



Plotted on: 2023-05-30

Design File name: S:\projects\612\54\02\Design\01\_Rio\_Hondo\ADA\civil\General\612540201\_Rio\_Hondo\_ADA\_IND.dgn

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

DESIGN

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL

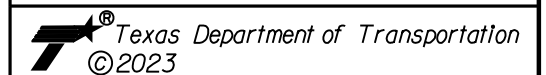
**INTERIM REVIEW**

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 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30

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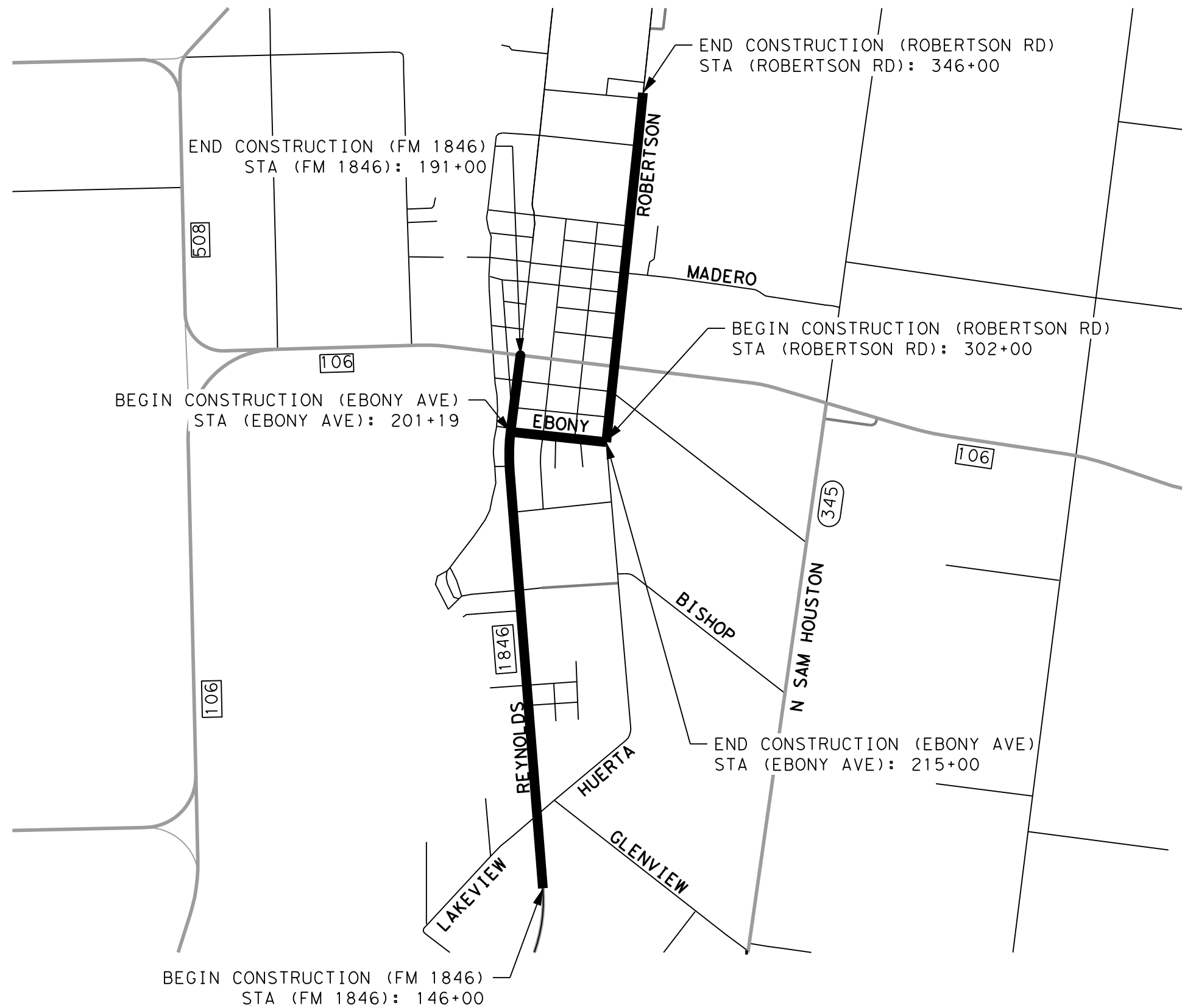


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 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



**INDEX OF SHEETS**

DGN:	FED. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	PHR	CAMERON	0921	06	348	2



DESIGN  
**INTERIM REVIEW**  
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ENGINEER: TYLER PAYNE DUBE  
P.E. SERIAL NO: 118612  
DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: JOHN A. TYLER  
P.E. SERIAL NO: 105193  
DATE: 2023-05-30

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



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**PROJECT LOCATION MAP**

DGN#	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	3

REV. NO.	DATE	DESCRIPTION	BY


  



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GENERAL NOTES


  

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	4



REV. NO.	DATE	DESCRIPTION	BY

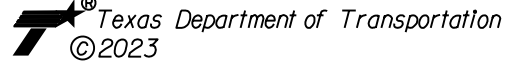
  



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ESTIMATE &  
QUANTITIES

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	5

ROADWAY QUANTITIES

SHT NO	ITEM	0100-6002	0104-6017	0104-6029	0160-6003	0162-6002	0168-6001	0420-6074	0450-6048
	DESCRIPTION	PREPARING ROW	REMOVING CONC (DRIVEWAYS)	REMOVING CONC (CURB OR CURB & GUTTER)	FURNISHING AND PLACING TOPSOIL (4")	BLOCK SODDING	VEGETATIVE WATERING	CL C CONC (MISC)	RAIL (HANDRAIL)(TY B)
	STA	SY	LF	SY	SY	MG	CY	LF	
44	FM 1846 SIDEWALK PLAN SHEET 1 OF 6	1.00	49		269	269	4.6		
45	FM 1846 SIDEWALK PLAN SHEET 2 OF 6	1.00	104		618	618	10.5		
46	FM 1846 SIDEWALK PLAN SHEET 3 OF 6	1.00	131		492	492	8.3	1.0	22
47	FM 1846 SIDEWALK PLAN SHEET 4 OF 6	1.00	22		82	82	1.4	1.6	25
48	FM 1846 SIDEWALK PLAN SHEET 5 OF 6	1.00							
49	FM 1846 SIDEWALK PLAN SHEET 6 OF 6	1.00							
50	EBONY AVE SIDEWALK PLAN SHEET 1 OF 3	1.00	54	24	374	374	6.3		
51	EBONY AVE SIDEWALK PLAN SHEET 2 OF 3	1.00		89	175	175	3.0		
52	EBONY AVE SIDEWALK PLAN SHEET 3 OF 3	1.00			134	134	2.3		
53	S ROBERTSON RD SIDEWALK PLAN SHEET 1 OF 9	1.00			200	200	3.4		
54	S ROBERTSON RD SIDEWALK PLAN SHEET 2 OF 9	1.00		12	280	280	4.8		
55	S ROBERTSON RD SIDEWALK PLAN SHEET 3 OF 9	1.00			318	318	5.4		
56	S ROBERTSON RD SIDEWALK PLAN SHEET 4 OF 9	1.00			172	172	2.9		
57	S ROBERTSON RD SIDEWALK PLAN SHEET 5 OF 9	1.00			385	385	6.5		
58	S ROBERTSON RD SIDEWALK PLAN SHEET 6 OF 9	1.00			400	400	6.8		
59	S ROBERTSON RD SIDEWALK PLAN SHEET 7 OF 9	1.00			400	400	6.8		
60	S ROBERTSON RD SIDEWALK PLAN SHEET 8 OF 9	1.00			124	124	2.1	1.0	
61	S ROBERTSON RD SIDEWALK PLAN SHEET 9 OF 9	1.00							
	TOTALS	18.00	360	125	4423	4423	75.1	3.6	47

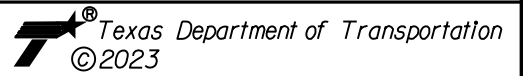
ROADWAY QUANTITIES

SHT NO	ITEM	0464-6005	0471-6003	0479-6001	0479-6005	0529-6002	0529-6008	0529-6012	0530-6004
	DESCRIPTION	RC PIPE (CL III)(24 IN)	GRATE & FRAME	ADJUSTING MANHOLES	ADJUSTING MANHOLES (WATER VALVE)	CONC CURB (TY II)	CONC CURB & GUTTER (TY II)	CONC CURB (SLOTTED)	DRIVEWAYS (CONC)
	LF	EA	EA	EA	LF	LF	LF	SY	
44	FM 1846 SIDEWALK PLAN SHEET 1 OF 6					4			49
45	FM 1846 SIDEWALK PLAN SHEET 2 OF 6							323	121
46	FM 1846 SIDEWALK PLAN SHEET 3 OF 6		6					210	137
47	FM 1846 SIDEWALK PLAN SHEET 4 OF 6		2						22
48	FM 1846 SIDEWALK PLAN SHEET 5 OF 6								
49	FM 1846 SIDEWALK PLAN SHEET 6 OF 6								
50	EBONY AVE SIDEWALK PLAN SHEET 1 OF 3	22			2		40		54
51	EBONY AVE SIDEWALK PLAN SHEET 2 OF 3			2			89		85
52	EBONY AVE SIDEWALK PLAN SHEET 3 OF 3						6		
53	S ROBERTSON RD SIDEWALK PLAN SHEET 1 OF 9								
54	S ROBERTSON RD SIDEWALK PLAN SHEET 2 OF 9					16	82		47
55	S ROBERTSON RD SIDEWALK PLAN SHEET 3 OF 9						84		
56	S ROBERTSON RD SIDEWALK PLAN SHEET 4 OF 9								131
57	S ROBERTSON RD SIDEWALK PLAN SHEET 5 OF 9								
58	S ROBERTSON RD SIDEWALK PLAN SHEET 6 OF 9								
59	S ROBERTSON RD SIDEWALK PLAN SHEET 7 OF 9								
60	S ROBERTSON RD SIDEWALK PLAN SHEET 8 OF 9		3						
61	S ROBERTSON RD SIDEWALK PLAN SHEET 9 OF 9								
	TOTALS	22	11	2	2	20	301	533	646

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SUMMARY OF ROADWAY QUANTITIES

SHEET 1 OF 4

DGN#	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	6

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ROADWAY QUANTITIES

ITEM		0531-6001	0531-6018	0531-6020	0531-6022	0531-6023	0531-6024	0531-6027	0531-6033
DESCRIPTION		CONC SIDEWALKS (4")	CURB RAMPS (TY 1)	CURB RAMPS (TY 3)	CURB RAMPS (TY 5)	CURB RAMPS (TY 6)	CURB RAMPS (TY 7)	CURB RAMPS (TY 10)	CONC SIDEWALKS (SPECIAL) (TYPE B)
SHT NO		SY	SY	SY	SY	SY	SY	SY	SY
44	FM 1846 SIDEWALK PLAN SHEET 1 OF 6	226							
45	FM 1846 SIDEWALK PLAN SHEET 2 OF 6	63			13			21	254
46	FM 1846 SIDEWALK PLAN SHEET 3 OF 6								330
47	FM 1846 SIDEWALK PLAN SHEET 4 OF 6	29							39
48	FM 1846 SIDEWALK PLAN SHEET 5 OF 6								
49	FM 1846 SIDEWALK PLAN SHEET 6 OF 6								
50	EBONY AVE SIDEWALK PLAN SHEET 1 OF 3	524					40	27	
51	EBONY AVE SIDEWALK PLAN SHEET 2 OF 3	474					41	27	
52	EBONY AVE SIDEWALK PLAN SHEET 3 OF 3	211				29		32	
53	S ROBERTSON RD SIDEWALK PLAN SHEET 1 OF 9	667							
54	S ROBERTSON RD SIDEWALK PLAN SHEET 2 OF 9	494		58			37		
55	S ROBERTSON RD SIDEWALK PLAN SHEET 3 OF 9	668							
56	S ROBERTSON RD SIDEWALK PLAN SHEET 4 OF 9	626							
57	S ROBERTSON RD SIDEWALK PLAN SHEET 5 OF 9	617					32		
58	S ROBERTSON RD SIDEWALK PLAN SHEET 6 OF 9	669							
59	S ROBERTSON RD SIDEWALK PLAN SHEET 7 OF 9	668							
60	S ROBERTSON RD SIDEWALK PLAN SHEET 8 OF 9	220	35						
61	S ROBERTSON RD SIDEWALK PLAN SHEET 9 OF 9								
	TOTALS	6156	35	58	13	29	150	107	623

ROADWAY QUANTITIES

ITEM		0560-6025	0644-6001	0644-6068	0666-6170	0666-6178	0666-6182	0666-6184	0666-6202
DESCRIPTION		RELOCATE EXISTING MAILBOX	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	RELOCATE SM RD SN SUP&AM TY 10BWG	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (W) 8" (SLD)	REFL PAV MRK TY II (W) 24" (SLD)	REFL PAV MRK TY II (W) (ARROW)	REFL PAV MRK TY II (W) (BIKE SYMBOL)
SHT NO		EA	EA	EA	LF	LF	LF	EA	EA
44	FM 1846 SIDEWALK PLAN SHEET 1 OF 6		6		1400	870		7	6
45	FM 1846 SIDEWALK PLAN SHEET 2 OF 6	4	3		1824	1140		8	9
46	FM 1846 SIDEWALK PLAN SHEET 3 OF 6	5	3		1978	1203		7	7
47	FM 1846 SIDEWALK PLAN SHEET 4 OF 6		7		1619	995		8	8
48	FM 1846 SIDEWALK PLAN SHEET 5 OF 6		6		1764	1104		8	8
49	FM 1846 SIDEWALK PLAN SHEET 6 OF 6		1		64	40		2	2
50	EBONY AVE SIDEWALK PLAN SHEET 1 OF 3			1			84		
51	EBONY AVE SIDEWALK PLAN SHEET 2 OF 3			1			166		
52	EBONY AVE SIDEWALK PLAN SHEET 3 OF 3			1			101		
53	S ROBERTSON RD SIDEWALK PLAN SHEET 1 OF 9								
54	S ROBERTSON RD SIDEWALK PLAN SHEET 2 OF 9						554		
55	S ROBERTSON RD SIDEWALK PLAN SHEET 3 OF 9								
56	S ROBERTSON RD SIDEWALK PLAN SHEET 4 OF 9								
57	S ROBERTSON RD SIDEWALK PLAN SHEET 5 OF 9								
58	S ROBERTSON RD SIDEWALK PLAN SHEET 6 OF 9								
59	S ROBERTSON RD SIDEWALK PLAN SHEET 7 OF 9								
60	S ROBERTSON RD SIDEWALK PLAN SHEET 8 OF 9						102		
61	S ROBERTSON RD SIDEWALK PLAN SHEET 9 OF 9								
	TOTALS	9	26	3	8649	5352	1007	40	40

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**SUMMARY OF ROADWAY QUANTITIES**

SHEET 2 OF 4

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	PHR	CAMERON	0921	06
			JOB NO.:	SHEET NO.:
			348	7

ROADWAY QUANTITIES

SHT NO	ITEM	0666-6224	0666-6226	0666-6230	0666-6231	0666-6245	0677-6001	0677-6003	0677-6007
	DESCRIPTION	PAVEMENT SEALER 4"	PAVEMENT SEALER 8"	PAVEMENT SEALER 24"	PAVEMENT SEALER (ARROW)	PAVEMENT SEALER (BIKE SYMBOL)	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (24")
		LF	LF	LF	EA	EA	LF	LF	LF
44	FM 1846 SIDEWALK PLAN SHEET 1 OF 6	1400	870		7	6			
45	FM 1846 SIDEWALK PLAN SHEET 2 OF 6	1824	1140		8	9		1140	
46	FM 1846 SIDEWALK PLAN SHEET 3 OF 6	1978	1203		7	7		1203	
47	FM 1846 SIDEWALK PLAN SHEET 4 OF 6	1619	995		8	8		995	
48	FM 1846 SIDEWALK PLAN SHEET 5 OF 6	1764	1104		8	8	552	1104	
49	FM 1846 SIDEWALK PLAN SHEET 6 OF 6	64	40		2	2		40	
50	EBONY AVE SIDEWALK PLAN SHEET 1 OF 3			84				515	
51	EBONY AVE SIDEWALK PLAN SHEET 2 OF 3			166				491	
52	EBONY AVE SIDEWALK PLAN SHEET 3 OF 3			101				122	
53	S ROBERTSON RD SIDEWALK PLAN SHEET 1 OF 9								
54	S ROBERTSON RD SIDEWALK PLAN SHEET 2 OF 9			554				167	35
55	S ROBERTSON RD SIDEWALK PLAN SHEET 3 OF 9								
56	S ROBERTSON RD SIDEWALK PLAN SHEET 4 OF 9								
57	S ROBERTSON RD SIDEWALK PLAN SHEET 5 OF 9								
58	S ROBERTSON RD SIDEWALK PLAN SHEET 6 OF 9								
59	S ROBERTSON RD SIDEWALK PLAN SHEET 7 OF 9								
60	S ROBERTSON RD SIDEWALK PLAN SHEET 8 OF 9			102					
61	S ROBERTSON RD SIDEWALK PLAN SHEET 9 OF 9								
	TOTALS	8649	5352	1007	40	40	552	5777	35

ROADWAY QUANTITIES

SHT NO	ITEM	0677-6023	0677-6025	0678-6001	0678-6004	0678-6008	0678-6009	0678-6028	0752-6005
	DESCRIPTION	ELIM EXT PAV MRK & MARKS (BIKE ARROW)	ELIM EXT PAV MRK & MARKS (BIKE SYMBOL)	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (8")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (ARROW)	PAV SURF PREP FOR MRK (BIKE SYMBOL)	TREE REMOVAL (4" - 12" DIA)
		EA	EA	LF	LF	LF	EA	EA	EA
44	FM 1846 SIDEWALK PLAN SHEET 1 OF 6			1400	870		7	6	
45	FM 1846 SIDEWALK PLAN SHEET 2 OF 6			1824	1140		8	9	
46	FM 1846 SIDEWALK PLAN SHEET 3 OF 6			1978	1203		7	7	
47	FM 1846 SIDEWALK PLAN SHEET 4 OF 6			1619	995		8	8	
48	FM 1846 SIDEWALK PLAN SHEET 5 OF 6			1764	1104		8	8	
49	FM 1846 SIDEWALK PLAN SHEET 6 OF 6			64	40		2	2	
50	EBONY AVE SIDEWALK PLAN SHEET 1 OF 3	3	3			84			1
51	EBONY AVE SIDEWALK PLAN SHEET 2 OF 3	2	2			166			
52	EBONY AVE SIDEWALK PLAN SHEET 3 OF 3					101			
53	S ROBERTSON RD SIDEWALK PLAN SHEET 1 OF 9								
54	S ROBERTSON RD SIDEWALK PLAN SHEET 2 OF 9					554			
55	S ROBERTSON RD SIDEWALK PLAN SHEET 3 OF 9								
56	S ROBERTSON RD SIDEWALK PLAN SHEET 4 OF 9								
57	S ROBERTSON RD SIDEWALK PLAN SHEET 5 OF 9								
58	S ROBERTSON RD SIDEWALK PLAN SHEET 6 OF 9								
59	S ROBERTSON RD SIDEWALK PLAN SHEET 7 OF 9								
60	S ROBERTSON RD SIDEWALK PLAN SHEET 8 OF 9					102			
61	S ROBERTSON RD SIDEWALK PLAN SHEET 9 OF 9								
	TOTALS	5	5	8649	5352	1007	40	40	1

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SUMMARY OF ROADWAY QUANTITIES

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	PHR	CAMERON	0921	06
			JOB NO.:	SHEET NO.:
			348	8

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ROADWAY QUANTITIES

SHT NO	ITEM	6444-6045
	DESCRIPTION	ADJUST PEDESTALS (TELE)
		EA
44	FM 1846 SIDEWALK PLAN SHEET 1 OF 6	
45	FM 1846 SIDEWALK PLAN SHEET 2 OF 6	
46	FM 1846 SIDEWALK PLAN SHEET 3 OF 6	
47	FM 1846 SIDEWALK PLAN SHEET 4 OF 6	
48	FM 1846 SIDEWALK PLAN SHEET 5 OF 6	
49	FM 1846 SIDEWALK PLAN SHEET 6 OF 6	
50	EBONY AVE SIDEWALK PLAN SHEET 1 OF 3	1
51	EBONY AVE SIDEWALK PLAN SHEET 2 OF 3	
52	EBONY AVE SIDEWALK PLAN SHEET 3 OF 3	
53	S ROBERTSON RD SIDEWALK PLAN SHEET 1 OF 9	
54	S ROBERTSON RD SIDEWALK PLAN SHEET 2 OF 9	1
55	S ROBERTSON RD SIDEWALK PLAN SHEET 3 OF 9	
56	S ROBERTSON RD SIDEWALK PLAN SHEET 4 OF 9	
57	S ROBERTSON RD SIDEWALK PLAN SHEET 5 OF 9	
58	S ROBERTSON RD SIDEWALK PLAN SHEET 6 OF 9	
59	S ROBERTSON RD SIDEWALK PLAN SHEET 7 OF 9	
60	S ROBERTSON RD SIDEWALK PLAN SHEET 8 OF 9	
61	S ROBERTSON RD SIDEWALK PLAN SHEET 9 OF 9	
	TOTALS	2

INCIDENTAL ROADWAY QUANTITIES

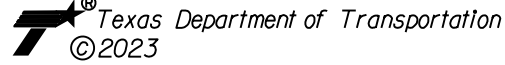
SHT NO	ITEM	0100-6001	0506-6035	0506-6041	0506-6043	6001-6001	6185-6002	6185-6005
		PREPARING ROW	SANDBAGS FOR EROSION CONTROL	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	DESCRIPTION	AC	EA	LF	LF	DAY	DAY	DAY
Incidental	Incidentals	1.00	500	1000	1000	210	105	1
	TOTALS	1.00	500	1000	1000	210	105	1

REV. NO.	DATE	DESCRIPTION	BY



**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



Texas Department of Transportation  
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SUMMARY OF ROADWAY QUANTITIES

SHEET 4 OF 4

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	9

LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET SHEET NUMBER					6185 6002	6185 6005
			FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	TMA (STATIONARY)	TMA (MOBILE OPERATION)
			EA	EA	EA	DAYS PER TMA/TA USE	DAY	DAY
1	ALL	TCP(2-1)-18, TCP(2-2)-18, TCP(2-4)-18 TCP(1-4)-18				105	105	
TOTALS			1				105	

NOTE.  
 FURNISH TMA/TA - THE NUMBER OF ATTENUATORS BEING FURNISHED FOR THE SPECIFIC TCP.  
 RELOCATE/REUSE TMA/TA - THE NUMBER OF ATTENUATORS BEING REUSED FROM A PREVIOUS TCP FOR THE SPECIFIC TCP.  
 TOTAL TMA/TA PER SET UP = (FURNISH TMA/TA) + (RELOCATE/REUSE TMA/TA)  
 DURATION OF TMA/TA SET UP - THE NUMBER OF DAYS THE ATTENUATORS WILL BE USED FOR THE SPECIFIC TCP.  
 TMA/TA (STATIONARY) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)  
 TMA/TA (MOBILE OPERATION) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)

TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET

FILE: tma.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB
REVISIONS 3/2018	0921	06	348
	DIST	COUNTY	
	PHR	CAMERON	
	FEDERAL AID PROJECT		SHEET NO.
	STP 2B23 (202)TAPS		10

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DATE: 2023-05-30 16:22:43  
 FILE: S:\Projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\TCP\bc-21.dgn

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

- The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
- The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
- Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
- When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
- The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
- The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
- Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

**WORKER SAFETY NOTES:**

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

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

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

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

SHEET 1 OF 12



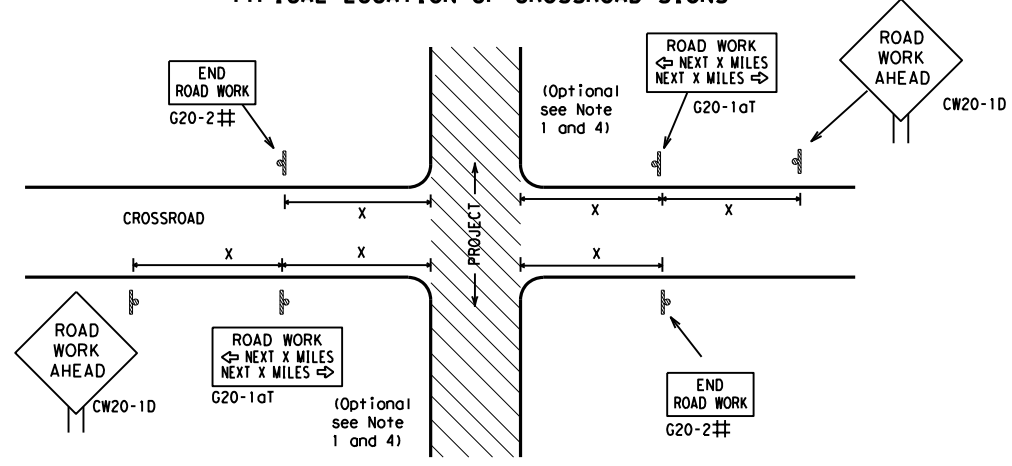
**BARRICADE AND CONSTRUCTION  
 GENERAL NOTES  
 AND REQUIREMENTS**

BC (1) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	DR:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
4-03	7-13	0921	06	348	VA				
9-07	8-14	DIST	COUNTY		SHEET NO.				
5-10	5-21	PHR	CAMERON		11				

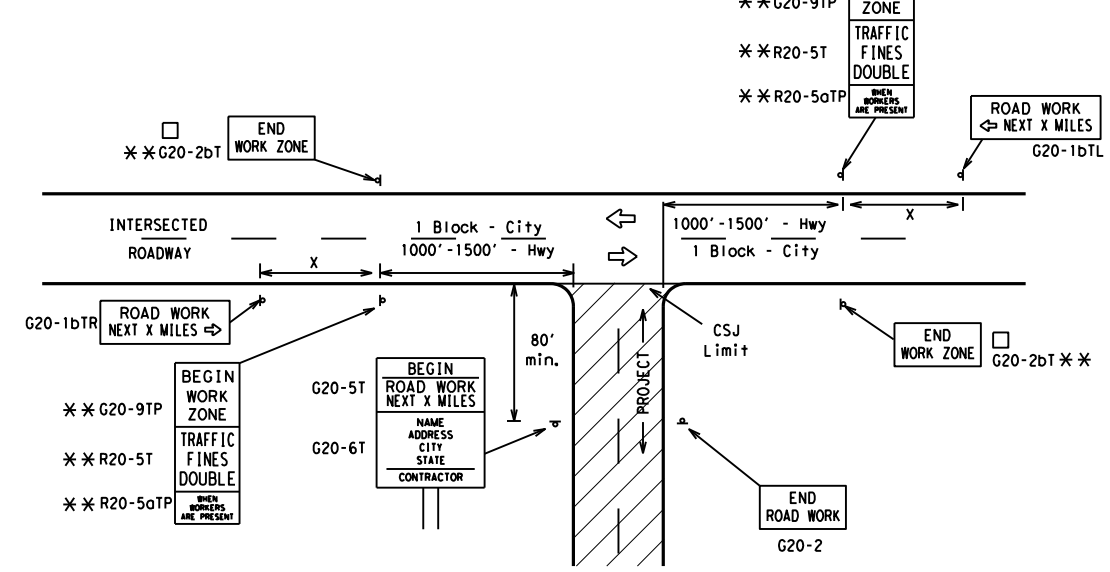
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**TYPICAL LOCATION OF CROSSROAD SIGNS**



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

**T-INTERSECTION**



**CSJ LIMITS AT T-INTERSECTION**

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

**TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING<sup>1,5,6</sup>**

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

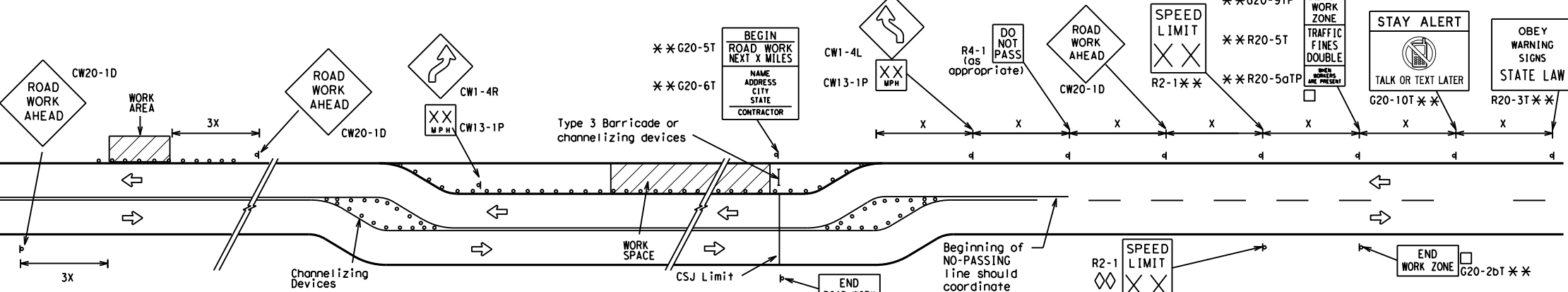
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

**GENERAL NOTES**

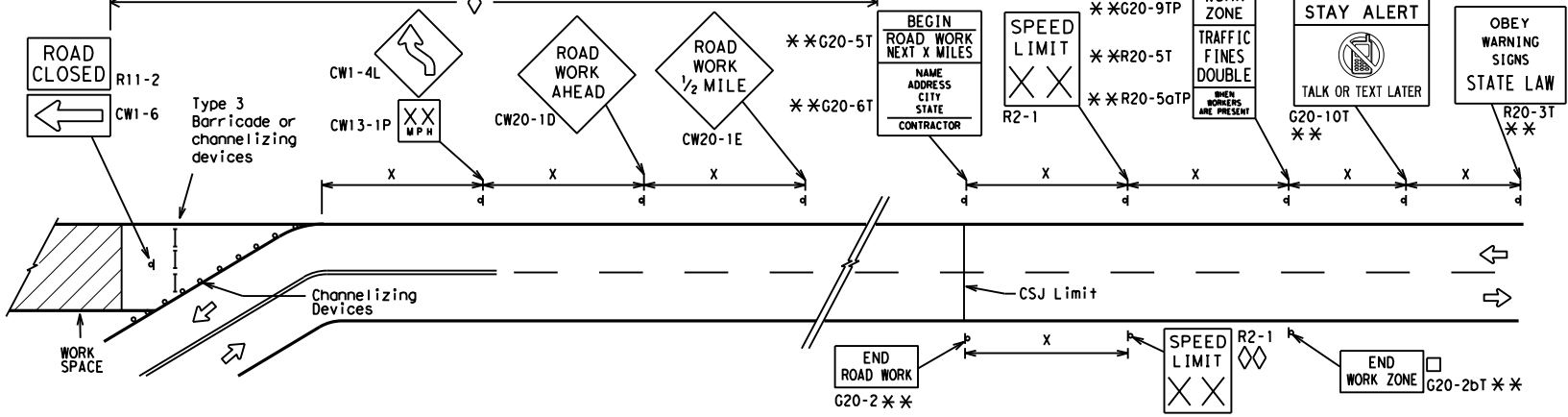
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

**WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS**

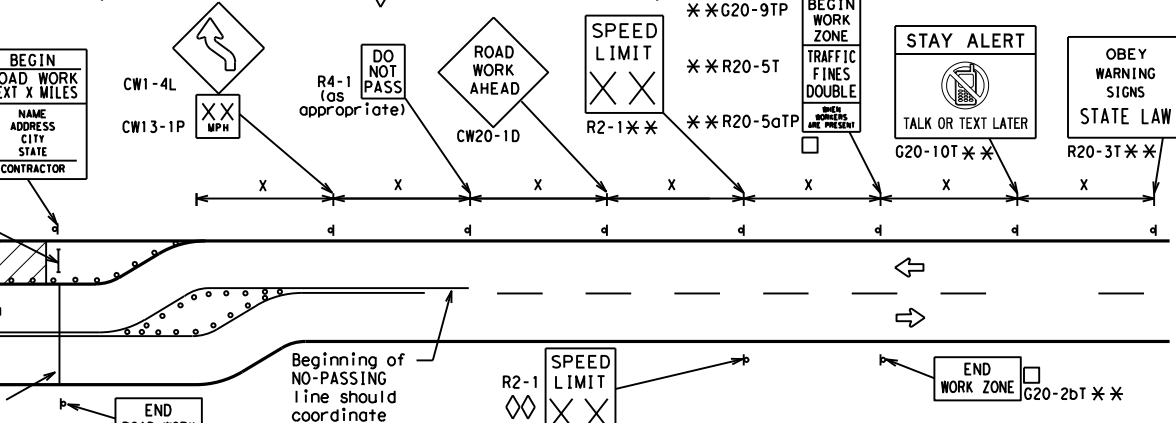


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



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



**NOTES**

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
  - CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
  - Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
  - Contractor will install a regulatory speed limit sign at the end of the work zone.

**LEGEND**

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

SHEET 2 OF 12



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

BC(2)-21

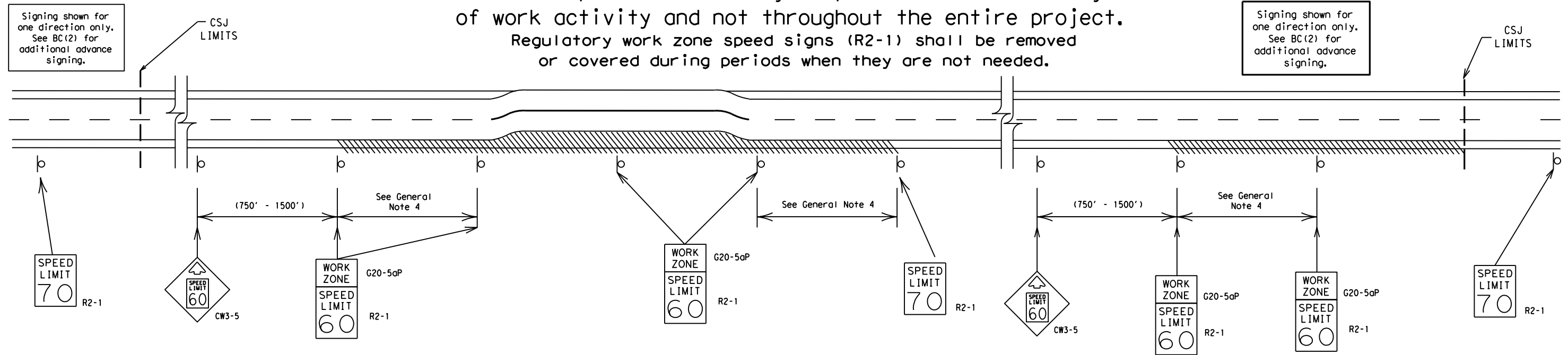
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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	PHR	CAMERON	12	



# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

### GENERAL NOTES

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

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

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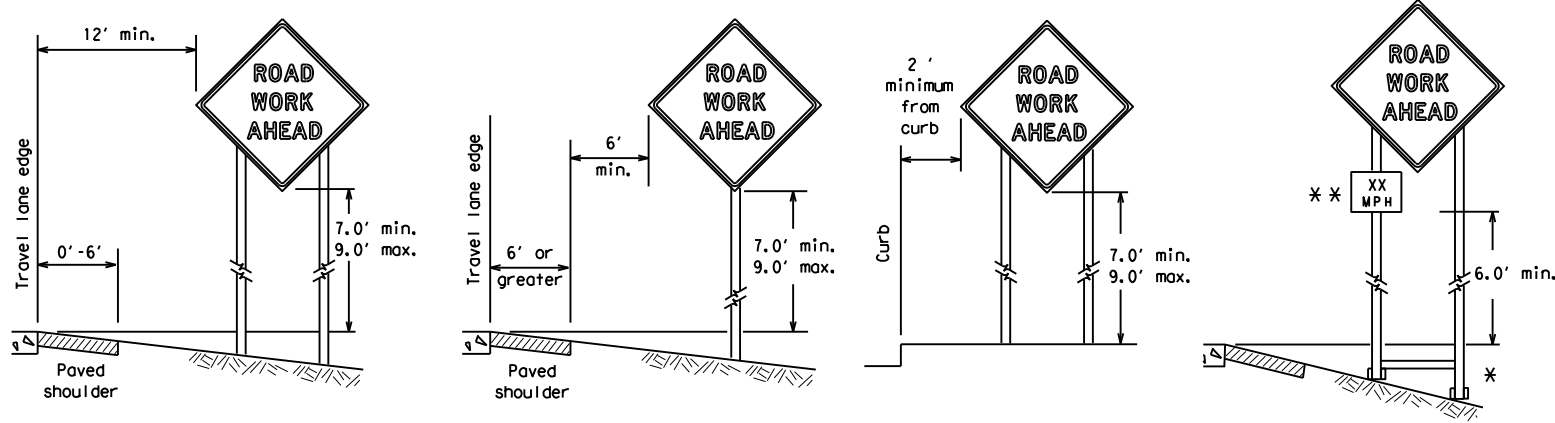
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SHEET 3 OF 12

		Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT			
BC (3) - 21			
FILE:	bc-21.dgn	DN:	TxDOT
© TxDOT	November 2002	CR:	TxDOT
REVISIONS		DW:	TxDOT
9-07	8-14	CR:	TxDOT
7-13	5-21	CON:	348
		SECT:	06
		JOB:	348
		HIGHWAY:	VA
		DIST:	CAMERON
		COUNTY:	CAMERON
		SHEET NO.:	13

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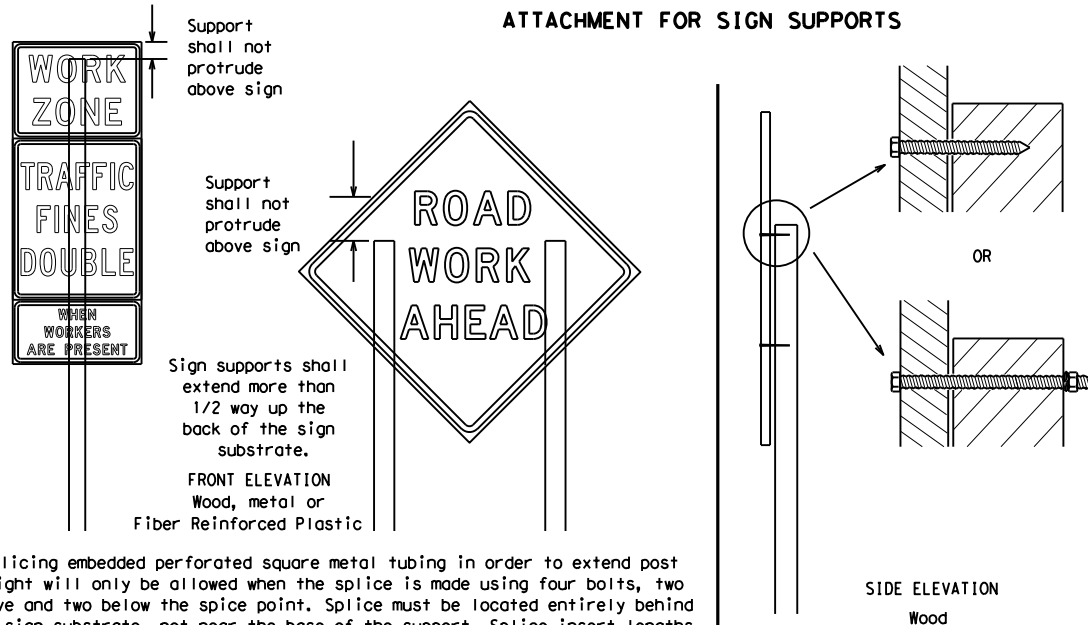
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



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

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

**ATTACHMENT FOR SIGN SUPPORTS**



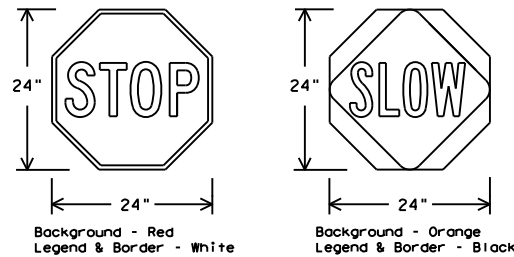
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

**STOP/SLOW PADDLES**

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

**CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS**

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRs standard sheets or the CWZTC 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" (CWZTC) 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 CWZTC lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

**REFLECTIVE SHEETING**

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

**SIGN LETTERS**

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

**REMOVING OR COVERING**

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

**SIGN SUPPORT WEIGHTS**

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

**FLAGS ON SIGNS**

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

SHEET 4 OF 12



**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

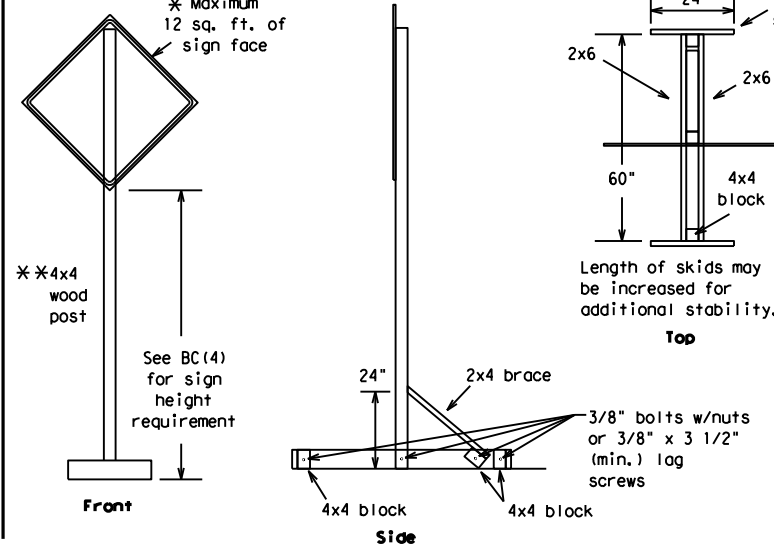
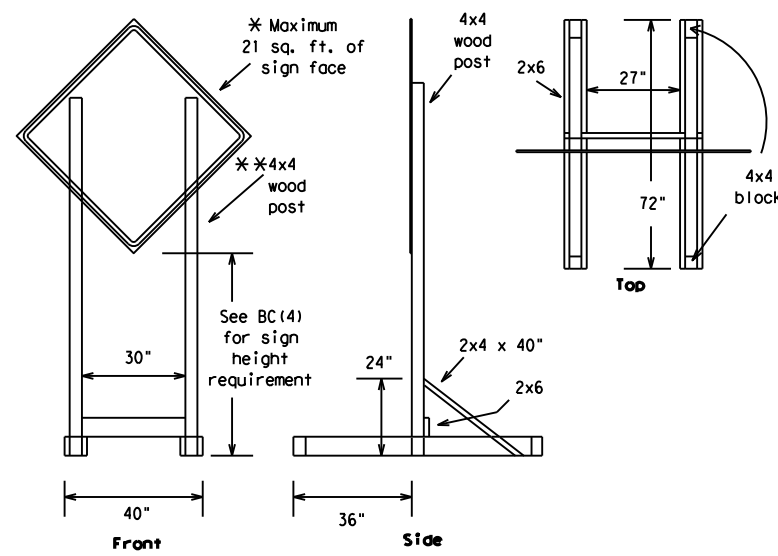
BC(4)-21

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	DR:	TxDOT	CR:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0921	06	348	VA				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	PHR	CAMERON	14					

DATE: 2023-05-30 16:22:45  
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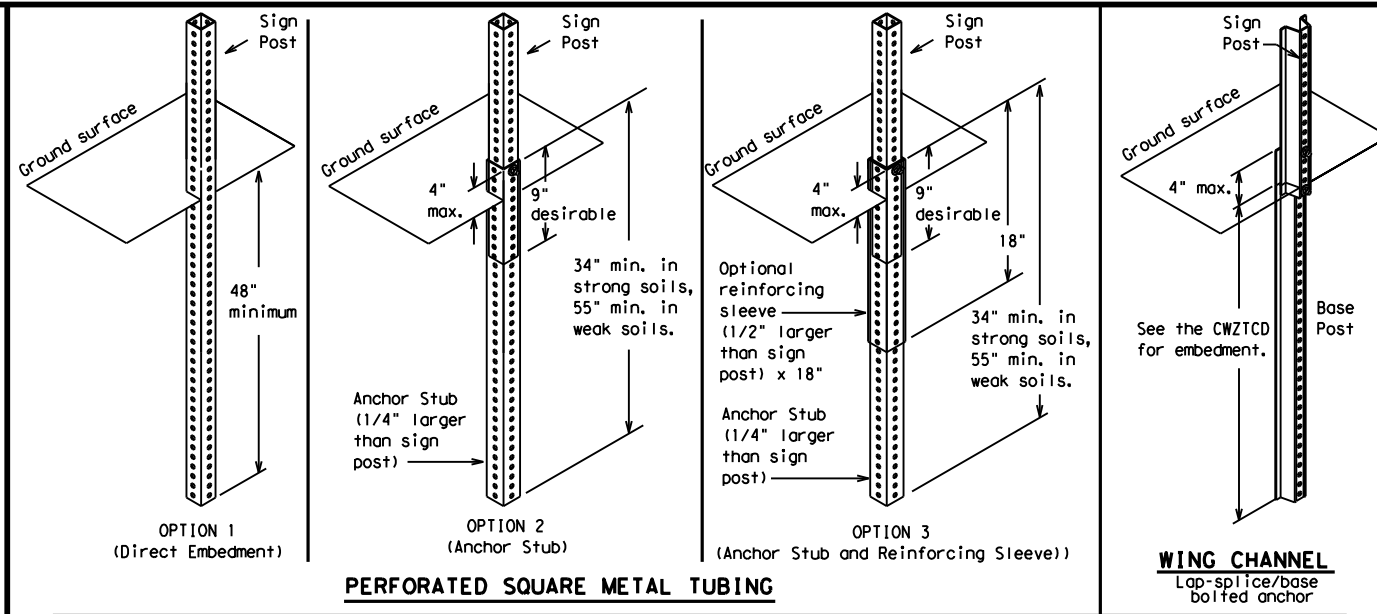
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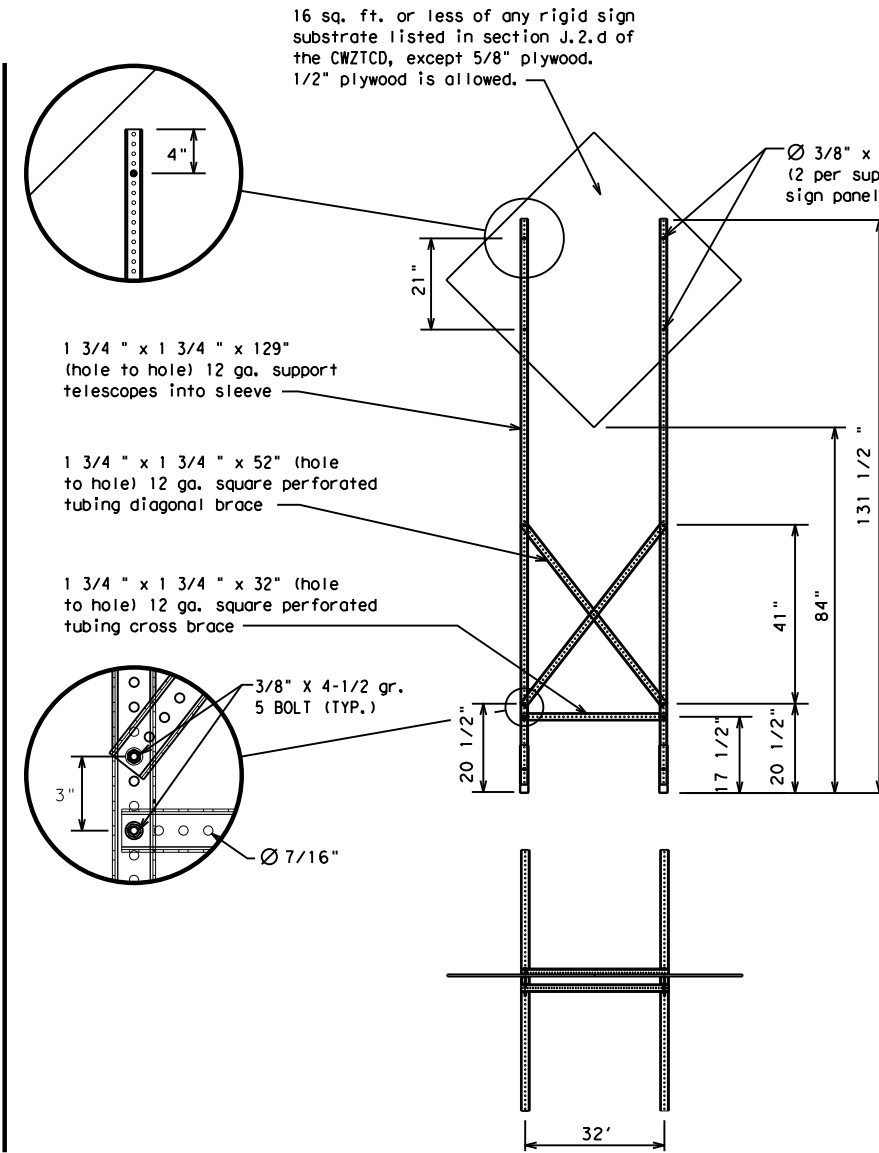
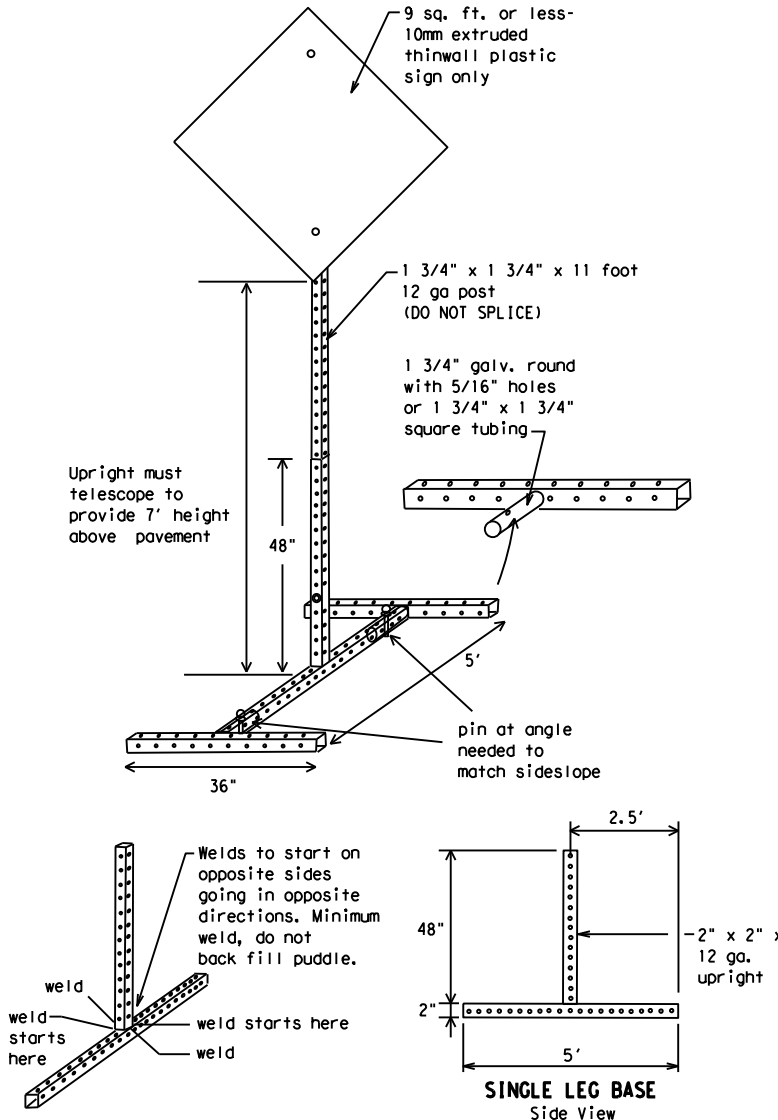
### SKID MOUNTED WOOD SIGN SUPPORTS

\* 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

- 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.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

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

SHEET 5 OF 12



## BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	PHR	CAMERON	15	

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

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

## 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
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

## APPLICATION GUIDELINES

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

## WORDING ALTERNATIVES

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

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

## FULL MATRIX PCMS SIGNS

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

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

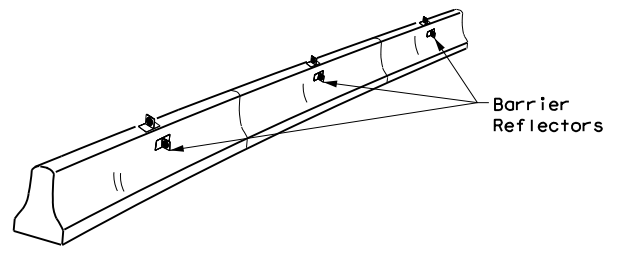
Roadway designation # IH-number, US-number, SH-number, FM-number

SHEET 6 OF 12

<h3>BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)</h3>			
<h2>BC (6) - 21</h2>			
FILE:	bc-21.dgn	DN:	TxDOT
© TxDOT	November 2002	CR:	TxDOT
REVISIONS		DM:	TxDOT
0921	06	CR:	TxDOT
9-07	8-14	JOB	348
7-13	5-21	HIGHWAY	VA
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		SHEET NO.	16

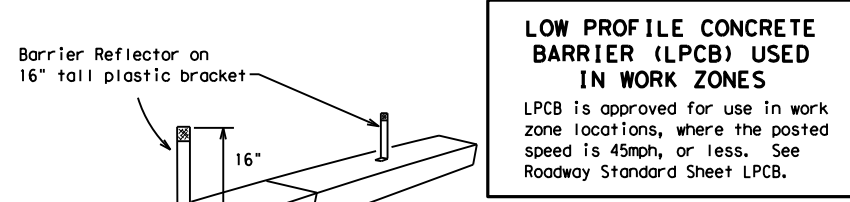
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



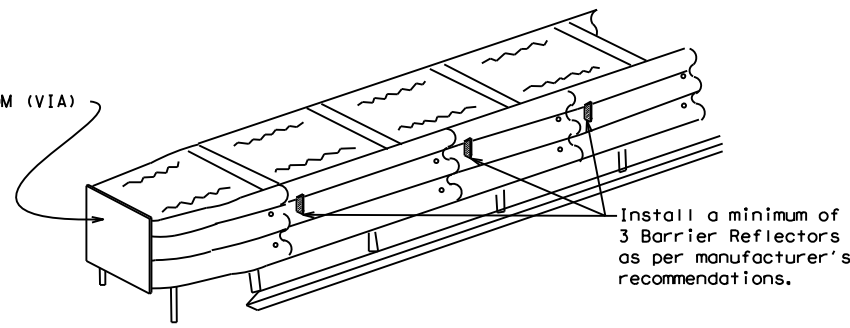
**CONCRETE TRAFFIC BARRIER (CTB)**

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



**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**  
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

**LOW PROFILE CONCRETE BARRIER (LPCB)**



**DELINEATION OF END TREATMENTS**

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**  
 End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTC List for approved end treatments and manufacturers.

**BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS**

**WARNING LIGHTS**

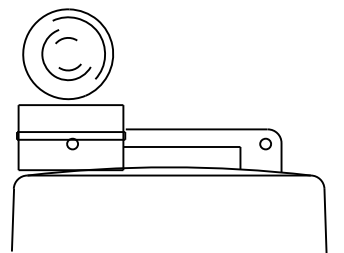
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

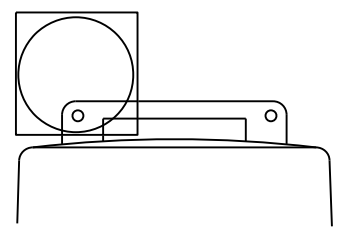
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



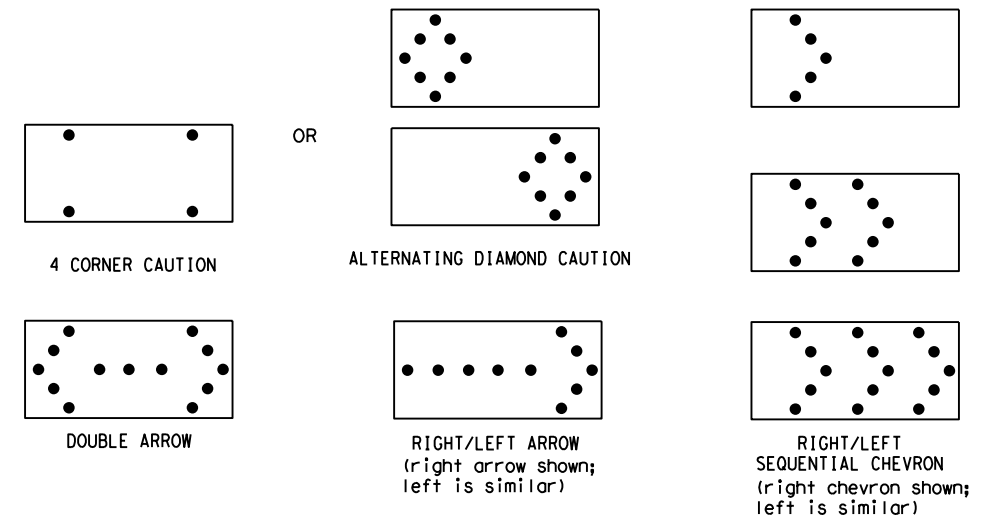
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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

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



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

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

**ATTENTION**  
 Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

**FLASHING ARROW BOARDS**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

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



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

BC (7) - 21

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**GENERAL NOTES**

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

**GENERAL DESIGN REQUIREMENTS**

Pre-qualified plastic drums shall meet the following requirements:

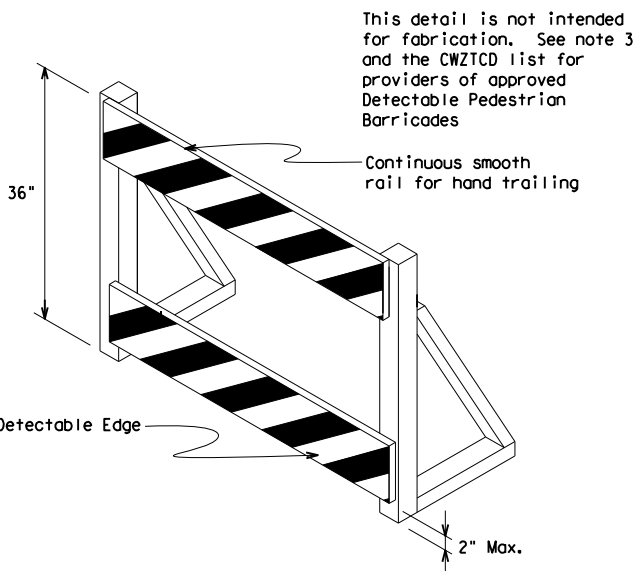
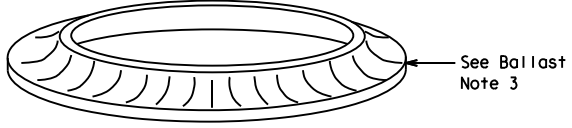
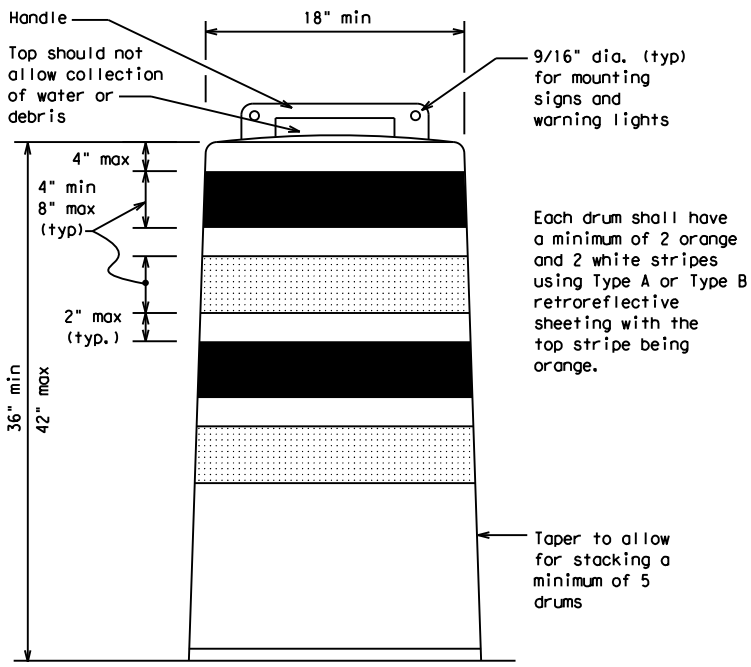
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

**RETROREFLECTIVE SHEETING**

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

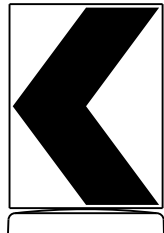
**BALLAST**

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

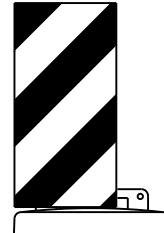


**DETECTABLE PEDESTRIAN BARRICADES**

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



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



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

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

**SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS**

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

SHEET 8 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

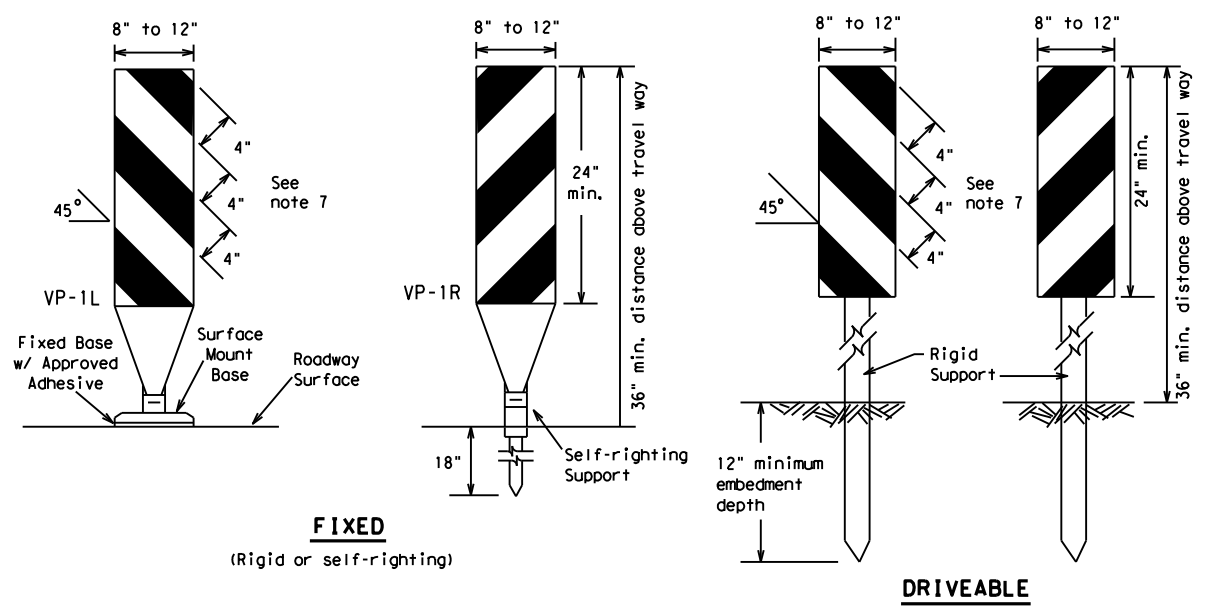
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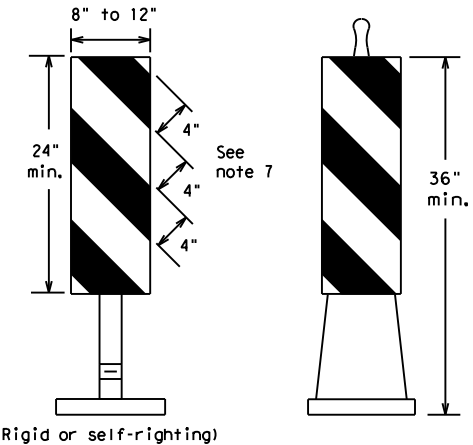
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**FIXED**  
(Rigid or self-righting)

**DRIVEABLE**

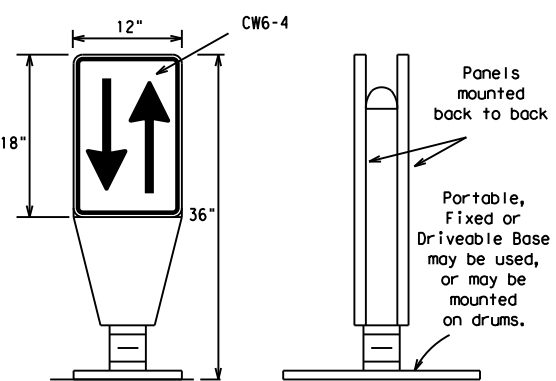


(Rigid or self-righting)

**PORTABLE**

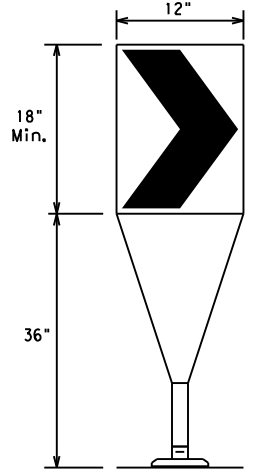
**VERTICAL PANELS (VPs)**

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



**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**

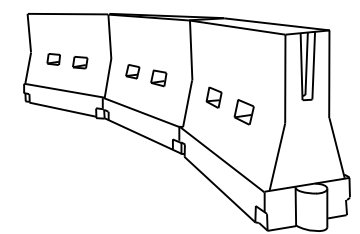
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base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



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

**CHEVRONS**

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



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

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

**WATER BALLASTED SYSTEMS USED AS BARRIERS**

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

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

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

**GENERAL NOTES**

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

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

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

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

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

BC (9) - 21

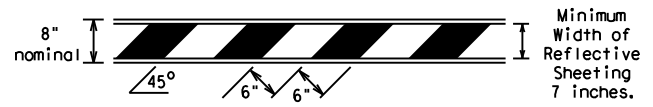
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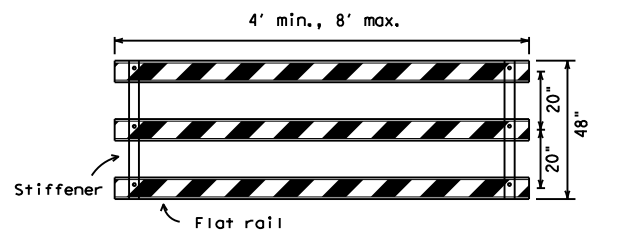
**TYPE 3 BARRICADES**

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

Barricades shall NOT be used as a sign support.

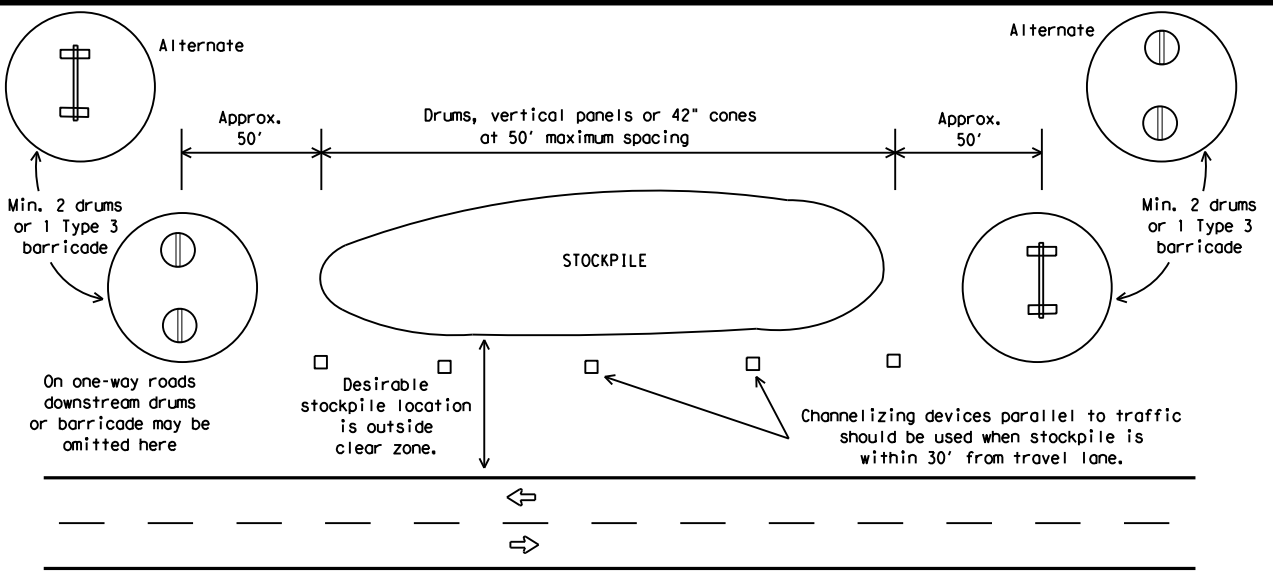


**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



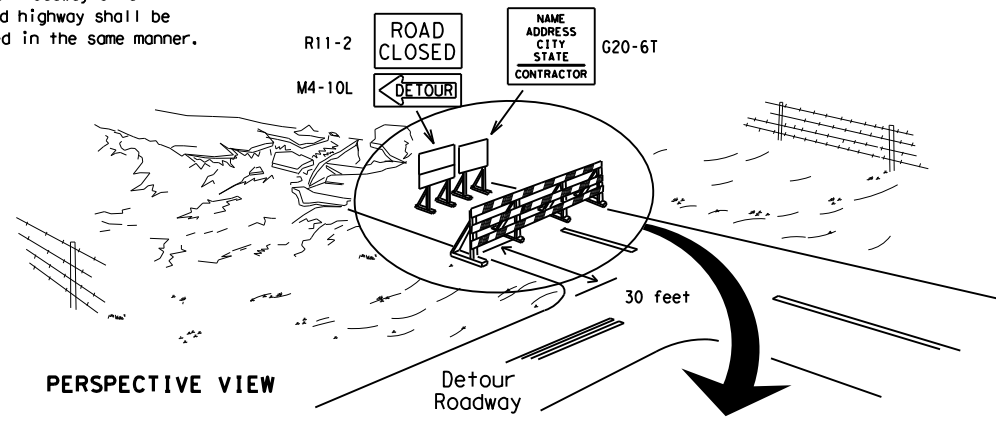
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

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



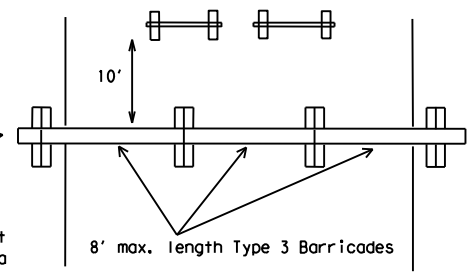
**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**

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



PERSPECTIVE VIEW

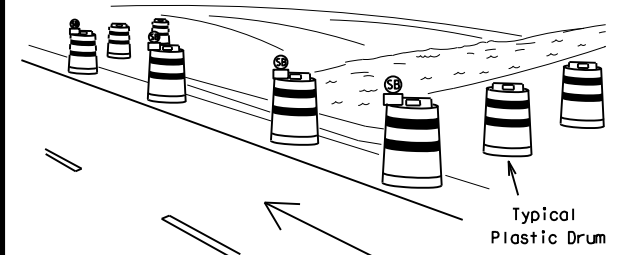
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



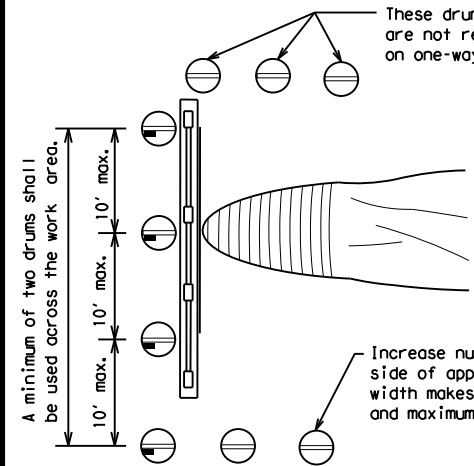
PLAN VIEW

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

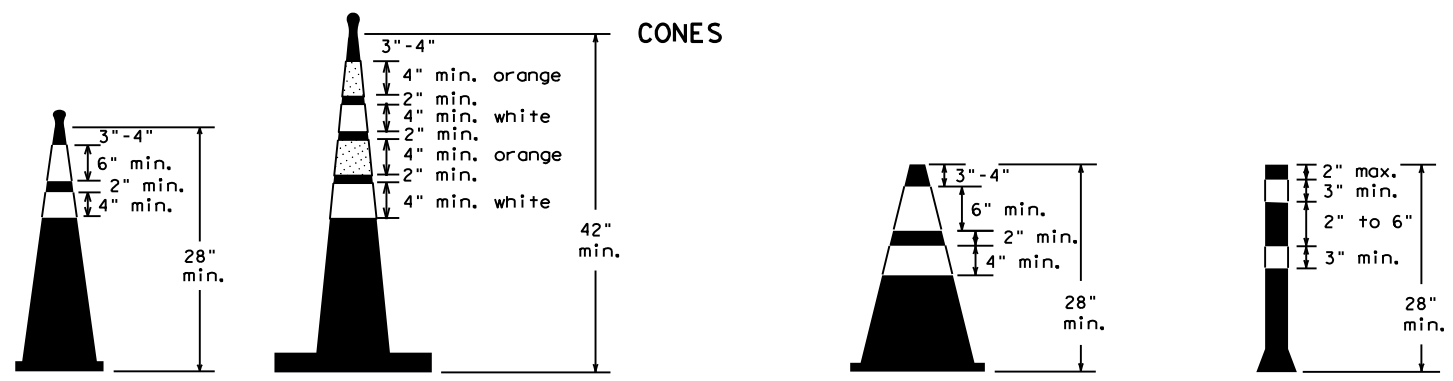


PLAN VIEW

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

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

**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.



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

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## WORK ZONE PAVEMENT MARKINGS

### GENERAL

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

### RAISED PAVEMENT MARKERS

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

### PREFABRICATED PAVEMENT MARKINGS

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

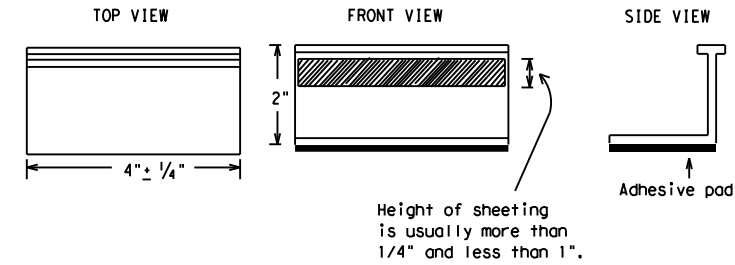
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

### REMOVAL OF PAVEMENT MARKINGS

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

## Temporary Flexible-Reflective Roadway Marker Tabs



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

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

### RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DR: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	PHR	CAMERON	21	
11-02 8-14				

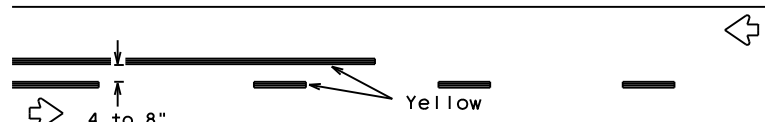
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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 FILE: S:\Projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standard\TCP\bc-21.dgn

## PAVEMENT MARKING PATTERNS

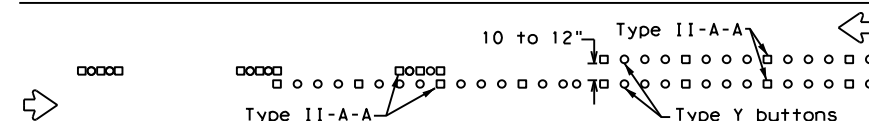


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

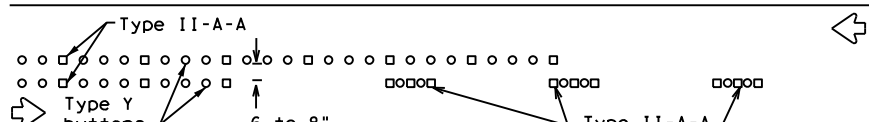


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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

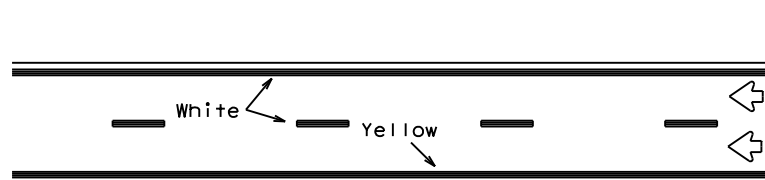


RAISED PAVEMENT MARKERS - PATTERN A



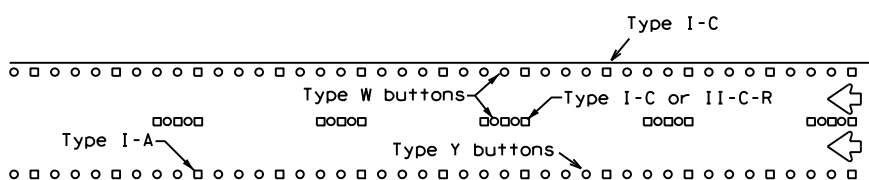
RAISED PAVEMENT MARKERS - PATTERN B

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



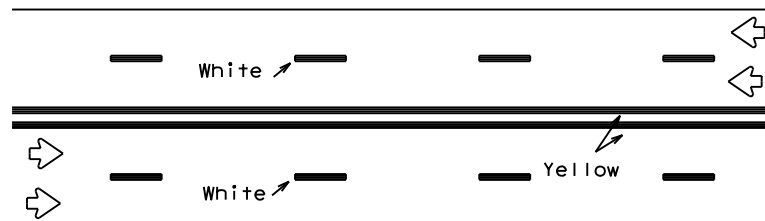
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



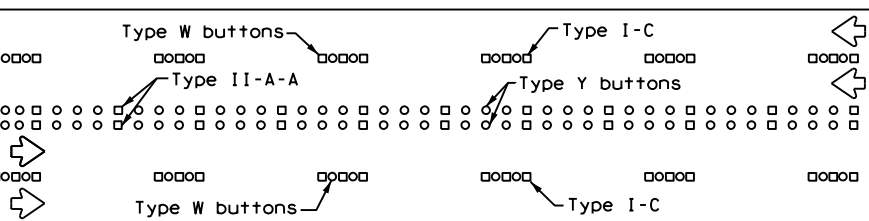
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



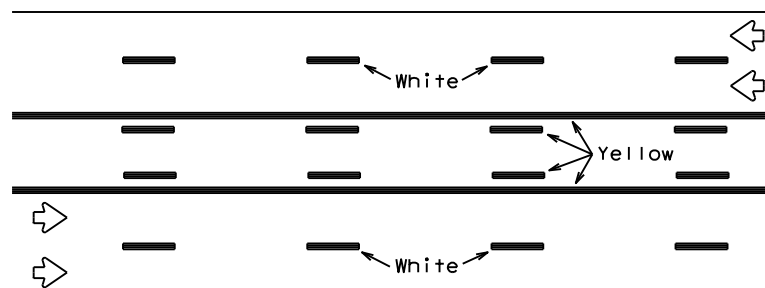
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



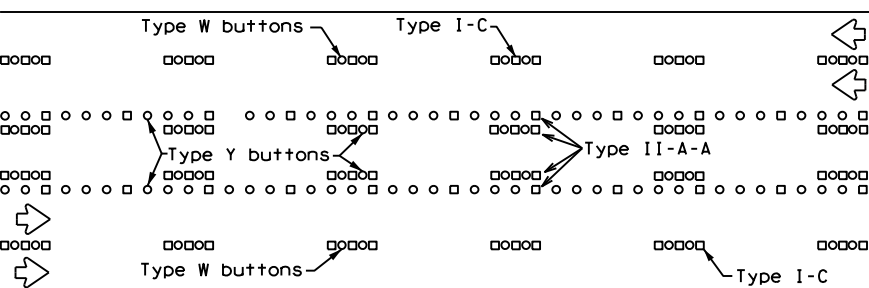
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

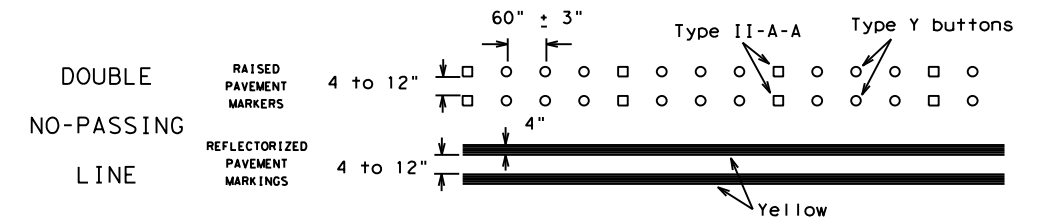
Prefabricated markings may be substituted for reflectORIZED pavement markings.



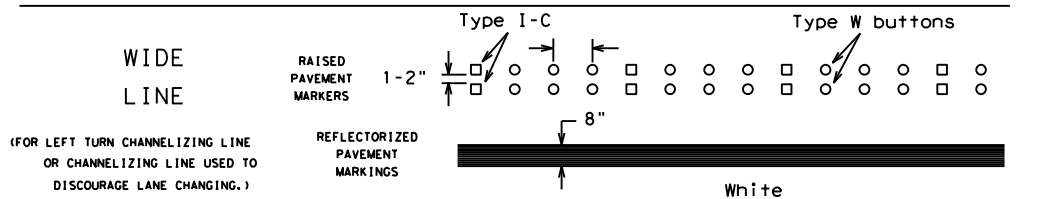
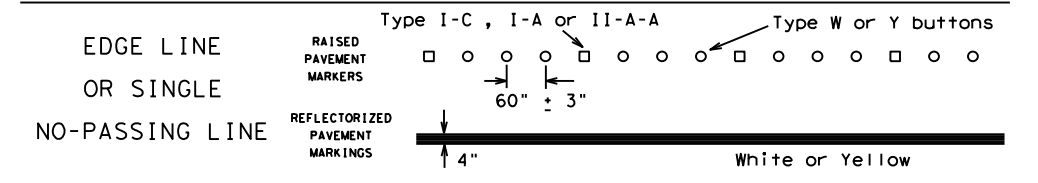
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

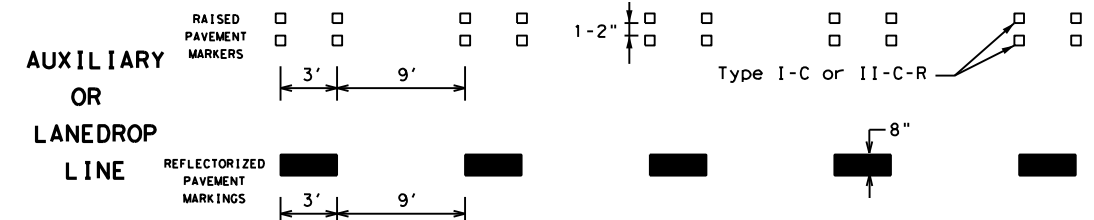
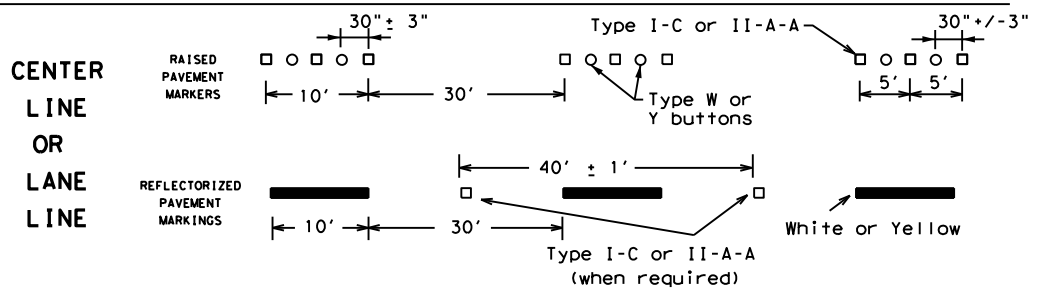
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



### SOLID LINES

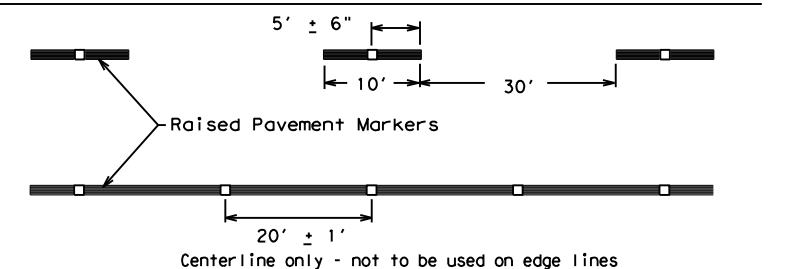


### BROKEN LINES



### REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

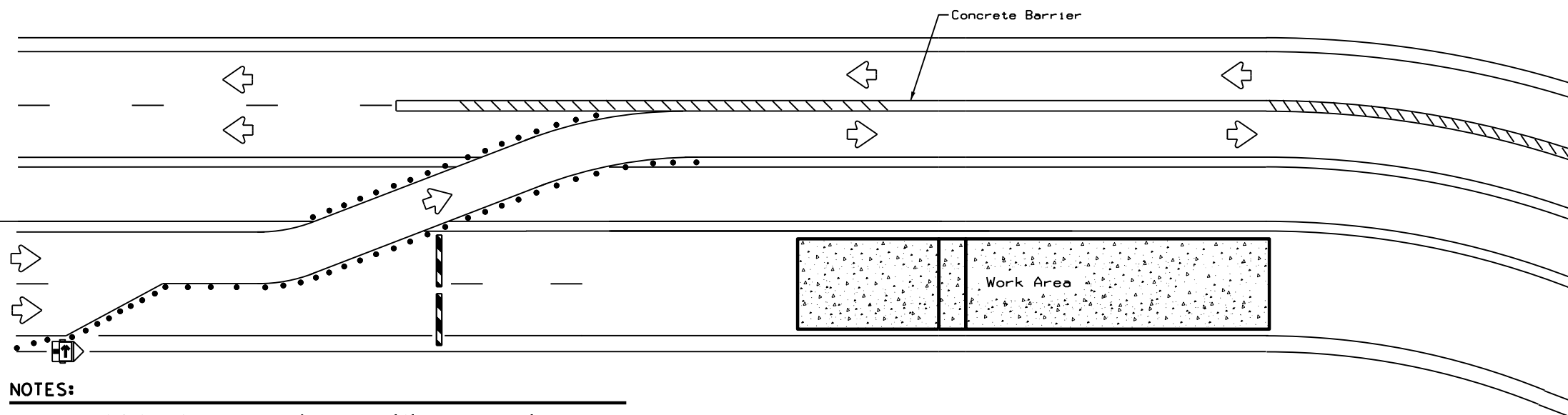
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DR: TxDOT	CR: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	PHR	CAMERON	22	
11-02 8-14				

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DATE: 2023-05-30 16:22:50  
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LEGEND	
	Type 3 Barricade
	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
	Safety glare screen

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

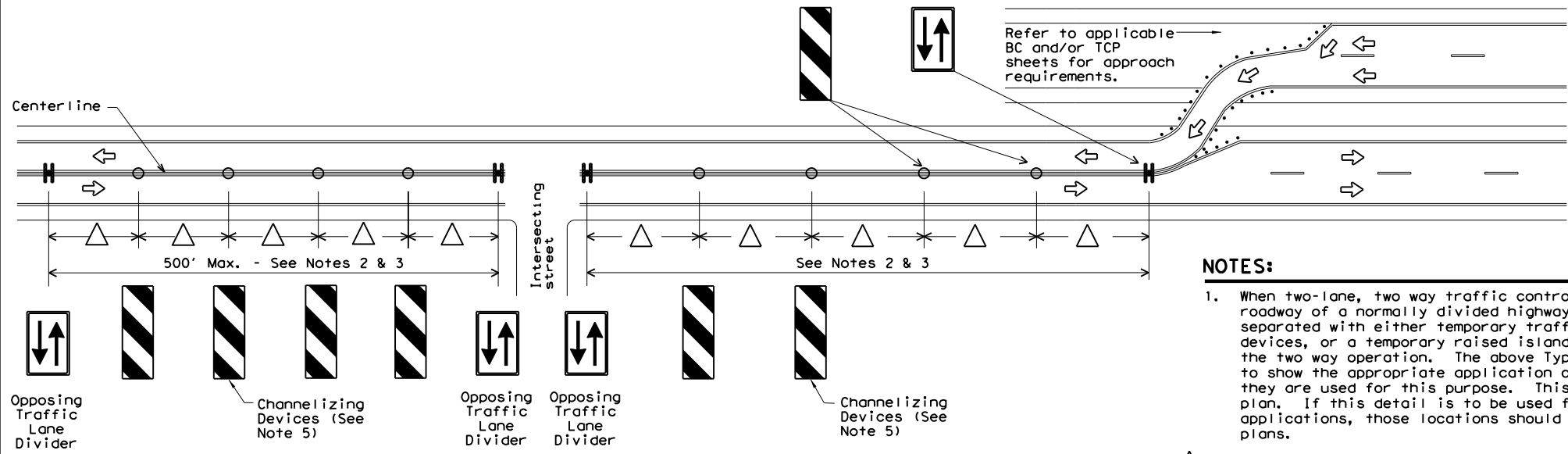
Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:

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

**NOTES:**

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

**BARRIER DELINEATION WITH MODULAR GLARE SCREENS**



**NOTES:**

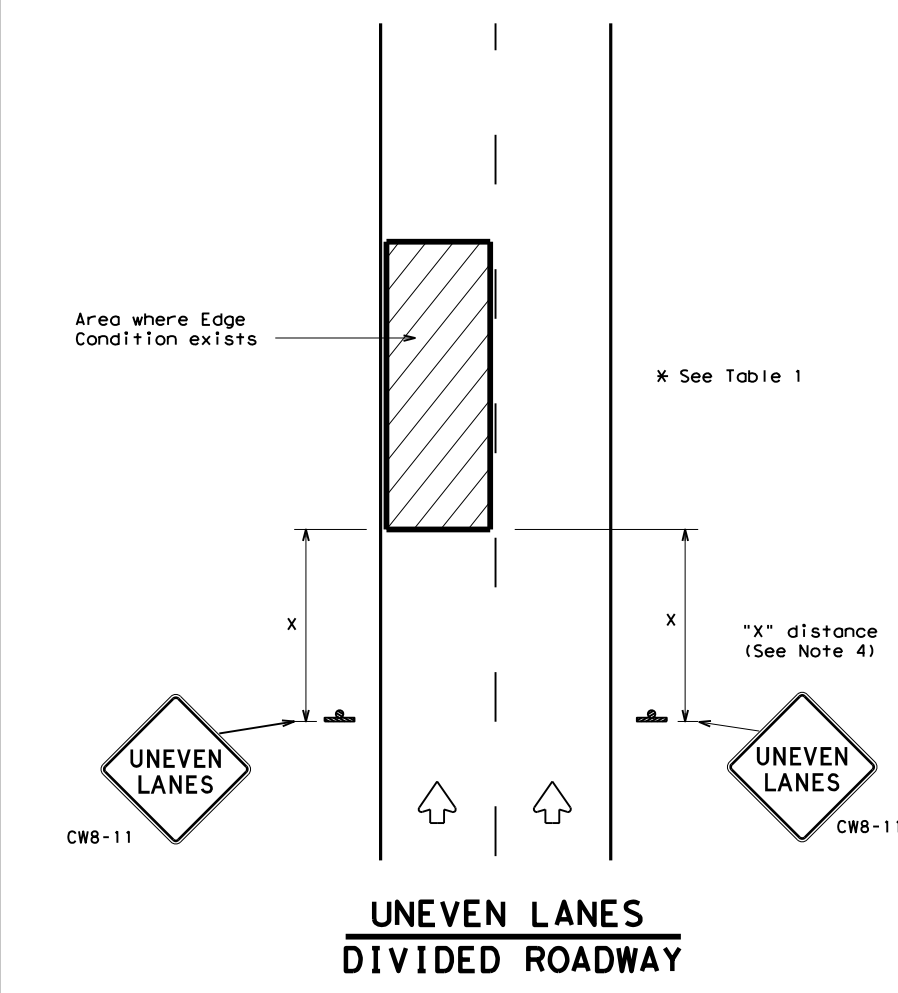
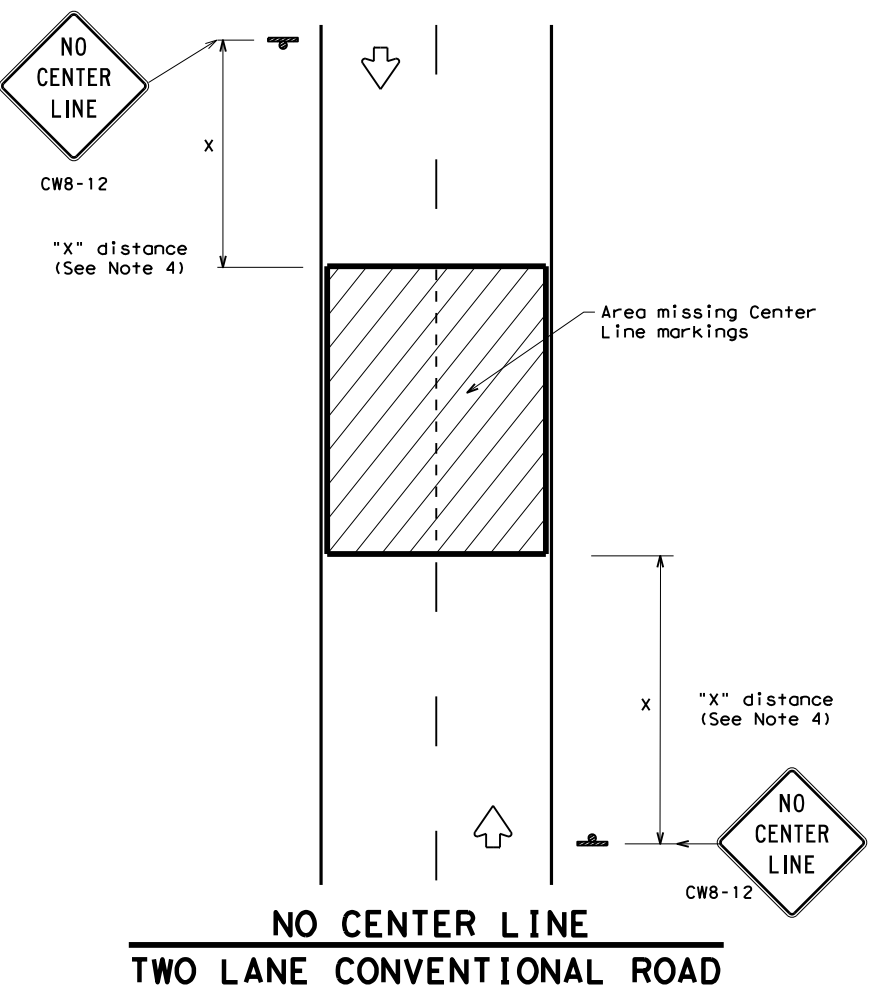
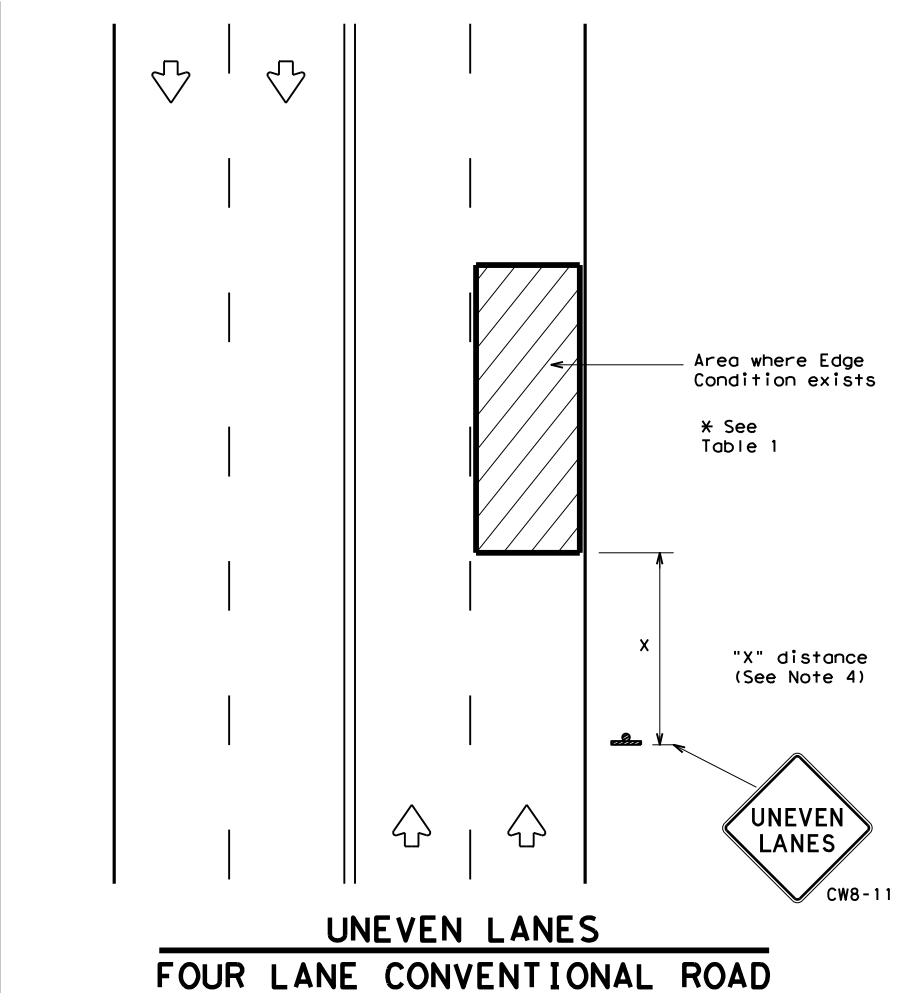
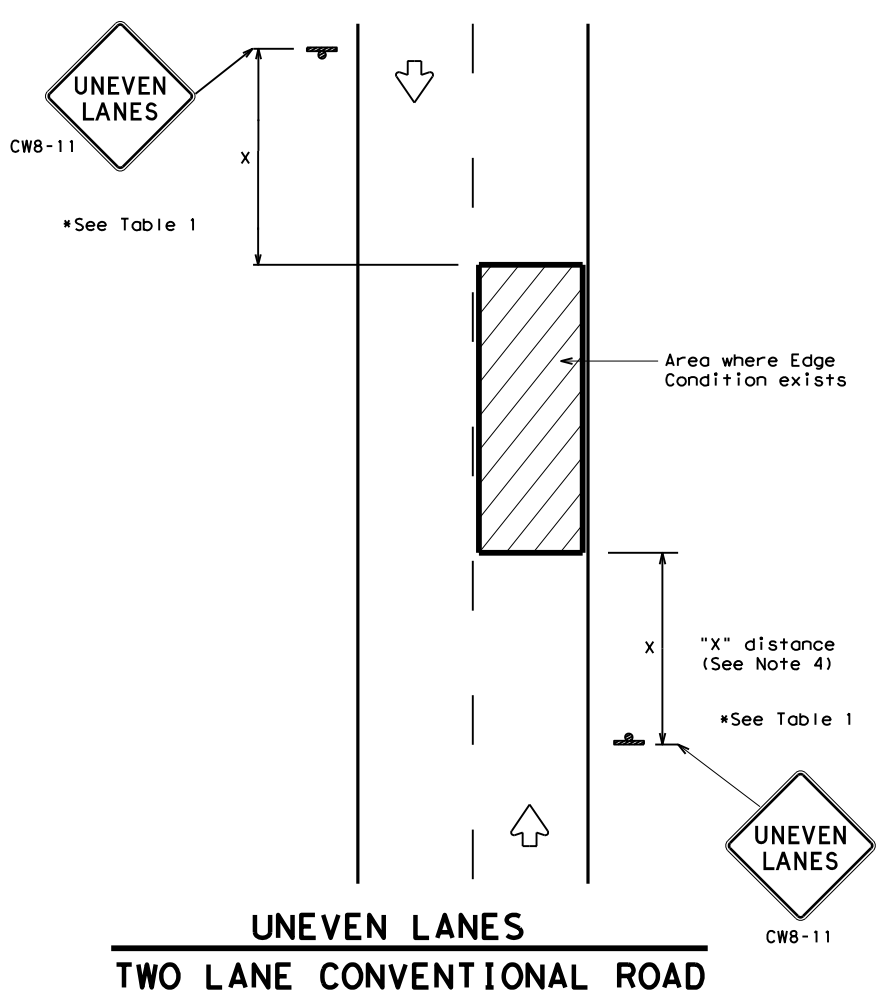
- When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application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

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

		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN TYPICAL DETAILS			
WZ(TD) - 17			
FILE:	wz1d-17.dgn	DN:	TxDOT
© TxDOT	February 1998	CONT	SECT
4-98	2-17	0921	06
3-03			
7-13			
		JOB	HIGHWAY
		348	VA
		DIST	COUNTY
		PHR	CAMERON
			SHEET NO.
			23

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DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub> SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

**GENERAL NOTES**

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1		
Edge Condition	Edge Height (D)	* Warning Devices
①	Less than or equal to: 1/4" (maximum-planing) 1/2" (typical-overlay)	Sign: CW8-11
②	Less than or equal to 3"	Sign: CW8-11
③	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

**TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.**

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"



**SIGNING FOR UNEVEN LANES**

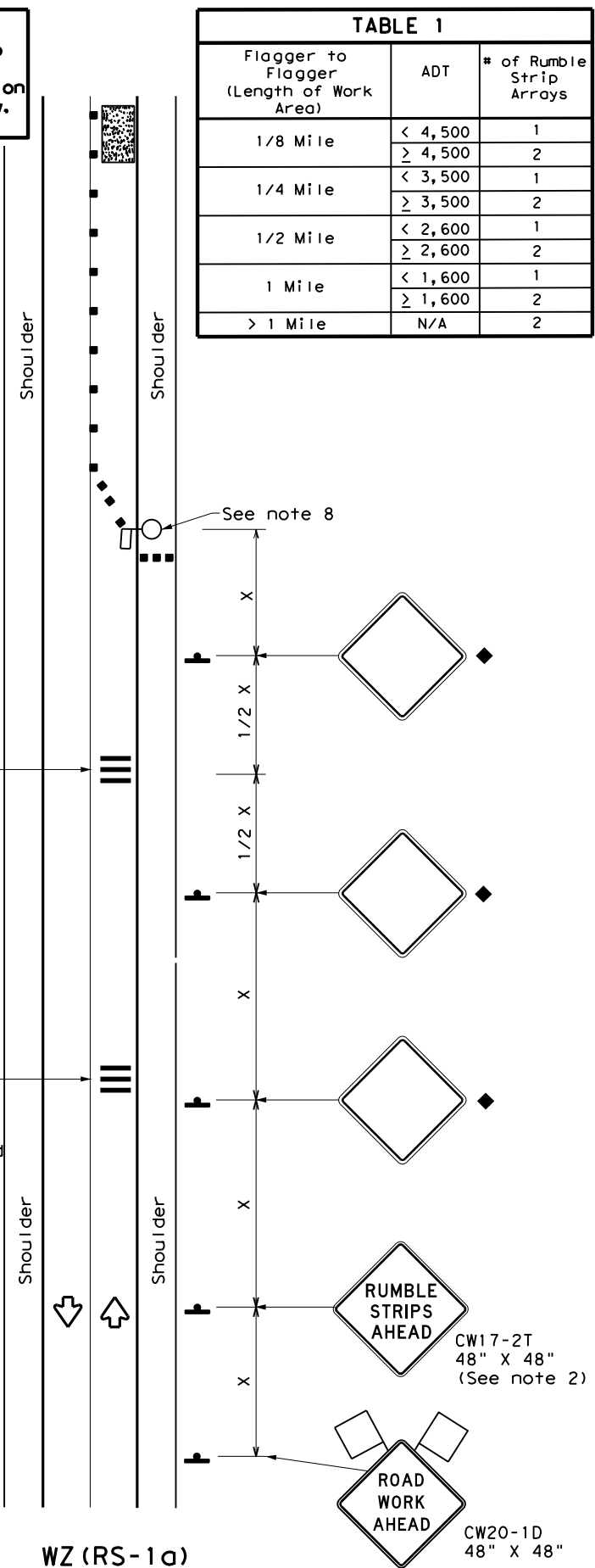
WZ (UL) - 13

FILE: WZUL-13.dgn	DN: TxDOT	CR: TxDOT	DR: TxDOT	CR: TxDOT
© TxDOT	APR 1992	CONT	SECT	JOB
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8-95	2-98	7-13	DIST	COUNTY
1-97	3-03	PHR	CAMERON	SHEET NO. 24

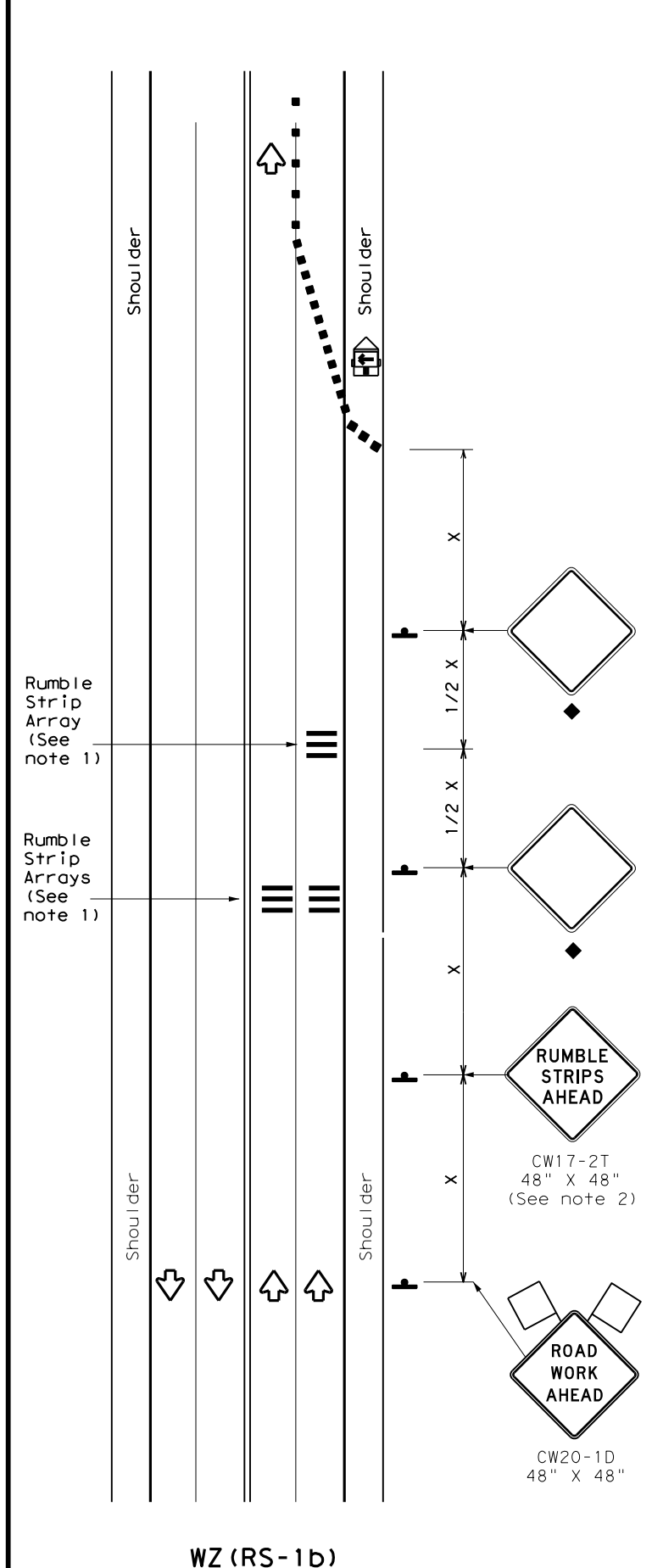
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 FILE: S:\Projects\612\54\02\Design\01\_Rto\_Hondo\_ADA\Civil\Standards\TCP\wzrs22.dgn

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

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



**RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION**



**RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY**

**GENERAL NOTES**

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

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

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

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

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

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

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.  
 \* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

Texas Department of Transportation  
 Traffic Safety Division Standard

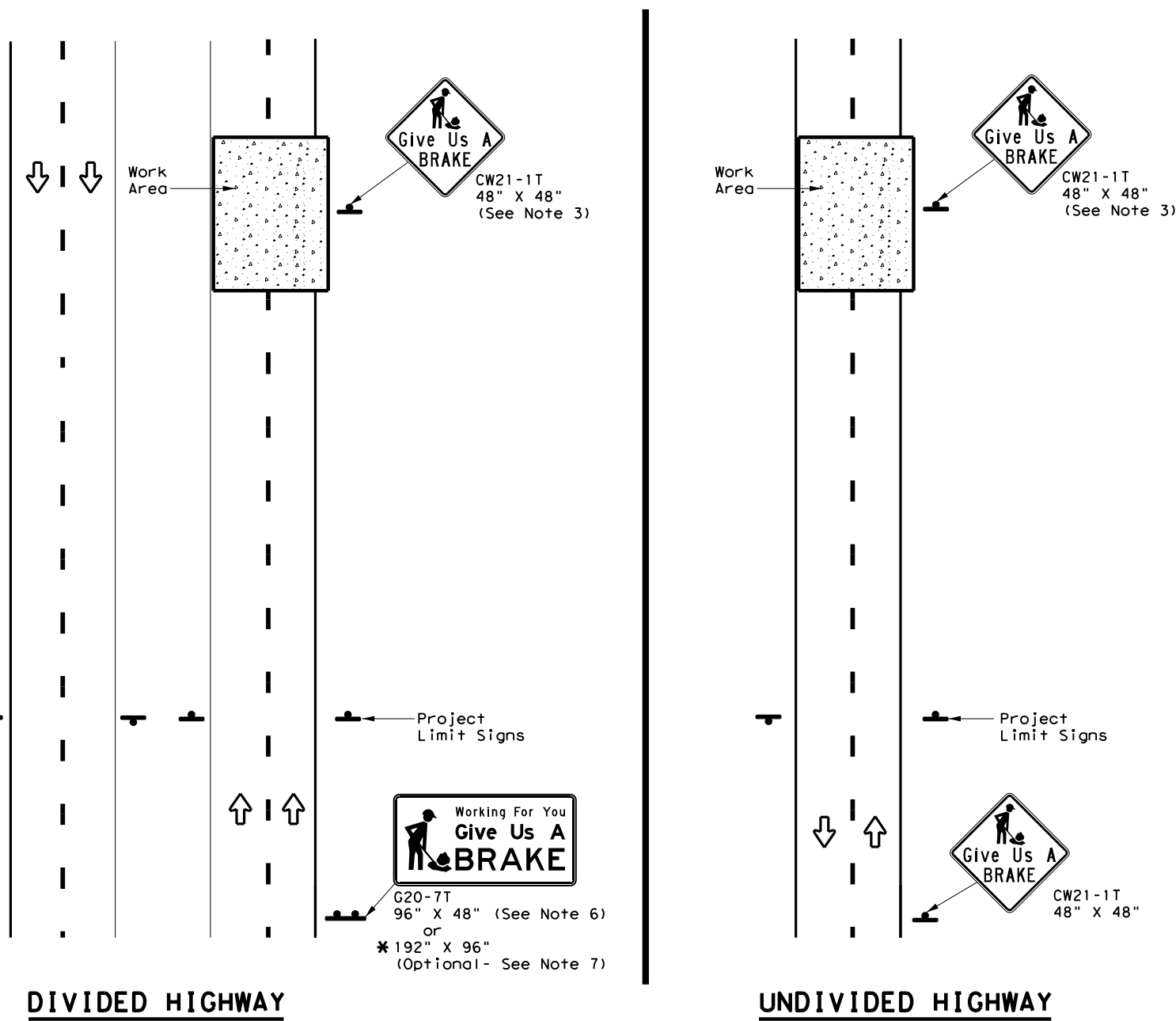
**TEMPORARY RUMBLE STRIPS**

WZ (RS) - 22

FILE: wzrs22.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
2-14 1-22	DIST	COUNTY	SHEET NO.	
4-16	PHR	CAMERON	25	

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 FILE: S:\Projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\TCP\wzbrk-13.dgn



SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

\* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B <sub>FL</sub> or C <sub>FL</sub>	32	▲	▲ ▲	▲
Orange	G20-7T		192" X 96"	Type B <sub>FL</sub> or C <sub>FL</sub>	128	W8x18	16 17	12

▲ See Note 6 Below

**LEGEND**

	Sign
	Large Sign
	Traffic Flow

**DEPARTMENTAL MATERIAL SPECIFICATIONS**

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub>
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:  
 Item 636 - Aluminum Signs  
 Item 647 - Large Roadside Sign Supports and Assemblies.  
 Item 416 - Drilled Shaft Foundations
- 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.

Texas Department of Transportation Traffic Operations Division Standard

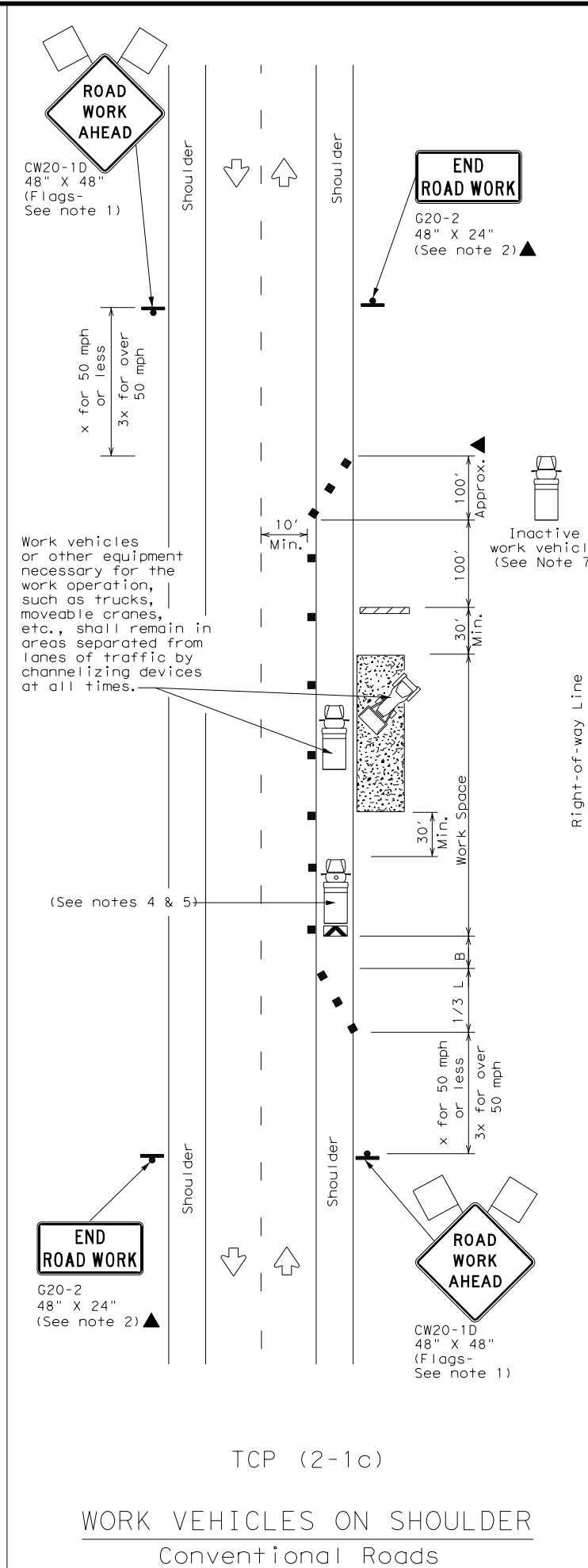
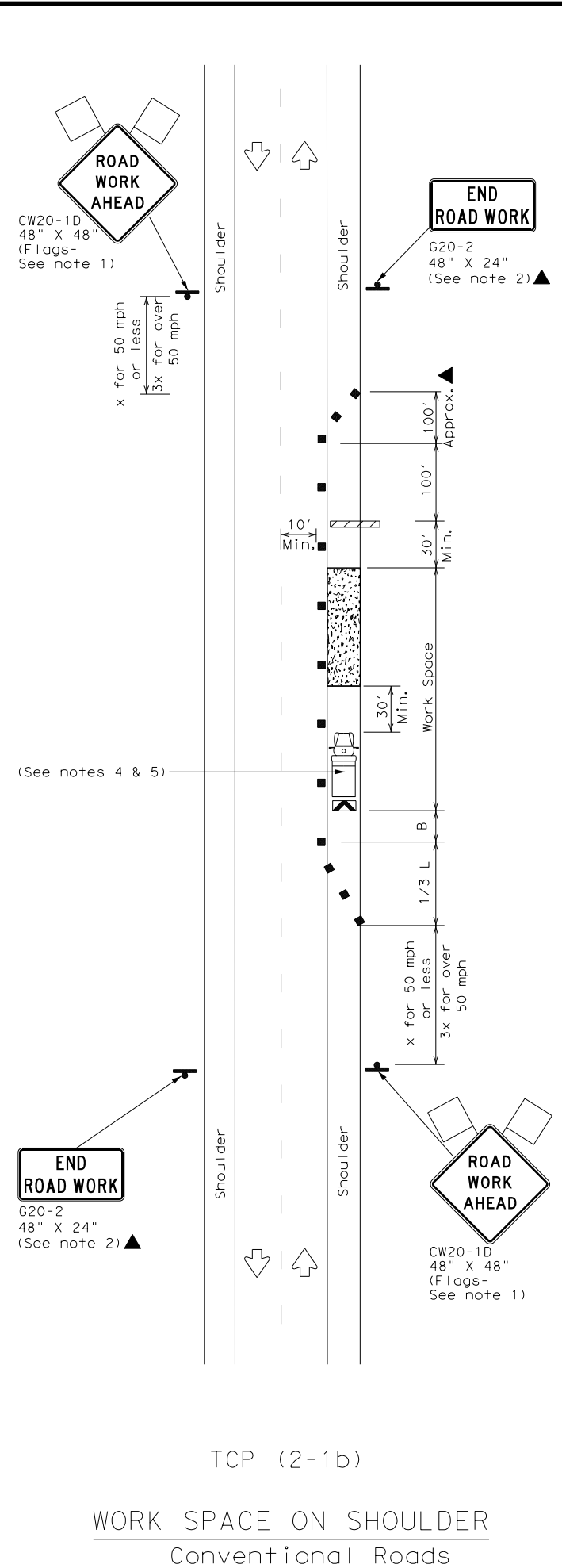
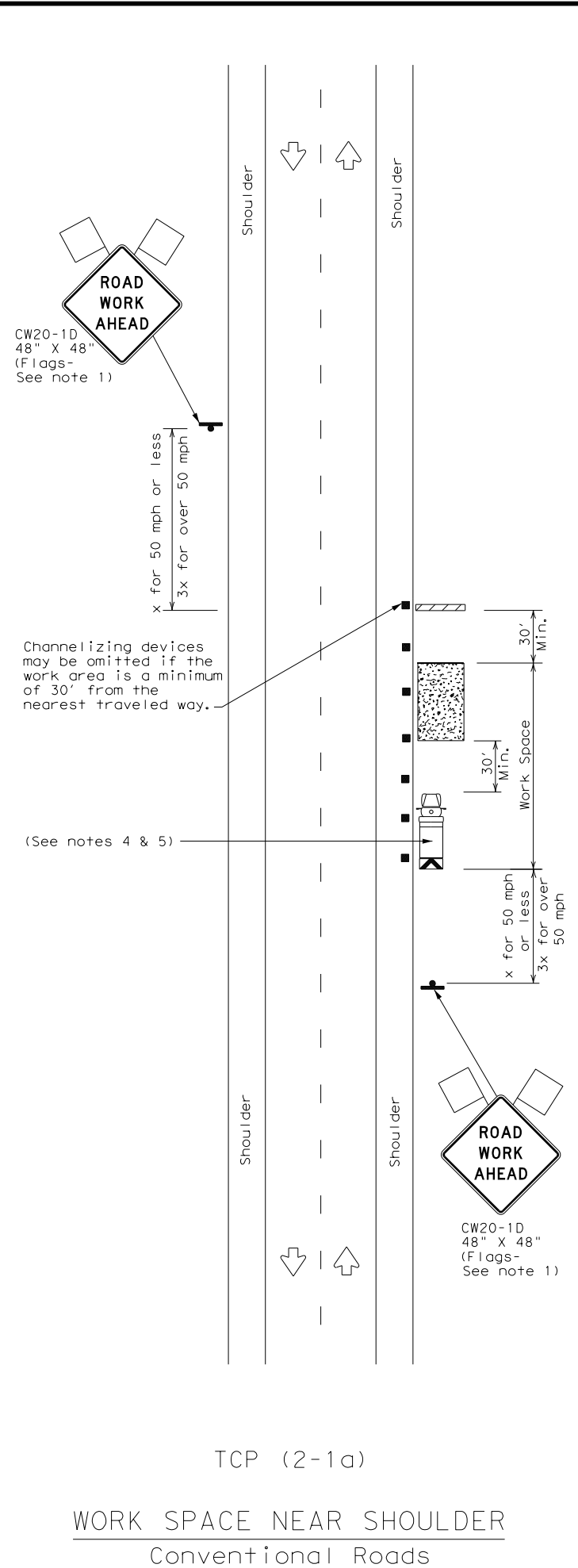
WORK ZONE  
 "GIVE US A BRAKE"  
 SIGNS

WZ (BRK) - 13

FILE: wzbrk-13.dgn	DN: TxDOT	CR: TxDOT	DR: TxDOT	CR: TxDOT
© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
6-96 5-98 7-13	DIST	COUNTY	SHEET NO.	
8-96 3-03	PHR	CAMERON	26	

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DATE: 2023-05-30 16:22:53  
 FILE: S:\Projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\civil\Standards\TCP\tcp2-1-18.dgn



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

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

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

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

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

Texas Department of Transportation  
 Traffic Operations Division Standard

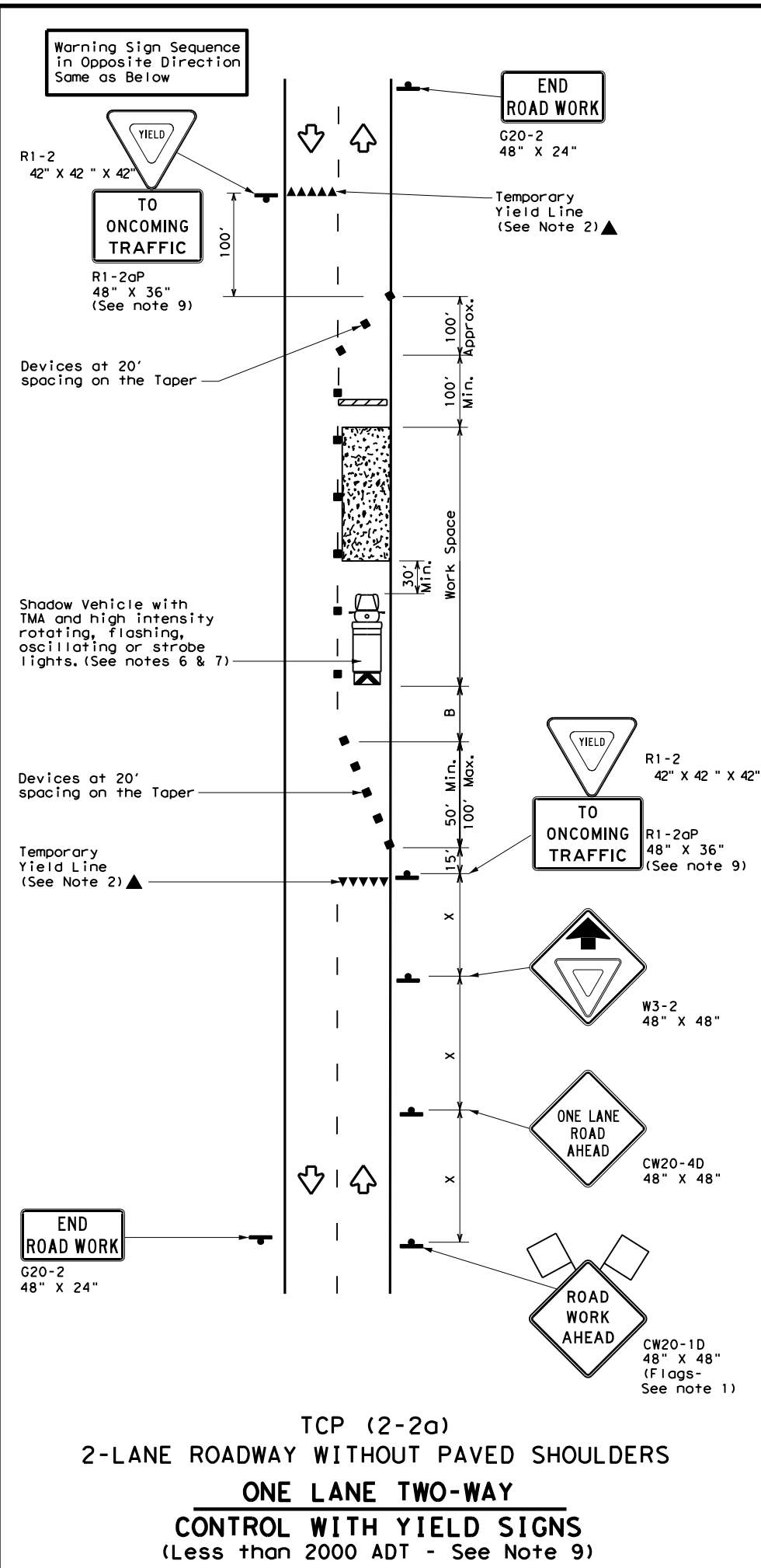
TRAFFIC CONTROL PLAN  
 CONVENTIONAL ROAD  
 SHOULDER WORK

TCP (2-1) - 18

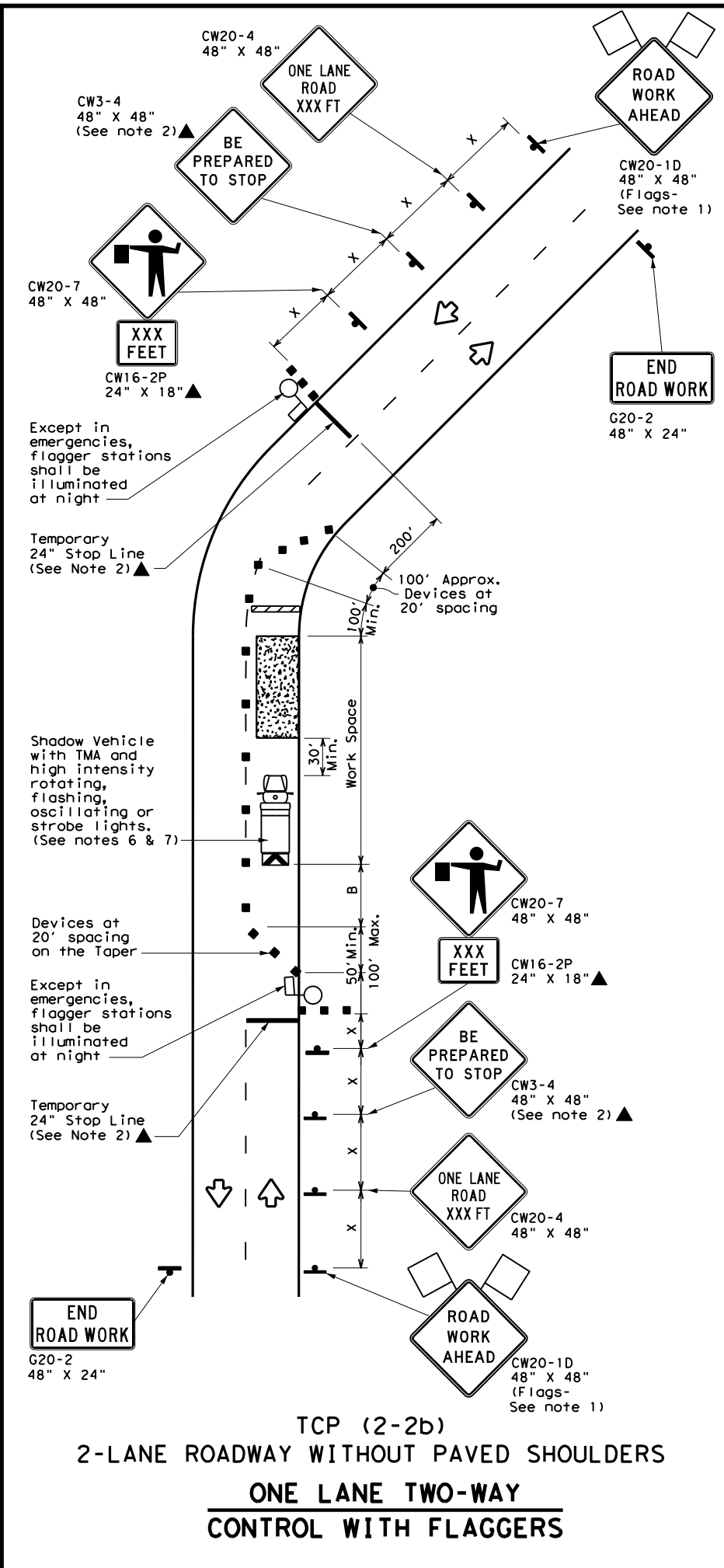
FILE:	tcp2-1-18.dgn	DN:	CK:	DR:	CR:
© TxDOT	December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS		0921	06	348	VA
2-94	4-98	DIST		COUNTY	SHEET NO.
8-95	2-12	PHR		CAMERON	27
1-97	2-18				

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DATE: 2023-05-30 16:22:54  
 FILE: S:\Projects\61254\02\Design\01\_Rto\_Hondo\_ADA\Civil\Standards\TCP\tcp2-2a.dgn



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



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

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

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

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

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

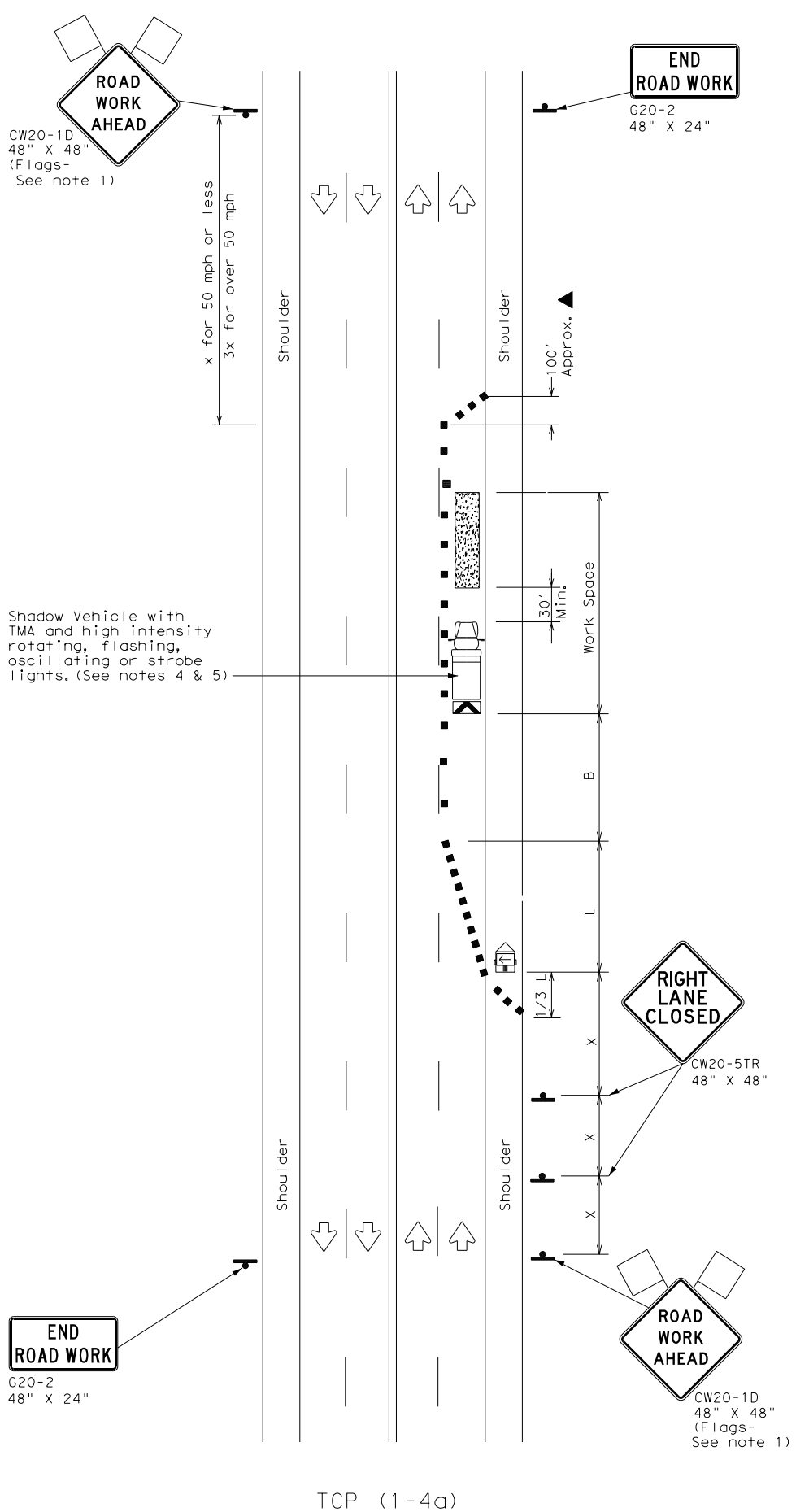
GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
  - Flaggers should use two-way radios or other methods of communication to control traffic.
  - Length of work space should be based on the ability of flaggers to communicate.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-2a)**
- The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
  - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)**
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
  - If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
  - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

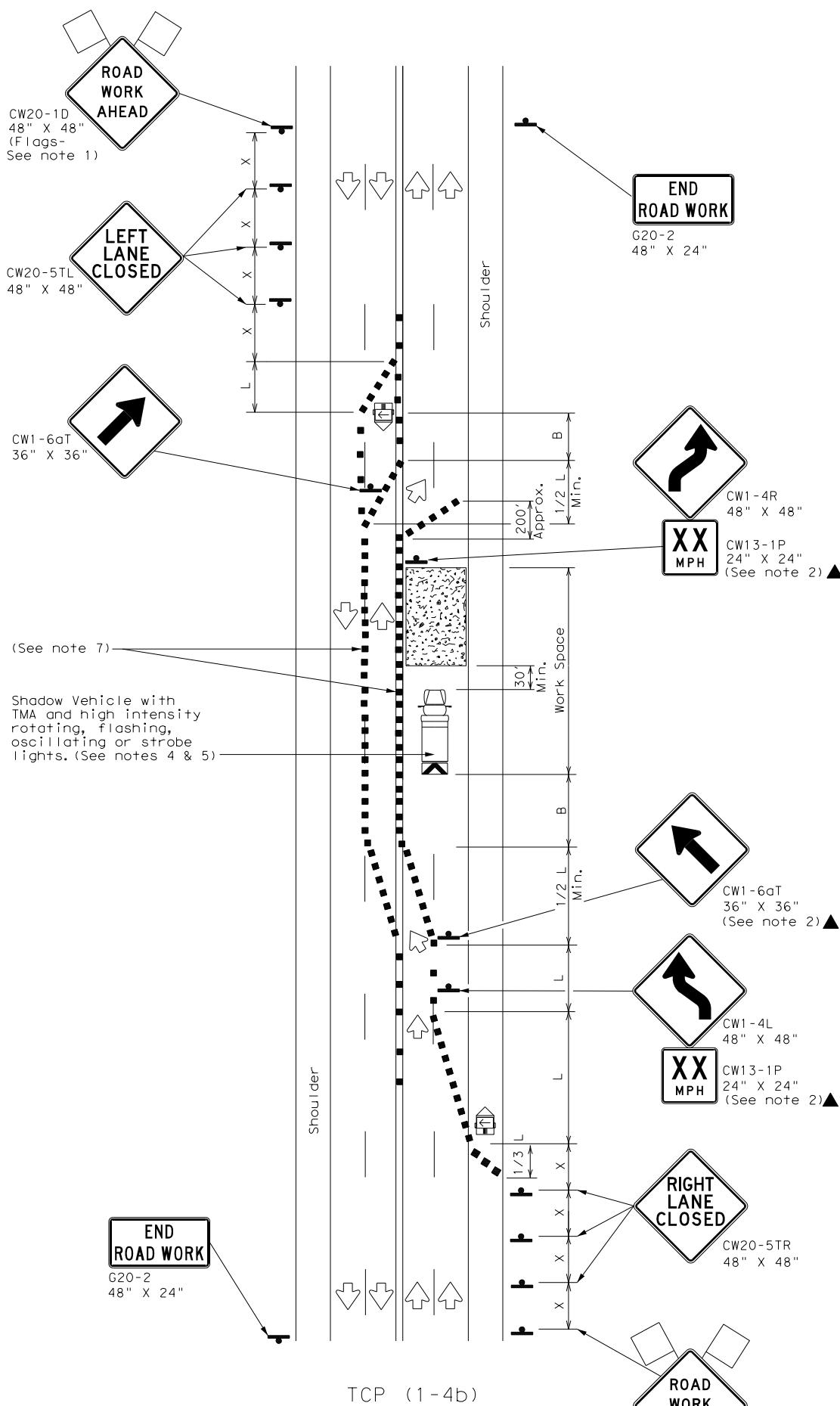
		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL			
TCP (2-2) - 18			
FILE: tcp2-2-18.dgn	DWG: CK1	DWR: DW1	CHK: CK1
© TxDOT December 1985	CONT: 0921	SECT: 06	JOB: 348
REVISIONS		HIGHWAY: VA	
8-95 3-03	DIST: COUNTY		SHEET NO.
1-97 2-12	PHR: CAMERON		28
4-98 2-18			



DATE: 2023-05-30 16:22:55  
 FILE: S:\Projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\TCP\tcp-18.dwg  
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TCP (1-4a)  
 ONE LANE CLOSED



TCP (1-4b)  
 TWO LANES CLOSED

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

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

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

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

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

**TCP (1-4a)**

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

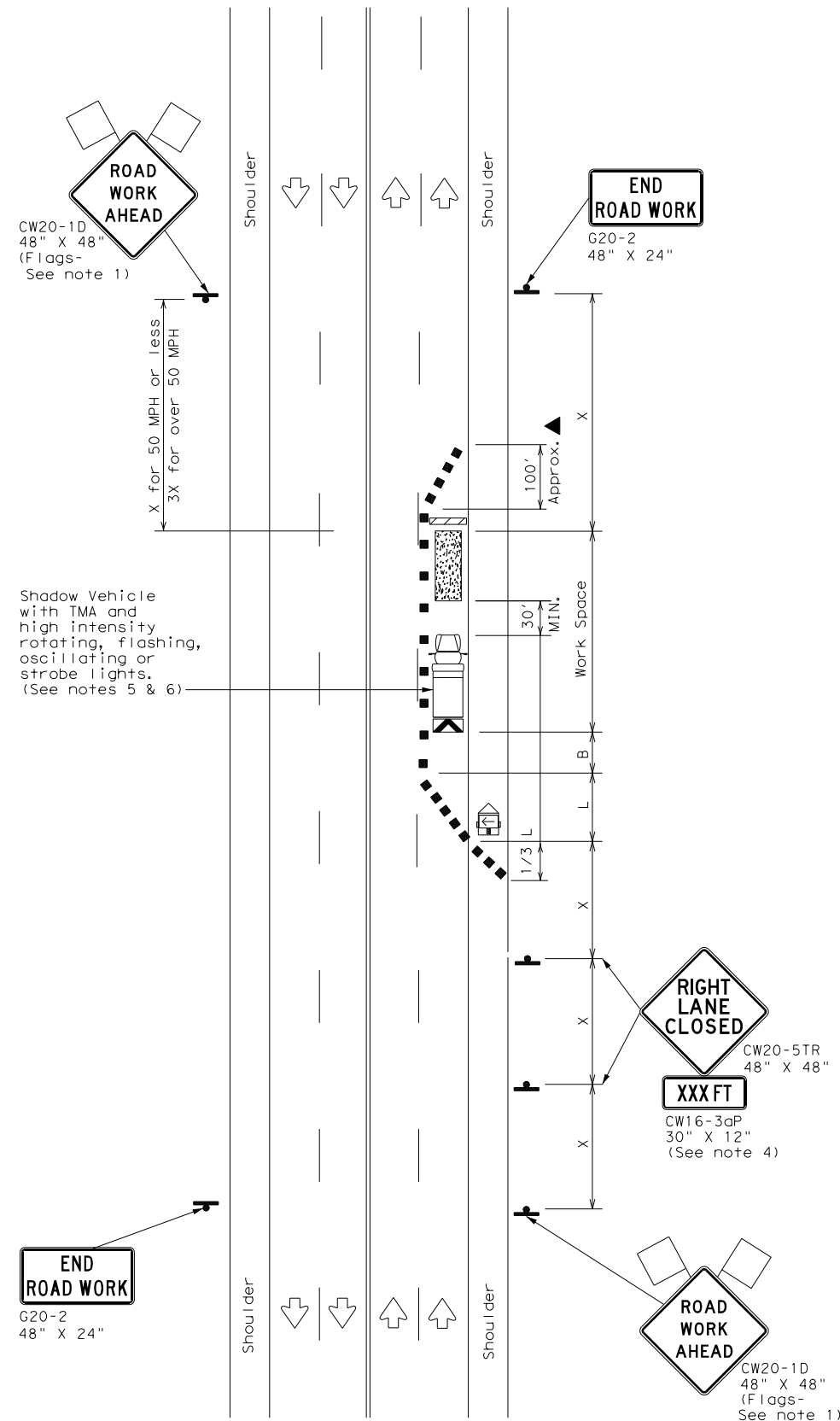
**TCP (1-4b)**

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

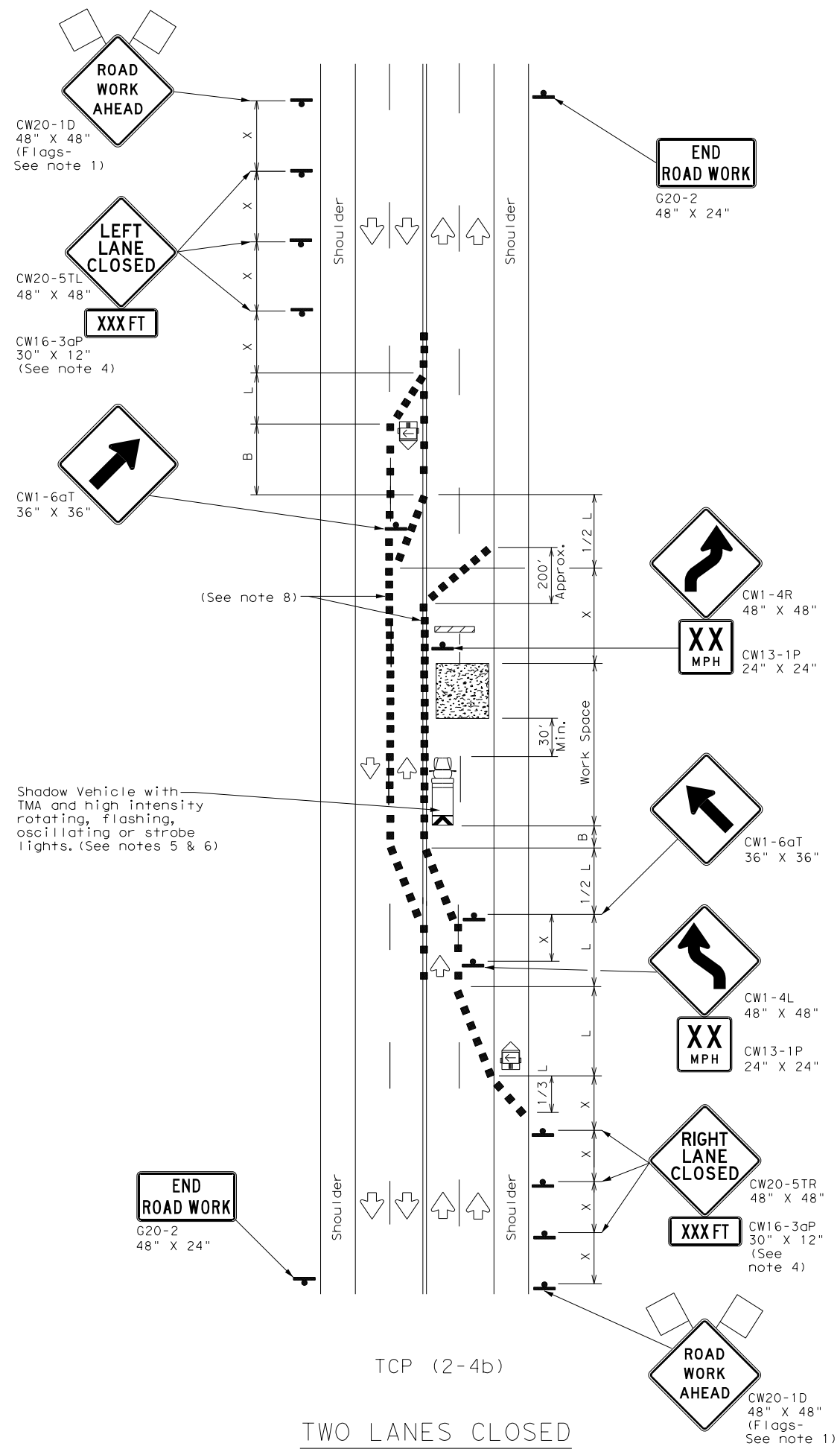
		Traffic Operations Division Standard	
<b>TRAFFIC CONTROL PLAN</b>			
<b>LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS</b>			
<b>TCP (1-4) - 18</b>			
FILE:	tcp1-4-18.dgn	DN:	CK:
© TxDOT	December 1985	CONT	SECT
REVISIONS		0921	06
2-94	4-98	JOB	HIGHWAY
8-95	2-12	348	VA
1-97	2-18	DIST	COUNTY
		PHR	CAMERON
			SHEET NO.
			29

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DATE: 2023-05-30 16:22:56  
 FILE: S:\Projects\61254\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\TCP\tcp-4-18.dwg



TCP (2-4a)  
 ONE LANE CLOSED



TCP (2-4b)  
 TWO LANES CLOSED

LEGEND

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

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

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

TYPICAL USAGE

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

- GENERAL NOTES
- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
  - For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-4a)
- If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.
- TCP (2-4b)
- For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation  
 Traffic Operations Division Standard

TRAFFIC CONTROL PLAN  
 LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP (2-4) - 18

FILE: tcp2-4-18.dgn	DN: CK: DR: CK:
© TxDOT December 1985	CONT SECT JOB HIGHWAY
REVISIONS	0921 06 348 VA
8-95 3-03	DIST COUNTY SHEET NO.
1-97 2-12	PHR CAMERON 30
4-98 2-18	

Plotted on: 2023-05-30

Design File name: S:\projects\61254\02\Design\01\_Rio\_Hondo\_ADA\civil\ReferenceFiles\6125402\_Rio\_Hondo\_ADA\_ha\_in\_data.dgn

### ROBERTSON RD

Beginning chain ROBERTSON description  
Feature: Road Centerline

Point ROBERTSON1 N 16,609,840.3499 E 1,286,355.6350 Sta 300+00.00

Course from ROBERTSON1 to PC ROBERTSON 3 N 4° 17' 25" W Dist 69.3960

Curve Data  
\*-----\*

Curve ROBERTSON 3  
 P.I. Station = 301+84.09 N 16,610,023.9282 E 1,286,341.8629  
 Delta = 10° 55' 11" (RT)  
 Degree = 4° 46' 29"  
 Tangent = 114.6983  
 Length = 228.7017  
 Radius = 1,200.0000  
 External = 5.4691  
 Long Chord = 228.3558  
 Mid. Ord. = 5.4443  
 P.C. Station = 300+69.40 N 16,609,909.5514 E 1,286,350.4435  
 P.T. Station = 302+98.10 N 16,610,137.8596 E 1,286,355.1044  
 C.C. = N 16,609,999.3237 E 1,287,547.0808  
 Back = N 4° 17' 25" W  
 Ahead = N 6° 37' 46" E  
 Chord Bear = N 1° 10' 10" E

Course from PT ROBERTSON 3 to PC ROBERTSON 6 N 6° 37' 46" E Dist 674.3108

Curve Data  
\*-----\*

Curve ROBERTSON 6  
 P.I. Station = 309+72.83 N 16,610,808.0783 E 1,286,432.9997  
 Delta = 0° 48' 04" (LT)  
 Degree = 95° 29' 35"  
 Tangent = 0.4195  
 Length = 0.8389  
 Radius = 60.0000  
 External = 0.0015  
 Long Chord = 0.8389  
 Mid. Ord. = 0.0015  
 P.C. Station = 309+72.41 N 16,610,807.6617 E 1,286,432.9513  
 P.T. Station = 309+73.25 N 16,610,808.4956 E 1,286,433.0423  
 C.C. = N 16,610,814.5885 E 1,286,373.3524  
 Back = N 6° 37' 46" E  
 Ahead = N 5° 49' 42" E  
 Chord Bear = N 6° 13' 44" E

Course from PT ROBERTSON 6 to PC ROBERTSON 9 N 5° 49' 42" E Dist 245.9400

Curve Data  
\*-----\*

Curve ROBERTSON 9  
 P.I. Station = 312+19.82 N 16,611,053.7979 E 1,286,458.0816  
 Delta = 1° 12' 59" (RT)  
 Degree = 95° 29' 35"  
 Tangent = 0.6369  
 Length = 1.2737  
 Radius = 60.0000  
 External = 0.0034  
 Long Chord = 1.2737  
 Mid. Ord. = 0.0034  
 P.C. Station = 312+19.19 N 16,611,053.1643 E 1,286,458.0169  
 P.T. Station = 312+20.46 N 16,611,054.4300 E 1,286,458.1597  
 C.C. = N 16,611,047.0714 E 1,286,517.7068  
 Back = N 5° 49' 42" E  
 Ahead = N 7° 02' 41" E  
 Chord Bear = N 6° 26' 11" E

Course from PT ROBERTSON 9 to ROBERTSON11 N 7° 02' 41" E Dist 4,045.4676

Point ROBERTSON11 N 16,615,069.3581 E 1,286,954.3054 Sta 352+65.93

Ending chain ROBERTSON description

### EBONY AVE

Beginning chain EBONY description  
Feature: Road Centerline

Point EBONY1 N 16,610,144.1005 E 1,284,908.8786 Sta 200+00.00

Course from EBONY1 to EBONY2 S 83° 08' 33" E Dist 1,508.1445

Point EBONY2 N 16,609,964.0286 E 1,286,406.2342 Sta 215+08.14

Ending chain EBONY description

### FM-1846 (REYNOLDS ST)

Beginning chain FM1846 description  
Feature: Road Centerline

Point FM18461 N 16,603,636.7599 E 1,285,308.7297 Sta 100+00.00

Course from FM18461 to PC FM1846 3 N 3° 52' 21" W Dist 5,752.4949

Curve Data  
\*-----\*

Curve FM1846 3  
 P.I. Station = 160+13.22 N 16,609,636.2499 E 1,284,902.6292  
 Delta = 10° 42' 56" (RT)  
 Degree = 2° 03' 40"  
 Tangent = 260.7237  
 Length = 519.9266  
 Radius = 2,780.0000  
 External = 12.1993  
 Long Chord = 519.1692  
 Mid. Ord. = 12.1460  
 P.C. Station = 157+52.49 N 16,609,376.1215 E 1,284,920.2371  
 P.T. Station = 162+72.42 N 16,609,895.1162 E 1,284,933.6956  
 C.C. = N 16,609,563.8677 E 1,287,693.8902  
 Back = N 3° 52' 21" W  
 Ahead = N 6° 50' 36" E  
 Chord Bear = N 1° 29' 08" E

Course from PT FM1846 3 to FM18465 N 6° 50' 36" E Dist 2,927.5771

Point FM18465 N 16,612,801.8365 E 1,285,282.5285 Sta 192+00.00

Ending chain FM1846 description

### SH-345 (N SAM HOUSTON BLVD)

Beginning chain SH345 description  
Feature: Road Centerline

Point SH3451 N 16,606,196.4991 E 1,288,910.5480 Sta 400+00.00

Course from SH3451 to SH3452 N 8° 51' 30" E Dist 4,999.9775

Point SH3452 N 16,611,136.8386 E 1,289,680.4960 Sta 449+99.98

Ending chain SH345 description

#### DESIGN

**INTERIM REVIEW**

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 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

#### APPROVAL

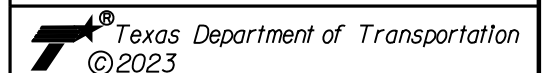
**INTERIM REVIEW**

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 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

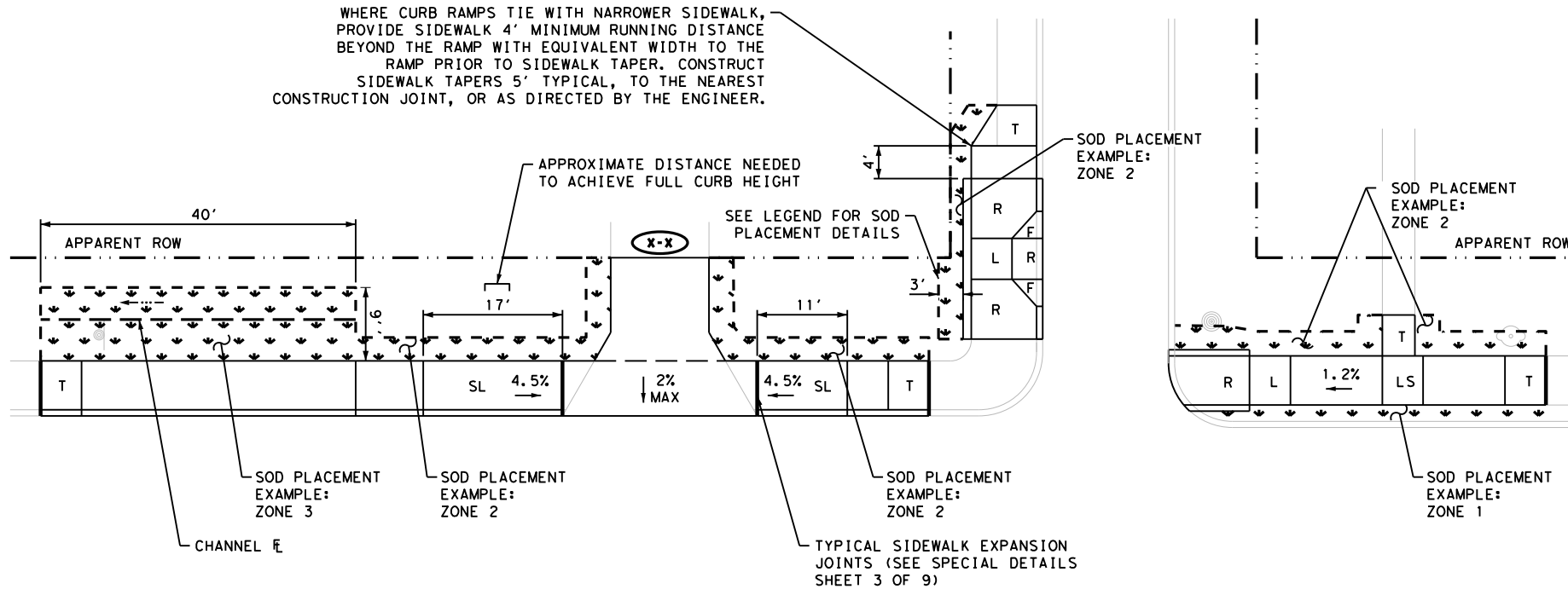


## HORIZONTAL ALIGNMENT DATA SHEET

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	31

# SAMPLE PLAN LAYOUT

WHERE CURB RAMPS TIE WITH NARROWER SIDEWALK, PROVIDE SIDEWALK 4' MINIMUM RUNNING DISTANCE BEYOND THE RAMP WITH EQUIVALENT WIDTH TO THE RAMP PRIOR TO SIDEWALK TAPER. CONSTRUCT SIDEWALK TAPERS 5' TYPICAL, TO THE NEAREST CONSTRUCTION JOINT, OR AS DIRECTED BY THE ENGINEER.



# LEGEND OF SYMBOLS

- |      |                            |        |  |
|------|----------------------------|--------|--|
| →    | DRAINAGE FLOW DIRECTION    | +      | PI POINT                                     |
| ⊙    | FIRE HYDRANT               | ⊙      | UTILITY POLE                                 |
| ⊗    | GAS METER                  | ⊙      | SEWER CLEANOUT                               |
| ⊕    | GAS VALVE                  | ⊙      | SIGN   |
| ↪    | GUY ANCHOR                 | ⊙      | TREE/BUSHES                                  |
| ○    | IRRIGATION                 | ⊙      | WATER METER                                  |
| □    | MAIL BOX                   | ⊙      | WATER VALVE                                  |
| ⊙    | MANHOLE                    | ↑ X.X% | EXISTING ROADWAY OR DRIVEWAY SLOPE           |
| NSPI | NO SEPARATE PAY ITEM       | ↑ X.X% | PROPOSED ROADWAY, SIDEWALK OR DRIVEWAY SLOPE |
| —G—  | EX UNDERGROUND GAS         | ℄      | BASE LINE                                    |
| —W—  | EX UNDERGROUND WATER       | PGL    | PROFILE GRADE LINE                           |
| —SS— | EX UNDERGROUND STORM SEWER | ←      | TRAFFIC FLOW ARROW                           |
| —UE— | EX UNDERGROUND ELECTRIC    | →      | DRAINAGE FLOW ARROW                          |
| —OE— | EX OVERHEAD ELECTRIC       | HOXXXX | DRIVEWAY ID                                  |
| —    | EXISTING FENCE             | TOC    | TOP OF CURB                                  |
| CTV  | CABLE PEDESTAL             | FOC    | FACE OF CURB                                 |
| ⊙    | TELEPHONE MANHOLE          | ⬇      | BLOCK SOD                                    |
| —    | FUTURE WORK BY OTHERS      |        |  |
| —    | EXISTING FEATURES          |        |  |

PLANAR SLOPE DESIGNATIONS

- F = FLARE (10:1 OR LESS) MEASURED AT FACE OF CURB
- R = RAMP (CROSS SLOPE NOT TO EXCEED 2 PERCENT; LONGITUDINAL NOT TO EXCEED 8.3 PERCENT)
- L = LANDING (SHALL NOT EXCEED 2 PERCENT SLOPE IN ANY DIRECTION)
- LI = SHARED LANDING (SHALL NOT EXCEED 2 PERCENT SLOPE IN ANY DIRECTION)
- LS = LEVEL SIDEWALK (SHALL NOT EXCEED 2 PERCENT SLOPE IN ANY DIRECTION)
- SL = SLOPED SIDEWALK. IF INDICATED, CONSTRUCT SLOPED SIDEWALK AT LONGITUDINAL SLOPE SHOWN ON THE PLANS. OTHERWISE LONGITUDINAL SLOPES MAY NOT EXCEED 5 PERCENT, CROSS SLOPES MAY NOT EXCEED 2 PERCENT
- T = TAPER SIDEWALK WIDTH TO NEAREST EXISTING PANEL JOINT (5' TYP)
- SDWK = SIDEWALK
- DRWY = DRIVEWAY

**TYPICAL LIMITS OF SOD PLACEMENT ARE AS FOLLOWS:**

ZONE 1: PLACE SOD BETWEEN THE BACK OF CURB AND PROPOSED IMPROVEMENTS (SIDEWALK, DRIVEWAY, RIPRAP, ETC.)

ZONE 2: PLACE SOD 3' BEYOND PROPOSED IMPROVEMENTS

IF THE SPACE BETWEEN THE IMPROVEMENTS AND THE ROW IS LESS THAN 3', PLACE SOD BETWEEN PROPOSED IMPROVEMENTS AND THE ROW

ZONE 3: PLACE SOD WITHIN THE LIMITS OF SOIL DISTURBANCE DUE TO EXCAVATION OR EMBANKMENT AS DIMENSIONED ON THE PLANS

PLACE SOD AS DIRECTED BY THE ENGINEER

**NOTES**

1. FLARE (F), RAMP (R), AND LANDING (L), DIRECTLY IN CONTACT WITH THE CURB RAMP ARE PAID FOR UNDER ITEM 531 "CURB RAMPS"
2. LEVEL SIDEWALK (LS) AND RAMPS (R) NOT DIRECTLY IN CONTACT WITH THE CURB RAMP ARE PAID FOR UNDER ITEM 531 "SIDEWALK"

DESIGN

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL

**INTERIM REVIEW**

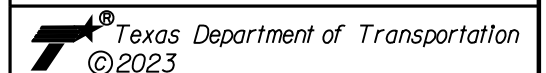
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



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**SAMPLE PLAN LAYOUT AND LEGEND OF SYMBOLS**

DGN:	FED. NO.:	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	PHR	CAMERON	0921	06
				JOB NO.
				348
				SHEET NO.
				32

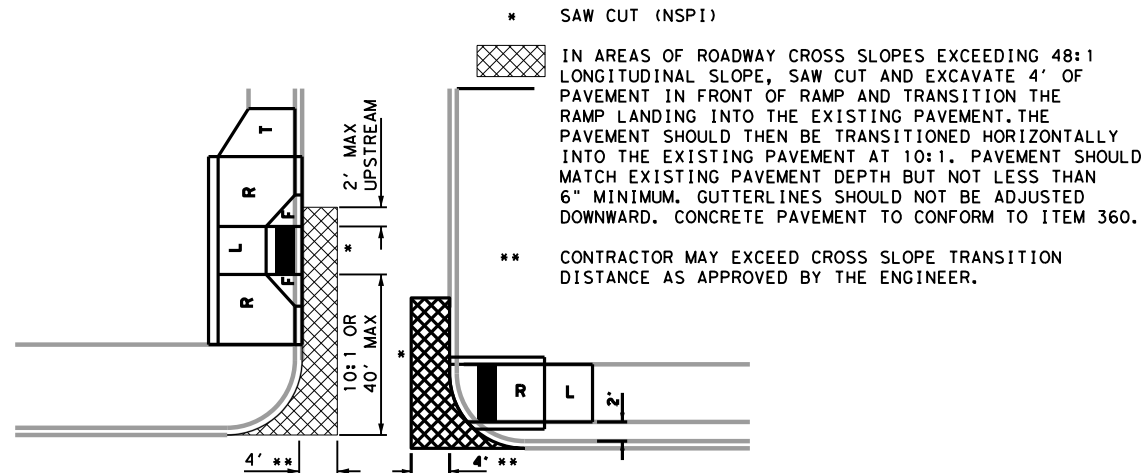
Plotted on: 2023-05-30

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Plotted on: 2023-05-30

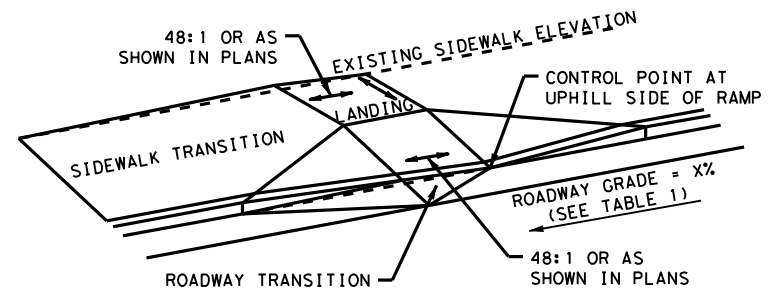
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**CONCRETE ROADWAY  
OR  
CURB AND GUTTER SECTION**

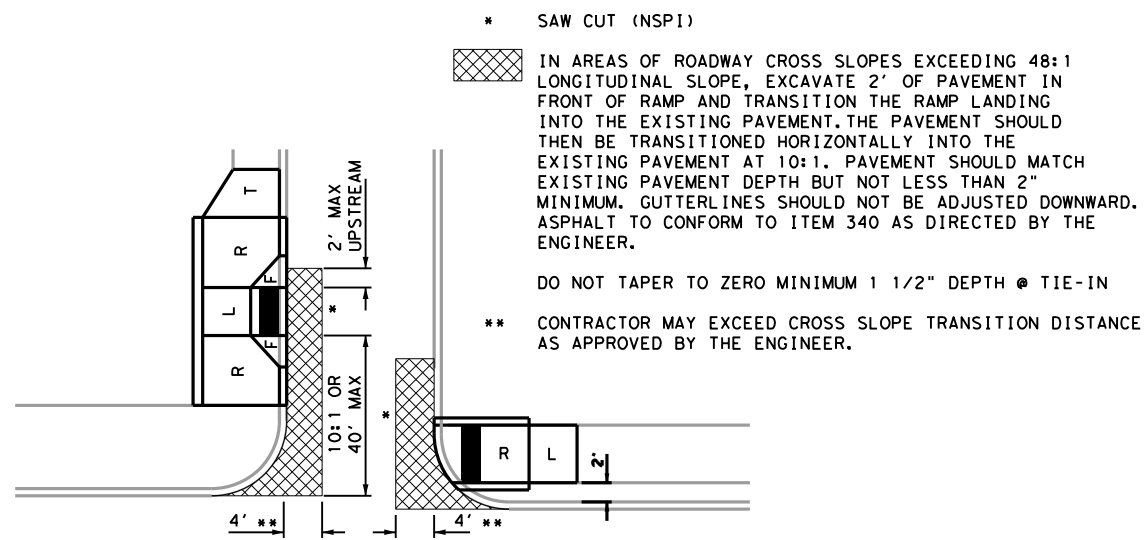


\* SAW CUT (NSPI)  
 IN AREAS OF ROADWAY CROSS SLOPES EXCEEDING 48:1 LONGITUDINAL SLOPE, SAW CUT AND EXCAVATE 4" OF PAVEMENT IN FRONT OF RAMP AND TRANSITION THE RAMP LANDING INTO THE EXISTING PAVEMENT. THE PAVEMENT SHOULD THEN BE TRANSITIONED HORIZONTALLY INTO THE EXISTING PAVEMENT AT 10:1. PAVEMENT SHOULD MATCH EXISTING PAVEMENT DEPTH BUT NOT LESS THAN 6" MINIMUM. GUTTERLINES SHOULD NOT BE ADJUSTED DOWNWARD. CONCRETE PAVEMENT TO CONFORM TO ITEM 360.  
 \*\* CONTRACTOR MAY EXCEED CROSS SLOPE TRANSITION DISTANCE AS APPROVED BY THE ENGINEER.

**ROADWAY TRANSITION**

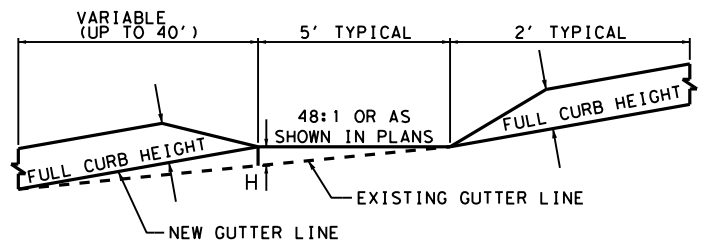


**ASPHALT/SEALCOAT ROADWAY**



\* SAW CUT (NSPI)  
 IN AREAS OF ROADWAY CROSS SLOPES EXCEEDING 48:1 LONGITUDINAL SLOPE, EXCAVATE 2" OF PAVEMENT IN FRONT OF RAMP AND TRANSITION THE RAMP LANDING INTO THE EXISTING PAVEMENT. THE PAVEMENT SHOULD THEN BE TRANSITIONED HORIZONTALLY INTO THE EXISTING PAVEMENT AT 10:1. PAVEMENT SHOULD MATCH EXISTING PAVEMENT DEPTH BUT NOT LESS THAN 2" MINIMUM. GUTTERLINES SHOULD NOT BE ADJUSTED DOWNWARD. ASPHALT TO CONFORM TO ITEM 340 AS DIRECTED BY THE ENGINEER.  
 DO NOT TAPER TO ZERO MINIMUM 1 1/2" DEPTH @ TIE-IN  
 \*\* CONTRACTOR MAY EXCEED CROSS SLOPE TRANSITION DISTANCE AS APPROVED BY THE ENGINEER.

**CURB ELEVATION**



DIFFERENTIAL BETWEEN RAMP AND ROADWAY LONGITUDINAL SLOPE	H	
1%	0.04'	0.50"
2%	0.08'	1.00"
3%	0.12'	1.50"
4%	0.16'	2.00"
5%	0.20'	2.40"
6%	0.24'	2.90"

DESIGN  
**INTERIM REVIEW**  
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 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
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 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30

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REV. NO.	DATE	DESCRIPTION	BY

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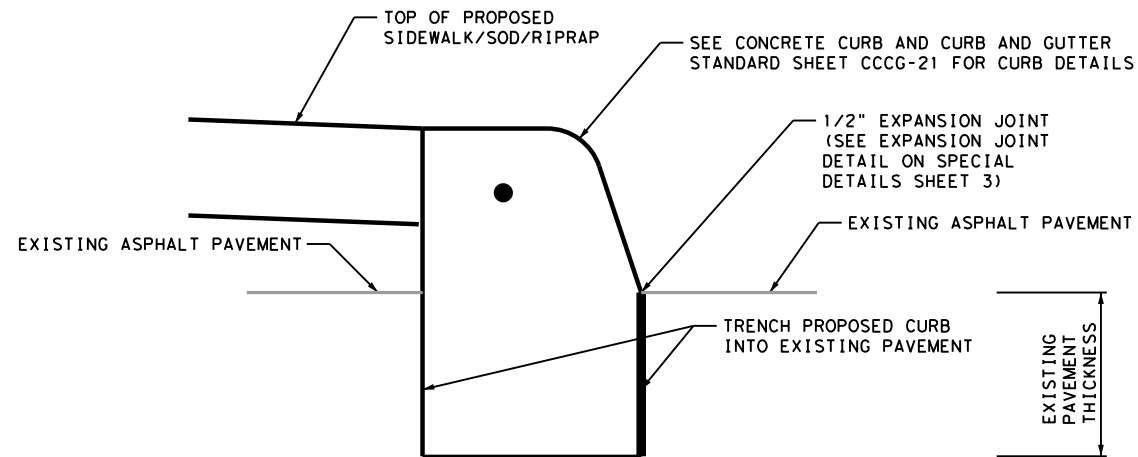
**SPECIAL DETAILS**

SHEET 1 OF 10

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	33

## CURB TRENCH DETAIL

USE WHEN INSTALLING A CURB INTO EXISTING ASPHALT PAVEMENT

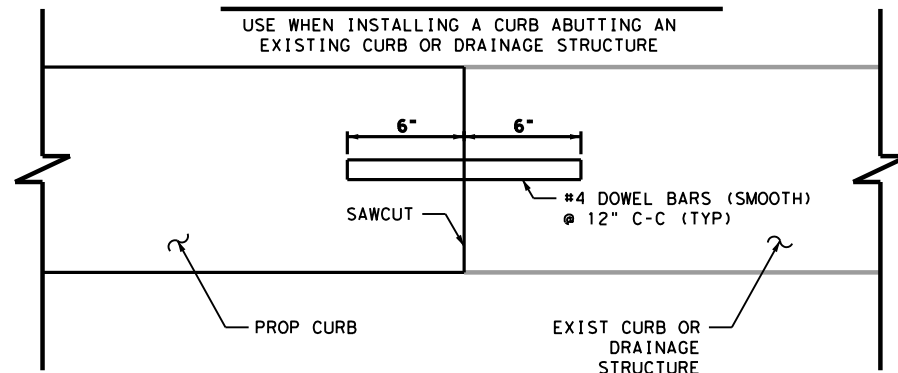


### NOTES:

1. VERTICAL DOWELING PROPOSED CURB INTO EXISTING PAVEMENT IS NOT PERMITTED
2. NO ADDITIONAL PAYMENT SHALL BE MADE FOR ADDITIONAL CONCRETE REQUIRED TO MATCH EXISTING PAVEMENT THICKNESS

## CURB TIE-IN DETAIL

USE WHEN INSTALLING A CURB ABUTTING AN EXISTING CURB OR DRAINAGE STRUCTURE

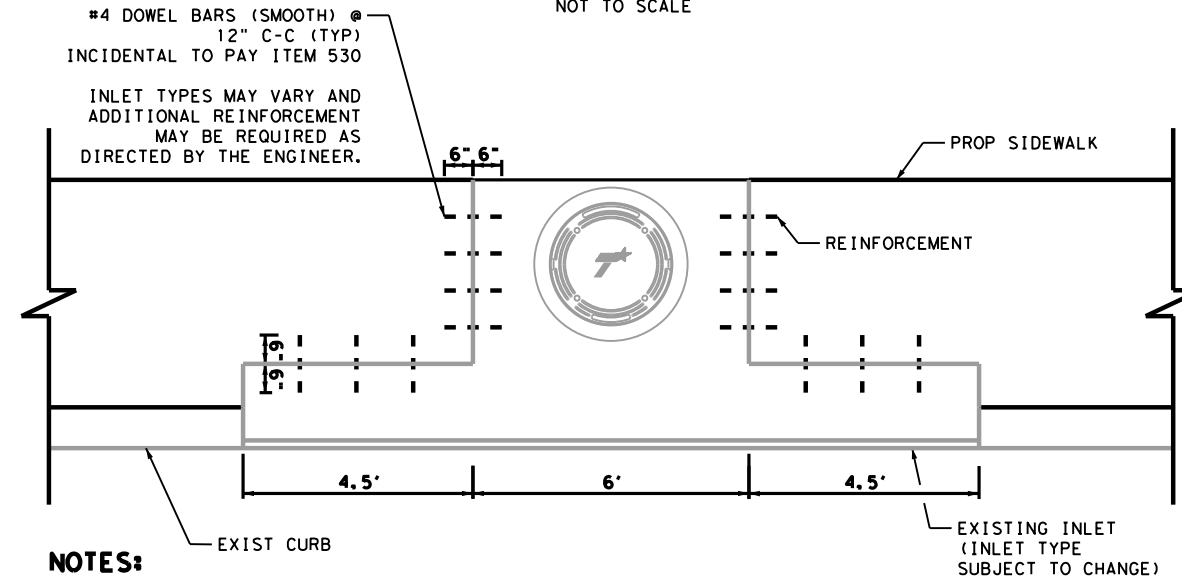


### NOTES:

1. DOWEL BARS TO BE DRILLED INTO EXISTING CONCRETE.
2. GROUT OR EPOXY BARS INTO EXISTING CONCRETE AS APPROVED BY THE ENGINEER.

## INLET DOWELING DETAIL

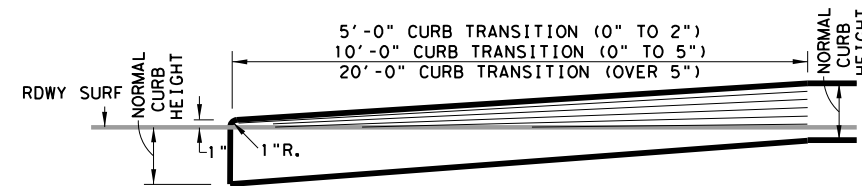
NOT TO SCALE



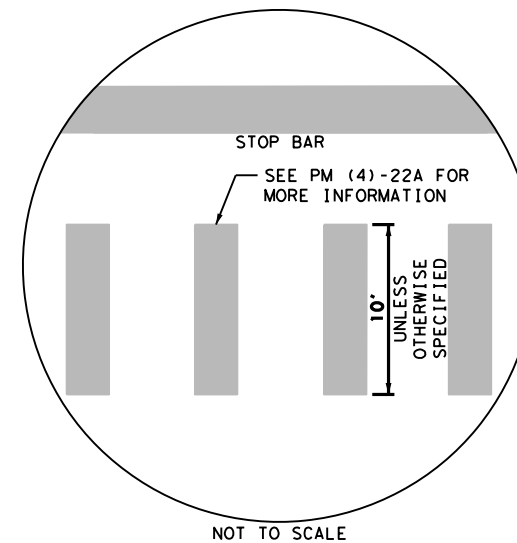
### NOTES:

1. DOWEL BARS TO BE DRILLED INTO EXISTING CONCRETE.
2. GROUT OR EPOXY BARS INTO EXISTING CONCRETE AS APPROVED BY THE ENGINEER.

## TYPICAL TRANSITION FOR CONCRETE CURB ENDS



## HIGH VISIBILITY LONGITUDINAL CROSSWALK DETAIL



### DESIGN

INTERIM REVIEW  
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ENGINEER: TYLER PAYNE DUBE  
P.E. SERIAL NO: 118612  
DATE: 2023-05-30

### APPROVAL

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ENGINEER: JOHN A. TYLER  
P.E. SERIAL NO: 105193  
DATE: 2023-05-30

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**Pape-Dawson Engineers**

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SPECIAL DETAILS

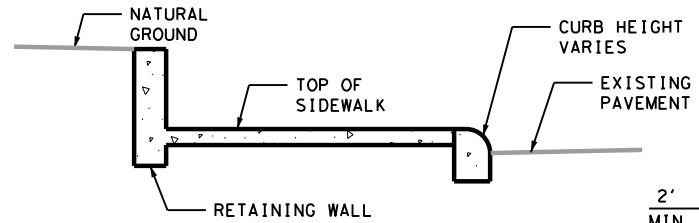
SHEET 2 OF 10

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	34

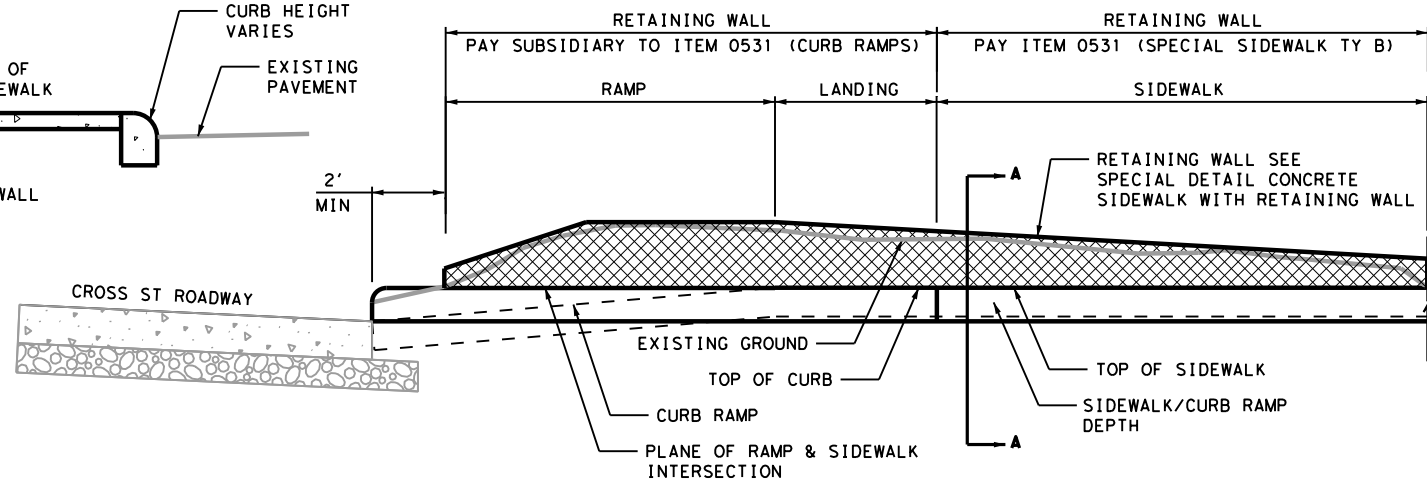
Plotted on: 2023-05-30

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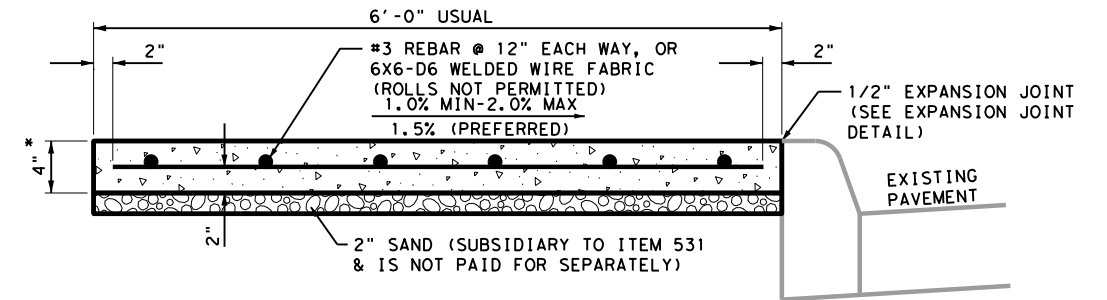
### SECTION A-A



### RETAINING WALL DETAIL



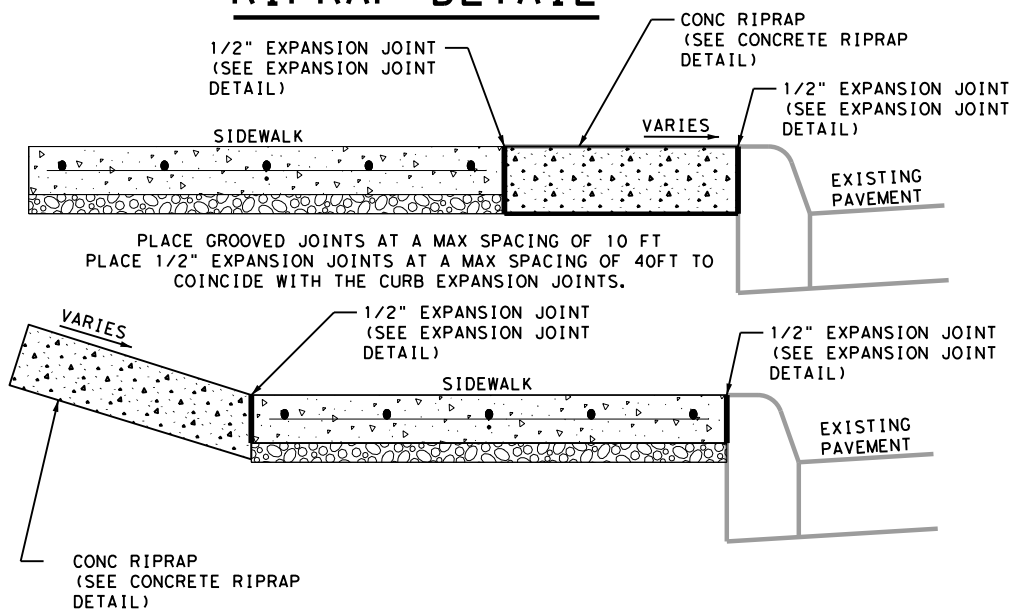
### SIDEWALK DETAILS



PLACE GROOVED JOINTS IN THE SIDEWALK AT A MAX SPACING OF 6 FT  
PLACE 1/2" EXPANSION JOINTS AT A MAX SPACING OF 40FT TO COINCIDE WITH THE CURB EXPANSION JOINTS.

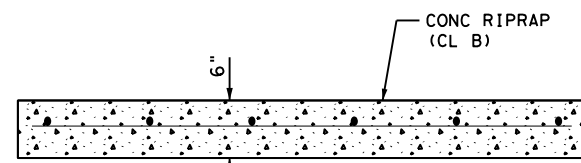
\* UNLESS OTHERWISE SHOWN

### RIPRAP DETAIL

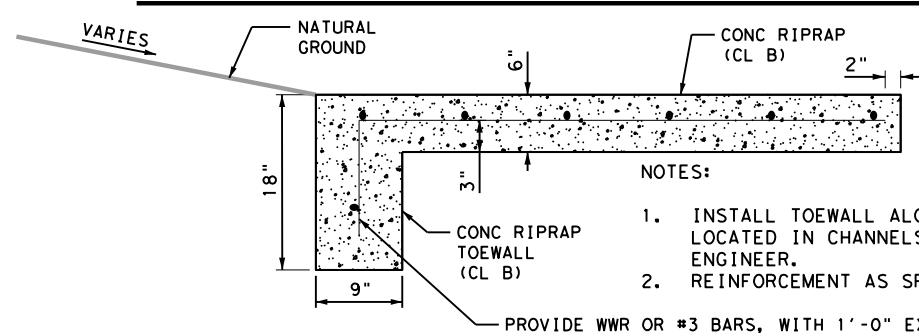


PLACE GROOVED JOINTS AT A MAX SPACING OF 10 FT  
PLACE 1/2" EXPANSION JOINTS AT A MAX SPACING OF 40FT TO COINCIDE WITH THE CURB EXPANSION JOINTS.

### CONCRETE RIPRAP DETAIL

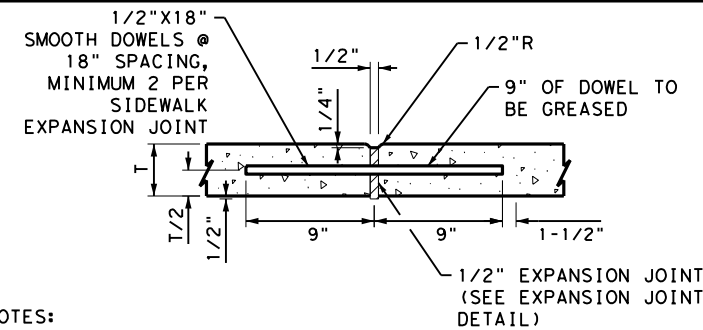


### CONCRETE RIPRAP W/ TOEWALL DETAIL



- NOTES:
- INSTALL TOEWALL ALONG PERIMETER OF RIPRAP LOCATED IN CHANNELS OR AS DIRECTED BY THE ENGINEER.
  - REINFORCEMENT AS SPECIFIED IN ITEM 432.

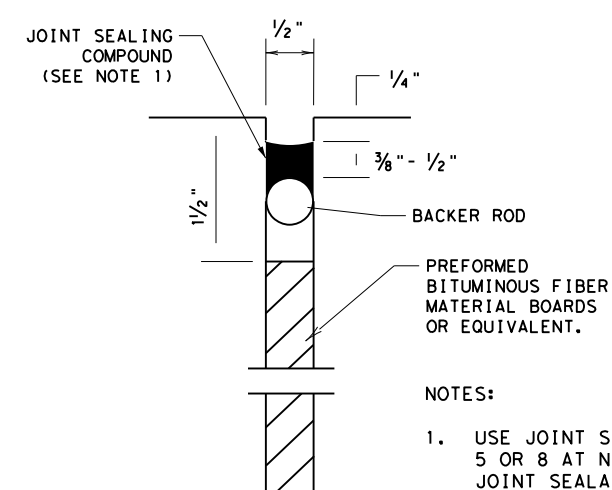
### SIDEWALK EXPANSION JOINT DETAIL



NOTES:

- SIDEWALK EXPANSION JOINT DOWELS ARE CONSIDERED SUBSIDIARY TO ITEM 531.
- SIDEWALK EXPANSION JOINTS SHALL BE INSTALLED AT MAXIMUM 40 FT INTERVALS, COINCIDE WITH CURB EXPANSION JOINT, CONNECTIONS TO EXISTING CONCRETE, CONNECTIONS TO PROPOSED CONCRETE DRIVEWAYS, WHERE DAILY WORK TERMINATES, AND AS DIRECTED BY THE ENGINEER.

### EXPANSION JOINT DETAIL



NOTES:

- USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4, 5, 7, OR 8 FOR MAINTAINING EXISTING JOINTS.

DESIGN

<b>INTERIM REVIEW</b>	
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ENGINEER: TYLER PAYNE DUBE	
P.E. SERIAL NO: 118612	
DATE: 2023-05-30	

APPROVAL

<b>INTERIM REVIEW</b>	
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ENGINEER: JOHN A. TYLER	
P.E. SERIAL NO: 105193	
DATE: 2023-05-30	

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REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**

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### SPECIAL DETAILS

SHEET 3 OF 10

CHK	FED. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
CHK	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
DWG:	PHR	CAMERON	0921	06	348	35

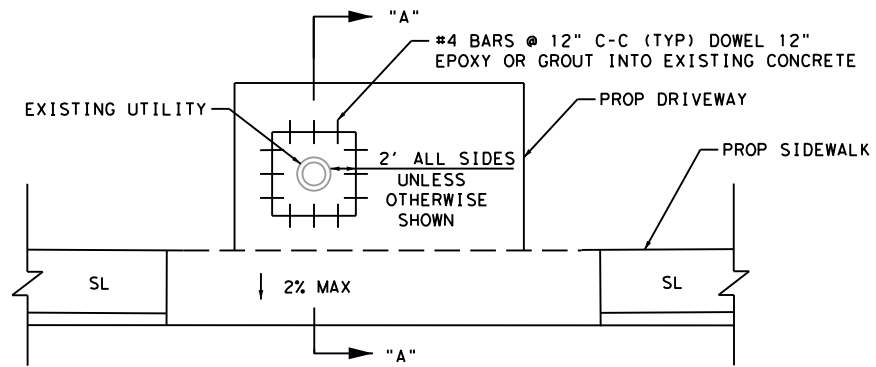
Plotted on: 2023-05-30

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## UTILITY BLOCKOUT

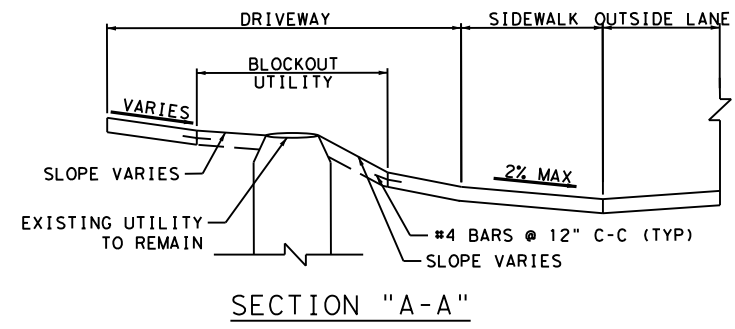
### NOTES:

1. GROUT OR EPOXY BARS INTO EXISTING CONCRETE AS APPROVED BY THE ENGINEER.



### SEQUENCE OF WORK:

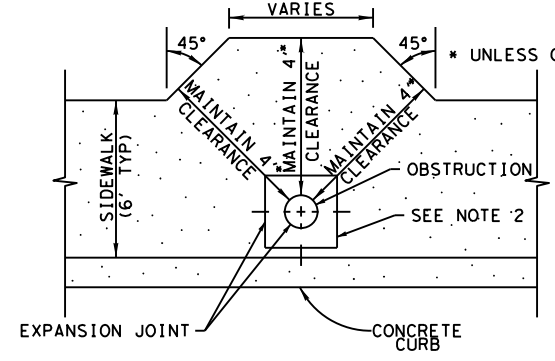
1. REMOVE EXISTING CONCRETE OR ASPHALT WITHIN LIMITS OF PROPOSED WORK. CONSTRUCT FORMWORK FOR PROPOSED IMPROVEMENTS, INCLUDING UTILITY BLOCKOUT AS SHOWN. EXISTING UTILITY RIM TO REMAIN UNDISTURBED.
2. CONSTRUCT PROPOSED IMPROVEMENTS EXCEPT WITHIN UTILITY BLOCKOUT AREA. ALLOW TIME TO CURE, REMOVE FORMWORK.
3. DOWEL REINFORCEMENT AS SHOWN. CONSTRUCT IMPROVEMENTS WITHIN UTILITY BLOCKOUT AREA FLUSH WITH RIM OF UTILITY AND SURROUNDING (COMPLETED) IMPROVEMENTS.



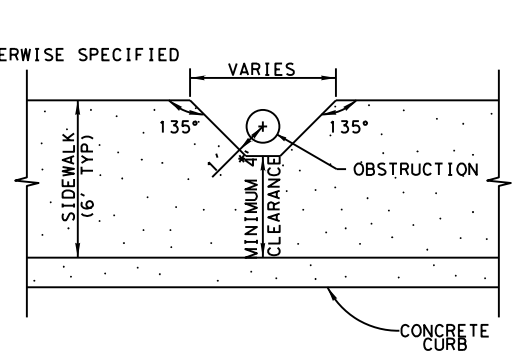
## OBSTRUCTION CONFLICT

### NOTES:

1. UTILIZE DETAIL AT OBSTRUCTION ENCROACHMENTS INTO THE PEDESTRIAN ACCESS ROUTE. A MINIMUM UNOBSTRUCTED CLEARANCE OF 4', UNLESS OTHERWISE SPECIFIED, SHOULD BE MAINTAINED AROUND THE OBSTRUCTION MEASURED FROM THE MOST RESTRICTIVE LOCATION OR AS APPROVED BY THE ENGINEER
2. IF OBSTRUCTION IS LOCATED WITHIN THE SIDEWALK, CONSTRUCT 2' SQUARE CONSTRUCTION JOINT CENTERED ON OBSTRUCTION TO FACILITATE FUTURE MAINTENANCE WITHOUT FULL SIDEWALK PANEL REMOVAL/REPLACEMENT



OBSTRUCTION IN SIDEWALK



OBSTRUCTION OUTSIDE SIDEWALK

### DESIGN

**INTERIM REVIEW**

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 ENGINEER: TYLER PAYNE DUBE  
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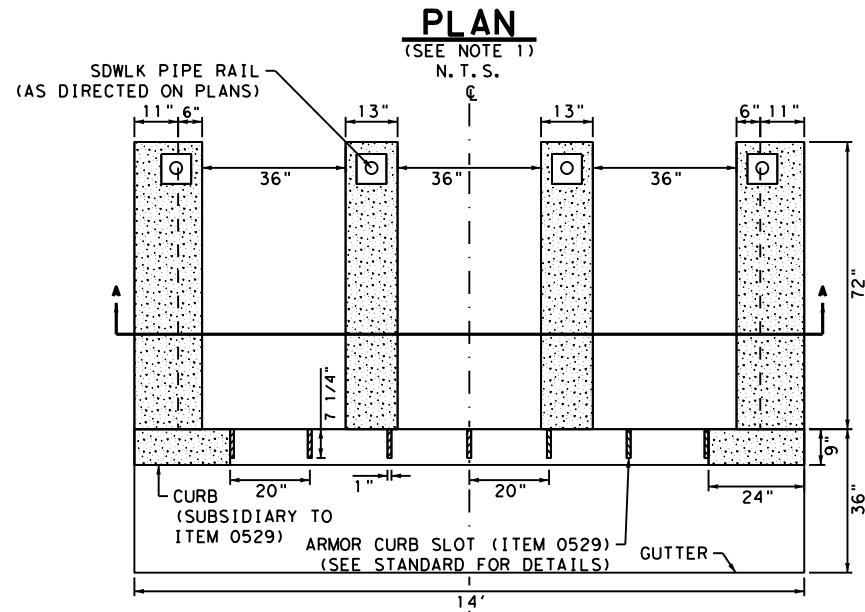
## SPECIAL DETAILS

SHEET 4 OF 10

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	36

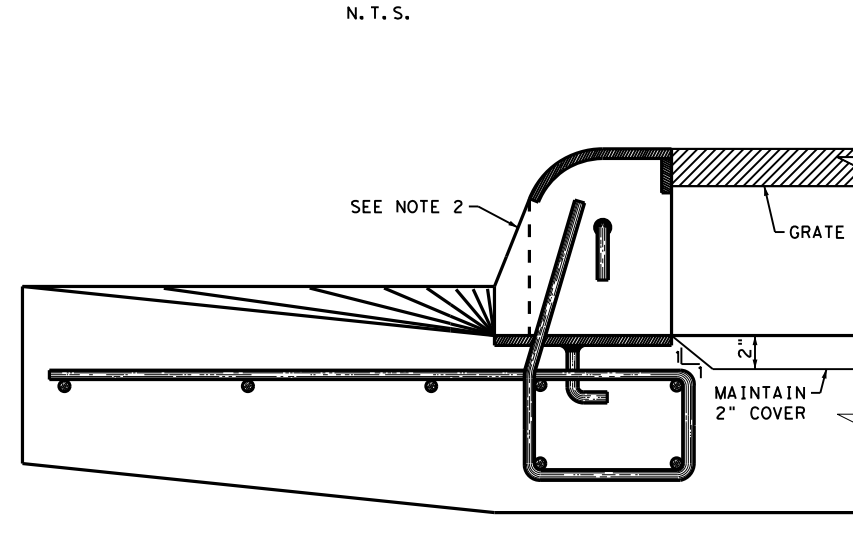


# SIDEWALK (TYPE A) DETAIL



NOTE: GRATE AND FRAMES NOT SHOWN IN PLAN VIEW FOR CLARITY

# ARMOR CURB SLOT DETAIL



**NOTES:**

- 1) SIDEWALK (TY A) IS PAID SEPARATELY UNDER THE FOLLOWING PAY ITEMS UNLESS OTHERWISE SHOW:  
  
ITEM 0104-6029 REMOVING CONC (CURB OR CURB & GUTTER)  
ITEM 0471-6003 GRATE & FRAME  
ITEM 0529-6020 CONC CURB & GUTTER (ARMOR CURB)  
ITEM 0420-6074 CL C CONC (MISC)
- 2) SEE ARMOR CURB SLOT DETAIL FOR ADDITIONAL INFORMATION

# SECTION A-A

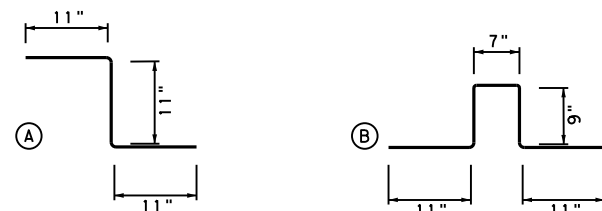
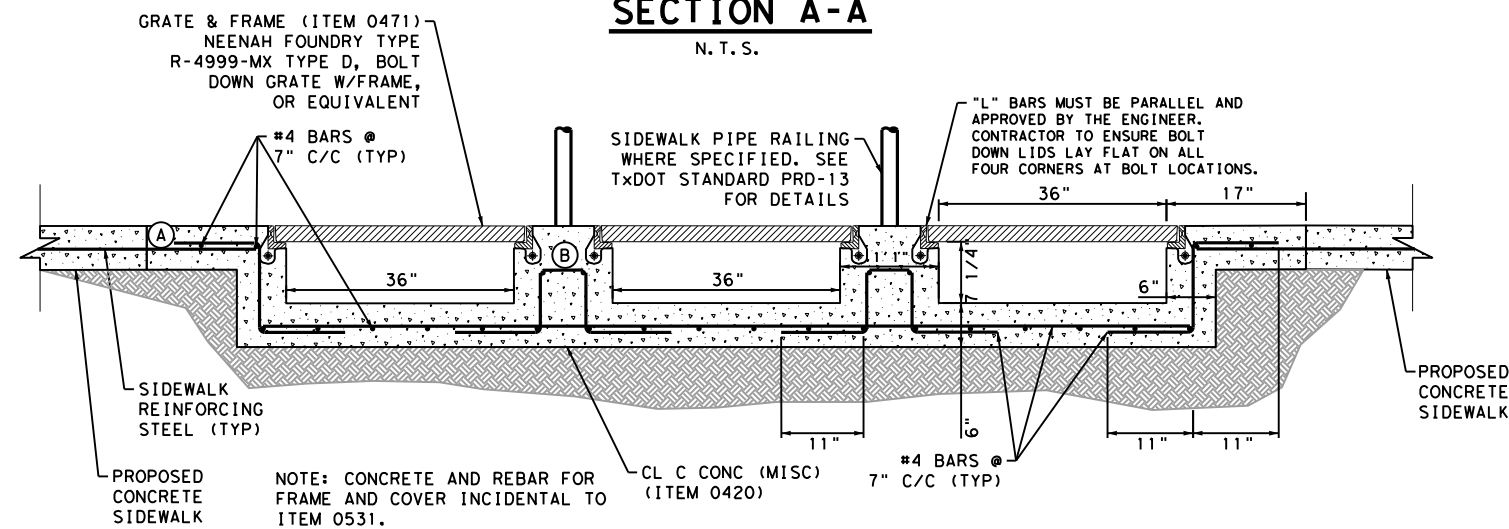


TABLE OF REINFORCING STEEL			
BAR	SIZE	SPAN	NO.
A	#4	2' - 9"	20
B	#4	3' - 11"	20

**DESIGN**

**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: TYLER PAYNE DUBE  
P. E. SERIAL NO: 118612  
DATE: 2023-05-30

**APPROVAL**

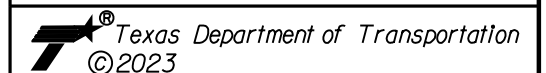
**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: JOHN A. TYLER  
P. E. SERIAL NO: 105193  
DATE: 2023-05-30

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



# SPECIAL DETAILS

SHEET 5 OF 10

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	37

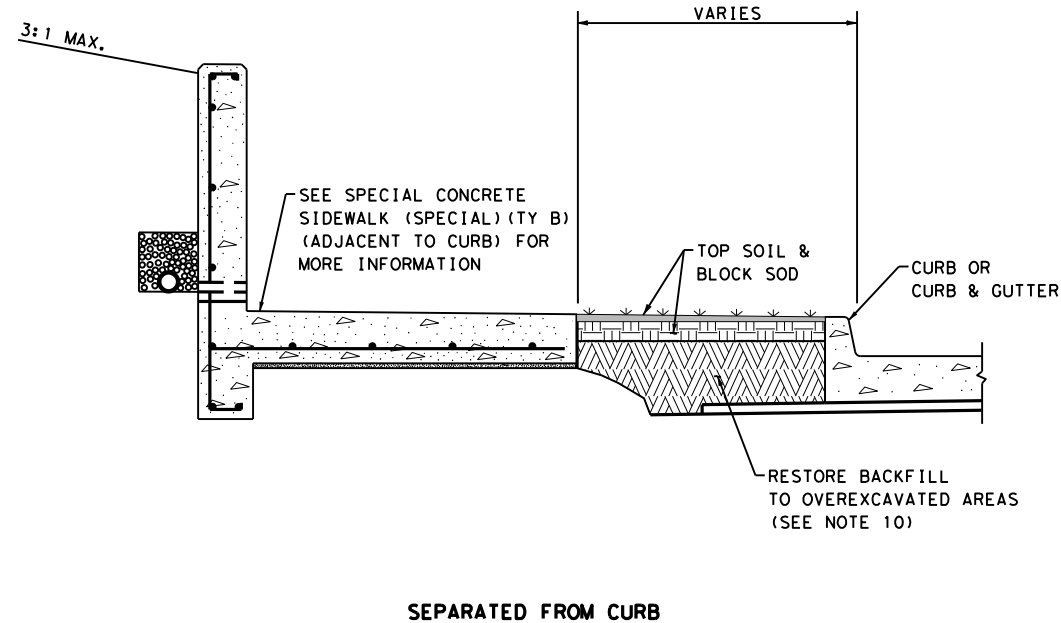
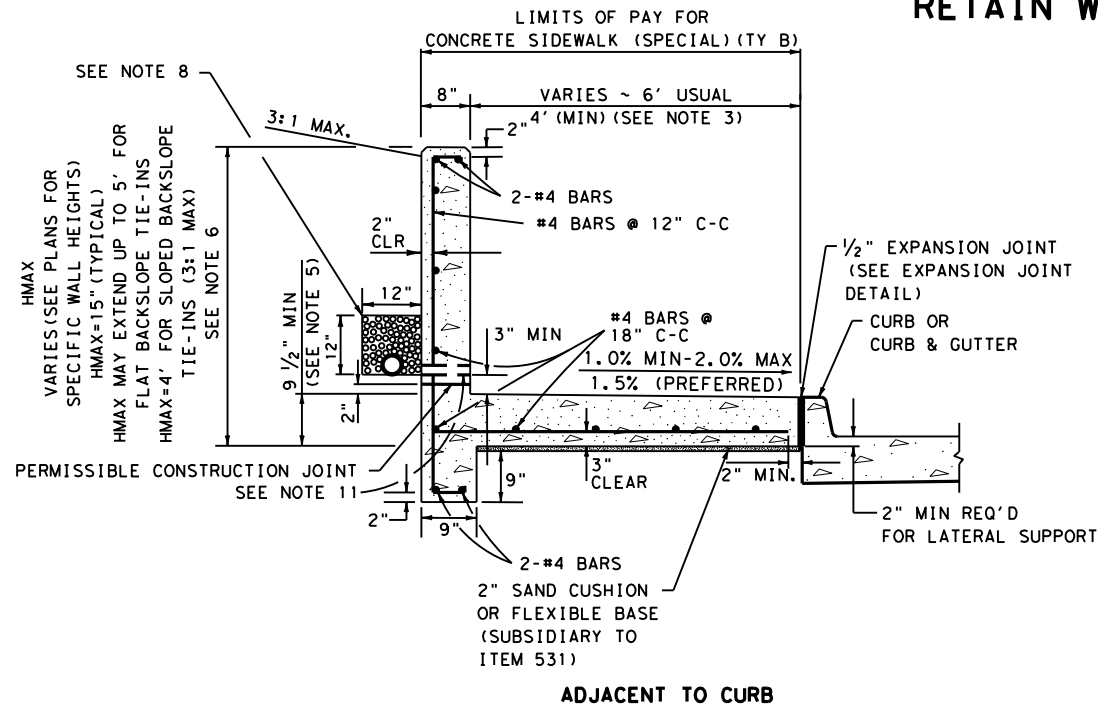
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Plotted on: 2023-05-30

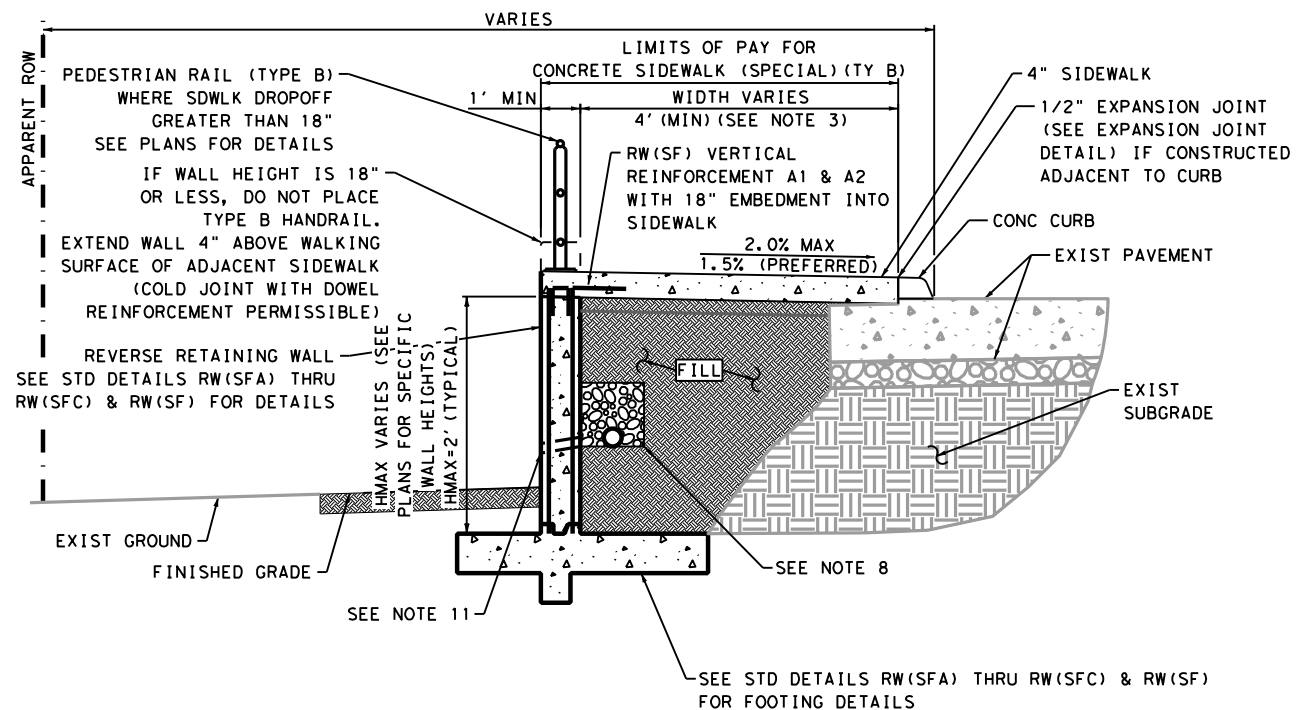
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### CONCRETE SIDEWALK (SPECIAL) (TY B) RETAIN WALL (CUT)



**REINFORCING STEEL DETAIL**

### CONCRETE SIDEWALK (SPECIAL) (TY B) RETAIN WALL (FILL)



**NOTES:**

- SEE PLAN SHEETS FOR LOCATIONS OF SIDEWALKS WITH INTEGRATED CUT OR FILL RETAINING WALLS.
- LONGITUDINAL SLOPE OF SIDEWALKS SHALL NOT EXCEED 5% EXCEPT IN CASES WHERE THE ADJACENT ROADWAY SLOPE EXCEEDS 5%. IF ROADWAY SLOPE EXCEEDS 5%, LONGITUDINAL SLOPE OF SIDEWALK MAY MATCH THAT OF ROADWAY.
- IF SIDEWALK WIDTH IS LESS THAN 5', PROVIDE 5' x 5' PASSING AREAS AT INTERVALS NOT TO EXCEED 200' SPACING.
- RETAINING WALL IS CONSIDERED SUBSIDIARY TO ITEM 531, WALL LENGTH AND HMAX ARE SHOWN ON THE PLANS FOR CONTRACTOR INFORMATION ONLY.
- FOR RETAINING WALL (CUT) FEATURES, CONCRETE SIDEWALK (SPECIAL) (TY B) THICKNESS IS PERMITTED TO BE 6" IN AREAS WHERE HMAX IS LESS THAN OR EQUAL TO 3'. THE SIDEWALK THICKNESS SHALL BE CONSTRUCTED AS INDICATED ON DETAIL FOR HMAX IN EXCESS OF 3' OR WHERE WALLS OF ANY HEIGHT ARE TO BE CONSTRUCTED ADJACENT TO PARKING.
- EXCAVATION, HAULING, AND DISPOSAL OF EXCAVATED MATERIAL IS NOT PAID FOR SEPARATELY, CONSIDERED SUBSIDIARY TO ITEM 531.
- EXCAVATED MATERIAL MAY BE USED AS EMBANKMENT IF APPROVED BY THE AREA ENGINEER.
- CONSTRUCT FILTER MATERIAL AND 4" DRAIN PIPE PER ITEM 556 (TYPE 5, 6, 7, OR 8) (NOT PAID FOR SEPARATELY, SUBSIDIARY TO ITEM 531). SLOPE TO DRAIN AND TERMINATE AT WALL LIMITS OR AS DIRECTED BY THE ENGINEER. IF, IN THE OPINION OF THE ENGINEER, THE USE OF AN UNDERDRAIN IS IMPRACTICAL, WEEP HOLES MAY BE USED (NSPI).
- CHAMFER ALL EXPOSED CORNERS 3/4".
- WHERE OVER-EXCAVATION IS REQUIRED TO FORM CURB AND/OR SIDEWALK, RESTORE AND COMPACT BACKFILL UP TO LIMITS OF TOPSOIL BEFORE BACKFILLING BEHIND WALL.
- 2" WEEP HOLES AT 15' MAX SPACING. SLOPE TO DRAIN. 1' SQUARE HARDWARE CLOTH (1/4" MESH) CENTERED BEHIND OPENING.

**DESIGN**

**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: TYLER PAYNE DUBE  
P.E. SERIAL NO: 118612  
DATE: 2023-05-30

**APPROVAL**

**INTERIM REVIEW**  
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ENGINEER: JOHN A. TYLER  
P.E. SERIAL NO: 105193  
DATE: 2023-05-30

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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## SPECIAL DETAILS

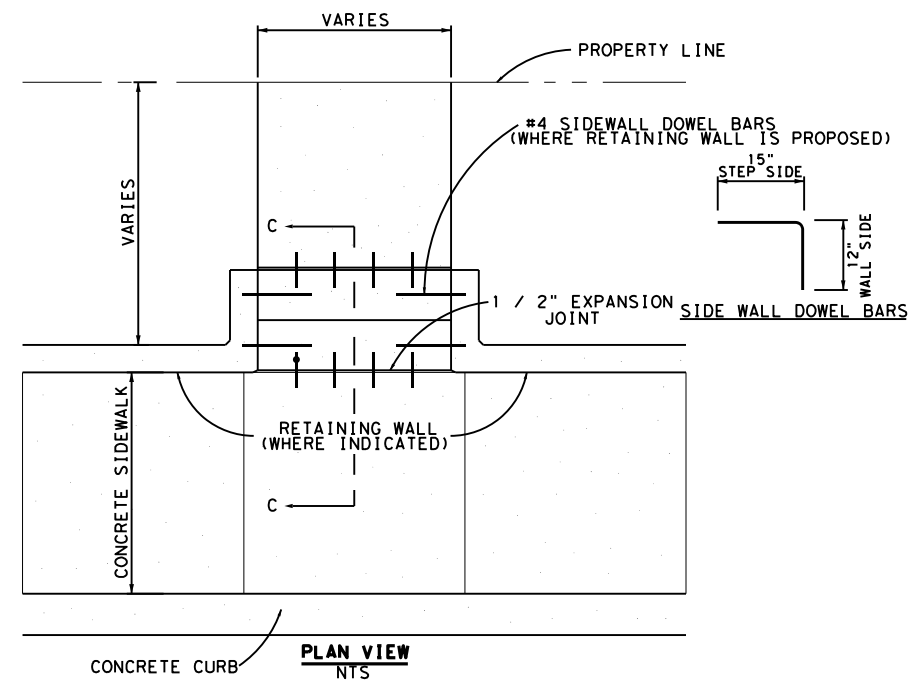
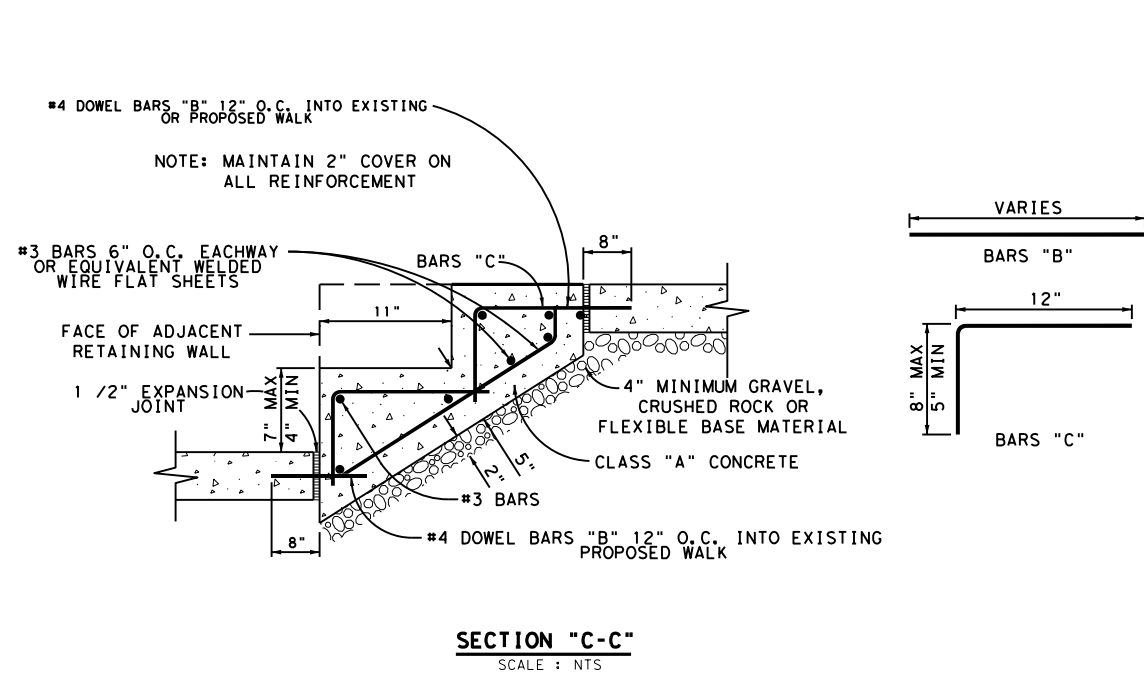
SHEET 6 OF 10

DGN#	FED. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	38

Plotted on: 2023-05-30

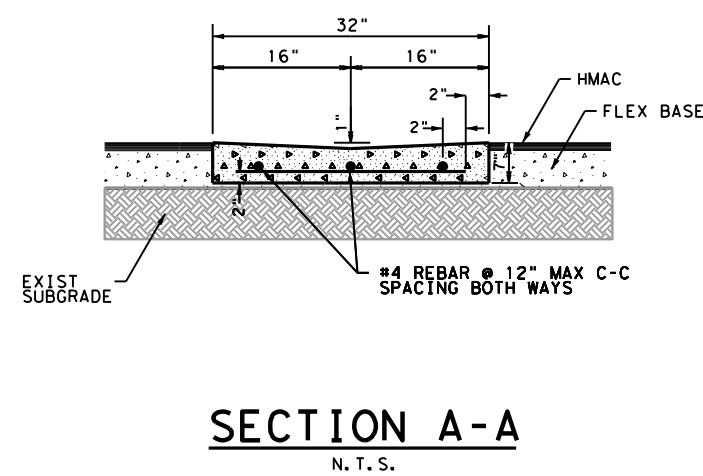
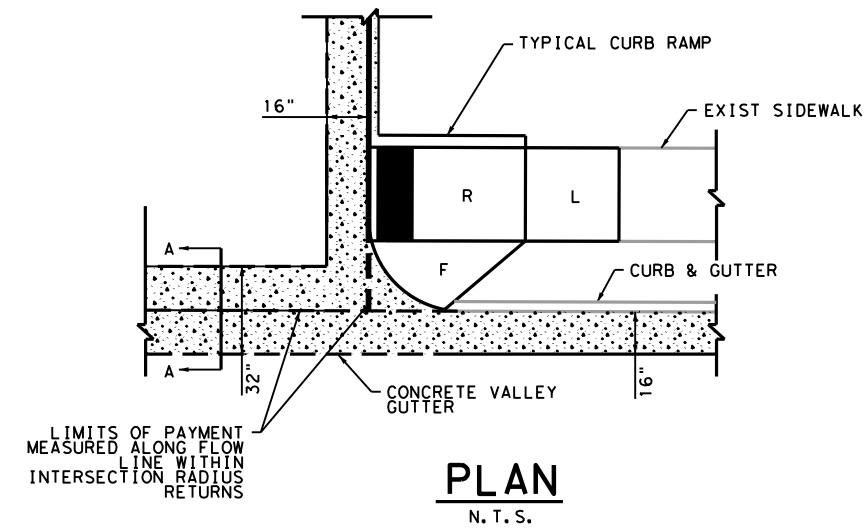
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### CONCRETE STEPS (ITEM 420)



### CONC CURB & GUTTER (VALLEY GUTTER) (ITEM 529)

TO BE USED WHERE REQUIRED TO CONVEY DRAINAGE ACROSS STREETS



DESIGN

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.

ENGINEER: TYLER PAYNE DUBE

P.E. SERIAL NO: 118612

DATE: 2023-05-30

---

APPROVAL

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.

ENGINEER: JOHN A. TYLER

P.E. SERIAL NO: 105193

DATE: 2023-05-30

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**PAPE-DAWSON ENGINEERS**

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## SPECIAL DETAILS

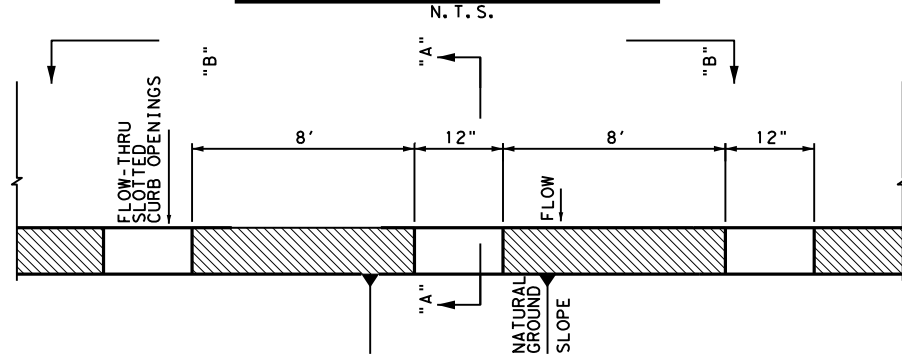
SHEET 7 OF 10

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	39

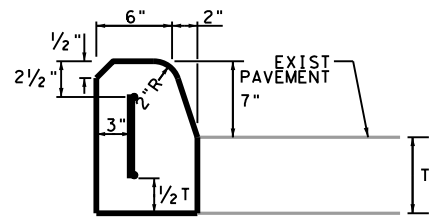
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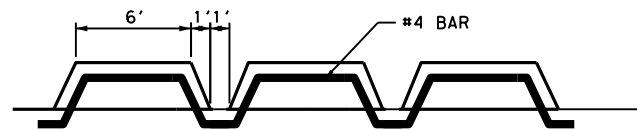
### SLOTTED CURB DETAIL



PLAN VIEW  
SCALE: N.T.S.

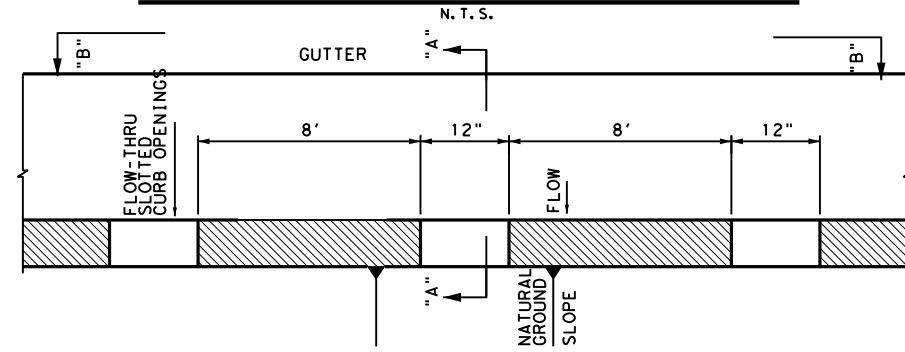


SECTION "A-A"  
N.T.S.

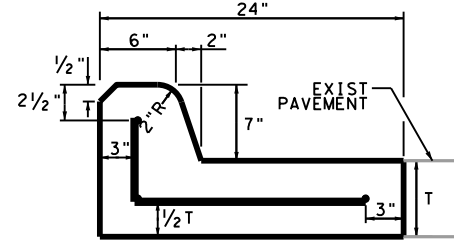


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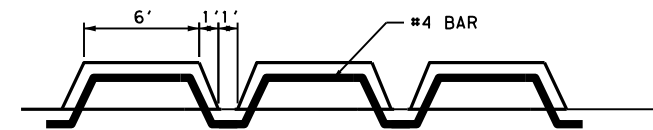
### SLOTTED CURB AND GUTTER DETAIL



PLAN VIEW  
SCALE: N.T.S.



SECTION "A-A"  
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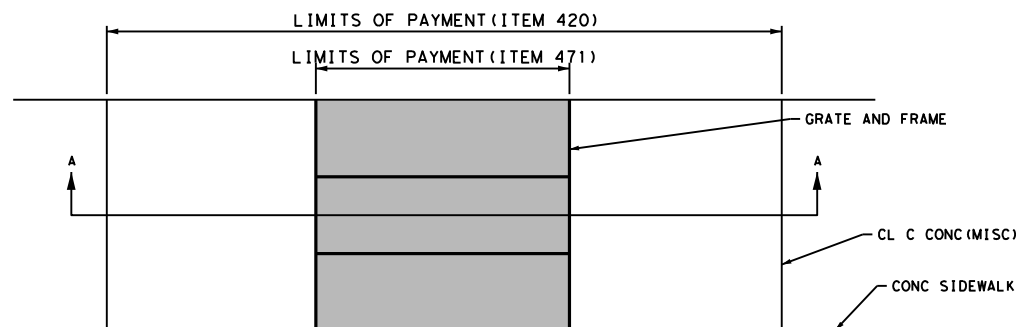


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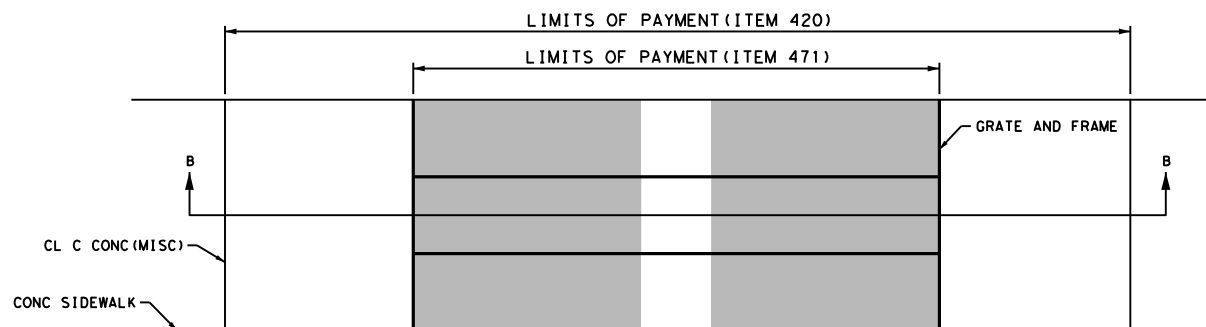
### GRATE & FRAME DETAIL

N.T.S.

\* REINFORCEMENT IS SUBSIDIARY TO ITEM 420.



SINGLE CHANNEL PLAN VIEW  
N.T.S.



DUAL CHANNEL PLAN VIEW  
N.T.S.

DESIGN

**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: TYLER PAYNE DUBE  
P.E. SERIAL NO: 118612  
DATE: 2023-05-30

APPROVAL

**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: JOHN A. TYLER  
P.E. SERIAL NO: 105193  
DATE: 2023-05-30

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**

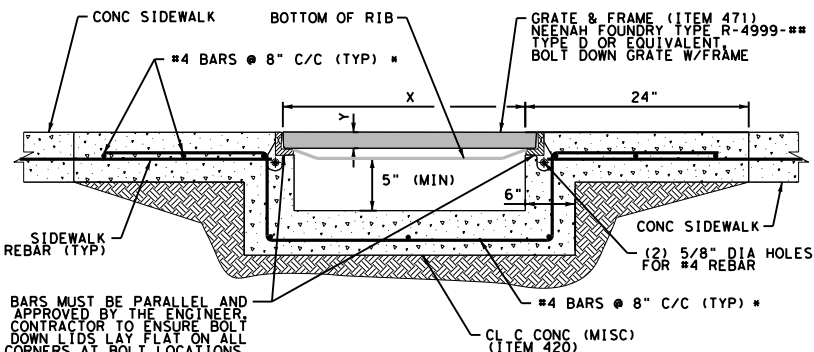
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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**SPECIAL DETAILS**

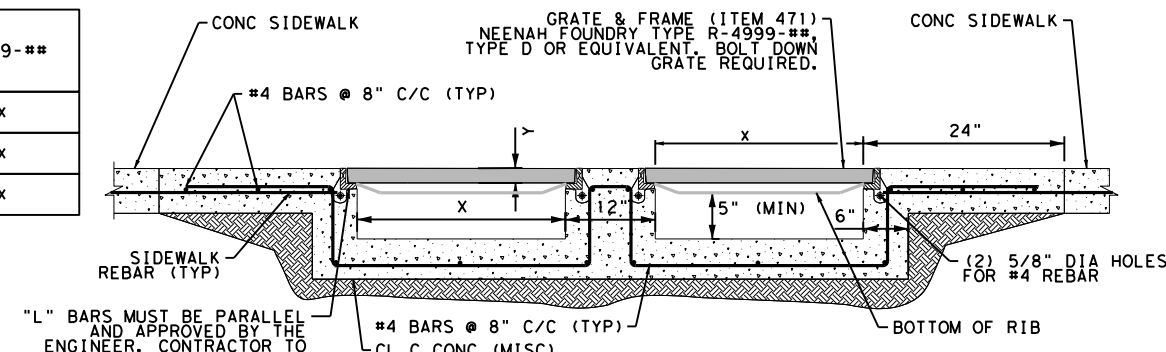
SHEET 8 OF 10

DGN#	FED. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202)TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	40



SECTION A-A  
N.T.S.

GRATE LENGTH	X	Y	R-4999-##
24"	24"	1.5"	HX
36"	36"	2.0"	MX
48"	48"	2.0"	OX



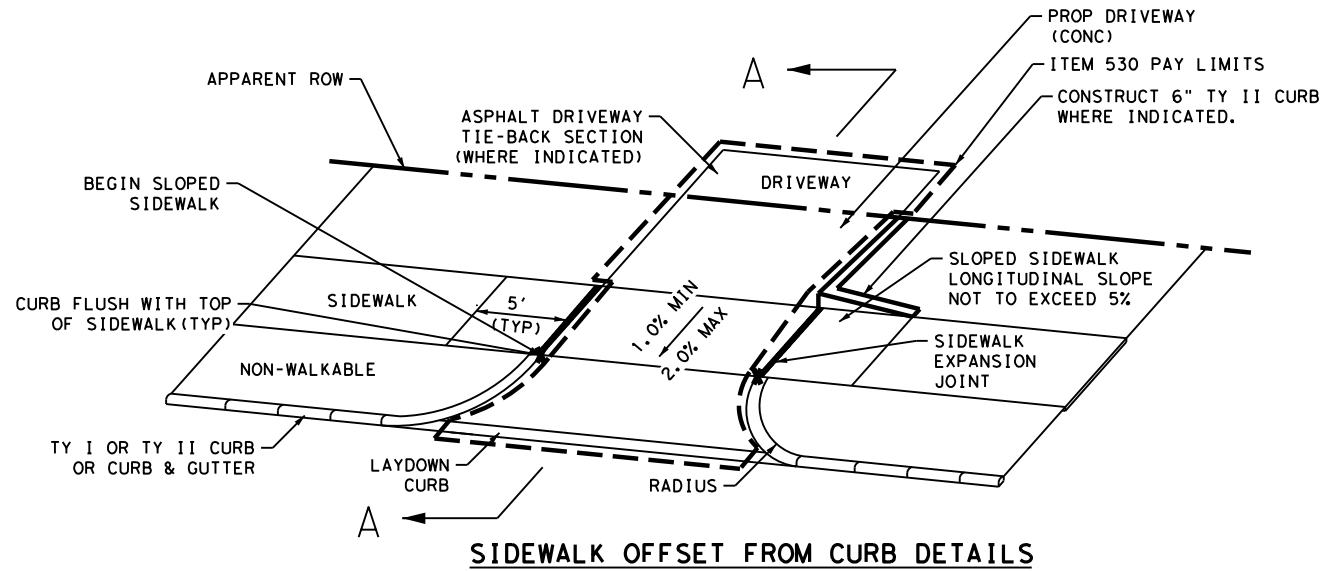
SECTION B-B  
N.T.S.

"L" BARS MUST BE PARALLEL AND APPROVED BY THE ENGINEER. CONTRACTOR TO ENSURE BOLT DOWN LIDS LAY FLAT ON ALL FOUR CORNERS AT BOLT LOCATIONS.

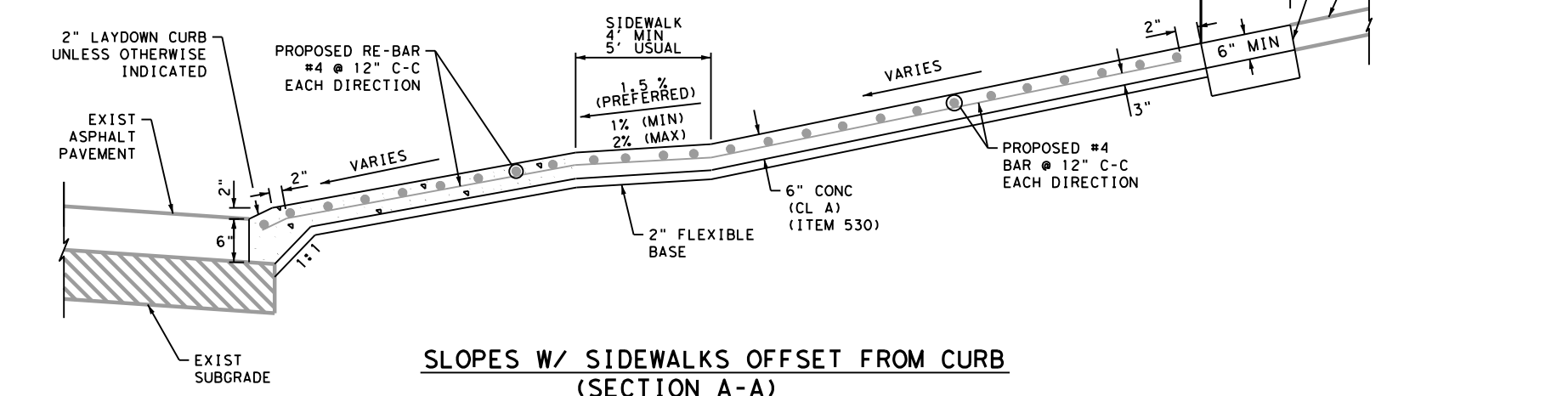
"L" BARS MUST BE PARALLEL AND APPROVED BY THE ENGINEER. CONTRACTOR TO ENSURE BOLT DOWN LIDS LAY FLAT ON ALL FOUR CORNERS AT BOLT LOCATIONS.

Plotted on: 2023-05-30

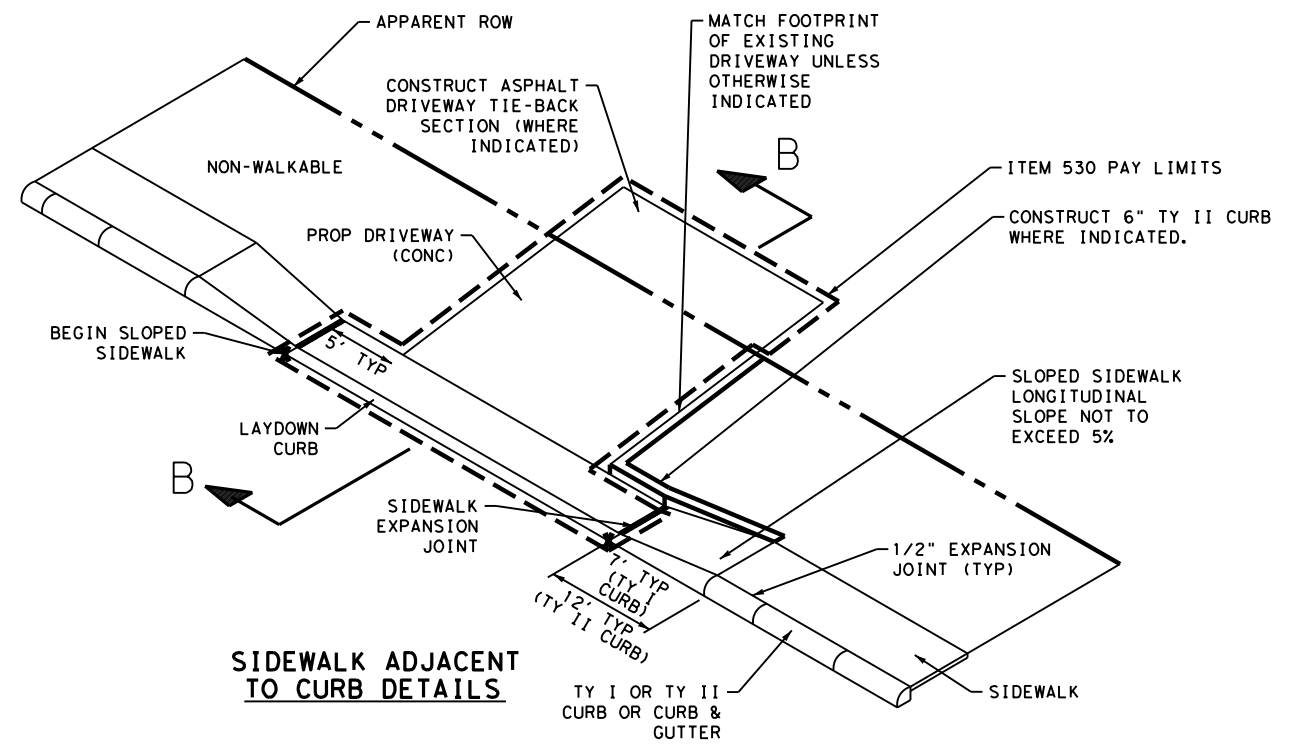
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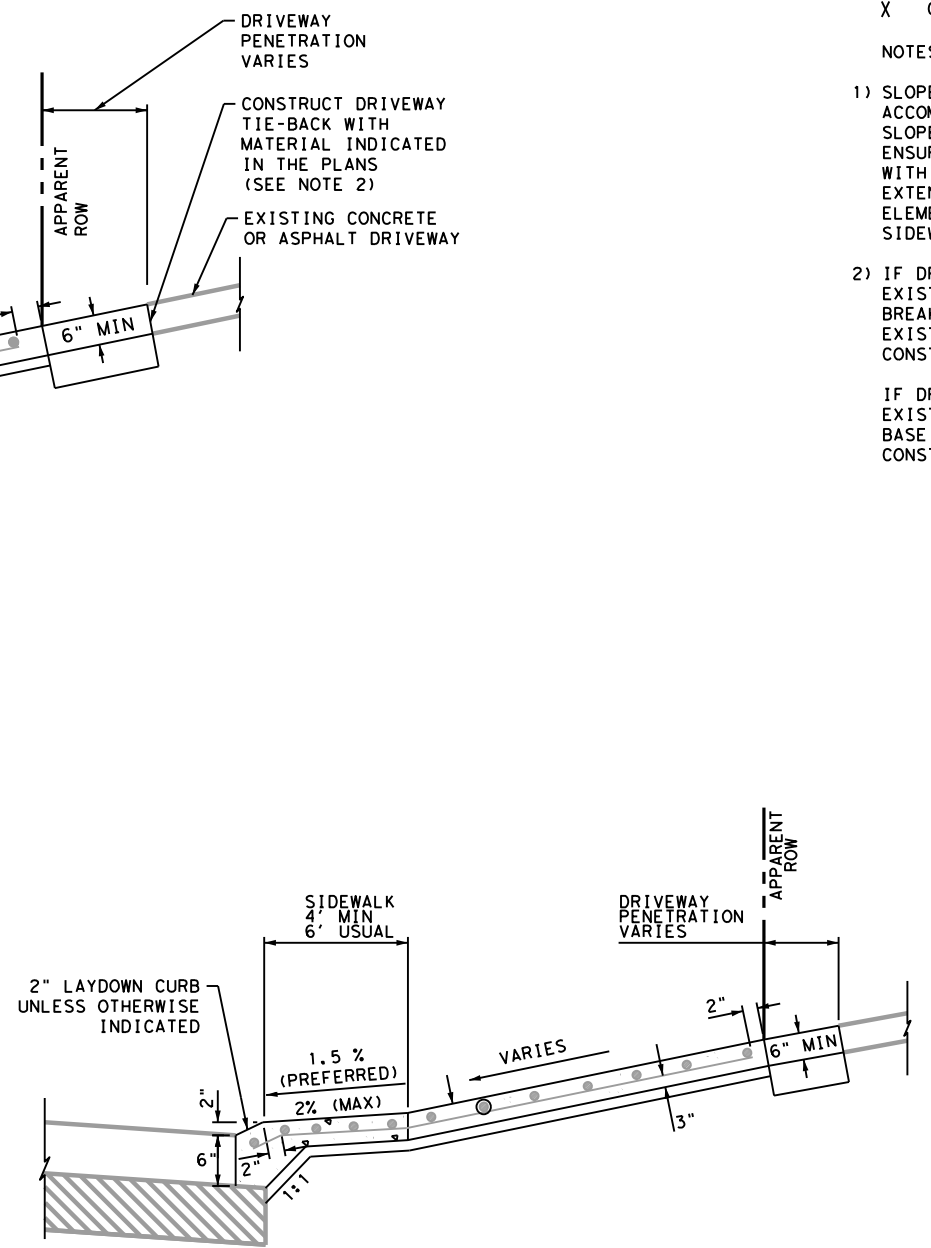
**SIDEWALK OFFSET FROM CURB DETAILS**



**SLOPES W/ SIDEWALKS OFFSET FROM CURB (SECTION A-A)**



**SIDEWALK ADJACENT TO CURB DETAILS**



**DRIVEWAY SLOPES W/ SIDEWALKS ADJACENT TO CURB (SECTION B-B)**

**LEGEND**  
X CONTROL POINT

- NOTES:**
- 1) SLOPED SIDEWALK SEGMENT LENGTHS ARE SHOWN TO CONSERVATIVELY ACCOMMODATE STANDARD CURB HEIGHTS ON LEVEL STREETS. SOME SLOPED SIDEWALK SEGMENTS MAY REQUIRE ADDITIONAL LENGTH TO ENSURE LONGITUDINAL SLOPES DO NOT EXCEED 5%. WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY EXTEND THE SLOPED SIDEWALK SEGMENT TO THE NEXT PLANAR ELEMENT (LS, L, SL, R, T, ETC.) OR UNTIL THE SLOPED SIDEWALK REACHES CURB HEIGHT, WHICHEVER IS SHORTER.
  - 2) IF DRIVEWAY TIE-BACK IS SPECIFIED AS CONCRETE, SAWCUT EXISTING CONCRETE AT THE TIE-IN LOCATION MIN. 1/2", THEN BREAKBACK, CLEAN, AND EXPOSE 18" STEEL REINFORCING IN EXISTING CONCRETE. INSTALL FLEXIBLE BASE AS INDICATED. CONSTRUCT CONCRETE DRIVEWAY PER ITEM 530.
- IF DRIVEWAY TIE-BACK IS SPECIFIED AS ASPHALT, SAWCUT EXISTING ASPHALT AT THE TIE-IN LOCATION. INSTALL 6" FLEXIBLE BASE OR ASPHALTIC CONCRETE BASE (SUBSIDIARY TO ITEM 530). CONSTRUCT ASPHALT DRIVEWAY (PG 64-22 SAC C) PER ITEM 530.

**DESIGN**

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: TYLER PAYNE DUBE  
P.E. SERIAL NO: 118612  
DATE: 2023-05-30

**APPROVAL**

**INTERIM REVIEW**

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ENGINEER: JOHN A. TYLER  
P.E. SERIAL NO: 105193  
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NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**

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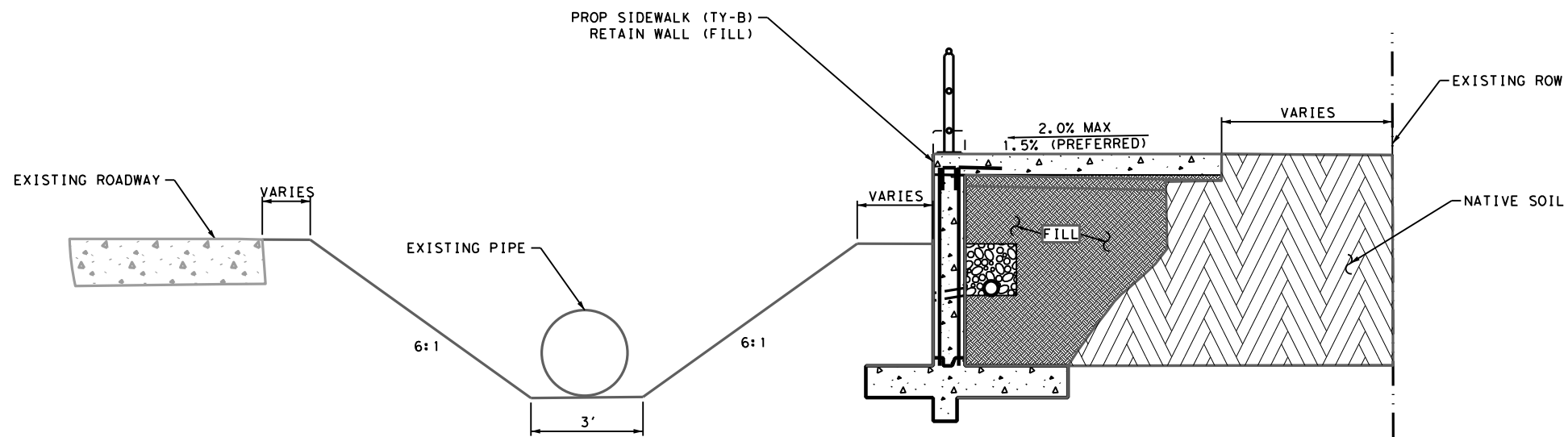
**SPECIAL DETAILS**

SHEET 9 OF 10

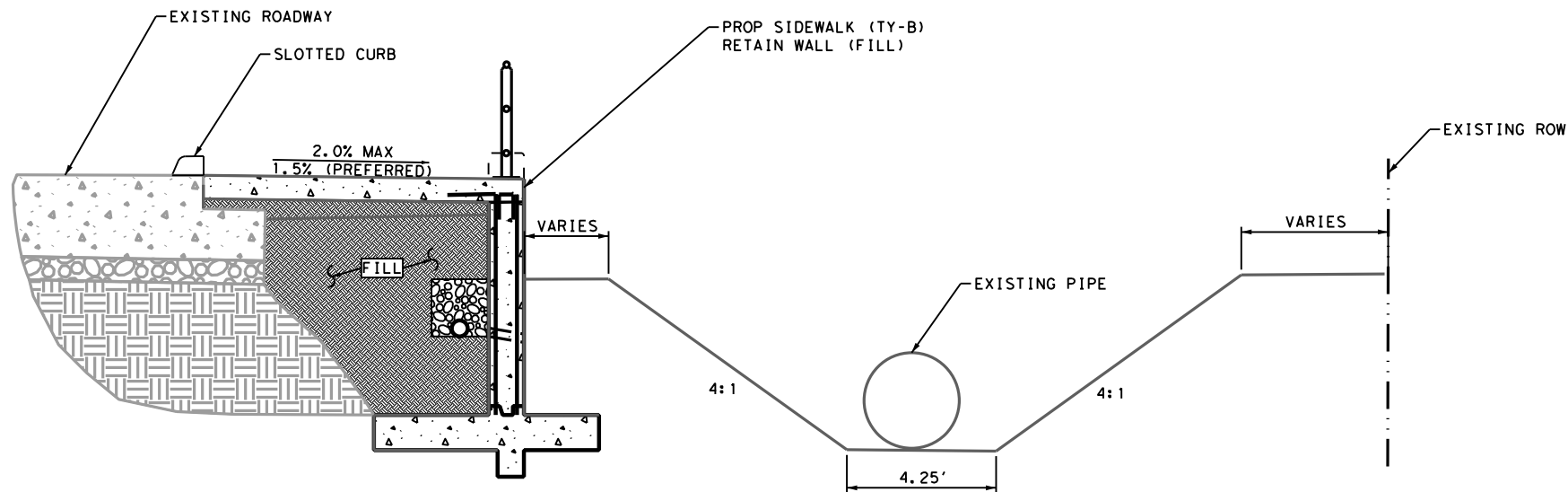
DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202)TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	41

Plotted on: 2023-05-30

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**DITCH REGRADING  
BETWEEN ROADWAY AND RETAIN WALL**



**DITCH REGRADING  
BETWEEN RETAIN WALL AND ROW**

DESIGN

INTERIM REVIEW  
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ENGINEER: TYLER PAYNE DUBE  
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DATE: 2023-05-30

APPROVAL

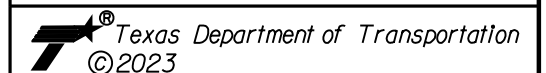
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DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: JOHN A. TYLER  
P.E. SERIAL NO: 105193  
DATE: 2023-05-30

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
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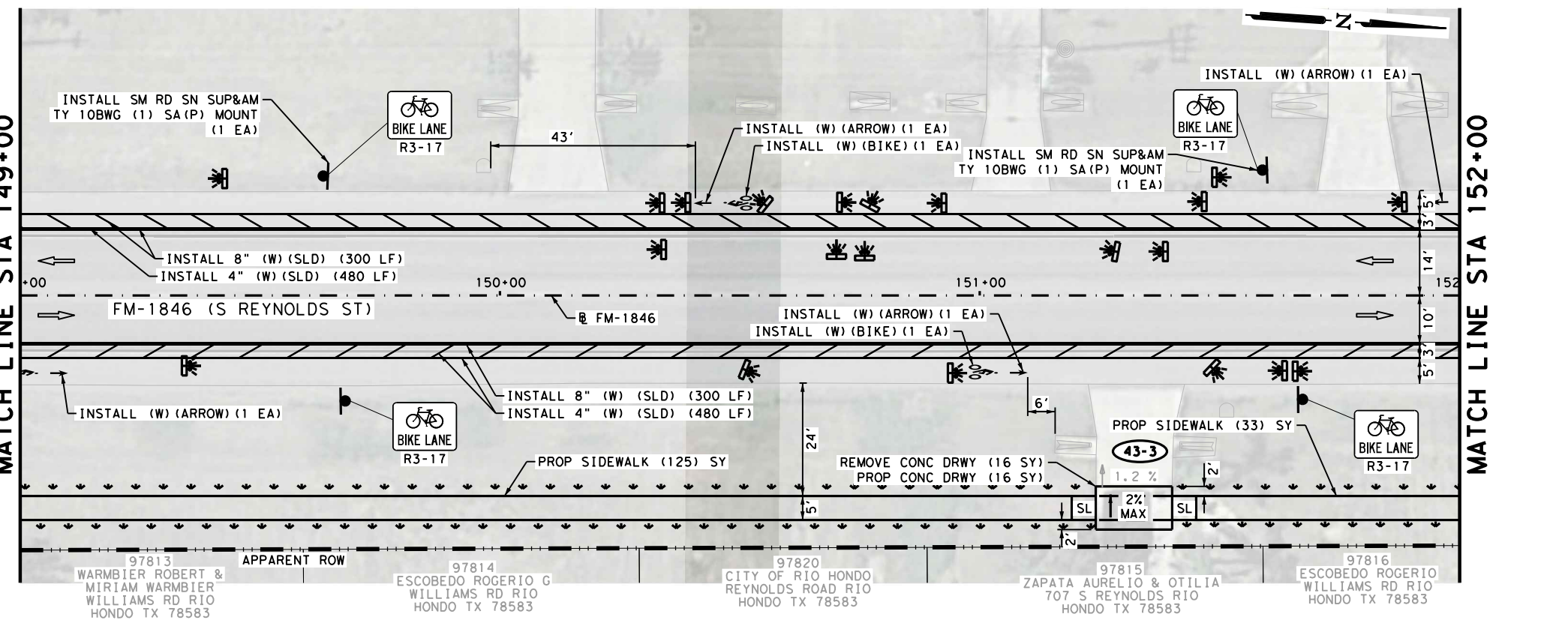
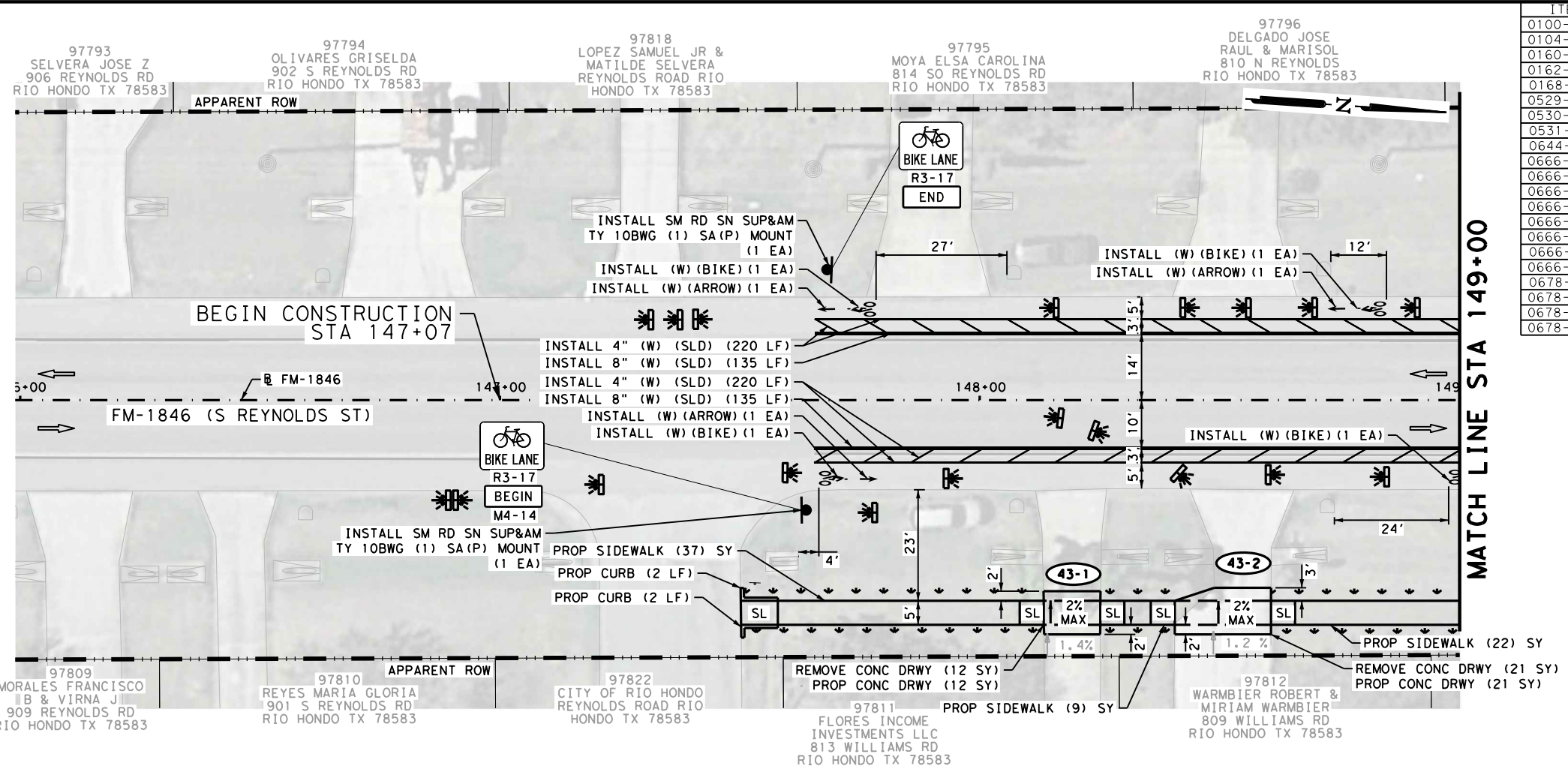
**SPECIAL DETAILS**

SHEET 10 OF 10

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	42

Plotted on: 2023-05-30

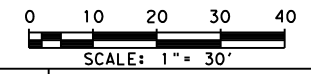
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	49
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	269
0162-6002	BLOCK SODDING	SY	269
0168-6001	VEGETATIVE WATERING	MG	4.6
0529-6002	CONC CURB (TY II)	LF	4
0530-6004	DRIVEWAYS (CONC)	SY	49
0531-6001	CONC SIDEWALKS (4")	SY	226
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	6
0666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1400
0666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	870
0666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	7
0666-6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	6
0666-6224	PAVEMENT SEALER 4"	LF	1400
0666-6226	PAVEMENT SEALER 8"	LF	870
0666-6231	PAVEMENT SEALER (ARROW)	EA	7
0666-6245	PAVEMENT SEALER (BIKE SYMBOL)	EA	6
0678-6001	PAV SURF PREP FOR MRK (4")	LF	1400
0678-6004	PAV SURF PREP FOR MRK (8")	LF	870
0678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	7
0678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	6

DESIGN  
**INTERIM REVIEW**  
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 P.E. SERIAL NO: 118612  
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APPROVAL  
**INTERIM REVIEW**  
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REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 1846 (REYNOLDS ST)

# SIDEWALK PLAN

BEGIN CONSTRUCTION TO STA 152+00

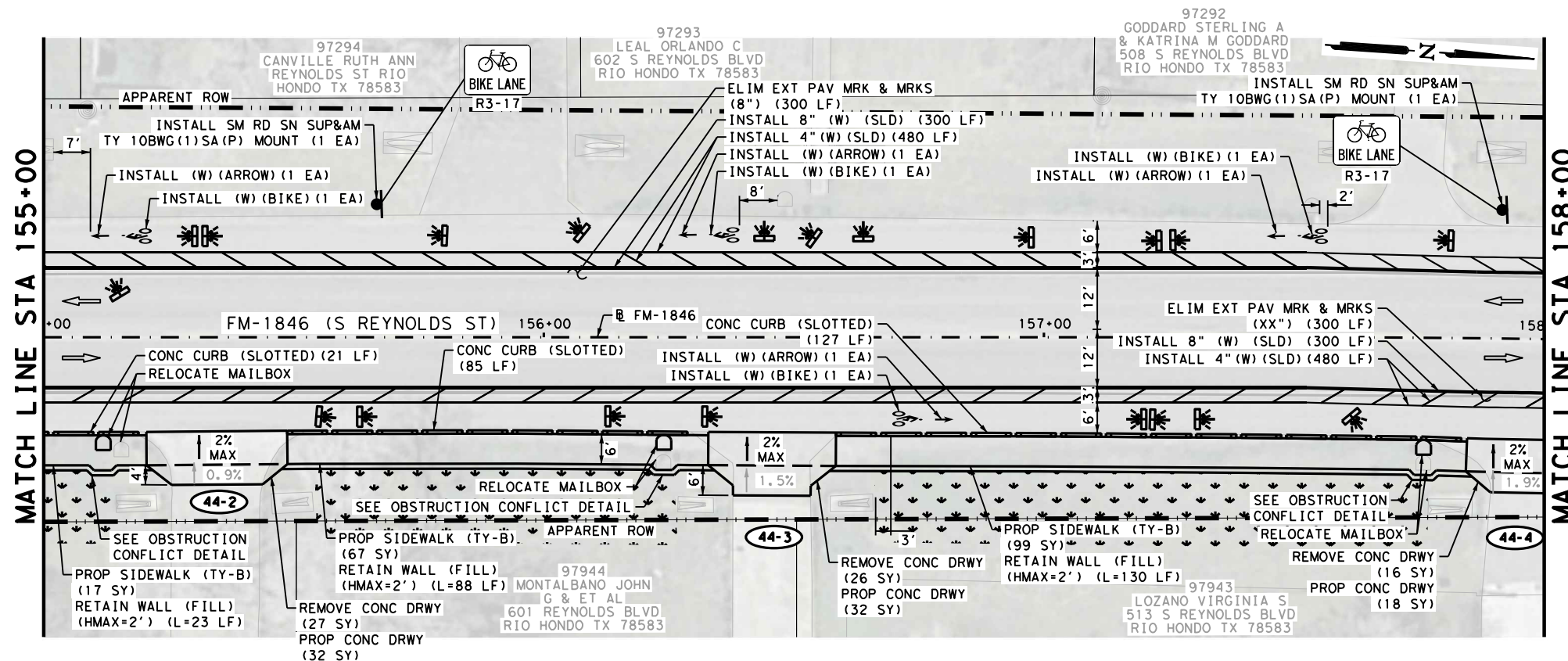
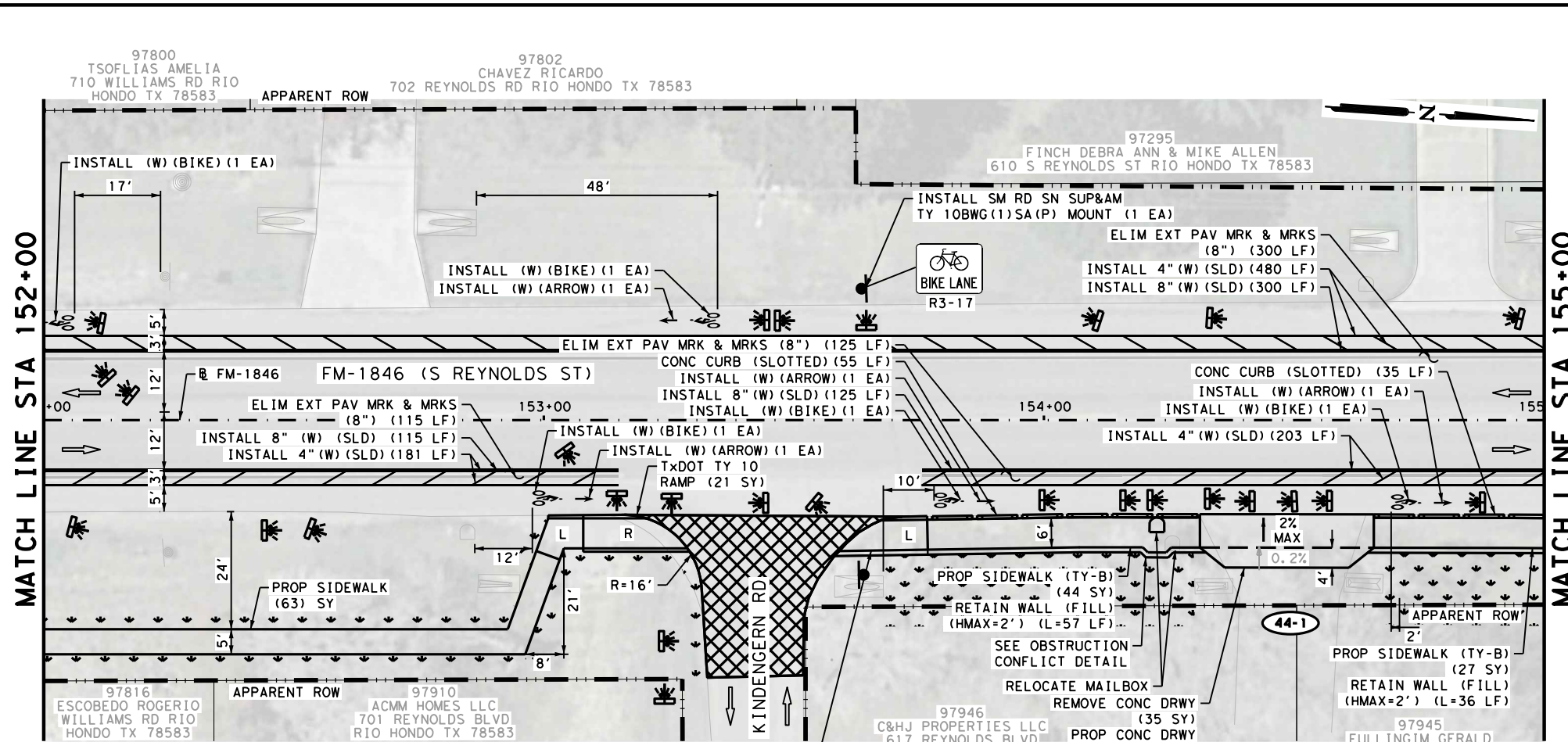
SHEET 1 OF 6

CHK	FED. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK	6	TEXAS	STP 2B23 (202) TAPS	VA		
CHK	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	PHR	CAMERON	0921	06	348	43



Plotted on: 2023-05-30

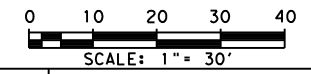
Design File name: S:\projects\61254\02\Design\01\_Rio\_Hondo\_ADA\Civil\Roadway\1-612540201\_FM1846\_02.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	104
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	618
0162-6002	BLOCK SODDING	SY	618
0168-6001	VEGETATIVE WATERING	MG	10.5
0529-6012	CONC CURB (SLOTTED)	LF	323
0530-6004	DRIVEWAYS (CONC)	SY	121
0531-6001	CONC SIDEWALKS (4")	SY	63
0531-6022	CURB RAMPS (TY 5)	SY	13
0531-6027	CURB RAMPS (TY 10)	SY	21
0531-6033	CONC SIDEWALKS (SPECIAL) (TYPE B)	SY	254
0560-6025	RELOCATE EXISTING MAILBOX	EA	4
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	3
0666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1824
0666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1140
0666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	8
0666-6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	9
0666-6224	PAVEMENT SEALER 4"	LF	1824
0666-6226	PAVEMENT SEALER 8"	LF	1140
0666-6231	PAVEMENT SEALER (ARROW)	EA	8
0666-6245	PAVEMENT SEALER (BIKE SYMBOL)	EA	9
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	1140
0678-6001	PAV SURF PREP FOR MRK (4")	LF	1824
0678-6004	PAV SURF PREP FOR MRK (8")	LF	1140
0678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
0678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	9

DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation  
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FM 1846 (REYNOLDS ST)  
**SIDEWALK PLAN**  
 STA 152+00 TO STA 158+00

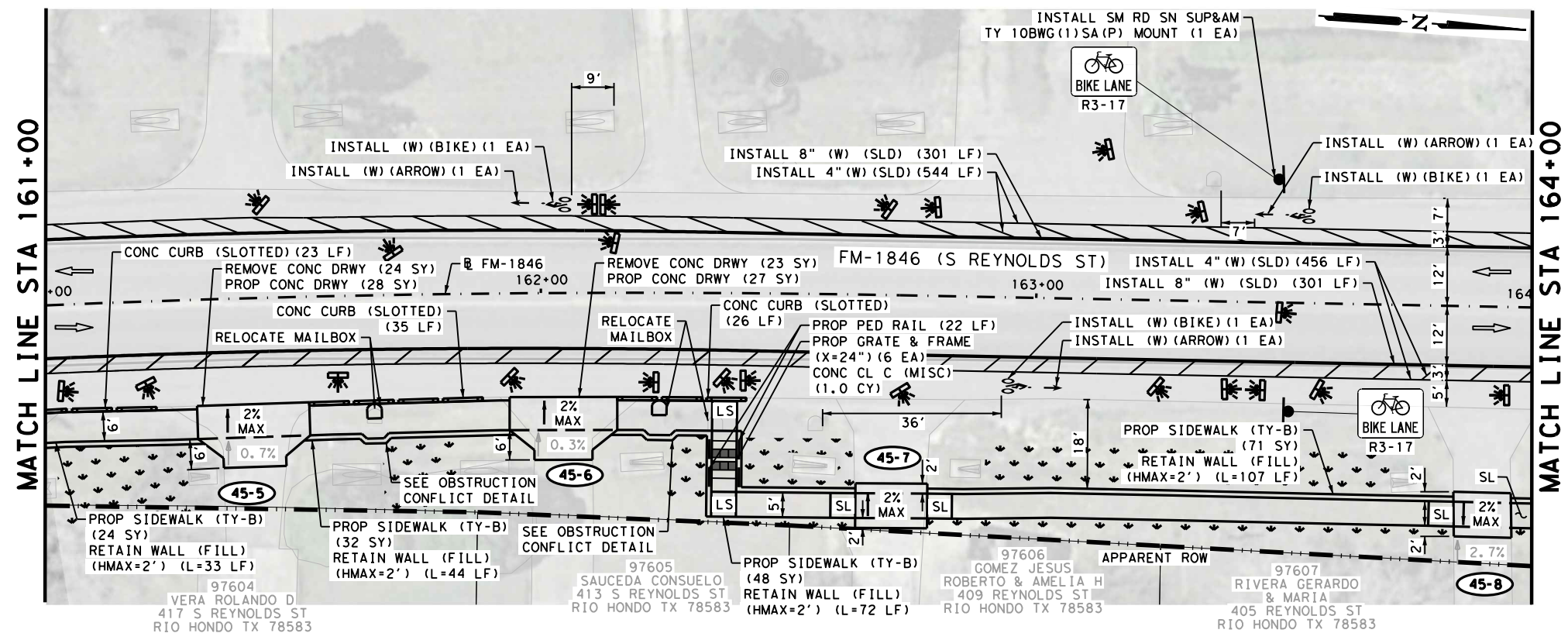
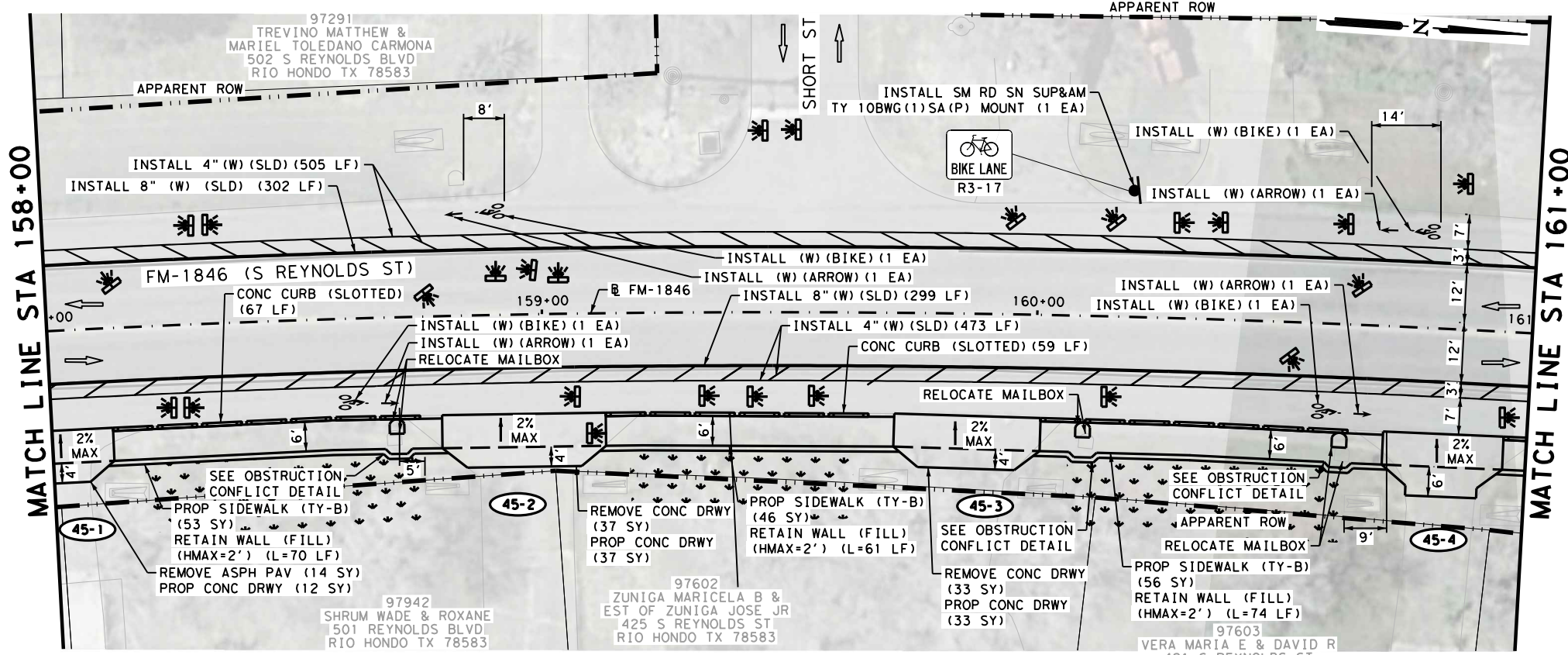
SHEET 2 OF 6

DGN#	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	44



Plotted on: 2023-05-30

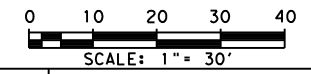
Design File name: S:\projects\61254\02\Design\01\_Rio\_Hondo\_ADA\civil\Roadway\1-612540201\_FM1846\_03.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	131
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	492
0162-6002	BLOCK SODDING	SY	492
0168-6001	VEGETATIVE WATERING	MG	8.3
0420-6074	CL C CONC (MISC)	CY	1.0
0450-6048	RAIL (HANDRAIL) (TY B)	LF	22
0471-6003	GRATE & FRAME	EA	6
0529-6012	CONC CURB (SLOTTED)	LF	210
0530-6004	DRIVEWAYS (CONC)	SY	137
0531-6033	CONC SIDEWALKS (SPECIAL) (TYPE B)	SY	330
0560-6025	RELOCATE EXISTING MAILBOX	EA	5
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	3
0666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1978
0666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1203
0666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	7
0666-6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	7
0666-6224	PAVEMENT SEALER 4"	LF	1978
0666-6226	PAVEMENT SEALER 8"	LF	1203
0666-6231	PAVEMENT SEALER (ARROW)	EA	7
0666-6245	PAVEMENT SEALER (BIKE SYMBOL)	EA	7
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	1203
0678-6001	PAV SURF PREP FOR MRK (4")	LF	1978
0678-6004	PAV SURF PREP FOR MRK (8")	LF	1203
0678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	7
0678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	7

DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation  
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FM 1846 (REYNOLDS ST)  
**SIDEWALK PLAN**  
 STA 158+00 TO STA 164+00

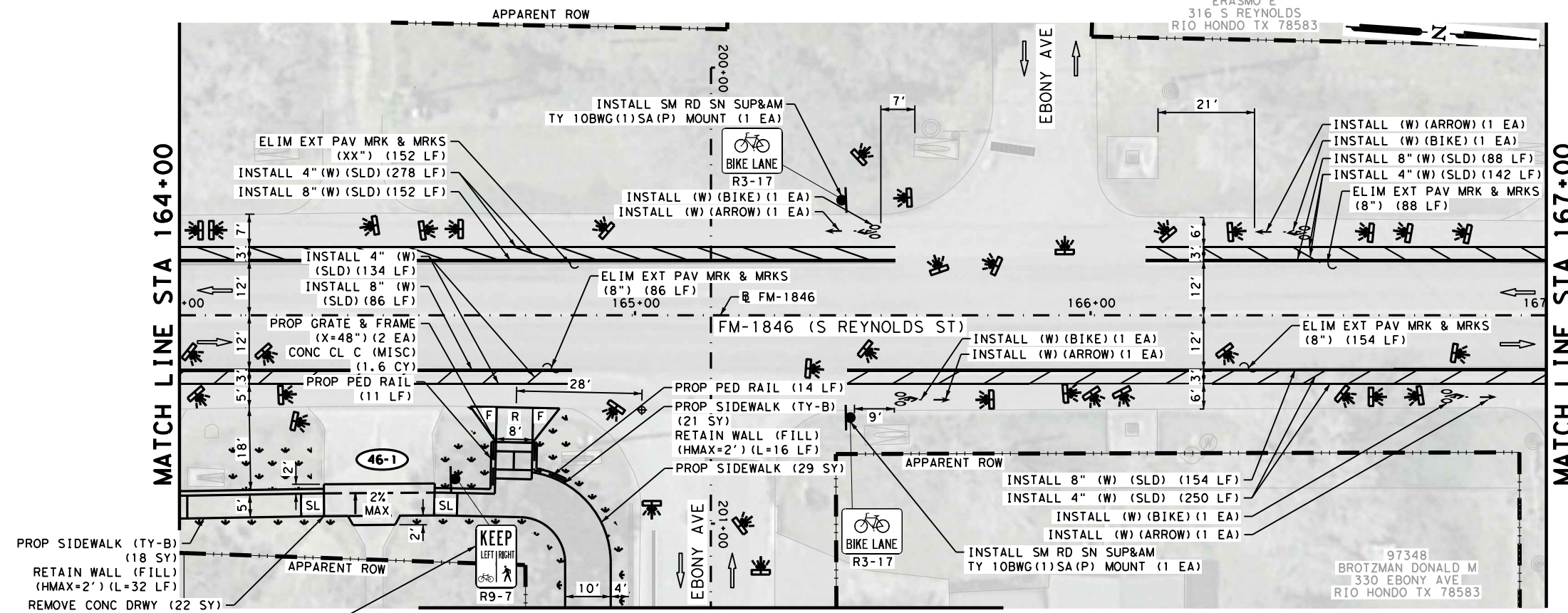
SHEET 3 OF 6

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	STP 2B23 (202)TAPS	VA
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	PHR	CAMERON	0921	06
				JOB NO.:
				348
				SHEET NO.:
				45

Plotted on: 2023-05-30

Design File name: S:\projects\61254\02\Design\01\_Rio\_Hondo\_ADA\Civil\Roadway\1-612540201\_FM1846\_04.dgn

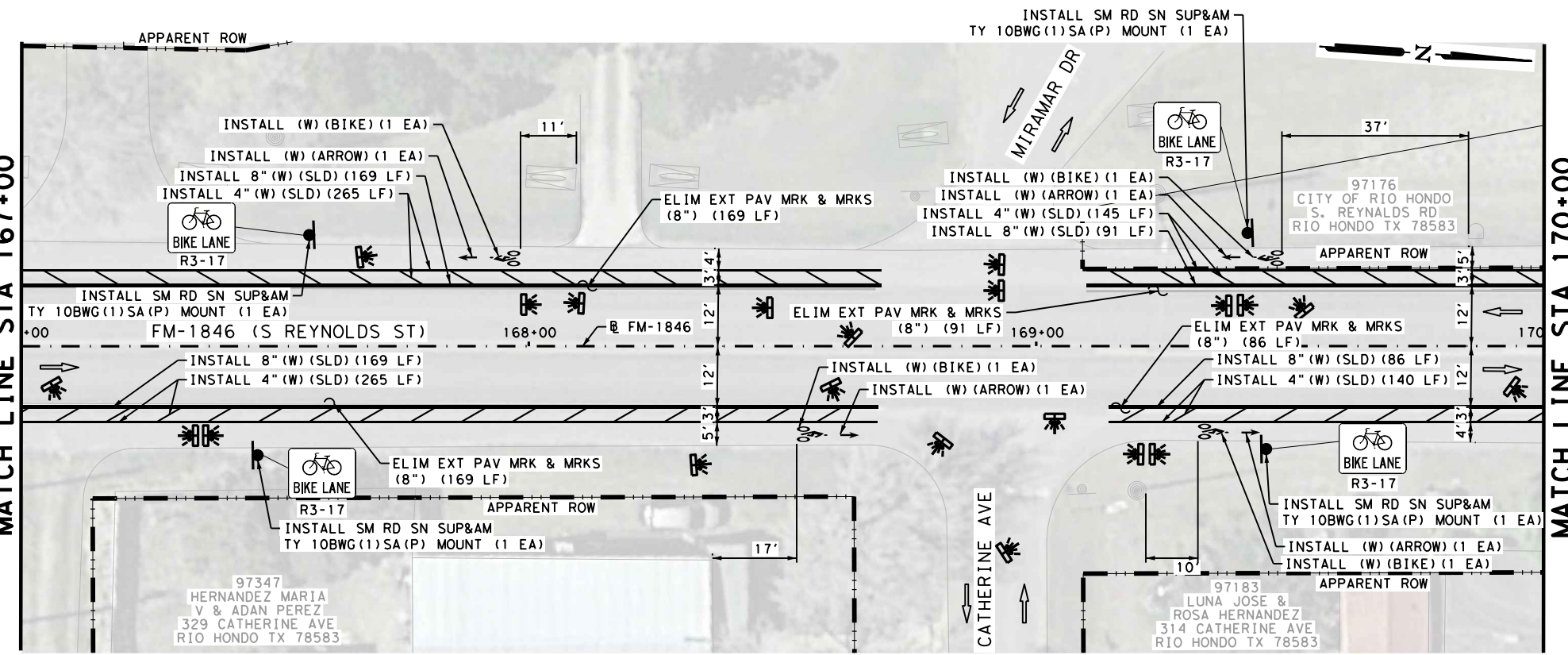
ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	22
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	82
0162-6002	BLOCK SODDING	SY	82
0168-6001	VEGETATIVE WATERING	MG	1.4
0420-6074	CL C CONC (MISC)	CY	1.6
0450-6048	RAIL (HANDRAIL) (TY B)	LF	25
0471-6003	GRATE & FRAME	EA	2
0530-6004	DRIVEWAYS (CONC)	SY	22
0531-6001	CONC SIDEWALKS (4")	SY	29
0531-6033	CONC SIDEWALKS (SPECIAL) (TYPE B)	SY	39
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	7
0666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1619
0666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	995
0666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	8
0666-6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	8
0666-6224	PAVEMENT SEALER 4"	LF	1619
0666-6226	PAVEMENT SEALER 8"	LF	995
0666-6231	PAVEMENT SEALER (ARROW)	EA	8
0666-6245	PAVEMENT SEALER (BIKE SYMBOL)	EA	8
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	995
0678-6001	PAV SURF PREP FOR MRK (4")	LF	1619
0678-6004	PAV SURF PREP FOR MRK (8")	LF	995
0678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
0678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	8



MATCH LINE STA 164+00

MATCH LINE STA 167+00

MATCH LINE 201+19 SEE SHEET 49



MATCH LINE STA 167+00

MATCH LINE STA 170+00

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.

ENGINEER: TYLER PAYNE DUBE

P.E. SERIAL NO: 118612

DATE: 2023-05-30

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.

ENGINEER: JOHN A. TYLER

P.E. SERIAL NO: 105193

DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

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FM 1846 (REYNOLDS ST)

**SIDEWALK PLAN**

STA 164+00 TO STA 170+00

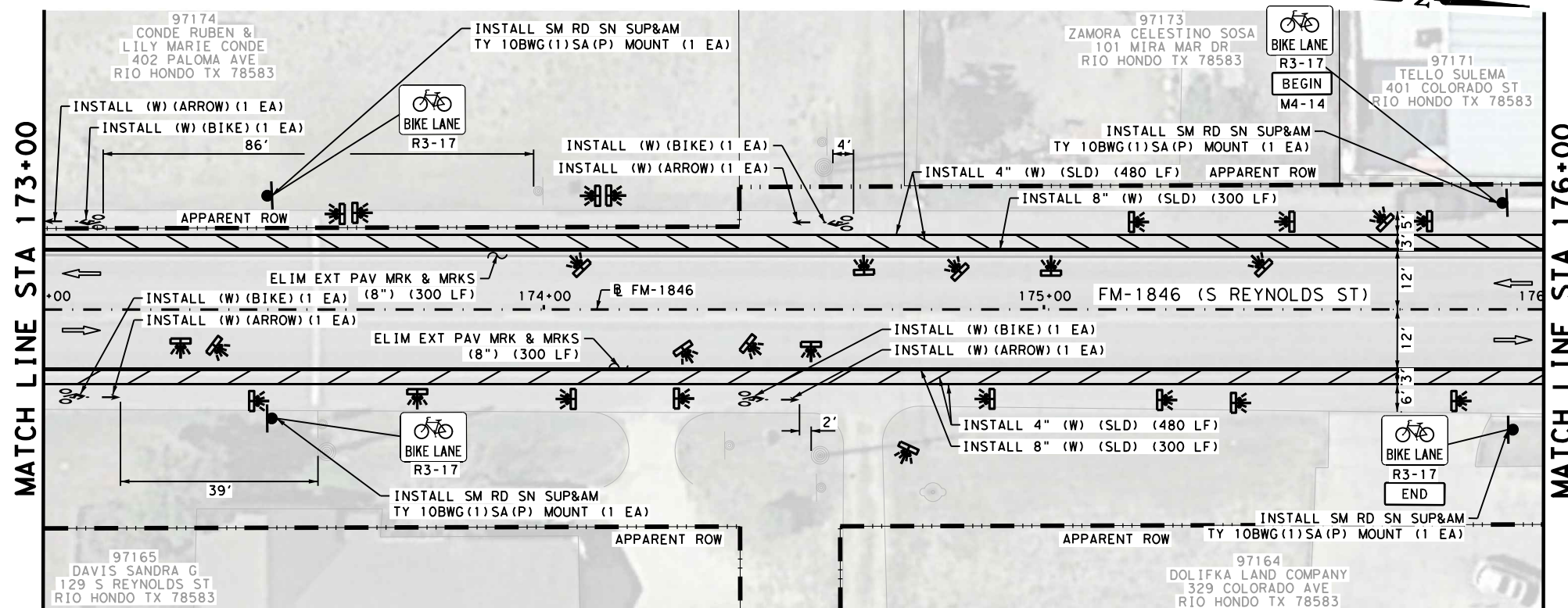
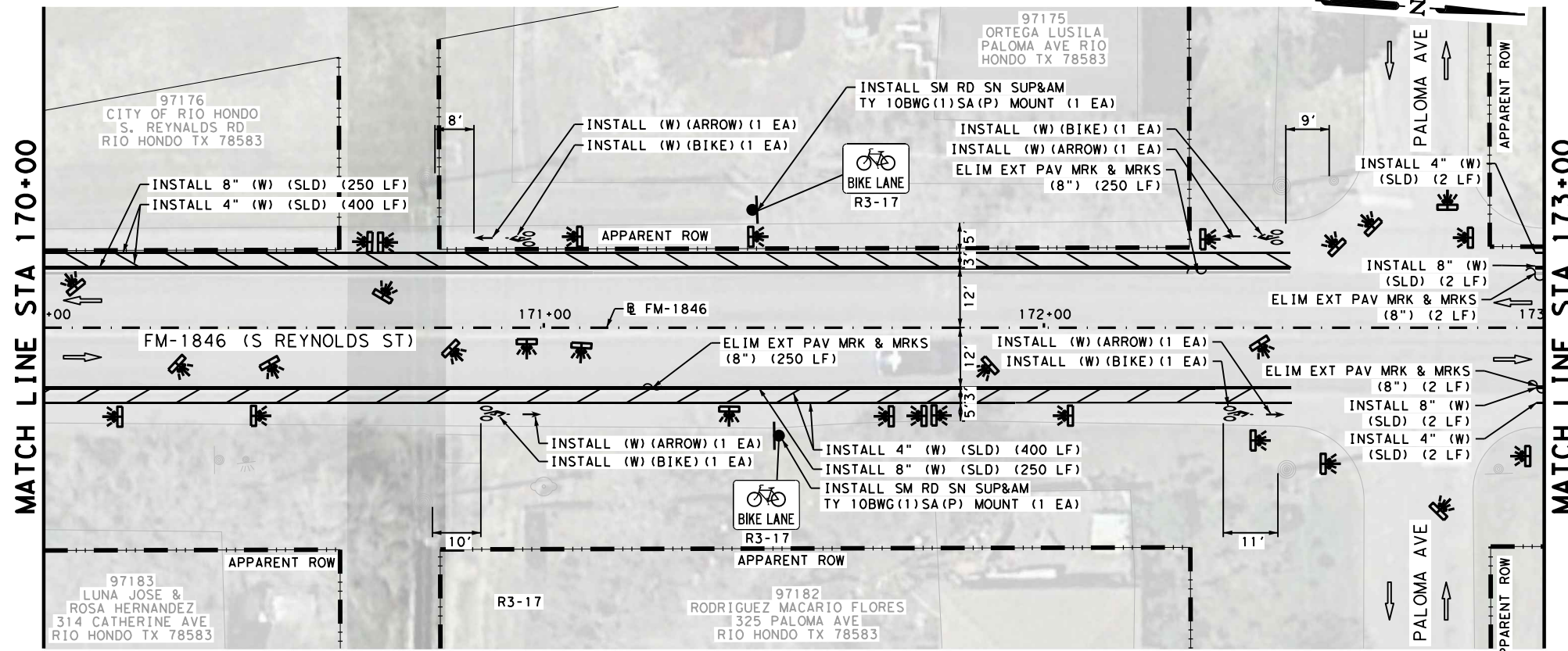
SHEET 4 OF 6

DGN#	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202)TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	46



Plotted on: 2023-05-30

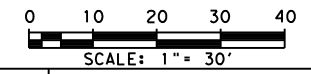
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	6
0666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1764
0666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1104
0666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	8
0666-6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	8
0666-6224	PAVEMENT SEALER 4"	LF	1764
0666-6226	PAVEMENT SEALER 8"	LF	1104
0666-6231	PAVEMENT SEALER (ARROW)	EA	8
0666-6245	PAVEMENT SEALER (BIKE SYMBOL)	EA	8
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	552
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	1104
0678-6001	PAV SURF PREP FOR MRK (4")	LF	1764
0678-6004	PAV SURF PREP FOR MRK (8")	LF	1104
0678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
0678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	8

DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation  
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FM 1846 (REYNOLDS ST)

**SIDEWALK PLAN**

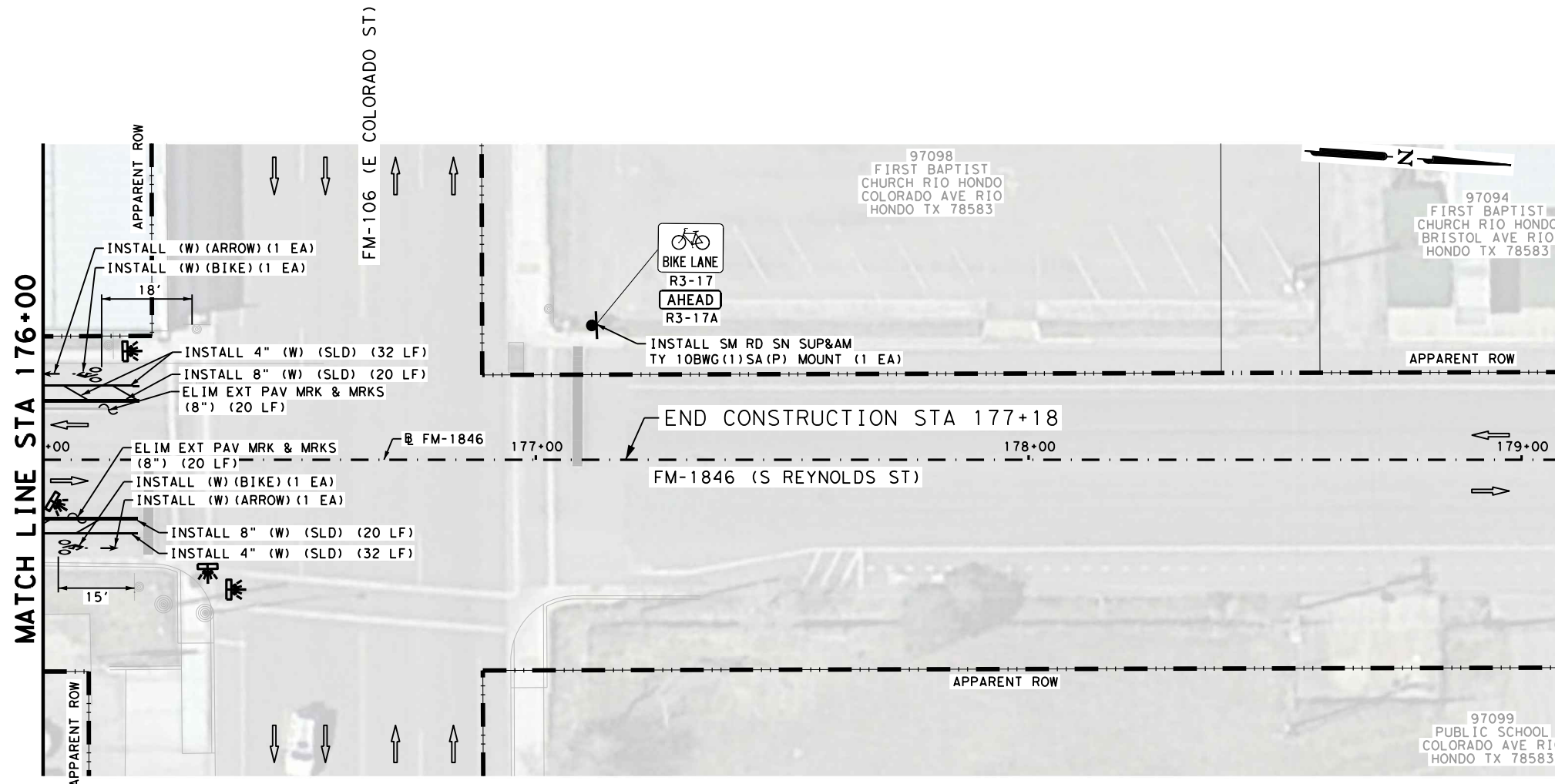
STA 170+00 TO STA 176+00

SHEET 5 OF 6

DGN#	FED. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK	6	TEXAS	STP 2B23 (202)TAPS	VA
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK	PHR	CAMERON	0921	06
DWG#			348	47

Plotted on: 2023-05-30

Design File name: S:\projects\61254\02\Design\01\_Rio\_Hondo\_ADA\civil\Roadway\1-612540201\_FM1846\_06.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
0666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	64
0666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	40
0666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	2
0666-6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	2
0666-6224	PAVEMENT SEALER 4"	LF	64
0666-6226	PAVEMENT SEALER 8"	LF	40
0666-6231	PAVEMENT SEALER (ARROW)	EA	2
0666-6245	PAVEMENT SEALER (BIKE SYMBOL)	EA	2
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	40
0678-6001	PAV SURF PREP FOR MRK (4")	LF	64
0678-6004	PAV SURF PREP FOR MRK (8")	LF	40
0678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	2
0678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	2

**DESIGN**

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.

ENGINEER: TYLER PAYNE DUBE

P.E. SERIAL NO: 118612

DATE: 2023-05-30

**APPROVAL**

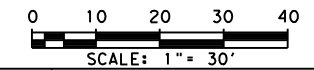
**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.

ENGINEER: JOHN A. TYLER

P.E. SERIAL NO: 105193

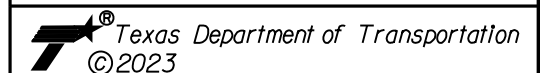
DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



FM 1846 (REYNOLDS ST)

**SIDEWALK PLAN**

STA 176+00 TO END CONSTRUCTION

SHEET 6 OF 6

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202)TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	48

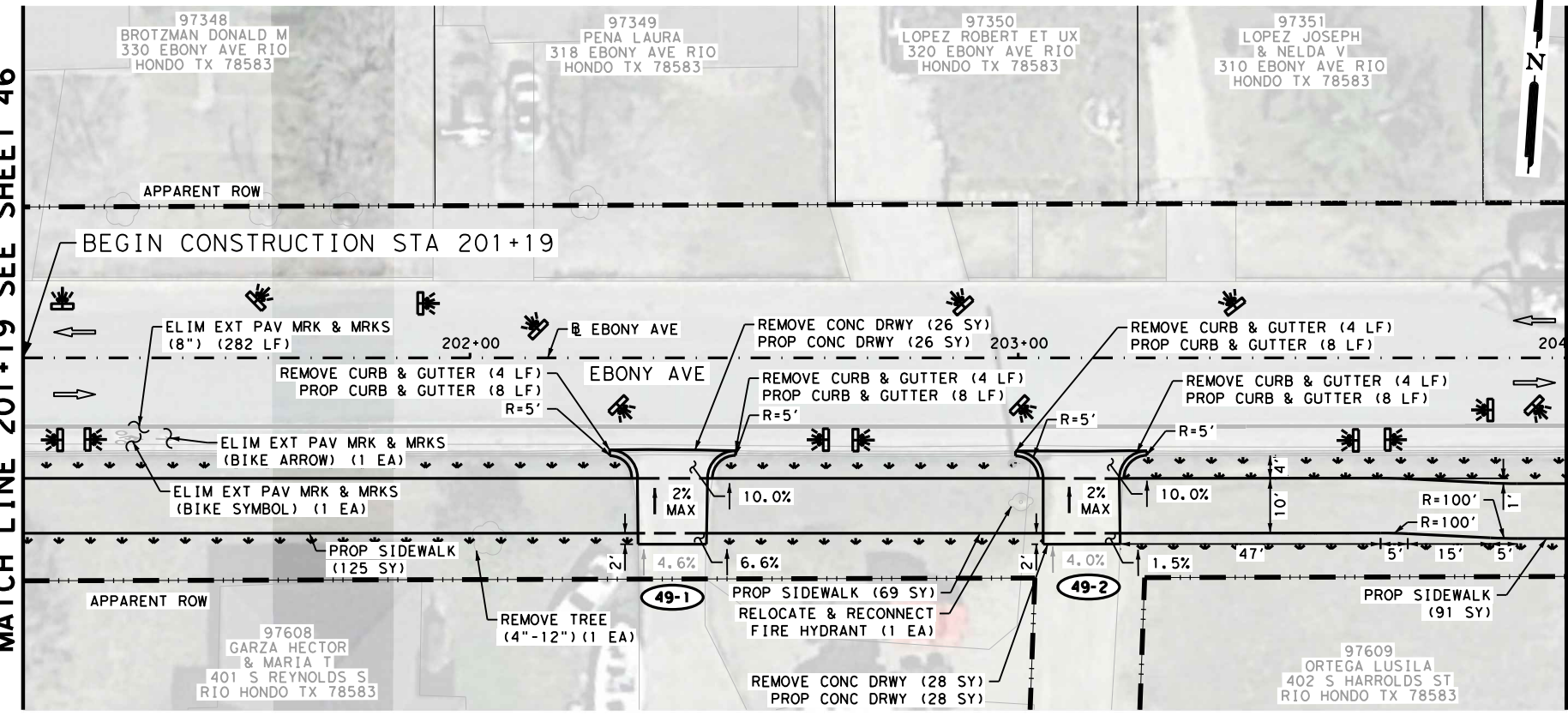


Plotted on: 2023-05-30

Design File name: S:\projects\61254\02\Design\01\_Rio\_Hondo\_ADA\civil\Roadway\2-612540201\_EBONY\_01.dgn

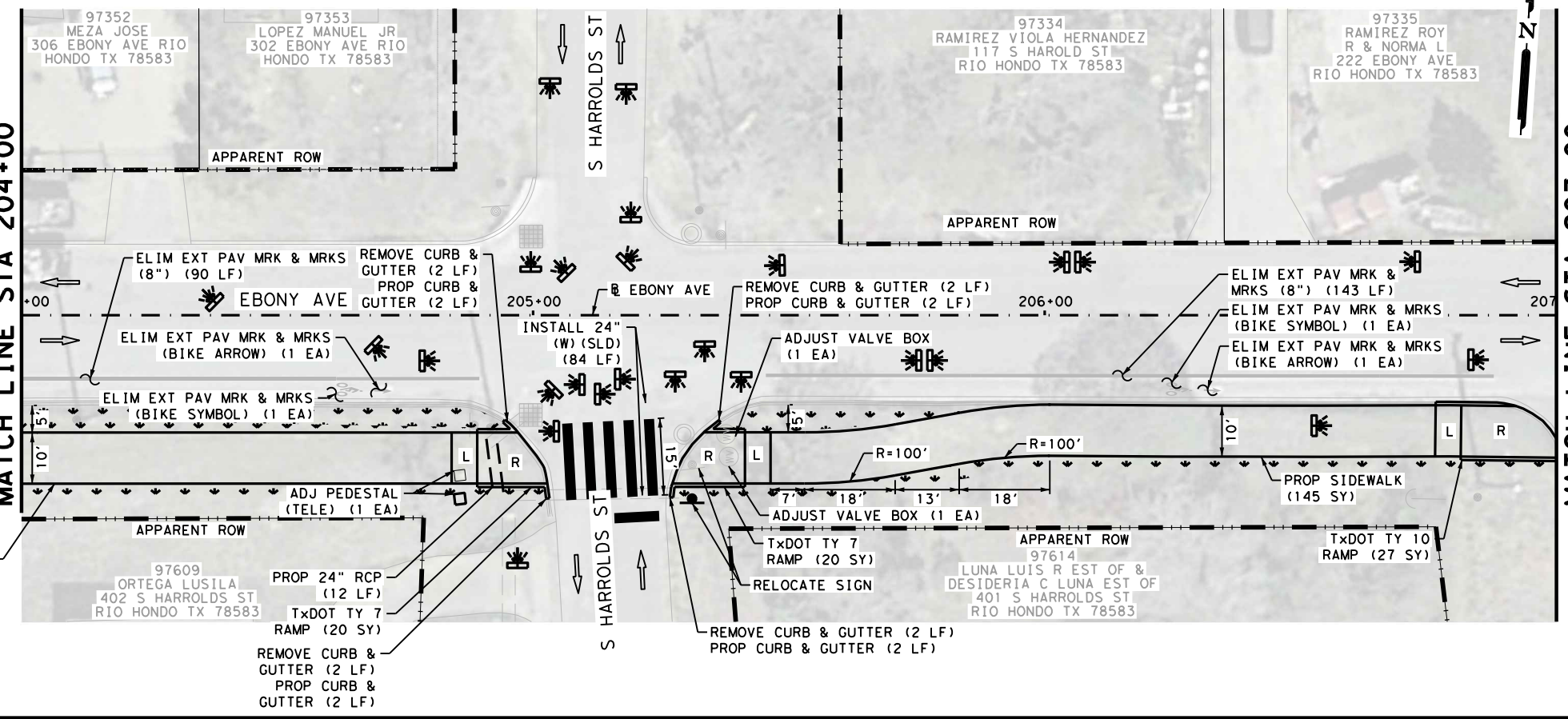
MATCH LINE 201+19 SEE SHEET 46

MATCH LINE STA 204+00



MATCH LINE STA 204+00

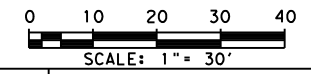
MATCH LINE STA 207+00



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	54
0104-6029	REMOVING CONC (CURB OR CURB & GUTTER)	LF	24
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	374
0162-6002	BLOCK SODDING	SY	374
0168-6001	VEGETATIVE WATERING	MG	6.3
0464-6005	RC PIPE (CL III) (24 IN)	LF	22
0479-6005	ADJUSTING MANHOLES (WATER VALVE BOX)	EA	2
0529-6008	CONC CURB & GUTTER (TY II)	LF	40
0530-6004	DRIVEWAYS (CONC)	SY	54
0531-6001	CONC SIDEWALKS (4")	SY	524
0531-6024	CURB RAMPS (TY 7)	SY	40
0531-6027	CURB RAMPS (TY 10)	SY	27
0644-6068	RELOCATE SM RD SN SUP&M TY 10BWG	EA	1
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	84
0666-6230	PAVEMENT SEALER 24"	LF	84
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	515
0677-6023	ELIM EXT PAV MRK & MARKS (BIKE ARROW)	EA	3
0677-6025	ELIM EXT PAV MRK & MARKS (BIKE SYMBOL)	EA	3
0678-6008	PAV SURF PREP FOR MRK (24")	LF	84
0752-6005	TREE REMOVAL (4" - 12" DIA)	EA	1
6444-6045	ADJUST PEDESTALS (TELE)	EA	1

DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

Texas Department of Transportation  
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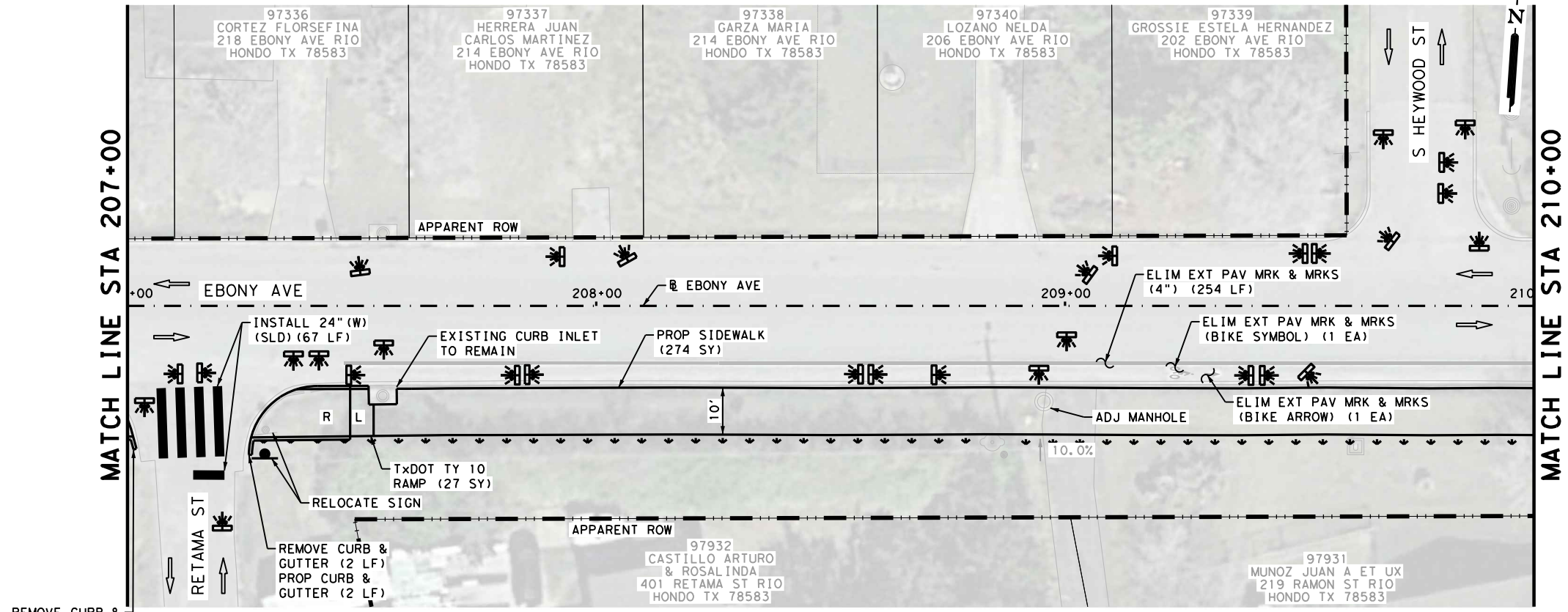
EBONY AVE  
**SIDEWALK PLAN**  
 STA 201+19 TO STA 207+00  
 SHEET 1 OF 3

DGN#	FED. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202)TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	49

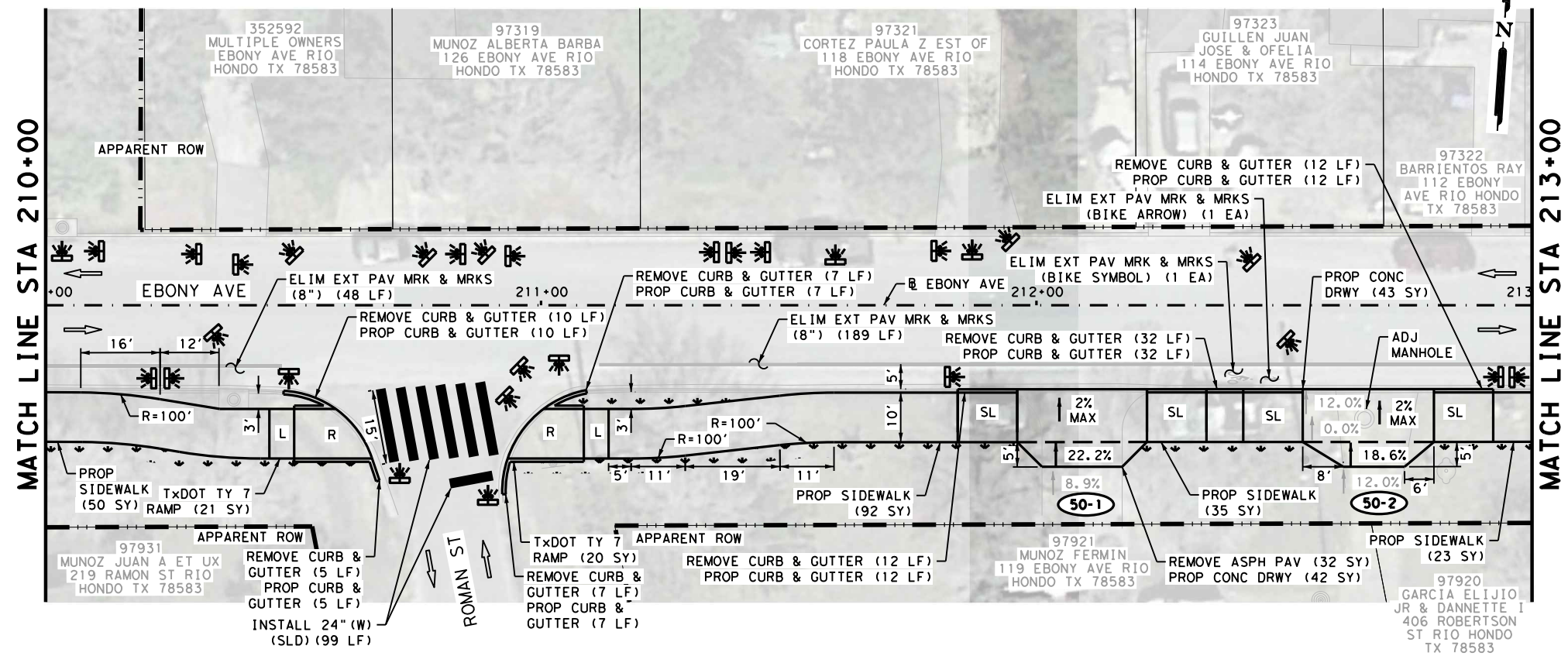
Plotted on: 2023-05-30

Design File name: S:\projects\6125402\Design\01\_Rio\_Hondo\_ADA\Civil\Roadway\2-612540201\_EBONY\_02.dgn

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0104-6029	REMOVING CONC (CURB OR CURB & GUTTER)	LF	89
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	175
0162-6002	BLOCK SODDING	SY	175
0168-6001	VEGETATIVE WATERING	MG	3.0
0479-6001	ADJUSTING MANHOLES	EA	2
0529-6008	CONC CURB & GUTTER (TY 11)	LF	89
0530-6004	DRIVEWAYS (CONC)	SY	85
0531-6001	CONC SIDEWALKS (4")	SY	474
0531-6024	CURB RAMPS (TY 7)	SY	41
0531-6027	CURB RAMPS (TY 10)	SY	27
0644-6068	RELOCATE SM RD SN SUP&M TY 10BWG	EA	1
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	166
0666-6230	PAVEMENT SEALER 24"	LF	166
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	491
0677-6023	ELIM EXT PAV MRK & MARKS (BIKE ARROW)	EA	2
0677-6025	ELIM EXT PAV MRK & MARKS (BIKE SYMBOL)	EA	2
0678-6008	PAV SURF PREP FOR MRK (24")	LF	166



REMOVE CURB & GUTTER (2 LF)  
PROP CURB & GUTTER (2 LF)



DESIGN  
**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: TYLER PAYNE DUBE  
P.E. SERIAL NO: 118612  
DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: JOHN A. TYLER  
P.E. SERIAL NO: 105193  
DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

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EBONY AVE  
**SIDEWALK PLAN**  
STA 207+00 TO STA 213+00  
SHEET 2 OF 3

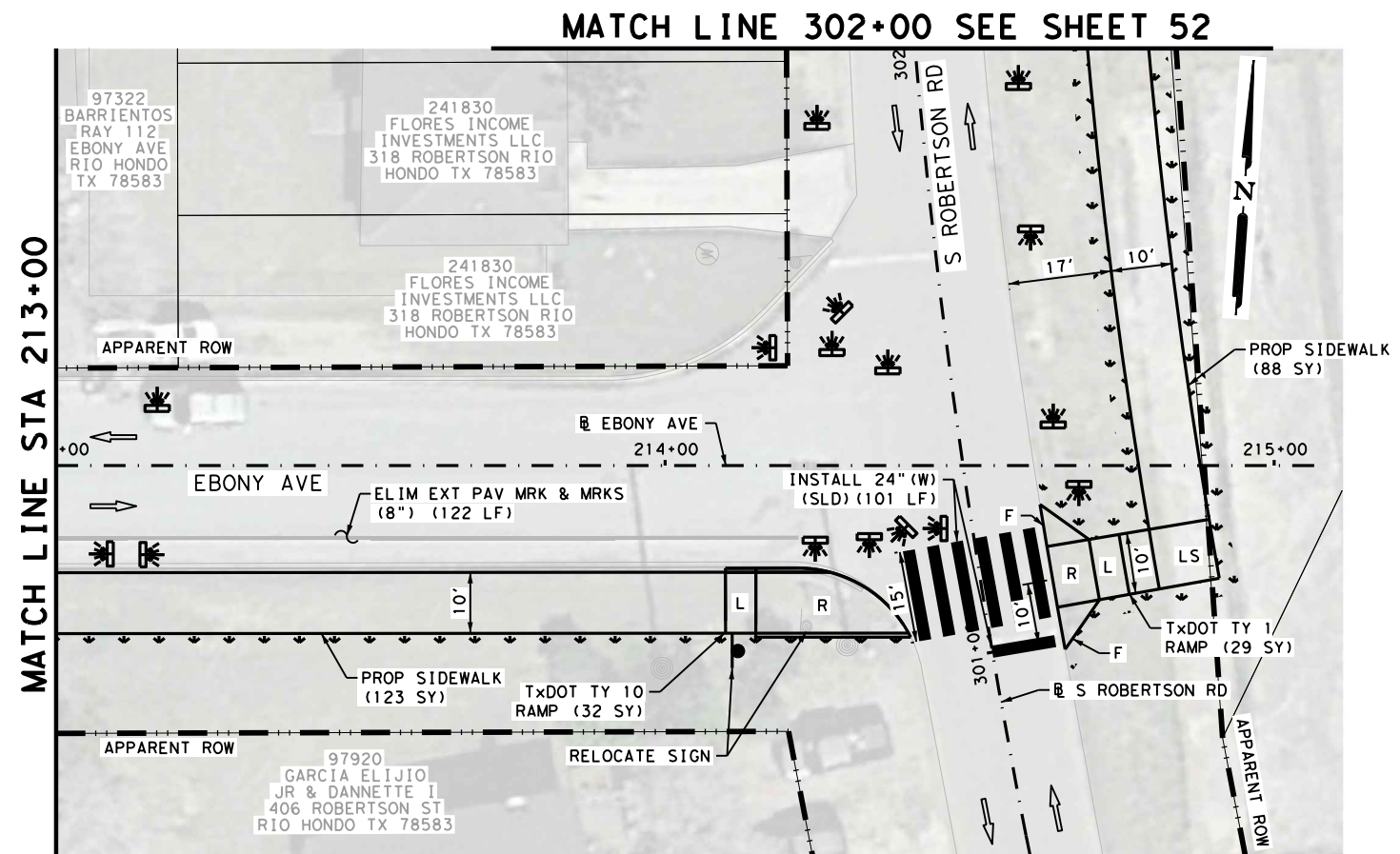
DGN#	FED. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202)TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	50



Plotted on: 2023-05-30

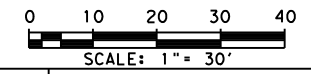
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	134
0162-6002	BLOCK SODDING	SY	134
0168-6001	VEGETATIVE WATERING	MG	2.3
0529-6008	CONC CURB & GUTTER (TY II)	LF	6
0531-6001	CONC SIDEWALKS (4")	SY	211
0531-6023	CURB RAMPS (TY 6)	SY	29
0531-6027	CURB RAMPS (TY 10)	SY	32
0644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	1
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	101
0666-6230	PAVEMENT SEALER 24"	LF	101
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	122
0678-6008	PAV SURF PREP FOR MRK (24")	LF	101



DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



EBONY AVE  
**SIDEWALK PLAN**

STA 213+00 TO STA 302+00

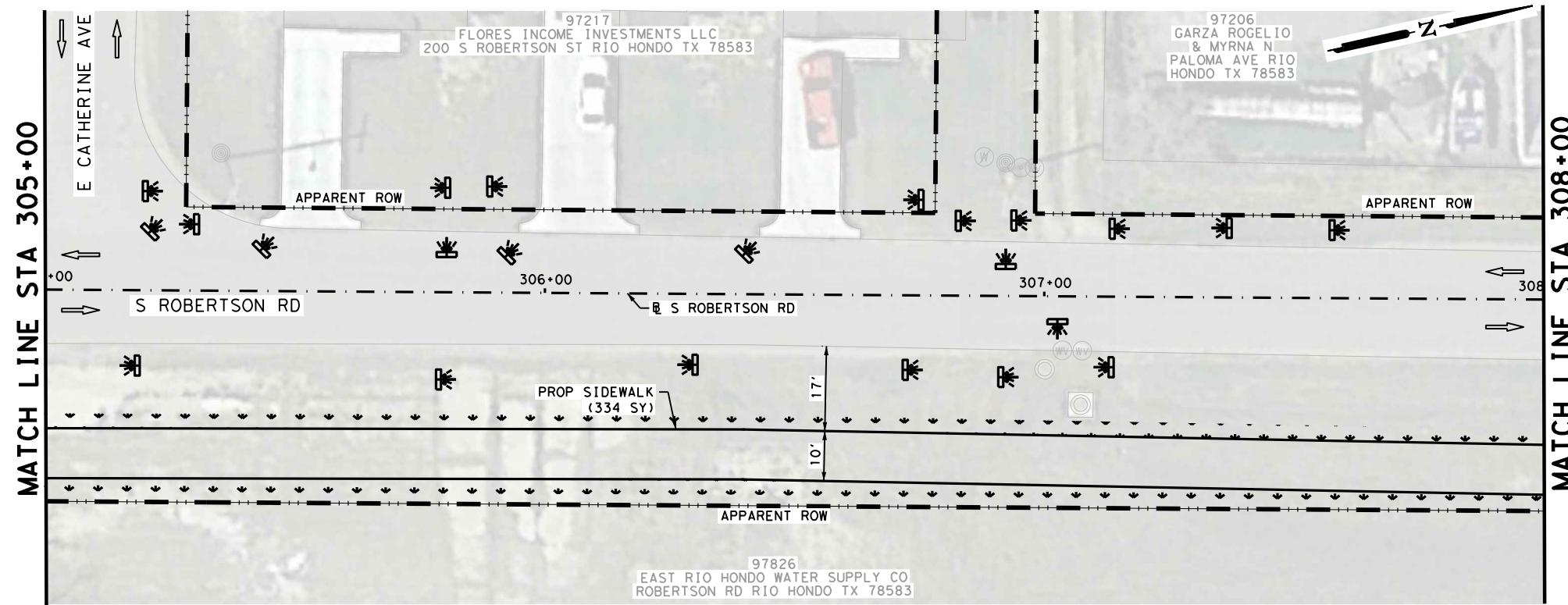
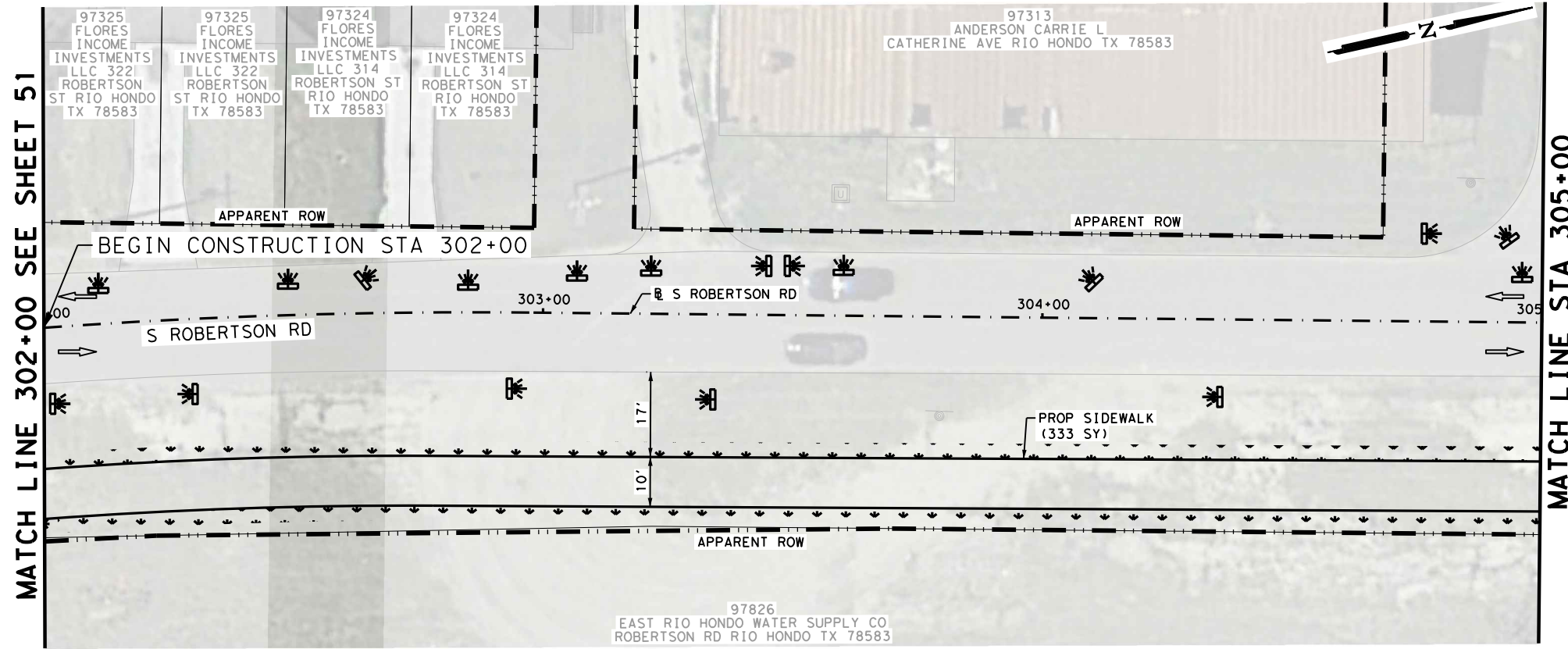
SHEET 3 OF 3

DGN#	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	PHR	CAMERON	0921	06	348	51

Plotted on: 2023-05-30

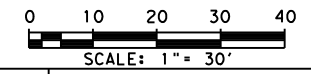
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	200
0162-6002	BLOCK SODDING	SY	200
0168-6001	VEGETATIVE WATERING	MG	3.4
0531-6001	CONC SIDEWALKS (4")	SY	667



DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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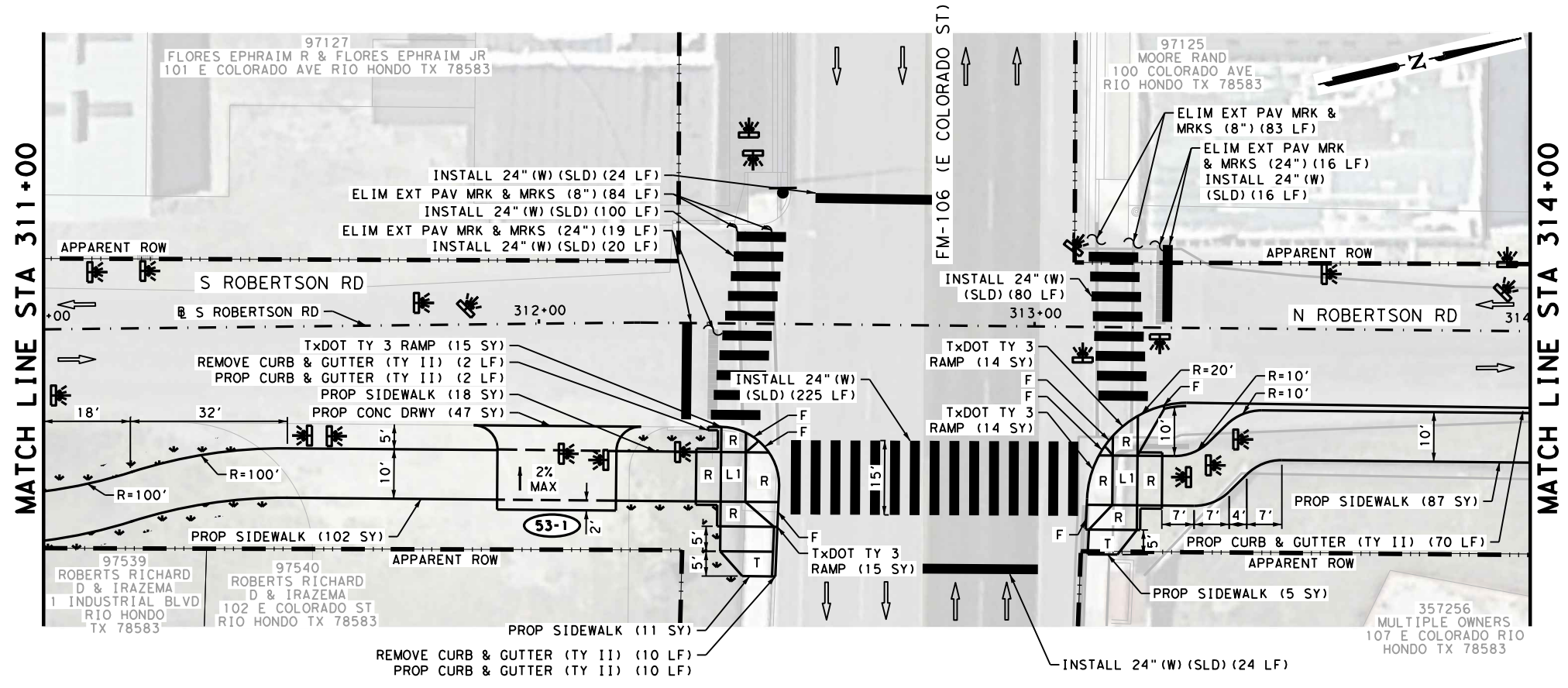
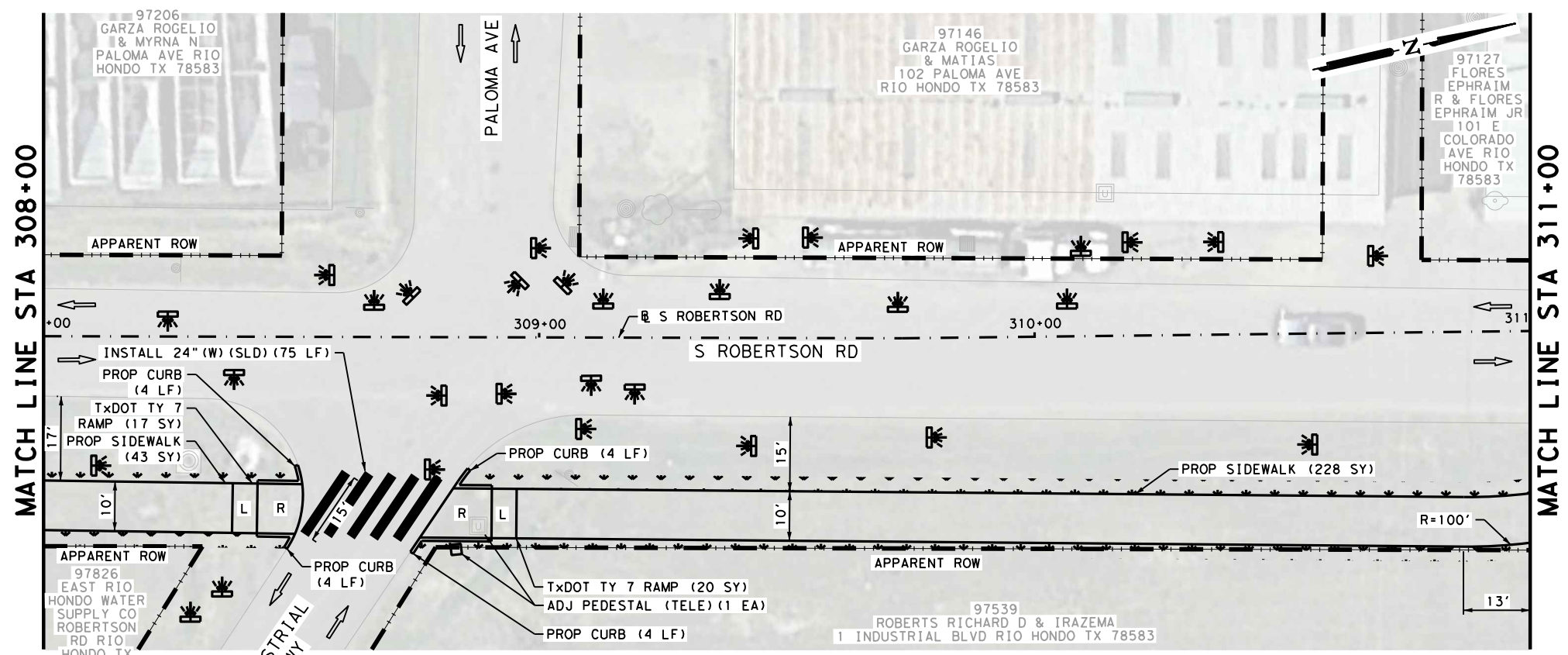
S ROBERTSON RD  
**SIDEWALK PLAN**  
 STA 302+00 TO STA 308+00  
 SHEET 1 OF 8

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	52



Plotted on: 2023-05-30

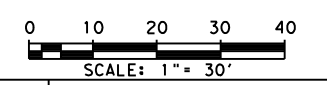
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0104-6029	REMOVING CONC (CURB OR CURB & GUTTER)	LF	12
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	280
0162-6002	BLOCK SODDING	SY	280
0168-6001	VEGETATIVE WATERING	MG	4.8
0529-6002	CONC CURB (TY II)	LF	16
0529-6008	CONC CURB & GUTTER (TY II)	LF	82
0530-6004	DRIVEWAYS (CONC)	SY	47
0531-6001	CONC SIDEWALKS (4")	SY	494
0531-6020	CURB RAMPS (TY 3)	SY	58
0531-6024	CURB RAMPS (TY 7)	SY	37
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	554
0666-6230	PAVEMENT SEALER 24"	LF	554
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	167
0677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	35
0678-6008	PAV SURF PREP FOR MRK (24")	LF	554
6444-6045	ADJUST PEDESTALS (TELE)	EA	1

DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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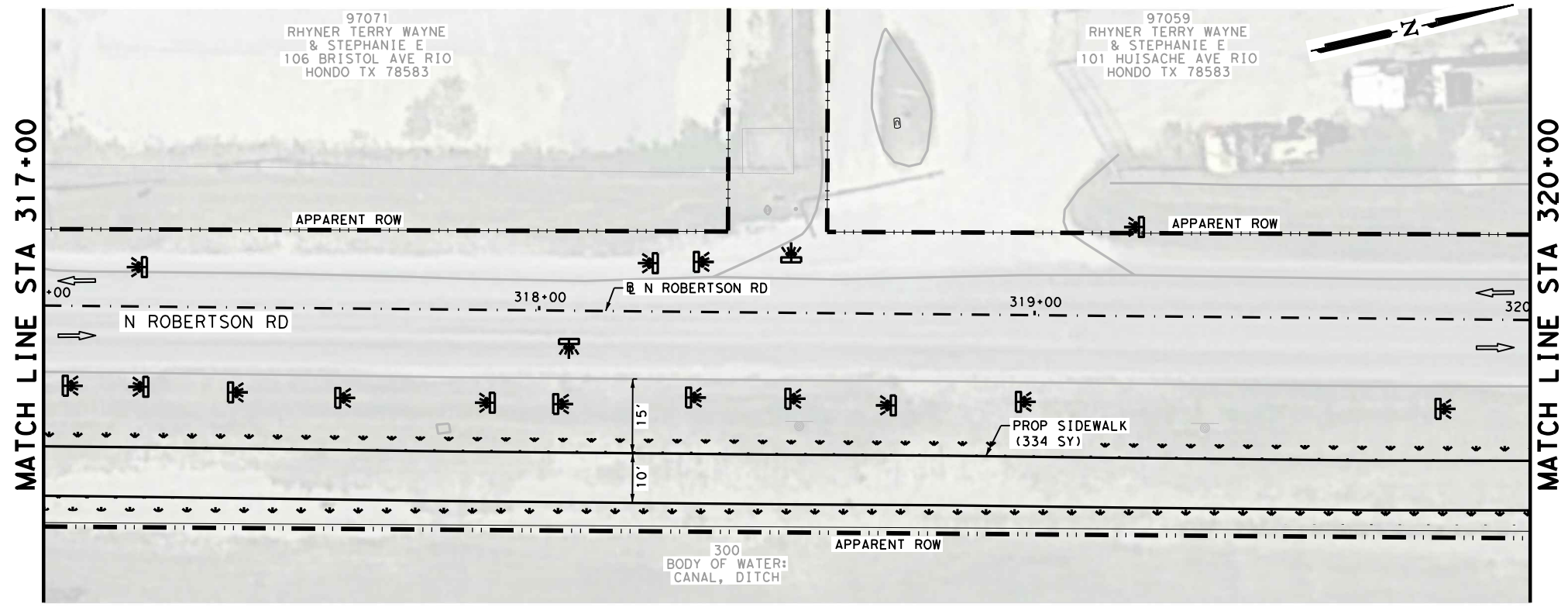
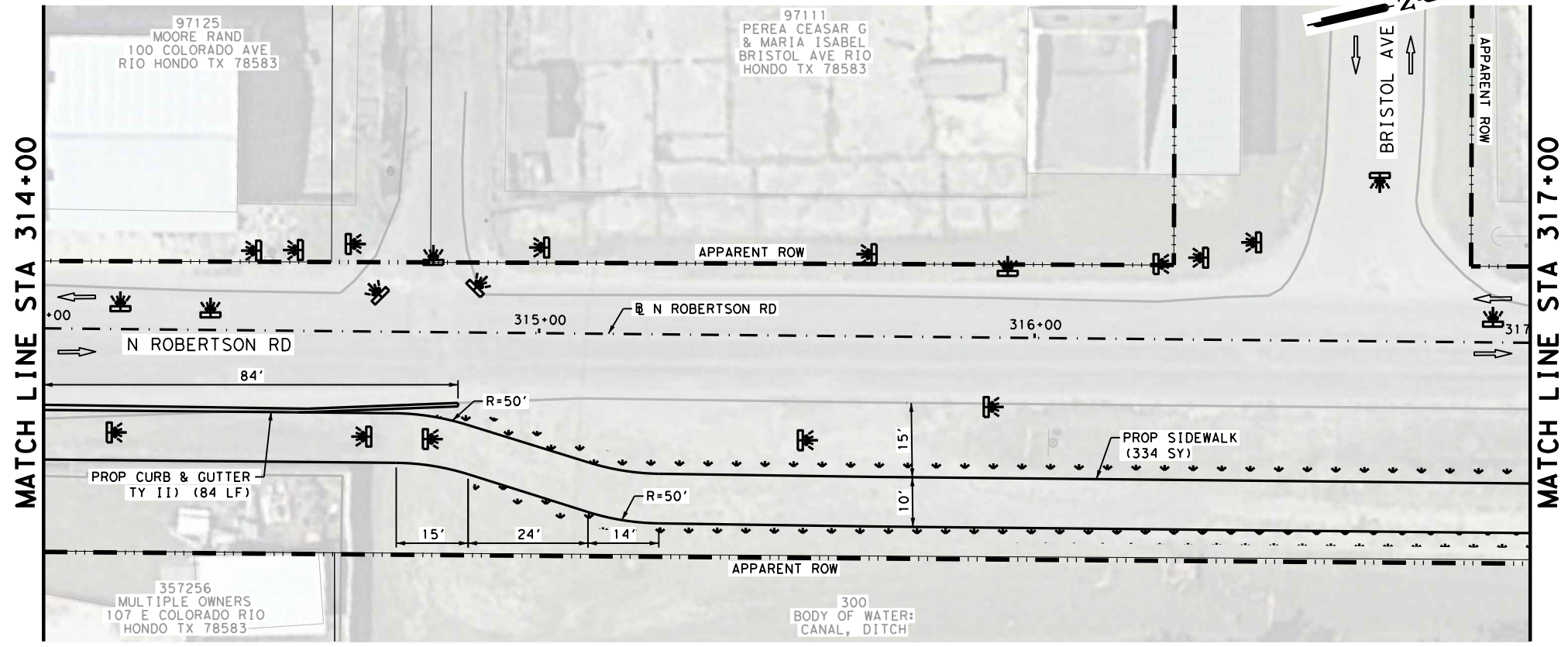
S ROBERTSON RD  
**SIDEWALK PLAN**  
 STA 308+00 TO STA 314+00  
 SHEET 2 OF 8

DGN#	FED. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHG	6	TEXAS	STP 2B23 (202) TAPS	VA		
DGN#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHG	PHR	CAMERON	0921	06	348	53

Plotted on: 2023-05-30

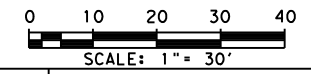
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	318
0162-6002	BLOCK SODDING	SY	318
0168-6001	VEGETATIVE WATERING	MG	5.4
0529-6008	CONC CURB & GUTTER (TY II)	LF	84
0531-6001	CONC SIDEWALKS (4")	SY	668



DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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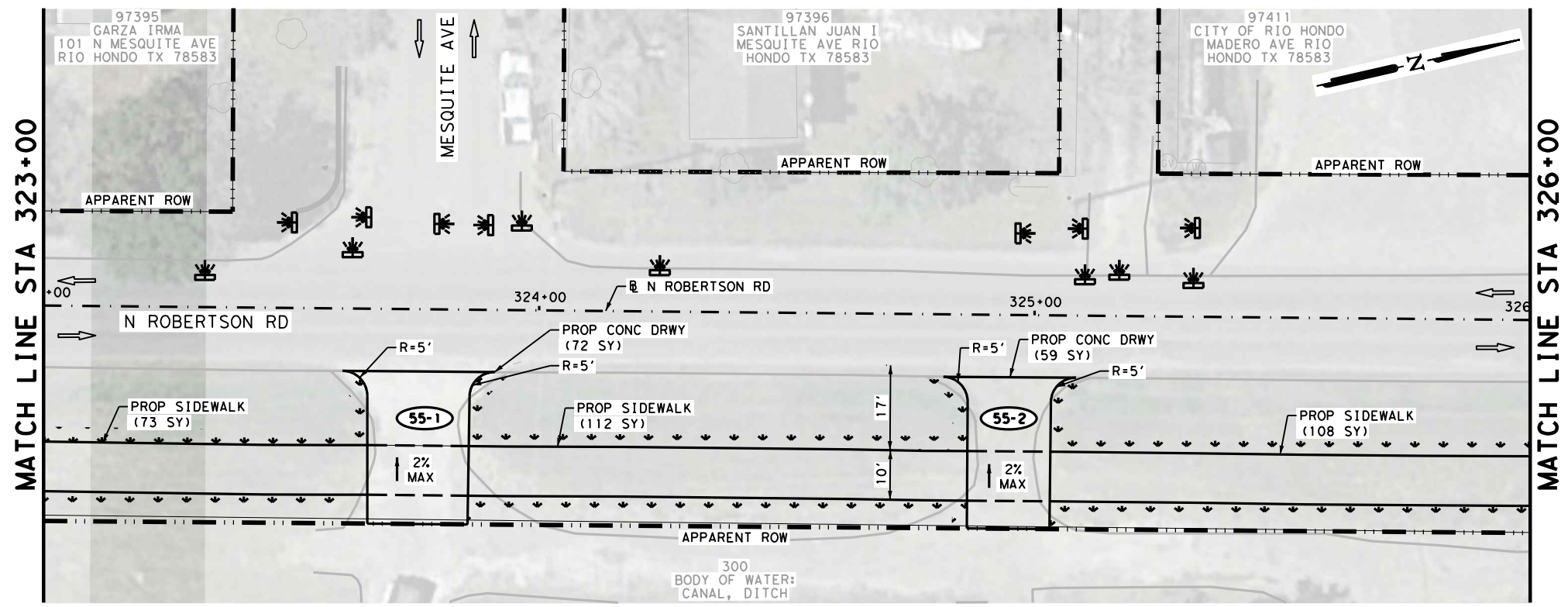
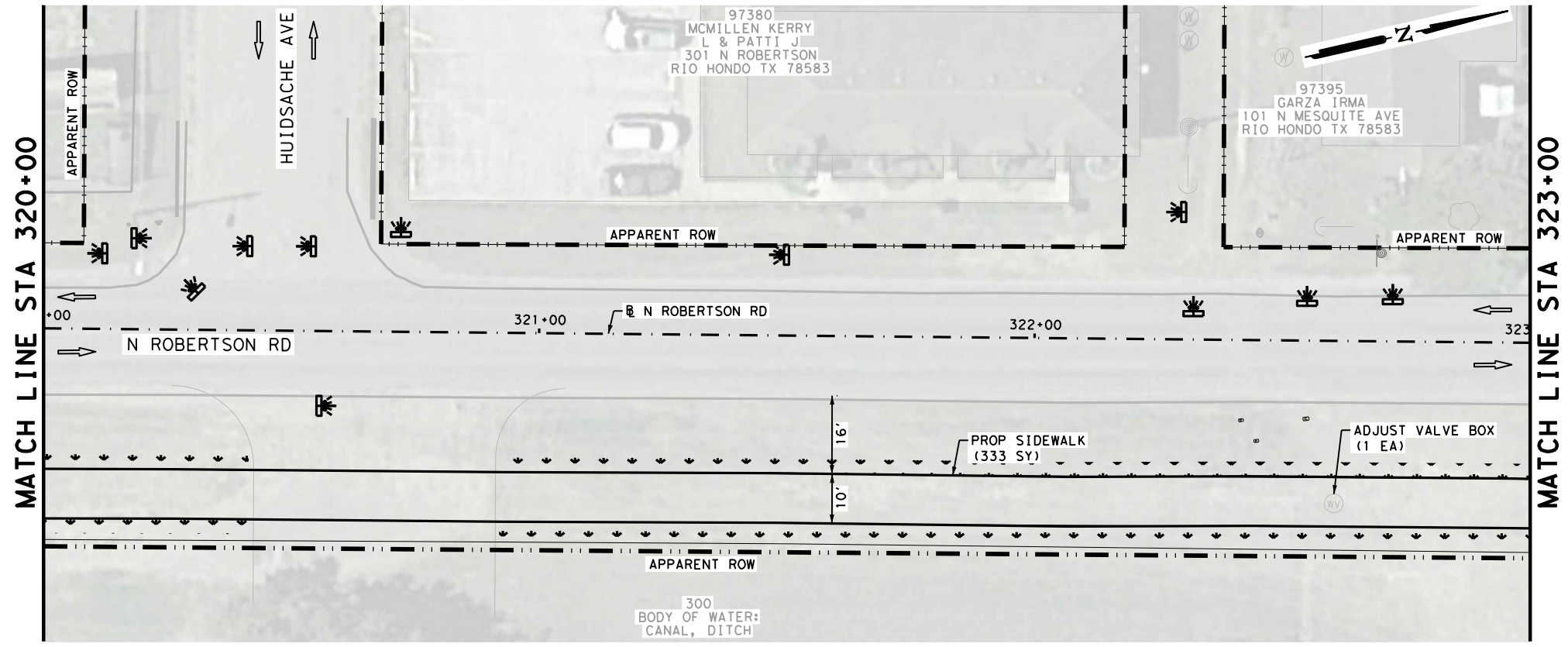
N ROBERTSON RD  
**SIDEWALK PLAN**  
 STA 314+00 TO STA 320+00  
 SHEET 3 OF 8

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	PHR	CAMERON	0921	06	348	54



Plotted on: 2023-05-30

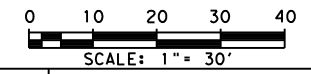
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	172
0162-6002	BLOCK SODDING	SY	172
0168-6001	VEGETATIVE WATERING	MG	2.9
0530-6004	DRIVEWAYS (CONC)	SY	131
0531-6001	CONC SIDEWALKS (4")	SY	626

DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
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 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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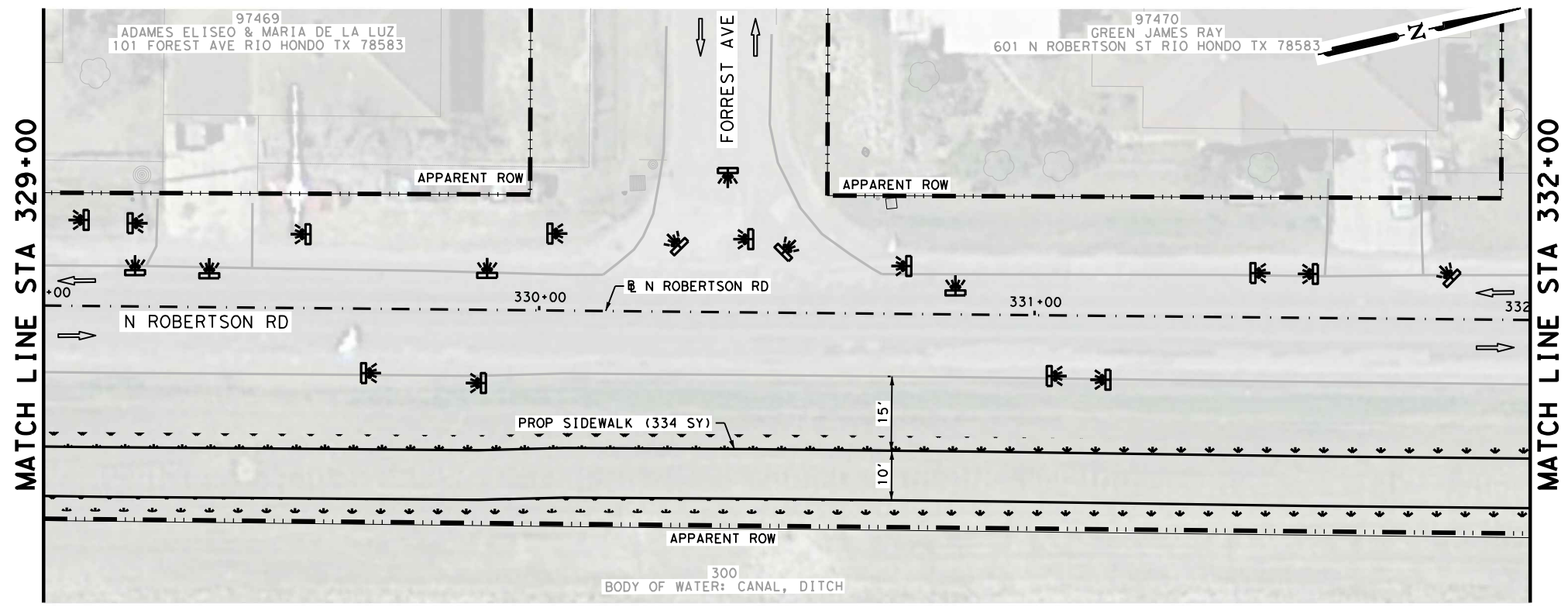
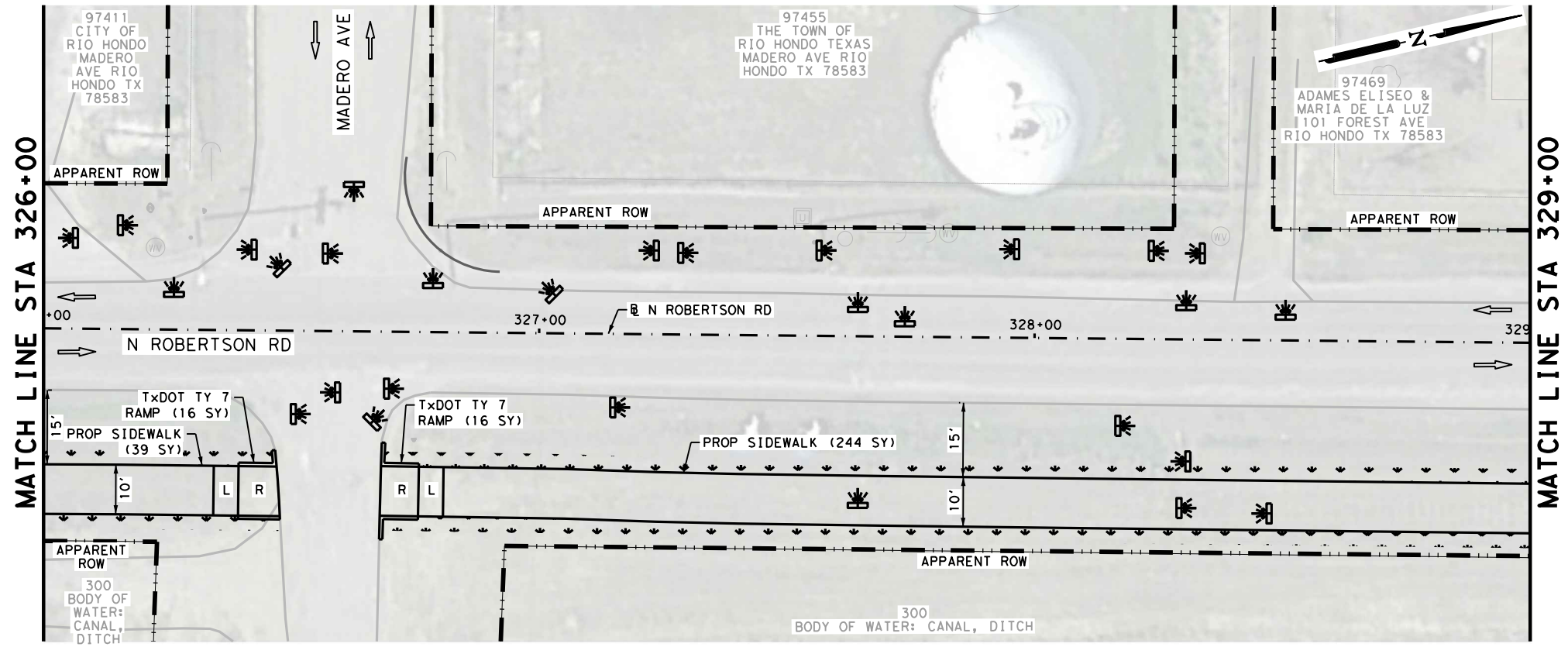
N ROBERTSON RD  
**SIDEWALK PLAN**  
 STA 320+00 TO STA 326+00  
 SHEET 4 OF 8

DGN:	FED. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	PHR	CAMERON	0921	06	348	55

Plotted on: 2023-05-30

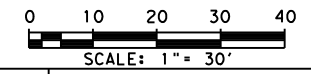
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	385
0162-6002	BLOCK SODDING	SY	385
0168-6001	VEGETATIVE WATERING	MG	6.5
0531-6001	CONC SIDEWALKS (4")	SY	617
0531-6024	CURB RAMPS (TY 7)	SY	32



DESIGN  
**INTERIM REVIEW**  
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 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson ENGINEERS**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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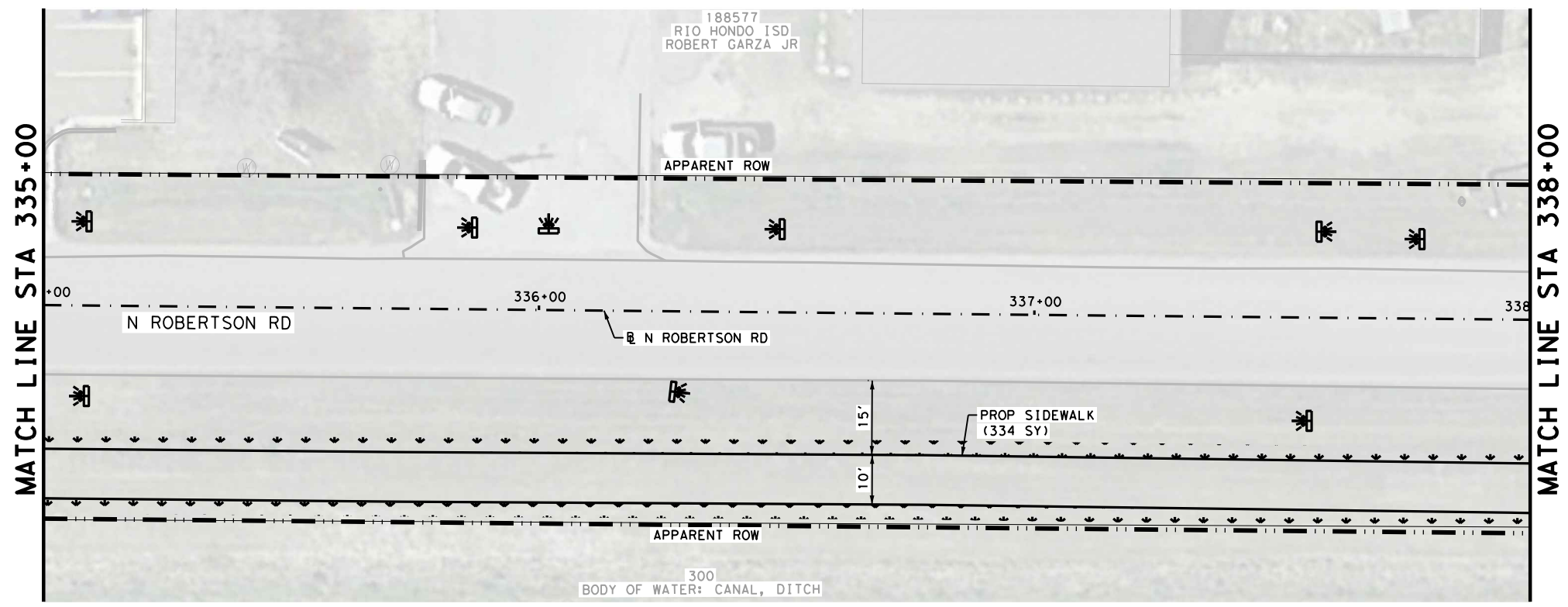
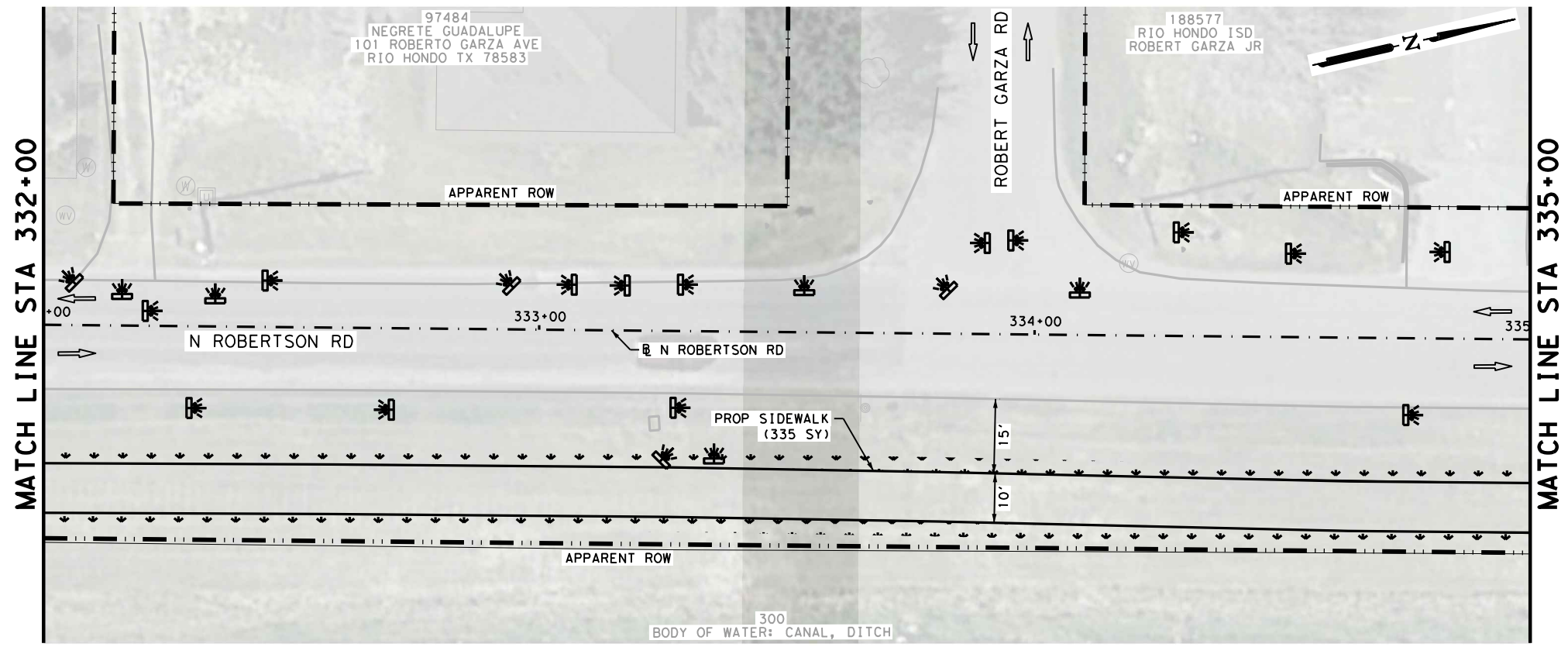
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**SIDEWALK PLAN**  
 STA 326+00 TO STA 332+00  
 SHEET 5 OF 8

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	56

Plotted on: 2023-05-30

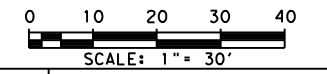
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ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	400
0162-6002	BLOCK SODDING	SY	400
0168-6001	VEGETATIVE WATERING	MG	6.8
0531-6001	CONC SIDEWALKS (4")	SY	669



DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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N ROBERTSON RD  
**SIDEWALK PLAN**  
 STA 332+00 TO STA 338+00  
 SHEET 6 OF 8

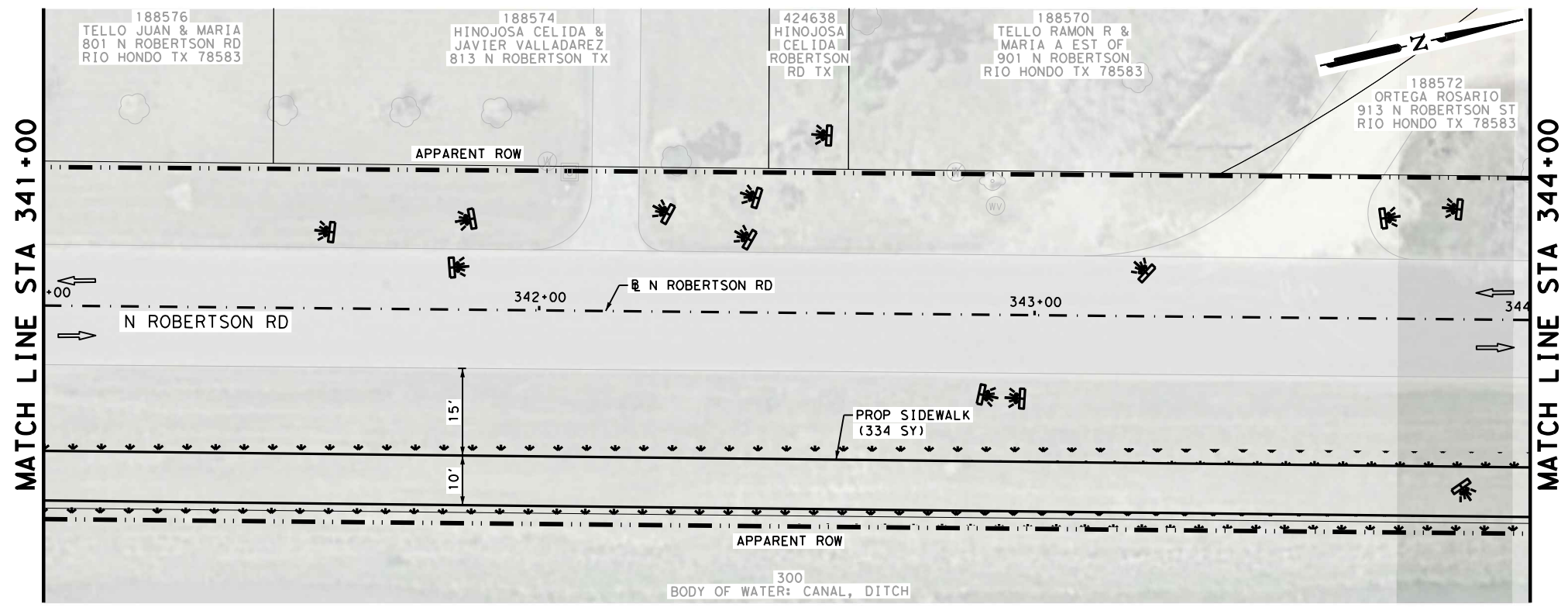
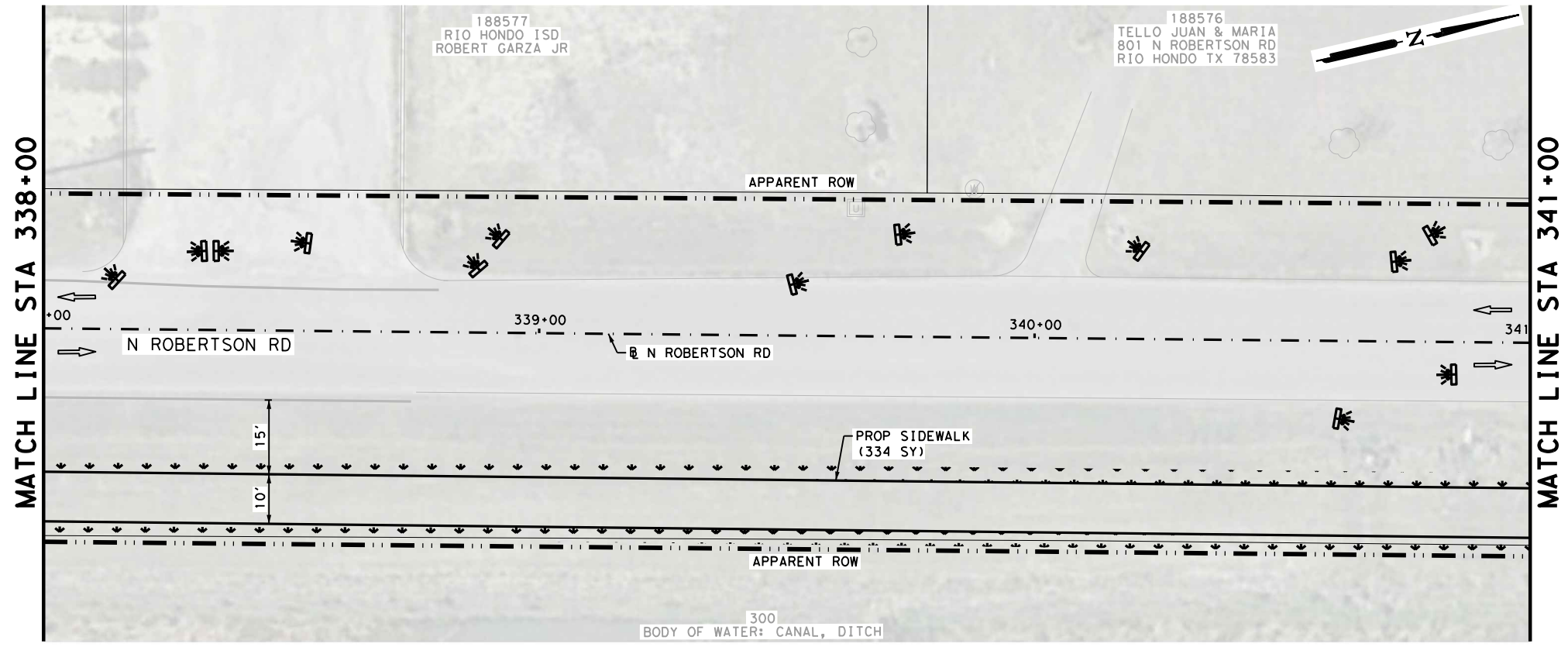
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CHK	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	PHR	CAMERON	0921	06	348	57



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	400
0162-6002	BLOCK SODDING	SY	400
0168-6001	VEGETATIVE WATERING	MG	6.8
0531-6001	CONC SIDEWALKS (4")	SY	668

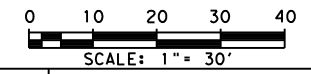
Plotted on: 2023-05-30

Design File name: S:\projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\civil\Roadway\3-612540201\_ROBERTSON\_07.dgn



DESIGN  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

APPROVAL  
**INTERIM REVIEW**  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**PAPE-DAWSON ENGINEERS**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

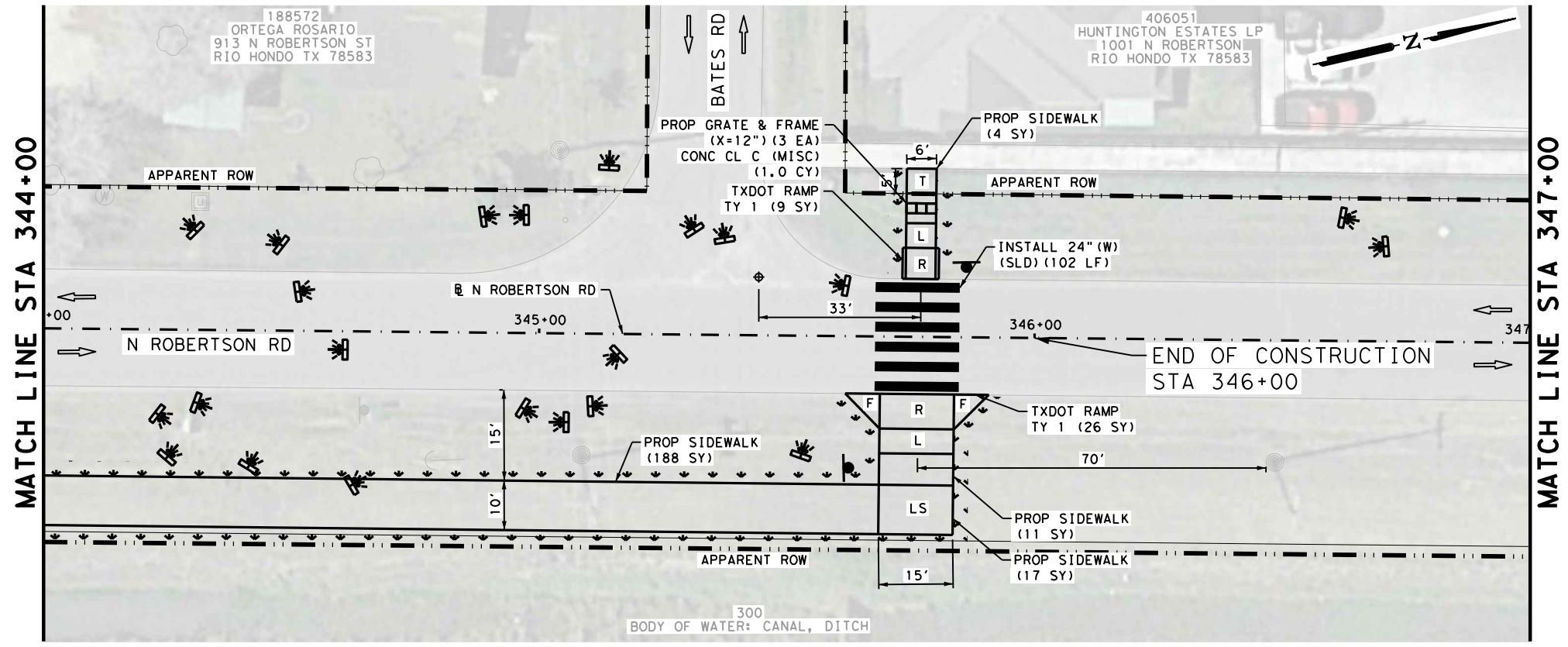
Texas Department of Transportation  
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N ROBERTSON RD  
**SIDEWALK PLAN**  
 STA 338+00 TO STA 344+00  
 SHEET 7 OF 8

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	58

Plotted on: 2023-05-30

Design File name: S:\projects\61254\02\Design\01\_Rio\_Hondo\ADA\civil\Roadway\3-612540201\_ROBERTSON\_08.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.00
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	124
0162-6002	BLOCK SODDING	SY	124
0168-6001	VEGETATIVE WATERING	MG	2.1
0420-6074	CL C CONC (MISC)	CY	1.0
0471-6003	GRATE & FRAME	EA	3
0531-6001	CONC SIDEWALKS (4")	SY	220
0531-6018	CURB RAMPS (TY 1)	SY	35
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	102
0666-6230	PAVEMENT SEALER 24"	LF	102
0678-6008	PAV SURF PREP FOR MRK (24")	LF	102

**DESIGN**

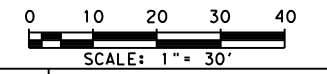
**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

**APPROVAL**

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30



REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



N ROBERTSON RD

**SIDEWALK PLAN**

STA 344+00 TO STA 350+00

SHEET 8 OF 8

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	59

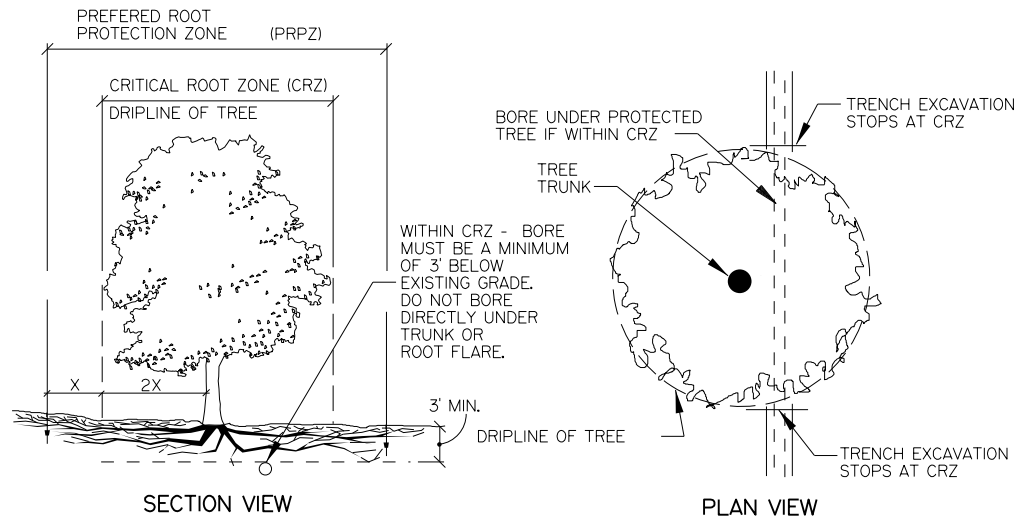
**GENERAL NOTES FOR TREE PROTECTION**

1. PROTECT AND INSURE THE CONTINUED GOOD HEALTH OF EXISTING TREES IDENTIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER. PRESERVE ALL EXISTING VEGETATION WITHIN THE PREFERRED ROOT PROTECTION ZONE.
2. SECURE THE SERVICES OF A TREE CARE SPECIALIST TO PERFORM OR OVERSEE ANY OPERATION INVOLVING LIMB PRUNING, ROOT PRUNING, CHEMICAL APPLICATION, OR ASSESSMENT OF THE CONDITION OF TREES OR EFFECTS OF CONSTRUCTION ON TREES DESIGNATED FOR PROTECTION.
3. WITHIN THE PREFERRED ROOT PROTECTION ZONE, NONE OF THE FOLLOWING ACTIVITIES ARE ALLOWED:

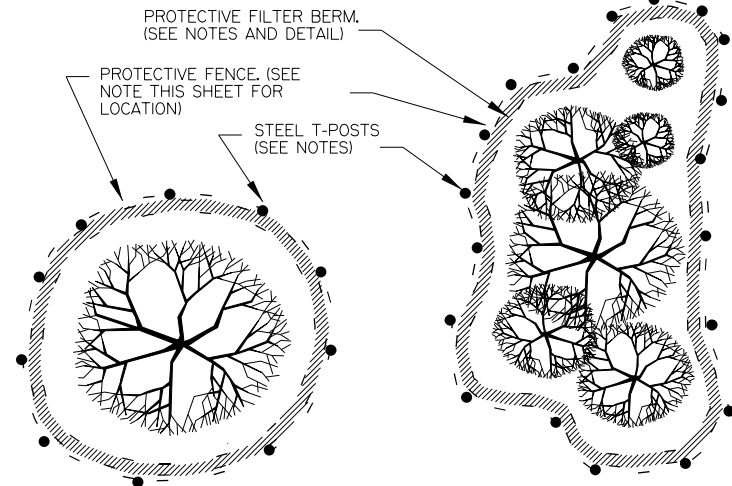
PARKING OF ANY VEHICLES; ERECTION OF ANY SHED OR STRUCTURE; STORAGE OF ANY EQUIPMENT OR MATERIALS; USE BY PEOPLE FOR ANY REASON; DUMPING OF ANY LITTER, WASTE MATERIALS, OR LIQUIDS; IMPOUNDMENT OF WATER; ADDITION OF FILL-SOIL; EXCAVATION, BORING, OR TRENCHING OF ANY TYPE

**DEFINITIONS**

1. DRIPLINE - THE LINE ON THE GROUND DIRECTLY BELOW THE OUTER TIPS OR ENDS OF THE TREE LIMBS.
2. CRITICAL ROOT ZONE (CRZ) - THE GROUND AREA EXTENDING OUT FROM THE TREE TRUNK TO THE DRIPLINE.
3. PREFERRED ROOT PROTECTION ZONE (PRPZ) - THE GROUND AREA EXTENDING OUT FROM THE TREE TRUNK A DISTANCE EQUAL TO ONE AND ONE HALF OF THE DISTANCE FROM THE TRUNK TO THE DRIPLINE.
4. TREE CARE SPECIALIST - CERTIFIED ARBORIST OR PROFESSIONAL URBAN FORESTER.
5. O.C. - ON CENTER



TRENCHING PAST TREES



PLAN VIEW OF FENCING LAYOUT

**CONSTRUCTION METHODS**

1. PRIOR TO THE START OF CONSTRUCTION, MARK ALL TREES OR OTHER FEATURES INDICATED ON THE PLANS TO BE PROTECTED WITH YELLOW FLAGGING FOR APPROVAL BY THE ENGINEER.
2. PRIOR TO CONSTRUCTION, PRUNE PROTECTED TREES AS FOLLOWS:
  - A. REMOVE ANY DISEASED OR DEAD LIMBS AND CORRECT ANY PREVIOUS IMPROPER PRUNING
  - B. REMOVE LIMBS FOR NECESSARY EQUIPMENT ACCESS (AS APPROVED BY THE ENGINEER).
  - C. REMOVE LIMBS THAT WILL BE WITHIN TWENTY FEET (20) VERTICAL CLEARANCE OF VEHICLE TRAVEL LANES.
  - D. REMOVE LIMBS THAT WILL BE WITHIN TEN FEET (10) VERTICAL CLEARANCE OF PEDESTRIAN AREAS.
3. PERFORM PRUNING USING ONLY TOOLS SPECIFICALLY DESIGNED FOR THE JOB AND IN ACCORDANCE WITH ANSI A300 PRUNING STANDARD. PRUNED MATERIAL BECOMES THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF OFF-SITE.
4. ERECT PROTECTIVE FENCING AT ALL TREES, GROUPS OF TREES, OR OTHER FEATURES AS SHOWN ON THE PLANS, OR DESIGNATED BY THE ENGINEER, OR OTHERWISE INDICATED FOR PROTECTION.
5. ERECT PROTECTIVE FENCING FOR TREES AT THE EDGE OF THE PRPZ. PLACE FENCING IN OTHER LOCATIONS ONLY WITH THE APPROVAL OF THE ENGINEER. THE FENCE MATERIAL SHALL BE CHAIN-LINK FENCE.
  - A. CHAIN-LINK FENCING SHALL BE SIX-FOOT (6) IN HEIGHT AND SUPPORTED BY EIGHT-FOOT (8) STEEL T-POSTS SPACED SIX FEET (6) O.C., DRIVEN A MINIMUM OF 20" INTO EXISTING GRADE.
  - B. THE FENCING SHALL BE CONTINUOUS BETWEEN POSTS AND SHALL BE FIRMLY ATTACHED TO THE POSTS WITH A MINIMUM OF 4 WIRE TIES.
6. PREPARE SIGNS WITH THE FOLLOWING WORDING, AND INSTALL AT A MINIMUM OF 50' ON CENTER ALONG THE PROTECTIVE FENCING:
 

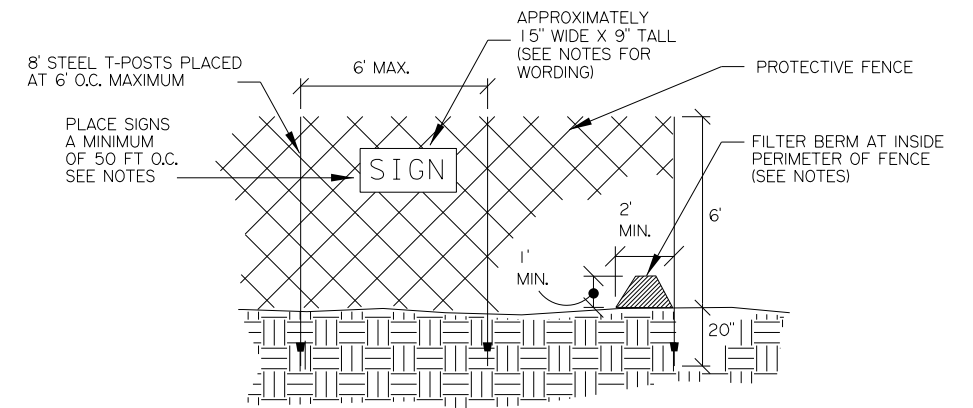
PROTECTED AREA  
DO NOT ENTER  
THIS FENCE MAY NOT BE REMOVED OR MODIFIED WITHOUT THE PERMISSION OF THE ENGINEER  
CONTACT (PHONE NUMBER)
7. IF IT BECOMES NECESSARY TO LOCATE THE PROTECTIVE FENCING WITHIN SIX FEET (6) OF THE TRUNK OF A TREE, SECURE WOOD PLANKING TO THE TRUNK. THE PLANKING SHALL BE NOMINAL 2X4 DIMENSION LUMBER SECURED WITH A ROPE, BAND, OR STRAP OF SUFFICIENT DURABILITY TO REMAIN IN PLACE FOR THE DURATION OF THE PROJECT. INSTALL PLANKS TO A HEIGHT OF TEN FEET (10) OR TO THE LOWEST MAJOR BRANCHES WHICHEVER IS LOWEST. DO NOT USE NAILS, SCREWS, OR ANY OTHER DAMAGING ATTACHMENTS UNDER ANY CIRCUMSTANCES.
8. ERECT A FILTER BERM COMPOSED OF WOOD CHIPS TO THE DIMENSIONS AND LOCATION SHOWN IN THE DETAILS. USE WOOD CHIPS LESS THAN OR EQUAL TO 5 IN. IN LENGTH WITH 95% PASSING A 2-IN. SCREEN AND LESS THAN 30% PASSING A 1-IN. SCREEN.
9. IMMEDIATELY REMOVE ANY CONCRETE, LIME OR OTHER CHEMICALS ACCIDENTALLY SPILLED WITHIN THE PROTECTED ROOT ZONE. IMMEDIATELY TREAT FOR ACCIDENTAL DAMAGE TO ANY TREE AS DIRECTED BY THE ENGINEER. SECURE THE SERVICES OF A TREE CARE SPECIALIST TO ASSESS AND/OR TREAT FOR THE DAMAGE.
10. MAINTAIN ALL TREE PROTECTION MATERIALS THROUGHOUT ENTIRE LENGTH OF PROJECT. REPAIR ANY DAMAGED TREE PROTECTION MATERIALS IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. ADDITIONAL COMPOST OR MULCH MATERIALS MAY BE REQUIRED.
11. NO TRENCHING, EXCAVATING, FILLING, OR COMPACTION IS ALLOWED WITHIN THE CRITICAL ROOT ZONE EXCEPT AS SPECIFICALLY IDENTIFIED IN THE PLANS OR APPROVED BY THE ENGINEER.
12. IF ROOT REMOVAL OR EXCAVATION IS UNAVOIDABLE WITHIN THE PREFERRED ROOT PROTECTION ZONE, HAND-DIG TO EXPOSE MAJOR TREE ROOTS OF ONE-INCH (1") DIAMETER OR GREATER. ONCE EXPOSED, PRUNE ROOTS WITH SHARP, CLEAN TOOLS DESIGNED FOR THAT PURPOSE. BACKFILL EXPOSED ROOT ENDS AS SOON AS POSSIBLE OR COVERED WITH SIX INCHES (6") SHREDDED HARDWOOD MULCH WITHIN THE SAME DAY OF EXCAVATION.
13. PRUNE ANY ROOTS EXPOSED BY CONSTRUCTION FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOPSOIL AS SOON AS POSSIBLE. IF EXPOSED ROOTS ARE NOT TO BE BACKFILLED WITHIN TWO DAYS, COVER THEM WITH A MINIMUM OF SIX INCHES (6") OF SHREDDED HARDWOOD MULCH.
14. SHOULD ACCESS ACROSS THE CRITICAL ROOT ZONE BE NECESSARY, OPEN ONLY THAT PORTION NEEDED FOR ACCESS AND THE COMPLETION OF THE TASK. INSTALL SIX INCHES (6") OF SHREDDED HARDWOOD BARK IN ACCESS AREAS BEFORE ANY WHEELED OR TRACKED VEHICLES ENTER THE CRITICAL ROOT ZONE. REPLACE PROTECTIVE FENCING TO ITS ORIGINAL POSITIONS AS SOON AS POSSIBLE AFTER THE CONSTRUCTION TASK IS COMPLETED AND REMOVE THE BARK MULCH LAYER AND STOCKPILE OUTSIDE THE CRITICAL ROOT ZONE.
15. FOR PROPOSED UNDERGROUND UTILITIES SHOWN ELSEWHERE IN THE PLANS THAT CROSS THE CRITICAL ROOT ZONE, BORE AT A MINIMUM OF THREE FEET (3) BELOW EXISTING GRADE. TRENCH FOR BORE SHALL NOT INTRUDE INTO CRITICAL ROOT ZONE.

**POST CONSTRUCTION**

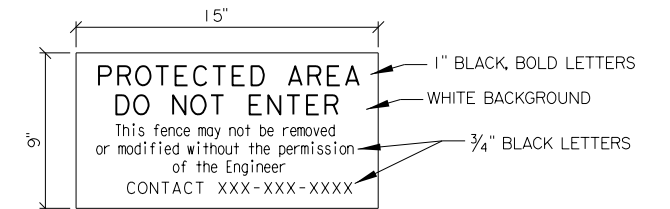
1. UPON THE COMPLETION OF CONSTRUCTION ACTIVITIES, CONDUCT A FINAL ASSESSMENT BY A TREE CARE SPECIALIST TO DETERMINE THE HEALTH AND CONDITION OF THE TREES. THE SPECIALIST SHOULD PROVIDE RECOMMENDATIONS FOR THE FOLLOWING INSPECTION ITEMS FOR NEEDED POST-CONSTRUCTION MEASURES:
  - A. DAMAGE TO ANY PART OF THE TREE
  - B. CHANGES IN SOILS STRUCTURE SUCH AS COMPACTION, FILLS, EROSION, OR LOSS OF ORGANIC MATTER

IMPLEMENT THE RECOMMENDATIONS MADE BY THE TREE CARE SPECIALIST AS DIRECTED. AT A MINIMUM, PERFORM THE FOLLOWING:

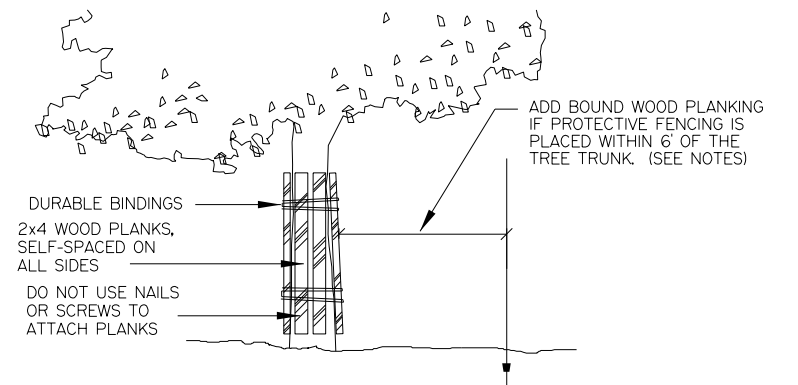
  - A. REMOVE TREES THAT MAY HAVE DIED DURING CONSTRUCTION
  - B. REMOVE ANY FILL SOIL FROM ROOT ZONES
  - C. REPAIR AREAS DAMAGED DURING CONSTRUCTION
2. AFTER ALL CONSTRUCTION ACTIVITIES HAVE CEASED, REMOVE ALL TREE PROTECTION MATERIALS FROM THE PROJECT SITE. MULCH MAY BE SPREAD OVER THE SITE IN A TWO-INCH THICK MAXIMUM LAYER.



PROTECTIVE FENCE AND SIGN PLACEMENT



SIGNAGE FOR PROTECTED AREAS



WOOD PLANKING INSTALLATION

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
ENGINEER: JOHN A. TYLER  
P. E. SERIAL NO: 105193  
DATE: 2023-05-30

THIS WORK AND ALL ASSOCIATED MATERIALS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 100 - PREPARING RIGHT OF WAY.

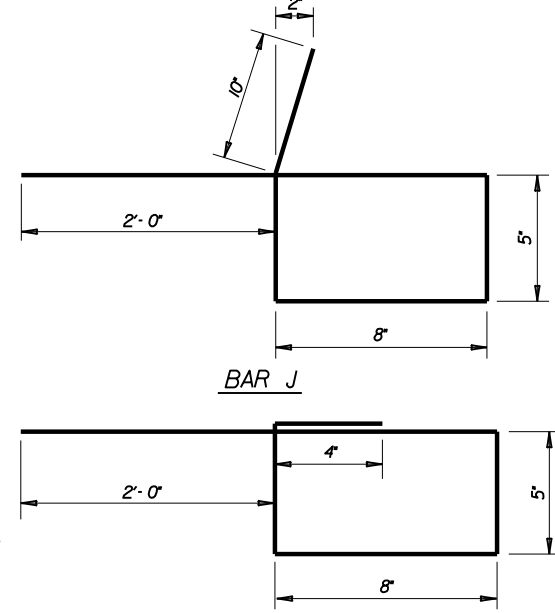
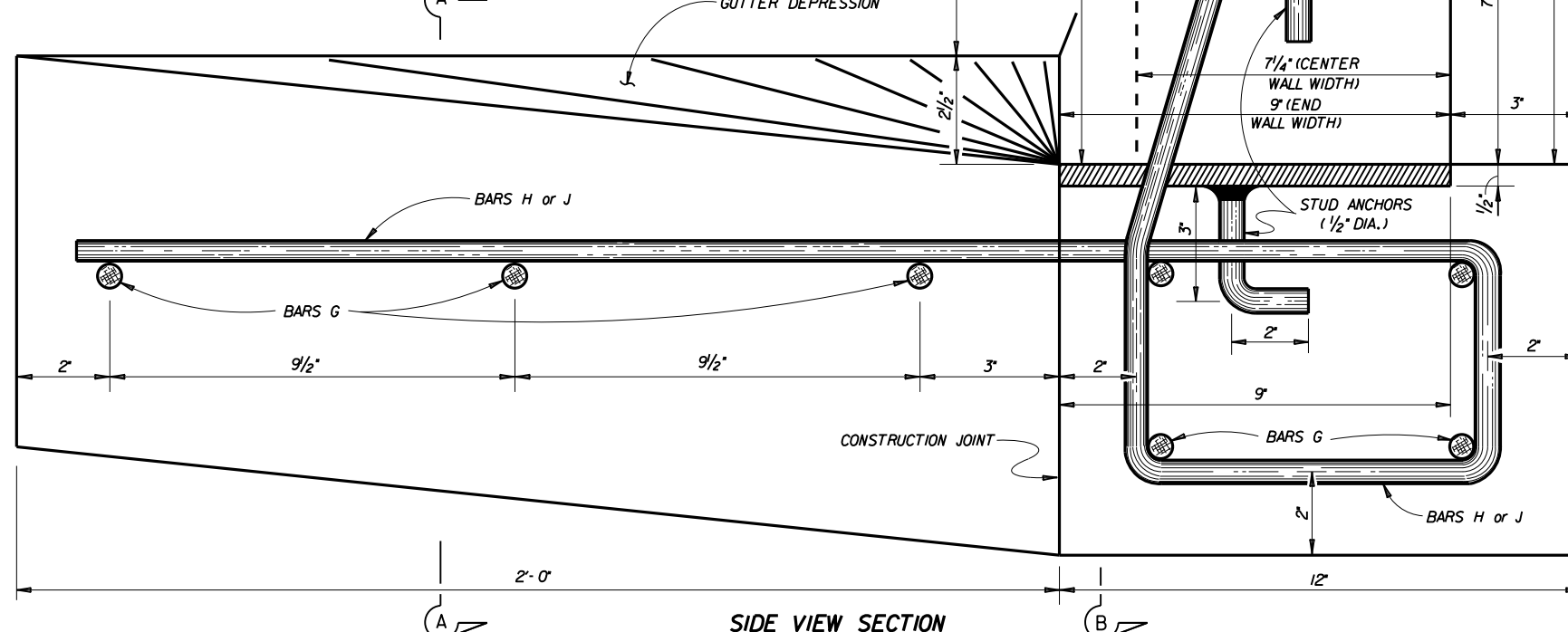
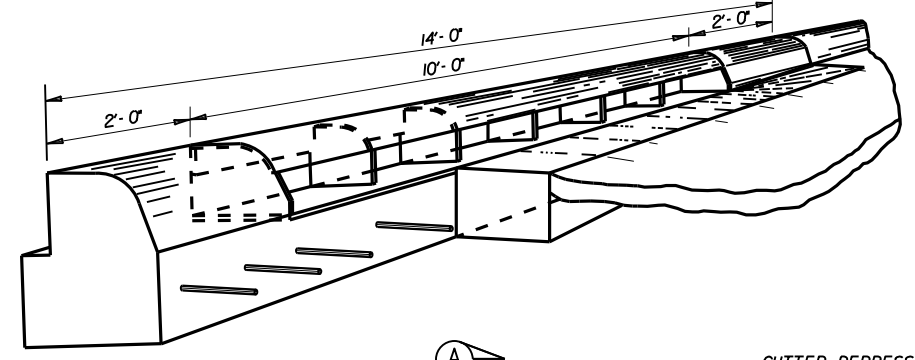
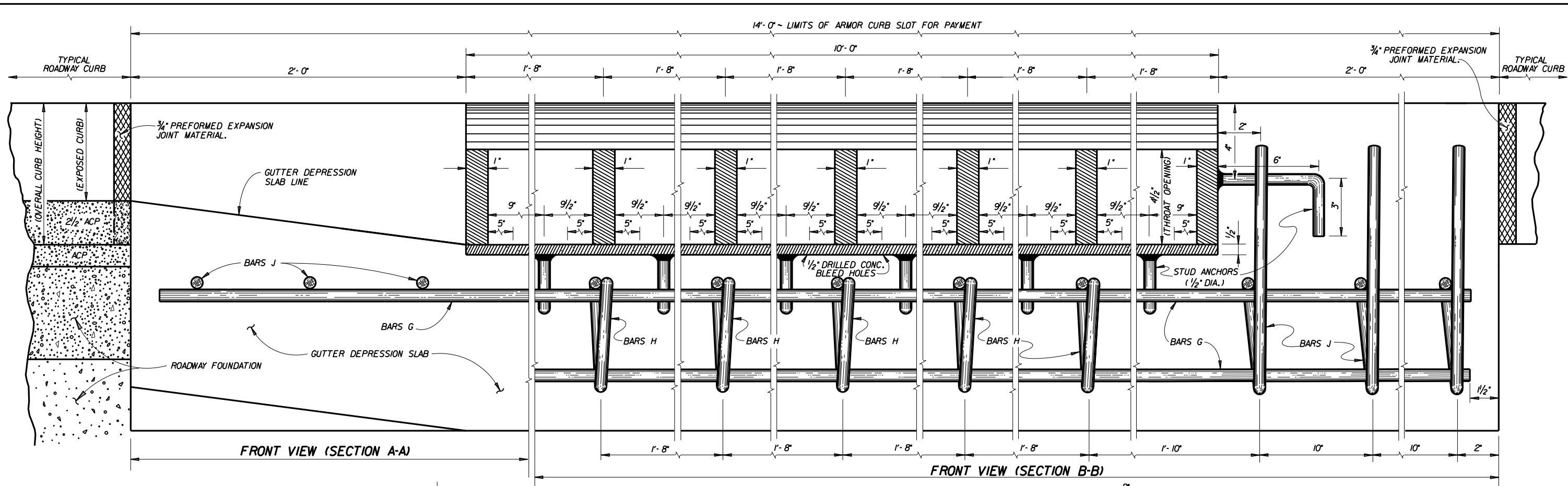
NOT TO SCALE



**TREE PROTECTION**

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ORIGINAL DRAWING DATE: 12-18-18	STATE DISTRICT: PHR	FEDERAL REGION: 6	FEDERAL AID PROJECT: STP 2B23 (202) TAPS	SHEET: 60	
REVISIONS		COUNTY: CAMERON	CONTROL: 0921	SECTION: 06	HIGHWAY: 348 VA





**ESTIMATED QUANTITIES FOR REINFORCING STEEL & CONCRETE**

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
G	7	#4	SHOWN	13'-9"	64
H	5	#4	1'-8"	4'-6"	15
J	6	#4	8"	5'-0"	20
TOTAL WEIGHT *				LBS.	99
CONCRETE FOR FOUNDATION *				C.Y.	0.47
CONCRETE FOR GUTTER DEPRESSION *				C.Y.	0.78

**STRUCTURAL STEEL FOR ARMOR CURB SLOT**

STUD ANCHORS (1/2" DIA.)	LBS.	3.5
STEEL PLATE	LBS.	451
TOTAL WEIGHT *	LBS.	454.5

\* FOR CONTRACTORS INFO ONLY.

**GENERAL NOTES:**  
 ALL CONCRETE SHALL BE CL.#4.  
 ALL STEEL SHALL BE ASTM A36.  
 ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.  
 ALL SIDES OF ARMOR CURB SLOT AND STUD ANCHORS SHALL BE 1/4" FILLET WELDS.  
 ALL EXPOSED STRUCTURAL STEEL (ARMOR) SHALL BE GALVANIZED UNDER ITEM 445.  
 ALL EXPOSED EDGES ON ARMOR CURB SHALL RECEIVE A 1/8" BEVEL.  
 THE SHAPE OF THE TYPICAL ROADWAY CURB SHALL TRANSITION TO THE ARMOR CURB AS APPROVED BY THE ENGINEER.

INTERIM REVIEW  
 DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

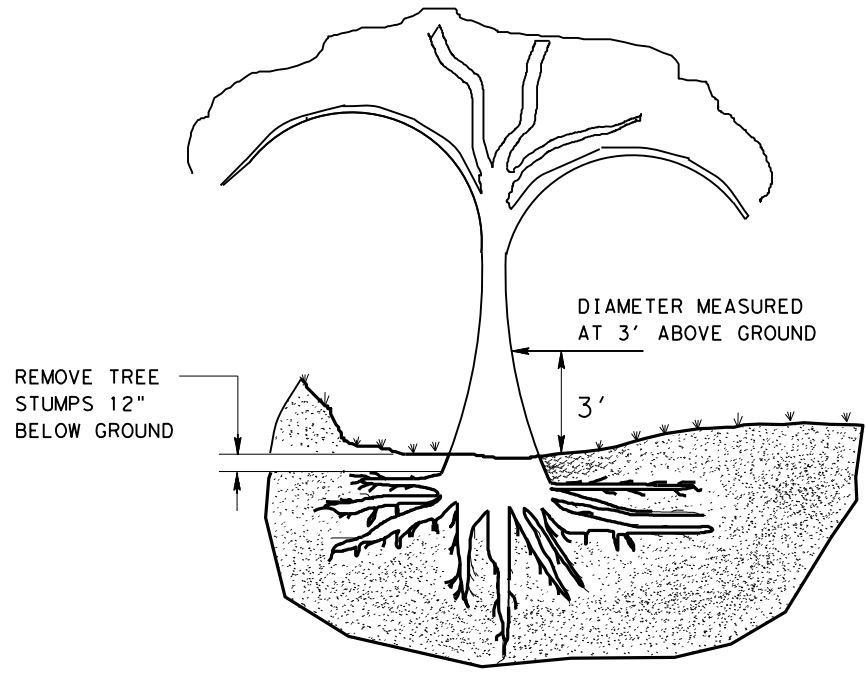
**ARMOR CURB SLOT WITH CONCRETE FOUNDATION**

DGN#	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#1	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#1	PHR	CAMERON	0921	06	348	61

STRUCTURE DESIGN / BRIDGE / STDS / ARMORCURB.DGN

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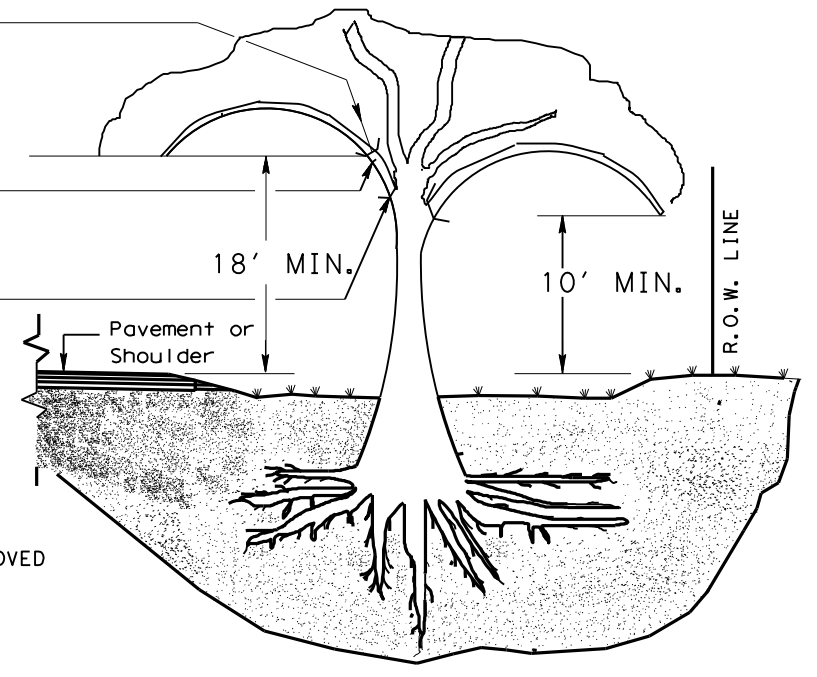
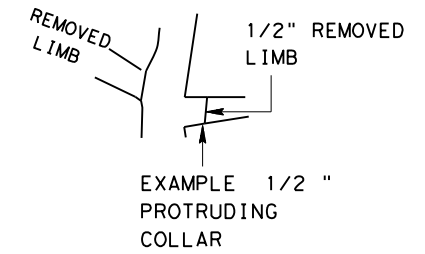


TREE REMOVAL

STEP 1:  
CUT 1/3 WAY THROUGH BOTTOM OF LIMB 8" TO 12" ABOVE MAIN STEM (OR TRUNK).

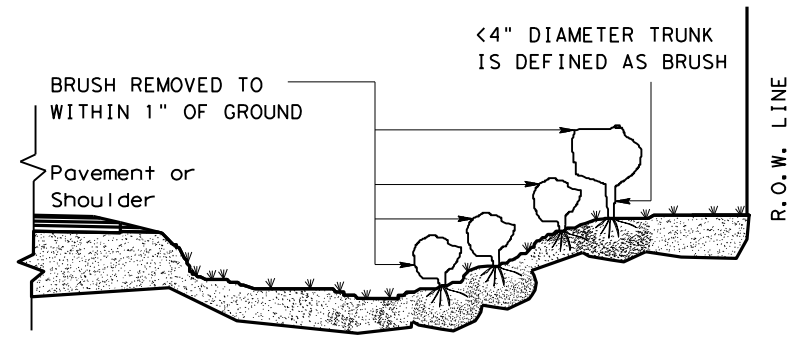
STEP 2:  
REMOVE LIMB 4" TO 6" BEYOND THE FIRST CUT

STEP 3:  
REMOVE STUB WITH A SMOOTH CUT SO THAT TRACE COLLAR OF THE REMOVED LIMB PROTRUDES APPROXIMATELY 1/2" FROM THE MAIN STEM



TREE TRIMMING

STEPS 1, 2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



BRUSH REMOVAL

GENERAL NOTES:

TREE TRIMMING

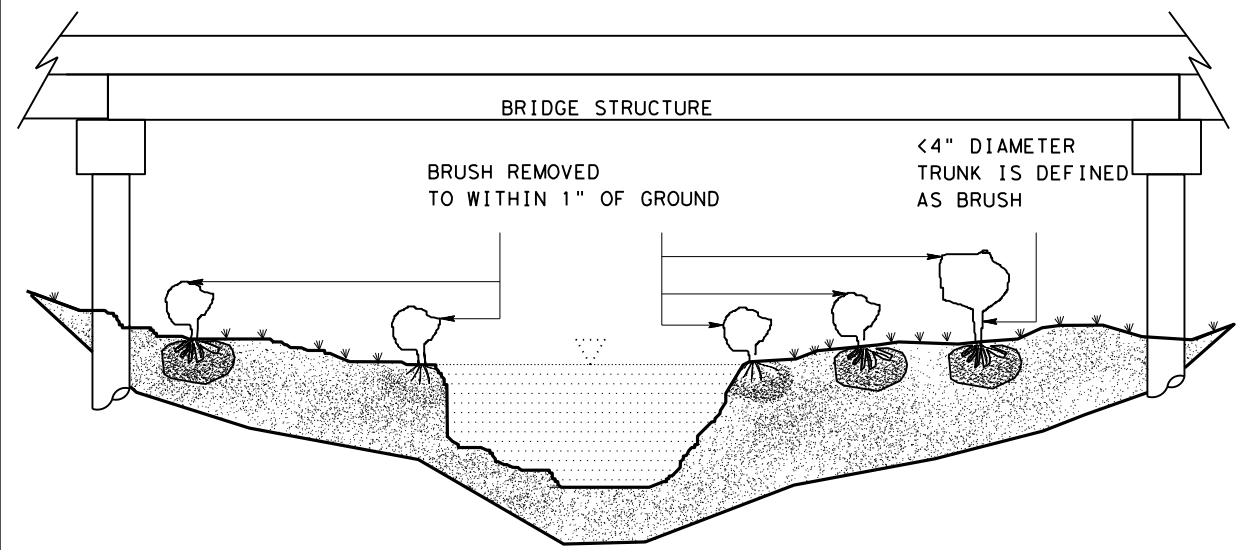
1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.
2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

TREE REMOVAL

3. FOR TREES MARKED FOR REMOVAL, THE DIAMETER OF TREES ARE DETERMINED BY MEASUREMENT OF THE TRUNK CIRCUMFERENCE 3' ABOVE THE GROUND. TREES WITH TRUNKS OF LESS THAN 4" DIAMETER ARE CONSIDERED TO BE BRUSH. TREES WITH MULTIPLE TRUNKS AT THE POINT OF MEASUREMENT ARE MEASURED AND PAID FOR SEPARATELY.
4. MEASUREMENTS FOR PAYMENT OF TREE DIAMETERS ARE DIVIDED INTO THE RANGES SHOWN IN TABLE 1.

TABLE 1 TREE TRUNK SIZE FOR TREE REMOVAL PAYMENT				
PAY ITEM	RANGE FOR PAY ITEMS			
	TRUNK DIAMETER *		TRUNK CIRCUMFERENCE	
	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO
752 6005	4	12	12 1/2	37 1/2
752 6006	12	18	37 1/2	56 1/2
752 6007	18	24	56 1/2	75 1/2
752 6008	24	30	75 1/2	94
752 6009	30	36	94	113
752 6010	36	42	113	132
752 6011	42	48	132	151
752 6012	48	60	151	188 1/2
752 6013	60	72	188 1/2	226
752 6019	72	84	226	264
	84	GREATER THAN 84	264	NOT APPLICABLE

\*SEE GENERAL NOTE #3.



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

**Texas Department of Transportation** Maintenance Division Standard

## TREE AND BRUSH REMOVAL

### TRB-15(1)

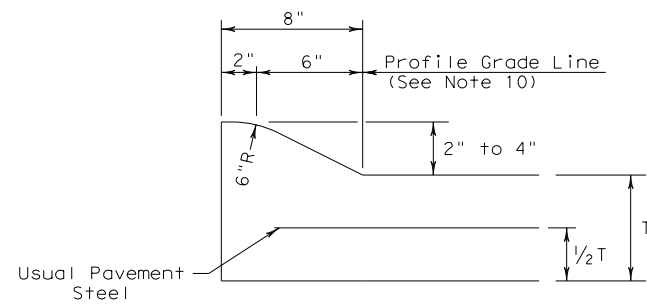
SHEET 1 OF 2

FILE:	DW: JEO	CK: LJB	DW: JEO	CK:
© TxDOT MARCH 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
Revised table 1 to 2014 Specification	DIST	COUNTY	SHEET NO.	
	PHR	CAMERON	62	

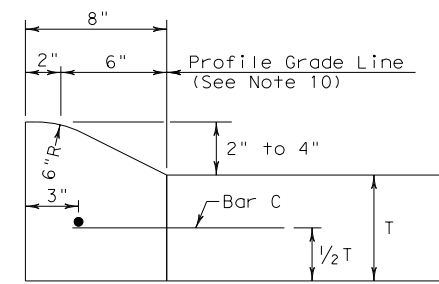


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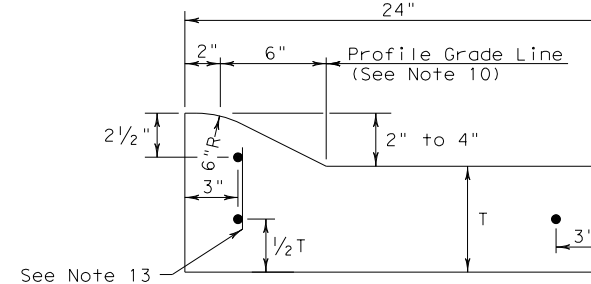
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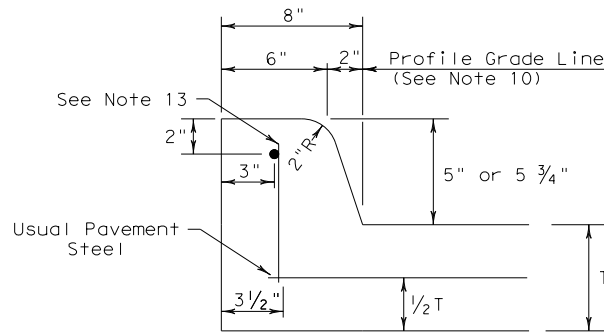
TYPE I CURB (MONOLITHIC)  
 2" - 4" HEIGHT



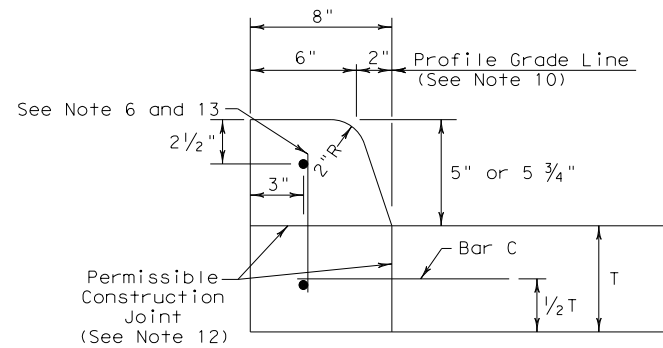
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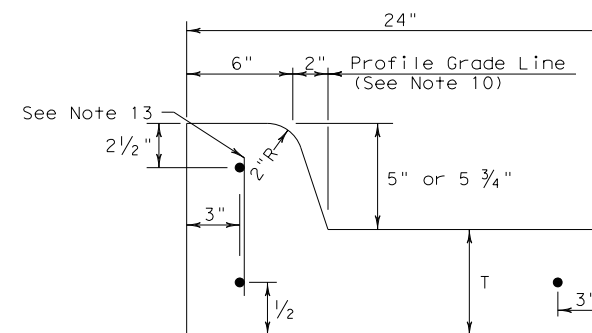
TYPE I CURB AND GUTTER  
 2" - 4" HEIGHT



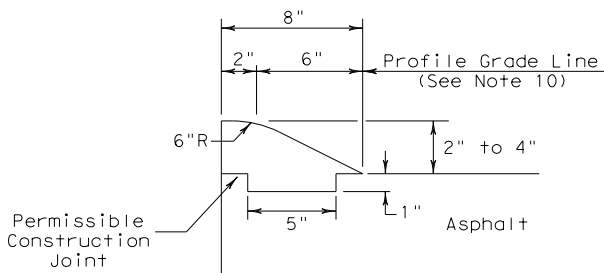
TYPE II CURB (MONOLITHIC)  
 5" - 5 3/4" HEIGHT



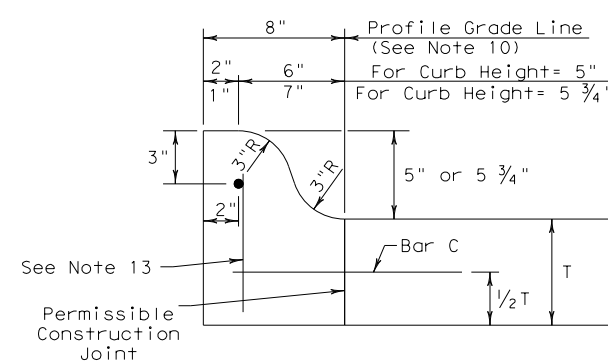
TYPE II CURB  
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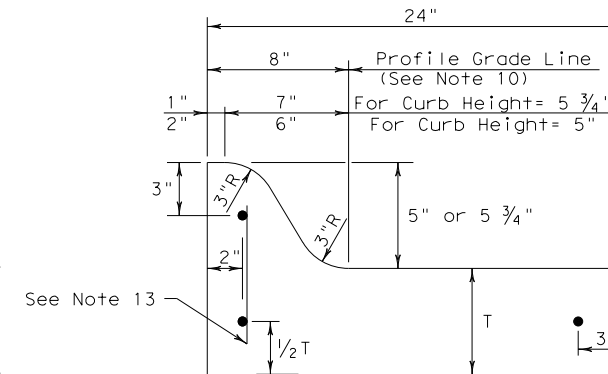
TYPE II CURB AND GUTTER  
 5" - 5 3/4" HEIGHT



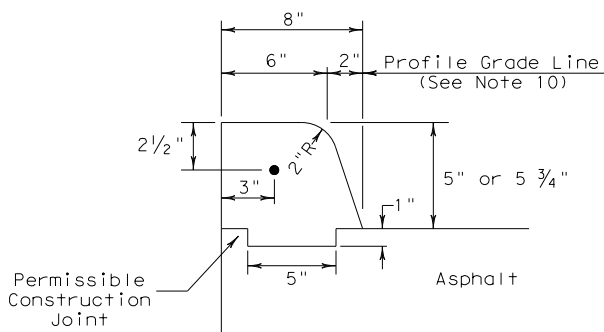
TYPE III CURB (KEYED)  
 2" - 4" HEIGHT



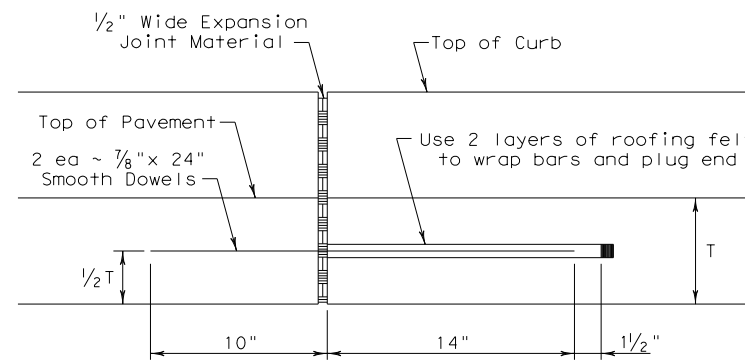
TYPE IIa CURB  
 5" - 5 3/4" HEIGHT



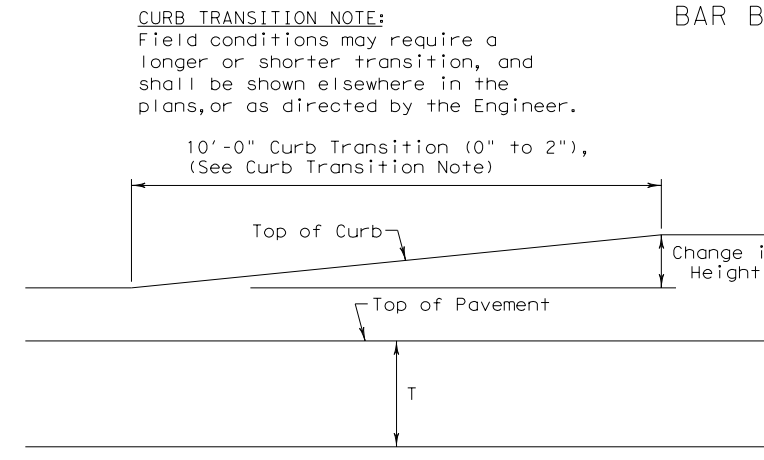
TYPE IIa CURB AND GUTTER  
 5" - 5 3/4" HEIGHT



TYPE IV CURB (KEYED)  
 5" - 5 3/4" HEIGHT



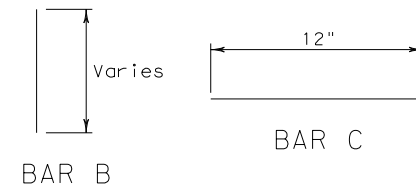
EXPANSION JOINT DETAIL



CURB TRANSITION  
 Note: To be paid for as Highest Curb

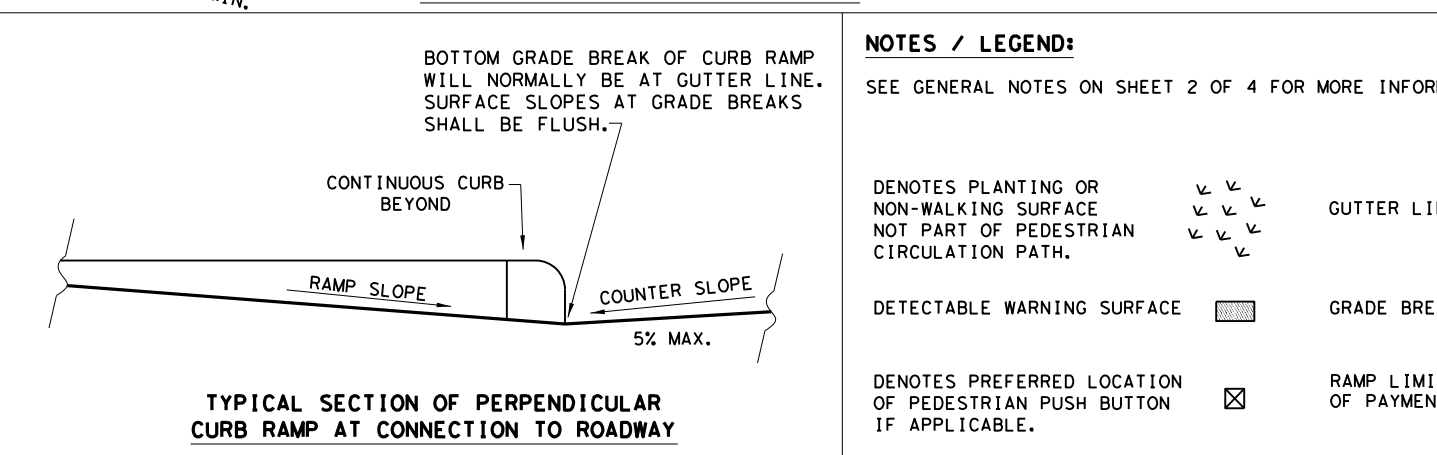
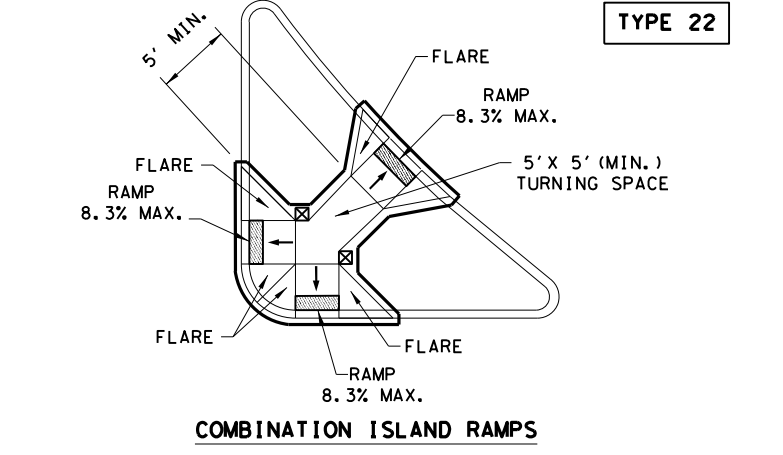
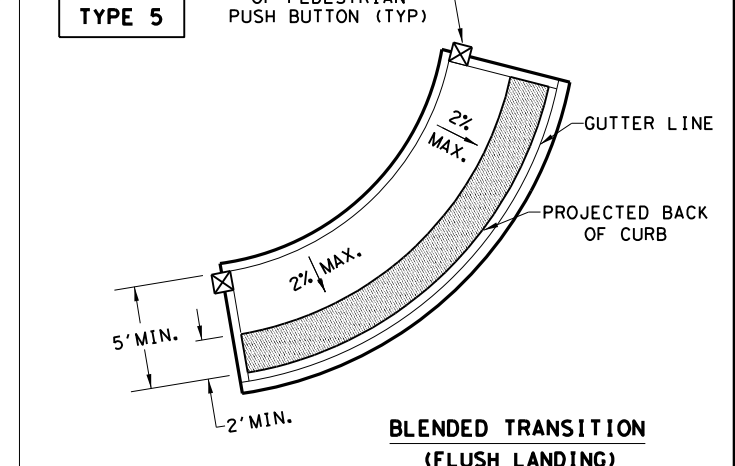
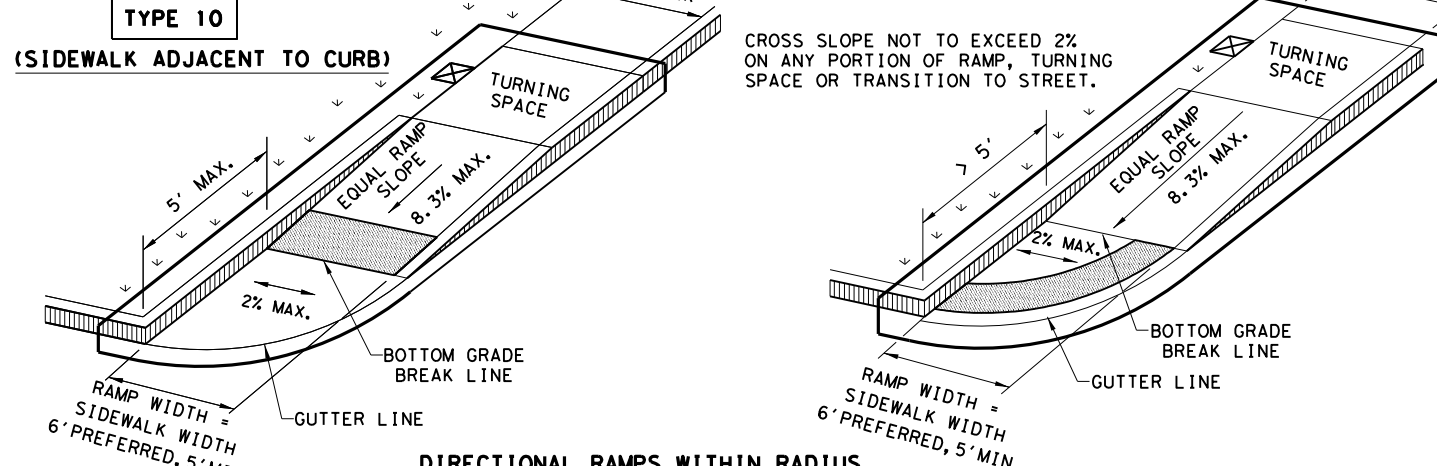
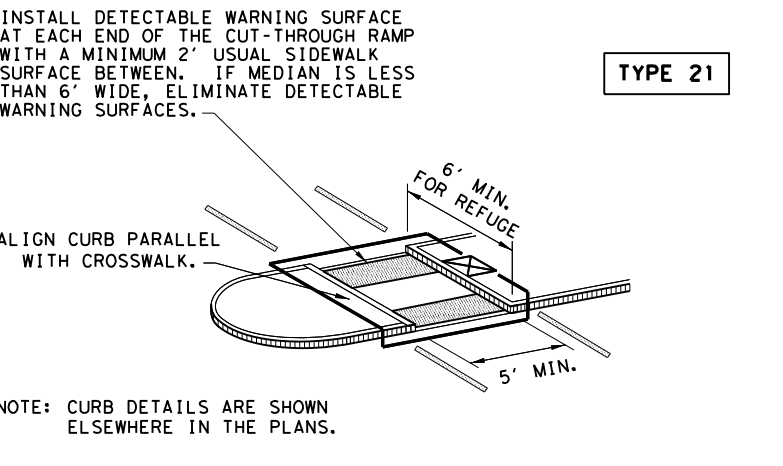
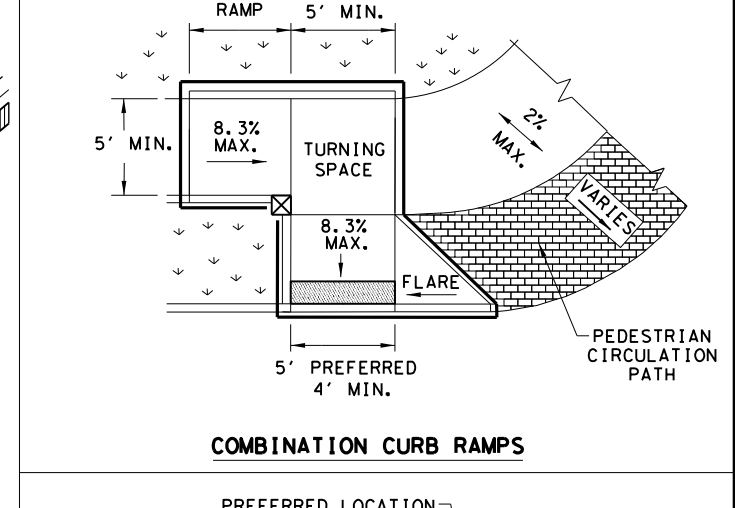
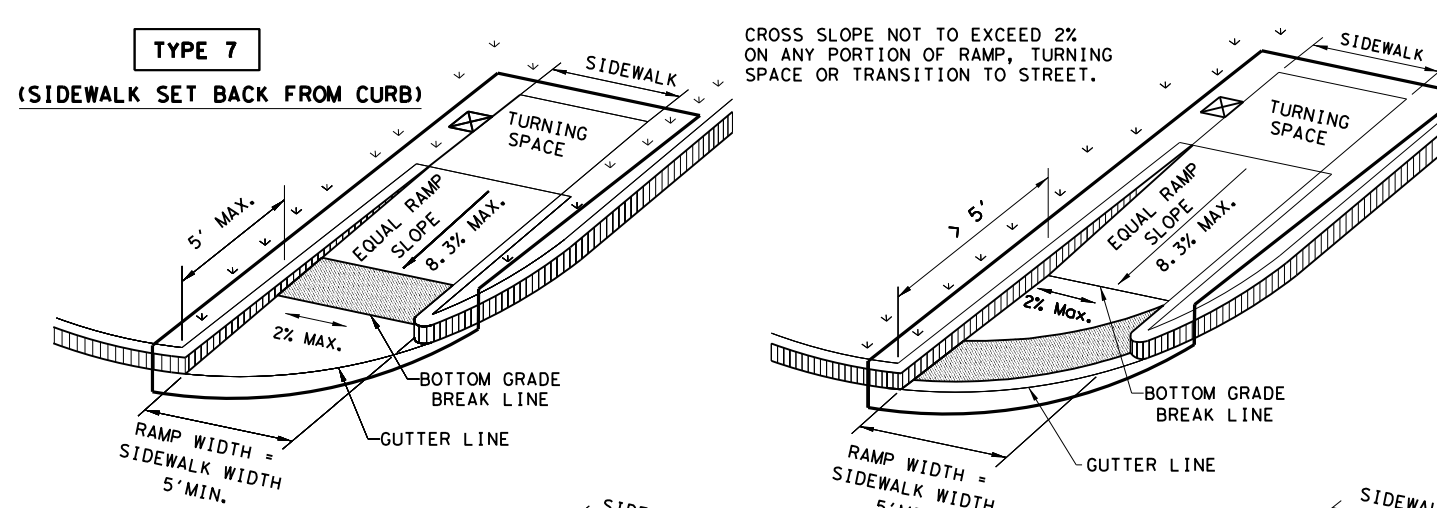
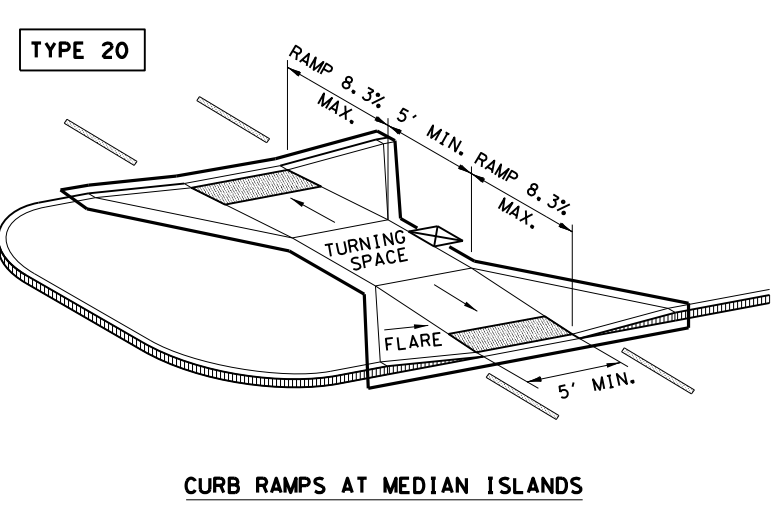
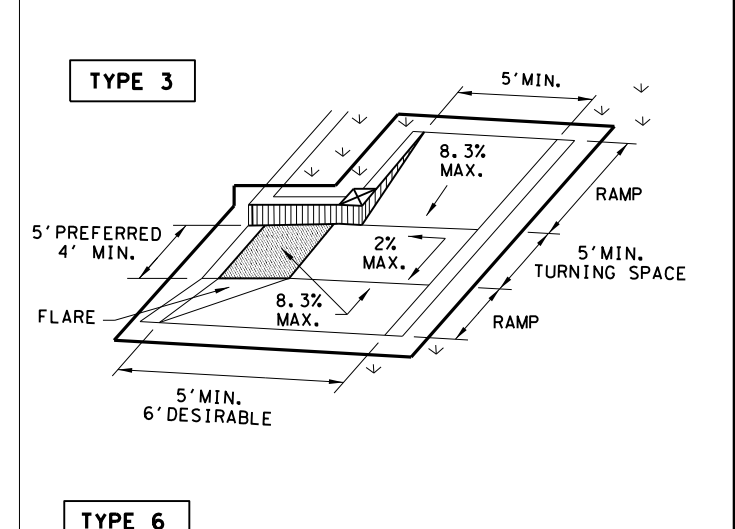
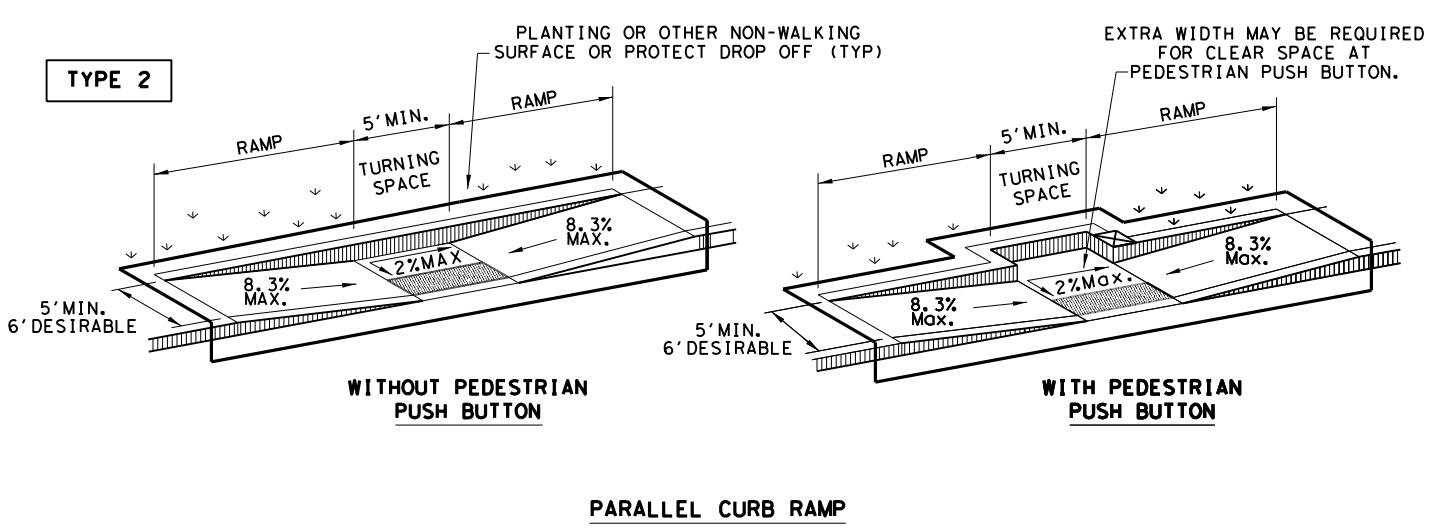
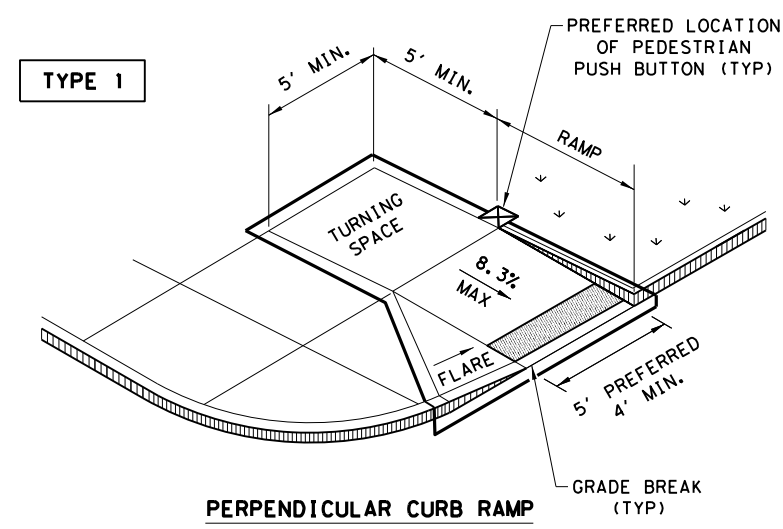
GENERAL NOTES

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



				<b>Design Division Standard</b>	
<h2>CONCRETE CURB AND GUTTER</h2>					
<h3>CCCG-22</h3>					
FILE: cccg22.dgn	DN: TxDOT	CR: AN	DR: CS	CR: KM	
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0921	06	348	VA	
	DIST	COUNTY	SHEET NO.		
	PHR	CAMERON	64		

DATE: 2023-05-30  
 FILE: S:\Projects\61254\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\Roadway\ped18.dgn  
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**NOTES / LEGEND:**

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

DETECTABLE WARNING SURFACE

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation  
 Design Division Standard

**PEDESTRIAN FACILITIES CURB RAMPS**  
 PED-18

FILE: ped18	DN: TxDOT	DN: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
REVISED 08, 2005	DIST	COUNTY	SHEET NO.	
REVISED 06, 2012	PHR	CAMERON	65	
REVISED 01, 2018				

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DATE: 2023-05-30  
 FILE: S:\Projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\Roadway\ped18.dgn

**GENERAL NOTES**

**CURB RAMP**

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5' x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5' x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4' x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5' x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

**DETECTABLE WARNING MATERIAL**

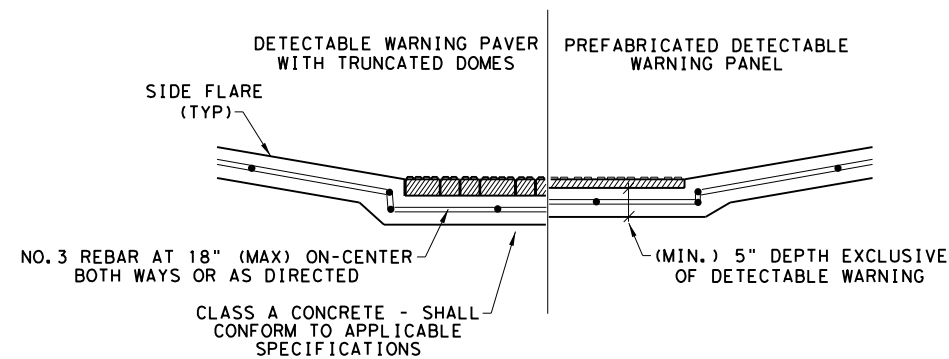
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

**DETECTABLE WARNING PAVERS (IF USED)**

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

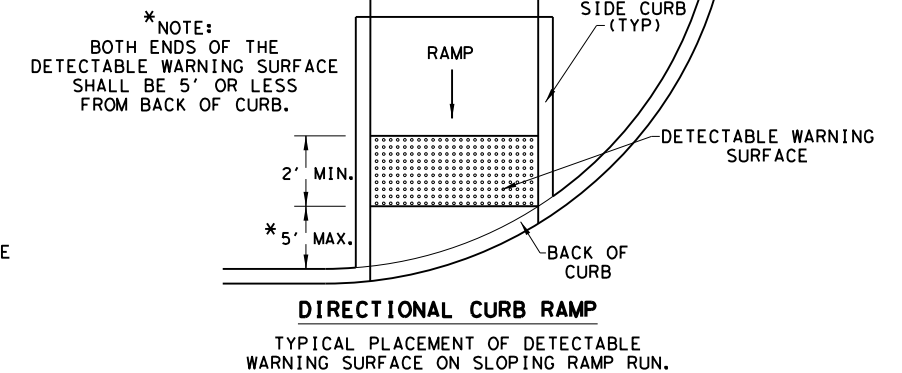
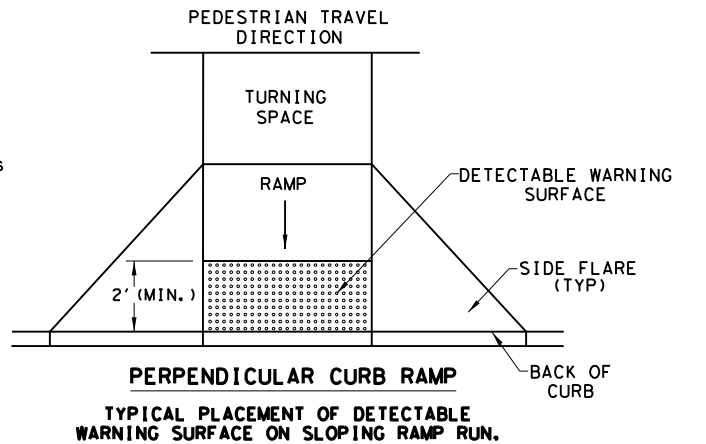
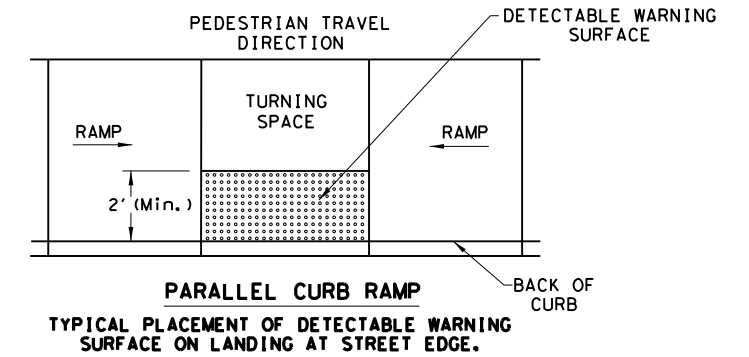
**SIDEWALKS**

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.



**SECTION VIEW DETAIL  
 CURB RAMP AT DETECTIBLE WARNINGS**

**DETECTABLE WARNING SURFACE DETAILS**



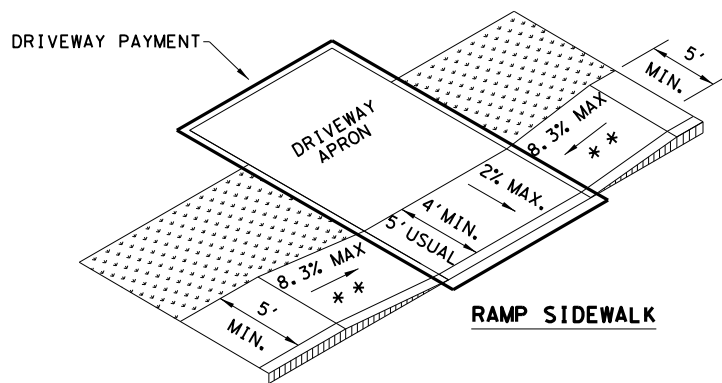
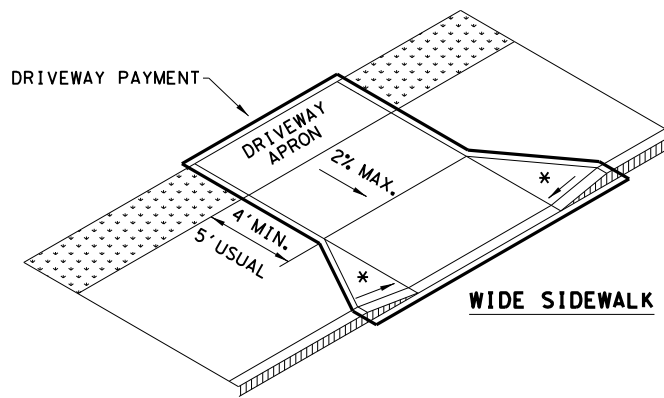
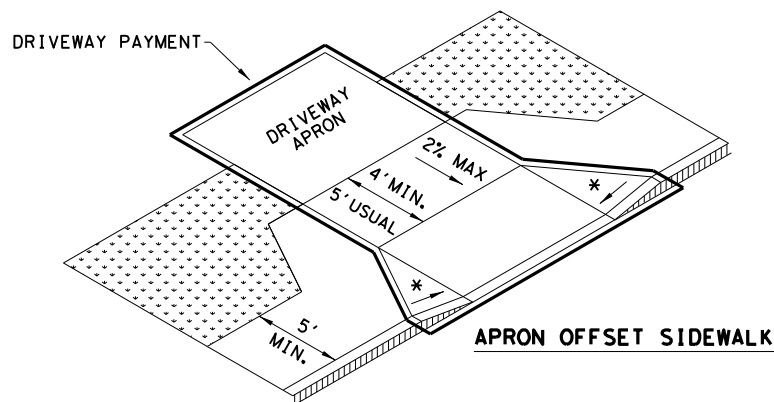
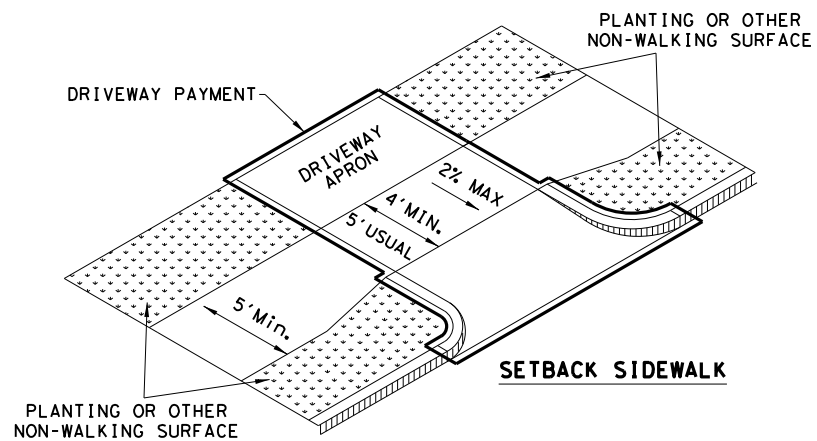
\* NOTE:  
 BOTH ENDS OF THE  
 DETECTABLE WARNING SURFACE  
 SHALL BE 5' OR LESS  
 FROM BACK OF CURB.

SHEET 2 OF 4

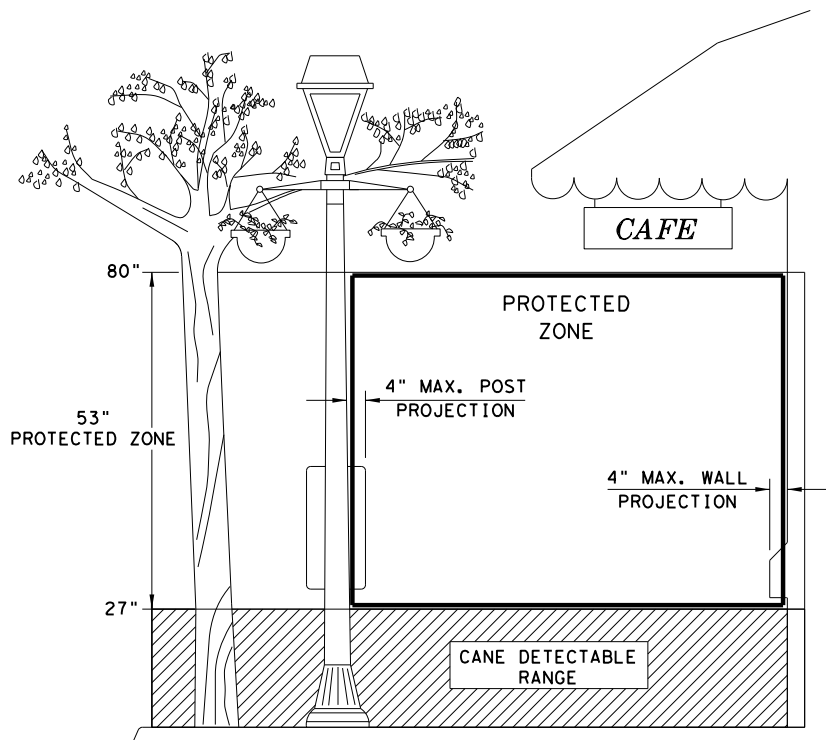
		<b>Design Division Standard</b>	
<h1>PEDESTRIAN FACILITIES</h1> <h2>CURB RAMPS</h2> <h3>PED-18</h3>			
FILE: ped18	DN: TxDOT	DN: VP	CK: KM
© TxDOT: MARCH, 2002	CONT	SECT	JOB
REVISIONS	0921	06	348
REVISOR: 08, 2005	DIST	COUNTY	SHEET NO.
REVISOR: 06, 2012	PHR	CAMERON	66
REVISOR: 01, 2018			

DATE: 2023-05-30  
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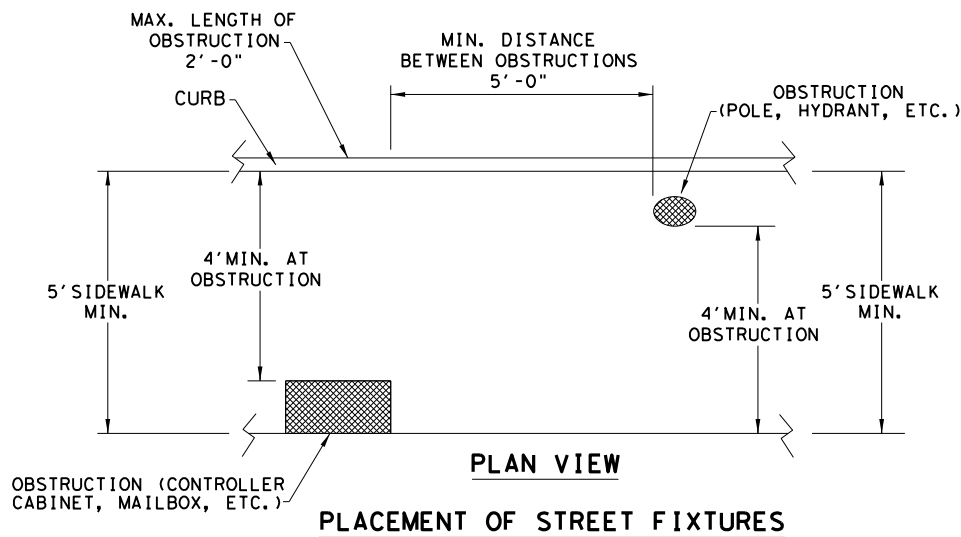
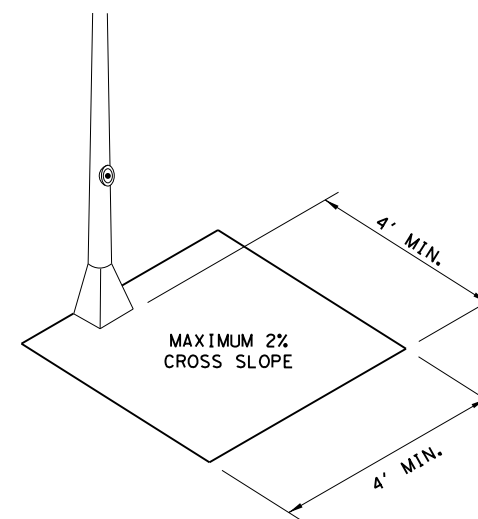
**SIDEWALK TREATMENT AT DRIVEWAYS**



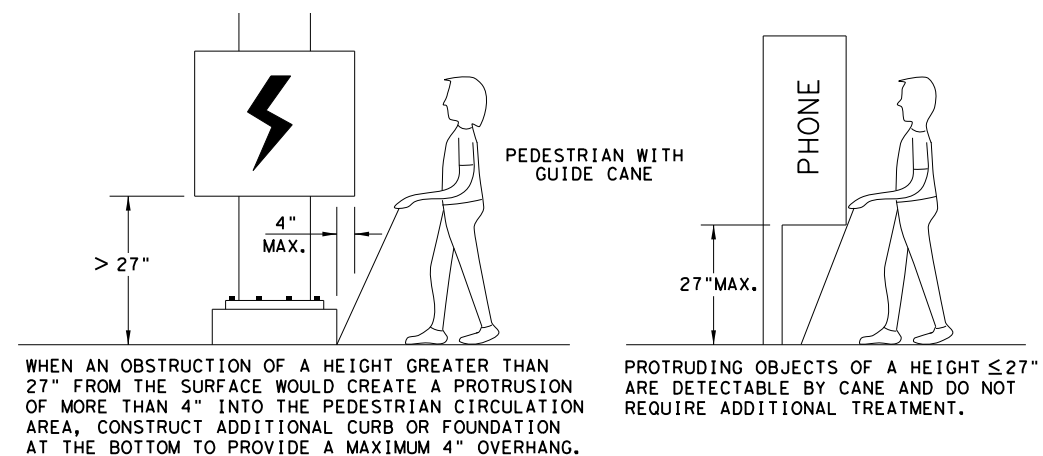
NOTES:  
 \* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.  
 \* \* IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.

PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

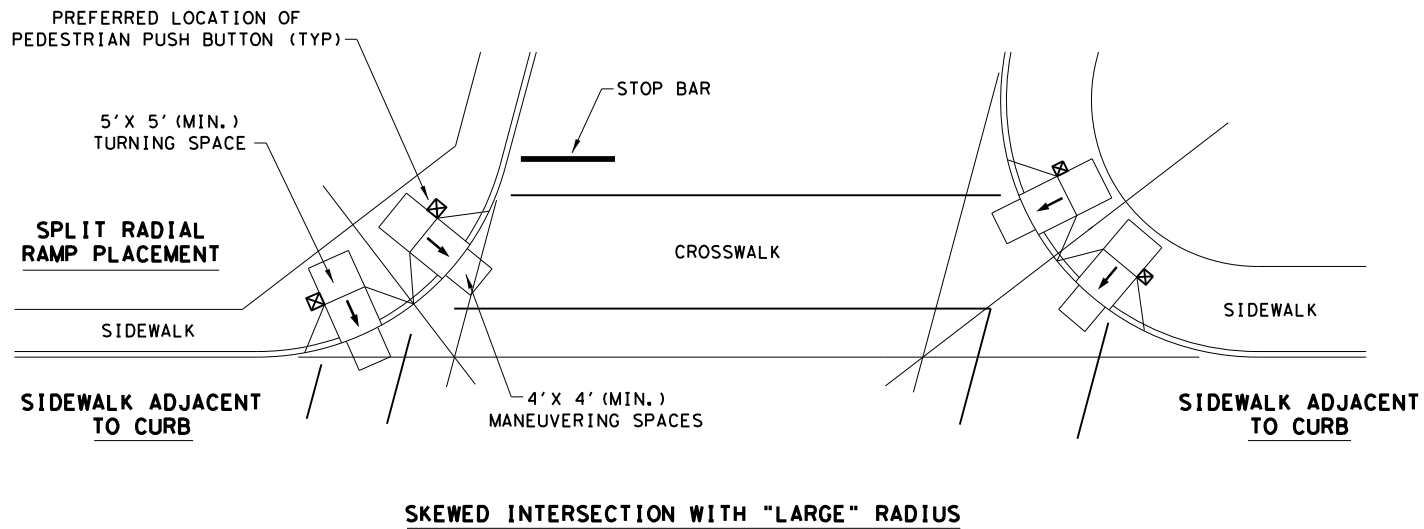
SHEET 3 OF 4

		Design Division Standard	
<b>PEDESTRIAN FACILITIES</b> <b>CURB RAMPS</b> <b>PED-18</b>			
FILE: ped18	DN: TxDOT	DN: VP	CK: KM
© TxDOT: MARCH, 2002	CONT	SECT	JOB
REVISIONS	0921	06	348
REVISED 08, 2005	DIST	COUNTY	SHEET NO.
REVISED 06, 2012	PHR	CAMERON	67
REVISED 01, 2018			

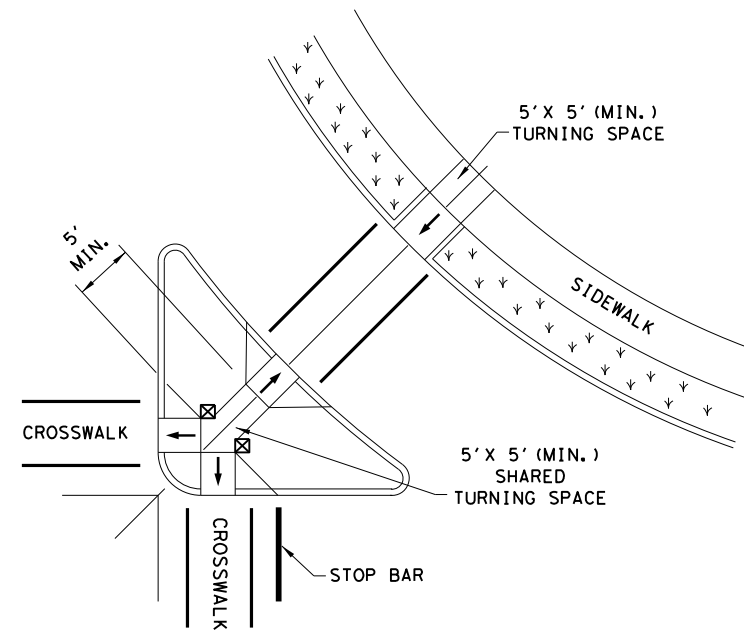
DATE: 2023-05-30  
 FILE: S:\Projects\612\54\02\Design\01\_Rto\_Hondo\_ADA\Civil\Standards\Roadway\ped18.dgn

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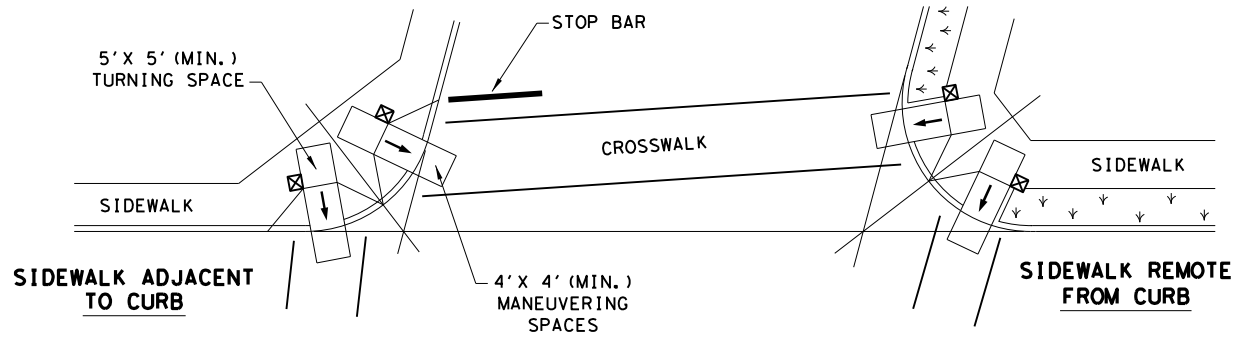
TYPICAL CROSSING LAYOUTS  
 SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



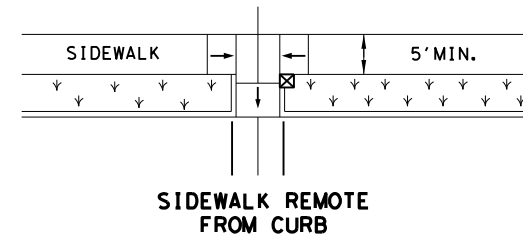
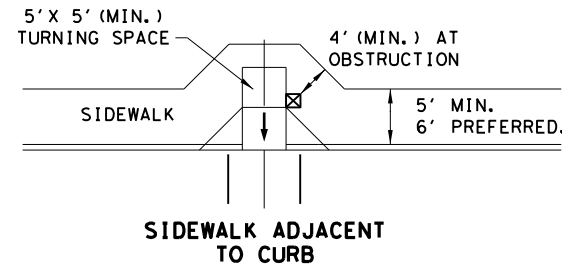
SKewed INTERSECTION WITH "LARGE" RADIUS



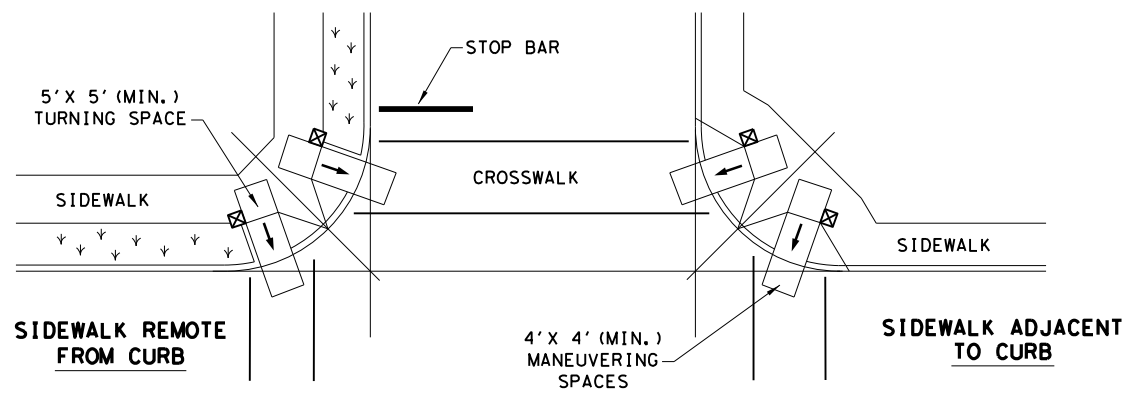
AT INTERSECTION  
 W/FREE RIGHT TURN & ISLAND



SKewed INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT  
 PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

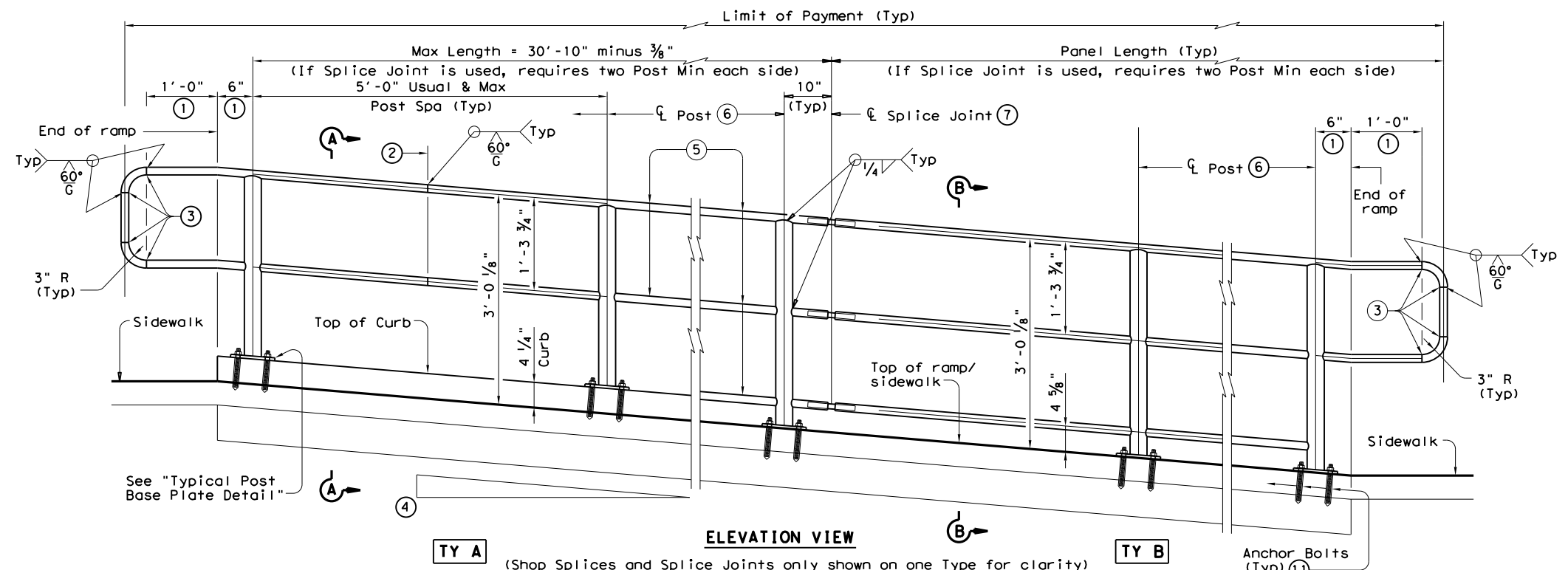
- SHOWS DOWNWARD SLOPE. →
- DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒
- DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH. ↙ ↘ ↙ ↘ ↙ ↘ ↙ ↘

		Design Division Standard	
PEDESTRIAN FACILITIES CURB RAMPS PED-18			
FILE: ped18	DN: TxDOT	DN: VP	CK: KM
© TxDOT: MARCH, 2002	CONT: 0921	SECT: 06	JOB: 348
REVISIONS	DIST: COUNTY		SHEET NO.
REVISED 08, 2005	PHR CAMERON		68
REVISED 06, 2012			
REVISED 01, 2018			



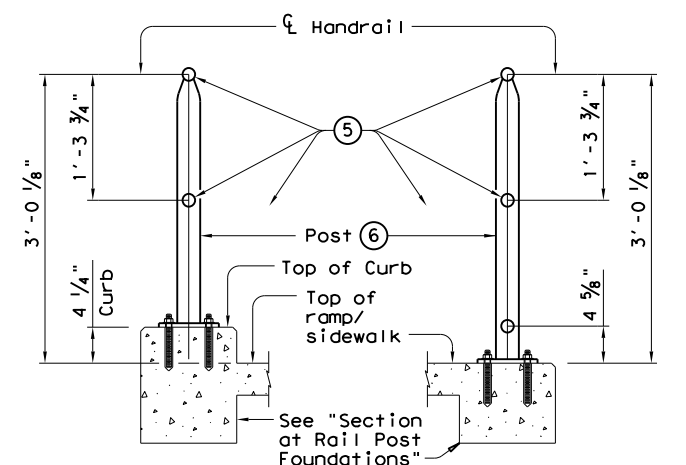
DATE: 2023-05-30  
 FILE: S:\Projects\61254\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\Roadway\prdl3.dgn

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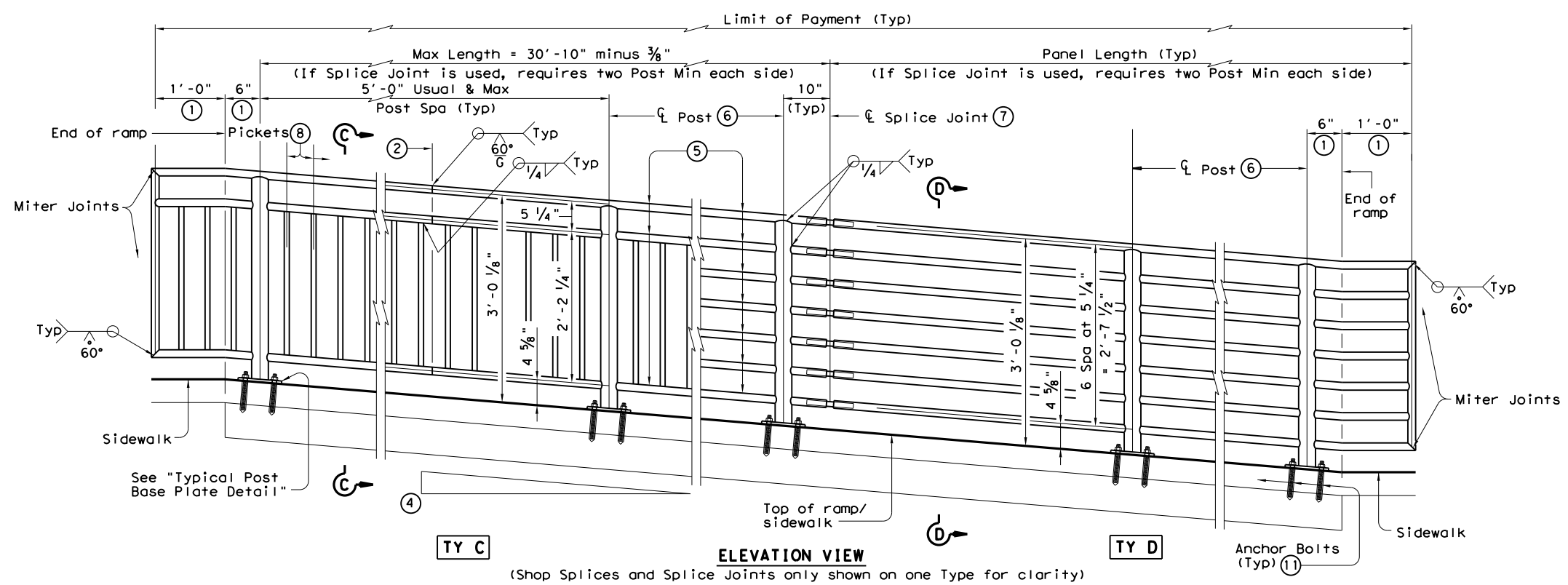


**TY A** (Shop Splices and Splice Joints only shown on one Type for clarity) **TY B**

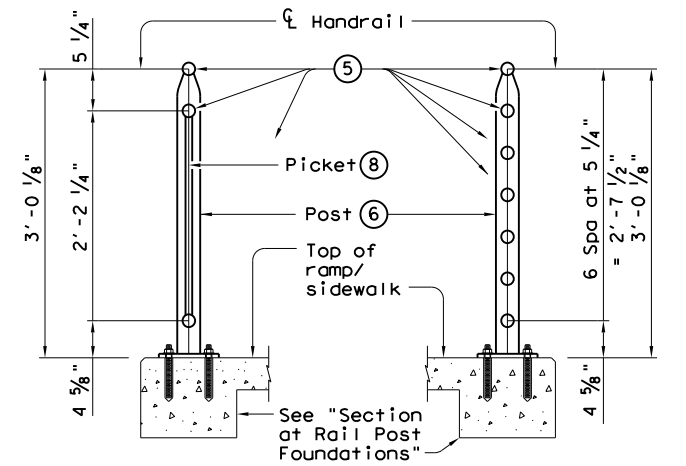
RECOMMENDED USAGE ⑨ ⑩	
Dropoff Height/Condition	Recommended Rail Options
< 30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



**SECTION A-A** (Showing Handrail TY A) **SECTION B-B** (Showing Handrail TY B)



**TY C** (Shop Splices and Splice Joints only shown on one Type for clarity) **TY D**



**SECTION C-C** (Showing Handrail TY C) **SECTION D-D** (Showing Handrail TY D)

- ① Parallel to ground.
- ② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- ③ Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- ④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
- ⑤ 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.

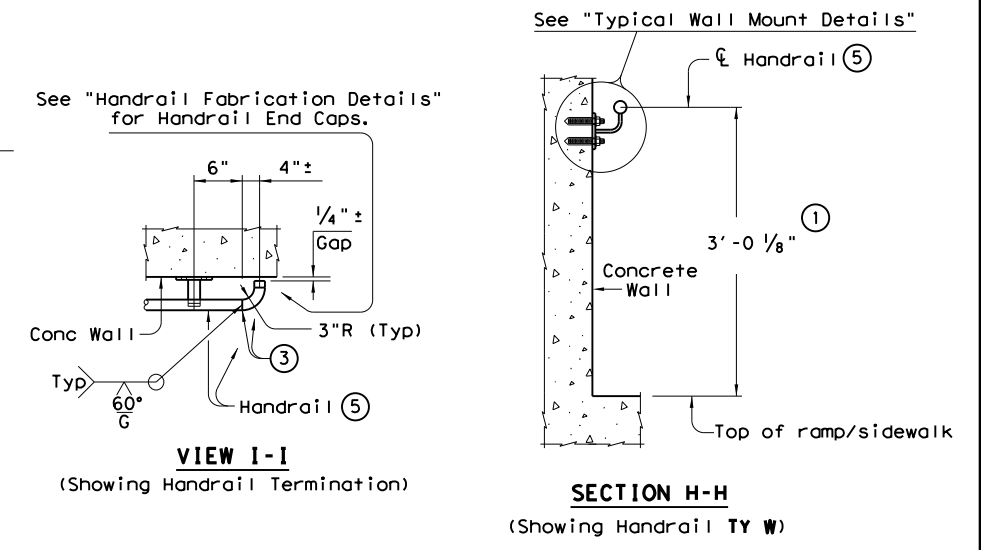
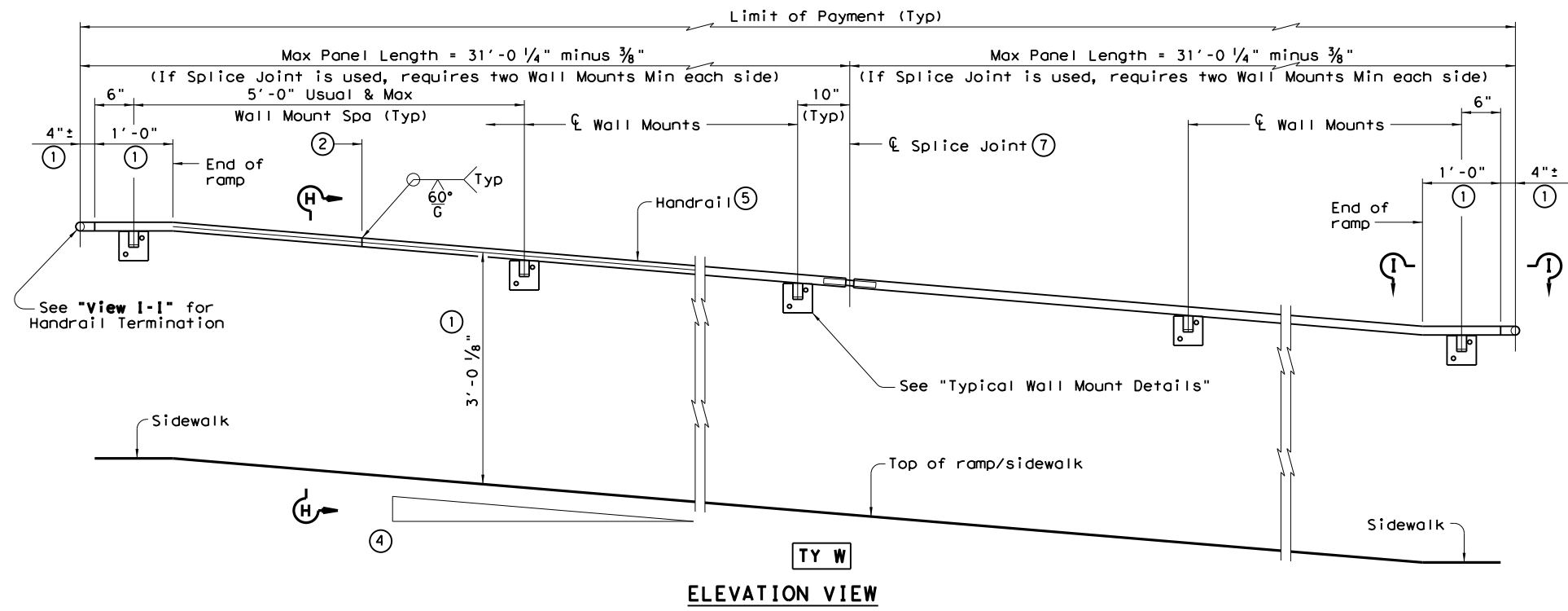
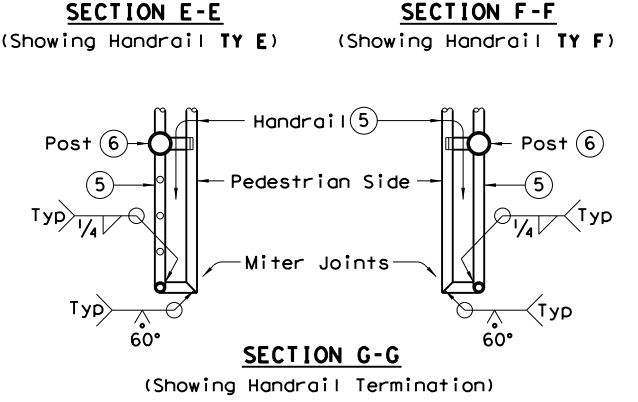
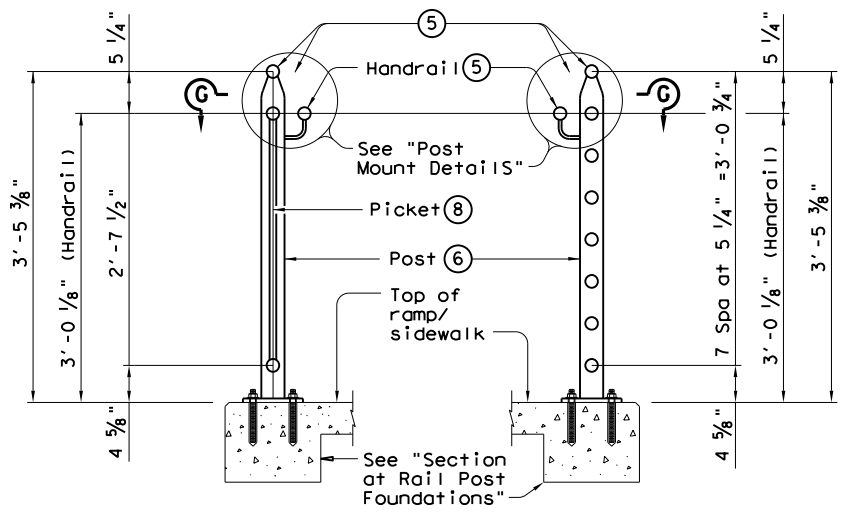
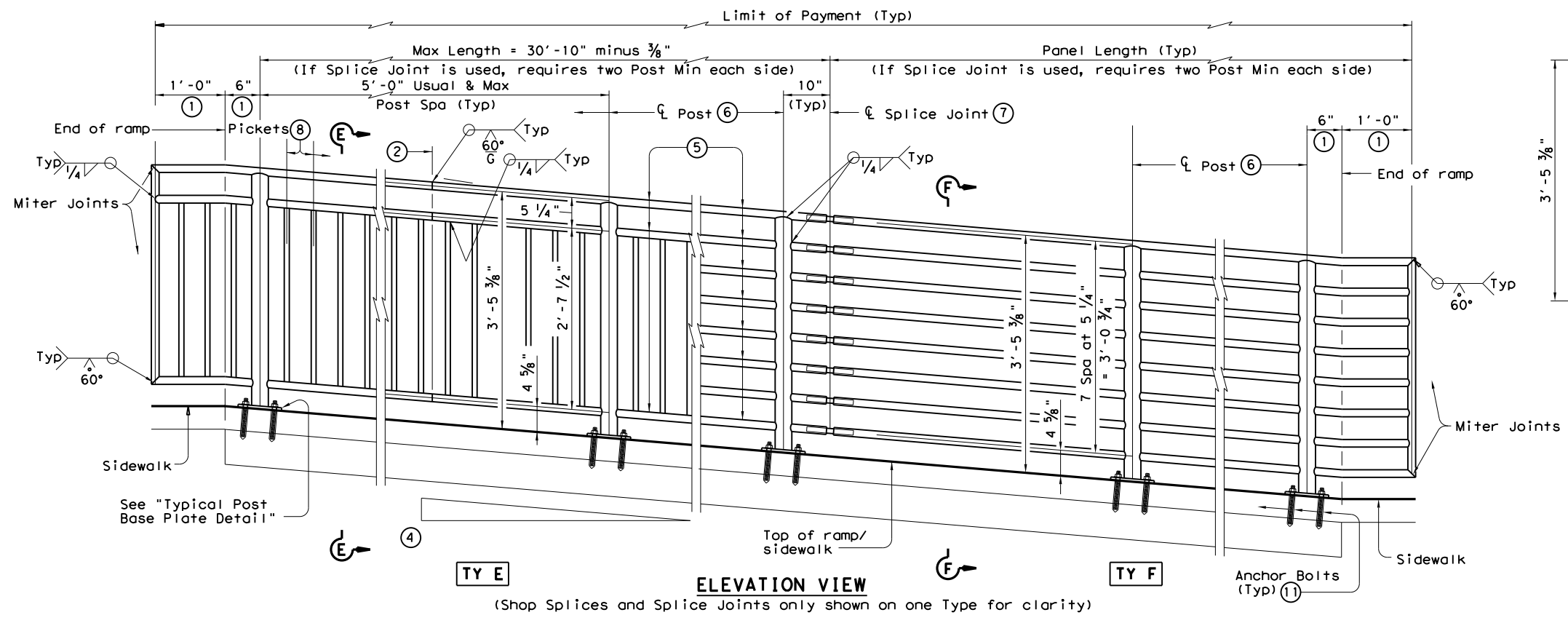
- ⑥ 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
- ⑦ See "Handrail Fabrication Details" for Splice Joints.
- ⑧ 1/2" Dia. Round Bar equal spacing at 4 1/2" Max. Plumb all pickets.
- ⑨ When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
- ⑩ Not to be used on bridges.
- ⑪ See "General Notes" for anchor bolt information.

SHEET 1 OF 3

		Design Division Standard	
<h2>PEDESTRIAN HANDRAIL DETAILS</h2> <h3>PRD-13</h3>			
FILE: prdl3.dgn	DN: TxDOT	CR: AM	DW: JTR
© TxDOT December 2006	CONT	SECT	JOB
REVISIONS	0921	06	348
REVISED MAY, 2013 (VP)	DIST	COUNTY	SHEET NO.
	PHR	CAMERON	69

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- ① Parallel to ground.
- ② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
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- ④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
- ⑤ 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.
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- ⑦ See "Handrail Fabrication Details" for Splice Joints.
- ⑧ 1/2" Dia. Round Bar equal spacing at 4 1/2" Max. Plumb all pickets.
- ⑪ See "General Notes" for anchor bolt information.

SHEET 2 OF 3

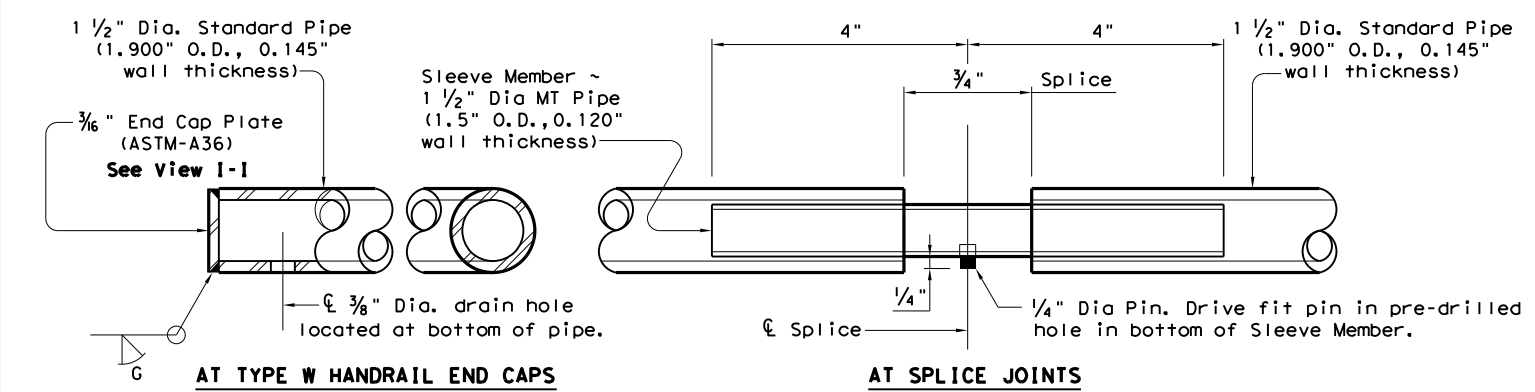
**Texas Department of Transportation**  
 Design Division Standard

## PEDESTRIAN HANDRAIL DETAILS

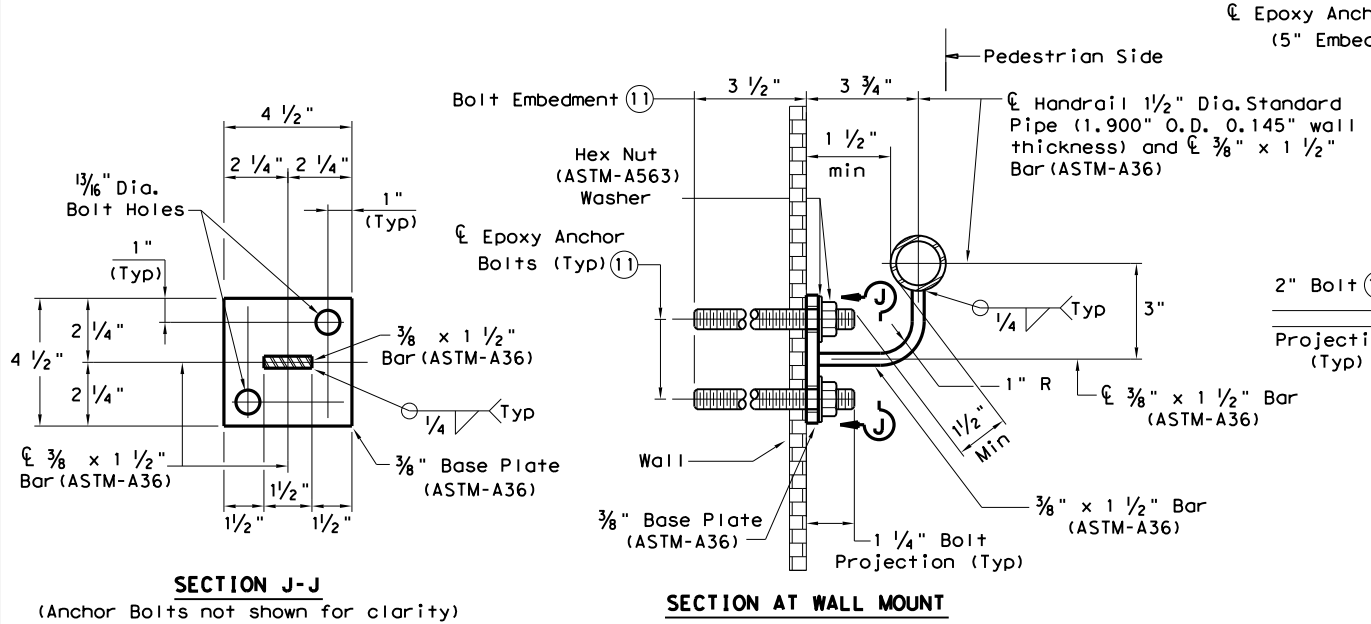
### PRD-13

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© TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
REVISED MAY, 2013 (VP)	DIST	COUNTY	SHEET NO.	
	PHR	CAMERON	70	

DATE: 2023-05-30  
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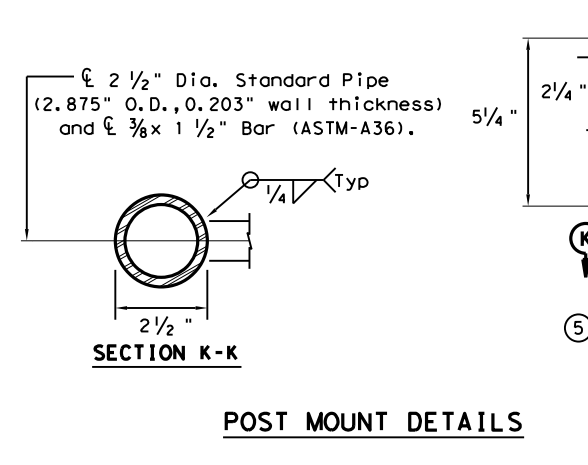
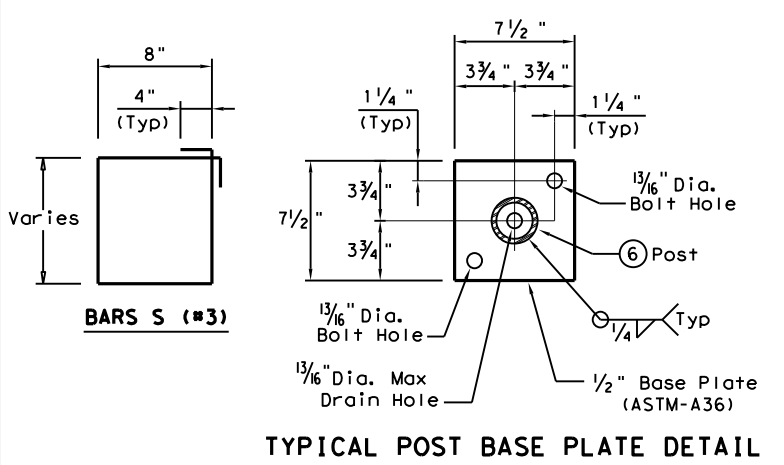


**HANDRAIL FABRICATION DETAILS**

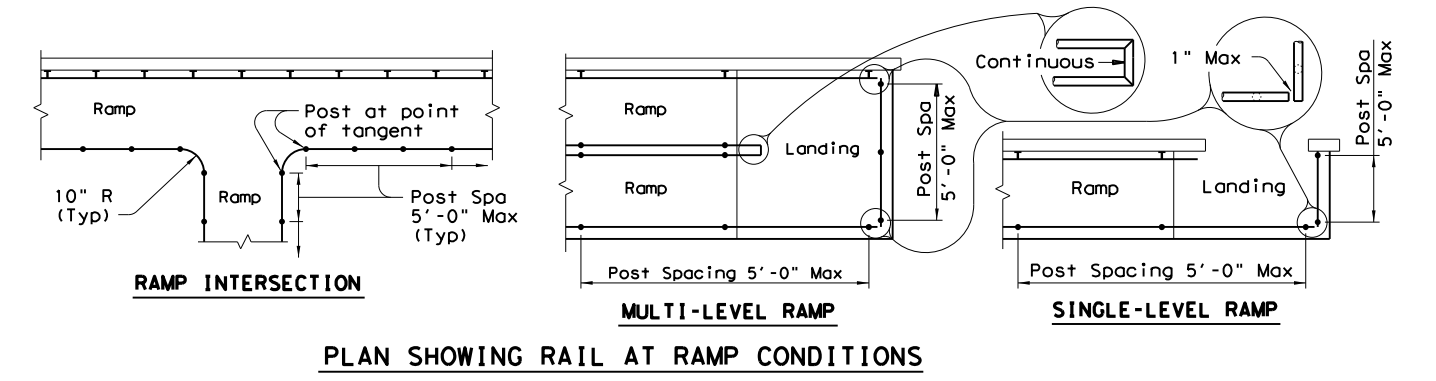


**TYPICAL WALL MOUNT DETAILS**

- (5) 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.
- (6) 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diameter of top rail. Provide holes as needed in post for galvanizing drainage and venting.
- (11) See "General Notes" for anchor bolt information.
- (12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).
- (13) Provide 1 1/2" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



**POST MOUNT DETAILS**



**PLAN SHOWING RAIL AT RAMP CONDITIONS**

**GENERAL NOTES**

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

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

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated #4 = 1'-5" Epoxy coated #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be 5/8" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. 3/8" Dia. threaded rod embedment depth for wall mounts is 3 1/2" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxyes and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be 5/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

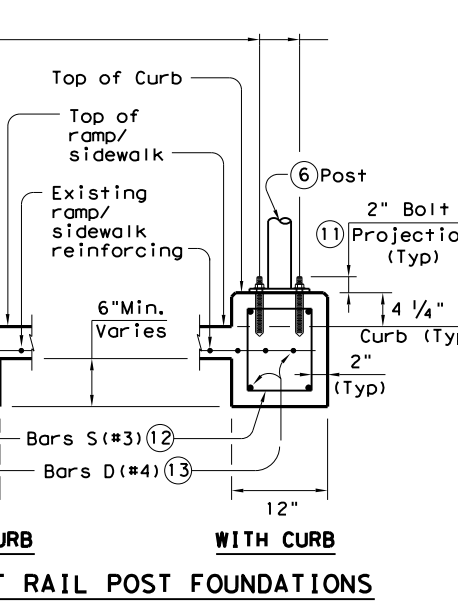
For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

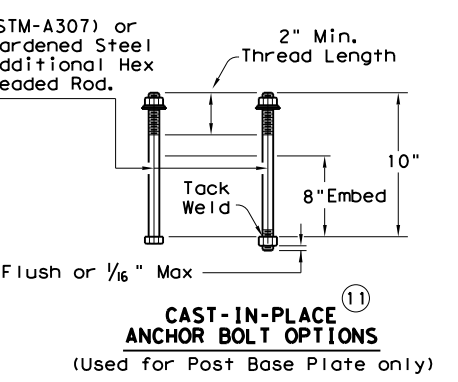
Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately 1/8" by grinding.



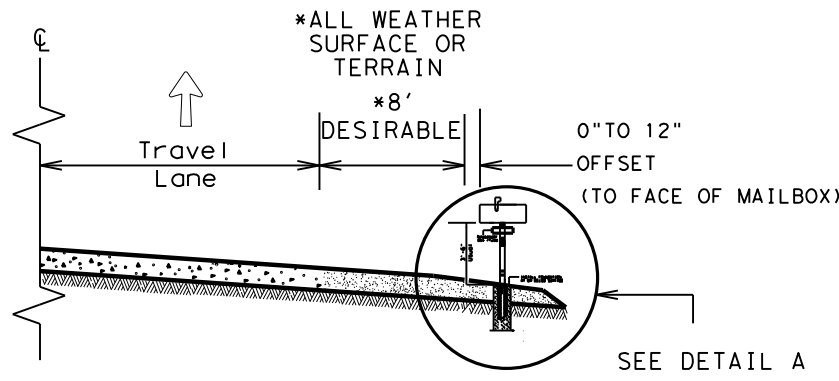
**SECTION AT RAIL POST FOUNDATIONS**



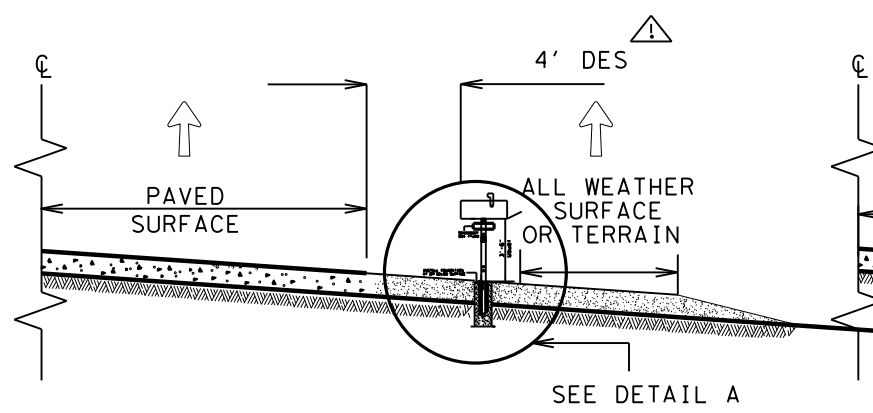
		<b>Design Division Standard</b>	
<b>PEDESTRIAN HANDRAIL DETAILS</b> <b>PRD-13</b>			
FILE: prdl3.dgn	DN: TxDOT	CR: AM	DR: JTR
© TxDOT December 2006	CONT	SECT	JOB
REVISIONS	0921	06	348
REVISED MAY, 2013 (VP)	DIST	COUNTY	SHEET NO.
	PHR	CAMERON	71

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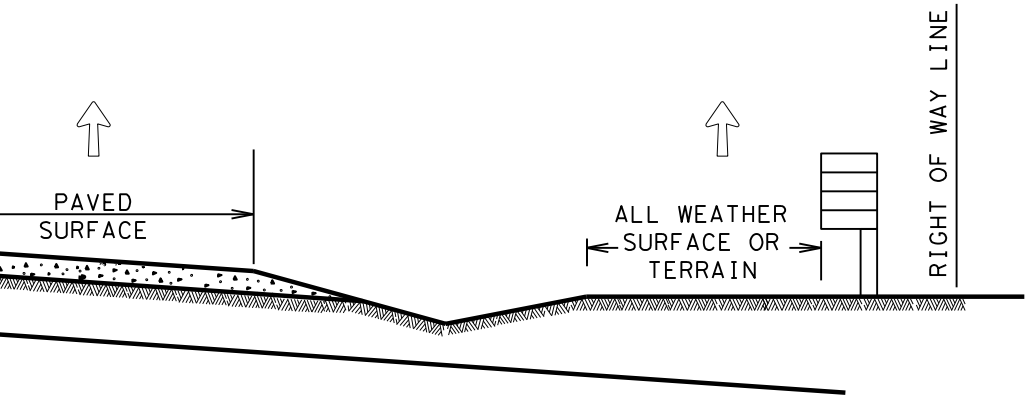
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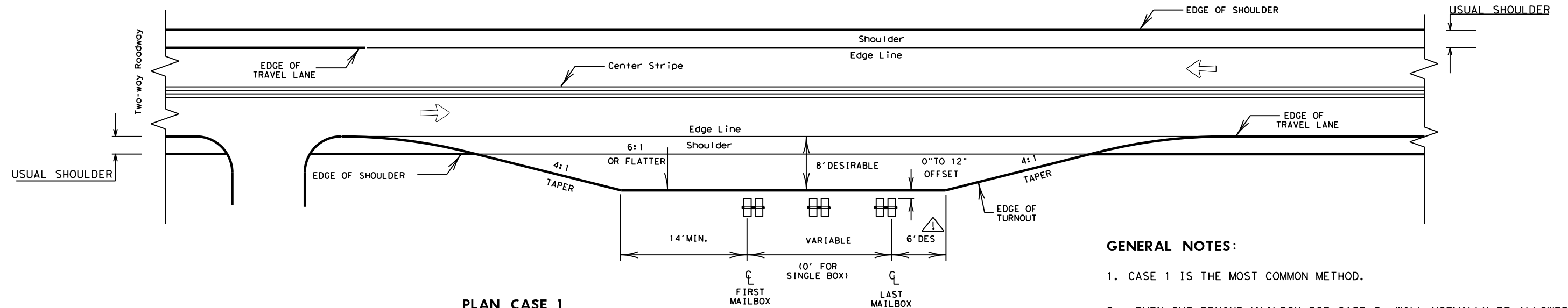
CASE 1. OFF TRAVEL WAY DELIVERY



CASE 2. BACK SIDE DELIVERY



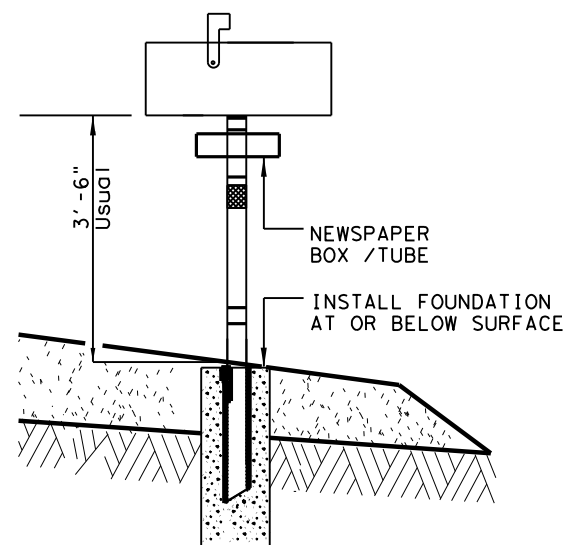
CASE 3. DELIVERY NEAR RIGHT OF WAY LINE



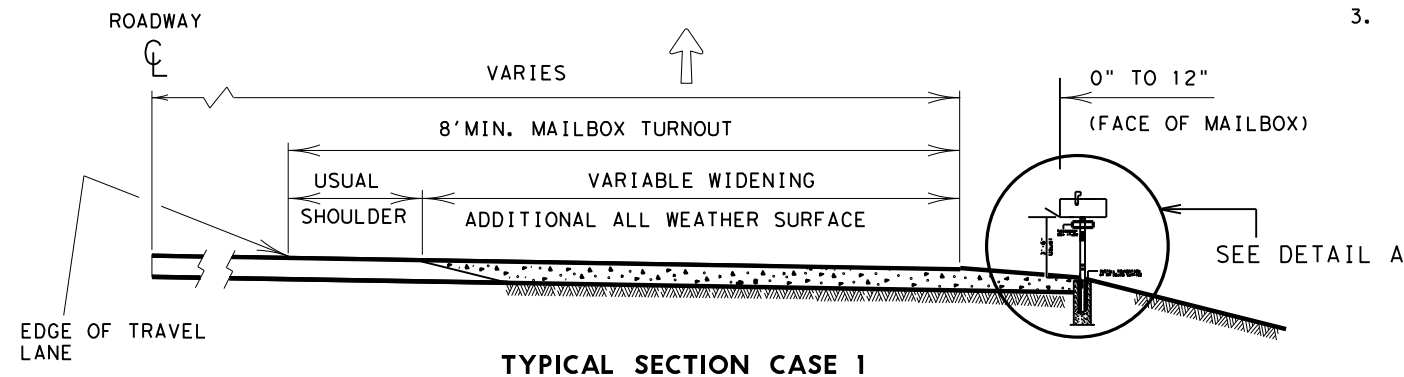
PLAN CASE 1

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. IF THE NUMBER OF MAILBOXES EXCEEDS FOUR, A COMMUNITY MAIL BOX SHOULD BE ENCOURAGED AT THESE LOCATIONS.



DETAIL A



TYPICAL SECTION CASE 1

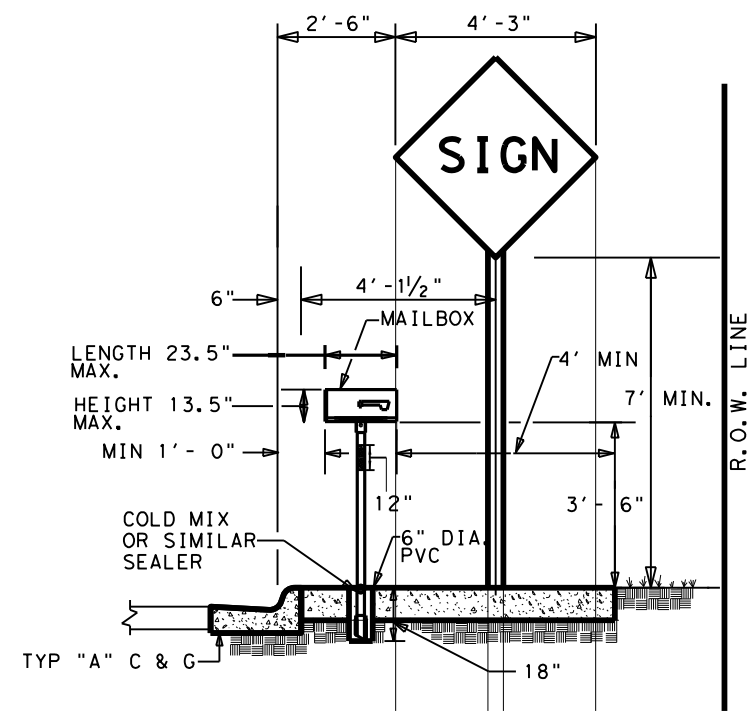
↑ MAIL DELIVERY VEHICLE TRAVEL DIRECTION

SHEET 1 OF 3

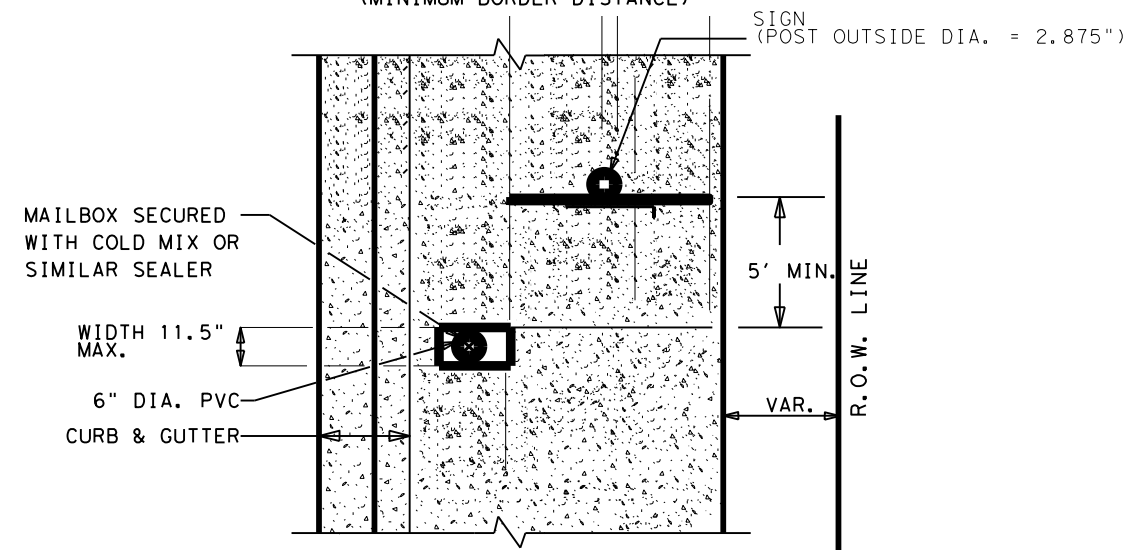
		Maintenance Division Standard	
<i>Guideline</i> <b>MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS MB-14(2)</b>			
FILE: MB14(2).DGN	DW: JEO	CK:	DW: JEO
© TxDOT MAY 2014	CONT	SECT	HIGHWAY
REVISIONS	0921	06	348 VA
DECEMBER 2012-NEW TxDOT TITLE BLOCK	DIST	COUNTY	SHEET NO.
	PHR	CAMERON	72

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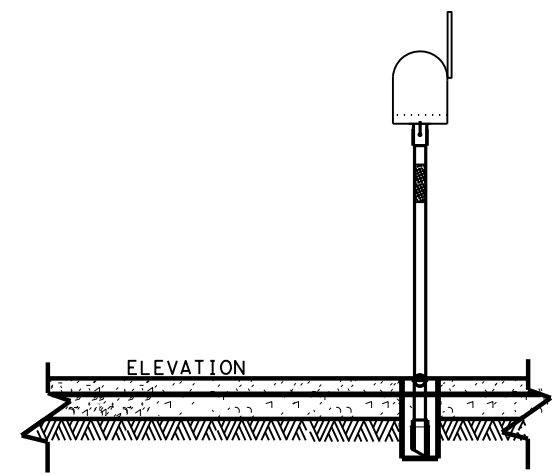
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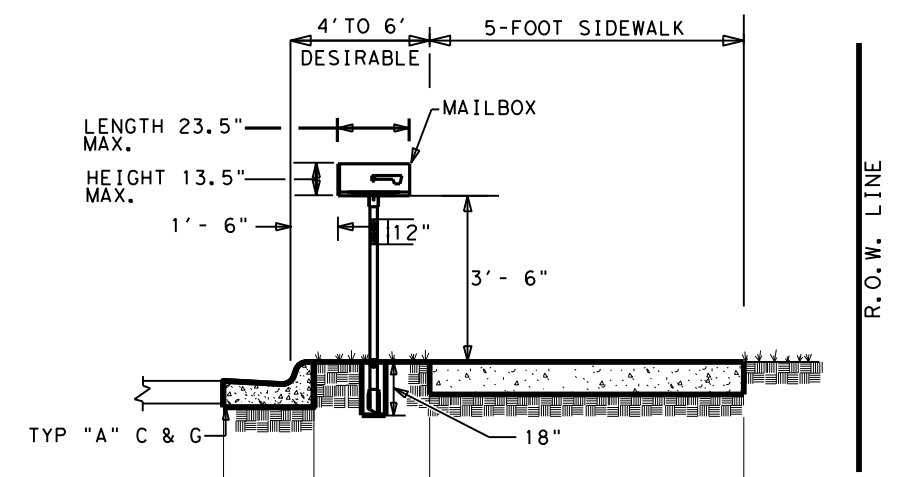
MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN (MINIMUM BORDER DISTANCE)



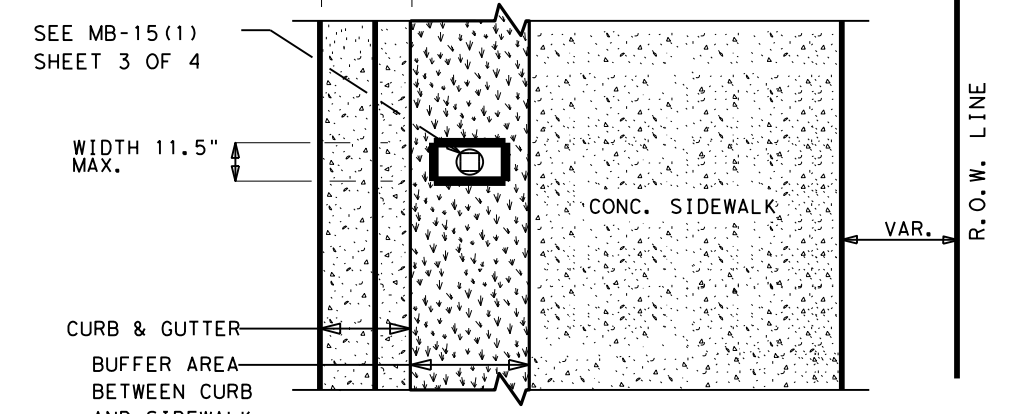
PLAN VIEW



ELEVATION



MAILBOX SIDEWALK INSTALLATION (DESIRABLE BORDER DISTANCE)



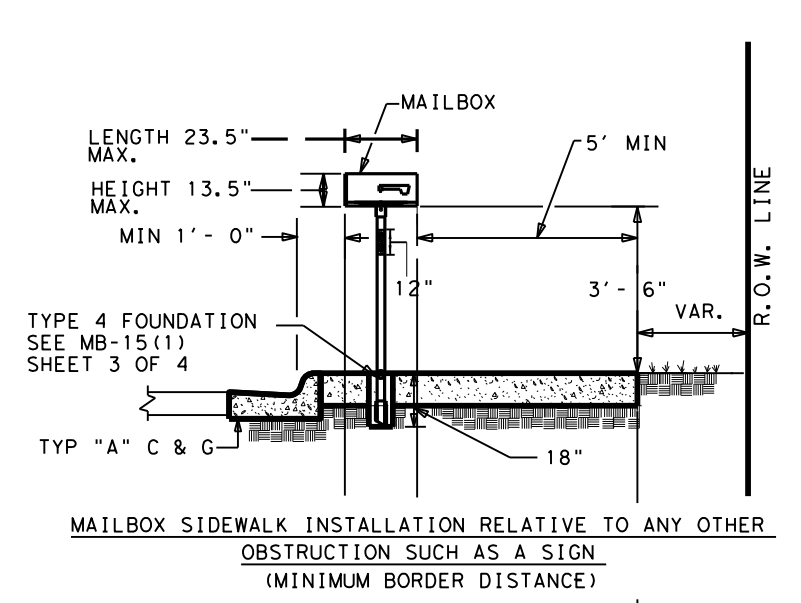
PLAN VIEW

SHEET 2 OF 3

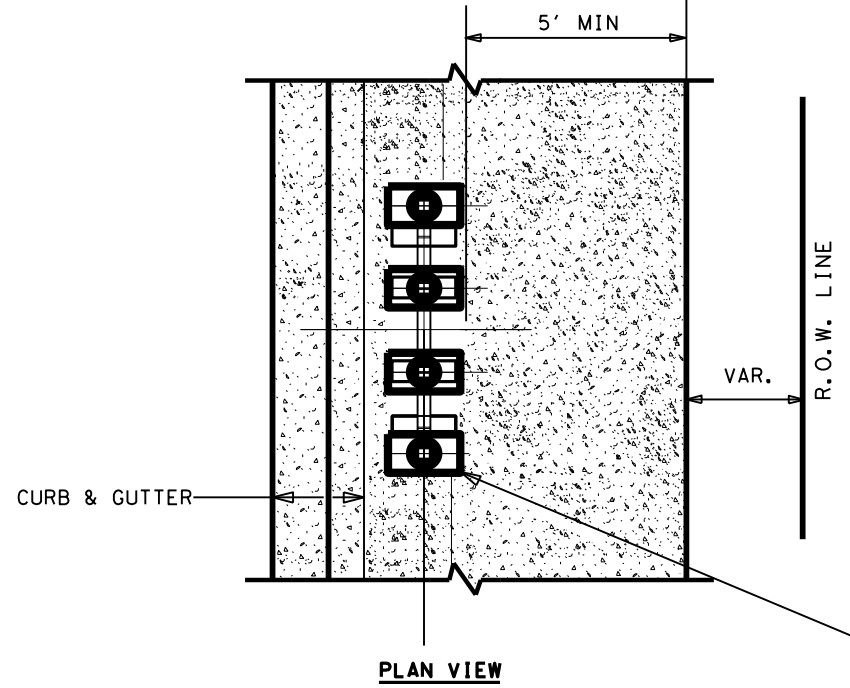
		Maintenance Division Standard	
<b>SINGLE MAILBOX PLACEMENT          BEHIND CURBS WITH OR WITHOUT          SIDEWALKS</b>			
<b>MB-14(2A)</b>			
FILE: MB-14(2A)	DN:	CK:	DR:
© TxDOT MAY 2014	CONT: 0921	SECT: 06	JOB: 348
REVISIONS	DIST: PHR	COUNTY: CAMERON	HIGHWAY: VA
			SHEET NO.: 73

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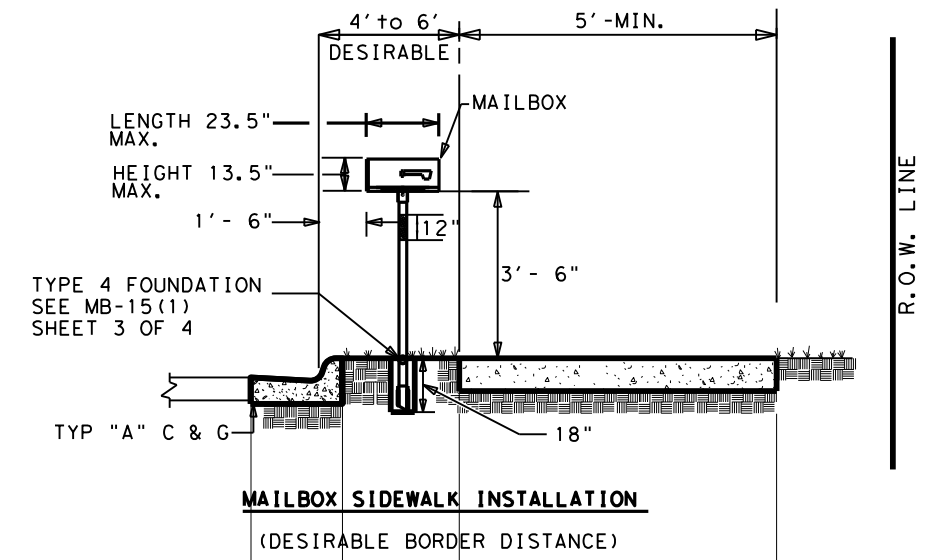
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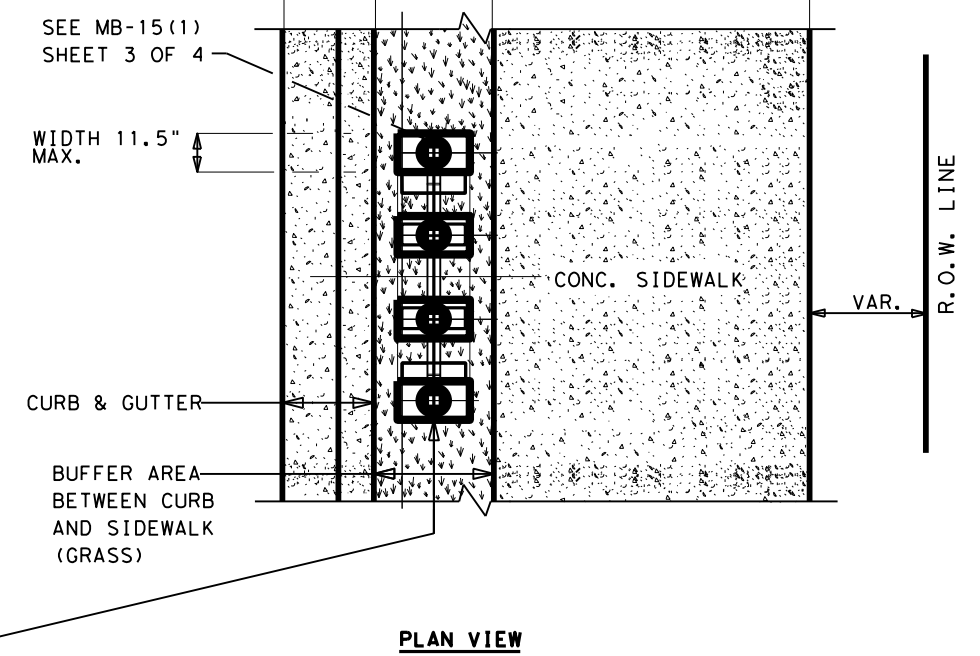
MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN (MINIMUM BORDER DISTANCE)



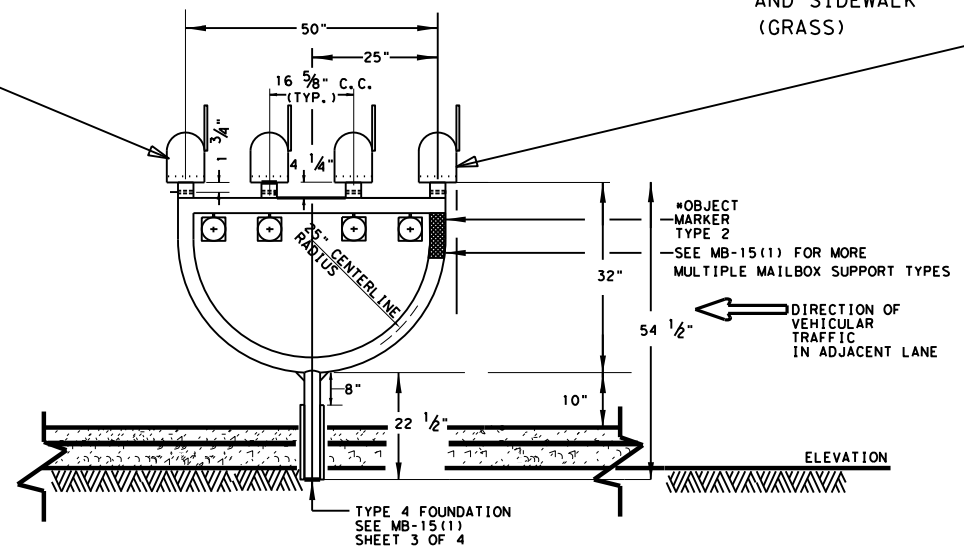
PLAN VIEW



MAILBOX SIDEWALK INSTALLATION (DESIRABLE BORDER DISTANCE)



PLAN VIEW



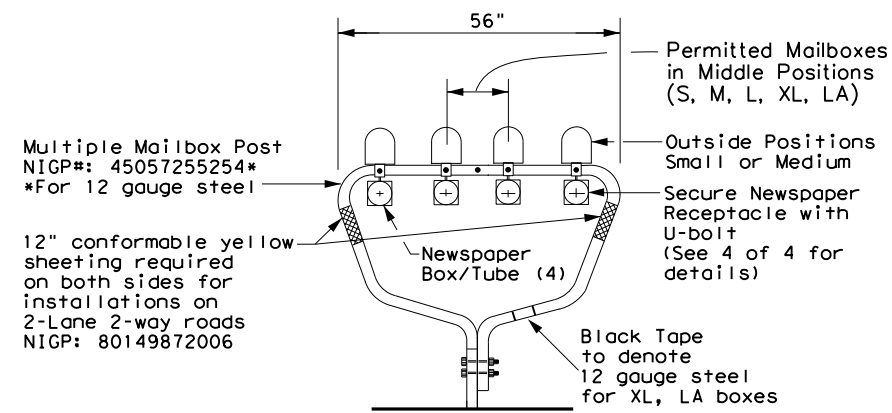
SHEET 3 OF 3

		Maintenance Division Standard	
<b>MULTIPLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS</b> <b>MB-14(2B)</b>			
FILE: MB-14(2A)	DN:	CK:	DR:
© TxDOT MAY 2014	CONT: 0921	SECT: 06	JOB: 348
REVISIONS	DIST: PHR		COUNTY: CAMERON
	HIGHWAY: VA		SHEET NO.: 74

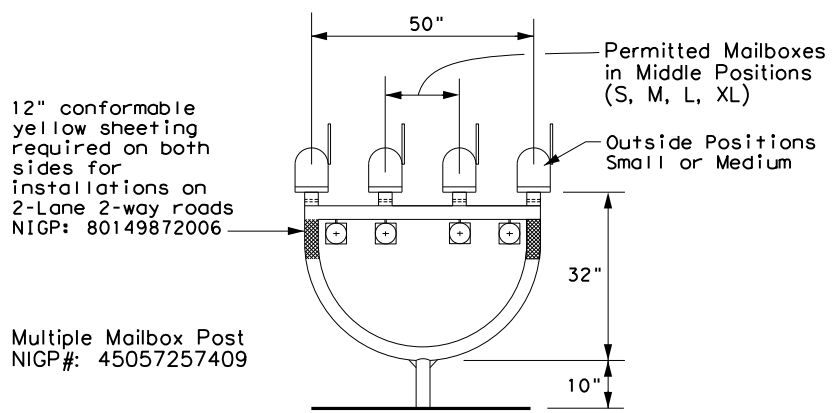
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### TYPE 1 - MULTIPLE



### TYPE 4 - MULTIPLE



### MAILBOX SIZES

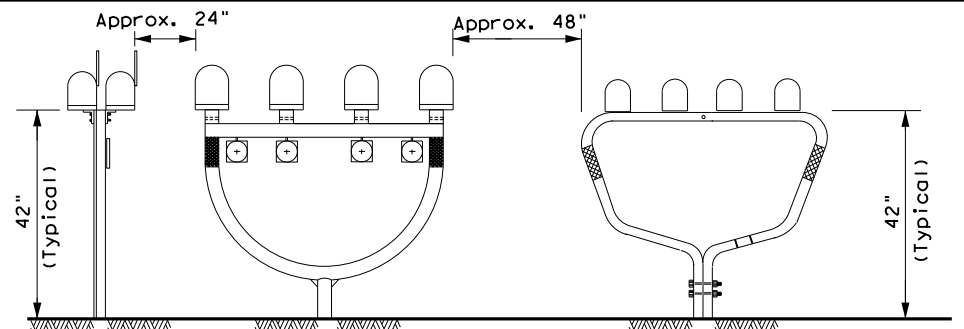
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

#### GENERAL NOTES:

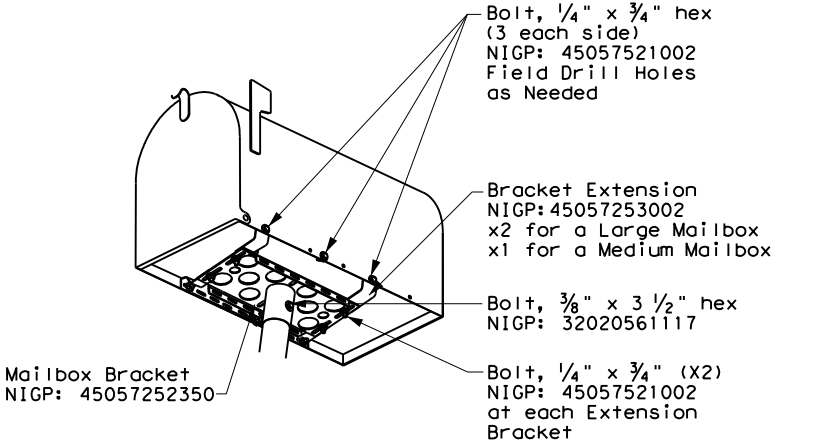
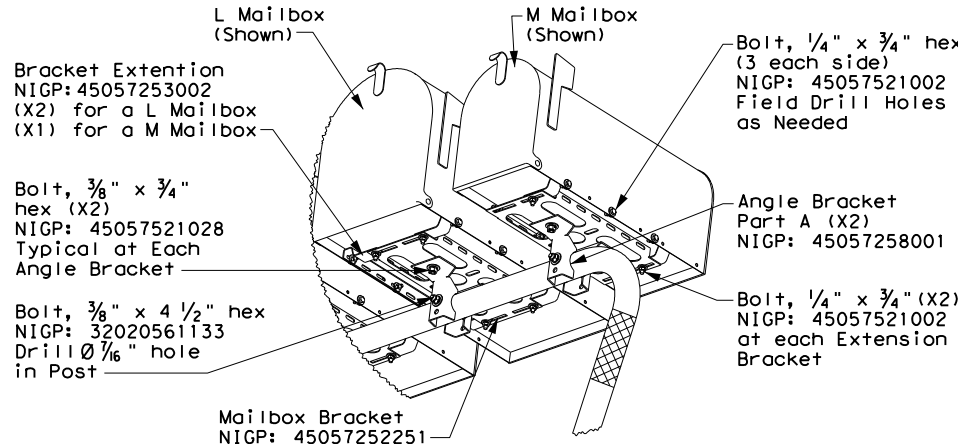
- Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
- Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

\* See Note 1.  
 \*\* Excluding Molded Plastic on 4 X 4 Post

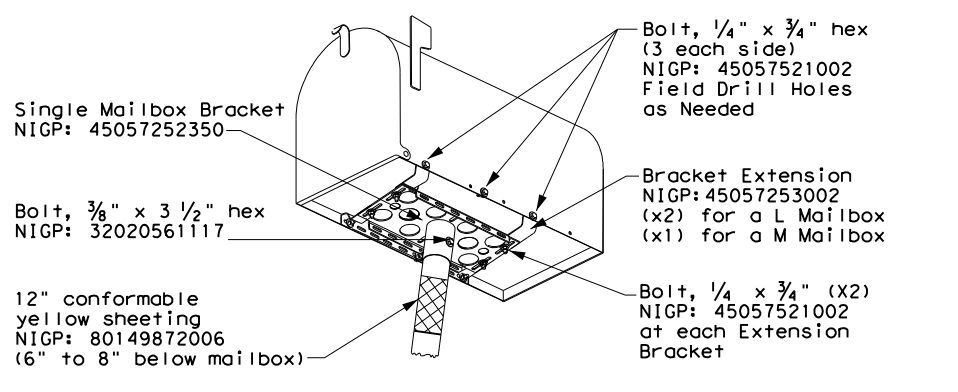
### TYPICAL INSTALLATION MEASUREMENTS



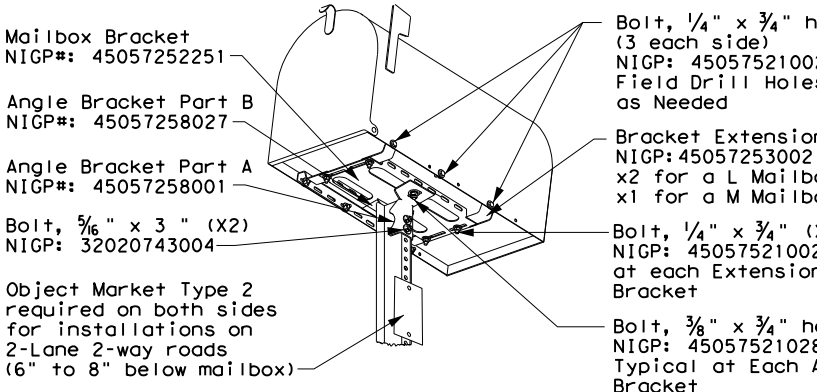
**NOTE:**  
 Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.



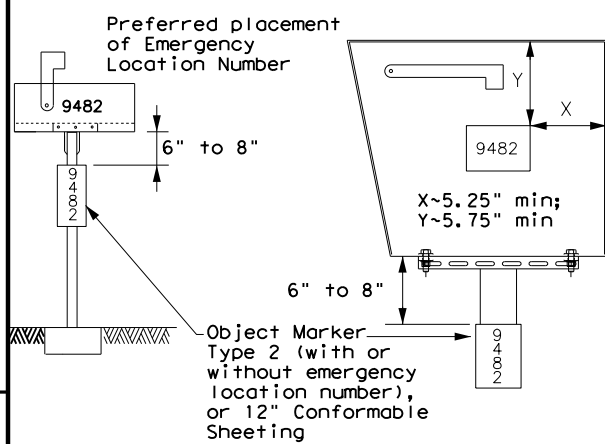
### TYPE 2 and 4 - SINGLE/DOUBLE



### TYPE 3 - SINGLE/DOUBLE



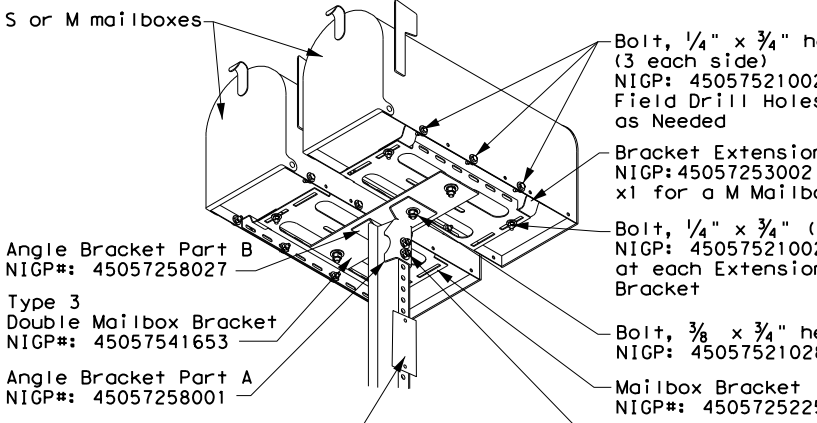
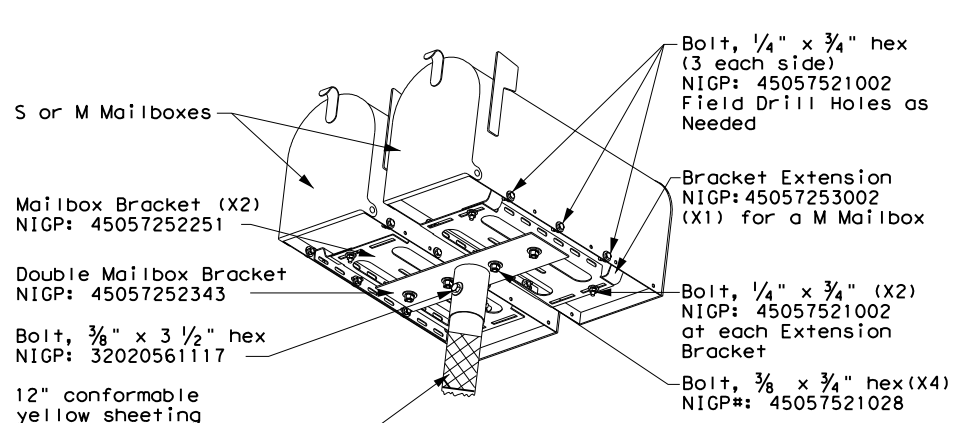
### PLACEMENT OF EMERGENCY LOCATION NUMBER



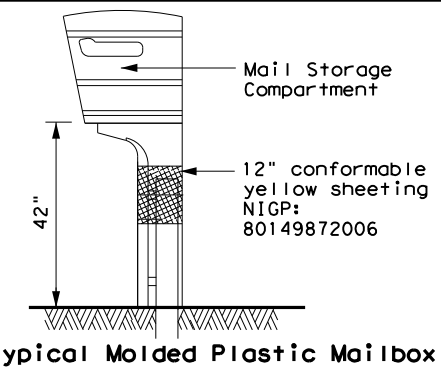
#### NOTES:

- Location numbers are provided by homeowner. Minimum size 1" height.
- Location number is typically placed on the mailbox in a contrasting color.
- Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
- Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
- See 3 of 4 for Foundation details.
- See 4 of 4 for Hardware details.

SHEET 1 OF 4



### TYPE 5



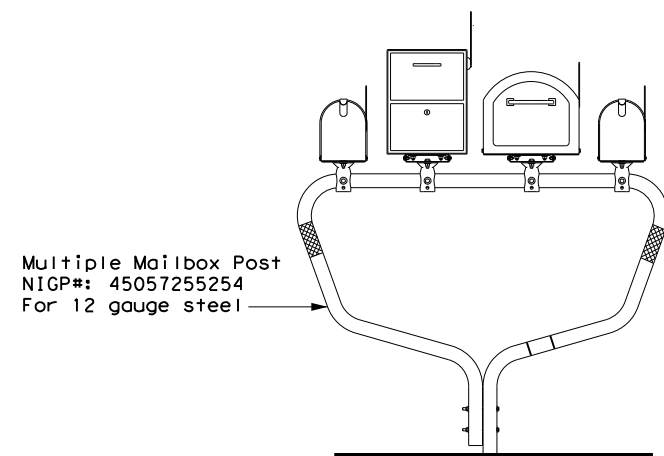
## MAILBOX MOUNTING AND ASSEMBLY

MB (1) - 21

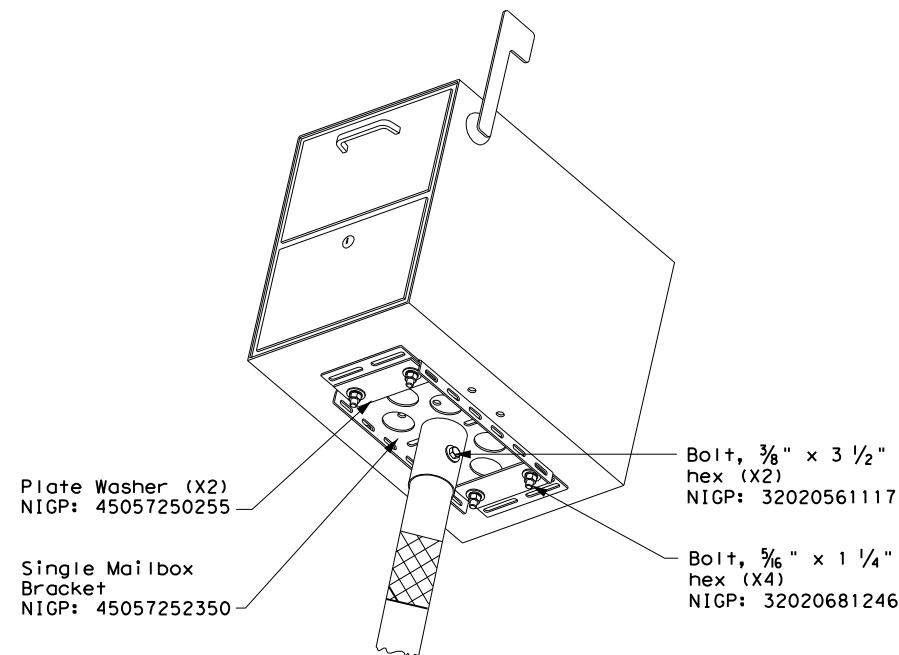
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© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
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2/2005	11/2009	4/2015		
6/2005	1/2011			
11/2006	7/2014			
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	PHR	CAMERON		75

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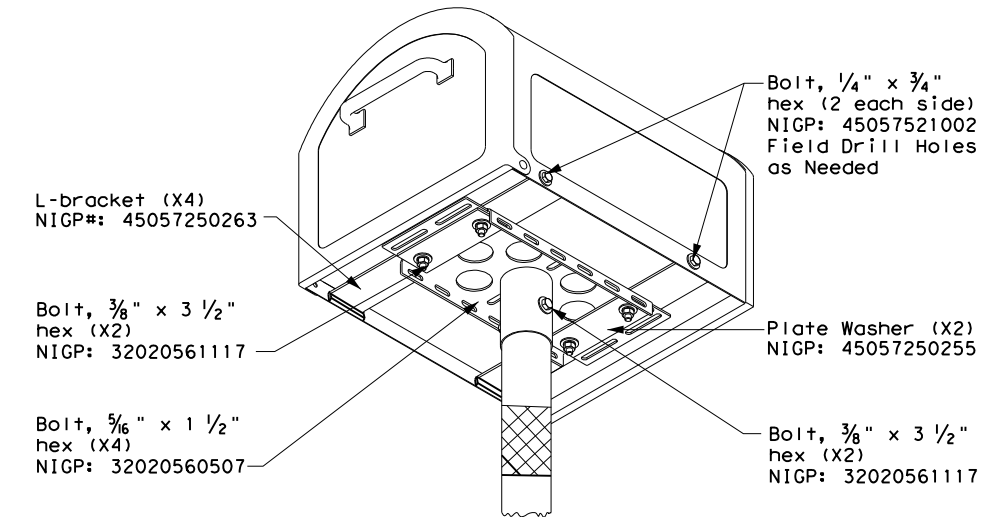
**TYPE 1 - MULTI LOCKABLE AND XL MAILBOX**



**TYPE 2/4 - SINGLE LOCKABLE MAILBOX**

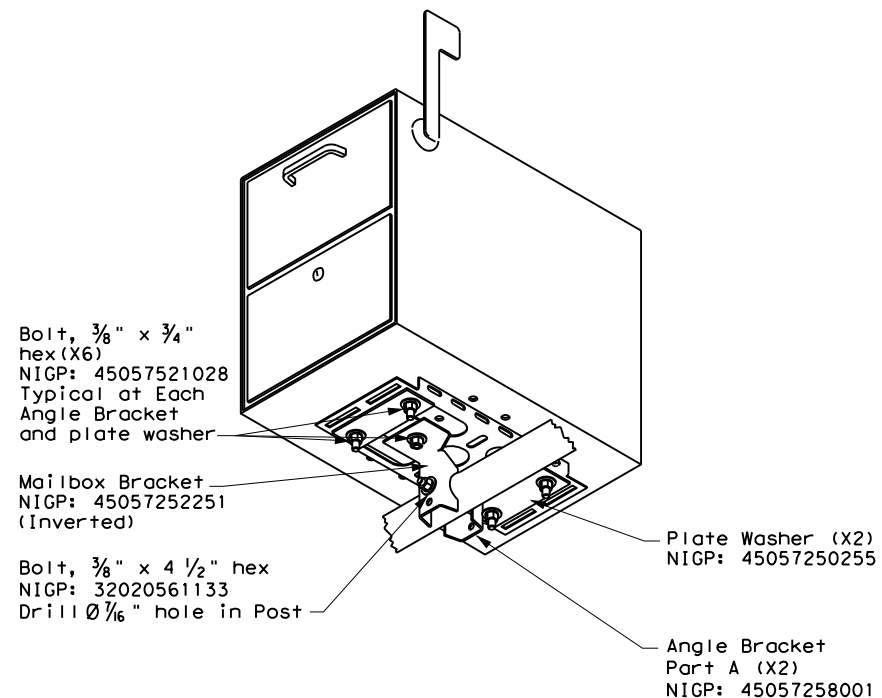


**TYPE 2/4 - SINGLE XL MAILBOX**

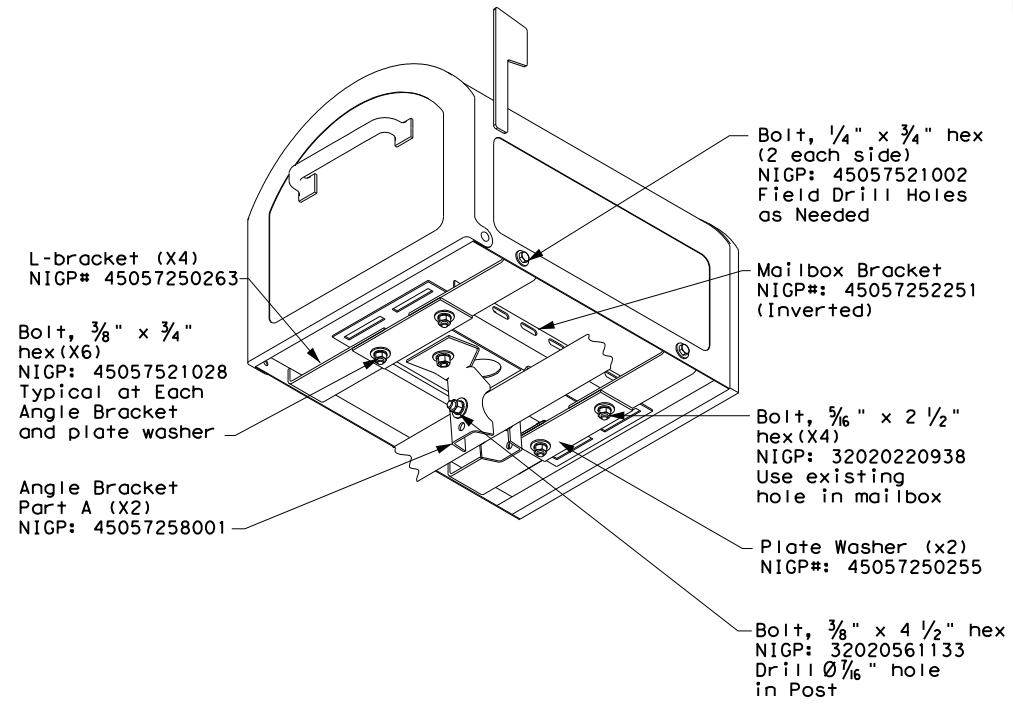


**NOTE:**  
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

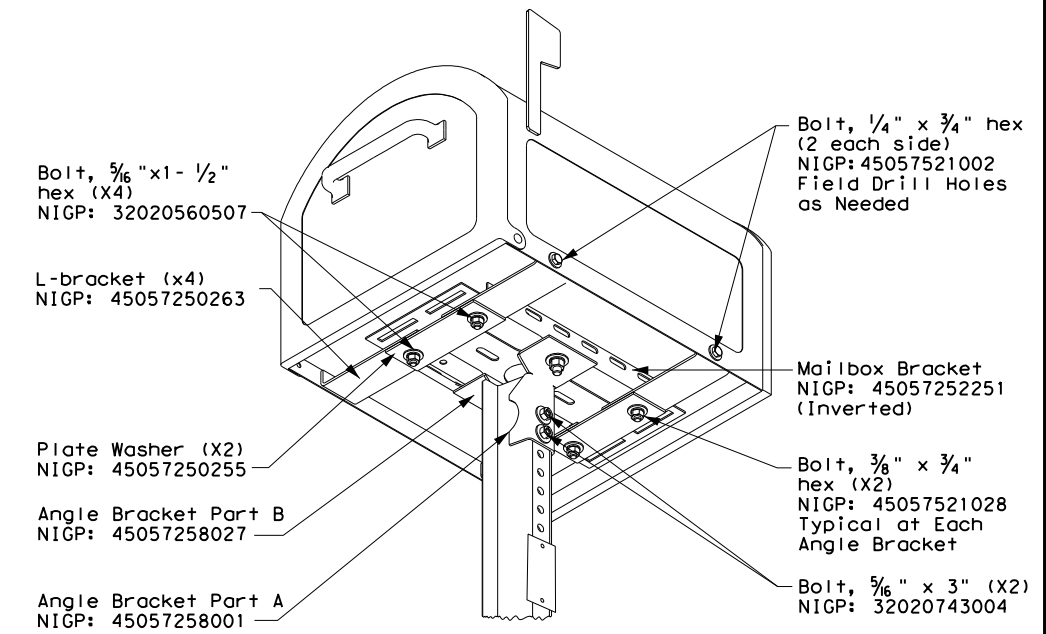
**TYPE 1 MULTI - LOCKABLE ARCHITECTURAL (LA)**



**TYPE 1 MULTI - XL MAILBOX**



**TYPE 3 - XL MAILBOX MOUNTING**



SHEET 2 OF 4

		Maintenance Division Standard	
<p><b>XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY</b></p> <p><b>MB (2) - 21</b></p>			
FILE: MB-21.dgn	DW: TxDOT	CK: TxDOT	DR: TxDOT
© TxDOT March 2004	CONT	SECT	JOB
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11/2006	PHR	CAMERON	76

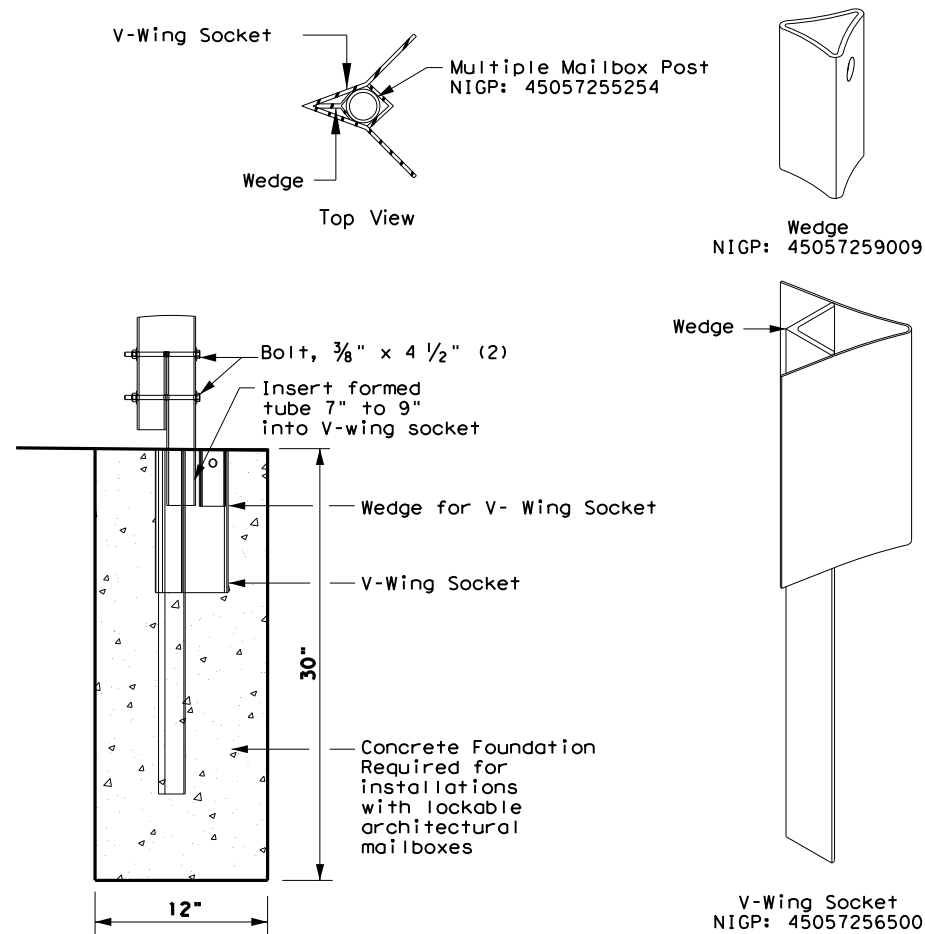


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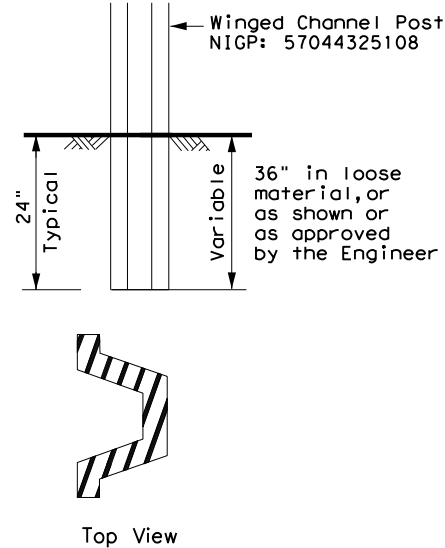
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### TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



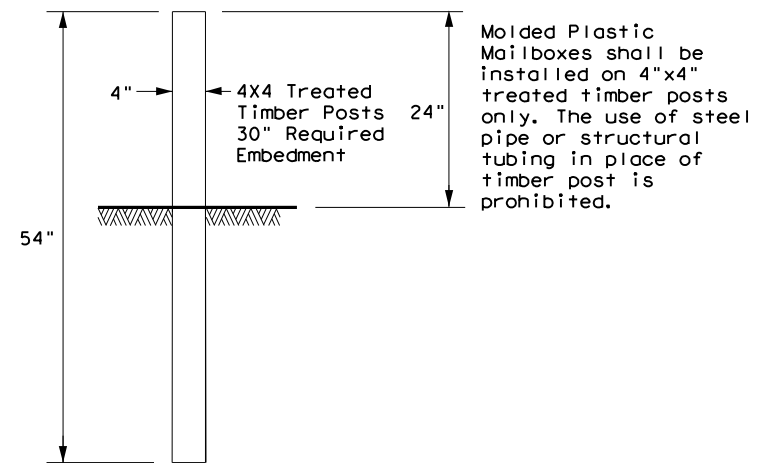
### TYPE 3 - SUPPORT/FOUNDATION



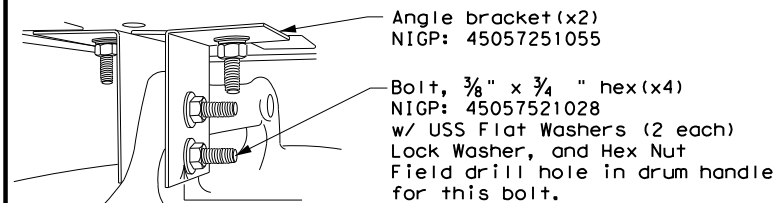
#### NOTES:

1. Attach Object Marker (OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

### TYPE 5 - SUPPORT/FOUNDATION



### TYPE 6 - TEMPORARY MAILBOX SUPPORT



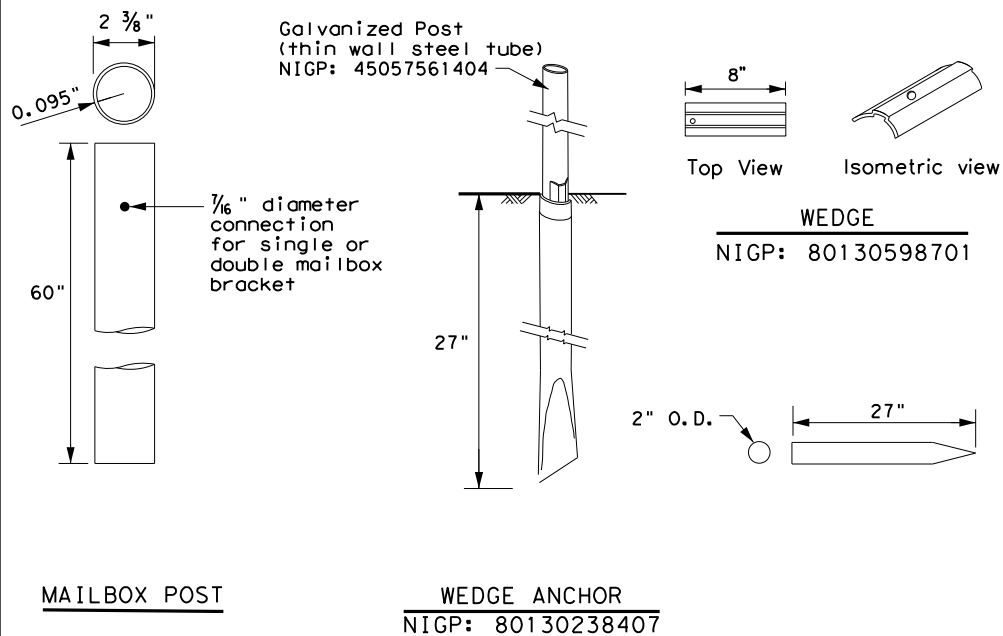
Plastic Drum NIGP: 55093383655  
 Rubber Collar NIGP: 55093387102

#### NOTES:

1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

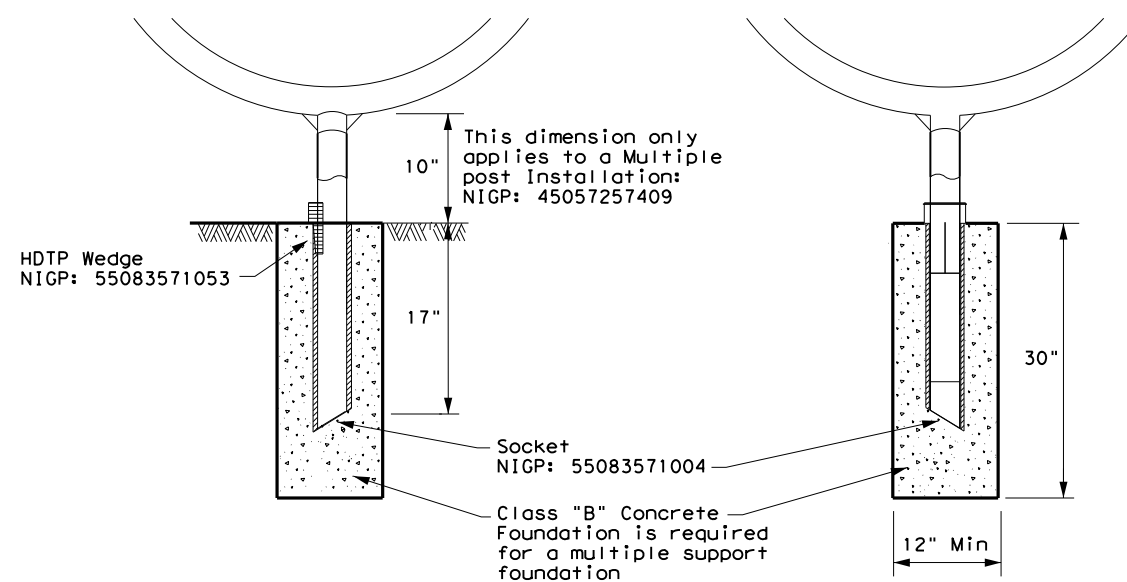
### TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System



### TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107  
 Multiple post NIGP: 45057257409  
 Recycled Rubber post (RR) NIGP: 45057561057



#### GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

SHEET 3 OF 4



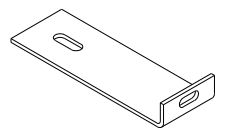
## MAILBOX SUPPORT AND FOUNDATION

MB (3) - 21

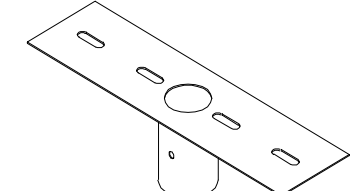
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© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
2/2005	11/2009	4/2015		
6/2005	1/2011			
11/2006	7/2014			
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	PHR	CAMERON	77	

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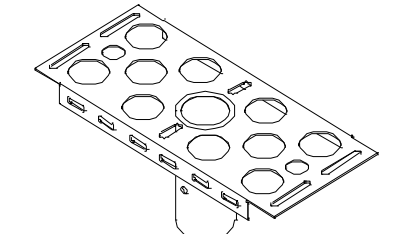
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Govanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete



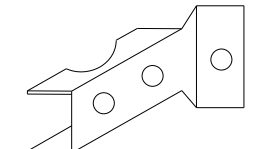
NIGP: 45057250263  
L-Bracket x4 for XL sized mailboxes



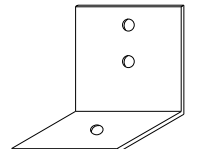
NIGP: 45057252343  
Double Mailbox Bracket For Type 2 and Type 4 double mount



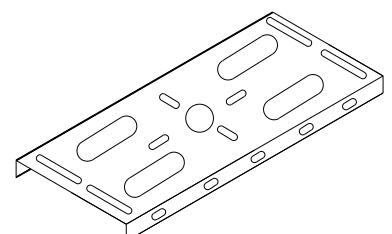
NIGP: 45057252350  
Single Mailbox Bracket For Type 2 single and for Type 4 single and multi mount



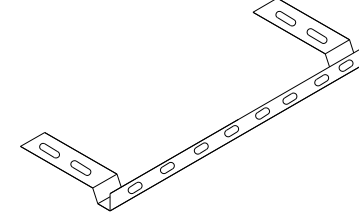
NIGP: 45057258001  
Part "A" Angle Bracket For Type 1 multi (2 per mailbox) and Type 3 single and double



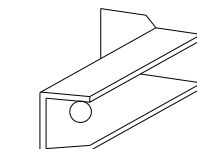
NIGP: 45057251055  
Type 6 Angle Bracket (2 per mailbox)



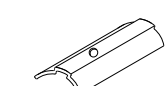
NIGP: 45057252251  
Mailbox Bracket For Type 1 multi and any double mount (use 2)




NIGP: 45057253002  
Bracket Extension Use 1 for a medium Mailbox Use 2 for a Large Mailbox



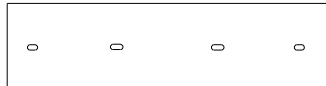
NIGP: 45057258027  
Part "B" Angle Bracket For Type 3 single and double



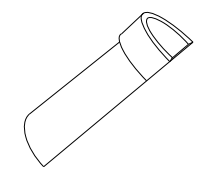
NIGP: 80130598701  
Wedge for Type 2



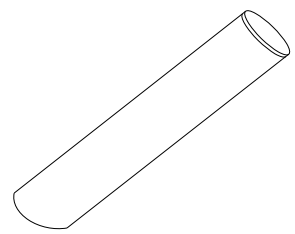
NIGP: 45057250255  
Plate Washer for Architecural and XL Mailboxes




NIGP: 45057541653  
Type 3 double mailbox bracket



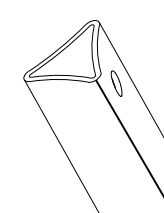
NIGP: 55083571053  
Type 4 Mailbox Wedge



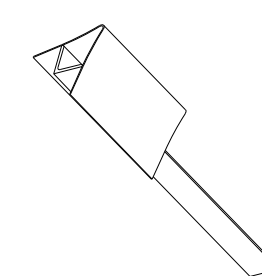
NIGP: 55083571004  
Type 4 Mailbox Socket



NIGP: 80130238407  
Type 2 Wedge Anchor



NIGP: 45057259009  
Wedge for Type 1 V-wing Socket



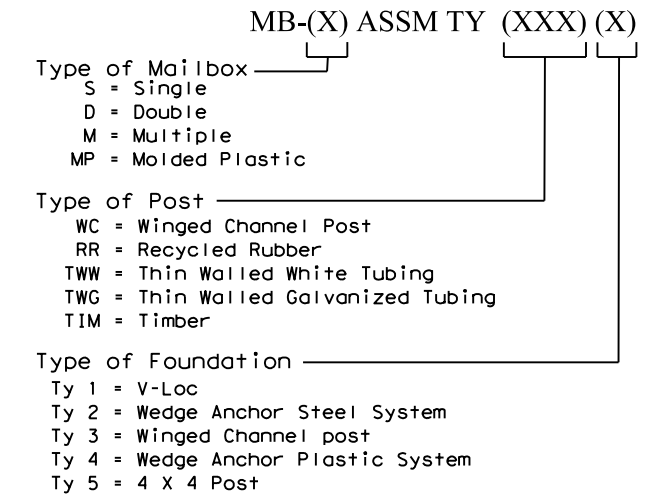
NIGP: 45057256500  
V-wing Socket for Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts


**NOTES:**

- Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
- A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

**BID CODES FOR CONTRACTS**

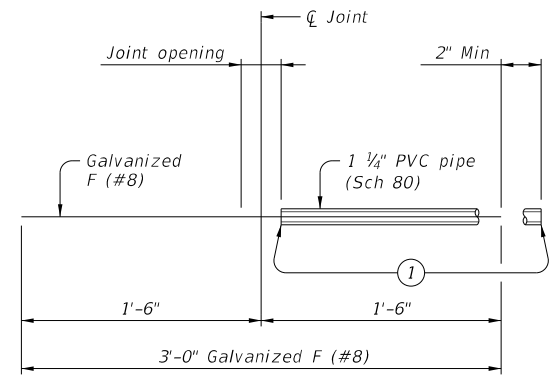


SHEET 4 OF 4

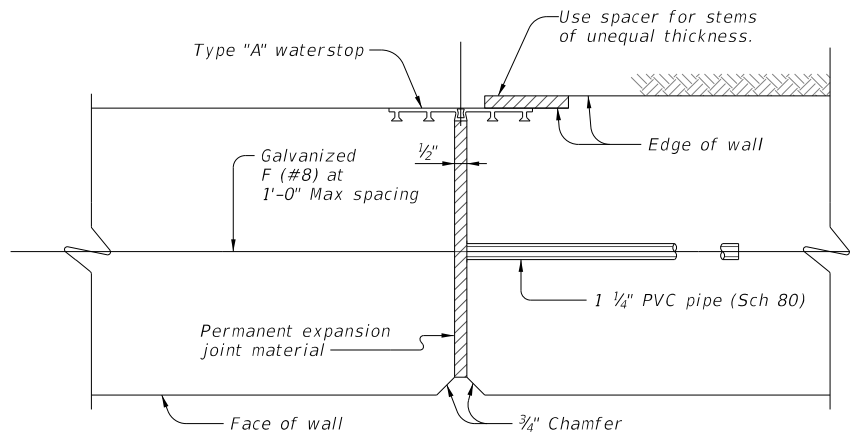
 Texas Department of Transportation				Maintenance Division Standard	
<h2>NIGP PARTS LIST AND COMPATIBILITY</h2> <h3>MB(4) - 21</h3>					
FILE: MB-21.dgn	DW: TxDOT	CK: TxDOT	DR: TxDOT	CR: TxDOT	
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0921	06	348	VA	
2/2005	11/2009	4/2015		DIST	COUNTY
6/2005	1/2011			PHR	SHEET NO.
11/2006	7/2014			CAMERON	78

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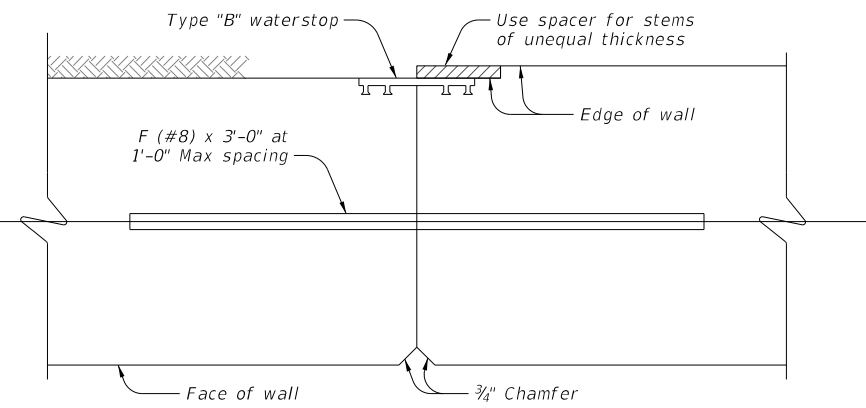
DATE: 2023-05-30 16:24:47  
 FILE: S:\Projects\61254\02\Design\01\_Rto\_Hondo\_ADA\Civil\Standards\Retaining Walls\RW-SF-22.dgn



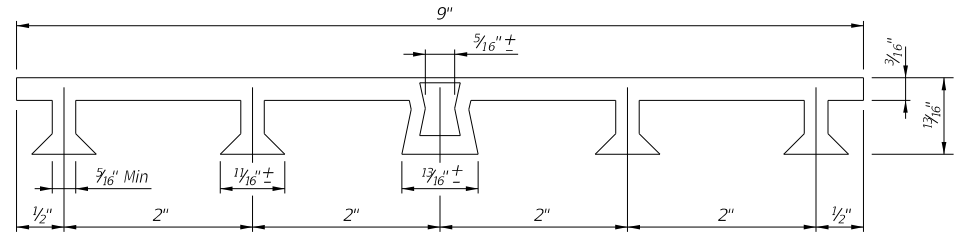
**BAR F (#8) ASSEMBLY DETAIL**



**EXPANSION JOINT**

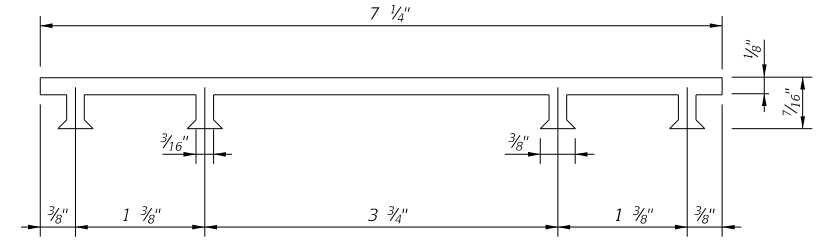


**CONSTRUCTION JOINT**



**PVC WATERSTOP TYPE "A"**

Note: Dimensions and shapes may vary slightly depending on manufacturer.



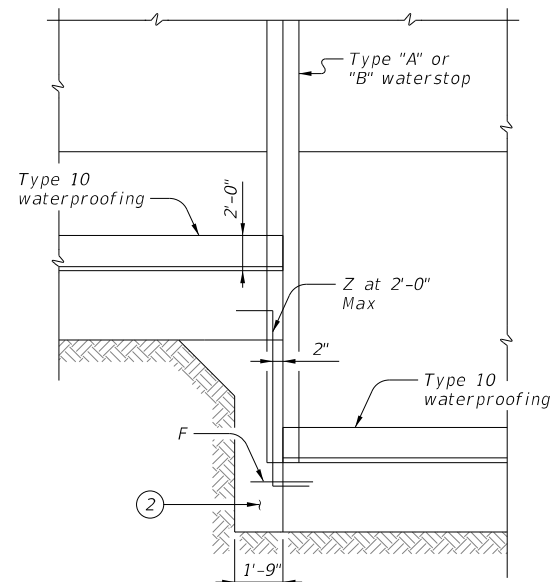
**PVC WATERSTOP TYPE "B"**

- ① Tape ends of 1 1/4" PVC Schedule 80 to prevent concrete or mortar from seeping in.
- ② Class C unreinforced concrete when difference in top of footing elevations is less than 2 feet. Omit when Dowel Bars F can be placed between adjacent footings with 4-inch cover top and bottom. Footing elevation difference not to exceed 4 feet.
- ③ Underdrain pipe to be in accordance with Item 556, "Pipe Underdrains."

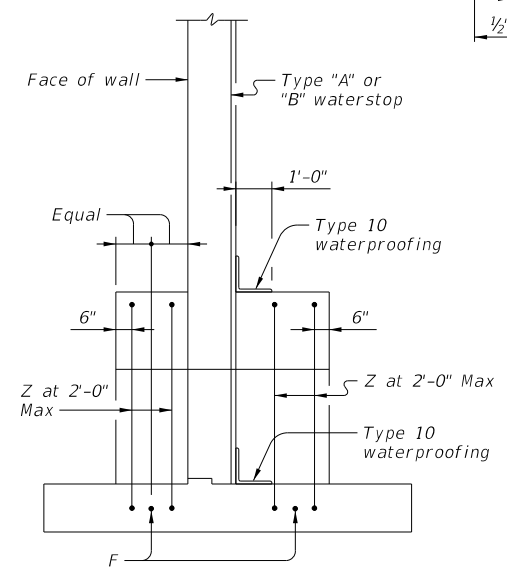
**MATERIAL NOTES:**  
 Provide Class C concrete (f'c=3,600 psi.)  
 Provide Grade 60 reinforcing steel.

**GENERAL NOTES:**  
 Designed according to AASHTO LRFD Bridge Design Specifications.  
 Walls are designed assuming unit weight of soil = 120 pcf and a friction angle = 30 degrees for foundation and retained soil.  
 The undisturbed or compacted soil depth in front of walls must not measure less than  $K_d + F_t + 1$  foot as measured upwards from bottom of key.  
 Retaining walls are detailed to be placed on grades up to 10% with level footing, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A and Bars B and increasing the length of legs of Bars U by the same amount. No change in quantities will be required.  
 Retaining walls may be placed on horizontal curves by adjusting lengths of Bars T and Bars H in the footing. Minor revisions to concrete quantities may be required as a result.

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

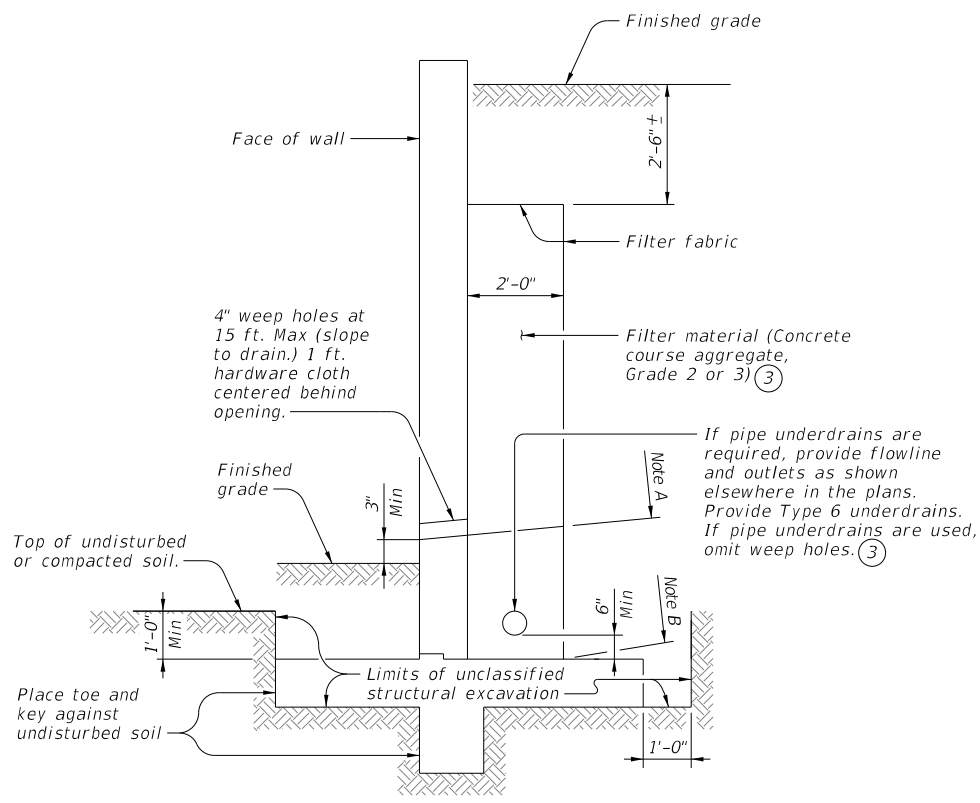


**PARTIAL ELEVATION**



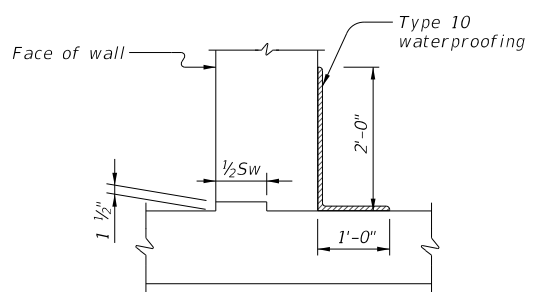
**PARTIAL SECTION**

**SHOWING WATERSTOP AT FOOTING ELEVATION TRANSITION**

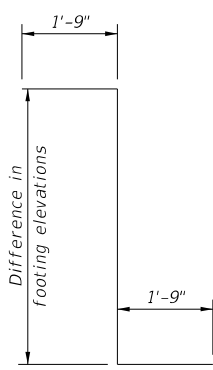


**DRAINAGE DETAILS AND EXCAVATION DIAGRAM**

- Note A: Stop coarse aggregate at this level when weep holes are used.
- Note B: Use coarse aggregate to here when underdrains are used.



**JOINT AND WATERSTOP DETAILS**



**BARS Z (#5)**  
 (Omit Bars Z when difference in top of footing elevations is less than 2 ft).

		<b>Bridge Division Standard</b>	
<b>SPREAD FOOTING RETAINING WALL MISCELLANEOUS DETAILS</b>			
<b>RW(SF)</b>			
FILE: RW-SF-22.dgn	DN: TAR	CK: RLE	DW: JER
©TxDOT June 2022	CONT SECT	JOB	HIGHWAY
REVISIONS	0921 06	348	VA
8-22: Updated underdrain requirements.	DIST	COUNTY	SHEET NO.
	PHR	CAMERON	79

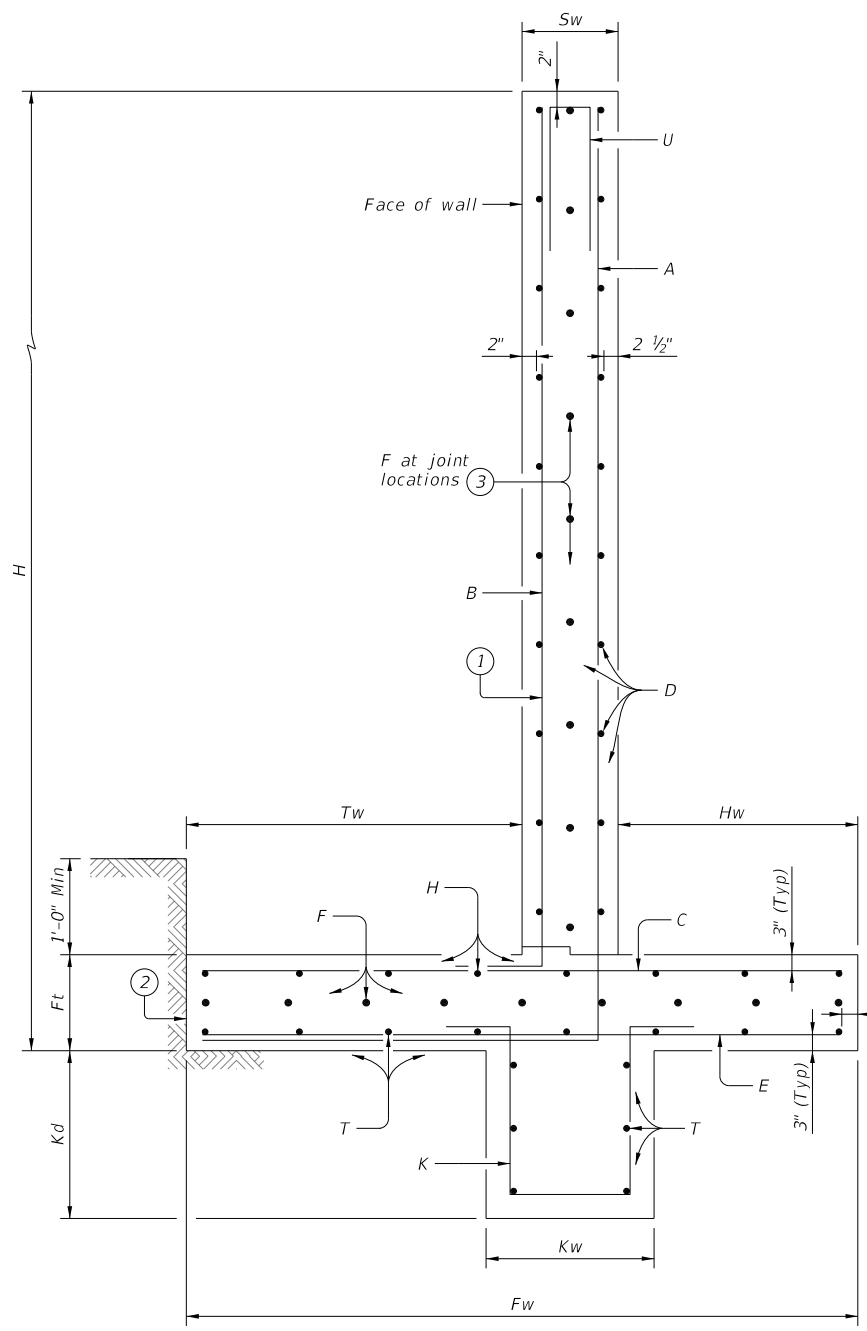




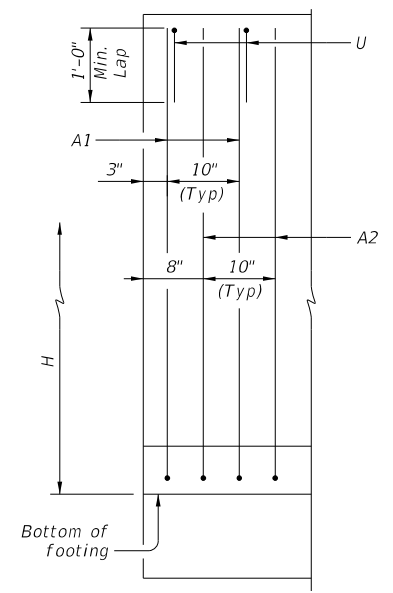
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DATE: 2023-05-30 16:24:51  
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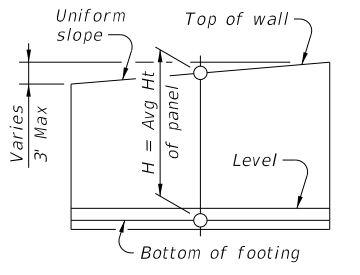
Wall Height "H" (Ft)	PROPERTIES								REINFORCING STEEL FOR ONE 32' PANEL (DESIGN C)																				QUANTITY FOR ONE 32' PANEL		Wall Height "H" (Ft)																				
	WALL DIMENSIONS							MAX SOIL PRESS T/SF	Bars A1		Bars A2		Bars B		Bars C		Bars E		Bars K		D (#5) at 12" Max.		Dowel F at 12" Max.		H (#5) at 12" Max.		T (#5) at 12" Max.		U ~ 39 #5 at 10" Max			Conc (CY)	REINF (LB)																		
	Fw	Tw	Sw	Hw	Ft	Kw	Kd		No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size				Spa.	Length	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	Length	Weight					
2	5'-0"	1'-0"	1'-0"	3'-0"	1'-0"	1'-0"	1'-0"	0.218	39	#4	10"	3'-2"	83	39	#4	10"	3'-2"	83	39	#4	10"	1'-11"	50	39	#4	10"	4'-6"	118	39	#4	10"	4'-6"	118	39	#4	10"	3'-10"	100	4	132	8	65	6	198	6	198	2'-0"	82	8.3	1227	2
4	5'-0"	1'-0"	1'-0"	3'-0"	1'-0"	1'-0"	1'-0"	0.321	39	#4	10"	5'-2"	135	39	#4	10"	5'-2"	135	39	#4	10"	3'-11"	103	39	#4	10"	4'-6"	118	39	#4	10"	4'-6"	118	39	#4	10"	3'-10"	100	8	263	10	81	6	198	6	198	6'-0"	245	10.7	1694	4
6	5'-6"	1'-6"	1'-0"	3'-0"	1'-0"	1'-0"	1'-0"	0.395	39	#4	10"	7'-8"	200	39	#4	10"	7'-8"	200	39	#4	10"	5'-11"	155	39	#4	10"	5'-0"	131	39	#4	10"	5'-0"	131	39	#4	10"	3'-10"	100	12	395	12	97	6	198	6	198	8'-5"	343	13.7	2148	6
8	7'-4"	1'-9"	1'-1"	4'-6"	1'-0"	1'-0"	1'-0"	0.500	39	#4	10"	10'-0"	261	39	#4	10"	10'-0"	261	39	#4	10"	7'-11"	207	39	#4	10"	6'-10"	179	39	#4	10"	6'-10"	179	39	#4	10"	3'-10"	100	16	526	16	129	8	263	8	263	8'-6"	346	18.9	2714	8
10	8'-8"	2'-4"	1'-1"	5'-3"	1'-2"	1'-6"	1'-2"	0.590	39	#5	10"	12'-7"	512	39	#4	10"	12'-7"	328	39	#4	10"	9'-9"	255	39	#5	10"	8'-2"	333	39	#4	10"	8'-2"	213	39	#4	10"	5'-4"	139	20	658	20	161	10	329	10	329	8'-6"	346	26.0	3603	10
12	10'-4"	2'-11"	1'-2"	6'-3"	1'-4"	1'-9"	1'-9"	0.684	39	#5	10"	15'-3"	621	39	#4	10"	15'-3"	398	39	#4	10"	11'-7"	302	39	#5	10"	9'-10"	400	39	#4	10"	9'-10"	257	39	#4	10"	6'-1"	159	24	789	23	185	11	362	11	362	8'-7"	350	34.8	4185	12
14	11'-8"	3'-6"	1'-4"	6'-10"	1'-7"	2'-0"	2'-0"	0.769	39	#5	10"	18'-0"	733	39	#4	10"	18'-0"	469	39	#4	10"	13'-4"	348	39	#5	10"	11'-2"	455	39	#4	10"	11'-2"	291	39	#4	10"	6'-10"	179	28	920	27	217	13	428	13	428	8'-9"	356	46.3	4824	14
16	13'-1"	4'-0"	1'-6"	7'-7"	1'-9"	2'-0"	2'-0"	0.853	39	#5	10"	20'-8"	841	39	#5	10"	20'-8"	841	39	#4	10"	15'-2"	396	39	#6	10"	12'-7"	738	39	#4	10"	12'-7"	329	39	#4	10"	6'-10"	179	32	1052	30	241	14	460	14	460	8'-11"	363	57.3	5900	16
18	14'-7"	4'-6"	1'-8"	8'-5"	1'-9"	2'-0"	2'-0"	0.937	39	#6	10"	23'-4"	1367	39	#5	10"	23'-4"	950	39	#4	10"	17'-2"	448	39	#7	10"	14'-1"	1124	39	#4	10"	14'-1"	368	39	#4	10"	6'-10"	179	36	1183	34	273	16	526	16	526	9'-1"	370	67.1	7314	18
20	16'-5"	5'-0"	1'-10"	9'-7"	2'-0"	2'-0"	2'-0"	1.039	39	#6	10"	26'-0"	1524	39	#6	10"	26'-0"	1524	39	#4	10"	18'-11"	493	39	#7	10"	17'-11"	1429	39	#4	10"	17'-11"	467	39	#4	10"	6'-10"	179	38	1249	36	289	17	559	17	559	9'-3"	377	82.8	8649	20



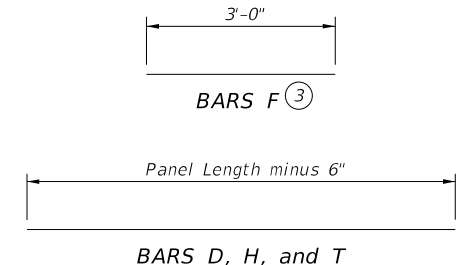
SECTION



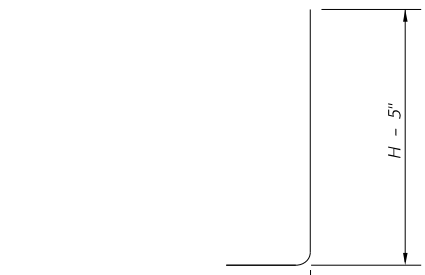
PARTIAL WALL ELEVATION  
(Showing vertical reinforcing pattern in back face.)



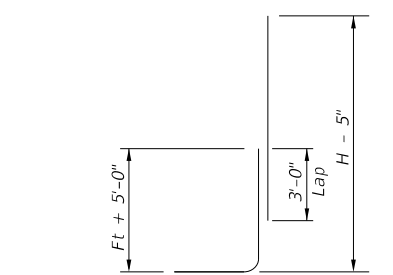
H DEFINITION



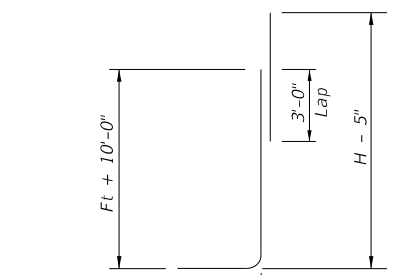
BARS D, H, and T



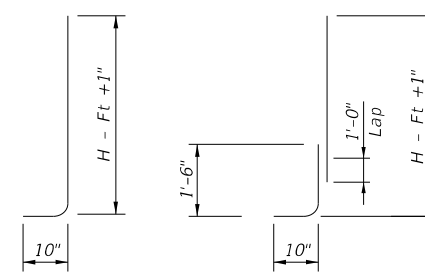
BARS A1 & A2



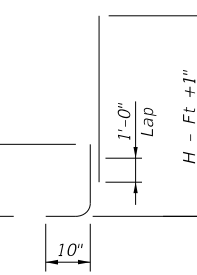
OPTIONAL BARS A1



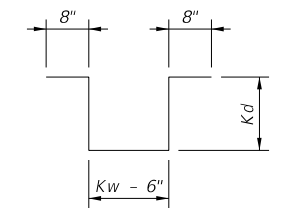
OPTIONAL BARS A2



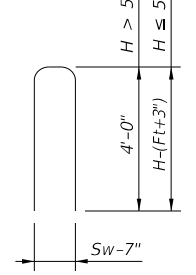
BARS B



OPTIONAL BARS B



BARS K



BARS U

- Place vertical bars inside of horizontal bars (Typical both faces).
- Place footing toe against undisturbed soil.
- See Retaining Wall Miscellaneous Details (RW(SF)) standard for size.
- Optional bars splices not included in above table.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi).  
 Provide Grade 60 reinforcing steel.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.  
 Walls are designed assuming unit weight of soil = 120 pcf and a friction angle = 30 degrees for foundation and retained soil.  
 See Retaining Wall Miscellaneous Details (RW(SF)) standard for details and notes not shown.  
 These details provide designs for wall heights of 2 to 20 feet. For heights not shown, round up "H" to determine wall dimensions and reinforcing. (For example, a 9-foot high wall would use the 10-foot high dimensions and reinforcing.)  
 Quantities are based on "H" being average height of panel.  
 Retaining walls are designed to be coded as follows on Retaining Wall Layout Sheets:

- C - 15 - 32 Panel length ~ 32 ft. is standard; 28 ft. requires special quantities.
- Average height (H) of panel.
- Design A = No surcharge or slope above wall.
- Design B = No surcharge; slopes to 3:1.
- Design C = Traffic surcharge; no slope above wall.

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

**Texas Department of Transportation**

**Bridge Division Standard**

## SPREAD FOOTING RETAINING WALL

### RW(SFC)

FILE: RW-SFC-22.dgn	DN: TAR	CK: RLE	DW: JER	CK: TAR
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
8-22: Constructability update.	DIST	COUNTY	SHEET NO.	
	PHR	CAMERON	82	

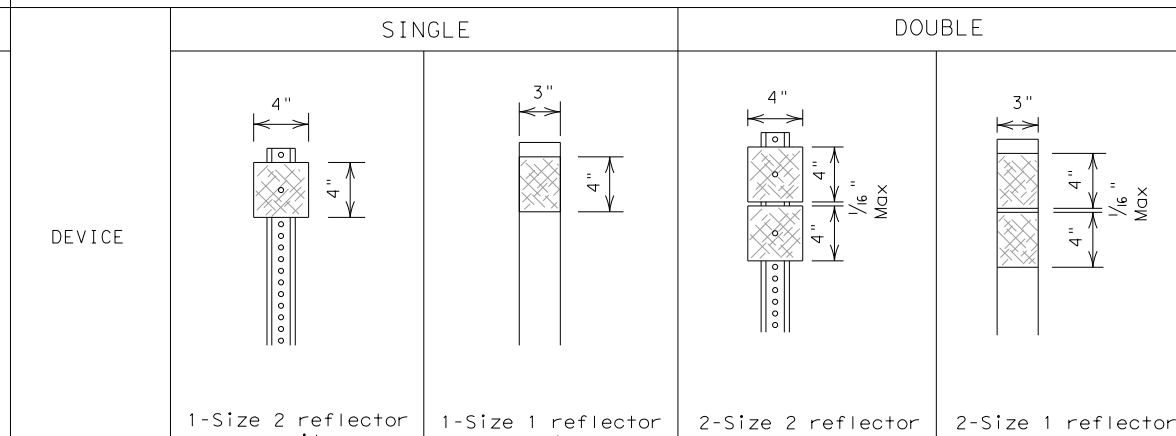
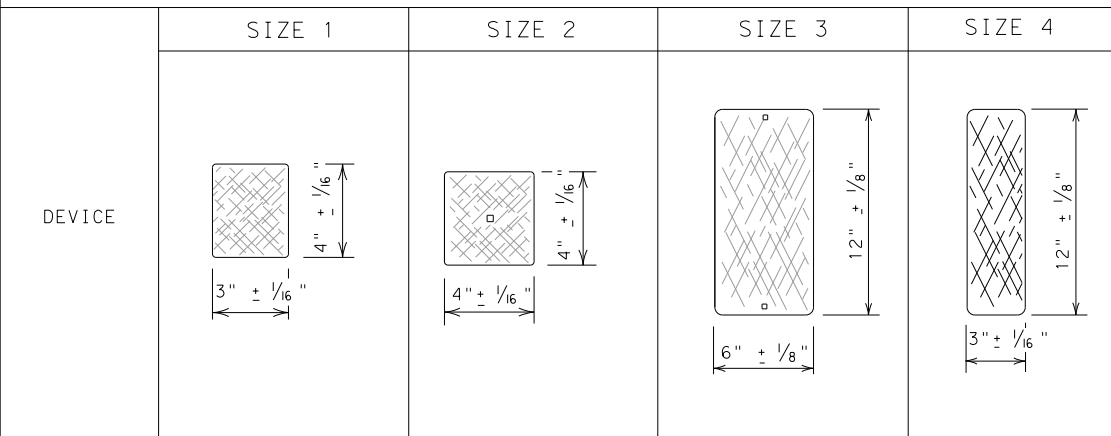
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DATE: FILE:

### REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

### DELINEATORS

### D & OM DESCRIPTIVE CODES



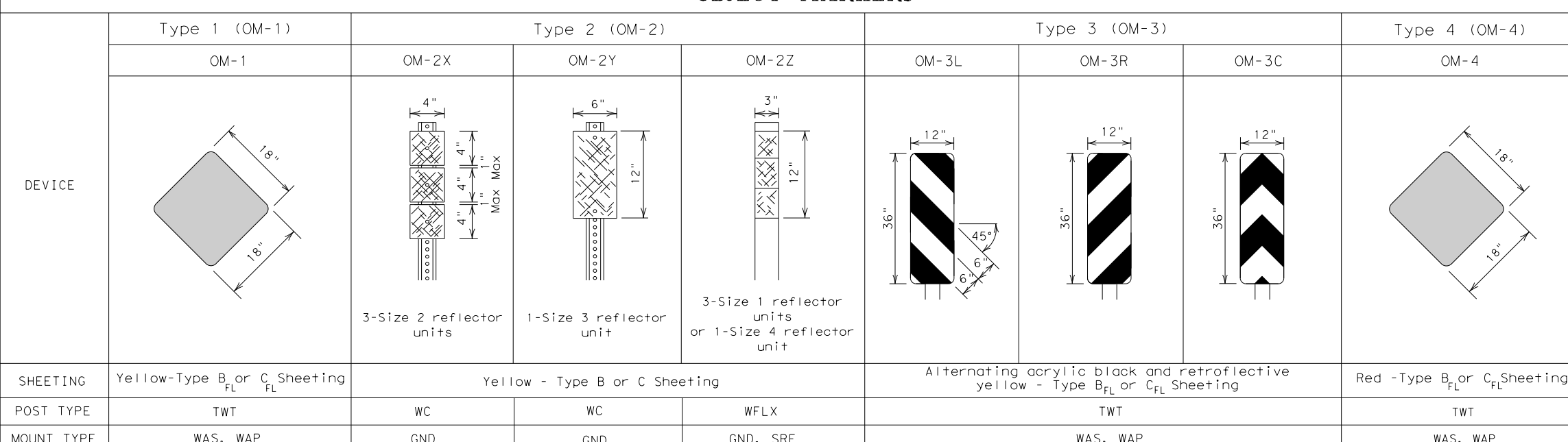
**INSTL DEL ASSM** (D-XX)SZ X (XXXX)XXX (XX)  
 NUMBER OF REFLECTORS  
 S = Single  
 D = Double  
 COLOR OF REFLECTORS  
 W = White  
 Y = Yellow  
 R = Red  
 REFLECTOR UNIT SIZE  
 1 or 2  
 TYPE OF POST OR DELINEATOR  
 WC = Wing Channel Post  
 YFLX = Yellow Flexible Post  
 WFLX = White Flexible 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

**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.

**SHEETING** Yellow, White or Red Type B or C Reflective Sheeting  
**POST TYPE** WC, YFLX, WFLX  
**MOUNT TYPE** GND, GND, SRF, GND, SRF

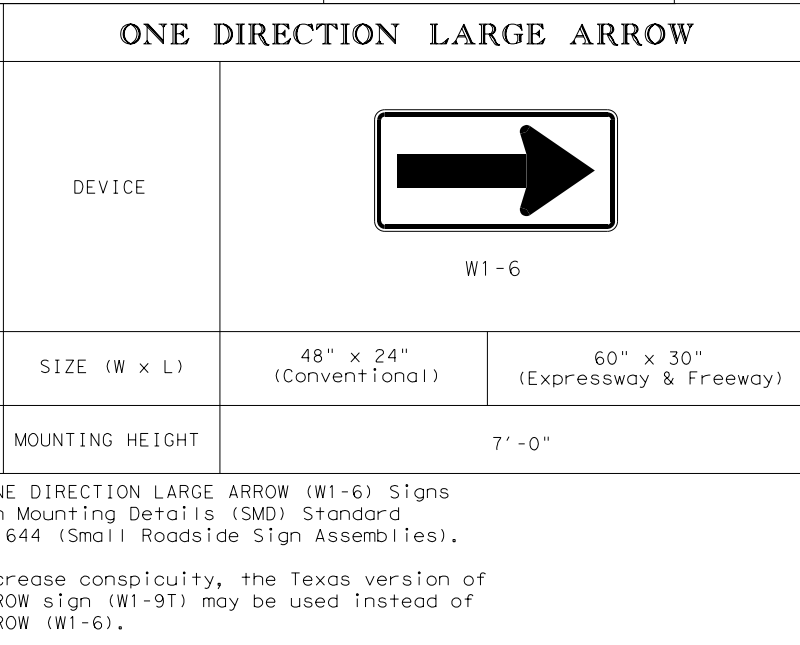
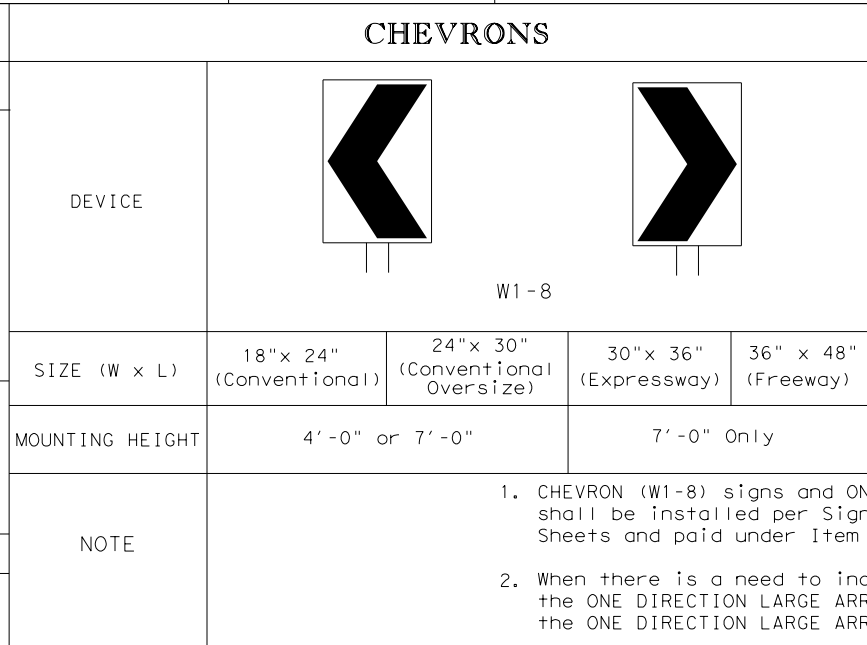
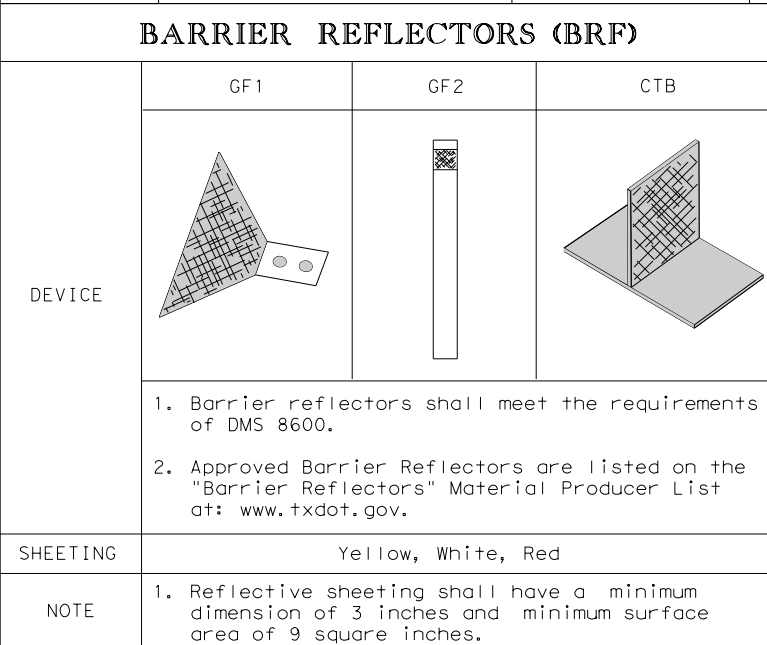
**DIRECTION**  
 If Required  
 BI = Bi-Directional  
 BR = Bi-Directional with red on back  
**INSTL OM ASSM** (OM-XX) (XXXX)XXX (XX)

### OBJECT MARKERS



**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

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.

<b>DELINEATOR &amp; OBJECT MARKER MATERIAL DESCRIPTION</b> <b>D &amp; OM(1)-20</b>			
FILE: dom1-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
© TxDOT August 2004	CONT	SECT	JOB
REVISIONS	0921	06	348
10-09 3-15	DIST	COUNTY	SHEET NO.
4-10 7-20	PHR	CAMERON	83

**SHEETING** Yellow, White, Red  
**NOTE**  
 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

**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).

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

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POST TYPE AND SUPPORT FOUNDATION DETAILS

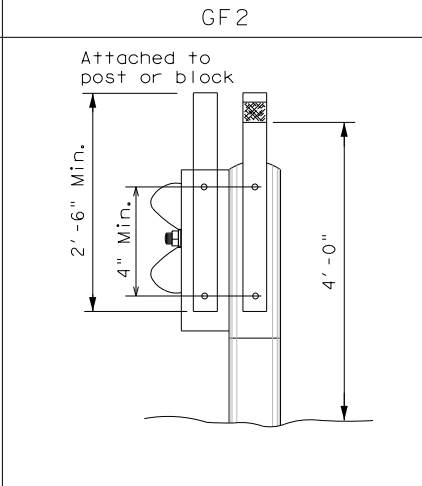
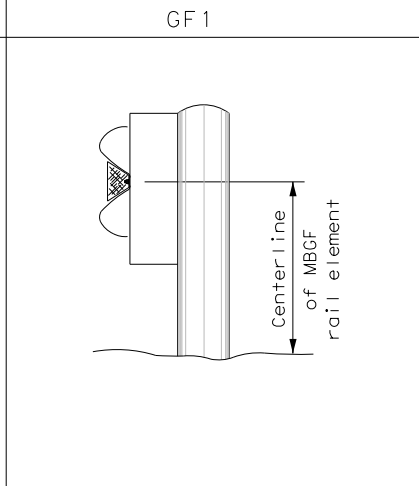
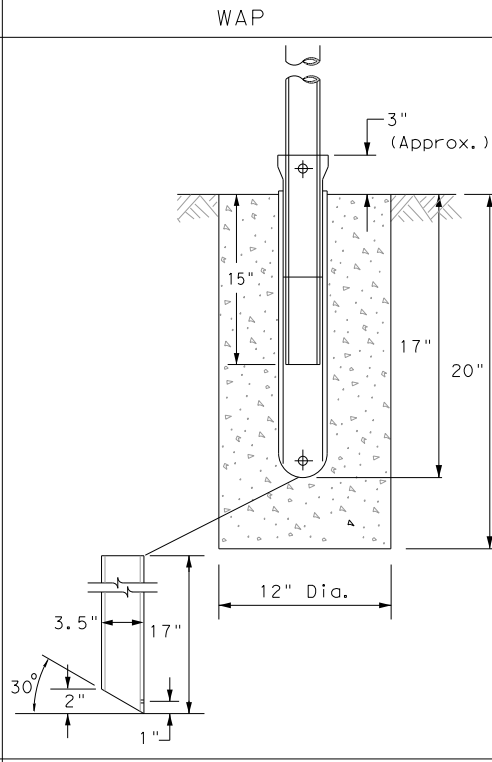
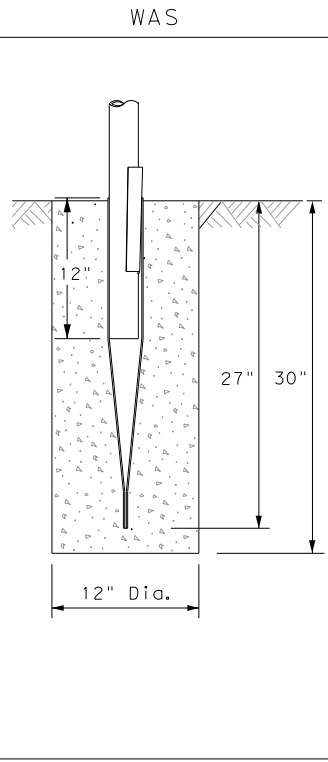
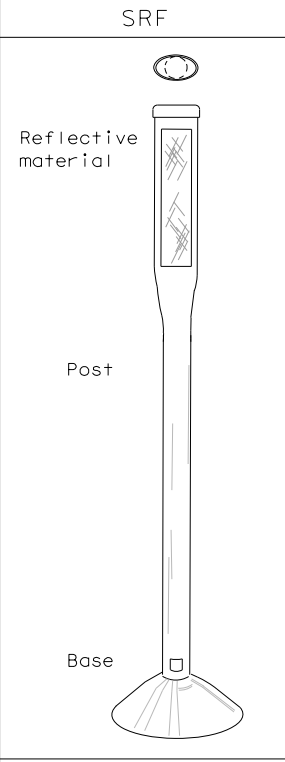
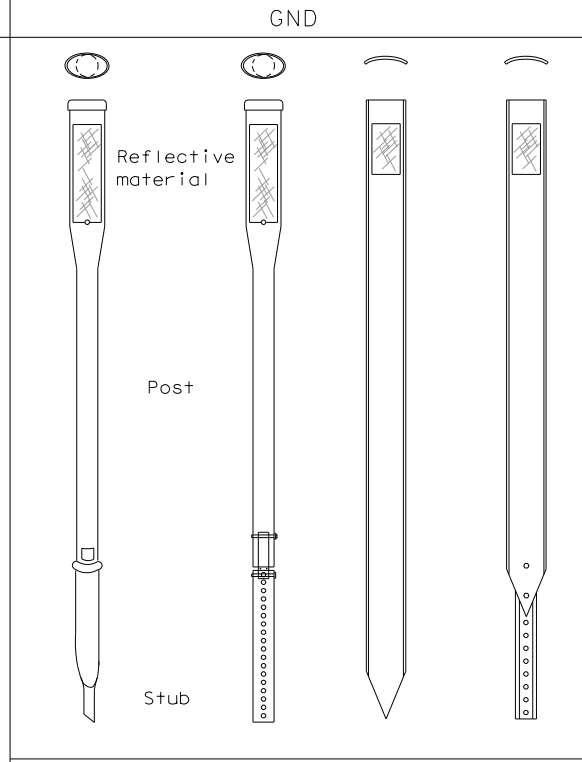
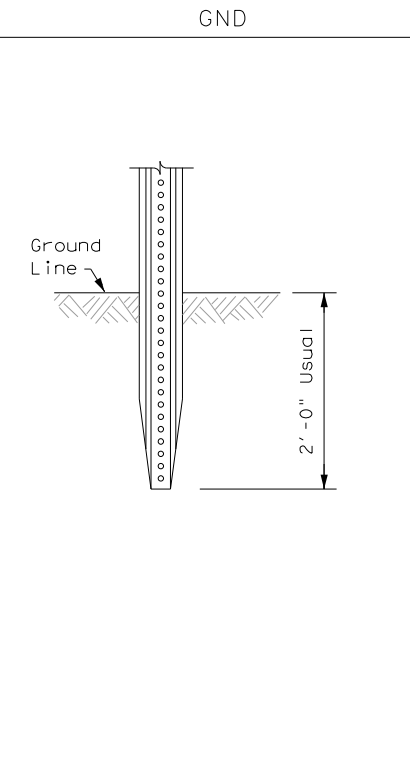
TYPE OF BARRIER MOUNTS

WING CHANNEL (WC)

FLEXIBLE POSTS (YFLX, WFLX)

WEDGE ANCHOR SYSTEMS

GUARD FENCE ATTACHMENT



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.

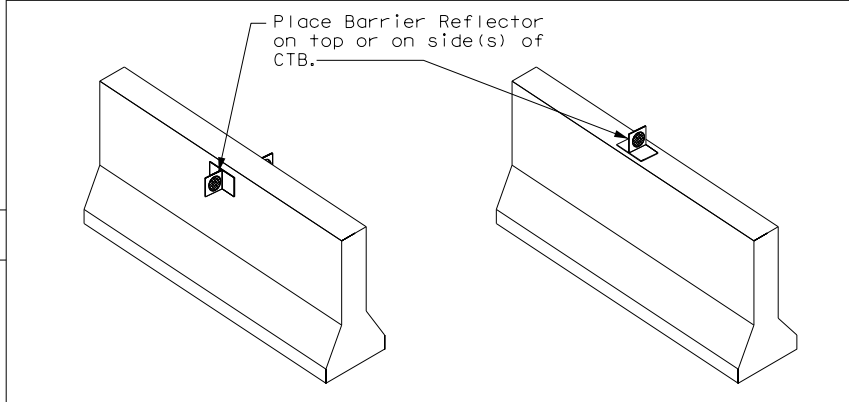
NOTES

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.

NOTE

1. Install per manufacturer's recommendations.

CONCRETE TRAFFIC BARRIER (CTB)



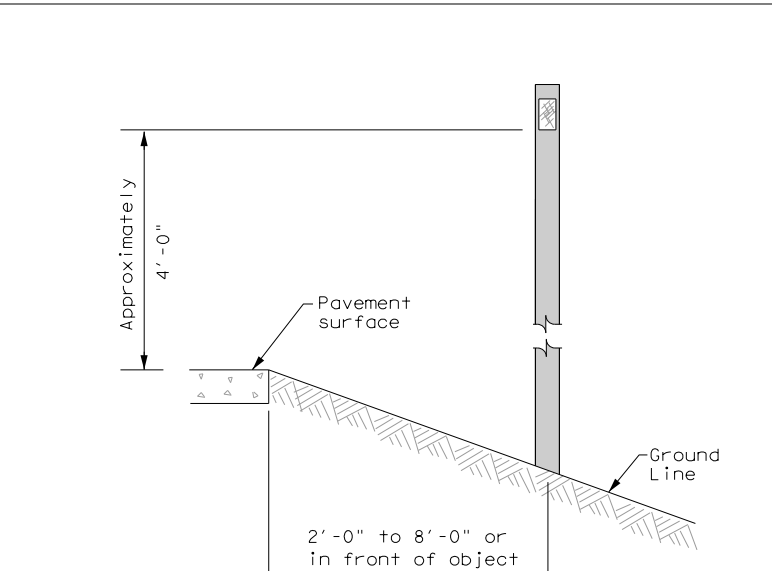
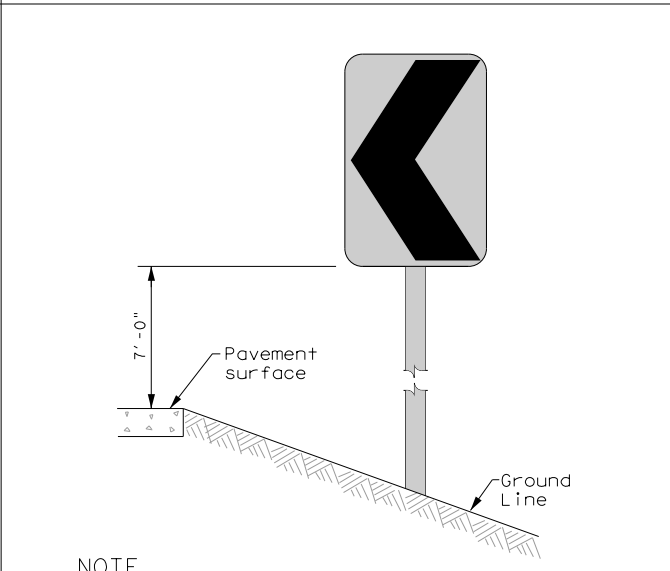
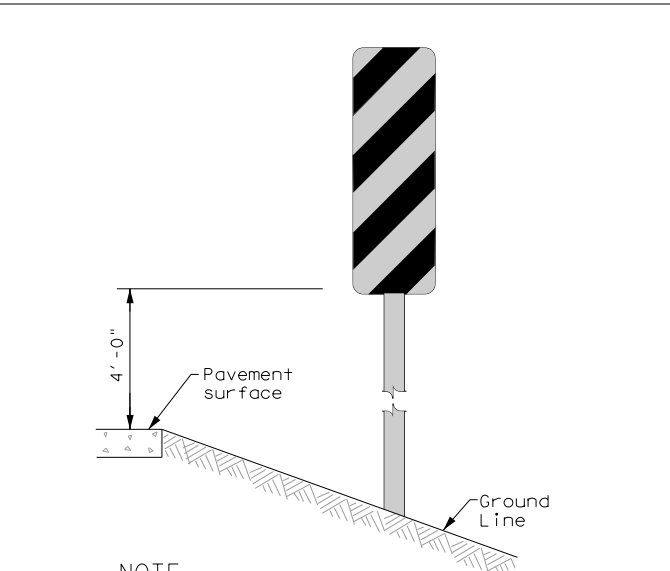
GENERAL NOTES

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

CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN

DELINEATORS AND TYPE 2 OBJECT MARKERS



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)

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.

See general notes 1, 2 and 3.

		<b>Traffic Safety Division Standard</b>	
<p>DELINEATOR &amp; OBJECT MARKER INSTALLATION</p> <p>D &amp; OM(2)-20</p>			
FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT August 2004	CONT	SECT	JOB
REVISIONS	0921	06	348
10-09 3-15	DIST	COUNTY	SHEET NO.
4-10 7-20	PHR	CAMERON	84

DATE: FILE:



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 FILE: S:\Projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\civil\Standards\Traffic\Items\smngen.dgn

### SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

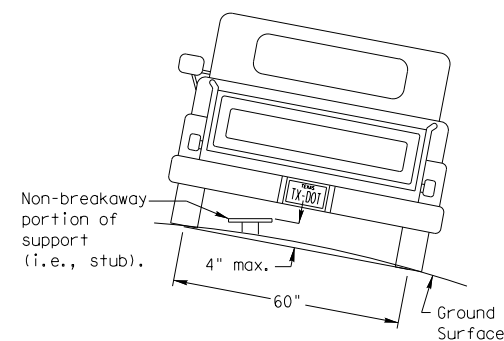
SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

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))

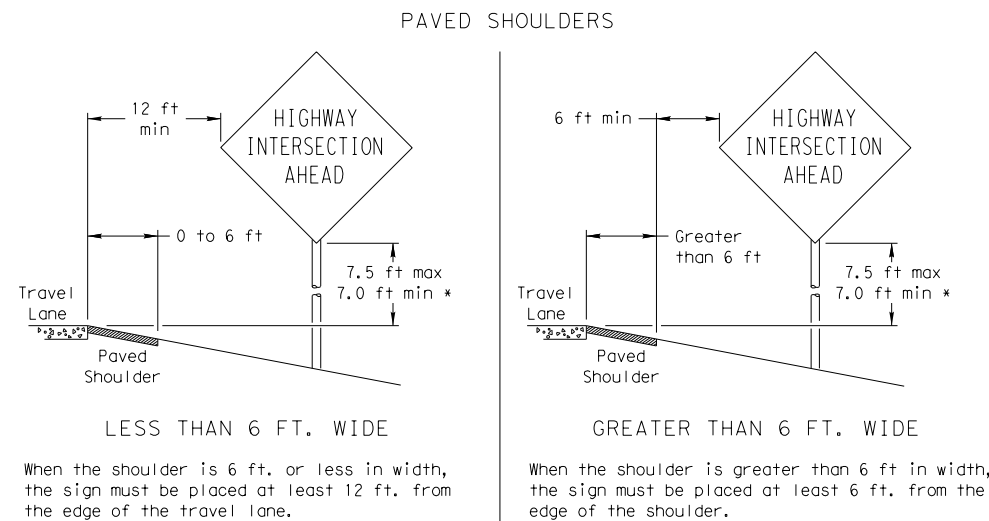
Sign Mounting Designation  
 P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))  
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))  
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))  
 IF REQUIRED  
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))  
 BM = Extruded 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-3))

### REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT

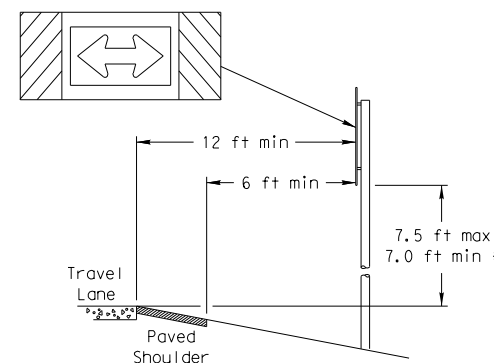


To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

### SIGN LOCATION

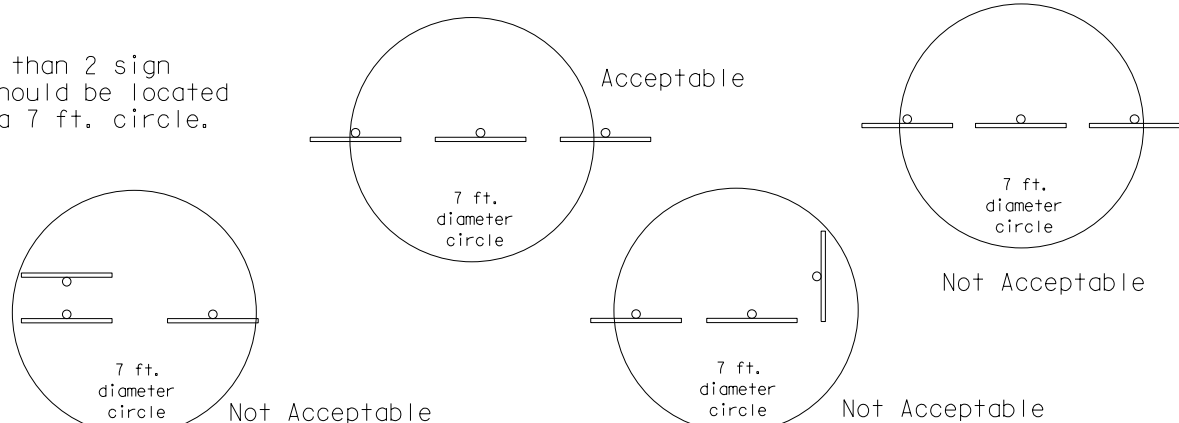


### T-INTERSECTION

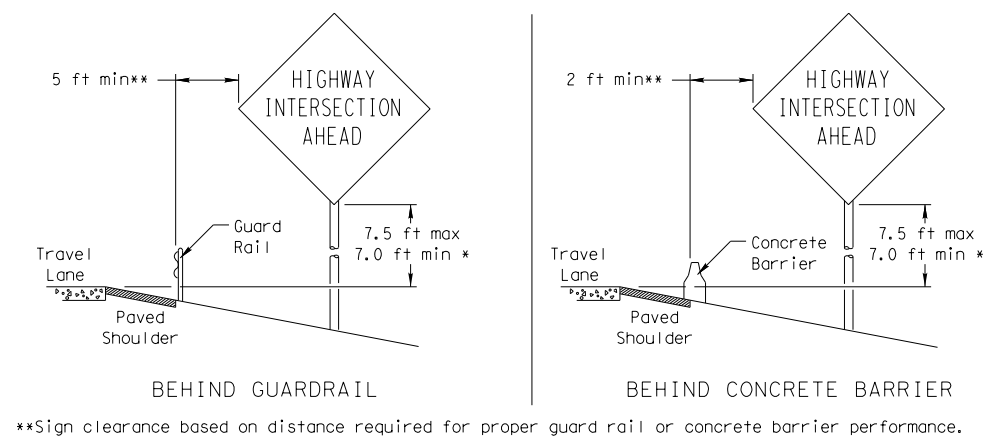


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

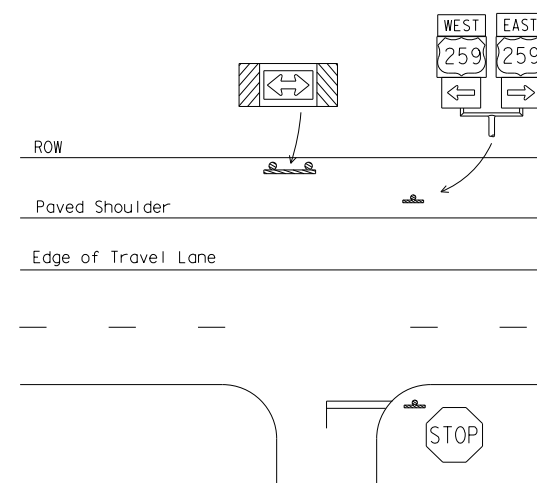
No more than 2 sign posts should be located within a 7 ft. circle.



### BEHIND BARRIER



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



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

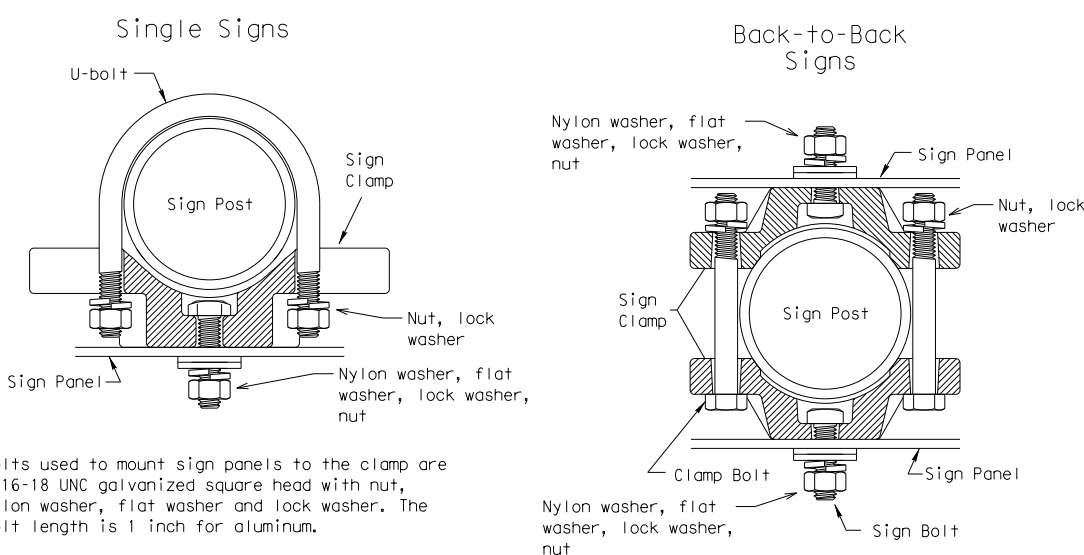
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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>

### TYPICAL SIGN ATTACHMENT DETAIL



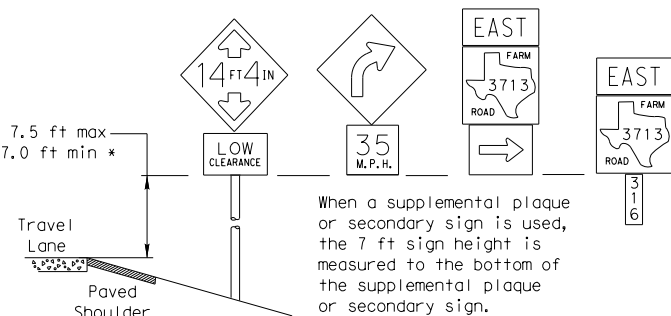
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

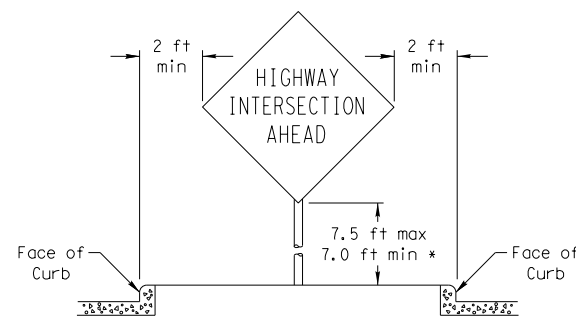
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

### SIGNS WITH PLAQUES

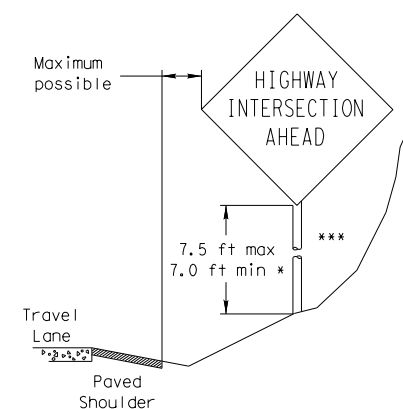


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

### 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.



## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

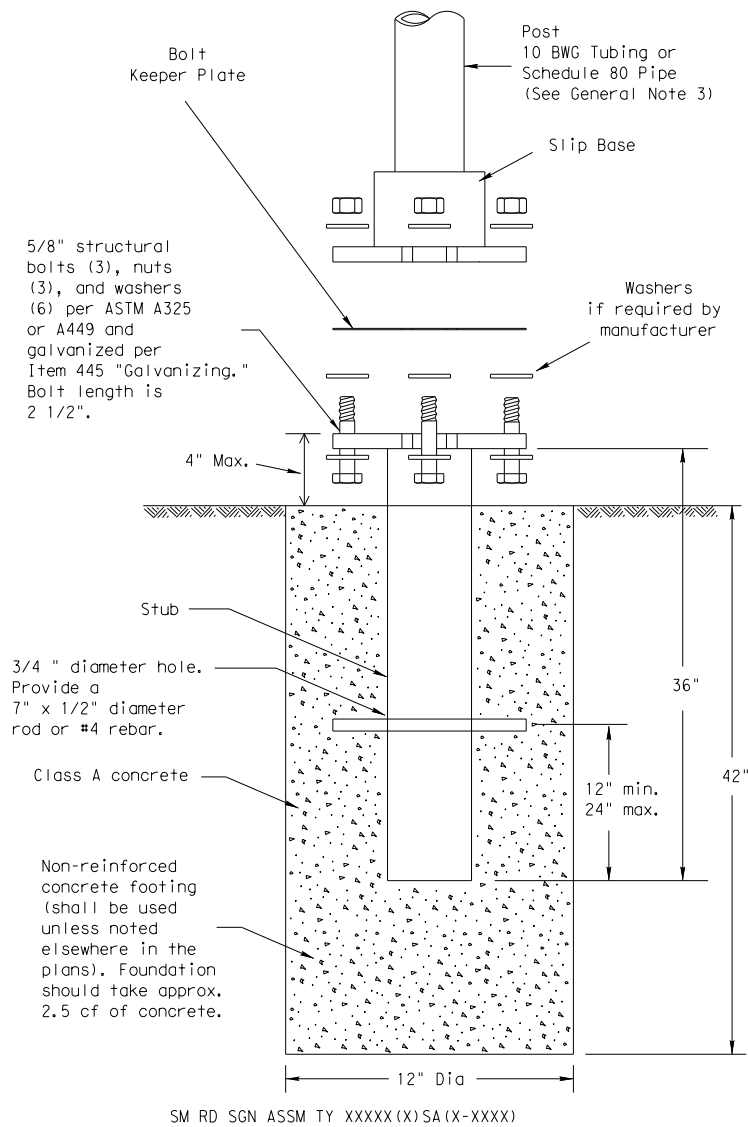
SMD(GEN)-08

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9-08	REVISIONS	CONT SECT	JOB	HIGHWAY
		0921 06	348	VA
		DIST	COUNTY	SHEET NO.
		PHR	CAMERON	85

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## TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



### 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](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:

- 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.
- 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
- 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>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

### ASSEMBLY PROCEDURE

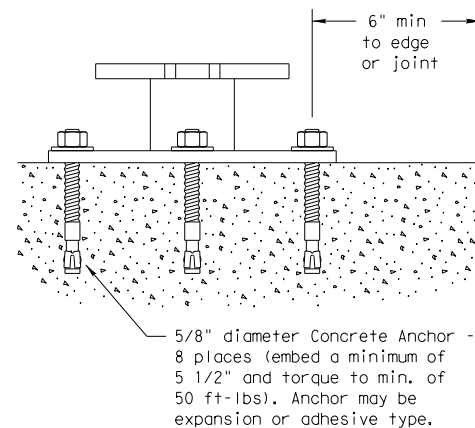
#### Foundation

- 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.
- 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.
- 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.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

#### Support

- 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.
- 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, "Epoxyes 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.



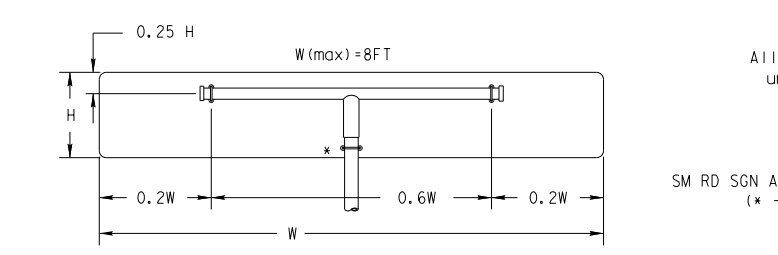
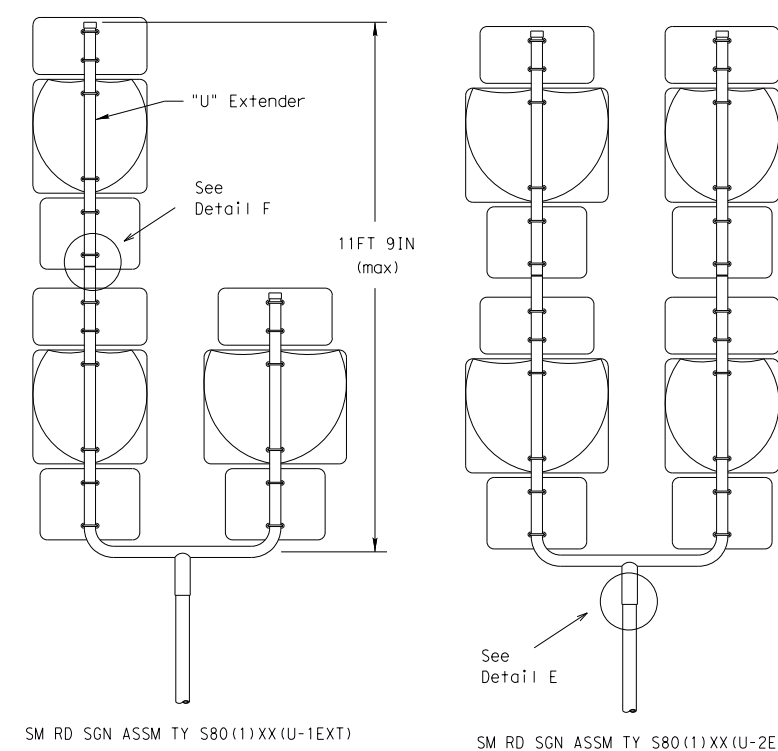
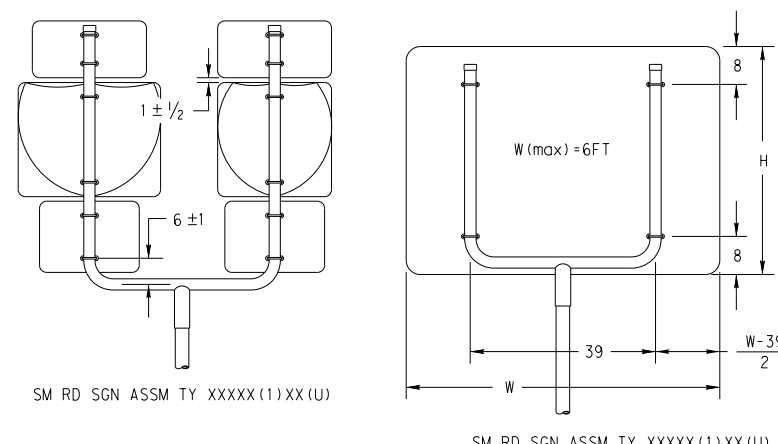
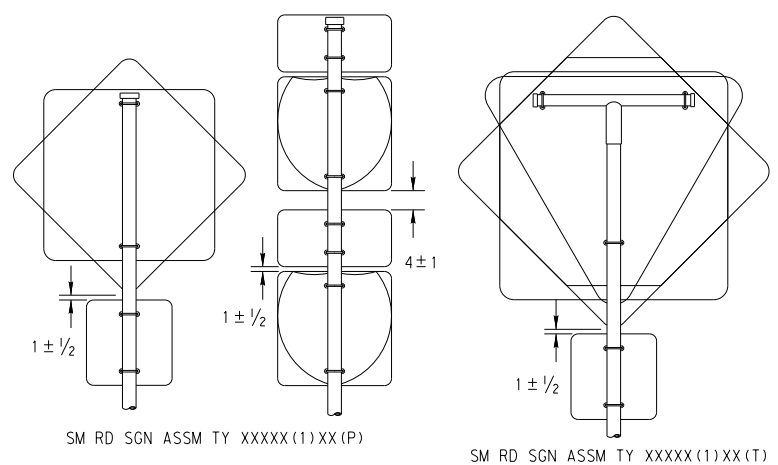
## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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9-08	REVISIONS		CONT	SECT	JOB	HIGHWAY
			0921	06	348	VA
	DIST	COUNTY	PHR		CAMERON	SHEET NO.
					86	

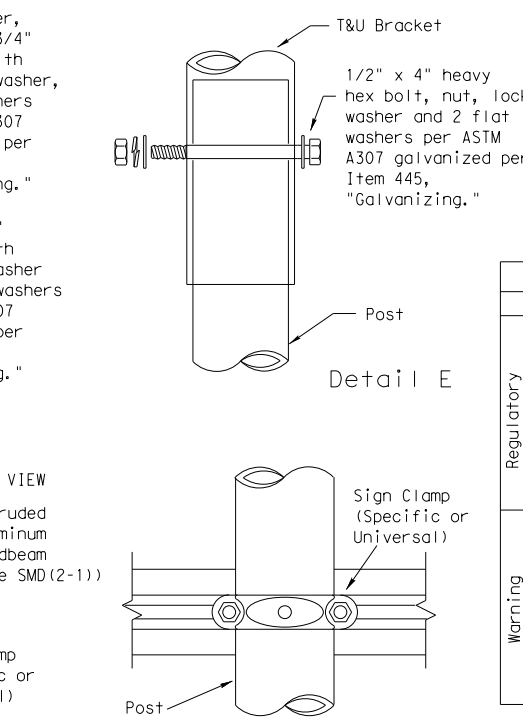
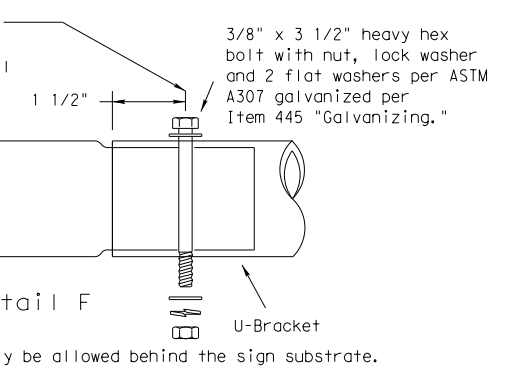
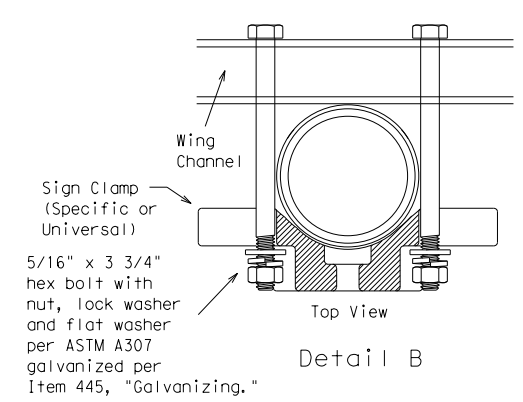
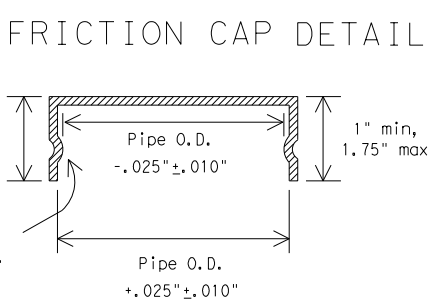
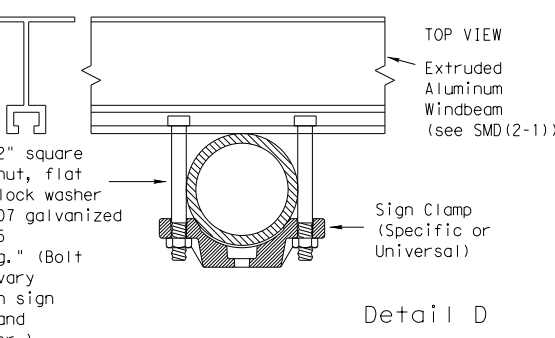
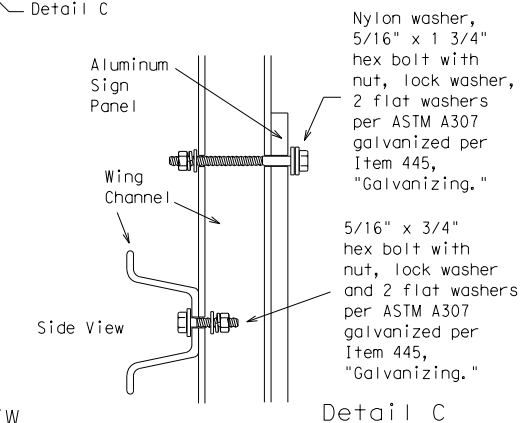
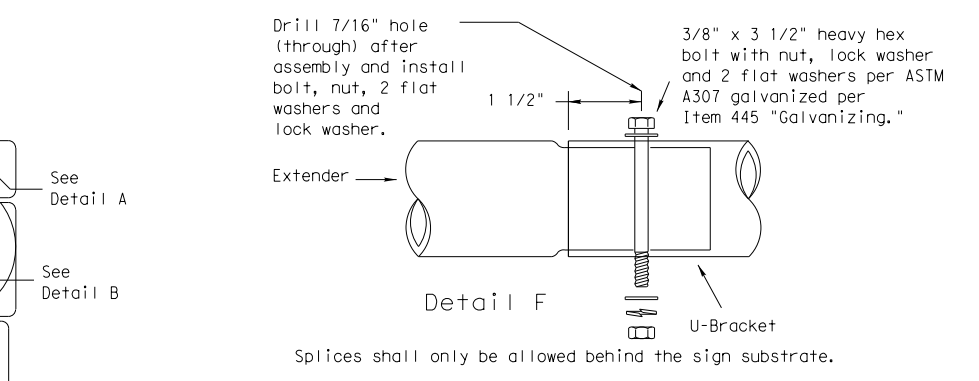
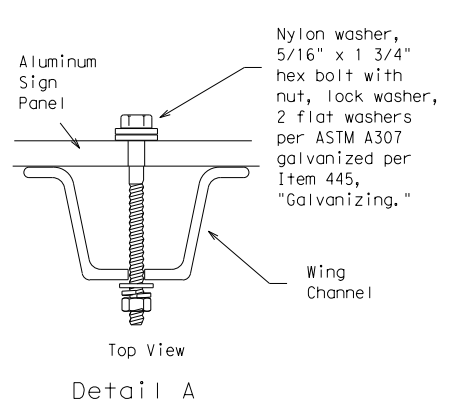
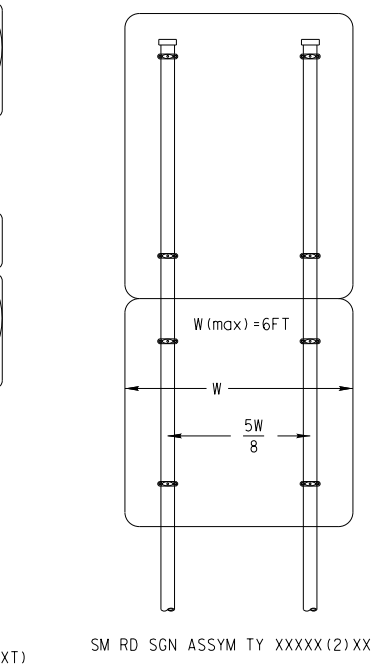
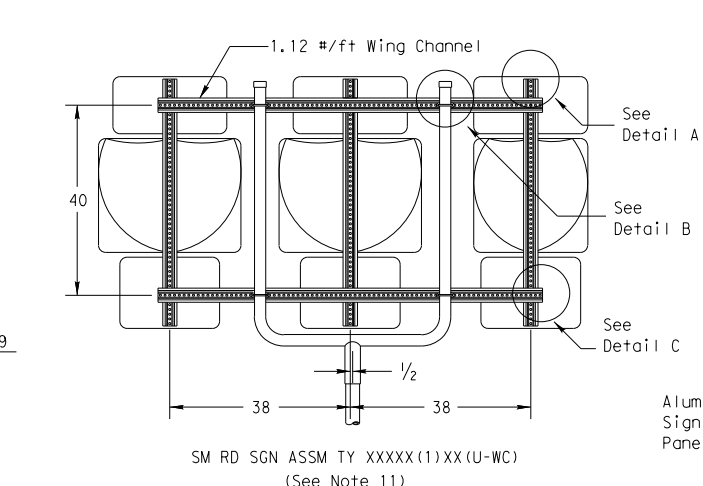
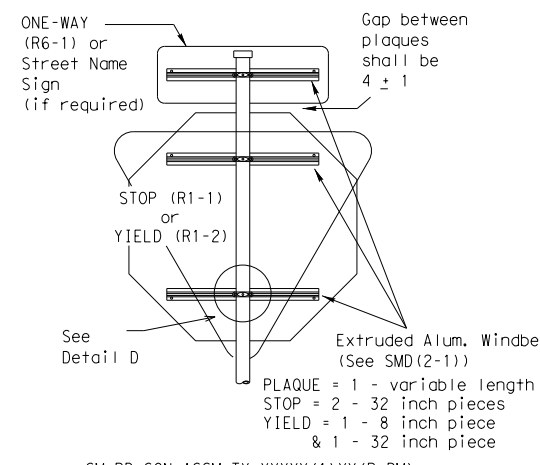
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DATE: 2023-05-30 16:24:57  
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All dimensions are in english unless detailed otherwise.

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



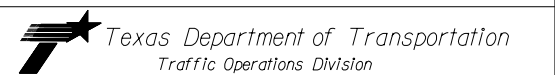
Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no 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.

GENERAL NOTES:

- SIGN SUPPORT # OF POSTS MAX. SIGN AREA
 

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
- 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.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
- 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.
- Post open ends shall be fitted with Friction Caps.
- Sign blanks shall be the sizes and shapes shown on the plans.

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)
Warning	48x60-inch signs	TY S80(1)XX(T)
	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)

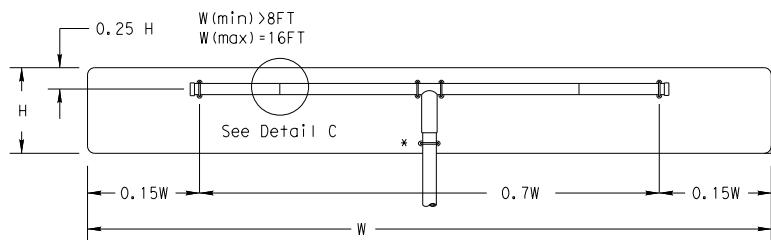


SIGN MOUNTING DETAILS  
 SMALL ROADSIDE SIGNS  
 TRIANGULAR SLIPBASE SYSTEM  
 SMD(SLIP-2) -08

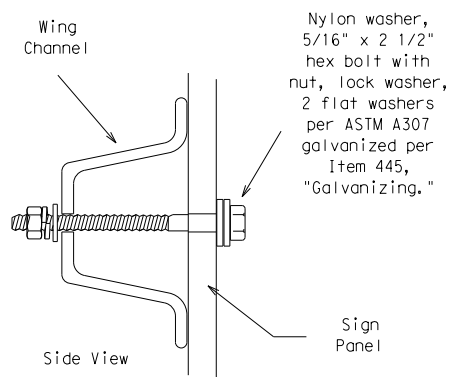
© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CON: 0921	SECT: 06	JOB: 348	HIGHWAY: VA
		DIST: PHR	COUNTY: CAMERON	SHEET NO. 87	

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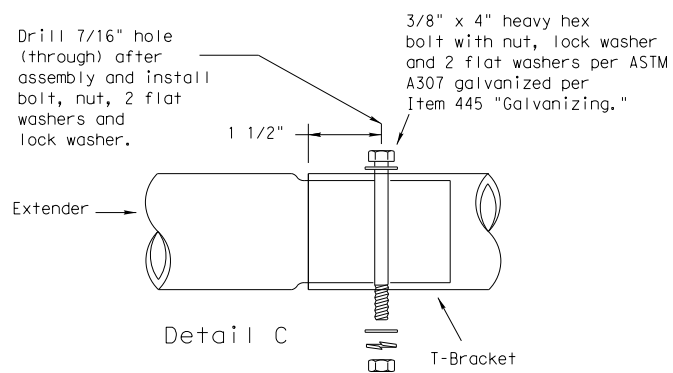
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FILE:



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



Detail B

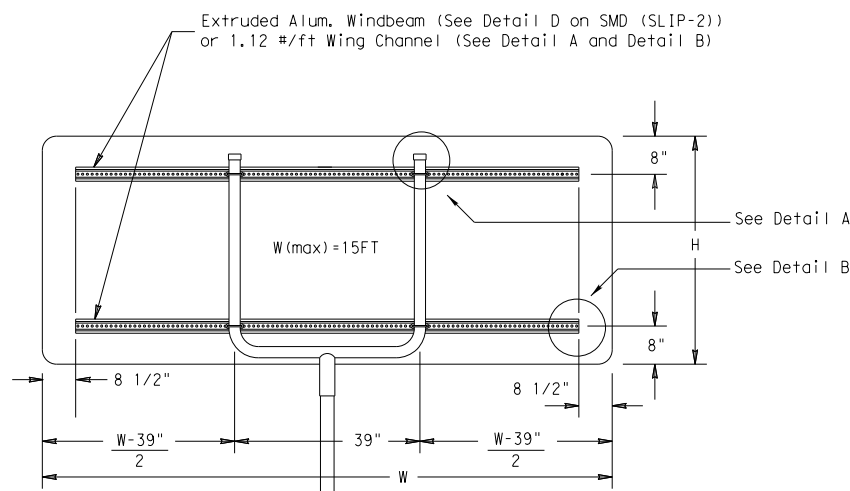


Splices shall only be allowed behind the sign substrate.

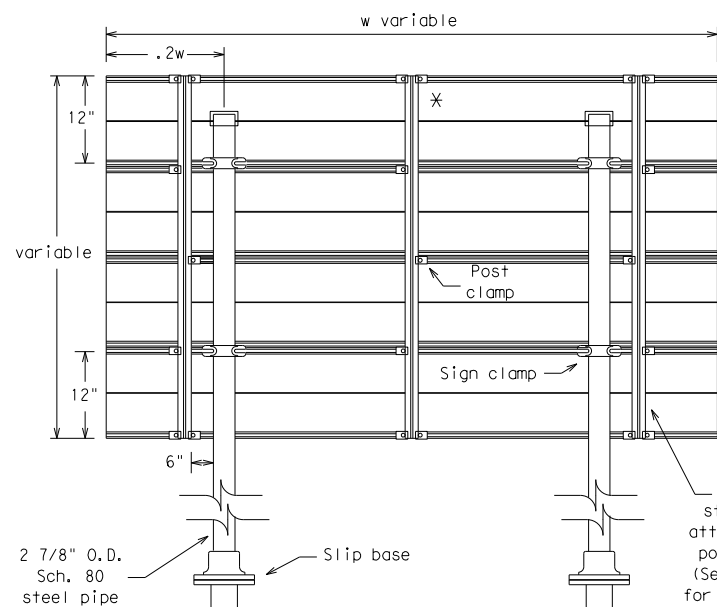
GENERAL NOTES:

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

- 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.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Sign blanks shall be the sizes and shapes shown on the plans.
- 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.
- Post open ends shall be fitted with Friction Caps.

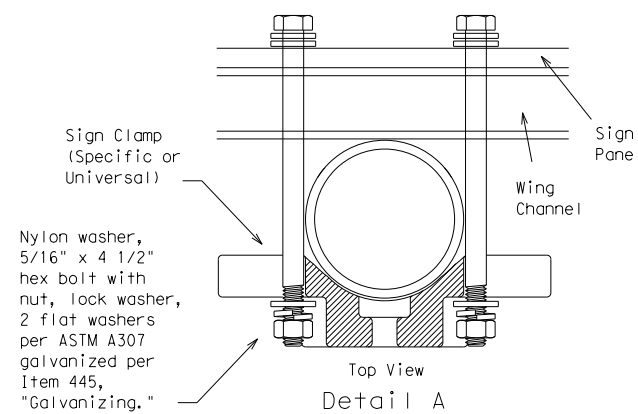


SM RD SGN ASSM TY XXXX(1)XX(U-XX)

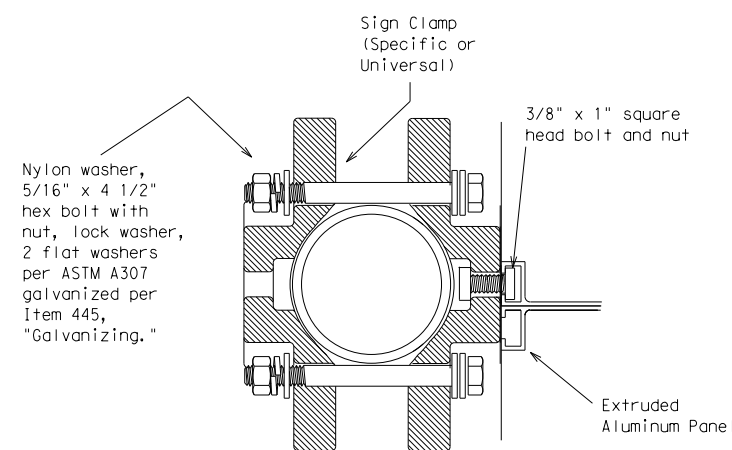


Typical Sign Mount

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'.

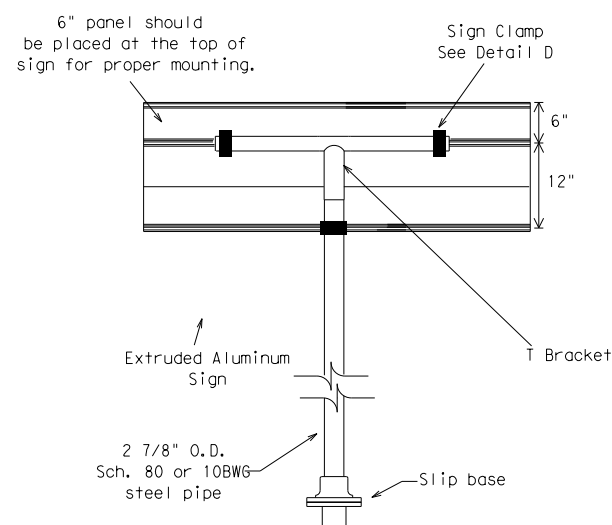


Detail A

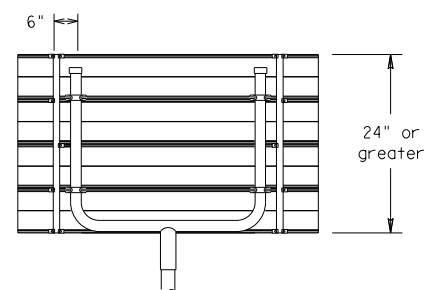


Detail D

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

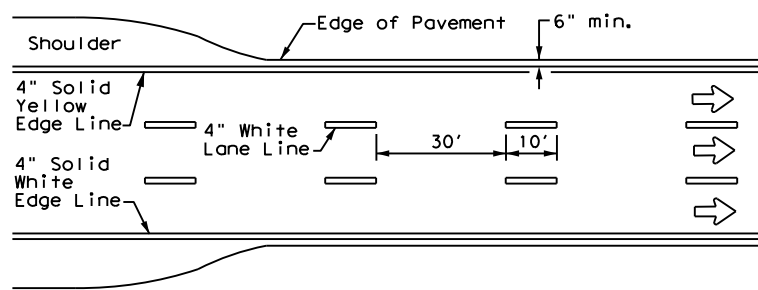
		REQUIRED SUPPORT	
		SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)	
Warning	48x60-inch signs	TY S80(1)XX(T)	
	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

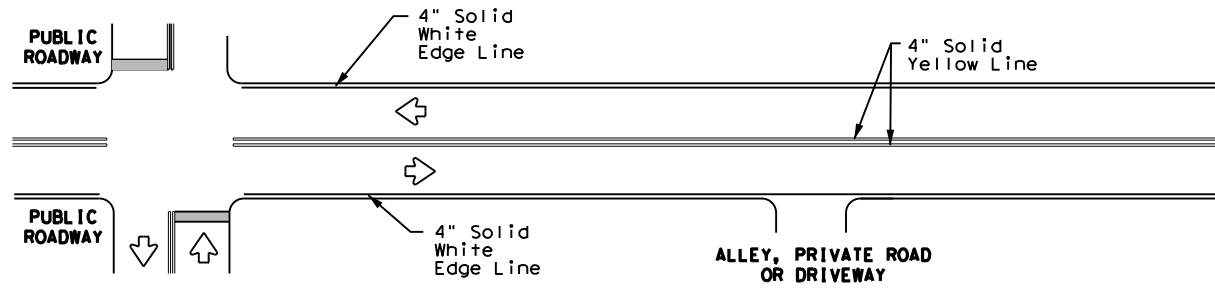
SIGN MOUNTING DETAILS  
SMALL ROADSIDE SIGNS  
TRIANGULAR SLIPBASE SYSTEM  
SMD(SLIP-3) -08

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0921	06	348	VA
		DIST	COUNTY	SHEET NO.	
		PHR	CAMERON	88	

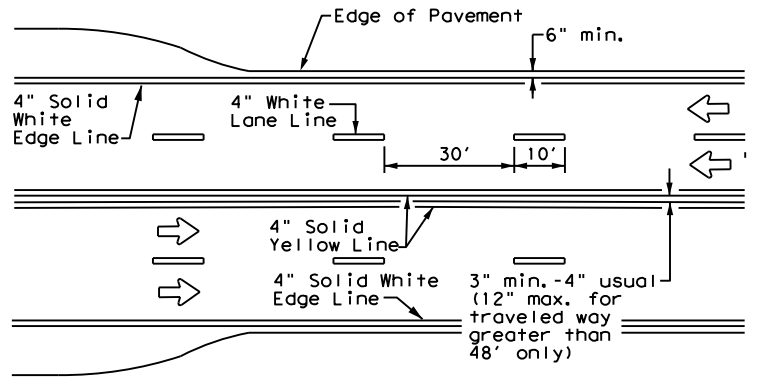
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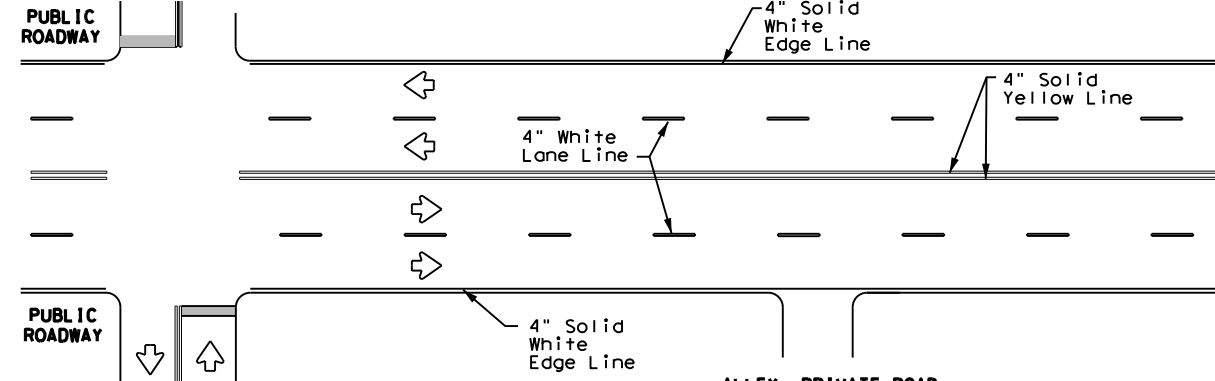
**EDGE LINE AND LANE LINES  
ONE-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



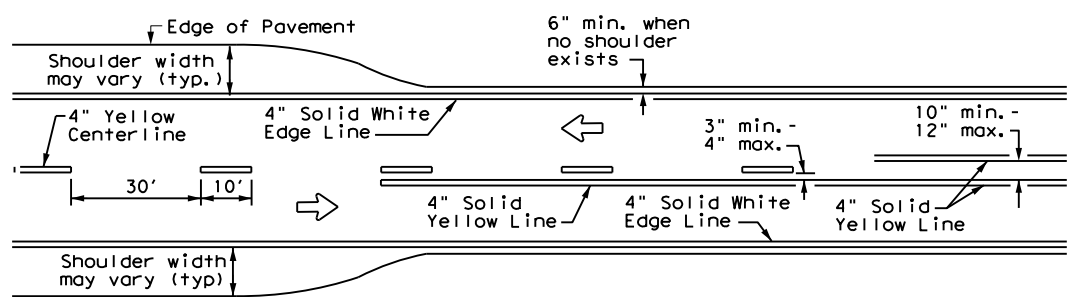
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT  
MARKINGS THROUGH INTERSECTIONS**



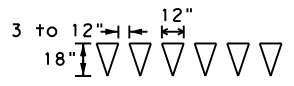
**CENTERLINE AND LANE LINES  
FOUR LANE TWO-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



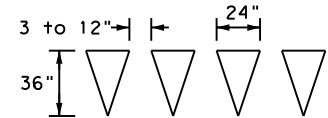
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT  
MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



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



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

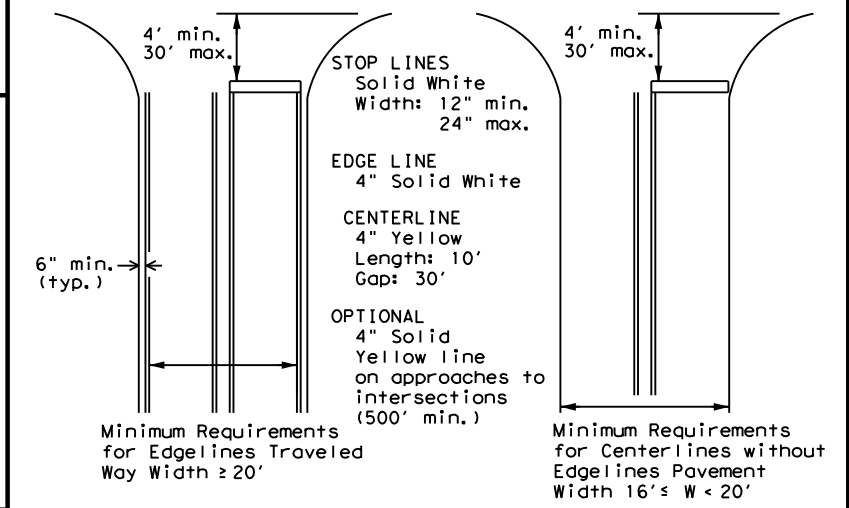
**YIELD LINES**

**GENERAL NOTES**

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

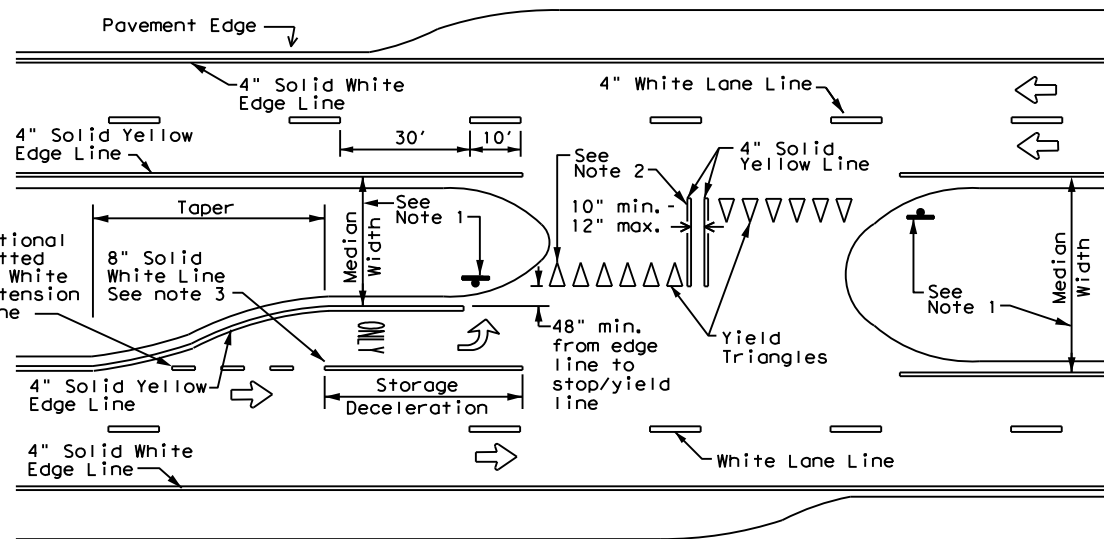
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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



**GUIDE FOR PLACEMENT OF STOP LINES,  
EDGE LINE & CENTERLINE**

Based on Traveled Way and Pavement Widths for Undivided Highways



**FOUR LANE DIVIDED ROADWAY CROSSOVERS**

**NOTES**

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



**TYPICAL STANDARD  
PAVEMENT MARKINGS**

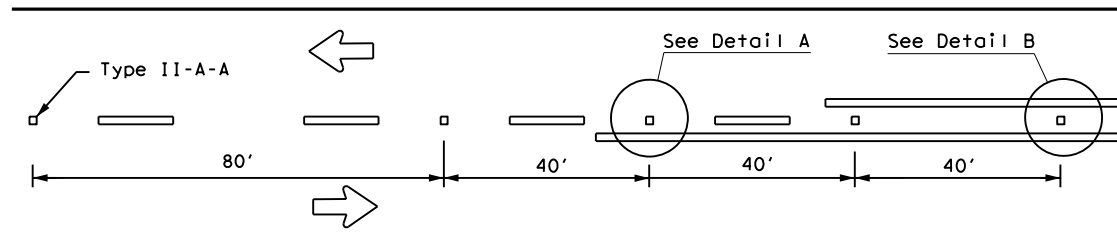
PM(1) - 20

FILE: pm1-20.dgn	DWG:	CHK:	DWG:	CHK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
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8-00 6-20	PHR	CAMERON	89	

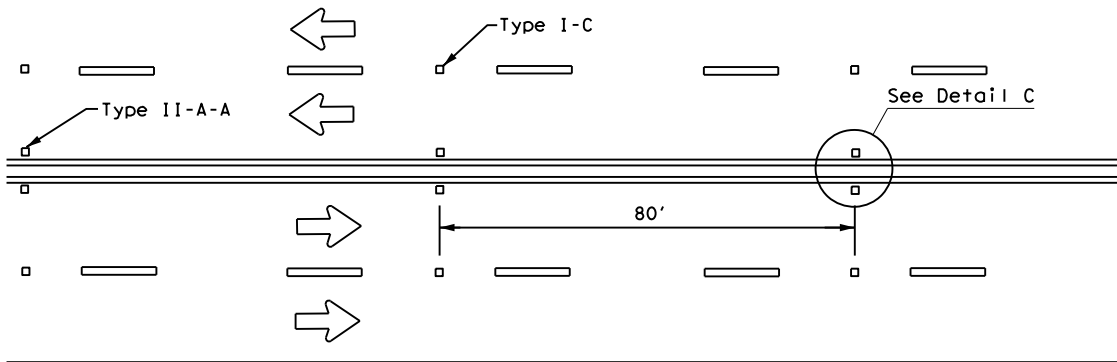
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FILE:

# REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

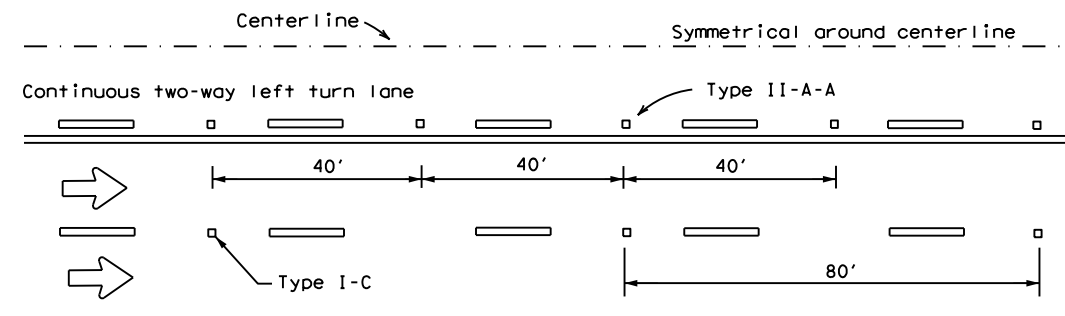
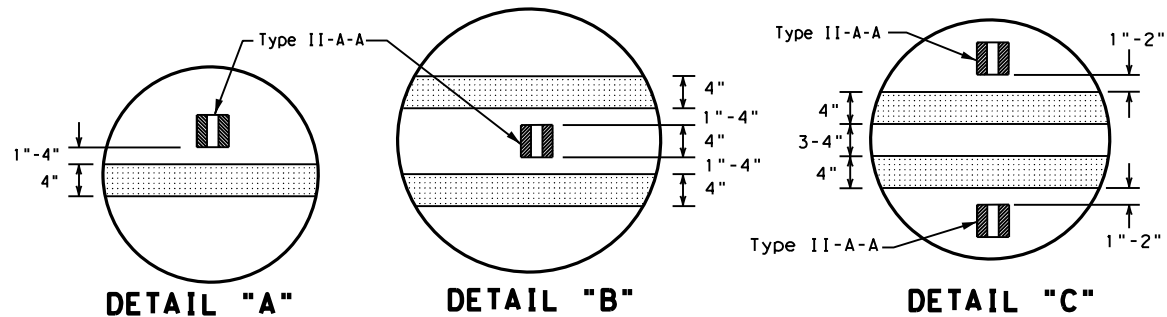
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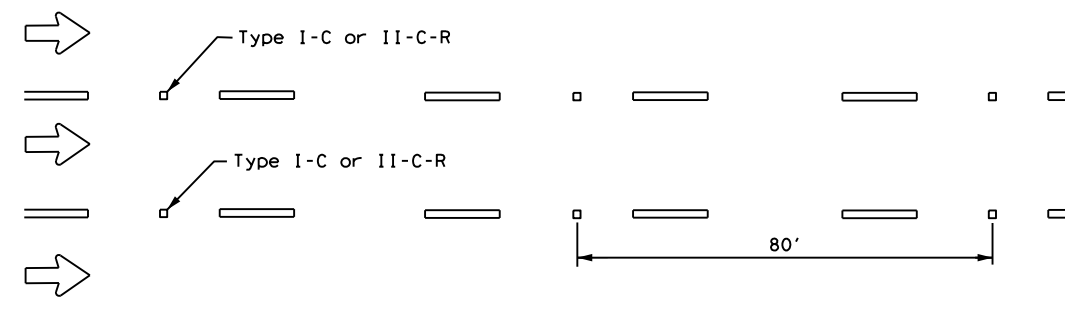
**CENTERLINE FOR ALL TWO LANE ROADWAYS**



**CENTERLINE & LANE LINES  
FOR FOUR LANE TWO-WAY HIGHWAYS**



**CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE**

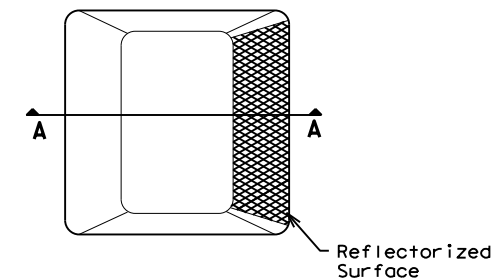


**LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)**

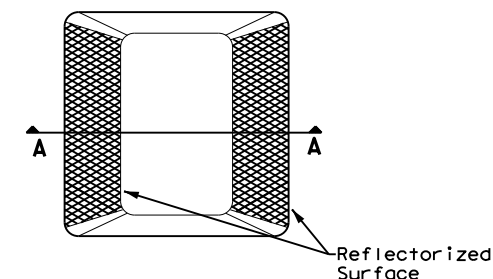
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

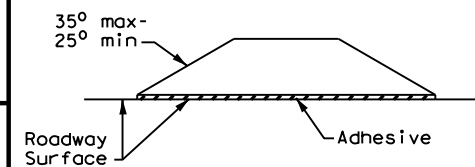
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



**Type I (Top View)**



**Type II (Top View)**



**SECTION A**

## RAISED PAVEMENT MARKERS

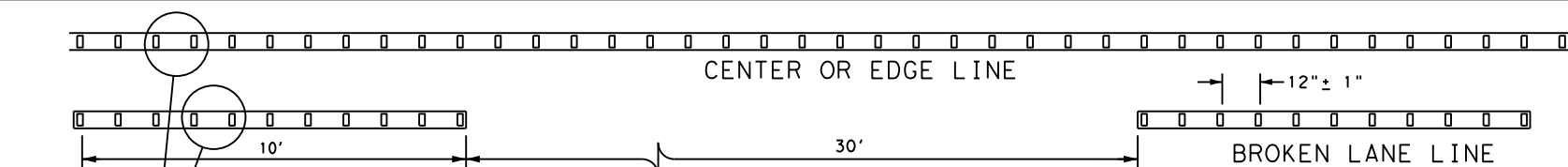


## POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10 REVISIONS	0921	06	348	VA
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20	PHR	CAMERON	90	

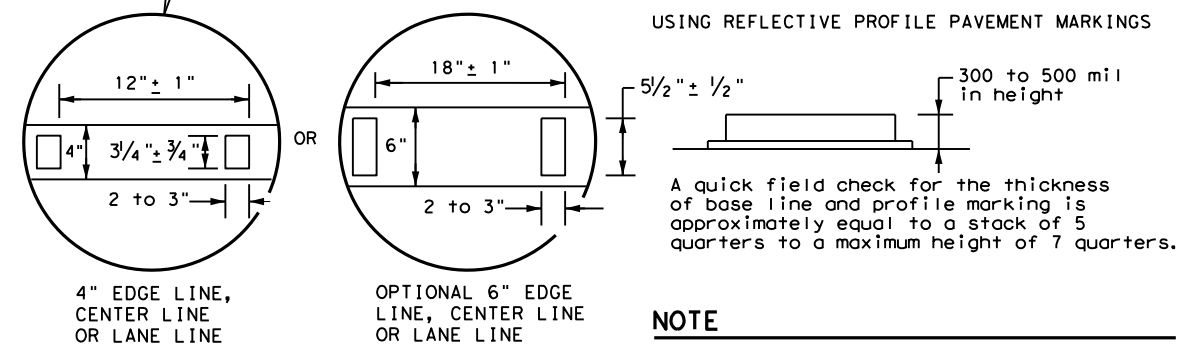
### GENERAL NOTES

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



### REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

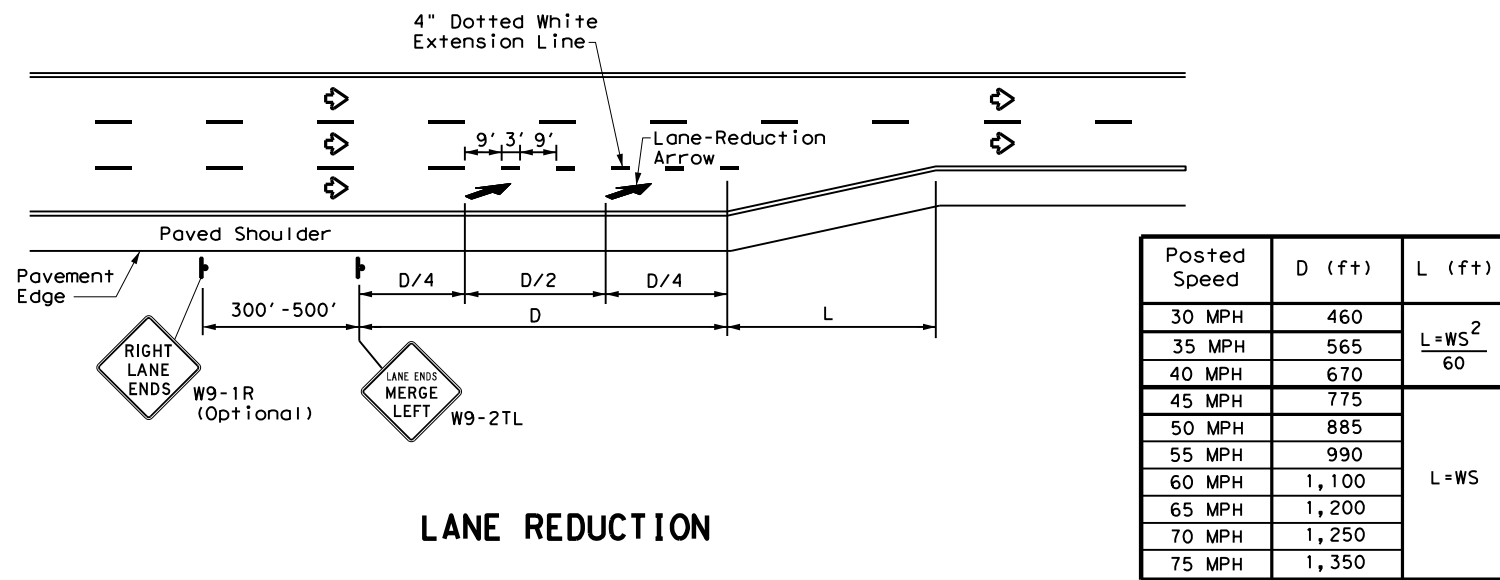


### NOTE

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

DATE:  
FILE:

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

**NOTES**

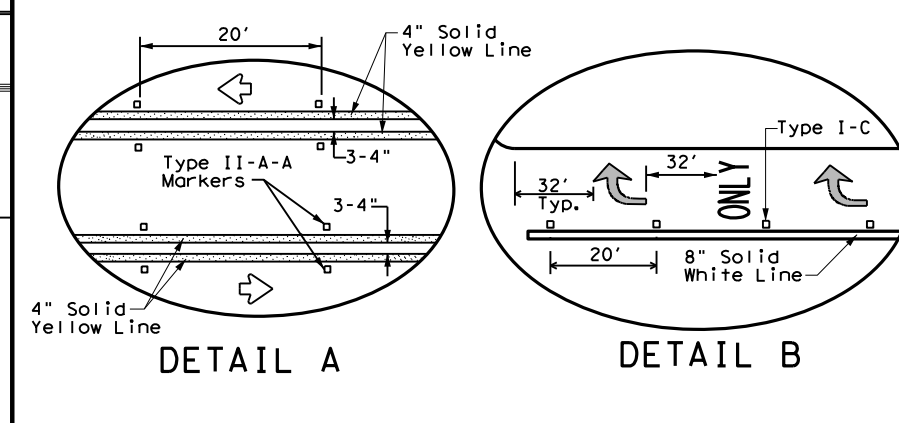
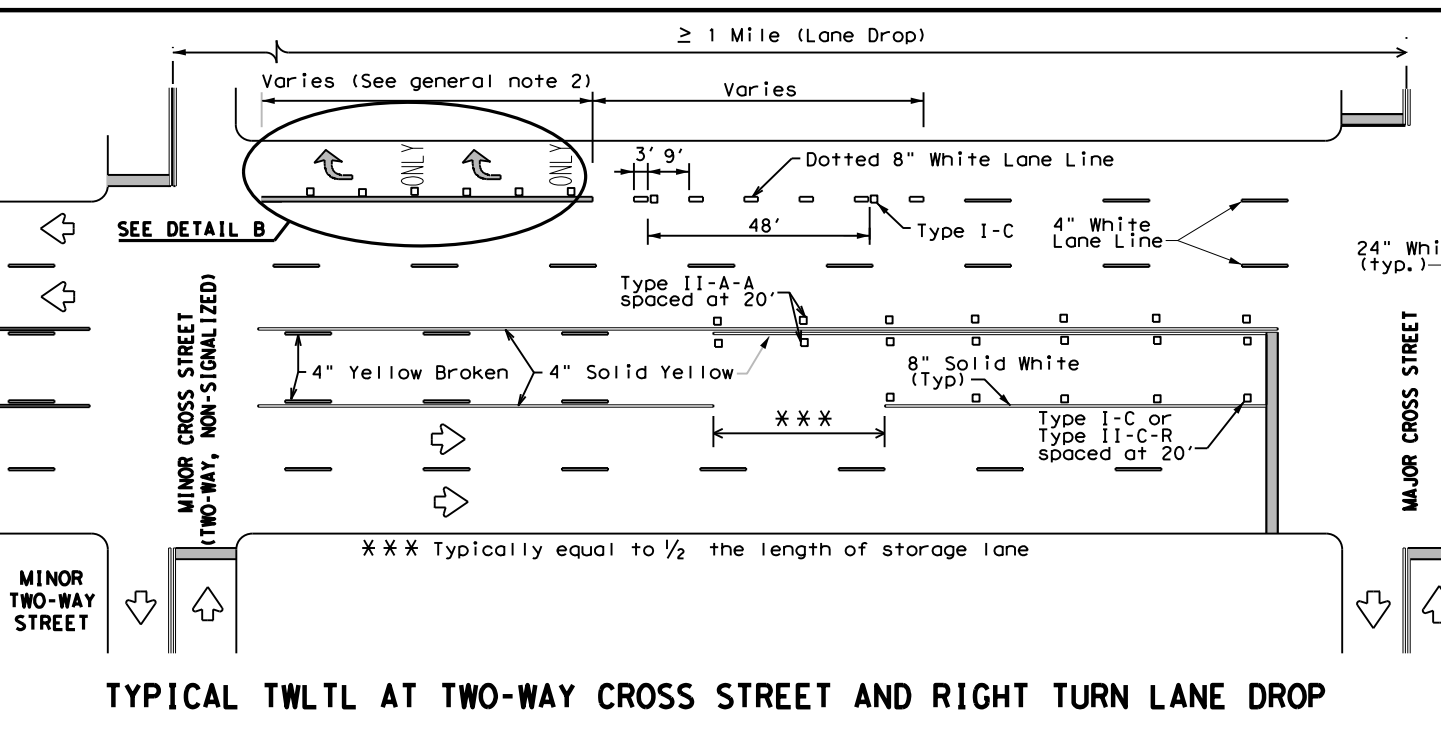
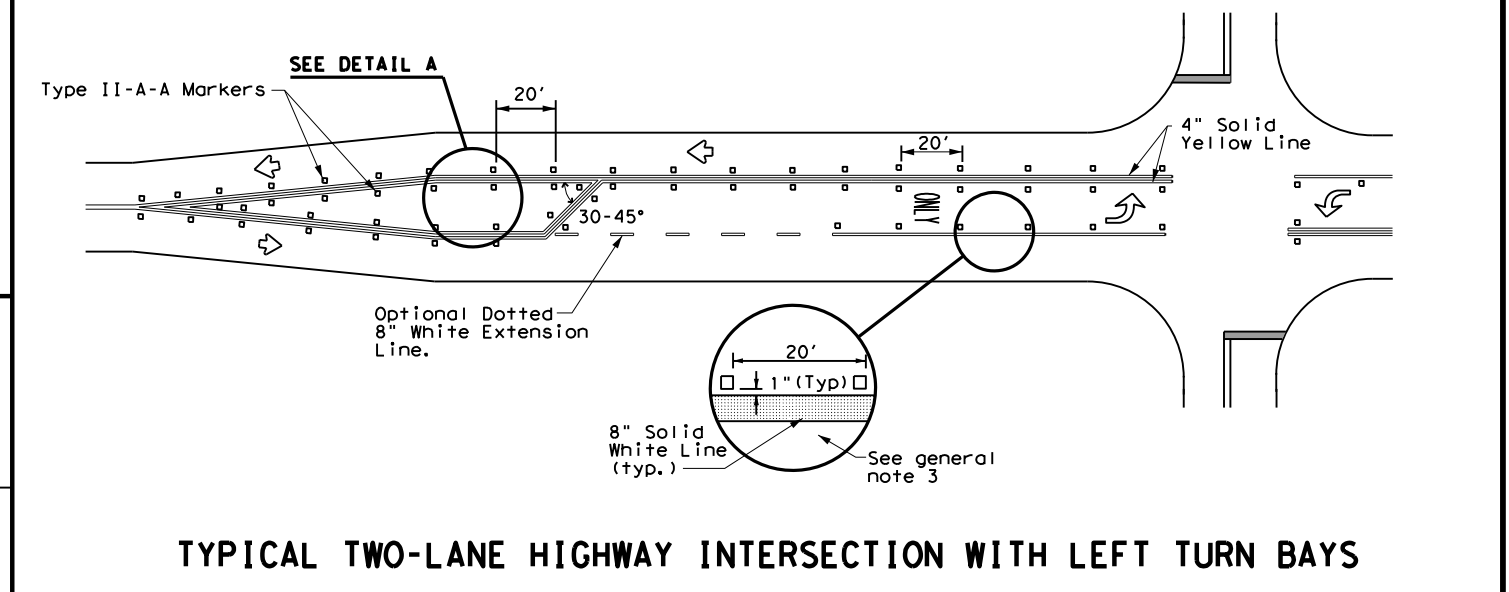
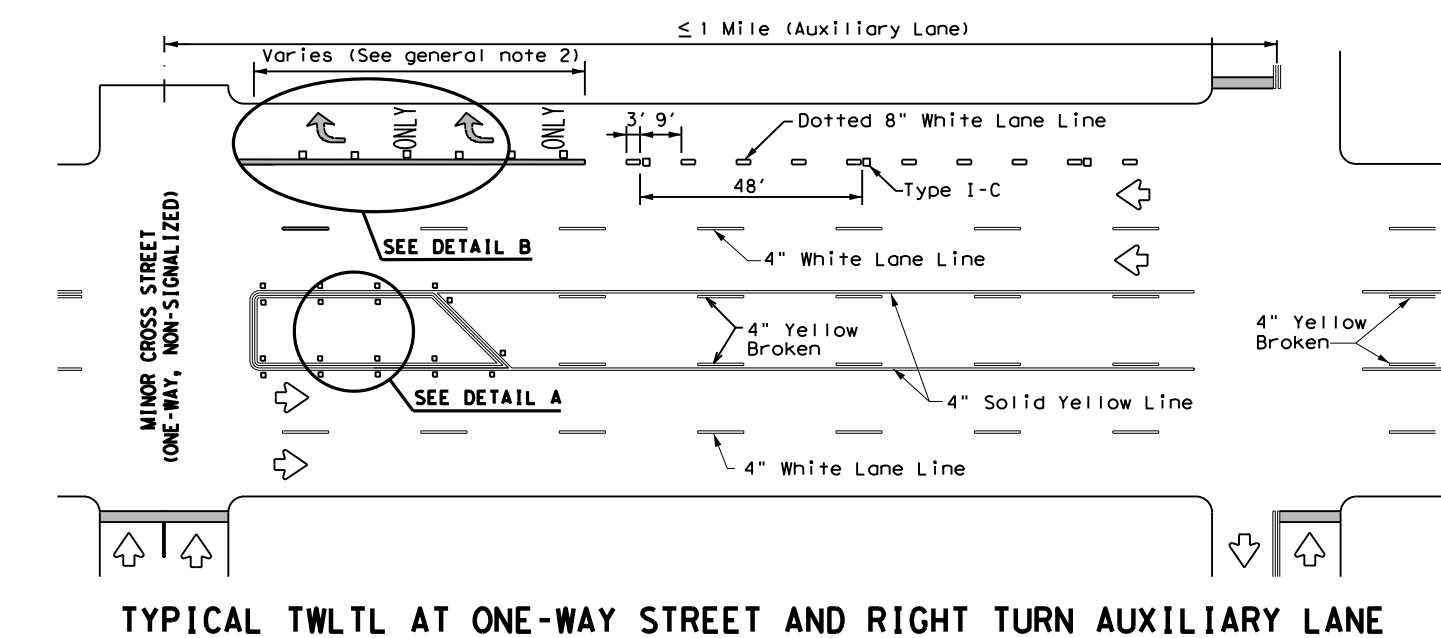
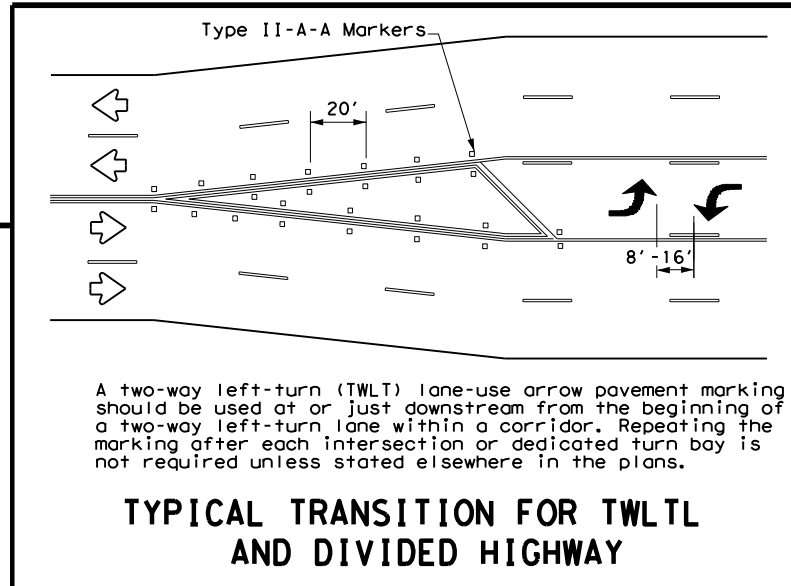
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an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

**GENERAL NOTES**

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

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

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



Texas Department of Transportation  
Traffic Safety Division Standard

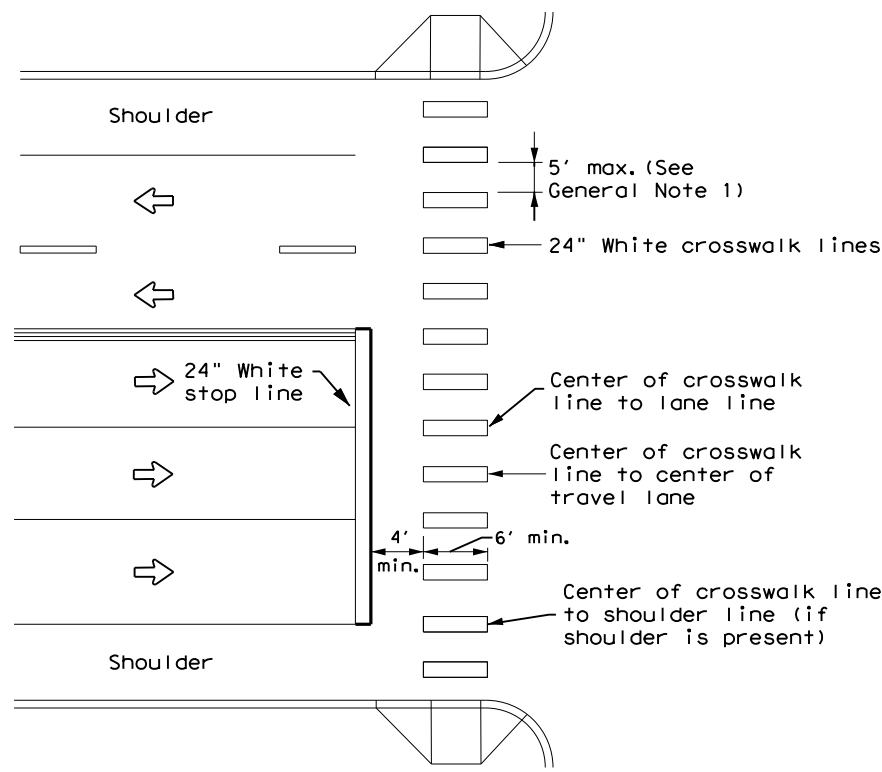
**TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS**  
PM(3)-20

FILE: pm3-20.dgn	DWG:	CHK:	DWG:	CHK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
5-00 2-10	DIST	COUNTY	SHEET NO.	
8-00 2-12	PHR	CAMERON	91	
3-03 6-20				

DATE: FILE:



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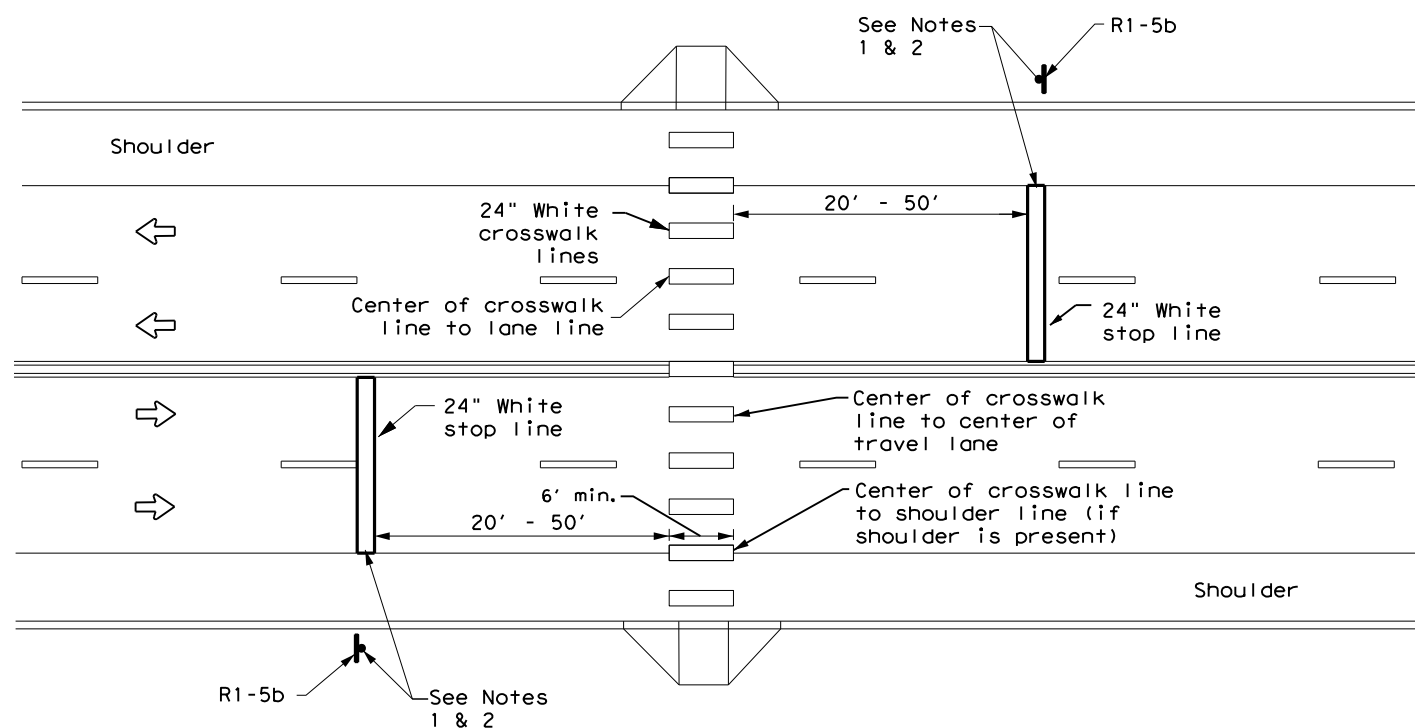
**HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH**

**GENERAL NOTES**

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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

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



**UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK**

**NOTES:**

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock crosswalks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

				Traffic Safety Division Standard	
<p>CROSSWALK PAVEMENT MARKINGS</p> <p>PM(4) - 22A</p>					
FILE:	pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS		0921	06	348	VA
6-20		DIST	COUNTY	SHEET NO.	
6-22		PHR	CAMERON	92	
12-22					
220					

DATE:  
 FILE:

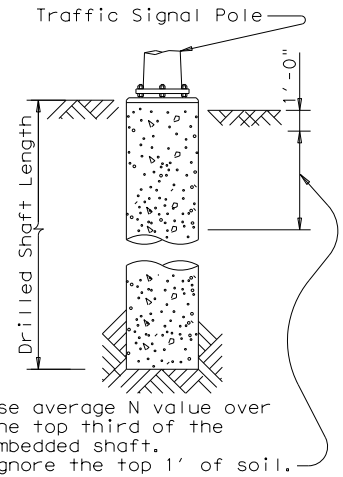
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.  
 DATE: 2023-05-30 16:25:02  
 FILE: S:\Projects\61254\02\Design\01\_Rio\_Hondo\_ADA\civil\Standards\Traffic\Items\ts-fd.dgn

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft (4), (5), (6)			ANCHOR BOLT DESIGN (1)				FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft	10	15	40	ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

- NOTES:**
- Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
  - Foundation Design Loads are the allowable moments and shears at the base of the structure.
  - Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
  - Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
  - If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
  - Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (6) (FEET)				
				24-A	30-A	36-A	36-B	42-A
TOTAL DRILLED SHAFT LENGTHS								

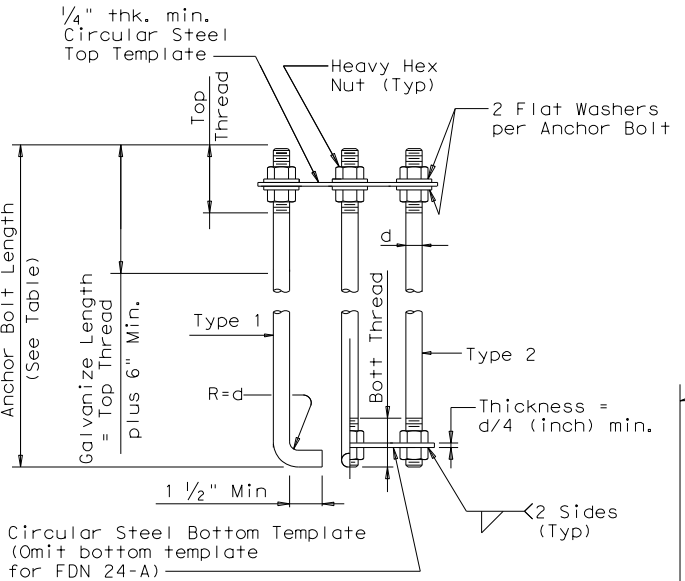
		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'			
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 24'			
				32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'



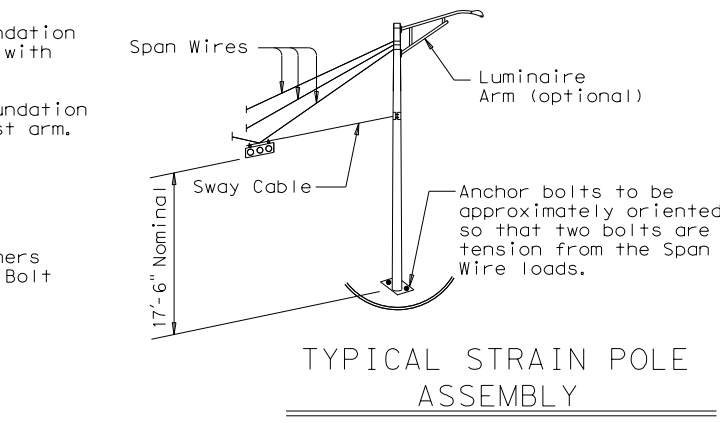
BOLT DIA IN.	(7) BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅞"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

(7) Min dimensions given, longer bolts are acceptable.

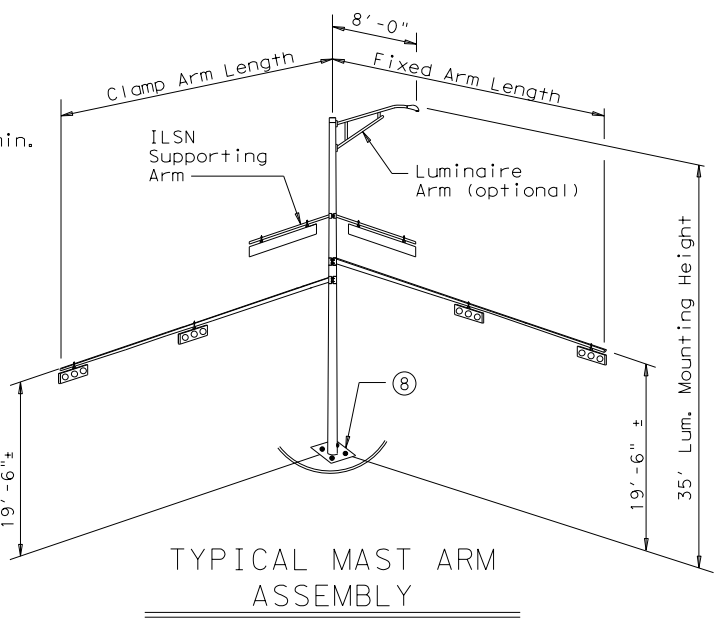
- EXAMPLE:**
- For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
  - For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



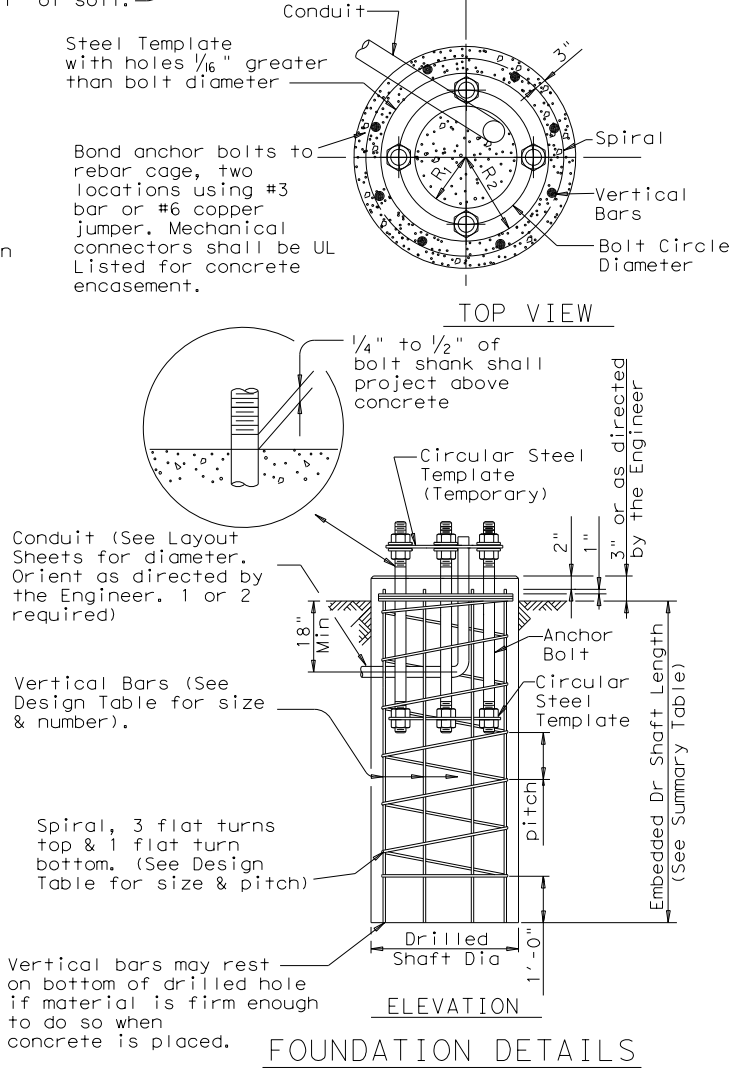
ANCHOR BOLT ASSEMBLY



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



FOUNDATION DETAILS

**GENERAL NOTES:**

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminares and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".



TRAFFIC SIGNAL  
POLE FOUNDATION

TS-FD-12

© TxDOT August 1995		DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-99 1-12		CONTRACT NO. 092106	SECTION 06	JOB NO. 348	HIGHWAY VA
DIST. PHR		COUNTY CAMERON	SHEET NO. 93		

**STORMWATER POLLUTION PREVENTION PLAN (SWP3):**

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

**1.0 SITE/PROJECT DESCRIPTION**

**1.1 PROJECT CONTROL SECTION JOB (CSJ):**

**1.2 PROJECT LIMITS:**

From: Rio Hondo City Park (FM-1846), FM-1846 (Ebony St.), Ebony St. (Robertson St.)  
To: Colorado St. (FM-1845), Robertson St. (Ebony St.), Riverside Village (Robertson St.)

**1.3 PROJECT COORDINATES:**

BEGIN: (Lat) \_\_\_\_\_, (Long) \_\_\_\_\_

END: (Lat) \_\_\_\_\_, (Long) \_\_\_\_\_

**1.4 TOTAL PROJECT AREA (Acres):** \_\_\_\_\_

**1.5 TOTAL AREA TO BE DISTURBED (Acres):** \_\_\_\_\_

**1.6 NATURE OF CONSTRUCTION ACTIVITY:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**1.7 MAJOR SOIL TYPES:**

Soil Type	Description

**1.8 PROJECT SPECIFIC LOCATIONS (PSLs):**

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- PSLs determined during preconstruction meeting
- PSLs determined during construction
- No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

**1.9 CONSTRUCTION ACTIVITIES:**

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

- Mobilization
- Install sediment and erosion controls
- Blade existing topsoil into windrows, prep ROW, clear and grub
- Remove existing pavement
- Grading operations, excavation, and embankment
- Excavate and prepare subgrade for proposed pavement widening
- Remove existing culverts, safety end treatments (SETs)
- Remove existing metal beam guard fence (MBGF), bridge rail
- Install proposed pavement per plans
- Install culverts, culvert extensions, SETs
- Install mow strip, MBGF, bridge rail
- Place flex base
- Rework slopes, grade ditches
- Blade windrowed material back across slopes
- Revegetation of unpaved areas
- Achieve site stabilization and remove sediment and erosion control measures
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**1.10 POTENTIAL POLLUTANTS AND SOURCES:**

- Sediment laden stormwater from stormwater conveyance over disturbed area
- Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- Solvents, paints, adhesives, etc. from various construction activities
- Transported soils from offsite vehicle tracking
- Construction debris and waste from various construction activities
- Contaminated water from excavation or dewatering pump-out water
- Sanitary waste from onsite restroom facilities
- Trash from various construction activities/receptacles
- Long-term stockpiles of material and waste
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**1.11 RECEIVING WATERS:**

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody

\* Add (\*) for impaired waterbodies with pollutant in ( ).

**1.12 ROLES AND RESPONSIBILITIES: TxDOT**

- Development of plans and specifications
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Perform SWP3 inspections
- Maintain SWP3 records and update to reflect daily operations
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR**

- Day To Day Operational Control
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Maintain schedule of major construction activities
- Install, maintain and modify BMPs
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:**

MS4 Entity

**STORMWATER POLLUTION PREVENTION PLAN (SWP3)**



FED. DIV. NO.	PROJECT NO.			SHEET NO.
				94
STATE	STATE DIST.	COUNTY		
TEXAS	PHR	CAMERON		
CONT.	SECT.	JOB	HIGHWAY NO.	
0921	06	348	VA	

**STORMWATER POLLUTION PREVENTION PLAN (SWP3):**

**2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE**

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

**2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:**

**T / P**

- Protection of Existing Vegetation
- Vegetated Buffer Zones
- Soil Retention Blankets
- Geotextiles
- Mulching/ Hydromulching
- Soil Surface Treatments
- Temporary Seeding
- Permanent Planting, Sodding or Seeding
- Biodegradable Erosion Control Logs
- Rock Filter Dams/ Rock Check Dams
- Vertical Tracking
- Interceptor Swale
- Riprap
- Diversion Dike
- Temporary Pipe Slope Drain
- Embankment for Erosion Control
- Paved Flumes
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**2.2 SEDIMENT CONTROL BMPs:**

**T / P**

- Biodegradable Erosion Control Logs
- Dewatering Controls
- Inlet Protection
- Rock Filter Dams/ Rock Check Dams
- Sandbag Berms
- Sediment Control Fence
- Stabilized Construction Exit
- Floating Turbidity Barrier
- Vegetated Buffer Zones
- Vegetated Filter Strips
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

**T / P**

- Sediment Trap
  - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - 3,600 cubic feet of storage per acre drained
- Sedimentation Basin
  - Not required (<10 acres disturbed)
  - Required (>10 acres) and implemented.
    - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - 3,600 cubic feet of storage per acre drained
  - Required (>10 acres), but not feasible due to:
    - Available area/Site geometry
    - Site slope/Drainage patterns
    - Site soils/Geotechnical factors
    - Public safety
    - Other: \_\_\_\_\_

**2.3 PERMANENT CONTROLS:**

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

**2.4 OFFSITE VEHICLE TRACKING CONTROLS:**

- Excess dirt/mud on road removed daily
- Haul roads dampened for dust control
- Loaded haul trucks to be covered with tarpaulin
- Stabilized construction exit
- Other: \_\_\_\_\_
- \_\_\_\_\_
- Other: \_\_\_\_\_
- \_\_\_\_\_
- Other: \_\_\_\_\_
- \_\_\_\_\_
- Other: \_\_\_\_\_
- \_\_\_\_\_

**2.5 POLLUTION PREVENTION MEASURES:**

- Chemical Management
- Concrete and Materials Waste Management
- Debris and Trash Management
- Dust Control
- Sanitary Facilities
- Other: \_\_\_\_\_
- \_\_\_\_\_
- Other: \_\_\_\_\_
- \_\_\_\_\_
- Other: \_\_\_\_\_
- \_\_\_\_\_

**2.6 VEGETATED BUFFER ZONES:**

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

**2.7 ALLOWABLE NON-STORMWATER DISCHARGES:**

- Fire hydrant flushings
- Irrigation drainage
- Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- Potable water sources
- Springs
- Uncontaminated groundwater
- Water used to wash vehicles or control dust
- Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

**2.8 INSPECTIONS:**

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

**2.9 MAINTENANCE:**

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

**STORMWATER POLLUTION PREVENTION PLAN (SWP3)**










FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				95
STATE	STATE DIST.	COUNTY		
TEXAS	PHR	CAMERON		
CONT.	SECT.	JOB	HIGHWAY NO.	
0921	06	348	VA	

Plotted on: 2023-05-30

Design File name: S:\projects\612\54\02\Design\01\_Rio\_Hondo\_ADA\civil\standards\SW3P\sw3pex01.dgn

**LEGEND**

-  BLOCK SODDING
-  FLOW DIRECTION
-  EROSION CONTROL LOG
-  WOOD OR METAL STAKES (AS APPROVED BY THE ENGINEER)
-  SANDBAGS
-  EXISTING FEATURES
-  PROPOSED WORK AREA

**NOTES:**

REFERENCE ENVIRONMENTAL PERMITS, ISSUES, AND COMMITMENTS (EPIC) AND STORM WATER POLLUTION PREVENTION PLAN (SW3P) SHEETS FOR SPECIFIC CONSTRUCTION CONSIDERATIONS OR REQUIREMENTS.

EXAMPLES SHOWN ON THE SHEET ARE FOR GENERAL GUIDANCE AND MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.

SITE CONDITIONS MAY DICTATE ADDITIONAL COUNTERMEASURES AS DIRECTED BY THE ENGINEER.

USE ADDITIONAL STAKES OR SAND BAGS AS NEEDED TO HOLD IN PLACE (NSP1)

INSTALLATION OF COUNTERMEASURES MUST BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT.

**DESIGN**

**INTERIM REVIEW**

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: TYLER PAYNE DUBE  
 P.E. SERIAL NO: 118612  
 DATE: 2023-05-30

**APPROVAL**

**INTERIM REVIEW**


DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.  
 ENGINEER: JOHN A. TYLER  
 P.E. SERIAL NO: 105193  
 DATE: 2023-05-30

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

**Pape-Dawson ENGINEERS**

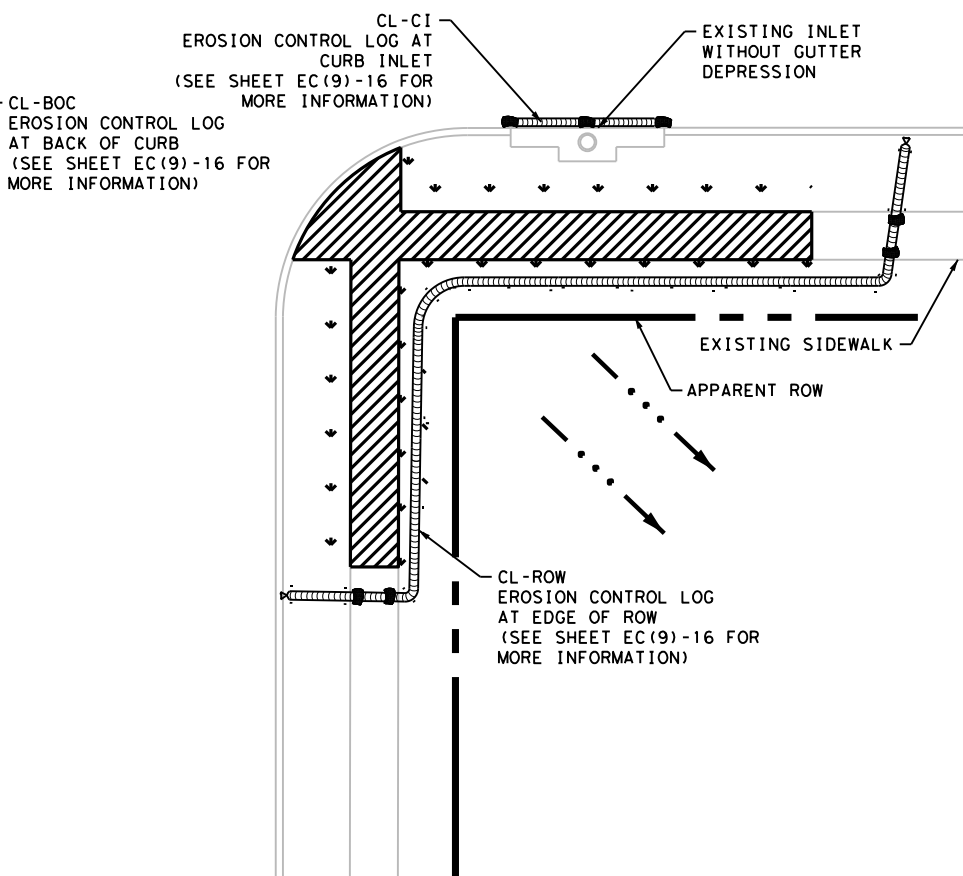
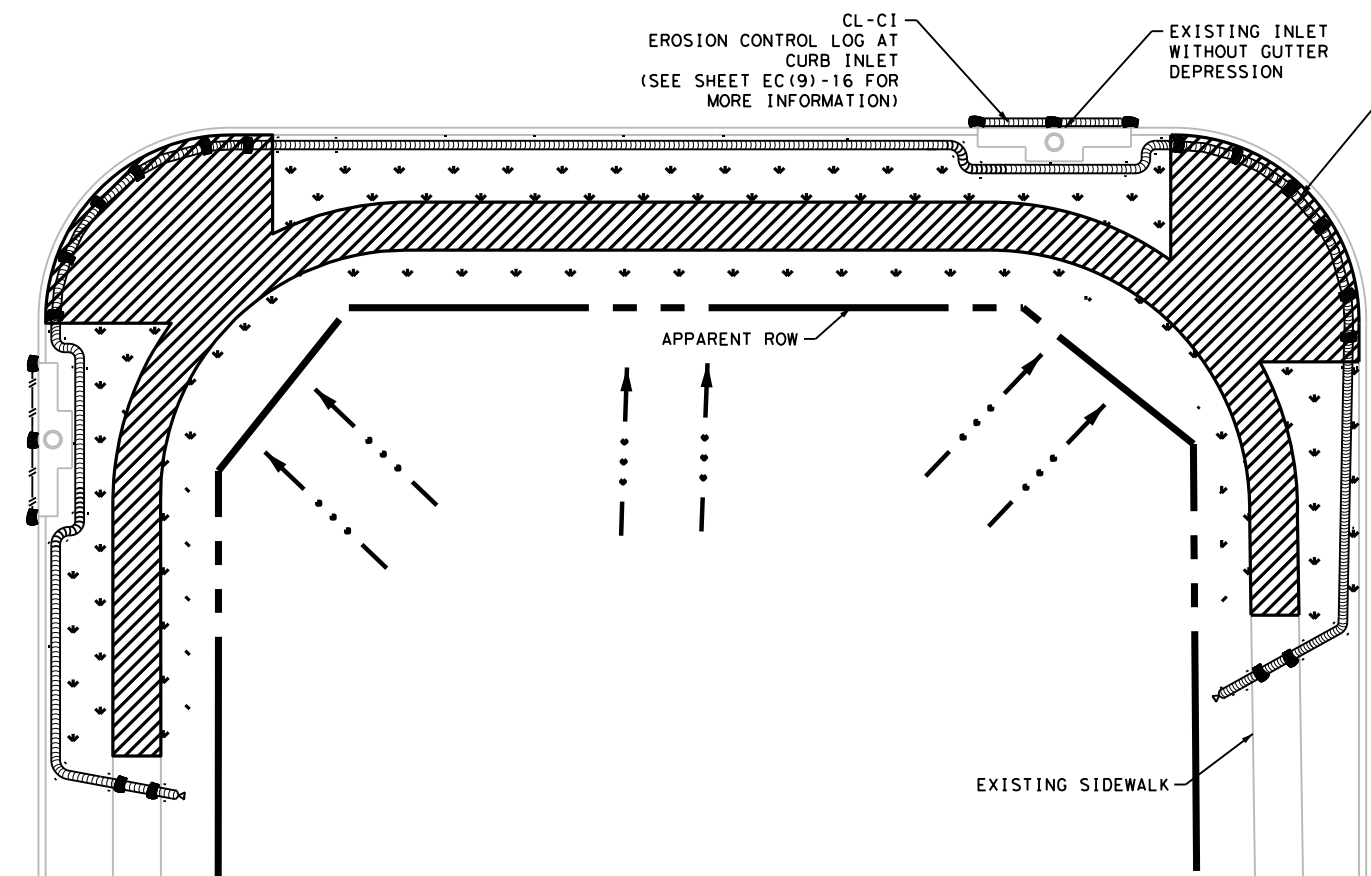
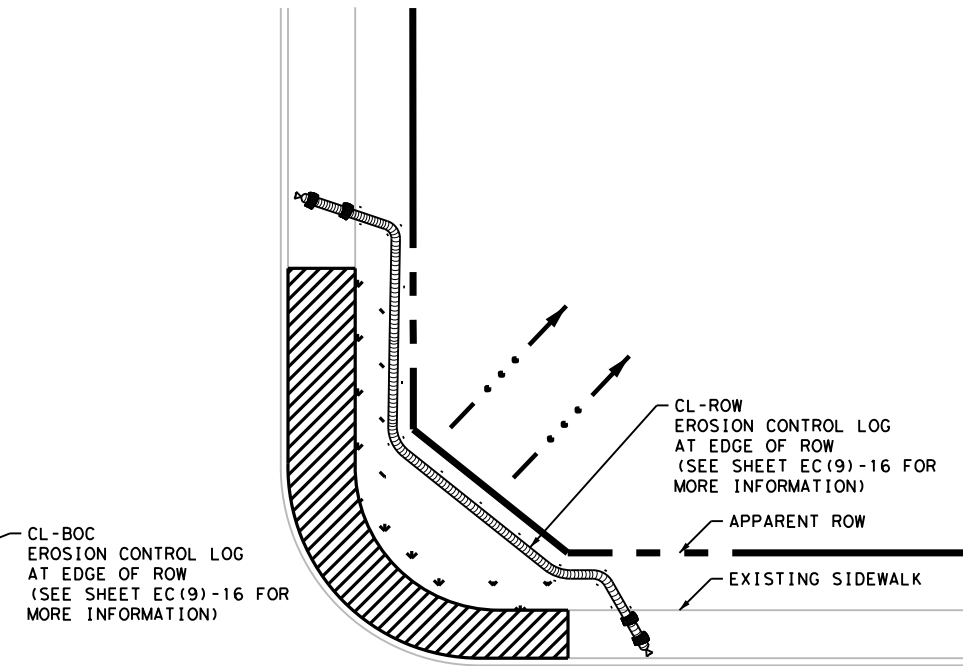
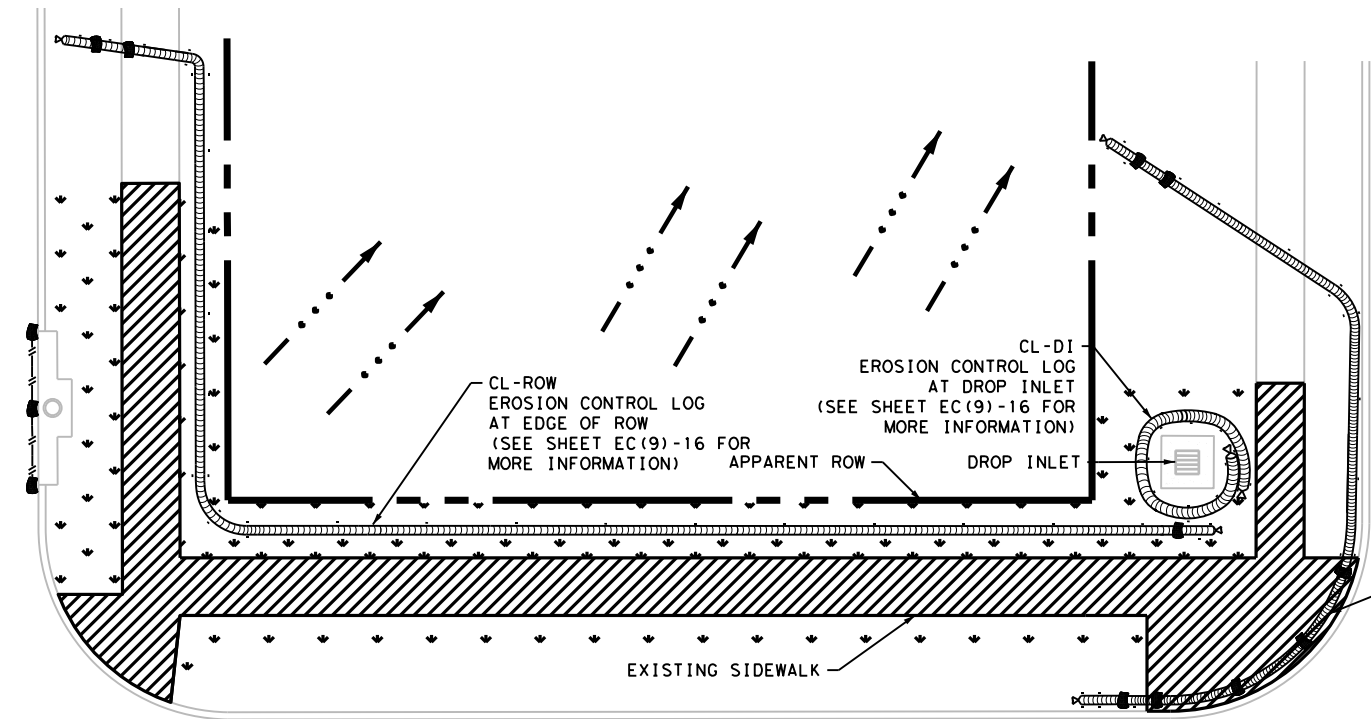
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

 Texas Department of Transportation  
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**SW3P EXAMPLE LAYOUTS**

SHEET 1 OF 1

DGN:	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	STP 2B23 (202) TAPS	VA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	PHR	CAMERON	0921	06	348	96



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DATE: 2023-05-30  
 FILE: S:\projects\612154\02\_Design\01\_Rto\_Hondo\_ADA\Civil\Standards\SW3P\epic.dgn

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.  
2.  
 No Action Required     Required Action

Action No.

- Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
- Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
- Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
- When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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
<input type="checkbox"/> Temporary Vegetation	<input type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input type="checkbox"/> Blankets/Matting	<input type="checkbox"/> Rock Berm	<input type="checkbox"/> Retention/Irrigation Systems
<input type="checkbox"/> Mulch	<input type="checkbox"/> Triangular Filter Dike	<input type="checkbox"/> Extended Detention Basin
<input type="checkbox"/> Sodding	<input type="checkbox"/> Sand Bag Berm	<input type="checkbox"/> Constructed Wetlands
<input type="checkbox"/> Interceptor Swale	<input type="checkbox"/> Straw Bale Dike	<input type="checkbox"/> Wet Basin
<input type="checkbox"/> Diversion Dike	<input type="checkbox"/> Brush Berms	<input type="checkbox"/> Erosion Control Compost
<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Mulch Filter Berm and Socks
<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks
<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Vegetation Lined Ditches
	<input type="checkbox"/> Stone Outlet Sediment Traps	<input type="checkbox"/> Sand Filter Systems
	<input type="checkbox"/> Sediment Basins	<input type="checkbox"/> 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.  
2.  
3.  
4.

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.  
2.  
3.  
4.

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.  
2.  
3.  
4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

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.

1.  
2.  
3.


VII. OTHER ENVIRONMENTAL ISSUES

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

- No Action Required     Required Action

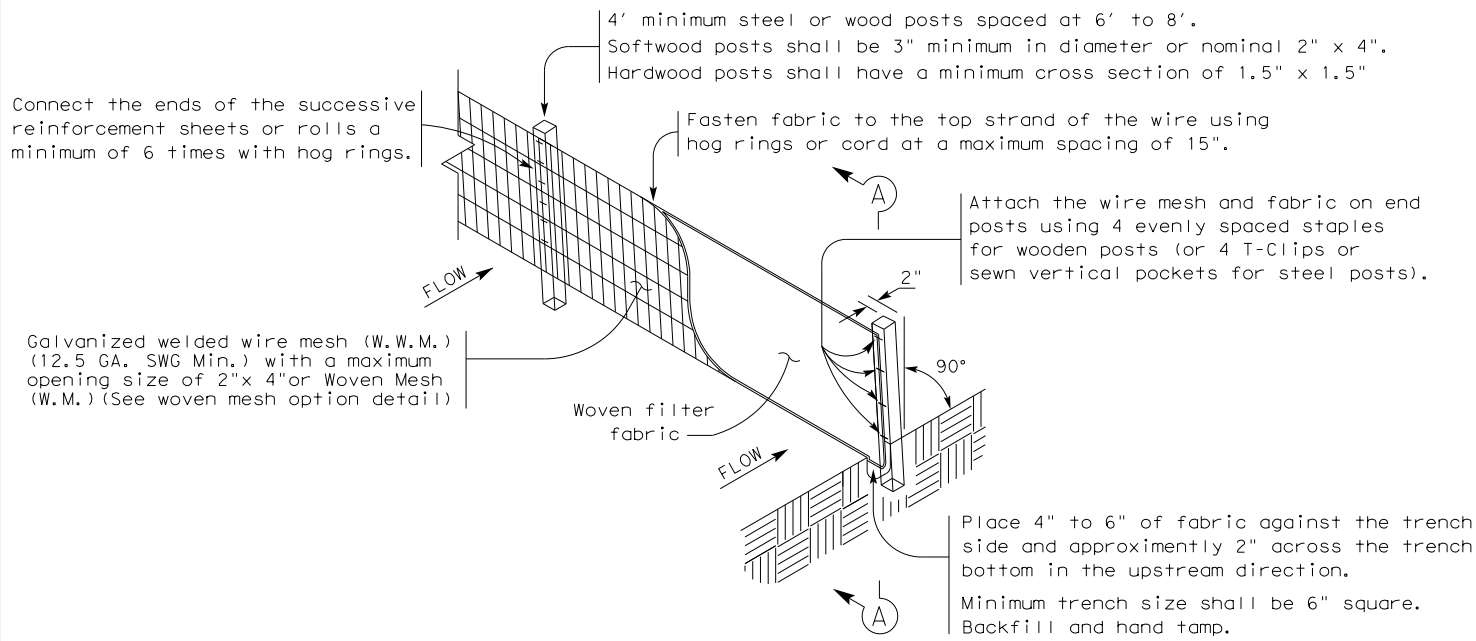
Action No.

1.  
2.  
3.

		<b>Design Division Standard</b>		
<p>ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC</p>				
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
12-12-2011 (DS) REVISIONS	0921	06	348	VA
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	PHR	CAMERON	97	

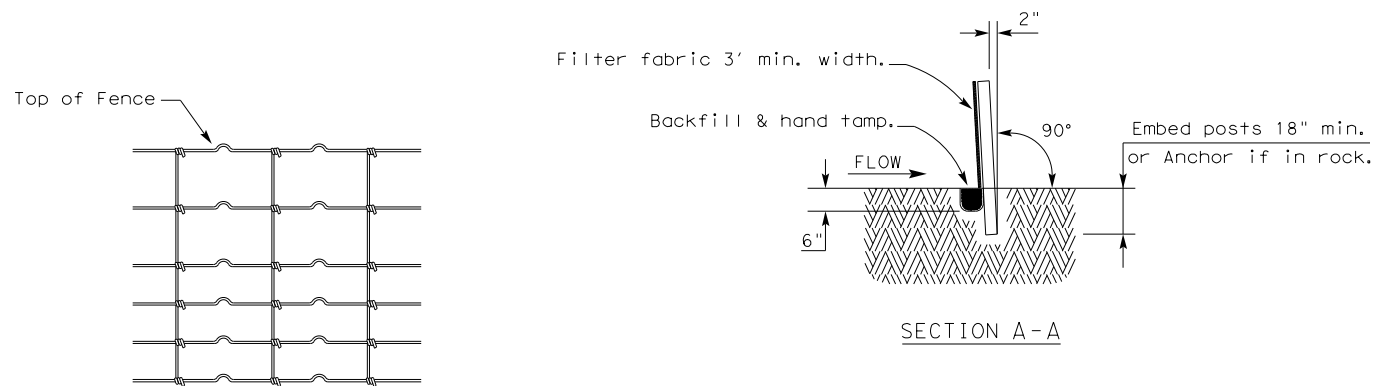


2023E05-30  
 SF1Defojects\612\54\02\Design\01\_Rio\_Hondo\_ADA\Civil\Standards\SW3P\ec116.dgn  
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TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT<sup>2</sup>. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

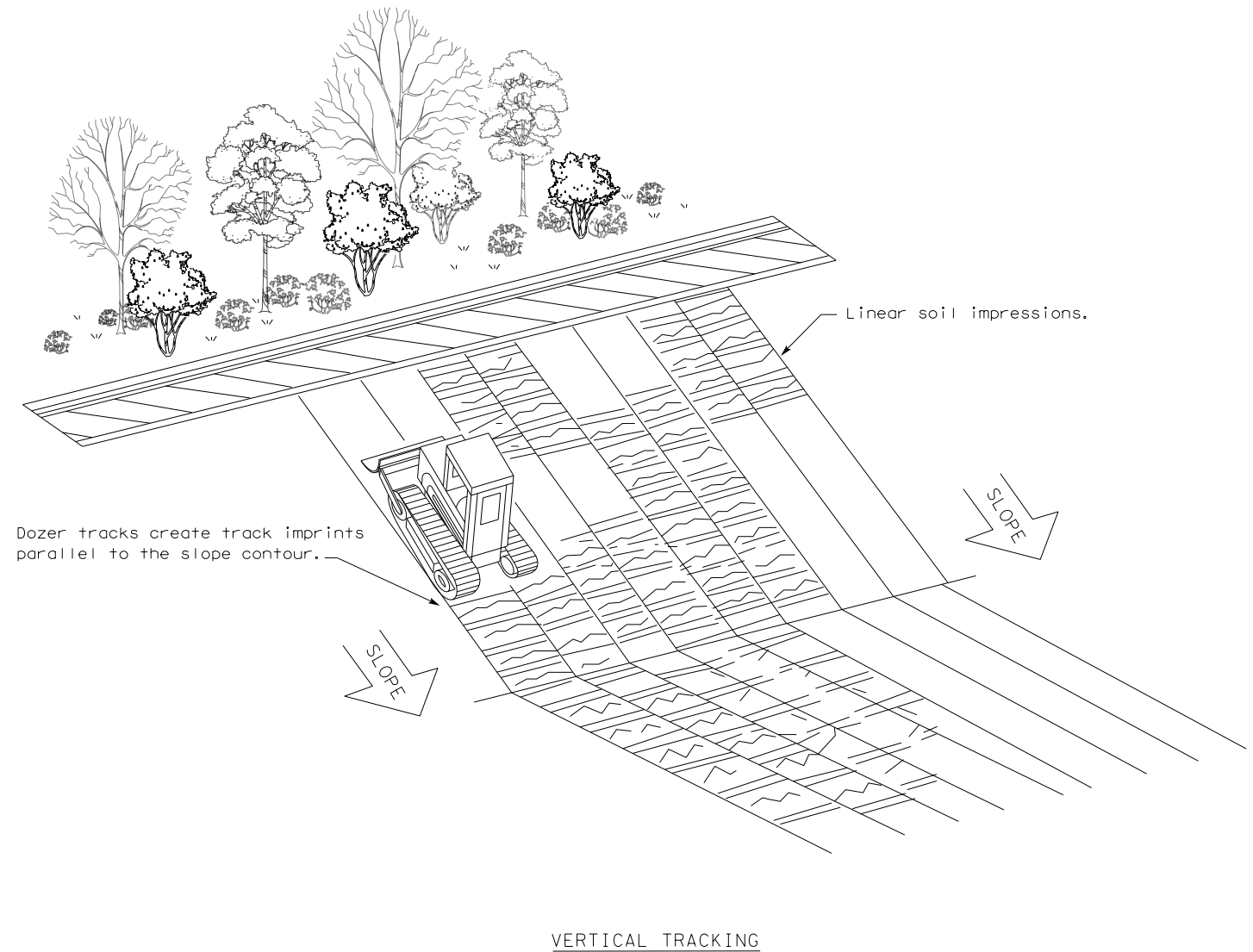
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

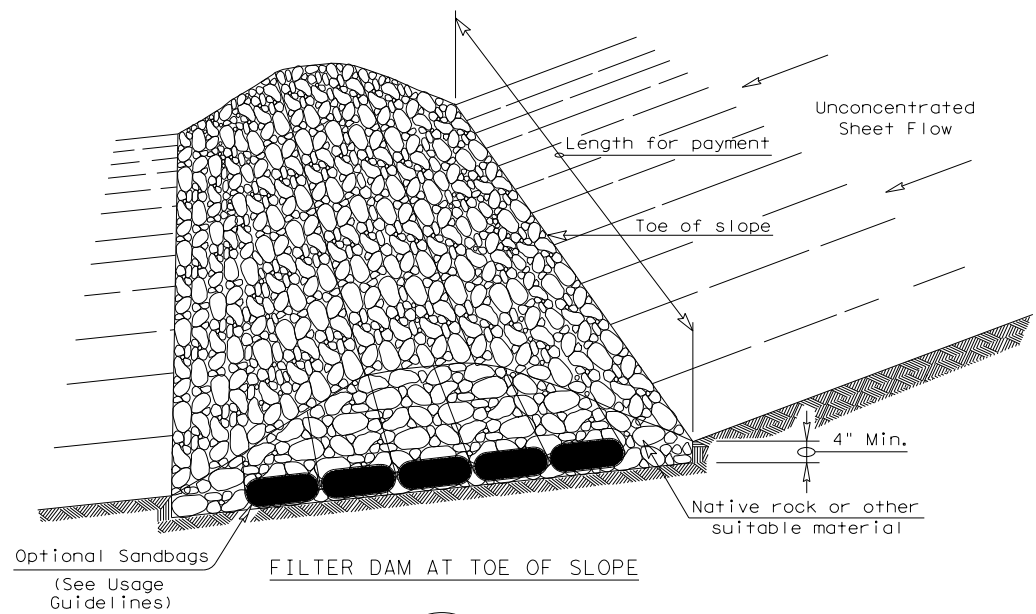


TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
	DIST	COUNTY	SHEET NO.	
	PHR	CAMERON	98	

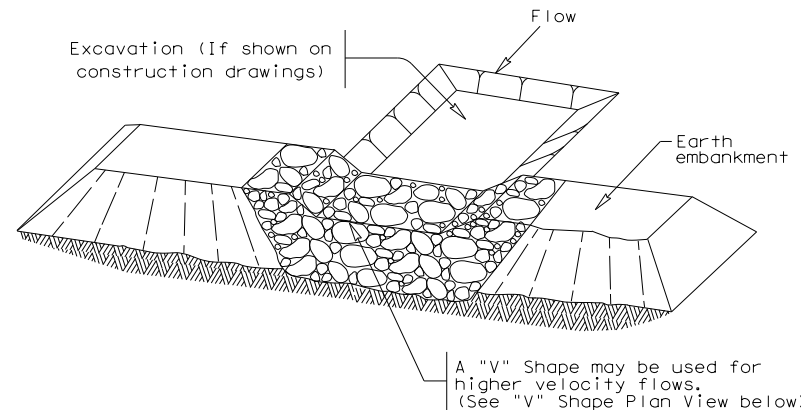
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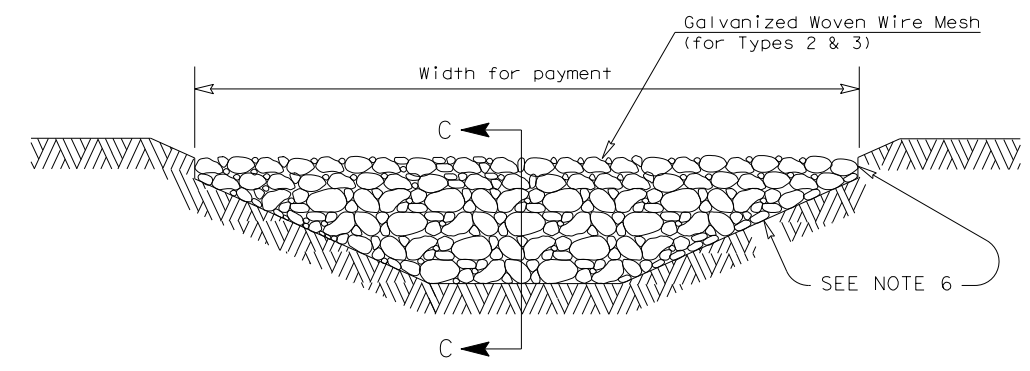
FILTER DAM AT TOE OF SLOPE

RFD1



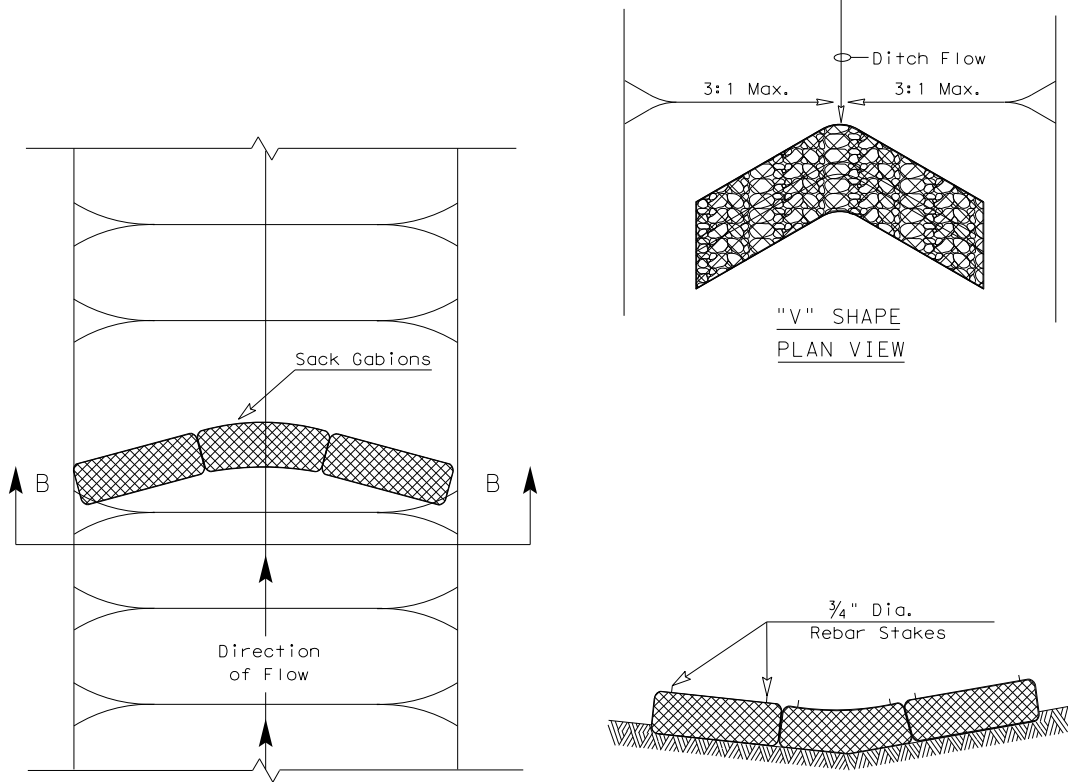
FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2

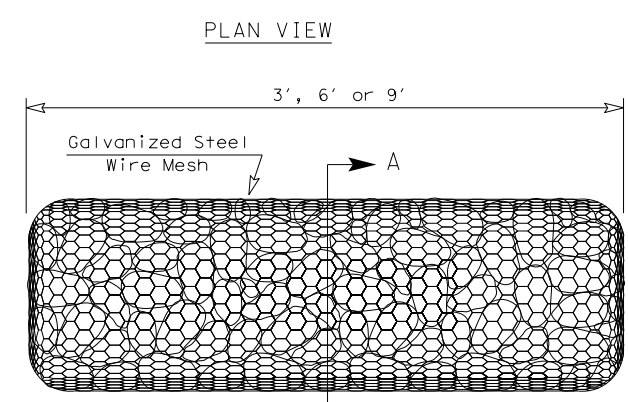


FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3



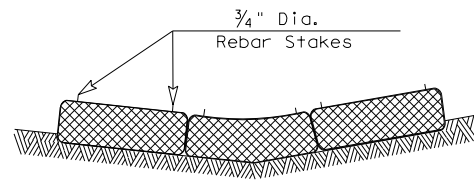
"V" SHAPE PLAN VIEW



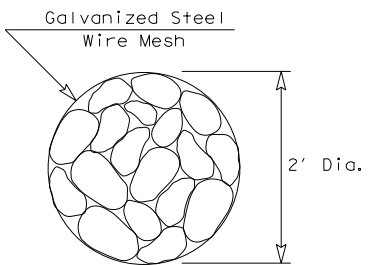
PLAN VIEW

TYPE 4 (SACK GABIONS)

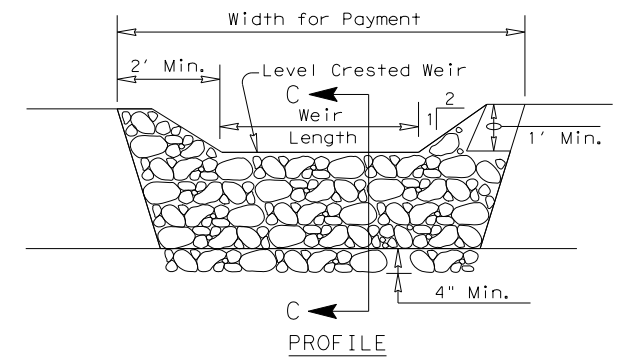
RFD4



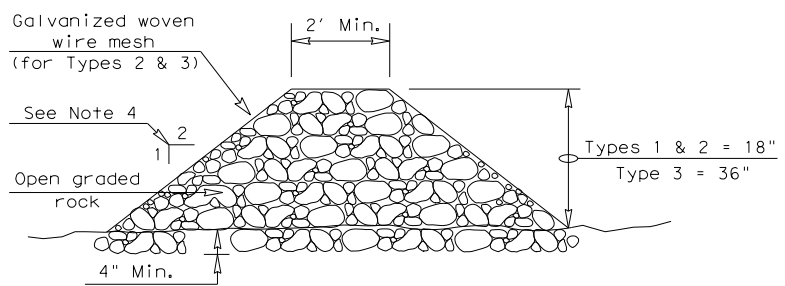
SECTION B-B



SECTION A-A



PROFILE



SECTION C-C

**ROCK FILTER DAM USAGE GUIDELINES**

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT<sup>2</sup> of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

**Type 1 (18" high with no wire mesh) (3" to 6" aggregate):** Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

**Type 2 (18" high with wire mesh) (3" to 6" aggregate):** Type 2 may be used in ditches and at dike or swale outlets.

**Type 3 (36" high with wire mesh) (4" to 8" aggregate):** Type 3 may be used in stream flow and should be secured to the stream bed.

**Type 4 (Sack gabions) (3" to 6" aggregate):** Type 4 May be used in ditches and smaller channels to form an erosion control dam.

**Type 5:** Provide rock filter dams as shown on plans.

**GENERAL NOTES**

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

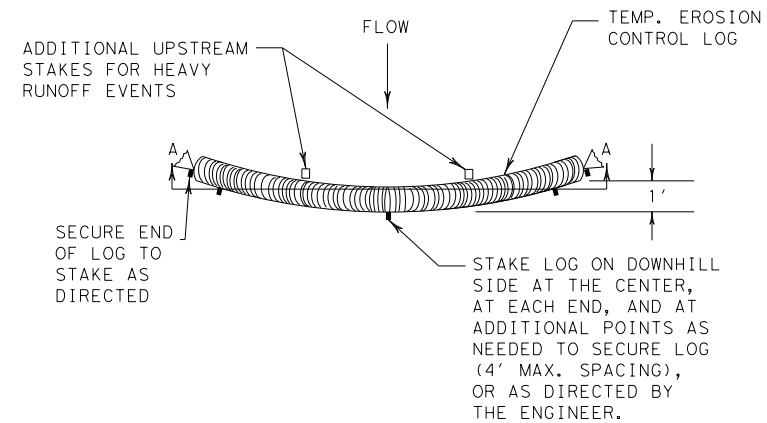
**PLAN SHEET LEGEND**

- Type 1 Rock Filter Dam — RFD1 —
- Type 2 Rock Filter Dam — RFD2 —
- Type 3 Rock Filter Dam — RFD3 —
- Type 4 Rock Filter Dam — RFD4 —

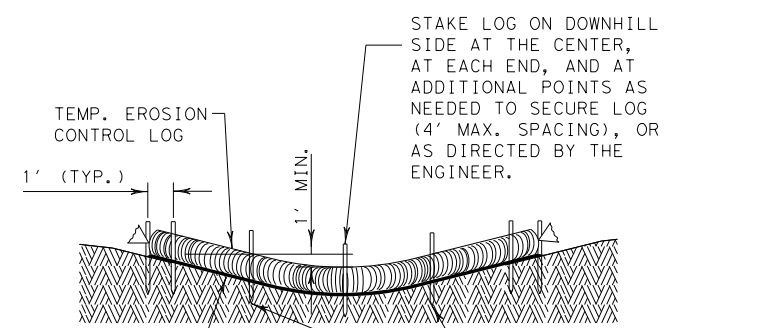
		<b>Design Division Standard</b>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>ROCK FILTER DAMS</b> <b>EC(2)-16</b>			
FILE: ec216	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0921	06	348
	DIST	COUNTY	SHEET NO.
	PHR	CAMERON	99

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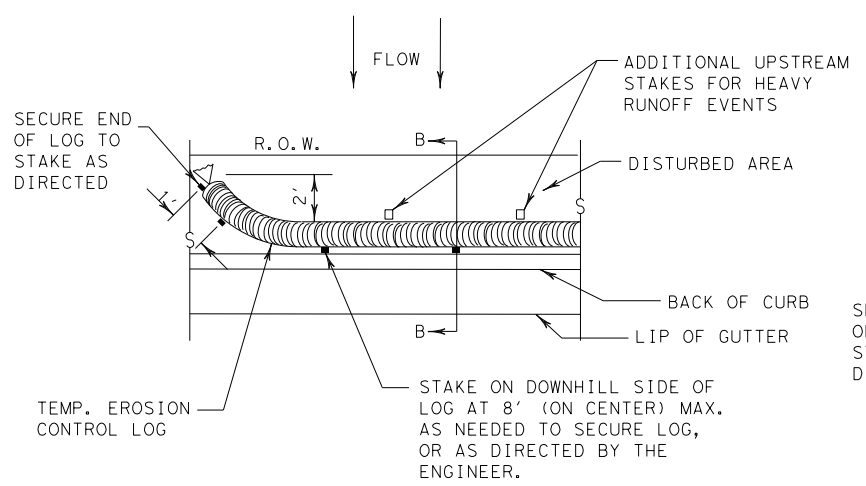
PLAN VIEW



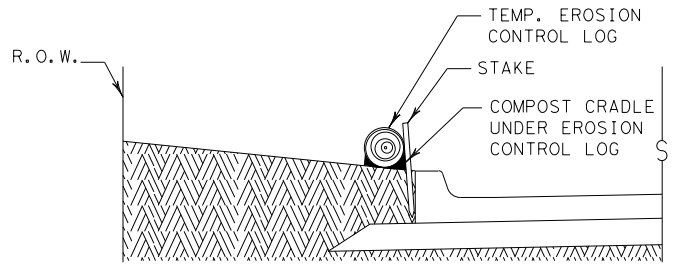
SECTION A-A

EROSION CONTROL LOG DAM

CL-D



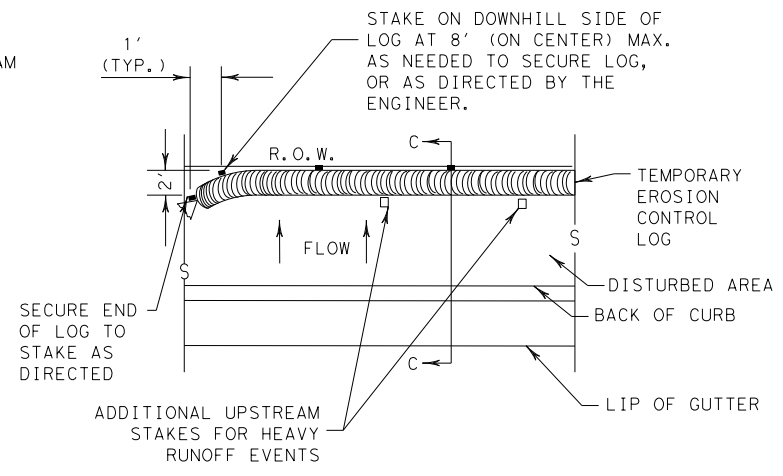
PLAN VIEW



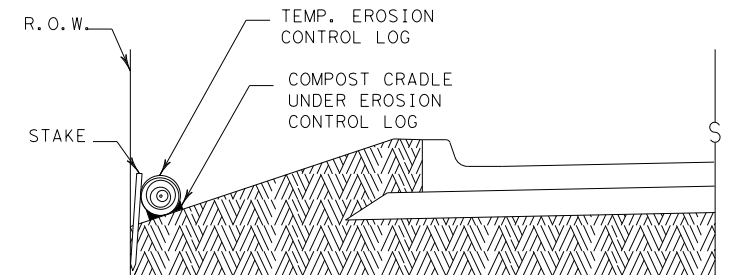
SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



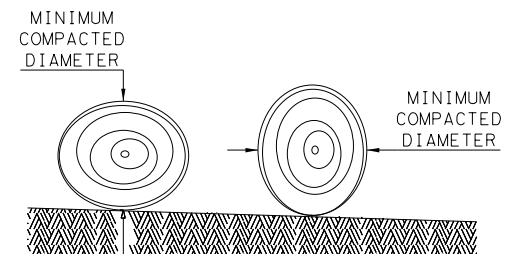
PLAN VIEW



SECTION C-C

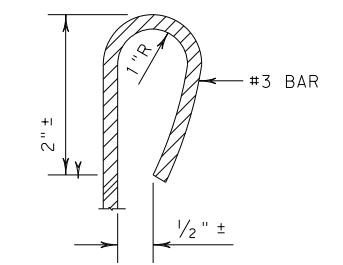
EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

- 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



REBAR STAKE DETAIL

**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:**

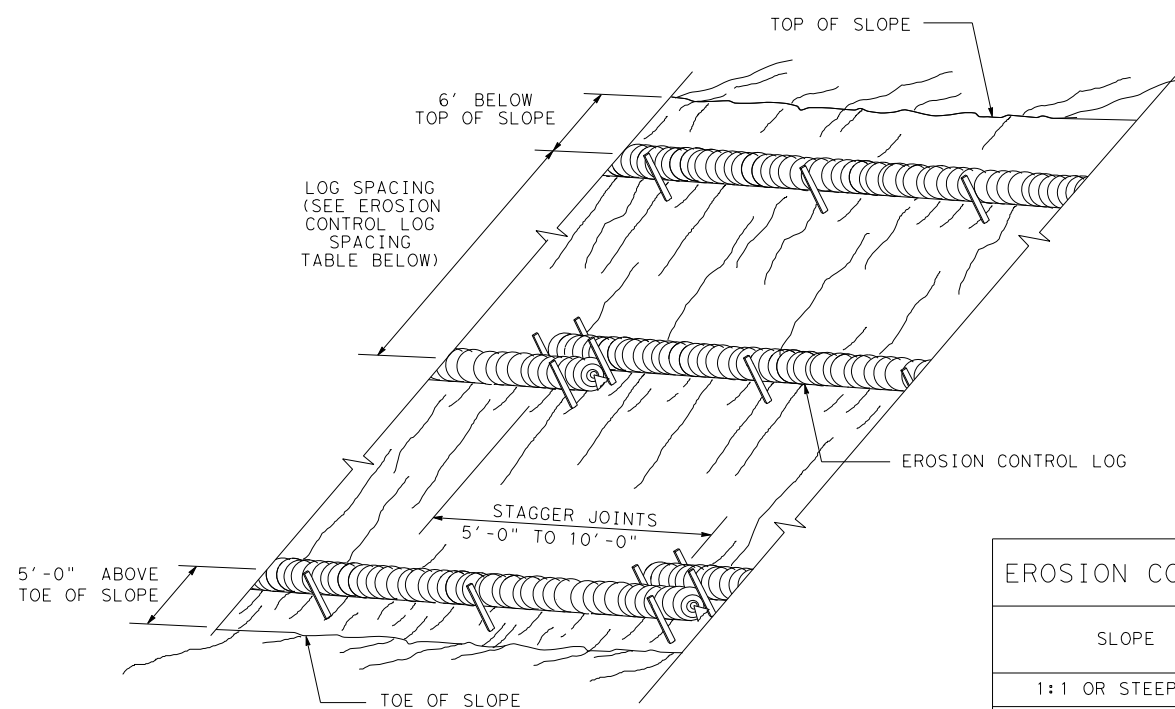
1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE 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.

SHEET 1 OF 3

		<b>Design Division Standard</b>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b>			
<b>EROSION CONTROL LOG</b>			
<b>EC(9) - 16</b>			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0921	06	348
	DIST	COUNTY	SHEET NO.
	PHR	CAMERON	100

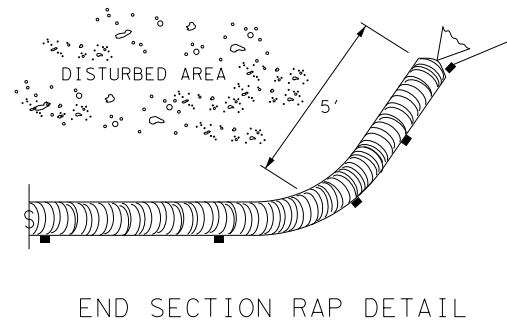
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 FILE: S:\projects\612154\02\Design\01\_Rto\_Hondo\_ADA\Civil\Standards\SW3P\ec916.dgn



EROSION CONTROL LOGS ON SLOPES  
STAKE AND TRENCHING ANCHORING

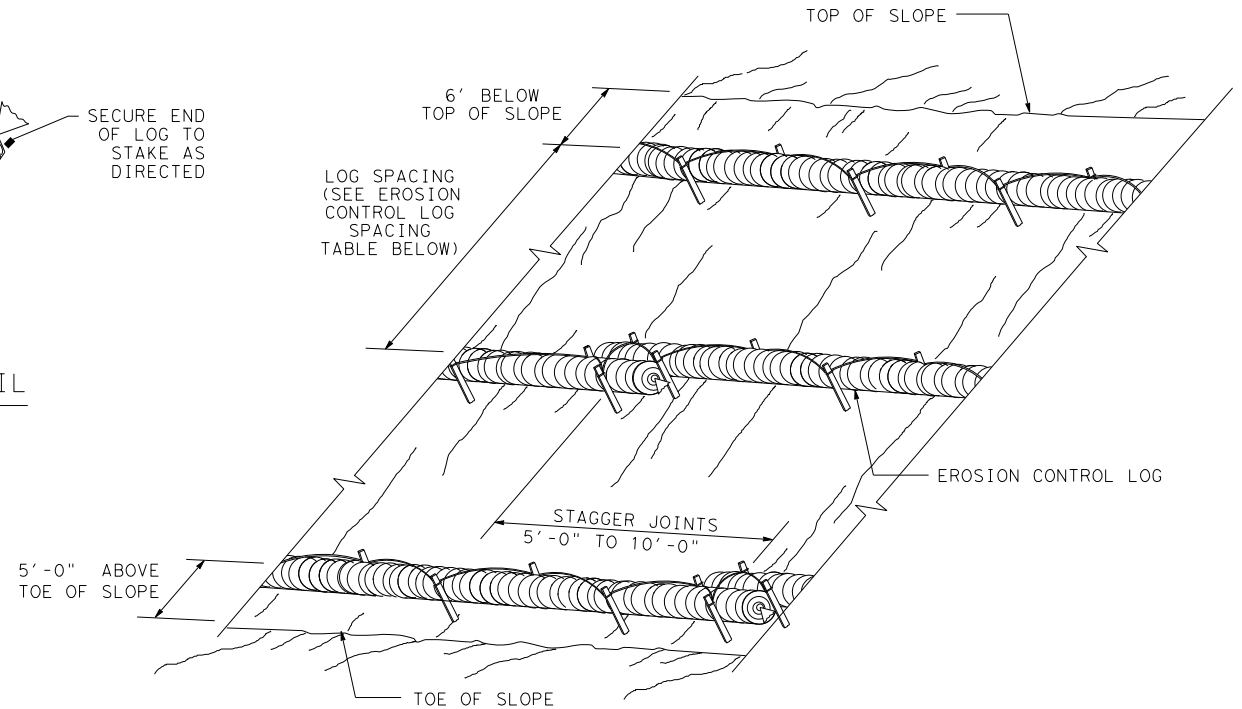
CL-SST



END SECTION RAP DETAIL

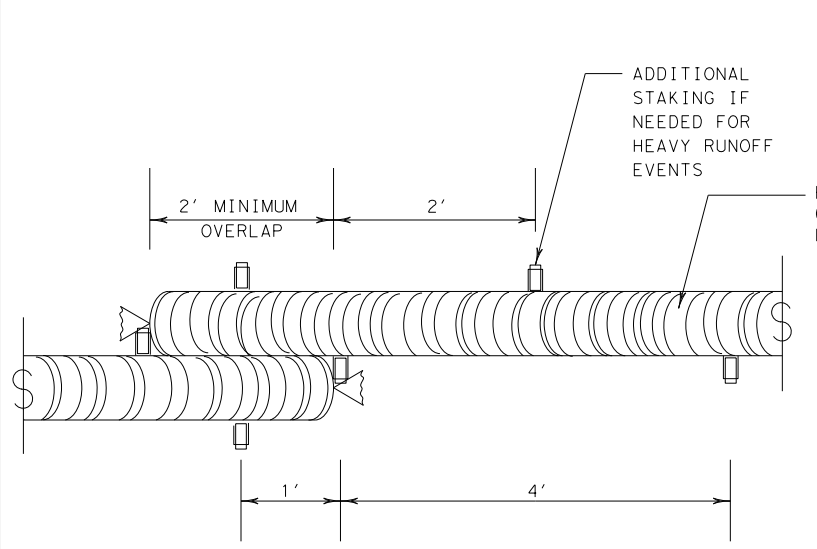
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

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



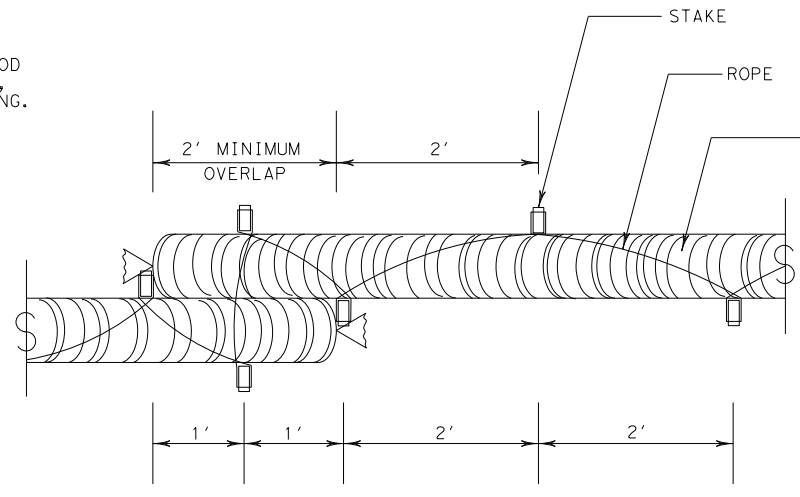
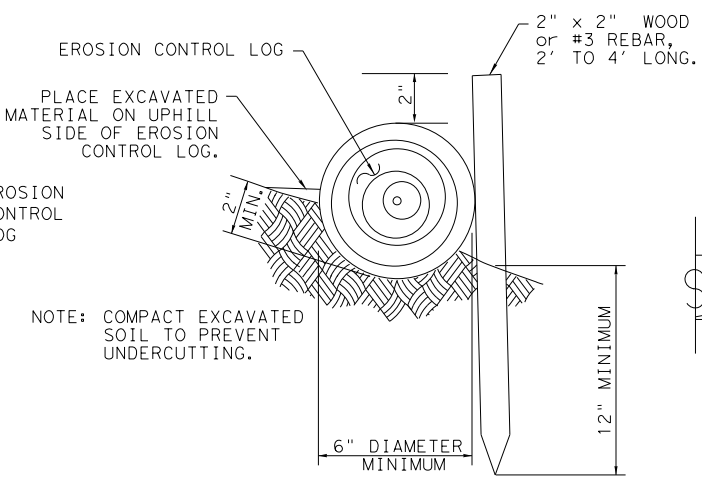
EROSION CONTROL LOGS ON SLOPES  
STAKE AND LASHING ANCHORING

CL-SSL



STAKE AND TRENCHING ANCHORING DETAIL

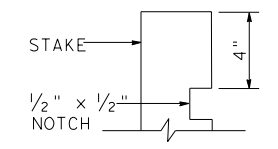
CL-SST



STAKE AND LASHING ANCHORING DETAIL

CL-SSL

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

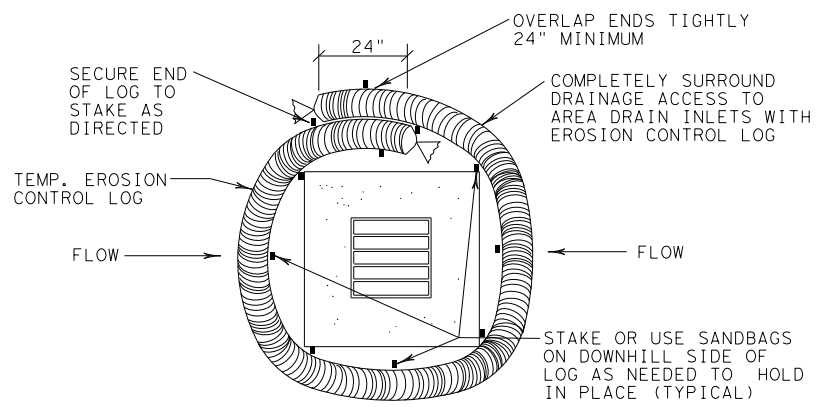


STAKE NOTCH DETAIL

		<b>Design Division Standard</b>	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC(9)-16			
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT
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REVISIONS	0921 06	348	VA
DIST	COUNTY	SHEET NO.	
PHR	CAMERON	101	

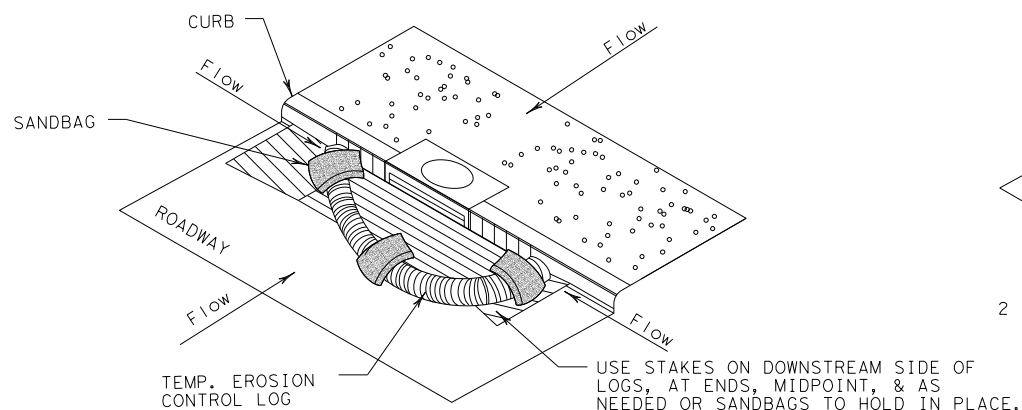
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 2023-05-30  
 FILE: S:\projects\612154\02\Design\01\_Rto\_Hondo\_ADA\Civil\Standards\SW3P\ec916.dgn



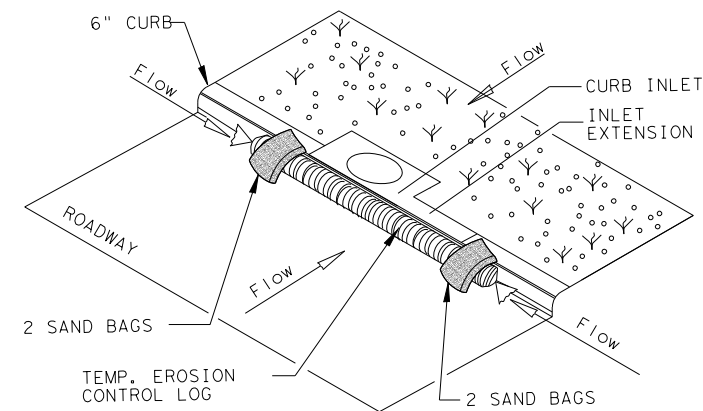
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

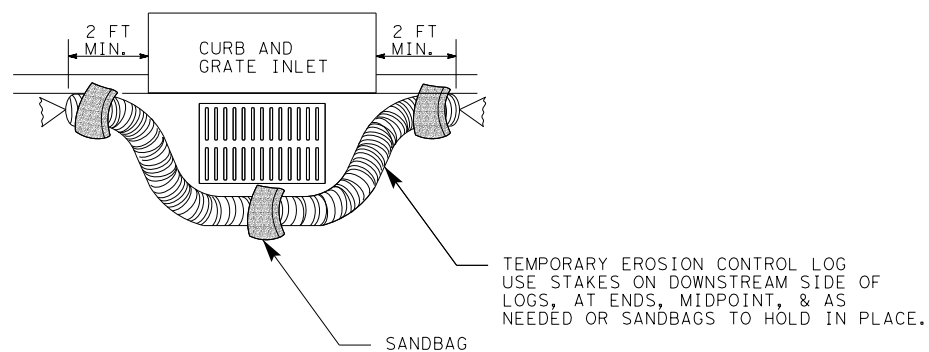
CL-CI



EROSION CONTROL LOG AT CURB INLET

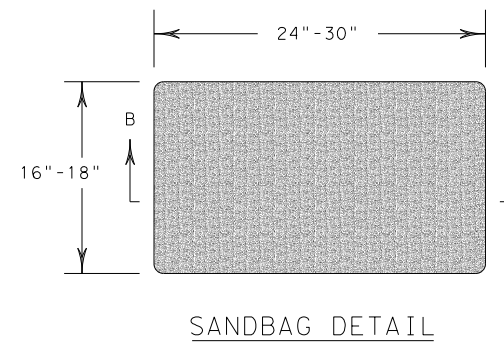
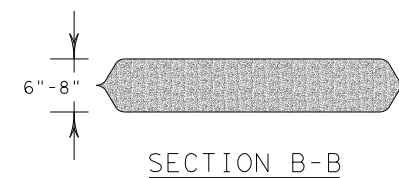
CL-CI

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



SHEET 3 OF 3



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

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	348	VA
	DIST	COUNTY	SHEET NO.	
	PHR	CAMERON	102	