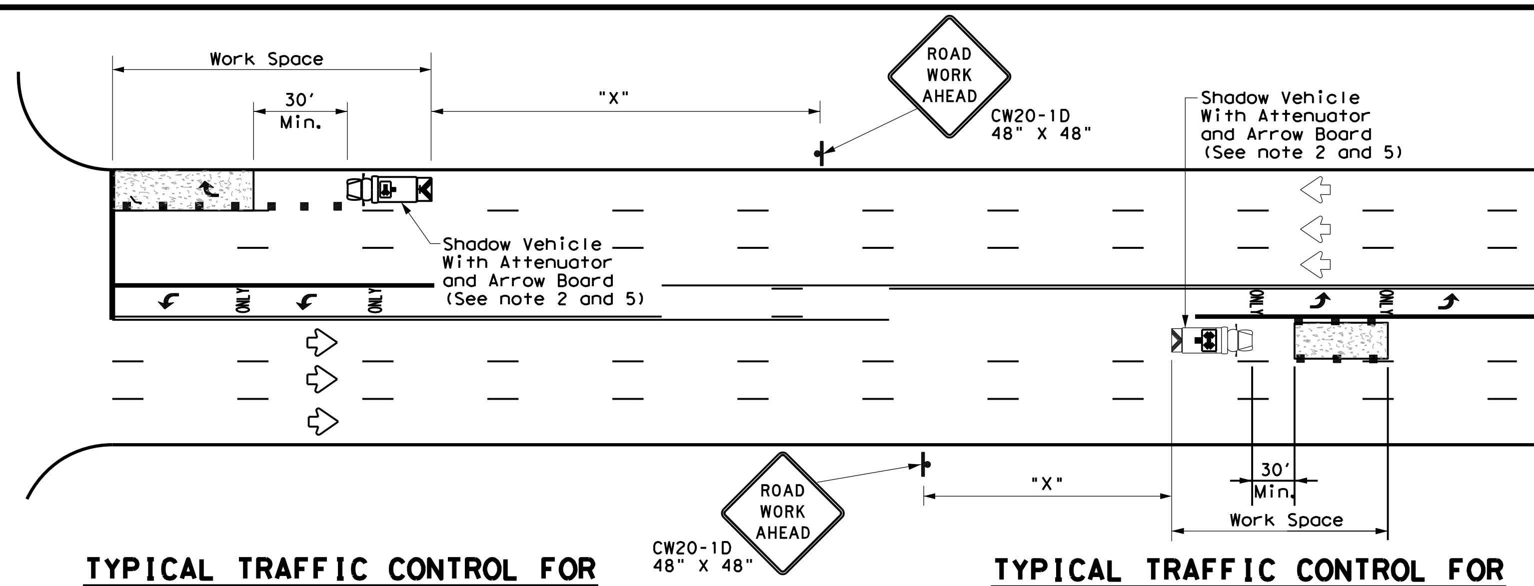
FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	AMA	POTTER, ETC		31
1-97 7-14				



TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

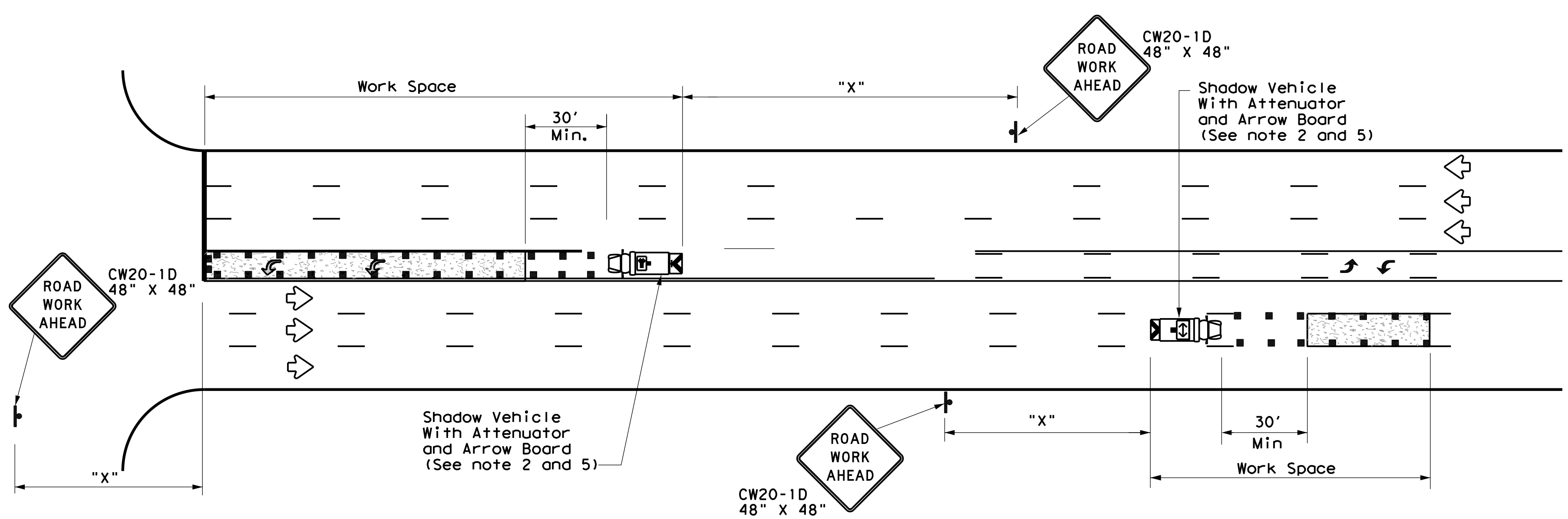


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

LEGEND

Symbol	Description	Symbol	ARROW BOARD DISPLAY
*	Trail Vehicle		
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow	■ ■ ■	Channelizing Devices

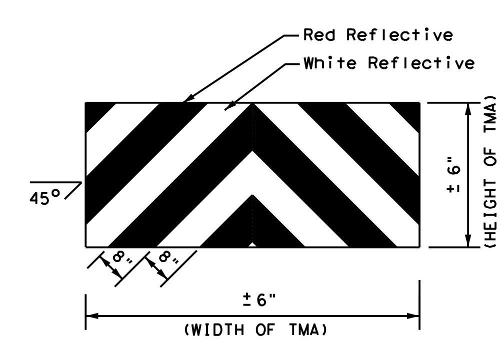
Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'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

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

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

GENERAL NOTES

1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

FILE: tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT July, 2013	CONT 6461	SECT 70	JOB 001	HIGHWAY VARIES
REVISIONS	DIST AMA	COUNTY POTTER, ETC		SHEET NO. 32

DATE: 9/12/2024 10:29:06 AM
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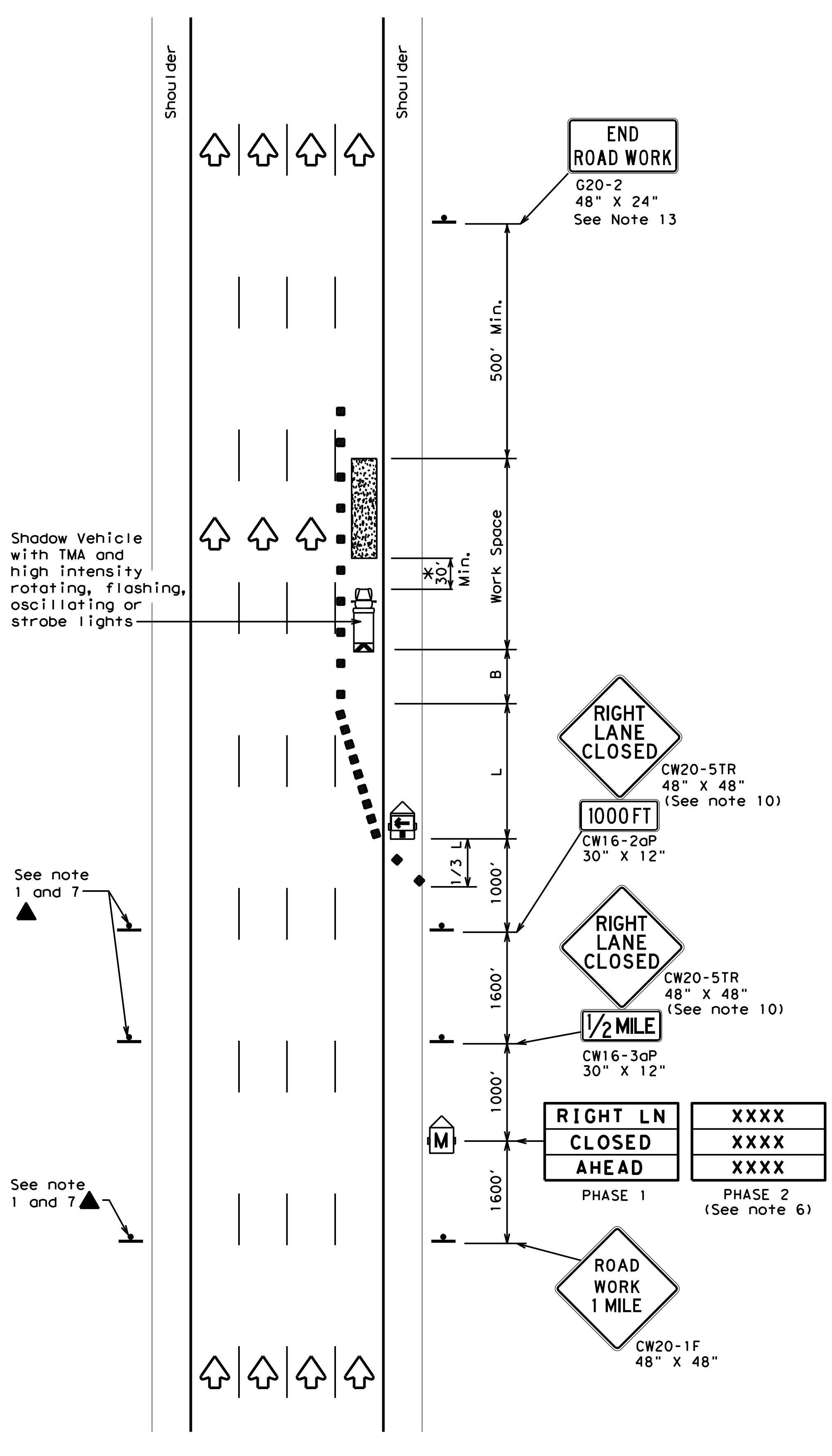
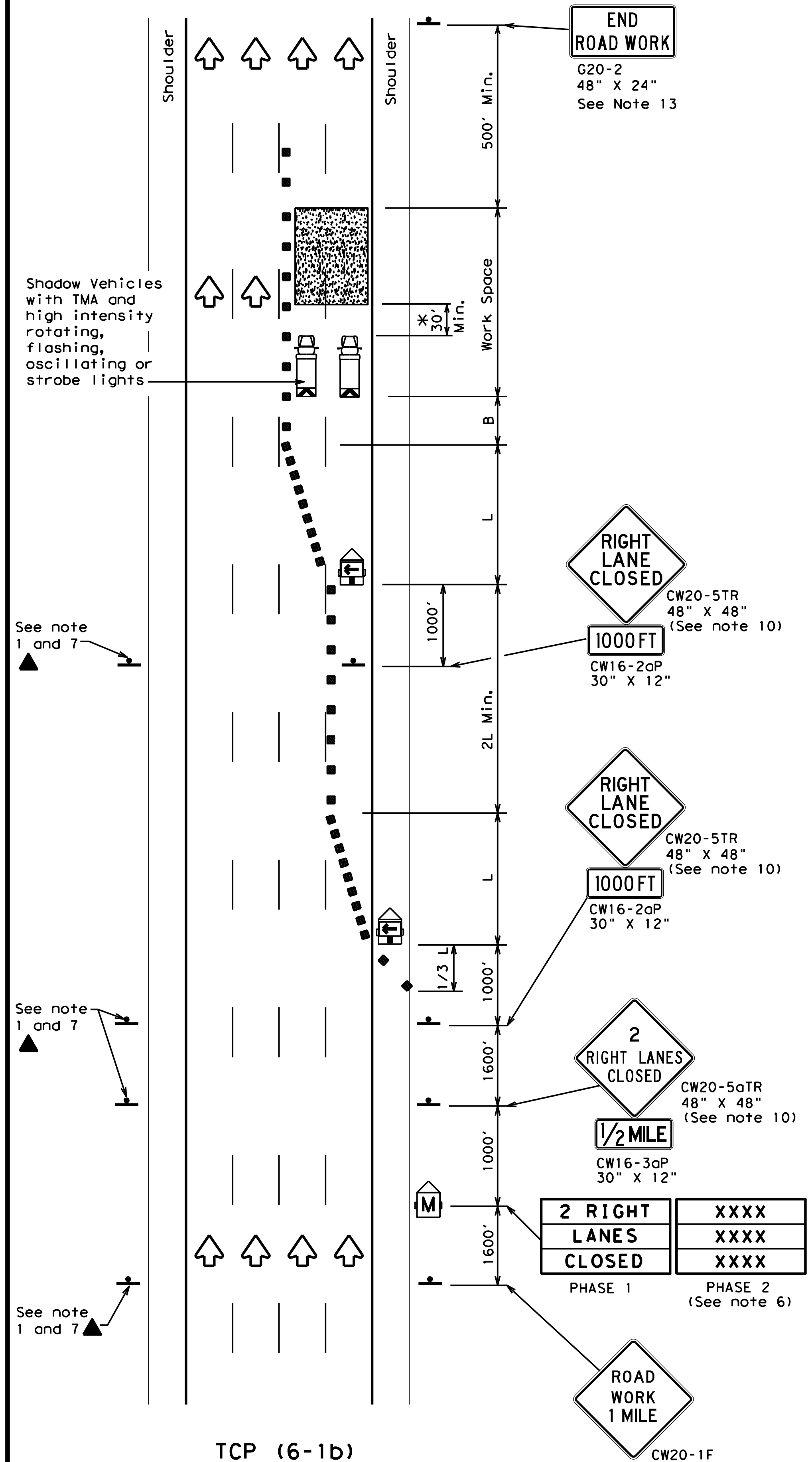


TCP (6-1a)

TYPICAL FREEWAY
ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY
TWO LANE CLOSURE

LEGEND

Symbol	Description	Symbol	Description
	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

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. 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.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. 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.
6. 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.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. 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.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. 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.
11. 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.
12. 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.
13. 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.

Texas Department of Transportation
Traffic Operations Division Standard

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
REVISIONS	6461	70	001	VARIES
8-12	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		33

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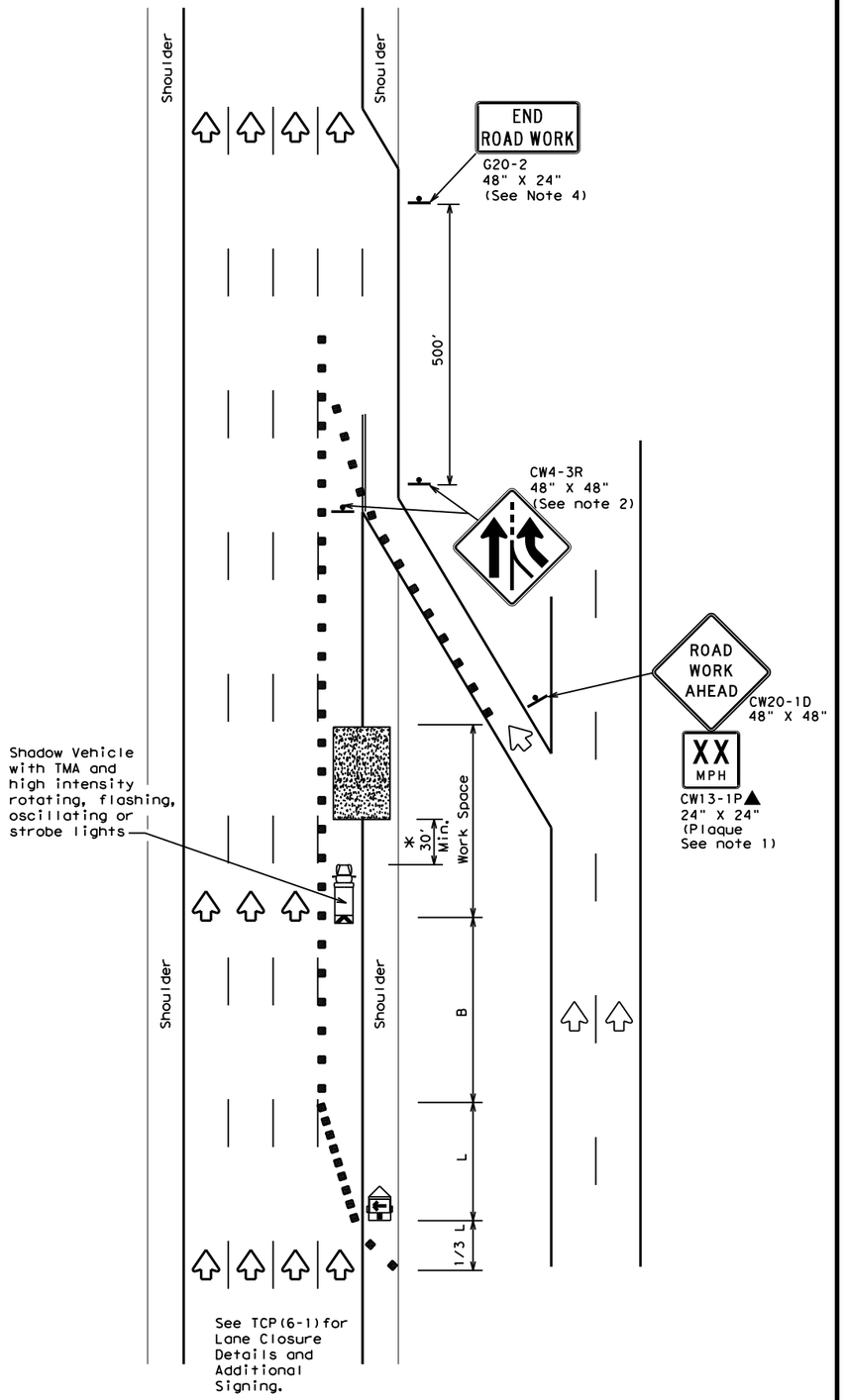
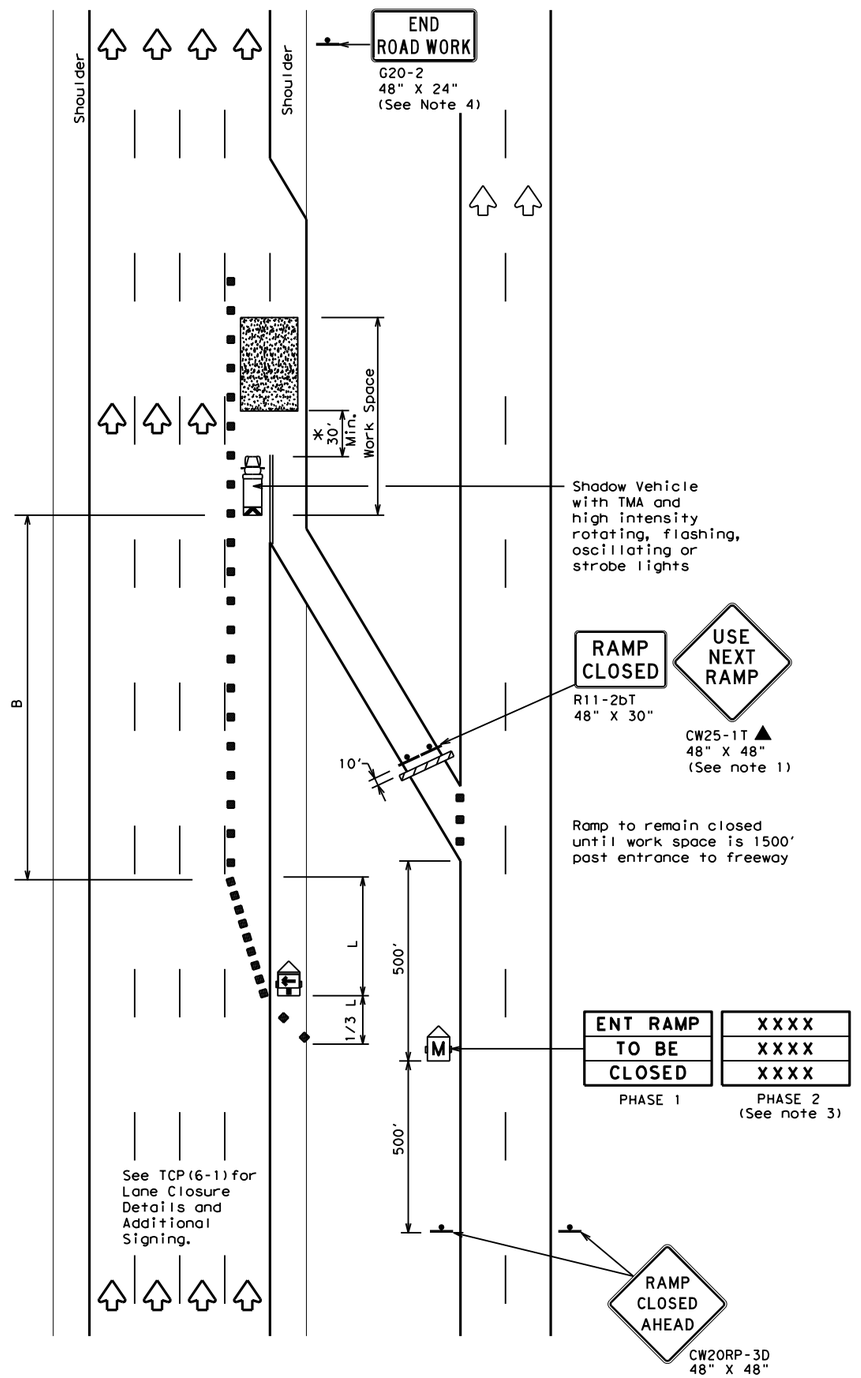


TCP (6-2a)

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. 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
WORK AREA NEAR RAMP

TCP(6-2)-12

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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER, ETC		34

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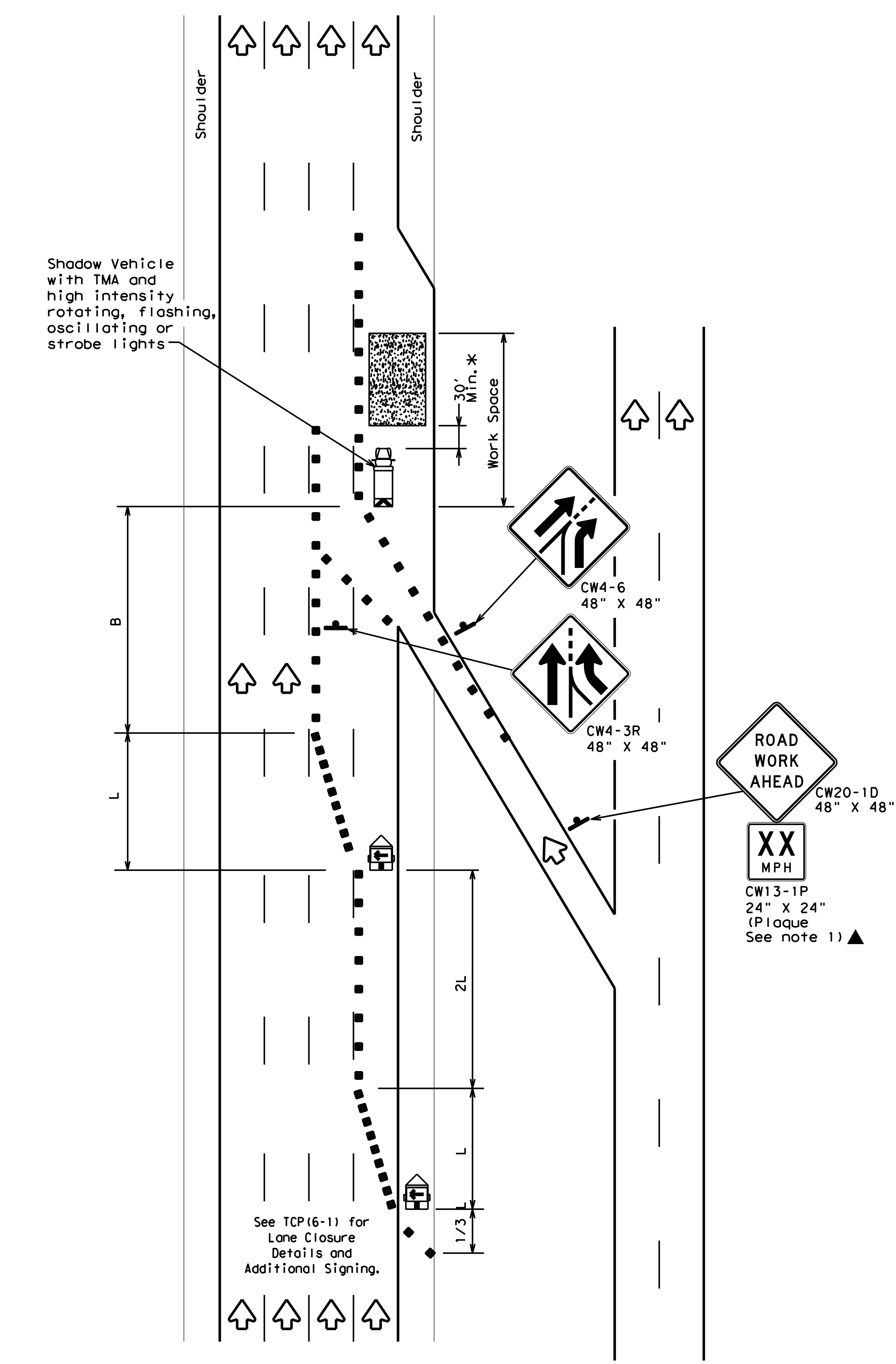
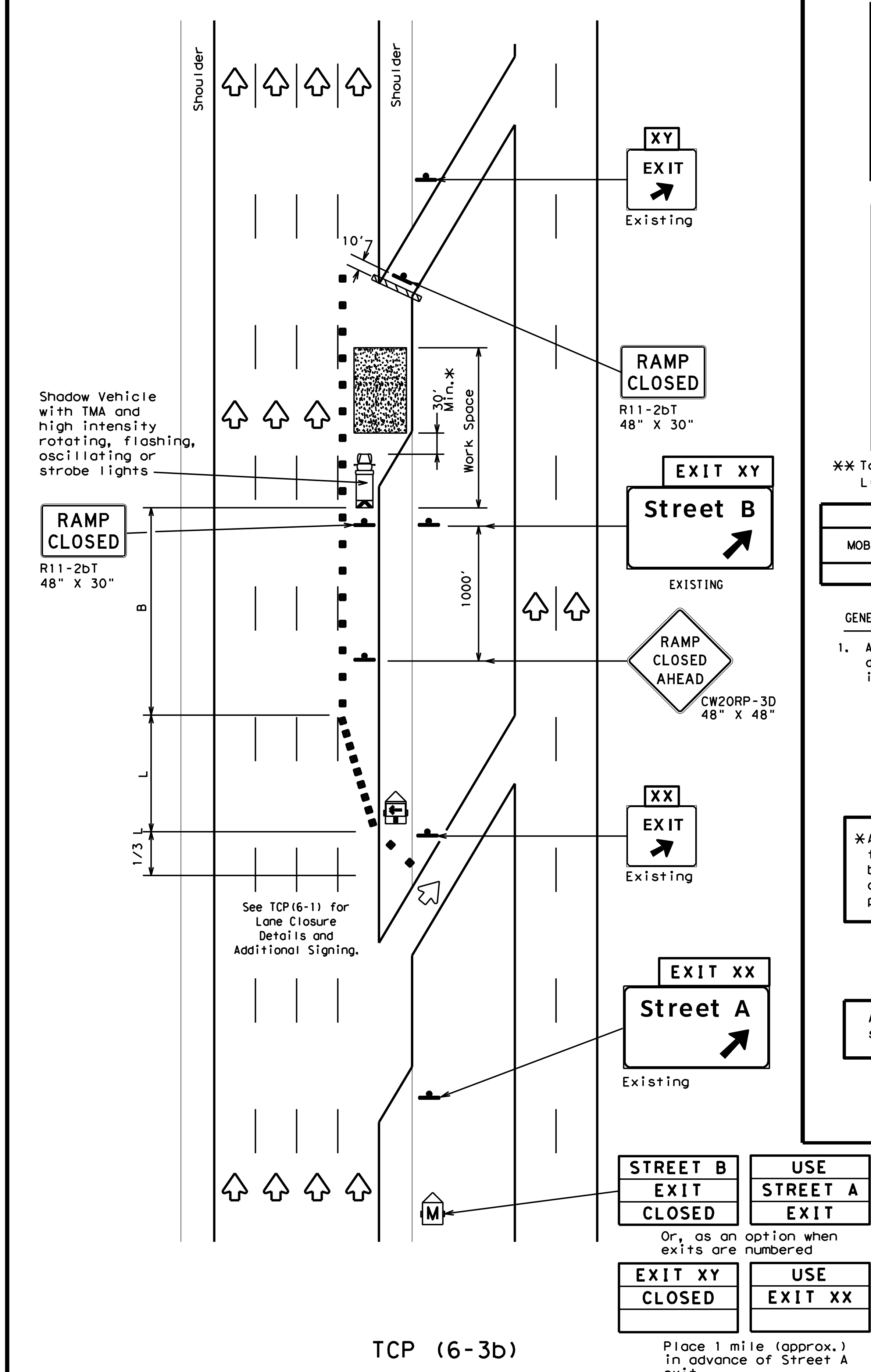


TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

LEGEND

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

1. 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

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT 6461	SECT 70	JOB 001	HIGHWAY VARIES
REVISIONS 1-97 8-98 4-98 8-12	DIST AMA	COUNTY POTTER, ETC		SHEET NO. 35

203

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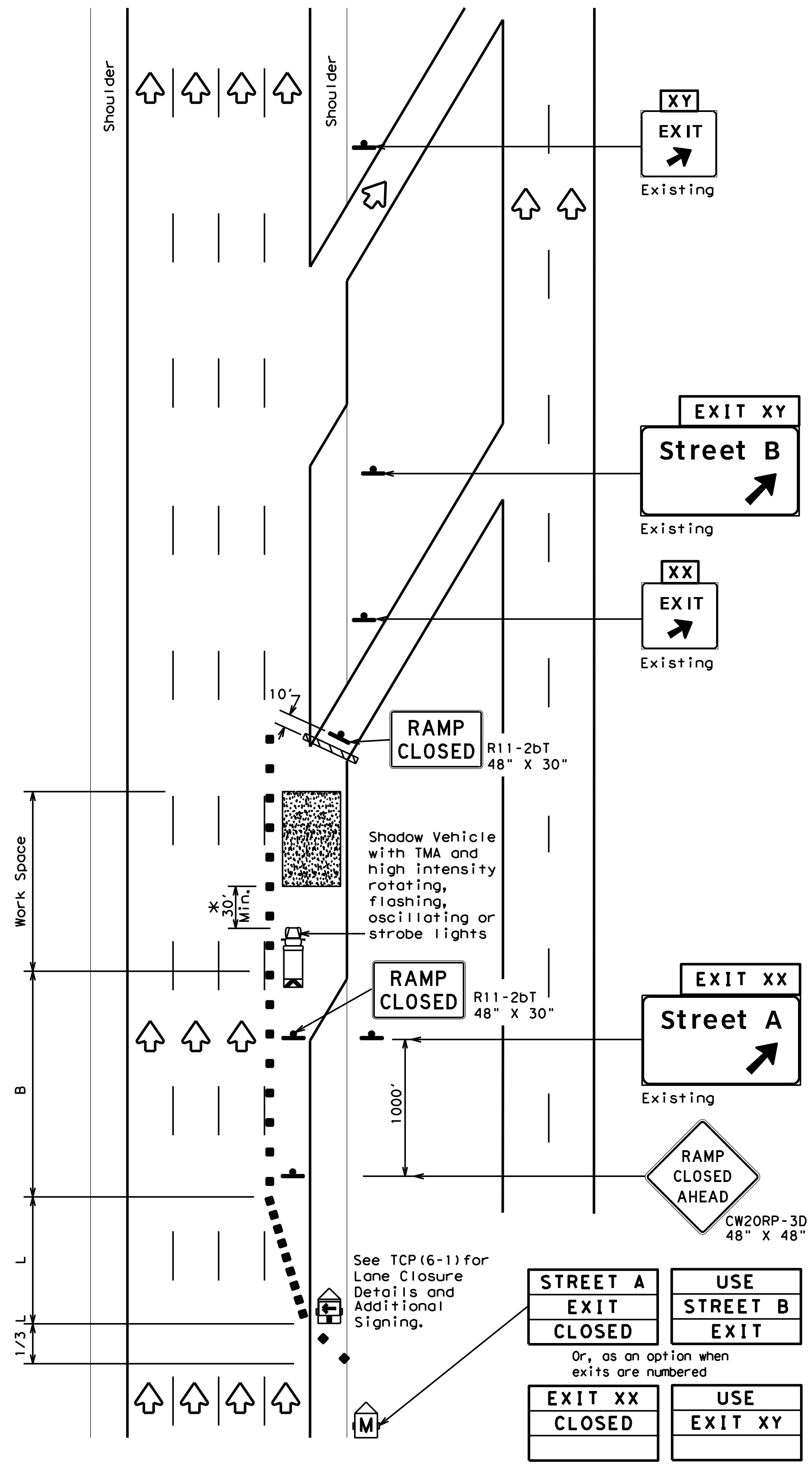
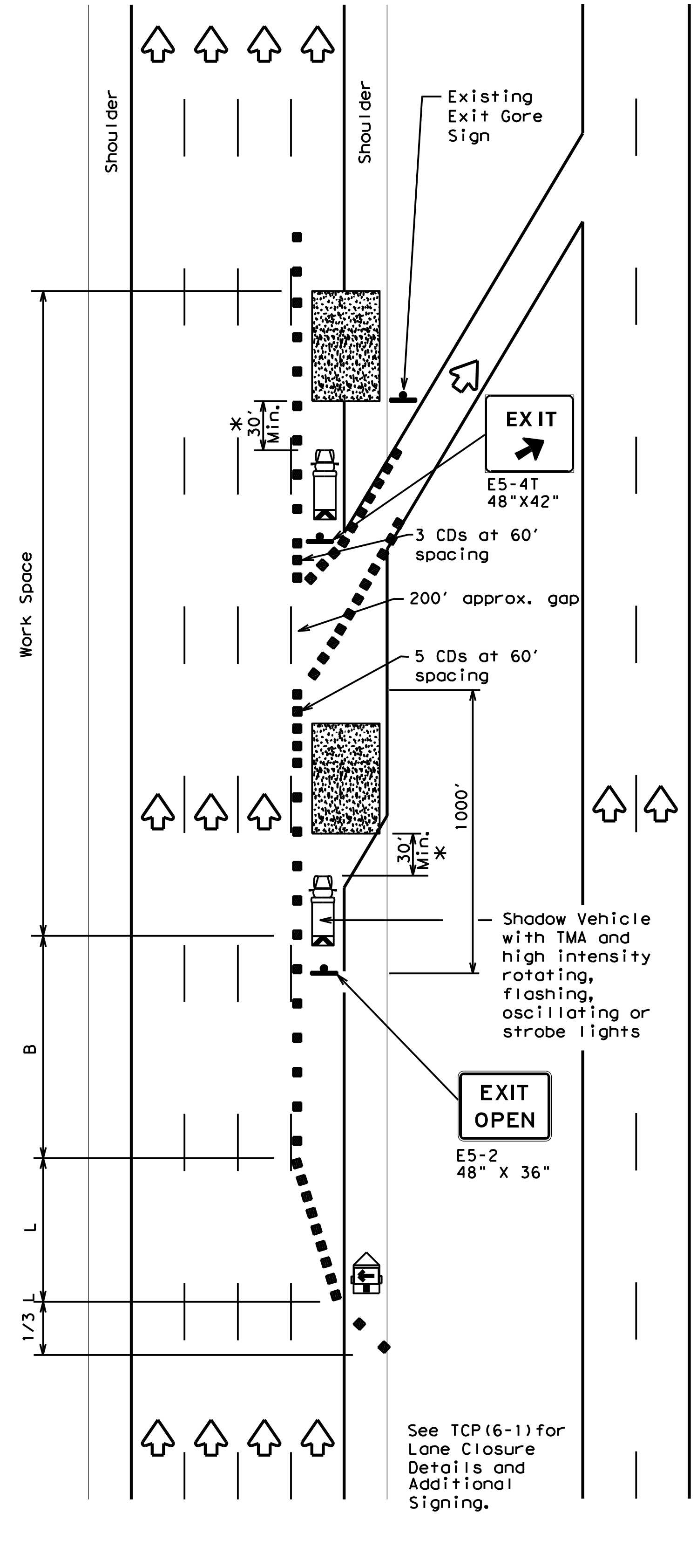


TCP (6-4a)

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

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT 6461	SECT 70	JOB 001	HIGHWAY VARIES
REVISIONS 1-97 8-98 4-98 8-12	DIST AMA	COUNTY POTTER, ETC		SHEET NO. 36

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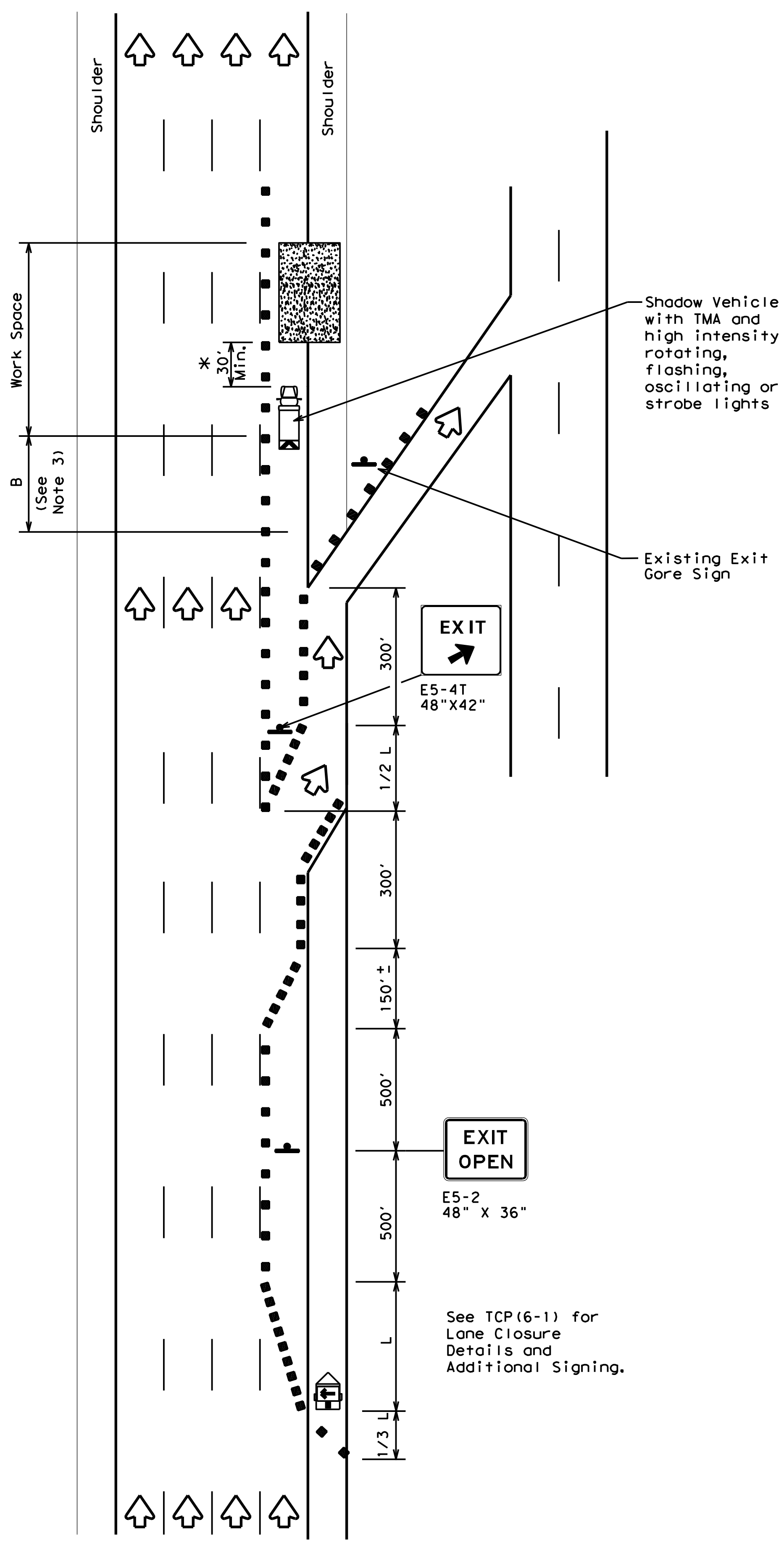
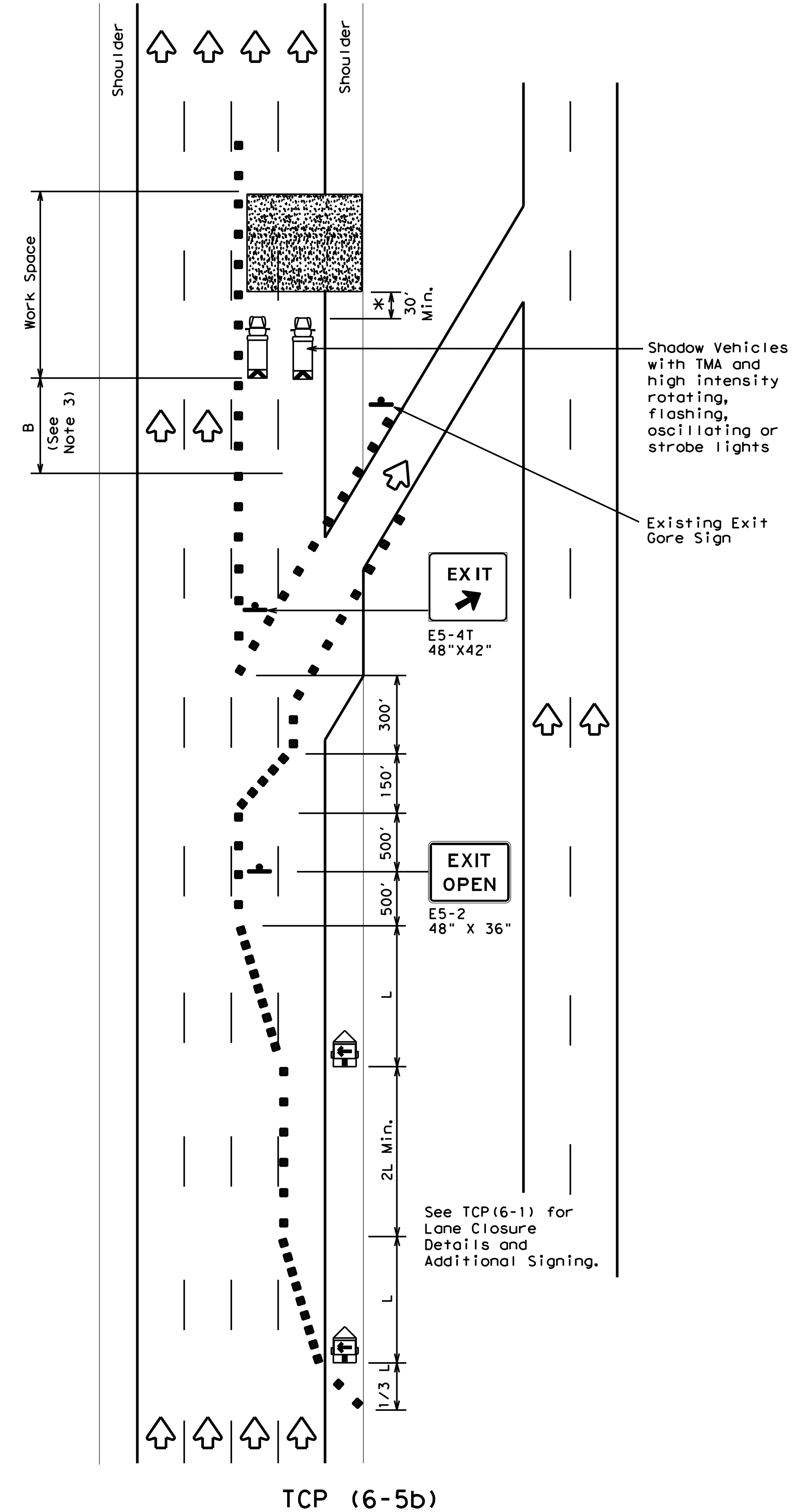


TCP (6-5a)

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

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
3. 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.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
1-97 8-98	DIST		COUNTY	SHEET NO.
4-98 8-12	AMA		POTTER, ETC	37

205

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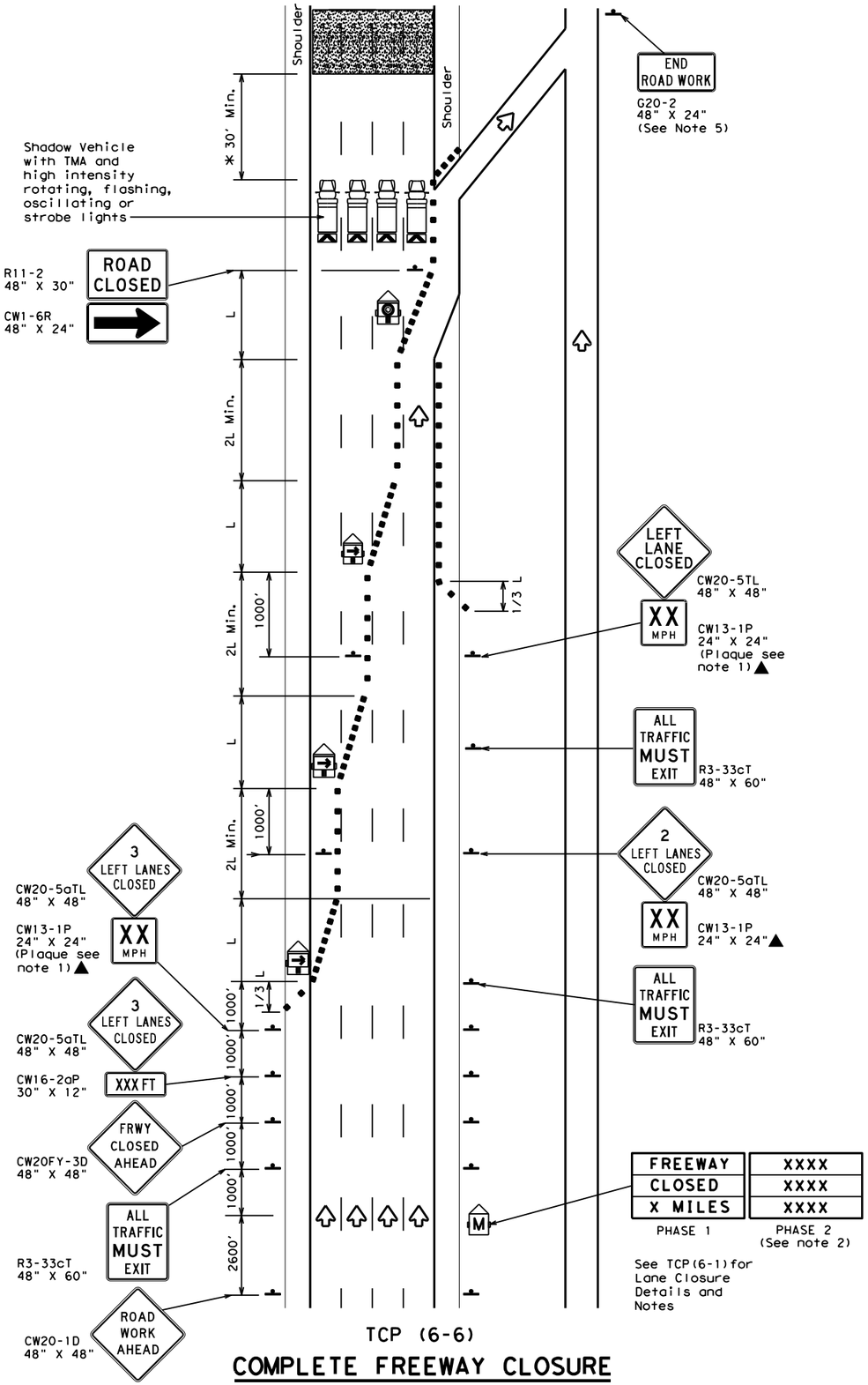

TCP (6-6)

COMPLETE FREEWAY CLOSURE

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	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

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. 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.
3. 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.
4. Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
5. 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

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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER, ETC		38

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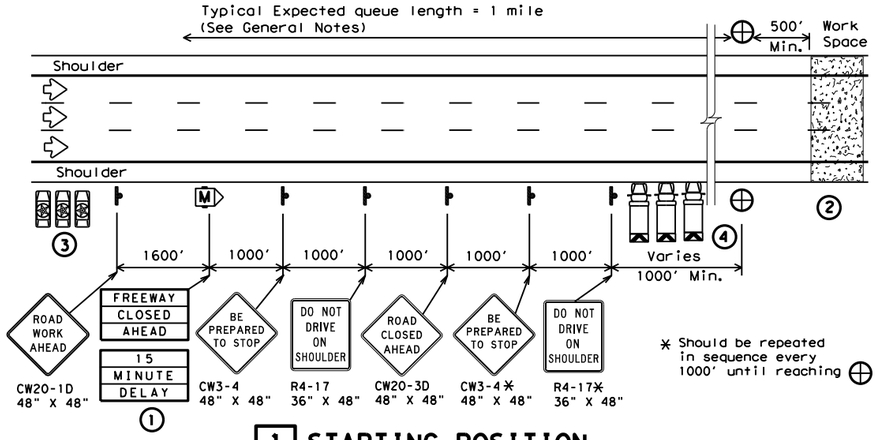


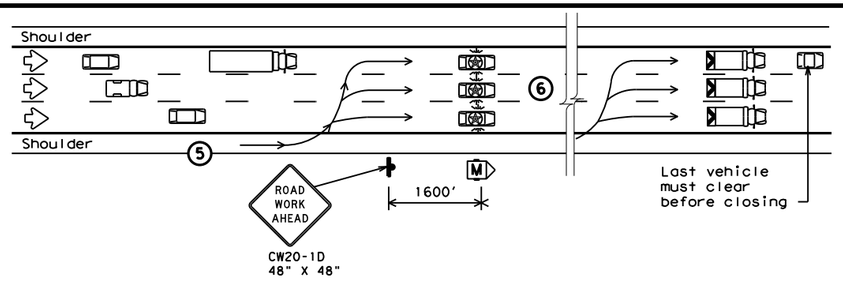
1 STARTING POSITION

(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.

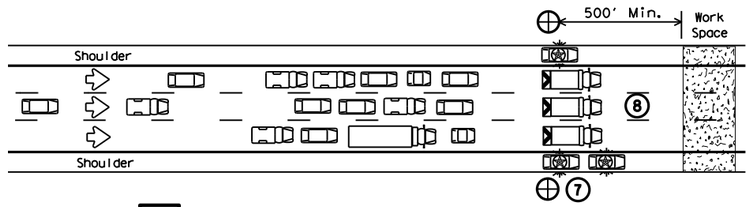
(4) One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



2 REDUCING SPEED OPERATION

(5) Starting position of the LEOVs should be in advance of the most distant warning signs.

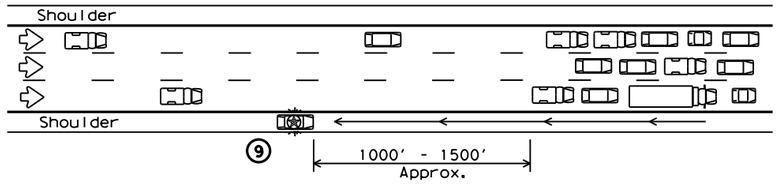
(6) Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles 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

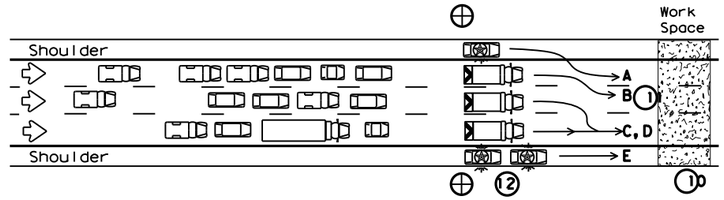
(7) Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

(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

FILE: tcp6-7.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
1-97 8-12	DIST	COUNTY		SHEET NO.
4-98	AMA	POTTER, ETC		39

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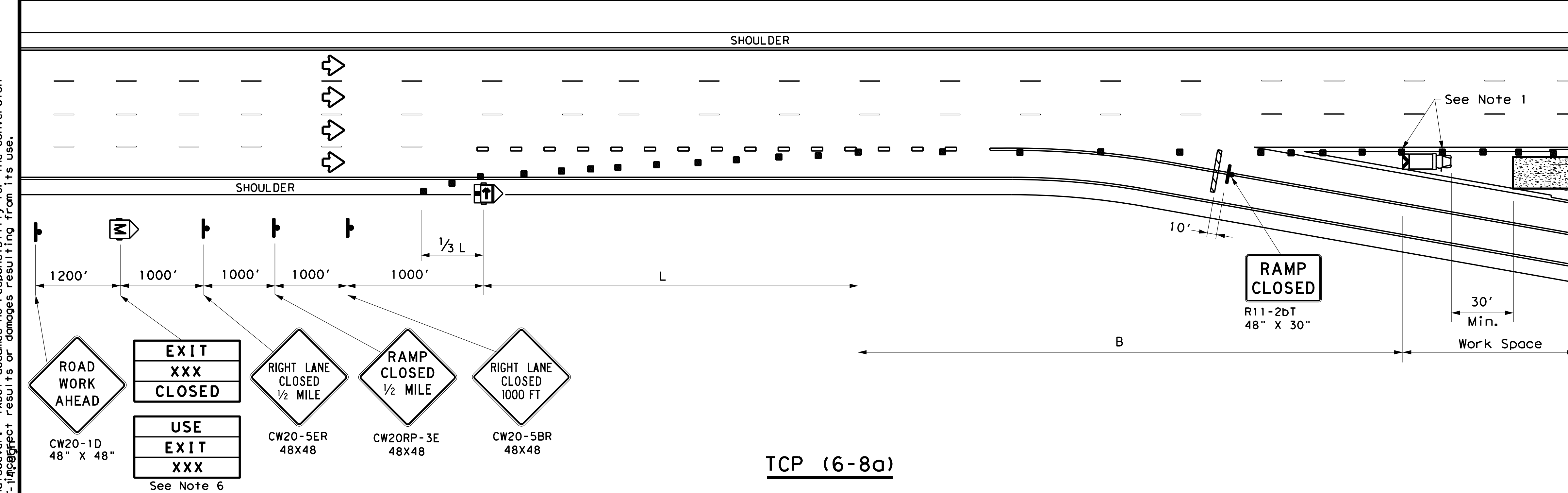
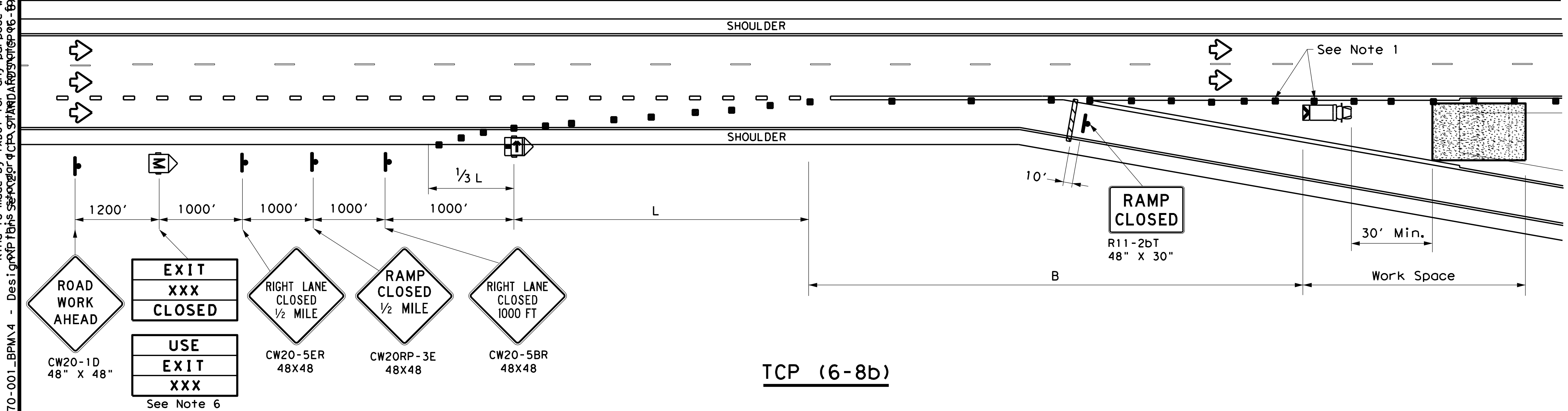
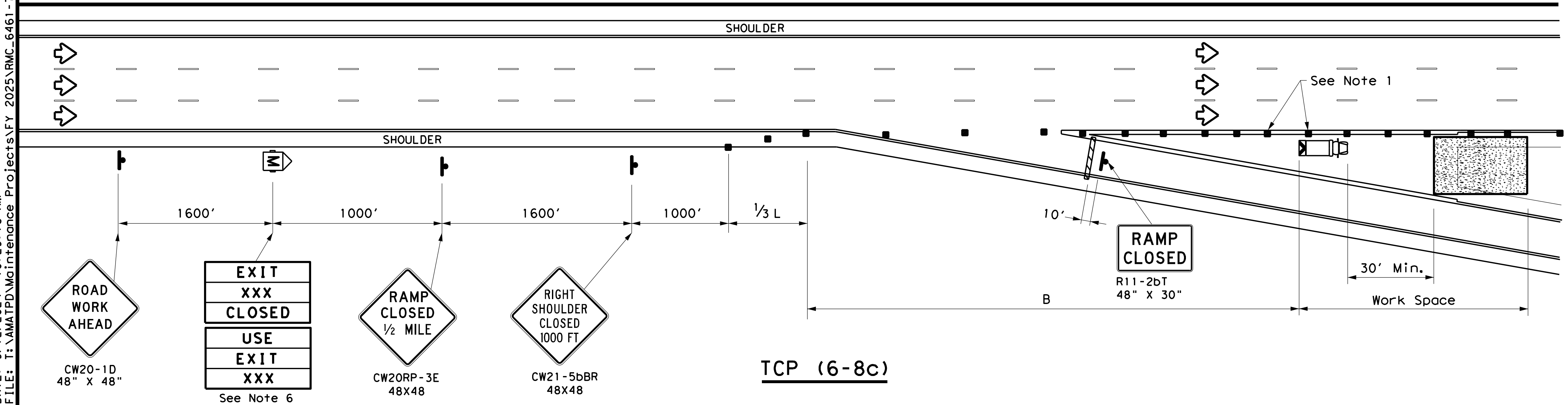


TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

LEGEND

Symbol	Description	Symbol	Description
	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

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
	DIST		COUNTY	SHEET NO.
	AMA		POTTER, ETC	40

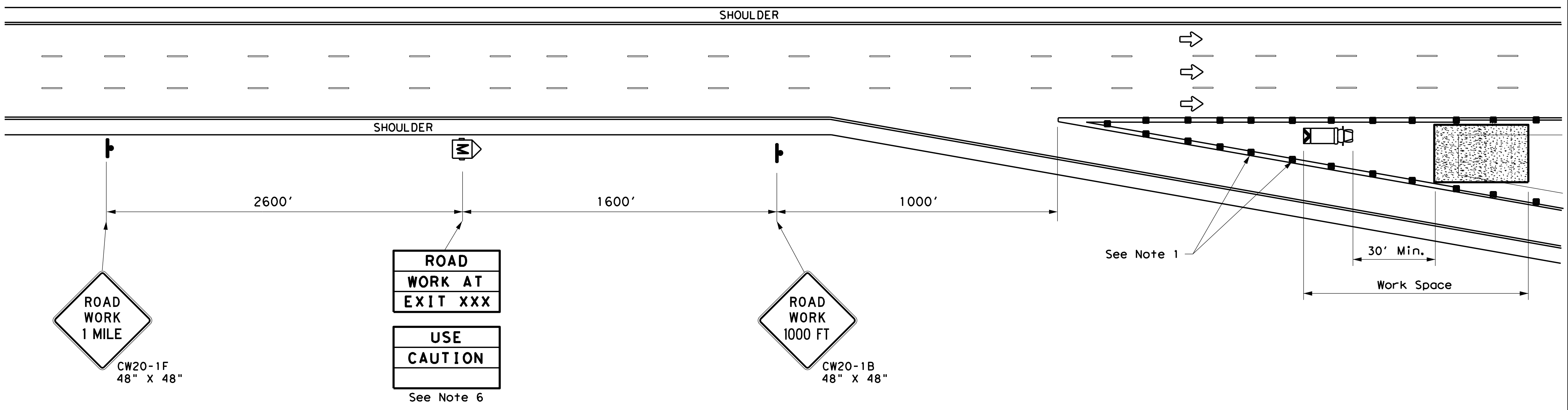
208

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

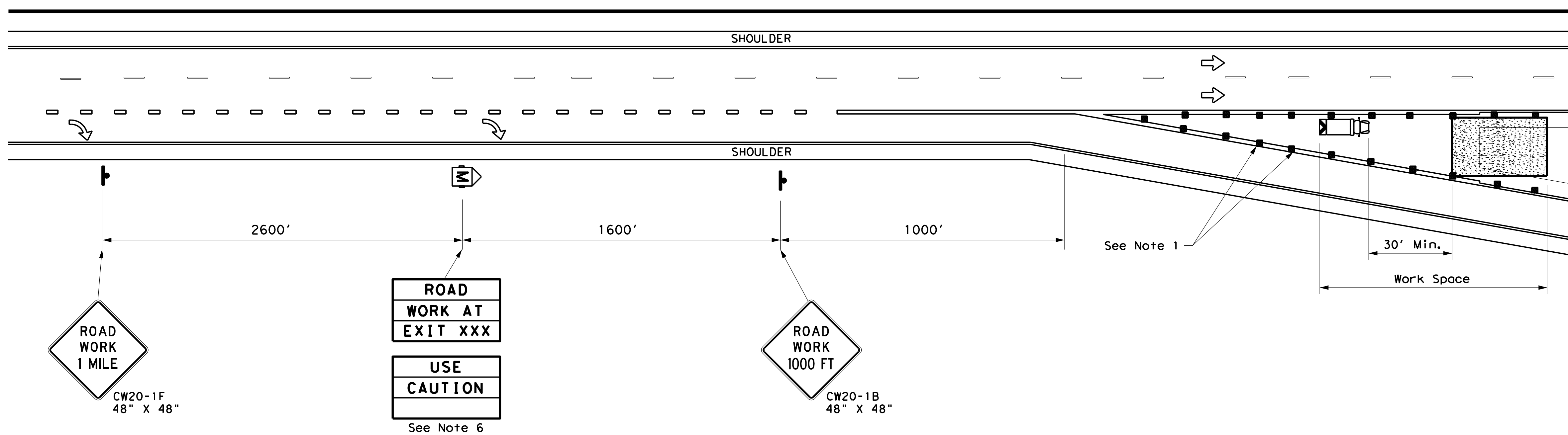
Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	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
	✓	✓		



TCP (6-9a)



TCP (6-9b)

GENERAL NOTES

1. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) and TCP(6-8)for traffic control details.
5. Truck mounted attenuators are required.
6. The PCMS may be omitted if replaced with a "ROAD WORK 1/2 MILE" (CW20-1E).
7. Roadway ADT should be less than 10,000.

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Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT LESS THAN 10,000

TCP(6-9)-14

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© TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
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	AMA		POTTER, ETC	41

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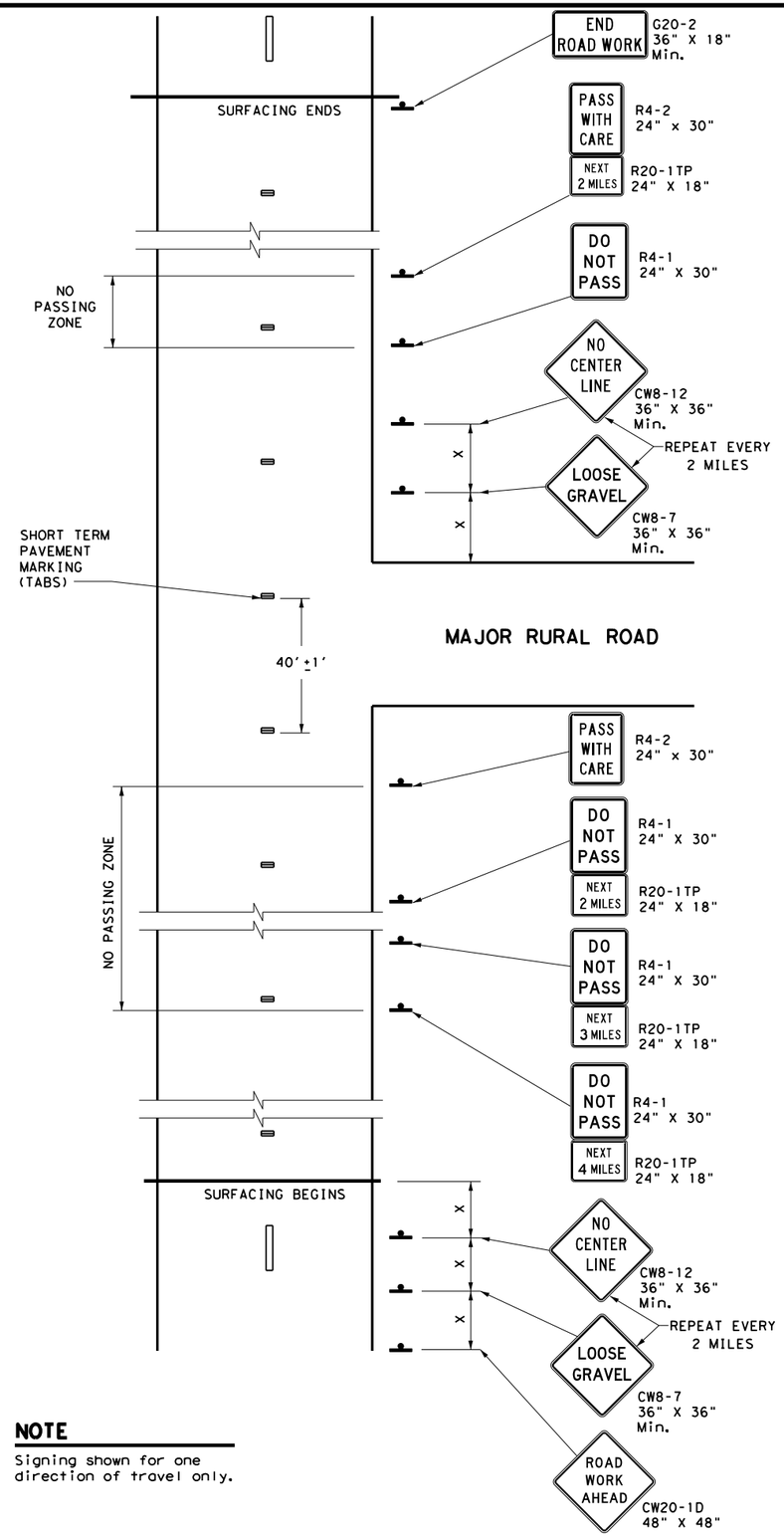
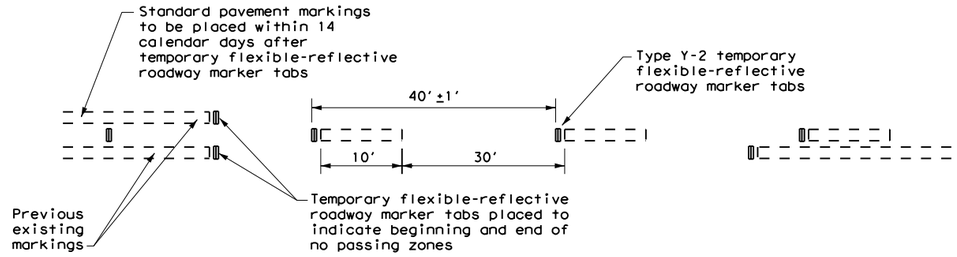


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	AMA	POTTER, ETC		42

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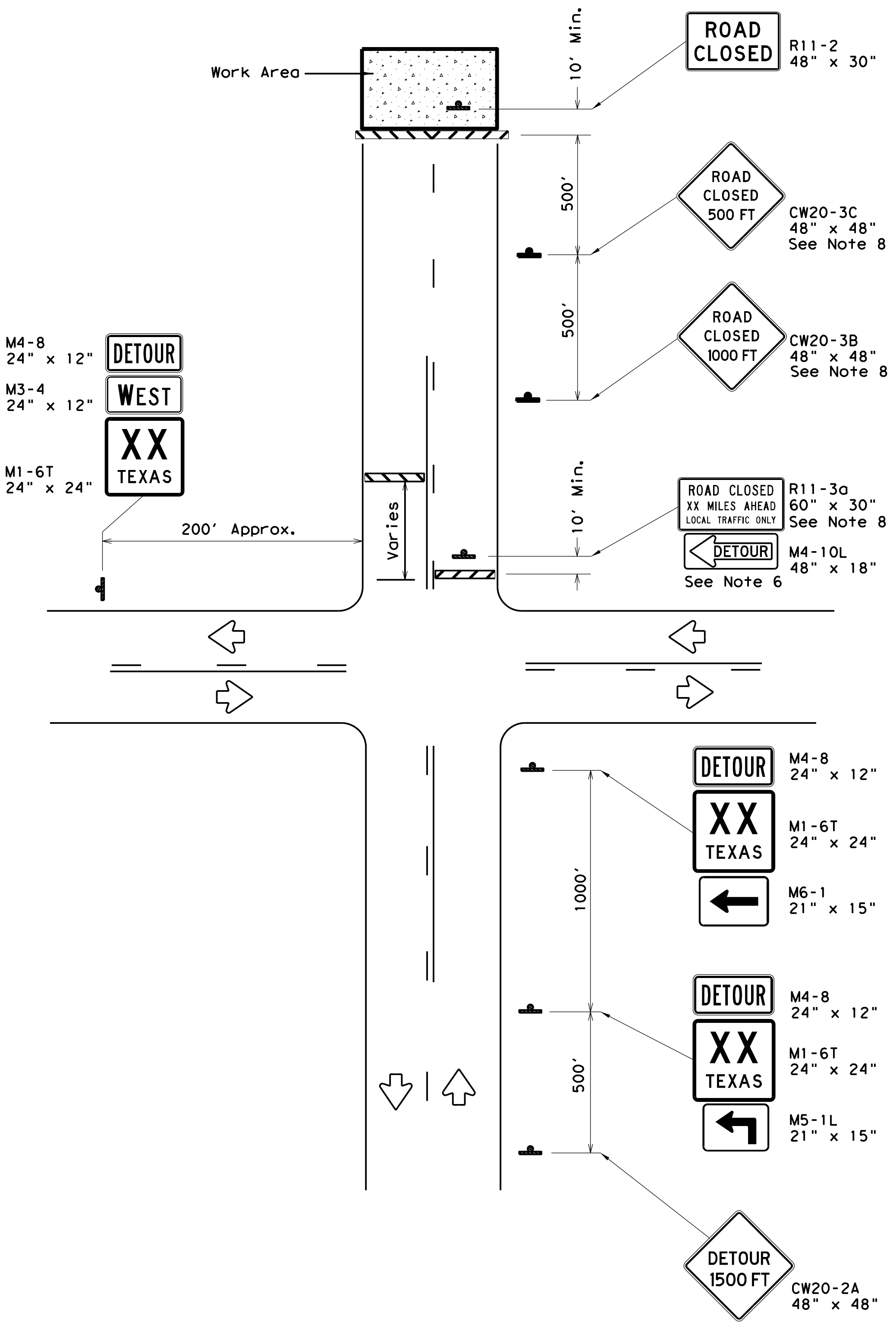
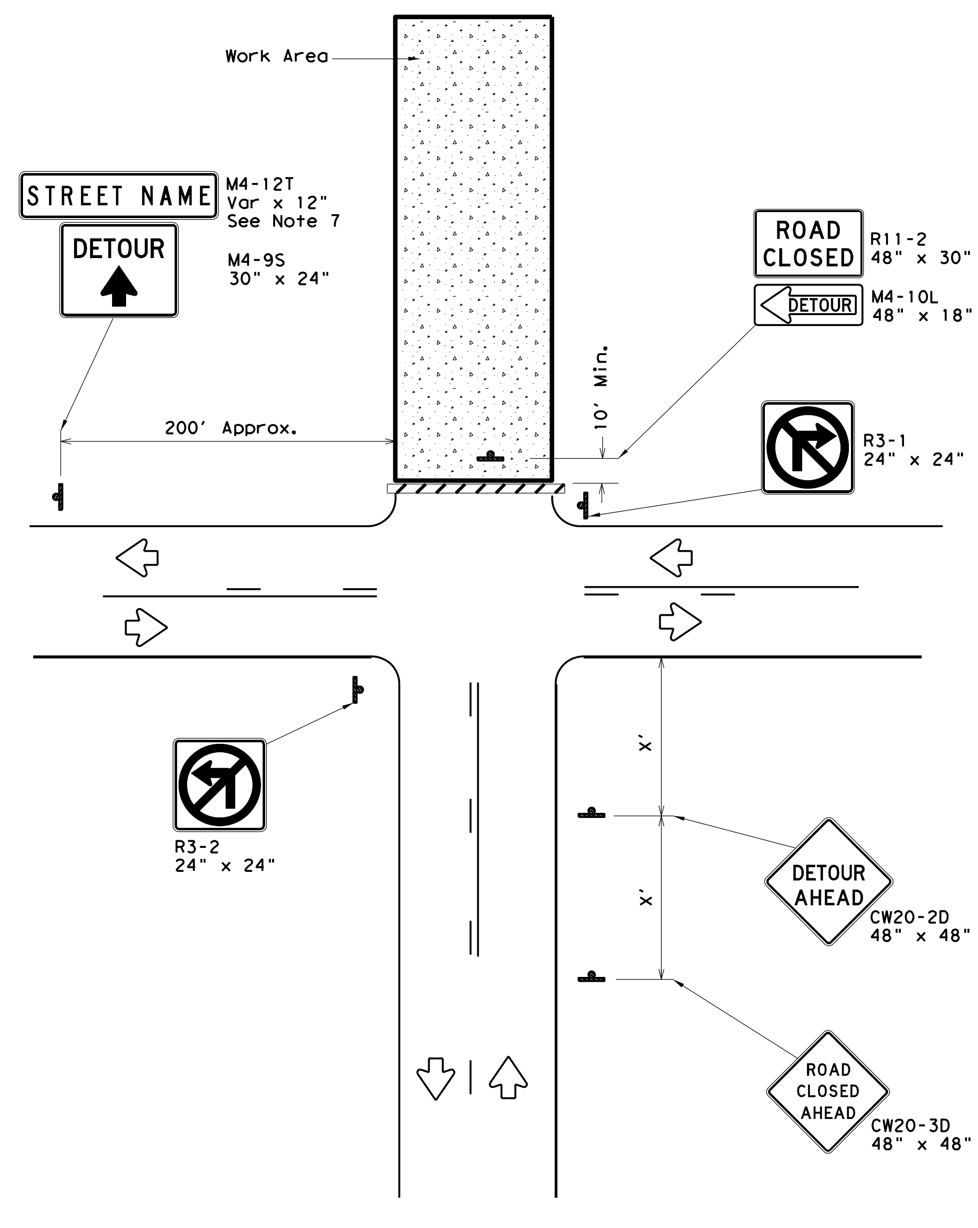


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
(barricade symbol)	Type 3 Barricade
(sign symbol)	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.

2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).

3. Stockpiled materials shall not be placed on the traffic side of barricades.

4. Barricades at the road closure should extend from pavement edge to pavement edge.

5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.

6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.

7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.

8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.

9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT 6461	SECT 70	JOB 001	HIGHWAY VARIES
REVISIONS 1-97 4-98 7-13 2-98 3-03	DIST AMA		COUNTY POTTER, ETC	SHEET NO. 43

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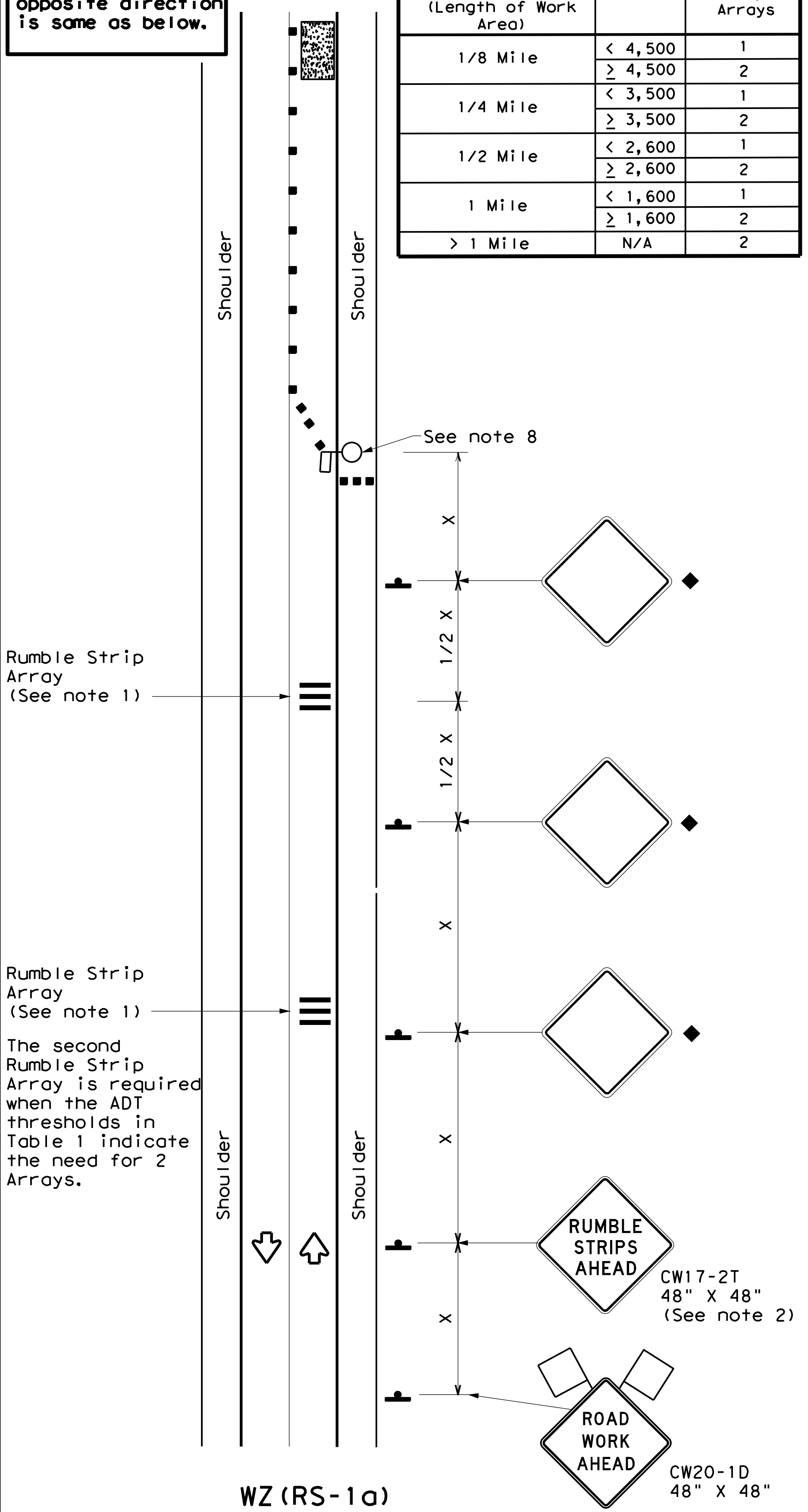
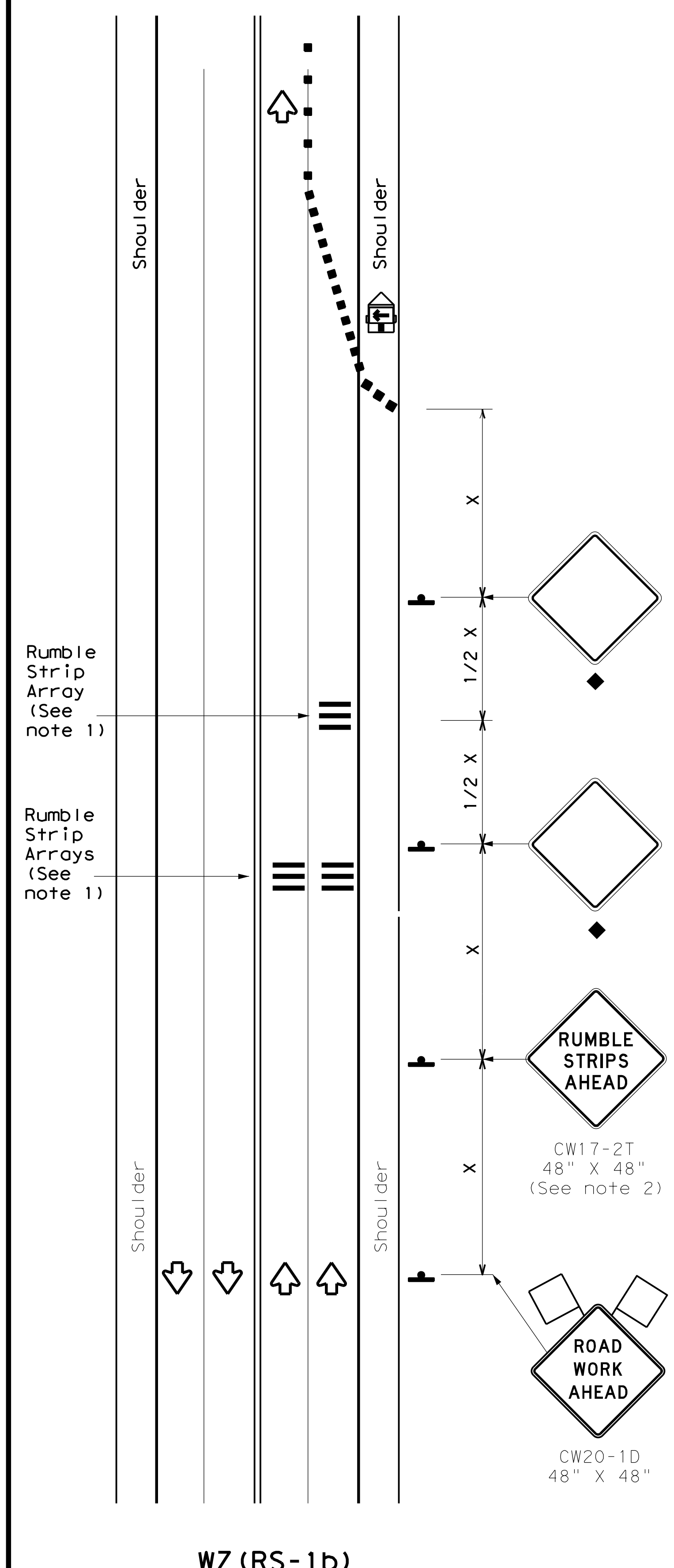
Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel		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
	✓	✓		

◆ **Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.**

* **For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.**

TABLE 2	
Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35'+

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT 6461	SECT 70	JOB 001	HIGHWAY VARIES
REVISIONS 2-14 1-22 4-16	DIST AMA		COUNTY POTTER, ETC	SHEET NO. 44

117

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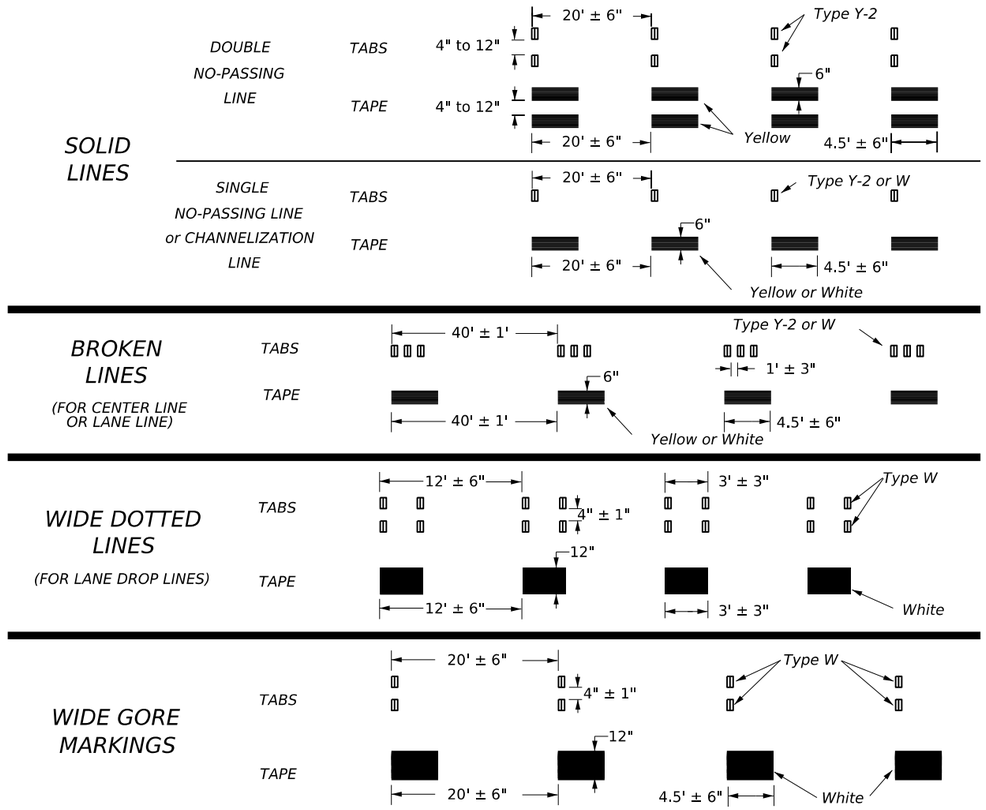
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



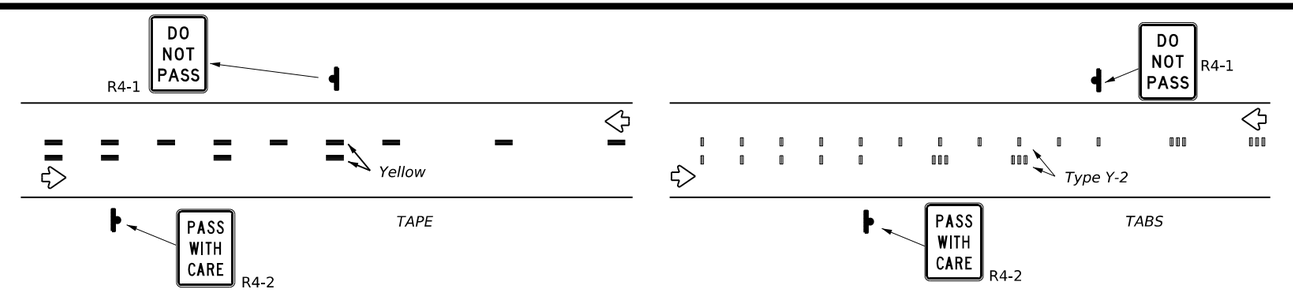
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

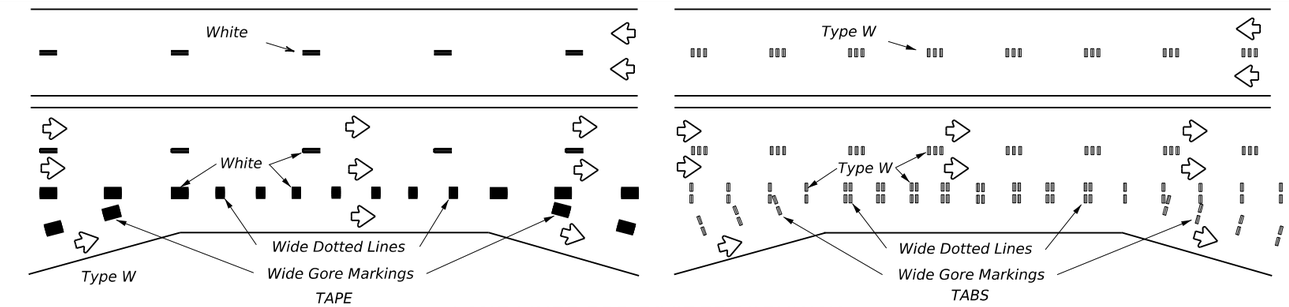
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

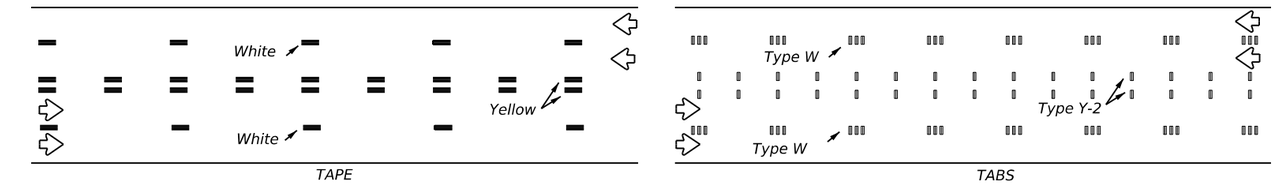
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



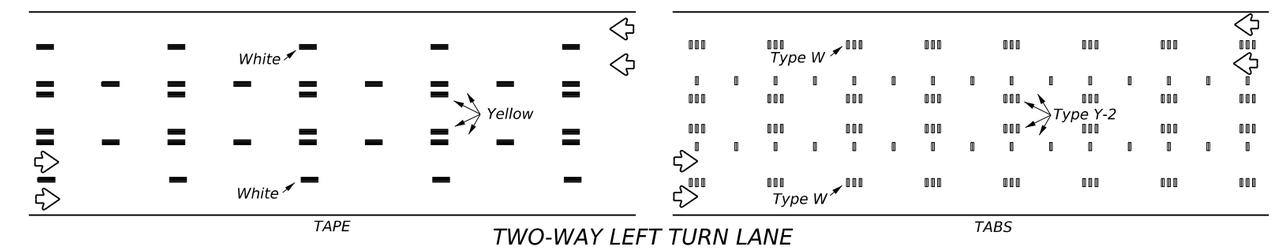
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



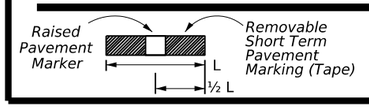
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

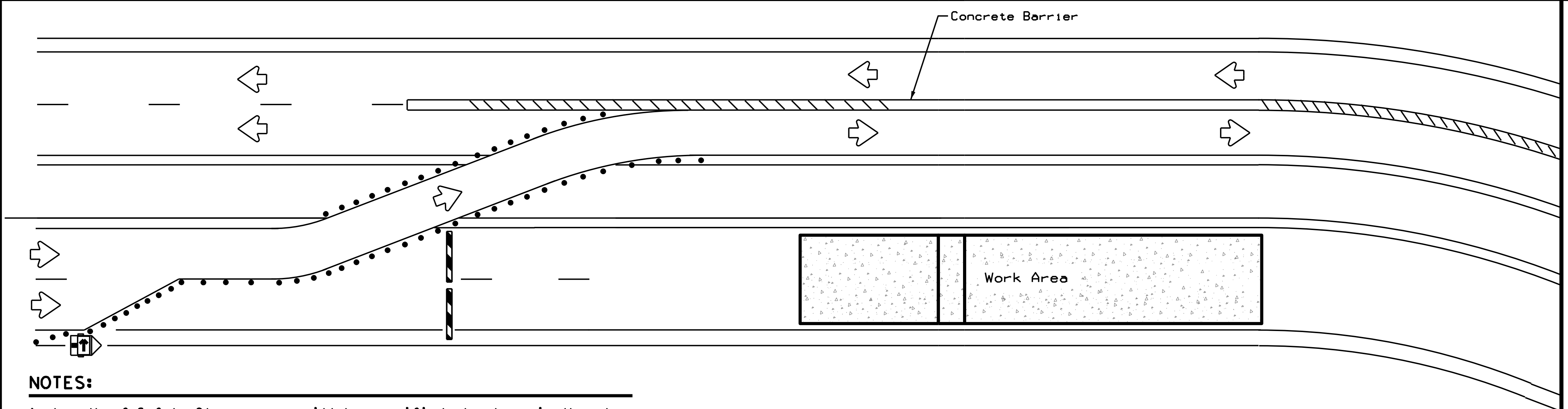
Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	AMA	POTTER, ETC		45
3-03				



NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

BARRIER DELINEATION WITH MODULAR GLARE SCREENS

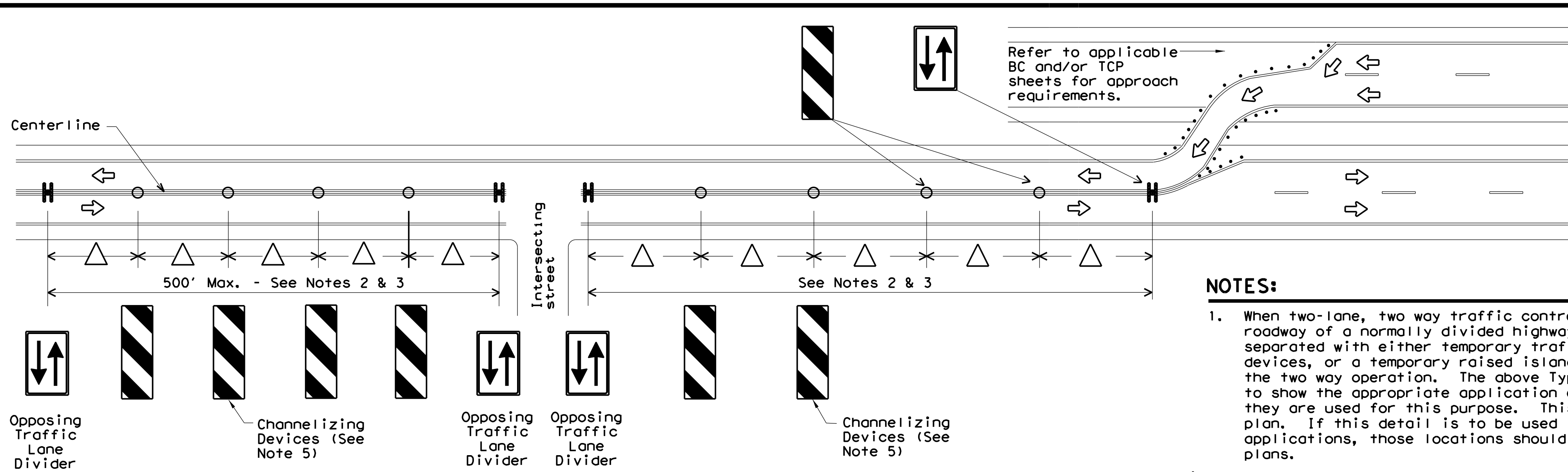
LEGEND

Symbol	Description
(barricade symbol)	Type 3 Barricade
• • •	Channelizing Devices
(arrow board symbol)	Trailer Mounted Flashing Arrow Board
(sign symbol)	Sign
\ \ \ \	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation
Traffic Operations Division Standard

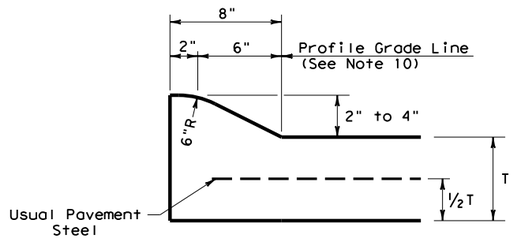
TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

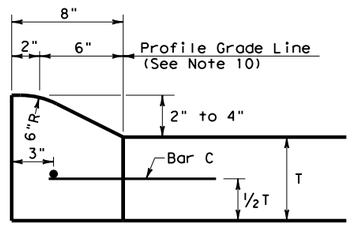
FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	6461	70	001	VARIES
	DIST		COUNTY	SHEET NO.
	AMA		POTTER, ETC	46

110

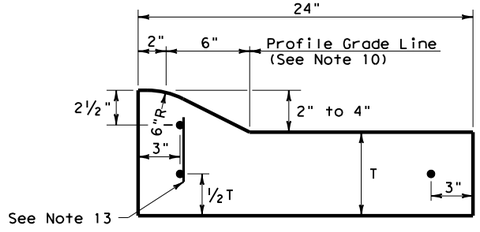
DATE:
FILE:



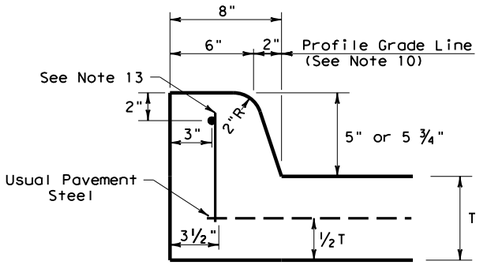
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



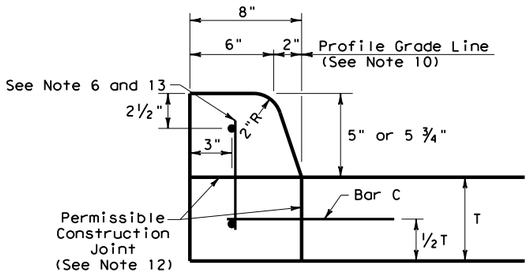
TYPE I CURB
2" - 4" HEIGHT



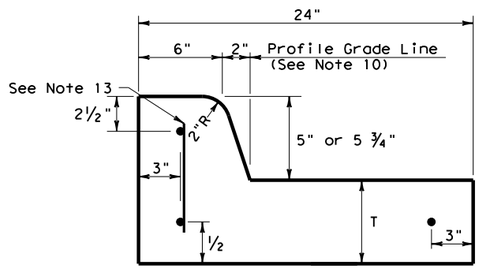
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



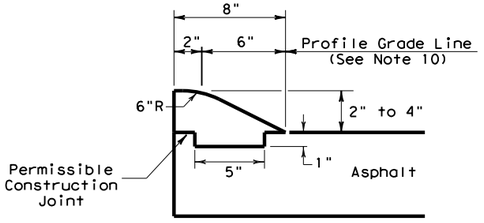
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



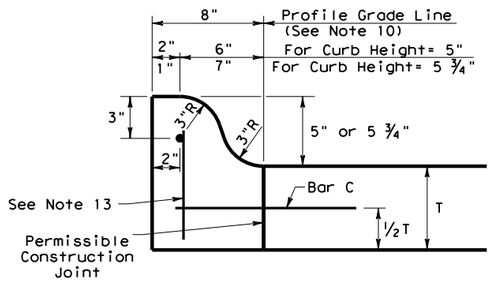
TYPE II CURB
5" - 5 ¾" HEIGHT



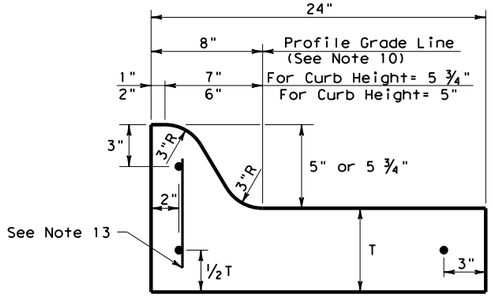
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



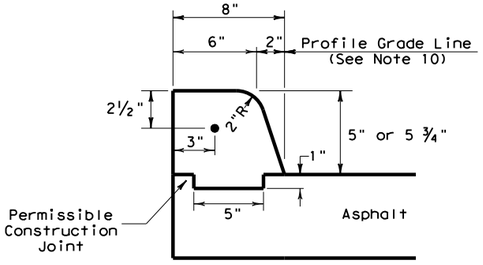
TYPE III CURB (KEYED)
2" - 4" HEIGHT



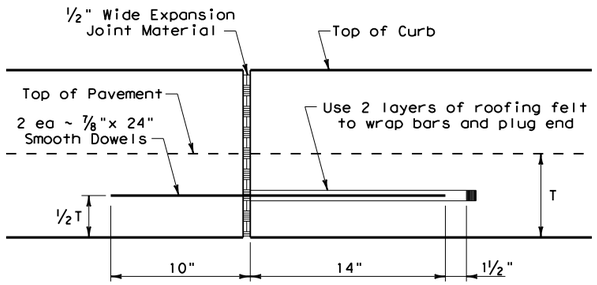
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

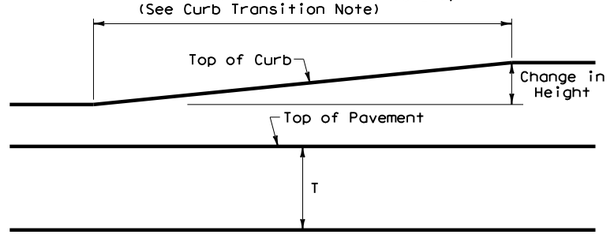


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

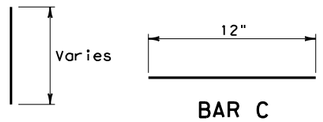
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		47

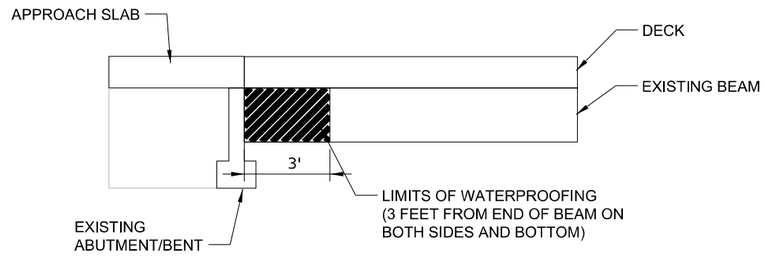
SUBSTRUCTURE WATERPROOFING PROCEDURE - COATED STRUCTURES

1. Use "Substructure Waterproofing - Coated Structures" for structures that have a surface finish. If structures do not have a surface finish, proceed with "Substructure Waterproofing - Uncoated Structures".

2. Perform all concrete repairs on substructures prior to waterproofing. Engineer shall approve all repairs.

3. Clean exposed surfaces of existing substructures using water blasting in accordance with Item 427, "Surface Finishes for Concrete".

4. Seal exposed surfaces with a waterproof finish as indicated on the plans and in accordance with Item 427, "Surface Finishes for Concrete". See detail for limits. Submit color to Engineer for approval.



TYPICAL BEAM END CRACK WATERPROOFING LIMITS

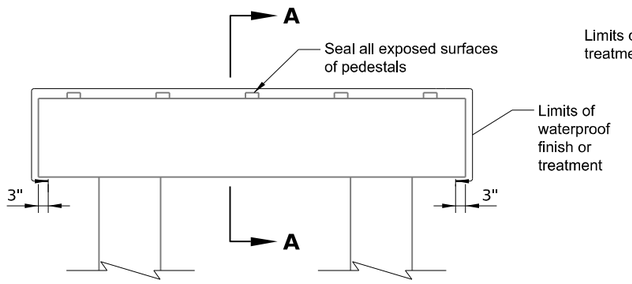
SUBSTRUCTURE WATERPROOFING PROCEDURE - UNCOATED STRUCTURES

5. Use "Substructure Waterproofing - Uncoated Structures" for structures that do not have a surface finish. If structures have a surface finish, proceed with "Substructure Waterproofing - Coated Structures".

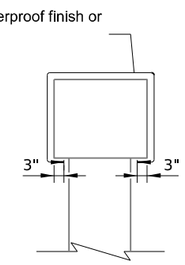
6. Perform all concrete repairs on substructures prior to waterproofing. Engineer shall approve all repairs.

7. Clean exposed surfaces of existing substructures using abrasive blasting in accordance with Item 427, "Surface Finshes for Concrete".

8. Seal exposed surfaces with a waterproof treatment as indicated on the plans and in accordance with Item 428, "Penetrating Concrete Surface Treatment". See detail for limits.



BENT ELEVATION



SECTION A-A

TYPICAL BENT WATERPROOFING LIMITS

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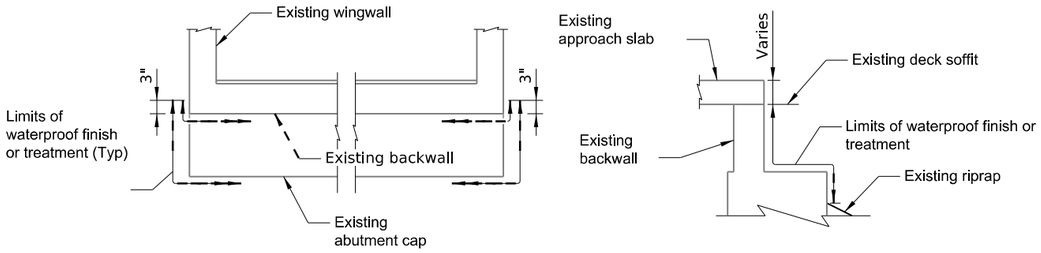

PLAN **SECTION**

TYPICAL ABUTMENT WATERPROOFING LIMITS

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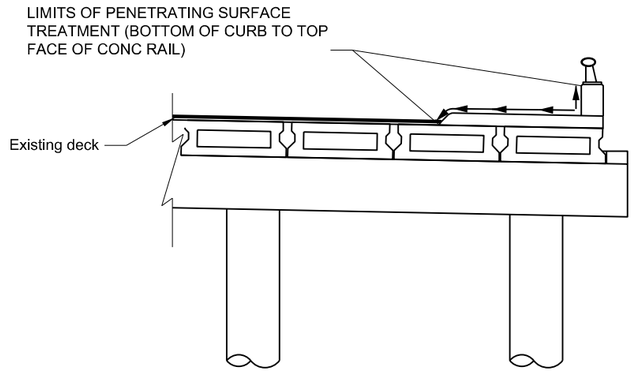
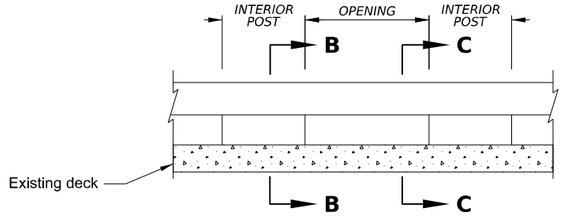


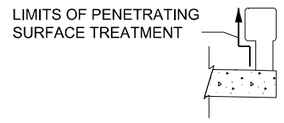
PENETRATING CONCRETE SURFACE TREATMENT DETAIL

FOR BRIDGE RAILS WITHOUT OPENINGS
Scale: N.T.S.



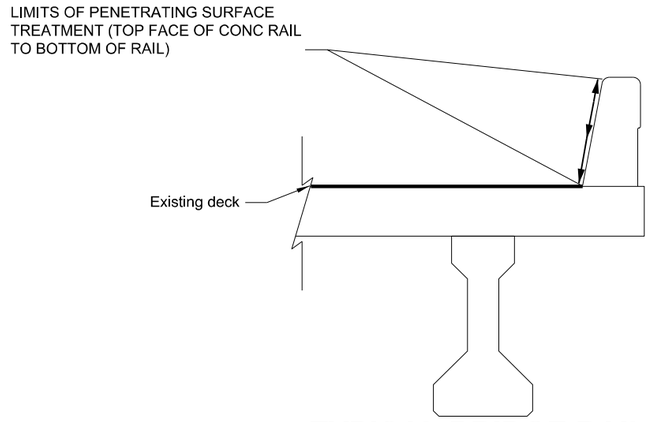
PENETRATING CONCRETE SURFACE TREATMENT DETAIL

FOR BRIDGE RAILS WITH OPENINGS
Scale: N.T.S.



SECTION B-B

SECTION C-C



TYPICAL BRIDGE RAIL WATERPROOFING LIMITS

Scale: N.T.S.

AMA FY25 BPM

WATERPROOFING DETAILS

SCALE: NTS

Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		48

DATE: 9/12/2024 9:56:47 AM
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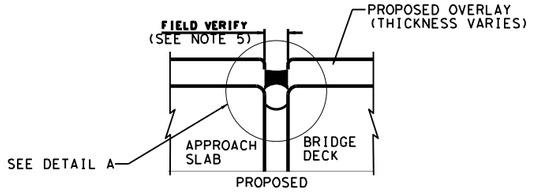
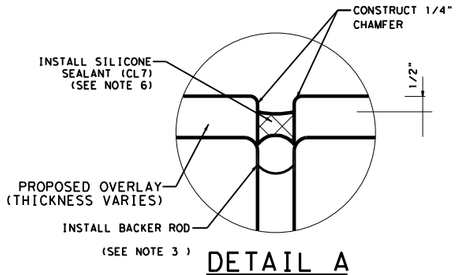


TYPE A JOINT
SEALED ISOLATION JOINT



DETAIL A

PROCEDURE FOR CLEANING
AND SEALING EXISTING JOINT
WITH 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 EXISTING JOINTS" CLEAN JOINT OUT FULL DEPTH OF THE JOINT.

(2) OBTAIN APPROVAL OF CLEANED JOINT PRIOR TO PROCEEDING WITH JOINT SEALING OPERATION.

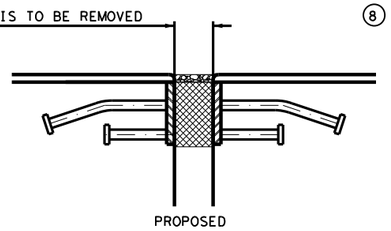
(3) PLACE BACKER ROD INTO JOINT OPENING 1" BELOW THE TOP OF CONCRETE. THE BACKER ROD MUST BE 25% LARGER THAN JOINT OPENING AND MUST BE COMPATIBLE WITH THE SEALANT. WHEN SEALING JOINTS FOR SLAB SPANS, PAN GIRDER SPANS, OR BOX BEAM SPANS, FILL VOID BELOW BACKER ROD WITH EXTRUDED POLYSTYRENE FOAM. USE OF MULTIPLE PIECES TO CREATE A BACKER ROD CROSS SECTION IS NOT PERMITTED. TOP OF BACKER ROD MUST BE CONVEX AS SHOWN.

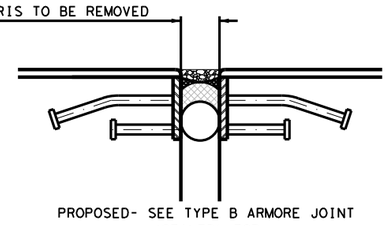
(4) SEAL THE JOINT OPENING WITH A CLASS 7 SILICONE. RECESS SEAL 1/2" BELOW TOP OF CONCRETE IN TRAVEL LANES AND 1/8" BELOW TOP OF CONCRETE IN SHOULDERS.

(5) CONTRACTOR IS REQUIRED TO VERIFY THE BRIDGE JOINT OPENING WIDTHS PRIOR TO ORDERING MATERIALS.

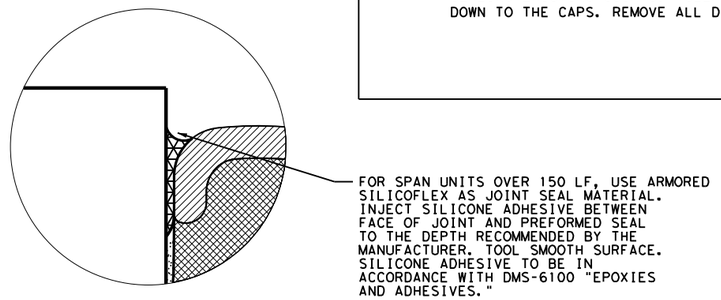
(6) APPROVED MATERIALS LISTED IN THE MATERIALS PRODUCER LIST FOR DMS-6310 "JOINT SEALANTS AND FILLERS". INSTALL PER MANUFACTURER'S RECOMMENDATION.

(7) REFER TO CLEAN AND SEAL JOINTS DETAIL SHEET 2 OF 3 FOR JOINT SEALANT TERMINATION DETAILS.

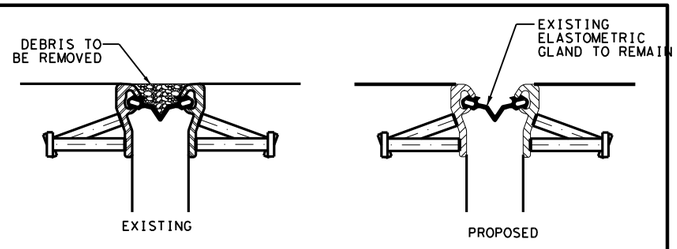




TYPE B
ARMOR JOINT
PROCEDURE FOR CLEANING
EXISTING
ARMOR JOINTS



TYPE B
AMOR JOINT (SEALED)
REPRESENTING TYPE B JOINT WITH SEAL (ARMOR
JOINT SEALED)



TYPE C
SEALED EXPANSION JOINT (SEJ-M)
NTS

(22) CLEAN JOINT OPENING OF ALL OLD EXPANSION MATERIALS/DEVICES, DIRT, AND ALL OTHER DELETERIOUS MATERIALS IN ACCORDANCE WITH ITEM 438. "CLEANING AND SEALING EXISTING JOINTS." CLEAN JOINT OUT FULL DEPTH OF THE JOINT DOWN TO THE CAPS. REMOVE ALL DEBRIS FROM CAPS, SUBSIDIARY TO ITEM 438.

PROCEDURE FOR CLEANING
AND SEALING EXISTING
ARMOR JOINTS

(8) CLEAN JOINT OPENING OF ALL OLD EXPANSION MATERIALS/DEVICES, DIRT, AND ALL OTHER DELETERIOUS MATERIALS IN ACCORDANCE WITH ITEM 438. "CLEANING AND SEALING EXISTING JOINTS."
CLEAN JOINT OUT FULL DEPTH OF THE JOINT DOWN TO THE CAPS. REMOVE ALL DEBRIS FROM CAPS, SUBSIDIARY TO ITEM 438.

(9) CONTRACTOR IS REQUIRED TO VERIFY THE BRIDGE JOINT OPENING WIDTHS PRIOR TO ORDERING MATERIALS

(10) ABRASIVE BLAST CLEAN TO EXISTING STEEL SURFACE WHERE PREMOLDED PREFORMED COMPRESSIBLE JOINT MATERIAL IS TO BE PLACED.

(11) WIPE DOWN JOINT SURFACES TO REMOVE CONTAMINATES.

(12) OBTAIN APPROVAL OF CLEANED JOINT PRIOR TO PROCEEDING WITH JOINT SEALING OPERATION.

(13) CORRECTLY SIZE JOINT SEAL BASED ON FIELD MEASUREMENT AND IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS. MULTIPLE SEAL WIDTHS MAY BE REQUIRED. ENSURE PROPER SEAL IS SELECTED FOR EACH JOINT. PROVIDE PREMOLDED PREFORMED COMPRESSIBLE JOINT MATERIAL 25% LARGER THAN THE JOINT OPENING.

(14) REFER TO CLEAN AND SEAL JOINTS DETAIL PAGE 2 OF 2 FOR JOINT SEALANT TERMINATION DETAIL.

(15) MASK AREAS ADJACENT TO JOINT OPENING SUFFICIENTLY TO KEEP EPOXY OFF DECK SURFACE.

(16) WHEN APPLYING THE SILICON SEAL WITH A BACKER ROD, PLACE BACKER ROD JOINT INTO OPENING 1" BELOW THE TOP OF THE 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.

(17) SEAL THE JOINT OPENING WITH A CLASS 7 JOI SEALANT. RECESS SEAL 1/2" BELOW TOP OF CONCRETE IN TRAVEL LANES AND 1/4" BELOW TOP OF CONCRETE IN SHOULDERS.

(18) APPLY EPOXY TO JOINT OPENING SIDE SURFACES AS PER MANUFACTURER'S RECCOMENDATIONS. EPOXY TO BE IN ACCORDANCE WITH DMS-6100 "EPOXIES AND ADHESIVES."

(19) WHILE EPOXY IS STILL TACKY, REMOVE SHRINK WRAP FROM SEAL AND INSTALL IN JOINT OPENING.

(20) RECESS TOP OF JOINT SEAL 1/2" IN TRAVEL LANES AND 1/4" IN SHOULDERS.

(21) INJECT SILICONE ADHESIVE ALONG TOP INTERFACE SEAL WITH JOINT SIDE SURFACE ACCORDING TO MANUFACTURER'S RECOMENDATION. TOOL TO SPREAD ADHESIVE AS NECESSARY. SEE DETAIL F.

AMA FY25 BPM

BRIDGE JOINT DETAILS

SCALE: NTS

Texas Department of Transportation

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		49

DATE: 9/12/2024 9:56:48 AM
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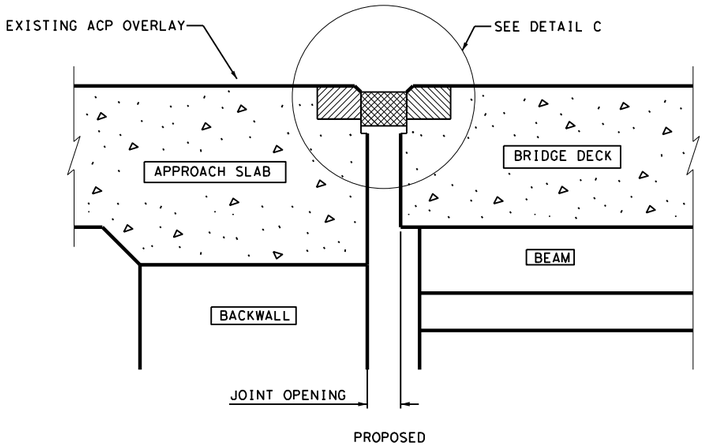


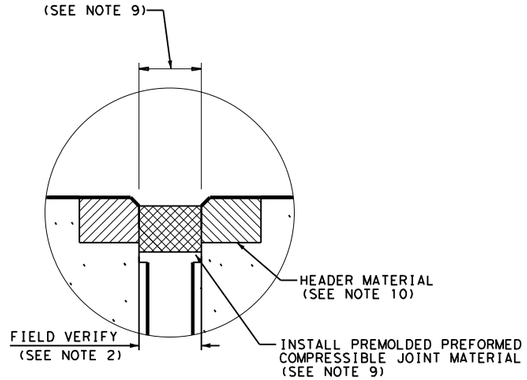
PROPOSED

TYPE D
HEADER TYPE EXPANSION JOINT

NTS

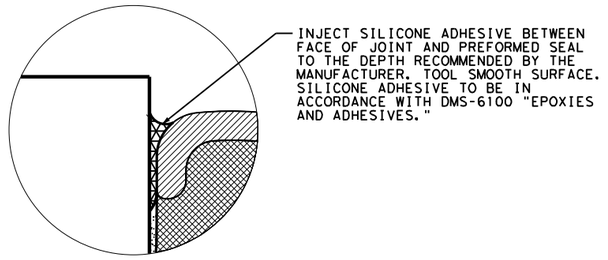
PROCEDURE FOR CLEANING AND SEALING HEADER JOINT WITH PRECOMPRESSIBLE JOINT MATERIAL

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." CLEAN JOINT OUT FULL DEPTH OF THE JOINT DOWN TO THE CAPS. REMOVE ALL DEBRIS FROM CAPS, SUBSIDIARY TO ITEM 438.
2. CONTRACTOR IS REQUIRED TO VERIFY THE BRIDGE JOINT OPENING WIDTHS PRIOR TO ORDERING MATERIALS
3. CLEAN THE VOIDED REGION OF ALL MATERIALS THAT COULD INHIBIT THE BOND BETWEEN HEADER MATERIAL AND CONCRETE OR STEEL.
4. MASK AREAS ADJACENT TO JOIN OPENING SUFFICIENTLY TO KEEP EPOXY OFF DECK SURFACE.
5. APPLY EPOXY TO JOINT OPENING SIDE SURFACES.
6. WHILE EPOXY IS STILL TACKY, REMOVE SHRINK WRAP FROM SEAL AND INSTALL IN JOINT OPENING.
7. RECESS TOP OF JOINT SEAL 1/2" IN TRAVEL LANES AND 1/4" IN SHOULDERS.
8. INJECT SILICONE ADHESIVE ALONG TOP INTERFACE SEAL WITH JOINT SIDES SURFACE ACCORDING TO MANUFACTURER'S RECOMMENDATION. TOOL TO SPREAD ADHESIVE AS NECESSARY SEE DETAIL "F". SILICONE ADHESIVE TO BE IN ACCORDANCE WITH DMS-6100 "EPOXIES AND ADHESIVES."



DETAIL C

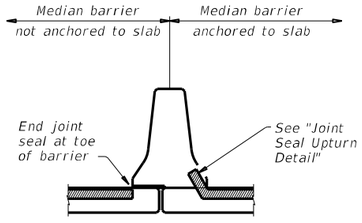
NTS



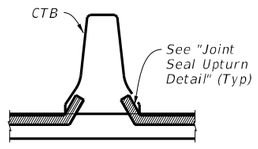
DETAIL F

GENERAL NOTES

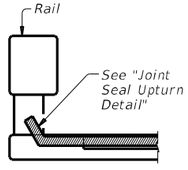
9. PREMOLDED PREFORMED COMPRESSIBLE JOINT MATERIAL SHALL BE 25% LARGER THAN JOINT OPENING. CONTRACTOR TO VERIFY JOINT OPENINGS PRIOR TO ORDERING MATERIALS:
   (3 1/8" FOR 2 1/2" OPENING)
   (3 3/4" FOR 3" OPENING)
   PRODUCT USED SHALL BE:
   SEALTITE BRIDGE JOINT SEALANT 50 N OR CHASE CONSTRUCTION PRODUCTS PHYZITE 380 OR APPROVED EQUAL
   INSTALL PER MANUFACTURER'S RECOMMENDATION
10. 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, IT WILL BE PAID AND CONSTRUCTED IN ACCORDANCE TO ITEM 454.
11. EXTEND SEALANT UP INTO RAIL OR CURB 4 INCHES ON LOW SIDE OR SIDES OF DECK. IF THE CLASS 7 SEALANT CANNOT BE EFFECTIVELY PLACED IN THE VERTICAL POSITION, A CLASS 4 SEALANT COMPATIBLE WITH THE CLASS 7 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. SEE JOINT SEALANT TERMINATION DETAILS.



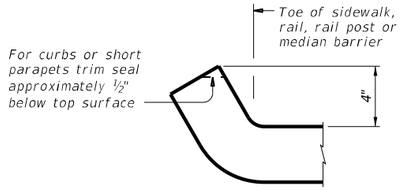
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



AT CONCRETE TRAFFIC BARRIER



AT CONCRETE BRIDGE RAIL



JOINT SEAL UPTURN DETAIL

(See Note D)

JOINT SEALANT TERMINATION DETAILS

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

AMA FY25 BPM

BRIDGE JOINT DETAILS

SCALE: NTS

2024 Texas Department of Transportation

SHEET 2 OF 3

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		50

DATE: 9/12/2024 9:56:49 AM
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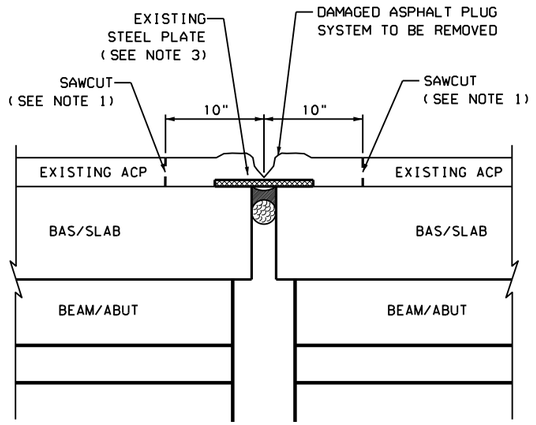
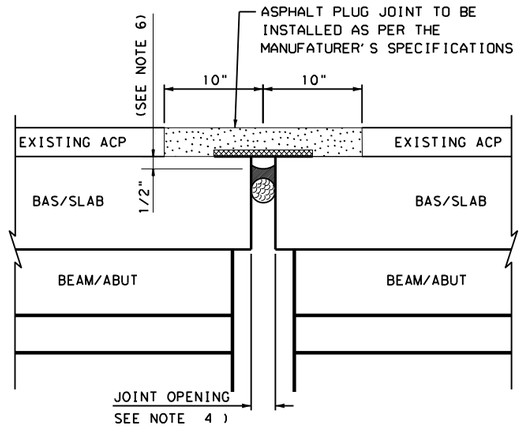


EXISTING



PROPOSED

TYPE E
ASPHALT PLUG JOINT

NTS

PROCEDURE FOR CLEANING AND SEALING EXISTING ASPHALT PLUG JOINTS

1. SAW CUT EDGES OF REPAIR AREA DOWN TO THE BRIDGE DECK SURFACE. BREAK OUT AND REMOVE ALL MATERIAL BETWEEN THE SAW CUTS DOWN TO THE CONCRETE DECK SURFACE. JOINT WIDTHS WILL BE 20 INCHES WIDE CENTERED OVER THE EXPANSION JOINT. THIS WORK WILL BE SUBSIDIARY TO ITEM 4001.

2. CLEAN JOINT OPENING OF ALL OLD 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 DOWN TO THE CAPS. REMOVE ALL DEBRIS FROM CAPS, SUBSIDIARY TO ITEM 438. ALL BLOCKOUT SURFACES SHALL BE DRY, THEN ABRASIVELY BLASTED TO REMOVE CONTAMINANTS AND LOOSE AGGREGATE.

3. CONTRACTOR TO ASSUME EXISTING STEEL PLATE SHALL NOT BE SALVAGED. THE CONTRACTOR TO PROVIDE A NEW STEEL PLATE AT NO ADDITIONAL COST, PLATE SIZE 3/8" x 8"

4. CONTRACTOR IS REQUIRED TO VERIFY THE BRIDGE JOINT OPENING WIDTHS PRIOR TO ORDERING MATERIALS.

5. OBTAIN APPROVAL OF CLEANED JOINT PRIOR TO PROCEEDING WITH JOINT SEALING OPERATION.

6. PLACE BACKER ROD INTO JOINT OPENING 1" BELOW THE TOP OF THE CONCRETE BRIDGE DECK. THE BACKER ROD MUST BE COMPATIBLE WITH THE SEALANT. WHEN SEALING JOINTS FOR SLAB SPANS, PAN GIRDER SPANS, OR BOX BEAM SPANS, FILL VOID BELOW BACKER ROD WITH POLYSTYRENE FOAM. USE OF MULTIPLE PIECES TO CREATE A BACKER ROD CROSS SECTION IS NOT PERMITTED. TOP OF BACKER ROD MUST BE CONVEX AS SHOWN.

7. POUR HEATED ELASTOMERIC BINDER OVER THE BACKER ROD IN THE JOINT OPENING TO SEAL THE GAP. THIS BINDER SHALL BE POURED LEVEL WITH THE BLOCKOUT, AND APPLIED OVER THE ENTIRE BLOCKOUT (BASE AND SIDEWALLS) TO FORM A MONOLITHIC MEMBRANE TO A THICKNESS AS PER MANUFACTURER'S RECOMMENDATIONS.

8. PLACE THE SALVAGED, OR NEW STEEL PLATE CENTERED OVER THE JOINT OPENING, END TO END ALONG THE JOINT, WITH NO OVERLAPPING. INSTALL CENTERING PINS AT THE PRE-DRILLED HOLES AND INSERTED DIRECTLY INTO THE MODIFIED BINDER PLUG. HEATED ELASTOMERIC BINDER SHALL BE POURED OVER THE STEEL PLATE TO ENCAPSULATE IT.

9. MIX A BLEND OF ELASTOMERIC BINDER, AND AGGREGATE. POUR THE MIXTURE INTO THE BLOCKOUT IN LIFTS AS PER MANUFACTURER'S RECOMMENDATIONS UNTIL FLUSH WITH THE ROAD SURFACE, AND LEVEL THE MIXTURE USING RAKES.

10. COMPACT THE COMPLETED JOINT USING METHODS RECOMMENDED BY THE MANUFACTURER SUCH THAT THE FINAL GRADE OF THE JOINT AFTER COMPACTION MATCHES THE FINISHED GRADE OF THE DECK.

11. HEAT THE TOP OF THE COMPACTED MIXTURE WITH A HEAT LANCE, AND SPREAD A THIN LAYER OF ELASTOMERIC BINDER OVER THE MIXTURE SURFACE. IMMEDIATELY APPLY A LAYER OF SURFACING AGGREGATE INTO THE ELASTOMERIC BINDER, COMPACT THE AGGREGATE INTO THE SURFACE. ALLOW THE JOINT TO TO COOL, AND SWEEP UP ANY LOOSE AGGREGATE PRIOR TO OPENING THE ROADWAY TO TRAFFIC.

LEGEND

4001 6001 PLUG EXP JOINT

AMA FY25 BPM

BRIDGE JOINT DETAILS

SCALE: NTS

2024 Texas Department of Transportation

SHEET 3 OF 3

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		51

DATE: 9/12/2024 9:56:50 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\BRIDGE JOINT DETAILS.dgn

SUMMARY OF BRIDGE JOINTS					
LOCATION	NBI	ROADWAY	CROSSING	JOINT	ACTION
REF 01	04-188-0-0041-07-093	MOBLEY AVE	US 87	TYPE D	CLEAN & SEAL
REF 02	04-188-0-0041-07-083	SL 434	US 87	TYPE D	CLEAN
REF 03	04-188-0-0275-01-177	BELL ST	IH 40	TYPE C	CLEAN
REF 04	04-033-0-0275-02-186	FM 2373	IH 40	TYPE D	CLEAN
REF 05	04-104-0-1108-01-004	FM 767	PUNTA DE AGUA	TYPE C	CLEAN
REF 06	04-033-0-0275-02-053	FM 2161	IH 40	TYPE B	CLEAN
REF 07	04-091-0-1861-02-011	RM 1321	CABIN CREEK	TYPE B	CLEAN & SEAL
REF 08	04-059-0-1491-02-004	SH 214	TIERRA BLANCA CREEK	TYPE A	CLEAN & SEAL
REF 09	04-118-0-2439-01-003	RM 1319	ANTELOPE CREEK	TYPE C	CLEAN
REF 10	04-148-0-0355-01-019	SH 15	PLUMMER CREEK	TYPE D	CLEAN
REF 11	04-091-0-1861-02-015	RM 1321	SAND CREEK	TYPE D	CLEAN
REF 12	04-006-0-0357-03-002	SH 207	MULBERRY CREEK		
REF 13	04-188-0-0275-01-019	CULVERT	IH 40		
REF 14	04-033-0-0275-03-056	CR K	IH 40	TYPE B	CLEAN & SEAL
REF 15	04-191-0-0067-17-108	CEMETERY RD	IH 27	PLUG	CLEAN & SEAL

DATE: 9/12/2024 10:29:35 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\7. Bridge\BRIDGE JOINT SUMMARY.dgn

BRIDGE JOINT SUMMARY

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		52

REF 01: MOBLEY AVE AT US 87 PROJECT SUMMARY									
LOCATION	427	428	438	439	483	662	666	785	7001
	7005	7001	7007	7014	7016	7114	7304	7002	7002
	EPOXY WATERPROOF FINISH (TY X)	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING AND SEALING EXIST JOINTS (CL 7)	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BRIDGE JOINT REPAIR (HEADER)	BENT CAP/ABUTMENT CAP CLEANING
	SF	SY	LF	SY	SY	EA	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	255	300		839	839	20	400	10	
BRIDGE REPAIR DETAIL SHEET 1 OF 1			188						5
PROJECT TOTALS:	**255**	**300**	**188**	**839**	**839**	**20**	**400**	**10**	**5**

1. SEE GENERAL NOTES FOR PERMITTED DATES OF CONSTRUCTION.

DATE: 9/12/2024 10:29:37 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 01_MOBLEY AVE AT US 87\MOBLEY AVE AT US 87 QUANTITY SUMMARY.dgn

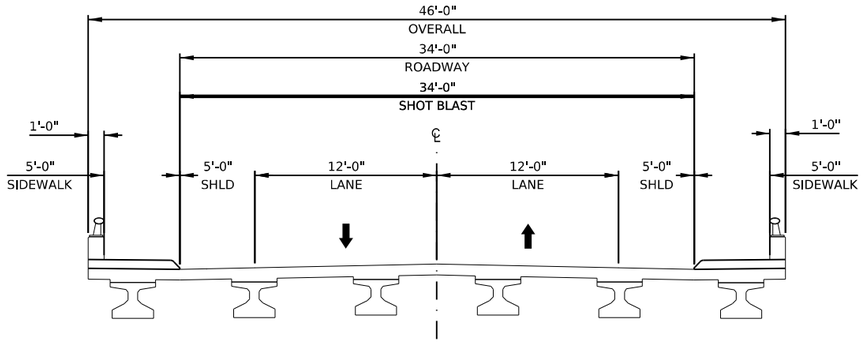
MOBLEY AVE
AT US 87
NBI:041880004107093

QUANTITY SUMMARY

2024 Texas Department of Transportation

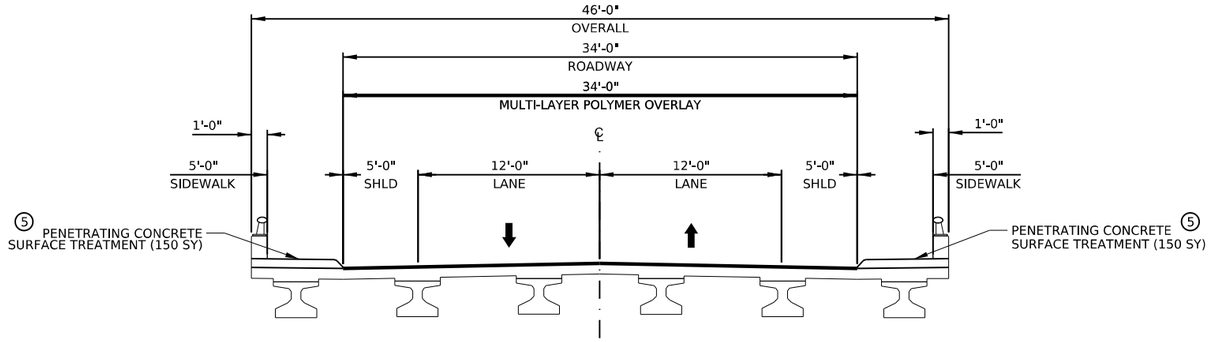
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		53



REF 01: MOBLEY AVE AT US 87 EXISTING TYPICAL SECTION

STA. 4+00 TO STA. 6+00



REF 01: MOBLEY AVE AT US 87 PROPOSED TYPICAL SECTION

STA. 4+00 TO STA. 6+00

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

MOBLEY AVE
AT US 87
NBI:041880004107093

TYPICAL SECTIONS

SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		54

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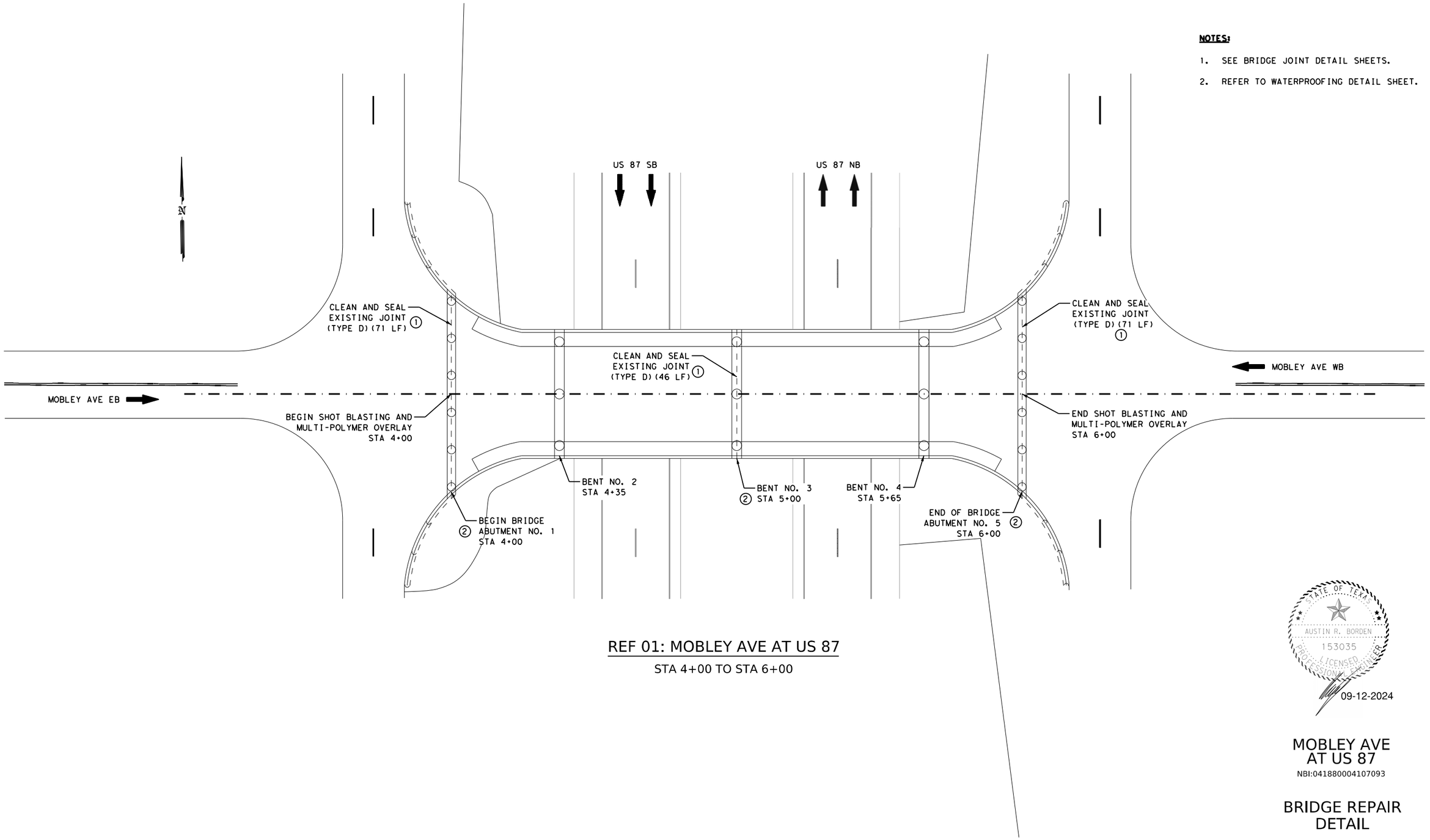
NOTES:

1. SEE BRIDGE JOINT DETAIL SHEETS.
2. REFER TO WATERPROOFING DETAIL SHEET.



REF 01: MOBLEY AVE AT US 87

STA 4+00 TO STA 6+00

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

MOBLEY AVE AT US 87

NBI:041880004107093

BRIDGE REPAIR DETAIL

SCALE: 1" = 30'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		55

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REF 02: SL 434 AT US 87 PROJECT SUMMARY								
LOCATION	428	438	439	483	662	666	785	7001
	7001	7008	7014	7016	7114	7304	7002	7002
	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BRIDGE JOINT REPAIR (HEADER)	BENT CAP/ABUTMENT CAP CLEANING
	SY	LF	SY	SY	EA	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	163		720	720	11	219	6	5
BRIDGE REPAIR DETAIL SHEET 1 OF 1		144						
PROJECT TOTALS:	**163**	**144**	**720**	**720**	**11**	**219**	**6**	**5**

SL 434
AT US 87
NBI:041880004107083

QUANTITY SUMMARY

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		56

DATE: 9/12/2024 10:29:38 AM
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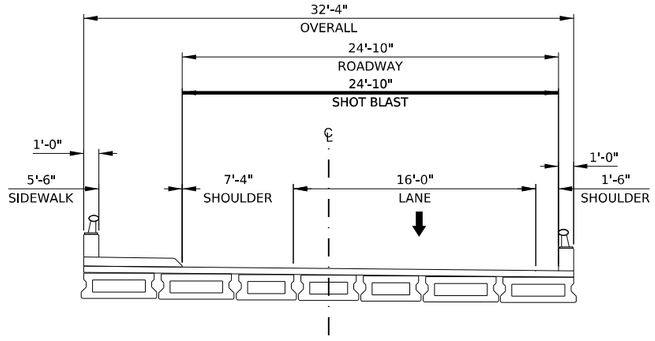
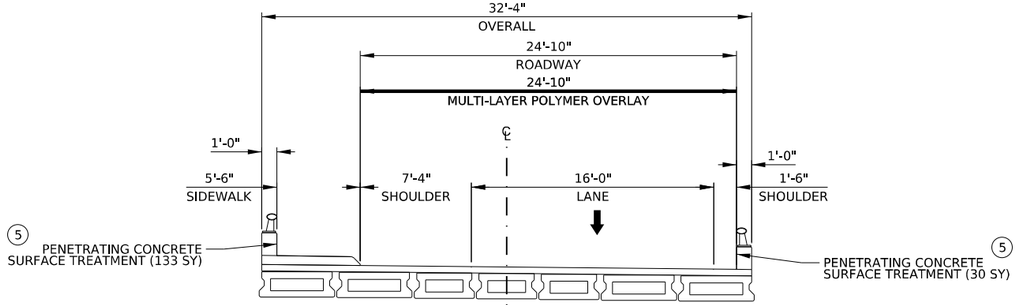


REF 02: SL 434 AT US 87 EXISTING TYPICAL SECTION

STA. 9+05 TO STA. 10+95



REF 02: SL 434 AT US 87 PROPOSED TYPICAL SECTION

STA. 9+05 TO STA. 10+95

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

SL 434
AT US 87
NBI:041880004107083

TYPICAL SECTIONS

SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		57

DATE: 9/12/2024 9:56:59 AM
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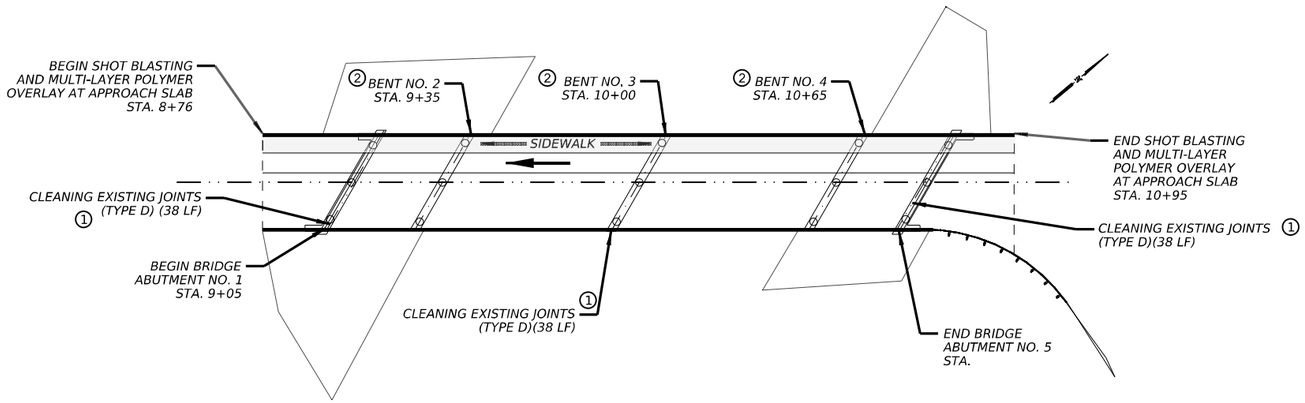
NOTES:

1. SEE BRIDGE JOINT DETAIL SHEETS.
2. SEE WATERPROOFING TYPICAL DETAILS FOR MORE INFORMATION.



REF 02: SL 434 AT US 87

STA 9+05 TO STA 10+95

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED PROFESSIONAL ENGINEER
09-12-2024

SL 434
AT US 87
NBI:041880004107083

BRIDGE REPAIR DETAIL

SCALE: 1" = 50'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		58

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REF 03: BELL ST AT IH 40 PROJECT SUMMARY													
LOCATION	428	438	439	483	662	662	668	668	668	666	666	666	7001
	7001	7008	7014	7016	7112	7114	7089	7091	7103	7289	7292	7304	7002
	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	PREFAB PAV MRK TY C (W) (24") (SLD)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	TY I HIGH PERF PM (W)6"(BRK) (090MIL)	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BENT CAP/ABUTMENT CAP CLEANING
	SY	LF	SY	SY	EA	EA	LF	EA	EA	LF	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	454		2,795	2,795	41	30		1	2	120	100	595	
BELL ST BRIDGE REPAIR DETAIL		315					36						5
TURN AROUND BRIDGE REPAIR DETAIL													5
PROJECT TOTALS:	**454**	**315**	**2,795**	**2,795**	**41**	**30**	**36**	**1**	**2**	**120**	**100**	**595**	**10**

DATE: 9/12/2024 10:29:40 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 03_BELL ST AT IH 40\BELL ST AT IH 40 QUANTITY SUMMARY.dgn

BELL ST
AT IH 40
NBI:041880027501177

QUANTITY SUMMARY

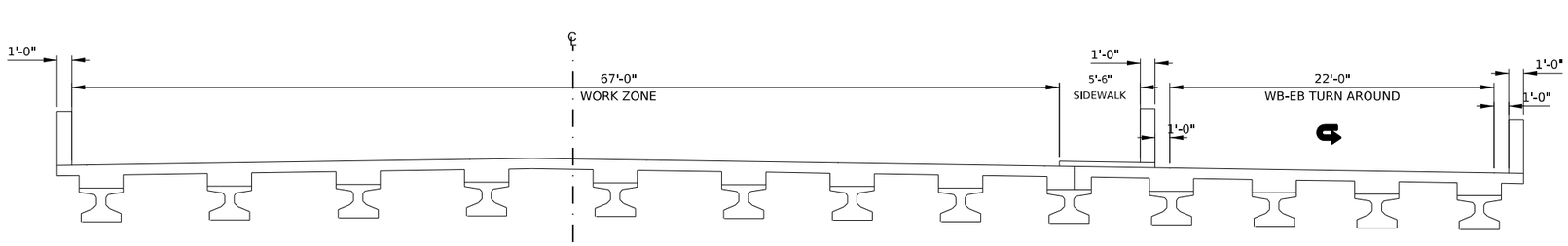
2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		59

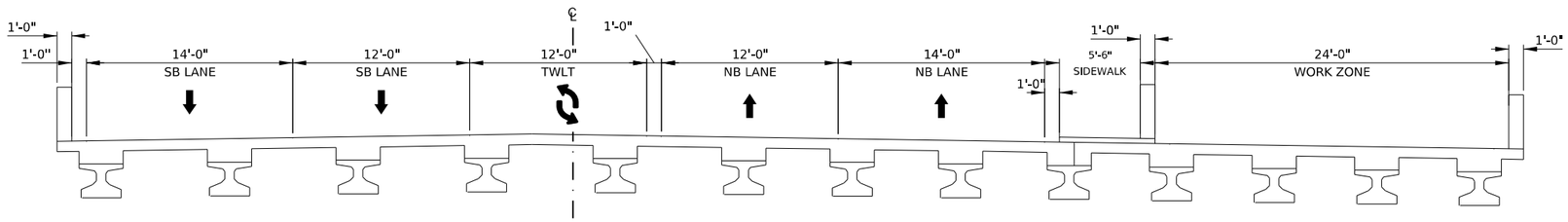
TRAFFIC CONTROL GENERAL NOTES:

1. CONTRACTOR WILL PLACE ALL TEMPORARY PAVEMENT MARKINGS, SIGNS, AND OTHER TEMPORARY TRAFFIC CONTROL DEVICES ACCORDING TO THE MOST CURRENT TXDOT STANDARDS AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
2. SUBMIT CONTRACTOR-PROPOSED TCP CHANGES, SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR APPROVAL. CHANGES MUST CONFORM TO GUIDELINES ESTABLISHED IN THE TMUTCD USING APPROVED PRODUCTS FROM THE DEPARTMENT'S COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICE LIST, PAYMENT WILL BE SUBSIDIARY TO ITEM 502.
3. THE ENGINEER WILL GIVE AT LEAST 7 CALENDAR DAYS NOTICE TO THE TRAVELING PUBLIC OF THE INTENDED START OF CONSTRUCTION. PAYMENT WILL BE SUBSIDIARY TO ITEM 502.
4. PLACE ADVANCED WARNING SIGNS PER BC STANDARDS PRIOR TO COMMENCING WORK. THE ADVANCED WARNING SIGNS WILL REMAIN IN PLACE FOR THE DURATION OF THE PROJECT.
5. EXISTING SIGNS IN CONFLICT WITH THE TCP WILL BE COVERED TO AVOID CONFUSION FOR THE TRAVELING PUBLIC. PAYMENT WILL BE SUBSIDIARY TO ITEM 502.
6. THE CONTRACTOR WILL ENSURE THAT ALL SIGNS, BOTH TEMPORARY AND PERMANENT, ARE CLEARLY VISIBLE AND FREE OF OBSTRUCTIONS AT ALL TIMES.
7. USE BARRELS IN TAPERS. CHANNELIZING DEVICES ON TANGENT AND TAPERS SHOULD BE SPACED ACCORDING TO THE POSTED SPEED AS SPECIFIED IN THE TMUTCD OR TXDOT BC STANDARDS.
8. TRAFFIC CONTROL WILL BE IN ACCORDANCE WITH THE PLANS, BC, TCP, AND WZ STANDARDS, AND AS DIRECTED BY THE ENGINEER.
9. CONTRACTOR TO REFER TO TXDOT BC STANDARDS FOR MORE INFORMATION NOT INCLUDING IN THE TRAFFIC CONTROL GENERAL NOTES.



BELL ST AT IH 40 PHASE 1

STA. 8+80 TO STA. 11+20



BELL ST AT IH 40 PHASE 2

STA. 8+80 TO STA. 11+20

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

BELL ST
AT IH 40
NBI:041880027501177

TCP NARRATIVE

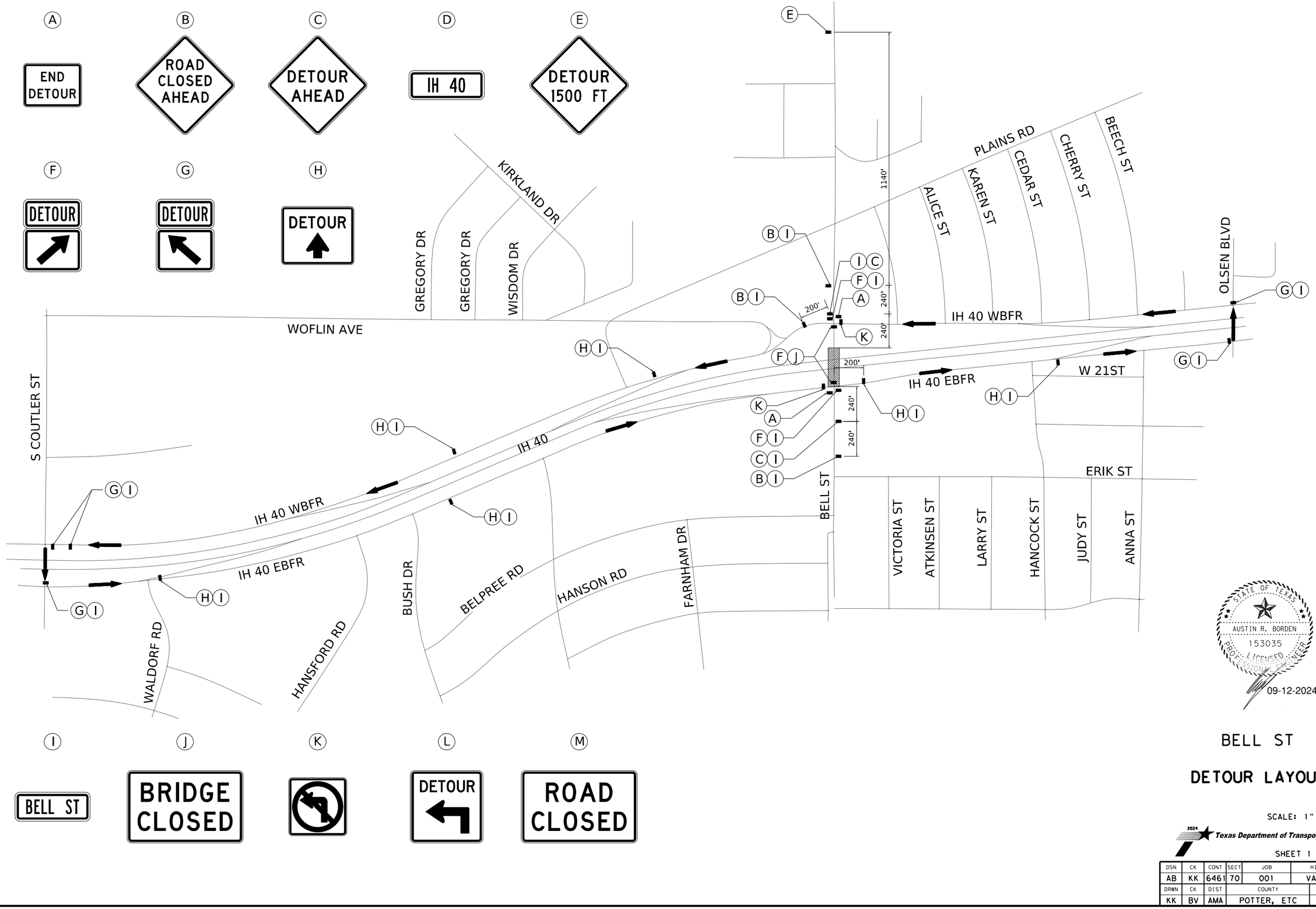
SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		60

DATE: 9/12/2024 9:57:04 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\2. TCP\REF 03_BELL ST AT IH 40\BELL ST AT IH 40 TCP NARRATIVE.dgn



STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED PROFESSIONAL ENGINEER
09-12-2024

BELL ST

DETOUR LAYOUT

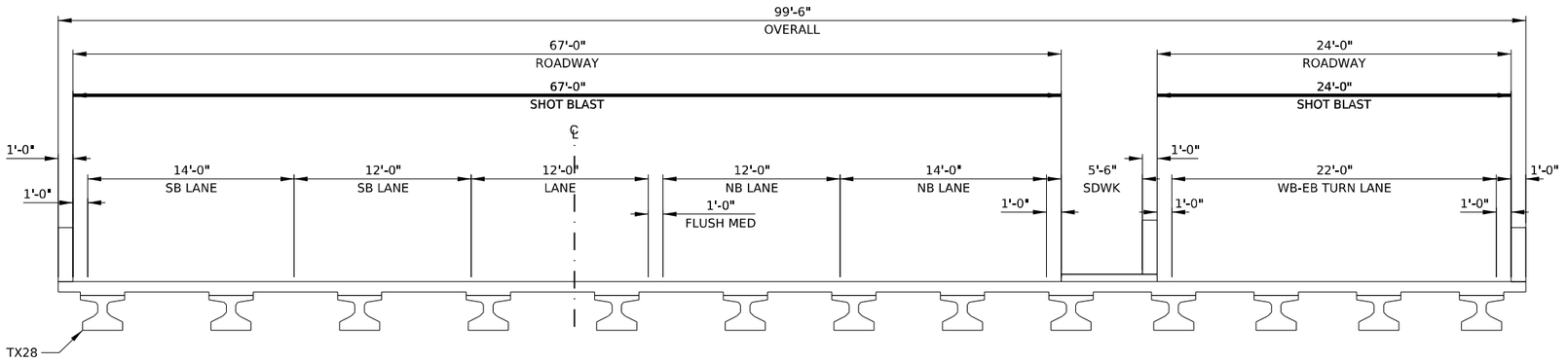
SCALE: 1" = 100'

2024 Texas Department of Transportation

SHEET 1 OF 1

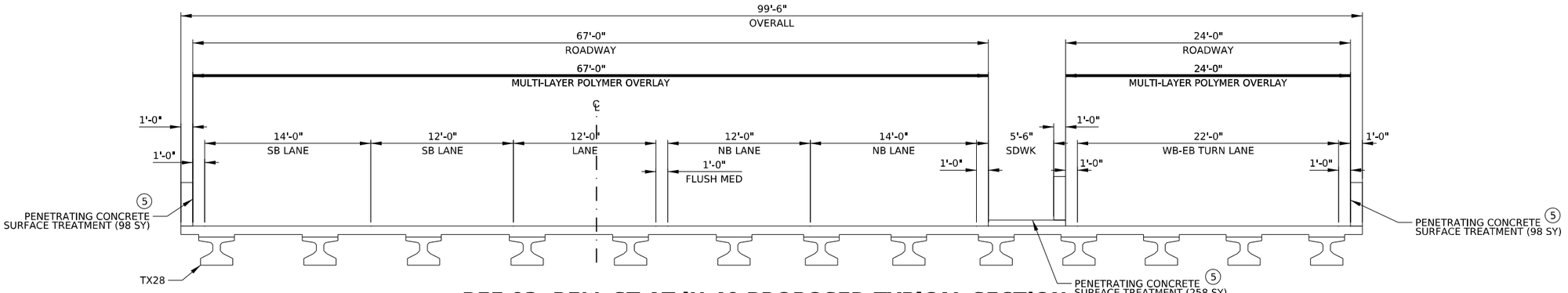
DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		61

DATE: 9/12/2024 9:57:06 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\2. TCP\REF 03_BELL ST AT IH 40\BELL ST AT IH 40 DETOUR LAYOUT.dgn



REF 03: BELL ST AT IH 40 EXISTING TYPICAL SECTION

STA. 8+80 TO STA. 11+20



REF 03: BELL ST AT IH 40 PROPOSED TYPICAL SECTION

STA. 8+80 TO STA. 11+20

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

SUGGESTED SEQUENCE OF WORK

1. WB-EB U-TURN
2. NB & SB OUTSIDE LANES
3. FULL CLOSURE OF NB & SB. OVERLAY MIDDLE 3 LANES OF STRUCTURE. (THIS PHASE CAN ONLY BE PERFORMED BETWEEN FRIDAY 8PM - MONDAY 5AM)

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

BELL ST
AT IH 40
NBI:041880027501177

TYPICAL SECTIONS

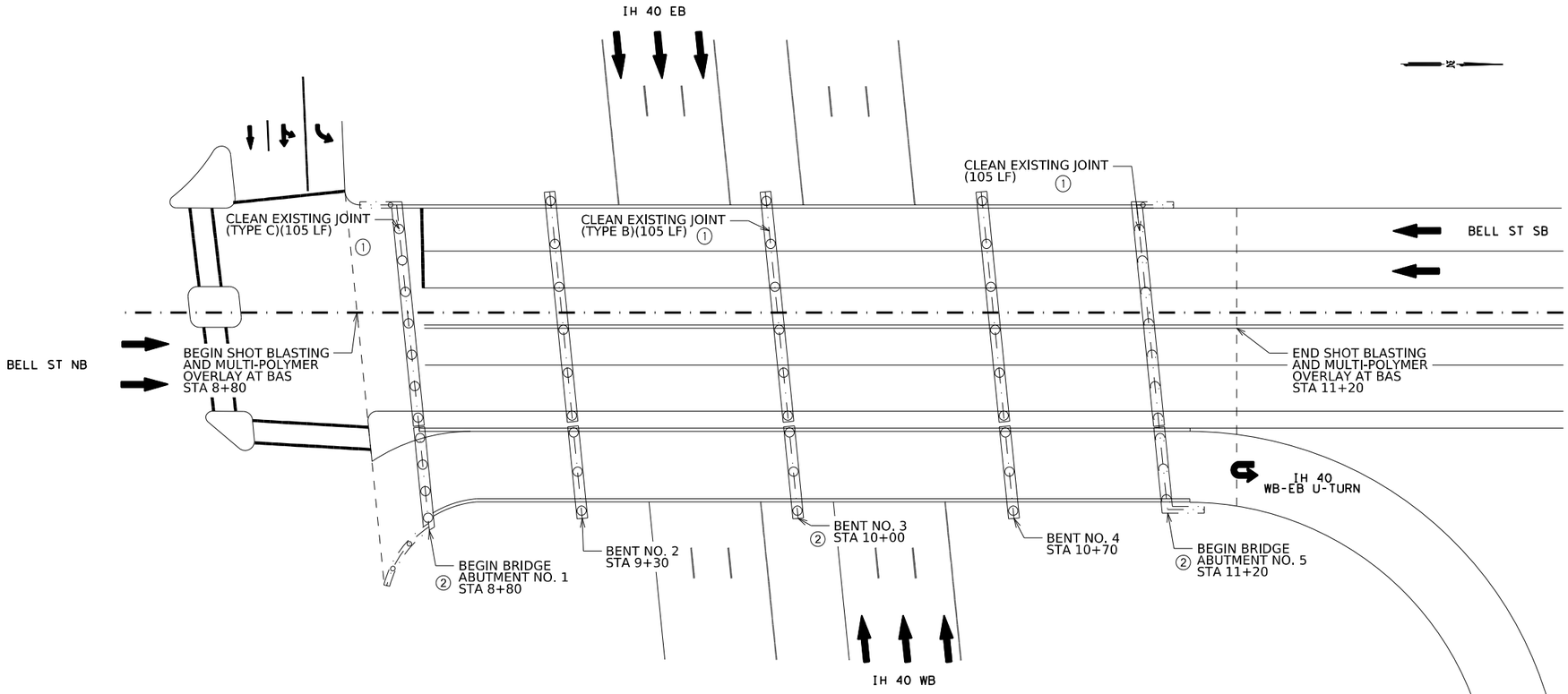
SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		62

DATE: 9/12/2024 9:57:08 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\1. General\TYPICAL SECTIONS\REF 03_BELL ST & IH 40\BELL ST AT IH 40 TYPICAL SECTION.dgn



REF 03: BELL ST AT IH 40

STA 8+80 TO STA 11+20

NOTES:

1. SEE BRIDGE JOINT DETAIL SHEETS.
2. REFER TO WATERPROOFING DETAIL SHEET.

STATE OF TEXAS
AUSTIN R. BORDEN
153035
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PROFESSIONAL ENGINEER
09-12-2024

BELL ST AT IH 40

NBI:041880027501177

BRIDGE REPAIR DETAIL

SCALE: 1" = 40'

2024 Texas Department of Transportation

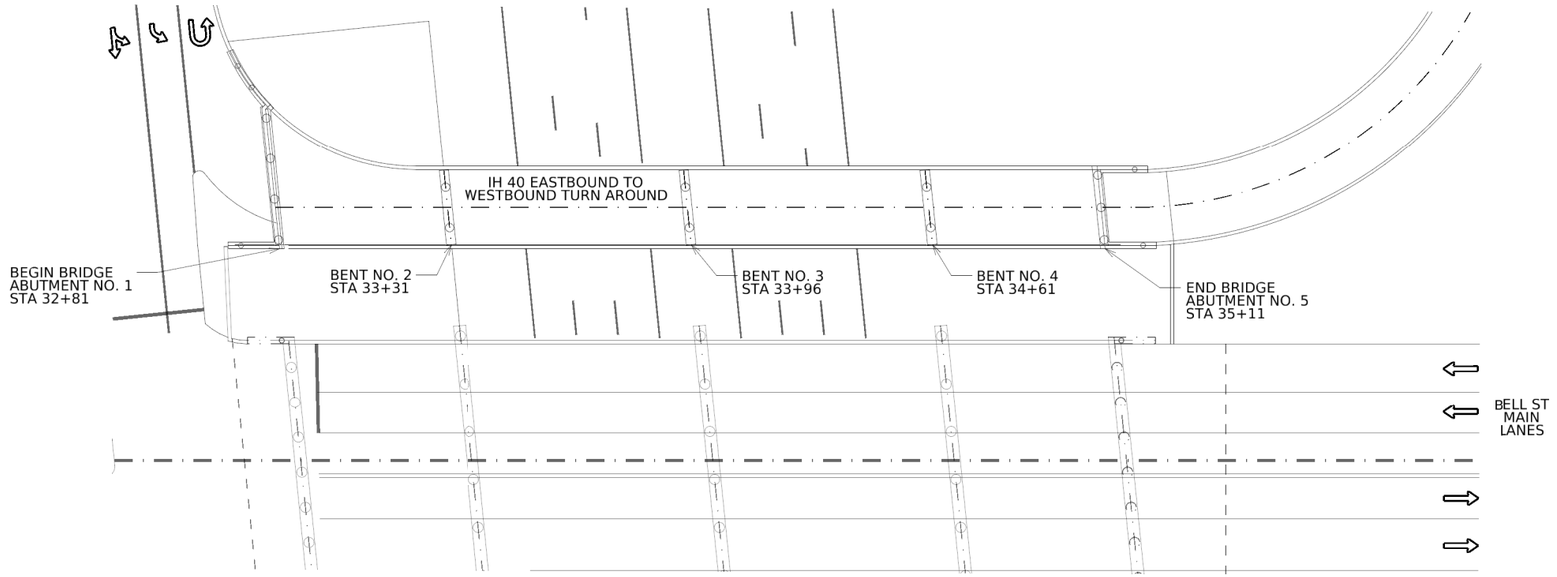
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		63

DATE: 9/12/2024 9:57:12 AM
FILE: I:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\REF 03_BELL ST AT IH 40\BELL ST AT IH 40 BRIDGE REPAIR DETAILS.dgn

NOTES:

1. SEE BRIDGE JOINT DETAIL SHEETS.
2. REFER TO WATERPROOFING DETAIL SHEET.



REF 03: TURN AROUND AT IH 40

STA 32+81 TO STA 35+11

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

TURN AROUND AT IH 40

NBI:041880027501180

BRIDGE REPAIR DETAIL

SCALE: 1" = 40'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		64

DATE: 9/12/2024 9:57:17 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\2 - Design\Plan Set\7. Bridge\REF 03_BELL ST AT IH 40\TURN AROUND AT IH 40 BRIDGE REPAIR DETAILS - Copy.dgn

REF 04: FM 2373 AT IH 40 PROJECT SUMMARY									
LOCATION	428	438	439	483	662	666	666	785	7001
	7001	7008	7014	7016	7114	7292	7304	7002	7002
	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BRIDGE JOINT REPAIR (HEADER)	BENT CAP/ABUTMENT CAP CLEANING
	SY	LF	SY	SY	EA	LF	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	120		1,081	1,081	18	360	360		
BRIDGE REPAIR DETAIL SHEET 1 OF 1		90						5	3
PROJECT TOTALS:	**120**	**90**	**1,081**	**1,081**	**18**	**360**	**360**	**5**	**3**

1. SEE GENERAL NOTES FOR PERMITTED DATES OF CONSTRUCTION

DATE: 9/12/2024 10:29:41 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 04_FM 2373 AT IH 40\FM 2373 AT IH 40 QUANTITY SUMMARY.dgn

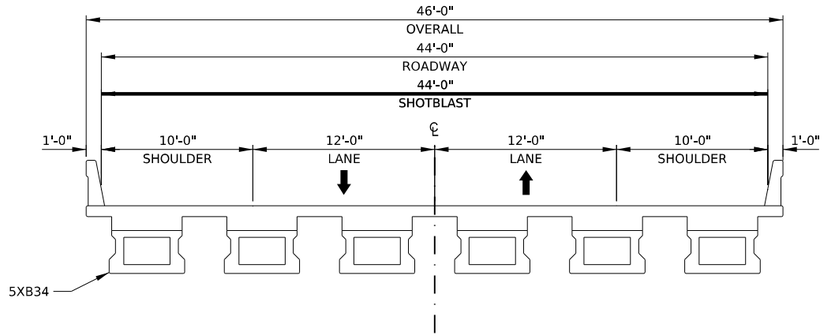
FM 2373
AT IH 40
NBI:040330027502186

QUANTITY SUMMARY

2024 Texas Department of Transportation

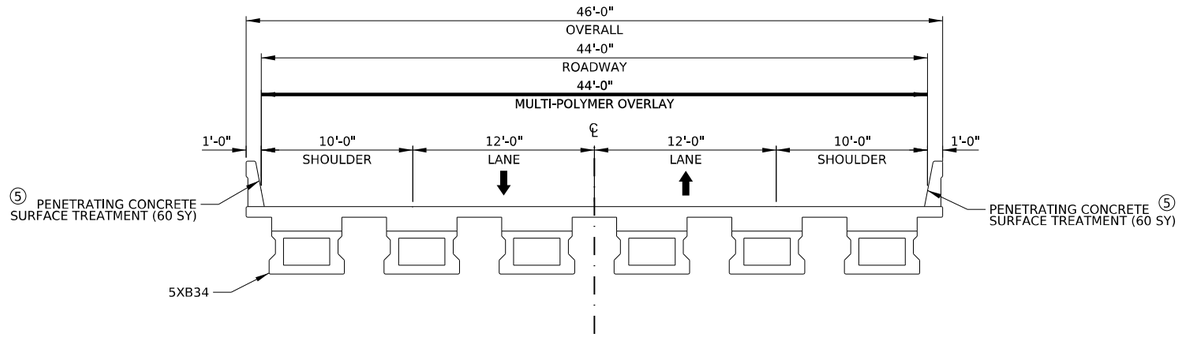
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		65



REF 04: FM 2373 AT IH 40 EXISTING TYPICAL SECTION

STA. 9+09 TO STA. 10+89



REF 04: FM 2373 AT IH 40 PROPOSED TYPICAL SECTION

STA. 9+09 TO STA. 10+89

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

FM 2373
AT IH 40
NBI:040330027502186

TYPICAL SECTIONS

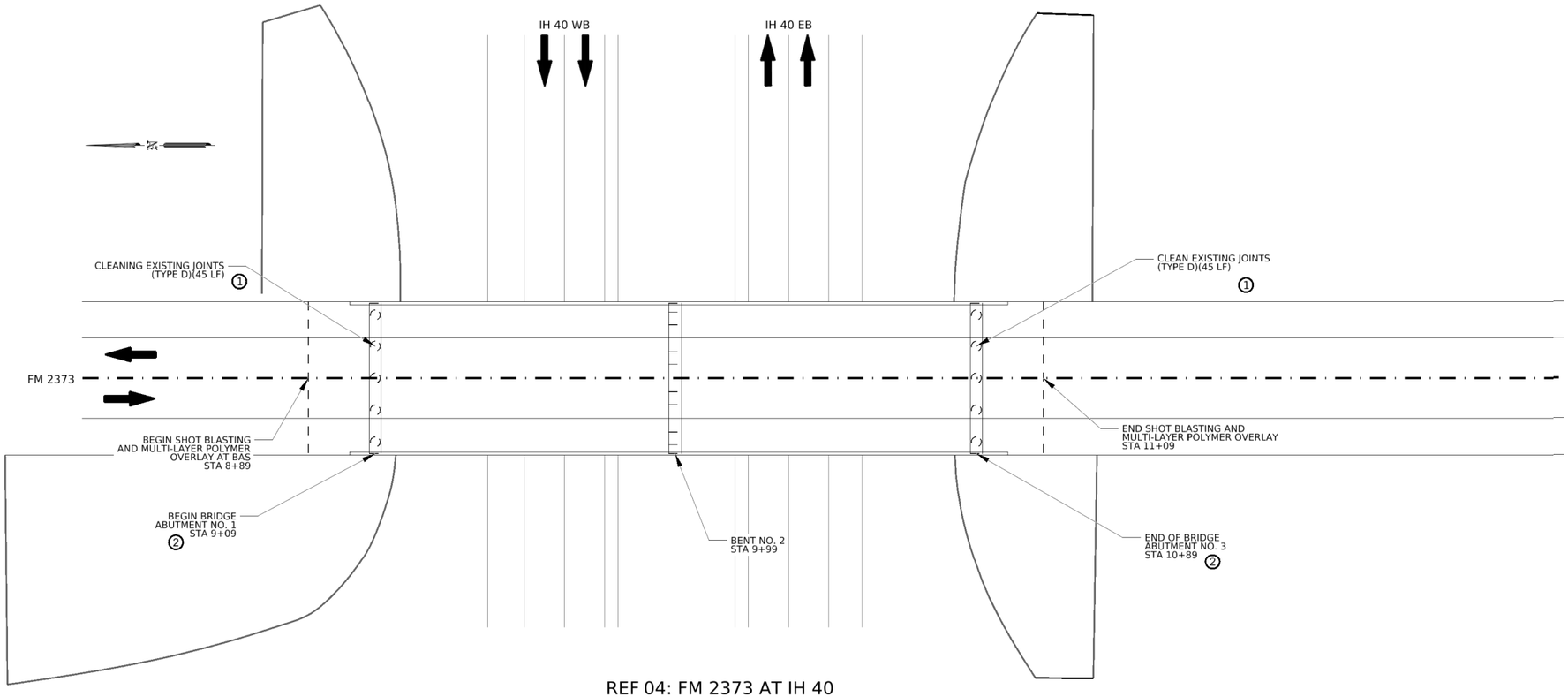
SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		66

DATE: 9/12/2024 9:57:19 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\1. General\TYPICAL SECTIONS\REF 04_FM 2373 & IH 40\FM 2373 AT IH 40 TYPICAL SECTION.dgn



REF 04: FM 2373 AT IH 40

STA 9+09 TO STA 10+89

NOTES:

1. SEE BRIDGE JOINT DETAIL SHEETS.
2. SEE WATERPROOFING TYPICAL DETAILS FOR MORE INFORMATION.

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

FM 2373 AT IH 40

NBI:040330027502186

BRIDGE REPAIR DETAIL

SCALE: 1" = 40'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		67

DATE: 9/12/2024 9:57:25 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\2 - Design\Plan Set\7. Bridge\REF 04_FM 2373 AT IH 40\FM 2373 AT IH 40 BRIDGE REPAIR DETAILS REPLACEMENT.dgn

REF 05: FM 767 AT PUNTA DE AGUA PROJECT SUMMARY							
LOCATION	428	438	439	483	662	666	7001
	7001	7008	7014	7016	7114	7304	7002
	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BENT CAP/ABUTMENT CAP CLEANING
	SY	LF	SY	SY	EA	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	614		6,100	6,100	93	1,850	
BRIDGE REPAIR DETAIL SHEET 1 OF 1		204					14
PROJECT TOTALS:	**614**	**204**	**6,100**	**6,100**	**93**	**1,850**	**14**

DATE: 9/12/2024 10:29:42 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 05_FM 767 AT PUNTA DE AGUA\FM 767 AT PUNTA DE AGUA QUANTITY S

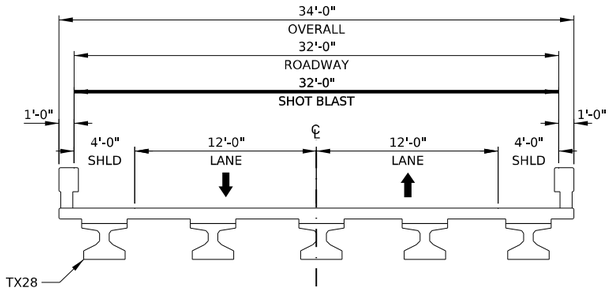
FM 767
AT PUNTA
DE AGUA
NBI:041040110801004

QUANTITY SUMMARY

2024 Texas Department of Transportation

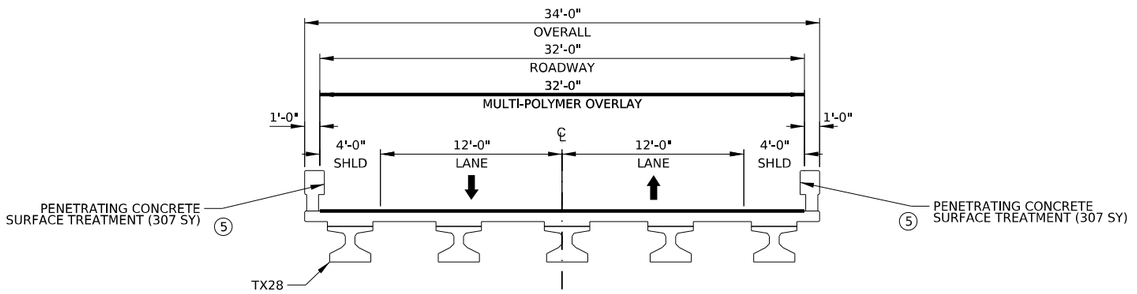
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		68



REF 05: FM 767 AT PUNTA DE AGUA EXISTING TYPICAL SECTION

STA. 1662+90 TO STA. 1672+15



REF 05: FM 767 AT PUNTA DE AGUA PROPOSED TYPICAL SECTION

STA. 1662+90 TO STA. 1672+15

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

FM 767
AT PUNTA
DE AGUA

NBI:041040110801004

TYPICAL SECTIONS

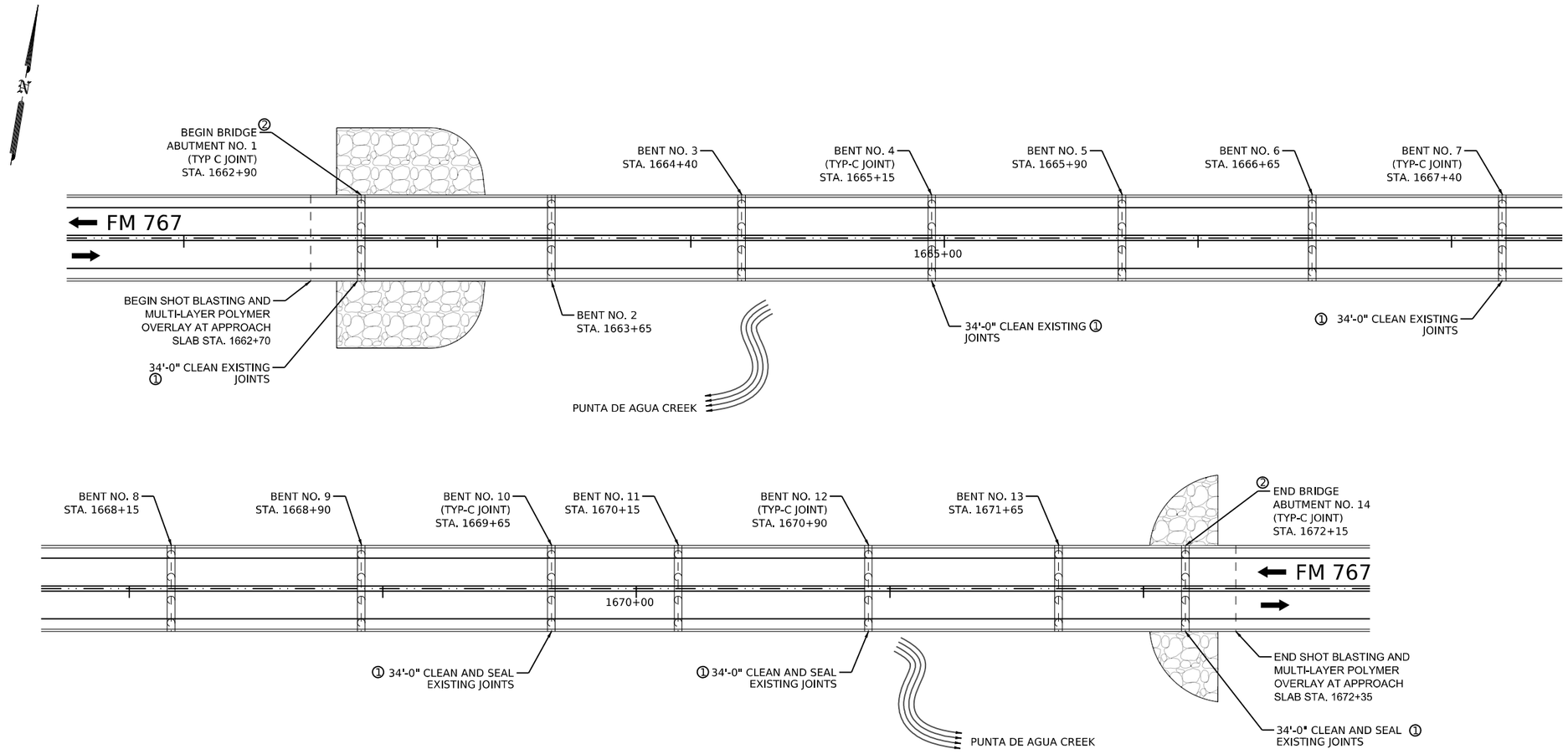
SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		69

DATE: 9/12/2024 9:57:27 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\1. General\TYPICAL SECTIONS\REF 05_FM 767 & PUNTA DE AGUA\FM 767 AT PUNTA DE AGUA TYPICAL SECTI



NOTES:

1. SEE BRIDGE JOINT DETAIL SHEETS.
2. SEE WATERPROOFING TYPICAL DETAILS FOR MORE INFORMATION.

REF 05: FM 767 AT PUNTA DE AGUA

STA 1662+70 TO STA 1672+35

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

FM 767 AT PUNTA DE AGUA

NBI:041040110801004

BRIDGE REPAIR DETAIL

SCALE: 1" = 50'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		70

DATE: 9/12/2024 9:57:31 AM
FILE: T:\AMA\TPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\7. Bridge\REF 05_FM 767 AT PUNTA DE AGUA\FM 767 AT PUNTA DE AGUA CREEK BRIDGE REPAIR DETAILS.dgn

REF 06: FM 2161 AT IH 40 PROJECT SUMMARY									
LOCATION	428	429	438	439	483	662	666	666	7001
	7001	7007	7008	7014	7016	7114	7292	7304	7002
	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BENT CAP/ABUTMENT CAP CLEANING
	SY	SF	LF	SY	SY	EA	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	148			732	732	21	424	424	
BRIDGE REPAIR DETAIL SHEET 1 OF 1		7	56						5
PROJECT TOTALS:	**148**	**7**	**56**	**732**	**732**	**21**	**424**	**424**	**5**

FM 2161
AT IH 40
NBI:040330027502053

QUANTITY SUMMARY

2024 Texas Department of Transportation

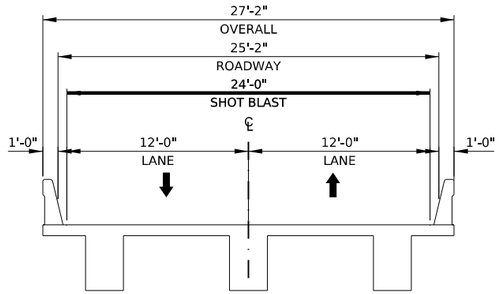
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		71

DATE: 9/12/2024 10:29:44 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 06_FM 2161 AT IH 40\FM 2161 AT IH 40 QUANTITY SUMMARY.dgn

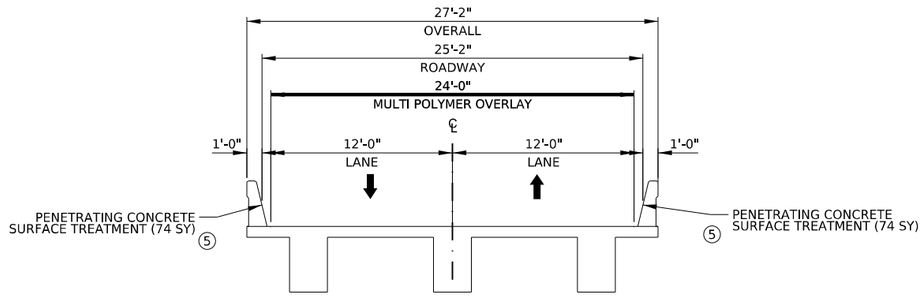
NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION



REF 06: FM 2161 AT IH 40 EXISTING TYPICAL SECTION

STA. 9+09 TO STA. 11+21



REF 06: FM 2161 AT IH 40 EXISTING PROPOSED SECTION

STA. 9+09 TO STA. 11+21

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

FM 2161
AT IH 40
NBI:040330027502053

TYPICAL SECTIONS

SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		72

DATE: 9/12/2024 9:57:34 AM
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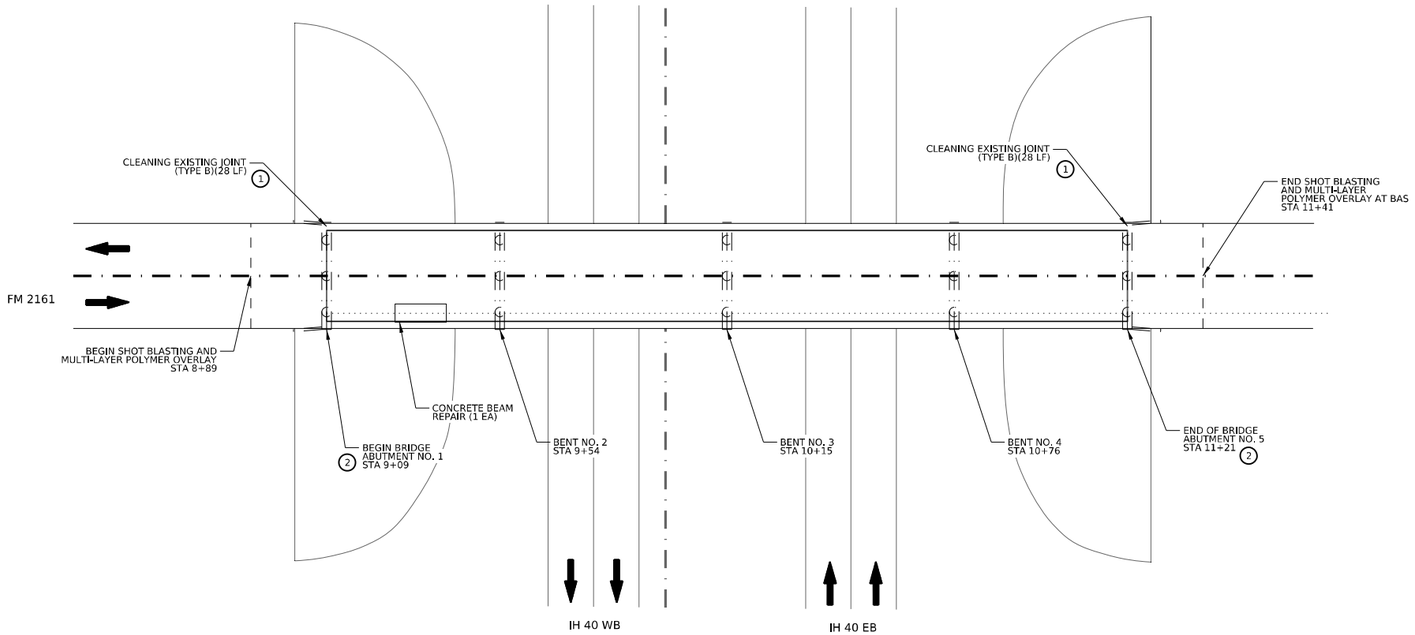
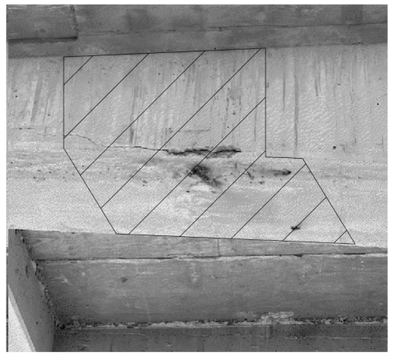


REF 06: FM 2161 AT IH 40

STA 9+09 TO STA 11+21



CONCRETE REPAIR

PHOTO SHOWING LOCATION OF REPAIR

NOTES:

1. SEE BRIDGE JOINT DETAIL SHEETS.
2. SEE WATERPROOFING TYPICAL DETAILS FOR MORE INFORMATION.

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

FM 2161 AT IH 40

NBI:040330027502053

BRIDGE REPAIR DETAIL

SCALE: 1" = 40'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		73

DATE: 9/12/2024 9:57:39 AM
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REF 07: RM 1321 AT CABIN CREEK PROJECT SUMMARY									
LOCATION	420	428	438	439	483	662	666	666	7001
	7059	7001	7007	7014	7016	7114	7292	7304	7002
	CL C CONC (PILE ENCASEMENT)	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING AND SEALING EXIST JOINTS (CL 7)	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	BENT CAP/ABUTMENT CAP CLEANING
	LF	SY	LF	SY	SY	EA	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1		62		571	571	11	220	220	
BRIDGE REPAIR DETAIL SHEET 1 OF 1	52		72						4
PROJECT TOTALS:	**52**	**62**	**72**	**571**	**571**	**11**	**220**	**220**	**4**

RM 1321
AT CABIN CREEK
NBI:040910186102011

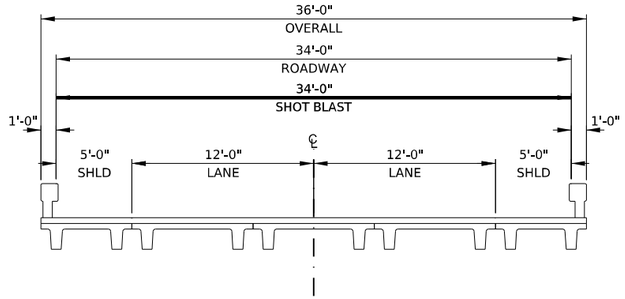
QUANTITY SUMMARY

2024 Texas Department of Transportation

SHEET 1 OF 1

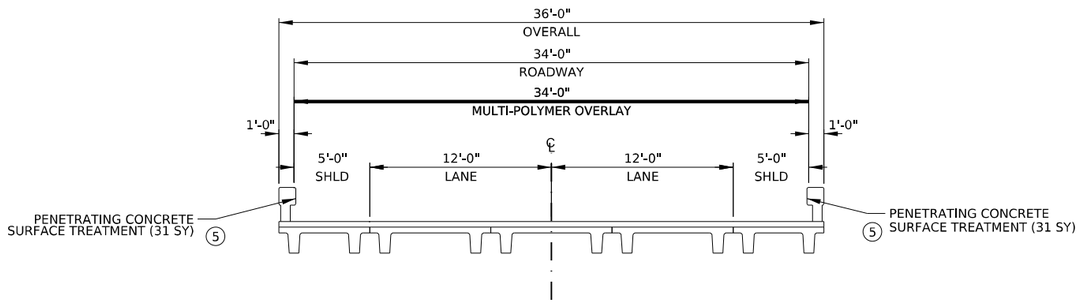
DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		74

DATE: 9/12/2024 10:29:45 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 07_RM 1321 AT CABIN CREEK\RM 1321 AT CABIN CREEK QUANTITY SUM



REF 07: RM 1321 AT CABIN CREEK EXISTING TYPICAL SECTION

STA. 80+19 TO STA. 81+29



REF 07: RM 1321 AT CABIN CREEK PROPOSED TYPICAL SECTION

STA. 80+19 TO STA. 81+29

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

RM 1321
AT CABIN CREEK

NBI:040910186102011

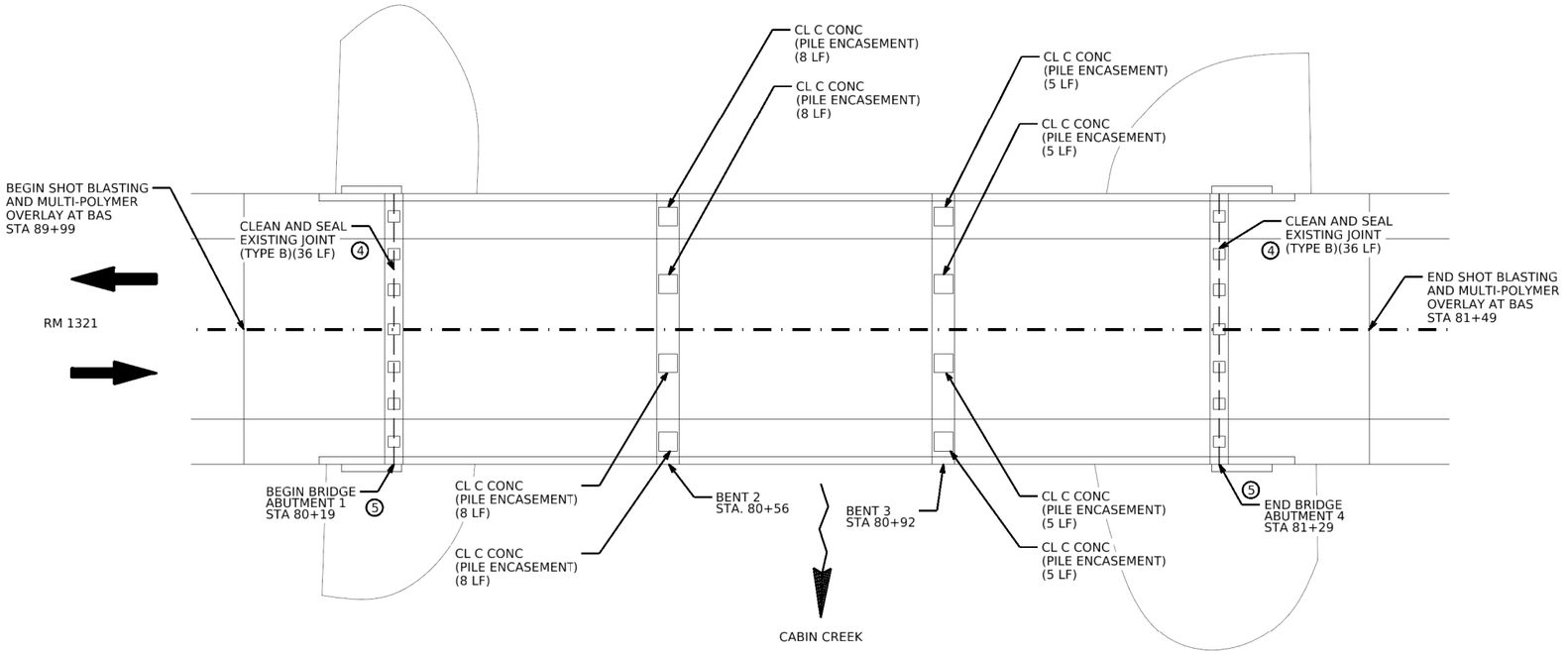
TYPICAL SECTIONS

SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		75



REF 07: RM 1321 AT CABIN CREEK

STA 80+19 TO STA 81+29

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEE BRIDGE JOINT DETAIL SHEETS
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

EXISTING STEEL PILES

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

RM 1321
AT CABIN CREEK

NBI:040910186102011

BRIDGE REPAIR DETAIL

SCALE: 1" = 20

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		76

DATE: 9/12/2024 9:57:55 AM
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DATE: 9/12/2024 9:57:58 AM
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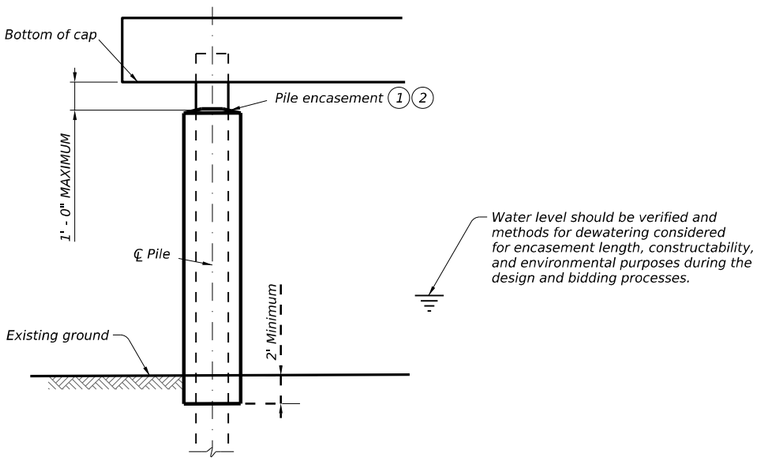


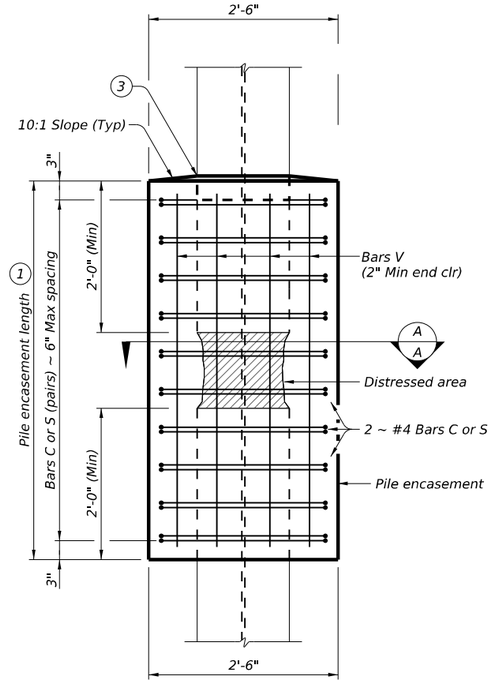
ELEVATION

Water level should be verified and methods for dewatering considered for encasement length, constructability, and environmental purposes during the design and bidding processes.

TABLE OF PILE ENCASEMENT LENGTHS			
Bent	Pile	Length of Pile Encasement (ft)	Bent Total (ft)
2	1	8	32
	2	8	
	3	8	
	4	8	
3	1	5	20
	2	5	
	3	5	
	4	5	
		Total	52

PILE ENCASEMENT PROCEDURE:

1) Verify channel line elevations and report to the Engineer for possible adjustments.
2) Submit a concrete mix design and procedures for casting the encasements for approval.
3) Clean mud, grease, loose rust, and paint off the section of H-piling to be encased with hand tools and high pressure water.
4) Place and secure the steel reinforcement and install formwork.
5) Place the concrete in the encasement per approved procedures and in accordance with Item 420, "Concrete Substructures."
6) Leave forms in-place for at least 48 hours.



ELEVATION

1. See Table of Pile Encasement Lengths.
2. Field adjust encasement length based on actual conditions.
3. Seal gap with Class 4 or Class 7 joint sealant (DMS-6310).

SECTION A-A

BAR C (#4)

Arrange Bar C pairs to provide 1'-0" opening on opposite faces:

GENERAL NOTES:

Verify dimensions for steel H-piling encasements and ground elevations. Pile Encasement Length may be adjusted by the Engineer based on actual channel and ground line elevations.

Existing conditions may be under water. Contractor is responsible for dewatering. Payment for dewatering is subsidiary to Item 420, "Concrete Substructures." The Contractor may submit a plan that adequately demonstrates the ability to perform the repairs without dewatering to the Engineer for approval. If approved, dewatering may be waived.

Obtain approval for the mix design and the construction procedures before beginning work.

If underwater placement is approved, concrete mix should be designed for underwater placement and may require the use of anti-washout admixtures.

Provide concrete for the H-piling encasement capable of attaining an average concrete compressive strength of 3,000 psi within 24 hours and consisting of coarse aggregate grades not greater than No. 5 (¾"). Provide a concrete mix with 2 gallons of corrosion inhibitor per CY.

Pile encasement will be paid for per the unit bid price for each linear foot of encasement, per Item 420, "Concrete Substructures." Payment for collars is subsidiary to Item 420, "Concrete Substructures."

Provide Grade 60 reinforcing steel.

Texas Department of Transportation | Bridge Division

PILE ENCASEMENT DETAILS
RM 1321 AT CABIN CREEK

NBI: 04-091-0-1861-02-011

FILE:	DN: AB	CK: KK	DW: KK	CK: BV
©TxDOT February 2024 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		77

REF 08: SH 214 AT TIERRA BLANCA CREEK PROJECT SUMMARY									
LOCATION	428	438	439	459	483	662	666	666	7001
	7001	7007	7014	7001	7016	7114	7292	7304	7002
	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING AND SEALING EXIST JOINTS (CL 7)	MULTI-LAYER POLYMER OVERLAY	GABION (GALV)	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BENT CAP/ABUTMENT CAP CLEANING
	SY	LF	SY	CY	SY	EA	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	78		665		665	14	280	280	5
BRIDGE REPAIR DETAIL SHEET 1 OF 1		72		2					
PROJECT TOTALS:	**78**	**72**	**665**	**2**	**665**	**14**	**280**	**280**	**5**

DATE: 9/12/2024 10:29:46 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 08_SH 214 AT TIERRA BLANCA CREEK\SH 214 AT TIERRA BLANCA CREE

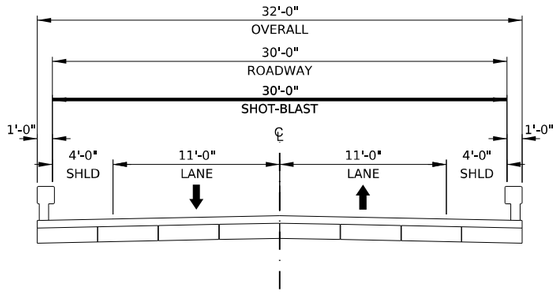
SH 214
AT TIERRA
BLANCA CREEK
NBI:040590149102004

QUANTITY SUMMARY

2024 Texas Department of Transportation

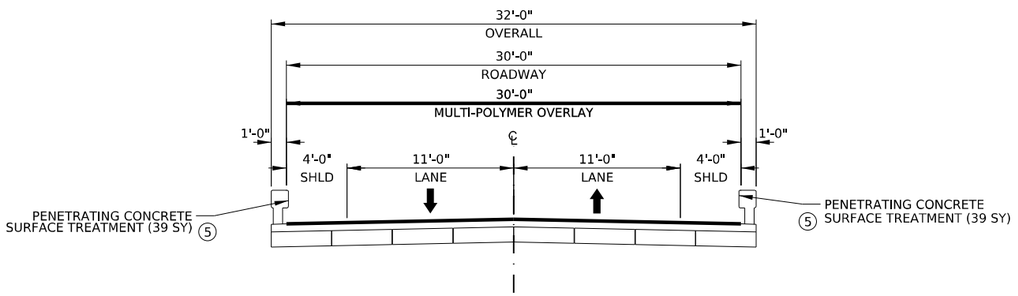
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		78



REF 08: SH 214 AT TIERRA BLANCA CREEK EXISTING TYPICAL SECTION

STA. 46+60 TO STA. 48+00



REF 08: SH 214 AT TIERRA BLANCA CREEK PROPOSED TYPICAL SECTION

STA. 46+60 TO STA. 48+00

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

SH 214 AT TIERRA BLANCA CREEK

NBI:040590149102004

TYPICAL SECTIONS

SCALE: 1" = 10'

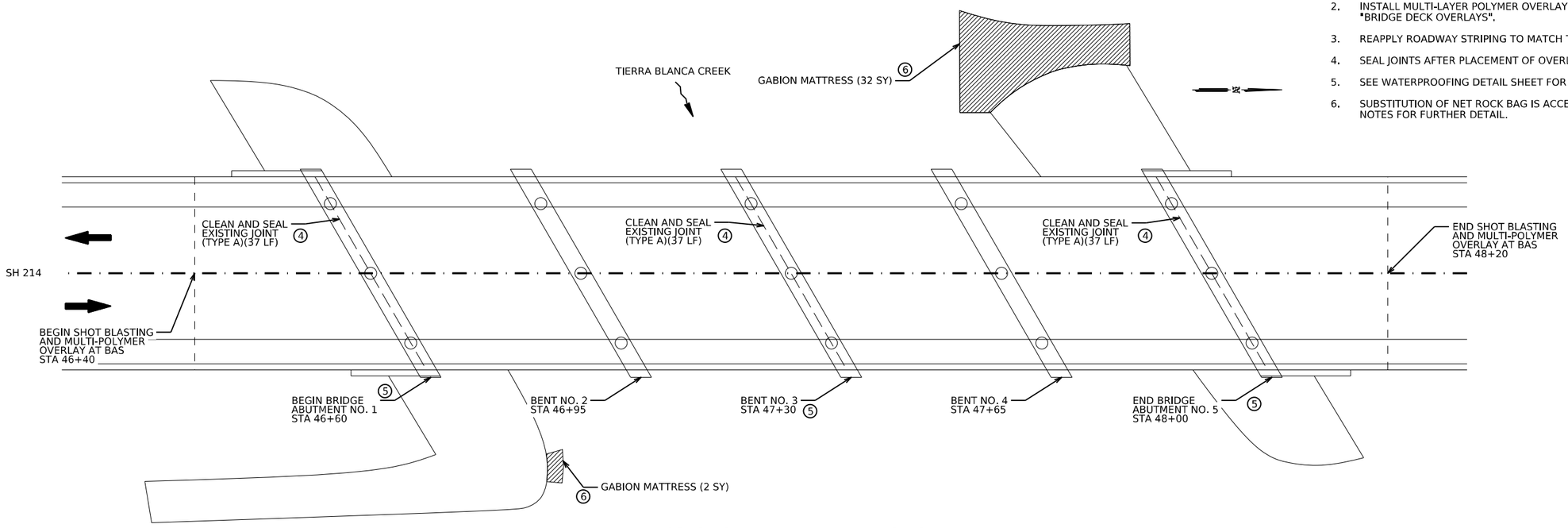
Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		79

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION
6. SUBSTITUTION OF NET ROCK BAG IS ACCEPTABLE. SEE GENERAL NOTES FOR FURTHER DETAIL.



REF 08: SH 214 AT TIERRA BLANCA CREEK

STA 46+60 TO STA 48+00

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED PROFESSIONAL ENGINEER
09-12-2024

SH 214 AT TIERRA BLANCA CREEK

NBI:040590149102004

BRIDGE REPAIR DETAIL

SCALE: 1" = 20'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		80

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REF 09: RM 1319 AT ANTELOPE CREEK PROJECT SUMMARY										
LOCATION	420	438	439	483	662	752	752	666	666	7001
	7059	7007	7014	7016	7114	7005	7006	7292	7304	7002
	CL C CONC (PILE ENCASEMENT)	CLEANING AND SEALING EXIST JOINTS (CL 7)	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TREE REMOVAL (4"-12" DIA)	TREE REMOVAL (12"-18" DIA)	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BENT CAP/ABUTMENT CAP CLEANING
	LF	LF	SY	SY	EA	EA	EA	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1			1,280	1,280	32			640	640	
BRIDGE REPAIR DETAIL SHEET 1 OF 1	90	102				7	2			3
PROJECT TOTALS:	**90**	**102**	**1,280**	**1,280**	**32**	**7**	**2**	**640**	**640**	**3**

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RM 1319
AT ANTELOPE CREEK
NBI:041180243701003

QUANTITY SUMMARY

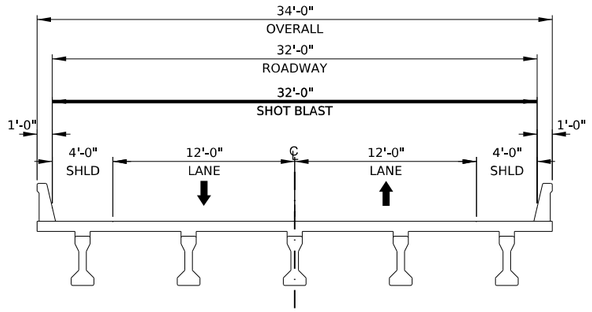
2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		81

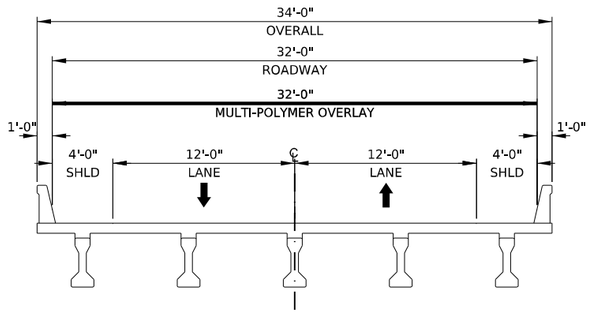
NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION



REF 09: RM 1319 AT ANTELOPE CREEK EXISTING TYPICAL SECTION

STA. 261+58 TO STA. 264+78



REF 09: RM 1319 AT ANTELOPE CREEK PROPOSED TYPICAL SECTION

STA. 261+58 TO STA. 264+78

RM 1319
AT ANTELOPE CREEK

NBI:041180243701003

TYPICAL SECTIONS

SCALE: 1" = 10'

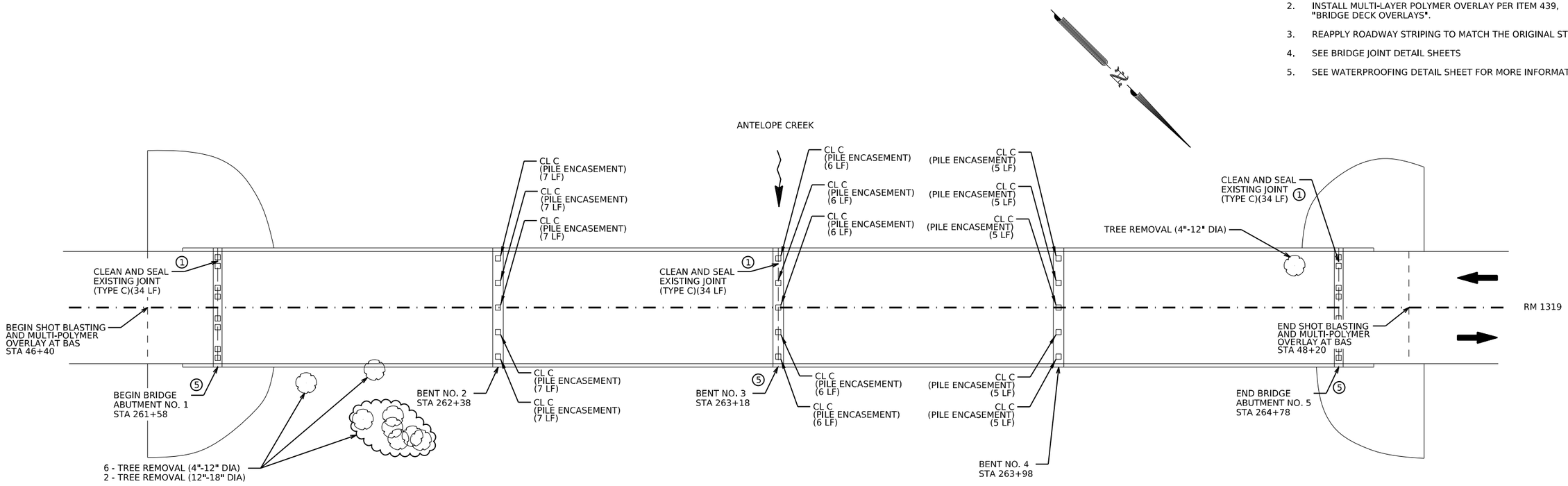
2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		82

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEE BRIDGE JOINT DETAIL SHEETS
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION



REF 09: RM 1319 AT ANTELOPE CREEK

STA 46+60 TO STA 48+00

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

RM 1319 AT ANTELOPE CREEK

NBI:041180243701003

BRIDGE REPAIR DETAIL

SCALE: 1" = 30'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		83

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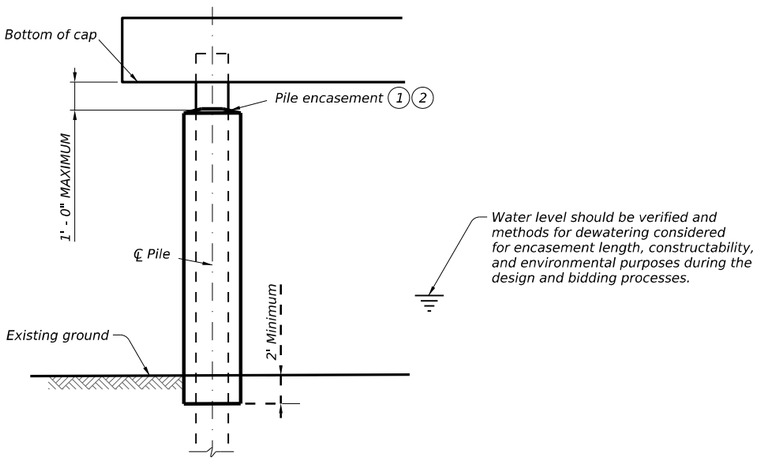
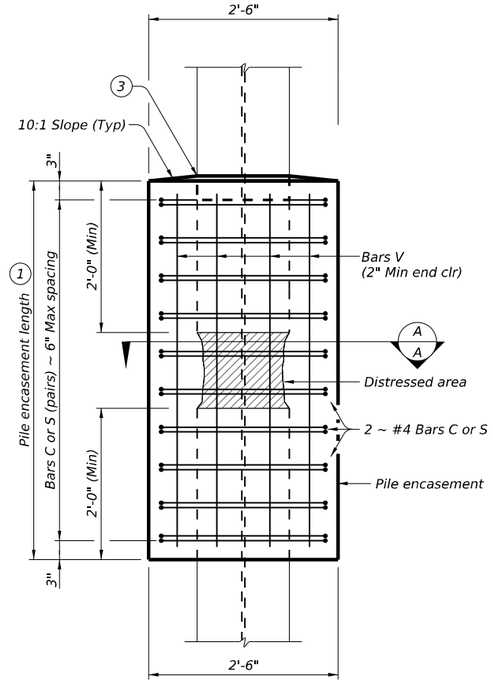


ELEVATION

TABLE OF PILE ENCASEMENT LENGTHS			
Bent	Pile	Length of Pile Encasement (ft)	Bent Total (ft)
2	1	7	35
	2	7	
	3	7	
	4	7	
	5	7	
3	1	6	30
	2	6	
	3	6	
	4	6	
	5	6	
4	1	5	25
	2	5	
	3	5	
	4	5	
	5	5	
		Total	90

PILE ENCASEMENT PROCEDURE:

1) Verify channel line elevations and report to the Engineer for possible adjustments.
2) Submit a concrete mix design and procedures for casting the encasements for approval.
3) Clean mud, grease, loose rust, and paint off the section of H-piling to be encased with hand tools and high pressure water.
4) Place and secure the steel reinforcement and install formwork.
5) Place the concrete in the encasement per approved procedures and in accordance with Item 420, "Concrete Substructures."
6) Leave forms in-place for at least 48 hours.



ELEVATION

(1) See Table of Pile Encasement Lengths.

(2) Field adjust encasement length based on actual conditions.

(3) Seal gap with Class 4 or Class 7 joint sealant (DMS-6310).

SECTION A-A

BAR C (#4)

Arrange Bar C pairs to provide 1'-0" opening on opposite faces:

GENERAL NOTES:

Verify dimensions for steel H-piling encasements and ground elevations. Pile Encasement Length may be adjusted by the Engineer based on actual channel and ground line elevations.

Existing conditions may be under water. Contractor is responsible for dewatering. Payment for dewatering is subsidiary to Item 420, "Concrete Substructures." The Contractor may submit a plan that adequately demonstrates the ability to perform the repairs without dewatering to the Engineer for approval. If approved, dewatering may be waived.

Obtain approval for the mix design and the construction procedures before beginning work.

If underwater placement is approved, concrete mix should be designed for underwater placement and may require the use of anti-washout admixtures.

Provide concrete for the H-piling encasement capable of attaining an average concrete compressive strength of 3,000 psi within 24 hours and consisting of coarse aggregate grades not greater than No. 5 (¾"). Provide a concrete mix with 2 gallons of corrosion inhibitor per CY.

Pile encasement will be paid for per the unit bid price for each linear foot of encasement, per Item 420, "Concrete Substructures." Payment for collars is subsidiary to Item 420, "Concrete Substructures."

Provide Grade 60 reinforcing steel.

Texas Department of Transportation — Bridge Division

PILE ENCASEMENT DETAILS RM 1319 AT ANTELOPE CREEK

NBI: 04-118-0-2437-01-003

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		84

REF 10: SH 15 AT PLUMMER CREEK PROJECT SUMMARY												
LOCATION	104	132	529	428	438	439	483	662	666	666	785	7001
	7016	7037	7002	7001	7008	7014	7016	7114	7292	7304	7002	7002
	REMOVING CONC (CURB)	EMBANK (FNL)(DC)(TY E)(CSBE_FND IMPR)	CONC CURB (TYPE II)	PENETRATING CONCRETE SURFACE TREATMENT	CLEANING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BRIDGE JOINT REPAIR (HEADER)	BENT CAP/ABUTMENT CAP CLEANING
	LF	CY	LF	SY	LF	SY	SY	EA	LF	LF	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1				165		684	684	10	200	200		
BRIDGE REPAIR DETAIL SHEET 1 OF 1	8	12	40		90						5	2
PROJECT TOTALS:	**8**	**12**	**40**	**165**	**90**	**684**	**684**	**10**	**200**	**200**	**5**	**2**

SH 15
AT PLUMMER CREEK
NBI:041480035501019

QUANTITY SUMMARY

2024 Texas Department of Transportation

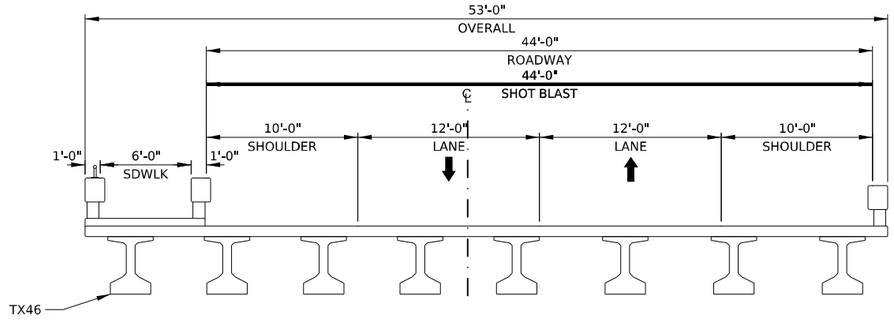
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		85

DATE: 9/12/2024 10:29:49 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 10_SH 15 AT PLUMMER CREEK\SH 15 AT PLUMMER CREEK QUANTITY SUM

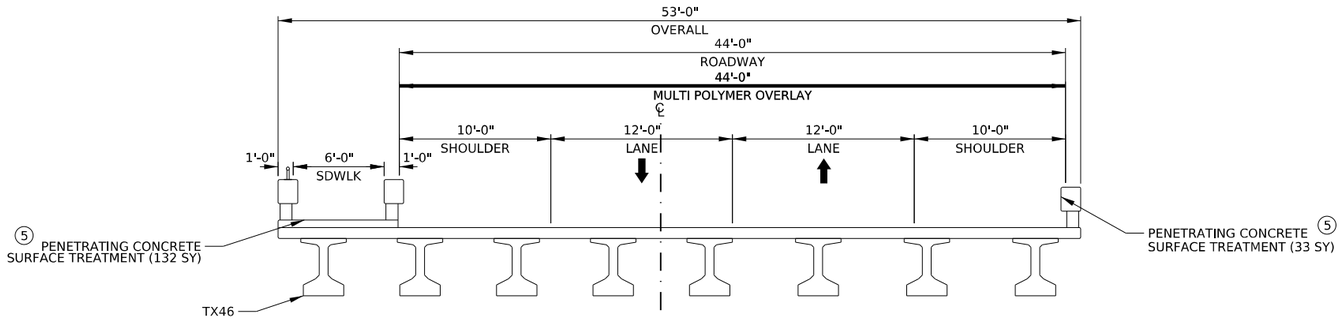
NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION



REF 10: SH 15 AT PLUMMER CREEK EXISTING TYPICAL SECTION

STA. 4469+56 TO STA. 4470+56



REF 10: SH 15 AT PLUMMER CREEK PROPOSED TYPICAL SECTION

STA. 4469+56 TO STA. 4470+56

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

SH 15
AT PLUMMER CREEK

NBI:041480035501019

TYPICAL SECTIONS

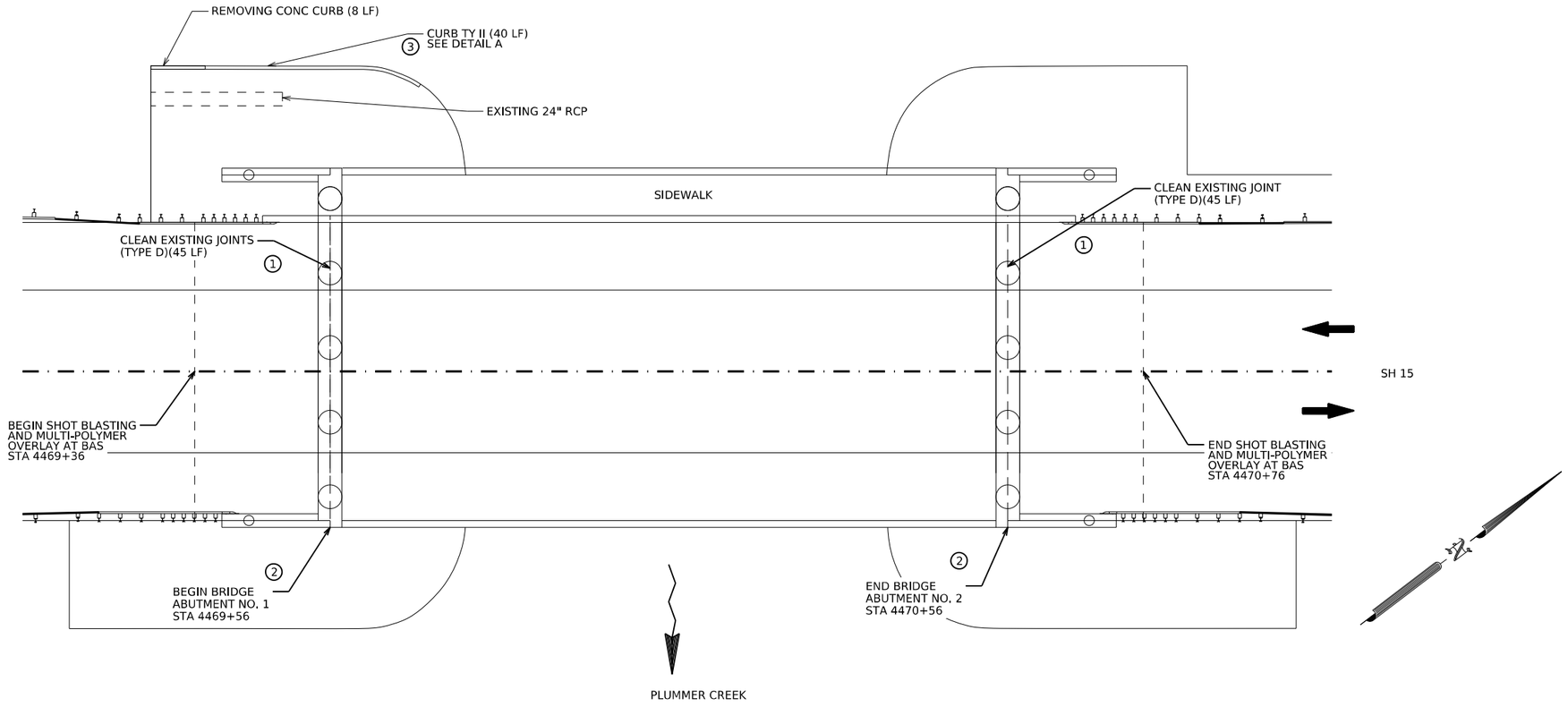
SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		86

DATE: 9/12/2024 10:35:24 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\1. General\TYPICAL SECTIONS\REF 10_SH 15 & PLUMMER CREEK\SH 15 AT PLUMMER CREEK TYPICAL SECTION



NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEE BRIDGE JOINT DETAIL SHEETS
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

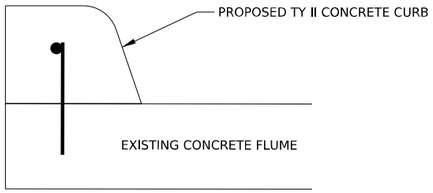
(1) SEE BRIDGE JOINT DETAIL SHEETS

(2) SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

(3) DIMENSIONS CONFORM TO CONCRETE CURB AND GUTTER STANDARD

REF 10: SH 15 AT PLUMMER CREEK

STA 4469+56 TO STA 4470+56



DETAIL A

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

SH 15 AT PLUMMER CREEK

NBI:041480035501019

BRIDGE REPAIR DETAIL

SCALE: 1" = 20'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		87

DATE: 9/12/2024 10:35:47 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\REF 10_SH 15 AT PLUMMER CREEK\SH 15 AT PLUMMER CREEK BRIDGE REPAIR DETAILS.dgn

REF 11: RM 1321 AT SAND CREEK PROJECT SUMMARY								
LOCATION	428	438	439	483	662	666	666	785
	7001	7008	7014	7016	7114	7292	7304	7002
	PENETRATING CONCRETE SURFACE TREATMENT	CEALNING EXISTING JOINTS	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (W)6"(SLD) (090MIL)	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BRIDGE JOINT REPAIR (HEADER)
	SY	LF	SY	SY	EA	LF	LF	LF
TYPICAL SECTIONS SHEET 1 OF 1	118		782	782	18	360	360	
BRIDGE REPAIR DETAIL SHEET 1 OF 1		68						5
PROJECT TOTALS:	**118**	**68**	**782**	**782**	**18**	**360**	**360**	**5**

DATE: 9/12/2024 10:29:50 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 11_RM 1321 AT SAND CREEK\RM 1321 AT SAND CREEK QUANTITY SUMMA

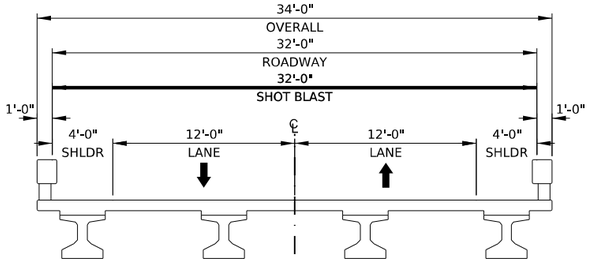
RM 1321
AT SAND CREEK
NBI:040910186102015

QUANTITY SUMMARY

2024 Texas Department of Transportation

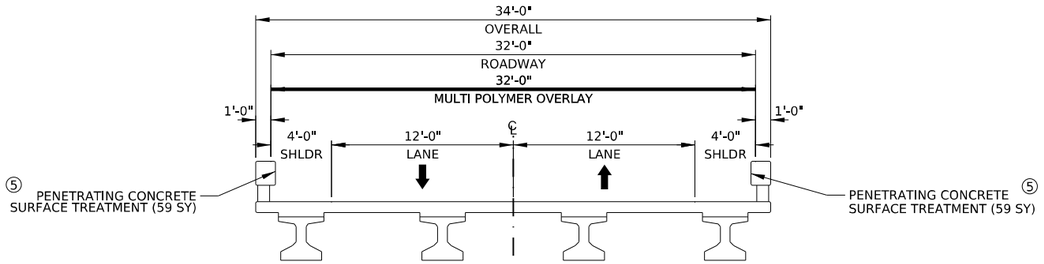
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		88



REF 11: RM 1321 AT SAND CREEK EXISTING TYPICAL SECTION

STA. 281+04 TO STA. 282+84



REF 11: RM 1321 AT SAND CREEK PROPOSED TYPICAL SECTION

STA. 281+04 TO STA. 282+84

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED PROFESSIONAL ENGINEER
09-12-2024

RM 1321 AT SAND CREEK

NBI:040910186102015

TYPICAL SECTIONS

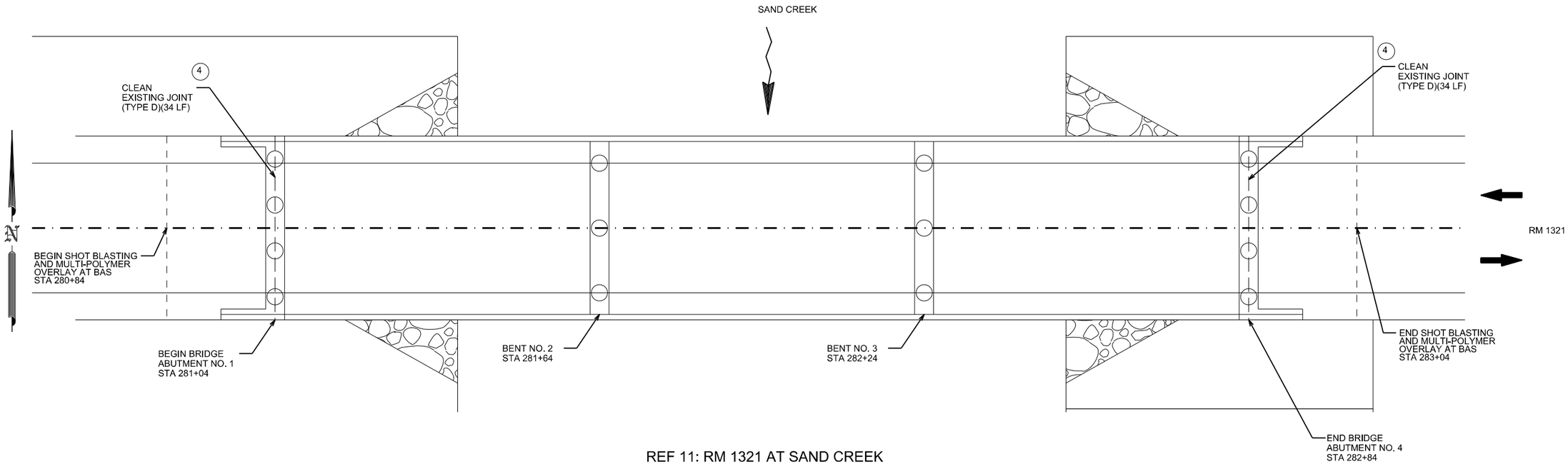
SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		89

DATE: 9/12/2024 10:35:49 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\1. General\TYPICAL SECTIONS\REF 11_RM 1321 & SAND CREEK\RM 1321 AT SAND CREEK TYPICAL SECTION.dgn



REF 11: RM 1321 AT SAND CREEK

STA 281+04 TO STA 282+84

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEE BRIDGE JOINT DETAIL SHEETS
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

RM 1321
AT SAND CREEK

NBI:040910186102015

BRIDGE REPAIR DETAIL

SCALE: 1" = 20'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		90

DATE: 9/12/2024 10:36:15 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\REF 11_RM 1321 AT SAND CREEK\RM 1321 AT SAND CREEK BRIDGE REPAIR DETAILS.dgn

REF 12: SH 207 AT MULBERRY CREEK PROJECT SUMMARY		
LOCATION	432	
	7002	
	RIPRAP (CONC) (5 IN)	
	CY	
TYPICAL SECTIONS SHEET 1 OF 1		
BRIDGE REPAIR DETAIL SHEET 1 OF 1	89	
PROJECT TOTALS:	**89**	

DATE: 9/12/2024 10:29:52 AM
FILE: I:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 12_SH 207 AT MULBERRY CREEK\SH 207 AT MULBERRY CREEK QUANTITY

SH 207
AT MULBERRY CREEK
NBI:040060035703002

QUANTITY SUMMARY

2024 Texas Department of Transportation

SHEET 1 OF 1

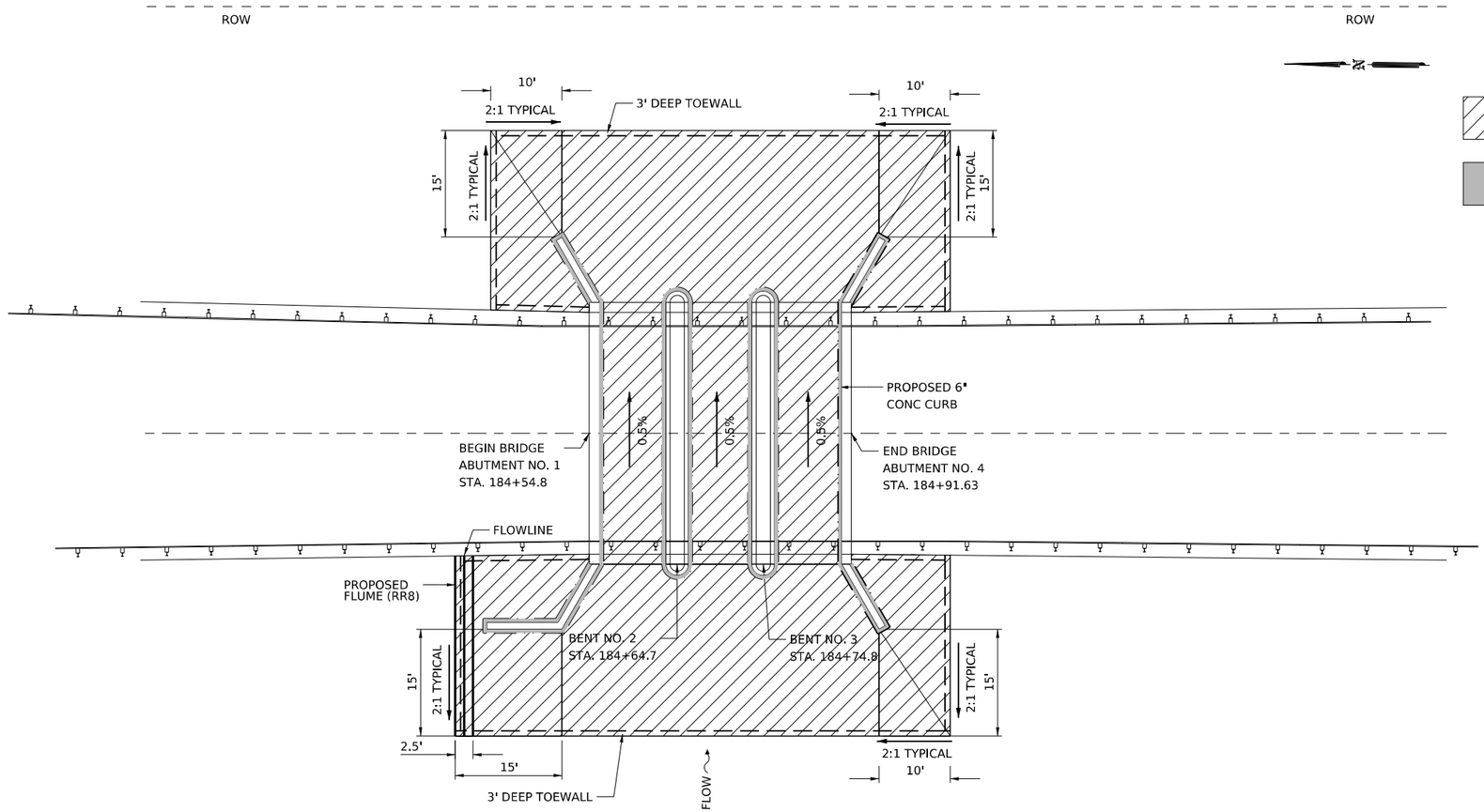
DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		91

NOTES

1. THE PROPOSED 6" CONCRETE CURB DOES NOT HAVE TO BE REINFORCED, AND WILL BE PAID FOR UNDER ITEM 439 RIPRAP BY THE CY.

PROPOSED RIPRAP

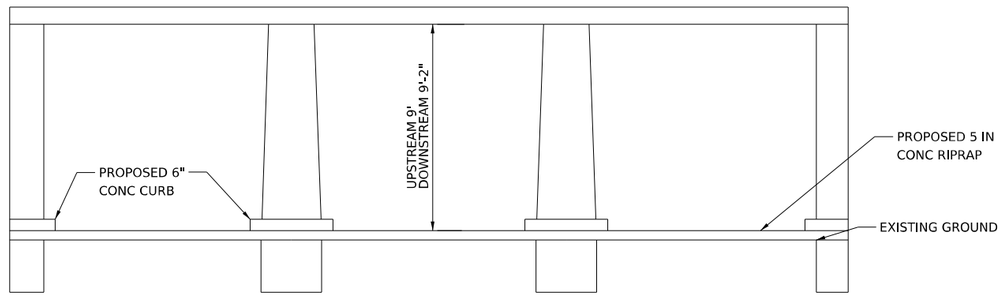
PROPOSED 6" CURB



REF 12: SH 207 AT MULBERRY CREEK

STA 184+54.8 TO STA 184+91.63

STRUCTURE SUMMARY	
LOCATION	432
	6002
	RIPRAP (CONC)(5 IN)
	CY
GROUND UNDER STRUCTURE	89
TOTALS:	89



ELEVATION VIEW

N.T.S.

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

SH 207 AT MULBERRY CREEK

NBI:040060035703002

BRIDGE REPAIR DETAIL

SCALE: 1" = 20'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
WL	KB	0904	00	209	IH 40
DRWN	CK	DIST	COUNTY		SHEET NO.
WL	KB	AMA	ARMSTRONG		92

REF 13: IH 40 AT CULVERT CROSSING PROJECT SUMMARY						
LOCATION	104	401	427	429	432	459
	7007	7001	7005	7007	7004	7001
	REMOVING CONC (RIPRAP)	FLOWABLE BACKFILL	EPOXY WATERPROOF FINISH (TY X)	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC) (5 IN)	GABIONS (GALV)
	SY	CY	SF	SF	CY	CY
INLET REPAIR DETAIL		5	138	101		
OUTFALL REPAIR DETAIL	28				4	12
PROJECT TOTALS:	**28**	**5**	**138**	**101**	**4**	**12**

DATE: 9/12/2024 10:29:53 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 13_CULVERT CROSSING AT IH 40\IH 40 AT CULVERT CROSSING QUANTI

IH 40 AT CULVERT CROSSING

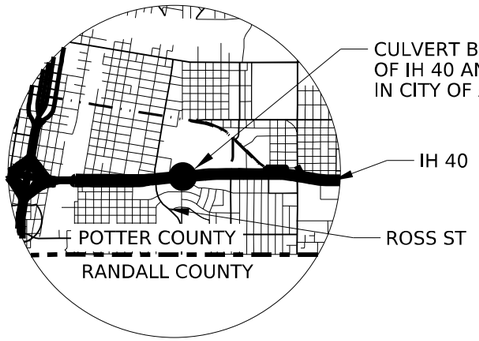
NBI:041880027501019

QUANTITY SUMMARY

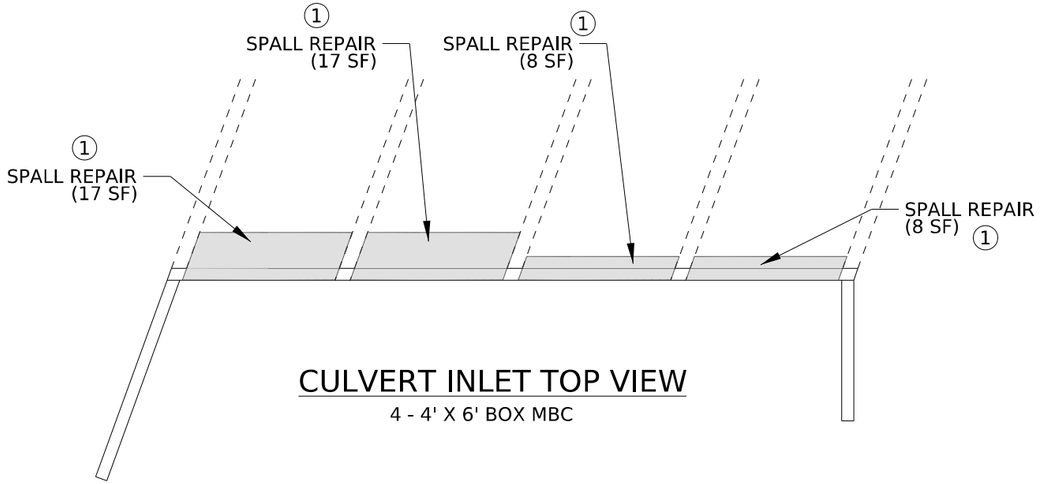
2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		93

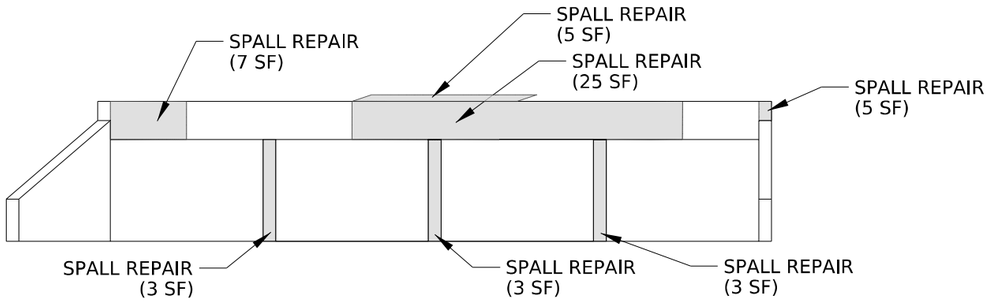


CULVERT LOCATION DETAIL



CULVERT INLET TOP VIEW

4 - 4' X 6' BOX MBC



CULVERT INLET FRONT VIEW

4 - 4' X 6' BOX MBC

① SPALLS ARE LOCATED ON THE TOP FACE INSIDE THE CULVERTS.

NOTES

1. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. PERFORM ALL CONCRETE REPAIRS IN ACCORDANCE WITH TXDOT CONCRETE REPAIR MANUAL.
3. SOME REPAIR AREAS INDICATED DO NOT EXHIBIT VISIBLE SPALLING AND WILL NEED TO BE IDENTIFIED BY SOUNDING THE CONCRETE WITH HAMMERS TO DETYERMINE THE LOCATION AND LIMITS OF REPAIRS.
4. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DESCREPENCIES. PROVIDE ACCESS TO ENGINEER FOR VERIFICATION.
5. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH LOCATION HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAI AREAS.
6. APPLY WATERPROOFING TO ENTIRE VERTICAL SURFACE AND TOP OF UPSTREAM HEADER AFTER SPALL REPAIRS.
7. APPLY WATERPROOFING TO BOTH VERTICAL WALLS INSIDE EACH CULVERT BOX EXTENDING 2LF INTO CULVERT AFTER SPALL REPAIRS.

IH 40 AT CULVERT CROSSING

NBI: 041880027501019

INLET REPAIR DETAIL

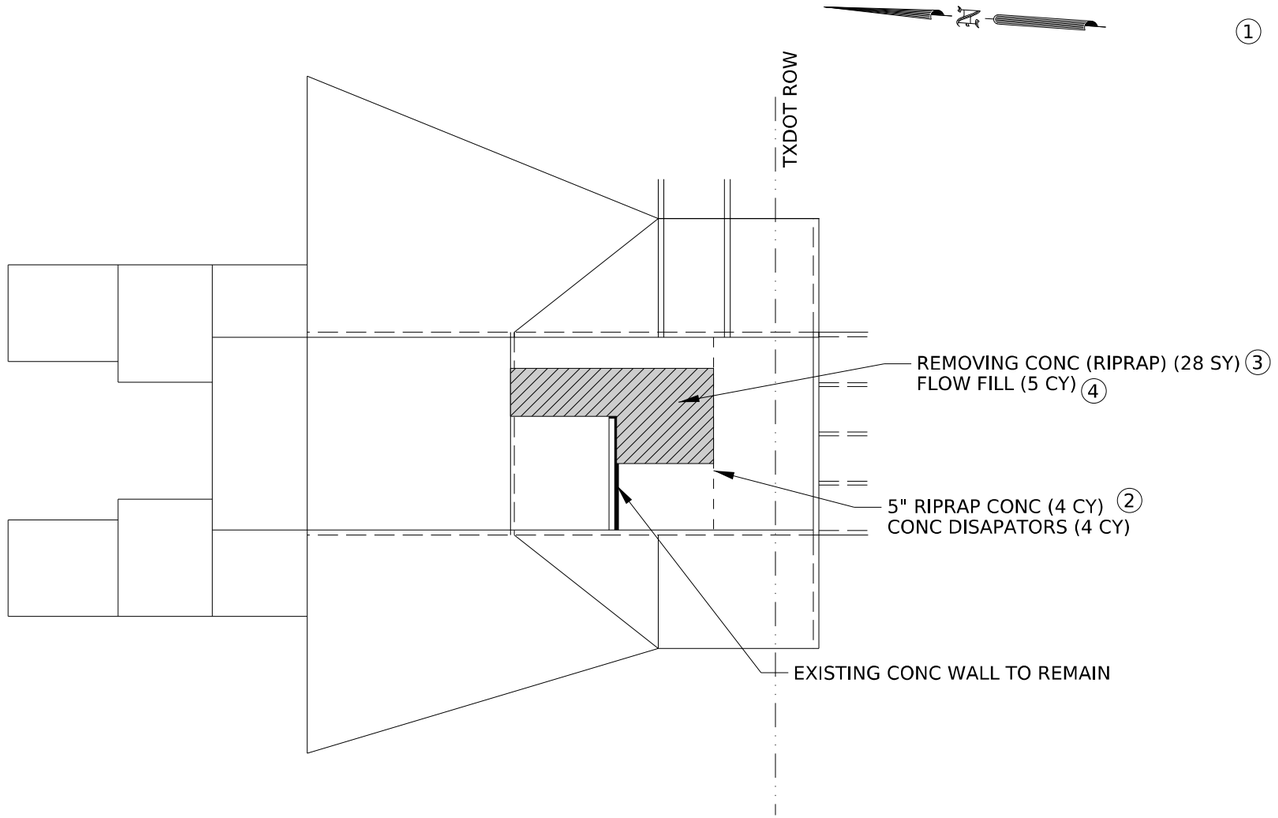
SCALE: NTS

2024 Texas Department of Transportation

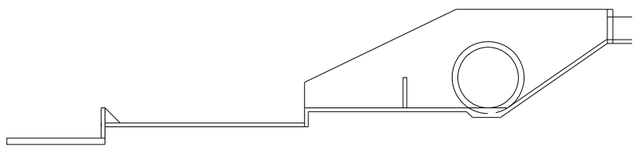
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		94

DATE: 9/12/2024 10:36:20 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\REF 13_CULVERT CROSSING AT IH 40\IH 40 AT CULVERT CROSSING REPAIR DETAILS.dgn



CULVERT OUTFALL



SIDE VIEW OF OUTFALL

1

NOTES

1. ROCK BAGS WILL BE PAID FOR AS GABION MATTRESS. SEE GABION MATRESS TYPICAL SECTION FOR MORE DETAILS.
   CONTRACTOR HAS OPTION TO USE GABION MATTRESS IN LEIU OF ROCK BAGS.
2. SEE RIPRAP DETAIL FOR MORE DETAILS.
3. SAWCUT AND REMOVE DEGRADED RIPRAP. CONTRACTOR TO VERIFY LIMITS OF RIPRAP REMOVAL WITH THE ENGINEER PRIOR TO CUTTING.
4. CONTRACTOR TO VERIFY QUANTITY WITH ENGINEER PRIOR TO PLACEMENT OF MATERIAL.

LEGEND

- RIPRAP REMOVAL
- 5" RIPRAP INSTALL
- ROCK BAGS

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

IH 40 AT CULVERT CROSSING

NBI: 041880027501019

OUTFALL REPAIR DETAIL

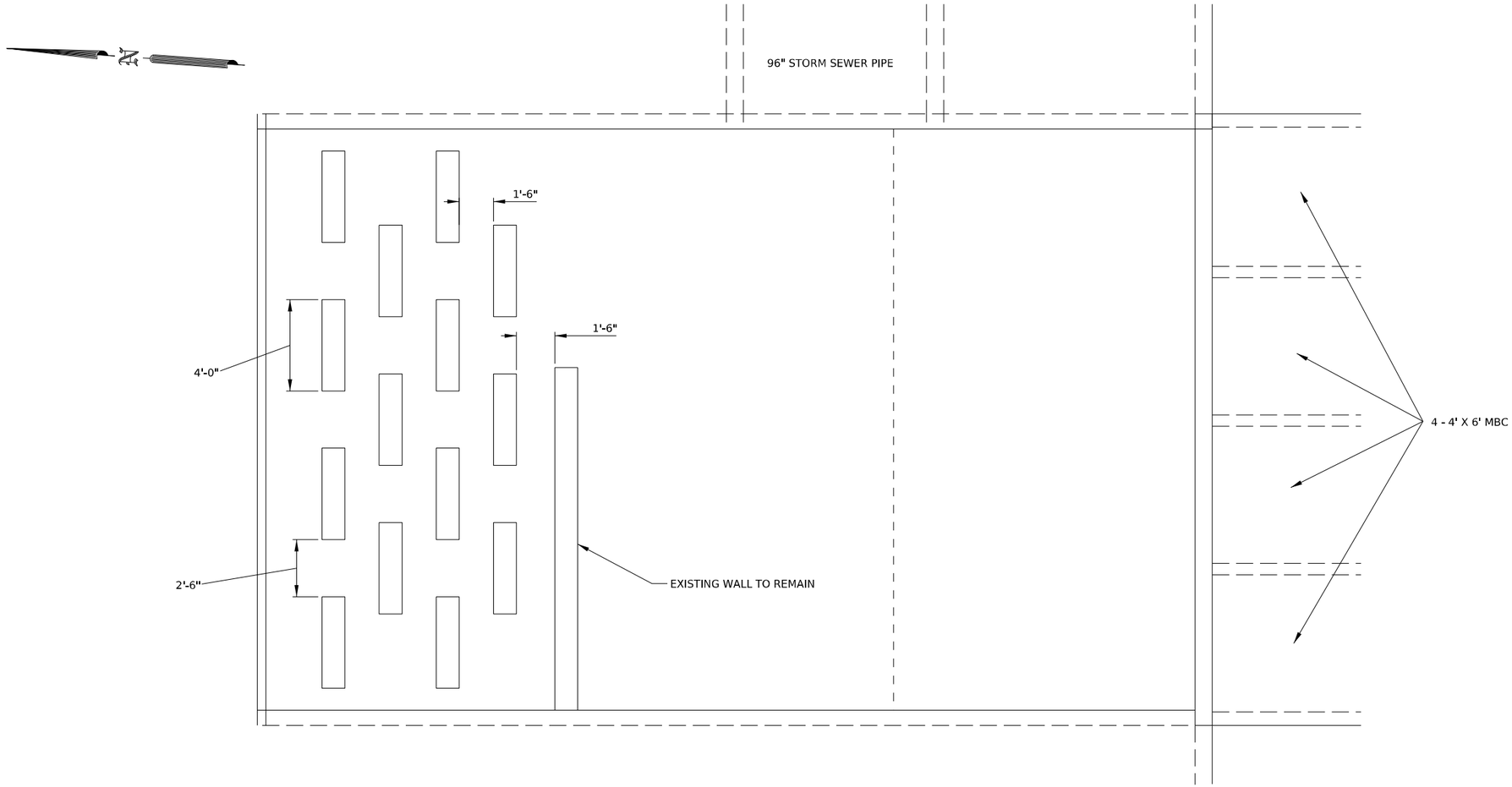
SCALE: 1" = 20'

2024 Texas Department of Transportation

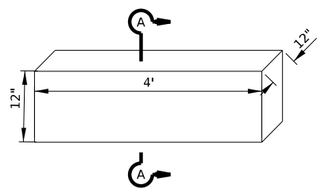
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		95

DATE: 9/12/2024 10:36:21 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\REF I3_CULVERT CROSSING AT Ih 40\IH 40 AT CULVERT CROSSING REPAIR DETAILS.dgn

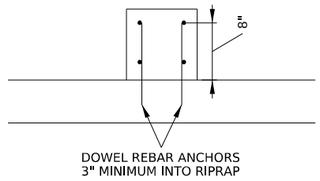


AREA OF RIPRAP WITH DISSAPATERS

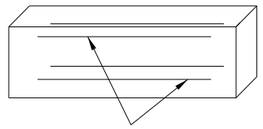


DISAPATER DIMENSIONS

0.15 CY EA.



SECTION A-A



DISSIPATER REBAR DETAIL

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

IH 40 AT CULVERT CROSSING

NBI: 041880027501019

RIPRAP DETAIL

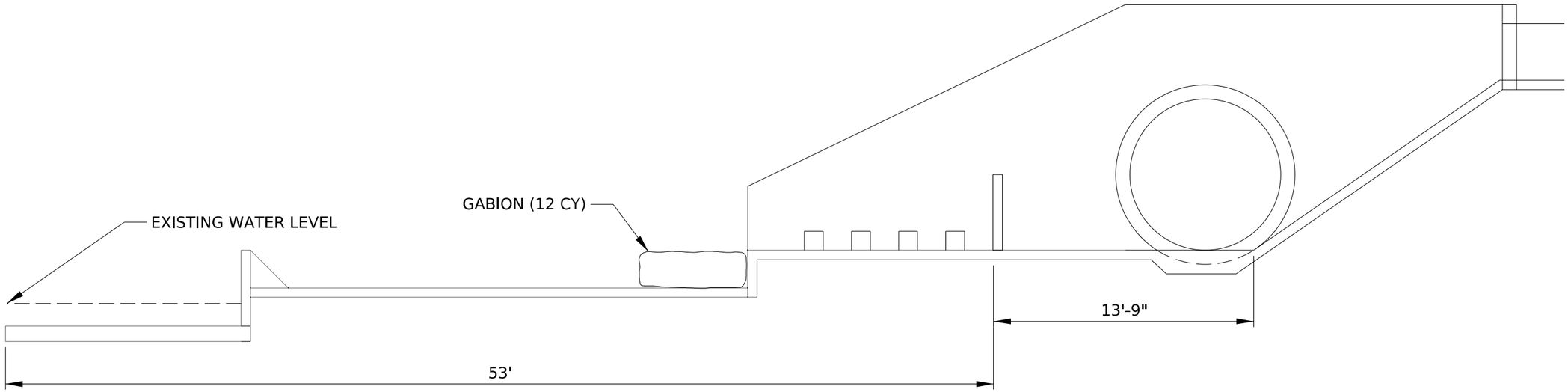
SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		96

DATE: 9/12/2024 10:36:22 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\REF 13_CULVERT CROSSING AT IH 40\RIPRAP DETAIL.dgn



ELEVATION VIEW

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

IH 40 AT CULVERT CROSSING

NBI: 041880027501019

GABION TYPICAL SECTION

SCALE: NTS

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		97

DATE: 9/12/2024 10:36:24 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMX4 - Design\Plan Set\7. Bridge\REF 13_CULVERT CROSSING AT IH 40\GABION MATRESS TYPICAL SECTION.dgn

REF 14: CR K AT IH 40 PROJECT SUMMARY									
LOCATION	427	428	429 ①	438	439	483	662	666	7001
	7005	7001	7003	7007	7014	7016	7114	7304	7002
	EPOXY WATERPROOF FINISH (TY X)	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR(DECK REP(PART DEPTH))	CLEANING AND SEALING EXISTING JOINTS (CL 7)	MULTI-LAYER POLYMER OVERLAY	SHOT BLASTING	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	TY I HIGH PERF PM (Y)6"(SLD) (090MIL)	BENT CAP/ABUTMENT CAP CLEANING
	SF	SY	SF	LF	SY	SY	EA	LF	EA
TYPICAL SECTIONS SHEET 1 OF 1	1,447	116	257		573	573	21	424	
BRIDGE REPAIR DETAIL SHEET 1 OF 1				84					5
PROJECT TOTALS:	**1,447**	**116**	**257**	**84**	**573**	**573**	**21**	**424**	**5**

① REPAIR LOCATIONS TO BE DETERMINED BY THE ENGINEER.

CR K
AT IH 40
NBI:040330027503056

QUANTITY SUMMARY

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		98

DATE: 9/12/2024 10:29:54 AM
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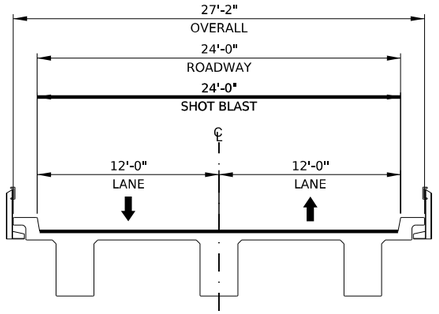
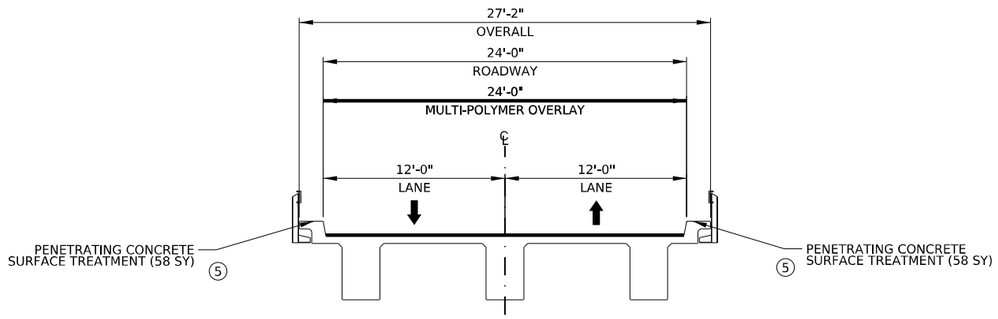


REF 14: CR K AT IH 40 EXISTING TYPICAL SECTION

STA. 8+94 TO STA. 11+06



REF 14: CR K AT IH 40 PROPOSED TYPICAL SECTION

STA. 8+94 TO STA. 11+06

NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION
6. WATERPROOF ABUTMENTS AND BENTS CAPS IN ACCORDANCE WITH THE WATERPROOFING DETAIL SHEET

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

CR K
AT IH 40
NBI:040330027503056

TYPICAL SECTIONS

SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		99

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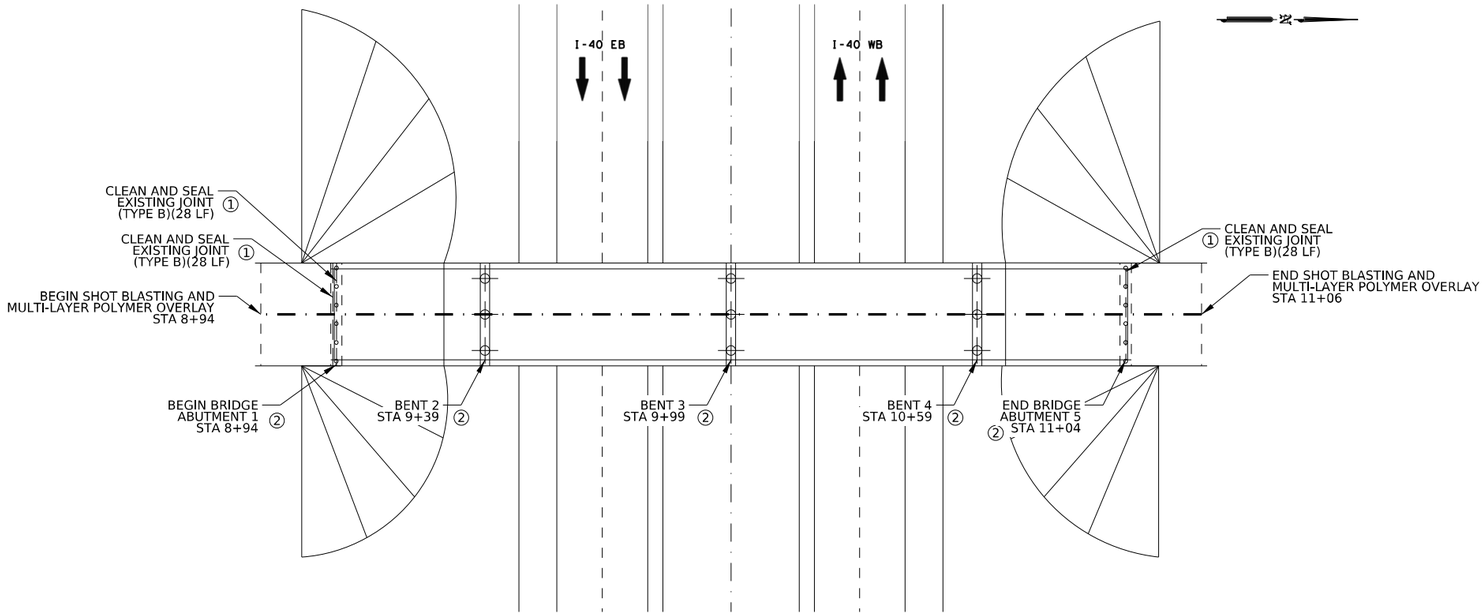

REF 14: CR K AT IH 40

STA 8+94 TO STA 11+04

NOTES

1. SEE BRIDGE JOINT DETAIL SHEETS
2. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

CR K AT IH 40

NBI:040330027503056

BRIDGE REPAIR DETAIL

SCALE: 1" = 40'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		100

DATE: 9/12/2024 10:36:50 AM
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REF 15: CEMETERY RD AT IH 27 PROJECT SUMMARY							
LOCATION	420	450	540	540	542	544	544
	7052	7004	7002	7005	7001	7001	7003
	CL C CONC (RAIL FOUNDATION)	RAIL (TY T221)	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)
	CY	LF	LF	EA	LF	EA	EA
BRIDGE REPAIR DETAIL SHEET 1 OF 2	9	45	75	2	525	2	2
BRIDGE REPAIR DETAIL SHEET 2 OF 2	9	45	300	2	450	2	2
PROJECT TOTALS:	**18**	**90**	**375**	**4**	**975**	**4**	**4**

DATE: 9/12/2024 10:29:55 AM
FILE: T:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plan Set\1. General\QUANTITY SUMMARIES\REF 15_CEMETERY RD AT IH 27\CEMETERY ROAD AT IH 27 QUANTITY SUMMA

CEMETERY RD
AT IH 27
NBI:041910006717108

QUANTITY SUMMARY

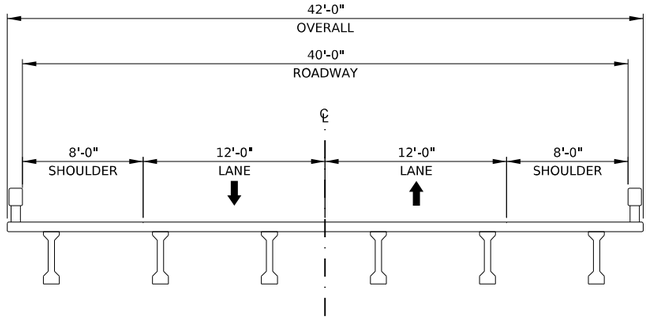
2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		101

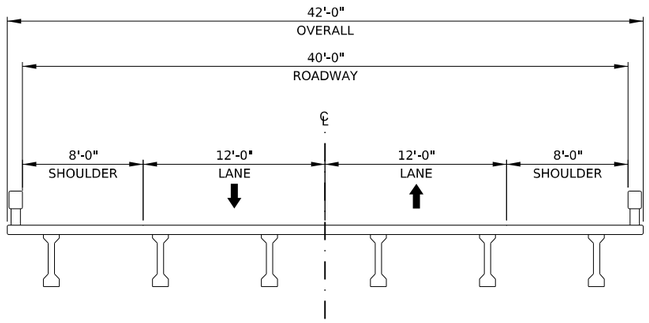
NOTES:

1. WILL BE REQUIRED TO MASK AND ISOLATE EXISTING BRIDGE JOINTS AND DECK DRAINS.
2. INSTALL MULTI-LAYER POLYMER OVERLAY PER ITEM 439, "BRIDGE DECK OVERLAYS".
3. REAPPLY ROADWAY STRIPING TO MATCH THE ORIGINAL STRIPING.
4. SEAL JOINTS AFTER PLACEMENT OF OVERLAY
5. SEE WATERPROOFING DETAIL SHEET FOR MORE INFORMATION



REF 15: CEMETERY RD AT IH 27 EXISTING TYPICAL SECTION

STA. 48+50 TO STA. 51+50



REF 15: CEMETERY RD AT IH 27 PROPOSED TYPICAL SECTION

STA. 48+50 TO STA. 51+50

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

CEMETERY RD
AT IH 27
NBI:041910006717108

TYPICAL SECTIONS

SCALE: 1" = 10'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		102

DATE: 9/12/2024 10:36:53 AM
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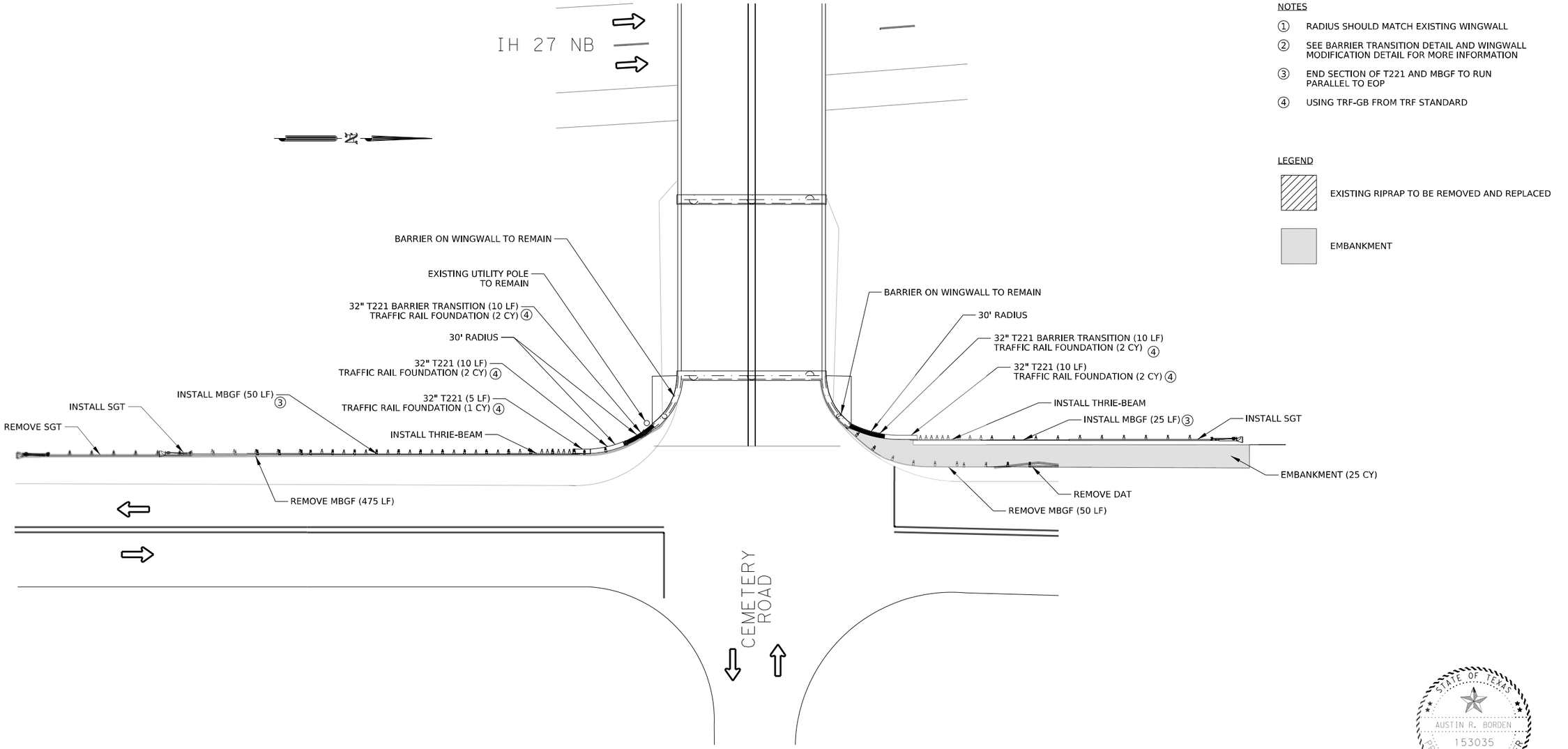


NOTES

1. RADIUS SHOULD MATCH EXISTING WINGWALL
2. SEE BARRIER TRANSITION DETAIL AND WINGWALL MODIFICATION DETAIL FOR MORE INFORMATION
3. END SECTION OF T221 AND MBGF TO RUN PARALLEL TO EOP
4. USING TRF-GB FROM TRF STANDARD

LEGEND

EXISTING RIPRAP TO BE REMOVED AND REPLACED

EMBANKMENT

REF 15: CEMETERY RD AT NB IH 27

STA 49+00 TO STA 51+00

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

CEMETERY RD AT IH 27

NBI:041910006717108

BRIDGE REPAIR DETAIL

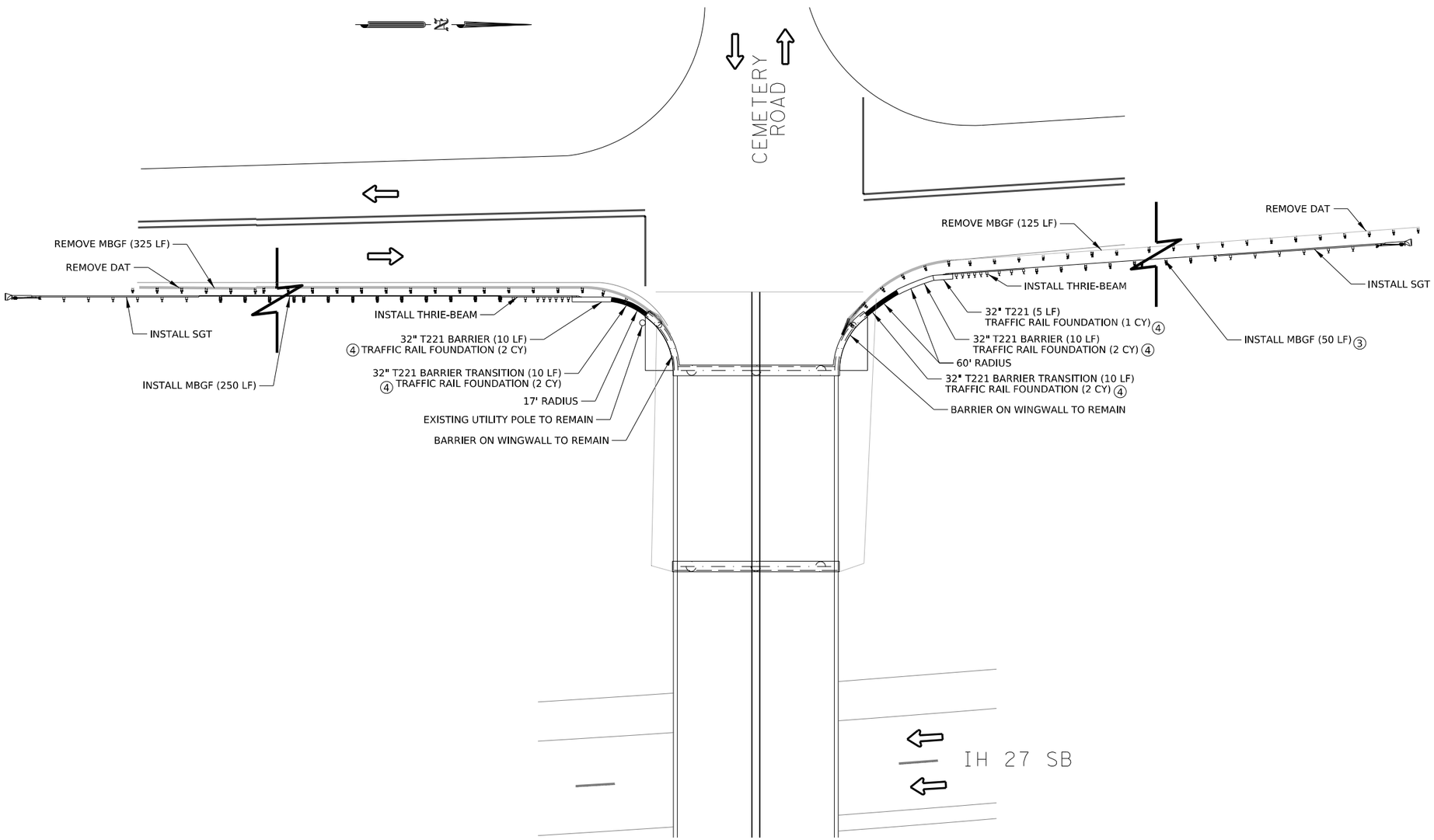
SCALE: 1" = 30'

2024 Texas Department of Transportation

SHEET 1 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		103

DATE: 9/12/2024 10:36:55 AM
FILE: I:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPM\4 - Design\Plan Set\7. Bridge\REF 15_CEMETERY RD AT IH 27\CEMETERY RD AT IH 27 BRIDGE REPAIR DETAIL.dgn



REF 15: CEMETERY RD AT SB IH 27

STA 49+00 TO STA 51+00

NOTES

1 RADIUS SHOULD MATCH EXISTING WINGWALL

2 SEE BARRIER TRANSITION DETAIL AND WINGWALL MODIFICATION DETAIL FOR MORE INFORMATION

3 END SECTION OF T221 AND MBGF TO RUN PARALLEL TO EOP

4 USING TRF-GB FROM TRF STANDARD

LEGEND

EXISTING RIPRAP TO BE REMOVED AND REPLACED

EMBANKMENT

STATE OF TEXAS
AUSTIN R. BORDEN
153035
LICENSED
PROFESSIONAL ENGINEER
09-12-2024

CEMETERY RD AT IH 27

NBI:041910006717108

BRIDGE REPAIR DETAIL

SCALE: 1" = 30'

2024 Texas Department of Transportation

SHEET 2 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		104

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BAR TABLE	
BAR	SIZE
D	#8
S	#5
R	#5
AB	#6

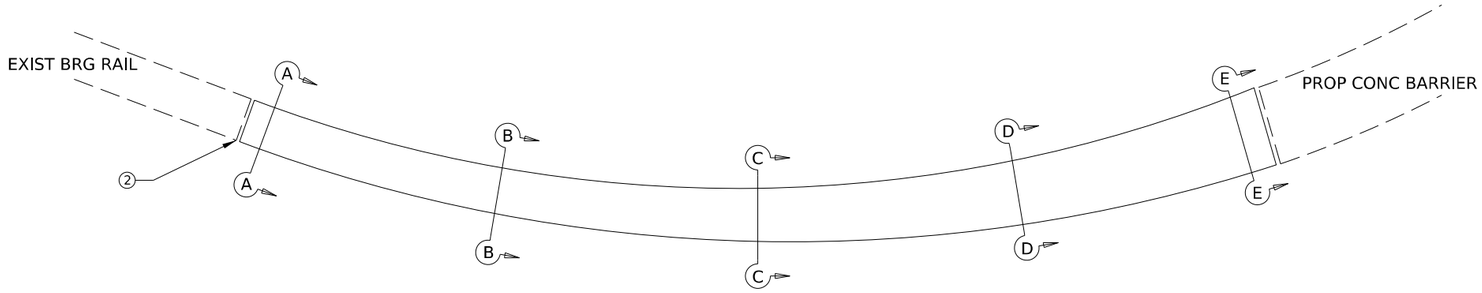
NOTES

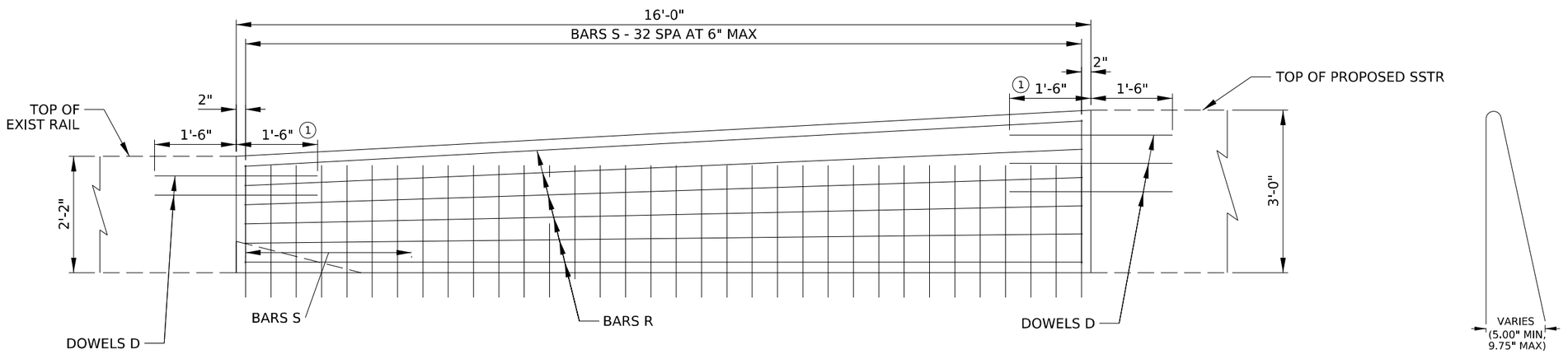
1. SEE WINGWALL MODIFICATION DETIAL FOR MORE INFORMATION.
2. CONTRACTOR TO ENSURE THAT THE FACE OF THE TRANSITION DOES NOT PROTRUDE BEYOND THE EXISTING RAIL.
3. FIELD BEND REINFORCING AS NEEDED TO PROVIDE 2" MIN CLEAR COVER.

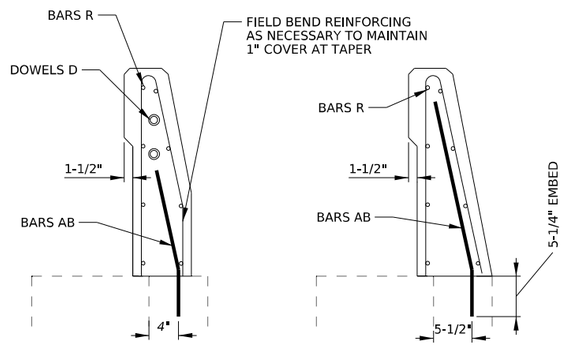
MATERIAL NOTES

1. PROVIDE CLASS "C" CONRETE, F'C = 3,600 PSI.
2. PROVIDE GRADE 60 REINFORCING STEEL

(1) DOWELS D, 1'-6" MIN EXTENSION INTO SSTR AND BRIDGE RAIL

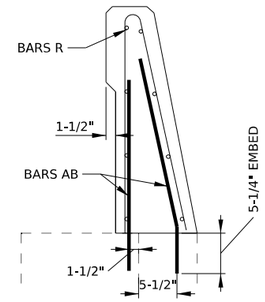




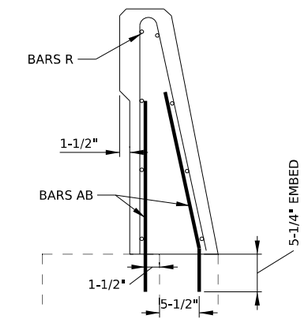


SECTION A-A

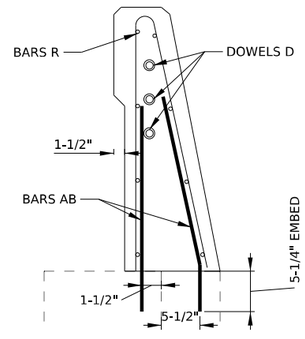
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

CEMETERY RD AT IH 27

NBI: 041910006717108

RAIL TRANSITION DETAIL

SCALE: 1" = 20'

2024 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
AB	KK	6461	70	001	VARIES
DRWN	CK	DIST	COUNTY		SHEET NO.
KK	BV	AMA	POTTER, ETC		105

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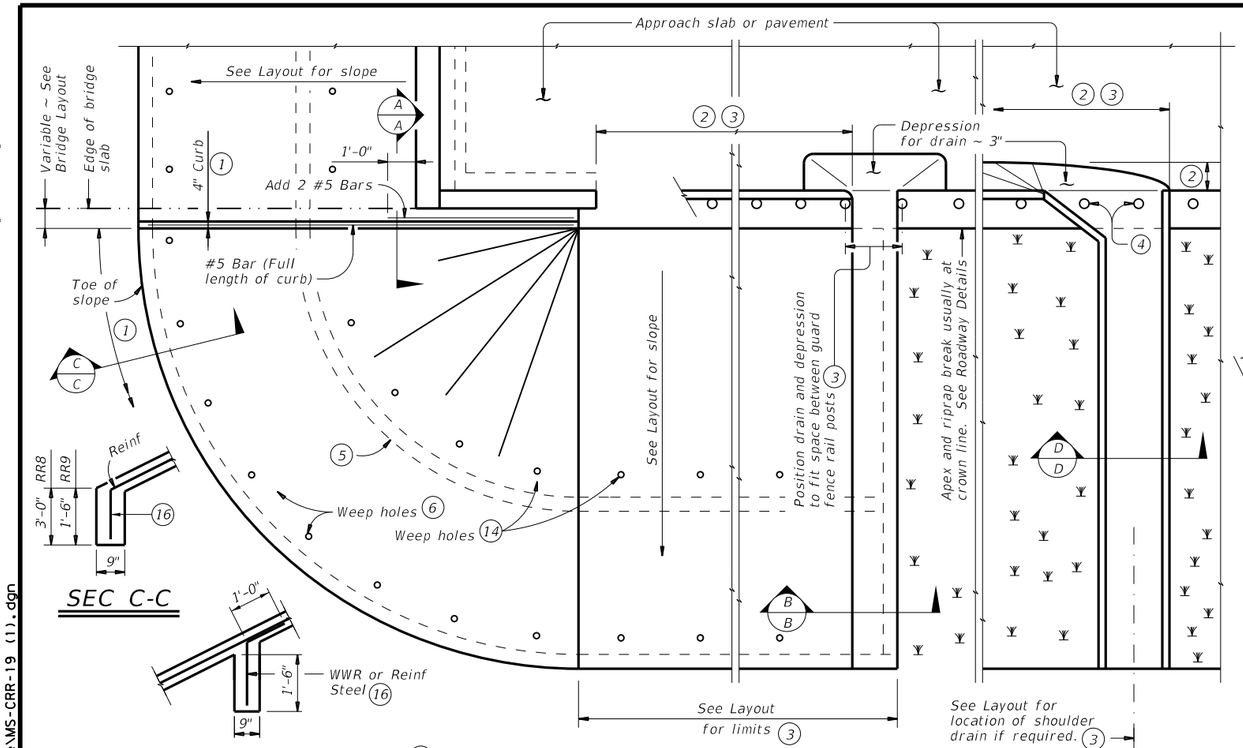
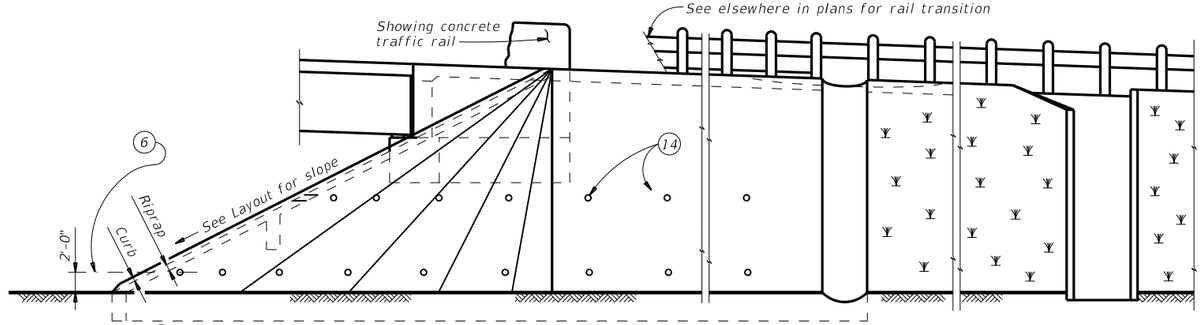


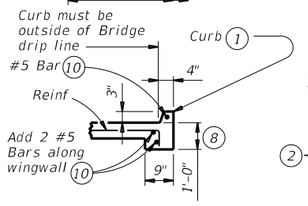
PLAN

SEC C-C

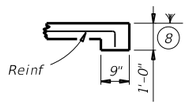
INTERMEDIATE TOEWALL



ELEVATION

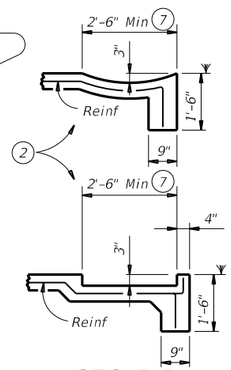


SEC A-A



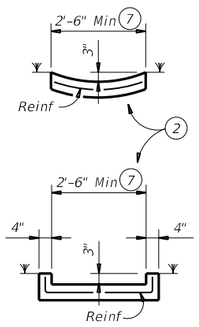
SEC B-B

(No drain)



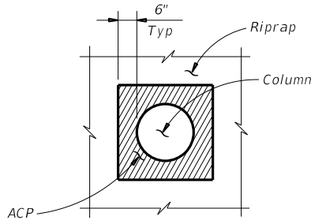
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

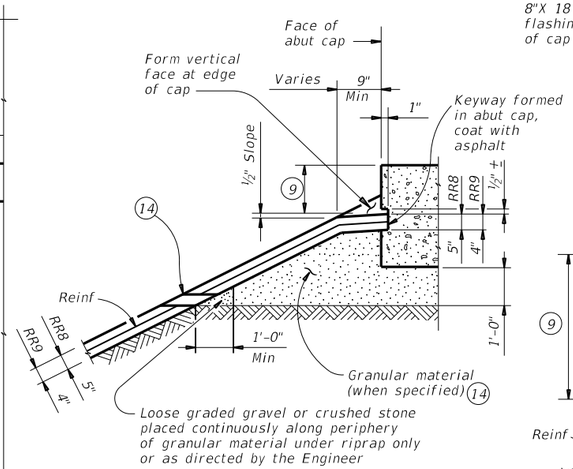
(Shoulder drain)



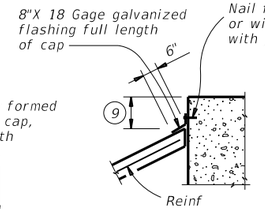
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

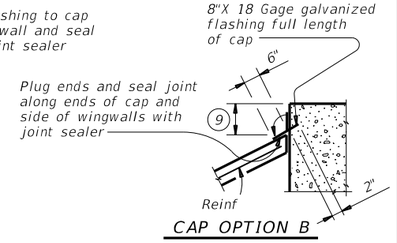
(As directed by the Engineer)



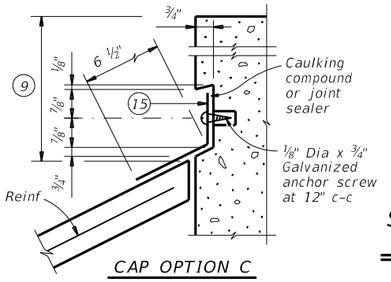
SHOWING KEYWAY OPTION



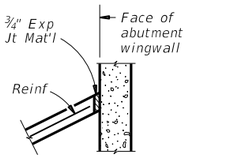
CAP OPTION A



CAP OPTION B

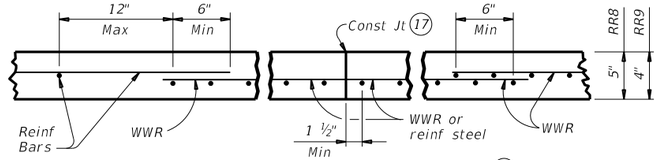


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		106

DATE: 9/12/2024 10:30:00 AM
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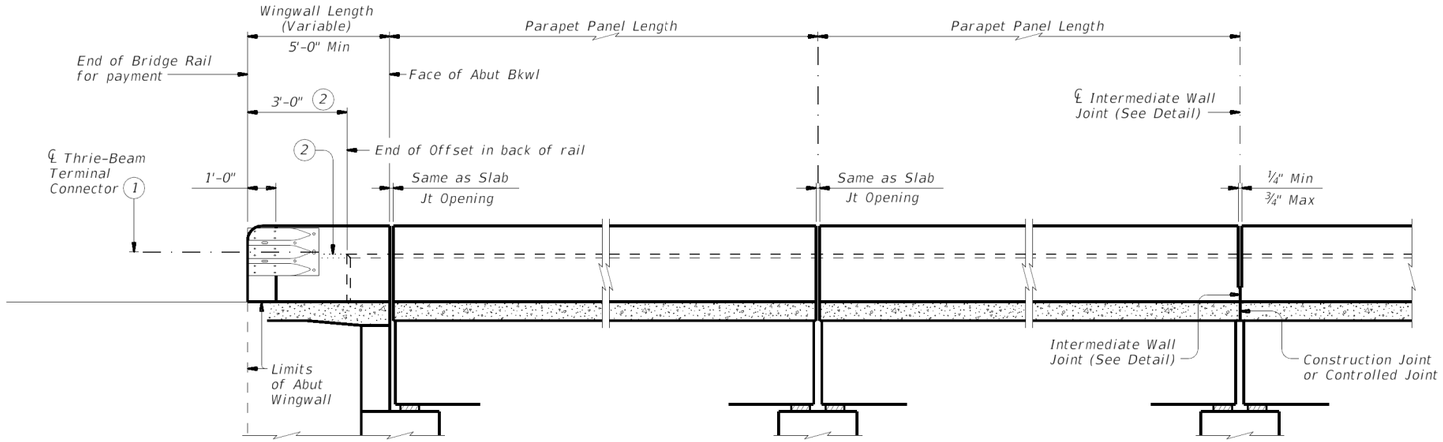
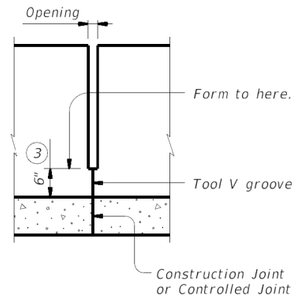


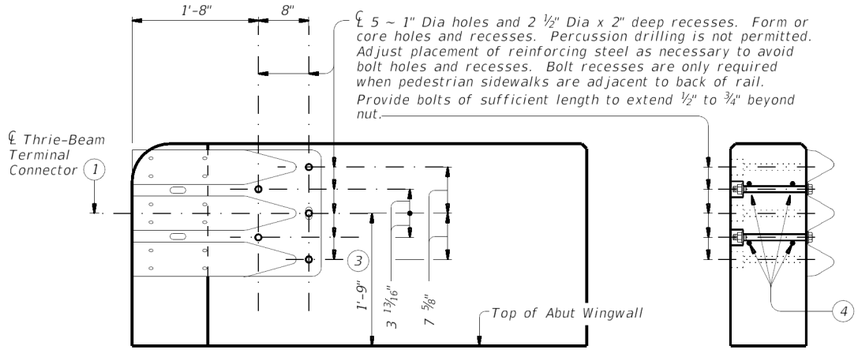
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

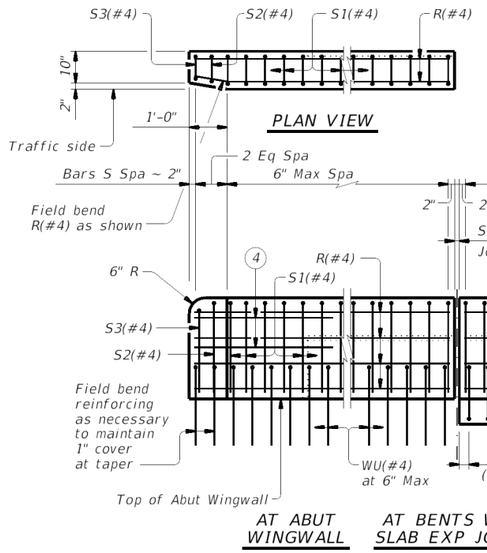
Provide at all interior bents without slab expansion joints.



ELEVATION | SECTION

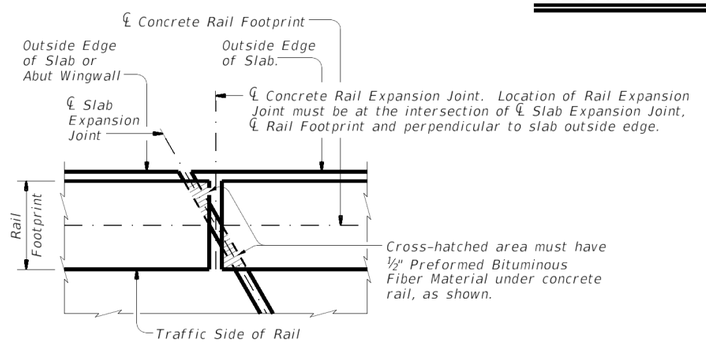
TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
3. Increase 2" for structures with overlay.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.



AT ABUT WINGWALL | AT BENTS WITH SLAB EXP JOINTS | AT SLAB | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL

TYPE T221

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		107

DATE: 9/12/2024 10:30:03 AM
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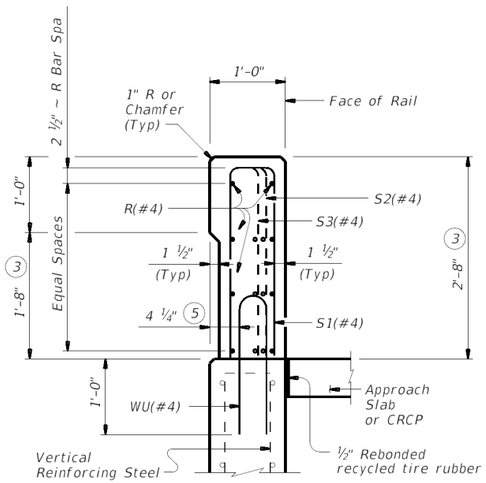
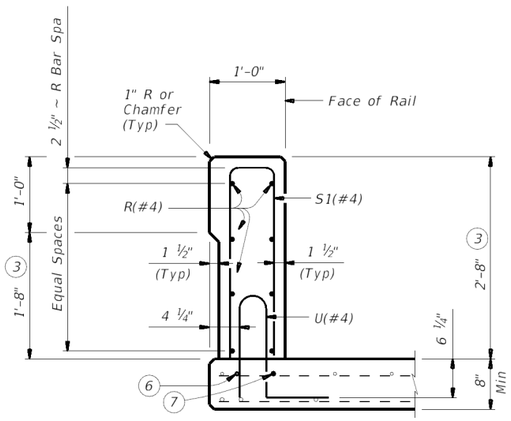


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(3) Increase 2" for structures with overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

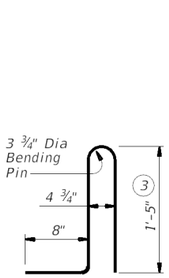
(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars will be furnished at the Contractors expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

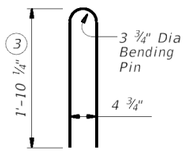
(8) Bend or cut as required to clear drain slots.

(9) No longitudinal wires may be in top center of cage.

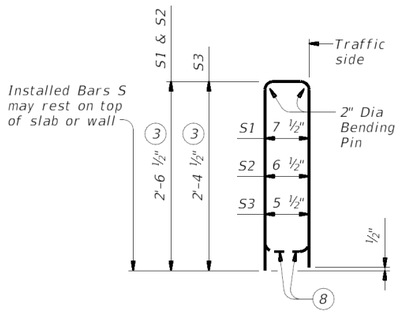
(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.



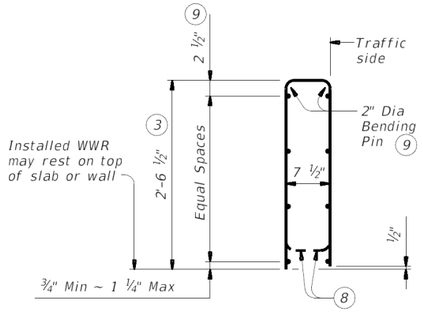
BARS U (#4)



BARS WU (#4)

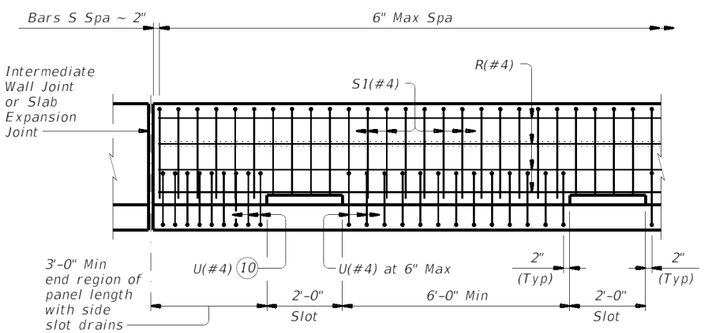


BARS S (#4)



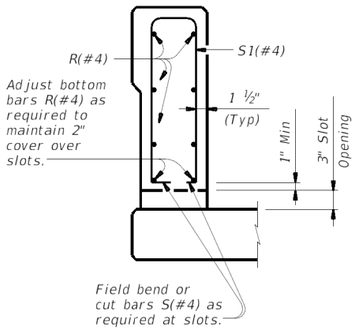
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings are not required for this rail.

Average weight of railing with no overlay is 370 plf.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T221

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		108

DATE: 9/12/2024 10:30:06 AM
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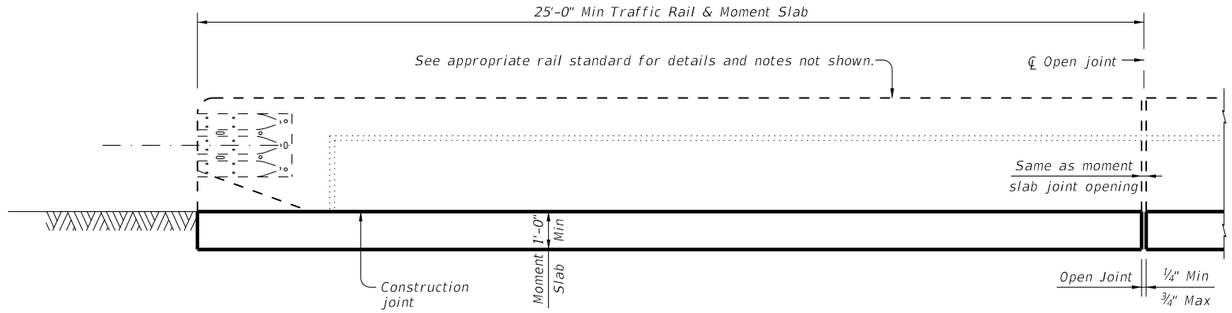
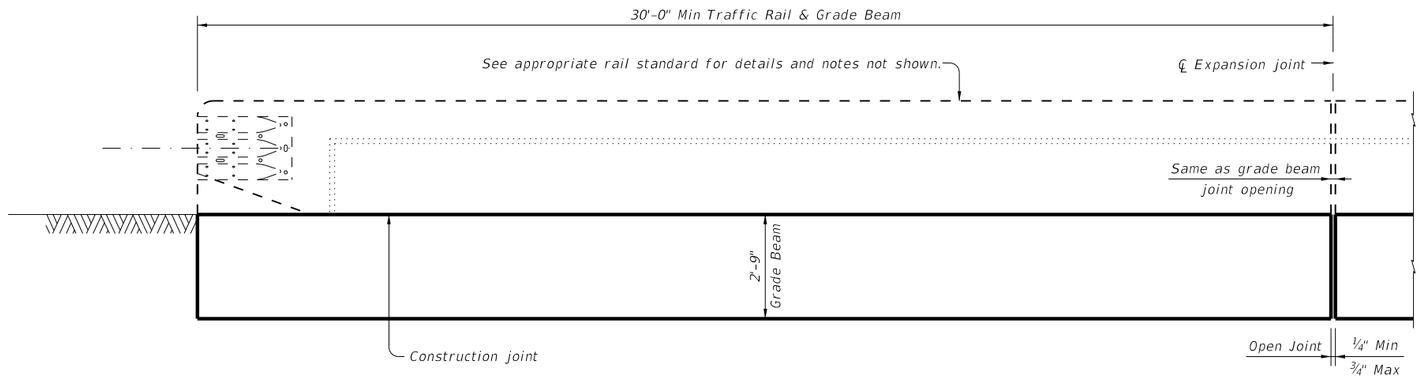


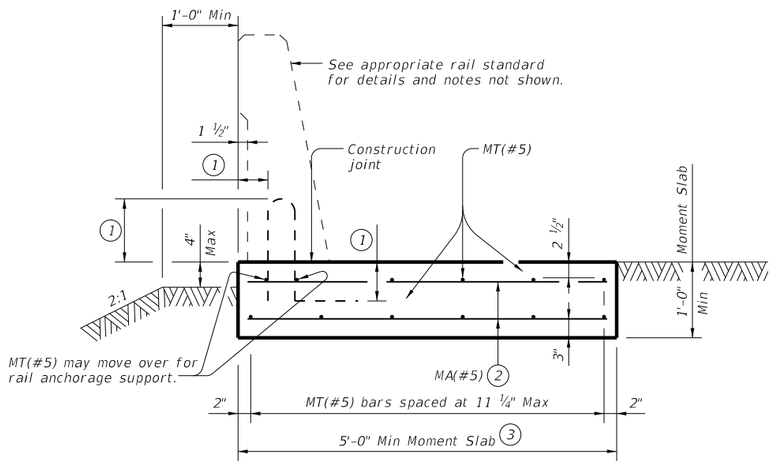
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



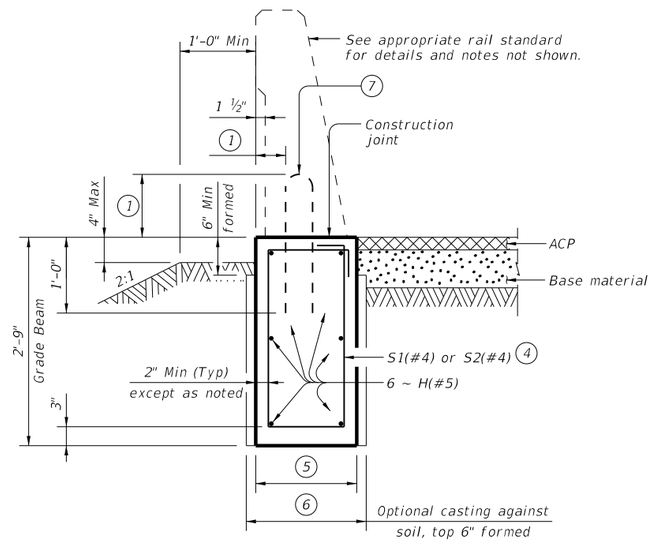
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



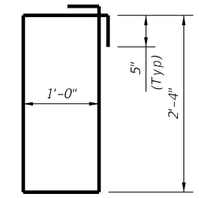
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

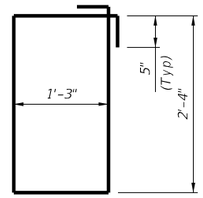
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
   Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66.
   Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

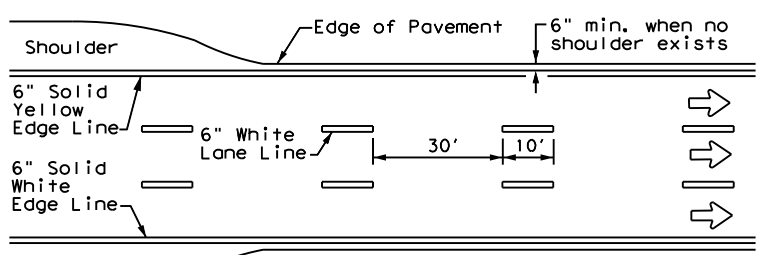
Texas Department of Transportation

Bridge Division Standard

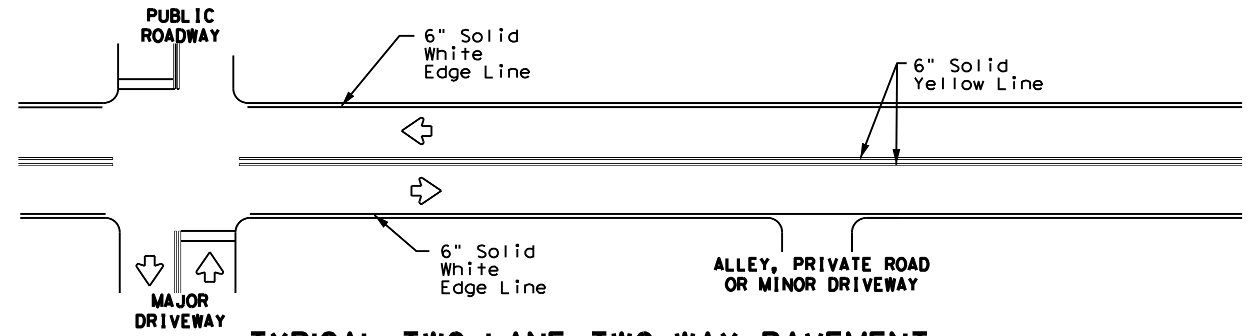
TRAFFIC RAIL FOUNDATIONS
FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

FILE:	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 07-20: Added moment slab with rail foundation lengths.	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		109



EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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

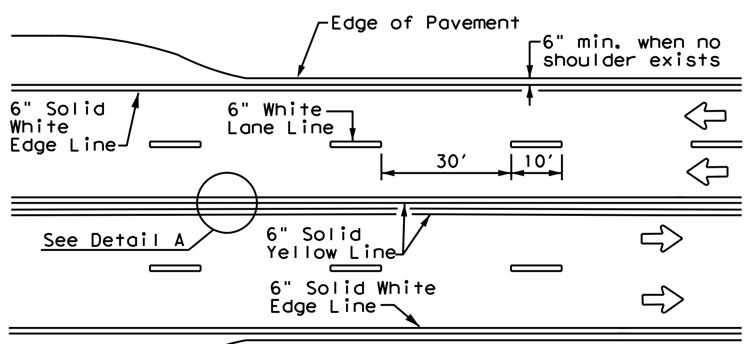
GENERAL NOTES

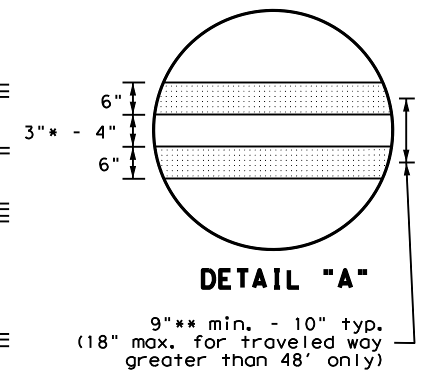
1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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





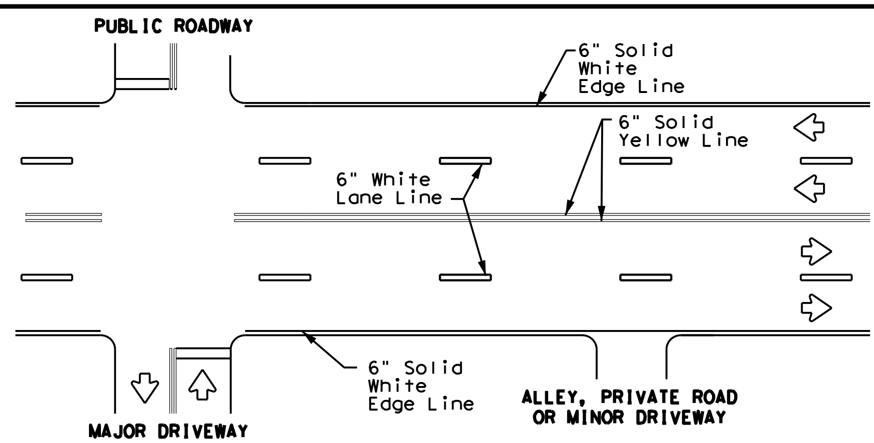
DETAIL "A"

9"** min. - 10" typ. (18" max. for traveled way greater than 48' only)

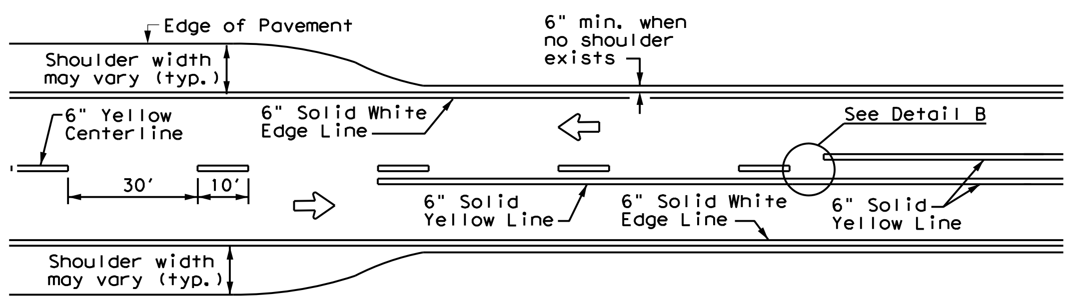
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

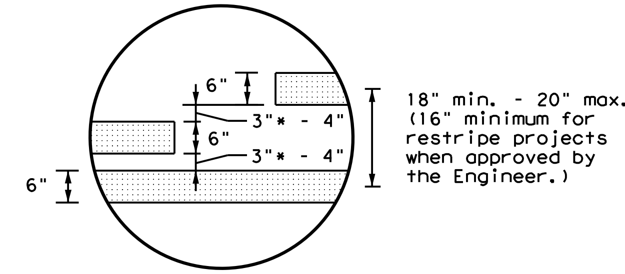
** 8" minimum for restripe projects when approved by the Engineer.



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

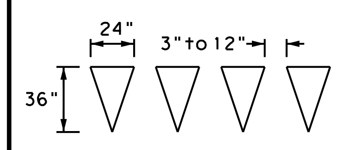


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



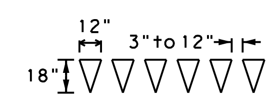
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

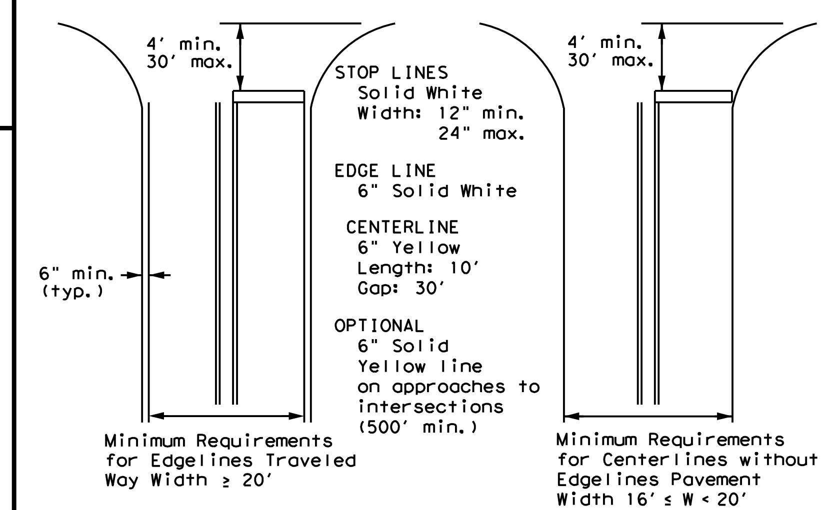


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



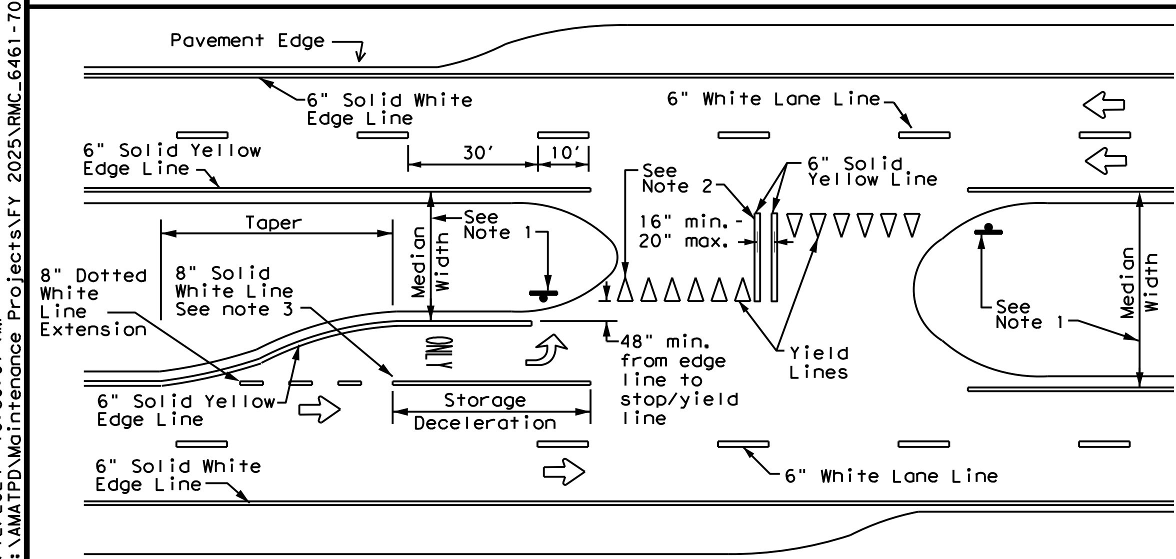
For posted speed on road being marked equal to or less than 40 MPH.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

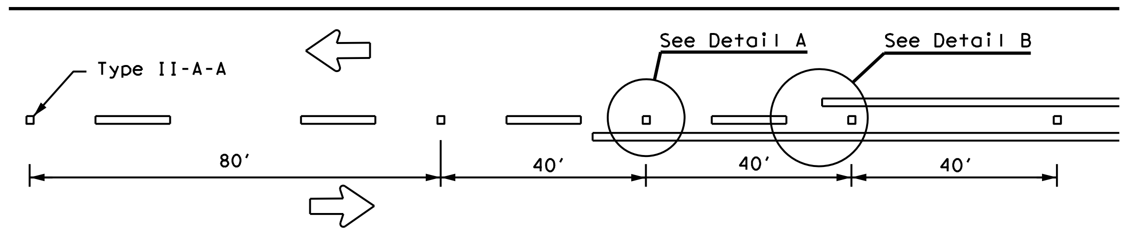
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	6461	70	001	VARIES
	DIST		COUNTY	SHEET NO.
	AMA		POTTER, ETC	110

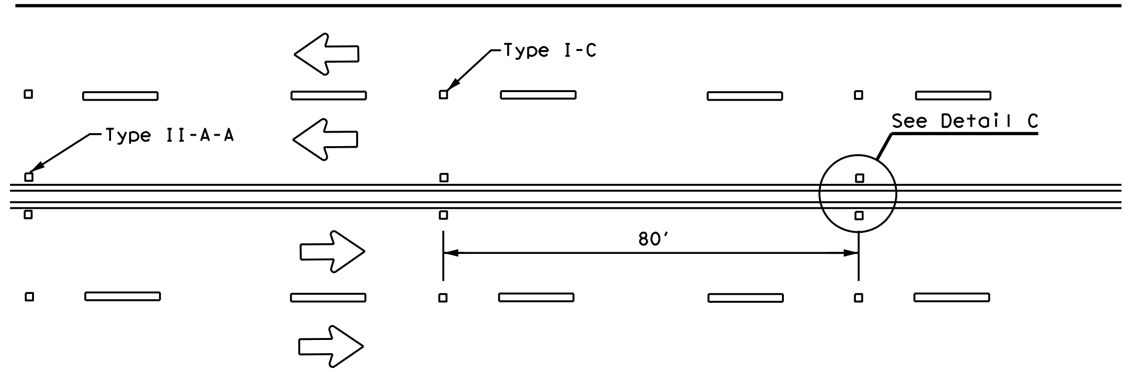
22A

DATE: 9/12/2024 10:30:07 AM
FILE: T:\AMATPD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\Plans\Standards\PM1-22.dgn

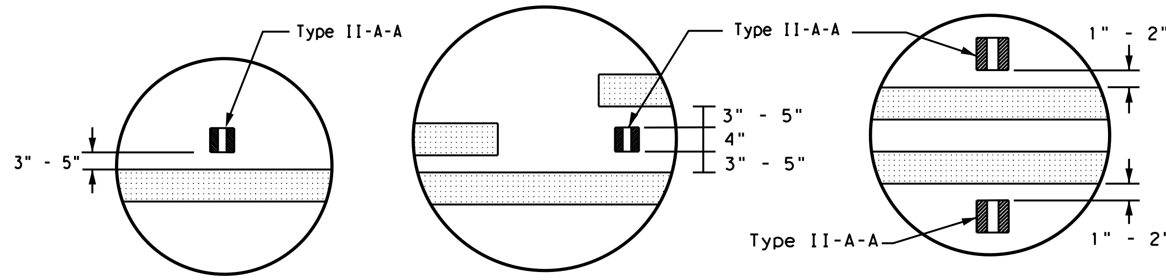
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



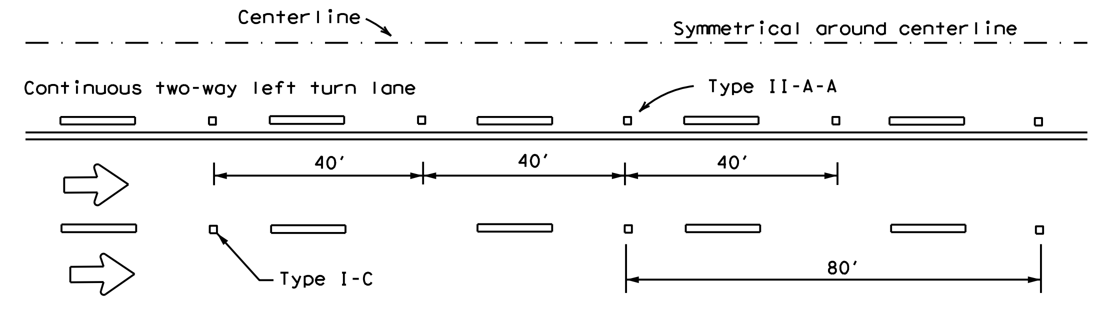
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



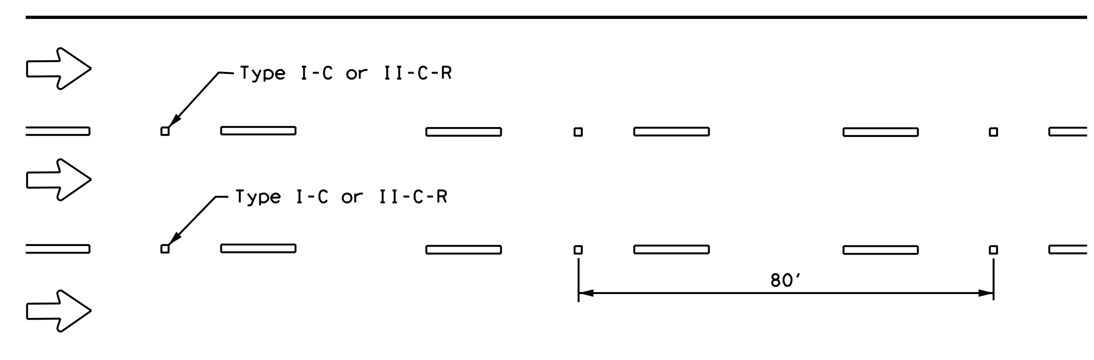
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



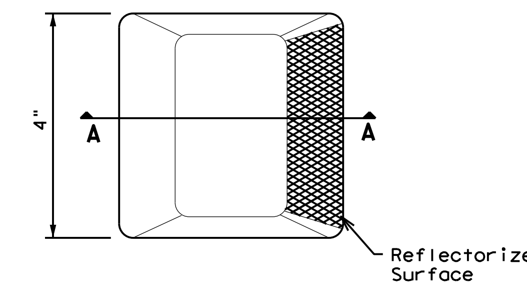
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

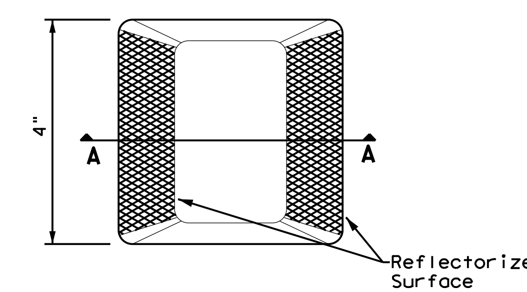
See Note 3.

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

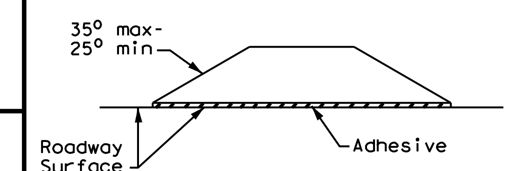
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

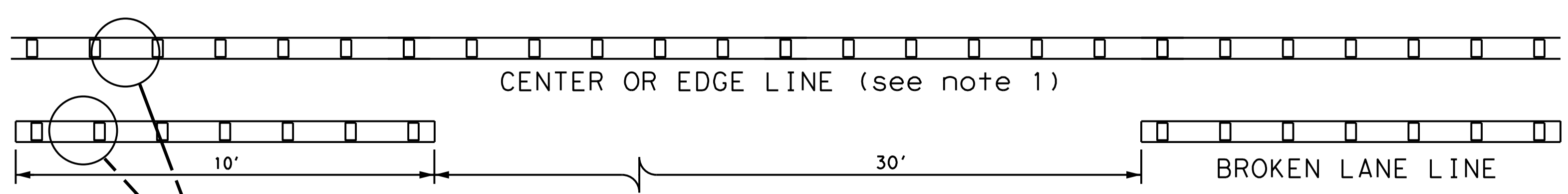


Type II (Top View)



SECTION A

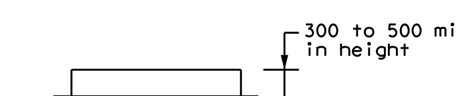
RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements, the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20	6461	70	001	VARIES
4-92 2-10 12-22	DIST		COUNTY	SHEET NO.
5-00 2-12	AMA		POTTER, ETC	111

22B

DATE: 9/12/2024 10:30:10 AM
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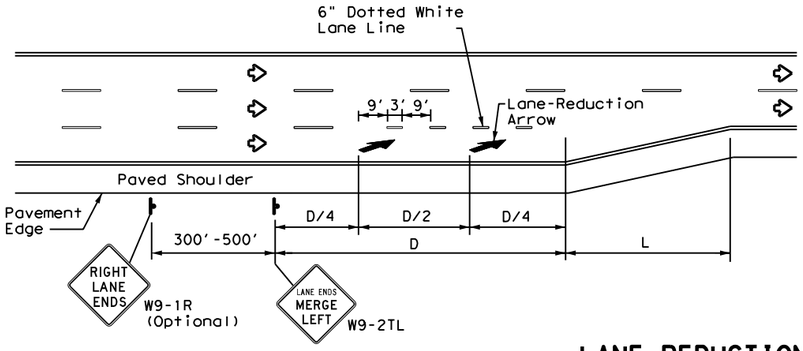


LANE REDUCTION

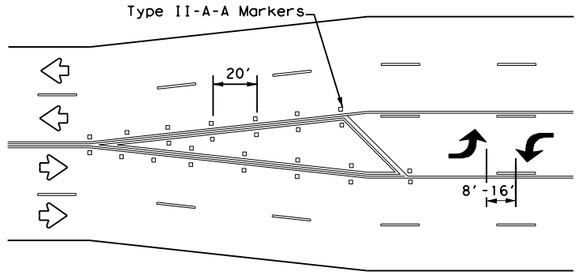
NOTES

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

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

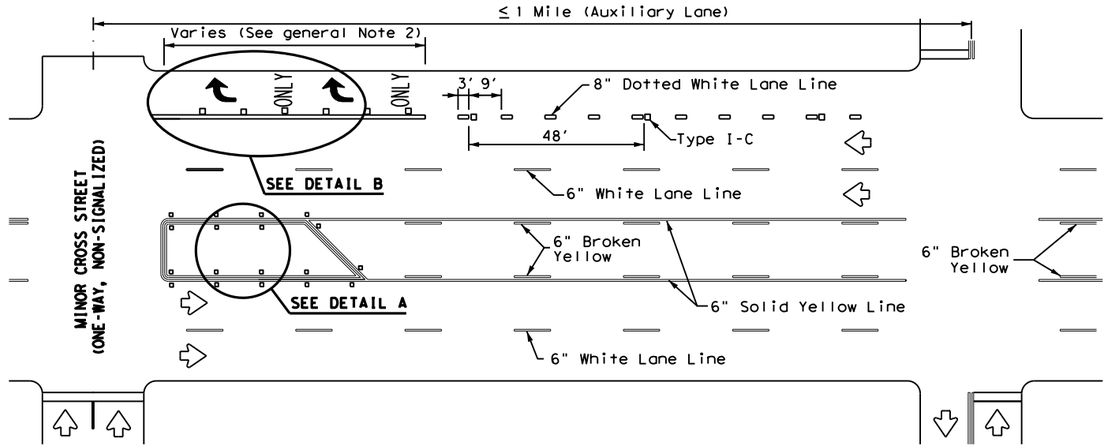


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

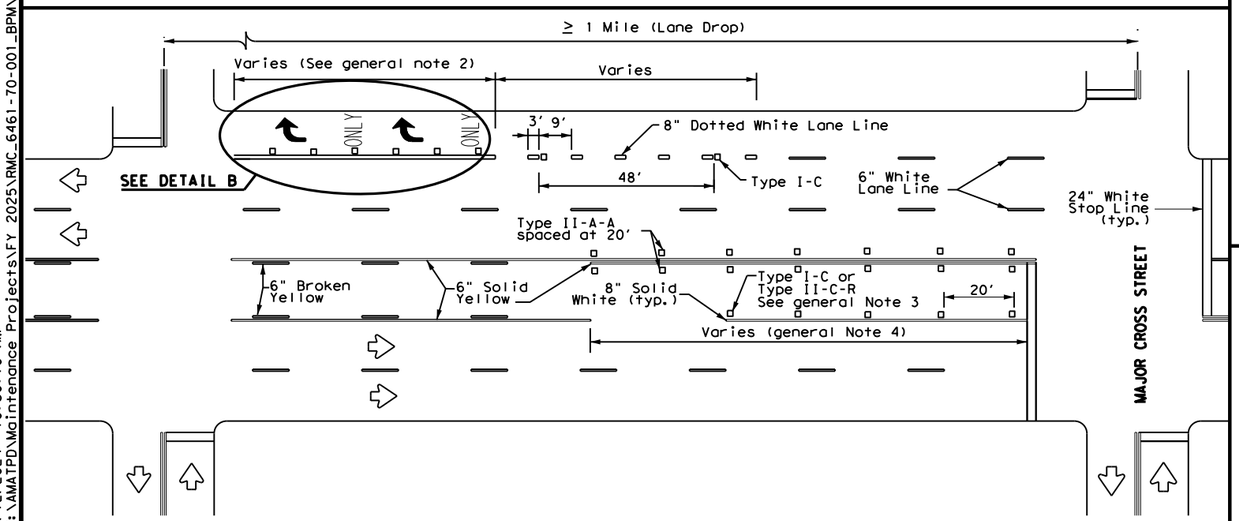
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

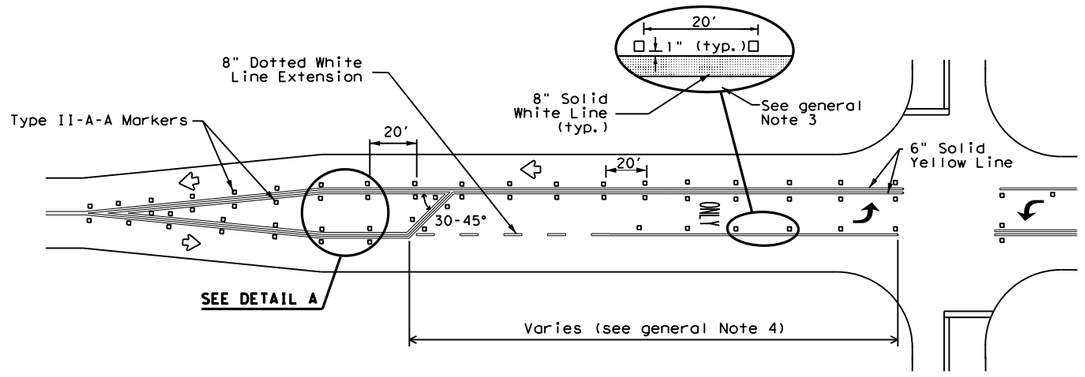
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



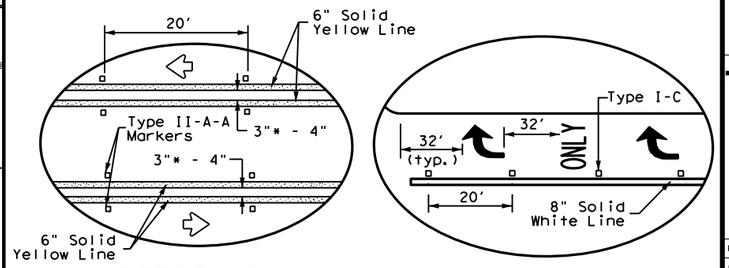
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		112

22C

DATE: 9/12/2024 10:30:12 AM
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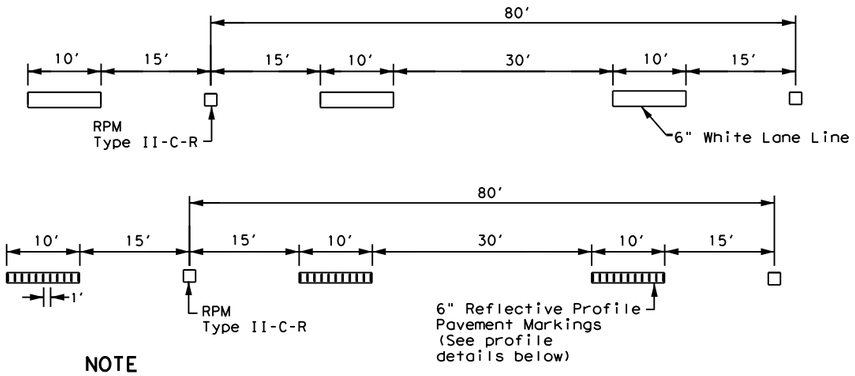
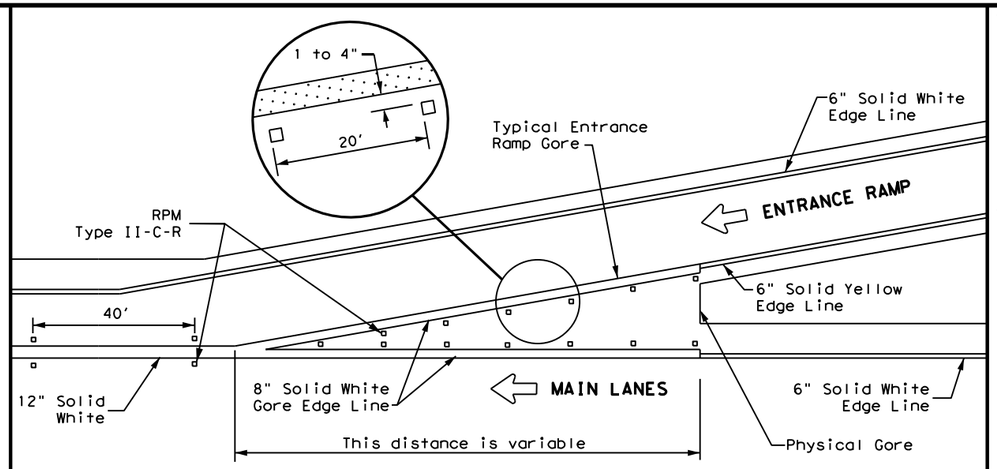


NOTE

Reflectorized raised pavement markers Type II-C-R shall be spaced on 80'centers with the clear face toward normal traffic and the red face toward wrong way traffic. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.

TRAFFIC LANE LINES PAVEMENT MARKING



TYPICAL ENTRANCE RAMP GORE MARKING

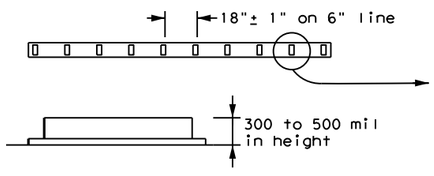
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

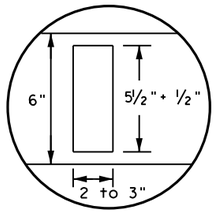
LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R

GENERAL NOTE

On concrete pavements the raised pavement markers shall be placed to one side of the longitudinal joints.



Reflective Profile Pavement Markings

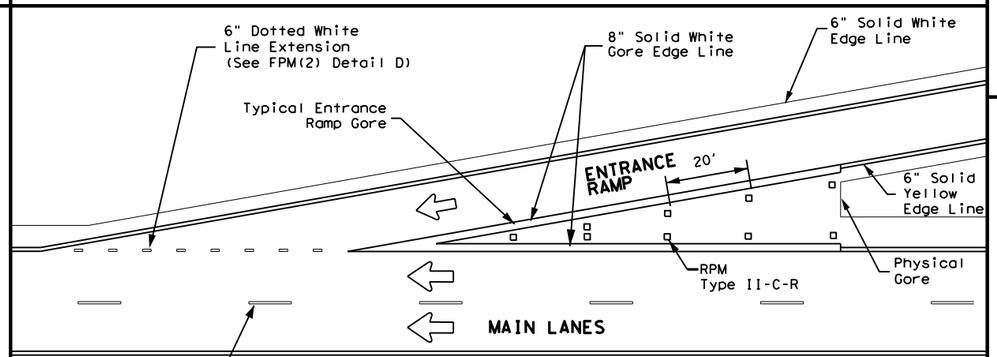


Standard 6" Profile Detail

NOTE

Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

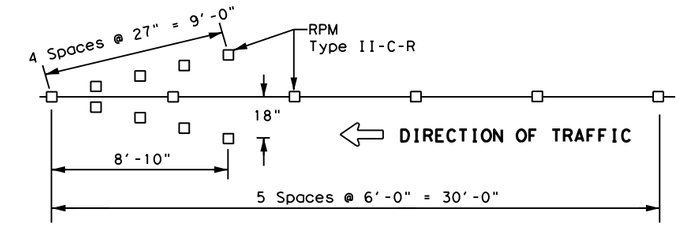
EDGE LINE PAVEMENT MARKINGS



NOTE

See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

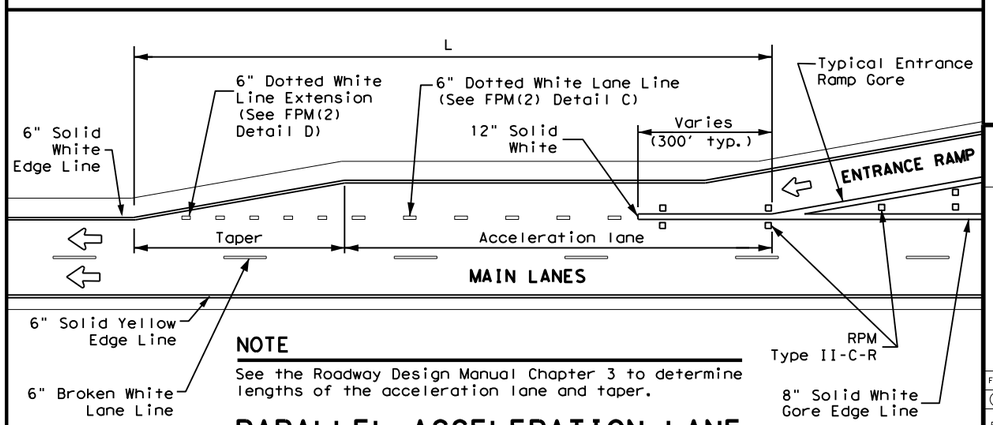
TAPERED ACCELERATION LANE



NOTES

1. Reflectorized raised pavement markers Type-II-C-R in the wrong way arrow shall have the clear face toward normal traffic and the red face toward the wrong way traffic.
2. Red reflectorized wrong way arrows, not to exceed two, may be placed on exit ramps. Locations of the arrows shall be as shown in the plans or as directed by the engineer.

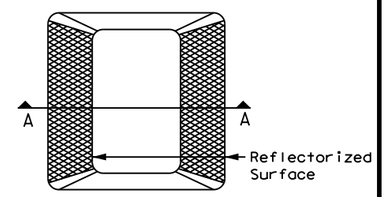
WRONG WAY ARROW



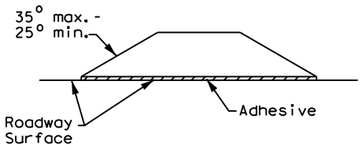
NOTE

See the Roadway Design Manual Chapter 3 to determine lengths of the acceleration lane and taper.

PARALLEL ACCELERATION LANE



Type II (Top View)



SECTION A

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation

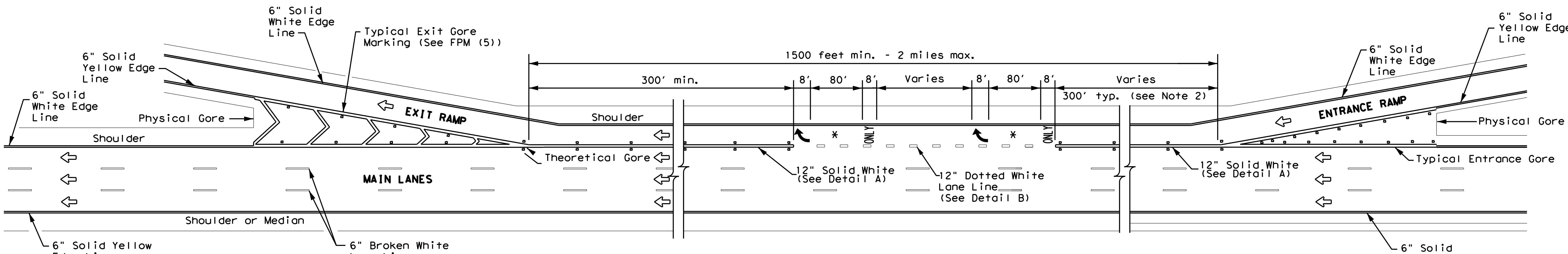
Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

FPM(1)-22

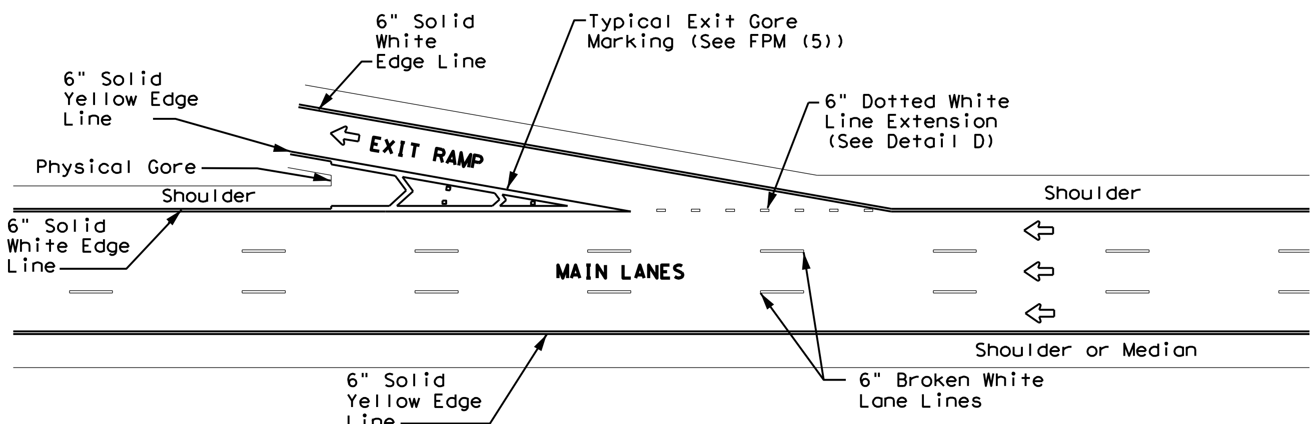
FILE: fpm(1)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
5-74 8-00 2-12	DIST	COUNTY		SHEET NO.
4-92 2-08 10-22	AMA	POTTER, ETC		113
5-00 2-10				

23A



SINGLE LANE EXIT WITH AUXILIARY LANE

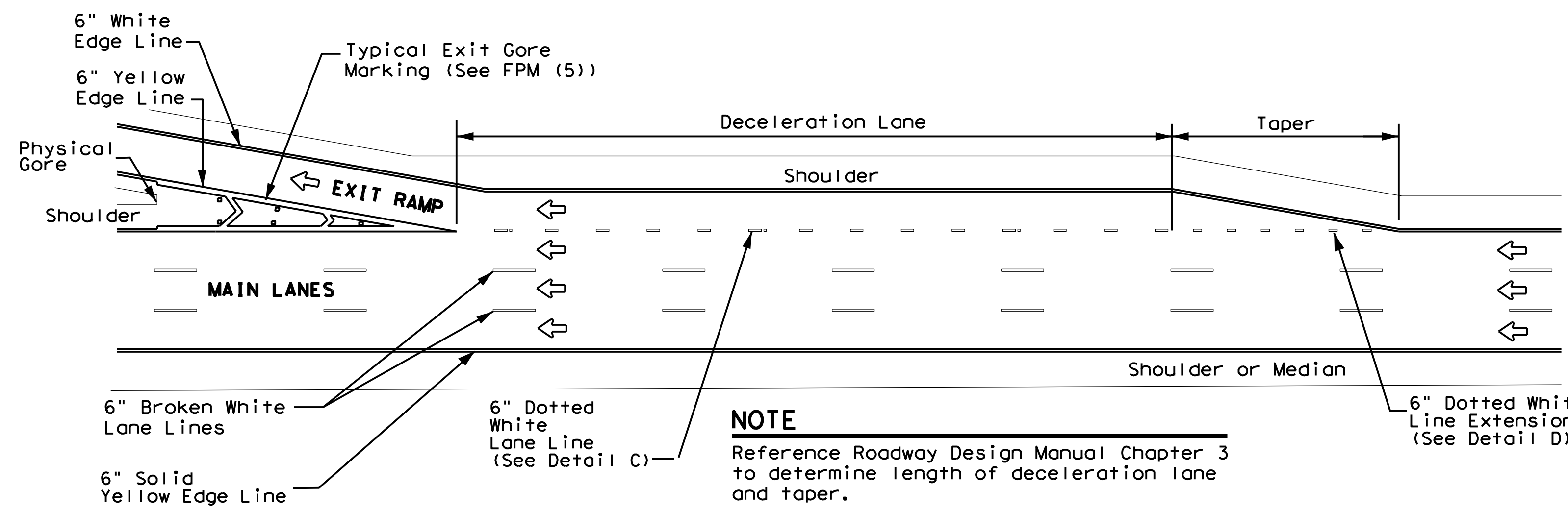
(See Note 2)



NOTE

Reference Roadway Design Manual Chapter 3 to determine if tapered deceleration lane may be used.

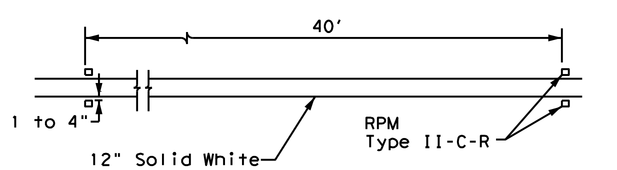
TAPERED DECELERATION LANE



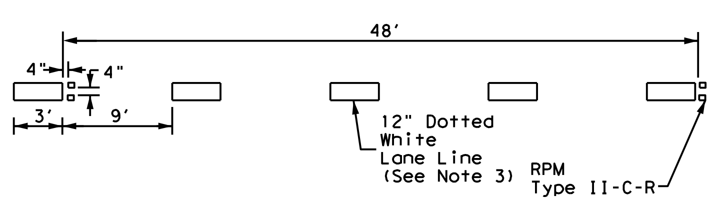
NOTE

Reference Roadway Design Manual Chapter 3 to determine length of deceleration lane and taper.

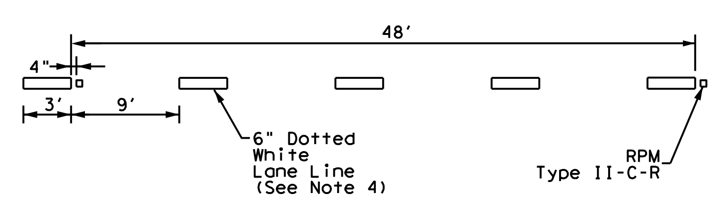
PARALLEL DECELERATION LANE



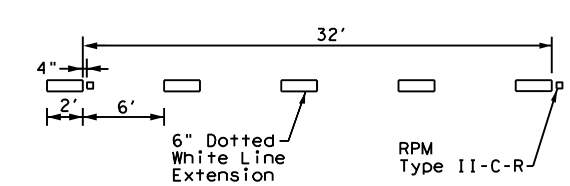
DETAIL A



DETAIL B



DETAIL C



DETAIL D

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Normal (6") dotted lane line (see Detail C) is used at parallel acceleration and deceleration lanes.
5. See FPM(1) for traffic lane line pavement marking details.

LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R
⁎	Arrow markings are optional, however "ONLY" is required if arrow is used

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

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

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-22

FILE: fpm(2)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-77 5-00 2-12; 4-92 8-00 10-22; 8-95 2-10	6461	70	001	VARIES
	DIST		COUNTY	SHEET NO.
	AMA		POTTER, ETC	114

23B

DATE: 9/12/2024 10:30:13 AM
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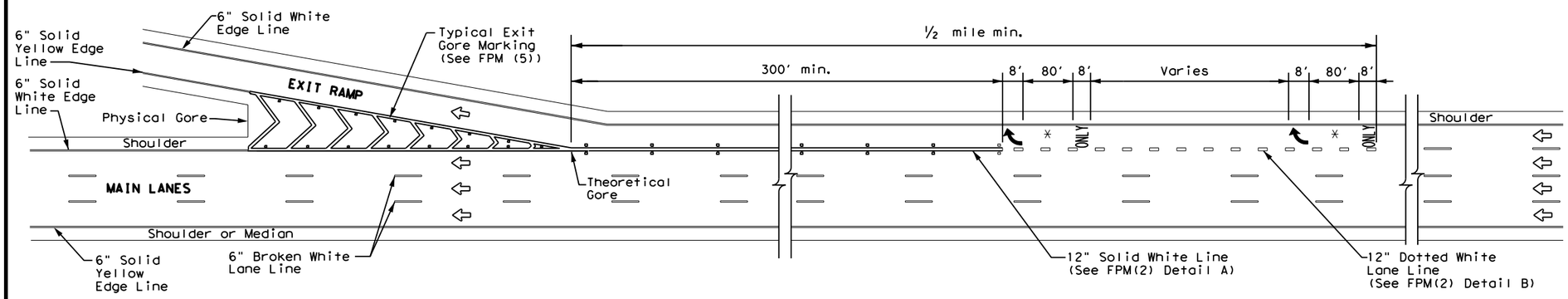
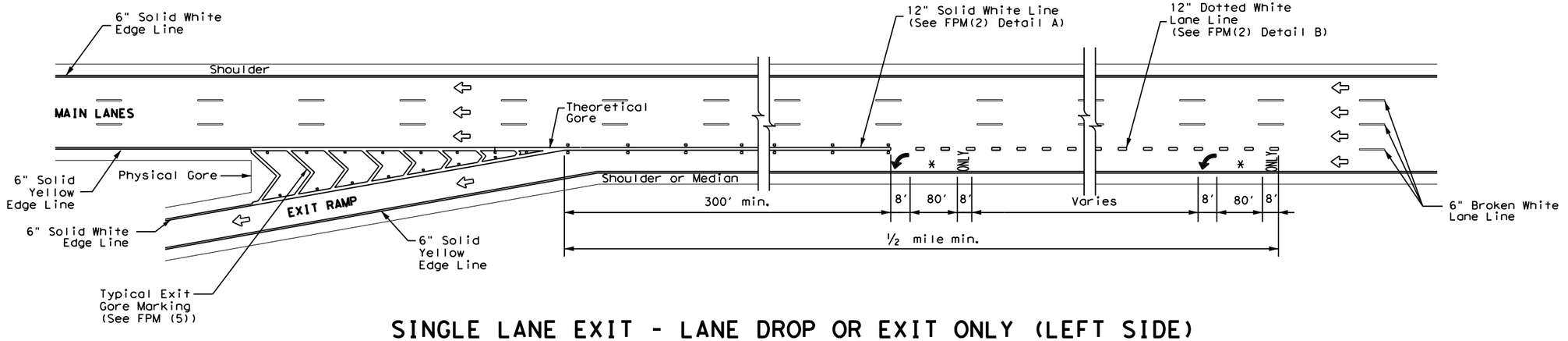


SINGLE LANE EXIT - LANE DROP OR EXIT ONLY

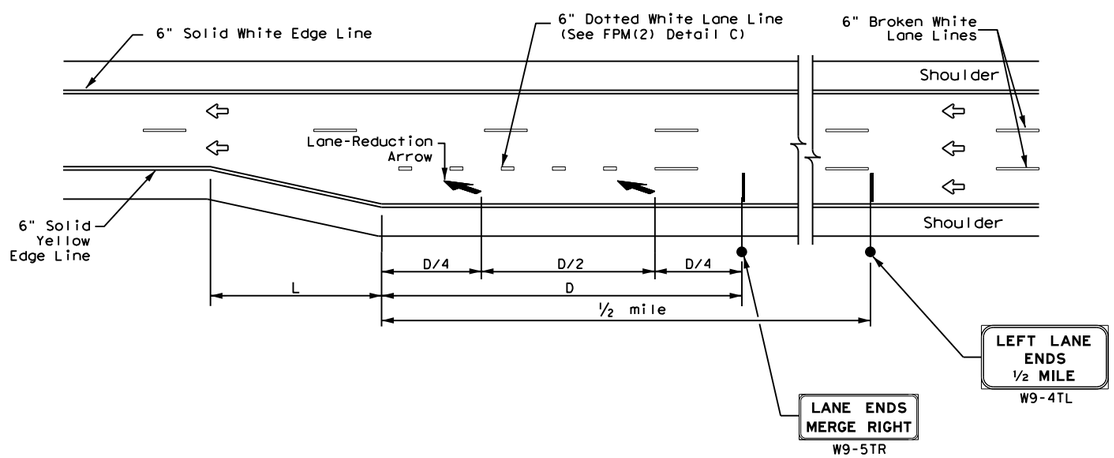
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R
*	Arrow markings are optional, however "ONLY" is required if arrow is used



SINGLE LANE EXIT - LANE DROP OR EXIT ONLY (LEFT SIDE)



FREEWAY LANE REDUCTION

NOTES

1. Large Guide signs shall conform to the TxDOT Freeway Signing Handbook.
2. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
3. Arrows and sign details can be found in the Standard Highway Sign Designs for Texas (SHSD) at http://www.txdot.gov.
4. These guidelines may also be applied to the design of a right side lane reduction. Use LANE ENDS MERGE LEFT (W9-5TL) and RIGHT LANE ENDS 1/2 MILE (W9-4TR) signs in lieu of what is shown on drawing.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	
80 MPH	1,500	
85 MPH	1,625	

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see FPM(2) Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Edge lines are not required in curb and gutter sections of frontage roads.
5. See FPM(1) for traffic lane line pavement marking details.

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS SINGLE LANE DROP (EXIT ONLY) AND LANE REDUCTION DETAILS

FPM(3)-22

FILE: fpm(3)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	6461	70	001	VARIES
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 10-22	AMA	POTTER, ETC		115

23C

DATE: 9/12/2024 10:30:15 AM
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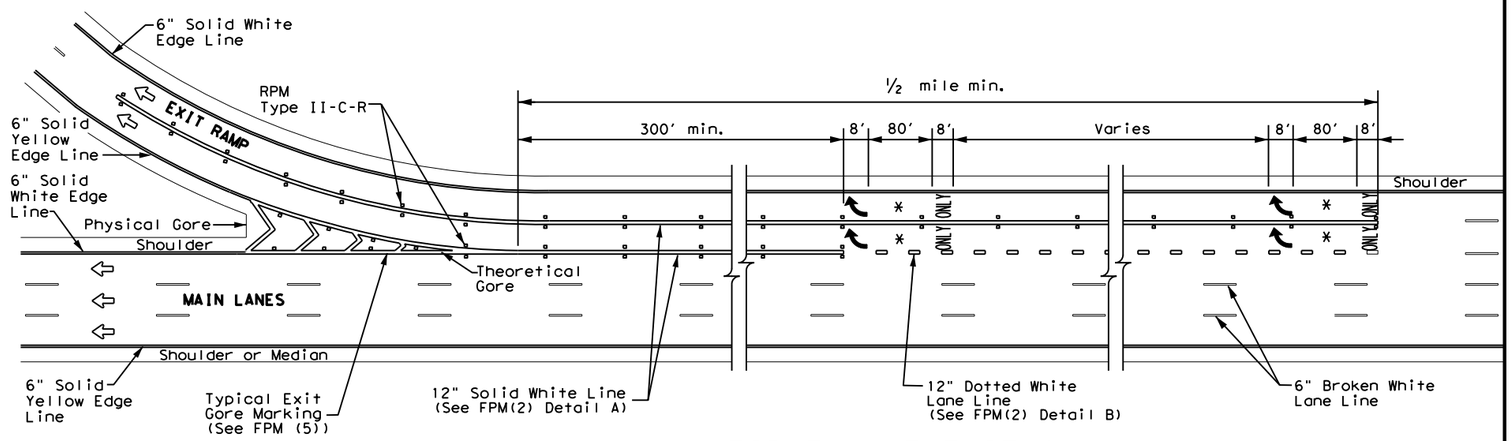


MULTIPLE LANE EXIT ONLY

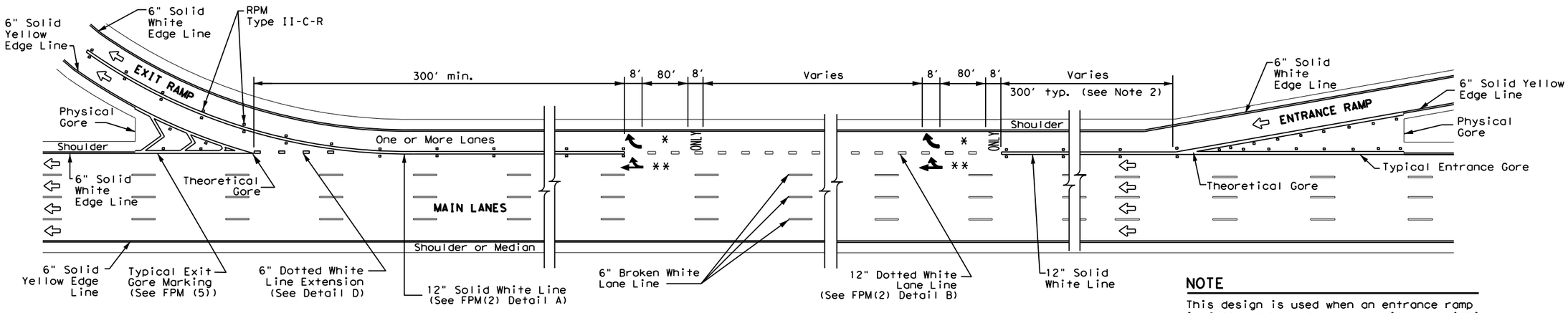
LEGEND	
⇦	Traffic Flow
▫	Reflectorized Raised Markers (RPM) Type II-C-R
↱	Pavement marking arrow (white)
*	Arrow markings are optional, however "ONLY" is required if arrow is used
**	Arrow markings are optional

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

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

GENERAL NOTES

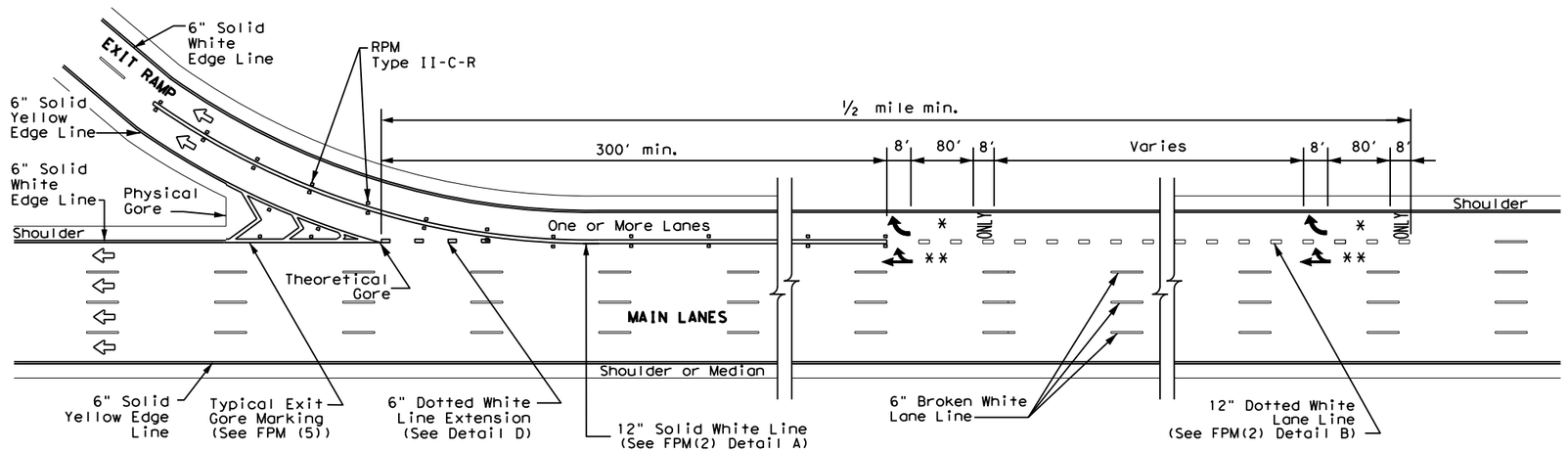
1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see FPM(2) Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Edge lines are not required in curb and gutter sections of frontage roads.
5. See FPM(1) for traffic lane line pavement marking details.



SINGLE LANE ENTRANCE WITH MULTIPLE LANE EXIT - EXIT ONLY WITH OPTION LANE

NOTE

This design is used when an entrance ramp is followed by a dual lane exit ramp within 2400' downstream (theoretical gore to theoretical gore).



MULTIPLE LANE EXIT - EXIT ONLY WITH OPTION LANE

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS MULTIPLE LANE DROP (EXIT) DETAILS

FPM(4)-22

FILE: fpm(4)-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	6461	70	001	VARIES
2-77 2-10	DIST	COUNTY		SHEET NO.
5-00 2-12	AMA	POTTER, ETC		116
8-00 10-22				

230

DATE: 9/12/2024 10:30:16 AM
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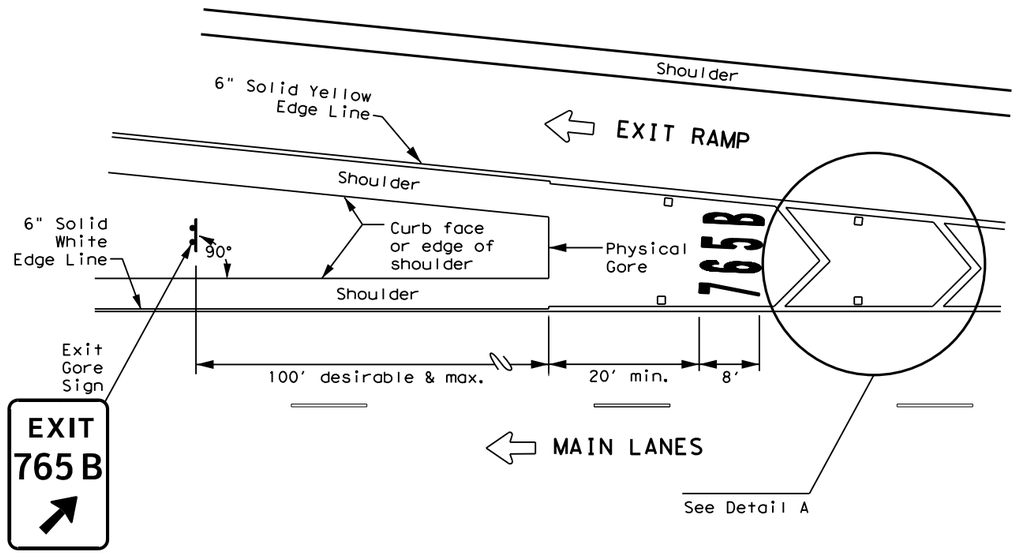
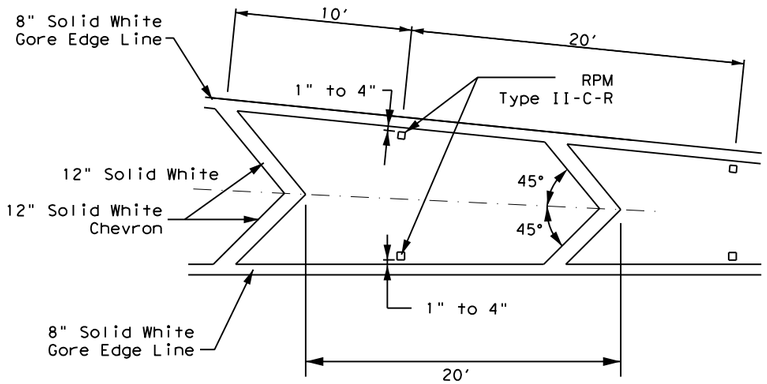
DATE: 9/12/2024 10:30:17 AM
FILE: I:\AMA\PD\Maintenance Projects\FY 2025\RMC_6461-70-001_BPMV4 - Design\PM Plans Set\fpm(5)-22.dgn

EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white exit number pavement markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Section 12 at http://www.txdot.gov



MARKINGS WITH EXIT NUMBER



NOTES

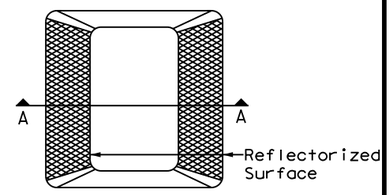
1. Raised pavement markers shall be centered between each chevron or neutral area line.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

DETAIL A

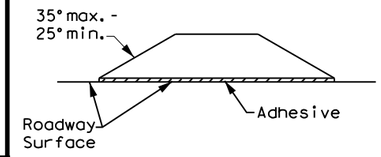
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

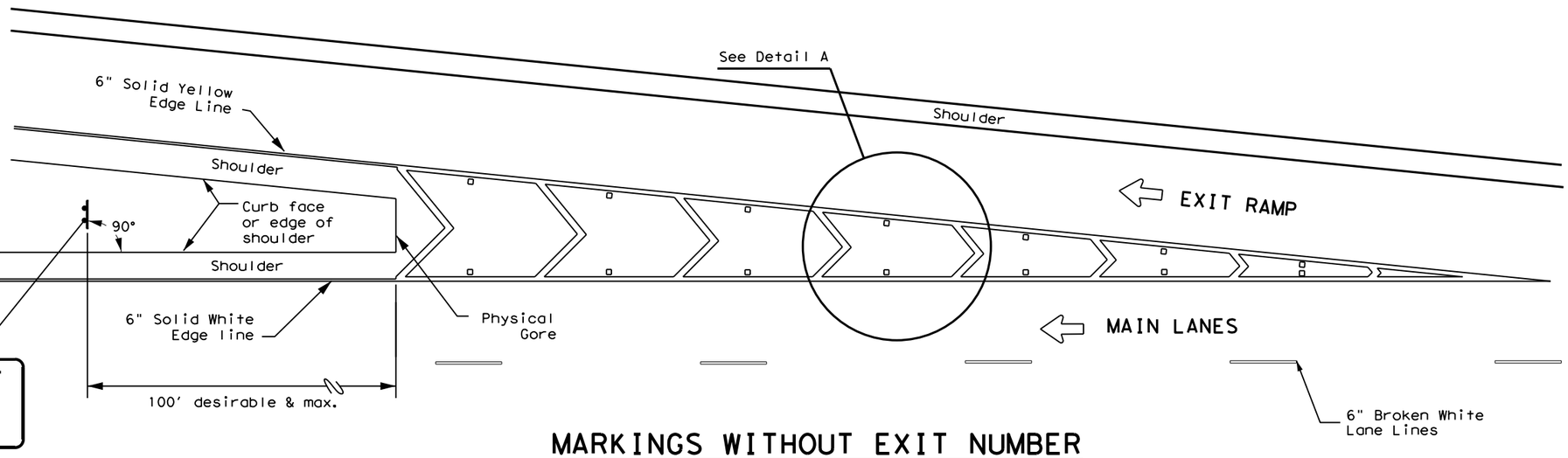
LEGEND	
⇦	Traffic flow
▫	Reflectorized Raised Markers (RPM) Type II-C-R



Type II (Top View)



SECTION A



MARKINGS WITHOUT EXIT NUMBER

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation — Traffic Safety Division Standard

EXIT GORE PAVEMENT MARKINGS

FPM(5)-22

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REVISIONS 9-19 10-22	6461	70	001	VARIES
	DIST	COUNTY		SHEET NO.
	AMA	POTTER, ETC		117

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