FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 2024 (389) HESG		1
STATE	STATE DIST.	COUNTY	
TEXAS	SA	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
915	12	696, ETC	CS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

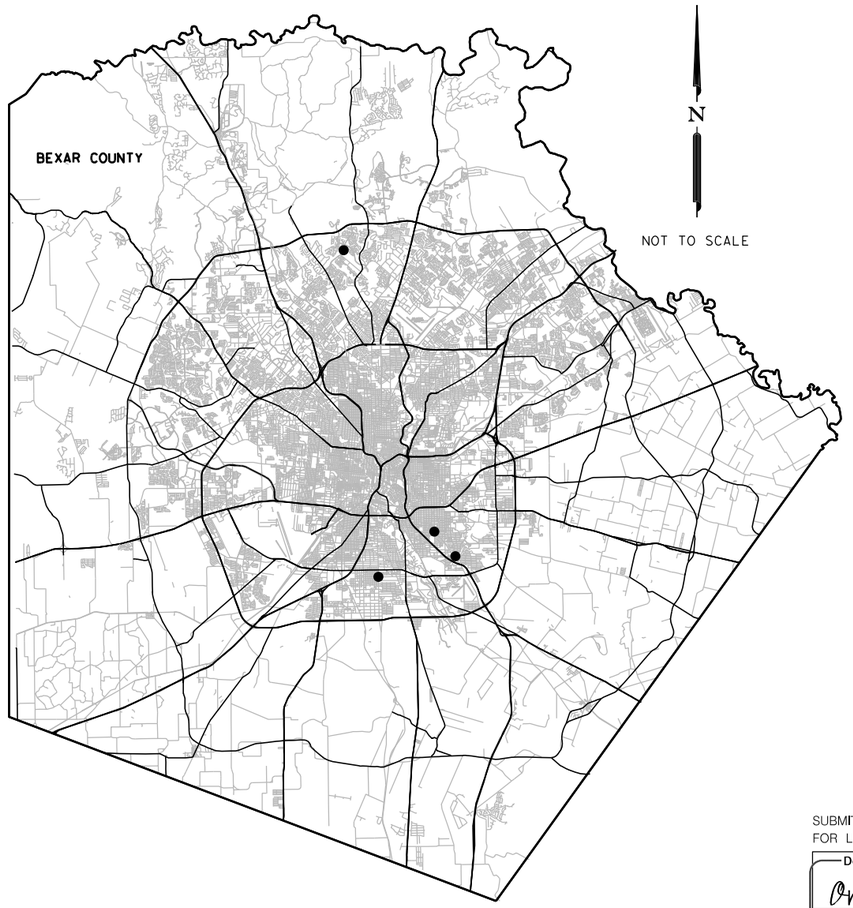
FEDERAL AID PROJECT NO.: STP()HESG
CCSJ: 0915-12-696, ETC.
LIMITS: IN SAN ANTONIO ON PLEASANTON RD @ HARDING BLVD, ETC.
PROJECT LENGTH: 0.2 MILES
FOR WORK CONSISTING OF HAZARD ELIMINATION & SAFETY
IMPROVE TRAFFIC SIGNALS, REPLACE SPAN WIRE SIGNAL WITH
MAST ARM AND UPGRADE DETECTION.
FOR PROJECT LOCATIONS SEE LOCATION MAP

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

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED
TDLR NO. TABS 2024000699

INDEX OF SHEETS

(SEE SHEET 2)



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

PLANS PREPARED BY:

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
911 CENTRAL PKWY N, STE 400 | SAN ANTONIO, TX 78232 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

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

SUBMITTED FOR LETTING: 9/1/2023
DocuSigned by: Orlando Gallegos, P.E.
446D458C803A437... TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING: 9/1/2023
DocuSigned by: Clayton Kipps, P.E.
74F59AC[illegible]...OF TRANSPORTATION PLANNING & DEVELOPMENT

REVIEWED FOR LETTING: 9/5/2023
DocuSigned by: DCRogers, P.E.
F29100BAA598499... TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING: 9/1/2023
DocuSigned by: Gina E. Gallegos, P.E.
124372CCDF60455... DISTRICT ENGINEER

Plotted on: 8/30/2023
Design Filename: P:\122\17\06\Design\Civil\General\12217_06_GNRL_TITL.dgn
COUNTY_____ PROJ. NO._____
HWY. NO._____ LETTING DATE_____
DATE ACCEPTED_____

Plotted on: 8/28/2023

Design Filename: P:\122\17\06\Design\Civil\General\12217_06_GNRL_INDX.dgn

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11-13	QUANTITY SUMMARY
	TRAFFIC CONTROL
14	TRAFFIC CONTROL PLAN NARRATIVE
15	SCHEDULE OF BARRICADES & ADVANCED WARNING DEVICES
16	TMA SUMMARY
	TRAFFIC SIGNAL PLANS
17	GOLIAD AT CLARK AVE EXISTING CONDITIONS
18	GOLIAD AT CLARK AVE PROPOSED SIGNAL LAYOUT
19-20	GOLIAD AT CLARK AVE CONDUIT AND CONDUCTOR SCHEDULE
21-22	GOLIAD AT CLARK AVE PROPOSED SIGNAL ELEVATIONS
23	GOLIAD AT CLARK AVE PROPOSED CURB RAMP LAYOUT
24	PLEASANTON AT HARDING BLVD EXISTING CONDITIONS
25	PLEASANTON AT HARDING BLVD PROPOSED SIGNAL LAYOUT
26-27	PLEASANTON AT HARDING BLVD CONDUIT AND CONDUCTOR SCHEDULE
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29	PLEASANTON AT HARDING BLVD PROPOSED CURB RAMP LAYOUT
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49	* BC(5)-21
50	* BC(6)-21
51	* BC(7)-21
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105	* EC(1)-16
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY (*) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 8/28/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

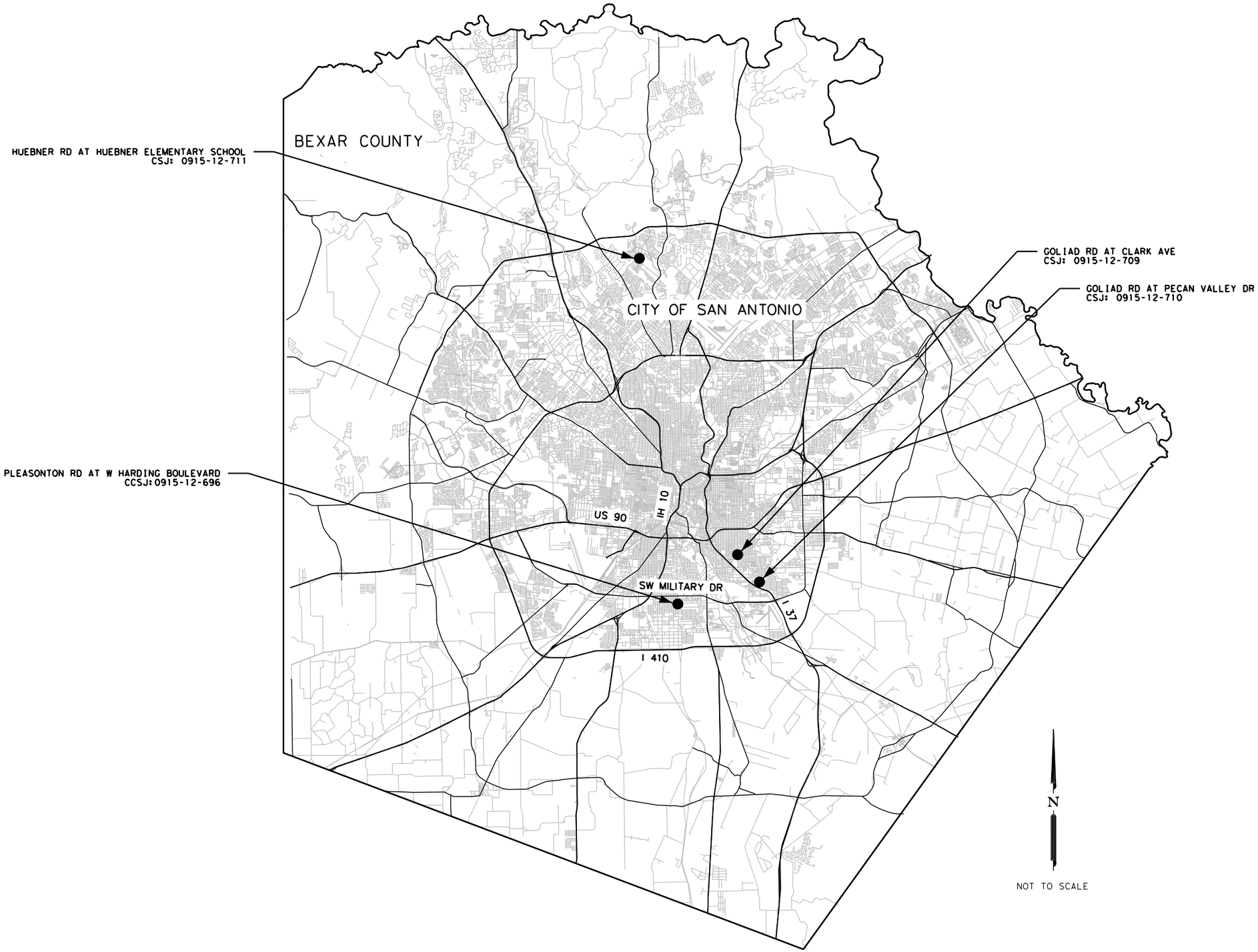
HIGHWAY SAFETY
IMPROVEMENT PROGRAM FY 23

PROJECT INDEX

GENERAL

	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	6	TEXAS	STP 2024(389)HESG			CS
	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
	SA	BEXAR	915	12	696,ETC	2

Plotted on: 8/28/2023



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NOT TO SCALE

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 8/28/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY
IMPROVEMENT PROGRAM FY 23

LOCATION MAP

GENERAL

	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	6	TEXAS	STP 2024(389)HESG			CS
	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
	SA	BEXAR	915	12	696,ETC	3

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**********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 materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

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.

Locate and reference all manholes and valves within the construction area with station and offset or GPS. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stockpiles, etc. cannot be placed over these valves or covers.

The Contractor has the option to adjust or construct all manholes and valves to final pavement elevations prior to the final mat of HMA or after final mat of HMA. If between the final elevation adjustment and the final mat of HMA, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the HMA work.

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.

Control: 0915-12-696, ETC.

County: BEXAR

Highway: PLEASANTON RD

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.

If a sanitary sewer overflow (SSO) occurs:
1. Attempt to eliminate the source of the SSO.
2. Contain sewage from the SSO to the extent possible to prevent contamination of waterways.
3. Call SAWS at (210) 233-2015.

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

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

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 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, PE Orlando.Gallegos@txdot.gov
Robert Steigleder, Robert.Steigleder@txdot.gov

Marc Jacobson, PE, PTOE Marc.Jacobson@sanantonio.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.

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and back feed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

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.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can

interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

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

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

Excavation within 5 feet of an existing CPS Energy pole will require pole bracing. Contact CPS Energy utility coordination to request pole bracing (Customer Engineering 210-353-4050). The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

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

Steel Wrapped or Asbestos Utility Lines:

Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

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.

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.

Create and maintain a Bar Chart schedule.

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 acquisition and contractor mobilization.

--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.

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 160--
Approximately 20 CY of existing topsoil may be windrowed or stockpiled (as approved) for later use under this Item. Place erosion control measures for the stockpile and/or windrow.

--Item 162--
Furnish and place Bermuda grass sod.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--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.
Treat the pavement drop-offs as shown in the TCP.

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

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.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

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 9AM TO 4PM, 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:
(With uniformed off duty law enforcement officers)

Weekend closures when approved by the Engineer:

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 (Bexar County Only)
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 (Bexar County Only)
During major events at the AT&T Center (Spurs home games, Rodeo, concerts, etc.)
Alamodome, and/or Convention Center (Bexar County Only)
Easter Weekend: April 7-9, 2023 & March 29-31, 2024

Traffic Signals

There are traffic signals at the intersections of: Goliad at Clark Ave, Pleasanton at Harding Blvd, Huebner Rd at Huebner Elementary Drwy, and Goliad at Pecan Valley. 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, City of New Braunfels, etc.) or TxDOT when left-turn lanes are closed and/or for signal timing revisions as necessary.

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--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 529--
Curb inlets and extensions are based on an exposed curb height of 7 inches. The roadway curb height and shape will be transitioned to the inlet's curb with a 40: 1 taper.

--Item 531--
The curb ramp locations shown in the plans have considered the geometric features of the intersection, traffic signals, and the pavement markings. If anything changes during construction, the location of curb ramps must be adjusted to ensure they meet TAS requirements. The contractor shall not remove or adjust any via assets. The contractor must contact VIA ((210)-419-6905) or (210)-362-5020) **fourteen days prior**, for the removal of benches, stop poles and any other VIA assets within the project limits. Please provide **thirty days prior** notice for shelter removal. If a lane closure will force the closure of a bus stop the contractor must contact VIA ((210)-419-6905) or (210)-362-5020) **seven days prior**. The contractor will be liable for any damages to VIA facilities not removed by VIA. The contractor is required to replace all flatwork removed or damaged in the course of executing the contract unless otherwise noted by VIA. The contractor will be responsible for protecting VIA facilities if adjacent to work area. The contractor shall schedule with VIA ((210)-419-6905) or (210)-362-5020) a pre-pour inspection for any shelter or bench pad, ADA connector or other placement that directly affects VIA assets placement not to include sidewalks. Any proposed adjacent sidewalk to match existing slope and grade of shelter foundation.

--Item 618--
It might be necessary to cut concrete for placement of conduit. Saw cut existing concrete, remove the concrete from the steel reinforcement (bars or fabric) and bend the steel to install the conduit. After the conduit has been placed, bend the steel back to its original position and back-fill the trench with an approved concrete. This work is subsidiary to this Item.

The conduit depth for illumination under the City of San Antonio streets is 36 inches.

--Item 628--
Make all arrangements for electrical service, and compliance with local standards and practices for proper installations.

--Item 644--
The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

Triangular Slipbase Systems with set screws are not allowed.

--Item 666--
Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The

adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 680--
Furnish and install all required materials and equipment necessary for the complete and operating traffic signal installation at the following intersections:
Goliad Rd @ Clark Ave, Goliad Rd @ Pecan Valley, Pleasanton @ Harding Blvd, Huebner Rd @ Huebner Elementary Drwy.

The locations shown on the plans for signal pole foundations, controller foundations, conduit and other items may be adjusted to better fit field conditions as approved.

Furnish and install a new City of San Antonio Type 332 Cabinet and 2070 controller with Intelight Maxtime software.

Deliver controller cabinet and assembly to the City of San Antonio signal shop for programming and testing two weeks in advance prior to contractor installing equipment in the field. Coordinate drop off and pick up with Mark Perez (210) 218-7430.

Connect all field wiring to the controller assembly into the polyphaser. The City of San Antonio Signal Shop representative will assist in determining how the detection cables are to be connected, and will also program the controller for operation, hook up the malfunction management unit (MMU) or conflict monitor, detector units, and other equipment, and turn on the controller. Have a qualified technician on the project site to place the traffic signals in operation.

Once final punch list is complete, contractor is allowed to begin flashing signal operations. Signal shall flash for a minimum of 7 days prior to full operation, unless otherwise approved by the Engineer.

Use LED lamps from the prequalified material producer lists as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) material producer list. Category is "Roadway Illumination and Electrical Supplies." under item 610. No substitutions will be allowed for materials found on this list.

Demonstrate that the field wiring is properly installed. Install the electrical equipment in a neat and workmanlike manner.

Use the following wiring sequence when connecting signal sections to the cabinet:

Conductor No.	Base Color	Tracer Color	Signal Face
1	Black		Yellow Ball
2	White		Neutral
3	Red		Red Ball
4	Green		Green Ball
5	Orange		Yellow Arrow
6	Blue		Green Arrow
7	White	Black	Spare

All existing signal equipment with the exception of the signal controller and related equipment become the property of the Contractor. Deliver the controller and related equipment to the City of San Antonio Signal shop, located at Northwest Service Center, 6939 W Loop 1604 N) in San Antonio, Texas or to the Area Office as directed.

Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the Engineer a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the Engineer of each trouble call. Do not clear the error log in the conflict monitor or MMU during the thirty-day test period without approval.

Provide a submittal compliance matrix with all traffic signal submittals.

Field verify the depths of the drill shafts to meet the minimum clearances specified in the plans before ordering materials.

Ensure that all TMS (Traffic Management System) equipment furnished and installed is completely compatible with the existing hardware and software located within the TransGuide operations center (i.e., TransGuide central software). The contractor shall contact the traffic management engineer for details on the system network architecture.

Contractor shall be responsible for integrating and testing all new TMS equipment and any existing TMS equipment that is relocated into the existing network management system, subsidiary to the various bid items.

--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.

--Item 684--
Provide an extra 10' for each cable terminating in the controller cabinet. All cables must be continuous without splices from terminal point to terminal point. All proposed signal cable must be #14 AWG, 4 Conductor or 9 Conductor for signal heads, pedestrian heads, and ILSN signs per the City of San Antonio

--Item 686 & 687--
Provide all signal poles from the same manufacturer. Pedestrian poles may be from a different manufacturer.

--Item 688--
The sealant used for vehicle loop wire must be approved.

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.

The pedestrian push button must be wired with a 3/C#16 loop detector cable in lieu of a #12 A.W.G. XHHW wire per City of San Antonio Guidelines.

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

--Item 6185--
1 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.

--Item 6292--
Radar presence detection device must utilize true-presence detection. Systems using locking algorithms to attempt presence detection will not be accepted. In addition, radar systems will not be allowed to use extensions/delays or place the controller on locking detection to aid in presence detection.

Radar presence detection device must be able to detect up to 10 lanes with a minimum offset of 6' and have at least 16 zones and channels per unit.

Radar presence detection device must be mounted on the same side of the intersection as the lanes it is set to detect.

Final placement of radar devices must be approved by the engineer.

Furnish and install new Wavetronix SmartSensor Matrix, or approved equivalent, for radar presence detectors and Wavetronix SmartSensor Advance, or approved equivalent, for radar advanced detection devices.

--Item 6437--
Fish Eye Detection System (FEDS) shall be compatible with City of San Antonio 332 Cabinet/Controller with Intelight Maxtime software.

Fish Eye Detection System (FEDS) shall be Miovision SmartView 360 Camera and equipment or approved equivalent.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-12-696 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY GOLIAD RD, HUEBNER RD, PLEASANTON RD

			CONTROL SECTION JOB	0915-12-696		0915-12-709		0915-12-710		0915-12-711		TOTAL EST.	TOTAL FINAL
			PROJECT ID	A00177577		A00177858		A00177863		A00177866			
			COUNTY	Bexar		Bexar		Bexar		Bexar			
			HIGHWAY	PLEASANTON RD		GOLIAD RD		GOLIAD RD		HUEBNER RD			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	1.000		1.000		1.000		1.000		4.000	
	104-6009	REMOVING CONC (RIPRAP)	SY			1.000						1.000	
	104-6015	REMOVING CONC (SIDEWALKS)	SY			51.000		50.000				101.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY			5.000						5.000	
	104-6021	REMOVING CONC (CURB)	LF					130.000				130.000	
	104-6029	REMOVING CONC (CURB OR CURB & GUTTER)	LF	78.000		78.000						156.000	
	105-6037	REMOVING STAB BASE AND ASPH PAV(0"-16")	SY			29.000						29.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	22.000		148.000						170.000	
	162-6002	BLOCK SODDING	SY	22.000		148.000						170.000	
	168-6001	VEGETATIVE WATERING	MG	0.400		2.700						3.100	
	416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	33.000		11.000		11.000				55.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	13.000		39.000		39.000		44.000		135.000	
	432-6003	RIPRAP (CONC)(6 IN)	CY	0.500		4.000						4.500	
	500-6001	MOBILIZATION	LS	1.000								1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000		2.000		2.000		8.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF							100.000		100.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF							100.000		100.000	
	529-6001	CONC CURB (TY I)	LF	26.000				96.000				122.000	
	529-6002	CONC CURB (TY II)	LF	49.000		181.000						230.000	
	529-6015	CONC CURB (TY C1)	LF	57.000				72.000				129.000	
	530-6005	DRIVEWAYS (ACP)	SY			7.000						7.000	
	531-6001	CONC SIDEWALKS (4")	SY	52.000		92.000						144.000	
	531-6003	CONC SIDEWALKS (6")	SY					51.000				51.000	
	531-6005	CURB RAMPS (TY 2)	EA							5.000		5.000	
	531-6010	CURB RAMPS (TY 7)	EA							1.000		1.000	
	531-6018	CURB RAMPS (TY 1)	SY			9.000						9.000	
	531-6019	CURB RAMPS (TY 2)	SY	53.000		34.000						87.000	
	531-6020	CURB RAMPS (TY 3)	SY	32.000		60.000						92.000	
	531-6022	CURB RAMPS (TY 5)	SY					51.000				51.000	
	531-6023	CURB RAMPS (TY 6)	SY			9.000						9.000	
	531-6024	CURB RAMPS (TY 7)	SY			12.000						12.000	
	531-6031	CURB RAMPS (TY 22)	SY			19.000						19.000	
	531-6033	CONC SIDEWALKS (SPECIAL) (TYPE B)	SY	49.000								49.000	
	618-6046	CONDT (PVC) (SCH 80) (2")	LF	190.000		340.000		340.000		70.000		940.000	
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	310.000		430.000		545.000		375.000		1,660.000	
	618-6053	CONDT (PVC) (SCH 80) (3")	LF	400.000		375.000		260.000		130.000		1,165.000	
	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	620.000		945.000		785.000		750.000		3,100.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-12-696 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY GOLIAD RD, HUEBNER RD, PLEASANTON RD

			CONTROL SECTION JOB	**0915-12-696**		**0915-12-709**		**0915-12-710**		**0915-12-711**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00177577**		**A00177858**		**A00177863**		**A00177866**			
			COUNTY	**Bexar**		**Bexar**		**Bexar**		**Bexar**			
			HIGHWAY	**PLEASANTON RD**		**GOLIAD RD**		**GOLIAD RD**		**HUEBNER RD**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	620-6007	ELEC CONDR (NO.8) BARE	LF	1,390.000		2,060.000		1,870.000		1,450.000		6,770.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	15.000		10.000		60.000		30.000		115.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	25.000		15.000		60.000		30.000		130.000	
	621-6002	TRAY CABLE (3 CONDR) (12 AWG)	LF	390.000		495.000		580.000				1,465.000	
	624-6009	GROUND BOX TY D (162922)	EA					5.000				5.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	4.000		7.000		1.000		4.000		16.000	
	628-6164	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	EA	1.000		1.000				1.000		3.000	
	628-6167	ELC SRV TY D 120/240 070(NS)AL(E)TP(O)	EA					1.000				1.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	2.000		4.000						6.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2.000		1.000						3.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	2.000		3.000						5.000	
	666-6006	REFL PAV MRK TY I (W)4"(DOT)(100MIL)	LF			32.000						32.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	200.000		800.000				281.000		1,281.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	500.000		484.000		524.000		364.000		1,872.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2.000		4.000				3.000		9.000	
	666-6057	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA			3.000						3.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	2.000		4.000				3.000		9.000	
	666-6162	RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL)	LF	1,600.000		1,360.000		1,600.000		1,080.000		5,640.000	
	666-6198	REFL PAV MRK TY II (W) 18" (YLD TRI)	EA			8.000						8.000	
	666-6224	PAVEMENT SEALER 4"	LF	1,000.000		2,382.000				1,750.000		5,132.000	
	666-6225	PAVEMENT SEALER 6"	LF	1,600.000		1,360.000		1,600.000		1,080.000		5,640.000	
	666-6226	PAVEMENT SEALER 8"	LF	200.000		800.000				281.000		1,281.000	
	666-6230	PAVEMENT SEALER 24"	LF	500.000		484.000		524.000		364.000		1,872.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA	2.000		4.000				3.000		9.000	
	666-6232	PAVEMENT SEALER (WORD)	EA	2.000		4.000				3.000		9.000	
	666-6234	PAVEMENT SEALER (DBL ARROW)	EA			3.000						3.000	
	666-6243	PAVEMENT SEALER (YLD TRI)	EA			8.000						8.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	200.000		150.000				190.000		540.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF							800.000		800.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	800.000		2,200.000				760.000		3,760.000	
	672-6007	REFL PAV MRKR TY I-C	EA	30.000		35.000						65.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	40.000		110.000						150.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA							22.000		22.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	1,000.000		1,964.000						2,964.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF							520.000		520.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	200.000		157.000						357.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	640.000		560.000						1,200.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-12-696 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY GOLIAD RD, HUEBNER RD, PLEASANTON RD

			CONTROL SECTION JOB	**0915-12-696**		**0915-12-709**		**0915-12-710**		**0915-12-711**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00177577**		**A00177858**		**A00177863**		**A00177866**			
			COUNTY	**Bexar**		**Bexar**		**Bexar**		**Bexar**			
			HIGHWAY	**PLEASANTON RD**		**GOLIAD RD**		**GOLIAD RD**		**HUEBNER RD**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	420.000		373.000				130.000		923.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF	1,000.000		2,382.000				1,750.000		5,132.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	1,600.000		1,360.000		1,600.000		1,080.000		5,640.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	200.000		800.000				281.000		1,281.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	500.000		484.000		524.000		364.000		1,872.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA							3.000		3.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA							3.000		3.000	
	680-6003	INSTALL HWY TRF SIG (SYSTEM)	EA	1.000		1.000		1.000		1.000		4.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA	1.000		1.000		1.000		1.000		4.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	8.000		12.000		8.000		8.000		36.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	2.000		7.000		4.000		2.000		15.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	8.000		12.000		8.000		8.000		36.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	4.000		10.000		6.000		2.000		22.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	8.000		12.000		8.000		8.000		36.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	2.000		5.000		2.000		2.000		11.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	8.000		10.000		8.000		6.000		32.000	
	682-6047	LOUVER (12") (ADJUSTABLE)	EA			16.000						16.000	
	682-6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	2.000		7.000		2.000		2.000		13.000	
	682-6050	BACKPLATE W/REFL BRDR(5 SEC)	EA					2.000				2.000	
	682-6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	8.000		10.000		6.000		8.000		32.000	
	684-6030	TRF SIG CBL (TY A)(14 AWG)(4 CONDR)	LF	745.000		760.000		725.000		1,060.000		3,290.000	
	684-6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	2,505.000		5,300.000		2,545.000		800.000		11,150.000	
	684-6049	TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	LF	1,080.000		1,895.000		1,200.000		1,060.000		5,235.000	
	686-6028	INS TRF SIG PL AM(S)1 ARM(24')LUM&ILSN	EA	1.000								1.000	
	686-6034	INS TRF SIG PL AM(S)1 ARM(32')ILSN	EA	1.000		1.000						2.000	
	686-6036	INS TRF SIG PL AM(S)1 ARM(32')LUM&ILSN	EA	1.000				1.000				2.000	
	686-6038	INS TRF SIG PL AM(S)1 ARM(36')ILSN	EA							2.000		2.000	
	686-6042	INS TRF SIG PL AM(S)1 ARM(40')ILSN	EA	1.000								1.000	
	686-6044	INS TRF SIG PL AM(S)1 ARM(40')LUM&ILSN	EA					2.000				2.000	
	686-6046	INS TRF SIG PL AM(S)1 ARM(44')ILSN	EA			1.000		1.000				2.000	
	686-6048	INS TRF SIG PL AM(S)1 ARM(44')LUM&ILSN	EA			2.000						2.000	
	686-6049	INS TRF SIG PL AM(S)1 ARM(48')	EA							2.000		2.000	
	687-6001	PED POLE ASSEMBLY	EA	4.000		10.000		7.000		4.000		25.000	
	687-6002	PEDESTRIAN PUSH BUTTON POLE	EA	1.000								1.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	8.000		10.000		8.000		6.000		32.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA	1.000		2.000		1.000		1.000		5.000	
	5003-6004	RETROFIT DET WARN SURF(SURF APPLIED)	EA	1.000								1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-12-696 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY GOLIAD RD, HUEBNER RD, PLEASANTON RD

													TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB	**0915-12-696**		**0915-12-709**		**0915-12-710**		**0915-12-711**				
			PROJECT ID	**A00177577**		**A00177858**		**A00177863**		**A00177866**				
			COUNTY	**Bexar**		**Bexar**		**Bexar**		**Bexar**				
			HIGHWAY	**PLEASANTON RD**		**GOLIAD RD**		**GOLIAD RD**		**HUEBNER RD**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL			
	5084-6001	FIXED BOLLARD	EA			6.000							6.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	56.000		70.000		28.000		28.000			182.000	
	6004-6031	ITS COM CBL (ETHERNET)	LF	195.000		165.000		295.000		70.000			725.000	
	6010-6001	CCTV FIELD EQUIPMENT (ANALOG)	EA	1.000		1.000		1.000		1.000			4.000	
	6010-6003	CCTV FIELD CONTROLLER	EA	1.000		1.000		1.000		1.000			4.000	
	6010-6004	CCTV MOUNT (POLE)	EA	1.000		1.000		1.000		1.000			4.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1.000		1.000		1.000		1.000			4.000	
	6185-6002	TMA (STATIONARY)	DAY	4.000		3.000		4.000		4.000			15.000	
	6437-6001	FEDS PROCESSOR UNIT	EA	1.000		1.000		1.000		1.000			4.000	
	6437-6002	FEDS FISH EYE CAMERA ASSEMBLY	EA	1.000		2.000		1.000		1.000			5.000	
	6437-6003	FEDS ADVANCED CAMERA ASSEMBLY	EA					2.000		2.000			4.000	
	6437-6004	LIFETIME FEDS DATA COLLECT & REPORTING	EA	1.000		2.000		1.000		1.000			5.000	
	6437-6005	FEDS ETHERNET REPEATER	EA	1.000		2.000		1.000		1.000			5.000	
	6437-6006	FEDS COMM CABLE (ETHERNET - CAT5E)	LF	145.000		480.000		620.000		590.000			1,835.000	
	6505-6001	ILSN(LED)(6S)	EA	2.000		2.000							4.000	
	6505-6002	ILSN(LED)(8S)	EA	2.000		2.000		4.000		2.000			10.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	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	

*ITEMS SUBSIDIARY TO ITEM 0680-6003 INCLUDED FOR CONTRACTOR INFORMATION ONLY.

ITEM	0100-6002	0104-6009	0104-6015	0104-6017	0104-6029	0105-6037	0160-6003	0162-6002	0168-6001	0416-6031	0416-6032
INTERSECTION	PREPARING ROW	REMOVING CONC (RIPRAP)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (DRIVEWAYS)	REMOVING CONC (CURB OR CURB & GUTTER)	REMOVING STAB BASE AND ASPH PAV(0"-16")	FURNISHING AND PLACING TOPSOIL (4")	BLOCK SODDING	VEGETATIVE WATERING	DRILL SHAFT (TRF SIG POLE) (30 IN)	DRILL SHAFT (TRF SIG POLE) (36 IN)
	STA	SY	SY	SY	LF	SY	SY	SY	MG	LF	LF
Goliad and Clark	1.0	1	51	5	78	29	148	148	2.70	11	39
Pleasanton and Harding	1.0				78		22	22	0.40	33	13
TOTALS	2.0	1	51	5	156	29	170	170	3.10	44	52

ITEM	0432-6003	0502-6001	0529-6001	0529-6002	0529-6015	0530-6005	0531-6001	0531-6018	0531-6019	0531-6020	0531-6023
INTERSECTION	RIPRAP (CONC)(6 IN)	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONC CURB (TY I)	CONC CURB (TY II)	CONC CURB (TY C1)	DRIVEWAYS (ACP)	CONC SIDEWALKS (4")	CURB RAMPS (TY 1)	CURB RAMPS (TY 2)	CURB RAMPS (TY 3)	CURB RAMPS (TY 6)
	CY	MO	LF	LF	LF	SY	SY	SY	SY	SY	SY
Goliad and Clark	4.0	2		181		7	92	9	34	60	9
Pleasanton and Harding	0.5	2	26	49	57		52		53	32	
TOTALS	4.5	4	26	230	57	7	144	9	87	92	9

ITEM	0531-6024	0531-6031	0531-6033	0618-6046	0618-6047	0618-6053	0618-6054	0620-6007	0620-6009	0620-6010	0621-6002
INTERSECTION	CURB RAMPS (TY 7)	CURB RAMPS (TY 22)	CONC SIDEWALKS (SPECIAL) (TYPE B)	CONDT (PVC) (SCH 80) (2")	CONDT (PVC) (SCH 80) (2") (BORE)	CONDT (PVC) (SCH 80) (3")	CONDT (PVC) (SCH 80) (3") (BORE)	ELEC CONDR (NO.8) BARE	ELEC CONDR (NO.6) BARE	ELEC CONDR (NO.6) INSULATED	TRAY CABLE (3 CONDR) (12 AWG)
	SY	SY	SY	LF	LF	LF	LF	LF	LF	LF	LF
Goliad and Clark	12	19		340	430	375	945	2060	10	15	495
Pleasanton and Harding			49	190	310	400	620	1390	15	25	390
TOTALS	12	19	49	530	740	775	1565	3450	25	40	885

ITEM	0624-6010	0628-6164	0644-6027	0644-6068	0644-6076	0666-6006	0666-6036	0666-6048	0666-6054	0666-6057	0666-6078
INTERSECTION	GROUND BOX TY D (162922)W/APRON	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	IN SM RD SN SUP&AM TYS80(1)SA(P)	RELOCATE SM RD SN SUP&AM TY 10BWG	REMOVE SM RD SN SUP&AM	REFL PAV MRK TY I (W)4"(DOT)(100 MIL)	REFL PAV MRK TY I (W)8"(SLD)(100 MIL)	REFL PAV MRK TY I (W)24"(SLD)(10 0MIL)	REFL PAV MRK TY I (W)(ARROW)(100 MIL)	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	REFL PAV MRK TY I (W)(WORD)(100M IL)
	EA	EA	EA	EA	EA	LF	LF	LF	EA	EA	EA
Goliad and Clark	7	1	4	1	3	32	800	484	4	3	4
Pleasanton and Harding	4	1	2	2	2		200	500	2		2
TOTALS	11	2	6	3	5	32	1000	984	6	3	6

ITEM	0666-6162	0666-6198	0666-6224	0666-6225	0666-6226	0666-6230	0666-6231	0666-6232	0666-6234	0666-6243	0666-6300
INTERSECTION	RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL)	REFL PAV MRK TY II (W)18" (YLD TRI)	PAVEMENT SEALER 4"	PAVEMENT SEALER 6"	PAVEMENT SEALER 8"	PAVEMENT SEALER 24"	PAVEMENT SEALER (ARROW)	PAVEMENT SEALER (WORD)	PAVEMENT SEALER (DBL ARROW)	PAVEMENT SEALER (YLD TRI)	RE PM W/RET REQ TY I (W)4"(BRK)(100 MIL)
	LF	EA	LF	LF	LF	LF	EA	EA	EA	EA	LF
Goliad and Clark	1360	8	2382	1360	800	484	4	4	3	8	150
Pleasanton and Harding	1600		1000	1600	200	500	2	2			200
TOTALS	2960	8	3382	2960	1000	984	6	6	3	8	350

ITEM	0666-6315	0672-6007	0672-6009	0677-6001	0677-6003	0677-6005	0677-6007	0678-6001	0678-6002	0678-6004	0678-6008
INTERSECTION	RE PM W/RET REQ TY I (Y)4"(SLD)(100 MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (12")	ELIM EXT PAV MRK & MRKS (24")	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (8")	PAV SURF PREP FOR MRK (24")
	LF	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF
Goliad and Clark	2200	35	110	1964	157	560	373	2382	1360	800	484
Pleasanton and Harding	800	30	40	1000	200	640	420	1000	1600	200	500
TOTALS	3000	65	150	2964	357	1200	793	3382	2960	1000	984

ITEM	0680-6003	0680-6004	0680-XX01*	0680-XX02*	0682-6001	0682-6002	0682-6003	0682-6004	0682-6005	0682-6006	0682-6018
INTERSECTION	INSTALL HWY TRF SIG (SYSTEM)	REMOVING TRAFFIC SIGNALS	TY 2070 CONTROLLER W/MAXTIME	TYPE 332 CABINET AND FOUNDATION	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) (COUNTDOWN)
	EA	EA	LF	LF	EA	EA	EA	EA	EA	EA	EA
Goliad and Clark	1	1	1	1	12	7	12	10	12	5	10
Pleasanton and Harding	1	1	1	1	8	2	8	4	8	2	8
TOTALS	2	2	2	2	20	9	20	14	20	7	18

ITEM	0682-6047	0682-6049	0682-6060	0684-6030	0684-6035	0684-6049	0686-6028	0686-6034	0686-6036	0686-6042	0686-6046
INTERSECTION	LOUVER (12") (ADJUSTABLE)	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(3 SEC)	TRF SIG CBL (TY A)(14 AWG)(4 CONDR)	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	INS TRF SIG PL AM(S)1 ARM(24')LUM&ILSN	INS TRF SIG PL AM(S)1 ARM(32')ILSN	INS TRF SIG PL AM(S)1 ARM(32')LUM&ILSN	INS TRF SIG PL AM(S)1 ARM(40')ILSN	INS TRF SIG PL AM(S)1 ARM(44')ILSN
	EA	EA	EA	LF	LF	LF	EA	EA	EA	EA	EA
Goliad and Clark	16	7	10	760	5300	1895		1			1
Pleasanton and Harding		2	8	745	2505	1080	1	1	1	1	
TOTALS	16	9	18	1505	7805	2975	1	2	1	1	1

ITEM	0686-6048	0687-6001	0687-6002	0688-6001	0688-6003	5003-6004	5084-6001	6001-6001	6004-6031	6010-6001	6010-6003
INTERSECTION	INS TRF SIG PL AM(S)1 ARM(44')LUM&ILSN	PED POLE ASSEMBLY	PEDESTRIAN PUSH BUTTON POLE	PED DETECT PUSH BUTTON (APS)	PED DETECTOR CONTROLLER UNIT	RETROFIT DET WARN SURF(SURF APPLIED)	FIXED BOLLARD	PORTABLE CHANGEABLE MESSAGE SIGN	ITS COM CBL (ETHERNET)	CCTV FIELD EQUIPMENT (ANALOG)	CCTV FIELD CONTROLLER
	EA	EA	EA	EA	EA	EA	EA	DAY	LF	EA	EA
Goliad and Clark	2	10		10	2		6	70	165	1	1
Pleasanton and Harding		4	1	8	1	1		56	195	1	1
TOTALS	2	14	1	18	3	1	6	126	360	2	2

ITEM	6010-6004	6058-6001	6185-6002	6437-6001	6437-6002	6437-6004	6437-6005	6437-6006	6505-6001	6505-6002
INTERSECTION	CCTV MOUNT (POLE)	BBU SYSTEM (EXTERNAL BATT CABINET)	TMA (STATIONARY)	FEDS PROCESSOR UNIT	FEDS FISH EYE CAMERA ASSEMBLY	LIFETIME FEDS DATA COLLECT & REPORTING	FEDS ETHERNET REPEATER	FEDS COMM CABLE (ETHERNET - CAT5E)	ILSN (LED) (6 D)	ILSN (LED) (8 D)
	EA	EA	DAY	EA	EA	EA	EA	LF	EA	EA
Goliad and Clark	1	1	3	1	2	2	2	480	2	2
Pleasanton and Harding	1	1	4	1	1	1	1	145	2	2
TOTALS	2	2	7	2	3	3	3	625	4	4

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

QUANTITY SUMMARY

GENERAL

SHEET 1 OF 2

	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	6	TEXAS	STP 2024(389)HESG			CS
	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
	SA	BEXAR	915	12	696,ETC	11

Plotted on: 8/28/2023

Design Filename: P:\122\17\06\Design\Civil\Summaries\12217_06_SUM_TSIG.dgn

Plotted on: 8/28/2023

Design Filename: P:\122\17\06\Design\Civil\Summaries\12217_06_LEGACY_QTY.dgn

SUMMARY OF QUANTITIES
PECAN VALLEY DR AT GOLIAD RD

ITEM	CODE	DESCRIPTION	UNIT	TOTAL QUANTITY
100	6002	PREPARING ROW	STA	1
104	6015	REMOVING CONC (SIDEWALKS)	SY	50
104	6021	REMOVING CONC (CURB)	LF	130
416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	11
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	39
502	6001	BARRICADES, SIGNS, AND TRAFFIC HANDLING	EA	2
529	6001	CONC CURB (TY I)	LF	96
529	6015	CONC CURB (TY C1)	LF	72
531	6003	CONC SIDEWALKS (6")	SY	51
531	6022	CURB RAMPS (TY 5)	SY	51
618	6046	CONDT (PVC) (SCH 80) (2")	LF	340
618	6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	545
618	6053	CONDT (PVC) (SCH 80) (3")	LF	260
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	785
620	6007	ELEC CONDR (NO.8) BARE	LF	1870
620	6009	ELEC CONDR (NO.6) BARE	LF	60
620	6010	ELEC CONDR (NO.6) INSULATED	LF	60
621	6002	TRAY CABLE (3 CONDR) (12 AWG)	LF	580
624	6009	GROUND BOX TY D (162922)	EA	5
624	6010	GROUND BOX TY D (162922)W/APRON	EA	1
628	6167	ELC SRV TY D 120/240 070(NS)AL(E)TP(O)	EA	1
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	524
666	6162	RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL)	LF	1600
666	6225	PAVEMENT SEALER 6"	LF	1600
666	6230	PAVEMENT SEALER 24"	LF	524
678	6002	PAV SURF PREP FOR MRK (6")	LF	1600
678	6008	PAV SURF PREP FOR MRK (24")	LF	524
680	6003	INSTALL HWY TRF SIG (SYSTEM)	EA	1
	**	TRAFFIC SIGNAL CONTROLLER ASSEMBLY	EA	1
	**	TRAFFIC SIGNAL CONTROLLER FOUNDATION	EA	1
	**	ROD. 5/8" X 10' COPPER GROUND (CONTROLLER ONLY	EA	1
	**	R10-12 SIGN (30" X 36")	EA	2
	**	R10-17T SIGN (30"X30")	EA	2
680	6004	REMOVING TRAFFIC SIGNALS	EA	1
682	6001	VEH SIG SEC (12")LED(GRN)	EA	8
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4
682	6003	VEH SIG SEC (12")LED(YEL)	EA	8
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	6
682	6005	VEH SIG SEC (12")LED(RED)	EA	8
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	2
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	8
682	6049	BACKPLATE W/REFL BRFR(4 SEC)	EA	2
682	6050	BACKPLATE W/REFL BRFR(5 SEC)	EA	2
682	6060	BACKPLATE W/REFL BRFR(3 SEC)	EA	6
684	6030	TRF SIG CBL (TY A)(14 AWG)(4 CONDR)	LF	725
684	6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	2545
684	6049	TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	LF	1200
686	6036	INS TRF SIG PL AM(S)1 ARM(32')LUM&ILSN	EA	1
686	6044	INS TRF SIG PL AM(S)1 ARM(40')LUM&ILSN	EA	2
686	6046	INS TRF SIG PL AM(S)1 ARM(44')ILSN	EA	1
687	6001	PED POLE ASSEMBLY	EA	7
	**	DRILL SHAFT(24")	LF	42
688	6001	PED DETECT PUSH BUTTON (APS)	EA	8
	**	R10-4bL	EA	4
	**	R10-4bR	EA	4
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1
6001	6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	28
6004	6031	ITS COM CBL (ETHERNET)	LF	295
6010	6001	CCTV FIELD EQUIPMENT (ANALOG)	EA	1
6010	6003	CCTV FIELD CONTROLLER	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6058	6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1
6185	6002	TMA (STATIONARY)	DAY	4
6437	6001	FEDS PROCESSOR UNIT	EA	1
6437	6002	FEDS FISH EYE CAMERA ASSEMBLY	EA	1
6437	6003	FEDS ADVANCED CAMERA ASSEMBLY	EA	2
6437	6004	LIFETIME FEDS DATA COLLECT & REPORTING	EA	1
6437	6005	FEDS ETHERNET REPEATER	EA	1
6437	6006	FEDS COMM CABLE (ETHERNET - CAT5E)	LF	620
6505	6002	ILSN (LED) (8 D)	EA	4

** MATERIALS SUBSIDIARY TO PERTINENT ITEMS

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

QUANTITY SUMMARY
PECAN VALLEY DR AT GOLIAD RD

SHEET X OF XX

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
6	TEXAS	STP 2024(389)HESG			CS
DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
SA	BEXAR	915	12	696,ETC	12

Plotted on: $DATE$

ITEM	DESCRIPTION	QUANTITY	UNIT
100 6002	PREPARING ROW	1	STA
*	DRILL SHAFT(TRF SIG POLE)(24 IN)	24	LF
416 6032	DRILL SHAFT (TRF SIG POLE)(36IN)	44	LF
506 6038	TEMP SEDMT CONT FENCE(INSTALL)	100	LF
506 6039	TEMP SEDMT CONT FENCE(REMOVE)	100	LF
531 6005	CURB RAMPS (TY 2)	5	EA
531 6010	CURB RAMPS (TY 7)	1	EA
618 6046	CONDT(PVC)(SCH 80)(2")	70	LF
618 6047	CONDT(PVC)(SCH 80)(2")(BORE)	375	LF
618 6053	CONDT(PVC)(SCH 80)(3")	130	LF
618 6054	CONDT(PVC)(SCH 80)(3")(BORE)	750	LF
620 6007	ELEC CONDR (NO.8) BARE	1450	LF
620 6009	ELEC CONDR (NO.6) BARE	30	LF
620 6010	ELEC CONDR (NO.6) INSULATED	30	LF
624 6010	GROUND BOX TY D (162922)W/APRON	4	EA
628 6164	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	1	EA
666 6036	REFL PAV MRK TYI (W)8"(SLD)(100MIL)	281	LF
666 6048	REFL PAV MRK TYI (W)24"(SLD)(100MIL)	364	LF
666 6054	REFL PAV MRK TYI (W)(ARROW)(100MIL)	3	EA
666 6078	REFL PAV MRK TYI (W)(WORD)(100MIL)	3	EA
666 6162	REFL PAV MRK TYI (BLACK)6"(SHADOW)(100MIL)	1080	LF
666 6224	PAVEMENT SEALER (4")	1750	LF
666 6225	PAVEMENT SEALER (6")	1080	LF
666 6226	PAVEMENT SEALER (8")	281	LF
666 6230	PAVEMENT SEALER (24")	364	LF
666 6231	PAVEMENT SEALER (ARROW)	3	EA
666 6232	PAVEMENT SEALER (WORD)	3	EA
666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	190	LF
666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	800	LF
666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	760	LF
672 6010	REFL PAV MRKR TYII-CR	22	EA
677 6002	ELIM EXT PAV MRK & MRKS(6")	520	LF
677 6007	ELIM EXT PAV MRK & MRKS(24")	130	LF
678 6001	PAV SURF PREP FOR MRK (4")	1750	LF
678 6002	PAV SURF PREP FOR MRK (6")	1080	LF
678 6004	PAV SURF PREP FOR MRK (8")	281	LF
678 6008	PAV SURF PREP FOR MRK (24")	364	LF
678 6009	PAV SURF PREP FOR MRK (ARROW)	3	EA
678 6016	PAV SURF PREP FOR MRK (WORD)	3	EA
680 6003	INSTALL HWY TRF SIG (SYSTEM)	1	EA
**	TYPE 2070 CONTROLLER W/MAXTIME	1	EA
**	TRAFFIC SIGNAL CABINET ASSEMBLY(TYPE 332 CABINET AND FOUNDATION)	1	EA
**	ROD. 5/8"X 10' COPPER GROUND(CONTROLLER ONLY)	1	EA
**	R10-11A SIGN (30"X 36")	1	EA
**	R10-17T SIGN (30"X 30")	2	EA
680 6004	REMOVING TRAFFIC SIGNALS	1	EA
682 6001	VEH SIG SEC (12")LED(GRN)	8	EA
682 6002	VEH SIG SEC (12")LED(GRN ARW)	2	EA
682 6003	VEH SIG SEC (12")LED(YEL)	8	EA
682 6004	VEH SIG SEC (12")LED(YEL ARW)	2	EA
682 6005	VEH SIG SEC (12")LED(RED)	8	EA
682 6006	VEH SIG SEC (12")LED(RED ARW)	2	EA
682 6018	PED SIG SEC (LED)(COUNTDOWN)	6	EA
682 6049	BACK PLATE W/REFL BRDR (4SEC)	2	EA
682 6060	BACK PLATE W/REFL BRDR (3SEC)	8	EA
684 6030	TRF SIG CBL (TY A)(14AWG)(4CONDR)	1060	LF
684 6035	TRF SIG CBL (TY A)(14AWG)(9CONDR)	800	LF

ITEM	DESCRIPTION	QUANTITY	UNIT
684 6049	TRF SIG CBL (TY A)(16AWG)(3CONDR)	1060	LF
686 6038	INS TRF SIG PL AM(S)1 ARM(36")ILSN	2	EA
686 6049	INS TRF SIG PL AM(S)1 ARM(48")	2	EA
687 6001	PED POLE ASSEMBLY	4	EA
688 6001	PED DETECT PUSH BUTTON(APS)	6	EA
688 6003	PED DETECTOR CONTROLLER UNIT	1	EA
6001 6001	PORTABLE CHANGEABLE MESSAGE SIGN	28	DAY
6004 6031	ITS COM CBL(ETHERNET)	70	LF
6010 6001	CCTV FIELD EQUIPMENT(ANALOG)	1	EA
6010 6003	CCTV FIELD CONTROLLER	1	EA
6010 6004	CCTV MOUNT POLE	1	EA
6058 6001	BBU SYSTEM (EXTERNAL BATT CABINET)	1	EA
6505 6002	ILSN(LED)(8 D)	2	EA
6185 6002	TMA(STATIONARY)	4	DAY
6437 6001	FEDS PROCESSOR UNIT	1	EA
6437 6002	FEDS FISH EYE CAMERA ASSEMBLY	1	EA
6437 6003	FEDS ADVANCED CAMERA ASSEMBLY	2	EA
6437 6004	LIFETIME FEDS DATA COLLECT & REPORTING	1	EA
6437 6005	FEDS ETHERNET REPEATER	1	EA
6437 6006	FEDS COMM CABLE (ETHERNET - CAT5E)	590	LF

* SUBSIDIARY TO ITEM 687.

** SUBSIDIARY TO ITEM 680.

NOTES:
1. CPS ELECTRICAL SERVICE ENCLOSURE AND METTER SHALL BE PROVIDED BY THE CONTRACTOR AS PER DETAIL IN THE PLAN SET
2. TYPE 332 CABINET FOUNDATIONS SHALL BE PROVIDED BY THE CONTRACTOR AS PER DEATIAL IN THIS PLAN SET. FURNISHING THE CABINET FOUNDATION SHALL BE SUBSIDIARY TO ITEM 680.
3. INTERNAL LIGHTED STREET NAME SIGNS (ILSN) SIGNS SHALL BE PROVIDED BY THE CONTRACTOR AS PER DETAIL IN THIS PLAN SET.
4. BATTERY BACKUP SYSTEM AND CABINET SHALL BE PROVIDED BY THE CONTRACTOR AS PER DETAIL IN THIS PLAN SET.
5. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR TESTING 4 WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
6. CONSTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4583 A MINIMUM OF FOURTEEN DAYS PRIOR TO THE TRAFFIC SIGNAL TURN-ON.

REV. NO.	DATE	DESCRIPTION	BY

DOUGHERTY Engineering Group, PLLC
TBPE Firm No. F-18636

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation ©2023

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

SUMMARY SHEET

HUEBNER RD AT HUEBNER ELEMENTARY

SHEET 6 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			HUEBNER RD
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696, ETC	13

Design Filename: $FILE$

Plotted on: 7/3/2023

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN (1) PHASE. 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) WORK HOURS WILL BE FROM 9AM TO 3PM.

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

PHASE 1

(1) COORDIANTE WITH UTILITY COMPANIES ON ANY CONFLICTS AND NEW ELECTRIC SERVICES

(2) INSATALL TCP SIGNING AND BARRICADES

(3) CONSTRUCT ALL CONCRETE FLATWORK FOR PROPOSED PEDESTRIAN RAMPS. WORK ON TWO CORNERS AT A TIME PER INTERSECTION TO MAINTAIN PEDESTRIAN ROUTE THROUGH INTERSECTION

(4) INSTALL DRILL SHAFT FOUNDATIONS FOR TRAFFIC SIGNAL POLES

(5) INSTALL TRAFFIC SIGNAL POLES AND TRAFFIC SIGNAL EQUIPMENT

(6) TEST SIGNAL EQUIPMENT AND DETECTION. COORDINATE WITH THE CITY ON TIMINGS AND SIGNAL ACTIVATION

(7) REMOVE EXISTING SPAN WIRE SIGNAL AND EQUIPMENT

(8) INSTALL ANY PROPOSED PAVEMENT MARKINGS

(9) REMOVE TCP SIGNING AND BARRICADES

(10) FINAL CLEAN-UP

-

DESIGN

STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/3/2023 DATE

APPROVAL

STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/3/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

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

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

TRAFFIC CONTROL PLAN NARRATIVE

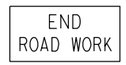
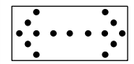
TRAFFIC CONTROL

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696, ETC	14

Design Filename: P:\122\17\06\Design\Civil\TCP\12217_06_TCP_NARR.dgn

Plotted on: 7/3/2023

TRAFFIC CONTROL PLAN ITEMS

	PROJECT LIMIT SIGNING										PHASE DEVICES	
LOCATION	 CW20SG-1 (48x48)	 R20-3T (48x42)	 G20-5aP (36x24)	 R20-5T (24x30)	 R20-5aTP PLAQUE (24x12)	 G20-5T (48x24)	 G20-6T (48x30)	 G20-2 (36x18)	 CW20-5R (48x48)	 CW20-5L (48x48)	 BARRELS	 ARROW BOARD
GOLIAD & CLARK AVE	X	X	X	X	X	X	X	X	X	X	X	X
W HARDING BLVD & PLEASONTON RD	X	X	X	X	X	X	X	X	X	X	X	X
GOLIAD & PECAN VALLEY RD	X	X	X	X	X	X	X	X	X	X	X	X
HUEBNER RD & HUEBNER ELEMENTARY SCHOOL	X	X	X	X	X	X	X	X	X	X	X	X

NOTE:

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".
2. BARRICADES AND WARNING SIGNS ON THIS SHEET ARE THE MINIMUM CONSTRUCTION ZONE, SIGNING, ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. REQUIRED IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD MAY REQUIRED IN AREAS OF ACTUAL CONSTRUCTION.
3. A DISTANCE PLAQUE IN FEET OR MILES MAY REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.
4. IMPLEMENT DETOURS IN ACCORDANCE WITH THE TEXAS MUTCD. USE CHANGEABLE MESSAGE BOARDS TO GUIDE MOTORISTS THROUGH THE DETOUR.

DESIGN

STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/3/2023 DATE

APPROVAL

STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/3/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

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

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

SCHEDULE OF BARRICADES & ADVANCED WARNING DEVICES

TRAFFIC CONTROL

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	15

Design Filename: P:\122\17\06\Design\Civil\TCP\12217_06_TCP_SOBC.dgn

LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET	FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	6185 6002 TMA/TA (STATIONARY)
		SHEET NUMBER	EA	EA	EA	DAYS PER TMA/TA USE	DAY
1	1	GOLIAD & CLARK AVE	1		1	3	3
2	1	W HARDING BLVD & PLEASONTON RD	1		1	4	4
3	1	GOLIAD & PECAN VALLEY RD	1		1	4	4
4	1	HUEBNER RD & HUEBNER ELEMENTARY SCHOOL	1		1	4	4
		TOTALS	1				15

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)

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	915	12	696,ETC	CS
	DIST	COUNTY		
	SA	BEXAR		
	FEDERAL AID PROJECT			SHEET NO.
				16

Plotted on: 7/3/2023

Design Filename: P:\122\17\06\Design\Civil\Traffic\12217_06_EXST_GOLIAD AT CLARK.dgn

TRAFFIC SIGNAL HEADS

12" LED SIGNAL SECTIONS WITH BACKPLATES		LED COUNTDOWN PEDESTRIAN SIGNALS	
1	2	W1	W10
10	2	10	

PHASE DIAGRAM

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4+8

EXISTING SIGNS

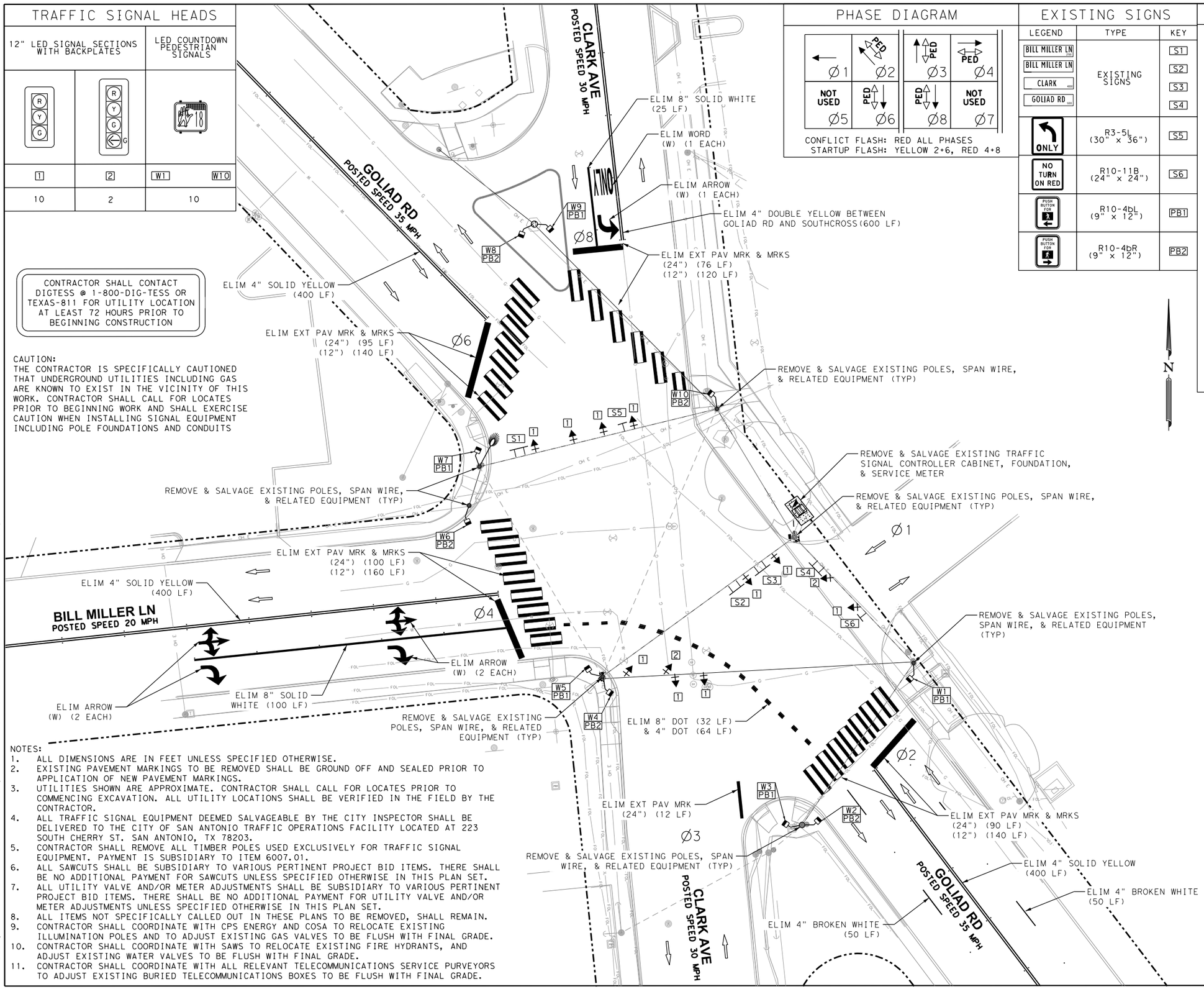
LEGEND	TYPE	KEY
BILL MILLER LN / BILL MILLER LN / CLARK / GOLIAD RD	EXISTING SIGNS	S1 / S2 / S3 / S4
ONLY	R3-5L (30" x 36")	S5
NO TURN ON RED	R10-11B (24" x 24")	S6
PUSH BUTTON FOR	R10-4bL (9" x 12")	PB1
PUSH BUTTON FOR	R10-4bR (9" x 12")	PB2

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- STREET NAME SIGN
- VIVDS
- CCTV
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- CABLE RUN (TRENCH)
- CABLE SPAN WIRE
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

CAUTION:
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS



N

NOTES:
1. ALL DIMENSIONS ARE IN FEET UNLESS SPECIFIED OTHERWISE.
2. EXISTING PAVEMENT MARKINGS TO BE REMOVED SHALL BE GROUND OFF AND SEALED PRIOR TO APPLICATION OF NEW PAVEMENT MARKINGS.
3. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
4. ALL TRAFFIC SIGNAL EQUIPMENT DEEMED SALVAGEABLE BY THE CITY INSPECTOR SHALL BE DELIVERED TO THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS FACILITY LOCATED AT 223 SOUTH CHERRY ST. SAN ANTONIO, TX 78203.
5. CONTRACTOR SHALL REMOVE ALL TIMBER POLES USED EXCLUSIVELY FOR TRAFFIC SIGNAL EQUIPMENT. PAYMENT IS SUBSIDIARY TO ITEM 6007.01.
6. ALL SAWCUTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR SAWCUTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
7. ALL UTILITY VALVE AND/OR METER ADJUSTMENTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR UTILITY VALVE AND/OR METER ADJUSTMENTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
8. ALL ITEMS NOT SPECIFICALLY CALLED OUT IN THESE PLANS TO BE REMOVED, SHALL REMAIN.
9. CONTRACTOR SHALL COORDINATE WITH CPS ENERGY AND COSA TO RELOCATE EXISTING ILLUMINATION POLES AND TO ADJUST EXISTING GAS VALVES TO BE FLUSH WITH FINAL GRADE.
10. CONTRACTOR SHALL COORDINATE WITH SAWS TO RELOCATE EXISTING FIRE HYDRANTS, AND ADJUST EXISTING WATER VALVES TO BE FLUSH WITH FINAL GRADE.
11. CONTRACTOR SHALL COORDINATE WITH ALL RELEVANT TELECOMMUNICATIONS SERVICE PURVEYORS TO ADJUST EXISTING BURIED TELECOMMUNICATIONS BOXES TO BE FLUSH WITH FINAL GRADE.

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/3/2023 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/3/2023 DATE

0 15 30 45

SCALE: 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

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HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

EXISTING CONDITIONS

GOLIAD AT CLARK AVE

SHEET 1 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	17

Plotted on: 7/12/2023

Design Filename: P:\122\17\06\Design\Civil\Traffic\12217_06_PROP_GOLIAD AT CLARK.dgn

TRAFFIC SIGNAL HEADS

	12" LED SIGNAL SECTIONS WITH BACKPLATES			LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES				
QTY KEY	1	2	3	W1 THRU W10
	10	5	2	10

PHASE DIAGRAM

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2,5,6, RED 3,4,7,8,9,10

PROPOSED SIGNS

LEGEND	TYPE	KEY
GOLIAD RD / Bill Miller / Bill Miller / GOLIAD RD	SEE ILSN SIGNING DETAILS	S1 S2 S3 S4
ONLY	R3-5L (30" x 36")	S5
NO RIGHT TURN ON RED	R10-11T (24" x 30")	S6
LEFT TURN YIELD ON FLASHING YELLOW ARROW	R10-17T (30" x 30")	S7
PUSH BUTTON FOR WALK	R10-4bR/L (9" x 12")	PB1 PB2

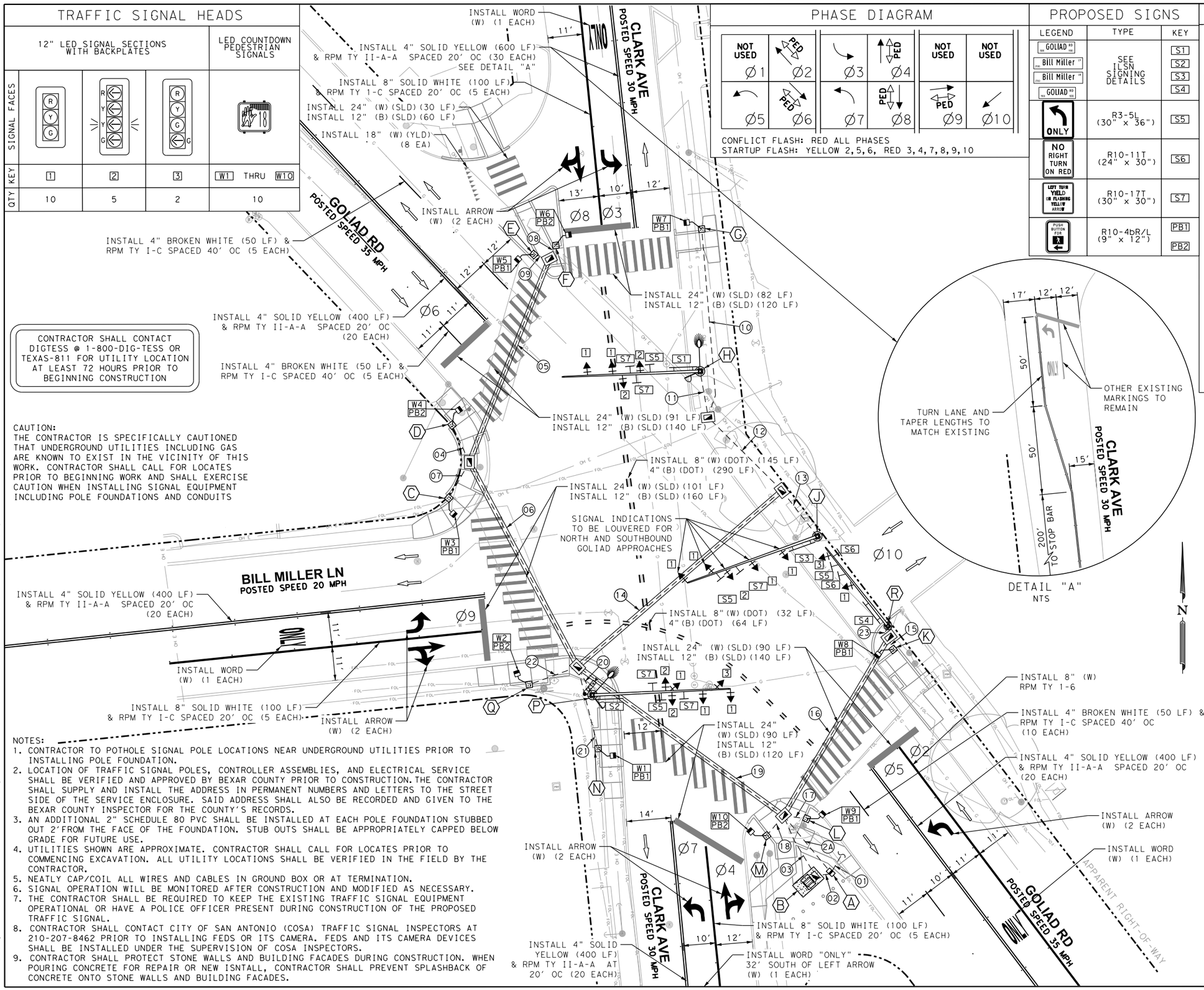
LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- ILSN
- FEDS ADVANCED DETECTION
- CCTV
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

CAUTION:
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS

NOTES:
1. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
2. LOCATION OF TRAFFIC SIGNAL POLES, CONTROLLER ASSEMBLIES, AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY BEXAR COUNTY PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE BEXAR COUNTY INSPECTOR FOR THE COUNTY'S RECORDS.
3. AN ADDITIONAL 2" SCHEDULE 80 PVC SHALL BE INSTALLED AT EACH POLE FOUNDATION STUBBED OUT 2' FROM THE FACE OF THE FOUNDATION. STUB OUTS SHALL BE APPROPRIATELY CAPPED BELOW GRADE FOR FUTURE USE.
4. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
5. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
6. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
7. THE CONTRACTOR SHALL BE REQUIRED TO KEEP THE EXISTING TRAFFIC SIGNAL EQUIPMENT OPERATIONAL OR HAVE A POLICE OFFICER PRESENT DURING CONSTRUCTION OF THE PROPOSED TRAFFIC SIGNAL.
8. CONTRACTOR SHALL CONTACT CITY OF SAN ANTONIO (COSA) TRAFFIC SIGNAL INSPECTORS AT 210-207-8462 PRIOR TO INSTALLING FEDS OR ITS CAMERA. FEDS AND ITS CAMERA DEVICES SHALL BE INSTALLED UNDER THE SUPERVISION OF COSA INSPECTORS.
9. CONTRACTOR SHALL PROTECT STONE WALLS AND BUILDING FACADES DURING CONSTRUCTION. WHEN POURING CONCRETE FOR REPAIR OR NEW ISNTALL, CONTRACTOR SHALL PREVENT SPLASHBACK OF CONCRETE ONTO STONE WALLS AND BUILDING FACADES.



DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/12/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

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HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL LAYOUT

GOLIAD AT CLARK AVE

SHEET 2 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696, ETC	18

CONDUIT AND CONDUCTOR SCHEDULE

RUN NUMBER			01	02	2A	03	04	05		06		07	08	09	10	11		12		13		14		15	16		17	18	19		20		21	22	23	
CONDUIT SIZE (INCHES)			3	2	2	3	2	3	2	3	2	2	2	2	2	3	2	3	2	3	2	3	2	2	3	2	2	2	3	2	3	2	2	2	3	2
NUMBER OF CONDUITS			1	1	1	3	1	2	1	3	1	1	1	1	1	2	1	2	1	2	1	2	1	1	2	1	1	1	2	1	2	1	1	1	1	1
LENGTH OF RUN (FT)			100	5	25	25	15	70	70	75	75	15	5	5	65	15	15	35	35	20	20	90	90	15	70	70	10	10	85	85	10	10	30	20	5	5
TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL (A)			T	T	T	T	T	B	B	B	B	T	T	T	T	T	T	T	T	T	T	B	B	T	B	B	T	T	B	B	T	T	T	T	T	T
CABLE	CIRCUIT		NUMBER OF CONDUCTORS																																	
#6 XHHW	120 POWER HOT			1																															
	120 POWER COMMON			1																															
#6 BARE	GROUND (ELECTRIC SERVICE)			1																															
#8 BARE	BARE BOND GROUND				1	3	1	2	1	3	1	1	1	1	1	2	1	2	1	2	1	2	1	1	2	1	1	1	3	1	2	1	1	1	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø 2+5				2														2		2							2							
		ø 4+7				3										1		1				1							3		2					
		ø 6				1														1		1							1							
		ø 8+3				3										2		2				2							3		1					
		ø 9				1																			1										1		
		ø 10				1																							1		1					
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE C				1				1		1																	1							
		POLE D				1	1			1																			1							
		POLE E				1		1		1																			1							
		POLE F				1		1		1			1																1							
		POLE G				1									1			1				1							1							
		POLE K				1																		1	1											
		POLE L				1																					1									
		POLE M				1																						1								
		POLE N				1																							1				1			
		POLE Q				1																							1					1		
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE C				1				1		1																	1							
		POLE D				1	1			1																			1							
		POLE E				1		1		1																			1							
		POLE F				1		1		1			1																1							
		POLE G				1									1			1				1							1							
		POLE K				1																		1	1											
		POLE L				1																					1									
		POLE M				1																						1								
		POLE N				1																							1				1			
		POLE Q				1																							1					1		
4 COND. #14 AWG TYPE "A"	ILSN SIGNS	POLE H			1											1		1				1								1						
		POLE J			1															1		1								1						
		POLE P			1																									1		1				
		POLE R			1																					1										1
3 COND. #12 AWG TRAY	LUMINAIRES	POLE H			1											1		1				1					131			1						
		POLE P			1																									1		1				
ETHERNET	CCTV (PTZ) CAMERA	POLE P				1																							1		1					
6 COND. POWER & DATA	FEDS	POLE H				1										1		1				1							1							
		POLE P				1																							1		1					

CABLES PULLED BY ELECTRIC COMPANY

ELECTRICAL SERVICE DATA

Elec. Service ID	Electrical Service Description (see ED (5) - 14)	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole / Amp	Two - Pole Contactor Amps	Panelbd/ Load center Amp Rating	Circuit No.	Branch Ckt. Bkr. Pole / Amps	Branch Circuit Amps	KVA Load
TL-1200	ELEC SERV TY D (120/240) 100 (NS) AL (E) PS (U)	3"	3/#6	N/A	2P/70	30	100	A (Signal) B (Lum) C (ILSN)	1P/50 1P/15 1P/15	40 5 8	6.4

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER
JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED PROFESSIONAL ENGINEER
GILMER D. GASTON, P.E. — 7/12/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

CONDUIT & CONDUCTOR SCHEDULE

GOLIAD AT CLARK AVE

SHEET 3 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696, ETC	19

Plotted on: 7/12/2023

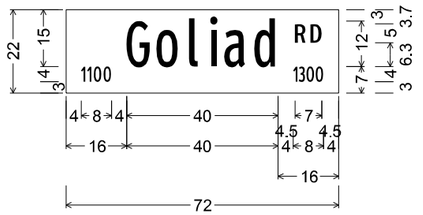
Design Filename: P:\122\17\06\Design\Civil\Traffic\12217_06_CCS_GOLIAD AT CLARK .dgn

POLE SCHEDULE

				POLE	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓙ	Ⓚ	Ⓛ	Ⓜ	Ⓝ	Ⓟ	Ⓠ	Ⓡ
				POLE TYPE (SMA/LMA/DMA/PED)	PED	PED	PED	PED	PED	SMA	SMA	PED	PED	PED	PED	SMA	PED	SMA
				POLE HEIGHT (FEET)	10	10	10	10	10	30	24	10	10	10	10	30	10	24
				MAST ARM LENGTH (FEET)	N/A	N/A	N/A	N/A	N/A	44	44	N/A	N/A	N/A	N/A	44	N/A	32
				LUMINAIRE (YES/NO)	N/A	N/A	N/A	N/A	N/A	YES	NO	N/A	N/A	N/A	N/A	YES	N/A	NO
				ILSN (YES/NO)	N/A	N/A	N/A	N/A	N/A	YES	YES	N/A	N/A	N/A	N/A	YES	N/A	YES
				ILSN ARM LENGTH (FEET)	N/A	N/A	N/A	N/A	N/A	7	9	N/A	N/A	N/A	N/A	9	N/A	7
				FOUNDATION TYPE	SPL	SPL	SPL	SPL	SPL	36-A	36-A	SPL	SPL	SPL	SPL	36-A	SPL	30-A
				FOUNDATION DEPTH (FEET)	N/A	N/A	N/A	N/A	N/A	13	13	N/A	N/A	N/A	N/A	13	N/A	11
CABLE	CIRCUIT																	
#8 BARE	BARE BOND GROUND				1	1	1	1	1	3	3	1	1	1	1	3	1	2
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	2+5								3							
		ø	4+7							1						3		
		ø	6								2							
		ø	8+3							3						1		
		ø	9															2
		ø	10													2		
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	C	1														
		POLE	D		1													
		POLE	E			1												
		POLE	F				1											
		POLE	G					1										
		POLE	K									1						
		POLE	L										1					
		POLE	M											1				
		POLE	N												1			
		POLE	Q														1	
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	C	1														
		POLE	D		1													
		POLE	E			1												
		POLE	F				1											
		POLE	G					1										
		POLE	K									1						
		POLE	L										1					
		POLE	M											1				
		POLE	N												1			
		POLE	Q														1	
4 COND. #14 AWG TYPE "A"	ILSN SIGNS	POLE	H							1								
		POLE	J								1							
		POLE	P													1		
		POLE	R															1
3 COND. #12 AWG TRAY	LUMINAIRES	POLE	H							1								
		POLE	P													1		
ETHERNET	CCTV (PTZ) CAMERA	POLE	P													1		
6 COND. POWER & DATA	FEDS	POLE	H							1								
		POLE	P													1		

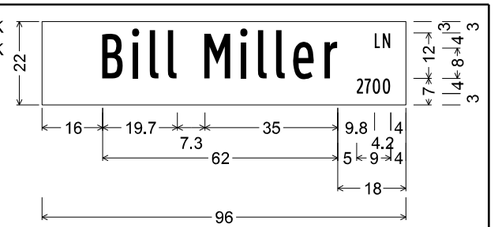
* SEE PEDESTRIAN POLE SPECIAL FOUNDATION FOR DETAILS

S1 BACK
S4 FRONT



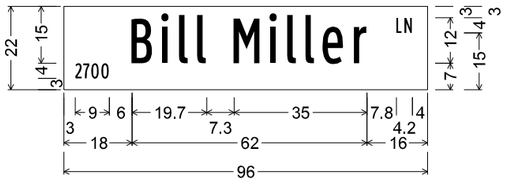
"1100" White, ClearviewHwy-1-W specified length;
No border, White on Blue;
"GOLIAD", ClearviewHwy-1-W specified length;
"RD" White, ClearviewHwy-2-W;
"1300" White, ClearviewHwy-1-W specified length;

S2 BACK
S3 BACK



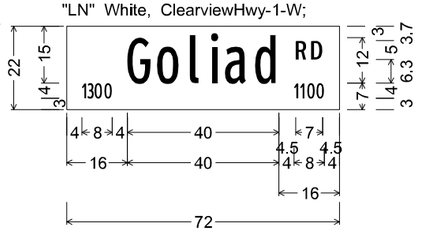
No border, White on Blue;
"Bill Miller", ClearviewHwy-1-W 96% spacing;
"LN" White, ClearviewHwy-1-W;
"2700" White, ClearviewHwy-1-W specified length;

S2 FRONT
S3 FRONT



"2700" White, ClearviewHwy-1-W specified length;
No border, White on Blue;
"Bill Miller", ClearviewHwy-1-W 96% spacing;
"LN" White, ClearviewHwy-1-W;

S1 FRONT
S4 BACK



"1100" White, ClearviewHwy-1-W specified length;
No border, White on Blue;
"GOLIAD", ClearviewHwy-1-W specified length;
"RD" White, ClearviewHwy-2-W;
"1300" White, ClearviewHwy-1-W specified length;

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
Ⓐ	PROPOSED CPS ENERGY METER WITH TXDOT TYPE D PEDESTAL SERVICE	N/A	N/A	N/A
Ⓑ	INSTALL SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH EXTERNAL BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH MAXTIME SOFTWARE ON COSA BASE-MOUNTFOUNDATION (5'X9')	N/A	N/A	N/A
Ⓒ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144513.2	13686802.3	FLUSH WITH LANDING
Ⓓ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144516.5	13686825.3	FLUSH WITH LANDING
Ⓔ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144547.9	13686876.8	FLUSH WITH LANDING
Ⓕ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144555.1	13686879.0	FLUSH WITH LANDING
Ⓖ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144601.9	13686879.6	FLUSH WITH LANDING
Ⓗ	INSTALL 30 FT SMA-80 ON 13 FT DRILLED SHAFT FOUNDATION (36-A) WITH 44 FT MAST ARM, ONE LUMINAIRE, ONE FED CAMERA, ONE ILSN, ONE R3-5L SIGN, TWO R10-17T SIGNS, AND FOUR VEHICLE SIGNAL HEADS AS ILLUSTRATED.	2144596.9	13686834.6	LEVEL WITH ROADWAY
Ⓙ	INSTALL 24 FT SMA-80 ON 13 FT DRILLED SHAFT FOUNDATION (36-A) WITH 44 FT MAST ARM, ONE ILSN, ONE R3-5L SIGN, ONE R10-17T SIGN, AND FIVE VEHICLE SIGNAL HEADS AS ILLUSTRATED.	2144656.4	13686782.4	LEVEL WITH ROADWAY
Ⓚ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144649.3	13686759.3	FLUSH WITH LANDING
Ⓛ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144616.5	13686689.3	FLUSH WITH LANDING
Ⓜ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144603.3	13686685.1	FLUSH WITH LANDING
Ⓝ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144552.6	13686718.1	FLUSH WITH LANDING
Ⓟ	INSTALL 30 FT SMA-80 ON 13 FT DRILLED SHAFT FOUNDATION (36-A) WITH 44 FT MAST ARM, ONE LUMINAIRE, ONE FED CAMERA, ONE CCTV CAMERA, ONE ILSN, ONE R3-5L SIGN, TWO R10-17T SIGNS, AND SIX VEHICLE SIGNAL HEADS AS ILLUSTRATED.	2144552.5	13686735.3	LEVEL WITH ROADWAY
Ⓠ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2144532.8	13686740.6	FLUSH WITH LANDING
Ⓡ	INSTALL 24 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A) WITH 32 FT MAST ARM, ONE ILSN, TWO R10-11T SIGNS, ONE R3-5L SIGN, AND TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED.	2144648.4	13686747.8	LEVEL WITH ROADWAY

SIGNS SHALL BE ATTACHED TO POLES AND MAST ARMS AS SHOWN ON PLANS.

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED
PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/12/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

CONDUIT & CONDUCTOR SCHEDULE

GOLIAD AT CLARK AVE

SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	20

Plotted on: 7/12/2023

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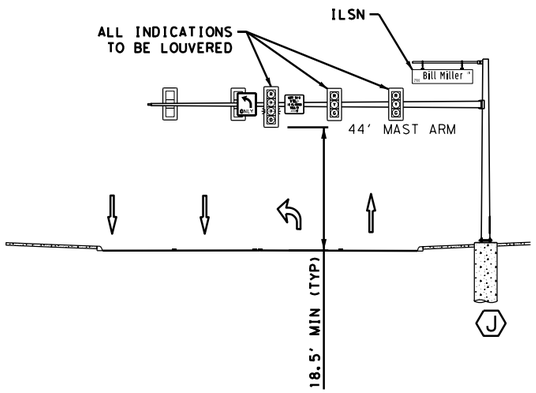
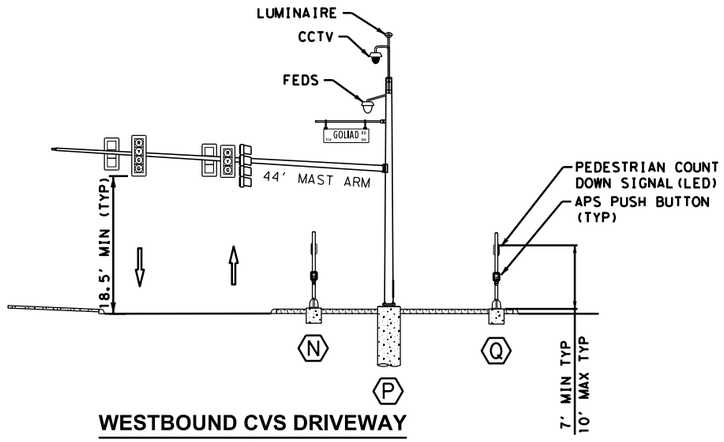


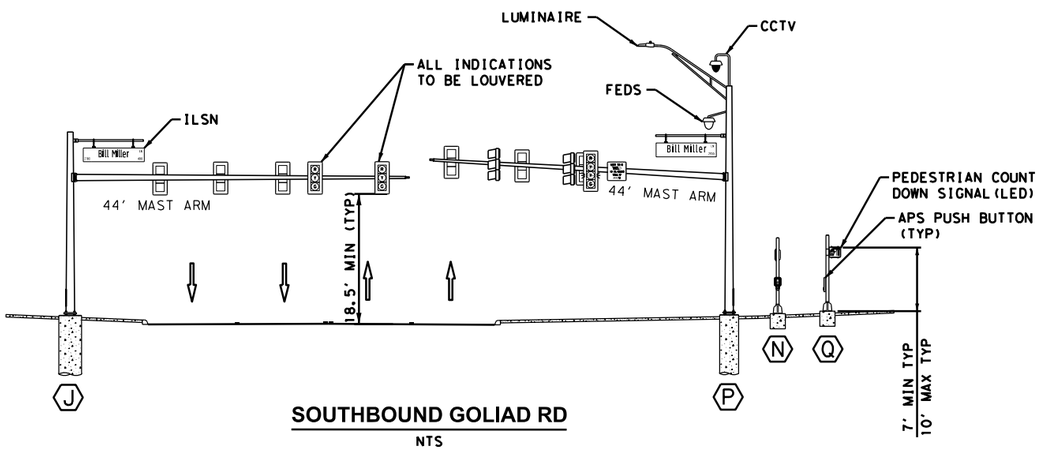
NORTHBOUND GOLIAD RD

NTS



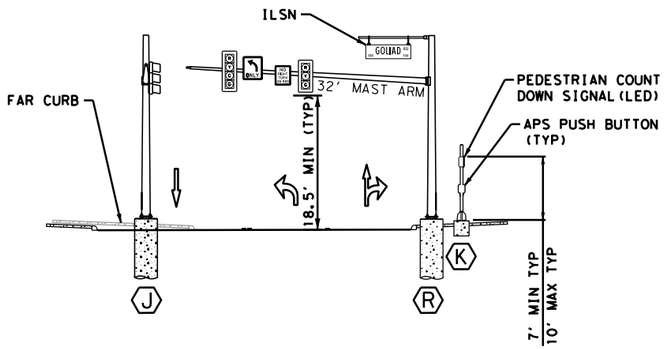
WESTBOUND CVS DRIVEWAY

NTS



SOUTHBOUND GOLIAD RD

NTS



EASTBOUND BILL MILLER LN

NTS

NOTES:
1. CONTRACTOR SHALL POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
2. MINIMUM CLEARANCE OF 10' RADIUS FROM NEUTRAL, PRIMARY, OR SECONDARY SHALL BE MAINTAINED BETWEEN PROPOSED TRAFFIC SIGNAL EQUIPMENT AND EXISTING OVERHEAD ELECTRICAL LINES.
3. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
4. SEE "SINGLE MAST ARM ASSEMBLY"(SMA-80), "LONG MAST ARM ASSEMBLY"(LMA-12), AND "DUEL MAST ARM ASSEMBLY"(DMA-80) STANDARDS FOR SIGNAL POLE AND MAST ARM DETAILS.
5. SEE "TRAFFIC SIGNAL POLE FOUNDATION"(TS-FD) AND "LONG MAST ARM ASSEMBLY"(LMA) STANDARDS FOR DRILLED SHAFT DETAILS.
6. SEE "MISCELLANEOUS TRAFFIC SIGNAL DETAILS"(MTS) STANDARD FOR PEDESTAL POLE DETAILS.
7. SIGNAL HEADS SHALL HAVE A MINIMUM OF 18.5 FEET CLEARANCE ABOVE ROADWAY SURFACE.

DESIGN

STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

APPROVAL

STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/12/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

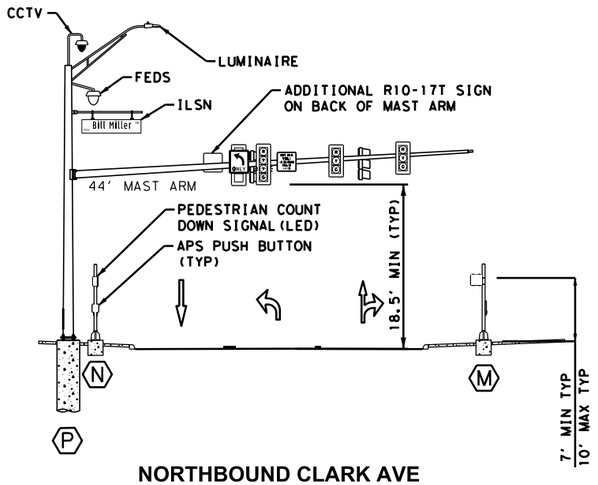
HIGHWAY SAFETY
IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL ELEVATIONS

GOLIAD AT CLARK AVE

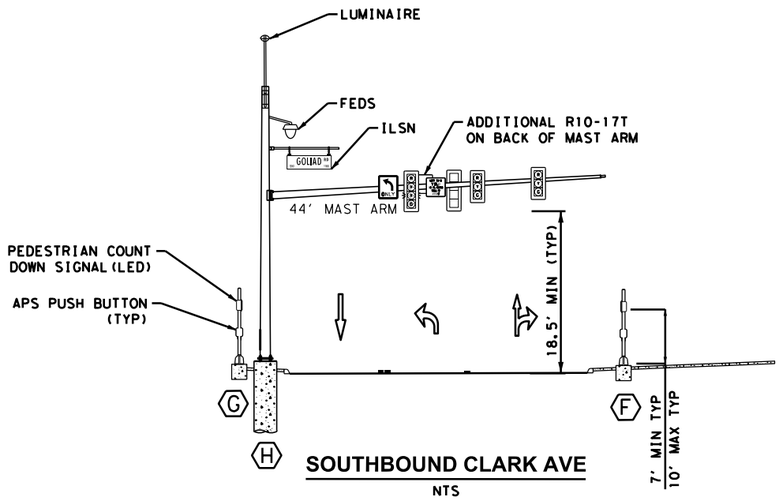
SHEET 5 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	21



NORTHBOUND CLARK AVE

NTS



SOUTHBOUND CLARK AVE

NTS

NOTES:
1. CONTRACTOR SHALL POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
2. MINIMUM CLEARANCE OF 10' RADIUS FROM NEUTRAL, PRIMARY, OR SECONDARY SHALL BE MAINTAINED BETWEEN PROPOSED TRAFFIC SIGNAL EQUIPMENT AND EXISTING OVERHEAD ELECTRICAL LINES.
3. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
4. SEE "SINGLE MAST ARM ASSEMBLY"(SMA-80), "LONG MAST ARM ASSEMBLY"(LMA-12), AND "DUEL MAST ARM ASSEMBLY"(DMA-80) STANDARDS FOR SIGNAL POLE AND MAST ARM DETAILS.
5. SEE "TRAFFIC SIGNAL POLE FOUNDATION"(TS-FD) AND "LONG MAST ARM ASSEMBLY"(LMA) STANDARDS FOR DRILLED SHAFT DETAILS.
6. SEE "MISCELLANEOUS TRAFFIC SIGNAL DETAILS"(MTS) STANDARD FOR PEDESTAL POLE DETAILS.
7. SIGNAL HEADS SHALL HAVE A MINIMUM OF 18.5 FEET CLEARANCE ABOVE ROADWAY SURFACE.

DESIGN

STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

APPROVAL

STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/12/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY
IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL ELEVATIONS

GOLIAD AT CLARK AVE

SHEET 6 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	22

Plotted on: 8/28/2023

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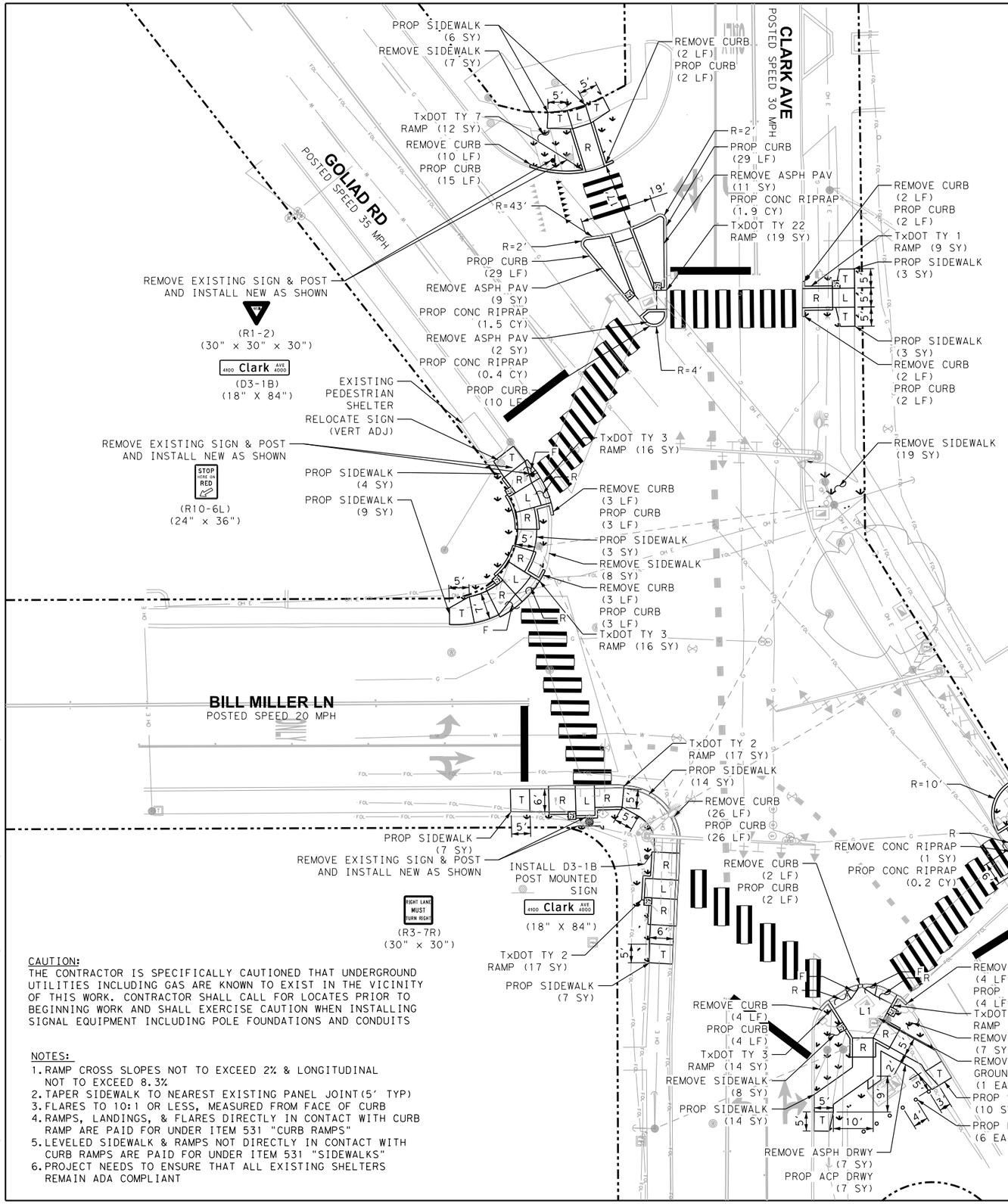


ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.0
0104-6009	REMOVING CONC (RIPRAP)	SY	1
0104-6015	REMOVING CONC (SIDEWALKS)	SY	51
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	5
0104-6029	REMOVING CONC (CURB OR CURB & GUTTER)	LF	78
0105-6037	REMOVING STAB BASE AND ASPH PAV(0"-16")	SY	29
0416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	11
0416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	39
0432-6003	RIPRAP (CONC)(6 IN)	CY	4.0
0529-6002	CONC CURB (TY II)	LF	181
0530-6005	DRIVEWAYS (ACP)	SY	7
0531-6001	CONC SIDEWALKS (4")	SY	92
0531-6018	CURB RAMPS (TY 1)	SY	9
0531-6019	CURB RAMPS (TY 2)	SY	34
0531-6020	CURB RAMPS (TY 3)	SY	60
0531-6023	CURB RAMPS (TY 6)	SY	9
0531-6024	CURB RAMPS (TY 7)	SY	12
0531-6031	CURB RAMPS (TY 22)	SY	19
0624-6010	GROUND BOX TY D (162922)W/APRON	EA	7
0628-6164	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	EA	1
0644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	4
5084-6001	FIXED BOLLARD	EA	6

LEGEND

SYMBOL	DESCRIPTION
R	RAMP
L	LANDING
T	TAPER
F	FLARE
	CONCRETE RIP-RAP

CAUTION:
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS

NOTES:
1. RAMP CROSS SLOPES NOT TO EXCEED 2% & LONGITUDINAL NOT TO EXCEED 8.3%
2. TAPER SIDEWALK TO NEAREST EXISTING PANEL JOINT(5' TYP)
3. FLARES TO 10:1 OR LESS, MEASURED FROM FACE OF CURB
4. RAMPS, LANDINGS, & FLARES DIRECTLY IN CONTACT WITH CURB RAMP ARE PAID FOR UNDER ITEM 531 "CURB RAMPS"
5. LEVELED SIDEWALK & RAMPS NOT DIRECTLY IN CONTACT WITH CURB RAMPS ARE PAID FOR UNDER ITEM 531 "SIDEWALKS"
6. PROJECT NEEDS TO ENSURE THAT ALL EXISTING SHELTERS REMAIN ADA COMPLIANT

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 8/28/2023 DATE

0 15 30 45
SCALE: 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED CURB RAMP LAYOUT

GOLIAD RD AT CLARK AVE

SHEET 7 OF 7

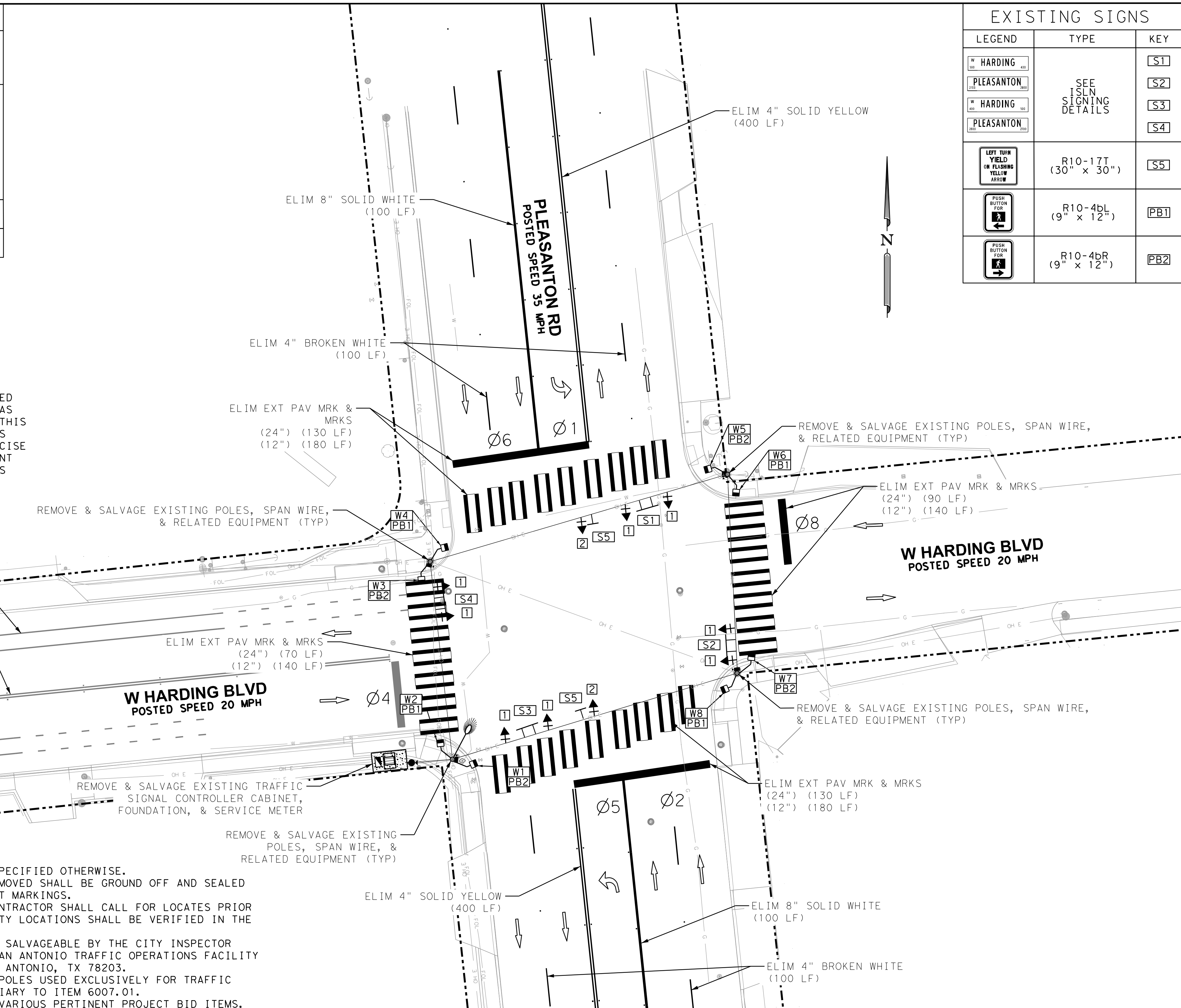
	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	6	TEXAS	STP 2024(389)HESG			CS
	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
	SA	BEXAR	915	12	696,ETC	23

TRAFFIC SIGNAL HEADS

	12" LED SIGNAL SECTIONS WITH BACKPLATES		LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	R Y Y G	18
KEY	1	2	W1 THRU W8
QTY	8	2	8

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

CAUTION:
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS



EXISTING SIGNS

LEGEND	TYPE	KEY
HARDING	SEE ISLN SIGNING DETAILS	S1
PLEASANTON		S2
HARDING		S3
PLEASANTON		S4
LEFT TURN YIELD ON FLASHING YELLOW ARROW	R10-17T (30" x 30")	S5
PUSH BUTTON FOR	R10-4bL (9" x 12")	PB1
PUSH BUTTON FOR	R10-4bR (9" x 12")	PB2

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- STREET NAME SIGN
- VIVDS
- CCTV
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- CABLE RUN (TRENCH)
- CABLE SPAN WIRE
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER

DESIGN
STATE OF TEXAS JUSTIN W. CLARK 118715 LICENSED PROFESSIONAL ENGINEER
JUSTIN W. CLARK, P.E. 7/3/2023 DATE

APPROVAL
STATE OF TEXAS GILMER D. GASTON 80472 LICENSED PROFESSIONAL ENGINEER
GILMER D. GASTON, P.E. 7/3/2023 DATE

0 15 30 45
SCALE: 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

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HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

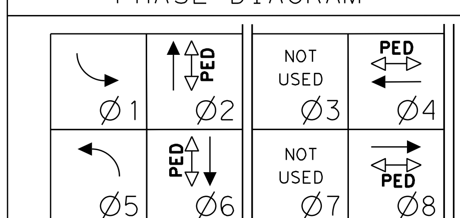
EXISTING CONDITIONS

PLEASANTON AT HARDING BLVD

SHEET 1 OF 6

	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
DGN: / CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	24

PHASE DIAGRAM



CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4+8

NOTES:
1. ALL DIMENSIONS ARE IN FEET UNLESS SPECIFIED OTHERWISE.
2. EXISTING PAVEMENT MARKINGS TO BE REMOVED SHALL BE GROUND OFF AND SEALED PRIOR TO APPLICATION OF NEW PAVEMENT MARKINGS.
3. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
4. ALL TRAFFIC SIGNAL EQUIPMENT DEEMED SALVAGEABLE BY THE CITY INSPECTOR SHALL BE DELIVERED TO THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS FACILITY LOCATED AT 223 SOUTH CHERRY ST. SAN ANTONIO, TX 78203.
5. CONTRACTOR SHALL REMOVE ALL TIMBER POLES USED EXCLUSIVELY FOR TRAFFIC SIGNAL EQUIPMENT. PAYMENT IS SUBSIDIARY TO ITEM 6007.01.
6. ALL SAWCUTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR SAWCUTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
7. ALL UTILITY VALVE AND/OR METER ADJUSTMENTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR UTILITY VALVE AND/OR METER ADJUSTMENTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
8. ALL ITEMS NOT SPECIFICALLY CALLED OUT IN THESE PLANS TO BE REMOVED, SHALL REMAIN.
9. CONTRACTOR SHALL COORDINATE WITH CPS ENERGY AND COSA TO RELOCATE EXISTING ILLUMINATION POLES AND TO ADJUST EXISTING GAS VALVES TO BE FLUSH WITH FINAL GRADE.
10. CONTRACTOR SHALL COORDINATE WITH SAWS TO RELOCATE EXISTING FIRE HYDRANTS, AND ADJUST EXISTING WATER VALVES TO BE FLUSH WITH FINAL GRADE.
11. CONTRACTOR SHALL COORDINATE WITH ALL RELEVANT TELECOMMUNICATIONS SERVICE PURVEYORS TO ADJUST EXISTING BURIED TELECOMMUNICATIONS BOXES TO BE FLUSH WITH FINAL GRADE.

Plotted on: 7/3/2023
Design Filename: P:\122\17\06\Design\Civil\Traffic\12217_06_EXST_PLEASANTON RD AT HARDING BLVD.dgn

Plotted on: 7/12/2023

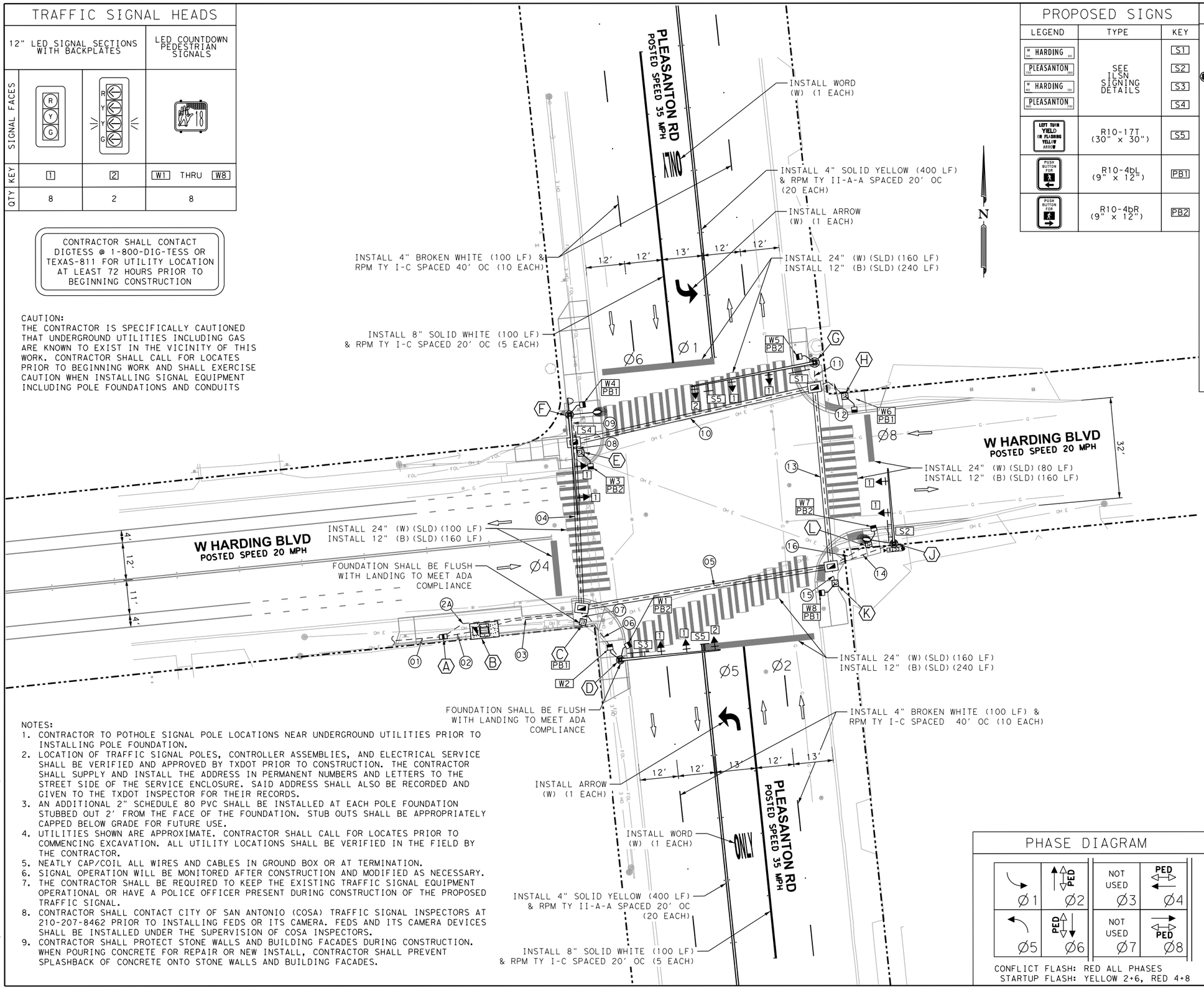
Design Filename: P:\122\17\06\Design\Civil\Traffic\12217_06_PROP_PLEASANTON RD AT HARDING BLVD.dgn

TRAFFIC SIGNAL HEADS

	12" LED SIGNAL SECTIONS WITH BACKPLATES		LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	R Y Y G	18
KEY	1	2	W1 THRU W8
QTY	8	2	8

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

CAUTION:
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS



PROPOSED SIGNS

LEGEND	TYPE	KEY
W HARDING / PLEASANTON / W HARDING / PLEASANTON	SEE ILSN SIGNING DETAILS	S1 S2 S3 S4
LEFT TURN YIELD ON FLASHING YELLOW ARROW	R10-17T (30" x 30")	S5
PUSH BUTTON FOR	R10-4bL (9" x 12")	PB1
PUSH BUTTON FOR	R10-4bR (9" x 12")	PB2

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- STREET NAME SIGN
- FEDS ADVANCED DETECTION
- CCTV
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER

NOTES:
1. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
2. LOCATION OF TRAFFIC SIGNAL POLES, CONTROLLER ASSEMBLIES, AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY TXDOT PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE TXDOT INSPECTOR FOR THEIR RECORDS.
3. AN ADDITIONAL 2" SCHEDULE 80 PVC SHALL BE INSTALLED AT EACH POLE FOUNDATION STUBBED OUT 2' FROM THE FACE OF THE FOUNDATION. STUB OUTS SHALL BE APPROPRIATELY CAPPED BELOW GRADE FOR FUTURE USE.
4. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
5. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
6. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
7. THE CONTRACTOR SHALL BE REQUIRED TO KEEP THE EXISTING TRAFFIC SIGNAL EQUIPMENT OPERATIONAL OR HAVE A POLICE OFFICER PRESENT DURING CONSTRUCTION OF THE PROPOSED TRAFFIC SIGNAL.
8. CONTRACTOR SHALL CONTACT CITY OF SAN ANTONIO (COSA) TRAFFIC SIGNAL INSPECTORS AT 210-207-8462 PRIOR TO INSTALLING FEDS OR ITS CAMERA. FEDS AND ITS CAMERA DEVICES SHALL BE INSTALLED UNDER THE SUPERVISION OF COSA INSPECTORS.
9. CONTRACTOR SHALL PROTECT STONE WALLS AND BUILDING FACADES DURING CONSTRUCTION. WHEN POURING CONCRETE FOR REPAIR OR NEW INSTALL, CONTRACTOR SHALL PREVENT SPLASHBACK OF CONCRETE ONTO STONE WALLS AND BUILDING FACADES.

PHASE DIAGRAM

Ø1	Ø2 PED	Ø3 NOT USED	Ø4 PED
Ø5	Ø6 PED	Ø7 NOT USED	Ø8 PED

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4+8

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/12/2023 DATE

0 15 30 45

SCALE: 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL LAYOUT

PLEASANTON AT HARDING BLVD

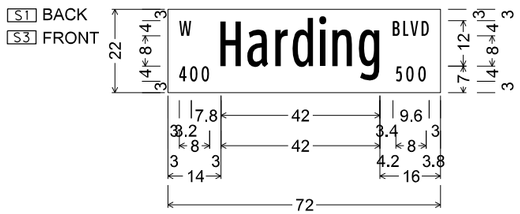
SHEET 2 OF 6

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	25

CONDUIT AND CONDUCTOR SCHEDULE

RUN NUMBER				01	02	2A	03	04		05		06		07	08	09		10		11		12	13		14		15	16
CONDUIT SIZE (INCHES)				3	2	2	3	3	2	3	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3	2	2	2
NUMBER OF CONDUITS				1	1	1	2	2	1	2	1	2	1	1	2	2	1	2	1	2	1	1	2	1	2	1	1	1
LENGTH OF RUN (FT)				100	10	50	35	55	55	85	85	25	25	5	25	10	10	80	80	10	10	10	60	60	25	25	10	15
TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL (A)				T	T	T	T	B	B	B	B	T	T	T	T	T	T	B	B	T	T	T	B	B	T	T	T	T
CABLE	CIRCUIT			NUMBER OF CONDUCTORS																								
#6 XHHW	120 POWER HOT				1																							
	120 POWER COMMON				1																							
#6 BARE	GROUND (ELECTRIC SERVICE)				1																							
#8 BARE	BARE BOND GROUND					1	2	2	1	2	1	2	1	1	2	2	1	2	1	2	1	1	2	1	2	1	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	8				1	1								1												
		ø	4				1			1															1			
		ø	2+5				2	2										2		2								
		ø	1+6				2					2																
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	D				2					2																
		POLE	E				1		1						1													
		POLE	F				1	1									1											
		POLE	G				1	1										1			1							
		POLE	H				1	1										1				1						
		POLE	K				1			1																	1	
		POLE	L				1			1																		1
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	C				1							1														
		POLE	D				1						1															
		POLE	E				1		1						1													
		POLE	F				1	1									1											
		POLE	G				1	1										1			1							
		POLE	H				1	1										1				1						
		POLE	K				1			1																	1	
		POLE	L				1			1																		1
4 COND. #14 AWG TYPE "A"	ILSN SIGNS	POLE	D			1							1															
		POLE	F			1			1								1											
		POLE	G			1			1										1		1							
		POLE	J			1					1															1		
3 COND. #12 AWG TRAY	LUMINAIRES	POLE	F			1			1								1											
		POLE	J			1					1															1		
ETHERNET	CCTV (PTZ) CAMERA	POLE	J				1			1															1			
ETHERNET	FEDS	POLE	F				1		1								1											

CABLES PULLED BY ELECTRIC COMPANY



"W" White, ClearviewHwy-1-W;
"400" White, ClearviewHwy-1-W specified length;
No border, White on Blue;
"Harding", ClearviewHwy-1-W 56% spacing;
"BLVD" White, ClearviewHwy-1-W;
"500" White, ClearviewHwy-1-W specified length;

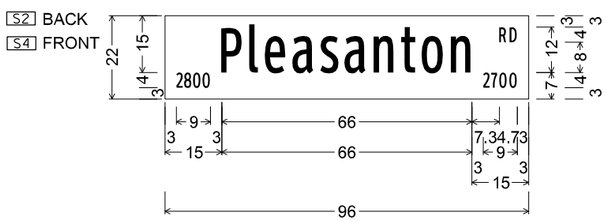
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

GILMER D. GASTON
80472
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
GILMER D. GASTON, P.E. — 7/12/2023 DATE

ELECTRICAL SERVICE DATA

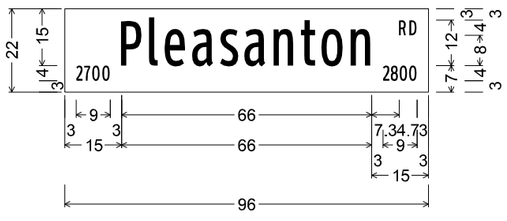
Elec. Service ID	Electrical Service Description (see ED (5) - 14)	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole / Amp	Two - Pole Contactor Amps	Panelbd/ Load center Amp Rating	Circuit No.	Branch Ckt. Bkr. Pole / Amps	Branch Circuit Amps	KVA Load
TL-500	ELEC SERV TY D (120/240) 100 (NS) AL (E) PS (U)	3"	3/#6	N/A	2P/70	30	100	A (Signal) B (Lum) C (ILSN)	1P/50 1P/15 1P/15	40 5 8	6.4

S2 BACK
S4 FRONT



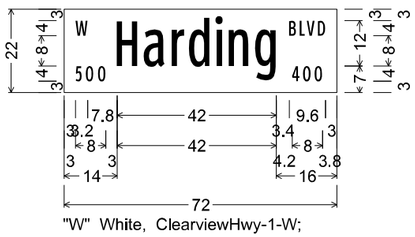
"2800" White, ClearviewHwy-1-W specified length;
No border, White on Blue;
"Pleasanton", ClearviewHwy-1-W 78% spacing;
"RD" White, ClearviewHwy-1-W;
"2700" White, ClearviewHwy-1-W specified length;

S2 FRONT
S4 BACK



"2700" White, ClearviewHwy-1-W specified length;
No border, White on Blue;
"Pleasanton", ClearviewHwy-1-W 78% spacing;
"RD" White, ClearviewHwy-1-W;
"2800" White, ClearviewHwy-1-W specified length;

S1 FRONT
S3 BACK



"W" White, ClearviewHwy-1-W;
"500" White, ClearviewHwy-1-W specified length;
No border, White on Blue;
"Harding", ClearviewHwy-1-W 56% spacing;
"BLVD" White, ClearviewHwy-1-W;
"400" White, ClearviewHwy-1-W specified length;

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
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HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

CONDUIT & CONDUCTOR SCHEDULE

PLEASANTON AT HARDING BLVD

SHEET 3 OF 6

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696, ETC	26

Plotted on: 7/12/2023

Design Filename: P:\122\17\06\Design\Civil\Traffic\122117_06_CCS_PLEASANTON RD AT HARDING BLVD.dgn

POLE SCHEDULE

				POLE	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓙ	Ⓚ	Ⓛ
				POLE TYPE (SMA/LMA/DMA/PED)	PED	SMA	PED	SMA	SMA	PED	SMA	PED	PED
				POLE HEIGHT (FEET)	5	24	10	30	24	10	30	10	10
				MAST ARM LENGTH (FEET)	N/A	32	N/A	32	40	N/A	24	N/A	N/A
				LUMINAIRE (YES/NO)	N/A	NO	N/A	YES	NO	N/A	YES	N/A	N/A
				ILSN (YES/NO)	N/A	YES	N/A	YES	YES	N/A	YES	N/A	N/A
				ILSN ARM LENGTH (FEET)	N/A	7	N/A	9	7	N/A	9	N/A	N/A
				FOUNDATION TYPE	SPL	30-A	SPL	30-A	36-A	SPL	30-A	SPL	SPL
				FOUNDATION DEPTH (FEET)	N/A	11	N/A	11	13	N/A	11	N/A	N/A
CABLE	CIRCUIT												
#8 BARE	BARE BOND GROUND				1	3	2	3	3	1	3	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	8					2					
		ø	4								2		
		ø	2*5						3				
		ø	1*6			3							
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	D			2							
		POLE	E				1						
		POLE	F					1					
		POLE	G						1				
		POLE	H							1			
		POLE	K									1	
		POLE	L										1
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	C	1									
		POLE	D			1							
		POLE	E				1						
		POLE	F					1					
		POLE	G						1				
		POLE	H							1			
		POLE	K									1	
		POLE	L										1
4 COND. #14 AWG TYPE "A"	ILSN SIGNS	POLE	D			1							
		POLE	F					1					
		POLE	G						1				
		POLE	J								1		
3 COND. #12 AWG TRAY	LUMINAIRES	POLE	F					1					
		POLE	J								1		
ETHERNET	CCTV (PTZ) CAMERA	POLE	J								1		
ETHERNET	FEDS	POLE	F					1					

* SEE PEDESTRIAN POLE SPECIAL FOUNDATION FOR DETAILS

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
Ⓐ	PROPOSED CPS ENERGY METER WITH TXDOT TYPE D PEDESTAL SERVICE	N/A	N/A	N/A
Ⓑ	INSTALL SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH EXTERNAL BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH MAXTIME SOFTWARE ON COSA BASE-MOUNTFOUNDATION (5'X9')	N/A	N/A	N/A
Ⓒ	INSTALL 5 FT BRUSHED ALUMINUM PUSH BUTTON POLE ON SPECIAL SHALLOW FOUNDATION, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126854.5	13678028.8	FLUSH WITH LANDING
Ⓓ	INSTALL 24 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A)) WITH 32 FT MAST ARM, ONE ILSN, THREE VEHICLE SIGNAL HEADS, TWO LED COUNTDOWN PEDESTRIAN SIGNAL HEADS, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126865.2	13678016.0	FLUSH WITH SIDEWALK
Ⓔ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126859.2	13678082.9	FLUSH WITH SIDEWALK
Ⓕ	INSTALL 30 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A) WITH 32 FT MAST ARM, ONE LUMINARE (LED), ONE ILSN, ONE FEDS AND TWO VEHICLE SIGNAL HEADS, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126856.9	13678095.3	LEVEL WITH ROADWAY CROWN
Ⓖ	INSTALL 24 FT SMA-80 ON 13 FT DRILLED SHAFT FOUNDATION (36-A) WITH 40 FT MAST ARM, ONE ILSN, AND THREE VEHICLE SIGNAL HEADS, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126936.2	13678104.1	LEVEL WITH ROADWAY CROWN
Ⓗ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126944.8	13678095.6	FLUSH WITH LANDING
Ⓙ	INSTALL 30 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A) WITH 24 FT MAST ARM, ONE LUMINARE (LED), ONE ILSN, ONE CCTV CAMERA AND TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED.	2126955.7	13678044.2	LEVEL WITH ROADWAY CROWN
Ⓚ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126935.8	13678033.4	FLUSH WITH SIDEWALK
Ⓛ	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4b (L OR R) SIGN AS ILLUSTRATED.	2126947.6	13678044.9	FLUSH WITH SIDEWALK

SIGNS SHALL BE ATTACHED TO POLES AND MAST ARMS AS SHOWN ON PLANS.

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER
JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED PROFESSIONAL ENGINEER
GILMER D. GASTON, P.E. — 7/12/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

CONDUIT & CONDUCTOR SCHEDULE

PLEASANTON AT HARDING BLVD

SHEET 4 OF 6

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	27

Plotted on: 7/12/2023

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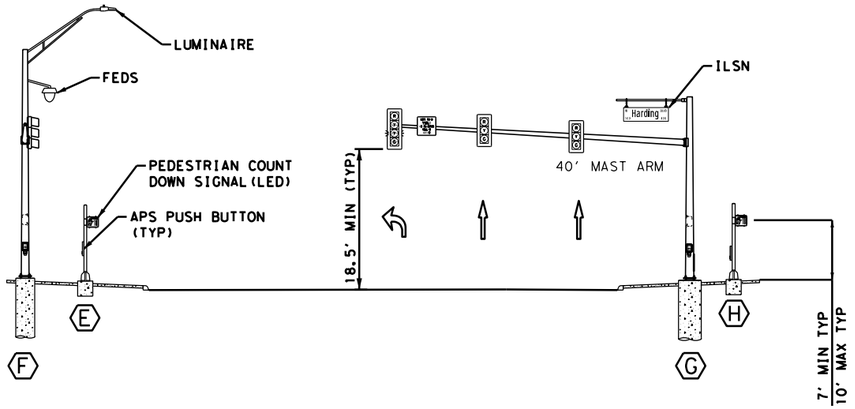
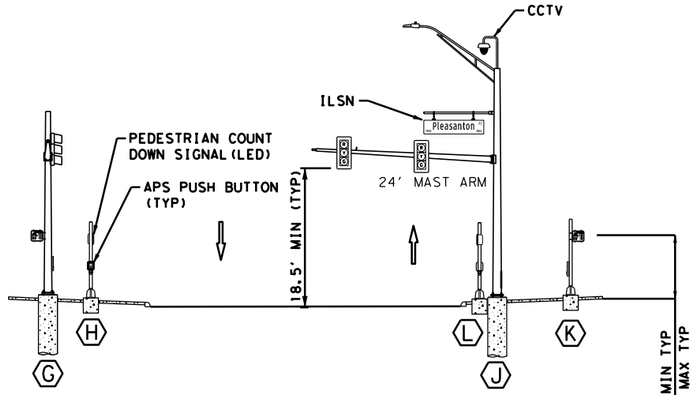


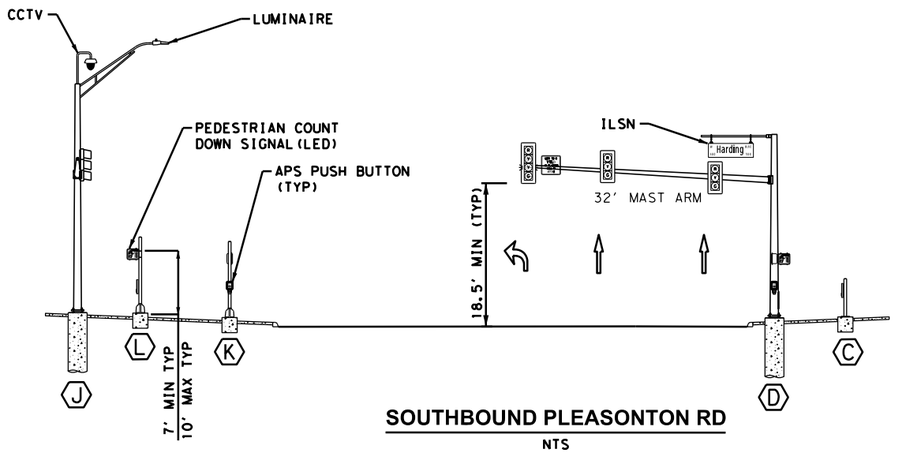
NORTHBOUND PLEASONTON RD

NTS



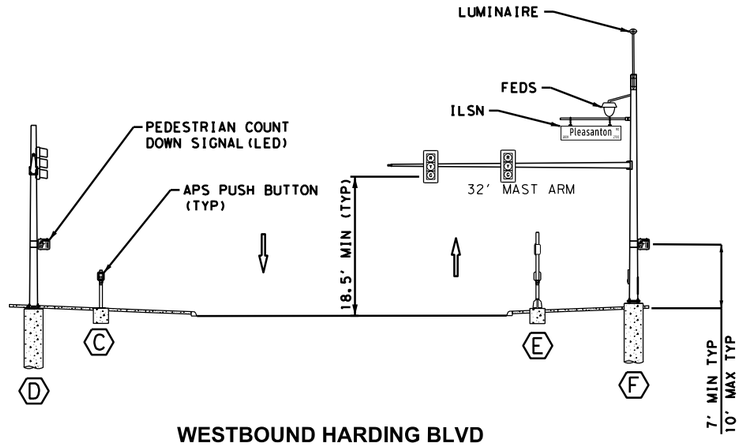
EASTBOUND HARDING BLVD

NTS



SOUTHBOUND PLEASONTON RD

NTS



WESTBOUND HARDING BLVD

NTS

NOTES:
1. CONTRACTOR SHALL POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
2. MINIMUM CLEARANCE OF 10' RADIUS FROM NEUTRAL, PRIMARY, OR SECONDARY SHALL BE MAINTAINED BETWEEN PROPOSED TRAFFIC SIGNAL EQUIPMENT AND EXISTING OVERHEAD ELECTRICAL LINES.
3. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
4. SEE "SINGLE MAST ARM ASSEMBLY"(SMA-80), "LONG MAST ARM ASSEMBLY"(LMA-12), AND "DUEL MAST ARM ASSEMBLY"(DMA-80) STANDARDS FOR SIGNAL POLE AND MAST ARM DETAILS.
5. SEE "TRAFFIC SIGNAL POLE FOUNDATION"(TS-FD) AND "LONG MAST ARM ASSEMBLY"(LMA) STANDARDS FOR DRILLED SHAFT DETAILS.
6. SEE "MISCELLANEOUS TRAFFIC SIGNAL DETAILS"(MTS) STANDARD FOR PEDESTAL POLE DETAILS.
7. SIGNAL HEADS SHALL HAVE A MINIMUM OF 18.5 FEET CLEARANCE ABOVE ROADWAY SURFACE.

DESIGN

STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/12/2023 DATE

APPROVAL

STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/12/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL ELEVATIONS

PLEASANTON AT HARDING BLVD

SHEET 5 OF 6

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	28

Plotted on: 7/12/2023

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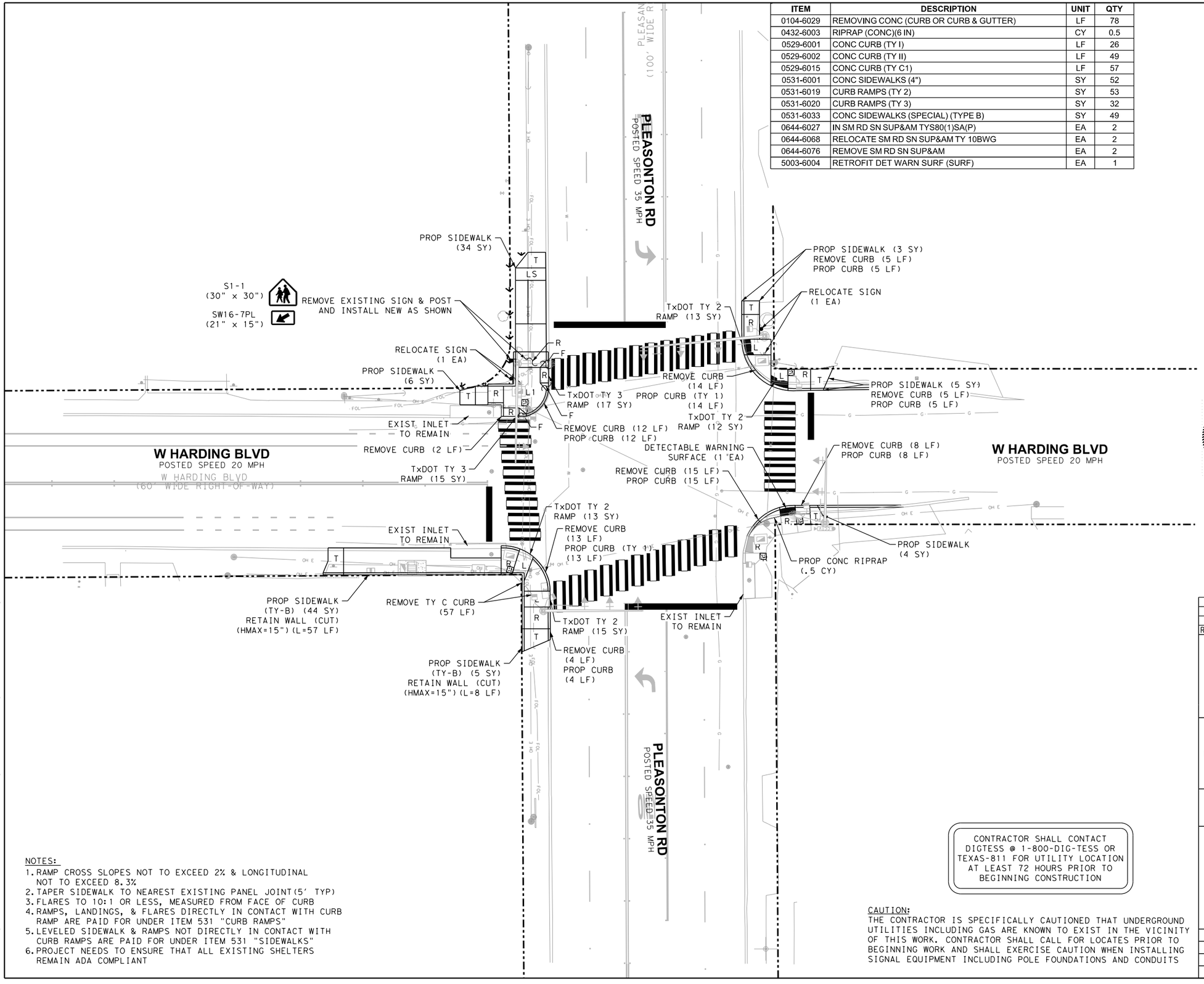
Plotted on: 8/28/2023

Design Filename: P:\122\17\06\Design\Civil\Roadway\1221706_RDWY02.dgn

ITEM	DESCRIPTION	UNIT	QTY
0104-6029	REMOVING CONC (CURB OR CURB & GUTTER)	LF	78
0432-6003	RIPRAP (CONC)(6 IN)	CY	0.5
0529-6001	CONC CURB (TY I)	LF	26
0529-6002	CONC CURB (TY II)	LF	49
0529-6015	CONC CURB (TY C1)	LF	57
0531-6001	CONC SIDEWALKS (4")	SY	52
0531-6019	CURB RAMPS (TY 2)	SY	53
0531-6020	CURB RAMPS (TY 3)	SY	32
0531-6033	CONC SIDEWALKS (SPECIAL) (TYPE B)	SY	49
0644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	2
0644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2
0644-6076	REMOVE SM RD SN SUP&AM	EA	2
5003-6004	RETROFIT DET WARN SURF (SURF)	EA	1

LEGEND

SYMBOL	DESCRIPTION
R	RAMP
L	LANDING
T	TAPER
F	FLARE
	CONCRETE RIP-RAP



0 15 30 45

SCALE: 1"= 30'

NOTES:
1. RAMP CROSS SLOPES NOT TO EXCEED 2% & LONGITUDINAL NOT TO EXCEED 8.3%
2. TAPER SIDEWALK TO NEAREST EXISTING PANEL JOINT(5' TYP)
3. FLARES TO 10:1 OR LESS, MEASURED FROM FACE OF CURB
4. RAMPS, LANDINGS, & FLARES DIRECTLY IN CONTACT WITH CURB RAMP ARE PAID FOR UNDER ITEM 531 "CURB RAMPS"
5. LEVELED SIDEWALK & RAMPS NOT DIRECTLY IN CONTACT WITH CURB RAMPS ARE PAID FOR UNDER ITEM 531 "SIDEWALKS"
6. PROJECT NEEDS TO ENSURE THAT ALL EXISTING SHELTERS REMAIN ADA COMPLIANT

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

CAUTION:
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 8/28/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED CURB RAMP LAYOUT

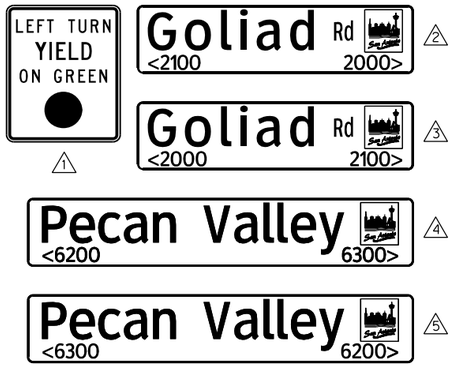
PLEASANTON RD AT W HARDING BLVD

SHEET 6 OF 6

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
6	TEXAS	STP 2024(389)HESG			CS
DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
SA	BEXAR	915	12	696,ETC	29

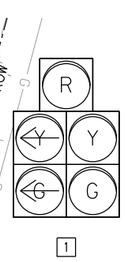
EXISTING SIGNING SCHEDULE

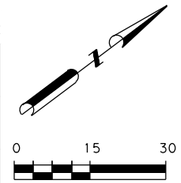
SPAN WIRE SIGNING



EXISTING SIGNAL SCHEDULE

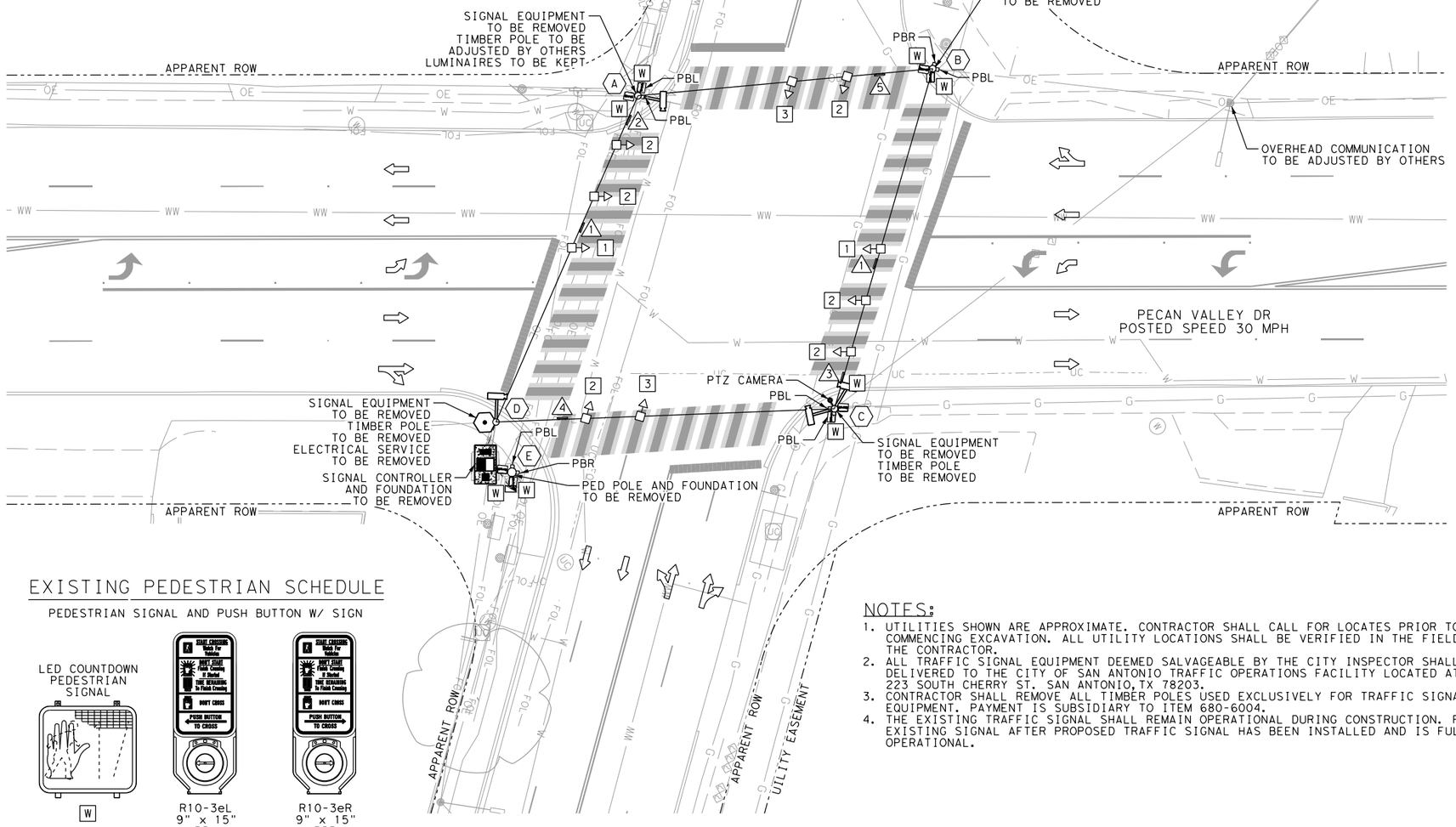
12" LED SIGN SECTIONS





LEGEND

- EXISTING TIMBER POLE
- EXISTING SIGNAL HEAD
- EXISTING SPAN WIRE
- EXISTING VIVDS CAMERA
- EXISTING PTZ CAMERA
- EXISTING PED SIGNAL HEAD
- EXISTING PED POLE
- EXISTING PUSH BUTTON
- EXISTING CONDUIT
- EXISTING GROUND BOX
- EXISTING GROUND MOUNTED COSA 332 CONTROLLER CABNIET W/ BBS
- EXISTING ELECTRICAL SERVICE
- EXISTING OVERHEAD SIGN
- EXISTING SIGN NO.
- EXISTING SIGNAL HEAD NO.
- DIRECTION OF TRAFFIC FLOW



EXISTING PEDESTRIAN SCHEDULE

PEDESTRIAN SIGNAL AND PUSH BUTTON W/ SIGN

R10-3eL
9" x 15"
PBL

R10-3eR
9" x 15"
PBR

POSTED SPEED LIMIT:
PECAN VALLEY DR = 30 MPH
GOLIAD RD = 35 MPH

NOTES:

1. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
2. ALL TRAFFIC SIGNAL EQUIPMENT DEEMED SALVAGEABLE BY THE CITY INSPECTOR SHALL BE DELIVERED TO THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS FACILITY LOCATED AT 223 SOUTH CHERRY ST. SAN ANTONIO, TX 78203.
3. CONTRACTOR SHALL REMOVE ALL TIMBER POLES USED EXCLUSIVELY FOR TRAFFIC SIGNAL EQUIPMENT. PAYMENT IS SUBSIDIARY TO ITEM 680-6004.
4. THE EXISTING TRAFFIC SIGNAL SHALL REMAIN OPERATIONAL DURING CONSTRUCTION. REMOVE EXISTING SIGNAL AFTER PROPOSED TRAFFIC SIGNAL HAS BEEN INSTALLED AND IS FULLY OPERATIONAL.

6/29/2023

REV. NO.	DATE	DESCRIPTION	BY

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.660.1960
TBPE Firm Registration No. 20623

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

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HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

EXISTING CONDITIONS

PECAN VALLEY DR AT GOLIAD RD

SHEET 1 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	30

Design Filename: P:\Municipalities Projects\COSA Projects\Pape-Dawson\Pecan Valley at Goliad TS\4 - Design\Plan Set\8. Traffic\PECAN_TRF_PR_SIGNAL.dgn Plotted on: 6/29/2023

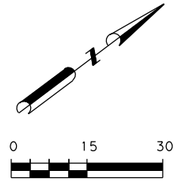
PROPOSED SIGNING SCHEDULE

MAST ARM SIGNING

1 R10-12 30" x 36" LEFT TURN YIELD ON GREEN	Goliad Rd 2100	2000	3 ILSN 22" x 96"
	Goliad Rd 2000	2100	4 ILSN 22" x 96"
2 R10-17T 30" x 30" LEFT TURN YIELD ON FLASHING YELLOW ARROW	Pecan Valley Dr 6300	6200	5 ILSN 22" x 96"
	Pecan Valley Dr 6200	6300	6 ILSN 22" x 96"

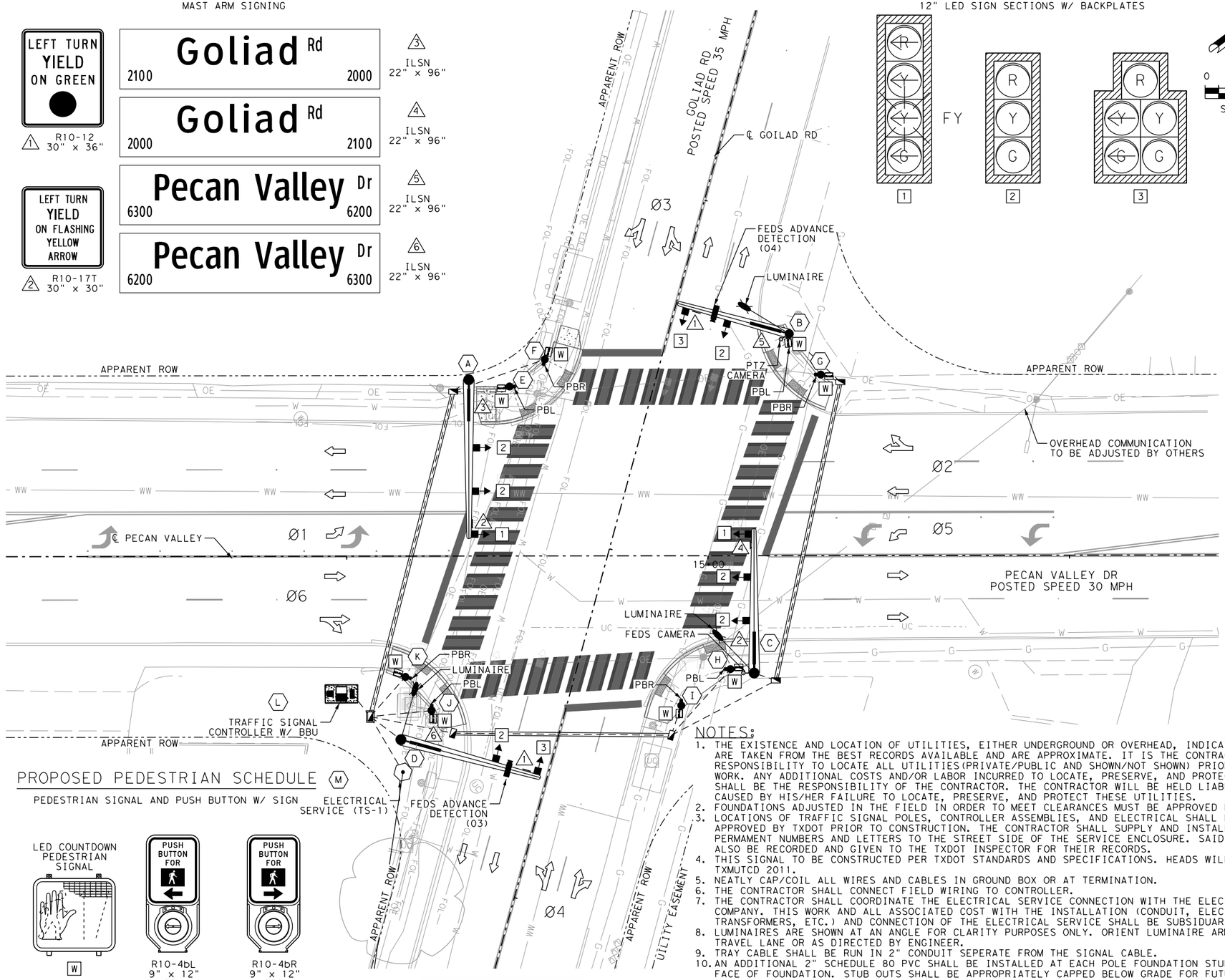
PROPOSED SIGNAL SCHEDULE

12" LED SIGN SECTIONS W/ BACKPLATES



LEGEND

- PROPOSED SIGNAL POLE & FOUNDATION
- PROPOSED SIGNAL HEAD
- PROPOSED FEDS ADVANCE DETECTION
- PROPOSED PTZ AND FEDS CAMERA
- PROPOSED ILSN W/ MAST ARM
- PROPOSED PED SIGNAL HEAD
- PROPOSED PED POLE & FOUNDATION
- PROPOSED PUSH BUTTON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- PROPOSED GROUND BOX W/ APRON
- PROPOSED GROUND BOX
- PROPOSED GROUND MOUNTED COSA 332 CONTROLLER CABNIET W/ BBS
- PROPOSED ELECTRICAL SERVICE
- PROPOSED OVERHEAD SIGN
- PROPOSED SIGN NO.
- PROPOSED SIGNAL HEAD NO.
- DIRECTION OF TRAFFIC FLOW



PROPOSED PEDESTRIAN SCHEDULE

PEDESTRIAN SIGNAL AND PUSH BUTTON W/ SIGN

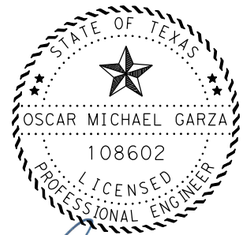
ELECTRICAL SERVICE (TS-1)

FEDS ADVANCE DETECTION (03)

POSTED SPEED LIMIT:
PECAN VALLEY DR = 30 MPH
GOLIAD RD = 35 MPH

NOTES:

1. THE EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE APPROXIMATE. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL UTILITIES(PRIVATE/PUBLIC AND SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. ANY ADDITIONAL COSTS AND/OR LABOR INCURRED TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ANY DAMAGES CAUSED BY HIS/HER FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES.
2. FOUNDATIONS ADJUSTED IN THE FIELD IN ORDER TO MEET CLEARANCES MUST BE APPROVED BY THE ENGINEER.
3. LOCATIONS OF TRAFFIC SIGNAL POLES, CONTROLLER ASSEMBLIES, AND ELECTRICAL SHALL BE VERIFIED AND APPROVED BY TXDOT PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMAMENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE TXDOT INSPECTOR FOR THEIR RECORDS.
4. THIS SIGNAL TO BE CONSTRUCTED PER TXDOT STANDARDS AND SPECIFICATIONS. HEADS WILL BE INSTALLED PER TXMUTCD 2011.
5. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
6. THE CONTRACTOR SHALL CONNECT FIELD WIRING TO CONTROLLER.
7. THE CONTRACTOR SHALL COORDINATE THE ELECTRICAL SERVICE CONNECTION WITH THE ELECTRICAL UTILITY COMPANY. THIS WORK AND ALL ASSOCIATED COST WITH THE INSTALLATION (CONDUIT, ELECTRICAL CONDUCTORS, TRANSFORMERS, ETC.) AND CONNECTION OF THE ELECTRICAL SERVICE SHALL BE SUBSIDUARY TO BID ITEM 628.
8. LUMINAIRES ARE SHOWN AT AN ANGLE FOR CLARITY PURPOSES ONLY. ORIENT LUMINAIRE ARMS PERPENDICULAR TO TRAVEL LANE OR AS DIRECTED BY ENGINEER.
9. TRAY CABLE SHALL BE RUN IN 2" CONDUIT SEPERATE FROM THE SIGNAL CABLE.
10. AN ADDITIONAL 2" SCHEDULE 80 PVC SHALL BE INSTALLED AT EACH POLE FOUNDATION STUBBED OUT 2'FROM THE FACE OF FOUNDATION. STUB OUTS SHALL BE APPROPRIATELY CAPPED BELOW GRADE FOR FUTURE USE.
11. THE CONTRACTOR SHALL BE REQUIRED TO KEEP THE EXISTING TRAFFIC SIGNAL EQUIPMENT OPERATIONAL OR HAVE A POLICE OFFICER PRESENT DURING CONSTRUCTION OF THE PROPOSED TRAFFIC SIGNAL.
12. CONTRACTOR SHALL CONTACT CITY OF SAN ANTONIO(COSA) TRAFFIC SIGNAL INSPECTORS AT 210-207-8462 PRIOR TO INSTALLING FEDS CAMERA. FEDS CAMERA DEVICES SHALL BE INSTALLED UNDER THE SUPERVISION OF COSA INSPECTORS.
13. THE TOP OF ALL PED POLE FOUNDATIONS SHALL BE INSTALLED FLUSH WITH THE SIDEWALK, FINISH SURFACE, OR AS DIRECTED BY THE TRAFFIC ENGINEER. IF PED POLE IS NOT ADJACENT TO THE SIDEWALK OR FINISH SURFACE, THE TOP OF THE FOUNDATION SHALL BE 3" ABOVE THE GROUND SURFACE.
14. SIGNAL HEADS SHALL HAVE A MINIMUM OF 18.5 FEET CLEARANCE ABOVE ROADWAY SURFACE.
15. FOR PAVEMENT MARKINGS, SEE PAVEMENT MARKING LAYOUT SHEET.



6/29/2023

REV. NO.	DATE	DESCRIPTION	BY

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.660.1960
TBPE Firm Registration No. 20623

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

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HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL LAYOUT

PECAN VALLEY DR AT GOLIAD RD

SHEET 2 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	31

Plotted on: 6/29/2023

Design Filename: P:\Municipalities Projects\COSA Projects\Pape-Dawson\Pecan Valley at Goliad TS\4 - Design\Plan Set\8. Traffic\PECAN_TRF_C&C_SCH.dgn

CONDUIT & CONDUCTOR SCHEDULE

	CONDUIT RUN NUMBER	1	2	3	3	4	4	5	6	7	7	8	8	9	10	11	11	12	12	13	13	14	14	15	16	16	17	17	18	19	TOTAL QTY
	NUMBER OF CONDUITS	-	2	2	4	1	1	1	1	2	3	3	4	1	1	2	3	1	1	2	3	1	1	1	2	3	1	1	1	1	
	CONDUIT SIZE IN INCHES	-	2	2	3	2	3	2	2	2	3	2	3	2	2	2	3	2	3	2	3	2	3	2	2	3	2	3	2	2	
	CONDUIT RUN LENGTH (FT)	-	20	10	10	15	15	20	15	25	25	65	65	10	20	30	30	10	10	85	85	20	20	10	90	90	10	10	15	25	
	RUN TYPE: T - TRENCH, B - BORE,	S	T	T	T	T	T	T	T	T	T	B	B	T	T	T	T	T	T	B	B	T	T	T	B	B	T	T	T	T	
CABLE	CIRCUIT																														
#6 XHHW	120V POWER HOT	1	1	1																											30
	120V POWER COMMON	1	1	1																											30
BARE BOND	BARE BOND GROUND #6	1	2	2																											60
	BARE BOND GROUND #8				4	1	1	1	1	2	3	3	4	1	1	2	3	1	1	2	3	1	1	1	2	3	1	1	1	1	1870
#14 9-COND. TY A STRANDED CABLE	SIGNALS																														
	POLE A - PHASE 02 & 05				2																				2		2				220
	POLE B - PHASE 04				1						1		1				1				1		1								235
	POLE C - PHASE 01 & 06				2						2		2				2		2												280
	POLE D - PHASE 03				1		1																								25
#14 9-COND. TY A STRANDED CABLE	PED. SIGNALS																														
	POLE E, K - PED PHASE 03				2				1																	1			1		140
	POLE J, I - PED PHASE 06				2			1			1		1	1																	140
	POLE H, G - PED PHASE 04				2						2		2		1		1				1			1							345
	POLE B, F - PED PHASE 02				2						1		1				1				1		1			1				1	360
#16 3-COND. TY A STRANDED CABLE	PED. PUSH BUTTON - APS																														
	POLE E, K - PED PHASE 03				2				1																	1			1		140
	POLE J, I - PED PHASE 06				2			1			1		1	1																	140
	POLE H, G - PED PHASE 04				2						2		2		1		1				1			1							345
	POLE B, F - PED PHASE 02				2						1		1				1				1		1			1				1	360
POWER & DATA CABLE	FEDS ADVANCE DETECTION																														
	POLE B - PHASE 04				1						1		1				1				1		1								235
	POLE D - PHASE 03				1		1																								25
#14 4-COND. TY A STRANDED CABLE	ILSN SIGNS																														
	POLE A - ILSN		1																						1		1				120
	POLE B - ILSN		1							1		1				1				1		1									245
	POLE C - ILSN		1							1		1				1		1													150
	POLE D - ILSN		1			1																									35
#12 3-COND. TRAY CABLE	LUMINAIRE																														
	POLE B - LUMINAIRE		1							1		1				1				1		1									245
	POLE C - LUMINAIRE		1							1		1				1		1													150
	POLE D - LUMINAIRE		1			1																									35
CAT 5E ETHERNET CABLE	CCTV CAMERA																														
	POLE B - PTZ CAMERA				1						1		1				1				1		1								235
CAT 5E ETHERNET CABLE	FEDS CAMERA																														
	POLE C - FEDS CAMERA				1						1		1				1		1												140

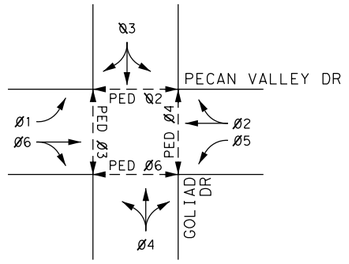
B=BORED CONDUIT (PER LIMITS SHOWN ON SIGNAL LAYOUT) T=TRENCH
RUN TRAY CABLE IN 2" CONDUIT SEPARATE FROM SIGNAL CABLE

POLE SCHEDULE

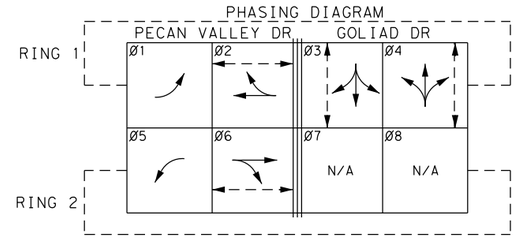
POLE	A	B	C	D	E	F	G	H	I	J	K
POLE TYPE	SMA-80	SMA-80	SMA-80	SMA-80	PED	PED	PED	PED	PED	PED	PED
POLE HEIGHT (FT)	24	30	30	30	10	10	10	10	10	10	10
MAST ARM LENGTH (FT)	44	32	40	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ILSN	YES	YES	YES	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ILSN ARM LENGTH	9	9	9	9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FOUNDATION TYPE	36-A	30-A	36-A	36-A	24-A	24-A	24-A	24-A	24-A	24-A	24-A
FOUNDATION DEPTH	13	11	13	13	6	6	6	6	6	6	6

CABLE	CIRCUIT		NUMBER OF CONDUCTORS										
#8 BARE (SOLID)			1	1	1	1	1	1	1	1	1	1	1
#14 9-COND. TY A STRANDED CABLE	TRAFFIC SIGNALS	02 & 05	1										
		04		1									
		01 & 06			1								
		03				1							
#14 9-COND. TY A STRANDED CABLE	PED SIGNALS	PED 03					1						1
		PED 06									1	1	
		PED 04							1	1			
		PED 02		1				1					
#16 3-COND. TY C STRANDED CABLE	PED PUSH BUTTON	PED 03					1						1
		PED 06									1	1	
		PED 04							1	1			
		PED 02		1				1					
#14 4-COND. TY A STRANDED CABLE	ILSN SIGNS	POLE A	1										
		POLE B		1									
		POLE C			1								
		POLE D				1							
#12 3-COND. TRAY CABLE	LUMINAIRE	POLE B		1									
		POLE C			1								
		POLE D				1							
POWER & DATA CABLE	FEDS ADVANCE DETECTION	POLE B		1									
		POLE D				1							
CAT 5E ETHERNET CABLE	PTZ CAMERA	POLE B		1									
CAT 5E ETHERNET CABLE	FEDS CAMERA	POLE C			1								

PHASING DIAGRAM

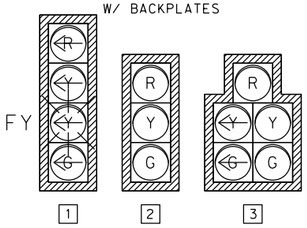


PHASING DIAGRAM



PROPOSED SIGNAL SCHEDULE

12" LED SIGN SECTIONS W/ BACKPLATES

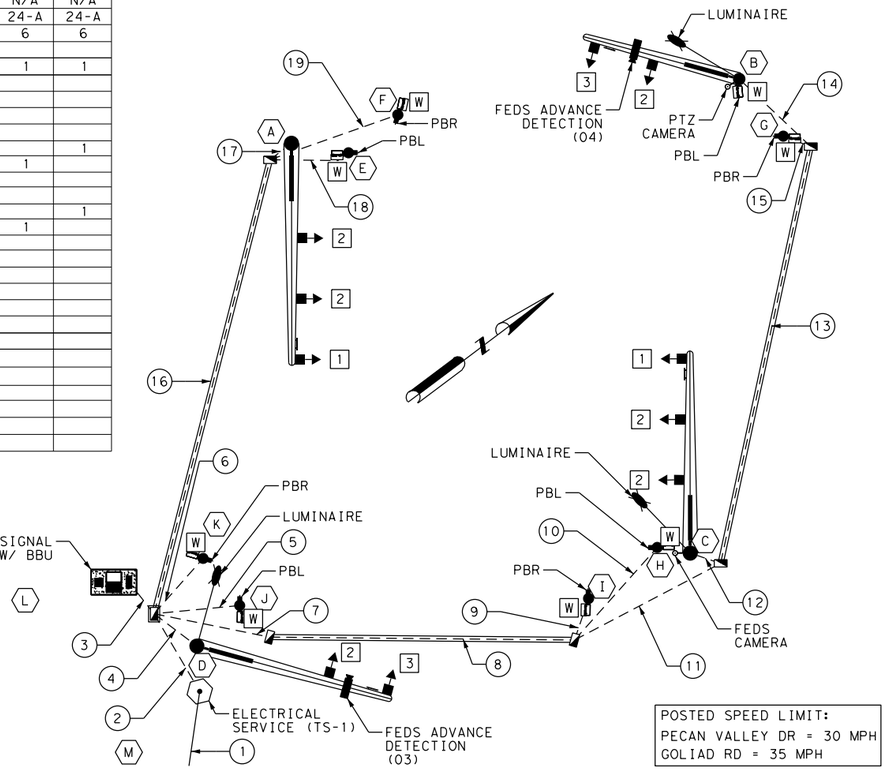


PROPOSED PEDESTRIAN SCHEDULE

PEDESTRIAN SIGNAL AND PUSH BUTTON W/ SIGN

LEGEND

- PROPOSED SIGNAL POLE & FOUNDATION
- PROPOSED SIGNAL HEAD
- PROPOSED FEDS ADVANCE DETECTION
- PROPOSED PTZ AND FEDS CAMERA
- PROPOSED ILSN W/ MAST ARM
- PROPOSED PED SIGNAL HEAD
- PROPOSED PED POLE & FOUNDATION
- PROPOSED PUSH BUTTON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- PROPOSED GROUND BOX W/ APRON
- PROPOSED GROUND BOX
- PROPOSED GROUND MOUNTED COSA 332 CONTROLLER CABNIET W/ BBS
- PROPOSED ELECTRICAL SERVICE
- PROPOSED OVERHEAD SIGN
- PROPOSED SIGNAL HEAD NO.
- CONDUIT RUN NO.
- EQUIPMENT ID.



STATE OF TEXAS
OSCAR MICHAEL GARZA
108602
LICENSED PROFESSIONAL ENGINEER
6/29/2023

REV. NO.	DATE	DESCRIPTION	BY

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.660.1960
TBPE Firm Registration No. 20623

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation ©2023

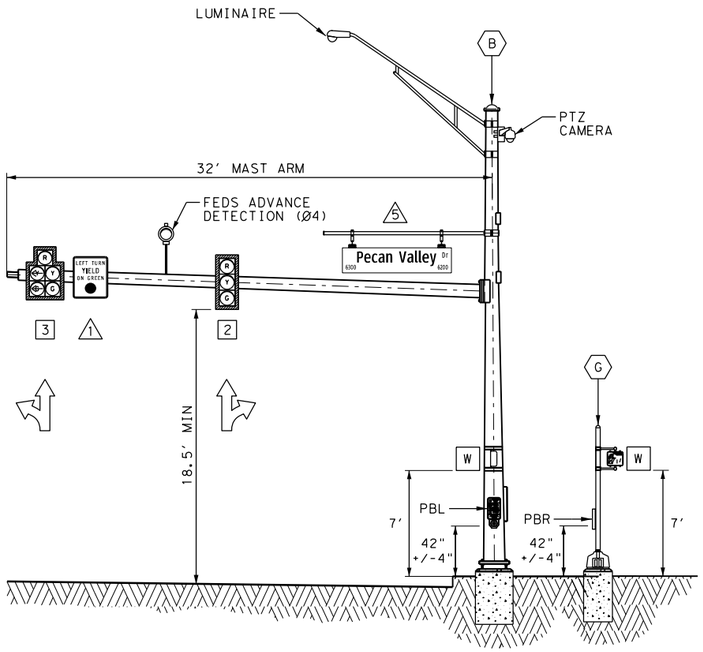
HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

CONDUIT & CONDUCTOR SCHEDULE

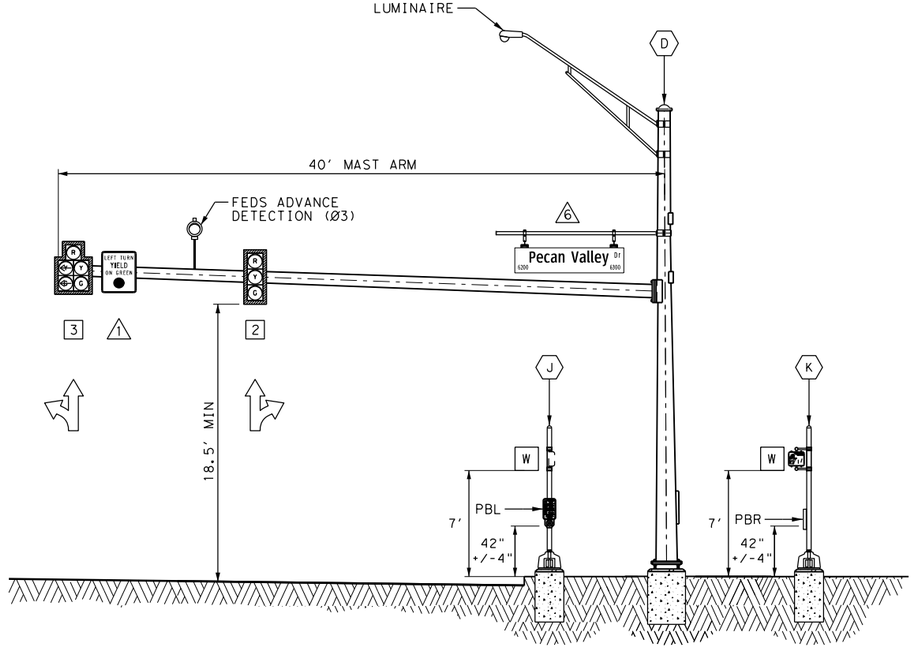
PECAN VALLEY DR AT GOLIAD RD

SHEET 3 OF 7

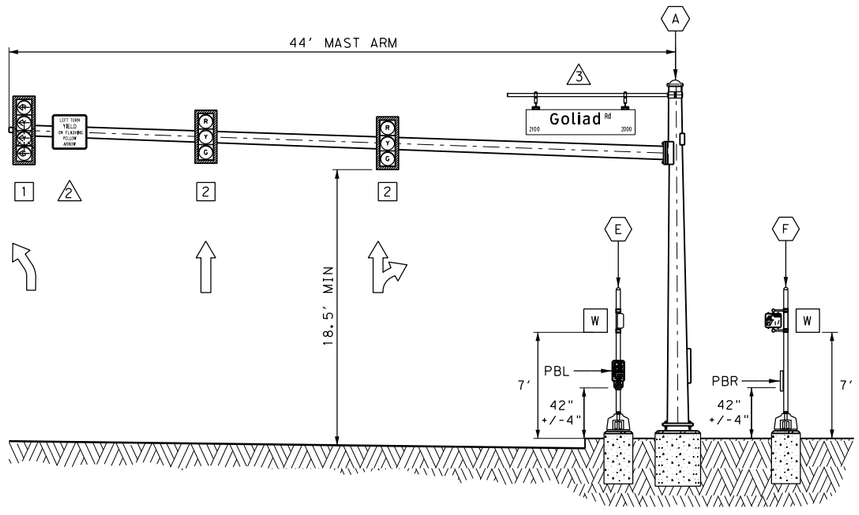
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	32



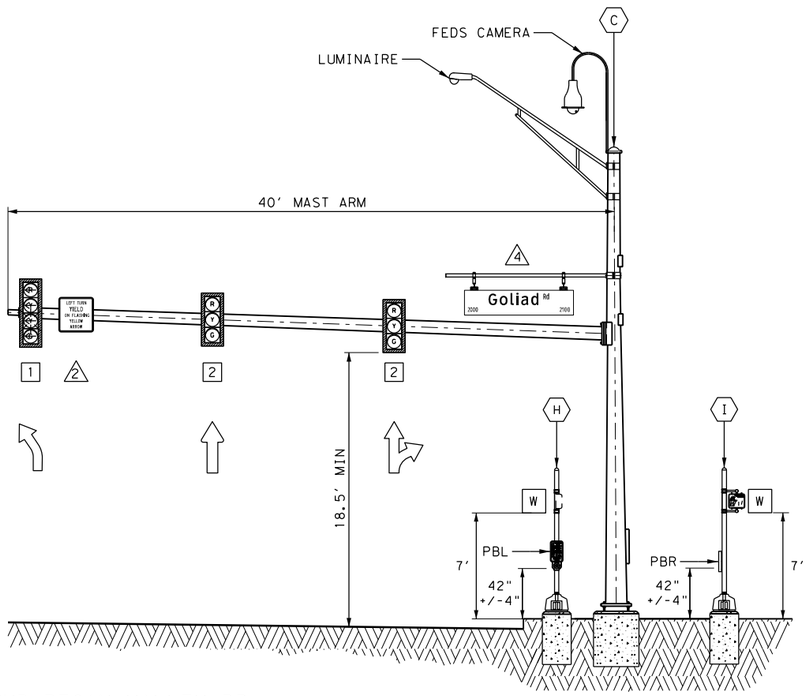
NORTHBOUND GOLIAD RD



SOUTHBOUND GOLIAD RD



WESTBOUND PECAN VALLEY DR



EASTBOUND PECAN VALLEY DR

NOTES:
1. HEADS WILL BE INSTALLED PER TMUTCD 2011.
2. FOUNDATIONS WILL BE ADJUSTED IN THE FIELD IN ORDER TO MEET CLEARANCE.
3. LOCATION OF SIGNAL HEADS ARE APPROXIMATE. ANY CHANGES WILL BE APPROVED BY THE ENGINEER.
4. MAST ARM ATTACHMENT HEIGHT WILL BE CALCULATED BY THE CONTRACTOR IN THE FIELD AND APPROVED BY THE ENGINEER.
5. PROVIDE 18.5' MIN. CLEARANCE FOR ALL SIGNAL HEADS.

STATE OF TEXAS
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6/29/2023

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

ELEVATION VIEW

PECAN VALLEY DR AT GOLIAD RD

N.T.S

SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696, ETC	33

Design Filename: P:\Municipalities Projects\COSA Projects\Pape-Dawson\Pecan Valley at Goliad TSI4 - Design\Plan Set\8. Traffic\PECAN_TRF_DETAIL.dgn Plotted on: 8/28/2023

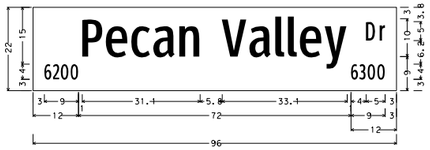
TRAFFIC SIGNAL SUMMARY OF QUANTITIES
PECAN VALLEY DR AT GOLIAD RD

ITEM	CODE	DESCRIPTION	UNIT	TOTAL QUANTITY
416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	11
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	39
618	6046	CONDT (PVC) (SCH 80) (2")	LF	340
618	6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	545
618	6053	CONDT (PVC) (SCH 80) (3")	LF	260
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	785
620	6007	ELEC CONDR (NO.8) BARE	LF	1870
620	6009	ELEC CONDR (NO.6) BARE	LF	60
620	6010	ELEC CONDR (NO.6) INSULATED	LF	60
621	6002	TRAY CABLE (3 CONDR) (12 AWG)	LF	580
624	6009	GROUND BOX TY D (162922)	EA	5
624	6010	GROUND BOX TY D (162922)W/APRON	EA	1
628	6167	ELC SRV TY D 120/240 070(NS)AL(E)TP(O)	EA	1
680	6003	INSTALL HWY TRF SIG (SYSTEM)	EA	1
	**	TRAFFIC SIGNAL CONTROLLER ASSEMBLY	EA	1
	**	TRAFFIC SIGNAL CONTROLLER FOUNDATION	EA	1
	**	ROD. 5/8" X 10' COPPER GROUND (CONTROLLER ONLY)	EA	1
	**	R10-12 SIGN (30" X 36")	EA	2
	**	R10-17T SIGN (30"X30")	EA	2
680	6004	REMOVING TRAFFIC SIGNALS	EA	1
682	6001	VEH SIG SEC (12")LED(GRN)	EA	8
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4
682	6003	VEH SIG SEC (12")LED(YEL)	EA	8
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	6
682	6005	VEH SIG SEC (12")LED(RED)	EA	8
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	2
682	6018	PED SIG SEC (LED) (COUNTDOWN)	EA	8
682	6049	BACKPLATE W/REFL BRFR(4 SEC)	EA	2
682	6050	BACKPLATE W/REFL BRFR(5 SEC)	EA	2
682	6060	BACKPLATE W/REFL BRFR(3 SEC)	EA	6
684	6030	TRF SIG CBL (TY A)(14 AWG)(4 CONDR)	LF	725
684	6035	TRF SIG CBL (TY A)(14 AWG)(9 CONDR)	LF	2545
684	6049	TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	LF	1200
686	6036	INS TRF SIG PL AM(S)1 ARM(32')LUM&ILSN	EA	1
686	6044	INS TRF SIG PL AM(S)1 ARM(40')LUM&ILSN	EA	2
686	6046	INS TRF SIG PL AM(S)1 ARM(44')ILSN	EA	1
687	6001	PED POLE ASSEMBLY	EA	7
	**	DRILL SHAFT(24")	LF	42
688	6001	PED DETECT PUSH BUTTON (APS)	EA	8
	**	R10-4bL	EA	4
	**	R10-4bR	EA	4
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1
6001	6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	28
6004	6031	ITS COM CBL (ETHERNET)	LF	295
6010	6001	CCTV FIELD EQUIPMENT (ANALOG)	EA	1
6010	6003	CCTV FIELD CONTROLLER	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6058	6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1
6185	6002	TMA (STATIONARY)	DAY	4
6437	6001	FEDS PROCESSOR UNIT	EA	1
6437	6002	FEDS FISH EYE CAMERA ASSEMBLY	EA	1
6437	6003	FEDS ADVANCED CAMERA ASSEMBLY	EA	2
6437	6004	LIFETIME FEDS DATA COLLECT & REPORTING	EA	1
6437	6005	FEDS ETHERNET REPEATER	EA	1
6437	6006	FEDS COMM CABLE (ETHERNET - CAT5E)	LF	620
6505	6002	ILSN(LED)(8S)	EA	4

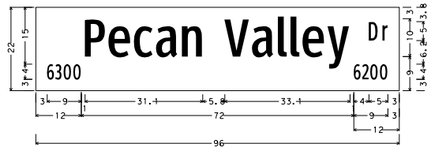
** MATERIALS SUBSIDIARY TO PERTINENT ITEMS

POLE & EQUIPMENT INFORMATION

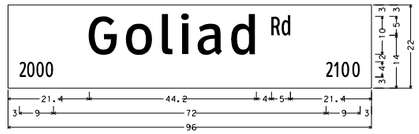
POLE	STATION	OFFSET	BASELINE	DESCRIPTION
A	14+34.00	48.75' LT	PECAN VALLEY ℄	INSTALL 24 FT SMA-80 ON 13 FT DRILLED SHAFT (36-A) W/ 44 FT MAST ARM, ONE (1) 9 FT ILSN MAST ARM W/ ILSN SIGN, ONE (1) R10-17T SIGN, AND THREE (3) VERTICAL SIGNAL HEADS AS ILLUSTRATED.
B	13+70.50	32.35' RT	GOLLIAD ℄	INSTALL 24 FT SMA-80 ON 11 FT DRILLED SHAFT (30-A) W/ 32 FT MAST ARM, ONE (1) LUMINAIRE (LED), ONE (1) 9 FT ILSN MAST ARM W/ ILSN SIGN, ONE (1) PTZ CAMERA, ONE (1) FEDS ADVANCED DETECTION CAMERA, ONE (1) R10-12 SIGN, ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE (1) APS PUSH BUTTON W/ R10-4bL SIGN AND TWO (2) VERTICAL SIGNAL HEADS AS ILLUSTRATED.
C	15+12.50	32.5' RT	PECAN VALLEY ℄	INSTALL 30 FT SMA-80 ON 13 FT DRILLED SHAFT (36-A) W/ 40 FT MAST ARM, ONE (1) LUMINAIRE (LED), ONE (1) 9 FT ILSN MAST ARM W/ ILSN SIGN, ONE (1) FEDS FISH EYE CAMERA, ONE (1) R10-17T SIGN, AND THREE (3) VERTICAL SIGNAL HEADS AS ILLUSTRATED.
D	12+34.00	41.8' LT	GOLLIAD ℄	INSTALL 30 FT SMA-80 ON 13 FT DRILLED SHAFT (36-A) W/ 40 FT MAST ARM, ONE (1) LUMINAIRE (LED), ONE (1) 9 FT ILSN MAST ARM W/ ILSN SIGN, ONE (1) FEDS ADVANCED DETECTION CAMERA, ONE (1) R10-12 SIGN, AND TWO (2) VERTICAL SIGNAL HEADS AS ILLUSTRATED.
E	14+45.00	46.9' LT	PECAN VALLEY ℄	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT (24-A) W/ ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE (1) APS PUSH BUTTON W/ R10-4bL SIGN AS ILLUSTRATED.
F	13+46.00	31.0' LT	PECAN VALLEY ℄	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT (24-A) W/ ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE (1) APS PUSH BUTTON W/ R10-4bR SIGN AS ILLUSTRATED.
G	15+31.00	50.0' LT	PECAN VALLEY ℄	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT (24-A) W/ ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE (1) APS PUSH BUTTON W/ R10-4bR SIGN AS ILLUSTRATED.
H	15+06.00	31.4' RT	PECAN VALLEY ℄	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT (24-A) W/ ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE (1) APS PUSH BUTTON W/R10-4bL SIGN AS ILLUSTRATED.
I	12+63.00	30.6' RT	GOLLIAD ℄	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT (24-A) W/ ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE (1) APS PUSH BUTTON W/R10-4bR SIGN AS ILLUSTRATED.
J	12+44.00	35.7' RT	GOLLIAD ℄	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT (24-A) W/ ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE (1) APS PUSH BUTTON W/ R10-4bL SIGN AS ILLUSTRATED.
K	14+16.50	28.9' RT	PECAN VALLEY ℄	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT (24-A) W/ ONE (1) LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE (1) APS PUSH BUTTON W/ R10-4bR SIGN AS ILLUSTRATED.
L	13+81.00	38.0' RT	PECAN VALLEY ℄	INSTALL SAN ANTONIO STANDARD MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY W/ MODEL 2070 CONTROLLER ON NEW COSA BASE-MOUNT FOUNDATION (5'X9') W/ EXTERNAL CABINET-MOUNTED BATTERY BACKUP SYSTEM.
M	13+98.00	59.5' RT	PECAN VALLEY ℄	PROPOSED TIMBER POLE AND METER W/ TXDOT TYPE D SERVICE.



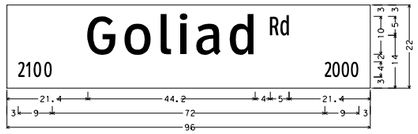
96x22;
No border, White on Blue;
"6200", ClearviewHwy-1-W specified length;
No border, White on Blue;
"Pecan Valley", ClearviewHwy-2-W specified length;
No border, White on Blue;
"Dr", ClearviewHwy-1-W specified length; "6300", ClearviewHwy-1-W specified length;



96x22;
No border, White on Blue;
"6300", ClearviewHwy-1-W specified length;
No border, White on Blue;
"Pecan Valley", ClearviewHwy-2-W specified length;
No border, White on Blue;
"Dr", ClearviewHwy-1-W specified length; "6200", ClearviewHwy-1-W specified length;



No border, Black on Blue;
"Goliad" White, ClearviewHwy-3-W; "Rd" White, ClearviewHwy-1-W specified length;
"2000" White, ClearviewHwy-1-W specified length;
"2100" White, ClearviewHwy-1-W specified length;



No border, Black on Blue;
"Goliad" White, ClearviewHwy-3-W; "Rd" White, ClearviewHwy-1-W specified length;
"2100" White, ClearviewHwy-1-W specified length;
"2000" White, ClearviewHwy-1-W specified length;

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO, SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT, BRK, POLE/AMP	TWO-POLE CONTRACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
TS-1	ELECTRICAL SERVICE TY D (120/240)070(NS)AL(E)TP(O)	2"	3/#6	N/A	2P/70	30	100	SIGNALS	1P/50	40	7.7
								LUMINAIRE	2P/15	4	
								ILSN	1P/15	8	

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

TRAFFIC SIGNAL DETAILS

PECAN VALLEY DR AT GOLIAD RD

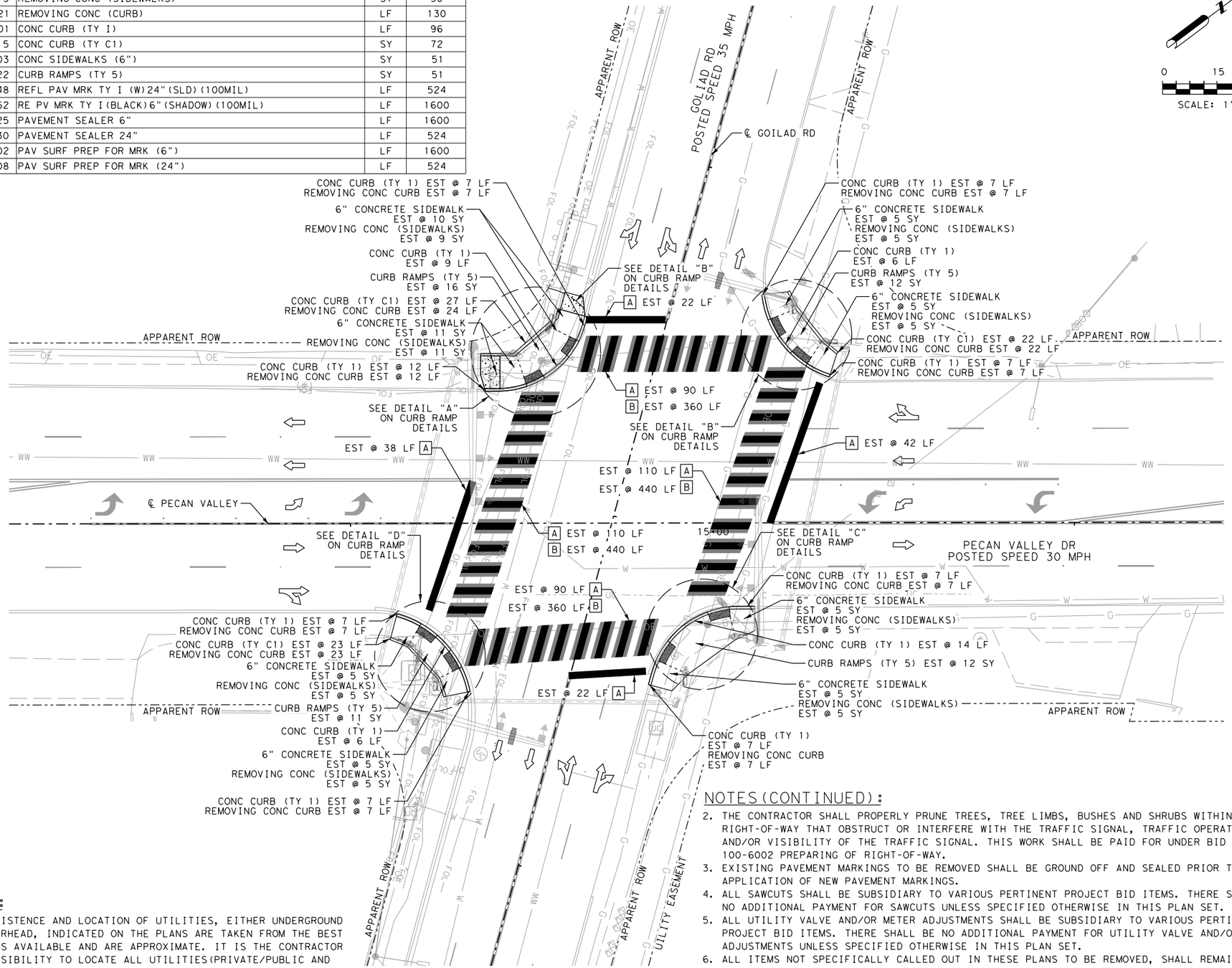
SHEET 5 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696, ETC	34

Design Filename: P:\Municipalities Projects\COSA Projects\Pape-Dawson\Pecan Valley at Goliad TS\4 - Design\Plan Set\8. Traffic\PECAN_TRF_PR_SPMD&CURB_RAMPS.dgn Plotted on: 6/29/2023

PAVEMENT MARKING & CURB RAMP SUMMARY OF QUANTITIES
PECAN VALLEY DR AT GOLIAD RD

ITEM	CODE	ITEM	UNIT	QUANTITY
100	6002	PREPARING ROW	STA	1
104	6015	REMOVING CONC (SIDEWALKS)	SY	50
104	6021	REMOVING CONC (CURB)	LF	130
529	6001	CONC CURB (TY I)	LF	96
529	6015	CONC CURB (TY C1)	SY	72
531	6003	CONC SIDEWALKS (6")	SY	51
531	6022	CURB RAMPS (TY 5)	SY	51
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	524
666	6162	RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL)	LF	1600
666	6225	PAVEMENT SEALER 6"	LF	1600
666	6230	PAVEMENT SEALER 24"	LF	524
678	6002	PAV SURF PREP FOR MRK (6")	LF	1600
678	6008	PAV SURF PREP FOR MRK (24")	LF	524



0 15 30
SCALE: 1"=30'

LEGEND

- A — PAV MARK WHITE 24" SOLID
- B — PAV MARK BLACK 6" SOLID (SHADOW)
- PROPOSED DETECTABLE WARNING SURFACE
- PROPOSED 6" CONCRETE SIDEWALK
- PROPOSED CONCRETE CURB
- APPARENT ROW
- EXISTING TRAFFIC FLOW

NOTES:

1. THE EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE APPROXIMATE. IT IS THE CONTRACTOR RESPONSIBILITY TO LOCATE ALL UTILITIES(PRIVATE/PUBLIC AND SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. ANY ADDITIONAL COSTS AND/OR LABOR INCURRED TO LOCATE,PRESERVE, OR PROTECT THESE UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE LIABLE FOR ANY DAMAGES CAUSED BY HIS/HER FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES.

NOTES(CONTINUED):

2. THE CONTRACTOR SHALL PROPERLY PRUNE TREES, TREE LIMBS, BUSHES AND SHRUBS WITHIN THE CITY RIGHT-OF-WAY THAT OBSTRUCT OR INTERFERE WITH THE TRAFFIC SIGNAL, TRAFFIC OPERATIONS, AND/OR VISIBILITY OF THE TRAFFIC SIGNAL. THIS WORK SHALL BE PAID FOR UNDER BID ITEM 100-6002 PREPARING OF RIGHT-OF-WAY.
3. EXISTING PAVEMENT MARKINGS TO BE REMOVED SHALL BE GROUND OFF AND SEALED PRIOR TO APPLICATION OF NEW PAVEMENT MARKINGS.
4. ALL SAWCUTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR SAWCUTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
5. ALL UTILITY VALVE AND/OR METER ADJUSTMENTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR UTILITY VALVE AND/OR METER ADJUSTMENTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
6. ALL ITEMS NOT SPECIFICALLY CALLED OUT IN THESE PLANS TO BE REMOVED, SHALL REMAIN.
7. CONTRACTOR SHALL COORDINATE WITH CPS ENERGY AND COSA TO RELOCATE AND/OR ADJUST EXISTING ILLUMINATION POLES AND TO ADJUST EXISTING GAS VALVES TO BE FLUSH WITH FINAL GRADE.
8. CONTRACTOR SHALL COORDINATE WITH SAWS TO RELOCATE EXISTING FIRE HYDRANTS, AND ADJUST EXISTING WATER VALVES TO BE FLUSH WITH FINAL GRADE.
9. CONTRACTOR SHALL COORDINATE WITH RELEVANT TELECOMMUNICATIONS SERVICE PURVEYORS TO ADJUST EXISTING BURIED TELECOMMUNICATION BOXES TO BE FLUSH WITH FINAL GRADE.

STATE OF TEXAS
OSCAR MICHAEL GARZA
108602
LICENSED PROFESSIONAL ENGINEER
6/29/2023

REV. NO.	DATE	DESCRIPTION	BY

LEGACY ENGINEERING GROUP

Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.660.1960
TBPE Firm Registration No. 20623

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

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HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED PAVEMENT MARKING & CURB RAMP LAYOUT

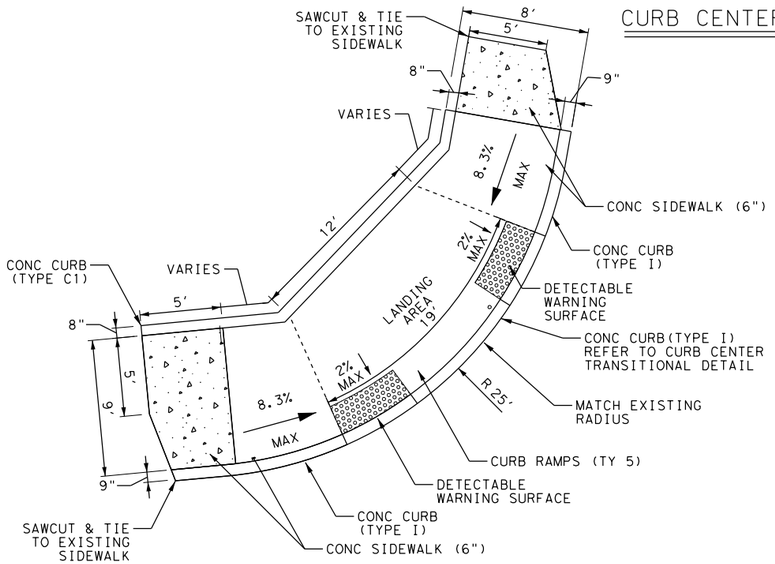
PECAN VALLEY DR AT GOLIAD RD

SHEET 6 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	35

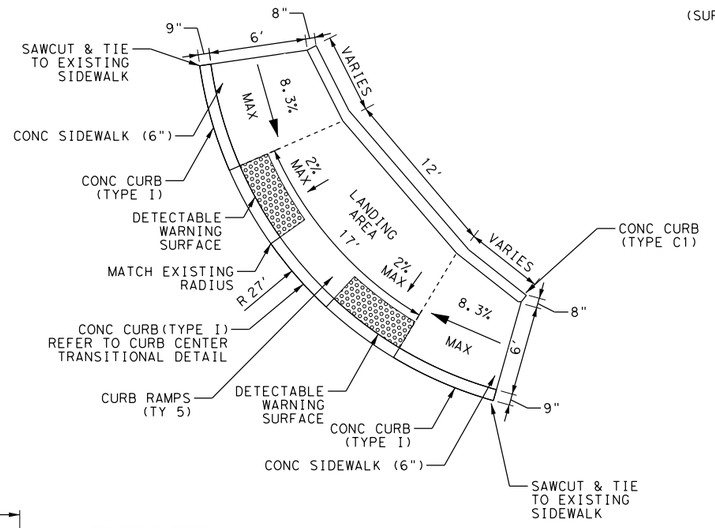
CURB CENTER TRANSITION DETAIL

N. T. S.



DETAIL "A"

N. T. S.



DETAIL "B"

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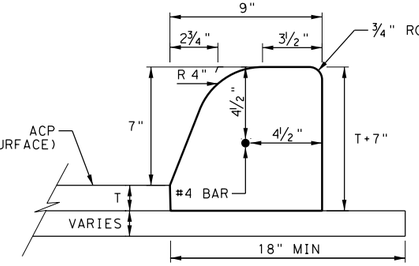
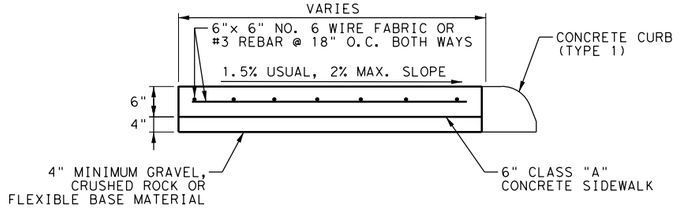


TYPE 1 CURB DETAIL

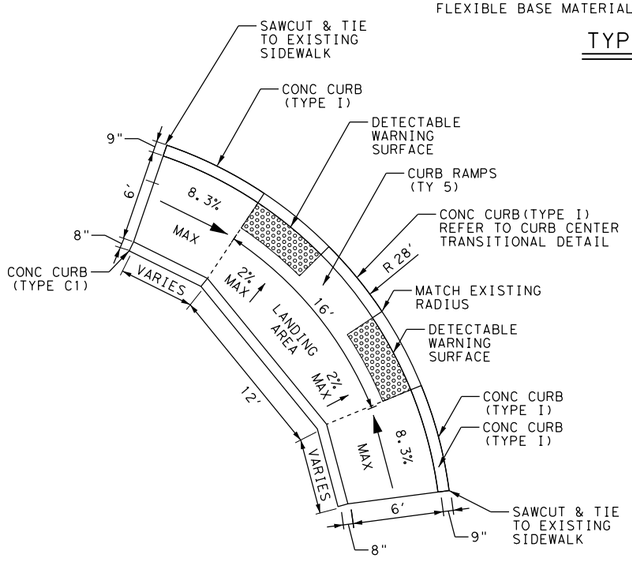
N. T. S.

NOTES:
1. REFER TO TXDOT PED-18 FOR MORE DETAILS.



TYPICAL SIDEWALK DETAIL

N. T. S.



DETAIL "D"

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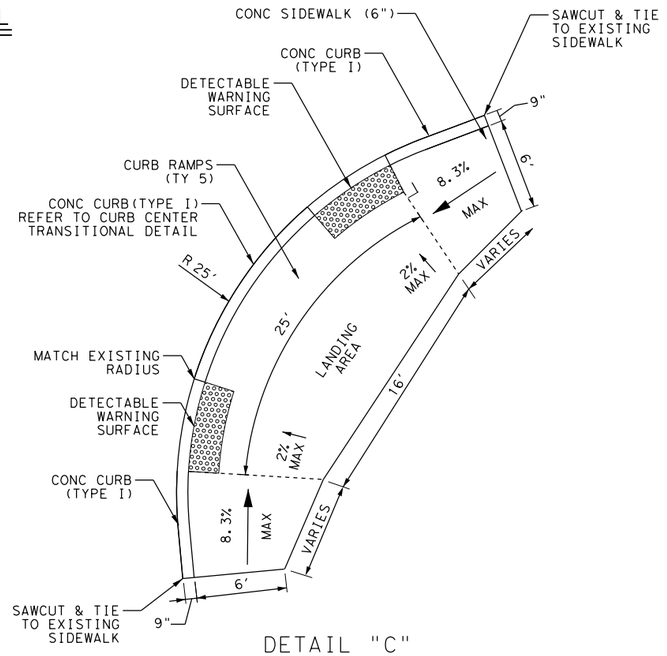


DETAIL "C"

N. T. S.

6/29/2023

REV. NO.	DATE	DESCRIPTION	BY

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.660.1960
TBPE Firm Registration No. 20623

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

CURB RAMP DETAILS

PECAN VALLEY DR AT GOLIAD RD

SHEET 7 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696, ETC	36

Plotted on: $DATE$

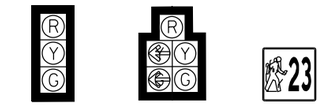
EXISTING SIGNAL TO REMAIN OPERATIONAL UNTIL PROPOSED SIGNAL IS READY TO BE PUT INTO SERVICE.
CONTACT COSA AT 210-207-4583 FOR SIGNAL LOCATES PRIOR TO STARTING ANY CONSTRUCTION.
CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO EXISTING SIGNAL DURING CONSTRUCTION.
COORDINATE WITH INSPECTION STAFF ON RETURNING ANY EQUIPMENT DEEMED AS SALVAGABLE.

EXISTING SIGNS

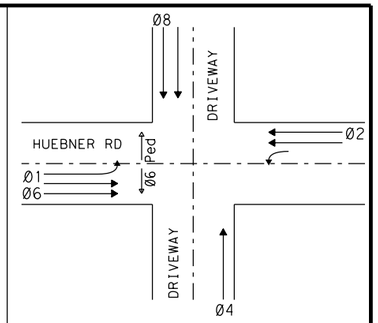
SIGN NO. 1 | SIGN NO. 2 | SIGN NO. 3 | SIGN NO. 4 | SIGN NO. 5 | SIGN NO. 6 | SIGN NO. 7

SIGNAL FACES

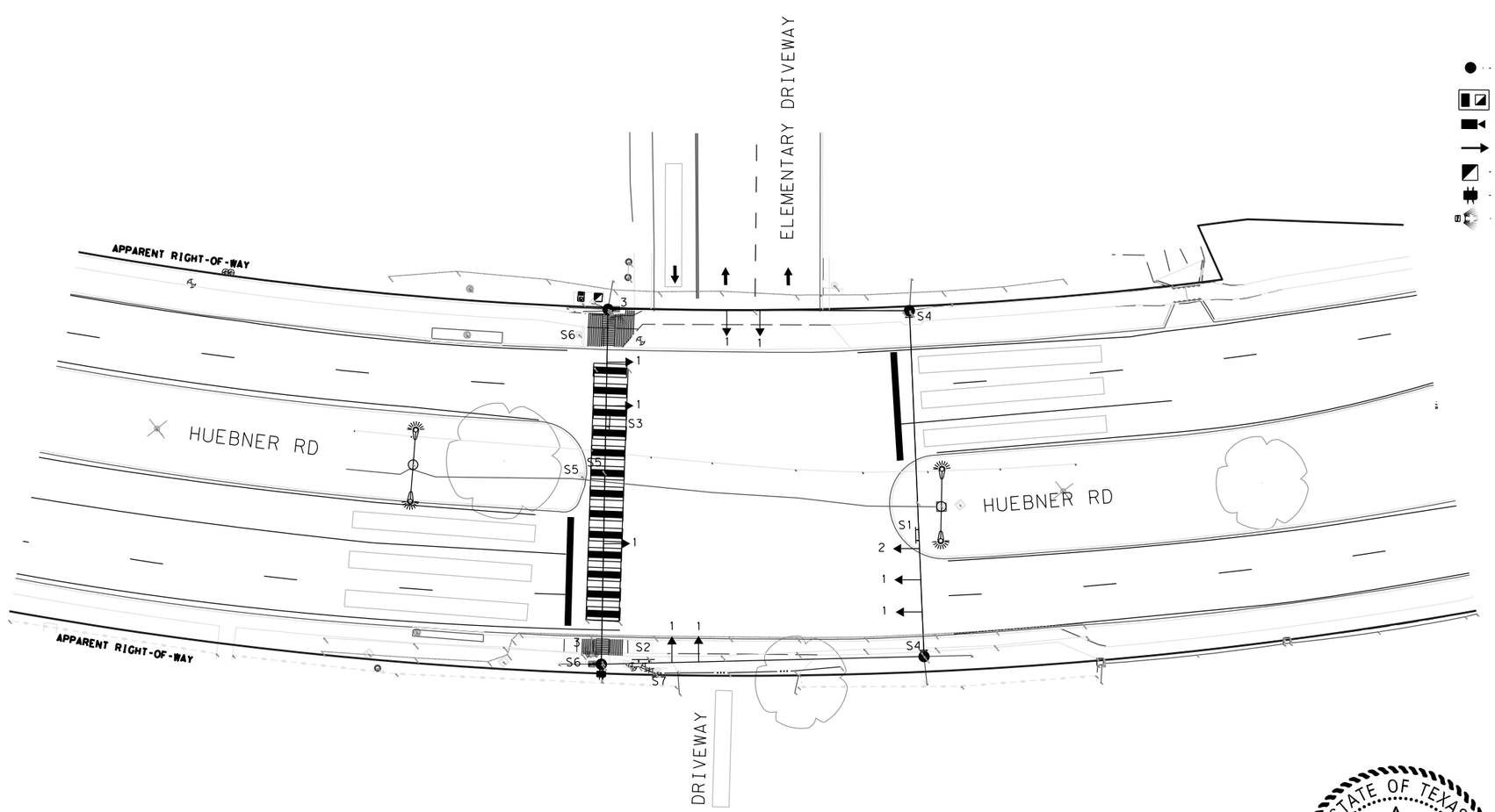
12" LED SIGNAL SECTIONS
WITH BACKPLATES



SIGNAL NO. 1 | SIGNAL NO. 2 | SIGNAL NO. 3



EXISTING INTERSECTION PHASING



LEGEND

- EXISTING POLES TO BE REMOVED IF NO ADDITIONAL UTILITIES ATTACHED
- EXISTING CABINET TO BE REMOVED
- EXISTING VIVDS CAMERA TO BE REMOVED
- EXISTING SIGNAL FACE TO BE REMOVED
- EXISTING GROUND BOX TO BE REMOVED
- EXISTING WIRELESS ACCESS POINT
- EXISTING PEDESTRIAN SIGNAL AND APS BUTTON TO BE REMOVED

20 0 20 40

SCALE: 1"= 40'

REV. NO.	DATE	DESCRIPTION	BY

STATE OF TEXAS
GUILLERMO A. DOUGHERTY, JR.
93649
LICENSED
PROFESSIONAL ENGINEER

7-5-2023

DOUGHERTY
Engineering Group, PLLC
TBPE Firm No. F-18636

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation
©2023

HIGHWAY SAFETY
IMPROVEMENT PROGRAM FY 23

EXISTING CONDITIONS

HUEBNER RD AT
HUEBNER ELEMENTARY

SHEET 1 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			HUEBNER RD
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	37

Design Filename: $FILE$

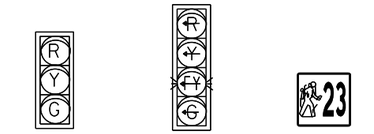
Plotted on: $DATE$

GENERAL NOTES:
1. EXISITNG SIGNAL TO REMAIN OPERATIONAL UNTIL PROPOSED SIGNAL IS READY TO BE PUT INTO SERVICE.
2. CONTACT COSA AT 210-207-7765 FOR SIGNAL LOCATES PRIOR TO STARTING ANY CONSTRUCTION.
3. CONTRACTOR IS RESPOSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO EXISITNG SIGNAL DURING CONSTRUCTION.
4. SALVAGEABLE MATERIAL SHALL BE DETERMINED BY THE CITY AND DELIVERED TO THE TRAFFIC OPERATIONS FACILITY LOCATED AT 223 CHERRY ST, SAN ANTONIO TX. THE CONTRACTOR SHALL CONTACT THE CITY MAINTENANCE SUPERINTENDENT AT 210-207-7769 TO DETERMINE SALVAGEABLE MATERIAL AND SHALL CONTACT THE SERVICES & SUPPLY SUPERINTENDENT AT 210-207-7771 SEVEN DAYS PRIOR OF DELIVERY OF SALVAGED MATERIAL. THE CONTRACTOR SHALL BECOME THE OWNER AND DISPOSE OF UNSALVAGABLE MATERIAL ACCORDING TO FEDERAL, STATE AND LOCAL REGULATION.
5. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT 210-207-4583 A MINIMUM OF 14 DAYS PRIOR TO THE SIGNAL TURN-ON.
6. CONTRACTOR TO FIELD VERIFY ALL CLEARANCES BEFORE ORDERING POLES.
7. ALL POLE FOUNDATIONS SHALL BE INTALLED FLUSH TO ADJACENT SIDEWALK OR CURB RAMP.

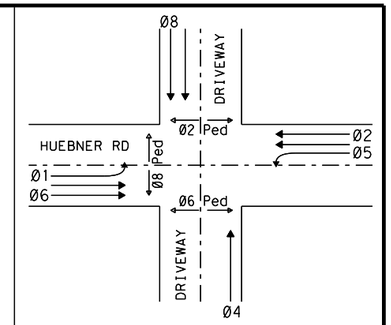
UTILITY NOTES:
1. LOCATION OF UTILITES SHOWN ARE APPROXIMATE, IT IS THE RESPONISBILTY OF THE CONTRACTOR TO LOCATE ALL UTILITES (PUBLIC AND PRIVATE) PRIOR TO COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO LOCATE, PRESERVE, OR PROTECT THESE UTILITIES WETHER UNDERGROUND, ABOVE GROUND OR OVERHEAD.
2. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED ACCURATE, CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES BEFORE COMMENCING WORK.

SIGNAL FACES

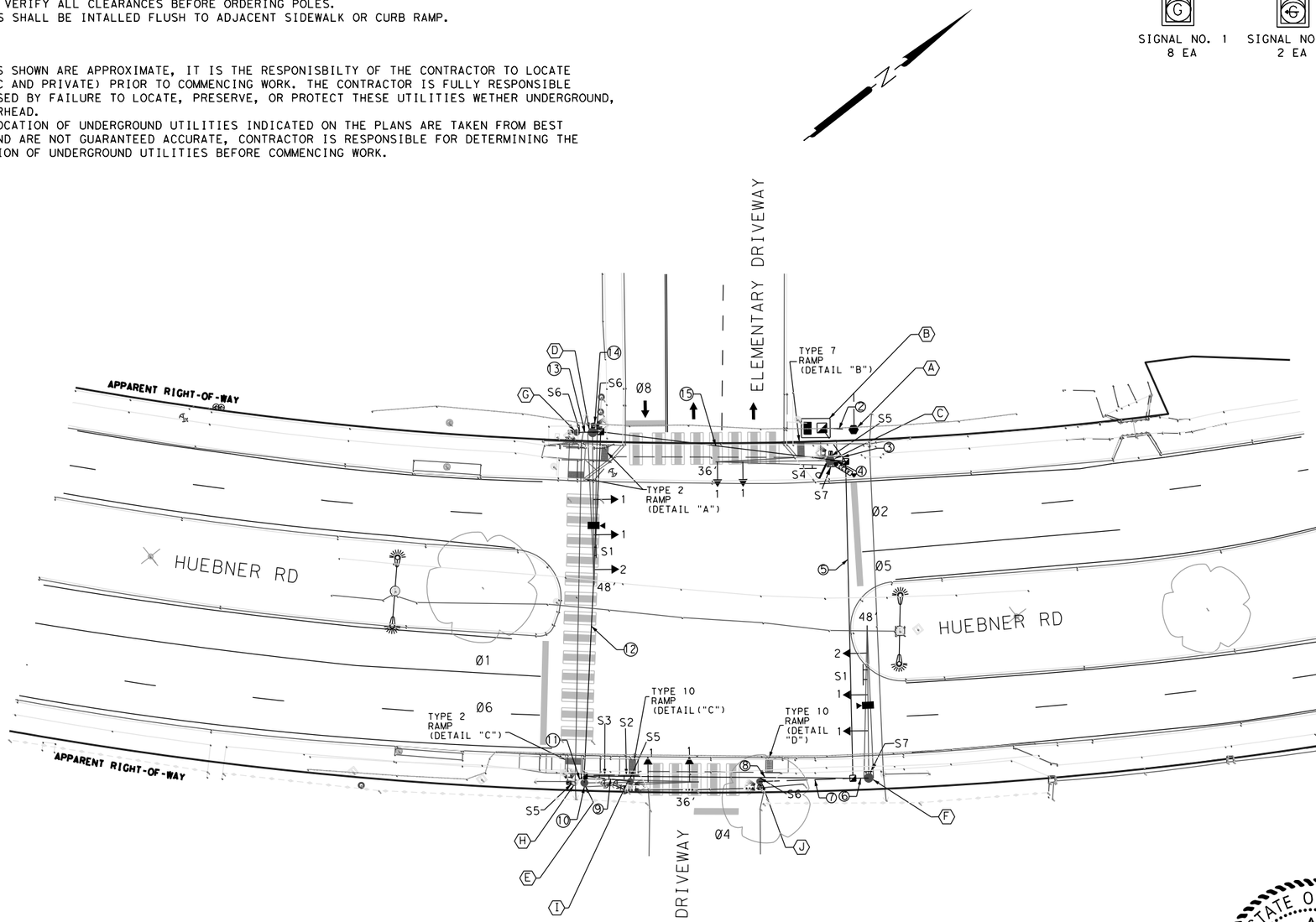
12" LED SIGNAL SECTIONS WITH BACKPLATES



SIGNAL NO. 1 8 EA | SIGNAL NO. 2 2 EA | SIGNAL NO. 3 2 EA



EXISTING INTERSECTION PHASING



LEGEND

- PROP. CABLE RUN ID
- PROP. SIGNAL FACE
- PROP. MAST ARM POLE AND FOUNDATION
- PROP. PVC (SCHEDULE 80) (TRENCH)
- PROP. PVC (SCHEDULE 80) (BORE)
- PROP. OVERHEAD SIGN
- PROP. GROUND BOX (TYPE "D")
- PROP. CONTROLLER, SLAB AND FOUNDATION
- PROP. FEDS FISH EYE CAMERA
- PROP. FEDS ADVANCE DETECTION
- PROP. CCTV
- PROP. PEDESTRIAN SIGNAL HEAD
- PROP. TY-D ELECTRICAL SERVICE

20 0 20 40

SCALE: 1"= 40'

REV. NO.	DATE	DESCRIPTION	BY

STATE OF TEXAS
GUILLERMO A. DOUGHERTY, JR.
93649
LICENSED
PROFESSIONAL ENGINEER

7-5-2023

DOUGHERTY Engineering Group, PLLC
TBPE Firm No. F-18636

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL LAYOUT

HUEBNER RD AT HUEBNER ELEMENTARY

SHEET 2 OF 7

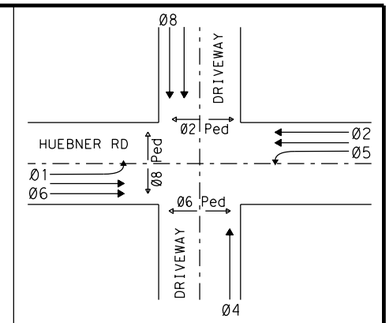
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			HUEBNER RD
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	38

Design Filename: $FILE$

Plotted on: $DATE$

PROPOSED CONDUIT AND CONDUCTOR SCHEDULE

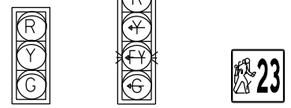
	RUN NUMBER		1	2	3		4		5		6		7	8		9	10		11	12		13	14		15	
B-BORED T-TRENCHED	CONDUIT SIZE IN INCHES		CONT	2.00	2.00	3.00	2.00	3.00	2.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	2.00	3.00
	NUMBER OF CONDUITS			2	1	2	1	2	1	2	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	2
	LENGTH OF RUN (FT)		10	10	15	15	5	5	100	100	5	5	30	85	85	15	5	5	5	110	110	10	5	5	80	80
	TRENCH(T)/BORE(B)/SPAN WIRE(S)			T	T	T	T	T	B	B	T	T	T	B	B	T	T	T	T	B	B	T	T	T	B	B
CABLE	CIRCUIT		NUMBER OF CONDUCTORS																							
#6XHHW	120 POWER HOT		1	1									1													
	120 POWER COMMON		1	1									1													
BARE BOUND GROUND	#8 BARE BOND GROUND		1	2	1	2	1	2	1	2	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	2
9-COND. #14CABLE	SIGNALS	POLE C	1			1		1																		
		POLE D	1			1																		1		1
		POLE E	1			1												1			1					1
		POLE F	1			1				1		1														
9-COND. #14CABLE	PED. SIGNALS	POLE C	1			1		1																		
		POLE D	1			1																		1		1
		POLE G	1			1																1				1
		POLE H	1			1													1		1					1
		POLE I	1			1										1					1					1
		POLE J	1			1				1			1													
3-COND. #16CABLE	PED. APS PUSHBUTTONS	POLE C	1			1		1																		
		POLE D	1			1																		1		1
		POLE G	1			1																1				1
		POLE H	1			1													1		1					1
		POLE I	1			1										1					1					1
		POLE J	1			1				1			1													
CAT 5E ETHERNET	FEDS ADVANCE DETECTION	POLE D	1			1																		1		1
		POLE F	1			1				1		1														
4-COND. #14CABLE	ILSN SIGNS	POLE C	1			1		1																		
		POLE E	1															1			1					1
CAT 5E ETHERNET	FEDS FISH EYE CAMERA	POLE C	1			1		1																		
ETHERNET	CCTV(PTZ)CAMERA	POLE C	1			1		1																		



EXISTING INTERSECTION PHASING

SIGNAL FACES

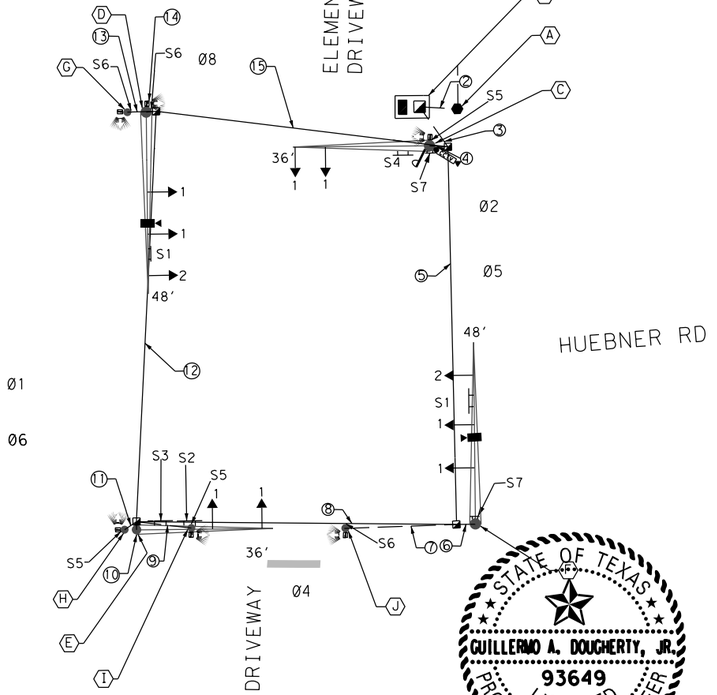
12" LED SIGNAL SECTIONS WITH BACKPLATES



SIGNAL NO. 1 SIGNAL NO. 2 SIGNAL NO. 3

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEVATION
(A)	PROPOSED CPS ENERGY METER WITH TXDOT TYPE D PEDESTAL SERVICE	N/A	N/A	N/A
(B)	INSTALL SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH EXTERNAL BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH MAXTIME SOFTWARE ON COSA BASE-MOUNTFOUNDATION (5'x9")	N/A	N/A	N/A
(C)	INSTALL ONE 24FT SMA-80 ON A 13FT 36-A DRILLED SHAFT FOUNDATION WITH A 36FT ARM, ONE 7FT 6IN ILSN SIGN, TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED, ONE FEDS CAMERA, ONE PTZ CAMERA, ONE R9-3 SIGN, ONE PEDESTRIAN COUNTDOWN SIGNAL HEAD, ONE APS PUSH BUTTON, ONE R10-3eR PEDESTRIAN SIGN, AND ONE PREEMPTION DETECTOR.	13763780.46	2118175.40	FLUSH W/ SIDEWALK
(D)	INSTALL ONE 19FT SMA-80 ON A 13FT 36-A DRILLED SHAFT FOUNDATION WITH A 48FT MAST ARM, ONE R10-17T SIGN, ONE FEDS ADVANCE DETECTION CAMERA, ONE FOUR VEHICLE SIGNAL HEAD, TWO THREE VEHICLE SIGNAL HEADS AS ILLUSTRATED, ONE PEDESTRIAN COUNTDOWN SIGNAL HEAD, ONE APS PUSH BUTTON, ONE R10-17eL PEDESTRIAN SIGN, AND ONE PREEMPTION DECTECTOR.	13763726.99	2118122.34	FLUSH W/ SIDEWALK
(E)	INSTALL ONE 24FT SMA -80 ON A 13FT 36-A DRILLED SHAFT FOUNDATION WITH A 36FT ARM, ONE 7FT 6IN ILSN SIGN, ONE R10-11a SIGN, TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED, AND ONE PREEMEPTION DETECTOR.	13763657.03	2118207.71	FLUSH W/ SIDEWALK
(F)	INSTALL ONE 19FT SMA -80 ON A 13FT 36-A DRILLED SHAFT FOUNDATION WITH A 48FT MAST ARM, ONE R10-17T SIGN, ONE FEDS ADVANCE DETECTION CAMERA, ONE FOUR VEHICLE SIGNAL HEAD, TWO THREE VEHICLE SIGNAL HEADS AS ILLUSTRATED, ONE R9-3 SIGN, AND ONE PREEMPTION DECTECTOR.	13763728.45	2118261.59	FLUSH W/ SIDEWALK
(G)	INSTALL ONE ONE 10FT PEDESTAL POLE ON A 6FT 24-A DRILLED SHAFT FOUNDATION, ONE APS PUSH BUTTON, ONE PEDESTRIAN COUNTDOWN SIGNAL HEAD AND ONE R10-3eL PEDESTRIAN SIGN.	13763723.02	2118119.32	FLUSH W/ SIDEWALK
(H)	INSTALL ONE ONE 10FT PEDESTAL POLE ON A 6FT 24-A DRILLED SHAFT FOUNDATION, ONE APS PUSH BUTTON, ONE PEDESTRIAN COUNTDOWN SIGNAL HEAD AND ONE R10-3eR PEDESTRIAN SIGN.	13763654.56	2118205.70	FLUSH W/ SIDEWALK
(I)	INSTALL ONE ONE 10FT PEDESTAL POLE ON A 6FT 24-A DRILLED SHAFT FOUNDATION, ONE APS PUSH BUTTON, ONE PEDESTRIAN COUNTDOWN SIGNAL HEAD AND ONE R10-3eL PEDESTRIAN SIGN.	13763668.74	2118216.24	FLUSH W/ SIDEWALK
(J)	INSTALL ONE ONE 10FT PEDESTAL POLE ON A 6FT 24-A DRILLED SHAFT FOUNDATION, ONE APS PUSH BUTTON, ONE PEDESTRIAN COUNTDOWN SIGNAL HEAD AND ONE R10-3eR PEDESTRIAN SIGN.	13763700.75	2118241.37	FLUSH W/ SIDEWALK



ELECTRICAL SERVICE DATA									
ELEC SERVE DESCRIPTION SEE ED (4) & (5) 14	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMP	TWO - POLE CONTRACTOR AMPS	PANEL BD./ LOAD CENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRKR. POLE/ AMP	KVA LOAD
TY D 120/240 100(NS)AL(E)PS(U)	3"	3/#6 AWG	N/A	2P/70	30	100	SIGNAL ILSN	1P/50 1P/15	<7.1

REV. NO.	DATE	DESCRIPTION	BY

DOUGHERTY Engineering Group, PLLC
TBPE Firm No. F-18636

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

CONDUIT & CONDUCTOR SCHEDULE

HUEBNER RD AT HUEBNER ELEMENTARY

SHEET 3 OF 7

STATE OF TEXAS
GUILLERMO A. DOUGHERTY, JR.
93649
LICENSED
PROFESSIONAL ENGINEER

7-5-2023

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			HUEBNER RD
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	39

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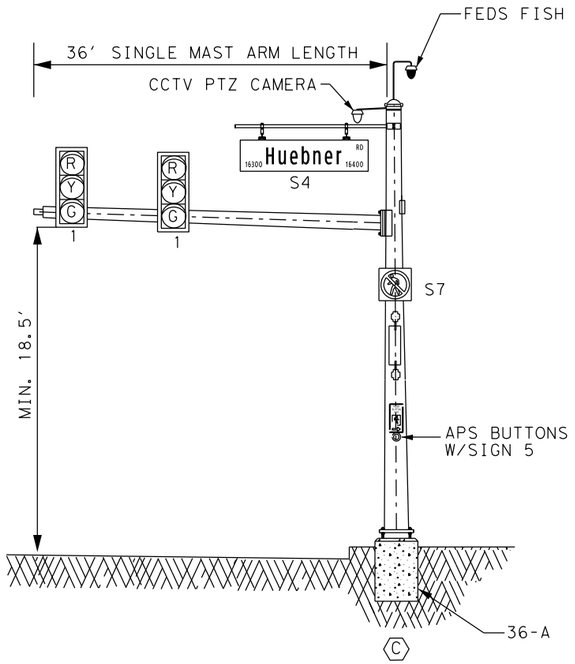
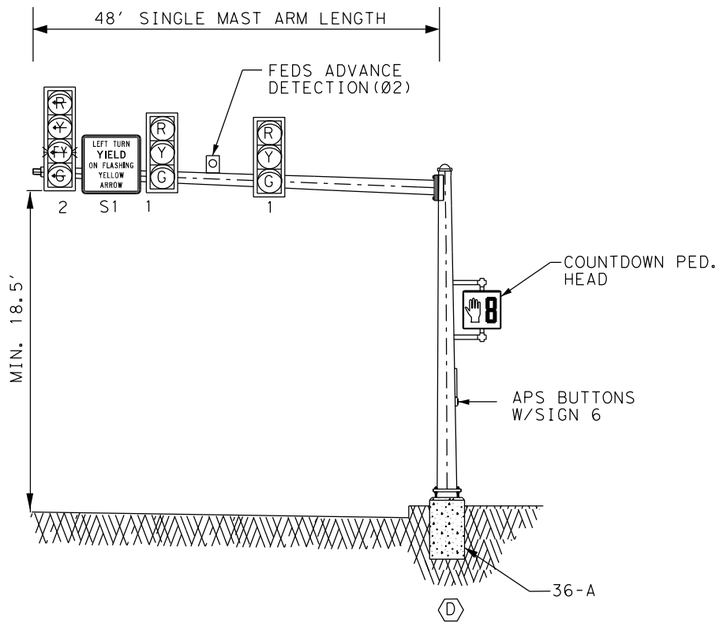
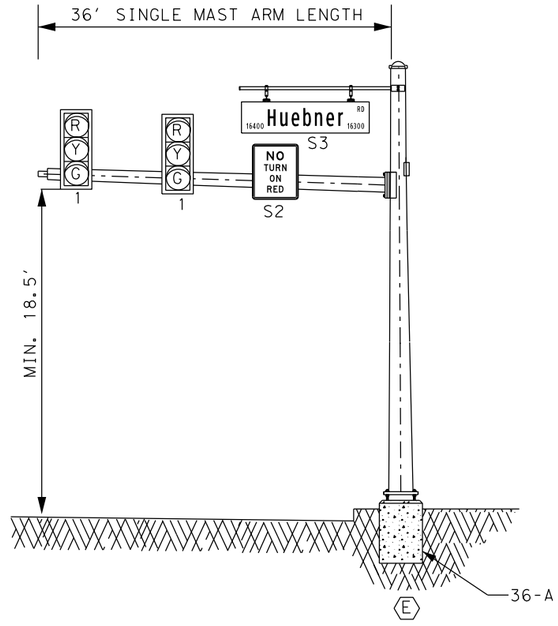
Plotted on: $DATE$



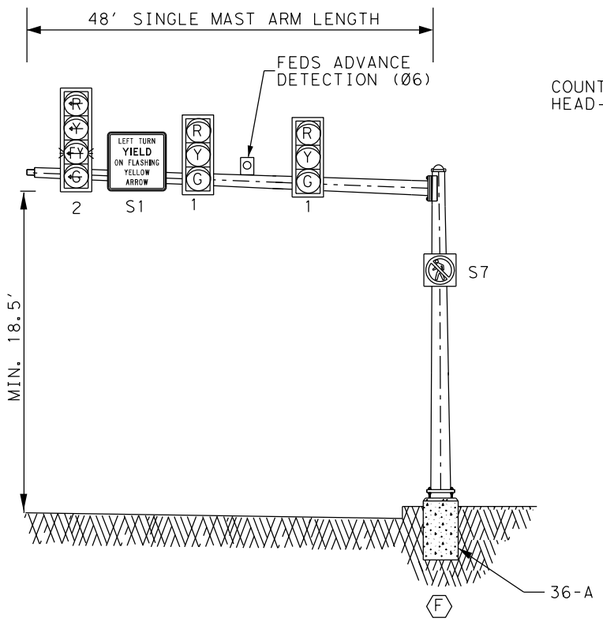
WESTBOUND DRIVEWAY



SOUTHBOUND HUEBNER RD



EASTBOUND HUEBNER ELEMENTARY DRIVEWAY



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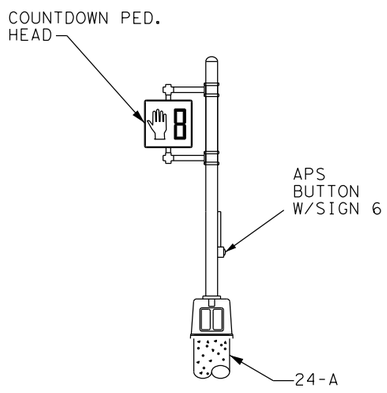
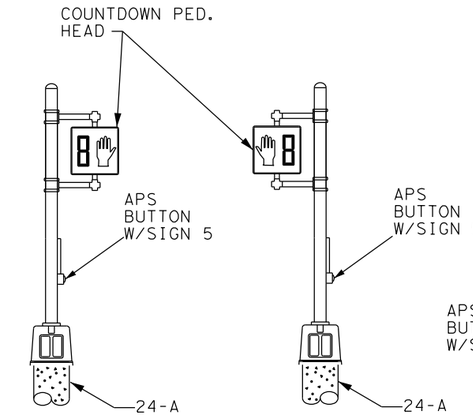
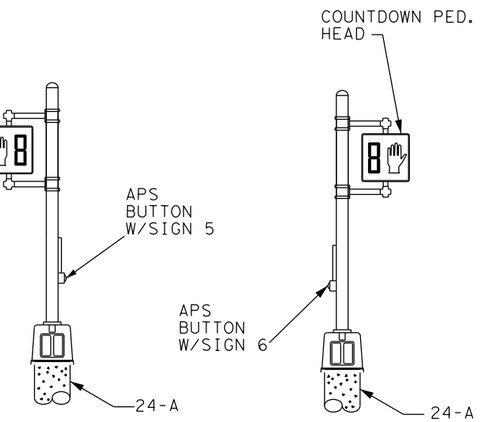


POLE G



POLE H



POLE I

POLE J

STATE OF TEXAS
GUILLERMO A. DOUGHERTY, JR.
93649
LICENSED
PROFESSIONAL ENGINEER

7-5-2023

REV. NO.	DATE	DESCRIPTION	BY

DOUGHERTY Engineering Group, PLLC
TBPE Firm No. F-18636

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation ©2023

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PROPOSED SIGNAL ELEVATIONS

HUEBNER RD AT HUEBNER ELEMENTARY

SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			HUEBNER RD
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	40

Design Filename: $FILE$

Plotted on: $DATE$

Design Filename: $FILE$

PROPOSED SIGNS

SIGN 3 ILSN 90" x 22" EST 1 EA

SIGN 4 ILSN 90" x 22" EST 1 EA

PROPOSED SIGNS

SIGN NO. 1
R10-17T
30" x 30"
EST @ 2 EA

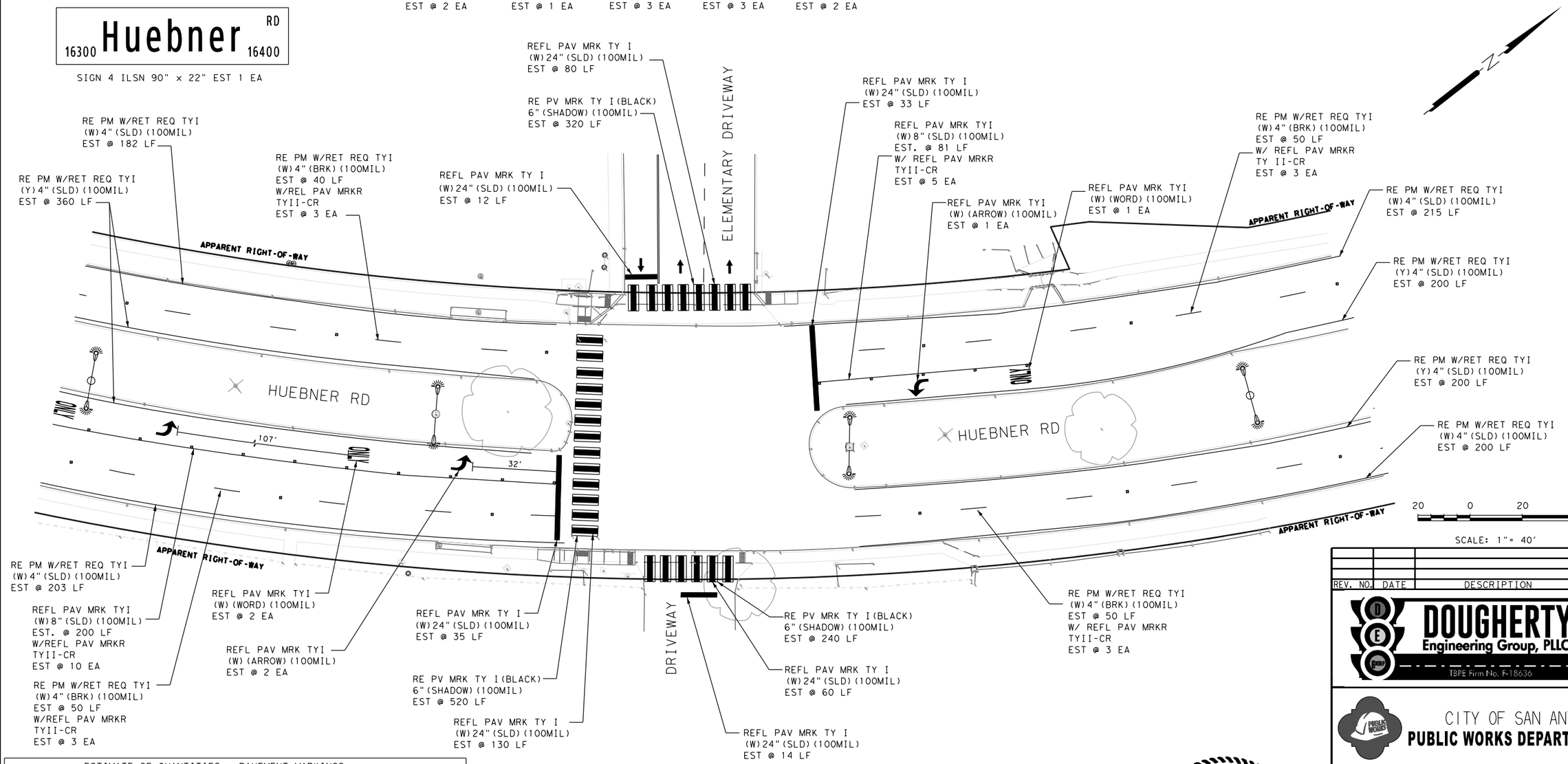
SIGN NO. 2
R10-11a
30" x 36"
EST @ 1 EA

SIGN NO. 5
R10-4bR
9" x 12"
EST @ 3 EA

SIGN NO. 6
R10-4bL
9" x 12"
EST @ 3 EA

SIGN NO. 7
R9-3
24" x 24"
EST @ 2 EA

GENERAL NOTES:
1. PAVEMENT MARKING QUANTITES ARE FOR RE-ESTABLISHING EXISITNG MARKINGS.
2. REMOVAL QUANTITES ARE FOR 24'' WHITE SOLID CROSSWALK LINES THAT MAY NEED TO BE REMOVED AND RELOCATED BASED ON THE NEW ALIGNMENT OF PROPOSED CURB RAMPS.
3. ALL SIGNS SHALL BE CONSIDERED SUBSIDIARY TO ITEM 680.
4. DESIGN SIGNS 3, 4, ACCORDING TO CITY OF SAN ANTONIO ILSN SIGN STANDARDS.
5. SEE ELEVATION LAYOUT FOR SIGN PLACEMENT.



20 0 20 40

SCALE: 1"= 40'

ESTIMATE OF QUANTITIES - PAVEMENT MARKINGS

ITEM NO.	DESC. CODE	ITEM DESCRIPTION	UNIT	ESTIMATE QUANTITY
666	6036	REFL PAV MRK TYI (W)8" (SLD) (100MIL)	LF	281
666	6048	REFL PAV MRK TYI (W)24" (SLD) (100MIL)	LF	364
666	6054	REFL PAV MRK TYI (W) (ARROW) (100MIL)	EA	3
666	6078	REFL PAV MRK TYI (W) (WORD) (100MIL)	EA	3
666	6162	REFL PAV MRK TYI (BLACK)6" (SHADOW) (100MIL)	LF	1080
666	6224	PAVEMENT SEALER (4")	LF	1750
666	6225	PAVEMENT SEALER (6")	LF	1080
666	6226	PAVEMENT SEALER (8")	LF	281
666	6230	PAVEMENT SEALER (24")	LF	364
666	6231	PAVEMENT SEALER (ARROW)	EA	3
666	6232	PAVEMENT SEALER (WORD)	EA	3
666	6300	RE PM W/RET REQ TYI (W)4" (BRK) (100MIL)	LF	190
666	6303	RE PM W/RET REQ TYI (W)4" (SLD) (100MIL)	LF	800
666	6315	RE PM W/RET REQ TYI (Y)4" (SLD) (100MIL)	LF	760

ESTIMATE OF QUANTITIES - PAVEMENT MARKINGS

ITEM NO.	DESC. CODE	ITEM DESCRIPTION	UNIT	ESTIMATE QUANTITY
672	6010	REFL PAV MRKR TYII-CR	EA	22
677	6002	ELIM EXT PAV MRK & MRKS(6")	LF	520
677	6007	ELIM EXT PAV MRK & MRKS(24")	LF	130
678	6001	PAV SURF PREP FOR MRK (4")	LF	1750
678	6002	PAV SURF PREP FOR MRK (6")	LF	1080
678	6004	PAV SURF PREP FOR MRK (8")	LF	281
678	6008	PAV SURF PREP FOR MRK (24")	LF	364
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	3
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	3

STATE OF TEXAS
GUILLERMO A. DOUGHERTY, JR.
93649
LICENSED
PROFESSIONAL ENGINEER

8-28-2023

REV. NO.	DATE	DESCRIPTION	BY

DOUGHERTY Engineering Group, PLLC
TBPE Firm No. F-18636

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

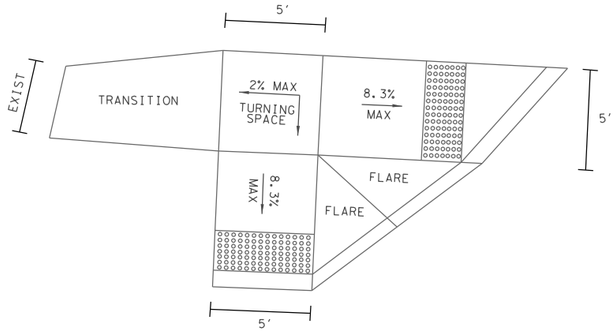
SIGNING & PAVEMENT MARKINGS

HUEBNER RD AT HUEBNER ELEMENTARY

SHEET 5 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			HUEBNER RD
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	41

Plotted on: $DATE$



DETAIL "A"
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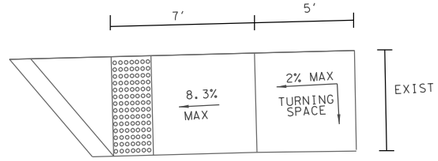

DETAIL "B"
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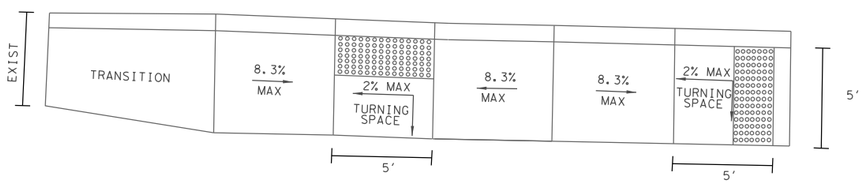

DETAIL "C"
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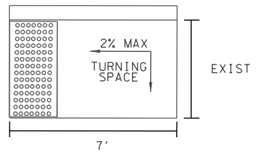

DETAIL "D"
N.T.S.

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

DOUGHERTY
Engineering Group, PLLC
TBPE Firm No. F-18636

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation
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HIGHWAY SAFETY
IMPROVEMENT PROGRAM FY 23

PROPOSED CURB RAMP LAYOUT

HUEBNER RD AT
HUEBNER ELEMENTARY

SHEET 7 OF 7

STATE OF TEXAS
GUILLERMO A. DOUGHERTY, JR.
93649
LICENSED
PROFESSIONAL ENGINEER

7-5-2023

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NUMBER			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			HUEBNER RD
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0915	12	696,ETC	42

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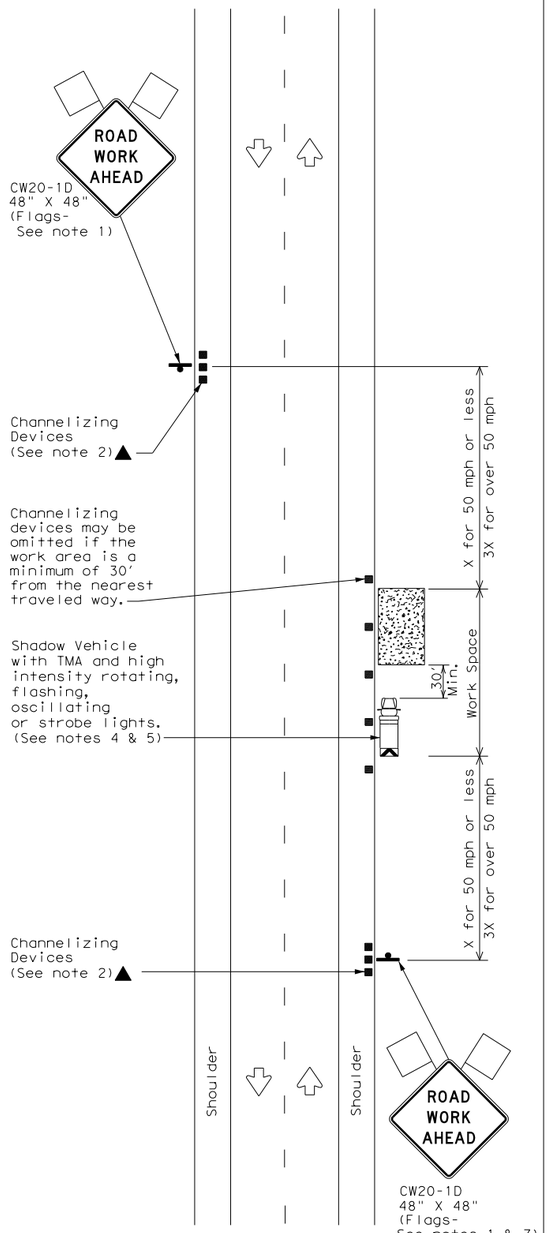
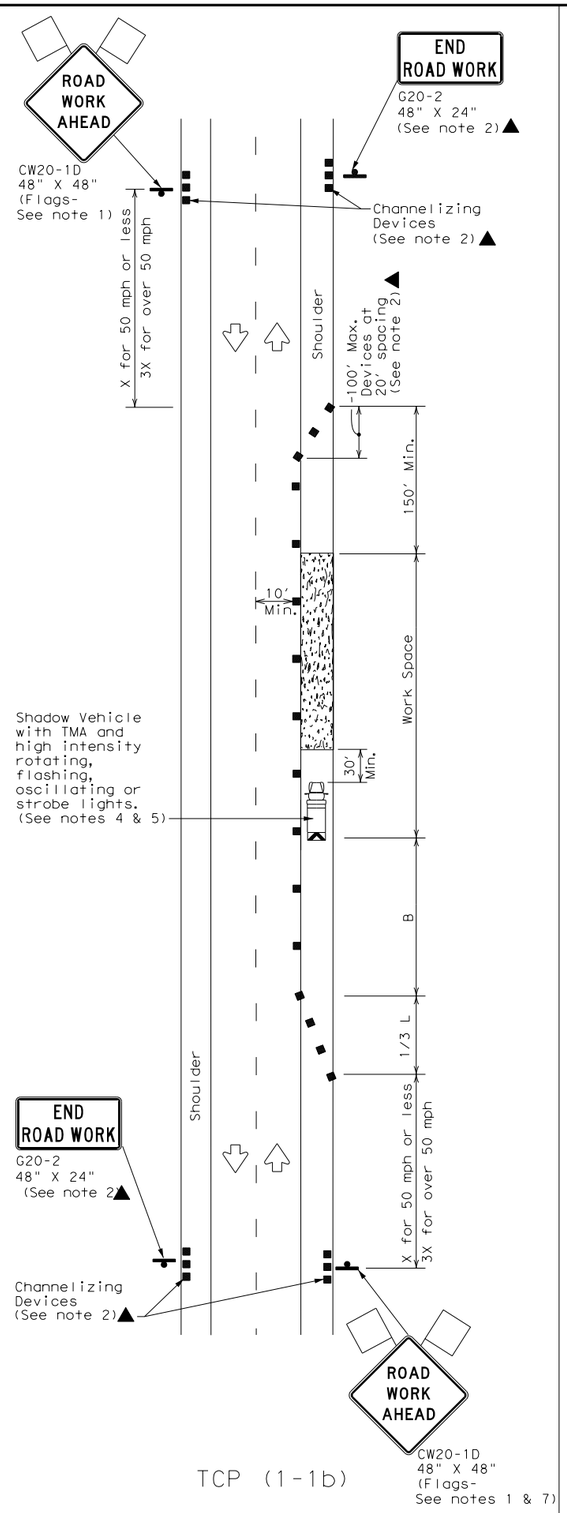


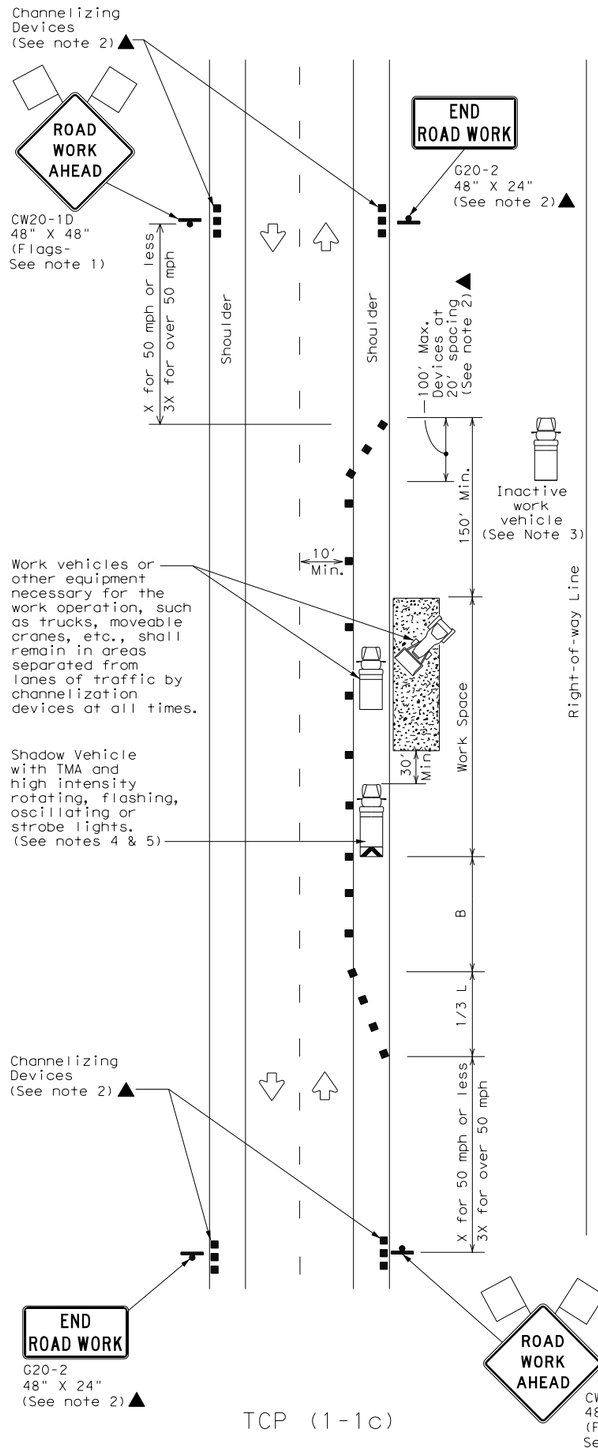
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SA	BEXAR		43
1-97 2-18				

151

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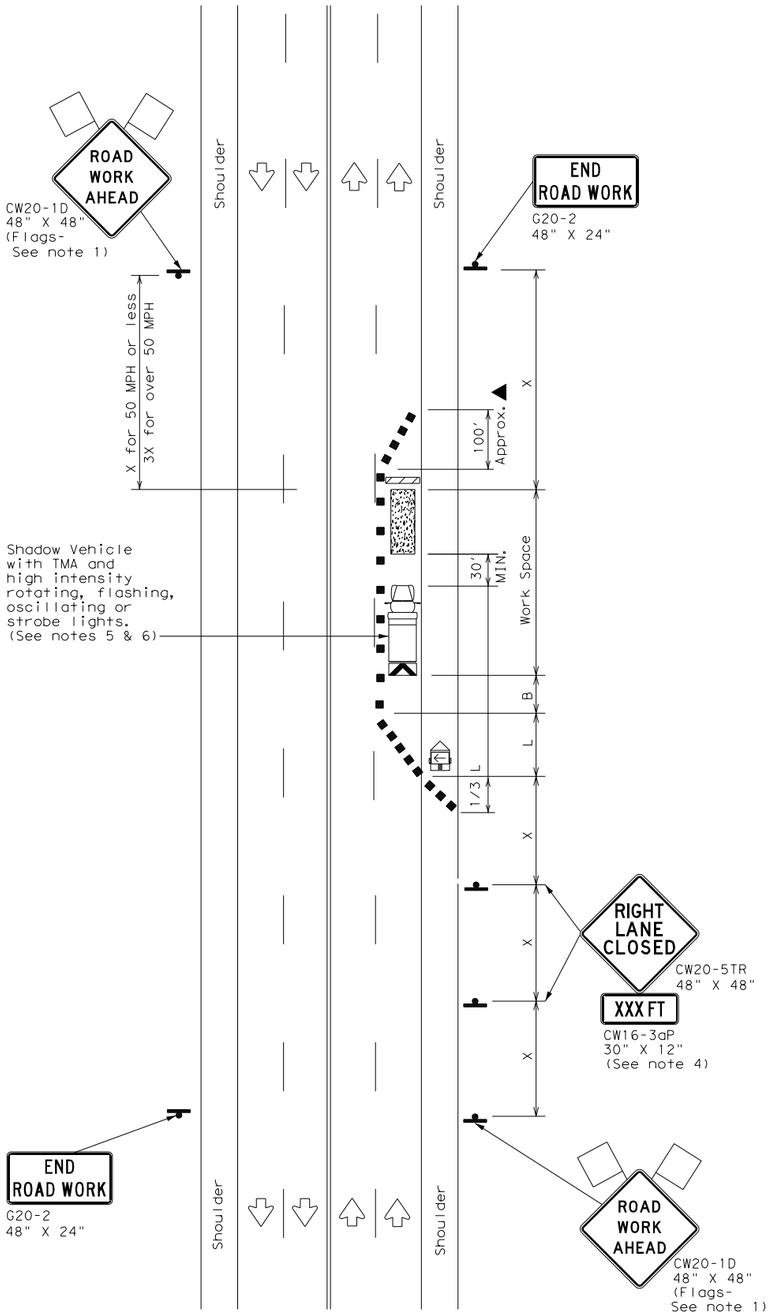
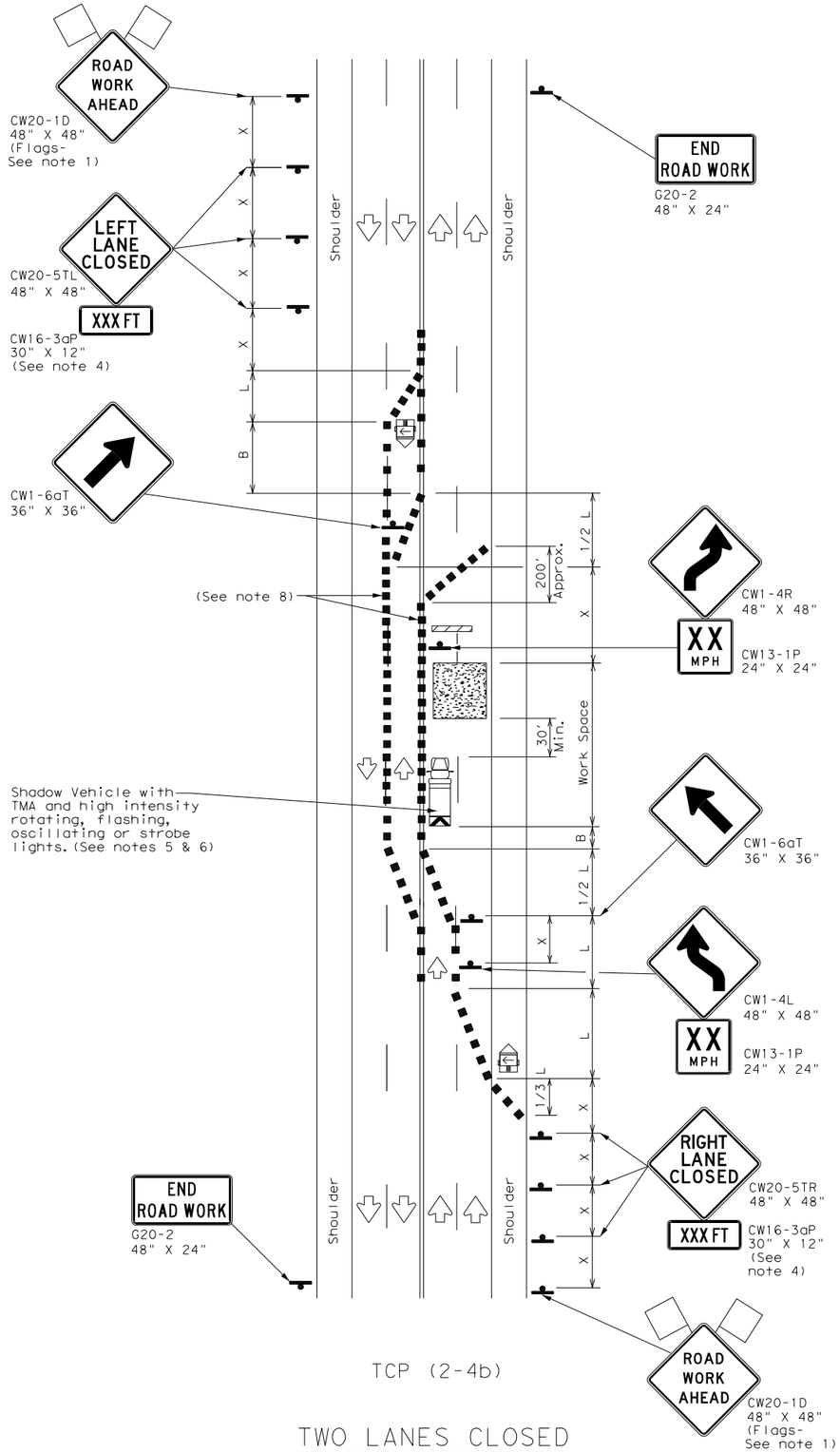


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	915	12	696,ETC	CS
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	SA	BEXAR		44

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		45

95

DATE: 8/28/2023 3:27:42 PM
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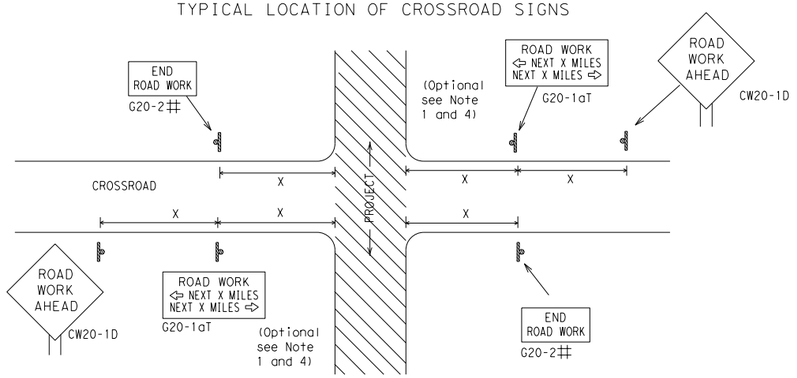
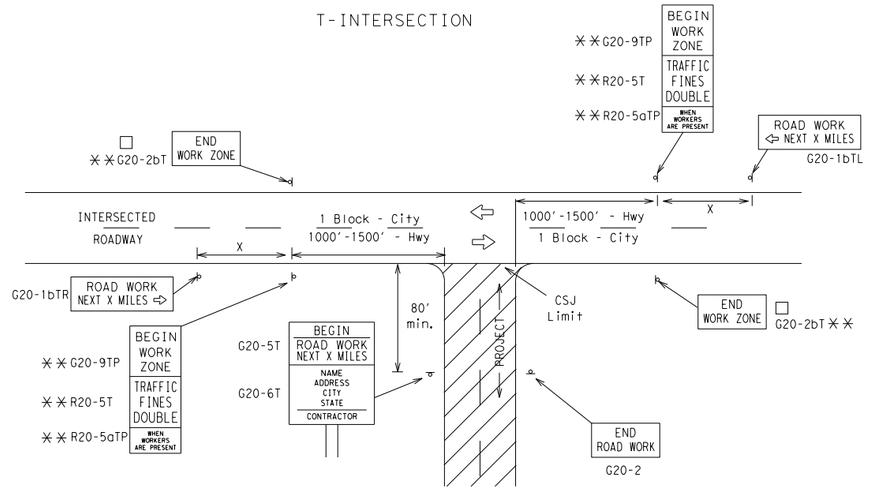
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

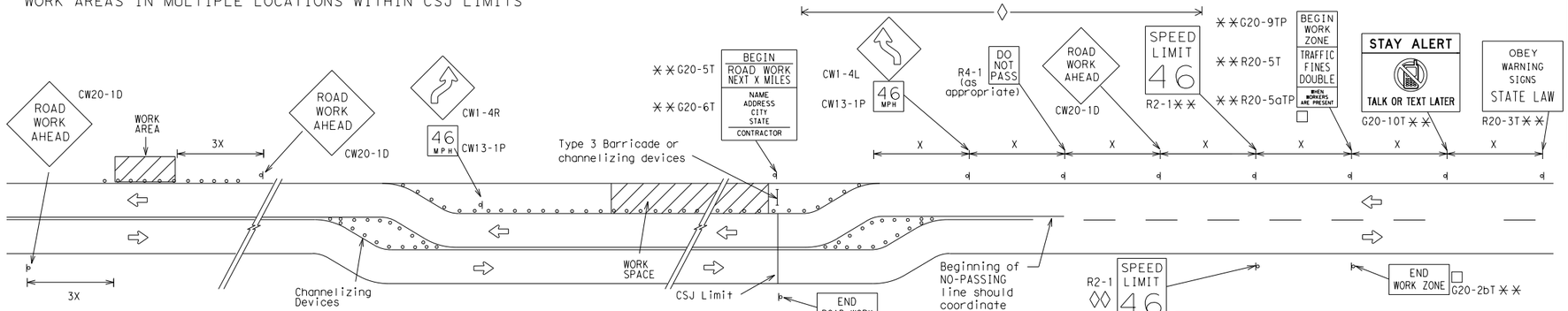
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

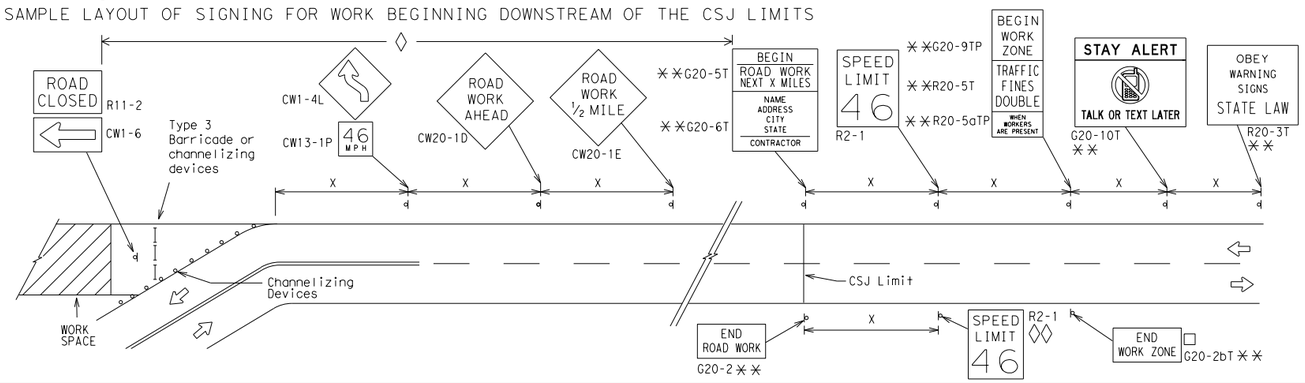
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SA	BEXAR		46

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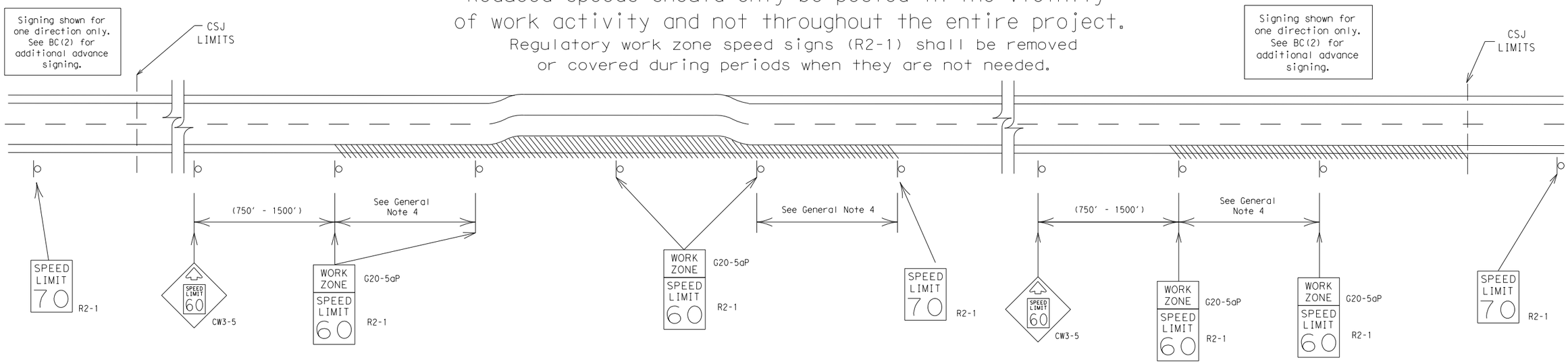
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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 9-07 8-14 7-13 5-21	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		47

97

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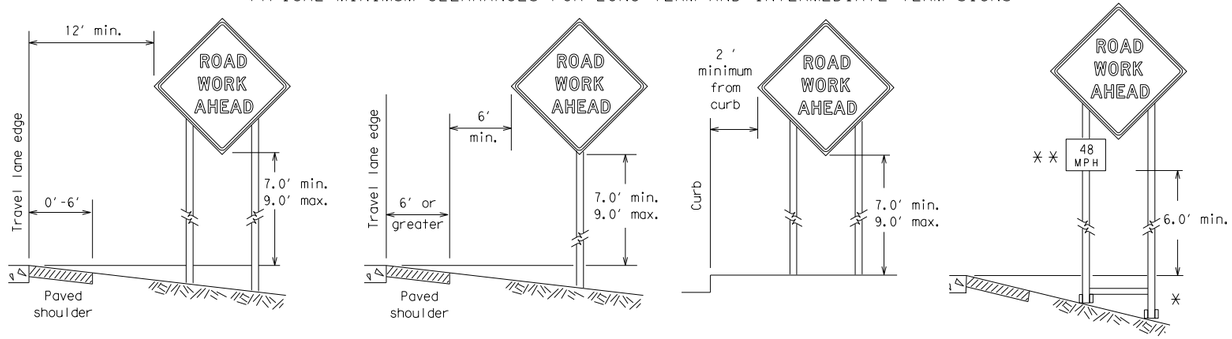
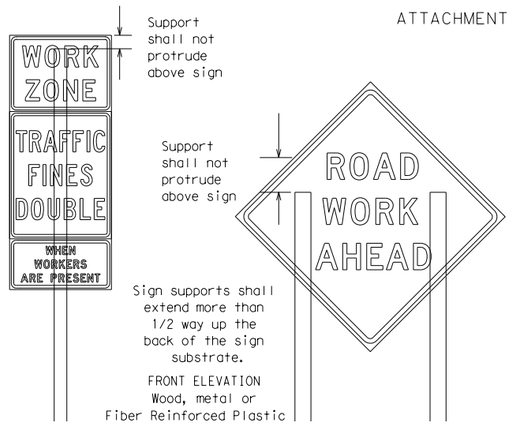
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

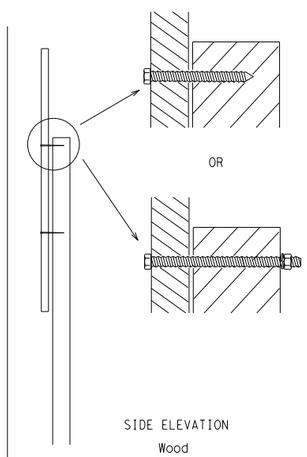


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





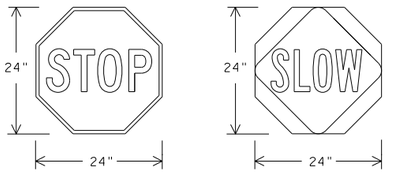
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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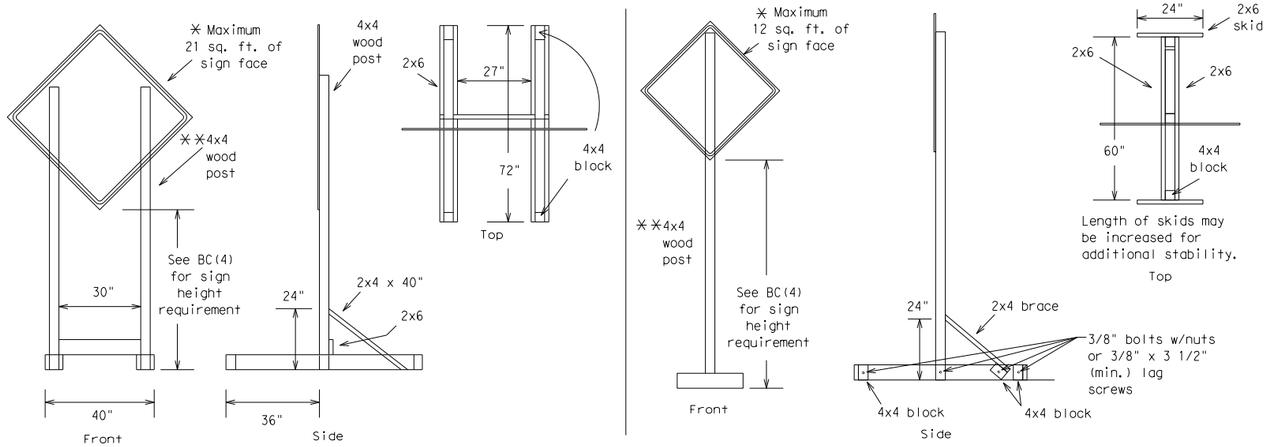
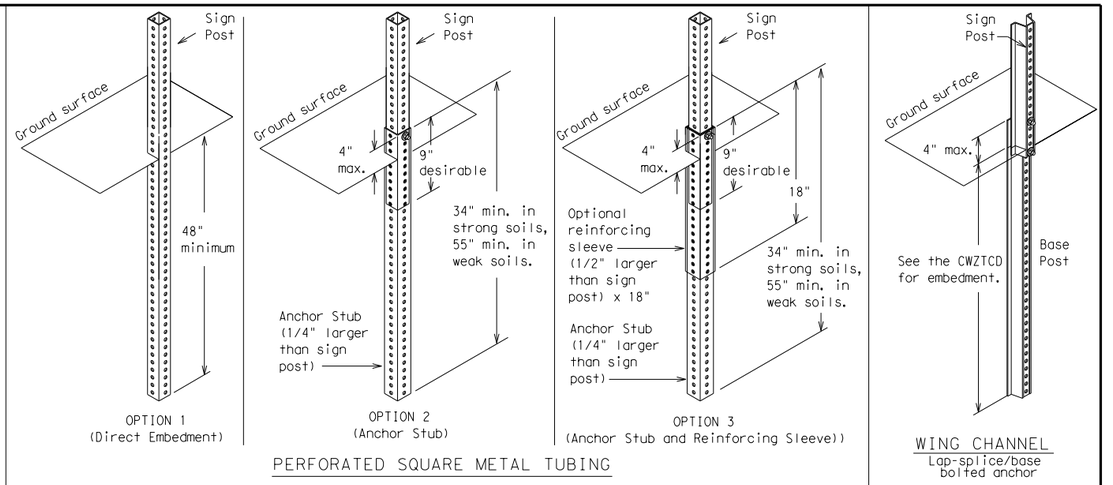


SKID MOUNTED WOOD SIGN SUPPORTS

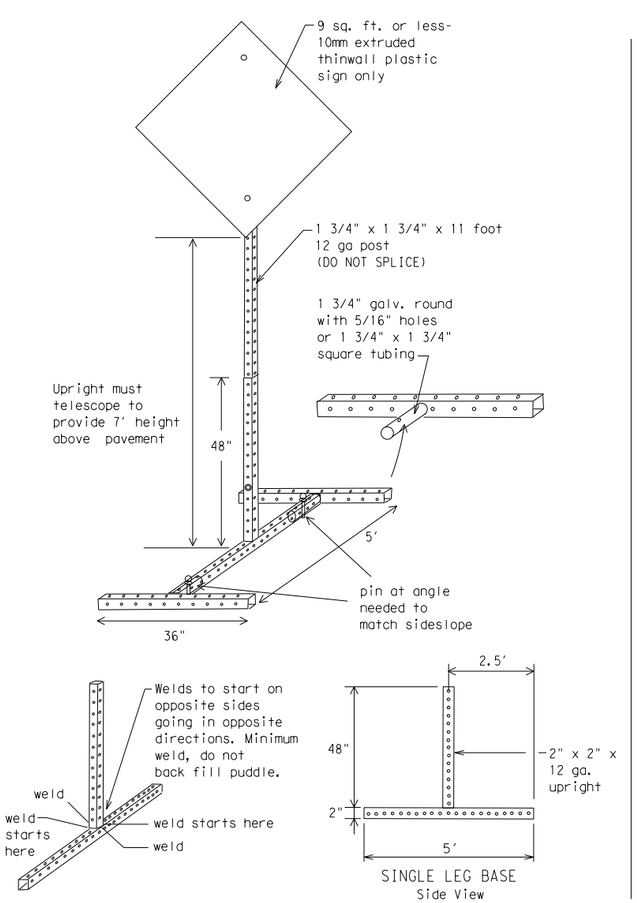
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

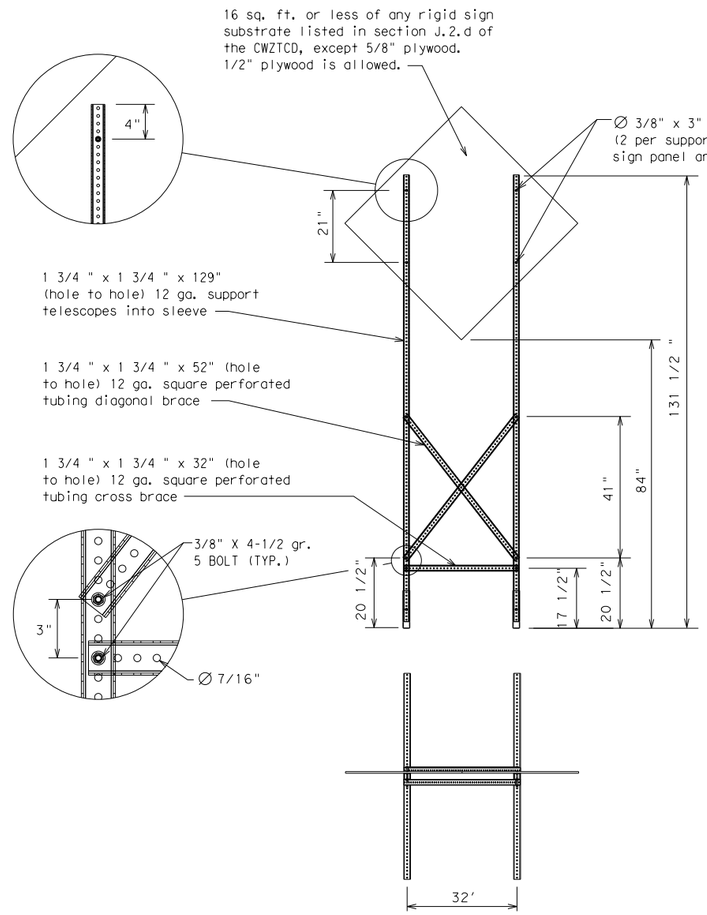


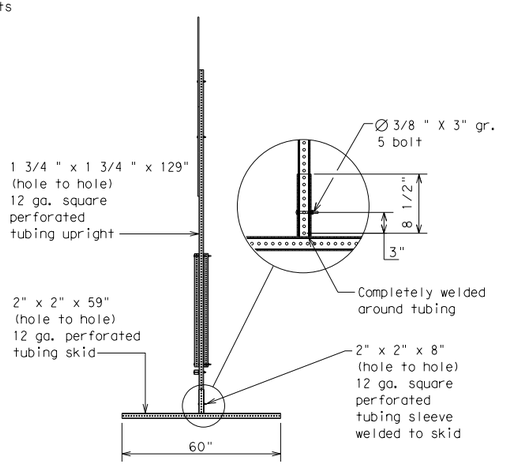
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	915	12	696,ETC	CS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SA	BEXAR		49

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

✳✳ Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-50 X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

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

✳✳ See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS		915	12	696,ETC	CS
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		SA	BEXAR		50

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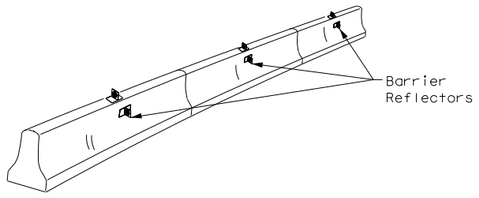
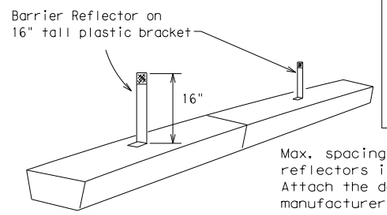
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

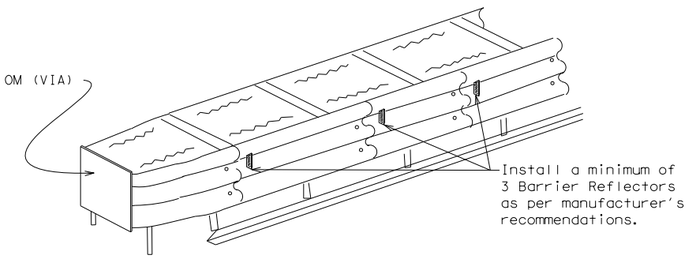


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

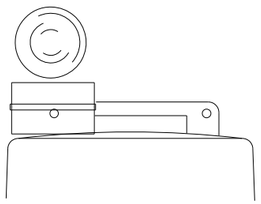


DELINEATION OF END TREATMENTS

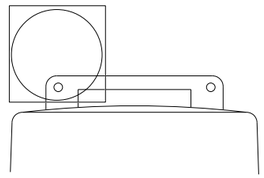
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

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

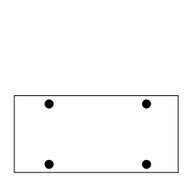
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

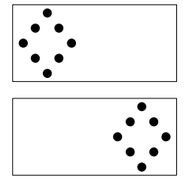
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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:

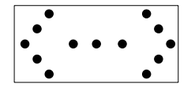


4 CORNER CAUTION

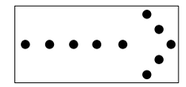
OR



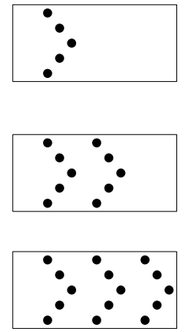
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



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



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

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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	915	12	696,ETC	CS
9-07 8-14	DIST	COUNTY		SHEET NO.
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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:

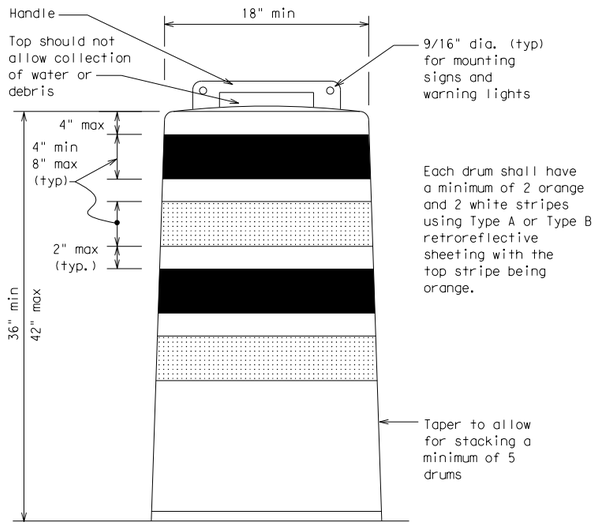
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

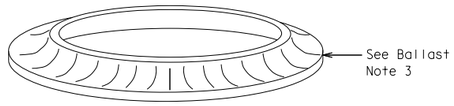
RETROREFLECTIVE SHEETING

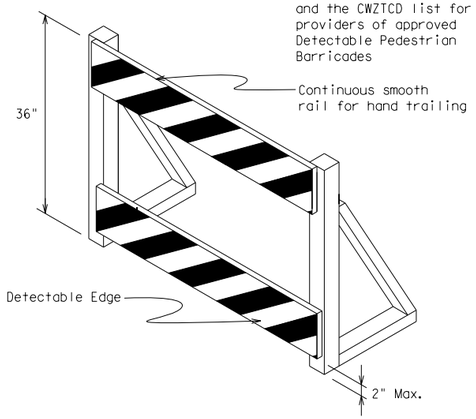
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

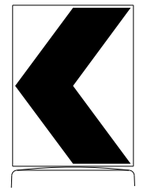




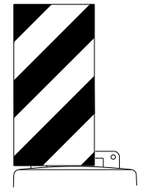


DETECTABLE PEDESTRIAN BARRICADES

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.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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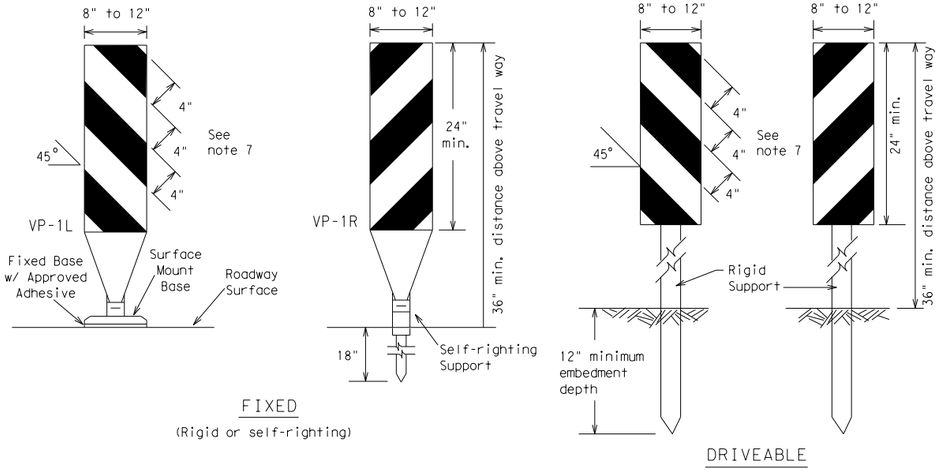
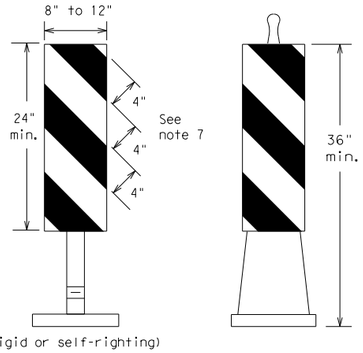


FIXED

(Rigid or self-righting)

DRIVEABLE

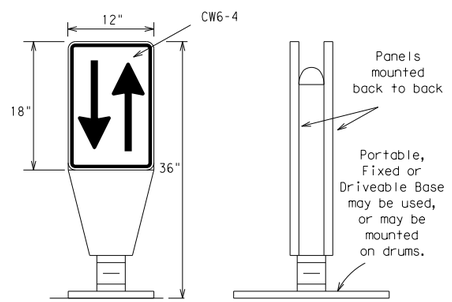


(Rigid or self-righting)

PORTABLE

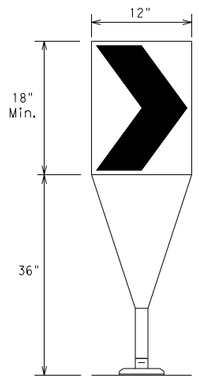
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



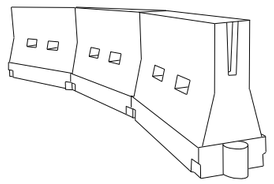
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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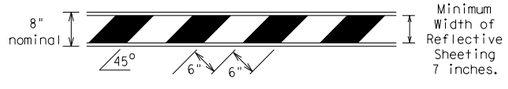
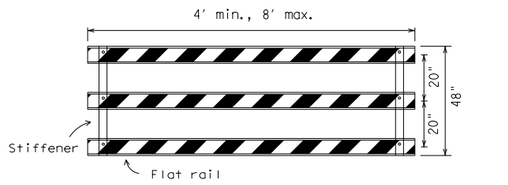
TYPE 3 BARRICADES

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.



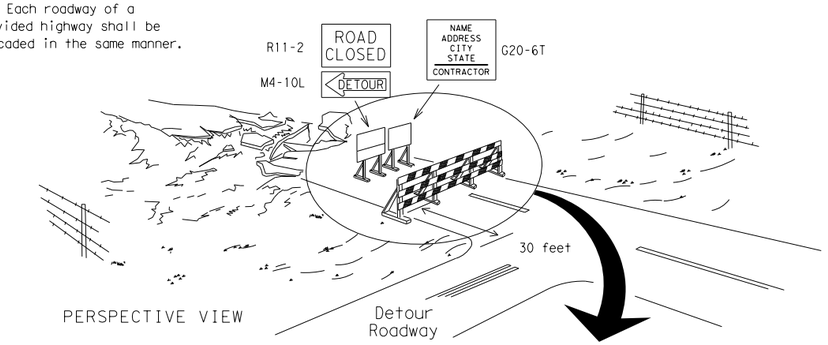
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

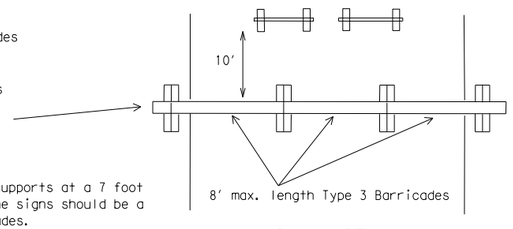
Each roadway of a divided highway shall be barricaded in the same manner.



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.

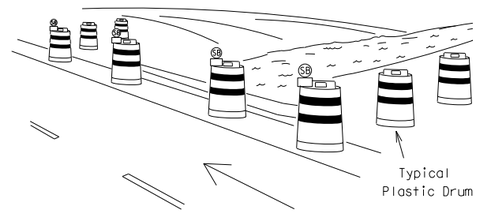
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

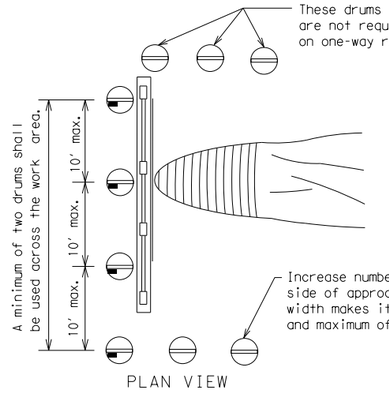
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

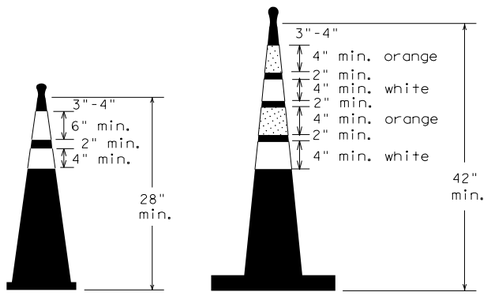
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

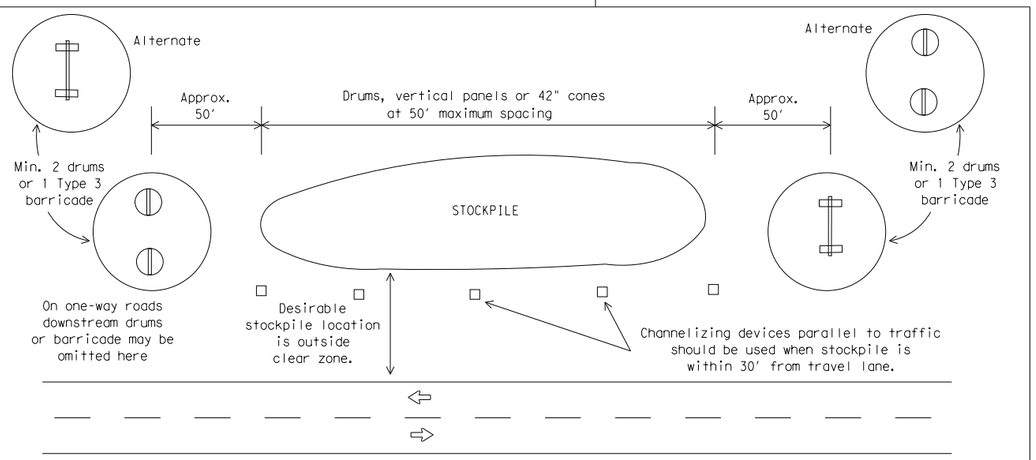
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

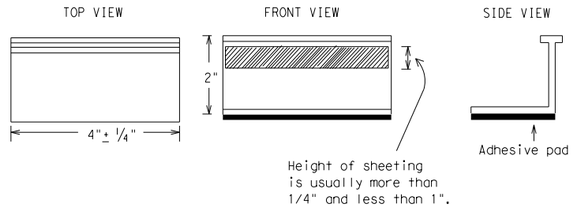
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21	915	12	696,ETC	CS
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	SA	BEXAR		55

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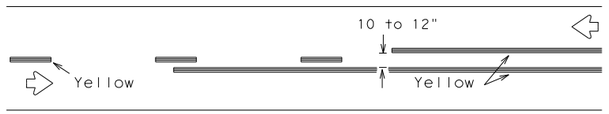
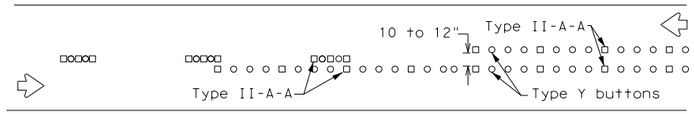
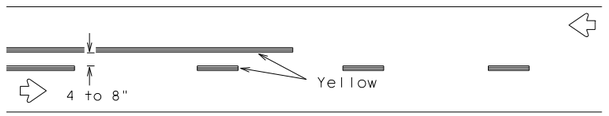
PAVEMENT MARKING PATTERNS



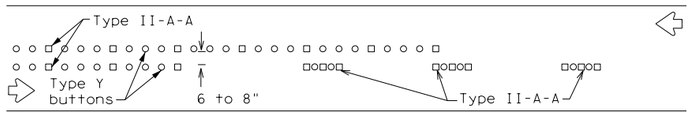
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



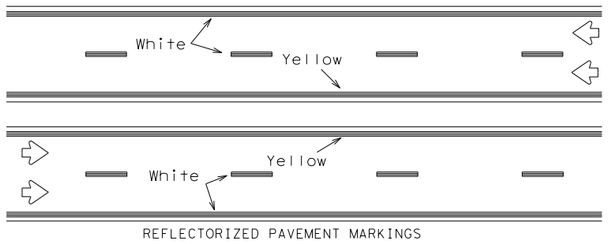
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



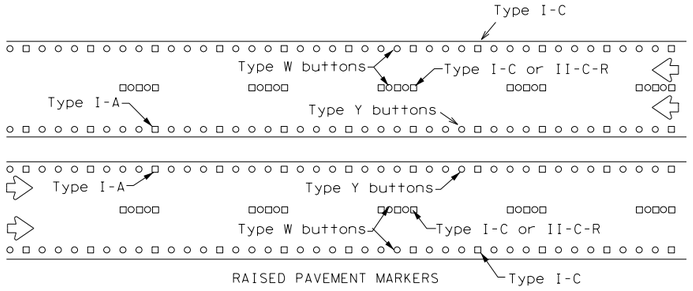
RAISED PAVEMENT MARKERS - PATTERN B

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



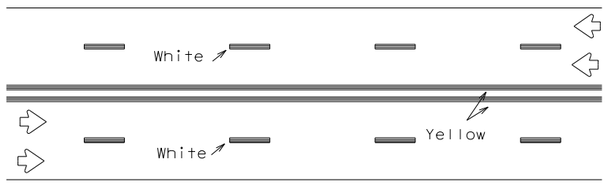
REFLECTORIZED PAVEMENT MARKINGS



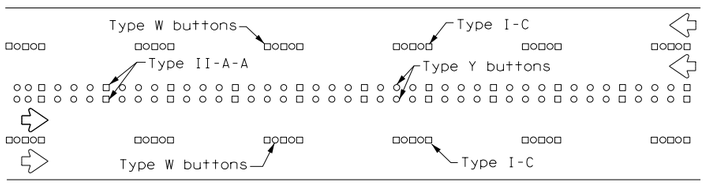
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



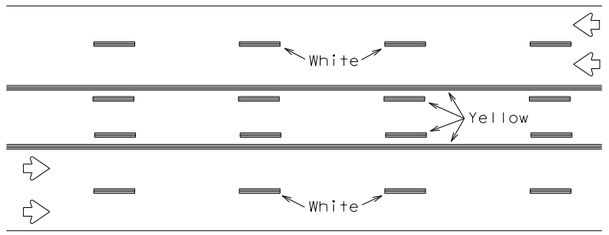
REFLECTORIZED PAVEMENT MARKINGS



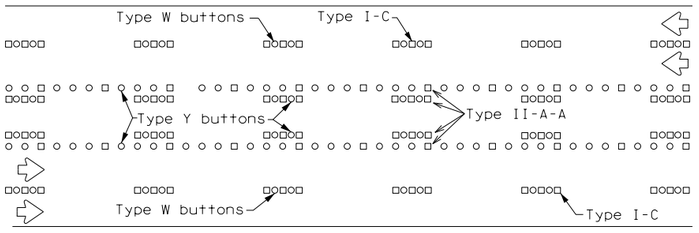
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

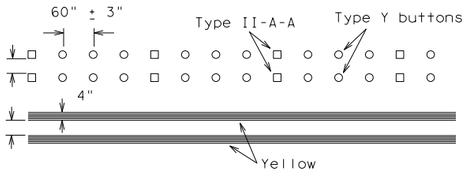
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

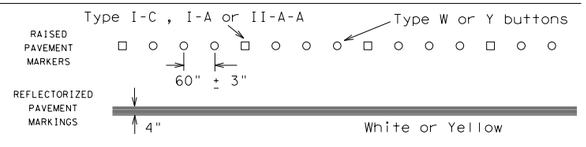
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

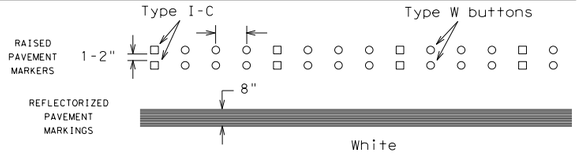


EDGE LINE OR SINGLE NO-PASSING LINE



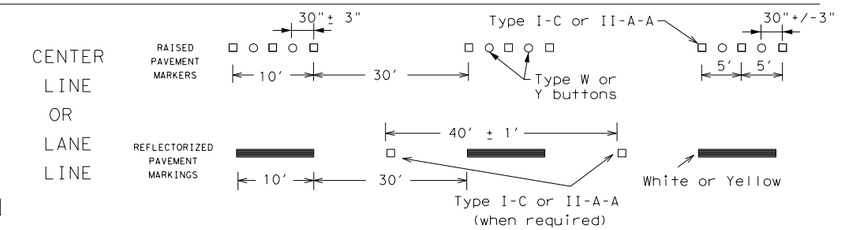
WIDE LINE

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

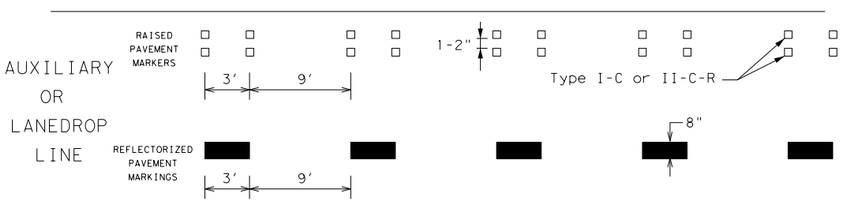


BROKEN LINES

CENTER LINE OR LANE LINE

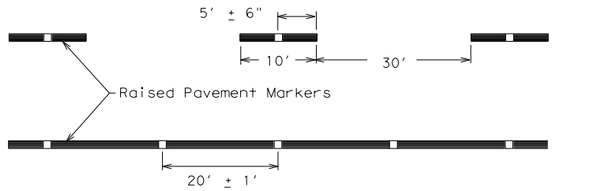


AUXILIARY OR LANEDROP LINE



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."

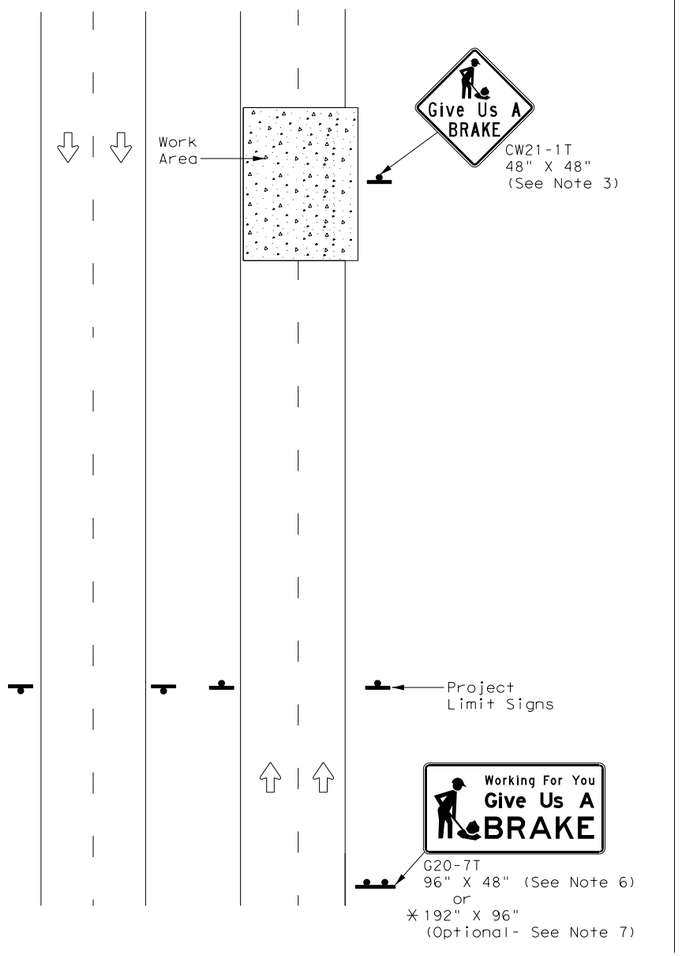
Texas Department of Transportation

Traffic Safety Division Standard

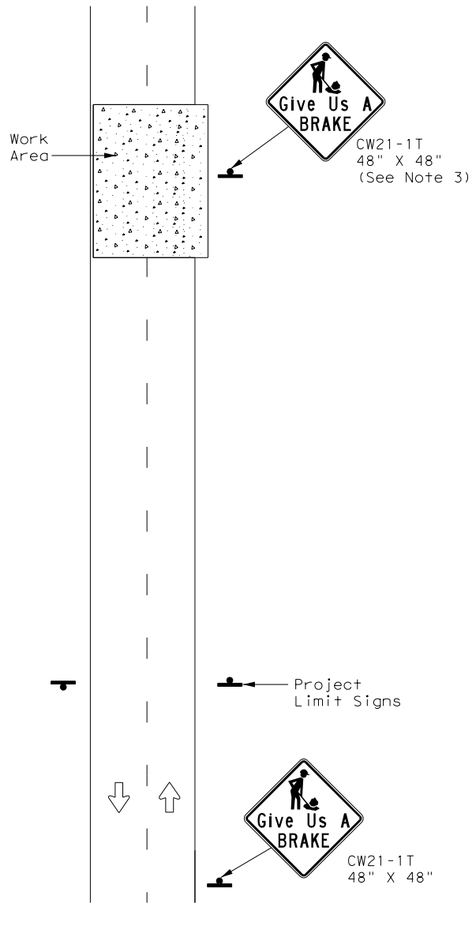
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

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	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		56



DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

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

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

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
6-96 5-98 7-13 8-96 3-03	DIST	COUNTY		SHEET NO.
	SA	BEXAR		57

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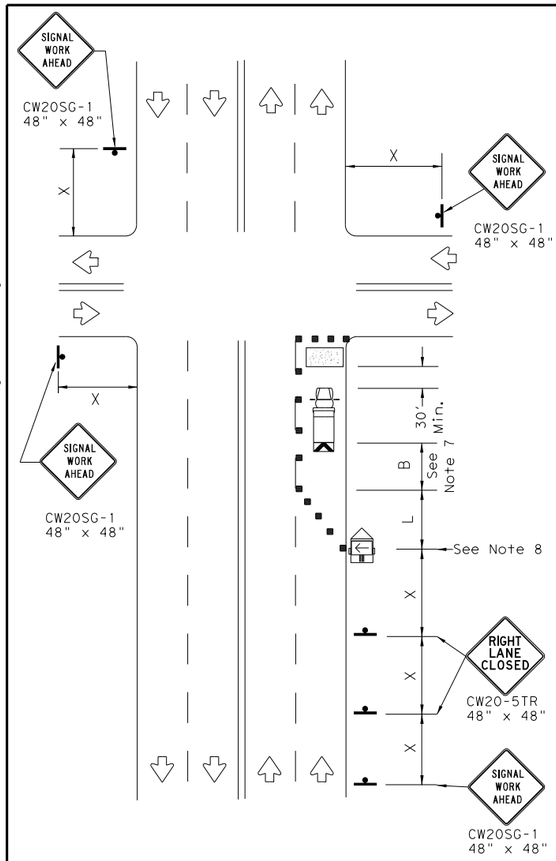
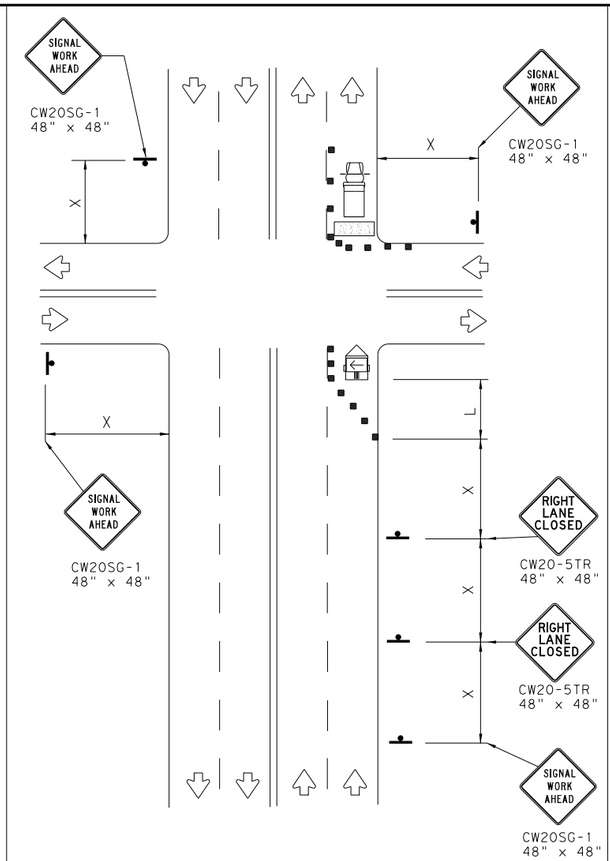


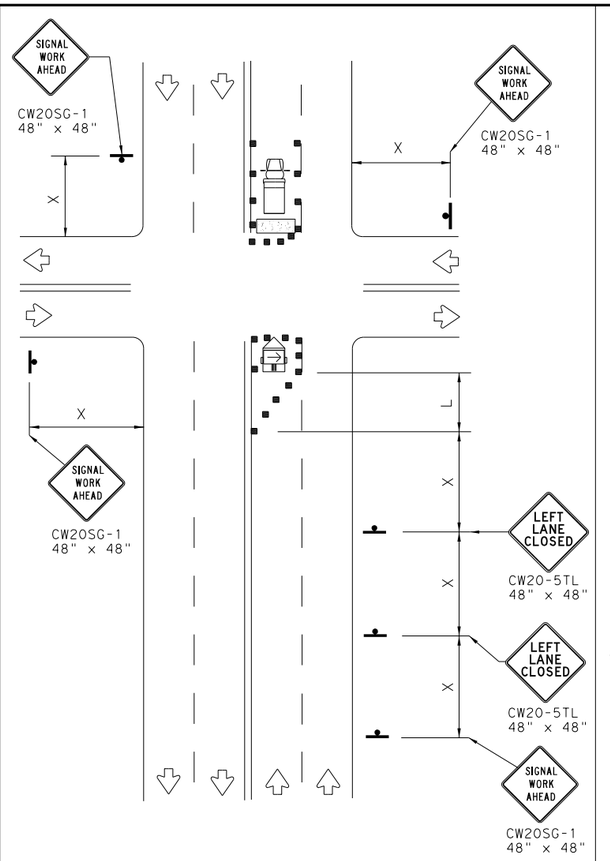
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



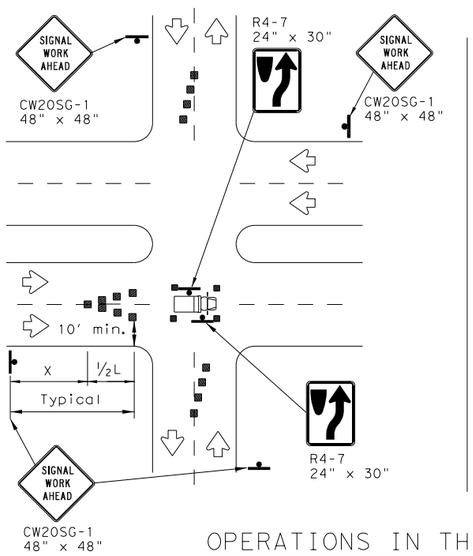
FAR SIDE RIGHT LANE CLOSURE

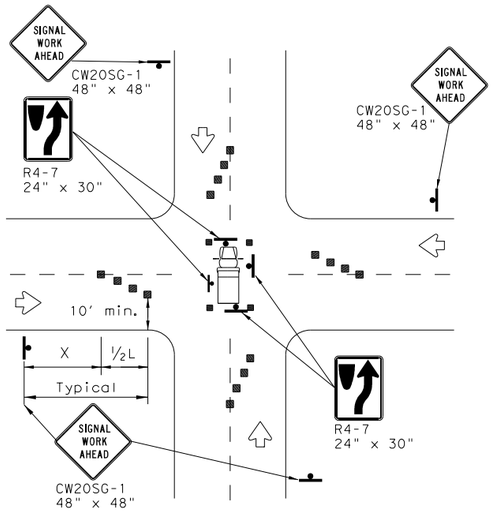
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	SA	BEXAR		58

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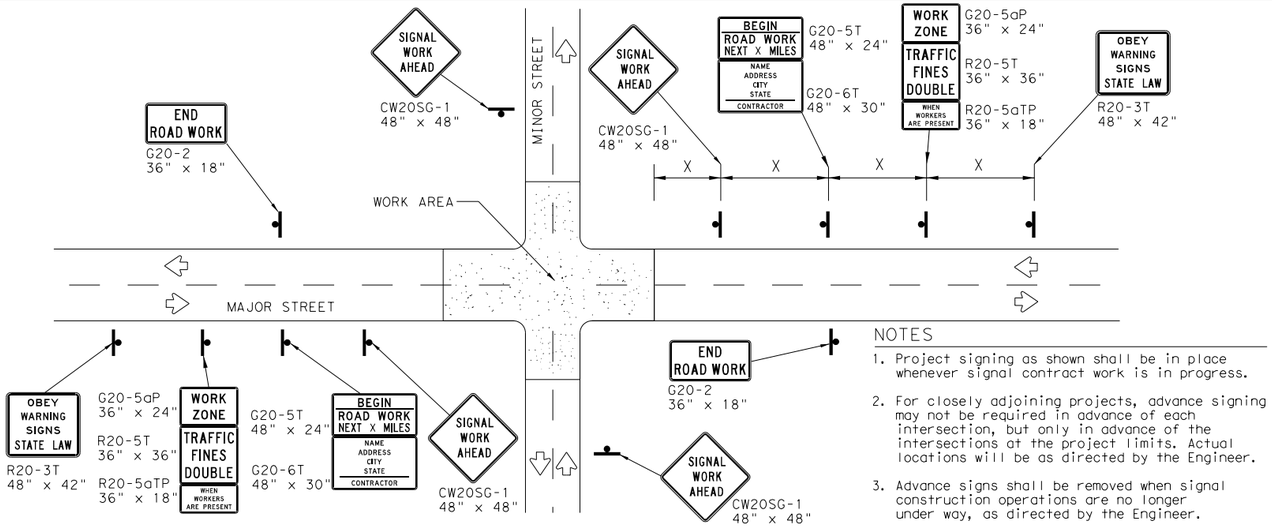


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

DURATION OF WORK

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

SIGN MOUNTING HEIGHT

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

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

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

SIGN SUPPORT WEIGHTS

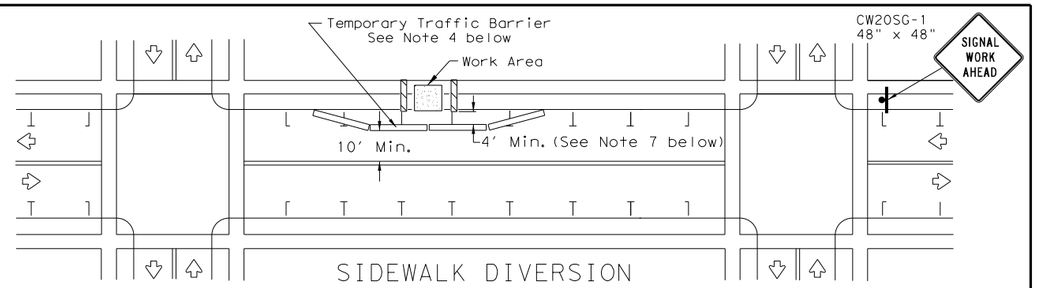
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

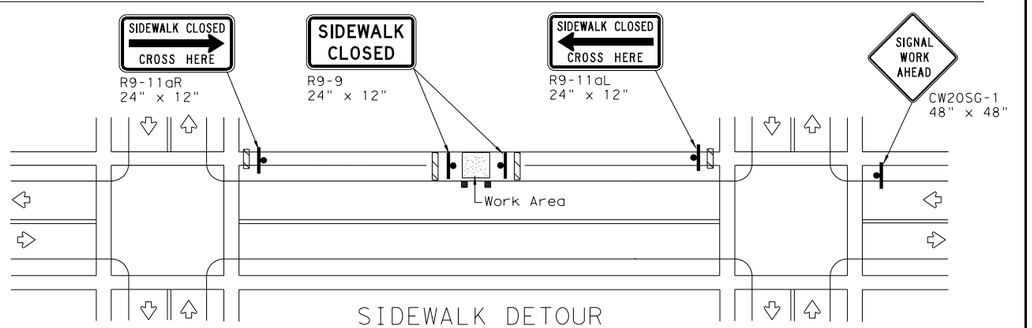
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

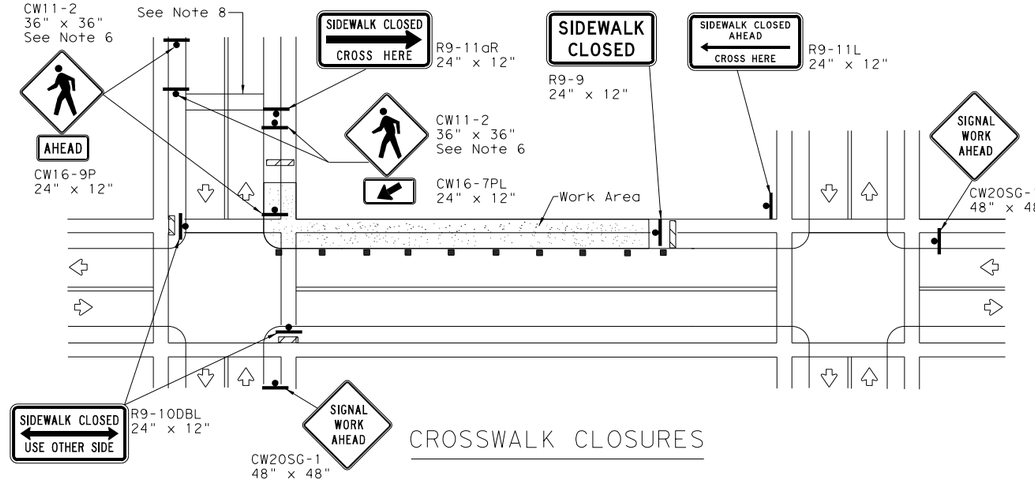
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

FILE:	wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		915	12	696, ETC	CS
2-98 10-99 7-13		DIST	COUNTY		SHEET NO.
4-98 3-03		SA	BEXAR		59

115

DATE: 7/3/2023 11:12:28 AM
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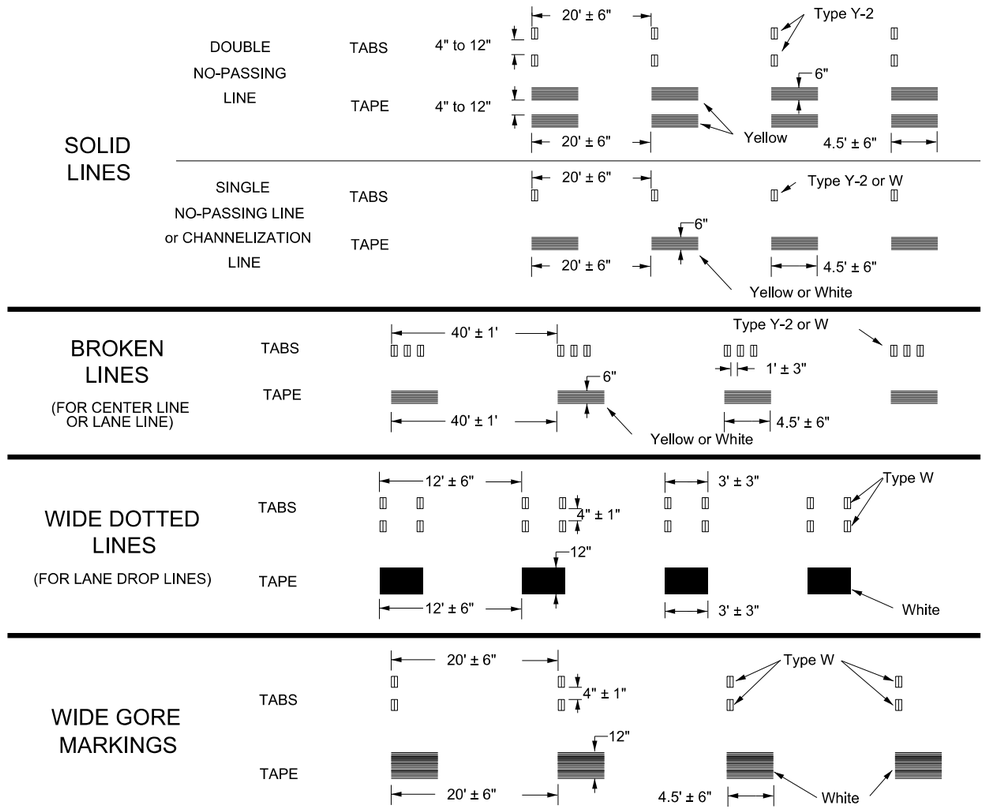
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



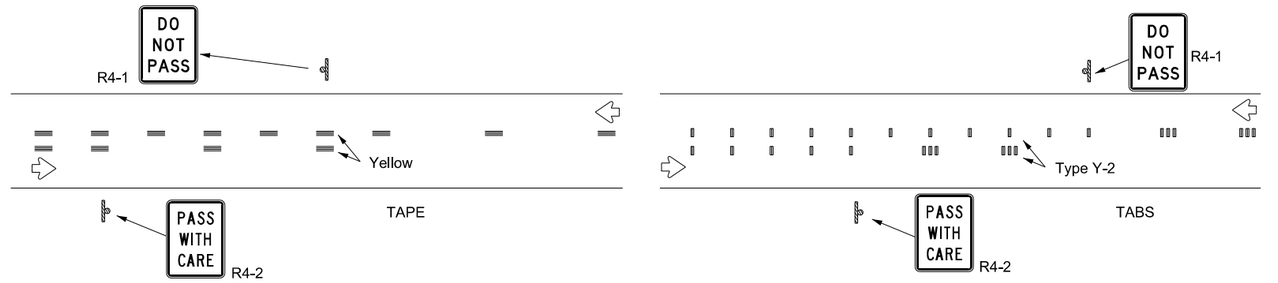
NOTES:

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

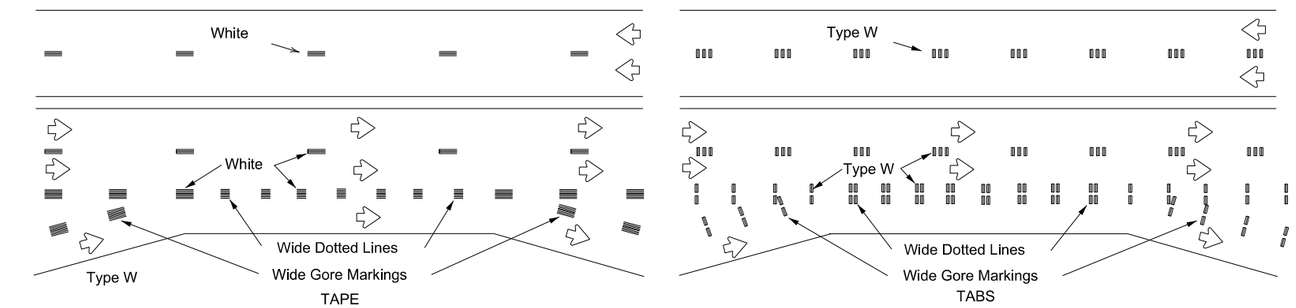
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

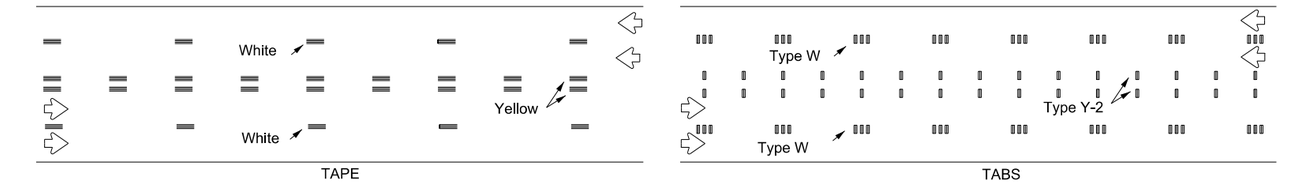
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



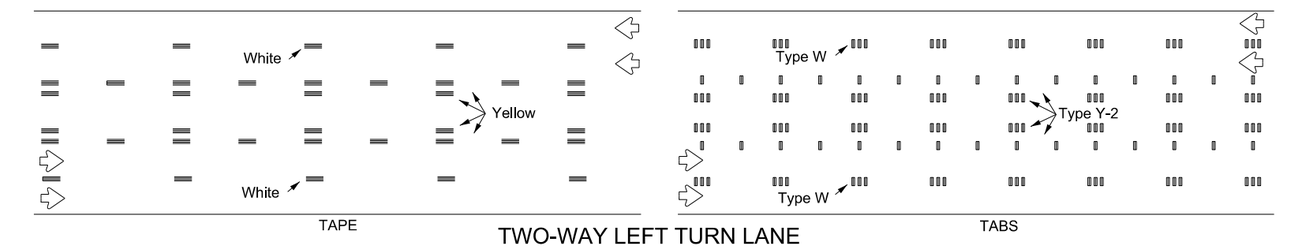
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



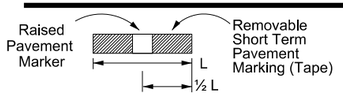
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
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4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	SA	BEXAR		60

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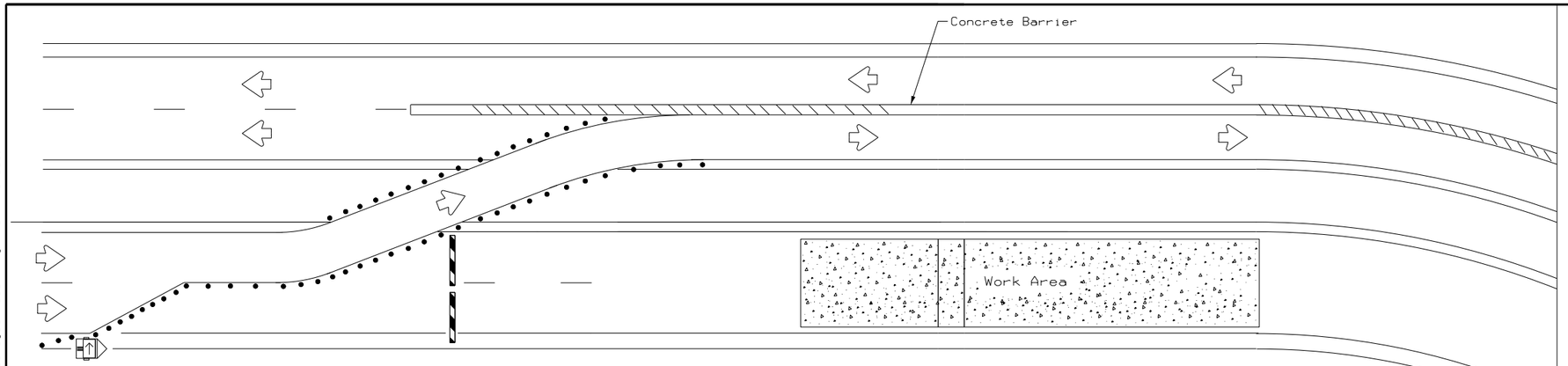


NOTES:

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

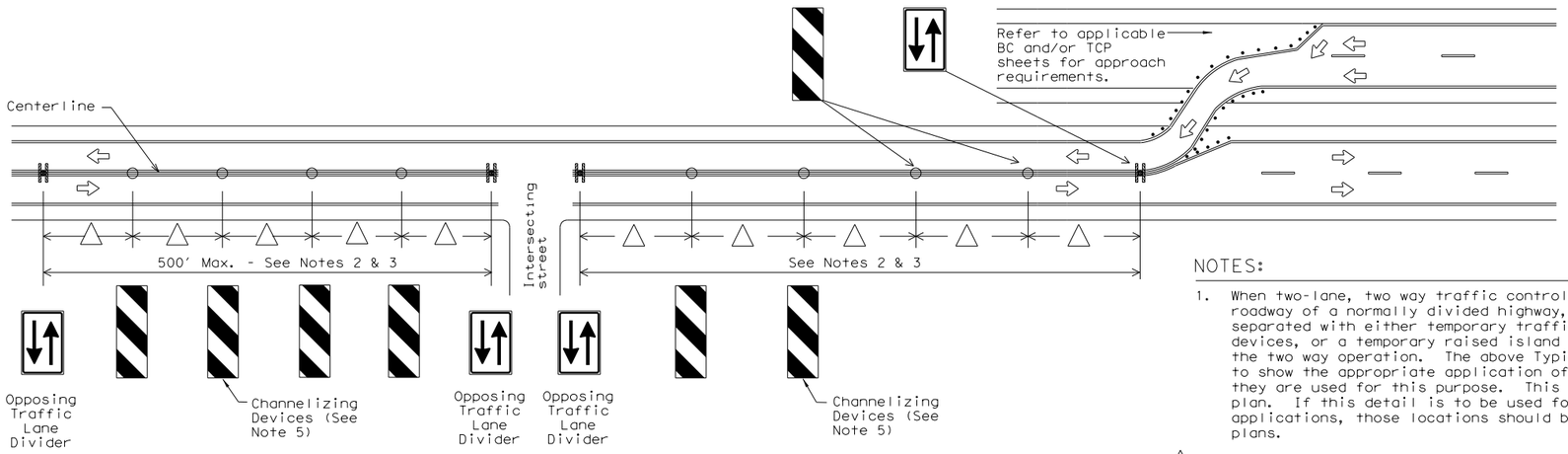
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\\\\	Safety glare screen

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

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

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



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

NOTES:

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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	SA	BEXAR		61

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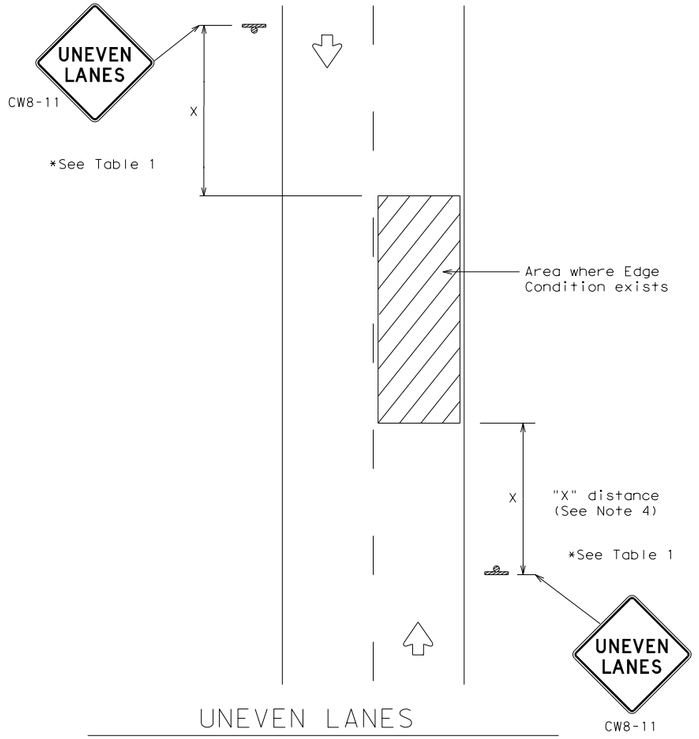
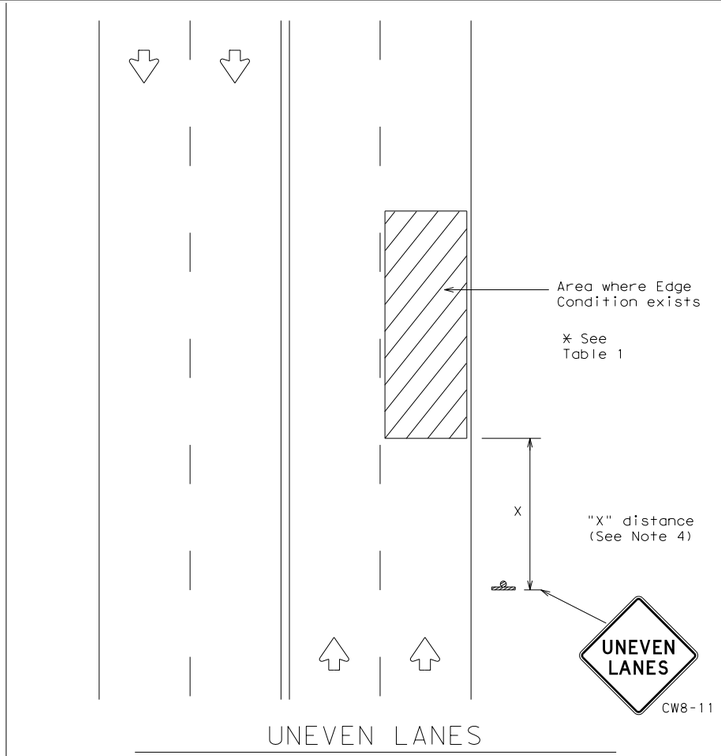
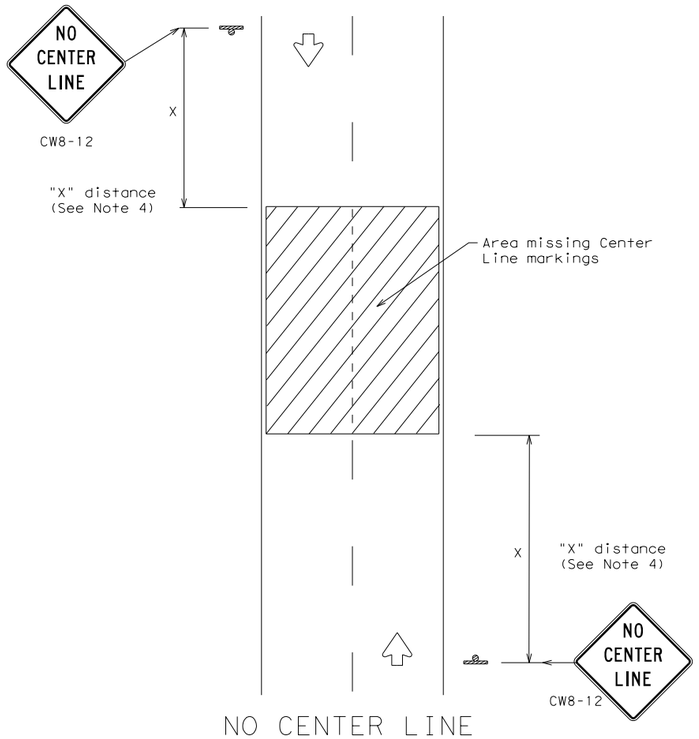


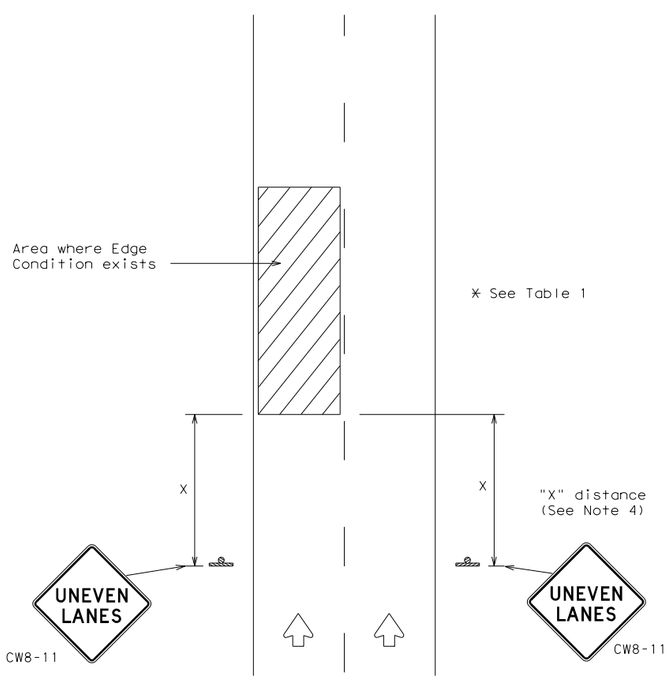
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

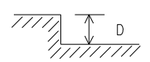
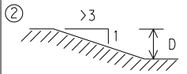
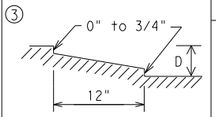
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	SA	BEXAR		62

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DATE: 7/3/2023
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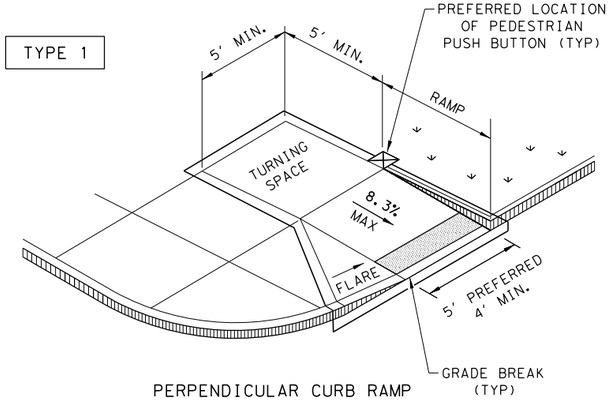
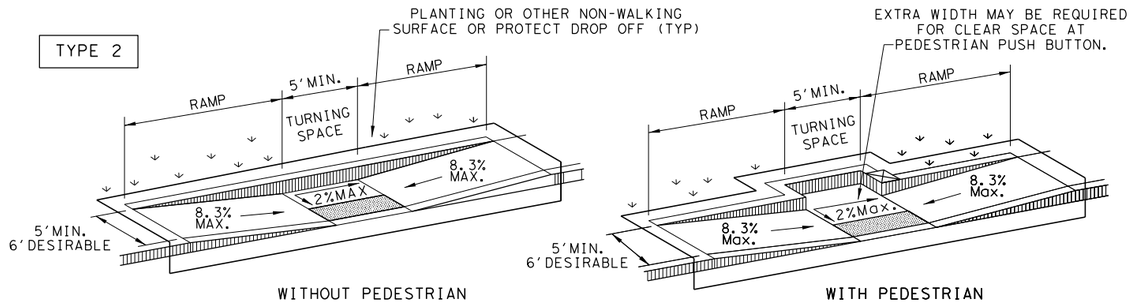


PERPENDICULAR CURB RAMP

TYPE 2

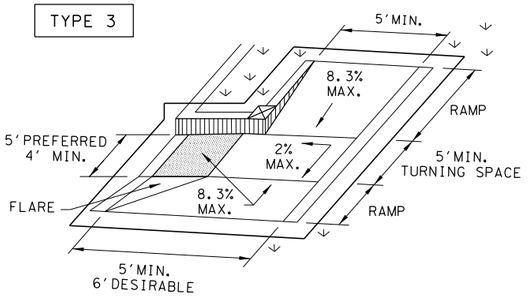


WITHOUT PEDESTRIAN PUSH BUTTON

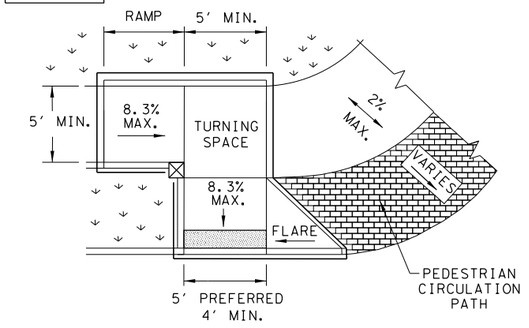
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

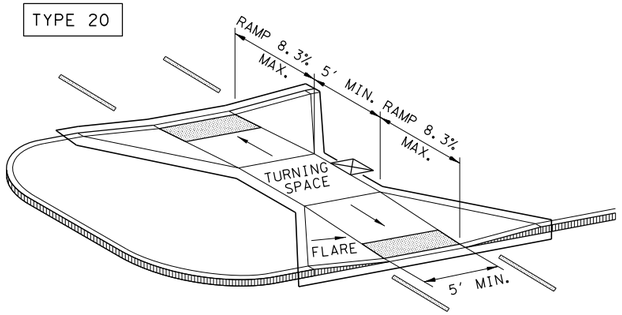


TYPE 6



COMBINATION CURB RAMPS

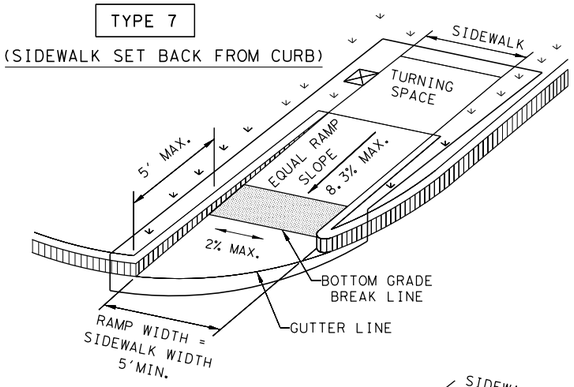
TYPE 20



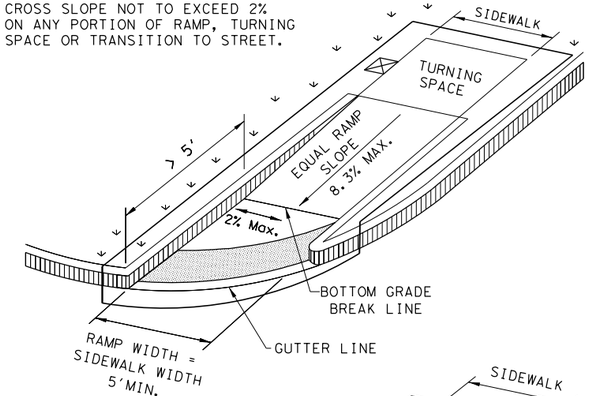
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

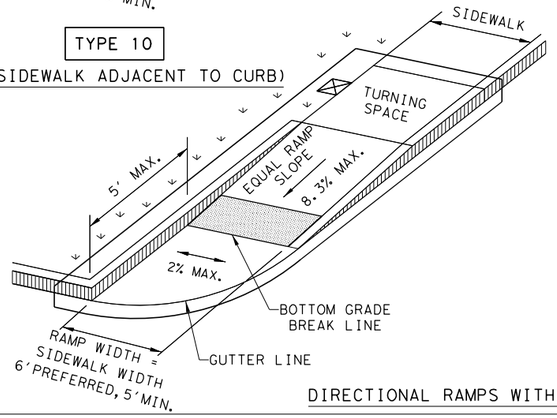


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

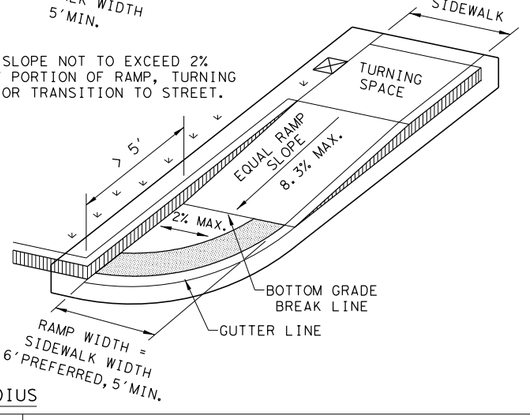


TYPE 10

(SIDEWALK ADJACENT TO CURB)

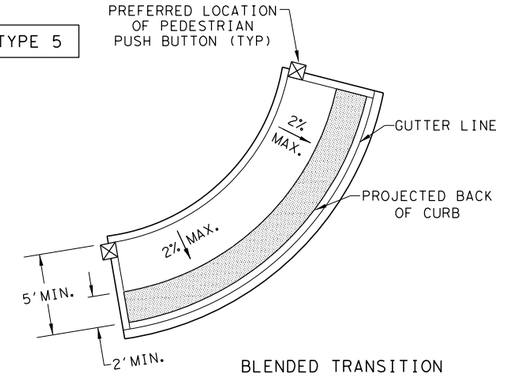


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

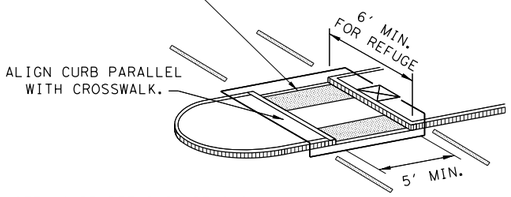
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

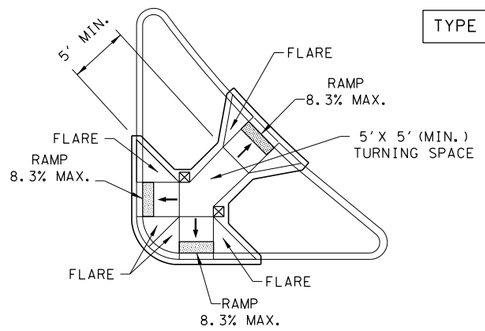
TYPE 21

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

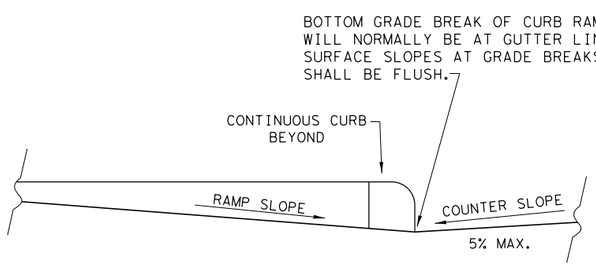


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696, ETC	CS
REVISED 08,2005	DIST	COUNTY		SHEET NO.
REVISED 06,2012	SA	BEXAR		63
REVISED 01,2018				

DATE: 7/3/2023
FILE: P:\122\IT\06\Design\Civil\Standards\Traffic Signals\ped18.dgn

GENERAL NOTES

CURB RAMPS

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

DETECTABLE WARNING MATERIAL

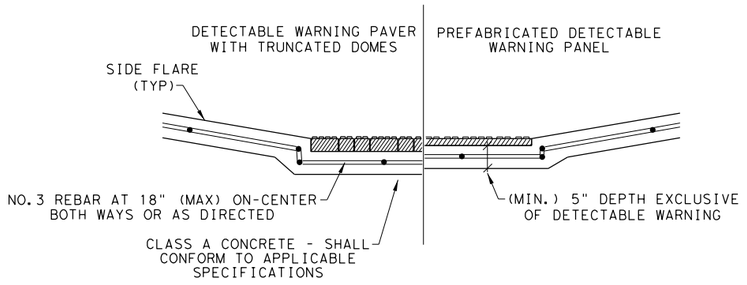
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

DETECTABLE WARNING PAVERS (IF USED)

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

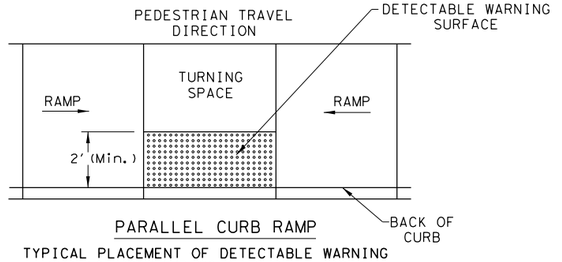
SIDEWALKS

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



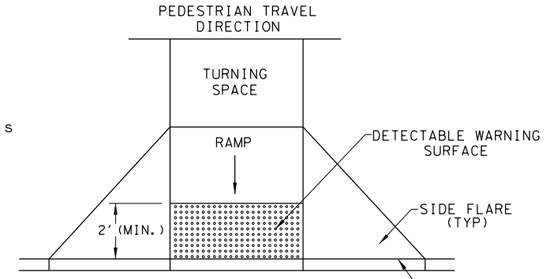
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



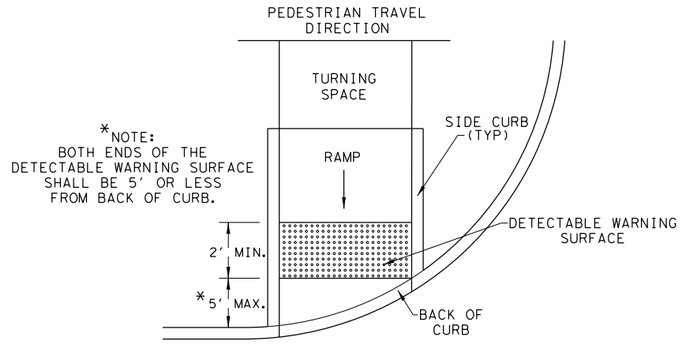
PARALLEL CURB RAMP

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



PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation

Design Division Standard

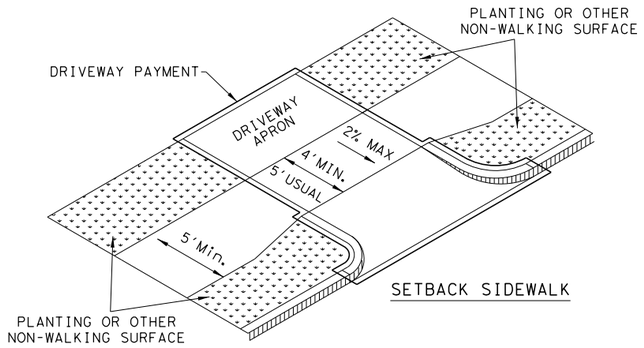
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

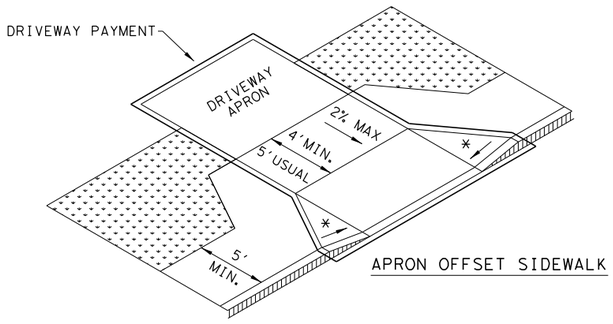
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
	CONT	SECT	JOB	HIGHWAY	
REVISIONS REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	915	12	696,ETC	CS	
	DIST	COUNTY		SHEET NO.	
	SA	BEXAR		64	

DATE: 7/3/2023
FILE: P:\122\17\06\Design\Civil\Standards\Traffic Signals\ped18.dgn

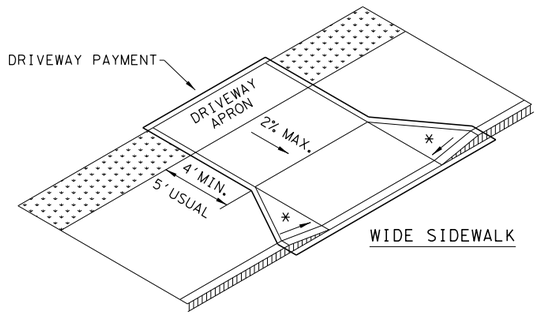
SIDEWALK TREATMENT AT DRIVEWAYS



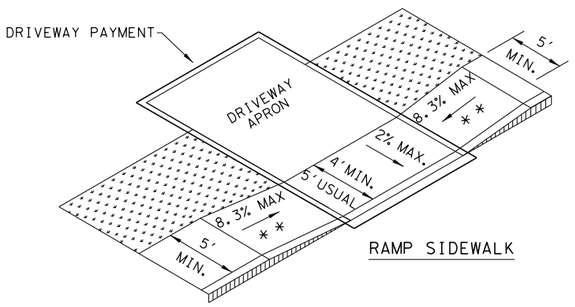
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

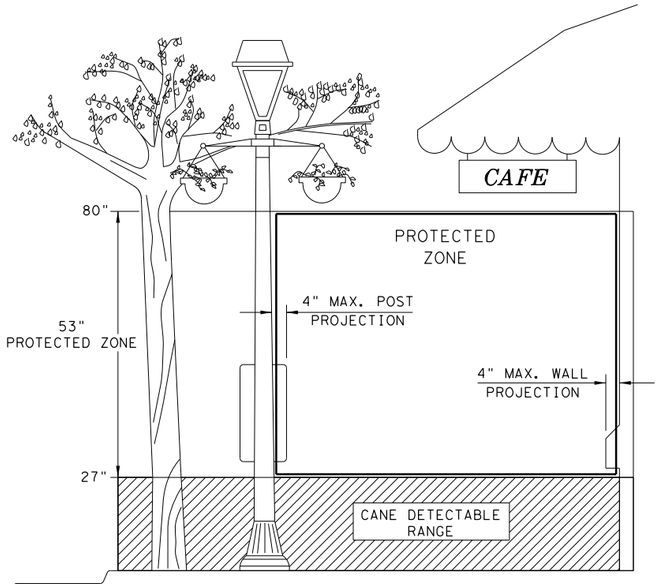


RAMP SIDEWALK

NOTES:

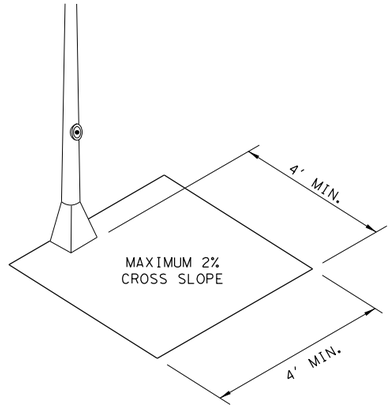
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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

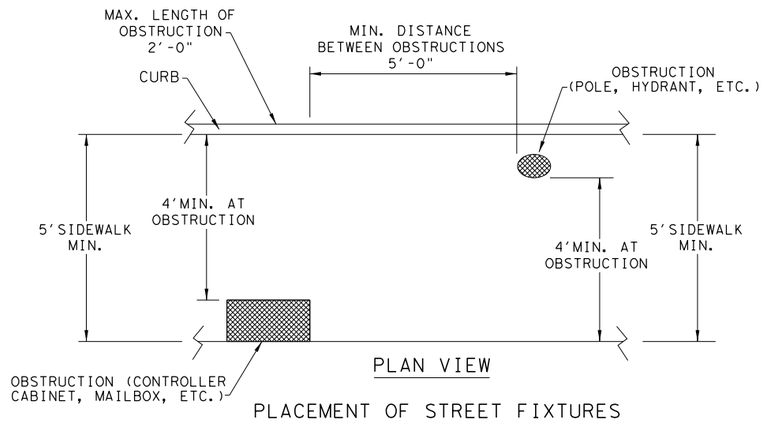


PROTECTED ZONE

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



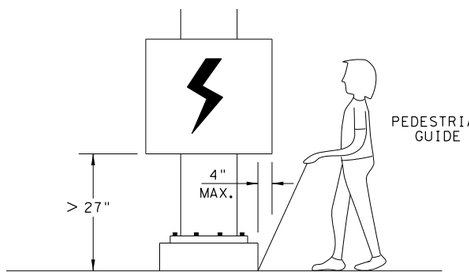
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



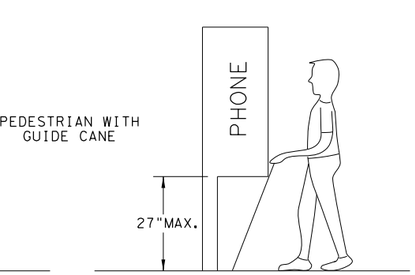
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

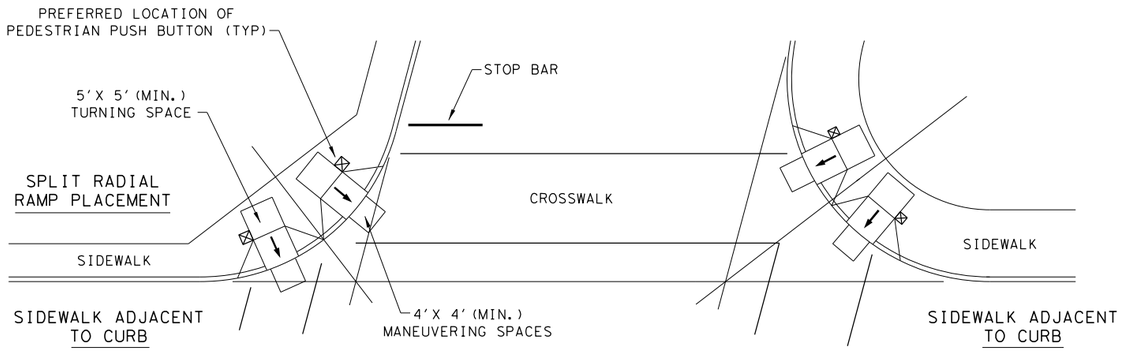
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696, ETC	CS
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	SA	BEXAR		65

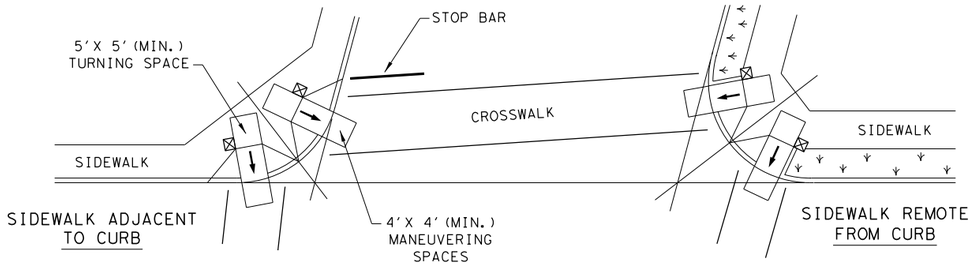
DATE: 7/3/2023
FILE: P:\122\17\06\Design\Civil\Standards\Traffic Signals\ped18.dgn

TYPICAL CROSSING LAYOUTS

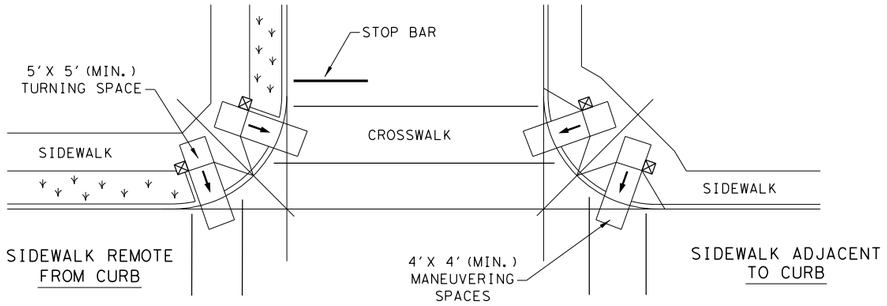
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



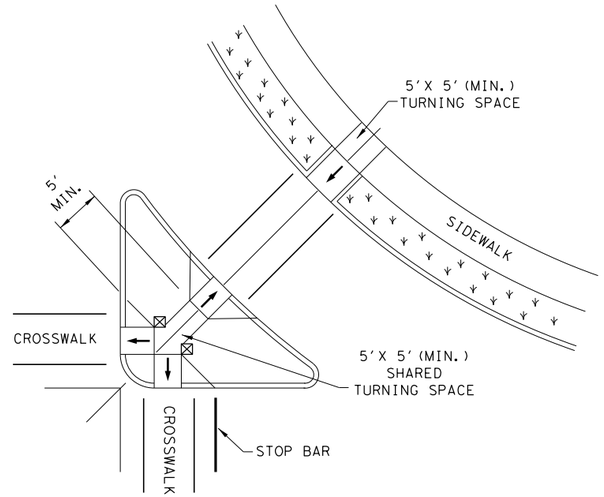
SKEWED INTERSECTION WITH "LARGE" RADIUS



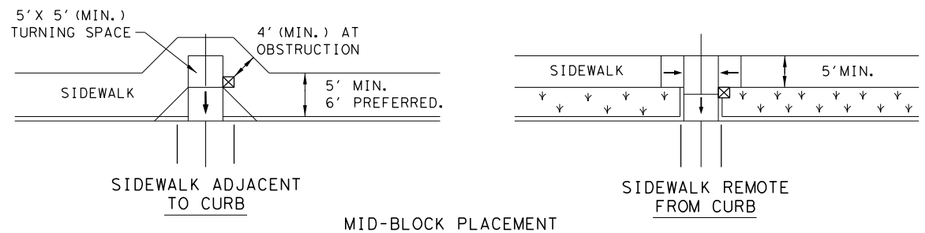
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

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

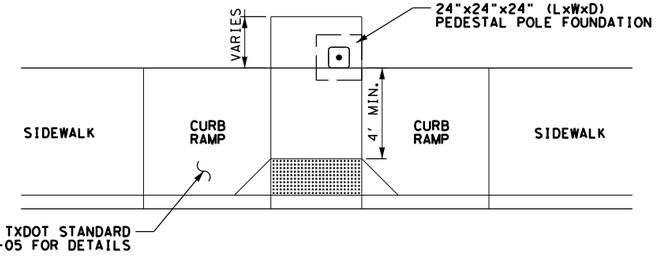
SHEET 4 OF 4

Texas Department of Transportation — Design Division Standard

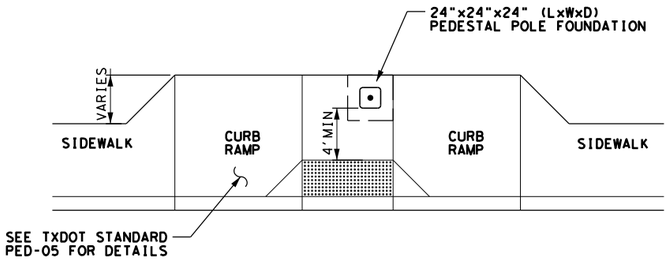
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

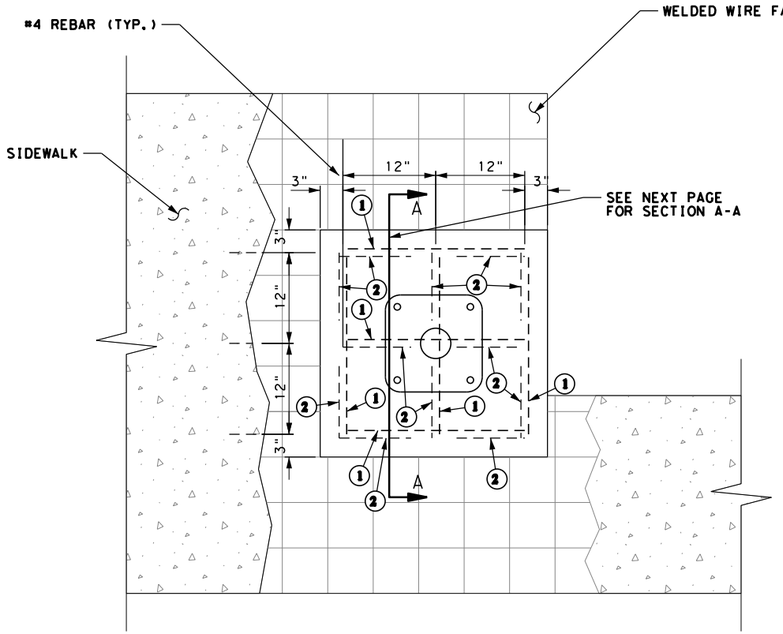
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696, ETC	CS
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	SA	BEXAR		66



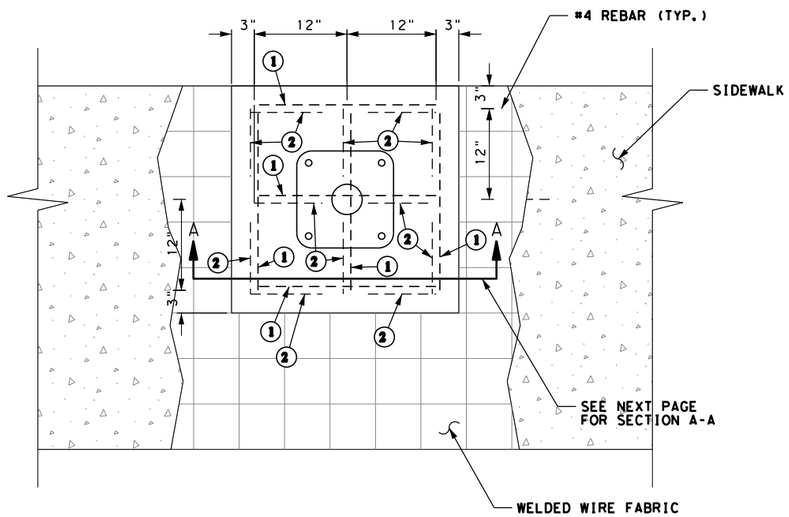
TYPICAL 24" x 24" FOUNDATION WIDE SIDEWALK DETAIL
NOT TO SCALE



TYPICAL 24" x 24" FOUNDATION NARROW SIDEWALK DETAIL
NOT TO SCALE



PEDESTAL POLE FOUNDATION PLAN VIEW
NOT TO SCALE



PEDESTAL POLE FOUNDATION PLAN VIEW
NOT TO SCALE

NOTES:
1. ALL REBAR SHALL BE #4 BARS.
2. SEE SHEET 2 OF 2 FOR SECTION A-A

KEYNOTES

① 18"

② 9" / 18"

③ 12"

DESIGN
STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER
JUSTIN W. CLARK, P.E. — 7/3/2023 DATE

APPROVAL
STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER
GILMER D. GASTON, P.E. — 7/3/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

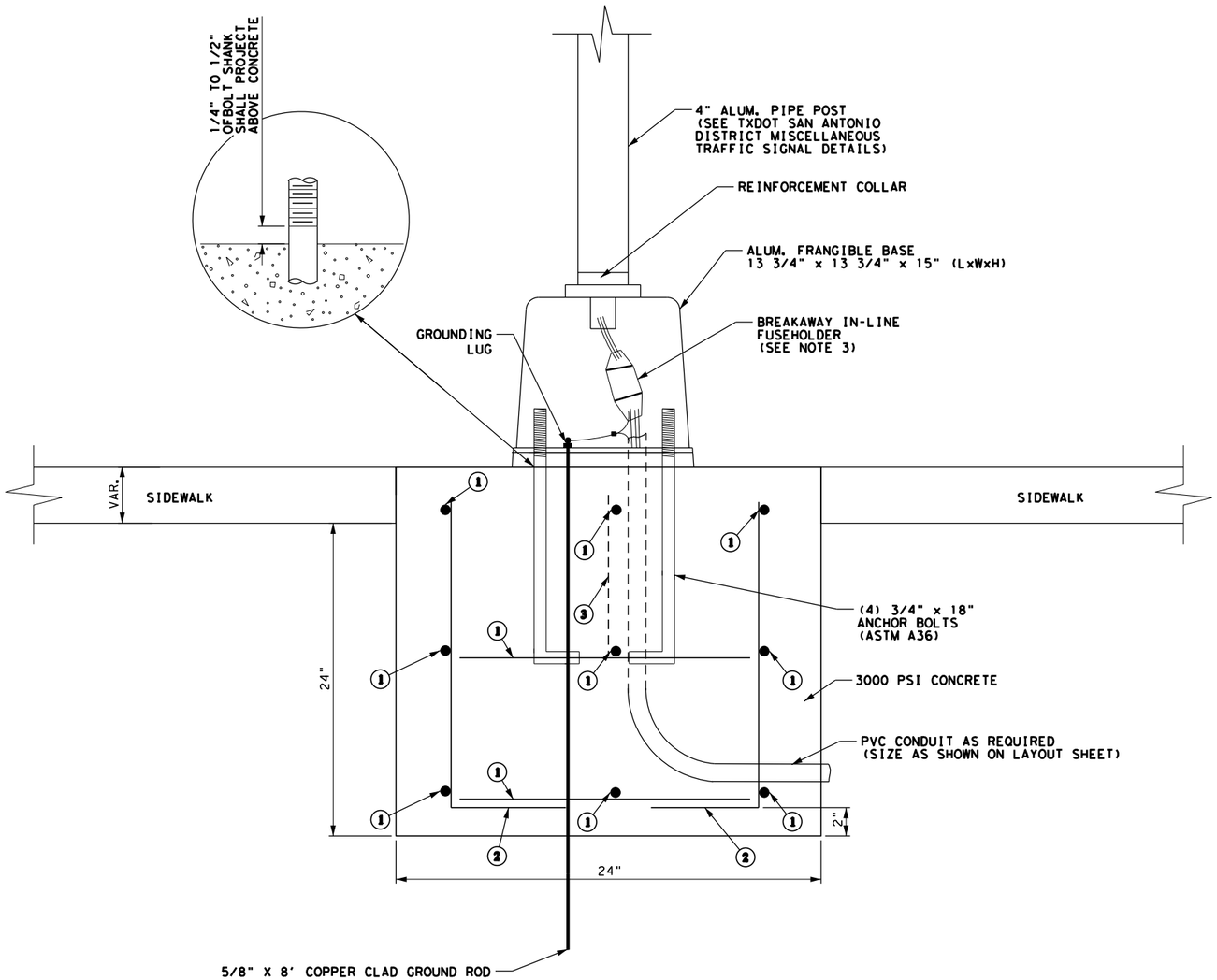
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY
IMPROVEMENT PROGRAM FY 23

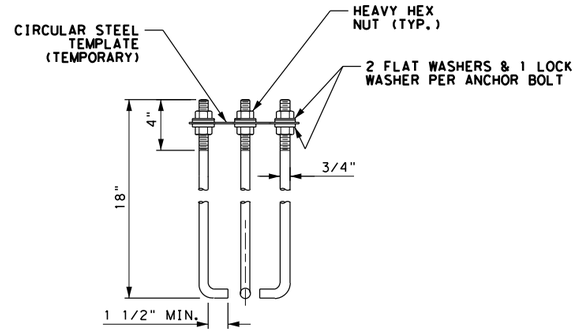
PEDESTAL POLE
SPECIAL FOUNDATION

SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	67



SECTION A-A
NOT TO SCALE



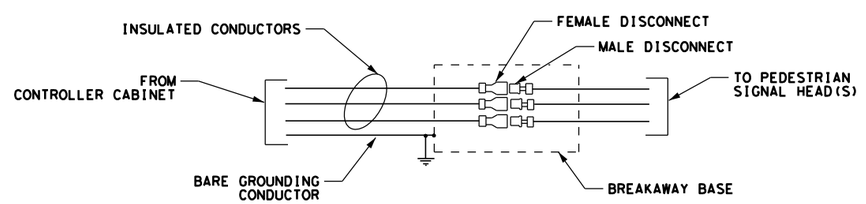
HOOKED ANCHOR
NOT TO SCALE

KEYNOTES

1. 18"
2. 9" / 18"
3. 12"

NOTES:

1. THE PEDESTAL POLE ASSEMBLY DEPICTED ON THIS SHEET IS DESIGNED FOR SIGNAL HEADS WHERE ELECTRICAL POWER IS NEEDED WITH A BREAKAWAY POLE.
2. POLE SHAFT SHALL BE ONE PIECE, SCHEDULE 40 ALUMINUM PIPE, ASTM B429 OR B221 (ALLOY 6061-T6 ONLY). ALUMINUM CONDUIT WILL NOT DEVELOP THE NECESSARY STRENGTH AND WILL NOT BE ALLOWED.
3. ALL ELECTRICAL CONNECTORS FOR BREAKAWAY POLES SHALL BE WATER TIGHT BREAKAWAY FUSEHOLDERS (BUCHANNAN 65U, BUSSMANN HEBW, LETTELFUSE LEB, HMC FLOOD-SEAL, FERRAZ-SHAWMUT, OR EQUAL). FUSES SHALL BE 10 AMP TIME DELAY.
4. CONDUIT IN FOUNDATION AND WITHIN 6 INCHES OF FOUNDATION IS SUBSIDIARY TO THE ITEM, "PEDESTAL POLE ASSEMBLY."
5. PER MANUFACTURER'S RECOMMENDATIONS, ENGAGE ALL THREADS ON THE PEDESTAL POLE BASE AND PIPE UNLESS THE PIPE IS FULLY SEATED INTO BASE.



BREAKAWAY IN-LINE FUSEHOLDERS
NOT TO SCALE

DESIGN
STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER
JUSTIN W. CLARK, P.E. — 7/3/2023 DATE

APPROVAL
STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER
GILMER D. GASTON, P.E. — 7/3/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
911 CENTRAL PKWY N, STE 400 | SAN ANTONIO, TX 78232 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

PEDESTAL POLE SPECIAL FOUNDATION

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	68

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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

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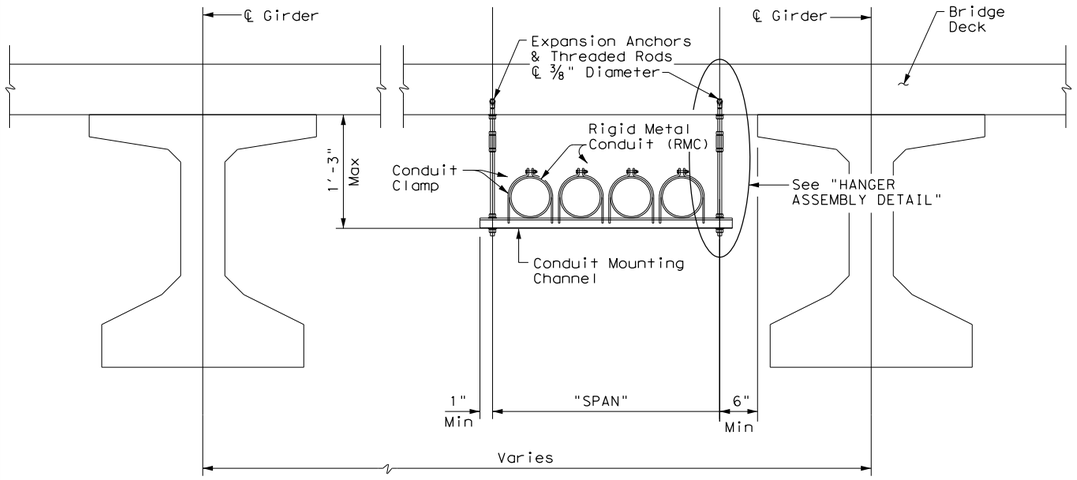
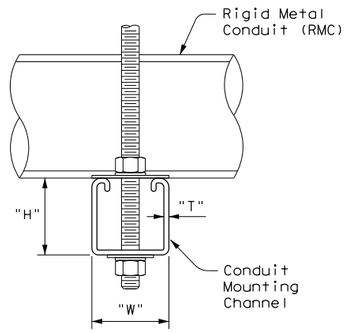
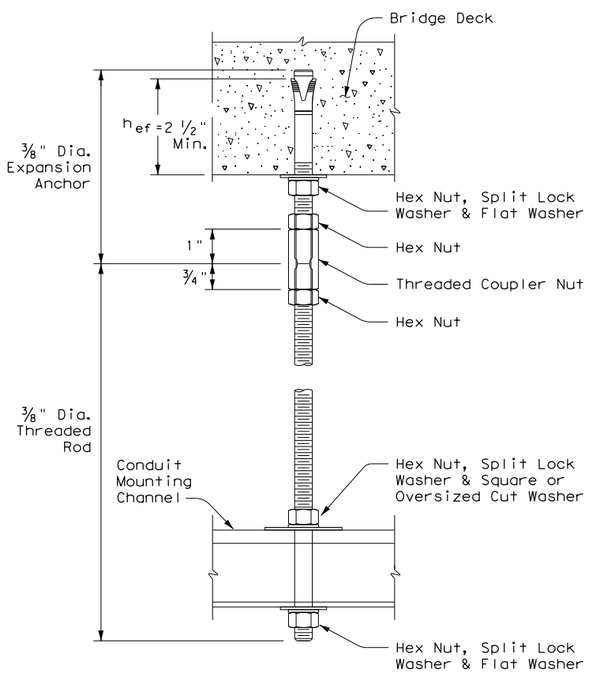


CONDUIT HANGING DETAIL

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.

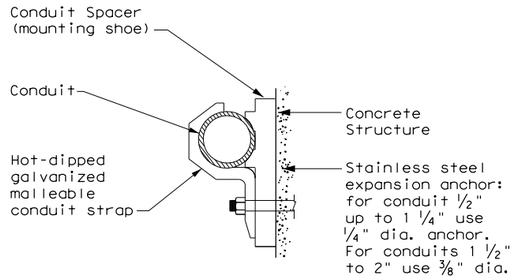
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

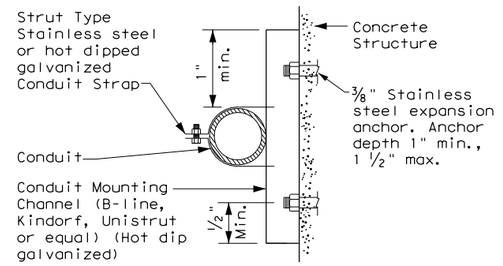




HANGER ASSEMBLY DETAIL

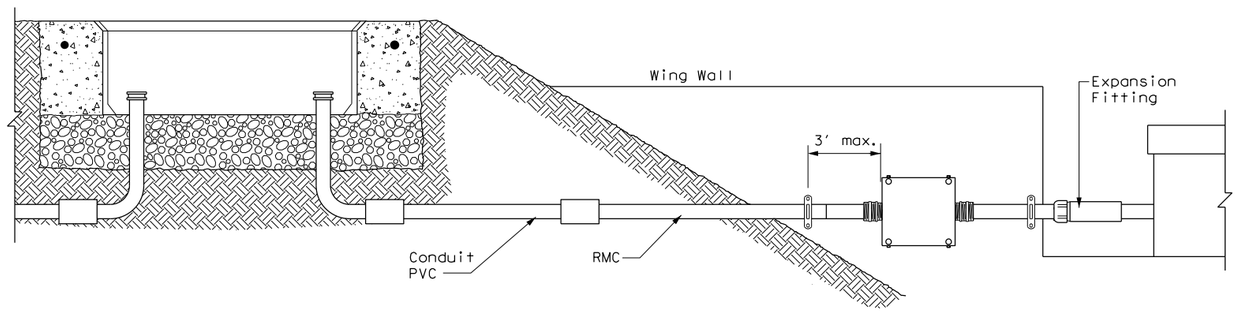
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





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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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.

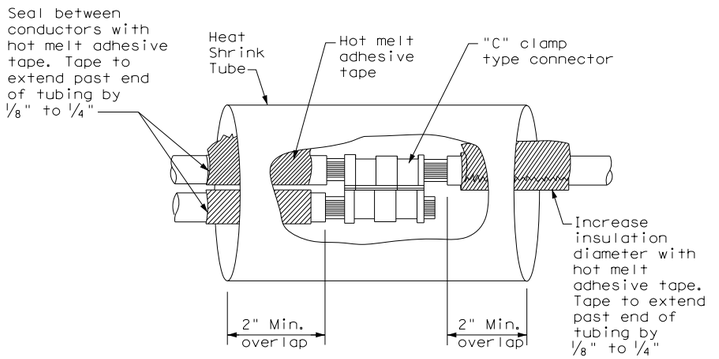
3. Install ground rods so the imprinted part number is at the upper end of the rod.

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
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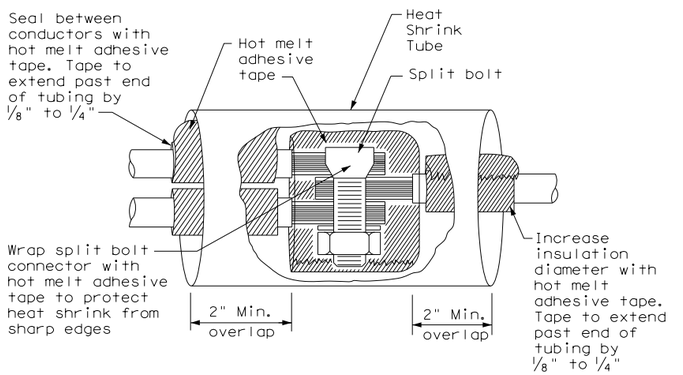
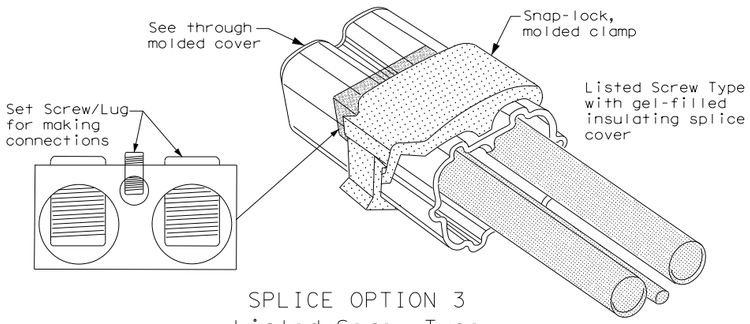


SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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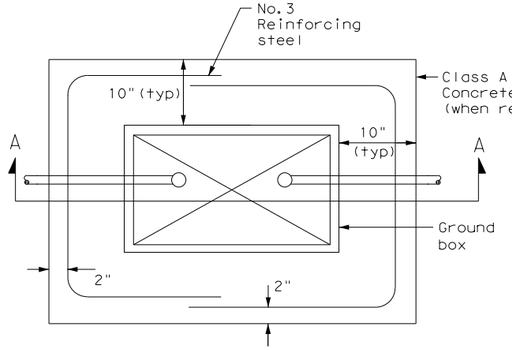
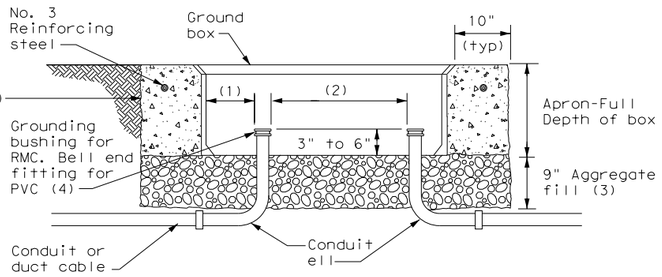


PLAN VIEW



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.

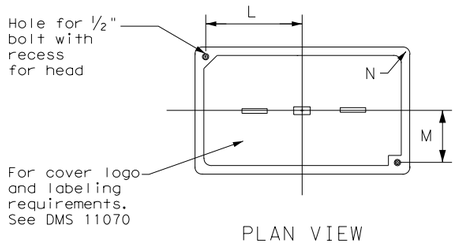
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

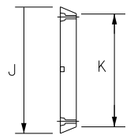
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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



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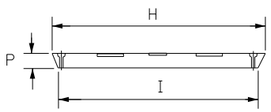

SIDE

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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	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
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	SA	BEXAR		72

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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	

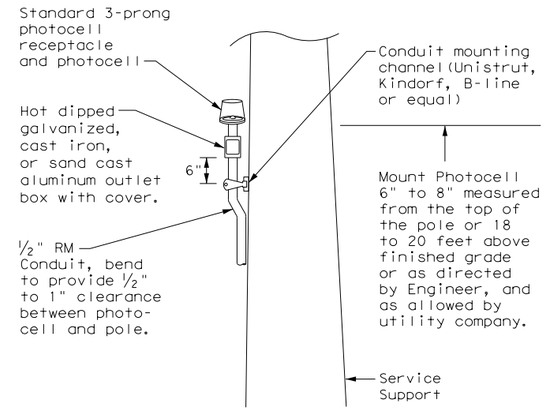
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** 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

ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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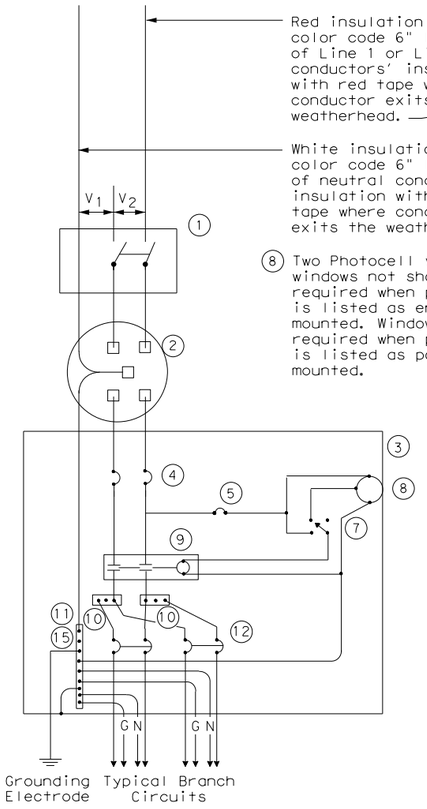
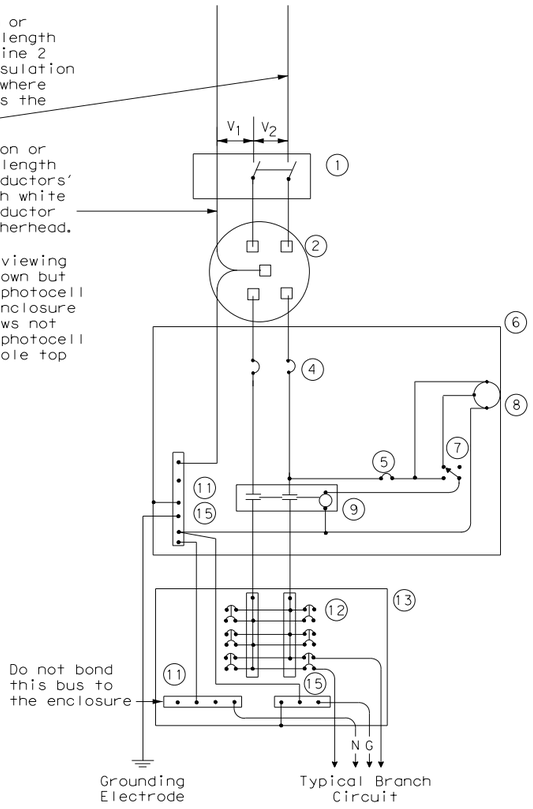
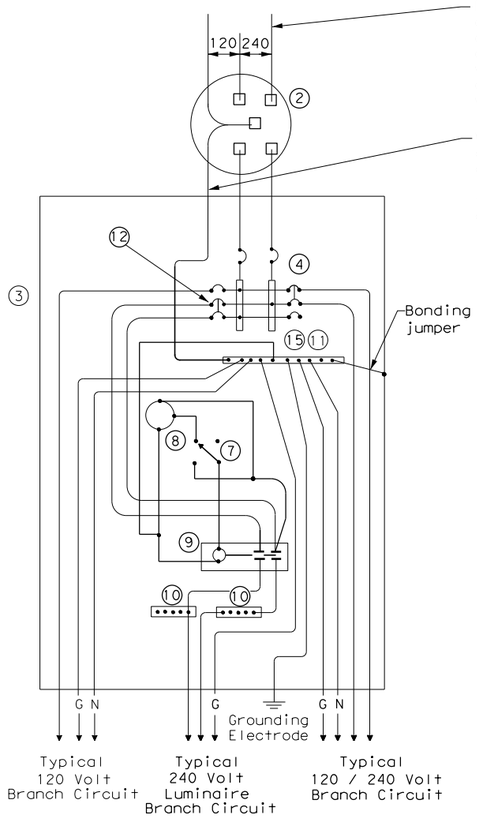


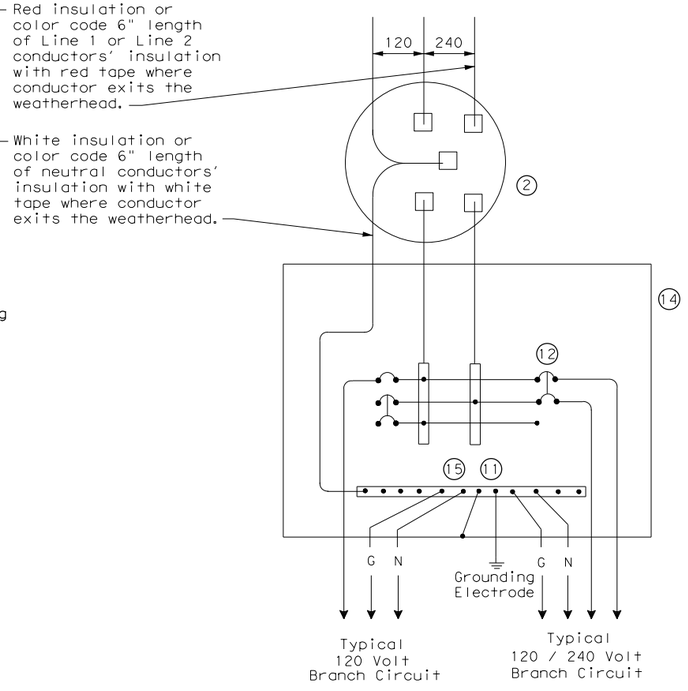
SCHEMATIC TYPE A
THREE WIRE



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

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	SA	BEXAR		74

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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.

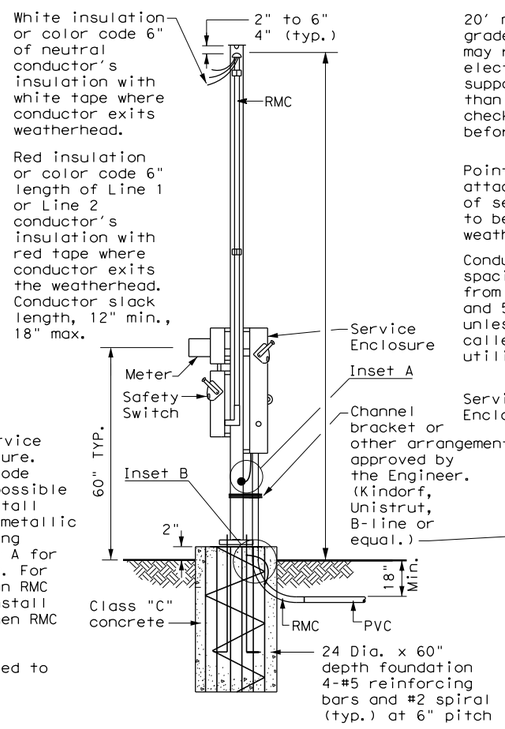
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode 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.

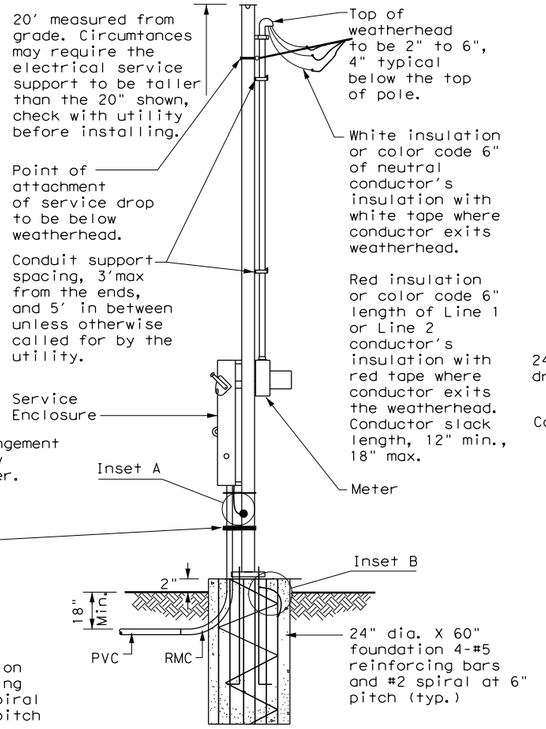
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

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.

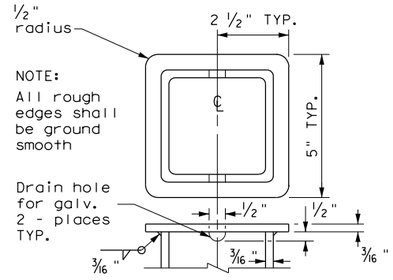


WITH SAFETY SWITCH

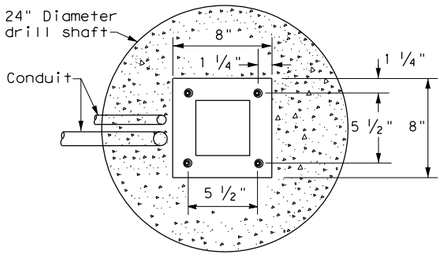


WITHOUT SAFETY SWITCH

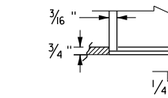
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

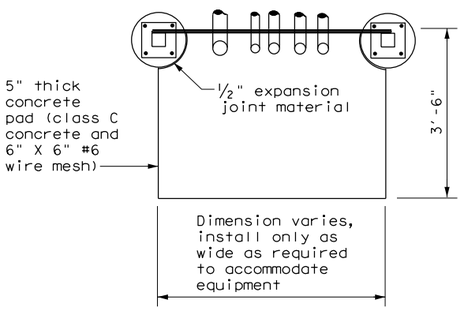


BASE PLATE DETAIL



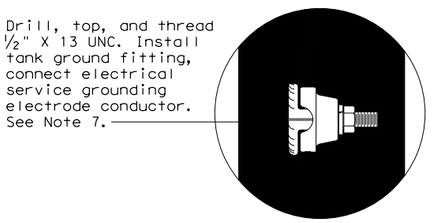
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



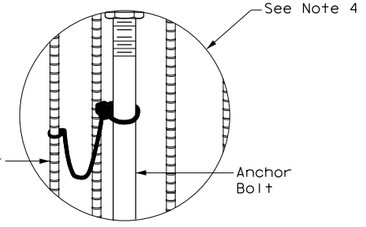
TOP VIEW

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

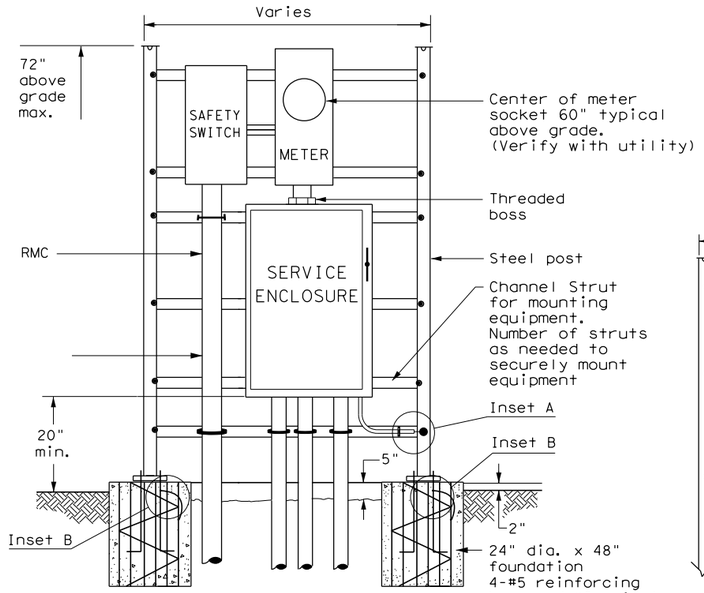


FRONT VIEW

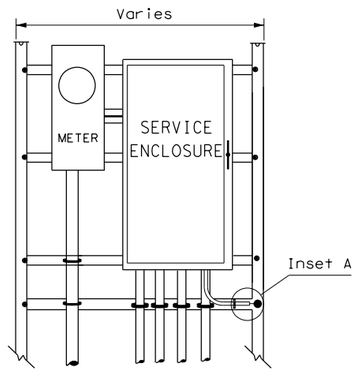
INSET A



INSET B

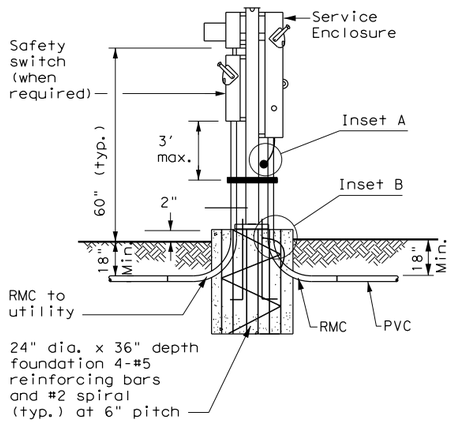


WITH SAFETY SWITCH
FRONT VIEW

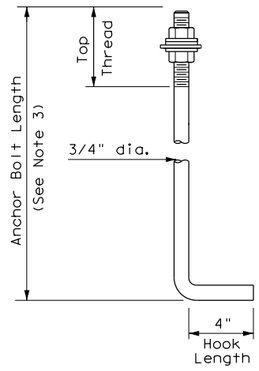


WITHOUT SAFETY SWITCH

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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	DIST	COUNTY		SHEET NO.
	SA	BEXAR		75

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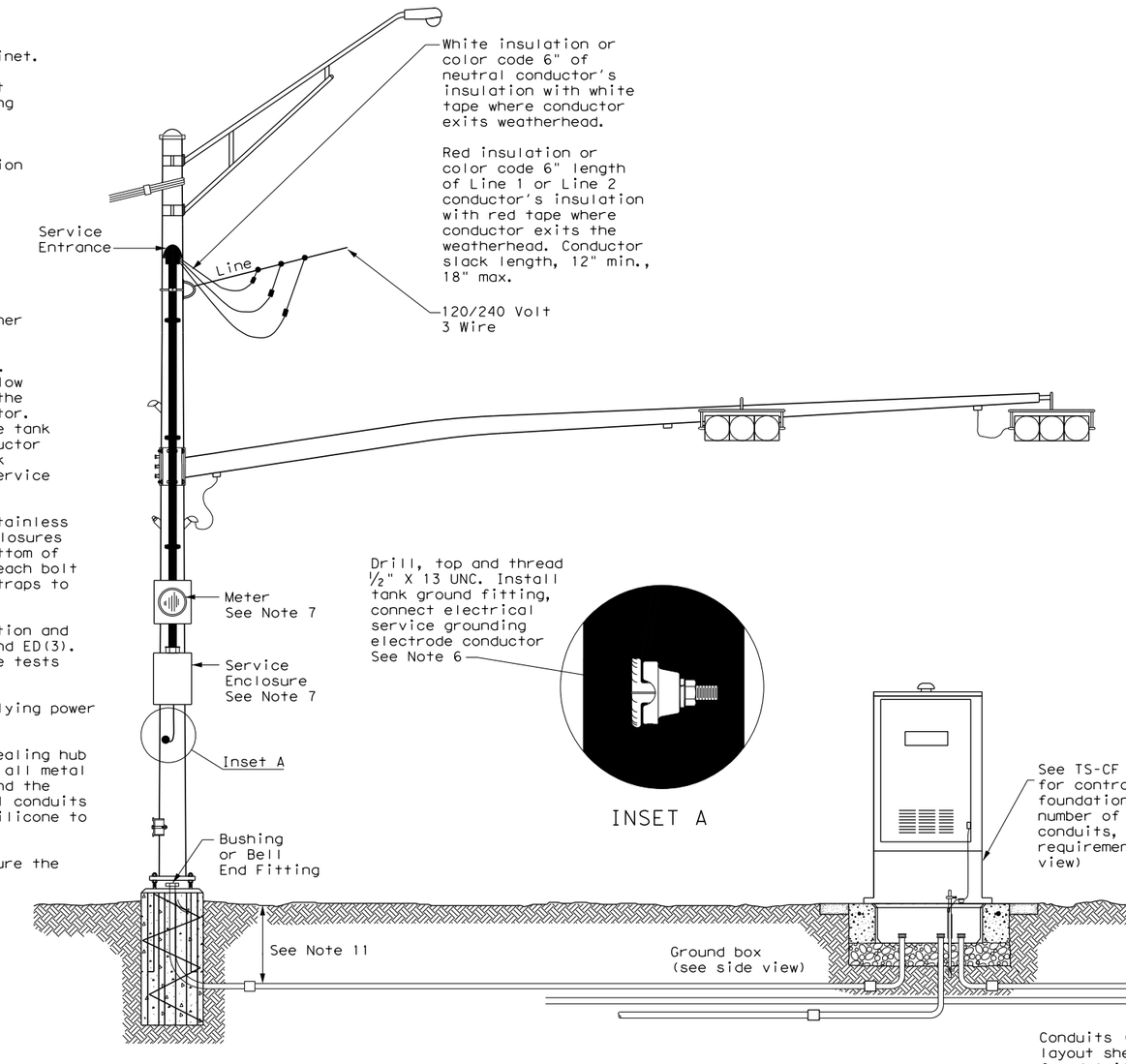
TRAFFIC SIGNAL NOTES

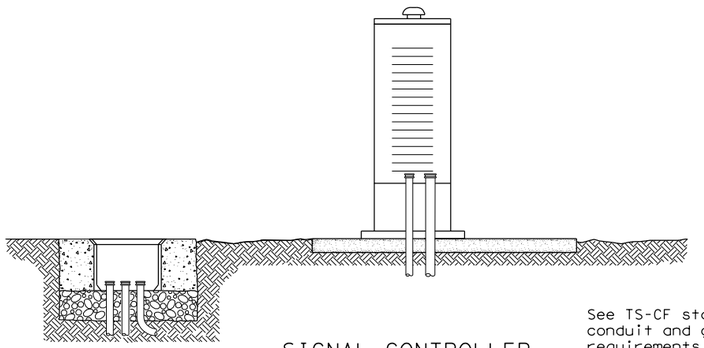
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material 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".



SIGNAL POLE WITH SERVICE

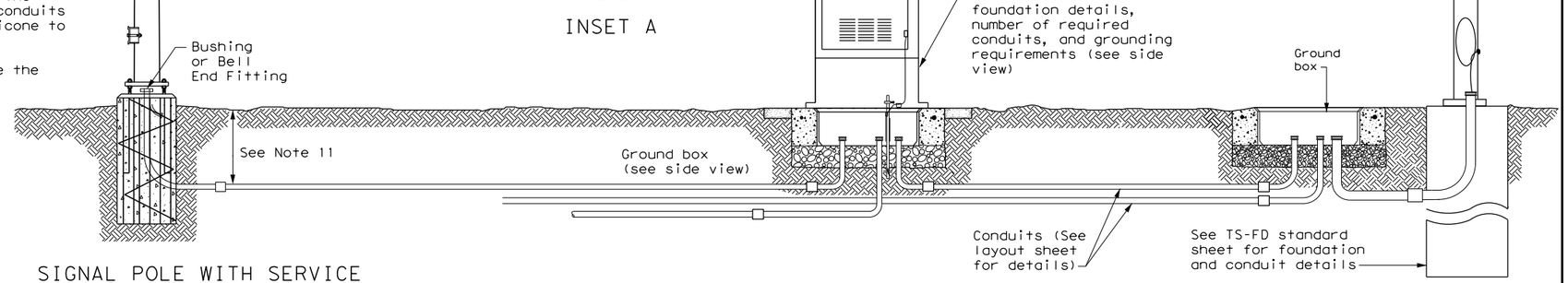
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A

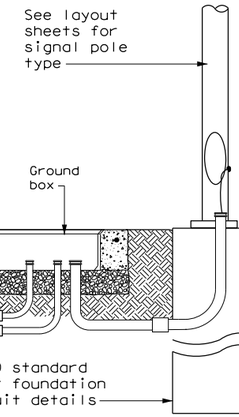


SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.



SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		76

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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.

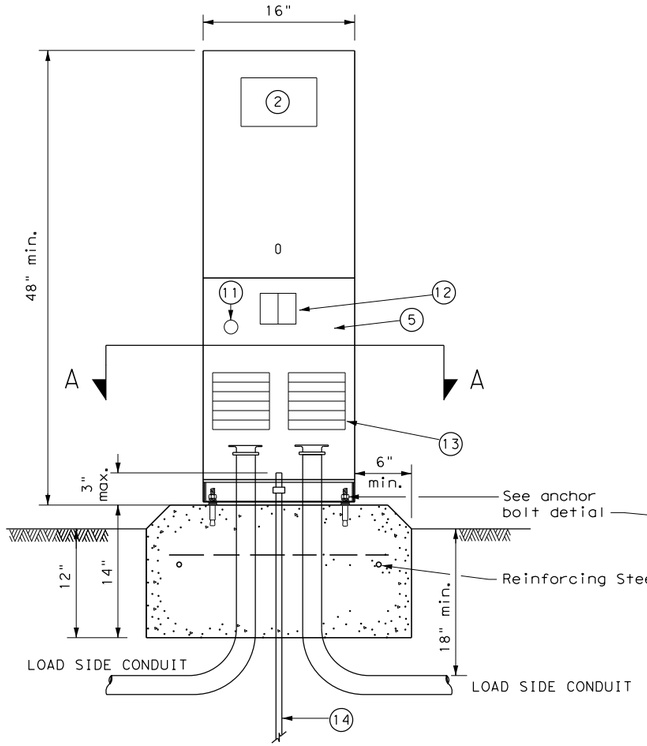
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

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.

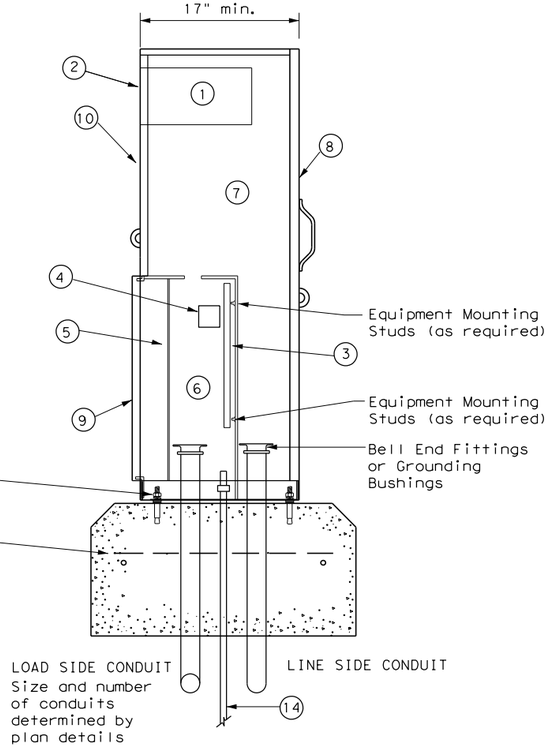
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to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

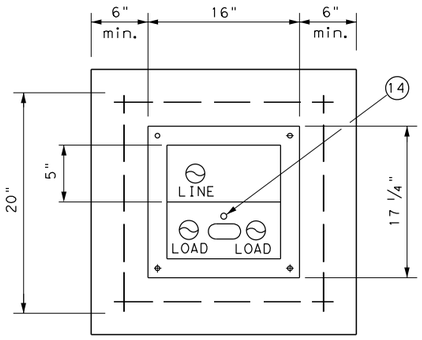


FRONT VIEW

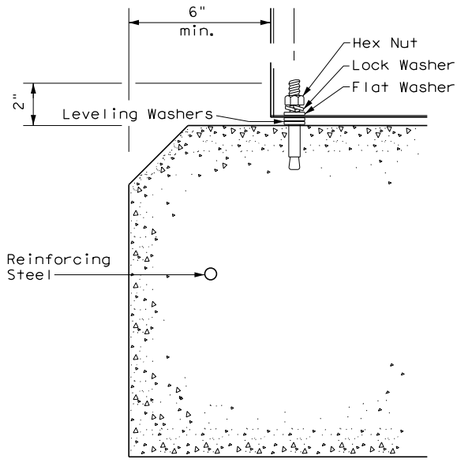


SIDE VIEW

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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REVISIONS	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		77

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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.

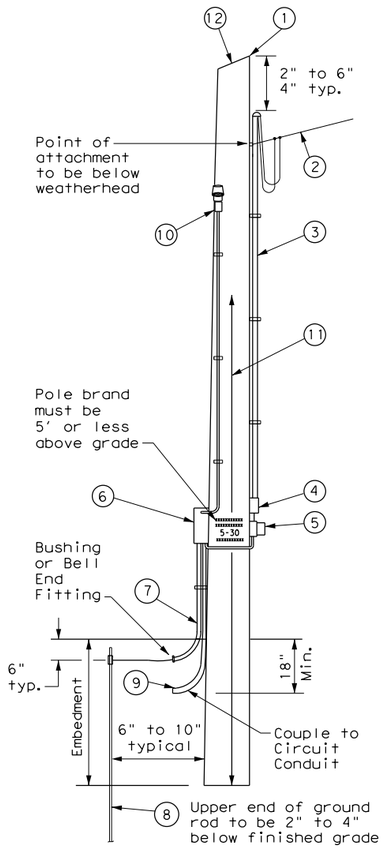
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(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.

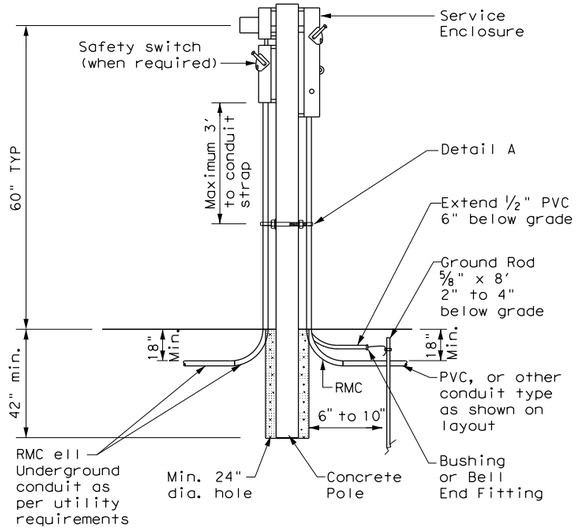


SERVICE SUPPORT TYPE TP (O)

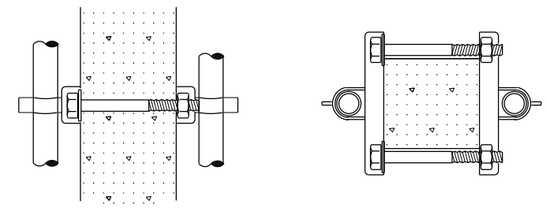
GRANITE CONCRETE(GC)& OTHER CONCRETE(OC)NOTES

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)



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.

CONCRETE SERVICE SUPPORT
Overhead(O)

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.

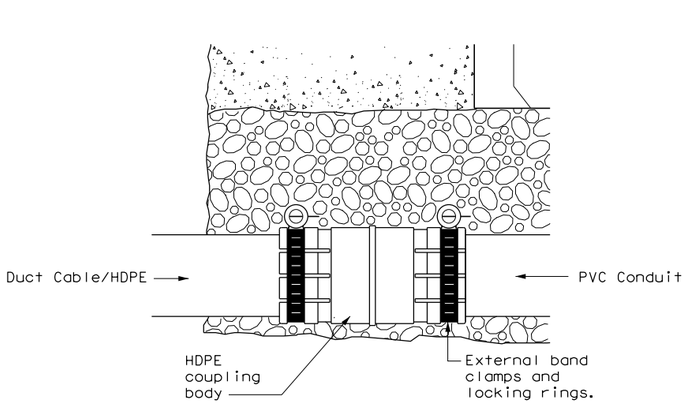
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."

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.

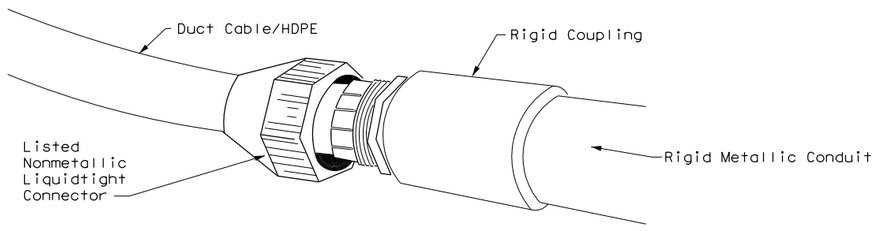
7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.

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

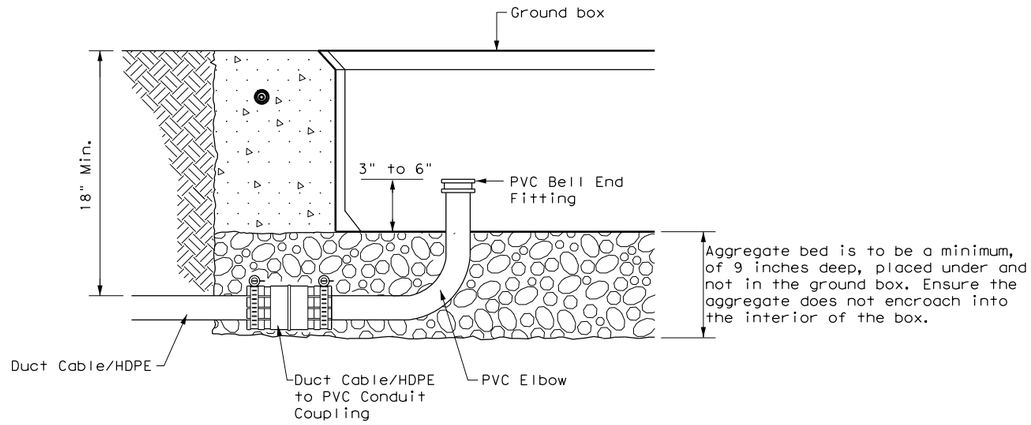
9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless 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 TO PVC



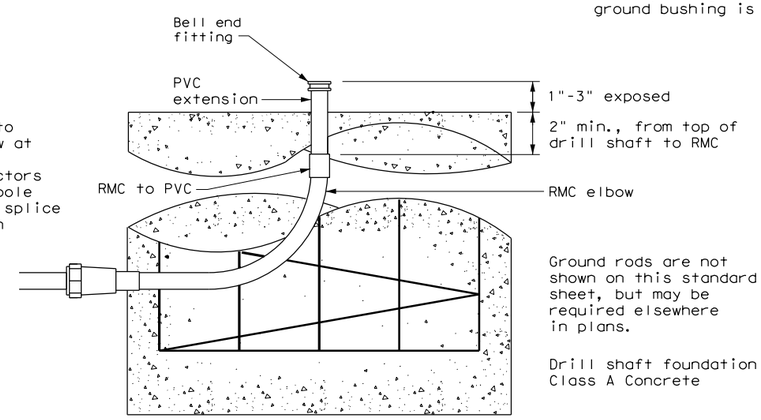
DUCT CABLE/HDPE TO RMC



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.

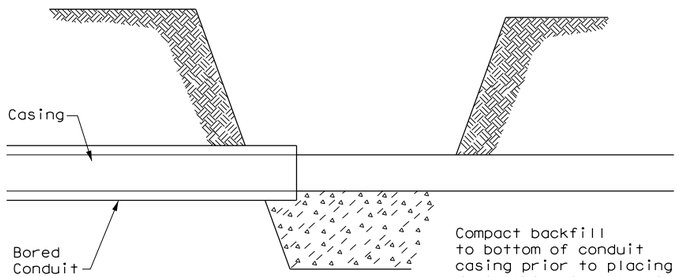
Couple duct to conduit elbow at foundations. Ensure conductors extend into pole base. Do not splice conductors in conduit.



Ground rods are not shown on this standard sheet, but may be required elsewhere in plans.

Drill shaft foundation Class A Concrete

DUCT CABLE / HDPE AT FOUNDATION



Compact backfill to bottom of conduit casing prior to placing duct cable, to prevent kinking.

BORE PIT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
DUCT CABLE/ HDPE CONDUIT

ED(11)-14

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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.

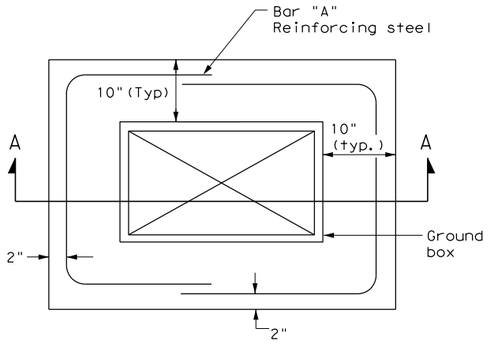
B. CONSTRUCTION METHODS

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

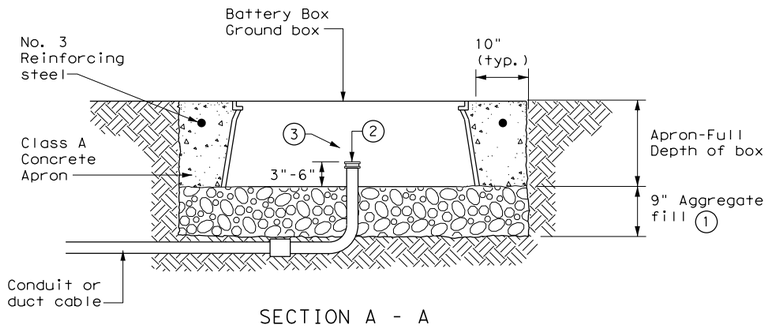
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior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



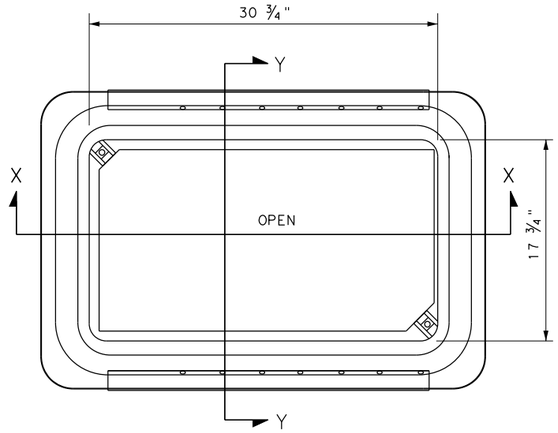
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

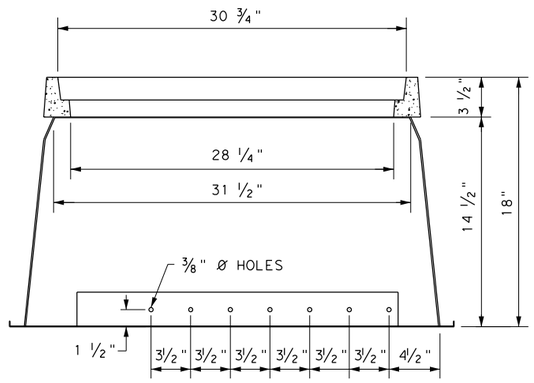
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(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



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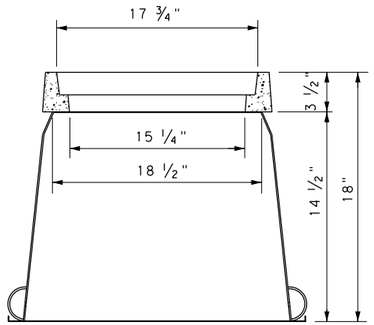

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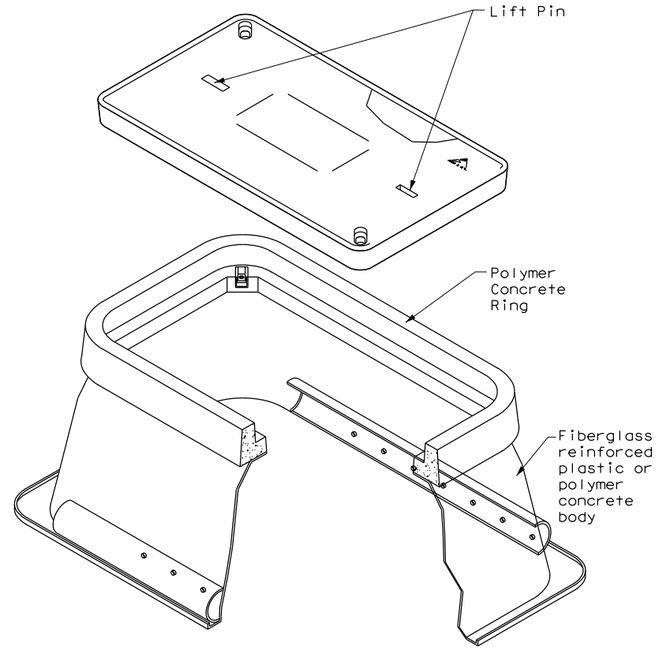

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

ED(12)-14

FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		80

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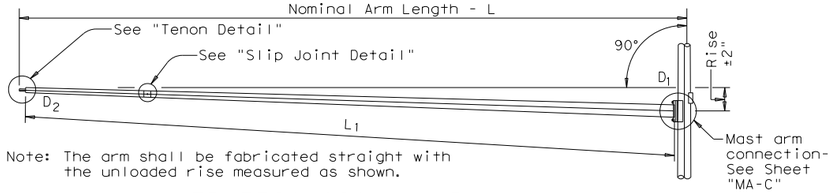
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

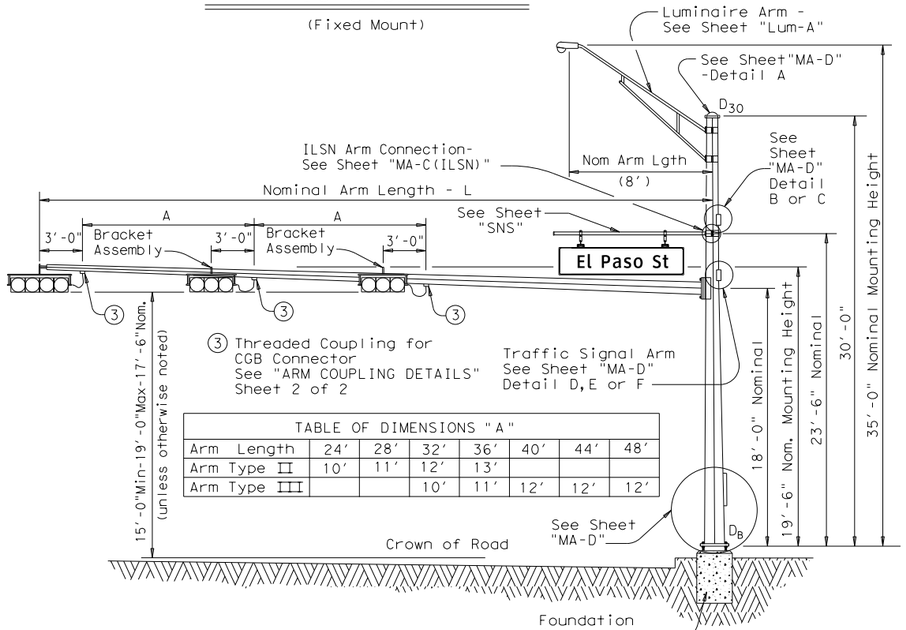


TABLE OF DIMENSIONS "A"							
Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80	1	24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80	2	32S-80	2	32-80	
36	36L-80		36S-80	2	36-80	
40	40L-80	2	40S-80	1	40-80	
44	44L-80	2	44S-80	2	44-80	
48	48L-80		48S-80		48-80	2

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80	1		
28	28I-80		28II-80			
32			32II-80		32III-80	4
36			36II-80		36III-80	2
40					40III-80	3
44					44III-80	4
48					48III-80	2

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	7

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	4
9′ Arm	10

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3′-4"	5
1 ¾"	3′-10"	11

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
915	12	696,ETC	CS
DIST	COUNTY		SHEET NO.
SA	BEXAR		81

122A

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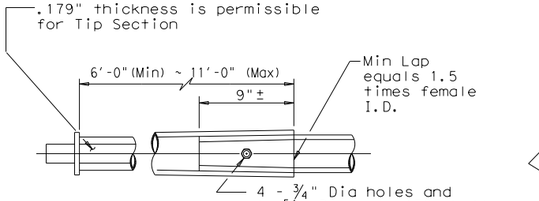
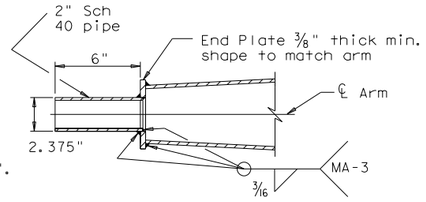


SLIP JOINT DETAIL



TENON DETAIL

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

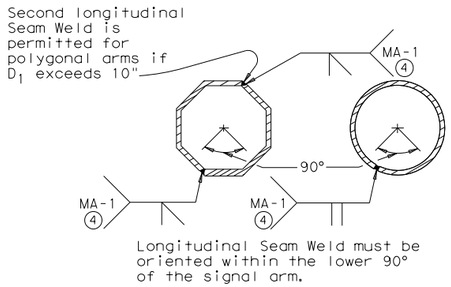
If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

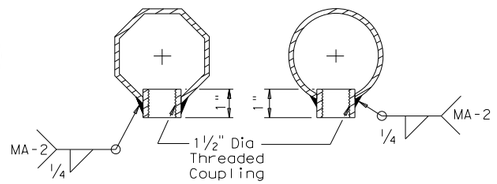
This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL



ARM COUPLING DETAILS

④ 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

DN: MS	CK: JSY	DW: MWF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
915	12	696, ETC	CS
DIST	COUNTY		SHEET NO.
SA	BEXAR		82

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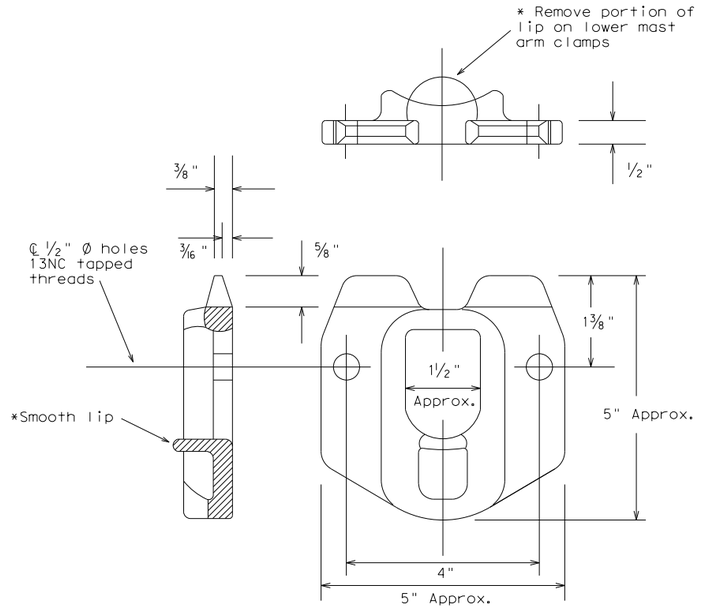
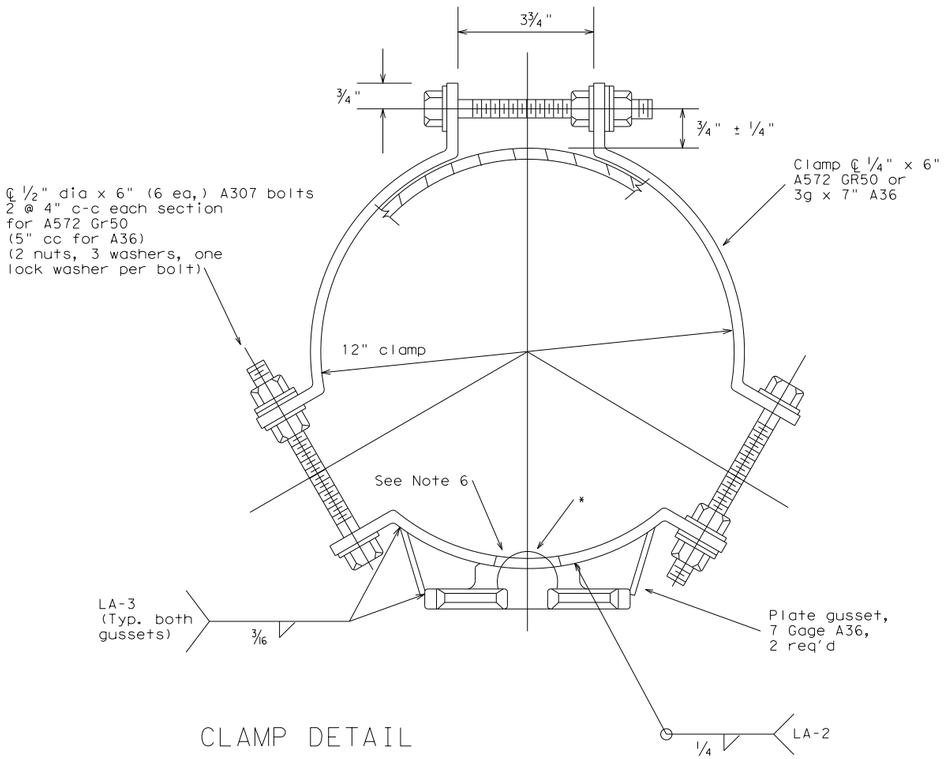
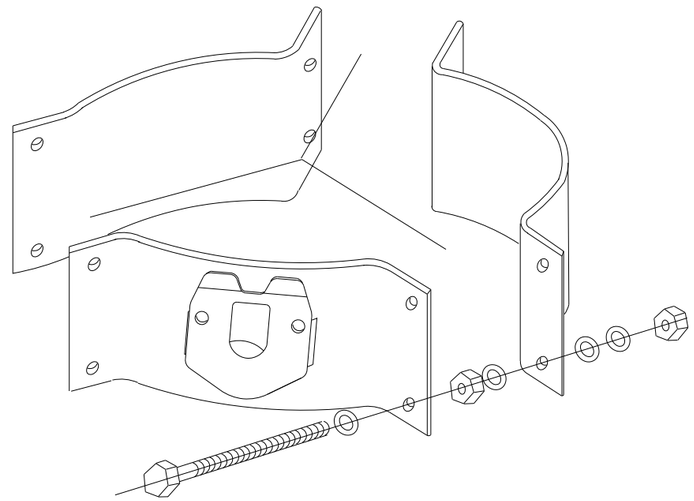


POLE SIMPLEX DETAILS



CLAMP DETAIL



PROJECTION

OTHER MATERIALS:

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, 1/2in. X 1 1/2in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

DN: KAB	CK: RES	DW: FDN	CK: CAL

REVISIONS
11-99
1-12

CONT	SECT	JOB	HIGHWAY
915	12	696, ETC	CS
DIST	COUNTY		SHEET NO.
SA	BEXAR		83

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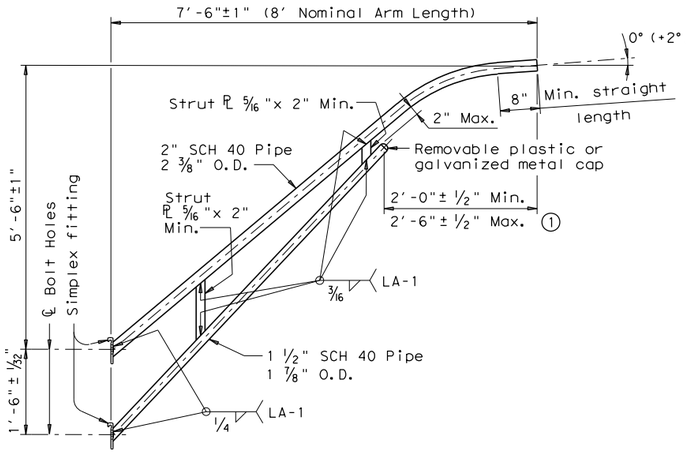
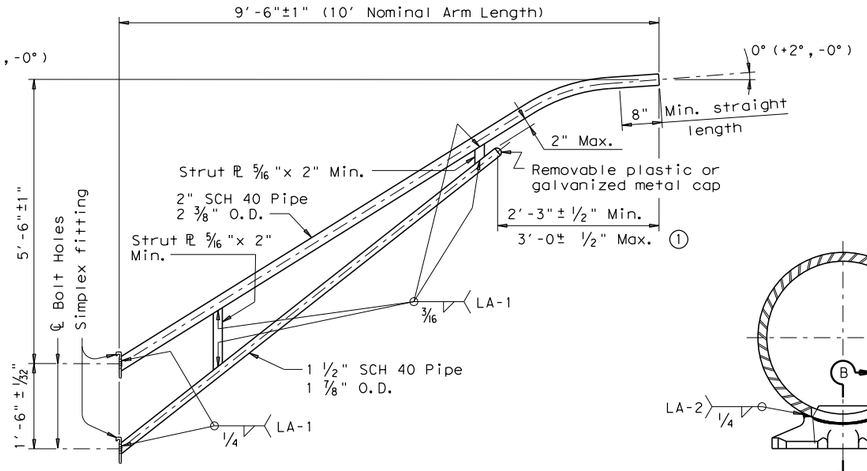
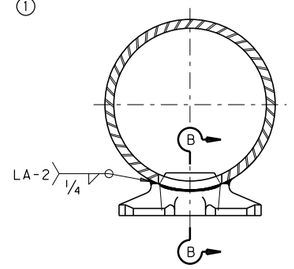


8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

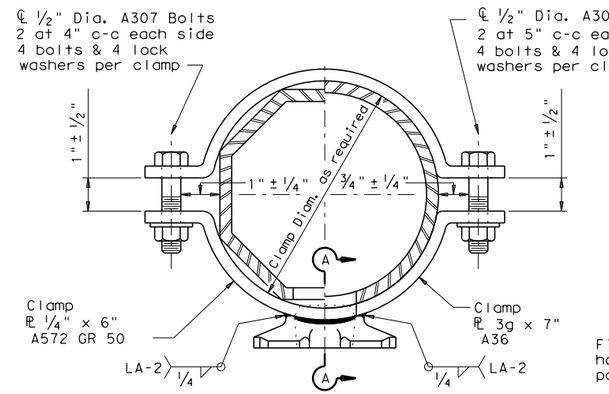
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

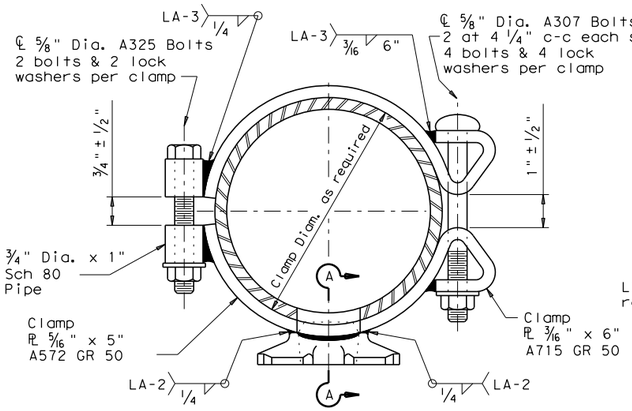
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



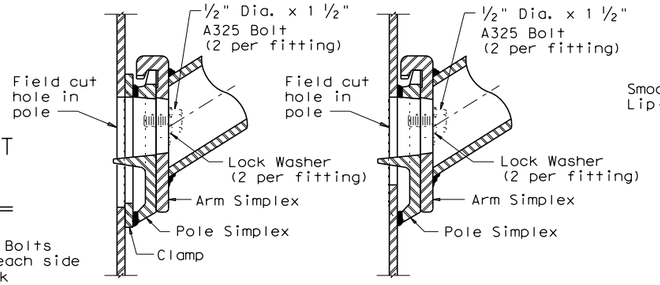
CLAMP ATTACHMENT DETAIL NO.1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO.2 (HALF SECTION)



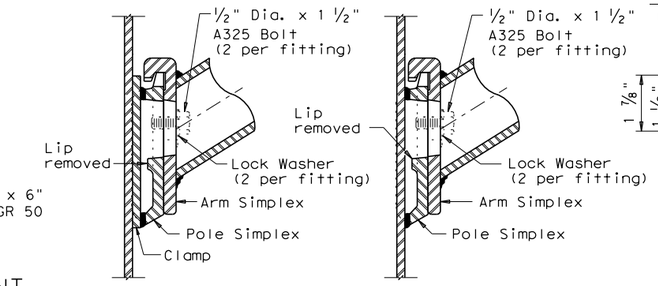
CLAMP ATTACHMENT DETAIL NO.3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO.4 (HALF SECTION)



UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING

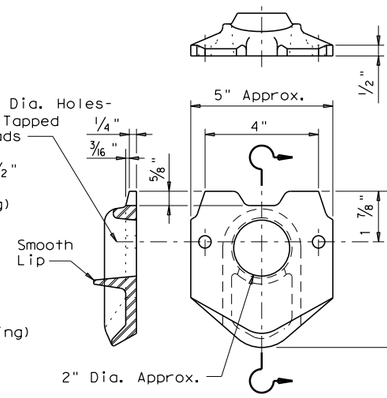


LOWER SIMPLEX FITTING

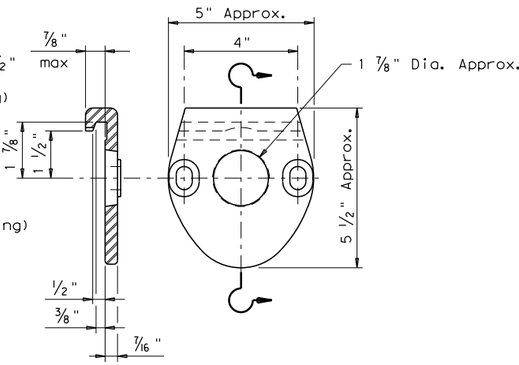
SECTON A-A

LOWER SIMPLEX FITTING

SECTON B-B



POLE SIMPLEX DETAIL



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

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REVISIONS 5-96 1-99 1-12	CONT	SECT	JOB	HIGHWAY
	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
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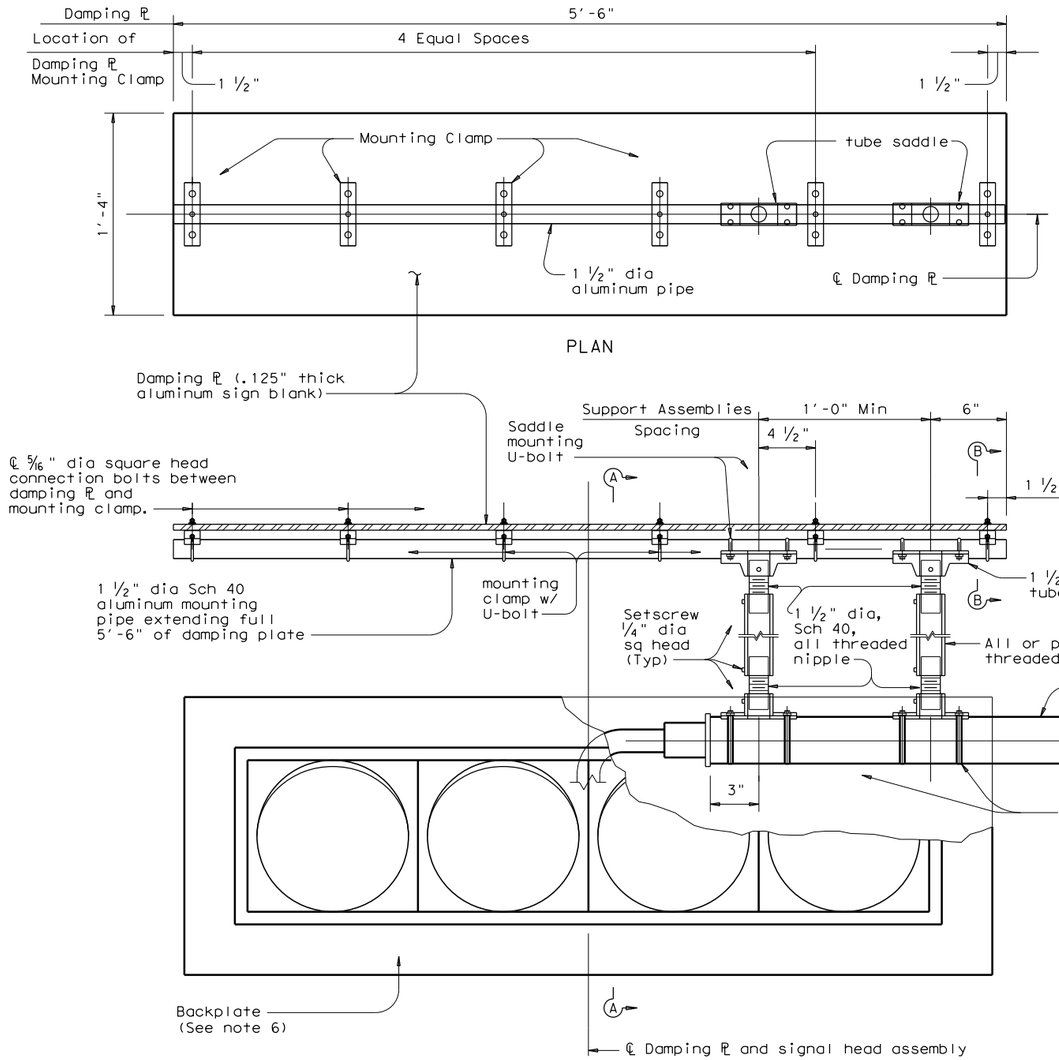
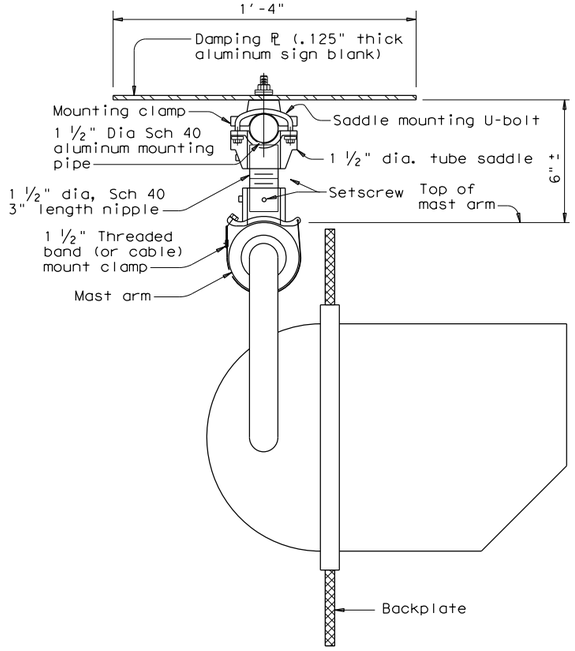


DAMPING PLATE MOUNTING DETAILS

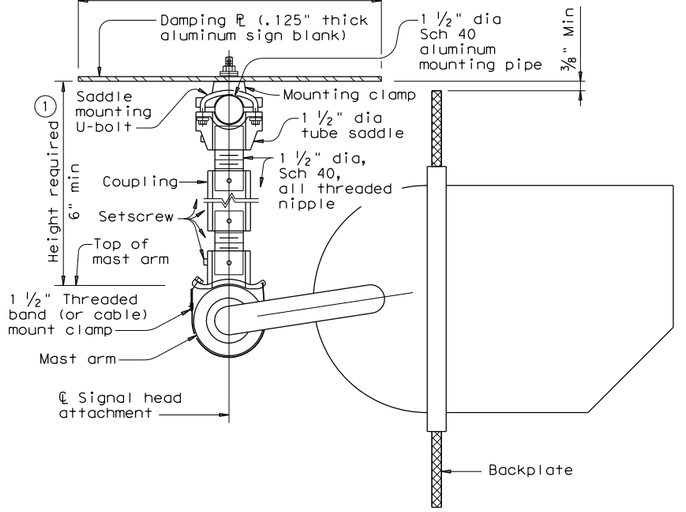
(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)

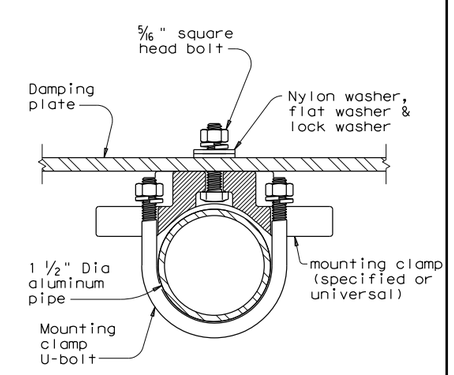


SECTION A-A

(Showing alternate placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)

① Recommended supporting assemblies to achieve required height for horizontal section heads			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"



SECTION B-B

(Showing damping plate attachment)

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.

2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.

3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.

4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".

5. Contractor will verify applicable field dimensions before the installation.

6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.

Texas Department of Transportation

Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696, ETC	CS
6-20	DIST	COUNTY		SHEET NO.
	SA	BEXAR		85

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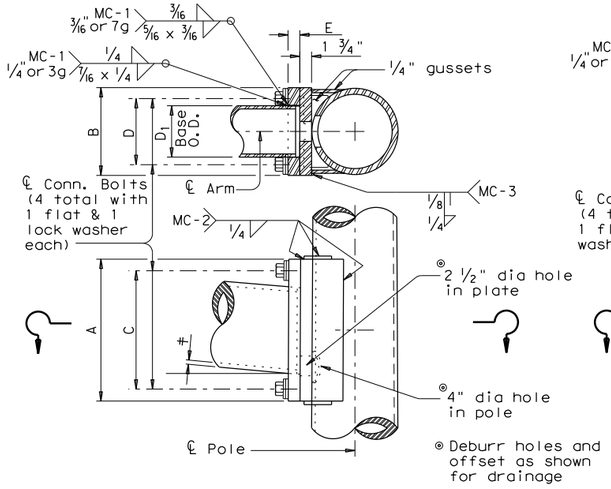
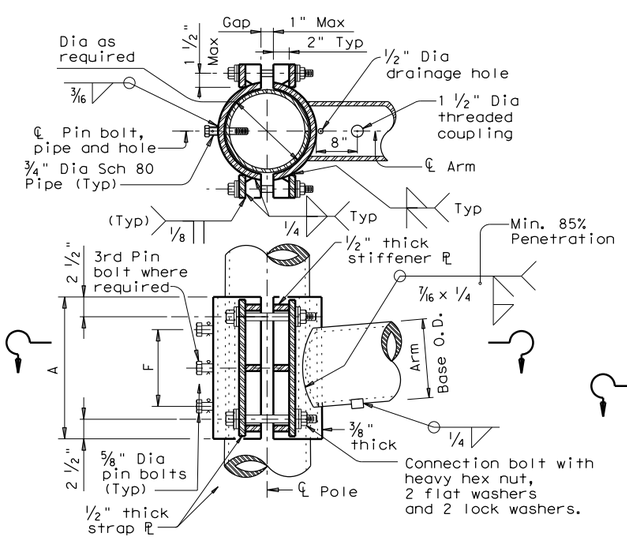
DATE: 7/3/2023 11:12:49 AM
FILE: P:\122\17\06\Design\Civil\Standards\Traffic Signals\mac.dgn

ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



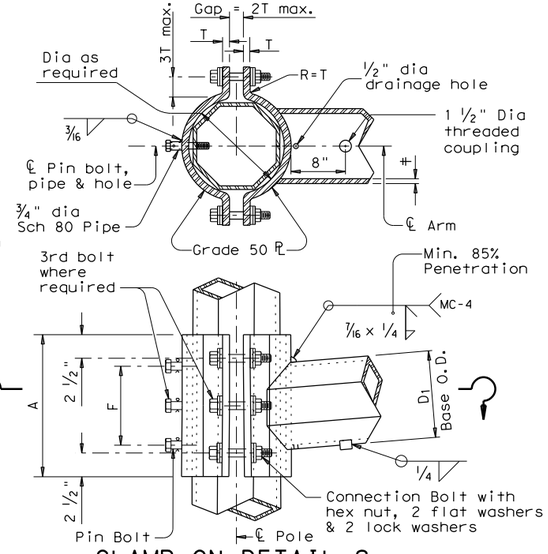
FIXED MOUNT DETAIL 1

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8



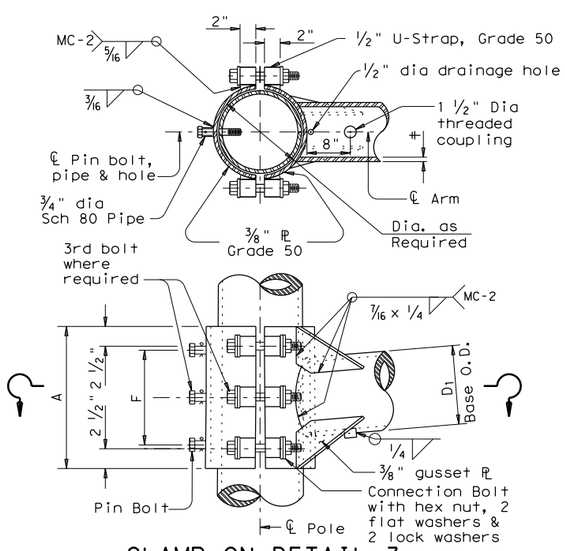
CLAMP-ON DETAIL 1

ARM SIZE D_1	ARM SIZE ǂ	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	3/4	4	3/4	2	5/8
7.5	.179	14	8	3/4	4	3/4	2	5/8
8.0	.179	14	8	3/4	4	3/4	2	5/8
9.0	.179	16	10	7/8	4	1	2	5/8
10.0	.179	18	10	7/8	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8

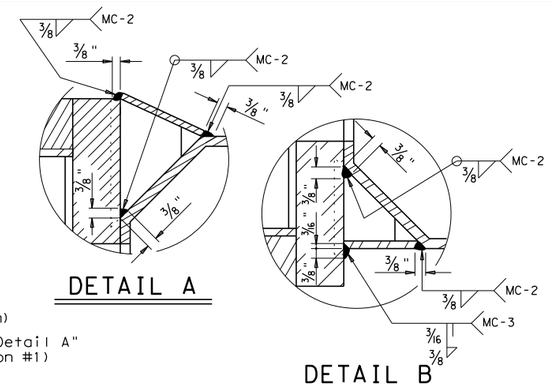


CLAMP-ON DETAIL 2

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

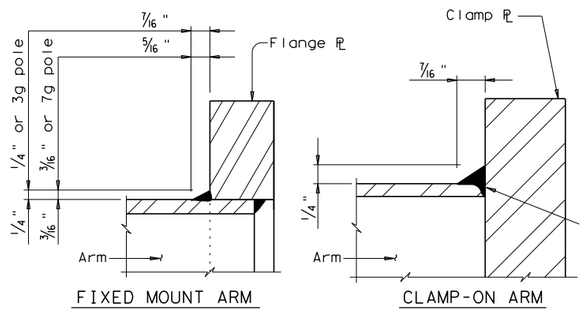


CLAMP-ON DETAIL 3



DETAIL A

DETAIL B



FIXED MOUNT ARM

CLAMP-ON ARM

ARM BASE WELD DETAILS

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

MATERIALS	
Round Shafts or Polygonal Shafts (1)	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 (2)
Plates (1)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe (1)	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

(1) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(2) ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 5/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

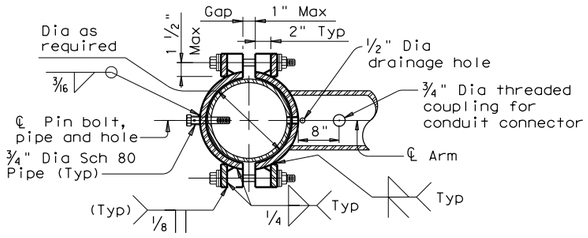
REVISIONS: 5-96, 5-09, 1-12

CONT	SECT	JOB	HIGHWAY
915	12	696, ETC	CS
DIST	COUNTY		SHEET NO.
SA	BEXAR		86

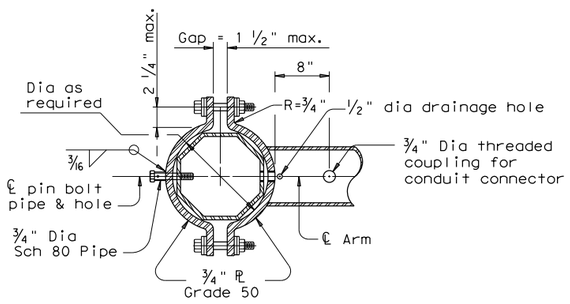
126A

DATE: 7/3/2023 11:12:50 AM
FILE: P:\122\17\06\Design\Civil\Standards\Traffic Signals\maclisn.dgn

TABLE OF DIMENSIONS for ILSN Support Arm Clamp-on Details 1, 2 and 3						
ILSN ARM SIZE	A	F	CONN. BOLTS		PIN BOLTS	
			No.	Dia	No.	Dia
	in.	in.	ea.	in.	ea.	in.
3 in. dia Schedule 40 Pipe	10	4	4	¾	2	⅝



SECTION A-A



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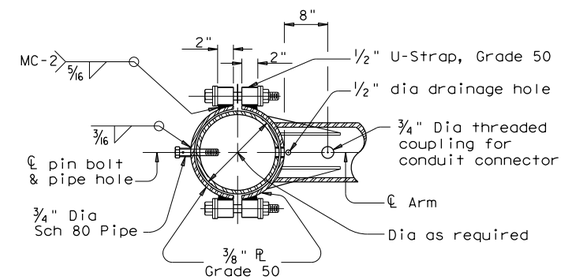

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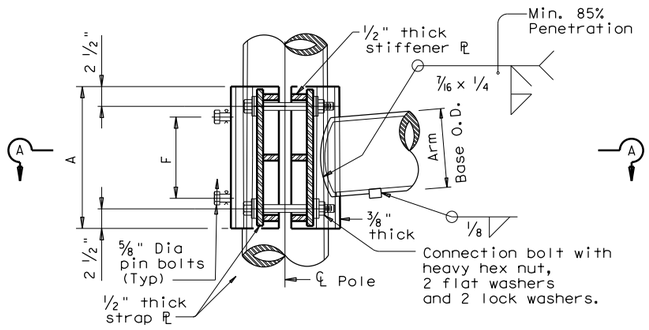
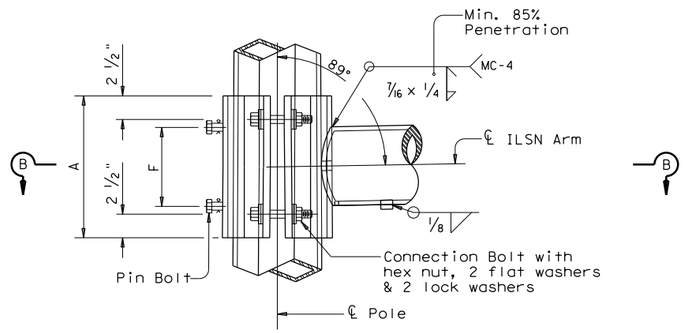
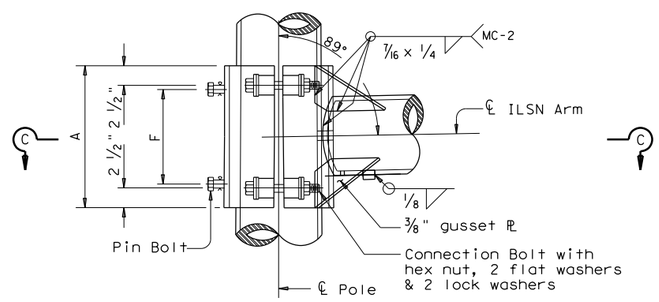


ILSN CLAMP-ON DETAIL 1



ILSN CLAMP-ON DETAIL 2



ILSN CLAMP-ON DETAIL 3

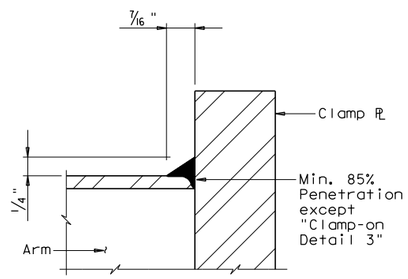
GENERAL NOTES:

Clamp-on details shall be used for ILSN support arm assemblies. A 1 ½" inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the details.

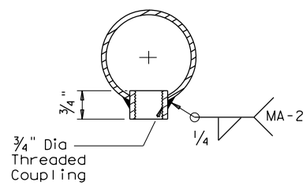
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:
Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 3/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



CLAMP-ON ARM

ARM BASE WELD DETAILS



ILSN ARM COUPLING DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST-ARM CONNECTIONS

MA-C(ILSN)-12

DN: MS	CK: JSY	DW: MWF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
915	12	696, ETC	CS
DIST	COUNTY		SHEET NO.
SA	BEXAR		87

126B

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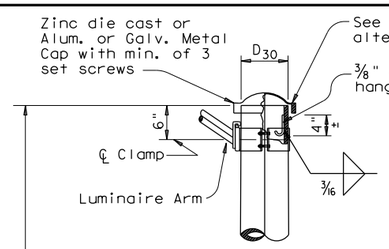
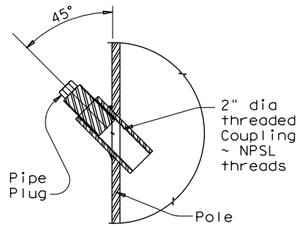
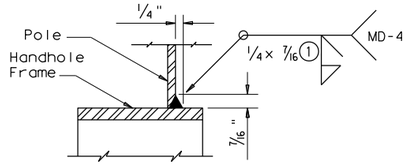


DETAIL A

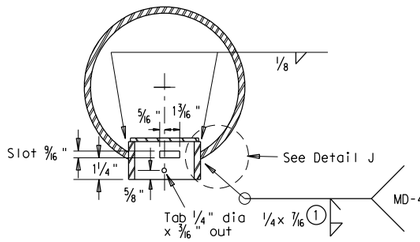
(for pole with luminaire)



POLE COUPLING DETAIL

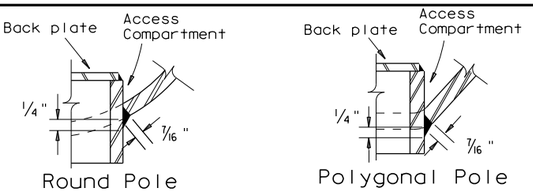


DETAIL G

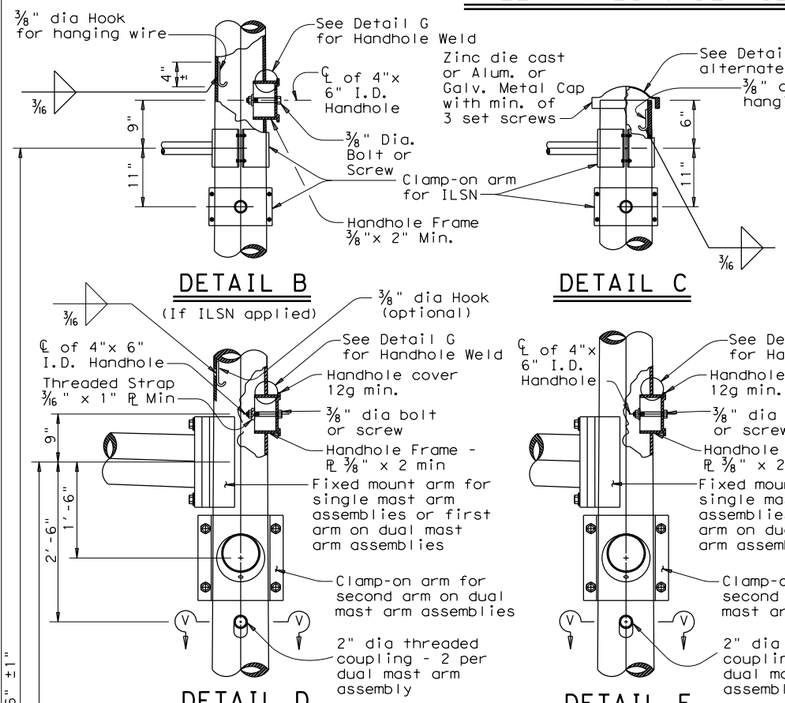


SECTION X-X

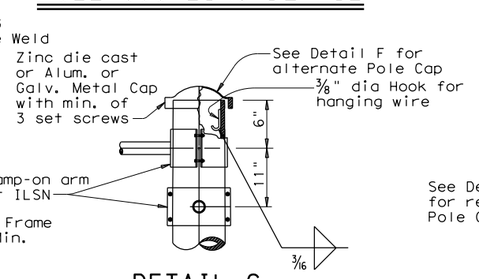
Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



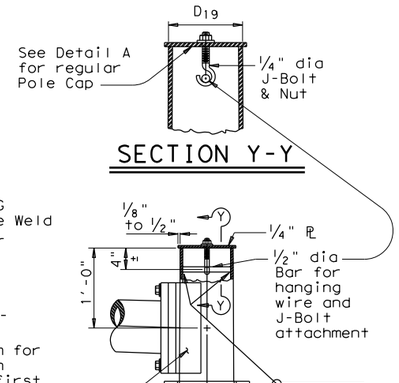
DETAIL J



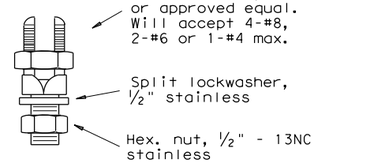
DETAIL B



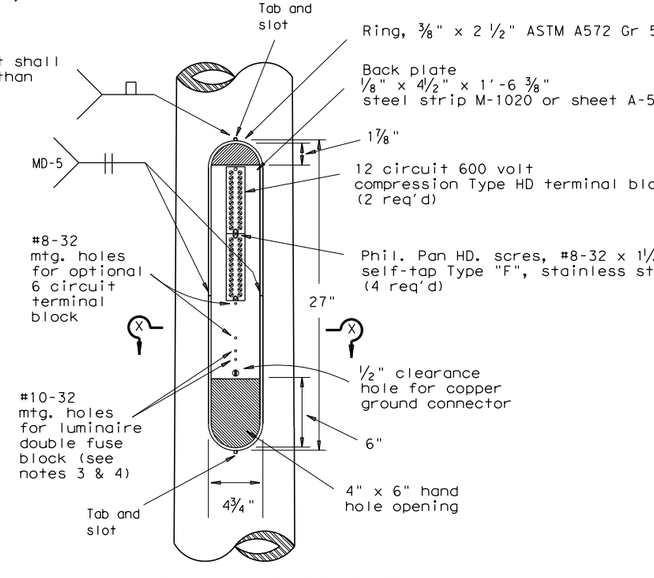
DETAIL C



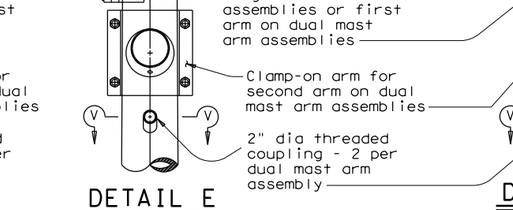
SECTION Y-Y



COPPER GROUND CONNECTOR



ACCESS COMPARTMENT

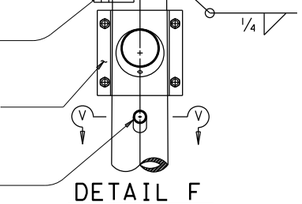


DETAIL D

(for 30' pole with luminaire and ILSN sign)

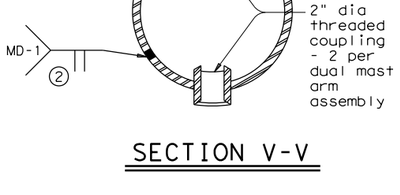
DETAIL E

(for 24' pole with ILSN sign and no luminaire)

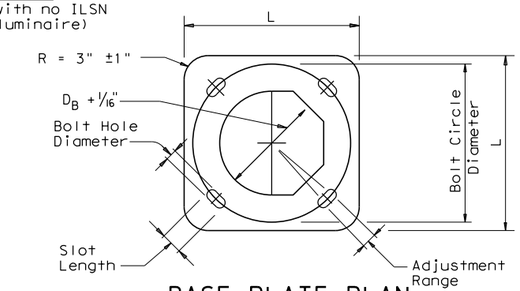


DETAIL F

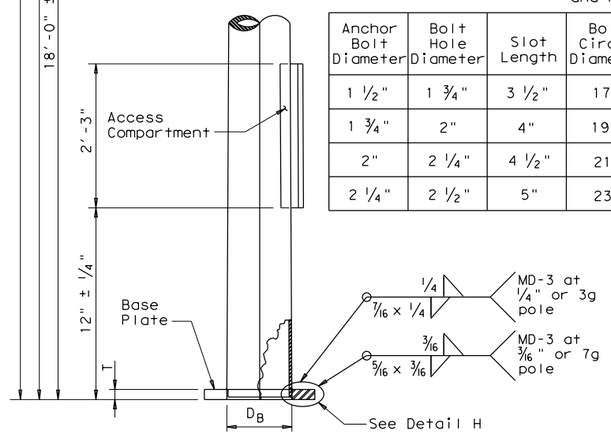
(for 19' pole with no ILSN sign and no luminaire)



SECTION V-V

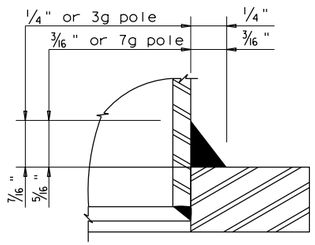


BASE PLATE PLAN



POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 ½"	1 ¾"	3 ½"	17"	18" x 1 ½"	13.4°
1 ¾"	2"	4"	19"	20" x 1 ¾"	13.5°
2"	2 ¼"	4 ½"	21"	22" x 2"	13.6°
2 ¼"	2 ½"	5"	23"	24" x 2 ¼"	13.7°



DETAIL H

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 ¼" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

① 85% Min. penetration

② 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

Texas Department of Transportation
Traffic Operations Division

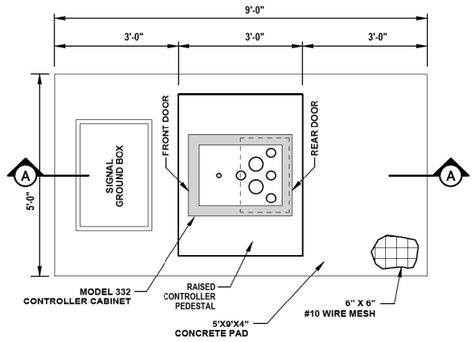
TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

DN: MS	CK: JSY	DW: FDN	CK: CAL

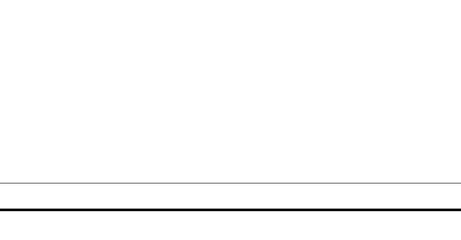
REVISIONS
8-99
1-12

CONT	SECT	JOB	HIGHWAY
915	12	696, ETC	CS
DIST	COUNTY		SHEET NO.
SA	BEXAR		88

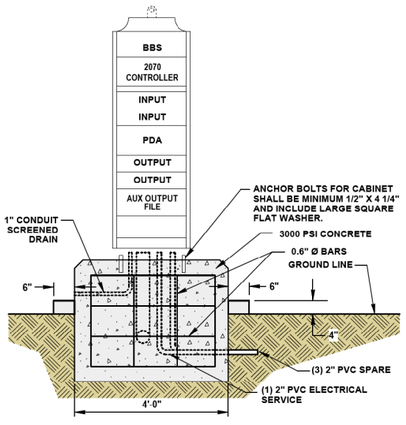


TOP VIEW

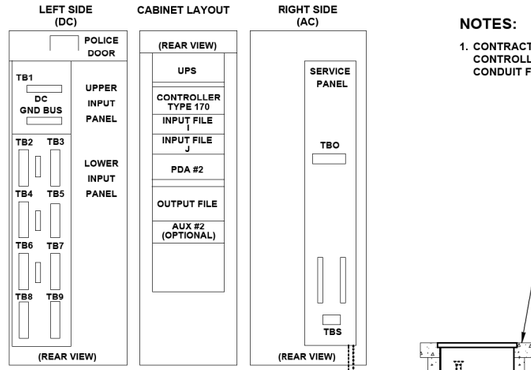
(NEW FOUNDATION)



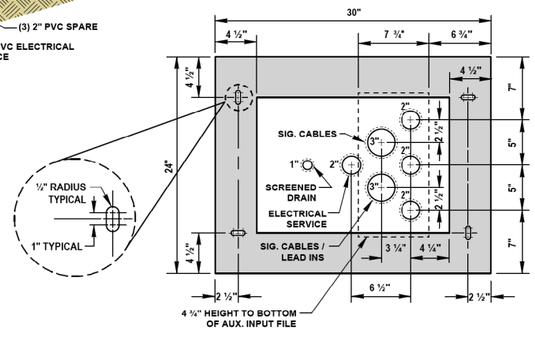
SECTION A-A



REAR VIEW



REAR VIEW SCHEMATIC



BASE PLATE TEMPLATE

NOTES:

1. CONTRACTOR TO INSTALL GROUNDBOX, CONDUIT, CONTROLLER FOUNDATION, CONCRETE SLAB AND CONDUIT FROM GROUNDBOX TO CABINET.

MARCH 2017

CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS DEPARTMENT

TRAFFIC STANDARDS

TYPE 332 CABINET FOUNDATION

SHEET 1 OF 1

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: PD	DSGN. BY: Pape-Dawson	CHKD. BY: MAB	SHEET NO.: OF

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/3/2023 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/3/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

COSA TYPE 332 CABINET FOUNDATION STANDARD

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	89

Plotted on: 7/3/2023

Design Filename: P:\122\17\06\Design\Civil\Standards\Traffic Signals\COSARADAR.dgn

MOUNTING LOCATIONS

PRESENCE (RPDD)

① PREFERRED PLACEMENT FOR MAST ARMS. MOUNT ON AND BELOW MAST ARM ON NEAR SIDE OF STREET.

② PREFERRED PLACEMENT FOR TIMBER POLE OR STRAIN POLE INSTALLATIONS. MOUNT AS HIGH AS POSSIBLE TO A MAXIMUM OF 30 FT ON TIMBER OR SPAN WIRE POLES. ON MAST ARM POLES, MOUNT BELOW CONNECTION OF MAST ARM TO A MINIMUM OF 15 FT.

③ ALTERNATE PLACEMENT LOCATION. MOUNT AS HIGH AS POSSIBLE TO A MAXIMUM OF 30 FT TO PREVENT OCCLUSION OF THE LEFT TURN LANES. THIS PLACEMENT TO BE USED ONLY IF RPDD CANNOT BE MOUNTED IN THE PREFERRED PLACEMENT LOCATIONS.

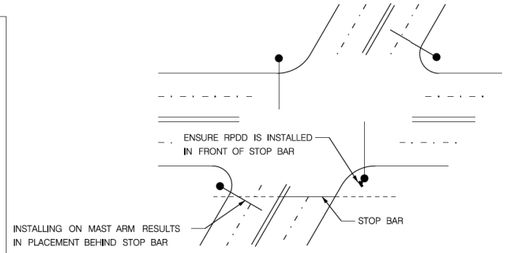
ADVANCE (RADD)

Ⓐ PREFERRED PLACEMENT FOR MAST ARMS. ALIGN RADD WITH CENTER OF TRAVEL LANES.

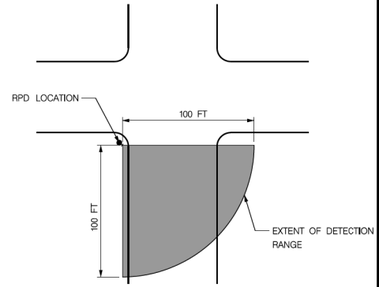
Ⓑ ALTERNATE PLACEMENT FOR MAST ARMS. MOUNT ON BACK SIDE OF OPPOSING MAST ARM.

Ⓒ TIMBER OR STRAIN POLE PLACEMENT. MOUNT ON NEAR SIDE POLE.

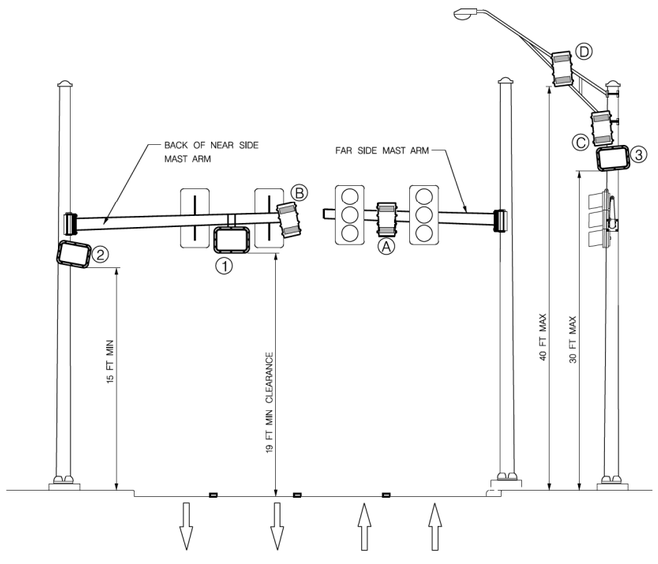
Ⓓ ALTERNATE TIMBER OR STRAIN POLE PLACEMENT. MOUNT LUMINAIRE ARM ON NEAR SIDE POLE WITH A MAXIMUM 40 FT MOUNTING HEIGHT.



SKEWED INTERSECTION RPDD PLACEMENT
NTS

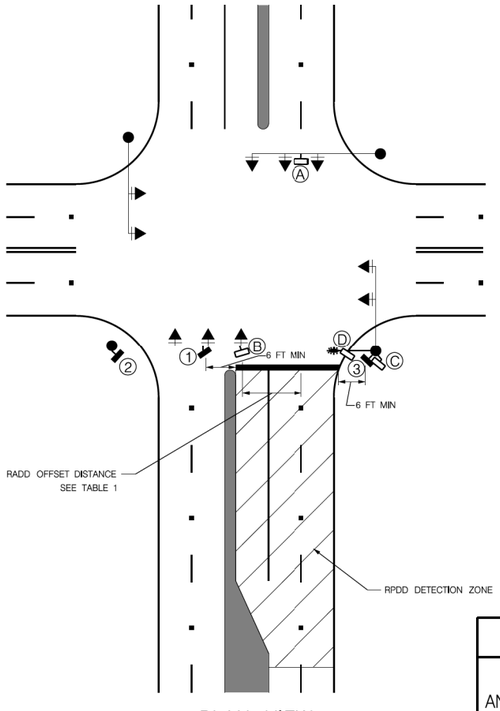


TYPICAL RPDD DETECTION RANGE
NTS



ELEVATION VIEW
NTS

LEGEND
OR RPDD
OR RADD



PLAN VIEW
NTS

NOTES:

1) A MINIMUM 6 FT HORIZONTAL OFFSET MUST BE MAINTAINED BETWEEN THE RPDD AND THE DETECTION ZONE

2) THE RPDD SHALL BE MOUNTED SUCH THAT AT LEAST 20 FT ALONG THE FARTHEST LANE TO BE MONITORED IS WITHIN THE FIELD OF VIEW OF THE RPDD

3) AIM RPDD AT THE CENTER OF THE LANES TO BE MONITORED, APPROXIMATELY 50 FT FROM THE RPDD UNIT

4) MOUNT RPDD SO THAT ITS FIELD OF VIEW IS NOT OCCLUDED BY POLES, SIGNS, OR OTHER STRUCTURES

5) RADD MOUNTING HEIGHT SHALL NOT BE LESS THAN 17 FT OR GREATER THAN 40 FT. RADD MOUNTING LOCATION SHALL HAVE A MAXIMUM 50 FT LATERAL OFFSET FROM CENTER OF TRAVEL LANES TO BE MONITORED

APRIL 2010

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGNAL STANDARDS

RADAR PRESENCE DETECTOR (RPDD) AND RADAR ADVANCE DETECTOR (RADD) PLACEMENT

SHEET 1 OF 1

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: DNM	DSGN. BY: DNM	CHKD. BY: GDG	SHEET NO.: OF

DESIGN

STATE OF TEXAS · JUSTIN W. CLARK · 118715 · LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 7/3/2023 DATE

APPROVAL

STATE OF TEXAS · GILMER D. GASTON · 80472 · LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 7/3/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

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

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

Texas Department of Transportation

HIGHWAY SAFETY IMPROVEMENT PROGRAM FY 23

COSA RADAR STANDARD

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	STP 2024(389)HESG			CS
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SA	BEXAR	915	12	696,ETC	90

DATE: 7/3/2023 11:12:59 AM
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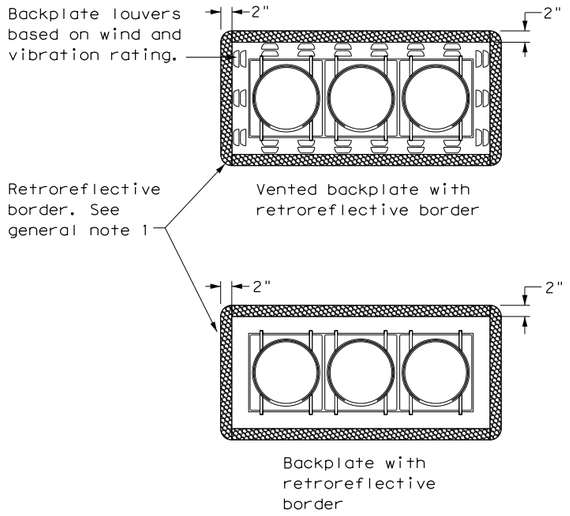
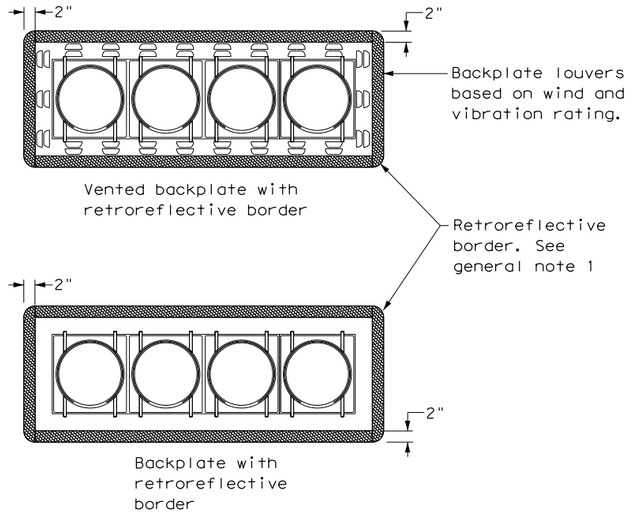
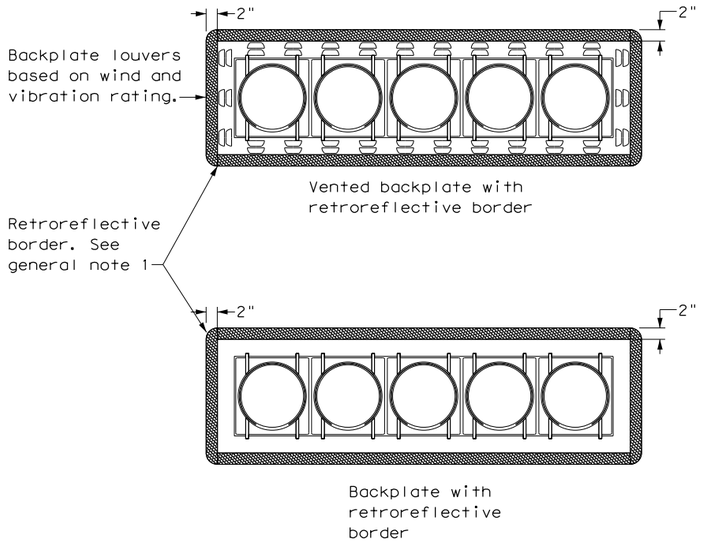


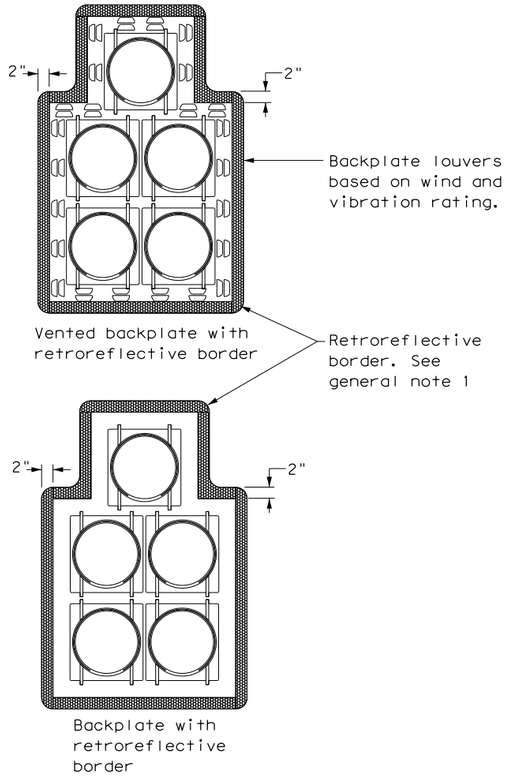
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



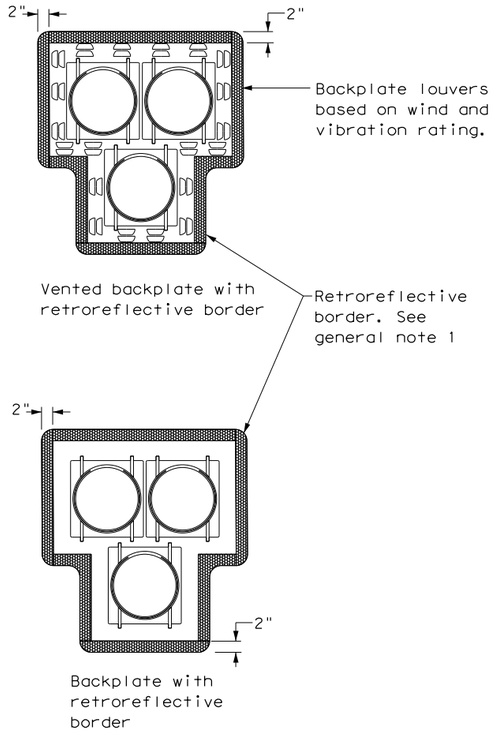
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



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	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		91

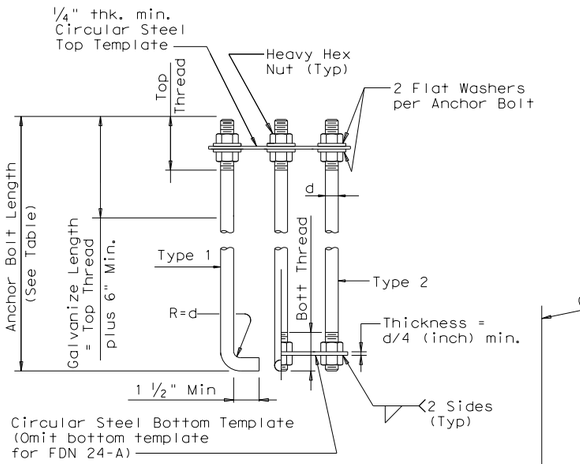
FOUNDATION DESIGN TABLE

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

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

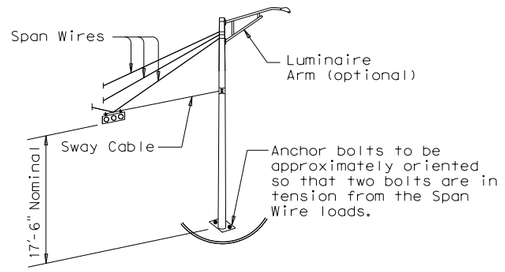
		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM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

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

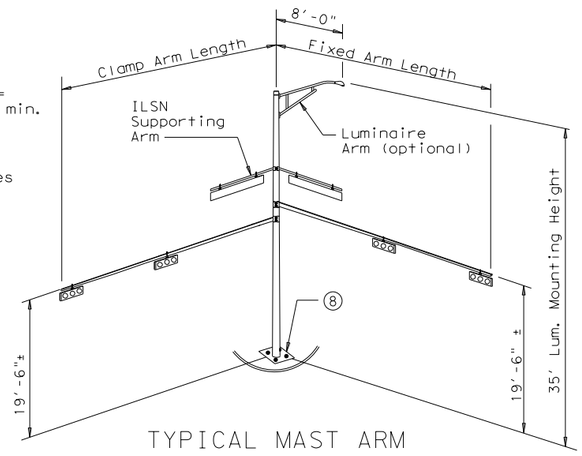


ANCHOR BOLT ASSEMBLY

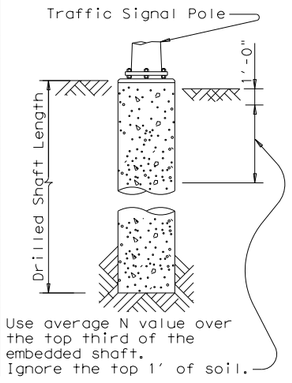
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

FOUNDATION DETAILS

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET) 24-A	30-A	36-A	36-B	48-A
GOLIAD AT CLARK AVE								
POLE H	10	36-A	1			13		
POLE J	10	36-A	1			13		
POLE P	10	36-A	1			13		
POLE R	10	30-A	1		11			
PLEASANTON AT HARDING BLVD								
POLE D	10	30-A	1		11			
POLE F	10	30-A	1		11			
POLE G	10	36-A	1			13		
POLE J	10	30-A	1		11			
TOTAL DRILLED SHAFT LENGTHS					44	52		

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

REVISIONS: 5-96, 11-98, 1-12

CONT	SECT	JOB	HIGHWAY
915	12	696,ETC	CS
DIST	COUNTY		SHEET NO.
SA	BEXAR		92

DATE: 7/3/2023 11:13:00 AM
FILE: P:\122\17\06\Design\Civil\Standards\Traffic Signals\ts-fd.dgn

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft 10	15	40	ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
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30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
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FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET) 24-A	30-A	36-A	36-B	42-A
HUEBNER RD AT HUEBNER ELEMENTARY								
POLE A		DS				11		
POLE B		DS				11		
POLE C		DS				11		
POLE D		DS				11		
POLE E		DS		6				
POLE F		DS		6				
POLE G		DS		6				
POLE H		DS		6				
TOTAL DRILLED SHAFT LENGTHS				24		44		

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
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			36' X 36'		
			40' X 36'		
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				36' X 36'	
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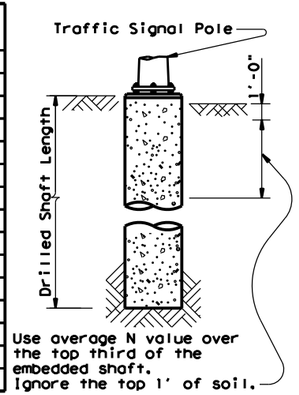


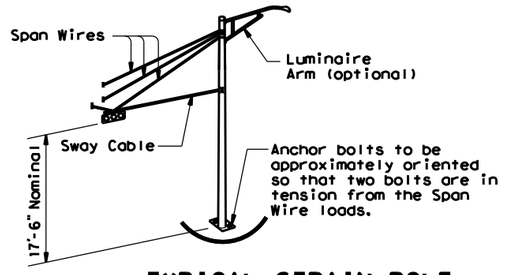
Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

ANCHOR BOLT & TEMPLATE SIZES

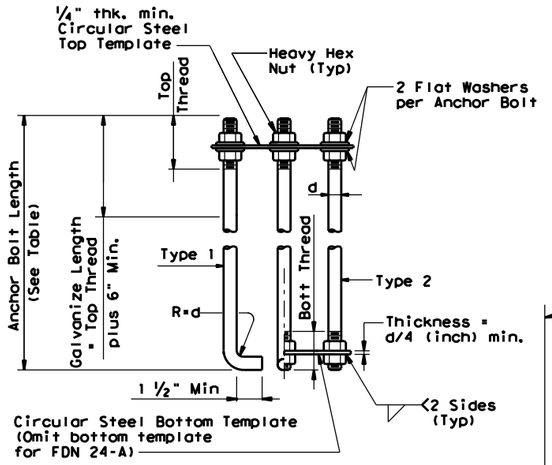
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

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

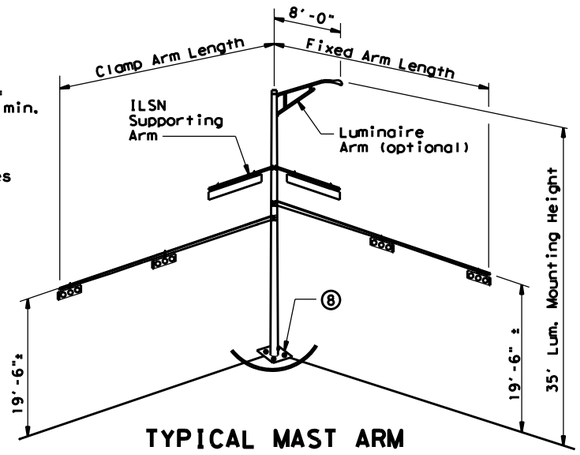


TYPICAL STRAIN POLE ASSEMBLY



HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY



TYPICAL MAST ARM ASSEMBLY

⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

TOP VIEW

ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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

STATE OF TEXAS
GUILLERMO A. DOUGHERTY, JR.
93649
LICENSED PROFESSIONAL ENGINEER
7-5-2023

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
REVISIONS			
5-95			
1-98			
1-12			

CONT	SECT	JOB	HIGHWAY
0915	12	696, ETC	HUEBNER RD
DIST	COUNTY		SHEET NO.
SAT	BEXAR		93

DATE: 7/5/2023 10:23:09 AM
FILE: ...\Standards\ts-fd.dgn

DATE: 6/29/2023 12:34:55 PM
FILE: P:\Municipalities Projects\COSA Projects\Pape-Dawson\Pecan Valley at Goliad TS\4 - Design\Plan Set\8. Traffic\Standards\ts-fd.dgn

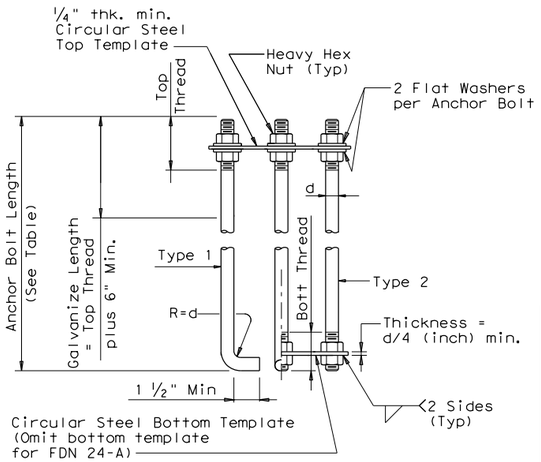
FOUNDATION DESIGN TABLE

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

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

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

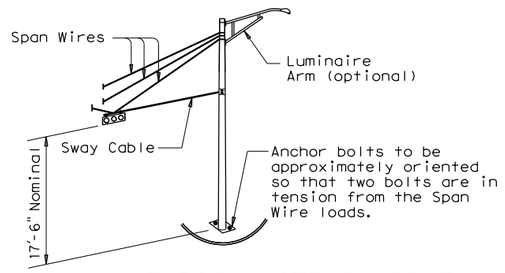
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



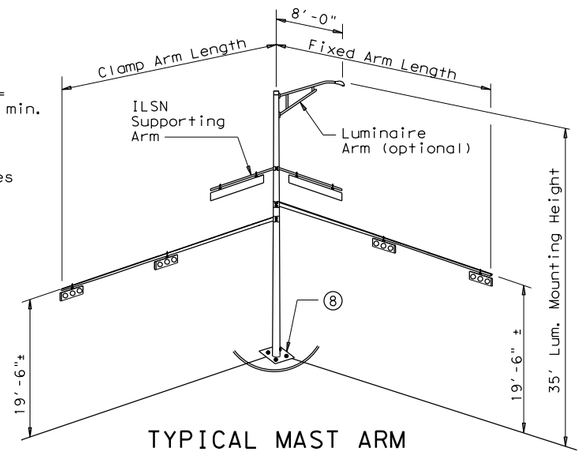
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

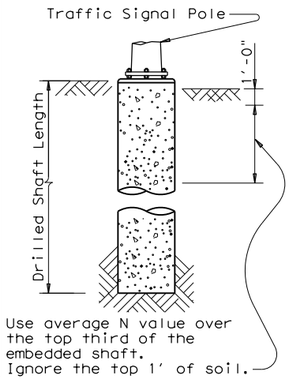
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET) 24-A	30-A	36-A	36-B	42-A
POLE A	10	36-A	1			13.0		
POLE B	10	36-A	1		11.0			
POLE C	10	36-A	1			13.0		
POLE D	10	36-A	1			13.0		
POLE E	10	24-A	1	6.0				
POLE F	10	24-A	1	6.0				
POLE G	10	24-A	1	6.0				
POLE H	10	24-A	1	6.0				
POLE I	10	24-A	1	6.0				
POLE J	10	24-A	1	6.0				
POLE K	10	24-A	1	6.0				
TOTAL DRILLED SHAFT LENGTHS				42.0	11.0	39.0		

ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

FOUNDATION DETAILS

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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

STATE OF TEXAS
OSCAR MICHAEL GARZA
108602
LICENSED
PROFESSIONAL ENGINEER
6/29/2023

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

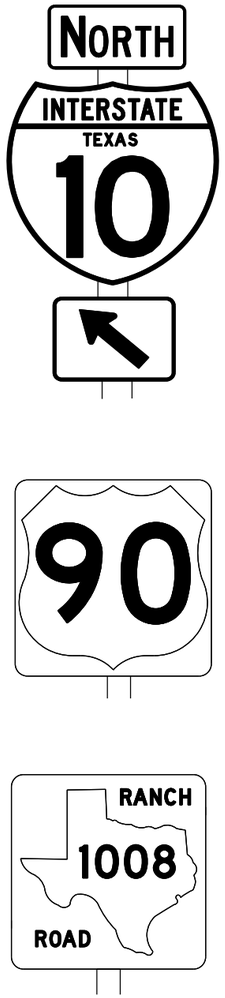
REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0915	12	696, ETC	CS
DIST	COUNTY		SHEET NO.
SAT	BEXAR		94

DATE: 7/3/2023 11:13:02 AM
FILE: P:\122\17\06\Design\Civil\Standards\Signing\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

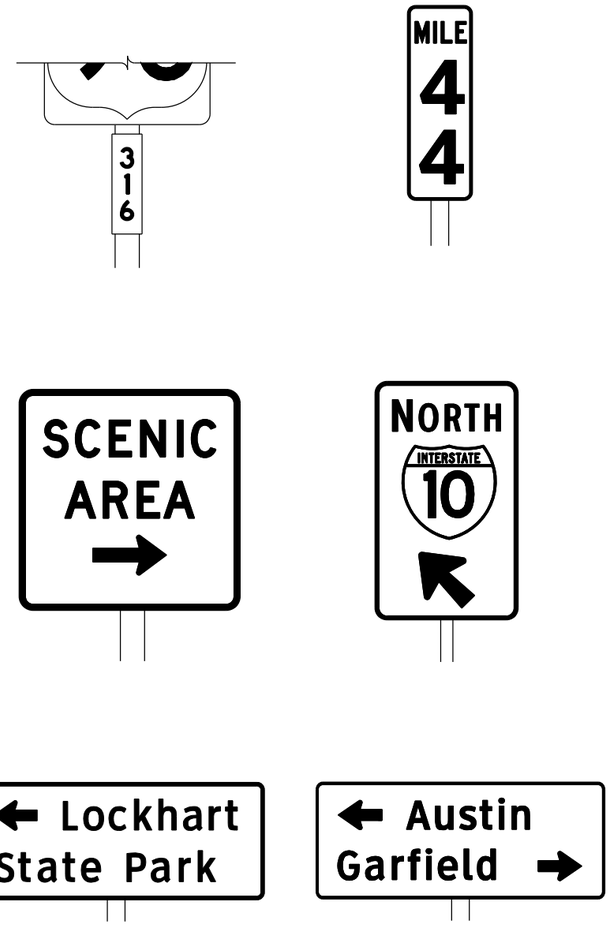
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

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

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



TYPICAL EXAMPLES

GENERAL NOTES

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

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

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

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

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

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

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

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

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

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
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/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

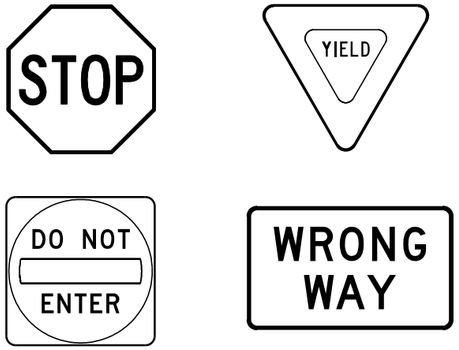
FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SA	BEXAR		95

3

DATE: 7/3/2023 11:13:12 AM
FILE: P:\122\17\06\Design\Civil\Standards\Signing\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

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



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

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

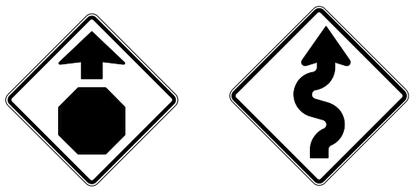
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

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

TYPICAL EXAMPLES

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

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

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

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

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

GENERAL NOTES

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
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/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

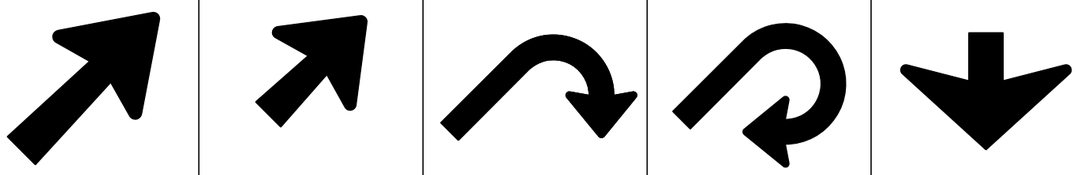
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696, ETC	CS
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SA	BEXAR		96

4

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



Type A | Type B | E-3 | E-4 | Down Arrow

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

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

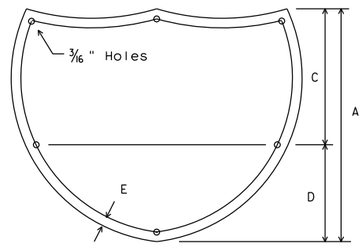
NOTE

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

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

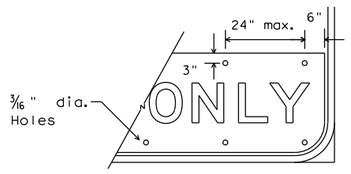
http://www.txdot.gov/

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

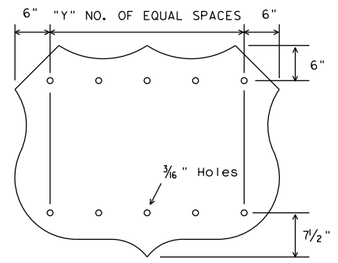


INTERSTATE ROUTE MARKERS

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

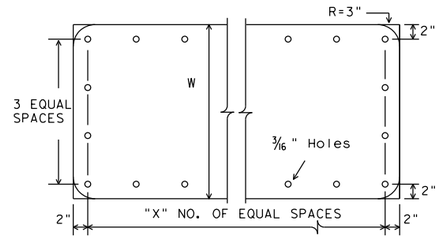


EXIT ONLY PANEL



U.S. ROUTE MARKERS

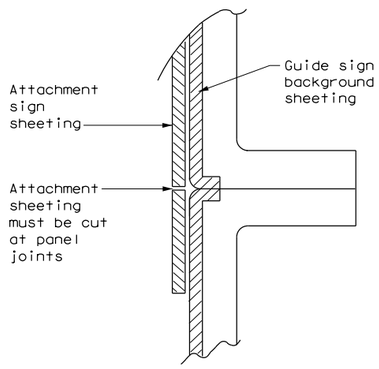
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



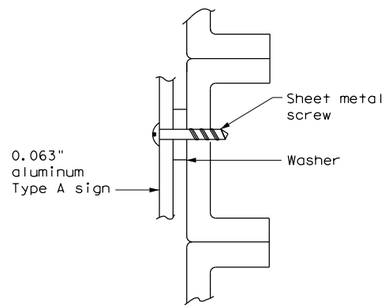
STATE ROUTE MARKERS

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

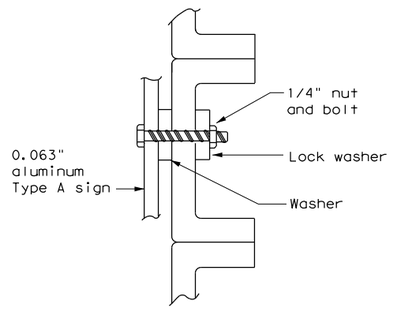
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

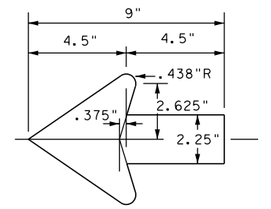
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

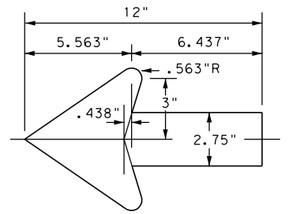
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SA	BEXAR		97

5

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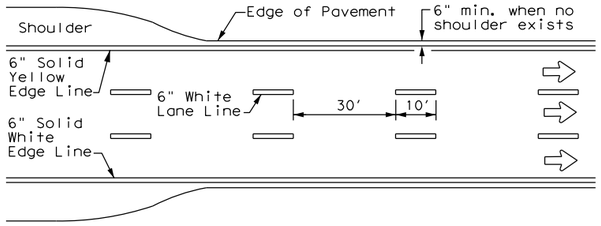
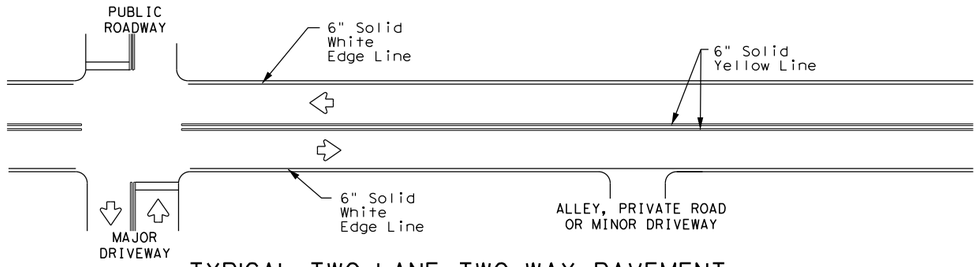
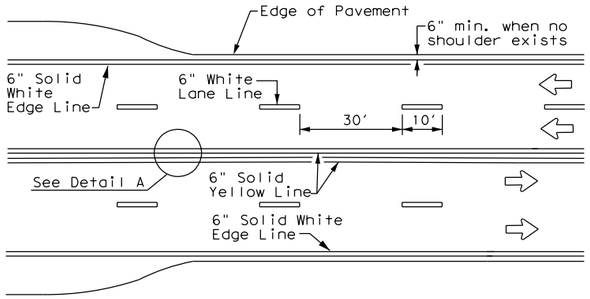
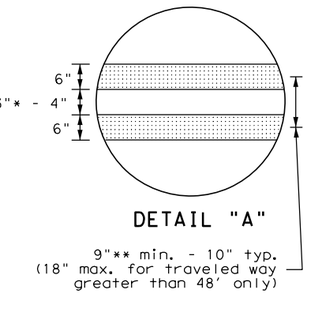


EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



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

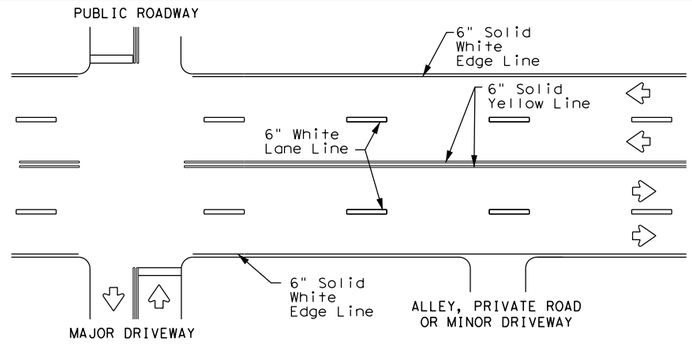




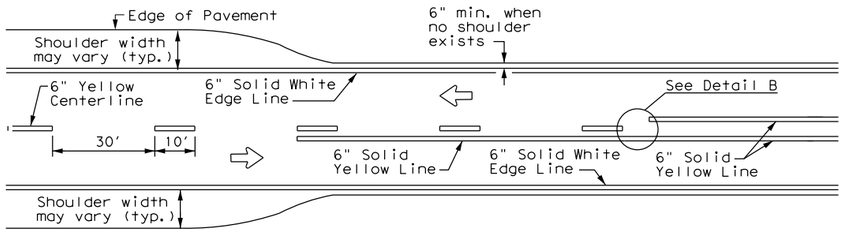
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

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

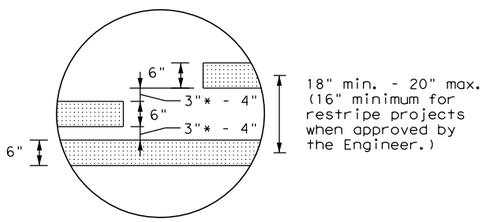
** 8" minimum for restripe projects when approved by the Engineer.



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

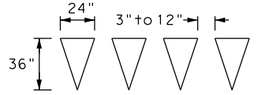


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



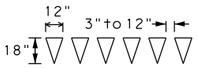
DETAIL "B"

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

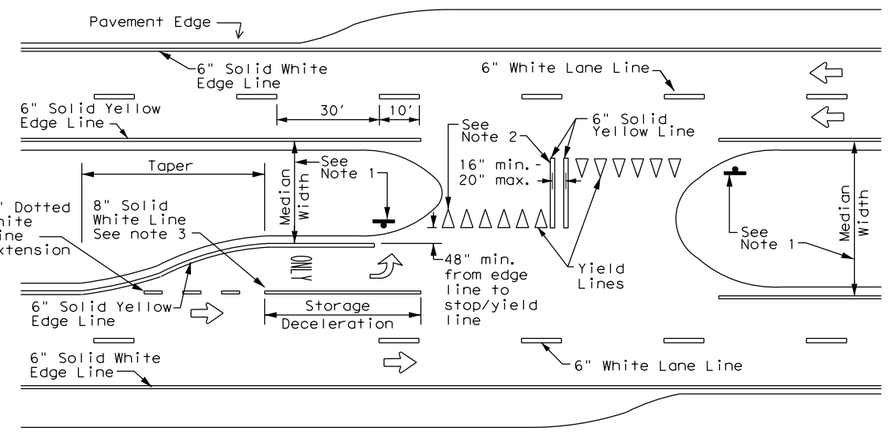


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

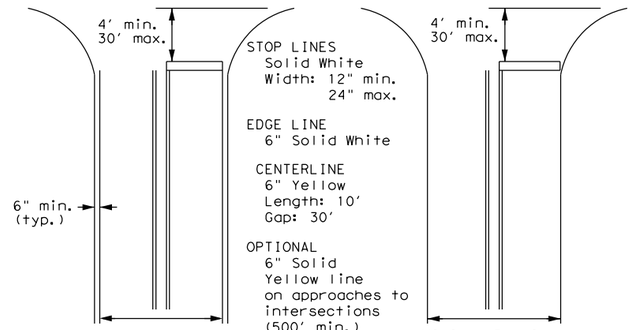
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

GENERAL NOTES

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

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths
for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

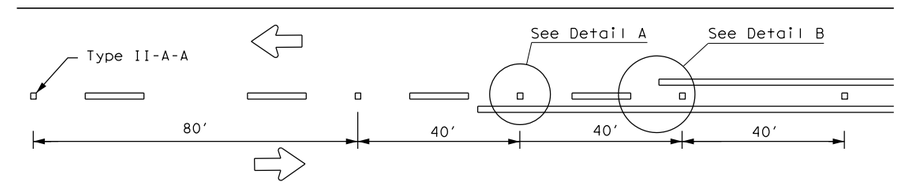
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

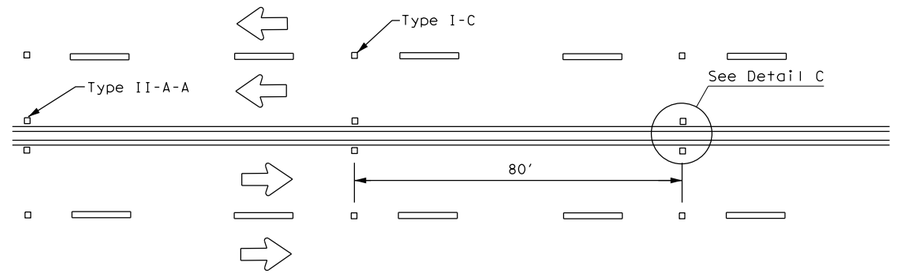
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	915	12	696,ETC	CS
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	SA	BEXAR		98

22A

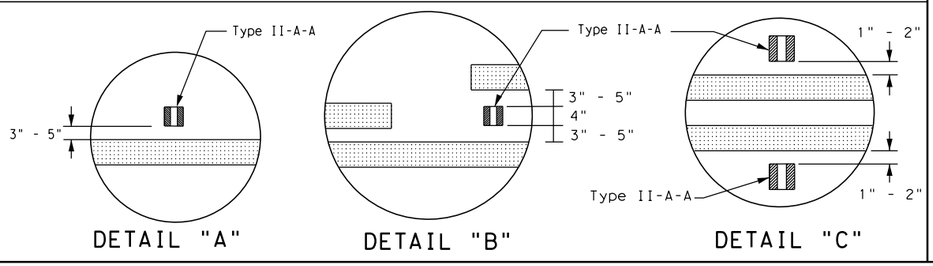
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



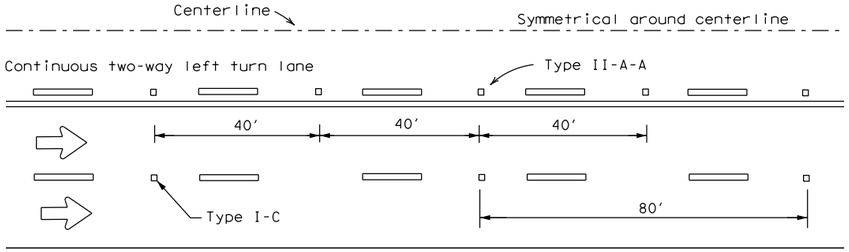
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



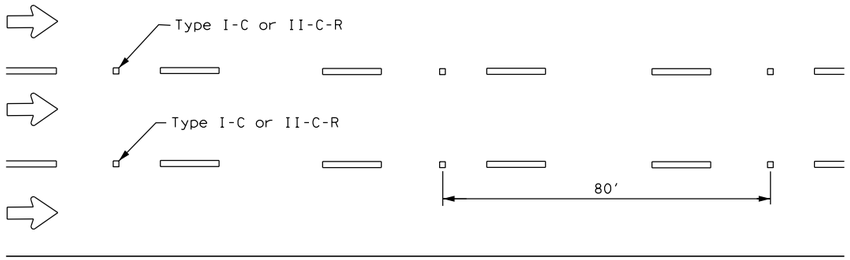
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



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



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



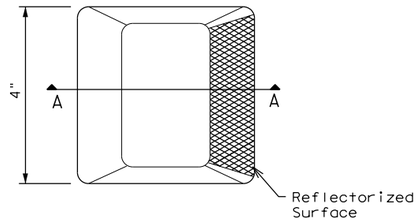
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

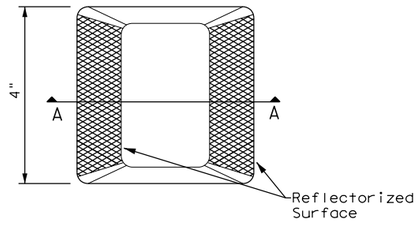
See Note 3.

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

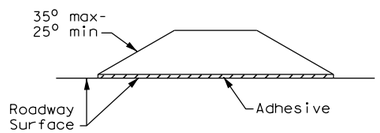
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

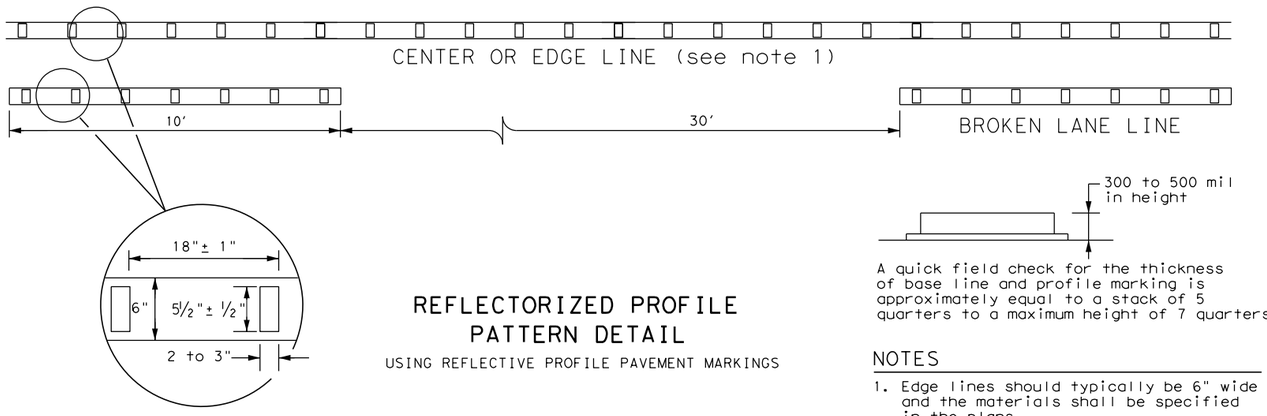


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

NOTES

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

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

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	915	12	696,ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		99

22B

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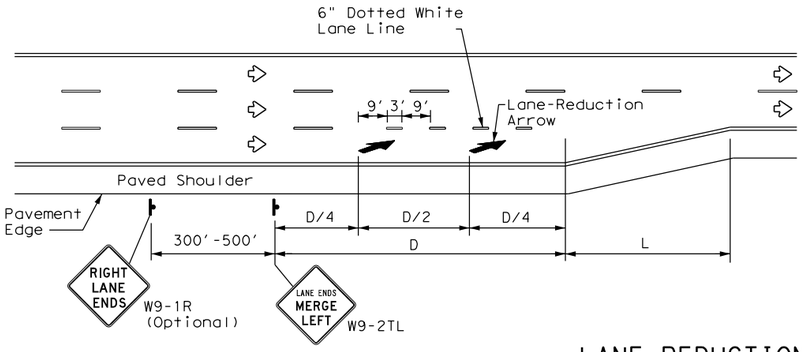


LANE REDUCTION

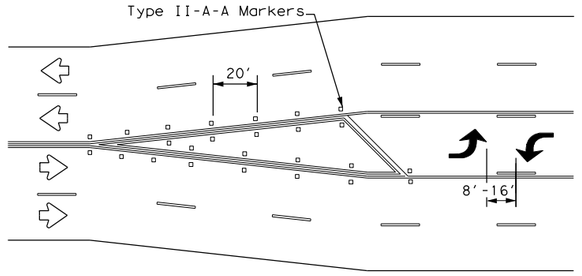
NOTES

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

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

GENERAL NOTES

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

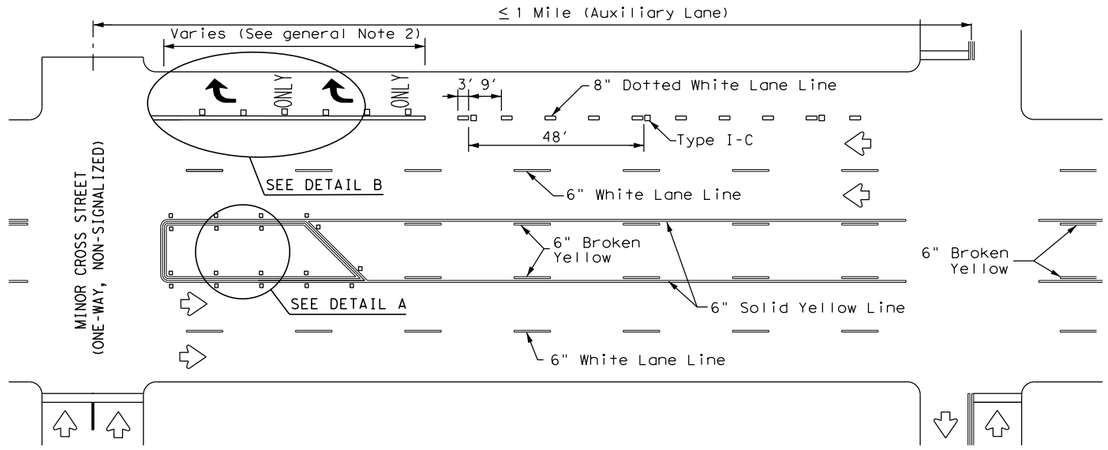


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

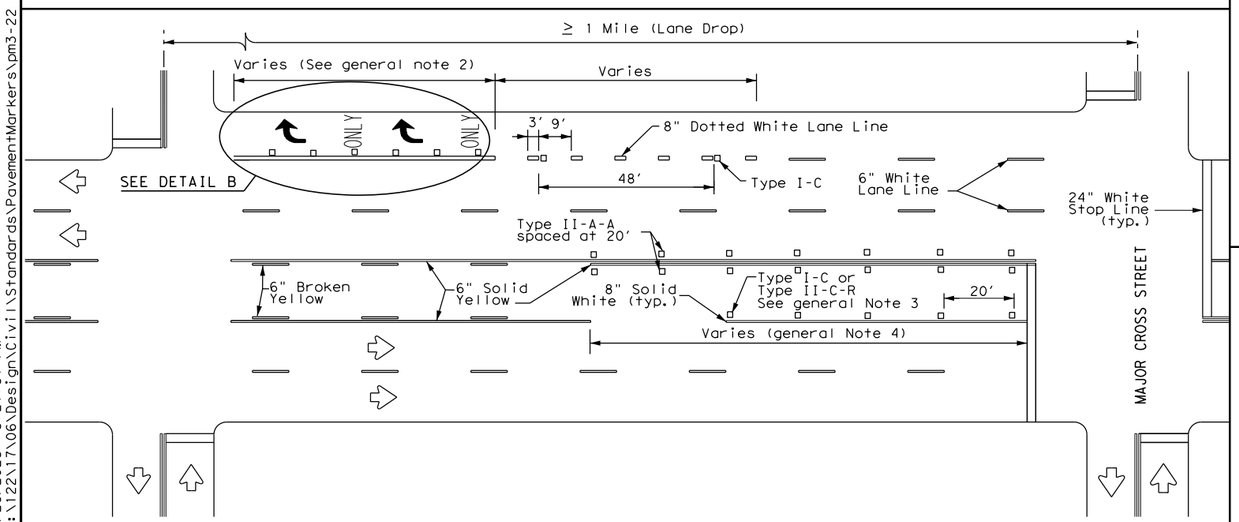
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

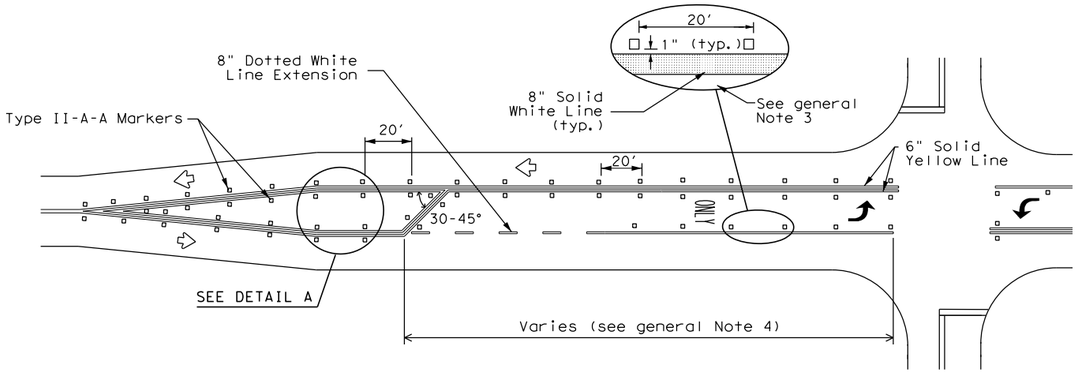
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



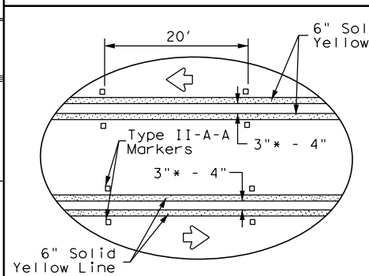
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



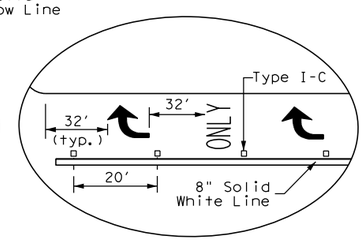
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

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

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-22

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©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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4-98 3-03 6-20	DIST	COUNTY		SHEET NO.
5-00 2-10 12-22	SA	BEXAR		100
8-00 2-12				

22C

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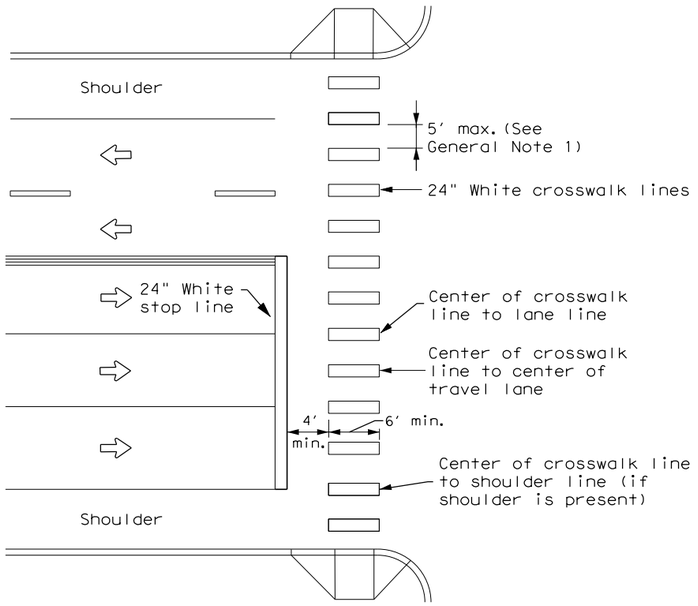


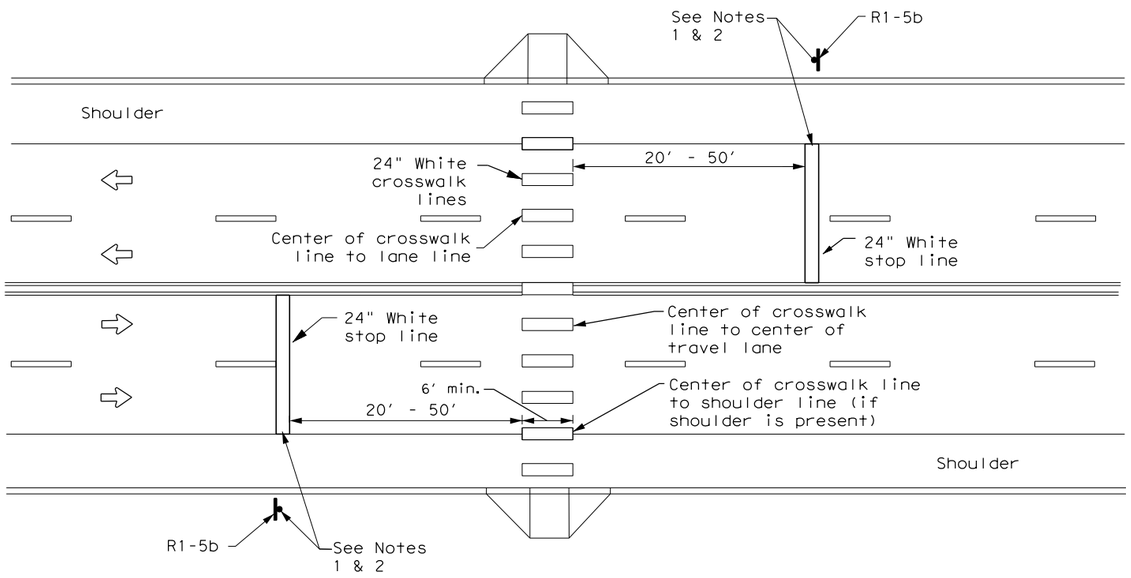
HIGH-VISIBILITY LONGITUDINAL CROSSWALK
AT CONTROLLED APPROACH

GENERAL NOTES

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

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

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



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY
LONGITUDINAL CROSSWALK

NOTES:

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

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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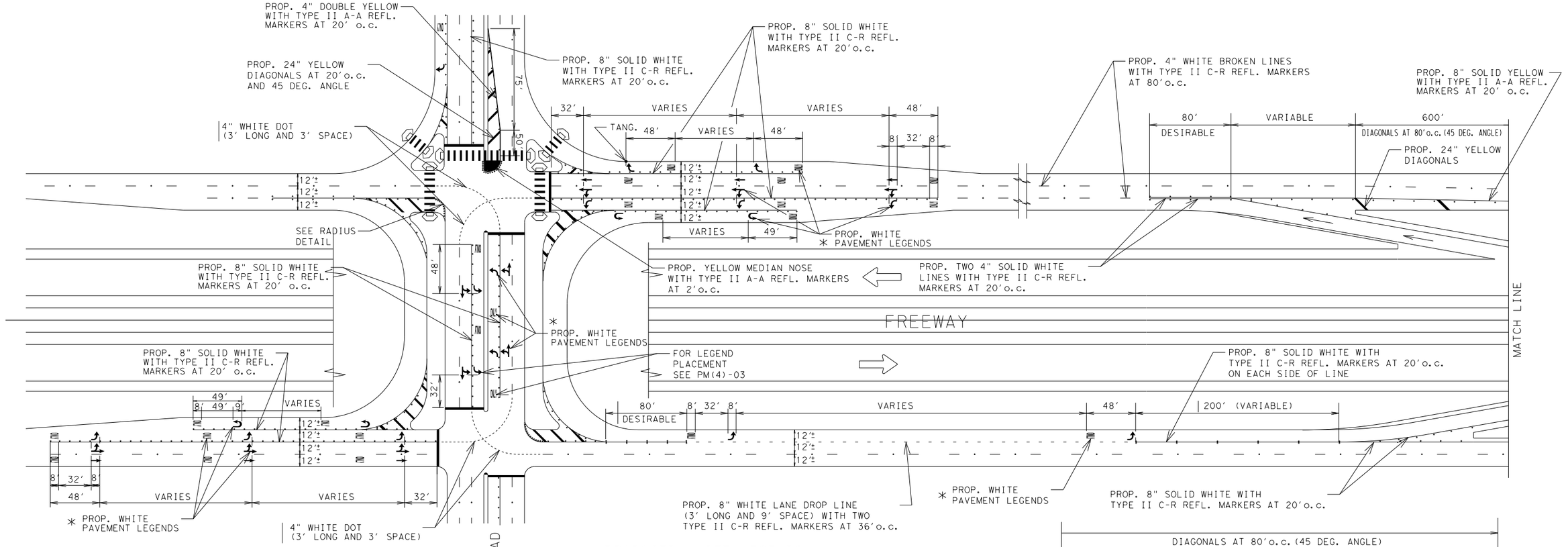
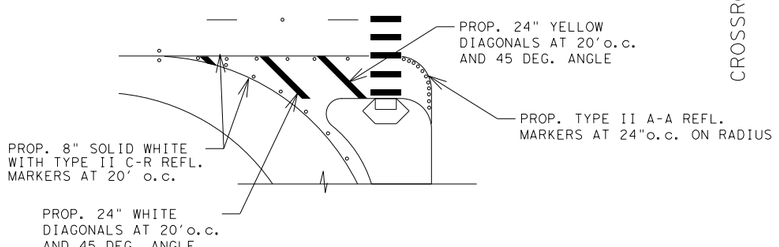
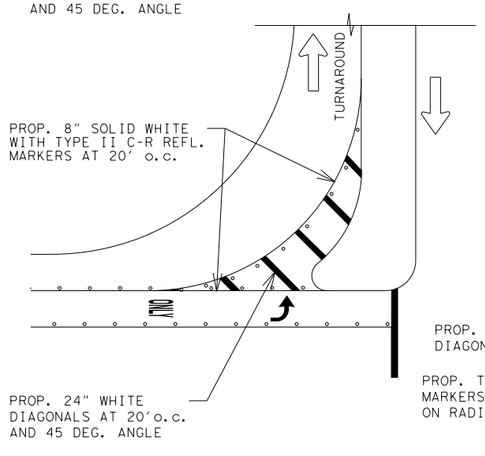
6-20	DIST	COUNTY		SHEET NO.
6-22	SA	BEXAR		101
12-22				

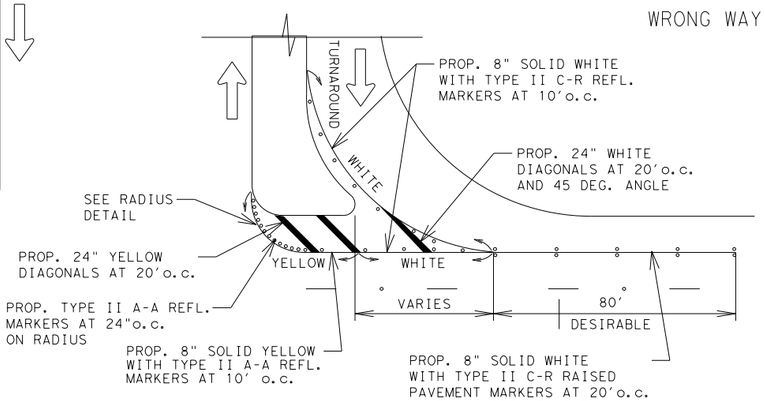
22D



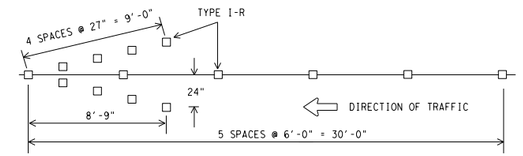
* PROPOSED WHITE LEGENDS TEXT AND ARROW SIZE TO BE IN ACCORDANCE WITH THE TEXAS M.U.T.C.D.







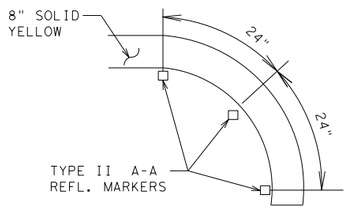
TYPICAL TURNAROUND PAVEMENT MARKING DETAILS



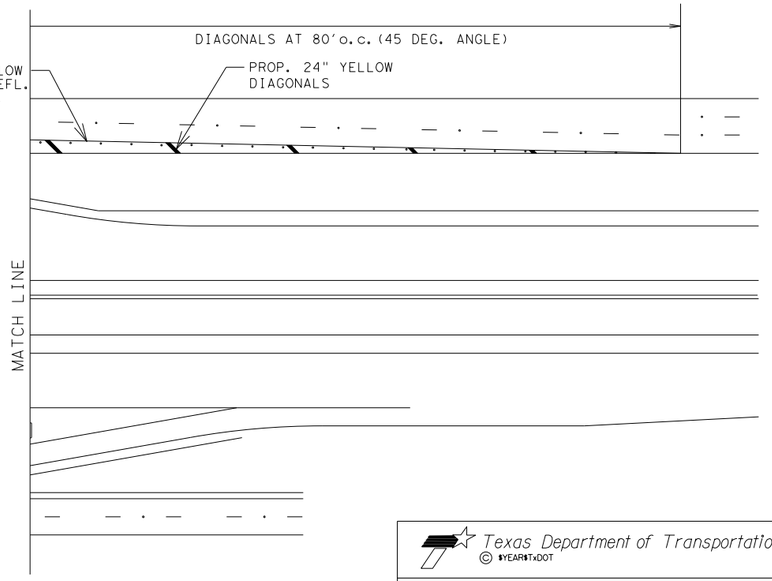
ALL RAISED MARKERS IN THE WRONG WAY ARROW SHALL BE TYPE I-R REFLECTORIZED PAVEMENT MARKERS WITH THE REFLECTORIZED SURFACE FACING THE WRONG WAY TRAFFIC. TYPE II-C-R SHALL NOT BE USED.

REFLECTORIZED WRONG WAY ARROWS, NOT TO EXCEED TWO, MAY BE PLACED ON EXIT RAMPS. LOCATION OF THE ARROWS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

WRONG WAY ARROW DETAIL



RADIUS DETAIL



Texas Department of Transportation

San Antonio District Standard

TYPICAL PAVEMENT MARKING DETAILS

SCALE: NS

TPMD

FHWA TEXAS DIVISION	FEDERAL AID PROJECT		SHEET NO.
	STP 2024(389)HESG		102
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
915	12	696,ETC	CS

7/3/2023 11:13:17 AM

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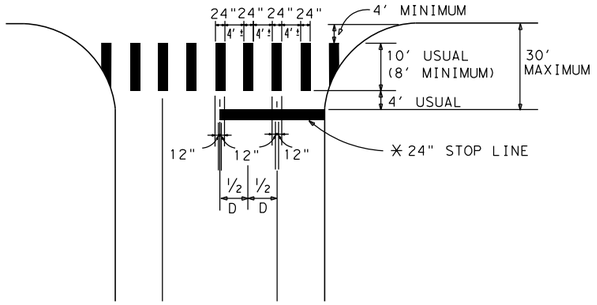
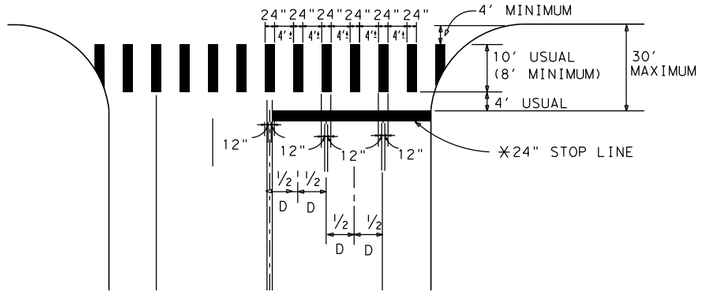
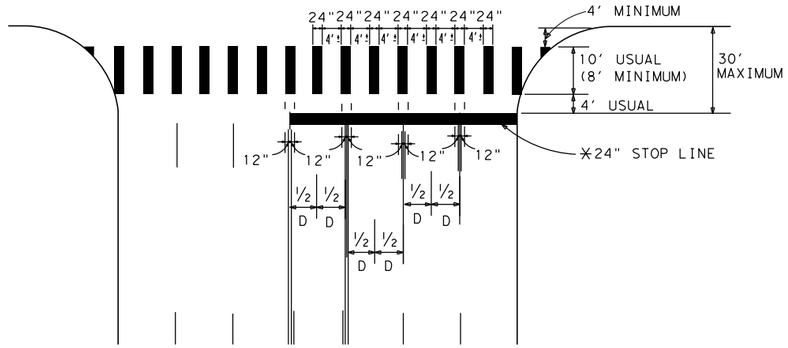


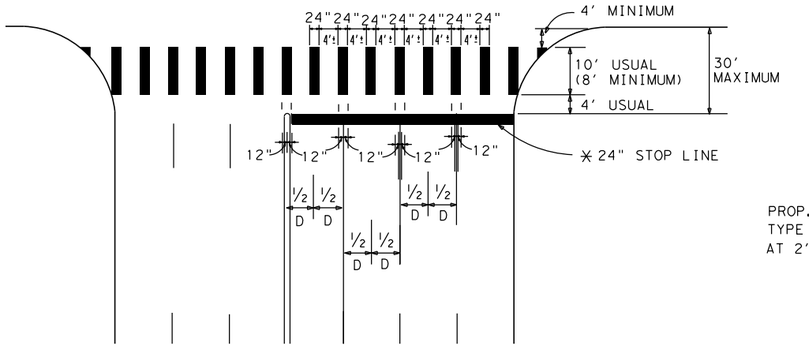
TWO LANES WITH SHOULDERS



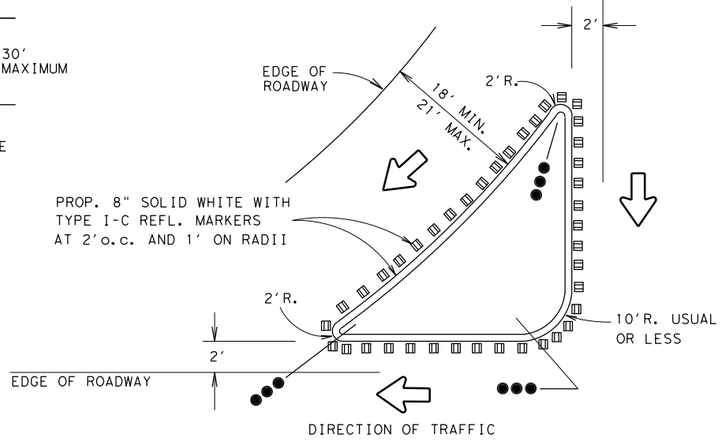
FOUR LANES WITH SHOULDERS



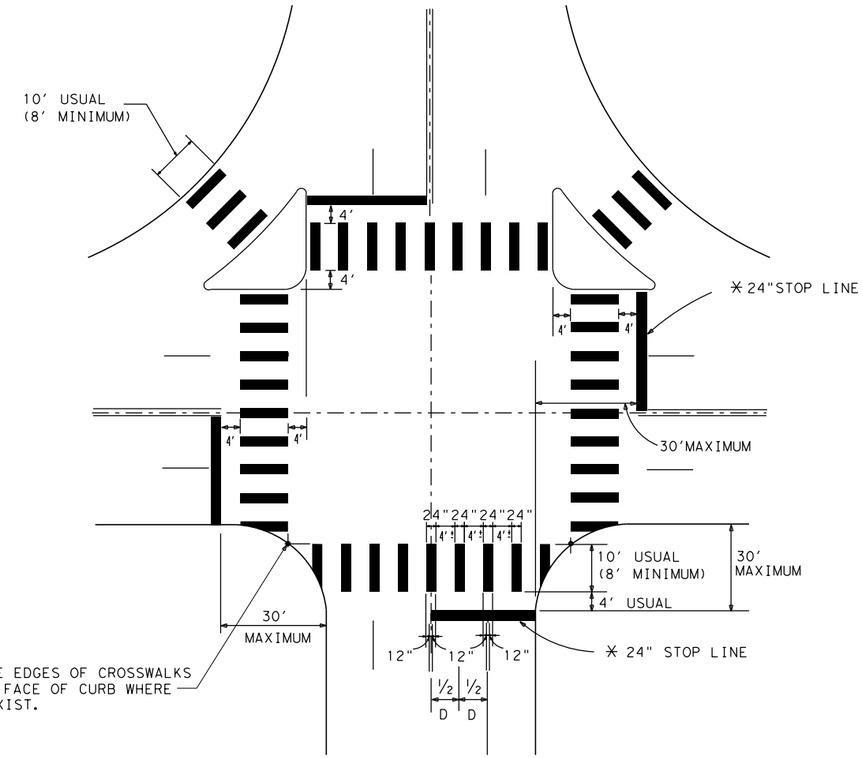
MULTI - LANES



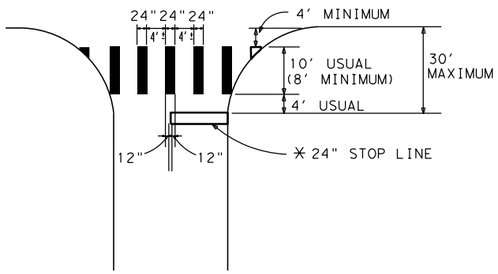
MULTI - LANE WITH MEDIAN



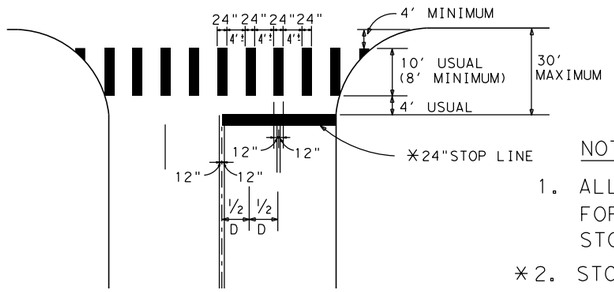
TYPICAL RIGHT TURN ISLAND
WITH DELINEATION



INTERSECTION WITH RIGHT - TURN ISLANDS



TWO LANES



FOUR LANES

NOTES:

1. ALL LONGITUDINAL LINES FORMING CROSSWALK AND STOP LINES SHALL BE WHITE
✳2. STOP LINES AS REQUIRED ON DETAILED PAVEMENT MARKING PLANS.
3. "D" IS EQUAL TO ONE HALF THE DISTANCE.

LEVELS DISPLAYED ACC:

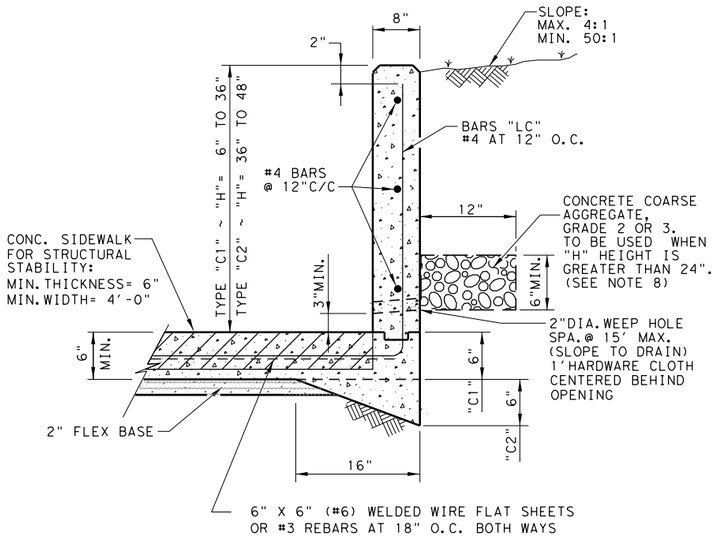
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

San Antonio District Standard

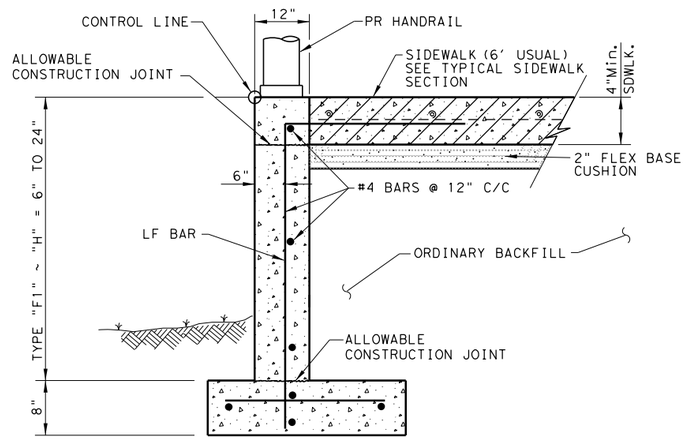
TYPICAL CROSSWALK DETAILS

TCD-05

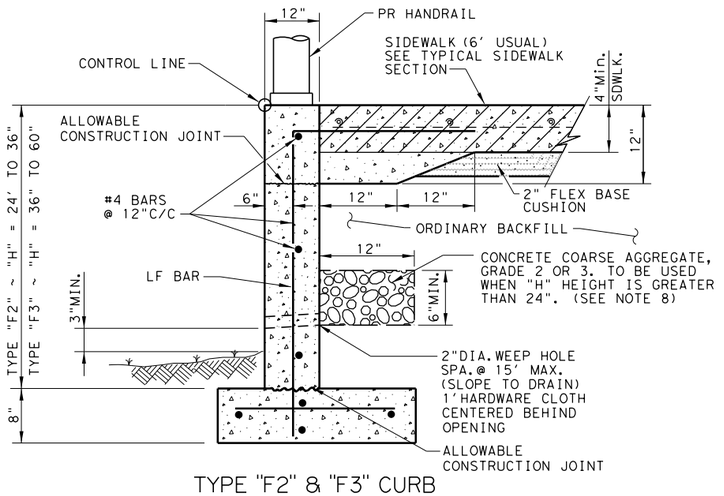
REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DEC 1999	6	STP 2024(389)HESG		103
AUG 2005	STATE	DIST.	COUNTY	
	TEXAS	SAT	BEXAR	
	CONT.	SECT.	JOB	HIGHWAY NO.
	915	12	696,ETC	CS



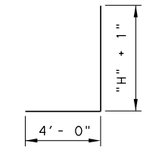
TYPE "C1" & "C2" CURB



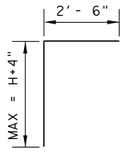
TYPE "F1" CURB



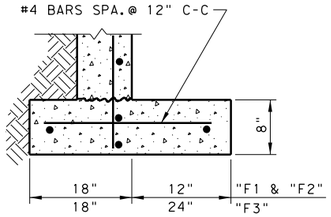
TYPE "F2" & "F3" CURB



BAR "LC"



BAR "LF"



FOOTING DETAIL

GENERAL NOTES:

1. CONCRETE FOR CURB TYPE F AND C SHOWN SHALL MEET THE MINIMUM SPECIFICATION REQUIREMENTS OF CLASS "C" CONCRETE PER ITEM 421
2. ALL REINFORCING STEEL SHALL BE GRADE 60
3. EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED TO MATCH PAVEMENT JOINITS IN ALL CURBS AND CURB AND GUTTER ADJACENT TO JOINTED CONCRETE PAVEMENT. WHERE PLACEMENT OF CURB OR CURB AND GUTTER IS NOT ADJACENT TO CONCRETE PAVEMENT, EXPANSION JOINTS SHALL BE PROVIDED AT STRUCTURES, CURB RETURNS AT STREETS, AND AT LOCATIONS DIRECTED BY THE ENGINEER.
4. VERTICAL AND HORIZONTAL DOWEL BARS AND TRANSVERSE REINFORCING BARS SHALL BE PLACED AT 4 FEET C-C, UNLESS OTHERWISE SHOWN.
5. UNTIL THE SIDEWALK IS COMPLETE, LATERAL SUPPORT FOR THE "F" CURBS WILL BE REQUIRED.
6. IF AGGREGATE IS REQUIRED PER THE DETAIL, IT IS PAID AS SUBSIDIARY TO THE CURB, ITEM 529.

DESIGN SOIL PARAMETERS:
Soil Unit Wt. = 120 pcf
Phi = 30 Degrees
Cohesion = 50 psf
Min. PI = 15
Max. PI = 30
SURCHARGE:
TYPE F CURB q = 2' Adjacent to sidewalk
Max. slope behind TYPE C Curb = 4:1
Min. Factor of Safety against sliding is 1.5.
Designed in accordance with current AASHTO Standards and Interim Specifications.

CLASS C CONCRETE PAID UNDER ITEM 531, SIDEWALK. (NOTE. ADDITIONAL CONCRETE TO MEET THE THICKENED SECTIONS REQUIRED BY THESE DETAILS IS SUBSIDIARY TO ITEM 531, CURB.)

Texas Department of Transportation
San Antonio District

MISCELLANEOUS CURB AND SIDEWALK DETAILS

San Antonio District Standard
Sheet (2 of 2)

T:Engdata/Standards/MiscCurbdetails.dgn

ORIGINAL DRAWING DATE: 8/28/2023

REVISIONS
09-01-08
10-10-17 sidewalk width equals 6' usual
07-22-20 9° curb + curb w/ conc pvmt det.
- -

PREPARED BY AND FOR USE OF TxDoT.

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #	SHEET
SA	6	STP 2024(389)HESG	104

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
BEXAR	915	12696,	ETCCS	

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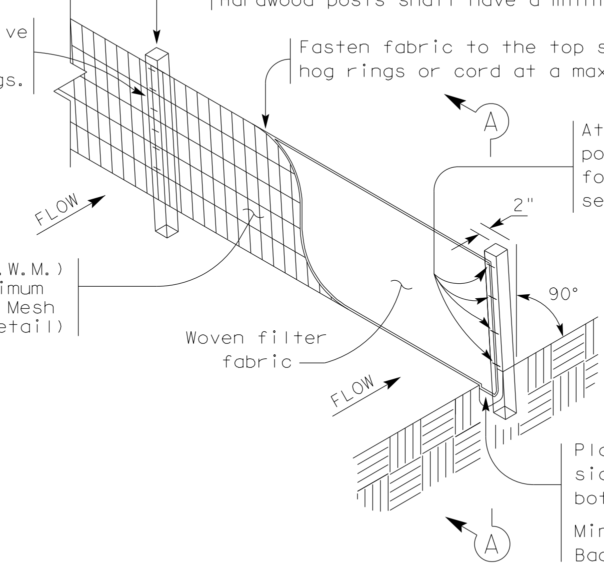
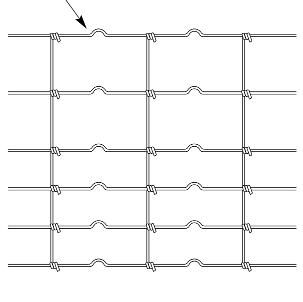


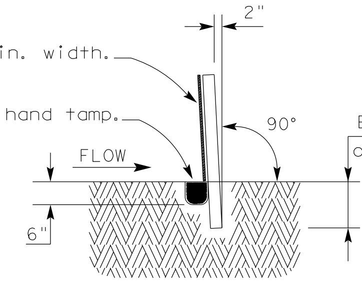
TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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



SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

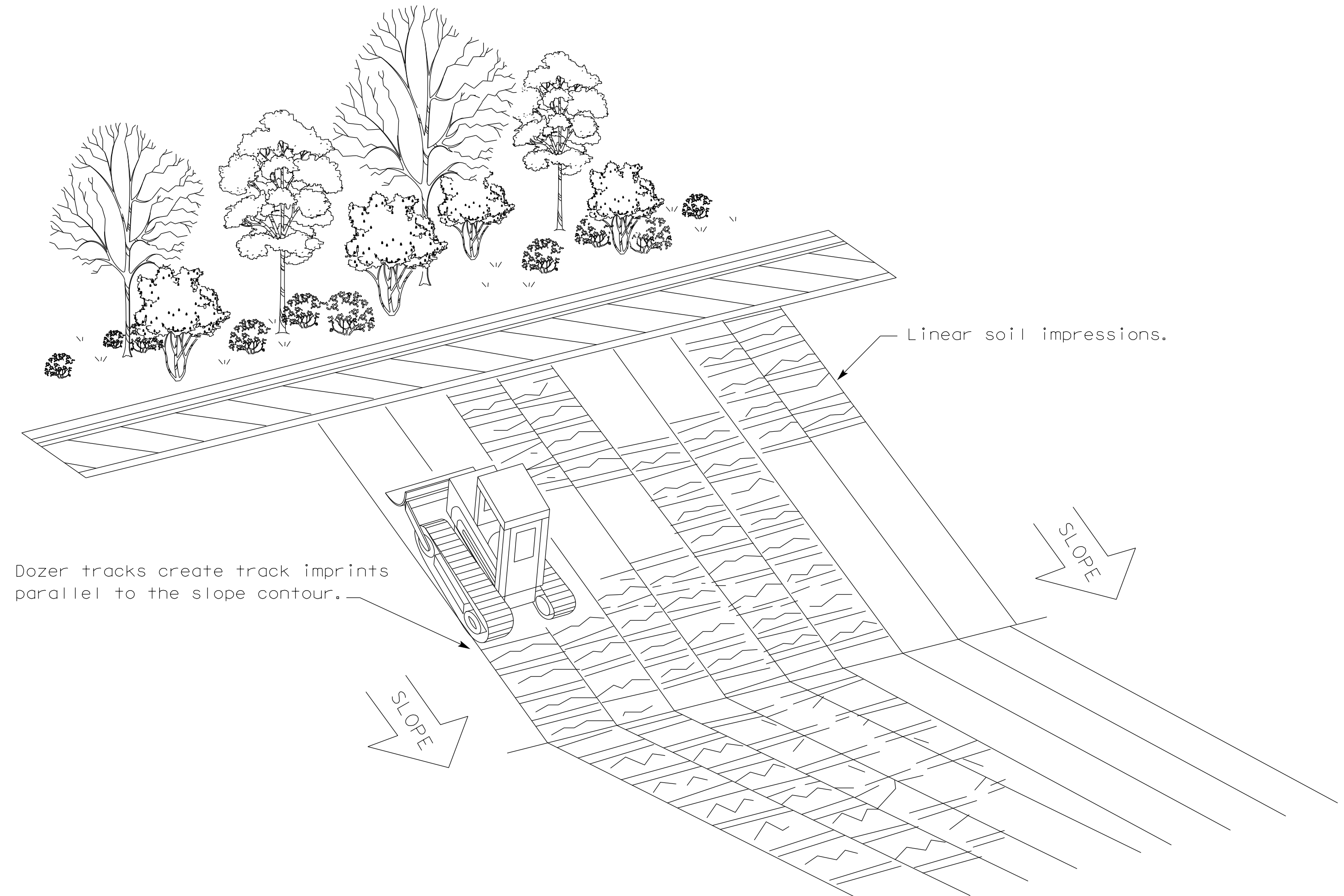
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation — Design Division Standard

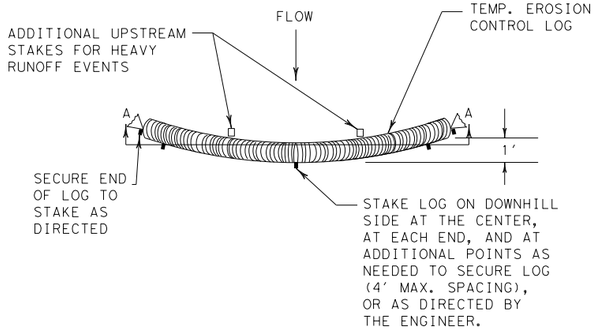
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

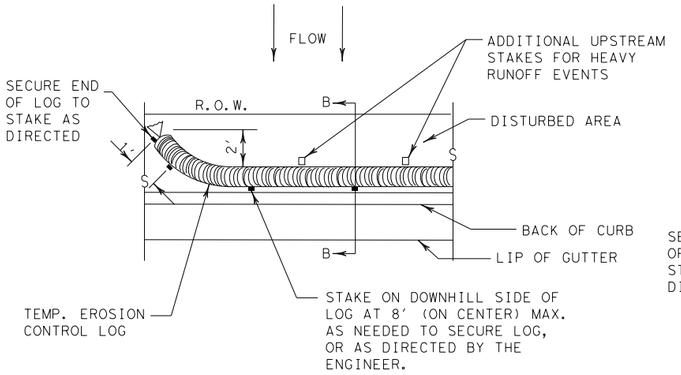
EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696,ETC	CS
	DIST		COUNTY	SHEET NO.
	SA		BEXAR	105

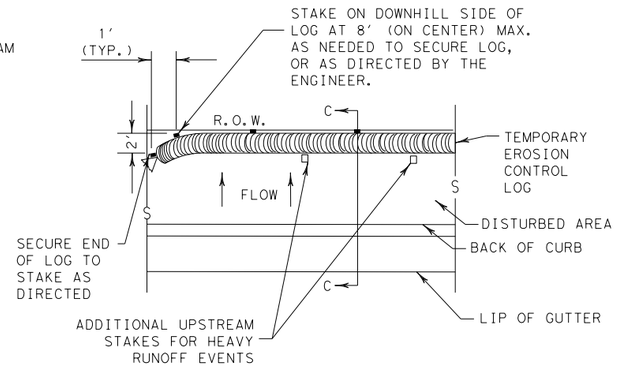
DATE: 7/3/2023
FILE: P:\122\17\06\Design\Civil\Standards\SW3P\ec916.dgn



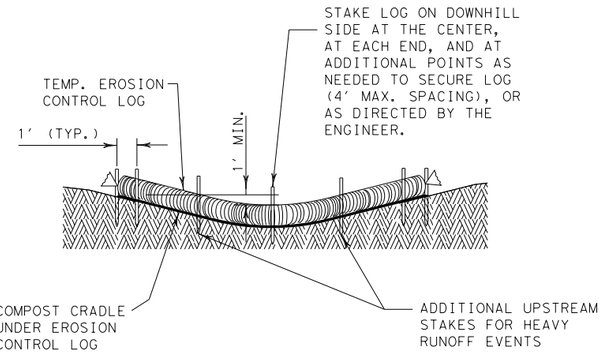
PLAN VIEW



PLAN VIEW



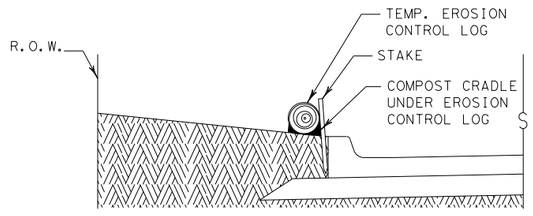
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

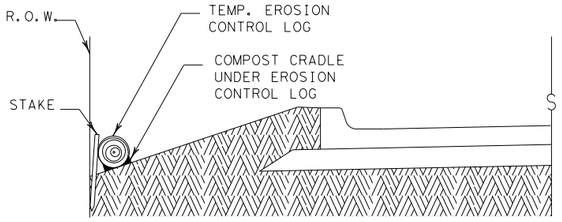
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



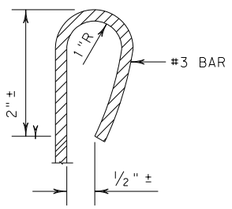
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

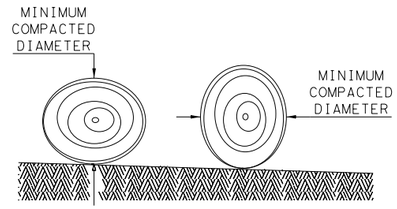
- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL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



REBAR STAKE DETAIL

GENERAL NOTES:

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

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

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

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	915	12	696, ETC		CS	
	DIST	COUNTY			SHEET NO.	
	SA	BEXAR			106	

DATE: 7/3/2023
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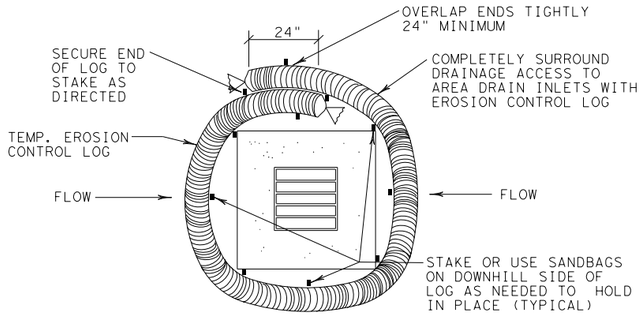
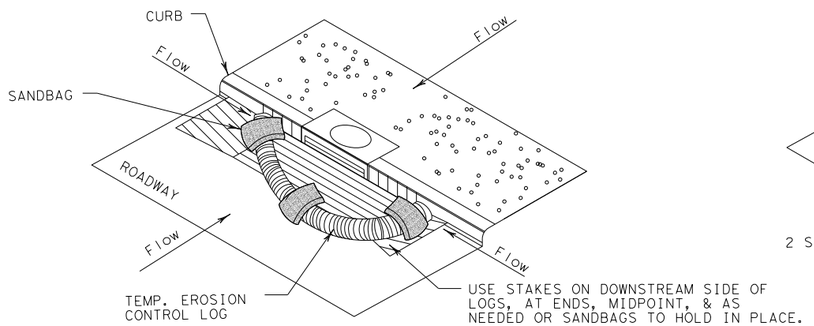


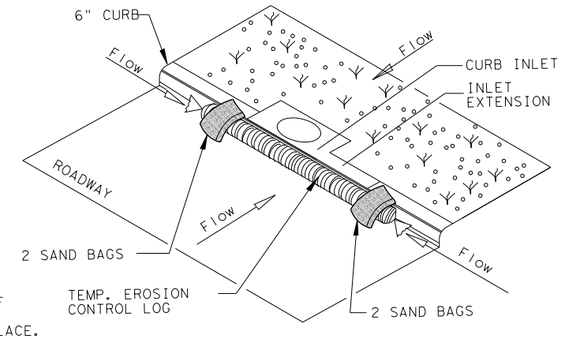
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

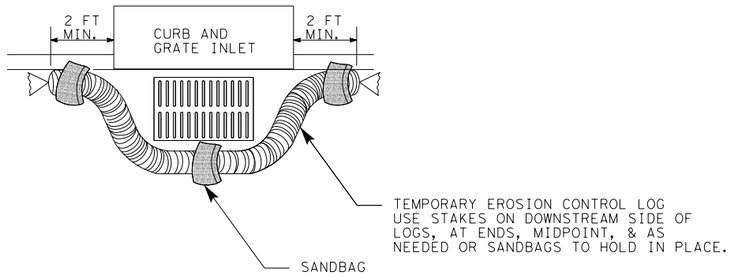
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

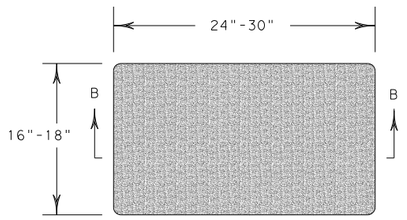
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation | Design Division Standard

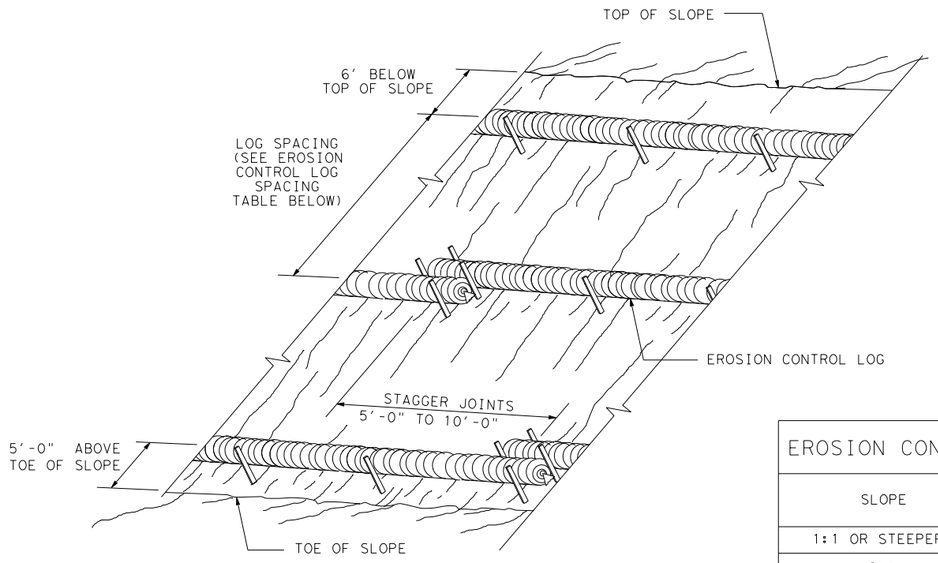
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

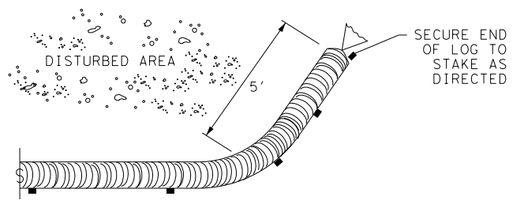
FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	915	12	696, ETC		CS		
	DIST	COUNTY			SHEET NO.		
	SA	BEXAR			107		

DATE: 7/3/2023
FILE: P:\122\17\06\Design\Civil\Standards\SW3P\ec916.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

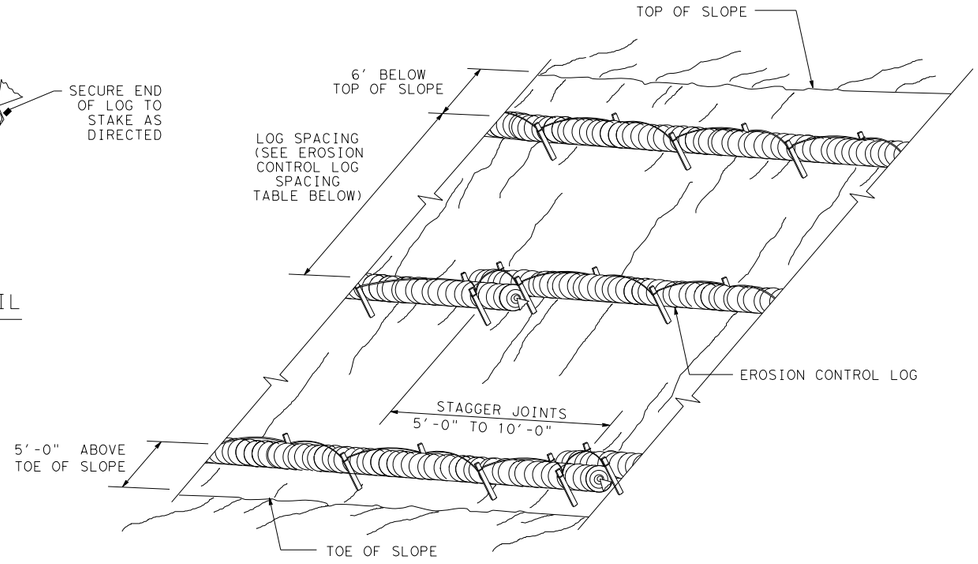
CL-SST



END SECTION RAP DETAIL

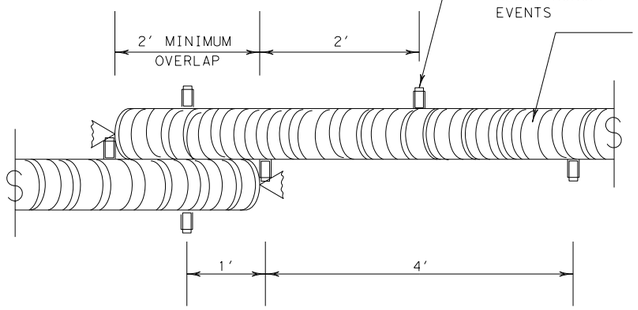
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

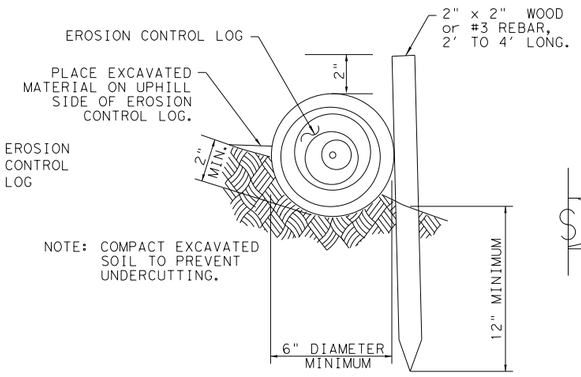
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

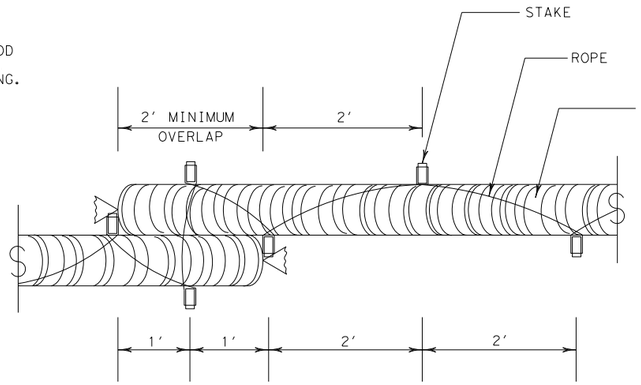


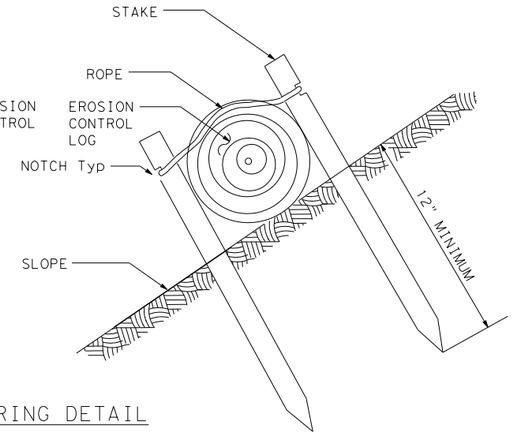


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

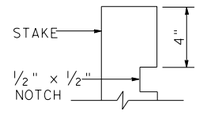
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	915	12	696, ETC	CS
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		108

7/3/2023 11:13:23 AM
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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.

☒ 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 ☒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):

☒ 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.

☐ No Action Required ☒ Required Action

Action No.

1.

2.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

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

☐ No Action Required ☒ Required Action

Action No.

1. 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 appropriate for any hazardous materials used.

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

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

Contact the Engineer if any of the 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:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ 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.)

☐ No Action Required ☒ Required Action

Action No.

1.

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	
	CONT	SECT	JOB		HIGHWAY		
REVISIONS	915	12	696, ETC		CS		
	DIST	COUNTY				SHEET NO.	
	SA	BEXAR				109	

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0915-12-969. ETC

1.2 PROJECT LIMITS:
From: PLEASANTON RD IN SAN ANTONIO ON PLEASANTON RD

To: AT HARDING BLVD, ETC

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 2126912.4 ,(Long) 13678090.6

END: (Lat) _____ ,(Long) _____

1.4 TOTAL PROJECT AREA (Acres): <0.1 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): <0.1 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:
INSTALLATION OF TRAFFIC SIGNALS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
CLAY/SAND	VARIES BY LOCATION

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

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
X No PSLs planned for construction

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

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

Tributaries	Classified Waterbody
N/A	

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications
X Perform SWP3 inspections
☐ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 9/15/2023 DATE

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP 2024 (389) HESG		110
STATE	STATE DIST.	COUNTY	
TEXAS	SA	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
915	12	696, ETC	CS

DATE: 9/15/2023
FILE: P:\122\17\06\Design\Civil\Standards\Traffic Signals\swp3a22.dgn

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- X Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 9/15/2023 DATE

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP 2024 (389) HESG		111
STATE	STATE DIST.	COUNTY	
TEXAS	SA	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
915	12	696, ETC	CS

DATE: 9/15/2023
FILE: P:\122\17\06\Design\Civil\Standards\Traffic Signals\swp3a22.dgn