FED.RD. DIV.NO.	FEDERAL PROJECT NO.		SHEET NO.
6	F 2021(874)		1
STATE	STATE DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	HIGHWAY NO.
0904	00	197	IH-40

DESIGN SPEED = NA
2021 ADT = 14,912
2041 ADT = 20,294
RURAL INTERSTATE

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

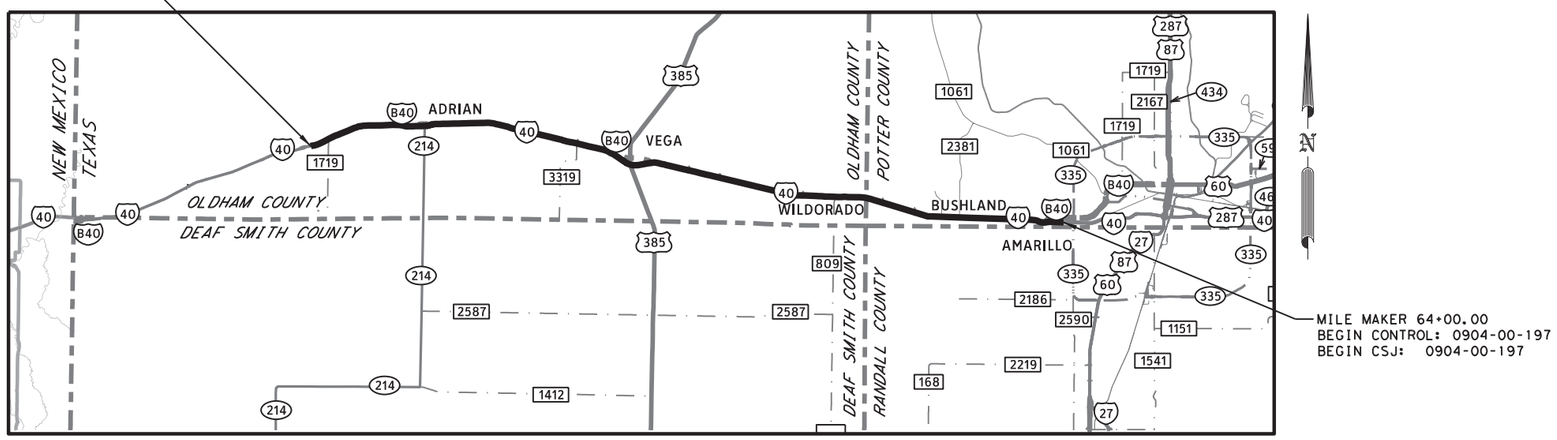
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
FEDERAL PROJECT: F 2021(874)
HIGHWAY - IH-40
POTTER COUNTY

CONTROL: 0904-00-197

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENTS.
CONSISTING OF INSTALLING CABLE MEDIAN BARRIER.

PROJECT LIMITS FROM: MM 15+00.94
TO: MM 64+0.25
ROADWAY LENGTH = 254,760 FT. = 48.250 MILES

MILE MARKER: 15+00.94
END CONTROL: 0904-00-197
BEGIN CSJ: 0904-00-197



MILE MAKER 64+00.00
BEGIN CONTROL: 0904-00-197
BEGIN CSJ: 0904-00-197

EXCEPTIONS:
NONE

RAILROADS:
NONE

EQUATIONS:
N/A

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012).

2021 Texas Department of Transportation

RECOMMENDED FOR LETTING: DATE: 5/28/2021
DocuSigned by: Corky Mukam
1D152781DAD9462...

DATE: 6/1/2021
DocuSigned by: Kit Black
9B5A6EA6AE8B46E...
DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: DATE: 6/3/2021
DocuSigned by: Blair Johnson
8B80E3AEB2BC43A...

INDEX OF SHEETS

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

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

INDEX OF SHEETS

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		2

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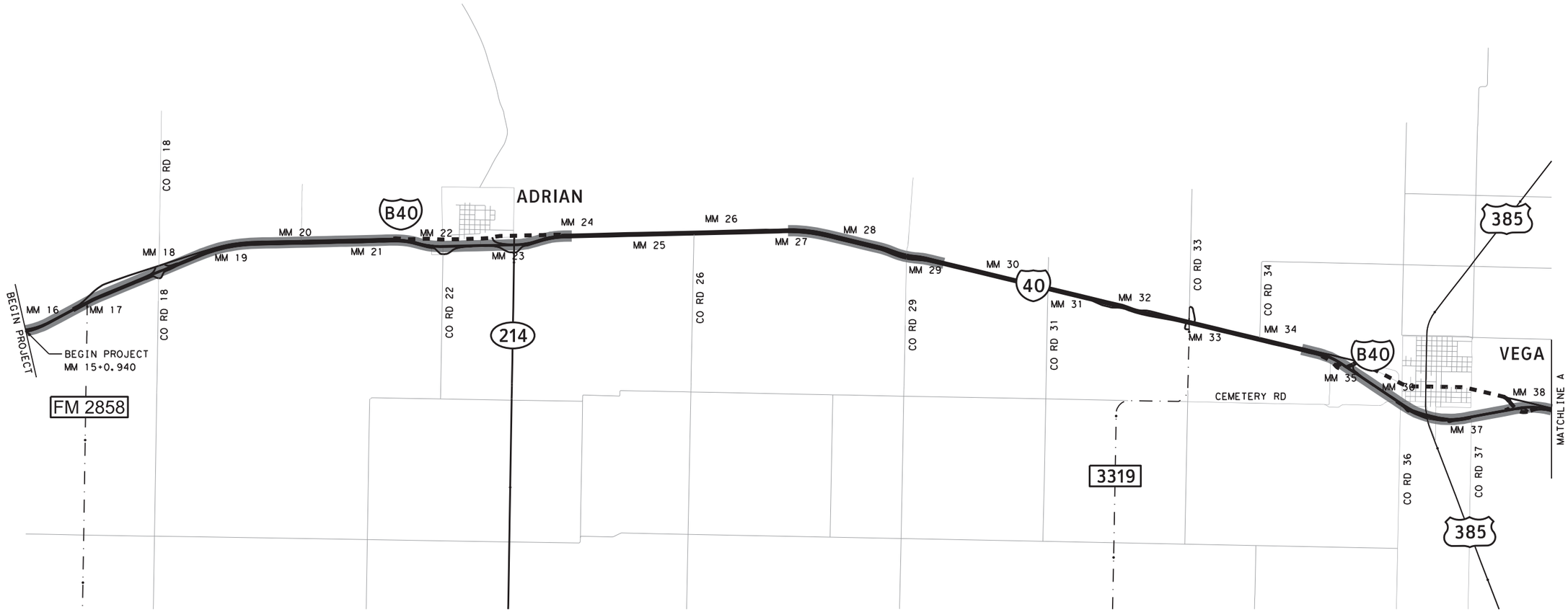

LEGEND

AREA OF WORK

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROJECT LAYOUT

SCALE: NTS

2021 Texas Department of Transportation

SHEET 1 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		3

DATE: 5/26/2021 10:19:33 AM
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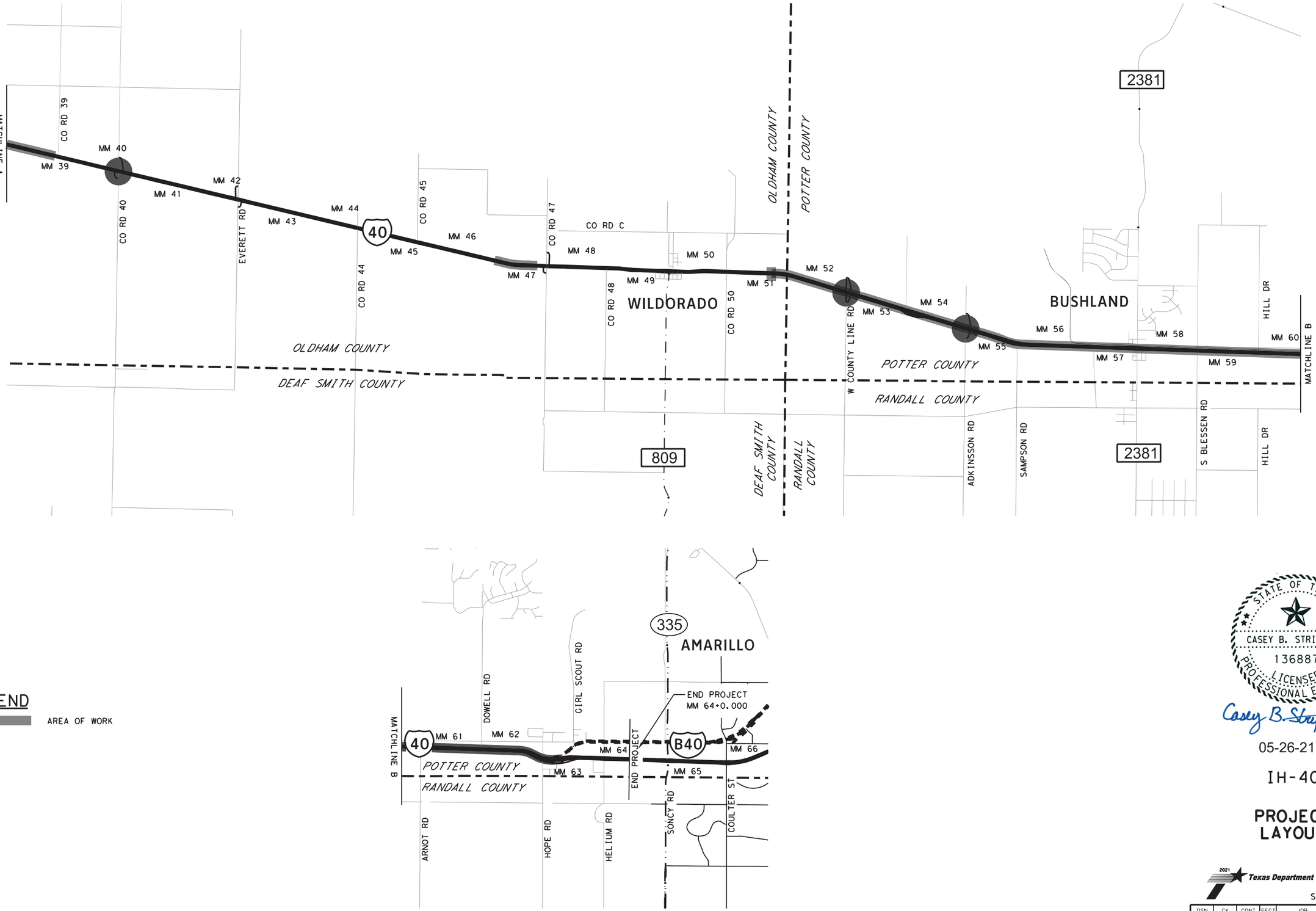

LEGEND

AREA OF WORK

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROJECT LAYOUT

SCALE: NTS

2021 Texas Department of Transportation

SHEET 2 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		4

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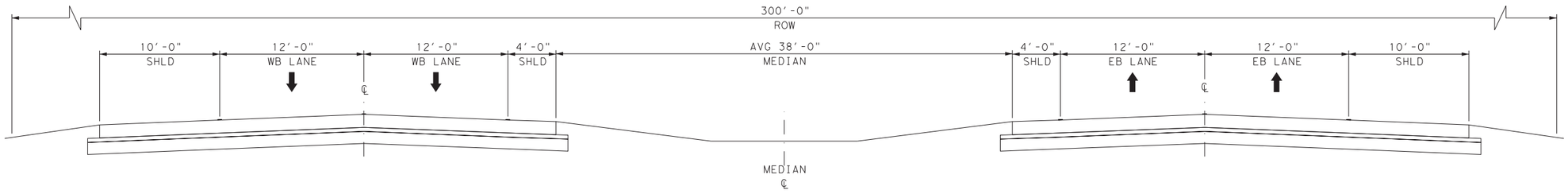
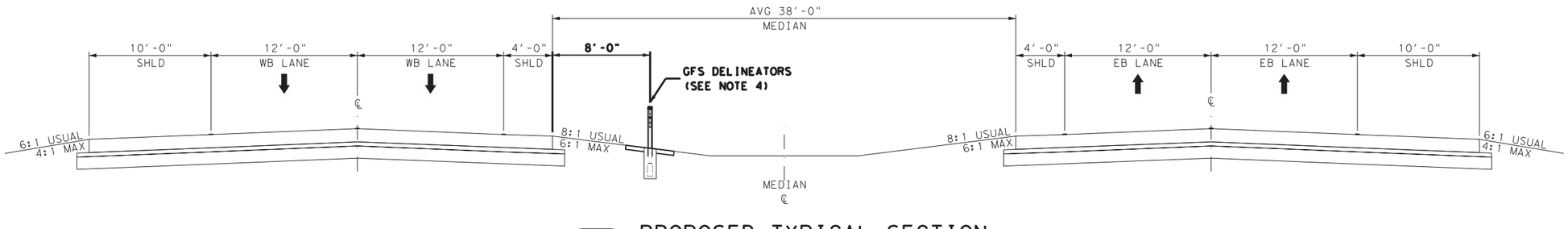


(A) EXISTING TYPICAL SECTION

CSJ: 0904-00-197

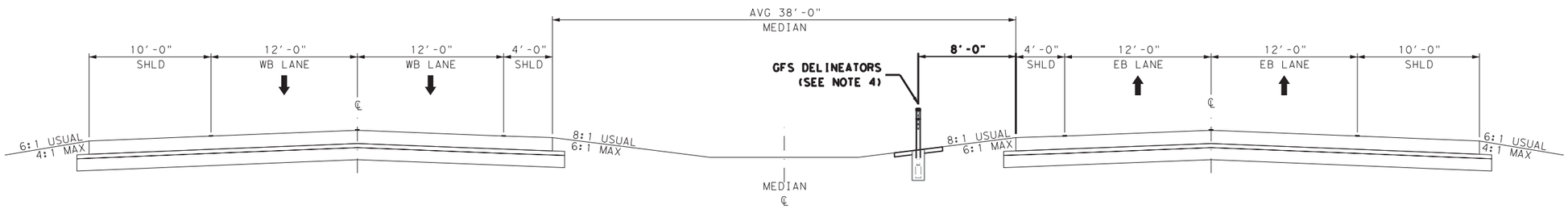
MM 16+0.00 TO MM 64+0.00



(A1) PROPOSED TYPICAL SECTION

CSJ: 0904-00-197

MM 16+0.704 TO MM 16+0.907
MM 17+0.131 TO MM 17+0.168
MM 17+0.378 TO MM 17+0.416
MM 18+0.019 TO MM 18+0.211
MM 18+0.677 TO MM 18+0.716
MM 18+0.938 TO MM 18+0.976
MM 19+0.177 TO MM 19+0.216
MM 19+0.437 TO MM 19+0.476
MM 19+0.673 TO MM 19+0.712
MM 20+0.979 TO MM 21+0.716
MM 22+0.976 TO MM 23+0.819
MM 26+0.948 TO MM 28+0.013
MM 28+0.713 TO MM 29+0.425
MM 34+0.441 TO MM 35+0.887
MM 37+0.362 TO MM 38+0.457
MM 52+0.359 TO MM 53+0.215
MM 55+0.085 TO MM 55+0.120
MM 55+0.337 TO MM 55+0.370
MM 55+0.585 TO MM 55+0.625
MM 55+0.897 TO MM 55+0.974
MM 56+0.172 TO MM 56+0.210
MM 56+0.423 TO MM 56+0.461
MM 56+0.671 TO MM 56+0.710
MM 59+0.288 TO MM 60+0.457
MM 62+0.194 TO MM 62+0.231



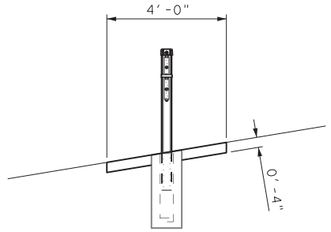
(A2) PROPOSED TYPICAL SECTION

CSJ: 0904-00-197

MM 15+0.963 TO MM 16+0.713
MM 17+0.602 TO MM 17+0.977
MM 18+0.402 TO MM 18+0.482
MM 19+0.910 TO MM 20+0.988
MM 21+0.706 TO MM 22+0.992
MM 27+0.983 TO MM 28+0.637
MM 35+0.857 TO MM 36+0.392
MM 36+0.467 TO MM 37+0.371
MM 46+0.538 TO MM 47+0.161
MM 51+0.163 TO MM 51+0.464
MM 51+0.702 TO MM 51+0.739
MM 51+0.949 TO MM 51+0.984
MM 52+0.191 TO MM 52+0.227
MM 53+0.461 TO MM 53+0.509
MM 53+0.711 TO MM 53+0.748
MM 53+0.957 TO MM 53+0.998
MM 54+0.207 TO MM 54+0.245
MM 54+0.487 TO MM 54+0.884
MM 56+0.904 TO MM 57+0.405
MM 57+0.790 TO MM 57+0.828
MM 58+0.120 TO MM 58+0.159
MM 58+0.495 TO MM 58+0.534
MM 58+0.957 TO MM 59+0.031
MM 60+0.876 TO MM 60+0.916
MM 61+0.193 TO MM 61+0.232
MM 61+0.592 TO MM 61+0.630

NOTES:

1. SEE CABLE BARRIER SYSTEM STANDARDS FOR FOUNDATION DETAILS.
2. FOLLOW CABLE BARRIER MANUFACTURERS RECOMMENDATIONS ON MAXIMUM POST SPACING. ADJUST POST SPACING TO AVOID UNDERGROUND UTILITIES AND DRAINAGE.
3. TOP OF POST FOUNDATION SHALL BE FLUSH WITH THE TOP OF THE RIPRAP.
4. MOUNT GF2 DELINEATOR TO CABLE BARRIER POST. REFER TO D&OM STANDARD FOR HEIGHT AND SPACING.



MOW STRIP DETAIL

NTS

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

TYPICAL SECTIONS

SCALE H: 1" = 10'
V: 1" = 5'

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		5

DATE: 5/26/2021 10:19:37 AM
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\1. General\197_04 TYPICAL SECTIONS.dgn

GENERAL NOTES

CSJ: 0904-00-197

BASIS OF ESTIMATE FOR CONSTRUCTION			
Item	Description	Unit	Rate
164	SEEDING		SEE PLAN SHEETS
166	FERTILIZER		SEE PLAN SHEETS
314	EMULSION ASPHALT (MULTI) (MS-2 OR SS-1)	GAL	SEE NOTE 1
NOTE:			
(1)	40% Emulsified Asphalt 60% Water Mixture Applied At 0.25 Gal/Sy. Paid using 0.1 Gal/Sy.		

General

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

TO:	Amarillo Area Engineer	Roy.Neukam@txdot.gov
CC:	Assistant Area Engineer	CC.Sysombath@txdot.gov
	Director of Construction	Kenneth.Petr@txdot.gov
	Construction Manager	Thomas.Nagel@txdot.gov

Contractor questions will be accepted through email, phone, or in person by the above individuals.

All Contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address.

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All questions submitted that generate responses will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

There are approximately 48 "reference markers" within the project limits. If a marker needs to be moved for any reason during construction operations, the Contractor is to remove it, install it in a temporary location and then reinstall it in its correct permanent location. Both the temporary and permanent locations are to be on a line that is perpendicular to the original "station" along the roadway. The temporary location is to be at or near the right-of-way. The permanent location is to be directed by the Engineer.

The following Standard Detail Sheets have been modified:

TSR (3)-13 (MOD)
TSR (4)-13 (MOD)

The Contractor is advised that a 65 mph construction speed zone will be applicable for this project. The construction speed zone is to be limited to the actual work areas under construction.

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.

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 7 Legal Relations and Responsibilities

No significant traffic generator events identified.

The total area disturbed for this project is approximately *12.76* acres. The disturbed area in this project, all project locations in the Contract, and the Contractor Project Specific Locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer and to the local government that operates a separate storm sewer system.

Item 8 Prosecution and Progress

Create, maintain, and submit for approval, a Critical Path Method (CPM) project schedule and a Project Schedule Summary Report (PSSR) using computer software that is fully compatible with the latest version of Primavera Systems, Inc. or Primavera P6.

Item 105 Removing Stabilized Base & Asphalt

The contractor may use the removed crossover material for embankment.

Item 164 Seeding for Erosion Control

Perform planting operations in accordance with the recommendations contained in the latest version of the TxDOT manual "A Guide to Roadside Vegetation Establishment" developed by the Vegetation Management Section of the Maintenance Division.

Seeding may require more than one mobilization, depending upon the Contractor's sequence of work.

Item 166 Fertilizer

Fertilize all areas of project to be seeded or sodded in accordance with the Amarillo District Vegetation Specification Sheet.

Item 300 Asphalts, Oils, and Emulsions

Asphalt from different sources is not to be blended.

The "Open" seasons for applying asphaltic materials and mixtures for the listed items are to be as follows, unless authorized otherwise in writing by the Engineer:

ITEMS	OPEN SEASON
314	All Year

Item 314 Emulsified Asphalt Treatment

See plans for areas to be treated with an emulsified asphalt mixture. The mixture may be placed in one or more applications at a total rate of 0.25 gallons per square yard, unless directed otherwise by the Engineer. The homogeneous mixture may be composed of approximately 40% asphalt (MS-2 or SS-1) and 60% water, unless directed otherwise by the Engineer.

Item 421 Hydraulic Cement Concrete

The sand equivalent value of fine aggregate is not to be less than 85 when subjected to test method tex-203-F.

The Engineer will perform all job control testing for acceptance.

The Engineer will provide strength-testing equipment when required in accordance with the Contract-controlling tests.

Furnish and maintain the following testing equipment:

- ♦ Test Molds
- ♦ Wheelbarrow or other container acceptable for the sampling of the concrete

Item 432 Riprap

The Contractor will have the option to use reinforcing fibers in place of steel reinforcing, only on 4in. Riprap Mow Strip.

Use of #3 rebar for reinforcing is required for all other riprap.

Item 464 Reinforced Concrete Pipe

Joint material for all pipes will be cold applied plastic asphalt sewer joint compound.

Bedding for pipe culverts is to be 6 inches of sand. The excavation required to place the sand will not be paid for directly but will be considered subsidiary to this item.

Backfill pipe up to the springline with granular material. The ponding method of backfilling will be allowed for the granular material only.

Item 467 Safety End Treatment

Cast-In-Place Safety End Treatments only.

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.

Item 506 Temporary Erosion, Sedimentation, and Environmental Controls

Erosion control devices are to be installed as needed in coordination with the work progress, or as directed by the Engineer.

Item 530 Intersection, Driveways, and Turnouts

Before grading begins, the vegetative cover within the areas to be graded are to be bladed into a windrow outside the limits of the slopes. After all grading is complete; the vegetative cover is to

be spread over the adjacent disturbed areas. This work is not to be paid for directly, but will be considered subsidiary work to the various bid items.

Materials excavated from the project will be allowed to be used on the project as directed by the Engineer.

543 CY of RAP will be available to the Contractor. The location of the stockpile is at:

1. Northwest side of Loop 335 & SH 136
   (Latitude: 35.260674°, Longitude: -101.744010°)

1147 CY of Recycled Asphalt Stabilized Base material will be available to the Contractor. The location of the stockpiles is at:

1. 0.5 miles east of Adrian, TX on B-40
   (Latitude: 35.271825°, Longitude: -102.652060°)

2. Southeast side of IH-40 and SH 214
   (Latitude: 35.269401°, Longitude: -102.654599°)

Item 543 Cable Barrier

All Cable Barrier materials (posts, cables, hardware, etc.) determined by the Engineer to be salvageable will remain property of the Department. Haul and stockpile all salvageable materials to the TxDOT Maintenance yard specified:

1. Cable Barrier designated as salvageable inside Oldham County will be stockpiled at the TxDOT Maintenance yard in Vega, Tx (606 W. Vega Blvd, VEGA, TX 79092)
2. Cable Barrier designated as salvageable inside Potter County will be stockpiled at the TxDOT Maintenance yard in Amarillo, Tx (8401 South Washington, AMARILLO, TX 79118)

The Contractor will be required to install the same cable barrier system when extending the existing cable barrier system. The existing cable within the project limits is the Trinity Cable Safety System (TL-4), CASS (TL4)-14. The Contractor will install the cable barrier as per manufacturer's recommendations.

Item 644 Small Roadside Sign Supports and Assemblies

All slip base signs will have a triangular slip base with a 2-bolt clamp to prevent rotation of signpost. Set screw type slip base will not be allowed.

A 7" x 1/2" diameter galvanized rod or #4 rebar is to be installed in the sign stub as shown on SMD(SLIP-1)-08 to prevent rotation of the sign stub in the concrete footing.

The exact locations of the large and small roadside signs are to be as designated by the Engineer.

The existing riprap aprons are to be removed and disposed of as approved by the Engineer. This work is not to be paid for directly, but will be considered subsidiary to the removal of foundations under this item.

Probe before drilling for foundations to determine the location of all utilities and structures. This work will not be paid for directly, but will be considered subsidiary to bid items involved.

Details for standard signs not shown on the signing standards of the signing detail plan sheets are to be in conformance with the department's "Standard Highway Sign Designs for Texas" Manual, Latest Edition.

Install a wrap of retroreflective sheeting conforming to DMS-8300 on all posts for small road sign assemblies. Sign post wraps will not be paid for directly, but are considered subsidiary to Item 644.

Install red sheeting on the posts containing the following signs:
Stop, Yield, Wrong Way & Do Not Enter

Install yellow sheeting on all other small sign posts.

Install all retroreflective wraps at a height of 4 ft. from bottom of the wrap to the edge of the travel lane surface. All retroreflective wraps will cover the full circumference of the sign post for a vertical width of 12 inches.

Item 658 Delineator and Object Marker Assemblies

For all ground mount applications provide hollow or tubular posts embedded in concrete using plastic wedged anchor system.

For all concrete barrier, bridge rail, and guard fence post mounted applications provide hollow or tubular posts with approved anchorage.

Item 6001 Portable Changeable Message Sign

Supply 2 Portable Changeable Message Signs (Type II – Lamp Matrix) for this project. This work will be paid at the unit price bid for each unit, which will include any moving, maintenance, and removing of the PCMS. No payment will be made for removing and replacing damaged PCMS. The Portable Changeable Message Signs will become property of the Contractor at the completion of the project.

If the Contractor chooses to have more than one lane closure set-up at a time, provide additional PCMS in accordance with TCP at no additional charge to the department.

County: Potter **Sheet:** 6C

Highway: IH 40 **Control:** 0904-00-197

Item 6185 Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide 0 additional shadow vehicle(s) with TMA for TCP (5-1)-18, (6-1)-12, (6-2)-12, (6-3)-12, (6-4)-12, (6-5)-12 as detailed on the General Notes of this standard sheets.

Therefore, *2* total shadow vehicles with TMA will be required for this type of work. The Contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

QUANTITY SHEET

CONTROLLING PROJECT ID 0904-00-197 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY Various

		CONTROL SECTION JOB		**0904-00-197**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00138682**			
		COUNTY		**Potter**			
		HIGHWAY		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF	18,452.000		18,452.000	
	105-6036	REMOVING STAB BASE & ASPH PAV(15"-20")	SY	3,348.000		3,348.000	
	150-6002	BLADING	HR	44.000		44.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8,896.000		8,896.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	8,896.000		8,896.000	
	314-6014	EMULS ASPH (EROSN CONT)(MS-2)	GAL	889.000		889.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	98.000		98.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	4,496.000		4,496.000	
	464-6032	RC PIPE (ARCH)(CL III)(DES 3)	LF	1,720.000		1,720.000	
	467-6603	SET (TY II) (DES 3) (RCP) (8:1) (P)	EA	10.000		10.000	
	500-6001	MOBILIZATION	LS	100.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12.000		12.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	2,100.000		2,100.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	2,100.000		2,100.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	1,440.000		1,440.000	
	530-6007	TURNOUTS (CONC)	SY	6,882.000		6,882.000	
	530-6024	TURNOUTS (RAP)	SY	3,255.000		3,255.000	
	543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	89,041.000		89,041.000	
	543-6019	CABLE BARRIER TERMINAL SECTION (TL-3)	EA	38.000		38.000	
	543-6021	REMOVE CABLE BARRIER	LF	13,475.000		13,475.000	
	543-6022	REMOVE CABLE BARRIER TERMINAL SECTION	EA	80.000		80.000	
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	14.000		14.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	29.000		29.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	20.000		20.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	14.000		14.000	
	658-6068	INSTL DEL ASSM (D-DY)SZ 1(BRF)GF2	EA	1,631.000		1,631.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	30.000		30.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	200.000		200.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF ROADWAY ITEMS								
LOCATION	104 6054	105 6036	150 6002	432 6001	432 6045	512 6001	530 6007	530 6024
	REMOVING CONCRETE(MOW STRIP)	REMOVING STAB BASE & ASPH PAV(15"-20")	BLADING	RIPRAP (CONC)(4 IN)	RIPRAP (MOW STRIP)(4 IN)	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	TURNOUTS (CONC)	TURNOUTS (RAP)
	LF	SY	HR	CY	CY	LF	SY	SY
CABLE BARRIER REMOVAL LAYOUT SHEET 1 OF 1	14545							
MEDIAN CROSSOVER REMOVAL & CONNECTING EXISTING CABLE BARRIER SHEET 2 OF 2	3695	3348	28		298			
PROPOSED CABLE BARRIER DETAIL SHEET 1 OF 3					3902			
PROPOSED CABLE BARRIER DETAIL SHEET 3 OF 3	212				296			
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 1 OF 5			6					2206
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 2 OF 5			4					1049
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 3 OF 5							3456	
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 4 OF 5							3210	
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 5 OF 5							216	
BRIDGE COLUMN PROTECTION LAYOUT SHEET 1 OF 1			6	27				
CADILLAC RANCH PCTB LAYOUT SHEET 1 OF 1				71		1440		
PROJECT TOTALS	**18452**	**3348**	**44**	**98**	**4496**	**1440**	**6882**	**3255**

SUMMARY OF ROADWAY ITEMS								
LOCATION	543 6002	543 6019	543 6021	543 6022	545 6007	658 6014	658 6068	658 6099
	CABLE BARRIER SYSTEM (TL-4)	CABLE BARRIER TERMINAL SECTION (TL-3)	REMOVE CABLE BARRIER	REMOVE CABLE BARRIER TERMINAL SECTION	CRASH CUSH ATTEN (INSTL)(L)(N) (TL3)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	INSTL DEL ASSM (D-DY)SZ 1(BRF)GF2	INSTL OM ASSM (ON-2Z) (WFLX) GND
	LF	EA	LF	EA	EA	EA	EA	EA
CABLE BARRIER REMOVAL LAYOUT SHEET 1 OF 1			13475	20				
MEDIAN CROSSOVER REMOVAL & CONNECTING EXISTING CABLE BARRIER SHEET 2 OF 2	6067			56			61	
PROPOSED CABLE BARRIER DETAIL SHEET 1 OF 3	77200	34					943	
PROPOSED CABLE BARRIER DETAIL SHEET 3 OF 3	5774	4		4			627	
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 1 OF 5								6
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 2 OF 5								4
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 3 OF 5								8
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 4 OF 5								10
PROPOSED MEDIAN CROSSOVER DETAIL SHEET 5 OF 5								2
BRIDGE COLUMN PROTECTION LAYOUT SHEET 1 OF 1					12			
CADILLAC RANCH PCTB LAYOUT SHEET 1 OF 1					2	14		
PROJECT TOTALS	**89041**	**38**	**13475**	**80**	**14**	**14**	**1631**	**30**

SUMMARY OF DRAINAGE ITEMS		
LOCATION	464 6032	467 6603
	RC PIPE (ARCH)(CL III)(DES 3)	SET (TY II) (DES 3) (RCP) (8:1) (P)
	LF	EA
PROPOSED CULVERT DETAIL SHEET 1 OF 2	1164	6
PROPOSED CULVERT DETAIL SHEET 2 OF 2	556	4
PROJECT TOTALS	**1720**	**10**

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IH-40

PROJECT SUMMARIES

2021 Texas Department of Transportation

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		8

SUMMARY OF SIGNING ITEMS		
LOCATION	644 6004	644 6076
	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	REMOVE SM RD SN SUP&AM
	EA	EA
SUMMARY OF SMALL SIGNS SHEET 1 OF 4	11	2
SUMMARY OF SMALL SIGNS SHEET 2 OF 4	8	2
SUMMARY OF SMALL SIGNS SHEET 3 OF 4	9	4
SUMMARY OF SMALL SIGNS SHEET 4 OF 4	1	2
PROJECT TOTALS	**29**	**10**

SUMMARY OF EROSION CONTROL ITEMS					
LOCATION	164 6035	164 6041	314 6014	506 6040	506 6043
	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	EMULS ASPH (EROSN CONT)(MS-2) (0.1 GAL/SY)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	GAL	LF	LF
SW3P LAYOUT SHEET 1 OF 2	5422	5422	541	1400	1400
SW3P LAYOUT SHEET 2 OF 2	3474	3474	348	700	700
PROJECT TOTALS	**8896**	**8896**	**889**	**2100**	**2100**

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IH-40

PROJECT SUMMARIES

2021 Texas Department of Transportation

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		9

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

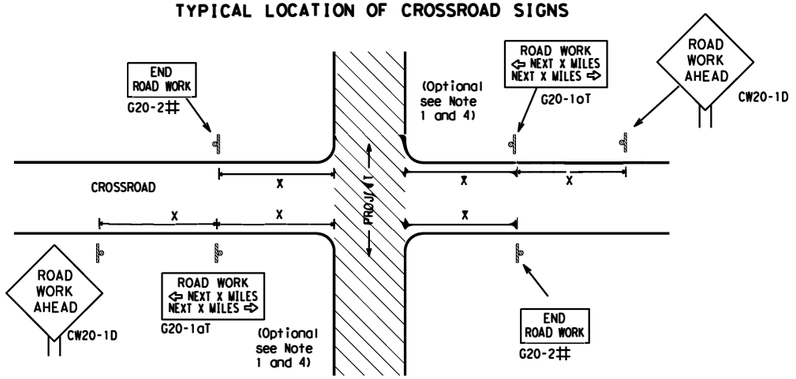
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		10

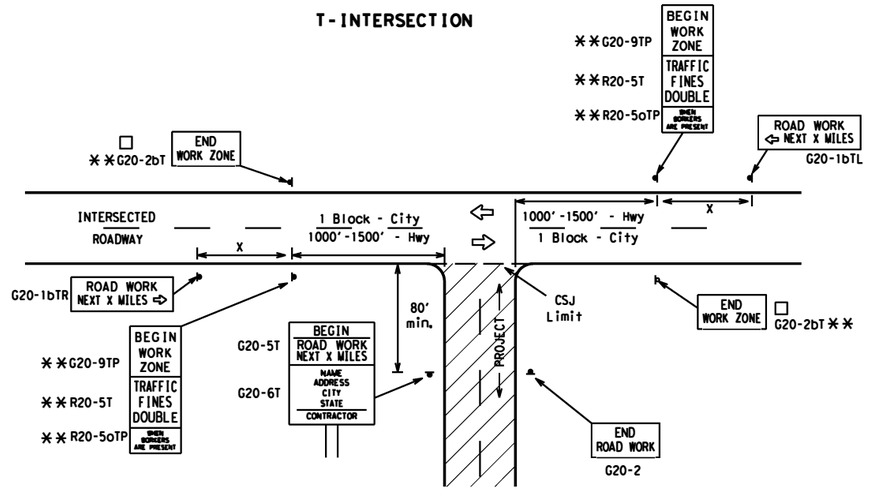
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on o crossroad approach should be o "ROAD WORK AHEAD" (CW20-1D)sign and o (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 bock to bock 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 detoils. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether o rood is low volume as per TMUTCD Port 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 ore required, these signs will be considered port 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"(G20-1oT)sign shoII 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 o 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, shoII 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 rood 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]

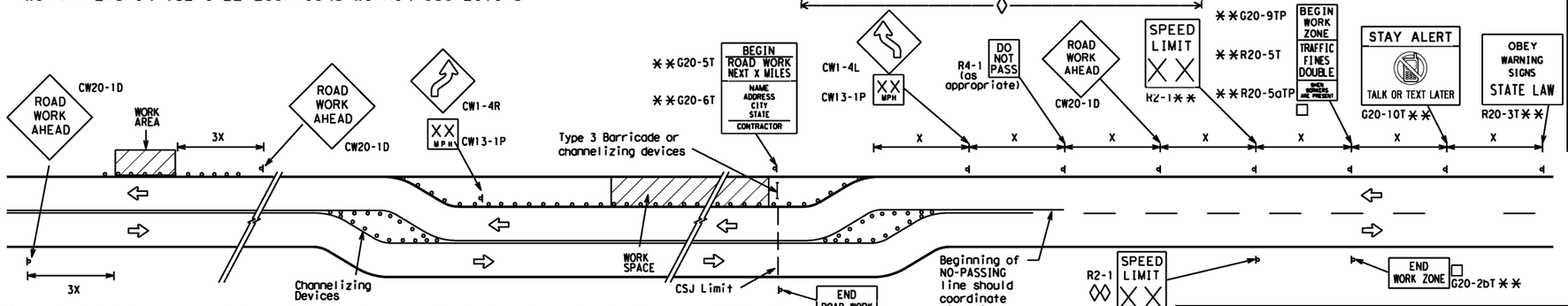
* For typical sign spacings on divided highways, expressways and freeways, see Port 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

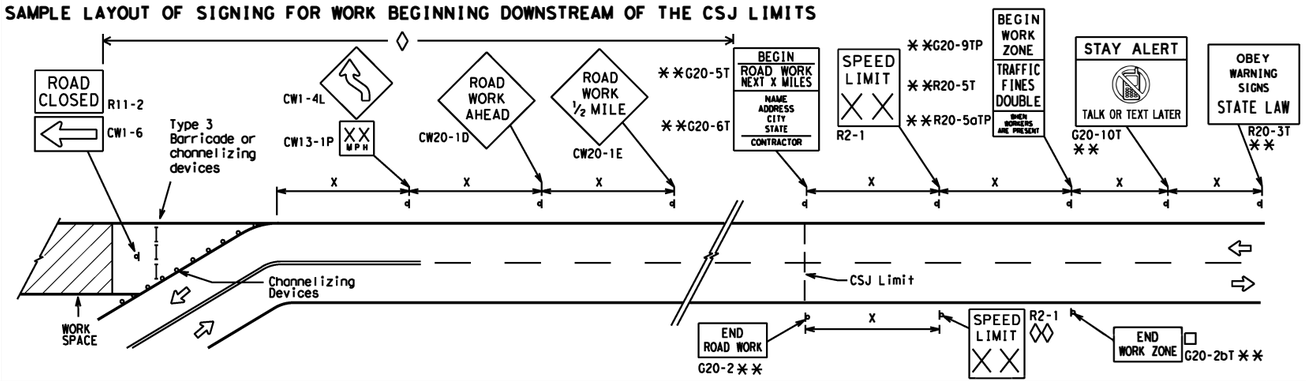
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to hove 1500 feet advance worning.
3. Distance between signs should be increased as required to hove 1/2 mile or more advance worning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Port 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 DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

LEGEND

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

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	0904	00	197	IH-40
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		11

DATE:
FILE:

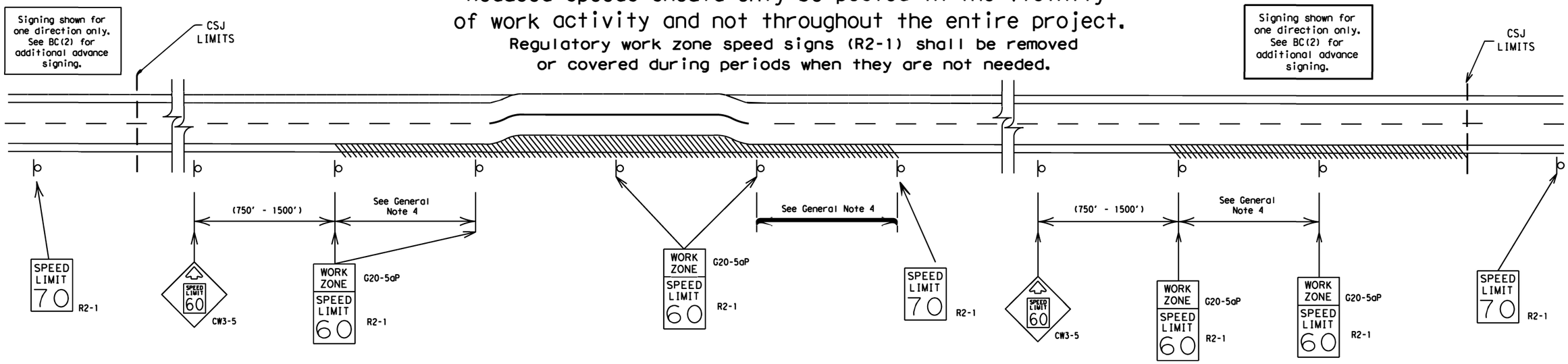
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		12

DATE:
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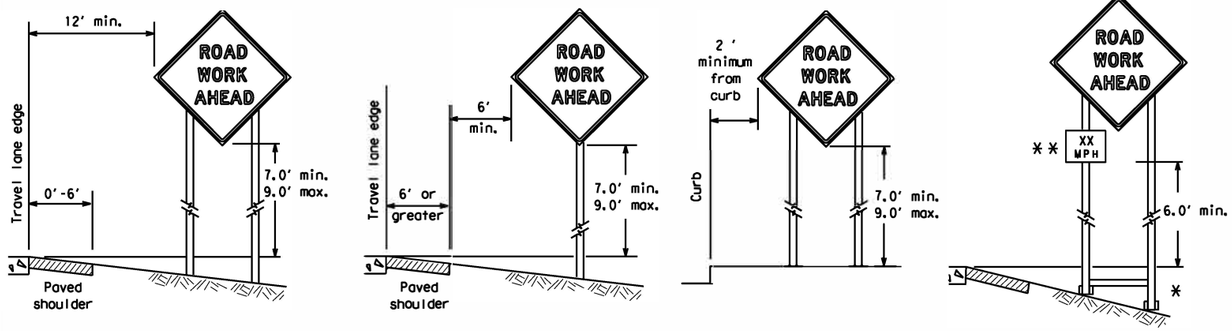
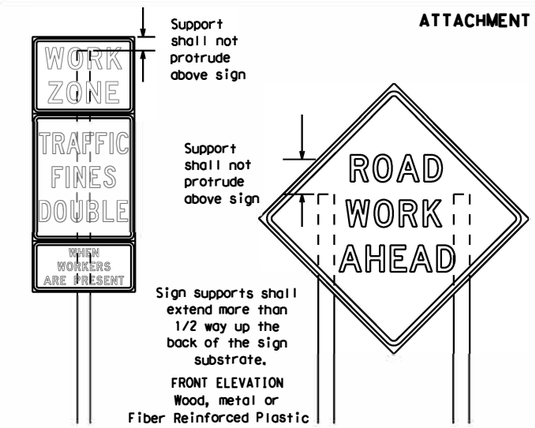
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

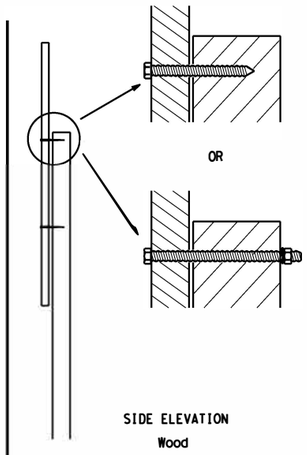


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





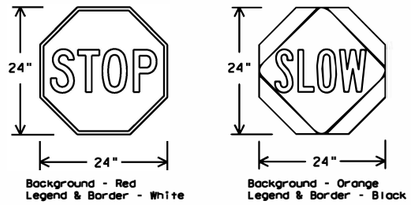
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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	0904	00	197	IH-40
9-07 8-14	DIST	COUNTY		SHEET NO.
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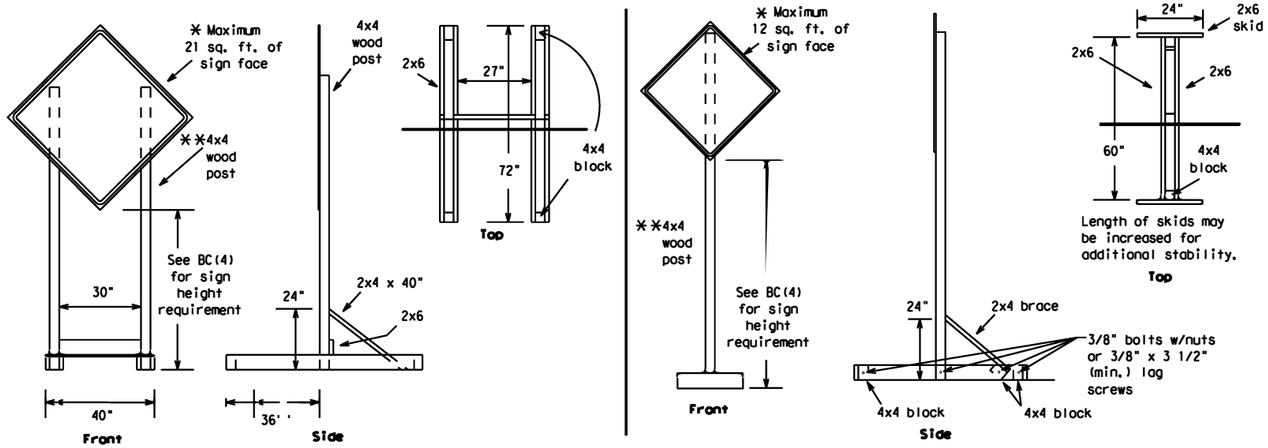
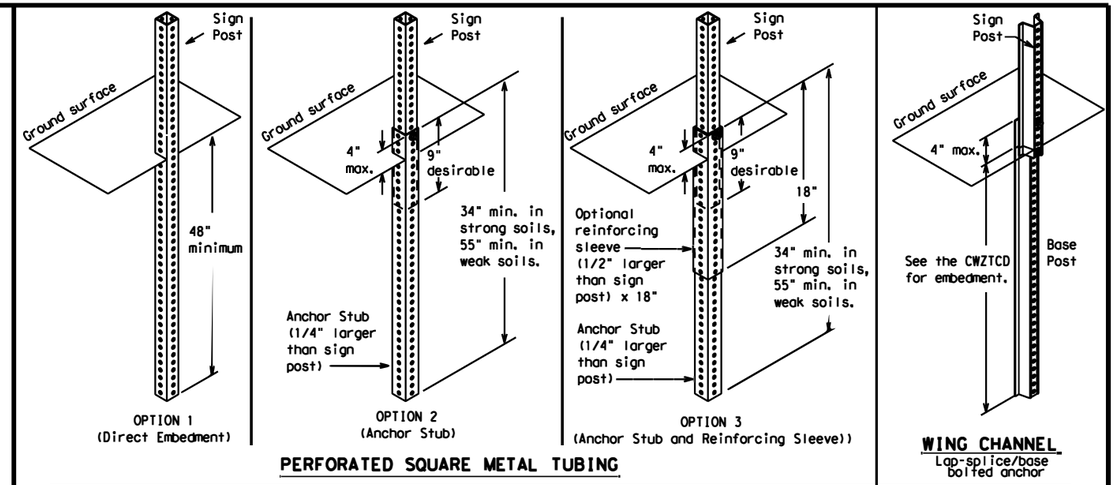


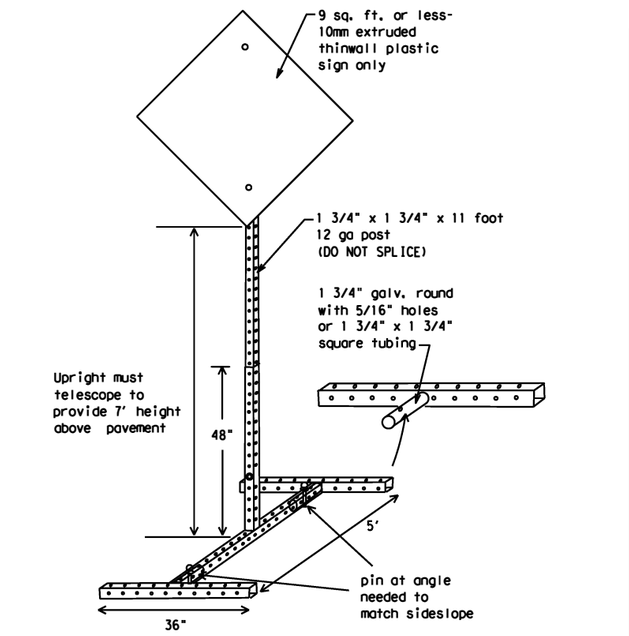
SKID MOUNTED WOOD SIGN SUPPORTS

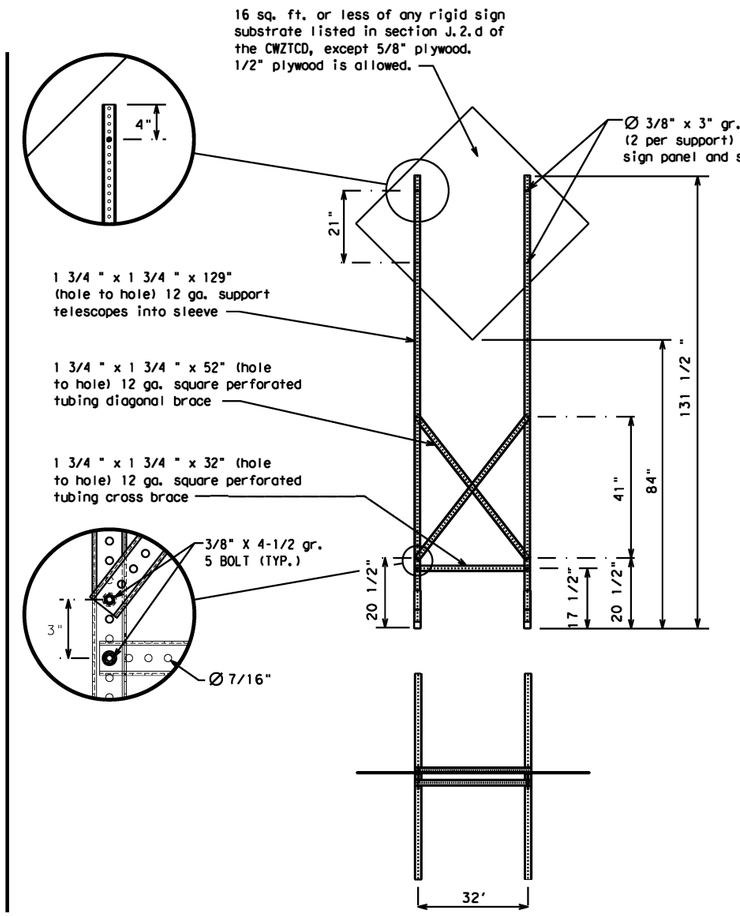
*** LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS**

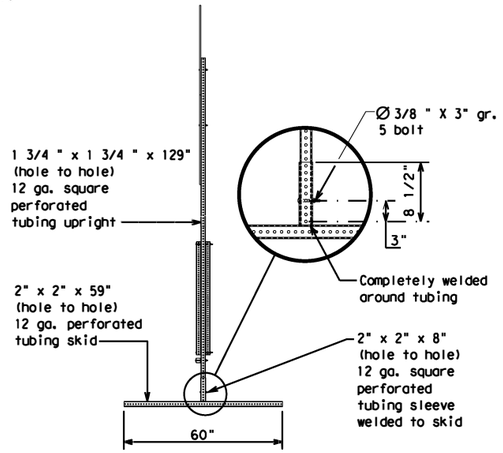


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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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
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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

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
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DATE:
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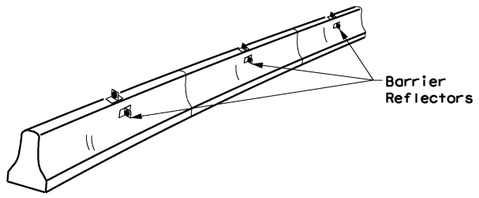
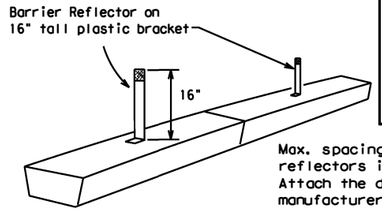
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



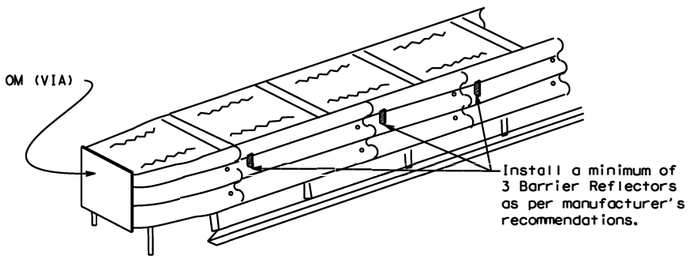
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

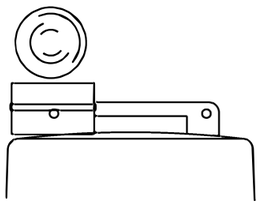
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

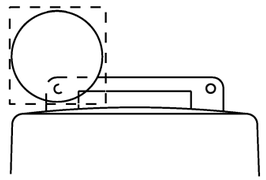
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the appropriate 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

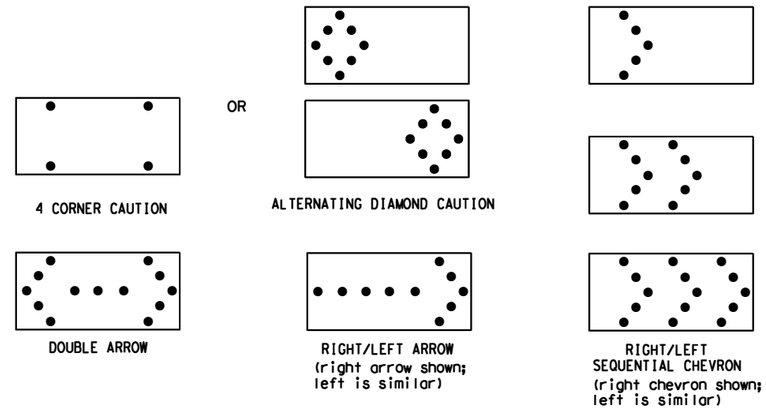
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

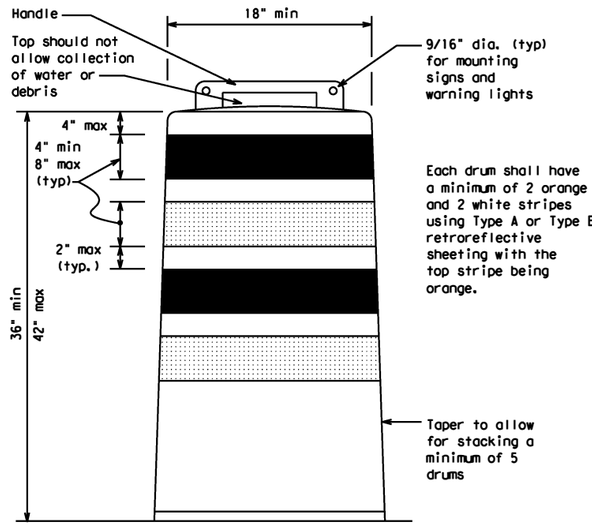
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

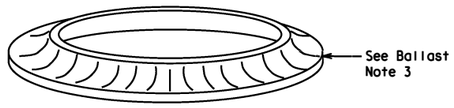
RETROREFLECTIVE SHEETING

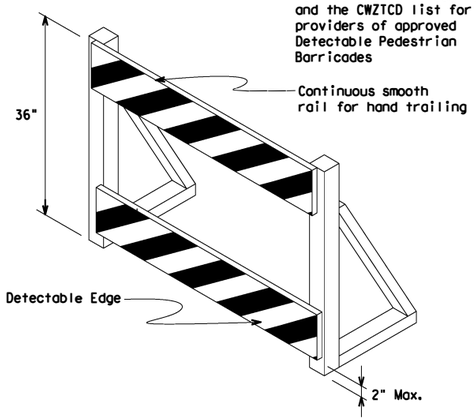
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Deportmentol Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

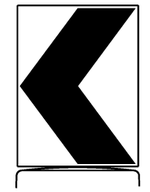




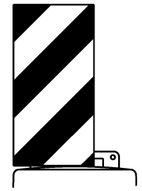


DETECTABLE PEDESTRIAN BARRICADES

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

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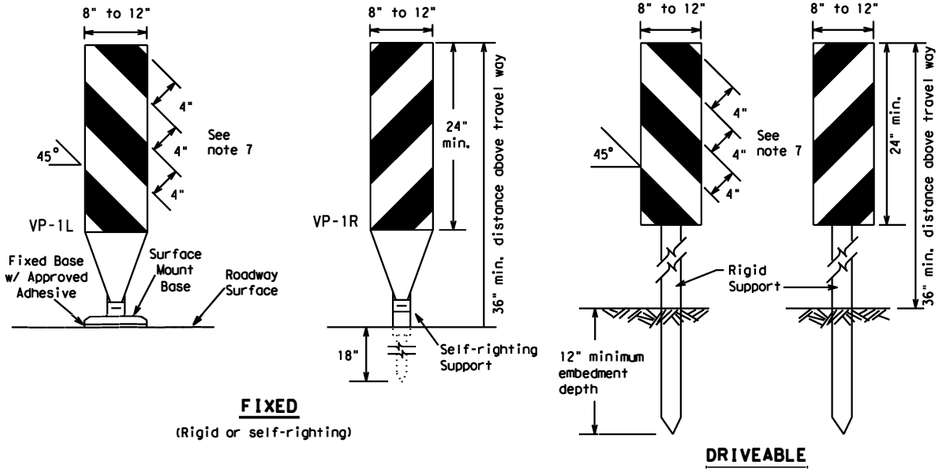


FIXED
(Rigid or self-righting)

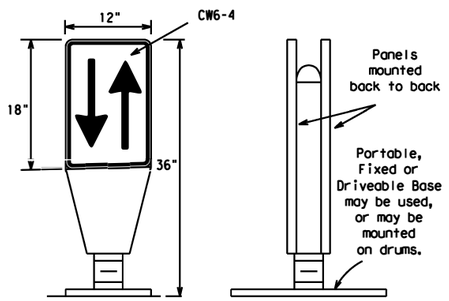
DRIVEABLE

(Rigid or self-righting)

PORTABLE

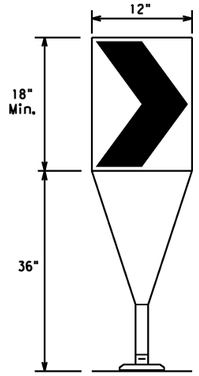
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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)



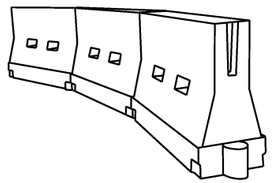
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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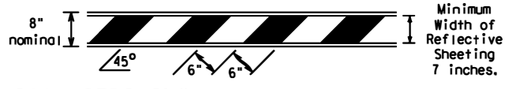
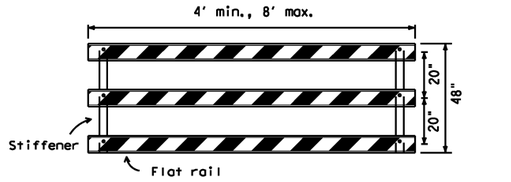
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



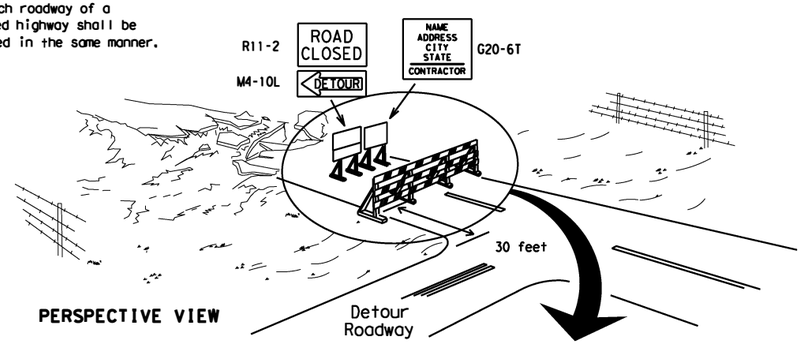
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

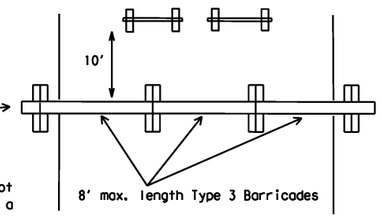
Each roadway of a divided highway shall be barricaded in the same manner.



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.

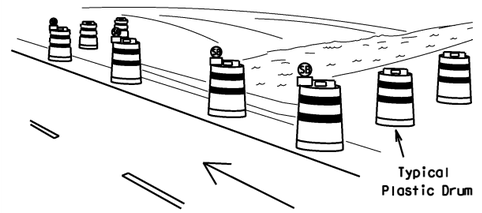
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

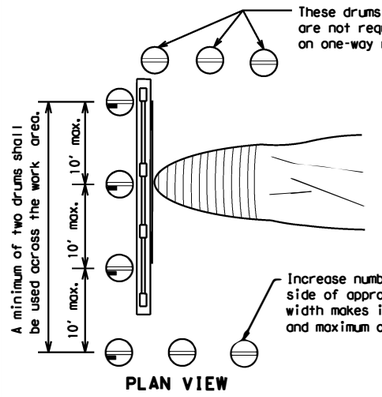
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

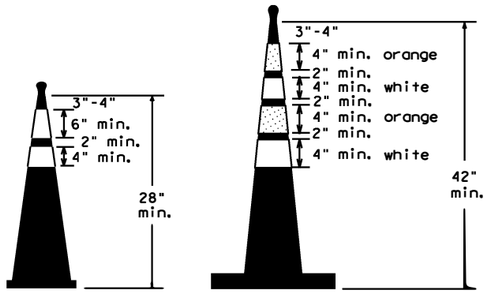
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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.



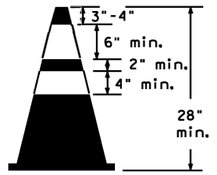
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

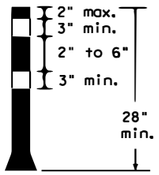
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

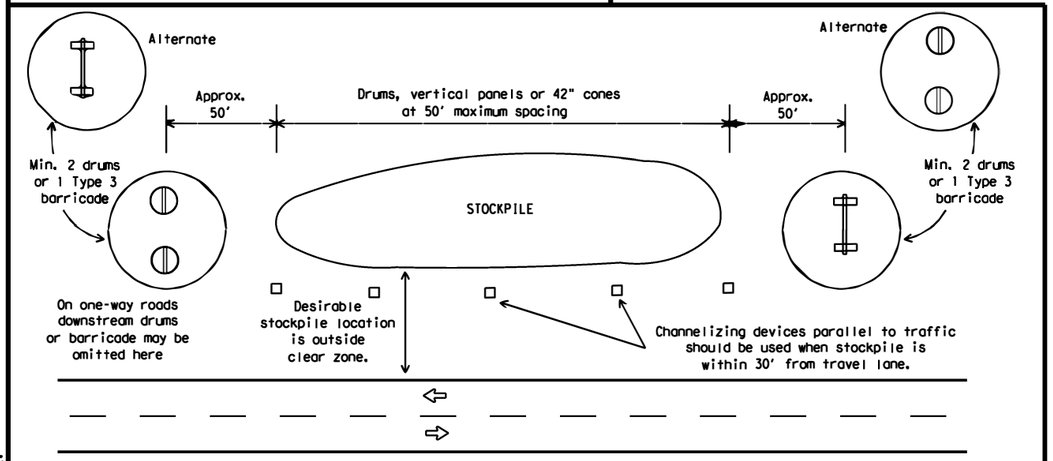


Tubular Marker

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

DATE:
FILE:

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
9-07 8-14	DIST	COUNTY		SHEET NO.
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

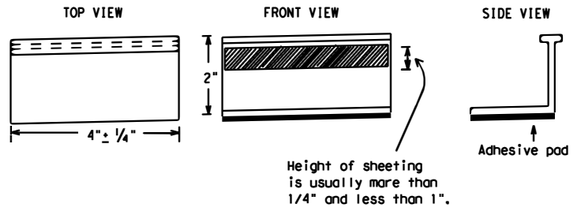
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

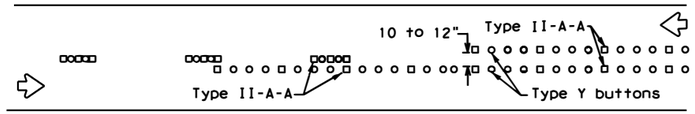
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	AMA	POTTER		20
11-02 8-14				

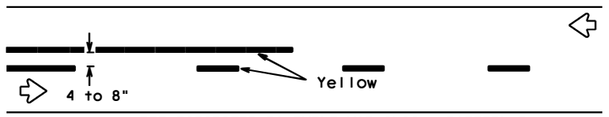
DATE:
FILE:

PAVEMENT MARKING PATTERNS

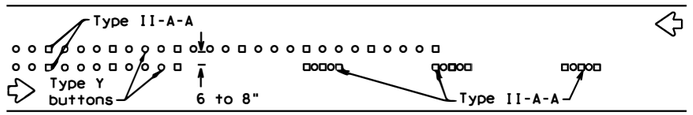
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



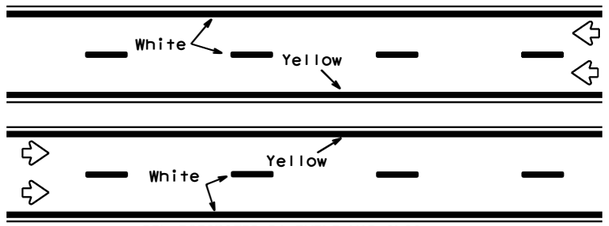
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



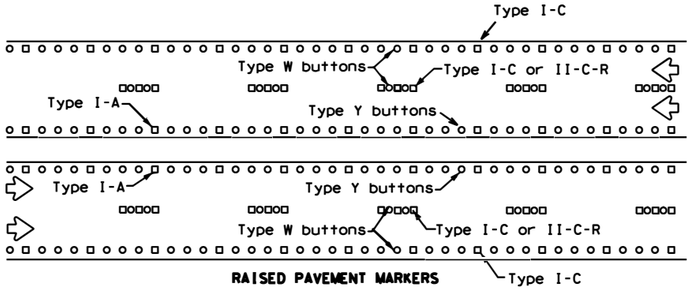
RAISED PAVEMENT MARKERS - PATTERN B

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

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



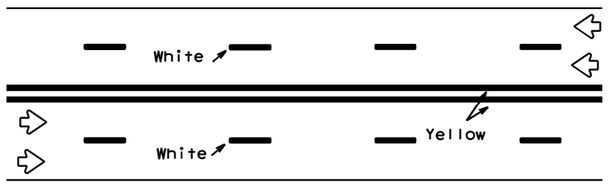
REFLECTORIZED PAVEMENT MARKINGS



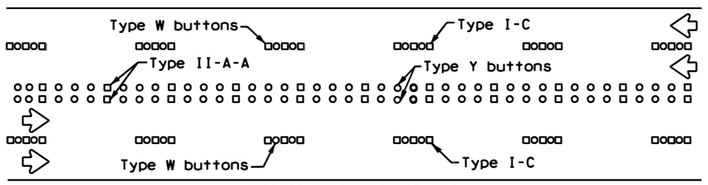
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



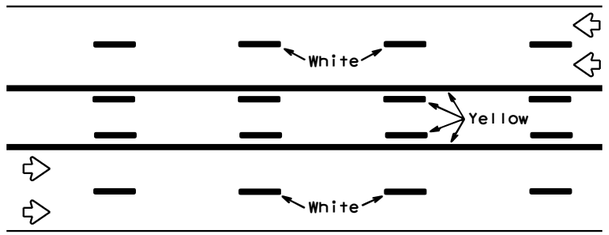
REFLECTORIZED PAVEMENT MARKINGS



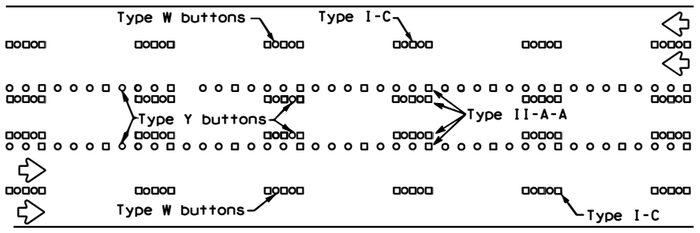
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

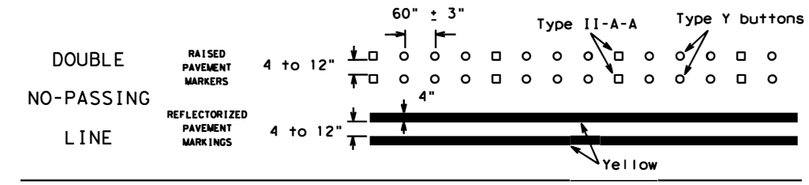
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

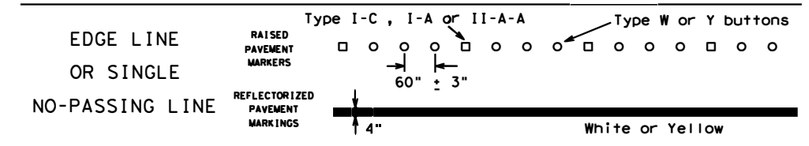
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

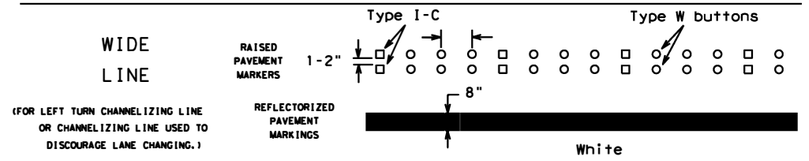


EDGE LINE OR SINGLE NO-PASSING LINE



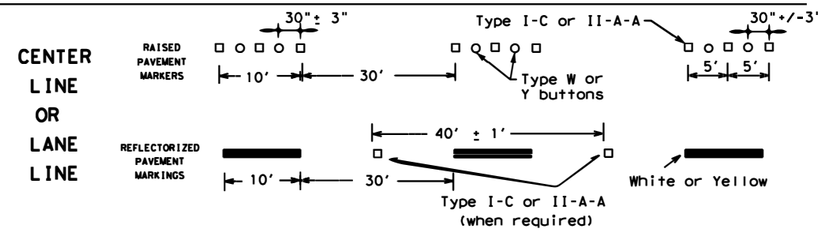
WIDE LINE

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

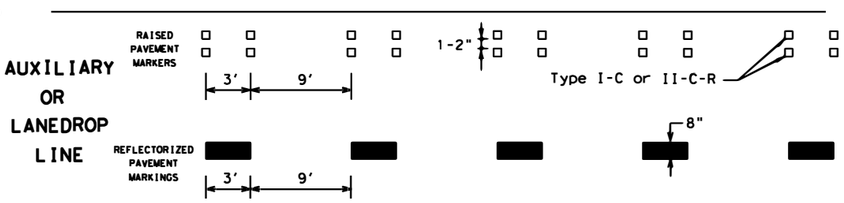


BROKEN LINES

CENTER LINE OR LANE LINE

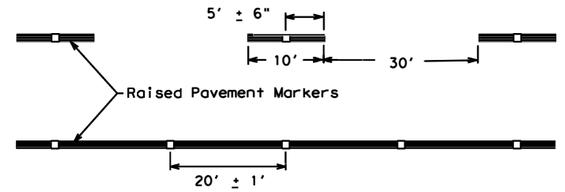


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		21

106

DATE: 5/26/2021 10:20:08 AM
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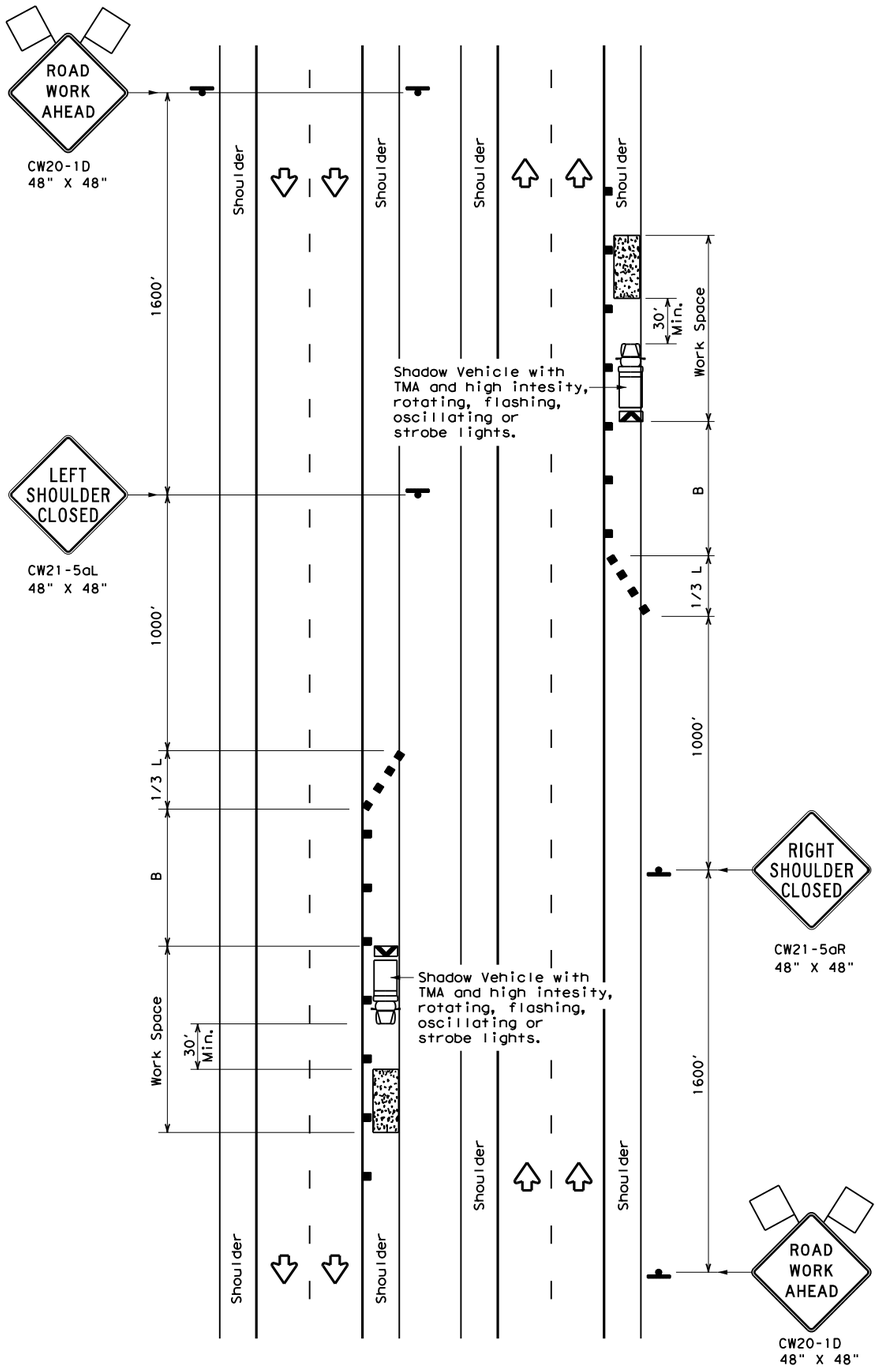
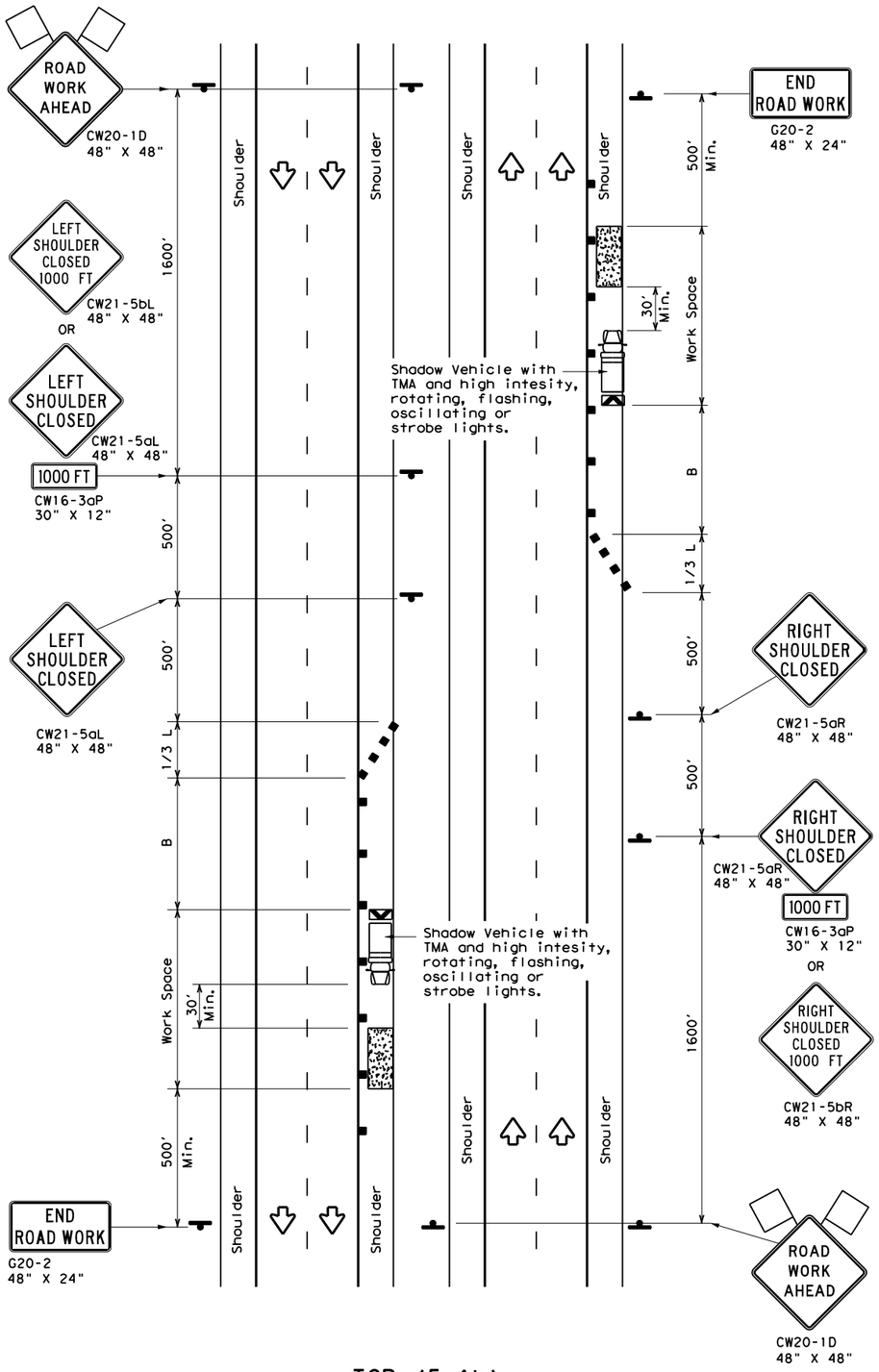


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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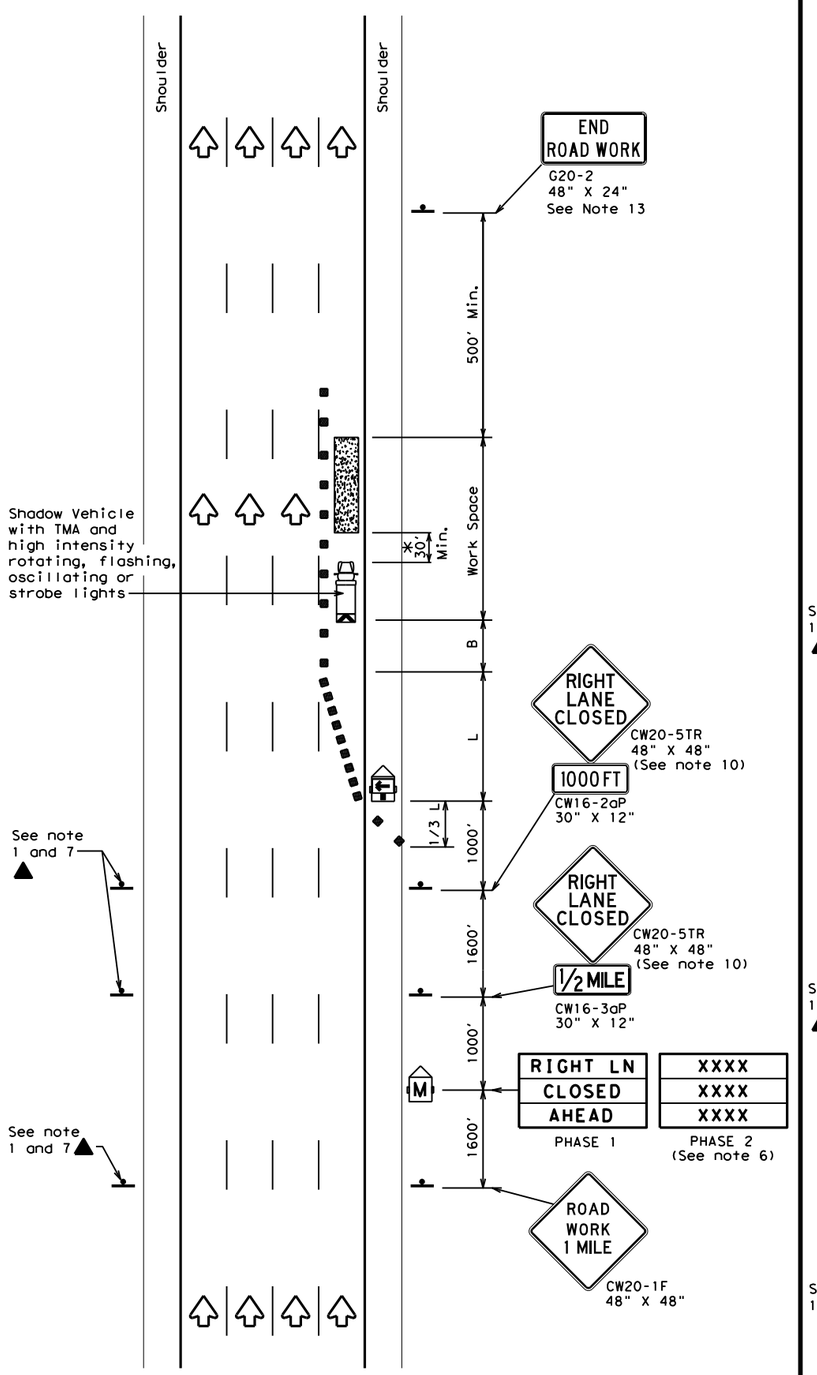
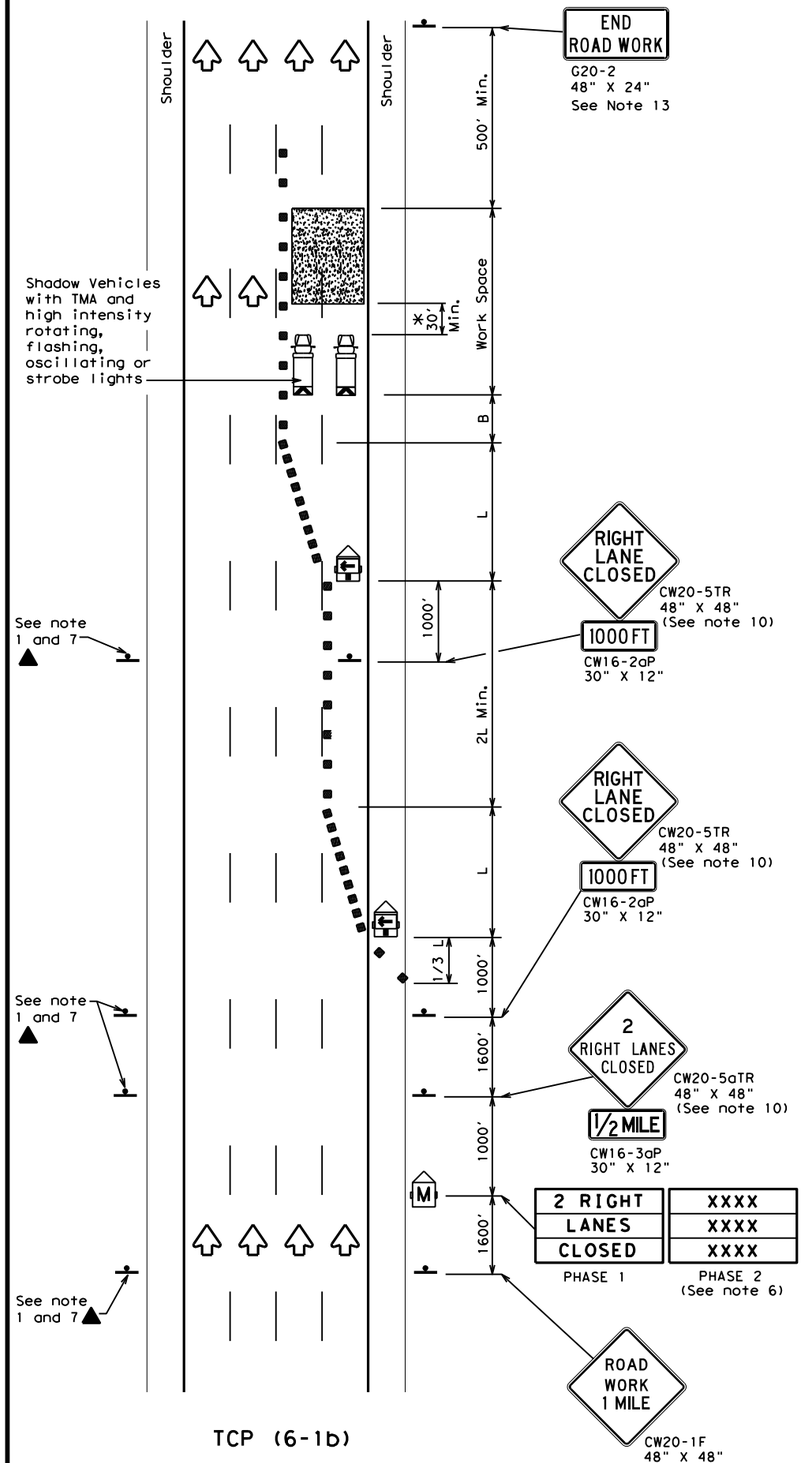


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

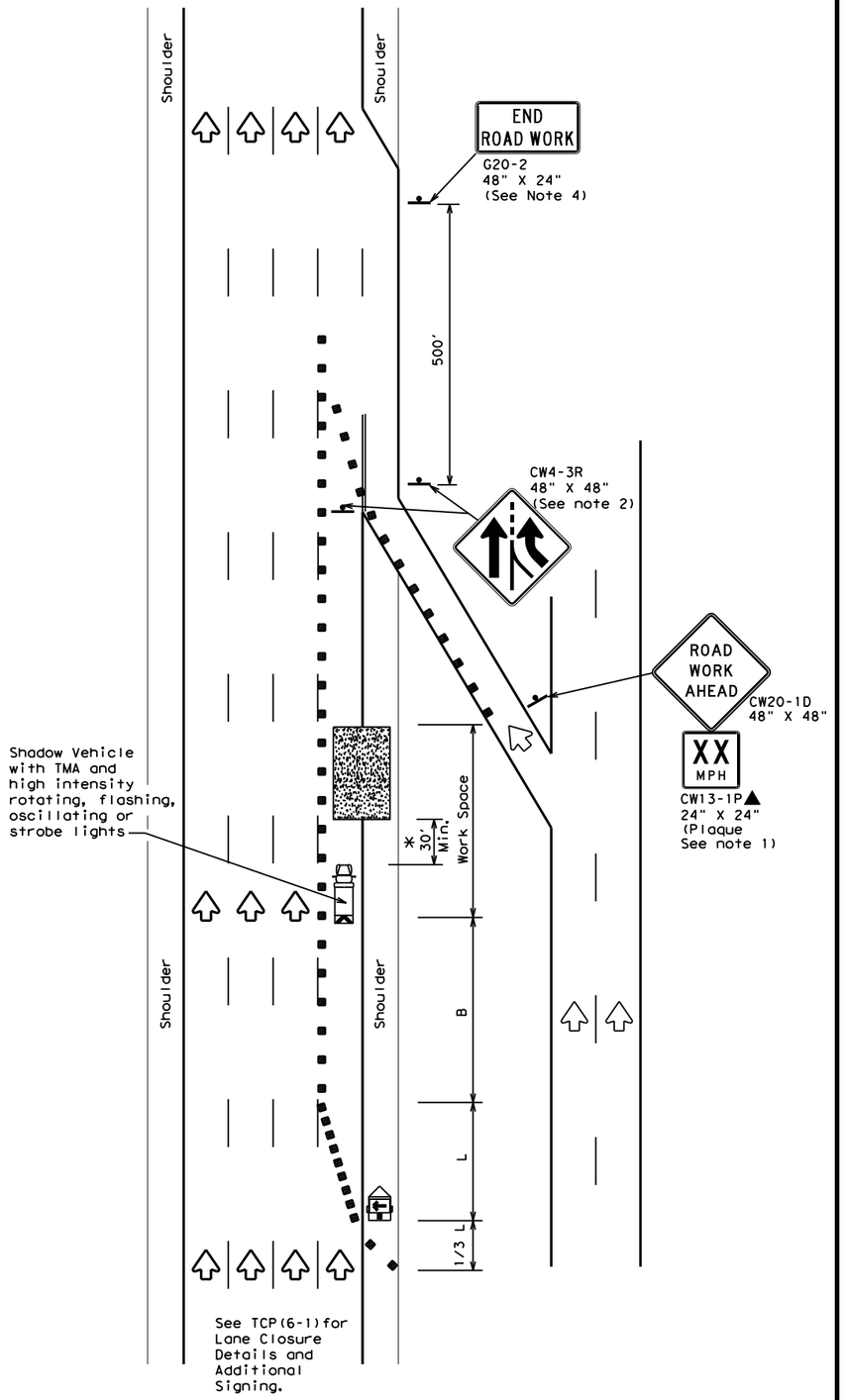
* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

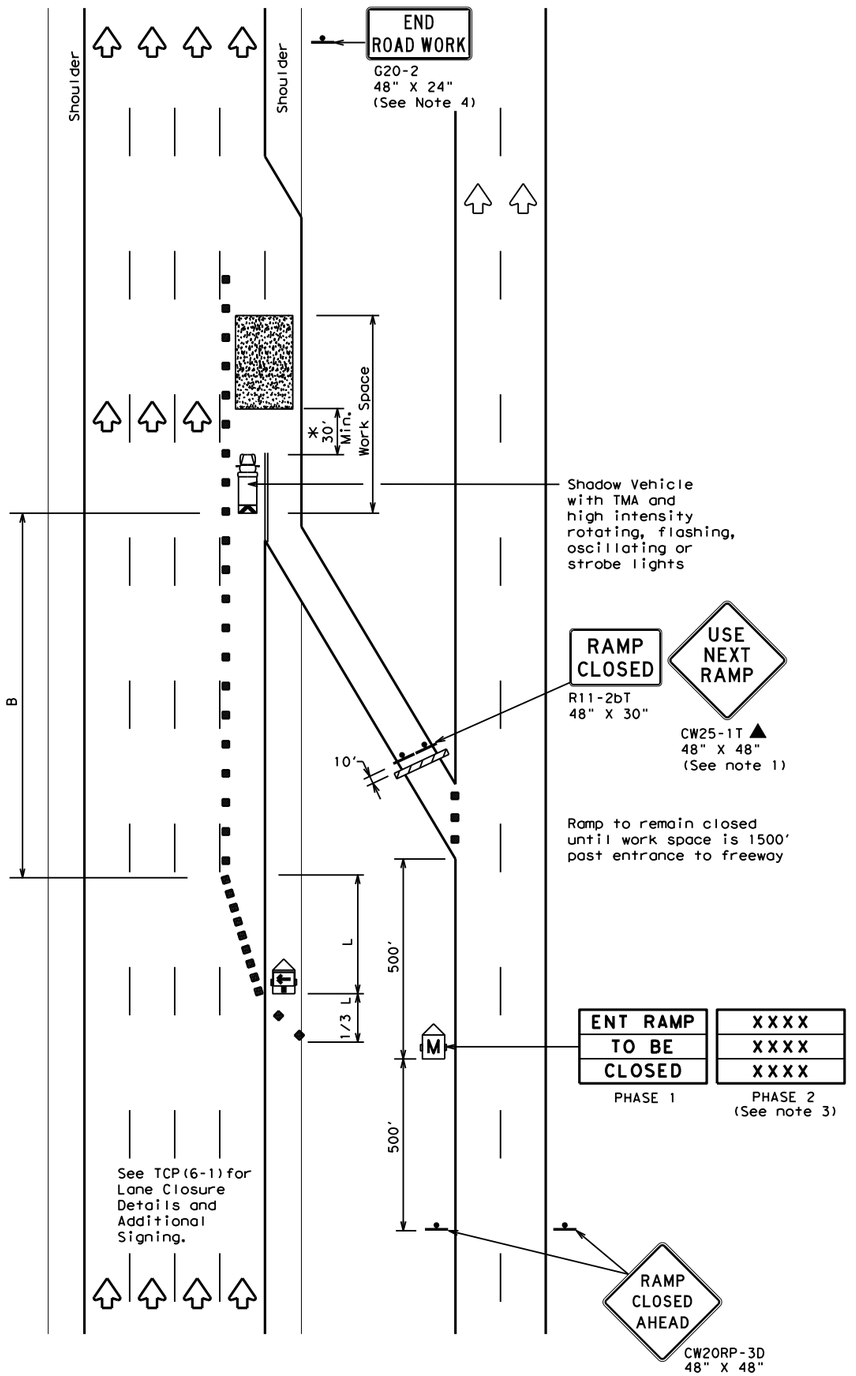
TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		23



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" **			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. 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

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER		24

202

DATE: 5/26/2021 10:20:12 AM
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 of 8\tcp6-2.dgn

DATE: 5/26/2021 10:20:14 AM
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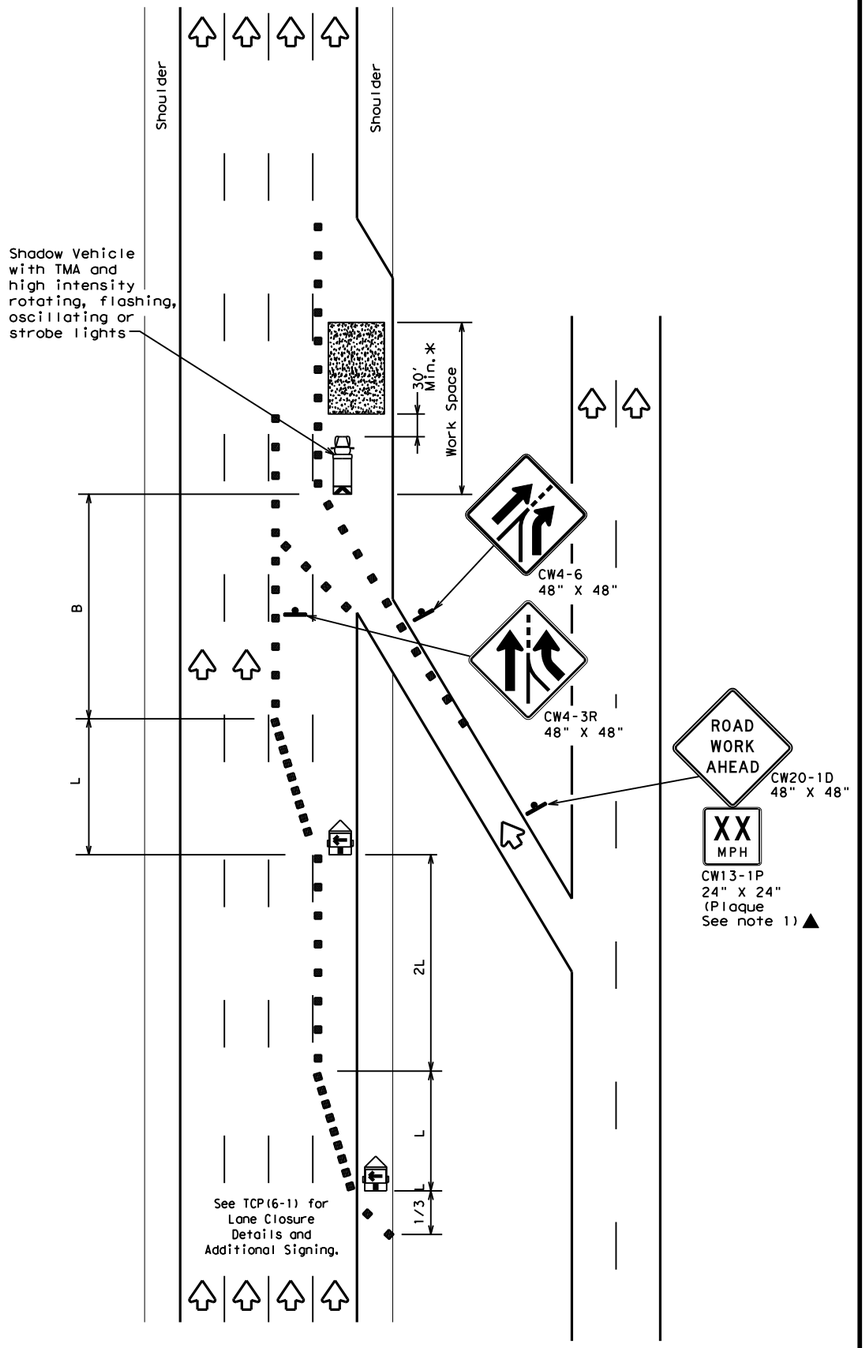
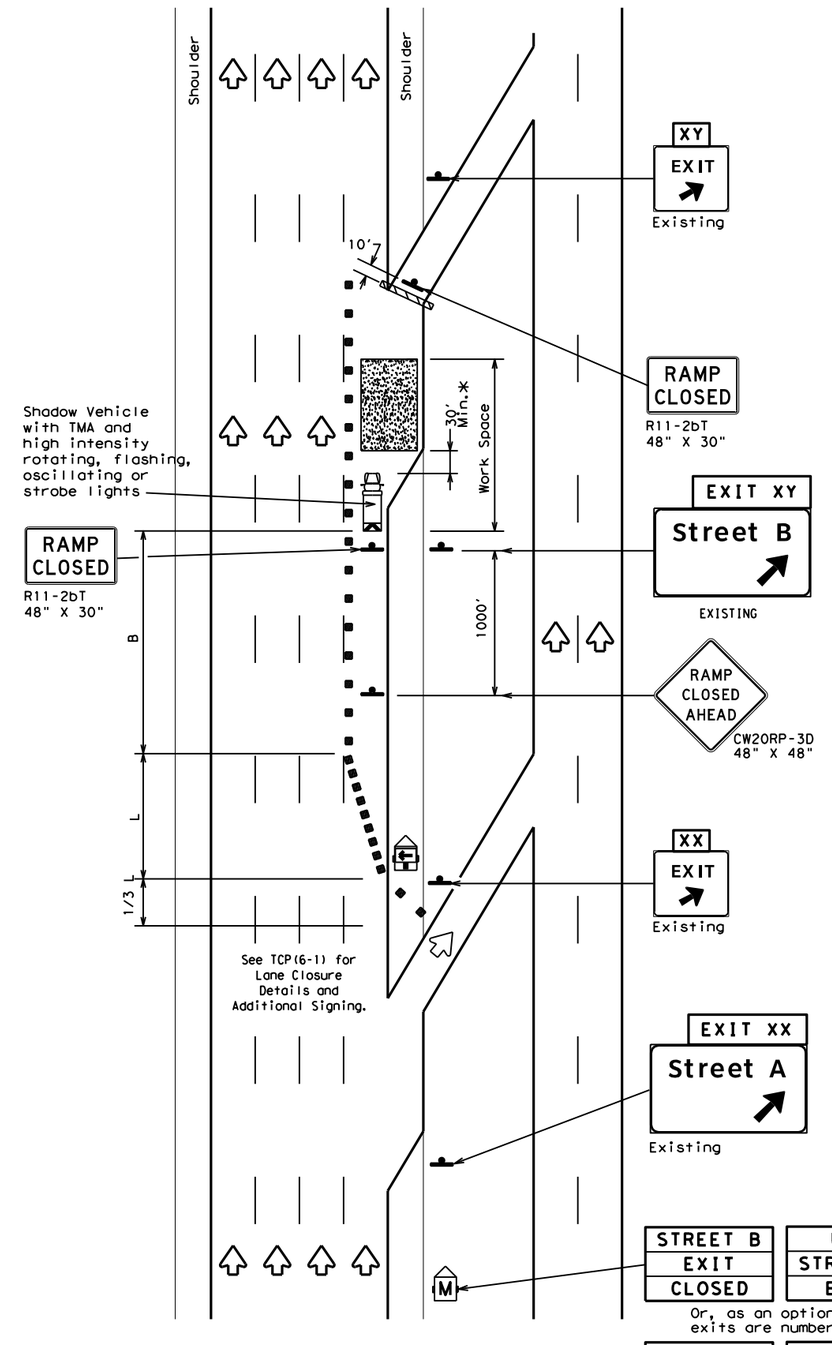


TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED
TRAFFIC EXITS PRIOR TO CLOSED RAMP

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.

*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	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER		25

DATE: 5/26/2021 10:20:16 AM
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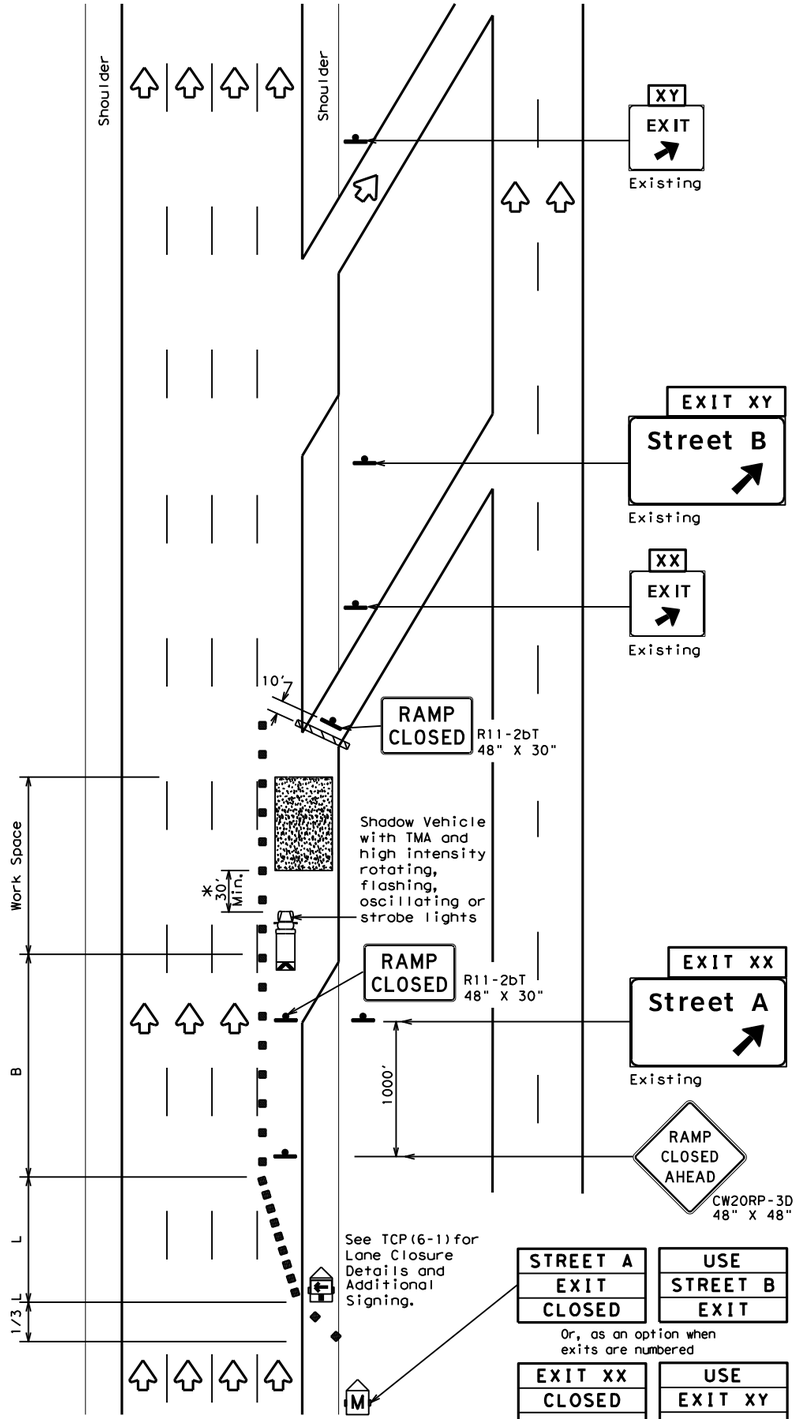
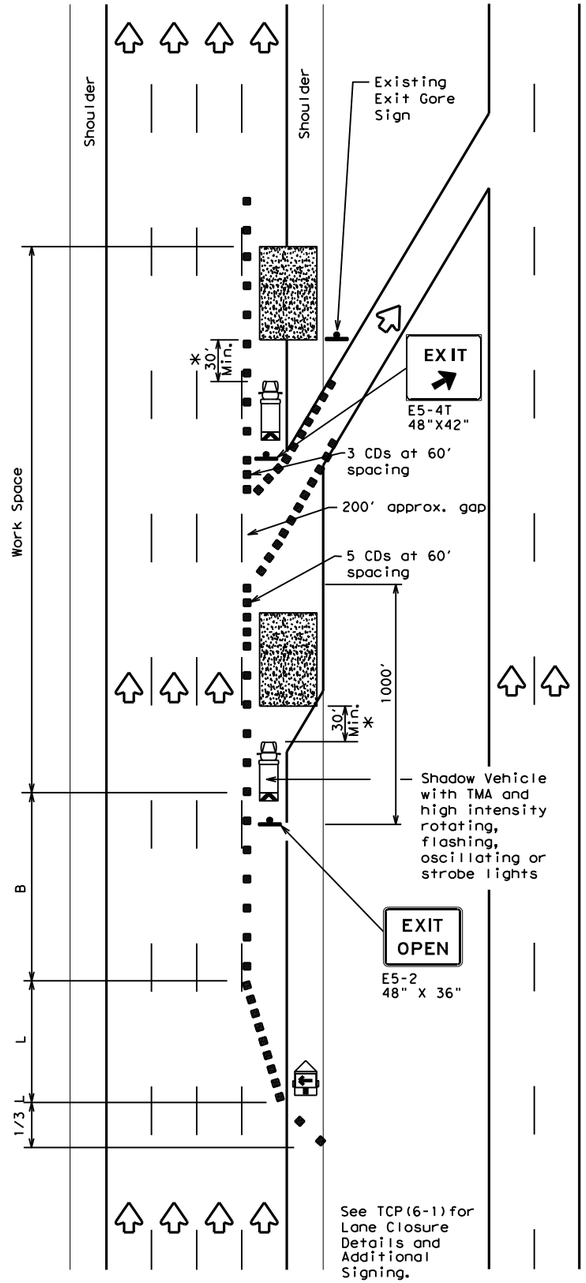


TCP (6-4a)

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER		26

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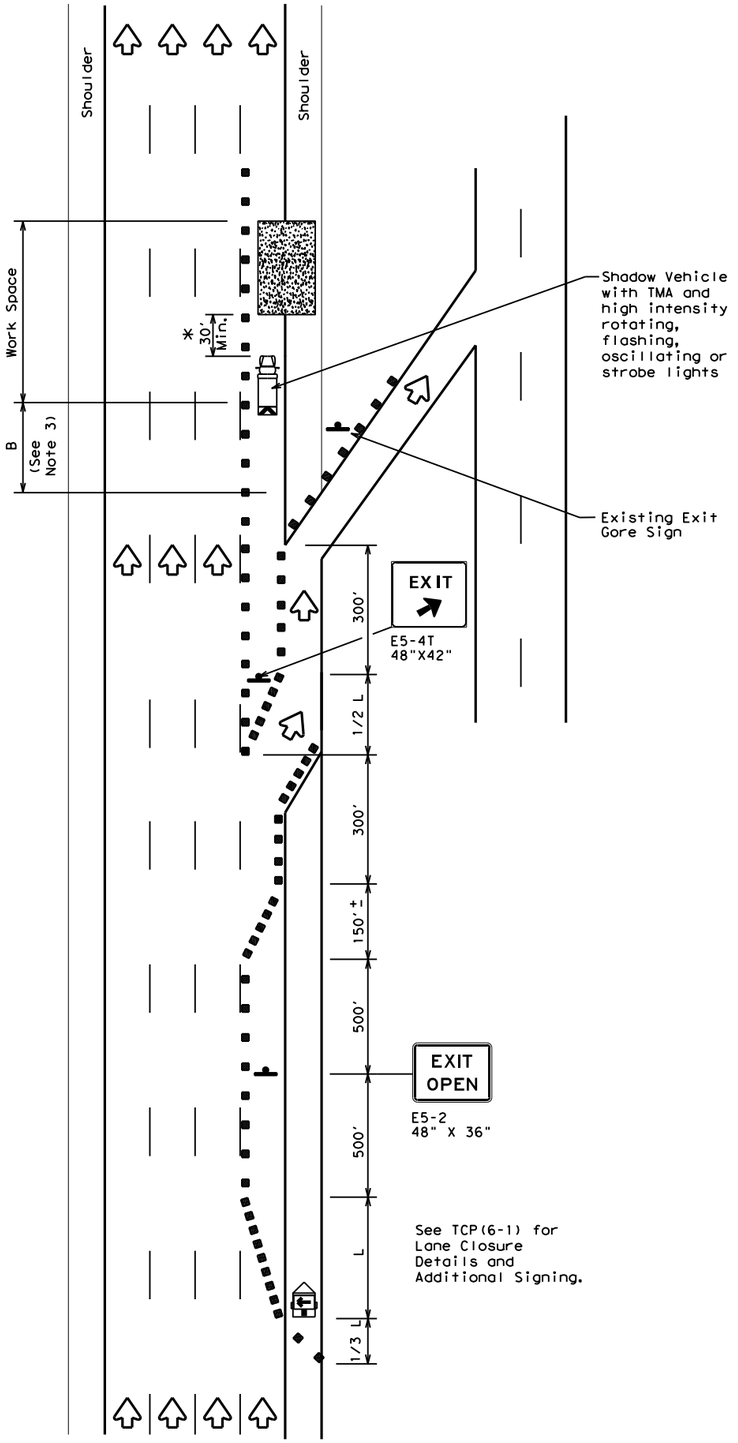
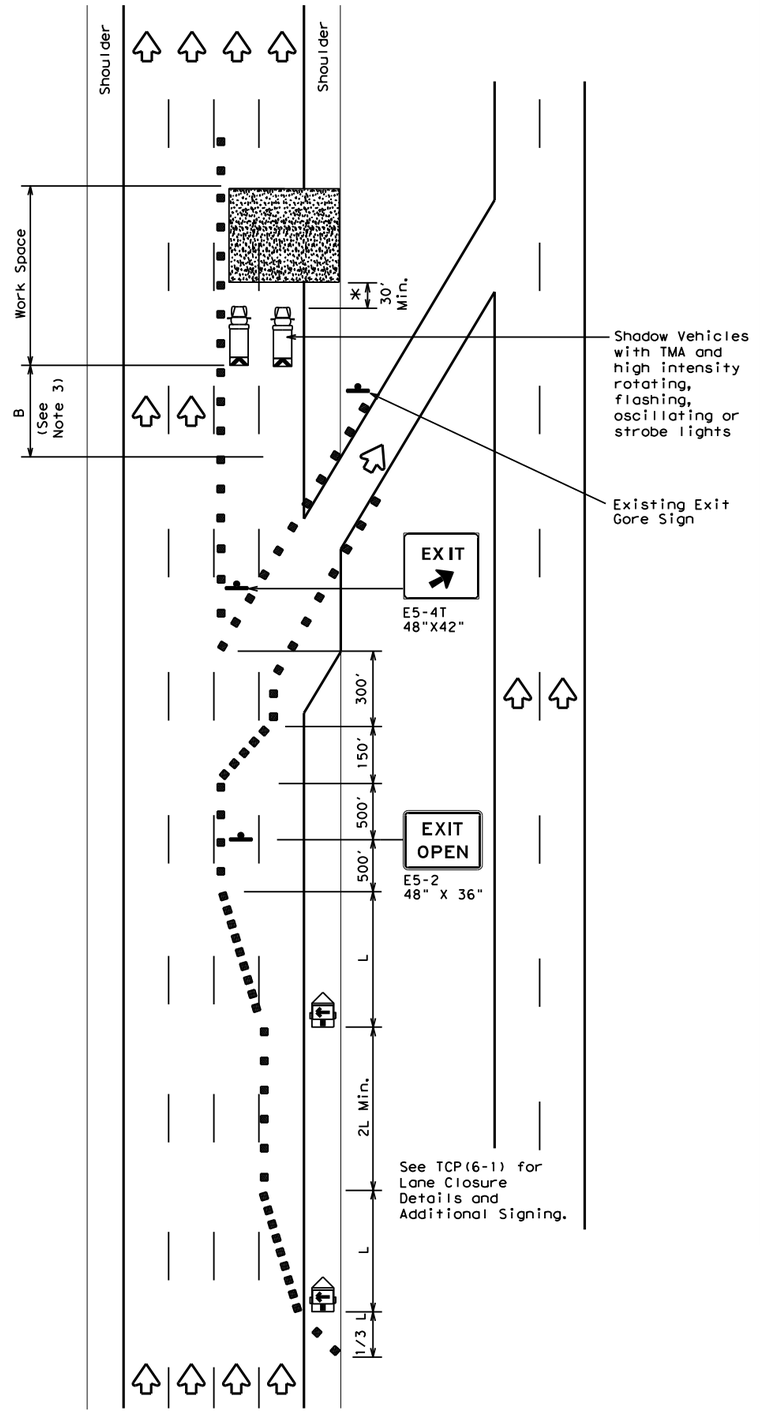


TCP (6-5a)

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

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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
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
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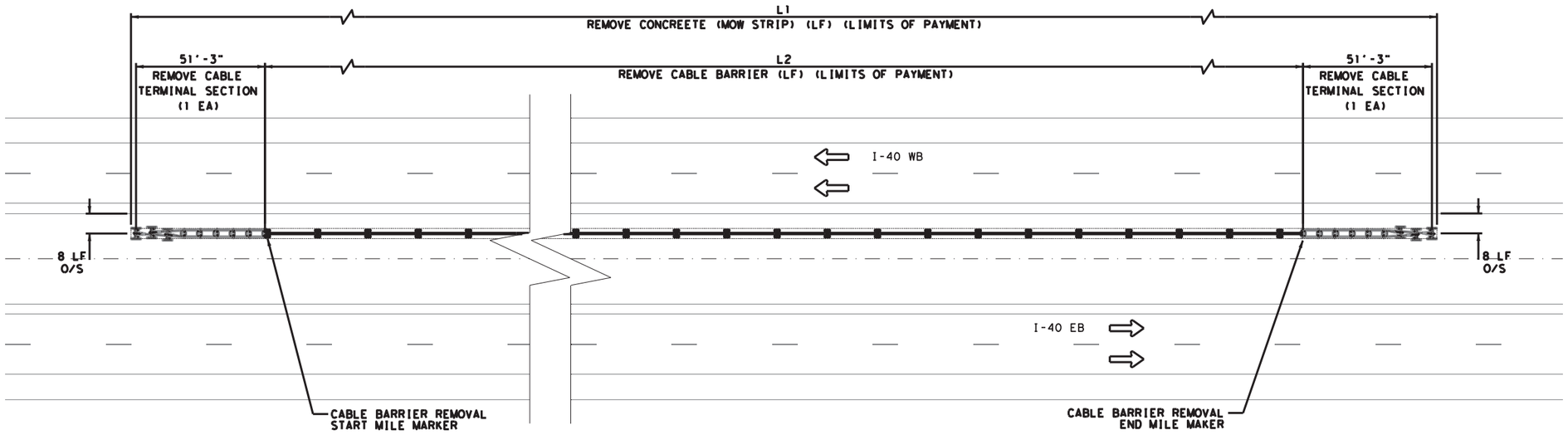
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER		27



CABLE BARRIER REMOVAL

CABLE BARRIER SYSTEM REMOVAL ITEMS					
LOCATION			104 6054 REMOVING CONCRETE (MOW STRIP)	543 6021 REMOVE CABLE BARRIER	543 6022 REMOVE CABLE BARRIER TERMINAL SECTION
START MM	END MM	O/S (8 LF) (WB/EB EOP)	LF (L1)	LF (L2)	EA
17+0.670	17+0.939	WB	1,525	1,418	2
19+0.979	20+0.122	WB	863	756	2
CSJ: 0904-00-197 OLDHAM COUNTY TOTALS			2,388	2,174	4
52+0.489	52+0.640	EB	904	797	2
52+0.673	52+0.884	EB	1,223	1,116	2
52+0.910	53+0.146	EB	1,239	1,132	2
54+0.653	54+0.841	WB	1,099	992	2
56+0.973	57+0.366	WB	2,182	2,075	2
59+0.337	59+0.643	EB	1,721	1,614	2
59+0.679	59+0.965	EB	1,615	1,508	2
60+0.006	60+0.398	EB	2,174	2,067	2
CSJ: 0904-00-197 POTTER COUNTY TOTALS			12,157	11,301	16
PROJECT TOTALS			14,545	13,475	20

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

CABLE BARRIER REMOVAL DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		28

DATE: 5/26/2021 10:20:21 AM
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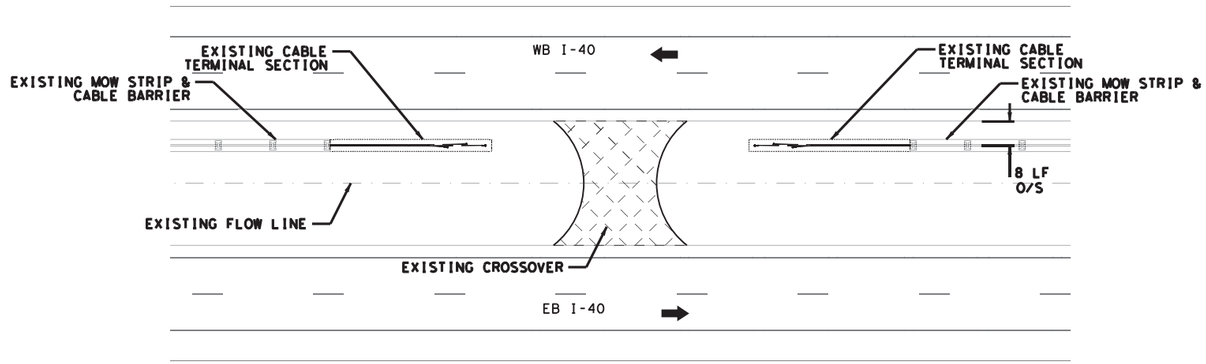
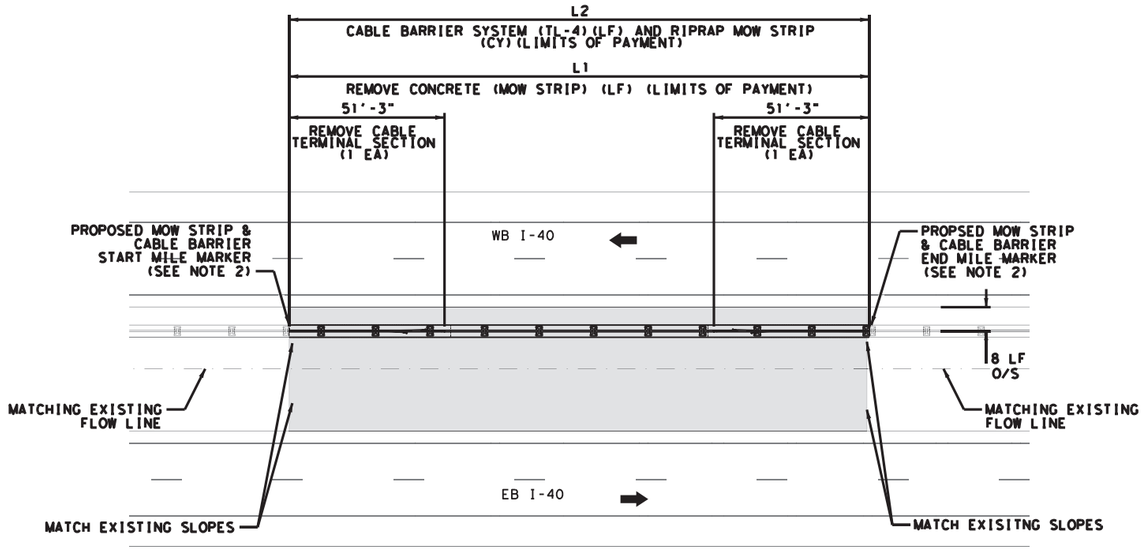


TYPICAL EXISTING CROSSOVER & EXISTING CABLE BARRIER



TYPICAL EXISTING CROSSOVER REMOVAL & CONNECTING EXISTING CABLE BARRIER

SEE NOTE 4

LEGEND

ITEM 105: REMOVE STAB BASE & ASPH PAV (SEE NOTE 2).

ITEM 150: BLADING (SEE NOTE 4)

NOTES:

1. INSTALL CABLE BARRIER SYSTEM & CABLE TERMINAL SECTION AS PER STANDARD & MANUFACTURERS RECOMMENDATIONS
2. NOT ALL MEDIAN LOCATIONS HAVE AN EXISTING ALL-WEATHER SURFACE. ITEM 105: REMOVE STAB BASE & ASPH PAV WILL ONLY BE PERFORMED WHERE APPLICABLE.
3. SPLICE PROPOSED CABLE BARRIER TO EXISTING CABLE BARRIER AS PER MANUFACTURERS RECCOMENDATIONS. ADDITIONAL CABLE, POST AND OTHER COMPONENTS MAY BE REQUIRED OUTSIDE THE SPECIFIED PAYMENT LIMITS AT NO ADDITIONAL COST.
4. MATCH EXISTING MEDIAN SLOPES AND STRAIGHT GRADING MEDIAN DITCH FLOW LINE TO MAINTAIN DRAINAGE AFTER CABLE BARRIER INSTALLATION IS COMPLETE, WILL BE PAID BY ITEM 150 BLADING.
5. SEE SHEET 2 OF 2 FOR PAY ITEM QUANTITIES

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

MEDIAN CROSSOVER REMOVAL AND CONNECTING EXISTING CABLE BARRIER

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 1 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		29

DATE: 5/26/2021 10:20:23 AM
FILE: I:\AMA\PD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\3. Roadway\197_MEDIAN CROSSOVER REMOVAL & CONNECTING EXISTING CABLE BARRIER.dgn

MEDIAN CROSSOVER REMOVAL & CONNECTING EXISTING CABLE BARRIER ITEMS									
LOCATION			104	105	150	432	543	543	658
			6054	6036	6002	6045	6002	6022	6068
			REMOVING CONCRETE (MOW STRIP)	REMOVING STAB BASE & ASPH PAV (15"-20")	BLADING	RIPRAP (MOW STRIP) (4 IN)	CABLE BARRIER SYSTEM (TL-4)	REMOVE CABLE BARRIER TERMINAL SECTION	INSTL DEL ASSM (D-DY) SZ 1 (BRF) GF2
START MM	END MM	O/S (8 LF) (WB/EB EOP)	LF (L1)	SY	HR	CY	LF (L2)	EA	EA
17+0.131	17+0.168	WB	107			9	192	2	2
17+0.378	17+0.416	WB	107			10	202	2	2
18+0.169	18+0.180			169	1				
18+0.677	18+0.716	WB	107			10	206	2	2
18+0.938	18+0.976	WB	107			10	201	2	2
19+0.177	19+0.216	WB	107			10	209	2	2
19+0.437	19+0.476	WB	107			10	209	2	2
19+0.673	19+0.712	WB	107			10	203	2	2
21+0.258	21+0.27			219	1				
23+0.262	23+0.277			310	1				
28+0.138	28+0.153			218	1				
29+0.220	29+0.237			215	1				
CSJ: 0904-00-197 OLDHAM COUNTY TOTALS			749	1,131	5	69	1,422	14	14
51+0.702	51+0.739	EB	198	112	1	10	198	2	2
51+0.949	51+0.984	EB	187	80	1	9	187	2	2
52+0.191	52+0.227	EB	188			9	188	2	2
52+0.402	52+0.411	WB		135	1				
52+0.898	52+0.905	EB	37	64	1				
53+0.461	53+0.509	EB	107	90	1	12	253	2	3
53+0.711	53+0.748			116	1				
53+0.957	53+0.998	EB	215	84	1	11	215	2	2
54+0.207	54+0.245	EB	204			10	204	2	2
54+0.499	54+0.509			93	1				
54+0.610	54+0.619			110	1				
55+0.085	55+0.120	WB	107			9	187	2	2
55+0.337	55+0.370	WB	107			9	175	2	2
55+0.585	55+0.625	EB	107	108	1	11	213	2	2
55+0.897	55+0.974	EB	107	74	1	20	408	2	4
56+0.172	56+0.210	WB	107	50	1	10	201	2	2
56+0.423	56+0.461	WB	107			10	205	2	2
56+0.671	56+0.710	WB	107	95	1	10	202	2	2
56+0.947	56+0.955			100	1				
57+0.790	57+0.828	EB	107	89	1	10	203	2	2
58+0.120	58+0.159	EB	107	110	1	10	203	2	2
58+0.495	58+0.534	EB	107	110	1	10	203	2	2
58+0.957	59+0.031	EB	107	105	1	19	393	2	4
59+0.653	59+0.669	EB	84	110	1				
59+0.975	59+0.998	EB	121	102	1				
60+0.876	60+0.916	EB	107	104	1	10	209	2	2
61+0.193	61+0.232	EB	107	93	1	10	204	2	2
61+0.592	61+0.630	EB	107	83	1	10	198	2	2
62+0.194	62+0.231	WB	107			10	196	2	2
CSJ: 0904-00-197 POTTER COUNTY TOTALS			2,946	2,217	23	229	4,645	42	47
PROJECT TOTALS			3,695	3,348	28	298	6,067	56	61

05-26-21

IH-40

MEDIAN CROSSOVER REMOVAL AND CONNECTING EXISTING CABLE BARRIER

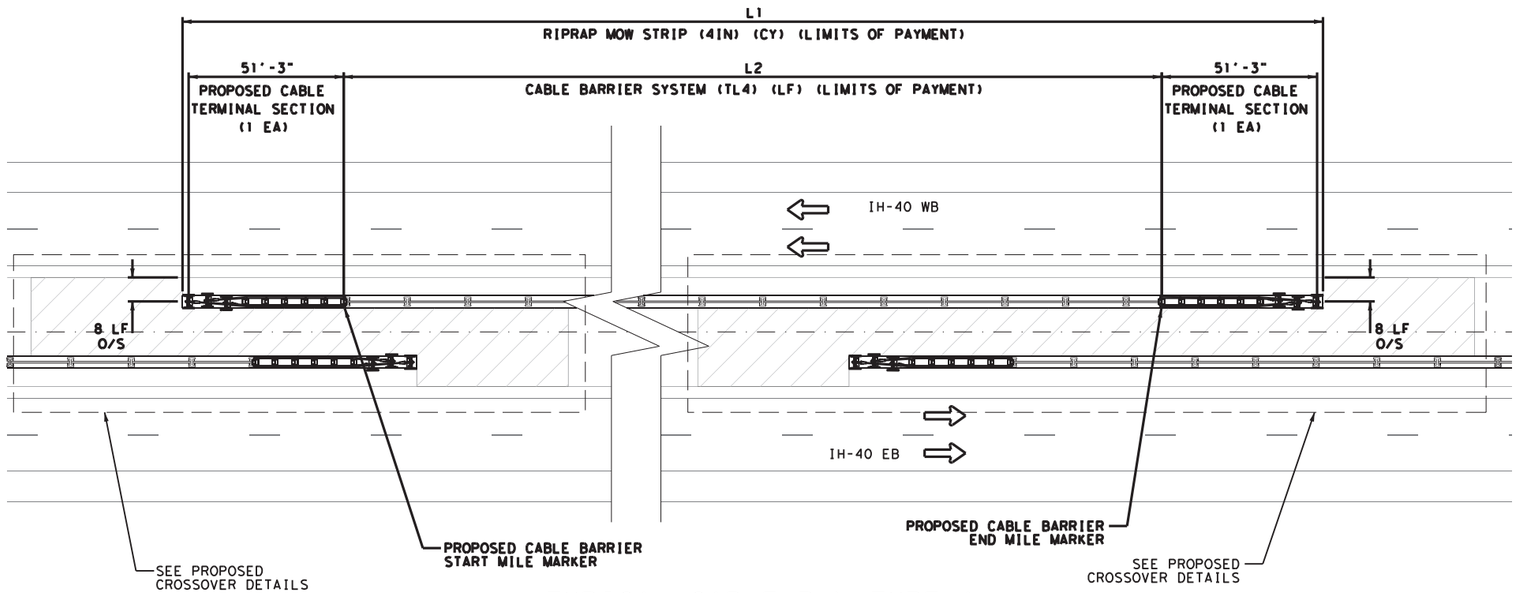
SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 2 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		30

DATE: 5/26/2021 10:20:25 AM
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\3. Roadway\197_MEDIAN CROSSOVER REMOVAL & CONNECTING EXISTING CABLE BARRIER.dgn



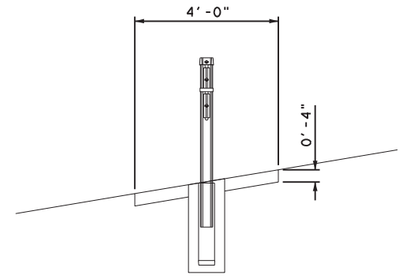
TYPICAL CABLE RUN TYPE A

PROPOSED CABLE BARRIER RUN TYPE A							
LOCATION			432		543	543	658
			6045		6002	6020	6068
			RIPRAP (MOW STRIP) (4 IN)		CABLE BARRIER SYSTEM (TL-4)	CABLE BARRIER TERMINAL SECTION (TL-4)	INSTL DEL ASSM (D-DY) SZ 1 (BRF) GF2
START MM	END MM	O/S (8 LF) (WB/ EB) EOP	LF ① (L1)	CY	LF (L2)	EA	EA
15+0.963	16+0.713	EB	4,062	201	3,955	2	50
17+0.602	17+0.977	EB	2,092	103	1,985	2	30
19+0.910	20+0.988	EB	5,799	286	5,692	2	67
20+0.979	21+0.716	WB	3,998	197	3,891	2	49
21+0.706	22+0.988	EB	6,876	340	6,769	2	78
22+0.979	23+0.819	WB	4,540	224	4,433	2	54
26+0.948	28+0.013	WB	5,732	283	5,625	2	66
27+0.983	28+0.637	EB	3,560	176	3,453	2	45
28+0.713	29+0.425	WB	3,868	191	3,761	2	48
34+0.441	35+0.887	WB	7,741	382	7,634	2	86
35+0.857	36+0.392	EB	2,932	145	2,825	2	38
36+0.467	3+0.371	EB	4,884	241	4,777	2	58
37+0.362	38+0.457	WB	5,888	291	5,781	2	68
46+0.538	47+0.161	EB	3,396	168	3,289	2	43
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS			65,368	3,228	63,870	28	780
52+0.359	53+0.215	WB	4,625	228	4,518	2	55
56+0.904	57+0.405	EB	2,750	136	2,643	2	36
59+0.288	60+0.457	WB	6,276	310	6,169	2	72
CSJ: 0904-00-197 POTTER COUNTY TOTALS			13,651	674	13,330	6	163
PROJECT TOTALS			79,019	3,902	77,200	34	943

①RIPRAP MOW STRIP LINEAR FOOT QUANTITY IS FOR CONTRACTOR INFORMATION ONLY

NOTES:

1. INSTALL CABLE BARRIER SYSTEM & CABLE TERMINAL SECTION AS PER STANDARD & MANUFACTURERS RECOMMENDATIONS.



MOW STRIP DETAIL

NTS

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED CABLE BARRIER DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 1 OF 3

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		31

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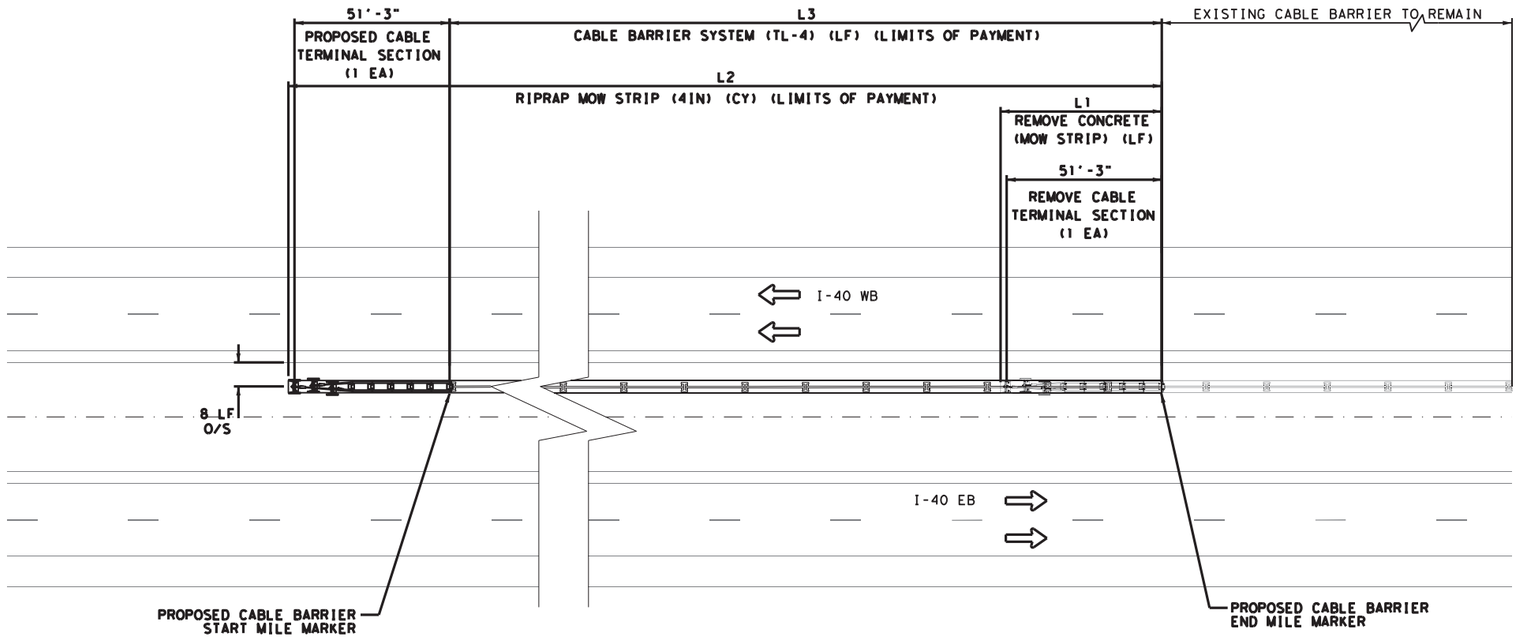
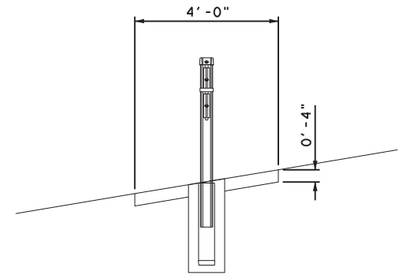


TYPICAL CABLE RUN TYPE B

QUANTITIES FOR TYPICAL CABLE RUN TYPE B FOUND ON PROPOSED CABLE BARRIER DETAIL SHEET 3 OF 3

NOTES:

1. INSTALL CABLE BARRIER SYSTEM & CABLE TERMINAL SECTION AS PER STANDARD & MANUFACTURERS RECOMMENDATIONS.



MOW STRIP DETAIL

NTS

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED CABLE BARRIER DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 2 OF 3

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		32

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PROPOSED CABLE BARRIER RUN TYPE B									
LOCATION			104	432		543	543	543	658
			6054	6045		6002	6020	6022	6068
			REMOVING CONCRETE (MOW STRIP)	RIPRAP (MOW STRIP) (4 IN)		CABLE BARRIER SYSTEM (TL-4)	CABLE BARRIER TERMINAL SECTION (TL-4)	REMOVE CABLE BARRIER TERMINAL SECTION	INSTL DEL ASSM (D-DY) SZ 1 (BRF) GF2
START MM	END MM	O/S (8 LF) (WB/ EB) EOP	LF (L1)	LF ① (L2)	CY	LF (L3)	EA	EA	EA
16+0.704	16+0.907	WB	53	1,129	56	1,076	1	1	16
16+0.907	17+0.131	WB							12 *
17+0.168	17+0.178	WB							11 *
17+0.416	17+0632	WB							16 *
18+0.019	18+0.211	WB	53	1,064	53	1,011	1	1	15
18+0.211	18+0.432	WB							17 *
18+0.470	18+0.677	WB							16 *
18+0.716	18+0.938	WB							12 *
18+0.976	19+0.177	WB							11 *
19+0.216	19+0.437	WB							12 *
19+0.476	19+0.673	WB							10 *
19+0.712	19+0.941	WB							17 *
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS			106	2,193	109	2,087	2	2	165
51+0.163	51+0.464	EB	53	1,641	81	1,588	1	1	21
51+0.464	51+0.702	EB							13 *
51+0.739	51+0.949	EB							11 *
51+0.984	52+0.191	EB							11 *
52+0.227	52+0.369	EB							13 *
53+0.184	53+0.461	EB							20 *
53+0.509	53+0.711	EB							11 *
53+0.748	53+0.957	EB							11 *
53+0.998	54+0.207	EB							11 *
54+0.245	54+0.487	EB							13 *
54+0.487	54+0.884	EB	53	2,152	106	2,099	1	1	26
54+0.875	55+0.085	WB							16 *
55+0.120	55+0.337	WB							11 *
55+0.370	55+0.585	WB							11 *
55+0.625	55+0.897	WB							14 *
55+0.974	56+0.172	WB							10 *
56+0.210	56+0.423	WB							11 *
56+0.461	56+0.671	WB							11 *
56+0.710	56+0.935	WB							17 *
57+0.534	57+0.790	EB							19 *
57+0.828	58+0.120	EB							15 *
58+0.159	58+0.495	EB							18 *
58+0.534	58+0.957	EB							22 *
59+0.032	59+0.298	EB							19 *
60+0.575	60+0.876	EB							21 *
60+0.916	61+0.193	EB							15 *
61+0.232	61+0.590	EB							19 *
61+0.630	61+0.852	EB							17 *
61+0.893	62+0.194	WB							16 *
62+0.231	62+0.488	WB							19 *
CSJ: 0904-00-197 POTTER COUNTY TOTALS			106	3,793	187	3,687	2	2	462
PROJECT TOTALS			212	5,986	296	5,774	4	4	627

* - INDICATED DELINEATION FOR EXISTING CABLE BARRIER ONLY

①RIPRAP MOW STRIP LINEAR FOOT QUANTITY IS FOR CONTRACTOR INFORMATION ONLY

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED CABLE BARRIER DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 3 OF 3

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		33

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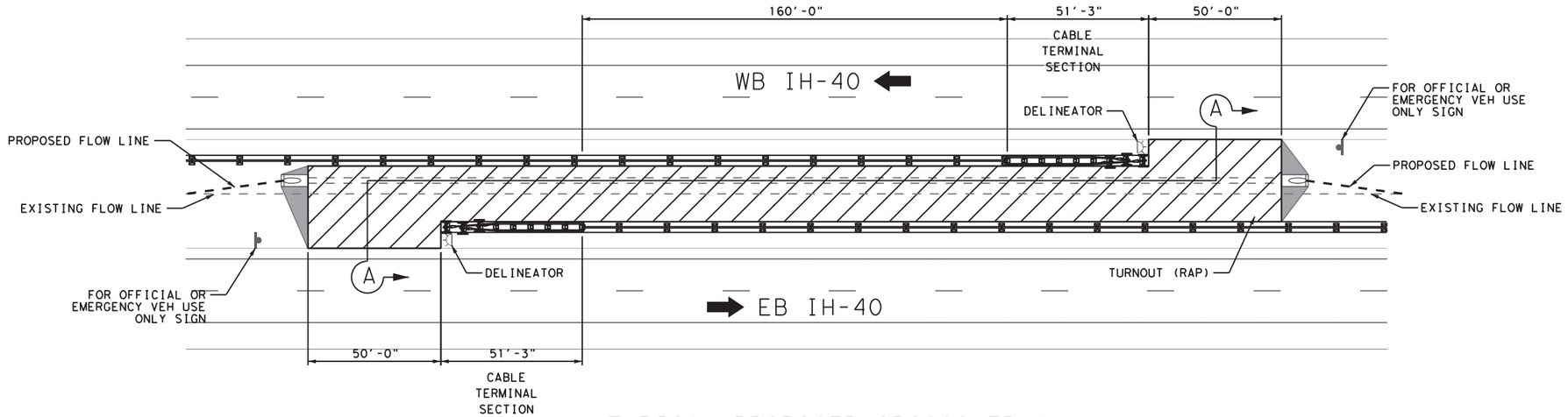
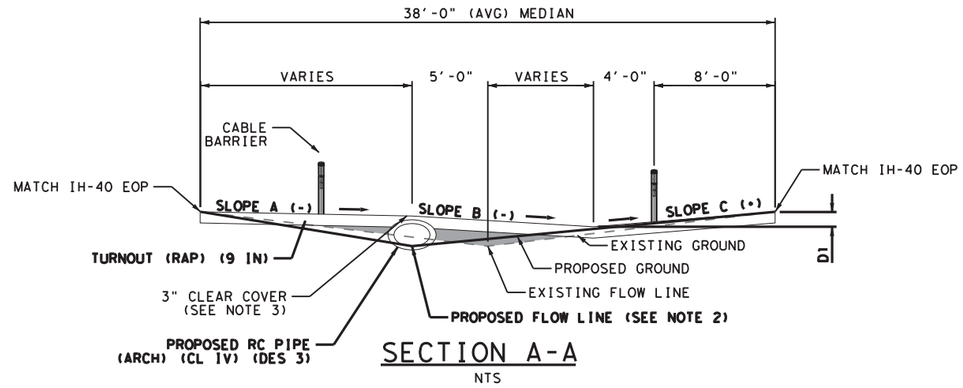


TYPICAL PROPOSED CROSSOVER A

CSJ: 0904-00-197



SECTION A-A

NTS

LEGEND

PROPOSED TURNOUT (RAP) (9 IN)

NOTES:

1. TURNOUTS (RAP) WILL BE CONSTRUCTED WITH MATERIAL PROVIDED BY TXDOT. THE LOCATION OF STOCKPILES IS SHOWN IN THE GENERAL NOTES. MATERIAL WILL BE COMPACTED IN ACCORDANCE TO ITEM 247 ORDINARY COMPACTION OR AS DIRECTED BY THE ENGINEER. USE A PNEUMATIC ROLLER FOR COMPACTION.
2. SHIFT FLOW LINE HORIZONTALLY 5' WHILE MAINTAINING EXISTING FLOW LINE ELEVATION.
3. CLEAR COVER OVER THE TOP OF DES 3 ARCHED PIPE WILL BE 3".
4. QUANTITIES CALCULATED GRAPHICALLY AND CARRIED TO SUMMARY SHEET
5. SEE D&OM(6)-20. FOR SIGN AND DELINEATION PLACEMENT.

PROPOSED CROSSOVER TYPE A

LOCATION		MEDIAN WIDTH	SLOPE A	SLOPE B	SLOPE C	D1	110 ① 6001 EXCAVATION (ROADWAY)	132 ① 6004 EMBANKMENT (FINAL) (DENS CONT) (TY B)	150 6002 BLADING	530 6024 TURNOUTS (RAP)	658 6099 INSTL OM ASSM (OM-2Z) (WFL X) GND
START MM	END MM	FT	H:V	H:V	H:V	IN	CY	CY	HR	SY	EA
19+0.891	19+0.960	37	45:1	16:1	12:1	12	149	86	2	803	2
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS							149	86	2	803	2
53+0.165	53+0.234	34	35:1	62:1	24:1	6	105	119	2	681	2
56+0.885	56+0.954	35	22:1	24:1	12:1	12	130	88	2	722	2
CSJ: 0904-00-197 - POTTER COUNTY TOTALS							235	207	4	1,403	4
PROJECT TOTALS							384	293	6	2,206	6

① FOR CONTRACTOR'S INFORMATION ONLY. ALL ITEMS LISTED AS "FOR CONTRACTOR'S INFORMATION ONLY" WILL BE COMPLETED IN ACCORDANCE WITH THE APPLICABLE TXDOT STANDARD SPECIFICATIONS, AND ARE CONSIDERED SUBSIDIARY TO ITEM 530.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED MEDIAN CROSSOVER DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 1 OF 5

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		34

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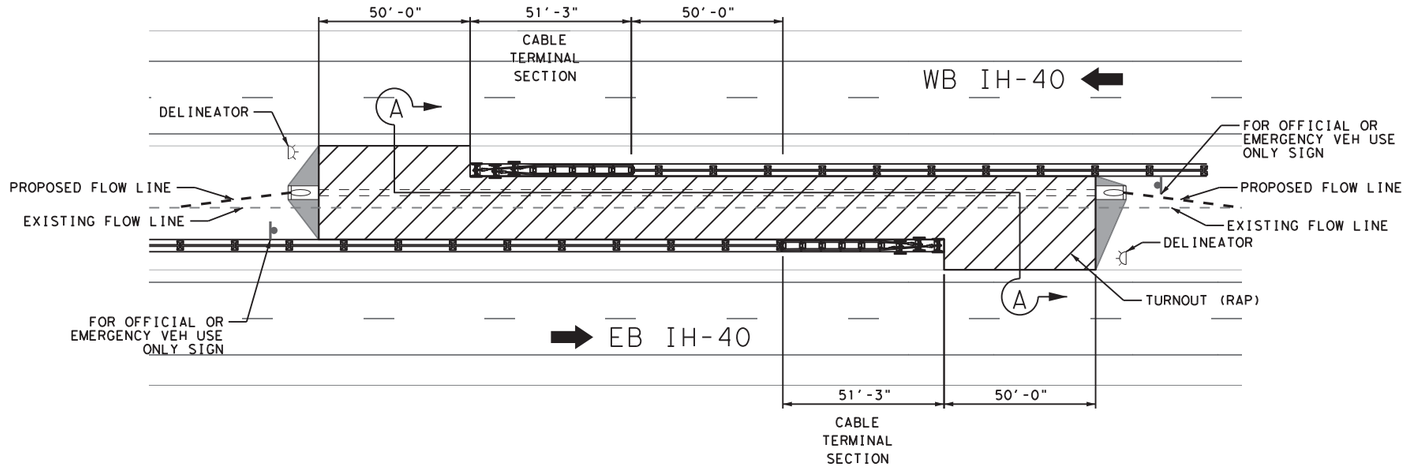
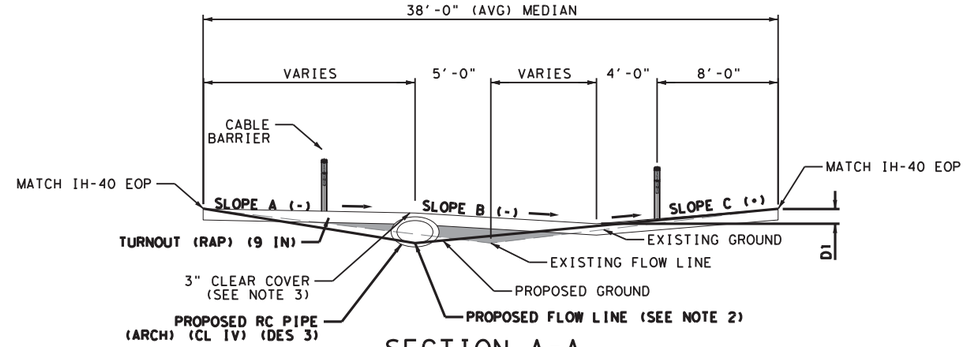


TYPICAL PROPOSED CROSSOVER B

CSJ: 0904-00-197



SECTION A-A

NTS

PROPOSED CROSSOVER TYPE B											
LOCATION		MEDIAN WIDTH	SLOPE A	SLOPE B	SLOPE C	D1	110 ① 6001 EXCAVATION (ROADWAY)	132 ① 6004 EMBANKMENT (FINAL) (DENS CONT) (TY B)	150 6002 BLADING	530 6024 TURNOUTS (RAP)	658 6099 INSTL OM ASSM (OM-2Z) (WFL X) GND
START MM	END MM	FT	H:V	H:V	H:V	IN	CY	CY	HR	SY	EA
54+0.855	54+0.904	34	19:1	26:1	12:1	12	87	61	2	510	2
59+0.269	59+0.317	35	19:1	30:1	12:1	12	88	59	2	539	2
CSJ: 0904-00-197 - POTTER COUNTY TOTALS							175	120	4	1,049	4
PROJECT TOTALS							175	120	4	1,049	4

① FOR CONTRACTOR'S INFORMATION ONLY. ALL ITEMS LISTED AS "FOR CONTRACTOR'S INFORMATION ONLY" WILL BE COMPLETED IN ACCORDANCE WITH THE APPLICABLE TXDOT STANDARD SPECIFICATIONS, AND ARE CONSIDERED SUBSIDIARY TO ITEM 530.

LEGEND

PROPOSED TURNOUT (RAP) (9 IN)

NOTES:

1. TURNOUTS (RAP) WILL BE CONSTRUCTED WITH MATERIAL PROVIDED BY TXDOT. THE LOCATION OF STOCKPILES IS SHOWN IN THE GENERAL NOTES. MATERIAL WILL BE COMPACTED IN ACCORDANCE TO ITEM 247 ORDINARY COMPACTION OR AS DIRECTED BY THE ENGINEER. USE A PNEUMATIC ROLLER FOR COMPACTION.
2. SHIFT FLOW LINE HORIZONTALLY 5' WHILE MAINTAINING EXISTING FLOW LINE ELEVATION.
3. CLEAR COVER OVER THE TOP OF DES 3 ARCHED PIPE WILL BE 3".
4. QUANTITIES CALCULATED GRAPHICALLY AND CARRIED TO SUMMARY SHEET
5. SEE D&OM(6)-20. FOR SIGN AND DELINEATION PLACEMENT.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

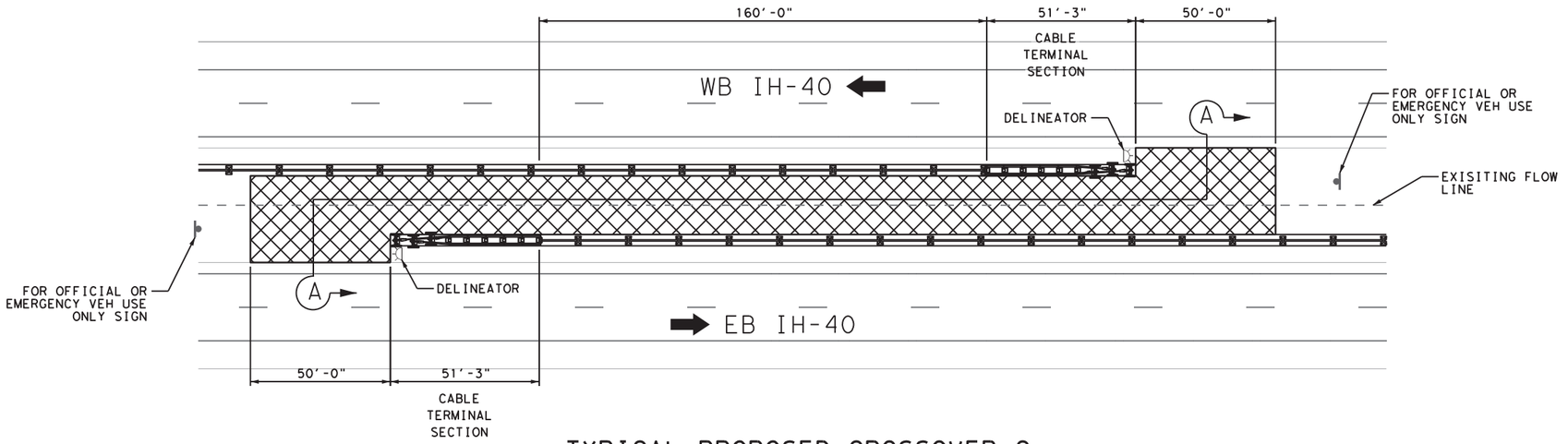
IH-40

PROPOSED MEDIAN CROSSOVER DETAIL

SCALE: 1" = 50'

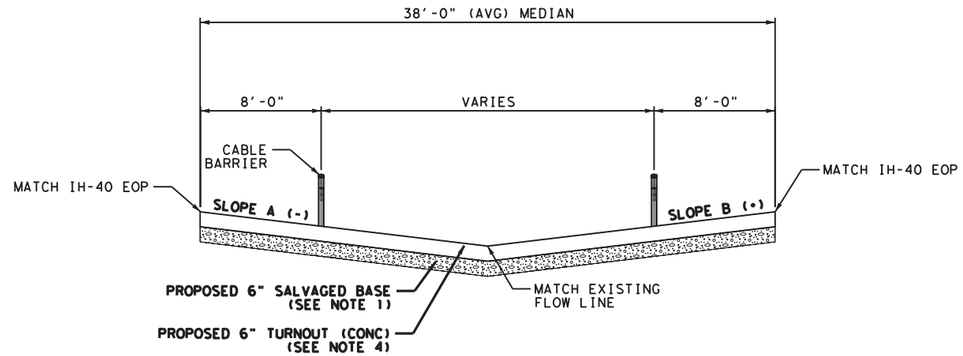
2021 Texas Department of Transportation

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		35



TYPICAL PROPOSED CROSSOVER C

CSJ: 0904-00-197



SECTION A-A

NTS

PROPOSED CROSSOVER TYPE C								
LOCATION		MEDIAN WIDTH	SLOPE A	SLOPE B	SALAVAGE BASE REQUIRED	110 ① 6001 EXCAVATION (ROADWAY)	530 6007 TURNOUTS (CONC)	658 6099 INSTL OM ASSM (OM-2Z)(WFLX) GND
START MM	END MM	FT	H:V	H:V	CY	CY	SY	EA
17+0.582	17+0.651	38	8:1	7:1	141	282	846	2
18+0.382	18+0.451	37	9:1	9:1	134	268	804	2
27+0.963	28+0.032	39	10:1	11:1	147	294	882	2
35+0.838	35+0.907	40	13:1	9:1	154	308	924	2
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS					576	1,152	3,456	8
PROJECT TOTALS					576	1,152	3,456	8

① FOR CONTRACTOR'S INFORMATION ONLY. ALL ITEMS LISTED AS "FOR CONTRACTOR'S INFORMATION ONLY" WILL BE COMPLETED IN ACCORDANCE WITH THE APPLICABLE TXDOT STANDARD SPECIFICATIONS, AND ARE CONSIDERED SUBSIDIARY TO ITEM 530.

LEGEND

- TURNOUTS (CONC) (6 IN) (SEE NOTE 4)
- PROPOSED 6" SALVAGED BASE

NOTES:

1. SALVAGED BASE WILL BE CONSTRUCTED WITH A MINIMUM OF 6" MATERIAL PROVIDED BY TXDOT. THE LOCATION OF STOCKPILES IS SHOWN IN THE GENERAL NOTES. MATERIAL WILL BE COMPACTED IN ACCORDANCE TO ITEM 247 ORDINARY COMPACTION OR AS DIRECTED BY THE ENGINEER. USE A PNEUMATIC ROLLER FOR COMPACTION.
2. QUANTITIES CALCULATED GRAPHICALLY AND CARRIED TO SUMMARY SHEET.
3. SEE D&OM(6)-20. FOR SIGN AND DELINEATION PLACEMENT.
4. USE CLASS A CONCRETE FOR TURNOUT (CONC).REINFORCING FIBERS WILL NOT BE ALLOWED FOR CROSSOVER. USE NO.4 REINFORCING BARS AT A MAXIMUM OF 18 INCHES IN EACH DIRECTION.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED MEDIAN CROSSOVER DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		36

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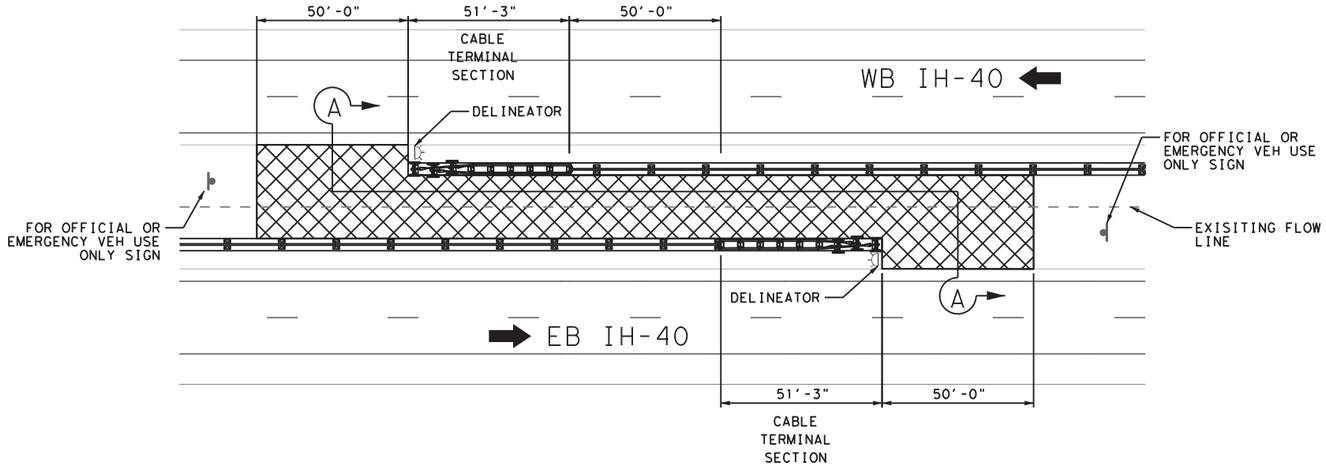
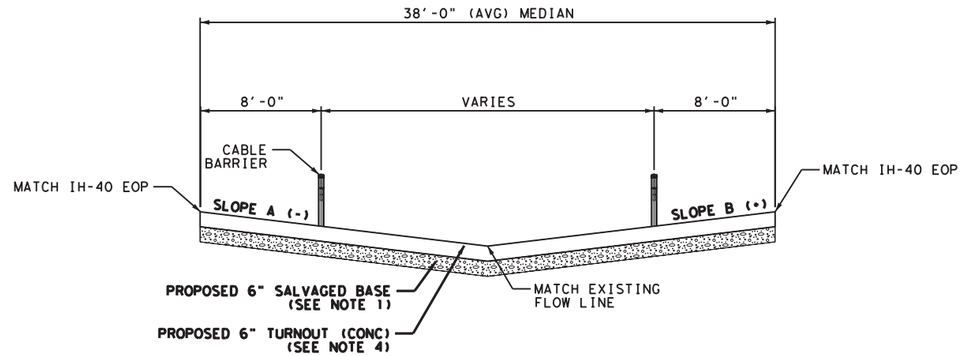


TYPICAL PROPOSED CROSSOVER D

CSJ: 0904-00-197



SECTION A-A

NTS

PROPOSED CROSSOVER TYPE D								
LOCATION		MEDIAN WIDTH	SLOPE A	SLOPE B	SALVAGE BASE REQUIRED	110 ① 6001 EXCAVATION (ROADWAY)	530 6007 TURNOUTS (CONC)	658 6099 INSTL OM ASSM (OM-2Z)(WFLX) GND
START MM	END MM	FT	H:V	H:V	CY	CY	SY	EA
16+0.684	16+0.732	42	9:1	8:1	123	246	738	2
20+0.959	21+0.005	38	12:1	9:1	104	208	624	2
22+0.956	23+0.012	39	9:1	14:1	109	218	654	2
37+0.343	37+0.391	40	14:1	12:1	114	228	684	2
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS					450	900	2,700	8
52+0.340	52+0.388	34	9:1	11:1	85	170	510	2
CSJ: 0904-00-197 - POTTER COUNTY TOTALS					85	170	510	2
PROJECT TOTALS					535	1,070	3,210	10

① FOR CONTRACTOR'S INFORMATION ONLY. ALL ITEMS LISTED AS "FOR CONTRACTOR'S INFORMATION ONLY" WILL BE COMPLETED IN ACCORDANCE WITH THE APPLICABLE TXDOT STANDARD SPECIFICATIONS, AND ARE CONSIDERED SUBSIDIARY TO ITEM 530.

LEGEND

- TURNOUTS (CONC) (6 IN) (SEE NOTE 4)
- PROPOSED 6" SALVAGED BASE

NOTES:

1. SALVAGED BASE WILL BE CONSTRUCTED WITH A MINIMUM OF 6" MATERIAL PROVIDED BY TXDOT. THE LOCATION OF STOCKPILES IS SHOWN IN THE GENERAL NOTES. MATERIAL WILL BE COMPACTED IN ACCORDANCE TO ITEM 247 ORDINARY COMPACTION OR AS DIRECTED BY THE ENGINEER. USE A PNEUMATIC ROLLER FOR COMPACTION.
2. QUANTITIES CALCULATED GRAPHICALLY AND CARRIED TO SUMMARY SHEET.
3. SEE D&OM(6)-20. FOR SIGN AND DELINEATION PLACEMENT.
4. USE CLASS A CONCRETE FOR TURNOUT (CONC).REINFORCING FIBERS WILL NOT BE ALLOWED FOR CROSSOVER. USE NO.4 REINFORCING BARS AT A MAXIMUM OF 18 INCHES IN EACH DIRECTION.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED MEDIAN CROSSOVER DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 4 OF 5

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		37

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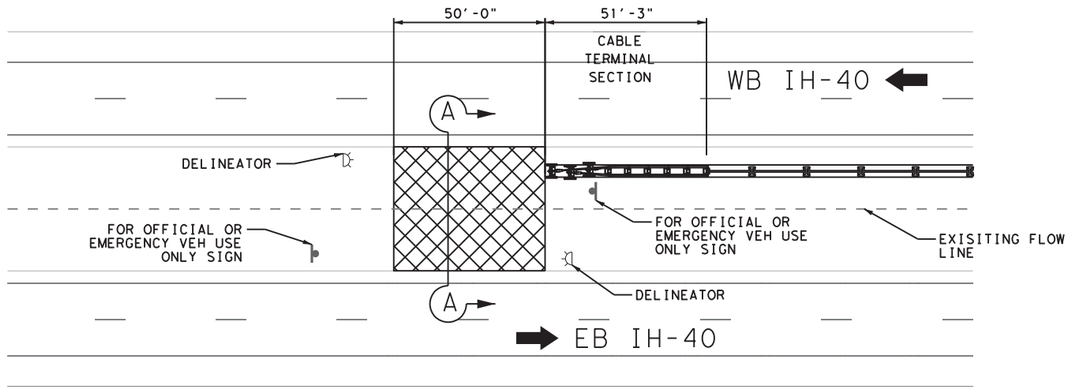
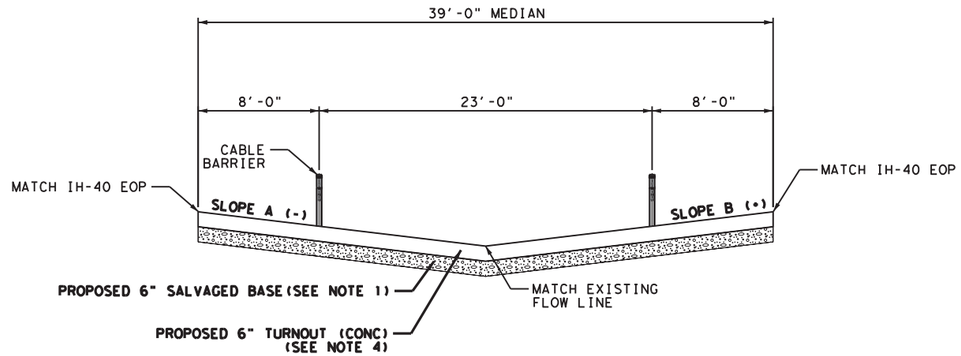


TYPICAL PROPOSED CROSSOVER E

CSJ: 0904-00-197



SECTION A-A

NTS

PROPOSED CROSSOVER TYPE C								
LOCATION		MEDIAN WIDTH	SLOPE A	SLOPE B	SALVAGE BASE REQUIRED	110 ① 6001 EXCAVATION (ROADWAY)	530 6007 TURNOUTS (CONC)	658 6099 INSTL OM ASSM (OM-2Z)(WFLX) GND
START MM	END MM	FT	H:V	H:V	CY	CY	SY	EA
26+0.925	26+0.934	39	11:1	11:1	36	72	216	2
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS					36	72	216	2
PROJECT TOTALS					36	72	216	2

① FOR CONTRACTOR'S INFORMATION ONLY. ALL ITEMS LISTED AS "FOR CONTRACTOR'S INFORMATION ONLY" WILL BE COMPLETED IN ACCORDANCE WITH THE APPLICABLE TXDOT STANDARD SPECIFICATIONS, AND ARE CONSIDERED SUBSIDIARY TO ITEM 530.

LEGEND

TURNOUTS (CONC) (6 IN) (SEE NOTE 4)

PROPOSED 6" SALVAGED BASE

NOTES:

1. SALVAGED BASE WILL BE CONSTRUCTED WITH A MINIMUM OF 6" MATERIAL PROVIDED BY TXDOT. THE LOCATION OF STOCKPILES IS SHOWN IN THE GENERAL NOTES. MATERIAL WILL BE COMPACTED IN ACCORDANCE TO ITEM 247 ORDINARY COMPACTION OR AS DIRECTED BY THE ENGINEER. USE A PNEUMATIC ROLLER FOR COMPACTION.
2. QUANTITIES CALCULATED GRAPHICALLY AND CARRIED TO SUMMARY SHEET.
3. SEE D&OM(6)-20. FOR SIGN AND DELINEATION PLACEMENT.
4. USE CLASS A CONCRETE FOR TURNOUT (CONC).REINFORCING FIBERS WILL NOT BE ALLOWED FOR CROSSOVER. USE NO.4 REINFORCING BARS AT A MAXIMUM OF 18 INCHES IN EACH DIRECTION.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED MEDIAN CROSSOVER DETAIL

SCALE: 1" = 50'

2021 Texas Department of Transportation

SHEET 5 OF 5

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		38

DATE: 5/26/2021 10:20:41 AM
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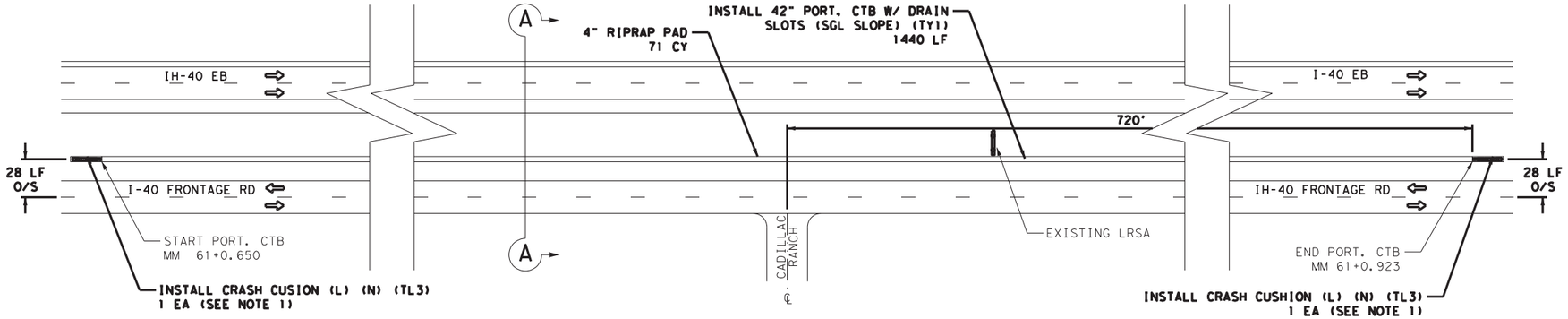
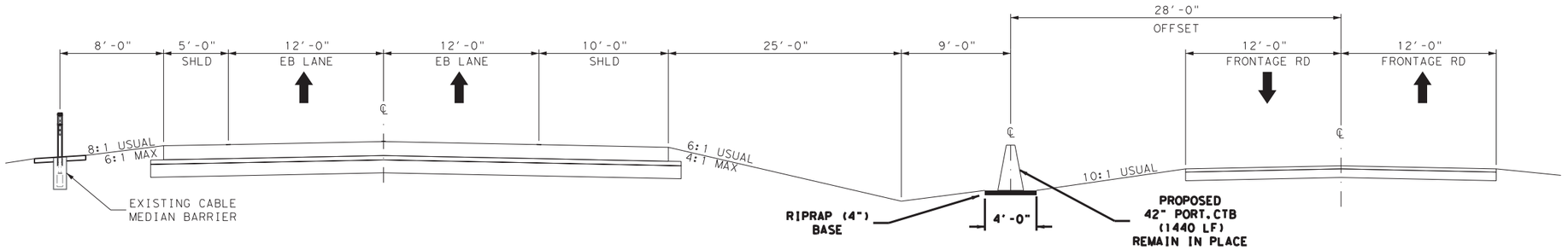


PROPOSED PORT. CTB ON IH-40 AT CADILLAC RANCH

CSJ: 0904-00-197

NOTES:

1. SEE STANDARDS FOR CONCRETE FOUNDATION DETAILS. FOUNDATION WILL BE SUBSIDIARY TO ITEM 545.
2. PORTABLE CONCRETE BARRIER TO REMAIN IN PLACE. WELDED REBAR GRID JOINT CONNECTION (TYPE R) IS REQUIRED.
3. SEE D & OM STANDARDS FOR BARRIER MOUNTED DELINEATORS. CONCRETE BARRIER MOUNTED DELINEATORS WILL BE MOUNTED ON TOP OF BARRIER, OR AS DIRECTED BY THE ENGINEER. DELINEATORS PAID BY ITEM 658. QUANTITIES ACCOUNTED FOR IN PROJECT SUMMARY.



IH 40 EASTBOUND MAIN LANES

IH 40 SOUTH FRONTAGE ROAD

SECTION A-A

CSJ: 0904-00-197
SCALE: NTS

CADILLAC RANCH PCTB ITEMS					
LOCATION		432	512	545	658
		6001	6001	6007	6027
		RIPRAP (CONC) (4 IN)	PORT CTB (FUR & INST) (SGL SLOPE) (TY 1)	CRASH CUSH ATTEN (INSTL) (L) (N) (TL3)	INSTL DEL ASSM (D-SY) SZ (BRF) CTB (BI)
START MM	END MM	CY	LF	EA	EA
61+0.650	61+0.923	71	1,440	2	14
PROJECT TOTAL		71	1,440	2	14

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CADILLAC RANCH PROPOSED PCTB LAYOUT

SCALE: 1" = 100'

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		39

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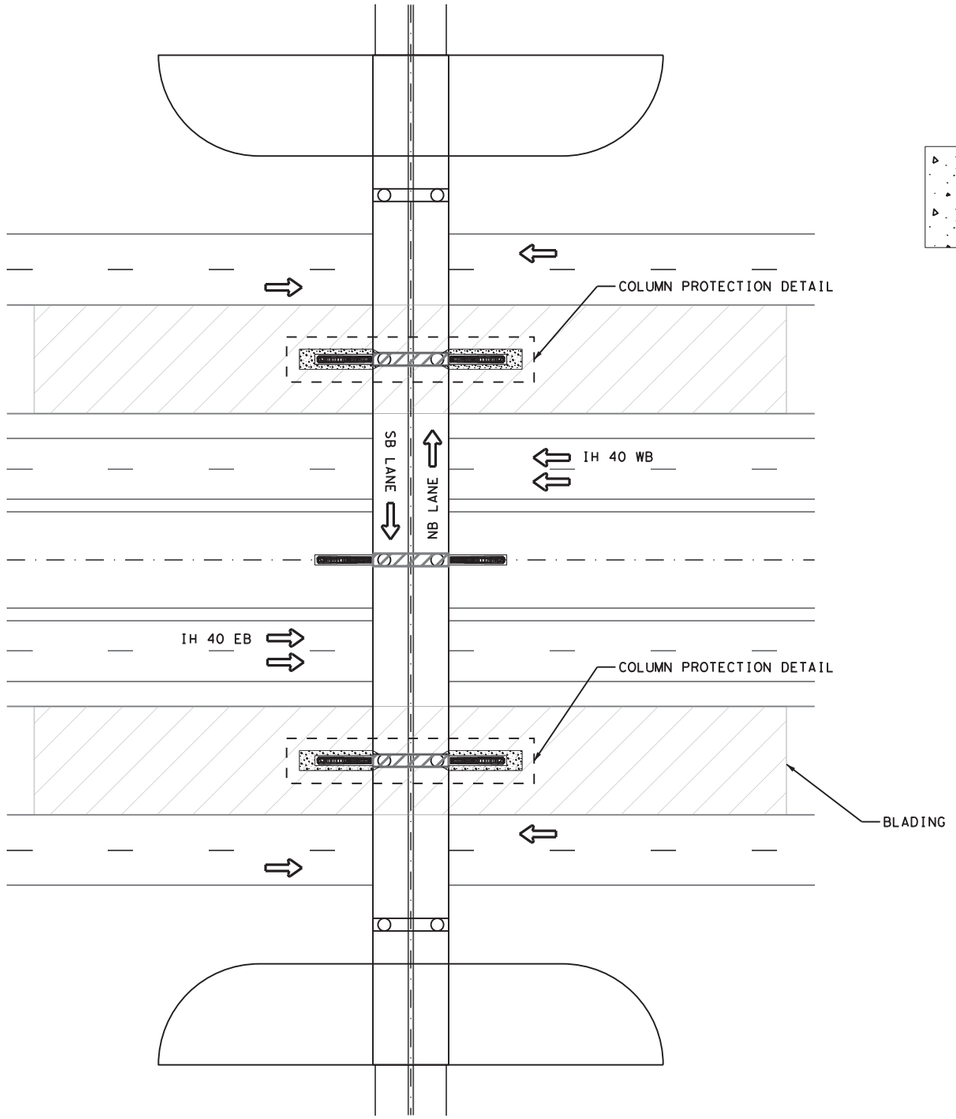
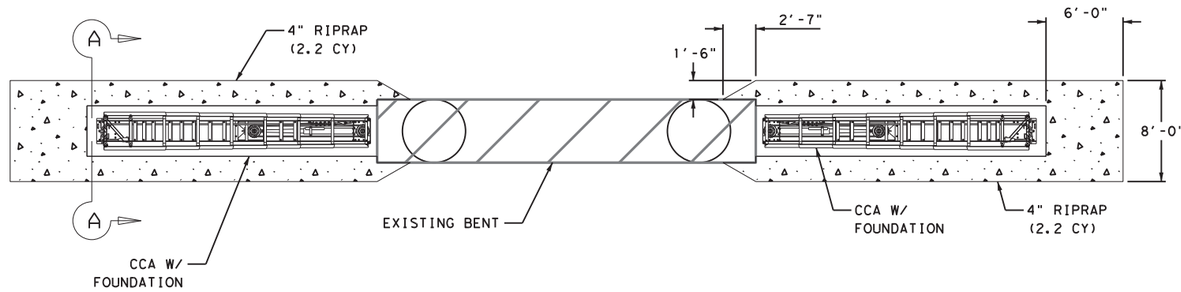
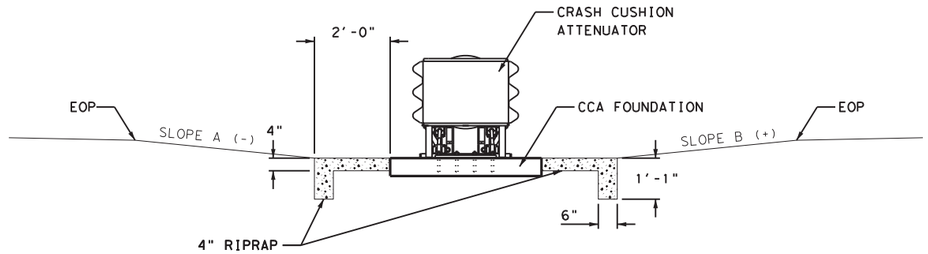




COLUMN PROTECTION DETAIL

NTS



SECTION A-A

NTS

BRIDGE COLUMN PROTECTION ITEMS					
			150	432	545
			6002	6001	6007
LOCATION	SLOPE A	SLOPE B	BLADING	RIPRAP (CONC) (4 IN)	CRASH CUSH ATTEN (INSTL) (L) (N) (TL3)
DISCRIPTION, MM	H:V	H:V	HR	CY	EA
CO RD 40, 40+0.099	12:1	12:1	2	9	4
EVERETT RD, 42+0.187	12:1	12:1	2	9	4
CSJ: 0904-00-197 OLDHAM COUNTY TOTALS			4	18	8
WESTLINE RD, 52+0.458	12:1	12:1	2	9	4
CSJ: 0904-00-197 POTTER COUNTY TOTALS			2	9	4
PROJECT TOTALS			6	27	12

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IH-40

BRIDGE COLUMN PROTECTION DETAIL

SCALE: 1" = 60'

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		40

DATE: 5/26/2021 10:20:46 AM
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\3. Roadway\197_BRIDGE COLUMN PROTECTION EXHIBIT.dgn

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	MM	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	-	37	CO RD 40, BENT BETWEEN WBML AND NORTH FRONTAGE ROAD, WEST SIDE	40+0.099	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
2	-	37	CO RD 40, BENT BETWEEN WBML AND NORTH FRONTAGE ROAD, EAST SIDE	40+0.099	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
3	-	37	CO RD 40, BENT BETWEEN EBML AND SOUTH FRONTAGE ROAD, WEST SIDE	40+0.099	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
4	-	37	CO RD 40, BENT BETWEEN EBML AND SOUTH FRONTAGE ROAD, EAST SIDE	40+0.099	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
5	-	37	EVERETT RD, BENT BETWEEN WBML AND NORTH FRONTAGE ROAD, WEST SIDE	42+0.187	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
6	-	37	EVERETT RD, BENT BETWEEN WBML AND NORTH FRONTAGE ROAD, EAST SIDE	42+0.187	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
7	-	37	EVERETT RD, BENT BETWEEN EBML AND SOUTH FRONTAGE ROAD, WEST SIDE	42+0.187	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
8	-	37	EVERETT RD, BENT BETWEEN EBML AND SOUTH FRONTAGE ROAD, EAST SIDE	42+0.187	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
9	-	37	WESTLINE RD, BENT BETWEEN WBML AND NORTH FRONTAGE ROAD, WEST SIDE	52+0.458	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
10	-	37	WESTLINE RD, BENT BETWEEN WBML AND NORTH FRONTAGE ROAD, EAST SIDE	52+0.458	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
11	-	37	WESTLINE RD, BENT BETWEEN EBML AND SOUTH FRONTAGE ROAD, WEST SIDE	52+0.458	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyise.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
	DIST	COUNTY		
	AMA	POTTER		
	FEDERAL AID PROJECT			SHEET NO.
	F 2021(874)			41

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	MM	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
12	-	37	WESTLINE RD, BENT BETWEEN EBML AND SOUTH FRONTAGE ROAD, EAST SIDE	52+0.458	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMENDATION BEFORE FINALIZING BACKUP SUPPORT- BRIDGE COLUMN	30"	BASED ON MANUFACTURER		1				1					
13	-	36	IN FRONT OF CADILLAC RANCH BETWEEN EBML AND SOUTH FRONTAGE ROAD, WEST SIDE	61+0.650	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMMENDATION BEFORE FINALIZING BACKUP SUPPORT - 42" PCTB	24"	BASED ON MANUFACTURER		1				1					
14	-	36	IN FRONT OF CADILLAC RANCH BETWEEN EBML AND SOUTH FRONTAGE ROAD, EAST SIDE	61+0.923	TL3/ 70 MPH	BI	REINFORCED CONCRETE	6"	CONSULT WITH MANUFACTURER'S RECOMMENDATION BEFORE FINALIZING BACKUP SUPPORT - 42" PCTB	24"	BASED ON MANUFACTURER		1				1					
												TOTALS	14				14					

LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
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FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyise.htm

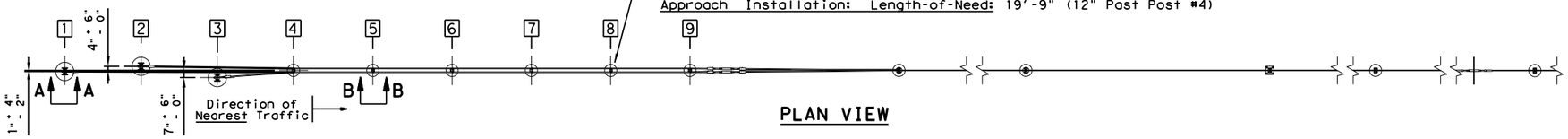
CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
	DIST	COUNTY		
	AMA	POTTER		
	FEDERAL AID PROJECT			SHEET NO.
	F 2021(874)			42

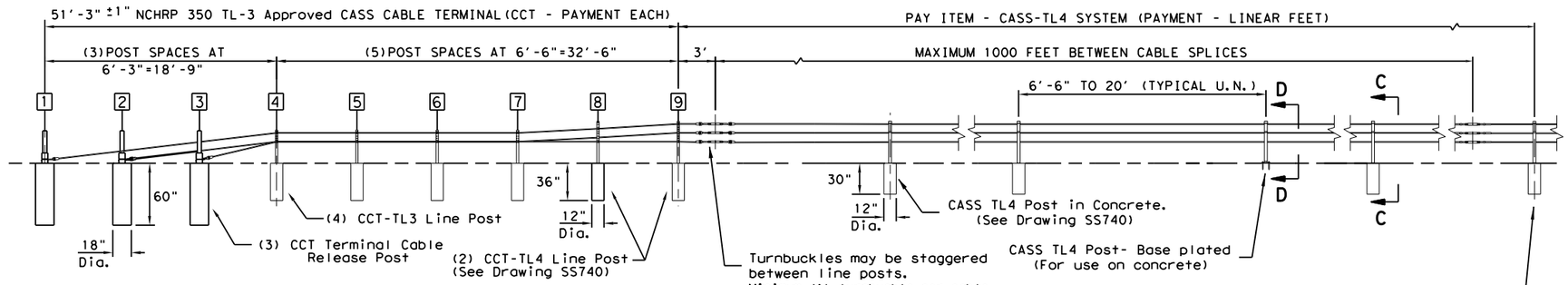
DATE: 5/26/2021
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\3. Roadway\Standards\197 047 CASS (TL4).dgn

Preferred Installation: Locate post #2 away from nearest traffic.
System has been succesfully tested with opposite installation.

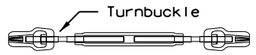
Length-of-Need Cass Cable Terminal (CCT):
Departure Installation: Length-of-Need: 44'-9" (At Post #8)
Approach Installation: Length-of-Need: 19'-9" (12" Past Post #4)



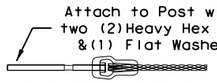
PLAN VIEW



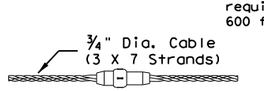
ELEVATION VIEW
(TYPICAL LAY-OUT)



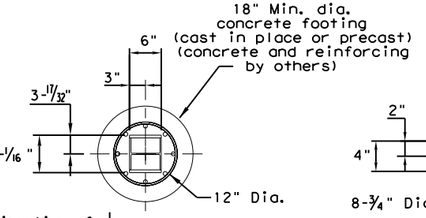
CABLE SPLICE WITH TURNBUCKLE
(OPEN BODY STYLE)



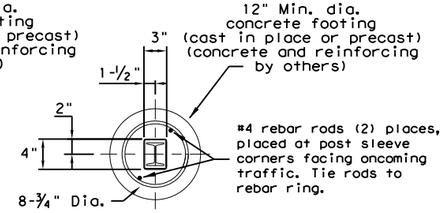
CABLE STUD ASSEMBLY



TORPEDO CABLE SPLICE



SECTION E-E



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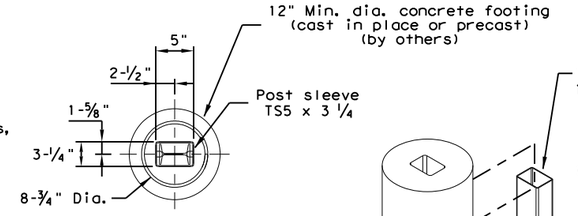

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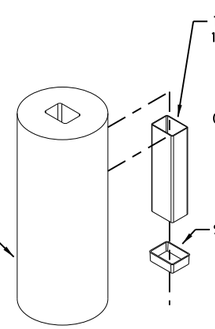
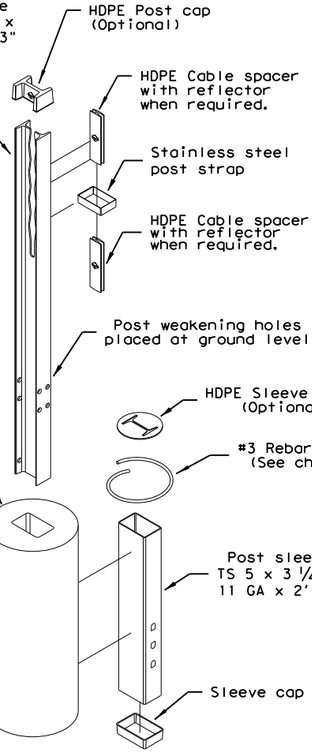
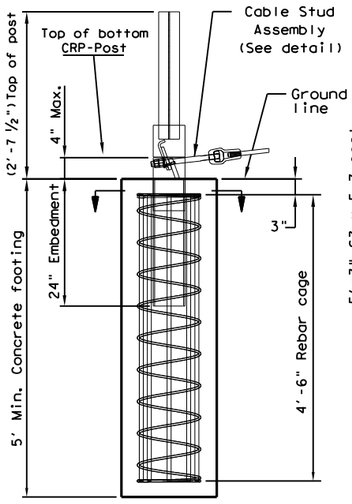


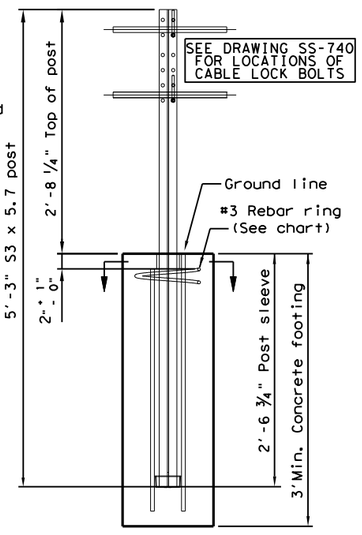
CONCRETE FOOTING
(IN QUALIFYING MOW STRIP SEE CHART)



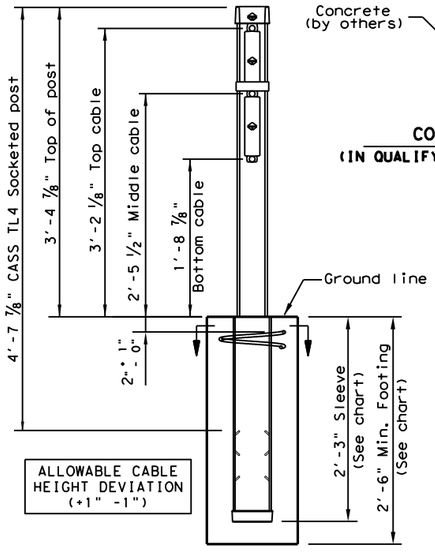
STANDARD POST & CONCRETE FOOTING
(SOCKETED POST)



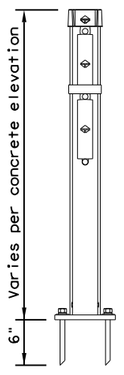
VIEW A-A
(CABLE RELEASE POST 1-3)



VIEW B-B
(TERMINAL LINE POST 4-7)



SECTION C-C
(SOCKETED POST)



SECTION D-D
(BASE PLATED POST)

GENERAL NOTES

1. This drawing is a general overview of CASS TL-4 Barrier System. See SS-740 (latest version) for specific details of CASS cable terminal (CCT) and cable safety system (CASS) requirements, proper installation, options and specification.
2. CASS is designed for bi-directional traffic flows and can be installed on either side of the median. Contact Trinity (800-527-6050) or consult the design, installation, or repair manual(s) for additional information.
3. All concrete for CASS footings shall be TxDOT class A. If class A or stronger concrete is utilized for the mowstrip, please see chart below for allowable footing depth and sleeve deviations.
4. All posts shall be socketed unless otherwise specified. All cables shall be pre-stretched unless otherwise specified.
5. For payment see Special Specification "Cable Barrier System".
6. CASS-TL4 shall be installed on shoulders or medians with slopes of 6:1 or flatter without obstructions, depressions, etc. That may significantly affect the stability of an errant vehicle. Grading of site and/or appropriate fill materials may be required. The designer/installer shall "Flatten" or "Round" various topographical inconsistencies that could interfere with the ability of the installer to consistently maintain the design height (in relation to the terrain) of the cables. Please consult manual(s) and / or TxDOT Memo(s) for installations in "Ditch Sections".
7. CASS TL-4 post spacing may be modified to avoid obstacles that conflict with the installation of cass-tl4 line posts or to reduce deflection on radiuses. No post space can exceed the maximum post TxDOT space limit of 20'. Reducing or increasing post spacing affects deflection. CASS TL-4 may be laterally transferred at a rate not to exceed 30:1.
8. Post foundations may be drilled through existing pavement. Please see line post foundation chart for minimum footing requirements in various applications.
9. For aesthetic purposes Trinity recommends all sleeves, driven posts, and lower cable release posts to be installed reasonably plumb (approximately 1/8" per foot).
10. CASS TL-4 shall be installed in well-drained, compacted, NCHRP Report 350 Standard soil. If soil does not meet this classification, if solid rock/concrete is encountered below grade or if soil is susceptable to severe freeze/thaw cycles, please contact Trinity about alternate footing design(s). Trinity suggests the use of "Mow strips" for erosion prevention and ease of maintenance / installation.
11. See the Texas MUTCD for proper "Barrier" Delineation.

MOW STRIP DETAIL*			CONCRETE FOOTING CHART		
MOW STRIP	DEPTH	WIDTH	FOOTING	TUBE SLEEVE	REBAR RING
NONE			30" Min.	27" Min.	YES
HMA	6" Min.	3' Min.	27" Min.	15" Min.	NO
HMA	8" Min.	3' Min.	24" Min.	15" Min.	NO
RC	3" Min.	3' Min.	24" Min.	15" Min.	NO

Chart does not apply to Terminal Posts 1 thru 9.
* Mow strip or pavement.
HMA = Hot Mix Asphalt (Not Recycled Asphalt Pavement).
RC = Reinforced Concrete (TxDOT Class A Minimum).

CABLE TENSION CHART	
FAHRENHEIT	PRE-STRETCHED
DEGREES	LB / FORCE
-10	7300
0	7000
10	6600
20	6300
30	6000
40	5600
50	5300
60	5000
70	4600
80	4300
90	4000
100	3600
110	3300
120	3000
130	2700
140	2500
150	2300

Allowable deviation from chart in tangent sections: +800, -200 pounds/force. Cable tension readings are typically higher in curved cable sections.

Trinity Highway Products, LLC.
2525 Stemmons Freeway
Dallas, TX 75207
Phone: (800) 644-7976

Product.INFO@TRIN.NET

Texas Department of Transportation
Design Division Standard

TRINITY CABLE SAFETY SYSTEM (TL-4)

CASS (TL4)-14

FILE: casst1414.dgn	DN: TxDOT	CK: RM	DW: VP	CK: TxDOT	
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0904	00	197	IH-40	
	DIST	COUNTY		SHEET NO.	
	AMA	POTTER		43	

DATE: 5/26/2021
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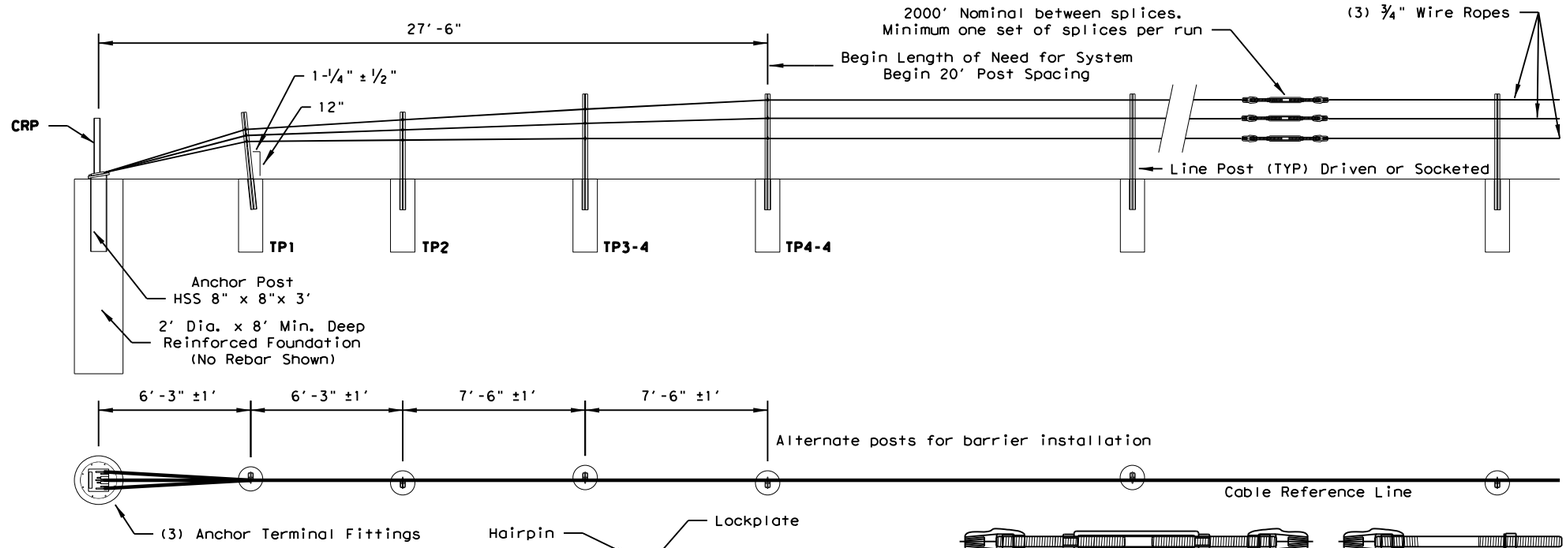
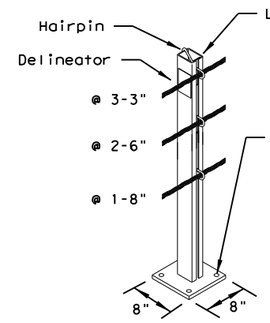
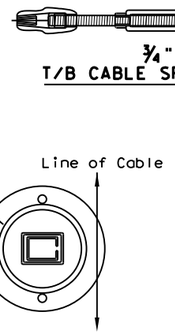
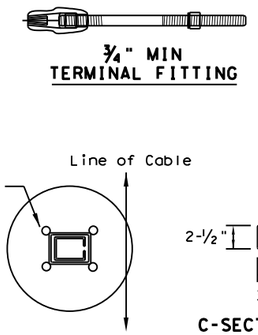




LINE POST
(BASE-PLATED OPTION)
Low-Fill Box Culvert Less than 15" Fill

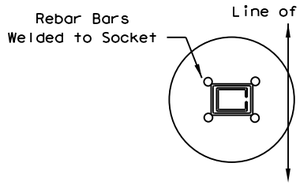


¾" MIN
T/B CABLE SPLICE FITTING



¾" MIN
TERMINAL FITTING

SECTION A

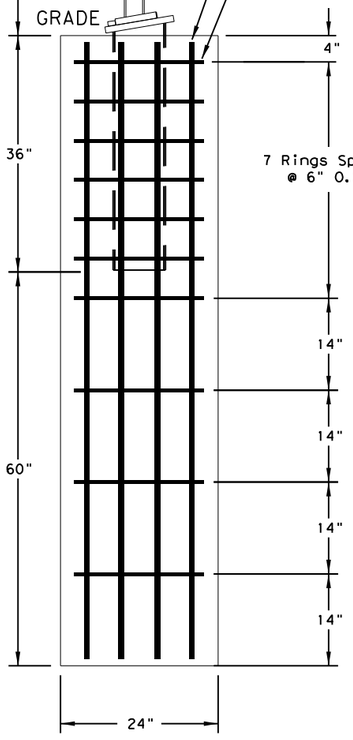


SECTION B

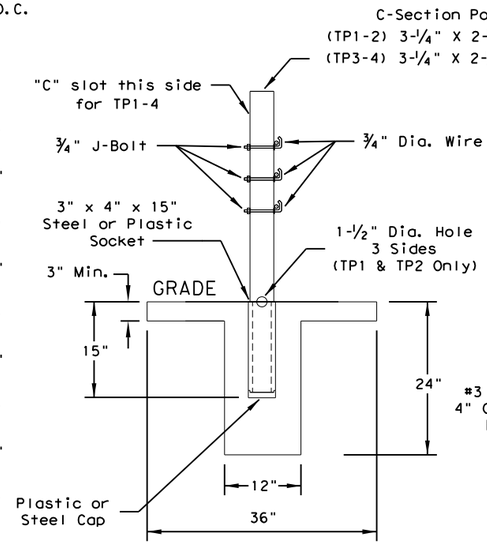
C-SECTION POST

GENERAL NOTES

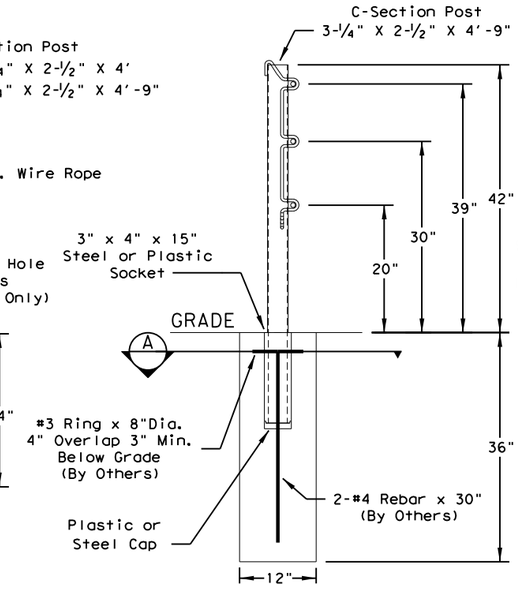
1. For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
2. All concrete shall be CLASS A.
3. The Cable Barrier System shall be installed on shoulders or on medians with slopes of 6:1 or flatter. If installed on slopes steeper than 6:1 up to 4:1 the TL-4 system performs as a TL-3 and Gibraltar must be contacted for various guidelines related to placement.
4. The Cable Barrier System is accepted by the FHWA Test Level - 4.
5. See the Texas MUTCD for proper "Barrier" delineation.
6. Rock Clause: Where solid rock is encountered:
   A. For socketed post, continue digging 12" diameter, 15" deep into rock or the required plan depth, whichever comes first.
   B. For driven post, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
   C. For Anchor post, continue digging 24" diameter, 30" deep into rock or the required plan depth, whichever comes first.
7. Tolerances:
   * LP = 3" out of plumb, at top
   * Cable height = 1"
   * Anchor Post = 5" off of Cable Reference Line
8. The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
9. All non-welded rebar by others.
10. Minimum recommended line post foundation.
    A. Without mowstrip, 36" Deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long
    B. With 4" minimum depth hot mix asphalt, 30" deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long.
    C. With 3" minimum depth concrete mowstrip, 24" deep x 12" diameter foundations. (No rebar required)
    D. Direct drive post 42" deep.



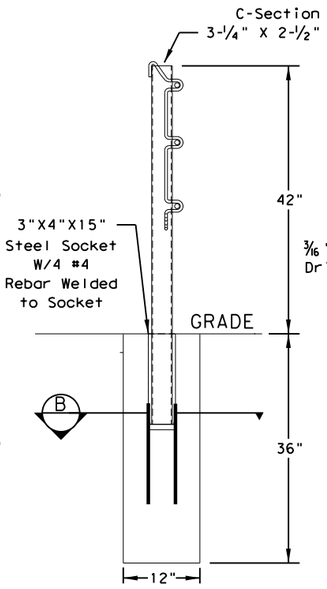
CABLE RELEASE AND ANCHOR POST



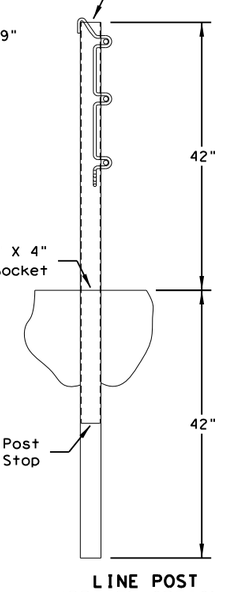
TERMINAL POST
(SHOWN WITH CONCRETE MOWSTRIP)
(Shown with Tube Plate Option)
(See Note 10)



LINE POST SOCKETED
(Shown with Rebar Ring/Bars Socket Option)
(See Note 9)



LINE POST SOCKETED
(Shown with Welded Rebar Socket Option)
(See Note 9)



LINE POST
(DRIVEN OPTION)
(Shown with Driven
Socket Option)
(See Note 9)

DEFLECTION	
Deflection	Post Spacing
8'-0"	20 FT
7'-0"	12 FT
6'-8"	10 FT

* Allowable Deviation from Chart +/- 10%

CABLE TENSION CHART*	
-10 °F	8000
0 °F	7600
10 °F	7200
20 °F	6800
30 °F	6400
40 °F	6000
50 °F	5600
60 °F	5200
70 °F	4800
80 °F	4400
90 °F	4000
100 °F	3600
110 °F	3200

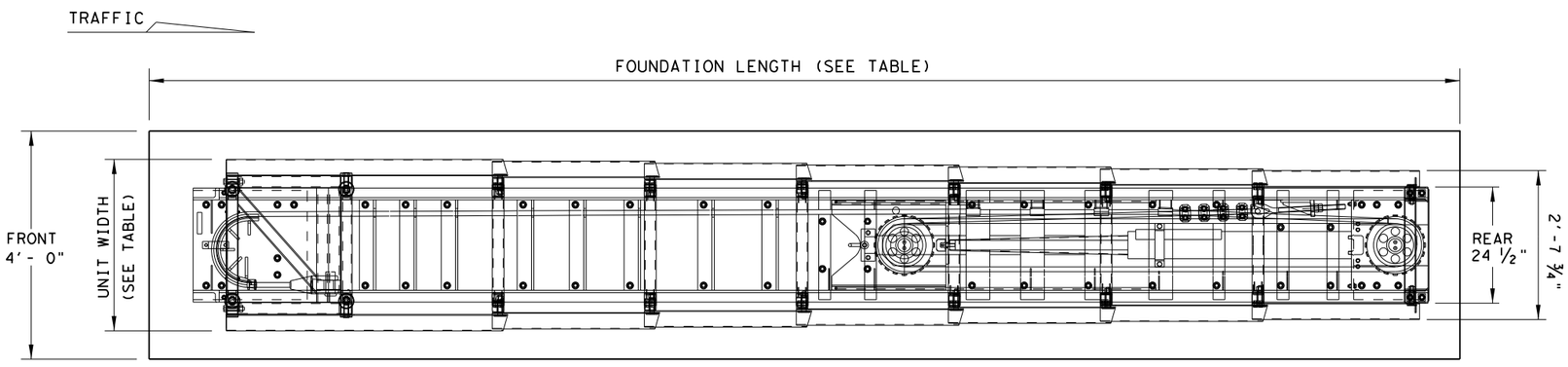
Texas Department of Transportation — Design Division Standard

GIBRALTAR
CABLE BARRIER SYSTEM
(TL-4)

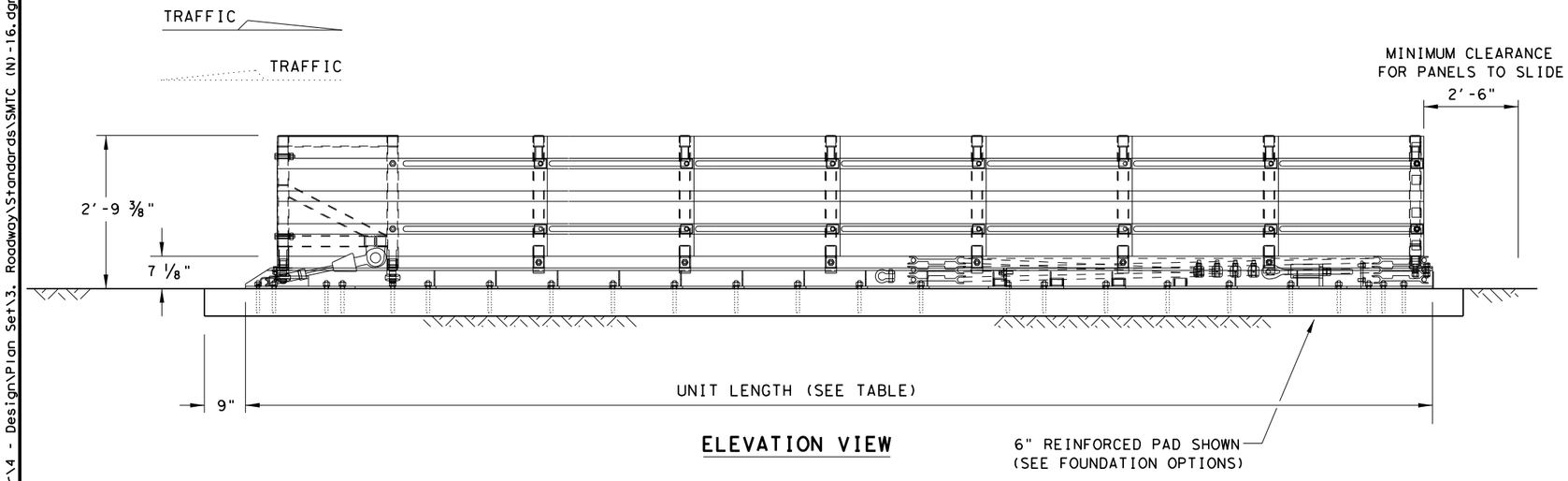
GBRLTR(TL4)-14

FILE: gbrltrtl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		44

DATE: 5/26/2021
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\3. Roadway\Standards\SMTC (N)-16.dgn



PLAN VIEW



ELEVATION VIEW

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: WORK AREA PROTECTION, CORP. AT (800) 327-4417, OR (630) 377-9100.
2. FOR BI-DIRECTIONAL TRAFFIC, APPROPRIATE TRANSITION PANELS WILL BE REQUIRED.
3. ADDITIONAL DETAILS FOR THE TRANSITION OPTION AND FOUNDATION OPTION WILL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS FURNISHED TO THE ENGINEER.
4. CONCRETE SHALL BE CLASS "S" WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
5. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
6. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
7. THE SCI100GM & SCI70GM SYSTEMS SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTERLINE OF MERGING BARRIERS.

NOTE:
FOR ATTACHMENT AND TRANSITIONS TO OTHER SHAPES, BARRIERS, RAILINGS AND BI-DIRECTIONAL TRAFFIC FLOWS ARE AVAILABLE. (SEE MANUFACTURER'S PRODUCT MANUAL)

NOTE:
SIDE PANELS CAN TRAVEL 30" BEYOND THE LAST TERMINAL BRACE AT THE REAR OF THE CUSHION. ALL OBJECTS THAT MAY INTERFERE WITH THIS MOTION CAN AFFECT PERFORMANCE OF AND MAY CAUSE UNDUE DAMAGE TO THE CRASH CUSHION.

MODEL	TEST LEVEL	UNIT LENGTH (approx.)	UNIT WIDTH	FOUNDATION LENGTH	OBSTACLE WIDTH
SCI70GM	TL-2	13'-6"	2'-10 ⅝"	15'- 6 ¼"	24"to 36"
SCI100GM	TL-3	21'-6"	3'-1 ½"	23'- 0"	24"to 36"

SYSTEM AND PAD LENGTHS VARY DEPENDING ON BACKUP TYPE.

FOUNDATION OPTIONS
6" REINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
8" UNREINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
3" MIN. ASPHALT OVER 3" MIN. CONCRETE (16 ½" ANCHOR EMBED.)
6" ASPHALT OVER 6" COMPACT SUBBASE (16 ½" ANCHOR EMBED.)
8" MINIMUM ASPHALT (16 ½" ANCHOR EMBEDMENT)

FOR STEEL PLACEMENT IN CONCRETE FOUNDATIONS, SEE MANUFACTURER'S PRODUCT MANUAL.

TRANSITION OPTIONS
CONCRETE VERTICAL WALL
CONCRETE TRAFFIC BARRIERS
GUARDRAIL (W-BEAM)
GUARDRAIL (THRIE-BEAM)

TRANSITION TYPES ARE SHOWN ELSEWHERE ON THE PLANS (I.E. ATTENUATOR LOCATION DETAILS OR IN THE GENERAL NOTES).

FOR BI-DIRECTIONAL TRANSITION PANEL AND END SHOE DETAILS, SEE MANUFACTURER'S PRODUCT MANUAL.

LOW MAINTENANCE

Texas Department of Transportation

Design Division Standard

WORK AREA PROTECTION CORP (SMART-NARROW)

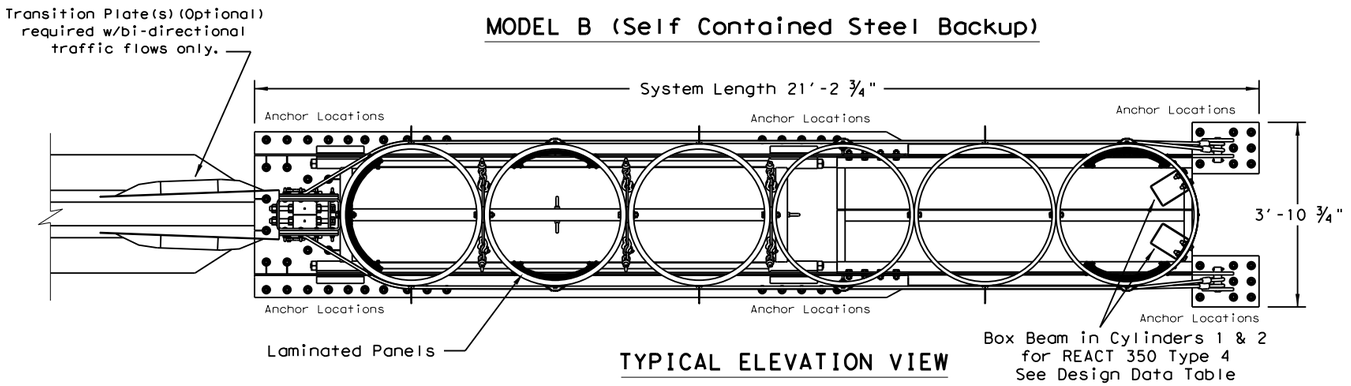
SMTC(N)-16

FILE: smtcn16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
© TxDOT: February 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
REVISED 06, 2013 (VP) REVISED 03, 2016 (VP)	DIST	COUNTY		SHEET NO.
	AMA	POTTER		45

DATE: 5/26/2021
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\3. Roadway\Standards\REACT(N)-16.dgn

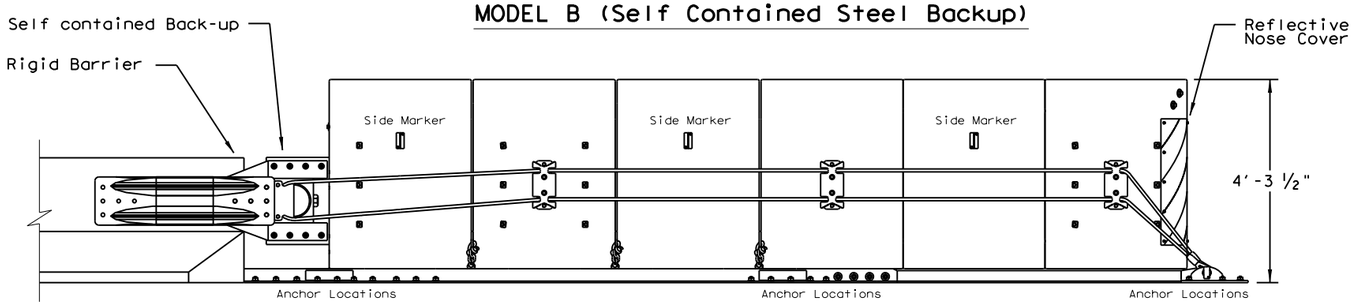
TYPICAL PLAN VIEW

MODEL B (Self Contained Steel Backup)



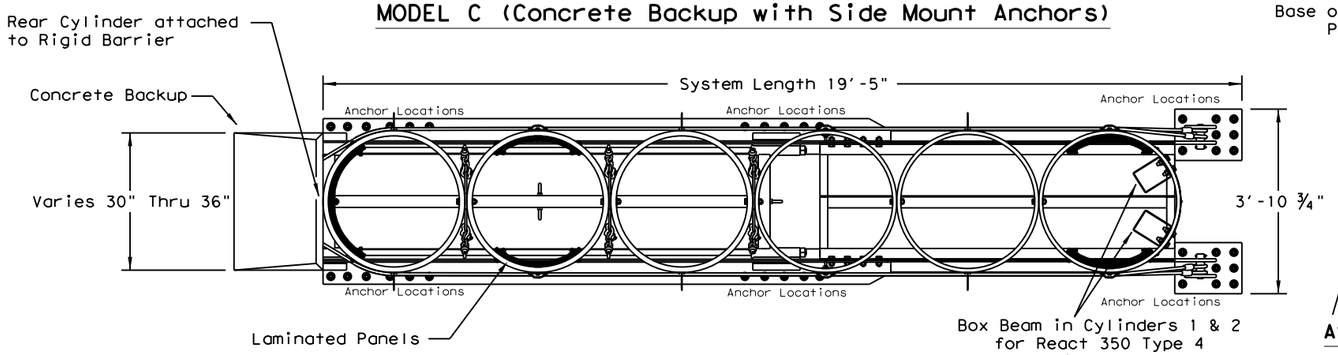
TYPICAL ELEVATION VIEW

MODEL B (Self Contained Steel Backup)



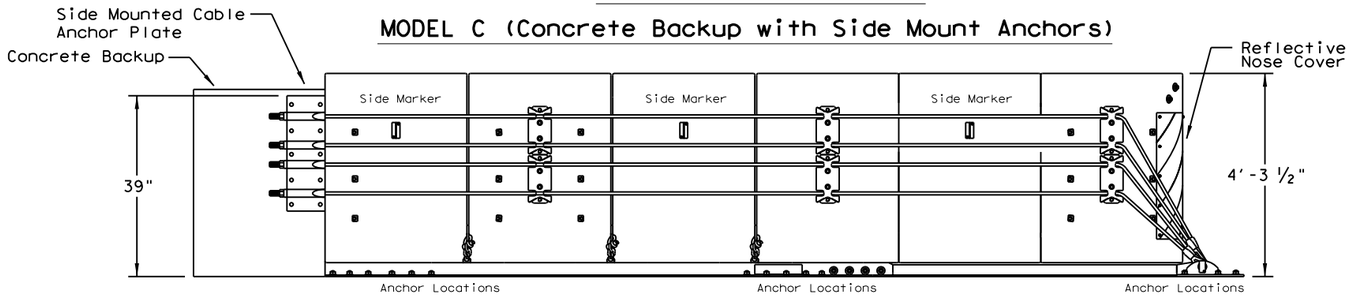
TYPICAL PLAN VIEW

MODEL C (Concrete Backup with Side Mount Anchors)



TYPICAL ELEVATION VIEW

MODEL C (Concrete Backup with Side Mount Anchors)

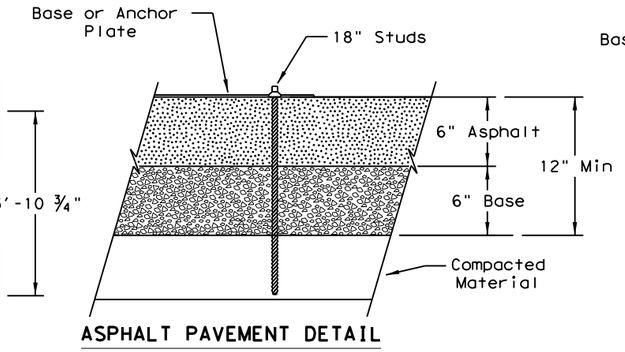


GENERAL NOTES

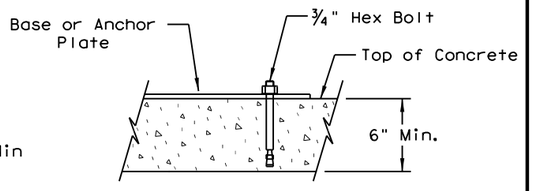
1. For specific information regarding installation and technical guidance of the system, contact: Trinity Highway - Energy Absorption at 1(888)323-6374. 70 W. Madison St. Suite 2350. Chicago, IL 60602
2. The nose of the REACT 350 shall be clad with a plastic wrap with standard delineation adhered to the wrap and shall have a series of side marker reflectors on both sides of the unit. See site plan views for marker and plastic wrap color orientation.
3. All steel components to be hot dipped galvanized except stakes, drive spikes, threaded bolts in backup unit, and wedge fittings on cables.
4. The installation area should be free from curbs, elevated objects, or depressions. If the REACT system is to span expansion joints contact the manufacturer.
5. The REACT system should be approximately parallel with the barrier or ℄ of merging barriers. The maximum permissible cross-slope is 8%.
6. REACT 350 II has laminated panels in cyliners 1, 5, & 6.

DESIGN DATA TABLE FOR REACT 350 AND REACT 350 II				
TYPE	REACT 350 4-B	REACT 350 4-C	REACT 350 II 6-B	REACT 350 II 6-C
Test Level	TL-2	TL-2	TL-3	TL-3
OVERALL LENGTH	15'-3"	13'-9"	21'-3"	19'-5"

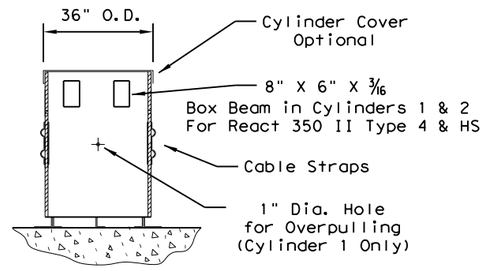
FOUNDATION AND ANCHORAGE TABLE FOR REACT 350 AND REACT 350 II			
FOUNDATION TYPE		MINIMUM THICKNESS	ANCHORAGE
A	CONCRETE PAD OR ROADWAY	6"	MP-3 WITH 7" STUDS [5.5" EMBEDMENT]
B	ASPHALT OVER CONCRETE PAVEMENT	6" CONCRETE PAVEMENT	ANCHOR LENGTH REQUIRED IS 7" STUD PLUS ASPHALT THICKNESS
C	ASPHALT OVER BASE	6" ACP + 6" BASE	MP-3 WITH 18" STUDS [16.5" EMBEDMENT]
D	ASPHALT ONLY	8"	MP-3 WITH 18" STUDS [16.5" EMBEDMENT]



ASPHALT PAVEMENT DETAIL



CONCRETE PAVEMENT DETAIL



TYPICAL CYLINDER

LOW MAINTENANCE

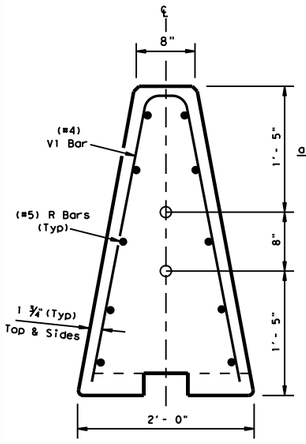
Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION (REACT 350 NARROW) (REACT 350 II NARROW)

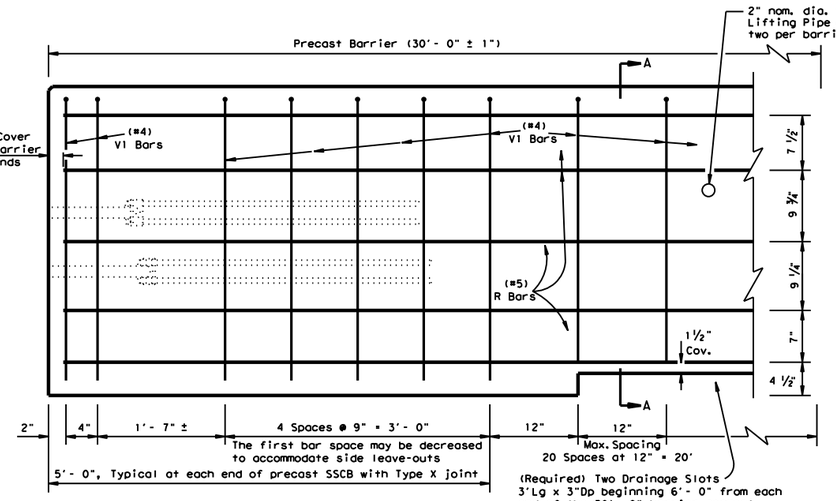
REACT(N)-16

FILE: reactn16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
REVISED 06,2013 (VP)	DIST	COUNTY		SHEET NO.
REVISED 03,2016 (VP)	AMA	POTTER		46



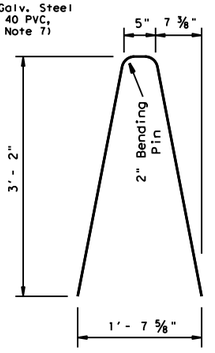
End View
Precast Barrier

Pipe locations for Joint Type X connection



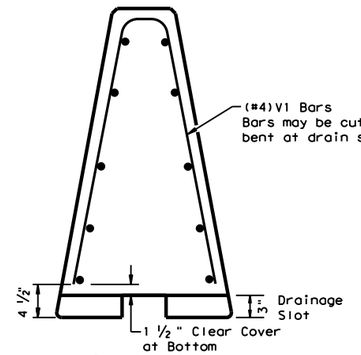
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



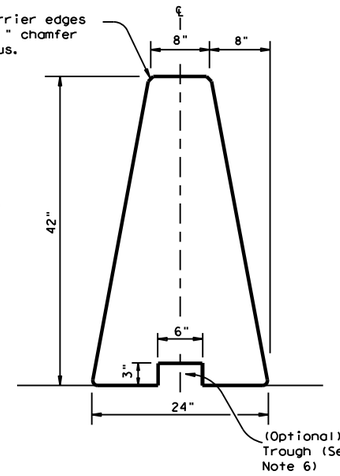
V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.



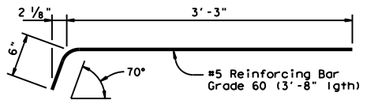
Section A-A
Steel Placement at (Required) Drainage Slots

All precast barrier edges shall have a ¾" chamfer or tooled radius.



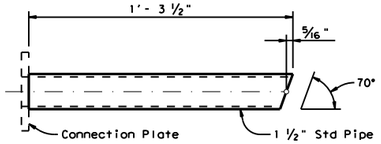
Single Slope Concrete Traffic Barrier

Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



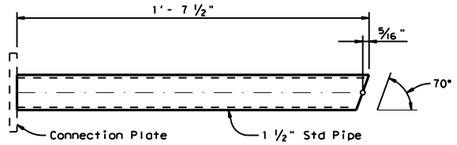
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



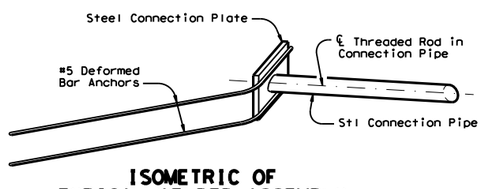
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.

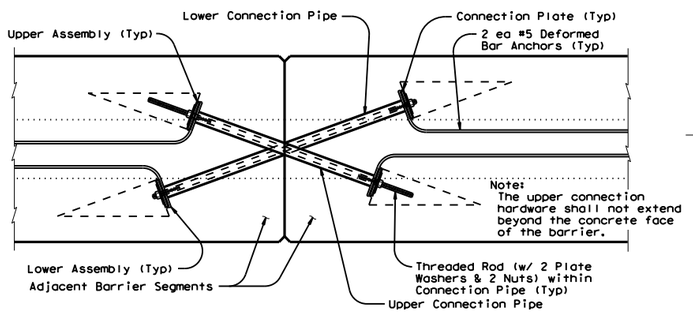


ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.

General Notes

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

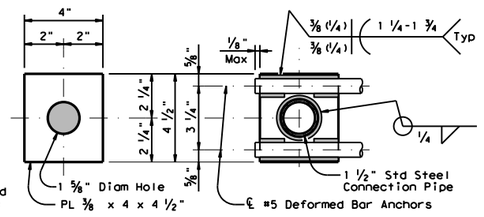
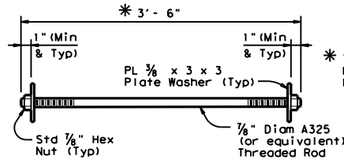


PLATE DIMENSIONS **WELDING DETAILS**

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.

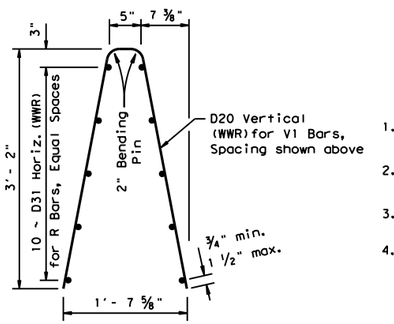


✱ The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts) (w/ Two (2) PL ⅜ x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per Joint.

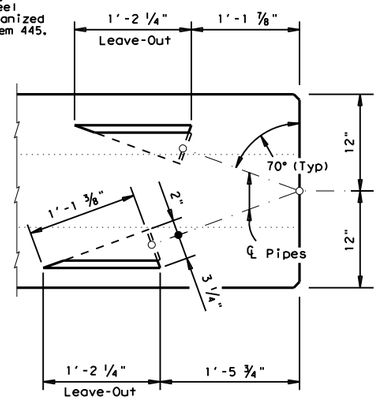
Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.



Welded Wire Reinforcement (WWR) Option for Bars R and V1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		47

DATE: 5/26/2021
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DATE: 5/26/2021
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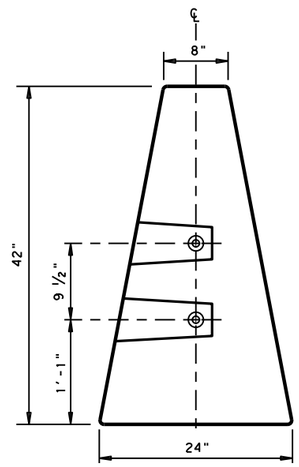
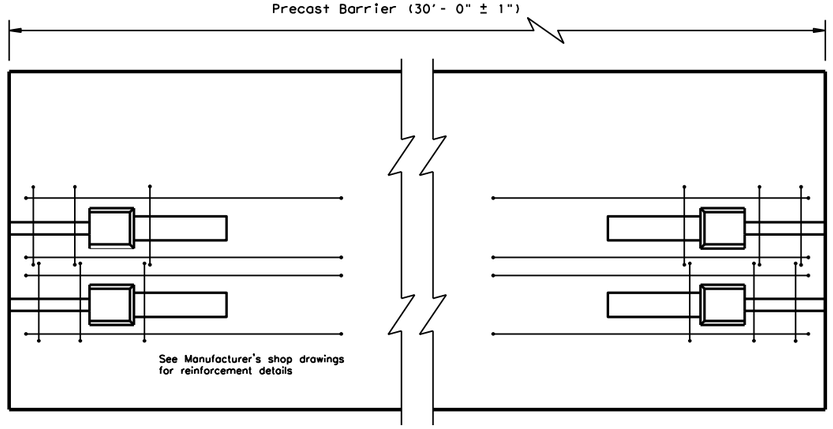
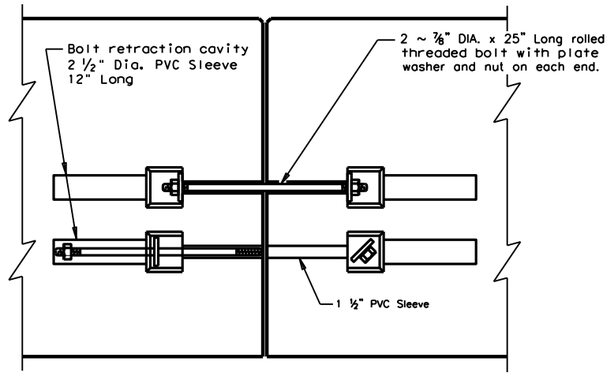


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

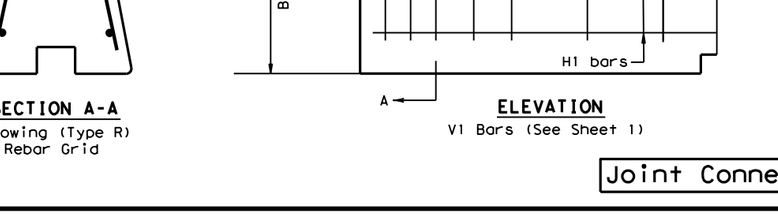


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

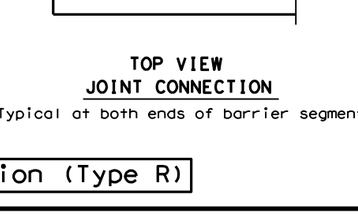


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

Joint Connection (Type Q)



TOP VIEW
PRECAST (SSCB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION

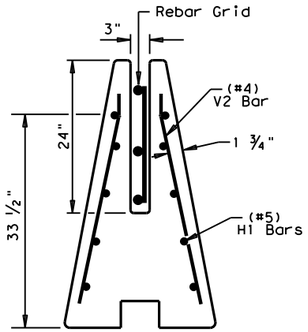
END VIEW

Proprietary Joint Connections (SSCB)

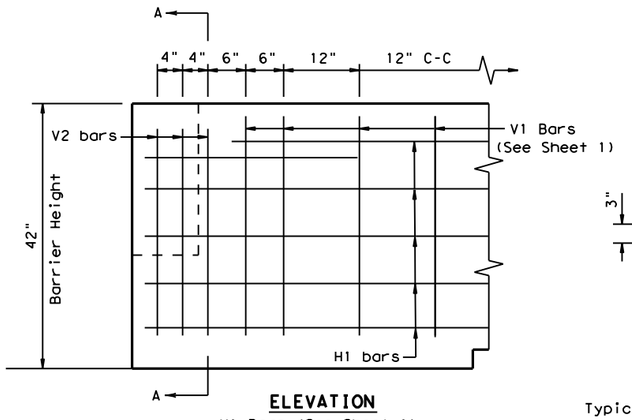
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

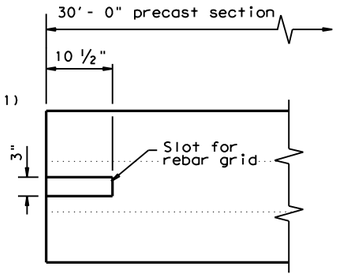
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



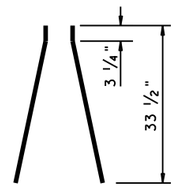
SECTION A-A
Showing (Type R) Rebar Grid



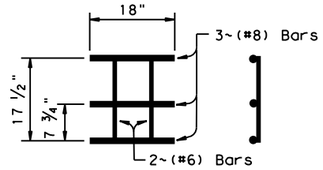
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per barrier segment



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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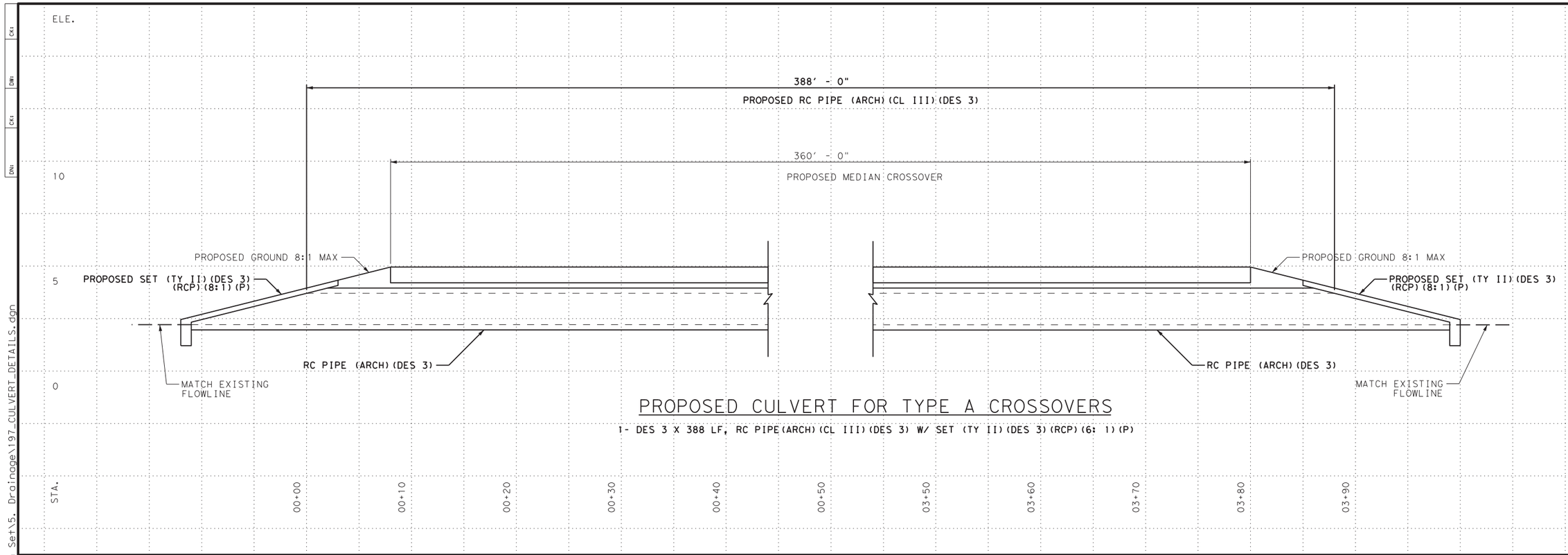
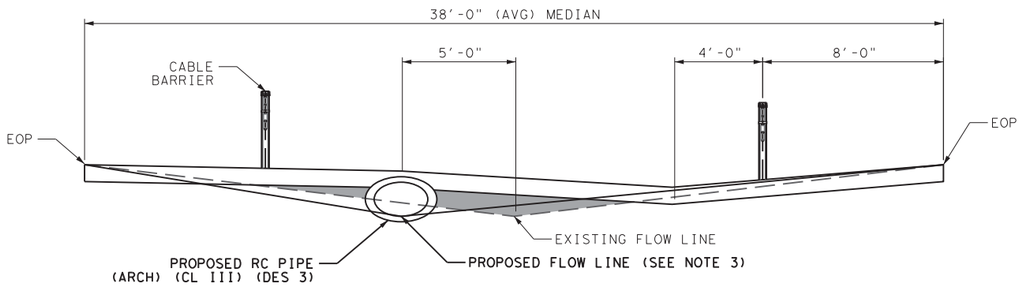
	AMA	POTTER		48



PROPOSED CULVERT FOR TYPE A CROSSOVERS

1- DES 3 X 388 LF, RC PIPE (ARCH) (CL III) (DES 3) W/ SET (TY II) (DES 3) (RCP) (6: 1) (P)

PROPOSED TYPE A CULVERT DRAINAGE ITEMS			
LOCATION		464 6032 RC PIPE (ARCH) (CL III) (DES 3)	467 6603 SET (TY II) (DES 3) (RCP) (8:1) (P)
START MM	END MM	LF	EA
19+0.889	19+0.962	388	2
CSJ: 0904-00-197 OLDHAM COUNTY TOTALS		388	2
53+0.138	53+0.254	388	2
56+0.883	56+0.956	388	2
CSJ: 0904-00-197 OLDHAM COUNTY TOTALS		776	4
PROJECT TOTALS		1,164	6



PROPOSED CULVERT CROSS SECTIONAL VIEW

NTS

NOTES:

1. SHIFT FLOW LINE HORIZONTALLY 5' WHILE MAINTAINING EXISTING FLOW LINE ELEVATION.
2. SEE MEDIAN CROSSOVER DETAILS FOR ADDITIONAL INFORMATION.
3. ELEVATION IS IN REFERENCE TO SCALE ONLY.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED CULVERT DETAIL

SCALE: H: 1" = 10'
V: 1" = 5'

2021 Texas Department of Transportation

SHEET 1 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		49

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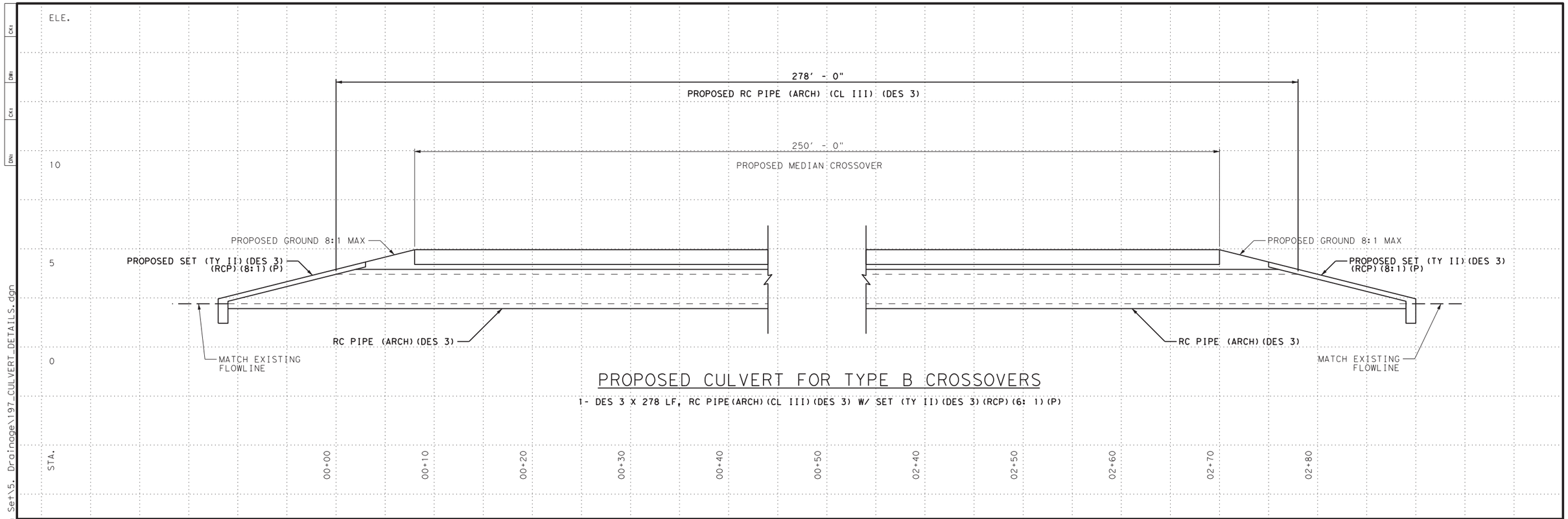
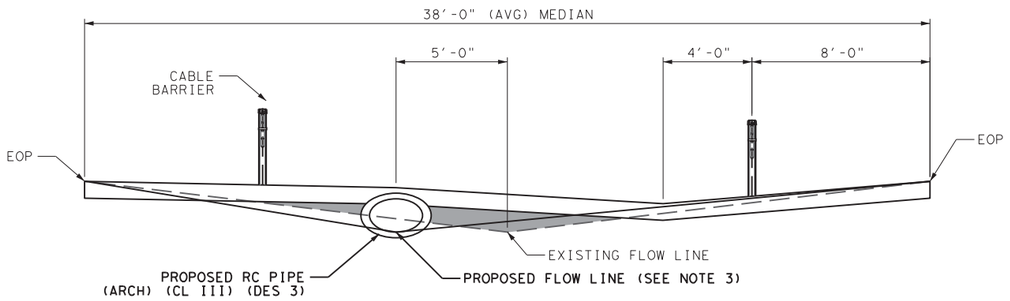


PROPOSED CULVERT FOR TYPE B CROSSOVERS

1- DES 3 X 278 LF, RC PIPE (ARCH) (CL III) (DES 3) W/ SET (TY II) (DES 3) (RCP) (6: 1) (P)

PROPOSED TYPE B CULVERT DRAINAGE ITEMS			
LOCATION		464 6032 RC PIPE (ARCH) (CL III) (DES 3)	467 6603 SET (TY II) (DES 3) (RCP) (8:1) (P)
START MM	END MM	LF	EA
54+0.853	54+0.906	278	2
59+0.267	59+0.319	278	2
CSJ: 0904-00-197 POTTER COUNTY TOTALS		556	4
PROJECT TOTALS		556	4



PROPOSED CULVERT CROSS SECTIONAL VIEW

NTS

NOTES:

1. SHIFT FLOW LINE HORIZONTALLY 5' WHILE MAINTAINING EXISTING FLOW LINE ELEVATION.
2. SEE MEDIAN CROSSOVER DETAILS FOR ADDITIONAL INFORMATION.
3. ELEVATION IS IN REFERENCE TO SCALE ONLY.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

PROPOSED CULVERT DETAIL

SCALE: H: 1" = 10'
V: 1" = 5'

2021 Texas Department of Transportation

SHEET 2 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
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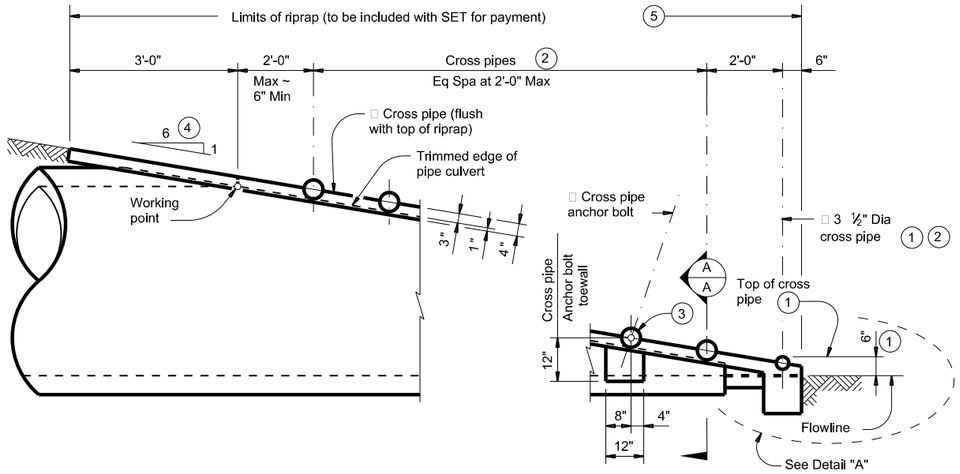


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details of corrugated metal pipe (CMP) culvert are similar. pipe runners not shown for clarity.)

CROSS PIPE LENGTHS AND REQUIRED PIPE SIZES (2)

Corrugated Metal Pipe (CMP) Culverts

Design	Conc Riprap (CY) (6)	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	17"	13"	1' - 0"	N/A	2' - 8"	2' - 5"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	21"	15"	1' - 2"	N/A	3' - 1"	2' - 11"		
3	0.9	28"	20"	1' - 5"	N/A	3' - 9"	3' - 9"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
4	1.0	35"	24"	1' - 8"	4' - 4"	4' - 6"	4' - 7"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	42"	29"	1' - 11"	4' - 11"	5' - 2"	5' - 5"		
6	1.4	49"	33"	2' - 2"	5' - 6"	5' - 11"	6' - 3"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	57"	38"	2' - 5"	6' - 2"	6' - 8"	7' - 2"		
8	1.8	64"	43"	2' - 10"	6' - 9"	7' - 6"	8' - 2"		
9	1.9	71"	47"	3' - 2"	7' - 4"	8' - 3"	9' - 1"		

Reinforced Concrete Pipe (RCP) Culverts

Design	Conc Riprap (CY) (6)	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	22"	13 ½"	1' - 0"	N/A	3' - 1"	2' - 10"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	26"	15 ½"	1' - 2"	N/A	3' - 6"	3' - 4"		
3	0.9	28 ½"	18"	1' - 5"	N/A	3' - 10"	3' - 9 ½"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
4	1.0	36 ¼"	22 ½"	1' - 8"	4' - 5"	4' - 7"	4' - 8 ¼"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	43 ¾"	26 b"	1' - 11"	5' - 1"	5' - 4"	5' - 6 ¾"		
6	1.4	51 ß"	31 Ð"	2' - 2"	5' - 8"	6' - 1"	6' - 5 ¼"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	58 ½"	36"	2' - 5"	6' - 4"	6' - 10"	7' - 3 ½"		
8	1.8	65"	40"	2' - 10"	6' - 10"	7' - 7"	8' - 3"		
9	1.9	73"	45"	3' - 2"	7' - 6"	8' - 5"	9' - 3"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third Cross Pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one pipe culvert. For multiple Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

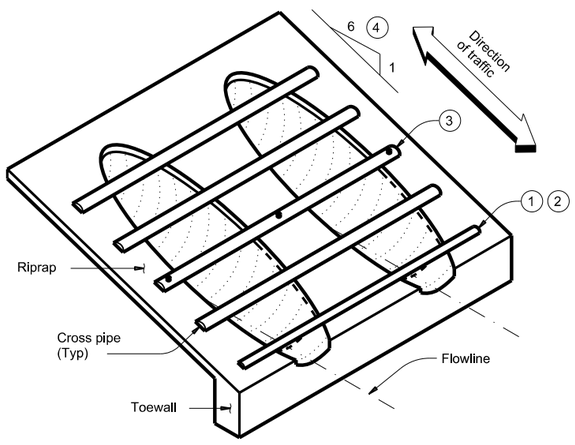
GENERAL NOTES:

Pipe runners are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

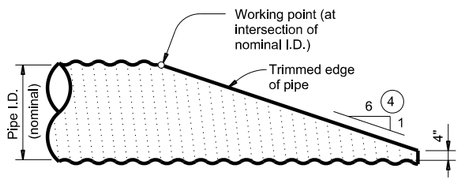
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the price bid for each safety end treatment.



ISOMETRIC VIEW OF TYPICAL INSTALLATION



NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete cipe (RCP) culvert are similar.)

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR DESIGN 1 TO 9
ARCH PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD-A

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
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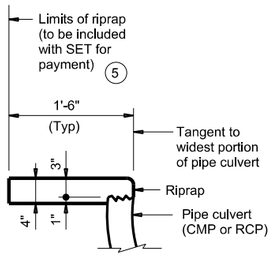
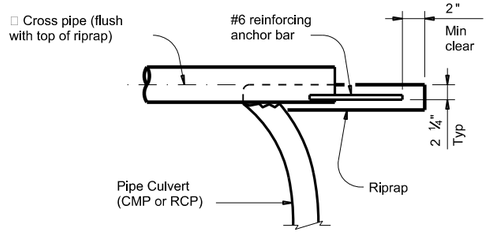
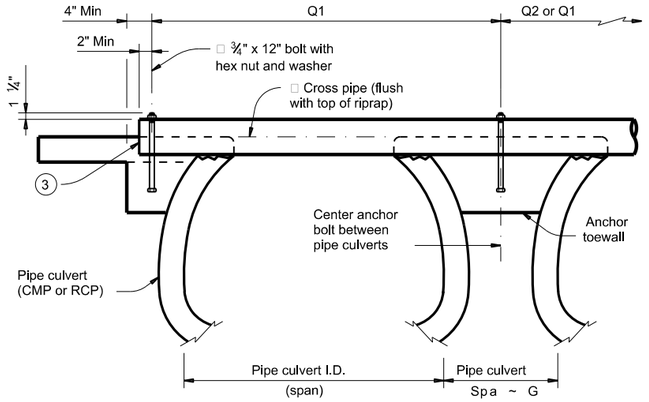


SHOWING TYPICAL PIPE CULVERT AND RIPRAP

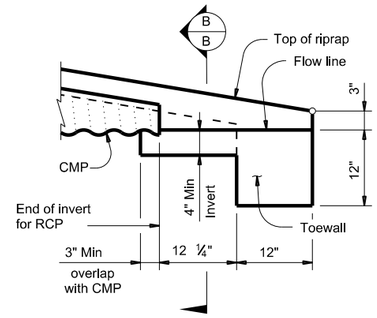


SHOWING CROSS PIPE WITH ANCHOR BAR



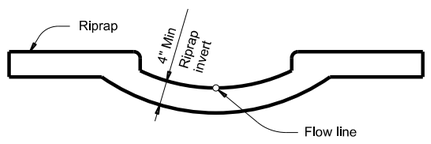
SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



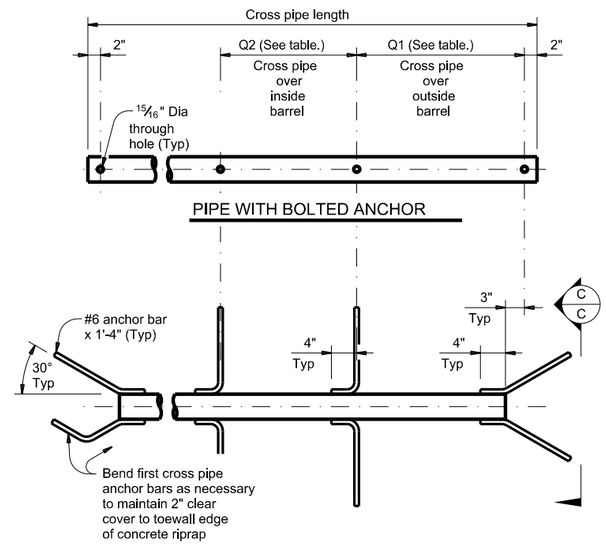
DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



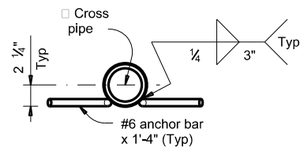
SECTION B-B

(Cross pipes not shown for clarity.)



PIPE WITH BOLTED ANCHOR

PIPE WITH ANCHOR BARS



SECTION C-C

CROSS PIPE DETAILS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR DESIGN 1 TO 9
ARCH PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD-A

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REVISIONS	0904	00	197	IH-40
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	AMA	POTTER		52

DATE: 5/26/2021
FILE: T:\AMA\TPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\8. Traffic\197_SOSS.dgn

SUMMARY OF SMALL SIGNS - CSJ: 0904-00-197 OLDHAM COUNTY

MM	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	Posts: 1 or 2	ANCHOR TYPE: UA=Univer-Conc, UB=Univer-Bolt, SA=Slip-Conc, SB=Slip-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain", T ="T", U ="U", B = BRIDGE MOUNT	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext., BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Chan., EXAL= Extruded Aluminum	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY =TYPE: TY N, TY S
16+0.458	1	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
16+0.789	2	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
17+0.525	3	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
17+0.708	4	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
18+0.169	5	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
18+0.325	6	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
18+0489	7	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
19+0.834	8	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
20+0.016	9	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
21+0.258	10	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
22+0.899	11	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
23+0.068	12	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
23+0.262	13	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
SQUARE FEET	MINIMUM THICKNESS
LESS THAN 7.5	0.100"
7.5 or Greater	0.125"

THE STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD) CAN BE FOUND AT THE FOLLOWING WEBSITE.
HTTP://WWW.TXDOT.GOV/

NOTE:

1. SIGN SUPPORTS SHALL BE LOCATED AS SHOWN ON THE PLANS, EXCEPT THAT THE ENGINEER MAY SHIFT THE SIGN SUPPORTS, WITHIN DESIGN GUIDELINES, WHERE NECESSARY TO SECURE A MORE DESIRABLE LOCATION OR TO AVOID CONFLICT WITH UTILITIES. UNLESS OTHERWISE SHOWN ON THE PLANS, THE CONTRACTOR SHALL STAKE AND THE ENGINEER WILL VERIFY ALL SIGN SUPPORT LOCATIONS.
2. FOR INSTALLATION OF BRIDGE MOUNT CLEARANCE SIGNS, SEE BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY (BMCS)STANDARD SHEET.
3. FOR SIGN SUPPORT DESCRIPTIVE CODES, SEE SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS SMD(GEN).
4. REPLACE SIGN FACE ON EXISTING BRIDGE MOUNT USING ITEM 636-6007.

Texas Department of Transportation | Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: SUMS16.DGN	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT MAY 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
4-16	DIST	COUNTY		SHEET NO.
8-16	AMA	POTTER		53

18

SUMMARY OF SMALL SIGNS - CSJ: 0904-00-197 OLDHAM COUNTY (CONTINUED)

MM	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	Posts: 1 or 2	ANCHOR TYPE: UA=Univer-Conc, UB=Univer-Bolt, SA=Slip-Conc, SB=Slip-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain", T ="T", U ="U", B = BRIDGE MOUNT	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Chan, EXAL= Extruded Aluminum	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY =TYPE TY N TY S
26+0.868	14	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
27+0.020	15	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
27+0.906	16	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
28+0.089	17	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
28+0.141	18	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
29+0.237	19	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
35+0.781	20	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
35+0.964		R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
37+0.286		R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
37+0.448		R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
SQUARE FEET	MINIMUM THICKNESS
LESS THAN 7.5	0.100"
7.5 or Greater	0.125"

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: SUMS16.DGN	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT MAY 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
4-16	DIST	COUNTY		SHEET NO.
8-16	AMA	POTTER		54

18

DATE: 5/26/2021
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\8. Traffic\197_SOSS.dgn

SUMMARY OF SMALL SIGNS - CSJ: 0904-00-197 POTTER COUNTY

MM	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	Posts: 1 or 2	ANCHOR TYPE: UA=Univer-Conc, UB=Univer-Bolt, SA=Slip-Conc, SB=Slip-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain", T ="T", U ="U", B = BRIDGE MOUNT	1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Chan, EXAL= Extruded Aluminum	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY =TYPE, TY N, TY S
52+0.283	21	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
52+0412	22	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
52+0.445	23	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
53+0.110	24	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
53+0.291	25	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
54+0.619	26	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
54+0.798	27	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
54+0.864	28	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
54+0.961	29	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
55+0.598	30	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)**	48 x 48	X							
56+0.828	31	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
57+0.011	32	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		
59+0.212	33	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY	48 x 48	X		10BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
SQUARE FEET	MINIMUM THICKNESS
LESS THAN 7.5	0.100"
7.5 or Greater	0.125"

THE STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD) CAN BE FOUND AT THE FOLLOWING WEBSITE.
HTTP://WWW.TXDOT.GOV/

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1. SIGN SUPPORTS SHALL BE LOCATED AS SHOWN ON THE PLANS, EXCEPT THAT THE ENGINEER MAY SHIFT THE SIGN SUPPORTS, WITHIN DESIGN GUIDELINES, WHERE NECESSARY TO SECURE A MORE DESIRABLE LOCATION OR TO AVOID CONFLICT WITH UTILITIES. UNLESS OTHERWISE SHOWN ON THE PLANS, THE CONTRACTOR SHALL STAKE AND THE ENGINEER WILL VERIFY ALL SIGN SUPPORT LOCATIONS.
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3. FOR SIGN SUPPORT DESCRIPTIVE CODES, SEE SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS SMD(GEN).
4. REPLACE SIGN FACE ON EXISTING BRIDGE MOUNT USING ITEM 636-6007.

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: SUMS16.DGN	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT MAY 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
4-16 8-16	DIST	COUNTY		SHEET NO.
	AMA	POTTER		55

18

DATE: 5/26/2021
FILE: T:\AMA\PDN\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\8. Traffic\197_SOSS.dgn

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 5/26/2021
FILE: T:\AMA\TPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\8. traffic\197_SOSS.dgn

SUMMARY OF SMALL SIGNS - CSJ: 0904-00-197 POTTER COUNTY (CONTINUED)

MM	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	Posts: 1 or 2	ANCHOR TYPE: UA=Univer-Conc, UB=Univer-Bolt, SA=Slip-Conc, SB=Slip-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T ="T", U ="U", B = BRIDGE MOUNT	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Chan, EXAL= Extruded Aluminum	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY =TYPE TY N TY S
59+0.374	34	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY 	48 x 48	X		10BWG	1	SA	T		
61+0.217	35	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)** 	48 x 48	X							
21+0.612	36	R5-11T	FOR OFFICIAL OR EMERGENCY VEH USE ONLY **(REMOVE. DO NOT REPLACE)** 	48 x 48	X							

ALUMINUM SIGN BLANKS THICKNESS	
SQUARE FEET	MINIMUM THICKNESS
LESS THAN 7.5	0.100"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

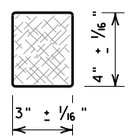
SOSS

FILE: SUMS16.DGN	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT MAY 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
4-16	DIST	COUNTY		SHEET NO.
8-16	AMA	POTTER		56

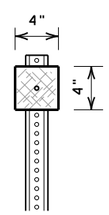
18

DATE: 5/26/2021 10:21:23 AM
FILE: T:\AMA\PD\Construction Projects\0904-00\197 - Cable Median Barrier\4 of 5\ama_dom1-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

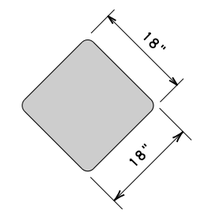
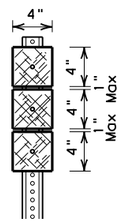
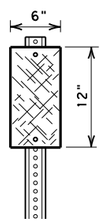
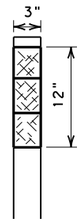
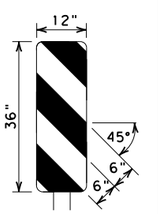
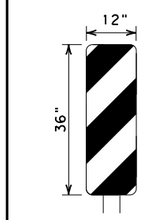
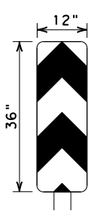
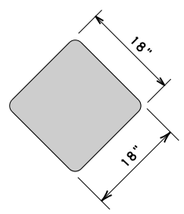
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

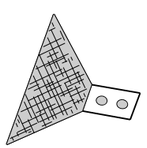
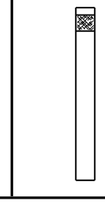
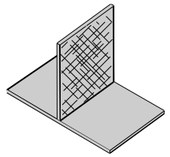
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

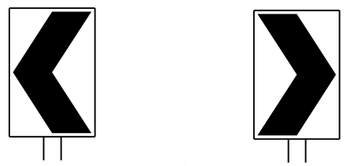
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



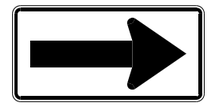
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	POTTER		57

20A

DATE: 5/26/2021 10:21:25 AM
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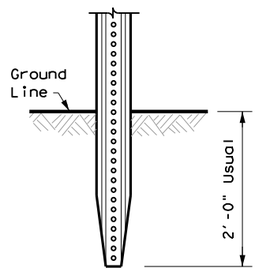
POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

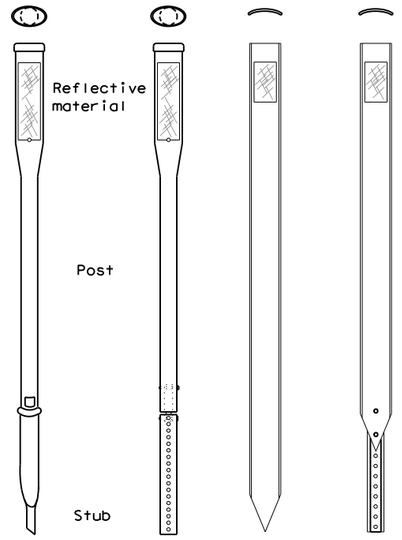


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

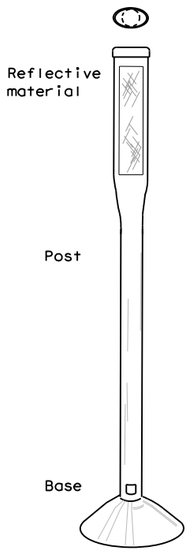
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



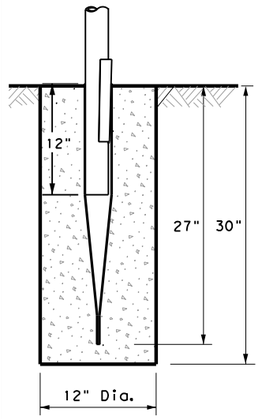
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

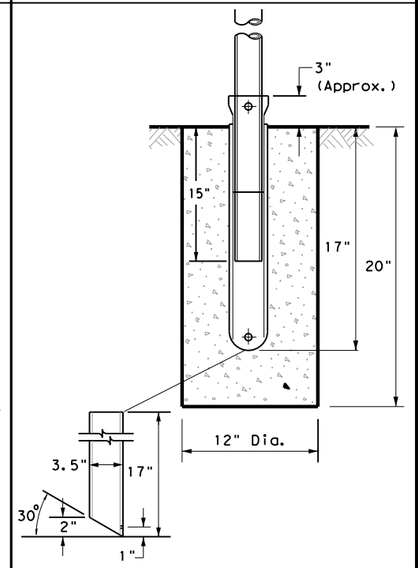
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

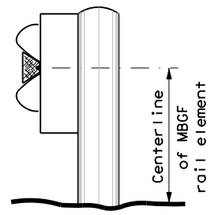
NOTE

1. Install per manufacturer's recommendations.

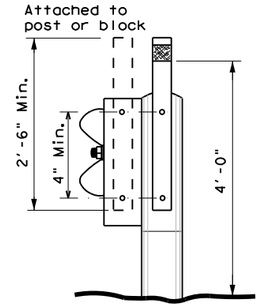
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

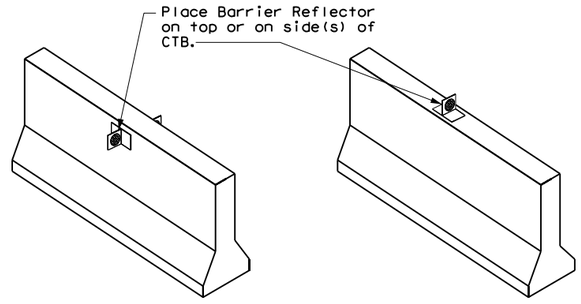
GF1



GF2



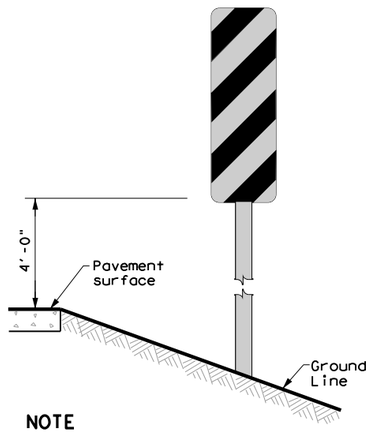
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

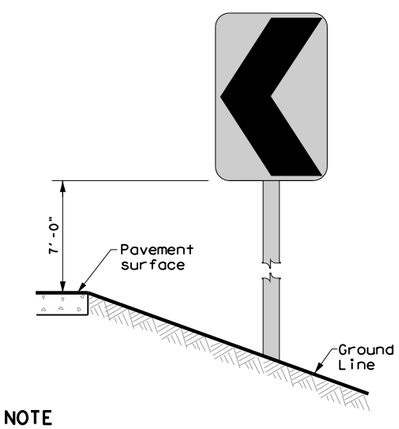
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

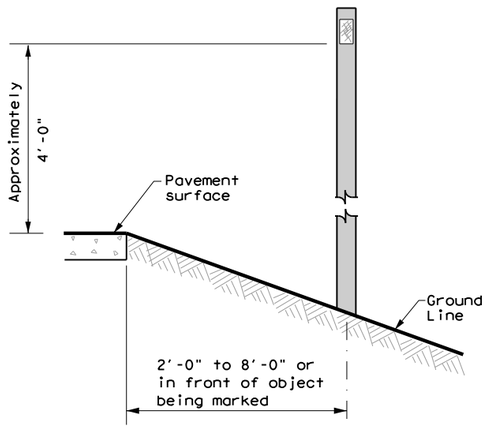
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

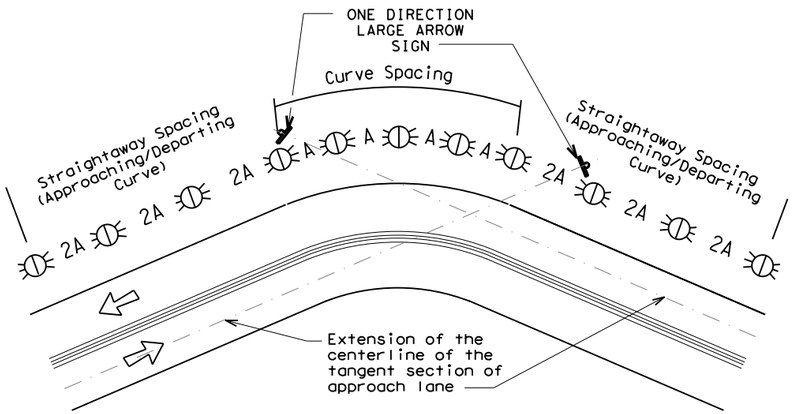
FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	POTTER		58

20B

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

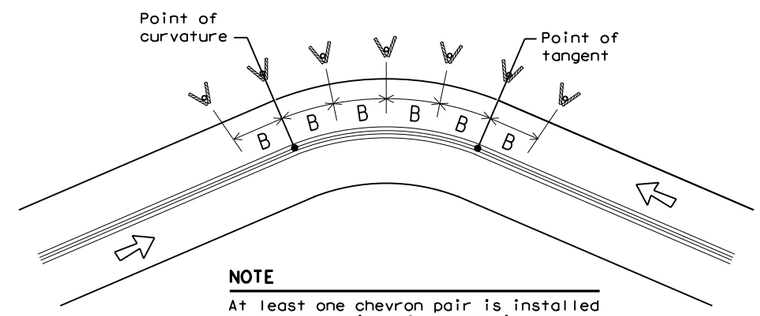
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	AMA	POTTER		59

20C

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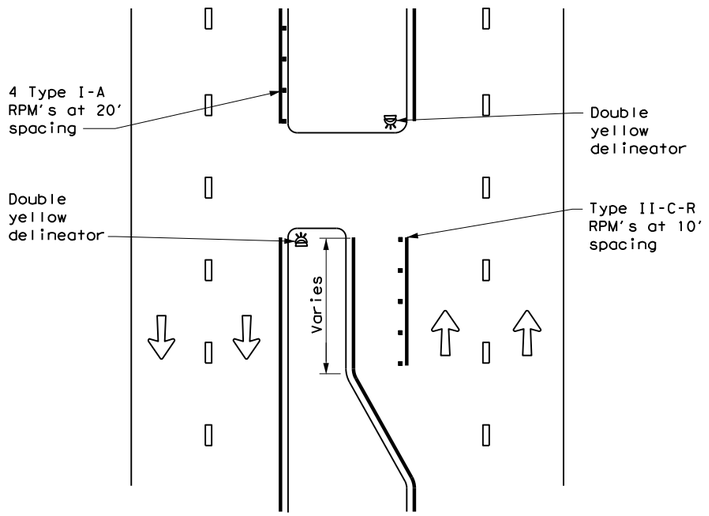
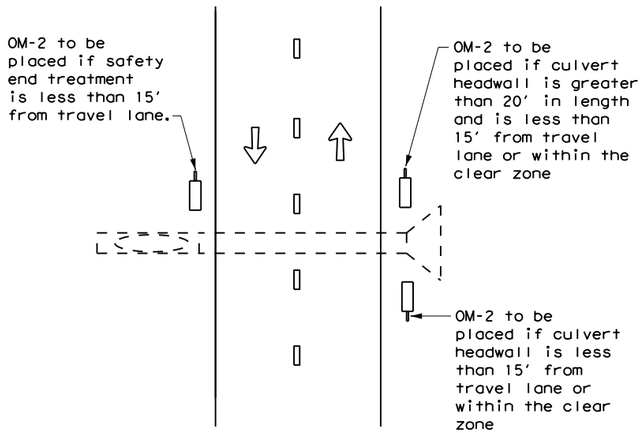
CROSSOVERS



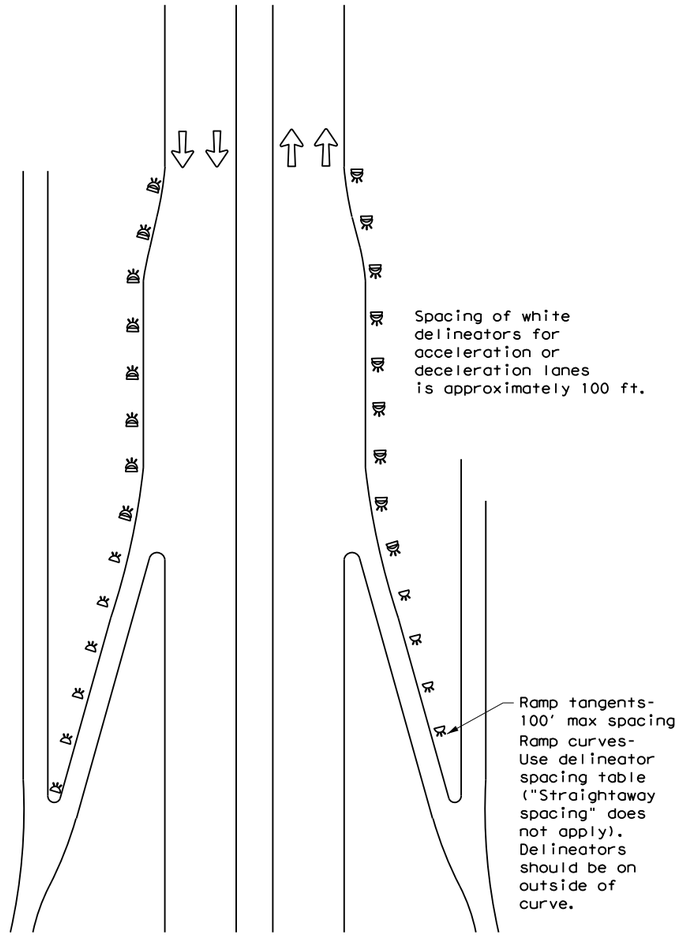
DETAIL 1

FOR CULVERTS WITHOUT MBGF



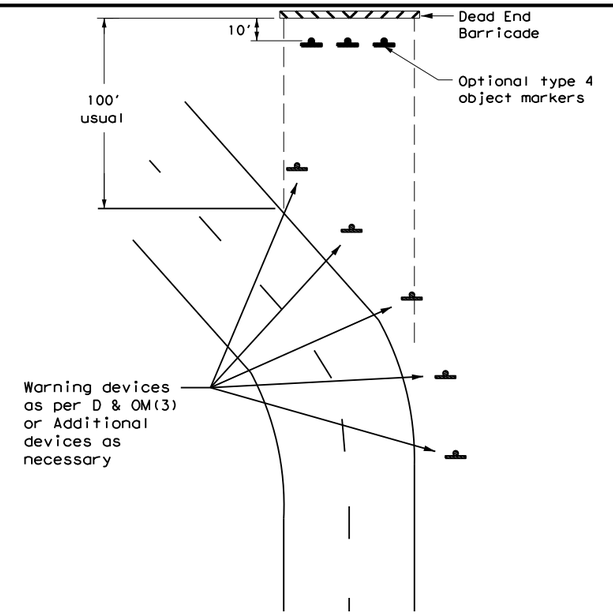
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



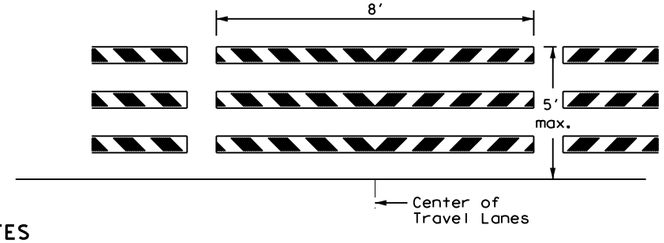
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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3-15	DIST	COUNTY		SHEET NO.
7-20	AMA	POTTER		60

20D

DATE: 5/26/2021 10:21:31 AM
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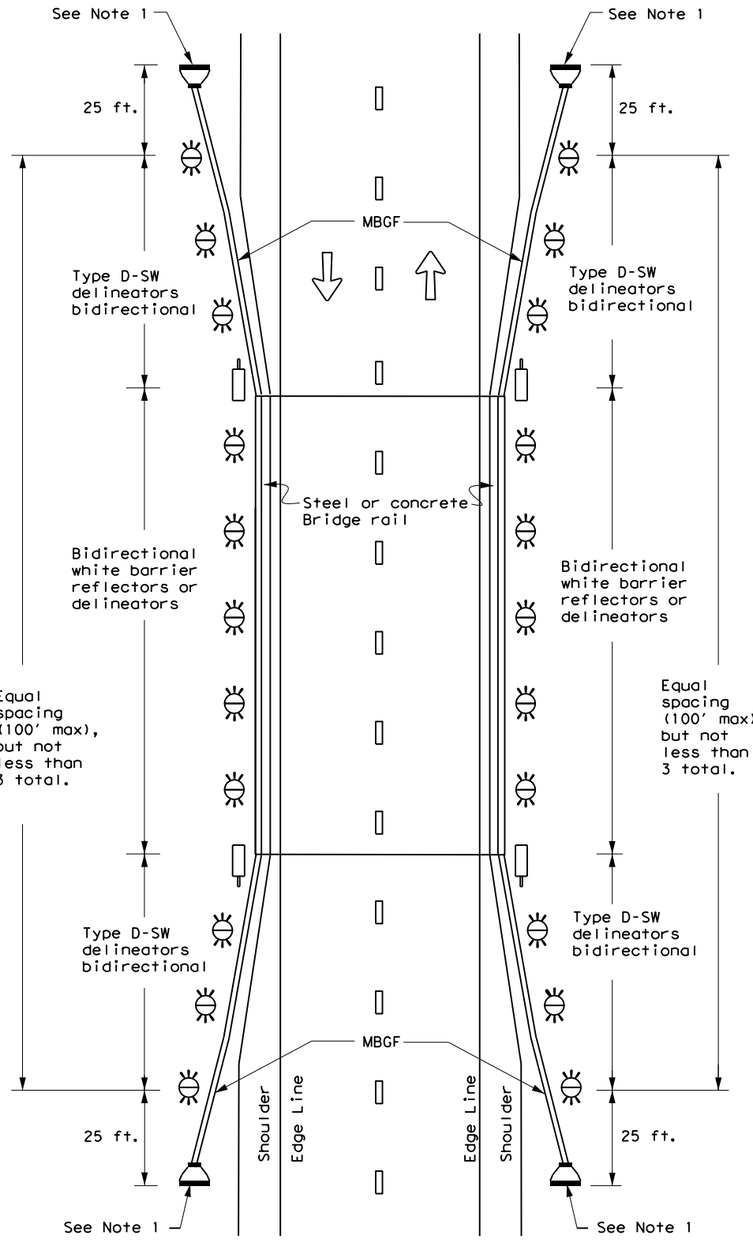
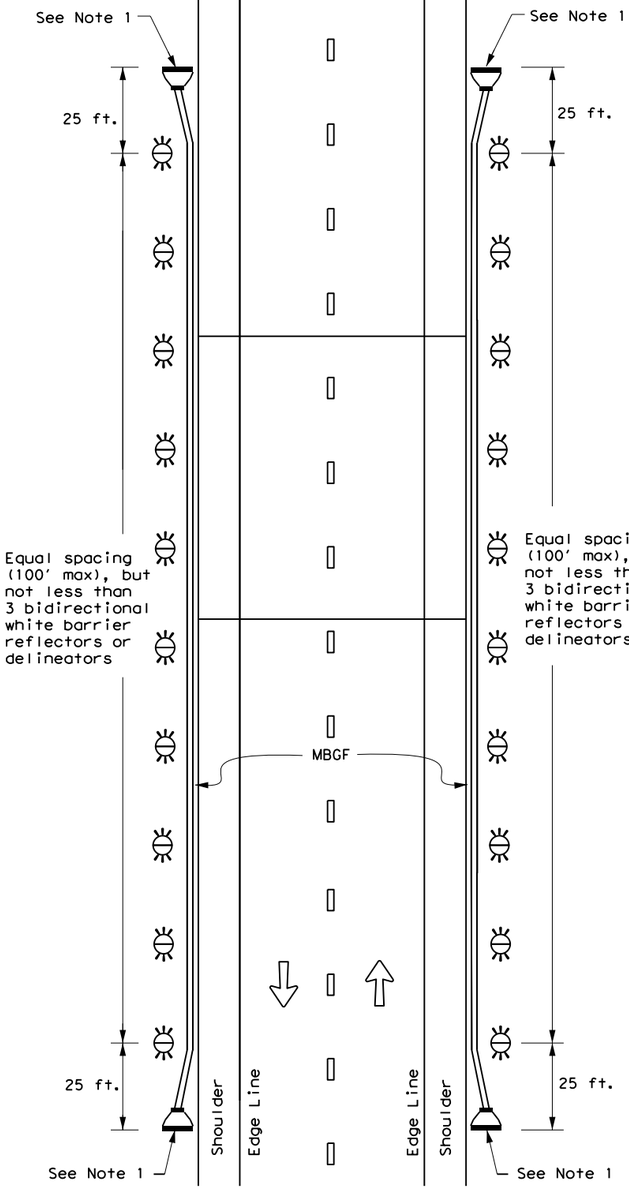
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

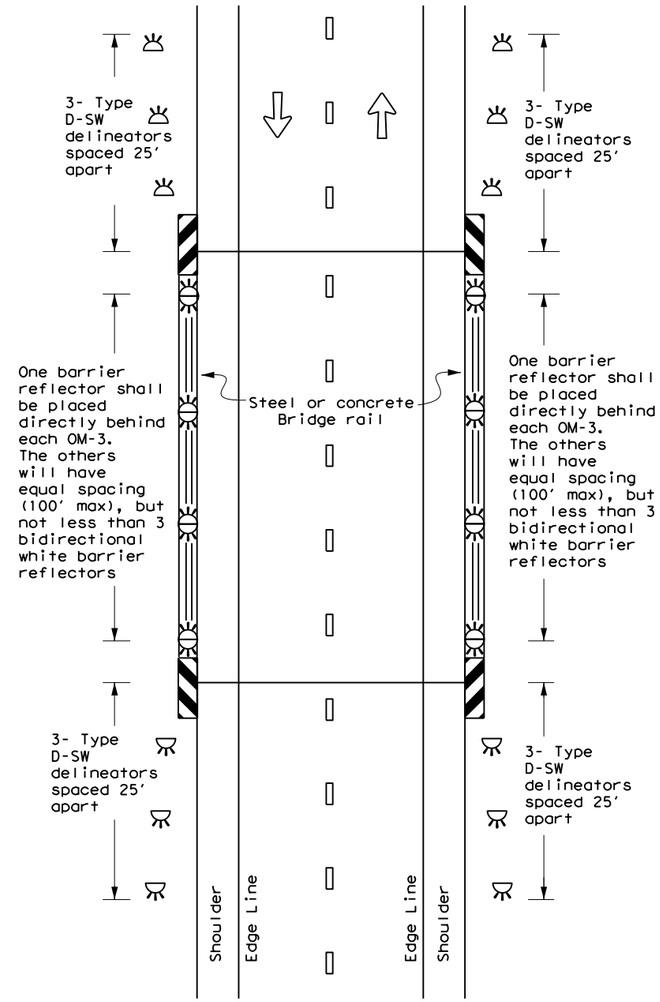
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	AMA	POTTER		61

20E

DATE: 5/26/2021 10:21:33 AM
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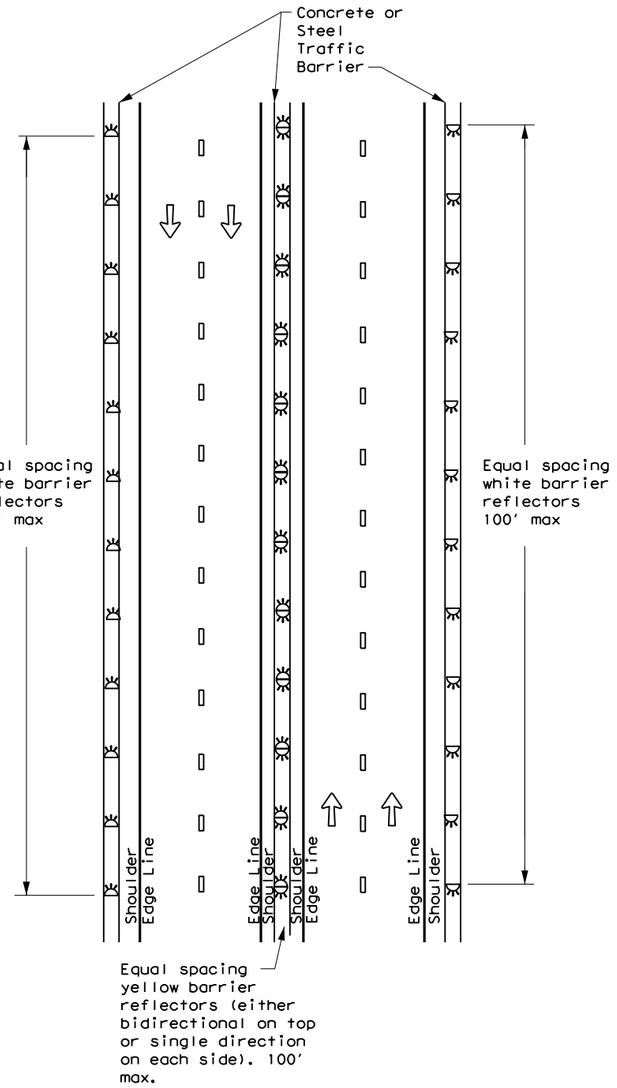
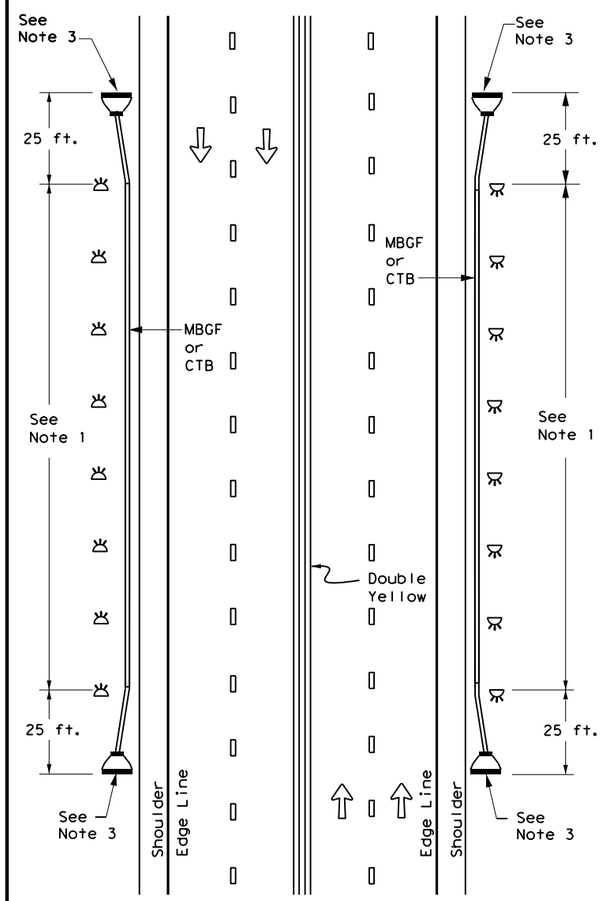
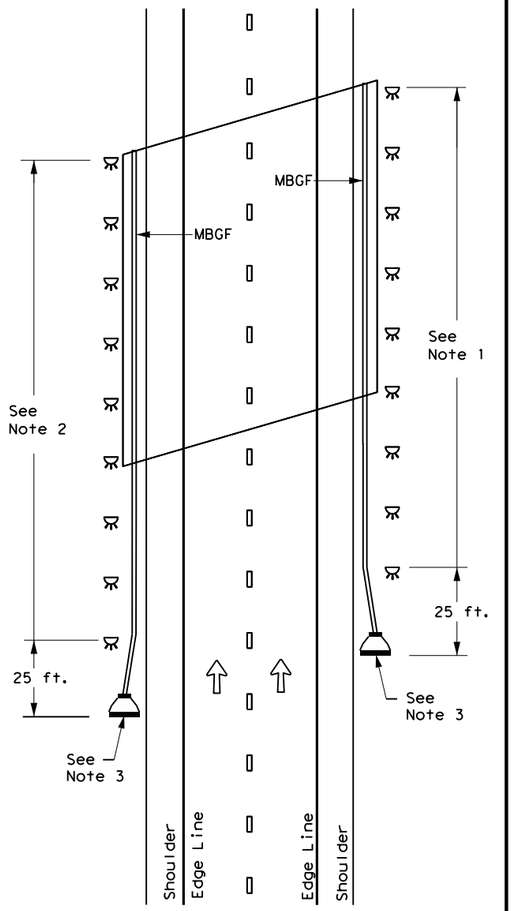
CONTINUOUS CONCRETE OR STEEL BARRIER



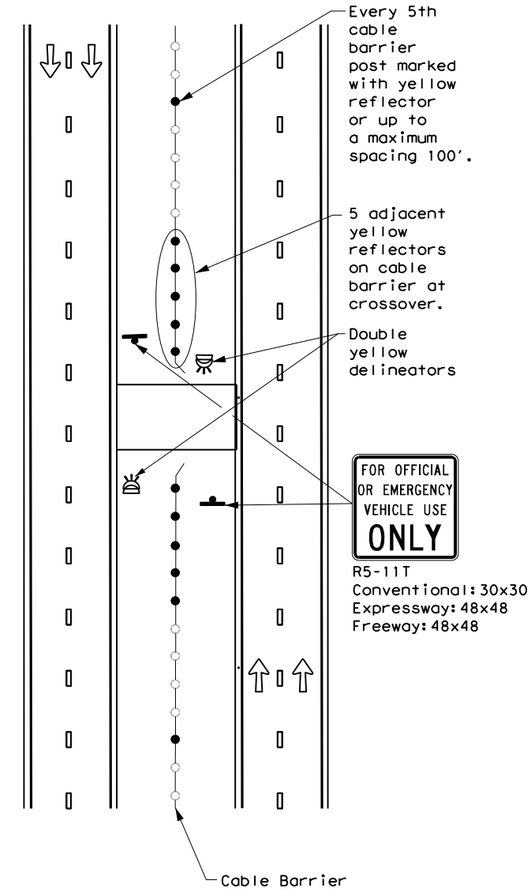
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-20	DIST	COUNTY		SHEET NO.
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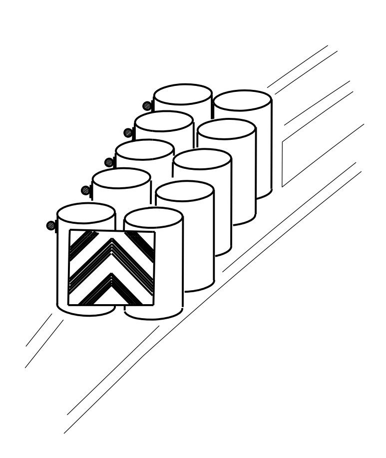
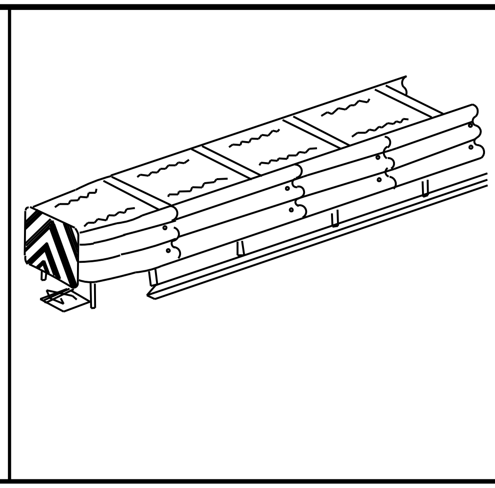
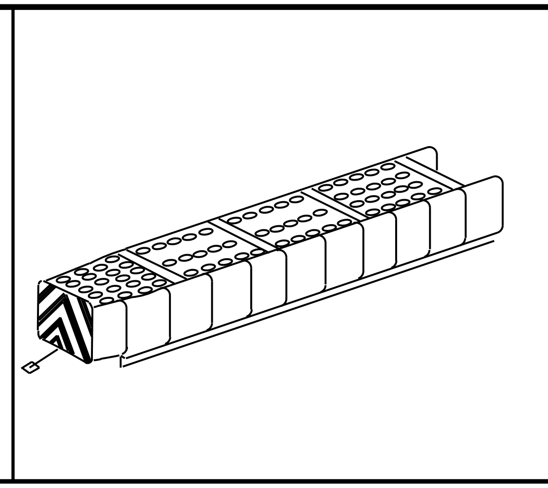
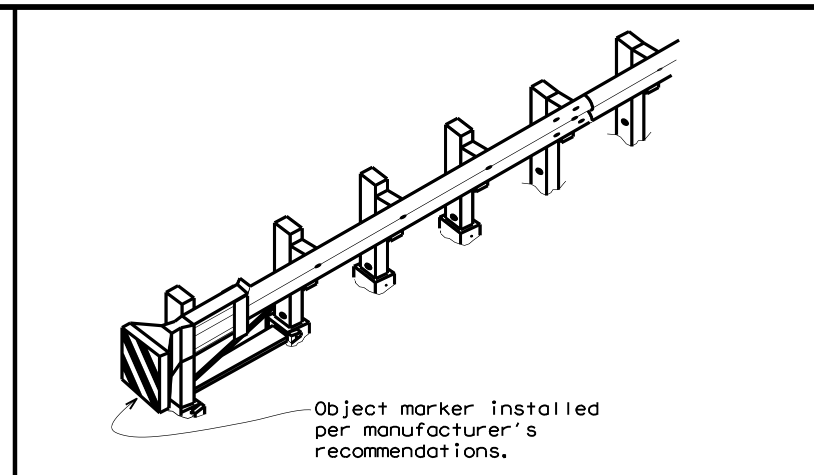
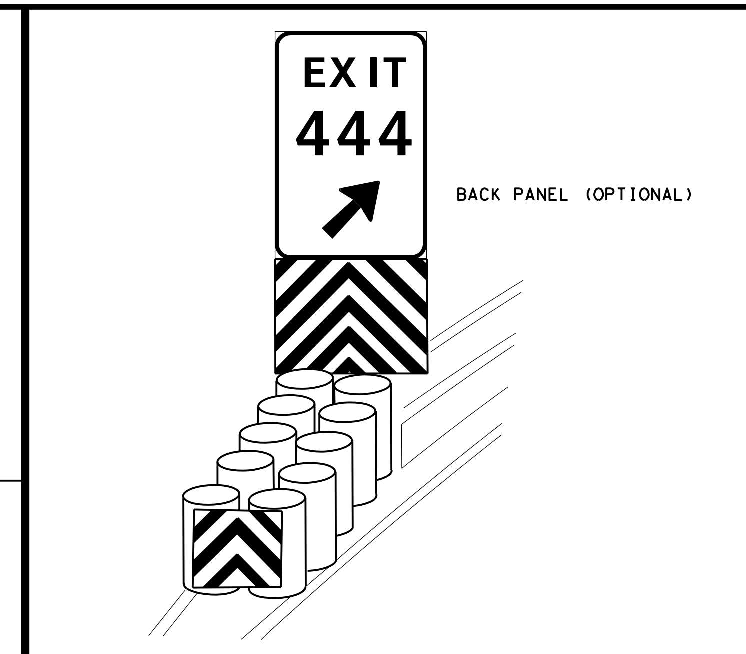
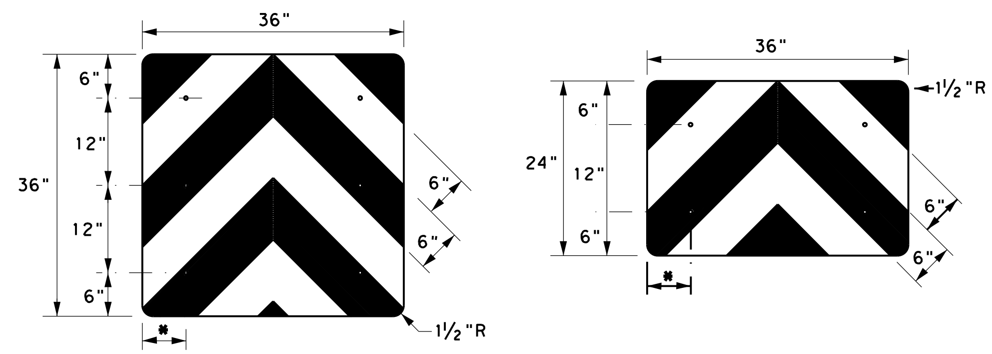




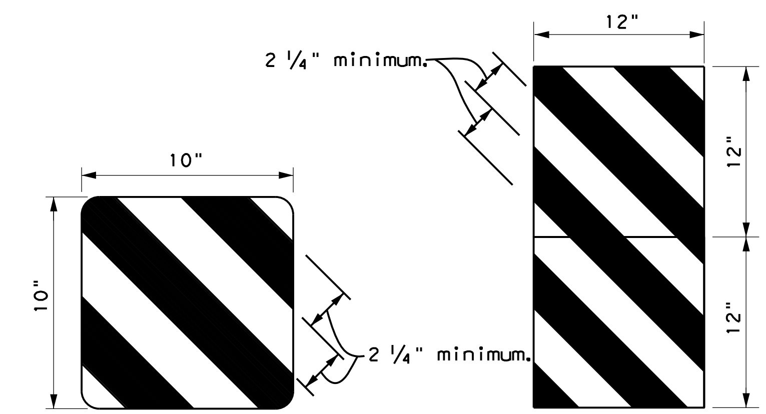




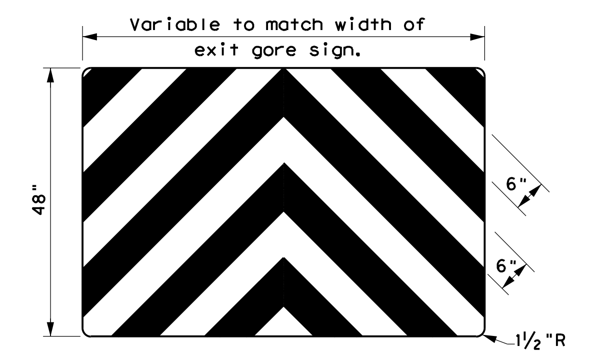


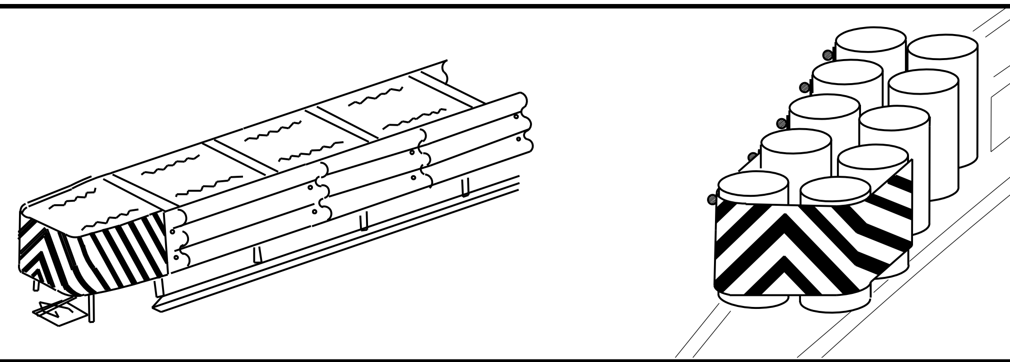


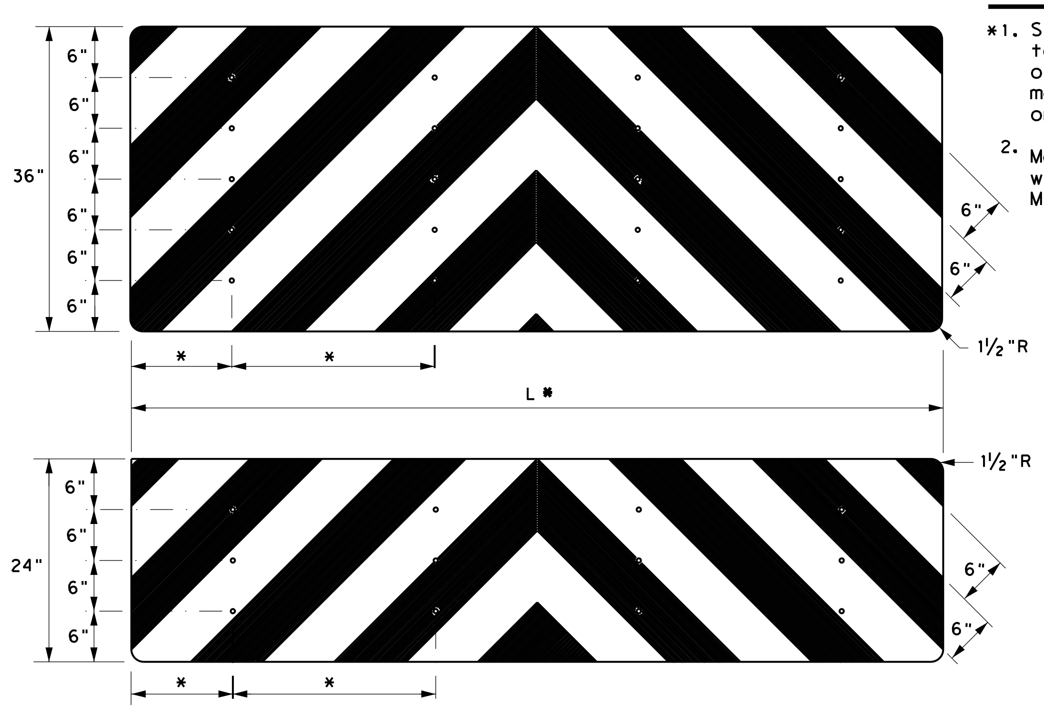
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer



OBJECT MARKERS SMALLER THAN 3 FT^2







NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 1/4".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

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Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
4-92 8-04 8-95 3-15 4-98 7-20	DIST		COUNTY	SHEET NO.
	AMA		POTTER	63

20G

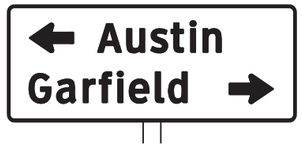
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES:

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	~~0.080~~ 0.100
~~7.5 or 15~~	~~0.100~~
7.5 or Greater ~~Greater than 15~~	0.125

⚠

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40 TYPICAL SIGN REQUIREMENTS

TSR(3)-13 (MOD)

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		64

⚠ REVISED MINIMUM SIGN BLANK THICKNESS

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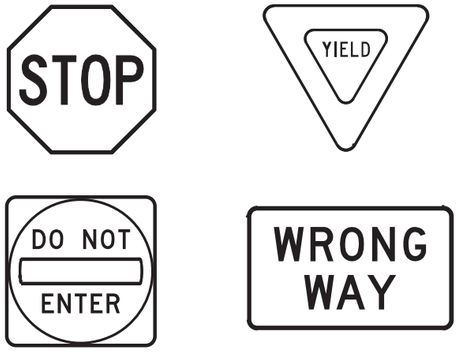
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

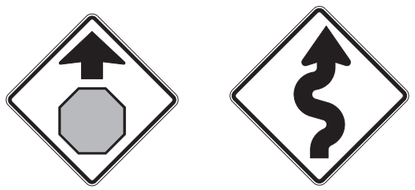
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES:

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	~~0.080~~ 0.100
~~7.5 or Greater Greater than 15~~	~~0.125~~
7.5 or Greater ~~Greater than 15~~	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

⚠ REVISED MINIMUM SIGN BLANK THICKNESS

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40 TYPICAL SIGN REQUIREMENTS

TSR(4)-13 (MOD)

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		65

DATE: 5/26/2021 10:35:20 AM
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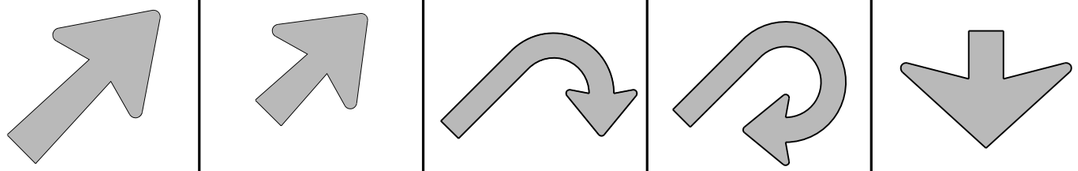
ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

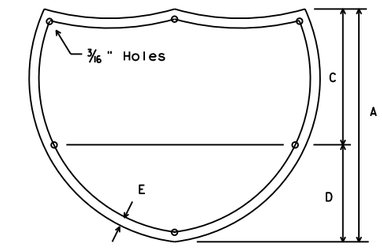
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

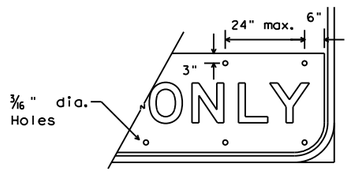
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

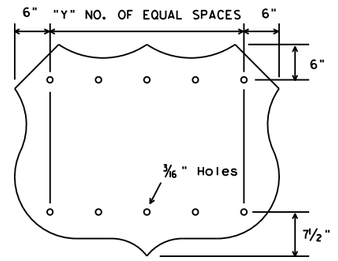


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

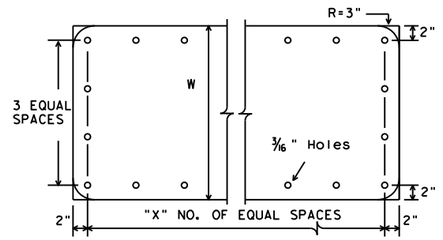


EXIT ONLY PANEL



U.S. ROUTE MARKERS

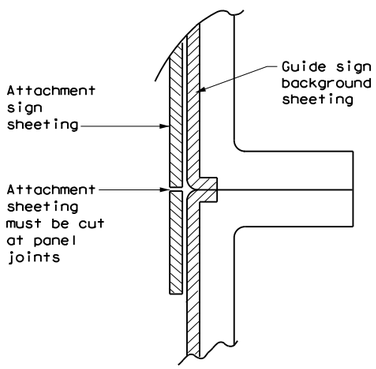
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

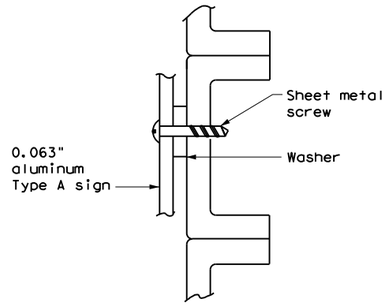
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



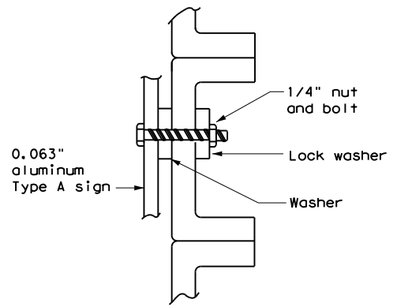
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



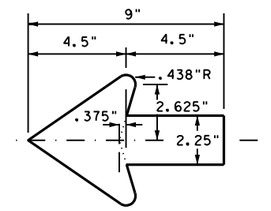
NUT/BOLT ATTACHMENT

NOTE:

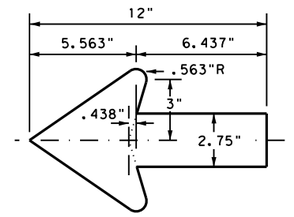
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0904	00	197	IH-40
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AMA	POTTER		66

5

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

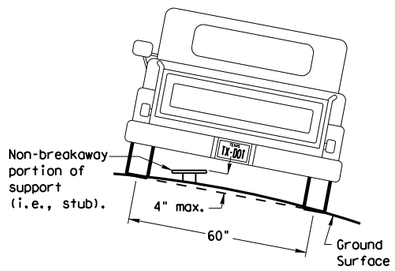
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

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

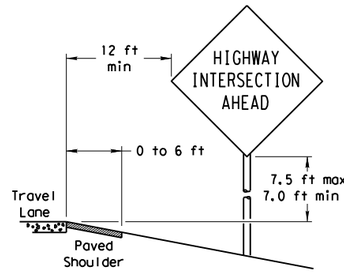
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

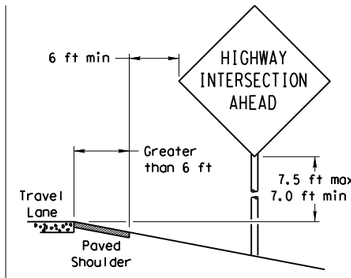
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

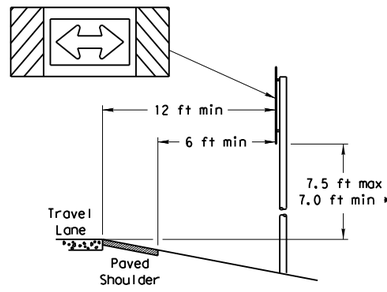
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



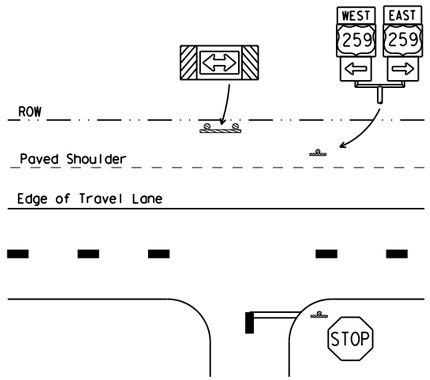
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

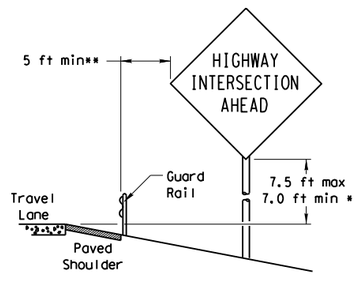
T-INTERSECTION



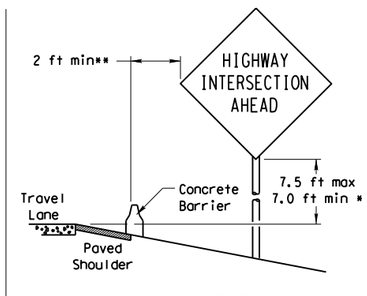
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



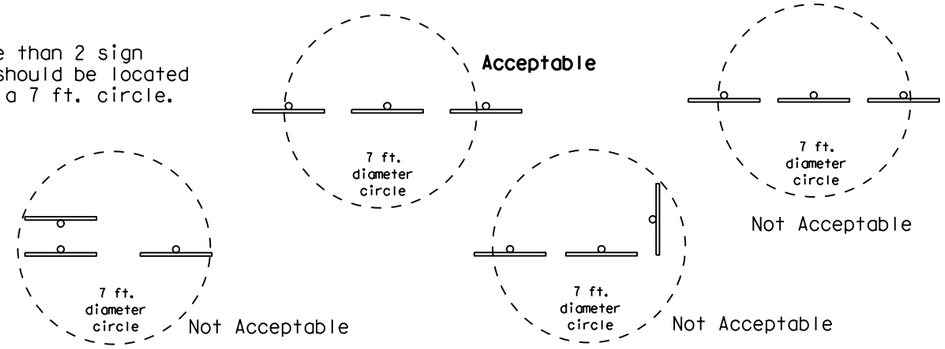
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

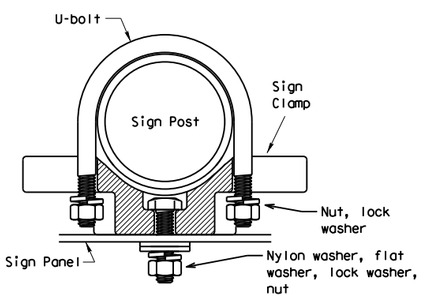
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

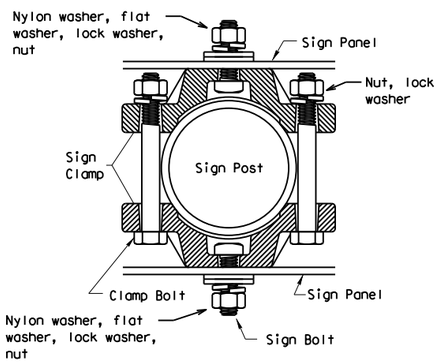


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

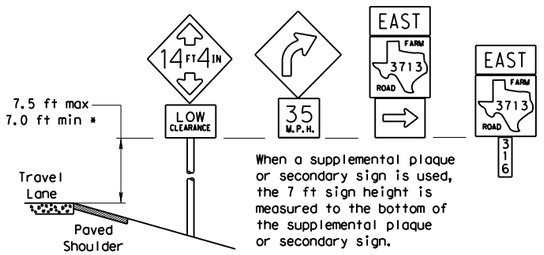
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



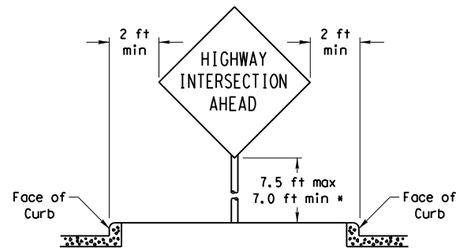
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



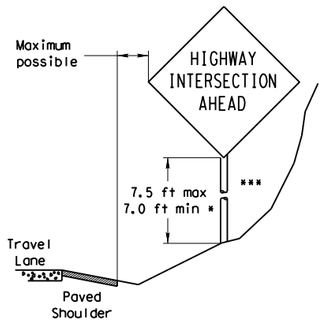
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

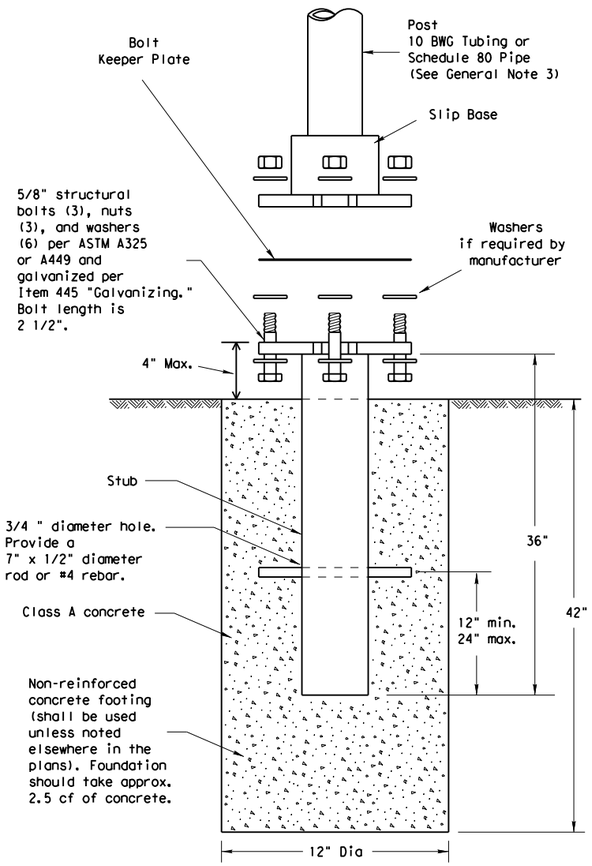
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		67

DATE: 5/26/2021 10:21:45 AM
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\8. Traffic\Standards\SMD (SLIP-1)-08.dgn

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

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

GENERAL NOTES:

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

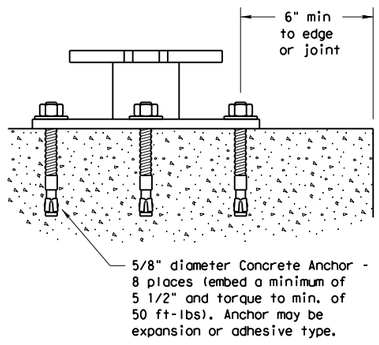
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum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

ASSEMBLY PROCEDURE

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

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

CONCRETE ANCHOR



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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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

CONT	SECT	JOB	HIGHWAY
0904	00	197	IH-40
DIST	COUNTY		SHEET NO.
AMA	POTTER		68

DATE: 5/26/2021 10:21:47 AM
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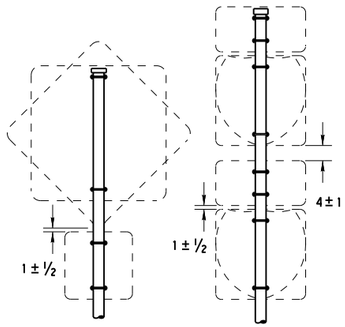
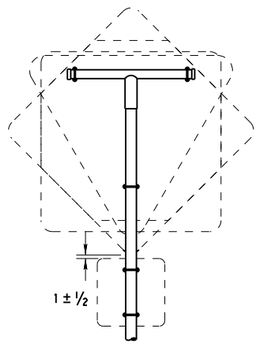


SM RD SGN ASSM TY XXXXX(1)XX(P)



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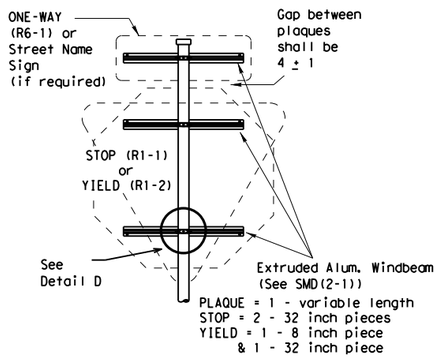

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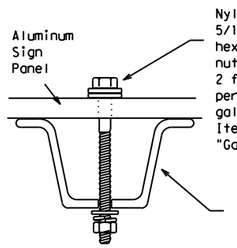
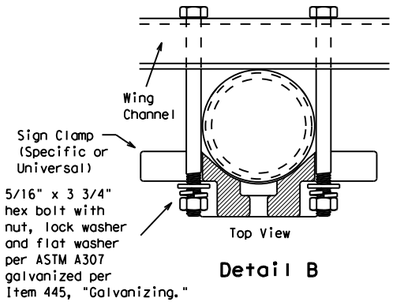
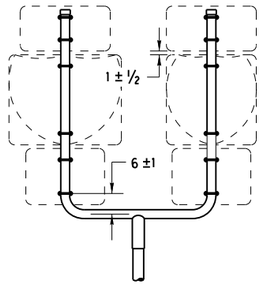


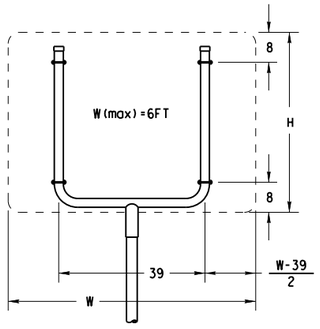
Detail A



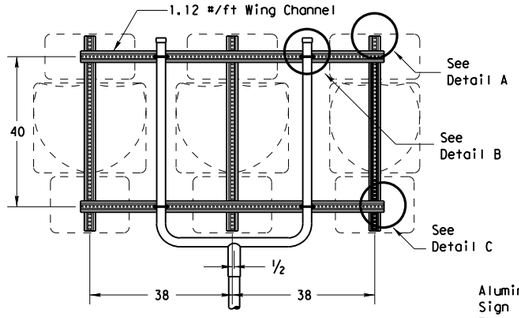
Detail B



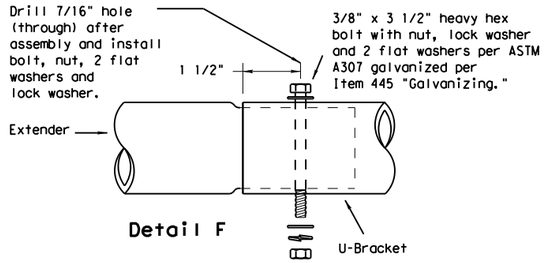
SM RD SGN ASSM TY XXXXX(1)XX(U)



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

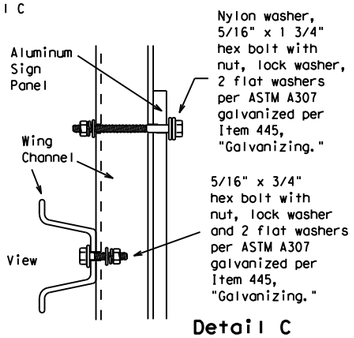


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

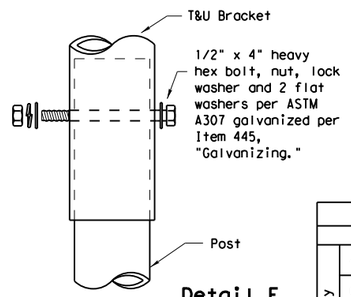


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



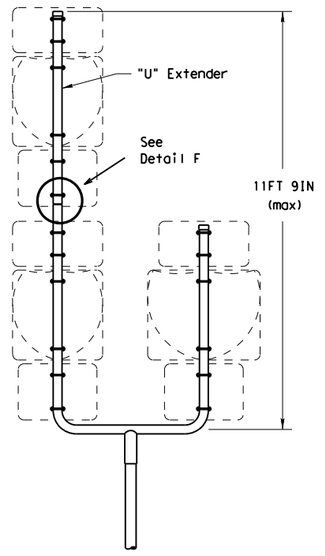
Detail E

GENERAL NOTES:

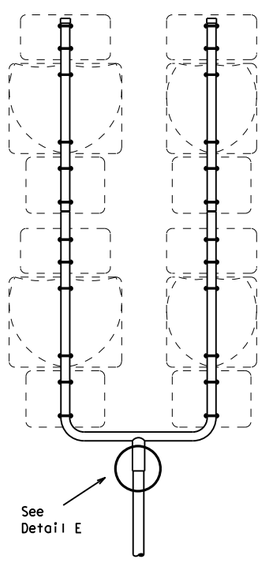
1.

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

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



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



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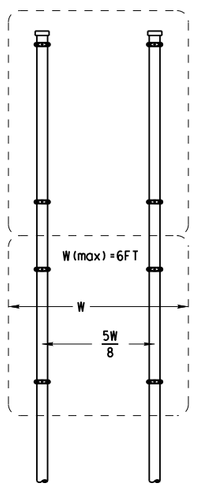
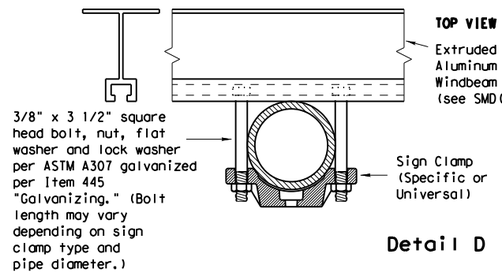
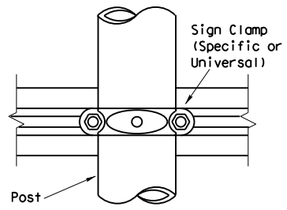


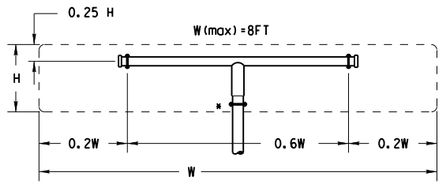
SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D



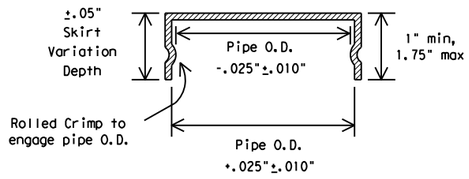
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)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



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

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



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

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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0904	00	197	IH-40

DIST	COUNTY	SHEET NO.
AMA	POTTER	69

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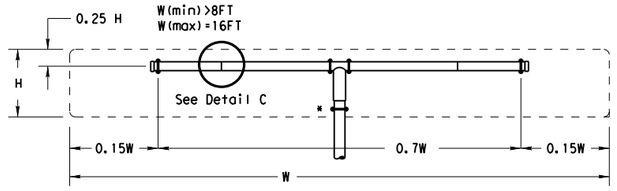
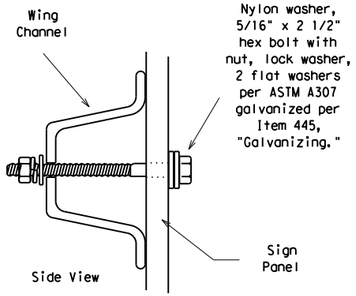
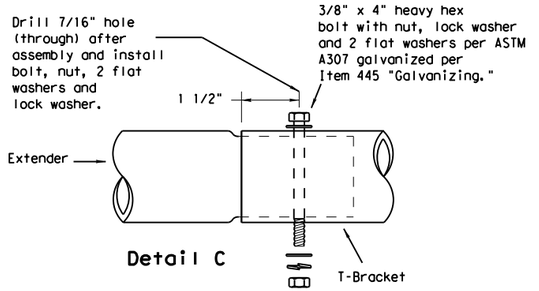


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



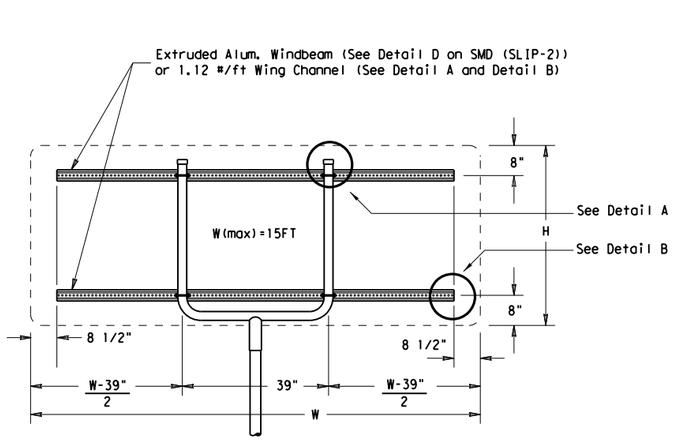
Detail C

Splices shall only be allowed behind the sign substrate.

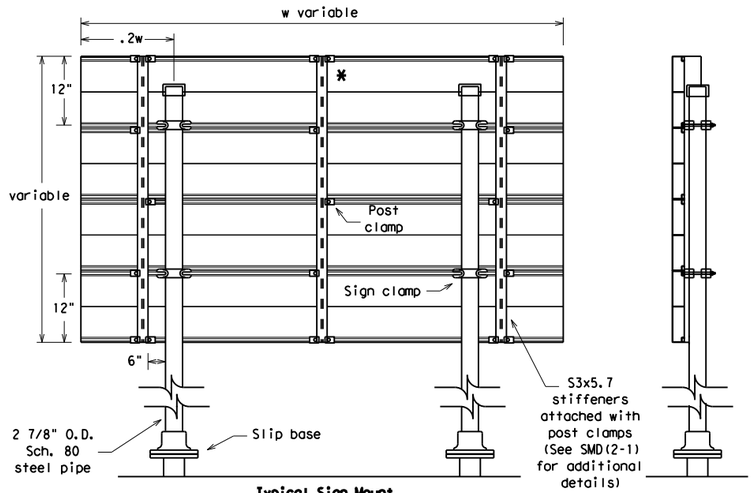
GENERAL NOTES:

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

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



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

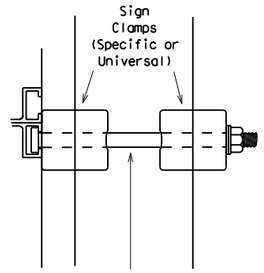


Typical Sign Mount

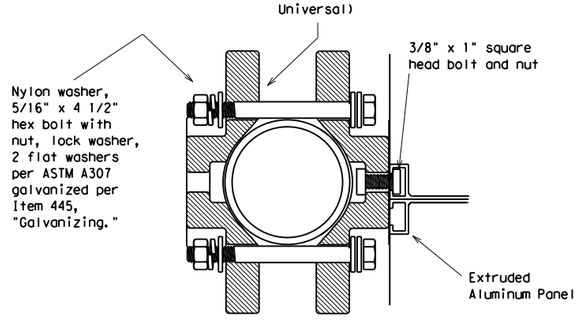
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

See Detail E
for clamp installation

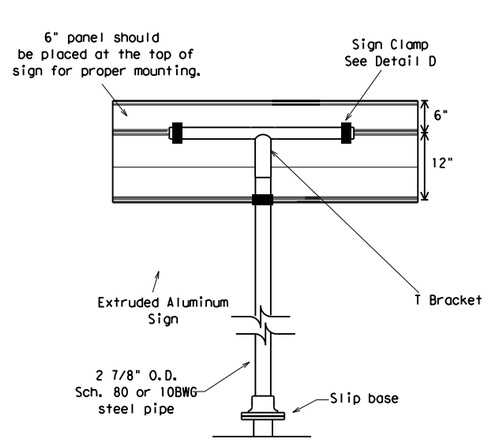


Detail E

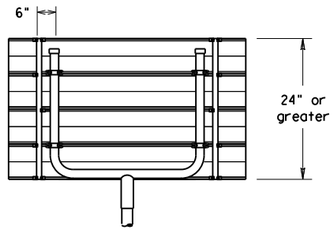


Detail A

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

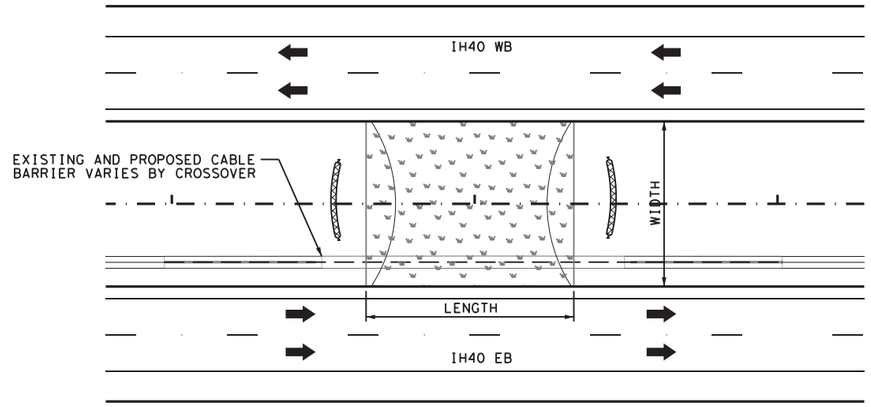
SMD(SLIP-3)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0904	00	197	IH-40

DIST	COUNTY	SHEET NO.
AMA	POTTER	70



TYPICAL SW3P LAYOUT AT REMOVAL LOCATION

EROSION CONTROL REMOVAL LOCATION SUMMARY							
			164	164	314	506	506
			6035	6041	6014	6040	6043
LOCATION	WIDTH	LENGTH	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	EMUL ASPH (EROSN CONT) (MS-2)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
MM	FT	FT	SY	SY	GAL	LF	LF
18+0.174	37	59	243	243	24	50	50
21+0.245	41	63	287	287	29	50	50
23+0.270	41	83	378	378	38	50	50
28+0.146	41	80	364	364	36	50	50
29+0.228	41	88	401	401	40	50	50
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS			1,673	1,673	167	250	250
51+0.720	34	49	185	185	19	50	50
51+0.966	34	48	181	181	18	50	50
52+0.406	34	61	230	230	23	50	50
52+0.901	34	40	151	151	15	50	50
53+0.48	34	51	193	193	19	50	50
53+0.729	34	44	166	166	17	50	50
53+0.978	34	49	185	185	19	50	50
54+0.508	34	49	185	185	19	50	50
54+0.614	34	38	144	144	14	50	50
55+0.437	34	53	200	200	20	50	50
55+0.934	34	29	110	110	11	50	50
56+0.19	34	24	91	91	9	50	50
56+0.690	34	51	193	193	19	50	50
56+0.951	34	43	162	162	16	50	50
57+0.809	34	35	132	132	13	50	50
58+0.138	34	42	159	159	16	50	50
58+0.514	34	53	200	200	20	50	50
58+0.995	34	37	140	140	14	50	50
59+0.657	34	53	200	200	20	50	50
59+0.985	34	38	144	144	14	50	50
60+0.891	34	38	144	144	14	50	50
61+0.212	34	38	144	144	14	50	50
61+0.609	34	29	110	110	11	50	50
CSJ: 0904-00-197 - POTTER COUNTY TOTALS			3,749	3,749	374	1,150	1,150
PROJECT TOTAL'S			5,422	5,422	541	1,400	1,400

LEGEND:

SEEDING

EROSION CONTROL LOG

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

SW3P LAYOUT

SCALE: NTS

2021 Texas Department of Transportation

SHEET 1 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		71

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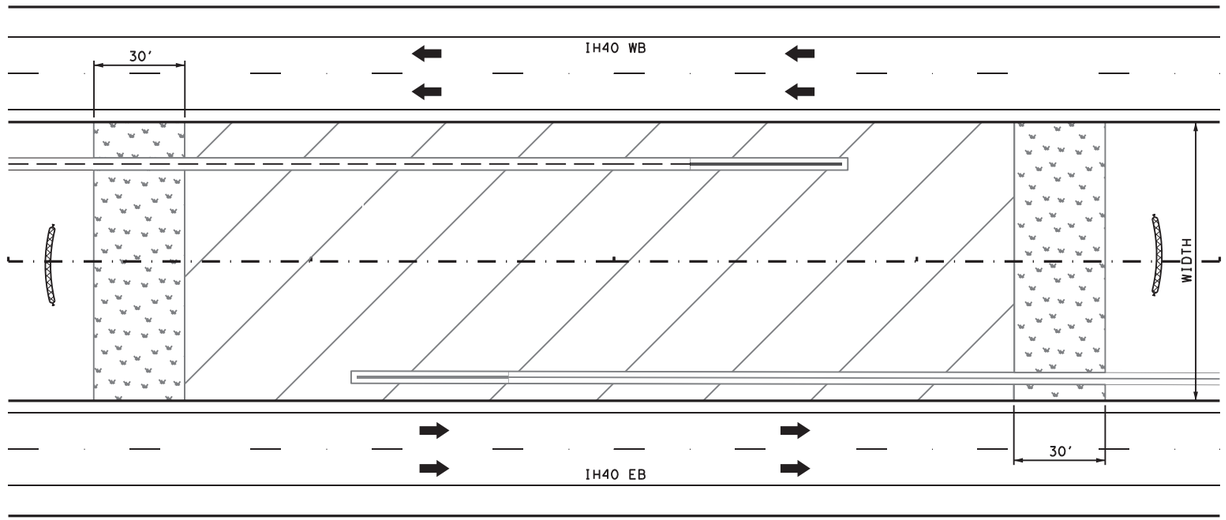

TYPICAL SW3P LAYOUT AT PROPOSED LOCATION

EROSION CONTROL PROPOSED LOCATION SUMMARY							
			164	164	314	506	506
			6035	6041	6014	6040	6043
LOCATION	WIDTH	LENGTH	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	EMUL ASPH (EROSN CONT) (MS-2)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
MM	FT	FT	SY	SY	GAL	LF	LF
17+0.616	38	60	253	253	25	50	50
18+0.416	37	60	247	247	25	50	50
19+0.926	37	60	247	247	25	50	50
20+0.984	38	60	253	253	25	50	50
22+0.984	39	60	260	260	26	50	50
26+0.930	41	60	273	273	27	50	50
27+0.998	39	60	260	260	26	50	50
35+0.872	40	60	267	267	27	50	50
37+0.367	40	60	267	267	27	50	50
CSJ: 0904-00-197 - OLDHAM COUNTY TOTALS			2,327	2,327	233	450	450
52+0.364	34	60	227	227	23	50	50
53+0.199	34	60	227	227	23	50	50
54+0.88	34	60	227	227	23	50	50
56+0.92	35	60	233	233	23	50	50
59+0.298	35	60	233	233	23	50	50
CSJ: 0904-00-197 - POTTER COUNTY TOTALS			1,147	1,147	115	250	250
PROJECT TOTAL'S			3,474	3,474	348	700	700

LEGEND:

SEEDING

EROSION CONTROL LOG

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED
PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

SW3P LAYOUT

SCALE: NTS

2021 Texas Department of Transportation

SHEET 2 OF 2

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		72

DATE: 5/26/2021 10:21:53 AM
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SITE DESCRIPTION

PROJECT LIMITS: MILE MARKER 16 TO MILE MARKER 64

PROJECT DESCRIPTION: SAFETY IMPROVEMENTS CONSISTING OF INSTALLING CABLE MEDIAN BARRIER.

MAJOR SOIL DISTURBING ACTIVITIES: MOW STRIP INSTALLATION, MOW STRIP REMOVAL, REMOVING EXISTING CROSSOVERS

TOTAL PROJECT AREA: APPROX. 1,745 ACRES

TOTAL AREA TO BE DISTURBED: APPROX. 12.76 ACRES

WEIGHTED RUNOFF COEFFICIENT

(BEFORE CONSTRUCTION): _____

(AFTER CONSTRUCTION): _____

EXPLANATION OF THE TECHNICAL BASIS USED TO SELECT THE PRACTICES TO CONTROL POLLUTION WHERE FLOWS EXCEED PRE-DEVELOPMENT LEVELS: _____

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: 90%

NAME OF RECEIVING WATERS: CANADIAN RIVER, NON-JURISDICTIONAL PLAYA LAKES

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

X	TEMPORARY SEEDING
X	PERMANENT PLANTING, SODDING, OR SEEDING
	MULCHING
	SOIL RETENTION BLANKET
	BUFFER ZONES
X	PRESERVATION OF NATURAL RESOURCES

OTHER: _____

EROSION AND SEDIMENT CONTROLS (CONT.)

STRUCTURAL PRACTICES:

Permanent	Temporary	
		SILT FENCES
		HAY BALES
		ROCK BERMS
		DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
		DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
		DIVERSION DIKE AND SWALE COMBINATIONS
		PIPE SLOPE DRAINS
		PAVED FLUMES
		ROCK BEDDING AT CONSTRUCTION EXIT
		TIMBER MATTING AT CONSTRUCTION EXIT
		CHANNEL LINERS
		SEDIMENT TRAPS
		SEDIMENT BASINS
		STORM INLET SEDIMENT TRAP
		STONE OUTLET STRUCTURES
		CURBS AND GUTTERS
		STORM SEWERS
		VELOCITY CONTROL DEVICES
	X	EROSION CONTROL LOGS

OTHER: _____

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

THE ORDER OF ACTIVITIES ARE AS FOLLOWS:

1. INSTALL CONTROL DEVICES AS SHOWN ON PLANS AND DIRECTED BY THE ENGINEER.
2. MAINTAIN AND UPGRADE DEVICES AS NEEDED.
3. WHEN CONSTRUCTION ACTIVITY IS COMPLETED TEMPORARY CONTROLS SHALL BE REMOVED AS APPROVED BY THE ENGINEER.

STORM WATER MANAGEMENT: CARE SHOULD BE TAKEN TO DISTURB AS LITTLE OF THE NATURAL AREA AS POSSIBLE.

STORM WATER DRAINAGE WILL BE PROVIDED BY EXISTING DITCHES AND CULVERTS. STORM WATER SHALL BE FILTERED THROUGH SEDIMENT CONTOL DEVICES BEFORE LEAVING THE PROJECT.

DESCRIPTION OF ANY MEASURES INSTALLED DURING THE CONSTRUCTION PROCESS TO CONTROL STORM WATER DISCHARGES AFTER CONSTRUCTION OPERATIONS HAVE BEEN COMPLETED:

ALL DISTURBED AREAS SHALL BE SEEDED BEFORE CONSTUCTION COMPLETION.

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER. IF A REPAIR IS NECESSARY, IT WILL BE DONE AT THE EARLIEST DATE POSSIBLE, BUT NO LATER THAN 7 CALENDAR DAYS AFTER THE SURROUNDING EXPOSED GROUND HAS DRIED SUFFICIENTLY TO PREVENT FURTHER DAMAGE FROM HEAVY EQUIPMENT.

INSPECTION: AN INSPECTION WILL BE PERFORMED BY A TXDOT INSPECTOR OF THE CONSTRUCTION SITE AT LEAST ONCE EVERY 7 CALENDAR DAYS REGARDLESS OF RAINFALL. AN INSPECTION AND MAINTENANCE REPORT WILL BE MADE PER EACH INSPECTION. BASED ON THE INSPECTION RESULTS, THE CONTROLS SHALL BE REVISED PER THE INSPECTION REPORT.

WASTE MATERIALS: ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. THE DUMPSTER WILL MEET ALL STATE AND LOCAL CITY SOLID WASTE MANAGEMENT REGULATIONS. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION, AND THE TRASH WILL BE HAULED TO A PERMITTED LANDFILL. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATAGORIES ARE CONSIDERED TO BE HAZARDOUS: PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR SHOULD BE CONTACTED IMMEDIATELY AT (806) 356-3200.

SANITARY WASTE: ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

OFF SITE VEHICLE TRACKING:

	HAUL ROADS DAMPENED FOR DUST CONTROL
X	LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
X	EXCESS DIRT ON ROAD REMOVED DAILY
	STABILIZED CONSTRUCTION ENTRANCE

OTHER: _____

REMARKS: DISPOSAL AREAS, STOCKPILES, AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT THAT MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WETLAND, WATERBODY OR STREAMBED. CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS. ALL WATERWAYS SHALL BE CLEARED AS SOON AS PRACTICABLE OF TEMPORARY EMBANKMENT, TEMPORARY BRIDGES, MATTING, FALSEWORK, PILING, DEBRIS OR OTHER OBSTRUCTIONS PLACED DURING CONSTRUCTION OPERATIONS THAT ARE NOT A PART OF THE FINISHED WORK.

STATE OF TEXAS
CASEY B. STRIPLING
136887
LICENSED PROFESSIONAL ENGINEER

Casey B. Stripling

05-26-21

IH-40

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

2021 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
SP	JR	0904	00	197	IH-40
DRWN	CK	DIST	COUNTY		SHEET NO.
SP	JR	AMA	POTTER		73

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. COMPLY WITH PROJECT SW3P AND CONSTRUCTION GENERAL PERMIT AND POST A CONSTRUCTION SITE NOTICE.

☒ No Action Required ☐ Required Action

Action No.

1. Submit an NOI to TCEQ

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☐ No Action Required ☒ **Required Action**

Action No.

1. IN THE EVENT THAT UNANTICIPATED ARCHAEOLOGICAL DEPOSITS ARE ENCOUNTERED DURING CONSTRUCTION, WORK IN THE IMMEDIATE AREA WILL CEASE, AND TXDOT ARCHAEOLOGICAL STAFF WILL BE CONTACTED TO INITIATE POST-REVIEW DISCOVERY PROCEDURES.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ **Required Action**

Action No.

1. COMPLY WITH EXECUTIVE ORDER 13112 ON INVASIVE SPECIES AND THE INTENT OF THE EXECUTIVE ORDER MEMORANDUM ON BENEFICIAL LANDSCAPES FOR RE-VEGETATING THE PROJECT AREA. THE PROPOSED SEED MIXTURE (BOTH GRASSES AND FORBS) WOULD BE IN ACCORDANCE WITH ITEM 164, SEEDING FOR EROSION CONTROL IN TXDOT'S STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF HIGHWAYS, STREETS, AND BRIDGES.

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

☐ No Action Required ☒ **Required Action**

Action No.

1. If any species on the Oldham or Potter County Threatened & Endangered List is sighted in the project area during construction, stop construction and notify the Area Engineer
2. Prairie Vole, Eastern Spotted Skunk, Swift Fox: Contractors will be advised of potential occurence in the project area, and to acoid harming the species if encountered, and to avoid unnecessary impact to dens.
3. Woodhouse's Toad, Western Box Turtle, Texas Horned Lizard, Western Hognose Snake, Prairie Rattlesnakes, Massasauga: Contractor will be advised of potential ocurrence in the project area, and to avoid harming the species if encountered. If reptiles are found on the project site, allow them to safely leave the project area. For the Texas Horned Lizard, avoidance should include avoiding harvester ant beds in the selection of Project Specific Locations (PSL's).
4. Bird BMP's: a) Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season; b) avoid the removal of unoccupied, inactive nests, as practicable; c) do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.
5. The Migratory Bird Treaty Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, egg in part or in whole, without a Federal permit issued in accordance within the Act's policies and regulations. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, egg, and/or young would be avoided.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ **No**

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ **No**

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ **No Action Required** ☐ Required Action

Action No.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ **No Action Required** ☐ Required Action

Action No.
1.

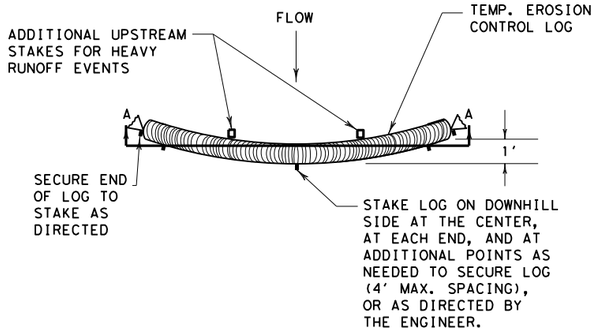
Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

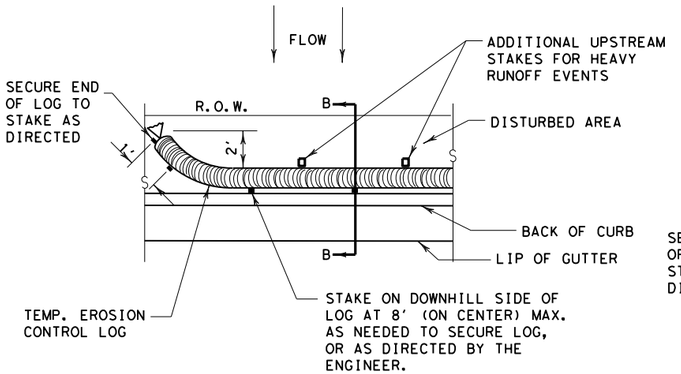
EPIC

FILE: epic.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		74

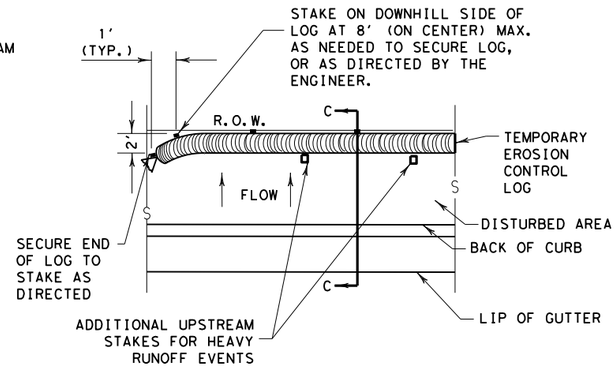
DATE: 5/26/2021
FILE: T:\AMATPD\Construction Projects\0904-00\197 - Cable Median Barrier\4 - Design\Plan Set\9. Environmental\Standards\EC (9)-16.dgn



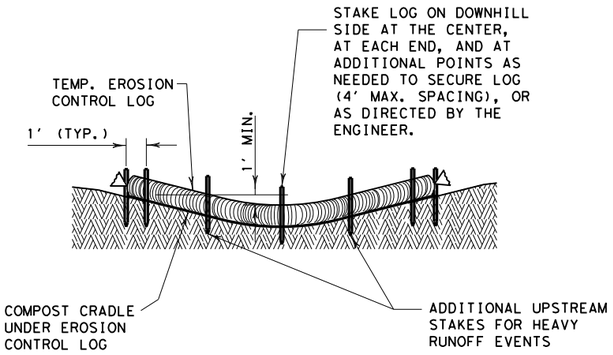
PLAN VIEW



PLAN VIEW



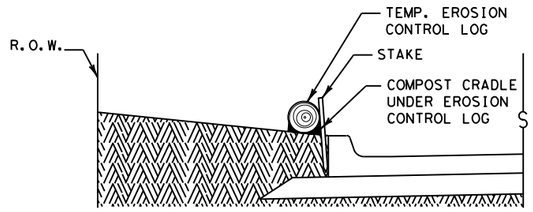
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

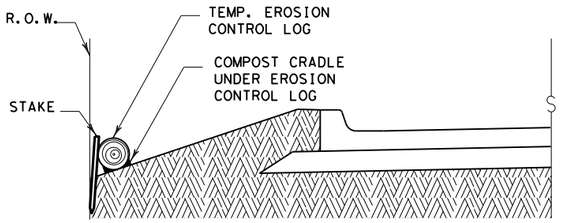
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

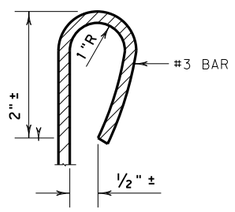
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

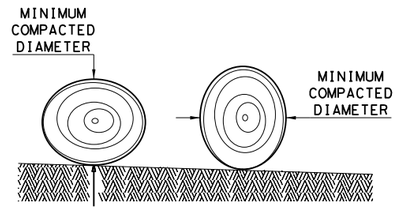
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC (9)-16

FILE: ec916.dgn	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS			
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0904	00	197	IH-40			
	DIST	COUNTY		SHEET NO.			
	AMA	POTTER		75			

DATE: 5/26/2021
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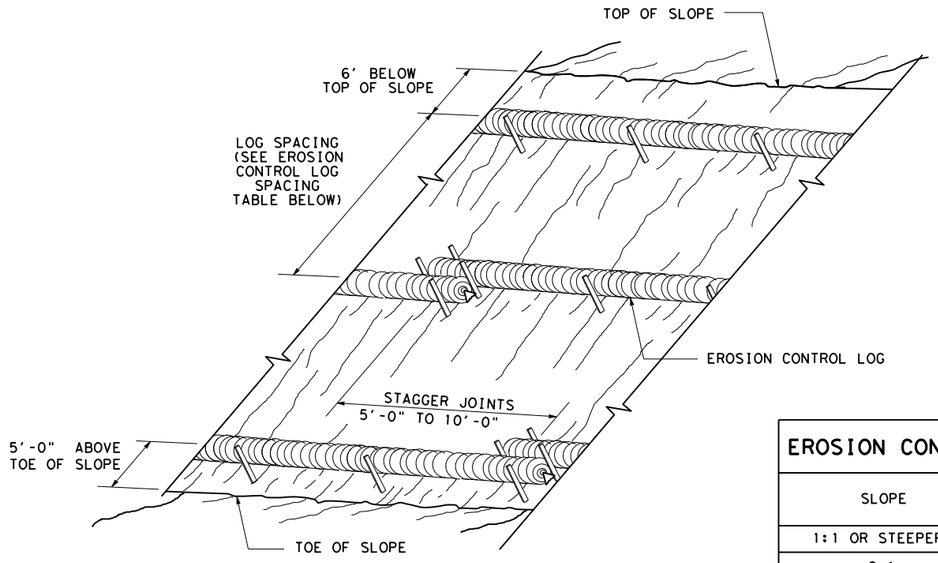
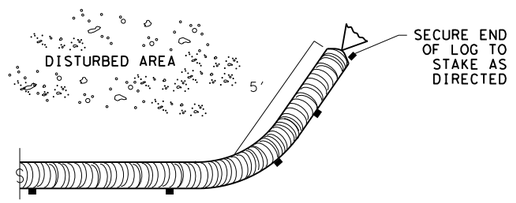


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

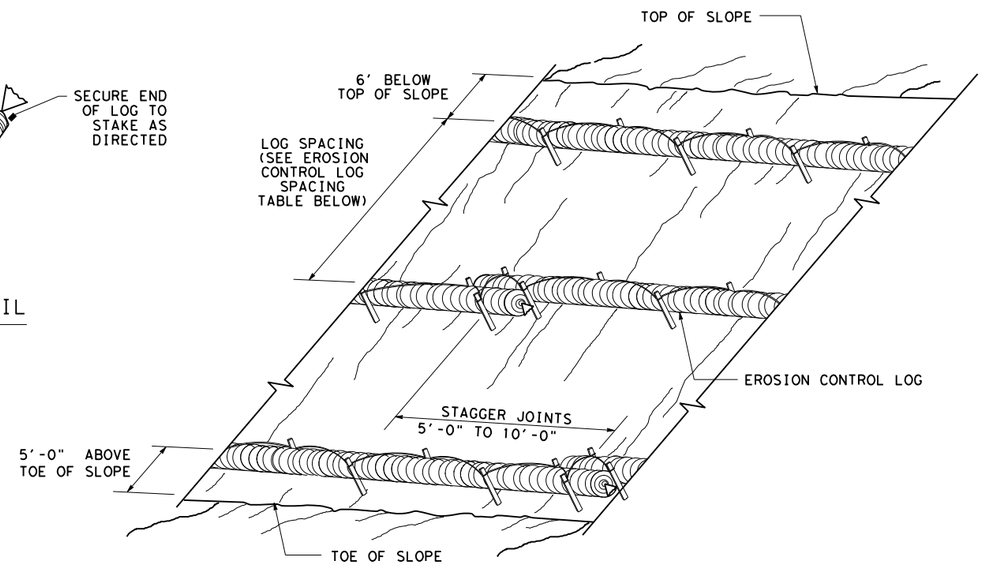
CL-SST



END SECTION RAP DETAIL

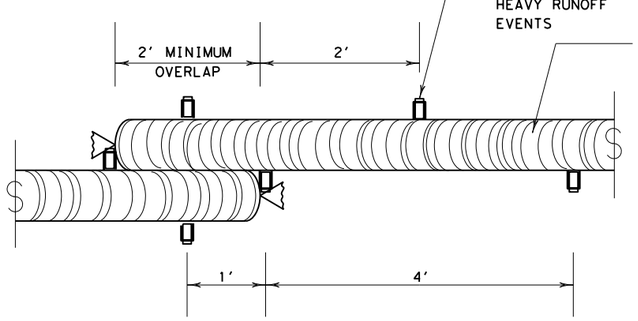
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

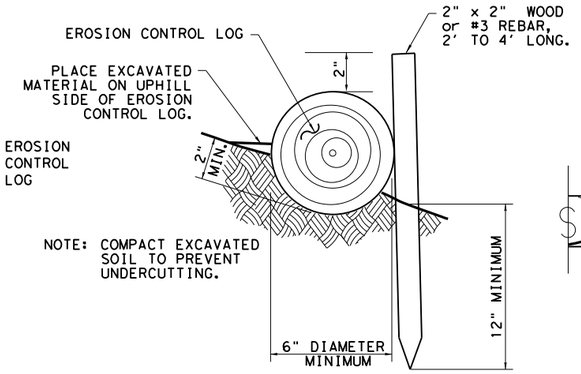
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

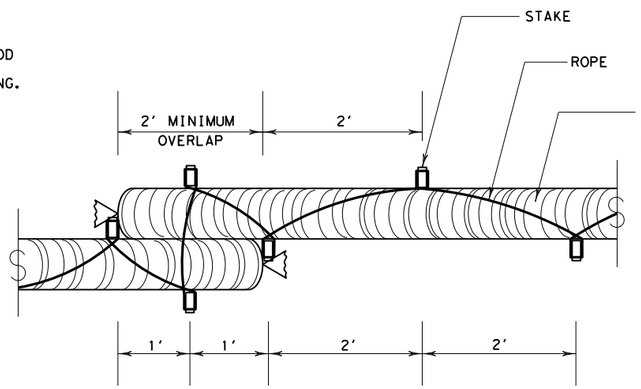


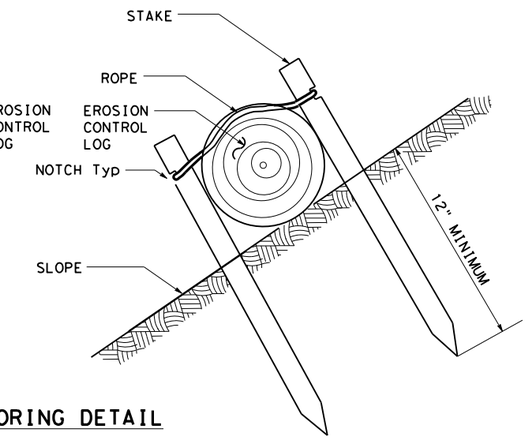


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

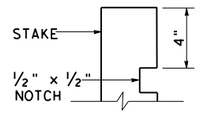
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC (9)-16

FILE: ec916.dgn	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
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REVISIONS	0904	00	197	IH-40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		76

DATE: 5/26/2021
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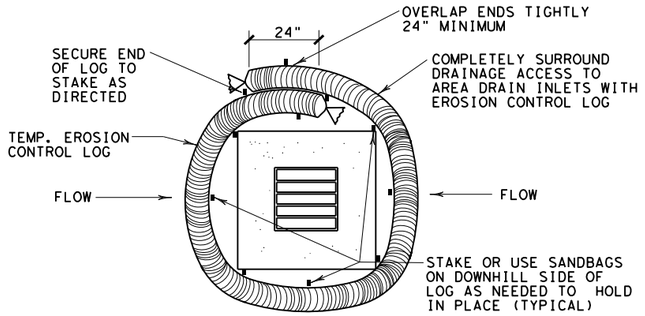
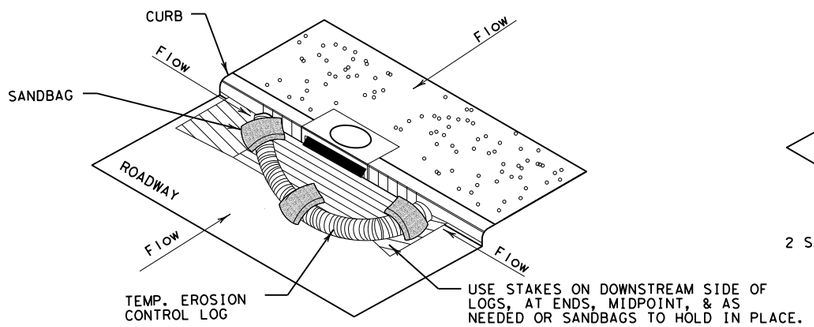


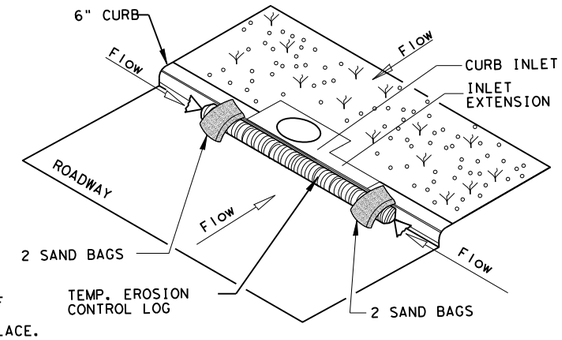
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

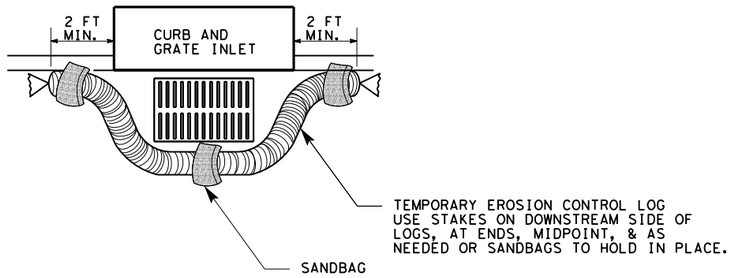
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

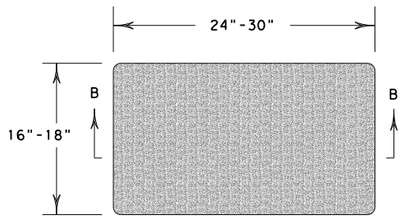
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC (9)-16

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