PROJECT NO.			
STP 2B24(305)VRU			
CONT	SECT	JOB	HIGHWAY
0165	01	109,ETC.	US 271,ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		1

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO. STP 2B24(305)VRU, STP 2B24(307)HESG

US 271 AT NE LOOP 323 EXTENSION
US 69 (S. BROADWAY AVENUE) AT AMHERST DRIVE
FM 756 (PALUXY DRIVE) AT SHILOH ROAD
LED CURVE WARNING SYSTEM ALONG SHILOH ROAD

SMITH COUNTY

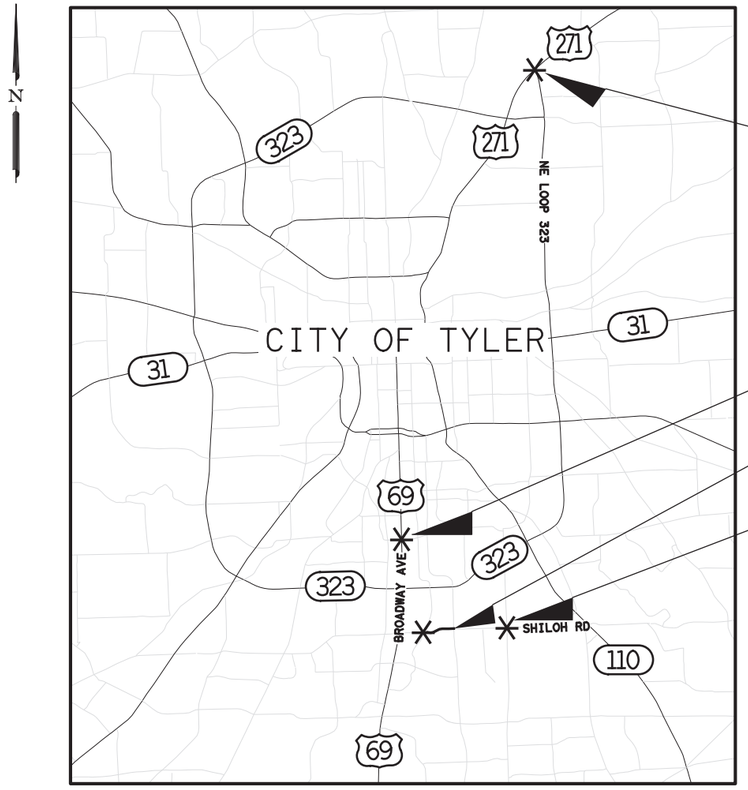
NET LENGTH OF PROJECT US 271= 800 FT.= 0.15 MI.
NET LENGTH OF PROJECT US 69= 800 FT.= 0.15 MI.
NET LENGTH OF PROJECT FM 756= 800 FT.= 0.15 MI.
NET LENGTH OF PROJECT LED CURVE WARNING SYSTEM= 2200 FT.= 0.42 MI.

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENT
PROJECTS CONSISTING OF TRAFFIC SIGNAL
IMPROVEMENTS, PEDESTRIAN SAFETY IMPROVEMENTS, AND
A LED CURVE WARNING SYSTEM

FUNCTIONAL CLASSIFICATION = US 271 - PRINCIPAL ARTERIAL
US 69 - PRINCIPAL ARTERIAL
FM 756 - PRINCIPAL ARTERIAL
SHILOH ROAD - MINOR ARTERIAL

DESIGN SPEED = US 271- 55 MPH
US 69 - 45 MPH
FM 756- 40 MPH
SHILOH ROAD - 40 MPH

AVERAGE DAILY TRAFFIC = US 271 - 16,387 VPD (CURRENT)
US 69 - 36,586 VPD (CURRENT)
FM 756 - 15,662 VPD (CURRENT)
SHILOH ROAD - 13,499 VPD (CURRENT)



CCSJ:0165-01-109
US 271 AT
NE LOOP 323 EXTENSION

CSJ:0191-01-096
US 69 (S. BROADWAY AVENUE)
AT AMHERST DRIVE

CSJ:0910-16-184
LED CURVE WARNING SYSTEM
AT SHILOH ROAD

CSJ:0492-04-045
FM 756 (PALUXY DRIVE)
AT SHILOH ROAD

STATE OF TEXAS
OSCAR I. GONZALEZ
140479
LICENSED
PROFESSIONAL ENGINEER

05/29/2024

FINAL PLANS

DATE CONTRACT LETTING: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK COMPLETED & ACCEPTED: _____

CONTRACTOR: _____

USED ____ OF ____ ALLOTTED DAYS _____

FINAL CONTRACT COST : $ _____

FINAL AS BUILT PLANS

THE CONSTRUCTION WAS PERFORMED UNDER MY SUPERVISION
IN ACCORDANCE WITH THE PLANS AND CONTRACT

_____ _____
DATE AREA ENGINEER

REGISTERED ACCESSIBILITY SPECIALIST (RAS)
INSPECTION REQUIRED. TDLR NO: TABS2024020865

* SIGN IN ACCORDANCE WITH THE STANDARD BC SHEETS AND PART 6 OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE CONTRACT PROVISIONS 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)

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

Texas Department of Transportation

SUBMITTED FOR LETTING: 5/31/2024

DocuSigned by: Rolando Mendez 8F5FF128DB7C484...
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: 5/31/2024

DocuSigned by: 6149184A8C65461...
DISTRICT ENGINEER

GENERAL

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS
3,3A - 3F	GENERAL NOTES
4 - 6	CITY OF TYLER GENERAL NOTES
7 - 9	ESTIMATE AND QUANTITY SHEET
10 - 11	SUMMARY OF QUANTITIES
12	SUMMARY OF SMALL SIGNS - TRAFFIC SIGNALS
12A	SUMMARY OF SMALL SIGNS - LED CHEVRONS

TRAFFIC CONTROL PLAN

SHEET NO.	DESCRIPTION
13	CONSTRUCTION SEQUENCE - TRAFFIC SIGNALS
14	CONSTRUCTION SEQUENCE - LED CHEVRONS

SHEET NO.	STANDARDS
15 - 26	* BC (1)-21 THRU BC (12)-21
27	* TCP (1-1) - 18
28	* TCP (1-3) - 18
29	* TCP (1-4) - 18
30	* TCP (2-1) - 18
31	* TCP (2-4) - 18
32	* WZ(BTS-1)-13
33	* WZ(BTS-2)-13

TRAFFIC ITEMS

SHEET NO.	DESCRIPTION
34	EXISTING CONDITIONS - US 271 AT NE LOOP 323 EXTENSION
35	PROPOSED CONDITIONS - US 271 AT NE LOOP 323 EXTENSION
36 - 37	PROPOSED TRAFFIC SIGNAL DETAILS (1-2) - US 271 AT NE LOOP 323 EXTENSION
38	PROPOSED SIGNAGE DETAILS - US 271 AT NE LOOP 323 EXTENSION
39	PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS - US 271 AT NE LOOP 323 EXTENSION
40 - 41	PEDESTRIAN FACILITY DETAILS - US 271 AT NE LOOP 323 EXTENSION
42	EXISTING CONDITIONS - US 69 AT AMHERST DRIVE
43	PROPOSED CONDITIONS - US 69 AT AMHERST DRIVE
44 - 45	PROPOSED TRAFFIC SIGNAL DETAILS (1-2) - US 69 AT AMHERST DRIVE
46	PROPOSED SIGNAGE DETAILS - US 69 AT AMHERST DRIVE
47	PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS - US 69 AT AMHERST DRIVE
48	PEDESTRIAN FACILITY DETAILS - US 69 AT AMHERST DRIVE
49	EXISTING CONDITIONS - FM 756 AT SHILOH ROAD
50	PROPOSED CONDITIONS - FM 756 AT SHILOH ROAD
51 - 52	PROPOSED TRAFFIC SIGNAL DETAILS (1-2) - FM 756 AT SHILOH ROAD
53	PROPOSED SIGNAGE DETAILS - FM 756 AT SHILOH ROAD
54	PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS - FM 756 AT SHILOH ROAD
55 - 56	PEDESTRIAN FACILITY DETAILS - FM 756 AT SHILOH ROAD
57 - 58	SIGNAGE PLAN
59	CABINET DETAILS

SHEET NO.	STANDARDS
60	* BLPM-10
61	* CCCG-22
62	* D&OM(1)-20
63	* D&OM(2)-20
64	* D&OM(3)-20
65 - 71	* ED(1,3-6,8-9) -14
72 - 75	* LMA (1-4) -12
76	* LONG MAST ARM LIST - US 271 AT NE LOOP 323
77	* LUM-A -12
78	* MA-D -12
79 - 82	* PED-18
83 - 85	* PM(1)-22 THRU PM(3)-22
86	* PM(4)-22A (MOD)
87	* RFBA -13
88 - 89	* RID (1-2) -20
90 - 93	* RIP(1-4) -19
94	* SINGLE MAST ARM LIST - US 271 AT NE LOOP 323
95	* SINGLE MAST ARM LIST - US 69 AT AMHERST DRIVE
96	* SINGLE MAST ARM LIST - FM 756 AT SHILOH ROAD
97	* SMA-80 (2) -12
98	* SMD(GEN)-08
99	* SMD(SLIP-1)-08
100	* SMD(SLIP-2)-08
101	* SMD(SLIP-3)-08
102	* SMD(TWT)-08
103	* TS-BP -20
104	* TRAFFIC SIGNAL POLE FOUNDATION - US 271 AT NE LOOP 323
105	* TRAFFIC SIGNAL POLE FOUNDATION - US 69 AT AMHERST DRIVE
106	* TRAFFIC SIGNAL POLE FOUNDATION - FM 756 AT SHILOH ROAD
107	* TSR(4)-13

ENVIRONMENTAL ISSUES

SHEET NO.	DESCRIPTION
108 - 109	STORMWATER POLLUTION PREVENTION PLAN (SW3P)
110	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET NO.	STANDARDS
111 - 113	* EC(9)-16

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

Ivan J.

05/30/2024

SIGNATURE DATE

STATE OF TEXAS
OSCAR I. GONZALEZ
140479
LICENSED PROFESSIONAL ENGINEER

Ivan J. 4/30/24

halff
1121 ESE LOOP 323, SUITE 117
TYLER, TX 75701
(903) 617-5369

CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SUPPLEMENTAL INDEX OF SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 2

REV DATE: 5/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.adpzal\AVO\55000\55503\00\10191-01-02\64 - Design\Master Design Files\TR-GNRL-55503.dgn

GENERAL NOTES:

GENERAL.

Contractor questions on this project are to be addressed to the following individuals:

Juanita Daniels-West	Juanita.DanielsWest@txdot.gov
Steven Swindell	steven.swindell@txdot.gov

For Q&A on Proposals navigate to:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

Use 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 and click on the link in the window that pops up to view the Q&A.

All relevant project documentation including Contract Time Determinations and cross-sections will still be posted to the districts FTP website.

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

For this Contract, the following standard sheets have been modified:

PM(4)-22(MOD)

ITEM 5. CONTROL OF THE WORK

If utility lines need adjustments during construction operations, modify operations and continue the work in a manner that will allow others to make the utility adjustments. Additional working time may be allowed for delays caused by these utility adjustments.

Utility locations shown on the plans are approximate. Contact utilities in accordance with Article 5.6., “Cooperating With Utilities.”

ITEM 6. CONTROL OF MATERIALS

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the Contractor must submit an original of the TxDOT

Project Number: **Sheet 3**

County: Smith **Control:** 0165-01-109, Etc.

Highway: US 271, Etc.

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 link below:

https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html

ITEM 7. LEGAL RELATIONS AND RESPONSIBILITIES

Concrete truck drivers and concrete pump operators are required to wash out only in designated areas specifically constructed for eliminating run-off. Dispose of materials in accordance with federal, state, and local requirements.

Maintain positive drainage for permanent and temporary work for the duration of the project. The Contractor will be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work will be subsidiary to various bid items.

The total disturbed area for this project is 0.2 acres. The disturbed area in this project and the Contractor Project Specific Locations (PSL’s) within 1 mile of the project limits for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSL for construction support activities on or off the ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceed 5 acres, before disturbance, provide a copy of the Contractor NOI for PSLs on the ROW and within 1 mile of the project limits to the Engineer and to any local government that operates a Municipal Separate Storm Sewer System (MSSS).

In accordance with Article 7.9, provide and maintain adequate, neat and sanitary toilet accommodations within the project limits for employees, including State employees.

No significant traffic generator events identified.

ITEM 8. PROSECUTION AND PROGRESS

Nighttime work is only allowed on this project with prior approval.

Prepare the progress schedule as a bar chart.

Special Provision 008-056 is included in this Contract. This is to allow for the manufacturer's delay in providing the traffic signal poles.

ITEM 100. PREPARING RIGHT OF WAY

Perform work as necessary off the right of way on temporary or drainage easements and at those locations where improvements have been taken or partially taken by right of way acquisition. Review these locations with the Area Engineer. The cost of this work will be included in the unit price bid for this Item.

Burning will not be permitted within the right of way.

Do not use a forestry type mulcher for grinding. Tub grinders will be allowed.

Dispose of trees from the right of way within 24 hours of removal.

ITEM 104. REMOVING CONCRETE

Blasting will not be permitted on this project.

Before removing existing curb & gutter or laydown curb, saw cut between the gutter pan and the roadbed to eliminate the possibility of damage to the pavement structure. When the existing pavement edge has to be removed to facilitate the curb & gutter transition from existing to the proposed ramp landing, remove the old and replace the new pavement structure the same day unless otherwise directed. The use of temporary material may be allowed as approved. This work will be subsidiary to Item 104.

Project Number: **Sheet 3A**

County: Smith **Control:** 0165-01-109, Etc.

Highway: US 271, Etc.

ITEM 132. EMBANKMENT

Furnish Type C embankment consisting of suitable earth material (rock, loam, clay, or other approved materials) that will form a stable embankment. The top 2 ft. of embankment material should have a plasticity index between 6 and 18.

ITEM 162. SODDING FOR EROSION CONTROL

Use Cynodon dactylon (Bermudagrass) for block sod.

Blade and rake smooth the area before laying block sod. Refer to the plans and details for areas to receive the sod. Remove 1 in. of soil along paved edges and curb lines before laying sod and dress the slope to match all exposed edges after placing the sod. Fertilize the ground with a slow-release homogeneous coated fertilizer at a rate of 1 lb. per 9 sq. yd. before installation of the sod.

ITEM 416. DRILLED SHAFT FOUNDATIONS

Provide a low clearance drilling rig to avoid overhead transmission line.

ITEM 420. CONCRETE SUBSTRUCTURES

Test procedure for Sampling Mechanical Couplers, Tex-743-I. Use couplers of the type specified in DMS-4510, Mechanical Couples for Reinforcing Steel, as defined in Section 440.2. Submit mechanical couples for test requirements once the project begins to prevent delays to the construction of bridge.

ITEMS 420 & 427. CONCRETE SUBSTRUCTURES & SURFACE FINISHES FOR CONCRETE

Provide the following surface finishes as listed: Surface Area II Rub Finish.

Provide a silicone acrylic concrete stain finish that meets the following requirements:

Stain color #1 - Federal Standard 595B color 30109 (similar to H&C "Tile Red")

Stain color #2 - Federal Standard 595B color 23522 (similar to H&C "Bombay")

Seal the textured concrete with a clear sealer in accordance with DMS 8110 within 10 days after stain application.

Do not use membrane curing for structural elements.

ITEM 432. RIPRAP

Locations and quantities may be varied as directed by the Engineer to accommodate field conditions.

ITEM 502. BARRICADES, SIGNS, AND TRAFFIC HANDLING

The traffic control plan for this Contract consists of: the installation and maintenance of warning signs and other traffic control devices shown on the plans; specification data, which may be included in the general notes; applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD); traffic control plan sheets included on the plans; standard BC sheets; Compliant Work Zone Traffic Control Device List, and Item 502 of the standard specifications.

Use ground-mounted sign mounts with two posts for all temporary work zone signs unless otherwise directed.

Inspect and correct deficiencies each day throughout the duration of the Contract. In accordance with Article 502.4., "Payment," no payment will be made for the month if the Contractor fails to provide or properly maintain signs and devices in compliance with Contract requirements. Temporary warning signs that are visible when conditions do not apply will be considered improper maintenance of signs.

Provide at least one employee on call nights and weekends (or any other time that work is not in progress) for maintenance of signs and traffic control devices. This employee must have an address and telephone number near the project, as approved. Notify the Engineer in writing of the name, address, and telephone number of this employee. The Engineer will furnish this information to local law enforcement officials.

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 30 minutes.

Sign all roads intersecting the project in accordance with current BC standards.

Refer to the traffic control plan sheets for traffic handling through the work area. Contractor may vary the signing arrangement and spacing as necessary to fit field conditions; however, any proposed changes in the traffic control plan must be approved before implementation.

When the sequence of work is shown on the plans, the Contractor may submit an alternate proposal for approval. Submit in writing all proposed variations and revisions.

Project Number: **Sheet 3B**

County: Smith **Control:** 0165-01-109, Etc.

Highway: US 271, Etc.

High-visibility safety apparel is required for workers in accordance with the General Notes on current BC standards.

Place and maintain signs, channelizing devices, and flaggers to direct and route traffic at any location and for any period of time as may be required or directed.

When operations require a lane closure, provide cones, vertical panels, drums, signs, flaggers, and flashing arrow panels as necessary to route traffic around the closed lane as shown on the plans and as directed. Lane closures will be limited to one specific lane as directed.

Lane closures will not be allowed before 8:30 A.M. unless otherwise directed.

Unless otherwise approved, construction operations will not be allowed on Good Friday, Easter weekend, the Friday before Memorial Day thru Memorial Day, July 4th, the Friday before Labor Day thru Labor Day, the Wednesday before Thanksgiving Day thru Sunday, Christmas Eve, Christmas Day, New Year's Eve, New Year's Day, or on any other high traffic days or holidays as determined by the Engineer.

Maintain existing roadside signs within this project's limits during this Contract. In order to accommodate the grading or other operations, temporarily relocate these signs in accordance with the TMUTCD as directed. Use ground-mounted sign mounts with two posts for all relocated signs unless otherwise directed. This work will not be paid for directly, but will be subsidiary to Item 502.

Provide truck-mounted attenuators (TMA) as shown on the appropriate traffic control plan sheets. Provide a letter certifying that all TMA used on this project meet NCHRP 350 or AASHTO Manual for Assessing Safety Hardware (MASH) requirements.

Regulate all construction activities and equipment to minimize inconvenience to the traveling public. At points where it is necessary for trucks to stop, load, or unload, provide warning signs and flaggers to protect the traveling public.

The pavement must be entirely open to traffic each night. Remove or clearly barricade all material stockpiles, equipment left overnight, or any obstruction within the right of way as approved.

The Contractor Force Account "Safety Contingency" is intended to be used for work zone enhancements that could not be foreseen in the project planning and design stage for the purpose of improving the effectiveness of the Traffic Control Plan. 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.

Provide flaggers at county roads, commercial driveways, and other intersecting roadways deemed necessary by the Engineer to maintain control of the work zone during one-lane two-way operations. Provide communication radios to each flagger in the work zone and the pilot vehicle operator.

The use of Law Enforcement Officers (LEOs) will be required for this project. Before the preconstruction meeting, coordinate with local agencies to be prepared for staffing needs.

Provide uniformed LEOs with marked vehicles during work zone activities. The officer in marked vehicle will be located as approved to monitor or direct traffic during the closure. The Engineer will approve the method used to direct traffic at signalized intersections. Additional officers and vehicles may be provided when 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. Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

All law enforcement personnel used in work zone traffic control must 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 verify completion when reporting to the work site.

Provide the Engineer 72-hour notice of lane or ramp closures to provide advance notice to the traveling public by way of media and for any dynamic message sign programing. Place Portable All work required by these general notes, except as provided for by Item 502, will not be paid for directly, but will be subsidiary to Item 502 unless otherwise shown on the plans.

ITEM 506. TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

Remove dirt, silt, rocks, debris, and other foreign matter that accumulates in all structures due to project erosion and Contractor’s operations. Keep stream channels open at all times. This work will not be paid for directly, but will be subsidiary to this Item.

The Engineer will provide copies of documents to meet TxDOT’s posting requirements. Laminate, post, and maintain these documents at the project limits and at major roadways intersecting the project as directed. Post required Contractor documents in the same manner and location. This work will be subsidiary to Item 506.

Project Number: **Sheet 3C**

County: Smith **Control:** 0165-01-109, Etc.

Highway: US 271, Etc.

For temporary sediment control fence, use steel posts with a minimum weight of 1.25 lb/ft.

ITEM 529. CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER

Provide steel reinforcement for all curb and curb and gutter unless otherwise directed.

ITEM 531. SIDEWALKS

Provide steel reinforcement for all sidewalks unless otherwise directed.

ITEM 618. CONDUIT

Conduit placed on the underside of the bridge slab overhang must be anchored with conduit straps at 5 ft. maximum intervals as shown on standard sheets ED(1) and (2)-14. Conduit hangers will not be allowed in this location.

Furnish couplings and connections that are made wrench tight. All conduit must be brought into a ground or junction box and elbowed unless otherwise shown on the plans.

Place conduit in an area not exceeding 2 ft. in any direction from a straight line between terminal points. The minimum depth of the conduit should be 2 ft. except when crossing a roadway where the depth should not be more than 3 ft. nor less than 1 ft. below the bottom of the base material when placed by the jacking or boring method.

Where conduit is to be placed under existing riprap, cut the existing riprap to neat lines as directed and replace to match original condition after conduit placement.

The Contractor may, at his option, substitute high-density polyethylene (HDPE) conduit meeting the specifications of Item 622 for all bores requiring PVC schedule 40 conduit and, when approved by the Engineer, may substitute HDPE for schedule 80 bored conduit. HDPE must be the same size as the PVC conduit shown on the plans. HDPE must be terminated with UL listed fittings. HDPE may be threaded and used with threaded PVC connectors or couplings. HDPE should be extended through the bore in one continuous piece and should be coupled to RMC elbows or to PVC conduit at the bore pits prior to entering ground boxes (if ground boxes are required by the plans). HDPE should not contain conductors during installation in this manner. No additional compensation will be paid to the Contractor when HDPE is substituted for this purpose.

Do not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes instead of the cast iron junction boxes shown on standard sheets CSB(3), CSB(4), and SSCB(4). Mount the junction boxes flush (+ 0 in., - 1/2 in.) with concrete surface of concrete barrier.

The polymer concrete barrier box will not be paid for separately, but will be subsidiary to Item 618, “Conduit.”

Use materials from prequalified material producers list as shown on the Material Producer List found on the TxDOT web site. Category is “Roadway Illumination and Electrical Supplies.”

ITEMS 618, 624, 680 & 684. CONDT, GRND BX, INSTL HWY TRF SIG & TRF SIG CBL

The location of the controller, conductors, conduits, junction boxes and ground boxes are diagrammatic only and may be shifted by the Engineer to accommodate field conditions.

ITEM 620. ELECTRICAL CONDUCTORS

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Material Producer List found on the TxDOT web site. Category is “Roadway Illumination and Electrical Supplies.”

Fuse holder is shown on list under Items 610 & 620.

Provide 10 amp time delay fuses.

ITEM 624. GROUND BOXES

All ground boxes will be precast polymer concrete of the size and type specified on the plans.

ITEM 644. SMALL ROADSIDE SIGN ASSEMBLIES

Sign types for which details are not shown on the plans must conform to “Standard Highway Sign Designs for Texas,” latest edition.

Stake all sign locations for approval prior to placement.

ITEM 666. RETROREFLECTORIZED PAVEMENT MARKINGS

Use the spray method for application of the thermoplastic compound for lane lines, barrier lines, edge lines and channelizing lines.

In high traffic volume areas, do not begin work before 9 A.M. and do not continue work after 4 P.M. unless otherwise approved. In other areas, the Engineer will approve and direct the time of work.

Project Number: **Sheet 3D**

County: Smith **Control:** 0165-01-109, Etc.

Highway: US 271, Etc.

Extrude hot to the pavement surface thermoplastic compound for arrows, stop lines, yield triangles, transverse lines, crosswalk lines, words and symbols.

For lengths greater than 300-ft, provide guide markings that will not leave a permanent mark on the roadway. Have the guide marking material and equipment used for placement approved prior to use. Provide adequate notification for approval of the guide markings prior to placement of the permanent pavement markings.

Provide a crew experienced in the work of installing pilot guideline markings and in the necessary traffic control. Supply all the equipment, personnel, traffic control, and materials necessary for the placement of pilot guideline markings as directed. All work will be in conformance with Part 6 of the TMUTCD.

Correct deficiencies in the alignment of pavement markings at Contractor’s expense, as directed. Use a strip seal with aggregate and asphalt types and rates as directed to eliminate the deficient pavement markings.

ITEM 672. RAISED PAVEMENT MARKERS

Provide dispensing equipment such that the bituminous material can be directly applied from the melting pot to the pavement surface without secondary handling. Dispensing material from the melting pot into a separate container and then to the pavement surface will not be permitted. Intermittent agitation of the bituminous material will be by a method approved by the Engineer to ensure even heat distribution and must be such that the adhesive is agitated at approved and consistent intervals.

ITEM 677. ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Unless otherwise directed, utilize Surface Treatment Method for removal on asphaltic surfaces. The Engineer will approve materials and rates prior to use.

Furnish a high-pressure water blasting system for removing paint, thermoplastic, epoxy and preformed tape material from the following surfaces without causing any grooves or trenching of the surface: asphalt, concrete, permeable friction course, grooved asphalt and grooved concrete.

Use a high-pressure water blasting system that consists of a vacuum recovery system that must provide for a nearly dry surface eliminating the possibility of uncontained run-off blasting water or debris, or the need for any secondary clean-up vehicles or operations.

All components required for the complete operation of the water blasting system (ultra-high-pressure pump, vacuum system, clean water supply, vacuum recovery storage, primary truck-mounted and optional secondary tractor-mounted blasting components)

must be mounted and transported on a single, fully self-contained and supporting single truck chassis, thereby eliminating the need for any additional water, vacuum or other transport vehicles.

ITEM 680. INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

A manufacturer's representative must be present when the signal lights are placed in operation.

Provide a uniformed law enforcement officer to maintain traffic control when the signal lights are placed in operation and at any time the normal signal operation is interrupted due to failure of Contractor supplied materials or workmanship.

The Contractor's maintenance responsibility begins on the day work is authorized, and continues until final acceptance. Designate in writing an IMSA certified signal technician who is available to perform repair work within a 2-hour response time at all times. This work will not be paid for directly, but will be subsidiary to Item 680.

Remove Cellular Routers in existing cabinets and install Cellular Router in new equipment cabinets in accordance with this Item and details and dimensions as shown on the plans or as directed. Maintain safe construction practices. Equipment will be installed in a neat and workmanlike manner. Adjustments or additions of attachment hardware, support brackets, and appurtenances may be necessary for compatibility, as shown on the plans, or as directed.

Prevent damage to all components. Any unused or removed material deemed salvageable by the Engineer will remain the property of the respective agency and must be delivered to a designated site. Accept ownership of unsalvageable materials and dispose of in accordance with federal, state, and local regulations. Stockpile all materials designated for reuse or to be retained by the respective agency within the project limits or at a designated location as directed.

Equipment to be installed at signal cabinet shown on the plans may include, but not be limited to, the following:

- Cellular Router (from existing cabinet),
- Cabling and connectors from power source to Cellular Router connection point as specified by the manufacturer (provided by the Contractor),
- Cabling and connectors from telecommunications source to Cellular Router connection point as specified by the Cellular Router manufacturer when required (provided by the Contractor), and
- External Antennas for communications as shown on the plans.
- Contractor to provide all new cabling, connectors, and antennas for the Cellular Router for installation in the new cabinet. Existing cabling, connectors, and antennas are not be re-used.

Project Number: **Sheet 3E**

County: Smith **Control:** 0165-01-109, Etc.

Highway: US 271, Etc.

Make all arrangements for connection to the power supply and telecommunications source including any required permits. Supply and install any required materials not provided by the utility companies (power or communications service provider).

Cellular Routers and all related accessories will be assembled on an equipment rack. All items need to be tied to the rack. Screw the equipment rack in the suitable location in the cabinet. Cabinet adjustments or additions of attachment hardware, support racks or brackets may be necessary. All adjustments or additional materials will not be paid for directly but will be subsidiary to this Item.

Install external antennas of the router on the top of the cabinet at optimum location as recommended by the manufacturer. Please follow the manufacturer instruction carefully to water seal the antenna to prevent water leaking. Each Cellular Router will be provided with 20 ft. of coax cable with weather resistant connectors installed to connect the antenna to the Cellular Router.

The work performed, and materials furnished in accordance with this Item will be paid for as subsidiary to Item 680. This price is full compensation for installation of Cellular Router, installing any new mounting hardware; storing the Cellular Router when required; testing the Cellular Router; replacement or repair of damaged components; disposal of unsalvageable material and for all manipulations, labor, tools, working drawings, equipment and incidentals.

ITEM 682. VEHICLE AND PEDESTRIAN SIGNAL HEADS

Fabricate the traffic signal heads using polycarbonate. Cover the traffic signal heads with factory-made signal head covers until placed in operation.

ITEM 684. TRAFFIC SIGNAL CABLES

An extra length of 5 ft. for each cable run must remain in each steel signal pole. For each conductor that terminates in the controller cabinet, an extra 5-ft. length must be provided. Wire nuts will not be permitted.

ITEM 686. TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)

All traffic signal poles & arm assemblies and pedestrian poles must be round and powder-coated black.

ITEM 688. PEDESTRIAN DETECTORS & VEHICLE LOOP DETECTORS

When installing traffic signal detectors, close only one lane of a roadway at a time. Conduct construction operations to provide the least possible interference to traffic as provided in the specifications or as directed.

ITEM 6001. PORTABLE CHANGEABLE MESSAGE SIGN

Provide a non-erodible, stable surface to place the Portable Changeable Message Sign (PCMS) units adjacent to the roadway as directed. Payment for this surface is incidental to Item 6001.

ITEM 6185. TRUCK MOUNTED ATTENUATOR (TMA)

Shadow vehicles with truck mounted attenuator (TMA) are required on the traffic control plan and TCP standards for this project. The Contractor will be responsible for determining if one or more of these traffic control operations will be ongoing at the same time to determine the total number of TMAs needed for the project. Additional truck mounted attenuators (TMAs) may be required as deemed necessary by the Engineer.

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

ITEM 6306. VIDEO IMAGING DETECTION SYSTEM

Each VIVDS must include all necessary hardware and software to adjust all detection zone features.

All VIVDS processors and cameras must be from same manufacturers for the duration of this Contract.

All camera cables must be inside the camera support arm.

Use coaxial cable meeting the requirements of Special Specification 6306 for the field communications link.

All software must be windows 10 compatible.

Deliver all system setup disks, including the original operating system setup disks, to the Tyler District Signal Shop at 2709 West Front Street.

VIVDS Card Racks and Power Supply Units (if required) for each location will be subsidiary to Item 6306, “Video Imaging Vehicle Detection System.”

Project Number: **Sheet 3F**

County: Smith **Control:** 0165-01-109, Etc.

Highway: US 271, Etc.

ITEM 6350. DYNAMIC LED CURVE WARNING SYSTEM

Warning system must be serviceable for a minimum of 10 years. The need to replace one unit within the system will not require the replacement of the entire system. Updates to existing units necessary to replace a damaged or non-functioning unit must be provided without cost to the Department. If updates cannot be made to existing units, then those units must be replaced by the manufacturer without cost to the Department. This warranty must be provided before installation of any signs. Products which cannot be warrantied in this way are not approved for installation.

LEDs must be used to enhance conspicuity of the chevron symbol or legend and not the border. The LEDs must be arranged to create the appearance of a solid line of light. A product that uses approximately 110 LEDs to outline the chevron of a 24”x30” W1-8 should meet this requirement.

Provide a system compatible with the City of Tyler’s existing Dynamic LED Curve Warning System.

CITY OF TYLER GENERAL NOTES

1. THE GOVERNING SPECIFICATIONS FOR THIS PROJECT ARE AS FOLLOWS:
   (1) TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES, 2014 ED.,
   (2) THE CITY OF TYLER (COT) STANDARD SPECIFICATIONS FOR PAVING AND UTILITIES AS CONTAINED IN THE DESIGN GUIDELINES FOR SUBDIVISION IMPROVEMENTS, 2021 ED.

2. ALL WORK ON THESE PLANS SHALL BE DONE IN STRICT ACCORDANCE WITH THE APPLICABLE CITY OF TYLER/TXDOT SPECIFICATIONS.

3. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS BEFORE CONSTRUCTION BEGINS.

4. CONSTRUCTION SHALL COMPLY WITH ALL GOVERNING CODES AND REQUIREMENTS. CONTRACTOR SHALL CONDUCT ALL REQUIRED TESTS TO THE SATISFACTION OF THE OWNER'S INSPECTING AUTHORITIES.

5. EXISTING FACILITIES AND UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS PER INFORMATION AND RECORDS AVAILABLE.
   CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL UTILITIES AND NOTIFYING THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING CONSTRUCTION.
   CONTACT CITY OF TYLER WATER SERVICE CENTER AT 903-531-1285 FOR WET UTILITY LOCATES.

6. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES RESULTING FROM CONSTRUCTION WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PUBLIC SAFETY DURING CONSTRUCTION AND WILL PROVIDE THE NECESSARY TRAFFIC BARRICADES AND WARNING SIGNAGE TO PROTECT THE CONSTRUCTION SITE.
   CONSTRUCTION BARRICADES SHALL BE IN CONFORMANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD), LATEST EDITION.
   IN AREAS WHERE LONG TERM NIGHTTIME BARRICADES ARE USED, BARRICADES SHOULD INCLUDE HIGH INTENSITY REFLECTIVE SHEETING.

8. THE LOCATION OF THE PROPOSED TRAFFIC SIGNAL POLES, SIGNAL HEADS, VIVDS DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.

ITEM 531 – SIDEWALKS

1. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION.
   IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE CITY AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS.
   IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.

2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.

ITEM 618 – CONDUIT

1. ALL CONDUITS ENTERING A PULL BOX OR CABINET SHALL BE PROTECTED WITH "DUCT SEAL PUTTY" (OR APPROVED EQUAL) BY INSERTING INTO THE CONDUIT AND FORMING IT AROUND THE WIRES.
   SPRAY FOAM SHALL NOT BE USED.

2. SPARE CONDUITS SHALL HAVE MULE TAPE INSTALLED TO FACILITATE EASIER PULLING OF NEW CABLES AT A LATER DATE.

3. FILL ON CONDUITS SHALL NOT EXCEED 40%. IF CONDUIT FILL WILL EXCEED 40% CONTRACTOR SHALL NOTIFY THE ENGINEER AND PROPOSE A SOLUTION.

4. PVC PRIMER SHALL BE USED ON ALL PVC CONDUIT SURFACES AT ANY JOINTS PRIOR TO APPLICATION OF PVC CEMENT.

5. ALL CONDUIT BORES TO BE A MINIMUM 36" – DEEP UNLESS THERE IS A UTILITY CONFLICT OR FIELD CONDITION THAT CAUSES A CONFLICT.

ITEM 624 – GROUND BOXES

1. INSTALL STANDARD GROUND BOXES WITH CONCRETE APRONS AS SHOWN ON PLANS.

2. GROUND BOXES FOR TRAFFIC SIGNAL INSTALLATION SHALL HAVE THE WORDS TRAFFIC SIGNAL PERMANENTLY ENGRAVED ON THE PULL BOX TOP.

ITEM 628 – ELECTRICAL SERVICES

1. CONTRACTOR TO CONTACT POWER COMPANY TO COORDINATE THE ELECTRICAL POINT OF DELIVERY, DISTRIBUTION TO ELECTRICAL PEDESTAL SERVICE, AND CONSTRUCTION AND INSTALLATION OF THE PROPOSED ELECTRICAL SERVICE FOR THE PROPOSED TRAFFIC SIGNAL.

2. THE ELECTRICAL DISCONNECT SHOULD BE WITHIN SIGHT OF THE CABINET AND WITHIN THE SAME QUADRANT AS FIELD CONDITIONS ALLOW.

ITEM 680 – INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

1. CONTRACTOR TO CONTACT CITY OF TYLER TRAFFIC ENGINEERING AT 903-531-1204 PRIOR TO PROCUREMENT OF ANY TRAFFIC SIGNAL EQUIPMENT TO CONFIRM ALL PROPOSED EQUIPMENT IS COMPATIBLE WITH THE EXISTING TRAFFIC SIGNAL SYSTEM. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO THE CITY OF TYLER TRAFFIC ENGINEER TO REVIEW AND APPROVE PRIOR TO PROCUREMENT.

2. SIGNAL CONTROLLER ASSEMBLY, INCLUDING THE CABINET, SHALL BE DELIVERED TO THE CITY OF TYLER SIGNAL SHOP AT 406 W. OAKWOOD, TYLER, TEXAS 75702 FOR TESTING AND PROGRAMING NO LESS THAN FOUR WEEKS PRIOR TO SIGNAL ACTIVATION.

3. THE CONTRACTOR SHALL CONTACT THE CITY OF TYLER AT (903) 531-1292 A MINIMUM OF ONE WEEK PRIOR TO THE BEGINNING OF ANY SIGNAL WORK. THE CONTRACTOR SHALL DELIVER ANY SALVAGEABLE MATERIAL, AS DETERMINED BY THE CITY, THE SIGNAL SHOP LOCATED AT 406 W. OAKWOOD, TYLER, TEXAS 75702.

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HIGHWAY SAFETY IMPROVEMENT PROGRAM

CITY OF TYLER GENERAL NOTES

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	SEE TITLE SHEET		US 271, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	4

REV DATE: 4/30/2024
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ITEM 680 – INSTALLATION OF HIGHWAY TRAFFIC SIGNALS (CONTINUED)

4. A SIGNAL TECHNICIAN FROM THE CITY OF TYLER SHALL BE PRESENT WHEN THE SIGNALS ARE PLACED IN OPERATION. THE CONTRACTOR SHALL NOTIFY THE CITY AT LEAST 48 HOURS IN ADVANCE OF TURN ON. TURN ON SHOULD OCCUR ON EITHER A TUESDAY, WEDNESDAY, OR THURSDAY BETWEEN THE HOURS OF 9 AM AND 3 PM.

5. TEST PERIOD FOR SIGNALS – ONCE THE PERMANENT SIGNALS HAVE BEEN INSTALLED AND PLACED IN OPERATION, THEY SHALL OPERATE CONTINUOUSLY FOR A MINIMUM OF 30 CALENDAR DAYS IN A SATISFACTORY MANNER. EQUIPMENT FAILURES DURING THESE 30 DAYS WILL CAUSE THE TEST PERIOD TO START OVER.

6. CONTRACTOR TO SUPPLY AND INSTALL NEW TRAFFIC SIGNAL CABINET AND FOUNDATION PER PLANS AND SPECIFICATIONS. THE CONTROLLER CABINET (TYPE ATC CABINET) SHALL BE INSTALLED ON A BASED MANUFACTURED OF POLYMER CONCRETE MATERIAL AND MEETS TEXAS DEPARTMENT OF TRANSPORTATION TS-CF-21 REQUIREMENTS.

7. SIGNAL TIMING PLAN AND COMMUNICATION SETTINGS WILL BE PROVIDED BY THE CITY OF TYLER.

8. ALL SIGNAL HEADS SHALL BE COVERED WITH BURLAP OR OTHER APPROVED MATERIAL FROM THE TIME OF INSTALLATION UNTIL THE SIGNAL IS PLACED IN OPERATION.

9. ALL NEW TRAFFIC SIGNAL SIGNS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

10. CONTRACTOR TO INSTALL NON-ILLUMINATED STREET NAME BLADE SIGNS ON MAST ARMS. ILSN POLE STUB OUT, IF SPECIFIED IN PLANS, SHALL REMAIN EMPTY AND PROVIDED ONLY FOR FUTURE INSTALLATION. CONTRACTOR SHALL VERIFY WITH THE CITY OF TYLER THAT STREET NAME BLADE DESIGNS ARE THE MOST CURRENT CITY STANDARD. CONTRACTOR SHALL VERIFY BLOCK NUMBERS ON STREET NAME SIGNS. STREET NAME SHOP DRAWING SHALL BE APPROVED BY THE CITY'S DESIGNEES BEFORE FABRICATION.

11. NO TRAFFIC SIGNS ARE TO BE RELOCATED OR REMOVED WITHOUT PRIOR APPROVAL OF THE CITY OF TYLER.

12. NATIONAL ELECTRIC CODE (NEC) REQUIRES THAT ANY UNUSED OPENINGS IN A BOX OR CABINET, INCLUDING A GROUND BOX, BE EFFECTIVELY CLOSED TO AFFORD PROTECTION SUBSTANTIALLY EQUIVALENT TO THE WALL OF EQUIPMENT. CONTRACTOR SHALL ENSURE THIS IS FOLLOWED ON ALL INSTALLATIONS.

13. TRAFFIC CABINET SCHEMATICS AND TRAFFIC SIGNAL TIMING SHEETS SHALL BE PLACED IN EACH CABINET.

14. ON SPAN WIRE ASSEMBLIES CABLE RINGS SHOULD BE USED TO ATTACH SIGNAL CABLE TO MESSENGER WIRE. SPLICES IN SPAN WIRE ARE NOT TO BE PERMITTED. SIGNAL HOUSES SHOULD BE SECURED TO SPAN WIRE WITH A SADDLE CLAMP CONNECTED TO AN ADJUSTABLE EXTENSION HANGER.

15. EXISTING SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH 5" OF TOPSOIL AND SOD (OR EQUIVALENT SURFACE MATERIAL).

ITEM 682 – VEHICLE AND PEDESTRIAN SIGNAL HEADS

1. SIGNAL HOUSINGS SHALL BE ALUMINUM AND BLACK IN COLOR.

2. SIGNAL VISORS SHALL BE POLYCARBONATE AND BLACK IN COLOR.

3. SIGNAL BACKPLATES SHALL BE POLYCARBONATE, BLACK IN COLOR, WITH RETROREFLECTIVE BORDER.

4. UNLESS OTHERWISE SHOWN ON THE PLANS, SIGNAL HEADS SHALL HAVE LED SIGNAL INDICATIONS AND SHALL BE MOUNTED HORIZONTALLY. ALL SIGNAL HEADS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. HORIZONTAL SIGNAL HEADS SHALL BE MOUNTED SO THAT THE DOORS OPEN DOWNWARD. VERTICAL SIGNALS HEADS SHALL BE MOUNTED SO THAT THE DOORS OPEN TO THE LEFT.

5. ALL SIGNAL HEAD ATTACHMENTS SHALL BE DESIGNED SUCH THAT THE WIRING TO EACH SIGNAL HEAD SHALL PASS FROM THE MAST ARM THROUGH THE SIGNAL HEAD BRACING OR ATTACHMENT HARDWARE TO THE SIGNAL HEAD. NO EXPOSED CABLE OR WIRING WILL BE PERMITTED.

6. A SMALL DRAIN HOLE SHALL BE DRILLED IN THE BOTTOM OF THE SIGNAL HEADS SO THAT ANY WATER THAT INADVERTENTLY ENTERS THE HEAD WILL NOT ACCUMULATE INSIDE THE SIGNAL HOUSING.

7. A DRIP LOOP SHALL BE PROVIDED AT THE TRANSITION TO EACH SIGNAL HEAD TO PREVENT WATER INFILTRATION INTO THE SIGNAL HEAD HOUSING.

8. CONTRACTOR SHALL USE PELCO ASTRO-BRAC CLAMP KIT, GALAXY HINGED, ABLE MOUNT, OR APPROVED EQUAL, FOR MOUNTING OF TRAFFIC SIGNAL HEADS TO TRAFFIC SIGNAL POLES.

ITEM 684 – TRAFFIC SIGNAL CABLES

1. ALL CABLES AND CONDUCTORS MUST BE LABELED AND CLEARLY IDENTIFIABLE. FOLLOW SCHEME AS IDENTIFIED IN THE CABLE TERMINATION CHART IN THE PLANS. COMPLETION OF THE WORK MUST PRESENT A NEAT, WORKMANLIKE, AND FINISHED APPEARANCE.

2. ALL UNUSED SIGNAL CABLES LOCATED IN OVERHEAD EQUIPMENT SHALL BE PROPERLY CAPPED TO AVOID SHORT CIRCUITS.

3. EXTRA CABLE LENGTH SHALL BE INCLUDED IN EACH CABLE RUN TO PROVIDE ADEQUATE SLACK, AS DETERMINED BY THE CITY OR SPECIFICATIONS, AT EACH GROUND BOX OR FOUNDATION.

4. CONTRACTOR SHALL USE A CALIBRATED CRIMPING TOOL WHEN CONNECTING FIELD TERMINALS/LUGS TO ENSURE PROPER FIELD CONNECTION.

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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

CITY OF TYLER GENERAL NOTES

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 5

REV DATE: 4/30/2024
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ITEM 686 – TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)

1. CONTRACTOR TO SUPPLY AND INSTALL TRAFFIC SIGNAL POLES
   ACCORDING TO TXDOT SPECIFICATIONS.
   ALL TRAFFIC SIGNAL AND PEDESTRIAN POLES SHALL BE POWDER COATED BLACK
   (OR ALTERNATE COLOR IF EXISTING POLES ARE DIFFERENT, CONTRACTOR TO VERIFY).
   THE COLOR SHALL BE RAL COLOR # 9017-TRAFFIC BLACK.

2. CONTRACTOR SHALL PROVIDE SMOOTH ROUND TRAFFIC SIGNAL POLES UNLESS
   OTHERWISE SPECIFIED ON THE PLAN.

3. LUMINAIRES SHALL BE POWDER COATED BLACK TO MATCH SIGNAL POLES
   AND SHALL BE LED FIXTURES.
   LUMINAIRES SHALL BE MOUNTED PERPENDICULAR TO THE ROADWAY THEY ARE
   INTENDED TO LIGHT, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

4. IF TRAFFIC SIGNAL OR PEDESTRIAN POLES CANNOT BE INSTALLED IN THE
   LOCATIONS SHOW ON THE PLANS,
   THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO MEET ON SITE
   TO DISCUSS NEW LOCATIONS.

5. NO MAST ARM POLES, OR PEDESTRIAN POLES SHALL BE PLACED ON THE FOUNDATIONS
   PRIOR TO SEVEN (7) DAYS FOLLOWING PLACEMENT OF CONCRETE.
   ALL EXPOSED SIGNAL POLE AND CONTROLLER FOUNDATIONS SHALL
   RECEIVE A CLASS C FINISH PER TXDOT ITEM 427.

ITEM 6306 – VIDEO IMAGING VEHICLE DETECTION SYSTEM

1. LABEL CABLES FOR THE VEHICLE DETECTION BASED UPON DIRECTION
   SERVED IN THE FIELD:
   A. NORTHBOUND – RED
   B. SOUTHBOUND – GREEN
   C. EASTBOUND – BROWN
   D. WESTBOUND – BLUE

2. VIVDS DETECTION ZONES TO BE PROGRAMMED BY THE CITY OF TYLER.
   CONTACT THE CITY OF TYLER AT 903-531-1292 WITH ONE WEEK NOTICE
   TO SCHEDULE PROGRAMMING AND SIGNAL ACTIVATION.

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Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0165-01-109 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY FM 756, SHILOH RD, US 271, US 69

			CONTROL SECTION JOB	0165-01-109		0191-01-096		0492-04-045		0910-16-184		TOTAL EST.	TOTAL FINAL
			PROJECT ID	A00193158		A00193168		A00193154		A00193206			
			COUNTY	Smith		Smith		Smith		Smith			
			HIGHWAY	US 271		US 69		FM 756		SHILOH RD			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA							12.000		12.000	
	104-6015	REMOVING CONC (SIDEWALKS)	SY			24.000		26.000				50.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	178.000		74.000		211.000				463.000	
	104-6044	REMOVING CONC (FLUME)	SY	6.000								6.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	27.000								27.000	
	162-6002	BLOCK SODDING	SY	303.000		51.000		102.000				456.000	
	416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	22.000		22.000		11.000				55.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	13.000		39.000		52.000				104.000	
	416-6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF	22.000								22.000	
	420-6002	CL A CONC (MISC)	CY	2.000								2.000	
	420-6007	CL A CONC (FLUME)	CY	1.000								1.000	
	432-6003	RIPRAP (CONC)(6 IN)	CY	6.000								6.000	
	471-6003	GRATE & FRAME	EA	1.000								1.000	
	500-6001	MOBILIZATION	LS	0.300		0.300		0.300		0.100		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000		2.000		1.000		7.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	10.000		38.000		90.000				138.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	10.000		38.000		90.000				138.000	
	528-6001	COLORED TEXTURED CONC (4")	SY	118.000								118.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	294.000		152.000		111.000				557.000	
	531-6003	CONC SIDEWALKS (6")	SY	210.000		24.000		102.000				336.000	
	531-6004	CURB RAMPS (TY 1)	EA	3.000		1.000		1.000				5.000	
	531-6008	CURB RAMPS (TY 5)	EA	2.000				2.000				4.000	
	531-6010	CURB RAMPS (TY 7)	EA	2.000		4.000		4.000				10.000	
	531-6017	CURB RAMPS (TY 22)	EA	3.000								3.000	
	536-6005	CONCRETE MEDIAN (NOSE)	SY	10.000								10.000	
	610-6162	IN RD IL (TY SA) 30T-8 (250W EQ) LED	EA					1.000				1.000	
	618-6046	CONDT (PVC) (SCH 80) (2")	LF	110.000		115.000		175.000				400.000	
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF			595.000						595.000	
	618-6053	CONDT (PVC) (SCH 80) (3")	LF	110.000		135.000		130.000				375.000	
	618-6058	CONDT (PVC) (SCH 80) (4")	LF	30.000		10.000						40.000	
	618-6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF	465.000		315.000		415.000				1,195.000	
	620-6004	ELEC CONDR (NO.12) INSULATED	LF			2,390.000						2,390.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	1,320.000		1,040.000		1,230.000				3,590.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	715.000		1,090.000		715.000				2,520.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	40.000		20.000		70.000				130.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	7.000		8.000		5.000				20.000	
	628-6187	ELC SRV TY D 120/240 070(NS)SS(E)PS(U)	EA			1.000		1.000				2.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0165-01-109 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY FM 756, SHILOH RD, US 271, US 69

				0165-01-109		0191-01-096		0492-04-045		0910-16-184		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB											
		PROJECT ID		**A00193158**		**A00193168**		**A00193154**		**A00193206**			
		COUNTY		**Smith**		**Smith**		**Smith**		**Smith**			
		HIGHWAY		**US 271**		**US 69**		**FM 756**		**SHILOH RD**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1.000								1.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA							15.000		15.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	1.000								1.000	
	644-6052	IN SM RD SN SUP&AM TYS80(2)SA(T-2EXT)	EA	1.000								1.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	3.000						6.000		9.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	95.000		150.000						245.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	2,200.000		410.000		710.000				3,320.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	378.000		325.000		410.000				1,113.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA	6.000		5.000		5.000				16.000	
	666-6232	PAVEMENT SEALER (WORD)	EA	6.000		5.000		5.000				16.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF			403.000						403.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	800.000		800.000		1,200.000				2,800.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	1,235.000		1,600.000		1,600.000				4,435.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	6.000		5.000		5.000				16.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	6.000		5.000		5.000				16.000	
	672-6007	REFL PAV MRKR TY I-C	EA	133.000		43.000		70.000				246.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	62.000		80.000		80.000				222.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF			325.000						325.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	1,863.000		2,522.000		2,694.000				7,079.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	2,221.000		430.000		697.000				3,348.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	132.000		591.000		441.000				1,164.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	4.000		8.000		10.000				22.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	4.000		2.000		6.000				12.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF			403.000						403.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	95.000		150.000						245.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	2,200.000		410.000		710.000				3,320.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	378.000		325.000		410.000				1,113.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	6.000		5.000		5.000				16.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	6.000		5.000		5.000				16.000	
	680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1.000		1.000		1.000				3.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA	1.000		1.000		1.000				3.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	8.000		8.000		9.000				25.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	2.000		4.000		5.000				11.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	8.000		10.000		9.000				27.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	4.000		8.000		9.000				21.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	8.000		8.000		9.000				25.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	2.000		4.000		4.000				10.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0165-01-109 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY FM 756, SHILOH RD, US 271, US 69

				0165-01-109		0191-01-096		0492-04-045		0910-16-184		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB											
		PROJECT ID		**A00193158**		**A00193168**		**A00193154**		**A00193206**			
		COUNTY		**Smith**		**Smith**		**Smith**		**Smith**			
		HIGHWAY		**US 271**		**US 69**		**FM 756**		**SHILOH RD**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	8.000		8.000		8.000				24.000	
	682-6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	8.000		8.000		8.000				24.000	
	682-6052	BACKPLATE W/REFL BRDR(4 SEC)ALUM	EA	2.000		4.000		4.000				10.000	
	682-6053	BACKPLATE W/REFL BRDR(5 SEC)ALUM	EA					1.000				1.000	
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	625.000		640.000		715.000				1,980.000	
	684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	125.000		225.000		300.000				650.000	
	684-6046	TRF SIG CBL (TY A)(14 AWG)(20 CONDR)	LF	730.000		440.000		540.000				1,710.000	
	684-6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	1,515.000		720.000		1,015.000				3,250.000	
	686-6027	INS TRF SIG PL AM(S)1 ARM(24')LUM	EA	1.000								1.000	
	686-6029	INS TRF SIG PL AM (S)1 ARM(28')	EA			1.000						1.000	
	686-6035	INS TRF SIG PL AM(S)1 ARM(32')LUM	EA	1.000		1.000						2.000	
	686-6039	INS TRF SIG PL AM(S)1 ARM(36')LUM	EA			1.000						1.000	
	686-6043	INS TRF SIG PL AM(S)1 ARM(40')LUM	EA			2.000						2.000	
	686-6045	INS TRF SIG PL AM(S)1 ARM(44')	EA					1.000				1.000	
	686-6047	INS TRF SIG PL AM(S)1 ARM(44')LUM	EA	1.000				3.000				4.000	
	686-6055	INS TRF SIG PL AM(S)1 ARM(50')LUM	EA	1.000								1.000	
	687-6001	PED POLE ASSEMBLY	EA	5.000		8.000		6.000				19.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	8.000		8.000		8.000				24.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA	1.000		1.000		1.000				3.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	10.000		10.000		10.000				30.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1.000		1.000		1.000				3.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY							7.000		7.000	
	6306-6001	VIVDS PROSR SYS	EA	1.000		1.000		1.000				3.000	
	6306-6002	VIVDS CAM ASSY FXD LNS	EA	4.000		4.000		4.000				12.000	
	6306-6005	VIVDS CNTRL SOFTWARE	EA	1.000		1.000		1.000				3.000	
	6306-6007	VIVDS CABLING	LF	940.000		650.000		785.000				2,375.000	
	6350-6001	LEAD LED CHEVRON	EA							2.000		2.000	
	6350-6002	LED CHEVRON	EA							24.000		24.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000								1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000								1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000								1.000	

BASIS OF ESTIMATE

ITEM	DESCRIPTION	CSJ 0191-01-096 AMOUNT	CSJ 0492-04-045 AMOUNT	CSJ 0165-01-109 AMOUNT	CSJ 0910-16-184 AMOUNT	UNIT	PAY UNIT
100	PREPARING ROW	0	0	0	12	STA	STA
500	MOBILIZATION	0.3	0.3	0.3	0.1	LS	LS
502	BARRICADES, SIGNS, AND TRAFFIC HANDLING	2	2	2	1	MO	MO

PAVEMENT MARKING SUMMARY

LOCATION	ITEM 666								ITEM 668		ITEM 672		ITEM 677						ITEM 678					
	REFL PAV MRK TY I (100MIL) (W)			PAVEMENT SEALER		RE PM W/RET REQ TY I (100MIL)			PREFAB PAV MRK TY C (W)		REFL PAV MRK TY I	REFL PAV MRK TY II	ELIM EXT PAV MRK & MRKS						PAV SURF PREP FOR MRK					
	8" (SLD)	24" (SLD)	6" (DOT)	(ARROW)	(WORD)	(W) 4" (SLD)	(W) 6" (BRK)	(Y) 6" (SLD)	(ARROW)	(WORD)	C	A-A	4"	6"	8"	24"	(ARROW)	(WORD)	4"	8"	6"	24"	(ARROW)	(WORD)
	LF	LF	LF	EA	EA	LF	LF	LF	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	LF	LF	LF	LF	EA	EA
CSJ 0191-01-096 SUBTOTAL	410	325	150	5	5	403	800	1600	5	5	43	80	325	2522	430	591	8	2	403	410	150	325	5	5
CSJ 0492-04-045 SUBTOTAL	710	410	0	5	5	0	1200	1600	5	5	70	80	0	2694	697	441	10	6	0	710	0	410	5	5
CSJ 0165-01-109 SUBTOTAL	2200	378	95	6	6	0	800	1235	6	6	133	62	0	1863	2221	132	4	4	0	2200	95	378	6	6
CSJ 0910-16-184 SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PROJECT TOTAL	**3320**	**1113**	**245**	**16**	**16**	**403**	**2800**	**4435**	**16**	**16**	**246**	**222**	**325**	**7079**	**3348**	**1164**	**22**	**12**	**403**	**3320**	**245**	**1113**	**16**	**16**

SIGNAL SUMMARY (PART 1 OF 3)

LOCATION	ITEM 416 DRILL SHAFT (TRF SIG POLE)				ITEM 610 IN RD IL (TY SA) 30T-8	ITEM 618 CONDT (PVC) (SCH 80)						ITEM 620 ELEC CONDR				ITEM 624	ITEM 628
																GROUND BOX TY D (162922) W/ APRON	ELC SRV TY D 120/240 070(NS)SS (E)PS(U)
	(24 IN)	(30 IN)	(36 IN)	(48 IN)	(250W EQ) LED	2"	2" (RISER)	2" (BORE)	3"	4"	4" (BORE)	(NO. 6) INSULATED	(NO. 6) BARE	(NO. 8) INSULATED	(NO. 12) INSULATED		
	LF	LF	LF	LF	EA	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA
CSJ 0191-01-096 SUBTOTAL	48	22	39	0	0	105	10	595	135	10	315	20	1090	1040	2390	8	1
CSJ 0492-04-045 SUBTOTAL	36	11	52	0	1	170	5	0	130	0	415	70	715	1230	0	5	1
CSJ 0165-01-109 SUBTOTAL	30	22	13	22	0	110	0	0	110	30	465	40	715	1320	0	7	0
CSJ 0910-16-184 SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PROJECT TOTAL	**114**	**55**	**104**	**22**	**1**	**385**	**15**	**595**	**375**	**40**	**1195**	**130**	**2520**	**3590**	**2390**	**20**	**2**

[1] FOR CONTRACTOR INFORMATION ONLY; PEDESTRIAN POLE FOUNDATIONS ARE SUBSIDIARY TO ITEM 687. OPTIONAL CONCRETE FOUNDATION SHOWN FOR EXAMPLE.

SIGNAL SUMMARY (PART 2 OF 3)

LOCATION	ITEM 680		ITEM 682										ITEM 684			
	REMOVE HWY TRF SIG	INSTALL HWY TRF SIG (ISOLATED)	VEH SIG SEC (12") LED						PED SIG SEC (LED) (COUNT DOWN)	BACKPLATE W/ REFL BRDR (12")			TRF SIG CBL			
													(TY A) (14 AWG)			(TY C) (12 AWG)
			(GRN)	(GRN ARW)	(YEL)	(YEL ARW)	(RED)	(RED ARW)		(3 SEC)	(4 SEC)	(5 SEC)	(5 CONDR)	(7 CONDR)	(20 CONDR)	(2 CONDR)
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF
CSJ 0191-01-096 SUBTOTAL	1	1	8	4	10	8	8	4	8	8	4	0	640	225	440	720
CSJ 0492-04-045 SUBTOTAL	1	1	9	5	9	9	9	4	8	8	4	1	715	300	540	1015
CSJ 0165-01-109 SUBTOTAL	1	1	8	2	8	4	8	2	8	8	2	0	625	125	730	1515
CSJ 0910-16-184 SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PROJECT TOTAL	**3**	**3**	**25**	**11**	**27**	**21**	**25**	**10**	**24**	**24**	**10**	**1**	**1980**	**650**	**1710**	**3250**

SIGNAL SUMMARY (PART 3 OF 3)

LOCATION	ITEM 686								ITEM 687	ITEM 688		ITEM 6306			
	INS TRF SIG PL AM(S) 1 ARM											VIVDS			
	(24') LUM	(28')	(32') LUM	(36') LUM	(40') LUM	(44')	(44') LUM	(50') LUM	PED POLE ASSEMBLY	PED DETECT CONTROL UNIT	PED DETECT PUSH BUTTON (APS)	PROSR SYS	CAM ASSY FXD LNS	CNTRL SOFTWARE	CABLING
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF
CSJ 0191-01-096 SUBTOTAL	0	1	1	1	2	0	0	0	8	1	8	1	4	1	650
CSJ 0492-04-045 SUBTOTAL	0	0	0	0	0	1	3	0	6	1	8	1	4	1	785
CSJ 0165-01-109 SUBTOTAL	1	0	1	0	0	0	1	1	5	1	8	1	4	1	940
CSJ 0910-16-184 SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PROJECT TOTAL	**1**	**1**	**2**	**1**	**2**	**1**	**4**	**1**	**19**	**3**	**24**	**3**	**12**	**3**	**2375**

STATE OF TEXAS
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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SUMMARY OF QUANTITIES

SHEET 01 OF 02

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	SEE TITLE SHEET	US 271, ETC.	
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	10

ROADWAY SUMMARY (PART 1 OF 2)

LOCATION	ITEM 104			ITEM 132	ITEM 420		ITEM 432	ITEM 471	ITEM 528
	REMOVING CONC	REMOVING CONC	REMOVING CONC	EMBANKMENT (FINAL ORD COMP)	CL A CONC	CL A CONC	RIPRAP CONC	GRATE AND FRAME	COLORED TEXTURED CONC
	(SIDEWALKS)	(CURB & GUTTER)	(FLUME)	(TY C)	(FLUME)	(MISC)	(6")		(4")
	SY	LF	SY	CY	CY	CY	CY	EA	SY
CSJ 0191-01-096 SUBTOTAL	24	74	0	0	0	0	0	0	0
CSJ 0492-04-045 SUBTOTAL	26	211	0	0	0	0	0	0	0
CSJ 0165-01-109 SUBTOTAL	0	178	6	27	1	2	6	1	118
CSJ 0910-16-184 SUBTOTAL	0	0	0	0	0	0	0	0	0
PROJECT TOTAL	50	463	6	27	1	2	6	1	118

ROADWAY SUMMARY (PART 2 OF 2)

LOCATION	ITEM 529	ITEM 531					ITEM 536
	CONC CURB & GUTTER	CONC SIDEWALKS	CURB RAMPS (TY 1)	CURB RAMPS (TY 5)	CURB RAMPS (TY 7)	CURB RAMPS (TY 22)	CONC MEDIAN
	(TY II)	(6")					(NOSE)
	LF	SY	EA	EA	EA	EA	SY
CSJ 0191-01-096 SUBTOTAL	152	24	1	0	4	0	0
CSJ 0492-04-045 SUBTOTAL	111	102	1	2	4	0	0
CSJ 0165-01-109 SUBTOTAL	294	210	3	2	2	3	10
CSJ 0910-16-184 SUBTOTAL	0	0	0	0	0	0	0
PROJECT TOTAL	**557**	**336**	**5**	**4**	**10**	**3**	**10**

SMALL SIGN TABULATION

LOCATION	ITEM 644					ITEM 6350	
	REMOVE SM RD SN SUP & AM	INSTALL SM RD SN SUP & AM TYS80(1)SA(P)	INSTALL SM RD SN SUP & AM TYS80(1)SA(U)	INSTALL SM RD SN SUP & AM TYS80(2)SA(T-2EXT)	INSTALL SM RD SN SUP & AM TY 10BWG(1)SA(P)	LEAD LED CHEVRON	LED CHEVRON
	EA	EA	EA	EA	EA	EA	EA
CSJ 0191-01-096 SUBTOTAL	0	0	0	0	0	0	0
CSJ 0492-04-045 SUBTOTAL	0	0	0	0	0	0	0
CSJ 0165-01-109 SUBTOTAL	3	0	1	1	1	0	0
CSJ 0910-16-184 SUBTOTAL	6	15	0	0	0	2	24
PROJECT TOTAL	9	15	1	1	1	2	24

EROSION CONTROL SUMMARY

LOCATION	ITEM 162	ITEM 506	
	BLOCK SODDING	BIODEG EROSN CONT LOGS	
		(INSTL) (8")	(REMOVE)
	SY	LF	LF
CSJ 0191-01-096 SUBTOTAL	51	38	38
CSJ 0492-04-045 SUBTOTAL	102	90	90
CSJ 0165-01-109 SUBTOTAL	303	10	10
CSJ 0910-16-184 SUBTOTAL	0	0	0
PROJECT TOTAL	456	138	138

NOTE: MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE VEGETATION IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT.

PORTABLE CHANGEABLE MESSAGE

SIGN	LOCATION	ITEM 6001
		PORTABLE CHANGEABLE MESSAGE SIGN
		DAYS
SIGN #1	AS DIRECTED	10
SIGN #2	AS DIRECTED	10
SIGN #3	AS DIRECTED	10
PROJECT TOTAL		**30**

NOTE: ADDITIONAL SIGNS MAY BE NEEDED IF WORKING ON MULTIPLE LOCATIONS AT A TIME

TRUCK MOUNTED ATTENUATORS

LOCATION	ITEM 6185
	TMA (MOBILE)
	DAY
CSJ 0191-01-096 SUBTOTAL	0
CSJ 0492-04-045 SUBTOTAL	0
CSJ 0165-01-109 SUBTOTAL	0
CSJ 0910-16-184 SUBTOTAL	7
PROJECT TOTAL	7

NOTE: ESTIMATED NUMBER OF TRUCKS IS FOR WORKING AT ONE LOCATION AT A TIME. ADDITIONAL TRUCKS WILL BE REQUIRED IF WORKING AT MULTIPLE LOCATIONS AT A TIME.

STATE OF TEXAS
OSCAR I. GONZALEZ
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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SUMMARY OF QUANTITIES

SHEET 02 OF 02

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	SEE TITLE SHEET	US 271, ETC.	
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	11

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
39												
	1	W14-2		30X30	✓		10BWG	1	SA	P		
	2	W1-7T		144X36	✓		S80	2	SA	T	2EXT	
	3	M3-3, M3-1		24X12, 24X12								
		M1-4, M1-4		30X24, 30X24								
		M1-6T-3		24X24, 24X24	✓		S80	1	SA	U		
		M6-1L, M6-1R		21X15, 21X15								

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

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

http://www.txdot.gov/

NOTE:

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

DATE:
FILE:

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS TRAFFIC SIGNALS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
4-16 8-16	DIST	COUNTY		SHEET NO.
	TYL	SMITH		12

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)					BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY = TYPE TY N TY S
1 15	W4-1L W13-P		30X30 18X18	X		S80	1	SA	P		
2 3 4 5 6 7 8 9 10 11 12 13 14	W1-8L W1-8R		24X30 24X30	X		S80	1	SA	P		

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

DATE:
FILE:

BLAKE WILLIAMS
120367
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

Blake Williams 04/30/2024

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS FOR LED CURVE WARNING SIGNS ON SHILOH ROAD

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	184	CS
4-16 8-16	DIST	COUNTY		SHEET NO.
	TYL	SMITH		12A

18

CONSTRUCTION SEQUENCE - TRAFFIC SIGNALS

1. INSTALL PROJECT SIGNS.
2. OBTAIN UTILITY INFORMATION FROM 811, TXDOT, AND CITY OF TYLER.
3. INSTALL AND PREPARE NEW TRAFFIC SIGNAL EQUIPMENT FOR OPERATION.
4. COVER OR TURN DOWN ALL SIGNAL HEADS. CONTRACTOR TO CONFIRM EXISTING SIGNAL HEADS ARE VISIBLE TO DRIVERS. MAINTAIN COVERS OVER PROPOSED PEDESTRIAN HEADS.
5. CONSTRUCT PROPOSED PEDESTRIAN RAMPS AND SIDEWALK FACILITIES ACCORDING TO LAYOUTS.
6. SCHEDULE AND ATTEND PRESTRIPING MEETING.
7. PLACE TYPE I PAVEMENT MARKINGS AND RPMS ACCORDING TO LAYOUTS.
8. WHEN APPROVED, PLACE NEW TRAFFIC SIGNAL EQUIPMENT INTO OPERATION AND REMOVE PEDESTRIAN HEAD COVERS. REMOVE ALL EXISTING SIGNALS AND INFRASTRUCTURE.
9. PERFORM FINAL CLEAN-UP.
10. REMOVE PROJECT SIGNS.

STATE OF TEXAS
OSCAR I. GONZALEZ
140479
LICENSED
PROFESSIONAL ENGINEER

4/30/24

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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

CONSTRUCTION SEQUENCE
TRAFFIC SIGNALS

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	SEE TITLE SHEET		US 271, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	13

REV DATE: 5/29/2024
CSJ: 0191-01-096, etc.
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CONSTRUCTION SEQUENCE - LED CHEVRONS

1. INSTALL PROJECT CONSTRUCTION SIGNS.
2. OBTAIN UTILITY INFORMATION FROM 811, TXDOT AND CITY OF TYLER.
3. PREPARE ROW BEFORE THE INSTALLATION OF SIGNS AND WORK WITH CITY STAFF TO IDENTIFY TRIMMING/REMOVAL NEEDS.
4. EXISTING SIGNS TO REMAIN IN PLACE UNLESS OTHERWISE SHOWN.
5. STAKE PROPOSED SIGN LOCATIONS AND RECEIVE APPROVAL BEFORE PLACING SIGNS.
6. INSTALL NEW LED CHEVRON SIGNS.
7. SIGNS MAY NEED TO BE SHIFTED TO AVOID DRIVES OR OTHER CONFLICTS.
8. THE REMOTE OPERATION OF THE LED CHEVRON SYSTEM SHALL BE COMPATIBLE WITH THE CITY OF TYLER'S EXISTING CLOUD BASED SYSTEM PROVIDED BY TRAFFICALM.
9. LED ACTIVATION TIMING IS SEQUENTIAL, DIRECTIONAL, AND RADAR INITIATED. SEE SS 6350 FOR MORE INFORMATION.
10. PERFORM FINAL CLEAN-UP.
11. REMOVE PROJECT CONSTRUCTION SIGNS, THIS CAN BE DONE BEFORE, AFTER OR CONCURRENTLY WITH THE TRAFFIC SIGNAL PROJECTS.

STATE OF TEXAS
BLAKE WILLIAMS
120367
LICENSED PROFESSIONAL ENGINEER

Blake Williams 04/30/2024

CS-LED.dgn

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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM
CONSTRUCTION SEQUENCE
LED CHEVRONS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	CS
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0910	16	184 / 14

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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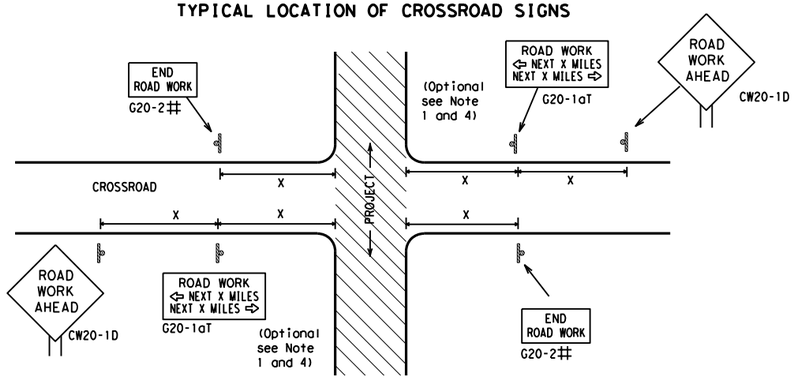
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		15

DATE:
FILE:

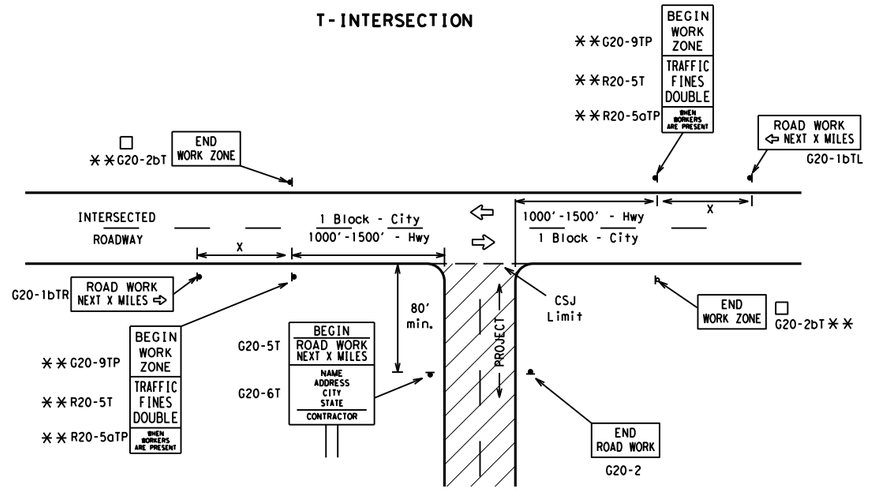
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

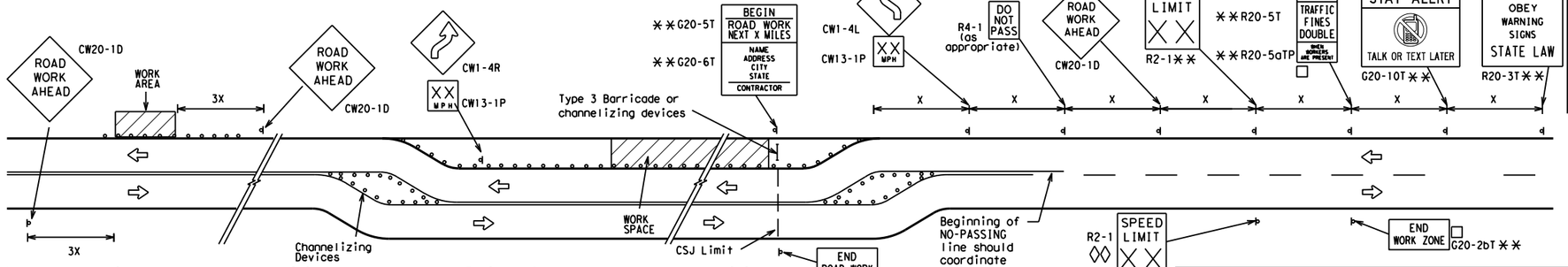
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

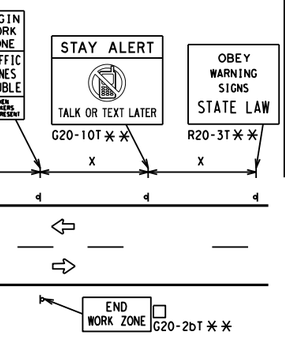
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

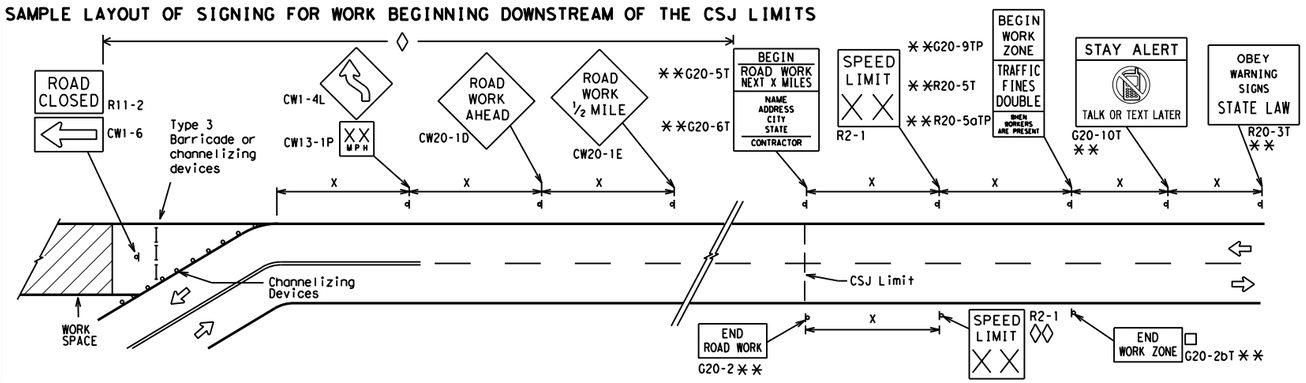


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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
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REVISIONS	0165	01	109, ETC.	US 271, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		16

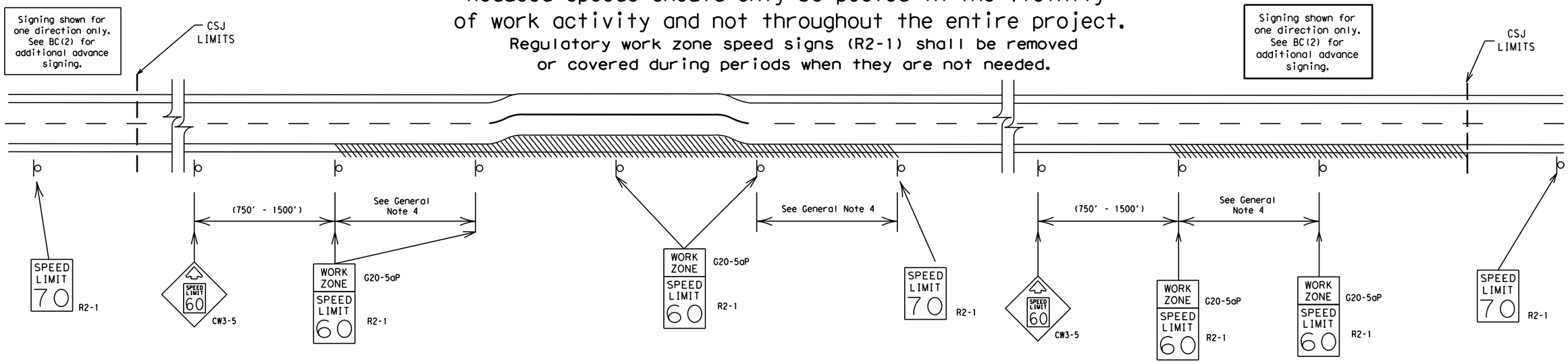
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13 5-21	TYL	SMITH		17

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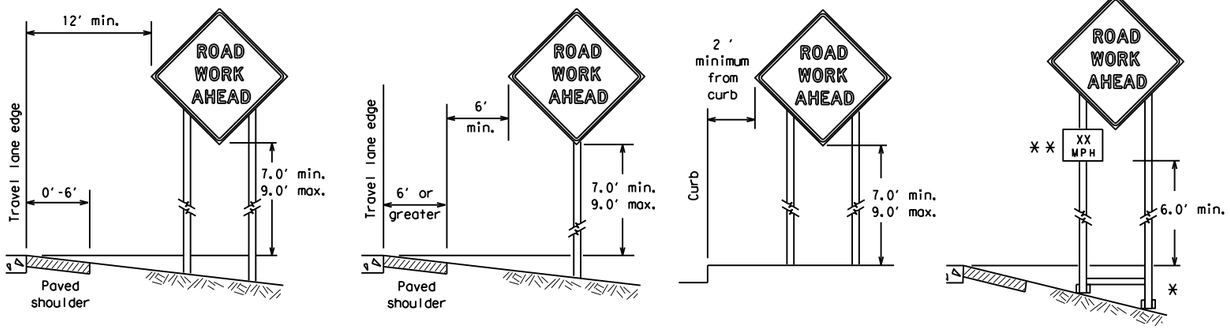
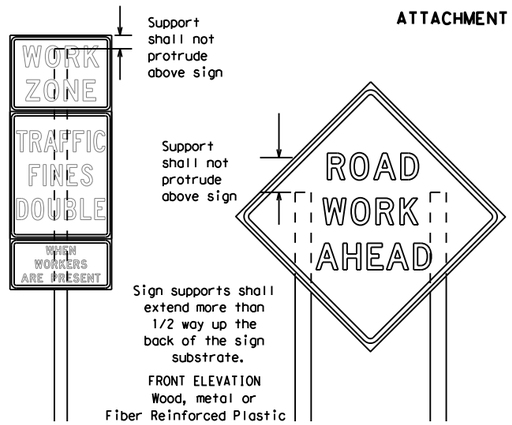
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

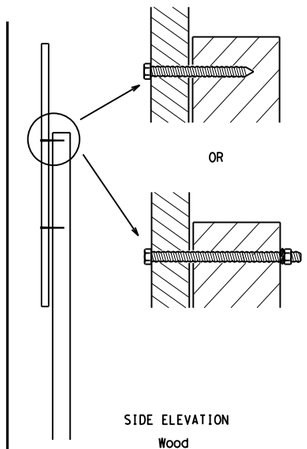


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





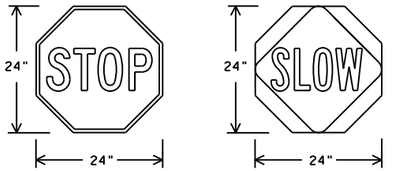
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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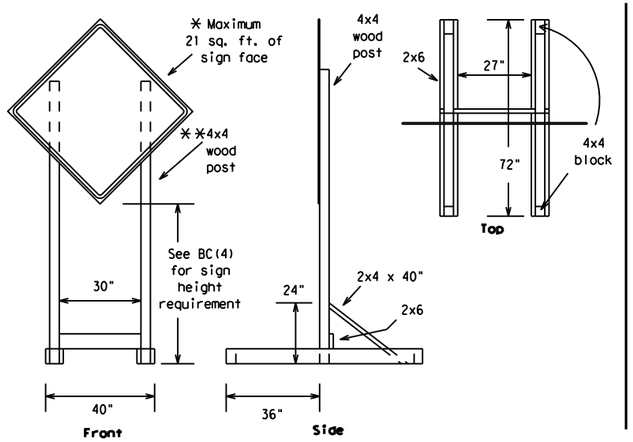
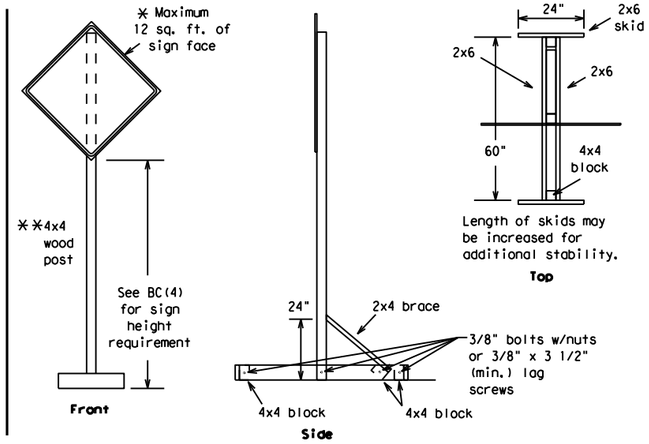
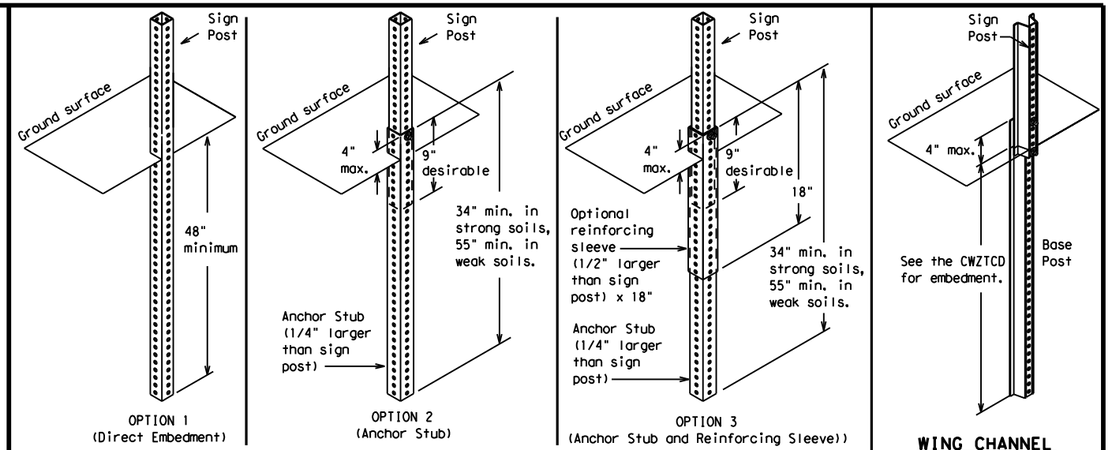




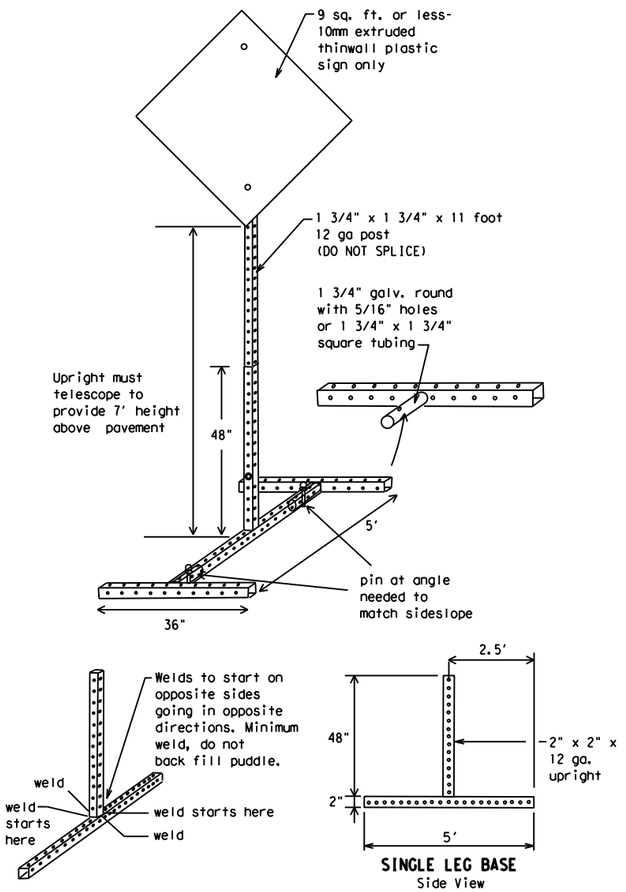
SKID MOUNTED WOOD SIGN SUPPORTS

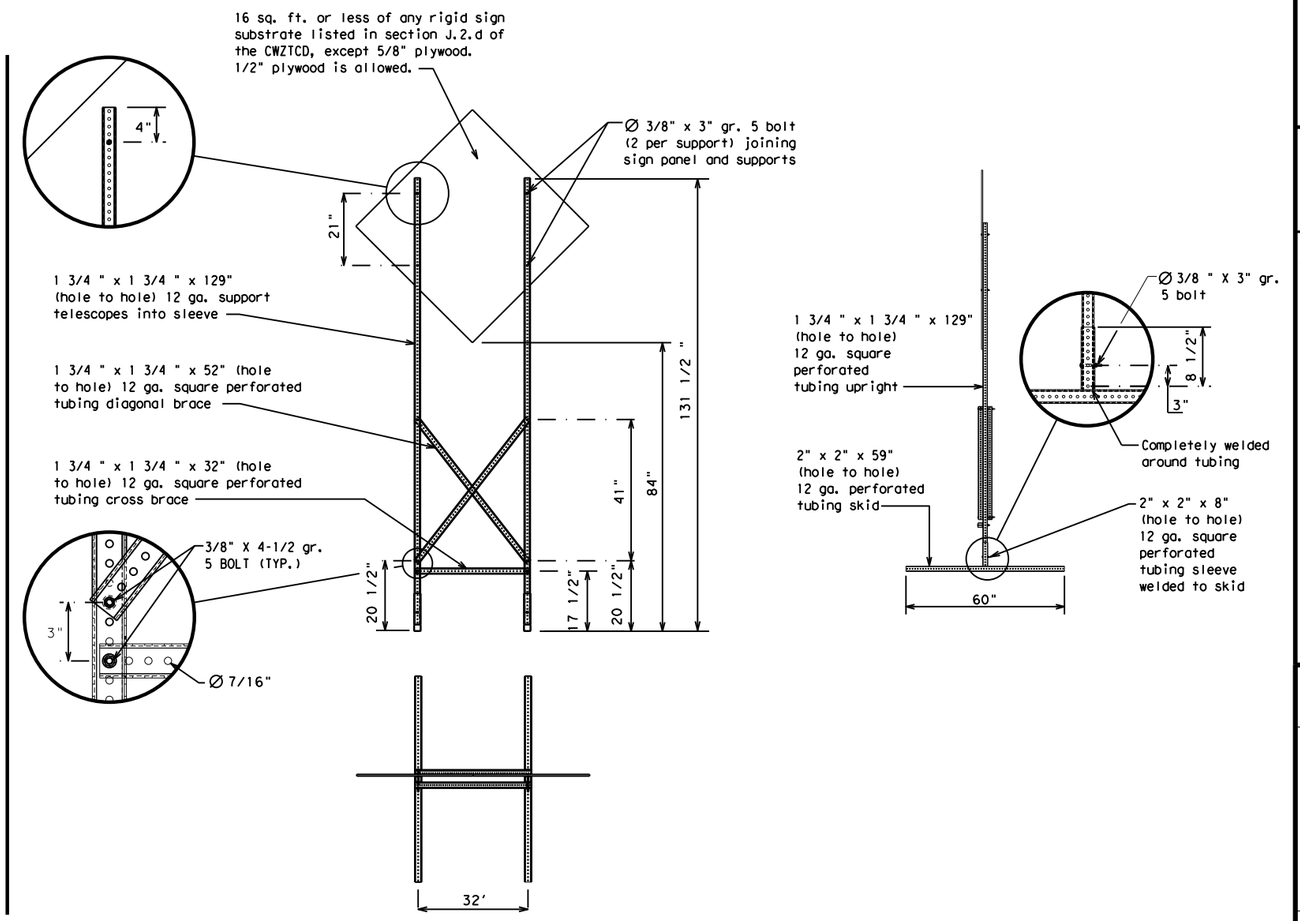
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



GROUND MOUNTED SIGN SUPPORTS

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





SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** 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

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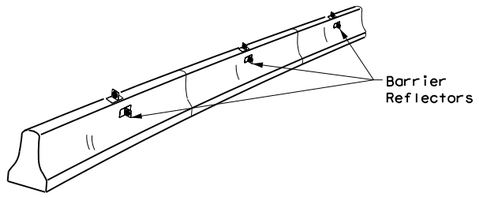
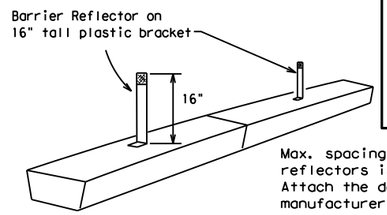
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



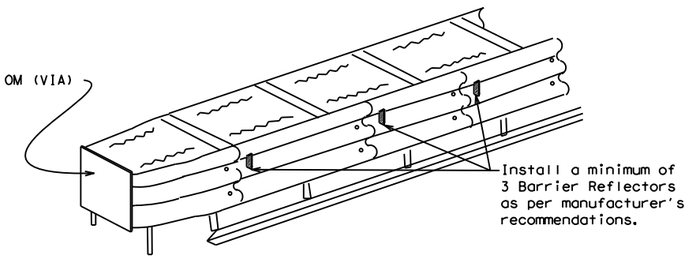
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

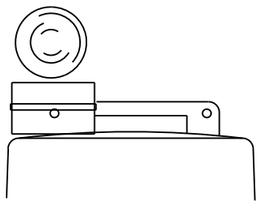
LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

WARNING LIGHTS

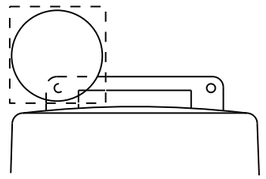


Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

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.



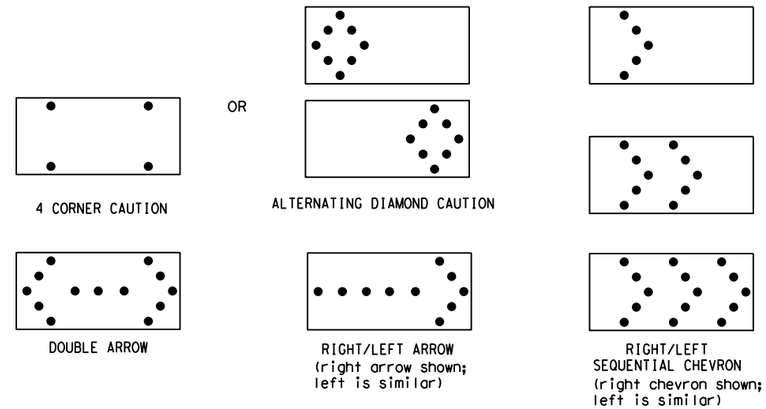
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		21

101

DATE:
FILE:

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

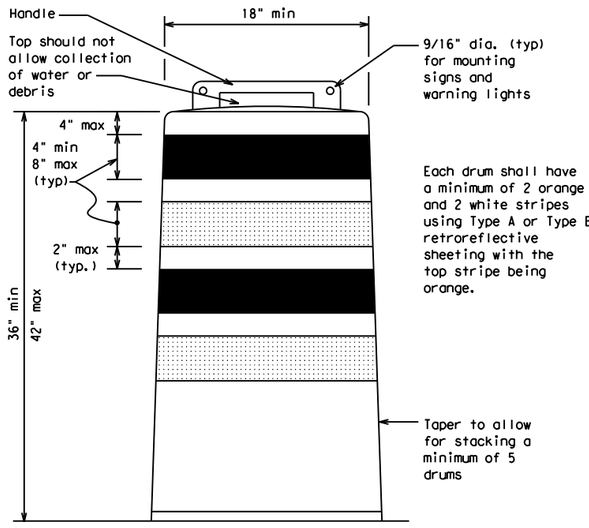
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

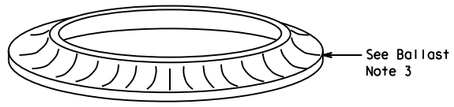
RETROREFLECTIVE SHEETING

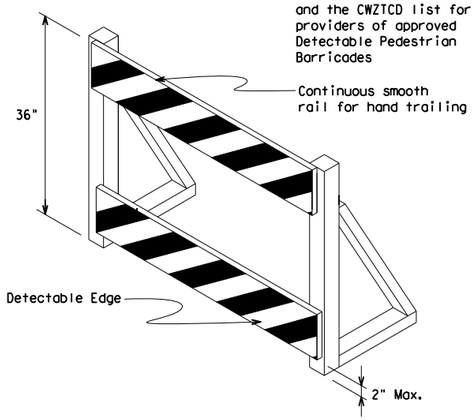
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

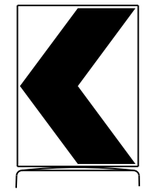




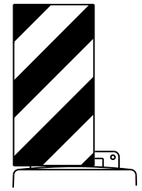


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	TYL	SMITH		22
7-13				

DATE:
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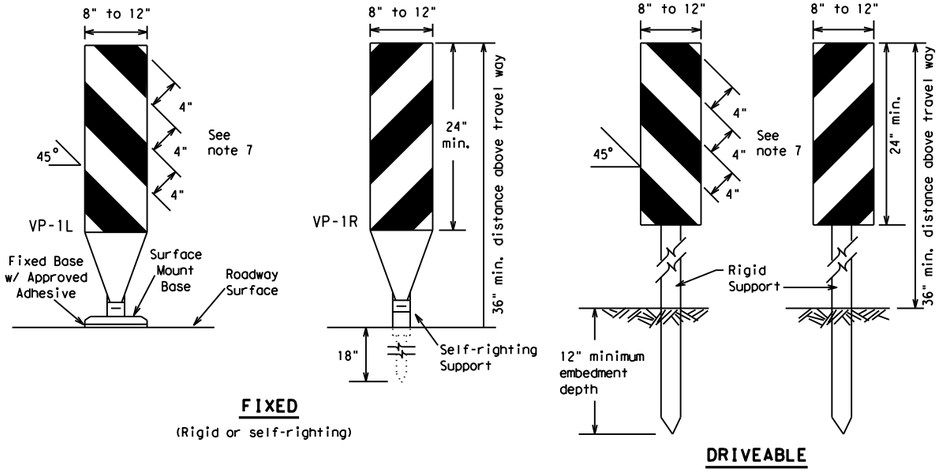
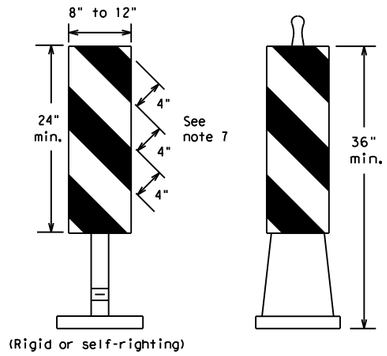


FIXED
(Rigid or self-righting)

DRIVEABLE

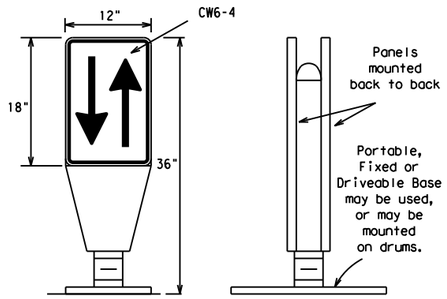


(Rigid or self-righting)

PORTABLE

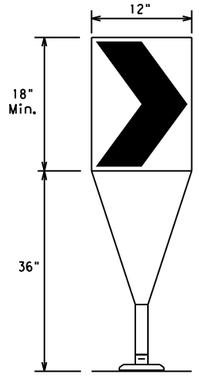
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

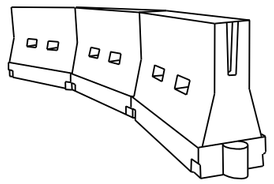
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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



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

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.

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

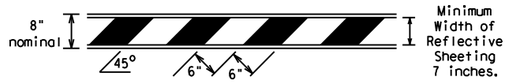
BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		23

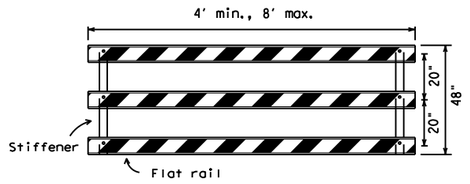
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



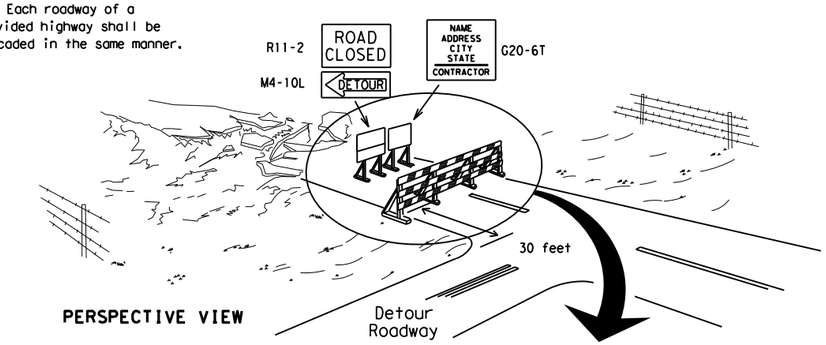
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

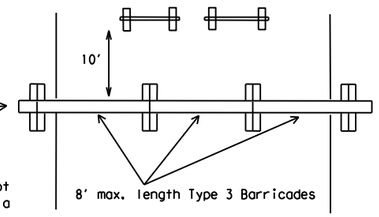
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

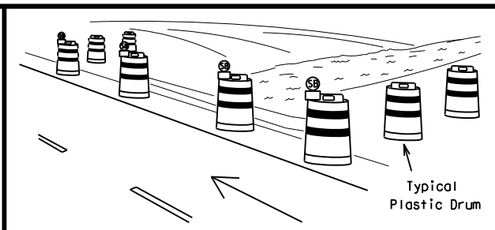
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

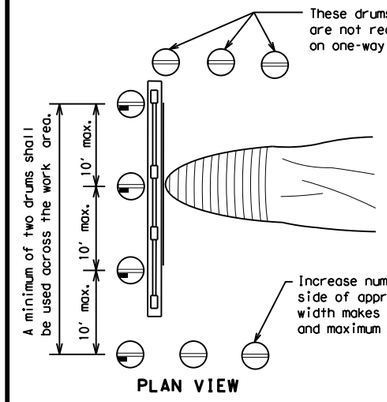
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

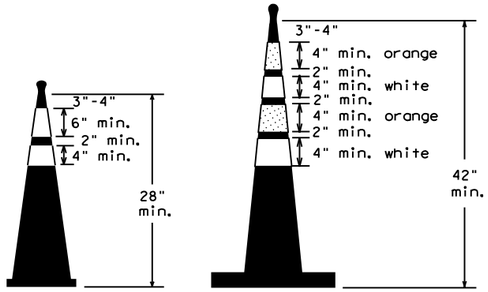
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

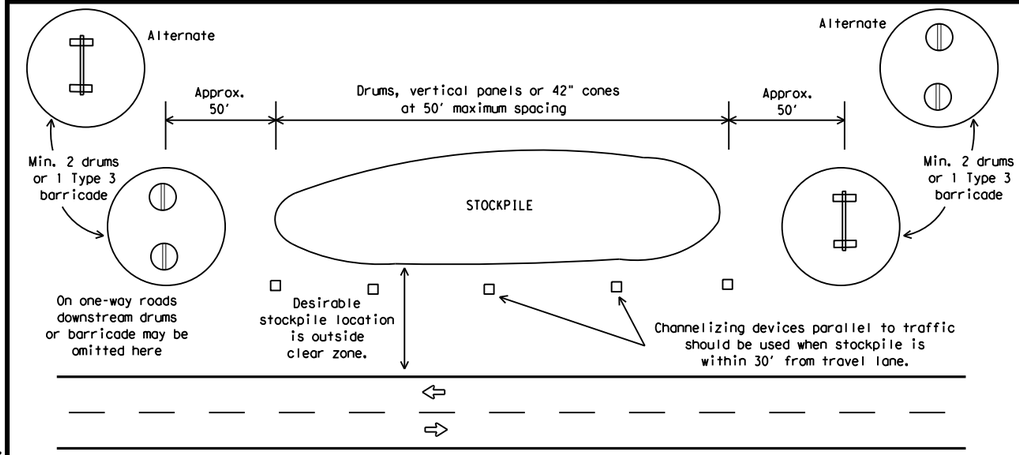
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
FILE:

SHEET 10 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		24

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DATE:
FILE:

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

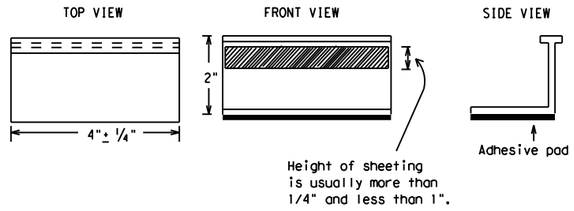
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0165	01	109, ETC.	US 271, ETC.
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	TYL	SMITH		25

105

DATE:
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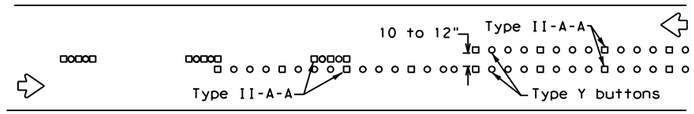
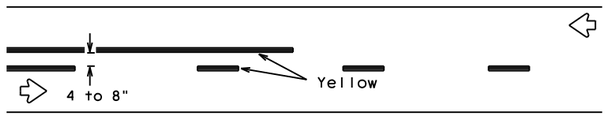
PAVEMENT MARKING PATTERNS

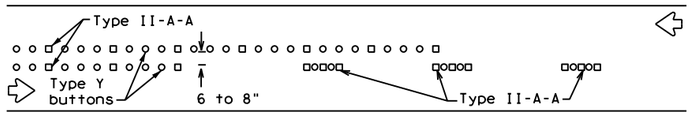
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



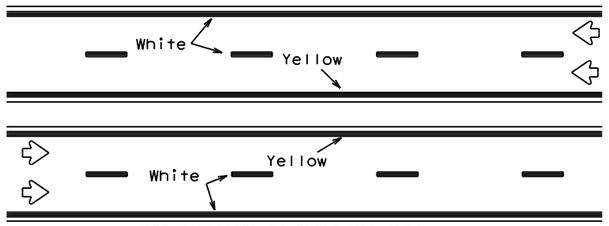
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



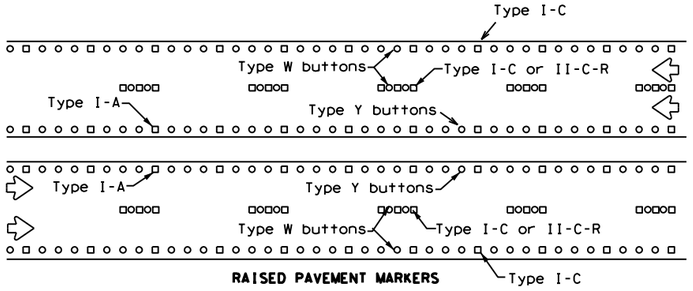
RAISED PAVEMENT MARKERS - PATTERN B

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



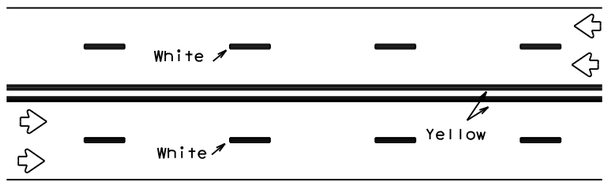
REFLECTORIZED PAVEMENT MARKINGS



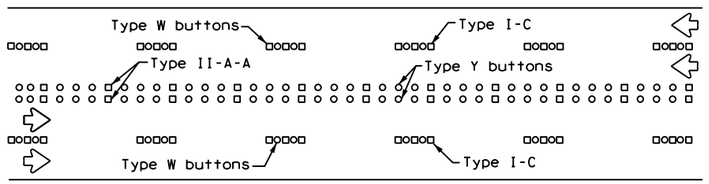
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



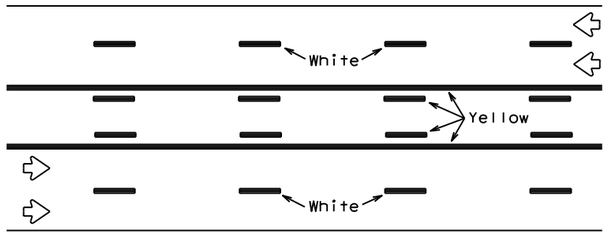
REFLECTORIZED PAVEMENT MARKINGS



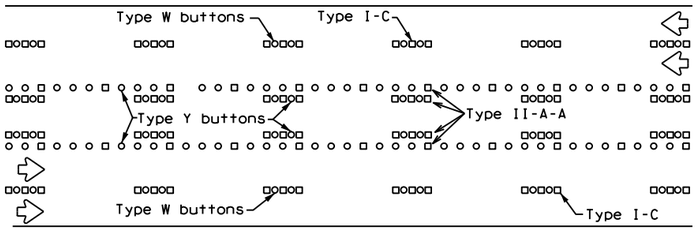
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

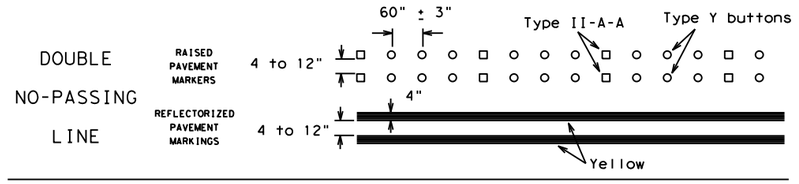
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

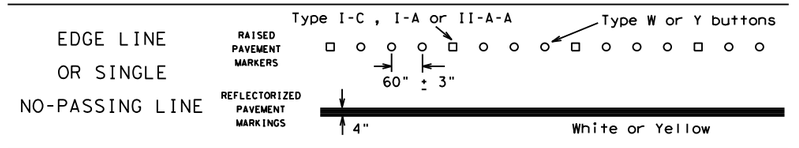
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

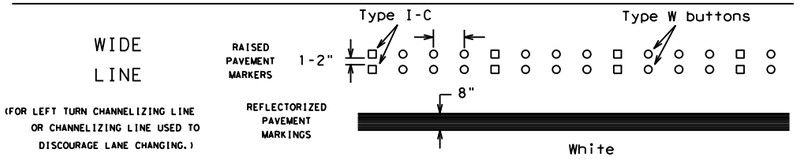


EDGE LINE OR SINGLE NO-PASSING LINE



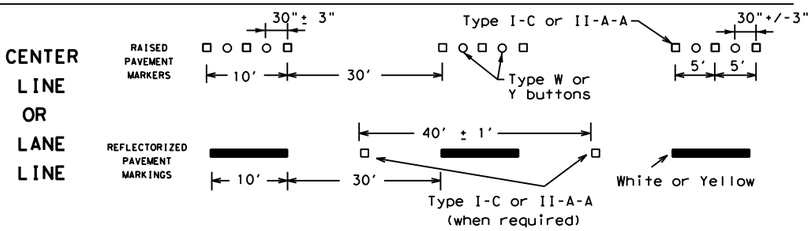
WIDE LINE

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

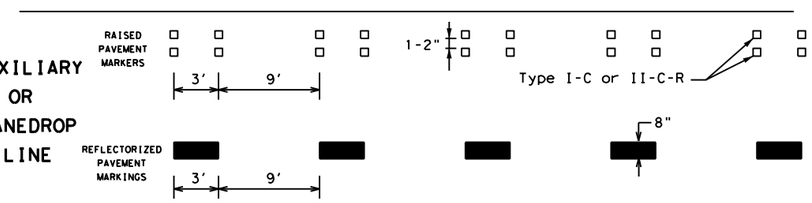


BROKEN LINES

CENTER LINE OR LANE LINE

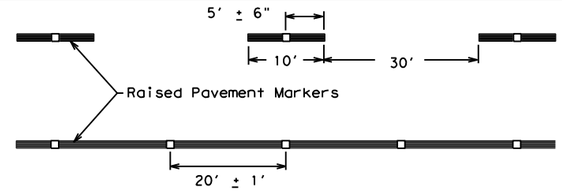


AUXILIARY OR LANEDROP LINE



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."

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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	TYL	SMITH		26

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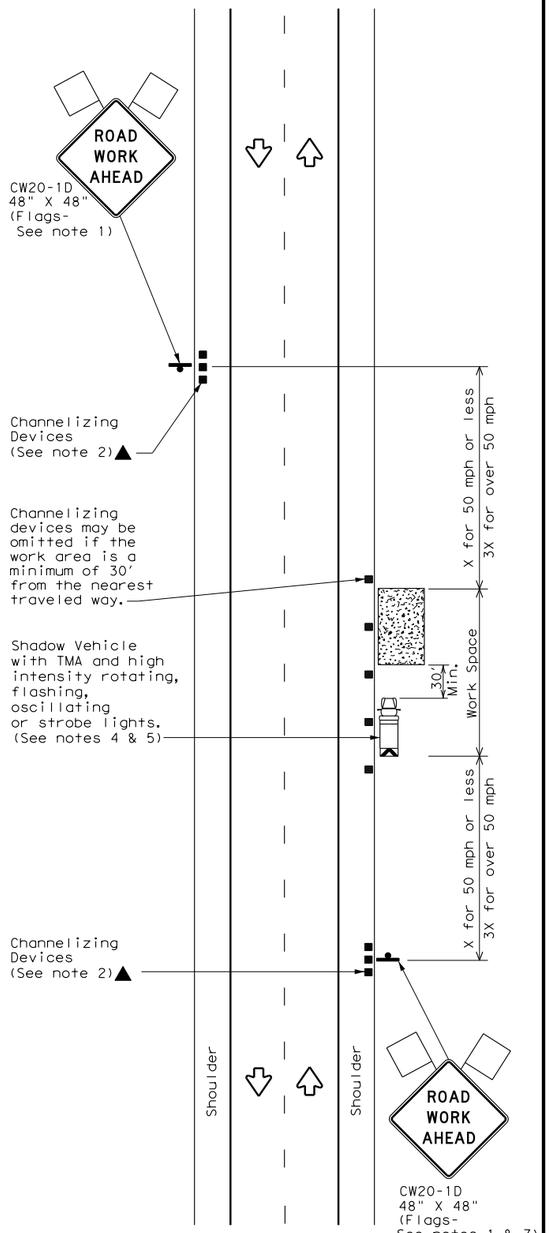
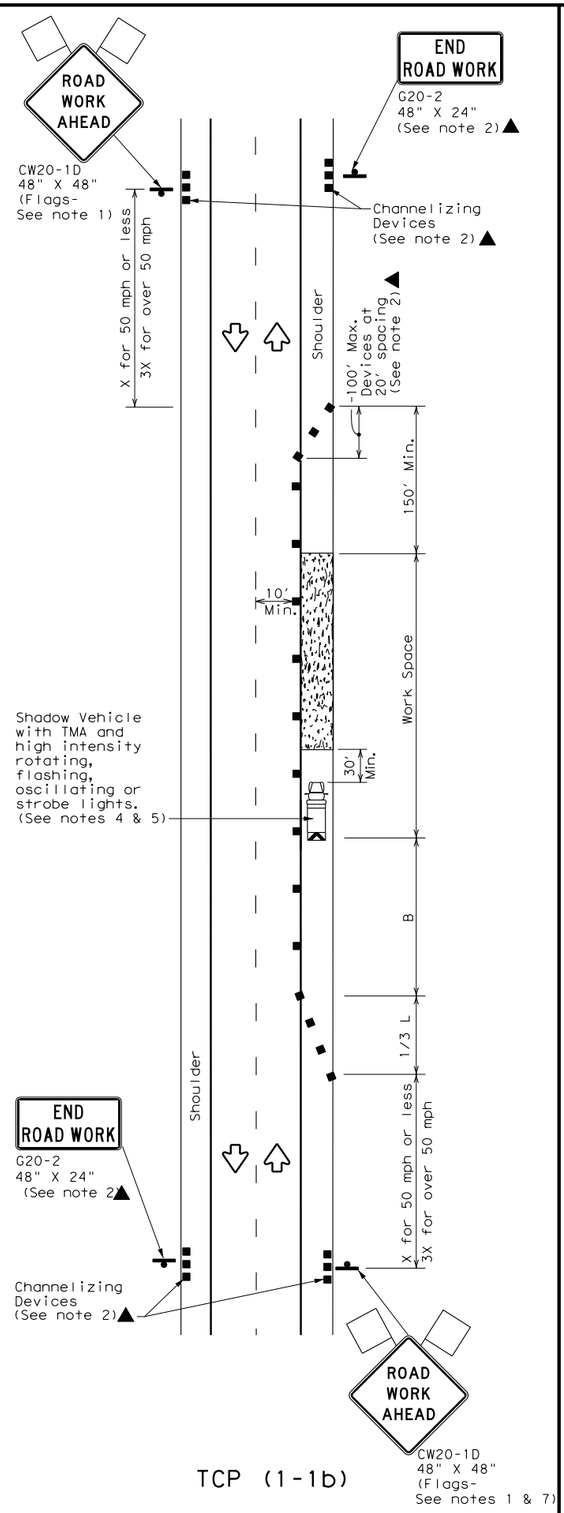


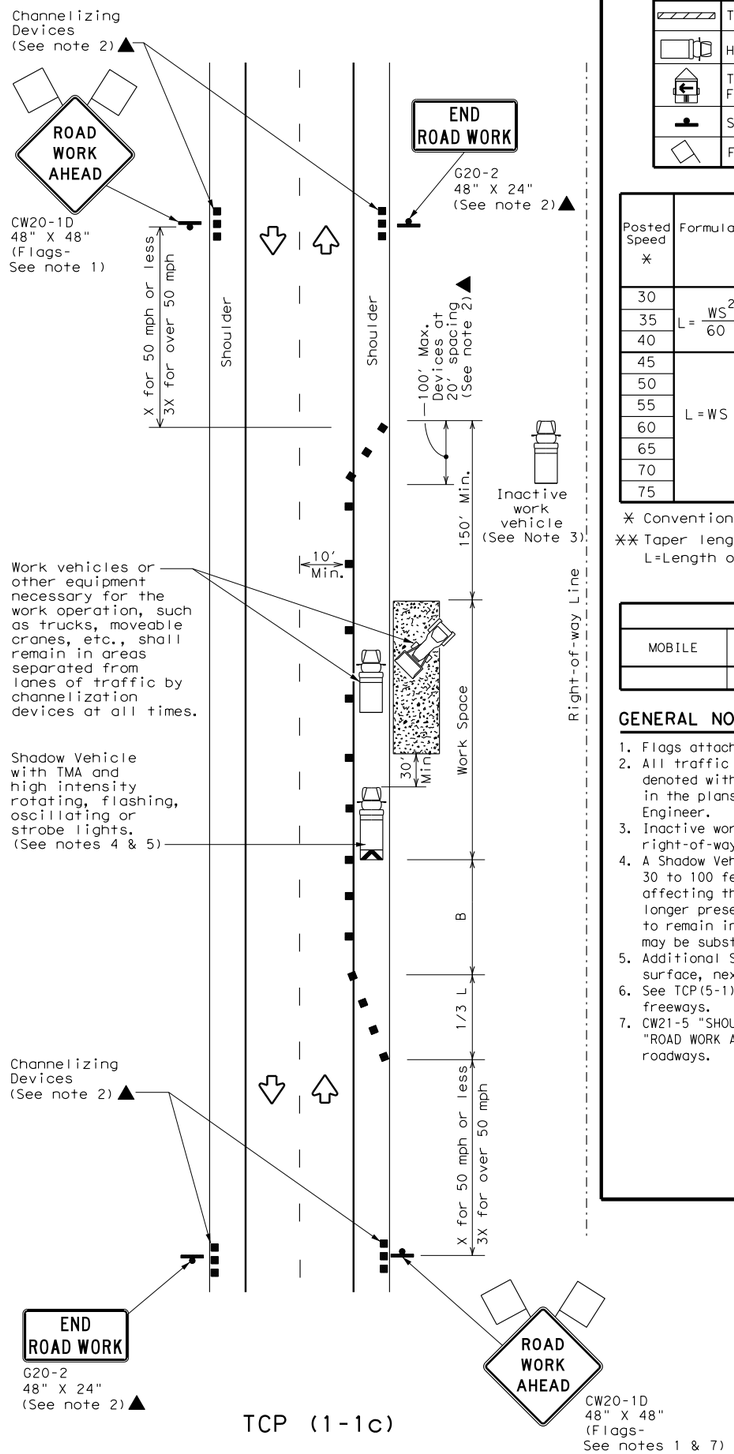
TCP (1-1a)

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:
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REVISIONS	0165	01	109, ETC.	US 271, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	SMITH		27
1-97 2-18				

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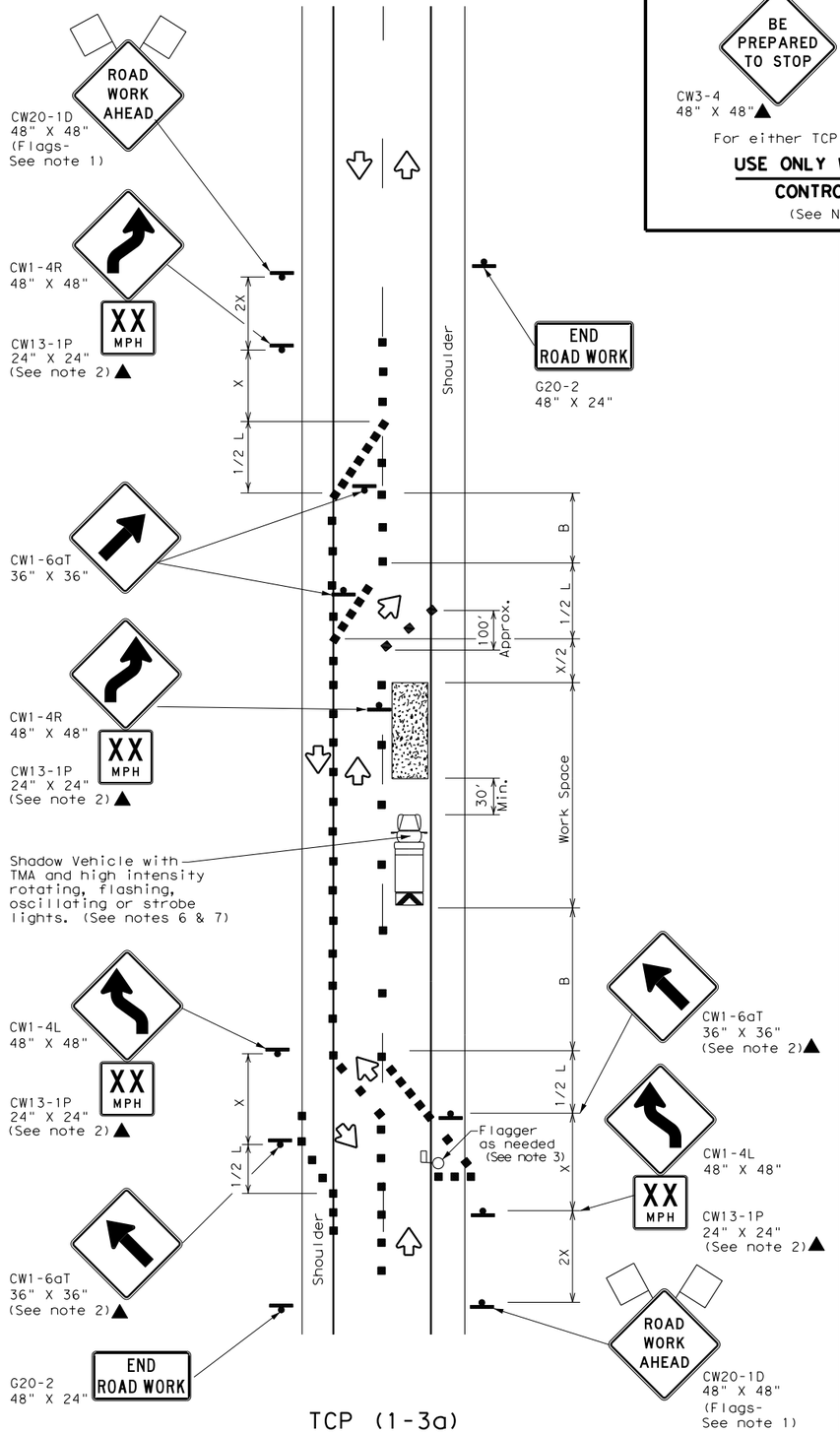
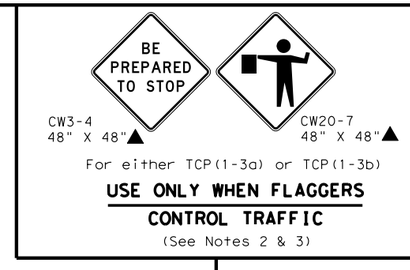


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

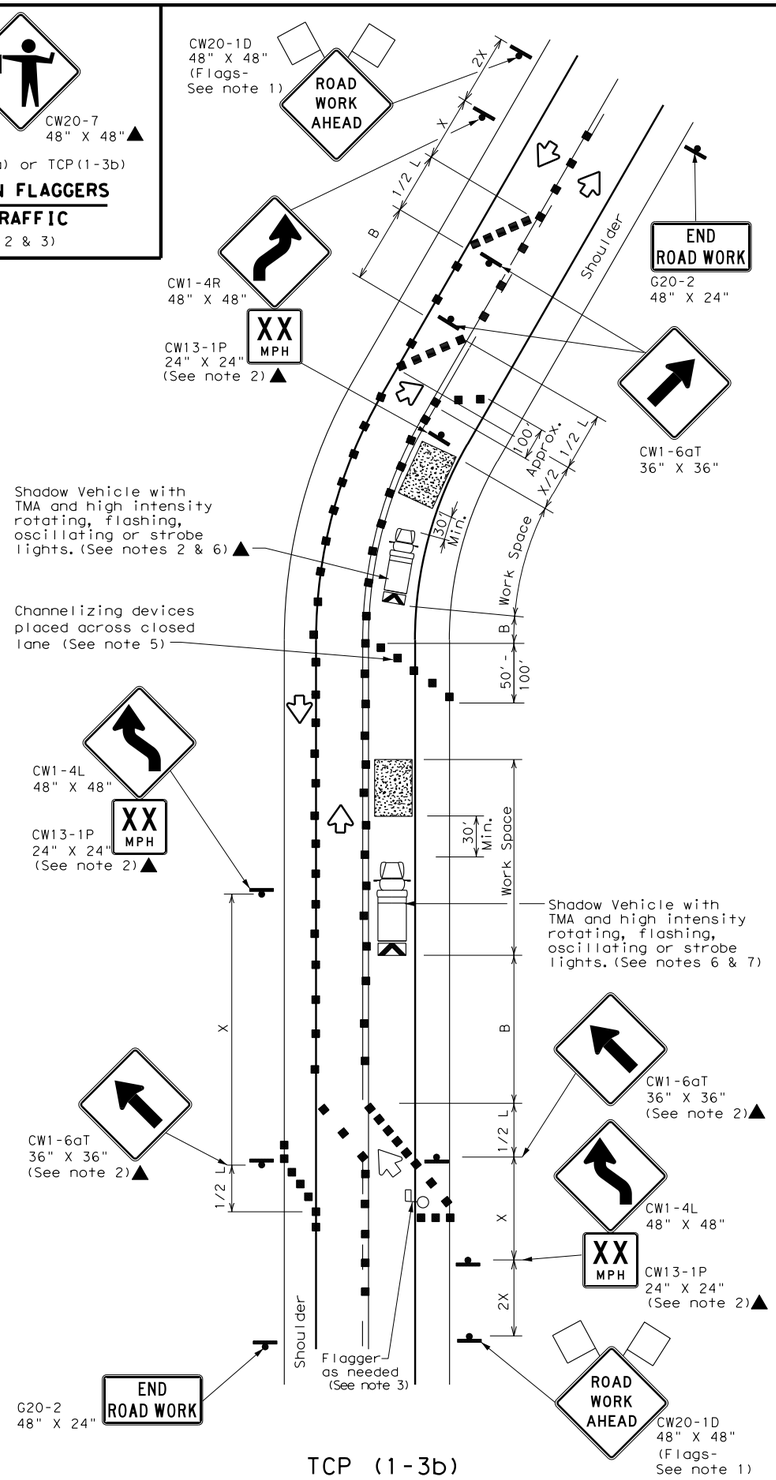
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC

(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. 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.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. 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 speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	SMITH		28
1-97 2-18				

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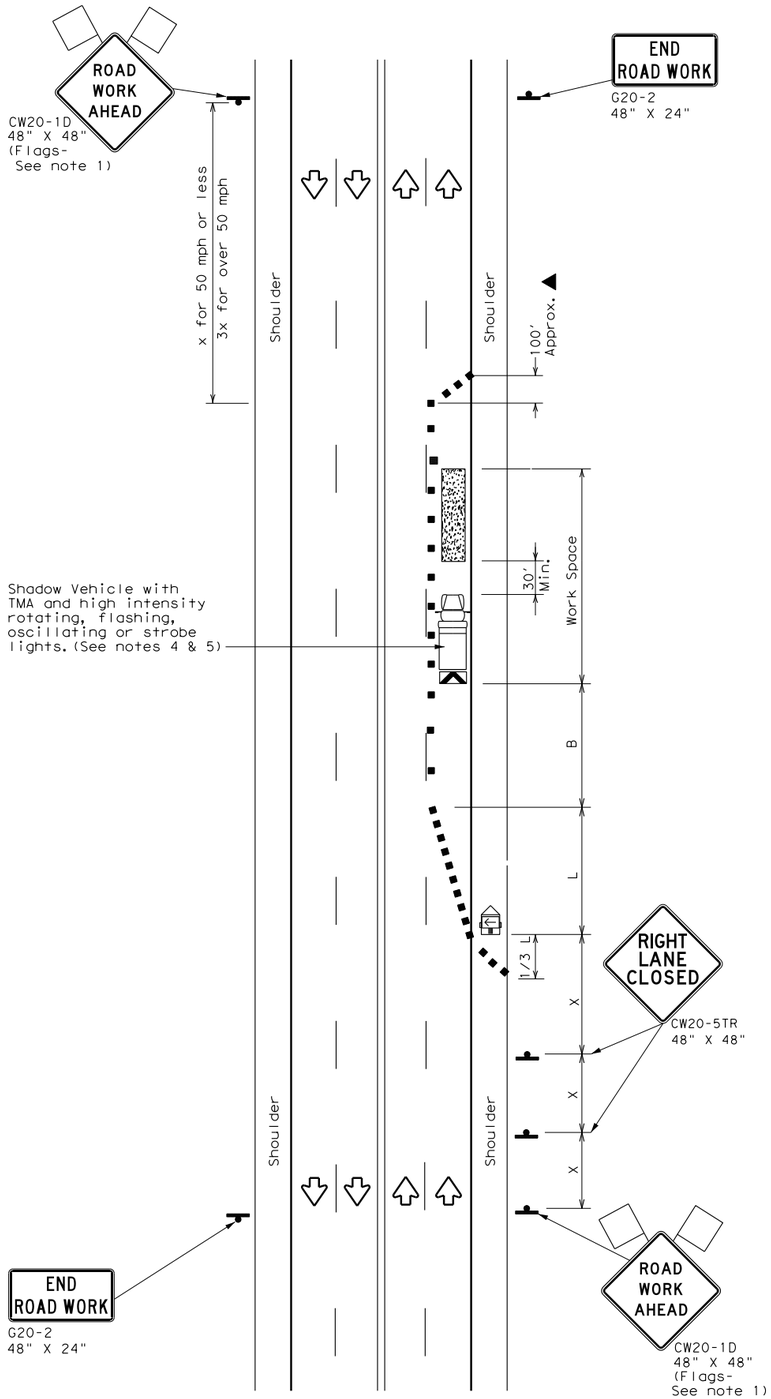
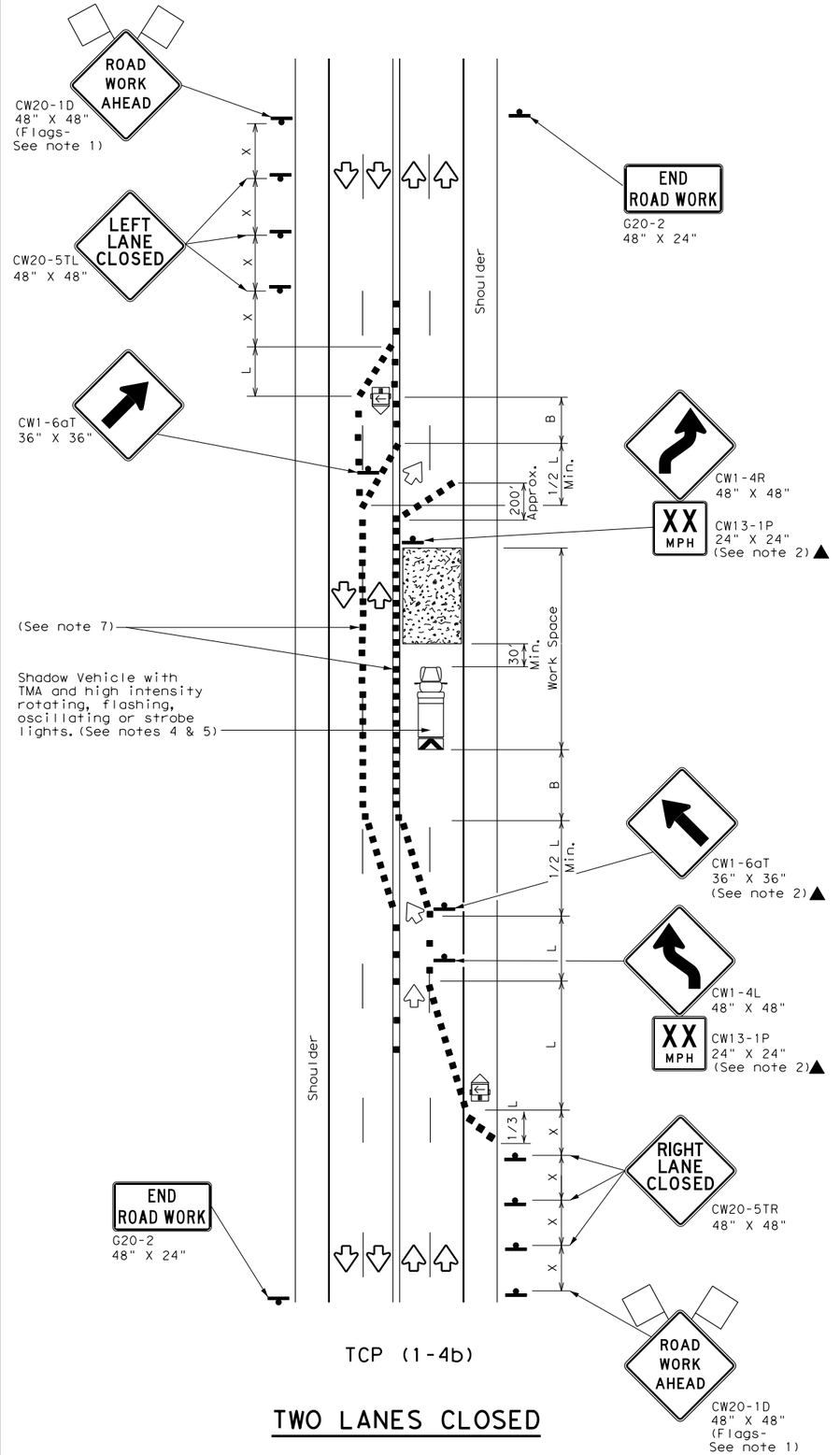
DATE:
FILE:



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	SMITH		29
1-97 2-18				

DATE:
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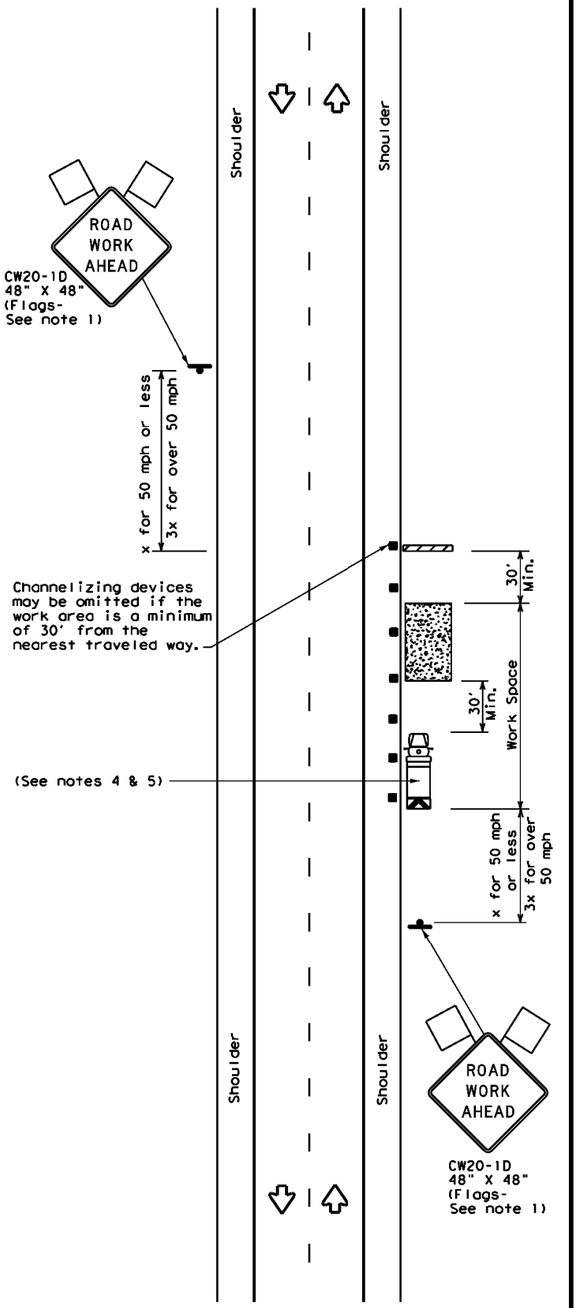
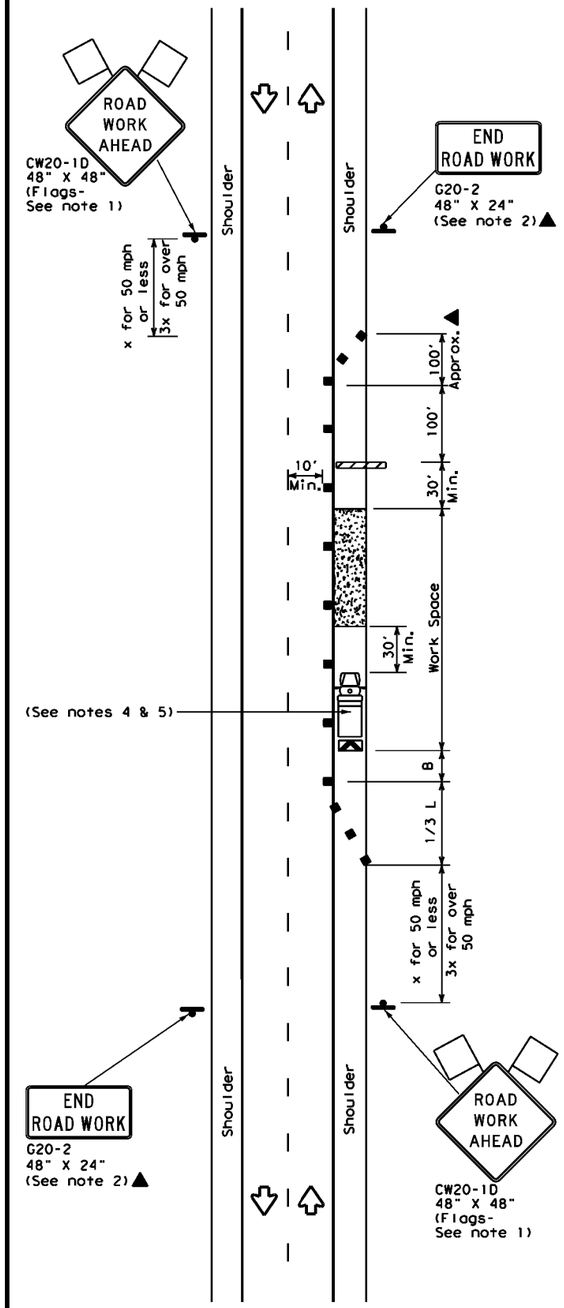


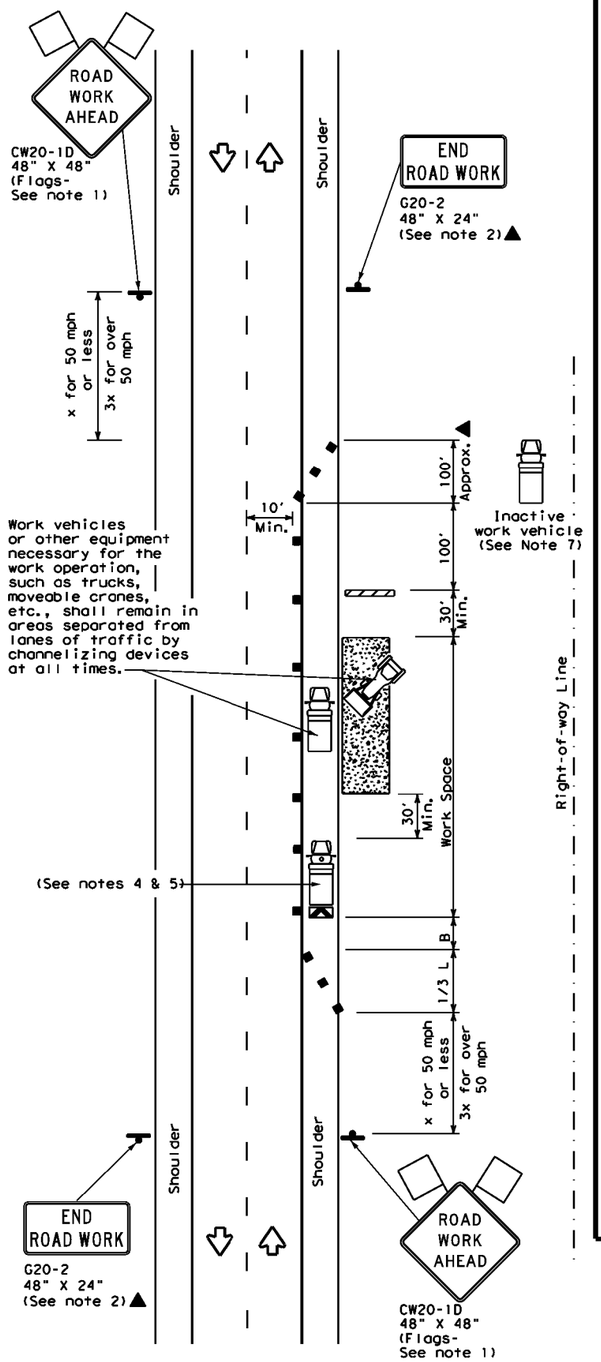
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		30

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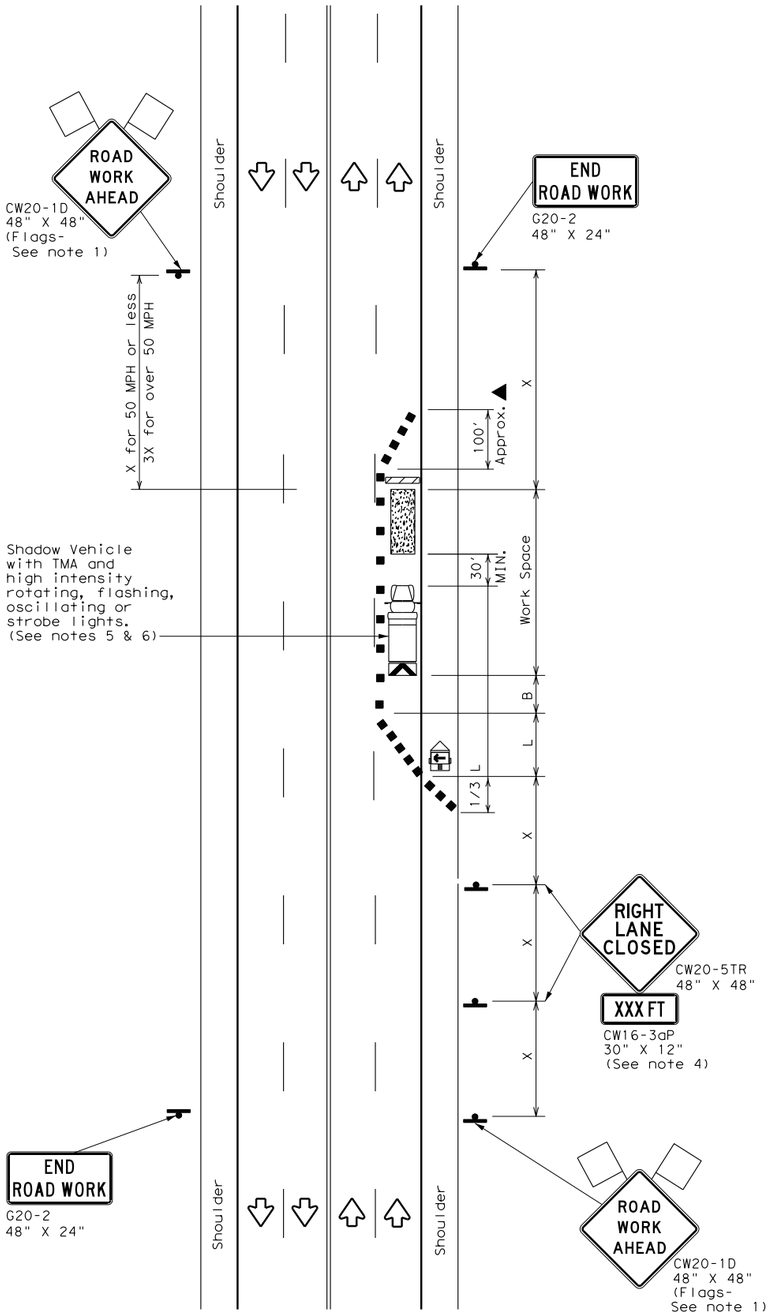
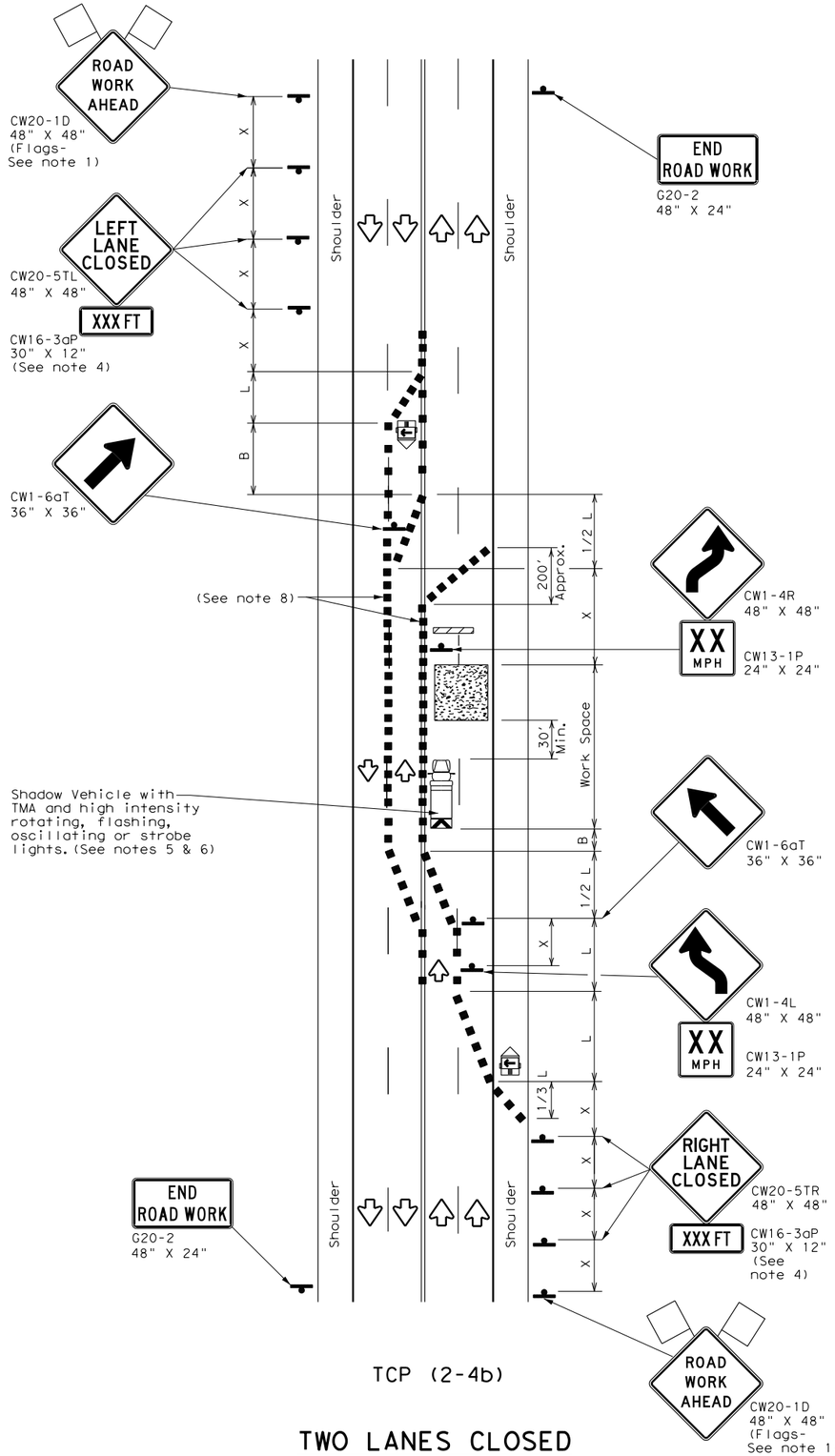


TCP (2-4a)

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0165	01	109, ETC.	US 271, ETC.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	TYL	SMITH		31

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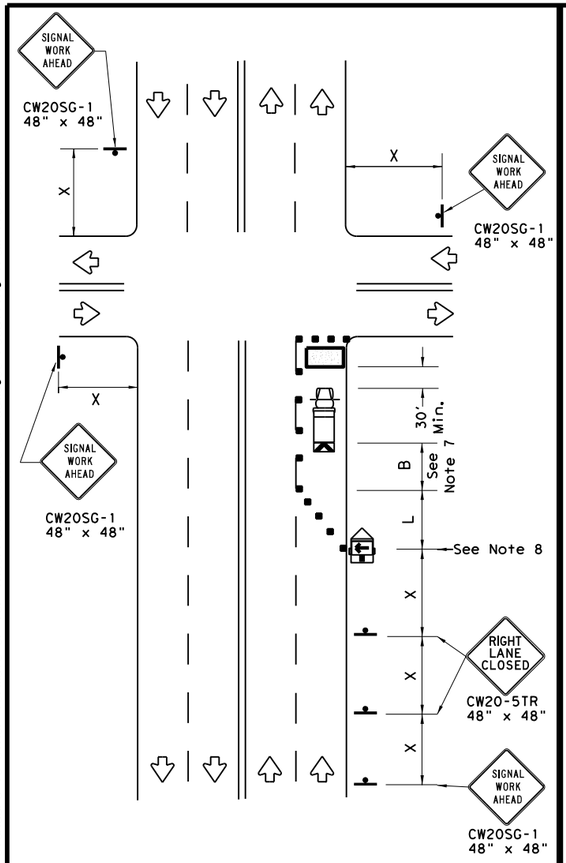
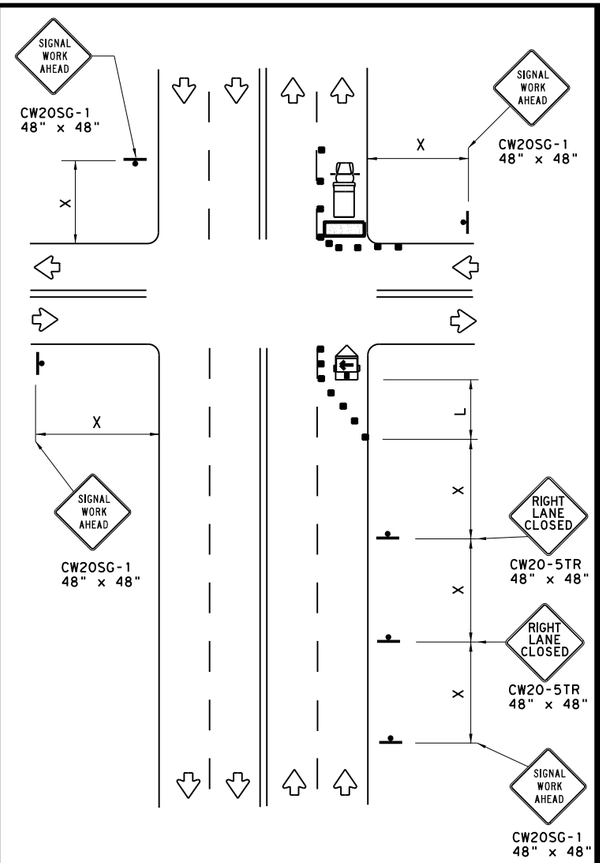


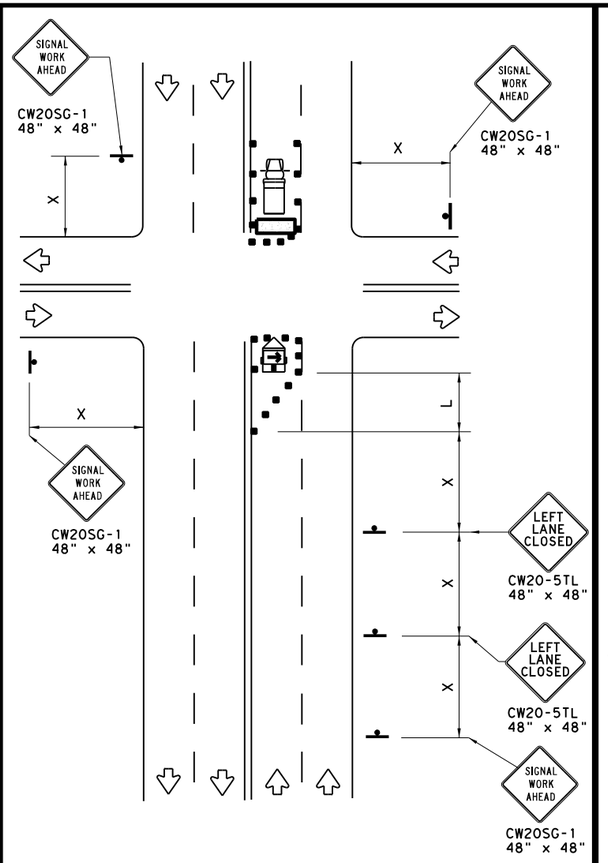
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



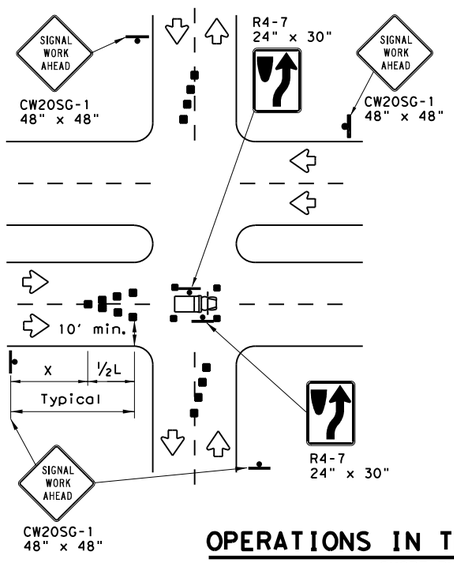
FAR SIDE RIGHT LANE CLOSURE

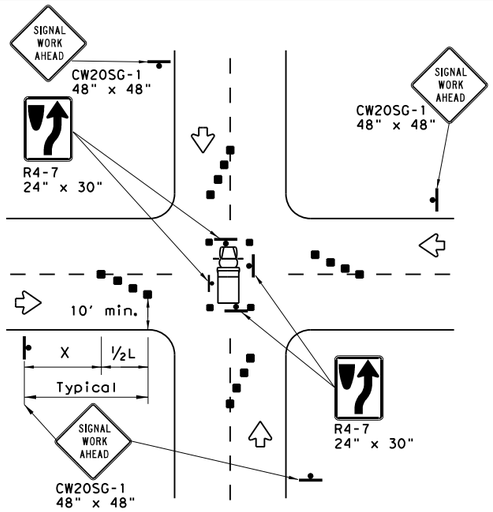
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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.

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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
2-98 10-99 7-13 4-98 3-03	DIST	COUNTY		SHEET NO.
	TYL	SMITH		32

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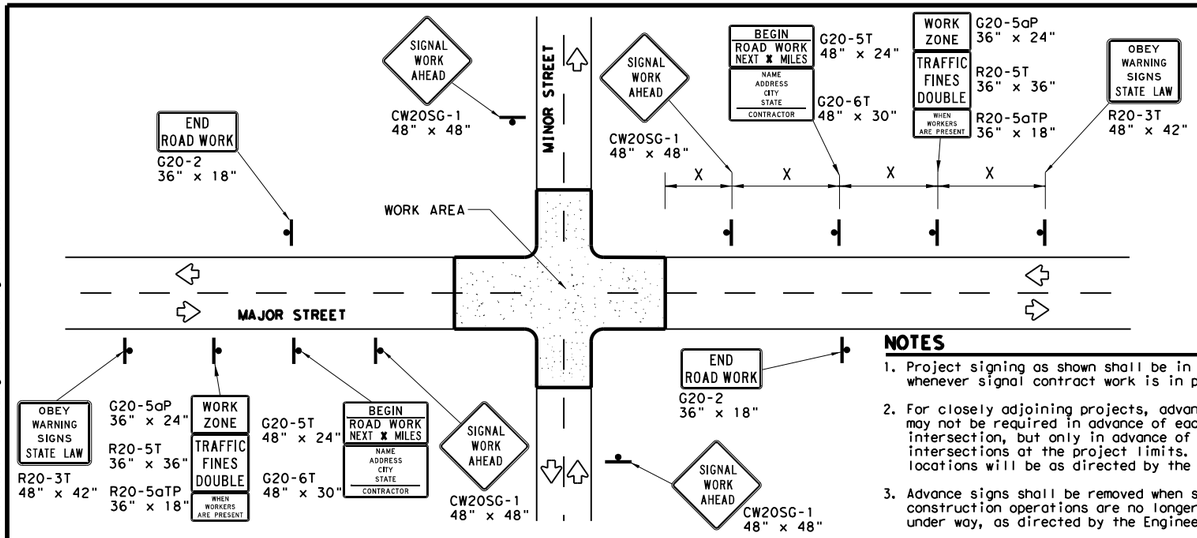


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

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

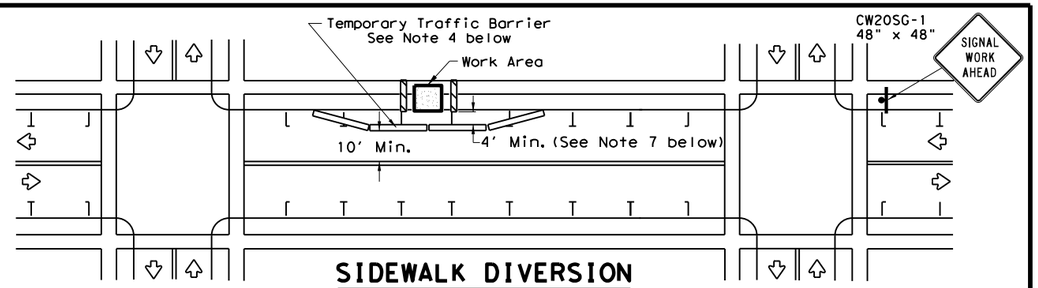
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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

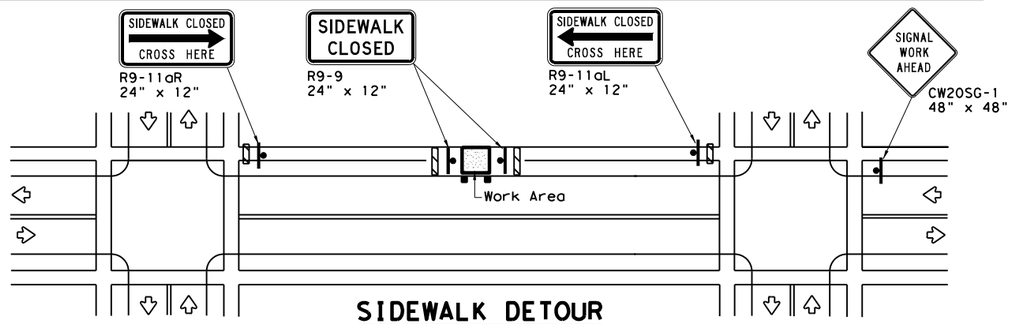
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

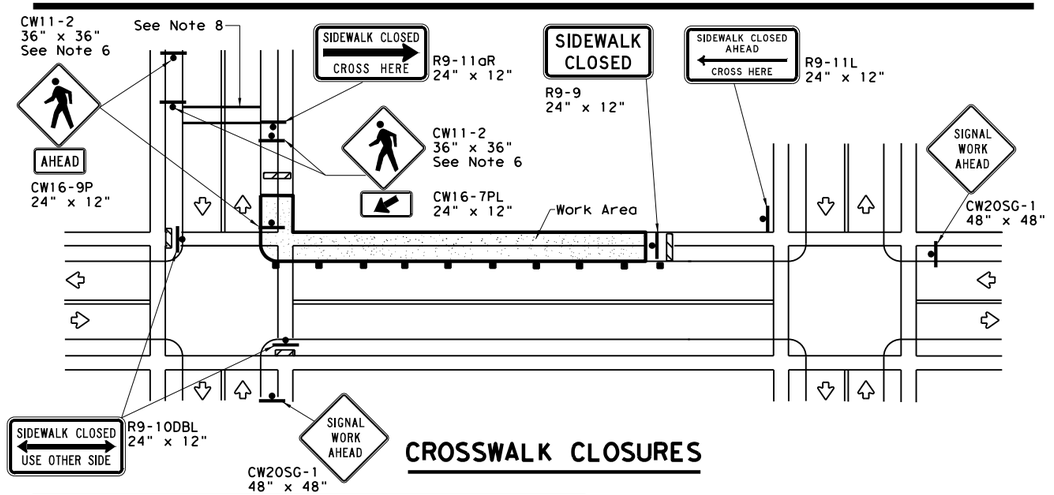
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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	0165	01	109, ETC.	US 271, ETC.
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	TYL	SMITH		33

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

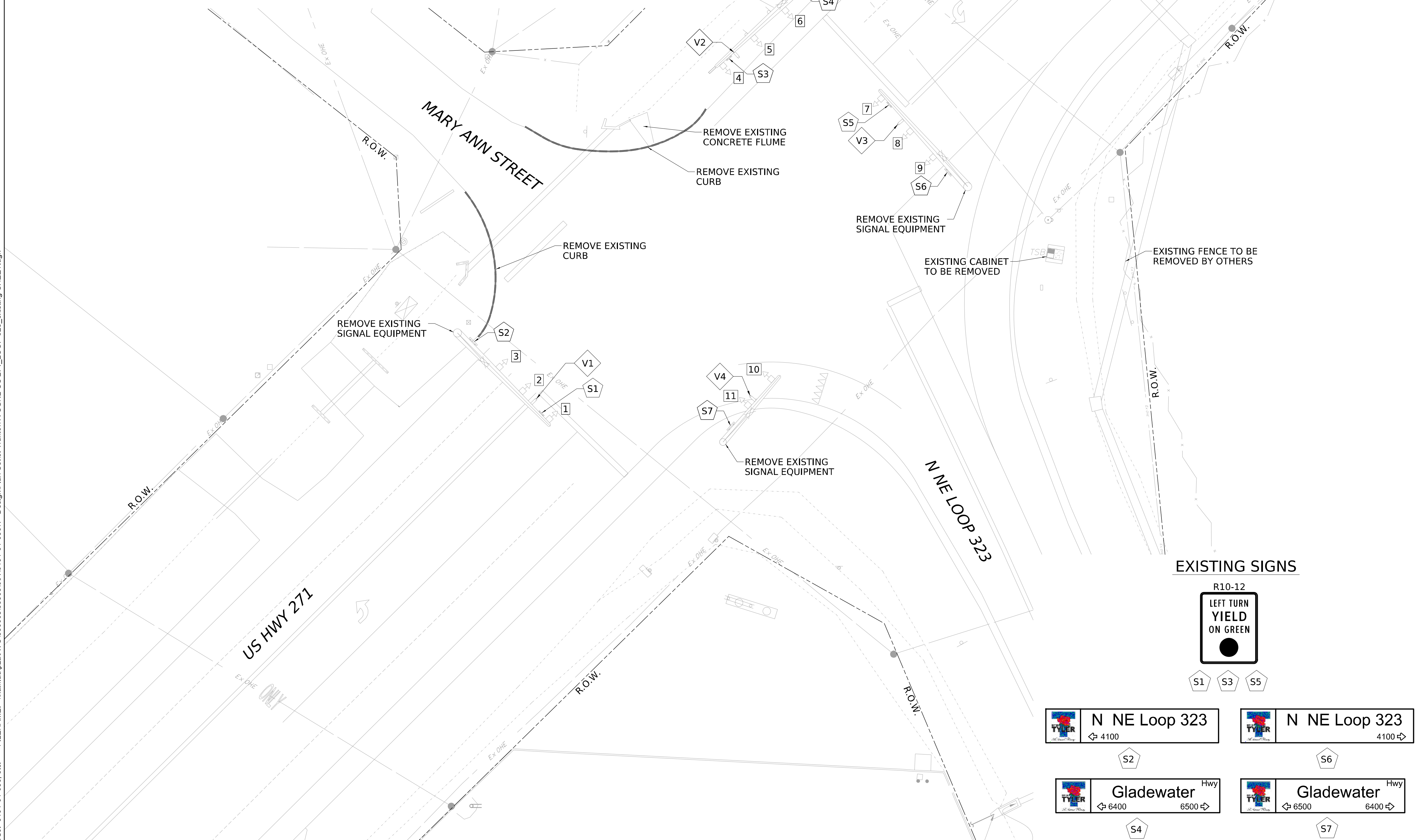
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.

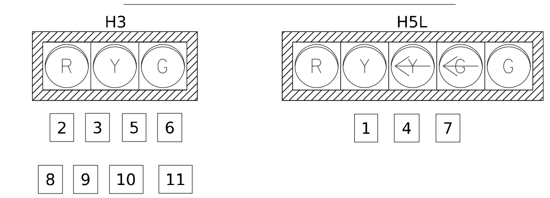
4. CONTRACTOR SHALL REMOVE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. RETURN SALVAGED ITEMS TO CITY OF TYLER SIGNAL SHOP AT 406 W. OAKWOOD ST. THE EXISTING GROUND BOXES SHALL BE REMOVED AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION UNLESS IT IS IDENTIFIED IN THE PLANS TO REMAIN. THE EXISTING FOUNDATIONS SHALL BE REMOVED, AND THE SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION IN THE SURROUNDING AREA. SEE GENERAL NOTES AND SPECIFICATIONS FOR MORE INFORMATION.

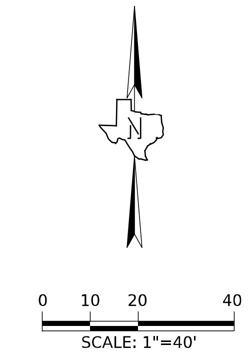
5. EXISTING SIGNS SHALL BE REMOVED WITH TRAFFIC SIGNAL EQUIPMENT.

6. THE CONTRACTOR SHALL REMOVE AND RELOCATE EXISTING CELLULAR MODEM AND INSTALL ALL EQUIPMENT NECESSARY FOR FULL OPERATION. CONTRACTOR SHALL CONFIGURE, TEST, AND INTEGRATE CELLULAR MODEM TO THE CITY NETWORK.



EXISTING SIGNAL FACES





LEGEND

	EXISTING ROW
	EXISTING METAL POLE AND MAST ARM
	EXISTING TRAFFIC SIGN ON MAST ARM
	EXISTING TRAFFIC SIGNAL HEAD
	EXISTING VIVDS CAMERA
	EXISTING LUMINAIRE
	EXISTING ELECTRICAL SERVICE
	EXISTING CONTROLLER CABINET
	PAVEMENT REMOVAL
EX OHE	EXISTING OVERHEAD ELECTRIC LINE
EX W	EXISTING WATER LINE
SS	EXISTING STORMSEWER LINE

EXISTING SIGNS

R10-12
LEFT TURN
YIELD
ON GREEN
S1 S3 S5
N NE Loop 323
4100
S2
N NE Loop 323
4100
S6
Gladewater Hwy
6400 6500
S4
Gladewater Hwy
6500 6400
S7

STATE OF TEXAS
ANTHONY X. RAGLAND
123267
LICENSED PROFESSIONAL ENGINEER

4/30/24

halff
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TYLER, TX 75701
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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

EXISTING CONDITIONS
US 271 AT NE LOOP 323

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	SEE TITLE SHEET		US 271, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	34

FILENAME: \\halff.ad\pza\AVO\55000s\55903\001\0191-01-096\4 - Design\Plan Set\8. Traffic\TR-SGNL-US 271_LOOP 323_existing-SHEET.dgn
REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.

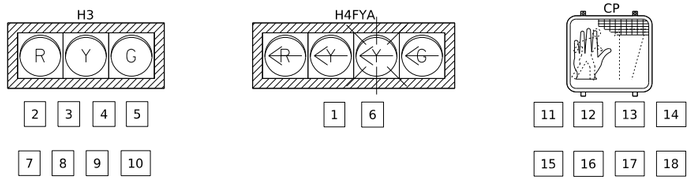
4. CONTRACTOR SHALL COORDINATE WITH ONCOR CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT ONCOR REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL PEDESTAL SERIVICE.

5. ALL POLES SHALL BE ROUND AND POWDERCOATED BLACK.

6. VIVIDS DETECTION ZONES TO BE PROGRAMMED BY THE CITY OF TYLER. CONTACT CITY OF TYLER TRAFFIC ENGINEER AT 903-531-1204 WITH 1 WEEK NOTICE TO SCHEDULE PROGRAMMING AND SIGNAL ACTIVATION.

NOTES CONTINUED ON NEXT SHEET.

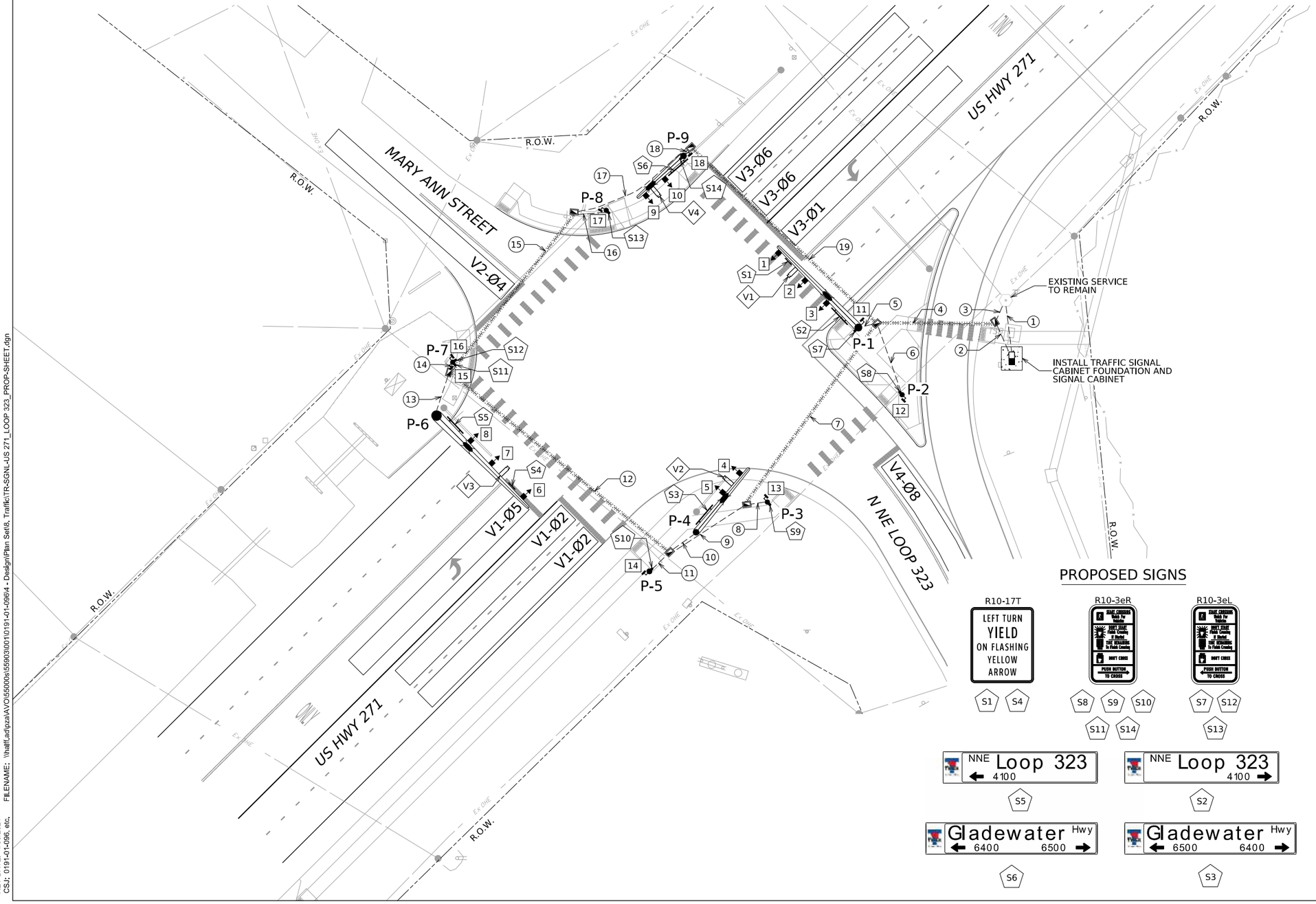
PROPOSED SIGNAL FACES



0 10 20 40
SCALE: 1"=40'

LEGEND

- ROW
- METAL POLE AND MAST ARM
- TRAFFIC SIGN ON MAST ARM
- TRAFFIC SIGNAL HEAD
- VIVDS CAMERA
- LUMINAIRE
- GROUND BOX (TYPE D) WITH APRON
- ELECTRICAL SERVICE
- GROUND MOUNTED CONTROLLER CABINET
- GROUND MOUNTED SIGN
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- PEDESTRIAN SIGNAL HEAD
- PEDESTAL POLE
- PEDESTRIAN DETECTION BUTTON
- EX OHE — EXISTING OVERHEAD ELECTRIC LINE
- EX W — EXISTING WATER LINE
- SS — EXISTING STORMSEWER LINE



PROPOSED SIGNS

STATE OF TEXAS
ANTHONY X. RAGLAND
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4/30/24

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TYLER, TX 75701
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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED CONDITIONS US 271 AT NE LOOP 323

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 35

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.adp2a\AVO\55000\s\55003000\10191-01-096\4 - Design\Plan Set\8, Traffic\TR-SGNL-US 271_LOOP 323_PROP-SHEET.dgn

TRAFFIC SIGNAL CONDUIT SUMMARY

WIRE SIZE AND TYPE

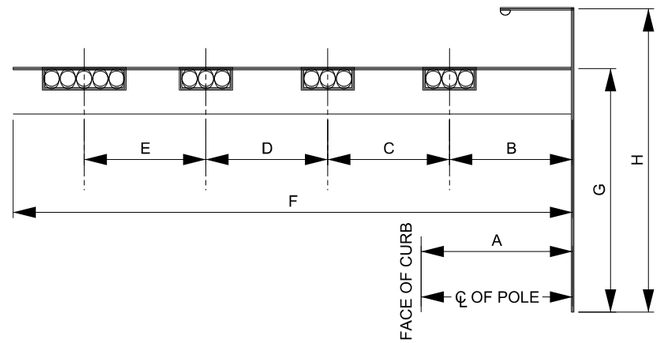
RUN NO. / POLE NO.	CONDUIT STATUS	ITEM 618 CONDUIT (SCH 80)												CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS								ITEM 684 TRAFFIC SIGNAL CABLES								ITEM 6306		TOTAL LENGTH OF RUN	RUN NO. / POLE NO.
		2" PVC (RISER)		2" PVC (TRENCHED)		2" PVC (BORED)		3" PVC (TRENCHED)		4" PVC (TRENCHED)		4" PVC (BORED)			NO. 6 XHHW WIRE		NO. 6 BARE WIRE		NO. 8 XHHW WIRE		NO. 12 XHHW WIRE		TY C 2 CNDR. 12 AWG		TY A 5 CNDR. 14 AWG		TY A 7 CNDR. 14 AWG		TY A 20 CNDR. 14 AWG		VIVDS CABLE			
		QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN		QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN		
1	I			1	20									I	2	40	1	20															20	1
2	I									2	30			I			2	30					8	120					4	60	4	60	15	2
3	I			1	10									I			1	10	4	40													10	3
4	I											2	90	I			2	90	4	180			8	360					4	180	4	180	45	4
5	I							1	5					I			1	5	2	10			1	5	1	5			1	5	1	5	5	5
6	I			1	30									I			1	30					1	30	1	30							30	6
7	I											1	85	I			1	85	2	170			2	170					1	85	1	85	85	7
8	I			1	10									I			1	10					1	10	1	10							10	8
9	I							1	35					I			1	35	2	70			1	35	1	35			1	35	1	35	35	9
10	I			1	15									I			1	15	2	30					2	30			1	15	1	15	15	10
11	I			1	10									I			1	10					1	10	1	10							10	11
12	I											1	110	I			1	110															110	12
13	I							1	15					I			1	15	2	30					2	30			1	15	1	15	15	13
14	I			1	5									I			1	5					2	10	2	10							5	14
15	I											1	80	I			1	80	2	160			2	160					1	80	1	80	80	15
16	I			1	10									I			1	10					1	10	1	10							10	16
17	I							1	50					I			1	50	2	100			3	150	1	50			1	50	1	50	50	17
18	I							1	5					I			1	5	2	10			1	5	1	5			1	5	1	5	5	18
19	I											1	100	I			1	100	2	200			4	400					2	200	2	200	100	19
SUBTOTAL			0		110		0		110		30		465			40		715		1000		0		1475		225		0		730		730		
P-1	P													I						80				5		90		60				60	VARIES	P-1
P-2	P													I										5		10							VARIES	P-2
P-3	P													I										5		10							VARIES	P-3
P-4	P													I						80						85						50	VARIES	P-4
P-5	P													I										5		10							VARIES	P-5
P-6	P													I						80						85		65				60	VARIES	P-6
P-7	P													I										10		20							VARIES	P-7
P-8	P													I										5		10							VARIES	P-8
P-9	P													I						80				5		80						40	VARIES	P-9
SUBTOTAL			0		0		0		0		0		0			0		0		320		0		40		400		125		0		210		
PROJECT TOTAL			0		110		0		110		30		465			40		715		1320		0		1515		625		125		730		940		

CONDUIT STATUS: I=INSTALL; E=EXISTING; P=WIRE TO BE INSTALLED INSIDE STELL POLE; ABANDON; REM=REMOVE AND SALVAGE
P-# - REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM
* - THE CONTRACTOR SHALL INSTALL A 2" PVC CONDUIT FROM THE POINT OF DELIVERY TO THE PEDESTAL METER.
ONCOR WILL INSTALL THE ELECTRICAL CONDUCTORS FROM THE POINT OF DELIVERY TO THE PEDESTAL METER.

SIGNAL HEAD AND POLE PLACEMENT (LF)

POLE NUMBER	STATUS	A	B	C	D	E	F	G	H	NO. OF SIGNAL HEADS	ITEM 6306 VIVDS DETECTION	LUM	DRILLED SHAFT LENGTH (LF) 24" DIA SUB TO ITEM 687	30" DIA TYPE A ITEM 415	36" DIA TYPE A ITEM 416	48" DIA TYPE A ITEM 416	FDN TYPE WIND ZONE 80 MPH
		LF	LF	LF	LF	LF	LF	LF	LF	EA	EA						
P-1	I	7	15	12	15	-	44	19	30	3	1	Y	-	-	13	-	36-A
P-2	I	6	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-3	I	8	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-4	I	13	19	10	-	-	32	19	30	2	1	Y	-	11	-	-	30-A
P-5	I	4	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-6	I	5	16	12	18	-	50	19	30	3	1	Y	-	-	-	22	48-A
P-7	I	9	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-8	I	9	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-9	I	10	11	10	-	-	24	19	30	2	1	Y	-	11	-	-	30-A
													30	22	13	22	

SIGNAL POLE STATUS: I=INSTALL; E=EXISTING; REM=REMOVE; F=INSTALL IN FUTURE PHASE



ELECTRICAL SERVICE DESCRIPTION

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION [SEE ED(5)-14]	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMP	TWO-POLE CONTACTOR AMPS	PANEL BD. / LOAD CENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES-03 (USE EXISTING)	TY D (120/240) 070 (NS) SS (E) SP (O)	-	-	-	-	-	-	-	-	-	-
								-	-	-	

VIVDS DETECTION ZONE DETAILS

DETECTION NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE (S)	DESCRIPTION
V1	SIGNAL POLE P-1 (44' ARM)	25'	EB + EBLT	ADVANCED + PRESENCE
V2	SIGNAL POLE P-4 (32' ARM)	25'	SB	PRESENCE
V3	SIGNAL POLE P-6 (50' ARM)	25'	WB + WBLT	ADVANCED + PRESENCE
V4	SIGNAL POLE P-9 (24' ARM)	25'	NB	PRESENCE

GROUND BOX SUMMARY

ITEM NO.	DESCRIPTION	UNIT	QTY
624	GROUND BOX TY D (162922) W/APRON	EA	7

NOTES CONTINUED:

7. ALL EQUIPMENT TO BE PROCURED AND INSTALLED BY THE CONTRACTOR, UNLESS OTHERWISE STATED. CONTRACTOR TO PROCURE EQUIPMENT LISTED BELOW, OR APPROVED EQUAL.

SUMMARY OF TRAFFIC SIGNAL EQUIPMENT		
EQUIPMENT	ITEM NO.	DESCRIPTION
DETECTION	6083	ITERIS VANTAGEVECTOR/NEXT SHELF MOUNT
CABINET	SUB TO 680	MOBOTREX ATC CABINET MODEL #TF6016TTYRTX02
BBU	6058	APC SECURE UPS W/MK5105A(4) BATTERIES
CONTROLLER	SUB TO 680	ECONOLITE COBALT "C" CONTOLLER, RACK MOUNT
APS	688	PELCO INTELLICROSS APS SYSTEM

8. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE CITY AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.

9. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.

10. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN IN THE PLANS, THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.

11. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.

12. CONTRACTOR TO MAINTAIN FULL ACCESS TO A MINIMUM OF TWO PEDESTRIAN CROSSINGS AT ALL TIMES DURING CONSTRUCTION.

13. ALL SIGNS ARE TO BE FURNISHED AND INSTALLED BY CONTRACTOR. CONTRACTOR TO INSTALL NON-ILLUMINATED STREET NAME BLADE SIGNS ON MAST ARMS. CONTRACTOR SHALL VERIFY STREET NAME BLADE DESIGN IS MOST CURRENT CITY OF TYLER STANDARD. CONTRACTOR SHALL VERIFY BLOCK NUMBERS WITH CITY PRIOR TO FABRICATION.

14. THE CONTRACTOR SHALL REMOVE AND RELOCATE EXISTING CELLULAR MODEM AND INSTALL ALL EQUIPMENT NECESSARY FOR FULL OPERATION. CONTRACTOR SHALL CONFIGURE, TEST, AND INTEGRATE CELLULAR MODEM TO THE CITY NETWORK.

STATE OF TEXAS
ANTHONY X. RAGLAND
123267
LICENSED PROFESSIONAL ENGINEER
4/30/24

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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED TRAFFIC SIGNAL DETAILS (1 OF 2) - US 271 AT NE LOOP 323

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 36

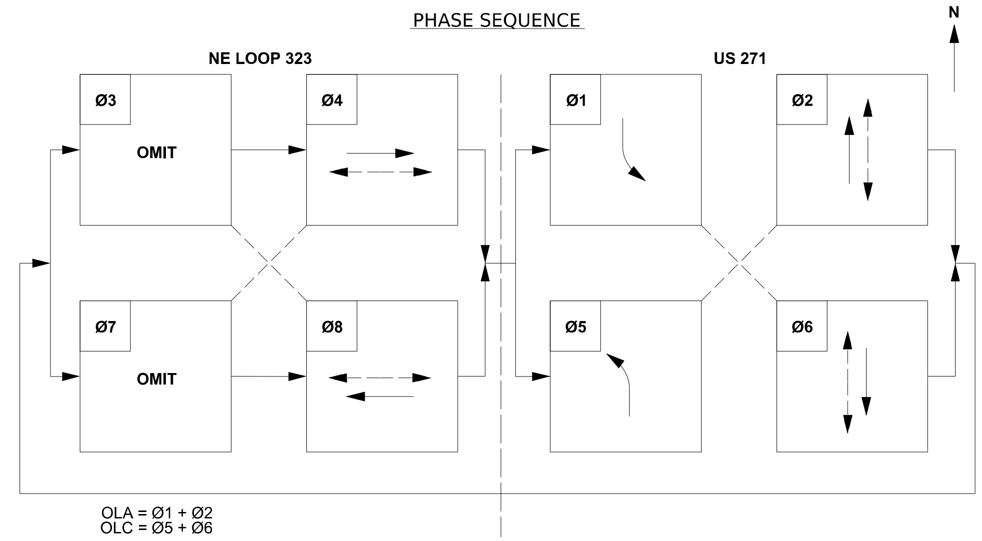
REV DATE: 5/10/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pza\AVO\55000s\55903\00191\01-096\4 - Design\Plan Set\8. Traffic\55903-INT3-SDT-1.dgn

CABLE TERMINATION CHART

CNDR. NO.	CONDUCTOR COLOR	CABLE 1 20 CNDR. FROM P-1 TO CNTRL.	CABLE 2 20 CNDR. FROM P-4 TO CNTRL.	CABLE 3 20 CNDR. FROM P-6 TO CNTRL.	CABLE 4 20 CNDR. FROM P-9 TO CNTRL.
1	BLACK	SPARE	SPARE	SPARE	SPARE
2	WHITE	SH COM	SH COM	SH COM	SH COM
3	RED	SH 2, 3 - Ø2 R	SH 4, 5 - Ø4 R	SH 7, 8 - Ø6 R	SH 9, 10 - Ø8 R
4	GREEN	SH 2, 3 - Ø2 G	SH 4, 5 - Ø4 G	SH 7, 8 - Ø6 G	SH 9, 10 - Ø8 G
5	ORANGE	SH 2, 3 - Ø2 Y	SH 4, 5 - Ø4 Y	SH 7, 8 - Ø6 Y	SH 9, 10 - Ø8 Y
6	BLUE	SPARE	SPARE	SPARE	SPARE
7	WHITE / BLACK	SPARE	SPARE	SPARE	SPARE
8	RED / BLACK	SH 1 - OLC R (LT ARW)	SPARE	SH 6 - OLA R (LT ARW)	SPARE
9	GREEN / BLACK	SH 1 - OLC G (LT ARW)	SPARE	SH 6 - OLA G (LT ARW)	SPARE
10	ORANGE / BLACK	SH 1 - OLC SY (LT ARW)	SPARE	SH 6 - OLA SY (LT ARW)	SPARE
11	BLUE / BLACK	SH 1 - OLC FY (LT ARW)	SPARE	SH 6 - OLA FY (LT ARW)	SPARE
12	BLACK / WHITE	SPARE	SPARE	SPARE	SPARE
13	RED / WHITE	SH 12 - Ø2 DW	SH 13 - Ø2 DW	SH 16 - Ø6 DW	SH 18 - Ø8 DW
14	GREEN / WHITE	SH 12 - Ø2 W	SH 13 - Ø2 W	SH 16 - Ø6 W	SH 18 - Ø8 W
15	BLUE / WHITE	SPARE	SPARE	SPARE	SPARE
16	BLACK / RED	SH 11- Ø8 DW	SH 14 - Ø4 DW	SH 15 - Ø4 DW	SH 17 - Ø6 DW
17	WHITE / RED	SH 11- Ø8 W	SH 14 - Ø4 W	SH 15 - Ø4 W	SH 17 - Ø6 W
18	ORANGE / RED	SPARE	SPARE	SPARE	SPARE
19	BLUE / RED	SPARE	SPARE	SPARE	SPARE
20	RED / GREEN	SPARE	SPARE	SPARE	SPARE

NOTE: HOME RUN 2 CONDR. TO ALL POLES WITH PED HEADS FOR PED CALL.

PHASE SEQUENCE



OLA = Ø1 + Ø2
OLC = Ø5 + Ø6

APS MESSAGE CHART

POLE NUMBER	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE / SOUND DETAILS
P-2	Ø2	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTH NORTHEAST LOOP 323 AT GLADEWATER HIGHWAY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-3	Ø2	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTH NORTHEAST LOOP 323 AT GLADEWATER HIGHWAY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-5	Ø4	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLADEWATER HIGHWAY AT NORTH NORTHEAST LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-7	Ø4	BUTTON PUSH ON DW	WAIT TO CROSS GLADEWATER HIGHWAY AT NORTH NORTHEAST LOOP 323
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLADEWATER HIGHWAY AT NORTH NORTHEAST LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	GLADEWATER HIGHWAY, WALK SIGN IS ON TO CROSS GLADEWATER HIGHWAY
P-7	Ø6	BUTTON PUSH ON DW	WAIT TO CROSS MARY ANN STREET AT GLADEWATER HIGHWAY
		EXTENDED BUTTON PUSH	WAIT TO CROSS MARY ANN STREET AT GLADEWATER HIGHWAY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	MARY ANN STREET, WALK SIGN IS ON TO CROSS MARY ANN STREET
P-8	Ø6	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS MARY ANN STREET AT GLADEWATER HIGHWAY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-1	Ø8	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLADEWATER HIGHWAY AT NORTH NORTHEAST LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-9	Ø8	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLADEWATER HIGHWAY AT NORTH NORTHEAST LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

SIGNAL HEADS

SIGNAL HEAD NUMBER	SIGNAL HEAD TYPE	STATUS	12" LED SIGNAL INDICATION								PED SIG SEC (LED) (COUNTDOWN)
			BACK PLATE		LED SIGNAL LAMPS						
			3 SEC	4 SEC	< - G -	G	< - Y -	Y	< - R -	R	
			EA	EA	EA	EA	EA	EA	EA	EA	EA
1	H4FYA	I		1	1		2		1		
2	H3	I	1			1		1		1	
3	H3	I	1			1		1		1	
4	H3	I	1			1		1		1	
5	H3	I	1			1		1		1	
6	H4FYA	I		1	1		2		1		
7	H3	I	1			1		1		1	
8	H3	I	1			1		1		1	
9	H3	I	1			1		1		1	
10	H3	I	1			1		1		1	
11	CP	I									1
12	CP	I									1
13	CP	I									1
14	CP	I									1
15	CP	I									1
16	CP	I									1
17	CP	I									1
18	CP	I									1
TOTAL			8	2	2	8	4	8	2	8	8

STATUS: I=INSTALL; E=EXISTING

STATE OF TEXAS
ANTHONY X. RAGLAND
123267
LICENSED
PROFESSIONAL ENGINEER

4/30/24

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CITY OF TYLER
A Natural Beauty

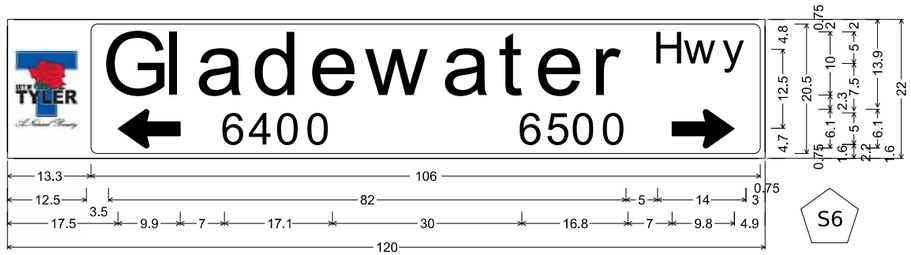
Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

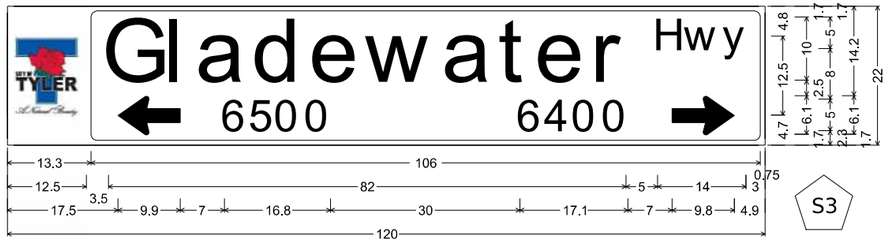
PROPOSED TRAFFIC SIGNAL DETAILS (2 OF 2) - US 271 AT NE LOOP 323

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	SEE TITLE SHEET		US 271, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	37

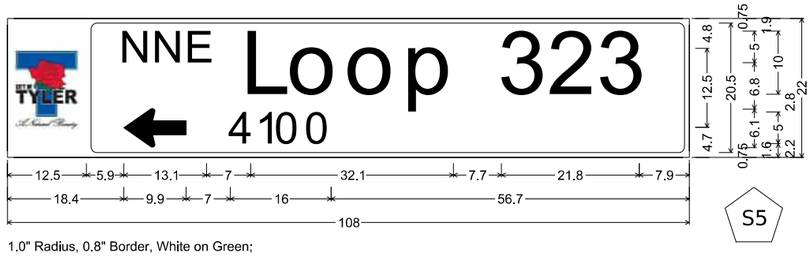
REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pza\AVO\55000s\55903\001\0191-01-096\4 - Design\Plan Set\8. Traffic\55903-INT3-SDT-2.dgn



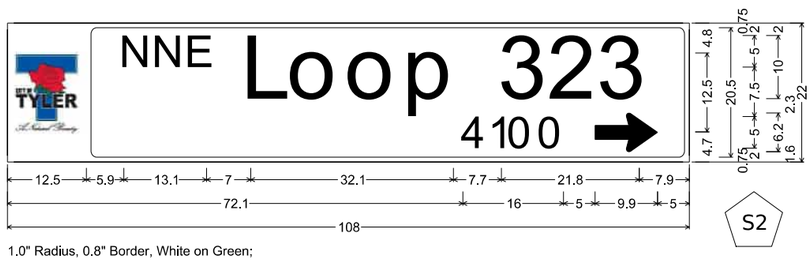
1.0" Radius, 0.8" Border, White on Green;
"Gladewater", ClearviewHwy-3-W; "Hwy", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 180°;
"6400", ClearviewHwy-3-W; "6500", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"Gladewater", ClearviewHwy-3-W; "Hwy", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 180°;
"6500", ClearviewHwy-3-W; "6400", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"NNE", ClearviewHwy-3-W; "Loop 323", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 180°;
"4100", ClearviewHwy-3-W;



1.0" Radius, 0.8" Border, White on Green;
"NNE", ClearviewHwy-3-W; "Loop 323", ClearviewHwy-3-W; "4100", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 0°;

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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED SIGNAGE DETAILS - US 271 AT NE LOOP 323

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 38

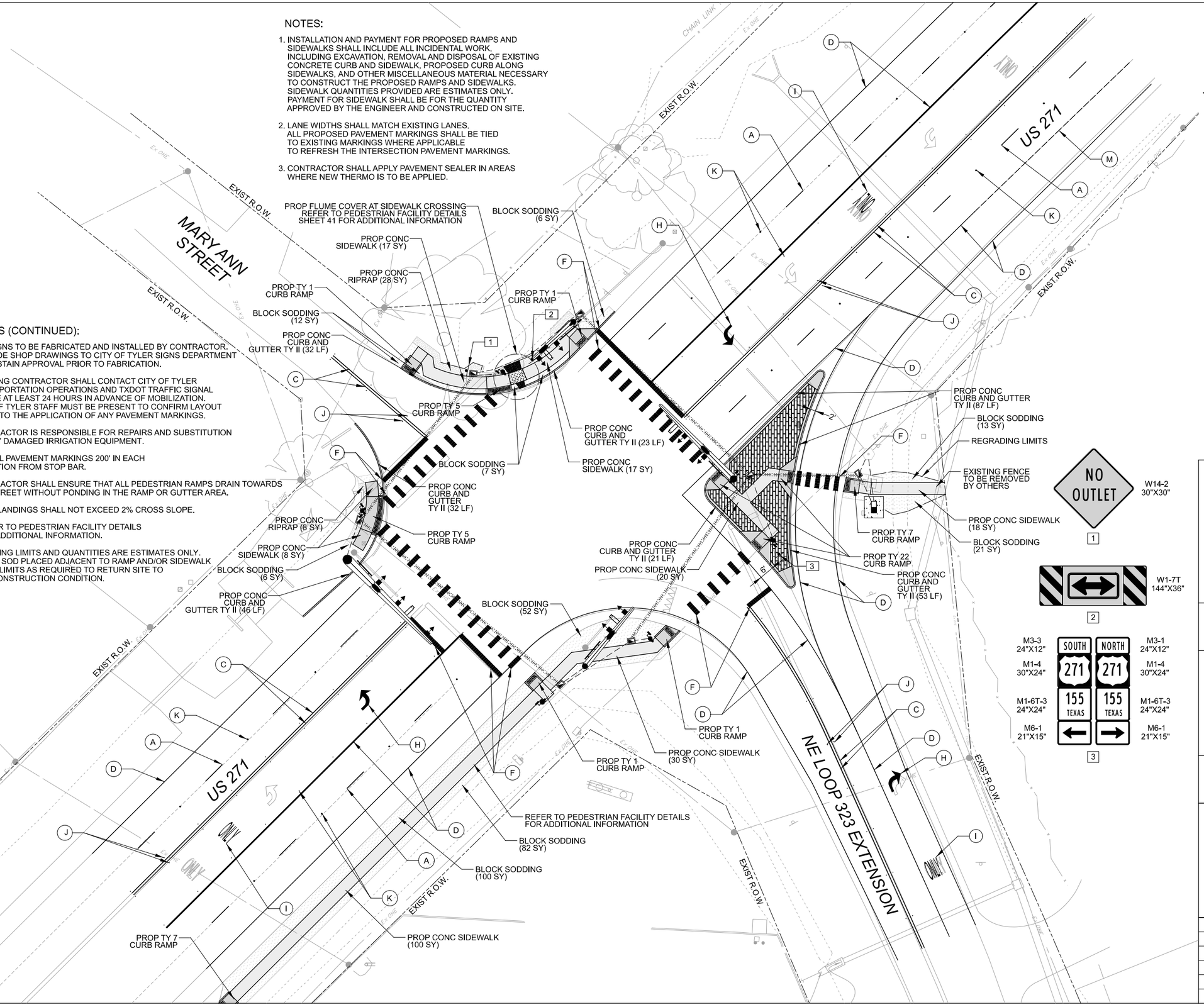
REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.adpzal\AVO\55000\s55903000\10191-01-096\4 - Design\Plan Set\8. Traffic\55903-INT3-SIGN DETAILS.dgn

NOTES:

1. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS. SIDEWALK QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAYMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE TO REFRESH THE INTERSECTION PAVEMENT MARKINGS.
3. CONTRACTOR SHALL APPLY PAVEMENT SEALER IN AREAS WHERE NEW THERMO IS TO BE APPLIED.

NOTES (CONTINUED):

4. ALL SIGNS TO BE FABRICATED AND INSTALLED BY CONTRACTOR. PROVIDE SHOP DRAWINGS TO CITY OF TYLER SIGNS DEPARTMENT AND OBTAIN APPROVAL PRIOR TO FABRICATION.
5. STRIPING CONTRACTOR SHALL CONTACT CITY OF TYLER TRANSPORTATION OPERATIONS AND TXDOT TRAFFIC SIGNAL OFFICE AT LEAST 24 HOURS IN ADVANCE OF MOBILIZATION. CITY OF TYLER STAFF MUST BE PRESENT TO CONFIRM LAYOUT PRIOR TO THE APPLICATION OF ANY PAVEMENT MARKINGS.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTION OF ANY DAMAGED IRRIGATION EQUIPMENT.
7. INSTALL PAVEMENT MARKINGS 200' IN EACH DIRECTION FROM STOP BAR.
8. CONTRACTOR SHALL ENSURE THAT ALL PEDESTRIAN RAMPS DRAIN TOWARDS THE STREET WITHOUT PONDING IN THE RAMP OR GUTTER AREA.
9. RAMP LANDINGS SHALL NOT EXCEED 2% CROSS SLOPE.
10. REFER TO PEDESTRIAN FACILITY DETAILS FOR ADDITIONAL INFORMATION.
11. SODDING LIMITS AND QUANTITIES ARE ESTIMATES ONLY. BLOCK SOD PLACED ADJACENT TO RAMP AND/OR SIDEWALK WORK LIMITS AS REQUIRED TO RETURN SITE TO PRE-CONSTRUCTION CONDITION.



LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (H) PREFAB PAV MRK TY C (W)(ARROW)
- (I) PREFAB PAV MRK TY C (W)(WORD)
- (J) REFL PAV MRK TY II A-A
- (K) REFL PAV MRK TY I-C
- (M) REFL PAV MRK TY I (W)6"(DOT)(100MIL)
- (O) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- [X] PROPOSED SMALL SIGN
- PROPOSED SIDEWALK
- PROPOSED PED CURB RAMP
- SODDING

0 20 40
HORIZONTAL SCALE IN FEET

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Tyler District

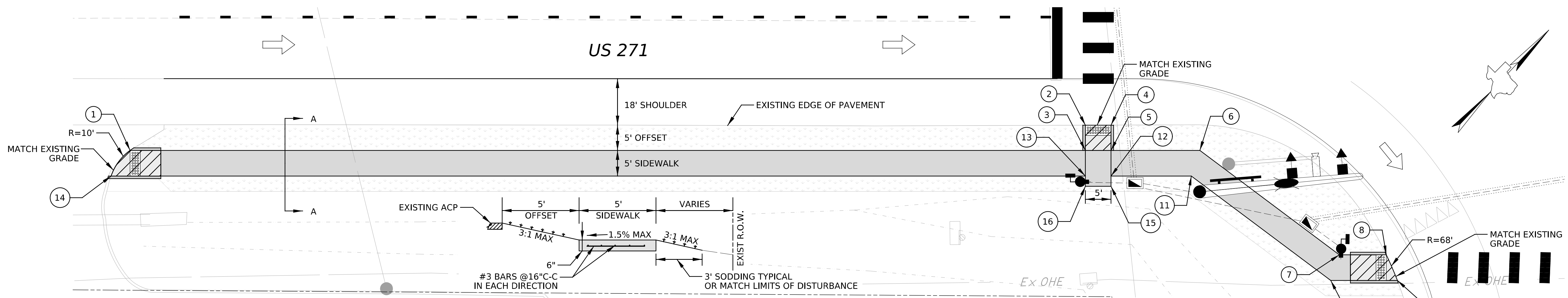
HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED PAVEMENT MARKINGS AND PEDESTRAIN RAMPS

US 271 AT NE LOOP 323 EXTENSION

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 39

REV DATE: 6/3/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.adp\za\AVO\55000s\55903\00\10191-01-09614 - DesignMaster Design Files_SHEETS_PAVE-55903.dgn

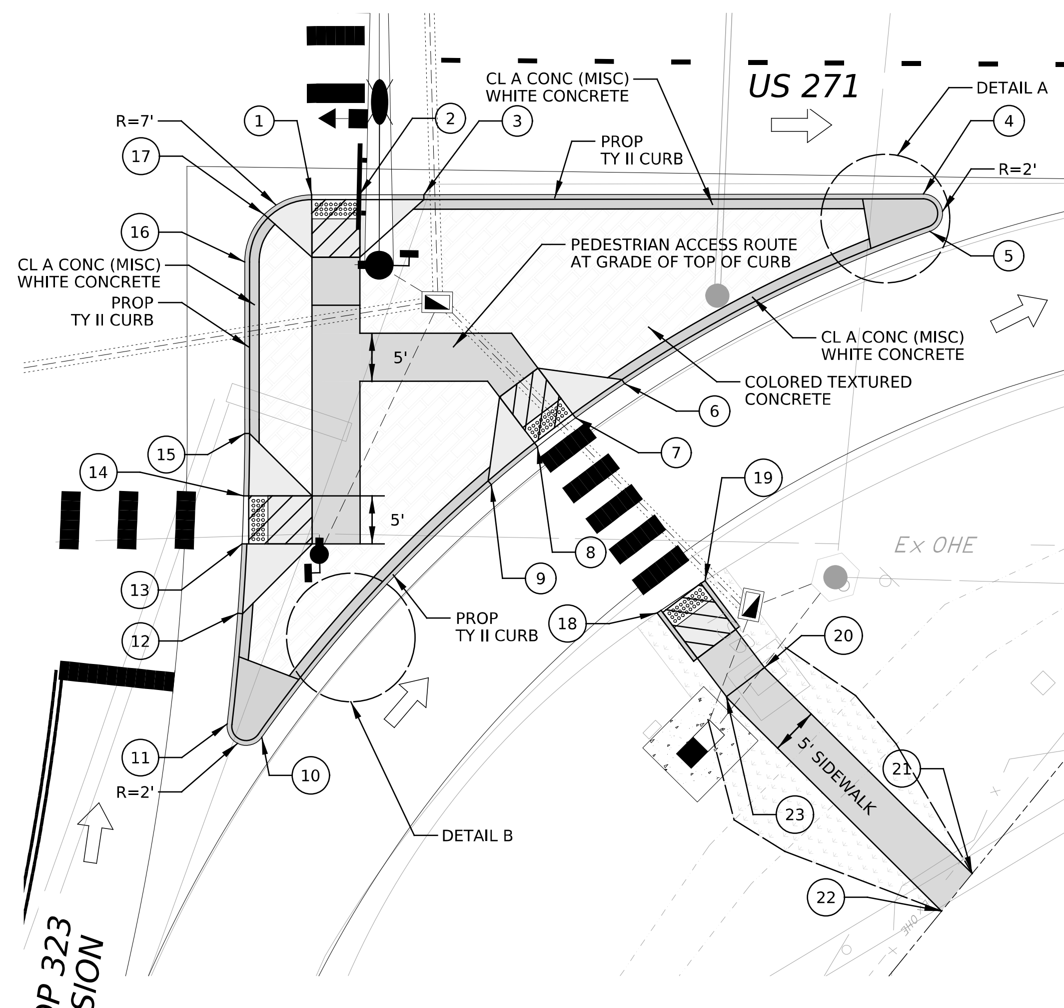


SECTION A-A

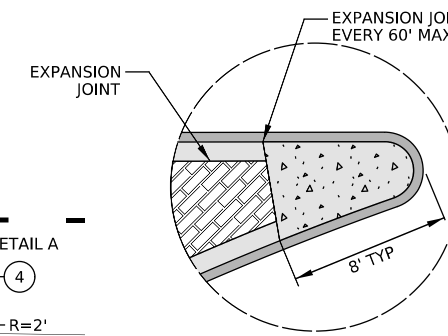
NOT TO SCALE

SW SIDEWALK AND RAMP DETAILS		
POINT	NORTHING	EASTING
1	6842171.412	2965352.995
2	6842305.435	2965481.433
3	6842301.941	2965484.908
4	6842308.961	2965484.977
5	6842305.467	2965488.453
6	6842317.695	2965500.744
7	6842322.446	2965534.377
8	6842328.911	2965540.875
9	6842326.886	2965545.929
10	6842317.728	2965536.723
11	6842312.977	2965503.091
12	6842301.922	2965491.979
13	6842298.396	2965488.434
14	6842164.400	2965353.744
15	6842300.505	2965493.389
16	6842296.979	2965489.845

SE RAISED MEDIAN AND RAMP DETAILS		
POINT	NORTHING	EASTING
1	6842390.772	2965558.605
2	6842394.298	2965562.149
3	6842399.005	2965566.880
4	6842435.720	2965603.786
5	6842433.430	2965606.995
6	6842399.774	2965595.587
7	6842393.648	2965594.470
8	6842388.715	2965593.768
9	6842382.520	2965593.134
10	6842347.018	2965594.709
11	6842345.449	2965591.163
12	6842354.405	2965583.836
13	6842359.844	2965579.057
14	6842363.526	2965575.670
15	6842368.219	2965571.163
16	6842380.874	2965558.579
17	6842385.828	2965556.542
18	6842385.209	2965614.812
19	6842391.100	2965616.001
20	6842389.062	2965626.783
21	6842389.062	2965657.237
22	6842384.062	2965657.730
23	6842384.112	2965626.080

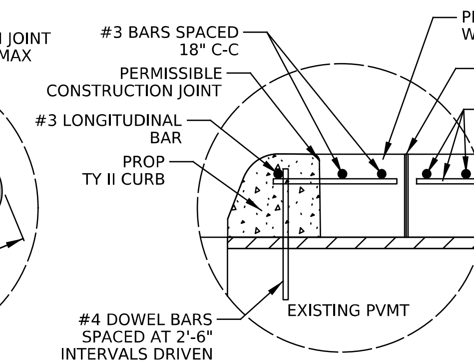


RAISED RIGHT TURN CHANNELIZING ISLAND AND RAMP DETAILS



DETAIL A

NOT TO SCALE



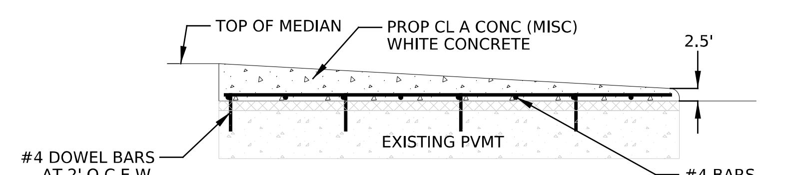
DETAIL B

NOT TO SCALE

PROPOSED SIDEWALK

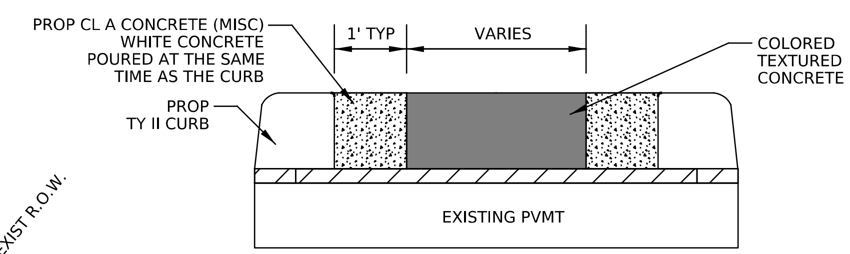
PROPOSED PED CURB RAMP
8.3% MAX RUNNING SLOPE
2.0% MAX CROSS SLOPE

0 2.5 5
SCALE: 1"=5'



MEDIAN NOSE DETAIL

NOT TO SCALE



RAISED RIGHT TURN CHANNELIZING ISLAND TYPICAL SECTION

1. MEDIAN TO BE FULL DEPTH CL A (MISC) WHITE CONCRETE.
2. COLORED TEXTURED CONC SHALL BE COLORED WITH RED CHROME-CRETE INTEGRAL COLOR, AS MANUFACTURED BY:
   SPECIALTY CONCRETE PRODUCTS
   PO BOX 2922
   WEST COLUMBIA, SC 29171
   800-533-4702
   (OR APPROVED EQUIVALENT)
3. THE COLOR CONCRETE SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. CL A CONCRETE (MEDIAN) SHALL BE STAMPED OR ROLLED WITH A RUNNING BOND PATTERN.
5. THE INSTALLATION CONTRACTOR SHALL HAVE A MINIMUM OF 3 YEARS EXPERIRENCE IN THE INSTALLATION OF CONCRETE AND TEXTURIZING.

STATE OF TEXAS
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4/30/24

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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PEDESTRIAN FACILITY DETAILS

US 271 AT NE LOOP 323 EXTENSION

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	SEE TITLE SHEET		US 271, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	40

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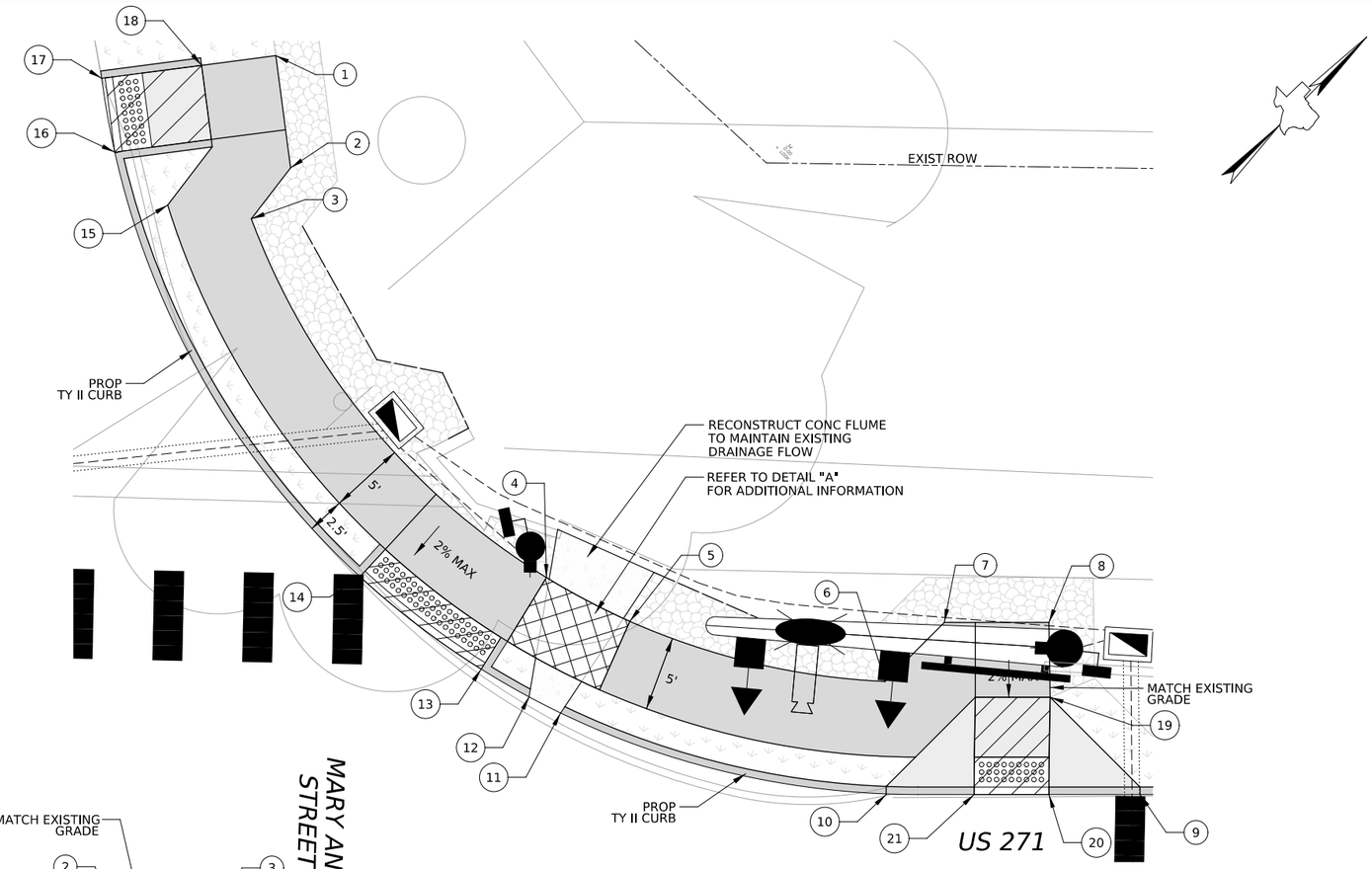
REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.

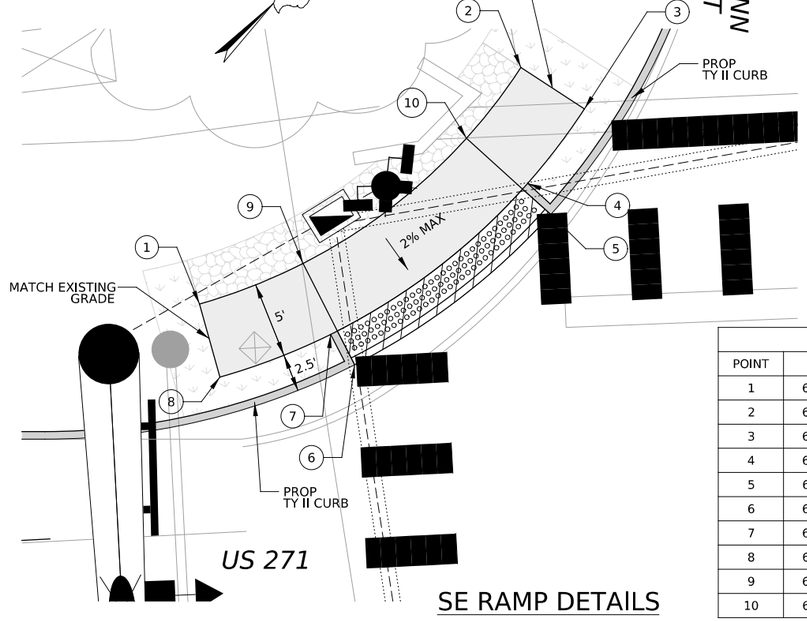
MARY ANN STREET

NE RAMP DETAILS		
POINT	NORTHING	EASTING
1	6842446.071	2965436.488
2	6842441.563	2965442.570
3	6842437.323	2965443.200
4	6842434.846	2965474.133
5	6842436.820	2965480.107
6	6842446.292	2965494.852
7	6842451.876	2965494.755
8	6842456.905	2965499.613
9	6842453.288	2965512.106
10	6842441.120	2965500.295
11	6842429.242	2965481.303
12	6842428.470	2965479.064
13	6842427.457	2965475.502
14	6842425.929	2965465.446
15	6842433.941	2965438.649
16	6842433.830	2965433.696
17	6842436.648	2965429.505
18	6842442.054	2965433.511
19	6842453.489	2965503.264
20	6842448.915	2965507.882
21	6842445.319	2965504.409



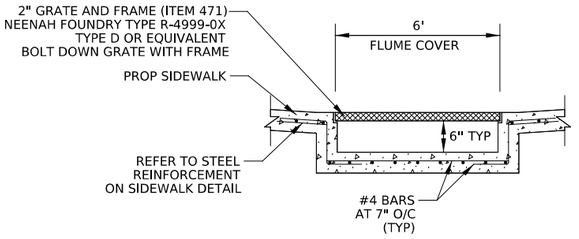
NE RAMP DETAILS

MARY ANN STREET



SE RAMP DETAILS

SE RAMP DETAILS		
POINT	NORTHING	EASTING
1	6842363.186	2965408.980
2	6842388.979	2965414.325
3	6842389.749	2965419.265
4	6842383.588	2965419.773
5	6842383.081	2965422.271
6	6842367.058	2965419.274
7	6842367.489	2965416.761
8	6842360.517	2965413.207
9	6842369.750	2965412.274
10	6842383.102	2965414.772



1. CONCRETE AND REBAR FOR FRAME AND COVER INCIDENTAL TO THE SIDEWALK.
2. CONTRACTOR TO FIELD VERIFY EXISTING DEPTH AND MATCH EXISTING FLOW ELEVATION.
3. ANGLED STEEL MUST BE PARALLEL AND APPROVED BY THE ENGINEER. CONTRACTOR TO ENSURE BOLT DOWN LIDS LAY FLAT ON ALL FOUR CORNERS AT BOLT LOCATIONS.

DETAIL "A"
NOT TO SCALE

PROPOSED SIDEWALK

PROPOSED PED CURB RAMP
8.3% MAX RUNNING SLOPE
2.0% MAX CROSS SLOPE

0 2.5 5
SCALE: 1"=5'

STATE OF TEXAS
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HIGHWAY SAFETY IMPROVEMENT PROGRAM

PEDESTRIAN FACILITY DETAILS

US 271 AT NE LOOP 323 EXTENSION

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 41

REV DATE: 5/1/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\proj\AVO\55000s\55903\001\0191-01-09604 - DesignMaster Design Files_SHEETS_PAVE_DET-55903.dgn

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

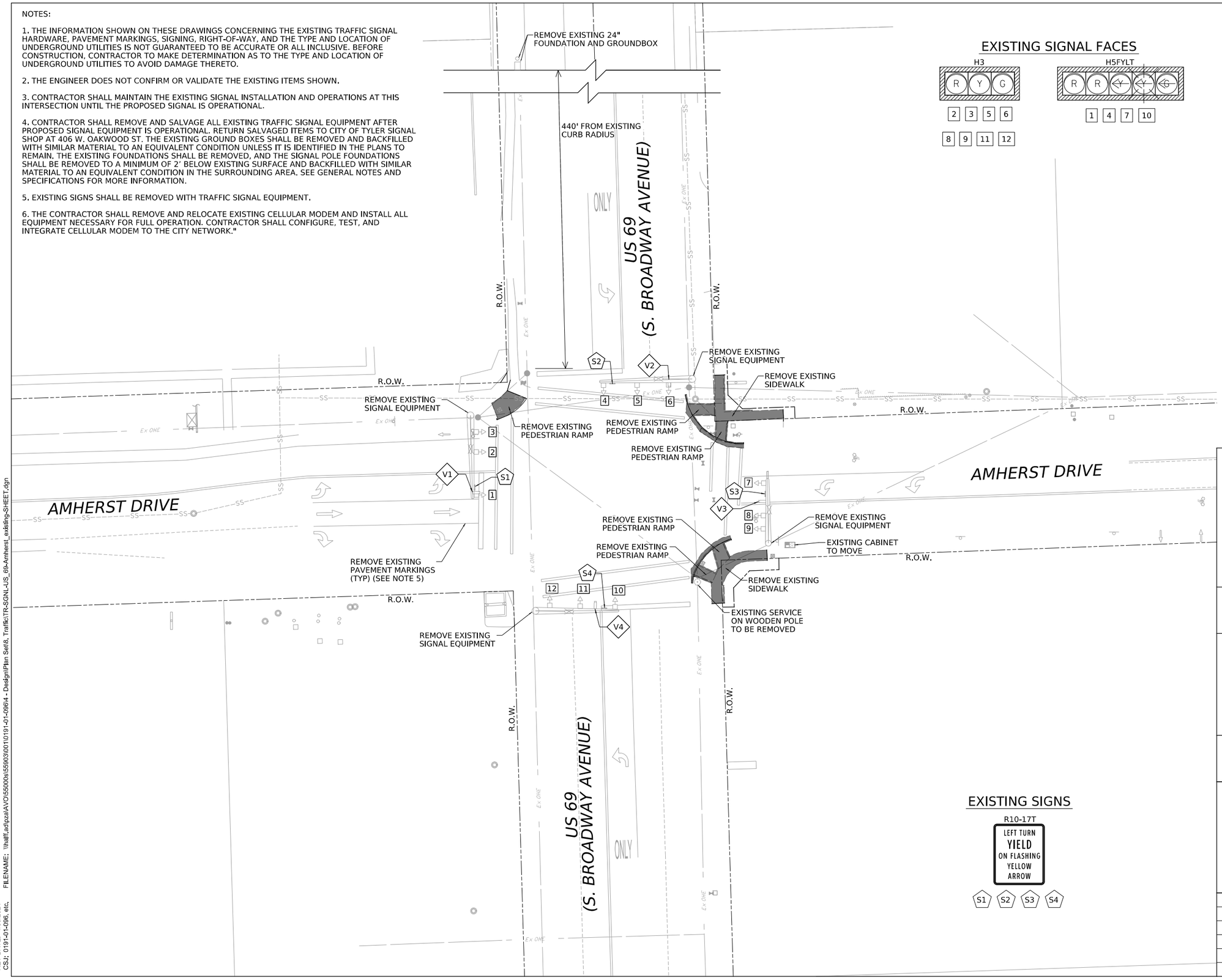
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.

4. CONTRACTOR SHALL REMOVE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. RETURN SALVAGED ITEMS TO CITY OF TYLER SIGNAL SHOP AT 406 W. OAKWOOD ST. THE EXISTING GROUND BOXES SHALL BE REMOVED AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION UNLESS IT IS IDENTIFIED IN THE PLANS TO REMAIN. THE EXISTING FOUNDATIONS SHALL BE REMOVED, AND THE SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION IN THE SURROUNDING AREA. SEE GENERAL NOTES AND SPECIFICATIONS FOR MORE INFORMATION.

5. EXISTING SIGNS SHALL BE REMOVED WITH TRAFFIC SIGNAL EQUIPMENT.

6. THE CONTRACTOR SHALL REMOVE AND RELOCATE EXISTING CELLULAR MODEM AND INSTALL ALL EQUIPMENT NECESSARY FOR FULL OPERATION. CONTRACTOR SHALL CONFIGURE, TEST, AND INTEGRATE CELLULAR MODEM TO THE CITY NETWORK."



EXISTING SIGNAL FACES

0 10 20 40

SCALE: 1"=40'

LEGEND

- EXISTING ROW
- EXISTING METAL POLE AND MAST ARM
- EXISTING TRAFFIC SIGN ON MAST ARM
- EXISTING TRAFFIC SIGNAL HEAD
- EXISTING VIVDS CAMERA
- EXISTING LUMINAIRE
- EXISTING ELECTRICAL SERVICE
- EXISTING CONTROLLER CABINET
- PAVEMENT REMOVAL
- EX OHE — EXISTING OVERHEAD ELECTRIC LINE
- EX W — EXISTING WATER LINE
- SS — EXISTING STORMSEWER LINE

EXISTING SIGNS

R10-17T

LEFT TURN YIELD ON FLASHING YELLOW ARROW

S1 S2 S3 S4

STATE OF TEXAS
ANTHONY X. RAGLAND
123267
LICENSED PROFESSIONAL ENGINEER

4/30/24

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CITY OF TYLER
A Natural Setting

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

EXISTING CONDITIONS US 69 AT AMHERST DRIVE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 42

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pza\AVO\55000s\55903\001\191-01-09604 - Design\Plan Set\6. Traffic\TR-SIGNL_US_69-Amherst_existing-SHEET.dgn

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.

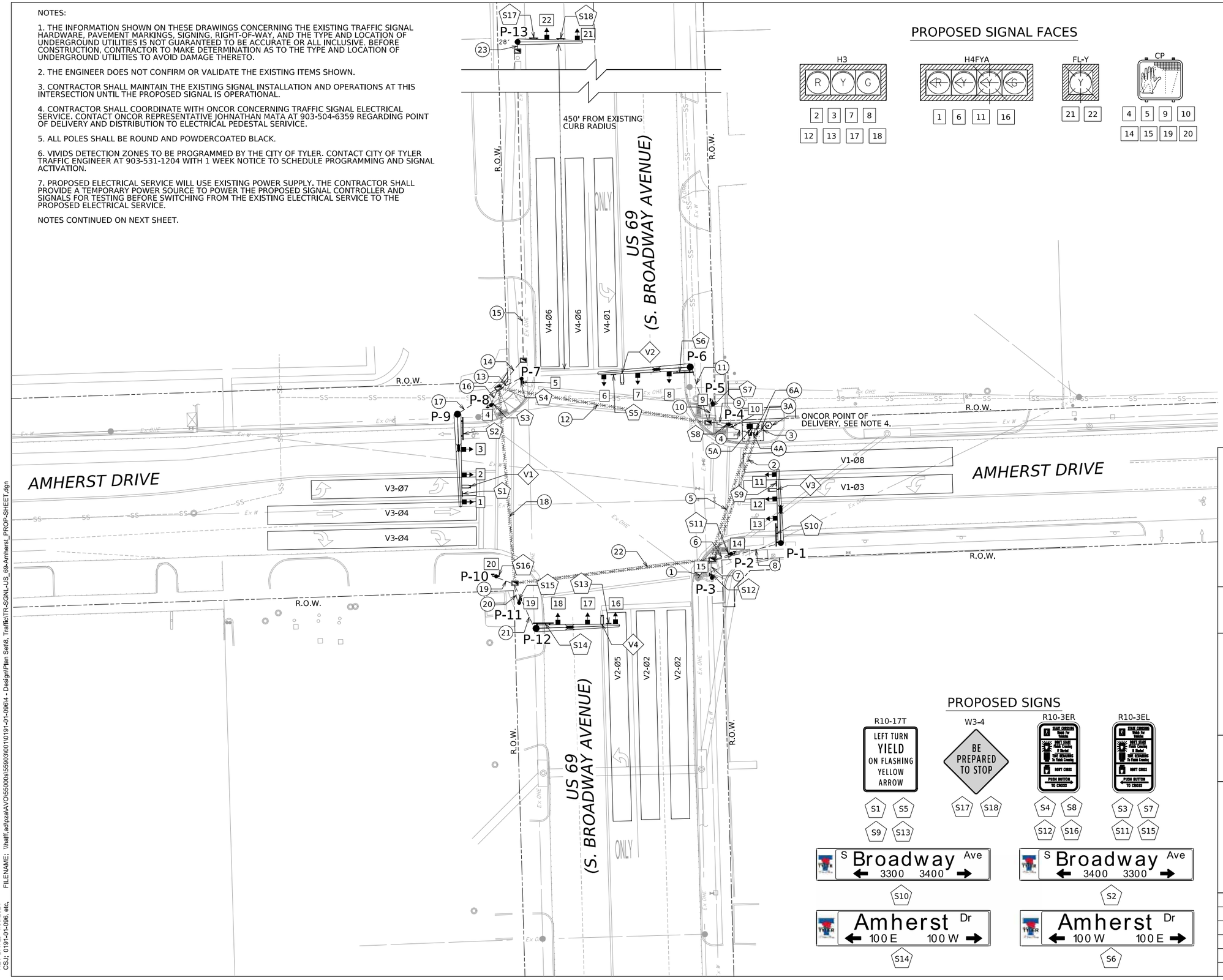
4. CONTRACTOR SHALL COORDINATE WITH ONCOR CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT ONCOR REPRESENTATIVE JOHNATHAN MATA AT 903-504-6359 REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL PEDESTAL SERIVICE.

5. ALL POLES SHALL BE ROUND AND POWDERCOATED BLACK.

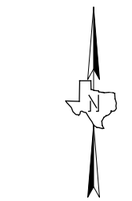
6. VIVIDS DETECTION ZONES TO BE PROGRAMMED BY THE CITY OF TYLER. CONTACT CITY OF TYLER TRAFFIC ENGINEER AT 903-531-1204 WITH 1 WEEK NOTICE TO SCHEDULE PROGRAMMING AND SIGNAL ACTIVATION.

7. PROPOSED ELECTRICAL SERVICE WILL USE EXISTING POWER SUPPLY. THE CONTRACTOR SHALL PROVIDE A TEMPORARY POWER SOURCE TO POWER THE PROPOSED SIGNAL CONTROLLER AND SIGNALS FOR TESTING BEFORE SWITCHING FROM THE EXISTING ELECTRICAL SERVICE TO THE PROPOSED ELECTRICAL SERVICE.

NOTES CONTINUED ON NEXT SHEET.



PROPOSED SIGNAL FACES



0 10 20 40

SCALE: 1"=40'

LEGEND

- ROW
- METAL POLE AND MAST ARM
- TRAFFIC SIGN ON MAST ARM
- TRAFFIC SIGNAL HEAD
- VIVDS CAMERA
- LUMINAIRE
- GROUND BOX (TYPE D) WITH APRON
- ELECTRICAL SERVICE
- GROUND MOUNTED CONTROLLER CABINET
- GROUND MOUNTED SIGN
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- PEDESTRIAN SIGNAL HEAD
- PEDESTAL POLE
- PEDESTRIAN DETECTION BUTTON
- EX OHE — EXISTING OVERHEAD ELECTRIC LINE
- EX W — EXISTING WATER LINE
- SS — EXISTING STORMSEWER LINE

PROPOSED SIGNS

ANTHONY X. RAGLAND
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4/30/24

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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED CONDITIONS US 69 AT AMHERST DRIVE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 43

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
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TRAFFIC SIGNAL CONDUIT SUMMARY

WIRE SIZE AND TYPE

RUN NO. / POLE NO.	CONDUIT STATUS	ITEM 618 CONDUIT (SCH 80)												CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS								ITEM 684 TRAFFIC SIGNAL CABLES								ITEM 6306		TOTAL LENGTH OF RUN	RUN NO. / POLE NO.
		2" PVC (RISER)		2" PVC (TRENCHED)		2" PVC (BORED)		3" PVC (TRENCHED)		4" PVC (TRENCHED)		4" PVC (BORED)			NO. 6 XHHW WIRE		NO. 6 BARE WIRE		NO. 8 XHHW WIRE		NO. 12 XHHW WIRE		TY C 2 CNDR. 12 AWG		TY A 5 CNDR. 14 AWG		TY A 7 CNDR. 14 AWG		TY A 20 CNDR. 14 AWG		VIVDS CABLE			
		QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN		QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN		
1	I	1	10											I	TO BE INSTALLED BY OTHERS																		10	1
2	I					1	60							I	TO BE INSTALLED BY OTHERS																		60	2
3	I			1	5									I	TO BE INSTALLED BY OTHERS																		5	3
3A	I			1	5									I	2	10	1	5	2	10	2	10											5	3A
4	I							1	20					I			1	20	2	40	4	80							2	40	2	40	20	4
4A	I			1	5									I			1	5	4	20													5	4A
5	I											1	55	I			1	55	2	110									2	110	2	110	55	5
5A	I									2	10			I			2	10					8	40					4	20	4	20	5	5A
6	I			1	10									I			1	10					1	10	1	10							10	6
6A	I			1	5									I	2	10	1	5															5	6A
7	I			1	10									I			1	10					1	10	1	10							10	7
8	I							1	30					I			1	30	2	60					2	60			1	30	1	30	30	8
9	I			1	10									I			1	10					1	10	1	10							10	9
10	I			1	10									I			1	10					1	10	1	10							10	10
11	I							1	25					I			1	25	2	50					2	50			1	25	1	25	25	11
12	I					1	90					1	90	I			2	180	2	180	4	360	2	180					1	90	1	90	90	12
13	I			1	10									I			1	10					1	10	1	10							10	13
14	I							1	15					I			1	15			4	60											15	14
15	I					1	445							I			1	445			4	1780											445	15
16	I			1	10									I			1	10					1	10	1	10							10	16
17	I							1	20					I			1	20	2	40					2	40			1	20	1	20	20	17
18	I											1	85	I			1	85					4	340									85	18
19	I			1	10									I			1	10					1	10	1	10							10	19
20	I			1	10									I			1	10					1	10	1	10							10	20
21	I							1	20					I			1	20	2	40			2	40	2	40			1	20	1	20	20	21
22	I											1	85	I			1	85	2	170									1	85	1	85	85	22
23	I			1	5			1	5					I			1	5			4	20											5	23
SUBTOTAL			10		105		595		135		10		315			20		1090		720		2310		680		270		0		440		440		
P-1	P													I						80						70		50				45	VARIES	P-1
P-2	P													I										5		10							VARIES	P-2
P-3	P													I										5		10							VARIES	P-3
P-4	P													I										5		10							VARIES	P-4
P-5	P													I										5		10							VARIES	P-5
P-6	P													I						80						70		60				55	VARIES	P-6
P-7	P													I										5		10							VARIES	P-7
P-8	P													I										5		10							VARIES	P-8
P-9	P													I						80						80		60				55	VARIES	P-9
P-10	P													I										5		10							VARIES	P-10
P-11	P													I										5		10							VARIES	P-11
P-12	P													I						80						70		55				55	VARIES	P-12
P-13	P													I							2	80											VARIES	P-13
SUBTOTAL			0		0		0		0		0		0			0		0		320		80		40		370		225		0		210		
PROJECT TOTAL			10		105		595		135		10		315			20		1090		1040		2390		720		640		225		440		650		

CONDUIT STATUS: I=INSTALL; E=EXISTING; P=WIRE TO BE INSTALLED INSIDE STELL POLE; ABANDON; REM=REMOVE AND SALVAGE

P-# - REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM

* - THE CONTRACTOR SHALL INSTALL A 2" PVC CONDUIT FROM THE POINT OF DELIVERY TO THE PEDESTAL METER. ONCOR WILL INSTALL THE ELECTRICAL CONDUCTORS FROM THE POINT OF DELIVERY TO THE PEDESTAL METER.

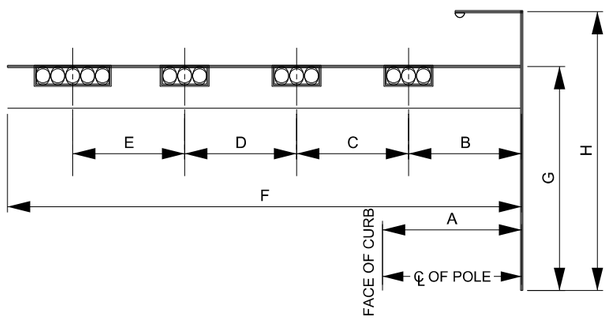
SIGNAL HEAD AND POLE PLACEMENT (LF)

POLE NUMBER	STATUS	A	B	C	D	E	F	G	H	NO. OF SIGNAL HEADS	ITEM 6306 VIVDS DETECTION	LUM	DRILLED SHAFT LENGTH (LF) 24" DIA SUB TO ITEM 687	30" DIA TYPE A ITEM 416	36" DIA TYPE A ITEM 416	48" DIA TYPE A ITEM 416	FDN TYPE WIND ZONE 80 MPH
		LF	LF	LF	LF	LF	LF	LF	LF	EA	EA						
P-1	I	4	11	8	11	-	32	19	30	3	1	Y	-	11	-	-	30-A
P-2	I	6	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-3	I	8	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-4	I	9	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-5	I	10	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-6	I	3	9	14	15	-	40	19	30	3	1	Y	-	-	13	-	36-A
P-7	I	5	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-8	I	7	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-9	I	4	15	11	12	-	40	19	30	3	1	Y	-	-	13	-	36-A
P-10	I	10	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-11	I	10	PEDESTRIAN POLE SIGNAL					10	-	-	-	N	6	-	-	-	24-A
P-12	I	4	10	13	12	-	36	19	30	3	1	Y	-	-	13	-	36-A
P-13	I	4	13	13	-	-	28	19	20	2	-	N	-	11	-	-	30-A
													48	22	39	0	

SIGNAL POLE STATUS: I=INSTALL; E=EXISTING; REM=REMOVE; F=INSTALL IN FUTURE PHASE

ELECTRICAL SERVICE DESCRIPTION

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION [SEE ED(5)-14]	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMP	TWO-POLE CONTACTOR AMPS	PANEL BD. / LOAD CENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES-01	TYPE D (120/240) 070 (NS) SS (E) PS (U)	2"	3 / #4	N/A	2P / 70	N/A	100	T.S.	1P / 50	40	<7.1
								LIGHTING	2P / 20	3	
								FLASHER	1P / 20	3	



VIVDS DETECTION ZONE DETAILS

DETECTION NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE (S)	DESCRIPTION
V1	SIGNAL POLE P-9	25'	WB + WBLT	PRESENCE
V2	SIGNAL POLE P-6	25'	NB + NBLT	ADVANCED + PRESENCE
V3	SIGNAL POLE P-1	25'	EB + EBLT	PRESENCE
V4	SIGNAL POLE P-12	25'	SB + SBLT	ADVANCED + PRESENCE

GROUND BOX SUMMARY

ITEM NO.	DESCRIPTION	UNIT	QTY
624	GROUND BOX TY D (162922) W/APRON	EA	8

NOTES CONTINUED:

8. ALL EQUIPMENT TO BE PROCURED AND INSTALLED BY THE CONTRACTOR, UNLESS OTHERWISE STATED. CONTRACTOR TO PROCURE EQUIPMENT LISTED BELOW, OR APPROVED EQUAL.

SUMMARY OF TRAFFIC SIGNAL EQUIPMENT		
EQUIPMENT	ITEM NO.	DESCRIPTION
DETECTION	6083	ITERIS VANTAGEVECTOR/NEXT SHELF MOUNT
CABINET	SUB TO 680	MOBOTREX ATC CABINET MODEL #TF6016TTYRTX02
BBU	6058	APC SECURE UPS W/MK5105A(4) BATTERIES
CONTROLLER	SUB TO 680	ECONOLITE COBALT 'C' CONTOLLER, RACK MOUNT
APS	688	PELCO INTELLICROSS APS SYSTEM

9. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE CITY AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.

10. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.

11. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN IN THE PLANS, THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.

12. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.

13. CONTRACTOR TO MAINTAIN FULL ACCESS TO A MINIMUM OF TWO PEDESTRIAN CROSSINGS AT ALL TIMES DURING CONSTRUCTION.

14. ALL SIGNS ARE TO BE FURNISHED AND INSTALLED BY CONTRACTOR. CONTRACTOR TO INSTALL NON-ILLUMINATED STREET NAME BLADE SIGNS ON MAST ARMS. CONTRACTOR SHALL VERIFY STREET NAME BLADE DESIGN IS MOST CURRENT CITY OF TYLER STANDARD. CONTRACTOR SHALL VERIFY BLOCK NUMBERS WITH CITY PRIOR TO FABRICATION.

15. THE CONTRACTOR SHALL REMOVE AND RELOCATE EXISTING CELLULAR MODEM AND INSTALL ALL EQUIPMENT NECESSARY FOR FULL OPERATION. CONTRACTOR SHALL CONFIGURE, TEST, AND INTEGRATE CELLULAR MODEM TO THE CITY NETWORK.

16. CONDUIT CABLES 1-3 WILL BE INSTALLED BY ONCOR ELECTRIC.

STATE OF TEXAS
ANTHONY X. RAGLAND
123267
LICENSED PROFESSIONAL ENGINEER

4/30/24

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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED TRAFFIC SIGNAL DETAILS (1 OF 2) - US 69 AT AMHERST DRIVE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 44

REV DATE: 5/10/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.adjoza\AVO\55000s\55803\00\10\191-01-09604 - Design\Plan Set\8. Traffic\55803-INT1-SDT-1.dgn

CABLE TERMINATION CHART

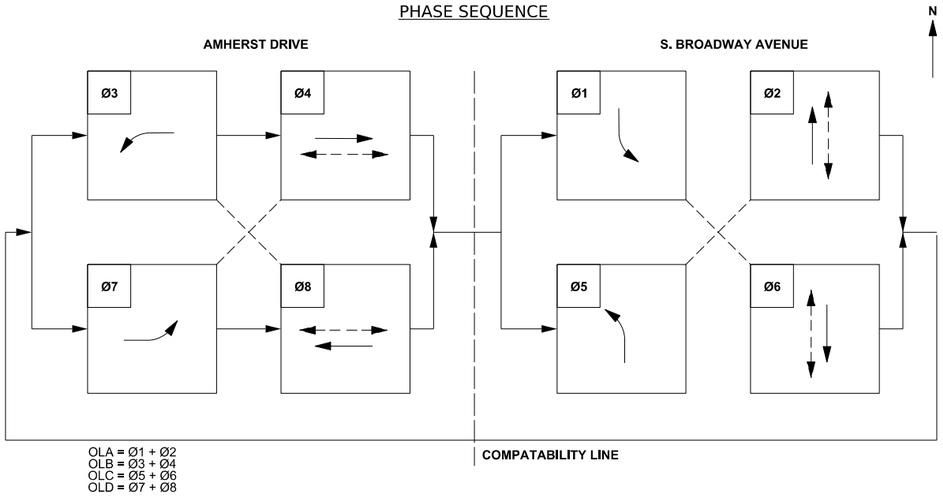
CNDR. NO.	CONDUCTOR COLOR	CABLE 1 20 CNDR. FROM P-1 TO CNTRL.	CABLE 2 20 CNDR. FROM P-6 TO CNTRL.	CABLE 3 20 CNDR. FROM P-9 TO CNTRL.	CABLE 4 20 CNDR. FROM P-12 TO CNTRL.
1	BLACK	SPARE	SPARE	SPARE	SPARE
2	WHITE	COMM	COMM	COMM	COMM
3	RED	SH 12, 13 - Ø4 R	SH 7, 8 - Ø2 R	SH 2, 3 - Ø8 R	SH 17, 18 - Ø6 R
4	GREEN	SH 12, 13 - Ø4 G	SH 7, 8 - Ø2 G	SH 2, 3 - Ø8 G	SH 17, 18 - Ø6 G
5	ORANGE	SH 12, 13 - Ø4 Y	SH 7, 8 - Ø2 Y	SH 2, 3 - Ø8 Y	SH 17, 18 - Ø6 Y
6	BLUE	SPARE	SPARE	SPARE	SPARE
7	WHITE / BLACK	SPARE	SPARE	SPARE	SPARE
8	RED / BLACK	SH 11 - OLD R	SH 6 - OLC R	SH 1 - OLB R	SH 16 - OLA R
9	GREEN / BLACK	SH 11 - OLD G (LT ARW)	SH 6 - OLC G (LT ARW)	SH 1 - OLB G (LT ARW)	SH 16 - OLA G (LT ARW)
10	ORANGE / BLACK	SH 11 - OLD SY (LT ARW)	SH 6 - OLC SY (LT ARW)	SH 1 - OLB SY (LT ARW)	SH 16 - OLA SY (LT ARW)
11	BLUE / BLACK	SH 11 - OLD FY (LT ARW)	SH 6 - OLC FY (LT ARW)	SH 1 - OLB FY (LT ARW)	SH 16 - OLA FY (LT ARW)
12	BLACK / WHITE	SPARE	SPARE	SPARE	SPARE
13	RED / WHITE	SH 14 - Ø2 DW	SH 10 - Ø2 DW	SH 4 - Ø6 DW	SH 20 - Ø6 DW
14	GREEN / WHITE	SH 14 - Ø2 W	SH 10 - Ø2 W	SH 4 - Ø6 W	SH 20 - Ø6 W
15	BLUE / WHITE	SPARE	SPARE	SPARE	SPARE
16	BLACK / RED	SH 15 - Ø4 DW	SH 9 - Ø8 DW	SH 5 - Ø8 DW	SH 19 - Ø4 DW
17	WHITE / RED	SH 15 - Ø4 W	SH 9 - Ø8 W	SH 5 - Ø8 W	SH 19 - Ø4 W
18	ORANGE / RED	SPARE	SPARE	SPARE	SPARE
19	BLUE / RED	SPARE	SPARE	SPARE	SPARE
20	RED / GREEN	SPARE	SPARE	SPARE	SPARE

APS MESSAGE CHART

POLE NUMBER	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE / SOUND DETAILS
P-2	Ø2	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS AMHERST DRIVE AT BROADWAY AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-4	Ø2	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS AMHERST DRIVE AT BROADWAY AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-3	Ø4	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS BROADWAY AVENUE AT AMHERST DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-11	Ø4	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS BROADWAY AVENUE AT AMHERST DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-8	Ø6	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS AMHERST DRIVE AT BROADWAY AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-10	Ø6	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS AMHERST DRIVE AT BROADWAY AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-5	Ø8	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS BROADWAY AVENUE AT AMHERST DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-7	Ø8	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS BROADWAY AVENUE AT AMHERST DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

PHASE SEQUENCE



OLA = Ø1 + Ø2
OLB = Ø3 + Ø4
OLC = Ø5 + Ø6
OLD = Ø7 + Ø8

SIGNAL HEADS

SIGNAL HEAD NUMBER	SIGNAL HEAD TYPE	12" LED SIGNAL INDICATION									PED SIG SEC (LED) (COUNTDOWN)
		BACK PLATE			LED SIGNAL LAMPS						
		3 SEC	4 SEC	5 SEC	< - G -	G	< - Y -	Y	< - R -	R	
		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
1	H4FYA		1		1		2		1		
2	H3	1				1		1		1	
3	H3	1				1		1		1	
4	CP										1
5	CP										1
6	H4FYA		1		1		2		1		
7	H3	1				1		1		1	
8	H3	1				1		1		1	
9	CP										1
10	CP										1
11	H4FYA		1		1		2		1		
12	H3	1				1		1		1	
13	H3	1				1		1		1	
14	CP										1
15	CP										1
16	H4FYA		1		1		2		1		
17	H3	1				1		1		1	
18	H3	1				1		1		1	
19	CP										1
20	CP										1
21	FL-Y							1			
22	FL-Y							1			
PROJECT TOTAL		8	4	0	4	8	8	10	4	8	8

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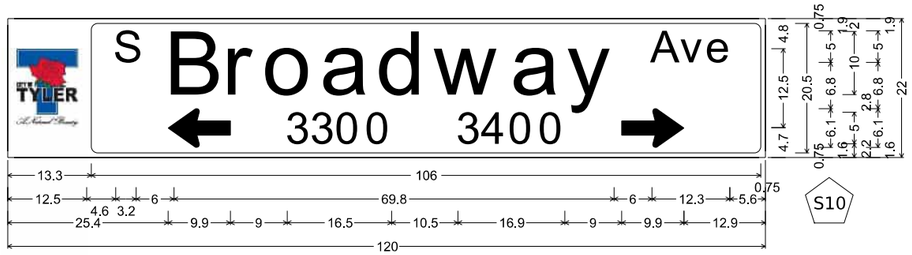
Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

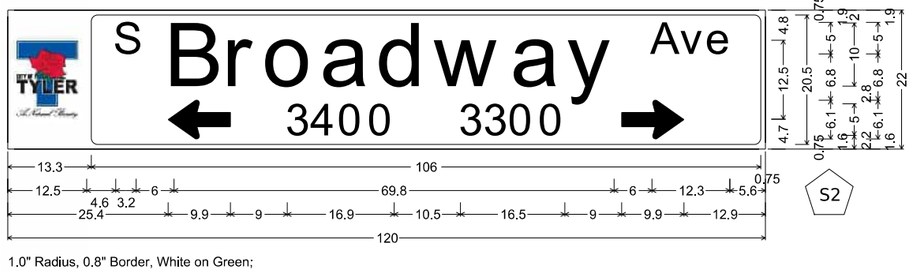
PROPOSED TRAFFIC SIGNAL DETAILS (2 OF 2) - US 69 AT AMHERST DRIVE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 45

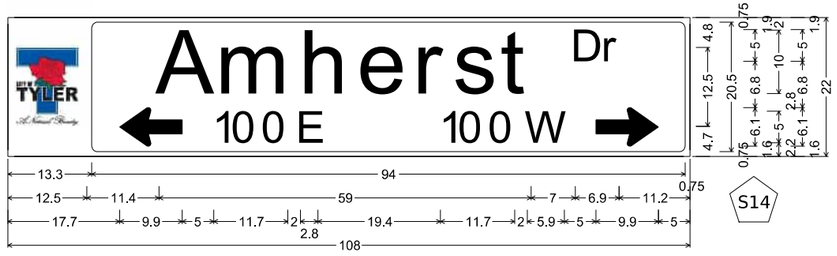
REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.adjoza\AVO\55000s\55903\00\10\191-01-09604 - Design\Plan Set\6. Traffic\55903-INT1-SDT-2.dgn



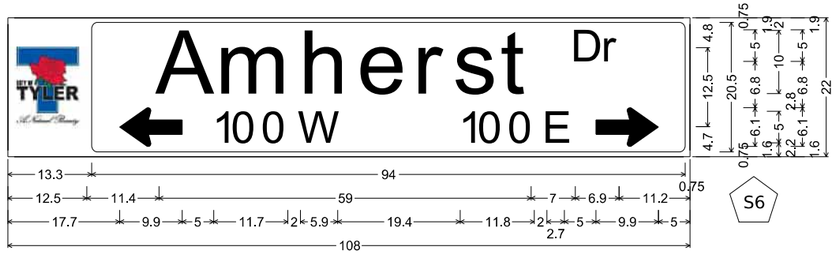
1.0" Radius, 0.8" Border, White on Green;
"S", ClearviewHwy-3-W; "Broadway", ClearviewHwy-3-W; "Ave", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 180°; "3300", ClearviewHwy-3-W; "3400", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"S", ClearviewHwy-3-W; "Broadway", ClearviewHwy-3-W; "Ave", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 180°; "3400", ClearviewHwy-3-W; "3300", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"Amherst", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 180°;
"100", ClearviewHwy-3-W; "E", ClearviewHwy-3-W; "100", ClearviewHwy-3-W; "W", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"Amherst", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 180°;
"100", ClearviewHwy-3-W; "W", ClearviewHwy-3-W; "100", ClearviewHwy-3-W; "E", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 0°;

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pza\AVO\55000s\55903\00\10191-01-09\64 - Design\Plan Set\8_Traffic\559003NT1-SIGN DETAILS.dgn

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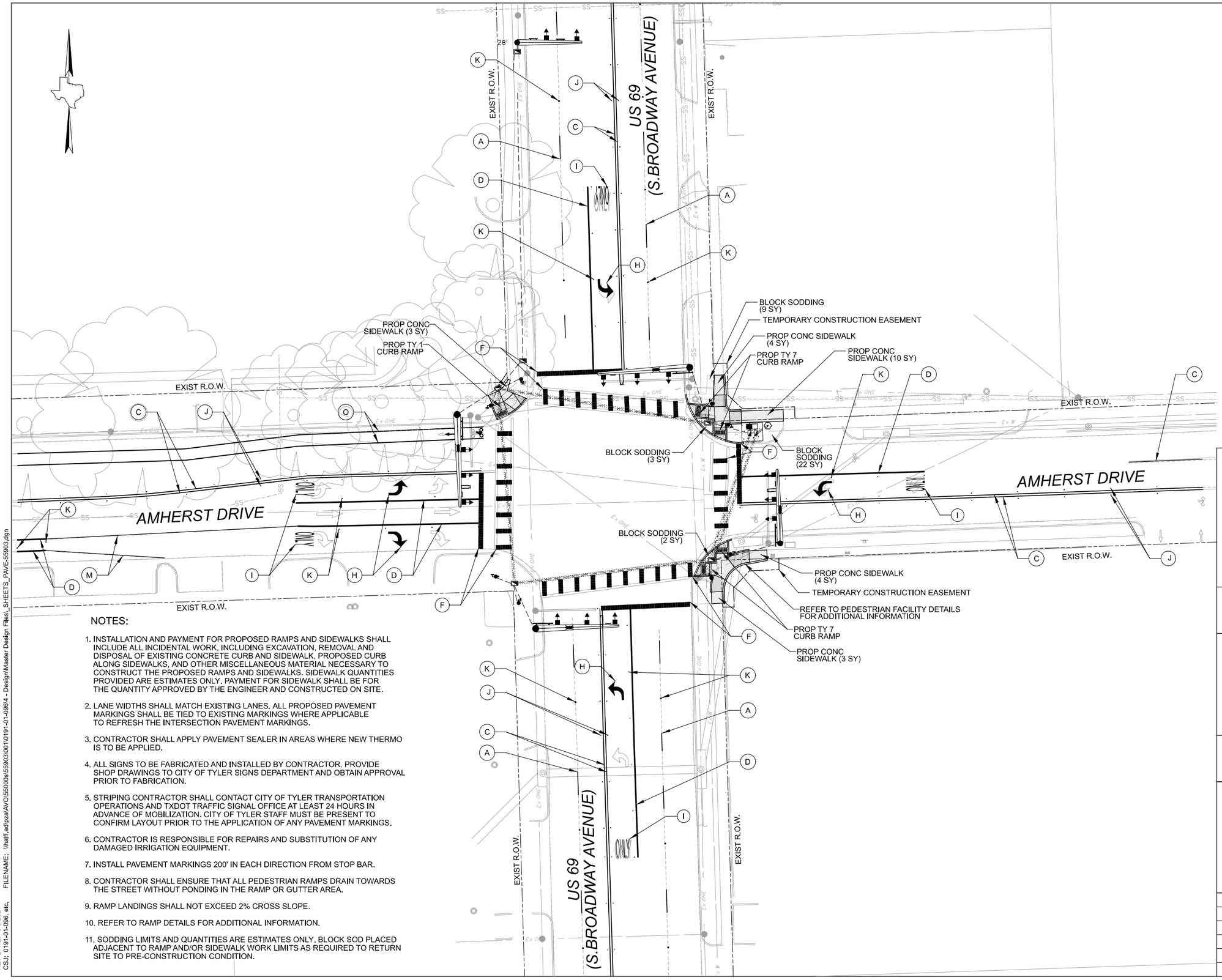
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED SIGNAGE DETAILS - US 69 AT AMHERST DRIVE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 46



LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (H) PREFAB PAV MRK TY C (W)(ARROW)
- (I) PREFAB PAV MRK TY C (W)(WORD)
- (J) REFL PAV MRK TY II A-A
- (K) REFL PAV MRK TY I-C
- (M) REFL PAV MRK TY I (W)6"(DOT)(100MIL)
- (O) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- [X] PROPOSED SMALL SIGN
- PROPOSED SIDEWALK
- PROPOSED PED CURB RAMP
- SODDING

0 20 40
HORIZONTAL SCALE IN FEET

NOTES:

1. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS. SIDEWALK QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAYMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE TO REFRESH THE INTERSECTION PAVEMENT MARKINGS.
3. CONTRACTOR SHALL APPLY PAVEMENT SEALER IN AREAS WHERE NEW THERMO IS TO BE APPLIED.
4. ALL SIGNS TO BE FABRICATED AND INSTALLED BY CONTRACTOR. PROVIDE SHOP DRAWINGS TO CITY OF TYLER SIGNS DEPARTMENT AND OBTAIN APPROVAL PRIOR TO FABRICATION.
5. STRIPING CONTRACTOR SHALL CONTACT CITY OF TYLER TRANSPORTATION OPERATIONS AND TXDOT TRAFFIC SIGNAL OFFICE AT LEAST 24 HOURS IN ADVANCE OF MOBILIZATION. CITY OF TYLER STAFF MUST BE PRESENT TO CONFIRM LAYOUT PRIOR TO THE APPLICATION OF ANY PAVEMENT MARKINGS.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTION OF ANY DAMAGED IRRIGATION EQUIPMENT.
7. INSTALL PAVEMENT MARKINGS 200' IN EACH DIRECTION FROM STOP BAR.
8. CONTRACTOR SHALL ENSURE THAT ALL PEDESTRIAN RAMPS DRAIN TOWARDS THE STREET WITHOUT PONDING IN THE RAMP OR GUTTER AREA.
9. RAMP LANDINGS SHALL NOT EXCEED 2% CROSS SLOPE.
10. REFER TO RAMP DETAILS FOR ADDITIONAL INFORMATION.
11. SODDING LIMITS AND QUANTITIES ARE ESTIMATES ONLY. BLOCK SOD PLACED ADJACENT TO RAMP AND/OR SIDEWALK WORK LIMITS AS REQUIRED TO RETURN SITE TO PRE-CONSTRUCTION CONDITION.

REV DATE: 6/3/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pza\AVO\55000s\55903\001\0191-01-09614 - Design\Master Design Files_SHEETS_PAVE-55903.dgn

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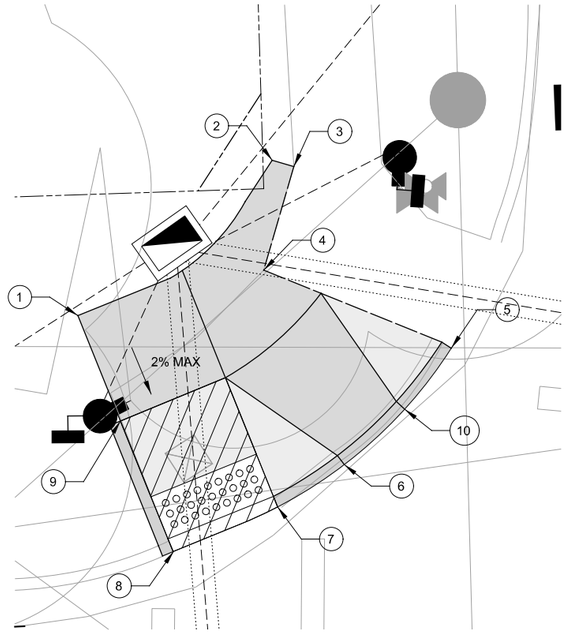
HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS

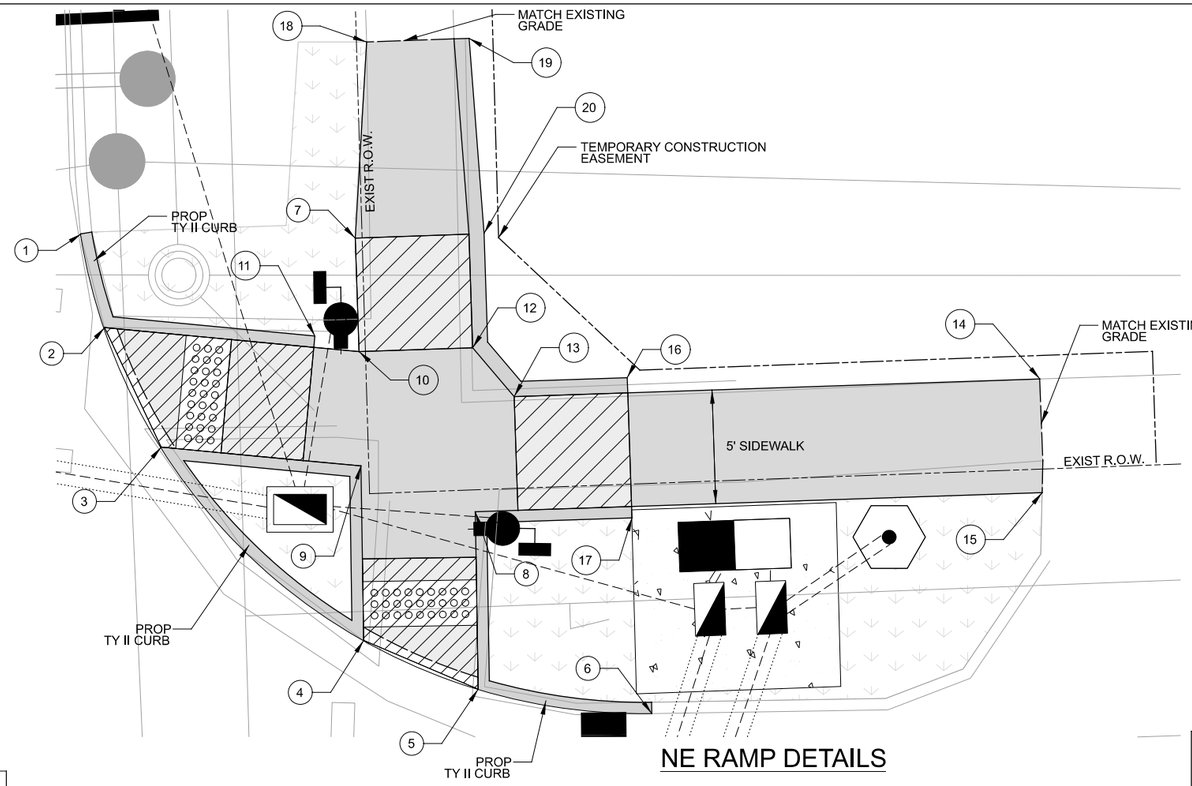
US 69 AT AMHERST DRIVE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 47

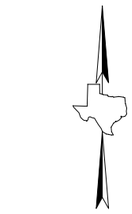


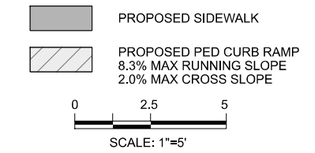
US 69
(S.BROADWAY AVENUE)

AMHERST DRIVE



NE RAMP DETAILS



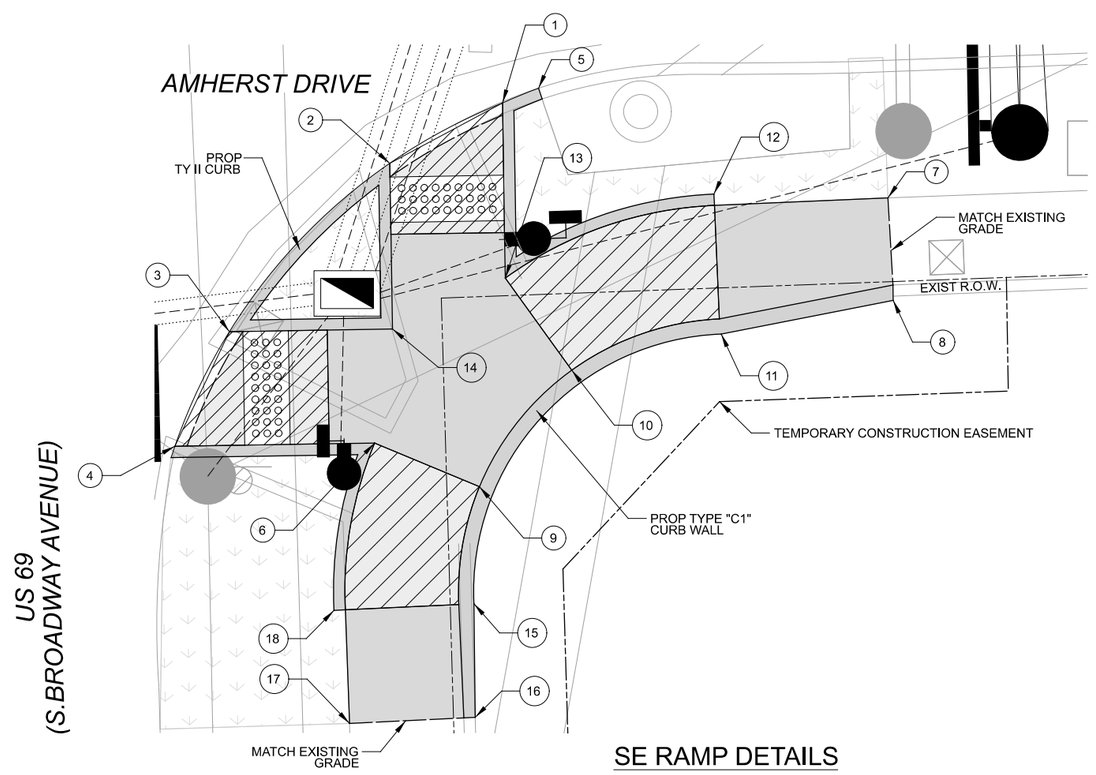


NW RAMP DETAILS

NW RAMP DETAILS		
POINT	NORTHING	EASTING
1	6811473.860	2956719.821
2	6811480.689	2956728.366
3	6811480.410	2956729.327
4	6811475.856	2956728.003
5	6811472.423	2956736.252
6	6811467.303	2956731.543
7	6811465.443	2956728.612
8	6811463.477	2956724.017
9	6811469.224	2956721.693
10	6811469.743	2956734.201

NE RAMP DETAILS		
POINT	NORTHING	EASTING
1	6811474.070	2956804.782
2	6811469.945	2956805.844
3	6811464.691	2956808.296
4	6811456.188	2956817.242
5	6811454.038	2956822.276
6	6811452.968	2956829.917
7	6811473.883	2956816.872
8	6811461.847	2956822.152
9	6811463.857	2956817.120
10	6811468.886	2956817.040
11	6811469.572	2956815.096
12	6811469.053	2956822.038
13	6811466.907	2956823.861
14	6811467.684	2956846.982
15	6811462.686	2956847.087
16	6811467.741	2956828.835
17	6811461.578	2956829.043
18	6811482.508	2956817.368
19	6811482.661	2956821.882
20	6811474.087	2956822.534

SE RAMP DETAILS		
POINT	NORTHING	EASTING
1	6811411.278	2956822.955
2	6811408.629	2956817.997
3	6811401.222	2956810.940
4	6811396.184	2956808.547
5	6811411.931	2956824.538
6	6811396.324	2956817.326
7	6811407.110	2956839.913
8	6811402.601	2956840.140
9	6811394.404	2956821.942
10	6811399.527	2956826.002
11	6811401.118	2956832.576
12	6811407.276	2956832.258
13	6811403.582	2956823.077
14	6811401.336	2956818.113
15	6811389.253	2956821.701
16	6811384.253	2956821.751
17	6811383.990	2956816.225
18	6811388.963	2956815.542



SE RAMP DETAILS

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CITY OF TYLER
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HIGHWAY SAFETY IMPROVEMENT PROGRAM

PEDESTRIAN FACILITY DETAILS

US 69 AT AMHERST DRIVE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 48

REV DATE: 5/1/2024
CSJ: 0191-01-096, etc. FILENAME: \\halff.ad\pza\AVO\55000s\55903\00110191-01-09604 - Design\Master Design Files_SHEETS_PAVE_DET-55903.dgn

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

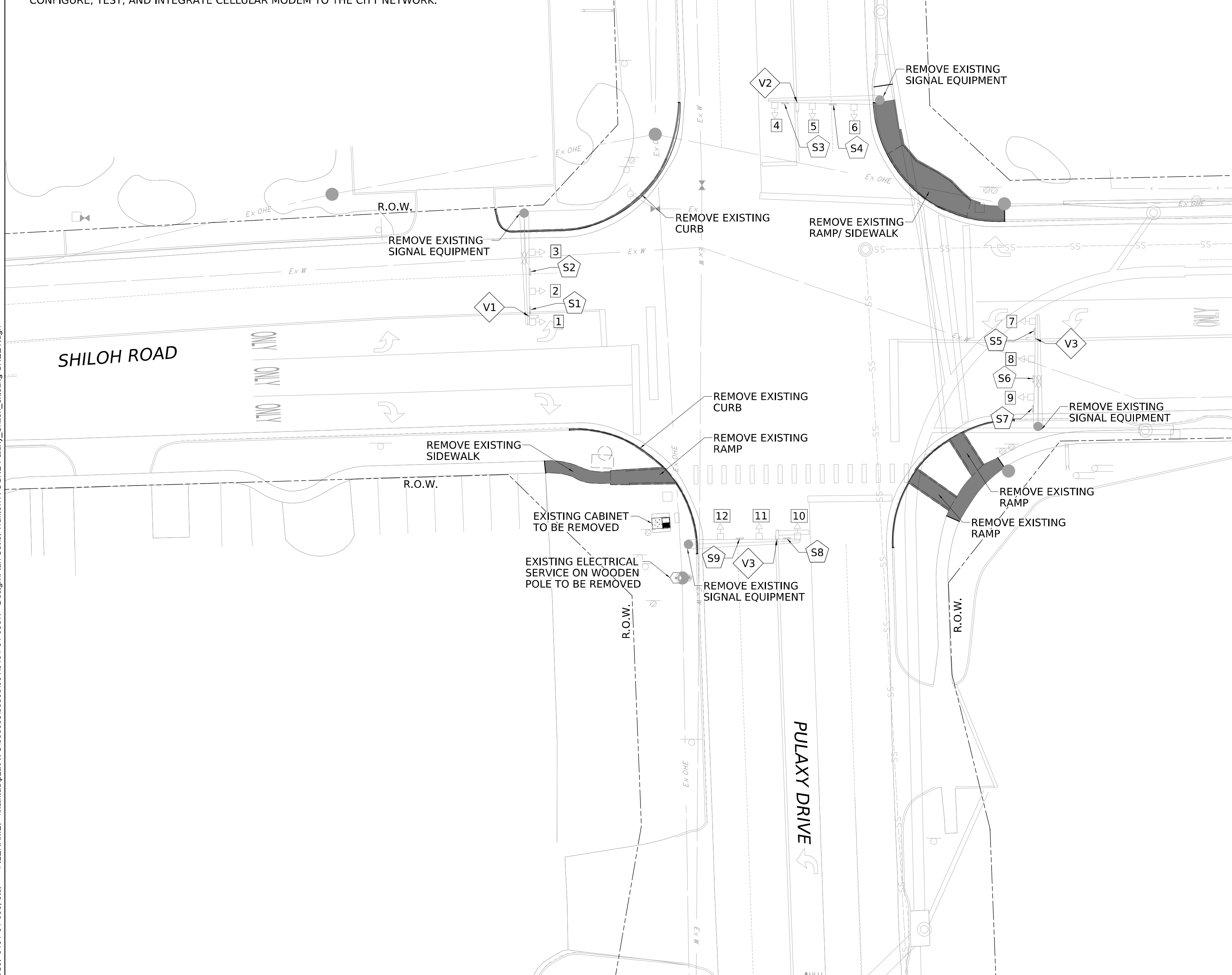
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.

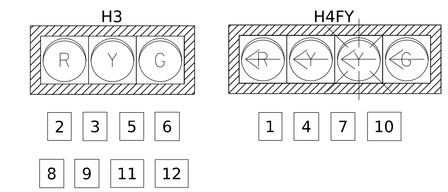
4. CONTRACTOR SHALL REMOVE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. RETURN SALVAGED ITEMS TO CITY OF TYLER SIGNAL SHOP AT 406 W. OAKWOOD ST. THE EXISTING GROUND BOXES SHALL BE REMOVED AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION UNLESS IT IS IDENTIFIED IN THE PLANS TO REMAIN. THE EXISTING FOUNDATIONS SHALL BE REMOVED, AND THE SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION IN THE SURROUNDING AREA. SEE GENERAL NOTES AND SPECIFICATIONS FOR MORE INFORMATION.

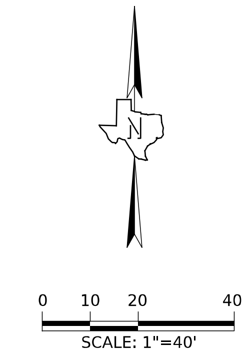
5. EXISTING SIGNS SHALL BE REMOVED WITH TRAFFIC SIGNAL EQUIPMENT.

6. THE CONTRACTOR SHALL REMOVE AND RELOCATE EXISTING CELLULAR MODEM AND INSTALL ALL EQUIPMENT NECESSARY FOR FULL OPERATION. CONTRACTOR SHALL CONFIGURE, TEST, AND INTEGRATE CELLULAR MODEM TO THE CITY NETWORK.



EXISTING SIGNAL FACES

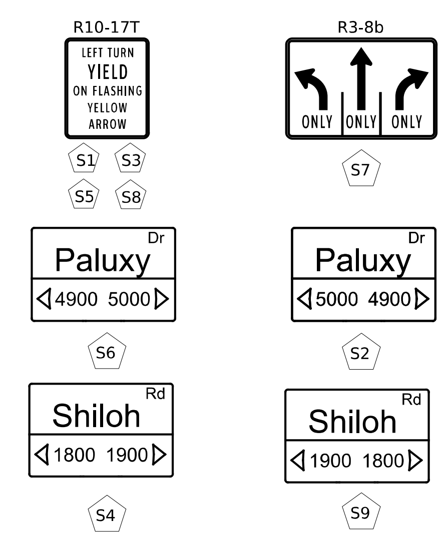




LEGEND

- EXISTING ROW
- EXISTING METAL POLE AND MAST ARM
- EXISTING TRAFFIC SIGN ON MAST ARM
- EXISTING TRAFFIC SIGNAL HEAD
- EXISTING VIVDS CAMERA
- EXISTING LUMINAIRE
- EXISTING ELECTRICAL SERVICE
- EXISTING CONTROLLER CABINET
- PAVEMENT REMOVAL
- EX OHE — EXISTING OVERHEAD ELECTRIC LINE
- EX W — EXISTING WATER LINE
- SS — EXISTING STORMSEWER LINE

EXISTING SIGNS



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Tyler District
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HIGHWAY SAFETY IMPROVEMENT PROGRAM

EXISTING CONDITIONS
FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	SEE TITLE SHEET		US 271, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	49

FILENAME: \\halff.ad\pza\AVO\55000s\55903\00\0191-01-09694 - Design\Plan Sets\8. Traffic\TR-SGNL-Paluxy_Shiloh_existing-SHEET.dgn

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.

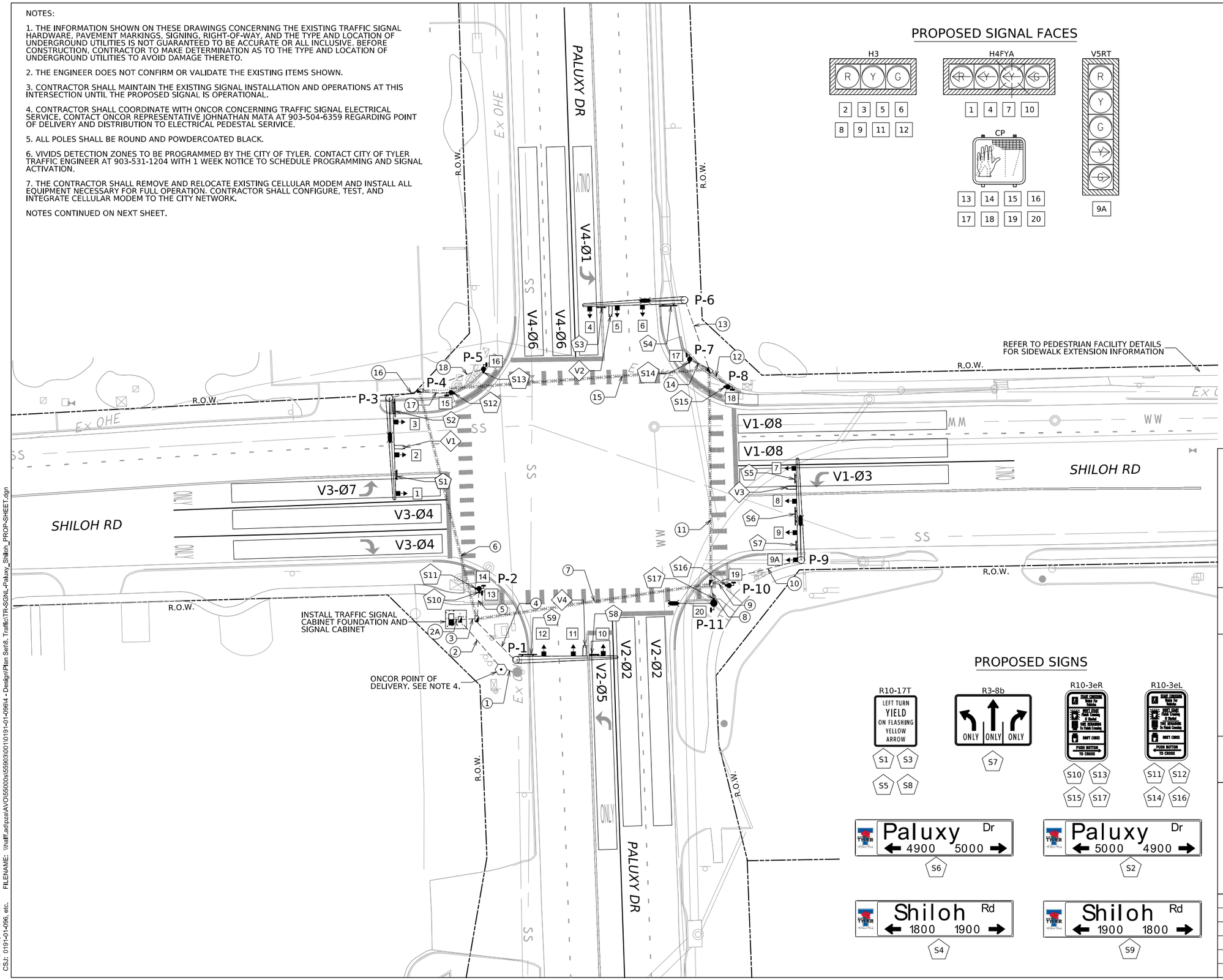
4. CONTRACTOR SHALL COORDINATE WITH ONCOR CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT ONCOR REPRESENTATIVE JOHNATHAN MATA AT 903-504-6359 REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL PEDESTAL SERIVICE.

5. ALL POLES SHALL BE ROUND AND POWDERCOATED BLACK.

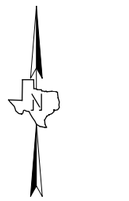
6. VIVIDS DETECTION ZONES TO BE PROGRAMMED BY THE CITY OF TYLER. CONTACT CITY OF TYLER TRAFFIC ENGINEER AT 903-531-1204 WITH 1 WEEK NOTICE TO SCHEDULE PROGRAMMING AND SIGNAL ACTIVATION.

7. THE CONTRACTOR SHALL REMOVE AND RELOCATE EXISTING CELLULAR MODEM AND INSTALL ALL EQUIPMENT NECESSARY FOR FULL OPERATION. CONTRACTOR SHALL CONFIGURE, TEST, AND INTEGRATE CELLULAR MODEM TO THE CITY NETWORK.

NOTES CONTINUED ON NEXT SHEET.



PROPOSED SIGNAL FACES



LEGEND

- ROW
- METAL POLE AND MAST ARM
- TRAFFIC SIGN ON MAST ARM
- TRAFFIC SIGNAL HEAD
- VIVDS CAMERA
- LUMINAIRE
- GROUND BOX (TYPE D) WITH APRON
- ELECTRICAL SERVICE
- GROUND MOUNTED CONTROLLER CABINET
- GROUND MOUNTED SIGN
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- PEDESTRIAN SIGNAL HEAD
- PEDESTAL POLE
- PEDESTRIAN DETECTION BUTTON
- EX OHE — EXISTING OVERHEAD ELECTRIC LINE
- EX W — EXISTING WATER LINE
- SS — EXISTING STORMSEWER LINE

PROPOSED SIGNS

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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED CONDITIONS FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 50

REV DATE: 5/10/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pzat\AVO\55000s\55590\00\10191-01-096\4 - Design\Plan Set\8. Traffic\TR-SIGNL-Paluxy_Shiloh_PROP-SHEET.dgn

TRAFFIC SIGNAL CONDUIT SUMMARY

WIRE SIZE AND TYPE

RUN NO. / POLE NO.	CONDUIT STATUS	ITEM 618 CONDUIT (SCH 80)												CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS								ITEM 684 TRAFFIC SIGNAL CABLES								ITEM 6306		TOTAL LENGTH OF RUN	RUN NO. / POLE NO.
		2" PVC (RISER)		2" PVC (TRENCHED)		2" PVC (BORED)		3" PVC (TRENCHED)		4" PVC (TRENCHED)		4" PVC (BORED)			NO. 6 XHHW WIRE		NO. 6 BARE WIRE		NO. 8 XHHW WIRE		NO. 12 XHHW WIRE		TY C 2 CNDR. 12 AWG		TY A 5 CNDR. 14 AWG		TY A 7 CNDR. 14 AWG		TY A 20 CNDR. 14 AWG		VIVDS CABLE			
		QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN		QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN	QTY	LEN		
1	I	1	5											I	TO BE INSTALLED BY OTHERS																		5	1
2	I			2	60									I	2	60	2	60	4	120													30	2
2A	I			1	5			2	10					I	2	10	3	15					8	40					4	20	4	20	5	2A
3	I			1	5			2	10					I			3	15	4	20			8	40					4	20	4	20	5	3
4	I							1	25					I			1	25							2	50			1	25	1	25	25	4
5	I			1	15									I			1	15					2	30	2	30							15	5
6	I											1	100	I			1	100	2	200			2	200					1	100	1	100	100	6
7	I											1	100	I			1	100	2	200			4	400					2	200	2	200	100	7
8	I			1	10									I			1	10	2	20			1	10	1	10							10	8
9	I			1	10									I			1	10					1	10	1	10							10	9
10	I							1	40					I			1	40	2	80					2	80			1	40	1	40	40	10
11	I											1	90	I			1	90	2	180			2	180					1	90	1	90	90	11
12	I			1	10									I			1	10					1	10	1	10							10	12
13	I							1	30					I			1	30	2	60					2	60			1	30	1	30	30	13
14	I			1	10									I			1	10					1	10	1	10							10	14
15	I											1	125	I			1	125															125	15
16	I							1	15					I			1	15	2	30					2	30			1	15	1	15	15	16
17	I			1	15									I			1	15					1	15	1	15							15	17
18	I			1	30									I			1	30					1	30	1	30							30	18
SUBTOTAL			5		170		0		130		0		415			70		715		910		0		975		335		0		540		540		
P-1	P													I												70		70				60	VARIES	P-1
P-2	P													I										10		20						VARIES	P-2
P-3	P													I						80						75		70				55	VARIES	P-3
P-4	P													I										5		10						VARIES	P-4
P-5	P													I										5		10						VARIES	P-5
P-6	P													I						80						80		70				65	VARIES	P-6
P-7	P													I										5		10						VARIES	P-7
P-8	P													I										5		10						VARIES	P-8
P-9	P													I						80						75		90				65	VARIES	P-9
P-10	P													I										5		10						VARIES	P-10
P-11	P													I						80				5		10						VARIES	P-11
SUBTOTAL			0		0		0		0		0		0			0		0		320		0		40		380		300		0		245		
PROJECT TOTAL			5		170		0		130		0		415			70		715		1230		0		1015		715		300		540		785		

CONDUIT STATUS: I=INSTALL; E=EXISTING; P=WIRE TO BE INSTALLED INSIDE STELL POLE; ABANDON; REM=REMOVE AND SALVAGE

P-# - REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM

* - THE CONTRACTOR SHALL INSTALL A 2" PVC CONDUIT FROM THE POINT OF DELIVERY TO THE PEDESTAL METER. ONCOR WILL INSTALL THE ELECTRICAL CONDUCTORS FROM THE POINT OF DELIVERY TO THE PEDESTAL METER.

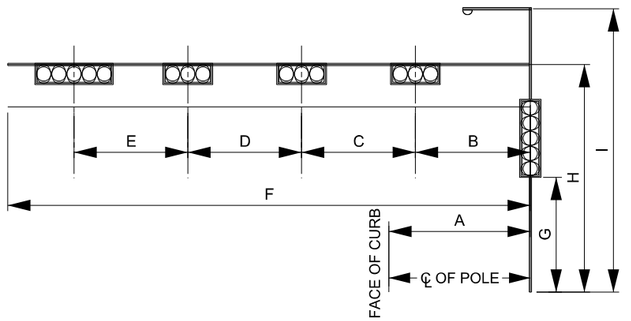
SIGNAL HEAD AND POLE PLACEMENT (LF)

POLE NUMBER	STATUS	A	B	C	D	E	F	G	H	I	NO. OF SIGNAL HEADS	ITEM 6306 VIVDS DETECTION	LUM	DRILLED SHAFT LENGTH (LF) 24" DIA SUB TO ITEM 687	30" DIA TYPE A ITEM 416	36" DIA TYPE A ITEM 416	48" DIA TYPE A ITEM 416	FDN TYPE WIND ZONE 80 MPH
		LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA						
P-1	I	6	12	13	13		44		19	20	3	1	N	-	-	13	-	36-A
P-2	I	6	PEDESTRIAN SIGNAL POLE						10	-	-	-	N	6	-	-	-	24-A
P-3	I	7	11	14	17		44		19	30	3	1	Y	-	-	13	-	36-A
P-4	I	6	PEDESTRIAN SIGNAL POLE						10	-	-	-	N	6	-	-	-	24-A
P-5	I	6	PEDESTRIAN SIGNAL POLE						10	-	-	-	N	6	-	-	-	24-A
P-6	I	11	19	11	12		44		19	30	3	1	Y	-	-	13	-	36-A
P-7	I	6	PEDESTRIAN SIGNAL POLE						10	-	-	-	N	6	-	-	-	24-A
P-8	I	6	PEDESTRIAN SIGNAL POLE						10	-	-	-	N	6	-	-	-	24-A
P-9	I	4	12	14	14		44	20	19	30	3	1	Y	-	-	13	-	36-A
P-10	I	9	PEDESTRIAN SIGNAL POLE						10	-	-	-	N	6	-	-	-	24-A
P-11	I	10	ROADWAY ILLUMINATIONS ASSEMBLY WITH PED SIGNAL						19	30	-	-	Y	-	11	-	-	30-A
														36	11	52	0	

SIGNAL POLE STATUS: I=INSTALL; E=EXISTING; REM=REMOVE; F=INSTALL IN FUTURE PHASE

ELECTRICAL SERVICE DESCRIPTION

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION [SEE ED(5)-14]	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMP	TWO-POLE CONTACTOR AMPS	PANEL BD. / LOAD CENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES-02	TYPE D (120/240) 070 (NS) SS (E) PS (U)	2"	3 / #4	N/A	2P / 70	N/A	100	T.S.	1P / 50	40	<7.1
								LIGHTING	2P / 20	3	



VIVDS DETECTION ZONE DETAILS

DETECTION NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE (S)	DESCRIPTION
V1	SIGNAL POLE P-3	25'	WB + WBLT	ADVANCED + PRESENCE
V2	SIGNAL POLE P-6	25'	NB + NBLT	ADVANCED + PRESENCE
V3	SIGNAL POLE P-9	25'	EB + EBLT	ADVANCED + PRESENCE
V4	SIGNAL POLE P-1	25'	SB + SBLT	ADVANCED + PRESENCE

GROUND BOX SUMMARY

ITEM NO.	DESCRIPTION	UNIT	QTY
624	GROUND BOX TY D (162922) W/APRON	EA	5

NOTES CONTINUED:

8. ALL EQUIPMENT TO BE PROCURED AND INSTALLED BY THE CONTRACTOR, UNLESS OTHERWISE STATED. CONTRACTOR TO PROCURE EQUIPMENT LISTED BELOW, OR APPROVED EQUAL.

SUMMARY OF TRAFFIC SIGNAL EQUIPMENT		
EQUIPMENT	ITEM NO.	DESCRIPTION
DETECTION	6083	ITERIS VANTAGEVECTOR/NEXT SHELF MOUNT
CABINET	SUB TO 680	MOBOTREX ATC CABINET MODEL #TF6016TTYRTX02
BBU	6058	APC SECURE UPS W/MK5105A(4) BATTERIES
CONTROLLER	SUB TO 680	ECONOLITE COBALT 'C' CONTOLLER, RACK MOUNT
APS	688	PELCO INTELLICROSS APS SYSTEM

9. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE CITY AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.

10. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.

11. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN IN THE PLANS, THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.

12. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.

13. CONTRACTOR TO MAINTAIN FULL ACCESS TO A MINIMUM OF TWO PEDESTRIAN CROSSINGS AT ALL TIMES DURING CONSTRUCTION.

14. ALL SIGNS ARE TO BE FURNISHED AND INSTALLED BY CONTRACTOR. CONTRACTOR TO INSTALL NON-ILLUMINATED STREET NAME BLADE SIGNS ON MAST ARMS. CONTRACTOR SHALL VERIFY STREET NAME BLADE DESIGN IS MOST CURRENT CITY OF TYLER STANDARD. CONTRACTOR SHALL VERIFY BLOCK NUMBERS WITH CITY PRIOR TO FABRICATION.

15. THE CONTRACTOR SHALL REMOVE AND RELOCATE EXISTING CELLULAR MODEM AND INSTALL ALL EQUIPMENT NECESSARY FOR FULL OPERATION. CONTRACTOR SHALL CONFIGURE, TEST, AND INTEGRATE CELLULAR MODEM TO THE CITY NETWORK.

16. CONDUIT CABLE 1 WILL BE INSTALLED BY ONCOR ELECTRIC.

STATE OF TEXAS
ANTHONY X. RAGLAND
123267
LICENSED PROFESSIONAL ENGINEER

4/30/24

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TYLER, TX 75701
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CITY OF TYLER
A Natural Beauty

Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED TRAFFIC SIGNAL DETAILS (1 OF 2) - FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 51

REV DATE: 5/10/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.adp\za\AVO\55000s\55903\000\0191-01-09814 - Design\Plan Set\8. Traffic\55903-INT2-SDT-1.dgn

CABLE TERMINATION CHART

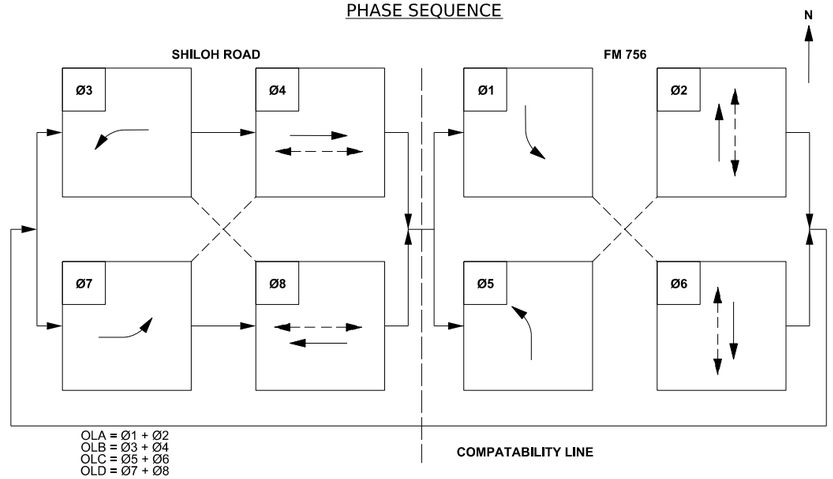
CNDR. NO.	CONDUCTOR COLOR	CABLE 1 20 CNDR. FROM P-1 TO CNTRL.	CABLE 2 20 CNDR. FROM P-3 TO CNTRL.	CABLE 3 20 CNDR. FROM P-6 TO CNTRL.	CABLE 4 20 CNDR. FROM P-9 TO CNTRL.
1	BLACK	SPARE	SPARE	SPARE	SPARE
2	WHITE	SH COM	SH COM	SH COM	SH COM
3	RED	SH 11, 12 - Ø6 R	SH 2, 3 - Ø8 R	SH 5, 6 - Ø2 R	SH 8, 9, 9A - Ø4 R
4	GREEN	SH 11, 12 - Ø6 G	SH 2, 3 - Ø8 G	SH 5, 6 - Ø2 G	SH 8, 9, 9A - Ø4 G
5	ORANGE	SH 11, 12 - Ø6 Y	SH 2, 3 - Ø8 Y	SH 5, 6 - Ø2 Y	SH 8, 9, 9A - Ø4 Y
6	BLUE	SPARE	SPARE	SPARE	SPARE
7	WHITE / BLACK	SPARE	SPARE	SPARE	SPARE
8	RED / BLACK	SH 10 - OLA R (LT ARW)	SH 1 - OLB R (LT ARW)	SH 4 - OLC R (LT ARW)	SH 7 - OLD R (LT ARW)
9	GREEN / BLACK	SH 10 - OLA G (LT ARW)	SH 1 - OLB G (LT ARW)	SH 4 - OLC G (LT ARW)	SH 7 / 9A - OLD G (LT / RT ARW)
10	ORANGE / BLACK	SH 10 - OLA SY (LT ARW)	SH 1 - OLB SY (LT ARW)	SH 4 - OLC SY (LT ARW)	SH 7 / 9A - OLD SY (LT / RT ARW)
11	BLUE / BLACK	SH 10 - OLA FY (LT ARW)	SH 1 - OLB FY (LT ARW)	SH 4 - OLC FY (LT ARW)	SH 7 - OLD FY (LT ARW)
12	BLACK / WHITE	SPARE	SPARE	SPARE	SPARE
13	RED / WHITE	SH 14 - Ø6 DW	SH 15 - Ø6 DW	SH 18 - Ø2 DW	SH 19 - Ø2 DW
14	GREEN / WHITE	SH 14 - Ø6 W	SH 15 - Ø6 W	SH 18 - Ø2 W	SH 19 - Ø2 W
15	BLUE / WHITE	SPARE	SPARE	SPARE	SPARE
16	BLACK / RED	SH 13 - Ø4 DW	SH 16 - Ø8 DW	SH 17 - Ø8 DW	SH 20 - Ø4 DW
17	WHITE / RED	SH 13 - Ø4 W	SH 16 - Ø8 W	SH 17 - Ø8 W	SH 20 - Ø4 W
18	ORANGE / RED	SPARE	SPARE	SPARE	SPARE
19	BLUE / RED	SPARE	SPARE	SPARE	SPARE
20	RED / GREEN	SPARE	SPARE	SPARE	SPARE

NOTE: HOME RUN 2 CONDR. TO ALL POLES WITH PED HEADS FOR PED CALL.

APS MESSAGE CHART

POLE NUMBER	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE / SOUND DETAILS
P-2	Ø4	BUTTON PUSH ON DW	WAIT TO CROSS PALUXY DRIVE AT SHILOH ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS PALUXY DRIVE AT SHILOH ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PALUXY DRIVE, WALK SIGN IS ON TO CROSS PALUXY DRIVE
P-2	Ø6	BUTTON PUSH ON DW	WAIT TO CROSS SHILOH ROAD AT PALUXY DRIVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SHILOH ROAD AT PALUXY DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	SHILOH ROAD, WALK SIGN IS ON TO CROSS SHILOH ROAD
P-4	Ø6	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS SHILOH ROAD AT PALUXY DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-5	Ø8	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS PALUXY DRIVE AT SHILOH ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-7	Ø8	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS PALUXY DRIVE AT SHILOH ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-8	Ø2	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS SHILOH ROAD AT PALUXY DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-10	Ø2	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS SHILOH ROAD AT PALUXY DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK
P-11	Ø4	BUTTON PUSH ON DW	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS PALUXY DRIVE AT SHILOH ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	RAPID TICK

PHASE SEQUENCE



SIGNAL HEADS

SIGNAL HEAD NUMBER	SIGNAL HEAD TYPE	12" LED SIGNAL INDICATION									PED SIG SEC (LED) (COUNTDOWN)
		BACK PLATE			LED SIGNAL LAMPS						
		3 SEC	4 SEC	5 SEC	< - G -	G	< - Y -	Y	< - R -	R	
		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
1	H4FYA		1		1		2		1		
2	H3	1				1		1		1	
3	H3	1				1		1		1	
4	H4FYA		1		1		2		1		
5	H3	1				1		1		1	
6	H3	1				1		1		1	
7	H4FYA		1		1		2		1		
8	H3	1				1		1		1	
9	H3	1				1		1		1	
9A	V5RT			1	1	1	1	1		1	
10	H4FYA		1		1		2		1		
11	H3	1				1		1		1	
12	H3	1				1		1		1	
13	CP										1
14	CP										1
15	CP										1
16	CP										1
17	CP										1
18	CP										1
19	CP										1
20	CP										1
TOTAL		8	4	1	5	9	9	9	4	9	8

4/30/24

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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED TRAFFIC SIGNAL DETAILS (2 OF 2) - FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 52

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
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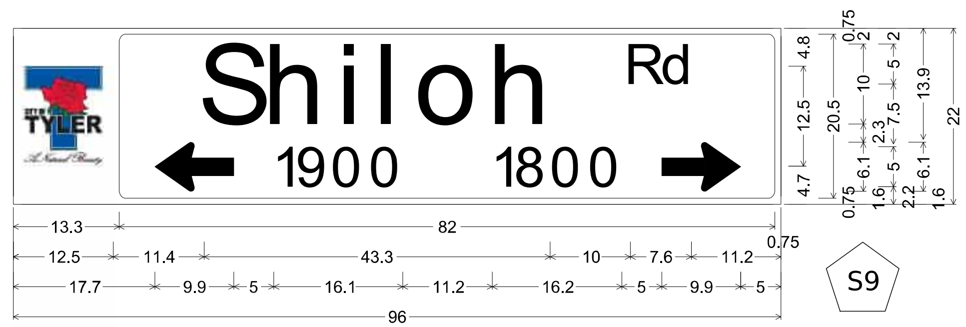
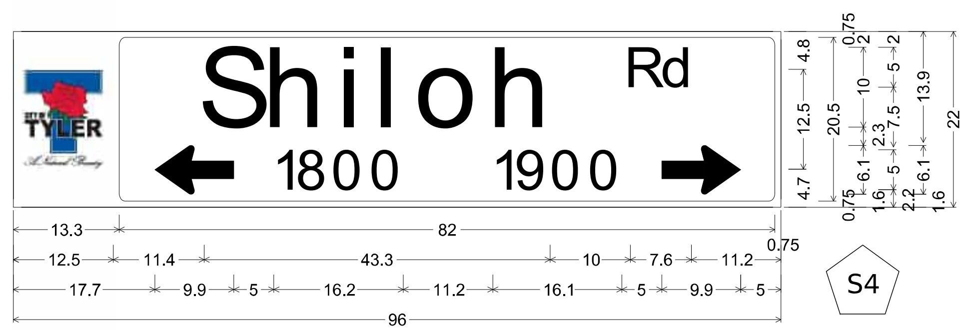
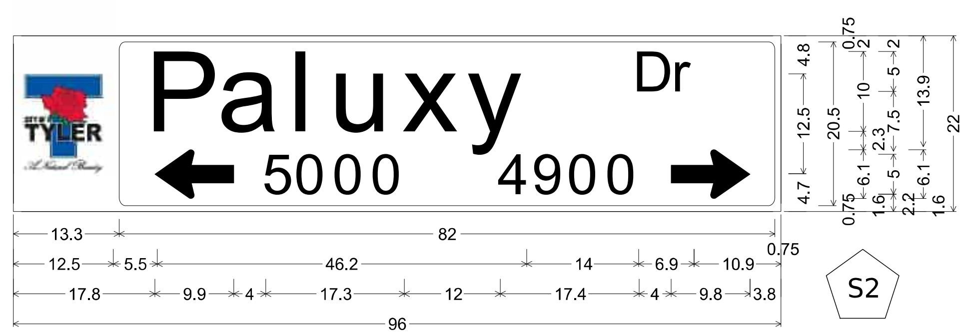


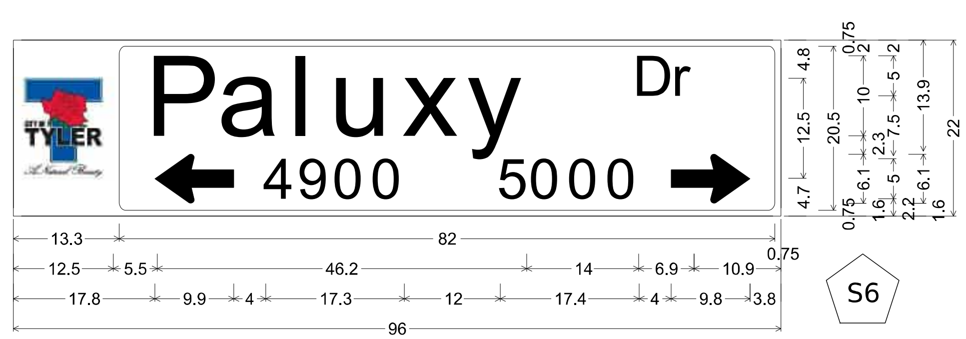
1.0" Radius, 0.8" Border, White on Green;
"Shiloh", ClearviewHwy-3-W; "Rd", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 180°; "1900", ClearviewHwy-3-W;
"1800", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"Shiloh", ClearviewHwy-3-W; "Rd", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 180°; "1800", ClearviewHwy-3-W;
"1900", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"Paluxy", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 180°; "5000", ClearviewHwy-3-W;
"4900", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 0°;



1.0" Radius, 0.8" Border, White on Green;
"Paluxy", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W;
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"5000", ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 0°;

STATE OF TEXAS
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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PROPOSED SIGNAGE DETAILS - FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	SEE TITLE SHEET	US 271, ETC.	
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	53

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
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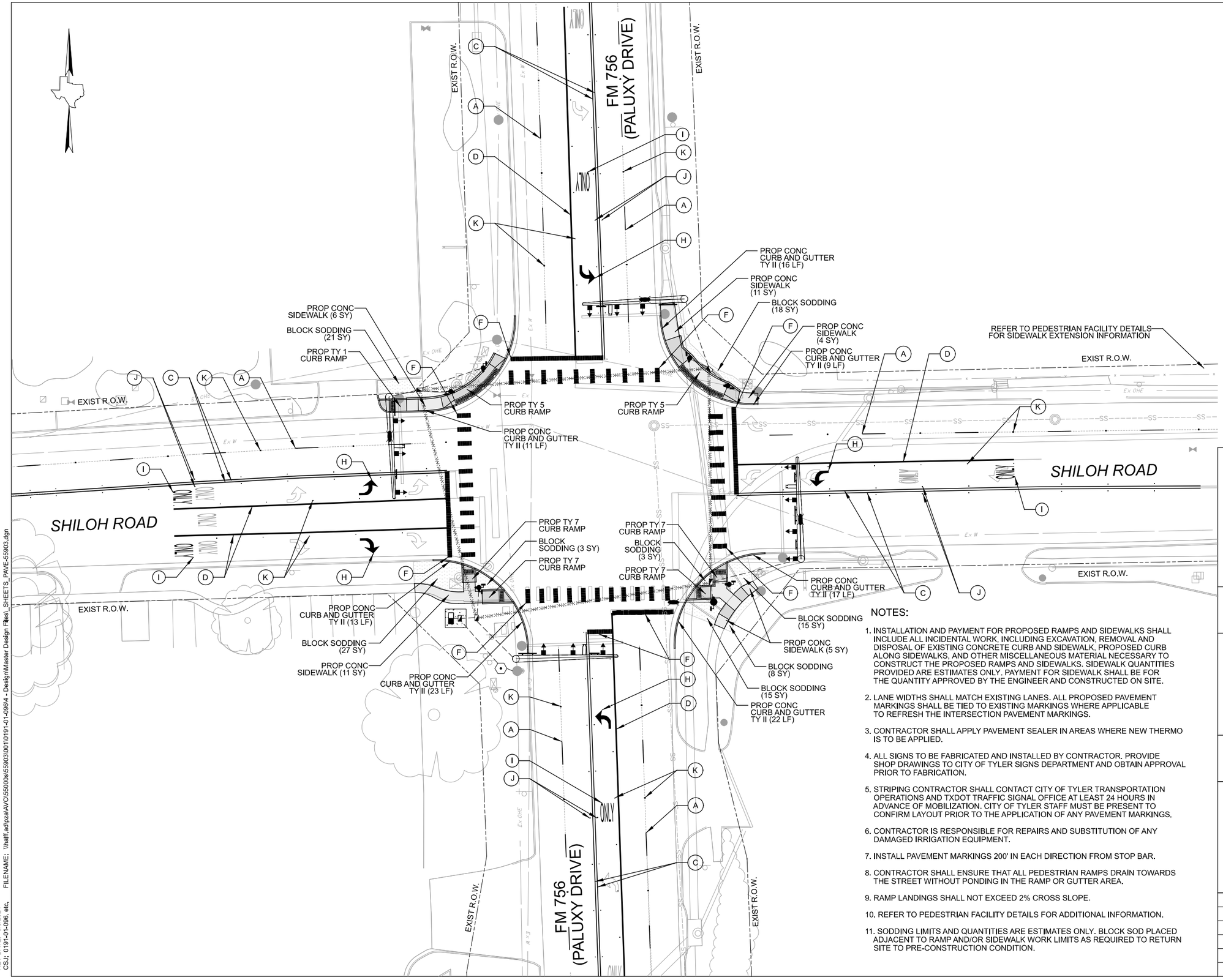

REV DATE: 6/3/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pza\AVO\55000s\55903\00\10191-01-09\04 - Design\Master Design Files_SHEETS_PAVE-55903.dgn

LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (H) PREFAB PAV MRK TY C (W)(ARROW)
- (I) PREFAB PAV MRK TY C (W)(WORD)
- (J) REFL PAV MRK TY II A-A
- (K) REFL PAV MRK TY I-C
- (M) REFL PAV MRK TY I (W)6"(DOT)(100MIL)
- (O) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- [X] PROPOSED SMALL SIGN
- PROPOSED SIDEWALK
- PROPOSED PED CURB RAMP
- SODDING

0 20 40
HORIZONTAL SCALE IN FEET

NOTES:

1. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS. SIDEWALK QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAYMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE TO REFRESH THE INTERSECTION PAVEMENT MARKINGS.
3. CONTRACTOR SHALL APPLY PAVEMENT SEALER IN AREAS WHERE NEW THERMO IS TO BE APPLIED.
4. ALL SIGNS TO BE FABRICATED AND INSTALLED BY CONTRACTOR. PROVIDE SHOP DRAWINGS TO CITY OF TYLER SIGNS DEPARTMENT AND OBTAIN APPROVAL PRIOR TO FABRICATION.
5. STRIPING CONTRACTOR SHALL CONTACT CITY OF TYLER TRANSPORTATION OPERATIONS AND TXDOT TRAFFIC SIGNAL OFFICE AT LEAST 24 HOURS IN ADVANCE OF MOBILIZATION. CITY OF TYLER STAFF MUST BE PRESENT TO CONFIRM LAYOUT PRIOR TO THE APPLICATION OF ANY PAVEMENT MARKINGS.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTION OF ANY DAMAGED IRRIGATION EQUIPMENT.
7. INSTALL PAVEMENT MARKINGS 200' IN EACH DIRECTION FROM STOP BAR.
8. CONTRACTOR SHALL ENSURE THAT ALL PEDESTRIAN RAMPS DRAIN TOWARDS THE STREET WITHOUT PONDING IN THE RAMP OR GUTTER AREA.
9. RAMP LANDINGS SHALL NOT EXCEED 2% CROSS SLOPE.
10. REFER TO PEDESTRIAN FACILITY DETAILS FOR ADDITIONAL INFORMATION.
11. SODDING LIMITS AND QUANTITIES ARE ESTIMATES ONLY. BLOCK SOD PLACED ADJACENT TO RAMP AND/OR SIDEWALK WORK LIMITS AS REQUIRED TO RETURN SITE TO PRE-CONSTRUCTION CONDITION.

STATE OF TEXAS
OSCAR I. GONZALEZ
140479
LICENSED PROFESSIONAL ENGINEER
4/30/24

halff
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(903) 617-5369

CITY OF TYLER
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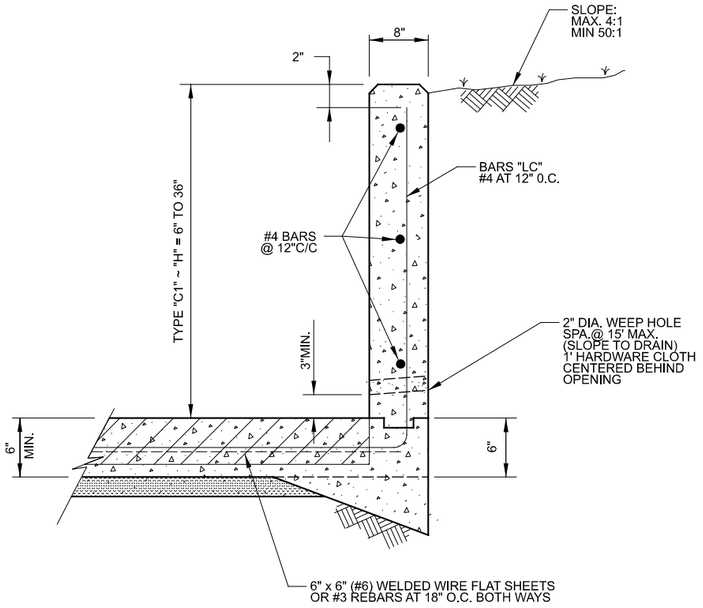
Texas Department of Transportation
Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

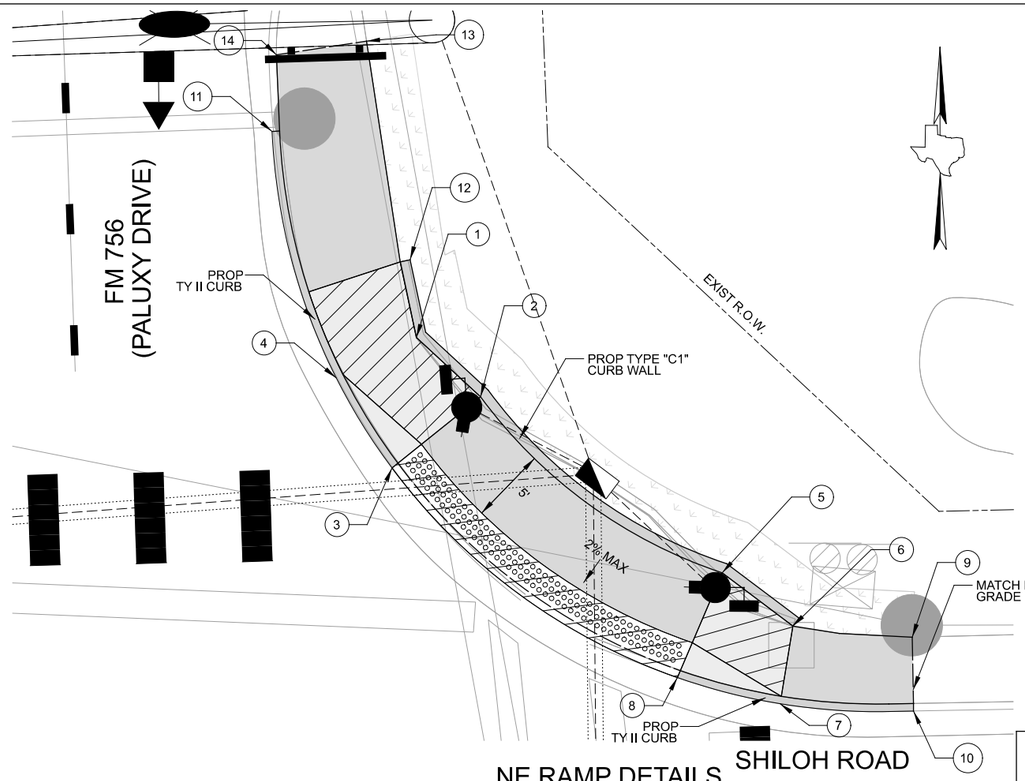
PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS

FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 54

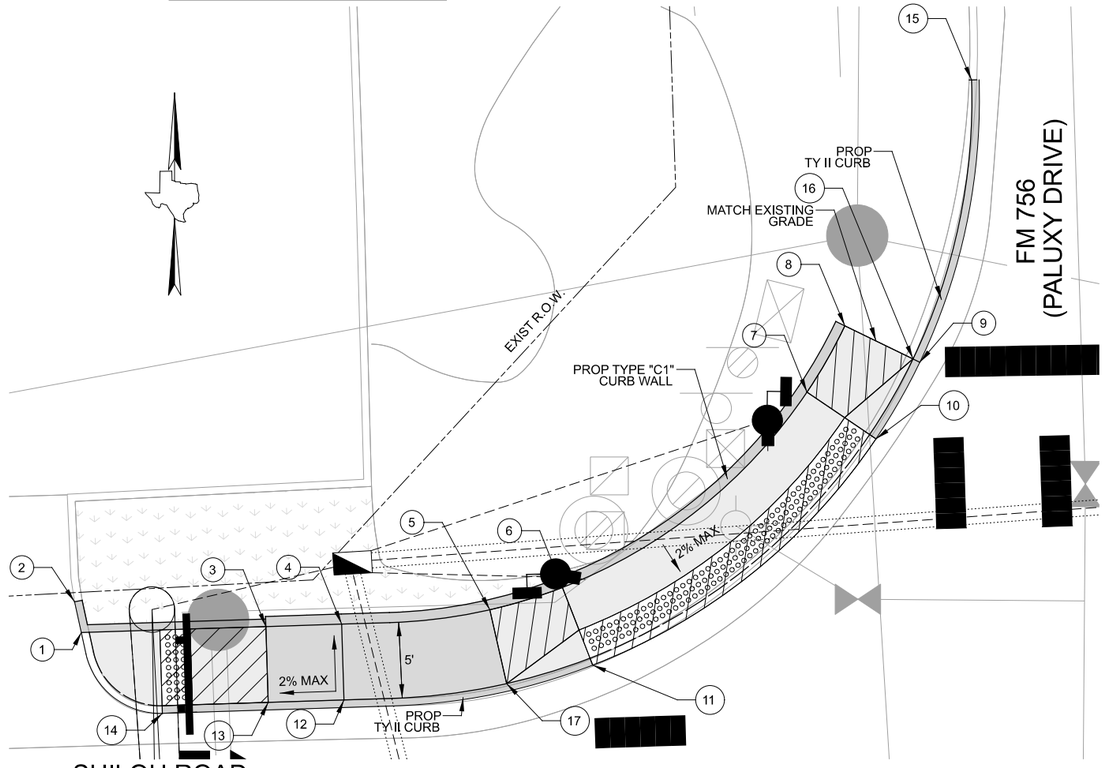


TYPE "C1" CURB WALL



NE RAMP DETAILS

NE RAMP DETAILS		
POINT	NORTHING	EASTING
1	6805686.771	2963732.798
2	6805682.859	2963737.033
3	6805678.165	2963731.177
4	6805684.108	2963727.504
5	6805671.250	2963752.966
6	6805667.727	2963757.633
7	6805662.607	2963756.798
8	6805664.334	2963750.013
9	6805667.000	2963765.512
10	6805662.126	2963765.602
11	6805700.368	2963723.275
12	6805691.901	2963732.372
13	6805706.331	2963729.503
14	6805705.427	2963723.559



NW SIDEWALK DETAILS

NW SIDEWALK DETAILS		
POINT	NORTHING	EASTING
1	6805663.980	2963601.909
2	6805666.002	2963601.465
3	6805664.364	2963614.081
4	6805664.521	2963619.078
5	6805665.473	2963628.865
6	6805666.942	2963633.658
7	6805679.828	2963649.786
8	6805684.208	2963652.292
9	6805681.804	2963657.238
10	6805676.756	2963654.348
11	6805661.815	29636635.65
12	6805659.525	2963619.236
13	6805659.367	2963614.239
14	6805658.646	2963607.259
15	6805700.445	2963661.149
16	6805682.022	2963656.788
17	6805660.599	2963629.979

STATE OF TEXAS
OSCAR I. GONZALEZ
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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

PEDESTRIAN FACILITY DETAILS

FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 55

REV DATE: 5/1/2024
CSJ: 0191-01-096, etc.
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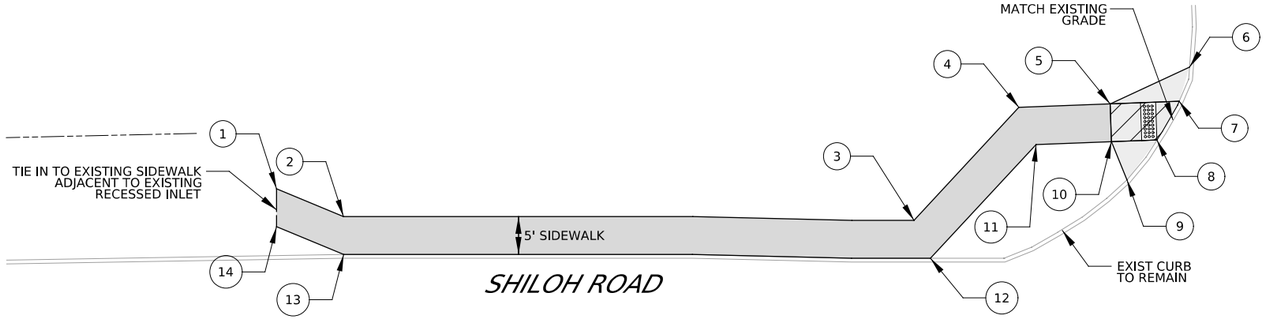
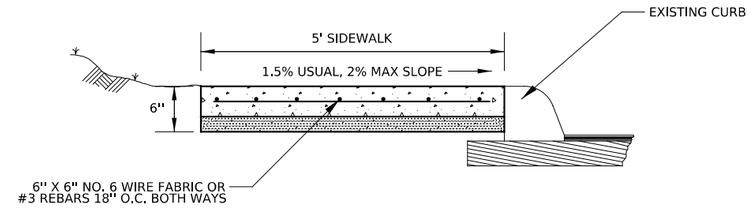




NE SIDEWALK AND RAMP DETAILS

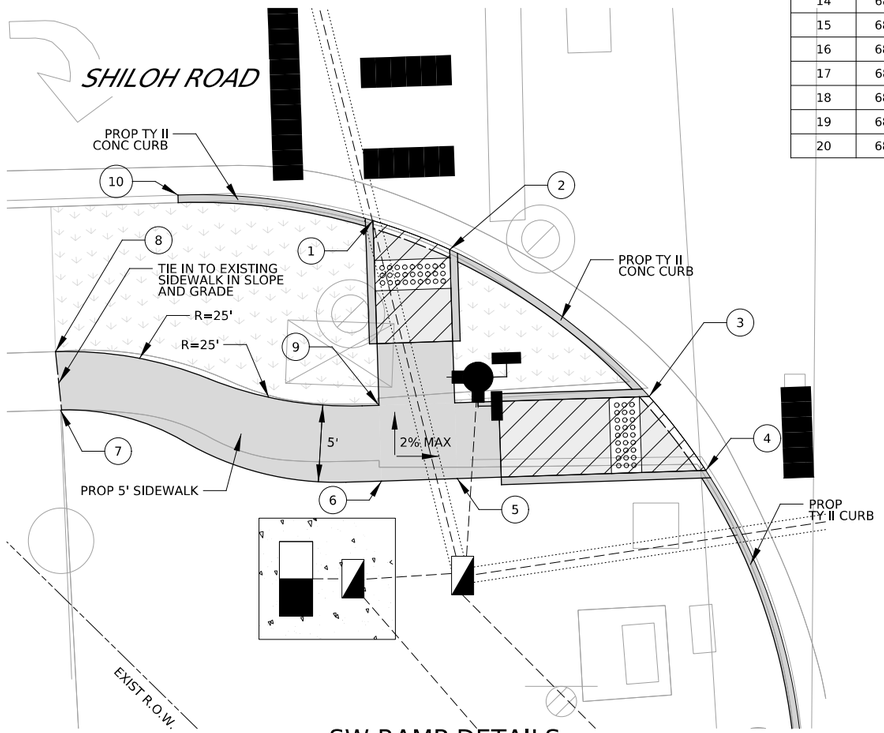
SW RAMP DETAILS		
POINT	NORTHING	EASTING
1	6805593.624	2963638.377
2	6805591.712	2963643.442
3	6805582.023	2963656.604
4	6805577.143	2963660.341
5	6805576.607	2963643.936
6	6805576.443	2963638.939
7	6805581.125	2963617.831
8	6805584.984	2963617.435
9	6805581.440	2963638.776
10	6805595.311	2963625.506

SE RAMP DETAILS		
POINT	NORTHING	EASTING
1	6805578.370	2963734.772
2	6805583.487	2963738.287
3	6805591.417	2963746.895
4	6805594.270	2963751.804
5	6805582.772	2963752.180
6	6805580.391	2963754.977
7	6805576.584	2963751.735
8	6805578.838	2963749.088
9	6805583.777	2963747.145
10	6805598.341	2963768.641
11	6805583.571	2963758.334
12	6805586.040	2963763.379
13	6805582.780	2963765.589
14	6805579.807	2963761.642
15	6805577.130	2963758.805
16	6805573.316	2963755.572
17	6805569.502	2963753.055
18	6805565.500	2963751.023
19	6805567.328	2963746.885
20	6805572.044	2963748.701

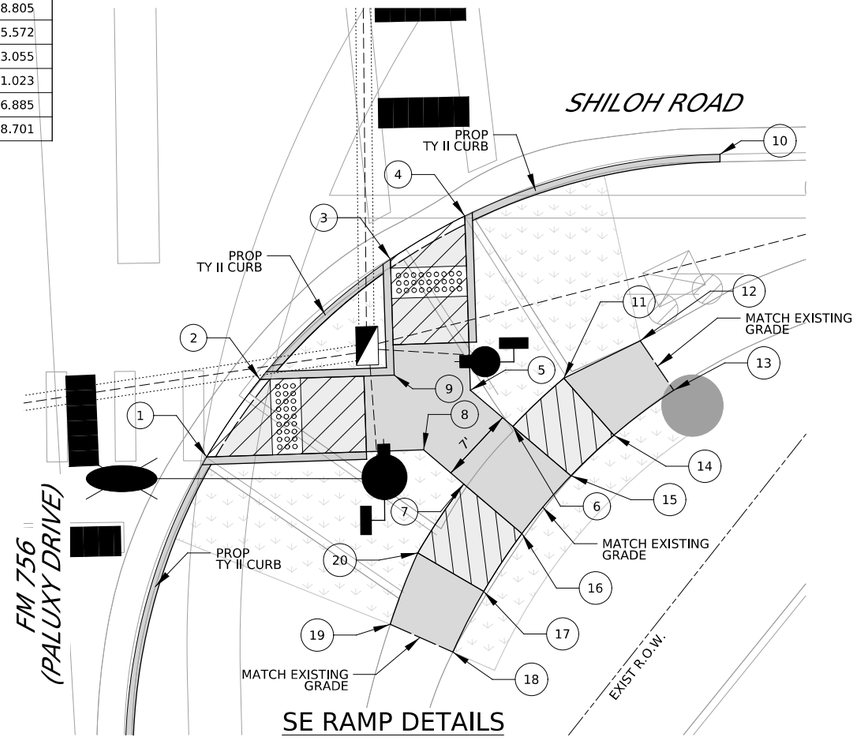
NE SIDEWALK AND RAMP DETAILS		
POINT	NORTHING	EASTING
1	6805674.173	2964056.148
2	6805670.504	2964064.977
3	6805670.004	2964145.254
4	6805684.920	2964154.105
5	6805685.367	2964166.144
6	6805690.212	2964176.625
7	6805685.746	2964175.822
8	6805680.628	2964172.941
9	6805675.324	2964168.370
10	6805680.371	2964166.329
11	6805680.001	2964156.359
12	6805665.004	2964142.435
13	6805665.504	2964065.003
14	6805669.174	2964056.148

TYPICAL SIDEWALK SECTION

NOT TO SCALE



SW RAMP DETAILS



SE RAMP DETAILS

PROPOSED SIDEWALK

PROPOSED PED CURB RAMP
8.3% MAX RUNNING SLOPE
2.0% MAX CROSS SLOPE

0 2.5 5

SCALE: 1"=5'

STATE OF TEXAS
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CITY OF TYLER
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Tyler District

HIGHWAY SAFETY IMPROVEMENT PROGRAM

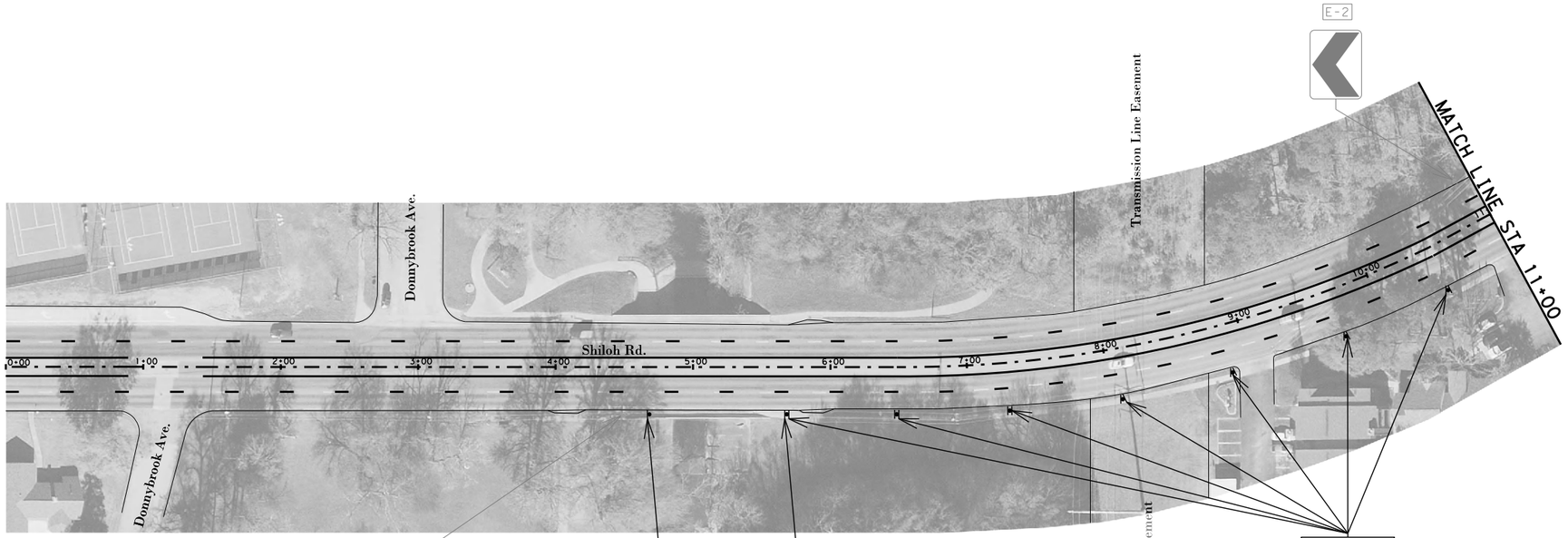
PEDESTRIAN FACILITY DETAILS

FM 756 AT SHILOH ROAD

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	US 271, ETC.
STATE	DISTRICT	COUNTY
TEXAS	TYL	SMITH
CONTROL	SECTION	JOB / SHEET NO.
0165	01	109, ETC. / 56

REV DATE: 4/30/2024
CSJ: 0191-01-096, etc.
FILENAME: \\halff.ad\pza\AVO\55000\s55903\001\0191-01-096\4 - Design\Master Design Files_SHEETS_PAVE_DET-55903.dgn

NOTES:
1. PREPARE ROW, IN AREAS SHOWN OR AS DIRECTED BEFORE THE INSTALLATION OF SIGNS:
   -WORK WITH CITY STAFF TO IDENTIFY TRIMMING/REMOVAL NEEDS DUE TO URBAN ENVIRONMENT AND LANDSCAPING CONSIDERATIONS.
   -LIMITS EXTEND A MINIMUM OF 100 FT. BEFORE AND AFTER EACH SOLAR POWERED SIGN
   -LIMITS INCLUDE BOTH SIDES OF THE ROAD FROM EDGE OF PAVEMENT TO ROW
2. EXISTING SIGNS TO REMAIN IN PLACE UNLESS OTHERWISE SHOWN.
3. REMOVE AND SALVAGE EXISTING ADVANCE REVERSE CURVE SIGN, SPEED ADVISORY PLAQUE AND POST AND RETURN TO CITY OF TYLER.
4. THE REMOTE OPERATION OF THE LED CHEVRON SYSTEM SHALL BE COMPATIBLE WITH THE CITY OF TYLER'S EXISTING CLOUD BASED SYSTEM PROVIDED BY TRAFFICALM.
5. LED ACTIVATION TIMING IS SEQUENTIAL, DIRECTIONAL, AND RADAR INITIATED. SEE SS 6350 FOR MORE INFORMATION.
6. STAKE PROPOSED SIGN LOCATIONS AND RECEIVE APPROVAL BEFORE PLACING SIGNS.
7. SIGNS MAY NEED TO BE SHIFTED TO AVOID DRIVES OR OTHER CONFLICTS.



LEGEND

- (X) PROPOSED SIGN
- E-X EXISTING SIGN
- PROPOSED SIGN POST
- EXISTING SIGN POST

STATE OF TEXAS
BLAKE WILLIAMS
120367
LICENSED PROFESSIONAL ENGINEER

Blake Williams 04/30/2024

LAYOUT_01.dgn

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Tyler District
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HIGHWAY SAFETY IMPROVEMENT PROGRAM SIGNAGE PLAN

STA 0+00 TO STA 11+00

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	CS

STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0910	16	184	57

DATE: 4/29/2024

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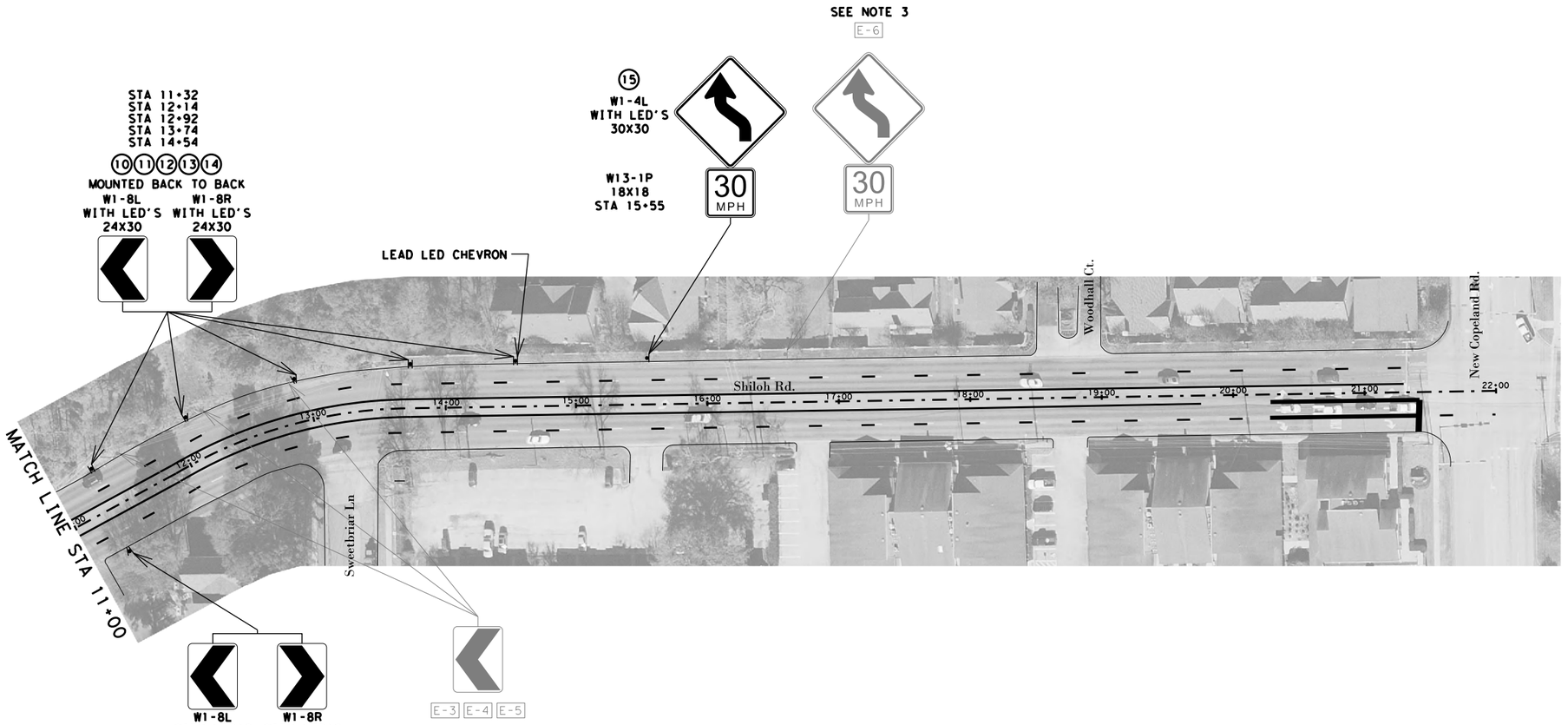
NOTES:
1. PREPARE ROW, IN AREAS SHOWN OR AS DIRECTED BEFORE THE INSTALLATION OF SIGNS:
   -WORK WITH CITY STAFF TO IDENTIFY TRIMMING/REMOVAL NEEDS DUE TO URBAN ENVIRONMENT AND LANDSCAPING CONSIDERATIONS.
   -LIMITS EXTEND A MINIMUM OF 100 FT. BEFORE AND AFTER EACH SOLAR POWERED SIGN
   -LIMITS INCLUDE BOTH SIDES OF THE ROAD FROM EDGE OF PAVEMENT TO ROW
2. EXISTING SIGNS TO REMAIN IN PLACE UNLESS OTHERWISE SHOWN.
3. REMOVE AND SALVAGE EXISTING ADVANCE REVERSE CURVE SIGN, SPEED ADVISORY PLAQUE AND POST AND RETURN TO CITY OF TYLER.
4. THE REMOTE OPERATION OF THE LED CHEVRON SYSTEM SHALL BE COMPATIBLE WITH THE CITY OF TYLER'S EXISTING CLOUD BASED SYSTEM PROVIDED BY TRAFFICALM.
5. LED ACTIVATION TIMING IS SEQUENTIAL, DIRECTIONAL, AND RADAR INITIATED. SEE SS 6350 FOR MORE INFORMATION.
6. STAKE PROPOSED SIGN LOCATIONS AND RECEIVE APPROVAL BEFORE PLACING SIGNS.
7. SIGNS MAY NEED TO BE SHIFTED TO AVOID DRIVES OR OTHER CONFLICTS.



LEGEND

(X)	PROPOSED SIGN
E-X	EXISTING SIGN
●	PROPOSED SIGN POST
●	EXISTING SIGN POST

STATE OF TEXAS
BLAKE WILLIAMS
120367
LICENSED
PROFESSIONAL ENGINEER

04/30/2024

LAYOUT_02.dgn

CITY OF TYLER TEXAS

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Tyler District
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HIGHWAY SAFETY IMPROVEMENT PROGRAM SIGNAGE PLAN

STA 11+00 TO STA 22+00

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	SEE TITLE SHEET	CS

STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0910	16	184	58

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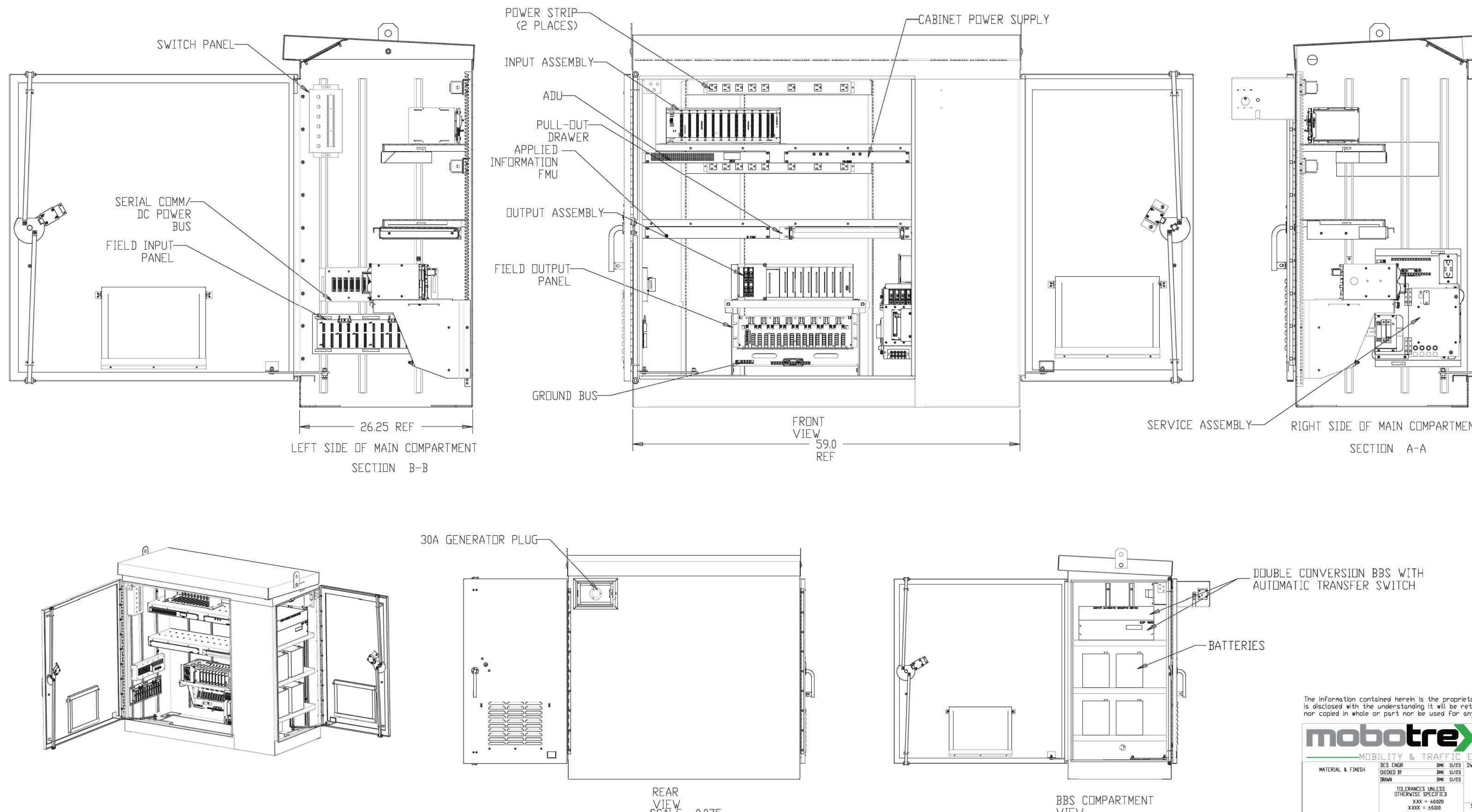
C:\Users\bwilliams\Yvonne Newman Engineering, Inc\ServerShare - Projects\City of Tyler\Shiloh at Sweetbriar LED Curve Warning System\DGN\LAYOUT*02.dgn

REVISIONS					
REV	ECN	DESCRIPTION	DRAFT	DATE	CHKD
A	XXXXX	PROPOSAL DRAWING	BMK	11/23	BMK
B	XXXXX	REMOVED LARGE DRWR AND TOP SHELF, ADDED SMALL DRWR AND PWR STRIPS	BMK	3/24	BMK



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109 WEST 55TH STREET DAVENPORT, IA 52806 PHONE: (563) 323-0009
301 W. HOWARD LN., STE.200 AUSTIN, TX 78753 PHONE: (512) 521-3060
WWW.MOBOTREX.COM

MATERIAL & FINISH	DES ENGR	BMK	11/23
	CHECKED BY	BMK	11/23
	DRAWN	BMK	11/23

TOLERANCES UNLESS OTHERWISE SPECIFIED
X.XX = ±0.020
X.XXX = ±0.010
ANGLES = ±1°
HOLE Ø = ±.005
UNITS = INCHES

BREAK ALL SHARP EDGES AND REMOVE ALL BURRS

PROE

DWG TITLE: CABINET, ATC, TYLER, TX
SIZE: D
DWG No: TYLER SUPER P ATC
SHEET 1 OF 1
REV: B

STATE OF TEXAS
OSCAR I. GONZALEZ
140479
LICENSED PROFESSIONAL ENGINEER
4/30/24

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Tyler District
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HIGHWAY SAFETY IMPROVEMENT PROGRAM

CABINET DETAILS

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	SEE TITLE SHEET		US 271, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	TYL	SMITH	
CONTROL	SECTION	JOB	SHEET NO.
0165	01	109, ETC.	59

REV DATE: 5/29/2024
CSJ: 0191-01-096, etc.
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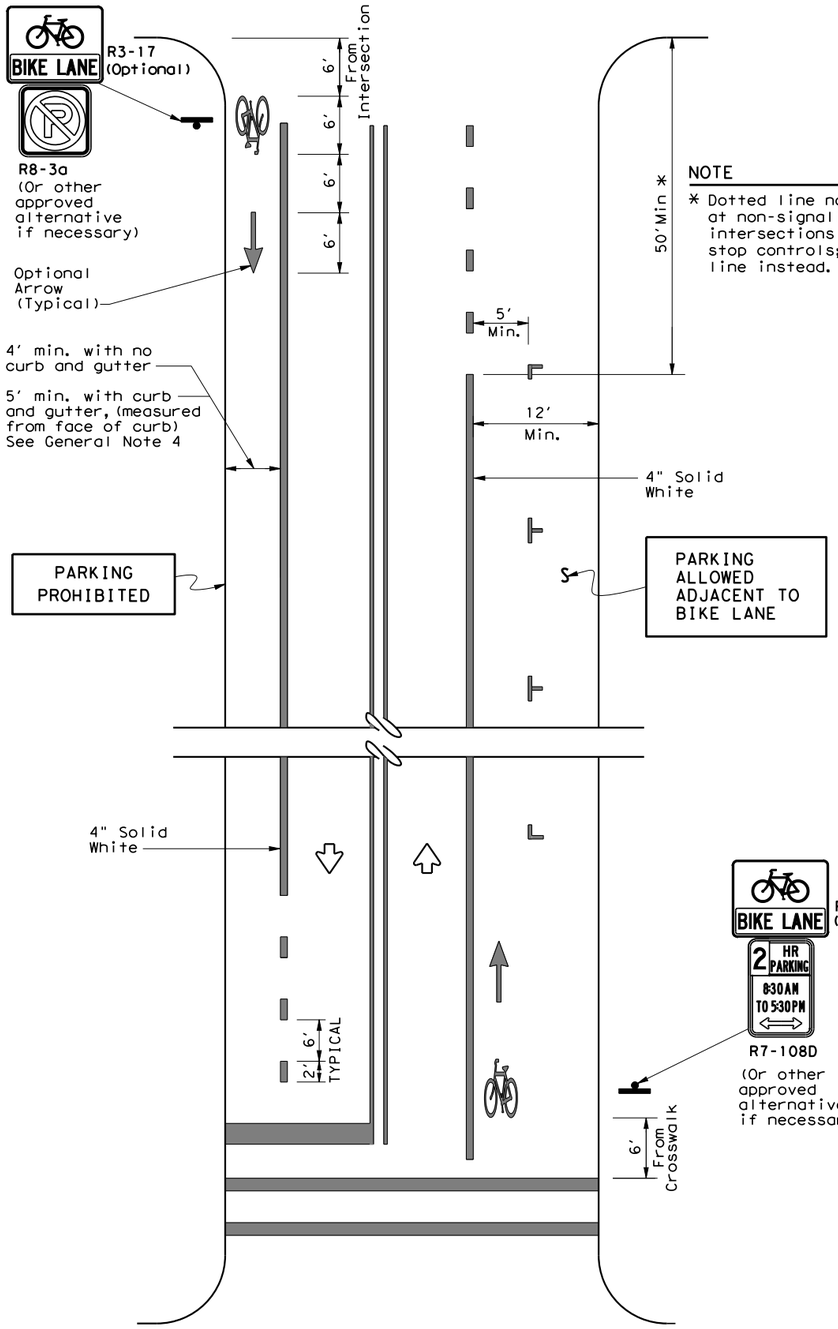


NOTES

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

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

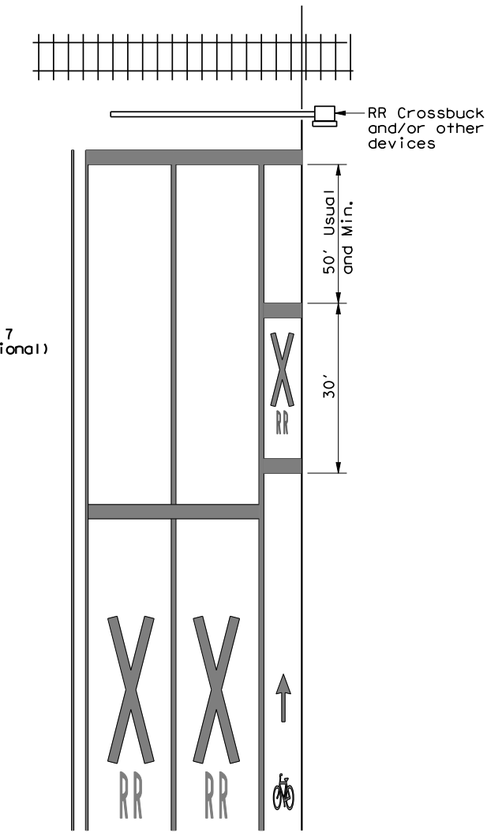
TWO-WAY STREET

NOTE

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

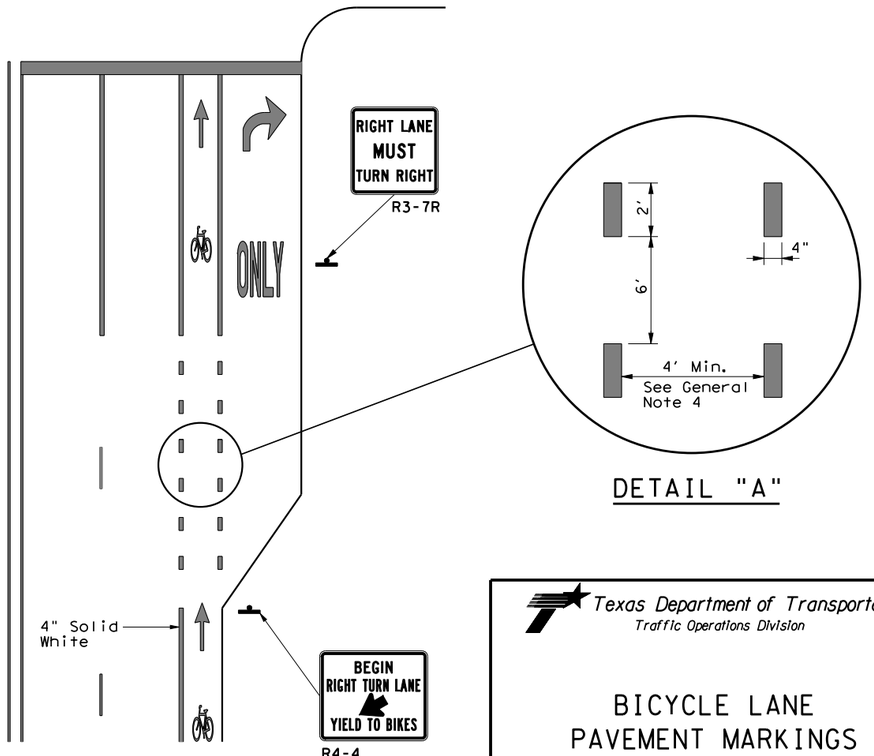
GENERAL NOTES

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



(See RCPM Standard for travel lane details)

RAILROAD CROSSING APPROACH



RIGHT TURN ONLY LANE

DETAIL "A"

LEGEND	
	Sign
	Traffic Flow

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

Texas Department of Transportation
Traffic Operations Division

BICYCLE LANE PAVEMENT MARKINGS

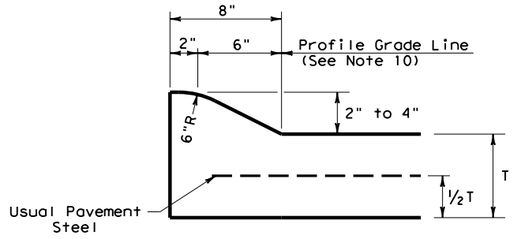
BLPM-10

REVISIONS

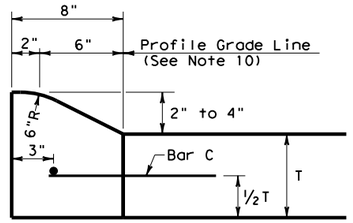
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		60

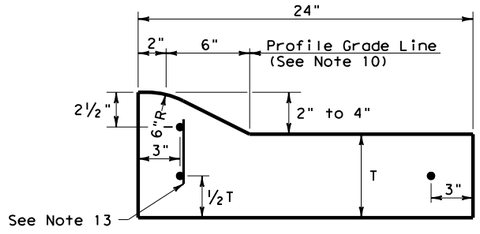
DATE:
FILE:



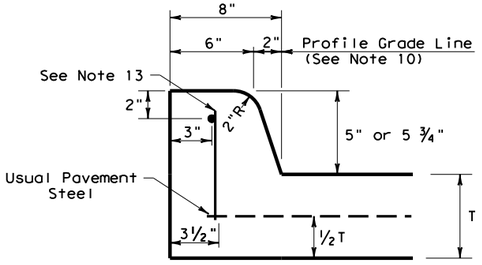
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



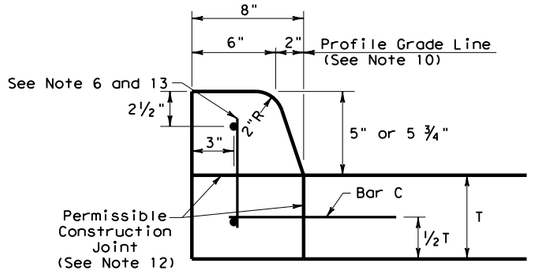
TYPE I CURB
2" - 4" HEIGHT



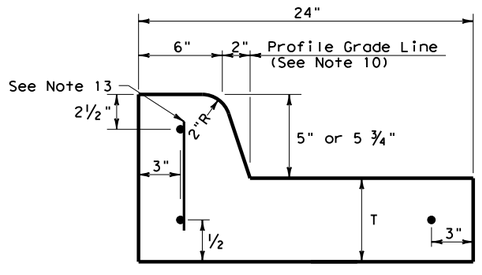
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



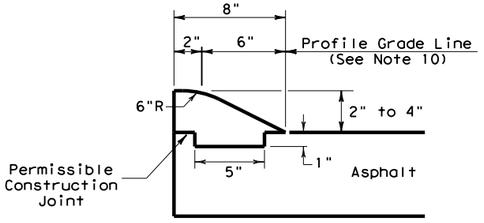
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



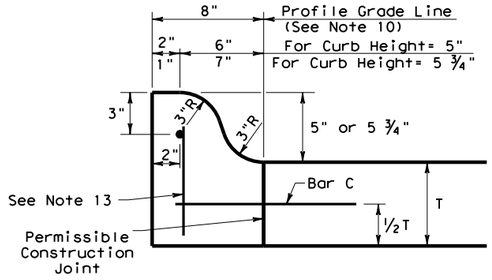
TYPE II CURB
5" - 5 ¾" HEIGHT



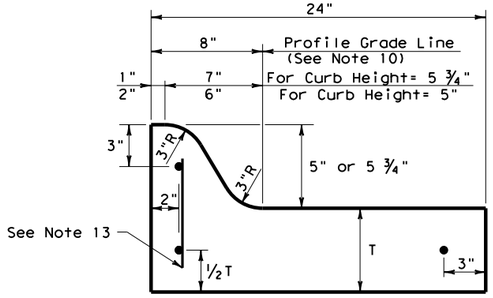
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



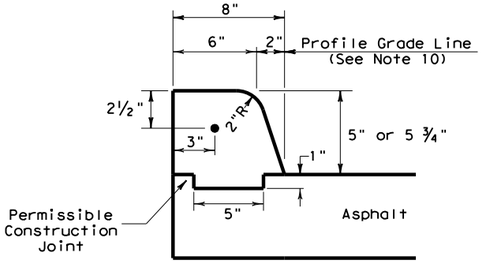
TYPE III CURB (KEYED)
2" - 4" HEIGHT



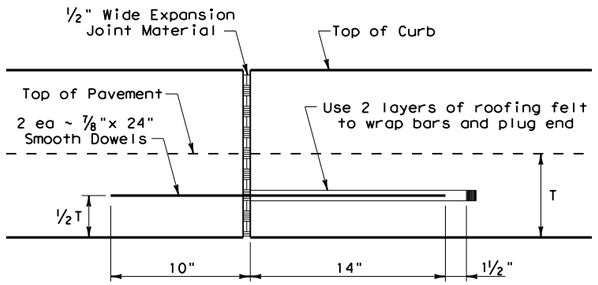
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

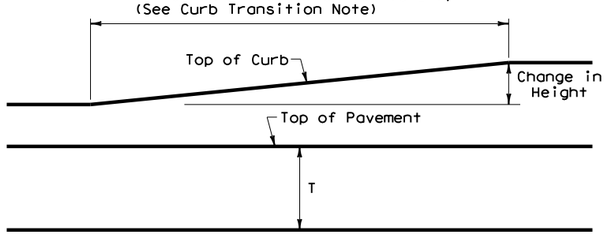


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

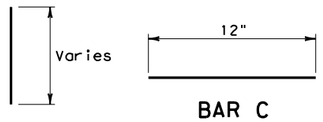
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

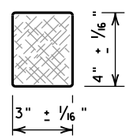
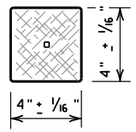
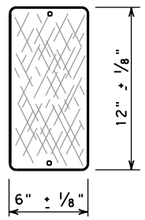
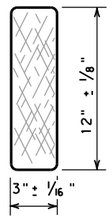
Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

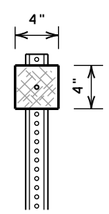
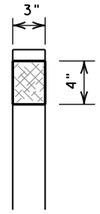
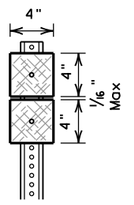
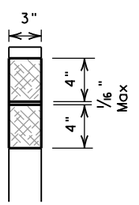
CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		61

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

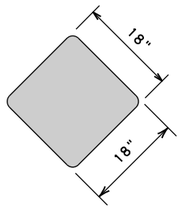
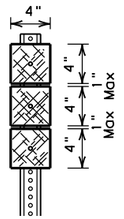
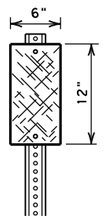
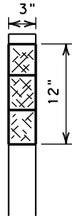
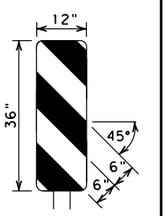
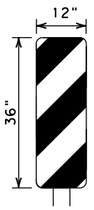
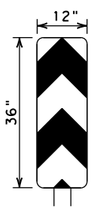
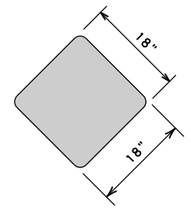
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

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

DIRECTION
If Required
BI = Bi-Directional

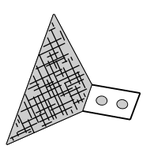
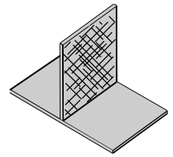
OBJECT MARKERS

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

DEPARTMENTAL MATERIAL SPECIFICATIONS

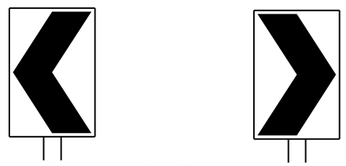
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

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

CHEVRONS

DEVICE

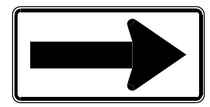


SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

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

ONE DIRECTION LARGE ARROW

DEVICE



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

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dam1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	SMITH		62

DATE:
FILE:

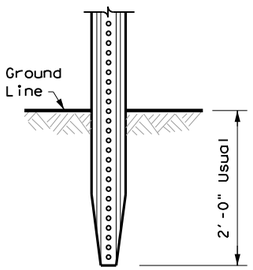
20A

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

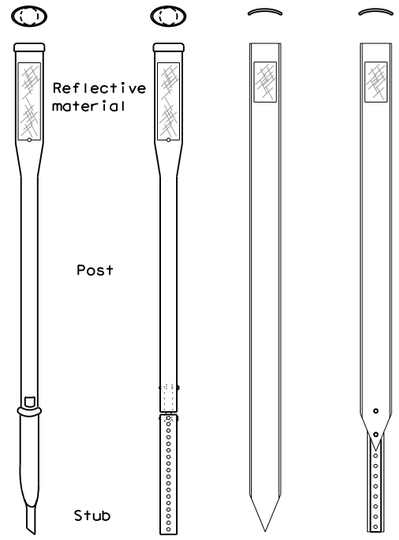


NOTES

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

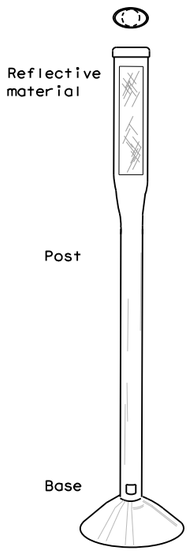
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



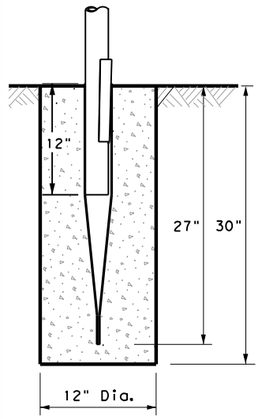
SURFACE MOUNT

NOTES

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

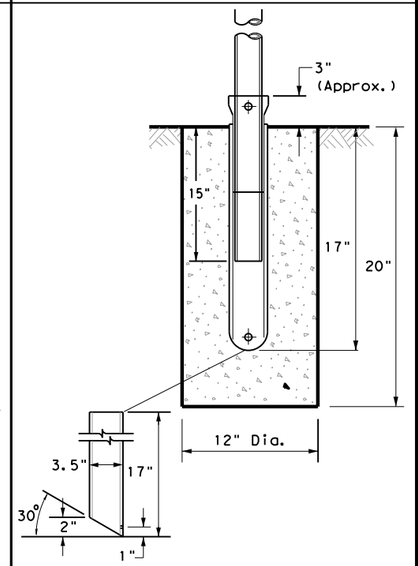
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

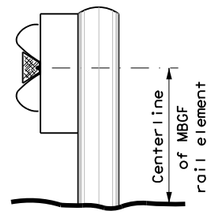
NOTE

1. Install per manufacturer's recommendations.

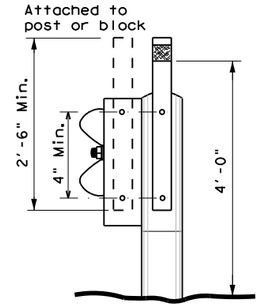
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

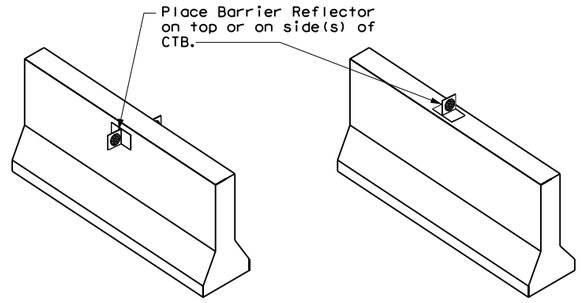
GF1



GF2



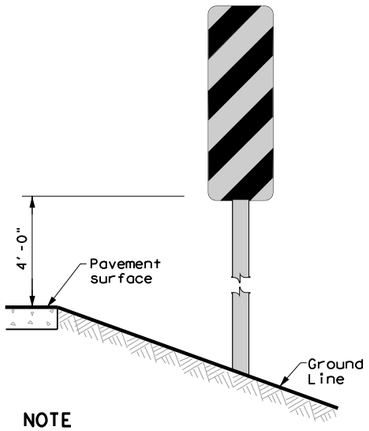
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

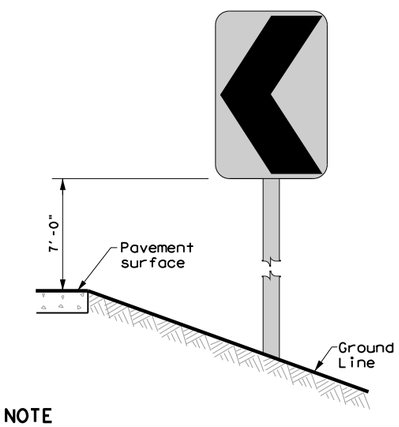
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

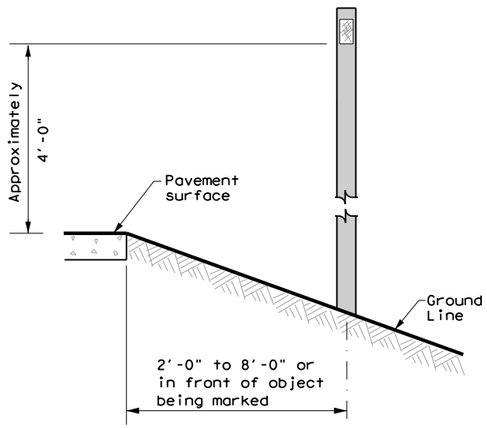
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

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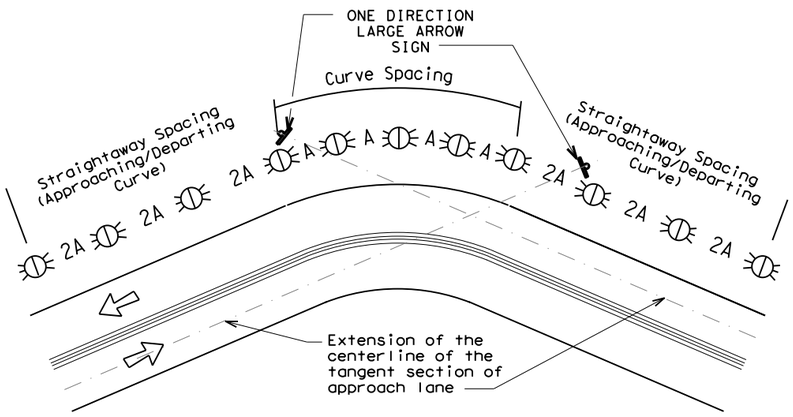
20B

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

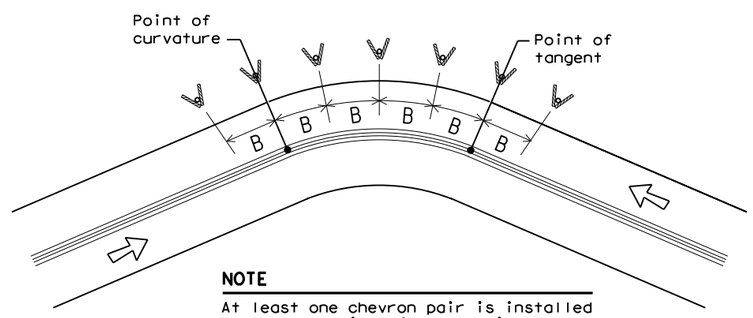
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

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8-15 7-20	TYL	SMITH		64

20C

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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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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

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

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

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

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

B. CONSTRUCTION METHODS

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

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

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

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

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

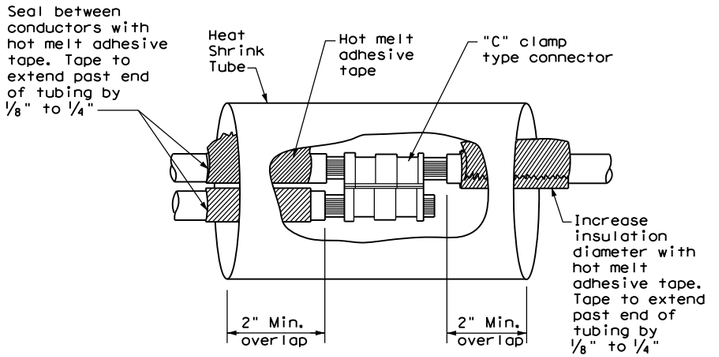
3. Install ground rods so the imprinted part number is at the upper end of the rod.

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

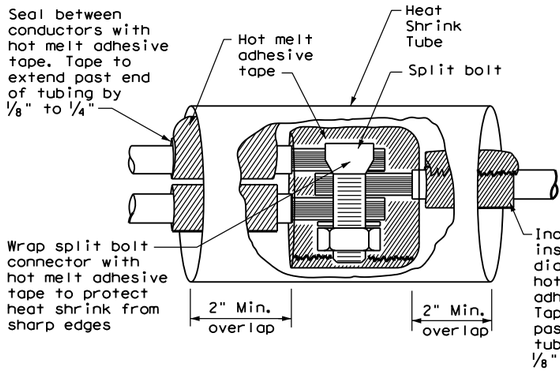
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

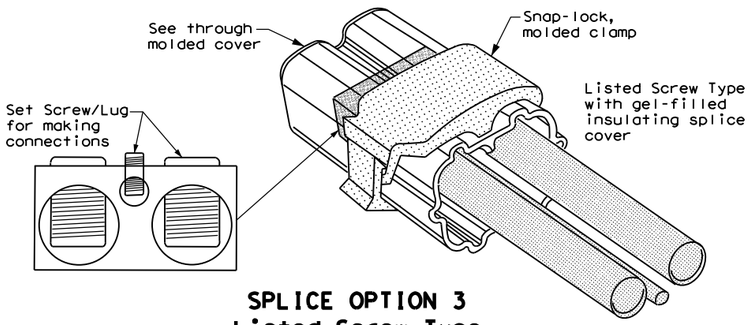
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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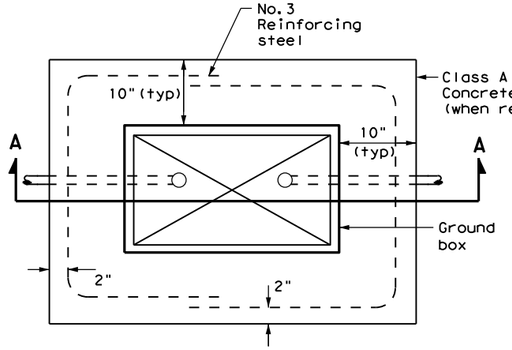
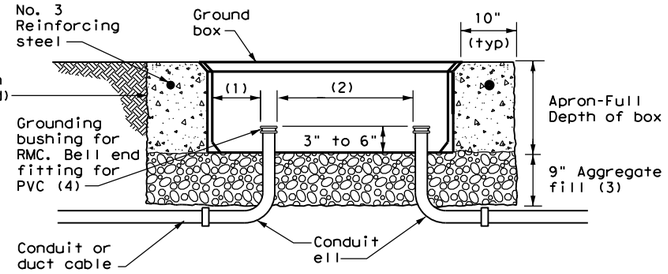


PLAN VIEW



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.

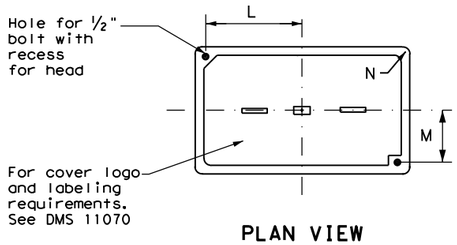
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

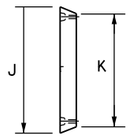
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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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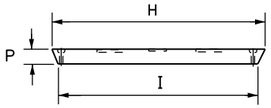

SIDE

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

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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FILE:

ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

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

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

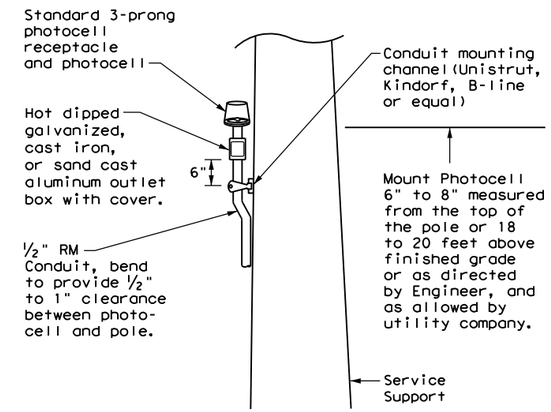
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	TYL	SMITH		68

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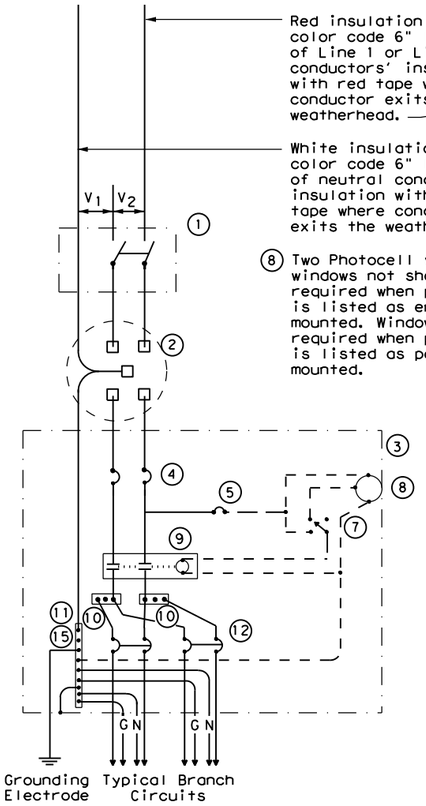
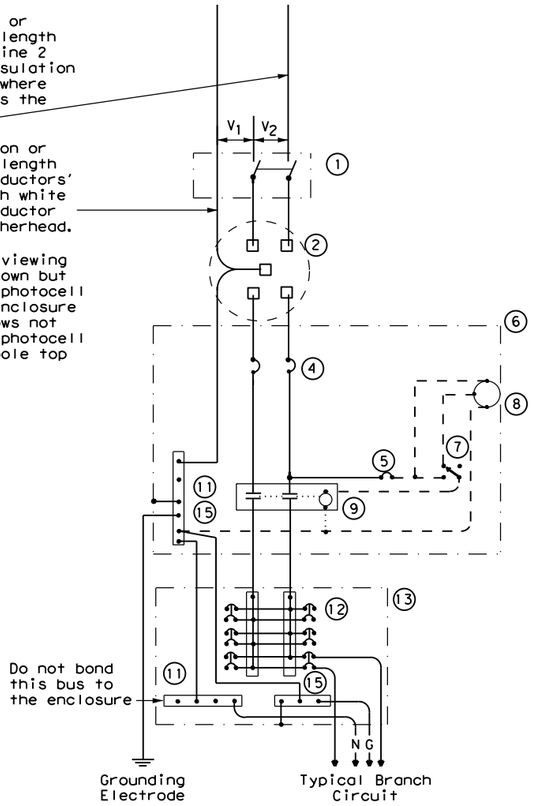
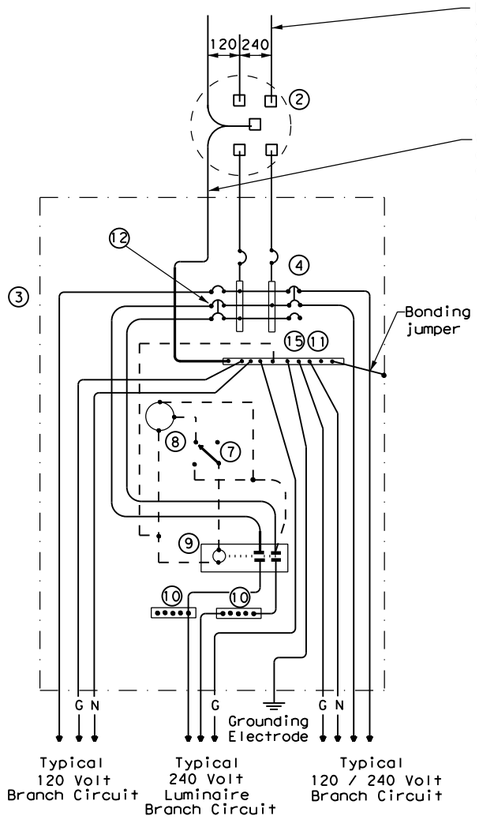


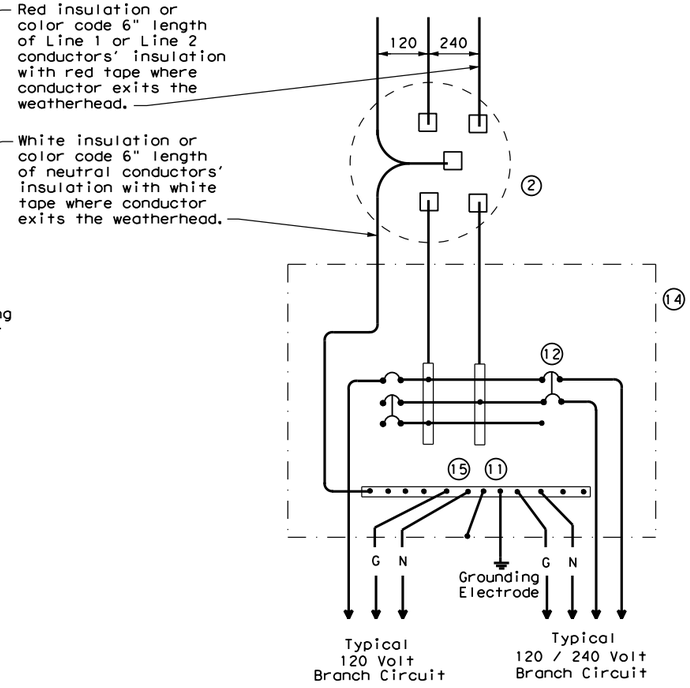
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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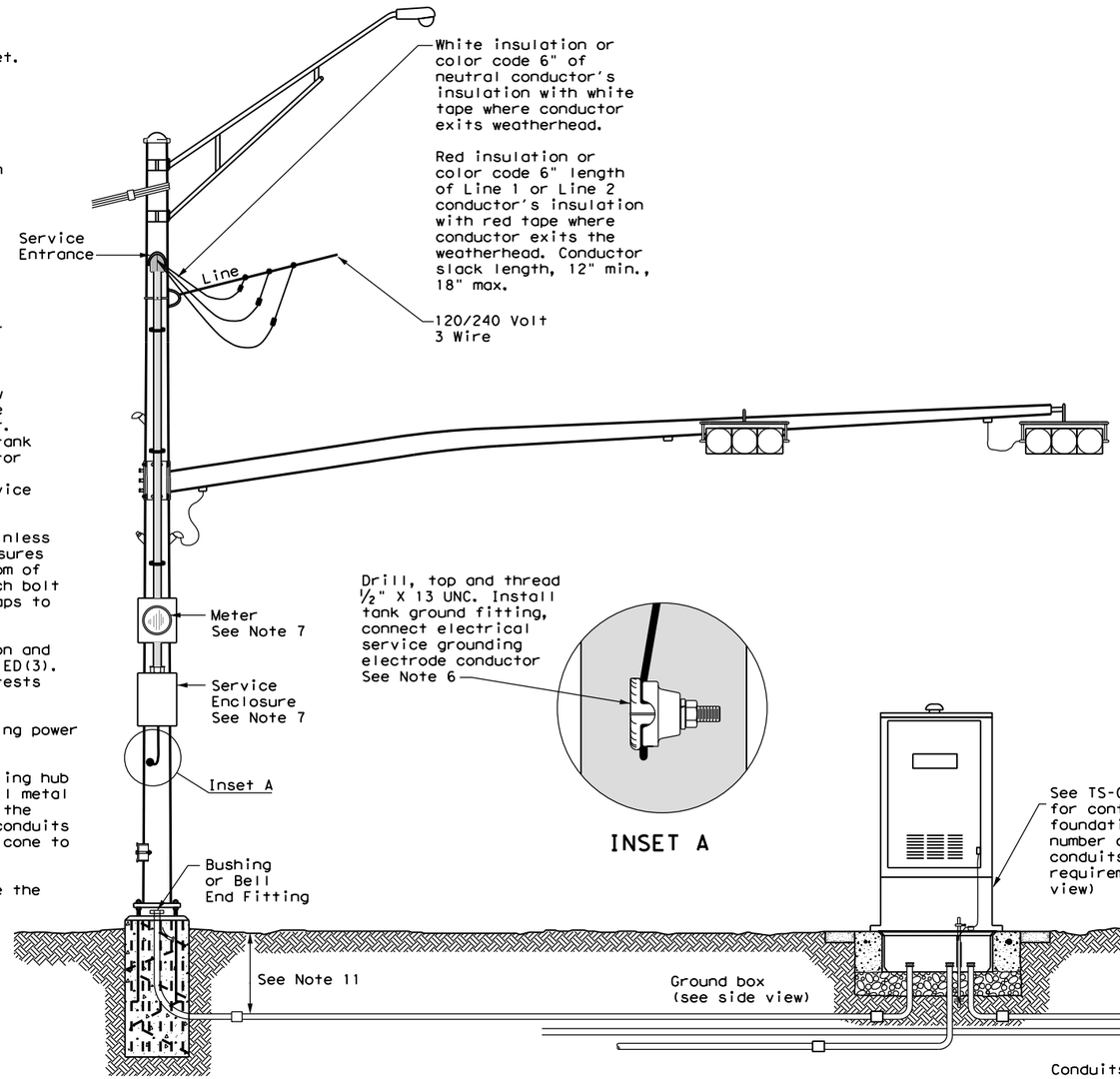
TRAFFIC SIGNAL NOTES

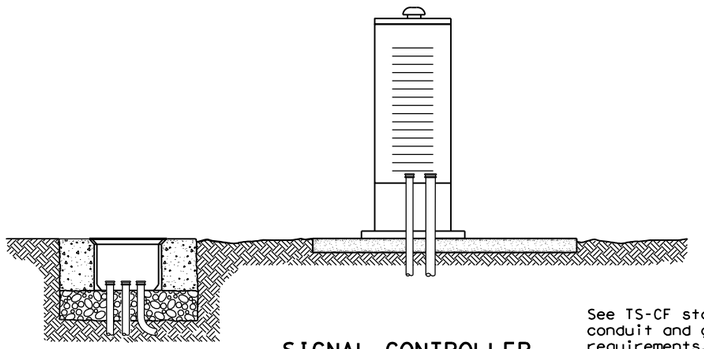
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material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

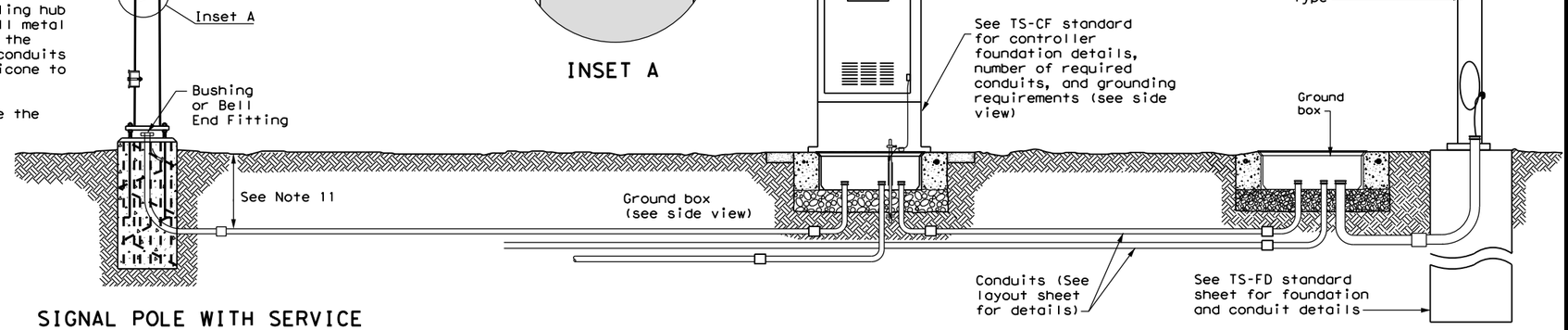
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

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

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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.

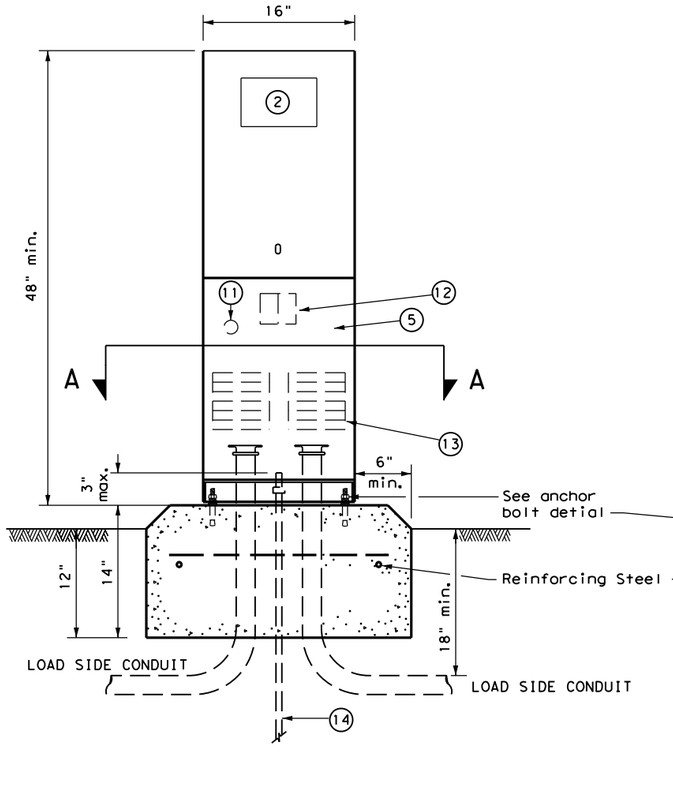
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ 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.

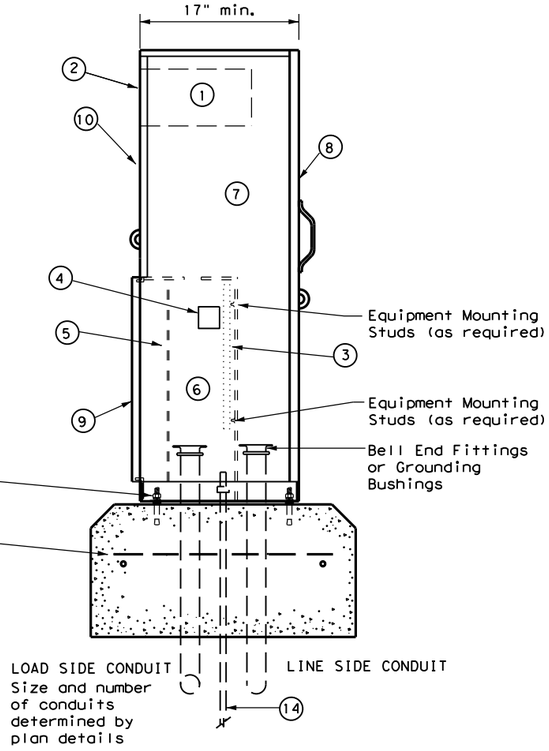
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to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

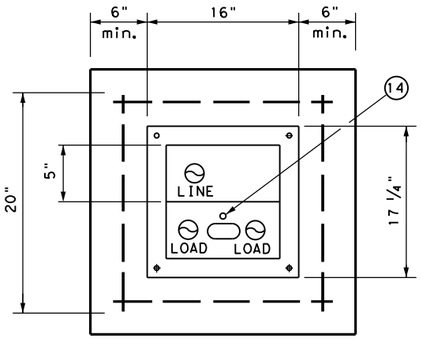


FRONT VIEW

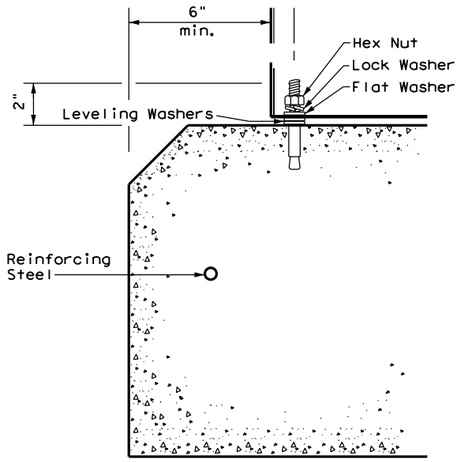


SIDE VIEW

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

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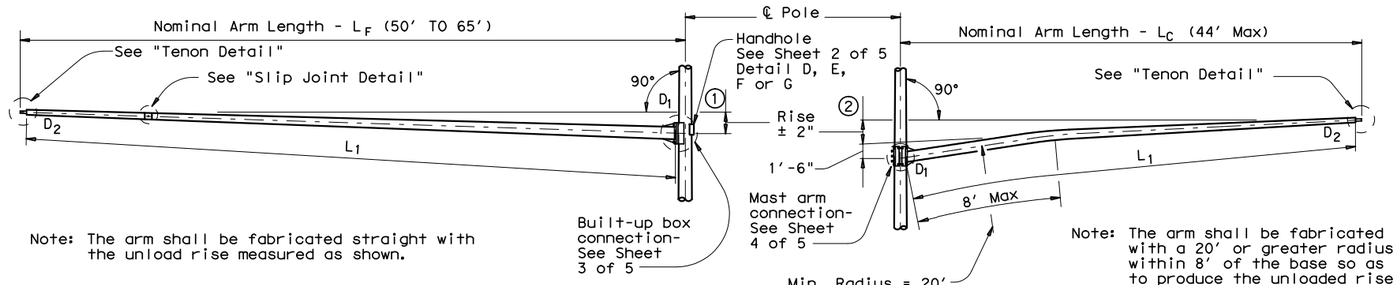


Note: The arm shall be fabricated straight with the unload rise measured as shown.

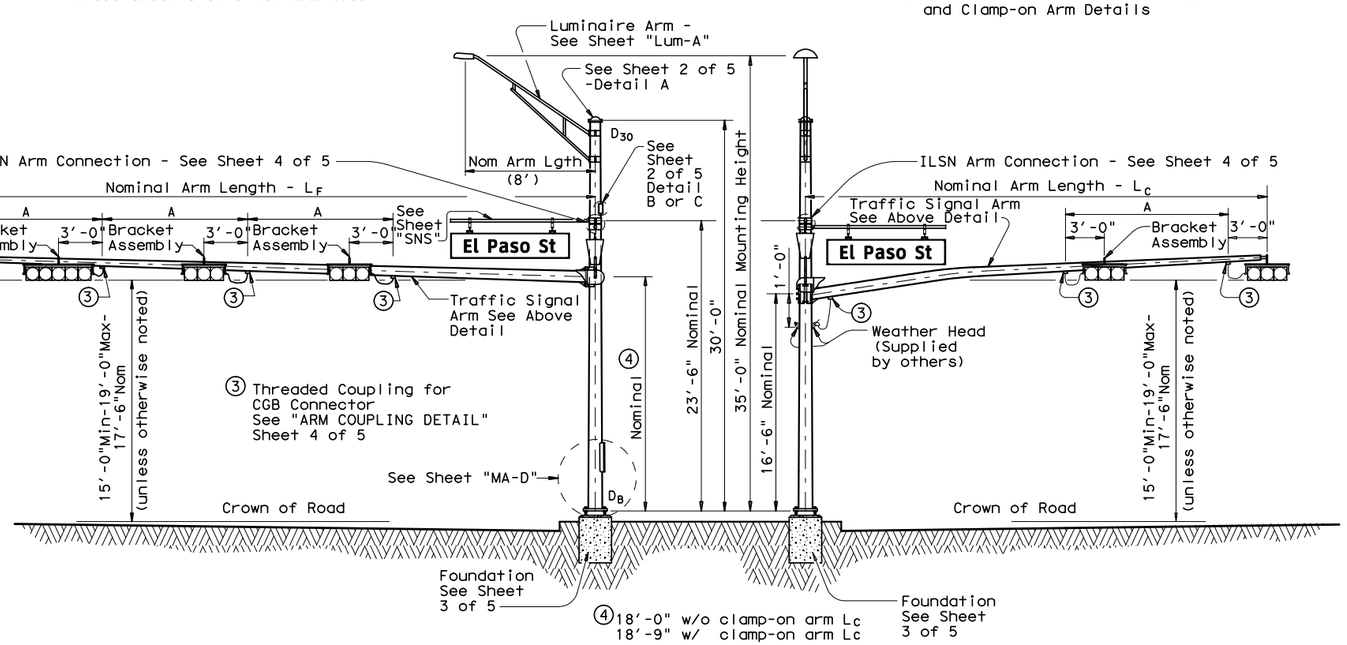
Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

FIXED MOUNT TRAFFIC SIGNAL ARM

① See Sheet 3 of 5 for Arm Rise

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

② See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



ELEVATION

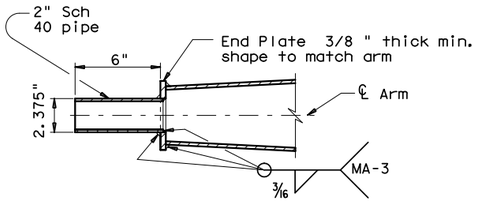
(Showing fixed mount arm)

STRUCTURE ASSEMBLY

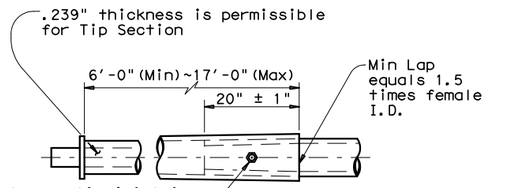
ELEVATION

(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"										
Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



Note: A slip joint is permissible for arms 50' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL(FIXED MOUNT ARM)

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 can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL ⑤	WL EPA ⑤⑥
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

⑤ Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

⑥ Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole 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.

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. Material, fabrication tolerances, and shipping practices shall also 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.

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

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

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Sheet 1 of 5

DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

REVISIONS
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CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		72

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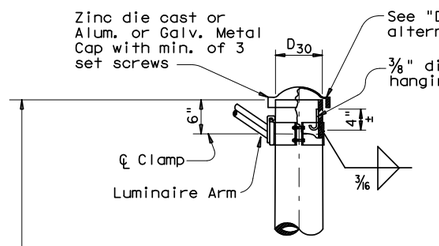
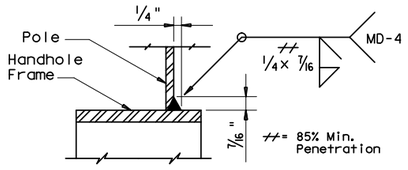
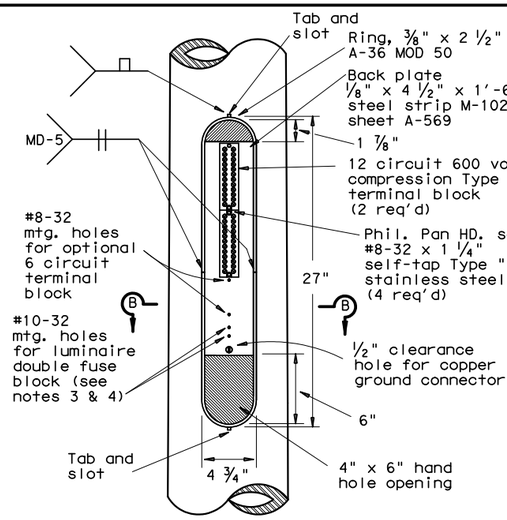


DETAIL A

(for pole with luminaire)



DETAIL H

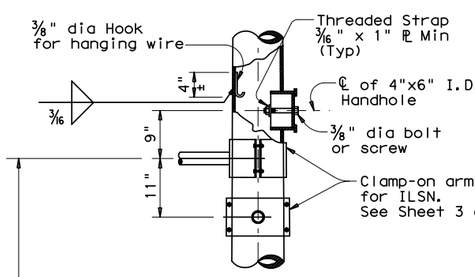


ACCESS COMPARTMENT

MATERIALS	
Round Shafts or Polygonal Shafts (7)	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 (8)
Plates (7)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe (7)	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

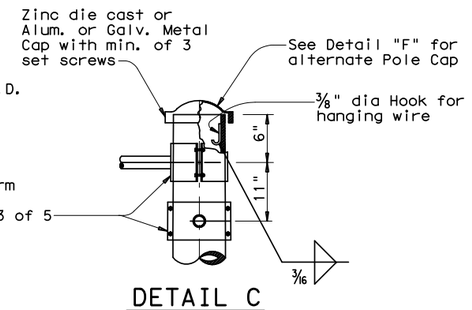
(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(8) ASTM A1011 SS Gr.50 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.

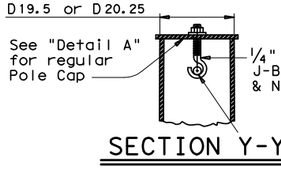


DETAIL B

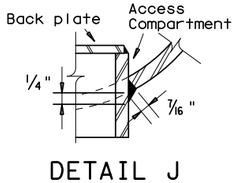
(If ILSN applied)



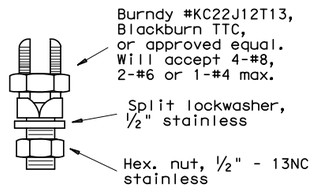
DETAIL C



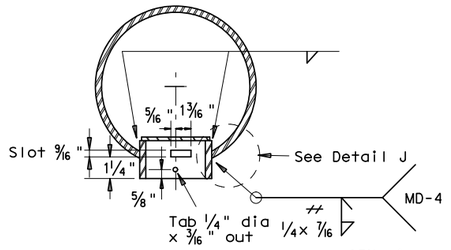
SECTION Y-Y



DETAIL J



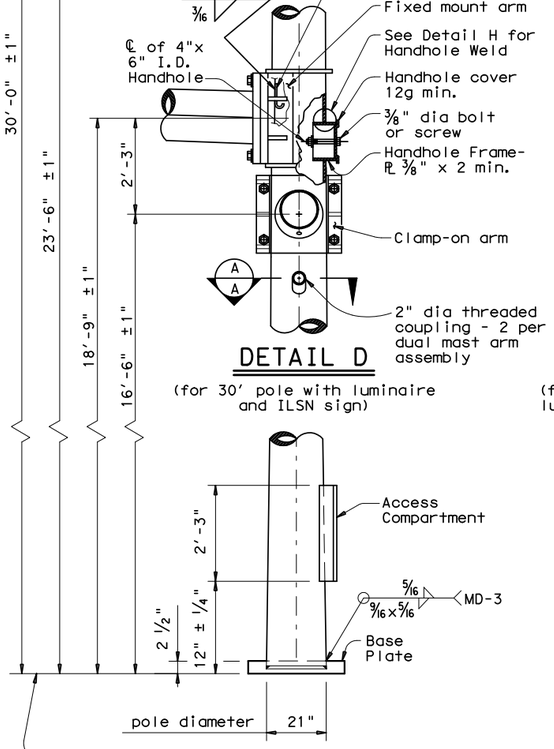
COPPER GROUND CONNECTOR



SECTION B-B

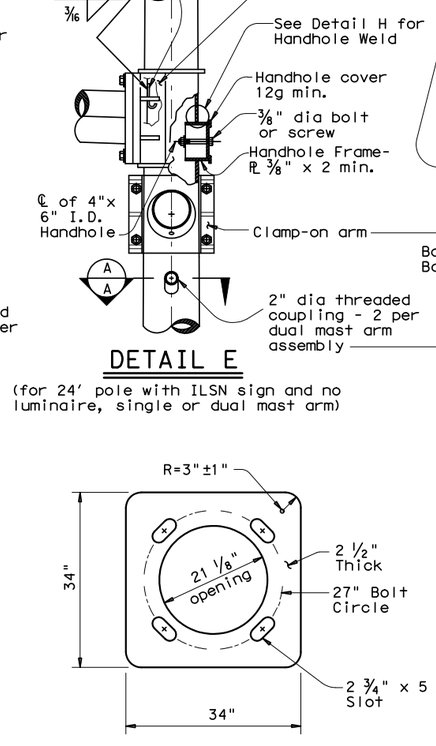
// = 85% Min. Penetration

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



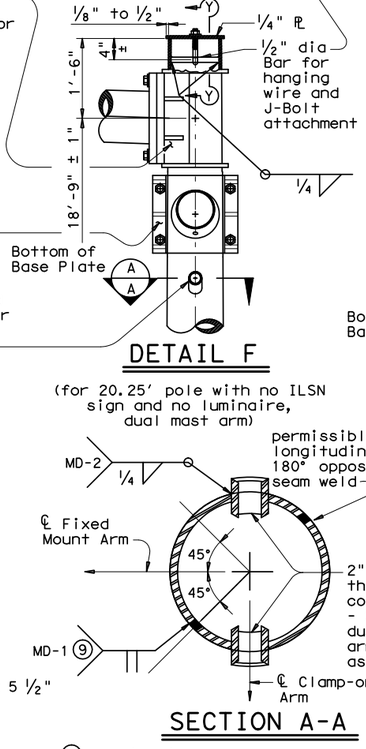
DETAIL D

(for 30' pole with luminaire and ILSN sign)



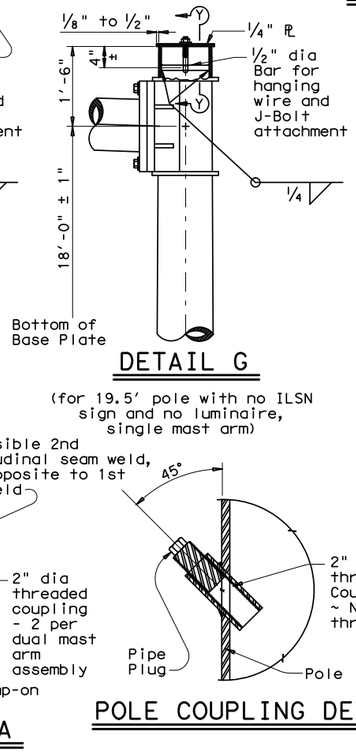
DETAIL E

(for 24' pole with ILSN sign and no luminaire, single or dual mast arm)



DETAIL F

(for 20.25' pole with no ILSN sign and no luminaire, dual mast arm)



DETAIL G

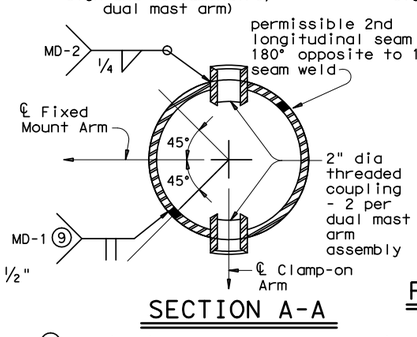
(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

ACCESS COMPARTMENT NOTES:

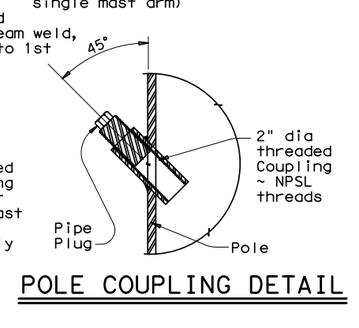
1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 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 1/4" 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.

POLE ELEVATION

BASE PLATE



SECTION A-A



POLE COUPLING DETAIL

(9) Longitudinal seam weld must be oriented within 90° (45° rotation each side) along the fixed mount arm. 60% min penetration required, 100% penetration within 6" of circumferential base weld.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 2 of 5

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1-12	DIST	COUNTY		SHEET NO.
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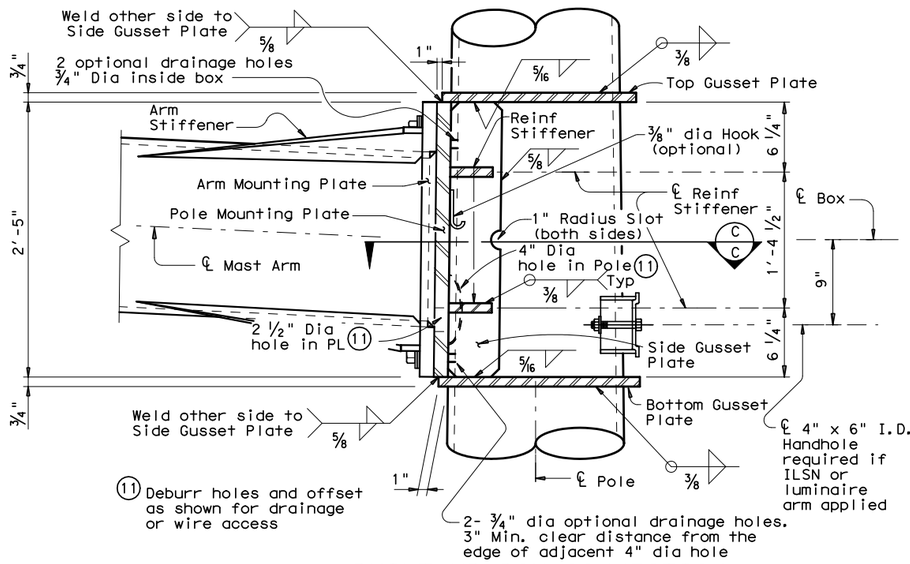
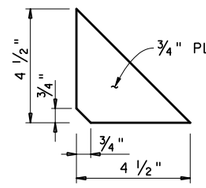
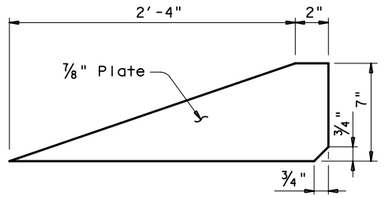


BUILT-UP BOX CONNECTION

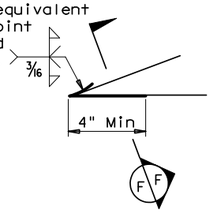


REINFORCING STIFFENER



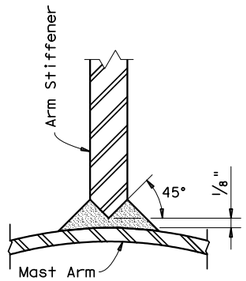
ARM STIFFENER
(Cut to match arm inclination and taper)

Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.



Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

DETAIL "K"



SECTION F-F

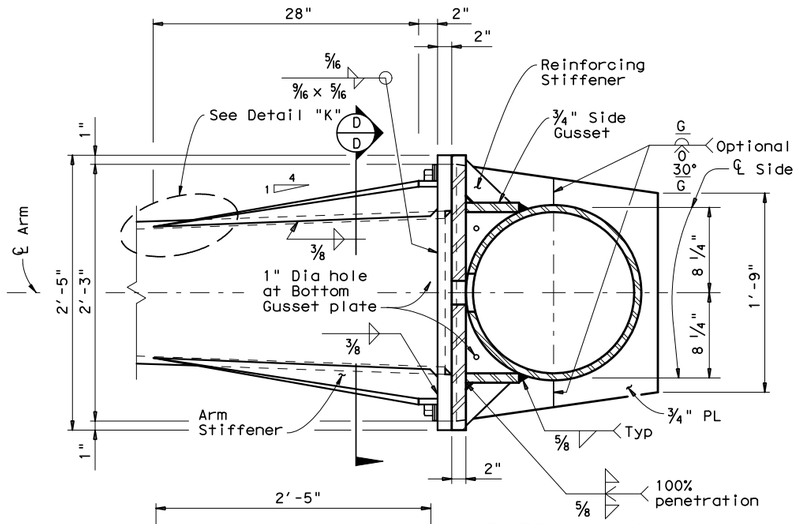
Fixed Mount Arm L_F	ROUND POLES (13)					Foundation Type
	D_B	$D_{19.5}$ or $D_{20.25}$	D_{24}	D_{30}	(12) thk	
ft.	in.	in.	in.	in.	in.	
50', 55' 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L_F	ROUND ARMS (13)				
	L_1	D_1	D_2	(12) thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'- 4"

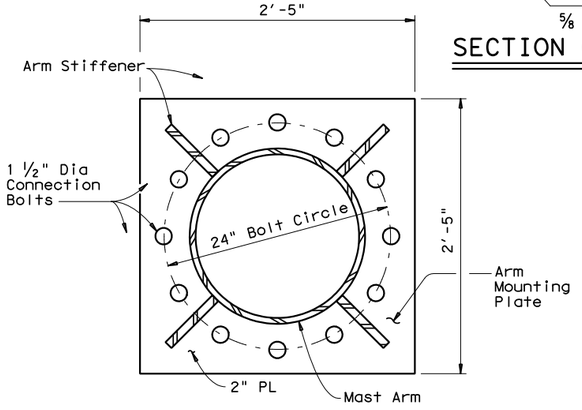
D_B = Pole Base O.D.
$D_{19.5}$ = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
$D_{20.25}$ = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

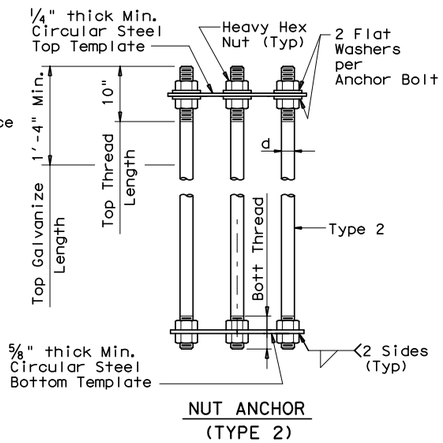
(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.



SECTION C-C

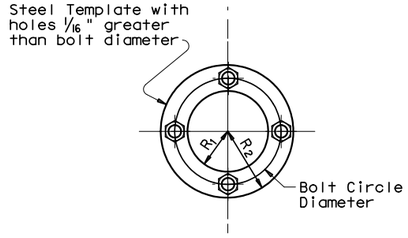


SECTION D-D



NUT ANCHOR
(TYPE 2)

ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL

ANCHOR BOLT & TEMPLATE SIZE						
Bolt Dia in.	Length ‡	Top Thread	Bottom Thread	Bolt Circle	R_2	R_1
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

‡ Min dimension given, longer bolts are acceptable.

FOUNDATION DESIGN TABLE													
FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)				FOUNDATION DESIGN LOAD (15)		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							
48-A	48"	20 #9	#4 at 6"	21.9	19.5	14.7	2 1/2"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

(14) Anchor bolt design develops the foundation capacity given under Foundation Design Laods.

(15) Foundation Design Loads are the allowable moments and shears at the base of the structure.

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

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

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

GENERAL NOTES:

Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 1/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

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

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TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

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DN: JSY	CK: ARC	DW: TGG	CK: JSY

REVISIONS
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CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		74

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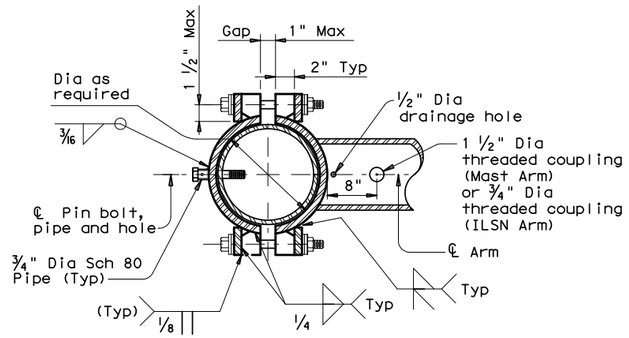
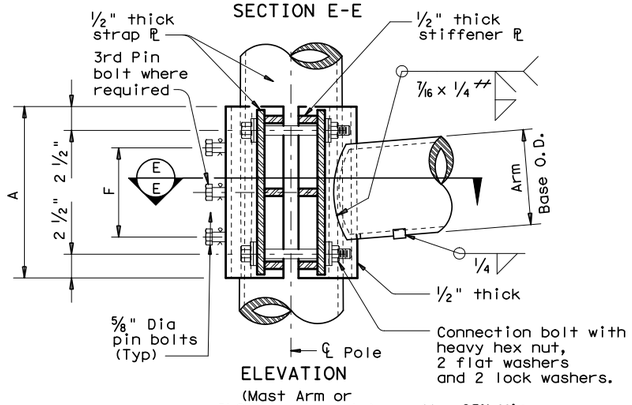


SECTION E-E



ELEVATION
(Mast Arm or ILSN Arm to pole)

= 85% Min. Penetration

CLAMP-ON CONNECTION

80 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	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"

100 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

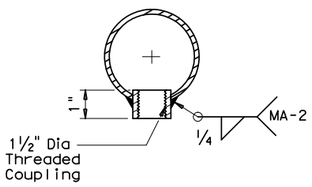
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
Lc = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

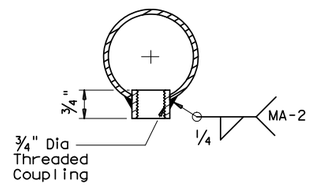
CLAMP-ON ARM CONNECTION

ILSN Arm Size		A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
Sch 40 pipe Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
3	.216	10	4	¾	2

Mast Arm Size		A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
Base Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 ¼	3
9.5	.239	18	12	1 ¼	3
10.0	.239	18	12	1 ¼	3
10.5	.239	18	12	1 ¼	3
11.0	.239	18	12	1 ¼	3
11.5	.239	18	12	1 ¼	3



ARM COUPLING DETAIL



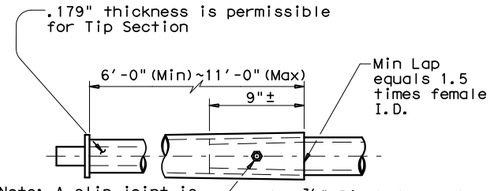
ILSN ARM COUPLING DETAIL

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 ½" wide vertical slotted hole may 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". For an ILSN arm, a 1 ½" diameter hole shall be cut in the front clamp plate for wire 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 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. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have 3/16" diameter holes for a 1/8" diameter galvanized cotter pin. Back clamp plate shall be furnished with a ¾" diameter hole for each pin bolt. An 11/16" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

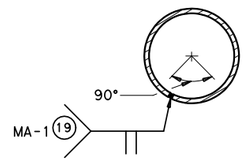


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL (CLAMP-ON ARM)

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

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.
60% Min penetration
100% penetration within 6" of circumferential base welds.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 4 of 5 LMA(4)-12

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01	0165	01	109, ETC.	US 271, ETC.
1-12	DIST	COUNTY		SHEET NO.
	TYL	SMITH		75

DATE:
FILE:

131D

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 See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		24′ Poles with ILSN See note above plus one small hand hole		19.50′ (Single Mast Arm) 20.25′ (Dual Mast Arm) Poles with no Luminaire and no ILSN See note above	
Single Mast Arm						
Lf ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	50L	1	50S		50	
55	55L		55S		55	
60	60L		60S		60	
65	65L		65S		65	
Dual Mast Arm						
Lf ft. / Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50 / 20	5020L		5020S		5020	
50 / 24	5024L		5024S		5024	
50 / 28	5028L		5028S		5028	
50 / 32	5032L		5032S		5032	
50 / 36	5036L		5036S		5036	
50 / 40	5040L		5040S		5040	
50 / 44	5044L		5044S		5044	
55 / 20	5520L		5520S		5520	
55 / 24	5524L		5524S		5524	
55 / 28	5528L		5528S		5528	
55 / 32	5532L		5532S		5532	
55 / 36	5536L		5536S		5536	
55 / 40	5540L		5540S		5540	
55 / 44	5544L		5544S		5544	
60 / 20	6020L		6020S		6020	
60 / 24	6024L		6024S		6024	
60 / 28	6028L		6028S		6028	
60 / 32	6032L		6032S		6032	
60 / 36	6036L		6036S		6036	
60 / 40	6040L		6040S		6040	
60 / 44	6044L		6044S		6044	
65 / 20	6520L		6520S		6520	
65 / 24	6524L		6524S		6524	
65 / 28	6528L		6528S		6528	
65 / 32	6532L		6532S		6532	
65 / 36	6536L		6536S		6536	
65 / 40	6540L		6540S		6540	
65 / 44	6544L		6544S		6544	

Shipping Parts List		
Traffic Signal Arms (Fixed Mount) (1 per pole) Ship each arm with listed equipment attached		
Nominal Arm Length	Type IV Arm (4 Signals) 3 Bracket Assembly and 4 CGB Connectors	
ft.	Designation	Quantity
50	50IV	1
55	55IV	
60	60IV	
65	65IV	

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	1

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

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5′ - 3"	1

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.

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet)
			48-A
P-6	10	1	22
Total Drill Shaft Length			22

Notes

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

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

Abbreviations

Lf= Fixed Arm Length

Lc= Clamp-on Arm Length (44′ Max.)

Texas Department of Transportation
Traffic Operations Division

LONG MAST ARM ASSEMBLY PARTS LIST

LONG MAST ARM LIST -
US 271 AT NE LOOP 323
Sheet 5 of 5

LMA(5)-12

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		76

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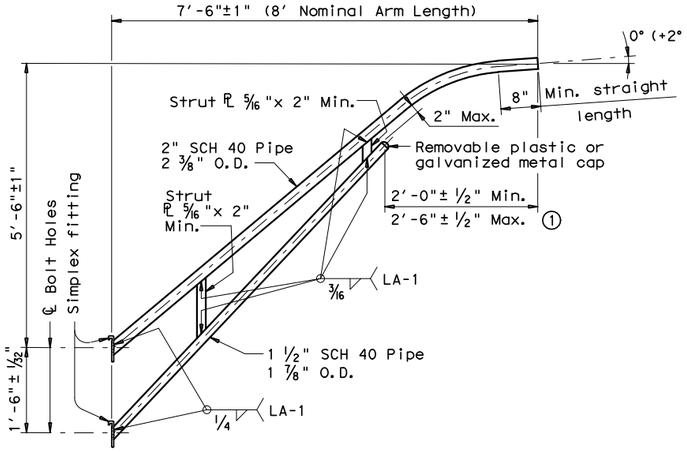
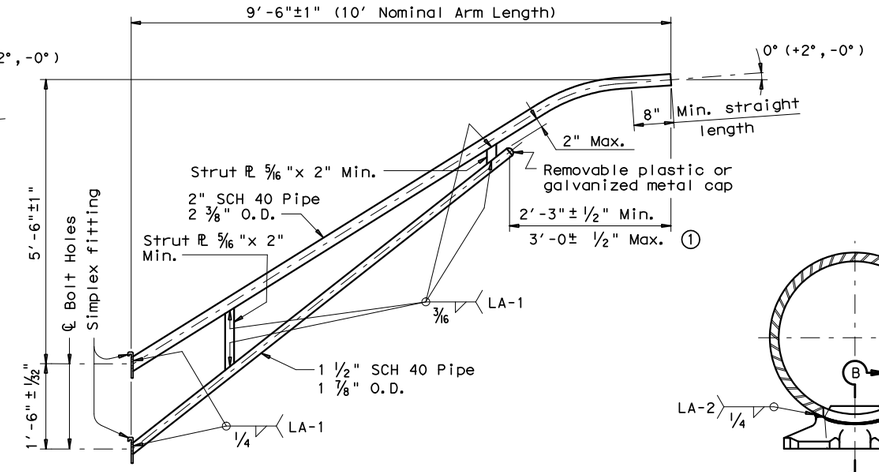
DATE:
FILE:

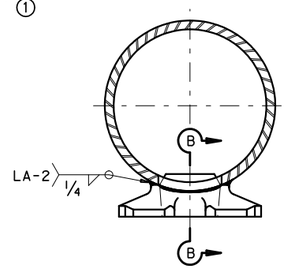
DATE:
FILE:



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.

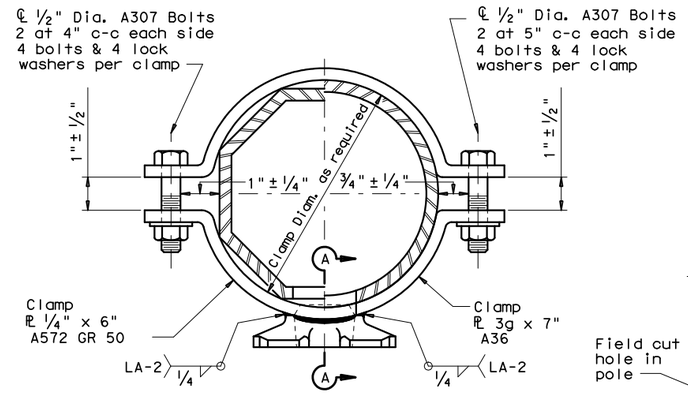
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified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

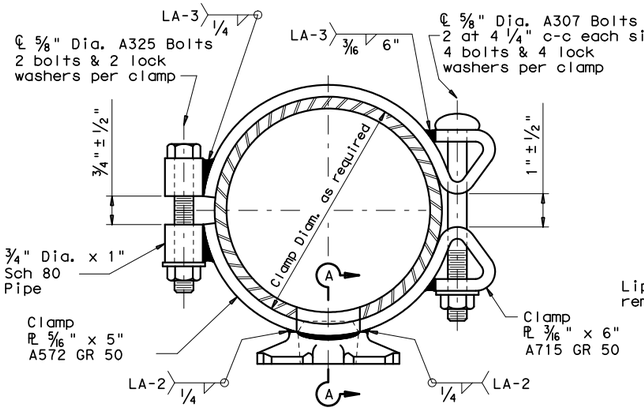
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly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



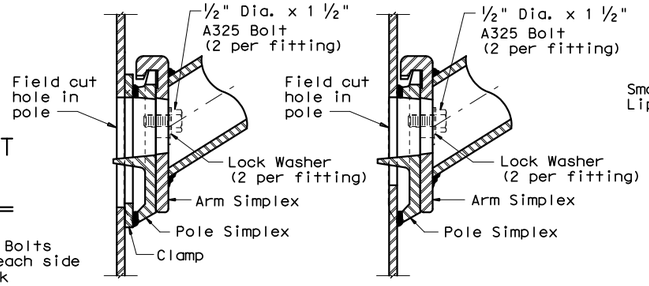
CLAMP ATTACHMENT DETAIL NO.1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO.2 (HALF SECTION)



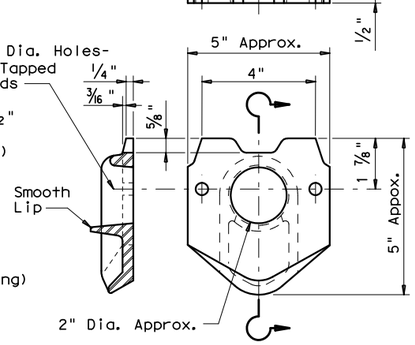
CLAMP ATTACHMENT DETAIL NO.3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO.4 (HALF SECTION)

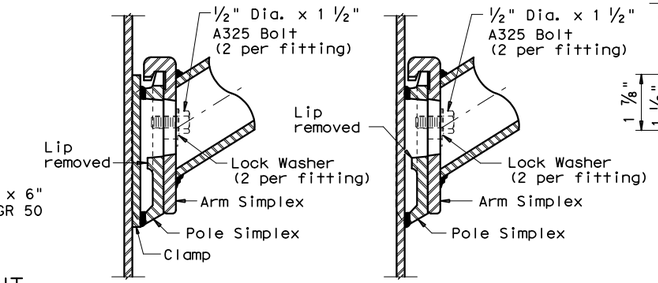


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

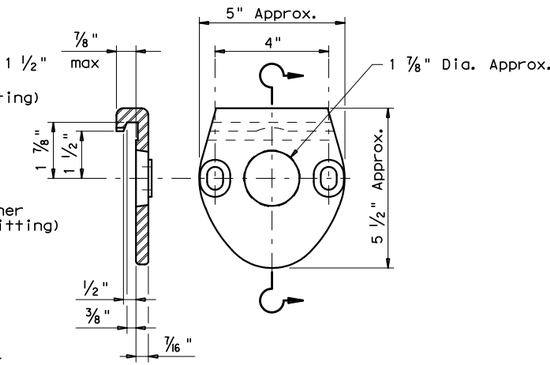


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

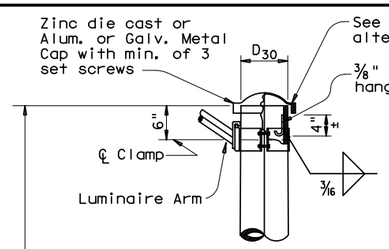
LUM-A-12

REVISIONS
5-96
1-99
1-12

DN: LEH	CK: JSY	DW: LTT	CK: TEB

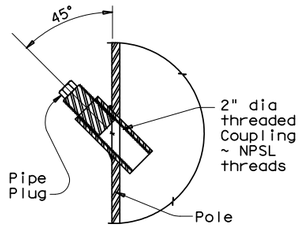
CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.

DIST	COUNTY	SHEET NO.
TYL	SMITH	77

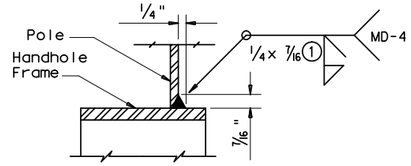


DETAIL A

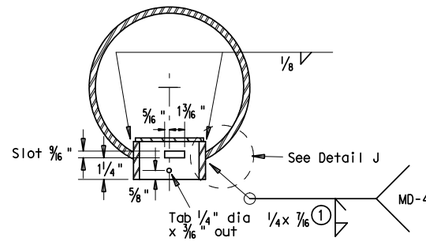
(for pole with luminaire)



POLE COUPLING DETAIL

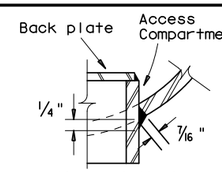


DETAIL G

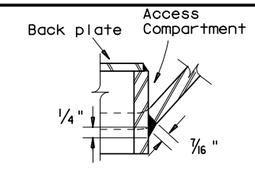


SECTION X-X

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

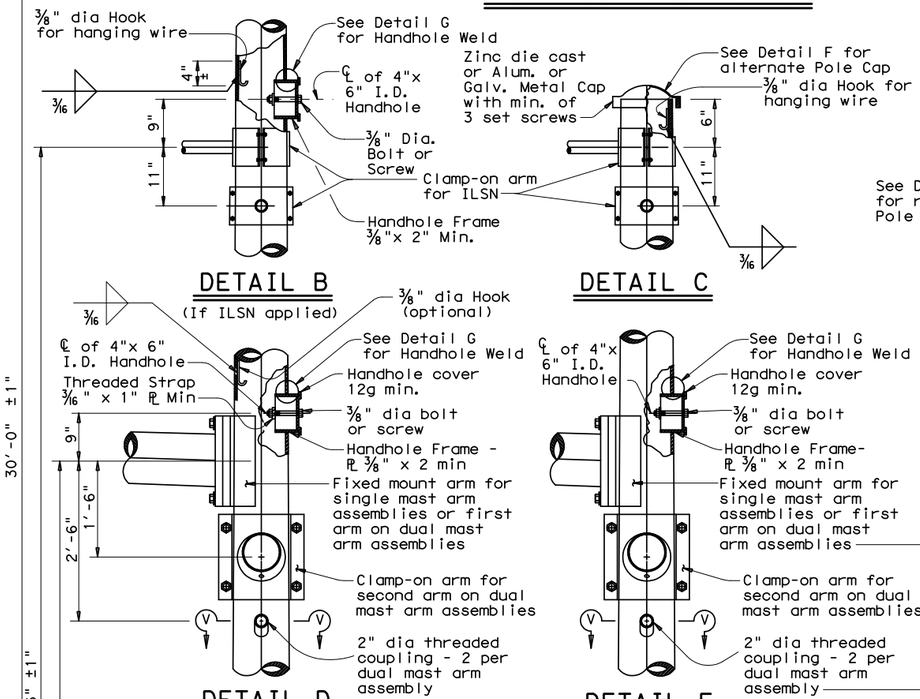


Round Pole



Polygonal Pole

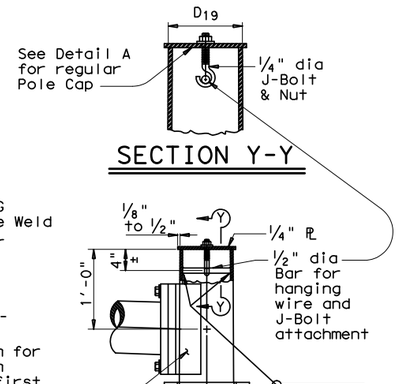
DETAIL J



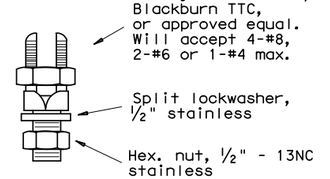
DETAIL B

(If ILSN applied)

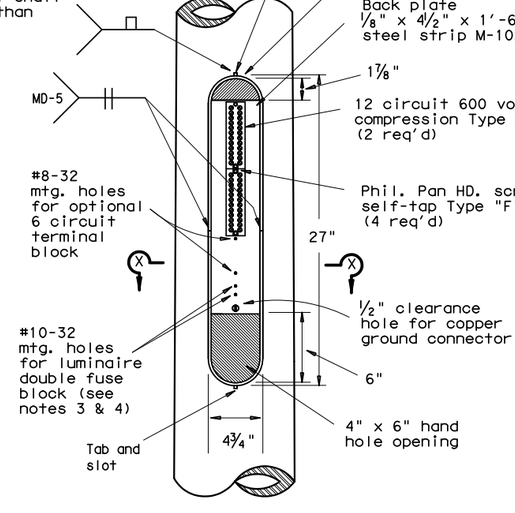
DETAIL C



SECTION Y-Y



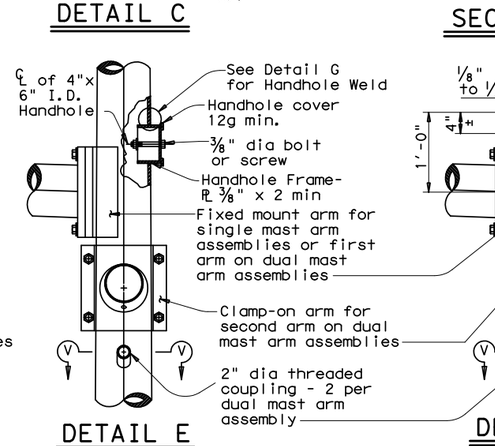
COPPER GROUND CONNECTOR



ACCESS COMPARTMENT

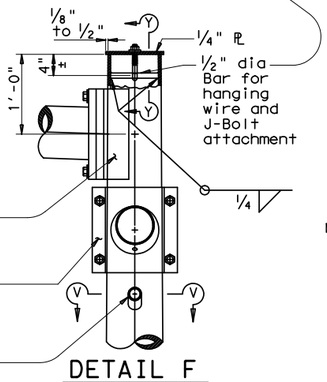
DETAIL D

(for 30' pole with luminaire and ILSN sign)



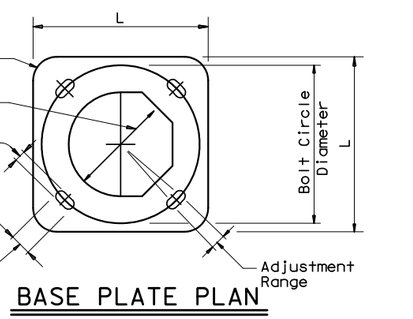
DETAIL E

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

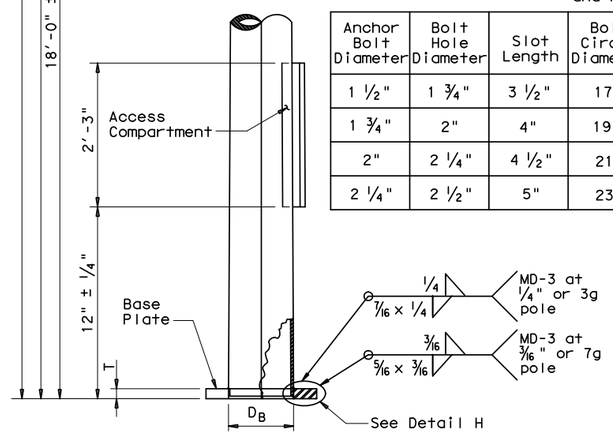


DETAIL F

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

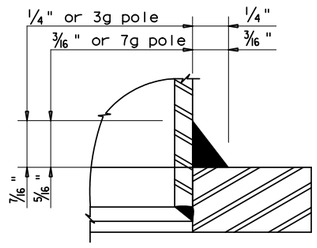


SECTION V-V



POLE ELEVATION

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



DETAIL H

BASE PLATE PLAN

(1) 85% Min. penetration

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

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 1/4" 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.

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

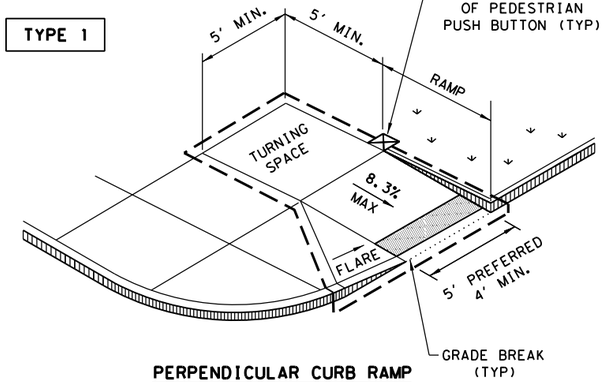
REVISIONS
8-99
1-12

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		78

DATE:
FILE:

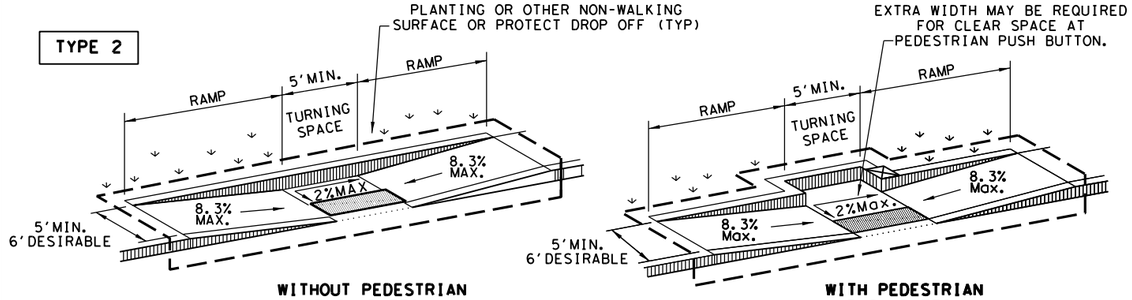
DATE:
FILE:

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

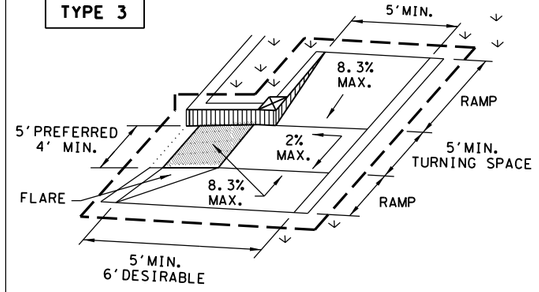


WITHOUT PEDESTRIAN PUSH BUTTON

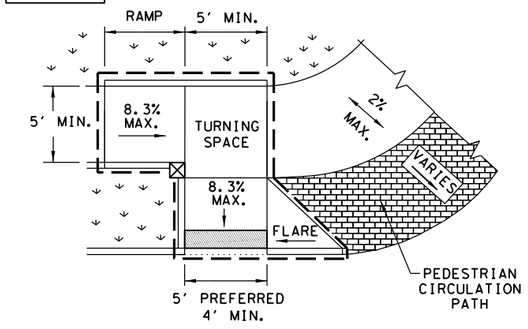
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

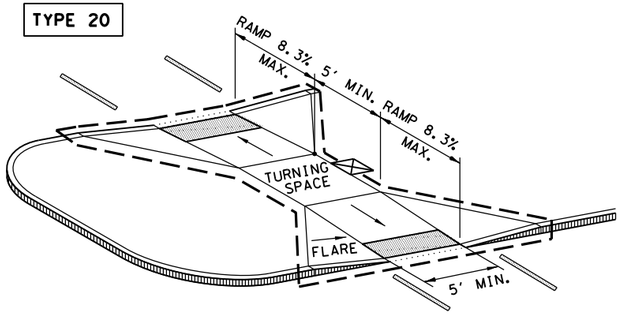


TYPE 6



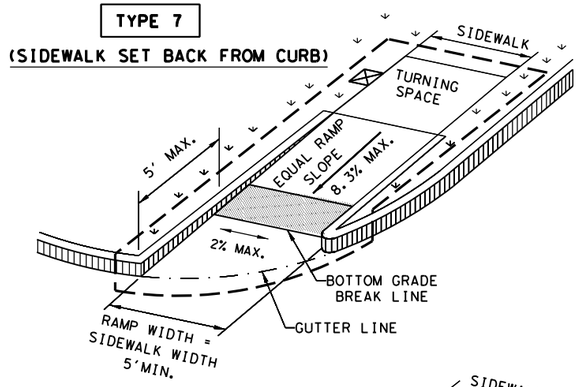
COMBINATION CURB RAMPS

TYPE 20

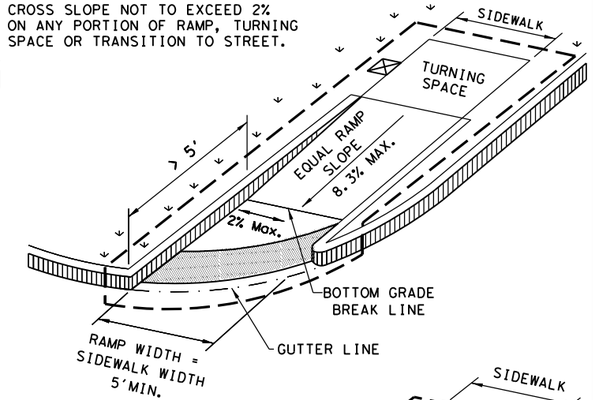


CURB RAMPS AT MEDIAN ISLANDS

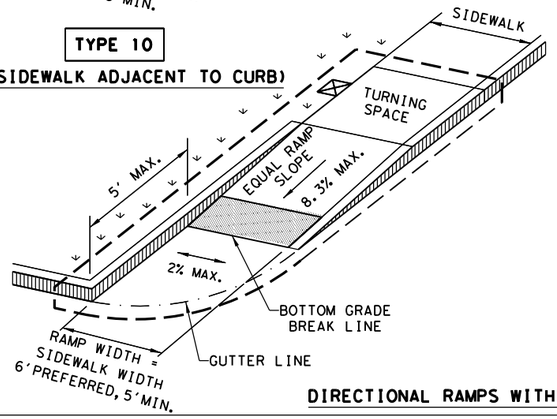
TYPE 7
(SIDEWALK SET BACK FROM CURB)



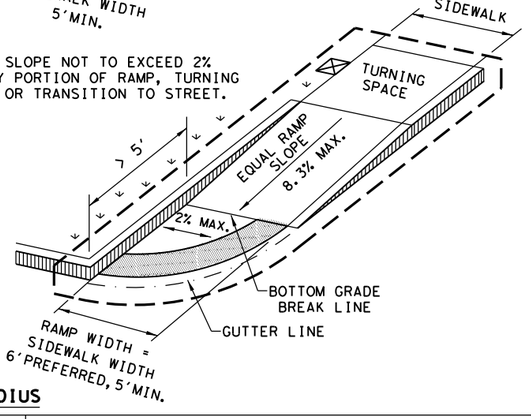
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

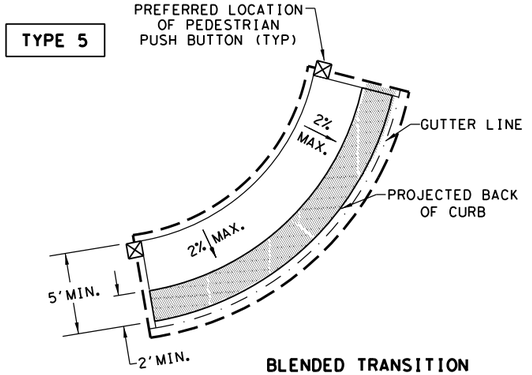


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

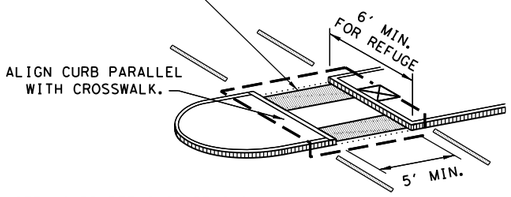
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

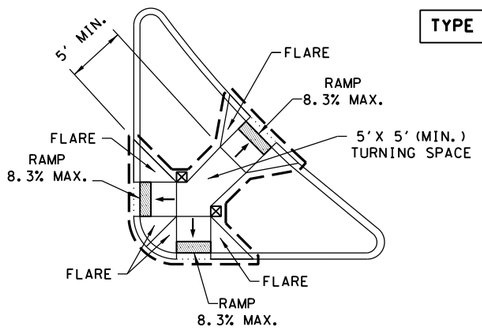
TYPE 21

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.



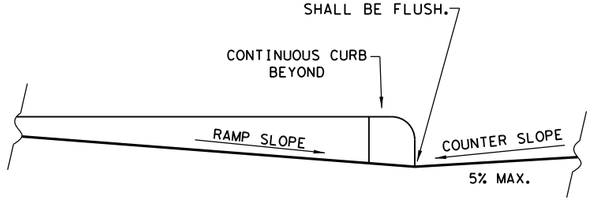
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

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



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0165	01	109, ETC.	US 271, ETC.	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	TYL	SMITH		79	

DATE:
FILE:

GENERAL NOTES

CURB RAMPS

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

DETECTABLE WARNING MATERIAL

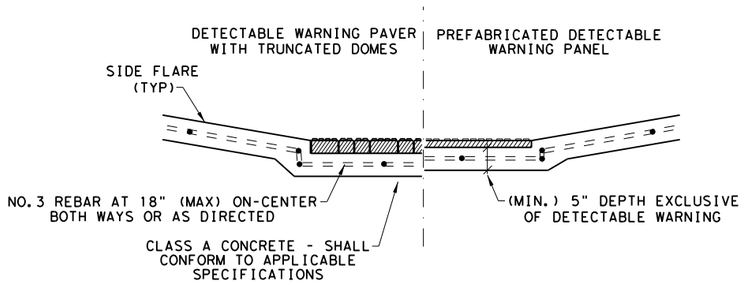
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

DETECTABLE WARNING PAVERS (IF USED)

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

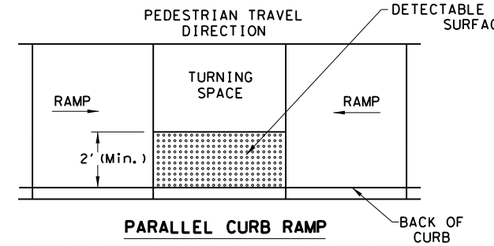
SIDEWALKS

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

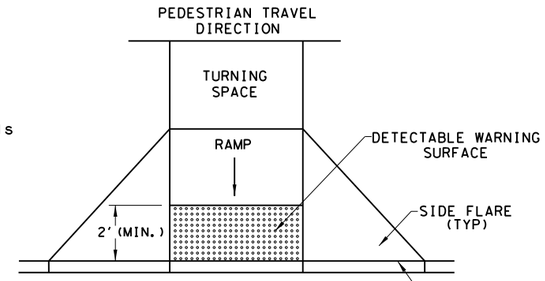


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

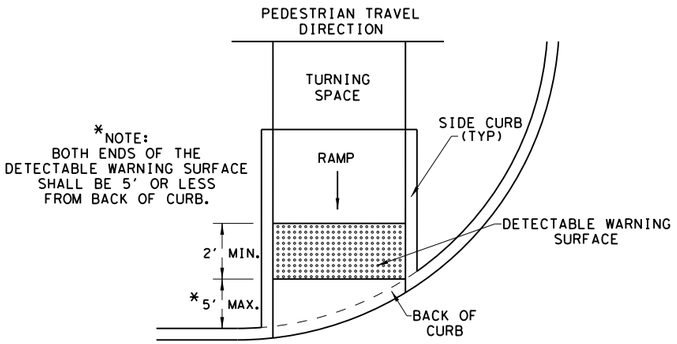
DETECTABLE WARNING SURFACE DETAILS



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



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation

Design Division Standard

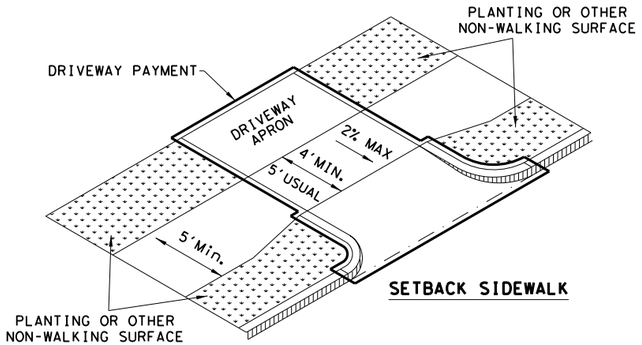
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

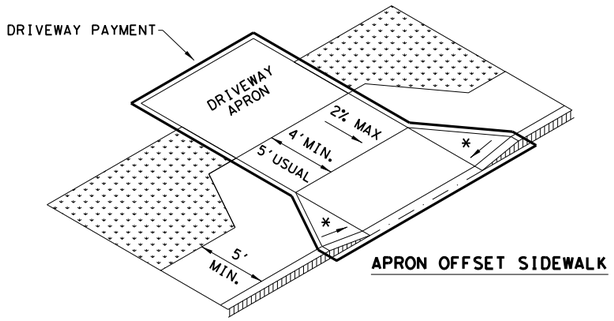
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0165	01	109, ETC.		US 271, ETC.
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	TYL	SMITH			80

DATE:
FILE:

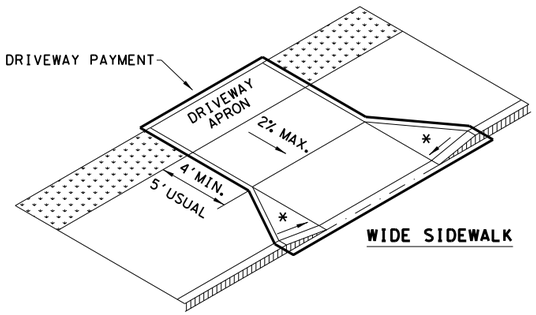
SIDEWALK TREATMENT AT DRIVEWAYS



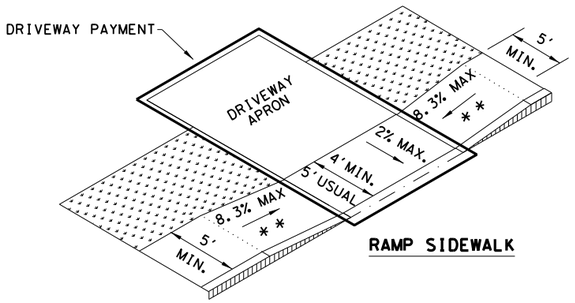
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

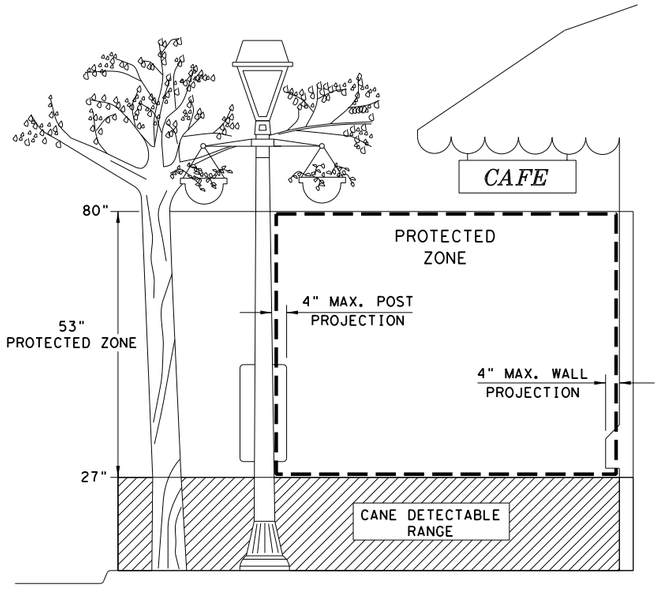


RAMP SIDEWALK

NOTES:

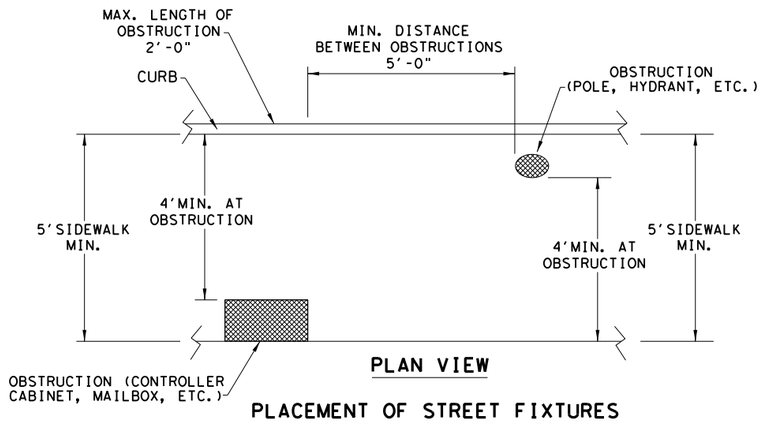
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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



PROTECTED ZONE

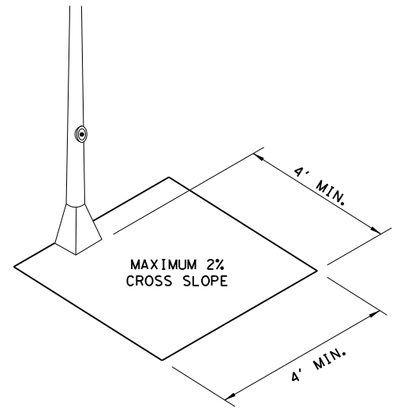
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



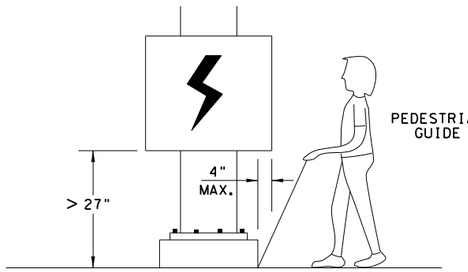
PLAN VIEW

PLACEMENT OF STREET FIXTURES

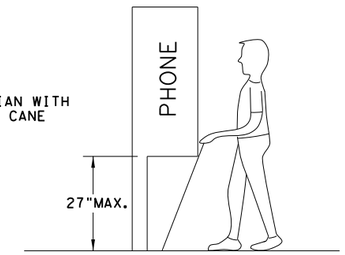
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



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

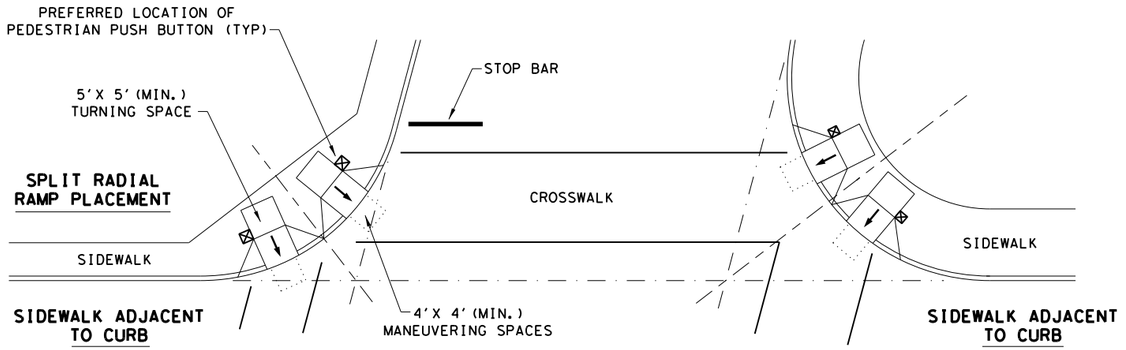
PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	0165	01	109, ETC.		US 271, ETC.
	DIST		COUNTY		SHEET NO.
	TYL		SMITH		81

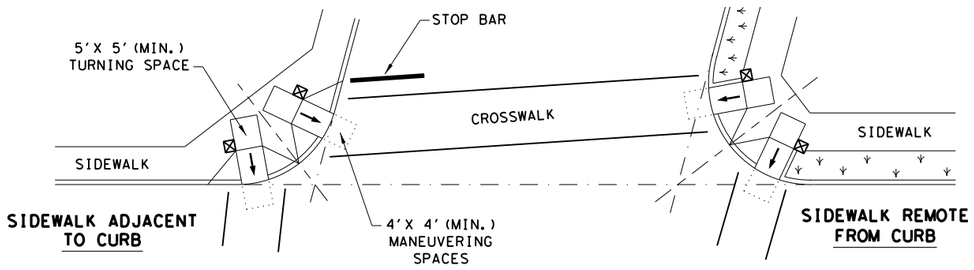
DATE:
FILE:

TYPICAL CROSSING LAYOUTS

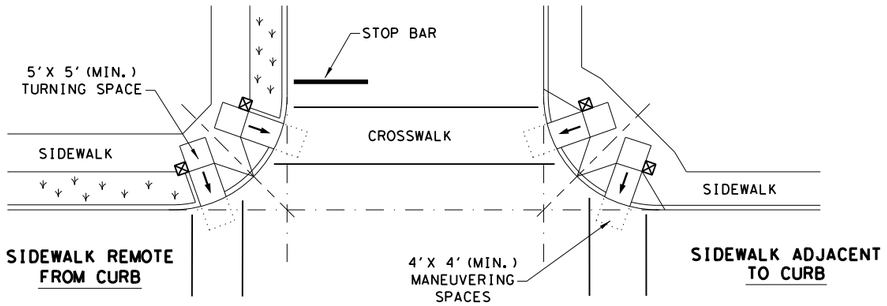
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



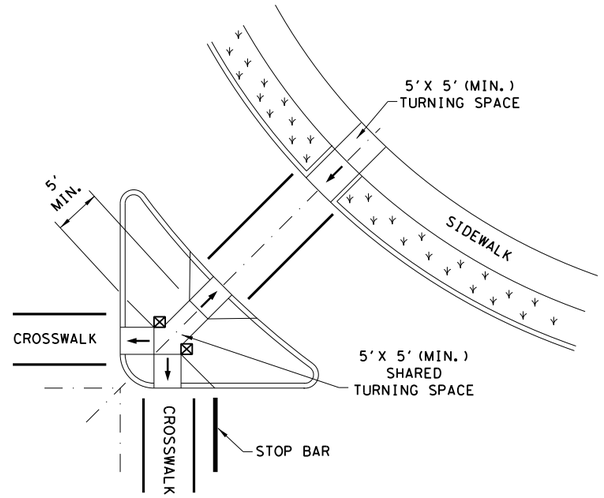
SKEWED INTERSECTION WITH "LARGE" RADIUS



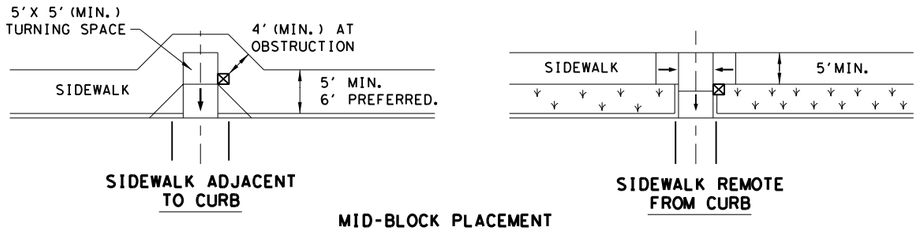
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

SHEET 4 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
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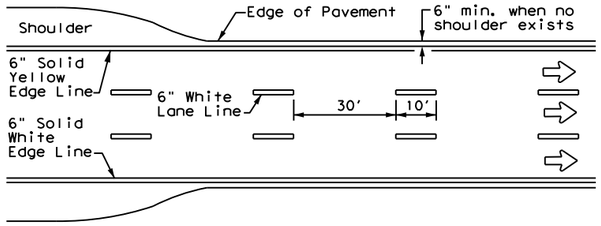
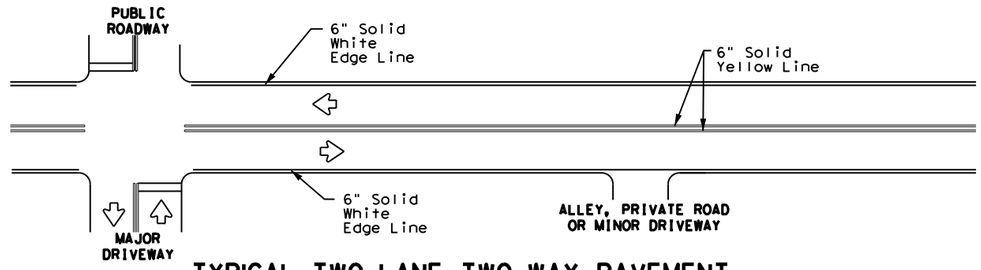
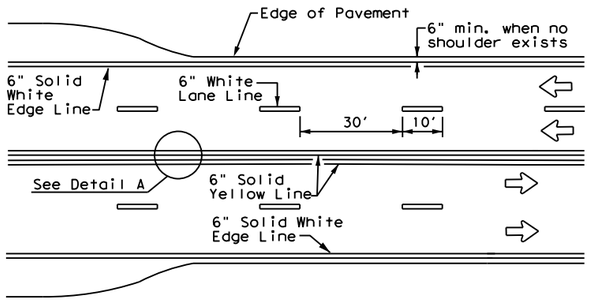
REVISIONS	0165	01	109, ETC.	US 271, ETC.
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	TYL	SMITH		82

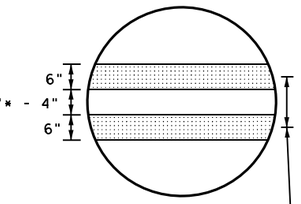


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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

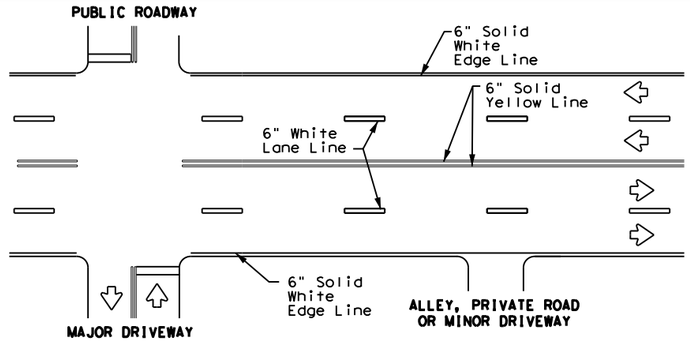




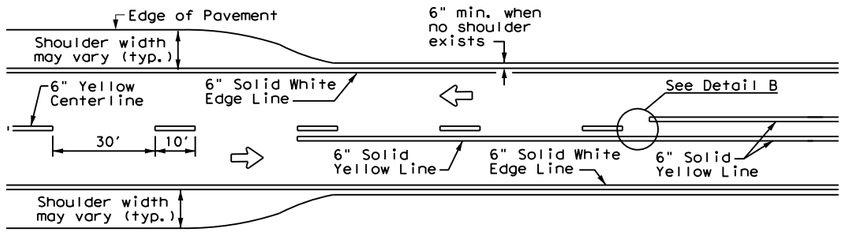
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

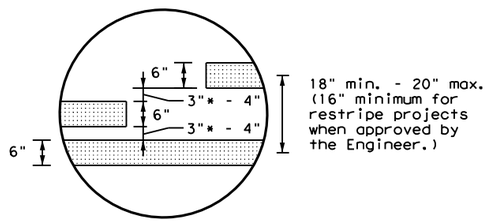
** 8" minimum for restripe projects when approved by the Engineer.



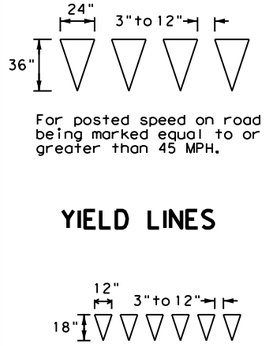
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

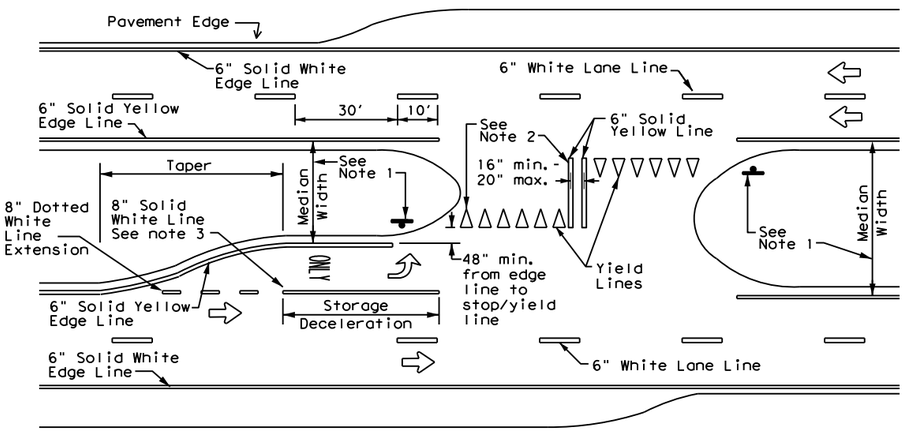


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

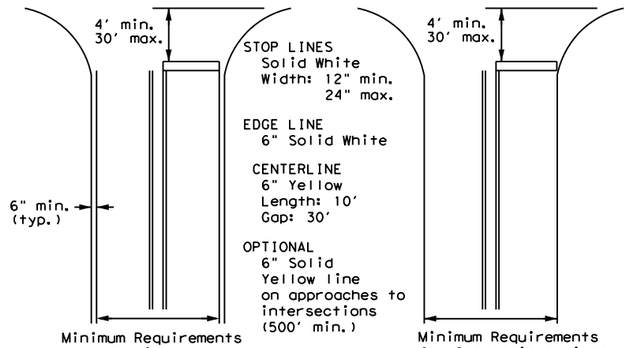
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling 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

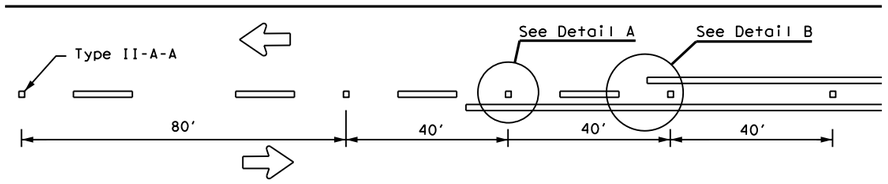
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0165	01	109, ETC.	US 271, ETC.
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	TYL	SMITH		83

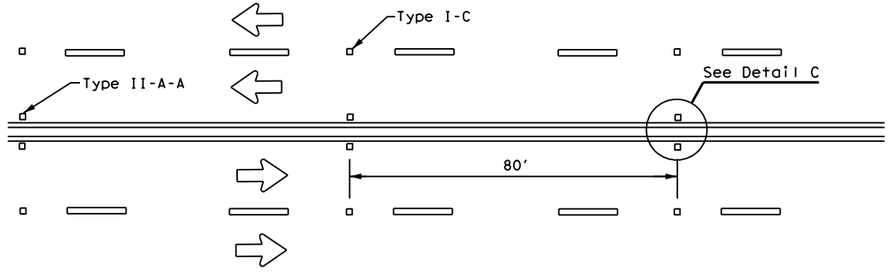
22A

DATE:
FILE:

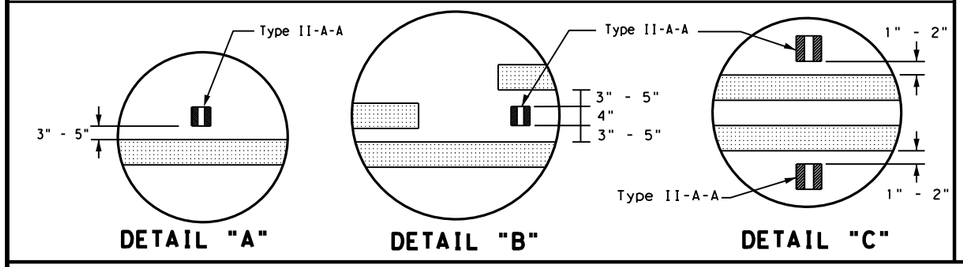
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

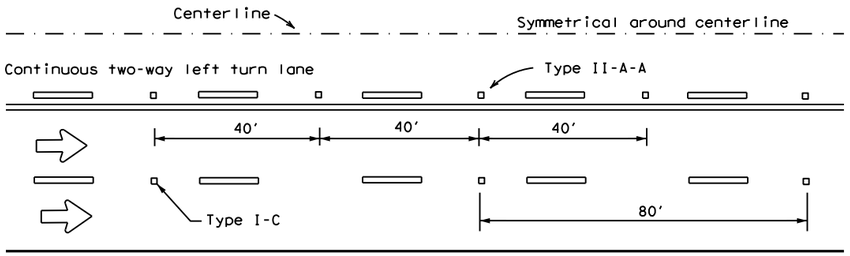


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

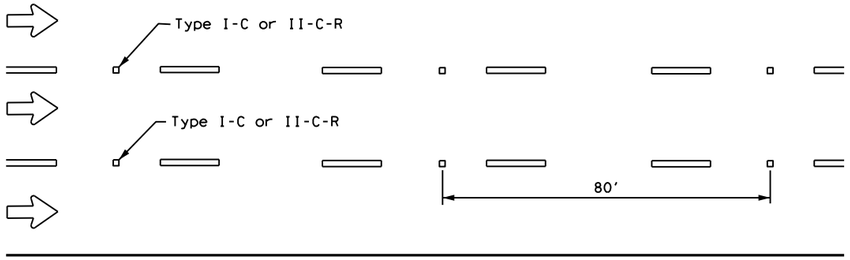


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



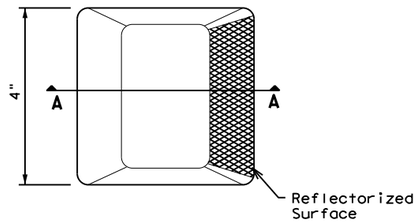
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

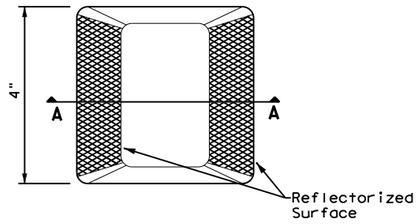
See Note 3.

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

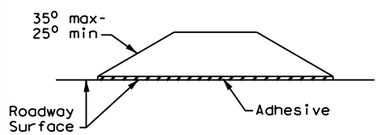
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

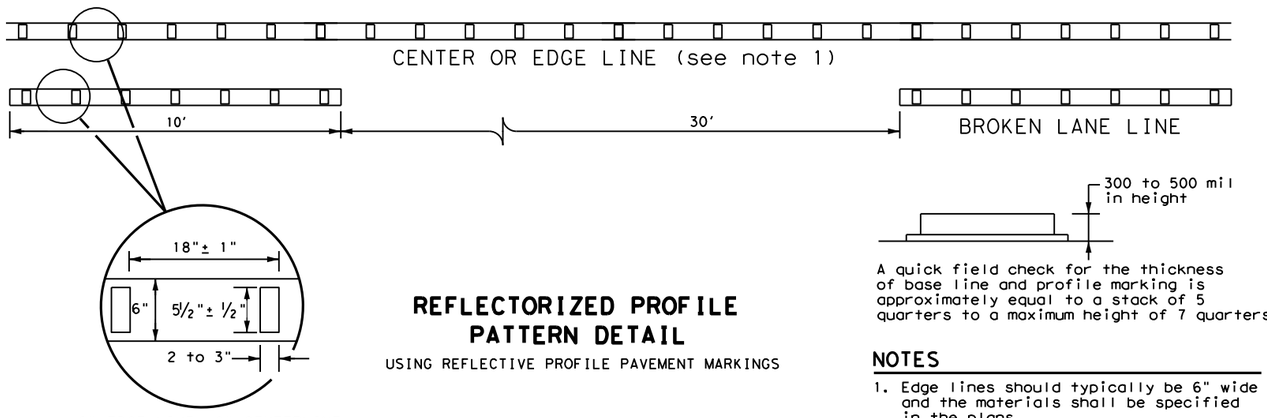


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

NOTES

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

GENERAL NOTES

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

Texas Department of Transportation

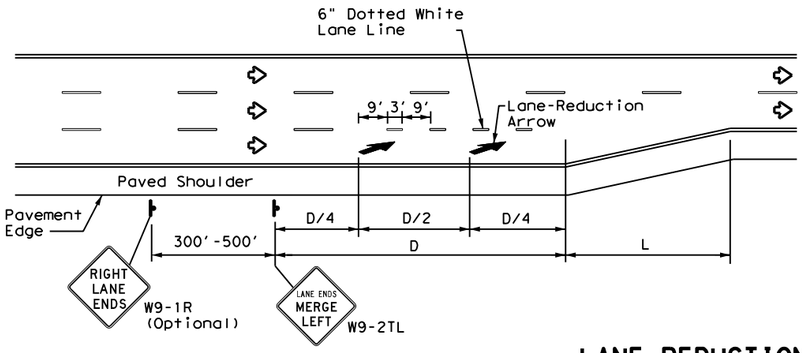
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED 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	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		84

22B

DATE:
FILE:



LANE REDUCTION

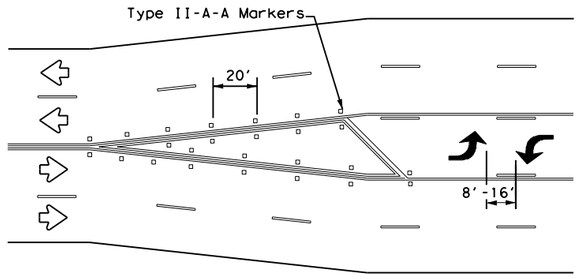
NOTES

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

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

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.

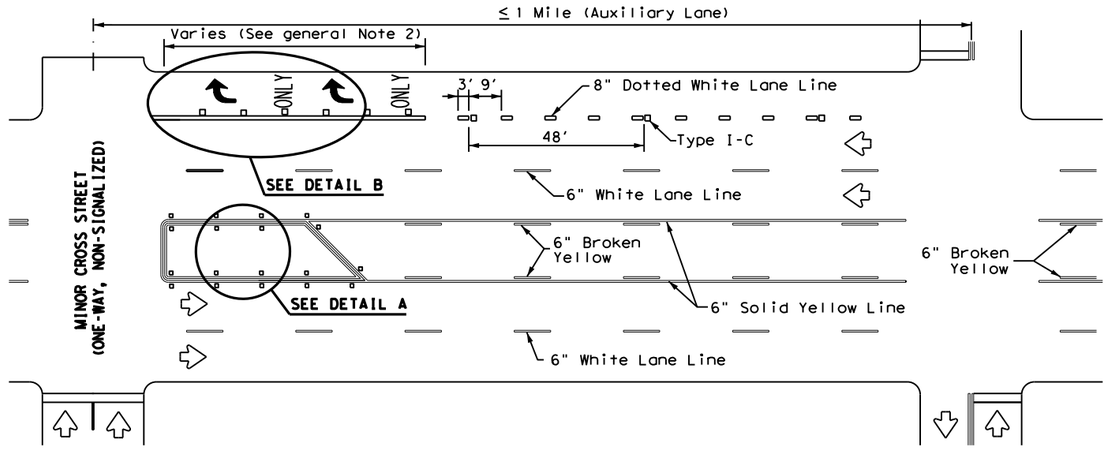


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

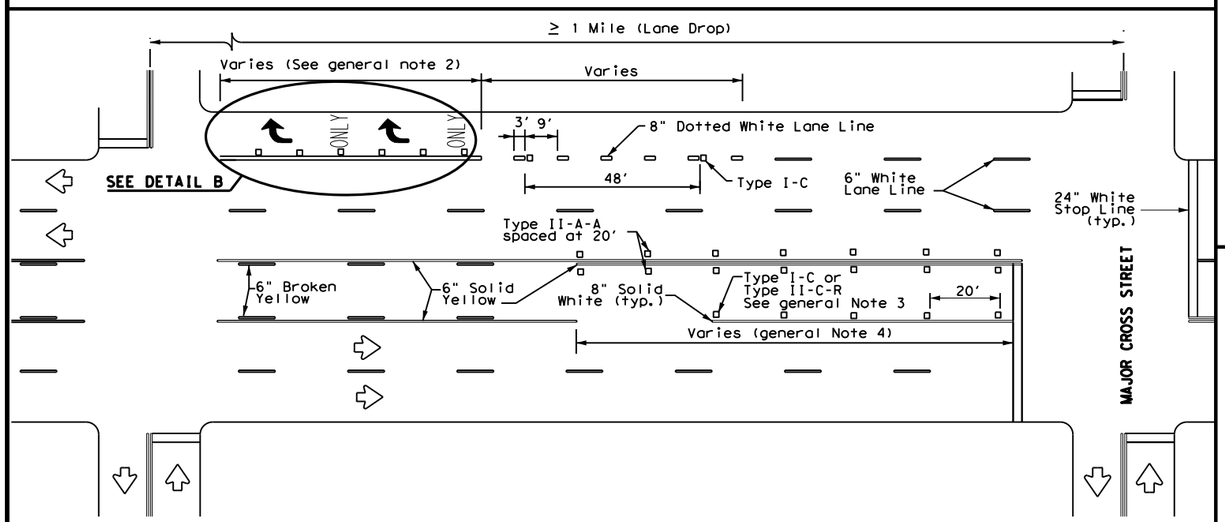
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

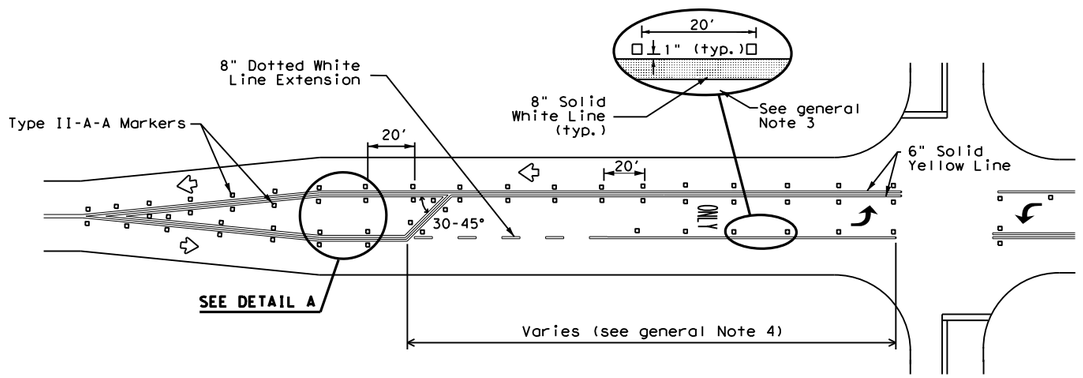
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



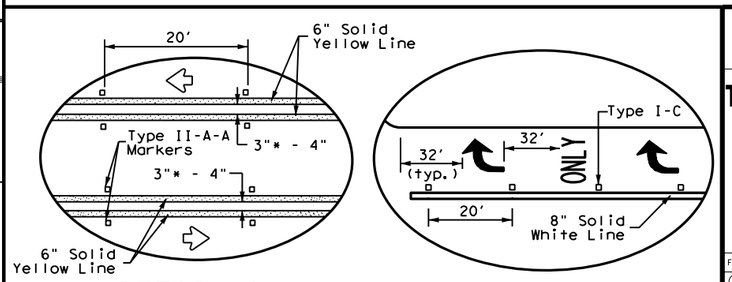
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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

Texas Department of Transportation

Traffic Safety Division Standard

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

PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		85

22C

DATE:
FILE:

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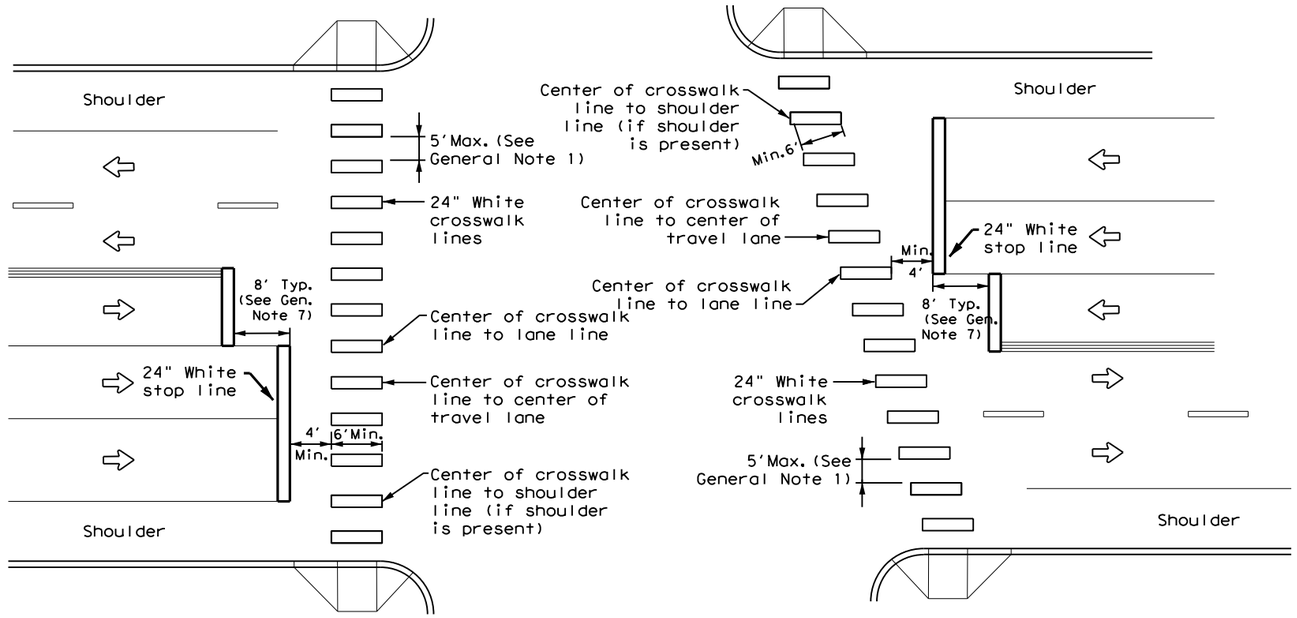
FILE:



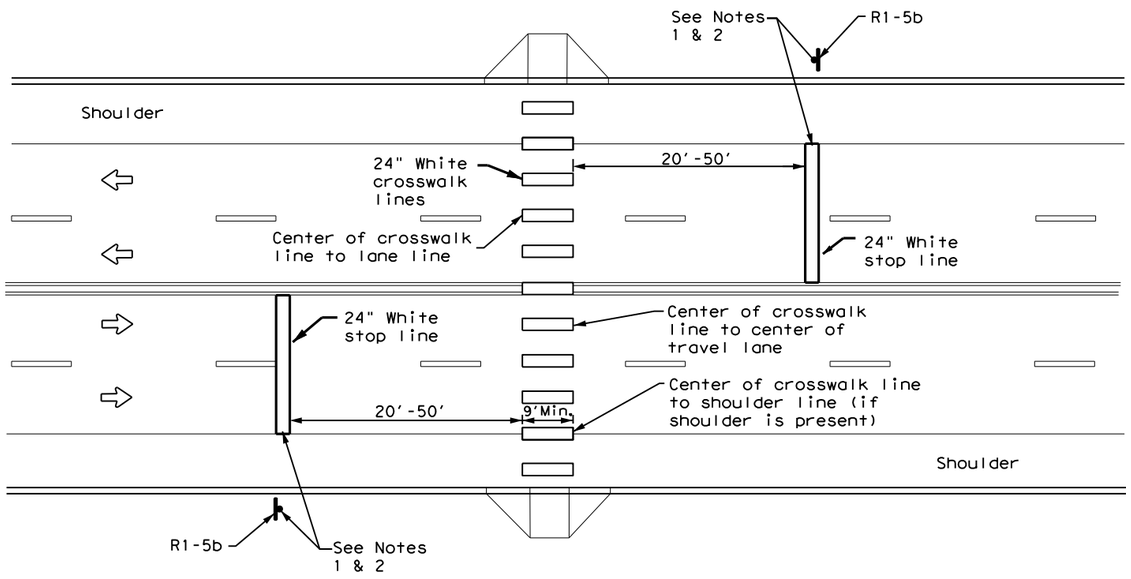
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

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

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

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



UNSIGNALIZED MID BLOCK 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.

CROSSWALK WIDTH = 9' FOR APPROACH SPEEDS OF 30 MPH OR LESS
CROSSWALK WIDTH = 12' FOR APPROACH SPEEDS OF 35 MPH OR MORE

STATE OF TEXAS
OSCAR I. GONZALEZ
140479
LICENSED
PROFESSIONAL ENGINEER

05/29/2024

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A (MOD)

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
12-22	DIST	COUNTY		SHEET NO.
	TYL	SMITH		86

22D

DATE:
FILE:

GENERAL NOTES:

1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.

2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.

3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.

4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.

5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".

6. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.

7. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."

8. Unless otherwise shown on the plans, 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.

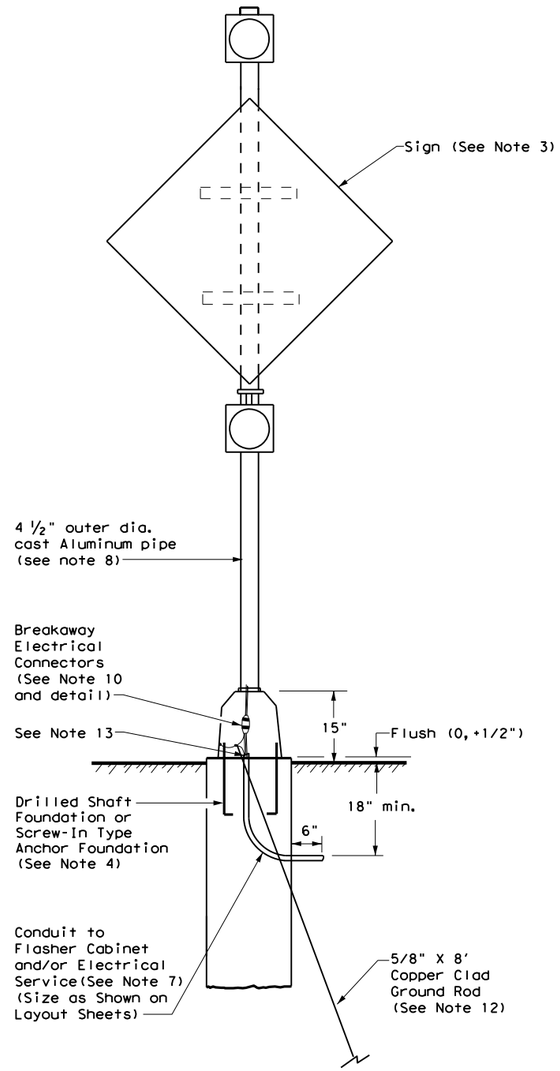
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening of connection.

10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

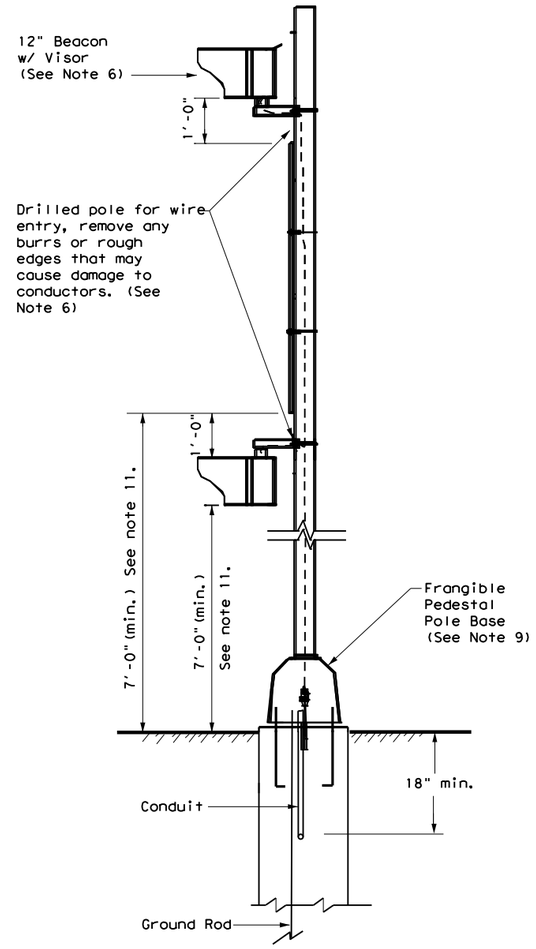
11. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.

12. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.

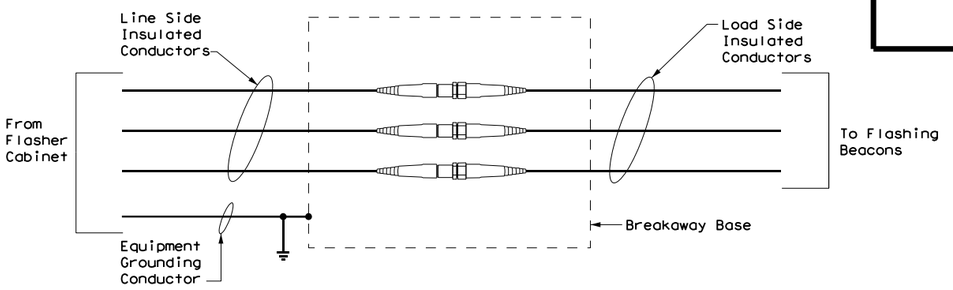
13. Ensure height of conduit and ground rod is below top of anchor bolts.



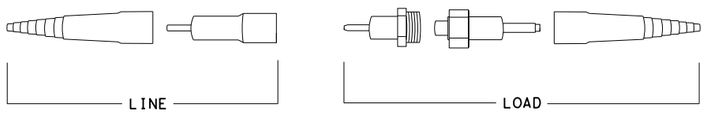
FRONT



SIDE



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

ROADSIDE FLASHING BEACON ASSEMBLY

RFBA-13

FILE: rfba-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-93 12-04 10-93 3-13 4-98	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		87

ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. 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, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

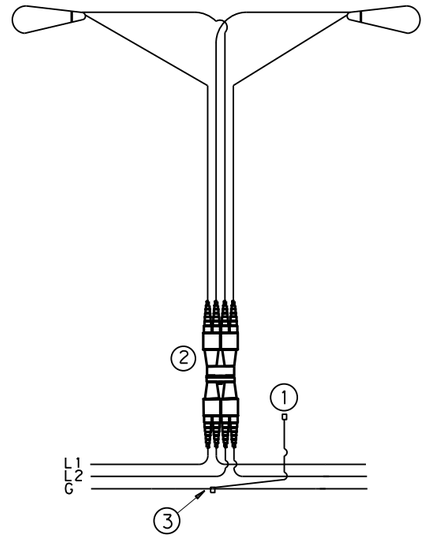
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.



L1,L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

   a. Provide NEMA 3R outdoor enclosure or as approved.

   b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

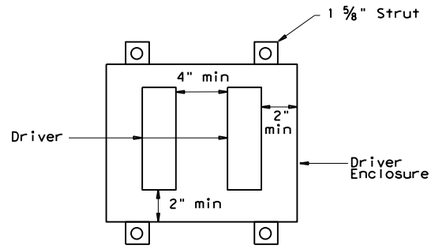
   c. Install drivers with at least 2 inches of space from enclosure walls.

   d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

   e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

   f. Provide remote drivers with a maximum of 100 watts

   g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure

Texas Department of Transportation — Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-20

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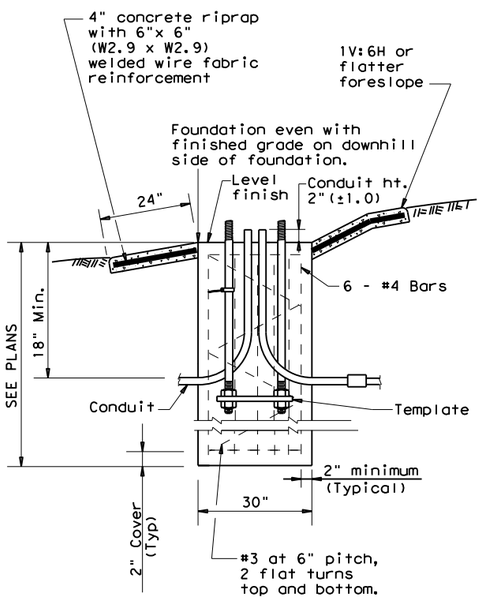
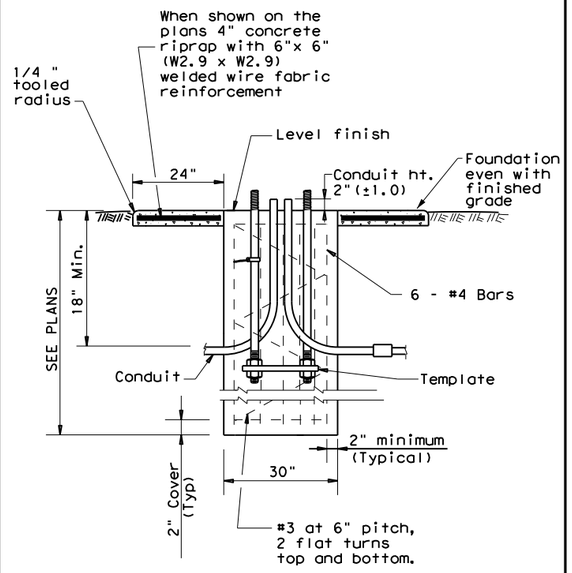


SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS (See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.

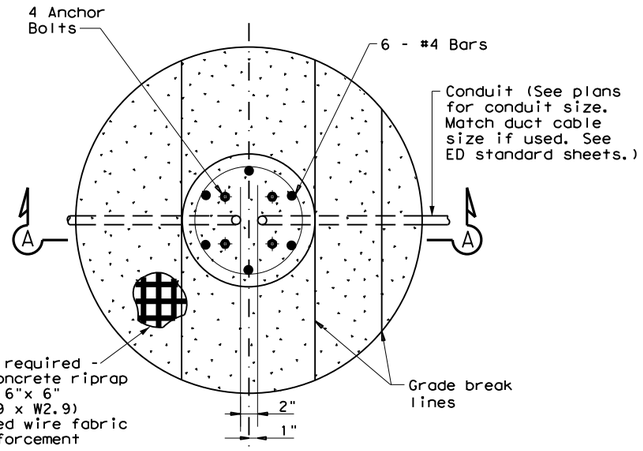
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

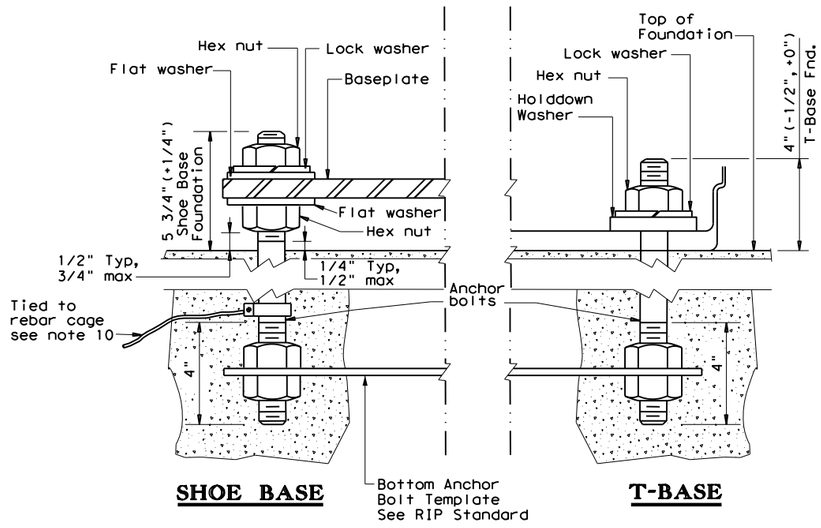
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



SHOE BASE

T-BASE

ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)
RID(2)-20

FILE: rid2-20.dgn	DN:	CK:	DW:	CK:
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SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base					T-Base					CSB/SSCB Mounted				
	Designation				Quantity	Designation				Quantity	Designation				Quantity
	Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire	
20	(Type SA 20 S - 4)			(150W EQ) LED		(Type SA 20 T - 4)			(150W EQ) LED						
	(Type SA 20 S - 4 - 4)			(150W EQ) LED		(Type SA 20 T - 4 - 4)			(150W EQ) LED						
30	(Type SA 30 S - 4)			(250W EQ) LED		(Type SA 30 T - 4)			(250W EQ) LED		(Type SP 28 S - 4)			(250W EQ) LED	
	(Type SA 30 S - 4 - 4)			(250W EQ) LED		(Type SA 30 T - 4 - 4)			(250W EQ) LED		(Type SP 28 S - 4 - 4)			(250W EQ) LED	
	(Type SA 30 S - 8)			(250W EQ) LED		(Type SA 30 T - 8)			(250W EQ) LED		(Type SP 28 S - 8)			(250W EQ) LED	
	(Type SA 30 S - 8 - 8)			(250W EQ) LED		(Type SA 30 T - 8 - 8)			(250W EQ) LED		(Type SP 28 S - 8 - 8)			(250W EQ) LED	
40	(Type SA 40 S - 4)			(250W EQ) LED		(Type SA 40 T - 4)			(250W EQ) LED		(Type SP 38 S - 4)			(250W EQ) LED	
	(Type SA 40 S - 4 - 4)			(250W EQ) LED		(Type SA 40 T - 4 - 4)			(250W EQ) LED		(Type SP 38 S - 4 - 4)			(250W EQ) LED	
	(Type SA 40 S - 8)			(250W EQ) LED		(Type SA 40 T - 8)			(250W EQ) LED		(Type SP 38 S - 8)			(250W EQ) LED	
	(Type SA 40 S - 8 - 8)			(250W EQ) LED		(Type SA 40 T - 8 - 8)			(250W EQ) LED		(Type SP 38 S - 8 - 8)			(250W EQ) LED	
	(Type SA 40 S - 10)			(250W EQ) LED		(Type SA 40 T - 10)			(250W EQ) LED		(Type SP 38 S - 10)			(250W EQ) LED	
	(Type SA 40 S - 10 - 10)			(250W EQ) LED		(Type SA 40 T - 10 - 10)			(250W EQ) LED		(Type SP 38 S - 10 - 10)			(250W EQ) LED	
	(Type SA 40 S - 12)			(250W EQ) LED		(Type SA 40 T - 12)			(250W EQ) LED		(Type SP 38 S - 12)			(250W EQ) LED	
	(Type SA 40 S - 12 - 12)			(250W EQ) LED		(Type SA 40 T - 12 - 12)			(250W EQ) LED		(Type SP 38 S - 12 - 12)			(250W EQ) LED	
50	(Type SA 50 S - 4)			(400W EQ) LED		(Type SA 50 T - 4)			(400W EQ) LED		(Type SP 48 S - 4)			(400W EQ) LED	
	(Type SA 50 S - 4 - 4)			(400W EQ) LED		(Type SA 50 T - 4 - 4)			(400W EQ) LED		(Type SP 48 S - 4 - 4)			(400W EQ) LED	
	(Type SA 50 S - 8)			(400W EQ) LED		(Type SA 50 T - 8)			(400W EQ) LED		(Type SP 48 S - 8)			(400W EQ) LED	
	(Type SA 50 S - 8 - 8)			(400W EQ) LED		(Type SA 50 T - 8 - 8)			(400W EQ) LED		(Type SP 48 S - 8 - 8)			(400W EQ) LED	
	(Type SA 50 S - 10)			(400W EQ) LED		(Type SA 50 T - 10)			(400W EQ) LED		(Type SP 48 S - 10)			(400W EQ) LED	
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	(Type SA 50 S - 12)			(400W EQ) LED		(Type SA 50 T - 12)			(400W EQ) LED		(Type SP 48 S - 12)			(400W EQ) LED	
	(Type SA 50 S - 12 - 12)			(400W EQ) LED		(Type SA 50 T - 12 - 12)			(400W EQ) LED		(Type SP 48 S - 12 - 12)			(400W EQ) LED	

OTHER				
Designation				Quantity
Pole	A1	A2	Luminaire	

GENERAL NOTES:

1. All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.

2. The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.

4. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.

   a. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
   b. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, Ir, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, Ir, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.
   c. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
   d. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.

5. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.

   a. Meet all of the requirements stated above for optional steel pole designs and the following:
      1. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
      2. Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
      3. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
      4. Pole components shall be constructed using the following material:
         Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
         Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
         Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
         Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
         Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
         Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.

6. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.

7. Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be 3'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (400W EQ) LED

SA: Pole and mast arm may be steel or aluminum.
ST: Pole and mast arm must be steel.
AL: Pole and mast arm must be aluminum.
SP: Special (ovalized) steel or aluminum pole for installing on CSB or SSCB. See standard sheet CSB (4), or SSCB (4).

Two numerical digits denote nominal mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, T-Transformer Base, or B-Bridge/Ret.Wall Mount)

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Luminaire rating in watts (i.e. 400W). Equivalent wattage LED fixtures will include EQ (i.e. 400W EQ)

Last letters indicate light source (S - High Pressure Sodium; LED - LED luminaire)

SHEET 1 OF 4

Texas Department of Transportation
Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(1)-19

FILE: rip-19.dgn
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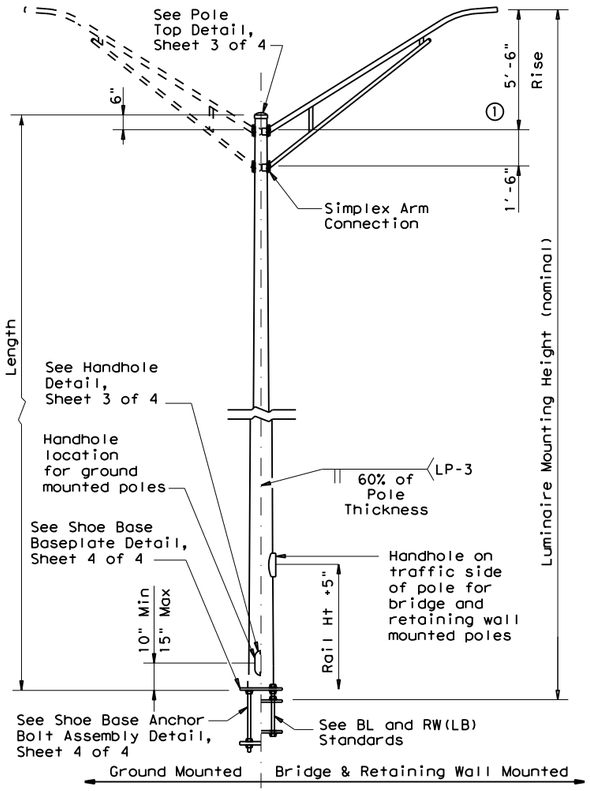
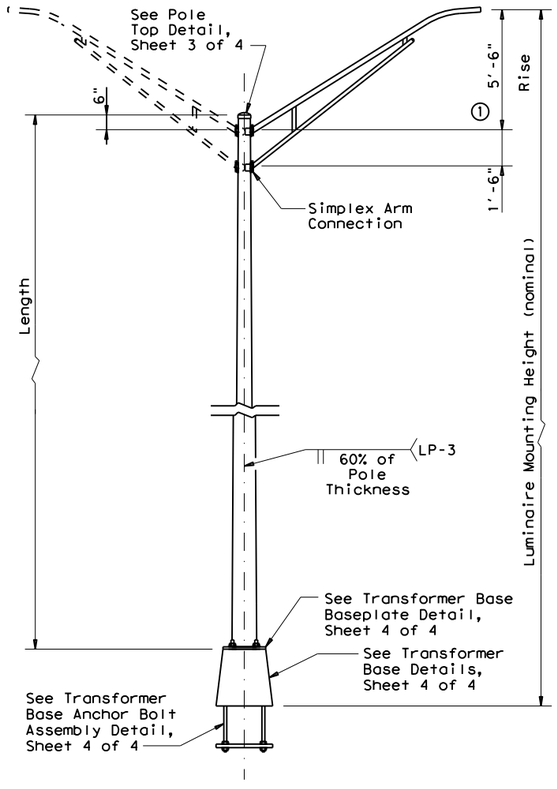


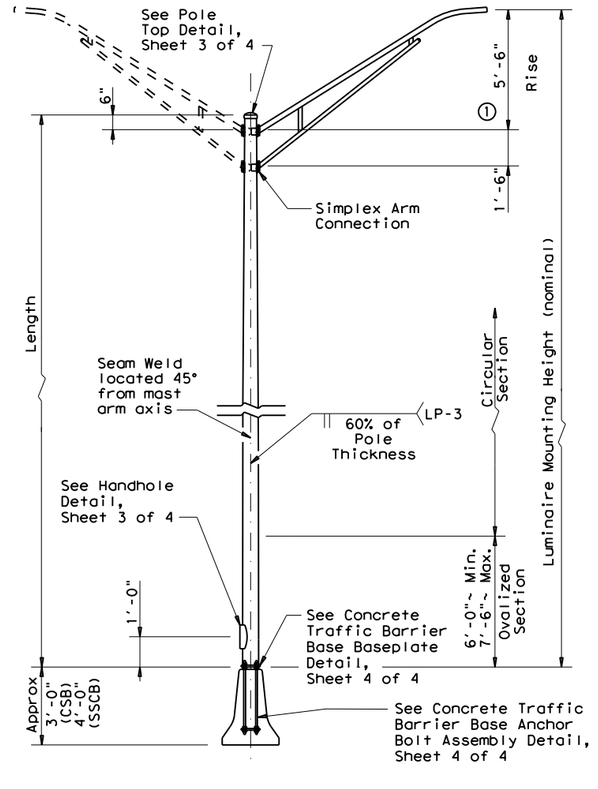
SHOE BASE POLE

SHOE BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

TRANSFORMER BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.91	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base ② Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About ℄ of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	F3125 Gr A325	92
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

① 2'-6" rise for 4 ft. luminaire arms.

② Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.

③ A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE

DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

GENERAL NOTES:

1. Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals , 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
2. Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
3. Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance 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 these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
4. For mounting heights between values shown in the tables, use base diameter and thickness values for the larger height.
5. Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
6. Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
7. Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
8. Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
9. Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
10. All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
11. The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
12. Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
13. Erect transformer base poles in accordance with sheet RID(1).

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ROADWAY ILLUMINATION POLES

RIP(2)-19

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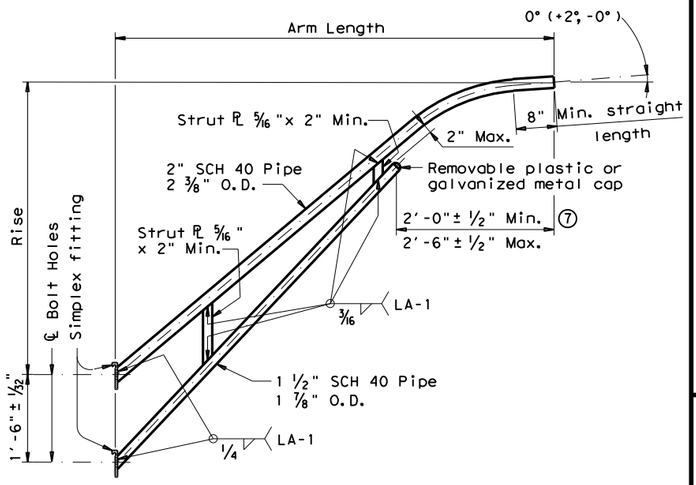
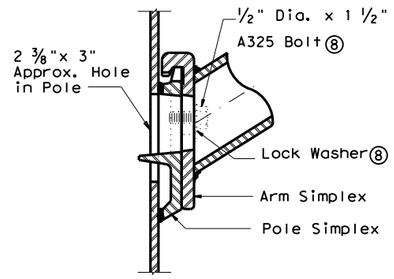


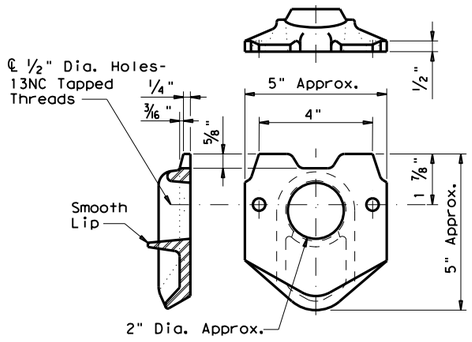
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

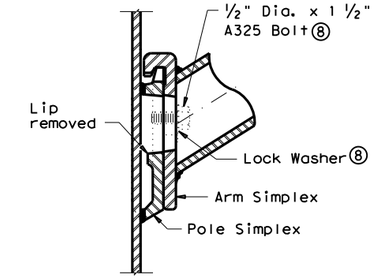
ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"



UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

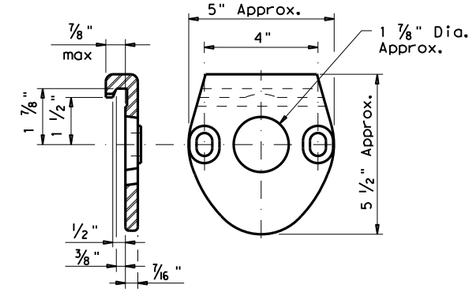


POLE SIMPLEX DETAIL ⑨



LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

SECTION B-B



ARM SIMPLEX DETAIL ⑨

NOTES:

④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

⑤ 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.

⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.

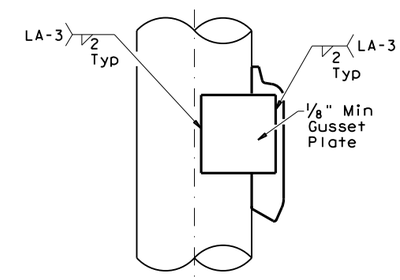
⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

⑧ Each pole simplex fitting shall be supplied with 2 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.

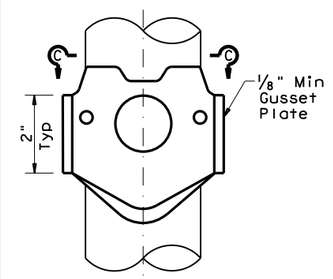
⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

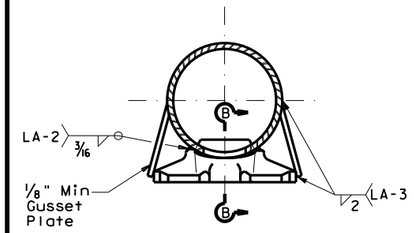
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted



SIDE

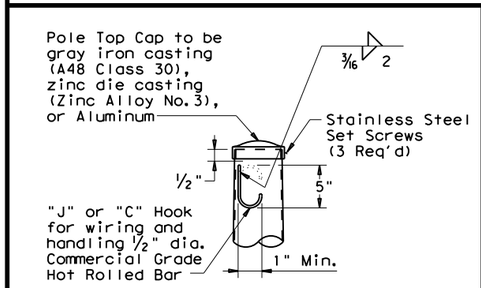


ELEVATION

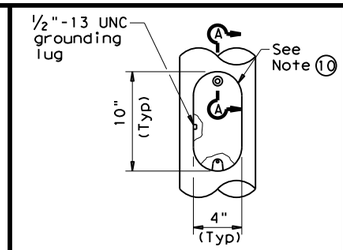


SECTION C-C

SIMPLEX ATTACHMENT DETAIL



POLE TOP



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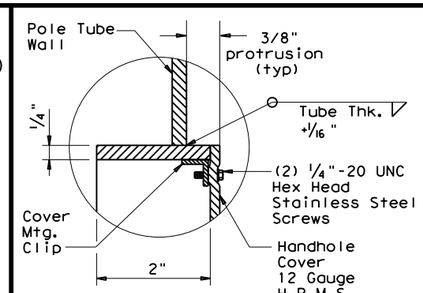

SECTION A-A

HANDHOLE

SHEET 3 OF 4

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Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

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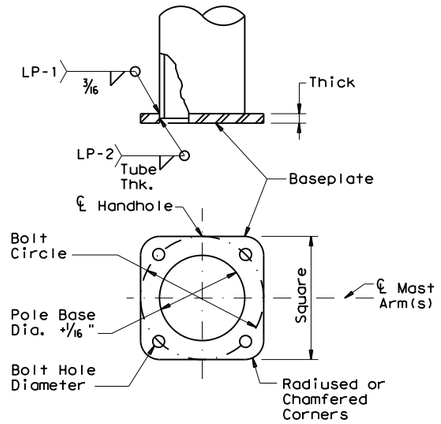
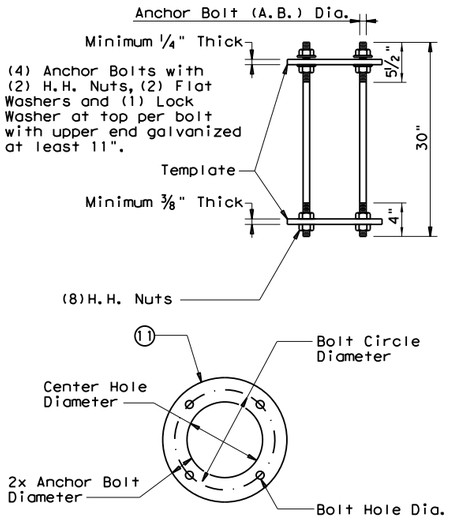


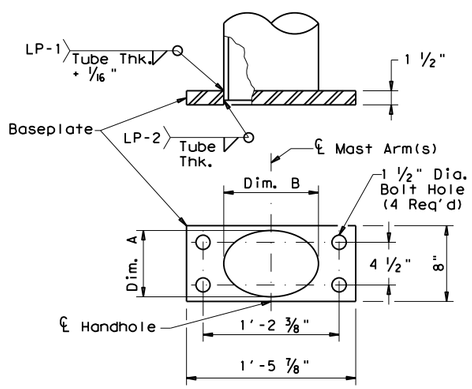
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20' - 39'	13"	13"	1 1/4"	1 1/4"
40'	15"	15"	1 1/4"	1 1/2"
50'	15"	15"	1 1/2"	1 1/2"



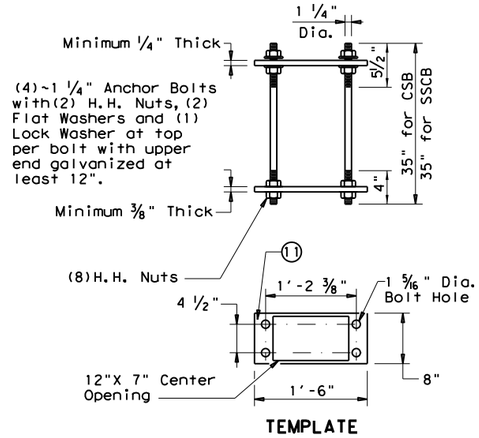
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20'-39'	1"	13"	11"	1 1/16"
40'-50'	1 1/4"	15"	12 1/2"	1 5/16"



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

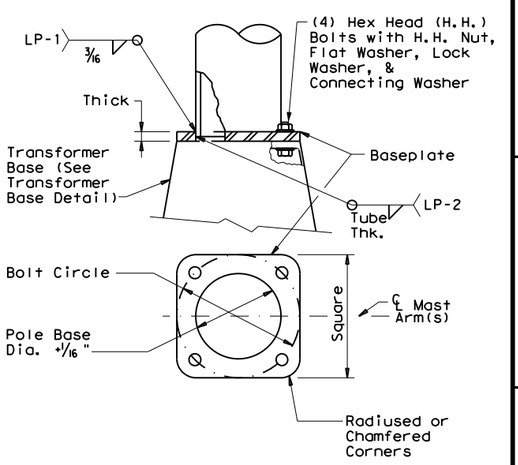
CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA.(12)	DIM. A	DIM. B
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"



TEMPLATE

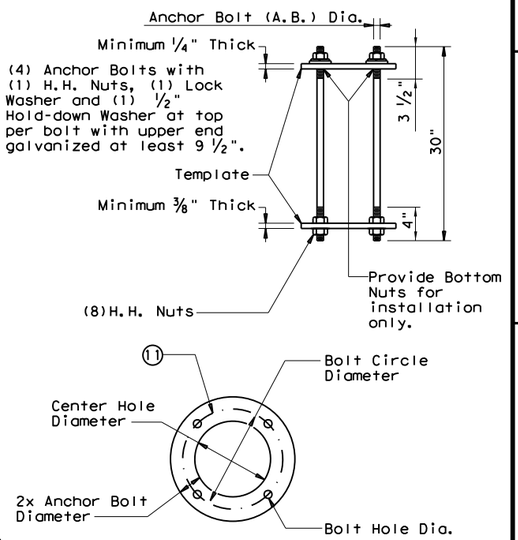
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	14"	12"	1 1/16"
40' - 50'	1 1/4"	17 1/4"	14 3/4"	1 5/16"



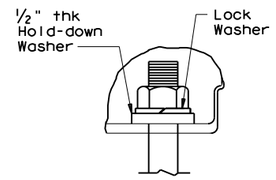
TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

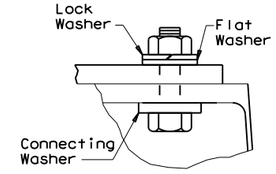


TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

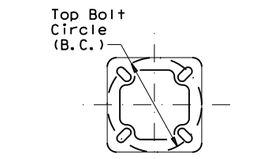
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



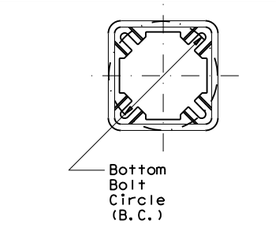
DETAIL A



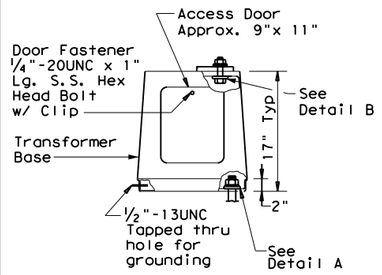
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

1. For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
3. Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
4. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
5. Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

(11) Anchor Bolt Templates do not need to be galvanized.

(12) Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"

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ROADWAY ILLUMINATION POLES

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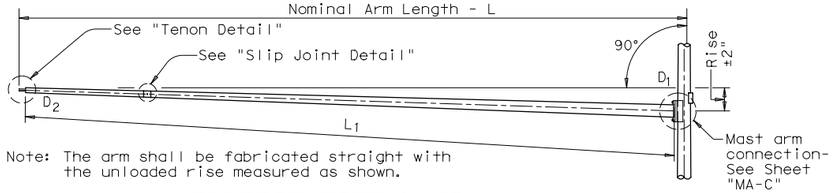
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	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)

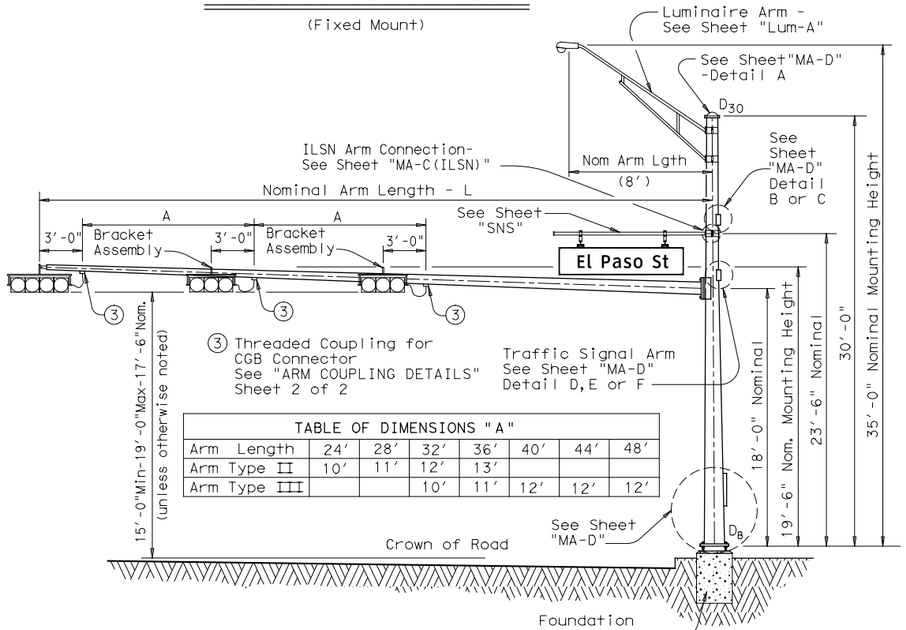


TABLE OF DIMENSIONS "A"							
Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

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	1	32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80	1	44S-80		44-80	
48	48L-80		48S-80		48-80	

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	1	32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	1
48					48III-80	

*INCLUDE ADDITIONAL CGB CONNECTOR FOR MAST ARM LOCATED ON POLE P-1

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	3

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	2
1 ¾"	3'-10"	1

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.

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SINGLE MAST ARM LIST - US 271 AT NE LOOP 323

SMA-80(1)-12

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

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		94

DATE:
FILE:

122A

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

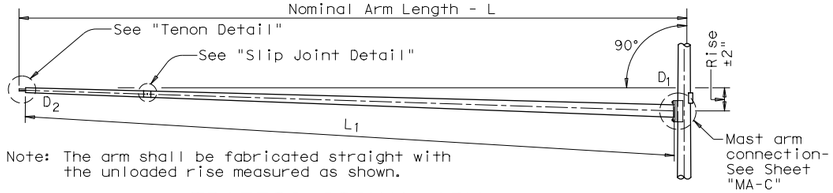
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	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)

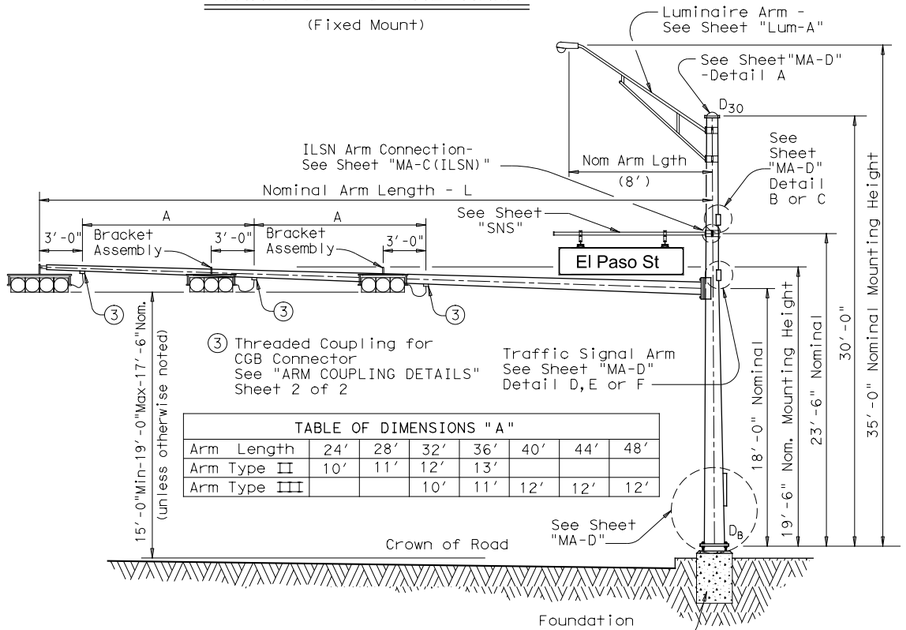


TABLE OF DIMENSIONS "A"

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		24S-80		24-80	
28	28L-80		28S-80		28-80	1
32	32L-80	1	32S-80		32-80	
36	36L-80	1	36S-80		36-80	
40	40L-80	2	40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80		48S-80		48-80	

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			
28	28I-80		28II-80	1		
32			32II-80		32III-80	1
36			36II-80		36III-80	1
40					40III-80	2
44					44III-80	
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	4

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	2
1 ¾"	3'-10"	3

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.

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SINGLE MAST ARM LIST - US 69 AT AMHERST DRIVE

SMA-80(1)-12

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

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		95

122A

DATE:
FILE:

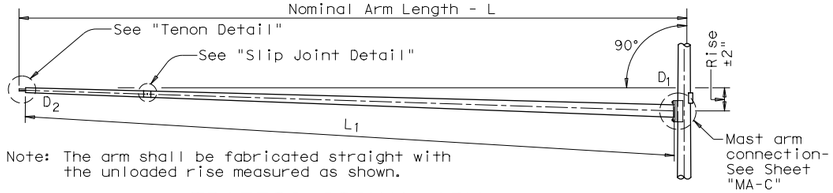
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	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)

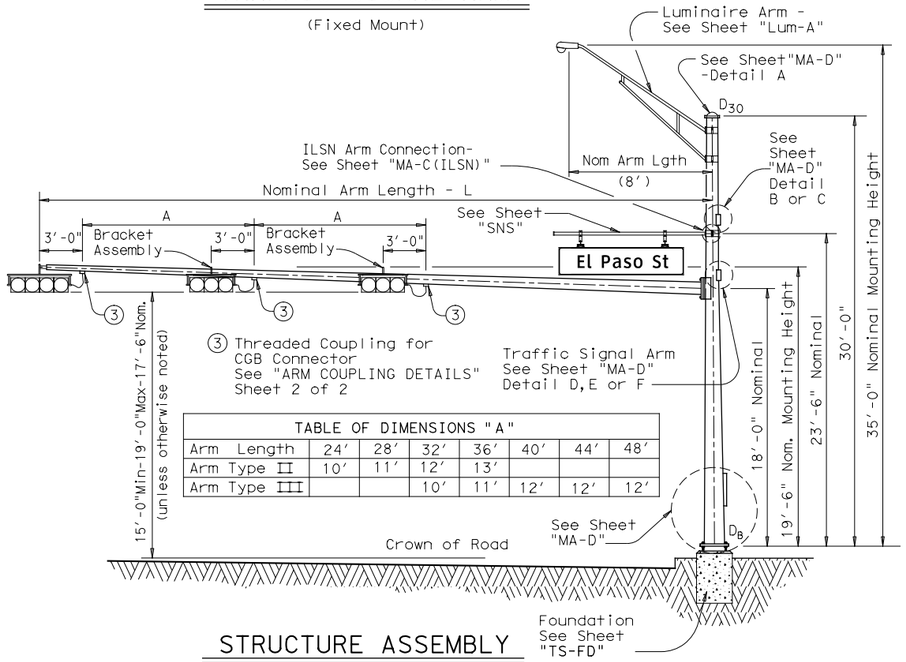


TABLE OF DIMENSIONS "A"

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		24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80	3	44S-80		44-80	1
48	48L-80		48S-80		48-80	

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			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	4
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	3

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	
1 ¾"	3'-10"	4

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)

SINGLE MAST ARM LIST - FM 756 AT SHILOH ROAD

SMA-80(1)-12

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

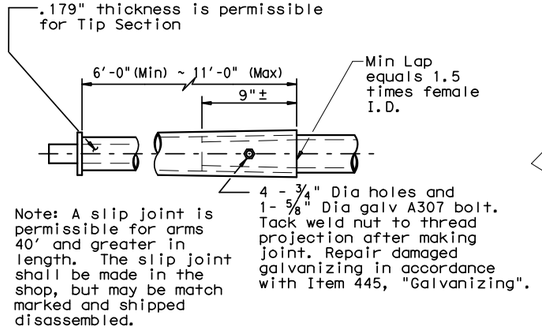
REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		96

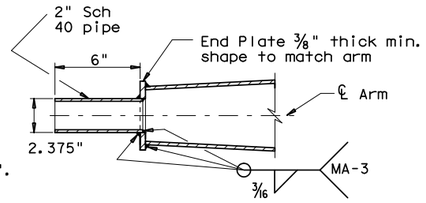
DATE:
FILE:

122A

DATE:
FILE:

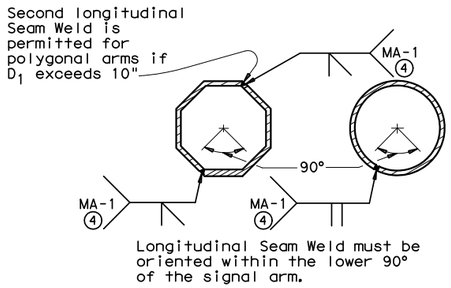


SLIP JOINT DETAIL



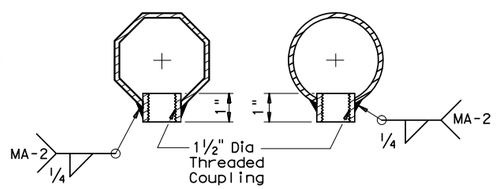
TENON DETAIL

BRACKET ASSEMBLY



ARM WELD DETAIL

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



ARM COUPLING DETAILS

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.

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: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		97

122B

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

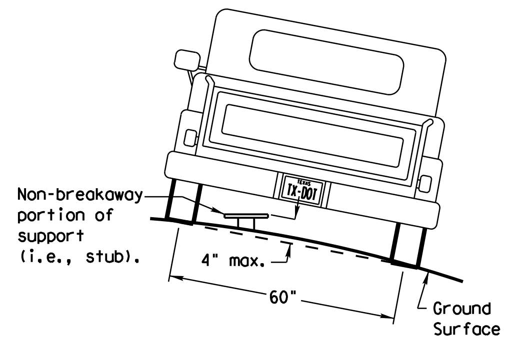
Anchor Type

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

Sign Mounting Designation

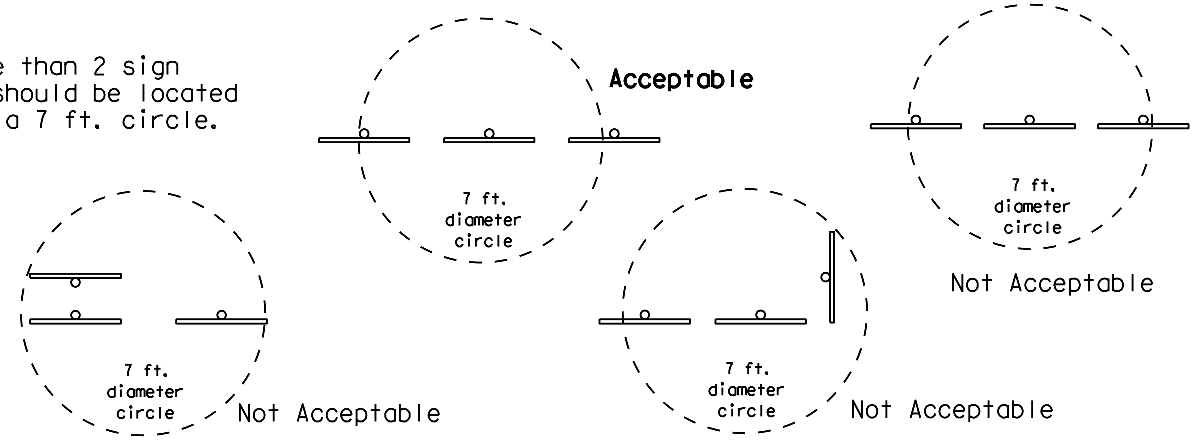
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))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

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



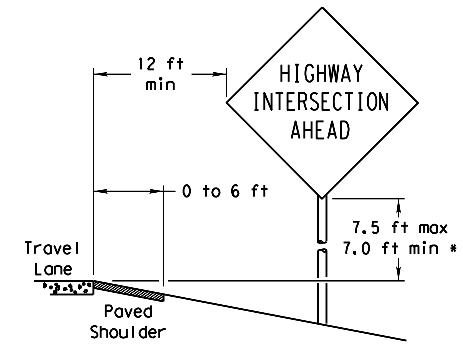
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

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



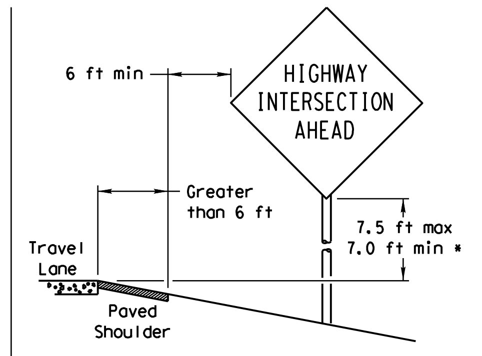
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

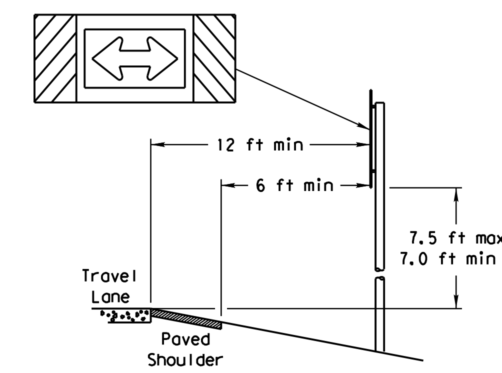
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



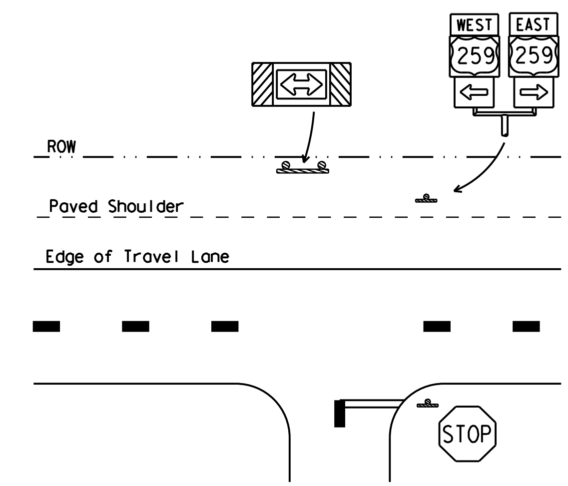
GREATER THAN 6 FT. WIDE

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

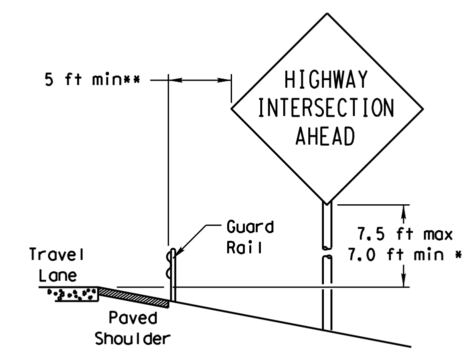
T-INTERSECTION



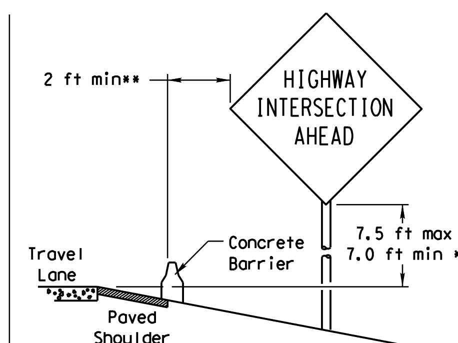
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

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

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

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

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

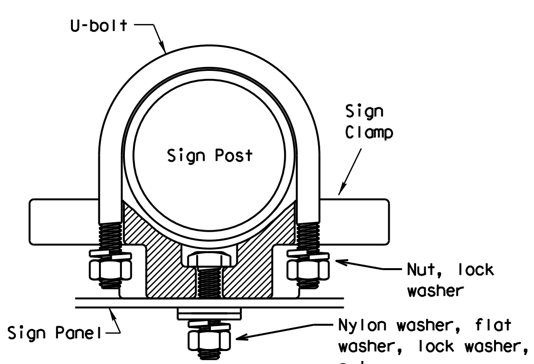
The maximum values may be increased when directed by the Engineer.

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

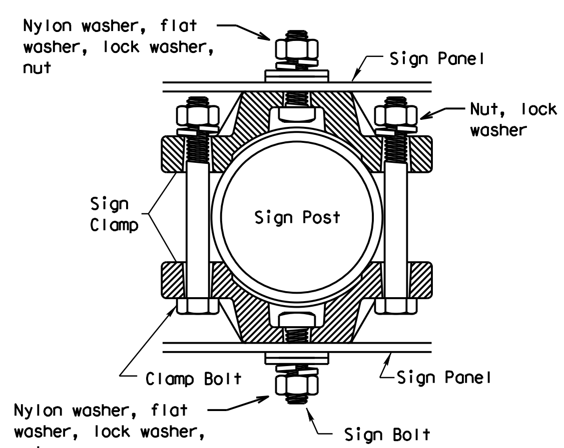
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



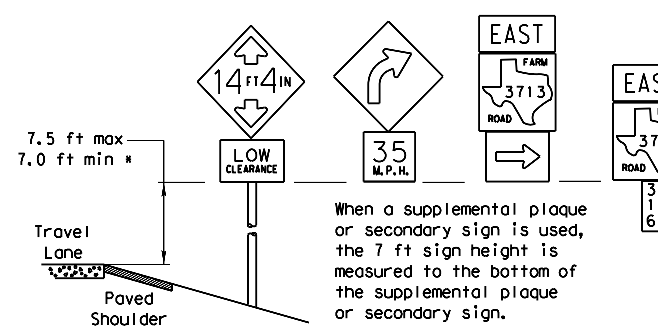
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

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

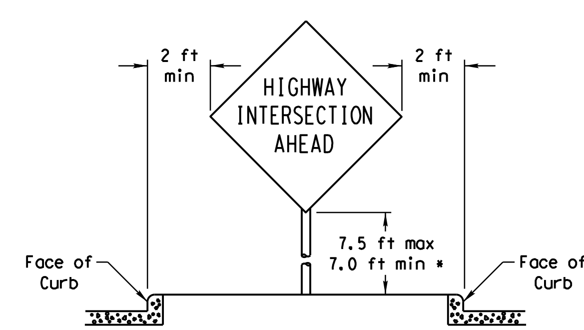
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



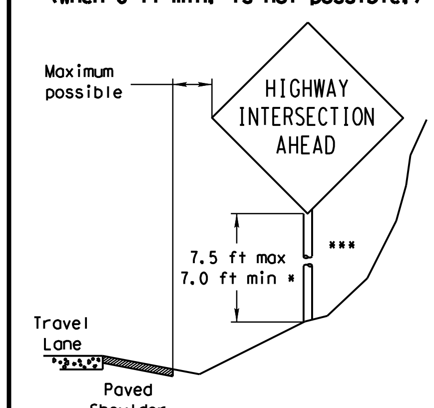
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



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

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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

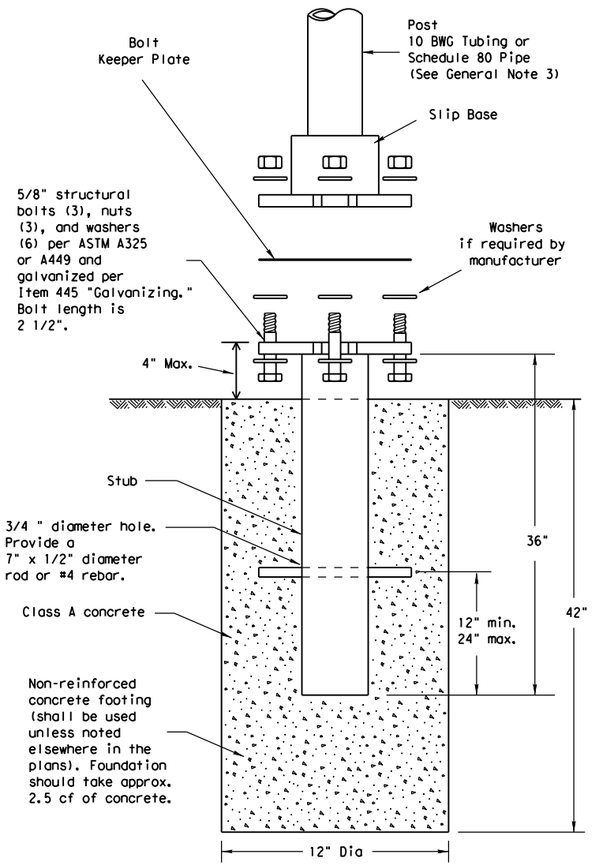
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0165	01	109, ETC.	US 271, ETC.
	DIST		COUNTY	SHEET NO.
	TYL		SMITH	98

26A

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

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

GENERAL NOTES:

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

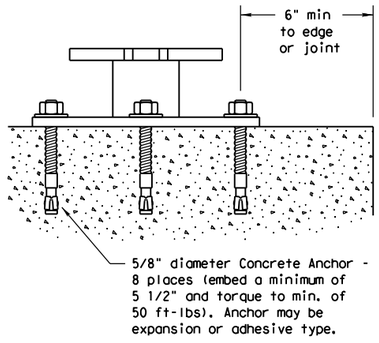
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum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

ASSEMBLY PROCEDURE

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

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

CONCRETE ANCHOR



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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

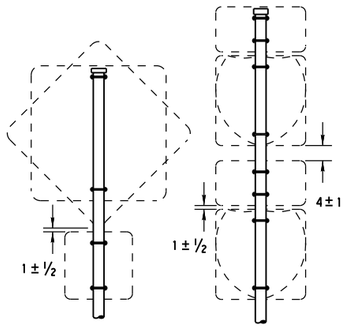
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

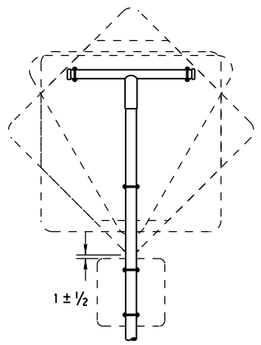
CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		99

DATE:
FILE:

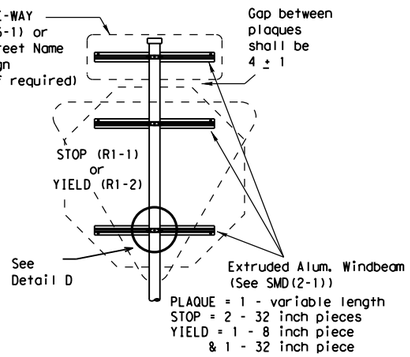
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



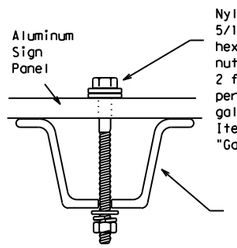
SM RD SGN ASSM TY XXXXX(1)XX(P)



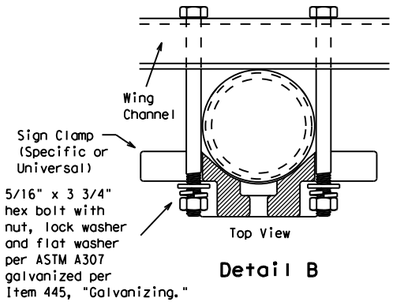
SM RD SGN ASSM TY XXXXX(1)XX(T)



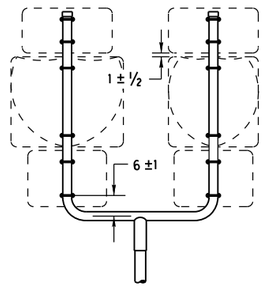
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



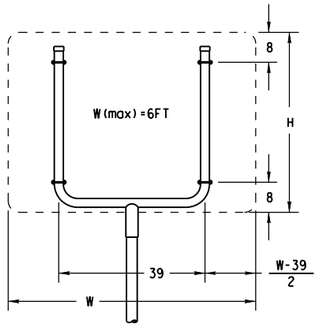
Detail A



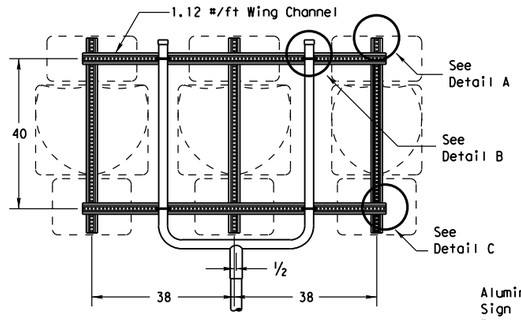
Detail B



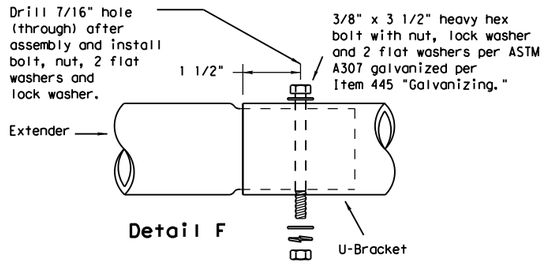
SM RD SGN ASSM TY XXXXX(1)XX(U)



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

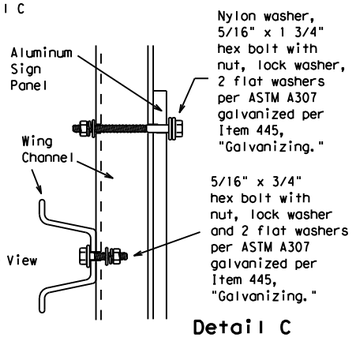


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

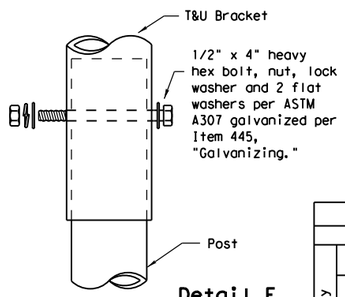


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



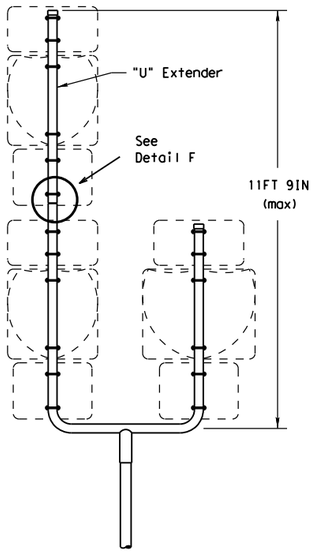
Detail E

GENERAL NOTES:

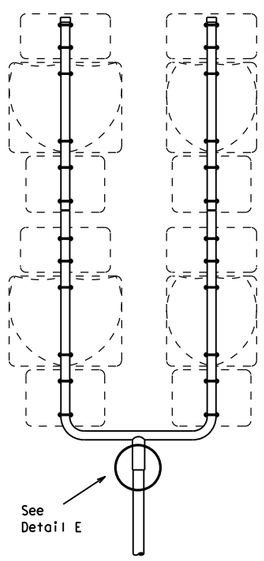
1.

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

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



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



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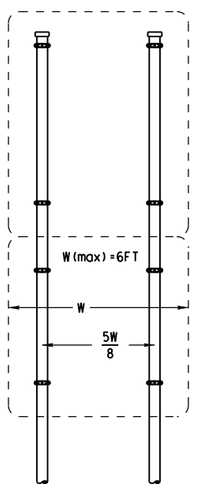
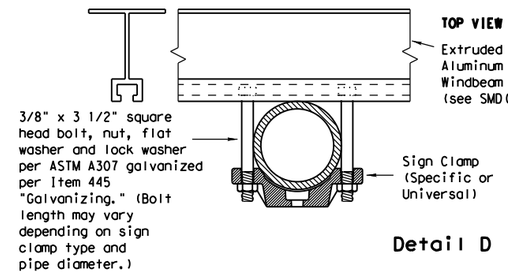
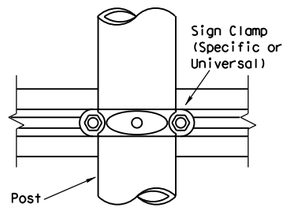


SM RD SGN ASSYM TY XXXXX(2)XX(P)

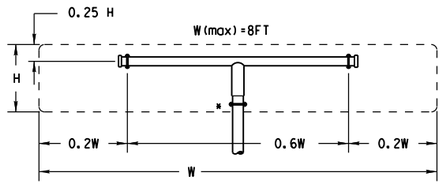
SIDE VIEW



Detail D



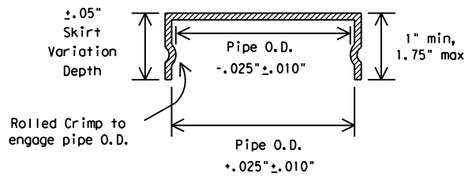
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)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



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

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



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

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

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

DATE:
FILE:

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

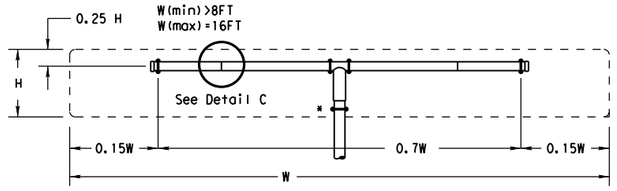
SMD(SLIP-2)-08

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

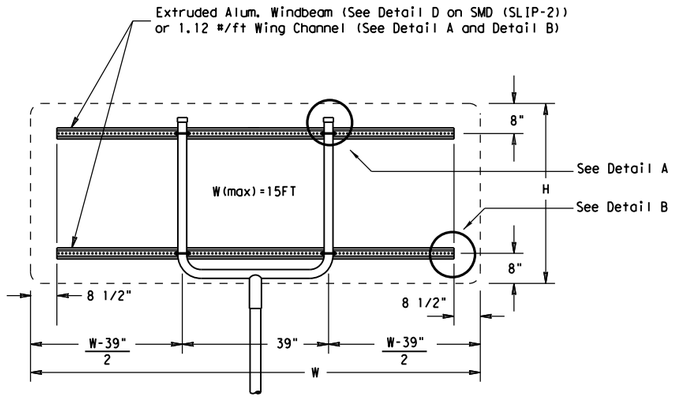
9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		100

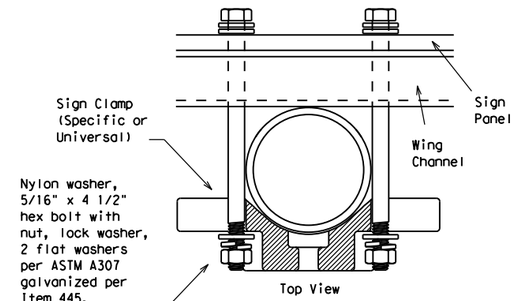
DATE:
FILE:



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

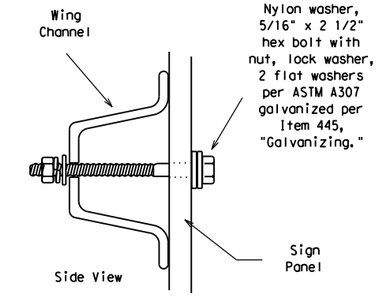


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

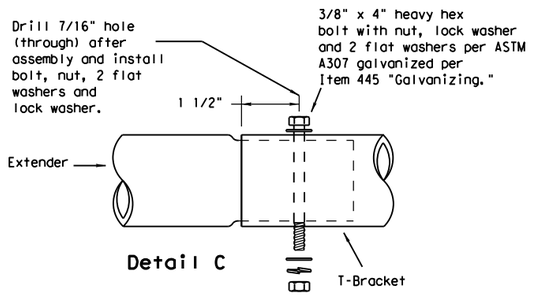


Top View

Detail A

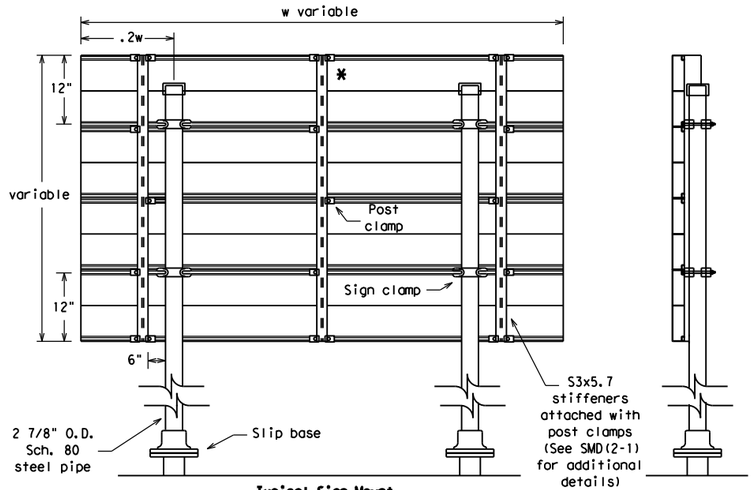


Detail B



Detail C

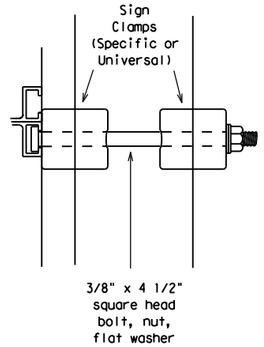
Splices shall only be allowed behind the sign substrate.



Typical Sign Mount

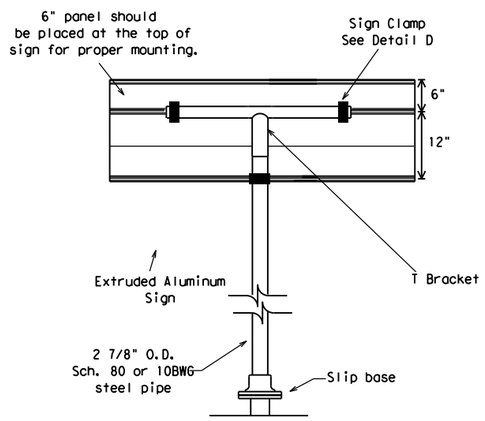
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

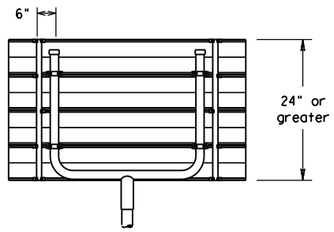


Detail E

See Detail E
for clamp installation

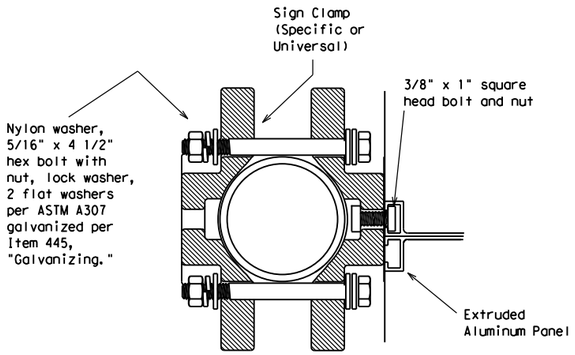


Extruded Aluminum Sign
With T Bracket



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

See Detail E
for clamp installation



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

GENERAL NOTES:

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

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

REQUIRED SUPPORT

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS
9-08

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

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.

DIST	COUNTY	SHEET NO.
TYL	SMITH	101

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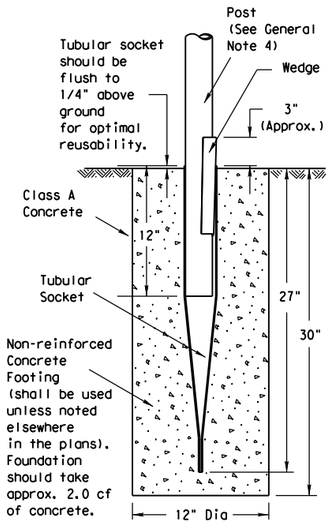
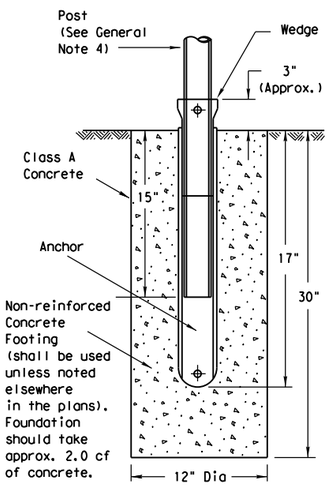
Wedge Anchor Steel System



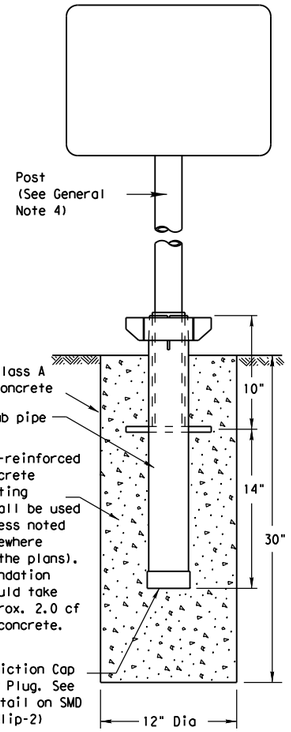
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

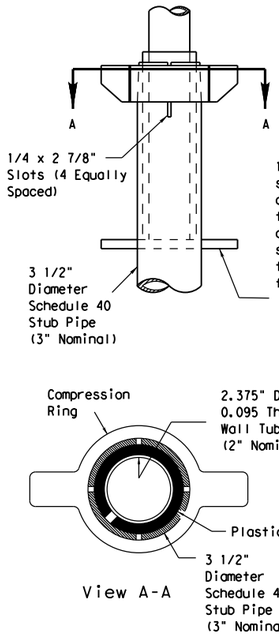


SMD RD SGN ASSM TY TWT(X)WP(X)

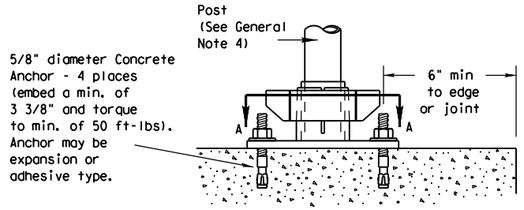
Universal Anchor System with Thin-Walled Tubing Post



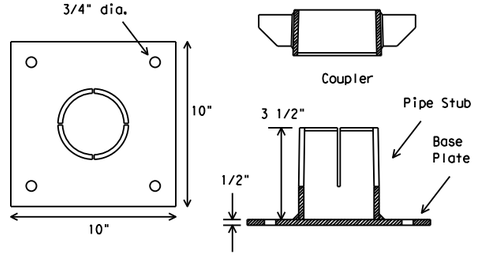
SM RD SGN ASSM TY TWT(X)UA(P)



Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

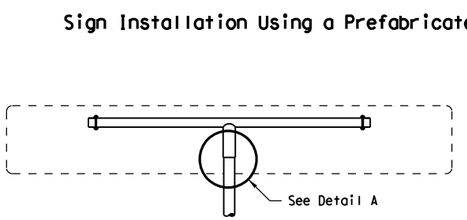


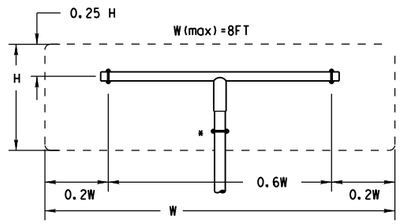
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



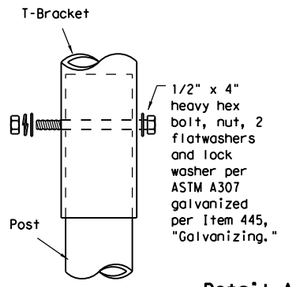
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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

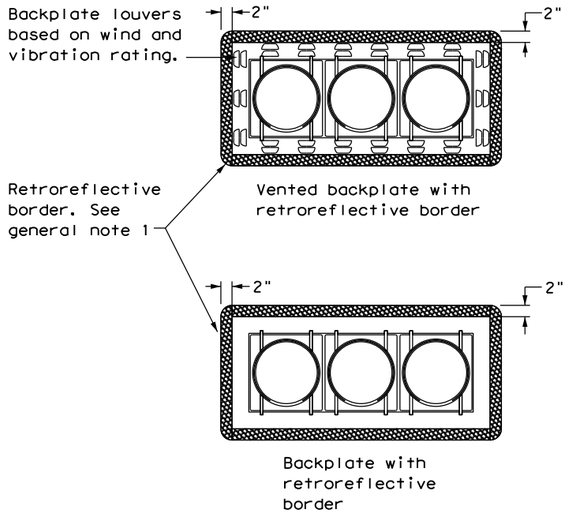
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		102

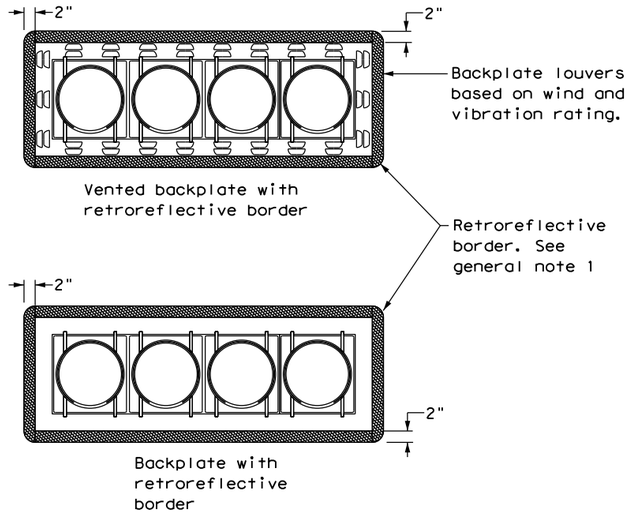
26E

DATE:
FILE:

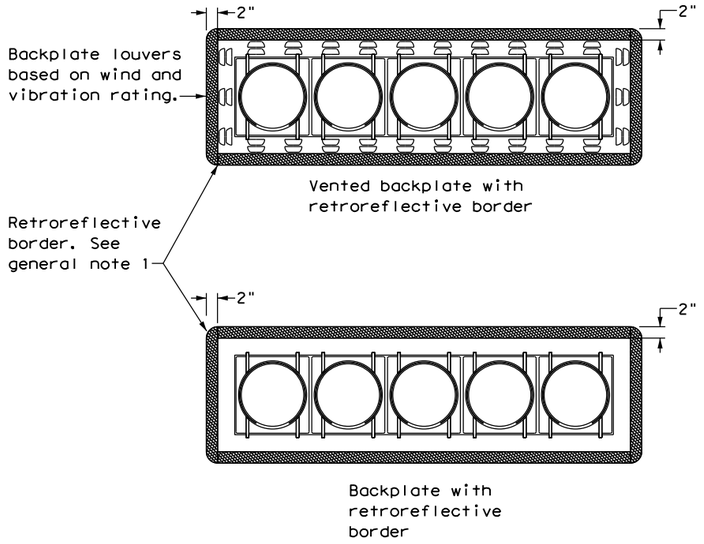
DATE:
FILE:



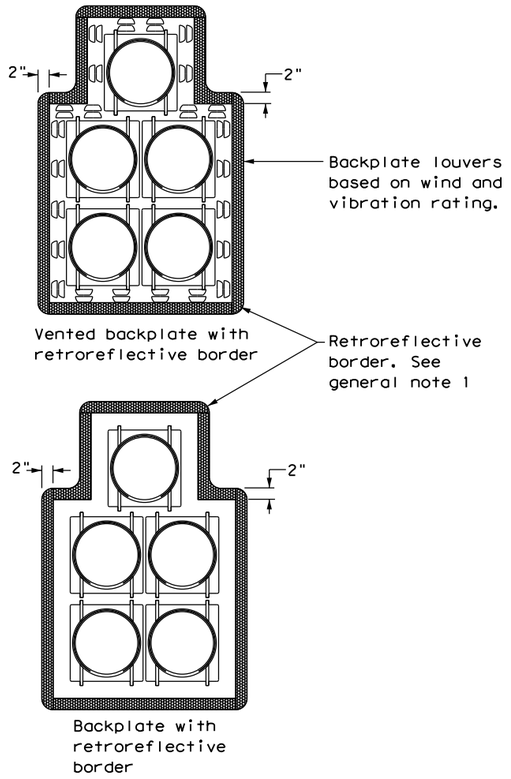
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



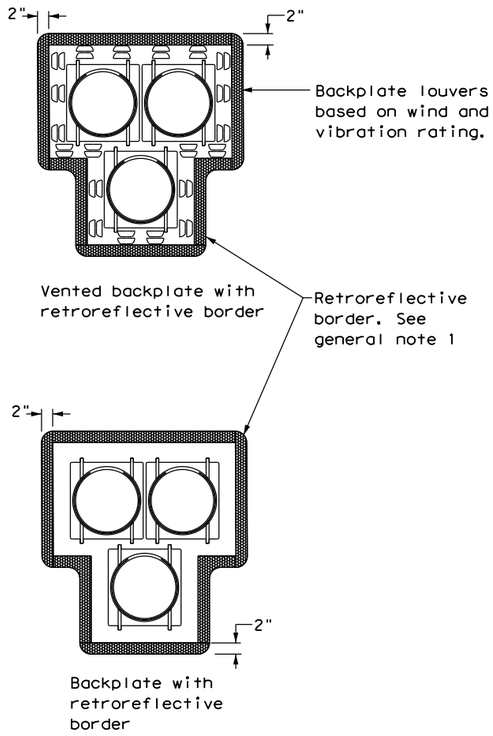
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		103

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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)

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.

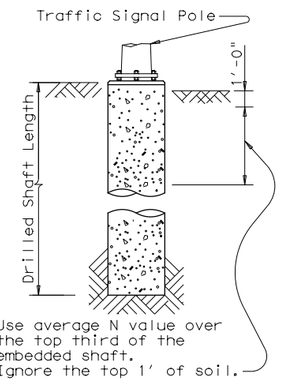
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

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
P-1	10	36-A	1			13		
P-2	10	24-A	1	6				
P-3	10	24-A	1	6				
P-4	10	30-A	1		11			
P-5	10	24-A	1	6				
P-7	10	24-A	1	6				
P-8	10	24-A	1	6				
P-9	10	30-A	1		11			
TOTAL DRILLED SHAFT LENGTHS				30	22	13		

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'

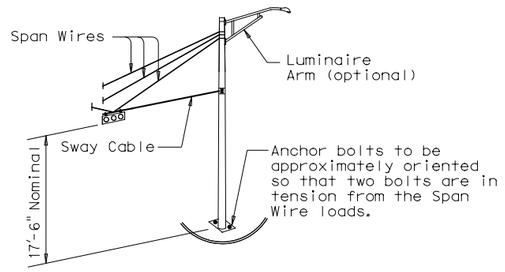


ANCHOR BOLT & TEMPLATE SIZES

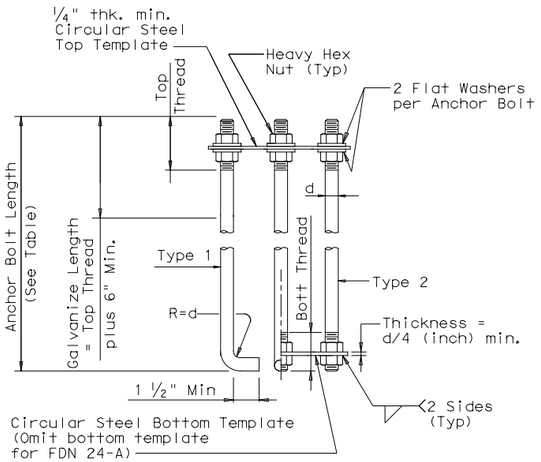
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	Rt
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

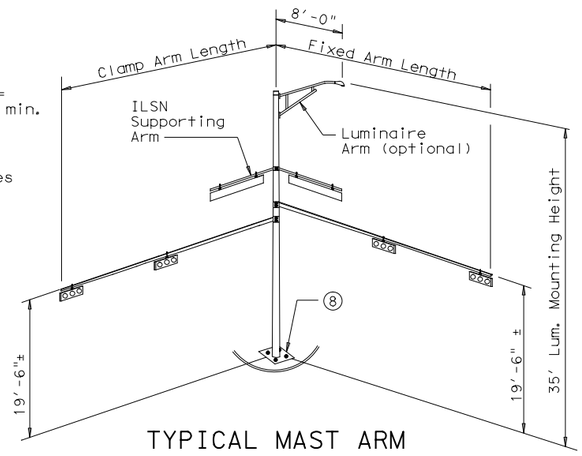
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



TYPICAL STRAIN POLE ASSEMBLY



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.

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".

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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

TRAFFIC SIGNAL POLE FOUNDATION - US 271 AT NE LOOP 323 — TS-FD-12

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

REVISIONS: 5-96, 11-99, 1-12

CONT	SECT	JOB	HIGHWAY
0165	01	109, ETC.	US 271, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		104

DATE:
FILE:

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

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)

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.

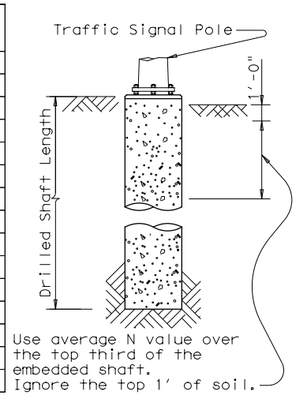
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

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
P-1	10	30-A	1		11			
P-2	10	24-A	1	6				
P-3	10	24-A	1	6				
P-4	10	24-A	1	6				
P-5	10	24-A	1	6				
P-6	10	36-A	1			13		
P-7	10	24-A	1	6				
P-8	10	24-A	1	6				
P-9	10	36-A	1			13		
P-10	10	24-A	1	6				
P-11	10	24-A	1	6				
P-12	10	36-A	1			13		
P-13	10	30-A	1		11			
TOTAL DRILLED SHAFT LENGTHS				48	22	39		

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'

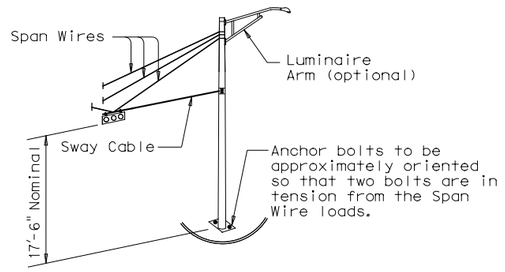


ANCHOR BOLT & TEMPLATE SIZES

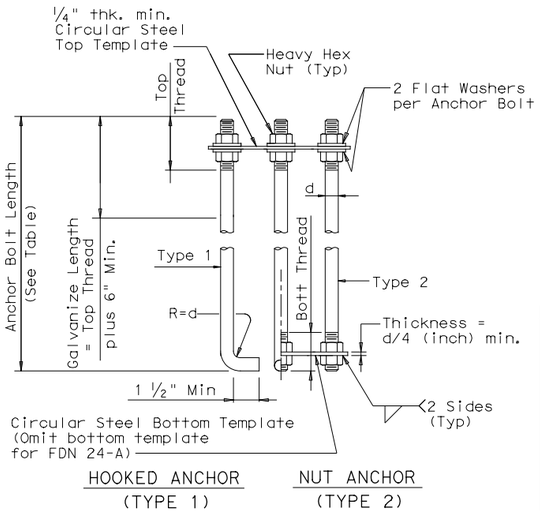
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	Rt
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

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



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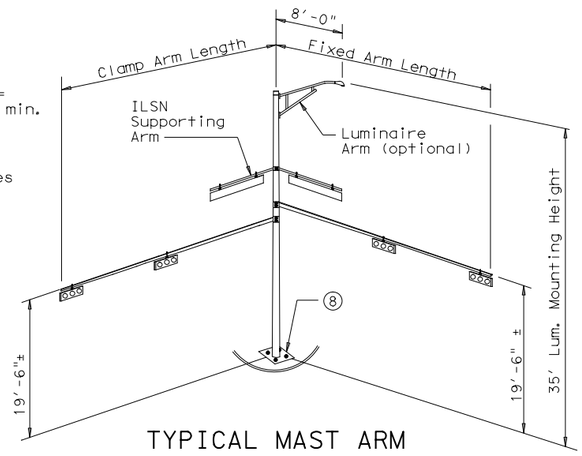

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⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

FOUNDATION DETAILS

GENERAL NOTES:

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Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TRAFFIC SIGNAL POLE FOUNDATION - US 69 AT AMHERST DRIVE **TS-FD-12**

REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		105

DATE:
FILE:

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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
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				_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)
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P-9	10	36-A	1			13		
P-10	10	24-A	1	6				
P-11	10	30-A	1		11			
TOTAL DRILLED SHAFT LENGTHS				36	11	52		

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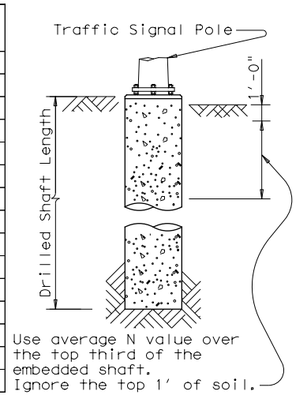

ANCHOR BOLT & TEMPLATE SIZES

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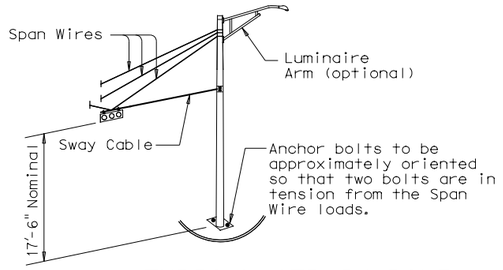
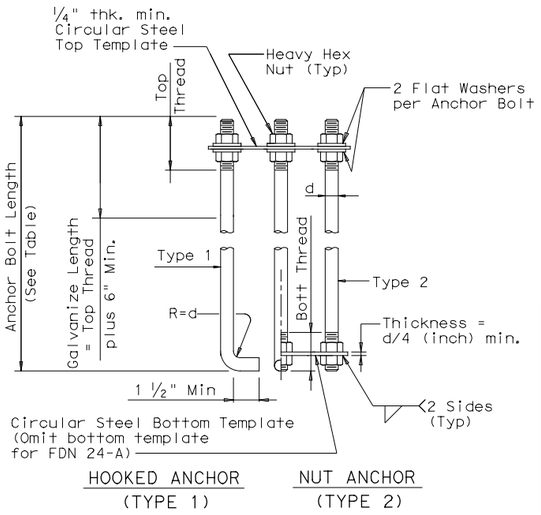
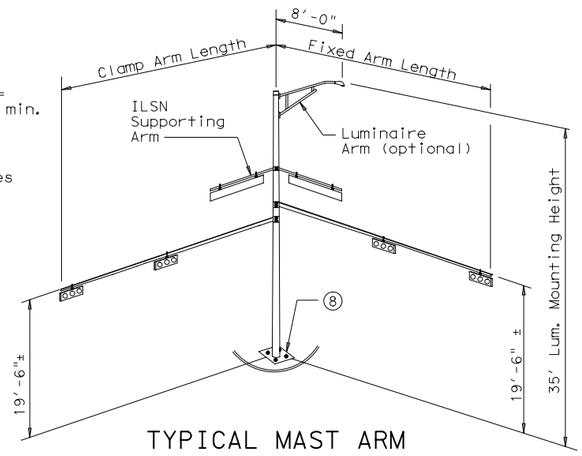


TYPICAL STRAIN POLE ASSEMBLY



ANCHOR BOLT ASSEMBLY



TYPICAL MAST ARM ASSEMBLY

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FOUNDATION DETAILS

GENERAL NOTES:

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Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TRAFFIC SIGNAL POLE FOUNDATION - FM 756 AT SHILOH ROAD **TS-FD-12**

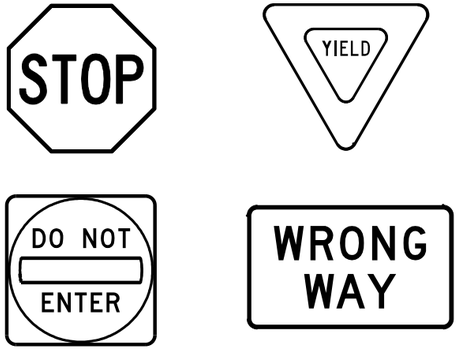
REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		106

DATE:
FILE:

DATE:
FILE:

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

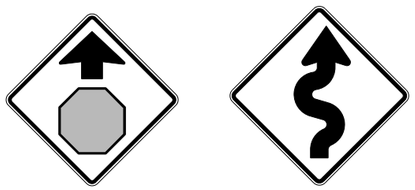
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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 12-03 7-13 9-08	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		107

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 projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

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

The construction of safety improvement projects consisting of traffic signal installation, pedestrian facilities improvements, and LED curve warning system.

1.1 PROJECT CONTROL SECTION JOB (CSJ):

CCSJ: 0165-01-109, 0191-01-096, 0492-04-045, 0910-16-184

1.2 PROJECT LIMITS:

From: Refer to Title Sheet

To: Refer to Title Sheet

1.3 PROJECT COORDINATES:

BEGIN: (Lat)_____,(Long)_____

END: (Lat)_____,(Long)_____

1.4 TOTAL PROJECT AREA (Acres): _____

1.5 TOTAL AREA TO BE DISTURBED (Acres): ~1

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Installation of traffic signals
Installation of pedestrian facilities
Installation of retroflective backplates, LED signal indications

1.7 MAJOR SOIL TYPES:

Soil Type	Description
OAKWOOD-CUTHBERT	very deep, moderately well drained, moderately slowly permeable soils
WOLFPEN-PICKTON	very deep, well drained, moderately permeable soils

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

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

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s
N/A	N/A

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
☒ Other: Install signs
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
☐ 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
WEST MUD CREEK	FLOWS INTO SEGMENT 0611D

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____

STATE OF TEXAS
OSCAR I. GONZALEZ
140479
LICENSED PROFESSIONAL ENGINEER
05/30/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		108
STATE	STATE DIST.	COUNTY	
TEXAS	TYL	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
0165	01	109, ETC.	US 271, ETC

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

- [X] [X] Protection of Existing Vegetation
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [ ] [ ] Temporary Seeding
- [ ] [ ] Permanent Planting, Sodding or Seeding
- [X] [ ] 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

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

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

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
N/A		

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
- [ ] Daily street sweeping
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [X] Chemical Management
- [X] Concrete and Materials Waste Management
- [X] 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
Preserve all existing vegetation.		

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 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed as indicated on the Field Inspection and Maintenance Report Form 2118.

2.10 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.

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05/30/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		109
STATE	STATE DIST.	COUNTY	
TEXAS	TYL	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
0165	01	109, ETC.	US 271, ETC

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1. City of Tyler

2.

☐ No Action Required ☒ Required Action

Action No.

1. PREVENT STORMWATER POLLUTION BY CONTROLLING EROSION AND SEDIMENTATION IN ACCORDANCE WITH TPDES PERMIT TXR 150000
2. COMPLY WITH THE SW3P AND REVISE WHEN NECESSARY TO CONTROL POLLUTION OR REQUIRED BY THE ENGINEER.
3. POST CONSTRUCTION SITE NOTICE (CSN) WITH SW3P INFORMATION ON OR NEAR THE SITE, ACCESSIBLE TO THE PUBLIC AND TCEQ, EPA OR OTHER INSPECTORS.
4. WHEN CONTRACTOR PROJECT SPECIFIC LOCATIONS (PSL'S) INCREASE DISTURBED SOIL AREA TO 5 ACRES OR MORE, SUBMIT NOI TO TCEQ AND THE ENGINEER.

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

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

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

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1. No action necessary above those required by the 2024 Texas Standard for Specifications Construction and Maintenance of Highways, Streets,
2. and Bridges.
3.
4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Contractor to adhere to specifications listed above.
2.
3.
4.

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

☐ No Action Required ☒ Required Action

Action No.

1. Contractor to adhere to direction concerning migratory birds described below.
2.
3.
4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☐ Yes ☒ No

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

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

☐ Yes ☐ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

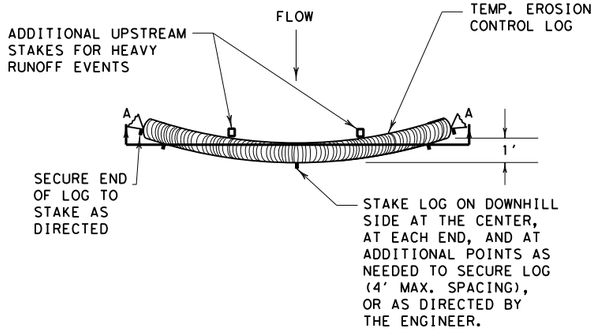
Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

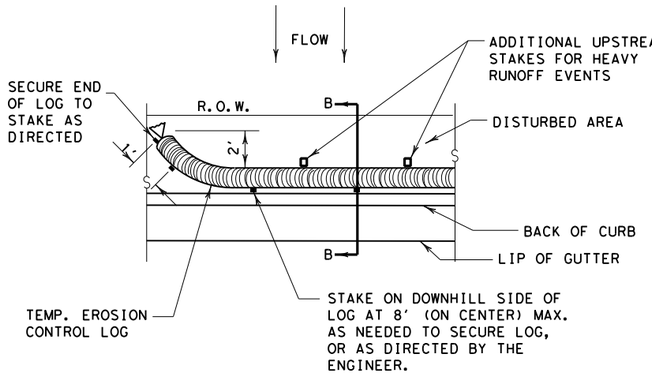
EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP		CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0165	01	109,ETC	US 271, ETC.	
12-12-2011 IDSI	DIST	COUNTY		SHEET NO.	
05-07-14 ADDED NOTE SECTION IV.	TYL	SMITH		110	
01-23-2015 SECTION I CHANGED ITEM 1122 TO ITEM 506. ADDED GRASSY SWALES.					

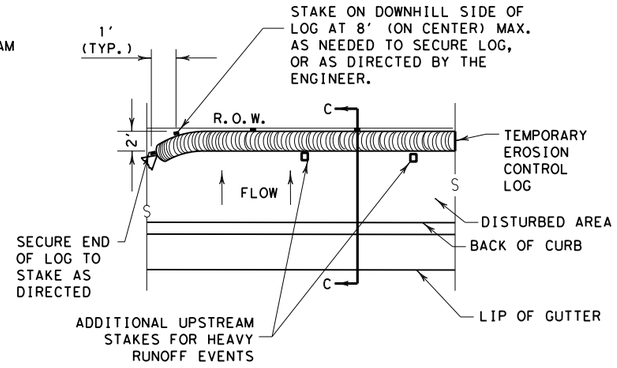
DATE:
FILE:



PLAN VIEW



PLAN VIEW



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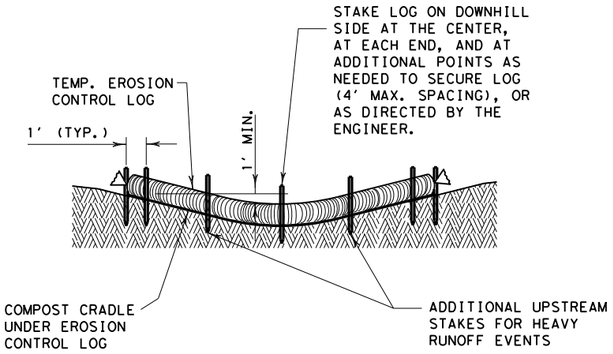
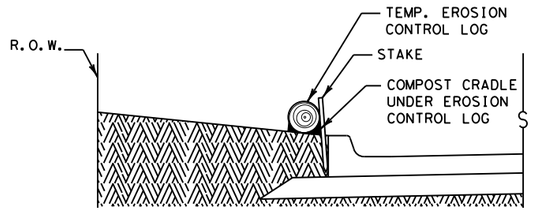


SECTION A-A

EROSION CONTROL LOG DAM

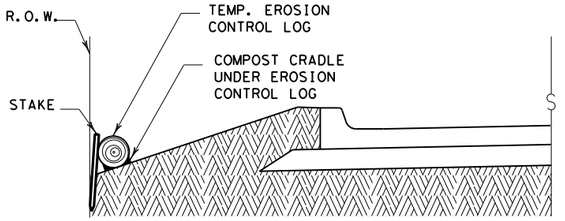
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



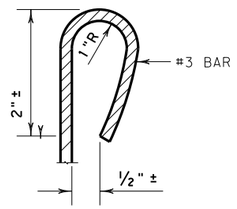
SECTION C-C

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.

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.

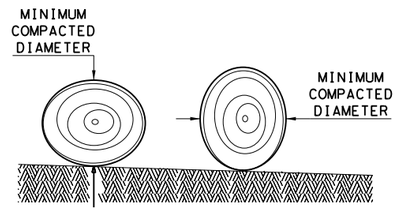
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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	0165	01	109, ETC.		US 271, ETC.		
	DIST	COUNTY				SHEET NO.	
	TYL	SMITH				111	

DATE:
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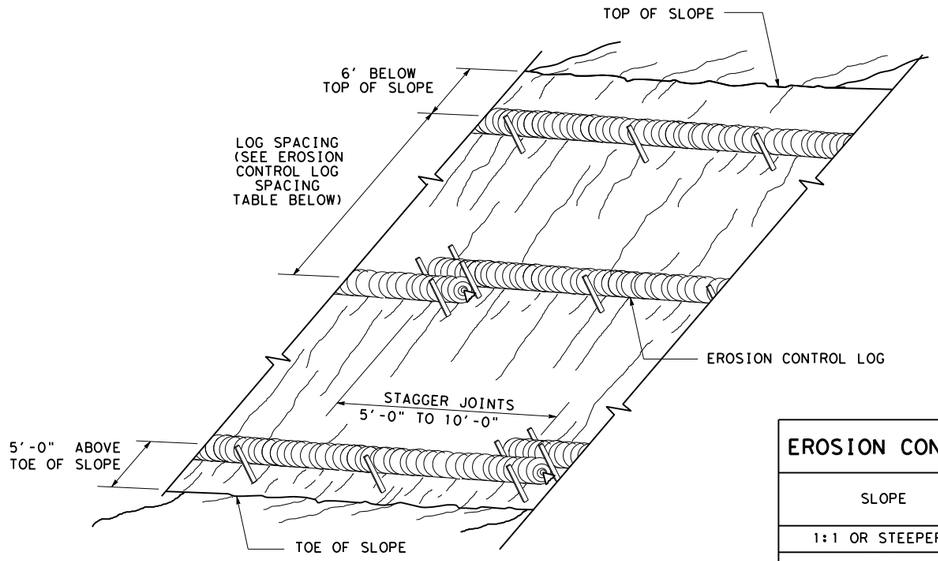
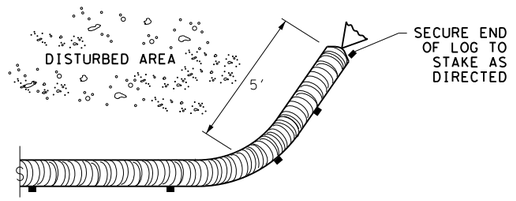


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

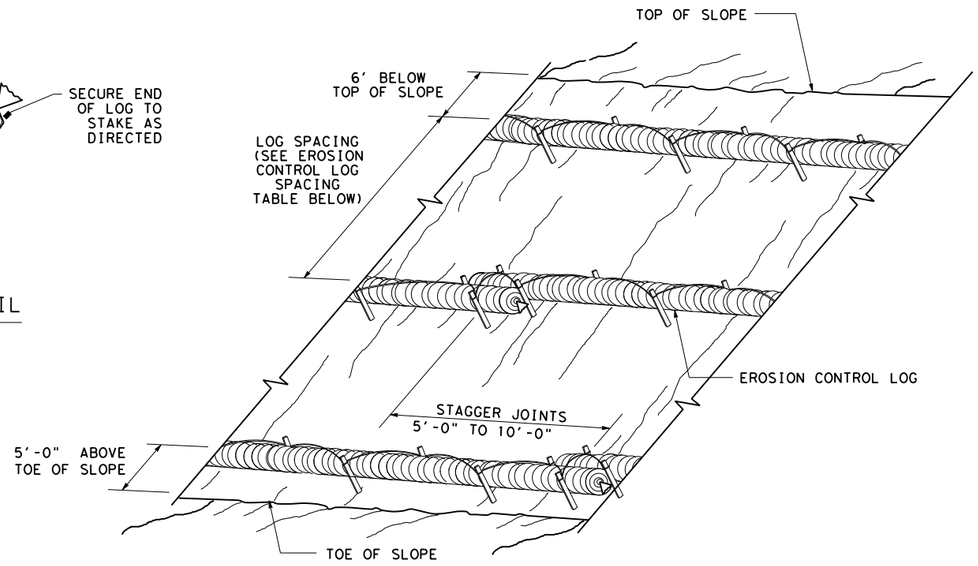
CL-SST



END SECTION RAP DETAIL

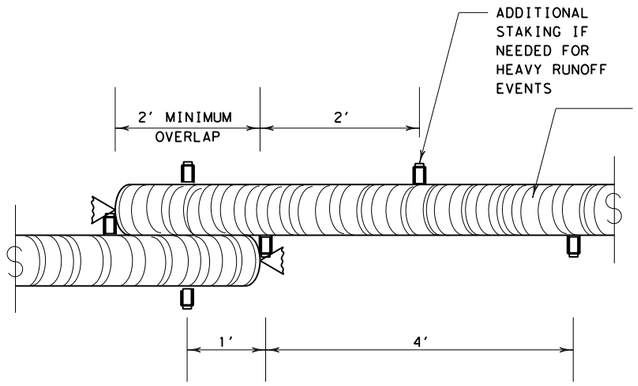
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

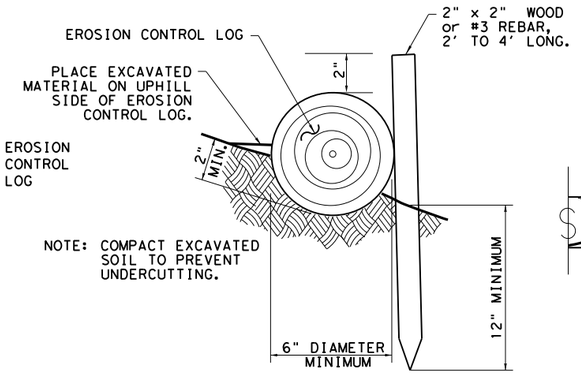
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

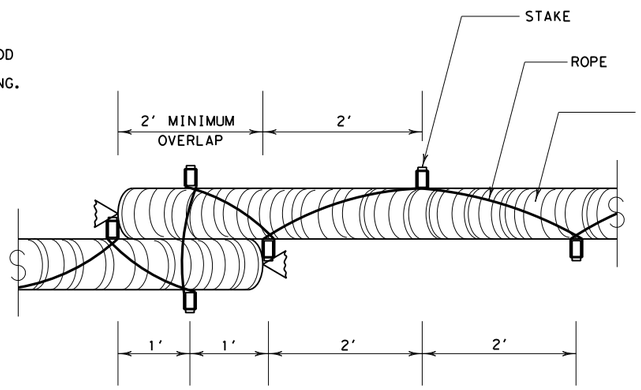


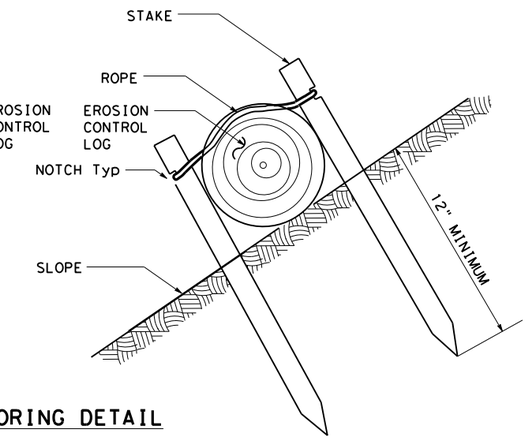


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

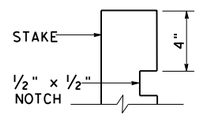
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

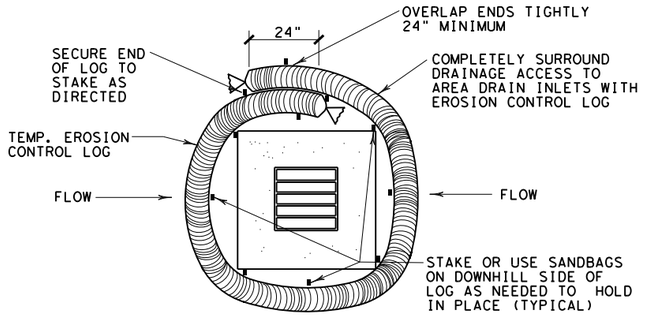
Texas Department of Transportation

Design Division Standard

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

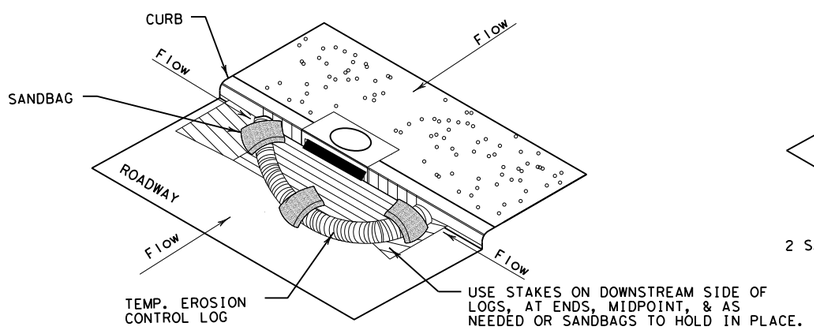
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		112

DATE:
FILE:



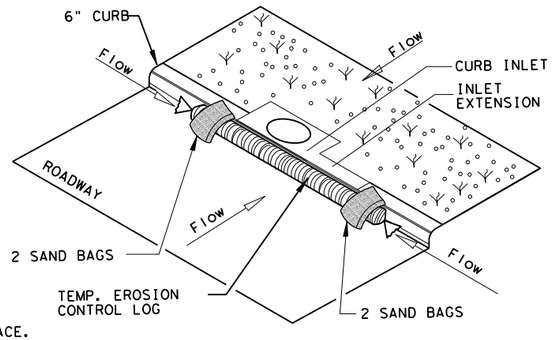
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

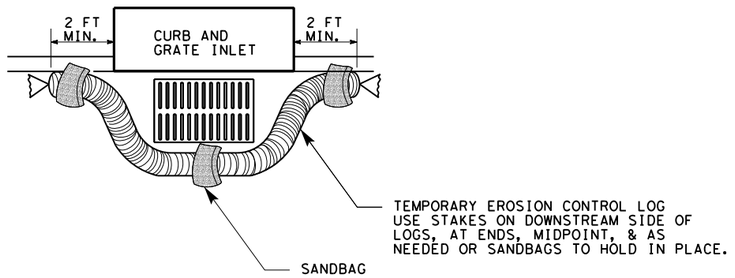
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

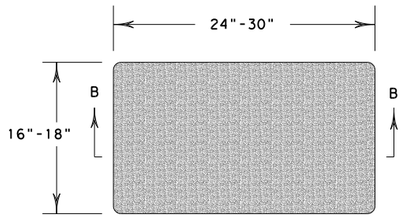
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



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
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REVISIONS	0165	01	109, ETC.	US 271, ETC.
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		113