100% SUBMITTAL

CONT	SECT	JOB	HIGHWAY
0914	04	331, ETC	-
DIST	COUNTY		SHEET NO.
AUS	TRAVIS		1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION
FOR THE INSTALLATION OF TRAFFIC SIGNALS

FEDERAL PROJECT NO. STP 2024(146)HESG

CSJ: 0914-04-331, ETC.
TRAVIS COUNTY

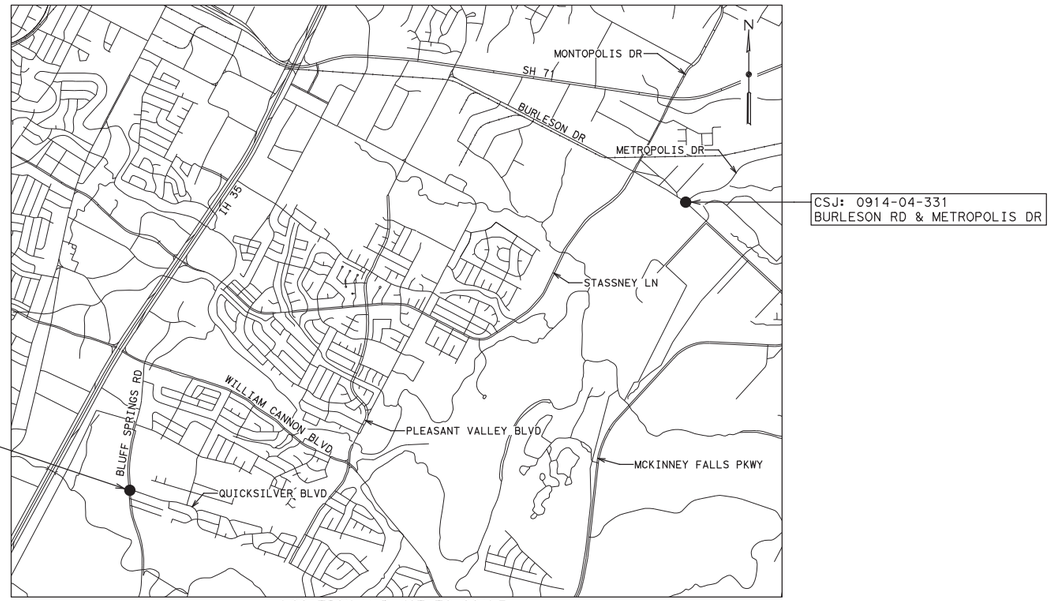
PROJECT LENGTH: 0..002 MILES

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENTS CONSISTING OF:
SIGNAL, SAFETY LIGHTING AND INTERSECTION IMPROVEMENTS AT
METROPOLIS DRIVE AND BLUFF SPRINGS

DESIGN SPEED:
BURLESON RD; 45 MPH*
METROPOLIS DR: 30 MPH*
QUICKSILVER RD: 30 MPH*
BLUFF SPRINGS RD: 60 MPH*
*FOR HSIP ELEMENTS ONLY

AADT:
BURLESON RD: 24,917(2020)
34,884(2041)
METROPOLIS DR: 3,217(2020)
4,504(2041)
QUICKSILVER RD: 4,162(2020)
5,827(2041)
BLUFF SPRINGS RD: 8,565(2020)
11,991(2041)

LIMITS:
(CSJ: 0914-04-331) INTERSECTION OF BURLESON RD AND METROPOLIS DR
(CSJ: 0914-04-333) INTERSECTION OF BLUFF SPRINGS RD AND QUICKSILVER BLVD



LOCATION MAP NOT TO SCALE
EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

FINAL PLANS

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED AND ACCEPTED: _____

FINAL CONTRACT COST: $_____

CONTRACTOR: _____

LIST OF APPROVED CHANGE ORDERS:

I CERTIFY THAT THIS PROJECT
WAS CONSTRUCTED IN SUBSTANTIAL
COMPLIANCE WITH THE FINAL AS-BUILT
PLANS AND SPECIFICATIONS.

_____ P.E. _____
AREA ENGINEER DATE

PLANS PREPARED BY:

710 Hesters Crossing | Suite 150 | Round Rock, Texas
78681 Texas P.E. Firm Registration No. F-754

SUKRIT NARULA
129760
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
6/28/2023

Registered Accessibility Specialist
(RAS) Inspection Required

TDLR No.: TABS2023019979

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 2022).

SUBMITTED FOR LETTING:	8/3/2023	DocuSigned by: C2754FBFB7A143C... DIRECTOR OF TRANSPORTATION OPERATIONS
RECOMMENDED FOR LETTING:	8/3/2023	DocuSigned by: Susana Ceballos P.E. E1816167B5C7414... DISTRICT DESIGN ENGINEER
RECOMMENDED FOR LETTING:	8/3/2023	DocuSigned by: 917B7C376B3C4D5... AREA ENGINEER
APPROVED FOR LETTING:	8/4/2023	DocuSigned by: 8912AF18F45A416... DIRECTOR OF TRANSPORTATION, PLANNING & DEVELOPMENT

Texas Department of Transportation

FILE: $FILE$
DATE: 6/28/2023 3:57:45 PM

SHEET NO.	GENERAL
1	Title Sheet
2	Index of Sheets
3	Quantity Summary - Burleson Rd and Metropolis Dr
4	Notes and Quantities - Bluff Springs Rd and Quicksilver Blvd
5, 5A-5H	TxDot General Notes
6, 6A-6B	Estimate and Quantities Sheets

SHEET NO.	TRAFFIC CONTROL STANDARDS
* 7	BC(1)-21
* 8	BC(2)-21
* 9	BC(3)-21
* 10	BC(4)-21
* 11	BC(5)-21
* 12	BC(6)-21
* 13	BC(7)-21
* 14	BC(8)-21
* 15	BC(9)-21
* 16	BC(10)-21
* 17	BC(11)-21
* 18	BC(12)-21
* 19	WZ(TD)-17
* 20	WZ(BTS-1)-13
* 21	WZ(BTS-2)-13
* 22	WZ(BRK)-13
* 23	TCP(1-4)-18
* 24	TCP(2-4)-18
* 25	TCP(3-1)-13
* 26	TCP(3-3)-14
* 27	TCP(3-4)-13

SHEET NO.	TRAFFIC SIGNALS
28	Existing Intersection Layout - Burleson Rd and Metropolis Dr
29	Proposed Pavement Marking and Paving Layout - Burleson Rd and Metropolis Dr
30	Proposed Signal Layout - Burleson Rd and Metropolis Dr
31	Signing and Phasing - Burleson Rd and Metropolis Dr
32 - 33	Conduit and Conductor Schedules - Burleson Rd and Metropolis Dr
34	Elevations - Burleson Rd and Metropolis Dr
35	Vehicle Detection Detail - Burleson Rd and Metropolis Dr
36	Existing Condition - Bluff Springs Rd and Quicksilver Blvd
37	Proposed Signs and Markings - Bluff Springs Rd and Quicksilver Blvd
38	Proposed Signal Layout - Bluff Springs Rd and Quicksilver Blvd
39	Proposed Conduit Layout - Bluff Springs Rd and Quicksilver Blvd
40	Signal Details - Bluff Springs Rd and Quicksilver Blvd
41	Signal Elevations - Bluff Springs Rd and Quicksilver Blvd
42	Vehicle Detection Detail - Bluff Springs Rd and Quicksilver Blvd
43	TXDOT Standard Slab Foundation Detail

SHEET NO.	CITY OF AUSTIN TRAFFIC SIGNAL STANDARDS
*** 44	City of Austin Standards
*** 45	City of Austin Standards
*** 46	City of Austin Standards
*** 47	City of Austin Standards
*** 48	City of Austin Standards
*** 49	City of Austin Standards
*** 50	City of Austin Standards

SHEET NO.	TXDOT TRAFFIC SIGNAL STANDARDS
* 51	BLPM-10
* 52	PM(1)-22
* 53	PM(2)-22
* 54	PM(3)-22
* 55	PM(4)-22A
* 56	PED(1)-18
* 57	PED(2)-18
* 58	PED(3)-18
* 59	PED(4)-18
* 60	ED(1)-14
* 61	ED(2)-14
* 62	ED(3)-14
* 63	ED(4)-14
* 64	ED(5)-14
* 65	ED(6)-14
* 66	ED(8)-14
* 67	ED(9)-14
* 68	TS-BP-20

SHEET NO.	TXDOT AUSTIN DISTRCT STANDARDS
** 69	PREP R.O.W. PRUNING DETAIL

SHEET NO.	ENVIROMENTAL
* 70	EPIC

NO.	DATE	REVISION	APPROVED

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

INDEX OF SHEETS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	2
CHECK	CONTROL	SECTION	JOB	
BP	914	04	331,ETC.	
CHECK				
SN				

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED
PROFESSIONAL ENGINEER

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

PROJECT ENGINEER, P.E. _____ P.E. 8/2/2023 DATE

* TXDOT STANDARDS
** TXDOT AUSTIN DISTRICT STANDARDS
*** CITY OF AUSTIN STANDARDS

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_00A.dgn
PENTABLE: I0329625.tbl
DATE: 8/2/2023
TIME: 8:38:36 AM
SCALE: I:I

TRAFFIC SIGNAL QUANTITY SUMMARY - CSJ: 0914-04-331

CONTRACTOR PROVIDED AND INSTALLED ITEMS				
TXDOT SPECS		DESCRIPTION	UNIT	QUANTITY
ITEM NO.	DESC. CODE			
100	6002	PREPARING ROW	STA	6
104	6022	REMOVING CONC (CURB AND GUTTER)	LF	172
104	6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	48
105	6094	REMOVING STAB BASE & ASPH PAV(12"-27")	SY	99
160	6004	FURNISHING AND PLACING TOPSOIL (6")	SY	99
162	6002	BLOCK SODDING	SY	99
SP831S-4-17 (COA)	-	48" DIAMETER TRAFFIC SIGNAL DRILLED SHAFT FOUNDATIONS 17' DEPTH	EA	1
SP831S-4-18 (COA)	-	48" DIAMETER TRAFFIC SIGNAL DRILLED SHAFT FOUNDATIONS 18' DEPTH	EA	2
500	6001	MOBILIZATION	LS	1
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2
506	6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	100
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	100
529	6008	CONC CURB & GUTTER (TY II)	LF	192
531	6002	CONC SIDEWALKS (5")	SY	50.5
531	6004	CURB RAMPS (TY 1)	EA	4
531	6010	CURB RAMPS (TY 7)	EA	2
618	6029	CONDT (PVC) (SCH 40) (3")	LF	940
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	450
618	6033	CONDT (PVC) (SCH 40) (4")	LF	30
618	6070	CONDT (RM) (2")	LF	10
620	6007	ELEC CONDR (NO.8) BARE	LF	1390
620	6008	ELEC CONDR (NO.8) INSULATED	LF	1420
620	6009	ELEC CONDR (NO.6) BARE	LF	30
620	6010	ELEC CONDR (NO.6) INSULATED	LF	60
624	6010	GROUND BOX TY D (162922)W/APRON	EA	5
628	6165	ELC SRV TY D 120/240 070(NS)AL(E)SP(O)	EA	1
636	6001	ALUMINUM SIGNS (TY A)	SF	6.25
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6076	REMOVE SM RD SN SUP&AM	EA	2
644	6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	1
658	6088	INSTL DEL ASSM (D-SY)SZ 1(YFLX)SRF	EA	18
666	6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	32
666	6024	REFL PAV MRK TY I (W)6"(SLD)(100MIL)	LF	326
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	308
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	352
666	6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	6
666	6105	REFL PAV MRK TY I(W)(BIKE ARW)(100MIL)	EA	2
666	6111	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)	EA	3
666	6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	123
666	6172	REFL PAV MRK TY II (W) 6" (DOT)	LF	32
666	6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	326
666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	308
666	6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	352
666	6184	REFL PAV MRK TY II (W) (ARROW)	EA	6
666	6200	REFL PAV MRK TY II (W) (BIKE ARROW)	EA	2
666	6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	3
666	6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	1144
666	6212	REFL PAV MRK TY II (Y) 12" (SLD)	LF	123
666	6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	1144
672	6007	REFL PAV MRKR TY I-C	EA	16
672	6009	REFL PAV MRKR TY II-A-A	EA	52
677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	1427
677	6003	ELIM EXT PAV MRK & MRKS (8")	LF	120
677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	30
677	6023	ELIM EXT PAV MRK & MARKS(BIKE ARROW)	EA	1
677	6025	ELIM EXT PAV MRK & MARKS(BIKE SYMBOL)	EA	1
677	6038	ELIM EXT PAV MRK & MRKRS(PLOWABLE RPMS)	EA	44
678	6002	PAV SURF PREP FOR MRK (6")	LF	1502
678	6004	PAV SURF PREP FOR MRK (8")	LF	308
678	6006	PAV SURF PREP FOR MRK (12")	LF	123
678	6008	PAV SURF PREP FOR MRK (24")	LF	352
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	6
678	6026	PAV SURF PREP FOR MRK (BIKE ARROW)	EA	2
678	6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	3
680	6005	INS HY TRF SIG (DPT SUP CNT & CAB)(ISO)	EA	1
	*	CONTROLLER FOUNDATION (CITY OF AUSTIN)	EA	1
	*	TRAFFIC SIGNAL CONTROLLER (INSTALL ONLY)	EA	1
	*	TRAFFIC SIGNAL CONTROLLER CABINET (INSTALL ONLY)	EA	1
	*	SIGN, R3-5L	EA	3
	*	SIGN, R3-5R	EA	1
	*	SIGN, "BURLESON RD"	EA	1
	*	SIGN, "METROPOLIS DR"	EA	2
	*	INSTALL CCTV	EA	1

CONTRACTOR PROVIDED AND INSTALLED ITEMS				
TXDOT SPECS		DESCRIPTION	UNIT	QUANTITY
ITEM NO.	DESC. CODE			
682	6001	VEH SIG SEC (12")LED(GRN)	EA	4
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4
682	6003	VEH SIG SEC (12")LED(YEL)	EA	4
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	8
682	6005	VEH SIG SEC (12")LED(RED)	EA	4
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	4
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	6
682	6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	4
682	6052	BACKPLATE W/REFL BRDR(4 SEC)ALUM	EA	4
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	795
684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	140
684	6046	TRF SIG CBL (TY A)(14 AWG)(20 CONDR)	LF	575
684	6080	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF	1395
686	6292	INS TRF SIG PL AM (MAST)(INSTALL ONLY)	EA	3
687	6001	PED POLE ASSEMBLY	EA	4
688	6001	PED DETECT PUSH BUTTON (APS)	EA	6
	**	SIGN, PEDESTRIAN PUSH BUTTON	EA	6
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1
6001	6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	94
6004	6031	ITS COM CBL (CCTV)	LF	80
6027	6010	GROUND BOX W/ APRON (ADJUST)	EA	1
6058	6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1
6185	6002	TMA (STATIONARY)	DAY	94
6185	6005	TMA (MOBILE OPERATION)	DAY	94
6292	6001	RVDS(PRESENCE DETECTION ONLY)	EA	3
7251	6001	SUBSURFACE UTIL LOCATE (OUTSIDE RDBED)	EA	7

*SUBSIDIARY TO ITEM 680.

** SUBSIDIARY TO ITEM 688.

TRAFFIC SIGNAL EQUIPMENT SUPPLIED BY CITY OF AUSTIN AND PAID BY FORCE ACCOUNT			
ITEM NO.	DESCRIPTION	UNIT	QUANTITY
SS1010-ATC-CU	2070 ATC CONTROLLER UNIT COMPLETE IN PLACE	EA	1
SS1012-C	CALTRANS 352, CABINET FOR 2070 CONTROLLER COMPLETE IN PLACE	EA	1
-	CONTROLLER FIRMWARE LICENSE	EA	1
SS1044-CCTV	CCTV CAMERA	EA	1
SP839S-MAP2W	TYPE 2W POLE WITH 40' MAST ARM AND LUMINAIRE	EA	1
SP839S-MAP3W	TYPE 3W POLE WITH 60' MAST ARM AND LUMINAIRE	EA	2

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

CITY OF AUSTIN FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

QUANTITY SUMMARY

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	3
BP	914	04	331,ETC.	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_01.dgn
PENTABLE: I0329625.tbl
DATE: 8/4/2023
TIME: 11:13:12 AM
SCALE: 1:1

100% SUBMITTAL

TRAFFIC SIGNAL ESTIMATE SUMMARY

ITEM NO.	CODE	DESCRIPTION	UNITS	EST
831S-3(COA)	-	42" DIAMETER TRAFFIC SIGNAL DRILLED SHAFT FOUNDATIONS 12' DEPTH	EA	2
831S-4(COA)	-	48" DIAMETER TRAFFIC SIGNAL DRILLED SHAFT FOUNDATIONS 14' DEPTH	EA	2
618	6029	CONDT (PVC) (SCH 40) (3")	LF	295
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	1080
618	6033	CONDT (PVC) (SCH 40) (4")	LF	200
618	6034	CONDT (PVC) (SCH 40) (4") (BORE)	LF	40
620	6007	ELEC CONDR (NO.8) BARE	LF	1310
620	6008	ELEC CONDR (NO.8) INSULATED	LF	640
620	6009	ELEC CONDR (NO.6) BARE	LF	25
620	6010	ELEC CONDR (NO.6) INSULATED	LF	50
624	6010	GROUND BOX TY D (162922)W/APRON	EA	8
628	6165	ELC SRV TY D 120/240 070(NS)AL(E)SP(O)	EA	1
680	6005	INS HY TRF SIG (DPT SUP CNT & CAB)(ISO)	EA	1
	**	CONTROLLER FOUNDATION (CITY OF AUSTIN)	EA	1
	**	TRAFFIC SIGNAL CONTROLLER (INSTALL ONLY)	EA	1
	**	TRAFFIC SIGNAL CABINET TYPE 352 (INSTALL ONLY)	EA	1
	**	CCTV CAMERA (INSTALL ONLY)	EA	1
	**	ROD, 5/8" X 10' COPPER GROUND (CONTROLLER ONLY)	EA	1
	**	LED RDWY LUMINAIRE (.25KW EQ)	EA	2
	**	SIGN, STREET NAME (18"X84")	EA	4
	**	SIGN, (R3-5)(30"x36")	EA	2
682	6001	VEH SIG SEC (12")LED(GRN)	EA	10
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4
682	6003	VEH SIG SEC (12")LED(YEL)	EA	10
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	6
682	6005	VEH SIG SEC (12")LED(RED)	EA	10
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	2
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	8
682	6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	2
682	6050	BACKPLATE W/REFL BRDR(5 SEC)	EA	2
682	6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	8
684	6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	1190
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	635
684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	190
684	6046	TRF SIG CBL (TY A)(14 AWG)(20 CONDR)	LF	530
686	6292	INS TRF SIG PL AM (MAST)(INSTALL ONLY)	EA	4
687	6001	PED POLE ASSEMBLY (10' POLE)	EA	3
687	6001	PED POLE ASSEMBLY (15' POLE)	EA	1
687	6002	PEDESTRIAN PUSH BUTTON POLE	EA	2
688	6001	PED DETECT PUSH BUTTON (APS)	EA	8
	**	SIGN, PEDESTRIAN PUSH BUTTON (9"X15") (R10-3eL)	EA	1
	**	SIGN, PEDESTRIAN PUSH BUTTON (9"X15") (R10-3eR)	EA	7
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1
6004	6031	ITS COM CBL (ETHERNET)	LF	80
6058	6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1
6292	6003	RVDS(PRESENCE AND ADVANCE DET)	EA	4
	**	RADAR DETECTION COMM CABLE	LF	710
7251	6001	SUBSURFACE UTIL LOCATE (OUTSIDE RDBED)	EA	4

** MATERIALS SUBSIDIARY TO PERTINENT ITEMS

ROADWAY, SIGNING & PAVEMENT MARKING ESTIMATE SUMMARY

100	6002	PREPARING ROW	STA	3
104	6015	REMOVING CONC (SIDEWALKS)	SY	18
104	6022	REMOVING CONC (CURB AND GUTTER)	LF	50
506	6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	100
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	100
531	6002	CONC SIDEWALKS (5")	SY	15
531	6005	CURB RAMPS (TY 2)	EA	1
531	6006	CURB RAMPS (TY 3)	EA	1
531	6010	CURB RAMPS (TY 7)	EA	1
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P) (R3-8)(36"x36")	EA	1
644	6076	REMOVE SM RD SN SUP&AM	EA	3
658	6083	INSTL DEL ASSM (D-SW)SZ 1(WFLX)SRF	EA	20
666	6105	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL)	EA	3
666	6111	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)	EA	3
666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	490
666	6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	120
666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	124
666	6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	480
666	6184	REFL PAV MRK TY II (W) (ARROW)	EA	3
666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	640
672	6007	REFL PAV MRKR TY I-C	EA	6
672	6009	REFL PAV MRKR TY II-A-A	EA	36
677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	240
677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	170

SIGNAL EQUIPMENT SUPPLIED BY CITY OF AUSTIN AND PAID BY FORCE ACOUNT

	DESCRIPTION	UNITS	EST
1	MANAGES HARDENED ETHERNET SWITCH	EA	1
2	POWER SUPPLY (FOR SWITCH)	EA	1
3	CCTV CAMERA	EA	1
4	ATD POLE AND SIGNAL ARM (1) (25') W/LUMINARE ARM	EA	1
5	ATD POLE AND SIGNAL ARM (1) (30') W/LUMINARE ARM	EA	1
6	ATD POLE AND SIGNAL ARM (1) (40')	EA	1
7	ATD POLE AND SIGNAL ARM (1) (45')	EA	1
8	ATD TYPE 352 TRAFFIC SIGNAL CABINET	EA	1
9	ATD TRAFFIC SIGNAL CONTROLLER	EA	1
10	FIRMWARE LICENSE	EA	1

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED
PROFESSIONAL ENGINEER
DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

LJA Engineering, Inc.
FRN - F-1386

SIGNAL DESIGN

BLUFFSPRINGS&QUICKSILVER
QUANTITIES

SCALE HORIZONTAL:
VERTICAL:
SHEET 1 OF 1

DESIGN	FED.RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AM				4
DRAWN	STATE	DIST. NO.	COUNTY	
KA	TX	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	HIGHWAY NO.
AM	914	04	331, ETC	-

8/4/2023
10:55:29 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762-2102*SIGNAL QUANTITIES & GENERAL NOTES.dgn

GENERAL NOTES: Version: August 3, 2023

GENERAL
Contractor questions and requests for documents on this project are to be addressed to the following individual(s):

South Austin	Mark.Baumann@txdot.gov
South Austin	Shane.Swimm@txdot.gov
Traffic	Mahendran.Thivakaran@txdot.gov
Traffic	Cory.Jucius@txdot.gov

Questions and requests for documents will be accepted via the Letting Pre-Bid Q&A web page. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

The roadbed will be free of organic material prior to placing any section of the pavement structure.

Contact the supervisor for the passenger facility at Capital Metro and request the relocation of Capital Metro signs. Contact the supervisor at (512) 385-0190.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Intelligent Transportation Systems (ITS) Infrastructure may exist within the limits of this project and that the system must remain operational throughout construction. The exact location of ITS Infrastructure is not known. Contact the TxDOT Area Engineer's or Inspection Team's Office for the location(s) at least 72 hours before commencing any work that might affect present ITS Infrastructure. In the event of system damage, notify TxDOT/CTECC at (512) 974-0883 within one hour of occurrence. Refer to Item 6000 for additional details.

Provide a smooth, clean sawcut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Construct all manholes/valves to final pavement elevations prior to the placement of final surface. If the manholes/valves are going to be exposed to traffic, place temporary asphalt around the manhole/valve to provide a 50:1 taper. The asphalt taper is subsidiary to the ACP work.

Keep the roadway free of debris and sediment caused by construction activities. Dispose of all material in accordance with federal, state, and local regulations. This work is subsidiary.

Damage to existing pipes and SET's due to Contractor operations will be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

Coordinate and obtain approval for all bridgework over existing roadways.

Bridge Vertical Clearance and Traffic Handling.
Notify TxDOT project staff and the local bridge engineer 10 business days prior to the following: change in vertical clearance, placing beams/girders over traffic, opening or removing traffic from a bridge or portion of a bridge, and completion of bridge work. This requirement includes bridge class culverts. Provide vertical clearance for all structures (including signal mast arms, span wires, and overhead sign bridge structures) within the project limit. Submit information and notices to local bridge engineer at AUS_BRG_Notify@txdot.gov.

During evacuation periods for Hurricane events the Contractor will cooperate with Department for the restricting of Lane Closures and arranging for Traffic Control to facilitate Coastal Evacuation Efforts.

ITEM 5 – CONTROL OF THE WORK
Place construction stakes at intervals of no more than 100 ft. This work is subsidiary.

Provide a 72 hour advance email notice to AUS_Locate@TxDOT.gov to request illumination, traffic signal, ITS, or toll equipment utility locates. Provide AUS_Locate@TxDOT.gov an electronic pdf of as-builts within 21 calendar days of illumination, traffic signal, ITS, or toll equipment being placed into operation. As-built shall include GPS coordinates of manholes and junction boxes. Include final version of RFI's and revised plan sheets.

Electronic Shop Drawing Submittals.

Submit electronic shop drawing submittals according to the current Guide to Electronic Shop Drawing Submittal, https://www.txdot.gov/business/resources/highway/bridge/shop-drawing-submittal-cycle.html. Pre-approved producers can be found online at https://www.txdot.gov/business/resources/materials/material-producer-list.html. Use the following contact list for all submittals that are not required to be sent to Bridge Division and to copy the Engineer for all submittals to the Bridge Division.

Submittal Contact List

South Austin	Mark.Baumann@txdot.gov	AUS_SA-ShopReview@txdot.gov
Signal Shop	Kevin.Plumlee@txdot.gov	
Signal Shop	Dave.Henry@txdot.gov	

All durations exclude utility owner holidays.

Provide a complete package of information for all resubmittals. Submit each item and individual components of that item under separate cover.

Prior to submitting a RFI, meet and discuss with TxDOT and the utility inspector. Include a proposed solution, existing and proposed line elevations, and redline of proposed changes with the RFI. Make note of adjacent utilities in the RFI if it includes relocation of a line. Submit RFIs via email to TxDOT and the utility inspector.

Complete pre-testing and have the utility inspector verify prior to formal testing and inspection. Submit email to TxDOT and the utility inspector requesting a formal test and inspection 14 calendar days before the test date. Pay retest fees directly to utility owner at current rates.

Submit an email to the utility inspector identifying the lines, valves, location, and date of shut offs or limited service 21 calendar days before for all lines and 60 calendar days before for water lines 24 in. or greater. The utility owner will conduct a test shut off before actual shut off. Do not shut off power or water lines 24 in. or greater between June 1st and August 31st. Provide a verbal notification 7 calendar days and written notification 72 hours before impact to service to all customers.

Austin Energy (AE) work must be performed by a qualified electrical contractor using qualified material producer. If the plans do not provide a list, the bidder must contact AE to obtain a list of qualified contractors and producers. Contractor will execute an agreement directly with Austin Energy to work on their system. Bidder may request a draft copy of this agreement prior to bidding. Added cost for insurance related to this AE agreement will be reimbursed at invoice amount from carrier with only 1 percent markup.

Removal of trees and brush within 15 feet of proposed power lines is required and subsidiary.

Notify the utility owner and TxDOT 60 calendar days prior to completion of electrical, communication or data infrastructure. Coordinate with the utility owner to schedule required utility owner work to complete their portion of utility installation. Allow 90 calendar day duration for the utility owner to complete their portion of the work. If the utility work requires

multiple owners to adjust upon completion of the work, allow separate and sequential 90 calendars day duration for each utility owner.

Provide an electronic pdf of as-builts within 28 calendar days of a line becoming active. Include GPS coordinates of items not installed per original plans including meters, manholes, valves, bends, and fire hydrant locations in the as-builts. Include limits of encasements such as steel and flowable fill. Include final version of RFI's and revised plan sheets.

ITEM 6 - CONTROL OF MATERIALS
Give a minimum of 1 business day notice for materials, which require inspection at the Plant.

For structures with paint containing hazardous materials, provide locations of material removal 60 days prior to begin removal. For metal elements to be removed, mechanical shear or unbolting for removal and disposal does not require paint abatement but requires 60 day advance notice.

The area designated as the potential habitat for the Houston Toad will not be allowed as a source for embankment unless approved by the Engineer. The general area is Bastrop County north of the Colorado River and east of SH 95 unless provided in the plans.

For removal, tie, or tap of asbestos concrete (AC) pipe, contact TxDOT and the local utility company 60 days prior to performing the work. Expose the AC pipe to provide a minimum of 1 ft. of clearance around the top and sides. A minimal amount of soil may remain around the AC pipe to avoid disturbance. The local utility company will be responsible for the demo notice to DSHS and removal of the AC pipe. Tie or tap into existing AC pipe may require removing an entire section of pipe from collar to collar and replacement of pipe with new pipe using existing bid items.

For Federally Funded Contracts, comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, by submitting a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product. Refer to the Buy America Material Classification Sheet, located at the following link, for clarification on material categorization. https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES
TxDOT will coordinate with TDLR regarding pedestrian elements and sidewalks. The contractor will procure and provide all permits, licenses, and inspections; pay all charges, fees, and taxes regarding TDLR rules governing industrialized housing and buildings.

Roadway closures during key dates and/or special events are prohibited. See notes for Item 502 for the key dates and/or special events.

Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

When any abandoned well is encountered, cease construction operations in this area and notify the Engineer who will coordinate the proper plugging procedures. A water well driller licensed in the State of Texas must be used to plug a well.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

PSL in Edwards Aquifer Recharge and Contributing Zone.
Obtain written approval from the Engineer for all on or off right of way PSLs not specifically addressed in the plans. Provide a signed sketch of the location 30 business days prior to use of the PSL. Include a list of materials, equipment and portable facilities that will be stored at the PSL. TxDOT will coordinate with the necessary agencies. Approval of the PSL is not guaranteed. Un approved PSL is not a compensable impact.

Work within a USACE Jurisdictional Area.
Do not initiate activities within a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Obtain written approval from the Engineer for activities not specifically addressed in the plans. Provide a signed sketch and description of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Un approved work is not a compensable impact.

Work over or near Bodies of Water (lakes, rivers, ponds, creeks, dry waterways, etc.).
Keep on site a universal spill kit adequate for the body of water and the work being performed. Debris is not allowed to fall into the ordinary high-water level (OHWL). Debris that falls into the OHWL must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. Install and maintain traffic

control devices to maintain a navigable corridor for water traffic, except during bridge demo and beam placement. This work is subsidiary.

Obtain written approval from the Engineer for temporary fill or crossings not specifically addressed in the plans. Provide a signed sketch of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Unapproved work is not a compensable impact.

DSHS Asbestos and Demolition Notification.
Complete and provide the Texas Department of State Health Services (DSHS) notification form to the Engineer and email to AUS_BRG_Notify@txdot.gov at least 30 calendar days prior to bridge removal or renovation for each phase or step of work. Notify the Engineer via email of any changes to the work start and end dates.

Migratory Birds and Bats.
Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to TxDOT 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

Tree and Brush Trimming and Removal.
Work will be conducted September 16 thru February 28. Work conducted outside this timeframe will require a bird survey. Submit a survey request to TxDOT 30 business days prior to begin work.

No extension of time or compensation will be granted for a delay or suspension due to the above bird, bat, and tree/brush requirements.

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

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed. Payment is for work performed. If the Contractor has a field office, provide an office location for a supervisory officer when event requires a supervising officer. This work is subsidiary.

A maximum combined rate of $70 per hour for the law enforcement personnel and the patrol vehicle will be allowed. Any scheduling fee is subsidiary per Standard Specification 502.4.2. Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or "show up" fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual "show up" time to the event site due to cancellation will be on a case-by-case basis at a maximum of 2 hours per officer.

Alterations to the cancellation and maximum rate must be approved by the Engineer or pre-determined by official policy of the officers governing authority.

Back Up Alarm.
For hours 9 P to 5 A, utilize a non-intrusive, self-adjusting noise level reverse signal alarm. This is not applicable to hotmix or seal coat operations. This is subsidiary.

ITEM 416 - DRILLED SHAFT FOUNDATIONS
Stake all Foundations, for approval, before beginning drilling operations.

Calculate the vertical signal head clearance before placing any signal pole foundation.

For mast-arm signal and strain pole anchor bolts, set two in tension and two in compression.

Obtain approval of placement prior to placing concrete.

Remove spoils from a flood plain at the end of each work day.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

Table 1

Roadway	Limits	Allowable Closure Time
IH 35	All (1 lane closed)	9 P to 5 A
IH 35	All (2 lanes closed, see allowable work below)	9 P to 5 A
IH 35	All (2 lanes closed, all work)	11 P to 5 A
SH 45	US 183 to SH130	8 P to 5 A
LP 1	William Cannon to Parmer Lane	8 P to 5 A
US 183	SH 29 to FM 1327	8 P to 5 A
SH 71	SH 130 to IH 35	8 P to 5 A
SH 71	SH 304 to Tahitian Drive	8 P to 5 A
SH 71	US 290 W to RM 3238	8 P to 5 A
US 290 W	IH 35 to Nutty Brown Rd	8 P to 5 A
US 290 E	IH 35 to SH 95	8 P to 5 A
FM 734	FM 1431 to US 290 E	8 P to 5 A
US 79	IH 35 to Bus 79 in Taylor	8 P to 5 A
RM 1431	Lohmans Ford Rd to IH 35	8 P to 5 A
SH 29	LP 332 western terminus to SH 130	8 P to 5 A
SH 80	Charles Austin to River Road	8 P to 5 A

RM 2222	All	8 P to 5 A
RM 620	All	8 P to 5 A
RM 2244	All	8 P to 5 A
SPUR 69	All	8 P to 5 A
LP 360	All	8 P to 5 A
LP 343	All	8 P to 5 A
LP 275	All	8 P to 5 A
FM 1325	All	8 P to 5 A
All	Within 200' of a signalized intersection	9 P to 5 A
All	All (Full Closure, see allowable work below)	11 P to 4 A

Table 2 (Mobile Operations)

Roadway	Allowable Sun Night thru Fri Noon	Allowable Sat thru Sun Morn
Within Austin City Limits	10 A to 2 P and 7 P to 6 A	7 P to 10 A
Outside Austin City Limits	9 A to 3 P and 7 P to 7 A	6 P to 11 A
IH 35 main lanes	10 P to 5 A	9 P to 9 A
AADT over 50,000	8 P to 6 A	8 P to 10 A

For roadways without defined allowable closure times, nighttime lane closures will be allowed from 8 P to 6 A. Unless stated, daytime or Friday night lane closures will not be allowed and one lane in each direction will remain open at all times for all roadways.

Two lanes closed on IH 35 allowed to begin at 9 P.M. for main lane (shoulder work not included) hotmix overlay or pavement repair operations (does not include bridge joint work).

Full closures only allowed Friday night thru Monday morning for bridge beam installation, bridge demolition, or OSB truss removal/installation. Full closures only allowed for roadways with frontage roads or if a designated detour route is provided in the plans.

No closures will be allowed on the weekends, working day prior, and working day after the National Holidays defined in the Standard Specifications, Good Friday, and Easter weekend. Closures the Sunday of the Super Bowl will not be allowed from 1 P to 11 P. No closures will be allowed on Friday and the weekends for projects within 20 miles of Formula 1 at COTA, ACL Fest, SXSW, ROT Rally, UT home football games (includes games not on a Friday or weekend), sales tax holiday, Dell Match Play (includes Thursday), Rodeo Austin, or other special events that could be impacted by the construction. All lanes will be open by noon of the day before these special events. Additional key dates or special events include the following: Austin FC home soccer games (includes games not on a Friday or weekend).

To account for directional traffic volumes, begin and end times of closures may be shifted equally by the Engineer. The closure duration will remain. Added compensation is not allowed.

Submit an emailed request for a lane closure (LCN) to TxDOT. The email will be submitted in the format provided. Receive concurrence prior to implementation. Submit a cancellation of

lane closures a minimum of 18 hours prior to implementation. Blanket requests for extended periods are not allowed. Max duration of a request is 2 weeks prior to requiring resubmittal.

Provide 2-hour notice prior to implementation and immediately upon removal of the closure.

For roadways listed in Table 1: Submit the request 96 hours prior to implementation.

For roadways not listed in Table 1: Submit the request a minimum of 48 hours prior to the closure and by the following deadline immediately prior to the closure: 11A on Tuesday or 11A on Friday.

For all roadways: Submit request for traffic detours and full roadway closures 168 hours prior to implementation. Submit request for nighttime work 96 hours to implementation date.

Cancellations of accepted closures (not applicable to full closures or detours) due to weather will not require resubmission in accordance with the above restrictions if the work is completed during the next allowable closure time.

Closures that conflict with adjacent contractor will be prioritized according to critical path work per latest schedule. Conflicting critical path or non-critical work will be approved for first LCN submitted. Denial of a closure due to prioritization or other reasons will not be reason for time suspension, delay, overhead, etc.

Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify current and future traffic control, if at any time the queue becomes greater than 20 minutes.

Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.

Cover, relocate, or remove existing small, large, and overhead signs that conflict with traffic control. Cover large and overhead signs to remain using latest standard TS-CD. This work is subsidiary.

Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.

Place a 28-inch cone, meeting requirements of BC (10) and Ty III barricades, on top of foundations that have protruding studs. This work is subsidiary.

Vertical panels used on roadways with speed limit 55mph or greater must be round in shape or have a self-righting mechanism. The “flat” or “oblong” shaped vertical panels are not allowed.

A series of sequential flashing warning lights, per BC(7), must be installed in a merging taper for long term stationary TCP. This includes all TCP setups, such as those shown on the plans or TCP setups per the standards.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

To determine a speed limit or an advisory speed limit, submit a request to TxDOT 60 business days prior to manufacture of the sign.

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

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS
If SW3P plan sheets are not provided, place the control measures as directed.
Install, maintain, remove control measures in areas of the right of way utilized by the Contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

Erosion control measures must be initiated immediately in areas where construction activities have ceased and will not resume for a period exceeding 14 calendar days. Vertical track all exposed soil, stockpiles, and slopes. Re-track after each rain event or every 14 days, whichever occurs first. Sheep foot roller is allowed for vertical tracking. This work is subsidiary.

Unless a specific pay item is provided in the plans, the installation of the 6:1 or flatter for RFD side slopes in the safety zone will be subsidiary to pertinent bid items.

ITEMS 600s & 6000s – ITS, TOLLING, LIGHTING, SIGNING, MARKINGS, AND SIGNALS
Meet the requirements of the NEC, Texas MUTCD, TxDOT standards, and TxDOT Standard Specifications. Notify the Engineer if existing elements to remain do not meet code or specification.

Contractor shall provide all service, equipment and material required to provide a functional item and interface with existing equipment and software.

For signal shop contact Charles Vaughn Jr (Charles.Vaughn@txdot.gov) and Robert Bolin (Robert.Bolin@txdot.gov)

Use the TxDOT provided form to submit an electrical, illumination, and signal checklist prior to request for signal activation or a punch list.

Provide a 7-day advance email notice to the Engineer to request illumination or traffic signal punch list inspection.

Provide a 14-day advance email notice to the Engineer with signal technician contact information and signal locations prior to working or assuming operations of illumination or traffic signal.

Provide a 60-day advance email notice to the Engineer to request signal timing if timing is not provided in the plans.

Provide a 180-day advance email notice to the Engineer for equipment to be provided by TxDOT.
Provide equipment that requires TxDOT programming, etc. to TxDOT 180 day in advance.

Prior to relief of maintenance, a 30-day Test Period is required for signals and ITS equipment in accordance with Item 680.3.1.8. Response time to reported trouble calls shall be less than 2 hours. Complete repairs within 24 hours. Notify the Engineer and maintain a logbook in the controller cabinet of each trouble call. Do not clear the error log in the conflict monitor without approval.

Maintain the existing ITS equipment and HUB buildings operational during construction. ITS downtime is allowed from 12A to 4A. Downtime is restricted to one time per HUB or equipment.

Definitions of abbreviations used to designate ITS equipment, material, etc. can be provided by the Engineer.

Provide email notice to TxDOT and toll road owner 60 business days prior to begin work that impacts tolling equipment. Attend a pre-construction meeting with TxDOT and toll road owner prior to begin work.

Coordinate with toll road owner during construction that impacts or installs tolling equipment. Toll owner will assist with inspection to ensure tolling equipment will operate correctly. Provide email notice to TxDOT and toll road owner 30 business days in advance of completion of toll equipment work. Once toll equipment work is complete, allow 60 calendar days for toll road owner to complete their portion of the work and testing.

Stakes or other physical method shall be installed to hold down conduit prior to placement of concrete/flow fill encasement.

Minimum distance between HDPE joints will be 200 ft.

For conduit mounted to bridges in hangers, fiberglass can be substituted for RMC. Furnish and install per Special Specification 6390.

ITEM 610 - ROADWAY ILLUMINATION ASSEMBLIES
Upon removal, contact signal shop to stockpile a maximum of 10 assemblies that meet the current TxDOT standards at the Austin District Headquarters located at 7901 North IH 35, 78753. If signal shop declines receipt of these assemblies, Contractor will be responsible for disposal.

For each assembly, paint the service, circuit, run and assembly number/letter using 3 in. tall characters and black paint. The marking shall be stacked vertically with the service on top and the assembly number/letter on the bottom. Paint 6 ft. above the roadway surface on the hand access door side of the pole or adjacent to the assembly if mounted to a structure. This work is subsidiary.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder.

Provide 10-amp time delay fuses.

Maintain all new and existing illumination for the duration of the contract. All existing illumination will remain operational until replaced by new illumination or required to be removed due to construction.

ITEM 618 - CONDUIT
Shift the locations of conduit and ground boxes to accommodate field conditions. Install conduit not exceeding 2 feet in any direction from a straight line. Install conduit at a minimum depth of 2 ft. below finished grade. Installation of the conduit by jacking or boring method will be at a depth of at least 1 ft. below subgrade.

Install a high tension, non-metallic pull rope in all empty conduit runs. This work is subsidiary. Use a coring device, not a hammer drill, when drilling holes through concrete structures.

Structurally mounted junction boxes will be as shown on the plans. When used for traffic signal installations, these boxes will be 12" x 12" x 8". This work is subsidiary.

For underground conduit, smooth wall schedule 40 equivalent HDPE can be substituted for schedule 40 PVC. Schedule 80 bore can be replaced with a schedule 40 equivalent HDPE carrier pipe of adequate size to carry the proposed conduits. HDPE must transition to RMC/PVC per ED (11)-14.

When using existing conduit, ensure that all conduits have bushings and cleaned of dirt, mud, grease, and other debris. Re-strap existing or relocated conduit per the specification. This work is subsidiary.

Abandoned underground conduit must have all conductors removed.

ITEM 620 - ELECTRICAL CONDUCTORS
Provide 10-amp time delay fuses.

For Flashing Beacons (Item 685) and Pedestal Poles (Item 687), provide single-pole breakaway disconnects.

Install a minimum size 8 AWG equipment grounding conductor (EGC) in all conduits including loop detectors and traffic signal cables. Payment and the size of the EGC will be in accordance with standard ED (3)-14 note 12.

Permanently mark "Illumination" on the luminaire conductors installed inside a traffic signal pole. Make the marks easily visible from the hand hole.

ITEM 624 – GROUND BOXES
Aggregate for fill under the box will be crushed, have a maximum size of 2 in., minimum size of ½ in., and requirements per Item 302 are waived.

ITEM 628 – ELECTRICAL SERVICES
Contact the utility company upon execution of contract and prior to the pre-construction meeting to make arrangements for all work and materials provided by the utility company. Contact AUS_Auditors@txdot.gov for account approval and information. Accounts shall be placed in the name of TxDOT.

ITEM 644 – SMALL ROADSIDE SIGN ASSEMBLIES
Triangular slip base that use set screws to secure the post will require 1 of the set screws to penetrate the post by drilling a hole in the post at the location of the screw. All set screws shall be treated with anti-seize compound.

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS
Notify the Engineer at least 24 hr. before beginning work.

The center-to-center minimum width for double yellow solid stripes must be 18 in. for all roadways.

Place longitudinal markings nightly for IH 35 main lanes or roadways with AADT greater than 100,000. Use of temporary flexible reflective roadway marker tabs is subsidiary and at the Contractor's option. Replace missing or damaged tabs nightly. If using tabs, place longitudinal markings weekly by 5 AM Friday for all weekday work and by 5 AM Monday for all weekend work. Failure to maintain tabs or place longitudinal markings by deadline will require nightly placement of longitudinal markings.

Place longitudinal markings no later than 7 calendar days after placement of the surface for roadways with AADT greater than 20,000.

When the raised portion of a profile marking is placed as a separate operation from the pavement marking, the raised portion must be placed first then covered with TY I.

When using black shadow to cover existing stripe apply a non-retroreflective angular abrasive bead drop. The marking color shall be adjusted to resemble the pavement color. If Item 677 is not used prior to placement of black shadow, scrape the top of the marking with a blade or large piece of equipment unless surface is a seal coat. The scraping of the marking is subsidiary.

ITEM 677 - ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS
Dispose of removed materials and debris at locations off the right of way.

Elimination using a pavement marking will not be allowed in lieu of methods listed in specification.

Remove pavement markings on concrete surfaces by a blasting method. Flail milling will be allowed when total quantity of removal on concrete surfaces is less than 1000 ft.

Strip seal is only method allowed on seal coat surface unless project includes placement of a new surface. If total quantity of removal on a seal coat surface is less than 2000 ft., elimination using a pavement marking is allowed if a test section is approved by the Engineer. Test section shall demonstrate the thermo marking color matches the existing pavement color.

Remove pavement markings outside the limits of the new surface by a blasting method.

Use a TRAIL or a non-retroreflective paint to cover stripe remnants that remain after elimination.

The test requirements for these materials are waived. The paint color shall be adjusted to resemble the existing pavement color. Installation and maintenance is subsidiary.

ITEM 680 - HIGHWAY TRAFFIC SIGNALS
For traffic signal head installation use Austin District MAD-14 detail.

Luminaire arms shall be aligned with the signal head support. If multiple signal head supports, the luminaire arm shall be aligned with the support over the higher volume roadway.

Install 250W EQ LED illumination fixtures as shown in the plans. Test in accordance with Item 616. This work is subsidiary.

Furnish all materials and install signs mounted on the traffic signal wire, traffic signal poles, mast arms, and pedestal pole assemblies. Remove all conflicting signs and sign foundations when signal is placed into operation. This work is subsidiary.

Use a Vulcan swinger sign mounting bracket or equivalent for all signs mounted on span wires.

Place the traffic signal into operation after the traffic signal and installation of striping have been completed. The timing Engineer will be present to program the controller and assist with

detection setup. Have a qualified technician and a representative from the controller supplier on the project site to place the traffic signals in operation.

If shown on the plans, install the Emergency Response Detection equipment supplied by the City.
Upon removal, contact signal shop to stockpile salvage materials that meet the current TxDOT standards at the Austin District Headquarters located at 7901 North IH 35, 78753. If signal shop declines receipt of material, Contractor will be responsible for disposal. All poles/arms will be stripped of components but must include all hardware including bolts. Contact signal shop 48 hours before delivery.

For city operated signals, the city may assist in determining how the detector loop lead-in cables are to be connected, and will also program the controller for operation, the video detection, hook up the conflict monitor, detector units and other equipment, and turn on the controller.

ITEM 682 – VEHICLE AND PEDESTRIAN SIGNAL HEADS
Install signal head attachments so the wiring to each passes from the signal pole through the attachment hardware to the signal head. Use UV rated tie wraps.

Traffic signal heads will be aluminum unless otherwise shown on the plans. Back plates will be black aluminum with reflective borders.

Provide louvers, which have five vanes with a black finish on inside surfaces when required. Fasten a hardware cloth screen, securely, with ⅝" or smaller mesh size to the front face of each louver to prevent bird nesting.

Use the four-point mounting system (TY A) for signal heads, except in cases of skewed or vertical heads when (TY B) will be used.

ITEM 684 – TRAFFIC SIGNAL CABLES
For Type A cables, cables meeting the requirements of IMSA 19-1 can be substituted for IMSA 20-1. For all types of cables, an increase of one size larger wire diameter and thickness can be substituted for plan size without additional cost to the Department. For example, 12 AWG can be substituted for 14 AWG.

For each cable run, coil an extra 2 ft. of cable in each steel pole and 5 ft. in the controller cabinet. Provide a separate multi-conductor signal cable (14 AWG) inside pedestal poles and mast-arm signal poles from the terminal strip to each signal head as shown on the plans.

ITEM 685 – ROADSIDE FLASHING BEACON ASSEMBLIES
Installation includes all components in the assembly, signs, signal heads, and conductors in the foundation and within 6 in. of the foundation to provide a fully operational assembly.

Test period for the assembly shall be in accordance with item 680.3.1.8.

ITEM 686 - TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)
Provide and install damping plates on all mast arms 40 ft. or greater. For mast arms less than 40 ft., refer to SMA and DMA vibration notes for guidance. This work is subsidiary.

When luminaires are installed on mast arm poles, install a separate terminal strip in the signal pole access compartment. Provide a 10-amp time-delay fuse for traffic signal poles with luminaires.

ITEM 687 – PEDESTAL POLE ASSEMBLIES
Verify the required pole height prior to ordering material.

ITEM 688 - PEDESTRIAN DETECTORS AND VEHICLE LOOP DETECTORS
Test all loops in accordance with the FHWA loop detector handbook.

Install vehicle loops prior to placement of roadway surface.

For work within the city limits of Austin, notify COA (512) 974-4099 and TxDOT 21 days prior to loop installation. Install quadrapole layout for presence detectors within city limits of Austin.

For replacement of existing loops, replacement of damaged or missing conduit from the vehicle loop detector to the ground box will be measured and paid by overrun of loop detector bid item.

Removal of damaged ground boxes at end of lead in cable is subsidiary to the new ground box.
Test period for the pedestrian detectors shall be in accordance with item 680.3.1.8.

Pedestrian push buttons will be mounted at 42 in. above the walking surface and have permanent type signs within the detector unit (9 in. x 12 in. sign and push button station on signal poles and 5 in. x 7 in. sign and push button station on pedestrian poles), which explains their purpose and indicates which crosswalk signal is actuated. Provide speech walk message as shown in the plans or per Engineer.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN
Provide 1 PCMS. Provide a replacement within 12 hours. PCMS will be available for traffic control, event notices, roadway conditions, service announcements, etc.

Place PCMS 10 calendar days prior to begin work stating “Road Work Begin Soon, Contact 832-7000 For Info”.

Place PCMS at time of LCN request. Place the PCMS at the expected end of queue caused by the closure. When the closure is active, revise the message to reflect the actual condition during the closure, such as “RIGHT LN CLOSED XXX FT”.

ITEM 6292 – RADAR VEHICLE DETECTION SYSTEM (RVDS) FOR SIGNALIZED INTERSECTION CONTROL
Provide and install Radar Vehicle Detection System (RVDS) and communication cable as directed by the Engineer. Place the radar detector communication cable in continuous and

separate runs from each RVDS to the controller. For each cable terminating at the controller cabinet, provide an extra 5-ft length when installing the cable into the controller. Provide a Serial to Ethernet convertor for each RVDS system. Consider the costs associated with the above work subsidiary to the pertinent Items.

Install the RVDS detection zones as directed. Have qualified personnel on site at the time of the signal turn-on to assist with the installation of detection zones.

Provide a set-up system. Load required set-up software for up to 15 of the District Signal Shop's computers and provide all necessary licensing or provide two setups (or upload/download) devices per contract.

If the RVDS locations shown in the plans do not allow for proper sight of the proposed detection zones, relocate the devices as needed and as directed. This labor and material cost will not be paid separately but is subsidiary to this Item.

ITEM 680 - HIGHWAY TRAFFIC SIGNALS
The list of material below is for the Contractor's information only and is subsidiary. It is the responsibility of the Contractor to verify all items and quantities listed below.

DESCRIPTION	UNIT	QUANTITY
CONTROLLER FOUNDATION (CITY OF AUSTIN STD)	EA	2
TRAFFIC SIGNAL CONTROLLER (INSTALL ONLY)	EA	2
TRAFFIC SIGNAL CABINET (INSTALL ONLY)	EA	2
GROUNDING ROD, 5/8" X 10' COPPER (CONTROLLER)	EA	2
CCTV CAMERA (INSTALL ONLY)	EA	2
REGULATORY SIGN PANEL (R3-5)	EA	2
REGULATORY SIGN PANEL (R3-5L)	EA	3
REGULATORY SIGN PANEL (R3-5R)	EA	1
STREET NAME SIGN	EA	7

SUBSIDIARY TO ITEM 688
The list of material below is for the Contractor's information only and is subsidiary. It is the responsibility of the Contractor to verify all items and quantities listed below.

DESCRIPTION	UNIT	QUANTITY
PEDESTRIAN PUSH BUTTON SIGNS (R10-3e)	EA	14

LIST OF MATERIAL
FURNISHED BY CITY OF AUSTIN

DESCRIPTION	UNIT	QUANTITY
2070 ATC CONTROLLER UNIT	EA	2
CALTRANS 352 CONTROLLER CABINET	EA	2
CONTROLLER FIRMWARE LICENSE	EA	2
CCTV CAMERA	EA	2
TYPE 2 SIGNAL POLE W/40' MAST ARM & LUMINAIRE	EA	1
TYPE 1W SIGNAL POLE W/25' MAST ARM & LUMINAIRE	EA	1
TYPE 1W SIGNAL POLE W/30' MAST ARM & LUMINAIRE	EA	1
TYPE 2W SIGNAL POLE W/40' MAST ARM & LUMINAIRE	EA	1
TYPE 2W SIGNAL POLE W/45' MAST ARM & LUMINAIRE	EA	1
TYPE 3W SIGNAL POLE W/60' MAST ARM & LUMINAIRE	EA	2

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-04-331 **DISTRICT** Austin **COUNTY** Travis
HIGHWAY BURLESON RD, QUICKSILVER BLVD

				0914-04-331		0914-04-333		TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB						
			PROJECT ID	**A00177228**		**A00177241**			
			COUNTY	**Travis**		**Travis**			
			HIGHWAY	**BURLESON RD**		**QUICKSILVER BLVD**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	6.000		3.000		9.000	
	104-6015	REMOVING CONC (SIDEWALKS)	SY			18.000		18.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	172.000		50.000		222.000	
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	48.000				48.000	
	105-6094	REMOVING STAB BASE & ASPH PAV(12"-27")	SY	99.000				99.000	
	160-6004	FURNISHING AND PLACING TOPSOIL (6")	SY	99.000				99.000	
	162-6002	BLOCK SODDING	SY	99.000				99.000	
	500-6001	MOBILIZATION	LS	0.500		0.500		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		3.000		6.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	100.000		100.000		200.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	100.000		100.000		200.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	192.000				192.000	
	531-6002	CONC SIDEWALKS (5")	SY	50.500		15.000		65.500	
	531-6004	CURB RAMPS (TY 1)	EA	4.000				4.000	
	531-6005	CURB RAMPS (TY 2)	EA			1.000		1.000	
	531-6006	CURB RAMPS (TY 3)	EA			1.000		1.000	
	531-6010	CURB RAMPS (TY 7)	EA	2.000		1.000		3.000	
	618-6029	CONDT (PVC) (SCH 40) (3")	LF	940.000		295.000		1,235.000	
	618-6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	450.000		1,080.000		1,530.000	
	618-6033	CONDT (PVC) (SCH 40) (4")	LF	30.000		200.000		230.000	
	618-6034	CONDT (PVC) (SCH 40) (4") (BORE)	LF			40.000		40.000	
	618-6070	CONDT (RM) (2")	LF	10.000				10.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	1,390.000		1,310.000		2,700.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	1,420.000		640.000		2,060.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	30.000		25.000		55.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	60.000		50.000		110.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	5.000		8.000		13.000	
	628-6165	ELC SRV TY D 120/240 070(NS)AL(E)SP(O)	EA	1.000		1.000		2.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	6.250				6.250	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1.000		1.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	2.000		3.000		5.000	
	644-6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA	1.000				1.000	
	658-6083	INSTL DEL ASSM (D-SW)SZ 1(WFLX)SRF	EA			20.000		20.000	
	658-6088	INSTL DEL ASSM (D-SY)SZ 1(YFLX)SRF	EA	18.000				18.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	32.000				32.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	308.000				308.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	352.000				352.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-04-331 **DISTRICT** Austin **COUNTY** Travis
HIGHWAY BURLESON RD, QUICKSILVER BLVD

		CONTROL SECTION JOB		**0914-04-331**		**0914-04-333**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00177228**		**A00177241**			
		COUNTY		**Travis**		**Travis**			
		HIGHWAY		**BURLESON RD**		**QUICKSILVER BLVD**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	6.000				6.000	
	666-6105	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL)	EA	2.000		3.000		5.000	
	666-6111	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)	EA	3.000		3.000		6.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	123.000		490.000		613.000	
	666-6172	REFL PAV MRK TY II (W) 6" (DOT)	LF	32.000				32.000	
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	326.000		120.000		446.000	
	666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	308.000		124.000		432.000	
	666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	352.000		480.000		832.000	
	666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	6.000		3.000		9.000	
	666-6200	REFL PAV MRK TY II (W) (BIKE ARROW)	EA	2.000				2.000	
	666-6202	REFL PAV MRK TY II (W) (BIKE SYMBOL)	EA	3.000				3.000	
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF			640.000		640.000	
	666-6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	1,144.000				1,144.000	
	666-6212	REFL PAV MRK TY II (Y) 12" (SLD)	LF	123.000				123.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	1,144.000				1,144.000	
	672-6007	REFL PAV MRKR TY I-C	EA	16.000		6.000		22.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	52.000		36.000		88.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	1,427.000		240.000		1,667.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	120.000				120.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	30.000		170.000		200.000	
	677-6023	ELIM EXT PAV MRK & MARKS (BIKE ARROW)	EA	1.000				1.000	
	677-6025	ELIM EXT PAV MRK & MARKS (BIKE SYMBOL)	EA	1.000				1.000	
	677-6038	ELIM EXT PAV MRK & MRKRS(PLOWABLE RPMS)	EA	44.000				44.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	1,502.000				1,502.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	308.000				308.000	
	678-6006	PAV SURF PREP FOR MRK (12")	LF	123.000				123.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	352.000				352.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	6.000				6.000	
	678-6026	PAV SURF PREP FOR MRK (BIKE ARROW)	EA	2.000				2.000	
	678-6028	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	3.000				3.000	
	680-6005	INS HY TRF SIG (DPT SUP CNT & CAB)(ISO)	EA	1.000		1.000		2.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	4.000		10.000		14.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4.000		4.000		8.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	4.000		10.000		14.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	8.000		6.000		14.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	4.000		10.000		14.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	4.000		2.000		6.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-04-331 **DISTRICT** Austin **COUNTY** Travis
HIGHWAY BURLESON RD, QUICKSILVER BLVD

		CONTROL SECTION JOB		**0914-04-331**		**0914-04-333**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00177228**		**A00177241**			
		COUNTY		**Travis**		**Travis**			
		HIGHWAY		**BURLESON RD**		**QUICKSILVER BLVD**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	6.000		8.000		14.000	
	682-6049	BACKPLATE W/REFL BRDR(4 SEC)	EA			2.000		2.000	
	682-6050	BACKPLATE W/REFL BRDR(5 SEC)	EA			2.000		2.000	
	682-6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	4.000				4.000	
	682-6052	BACKPLATE W/REFL BRDR(4 SEC)ALUM	EA	4.000				4.000	
	682-6060	BACKPLATE W/REFL BRDR(3 SEC)	EA			8.000		8.000	
	684-6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF			1,190.000		1,190.000	
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	795.000		635.000		1,430.000	
	684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	140.000		190.000		330.000	
	684-6046	TRF SIG CBL (TY A)(14 AWG)(20 CONDR)	LF	575.000		530.000		1,105.000	
	684-6080	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF	1,395.000				1,395.000	
	686-6292	INS TRF SIG PL AM (MAST)(INSTALL ONLY)	EA	3.000		4.000		7.000	
	687-6001	PED POLE ASSEMBLY	EA	4.000		4.000		8.000	
	687-6002	PEDESTRIAN PUSH BUTTON POLE	EA			2.000		2.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	6.000		8.000		14.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA	1.000		1.000		2.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	94.000				94.000	
	6004-6031	ITS COM CBL (ETHERNET)	LF	80.000		80.000		160.000	
	6027-6010	GROUND BOX W/ APRON (ADJUST)	EA	1.000				1.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1.000		1.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	94.000				94.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	94.000				94.000	
	6292-6001	RVDS(PRESENCE DETECTION ONLY)	EA	3.000				3.000	
	6292-6003	RVDS(PRESENCE AND ADVANCE DET)	EA			4.000		4.000	
	7251-6001	Subsurface Util Locate (Outside Rdbed)	EA	7.000		4.000		11.000	
	06	MATERIAL FURNISHED BY THE STATE	LS	1.000		1.000		2.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		2.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000		2.000	
	32	MATERIALS FURNISHED BY CITY (NON-PARTICIPATING)	LS	1.000		1.000		2.000	

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

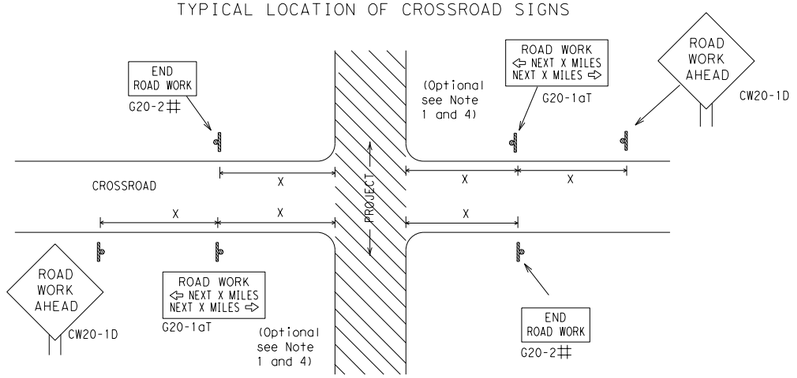
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	AUSTIN	TRAVIS		7
5-10 5-21				

DATE: 6/28/2023 3:57:51 PM
FILE: $FILE$

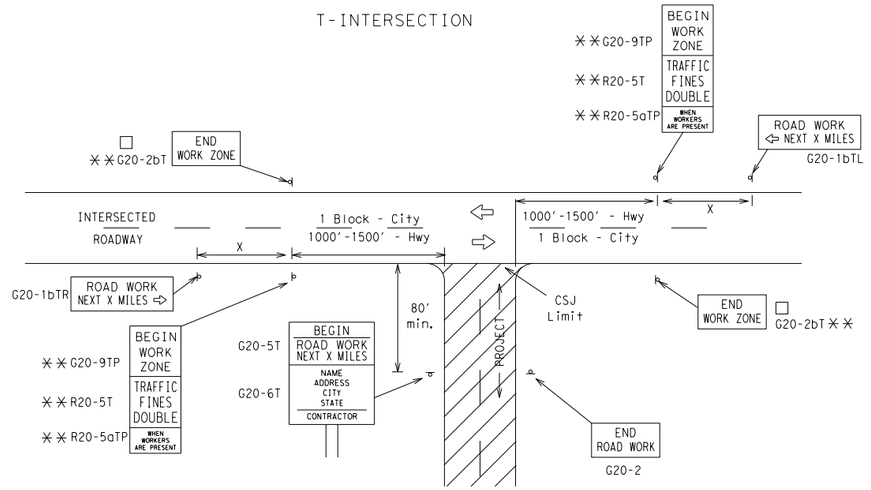
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

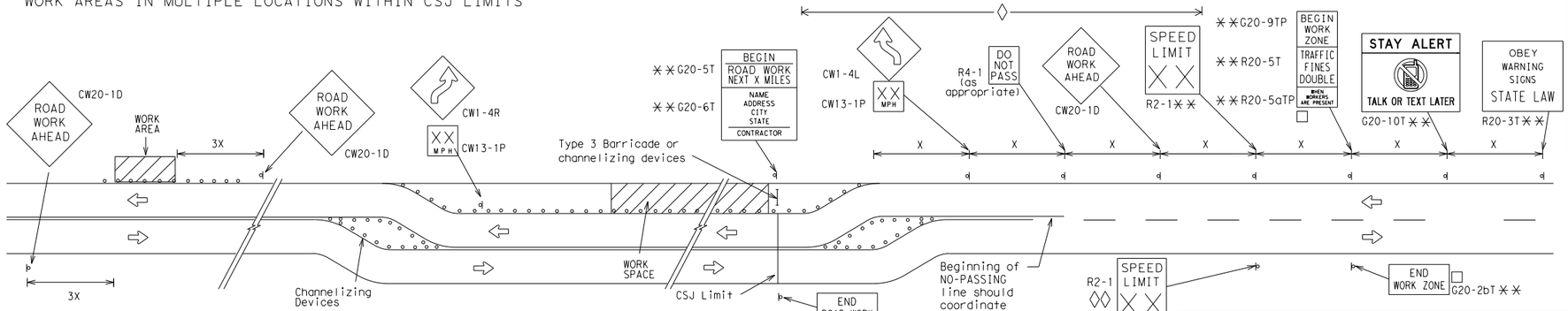
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

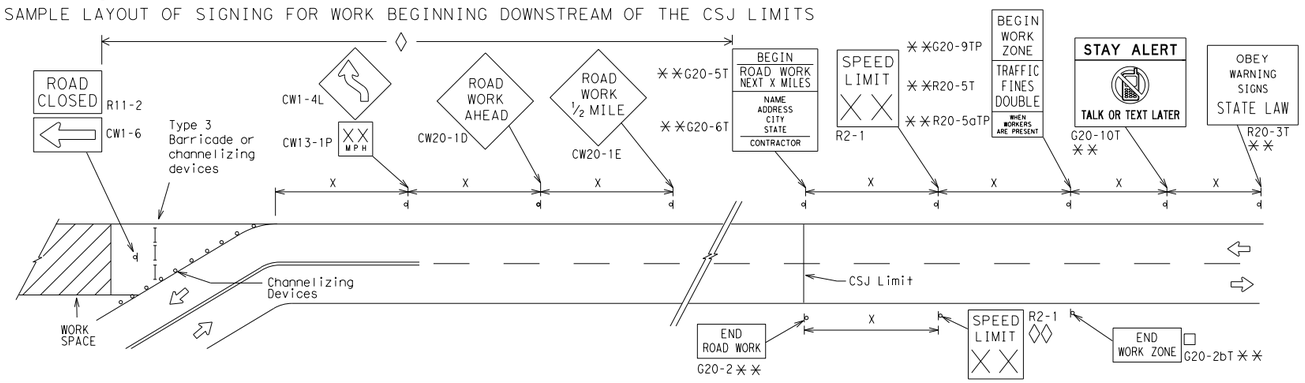
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE 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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUSTIN	TRAVIS		8

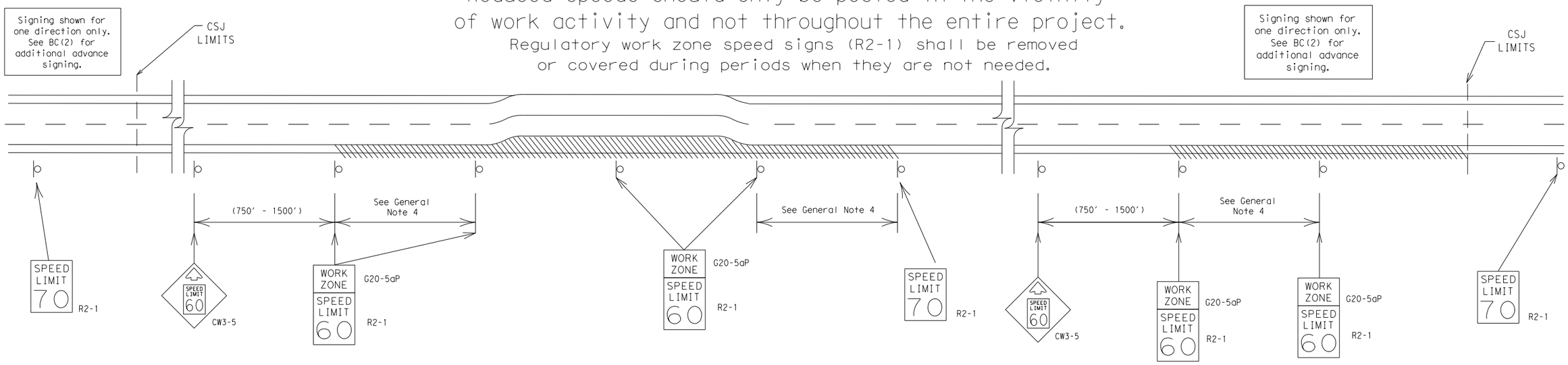
DATE: 6/28/2023 3:57:52 PM
FILE: $FILE$

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

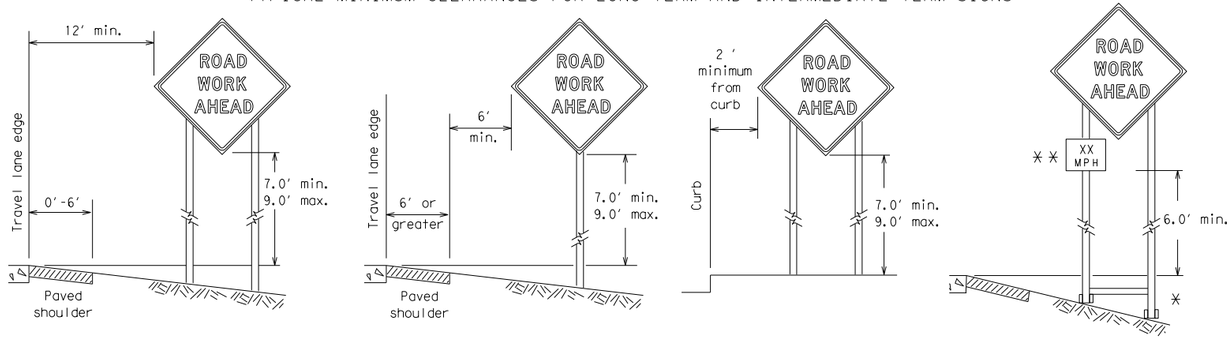
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUSTIN	TRAVIS		9

DATE: 6/28/2023 3:57:52 PM
FILE: $FILE$

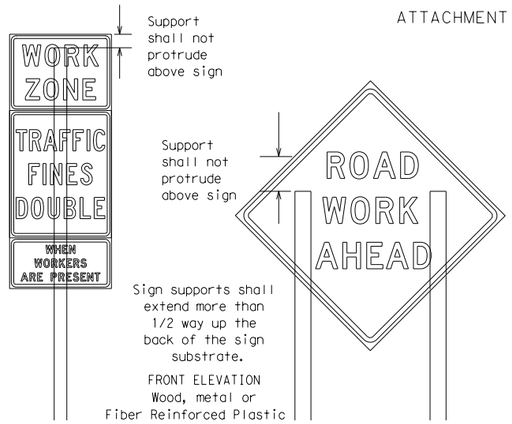
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



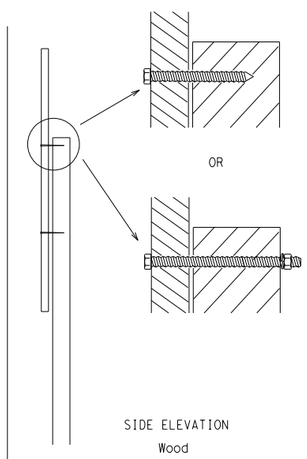
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

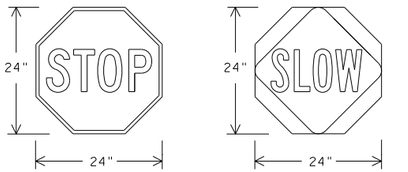
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

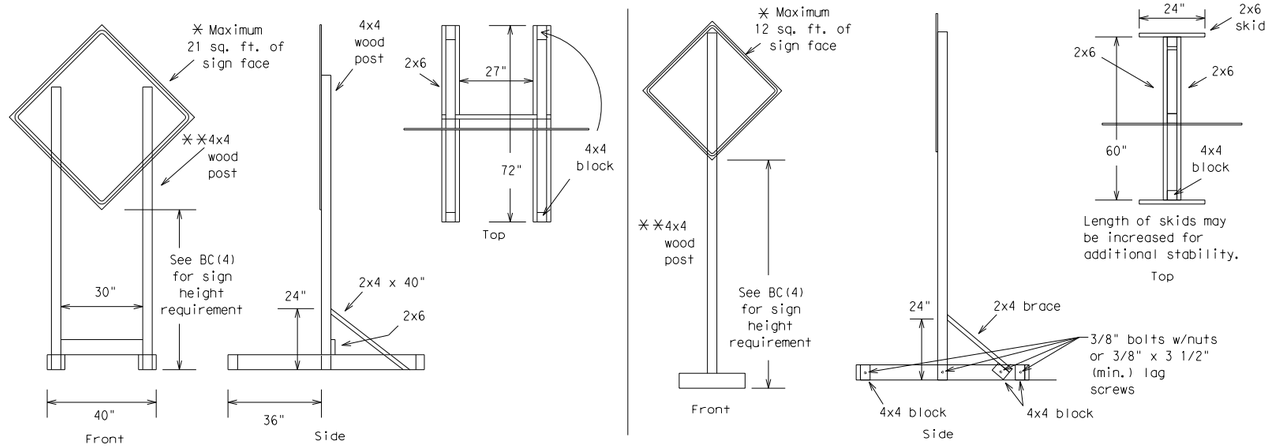
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUSTIN	TRAVIS		10

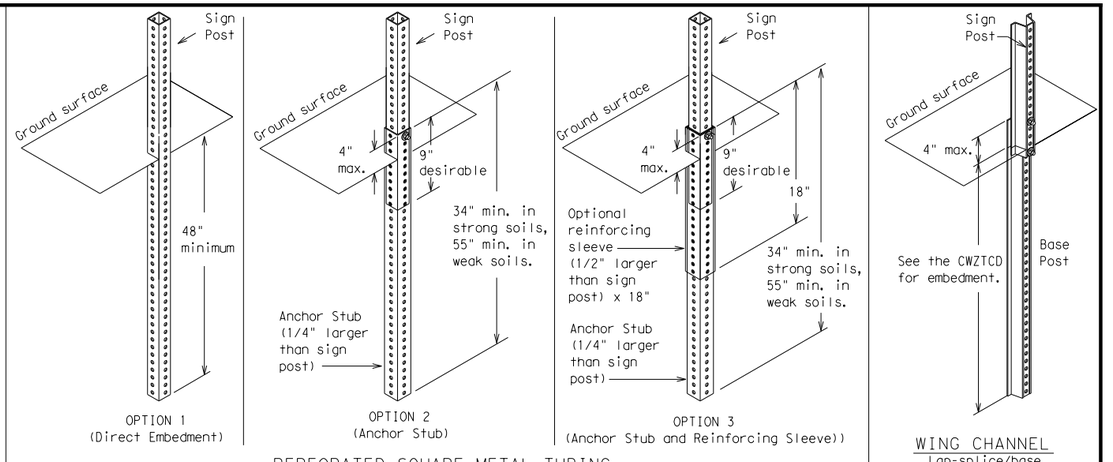
DATE: 6/28/2023 3:57:53 PM
FILE: $FILE$

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.



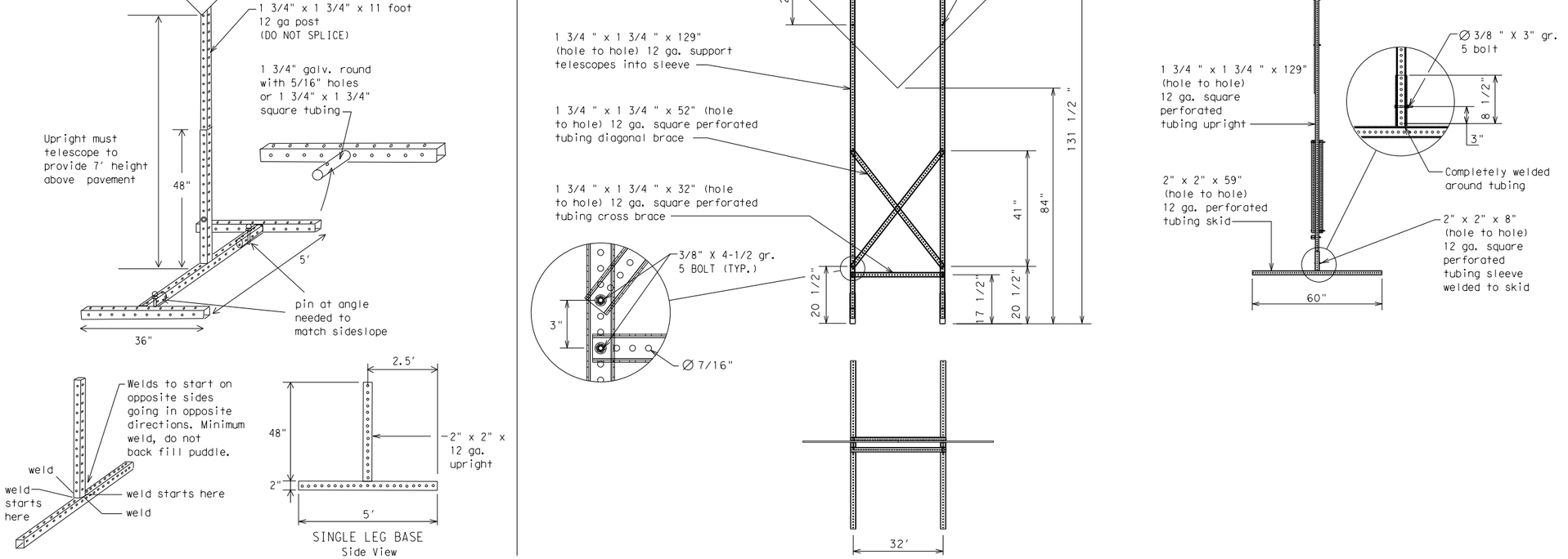
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUSTIN	TRAVIS		11

DATE: 6/28/2023 3:57:53 PM
FILE: $FILE$

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

⁑⁑ Advance Notice List

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

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

⁑⁑ See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

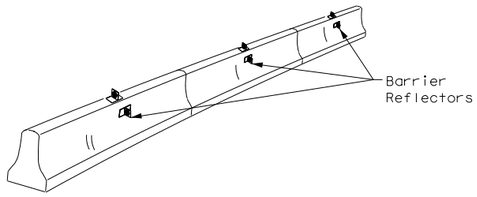
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		914	4	331	-
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		AUSTIN	TRAVIS		12

100

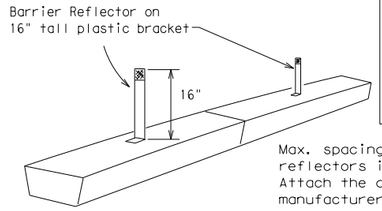
DATE: 6/28/2023 3:57:54 PM
FILE: $FILE$

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



CONCRETE TRAFFIC BARRIER (CTB)

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

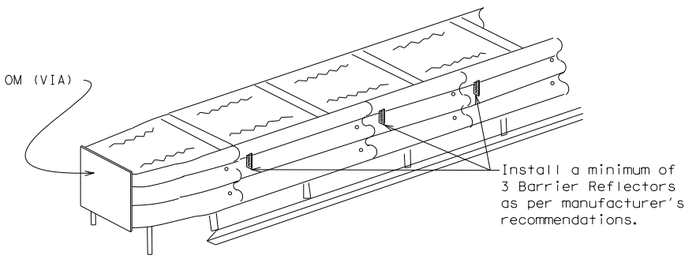


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

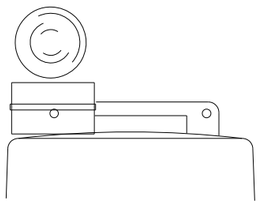


DELINEATION OF END TREATMENTS

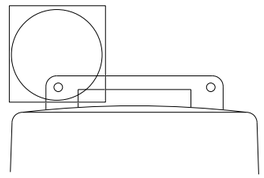
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRICADE REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

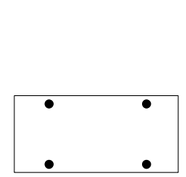
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

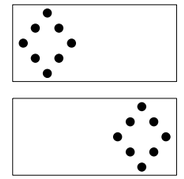
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

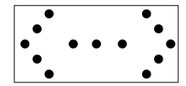


4 CORNER CAUTION

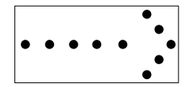
OR



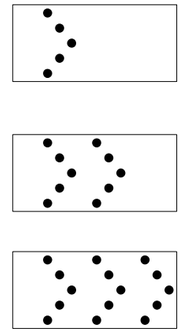
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUSTIN	TRAVIS		13

101

DATE: 6/28/2023 3:57:55 PM
FILE: $FILE$

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

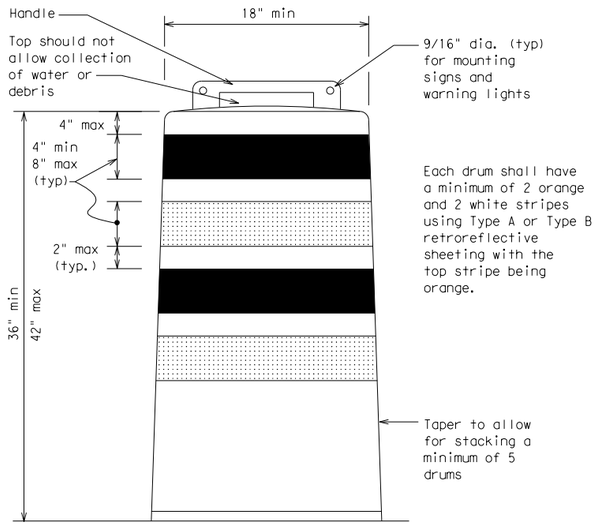
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

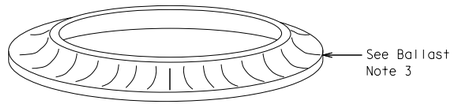
RETROREFLECTIVE SHEETING

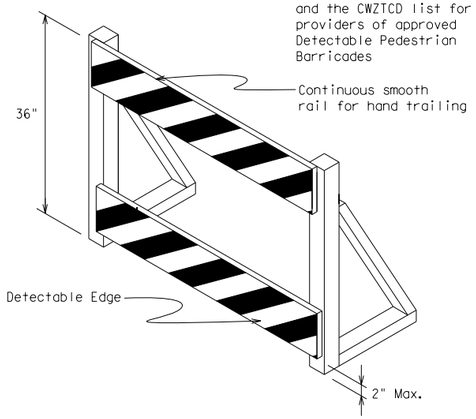
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

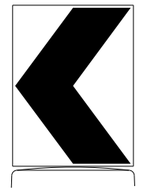




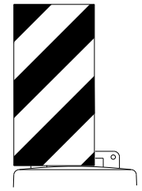


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

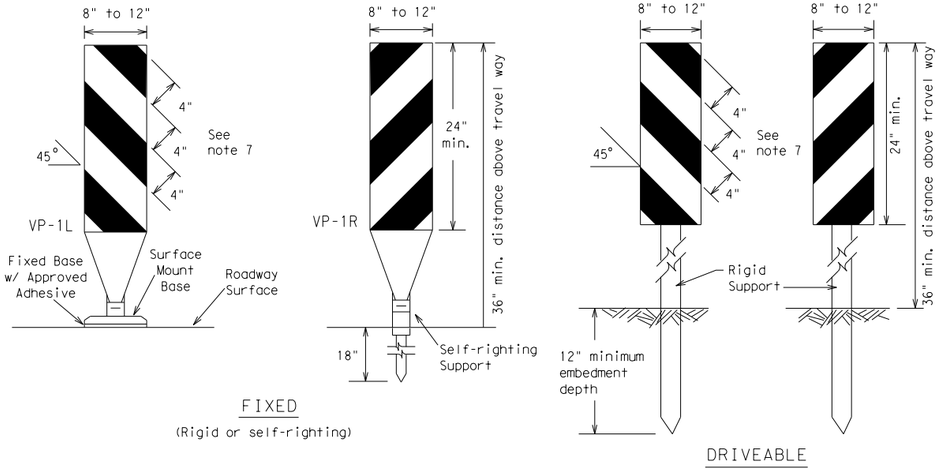
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	AUSTIN	TRAVIS		14
7-13				

DATE: 6/28/2023 3:57:55 PM
FILE: $FILE$

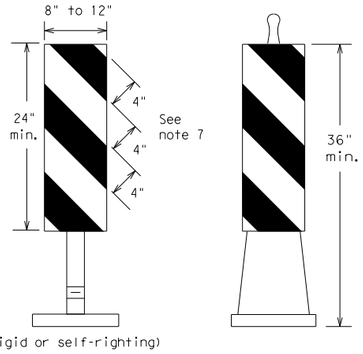
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



FIXED

(Rigid or self-righting)

DRIVEABLE

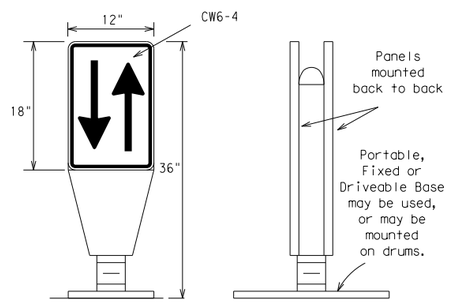


(Rigid or self-righting)

PORTABLE

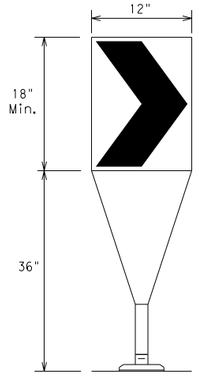
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



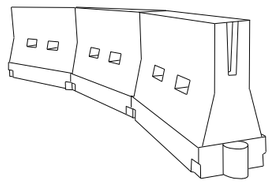
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUSTIN	TRAVIS		15

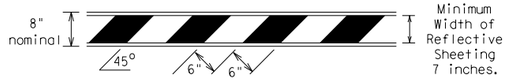
103

DATE: 6/28/2023 3:57:56 PM
FILE: $FILE$

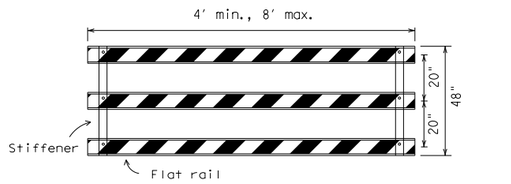
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



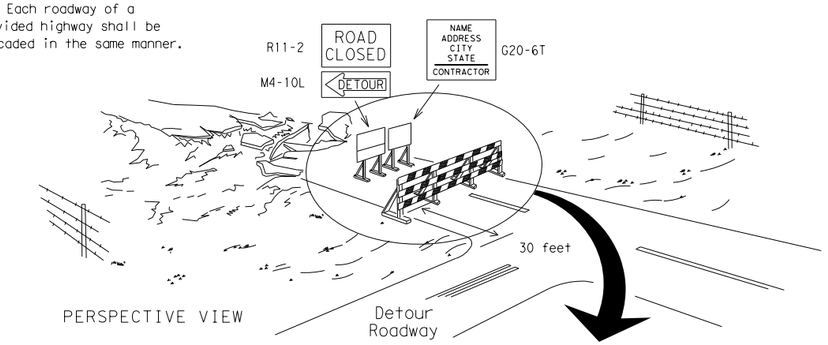
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

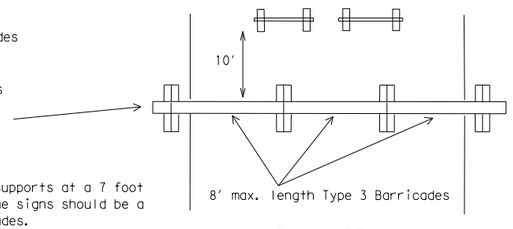
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

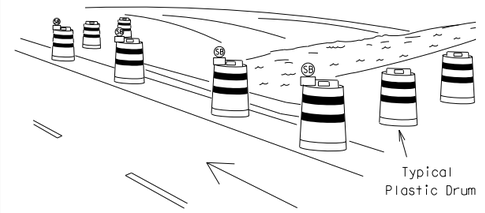
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

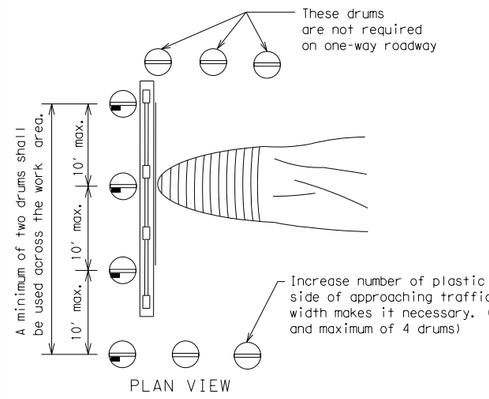
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

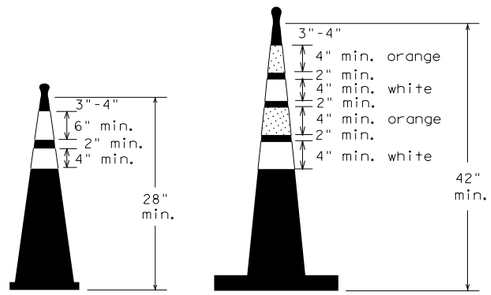
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

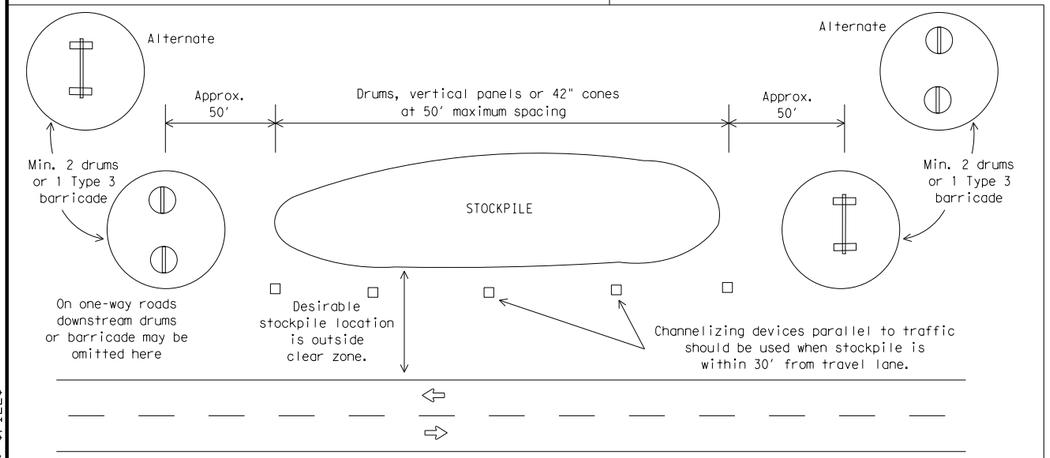
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUSTIN	TRAVIS		16

104

DATE: 6/28/2023 3:57:56 PM
FILE: $FILE$

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

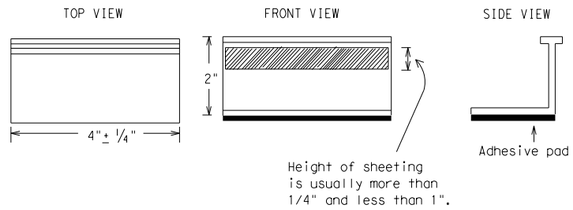
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

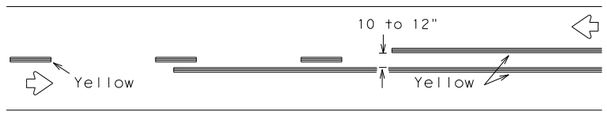
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		17

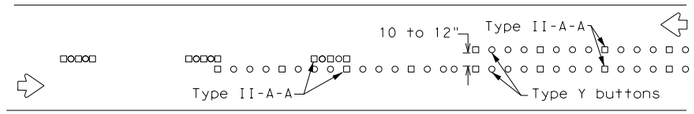
105

DATE: 6/28/2023 3:57:57 PM
FILE: $FILE$

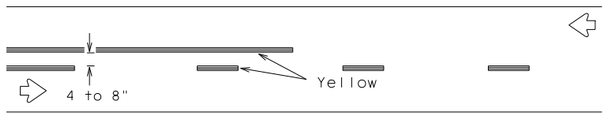
PAVEMENT MARKING PATTERNS



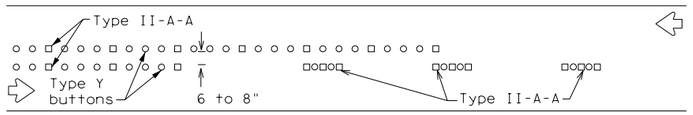
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



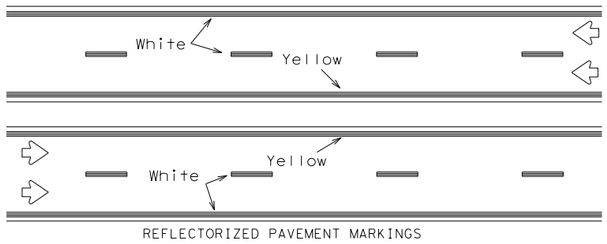
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



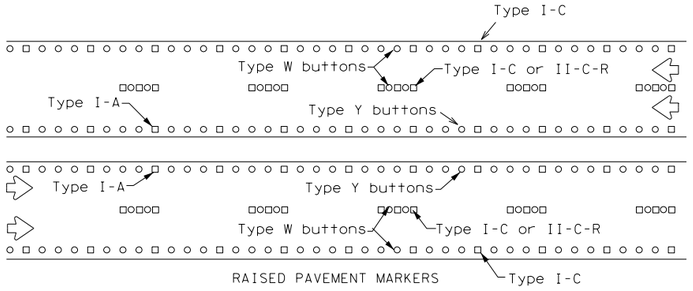
RAISED PAVEMENT MARKERS - PATTERN B

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

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



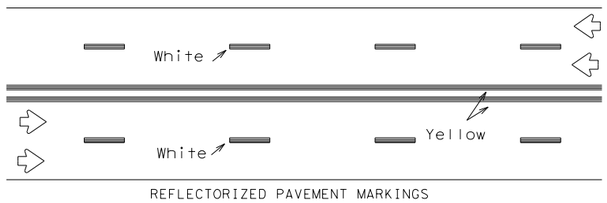
REFLECTORIZED PAVEMENT MARKINGS



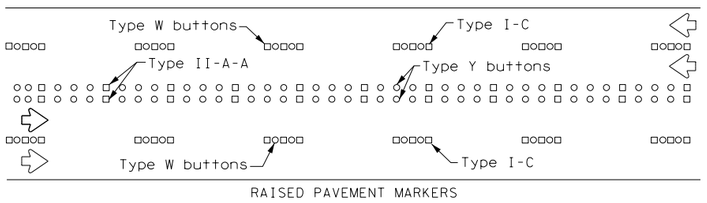
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



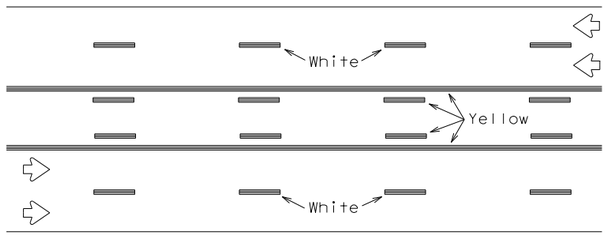
REFLECTORIZED PAVEMENT MARKINGS



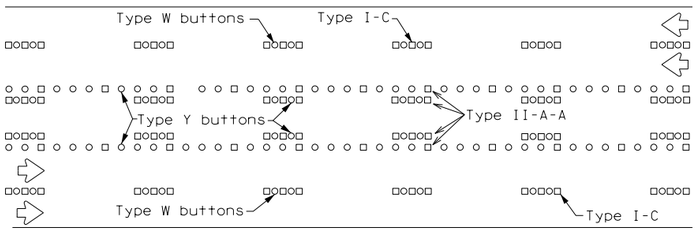
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

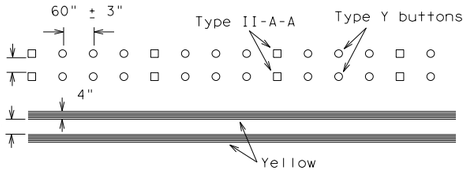
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

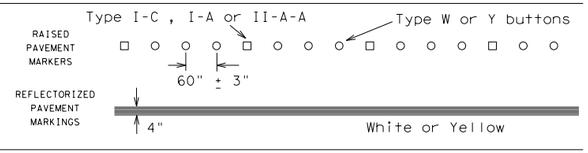
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

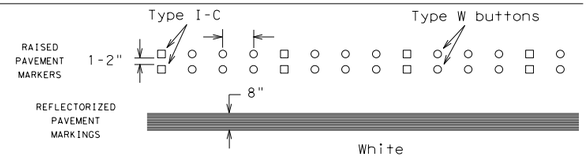


EDGE LINE OR SINGLE NO-PASSING LINE



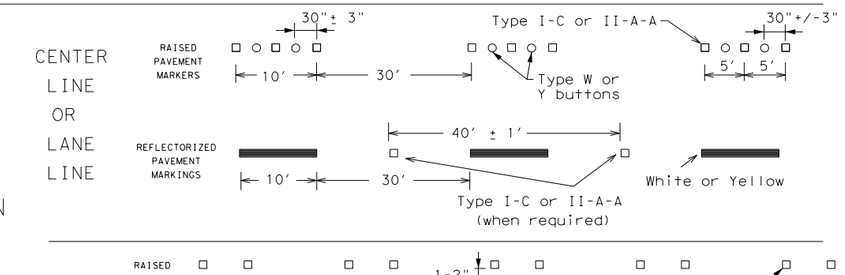
WIDE LINE

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

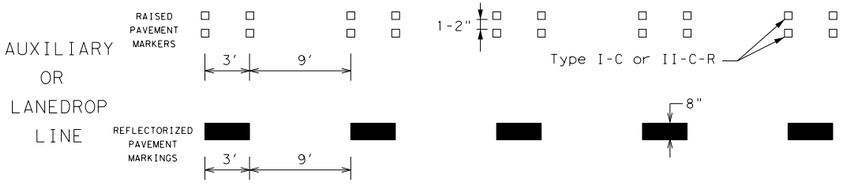


BROKEN LINES

CENTER LINE OR LANE LINE

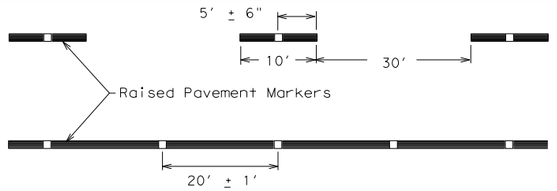


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

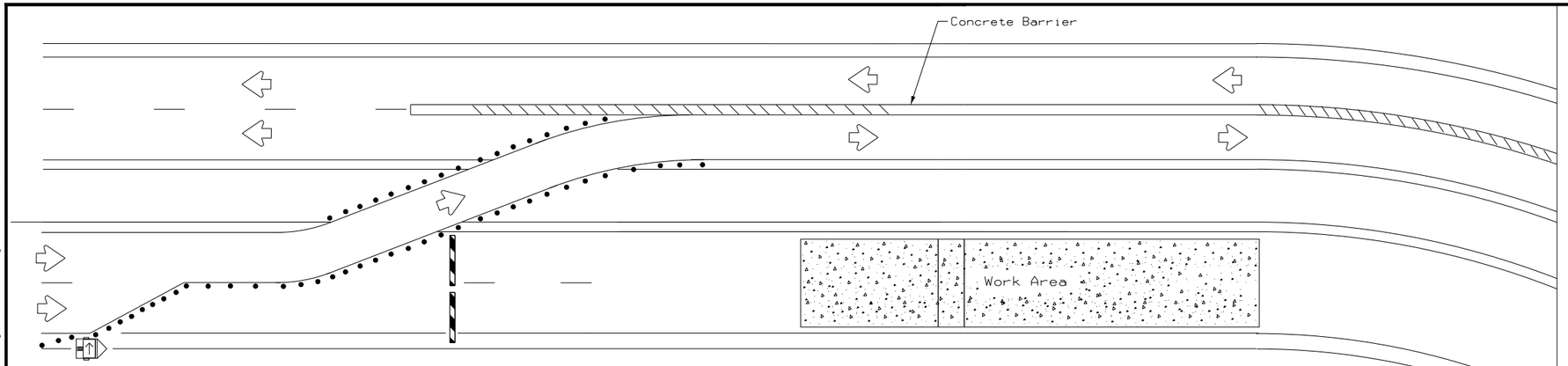
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		18

106



NOTES:

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

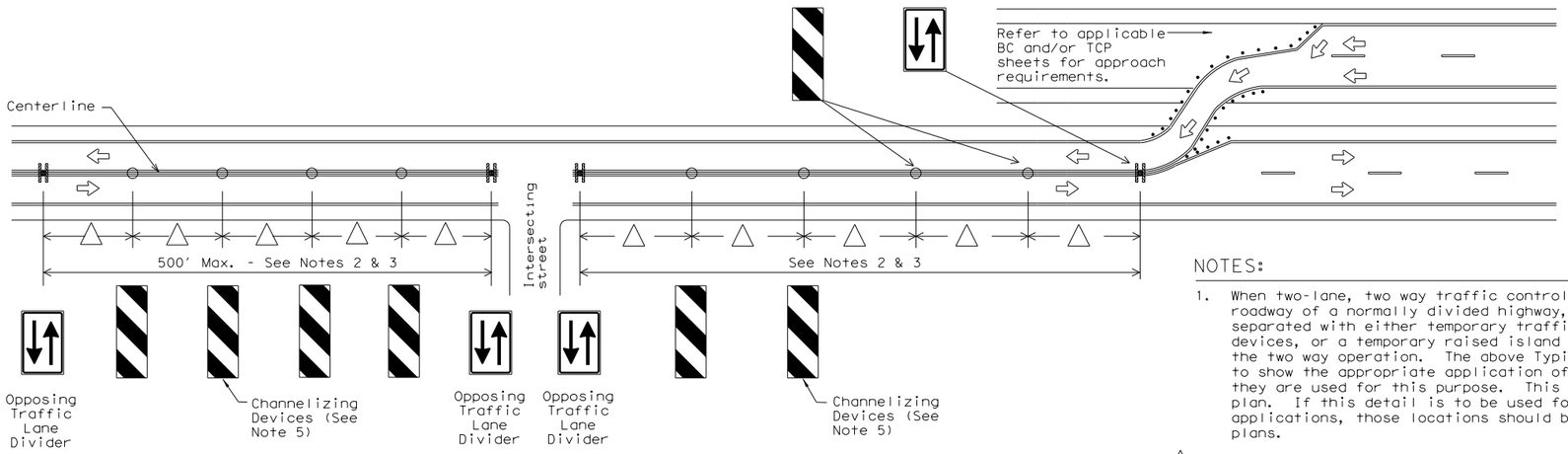
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	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



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

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.

△2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100′.

3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

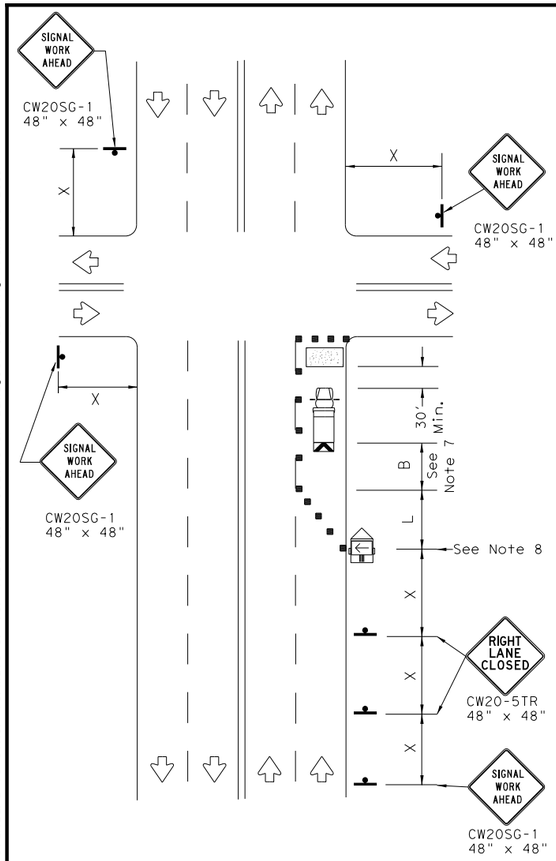
TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-17 4-98 3-03 7-13	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		19

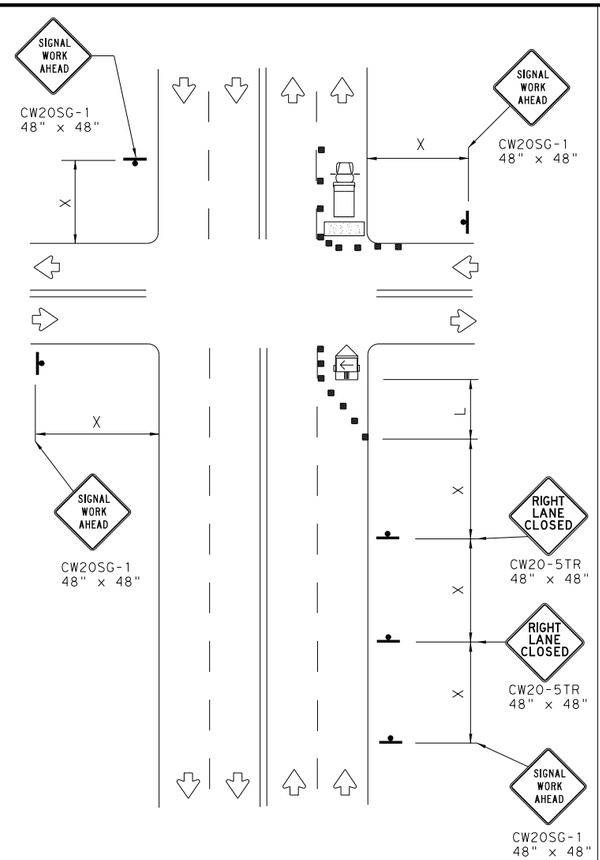
110

DATE: 6/28/2023 3:58:00 PM
FILE: $FILE$



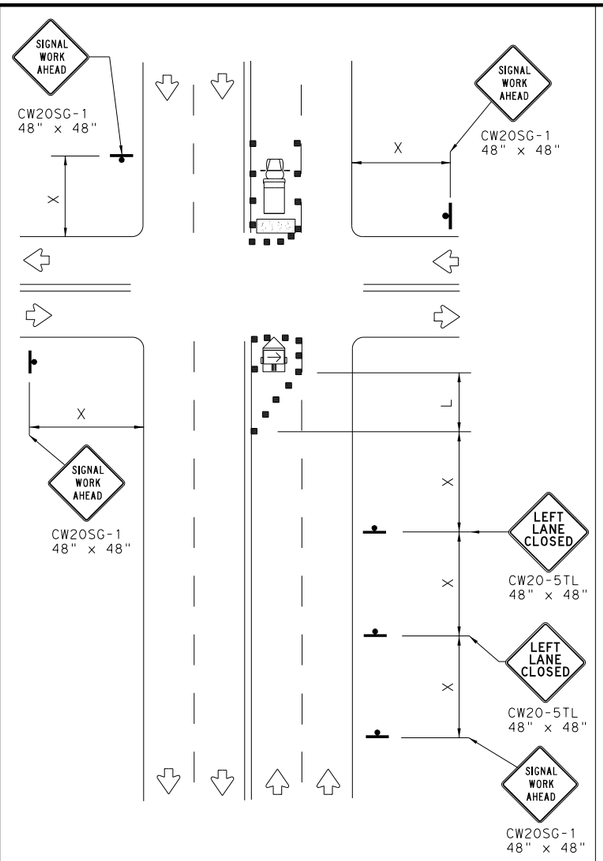
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE RIGHT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY

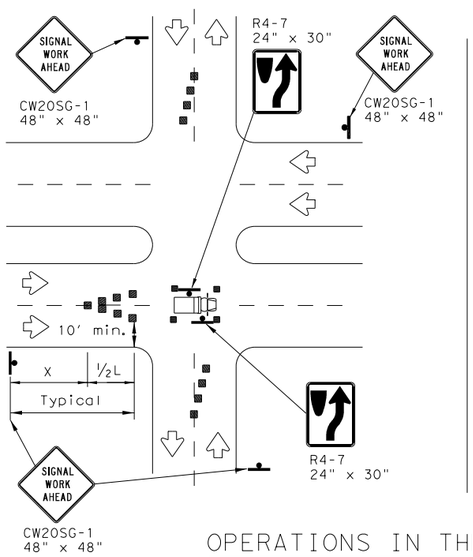
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

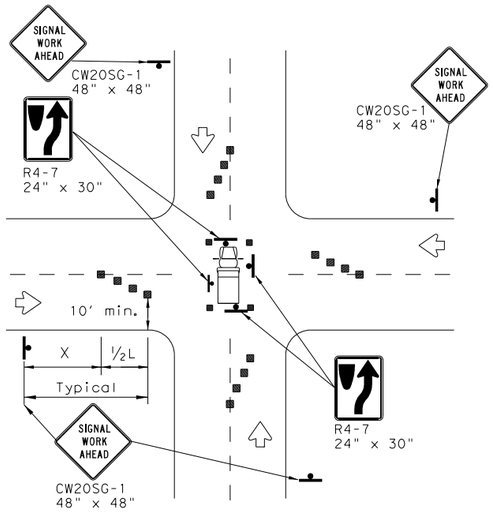
Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'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

* Conventional Roads Only

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

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

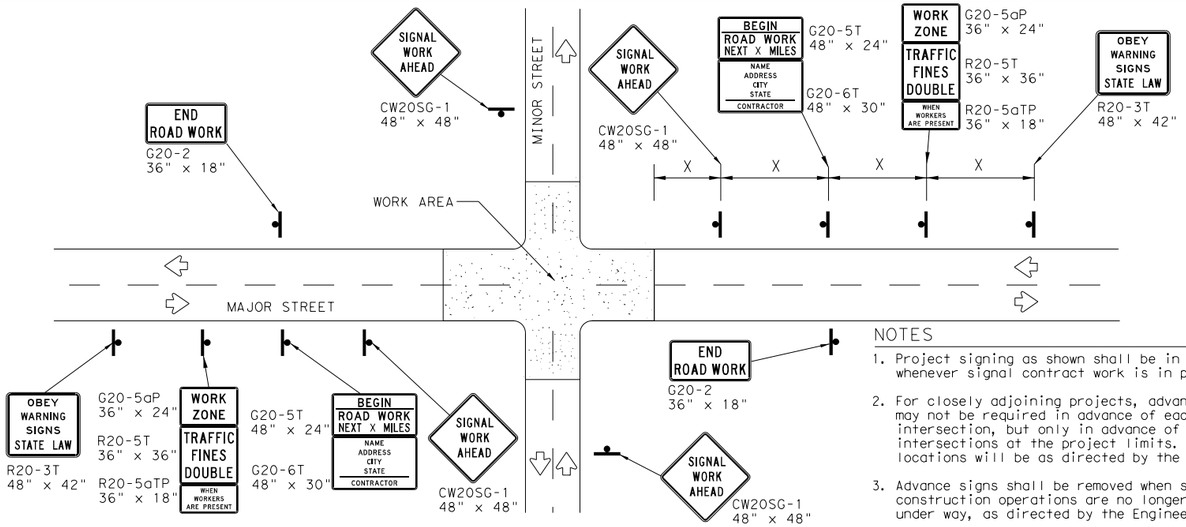
Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	AUSTIN	TRAVIS		20

DATE: 6/28/2023 3:58:02 PM
FILE: $FILE$



TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

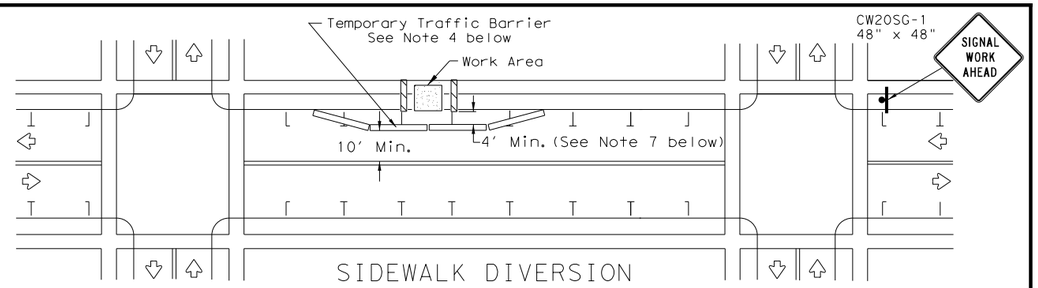
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

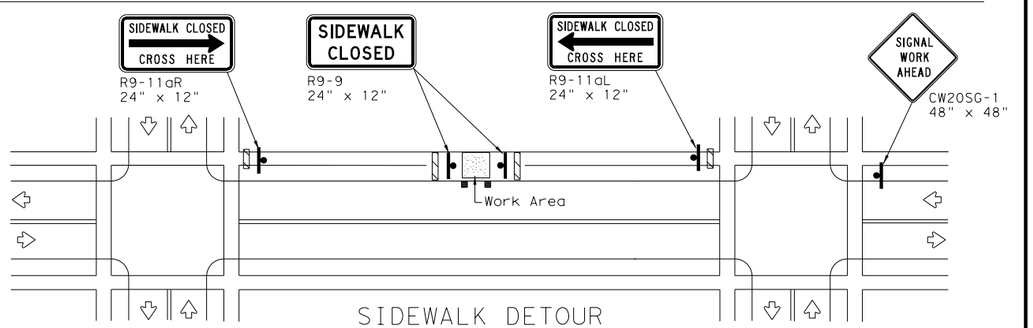
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

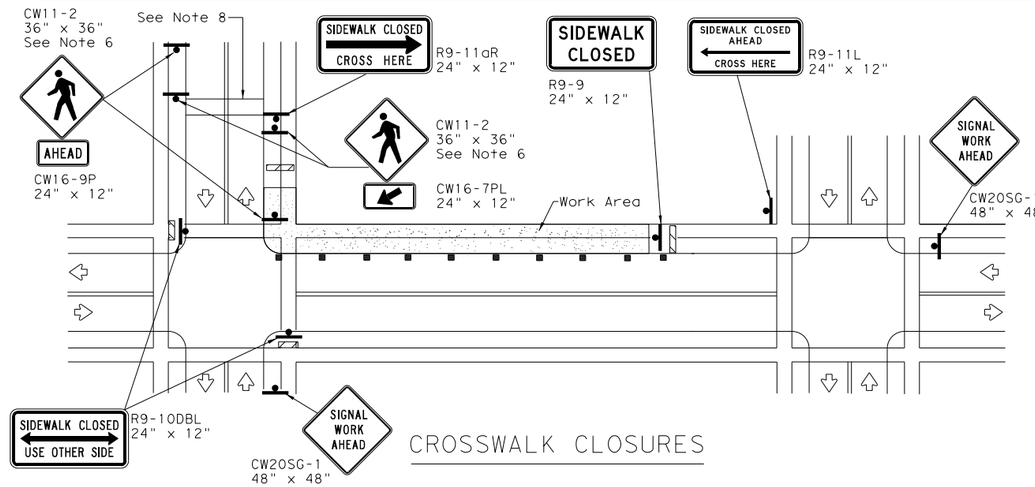
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

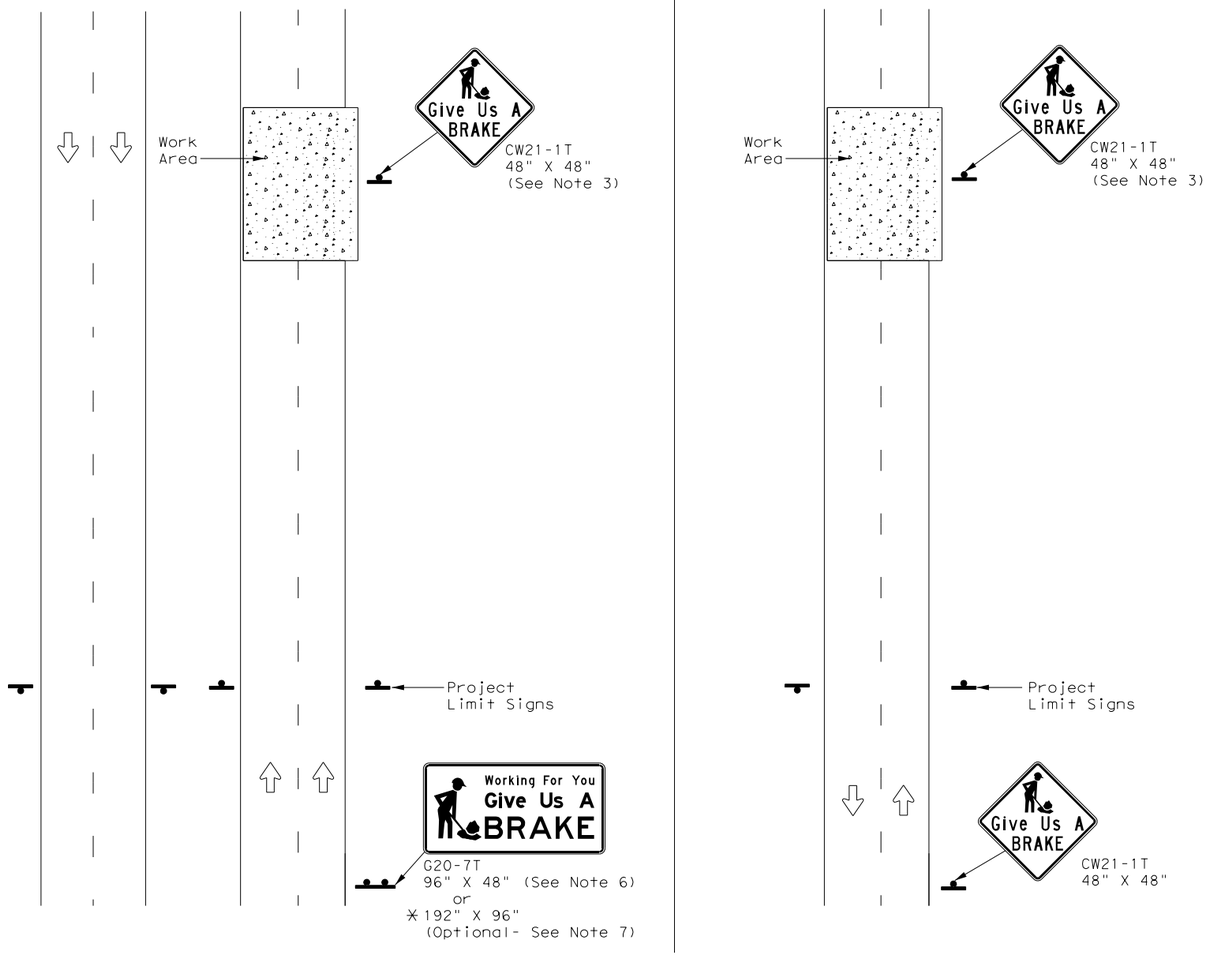
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

FILE:	wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		914	4	331	-
2-98 10-99 7-13		DIST	COUNTY		SHEET NO.
4-98 3-03		AUSTIN	TRAVIS		21

DATE: 6/28/2023 3:58:02 PM
FILE: $FILE$



DIVIDED HIGHWAY

UNDIVIDED HIGHWAY

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 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	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_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. 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.
4. 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.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. 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.
7. 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
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

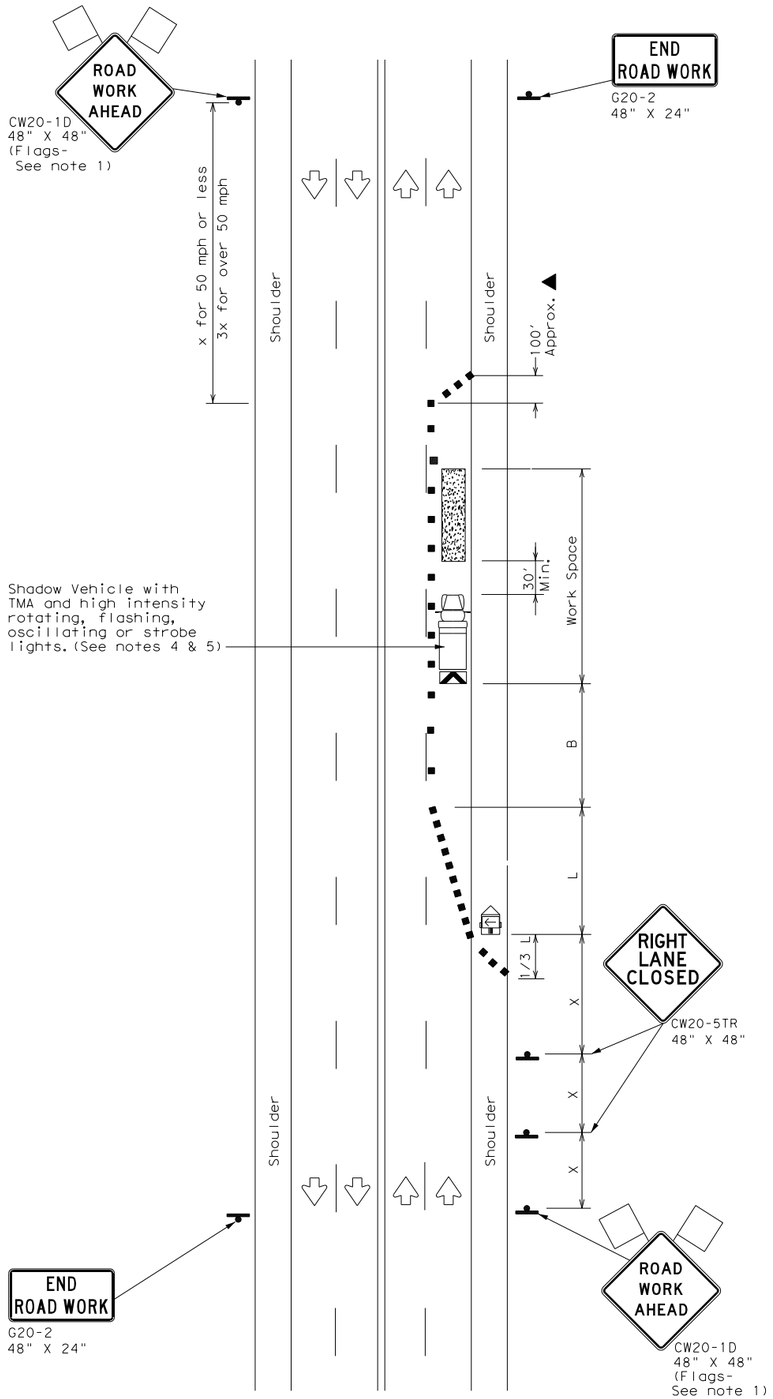
FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	AUSTIN	TRAVIS		22

116

DATE: 6/28/2023 3:58:04 PM
FILE: $FILE$

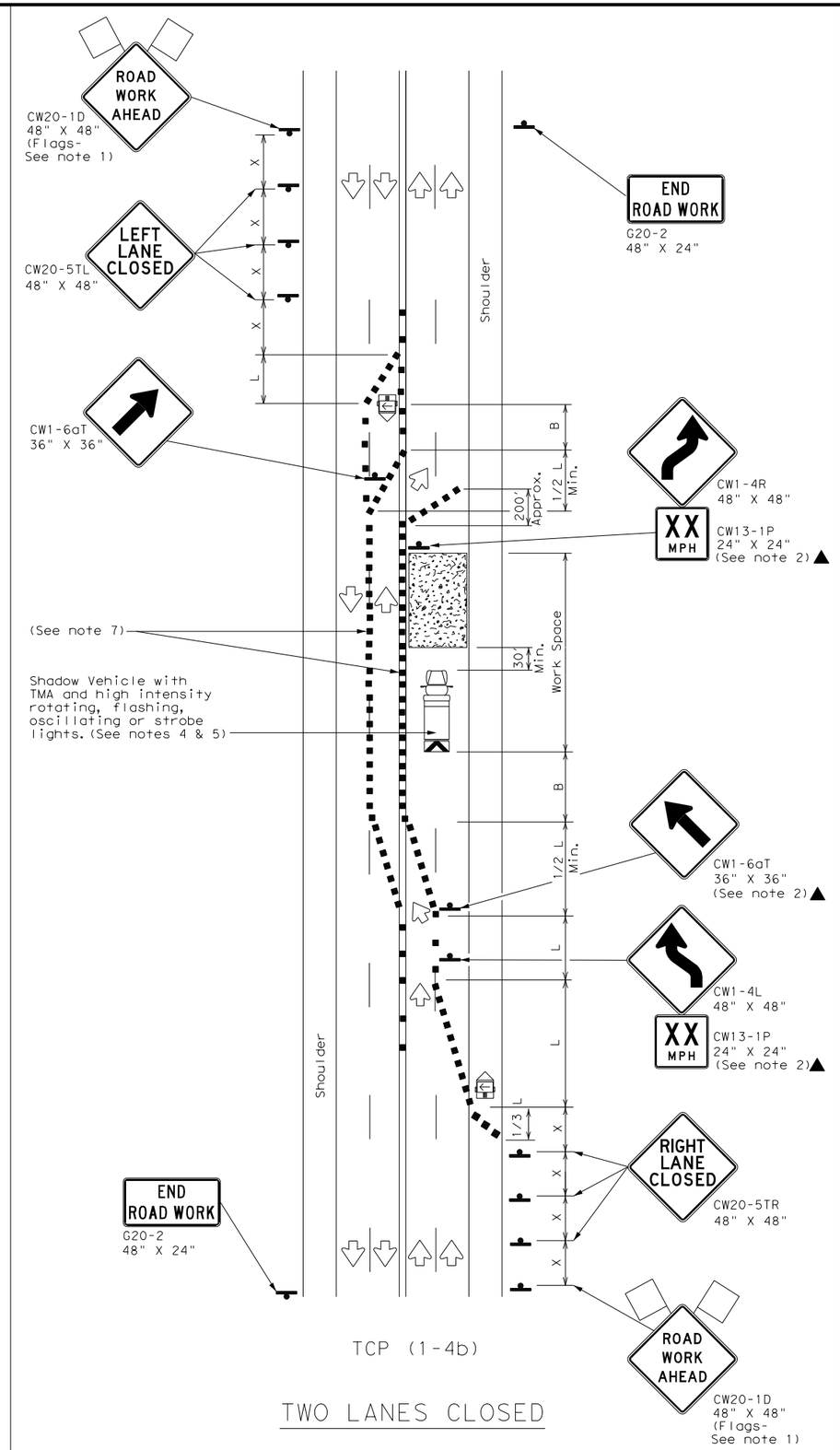
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 6/28/2023 3:58:06 PM
FILE: $FILE$



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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

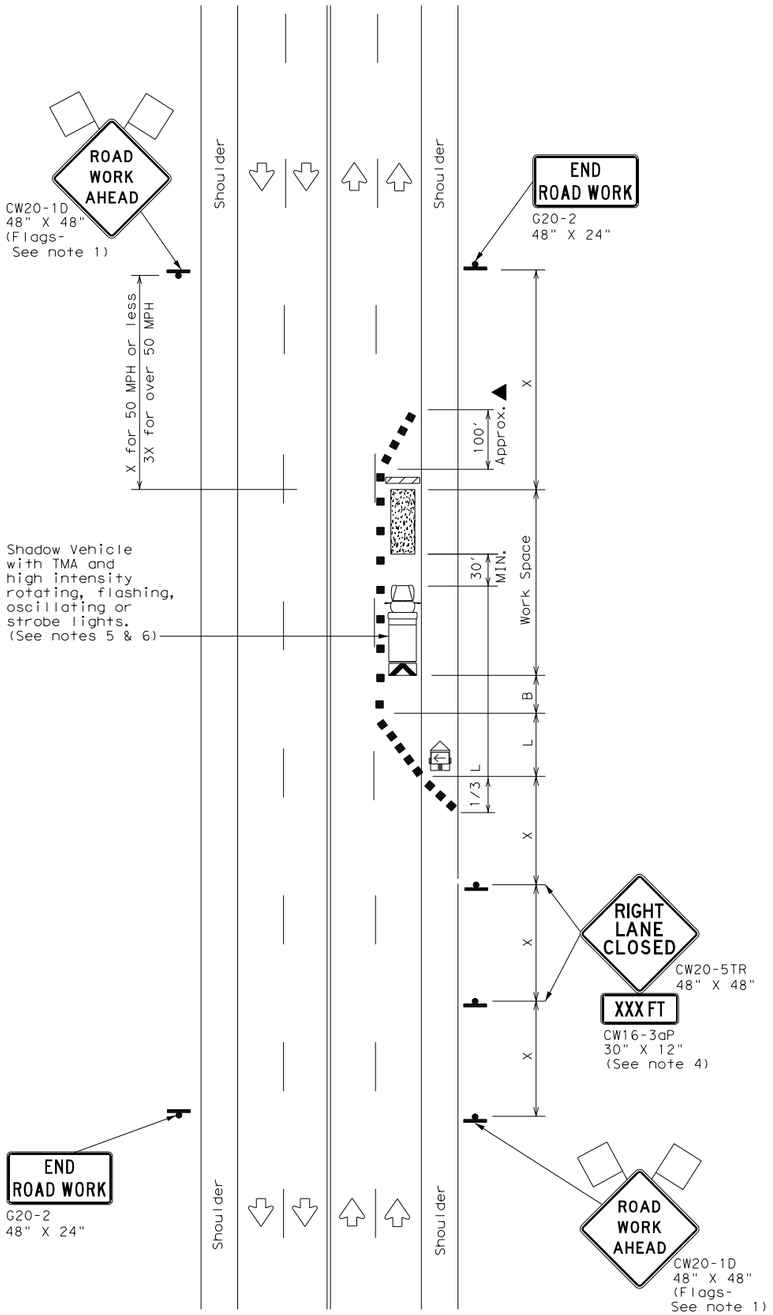
TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP (1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AUSTIN	TRAVIS		23
1-97 2-18				

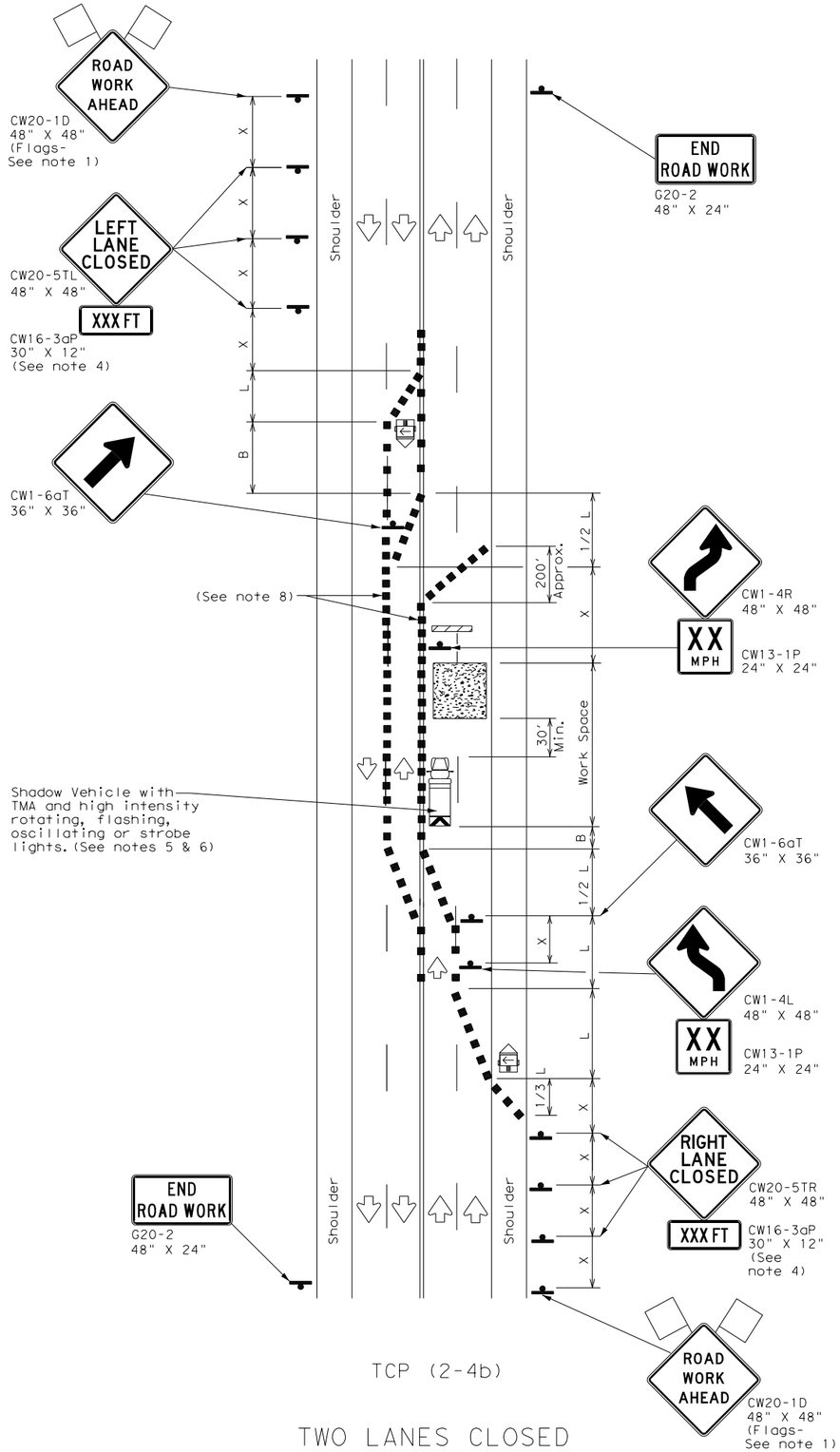
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 6/28/2023 3:58:08 PM
FILE: $FILE$



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

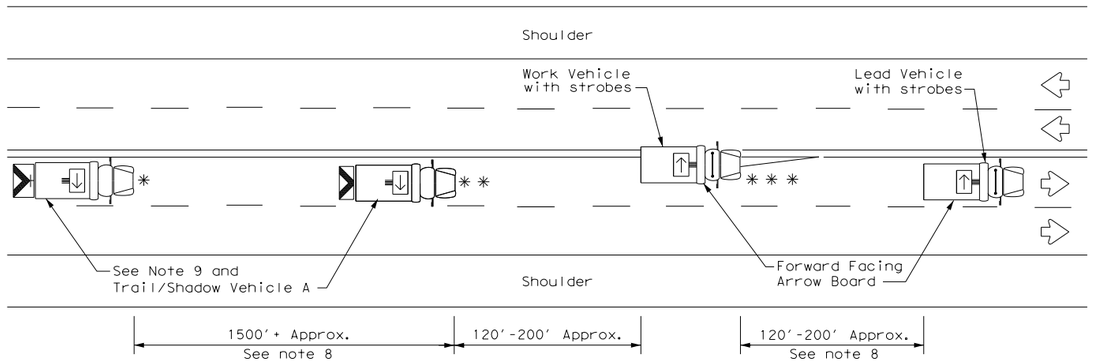
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

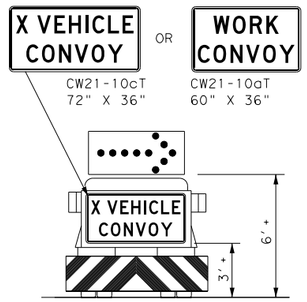
TCP (2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	914	4	331	-
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	AUSTIN	TRAVIS		24



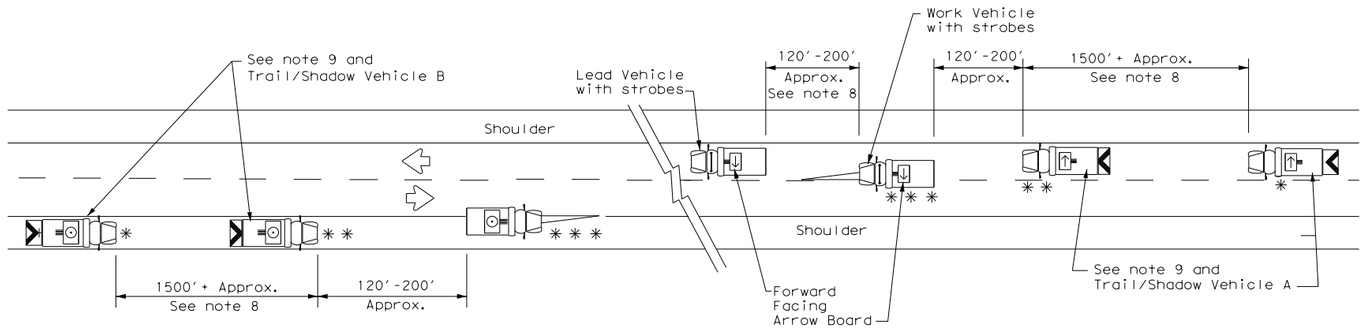
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

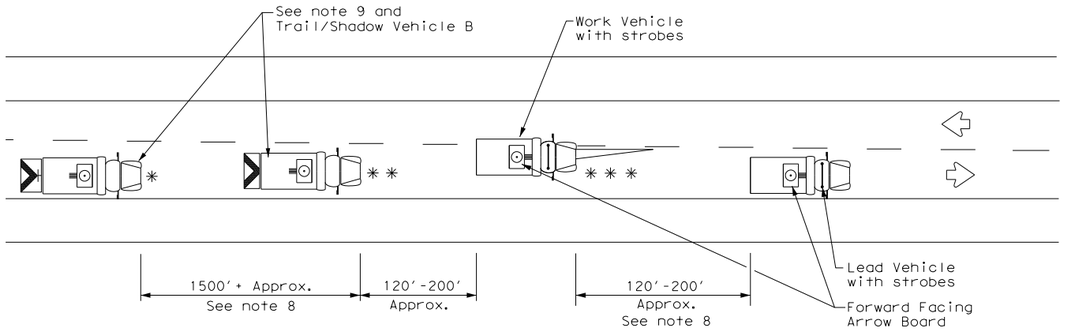


WORK ON SHOULDER

WORK ON TRAVEL LANE

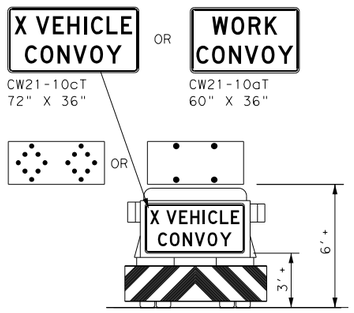
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

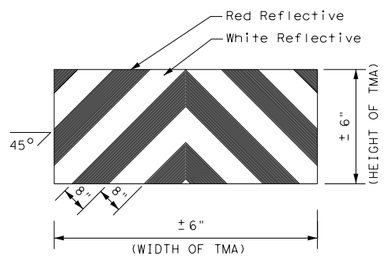
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

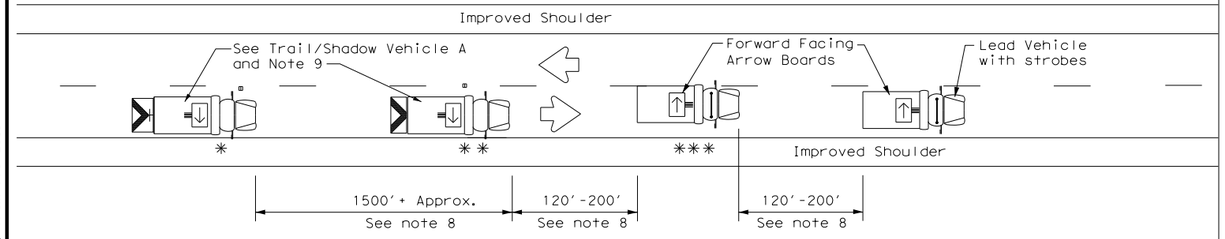
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP (3-1)-13

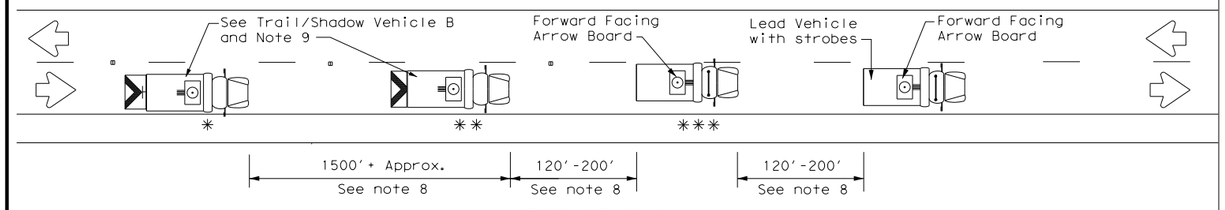
FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
2-94 4-98 8-95 7-13 1-97	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		25

DATE: 6/28/2023 3:58:10 PM
FILE: $FILE$



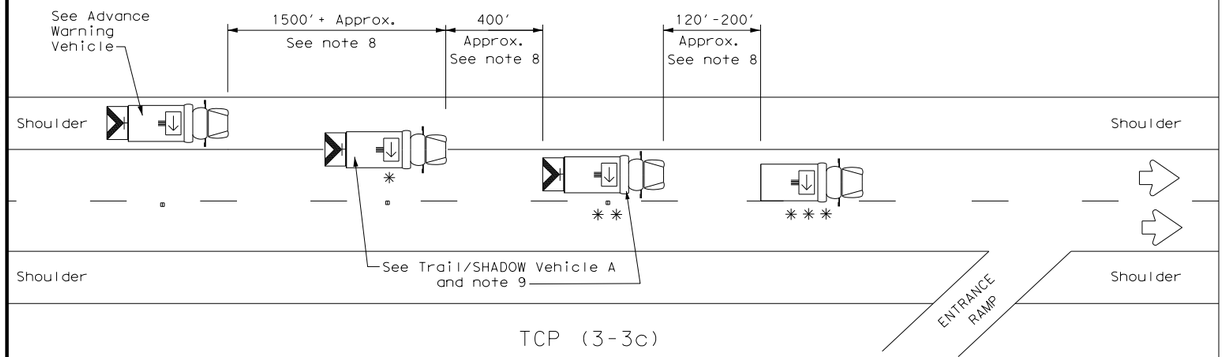
TCP (3-3a)

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



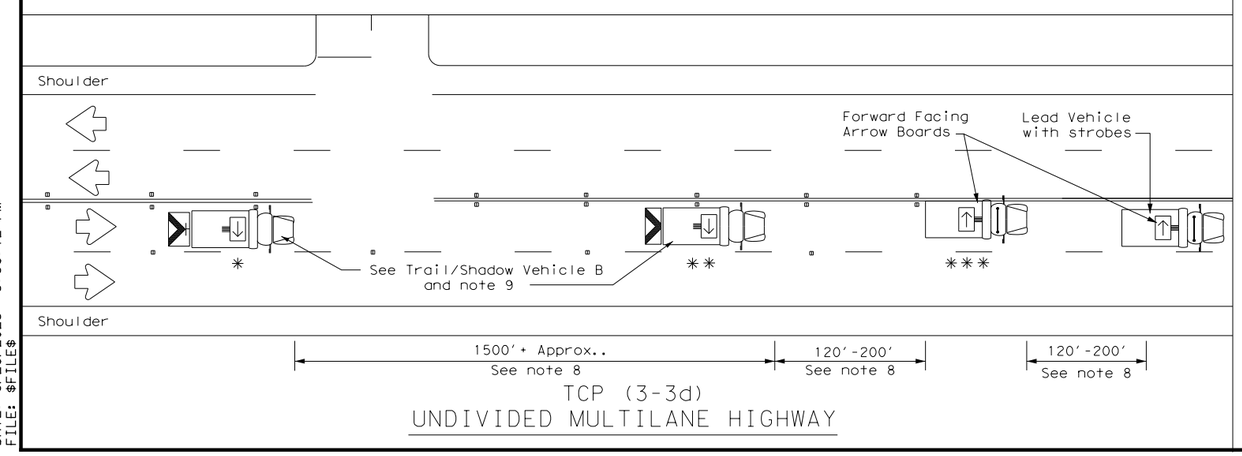
TCP (3-3b)

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



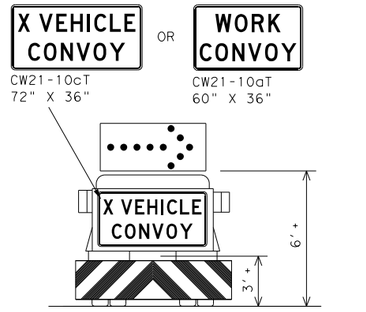
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



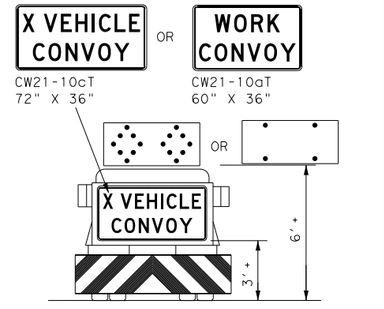
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



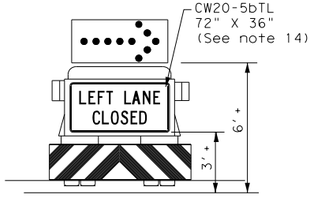
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

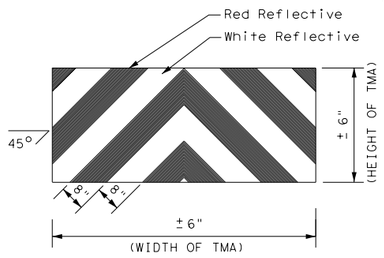


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

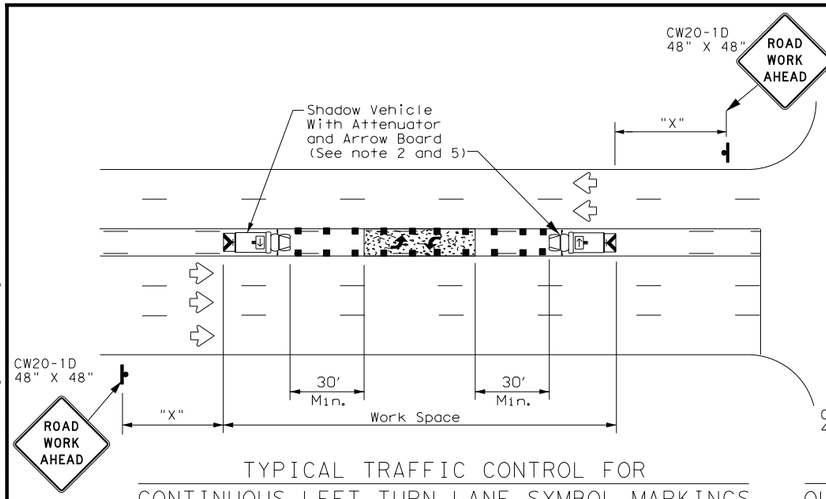
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

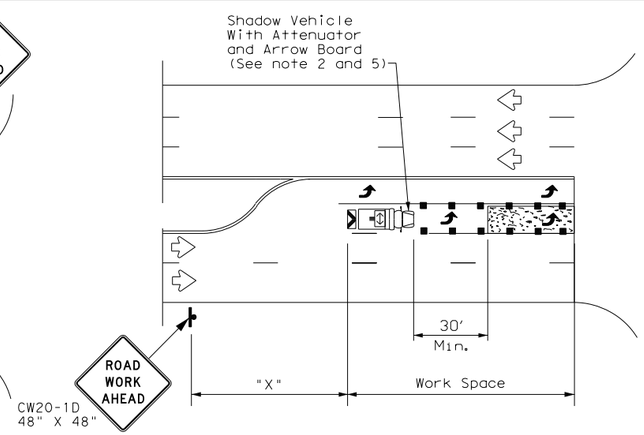
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13				
1-97 7-14	AUSTIN	TRAVIS		26

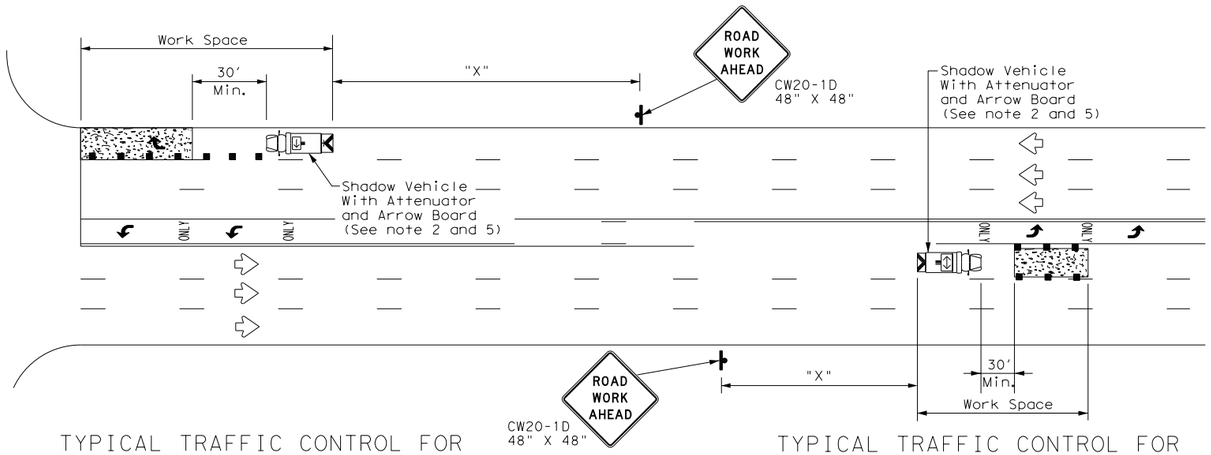
DATE: 6/28/2023 3:58:12 PM
FILE: $FILE$



TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

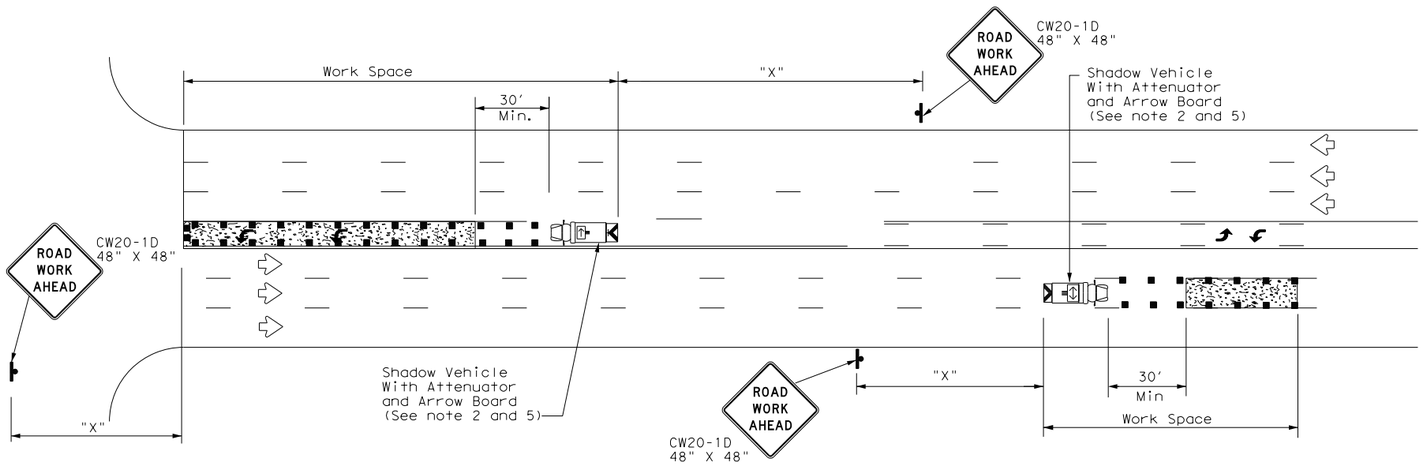


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

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

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

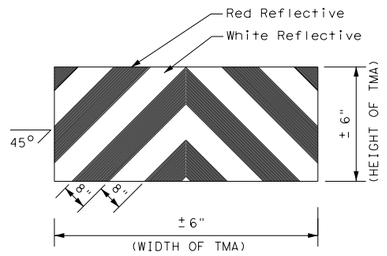
✳ Conventional Roads Only

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

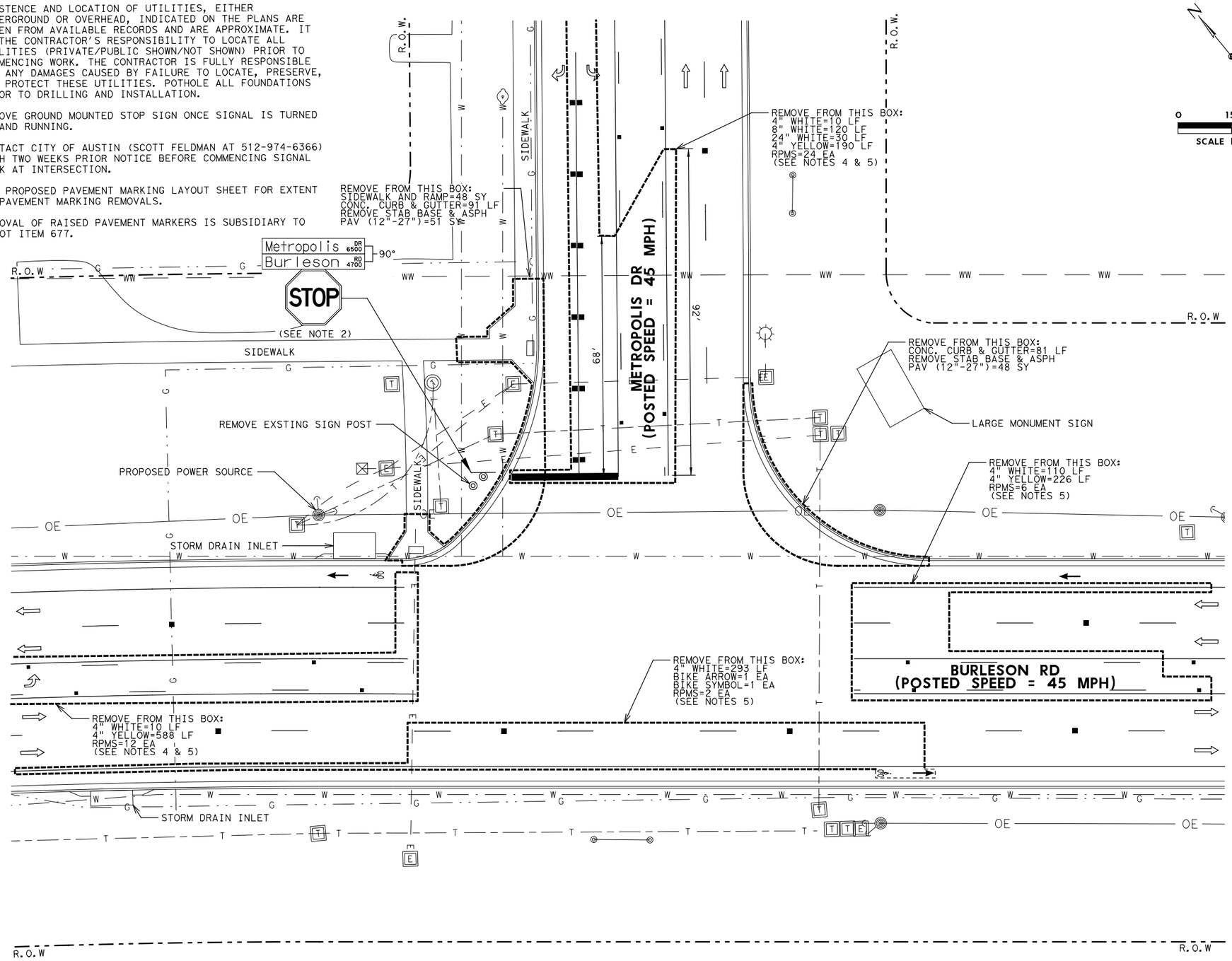
TCP(3-4)-13

FILE: tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		27

DATE: 6/28/2023 3:58:14 PM
FILE: $FILE$

NOTES

1. EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES (PRIVATE/PUBLIC SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES. POTHOLE ALL FOUNDATIONS PRIOR TO DRILLING AND INSTALLATION.
2. REMOVE GROUND MOUNTED STOP SIGN ONCE SIGNAL IS TURNED ON AND RUNNING.
3. CONTACT CITY OF AUSTIN (SCOTT FELDMAN AT 512-974-6366) WITH TWO WEEKS PRIOR NOTICE BEFORE COMMENCING SIGNAL WORK AT INTERSECTION.
4. SEE PROPOSED PAVEMENT MARKING LAYOUT SHEET FOR EXTENT OF PAVEMENT MARKING REMOVALS.
5. REMOVAL OF RAISED PAVEMENT MARKERS IS SUBSIDIARY TO TXDOT ITEM 677.



0 15 30
SCALE IN FEET

LEGEND

- EX. GROUND MOUNTED SIGN
- EX. ELECTRIC SERVICE METER (ON POST)
- EX. UTILITY POLE
- EX. DOWN GUY
- EX. LIGHT POLE
- EX. ELECTRIC GROUND BOX
- EX. TELECOM GROUND BOX/PEDESTAL
- EX. TELECOM MANHOLE
- EX. FIRE HYDRANT
- OE — EX. OVERHEAD ELECTRIC
- E — EX. ELECTRIC LINE
- G — EX. GAS LINE
- W — EX. WATER LINE
- WW — EX. WASTEWATER LINE
- T — EX. TELECOM LINE
- EX. RIGHT OF WAY
- REMOVAL LIMITS
- DIRECTION OF TRAVEL

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

EXISTING INTERSECTION LAYOUT

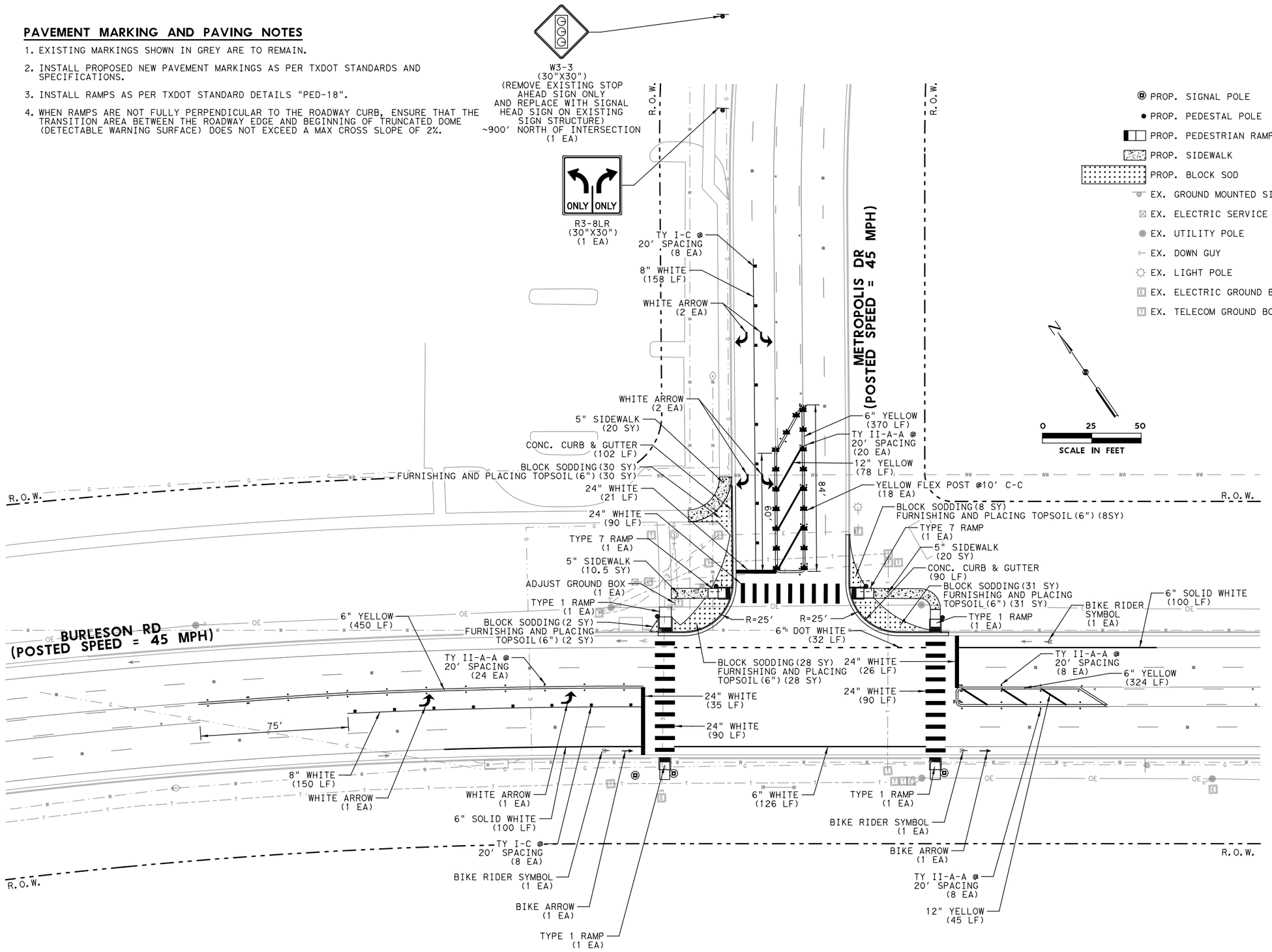
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS: SF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: BP	TEXAS	AUS	TRAVIS	28
CHECK: SN	CONTROL	SECTION	JOB	
	914	04	331, ETC.	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_02.dgn
PENTABLE: 10329625.tbl
DATE: 8/4/2023
TIME: 11:13:38 AM
SCALE: 1:30

PAVEMENT MARKING AND PAVING NOTES

1. EXISTING MARKINGS SHOWN IN GREY ARE TO REMAIN.
2. INSTALL PROPOSED NEW PAVEMENT MARKINGS AS PER TXDOT STANDARDS AND SPECIFICATIONS.
3. INSTALL RAMPS AS PER TXDOT STANDARD DETAILS "PED-18".
4. WHEN RAMPS ARE NOT FULLY PERPENDICULAR TO THE ROADWAY CURB, ENSURE THAT THE TRANSITION AREA BETWEEN THE ROADWAY EDGE AND BEGINNING OF TRUNCATED DOME (DETECTABLE WARNING SURFACE) DOES NOT EXCEED A MAX CROSS SLOPE OF 2%.



LEGEND

- PROP. SIGNAL POLE
- PROP. PEDESTAL POLE
- PROP. PEDESTRIAN RAMP
- PROP. SIDEWALK
- PROP. BLOCK SOD
- EX. GROUND MOUNTED SIGN
- EX. ELECTRIC SERVICE METER (ON POST)
- EX. UTILITY POLE
- EX. DOWN GUY
- EX. LIGHT POLE
- EX. ELECTRIC GROUND BOX
- EX. TELECOM GROUND BOX/PEDESTAL
- EX. TELECOM MANHOLE
- EX. FIRE HYDRANT
- EX. OVERHEAD ELECTRIC
- EX. ELECTRIC LINE
- EX. GAS LINE
- EX. WATER LINE
- EX. WASTEWATER LINE
- EX. TELECOM LINE
- EX. RIGHT OF WAY
- DIRECTION OF TRAVEL

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED
PROFESSIONAL ENGINEER
8/4/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

PROPOSED PAVEMENT MARKING AND PAVING LAYOUT

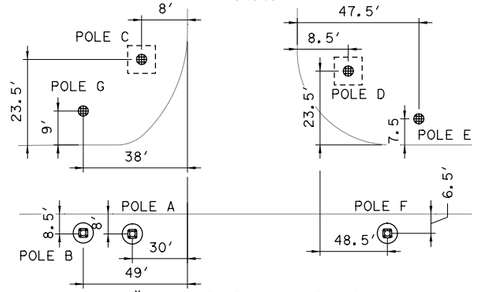
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	29
CHECK	CONTROL	SECTION	JOB	
BP	914	04	331, ETC.	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_03.dgn
PENTABLE: I0329625.tbl
DATE: 8/4/2023
TIME: 11:13:41 AM
SCALE: 1:50

PROPOSED POLE OFFSETS*

N.T.S.



*ALL OFFSETS ARE MEASURED FROM TANGENT SECTION OF EDGE OF PAVEMENT/FACE OF CURB TO CENTER OF POLE.

0 15 30

SCALE IN FEET

LEGEND

- PROP. SIGNAL POLE AND MAST ARM
- PROP. PEDESTAL POLE
- PROP. SIGNAL HEAD
- PROP. PEDESTRIAN HEAD
- PROP. TYPE D GROUND BOX
- PROP. LUMINAIRE
- PROP. TRAFFIC SIGN ON MAST ARM
- PROP. AERIAL ELECTRIC DROP
- PROP. CONDUIT (TRENCH)
- PROP. CONDUIT (BORE)
- PROP. CCTV CAMERA
- PROP. CONTROLLER
- PROP. RADAR DETECTOR
- PROP. ELECTRIC SERVICE
- EX. GROUND MOUNTED SIGN
- EX. ELECTRIC SERVICE METER (ON POST)
- EX. UTILITY POLE
- EX. DOWN GUY
- EX. LIGHT POLE
- EX. ELECTRIC GROUND BOX
- EX. TELECOM GROUND BOX/PEDESTAL
- EX. TELECOM MANHOLE
- EX. FIRE HYDRANT
- EX. OVERHEAD ELECTRIC
- EX. ELECTRIC LINE
- EX. GAS LINE
- EX. WATER LINE
- EX. WASTEWATER LINE
- EX. TELECOM LINE
- EX. RIGHT OF WAY
- DIRECTION OF TRAVEL

SIGNAL NOTES

1. EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES (PRIVATE/PUBLIC AND SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES.
2. CONTACT CITY OF AUSTIN (SCOTT FELDMAN AT 512-974-6366) WITH TWO WEEKS PRIOR NOTICE BEFORE COMMENCING ANY SIGNAL WORK AT INTERSECTION.
3. COORDINATE WITH AUSTIN ENERGY TO ESTABLISH POWER SOURCE AND INSTALL SERVICE METER. ALL COORDINATION AND INSTALLATION IS SUBSIDIARY TO ITEM 628.
4. INSTALL PEDESTAL POLE AND SLAB FOUNDATION AS SHOWN IN THE PLANS AND SUMMARIZED IN POLE SCHEDULE. SEE SLAB FOUNDATION DETAIL FOR INSTALLATION ABOVE UNDERGROUND UTILITIES.
5. STREET NAME SIGN AND SIGNS ON MAST ARM SHALL BE FABRICATED PER CITY SPECIFICATIONS. COORDINATE WITH CITY OF AUSTIN SIGN SHOP AT 512-974-4055 FOR FABRICATION OF SIGNS.

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

PROPOSED SIGNAL LAYOUT

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	30
BP				
CHECK	914	04	331, ETC.	
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_04.dgn
PENTABLE: 10329625.tbl
DATE: 8/4/2023
TIME: 11:13:44 AM
SCALE: 1:30

PROPOSED SIGN LEGEND

S3
R3-5L
(30"X36"
(3 EA)

S4
R3-5L
(30"X36"
(2 EA)

S5*
(4 EA)

S6*
(2 EA)

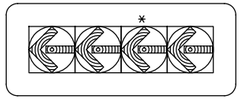
(* SHOWN ON ELEVATION SHEET ONLY)

S1
(CITY OF AUSTIN
STREET NAME SIGN)
(1 EA)

S2
(CITY OF AUSTIN
STREET NAME SIGN)
(2 EA)

NOTE: STREET NAME SIGN AND SIGNS ON MAST ARM SHALL BE FABRICATED PER CITY SPECIFICATIONS. COORDINATE WITH CITY OF AUSTIN SIGN SHOP AT 512-974-4055 FOR FABRICATION OF SIGNS.

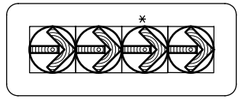
PROPOSED SIGNAL HEAD LEGEND



HEADS: 1, 2, 6

4 SECTION HEAD AND BACKPLATE

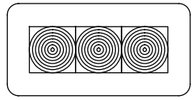
* FLASHING YELLOW ARROW



HEAD: 3

4 SECTION HEAD AND BACKPLATE

* FLASHING YELLOW ARROW



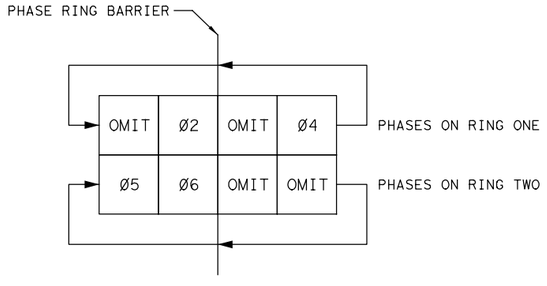
HEADS: 4, 5, 7, 8

3 SECTION HEAD AND BACKPLATE

HEADS: P1-P6

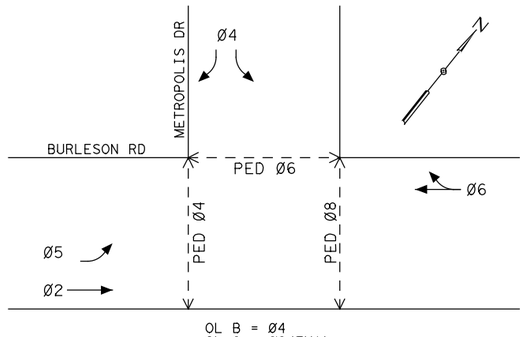
COUNTDOWN PEDESTRIAN HEADS

PHASE RING DIAGRAM



NOTE: SIGNAL TIMING/PHASING TO BE PROVIDED BY TXDOT. COORDINATE WITH TXDOT FOR IMPLEMENTATION. CALL CHARLES VAUGHN (512)284-0282 WITH 2 WEEKS NOTICE.

PHASING DIAGRAM



OL B = Ø4
OL O = Ø6(FYA)

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

SIGNING AND PHASING

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	31
CHECK	CONTROL	SECTION	JOB	
BP	914	04	331, ETC.	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_05.dgn
PENTABLE: I0329625.tbl
DATE: 8/4/2023
TIME: 11:3:47 AM
SCALE: 1:1

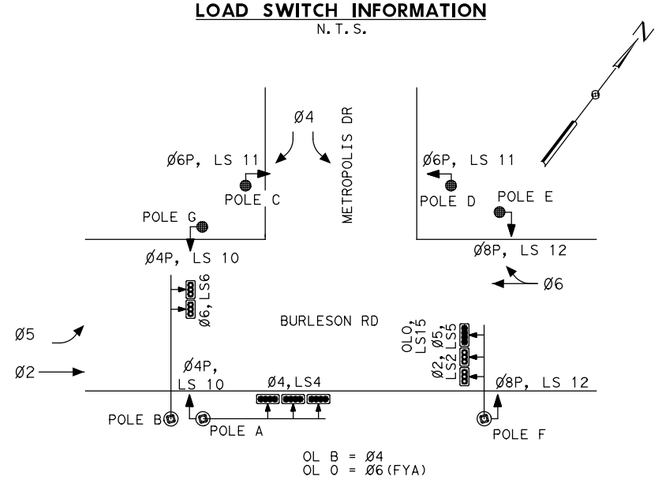
CONDUIT AND CONDUCTOR SCHEDULE

RUN	LENGTH	3" PVC	4" PVC	3" PVC (BORED)**	2" (RM)	NO. 6 BARE	NO. 6 INSULATED	NO. 8 BARE	NO. 8 XHHW (LUM'S)	TY A 14 AWG 20/C SIGNAL CABLE	TY A 14 AWG 5/C PED HEADS	TY C 14 AWG 2/C PUSH BUTTON	6/C (RADAR)	CAT 6 (PTZ CAMERA)
NO.	FT	EA	EA	EA		EA	EA	EA	EA	EA	EA	EA	EA	EA
0*	10													
1	20	1				1	2		6					
2	10	1	3			1	2	3		3		6	3	1
3	30	3						3	6	3		6	3	1
4	40	1						1			1	1		
5	65			3				3	6	3	2	4	2	
5A	10	3						3	6	3	2	4	2	
5B	10	3						3	6	3	2	4	2	
6	120	3						3	2	1		3	1	
7***	85			3				3			2	2		
7A***	25	3						3			2	2		
7B***	10	3						3			2	2		
8	5	1						1			1	1	1	1
9	15	3						3	2	1		1	1	
10	40	3						3	2	1	2	1	1	
11	45	1						1			1	1		
12	10	1						1			1	1		
13	10	3						3	2	1	2			
14	10				1									
TOTAL (LF)		940	30	450	10	30	60	1390	1180	560	610	1335	470	45

NOTES:
(1) *RUN 0 IS OVERHEAD DROP TO ELECTRIC SERVCE METER. NOTIFY COA SIGNAL SHOP ONE MONTH IN ADVANCE FOR ESTABLISHING ELECTRIC SERVICE.
(2) ** ENCASE ALL BORED CONDUITS WITH MINIMUM 2" THICK PRESSURE GROUTED FLOWABLE FILL CEMENT. CONSIDERED SUBSIDIARY TO ITEM 618.
(3) RUN POWER AND LUMINAIRE WIRES IN SEPARATE CONDUITS FROM SIGNAL WIRES.
(4) *** PERFORM BORING AND TRENCH WORK PRIOR TO RAMP CONSTRUCTION.

LOAD SWITCH INFORMATION

N.T.S.



POLE DETAILS AND WIRING INSIDE POLES AND ARMS

POLE	TYPE	CONDUCTORS/CABLE IN POLES (LF) NO. 8 XHHW (LUM'S)	5/C (SIGNAL)	7/C (SIGNAL)	5/C (PED HEADS)	2/C (PUSH BTN)	6/C (RADAR)	CAT 6 (PTZ CAMERA)
A	STEEL POLE WITH 60' MA & LUM	80		80	10	5	80	
B	STEEL POLE WITH 60' MA & LUM	80	65				65	30
C	PEDESTAL POLE (10' TALL)				10	5		
D	PEDESTAL POLE (10' TALL)				10	5		
E	PEDESTAL POLE (10' TALL)				10	5		
F	STEEL POLE WITH 40' MA & LUM	80	60	60	10	5	60	
G	PEDESTAL POLE (10' TALL)				10	5		
TOTALS (LF)		240	125	140	60	30	205	30

INSIDE CABINET CHART

CONDUCTOR/CABLE IN CABINET (LF) 20/C (SIGNAL)	2/C (PUSH BTN)	6/C (RADAR)	CAT 6 (PTZ CAMERA)
LF	LF	LF	LF
15	30	15	5

FLASHING YELLOW ARROW CHANNEL CONFIGURATION

PROTECTED TURN CHANNELS (R ARW, Y ARW, G ARW)	OPPOSING THROUGH CHANNEL	PERMISSIVE TURN CHANNEL (FYA)	FLASHING ARROW SIGNAL DRIVER SOURCE
3	4	10 YELLOW (PED 4)	10 YELLOW (PED 4)
5	6	11 YELLOW (PED 6)	11 YELLOW (PED 6)
7	8	12 YELLOW (PED 8)	12 YELLOW (PED 8)

APS MESSAGE INFORMATION

APS UNIT #	ACKNOWLEDGEMENT DEFAULT "WAIT"	EXTENDED PRESS MESSAGE WAIT TO CROSS (STREET NAME) AT (CROSS STREET NAME)"	WALK PHASE MESSAGE (STREET NAME) WALK SIGN IS ON TO CROSS (STREET NAME)" OR TONE
P1	YES	BURLESON AT METROPOLIS	BURLESON
P2	YES	BURLESON AT METROPOLIS	BURLESON
P3	YES	METROPOLIS AT BURLESON	METROPOLIS
P4	YES	METROPOLIS AT BURLESON	METROPOLIS
P5	YES	BURLESON AT METROPOLIS	BURLESON
P6	YES	BURLESON AT METROPOLIS	BURLESON

ELECTRIC SERVICE

SERVICE POLE NO.	SERVICE POLE DESCRIPTION (SEE ED (4) - 03)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO/SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT SWITCH AMPS/FUSE	MAIN DISCONNECT CKT. BKR. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBOARD/ LOAD CENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	CIRCUIT AMP LOAD	SERVICE KVA LOAD
1	ELC SRV TY D 120/240 070 (NS)AL(E)SP(O)	2"	3/#6	N/A	N/A	2P/60	30	100	A-SIGNAL	1P/30	24	3.4
									B-LUM	2P/15	2.13	

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

CONDUIT AND CONDUCTOR SCHEDULES

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	32
CHECK	CONTROL	SECTION	JOB	
BP	914	04	331,ETC.	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_06.dgn
PENTABLE: I0329625.tbl
DATE: 8/4/2023
TIME: 11:13:50 AM
SCALE: 1:1

CABLE TERMINATION CHART

# TERMINAL	CONDUCTOR COLOR	SIGNAL DIRECTION	SIGNAL COLORS	CORNER 1 (POLE A)				CORNER 2 (POLE B)				CORNER 3 (POLE F)					
				LEFT TURNS (FYA)		RIGHT TURNS (FYA)	N/S PEDS	THRUS (3 SECTION)		PED POLE G N/S PEDS	PED POLE C E/W PEDS	LEFT TURNS (FYA)	THRUS (3 SECTION)		N/S PEDS	PED POLE E N/S PEDS	PED POLE D E/W PEDS
				HEAD 1	HEAD 2	HEAD 3	HEAD P1	HEAD 4	HEAD 5	HEAD P2	HEAD P3	HEAD 6	HEAD 7	HEAD 8	HEAD P6	HEAD P5	HEAD P4
COND #				7C	7C	7C	5C	5C	5C	5C	5C	7C	5C	5C	5C	5C	5C
1	RED/WHITE	THRU	RED					RED	RED				RED	RED			
2	BLUE/WHITE		YELLOW					BLACK	BLACK				BLACK	BLACK			
3	GREEN/WHITE		GREEN					GREEN	GREEN				GREEN	GREEN			
4	WHITE	NEUTRAL						WHITE	WHITE				WHITE	WHITE			
5	RED	LEFT TURNS 3-SECTION, FYA / 5-SECTION	< -- R / R	RED	RED							RED					
6	ORANGE		<-- Y / Y	ORANGE	ORANGE							ORANGE					
7	BLACK		FYA / <-- Y	BLACK	BLACK							BLACK					
8	BLUE		SPARE / <-- G														
9	GREEN		<-- G / G	GREEN	GREEN							GREEN					
10	NEUTRAL JUMPER			WHITE	WHITE							WHITE					
11	RED/BLACK	N/S PEDS	DON'T WALK				RED			RED					RED	RED	
12	GREEN/BLACK		WALK				GREEN			GREEN					GREEN	GREEN	
13	BLACK/WHITE	E/W PEDS	DON'T WALK								RED						RED
14	BLUE/BLACK		WALK								GREEN						GREEN
15	NEUTRAL JUMPER						WHITE			WHITE	WHITE				WHITE	WHITE	WHITE
16	RED/GREEN	RIGHT TURN / NEARSIDE	RED														
17	ORANGE/RED		YELLOW														
18	BLUE/RED		GREEN														
19	NEUTRAL JUMPER																
20	WHITE/RED	SPARE / RIGHT TURN FYA	R -->			RED											
21	ORANGE/BLACK		Y -->			ORANGE											
22	WHITE/BLACK		FYA / Y-->			BLACK											
23	BLACK/RED		G -->			GREEN											
24	NEUTRAL JUMPER					WHITE											

NOTES:
1. CONTRACTOR SHALL LAND ALL CONDUCTORS FROM THE 20C CABLE TO THE LEFT SIDE OF TERMINAL STRIP.
2. SPARE CONDUCTORS TO BE LEFT AS LONG AS THE LONGEST CONDUCTOR USED FOR THAT WIRE.
3. BEFORE INSTALLING THE FINAL WIRING, MEET WITH THE CITY SIGNAL SUPERINTENDANT TO DISCUSS ANY FIELD CHANGES.

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

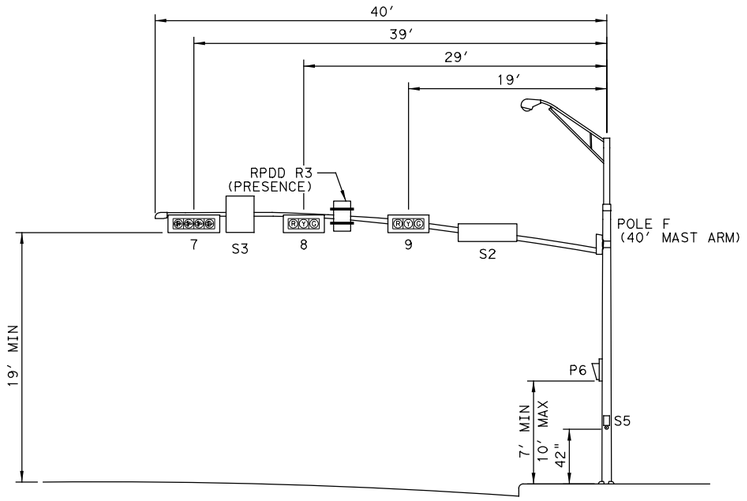
BURLESON RD AND METROPOLIS DR

CONDUIT AND CONDUCTOR SCHEDULES

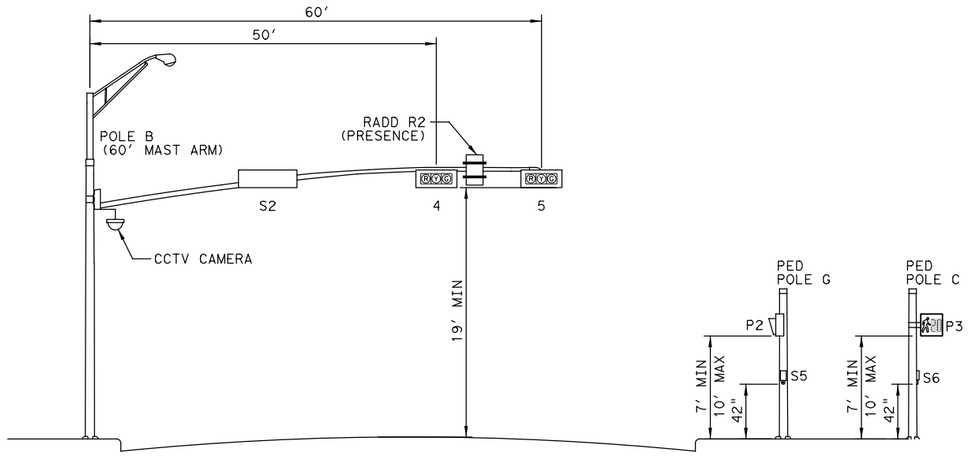
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	33
CHECK	CONTROL	SECTION	JOB	
BP	914	04	331, ETC.	
CHECK				
SN				

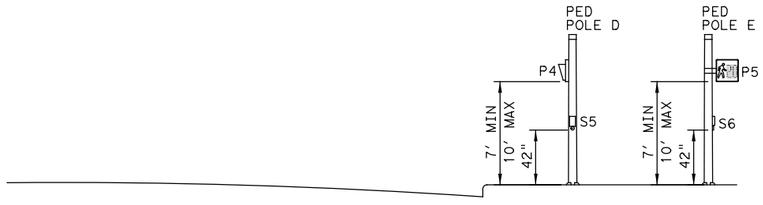
PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_06A.dgn
PENTABLE: 10329625.tbl
DATE: 8/4/2023
TIME: 11:13:52 AM
SCALE: NI



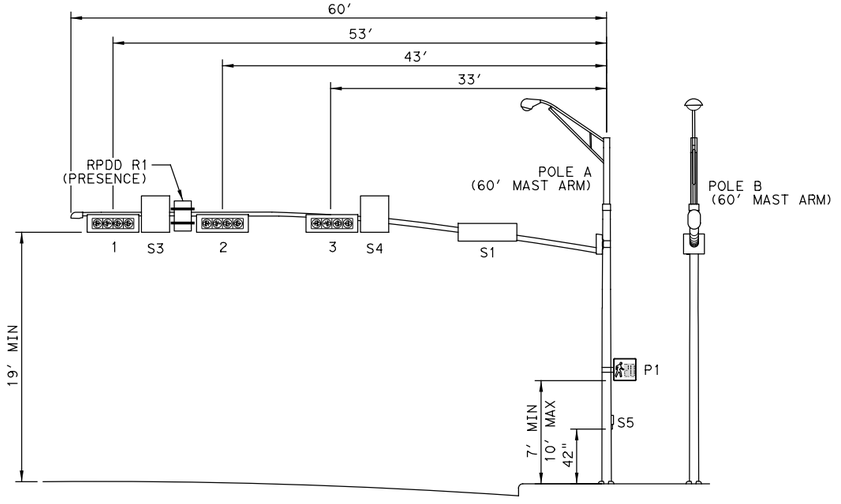
LOOKING EAST ON BURLESON RD AT METROPOLIS DR



LOOKING WEST ON BURLESON RD AT METROPOLIS DR



LOOKING NORTH ON METROPOLIS DR AT BURLESON RD



LOOKING SOUTH ON METROPOLIS DR AT BURLESON RD

NOTES:

1. CENTER HEADS OVER THE LANES, OR AS DIRECTED BY ENGINEER. DISTANCES SHOWN ALONG MAST ARMS ARE APPROXIMATE AND MUST BE ADJUSTED IN THE FIELD AS NEEDED.
2. ADJUST FOUNDATIONS IN THE FIELD IN ORDER TO MEET CLEARANCE.
3. CALCULATE MAST ARM ATTACHMENT HEIGHT IN THE FIELD FOR APPROVAL BY THE ENGINEER.
4. INSTALL RADAR LOCATIONS AS DIRECTED BY THE ENGINEER.

DRAWING NOT TO SCALE

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

ELEVATIONS

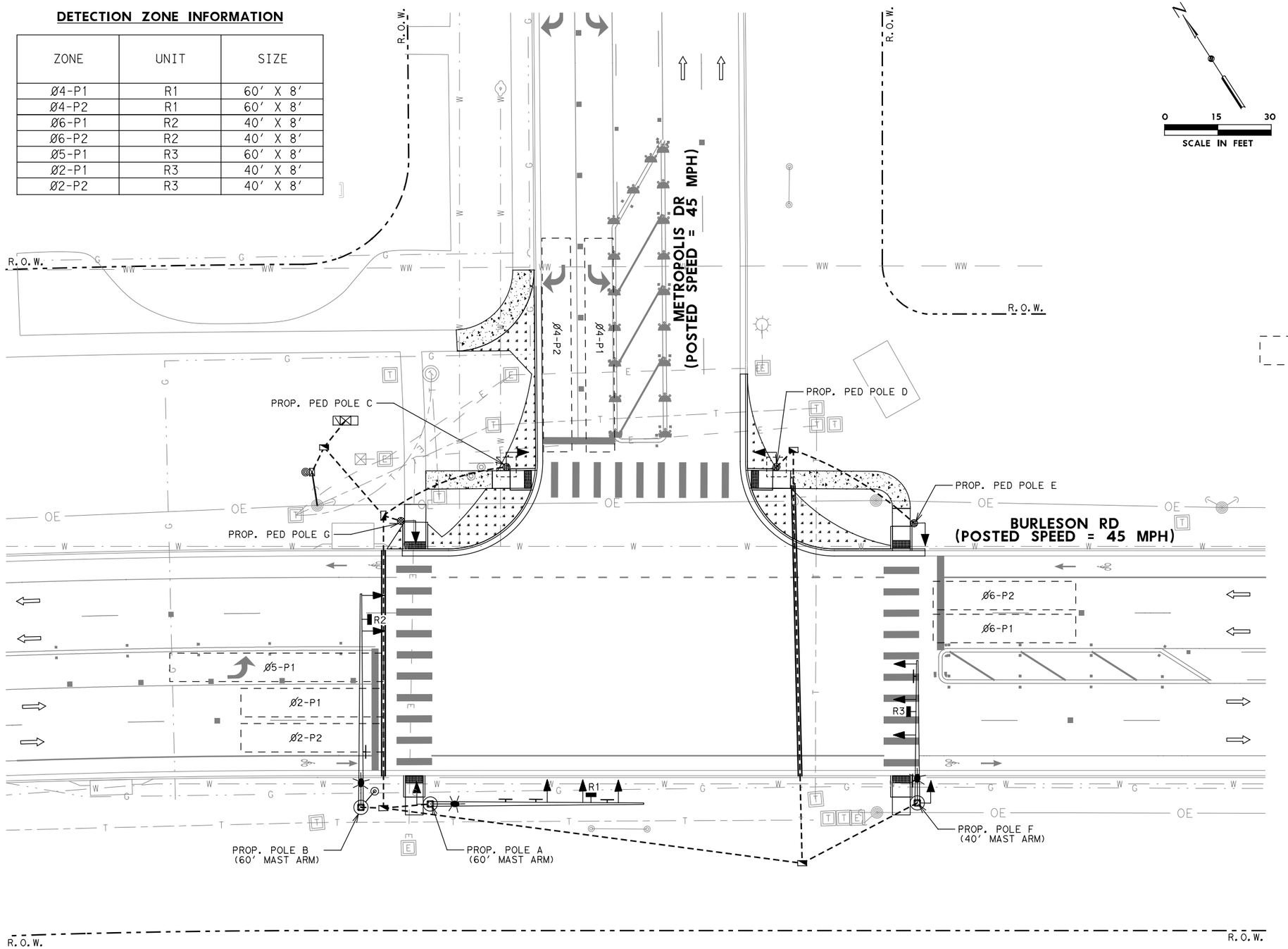
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	–			–
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	34
CHECK	CONTROL	SECTION	JOB	
BP	914	04	331,ETC.	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_07.dgn
PENTABLE: I0329625.tbl
DATE: 8/4/2023
TIME: 11:3:55 AM
SCALE: 1:1

DETECTION ZONE INFORMATION

ZONE	UNIT	SIZE
Ø4-P1	R1	60' X 8'
Ø4-P2	R1	60' X 8'
Ø6-P1	R2	40' X 8'
Ø6-P2	R2	40' X 8'
Ø5-P1	R3	60' X 8'
Ø2-P1	R3	40' X 8'
Ø2-P2	R3	40' X 8'



0 15 30
SCALE IN FEET

LEGEND

- PROP. SIGNAL POLE AND MAST ARM
- PROP. PEDESTAL POLE
- PROP. SIGNAL HEAD
- PROP. PEDESTRIAN HEAD
- PROP. TYPE D GROUND BOX
- PROP. LUMINAIRE
- PROP. TRAFFIC SIGN ON MAST ARM
- PROP. AERIAL ELECTRIC DROP
- PROP. CONDUIT (TRENCH)
- PROP. CONDUIT (BORE)
- PROP. CCTV CAMERA
- PROP. CONTROLLER
- PROP. RADAR DETECTOR
- EX. RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROP. PRESENCE DETECTION ZONE

SIGNAL NOTES

1. PRESENCE DETECTION TO BE ACCOMPLISHED BY RADAR UNITS AS SHOWN.
2. RADAR LOCATIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
8/4/2023

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

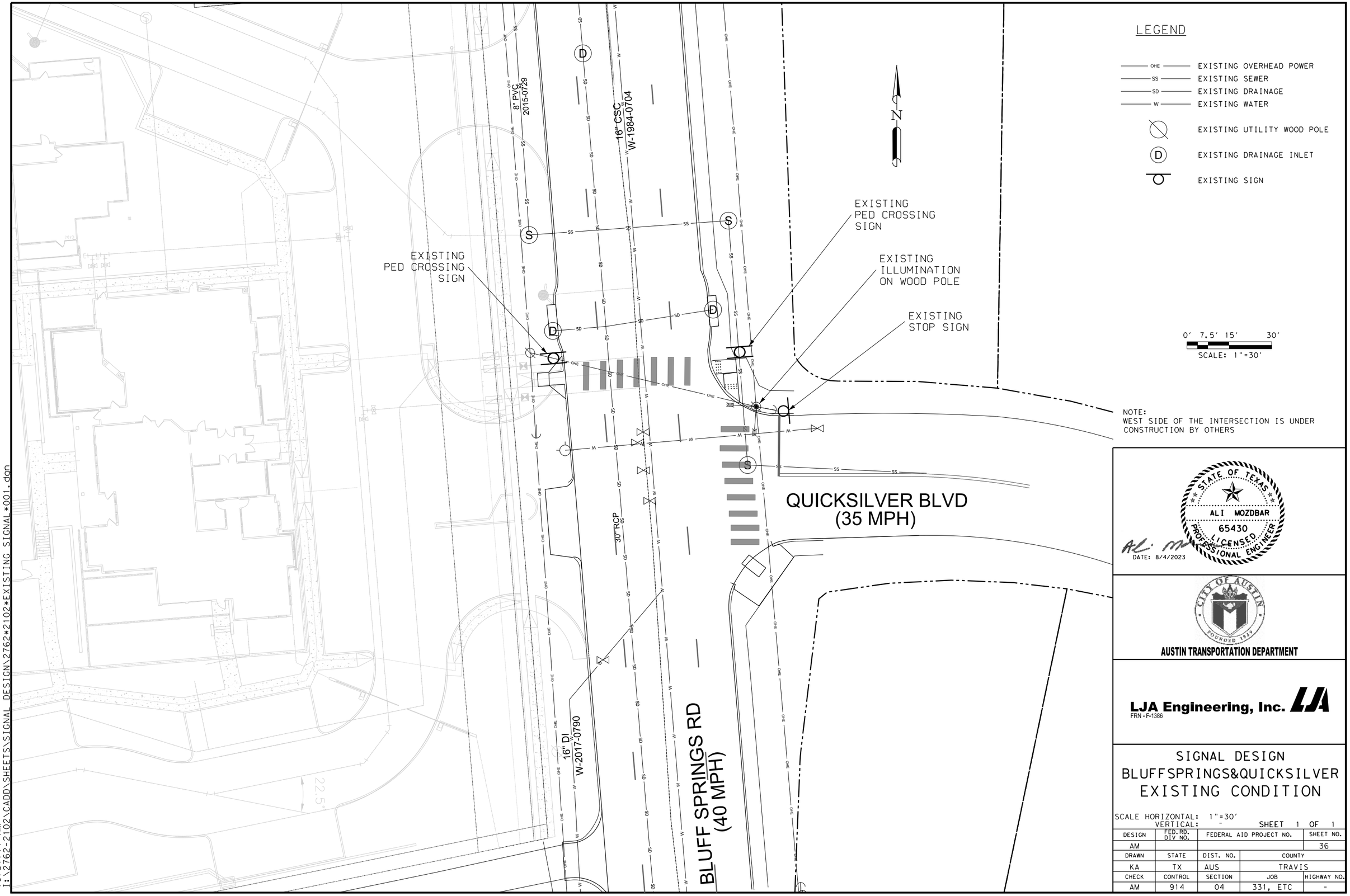
VEHICLE DETECTION DETAIL

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	35
BP	914	04	331, ETC.	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_08.dgn
PENTABLE: 10329625.tbl
DATE: 8/4/2023
TIME: 11:13:58 AM
SCALE: 1:30

100% SUBMITTAL



LEGEND

- OHE — EXISTING OVERHEAD POWER
- SS — EXISTING SEWER
- SD — EXISTING DRAINAGE
- W — EXISTING WATER
- EXISTING UTILITY WOOD POLE
- (D) EXISTING DRAINAGE INLET
- EXISTING SIGN

0′ 7.5′ 15′ 30′
SCALE: 1"=30′

NOTE:
WEST SIDE OF THE INTERSECTION IS UNDER CONSTRUCTION BY OTHERS

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED
PROFESSIONAL ENGINEER
DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

LJA Engineering, Inc.
FRN - F-1386

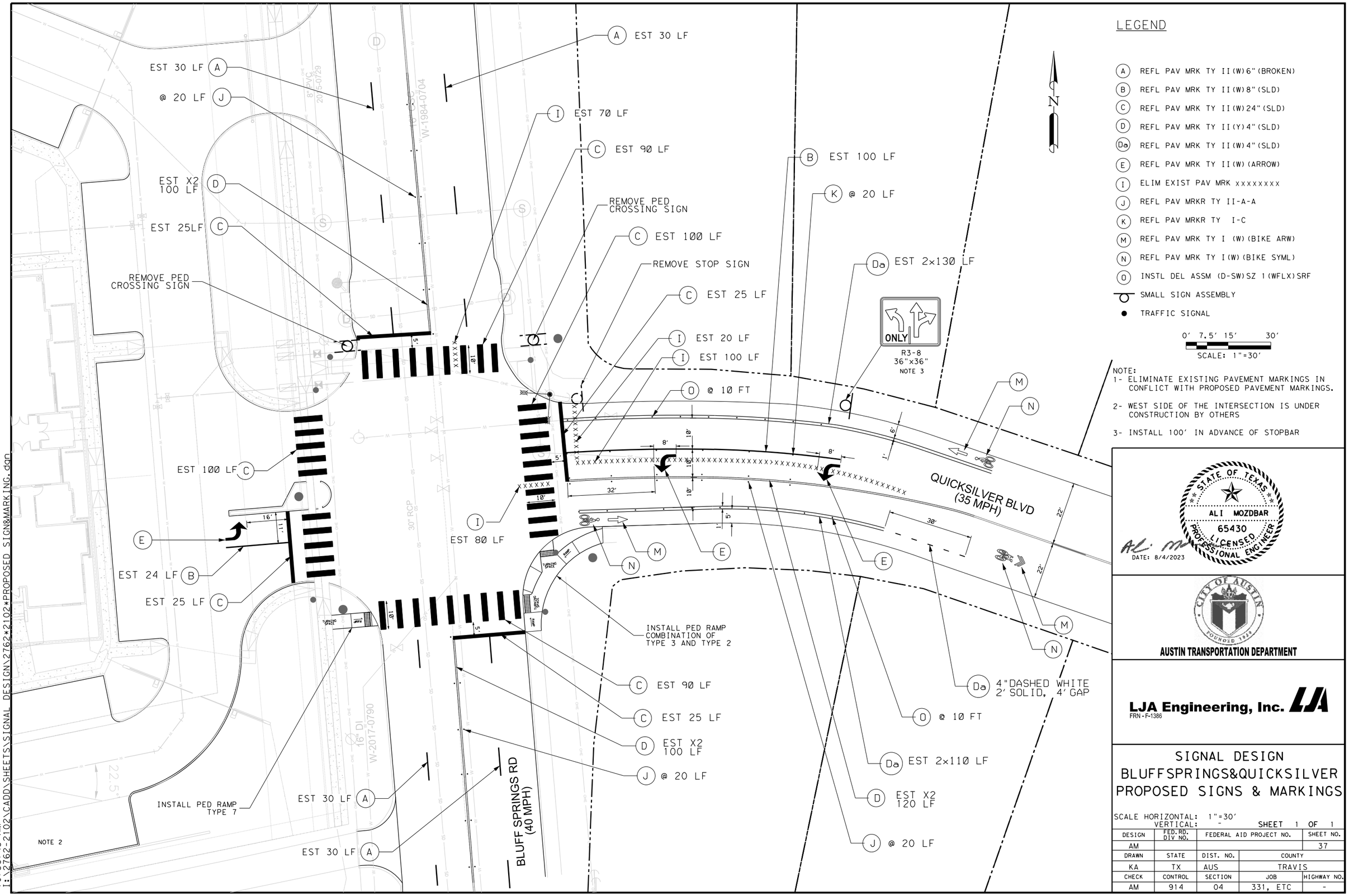
SIGNAL DESIGN
BLUFFSPRINGS&QUICKSILVER
EXISTING CONDITION

SCALE HORIZONTAL: 1"=30′
VERTICAL: -
SHEET 1 OF 1

DESIGN	FED.RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AM				36
DRAWN	STATE	DIST. NO.	COUNTY	
KA	TX	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	HIGHWAY NO.
AM	914	04	331, ETC	-

8/4/2023
10:57:11 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762*2102*EXISTING SIGNAL*001.dgn

100% SUBMITTAL



LEGEND

- (A) REFL PAV MRK TY II(W)6"(BROKEN)
- (B) REFL PAV MRK TY II(W)8"(SLD)
- (C) REFL PAV MRK TY II(W)24"(SLD)
- (D) REFL PAV MRK TY II(Y)4"(SLD)
- (Da) REFL PAV MRK TY II(W)4"(SLD)
- (E) REFL PAV MRK TY II(W)(ARROW)
- (I) ELIM EXIST PAV MRK xxxxxxxx
- (J) REFL PAV MRKR TY II-A-A
- (K) REFL PAV MRKR TY I-C
- (M) REFL PAV MRK TY I (W)(BIKE ARW)
- (N) REFL PAV MRK TY I(W)(BIKE SYML)
- (O) INSTL DEL ASSM (D-SW)SZ 1(WFLX)SRF
- SMALL SIGN ASSEMBLY
- TRAFFIC SIGNAL

0' 7.5' 15' 30'
SCALE: 1"=30'

NOTE:
1- ELIMINATE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
2- WEST SIDE OF THE INTERSECTION IS UNDER CONSTRUCTION BY OTHERS
3- INSTALL 100' IN ADVANCE OF STOPBAR

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED
PROFESSIONAL ENGINEER
DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

LJA Engineering, Inc.
FRN - F-1386

SIGNAL DESIGN
BLUFFSPRINGS&QUICKSILVER
PROPOSED SIGNS & MARKINGS

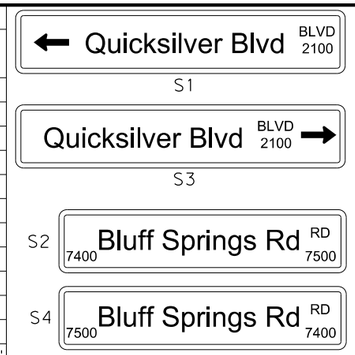
SCALE HORIZONTAL: 1"=30'
VERTICAL: -
SHEET 1 OF 1

DESIGN	FED.RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AM				37
DRAWN	STATE	DIST. NO.	COUNTY	
KA	TX	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	HIGHWAY NO.
AM	914	04	331, ETC	-

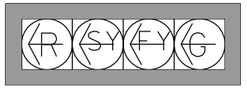
8/4/2023
10:58:45 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762#2102*PROPOSED SIGN&MARKING.dgn

100% SUBMITTAL

FOUNDATION, POLE AND MAST ARM (BLUFF SPRINGS RD & QUICKSILVER BLVD)					
POLE NO.	MAST ARM LENGTH (FT)	STATUS	DESCRIPTION	FOUNDATION DIAMETER	DRILL SHAFT (LF)
1	40	PROP	TRF SIG PL TYPE 2 WITH 40' MAST ARM	48"	14
2	30	PROP	TRF SIG PL TYPE 1 WITH 30' MAST ARM & LUM	42"	12
3	45	PROP	TRF SIG PL TYPE 2 WITH 45' MAST ARM	48"	14
4	25	PROP	TRF SIG PL TYPE 1 WITH 25' MAST ARM & LUM	42"	12
5		PROP	5' PED POLE	TYPE V - 24"	4
6		PROP	15' PED POLE	TYPE V - 24"	4
7		PROP	10' PED POLE	TYPE V - 24"	4
8		PROP	5' PED POLE	TYPE V - 24"	4
9		PROP	10' PED POLE	TYPE V - 24"	4
10		PROP	10' PED POLE	TYPE V - 24"	4
-	-	PROP	ELECTRICAL SERVICE	-	-
-	-	PROP	TRAFFIC SIGNAL CONTROLLER	CABINET FOUND	36"x30"x40"

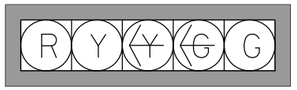


3 SEC HOR SIG HEAD
2, 5, 8, 11

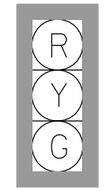


4 SEC HOR SIG HEAD
4, 10

S5, S6
R3-5
30"x36"



5 SEC HOR SIG HEAD
1, 7

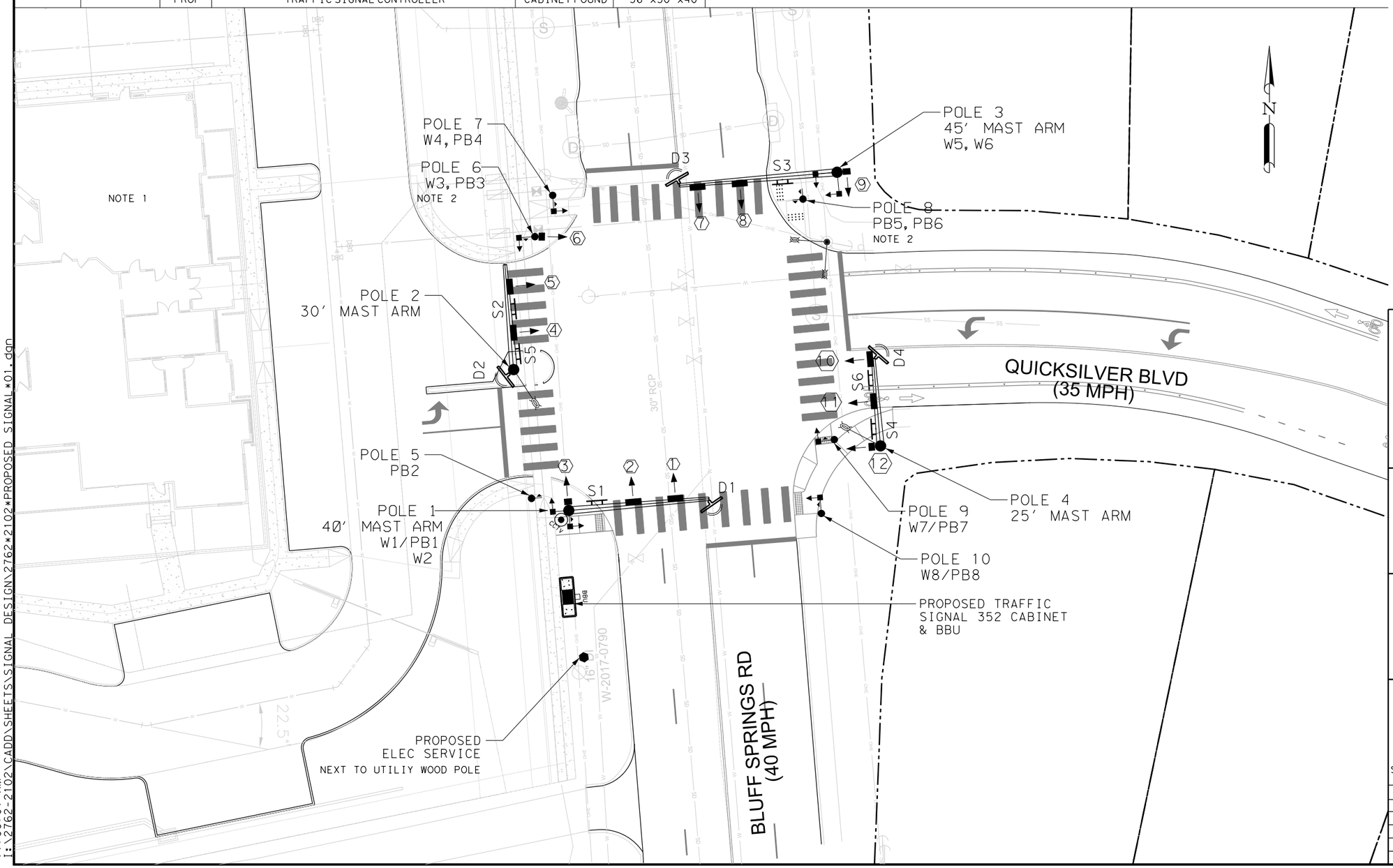


3 SEC
VER SIG HEAD
3, 6, 9, 12

LEGEND

- PROP ELECTRICAL SERVICE
- PROP TRAFFIC SIGNAL POLE
- PROP PEDESTAL POLE
- PROP TRAFFIC SIGNAL CABINET & BATTERY BACKUP UNIT
- PROP TRAFFIC SIGNAL MAST ARM
- PROP HORIZONTAL SIGNAL HEAD
- PROP VERTICAL SIGNAL HEAD
- PROP PUSH BUTTON
- PROP PED HEAD
- PROP RADAR DETECTOR
- PROP CCTV
- PROP SIGN

0' 7.5' 15' 30'
SCALE: 1"=30'



NOTE:
1- WEST SIDE OF THE INTERSECTION IS UNDER CONSTRUCTION BY OTHERS

2- USE SLAB FOUNDATION IF DRILL SHAFT HAS CONFLICT WITH UTILITY

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED
PROFESSIONAL ENGINEER

DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

LJA Engineering, Inc.
FRN-F-1386

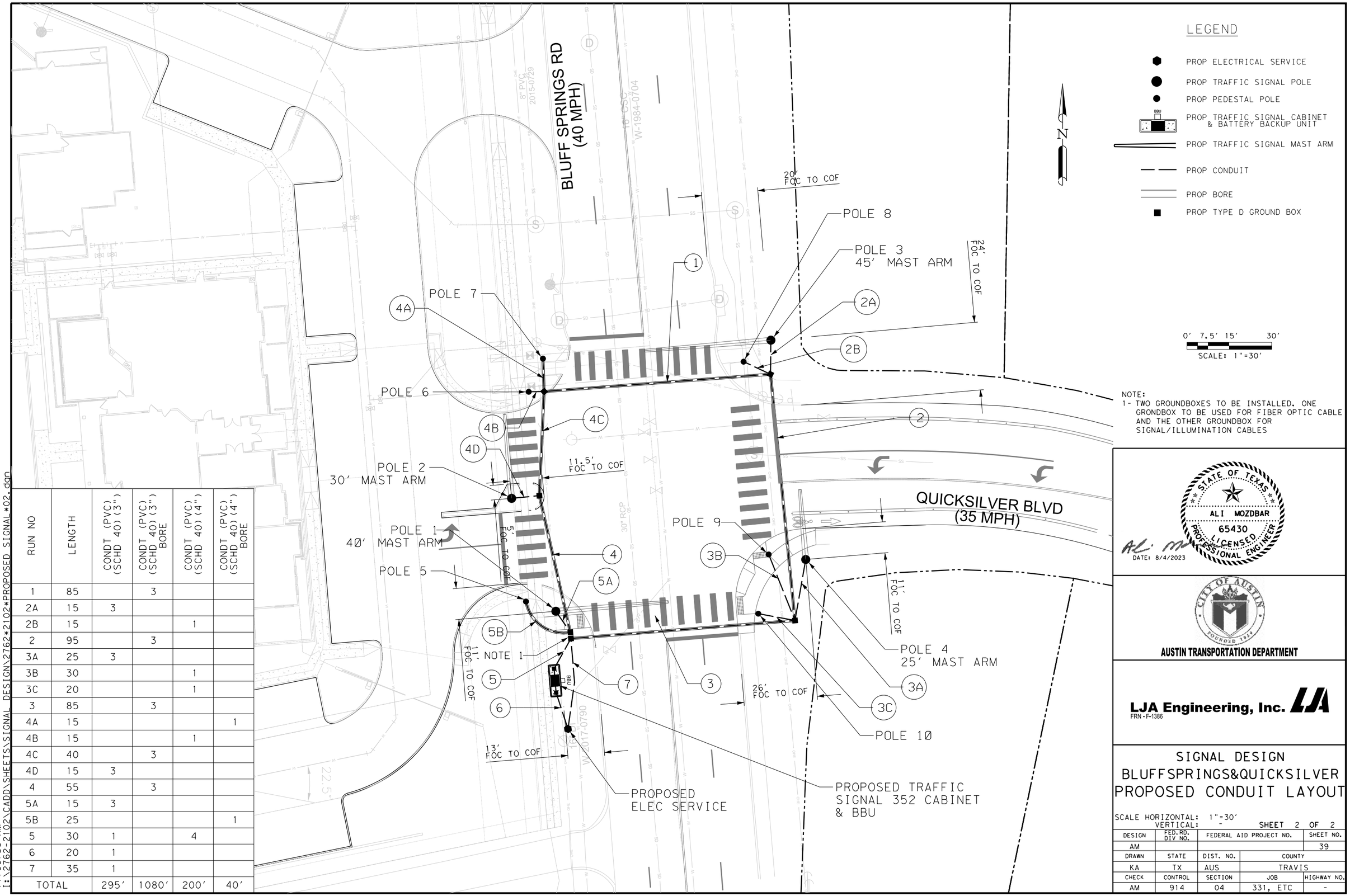
SIGNAL DESIGN
BLUFFSPRINGS&QUICKSILVER
PROPOSED SIGNAL LAYOUT

SCALE HORIZONTAL: 1"=30'
VERTICAL: -
SHEET 1 OF 2

DESIGN	FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AM				38
DRAWN	STATE	DIST. NO.	COUNTY	
KA	TX	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	HIGHWAY NO.
AM	914	04	331, ETC	-

8/4/2023
11:00:07 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762*2102*PROPOSED SIGNAL*01.dgn

100% SUBMITTAL



LEGEND

- PROP ELECTRICAL SERVICE
- PROP TRAFFIC SIGNAL POLE
- PROP PEDESTAL POLE
- PROP TRAFFIC SIGNAL CABINET & BATTERY BACKUP UNIT
- PROP TRAFFIC SIGNAL MAST ARM
- PROP CONDUIT
- PROP BORE
- PROP TYPE D GROUND BOX

0' 7.5' 15' 30'
SCALE: 1"=30'

NOTE:
1- TWO GROUNDBOXES TO BE INSTALLED. ONE GRONDBOX TO BE USED FOR FIBER OPTIC CABLE AND THE OTHER GROUNDBOX FOR SIGNAL/ILLUMINATION CABLES

RUN NO	LENGTH	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	CONDT (PVC) (SCHD 40) (4")	CONDT (PVC) (SCHD 40) (4") BORE
1	85		3		
2A	15	3			
2B	15			1	
2	95		3		
3A	25	3			
3B	30			1	
3C	20			1	
3	85		3		
4A	15				1
4B	15			1	
4C	40		3		
4D	15	3			
4	55		3		
5A	15	3			
5B	25				1
5	30	1		4	
6	20	1			
7	35	1			
TOTAL		295'	1080'	200'	40'

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED
PROFESSIONAL ENGINEER
DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

LJA Engineering, Inc.
FRN - F-1386

SIGNAL DESIGN
BLUFFSPRINGS&QUICKSILVER
PROPOSED CONDUIT LAYOUT

SCALE HORIZONTAL: 1"=30'
VERTICAL: -
SHEET 2 OF 2

DESIGN	FED.RD. DIV NO.	FEDERAL AID PROJECT NO.	SHEET NO.
AM			39
DRAWN	STATE	DIST. NO.	COUNTY
KA	TX	AUS	TRAVIS
CHECK	CONTROL	SECTION	JOB / HIGHWAY NO.
AM	914	04	331, ETC / -

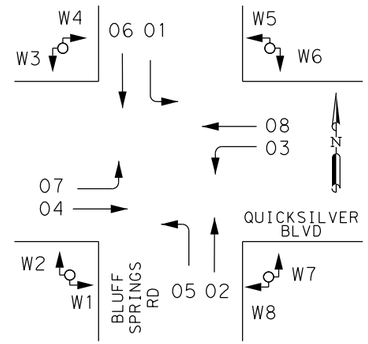
8/4/2023
11:00:38 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762*2102*PROPOSED SIGNAL*02.dgn

100% SUBMITTAL

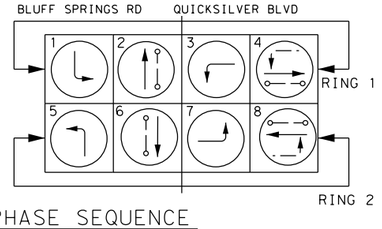
SUMMARY OF CONDUITS AND CABLES - BLUFF SPRINGS RD AT QUICKSILVER BLVD

RUN NO	LENGTH	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	CONDT (PVC) (SCHD 40) (4")	CONDT (PVC) (SCHD 40) (4") BORE	ELECTRICAL CONDUCTORS				TRAFFIC SIGNAL CABLES					
						ELEC CONDR (NO. 6) BARE	ELEC CONDR (NO. 6) INSULATED	ELEC CONDR (NO. 8) BARE	ELEC CONDR (NO. 8) INSULATED	TRF SIG CBL (TY A) (14 AWG) (5 CONDR)	TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	TRF SIG CBL (TY A) (14 AWG) (20 CONDR)	TRF SIG CBL (TY C) (12 AWG) (2 CONDR)	DETECTION CABLE	CCTV CABLE
1	85		3			SPARE									
2A	15	3						3				1		1	
2B	15			1				1					2		
2	95		3					3				1	2	1	
3A	25	3						3	2	2		1		1	
3B	30			1				1		1			1		
3C	20			1				1		1			1		
3	85		3					3	2			2	4	2	
4A	15				1			1		1			1		
4B	15			1				1		2			1		
4C	40		3					3		3			2		
4D	15	3						3	2	3		1		1	
4	55		3					3	2			1	2	1	
5A	15	3						3				1	1	1	1
5B	25				1			1					1		
5	30	1		4				4				4	8	4	1
6	20	1				1	2								
7	35	1						1	4						
TOTAL		295′	1080′	200′	40′	20′	40′	1310′	500′	310′	0′	510′	1110′	510′	45′

INSIDE ARMS	14 AWG 5/C	14 AWG 7/C	DET CABLE
POLE 1 (40′ MAST ARM)			
HEAD 1		35′	
HEAD 2	25′		
HEAD 3	0′		
DET 1			35′
POLE 2 (30′ MAST ARM)			
HEAD 4		10′	
HEAD 5	20′		
DET 2			0′
POLE 3 (45′ MAST ARM)			
HEAD 7		40′	
HEAD 8	30′		
HEAD 9	0′		
DET 3			40′
POLE 4 (25′ MAST ARM)			
HEAD 10		25′	
HEAD 11	15′		
HEAD 12	0′		
DET 4			25′
TOTAL	90′	110′	100′



ORIENTATION VIEW
APS INFORMATION



PHASE SEQUENCE

- ← PROTECTED MOVEMENT
- ← – PROTECTED/PERMISSIVE MOVEMENT
- o—o PEDESTRIAN PHASE

INSIDE POLES	14 AWG 5/C	14 AWG 7/C	12 AWG 2/C	#8 AWG (INS)	DET CABLE	CCTV CABLE
POLE 1	60′	20′	5′		20′	30′
POLE 2	20′	20′		70′	20′	
POLE 3	60′	20′			20′	
POLE 4	40′	20′		70′	20′	
POLE 5			5′			
POLE 6	25′		5′			
POLE 7	10′		5′			
POLE 8			10′			
POLE 9	10′		5′			
POLE 10	10′		5′			
TOTAL	235′	80′	40′	140′	80′	30′

SUMMARY OF TRAFFIC SIGNAL HEADS

SIGNAL HEAD NUMBER	BACK PLATE (12 IN) (3 SEC) ALUM	BACK PLATE (12 IN) (4 SEC) ALUM	BACK PLATE (12 IN) (5 SEC) ALUM	VEH SIG SEC (12 IN)LED (GRN ARW)	VEH SIG SEC (12 IN)LED (GRN)	VEH SIG SEC (12 IN) LED (YEL ARW)	VEH SIG SEC (12 IN) LED (YEL)	VEH SIG SEC (12 IN) LED (RED ARW)	VEH SIG SEC (12 IN)LED (RED)
3-SEC (2,3,5,6,8,9,11,12)	8				8		8		8
4-SEC (4,10)		2		2		4		2	
5-SEC (1,7)			2	2	2	2	2		2
TOTAL	8	2	2	4	10	6	10	2	10

INSIDE CABINET	14 AWG 20C	12 AWG 2C	#6 AWG (BARE)	#6 AWG (INS)	DET CABLE	CCTV CABLE
TOTAL	20′	40′	5′	10′	20′	5′

Terminal #	Conductor Color	Signal Direction	Signal Colors		Corner 1 Pull Box-A Pole 1					Corner 2 Pull Box-B Pole 2		Pull Box - C Pole 6		Pole 7	Corner 3 Pull Box - D Pole 3					Corner 4 Pull Box-E Pole 4			Pole 9	Pole 10
					Head 1 (LEFT)	Head 2 (THRU)	Head 3 (THRU)	E/W Ped W1	N/S Ped W2	Head 4 (LEFT)FYA	Head 5 (THRU)	Head 6 (THRU)	N/S Ped W3	E/W Ped W4	Head 7 (LEFT)	Head 8 (THRU)	Head 9 (THRU)	E/W Ped W5	N/S Ped W6	Head 10 (LEFT)FYA	Head 11 (THRU)	Head 12 (THRU)	N/S Ped W7	E/W Ped W8
					7	5	5	5	5	7	5	5	5	5	7	5	5	5	5	7	5	5	5	5
1	Red/White	Thru	Red			RED	RED				RED	RED				RED	RED				RED	RED		
2	Blue/White		Yellow			BLACK	BLACK				BLACK	BLACK				BLACK	BLACK				BLACK	BLACK		
3	Green/White		Green			GREEN	GREEN				GREEN	GREEN				GREEN	GREEN				GREEN	GREEN		
4	White	Neutral				WHITE	WHITE				WHITE	WHITE				WHITE	WHITE				WHITE	WHITE		
5	Red	Left Turns 5 SEC or 4 SEC FYA	Red	<-- R	RED					RED					RED					RED				
6	Orange		Yellow	<-- Y	ORANGE					ORANGE					ORANGE					ORANGE				
7	Black		<-- Y	FYA	BLACK					BLACK					BLACK					BLACK				
8	Blue		<-- G	Spare	BLUE										BLUE									
9	Green		GREEN	<-- G	GREEN					GREEN					GREEN					GREEN				
10	NEUTRAL JUMPER				WHITE					WHITE					WHITE									
11	Red/Black	N/S Peds	Don't Walk						RED				RED						RED				RED	
12	Green/Black		Walk						GREEN				GREEN						GREEN				GREEN	
13	Black/White	E/W Peds	Don't Walk					RED						RED				RED						RED
14	Blue/Black		Walk					GREEN						GREEN				GREEN						GREEN
15	NEUTRAL JUMPER							WHITE	WHITE				WHITE	WHITE				WHITE	WHITE				WHITE	WHITE
16	Red/Green	Right Turn/ Nearside	Red																					
17	Orange/Red		Yellow																					
18	Blue/Red		Green																					
19	NEUTRAL JUMPER																							
20	White/Red	Spare/Right Turn FYA	R -->																					
21	Orange/Black		Y -->																					
22	White/Black		FYA																					
23	Black/Red		G -->																					
24	NEUTRAL JUMPER																							

NOTE: CONTRACTOR SHALL LAND ALL CONDUCTORS FROM THE 20C CABLE TO THE LEFT SIDE OF TERMINAL STRIP

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED
PROFESSIONAL ENGINEER
DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

LJA Engineering, Inc.
FRN - F-1386

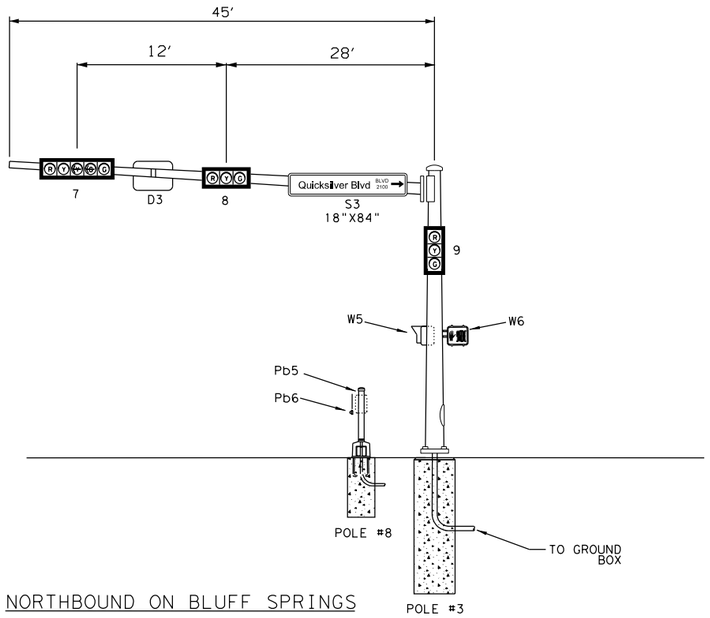
SIGNAL DESIGN
BLUFFSPRINGS&QUICKSILVER
SIGNAL DETAILS

SHEET 1 OF 1

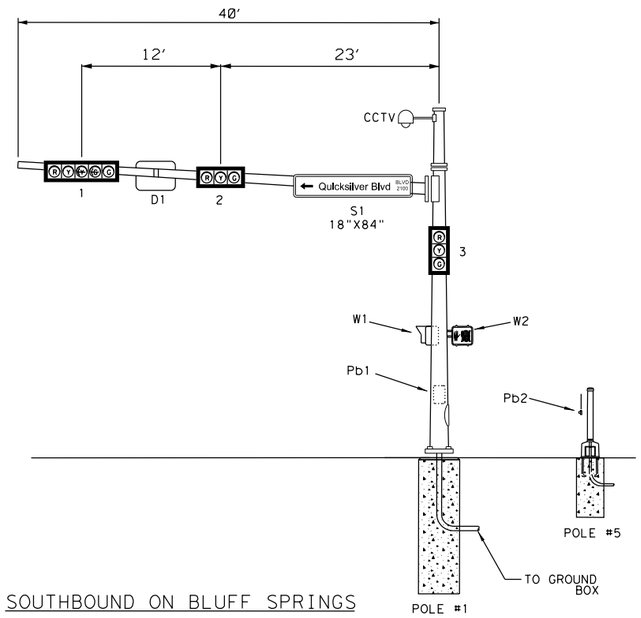
DESIGN	FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AM				40
DRAWN	STATE	DIST. NO.	COUNTY	
KA	TX	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	HIGHWAY NO.
AM	914	04	331, ETC	-

8/4/2023
11:00:46 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762*2102*SIGNAL*DETAILS*001.dgn

100% SUBMITTAL



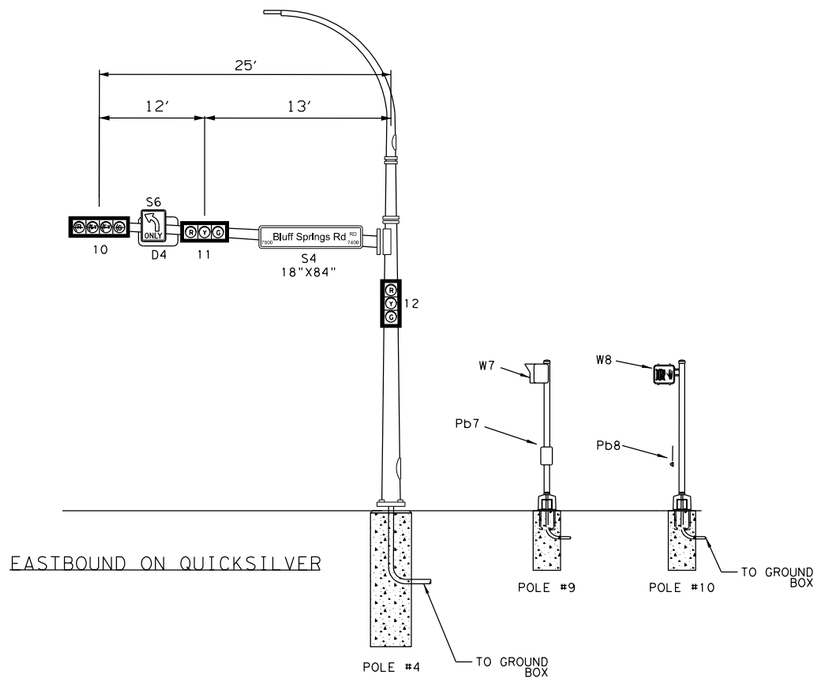
NORTHBOUND ON BLUFF SPRINGS



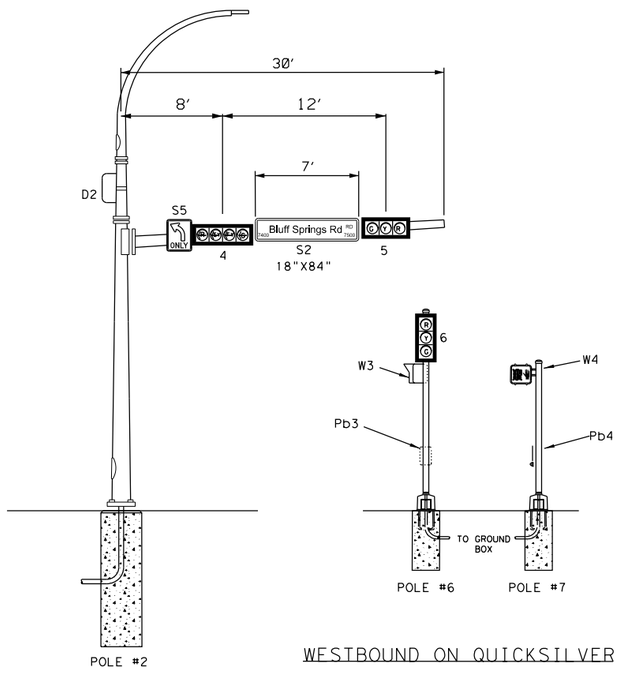
SOUTHBOUND ON BLUFF SPRINGS

NOTES:

1. HEADS WILL BE CENTERED OVER THE LANES, OR AS DIRECTED BY ENGINEER. DISTANCE SHOWN ALONG MAST ARMS ARE APPROXIMATE AND WILL BE ADJUSTED IN THE FIELD AS NEEDED.
2. FOUNDATIONS WILL BE ADJUSTED IN THE FIELD IN ORDER TO MEET CLEARANCE.
3. LOCATION OF MAST ARMS IS APPROXIMATE. ANY CHANGES WILL BE APPROVED BY THE ENGINEER.
4. MAST ARM ATTACHMENT HEIGHT WILL BE CALCUALTED BY THE CONTRACTOR IN THE FIELD AND APPROVED BY THE ENGINEER.
5. AIR WINGS TO BE INSTALLED ON ARMS 40′ OR LONGER.
6. LUMINAIRES ARE DRAWN FOR CLARITY. ALL LUMINAIRES WILL BE INSTALLED IN THE FIELD SO THAT THE LUMINAIRE HEAD POINTS TO THE NEAREST ADJACENT STOP BAR.



EASTBOUND ON QUICKSILVER



WESTBOUND ON QUICKSILVER

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED
PROFESSIONAL ENGINEER
DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

LJA Engineering, Inc.
FRN - F-1386

SIGNAL DESIGN
BLUFFSPRINGS&QUICKSILVER
ELEVATIONS

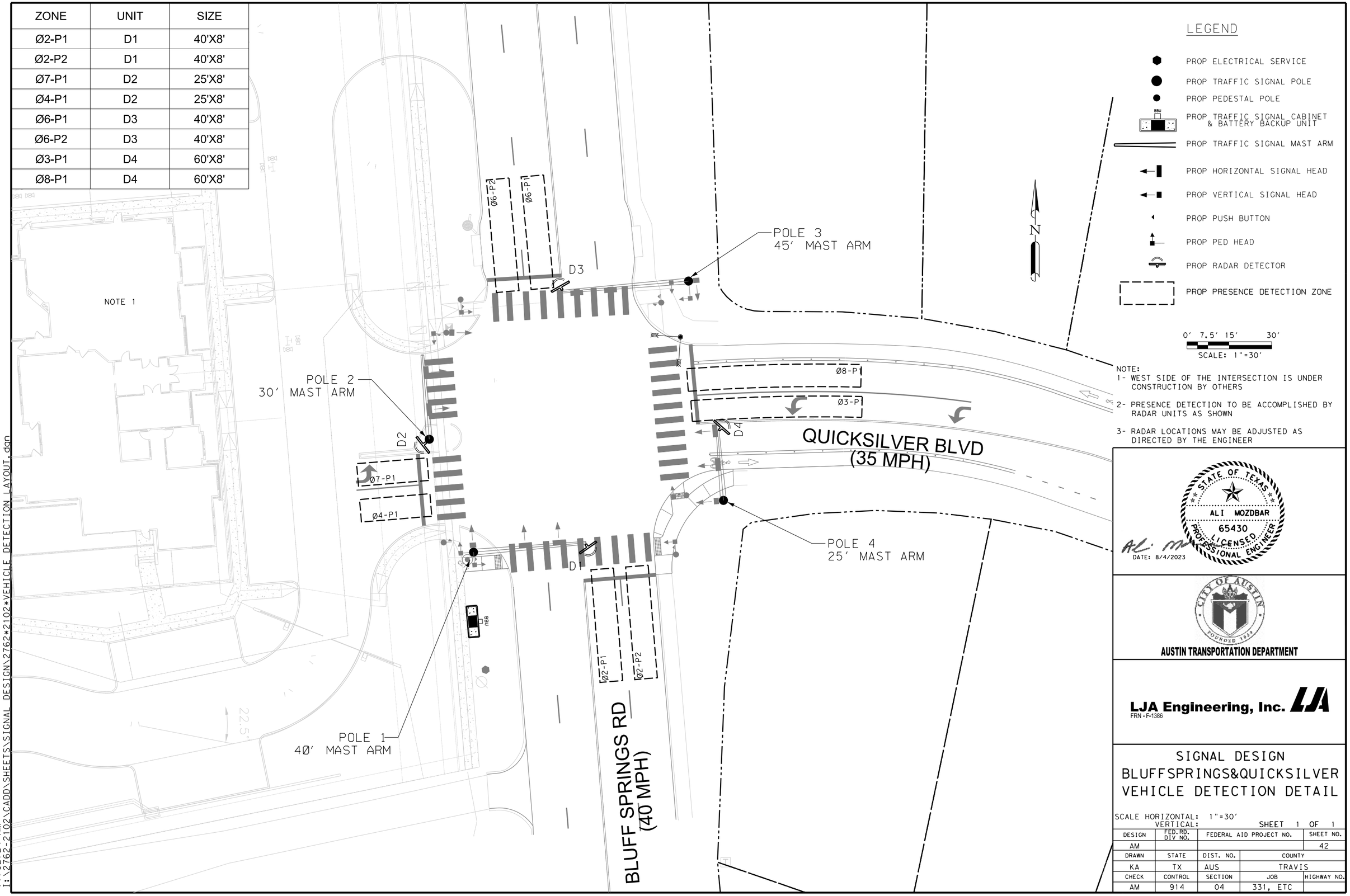
SHEET 1 OF 1

DESIGN	FED.RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AM				41
DRAWN	STATE	DIST. NO.	COUNTY	
KA	TX	AUS	TRAVIS	
CHECK	CONTROL	SECTION	JOB	HIGHWAY NO.
AM	914	04	331, ETC	-

8/4/2023
11:00:54 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762*2102*SIGNAL ELEVATIONS*001.dgn

100% SUBMITTAL

ZONE	UNIT	SIZE
Ø2-P1	D1	40'X8'
Ø2-P2	D1	40'X8'
Ø7-P1	D2	25'X8'
Ø4-P1	D2	25'X8'
Ø6-P1	D3	40'X8'
Ø6-P2	D3	40'X8'
Ø3-P1	D4	60'X8'
Ø8-P1	D4	60'X8'



LEGEND

- PROP ELECTRICAL SERVICE
- PROP TRAFFIC SIGNAL POLE
- PROP PEDESTAL POLE
- PROP TRAFFIC SIGNAL CABINET & BATTERY BACKUP UNIT (BBU)
- PROP TRAFFIC SIGNAL MAST ARM
- PROP HORIZONTAL SIGNAL HEAD
- PROP VERTICAL SIGNAL HEAD
- PROP PUSH BUTTON
- PROP PED HEAD
- PROP RADAR DETECTOR
- PROP PRESENCE DETECTION ZONE

0' 7.5' 15' 30'
SCALE: 1"=30'

NOTE:
1- WEST SIDE OF THE INTERSECTION IS UNDER CONSTRUCTION BY OTHERS
2- PRESENCE DETECTION TO BE ACCOMPLISHED BY RADAR UNITS AS SHOWN
3- RADAR LOCATIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER

STATE OF TEXAS
ALI MOZDBAR
65430
LICENSED PROFESSIONAL ENGINEER
DATE: 8/4/2023

CITY OF AUSTIN
FOUNDED 1839
AUSTIN TRANSPORTATION DEPARTMENT

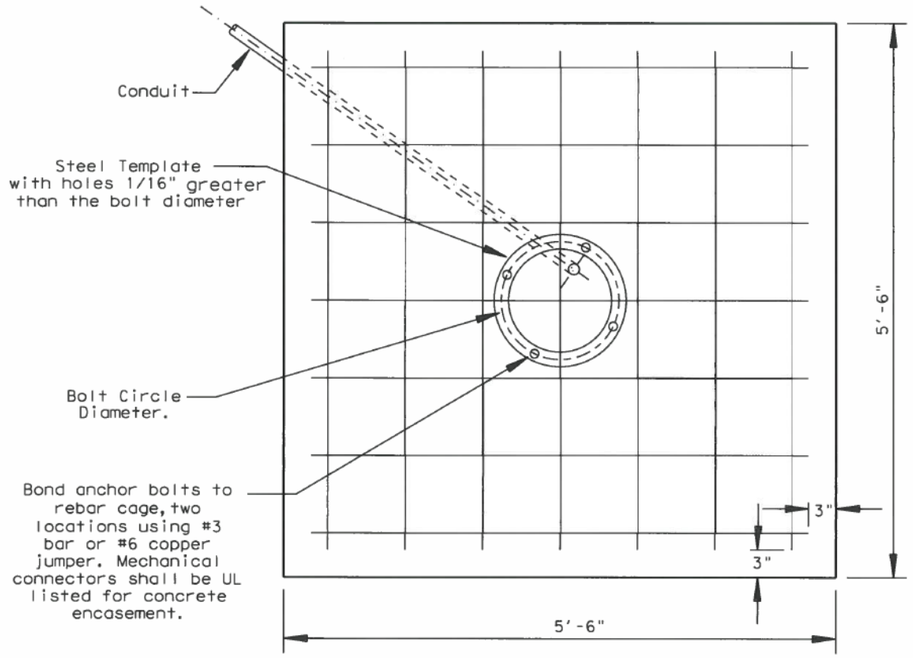
LJA Engineering, Inc.
FRN - F-1386

SIGNAL DESIGN
BLUFFSPRINGS&QUICKSILVER
VEHICLE DETECTION DETAIL

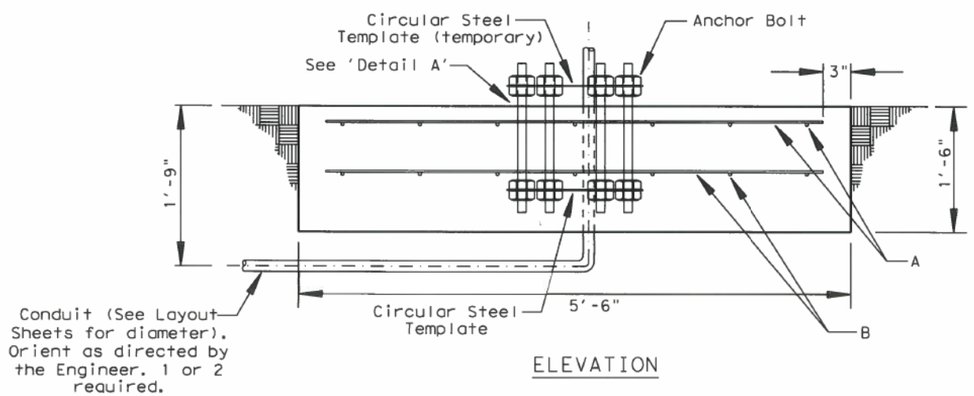
SCALE HORIZONTAL: 1"=30'
VERTICAL:
SHEET 1 OF 1

DESIGN	FED.RD. DIV NO.	FEDERAL AID PROJECT NO.	SHEET NO.
AM			42
DRAWN	STATE	DIST. NO.	COUNTY
KA	TX	AUS	TRAVIS
CHECK	CONTROL	SECTION	JOB / HIGHWAY NO.
AM	914	04	331, ETC

8/4/2023
11:02:24 AM
I:\2762-2102\CADD\SHEETS\SIGNAL DESIGN\2762*2102*VEHICLE DETECTION LAYOUT.dgn



TOP VIEW



ELEVATION

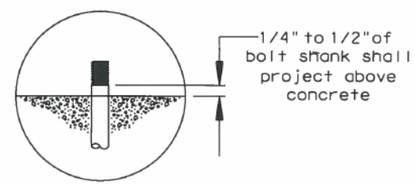
GENERAL NOTES

* Concrete shall be Class 'C'
* Reinforcing steel shall conform to item 440, "Reinforcing Steel", Grade 60 min.
* Threads for anchor bolts and nuts shall be rolled or cut threads of BUN 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 shall conform to ASTM A36. Galvanizing a minimum of the tap and 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".

ANCHOR BOLT & TEMPLATE SIZE						
BOLT DIA IN.	BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R_2	R_1
3/4"	1'-6"	3"	----	12 3/4"	7 1/8"	5 3/8"

QUANTITIES ①				
Matte	No.	Size	Max. Spa.	Length
A	14	#5	9" C-C	5'-0"
B	14	#5	9" C-C	5'-0"
Reinforcing Steel			LD	146.0
Class 'C' Concrete			CY	1.7

① Quantity shown is the average for one footing only.



'DETAIL A'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
6/28/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

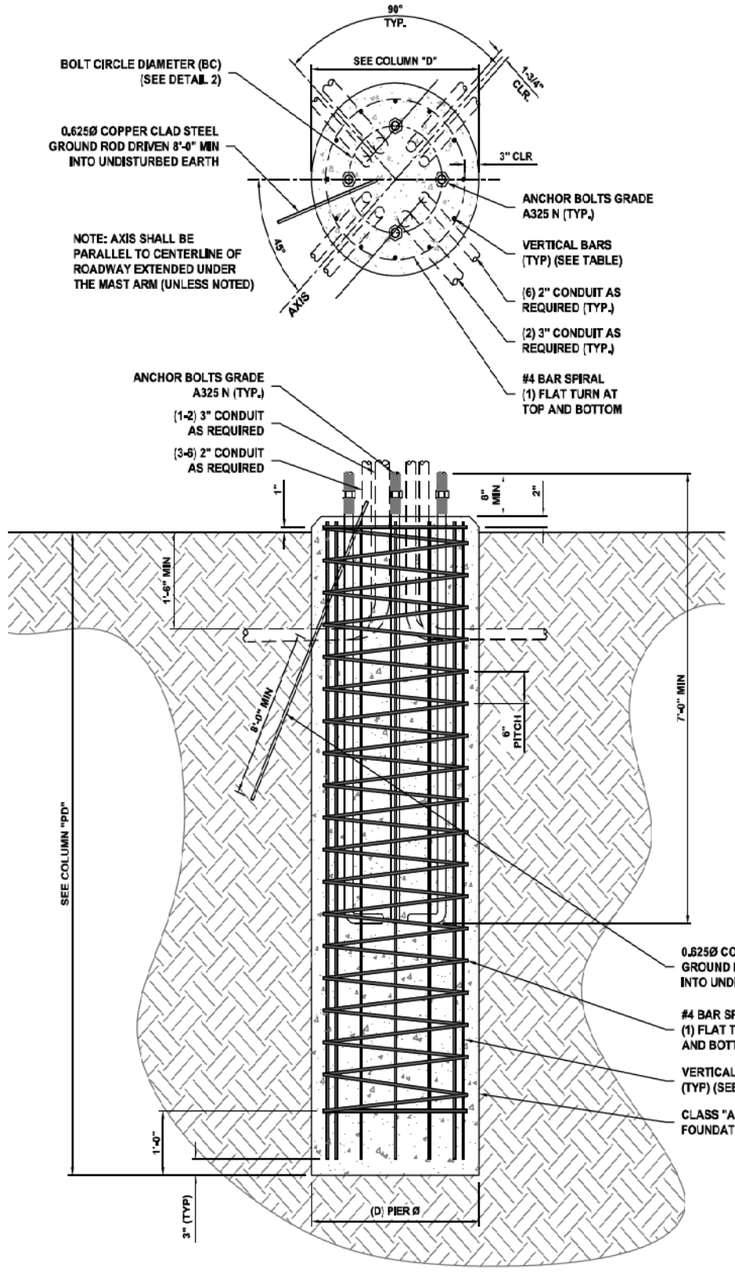
BURLESON RD AND METROPOLIS DR

TXDOT STANDARD SLAB FOUNDATION DETAIL

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS	
CHECK	CONTROL	SECTION	JOB	43
BP	914	4	331	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_08A.dgn
PENTABLE: I0329625.tbl
DATE: 6/28/2023
TIME: 3:58:42 PM
SCALE: NTS



GENERAL STRUCTURAL NOTES:

1. DESIGN INFORMATION AND GENERAL REQUIREMENTS

1.1 CODES
- a. DESIGN CONFORMS TO UNIFORM BUILDING CODE, LATEST EDITION
- b. TIA-222-G, STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS WITH EXCEPTION OF LOCAL CODE REQUIREMENTS FOR FROST DEPTH.
- c. REFERENCE CITY OF AUSTIN SPECS FOR CONCRETE STRUCTURES 403S, 406S & 420S

1.2 DESIGN CRITERIA
- a. LIMESTONE ROCK:
  - BEARING PRESSURE: 6000 PSF
  - LATERAL BEARING PRESSURE: 400 PSF
  - SKIN FRICTION: 1500 PSF
- b. SILTY CLAY:
  - BEARING PRESSURE: 2000 PSF
  - LATERAL BEARING PRESSURE: 150 PSF
  - SKIN FRICTION: 500 PSF

1.3 MISCELLANEOUS
- a. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS AND EXISTING CONDITIONS PRIOR TO PROCEEDING WITH THE WORK.
- b. LOCATION OF ALL UNDERGROUND UTILITIES SHALL BE VERIFIED BEFORE ANY EXCAVATION IS STARTED.

FOUNDATION NOTES
- a. EXCAVATIONS SHALL BE FREE OF ALL WATER AND LOOSE MATERIALS.
- b. POLE FOUNDATIONS SHALL BE POURED WITHIN 8 HRS OF SOIL DISTURBANCE.
- c. IF NECESSARY, REINFORCEMENT MAY BE SPLICED BUT SHALL BE LAPPED A MINIMUM OF 40 BAR DIAMETERS.
- d. CONCRETE SHALL BE TYPE 1 PER ASTM C150.
- e. FINE AND COURSE AGGREGATE SHALL MEET THE CRITERIA OF ASTM C33-78, MAX SIZE ALLOWABLE: 1-1/2".
- f. WATER SHALL BE CLEAR, POTABLE AND FREE OF ALL HARMFUL SUBSTANCES.
- g. BEFORE PLACING CONCRETE, ALL FOREIGN MATERIAL SHALL BE REMOVED FROM THE EXCAVATION.
- h. STEEL REINFORCEMENT SHALL BE FREE OF RUST, SCALE OR OTHER COATINGS THAT WOULD REDUCE OR DESTROY BOND. REINFORCEMENT LEFT EXPOSED FOR FUTURE BONDING SHALL BE CLEANED OF CONCRETE PASTE PRIOR TO COVERING WITH CONCRETE.

2.2 GEOTECHNICAL
- a. THE FOUNDATIONS SHALL NOT BEAR ON ORGANIC SOILS, VOIDS, DELETERIOUS SOILS, CONDUITS, LOOSE SOILS OR FULLY SATURATED SOILS. IF ANY OF THESE OR OTHER COMPROMISED SOIL CONDITIONS ARE PRESENT DURING CONSTRUCTION IT SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD IMMEDIATELY.

CONCRETE FORMWORK
- a. CONCRETE CONSTRUCTION SHALL CONFORM TO "SPECIFICATIONS FOR STRUCTURAL CONCRETE" ACI 301-10.
- b. FORMWORK SHALL CONFORM TO "SPECIFICATIONS FOR STRUCTURAL CONCRETE" ACI 301-10.
- c. ANY FORMS UTILIZED TO CAST THE FOUNDATION SHALL BE FULLY REMOVED PRIOR TO PLACING FLOWABLE FILL, AND PRIOR TO PLACING THE POLE ATOP THE FOUNDATION.

EQUIPMENT VOLUME TABLE

POLE TYPE	SOIL TYPE	ANCHOR BOLT Ø (IN)	(BW) BASE PLATE WIDTH (IN)	(BC) BOLT CIRCLE Ø (IN)	(D) PIER Ø (IN)	(PD) PIER DEPTH (FT)	VERTICAL BARS QUANTITY	VERTICAL BARS SIZE
0	LIMESTONE	1-3/4	21.0	23.0	36	10	12	#6
1		1-3/4	16.75	15.0	30	8	8	#6
2		1-3/4	21.0	23.0	36	10	12	#6
3		2	21.0	23.0	36	10	12	#6
0	SILTY CLAY	1-3/4	21.0	23.0	48	14	16	#6
1		1-3/4	16.75	15.0	42	12	14	#6
2		1-3/4	21.0	23.0	48	14	16	#6
3		2	21.0	23.0	48	14	16	#6
1W	LIMESTONE	1-3/4	21.0	23.0	30	10	8	#6
2W		1-3/4	21.0	23.0	36	11	12	#6
3W		2	22.0	21.0	36	13	12	#6
1W	SILTY CLAY	1-3/4	21.0	23.0	42	16	15	#6
2W		1-3/4	21.0	23.0	48	17	15	#7
3W		2	22.0	21.0	48	18	15	#7
1W-S	LIMESTONE	1-3/4	21.0	23.0	30	10	8	#6
2W-S		1-3/4	21.0	23.0	36	11	12	#6
3W-S		2	22.0	21.0	36	13	12	#6
1W-S	SILTY CLAY	1-3/4	21.0	23.0	42	16	15	#6
2W-S		1-3/4	21.0	23.0	48	17	15	#7
3W-S		2	22.0	21.0	48	18	15	#7

ANCHOR BOLT SPECS TABLE

DIAMETER	LENGTH	HOOK	THREAD LENGTH	MIN YIELD & COLOR
1.75"	84.00"	6.00"	12.00"	55 KSI YELLOW
2.00"	84.00"	6.00"	12.00"	55 KSI YELLOW

NOTE:
TO USE THE LIMESTONE ROCK SOIL CLASS, THE LIMESTONE STRATA MUST EXTEND THE FULL DEPTH OF PIER UP TO A MAXIMUM OF 2'-0" BELOW FINISH GRADE. OTHERWISE, SILTY CLAY SOIL CLASS MUST BE USED.

AeroSolutions LLC
Optimizing Your Wireless Infrastructure
5555 CENTRAL AVENUE #100
BOULDER, COLORADO 80301
PH: (720) 304-6682
FAX: (720) 304-6883

AERO PROJECT #:

REVISION SCHEDULE

REV	DATE	BY	DESCRIPTION
5	11-25-19	JJD	REVISED PE STAMP EXP. DATE
4	11-08-19	JJD	REVISED TABLES
3	09-12-19	JJD	REVISED FOUNDATION DESIGN
2	07-19-19	LDW	REVISED FOUNDATION DESIGN
1	06-05-19	LDW	REVISED FOUNDATION DESIGN
0	04-30-19	LDW	FOUNDATION DESIGN

DRAWING TITLE:
FOUNDATION DETAILS & NOTES

DRAWING SHEET:
C-1

SHEET NUMBER:
1OF 1

SITE INFORMATION:

SITE NAME:
TRAFFIC SIGNAL POLE FOUNDATION DESIGN

JURISDICTION:
CITY OF AUSTIN, TX

MIKKO P. AHOLA, P.E.
TEXAS PROFESSIONAL ENGINEER
LICENSE #80990 (EXP. 12/31/2019)

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
6/28/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

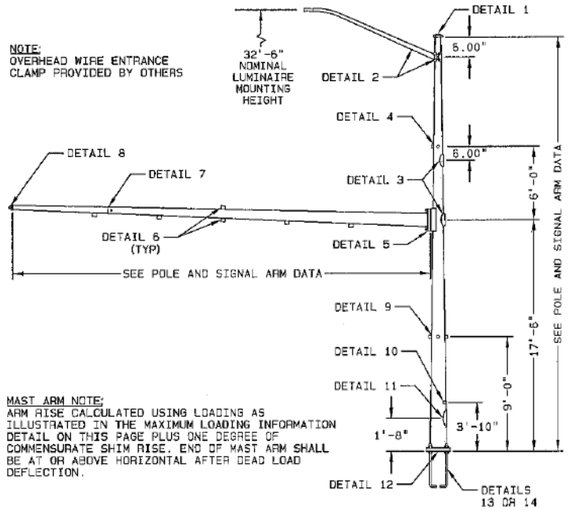
BURLESON RD AND METROPOLIS DR

CITY OF AUSTIN STANDARDS

SHEET 1 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	–			–
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS	
CHECK	CONTROL	SECTION	JOB	44
BP	914	4	331	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_09.dgn
PENTABLE: 10329625.tbl
DATE: 6/28/2023 TIME: 3:56:45 PM SCALE: 1:1

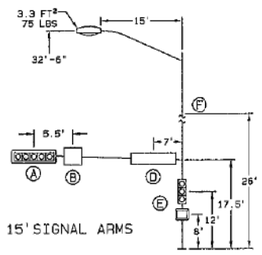


NOTE:
OVERHEAD WIRE ENTRANCE CLAMP PROVIDED BY OTHERS

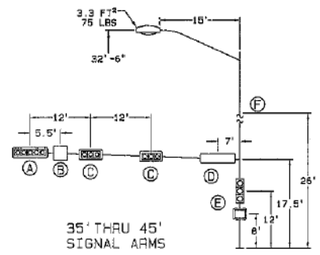
MAST ARM NOTE:
ARM RISE CALCULATED USING LOADING AS ILLUSTRATED IN THE MAXIMUM LOADING INFORMATION DETAIL ON THIS PAGE PLUS ONE DEGREE OF COMMENSURATE SHIM RISE. END OF MAST ARM SHALL BE AT OR ABOVE HORIZONTAL AFTER DEAD LOAD DEFLECTION.

MATERIAL DATA

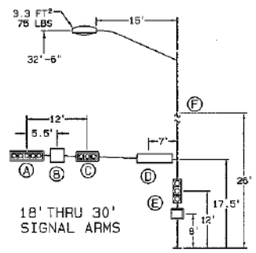
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)	COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
POLE SHAFTS (TYPE 1)	A595 GR.A	55	LUM.ARM CONN. BOLTS	A325	
POLE SHAFTS (TYPE 2&3)	A572 GR.65	65	ANCHOR BOLTS	F1554 GR.55	55
MAST ARM SHAFTS	A595 GR.A	55	GALVANIZING	A123	
LUMINAIRE ARM SHAFT	A595 GR.A	55	GALVANIZING-HARDWARE	HOT DIP ZINC	
BASE PLATES	A36	36			
ARM ATTACHMENTS	A36	36			
MAST ARM CONN. BOLTS	A325				



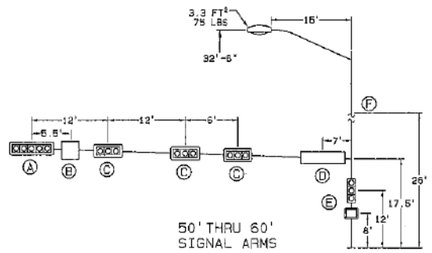
15' SIGNAL ARMS



35' THRU 45' SIGNAL ARMS



18' THRU 30' SIGNAL ARMS



50' THRU 60' SIGNAL ARMS

DESIGN CRITERIA:

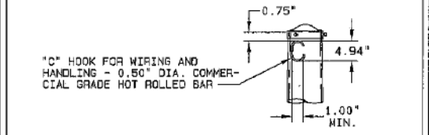
1994 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.

WIND VELOCITY:

80 MPH ISOTACH.

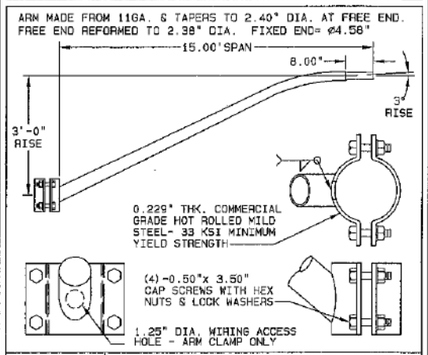
DEVICE	DESCRIPTION	PROJ.AREA (SQ.FT.)	WEIGHT (LBS.)
(A)	12"-5 SEC. SIGNAL W/BACKPLATES	15.00	85
(B)	36" X 36" DIRECTIONAL SIGN	9.00	27
(C)	12"-3 SEC. SIGNAL W/BACKPLATES	9.00	53
(D)	36" X 84" STREET NAME SIGN	15.00	36
(E)	PEDESTRIAN SIGNAL HEADS	8.00	80
(F)	OVERHEAD WIRE ENTRANCE	64.00	200

MAX. LOADING INFORMATION

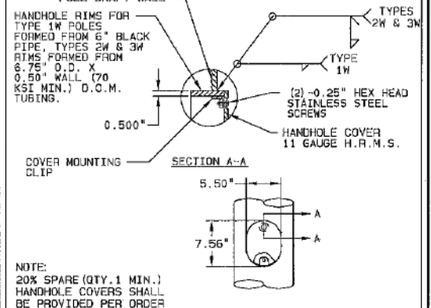


"C" HOOK FOR WIRING AND HANDLING - 0.50" DIA. COMMERCIAL GRADE HOT ROLLED BAR

DETAIL 1 | POLE TOP



DETAIL 2 | LUMINAIRE ARM & ATTACHMENT



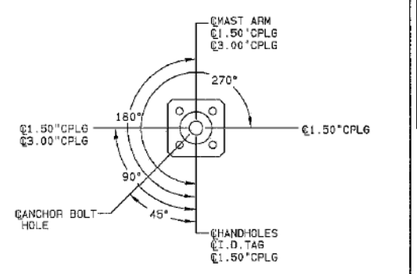
NOTE:
20% SPARE (QTY.1 MIN.) HANDHOLE COVERS SHALL BE PROVIDED PER ORDER

DETAIL 3 | HANDHOLE

POLE AND SIGNAL ARM DATA

POLE TYPE	POLE TUBE BASE DIA. (IN)	POLE TUBE TOP DIA. (IN)	POLE TUBE LENGTH (FT)	POLE TUBE GAUGE OR THK. (IN)	SIGNAL ARM TUBE ARM SPAN (FT)	SIGNAL ARM TUBE FIXED END DIA. (IN)	SIGNAL ARM TUBE FREE END DIA. (IN)	SIGNAL ARM TUBE GAUGE OR THICK (IN)	SIGNAL ARM COUPLING LOCATIONS & ORIENTATIONS (*OPTIONAL SIGNAL SPACING) COUPLING DISTANCE FROM END OF ARM. / ANGLES CW. FROM TOP OF SIMPLEX AS VIEWED FROM SMALL END OF MAST ARM.					
1W	12.50	8.30	30.00	3	15.00	6.00	3.90	7						7.5' / 0°
					18.00	6.00	3.48	7	12'/180°					9' / 0°
					20.00	6.00	3.20	7	12'/180°					10' / 0°
					25.00	7.00	3.50	7	12'/180°					12.5' / 0°
					30.00	8.00	3.80	7	12'/180°					15' / 0°
2W	13.50	9.30	30.00	0.2188	35.00	9.00	4.10	7	12'/180°		24'/180°			17.5' / 0°
					40.00	10.00	4.40	7	12'/180°	*18'/180°	24'/180°	*30'/180°		20' / 0°
					45.00	10.50	4.20	7	12'/180°	*18'/180°	24'/180°	*30'/180°		22.5' / 0°
3W	16.00	11.80	30.00	0.2188	50.00	12.00	5.00	7	12'/180°	*18'/180°	24'/180°	*30'/180°	36'/180°	25' / 0°
					55.00	13.00	5.53	DET.7	12'/180°	*18'/180°	24'/180°	*30'/180°	36'/180°	27.5' / 0°
					60.00	13.00	4.83	DET.7	12'/180°	*18'/180°	24'/180°	*30'/180°	36'/180°	30' / 0°

ALL ANGLES MEASURED CLOCKWISE FROM LOWER HANDHOLE AS VIEWED FROM SMALL END OF POLE



RADIAL INDEX

REV	DRAWN BY-DATE	CHECK BY-DATE	DESCRIPTION
D	AC19 07/30/13	AC19 07/30/13	LOC.BASE HH/TOP HH'S TO BE THE SAME
—	DJT 05/06/01		

TITLE: CITY OF AUSTIN, TX.
MASTARM TRAFFIC STRUCTURES Special Detail #12

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS, ENGINEER APPROVED, MATERIAL HANGING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.

valmont
Valley, NE 68064
(402) 359-2201

PAGE NUMBER: 1 OF 2
DRAWING NUMBER: DB00591
REV: D

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
6/28/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STATE OF TEXAS
BARRY N. SLADEK
91283
LICENSED PROFESSIONAL ENGINEER
7/31/13

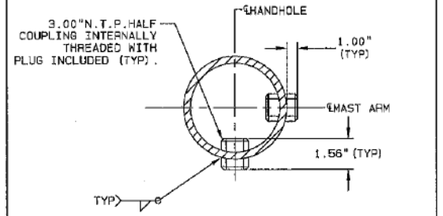
BURLESON RD AND METROPOLIS DR

CITY OF AUSTIN STANDARDS

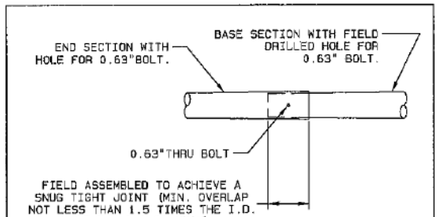
SHEET 2 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS	
CHECK	CONTROL	SECTION	JOB	45
BP	914	4	331	
CHECK				
SN				

PLOT DRIVER: TXDOT_POF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_10.dgn
PENTABLE: I0329625.tbl
DATE: 6/28/2023 TIME: 3:58:49 PM
SCALE: NONE

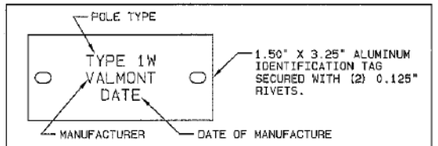


DETAIL 4 | 3.00"POLE COUPLINGS

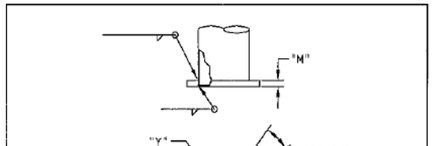


ARM LENGTH	BASE SECTION		END SECTION	
	LENGTH	GAUGE	LENGTH	GAUGE
55'-0"	50'-0"	7	6'-11"	11
60'-0"	50'-0"	5	11'-11"	11

DETAIL 7 | SIGNAL ARM SLIP JOINT

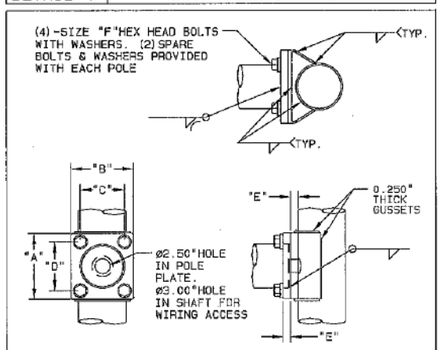


DETAIL 10 | POLE I.D. TAG

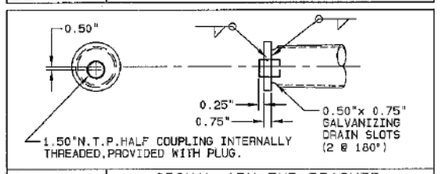


POLE TYPE	SQUARE "Y" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	SLOT "Z" (IN)
1W & 2W	21.00	20.00	1.75	2.00 x 4.38
3W	22.00	21.00	1.75	2.25 x 4.68

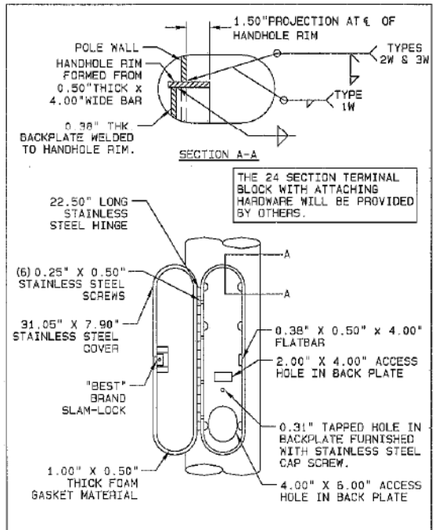
DETAIL 12 | POLE BASE



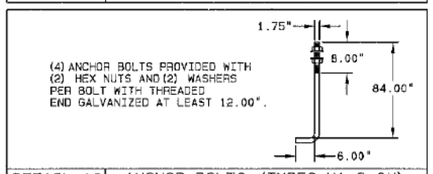
DETAIL 5 | SIGNAL ARM ATTACHMENT



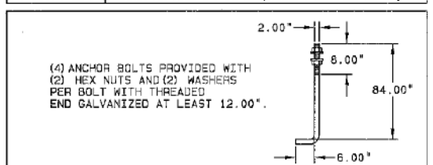
DETAIL 8 | SIGNAL ARM END BRACKET



DETAIL 11 | BASE HANDHOLE



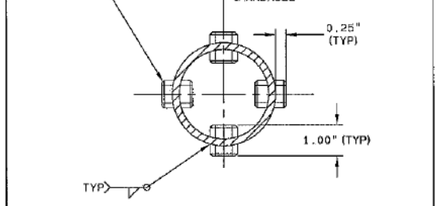
DETAIL 13 | ANCHOR BOLTS (TYPES W1 & 2W)



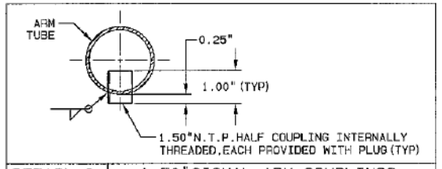
DETAIL 14 | ANCHOR BOLTS (TYPE 3W)

SIGNAL ARM ATTACHMENT DATA

POLE TYPE	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
1W	16.00	11.25	6.50	14.00	2.00	1.25"-7UNC X 4.25"LG
2W	16.00	16.00	14.75	14.75	2.00	1.25"-7UNC X 4.25"LG
3W	19.25	19.25	16.00	16.00	2.00	1.25"-7UNC X 4.25"LG



DETAIL 9 | 1.50"POLE COUPLINGS



DETAIL 6 | 1.50"SIGNAL ARM COUPLINGS

STATE OF TEXAS
BARRY N. SLADEK
91283
LICENSED
PROFESSIONAL ENGINEER
7/31/13

TITLE: CITY OF AUSTIN, TX.
MASTARM TRAFFIC STRUCTURES

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS, ENGINEER APPROVED, MATERIAL HANDING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.

valmont
Valley, NE 68064
(402) 359-2201

PAGE NUMBER: 2 OF 2
DRAWING NUMBER: DB00591
REV: D

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED
PROFESSIONAL ENGINEER
6/28/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

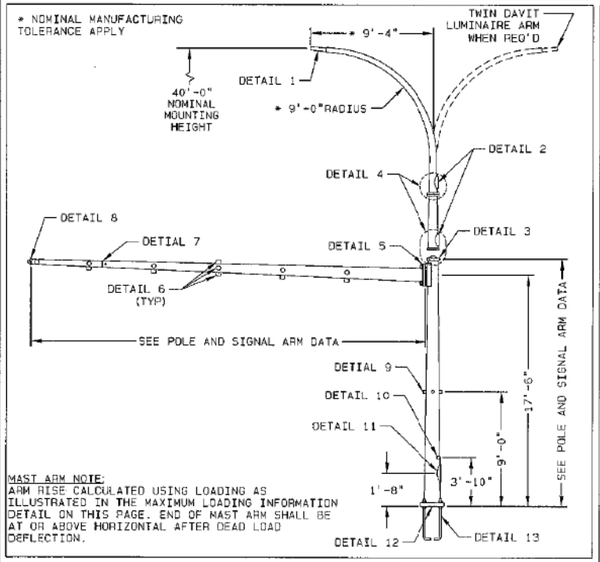
BURLESON RD AND METROPOLIS DR

CITY OF AUSTIN STANDARDS

SHEET 3 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			HIGHWAY NO.
SN	–				–
GRAPHICS	STATE	DISTRICT	COUNTY		SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS		
CHECK	CONTROL	SECTION	JOB		46
BP	914	4	331		
CHECK					
SN					

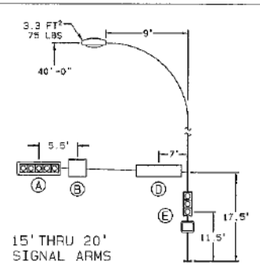
PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_II.dgn
PENTABLE: I0329625.tbl
DATE: 6/28/2023 TIME: 3:58:52 PM
SCALE: NI



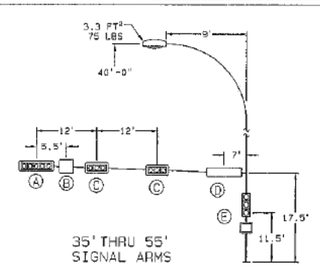
MAST ARM NOTE:
ARM RISE CALCULATED USING LOADING AS ILLUSTRATED IN THE MAXIMUM LOADING INFORMATION DETAIL ON THIS PAGE. END OF MAST ARM SHALL BE AT OR ABOVE HORIZONTAL AFTER DEAD LOAD DEFLECTION.

MATERIAL DATA

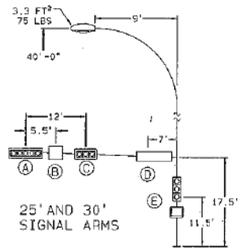
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)	COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
POLE SHAFTS(TYPE 1&2)	A595 GR.A	55	LUM ARM CONN. BOLTS	A325	
POLE SHAFTS(TYPE 3)	A572 GR.65	65	ANCHOR BOLTS	F1554 GR.55	55
MAST ARM SHAFTS	A595 GR.A	55	GALVANIZING	A123	
LUMINAIRE ARM SHAFT	A595 GR.A	55	GALVANIZING-HARDWARE	HOT DIP ZINC	
BASE PLATES(TYPE 1&2)	A36	36			
BASE PLATES(TYPE 3)	A572 GR.42	42			
ARM ATTACHMENTS	A36	36			
MAST ARM CONN. BOLTS	A325				



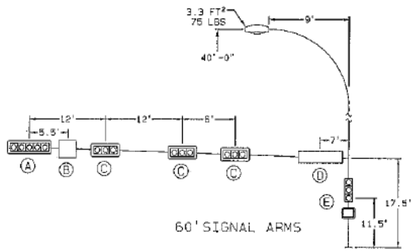
15' THRU 20' SIGNAL ARMS



35' THRU 55' SIGNAL ARMS



25' AND 30' SIGNAL ARMS



60' SIGNAL ARMS

DESIGN CRITERIA:

1994 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.

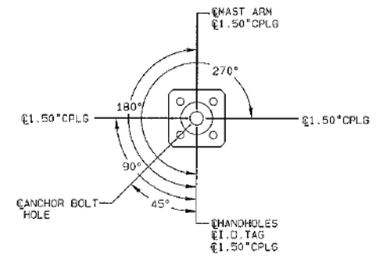
WIND VELOCITY:

80 MPH ISOTACH.

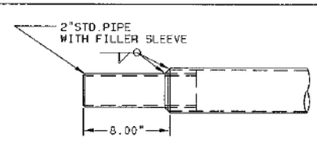
DEVICE	DESCRIPTION	PROJ. AREA (SQ.FT.)	WEIGHT (LBS.)
(A)	12"-5 SEC. SIGNAL W/BACKPLATES	13.33	83
(B)	36" X 36" DIRECTIONAL SIGN	9.00	27
(C)	12"-3 SEC. SIGNAL W/BACKPLATES	8.67	53
(D)	18" X 84" STREET NAME SIGN	10.50	27
(E)	12"-3 SEC. SIGNAL & PED SIGNALS	9.50	135

MAX. LOADING INFORMATION

ALL ANGLES MEASURED CLOCKWISE FROM LOWER HANDHOLE AS VIEWED FROM SMALL END OF POLE

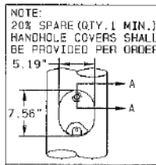


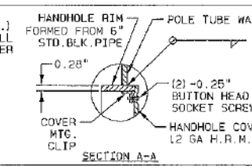
RADIAL INDEX



DETAIL 1 | DAVIT ARM END TENON

NOTE:
20% SPARE (QTY.1 MIN.) HANDHOLE COVERS SHALL BE PROVIDED PER ORDER





DETAIL 2 | UPPER HANDHOLE

POLE AND SIGNAL ARM DATA

POLE TYPE	POLE TUBE				SIGNAL ARM TUBE				SIGNAL ARM COUPLING LOCATIONS & ORIENTATIONS (1.50" COUPLING DISTANCE FROM SMALL END OF ARM. / ANGLES CW. FROM TOP OF SIMPLEX AS VIEWED FROM SMALL END OF MAST ARM.)						
	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	GAUGE OR THK. (IN)	ARM SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)							
1	11.00	8.41	18.50	3	15.00	6.00	3.90	7	0.25'/90°						7.5'/ 0°
					18.00	6.00	3.48	7	0.25'/90°	12'/90&180°					9'/ 0°
					20.00	6.00	3.20	7	0.25'/90°	12'/90&180°					10'/ 0°
					25.00	7.00	3.50	7	0.25'/90°	12'/90&180°					12.5'/ 0°
					30.00	8.00	3.80	7	0.25'/90°	12'/90&180°		24'/90&180°			15'/ 0°
2	13.00	10.41	18.50	3	35.00	9.00	4.10	7	0.25'/90°	12'/90&180°		24'/90&180°			17.5'/ 0°
					40.00	10.00	4.40	7	0.25'/90°	12'/90&180°	18'/90&180°	24'/90&180°	30'/90&180°		20'/ 0°
					45.00	10.50	4.20	7	0.25'/90°	12'/90&180°	18'/90&180°	24'/90&180°	30'/90&180°		22.5'/ 0°
3	15.00	12.41	18.50	0.2188	50.00	12.00	5.00	7	0.25'/90°	12'/90&180°	18'/90&180°	24'/90&180°			25'/ 0°
					55.00	13.00	5.53	DET.7	0.25'/90°	12'/90&180°	18'/90&180°	24'/90&180°	30'/90&180°		27.5'/ 0°
					60.00	13.00	4.93	DET.7	0.25'/90°	12'/90&180°	18'/90&180°	24'/90&180°	30'/90&180°	36'/90&180°	30'/ 0°

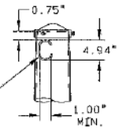
DAVIT LUMINAIRE ARM

FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)	LENGTH (FT)	RISE (FT)
6.15	3.87	11	16.31	11.50

POLE EXTENSION

FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)	LENGTH (FT)	RISE (FT)
7.55	6.15	11	10.00	10.00

CAP PROVIDED WITH EACH POLE AND USED ONLY WHEN POLE EXTENSION IS NOT REQUIRED



"G" HOOK FOR WIRING AND HANDLING - 0.50" DIA. COMMERCIAL GRADE HOT ROLLED BAR

DETAIL 3 | POLE TOP

Special Detail #13

REV	DRAWN BY-DATE	CHECK BY-DATE	DESCRIPTION
B	AC19 08/02/13	BDS 08/05/13	A.CAD TEM./-BS.DGN/-DR.DGN3"-6"/-SIG. ©RMTS/v1.SCR.G/M.H./ATT.BLMS
A	REM 04/22/99		ADDED RISE NOTE/REMOVED SHIM
—	BEG 12/16/96		— — — — — — — — — — — — — — — — — — — —

TITLE CITY OF AUSTIN, TX.
MASTARM & DAVIT EXTENSION TRAFFIC STRUCTURES

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS, ENGINEER APPROVED, MATERIAL HANGING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.

valmont
Valley, NE 68064
(402) 359-2201

PAGE NUMBER 1 OF 3
DRAWING NUMBER DB00410
REV B

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
6/28/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STATE OF TEXAS
BARRY N. SLADEK
91283
LICENSED PROFESSIONAL ENGINEER
5/8/13

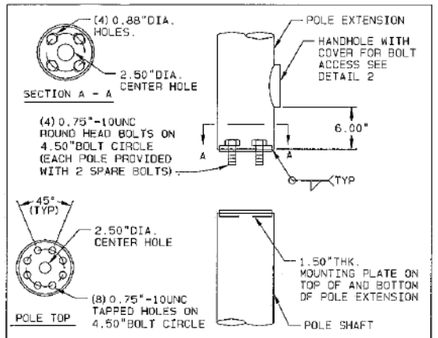
BURLESON RD AND METROPOLIS DR

CITY OF AUSTIN STANDARDS

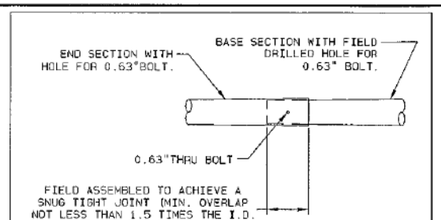
SHEET 4 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	–			–
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS	
CHECK	CONTROL	SECTION	JOB	47
BP	914	4	331	
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_12.dgn
PENTABLE: I0329625.tbl
DATE: 6/28/2023 TIME: 3:58:54 PM
SCALE: 1:1

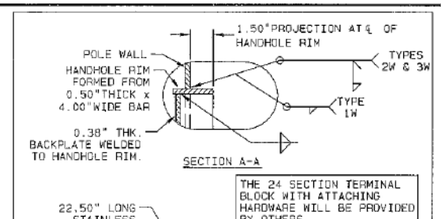


DETAIL 4 | POLE EXTENSION CONNECTION

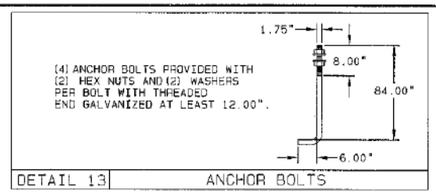


ARM LENGTH	BASE SECTION		END SECTION	
	LENGTH	GAUGE	LENGTH	GAUGE
55'-0"	50'-0"	7	6'-11"	11
60'-0"	50'-0"	5	11'-11"	11

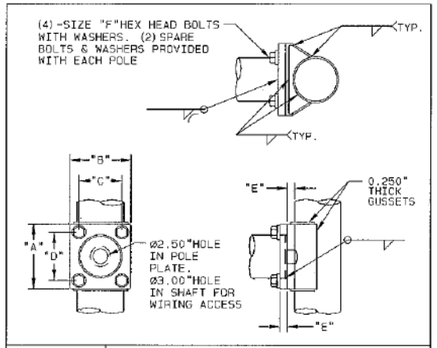
DETAIL 7 | SIGNAL ARM SLIP JOINT



DETAIL 11 | BASE HANDHOLE



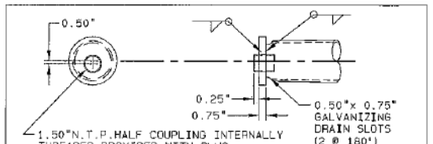
DETAIL 13 | ANCHOR BOLTS



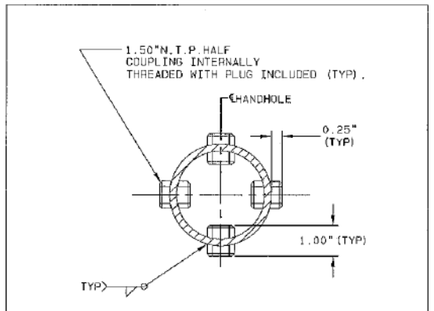
DETAIL 5 | SIGNAL ARM ATTACHMENT

SIGNAL ARM ATTACHMENT DATA

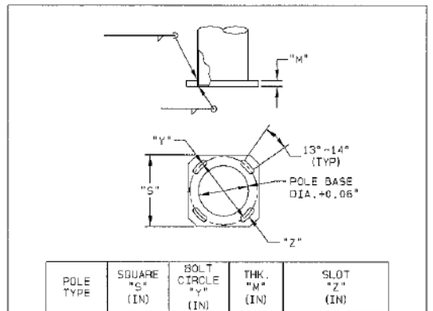
POLE TYPE	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
1	18.00	9.75	6.50	14.00	2.00	1.25"-7UNC X 4.25"LG
2	18.00	18.00	14.75	14.75	2.00	1.25"-7UNC X 4.25"LG
3	19.25	19.25	16.00	16.00	2.00	1.25"-7UNC X 4.25"LG



DETAIL 8 | SIGNAL ARM END BRACKET

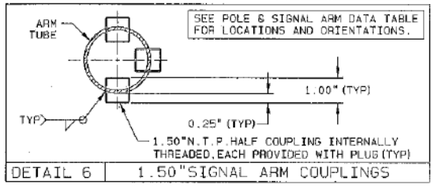


DETAIL 9 | 1.50"POLE COUPLINGS

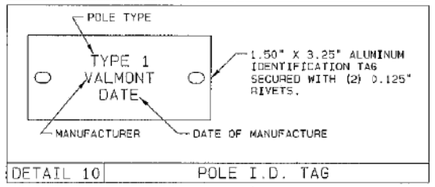


POLE TYPE	SQUARE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	SLOT "Z" (IN)
1	16.75	15.00	1.75	2.00 x 3.75
2 & 3	21.00	20.00	1.75	2.00 x 3.75

DETAIL 12 | POLE BASE



DETAIL 6 | 1.50"SIGNAL ARM COUPLINGS



DETAIL 10 | POLE I.D. TAG

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
6/28/2023

STATE OF TEXAS
BARRY N. SLADEK
91283
LICENSED PROFESSIONAL ENGINEER
8/8/13

Texas Department of Transportation
2023 ©

CITY OF AUSTIN FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

BURLESON RD AND METROPOLIS DR

CITY OF AUSTIN STANDARDS

TITLE: CITY OF AUSTIN, TX.
MASTARM & DAVIT EXTENSION TRAFFIC STRUCTURES

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS ENGINEER APPROVED, MATERIAL HANGING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.

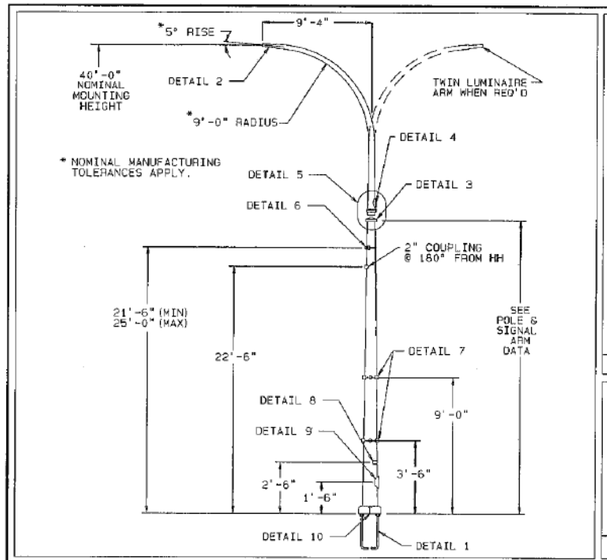
valmont
Valley, NE 68064
(402) 359-2201

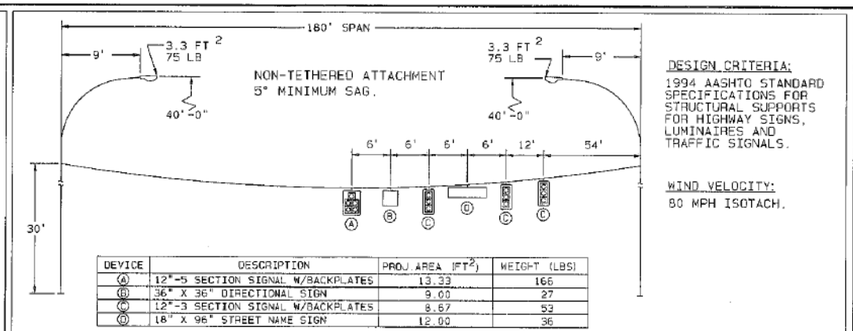
PAGE NUMBER: 2 OF 3
DRAWING NUMBER: DB00410
REV: B

SHEET 5 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS	
CHECK	CONTROL	SECTION	JOB	
BP	914	4	331	48
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_13.dgn
PENTABLE: I0329625.tbl
DATE: 6/28/2023 TIME: 3:58:57 PM
SCALE: is!



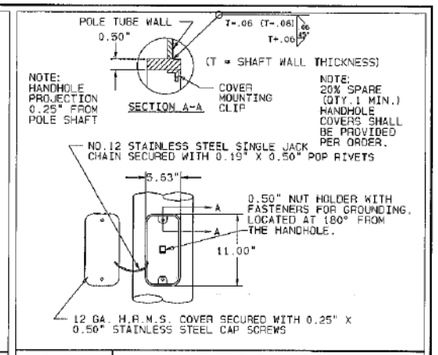


DEVICE	DESCRIPTION	PROJ. AREA (FT²)	WEIGHT (LBS)
Ⓐ	12"-5 SECTION SIGNAL W/BACKPLATES	13.33	166
Ⓑ	36" X 36" DIRECTIONAL SIGN	9.00	27
Ⓒ	12"-3 SECTION SIGNAL W/BACKPLATES	8.67	53
Ⓓ	18" X 96" STREET NAME SIGN	12.00	36

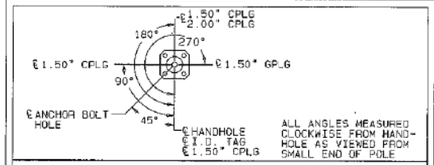
DESIGN CRITERIA:
1994 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.

WIND VELOCITY:
80 MPH ISOTACH.

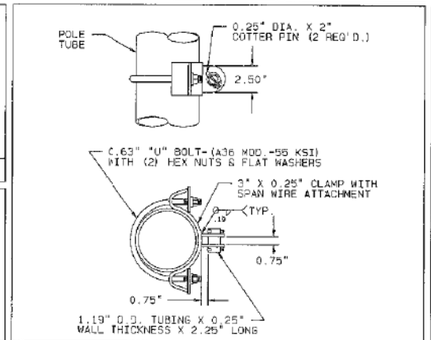
MAX. LOADING INFORMATION



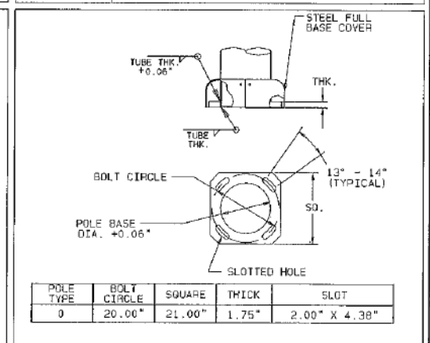
DETAIL 9 | HANDHOLE POLE TYPE 0



RADIAL INDEX



DETAIL 6 | SPAN WIRE CLAMP

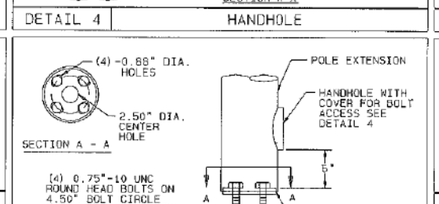


POLE TYPE	BOLT CIRCLE	SQUARE	THICK	SLOT
0	20.00"	21.00"	1.75"	2.00" X 4.38"

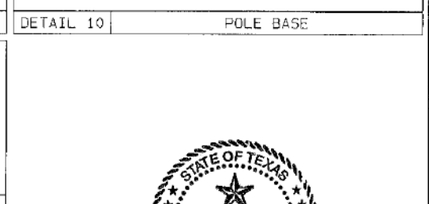
DETAIL 10 | POLE BASE

POLE AND ARM DATA TABLE

POLE TUBE					LUMINAIRE ARM TYPE 2					
POLE TYPE	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	GAUGE OR THICK (IN)	SGL. LUM. ARM QTY.	TWIN LUM. ARM QTY.	FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)	RISE (FT)
0	14.00	9.73	30.50	0.25	2	1	6.15	3.87	11	11.50



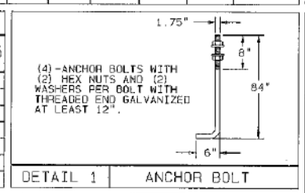
DETAIL 4 | HANDHOLE



DETAIL 7 | COUPLINGS

MATERIAL DATA

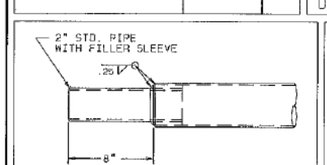
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
POLE SHAFTS (TYPE 0)	A572 GR.65	65
BASEPLATES (TYPE 0)	A36	36
LUMINAIRE ARM SHAFTS	A595 GR. A	55
LUMINAIRE ARM CONN. BOLTS	A325	
ANCHOR BOLTS	F1554 GR.55	55
GALVANIZING	A123 & A153	



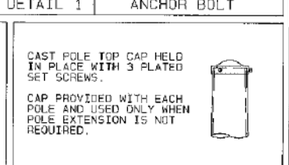
DETAIL 1 | ANCHOR BOLT

DETAIL 5 | POLE EXTENSION CONNECTION

DETAIL 8 | I.D. TAG



DETAIL 2 | DAVIT ARM END TENON



DETAIL 3 | POLE TOP

TITLE: CITY OF AUSTIN, TX.
SPAN WIRE TRAFFIC STRUCTURES

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS, ENGINEER APPROVED, MATERIAL HANGING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.

valmont
Valley, NE 68064
(402) 359-2201

PAGE NUMBER: 3 OF 3
DRAWING NUMBER: DB00410
REV: B

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
6/28/2023

Texas Department of Transportation
2023 ©

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STATE OF TEXAS
BARRY N. SLADEK
91283
LICENSED PROFESSIONAL ENGINEER
8/8/13

BURLESON RD AND METROPOLIS DR

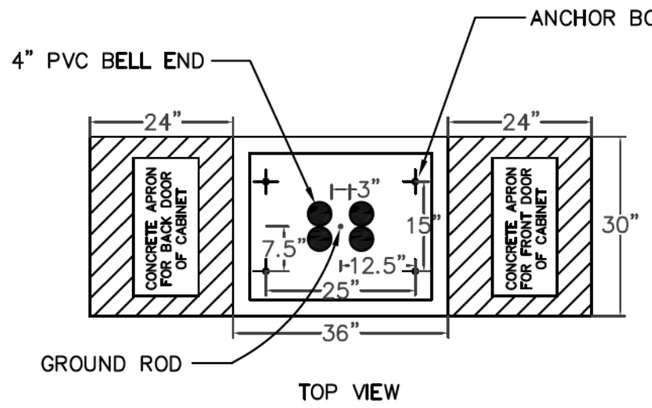
CITY OF AUSTIN STANDARDS

SHEET 6 OF 7

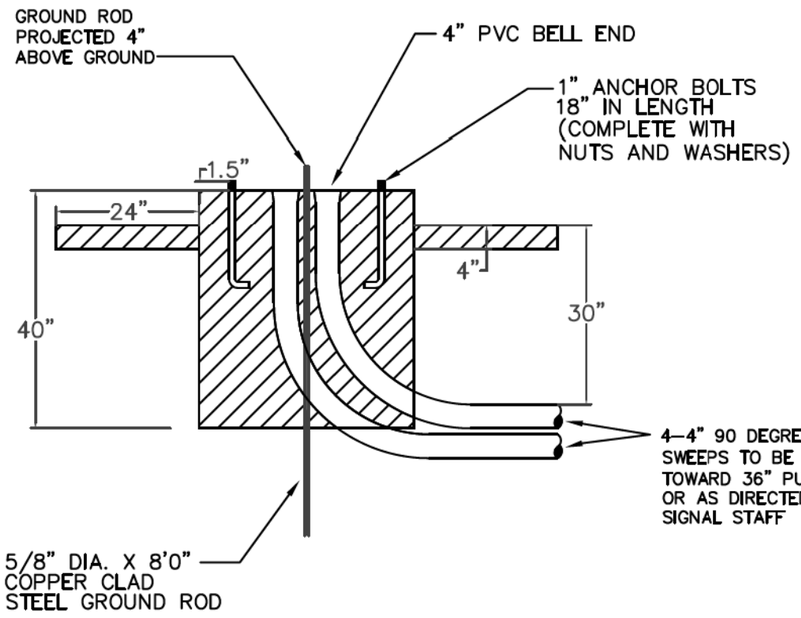
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS	
CHECK	CONTROL	SECTION	JOB	49
BP				
CHECK	914	4	331	
SN				

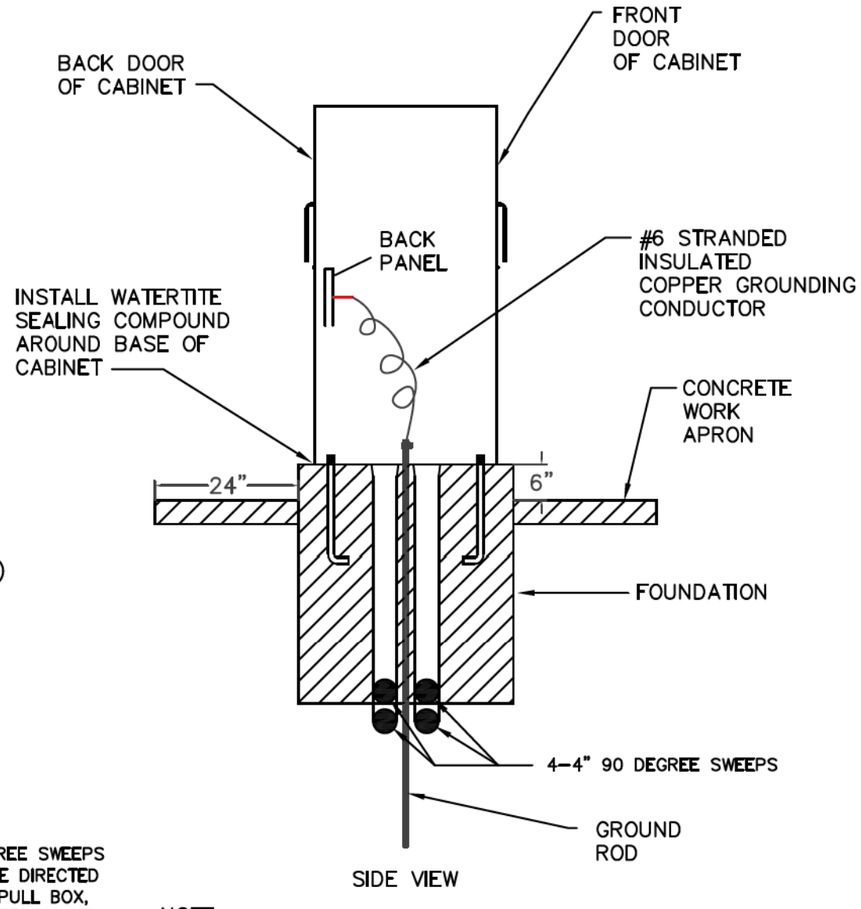
PLOT DRIVER: TXDOT_POF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_14.dgn
PENTABLE: 0329625.tbl
DATE: 6/28/2023 TIME: 3:58:59 PM
SCALE: 1:1

BASE MOUNTED CONTROLLER CABINET



TOP VIEW





SIDE VIEW

NOTE:
ALL CONCRETE SHALL BE EITHER CLASS A OR CLASS C AS DEFINED IN THE CENTRAL TEXAS COUNCIL OF GOVERNMENTS' "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION".

SPECIAL DETAIL #1

CITY OF AUSTIN TRANSPORTATION DEPARTMENT	FOUNDATION DETAILS FOR BASE MOUNTED CONTROLLER CABINET
RECORD COPY SIGNED BY SCOTT FELDMAN 10/5/21	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

NO.	DATE	REVISION	APPROVED

SUKRIT NARULA
129760
LICENSED PROFESSIONAL ENGINEER
6/28/2023

CITY OF AUSTIN
FOUNDED 1839

HDR Engineering, Inc.
710 Hesters Crossing, Suite 150
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

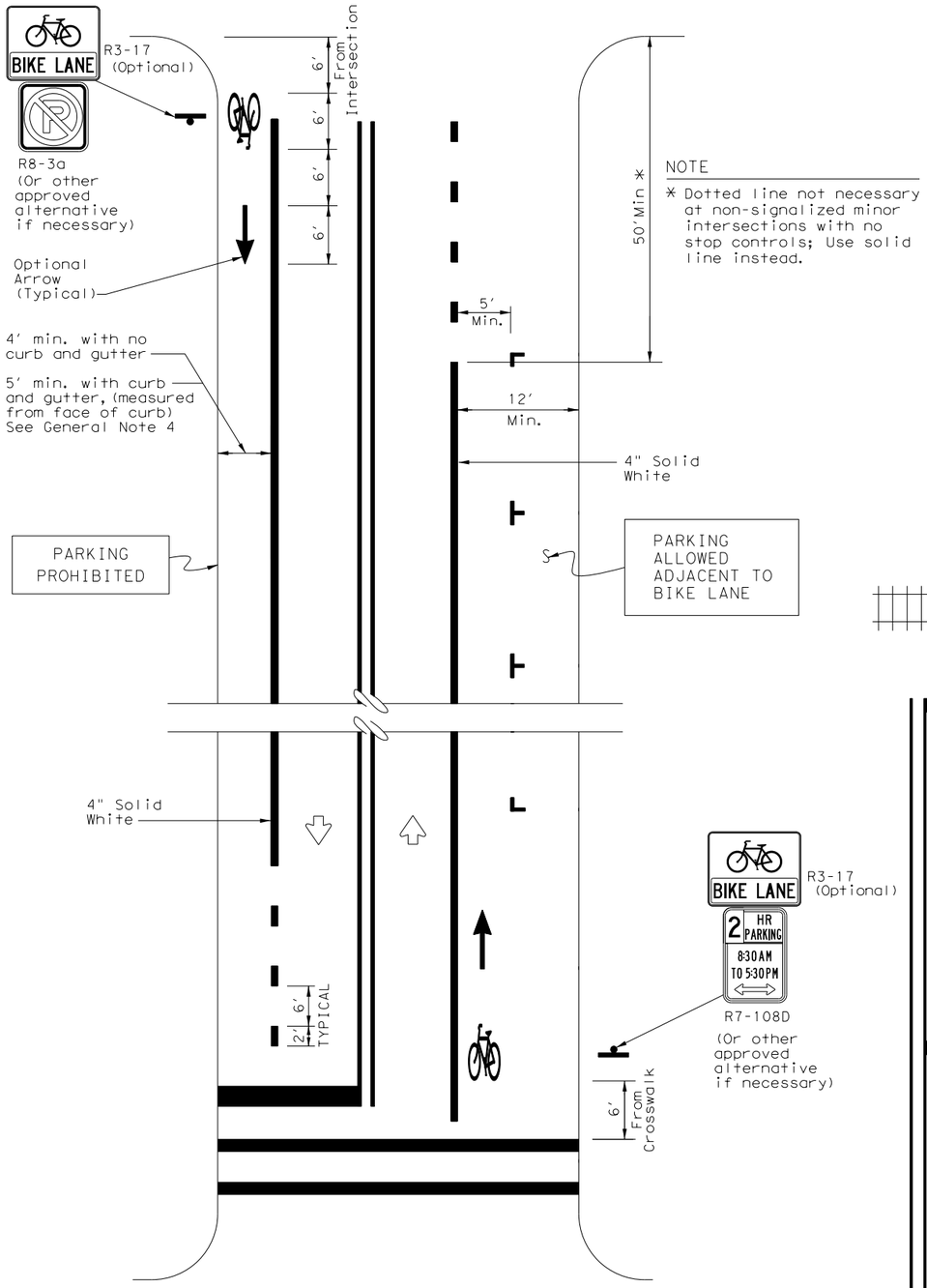
BURLESON RD AND METROPOLIS DR

CITY OF AUSTIN STANDARDS

SHEET 7 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SN	-			-
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SF	TEXAS	AUSTIN	TRAVIS	
CHECK	CONTROL	SECTION	JOB	
BP	914	4	331	50
CHECK				
SN				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: AFAZ
FILE: TXDOT_BM_SGNL_15.dgn
PENTABLE: 10329625.tbl
DATE: 6/28/2023 TIME: 3:59:01 PM
SCALE: NI



NOTE

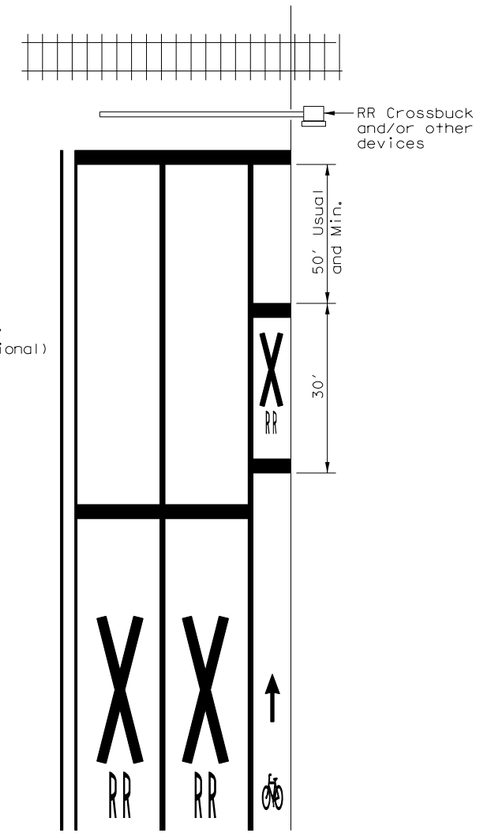
* Dotted line not necessary at non-signalized minor intersections with no stop controls; Use solid line instead.

NOTES

1. Bicycle lane pavement markings typically repeated after each intersection or signalized driveway.
2. On uninterrupted sections of roadway, bicycle lane pavement markings typically repeated as follows:

   -1200′ for 45 MPH or less roads
   -2500′ for 50 MPH and greater roads.

TWO-WAY STREET



(See RCPM Standard for travel lane details)

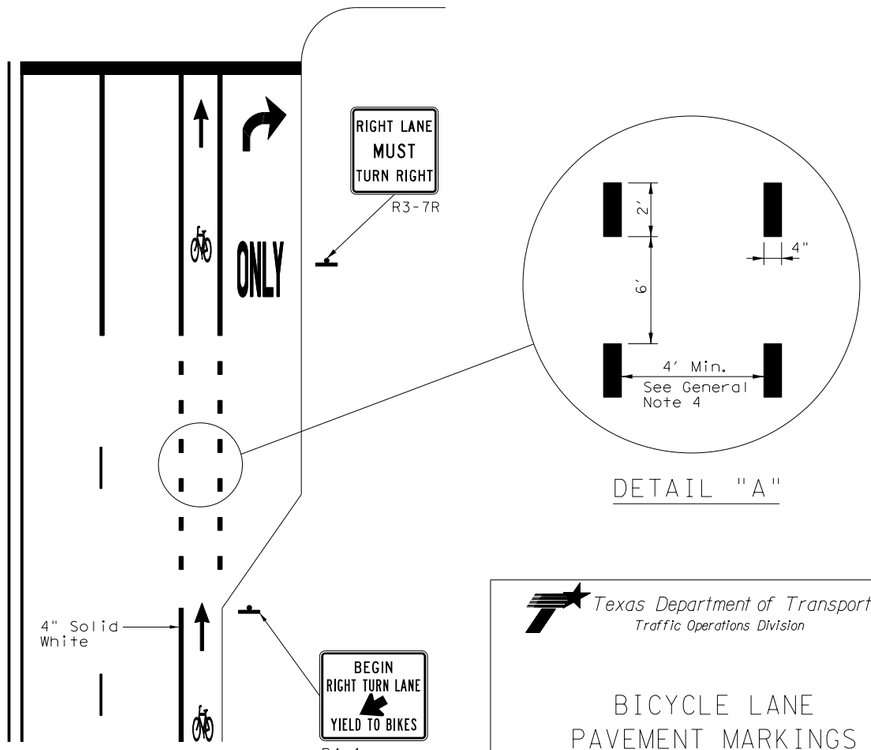
RAILROAD CROSSING APPROACH

GENERAL NOTES

1. All bicycle lane pavement markings shall be white unless otherwise noted.
2. All pavement marking materials shall meet the required Department Material Specifications as specified by the plans.
3. Exact sign placement and details are shown elsewhere in the plans.
4. The current edition of AASHTO'S Guide for the Development of Bicycle Facilities should be referenced for variations in design, other geometric conditions, and lane width options.
5. Other bicycle lane symbol or word markings as shown in the Texas Manual on Uniform Traffic Control Devices may be used. Details for words, arrows and symbols as shown in the Standard Highway Sign Designs for Texas.
6. The "BIKE LANE" (R3-17) sign with the "AHEAD" (R3-17a) sign mounted directly below should be installed in advance of the beginning of a marked bike lane.
7. The "BIKE LANE" (R3-17) sign with the "END" (R3-17b) sign mounted directly below should be installed at the end of marked bicycle lane.

LEGEND	
	Sign
	Traffic Flow

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290



RIGHT TURN ONLY LANE

DETAIL "A"

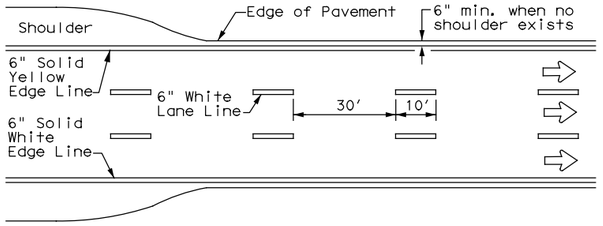
Texas Department of Transportation
Traffic Operations Division

BICYCLE LANE PAVEMENT MARKINGS

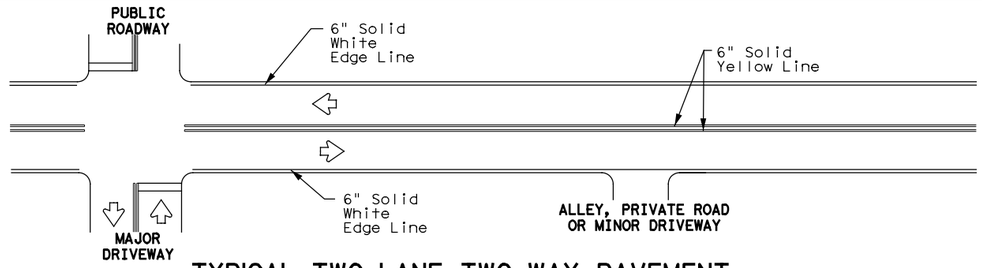
BLPM-10

© TxDOT May 2010	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		51

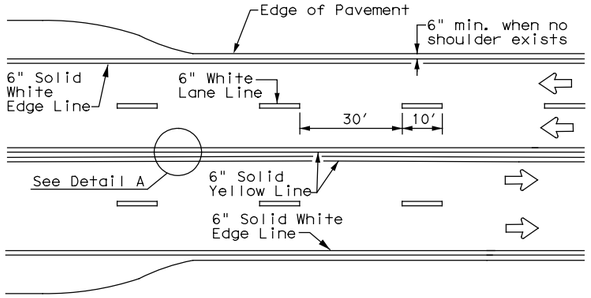
DATE: 6/28/2023 3:59:03 PM
FILE: $FILE$

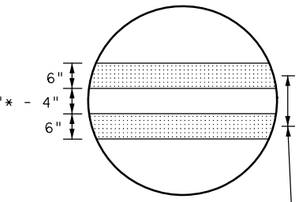


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





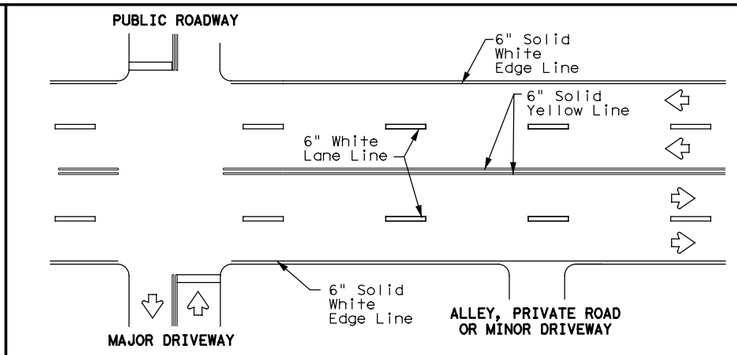
DETAIL "A"

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

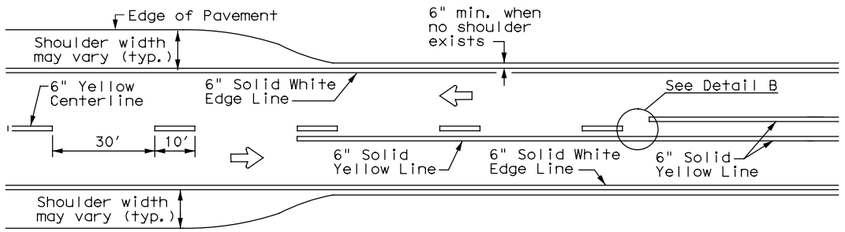
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

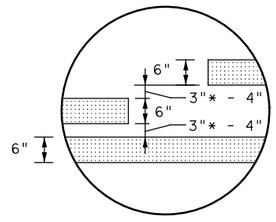
** 8" minimum for restripe projects when approved by the Engineer.



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



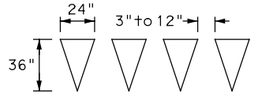
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

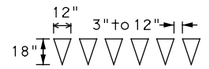
DETAIL "B"

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

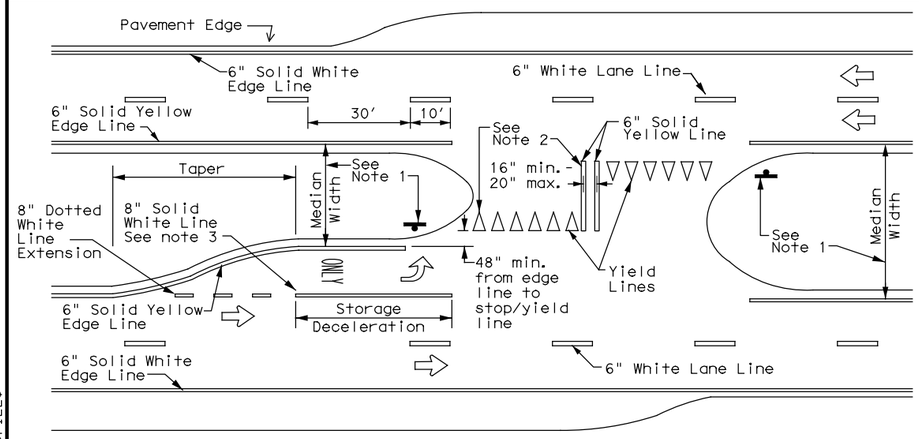


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

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

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

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

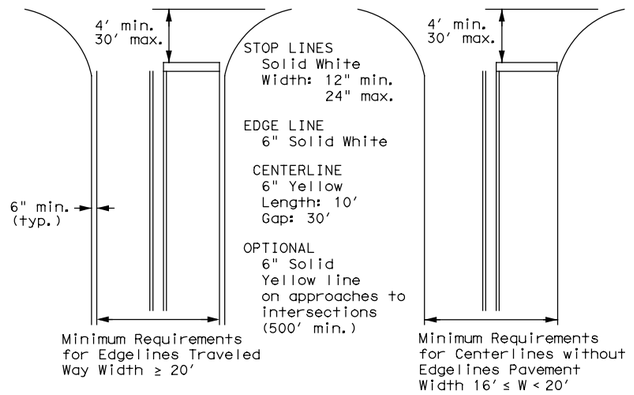
GENERAL NOTES

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

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

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

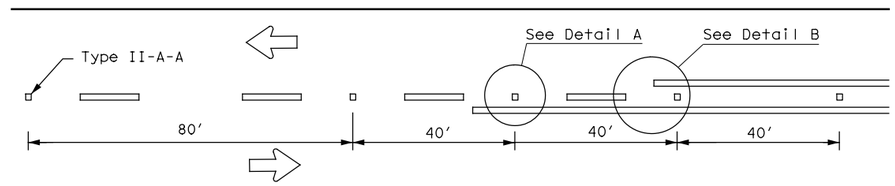
PM(1)-22

FILE: 52	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	AUSTIN	TRAVIS		52
5-00 2-12				

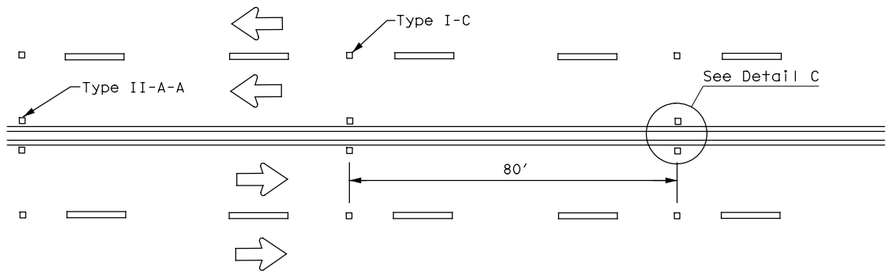
22A

DATE: 6/28/2023 3:59:05 PM
FILE: $FILE$

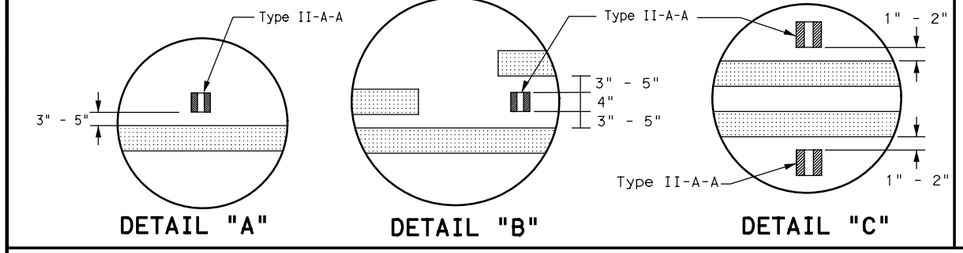
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

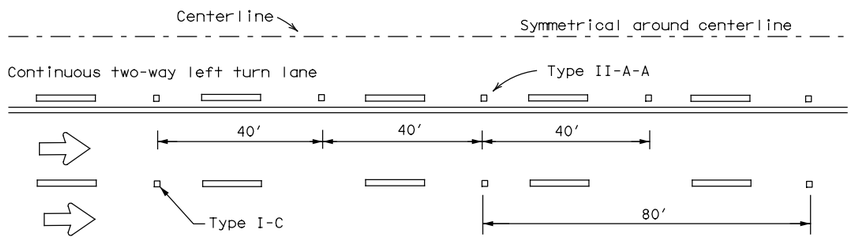


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

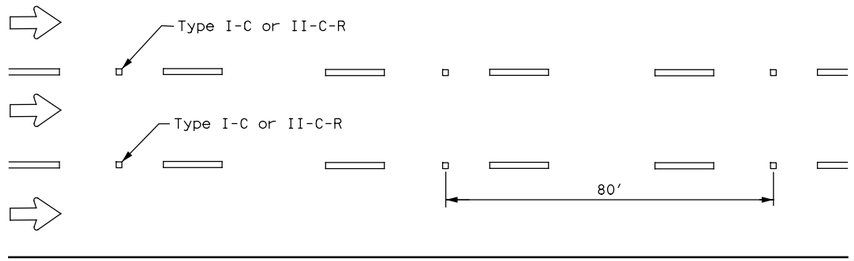


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



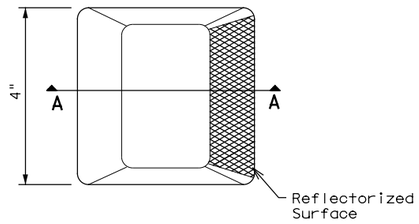
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

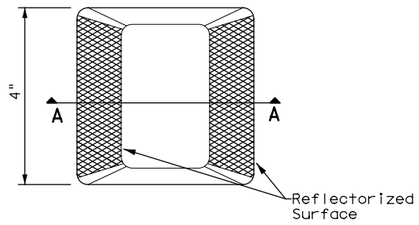
See Note 3.

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

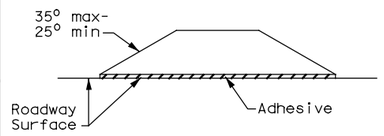
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

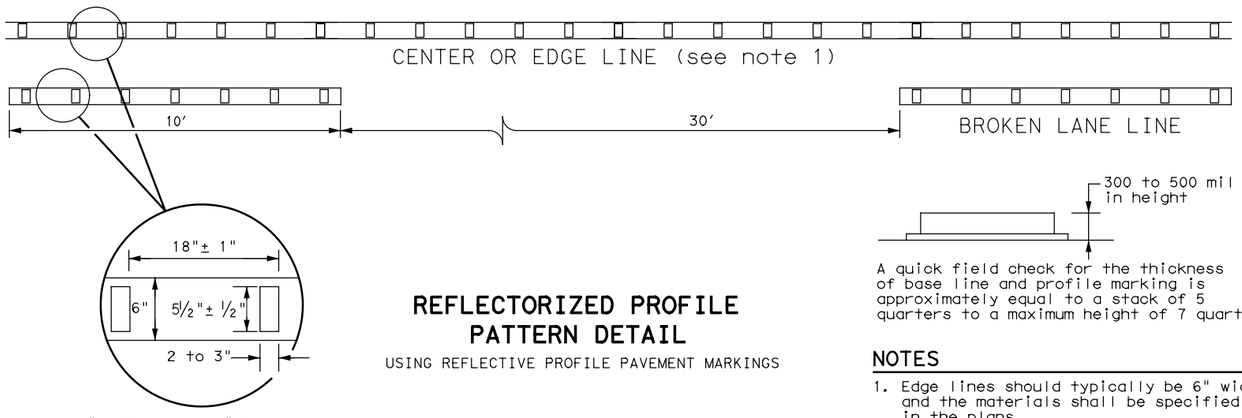


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

NOTES

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

GENERAL NOTES

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

Texas Department of Transportation

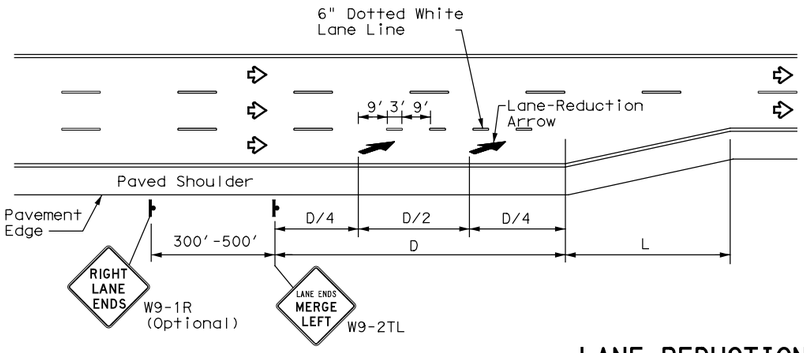
Traffic Safety Division Standard

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

FILE: 53	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	AUSTIN	TRAVIS		53
5-00 2-12				

22B

DATE: 6/28/2023 3:59:07 PM
FILE: $FILE$

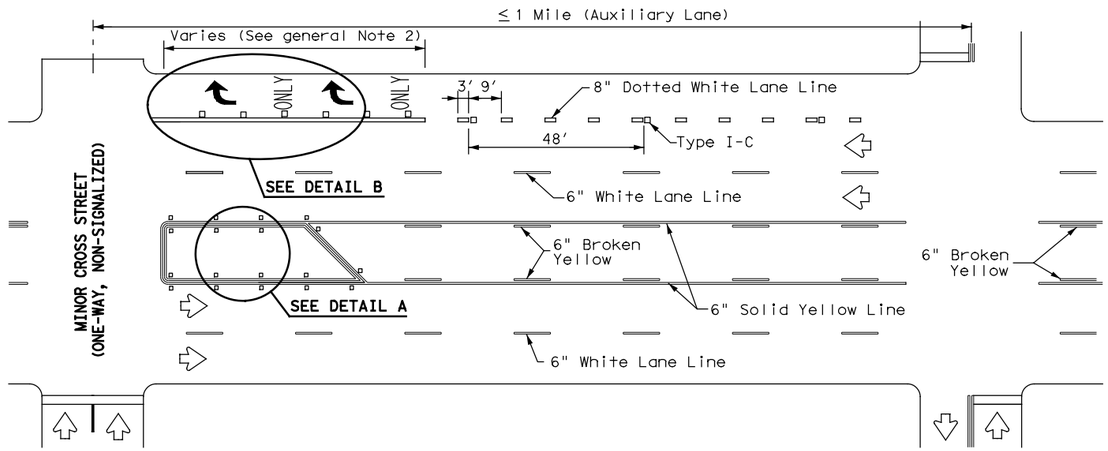


LANE REDUCTION

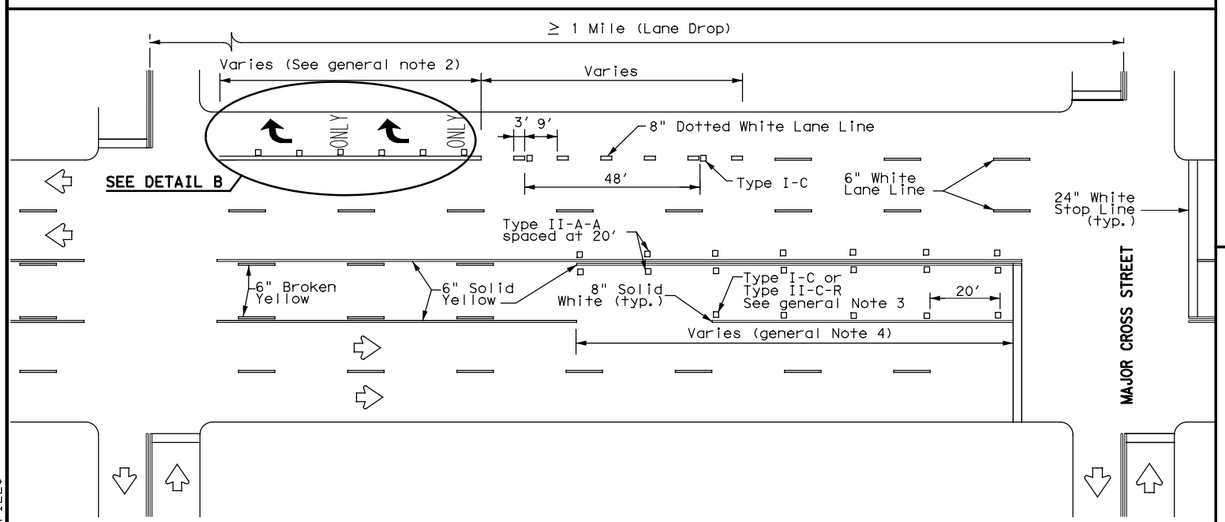
NOTES

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

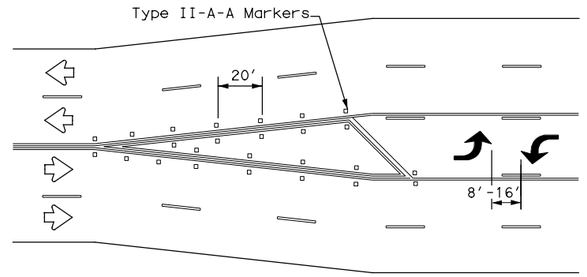
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



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



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



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

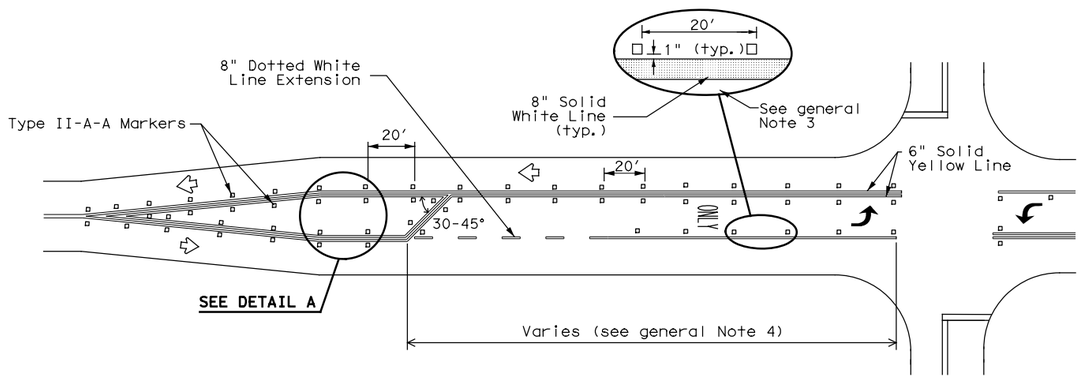
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

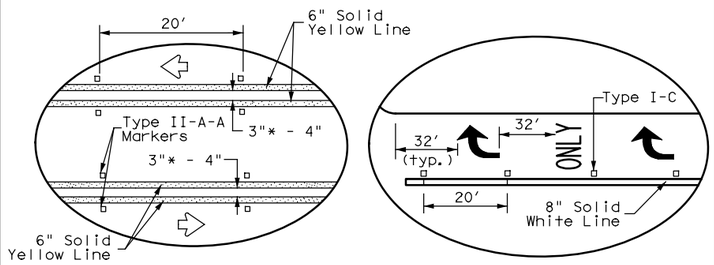
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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

Texas Department of Transportation — Traffic Safety Division Standard

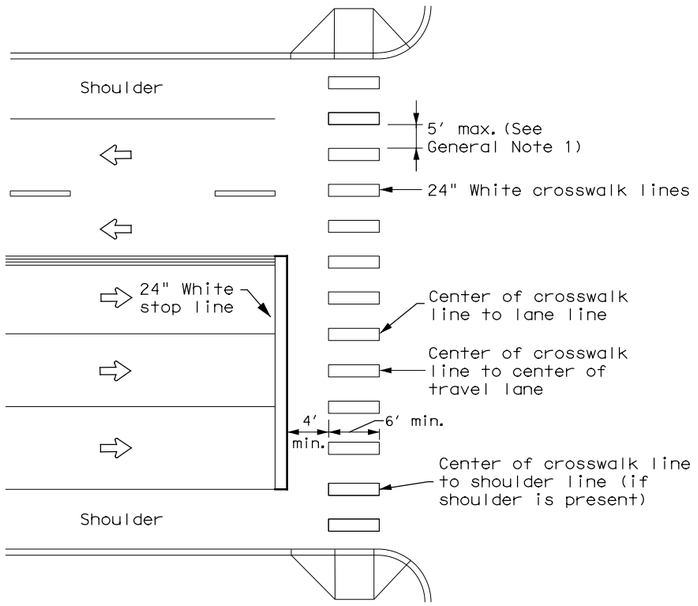
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE: 54	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		54

22C

DATE: 6/28/2023 3:59:09 PM
FILE: $FILE$



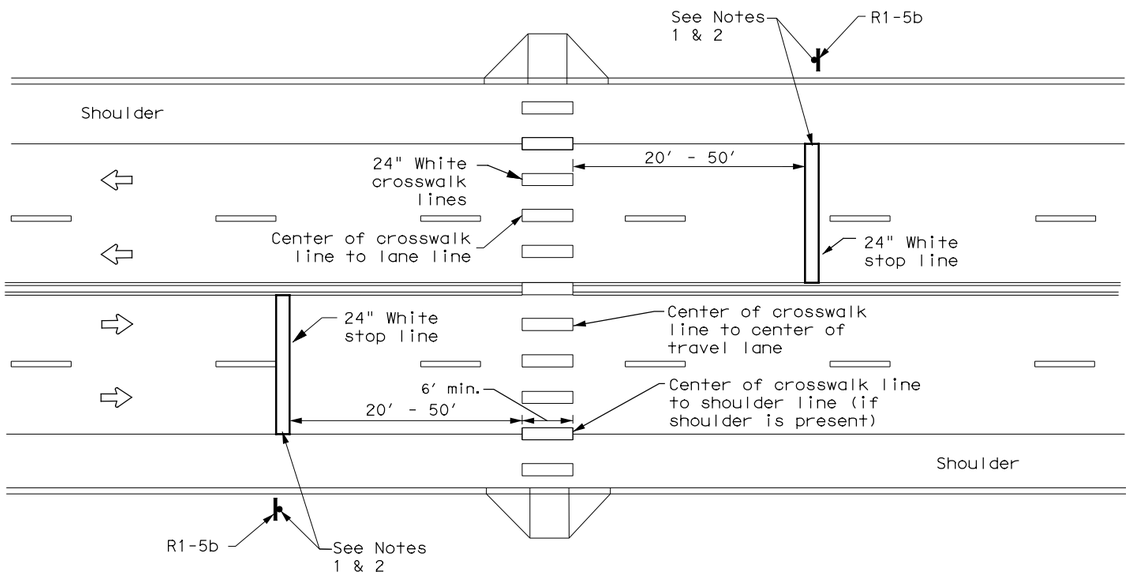
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

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 cross walks.
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.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

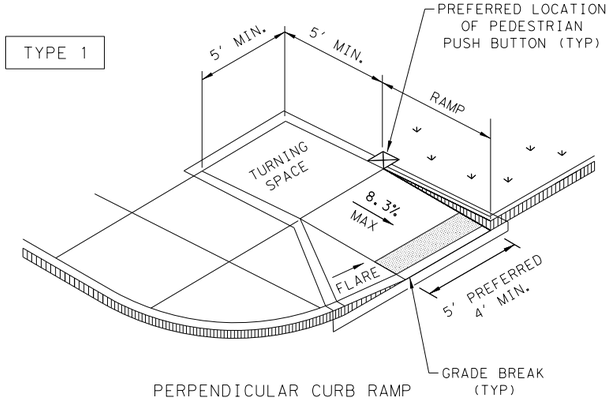
PM(4)-22A

FILE: 55	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
6-20	DIST	COUNTY		SHEET NO.
6-22	AUSTIN	TRAVIS		55
12-22				
22D				

DATE: 6/28/2023 3:59:11 PM
FILE: $FILE$

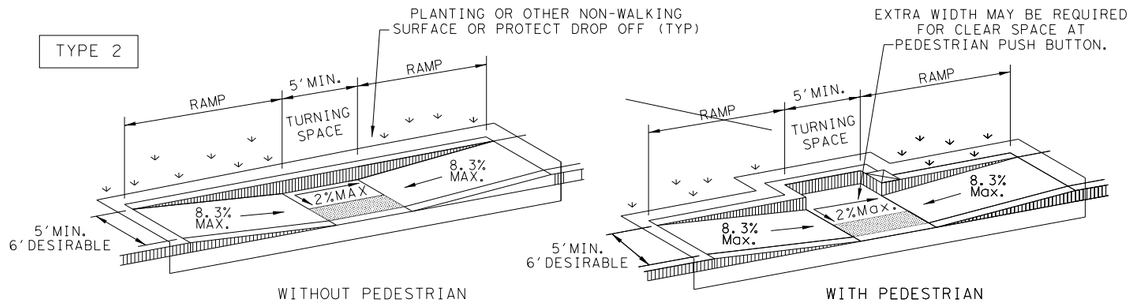
DATE: 6/28/2023
FILE: $FILE$

TYPE 1



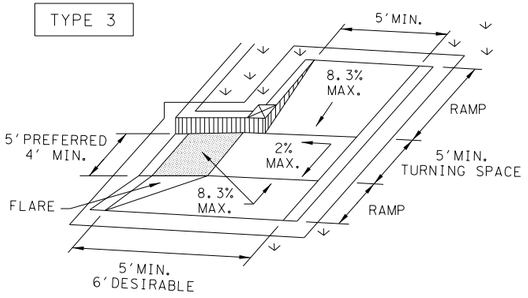
PERPENDICULAR CURB RAMP

TYPE 2

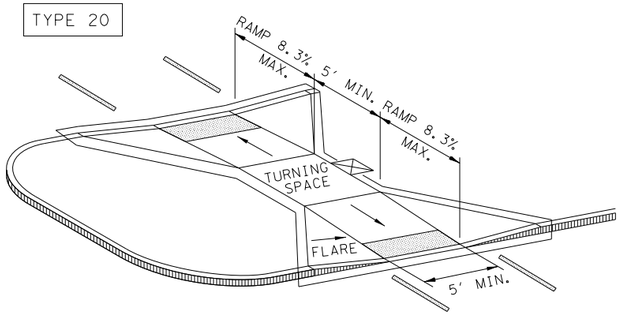


PARALLEL CURB RAMP

TYPE 3



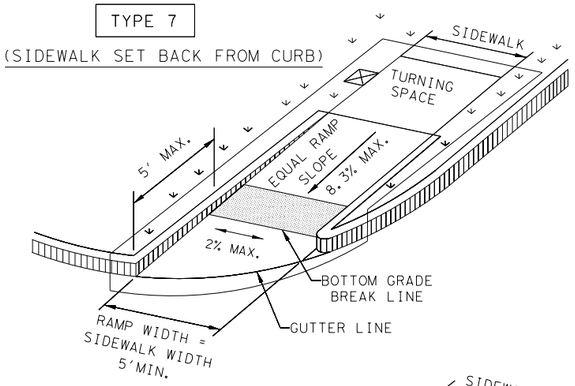
TYPE 20



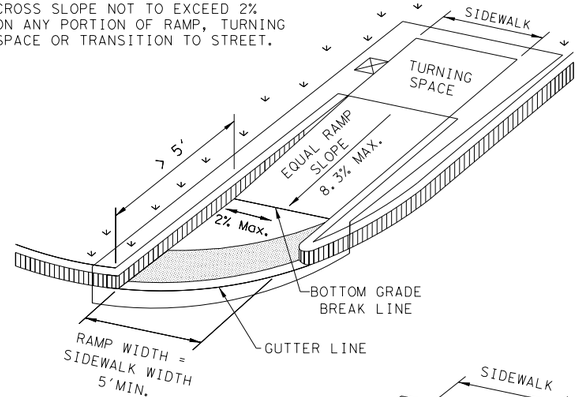
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

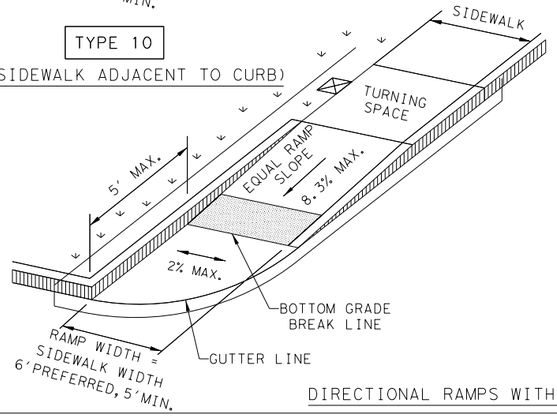


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

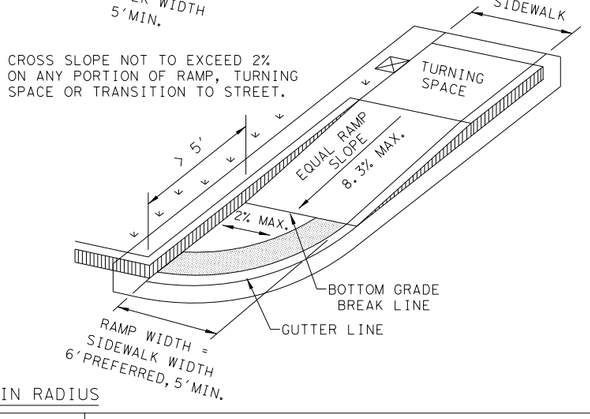


TYPE 10

(SIDEWALK ADJACENT TO CURB)

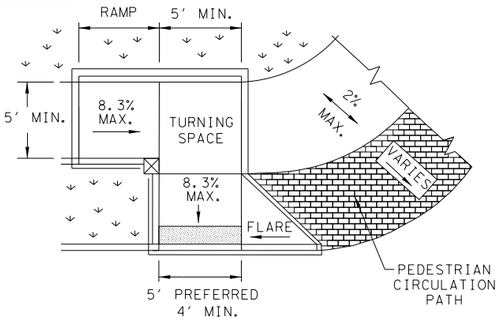


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



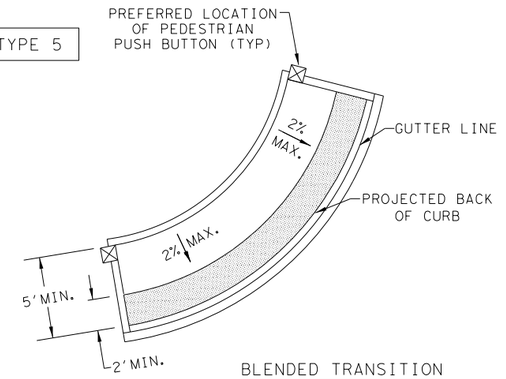
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 6



COMBINATION CURB RAMPS

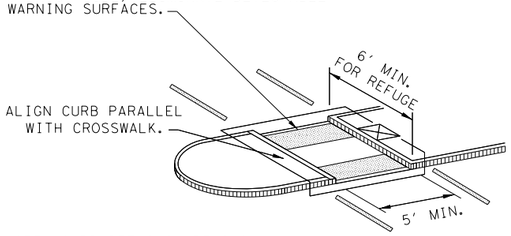
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

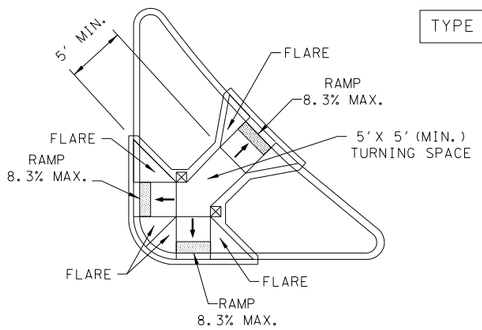
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



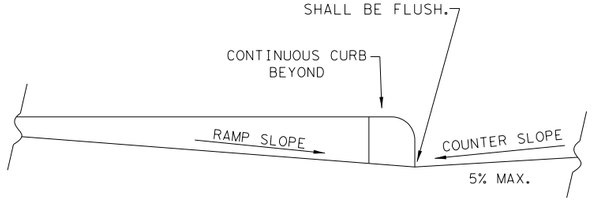
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

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.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

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		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	914	4	331		-
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	AUSTIN	TRAVIS			56

DATE: 6/28/2023
FILE: $FILE$

GENERAL NOTES

CURB RAMPS

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 applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

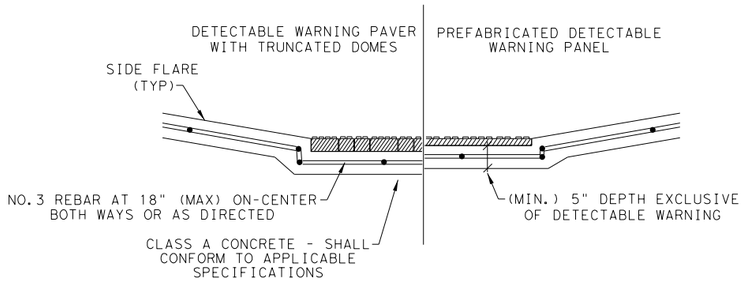
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material 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.

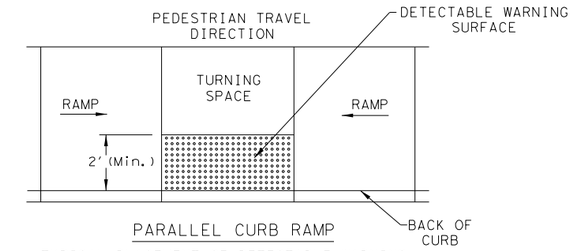
SIDEWALKS

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.



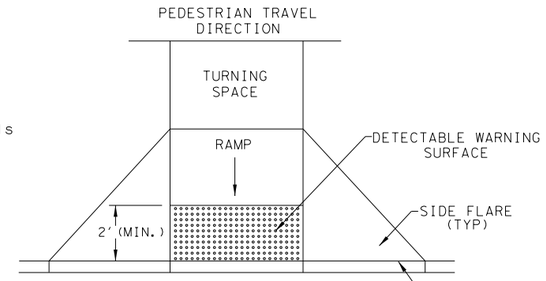
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



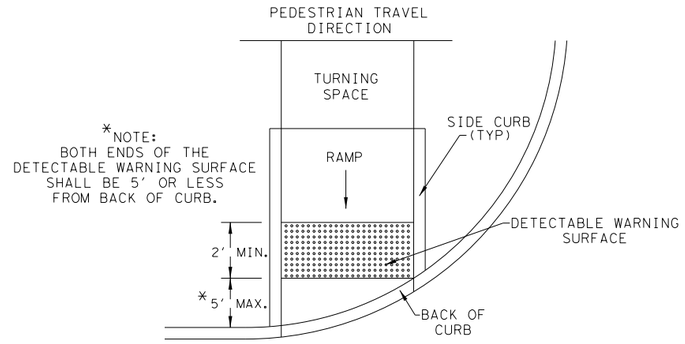
PARALLEL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation

Design Division Standard

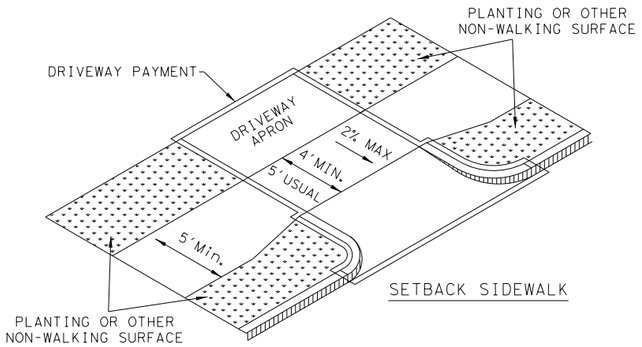
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

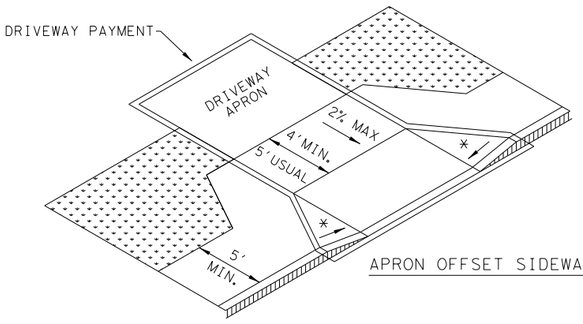
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	914	4	331		-
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	AUSTIN	TRAVIS			57

DATE: 6/28/2023
FILE: $FILE$

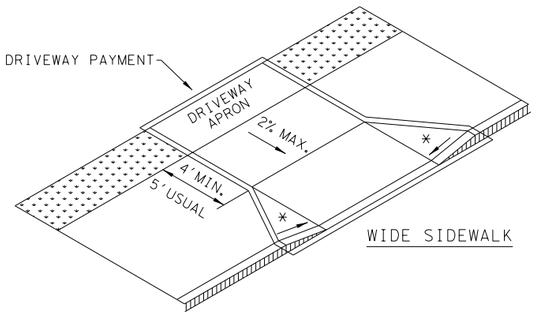
SIDEWALK TREATMENT AT DRIVEWAYS



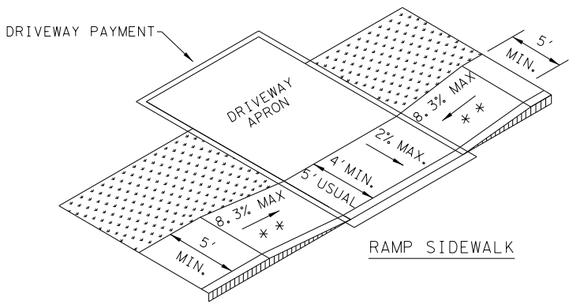
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

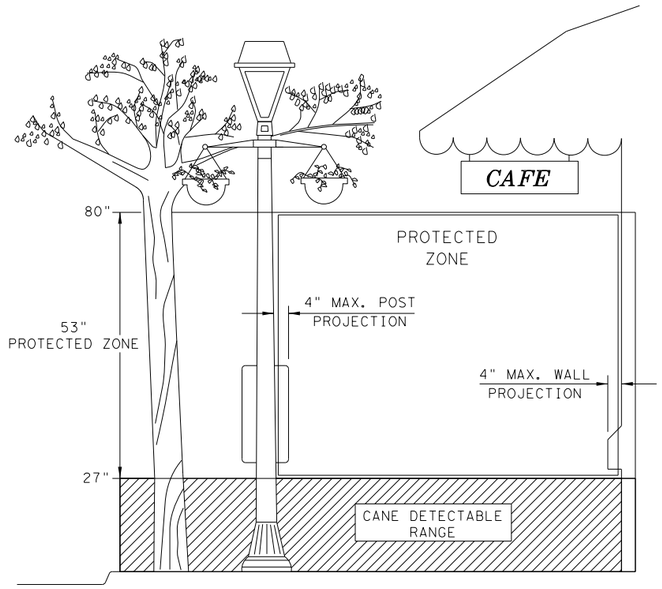


RAMP SIDEWALK

NOTES:

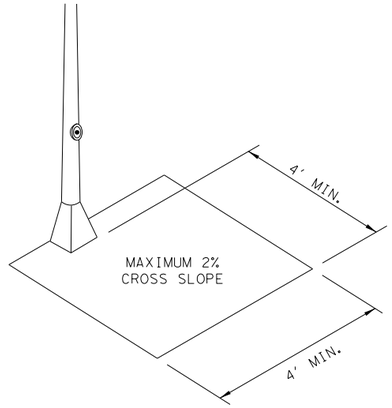
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

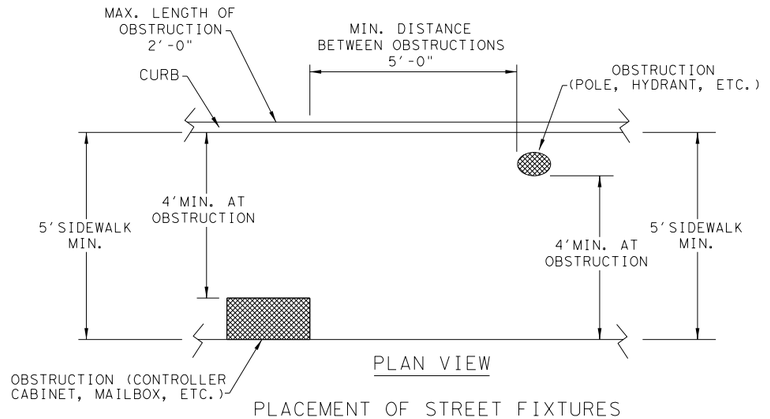


PROTECTED ZONE

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



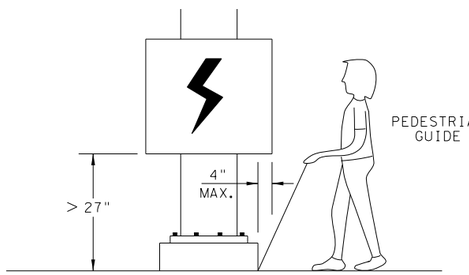
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



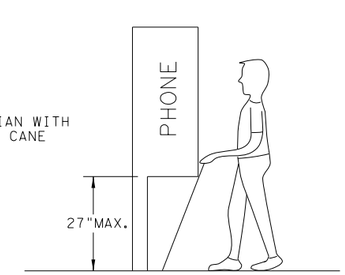
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

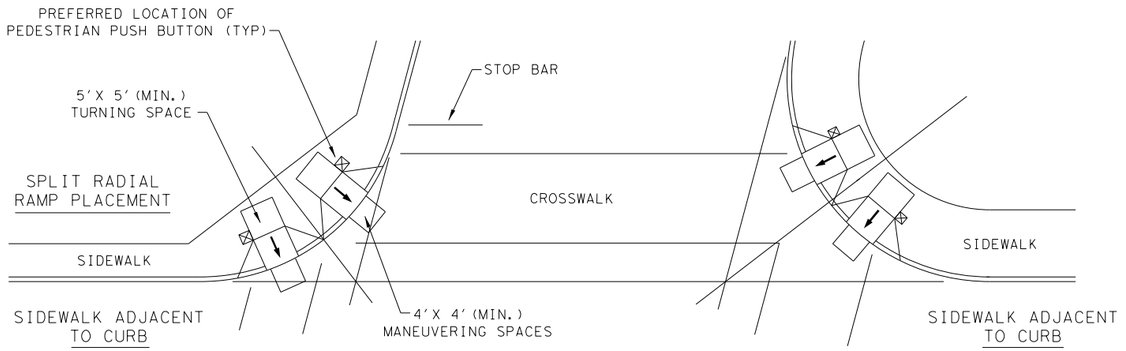
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	914	4	331	-	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	AUSTIN	TRAVIS		58	

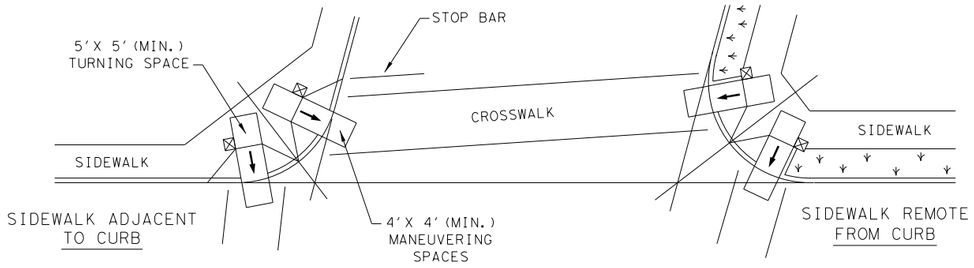
DATE: 6/28/2023
FILE: $FILE$

TYPICAL CROSSING LAYOUTS

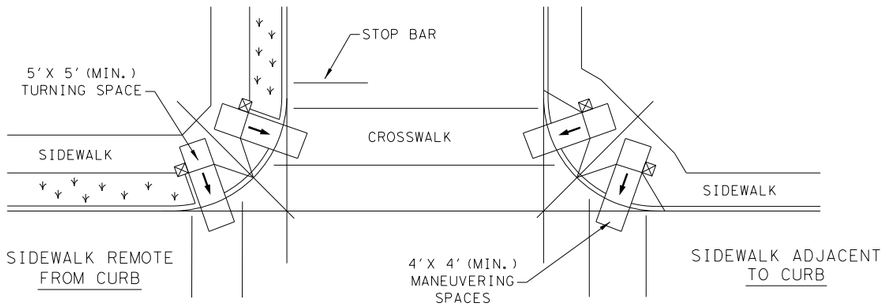
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



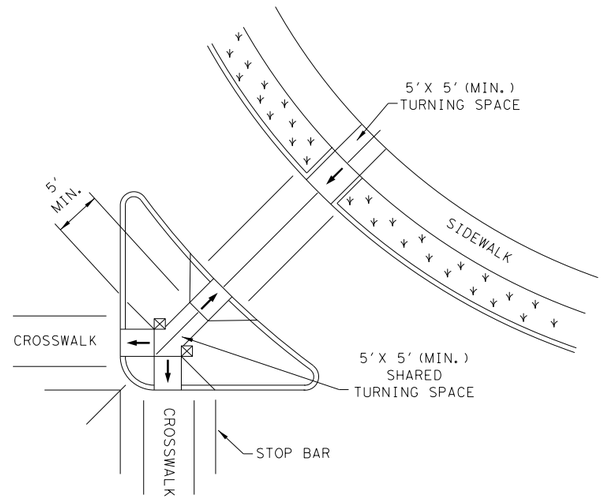
SKEWED INTERSECTION WITH "LARGE" RADIUS



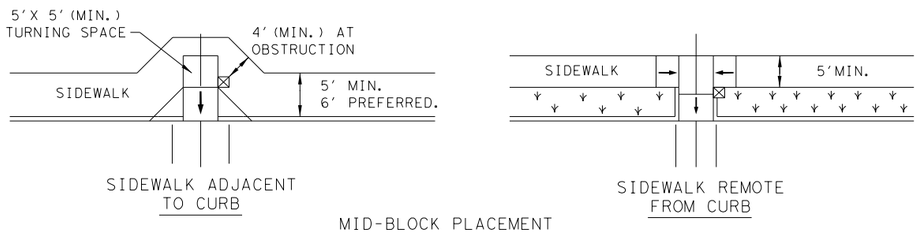
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

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.

SHEET 4 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	914	4	331		-
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	AUSTIN	TRAVIS			59

GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

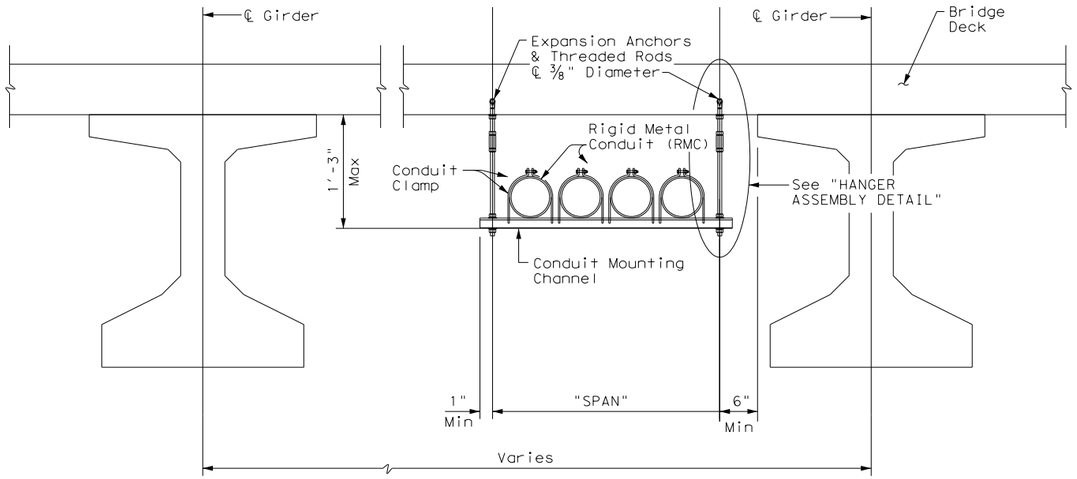
ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
	REVISIONS	914	4	331	-
		DIST	COUNTY		SHEET NO.
		AUSTIN	TRAVIS		60

71A

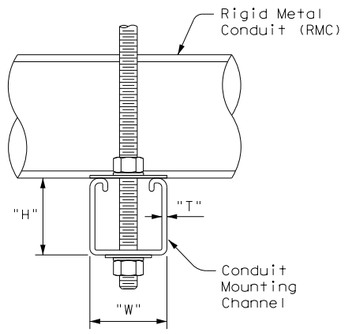
DATE: 6/28/2023 3:59:16 PM
FILE: $FILE$

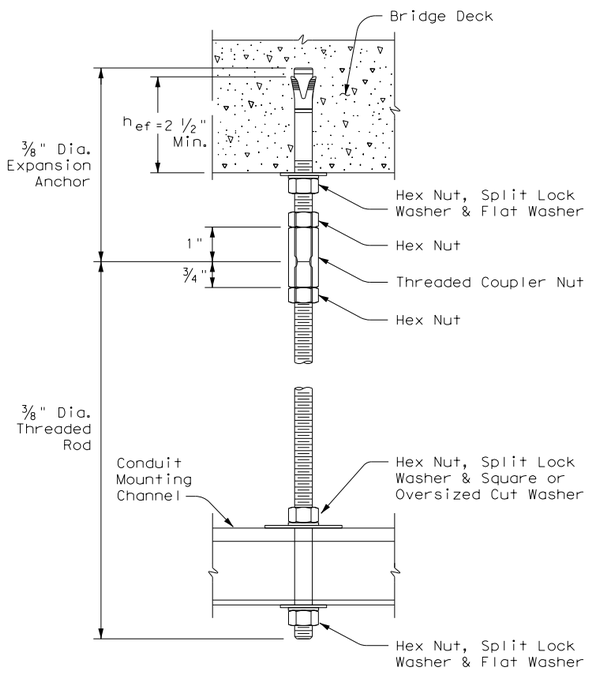


CONDUIT HANGING DETAIL

CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

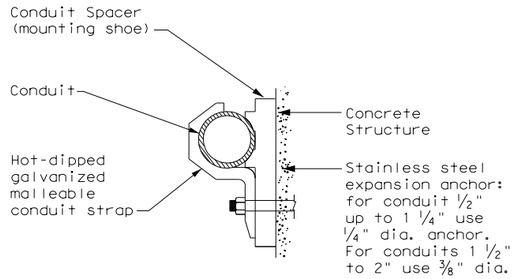
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

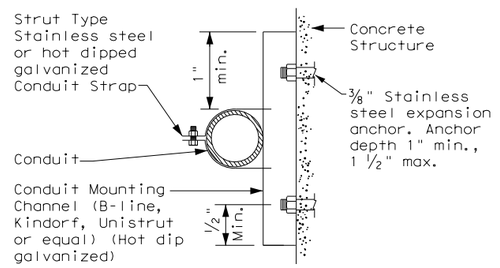




HANGER ASSEMBLY DETAIL

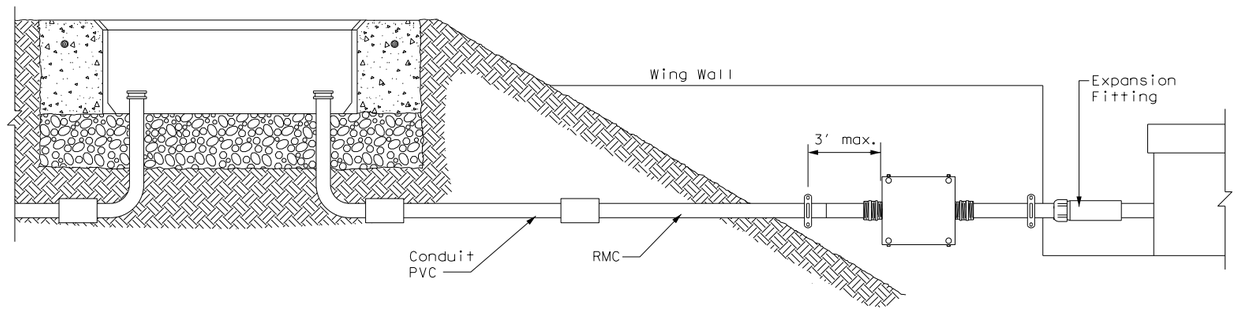
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)B.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef})as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUIT SUPPORTS

ED(2)-14

FILE: ed2-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		61

71B

DATE: 6/28/2023 3:59:18 PM
FILE: $FILE$

DATE: 6/28/2023 3:59:20 PM
FILE: $FILE$

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

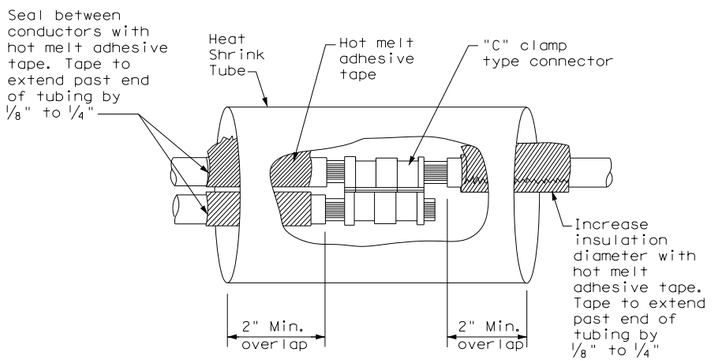
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

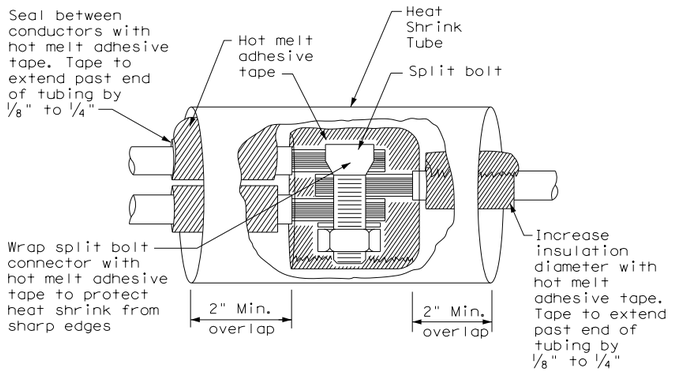
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

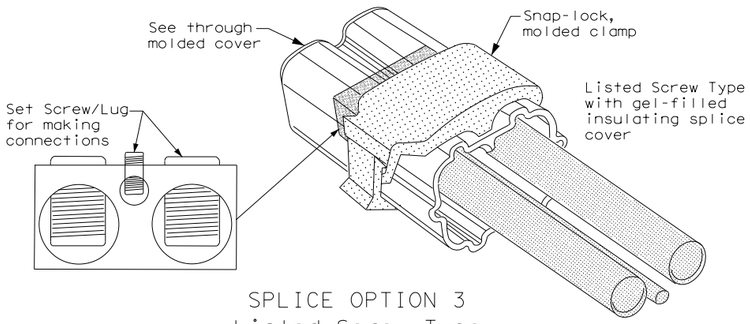
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

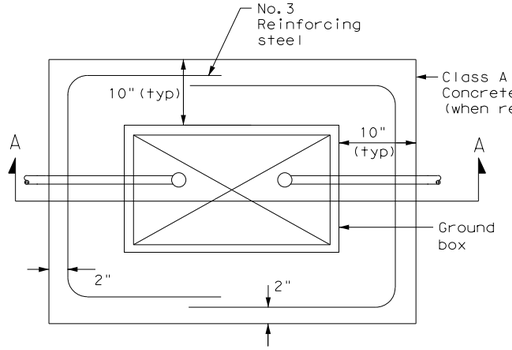
Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

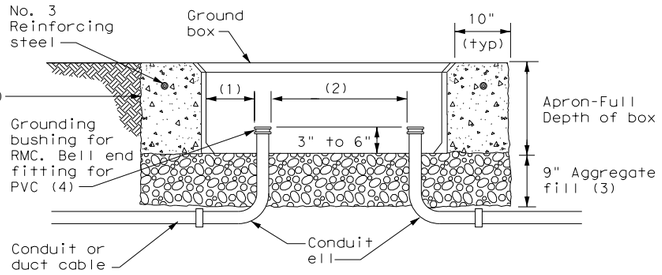
ED(3)-14

FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		62

71C



PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

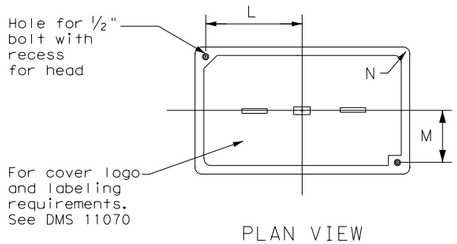
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

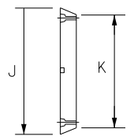
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

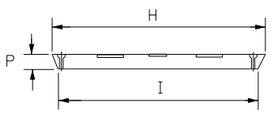
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		63

71D

DATE: 6/28/2023 3:59:22 PM
FILE: $FILE$

DATE: 6/28/2023 3:59:23 PM
FILE: $FILE$

ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

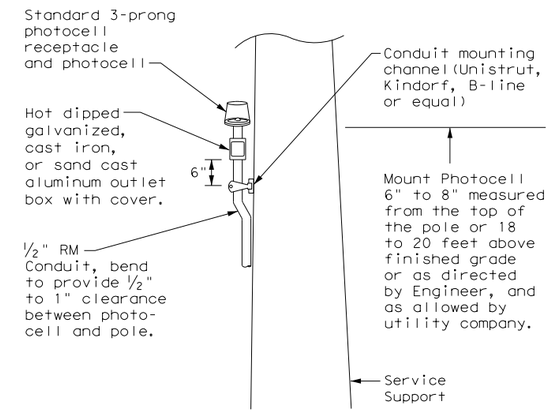
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating
  000 indicates main lug only/
  Typically Type T
- (SS)= Safety Switch Ahead of Meter-Check with Utility
  (NS)= No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type
  GS= Galvanized steel("off the shelf")
  SS= Stainless steel(Custom Enclosure)See MPL
  AL= Aluminum (Custom Enclosure)See MPL
- Photocell Mounting Location
  (E)= Inside Service/Enclosure Mounted
  (T)= Top of pole
  (L)= Luminaire mounted
  (N)= None/No Photocell or Lighting Contactor Required
- Service Support Type
  GC= Granite concrete
  OC= Other concrete
  TP= Timber pole
  SP= Steel pole
  SF= Steel frame
  OT= Pole by others or paid for separately
  EX= Existing pole
  TS= Service on traffic signal pole
  PS= Pedestal Service
- O= Overhead Service Feed from Utility
  U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

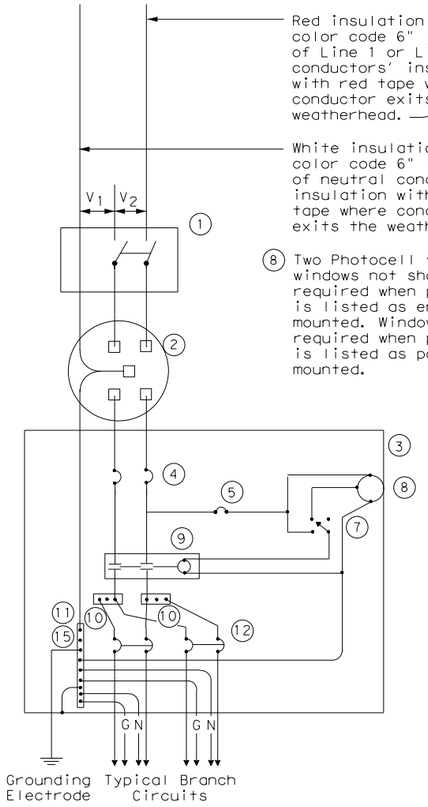
Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

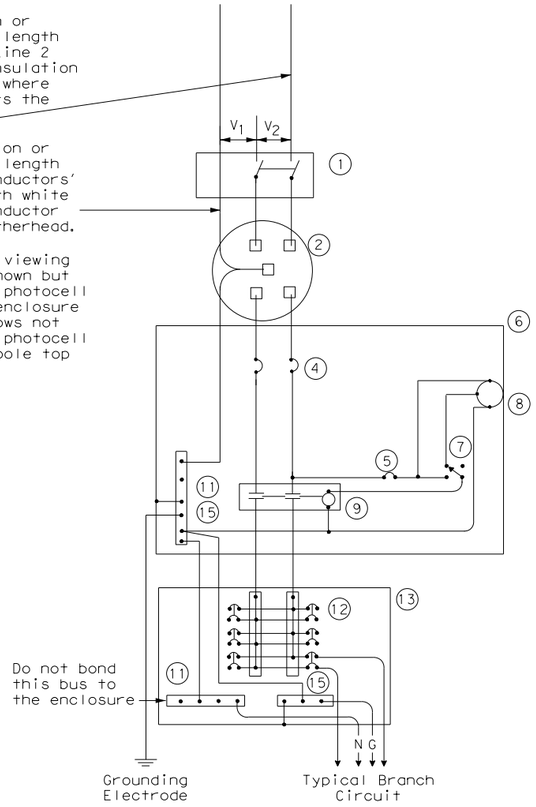
ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		64

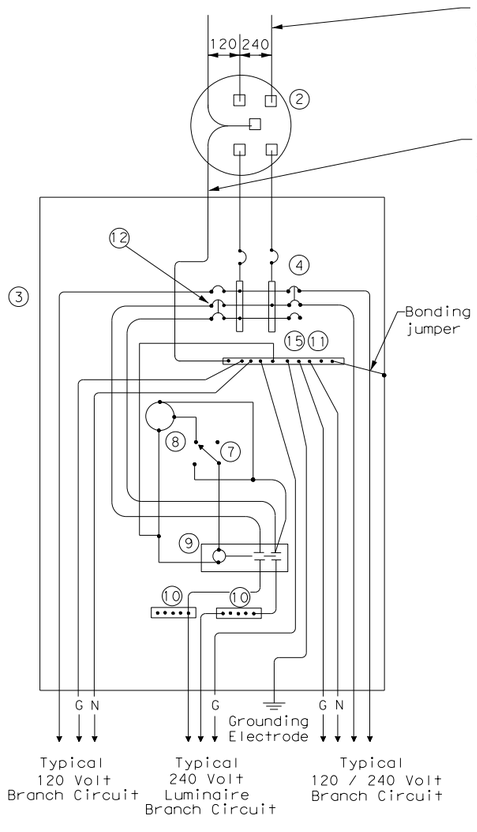
71E



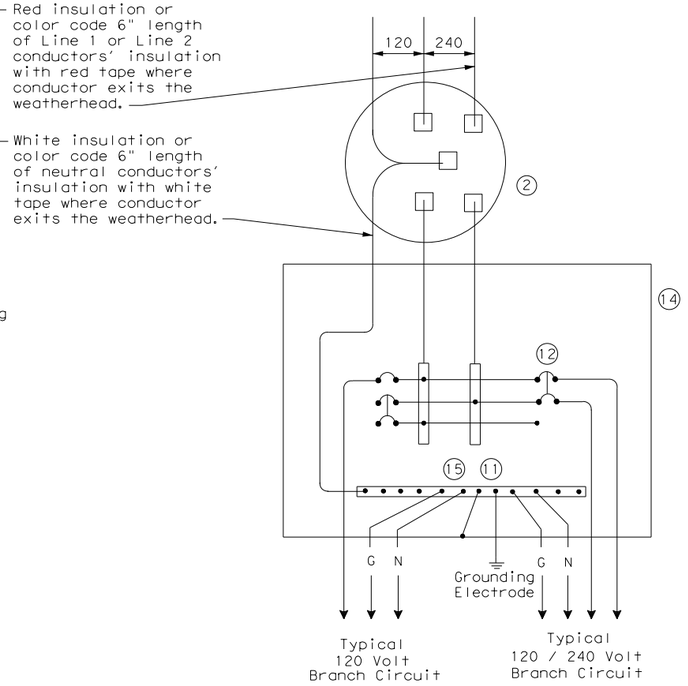
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
———	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

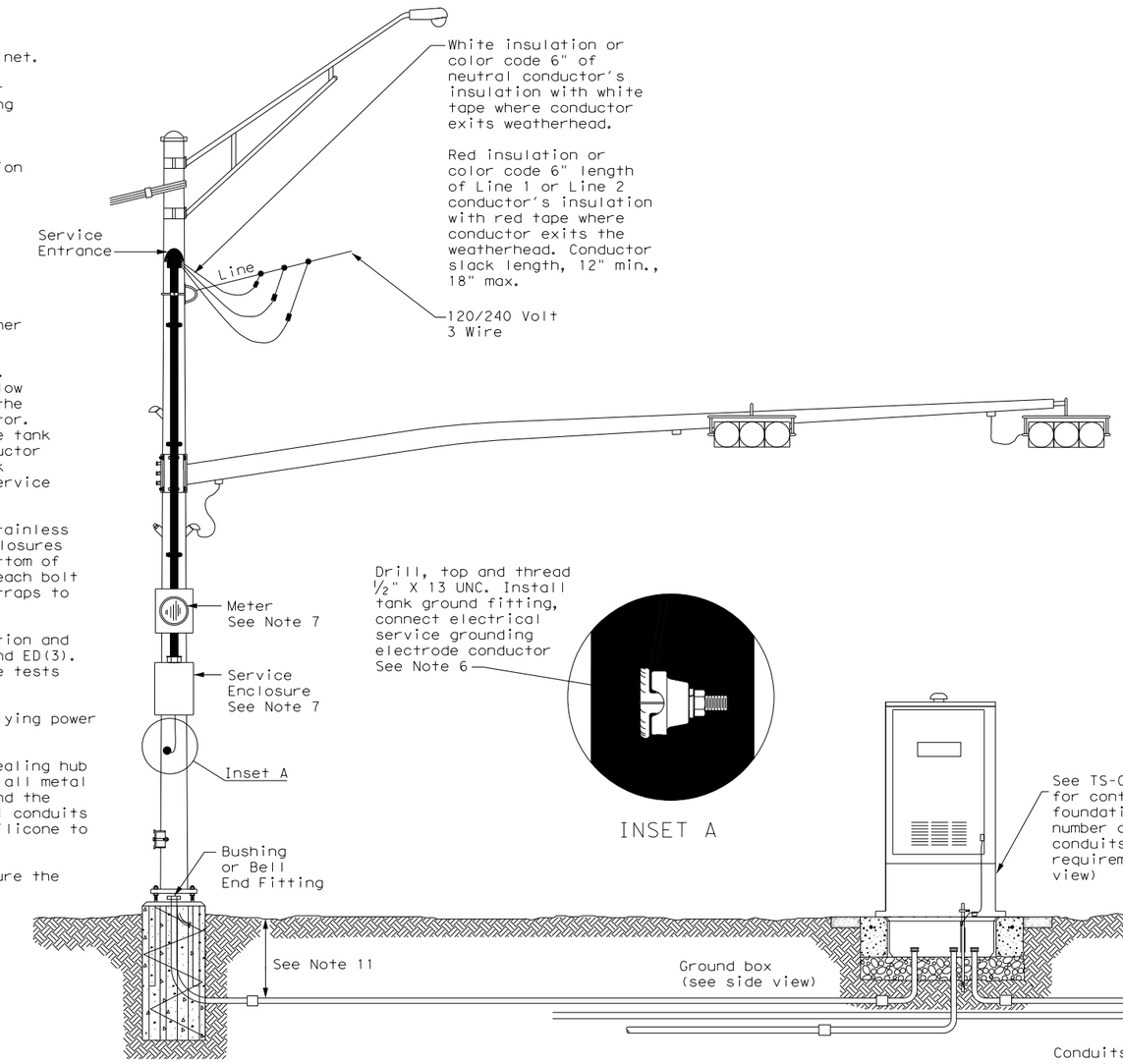
FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		65

71F

DATE: 6/28/2023 3:59:26 PM
FILE: $FILE$

TRAFFIC SIGNAL NOTES

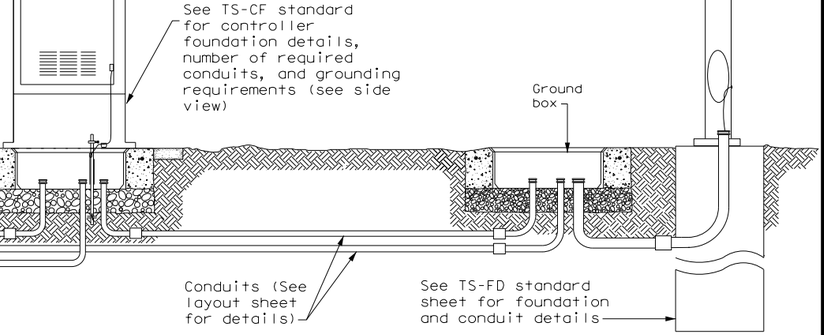
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



INSET A

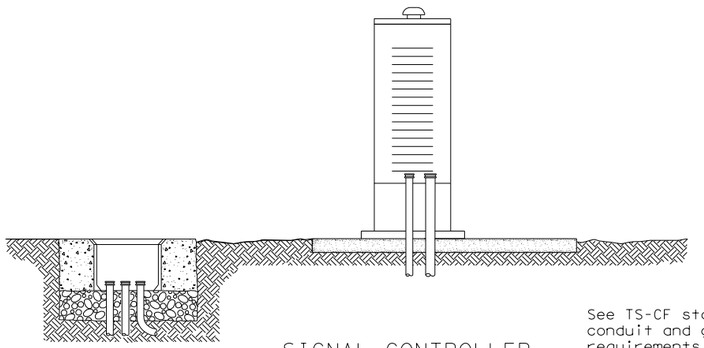
SIGNAL POLE WITH SERVICE

Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

Texas Department of Transportation — Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		66

71H

DATE: 6/28/2023 3:59:27 PM
FILE: $FILE$

PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

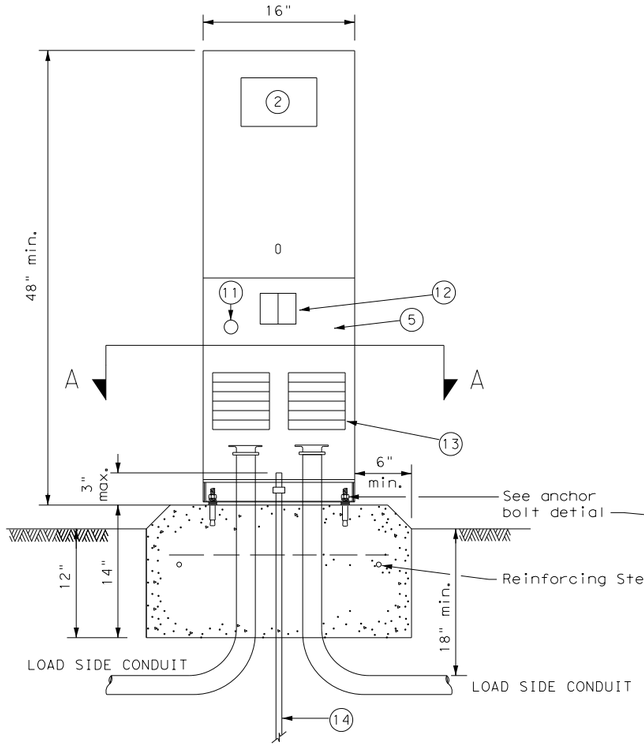
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⁷⁄₁₆ in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

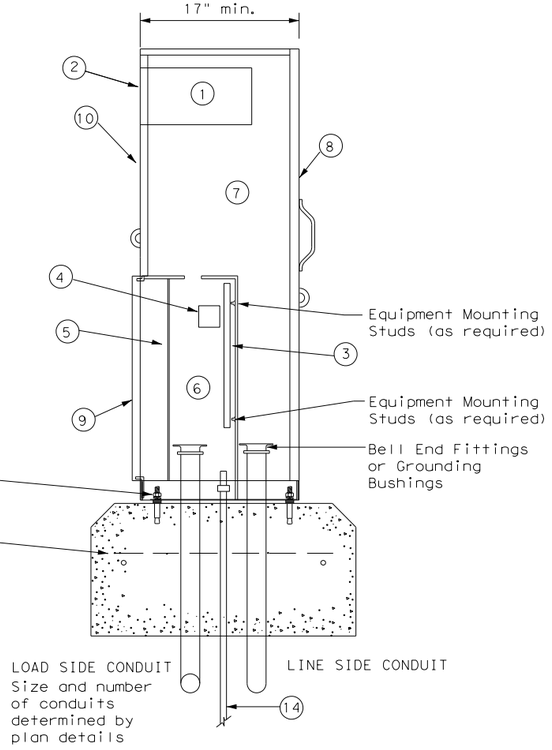
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

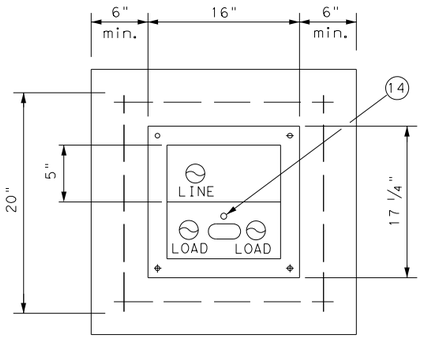


FRONT VIEW

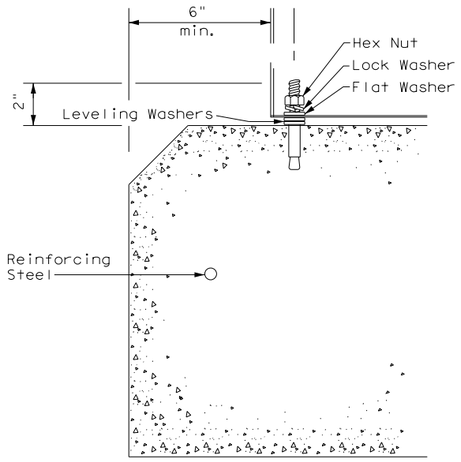


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

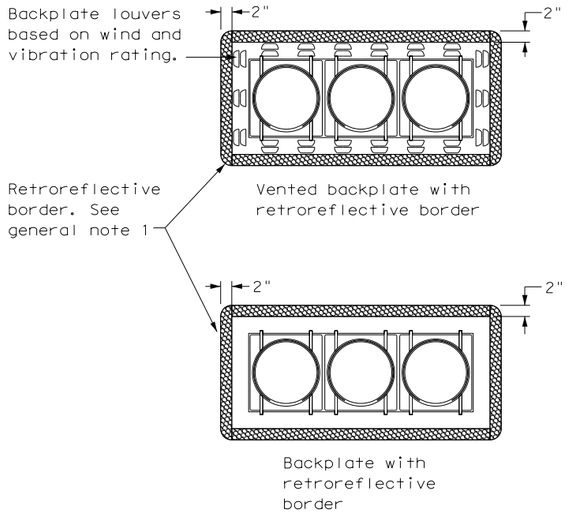
ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

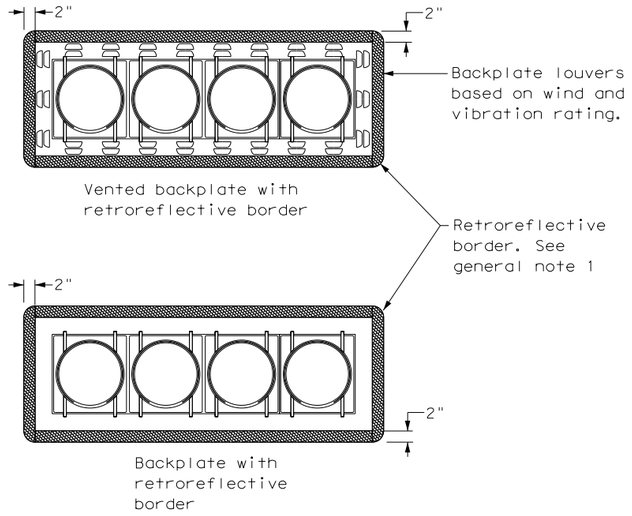
FILE: ed9-14.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
©TxDOT October 2014		CONT	SECT	JOB	HIGHWAY		
REVISIONS		914	4	331	-		
		DIST	COUNTY		SHEET NO.		
		AUSTIN	TRAVIS		67		

71J

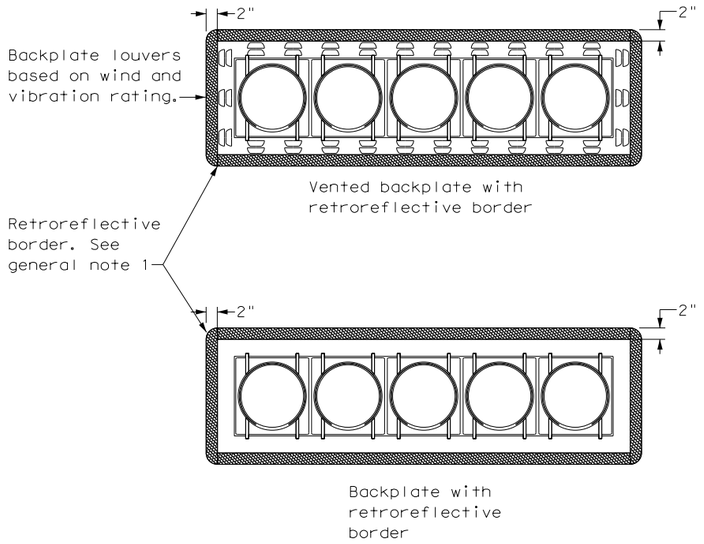
DATE: 6/28/2023 3:59:29 PM
FILE: $FILE$



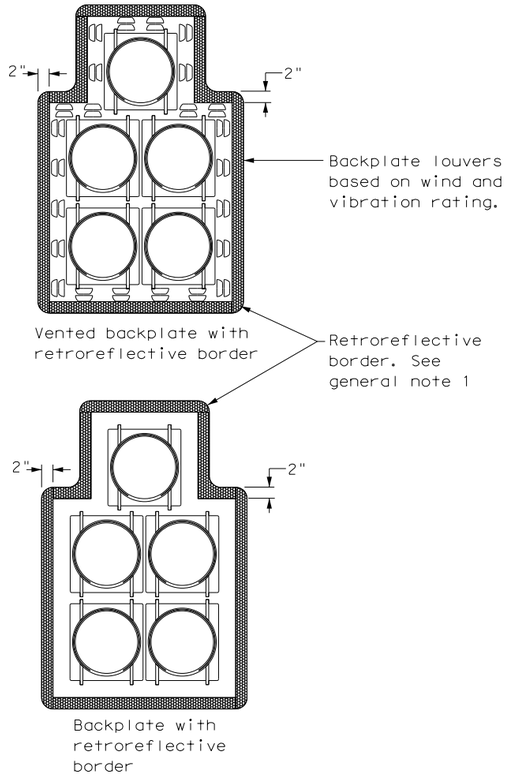
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



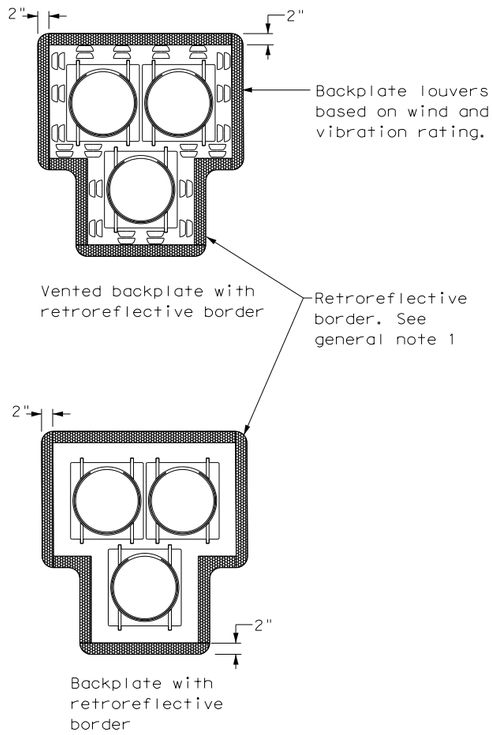
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

Texas Department of Transportation

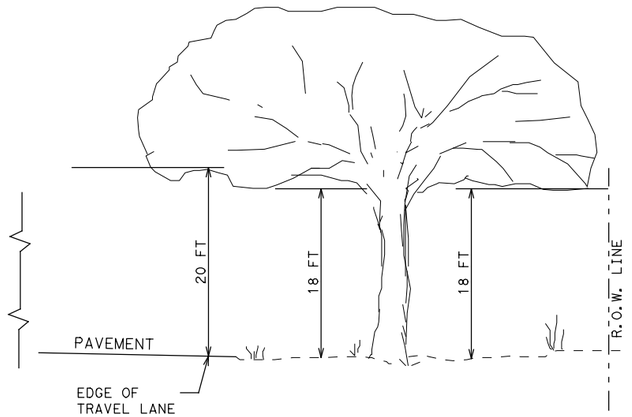
Traffic Safety Division Standard

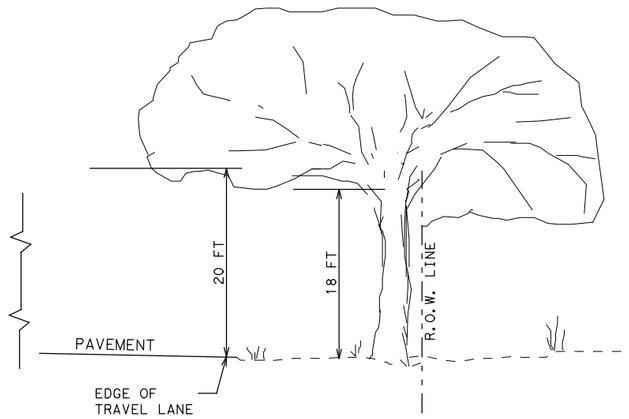
TRAFFIC SIGNAL HEAD WITH BACKPLATE

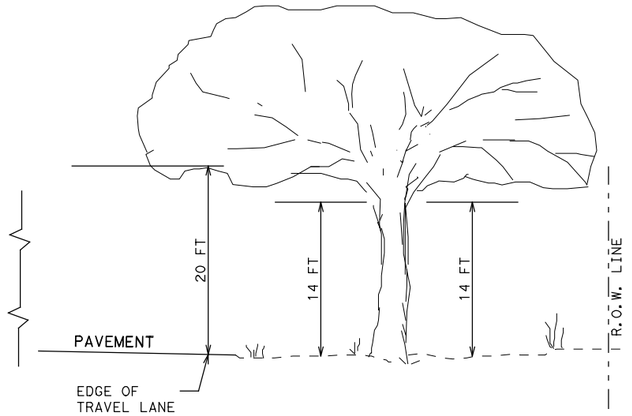
TS-BP-20

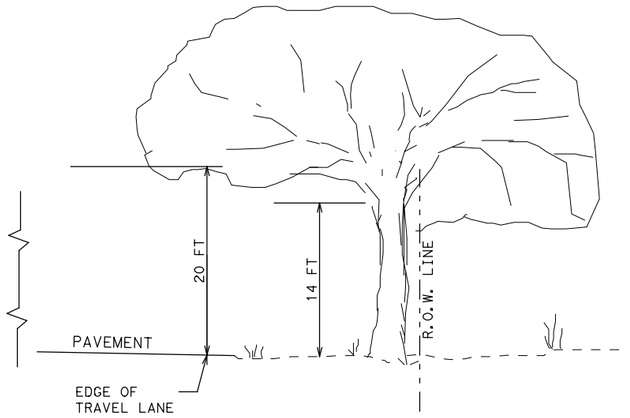
FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	914	4	331	-
	DIST	COUNTY		SHEET NO.
	AUSTIN	TRAVIS		68

DATE: 6/28/2023 3:59:31 PM
FILE: $FILE$





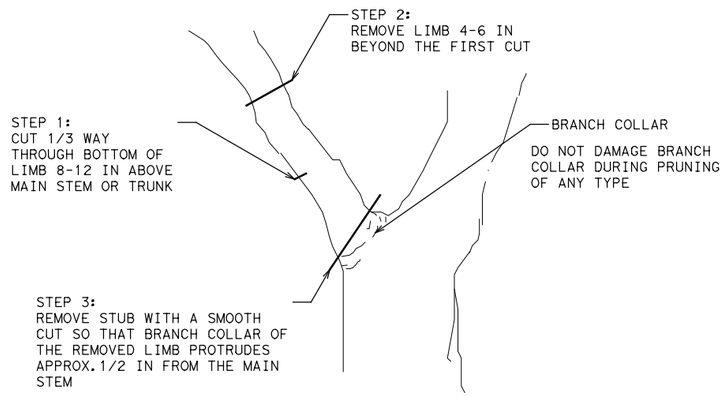




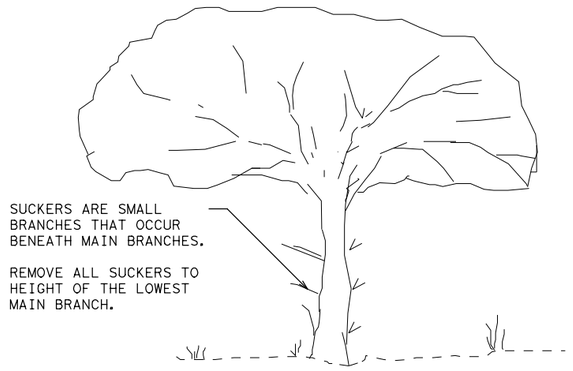
GENERAL NOTES

PAYMENT FOR THIS WORK IS SUBSIDIARY TO PREP R.O.W.

1. REMOVE ALL DEAD TREES, DEAD BRUSH, AND DEAD MULTI-TRUNKED TREES WITHIN THE R.O.W.. TREES, SHRUBS, OR MULTI-TRUNKED TREES THAT DIE DURING CONSTRUCTION SHALL BE REMOVED PRIOR TO COMPLETION OF THE PROJECT.
2. USE WORK METHODS IN ACCORDANCE WITH ANSI A300 STANDARDS AND ITEM 752.
3. FLAILING EQUIPMENT IS NOT ALLOWED ON OAK TREES.
4. REPAIR DAMAGE TO PRIVATE FENCES AND/OR PRIVATE PROPERTY.
5. PERFORM TREE PRUNING ONLY WITHIN THE R.O.W.. NO CUTS SHALL BE MADE OUTSIDE THE R.O.W..
6. PERFORM TREE PRUNING PER DETAIL FOR ENTIRE R.O.W. AREA WITHIN PROJECT LIMITS. THE ENGINEER MAY DEFINE AREAS TO RESTRICT TREE PRUNING.
7. REVIEW EPIC SHEETS FOR AREAS TO BE AVOIDED DUE TO ENVIRONMENTAL REASONS OR ADDITIONAL NOTES THAT PERTAIN TO TREE PRUNING.
8. MIGRATORY BIRDS AND BATS MAY BE NESTING WITHIN THE PROJECT LIMITS. PERFORM TREE TRIMMING OUTSIDE THE NESTING SEASON DATES LISTED IN THE GENERAL NOTES.
9. NO TRIMMING OF THE VEGETATION THAT CONTAINS AN ACTIVE NEST FOR MIGRATORY BIRDS IS ALLOWED.
10. THE TRIMMING OR CUTTING OF RED OAK AND LIVE OAK SPECIES FOR PURPOSES OTHER THAN PROTECTING PUBLIC SAFETY IS ONLY PERMITTED BETWEEN JULY 1ST AND JANUARY 31ST AND PROHIBITED BETWEEN FEBRUARY 1ST AND JUNE 30TH
11. ALL PRUNING CUTS MUST BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE EXPOSED SURFACE FROM CONTAMINATION. USE OF AEROSOL CAN IS THE PREFERRED METHOD OF APPLICATION FOR SEALING CUTS. ANY WOUNDS, WHETHER MADE BY TRIMMING, CONSTRUCTION OR ACCIDENT, SHALL BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE SURFACE FROM CONTAMINATION. THE TXDOT INSPECTOR MAY CONDUCT UNANNOUNCED INSPECTIONS TO ENSURE COMPLIANCE.
12. IF MORE THAN 25% OF THE TREE CANOPY WILL BE REMOVED CONTACT THE TXDOT ABORIST OR INSPECTOR FOR APPROVAL PRIOR TO PROCEEDING.



FOR LIMBS 2" IN DIA. AND GREATER



Texas Department of Transportation

Austin District Standard

PREP R.O.W. PRUNING DETAIL

PRWPD-20 (AUS)

CONT	SECT	JOB	HIGHWAY
914	4	331	-
DIST	COUNTY		SHEET NO.
AUSTIN	TRAVIS		69

DATE: 6/28/2023 3:59:33 PM
FILE: $FILE$

DATE:
FILE:

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.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. 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
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

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.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

SHEET 1 OF 1

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0914	04	331, 333	
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.	14	TRAVIS		70