FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
PROJECT NO. STP 2024(413)HES
CSJ: 0291-10-119, ETC

BEXAR
VARIOUS

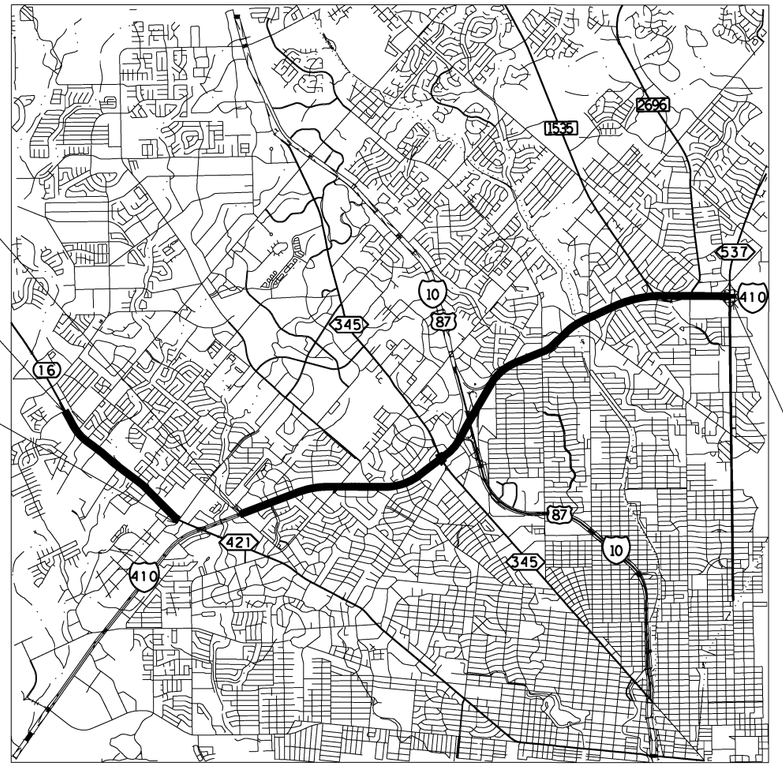
LIMITS FROM: REINDEER TRAIL
TO: WURZBACH RD

NET LENGTH OF ROADWAY = N/A
NET LENGTH OF BRIDGE = N/A
NET LENGTH OF PROJECT = N/A

DESIGN SPEED = VARIOUS
AREA OF DISTURBED SOIL = N/A
ADT: VARIOUS

ACCESSIBILITY STANDARDS = N/A

FOR WORK CONSISTING OF INSTALLING SIGNAL BACKPLATE AND SIGNAL HEADS AT VARIOUS INTERSECTIONS.



FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED
IN ACCORDANCE WITH THE PLANS.

P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: JACKSON KELLER AT IH410 WB/EBFR
DOT No. 763824G MP 8.880
DOT No. 763825N MP 8.830
DOT No. 764194T MP 8.890

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, October 23, 2023

SUBMITTED FOR LETTING 10/4/2023
DocuSigned by: Orlando Gallegos, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 10/2/2023
DocuSigned by: Clayton Kipps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

REVIEWED FOR LETTING 10/2/2023
DocuSigned by: D.R. Rogers, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING 10/2/2023
DocuSigned by: Gina E. Gallegos, P.E.
DISTRICT ENGINEER

FILE LOCATION AND NAME
T:\Engdata\Standards\Design\TITLESHEET-2014Specs.DGN

LEVELS DISPLAYED
1

PROJ. NO. _____
COUNTY _____ LETTING DATE _____
HWY. NO. _____
DATE ACCEPTED _____

NOTES:
1: (**) INDICATES SAN ANTONIO DISTRICT STANDARDS
2: (*) INDICATES STATE STANDARDS

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 9-20-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

THE STANDARD SHEETS SPECIFICALLY IDENTIFY BY (*) & (**) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Texas Department of Transportation

SH 16
INDEX OF SHEETS

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	2

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

9/19/2023 1:28:27 PM
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County: Bexar

Highway: Various

**********GENERAL NOTES**********
2014 Specification Book

--General--

Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

City of San Antonio: (210) 207-8642

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

Submit locate request for SAWS water and sewer to TXDOTlocates@saws.org.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the

County: Bexar

Highway: Various

appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
Orlando Gallegos, P.E. District Traffic Engineer, Orlando.Gallegos@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

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

--Item 5--
Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit 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.

County: Bexar

Highway: Various

Refer to the Buy America Material Classification Sheet for clarification on material categorization.
The Buy America Material Classification Sheet is located at the below link.
https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

--Item 7--
The total disturbed area within the project is anticipated at less than one (1) acre. Due to this type of construction, the project qualifies for exclusion under the Construction General Permit (CGP) issued by the Texas Commission on Environmental Quality (TCEQ). However, should the sum of the Engineer's anticipated disturbances and the Contractor's (On ROW and off ROW) PSL's equal or exceed the one (1) acre threshold; both TxDOT and the Contractor have project responsibilities under the CGP that reverts to non-exclusion status. Obtain approval for all non-depicted areas of disturbance that increases the initial soil and vegetation disturbed area estimates before work starts at these locations.

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

Roadway closures during the following key dates and/or special event are prohibited.
See the general notes under Item 502 for these dates.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4 Standard work week.

A Special Provision to Item 8 for a delayed authorized date to begin work has been included in the contract. The reason for including the Special Provision is for material processing or contractor mobilization.

Create and maintain a Bar Chart schedule.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

County: Bexar

Highway: Various

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
General
In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Avoid placing stockpiles, equipment, and other construction materials within the roadway's horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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.

Access to adjoining property must be maintained at all times.

County: Bexar

Highway: Various

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

For closures not listed in the TCP; the lane closures are limited to between the hours of 9 P.M. to 5 A.M., and at least one lane must remain open at all times.

At no time shall two consecutive intersecting roadways be closed at one time during construction.

At no time shall two consecutive ramps be closed at one time during construction or overlay operations.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions:

Nighttime: Nighttime work is permitted Sunday-Thursday from 9 P.M. to 5 A.M. (With uniformed off duty law enforcement officers) No daytime lane closures.

Weekend closures when approved by the Engineer: Weekend work is not permitted.

No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Fiesta Week and Sales Tax Holidays
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Election days
During major events at the AT&T Center (Spurs home games, Rodeo, concerts, etc.)
Alamodome, and/or Convention Center (Bexar County Only)

County: Bexar

Highway: Various

Easter Weekend - April 7th to 9th

Traffic Signals

There are traffic signals at the intersection of SH 16 at Reindeer Trail, Huebner, Poss, Grissom, El Verde, Seneca Drive, and Wurzbach, and IH 410 frontage road at Evers, Callaghan, Babcock, Fredericksburg, Cherry Ridge Drive, Vance Jackson, Jackson Keller, West Avenue, Honeysuckle Lane, FM 1535, Blanco, and San Pedro Avenue . Always keep the signals in operation except when necessary for specific installation operations, including any modifications to existing signal heads to always maintain clear visibility. Adjustment of any signal head will be subsidiary to Item 502. When it is necessary for a signal to be turned off, or when left-turn lanes are closed, hire off duty police officers to control the traffic until the signals are back in satisfactory condition.

Moving or adjustment of traffic signal heads, VIVDS, and radar detection for the purpose of alignment with the shifting of lanes in conjunction with the traffic control plan will be subsidiary to various bid items.

Coordinate with the appropriate entity (City of San Antonio) or TxDOT when left-turn lanes are closed and/or for signal timing revisions as necessary.

--Item 506--
The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. An Inspector will perform a regularly scheduled SW3P inspection every 7 calendar days if erosion control measures are installed.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 682--
Pedestrian signals may be by a different manufacturer than the vehicle signal heads.

Cover all signal faces until placed in operation. This work is subsidiary to various bid items.

All mounting attachments shall be constructed of steel pipe and mounted as shown on the plans.

County: Bexar

Highway: Various

--Item 688--
The button placement must be coordinated with the concrete pad to access the button according to ADA and TAS. If any mounting modifications are needed (extensions, brackets, etc.) to meet ADA and TAS requirements the adjustment will be subsidiary to Item 688. The concrete pad (if required) will be paid separately.

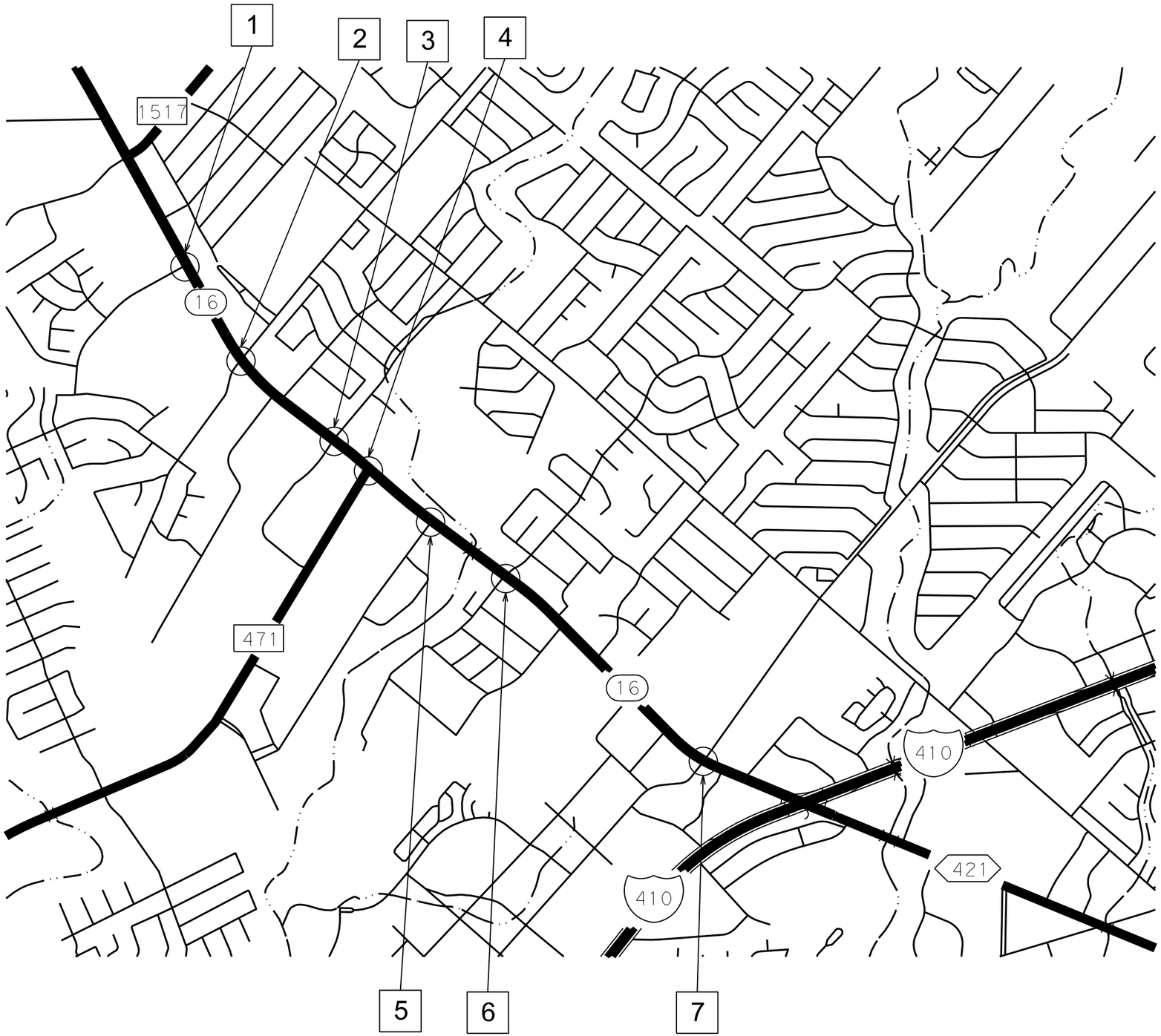
Furnish and install new Polara Enterprises accessible pedestrian signals (APS) push buttons or approved equivalent.

--Item 6185--
2 shadow vehicles with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project. See TMA and TA Summary sheet in the plans.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0291-10-119 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY IH 410, SH 16

			CONTROL SECTION JOB		**0291-10-119**		**0521-04-299**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00190644**		**A00190643**			
			COUNTY		**Bexar**		**Bexar**			
			HIGHWAY		**SH 16**		**IH 410**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	500-6001	MOBILIZATION	LS	1.000				1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.000				5.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF			126.000		126.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	74.000		152.000		226.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	27.000		76.000		103.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	74.000		152.000		226.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	19.000		68.000		87.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	74.000		152.000		226.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	19.000		34.000		53.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA			28.000		28.000	
	682-6054	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	EA	85.000		132.000		217.000	
	682-6055	BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM	EA	8.000		32.000		40.000	
	682-6056	BACKPLATE W/REF BRDR(5 SEC)(VENT)ALUM	EA			22.000		22.000	
	684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	3,985.000		8,266.000		12,251.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA			27.000		27.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA			2.000		2.000	
	690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	93.000		179.000		272.000	
	690-6030	REMOVAL OF PEDESTRIAN PUSH BUTTONS	EA			27.000		27.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	58.000		92.000		150.000	
	6185-6002	TMA (STATIONARY)	DAY	58.000		92.000		150.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000				1.000	
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	



N.T.S

REF. NO.	HWY.	LIMITS TO (AT)
1	SH 16	REINDEER TRAIL
2	SH 16	HUEBNER ROAD
3	SH 16	POSS ROAD
4	SH 16	GRISSOM ROAD
5	SH 16	EL VERDE ROAD
6	SH 16	SENECA DRIVE
7	SH 16	WURZBACH ROAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
LOCATION MAP

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		5
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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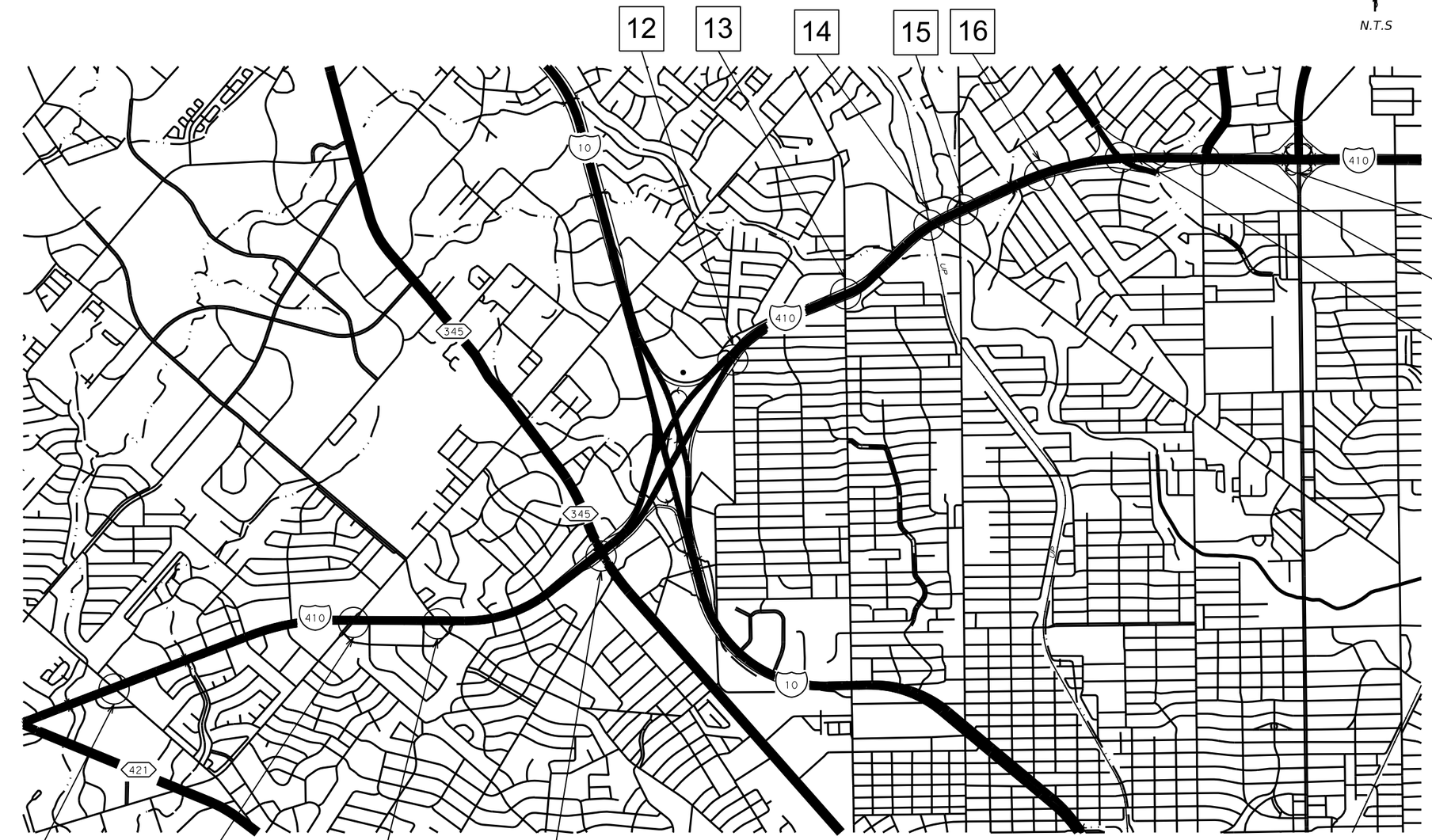

REF. NO.	HWY.	LIMITS TO (AT)
8	IH 410	EVERS ROAD
9	IH 410	CALLAGHAN ROAD
10	IH 410	BABCOCK ROAD
11	IH 410	FREDRICKSBURG ROAD
12	IH 410	CHERRY RIDGE DRIVE
13	IH 410	VANCE JACKSON ROAD
14	IH 410	JACKSON KELLER ROAD
15	IH 410	WEST AVENUE
16	IH 410	HONEYSUCKLE LANE
17	IH 410	FM 1535
18	IH 410	BLANCO ROAD
19	IH 410	SAN PEDRO AVENUE

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
LOCATION MAP

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	6

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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ITEM NO.			636-6001	0682-6001	0682-6002	0682-6003	0682-6004	0682-6005	0682-6006	0682-6018	0682-6054	0682-6055	0682-6056	0684-6035	0688-6001	0688-6003	0690-6024	0690-6030	6001-6001
SHEET NO.	REF. NO.	LOCATION	ALUMINUM SIGNS (TY A)	VEH SIG SEC (12") LED(GRN)	VEH SIG SEC (12") LED (GRN ARW)	VEH SIG SEC (12") LED(YEL)	VEH SIG SEC (12") LED (YEL ARW)	VEH SIG SEC (12") LED(RED)	VEH SIG SEC (12") LED (RED ARW)	PED SIG SEC (LED)(COUNT DOWN)	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	PED DETECT PUSH BUTTON (APS)	PED DETECTOR CONTROLLER UNIT	REMOVAL OF SIGNAL HEAD ASSM	REMOVAL OF PEDESTRIAN PUSH BUTTONS	PORTABLE CHANGEABLE MESSAGE SIGN
SH 16			**SF**	**EA**	**EA**	**EA**	**EA**	**EA**	**EA**	**EA**	**EA**	**EA**	**EA**	**LF**	**EA**	**EA**	**EA**	**EA**	**DAY**
		CSJ: 0291-10-119																	
24	1	Reindeer Trail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
25	1	Reindeer Trail	0	10	2	10	2	10	2	0	12	0	0	533	0	0	0	0	8
26	2	Huebner Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0
27	2	Huebner Rd	0	10	6	10	4	10	4	0	12	2	0	579	0	0	0	0	8
28	3	Poss Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
29	3	Poss Rd	0	10	4	10	2	10	2	0	10	2	0	517	0	0	0	0	8
30	4	Grissom Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0
31	4	Grissom Rd	0	10	5	10	3	10	3	0	11	2	0	543	0	0	0	0	8
32	5	El Verde Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
33	5	El Verde Rd	0	8	2	8	2	8	2	0	10	0	0	400	0	0	0	0	8
34	6	Seneca Dr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
35	6	Seneca Dr	0	10	2	10	2	10	2	0	12	0	0	525	0	0	0	0	8
36	7	Wurzbach Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0
37	7	Wurzbach Rd	0	16	6	16	4	16	4	0	18	2	0	888	0	0	0	0	10
		SH 16 TOTALS	0	**74**	**27**	**74**	**19**	**74**	**19**	**0**	**85**	**8**	**0**	**3,985**	**0**	**0**	**93**	**0**	**58**
IH 410																			
		CSJ: 0521-04-299																	
38	8	Evers Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	12	0
39	8	Evers Rd	21	14	8	14	8	14	4	12	12	4	2	803	12	1	0	0	12
40	9	Callaghan Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
41	9	Callaghan Rd	21	14	8	14	8	14	4	0	12	4	2	743	0	0	0	0	8
42	10	Babcock Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
43	10	Babcock Rd	21	14	8	14	8	14	4	0	12	4	2	811	0	0	0	0	8
44	11	Fredricksburg Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0
45	11	Fredricksburg Rd	21	14	8	14	8	14	4	0	12	4	2	807	0	0	0	0	8
46	12	Cherry Ridge Dr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
47	12	Cherry Ridge Dr	0	12	6	12	4	12	2	0	10	2	2	547	0	0	0	0	6
48	13	Vance Jackson Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
49	13	Vance Jackson Rd	0	12	2	12	2	12	0	0	10	0	2	552	0	0	0	0	6
50	14	Jackson Keller Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
51	14	Jackson Keller Rd	0	12	6	12	4	12	2	0	10	2	2	591	0	0	0	0	6
52	15	West Ave	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
53	15	West Ave	21	14	8	14	8	14	4	0	12	4	2	824	0	0	0	0	8
54	16	Honeysuckle Ln	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
55	16	Honeysuckle Ln	0	12	6	12	4	12	2	0	10	2	2	612	0	0	0	0	6
56	17	FM 1535	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
57	17	FM 1535	0	2	2	2	2	2	2	0	4	0	0	172	0	0	0	0	2
58	18	Blanco Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0
59	18	Blanco Rd	21	14	8	14	8	14	4	0	12	4	2	730	0	0	0	0	8
60	19	San Pedro Ave	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	15	0
61	19	San Pedro Ave	0	18	6	18	4	18	2	16	16	2	2	1074	15	1	0	0	14
		IH 410 TOTALS	**126**	**152**	**76**	**152**	**68**	**152**	**34**	**28**	**132**	**32**	**22**	**8,266**	**27**	**2**	**179**	**27**	**92**
		PROJECT TOTALS	**126**	**226**	**103**	**226**	**87**	**226**	**53**	**28**	**217**	**40**	**22**	**12,251**	**27**	**2**	**272**	**27**	**150**

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 8-29-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
QUANTITY SUMMARY

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	7

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)					BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY N TY S
	S1	R10-17T	LEFT TURN YIELD ON FLASHING YELLOW ARROW	36" x 42"	✓							

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

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

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0291	10	119	VARIOUS
4-16		DIST	COUNTY		SHEET NO.
8-16		SAT	BEXAR		8

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LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET					6185 6002	6185 6005
			FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		SHEET NUMBER	EA	EA	EA	DAYS PER TMA/TA USE	DAY	DAY
1	SH 16	REINDEER TRAIL	2		2	4	8	
2	SH 16	HUEBNER ROAD		2	2	4	8	
3	SH 16	POSS ROAD		2	2	4	8	
4	SH 16	GRISSOM ROAD		2	2	4	8	
5	SH 16	EL VERDE ROAD		2	2	4	8	
6	SH 16	SENECA DRIVE		2	2	4	8	
7	SH 16	WURZBACH ROAD		2	2	5	10	
8	IH 410	EVERS ROAD		2	2	6	12	
9	IH 410	CALLAGHAN ROAD		2	2	4	8	
10	IH 410	BABCOCK ROAD		2	2	4	8	
11	IH 410	FREDRICKSBURG ROAD		2	2	4	8	
12	IH 410	CHERRY RIDGE DRIVE		2	2	3	6	
13	IH 410	VANCE JACKSON ROAD		2	2	3	6	
14	IH 410	JACKSON KELLER ROAD		2	2	3	6	
15	IH 410	WEST AVE		2	2	4	8	
16	IH 410	HONEYSUCKLE LANE		2	2	3	6	
17	IH 410	FM 1535		2	2	1	2	
18	IH 410	BLANCO ROAD		2	2	4	8	
19	IH 410	SAN PEDRO AVENUE		2	2	7	14	
		TOTALS	2	36	38	75	150	

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

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

FILE: tma.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2018	0291	10	119	VARIOUS
	DIST	COUNTY	
	SAT	BEXAR	
	FEDERAL AID PROJECT		SHEET NO.
			9

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN (2) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.

(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.

(3) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.

(4) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES

(5) CONTRACTOR IS NOT PERMITTED TO WORK IN AREAS WITH ONGOING UTILITY RELOCATION OR ROW ACQUISITION.

(6) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1

THE INTENT OF THIS PHASE IS TO COMPLETE INSTALLATION OF SIGNAL HEADS AND BACKPLATES AT VARIOUS INTERSECTIONS ALONG SH 16.

(1) IMPLEMENT TRAFFIC CONTROL AS PER STATE AND DISTRICT STANDARDS.

(2) REPLACE SIGNAL HEADS AND BACKPLATES USING WZ(BTS-1)-13 AND LAW ENFORCEMENT OFFICERS OR AS DIRECTED BY THE ENGINEER.

(3) PERFORM CLEAN UP AND REMOVAL OF TEMPORARY TRAFFIC CONTROL ITEMS; CLEAN UP OF EACH LOCATION SHALL OCCUR BEFORE STARTING WORK ON A NEW LOCATION.

PHASE 1A

THE INTENT OF THIS PHASE IS TO COMPLETE INSTALLATION OF SIGNAL HEADS AND BACKPLATES AT VARIOUS FRONTAGE ROAD INTERSECTIONS ALONG IH 410.

(1) IMPLEMENT TRAFFIC CONTROL AS PER STATE AND DISTRICT STANDARDS.

(2) REPLACE SIGNAL HEADS AND BACKPLATES USING WZ(BTS-1)-13 AND LAW ENFORCEMENT OFFICERS OR AS DIRECTED BY THE ENGINEER.

(3) PERFORM CLEAN UP AND REMOVAL OF TEMPORARY TRAFFIC CONTROL ITEMS; CLEAN UP OF EACH LOCATION SHALL OCCUR BEFORE STARTING WORK ON A NEW LOCATION.

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	10

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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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

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	SAT	BEXAR		11
5-10 5-21				

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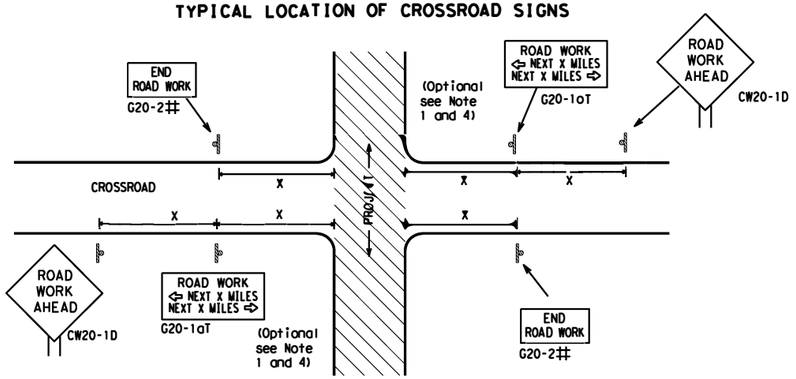
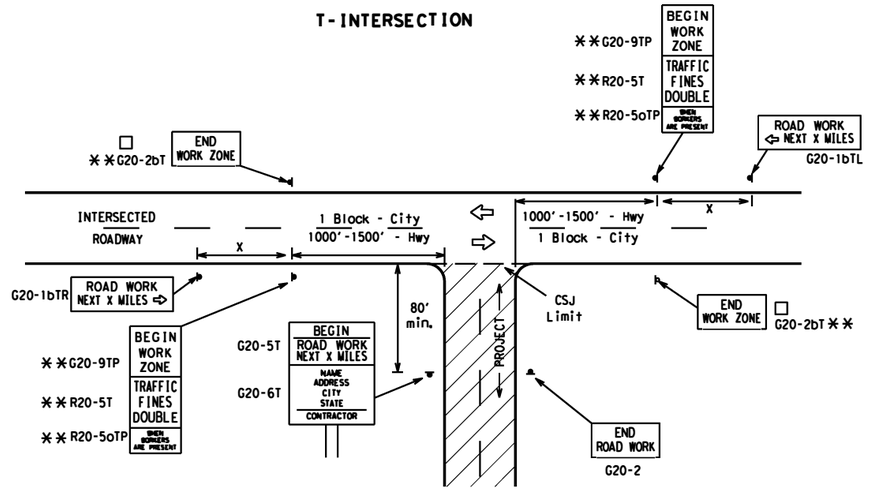
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on o crossroad approach should be o "ROAD WORK AHEAD" (CW20-1D)sign and o (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted bock to 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 detoils. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether o rood is low volume as per TMUTCD Port 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs ore required, these signs will be considered port of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1oT)sign shoII be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether o roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shoII be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

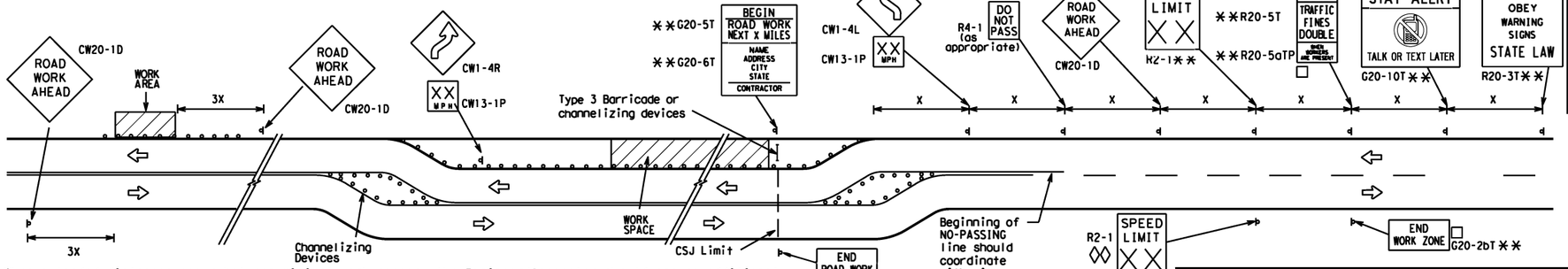
* For typical sign spacings on divided highways, expressways and freeways, see Port 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

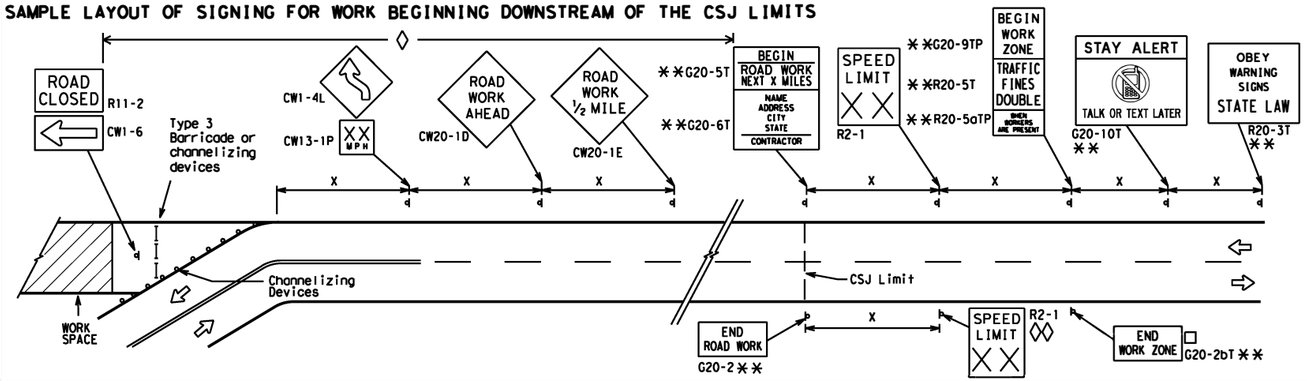
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to hove 1500 feet advance worning.
3. Distance between signs should be increased as required to hove 1/2 mile or more advance worning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		12

DATE: 8/18/2023 4:42:11 PM
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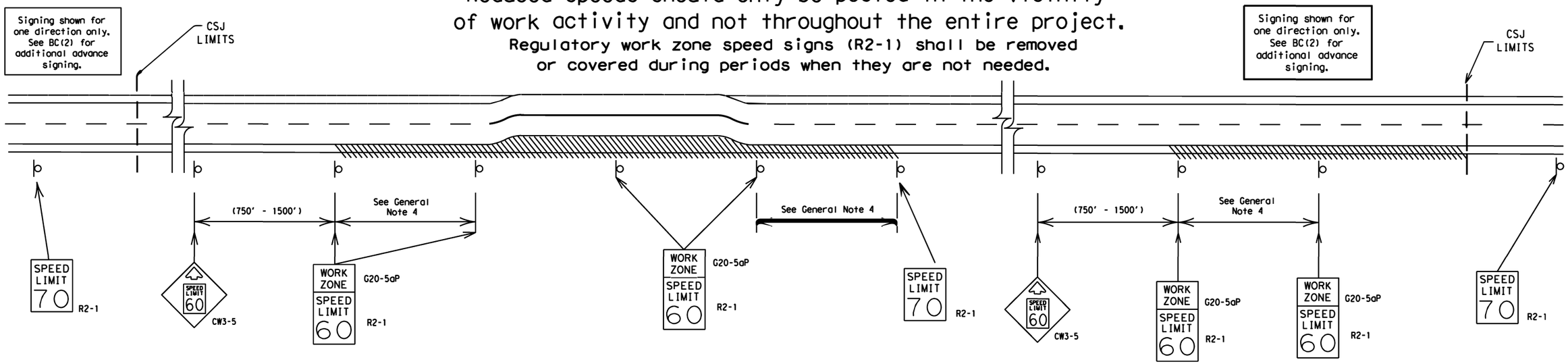
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		13

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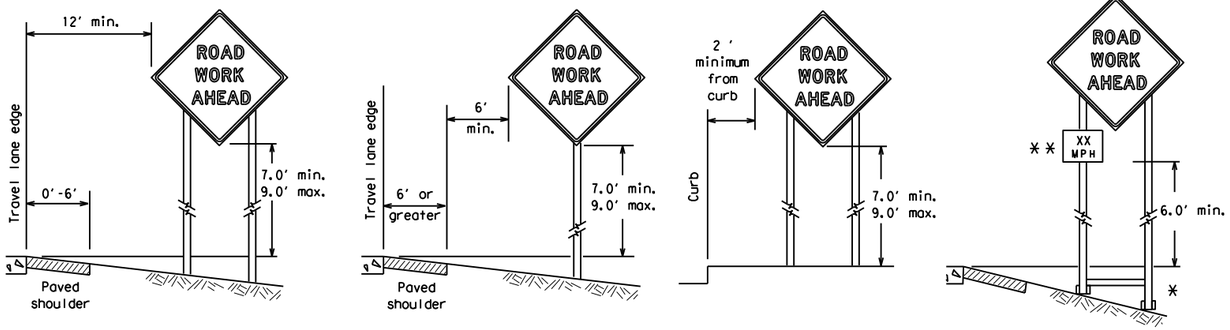
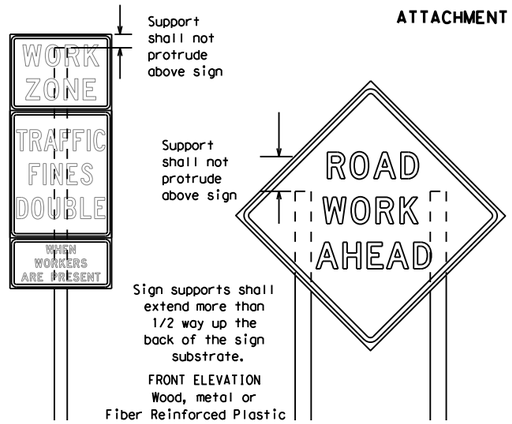
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

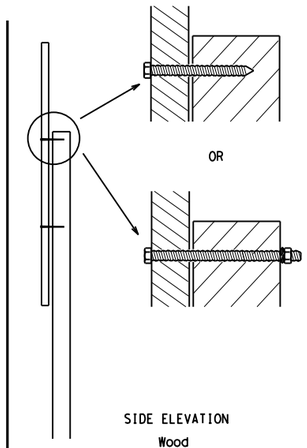


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





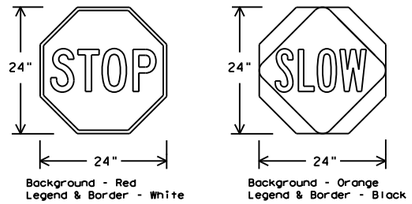
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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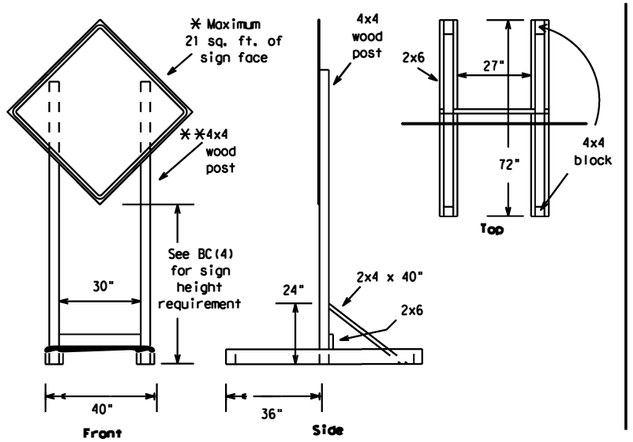
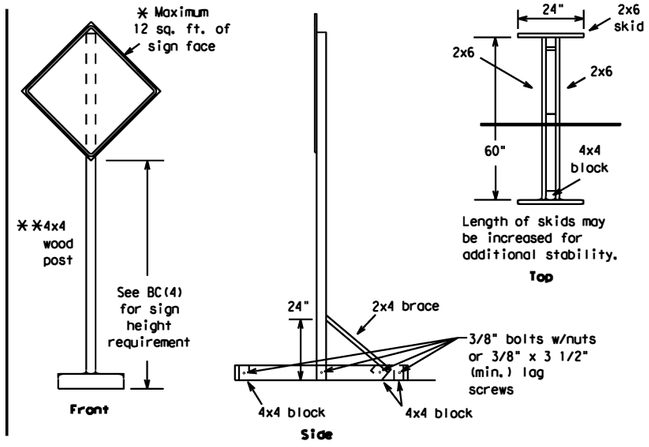
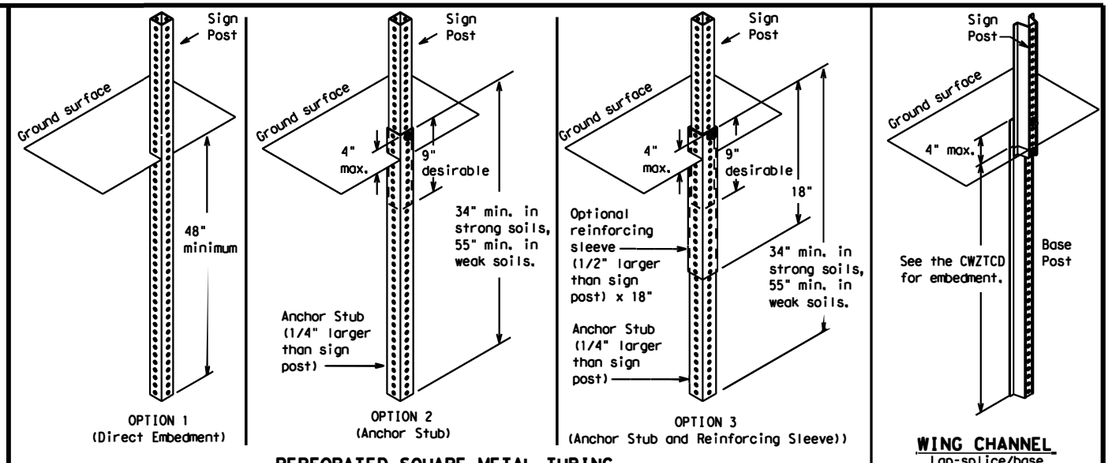




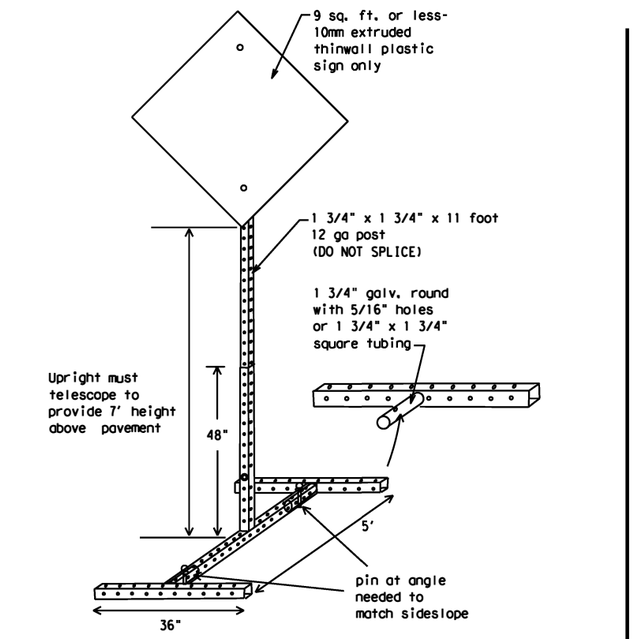
SKID MOUNTED WOOD SIGN SUPPORTS

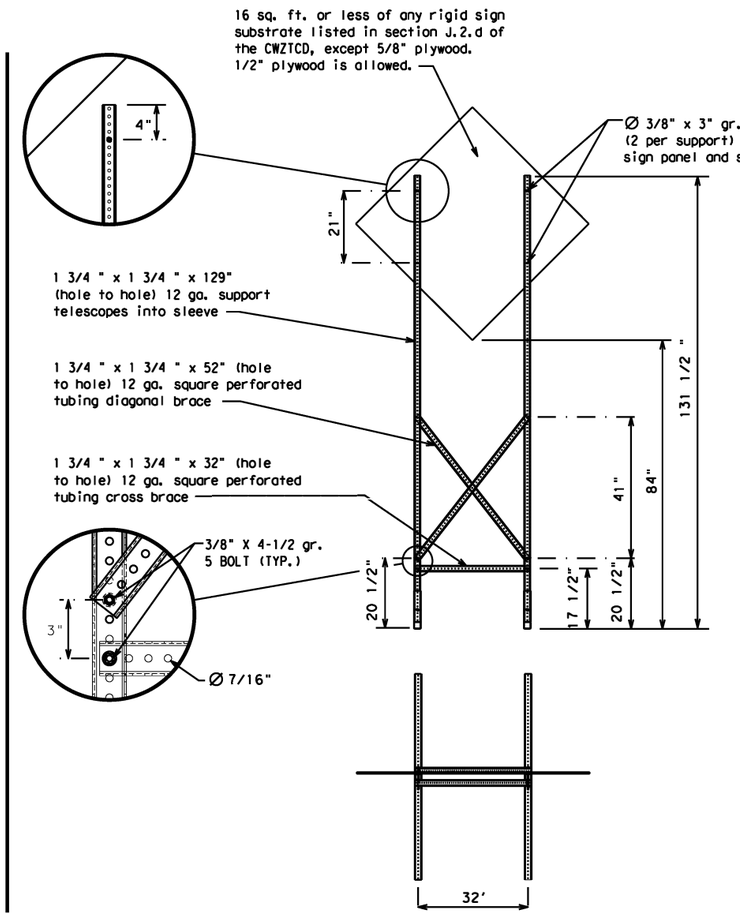
*** LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS**

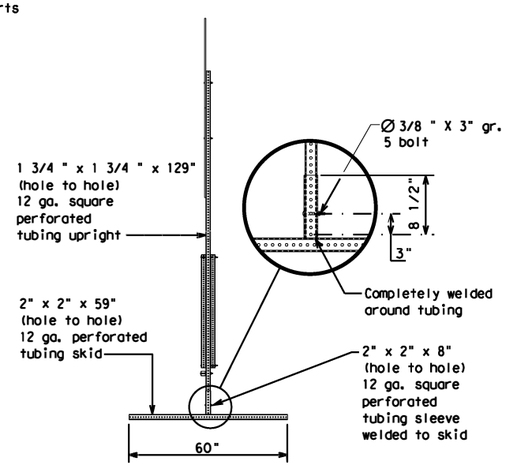


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

** 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		0291	10	119	VARIOUS
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		SAT	BEXAR		16

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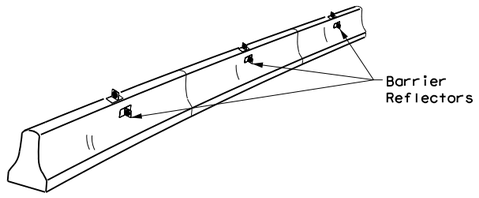
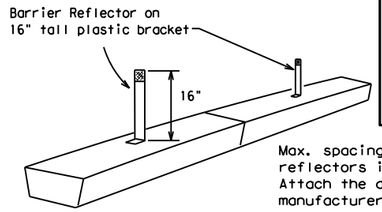
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

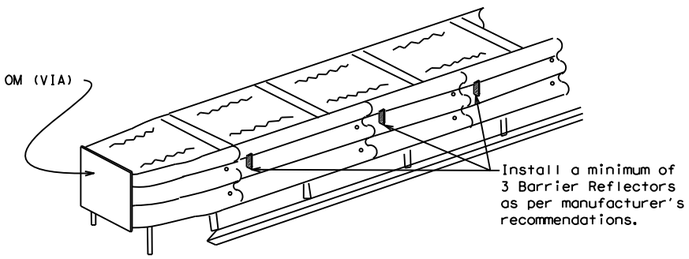


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

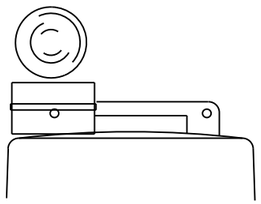


DELINEATION OF END TREATMENTS

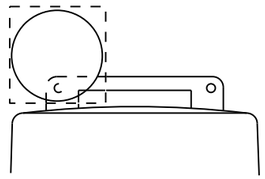
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

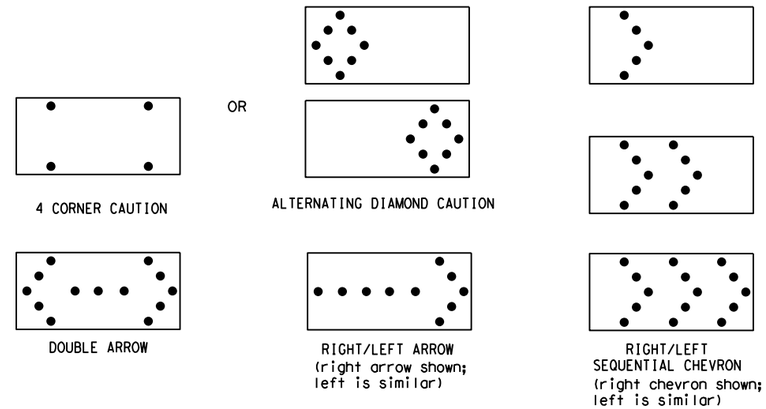
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

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	0291	10	119	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		17

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

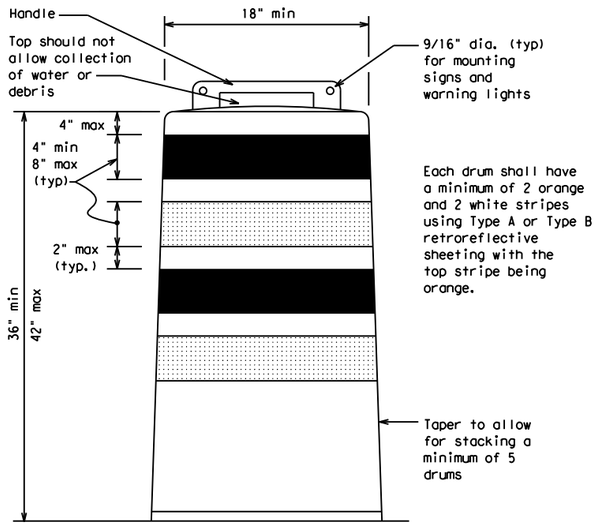
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

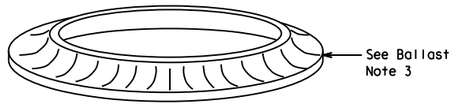
RETROREFLECTIVE SHEETING

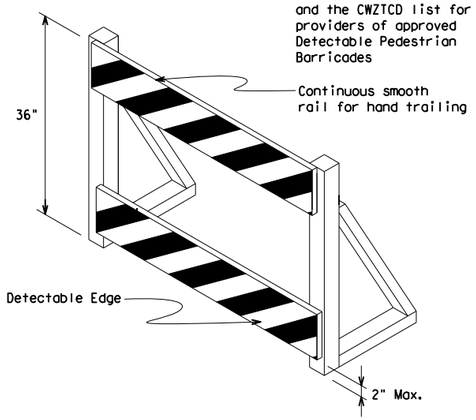
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

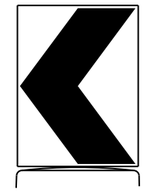




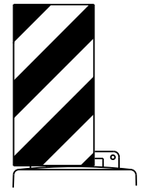


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	SAT	BEXAR		18
7-13				

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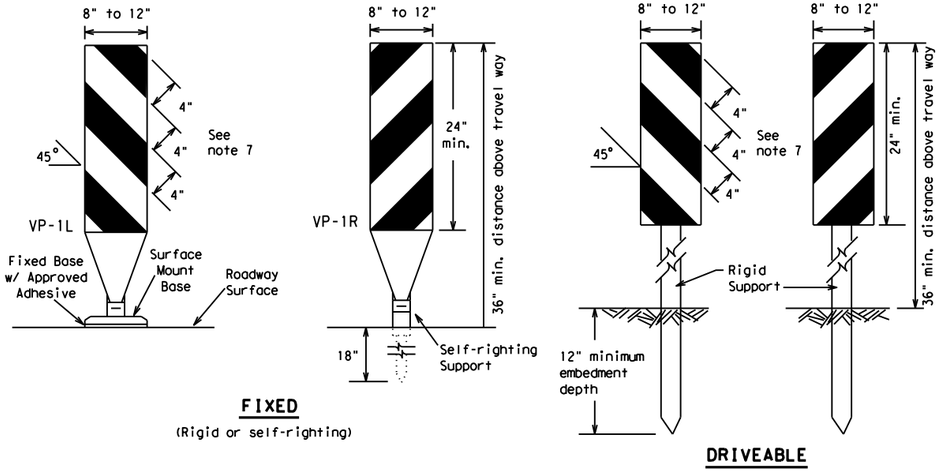
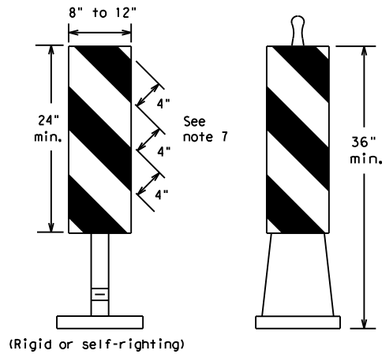


FIXED
(Rigid or self-righting)

DRIVEABLE

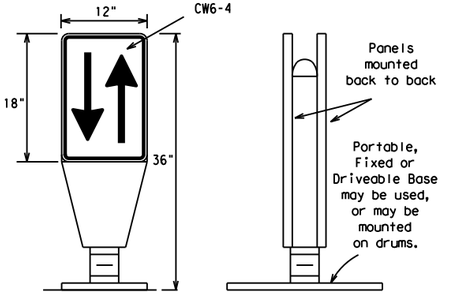


(Rigid or self-righting)

PORTABLE

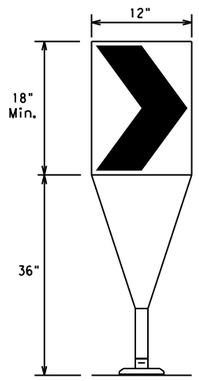
VERTICAL PANELS (VPs)

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.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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.



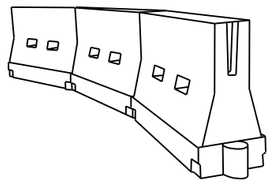
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0291	10	119	VARIOUS
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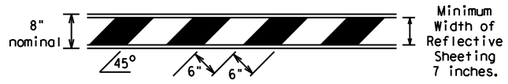
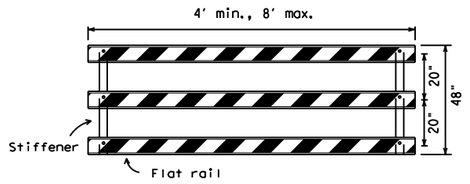
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



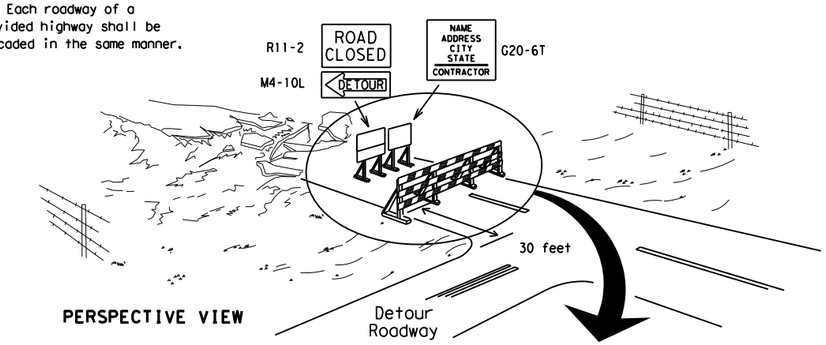
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

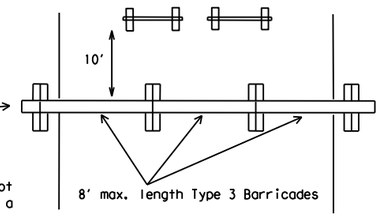
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

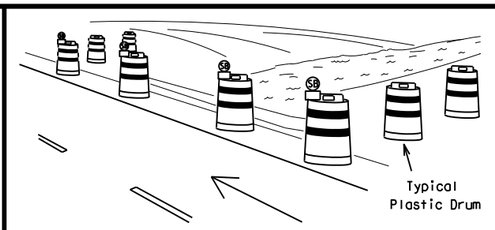
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

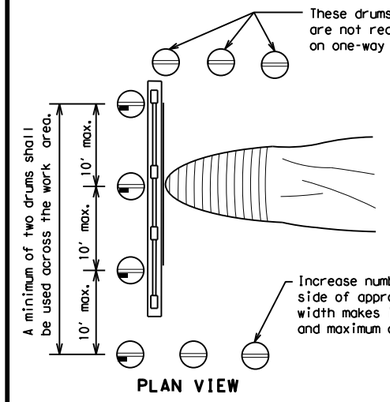
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

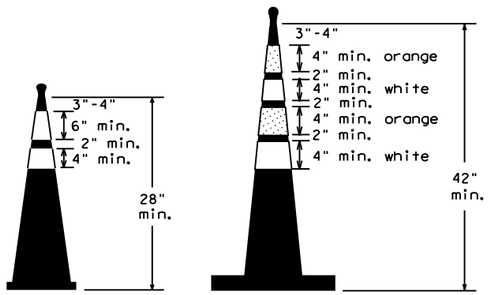
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

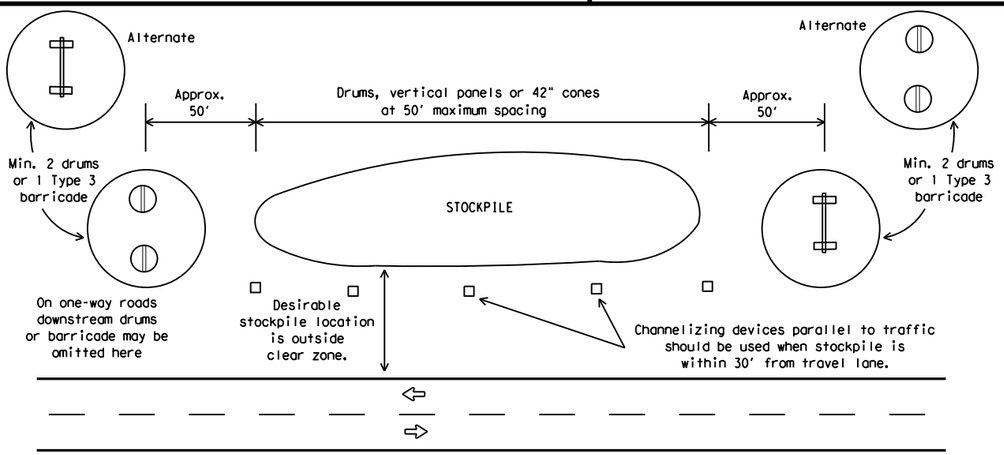
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

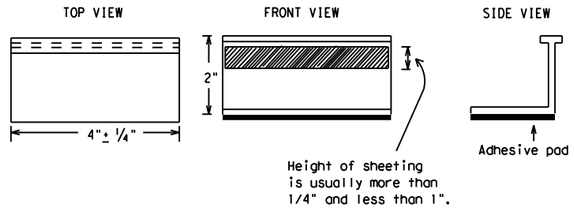
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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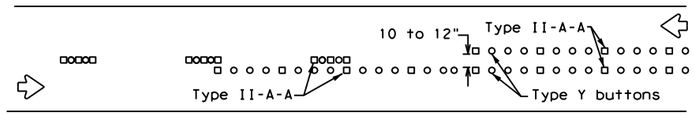
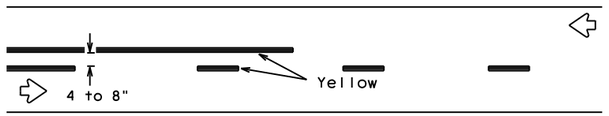
PAVEMENT MARKING PATTERNS

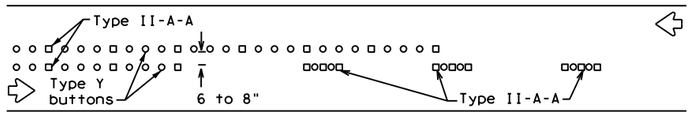
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



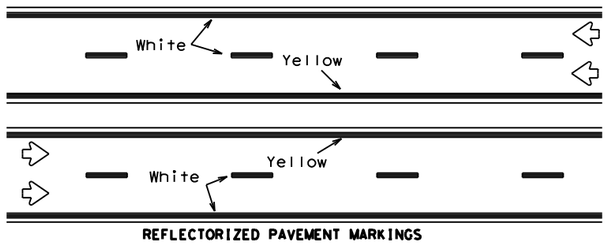
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



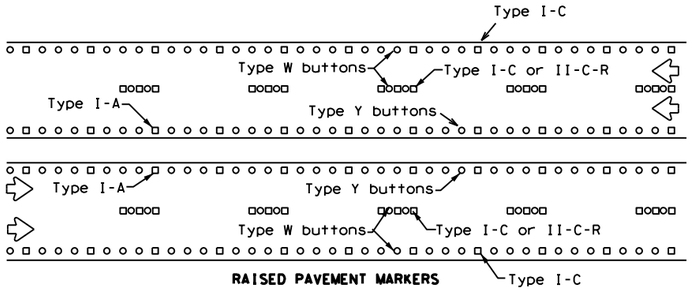
RAISED PAVEMENT MARKERS - PATTERN B

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

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



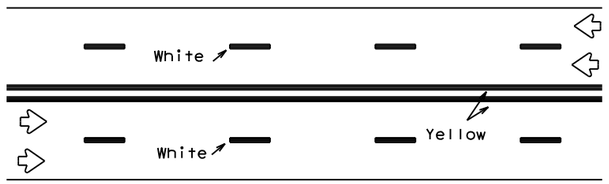
REFLECTORIZED PAVEMENT MARKINGS



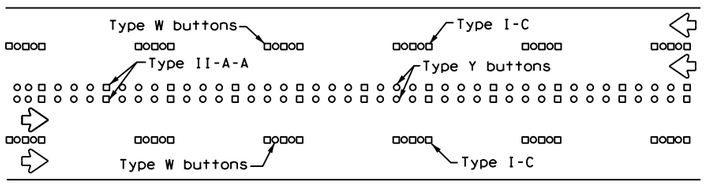
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



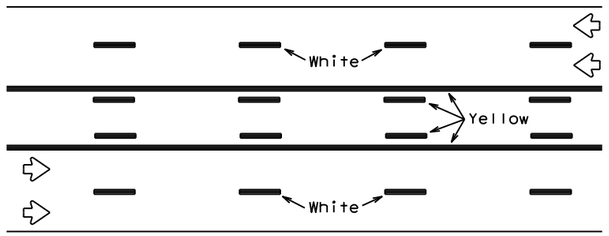
REFLECTORIZED PAVEMENT MARKINGS



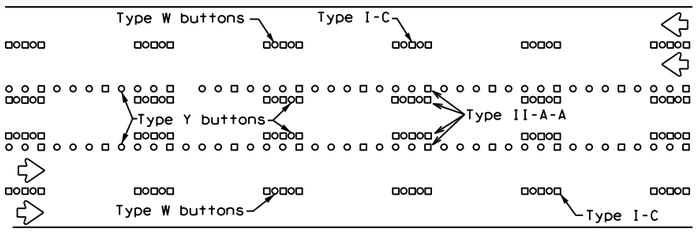
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

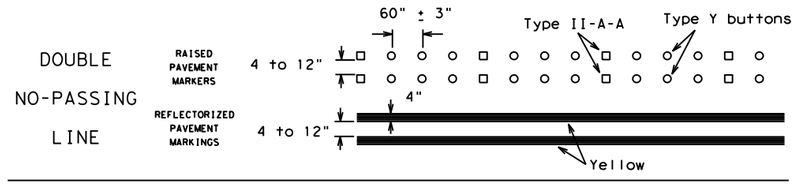
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

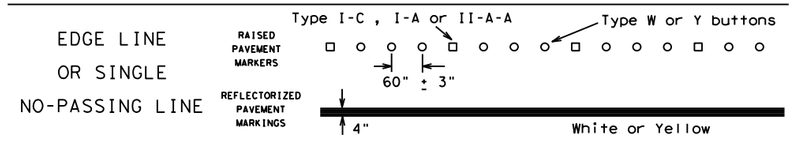
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

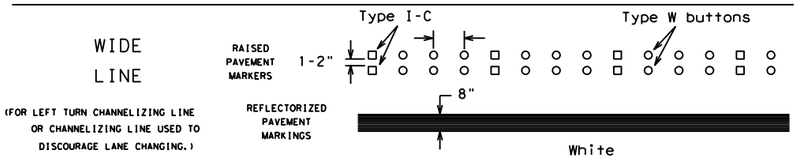


EDGE LINE OR SINGLE NO-PASSING LINE



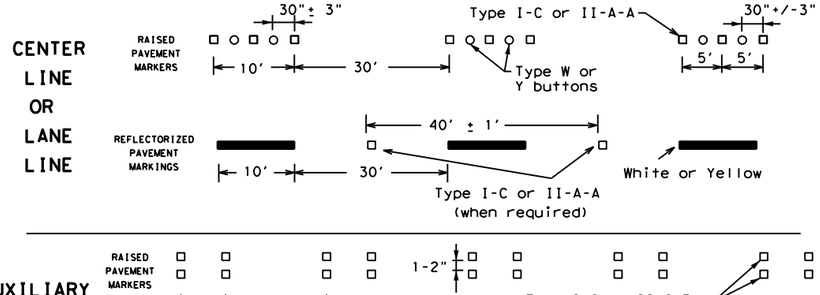
WIDE LINE

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

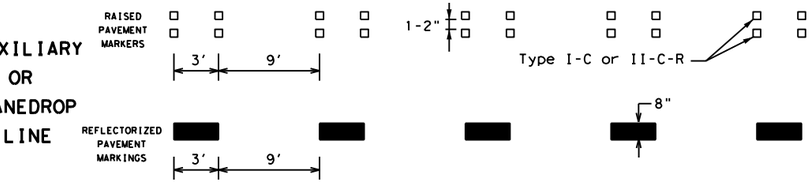


BROKEN LINES

CENTER LINE OR LANE LINE

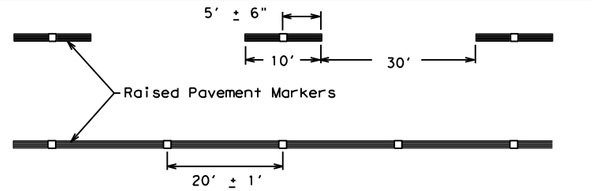


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

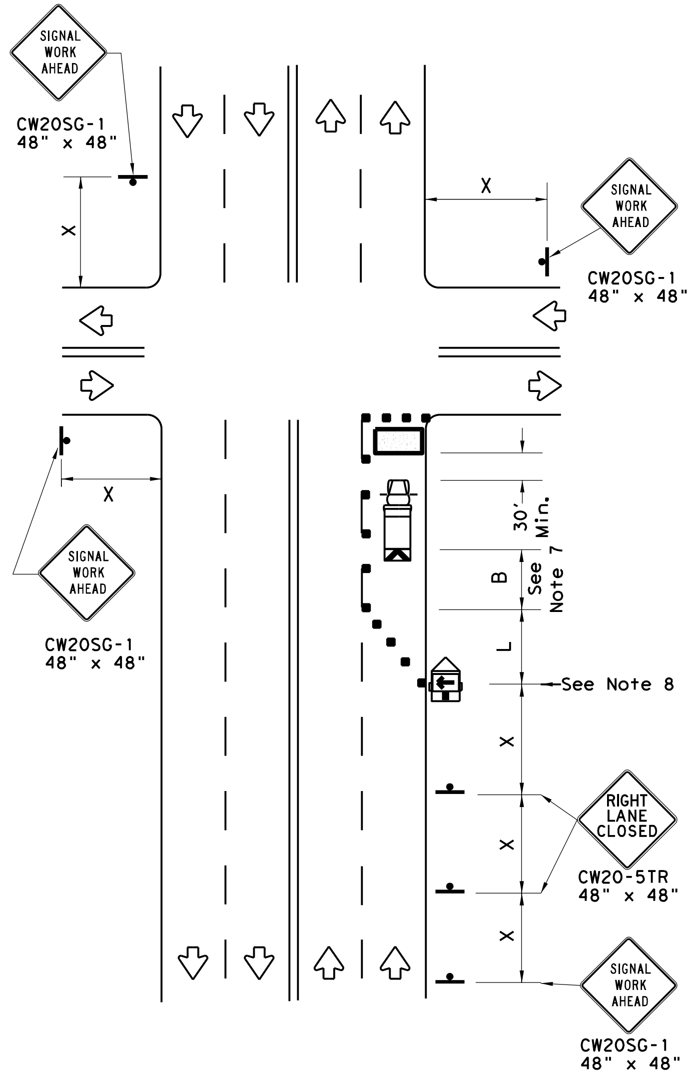
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

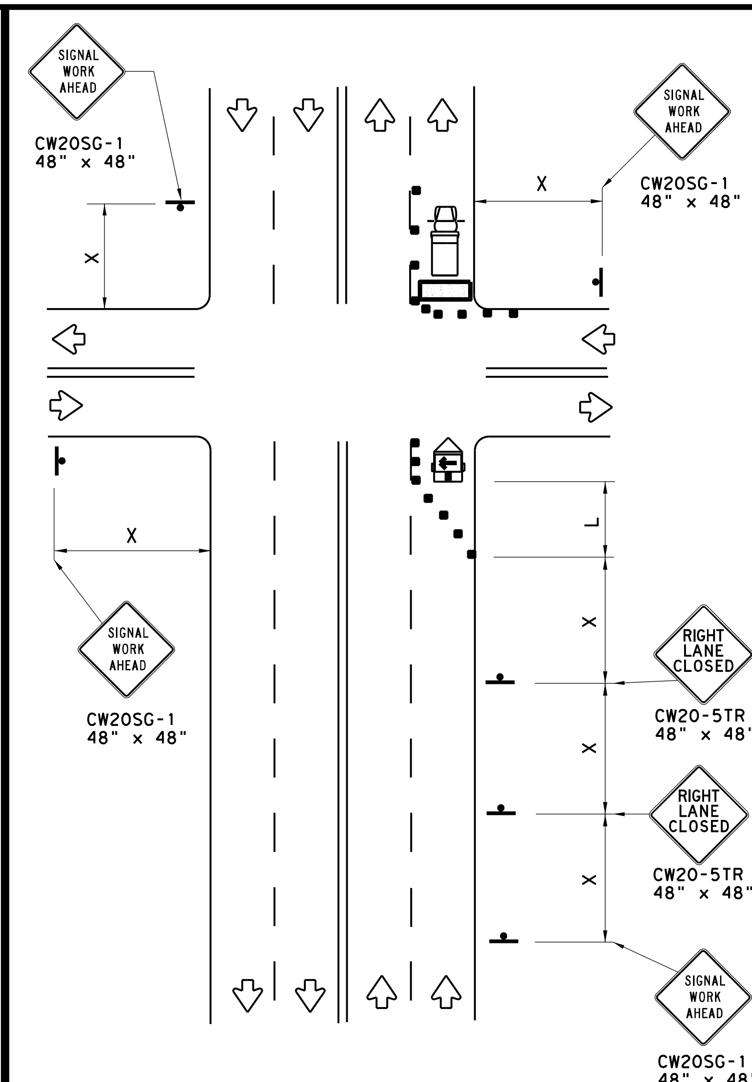
BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0291	10	119	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		22



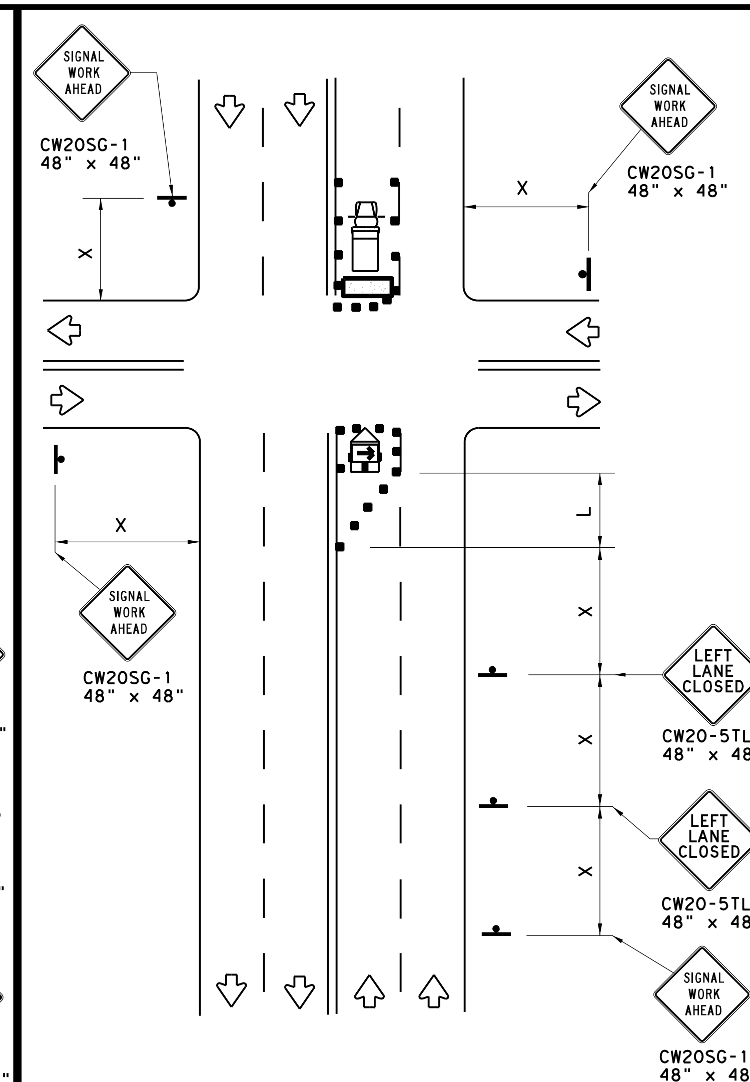
NEAR SIDE LANE CLOSURE

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

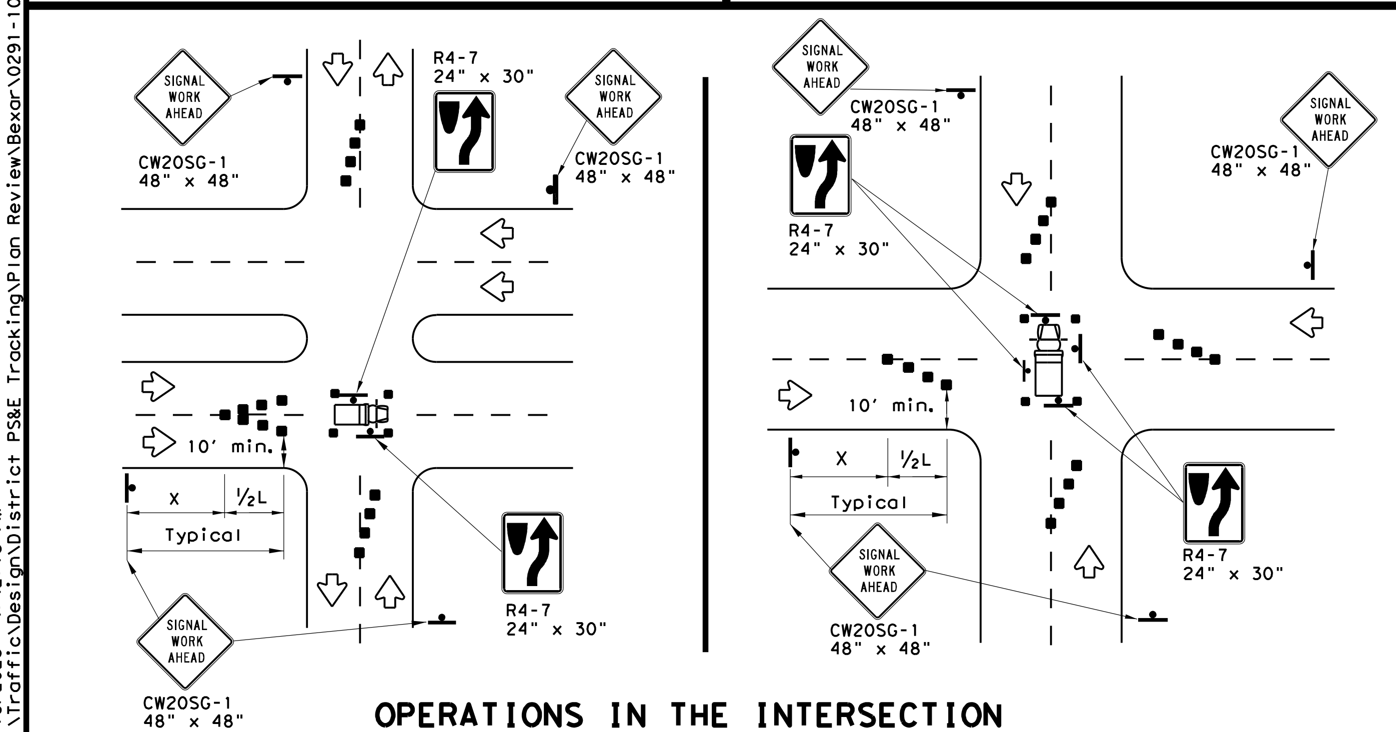
LEGEND			
[symbol]	Type 3 Barricade	[symbol]	Channelizing Devices
[symbol]	Heavy Work Vehicle	[symbol]	Truck Mounted Attenuator (TMA)
[symbol]	Trailer Mounted Flashing Arrow Board	[symbol]	Portable Changeable Message Sign (PCMS)
[symbol]	Sign	[symbol]	Traffic Flow
[symbol]	Flag	[symbol]	Flagger

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

* Conventional Roads Only

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

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.

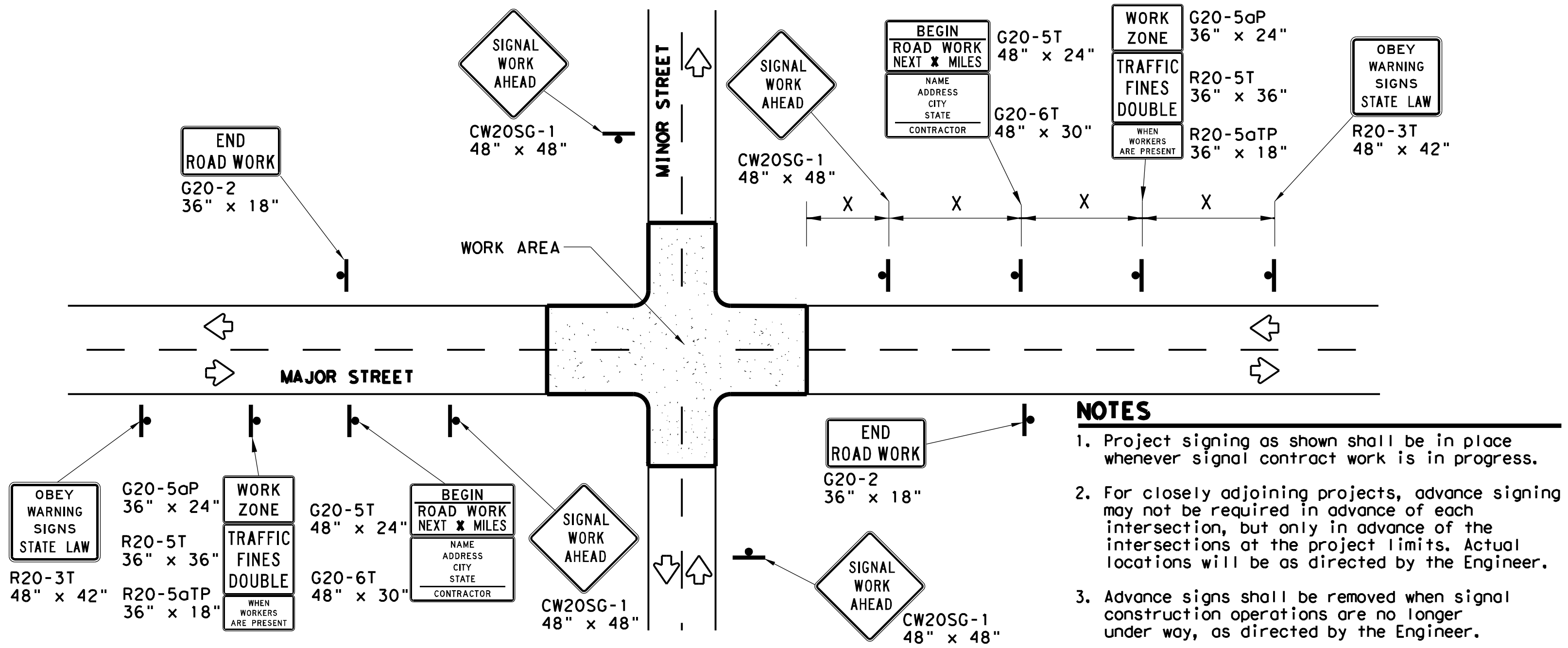
Texas Department of Transportation — Traffic Operations Division Standard

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 0291	SECT 10	JOB 119	HIGHWAY VARIOUS
REVISIONS 2-98 10-99 7-13 4-98 3-03	DIST SAT		COUNTY BEXAR	SHEET NO. 23

114

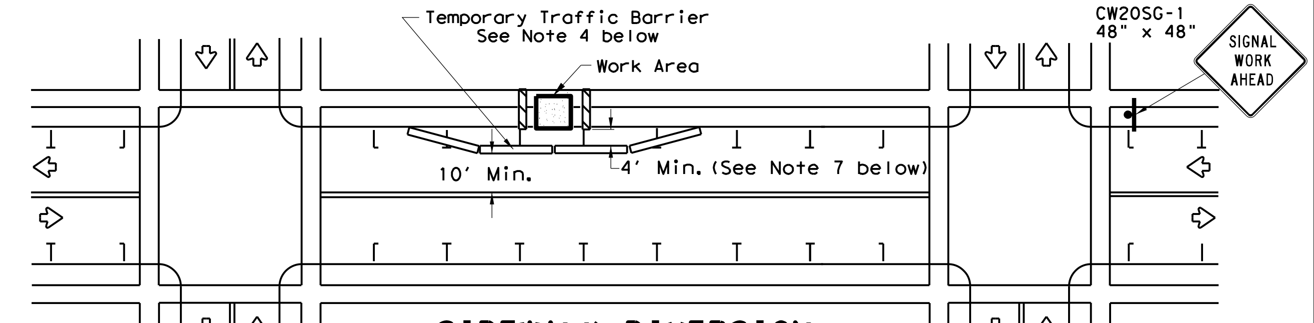


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

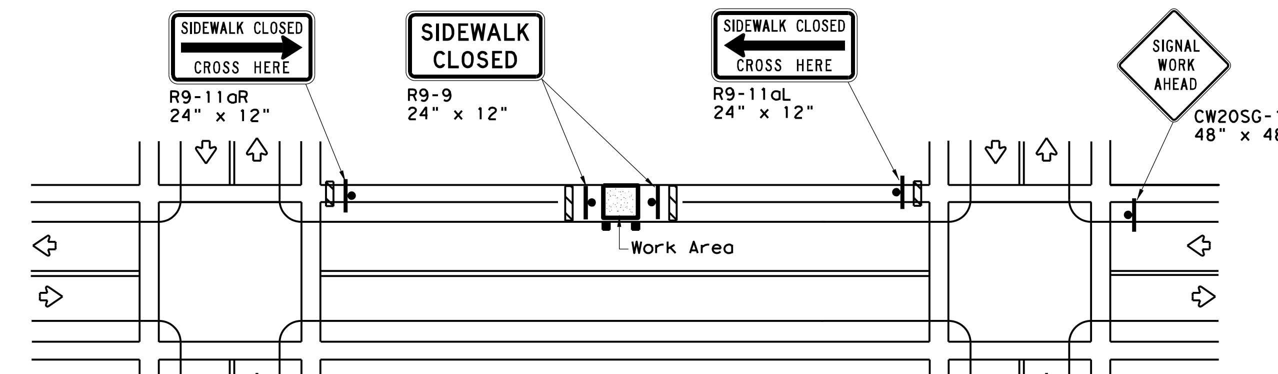
FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

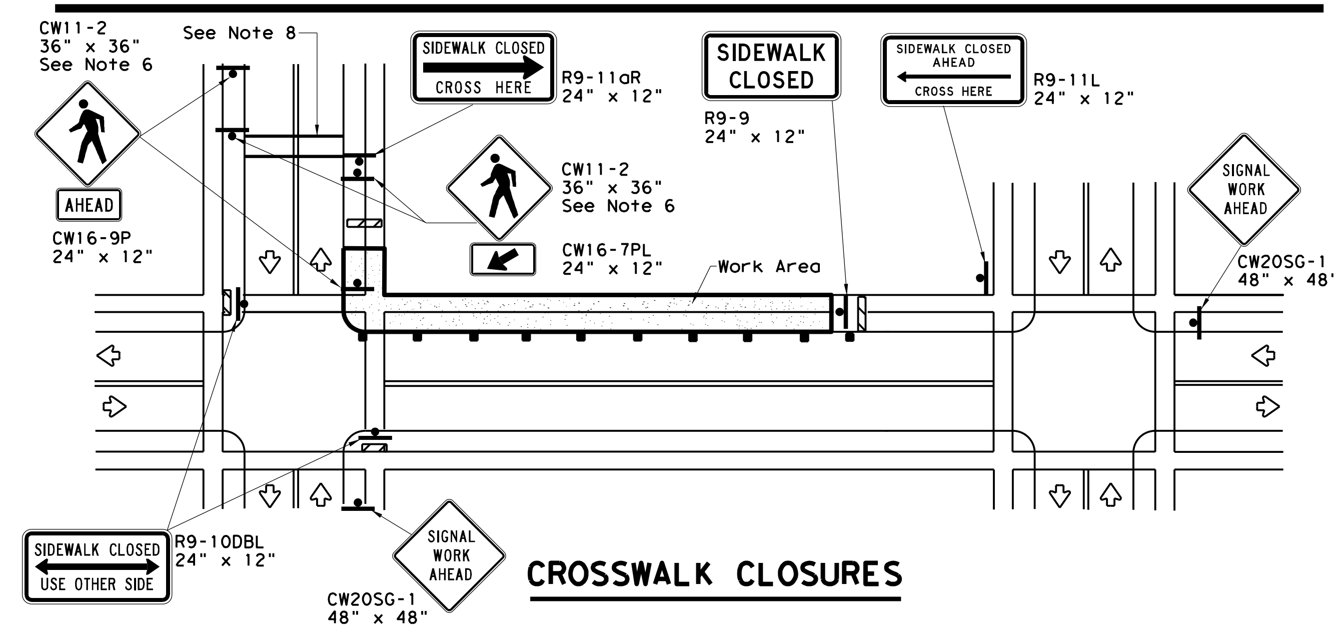
1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the 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.



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

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	
(symbol)	Sign
(symbol)	Channelizing Devices
(symbol)	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

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.

SHEET 2 OF 2

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

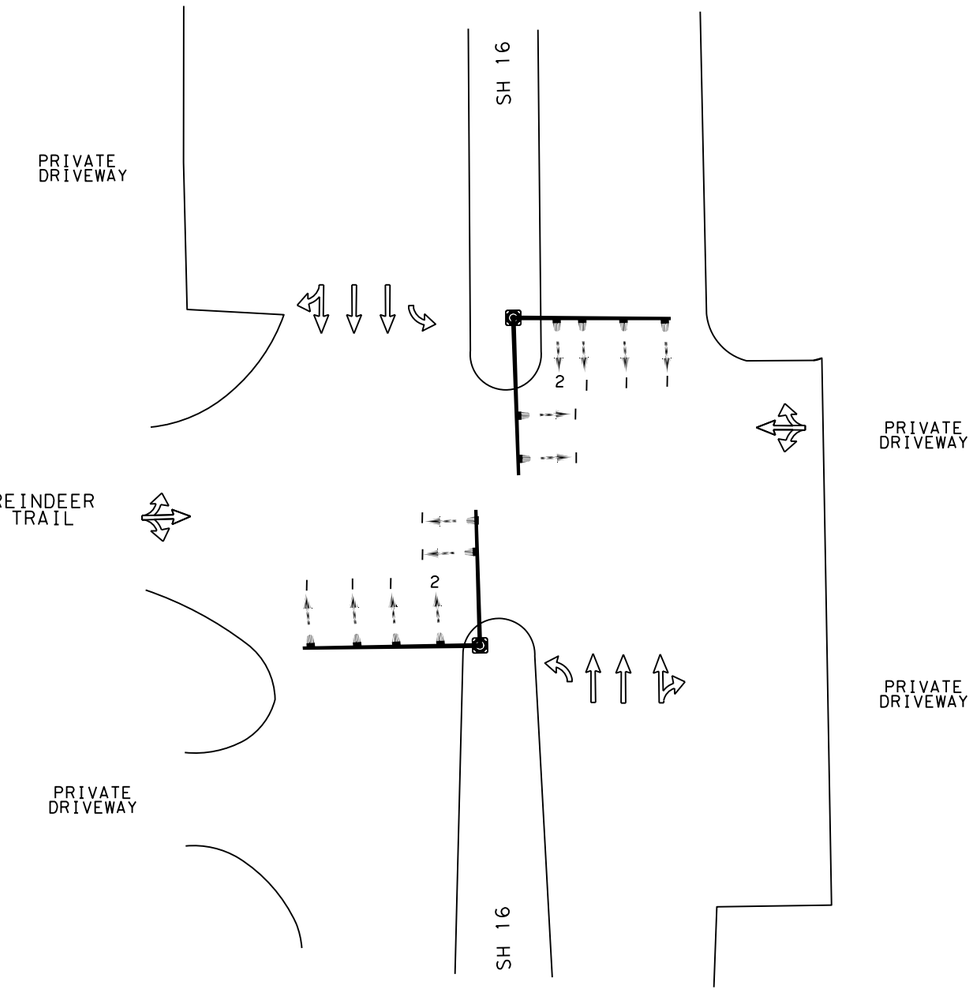
FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
2-98 10-99 7-13 / 4-98 3-03	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	24

	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S

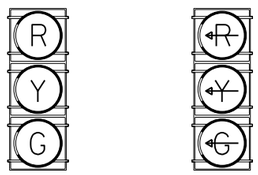


LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
EXISTING SIGNAL LAYOUT
REINDEER TRAIL

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	25

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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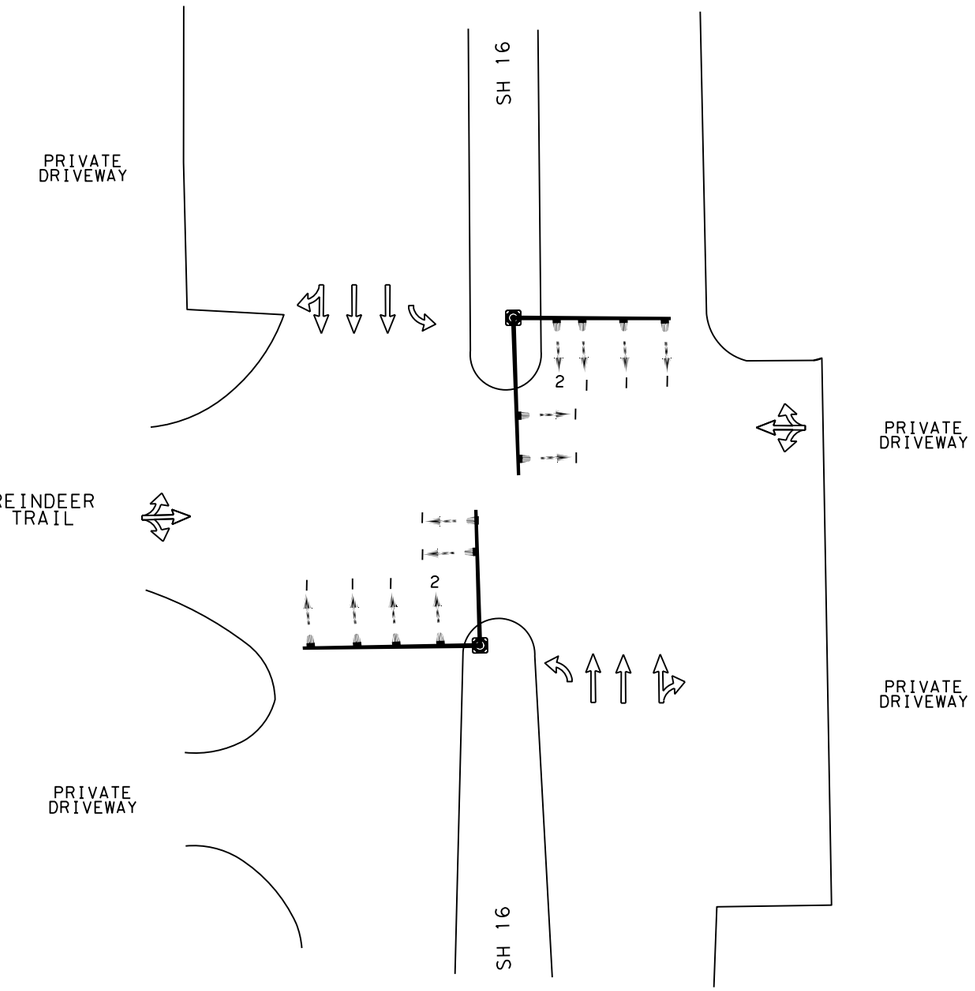
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	10
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	2
682-6003	VEH SIG SEC (12") LED (YEL)	EA	10
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	2
682-6005	VEH SIG SEC (12") LED (RED)	EA	10
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	533

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

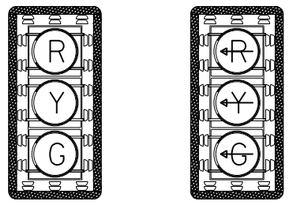
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

N.T.S



PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

SH 16
PROPOSED SIGNAL LAYOUT
REINDEER TRAIL

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	26

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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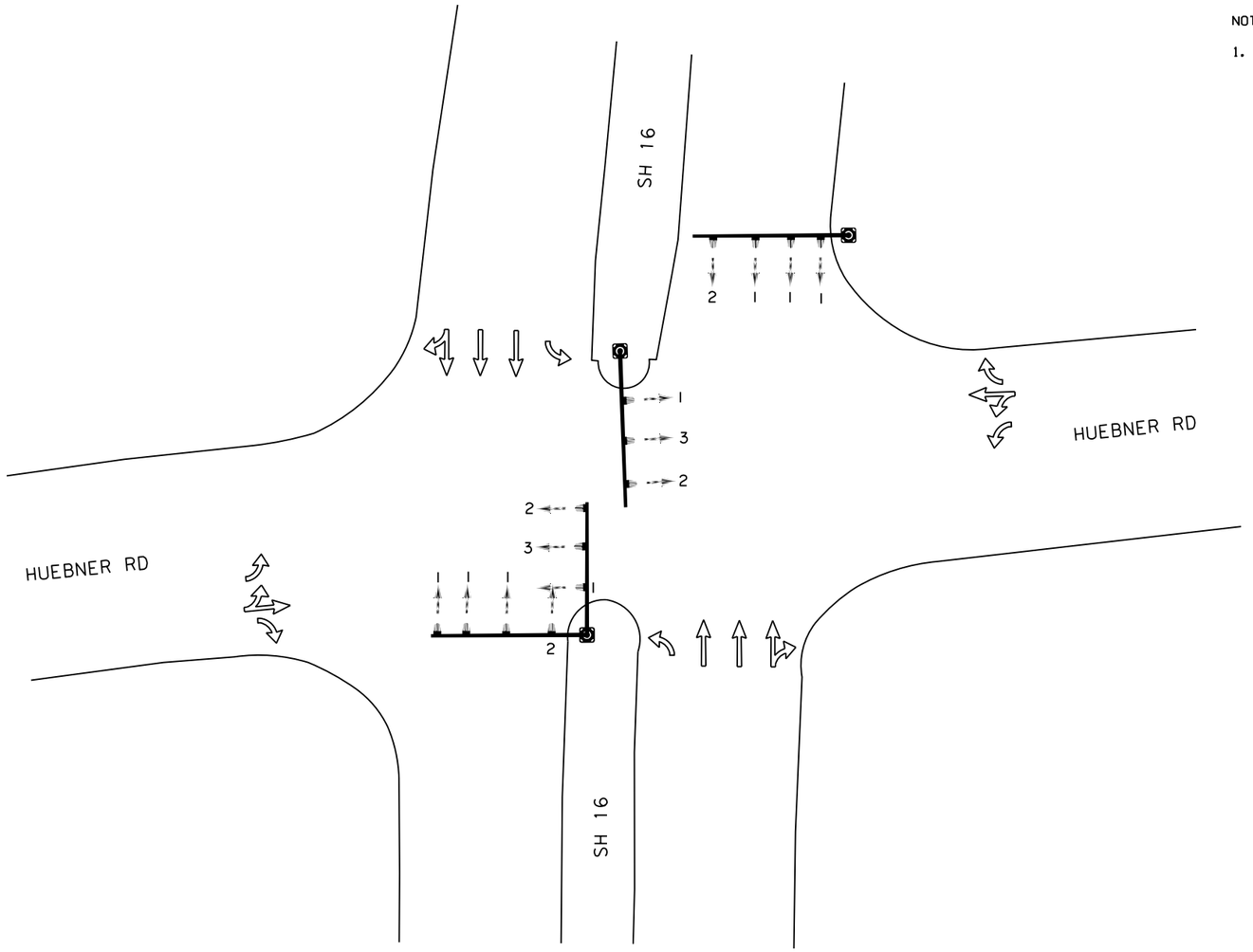
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	14

N.T.S



NOTES:

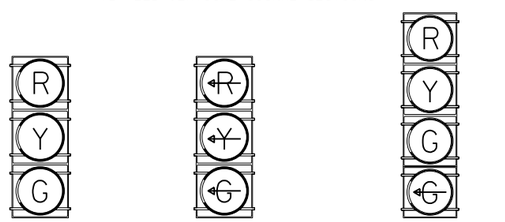
1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
EXISTING SIGNAL LAYOUT
HUEBNER ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	27

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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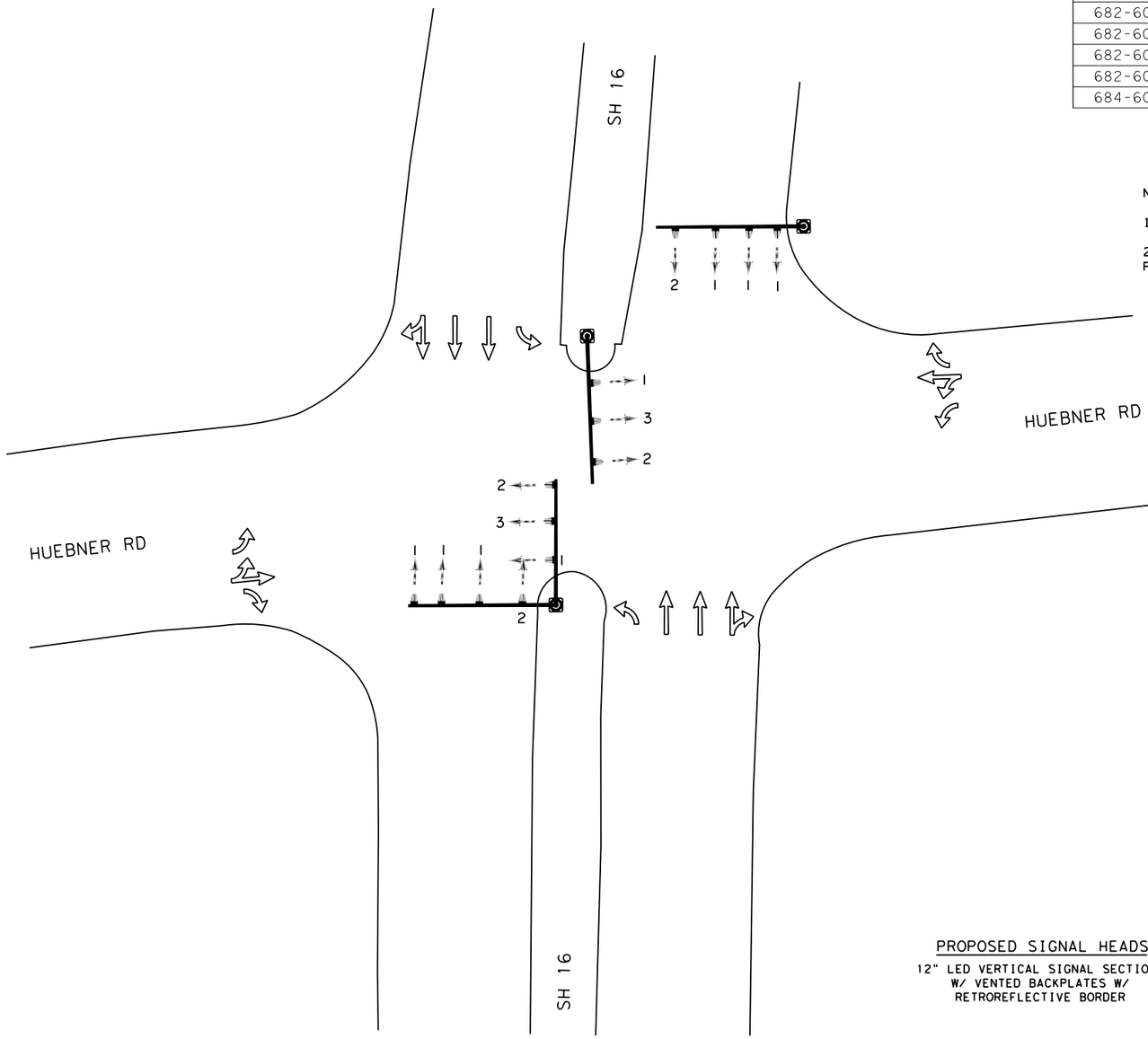
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	10
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	6
682-6003	VEH SIG SEC (12") LED (YEL)	EA	10
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	4
682-6005	VEH SIG SEC (12") LED (RED)	EA	10
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	579

N.T.S



NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

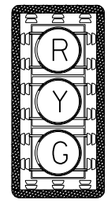
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

LEGEND

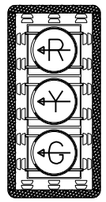
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD



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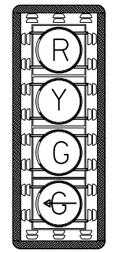
3 SEC SIGNAL HEAD



SIGNAL NO. 3
4 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
PROPOSED SIGNAL LAYOUT
HUEBNER ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	28

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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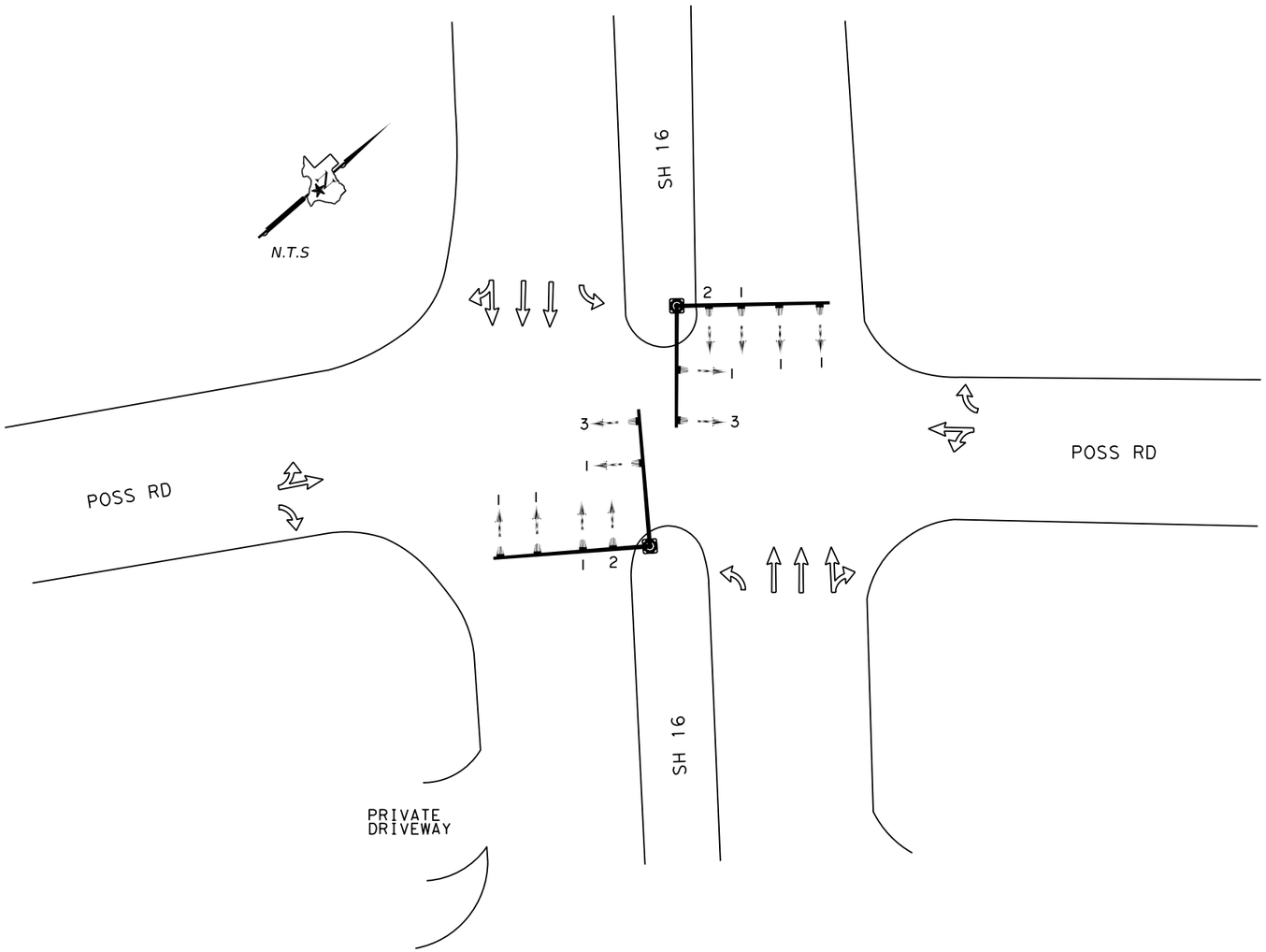
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

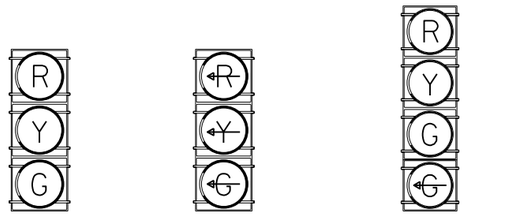
NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.



EXISTING SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
EXISTING SIGNAL LAYOUT
POSS ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		29
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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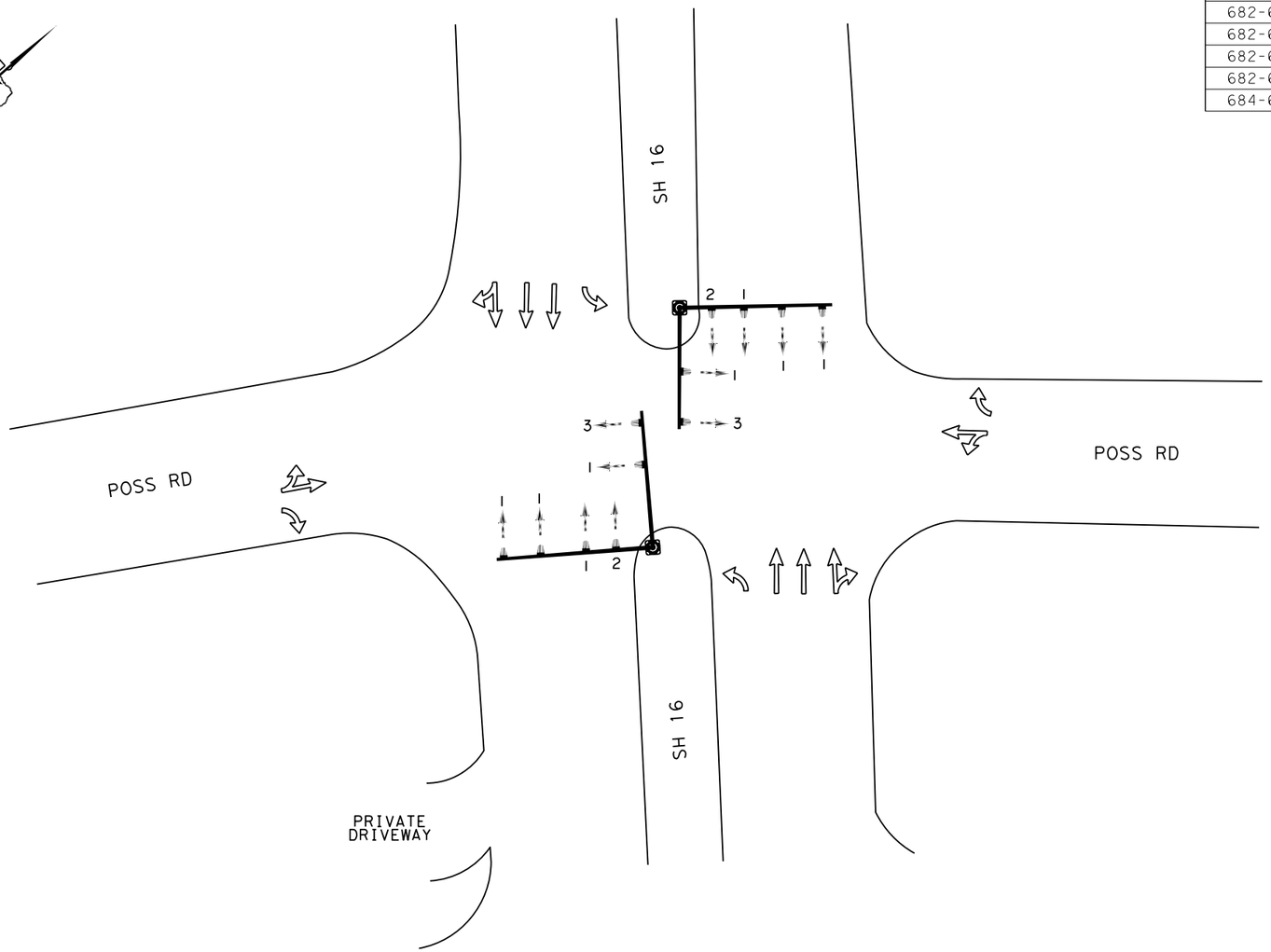
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	10
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	4
682-6003	VEH SIG SEC (12") LED (YEL)	EA	10
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	2
682-6005	VEH SIG SEC (12") LED (RED)	EA	10
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	10
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	517

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

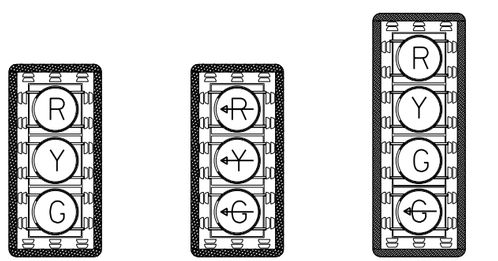
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

N.T.S



PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
PROPOSED SIGNAL LAYOUT
POSS ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		30
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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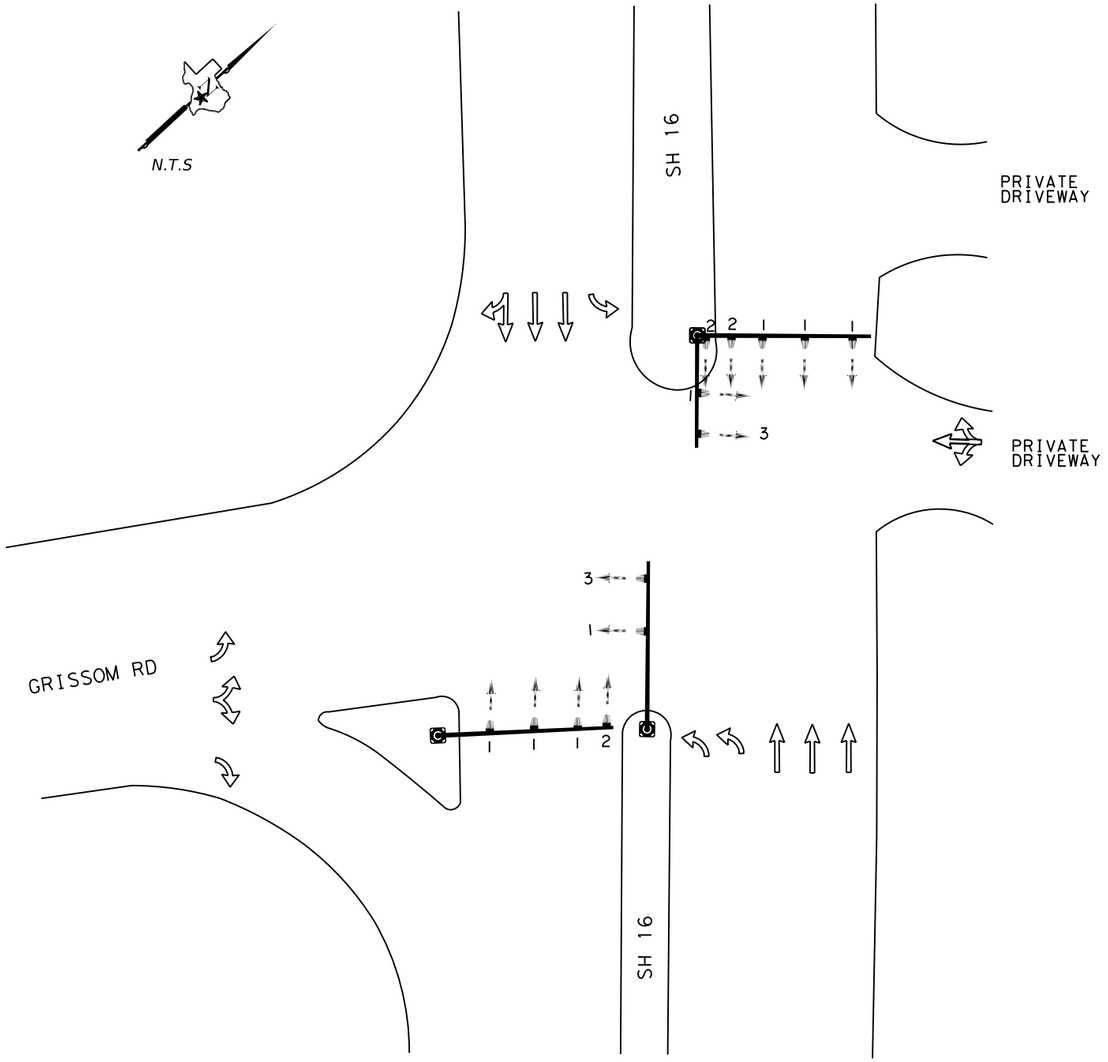
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	13

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

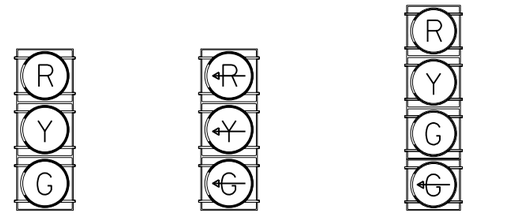


LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
EXISTING SIGNAL LAYOUT
GRISSOM ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		31
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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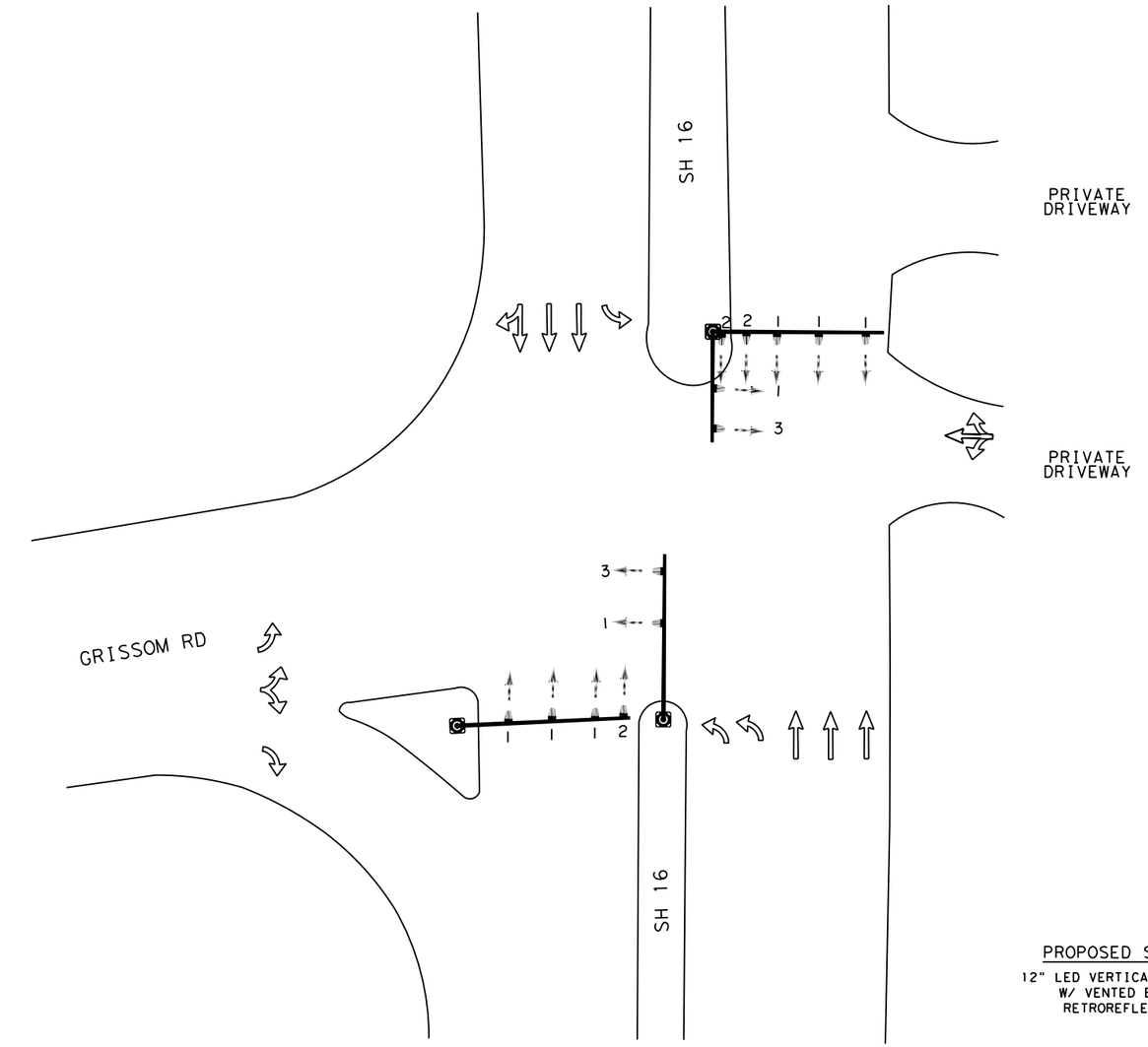
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	10
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	5
682-6003	VEH SIG SEC (12") LED (YEL)	EA	10
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	3
682-6005	VEH SIG SEC (12") LED (RED)	EA	10
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	3
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	11
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	543

N.T.S



NOTES:

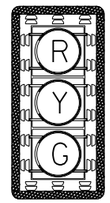
1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

LEGEND

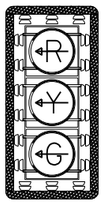
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

PROPOSED SIGNAL HEADS

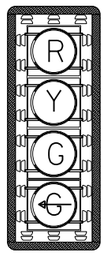
12" LED VERTICAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER



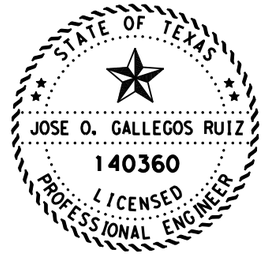
SIGNAL NO. 1
3 SEC SIGNAL HEAD



SIGNAL NO. 2
3 SEC SIGNAL HEAD



SIGNAL NO. 3
4 SEC SIGNAL HEAD



Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation
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SH 16
PROPOSED SIGNAL LAYOUT
GRISSOM ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		32
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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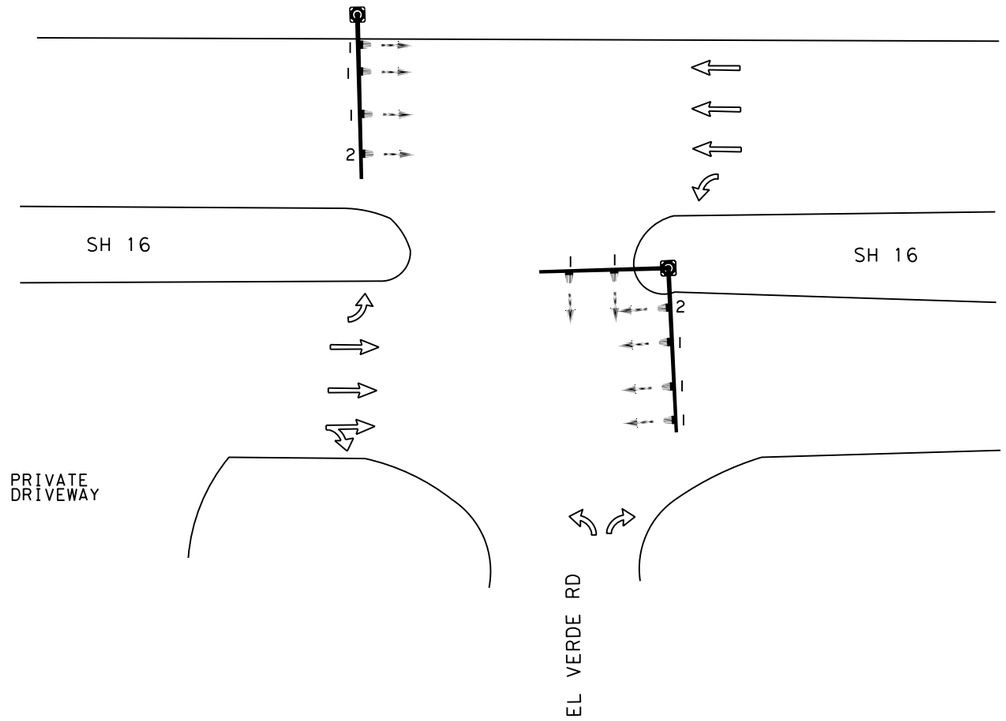
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	10

NOTES:

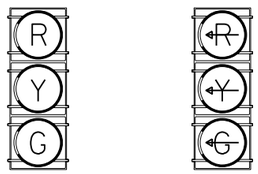
1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S



EXISTING SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

LEGEND

⇦ ..... DIRECTION OF TRAFFIC FLOW

EXIST. SIGNAL POLE W/ MAST ARM

EXIST. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
EXISTING SIGNAL LAYOUT
EL VERDE ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	33

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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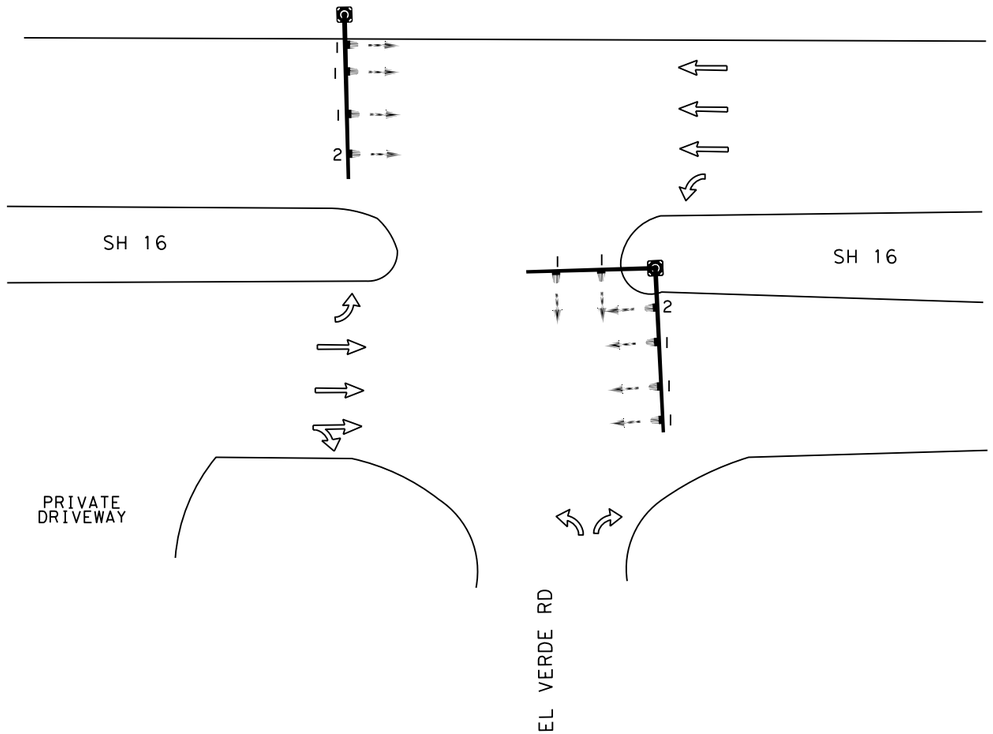
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	8
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	2
682-6003	VEH SIG SEC (12") LED (YEL)	EA	8
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	2
682-6005	VEH SIG SEC (12") LED (RED)	EA	8
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	10
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	400

N.T.S



NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

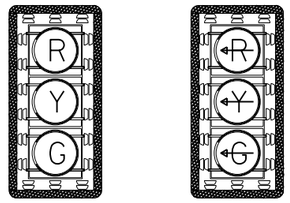
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
PROPOSED SIGNAL LAYOUT
EL VERDE ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		34
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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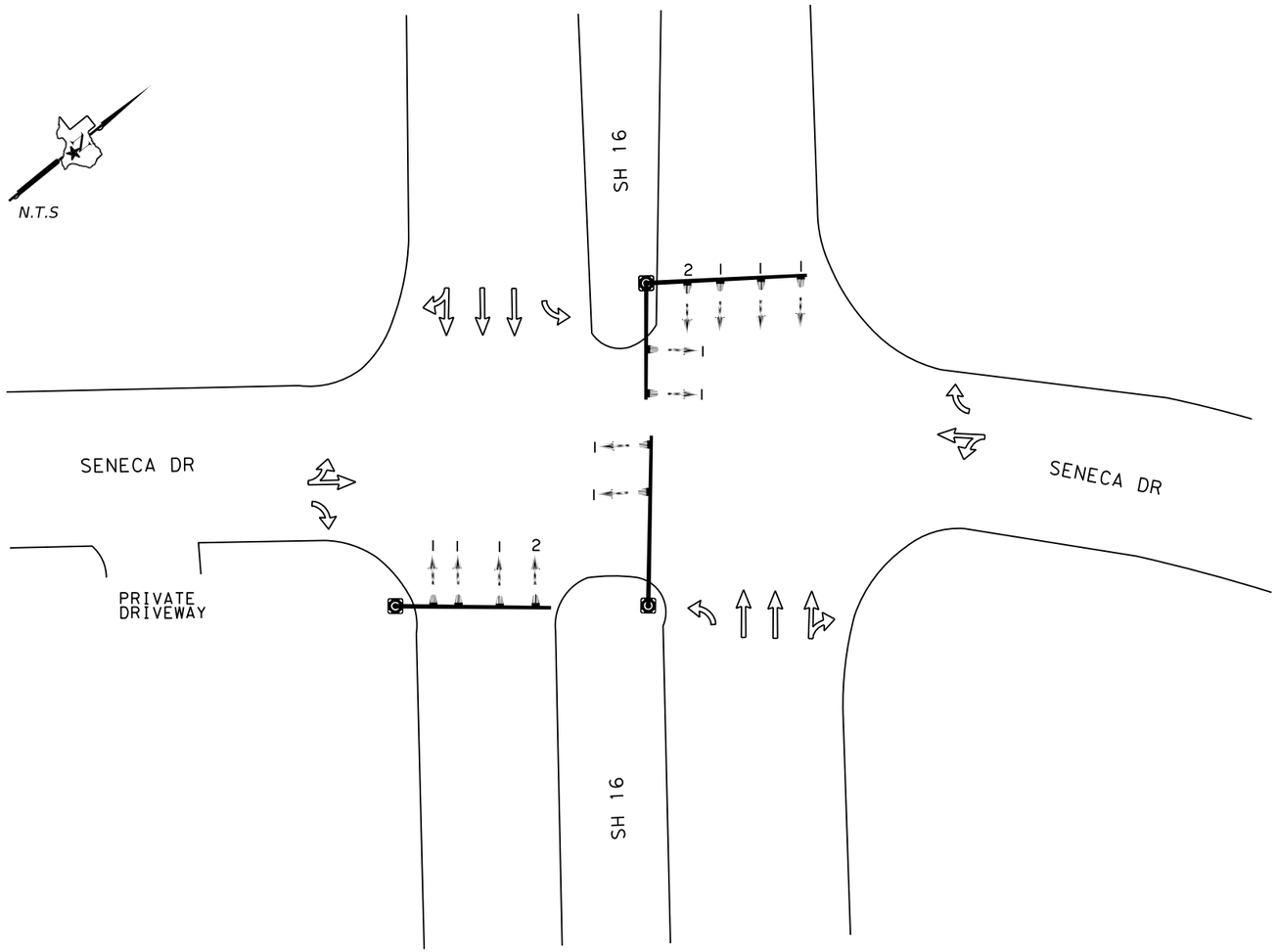
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

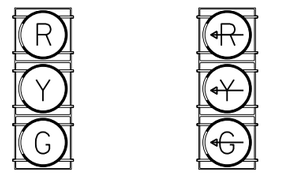


LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
EXISTING SIGNAL LAYOUT
SENECA DRIVE

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		35
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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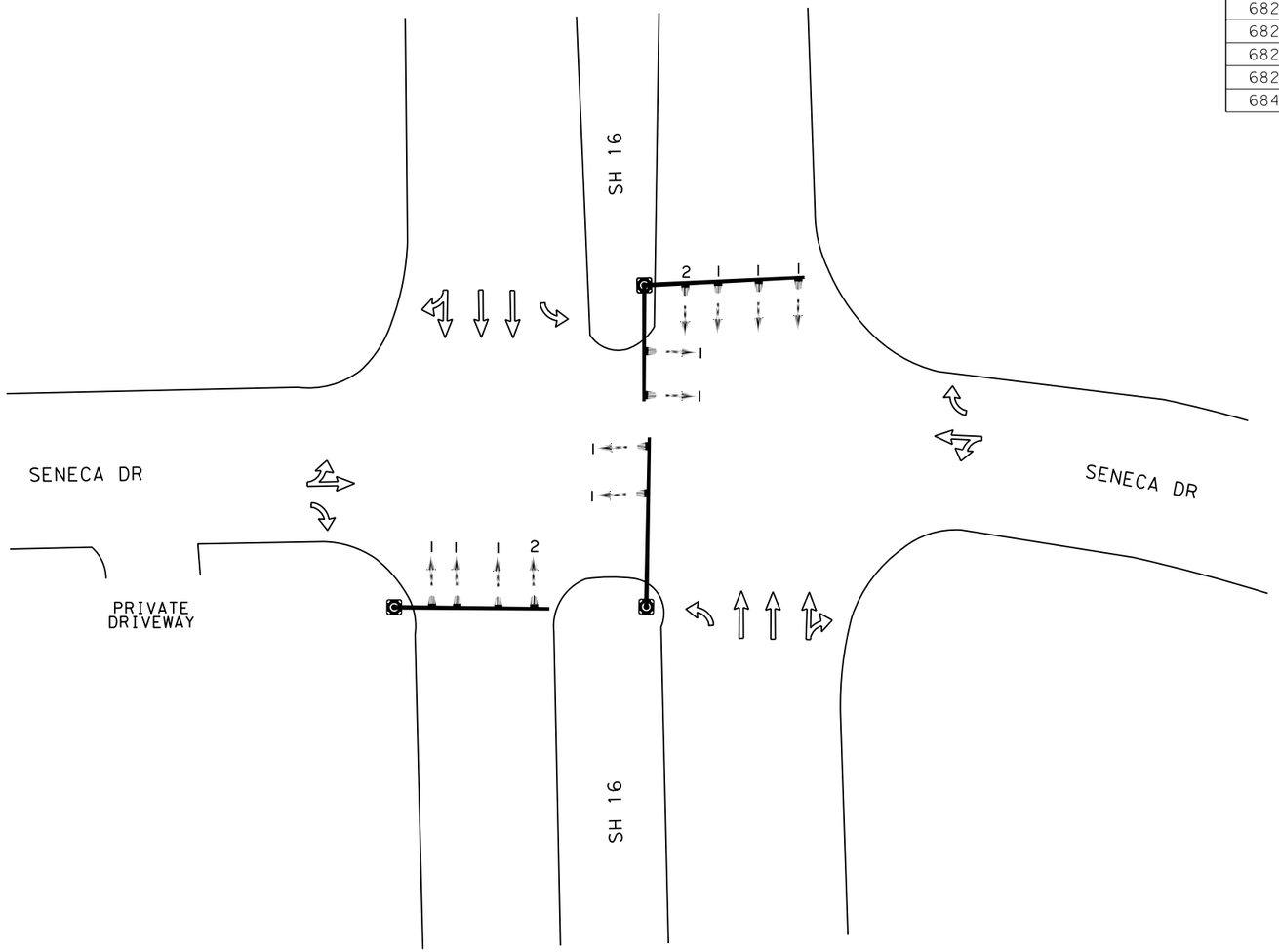
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	10
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	2
682-6003	VEH SIG SEC (12") LED (YEL)	EA	10
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	2
682-6005	VEH SIG SEC (12") LED (RED)	EA	10
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	525

N.T.S



NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

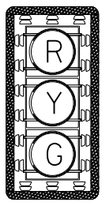
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

LEGEND

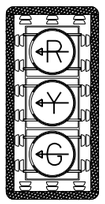
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD



SIGNAL NO. 2
3 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

SH 16
PROPOSED SIGNAL LAYOUT
SENECA DRIVE

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		36
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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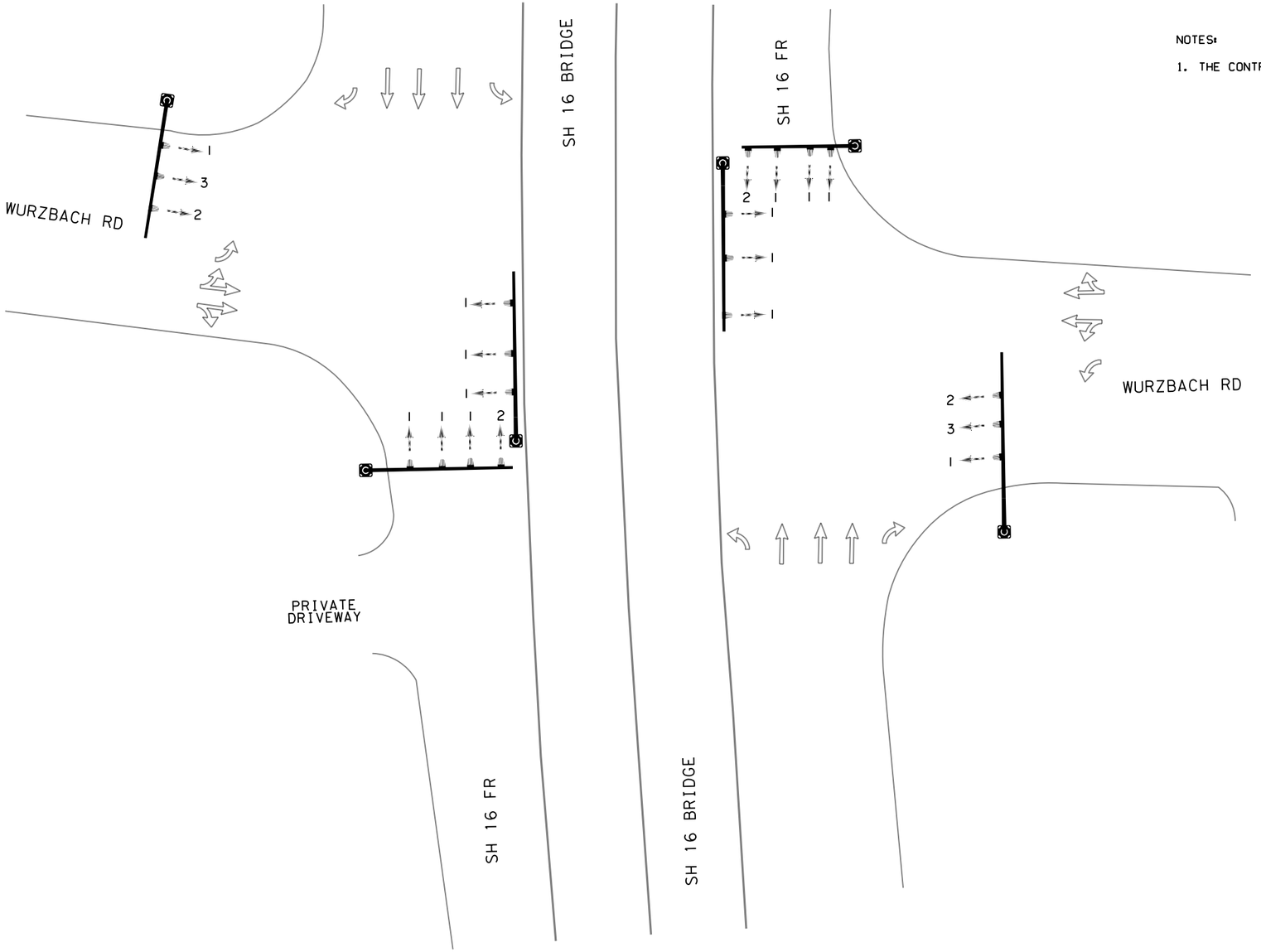
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	20

N.T.S



NOTES:

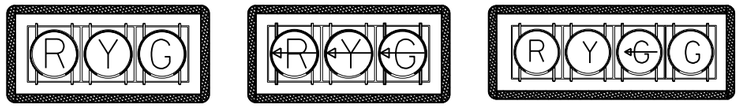
1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 8-29-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation
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SH 16
EXISTING SIGNAL LAYOUT
WURZBACH ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		37
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

8/28/2023 10:55:04 AM
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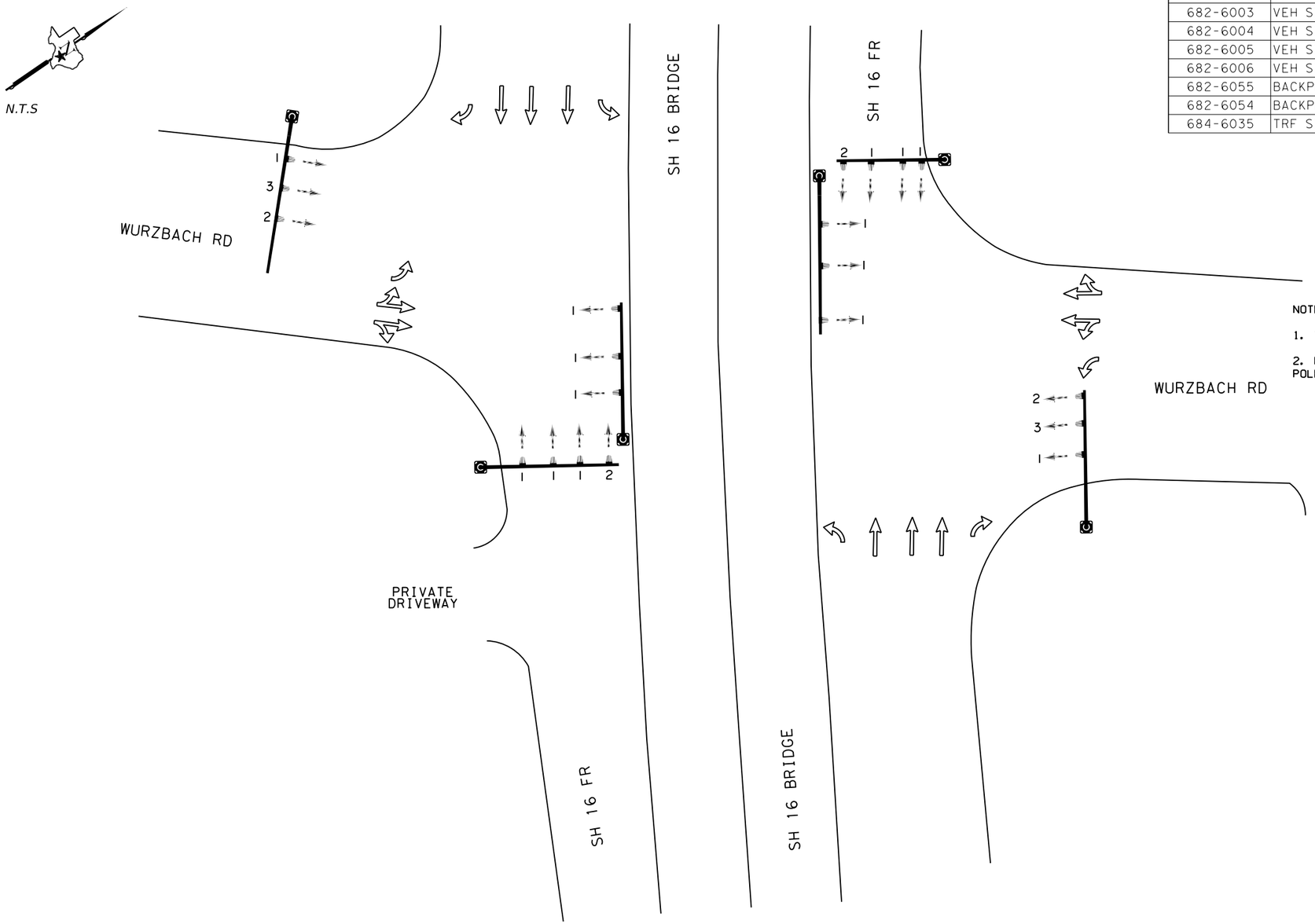
QUANTITY SUMMARY CSJ: 0291-10-119			
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	16
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	6
682-6003	VEH SIG SEC (12") LED (YEL)	EA	16
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	4
682-6005	VEH SIG SEC (12") LED (RED)	EA	16
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	18
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	888



NOTES:

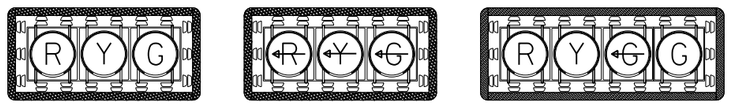
1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

PROPOSED SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 8-29-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

SH 16
PROPOSED SIGNAL LAYOUT
WURZBACH ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	38

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	SH 16

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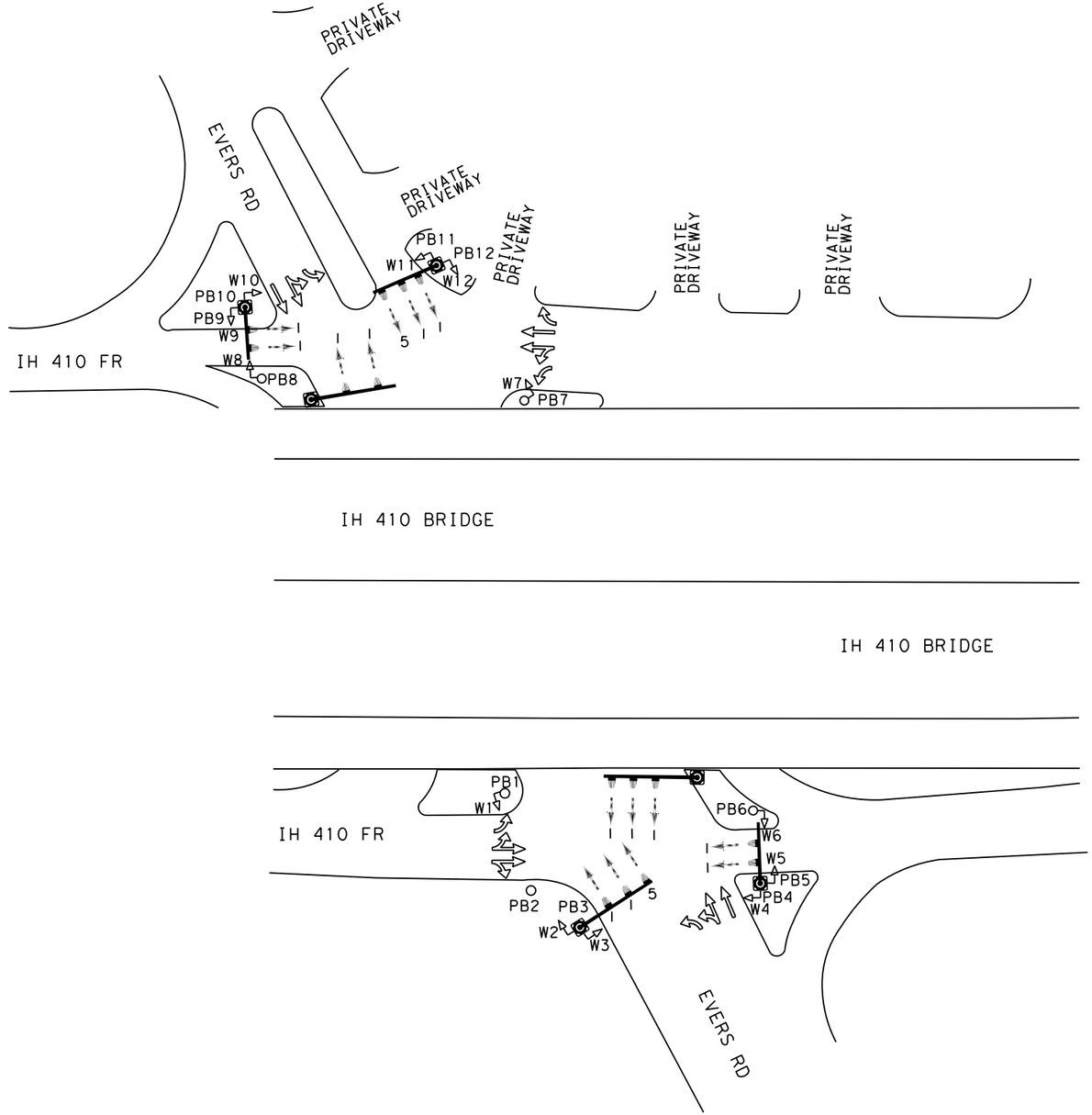
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	28
690-6030	REMOVAL OF PEDESTRIAN PUSH BUTTONS	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S



LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING
- EXIST. PEDESTRIAN POLE
- EXIST. PEDESTRIAN SIGNAL HEAD W/ PUSH BUTTON

EXISTING SIGNS TO BE REMOVED

PB1, PB4, PB5, PB7, PB10, PB12

PB2, PB3, PB6, PB8, PB9, PB11

EXISTING SIGNAL HEADS TO BE REMOVED

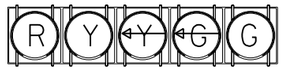
W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, W11, W12

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS

SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation
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IH 410
EXISTING SIGNAL LAYOUT
EVERS ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	39

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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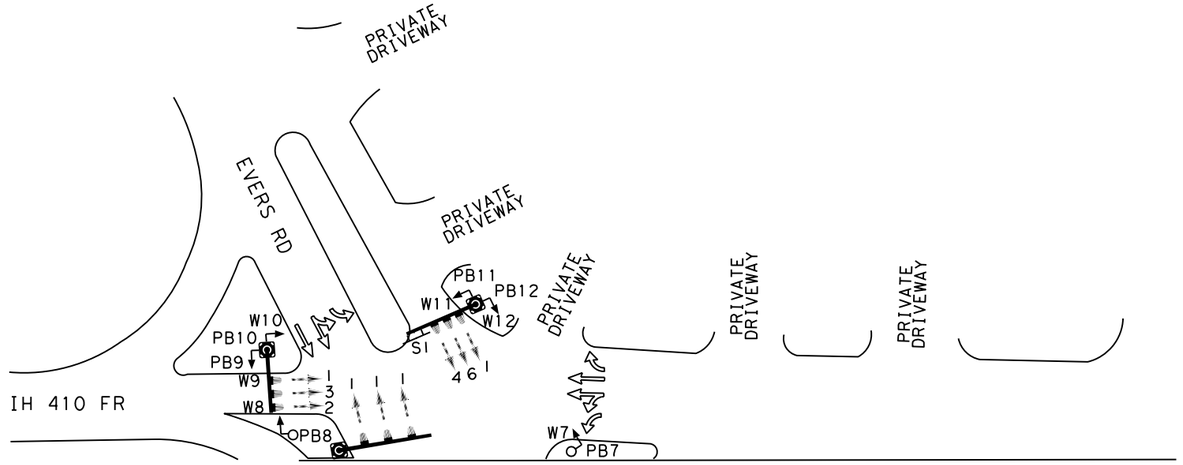
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
636-6001	ALUMINUM SIGNS (TY A)	SF	21
682-6001	VEH SIG SEC (12") LED (GRN)	EA	14
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	8
682-6003	VEH SIG SEC (12") LED (YEL)	EA	14
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	8
682-6005	VEH SIG SEC (12") LED (RED)	EA	14
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	4
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	803
682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	12
688-6001	PED DETECT PUSH BUTTON (APS)	EA	12
688-6003	PED DETECTOR CONTROLLER UNIT	EA	1

N.T.S



NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.
3. SEE SOSS FOR PROPOSED SIGNS.
4. BEFORE INSTALLATION OF EACH SIGNAL NO. 4, CONTRACTOR WILL NOTIFY ENGINEER FOR SIGNAL PROGRAMMING.

PROPOSED LED SIGNAL HEADS

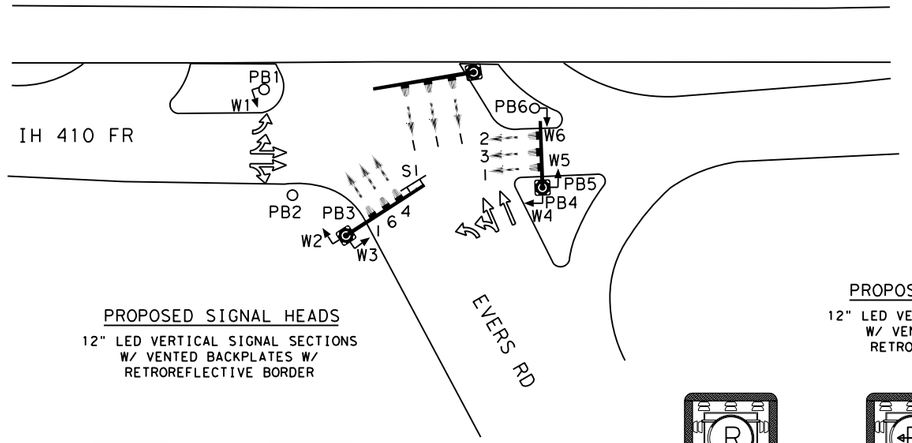
COUNTDOWN PEDESTRIAN SIGNAL HEAD

W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, W11, W12

PROPOSED SIGNS

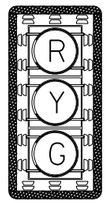
PB2, PB3, PB6, PB8, PB9, PB11

PB1, PB4, PB5, PB7, PB10, PB12

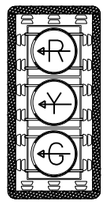


PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



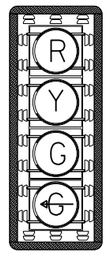
SIGNAL NO. 1
3 SEC SIGNAL HEAD



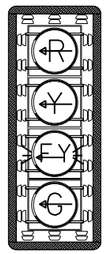
SIGNAL NO. 2
3 SEC SIGNAL HEAD

PROPOSED SIGNAL HEADS

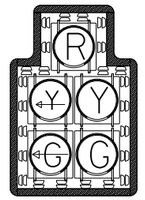
12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 3
4 SEC SIGNAL HEAD



SIGNAL NO. 4
4 SEC SIGNAL HEAD



SIGNAL NO. 6
5 SEC SIGNAL HEAD

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING
- S# PROP. SIGNS
- EXIST. PEDESTRIAN POLE
- PROP. PEDESTRIAN SIGNAL HEAD W/ PUSH BUTTON

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
PROPOSED SIGNAL LAYOUT
EVERS ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	40

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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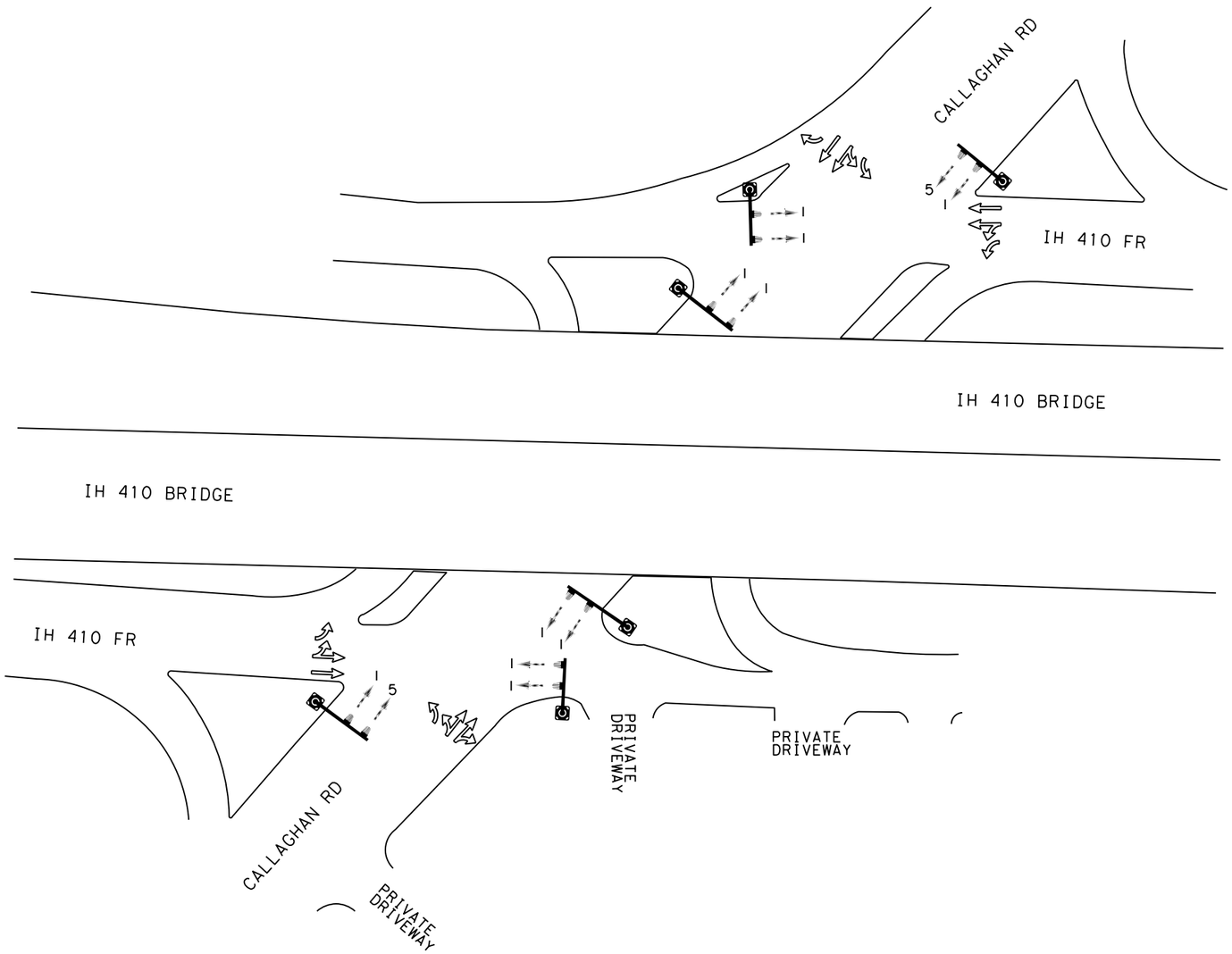
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

N.T.S



NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

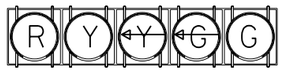
LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS

SIGNAL NO. 1
3 SEC SIGNAL HEAD



SIGNAL NO. 5
5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
EXISTING SIGNAL LAYOUT
CALLAGHAN ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		41
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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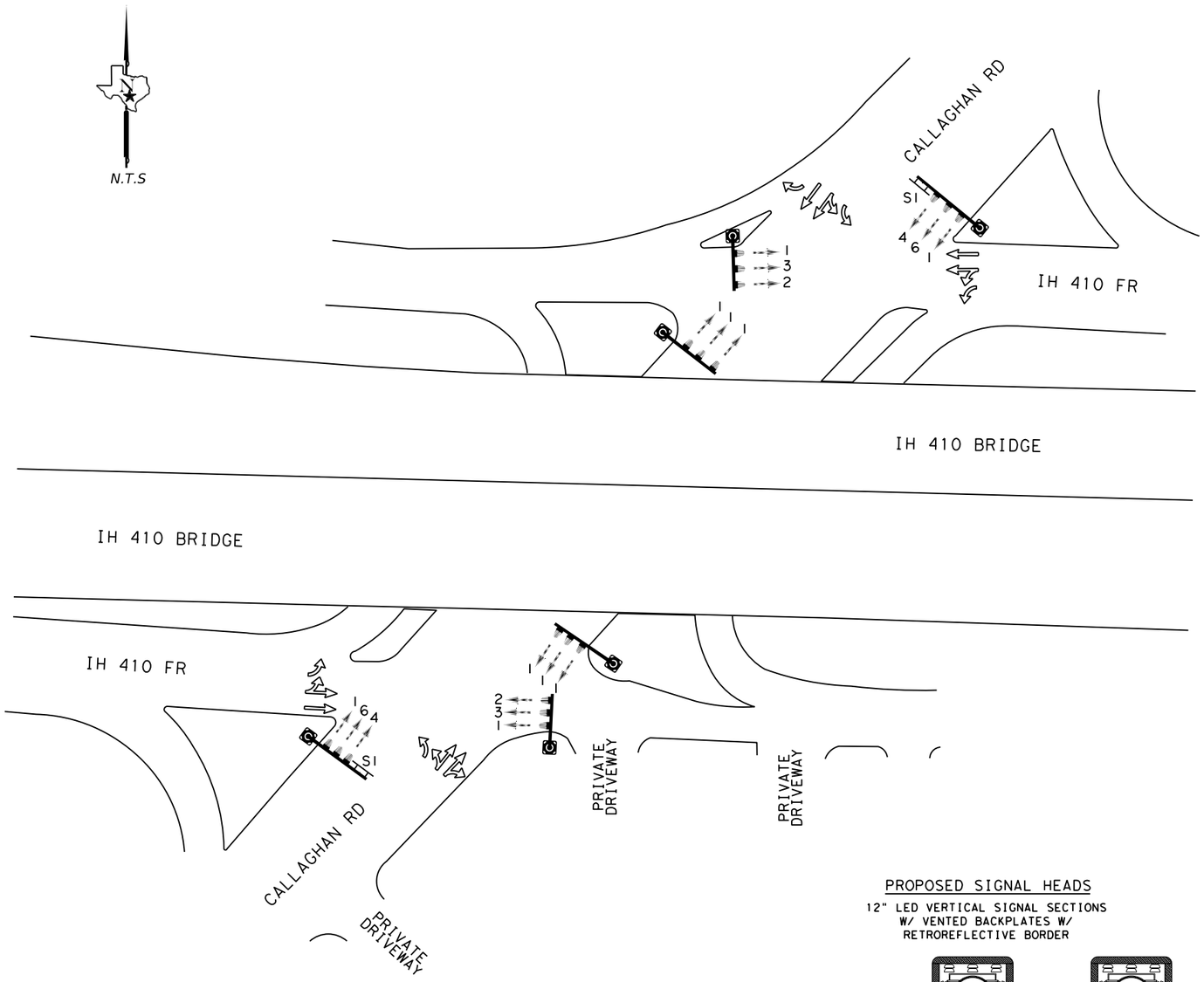


	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
636-6001	ALUMINUM SIGNS (TY A)	SF	21
682-6001	VEH SIG SEC (12") LED (GRN)	EA	14
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	8
682-6003	VEH SIG SEC (12") LED (YEL)	EA	14
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	8
682-6005	VEH SIG SEC (12") LED (RED)	EA	14
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	4
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	743

NOTES:

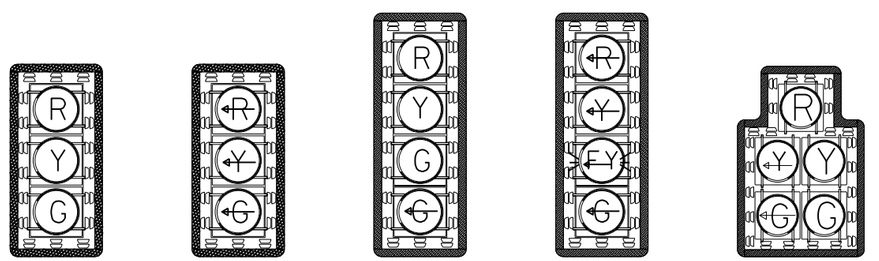
1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.
3. SEE SOSS FOR PROPOSED SIGNS.
4. BEFORE INSTALLATION OF EACH SIGNAL NO. 4, CONTRACTOR WILL NOTIFY ENGINEER FOR SIGNAL PROGRAMMING.

LEGEND

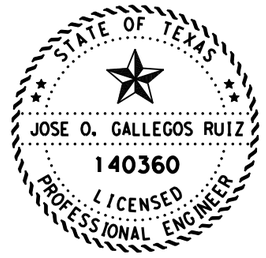
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING
- S# PROP. SIGNS

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1 — 3 SEC SIGNAL HEAD
SIGNAL NO. 2 — 3 SEC SIGNAL HEAD
SIGNAL NO. 3 — 4 SEC SIGNAL HEAD
SIGNAL NO. 4 — 4 SEC SIGNAL HEAD
SIGNAL NO. 6 — 5 SEC SIGNAL HEAD



Jose Gallegos P.E. — JOSE O. GALLEGOS RUIZ, P.E. — 8-27-23 DATE

IH 410 PROPOSED SIGNAL LAYOUT CALLAGHAN ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	42

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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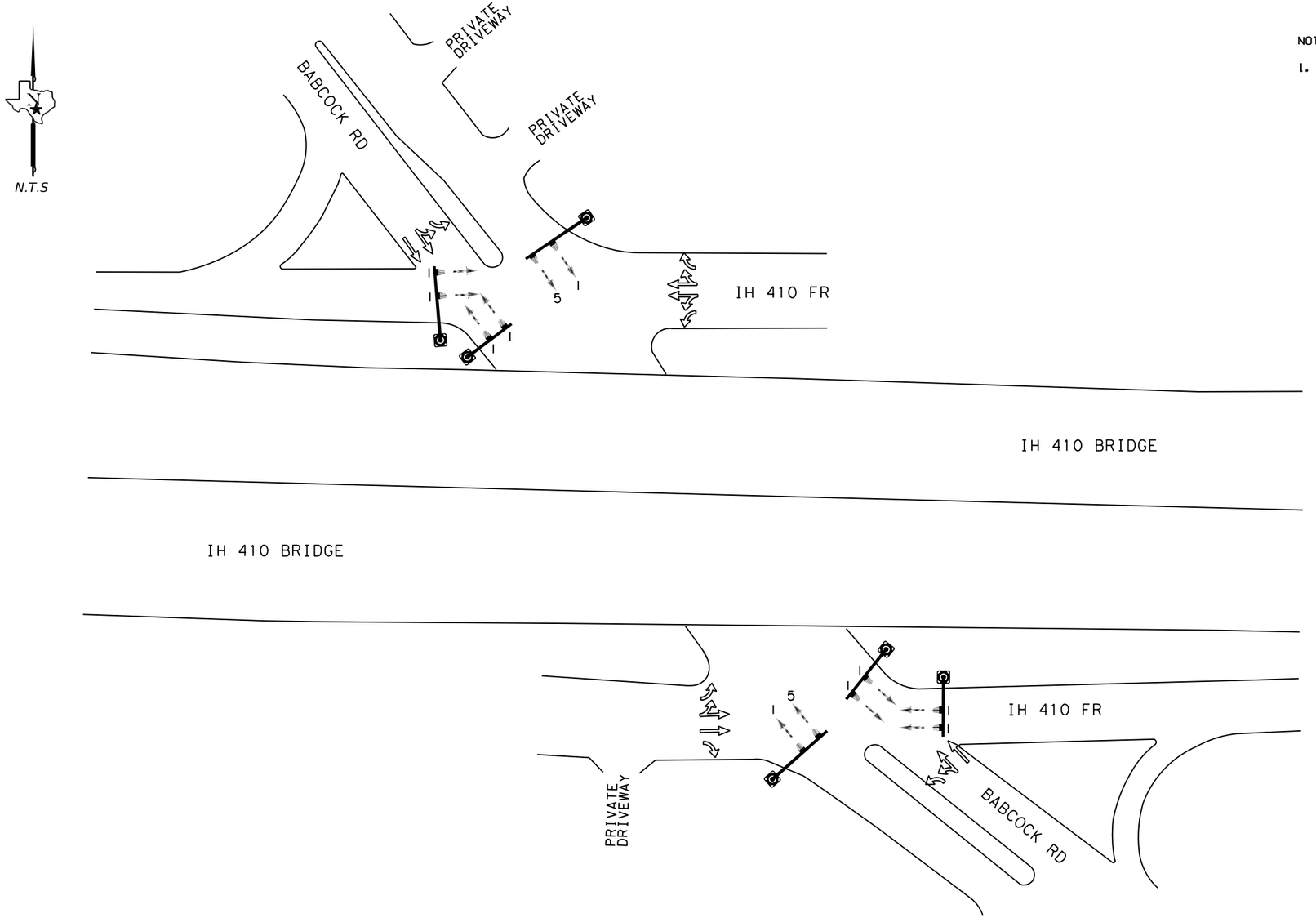
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S

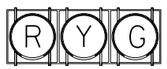


LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

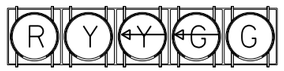
EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS



SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
EXISTING SIGNAL LAYOUT
BABCOCK ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		43
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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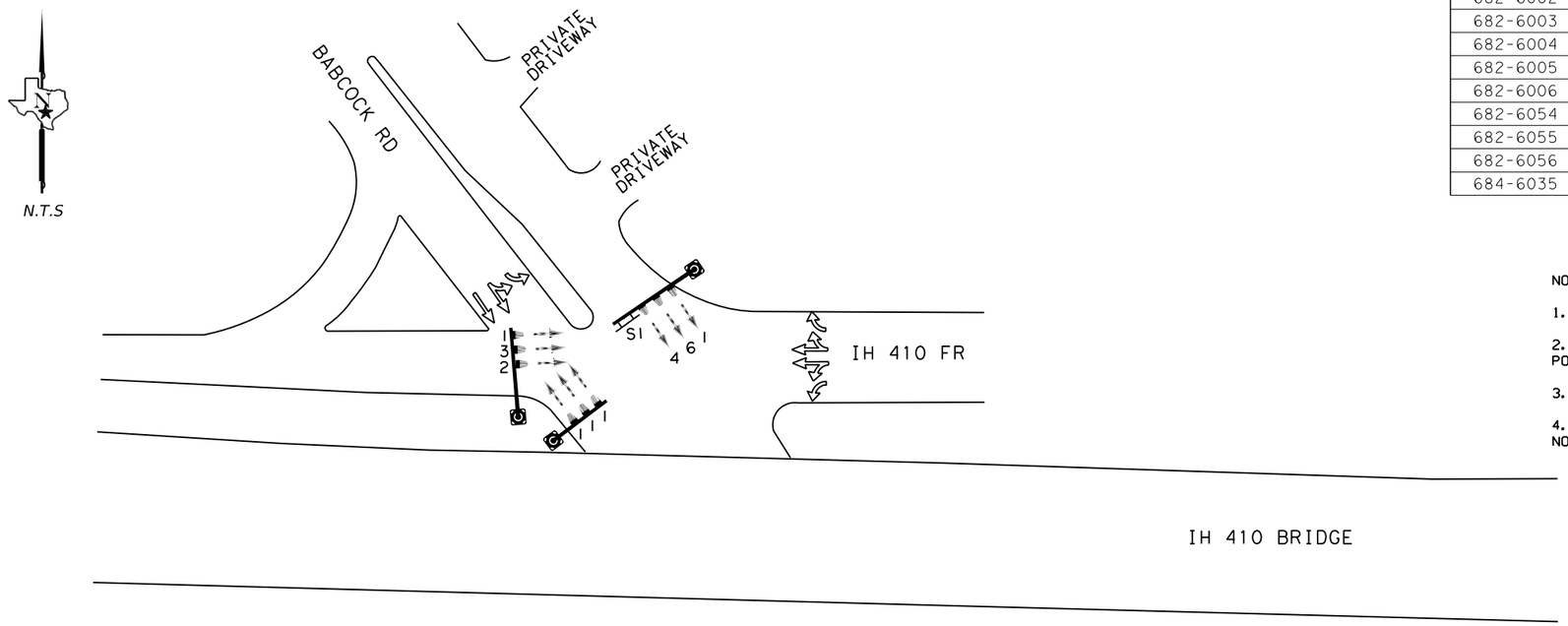
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
636-6001	ALUMINUM SIGNS (TY A)	SF	21
682-6001	VEH SIG SEC (12") LED (GRN)	EA	14
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	8
682-6003	VEH SIG SEC (12") LED (YEL)	EA	14
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	8
682-6005	VEH SIG SEC (12") LED (RED)	EA	14
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	4
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	811



NOTES:

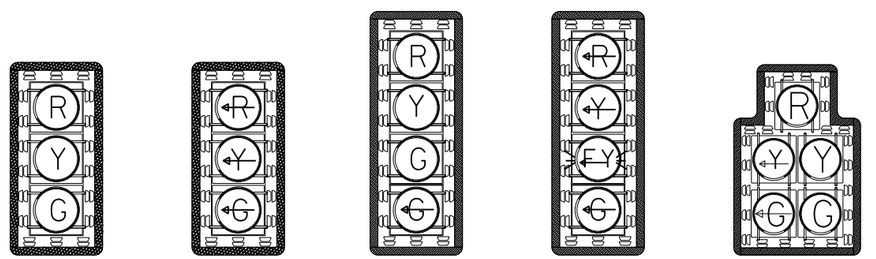
1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.
3. SEE SOSS FOR PROPOSED SIGNS.
4. BEFORE INSTALLATION OF EACH SIGNAL NO. 4, CONTRACTOR WILL NOTIFY ENGINEER FOR SIGNAL PROGRAMMING.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING
- S# PROP. SIGNS

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1 — 3 SEC SIGNAL HEAD
SIGNAL NO. 2 — 3 SEC SIGNAL HEAD
SIGNAL NO. 3 — 4 SEC SIGNAL HEAD
SIGNAL NO. 4 — 4 SEC SIGNAL HEAD
SIGNAL NO. 6 — 5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
PROPOSED SIGNAL LAYOUT
BABCOCK ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		44
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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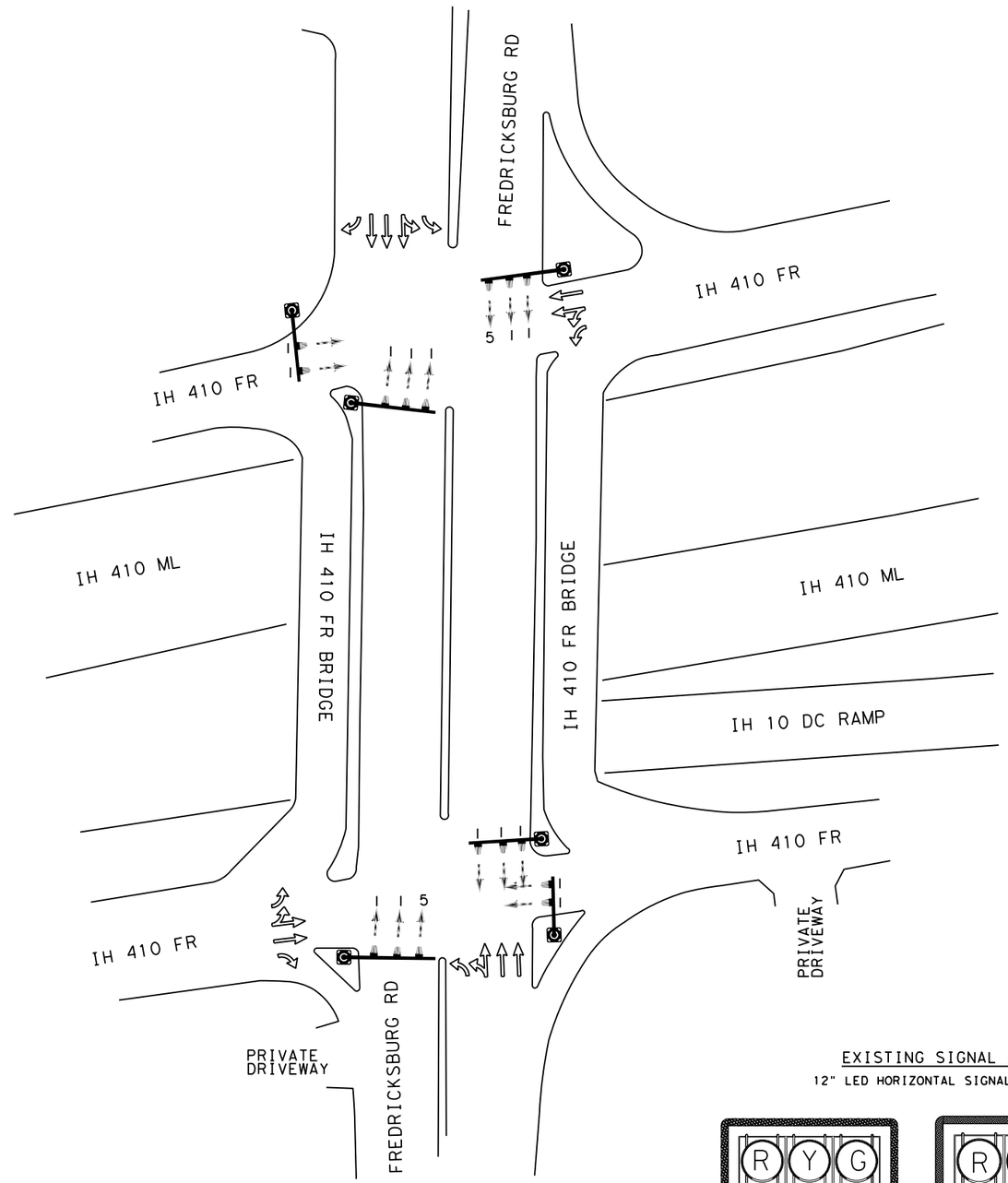
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	16

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S



LEGEND

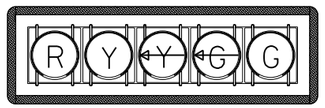
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS

SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 8-29-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

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IH 410
EXISTING SIGNAL LAYOUT
FREDRICKSBURG ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	45

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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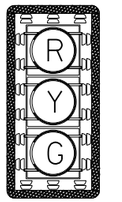
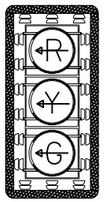
PROPOSED SIGNAL HEADS

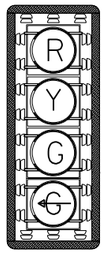
12" LED VERTICAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER



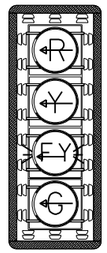
SIGNAL NO. 1
3 SEC SIGNAL HEAD



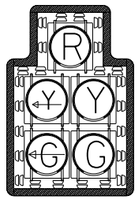
SIGNAL NO. 2
3 SEC SIGNAL HEAD



SIGNAL NO. 3
4 SEC SIGNAL HEAD

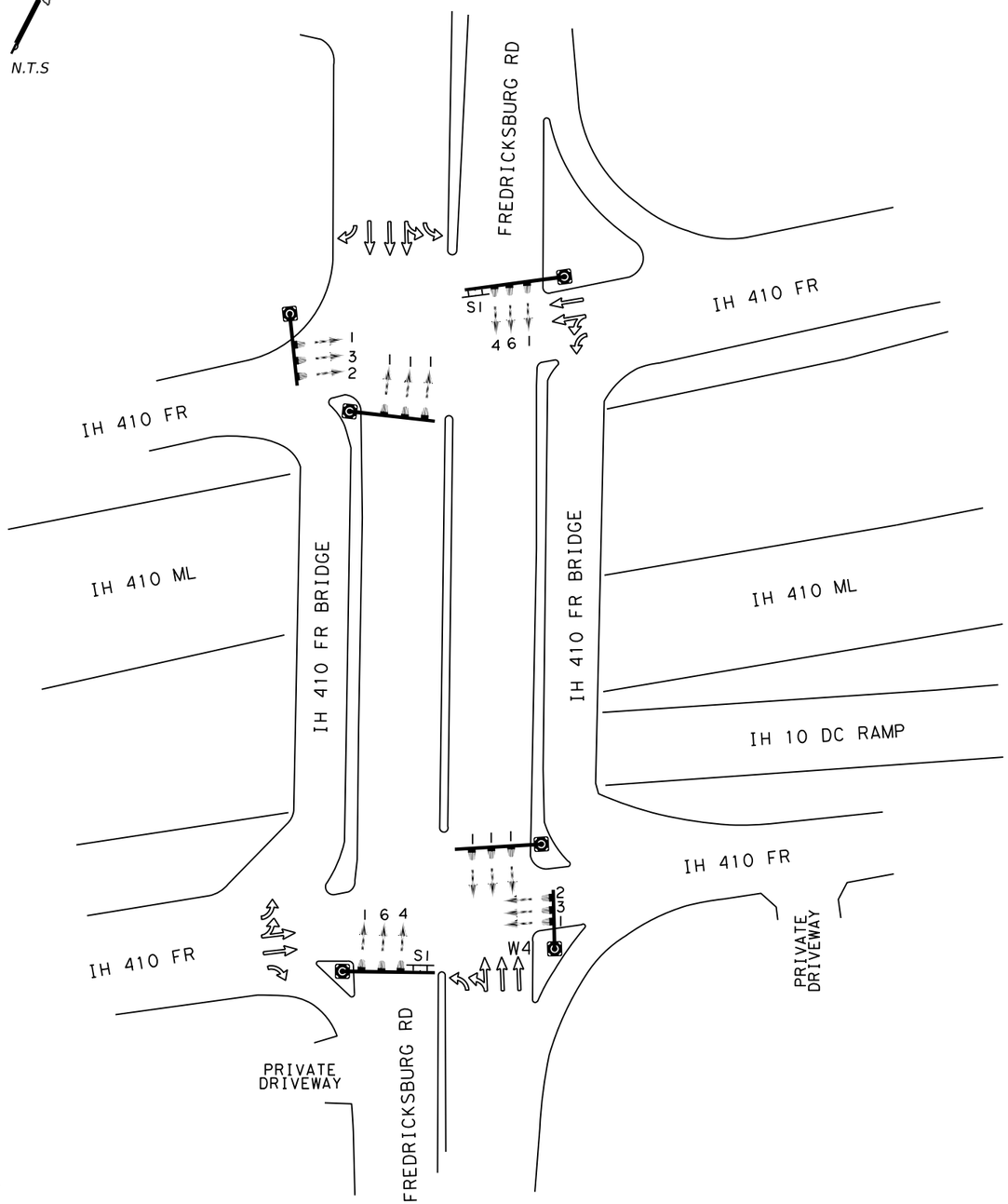


SIGNAL NO. 4
4 SEC SIGNAL HEAD



SIGNAL NO. 6
5 SEC SIGNAL HEAD

N.T.S



LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING
- S# PROP. SIGNS

	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
636-6001	ALUMINUM SIGNS (TY A)	SF	21
682-6001	VEH SIG SEC (12") LED (GRN)	EA	14
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	8
682-6003	VEH SIG SEC (12") LED (YEL)	EA	14
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	8
682-6005	VEH SIG SEC (12") LED (RED)	EA	14
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	4
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	807

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.
3. SEE SOSS FOR PROPOSED SIGNS.
4. BEFORE INSTALLATION OF EACH SIGNAL NO. 4, CONTRACTOR WILL NOTIFY ENGINEER FOR SIGNAL PROGRAMMING.

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 8-29-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
PROPOSED SIGNAL LAYOUT
FREDRICKSBURG ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		46
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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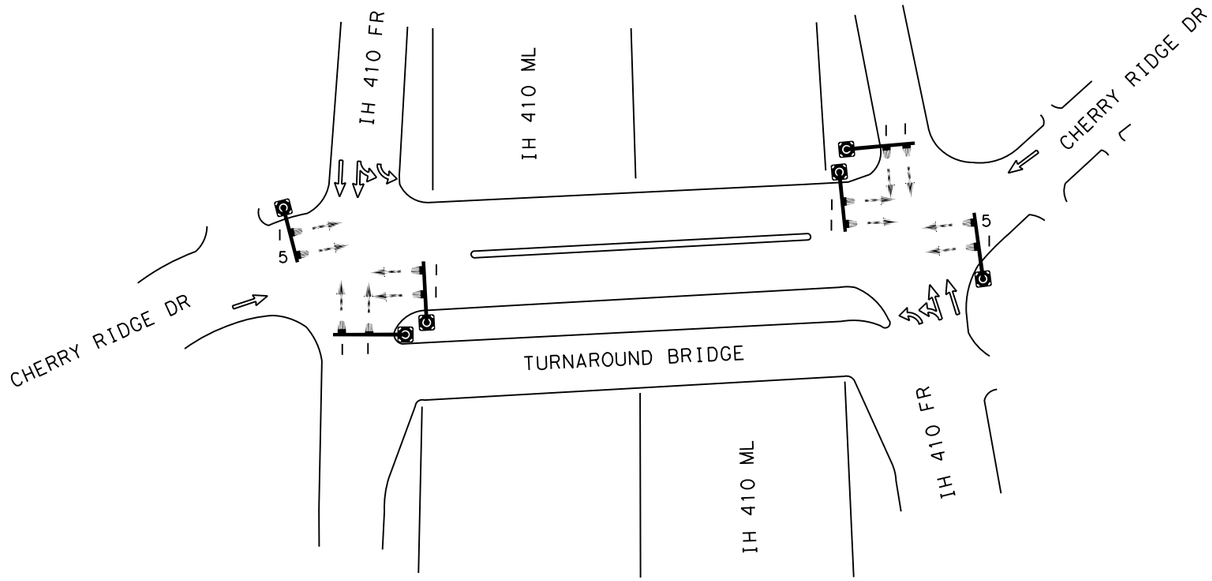
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S



LEGEND

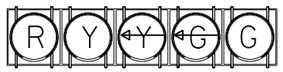
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS

SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation
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IH 410
EXISTING SIGNAL LAYOUT
CHERRY RIDGE DRIVE

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		47
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

8/18/2023 4:42:43 PM
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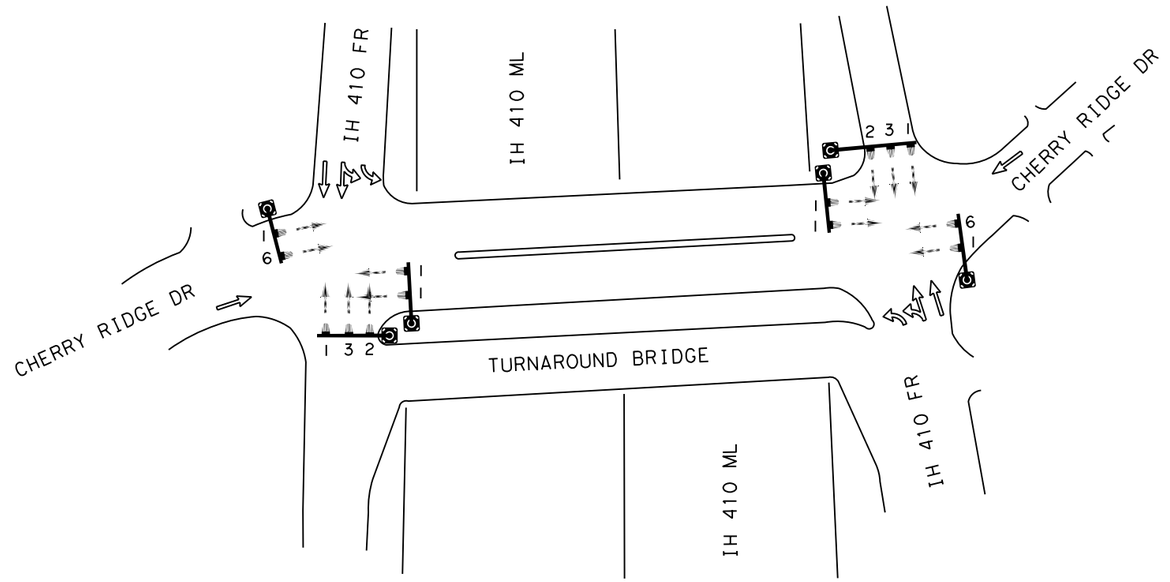
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	12
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	6
682-6003	VEH SIG SEC (12") LED (YEL)	EA	12
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	4
682-6005	VEH SIG SEC (12") LED (RED)	EA	12
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	10
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	547

N.T.S



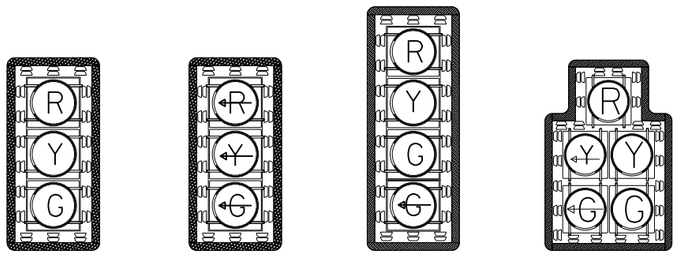
NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

SIGNAL NO. 6
5 SEC SIGNAL HEAD

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
PROPOSED SIGNAL LAYOUT
CHERRY RIDGE DRIVE

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	48

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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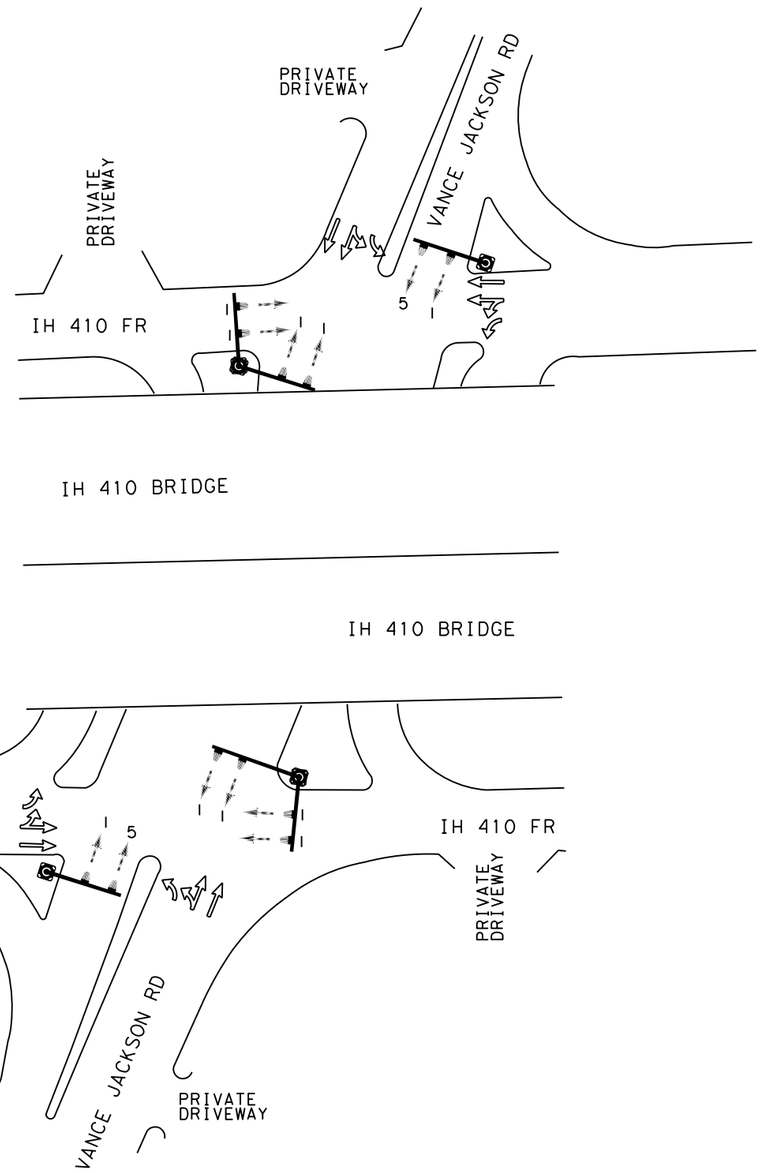
QUANTITY SUMMARY CSJ: 0291-10-119			
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S



LEGEND

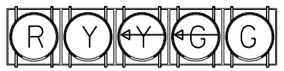
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS

SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 8-29-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

IH 410
EXISTING SIGNAL LAYOUT
VANCE JACKSON ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		49
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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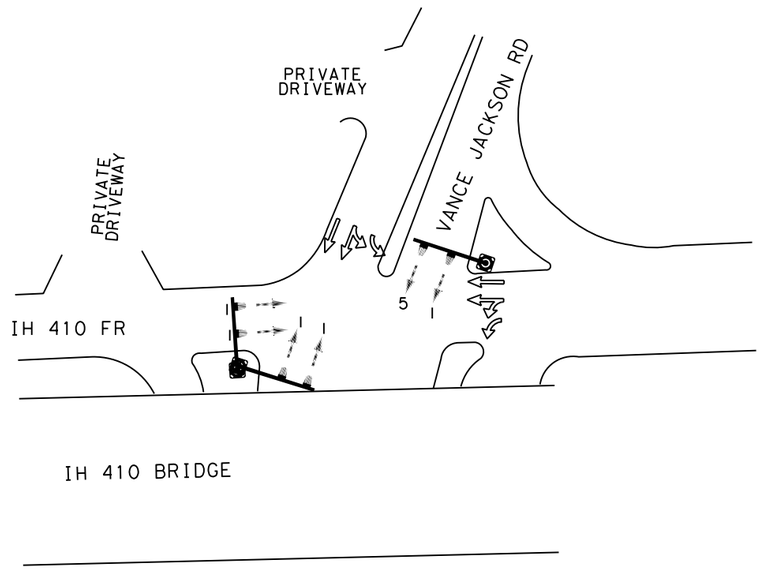
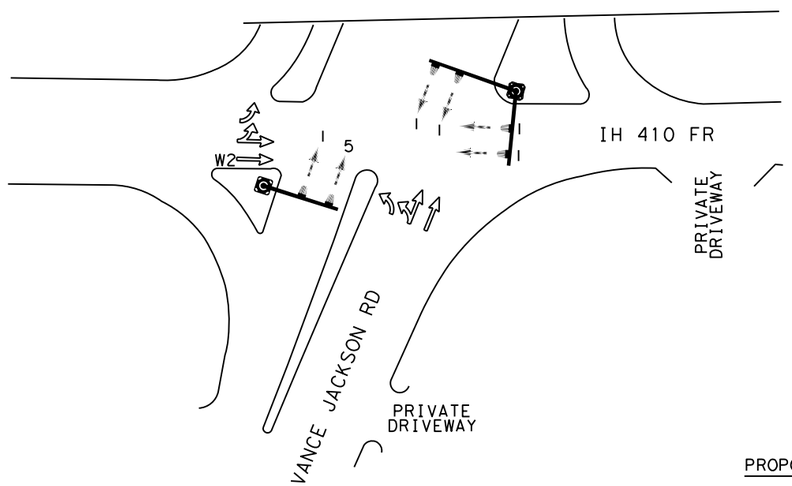




	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	12
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	2
682-6003	VEH SIG SEC (12") LED (YEL)	EA	12
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	2
682-6005	VEH SIG SEC (12") LED (RED)	EA	12
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	10
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	552

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

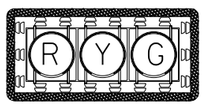
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

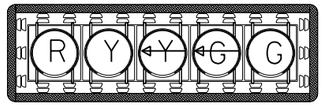
PROPOSED SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER



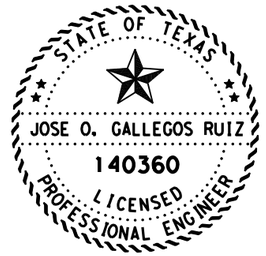
SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD



Jose Gallegos, P.E. 8-29-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
PROPOSED SIGNAL LAYOUT
VANCE JACKSON ROAD

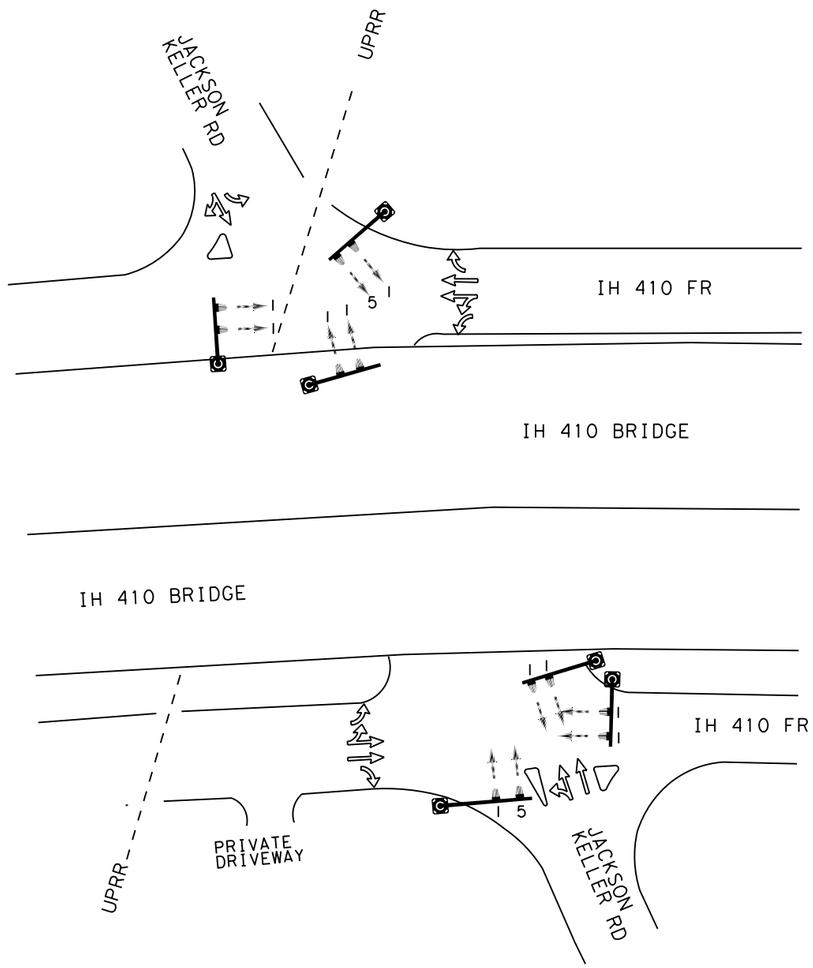
SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		50
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.



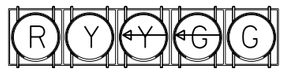
LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS

SIGNAL NO. 1
3 SEC SIGNAL HEAD



SIGNAL NO. 5
5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
EXISTING SIGNAL LAYOUT
JACKSON KELLER ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	51

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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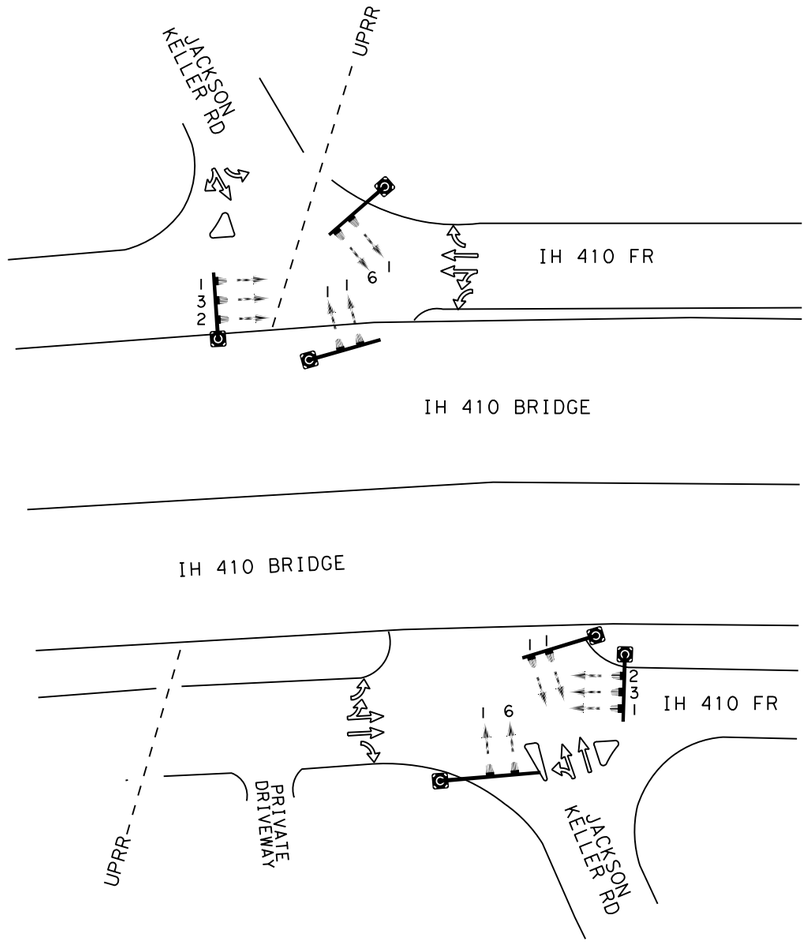
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	12
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	6
682-6003	VEH SIG SEC (12") LED (YEL)	EA	12
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	4
682-6005	VEH SIG SEC (12") LED (RED)	EA	12
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	10
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	591

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

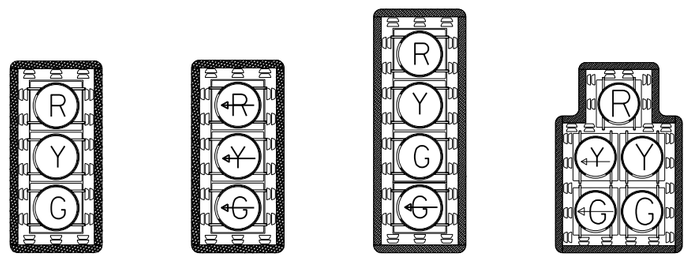
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

N.T.S



PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD

SIGNAL NO. 3
4 SEC SIGNAL HEAD

SIGNAL NO. 6
5 SEC SIGNAL HEAD

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

IH 410
PROPOSED SIGNAL LAYOUT
JACKSON KELLER ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		52
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

8/18/2023 4:42:49 PM
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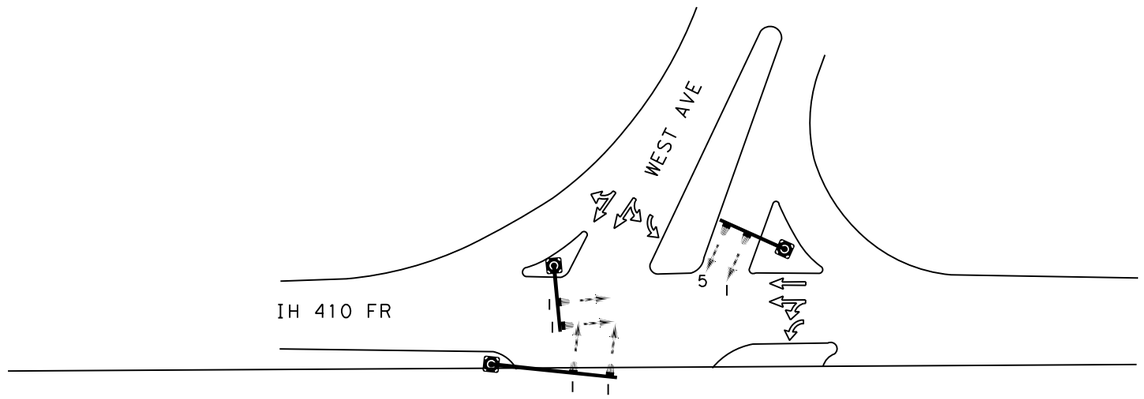
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

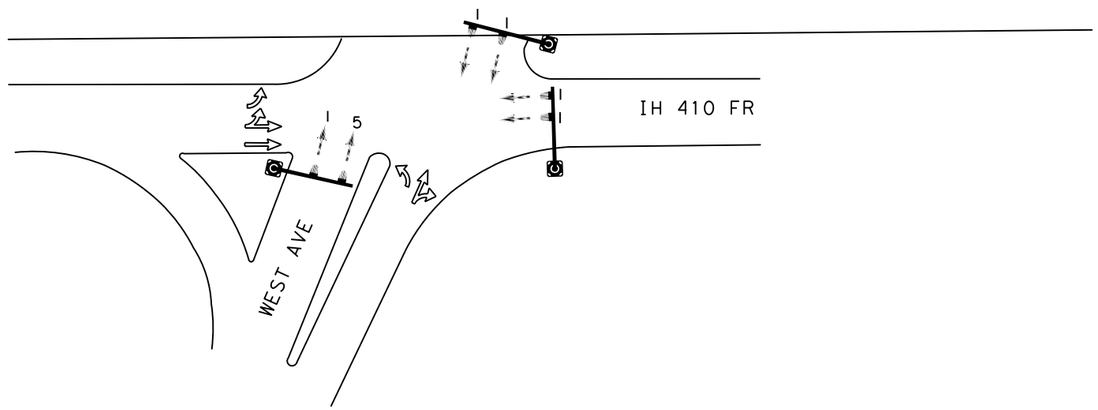
NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S



IH 410 BRIDGE

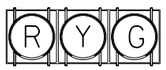


LEGEND

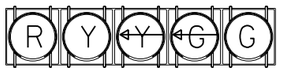
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS



SIGNAL NO. 1
3 SEC SIGNAL HEAD



SIGNAL NO. 5
5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
EXISTING SIGNAL LAYOUT
WEST AVENUE

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		53
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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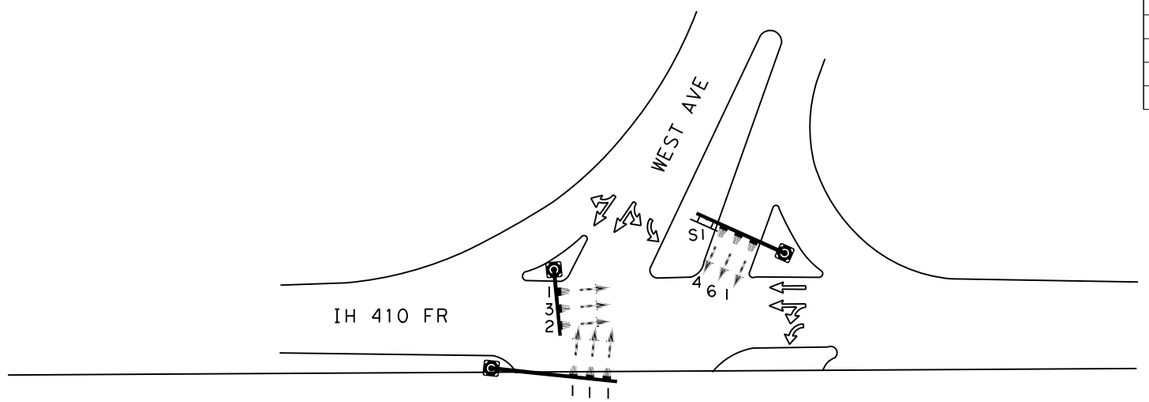
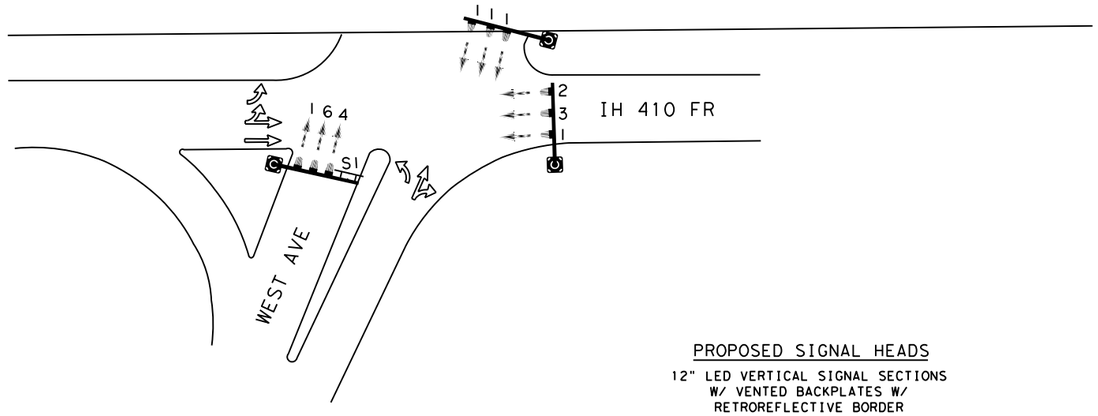
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
636-6001	ALUMINUM SIGNS (TY A)	SF	21
682-6001	VEH SIG SEC (12") LED (GRN)	EA	14
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	8
682-6003	VEH SIG SEC (12") LED (YEL)	EA	14
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	8
682-6005	VEH SIG SEC (12") LED (RED)	EA	14
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	4
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	824

N.T.S





NOTES:

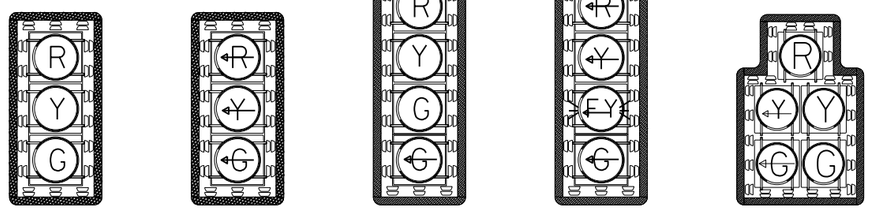
1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.
3. SEE SOSS FOR PROPOSED SIGNS.
4. BEFORE INSTALLATION OF EACH SIGNAL NO. 4, CONTRACTOR WILL NOTIFY ENGINEER FOR SIGNAL PROGRAMMING.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING
- S# PROP. SIGNS

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1 — 3 SEC SIGNAL HEAD
SIGNAL NO. 2 — 3 SEC SIGNAL HEAD
SIGNAL NO. 3 — 4 SEC SIGNAL HEAD
SIGNAL NO. 4 — 4 SEC SIGNAL HEAD
SIGNAL NO. 6 — 5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
PROPOSED SIGNAL LAYOUT
WEST AVENUE

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	54

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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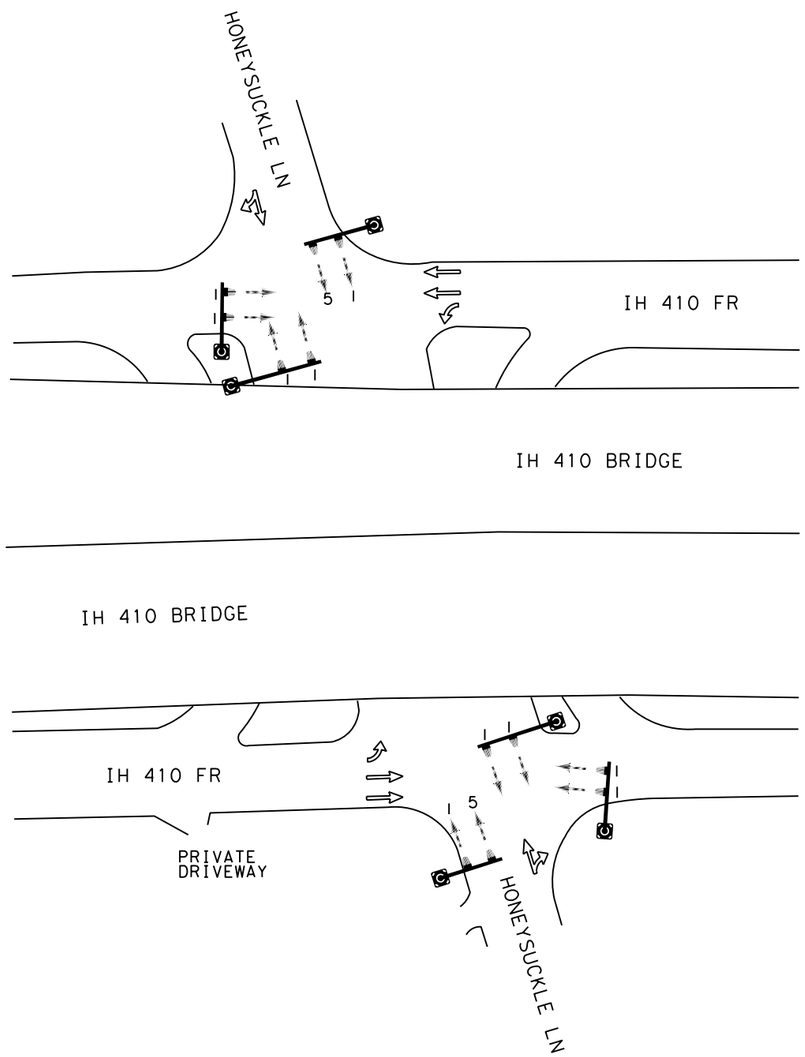
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	12

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

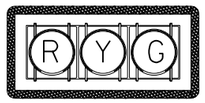


LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

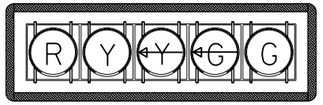
EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS



SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
EXISTING SIGNAL LAYOUT
HONEYSUCKLE LANE

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		55
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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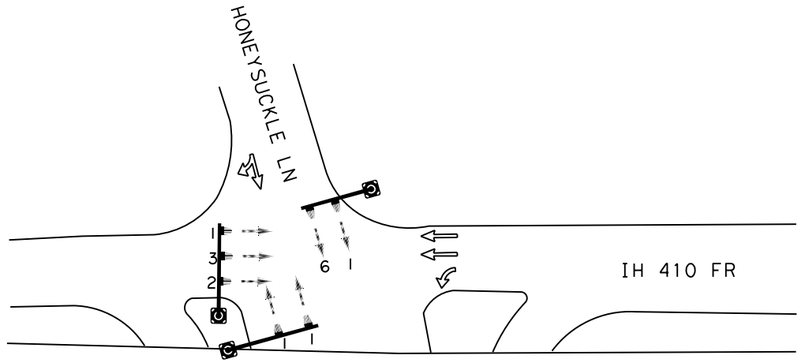
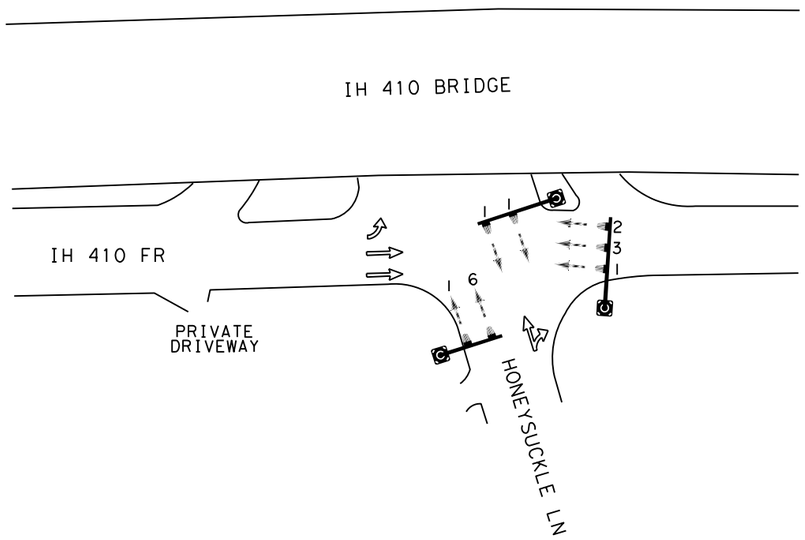


IH 410 BRIDGE

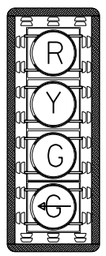


PROPOSED SIGNAL HEADS

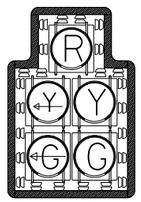
12" LED VERTICAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER

SIGNAL NO. 1
3 SEC SIGNAL HEAD

SIGNAL NO. 2
3 SEC SIGNAL HEAD



SIGNAL NO. 3
4 SEC SIGNAL HEAD



SIGNAL NO. 6
5 SEC SIGNAL HEAD

LEGEND

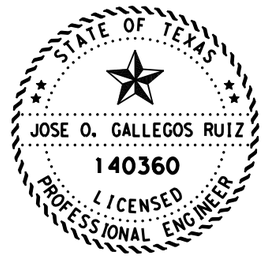
- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING

	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	12
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	6
682-6003	VEH SIG SEC (12") LED (YEL)	EA	12
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	4
682-6005	VEH SIG SEC (12") LED (RED)	EA	12
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	10
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	612

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.



Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation

IH 410
PROPOSED SIGNAL LAYOUT
HONEYSUCKLE LANE

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		56
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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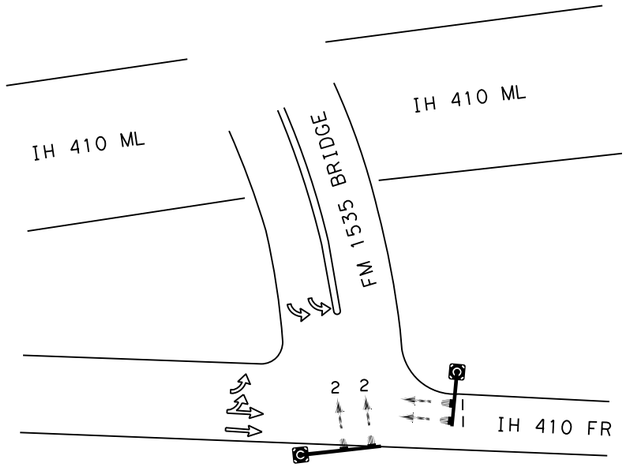
QUANTITY SUMMARY CSJ: 0291-10-119			
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	4

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S

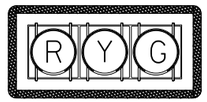


LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING

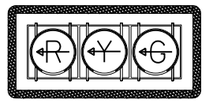
EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS



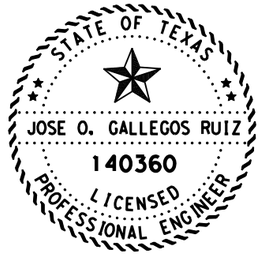
SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 2

3 SEC SIGNAL HEAD



Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

IH 410
EXISTING SIGNAL LAYOUT
FM 1535

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		57
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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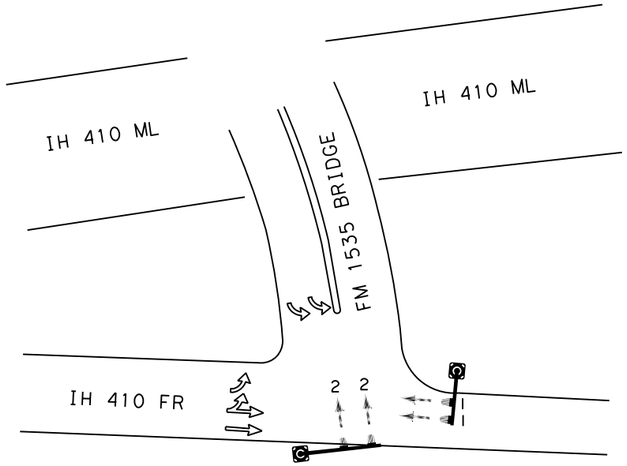
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	2
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	2
682-6003	VEH SIG SEC (12") LED (YEL)	EA	2
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	2
682-6005	VEH SIG SEC (12") LED (RED)	EA	2
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	4
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	172

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

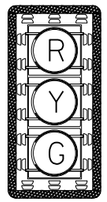
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

N.T.S

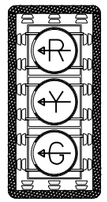


PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS
W/ VENTED BACKPLATES W/
RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD



SIGNAL NO. 2
3 SEC SIGNAL HEAD

LEGEND

⇦ ..... DIRECTION OF TRAFFIC FLOW

EXIST. SIGNAL POLE W/ MAST ARM

PROP. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

IH 410
PROPOSED SIGNAL LAYOUT
FM 1535

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		58
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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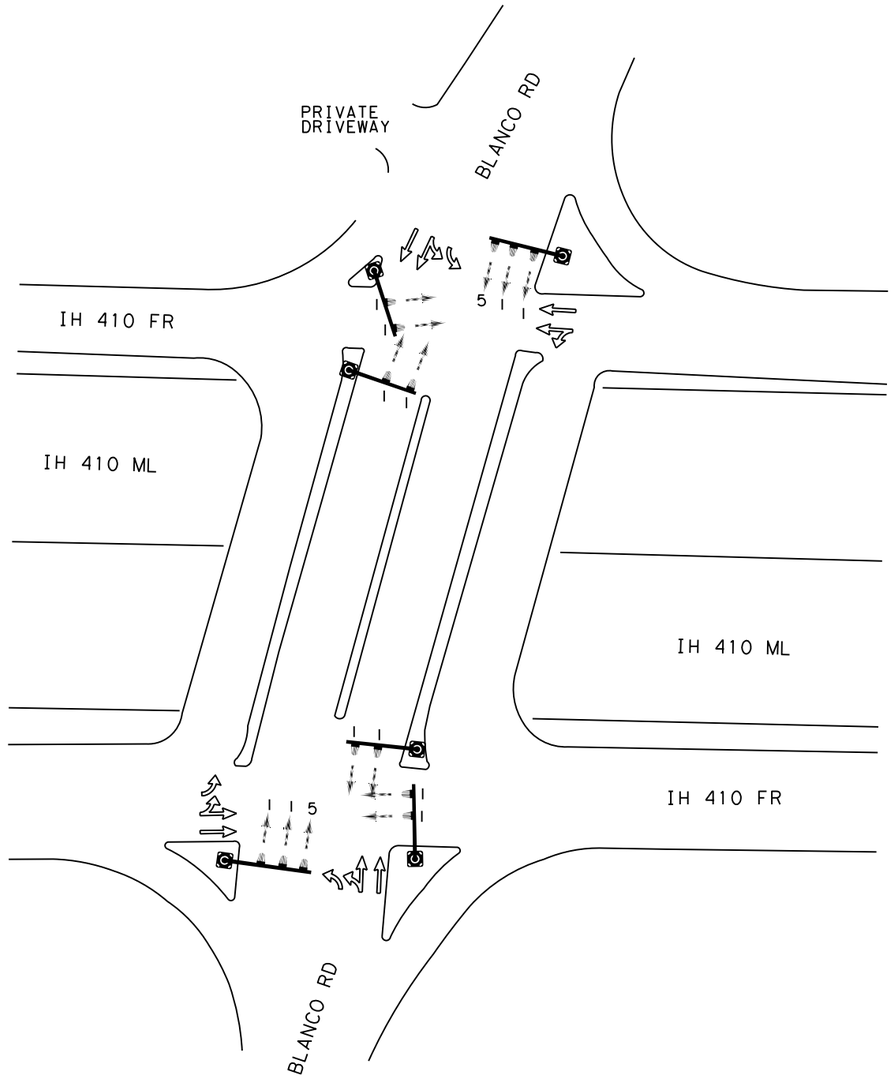
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	14

NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S

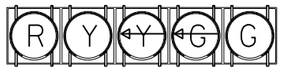


EXISTING SIGNAL HEADS

12" LED HORIZONTAL SIGNAL SECTIONS

SIGNAL NO. 1

3 SEC SIGNAL HEAD



SIGNAL NO. 5

5 SEC SIGNAL HEAD

LEGEND

⇦ ..... DIRECTION OF TRAFFIC FLOW

■ ——— ..... EXIST. SIGNAL POLE W/ MAST ARM

▸ - - → ..... EXIST. SIGNAL HEAD FACING

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. 8-29-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

IH 410
EXISTING SIGNAL LAYOUT
BLANCO ROAD

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	59

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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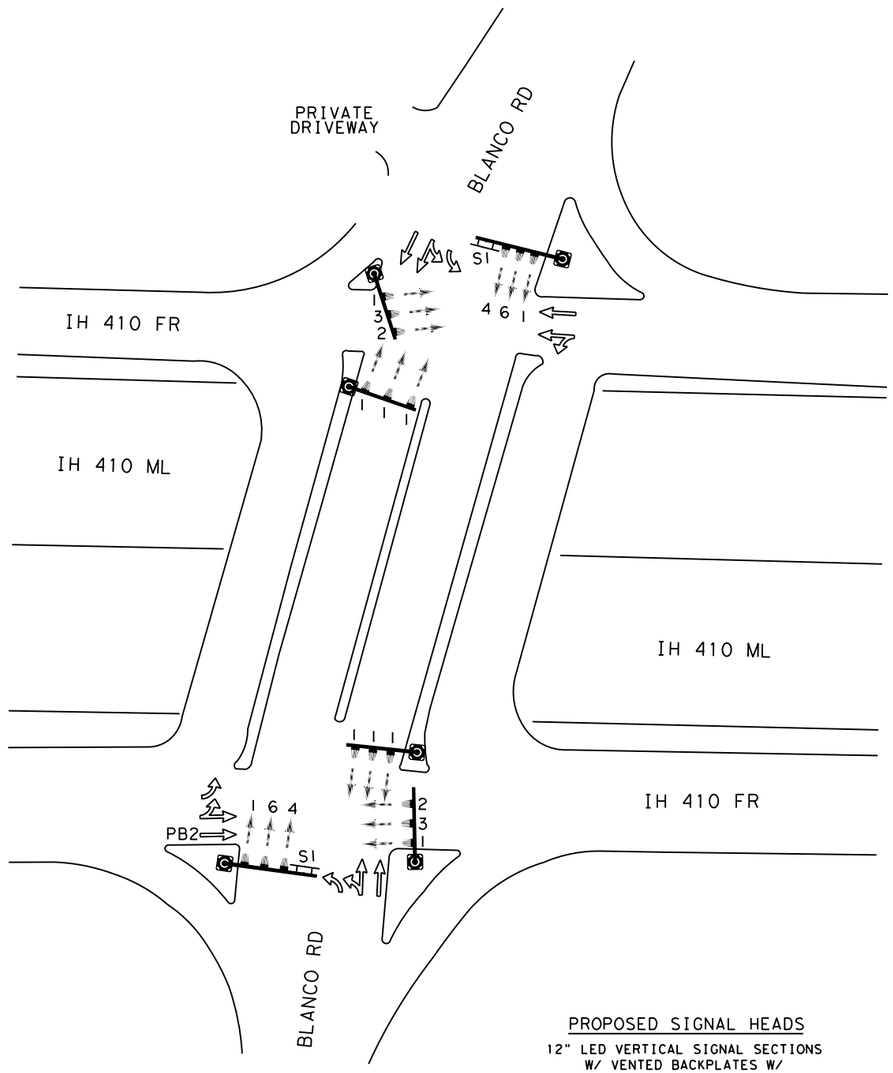
N.T.S



	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
636-6001	ALUMINUM SIGNS (TY A)	SF	21
682-6001	VEH SIG SEC (12") LED (GRN)	EA	14
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	8
682-6003	VEH SIG SEC (12") LED (YEL)	EA	14
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	8
682-6005	VEH SIG SEC (12") LED (RED)	EA	14
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	4
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	12
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	4
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	730

NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.

2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

3. SEE SOSS FOR PROPOSED SIGNS.

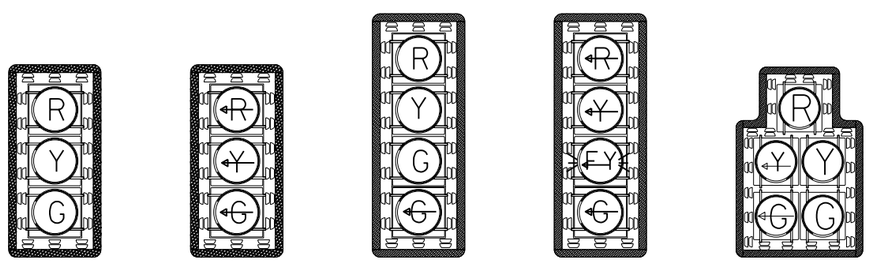
4. BEFORE INSTALLATION OF EACH SIGNAL NO. 4, CONTRACTOR WILL NOTIFY ENGINEER FOR SIGNAL PROGRAMMING.

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING
- S# PROP. SIGNS

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1 — 3 SEC SIGNAL HEAD

SIGNAL NO. 2 — 3 SEC SIGNAL HEAD

SIGNAL NO. 3 — 4 SEC SIGNAL HEAD

SIGNAL NO. 4 — 4 SEC SIGNAL HEAD

SIGNAL NO. 6 — 5 SEC SIGNAL HEAD

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos, P.E. — JOSE O. GALLEGOS RUIZ, P.E.

8-29-23 — DATE

Texas Department of Transportation
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IH 410
PROPOSED SIGNAL LAYOUT
BLANCO ROAD

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	60

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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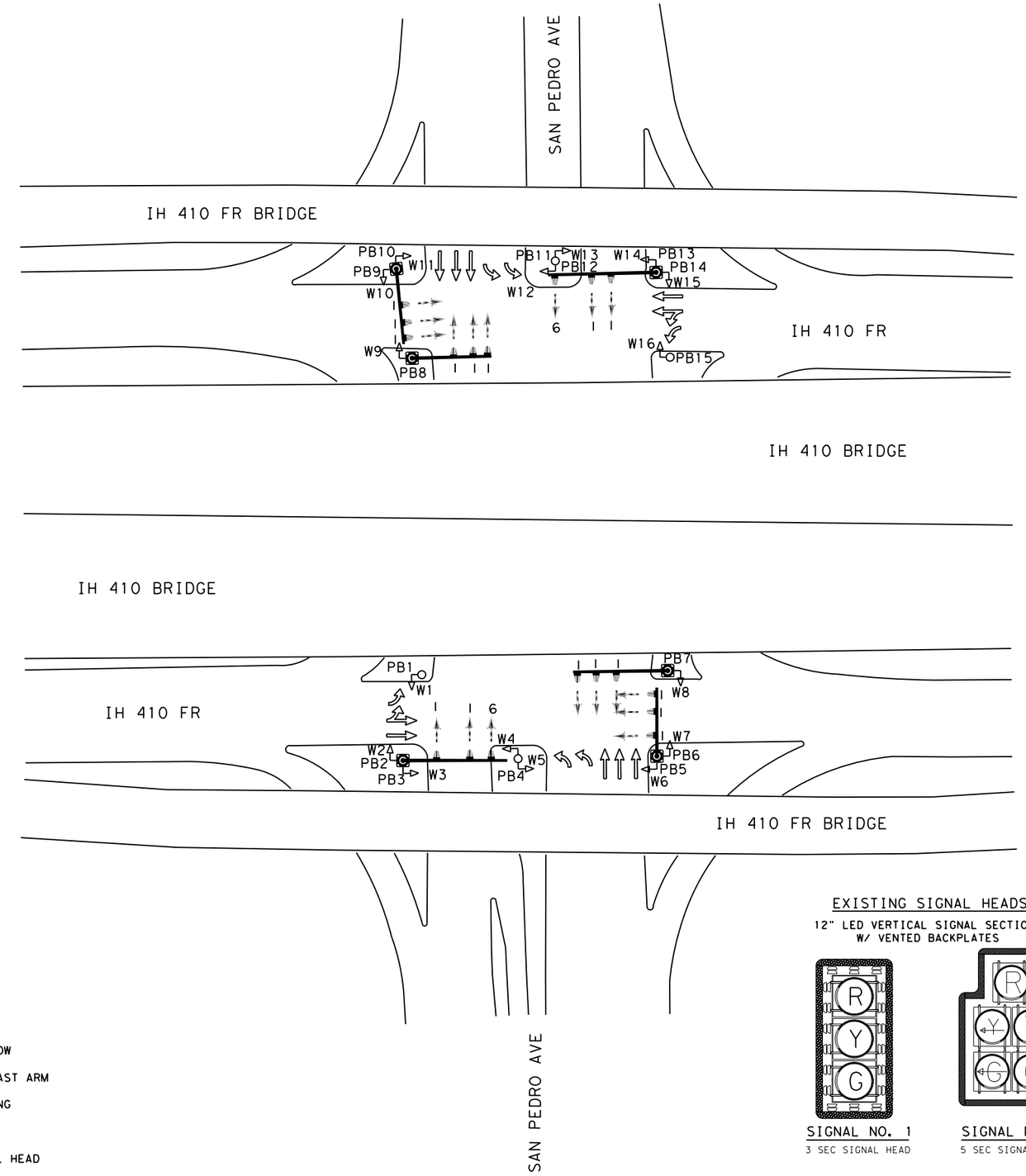
	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
690-6024	REMOVAL OF SIGNAL HEAD ASSM	EA	34
690-6030	REMOVAL OF PEDESTRIAN PUSH BUTTONS	EA	15

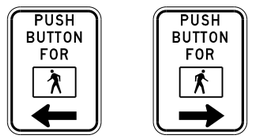
NOTES:

1. THE CONTRACTOR WILL REMOVE THE EXISTING TRAFFIC SIGNAL HEADS.

N.T.S



EXISTING SIGNS TO BE REMOVED



PB2, PB4, PB5, PB7, PB8, PB10, PB11, PB14

PB1, PB3, PB6, PB9, PB13, PB15

PB11, PB12

EXISTING SIGNAL HEAD TO BE REMOVED

W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, W11, W12, W13, W14, W15, W16

LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- EXIST. SIGNAL HEAD FACING
- EXIST. PEDESTRIAN POLE
- EXIST. PEDESTRIAN SIGNAL HEAD W/ PUSH BUTTON

EXISTING SIGNAL HEADS

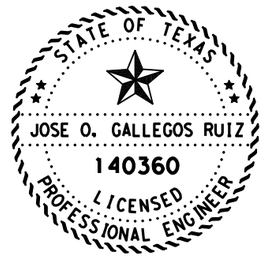
12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES

SIGNAL NO. 1

3 SEC SIGNAL HEAD

SIGNAL NO. 6

5 SEC SIGNAL HEAD



Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation ©2023

IH 410
EXISTING SIGNAL LAYOUT
SAN PEDRO AVENUE

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		61
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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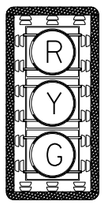
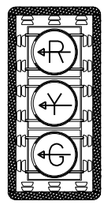
N.T.S

PROPOSED SIGNAL HEADS

12" LED VERTICAL SIGNAL SECTIONS W/ VENTED BACKPLATES W/ RETROREFLECTIVE BORDER



SIGNAL NO. 1
3 SEC SIGNAL HEAD



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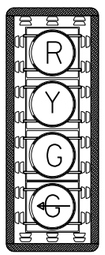

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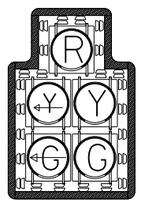
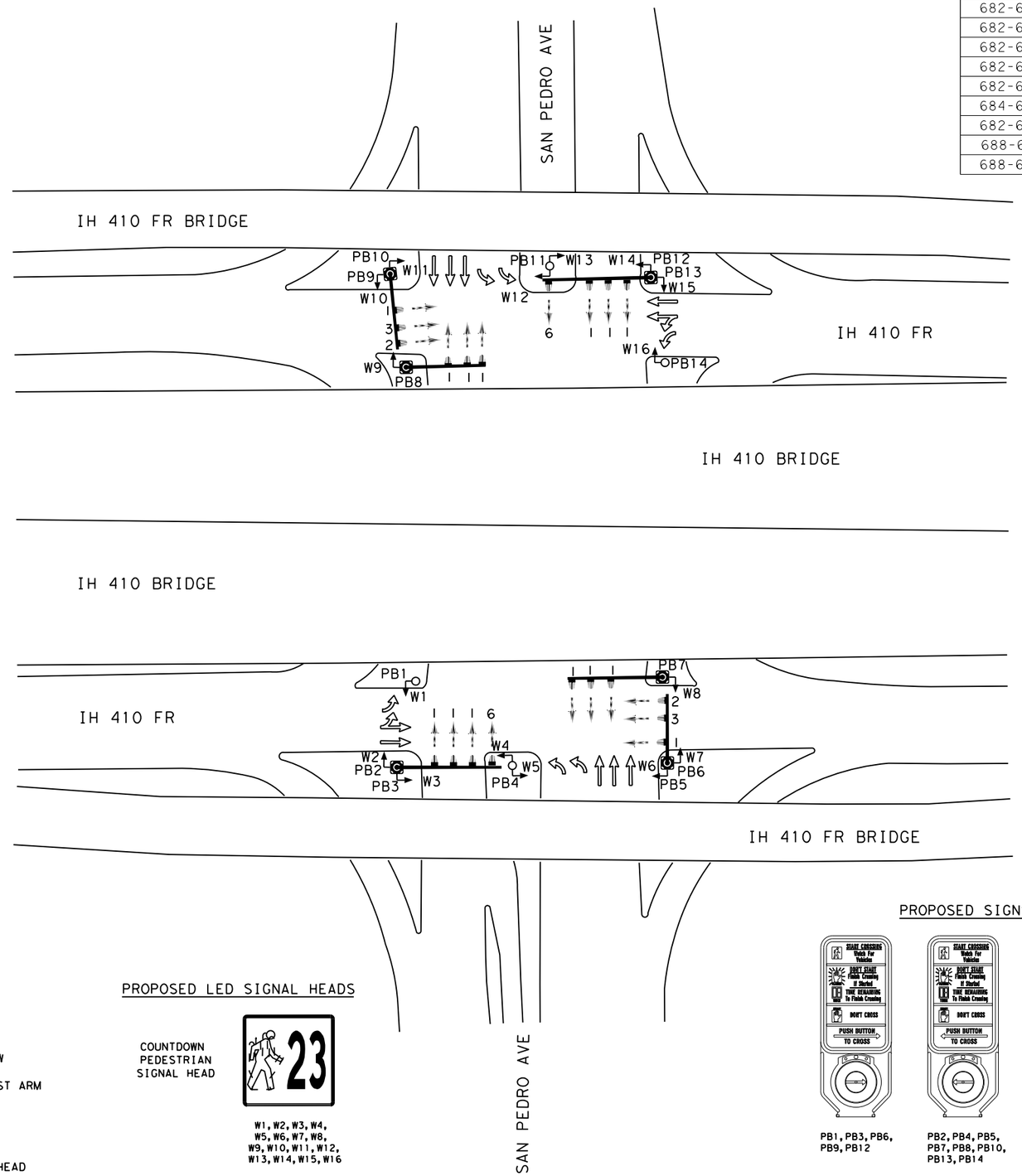


SIGNAL NO. 6
5 SEC SIGNAL HEAD



LEGEND

- DIRECTION OF TRAFFIC FLOW
- EXIST. SIGNAL POLE W/ MAST ARM
- PROP. SIGNAL HEAD FACING
- EXIST. PEDESTRIAN POLE
- PROP. PEDESTRIAN SIGNAL HEAD W/ PUSH BUTTON

PROPOSED LED SIGNAL HEADS

COUNTDOWN PEDESTRIAN SIGNAL HEAD

W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, W11, W12, W13, W14, W15, W16

	QUANTITY SUMMARY CSJ: 0291-10-119		
ITEM NO.	ITEM	UNIT	QUANTITY
682-6001	VEH SIG SEC (12") LED (GRN)	EA	18
682-6002	VEH SIG SEC (12") LED (GRN ARW)	EA	6
682-6003	VEH SIG SEC (12") LED (YEL)	EA	18
682-6004	VEH SIG SEC (12") LED (YEL ARW)	EA	4
682-6005	VEH SIG SEC (12") LED (RED)	EA	18
682-6006	VEH SIG SEC (12") LED (RED ARW)	EA	2
682-6054	BACKPLATE W/REFL BRDR (3 SEC)(VENT)ALUM	EA	16
682-6055	BACKPLATE W/REFL BRDR (4 SEC)(VENT)ALUM	EA	2
682-6056	BACKPLATE W/REFL BRDR (5 SEC)(VENT)ALUM	EA	2
684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	1074
682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	16
688-6001	PED DETECT PUSH BUTTON (APS)	EA	15
688-6003	PED DETECTOR CONTROLLER UNIT	EA	1

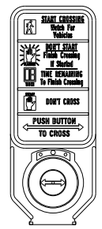
NOTES:

1. THE CONTRACTOR SHOULD CONNECT ALL THE WIRES IN THE FIELD.
2. REMOVE AND REPLACE EXISTING SIGNAL CONDUCTORS INSIDE SIGNAL POLES AND MAST ARMS FROM THE TERMINAL BLOCK.

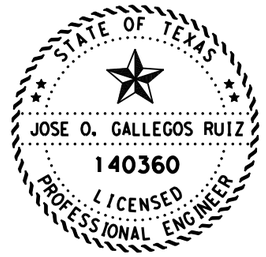
PROPOSED SIGNS

PB1, PB3, PB6, PB9, PB12

PB2, PB4, PB5, PB7, PB8, PB10, PB13, PB14



PB11



Jose Gallegos P.E. 8-27-23
JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation
©2023

IH 410
PROPOSED SIGNAL LAYOUT
SAN PEDRO AVENUE

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	62

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0291	10	119	VARIOUS

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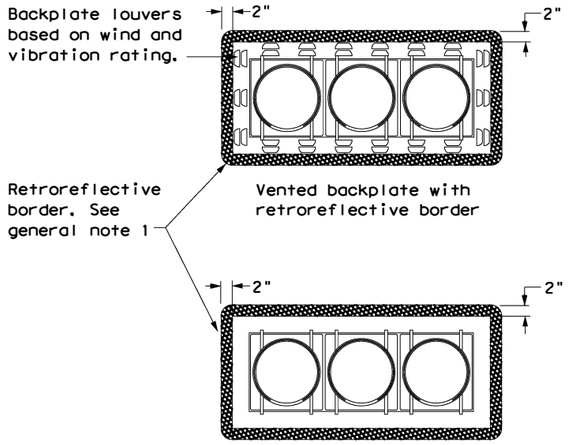
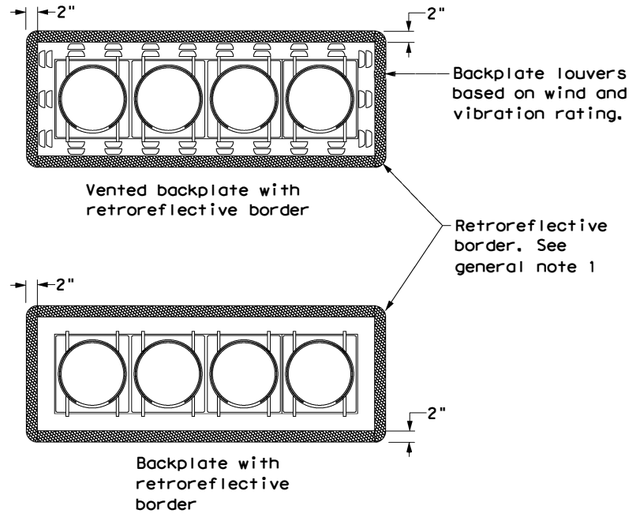
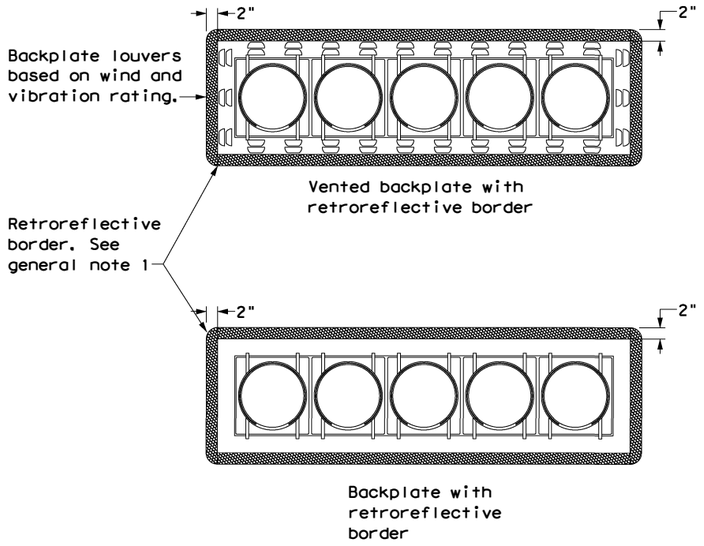


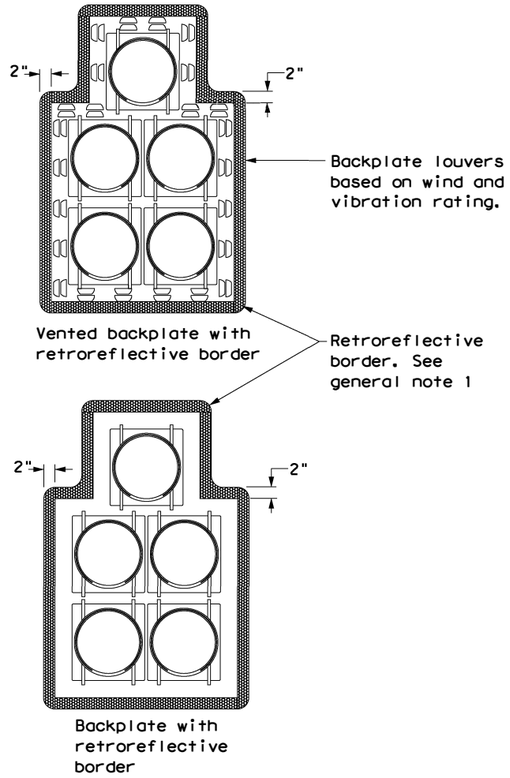
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



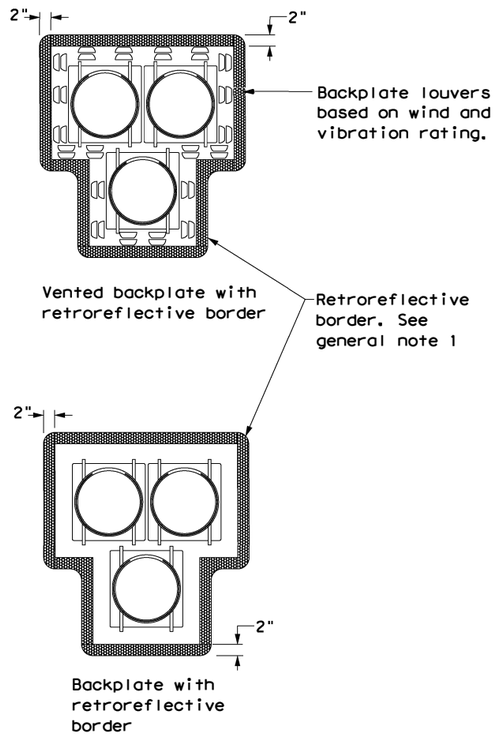
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



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

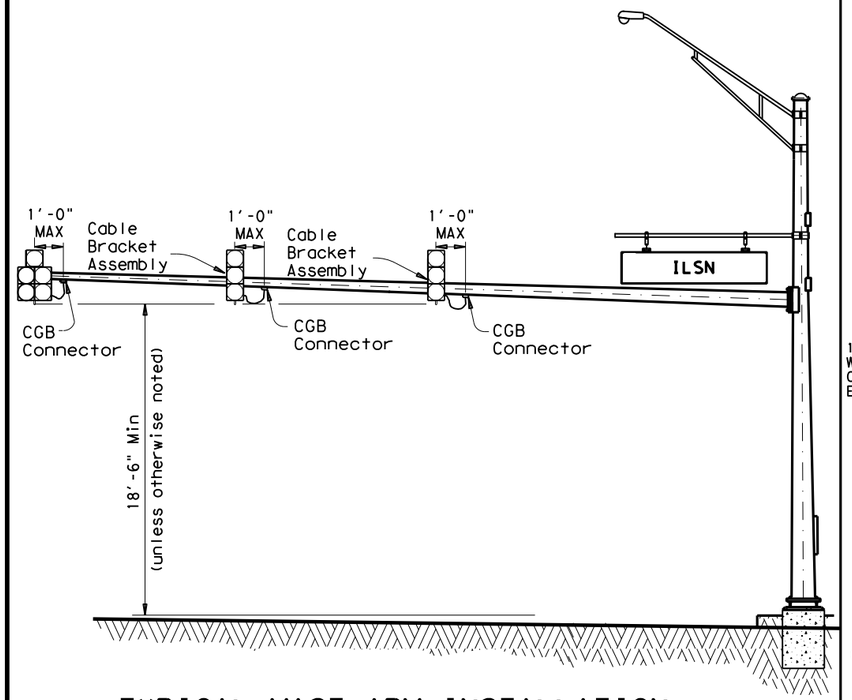
Texas Department of Transportation

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	0291	10	119	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		63



TYPICAL MAST ARM INSTALLATION

BACKPLATES ARE NOT SHOWN FOR CLARITY

NOTES:

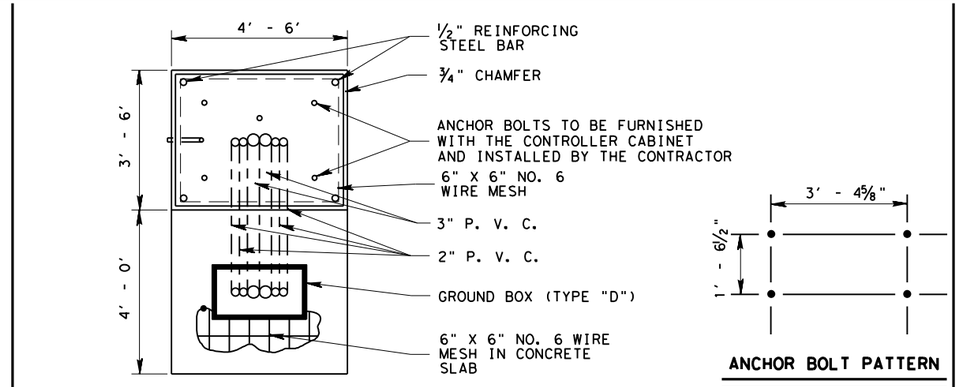
SHALL INSTALL CONDUIT ENCASED LOOPS AT THE LOCATIONS SHOWN ON THE PLANS USING 3/4 " DIAMETER PVC SCHEDULE 40 OR AT NO ADDITIONAL COST 1" DIAMETER PVC SCHEDULE 80.

LOOP LOCATIONS MAY BE STAGGERED SLIGHTLY (6") TO ACCOMMODATE HOME RUN PLACEMENT.

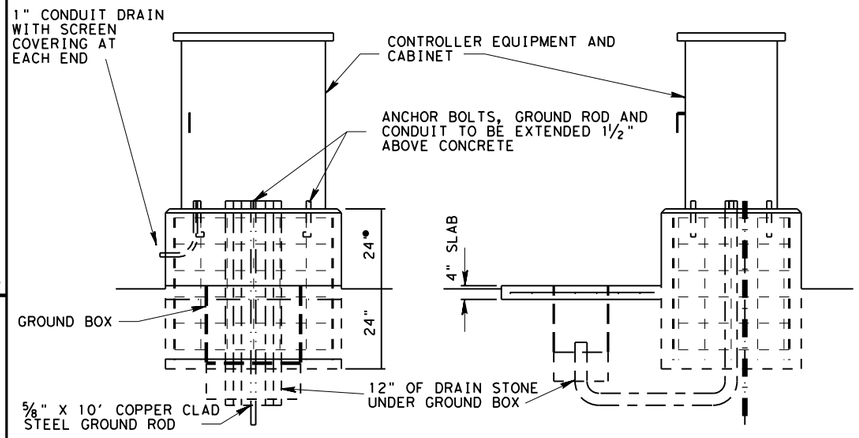
INDIVIDUAL HOME RUN CONDUITS SHALL BE EXTENDED TO THE GROUND BOX SHOWN ON THE PLANS FOR EACH LOOP INSTALLED.

THE NUMBER OF LOOP WIRE TURNS SHALL BE AS SHOWN ON THE TYPICAL LOOP DETECTOR DETAILS.

CONDUIT ENCASED LOOPS



ANCHOR BOLT PATTERN



CONTROLLER MOUNT NOTES :

ALL WIRING TERMINATING IN THE CONTROLLER SHALL BE LABELED IN A MANNER THAT CAN BE IDENTIFIED WHEN THE CONTROLLER IS INSTALLED THE CONTRACTOR SHALL CONNECT THE FIELD WIRING TO THE CONTROLLER

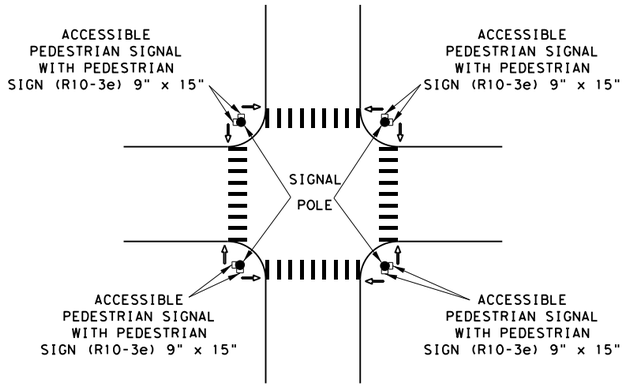
ONE 2" PVC SHALL REMAIN EMPTY FOR FUTURE USE

CONCRETE SHALL BE TESTED AS MISCELLANEOUS CONCRETE

ALL MATERIALS SHOWN AND LABOR TO INSTALL THE CONTROLLER FOUNDATION SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT ITEMS

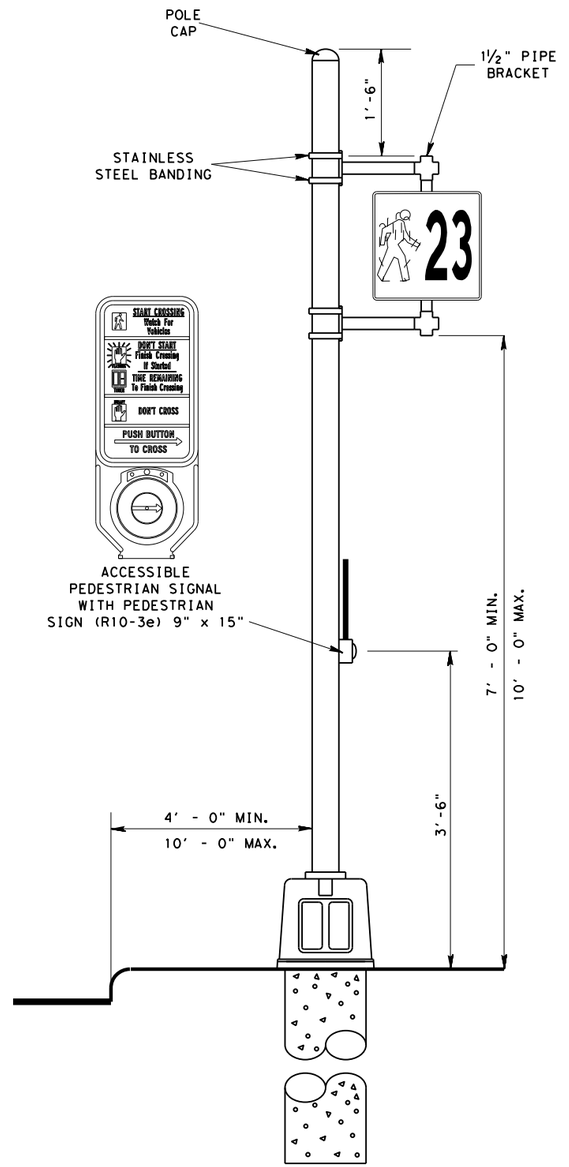
CONTROLLER FOUNDATION SHALL BE AS SHOWN ON THE PLANS, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

TYPICAL CONTROLLER MOUNT DETAILS



TYPICAL PED PUSH BUTTON LOCATION

THE ENGINEER SHALL VERIFY ALL PEDESTRIAN SIGNAL AND PEDESTRIAN PUSH BUTTON LOCATIONS PRIOR TO INSTALLATION.



TYPICAL PEDESTAL POLE ASSEMBLY

San Antonio District Standard

MISCELLANEOUS TRAFFIC SIGNAL DETAILS

SCALE: NS

MTS-18

REVISIONS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
FEB 2006	6	SEE TITLE SHEET		64
OCT 2007	STATE	DIST.	COUNTY	
MAR 2017	TEXAS	SAT	BEXAR	
MAY 2018	CONT.	SECT.	JOB	HIGHWAY NO.
	0291	10	119	VARIOUS

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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		0291	10	119	VARIOUS
		DIST	COUNTY		SHEET NO.
		SAT	BEXAR		65

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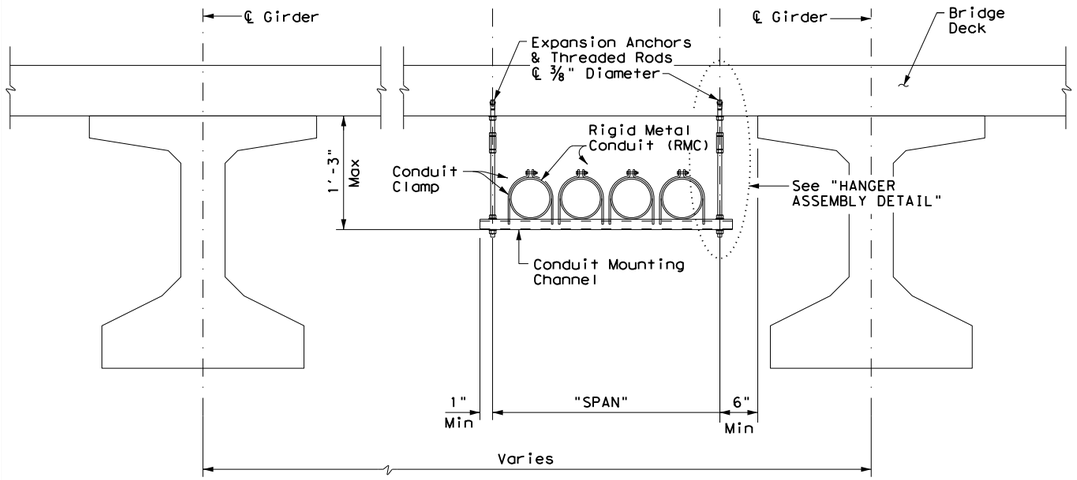
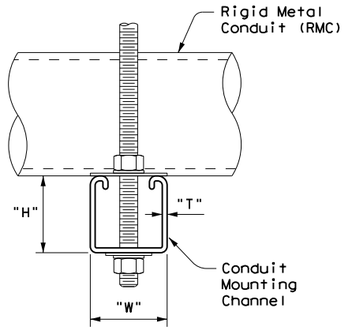
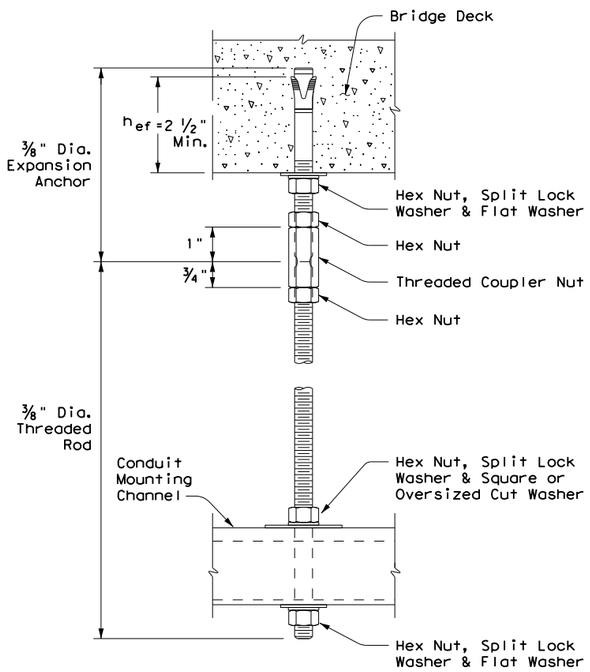


CONDUIT HANGING DETAIL

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.

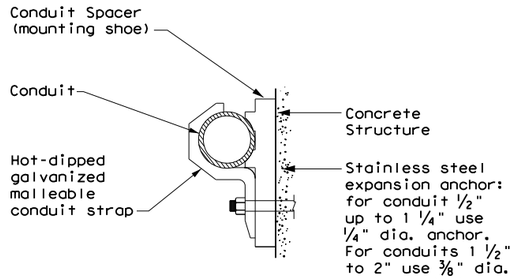
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

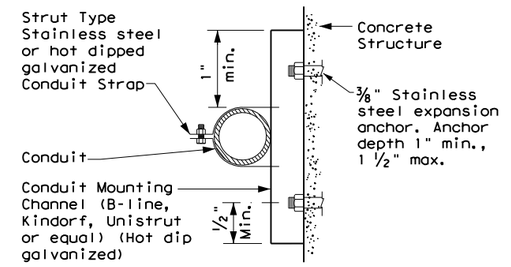




HANGER ASSEMBLY DETAIL

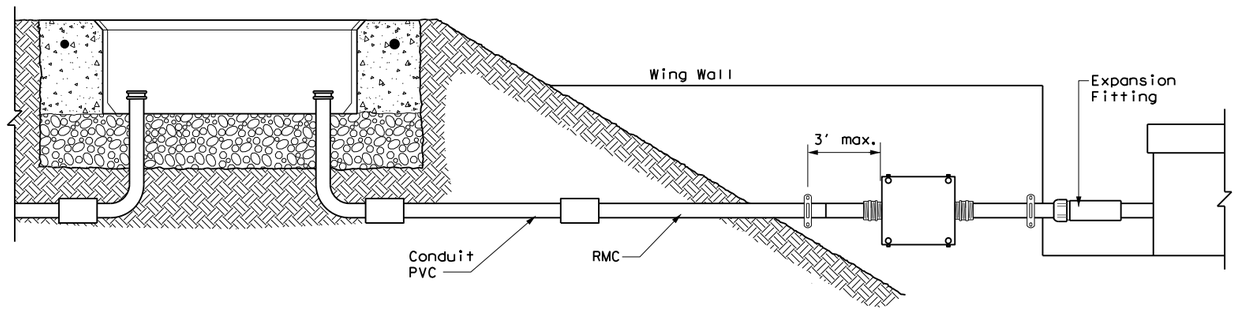
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





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

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	SAT	BEXAR		66

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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.

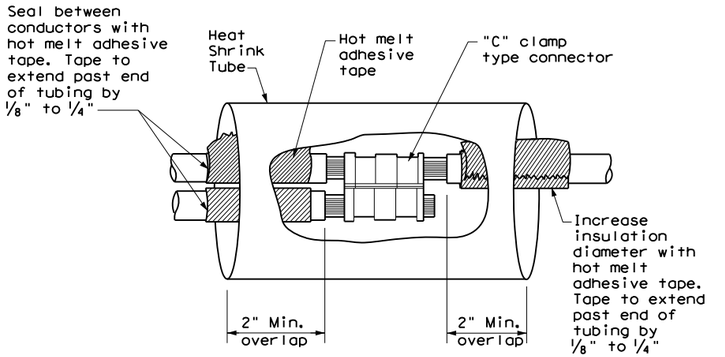
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

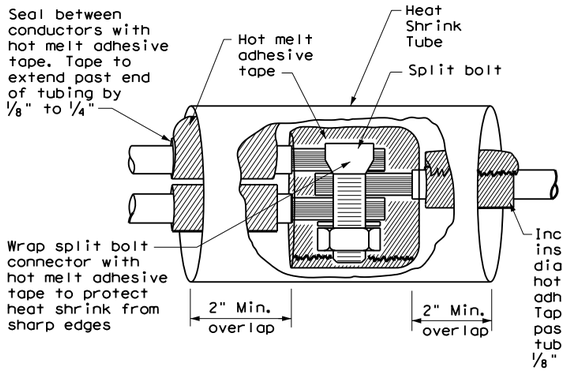
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

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.

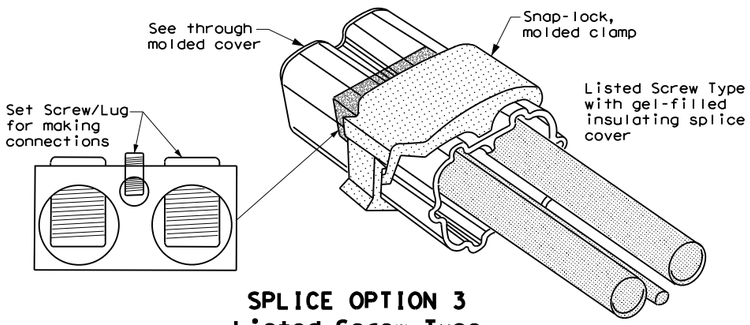
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

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Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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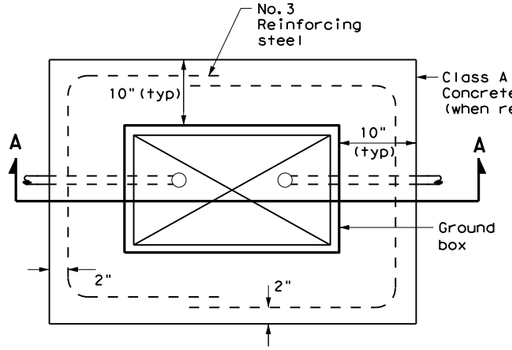
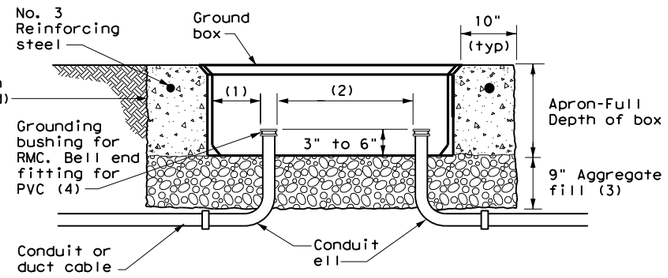


PLAN VIEW



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.

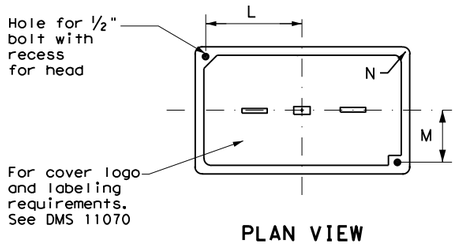
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

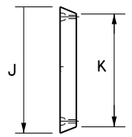
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

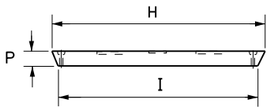
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



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

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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

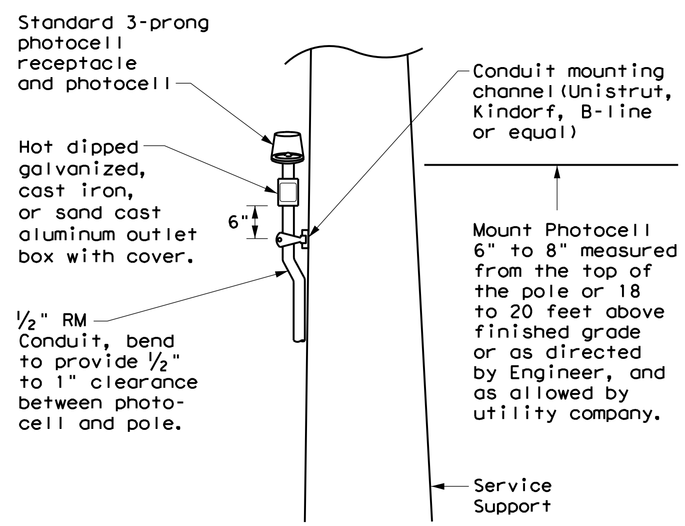
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

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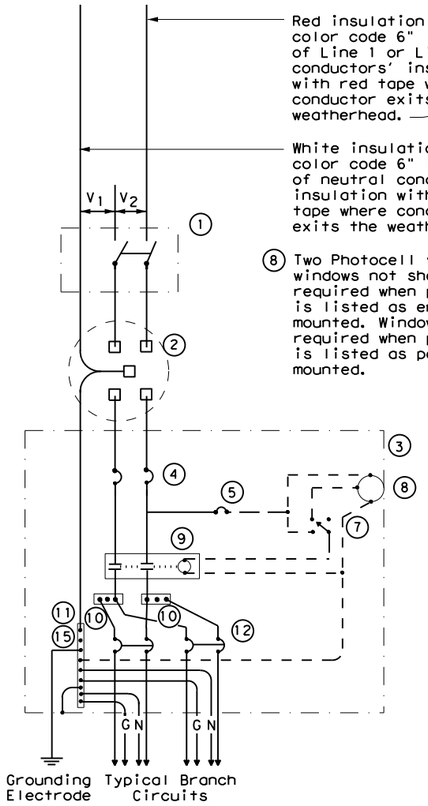
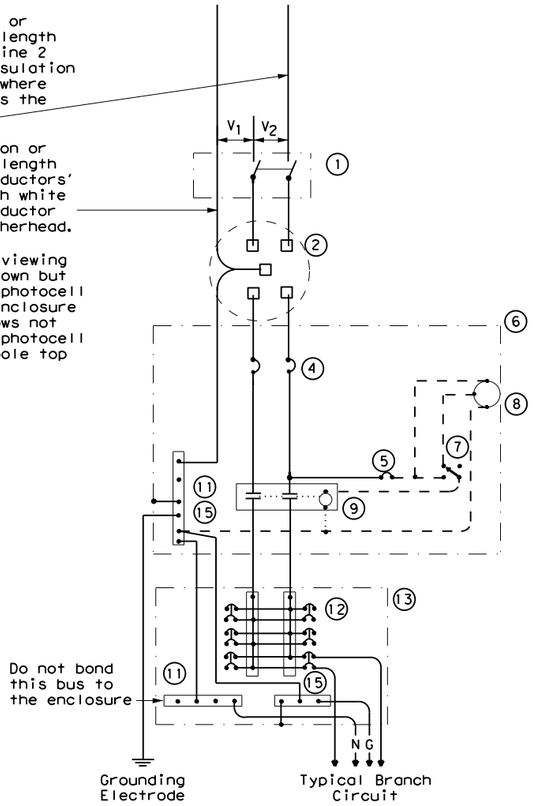
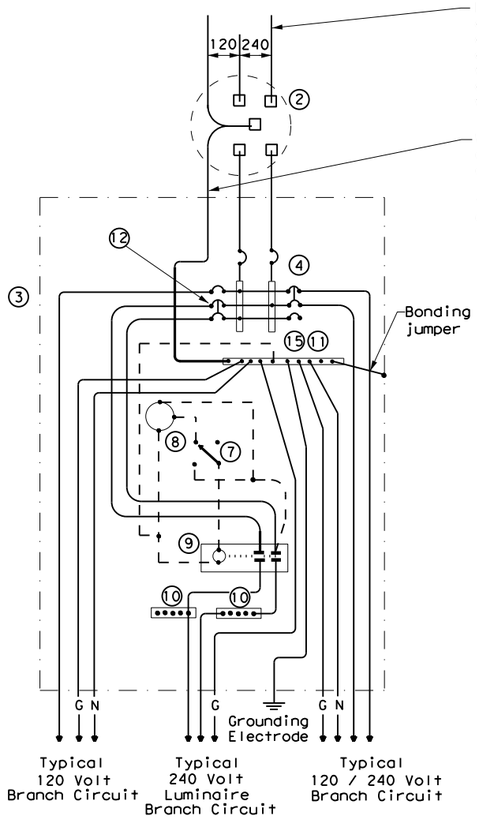


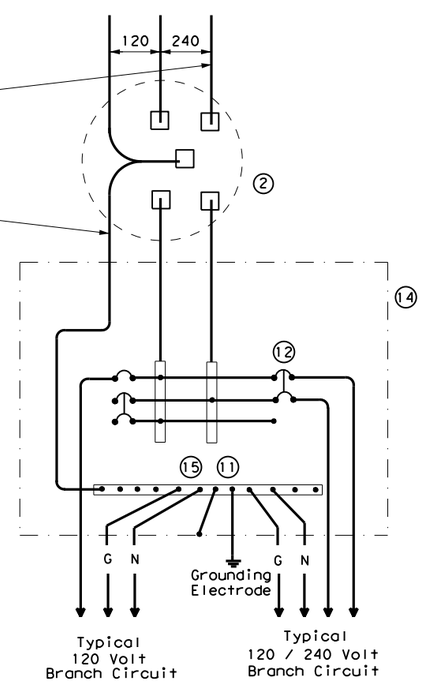
SCHEMATIC TYPE A
THREE WIRE



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
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	SAT	BEXAR		70

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

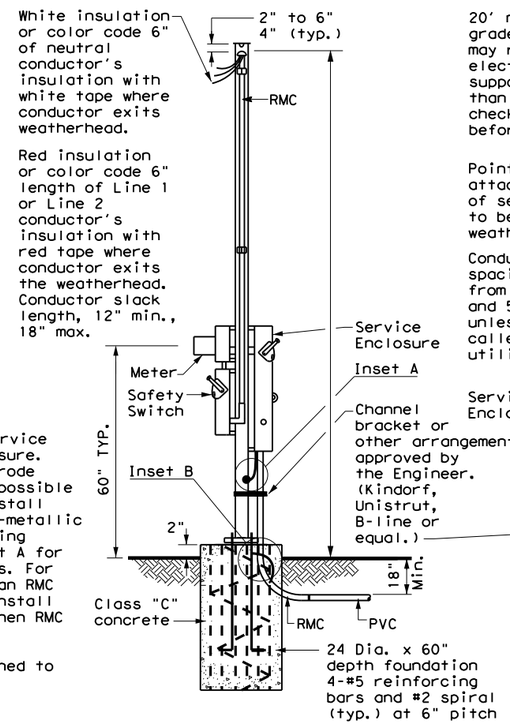
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

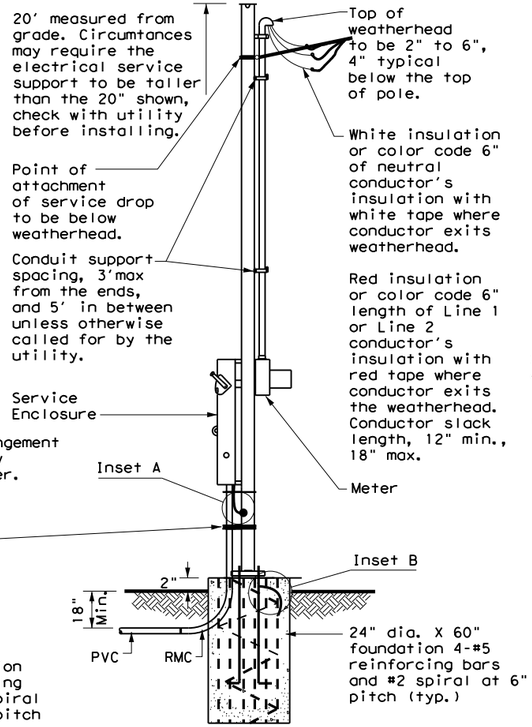
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

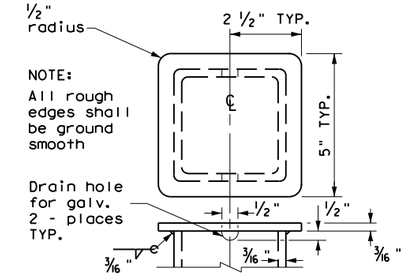


WITH SAFETY SWITCH

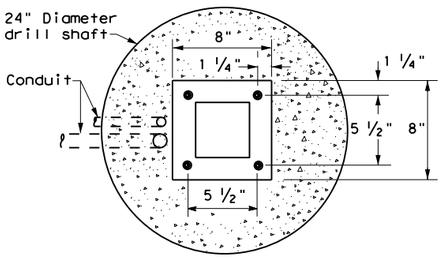


WITHOUT SAFETY SWITCH

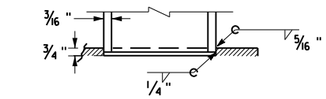
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

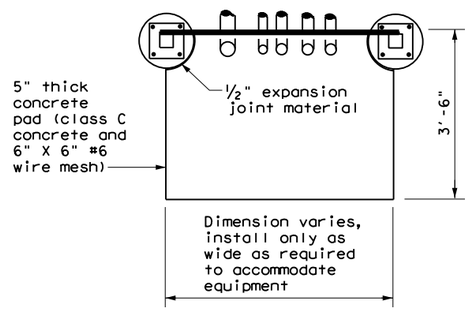


BASE PLATE DETAIL



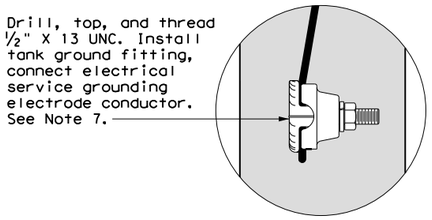
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



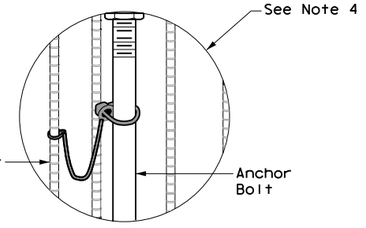
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

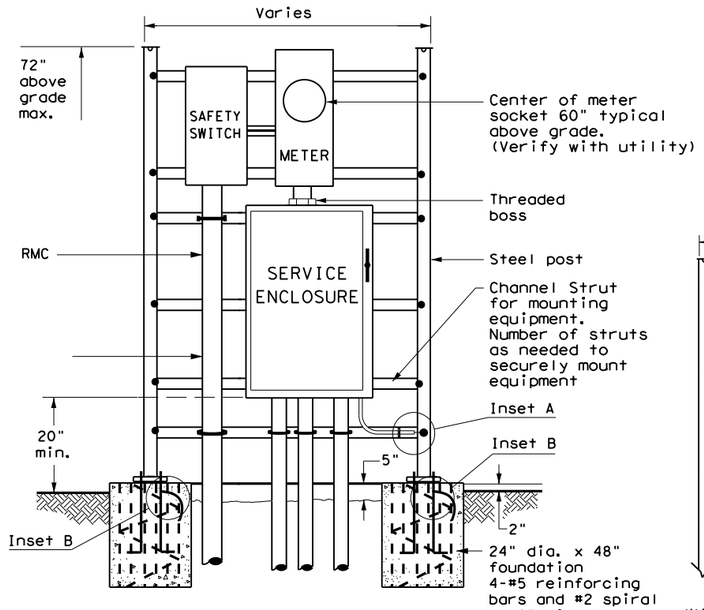


FRONT VIEW

INSET A

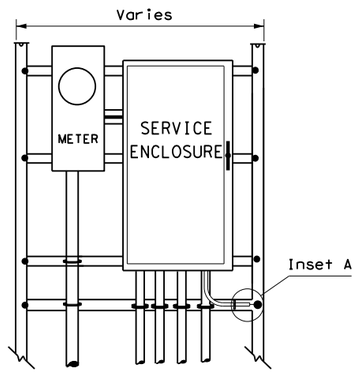


INSET B



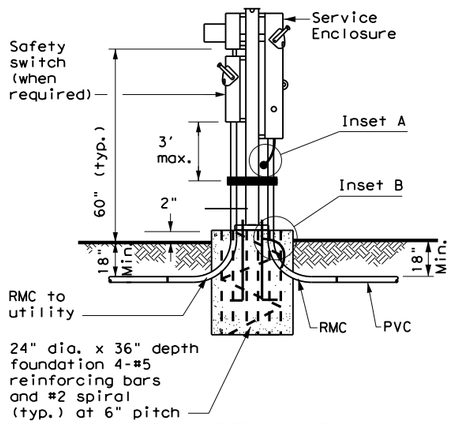
WITH SAFETY SWITCH

FRONT VIEW

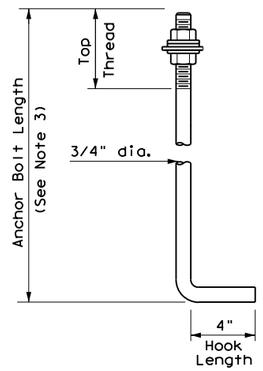


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

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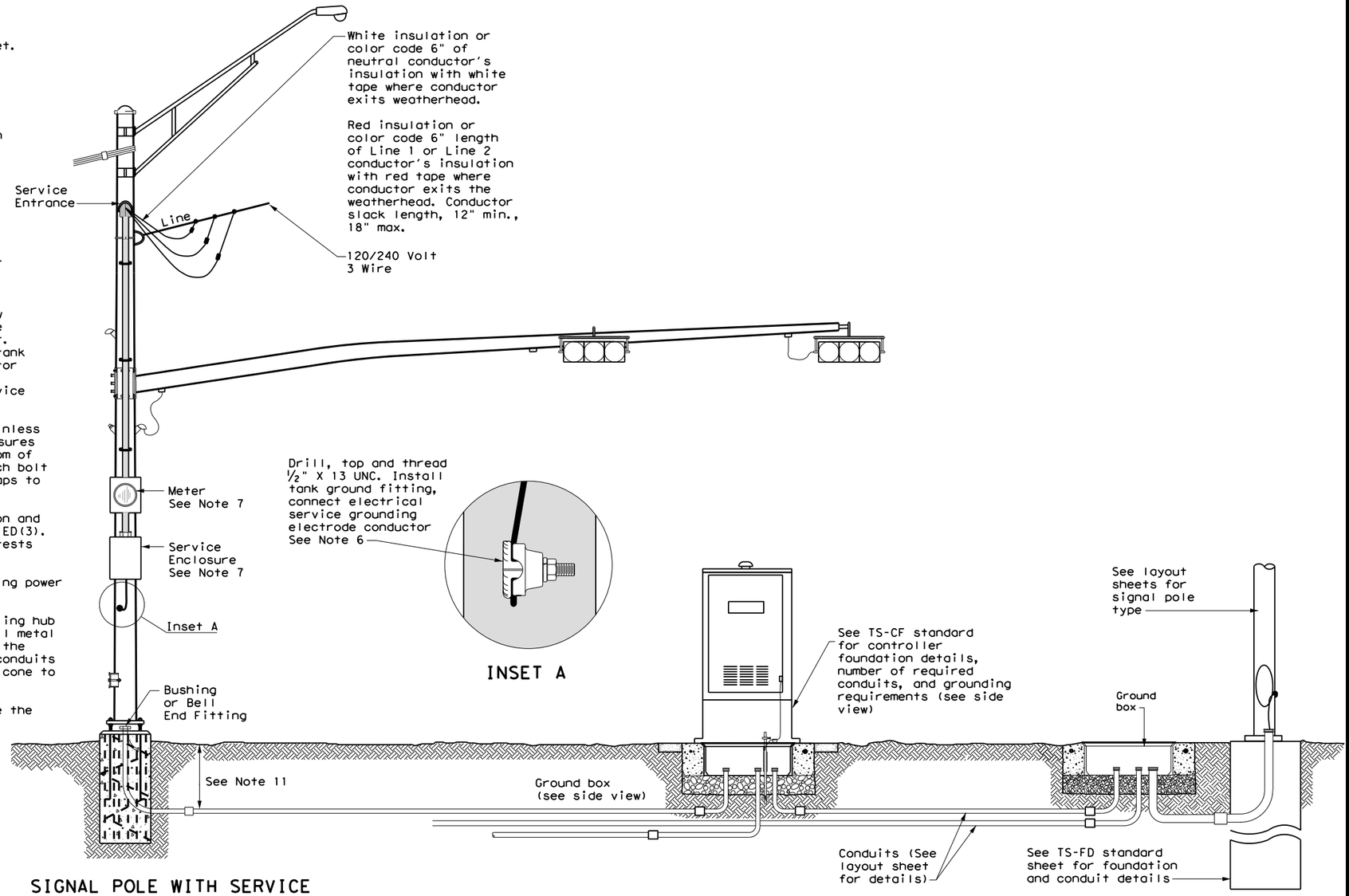
TRAFFIC SIGNAL NOTES

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 brackets near top and bottom of each enclosure. 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".



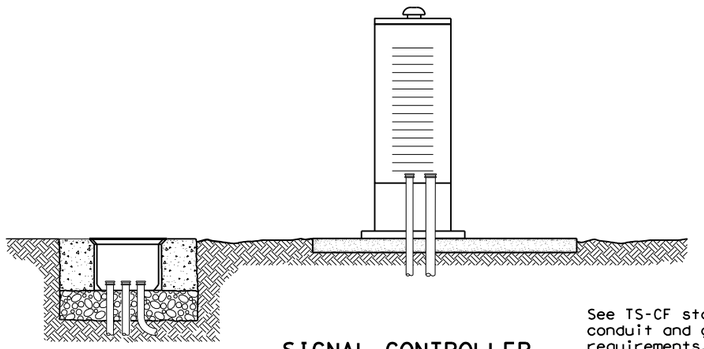
INSET A

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

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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.

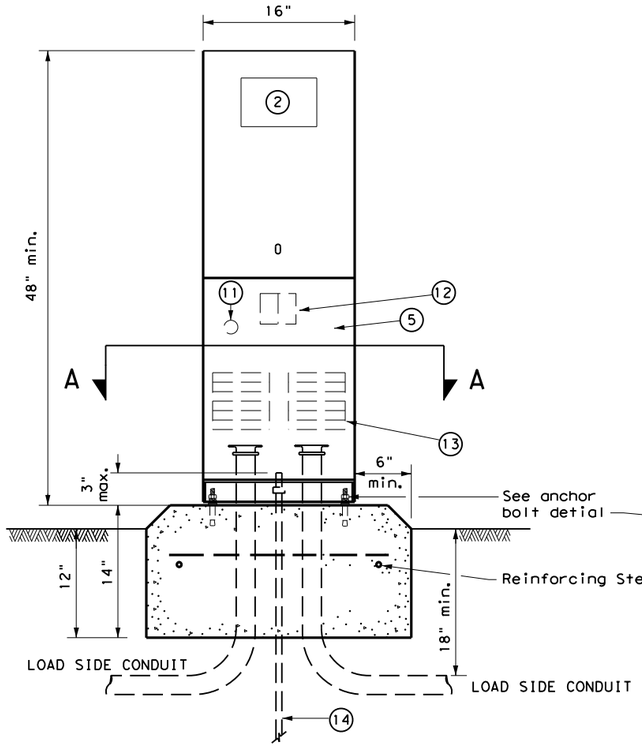
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 1⁄16 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.

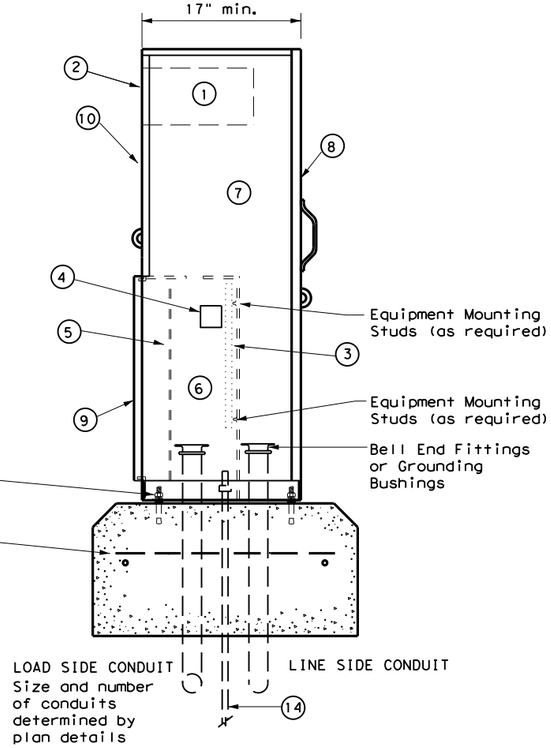
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to 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.

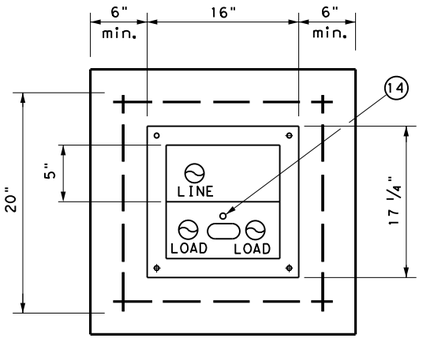


FRONT VIEW

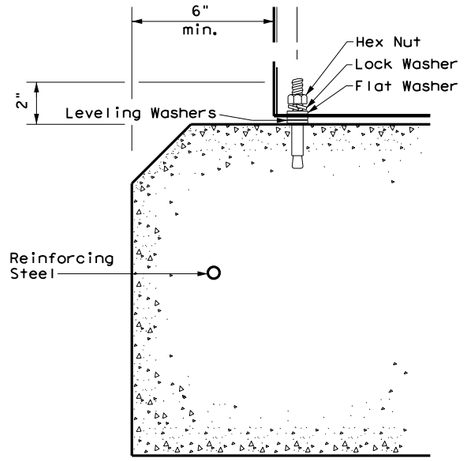


SIDE VIEW

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
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TIMBER POLE (TP) SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to 5/8 in. max. depth and 1 7/8 in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 3/4 in. maximum depth, and 1½ in. to 1⅝ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, ¼ in. minimum diameter by 1½ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

(1) Class 5 pole, height as required

(2) Service drop from utility company (attached below weatherhead)

(3) Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

(7) 6 AWG bare grounding electrode conductor in ½ in. PVC to ground rod - extend ½ in. PVC 6 in. underground.

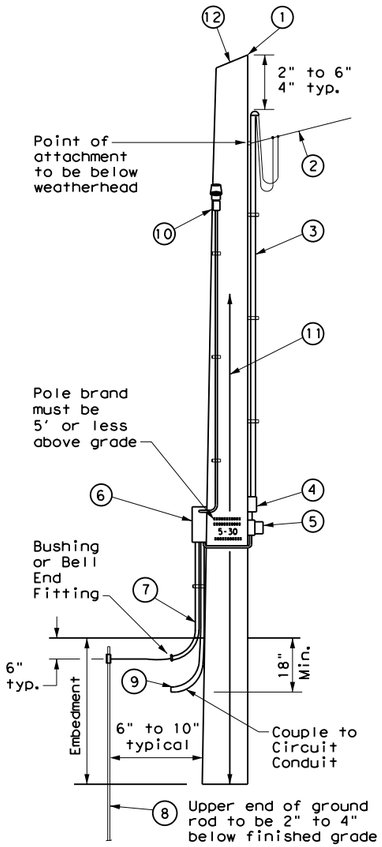
(8) ⅝ in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

(10) See pole-top mounted photocell detail on ED(5).

(11) When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.

(12) When required by utility, cut top of pole at an angle to enhance rain run off.

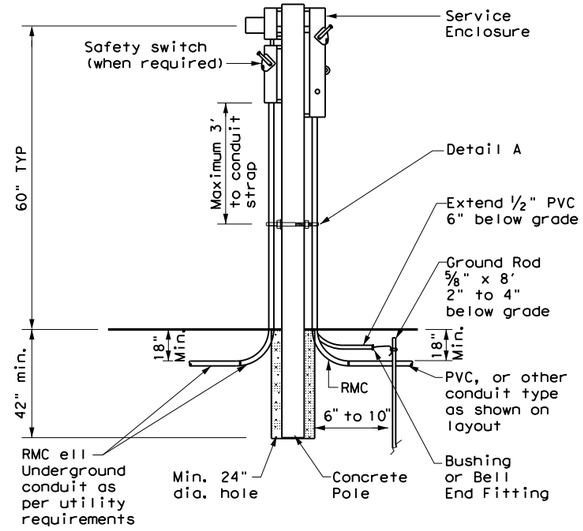


SERVICE SUPPORT TYPE TP (O)

GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.

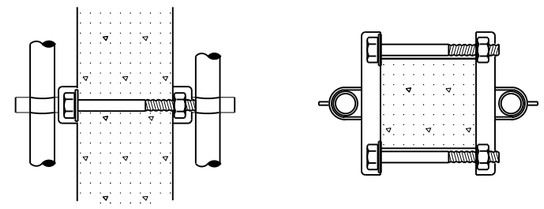


CONCRETE SERVICE SUPPORT

Underground (U)

CONCRETE SERVICE SUPPORT

Overhead (O)



DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

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DUCT CABLE & HDPE CONDUIT NOTES

1. Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.

2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.

3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.

4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.

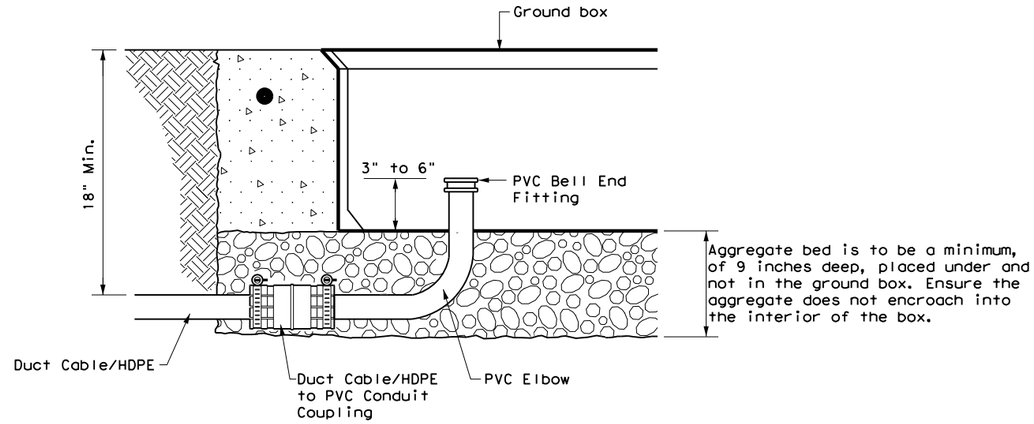
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."

6. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.

7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.

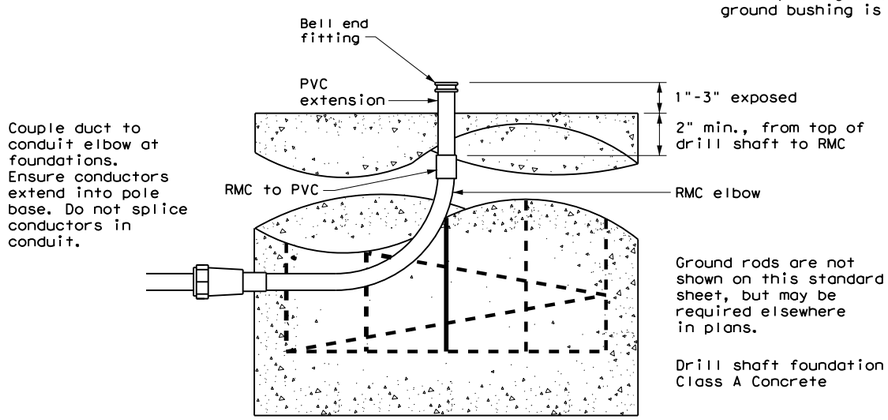
8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.

9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

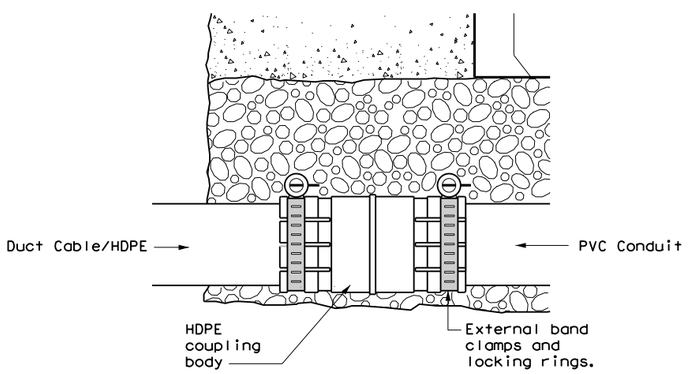


DUCT CABLE/HDPE AT GROUND BOX

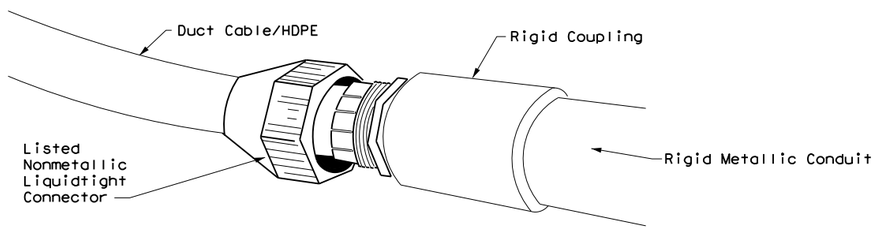
When the upper end of an RMC Ell does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



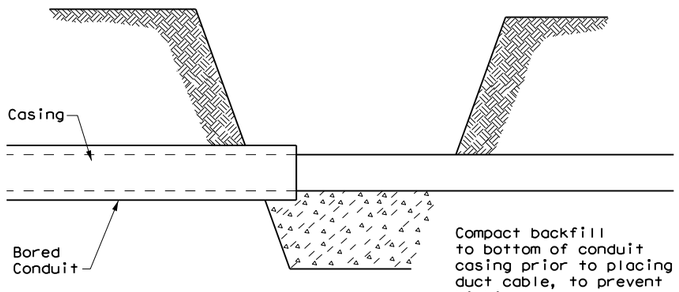
DUCT CABLE / HDPE AT FOUNDATION



DUCT CABLE/HDPE TO PVC



DUCT CABLE/HDPE TO RMC



BORE PIT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
DUCT CABLE/ HDPE CONDUIT

ED(11)-14

FILE: ed11-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		75

71L

DATE: 8/18/2023 4:43:14 PM
FILE: T:\Traffic\Design\District PS&E Tracking\Plan Review\Bexar\0291-10-119\Standards\ed12-14.dgn

BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

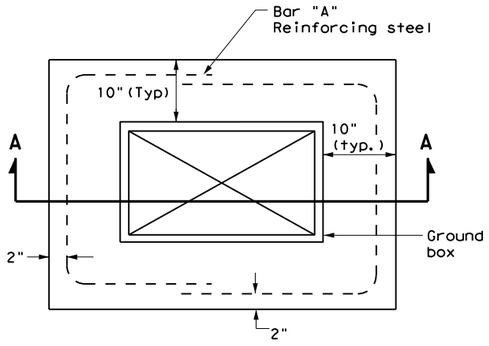
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

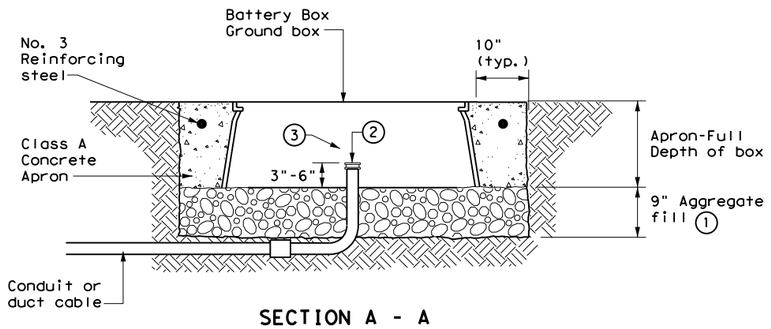
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery 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. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



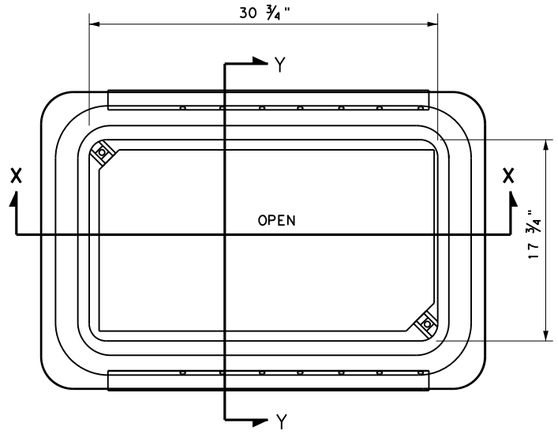
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

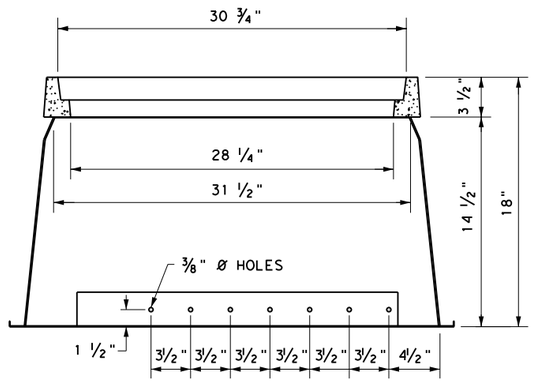
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

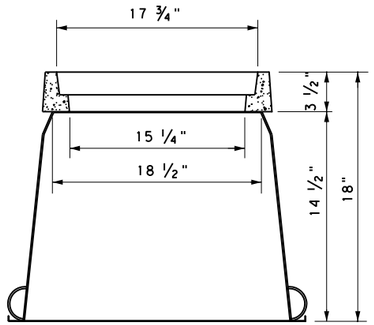
(3) Install all conduits in a neat and workmanlike manner.



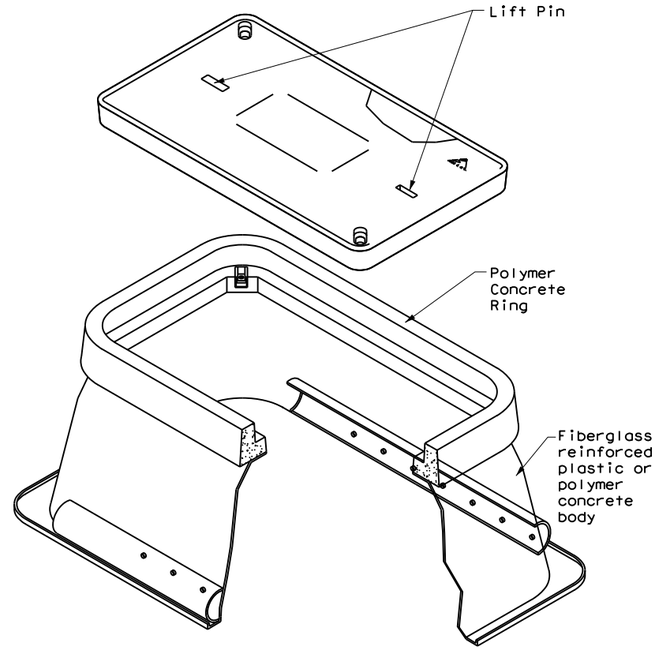
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

ED(12)-14

FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		76

71M

DATE: 8/18/2023 4:55:40 PM
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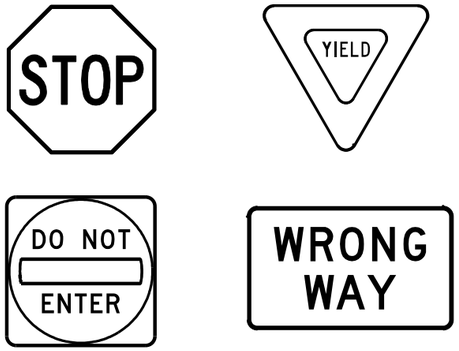
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

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



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

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

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

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

TYPICAL EXAMPLES

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

GENERAL NOTES

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

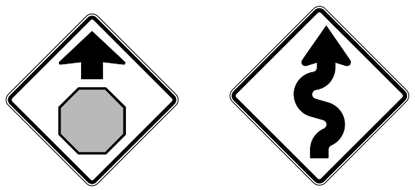
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

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

http://www.txdot.gov/

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

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

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

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

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	VARIOUS
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	BEXAR		77

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

☐ This project is adjacent or parallel work, not within RR ROW:

DOT No.: 763824G IH410 WB FR

Crossing Type: AT GRADE

RR Company Operating Track at Crossing: UNION PACIFIC RAILROAD COMPANY

RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD COMPANY

RR MP: 8.880

RR Subdivision: KERRVILLE

City: SAN ANTONIO

County: BEXAR

CSJ at this Crossing: 0291-10-119

Latitude: 29.516625

Longitude: -98.5284434

Scope of Work, including any TCP, to be performed by State Contractor:

Install signal backplate and signal head at intersection. Police will be used to control traffic during night operations when signal is turned off. Flagging will be required during any scheduled night trains.

This DOT is also 48 ft away from DOT 764194T Jackson Keller (MP 8.890) See SOW.

Scope of Work to be performed by Railroad Company:

None

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

☑ Expected

☐ Not Expected

Flagging services will be provided by:

☐ Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.

☑ Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☑ **UPRR** UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
UP.request@nrssinc.net
Call Center 877-984-6777

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

☐ **CPKCR** KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

☑ Not Required

☐ Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

☐ Required.

☑ Not Required

Railroad Point of Contact: _____

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

IV. RAILROAD INSURANCE REQUIREMENTS

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000

Railroad Protective Liability Limits

☐ Not Required	
☑ Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	$2,000,000 / $6,000,000
☐ Bridge Structure Projects. Includes new construction or replacement of overpass/ underpass structures	$5,000,000 / $10,000,000
☐ Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

☐ Not Required

☑ Required: UPRR Maintenance Consent Letter. TxDOT to assist

☐ Required: TxDOT to assist in obtaining the UPRR CROE

☐ Required: Contractor to obtain

- ☐ BNSF: _____
  https://bnsf.railpermitting.com
- ☐ CPKCR
  https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- ☐ Other Railroads: _____

To view previously approved CROE templates agreed upon between the State and Railroad, see: https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html

Approved CROE templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed CROE between the Contractor and the Railroad if required on project.

VI. RAILROAD COORDINATION MEETING

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

VII. RAILROAD SAFETY ORIENTATION

A. Complete the Railroad's course "Orientation for Contractor's Safety," and maintain registration prior to working on the Railroad's property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

UPRR, BNSF, CPKCR will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information.

Know and follow the Contractor's Right of Entry Agreement EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency

Call: Union Pacific Railroad Company

Railroad Emergency Line at: 800-848-8715

Location: DOT 763824G

RR Milepost: 8.880

Subdivision: Kerrville

RRD Review Only

Initials: _____

Date: 07/25/2023

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf		DN: TxDOT	CK:	DW:		CK:	
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS	6/2023	0291	10	119		IH410	
		DIST	COUNTY			SHEET NO.	
		15	Bexar			78	

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

☐ This project is adjacent or parallel work, not within RR ROW:

DOT No.: 763825N IH410 EBFR
Crossing Type: At grade
RR Company Operating Track at Crossing: Union Pacific Railroad Company
RR Company Owning Track at Crossing: Union Pacific Railroad Company
RR MP: 8.830
RR Subdivision: Kerrville
City: San Antonio
County: Bexar
CSJ at this Crossing: 0291-10-119
Latitude: 29.5158744
Longitude: -98.5282577

Scope of Work, including any TCP, to be performed by State Contractor:

Install signal backplate and signal head at intersection. Police will be used to control traffic during night operations when signal is turned off. Flagging will be required during any scheduled night trains. This DOT is 168 ft away from the intersection but because the signals will be shut down during maint, we need the MCL for flagging and traffic control around tracks.

Scope of Work to be performed by Railroad Company:

None

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

☑ Expected
☐ Not Expected

Flagging services will be provided by:

☐ Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
☑ Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☑ **UPRR** UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
UP.request@nrssinc.net
Call Center 877-984-6777

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

☐ **CPKCR** KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

☑ Not Required
☐ Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

☐ Required.
☑ Not Required

Railroad Point of Contact: _____

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

IV. RAILROAD INSURANCE REQUIREMENTS

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
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Business Automobile	$2,000,000

Railroad Protective Liability Limits

☐ Not Required	
☑ Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	$2,000,000 / $6,000,000
☐ Bridge Structure Projects. Includes new construction or replacement of overpass/ underpass structures	$5,000,000 / $10,000,000
☐ Other: _____	

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☑ Required: UPRR Maintenance Consent Letter. TxDOT to assist
☐ Required: TxDOT to assist in obtaining the UPRR CROE
☐ Required: Contractor to obtain
- ☐ BNSF: _____
  https://bnsf.railpermitting.com
- ☐ CPKCR
  https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- ☐ Other Railroads: _____

To view previously approved CROE templates agreed upon between the State and Railroad, see: https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html

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Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed CROE between the Contractor and the Railroad if required on project.

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In Case of Railroad Emergency
Call: Union Pacific Railroad Company
Railroad Emergency Line at: 800-848-8715
Location: DOT 763825N
RR Milepost: 8.830
Subdivision: Kerrville

RRD Review Only
Initials: _____
Date: 07/25/2023

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf		DN: TxDOT	CK:	DW:		CK:	
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS	6/2023	0291	10	119		IH410	
		DIST	COUNTY			SHEET NO.	
		15	Bexar			79	

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

☐ This project is adjacent or parallel work, not within RR ROW:

DOT No.: 764194T Jackson Keller at IH410 WB FR
Crossing Type: At grade
RR Company Operating Track at Crossing: Union Pacific Railroad Company
RR Company Owning Track at Crossing: Union Pacific Railroad Company
RR MP: 8.890
RR Subdivision: Kerrville
City: San Antonio
County: Bexar
CSJ at this Crossing: 0291-10-119
Latitude: 29.5164934
Longitude: -98.5284146

Scope of Work, including any TCP, to be performed by State Contractor:

Install signal backplate and signal head at intersection. Police will be used to control traffic during night operations when signal is turned off. Flagging will be required during any scheduled night trains.

This DOT is also 48 ft away from DOT 763824G IH410 WB FR/Jackson Keller (MP 8.880) See SOW.

Scope of Work to be performed by Railroad Company:

None

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

☑ Expected
☐ Not Expected

Flagging services will be provided by:

☐ Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
☑ Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☑ **UPRR** UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
UP.request@nrssinc.net
Call Center 877-984-6777

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

☐ **CPKCR** KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

☑ Not Required
☐ Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

☐ Required.
☑ Not Required

Railroad Point of Contact: _____

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

IV. RAILROAD INSURANCE REQUIREMENTS

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000

Railroad Protective Liability Limits

☐ Not Required	
☑ Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	$2,000,000 / $6,000,000
☐ Bridge Structure Projects. Includes new construction or replacement of overpass/ underpass structures	$5,000,000 / $10,000,000
☐ Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

☐ Not Required
☑ Required: UPRR Maintenance Consent Letter. TxDOT to assist
☐ Required: TxDOT to assist in obtaining the UPRR CROE
☐ Required: Contractor to obtain
- ☐ BNSF: _____
  https://bnsf.railpermitting.com
- ☐ CPKCR
  https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- ☐ Other Railroads: _____

To view previously approved CROE templates agreed upon between the State and Railroad, see: https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html

Approved CROE templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed CROE between the Contractor and the Railroad if required on project.

VI. RAILROAD COORDINATION MEETING

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

VII. RAILROAD SAFETY ORIENTATION

A. Complete the Railroad's course "Orientation for Contractor's Safety," and maintain registration prior to working on the Railroad's property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

UPRR, BNSF, CPKCR will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information.

Know and follow the Contractor's Right of Entry Agreement EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call: Union Pacific Railroad Company
Railroad Emergency Line at: 800-848-8715
Location: DOT 764194T
RR Milepost: 8.890
Subdivision: Kerrville

RRD Review Only
Initials: _____
Date: 07/25/2023

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf		DN: TxDOT	CK:	DW:		CK:	
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0291	10	119		IH410	
6/2023		DIST	COUNTY			SHEET NO.	
		15	Bexar			80	

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0291	10	119	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		81

DATE: 8/18/2023 4:43:15 PM
FILE: T:\Traffic\Design\District PS&E Tracking\Plan Review\Bexar\0291-10-119\4 - Design\Plan Set\8. Traffic\RR SOW And Standards\Non Bridge-Projects (2).dgn

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
1. Pre-construction meetings.
2. Pile driving/drilling of caissons or drilled shafts.
3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
4. Erection of precast concrete or steel bridge superstructure.
5. Placement of waterproofing (prior to placing ballast on bridge deck).
6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193
7:00 AM to 9:00 PM CST Monday-Friday except holidays,
staffed 24 hrs/day for emergencies
48 hrs notice required

BNSF 1-800-533-2891
24 hour number
5 working days notice required

KCS 1-800-344-8377
Texas One Call, a 24 hour number
48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of $\frac{1}{4}$ inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

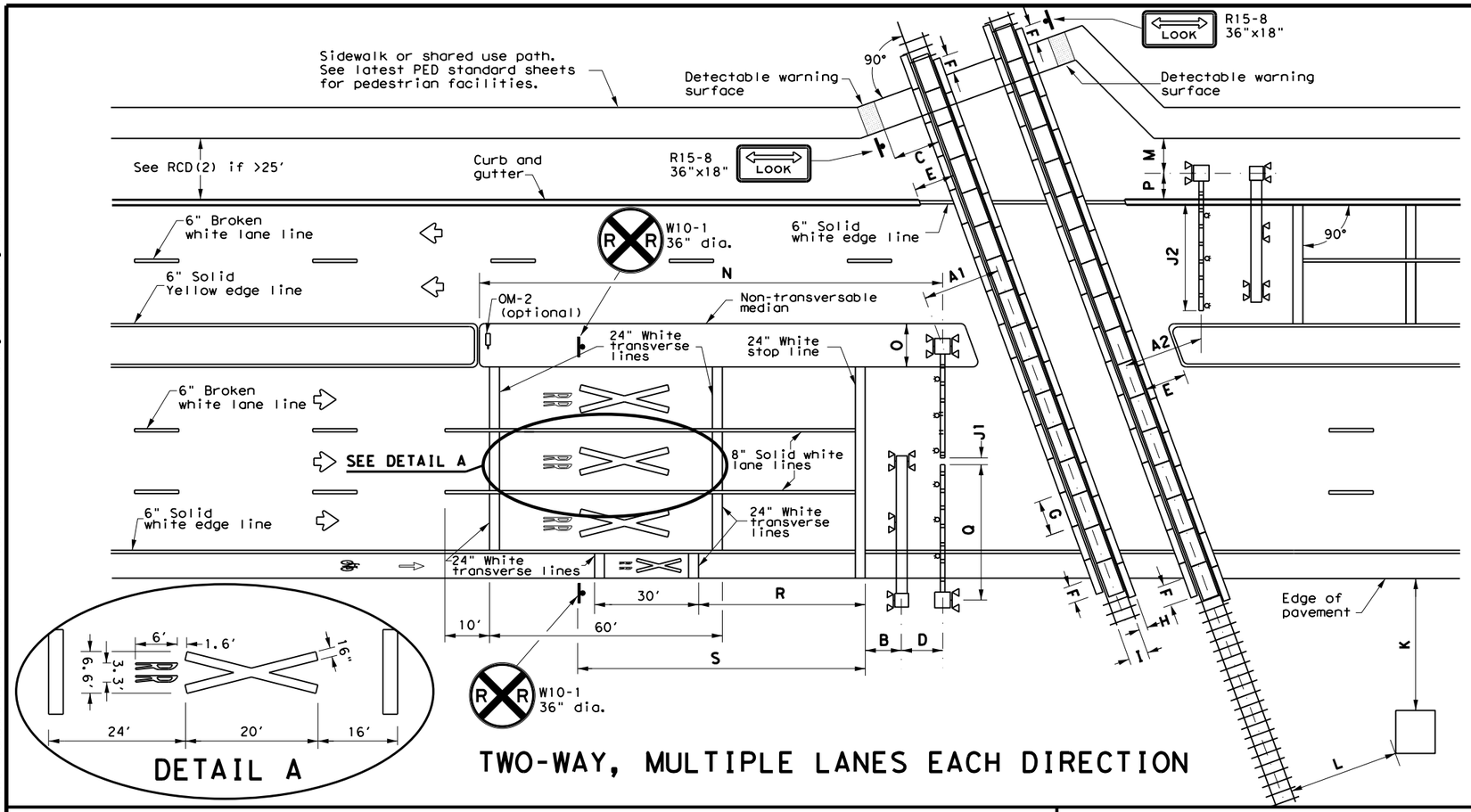
3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0291	10	119	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		82



TWO-WAY, MULTIPLE LANES EACH DIRECTION

NOTES

A1: Center of RR mast to center of rail: 12' minimum, 15' typical.

A2: Tip of gate to center of rail: 12' minimum, 15' typical.

B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).

C: Near edge of detectable warning surface to nearest rail: 12' minimum.

D: Center of gate mast to center of cantilever mast: 6' typical. NOTE: Cantilever may be located in front or behind gates.

E: Edge of median or curb to nearest rail: 10' typical. NOTE: Design median edge to be parallel with rail.

F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum. NOTE: Field panels need not be in line with gauge panels.

G: Length of panels along rail: 8' typical.

H: Width of field panel: 2' typical (check with railroad company).

I: Distance between rails: 4'- 8'1/2".

J1: Tip of gate to tip of gate: 2' maximum.

J2: 90% of traveled roadway to be covered by gate.

K: Nearest edge of RR cabinet from edge of pavement: 30' typical. NOTE: Cabinet not required to be parallel to edge of pavement.

L: Nearest edge of RR cabinet from nearest rail: 25' typical.

M: Center of RR mast to edge of sidewalk: 6' minimum.

N: Center of gate mast to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60'will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.

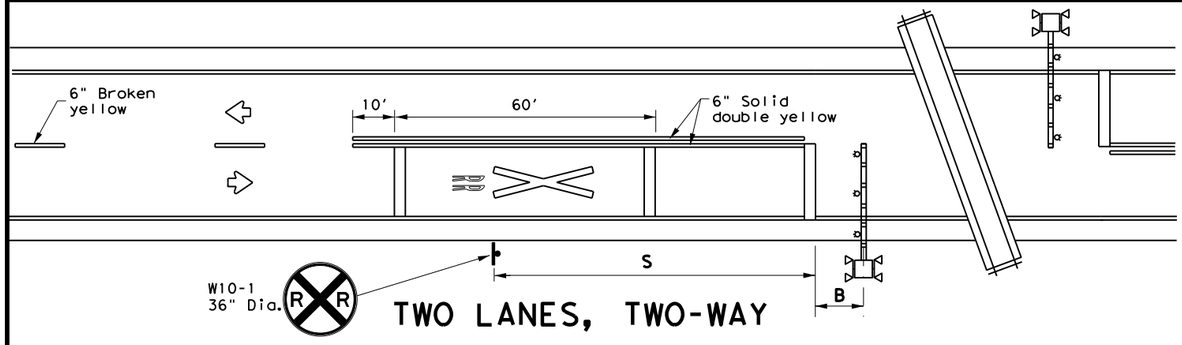
O: Width of median for RR gate assembly: 8'-6" minimum, 10' typical when using median gates. NOTE: Center of gate mast minimum 4'-3" from face of curb.

P: Center of RR mast to face of curb: 5'-3" minimum.
Center of RR mast to edge of pavement (with shoulder): 7' minimum.
Center of RR mast to edge of pavement (no shoulder): 9'-3" minimum.
NOTE: Final location determined by the railroad company.

Q: Gate length: 28' or less typical, but railroad company may allow up to 32' under special circumstances.

R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.

S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.



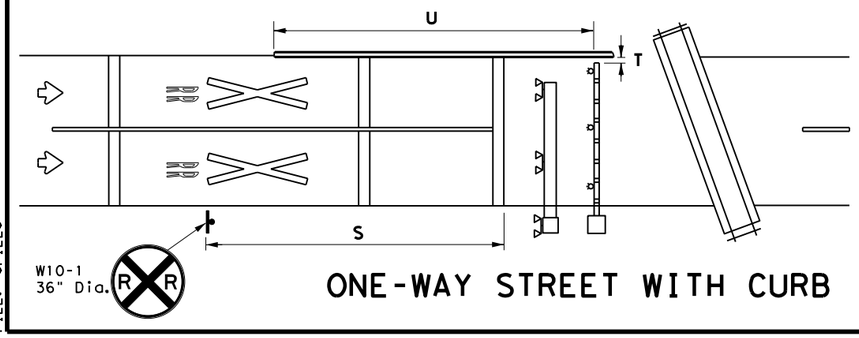
TWO LANES, TWO-WAY

TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

LEGEND	
	Sign
	Object Marker
	Traffic Flow
	Cantilever
	Gate Assembly
	Mast Flasher Pair

GENERAL NOTES

1. Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
2. Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
3. Medians preferred whenever possible to prevent vehicles from driving around gates.
4. Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
5. See SMD standard sheets for sign mounting details.
6. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

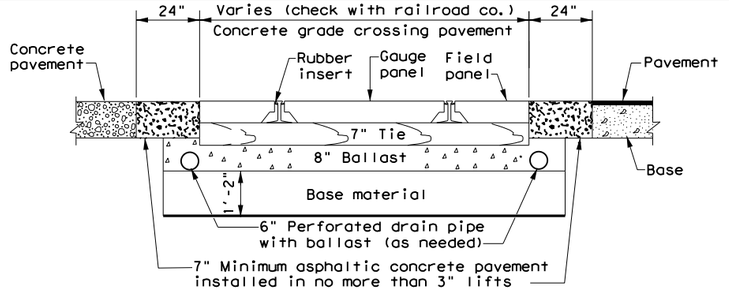


ONE-WAY STREET WITH CURB

NOTES

T: Tip of gate to edge of curb: 1' maximum for Quiet Zone SSM, 90% of traveled way covered by gates for all other locations.

U: Non-traversable curb length from gate: 100' minimum for a Quiet Zone SSM, 10' minimum for all other locations.



CROSSING SURFACE CROSS SECTION

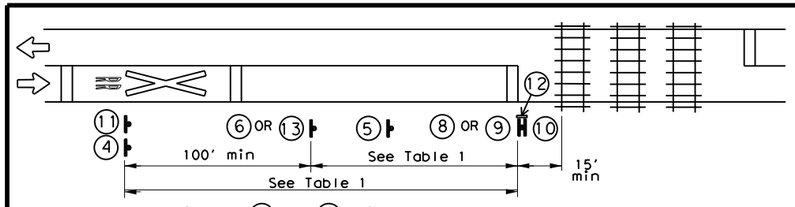
Texas Department of Transportation

Traffic Safety Division Standard

RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT RCD(1)-22

FILE: rcd1-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	SH 16
2-16	DIST	COUNTY		SHEET NO.
11-22	SAT	BEXAR		83

DATE: $DATE$ $TIME$
FILE: $FILE$

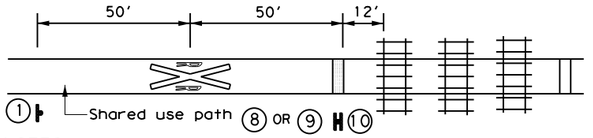


(if no (6) or (13) sign used)

PASSIVE CROSSING

NOTES

1. STOP or YIELD sign may also be installed to the left of the crossbuck sign, rather than below it.
2. A 2" white retroreflective strip shall be installed on front and back of crossbuck sign post.
3. See the Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings section of the TMUTCD for further details about sign mounting arrangements.



NOTES

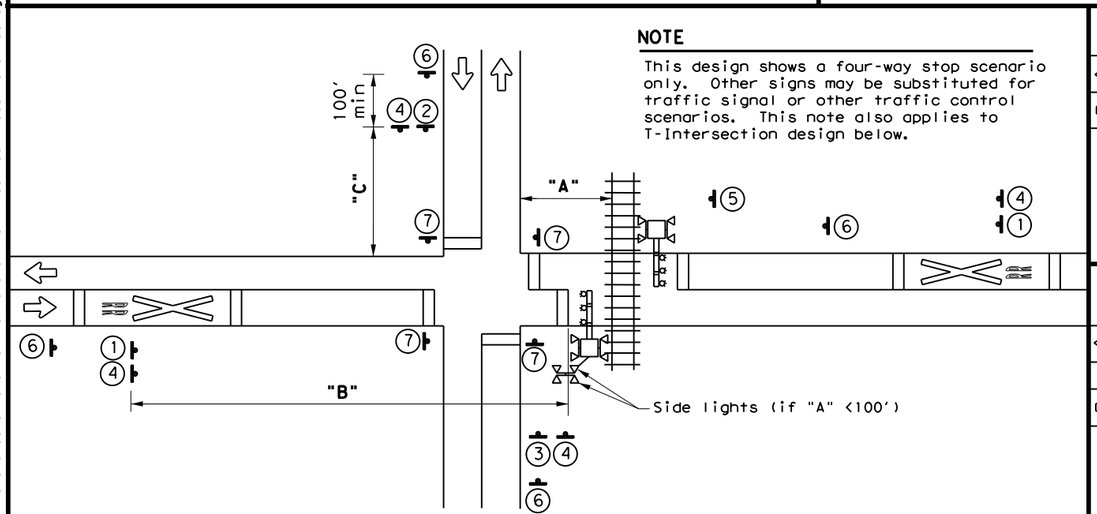
1. A shared use path is considered a separate pathway crossing when more than 25' from traveled way of adjacent roadway.
2. Detectable warning used at stop bar.
3. Smaller signs preferred. See the Design of Bicycle Signs section within the TMUTCD for sizing details.

PATHWAY CROSSING

TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

GENERAL NOTES

1. Railroad company to provide active traffic control devices, CROSSBUCK (R15-1), NUMBER OF TRACKS (R15-2P) plaque (if more than 1 track), and EMERGENCY NOTIFICATION (I-13) signs.
2. LOW GROUND CLEARANCE (W10-5) signs may be relocated further upstream of crossing to provide advance warning of alternate route.
3. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2) signs may be modified as needed to fit roadway geometry.
4. Table 1 placement distances may vary per the Placement of Warning Signs section of the TMUTCD.
5. See Table 1 to determine placement of STOP AHEAD (W3-1) and YIELD AHEAD (W3-2) signs unless shown otherwise.
6. DO NOT STOP ON TRACKS (R8-8) signs installed when potential for vehicles stopping on tracks is significant as determined by sealing engineer. Install so sign does not block view of RR mast.
7. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

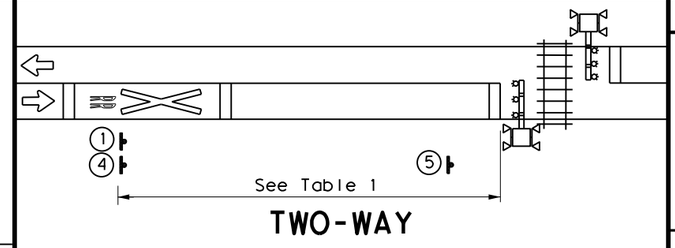


NOTE

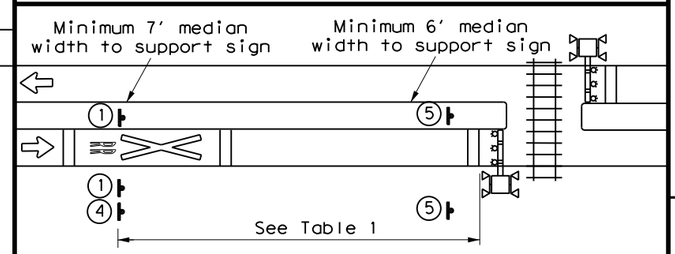
This design shows a four-way stop scenario only. Other signs may be substituted for traffic signal or other traffic control scenarios. This note also applies to T-Intersection design below.

	"A" <100'	"A" ≥100'
"B"	See Table 1. Place pavement markings and signs on opposite side of intersection from rail if spacing from Table 1 would put markings within intersection.	See Table 1. Place pavement markings and signs between rail and intersection if spacing from Table 1 would put markings within intersection.
"C"	See Table 1.	GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2, W10-3, W10-4) signs should only be installed if W10-1 sign is not between intersection and railroad crossing. If needed, see Table 1.

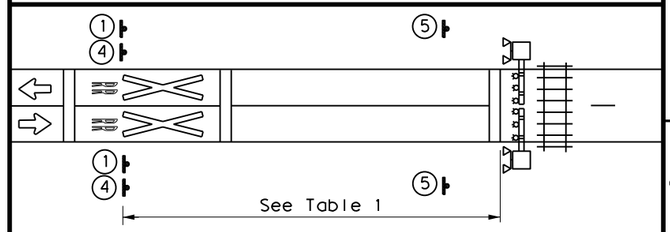
GRADE CROSSING NEAR A PARALLEL STREET



TWO-WAY

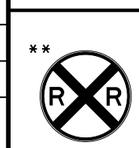


TWO-WAY WITH MEDIAN



ONE-WAY

SIGNS



1 W10-1 36" Dia.

2 W10-2L 36" X 36"

3 W10-2R 36" X 36"

IF NEEDED

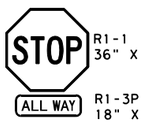
4 W10-5 36" X 36"
W10-5P 30" X 24"

IF NEEDED

5 R8-8 24" X 30"

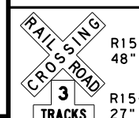
IF NEEDED

6 W3-1 30" X 30"

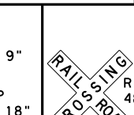


R1-1 36" X 36"
R1-3P 18" X 6"
7

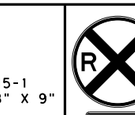
R15-1 48" X 9"
R15-2P 27" X 18"
R1-1 36" X 36"
8



R15-1 48" X 9"
R15-2P 27" X 18"
9 R1-2 48" X 48" X 48"



R15-1 48" X 9"
R15-2P 27" X 18"
10



W10-1 36" Dia.
W10-13P 30" X 24"
11 **

REPORT EMERGENCY OR PROBLEM 1-800-555-5555 CROSSING 836 597 H

Sign may be placed perpend. to travel lanes.

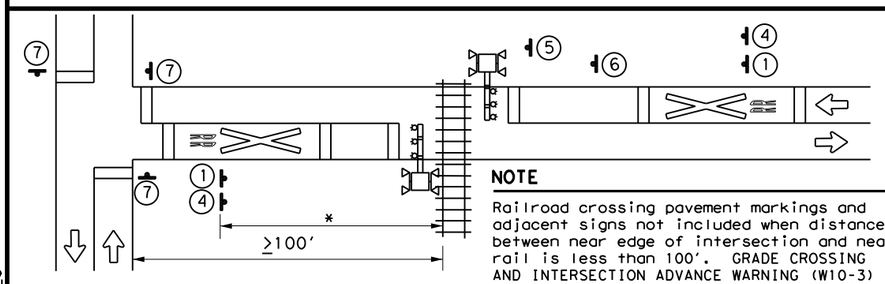
12 I-13 15" X 9"

IF NEEDED

13 W3-2 30" X 30"

** Includes a NO TRAIN HORN (W10-9P) plaque if crossing is in a Quiet Zone. If needed, is mounted below W10-2/W10-3/W10-4 signs.

W10-9P 30" X 24"

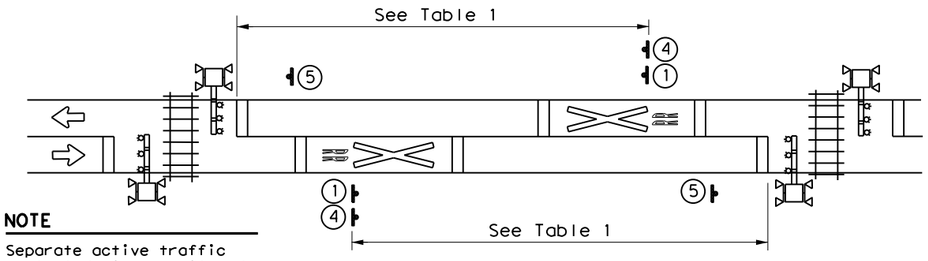


*Use Table 1 if sufficient space exists.

NOTE

Railroad crossing pavement markings and adjacent signs not included when distance between near edge of intersection and near rail is less than 100'. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-3) signs installed on roadway parallel with rail in this case.

T-INTERSECTION



NOTE

Separate active traffic control devices, railroad crossing pavement markings, and adjacent signs required when tracks are more than 100' apart.

TWO ADJACENT CROSSINGS

Texas Department of Transportation

Traffic Safety Division Standard

RAILROAD CROSSING DETAILS SIGNING & STRIPING

RCD(2)-22

FILE: rcd2-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0291	10	119	SH 16
2-16 11-22	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		84

DATE: $DATE$ $TIME$
FILE: $FILE$

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

[X] 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 Storm Water Pollution Prevention Plan (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 Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: [ ] Yes [X] No

Note: If amount of soil disturbance changes, permit requirements may change.

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

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

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

- [X] No Permit Required
- [ ] Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
- [ ] Nationwide Permit 14 - PCN Required
- [ ] 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 (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

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	[ ] Sedimentation Chambers
		[ ] 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.

[X] 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.

[X] 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 [X] Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
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 immediated area, and contact the Engineer immediately.

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 appropiate 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 follwing 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

Hazardous Materials or Contamination Issues Specific to this Project:

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

[ ] Yes [X] No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

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

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

STATE OF TEXAS
JOSE O. GALLEGOS RUIZ
140360
LICENSED
PROFESSIONAL ENGINEER

Jose Gallegos P.E. 8-27-23

JOSE O. GALLEGOS RUIZ, P.E. DATE

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
© TxDOT OCTOBER 2015	CONT 0291	SECT 10	JOB 119	HIGHWAY VARIOUS
REVISIONS	DIST SAT		COUNTY BEXAR	SHEET NO. 85

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