FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	F 2022(826), ETC.		US 80, ETC.
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	DALLAS	KAUFMAN, ETC.	1
CONTROL	SECTION	JOB	
0095	05	063, ETC.	

FINAL PLANS

NAME OF CONTRACTOR: _____

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

SUMMARY OF CHANGE ORDERS:

DATE: 5/17/2022 TIME: 2:29:34 PM

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
F 2022(826), ETC.

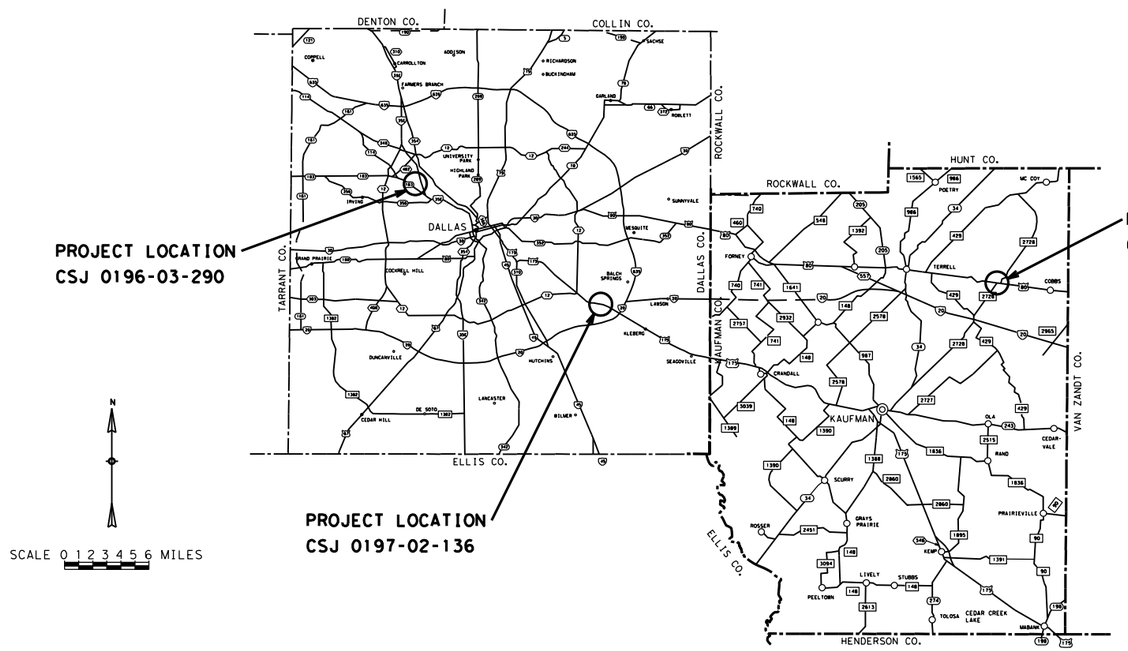
NOTE:
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012)

PROJECT: F 2022(826)
CSJ: 0095-05-063
INSTALL TRAFFIC SIGNAL
ON US 80
AT FM 2728 (WEST)
KAUFMAN COUNTY

PROJECT: F 2022(825)
CSJ: 0196-03-290
TRAFFIC SIGNAL IMPROVEMENTS
ON IH 35E
FROM RIVER BEND DR
TO NORTH MOCKINGBIRD INTERSECTION
CITY OF DALLAS
DALLAS COUNTY

PROJECT: F 2022(825)
CSJ: 0197-02-136
HAZARD ELIMINATION & SAFETY
ON US 175
FROM RYLIE CREST DR
TO OLD MILL LN
CITY OF DALLAS
DALLAS COUNTY

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENT PROJECTS
CONSISTING OF SIGNAL INSTALLATION, SIGNAL UPGRADE, AND SIDEWALK INSTALLATION



Registered Accessibility Specialist (RAS) inspection required. TDLR No. TABS2022019044

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 5/25/2022
DocuSigned by: Alan McNeil , P.E.
TRAFFIC DESIGN SUPERVISOR
42603C6AC62D4EB...

RECOMMENDED FOR LETTING: 5/26/2022
DocuSigned by: JEFFREY BUSH , P.E.
DIRECTOR OF OPERATIONS
345B765EB03F406...

RECOMMENDED FOR LETTING: 5/25/2022
DocuSigned by: Brandi K. Bush , P.E.
DIST. TRANS. OPS. ENGINEER
83A34C9CC0641432...

APPROVED FOR LETTING: 5/26/2022
DocuSigned by: , P.E.
DISTRICT ENGINEER
E25276536E0E479...

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

_____, P.E.
Signature of Registrant & Date

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

FILE: T:\DALTRAFSD\Jason Pascoe\FM2728 Title Sheet*FINAL.dgn

INDEX OF SHEETS

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/3/2022
Digitally signed by Sirwan Shahooei, P.E. Date

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

STATE OF TEXAS
DUNG HUY NGUYEN
128595
LICENSED PROFESSIONAL ENGINEER

Dung Nguyen, P.E. 6/3/2022
Digitally signed by Dung Huy Nguyen, P.E. Date

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

STATE OF TEXAS
JASON J. PASCOE
144646
LICENSED PROFESSIONAL ENGINEER

Jason J Pascoe, P.E. 6/3/2022
Digitally signed by Jason J. Pascoe, P.E. Date

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

INDEX OF SHEETS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JJP	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS JJP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	2
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

SPECIFICATION DATA

Table 2: Basis of Estimate for Permanent Construction

Item	Description	Thickness	Rate		Quantity
161	Compost Manuf Topsoil	4”			3,389 SY
162	Block Sodding	N/A	See Specifications		3,389 SY
166 *	Fertilizer (12-6-6)	N/A	500	Lbs./Ac	0.175 Ton
168	Vegetative Watering (Warm)**	N/A	12	MG/Ac/Day	505 MG

*For contractor’s information only
**Use Summer rate for calculation, adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Plan Sheet for estimated daily rates.
***Portland Concrete Cement

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 0.01AC (CSJ 0095-05-063), 0.35AC (CSJ 0196-03-290), and 1.09AC (CSJ 0197-02-136). However, **the Total Disturbed Area** (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

CSJ: 0095-05-063, etc **Sheet 3**

County: Kaufman, etc

Highway: US 80, etc

Provide the Engineer with a copy of all DBE subcontractor agreements prior to commencing work.

Contractor questions on this project are to be addressed to the following individual(s):
Engineer’s Email: Tony.Ragland@txdot.gov
Construction Manager’s Email: Eric.Herman@txdot.gov
Construction Record-Keeper’s Email: Anthony.Block@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

All contractor questions will be reviewed by the Engineer or Construction Manager. Once a response is developed, it will be posted to TxDOT’s Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Contact Alfred Lemon with the City of Dallas (214-670-4812) for City supplied materials on this project.

The Contractor shall obtain a City of Dallas ROW Permit for portions of the project outside of TxDOT ROW and within City of Dallas ROW.

Item 5:

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (214-320-6682) for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Maintenance Landscape Office (214-320-6636) for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above mentioned utilities when working without having the utilities located prior to excavation.

For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

Ensure a representative of the Prime Contractor is available on the project site at all times when work is being performed by the Prime Contractor or sub-contractor(s) to receive instructions from the Engineer or authorized Department representative.

Submit all shop drawings, working drawings, or other documents which require review sufficiently in advance of scheduled construction to allow no less than thirty (30) calendar days for review and response.

Locate all utilities, both underground and above ground, in the project area prior to beginning work so that conflicts are avoided.

Provide to the Engineer, in addition to any submittals required by the specifications and elsewhere in the general notes, a list of pre-qualified material to be used on this project.

Item 7:

Repair or replace any structures and utilities that might have been damaged by negligence or a failure to have utility locates performed.

Perform all electrical work in accordance with the National Electrical Code and Texas Department of Transportation Specifications.

Consult with appropriate electric company representatives according to their respective area to coordinate electrical services installations.

Contractor will be responsible for all costs associated with locating and/or exposing existing utilities. This includes existing utilities that may have been mismarked by the locator and/or utilities that are in the near vicinity of proposed construction. In addition, this includes all costs associated with pot-holing, mechanical vacuuming, hand-digging, etc. as needed to properly locate and protect all existing utilities.

Holiday restrictions – The Engineer may decide that no lane closures or construction operations shall be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No additional compensation will be allowed for these closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

- New Year's Eve & Day (5 am on December 31 thru 10:00 pm January 1)
- Easter Holiday weekend (5 am on Friday thru 10:00 pm Sunday)
- Memorial Day weekend (5 am on Friday thru 10:00 pm Monday)
- Independence Day (5 am on July 3 thru 10:00 pm on July 5)
- Labor Day weekend (5 am on Friday thru 10:00 pm Monday)
- Thanksgiving Holiday (5 am on Wednesday thru 10:00 pm Sunday)
- Christmas Holiday (5 am on December 23 thru 10:00 pm December 26)

No significant traffic generator events identified.

CSJ: 0095-05-063, etc **Sheet 3A**

County: Kaufman, etc

Highway: US 80, etc

Item 8:

This project will be a Standard Workweek in accordance with Article 8.3.1.4.

Meet daily with the Engineer to notify him or her of planned work for the day and to provide 24 hour notice of lane closures for planned work for the next day. Do not close lanes for which this requirement is not met. No work is to be performed without prior coordination with the Engineer.

A 120 day construction delay is included in this contract through Special Provision 008-004. This delay is included for material acquisition.

Item 100:
The limits of preparing right of way will be measured from Sta. 201+00.00 to Sta. 258+97.44 along the centerline of construction for US 175.

Tree removal will be subsidiary to preparing right of way.

Item 104:
In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planing or grinding is considered an acceptable method at these locations. Measurement and payment is in accordance with this item.

Sawing of concrete is not paid for directly, but is considered subsidiary to this item.

Item 160:
Sequence construction operations to salvage topsoil from one location and spread on areas ready to receive topsoil. Keep stockpiling of topsoil to a minimum.

Use fertile clay or loam from the project site not more than six inches below natural grade as topsoil.

Item 161:
Provide tickets representing quantity of compost delivered to site.

Item 162:

Install block sod as directed by the Engineer.

Item 168:

Water once a day where sod is installed. Include cost for this work in the unit bid price for this item.

Item 416:

Drilled shafts shall be drilled and poured on the same day unless directed by the engineer.

Provide a formed smooth finish for all portions of drill shafts extending above proposed ground. Include cost for this work in the unit bid price for this item.

Traffic signal and illumination pole foundations will be paid for once regardless of extra work caused by obstructions.

Concrete removal required for installation of drilled shafts will be subsidiary to Item 416.

Item 421:

Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (SiteManager). Mix Design templates will be provided by the Engineer.

Provide sulfate resistant concrete for all drilled shafts.

Provide all freshly mixed concrete testing equipment as required by subsection 3.3, except as noted here. Curing facilities, maturity meters, and strength-testing equipment will not be required. Air content testing is waived for this project. All testing equipment shall be clean and in like-new condition. Test molds shall be 4" diameter x 8" tall.

Item 449:

Use Thomas & Betts Kopr-Shield, MG Chemicals #846, MG Chemicals #8463, NYOGEL #756G, Pro-Shield #7308, Cho-Lube #4220, or other approved electrically conducting lubricant compound.

Item 500:

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

Item 502:

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

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic

CSJ: 0095-05-063, etc **Sheet 3B**

County: Kaufman, etc

Highway: US 80, etc

from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide written proposed lane closure information by 1:00 pm on the business day prior to the proposed closures. Do not close lanes when this requirement is not met.

When excavation is required next to a pavement lane carrying traffic and the sidewalk installation is not completed by the end of the work day, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

Do not commence work on the road before sunrise. Do not operate or park any equipment/machinery closer than 30 feet from the traveled roadway after sunset unless authorized by the engineer.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

Limit lane closures to the hours between 9:00 am and 3:30 pm. Work in other areas of the project is not restricted to this time frame.

As approved by the Engineer, provide uniformed off duty police officers and squad cars during lane or ramp closures, night time work or other situations that indicate a need for additional traffic control to protect the traveling public or the construction workforce. Provide documentation such as payroll, log sheets with signatures and badge number, or invoices from the government entity providing the officers for reimbursement. Complete the weekly 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. Reimbursement will not be made for coordination fees charged by any party.

Traffic Control Plans with Lane Closures causing back-ups of 8 minutes or greater in duration will be modified by the Engineer up to and including removal of the lane closure.

Additional lanes may be closed, started earlier, or extended later with written permission of the Engineer.

Item 506:

Install Biodegradable Erosion Control Logs as directed by the Engineer.

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

If temporary construction stream crossings are allowed under a Nationwide Permit, submit in writing for approval the type and location of each temporary stream crossing. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for temporary stream crossings. A temporary culvert crossing will consist of storm sewer pipes and 4- to 8-inch nominal size rock. Temporary stream crossings must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality. Remove the temporary stream crossings in their entirety and return the affected areas to their pre-existing elevation. All work and materials use for temporary construction stream crossings will not be paid for directly but are subsidiary to pertinent Items. Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" plywood sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow over flow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Item 529:

Provide grooved joints at 10-foot intervals and ¾ inch expansion joint material for doweled curb at the same locations as on the existing pavement.

For Curb and Gutter sections, provide grooved joints at 10-foot intervals and ¾ inch expansion joint material at a maximum of 50-foot centers and at all radius points and inlets.

CSJ: 0095-05-063, etc **Sheet 3C**

County: Kaufman, etc

Highway: US 80, etc

Curb and Gutter transitions will be paid for by the foot at the unit price for the corresponding curb or curb and gutter section.

Saw joints at the same location as on the existing pavement.

Item 531:

Joint sealant is required when shown in the plans. This work will not be paid for directly but will be considered subsidiary to this Item.

Item 536:

Use Class "B" concrete for concrete medians and directional islands.

Item 610:

Provide 12 circuit Buchanan Type 112SN, Kulka Type 985-GP-10 CU, or equal terminal strip in the luminaire pole access compartment. The conductors for the line and load side of the terminal strip shall be identified with a plastic label with two straps per tag. The load side shall have each signal head and ped head identified on the tag.

Use 120 to 277 volt electronic LED drivers for luminaires on this project.

Item 618:

The location of conduits and ground boxes are diagrammatic only and may be shifted to accommodate field conditions as directed.

Secure permission and approval from the proper authority prior to cutting into or removing any sidewalks or curbs for installation of this Item.

Place conduit under existing pavement by an approved boring method. Do not place boring pits closer than 2 feet from the edge of the pavement unless otherwise directed. Do not use water jetting. When conduits are bored, do not exceed 18 inches in the vertical and horizontal tolerances as measured from the intended target point.

Do not use a pneumatically driven device for punching holes beneath the pavement (commonly known as a "missile").

Furnish and install a flat, high tensile strength polyester fiber pull tape in conduit runs in excess of 50 feet or for future use and protected with standard weather-tight conduit caps, as approved. Acceptable products include Garvin # PT-1250-3K, ComStar PUL 1250P3K, Ideal Part No. 31-315 or equal as approved by the Engineer. This work will not be paid for directly, but is subsidiary to this Item.

Use a colored cleaner-primer on all PVC to PVC joints before application of PVC cement.

Seal all conduit ends with a permanently soft, non-toxic duct seal. Use a duct seal that does not adversely affect other plastic materials or corrode metals.

Existing conduit is proposed for reuse in this project. Conduit prep will be paid for under Item 6027 as directed by the Engineer.

When using existing conduit, ensure that all conduits have bushings and are cleaned of mud and debris. This work will not be paid for directly, but is subsidiary to this Item.

2" Schedule 80 PVC will be used at the power pole to supply electricity to underground services.

Item 620:

The equipment grounding conductor shall be identified by a continuous green colored jacket insulation or bare wire. Grounded conductors (Neutral) shall be identified by a continuous white colored jacket. Ungrounded conductors (Hot) in a 120/240v system shall be identified by each pole or leg. For 240-volt branch circuit fed from 120/240 source, ensure one leg is identified by a continuous black colored jacket and the other leg by a continuous red colored jacket.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Texas Department of Transportation (TxDOT) - Construction Division's (CST) materials producers list. 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:

Slack conductors required by Standard Sheet ED(3)-14 will be subsidiary to Item 624.

Concrete removal required for installation of ground boxes will be subsidiary to Item 624.

Item 628:

Contact the appropriate utility company during the first three weeks of the project lead-time period to allow adequate time for any necessary utility adjustments, transformer installation, etc.

Contractor shall submit an online request at ONCOR.com by following the steps below:
Select Construction and Development tab at top of screen.
Scroll down to New Construction and select Learn More.
Select the Start Request icon under the Commercial and Industrial project type.

CSJ: 0095-05-063, etc **Sheet 3D**

County: Kaufman, etc

Highway: US 80, etc

Select the One Single Building Facility tab and fill in all required information.
Submit the request. An ONCOR representative will contact you within a few days.

Granite concrete service pole embedment depth shall be 10' and shall be a minimum of 25' above grade.

Backfill Granite Concrete service poles with a Class A concrete in accordance with Item 421, "Hydraulic Cement Concrete", except consider the concrete subsidiary to Item 628 for payment purposes.

The Meter Base shall be mounted facing the roadway and the service enclosure shall be mounted on the opposite side of the service pole or pedestal.

The Contractor shall obtain the street address of the new electrical service directly from the applicable City.

Label the service enclosures indicating service address as well as all required information as shown on the Electrical Detail (ED) standard sheets. Labeling shall be silk screening or other acceptable method. This work will not be paid for directly, but is subsidiary to this Item.

A Licensed Master Electrician shall oversee the installation of all electrical services.

Bill the electrical service power usage to the Texas Department of Transportation.

On the outside lower front of each electrical service meter base cover, install a 12 gauge minimum thickness stainless steel, aluminum or brass placard. The placard shall be engraved or stamped with the numeric portion of the street address and permanently affixed to the cover with exterior rated adhesive so as not to interfere with the operation of the latch. This work will not be paid for directly, but is subsidiary to this Item.

Item 644:

Prior to taking elevations to determine lengths for fabrication of sign posts, obtain verification of all proposed locations.

All sign mounts shall have a clamp base system for all small roadside sign assemblies.

Affix a sign identification decal to the back of all signs in accordance with Item 643.

A 3 inch strip of red reflective sheeting shall be placed on all Do Not Enter sign assemblies. This sheeting shall be placed directly below the Do Not Enter sign for the entire length of the sign post facing wrong way traffic. This work will be considered subsidiary to Item 644.

Item 656:

Before placing the concrete for the controller foundations in the City of Dallas, coordinate with the City of Dallas to ensure that the anchor bolt spacing will match the anchor bolts and cabinet supplied by the city.

Form a 3/4-inch chamfer on the top edge of each pedestal pole foundation.

Probe for utilities and underground structures prior to drilling foundations. Foundations shall be paid for once regardless of extra work caused by obstructions.

Item 672:

Black adhesive will be used on asphalt pavements and white adhesive will be used on concrete pavements.

Item 677:

A water blasting method approved by the Engineer will be the only method allowed for the removal of permanent and temporary pavement markings except on a sealcoat surface. A 2 foot wide sealcoat will be required on sealcoat surfaces to eliminate permanent and temporary pavement markings.

Item 680:

Requirements for this Item include the following work, all of which are subsidiary to this Item:

1. Notify the Traffic Projects Office at DAL_TPO@txdot.gov one week before beginning any work involving traffic signals. Supplement email correspondence with the District Signal Maintenance Office at (214)320-6682 and Construction Office at (214)319-6406. In addition to these contacts, notify the City of Dallas Signal Shop at (214)670-4812 for their intersections.
2. Provide submittal literature for all traffic signal equipment before installation.
3. Furnish and install a new controller (eight phase NEMA TS 2 Type 1) and cabinet (NEMA TS 2 Size 6, 16 position load bay), meeting the requirements of Departmental Materials Specifications DMS-11170 for the intersection of US 80 at FM 2728 (West). Provide detector panel toggle switches that additionally permit the user to disconnect the detector. Provide new MMU with Ethernet port. For the intersections in the City of Dallas, install the supplied traffic signal controller and cabinet.
4. Deliver the cabinet, controller, and accessories (with all cabinet components completely connected and securely strapped down) for the intersection of US 80 and FM 2728 (West) to the District Signal Shop, 4777 E Hwy 80, Mesquite, for testing. Notify the District Signal Shop two working days before delivery at (214)320-6682.
5. Install the controller cabinets in an orientation as directed.
6. Connect all field wiring to the controller assembly. The District (for US 80 at FM 2728 West) or the City of Dallas (for Mockingbird signals) will assist in determining

CSJ: 0095-05-063, etc **Sheet 3E**

County: Kaufman, etc

Highway: US 80, etc

how the detection cables are to be connected, and will also program the controller for operation, hook up the malfunction management unit (MMU) or conflict monitor, detector units, and other equipment, and turn on the controller. Pick up the signal cabinets from the City of Dallas or the District Signal Shop as applicable. Have a qualified technician and a representative from the controller supplier on the project site to place the traffic signals at US 80 and FM 2728 West in operation.

7. Furnish and install all sign panels for mounting on signal poles and mast arms. Fabricate the sign panels in accordance with Item 636, and mount with Astro-Sign Brac, Signfix aluminum channel, or equal as approved by the Engineer. Submit five (5) sets of shop drawings for street name signs.
8. Provide 250W equivalent LED fixtures with 120 - 277 volt electronic LED drivers as shown on the Material Producers List.
9. Remove the existing stop sign assemblies after the traffic signals are in operation for US 80 at FM 2728 (West).
10. Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the Engineer a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the Engineer of each trouble call. Do not clear the error log in the conflict monitor or MMU during the thirty-day test period without approval.
11. When the work required by this contract has been satisfactorily completed on any individual or inter-connected system of signalized intersections, final clean-up has been performed, and the traffic signal equipment supplied has operated continuously and satisfactorily for at least 30 days, release from further maintenance on that particular intersection is authorized. This partial acceptance, made in writing, does not void or alter any of the terms of the contract.
12. Prevent any damage to property owner's poles, fences, shrubs, mailboxes, etc. Protect all underground and overhead utilities and repair any damage. Provide access to all driveways during construction.
13. Integrate the proposed traffic signal at US 80 and FM 2728 (West) into the existing closed loop system as shown on the plans. CENTRACS closed loop software, which utilizes Econolite Cobalt controllers, is currently in use in the Dallas District. Provide controllers on this project that fully communicate with the existing closed loop system.
14. For US 80 at FM 2728 (West), the concrete foundation for the controller as shown on standard TS-CF is diagrammatic and the dimensions will be adjusted in the field to fit existing conditions.
15. For the City of Dallas signals, install a concrete foundation for the controller as shown on the City Controller Cabinet Foundation sheet.
16. Salvage the existing traffic signals at IH 35E & Mockingbird Ln and SH 183 & Mockingbird Ln as shown on the plans. Salvage poles, cabinets, service poles and equipment, exposed conduit, and any other equipment as directed. This equipment remains the property of the City of Dallas. Contact the City of Dallas Traffic Field Operations Supervisor, Mr. Alfred Lemon, at (214) 670-3896 with at least 24 hours'

notice of intent to drop-off materials at the City of Dallas. The location of the drop-off facility is 3204 Canton Street, Dallas, TX. All other material removed in this project will become the property of the Contractor. Dispose of material off the right of way in accordance with federal, state, and local regulations. Maintain the operation of the existing traffic signal until directed to remove it.

Item 682:

Install signal head attachments so that the wiring to each signal head passes from the mast arm through the attachment hardware to the signal head. Do not leave cable or wiring exposed.

Provide signal head attachments that allow for adjustment about the horizontal and vertical axis.

For the intersection of US 80 at FM 2728 (West), provide aluminum vehicle signal heads in the following color: Federal Yellow #13538 of Federal Standard 595. Provide non-painted aluminum tubing. Provide back plates and the inside of visors with a flat black finish. Provide aluminum vented back plates for all traffic signal heads.

For IH 35E & SH 183 at Mockingbird signals, provide black polycarbonate pedestrian and vehicle signal heads with non-painted aluminum tubing. Provide black retroreflective aluminum non-vented back plates for all traffic signal heads.

Turn down signal heads or cover with burlap or other material, as approved, until traffic signal is placed in operation.

Mount signal heads level and plumb and aim as directed.

Item 684:

Provide stranded 14 AWG Type A signal cables for LED signal heads and stranded 12 AWG Type C cables for APS units.

Provide a separate multi-conductor signal cable (14 AWG) inside pedestal poles and signal poles from the terminal strip to each signal head as shown on the plans.

Identify each cable as shown on the plans (cable 1, etc.) with permanent marking labels (Panduit Type PLM standard single marker tie, Thomas&Betts Type 548M, or equal) at each ground box, pole base, and controller.

Item 686:

Provide 12 circuit Buchanan Type 112SN, Kulka Type 985-GP-12 CU, or equal terminal strips in the signal pole access compartment. Provide additional terminal strips of 8 circuits each when more than 12 circuits are required. The conductors for the line and

CSJ: 0095-05-063, etc **Sheet 3F**

County: Kaufman, etc

Highway: US 80, etc

load side of the terminal strip shall be identified with a plastic label with two straps per tag. The load side shall have each signal head and ped head identified on the tag.

Mark pole shafts and mast arms with the identification numbers from the plans to facilitate field-assembly. Identify pole shafts and mast arms by intersection for projects with multiple intersections.

Provide nuts on top and bottom (double nuts) of the base plate as shown on the plans.

Set anchor bolts for mast arm signal poles and strain poles so that two are in tension and two are in compression. Obtain approval of anchor bolt placement before placing concrete.

Provide vertical clearance of 17 to 19 feet from the roadway to the lowest point of the signal head or mast arm. Except for supplemental nearside signal heads, all signal heads must be installed at least 40' from the stop line. If field adjustments result in the nearest signal head being more than 180' from the stop line, install a supplemental nearside signal head as directed by the engineer. Determine the field measurements and elevations from the actual field location of the poles, considering all above and below ground utilities and existing roadway elevations.

Provide vibration dampers for mast arms 28 feet to 48 feet in length. Install as shown on MA-DPD.

Provide 3 pipe plugs for wiring access on strain poles.

Provide a three piece bracket assembly on strain poles or drill the pole and use thimble eye bolts to attach the strain vise for the span wire.

Item 687:

Provide 12 circuit Buchanan Type 112SN, Kulka Type 985-GP-10 CU, or equal terminal strip in the pedestal pole base. The conductors for the line and load side of the terminal strip shall be identified with a plastic label with two straps per tag. The load side shall have each signal head and ped head identified on the tag.

Item 688:

Verify the location of the APS units and the direction of the arrows on the signs prior to installation.

Contractor shall provide a digital copy of the APS messages to the City of Dallas for all new APS units on the project.

APS Units shall operate with hardwired connections for the communications path between the APS Units and the APS controller.

Item 6007: Fiber Optic Cable

The single mode fiber optic cable will be installed continuous, without splices, from one controller cabinet to the other as shown in the plans. Extra cable length will be included in the ITS ground box adjacent to each controller cabinet to provide adequate slack as shown in the plans.

Fiber optic cable patch panel terminations and patch cords (fiber optic jumpers) shall have LC connectors. 6 patch cords shall be provided per cabinet (4 active and 2 spares).

Item 6058:

For US 80 at FM 2728 (West), the BBU will be installed with the controller on the concrete pad paid for under Item 680. If a larger pad is needed to accommodate the BBU, the additional labor and material will be subsidiary to this item.

Item 6185:

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

TCP 1 Series	Scenario	Required TMA
(1-5)-18		1

TCP 2 Series	Scenario	Required TMA/TA
(2-6)-18	All	1

TCP 3 Series	Scenario	Required TMA/TA
(3-2)-18	All	3

TCP 5 Series	Scenario		Required TMA/TA
(5-1)-18	A	B	1

WZ (BTS) Series	Scenario	Required TMA
(BTS-1)-13	Near Side Lane Closure	1

Shadow vehicles equipped for truck mounted attenuators (TMA) for stationary operations will be paid for by the day and must be available for use at any time as determined by the Engineer.

CSJ: 0095-05-063, etc **Sheet 3G**

County: Kaufman, etc

Highway: US 80, etc

Therefore, 1 total shadow vehicle with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project for those times per plan requirements. Additional TMAs used that are not specified in the plans in which the contractor expects compensation will require prior approval from the Engineer.

Item 6292:

For US 80 at FM 2728 (West), all additional items such as poles, conduit, cable, etc. required to achieve the detection specified in the plans will not be paid for separately, but will be considered subsidiary to this item.

If the radar mounting locations shown on the plans for the Mockingbird signals do not allow for proper detection of the proposed zones, relocate the radar units as needed and directed. The labor cost to adjust the units will not be paid for separately but will be considered subsidiary to these items.

For the Mockingbird signals, this pay item includes install only for radar detectors and radar cable.

For the US 80 at FM 2728 (West) intersection, this pay item includes furnish and install for radar detectors and cable.

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

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 680
US 80 AT FM 2728 (WEST)

DESCRIPTION	UNIT	QUANTITY
250W EQ LED LUMINAIRE	EA	4
8 PHASE NEMA CONTROLLER COMPLETE W/ CABINET AND ACCESSORIES	EA	1
TRAFFIC SIGNAL CONTROLLER BASE	EA	1
REGULATORY SIGN PANEL (R10-12,ETC)	EA	1

SINGLE STREET NAME SIGN PANEL	EA	3
CONCRETE FOUNDATION (8’ X 9’ X 6”, CLASS B)	CY	1.3

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 680
IH 35E AT MOCKINGBIRD LN

DESCRIPTION	UNIT	QUANTITY
250W EQ LED LUMINAIRE	EA	6
INSTALL CITY-SUPPLIED CONTROLLER COMPLETE W/ CABINET AND ACCESSORIES	EA	1
REGULATORY SIGN PANEL (R10-12,ETC)	EA	10
SINGLE STREET NAME SIGN PANEL	EA	6
CONCRETE FOUNDATION (FOR CITY CABINET)	CY	0.9

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 680
SH 183 AT MOCKINGBIRD LN

DESCRIPTION	UNIT	QUANTITY
250W EQ LED LUMINAIRE	EA	6
INSTALL CITY-SUPPLIED CONTROLLER COMPLETE W/ CABINET AND ACCESSORIES	EA	1
REGULATORY SIGN PANEL (R10-12,ETC)	EA	10
SINGLE STREET NAME SIGN PANEL	EA	6
CONCRETE FOUNDATION (FOR CITY CABINET)	CY	0.9

CSJ: 0095-05-063, etc **Sheet 3H**

County: Kaufman, etc

Highway: US 80, etc

LIST OF MATERIAL
FURNISHED BY THE CITY OF DALLAS

DESCRIPTION	UNIT	QUANTITY
TRAFFIC SIGNAL CONTROLLER/CABINET	EA	2
ADVANCE RADAR DETECTION UNITS	EA	12
PRESENCE RADAR DETECTION UNITS	EA	12
RADAR CABLE	LF	5743
PTZ CAMERA	EA	3
BBU	EA	2

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0095-05-063 **DISTRICT** Dallas **COUNTY** Dallas, Kaufman
HIGHWAY IH 35E, US 175, US 80

			CONTROL SECTION JOB	**0095-05-063**		**0196-03-290**		**0197-02-136**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00183511**		**A00183499**		**A00183508**			
			COUNTY	**Kaufman**		**Dallas**		**Dallas**			
			HIGHWAY	**US 80**		**IH 35E**		**US 175**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA			5.000		5.000		10.000	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY			683.000		2,706.000		3,389.000	
	162-6002	BLOCK SODDING	SY			683.000		2,706.000		3,389.000	
	168-6001	VEGETATIVE WATERING	MG			102.000		403.000		505.000	
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF			44.000				44.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	60.000		117.000				177.000	
	416-6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF			66.000				66.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY			1.000		1.000		2.000	
	432-6003	RIPRAP (CONC)(6 IN)	CY			2.000				2.000	
	500-6001	MOBILIZATION	LS	0.150		0.470		0.380		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		6.000		5.000		13.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF			315.000		525.000		840.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF			315.000		525.000		840.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	50.000		358.000		315.000		723.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	50.000		358.000		315.000		723.000	
	529-6002	CONC CURB (TY II)	LF			133.000		61.000		194.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF			19.000				19.000	
	531-6001	CONC SIDEWALKS (4")	SY			972.000		2,555.000		3,527.000	
	531-6004	CURB RAMPS (TY 1)	EA			10.000				10.000	
	531-6005	CURB RAMPS (TY 2)	EA			8.000				8.000	
	531-6008	CURB RAMPS (TY 5)	EA			2.000				2.000	
	531-6013	CURB RAMPS (TY 10)	EA					4.000		4.000	
	531-6016	CURB RAMPS (TY 21)	EA			1.000				1.000	
	531-6017	CURB RAMPS (TY 22)	EA			6.000				6.000	
	536-6004	CONC DIRECTIONAL ISLAND	SY			92.000				92.000	
	610-6162	IN RD IL (TY SA) 30T-8 (250W EQ) LED	EA			4.000				4.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	55.000						55.000	
	618-6029	CONDT (PVC) (SCH 40) (3")	LF	14.000						14.000	
	618-6033	CONDT (PVC) (SCH 40) (4")	LF	59.000						59.000	
	618-6046	CONDT (PVC) (SCH 80) (2")	LF			272.000				272.000	
	618-6053	CONDT (PVC) (SCH 80) (3")	LF			336.000				336.000	
	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF			849.000				849.000	
	618-6058	CONDT (PVC) (SCH 80) (4")	LF			37.000				37.000	
	618-6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF			1,858.000				1,858.000	
	620-6004	ELEC CONDR (NO.12) INSULATED	LF			1,280.000				1,280.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	1,218.000		3,754.000				4,972.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	114.000		2,044.000				2,158.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0095-05-063 **DISTRICT** Dallas **COUNTY** Dallas, Kaufman
HIGHWAY IH 35E, US 175, US 80

			CONTROL SECTION JOB	**0095-05-063**		**0196-03-290**		**0197-02-136**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00183511**		**A00183499**		**A00183508**			
			COUNTY	**Kaufman**		**Dallas**		**Dallas**			
			HIGHWAY	**US 80**		**IH 35E**		**US 175**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	110.000						110.000	
	620-6012	ELEC CONDR (NO.4) INSULATED	LF			86.000				86.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	1.000		4.000				5.000	
	624-6008	GROUND BOX TY C (162911)W/APRON	EA	1.000						1.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA			16.000				16.000	
	624-6028	REMOVE GROUND BOX	EA			26.000				26.000	
	625-6002	ZINC-COAT STL WIRE STRAND (3/16")	LF	800.000						800.000	
	625-6004	ZINC-COAT STL WIRE STRAND (5/16")	LF	860.000						860.000	
	628-6185	ELC SRV TY D 120/240 070(NS)SS(E)GC(O)	EA	1.000						1.000	
	628-6187	ELC SRV TY D 120/240 070(NS)SS(E)PS(U)	EA			2.000				2.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA			1.000				1.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA			3.000				3.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	2.000		4.000				6.000	
	666-6017	REFL PAV MRK TY I (W)6"(DOT)(090MIL)	LF			114.000				114.000	
	666-6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF			2,435.000				2,435.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	116.000						116.000	
	666-6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF			2,015.000				2,015.000	
	666-6098	REF PAV MRK TY I(W)18"(YLD TRI)(090MIL)	EA			86.000				86.000	
	666-6224	PAVEMENT SEALER 4"	LF	673.000		3,860.000				4,533.000	
	666-6225	PAVEMENT SEALER 6"	LF			114.000				114.000	
	666-6226	PAVEMENT SEALER 8"	LF	116.000		2,435.000				2,551.000	
	666-6230	PAVEMENT SEALER 24"	LF	85.000		2,015.000				2,100.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA			26.000				26.000	
	666-6232	PAVEMENT SEALER (WORD)	EA			14.000				14.000	
	666-6234	PAVEMENT SEALER (DBL ARROW)	EA			7.000				7.000	
	666-6236	PAVEMENT SEALER (UTURN ARROW)	EA			1.000				1.000	
	666-6243	PAVEMENT SEALER (YLD TRI)	EA			86.000				86.000	
	666-6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF			1,260.000				1,260.000	
	666-6302	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	LF			1,825.000				1,825.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	179.000						179.000	
	666-6314	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	LF			775.000				775.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	494.000						494.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	85.000						85.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA			26.000				26.000	
	668-6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA			7.000				7.000	
	668-6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA			1.000				1.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA			14.000				14.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0095-05-063 **DISTRICT** Dallas **COUNTY** Dallas, Kaufman
HIGHWAY IH 35E, US 175, US 80

			CONTROL SECTION JOB	**0095-05-063**		**0196-03-290**		**0197-02-136**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00183511**		**A00183499**		**A00183508**			
			COUNTY	**Kaufman**		**Dallas**		**Dallas**			
			HIGHWAY	**US 80**		**IH 35E**		**US 175**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	672-6007	REFL PAV MRKR TY I-C	EA	6.000						6.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA			32.000				32.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA			809.000				809.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	649.000		3,860.000				4,509.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF			114.000				114.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	121.000		2,435.000				2,556.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF			1,486.000				1,486.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	16.000		602.000				618.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA			27.000				27.000	
	677-6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA			7.000				7.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA			14.000				14.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF	673.000		3,860.000				4,533.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF			114.000				114.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	116.000		2,435.000				2,551.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	85.000		2,015.000				2,100.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA			26.000				26.000	
	678-6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA			7.000				7.000	
	678-6012	PAV SURF PREP FOR MRK (UTURN ARR)	EA			1.000				1.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA			14.000				14.000	
	678-6022	PAV SURF PREP FOR MRK (18")(YLD TRI)	EA			86.000				86.000	
	678-6033	PAV SURF PREP FOR MRK (RPM)	EA	6.000		841.000				847.000	
	680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1.000						1.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA			2.000				2.000	
	680-6005	INS HY TRF SIG (DPT SUP CNT & CAB)(ISO)	EA			2.000				2.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	6.000		29.000				35.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	1.000		18.000				19.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	6.000		42.000				48.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	2.000		8.000				10.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	6.000		42.000				48.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	2.000		8.000				10.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA			24.000				24.000	
	682-6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA			42.000				42.000	
	682-6053	BACKPLATE W/REFL BRDR(5 SEC)ALUM	EA			4.000				4.000	
	682-6054	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	EA	5.000						5.000	
	682-6055	BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM	EA	2.000						2.000	
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF			1,797.000				1,797.000	
	684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	823.000		271.000				1,094.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0095-05-063 **DISTRICT** Dallas **COUNTY** Dallas, Kaufman
HIGHWAY IH 35E, US 175, US 80

			CONTROL SECTION JOB		**0095-05-063**		**0196-03-290**		**0197-02-136**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00183511**		**A00183499**		**A00183508**			
			COUNTY		**Kaufman**		**Dallas**		**Dallas**			
			HIGHWAY		**US 80**		**IH 35E**		**US 175**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	684-6036	TRF SIG CBL (TY A)(14 AWG)(10 CONDR)		LF			3,457.000				3,457.000	
	684-6046	TRF SIG CBL (TY A)(14 AWG)(20 CONDR)		LF			3,093.000				3,093.000	
	684-6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)		LF			6,168.000				6,168.000	
	686-6020	INS TRF SIG PL AM (S)STR(TY D)LUM		EA	4.000						4.000	
	686-6039	INS TRF SIG PL AM(S)1 ARM(36')LUM		EA			4.000				4.000	
	686-6047	INS TRF SIG PL AM(S)1 ARM(44')LUM		EA			3.000				3.000	
	686-6051	INS TRF SIG PL AM(S)1 ARM(48')LUM		EA			2.000				2.000	
	686-6059	INS TRF SIG PL AM(S)1 ARM(55')LUM		EA			2.000				2.000	
	686-6063	INS TRF SIG PL AM(S)1 ARM(60')LUM		EA			1.000				1.000	
	687-6001	PED POLE ASSEMBLY		EA			10.000				10.000	
	688-6001	PED DETECT PUSH BUTTON (APS)		EA			24.000				24.000	
	688-6003	PED DETECTOR CONTROLLER UNIT		EA			4.000				4.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN		DAY	10.000		20.000				30.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN		EA					2.000		2.000	
	6004-6031	ITS COM CBL (ETHERNET)		LF			852.000				852.000	
	6007-6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)		LF			1,270.000				1,270.000	
	6007-6096	FIBER OPTIC PATCH PANEL (12 POSITION)		EA			2.000				2.000	
	6007-6109	FIBER OPTIC JUMPERS		EA			12.000				12.000	
	6010-6004	CCTV MOUNT (POLE)		EA			3.000				3.000	
	6010-6011	CCTV FIELD EQUIP (DIGITAL) (INSTL ONLY)		EA			3.000				3.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)		EA	1.000						1.000	
	6185-6002	TMA (STATIONARY)		DAY	6.000		12.000		86.000		104.000	
	6185-6005	TMA (MOBILE OPERATION)		DAY					86.000		86.000	
	6186-6014	ITS GND BOX (POLY) TY 1 (243624)W/APRN		EA			4.000				4.000	
	6292-6001	RVDS(PRESENCE DETECTION ONLY)		EA	1.000						1.000	
	6292-6003	RVDS(PRESENCE AND ADVANCE DET)		EA	2.000						2.000	
	6292-6004	RVDS(PRESENCE DET ONLY)(INSTALL ONLY)		EA			4.000				4.000	
	6292-6006	RVDS(PRES AND ADV DET)(INSTALL ONLY)		EA			8.000				8.000	
	14	PUBLIC UTILITY FORCE ACCT WORK (PARTICIPATING)		LS	1.000		1.000				2.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)		LS	1.000		1.000				2.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS	1.000		1.000				2.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS			1.000				1.000	
	31	MATERIALS FURNISHED BY CITY (PARTICIPATING)		LS			1.000				1.000	

ITEM	NO.	DESCRIPTION	UNIT	CSJ 0095-05-063 QUANTITY
0416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	**60**
0500	6001	MOBILIZATION	LS	**0.15**
0502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	**2**
0506	6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	**50**
0506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	**50**
0618	6023	CONDUIT (PVC)(SCHD 40)(2 ")	LF	**55**
0618	6029	CONDUIT (PVC)(SCHD 40)(3 ")	LF	**14**
0618	6033	CONDUIT (PVC)(SCHD 40)(4 ")	LF	**59**
0620	6008	ELEC CONDUCTOR (NO. 8) INSULATED	LF	**1218**
0620	6009	ELEC CONDUCTOR (NO. 6) BARE	LF	**114**
0620	6010	ELEC CONDUCTOR (NO. 6) INSULATED	LF	**110**
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	**1**
0624	6008	GROUND BOX TY C (162911) W/APRON	EA	**1**
0625	6002	ZINC-COAT STL WIRE STRAND (3/16")	LF	**800**
0625	6004	ZINC-COAT STL WIRE STRAND (5/16")	LF	**860**
0628	6185	ELC SRV TY D 120 / 240 070 (NS) SS (E) GC (O)	EA	**1**
0644	6076	REMOVE SM RD SN SUP & AM	EA	**2**
0666	6036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	**116**
0666	6224	PAVEMENT SEALER 4"	LF	**673**
0666	6226	PAVEMENT SEALER 8"	LF	**116**
0666	6230	PAVEMENT SEALER 24"	LF	**85**
0666	6303	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	LF	**179**
0666	6315	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	**494**
0668	6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	**85**
0672	6007	REFL PAV MRKR TY I-C	EA	**6**
0677	6001	ELIM EXT PAV MRK & MRKR (4")	LF	**649**
0677	6003	ELIM EXT PAV MRK & MRKR (8")	LF	**121**
0677	6007	ELIM EXT PAV MRK & MRKR (24")	LF	**16**
0678	6001	PAV SURF PREP FOR MRK (4")	LF	**673**
0678	6004	PAV SURF PREP FOR MRK (8")	LF	**116**
0678	6008	PAV SURF PREP FOR MRK (24")	LF	**85**
0678	6033	PAV SURF PREP FOR MRK (RPM)	EA	**6**
0680	6002	INSTAL OF HWY TRAF SIG (ISOLATED)	EA	**1**
0682	6001	VEH SIG SEC (12 IN) LED (GRN)	EA	**6**
0682	6002	VEH SIG SEC (12 IN) LED (GRN ARW)	EA	**1**
0682	6003	VEH SIG SEC (12 IN) LED (YEL)	EA	**6**
0682	6004	VEH SIG SEC (12 IN) LED (YEL ARW)	EA	**2**
0682	6005	VEH SIG SEC (12 IN) LED (RED)	EA	**6**
0682	6006	VEH SIG SEC (12 IN) LED (RED ARW)	EA	**2**
0682	6054	BACKPLATE W/REF BRDR (3 SEC)(VENT) ALUM	EA	**5**
0682	6055	BACKPLATE W/REF BRDR (4 SEC)(VENT) ALUM	EA	**2**
0684	6033	TRAF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	**823**
0686	6020	TRAF SIG POLE ASM (STL) STR (TY D) LUM	EA	**4**
6001	6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	**10**
6058	6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	**1**
6185	6002	TMA (STATIONARY)	DAY	**6**
6292	6001	RVDS (PRESENCE DETECTION ONLY)	EA	**1**
6292	6003	RVDS (PRESENCE AND ADVANCE DET)	EA	**2**

FILE: T:\DALTRAFSD\Jason Pascoe\FM2728 Project Summary.dgn

Texas Department of Transportation

PROJECT SUMMARY
US 80 AT FM 2728 (WEST)

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JJP	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS JJP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	5
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

SUMMARY OF TRAFFIC SIGNAL ITEMS - CSJ 0196-03-290

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	IH 35E AT MOCKINGBIRD LN	SH 183 AT MOCKINGBIRD LN	PROJECT TOTAL
				EST.	EST.	EST.
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	78	39	117
416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	22	22	44
416	6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF		66	66
432	6003	RIPRAP (CONC)(6 IN)	CY		1.5	1.5
500	6001	MOBILIZATION	LS	0.23	0.24	0.47
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3	3	6
506	6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	100	100	200
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	100	100	200
529	6002	CONC CURB (TY II)	LF	8	125	133
529	6008	CONC CURB & GUTTER (TY II)	LF	19		19
531	6001	CONC SIDEWALKS (4")	SY	1	32	33
531	6004	CURB RAMPS (TY 1)	EA	5	5	10
531	6005	CURB RAMPS (TY 2)	EA	4	4	8
531	6008	CURB RAMPS (TY 5)	EA	1	1	2
531	6016	CURB RAMPS (TY 21)	EA		1	1
531	6017	CURB RAMPS (TY 22)	EA	3	3	6
536	6004	CONC DIRECTIONAL ISLAND	SY	92		92
610	6162	IN RD IL (TY SA) 30T-8 (250W EQ) LED	EA	2	2	4
618	6046	CONDT (PVC) (SCH 80) (2")	LF	124	148	272
618	6053	CONDT (PVC) (SCH 80) (3")	LF	155	181	336
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	524	325	849
618	6058	CONDT (PVC) (SCH 80) (4")	LF	20	17	37
618	6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF	1001	857	1858
620	6004	ELEC CONDR (NO.12) INSULATED	LF	640	640	1280
620	6008	ELEC CONDR (NO.8) INSULATED	LF	2026	1728	3754
620	6009	ELEC CONDR (NO.6) BARE	LF	1092	952	2044
620	6012	ELEC CONDR (NO.4) INSULATED	LF	54	32	86
624	6002	GROUND BOX TY A (122311)W/APRON	EA	2	2	4
624	6010	GROUND BOX TY D (162922)W/APRON	EA	9	7	16
624	6028	REMOVE GROUND BOX	EA	13	13	26
628	6187	ELC SRV TY D 120/240 070(NS)SS(E)PS(U)	EA	1	1	2
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA		1	1
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2	1	3
644	6076	REMOVE SM RD SN SUP&AM	EA	3	1	4
666	6017	REFL PAV MRK TY I (W)6"(DOT)(090MIL)	LF	53	61	114
666	6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	1350	1085	2435
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	952	1063	2015
666	6098	REF PAV MRK TY I(W)18"(YLD TRI)(090MIL)	EA	42	44	86
666	6224	PAVEMENT SEALER 4"	LF	1963	1897	3860
666	6225	PAVEMENT SEALER 6"	LF	53	61	114
666	6226	PAVEMENT SEALER 8"	LF	1350	1085	2435
666	6230	PAVEMENT SEALER 24"	LF	952	1063	2015
666	6231	PAVEMENT SEALER (ARROW)	EA	13	13	26
666	6232	PAVEMENT SEALER (WORD)	EA	7	7	14
666	6234	PAVEMENT SEALER (DBL ARROW)	EA	3	4	7
666	6236	PAVEMENT SEALER (UTURN ARROW)	EA		1	1
666	6243	PAVEMENT SEALER (YLD TRI)	EA	42	44	86
666	6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF	680	580	1260
666	6302	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	LF	883	942	1825
666	6314	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	LF	400	375	775
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	13	13	26
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	3	4	7
668	6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA		1	1
668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	7	7	14
672	6009	REFL PAV MRKR TY II-A-A	EA	16	16	32
672	6010	REFL PAV MRKR TY II-C-R	EA	406	403	809
677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	1963	1897	3860
677	6002	ELIM EXT PAV MRK & MRKS (6")	LF	53	61	114
677	6003	ELIM EXT PAV MRK & MRKS (8")	LF	1350	1085	2435
677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	666	820	1486
677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	360	242	602
677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	13	14	27
677	6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	3	4	7
677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	7	7	14
678	6001	PAV SURF PREP FOR MRK (4")	LF	1963	1897	3860
678	6002	PAV SURF PREP FOR MRK (6")	LF	53	61	114
678	6004	PAV SURF PREP FOR MRK (8")	LF	1350	1085	2435
678	6008	PAV SURF PREP FOR MRK (24")	LF	952	1063	2015

SUMMARY OF TRAFFIC SIGNAL ITEMS - CSJ 0196-03-290

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	IH 35E AT MOCKINGBIRD LN	SH 183 AT MOCKINGBIRD LN	PROJECT TOTAL
				EST.	EST.	EST.
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	13	13	26
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	3	4	7
678	6012	PAV SURF PREP FOR MRK (UTURN ARR)	EA		1	1
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	7	7	14
678	6022	PAV SURF PREP FOR MRK (18")(YLD TRI)	EA	42	44	86
678	6033	PAV SURF PREP FOR MRK (RPM)	EA	422	419	841
680	6004	REMOVING TRAFFIC SIGNALS	EA	1	1	2
680	6005	INS HY TRF SIG (DPT SUP CNT & CAB)(ISO)	EA	1	1	2
682	6001	VEH SIG SEC (12")LED(GRN)	EA	15	14	29
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	10	8	18
682	6003	VEH SIG SEC (12")LED(YEL)	EA	22	20	42
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	4	4	8
682	6005	VEH SIG SEC (12")LED(RED)	EA	22	20	42
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	4	4	8
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	12	12	24
682	6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	22	20	42
682	6053	BACKPLATE W/REFL BRDR(5 SEC)ALUM	EA	2	2	4
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	823	974	1797
684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	121	150	271
684	6036	TRF SIG CBL (TY A)(14 AWG)(10 CONDR)	LF	1,145	2,312	3457
684	6046	TRF SIG CBL (TY A)(14 AWG)(20 CONDR)	LF	1,696	1,397	3093
684	6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	3,448	2,720	6168
686	6039	INS TRF SIG PL AM(S)1 ARM(36')LUM	EA	2	2	4
686	6047	INS TRF SIG PL AM(S)1 ARM(44')LUM	EA	2	1	3
686	6051	INS TRF SIG PL AM(S)1 ARM(48')LUM	EA	2		2
686	6059	INS TRF SIG PL AM(S)1 ARM(55')LUM	EA		2	2
686	6063	INS TRF SIG PL AM(S)1 ARM(60')LUM	EA		1	1
687	6001	PED POLE ASSEMBLY	EA	5	5	10
688	6001	PED DETECT PUSH BUTTON (APS)	EA	12	12	24
688	6003	PED DETECTOR CONTROLLER UNIT	EA	2	2	4
6001	6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	10	10	20
6004	6031	ITS COM CBL (ETHERNET)	LF	264	588	852
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	737	533	1270
6007	6096	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1	1	2
6007	6109	FIBER OPTIC JUMPERS	EA	6	6	12
6010	6004	CCTV MOUNT (POLE)	EA	1	2	3
6010	6011	CCTV FIELD EQUIP (DIGITAL) (INSTL ONLY)	EA	1	2	3
6185	6002	TMA (STATIONARY)	DAY	6	6	12
6186	6014	ITS GND BOX (POLY) TY 1 (243624)W/APRN	EA	2	2	4
6292	6004	RVDS(PRESENCE DET ONLY)(INSTALL ONLY)	EA	2	2	4
6292	6006	RVDS(PRES AND ADV DET)(INSTALL ONLY)	EA	4	4	8

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

PROJECT SUMMARY
IH 35E AT MOCKINGBIRD LN
SH 183 AT MOCKINGBIRD LN

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	6
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

DATE:
FILE:

SUMMARY OF EROSION CONTROL ITEMS							
LOCATION	161 6017	162 6002	168 6001	506 6038	506 6039	506 6042	506 6043
	COMPOST MANUF TOPSOIL (4")	BLOCK SODDING	VEGETATIVE WATERING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (18")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	MG	LF	LF	LF	LF
IH 35E							
CSJ 0196-03-290	650	650	97	300	300	150	150
5% ADDITIONAL QUANTITY	33	33	5	15	15	8	8
PROJECT TOTALS	**683**	**683**	**102**	**315**	**315**	**158**	**158**

SUMMARY OF ROADWAY ITEMS			
LOCATION	100 6002	432 6001	531 6001
	PREPARING ROW	RIPRAP (CONC) (4 IN)	CONC SIDEWALKS (4")
	STA	CY	SY
IH 35E			
CSJ 0196-03-290	5	1	939
PROJECT TOTALS	**5**	**1**	**939**

IH 35E

PROJECT SUMMARY

N.T.S.

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	7
CHECK	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

SUMMARY OF ROADWAY ITEMS									
LOCATION	100 6002	432 6001	502 6001	529 6002	531 6001	531 6013	6001 6002	6185 6002	6185 6005
	PREPARING ROW	RIPRAP (CONC) (4 IN)	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONC CURB (TY II)	CONC SIDEWALKS (4")	CURB RAMPS (TY 10)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	STA	CY	MO	LF	SY	EA	EA	DAY	DAY
US 175									
CSJ 0197-02-136									
STA. 201+00.00 TO STA. 258+97.44	5	1	5	61	2,555	4	2	86	86
PROJECT TOTALS	**5**	**1**	**5**	**61**	**2,555**	**4**	**2**	**86**	**86**

SUMMARY OF EROSION CONTROL ITEMS							
LOCATION	161 6017	162 6002	168 6001	506 6038	506 6039	506 6042	506 6043
	COMPOST MANUF TOPSOIL (4")	BLOCK SODDING	VEGETATIVE WATERING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (18")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	MG	LF	LF	LF	LF
US 175							
CSJ 0197-02-136							
STA. 201+00.00 TO STA. 258+97.44	2,577	2,577	384	500	500	300	300
5% ADDITIONAL QUANTITY	129	129	19	25	25	15	15
PROJECT TOTALS	**2,706**	**2,706**	**403**	**525**	**525**	**315**	**315**

US 175

PROJECT SUMMARY

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS: DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	8
CHECK	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

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) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
										PREFABRICATED	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TYPE N	TYPE S
	A*	R10-17T	LEFT TURN YIELD ON FLASHING YELLOW ARROW	36" X 42"	X		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	P = "Plain" T = "T" U = "U"			
							MOUNT ON SPAN P1-P2						
	B*	D3-1G	12800 FM 2728	84" X 18"	X								
							MOUNT ON SPAN P1-P2						
	C*	D3-1G	7200 US 80 7300	84" X 18"	X								
							MOUNT ON SPAN P2-P3						
	D*	D3-1G	FM 2728 12800	84" X 18"	X								
							MOUNT ON SPAN P3-P4						

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).

* SUBISDIARY TO ITEM 680

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FILE: T:\DALTRAFSD\Jason Pascoe\FM2728 SOSS.dgn

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	18	KAUFMAN, ETC.		9

DATE:
FILE:

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	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							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
	A	R6-2R	ONE WAY	30"X36"	X		MOUNT ON MAST ARM P-1					
	B	D3-1aG	35E Stemmons 7200N 7300N	132"X30"	X		MOUNT ON MAST ARM P-1					
	C, I L, R	R9-3		18"X18"	X		MOUNT ON POLE P-1, P-6, P-7, P-12					
	D	I-5 M6-1G		24"X24" 21"X15"	X X		MOUNT ON MAST ARM P-2					
	E	R3-8LMS	ONLY ONLY	48"X30"	X		MOUNT ON MAST ARM P-2					
	F	D3-1aG	Mockingbird 1100W 1200W	108"X24"	X		MOUNT ON MAST ARM P-2					
	G	R6-2L	ONE WAY	30"X36"	X		MOUNT ON MAST ARM P-4					
	H	D3-1aG	35E Stemmons 7300N 7200N	132"X30"	X		MOUNT ON MAST ARM P-4					
	J	R6-2R	ONE WAY	30"X36"	X		MOUNT ON MAST ARM P-7					
	K	D3-1aG	35E Stemmons 7300N 7200N	132"X30"	X		MOUNT ON MAST ARM P-7					
	M	I-5 M6-1G		24"X24" 21"X15"	X X		MOUNT ON MAST ARM P-8					
	N	R3-8 (MOD)	ONLY	48"X30"	X		MOUNT ON MAST ARM P-8					
	O	D3-1aG	Mockingbird 1200W 1100W	108"X24"	X		MOUNT ON MAST ARM P-8					
	P	R6-2L	ONE WAY	30"X36"	X		MOUNT ON MAST ARM P-10					
	Q	D3-1aG	35E Stemmons 7200N 7300N	132"X30"	X		MOUNT ON MAST ARM P-10					
	S, U	R5-1	DO NOT ENTER	48"X48"	X		10 BWG	1	SB	T		
	T	R3-5R	ONLY	30"X36"	X		10 BWG	1	SB	T		
	V	R3-8L	ONLY	36"X36"	X		10 BWG	1	SB	T		

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

IH 35E AT MOCKINGBIRD LN

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0095	05	063, ETC.	US 80, ETC.
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8-16		18	KAUFMAN, ETC.		10

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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")	MOUNTING DESIGNATION: 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)
	A	R6-2R	ONE WAY ⇨	30"X36"	X		MOUNT ON MASR ARM P-1					
	B	D3-1aG	TEXAS 183 JW Carpenter 7200 7300	162"X30"	X		MOUNT ON MASR ARM P-1					
	C, I L, R	R9-3		18"X18"	X		MOUNT ON POLE P-1, P-7, P-9, P-13					
	D	R3-8(MOD)	ONLY	48"X30"	X		MOUNT ON MASR ARM P-3					
	E	I-5 M6-1G		24"X24" 21"X15"	X X		MOUNT ON MASR ARM P-3					
	F	D3-1aG	Mockingbird 1000W 1100W	108"X24"	X		MOUNT ON MASR ARM P-3					
	G	R6-2L	ONE WAY ⇦	30"X36"	X		MOUNT ON MASR ARM P-5					
	H	D3-1aG	TEXAS 183 JW Carpenter 7300 7200	162"X30"	X		MOUNT ON MASR ARM P-5					
	J	R6-2R	ONE WAY ⇨	30"X36"	X		MOUNT ON MASR ARM P-8					
	K	D3-1aG	TEXAS 183 JW Carpenter 7300 7200	162"X30"	X		MOUNT ON MASR ARM P-8					
	M	D3-1aG	Mockingbird 1100W 1000W	108"X24"	X		MOUNT ON MASR ARM P-9					
	N	I-5 M6-1G		24"X24" 21"X15"	X X		MOUNT ON MASR ARM P-9					
	O	R3-8(MOD)	ONLY	48"X30"	X		MOUNT ON MASR ARM P-9					
	P	R6-2L	ONE WAY ⇦	30"X36"	X		MOUNT ON MASR ARM P-11					
	Q	D3-1aG	TEXAS 183 JW Carpenter 7200 7300	162"X30"	X		MOUNT ON MASR ARM P-11					
	S	R1-5cL	STOP HERE FOR PEDESTRIANS	24"X30"	X		10 BWG	1	SB	P		
	T	R5-1	DO NOT ENTER	48"X48"	X		10 BWG	1	SB	T		

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

SH 183 AT MOCKINGBIRD LN

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		12

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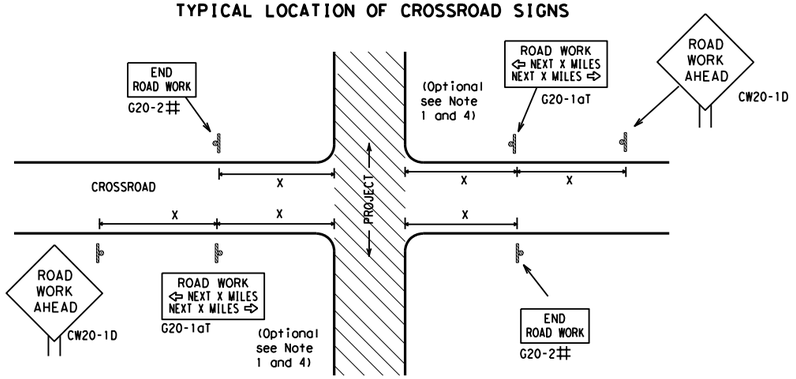
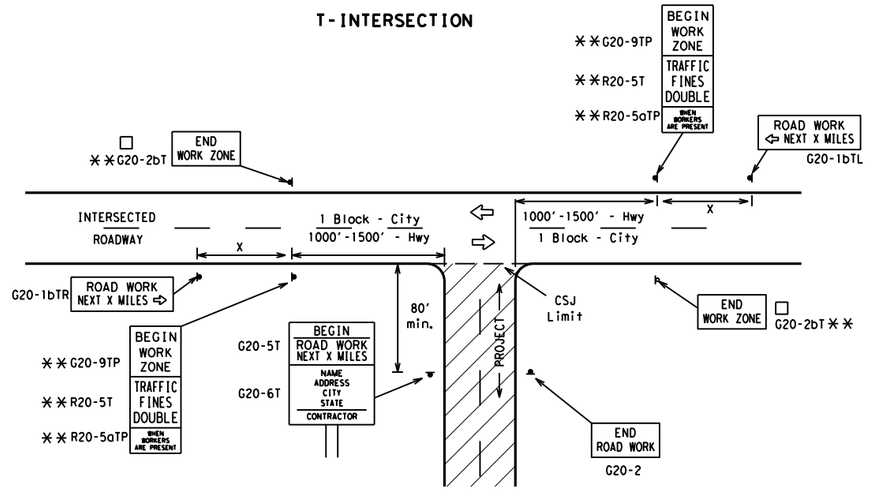
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

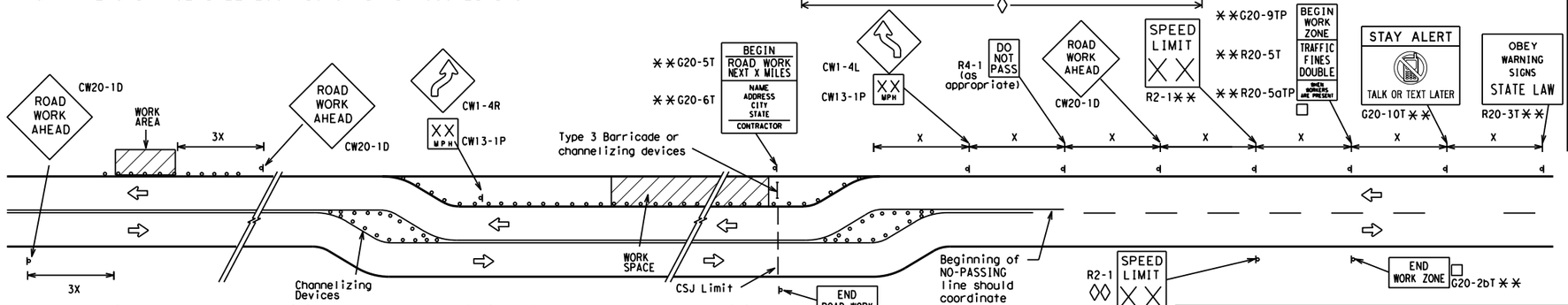
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

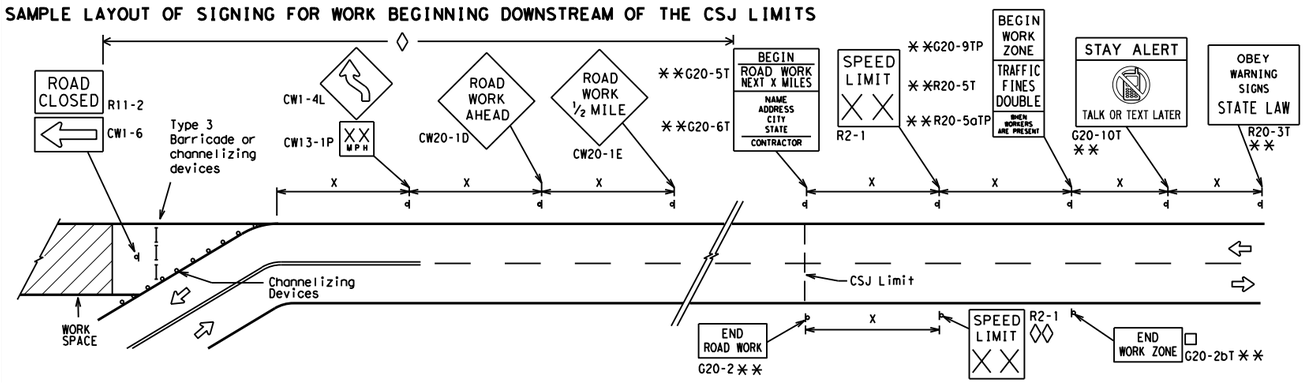
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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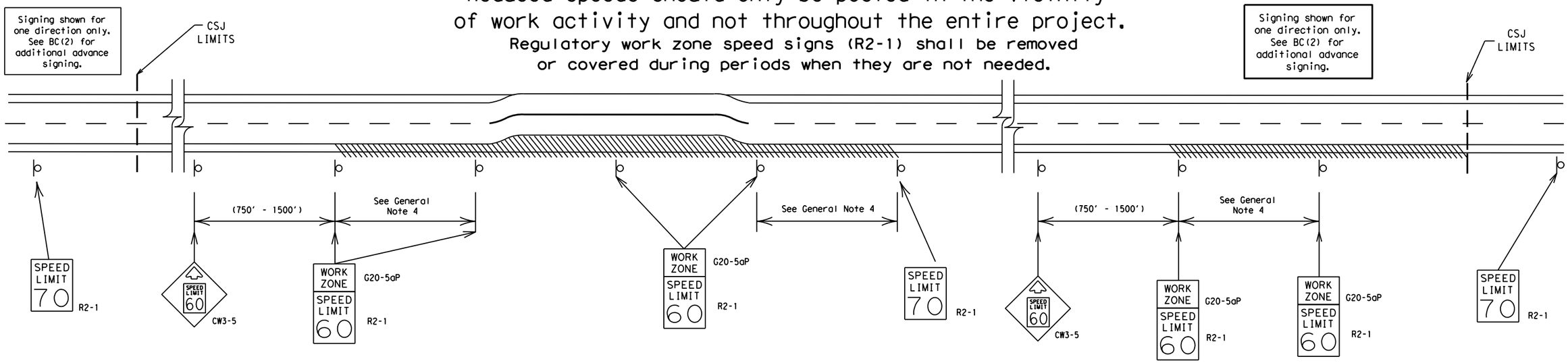
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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REVISIONS	0095	05	063, ETC.	US 80, ETC.
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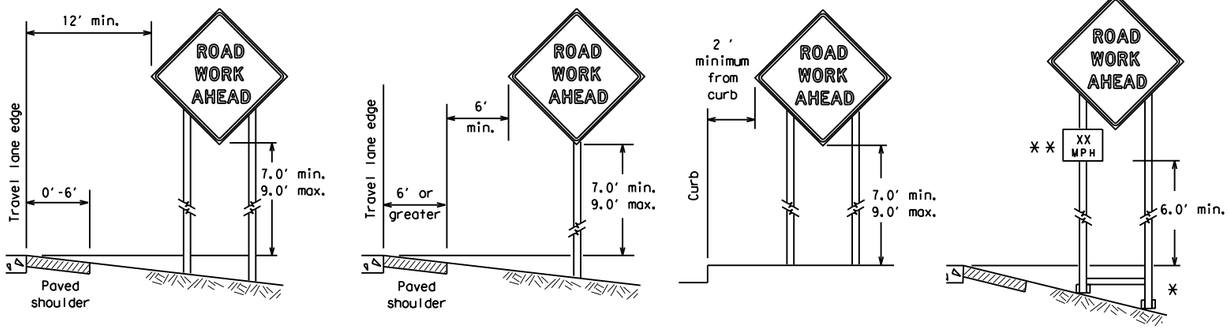
7-13 5-21	DAL	KAUFMAN, ETC.		14

DATE:
FILE:

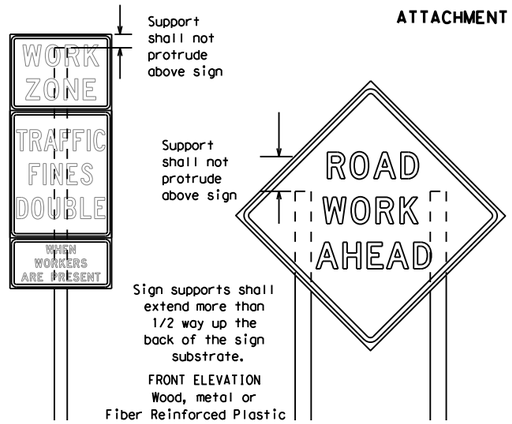
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

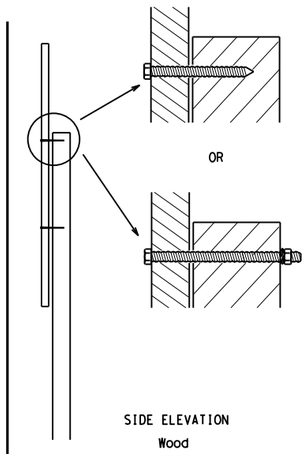


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





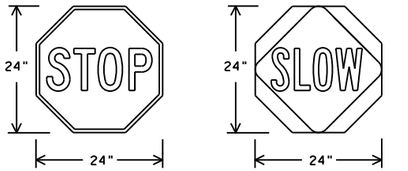
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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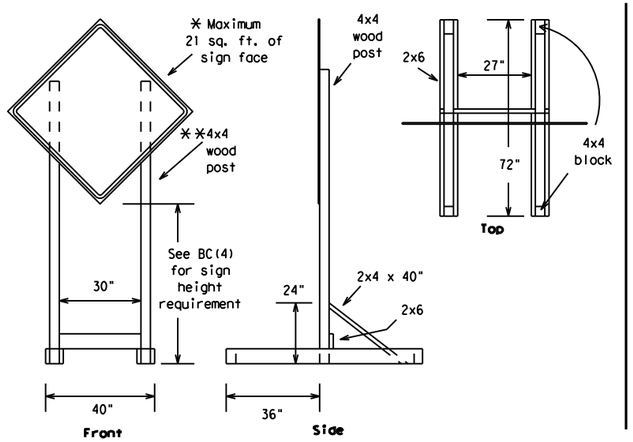
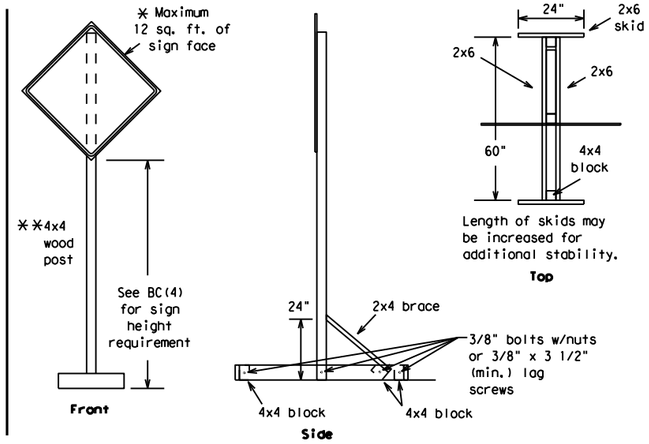
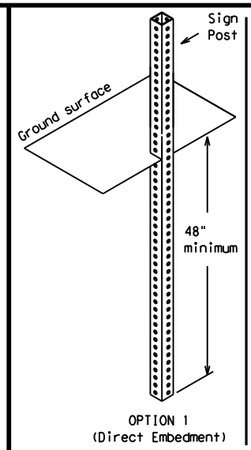
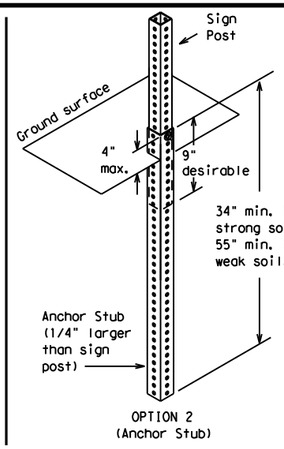


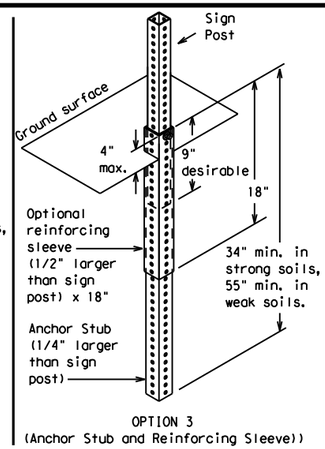


SKID MOUNTED WOOD SIGN SUPPORTS

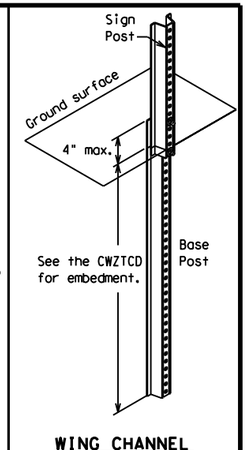
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







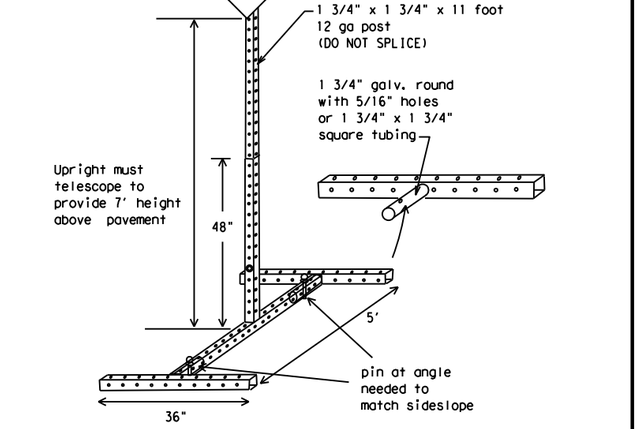
PERFORATED SQUARE METAL TUBING

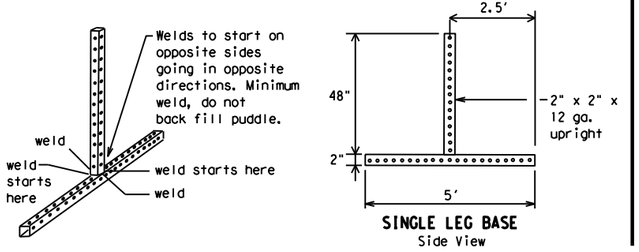


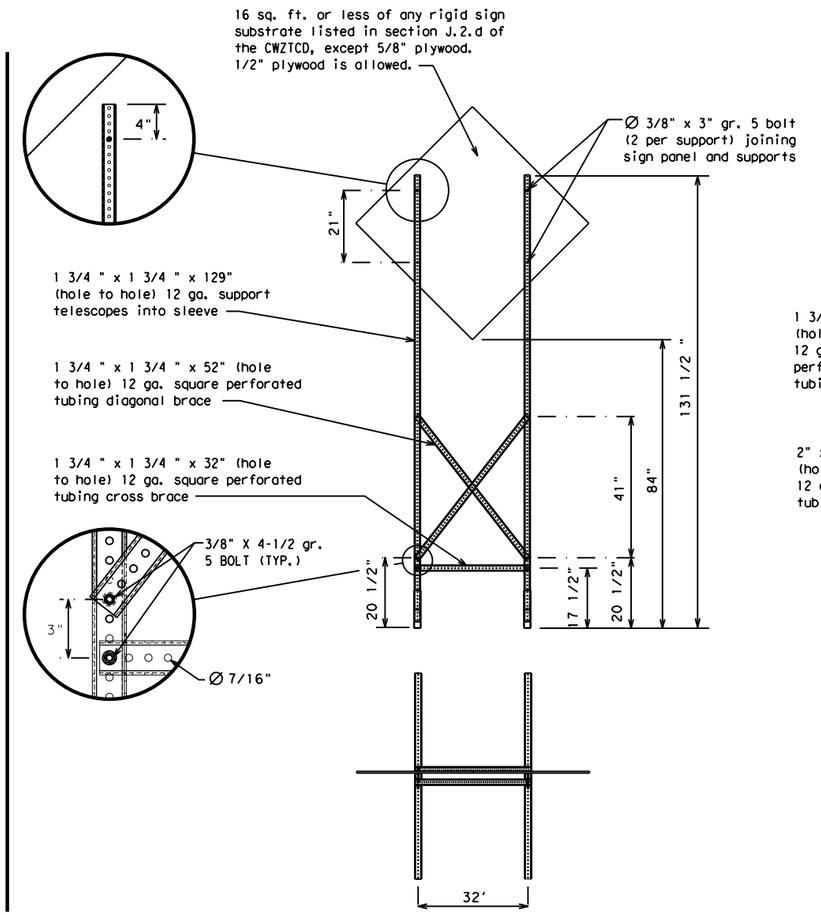
WING CHANNEL
Lap-splice/base bolted anchor

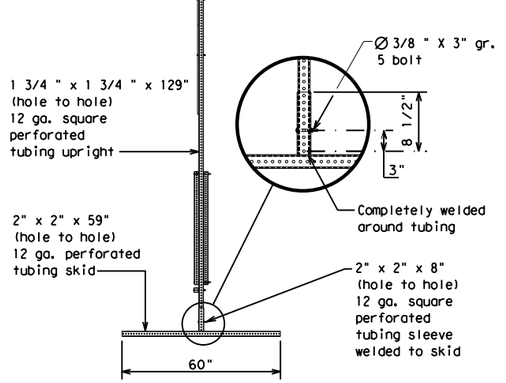
GROUND MOUNTED SIGN SUPPORTS

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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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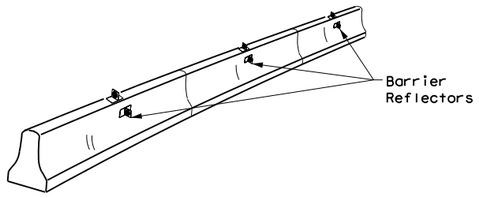
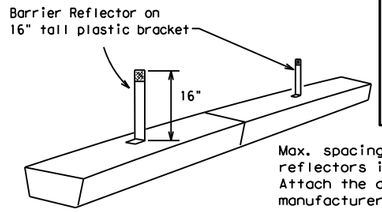
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

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

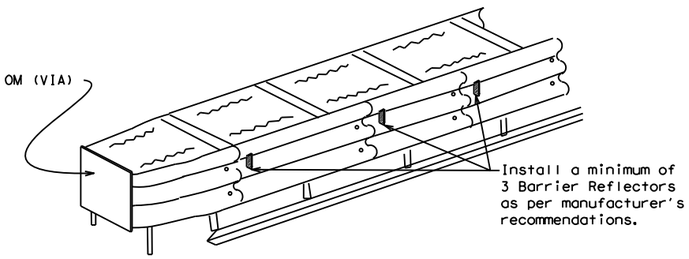


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

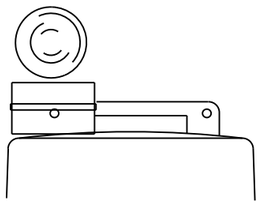


DELINEATION OF END TREATMENTS

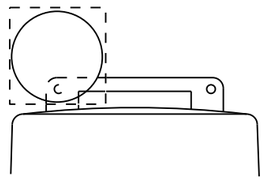
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

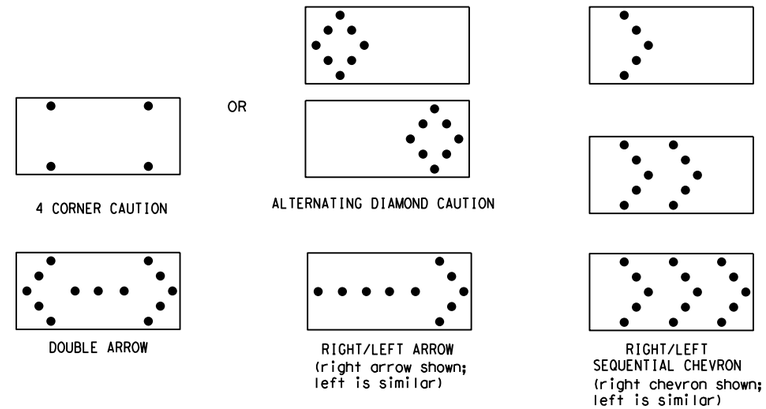
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	KAUFMAN, ETC.		18

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:

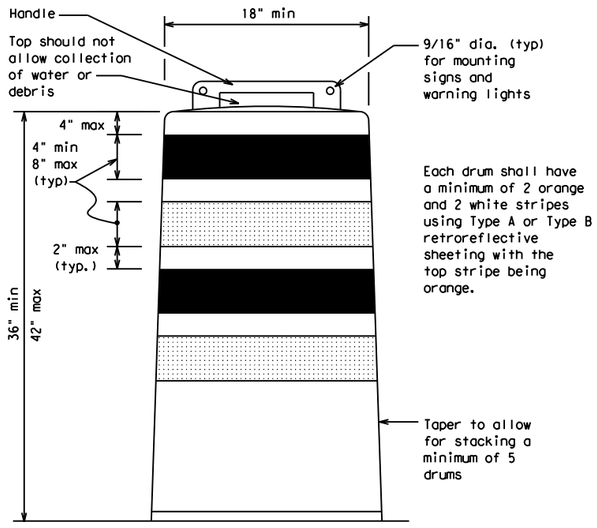
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

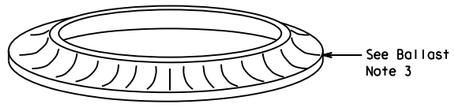
RETROREFLECTIVE SHEETING

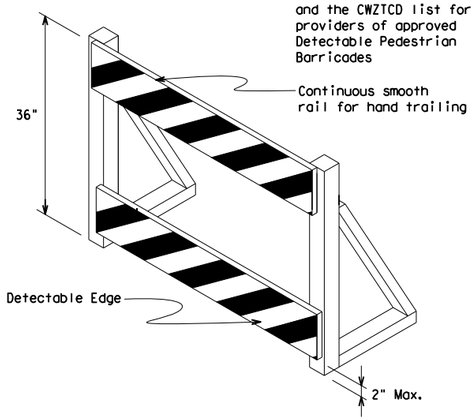
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

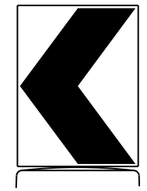




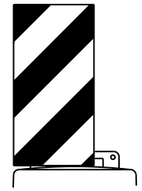


DETECTABLE PEDESTRIAN BARRICADES

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	0095	05	063, ETC.	US 80, ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	DAL	KAUFMAN, ETC.		19
7-13				

102

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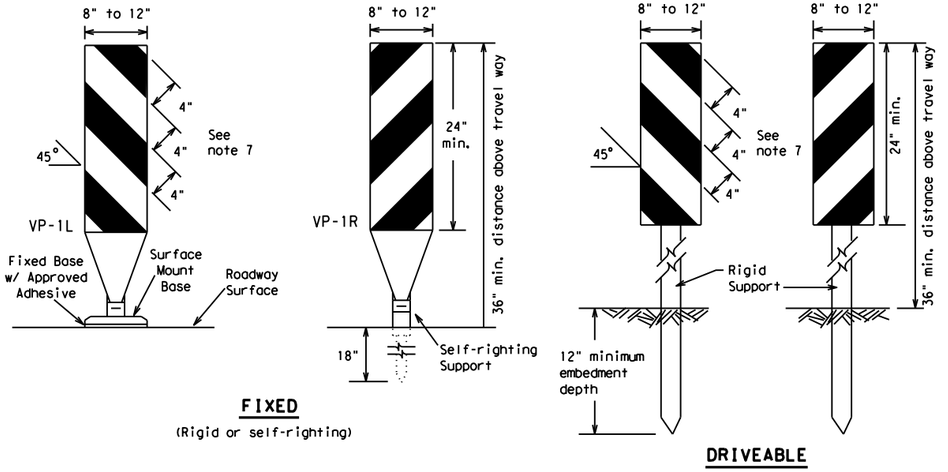
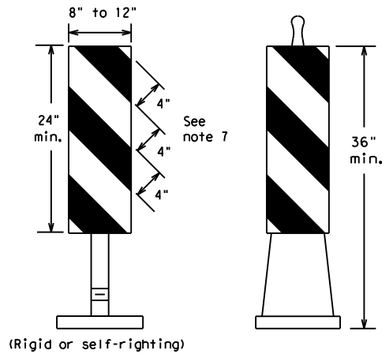


FIXED
(Rigid or self-righting)

DRIVEABLE

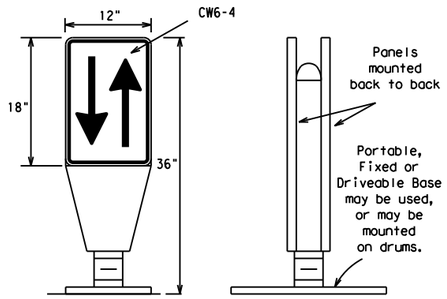


(Rigid or self-righting)

PORTABLE

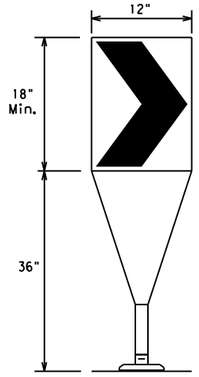
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



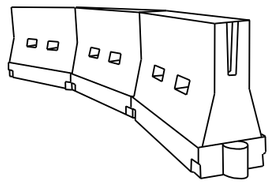
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 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

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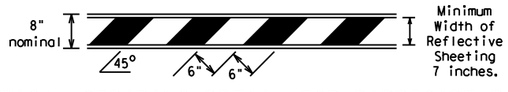
DATE:
FILE:

103

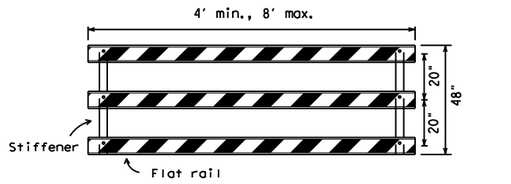
TYPE 3 BARRICADES

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.



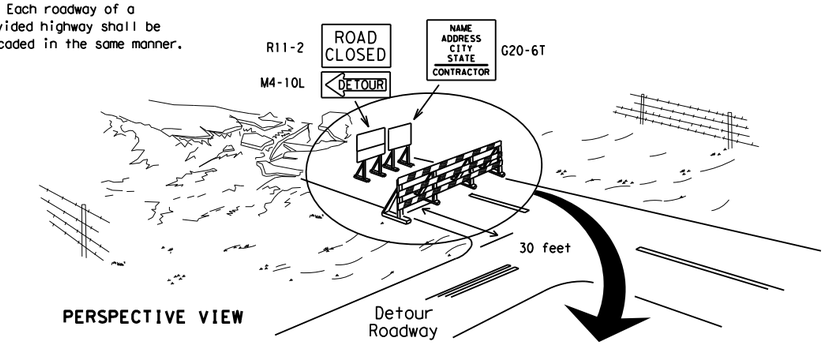
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

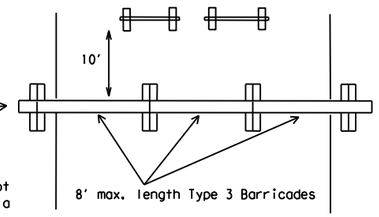
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

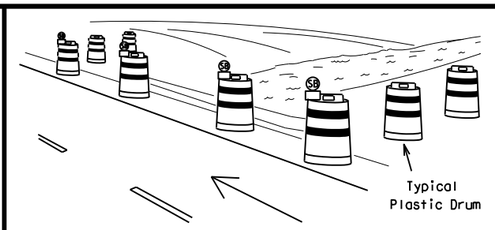
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

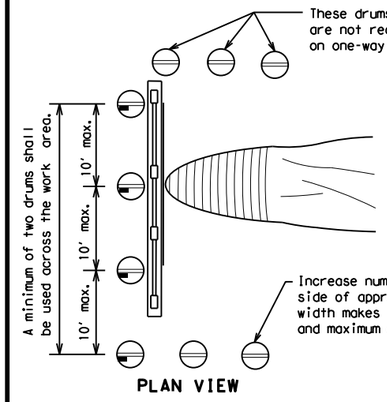
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

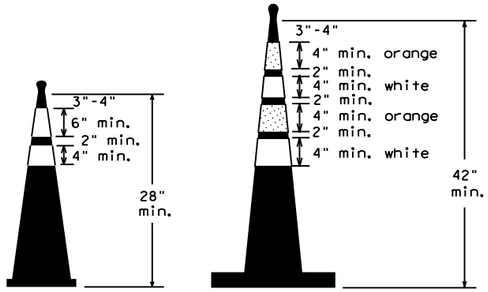
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

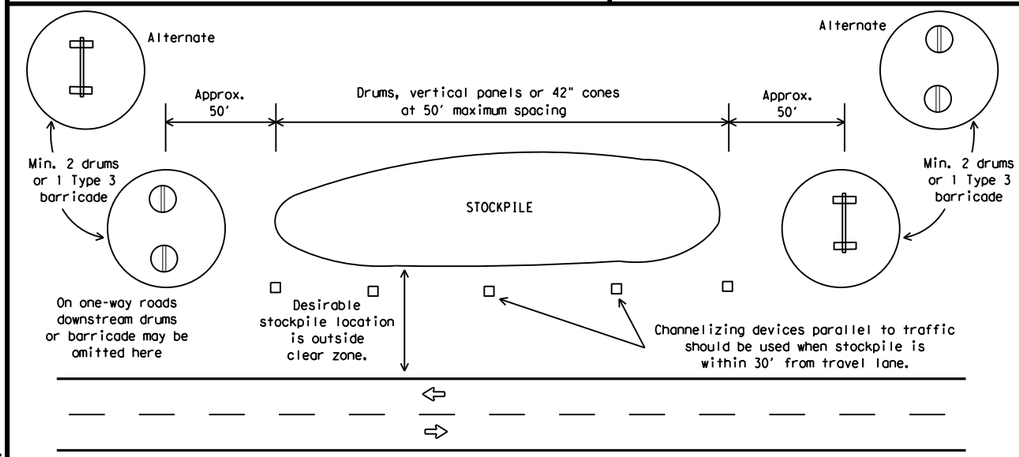
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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SHEET 10 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		21

104

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.

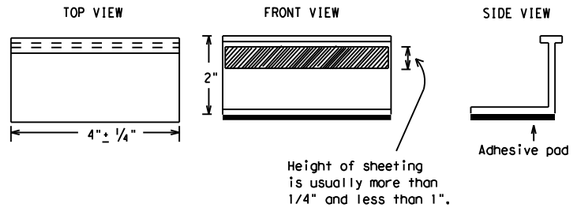
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

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11-02 8-14				

105

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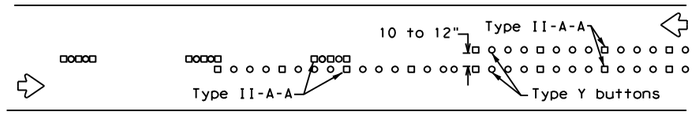
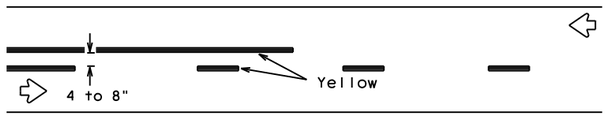
PAVEMENT MARKING PATTERNS

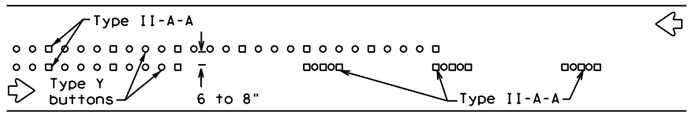
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



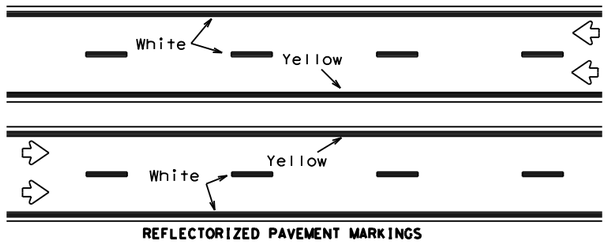
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



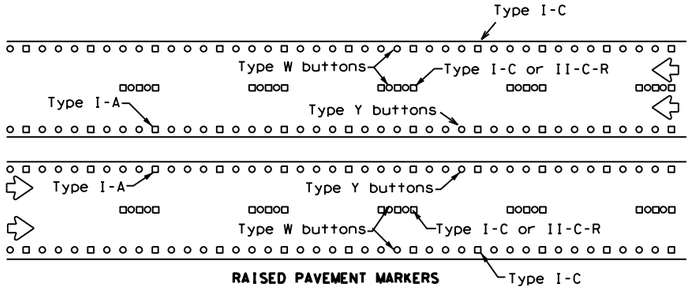
RAISED PAVEMENT MARKERS - PATTERN B

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



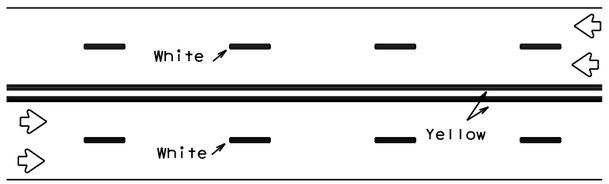
REFLECTORIZED PAVEMENT MARKINGS



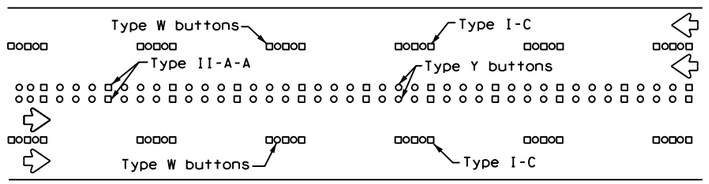
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



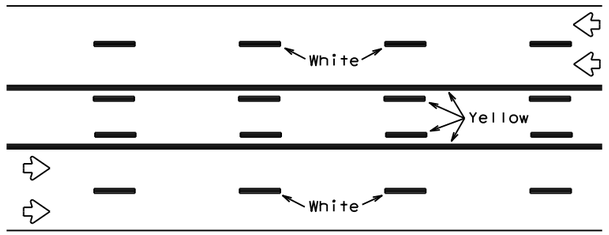
REFLECTORIZED PAVEMENT MARKINGS



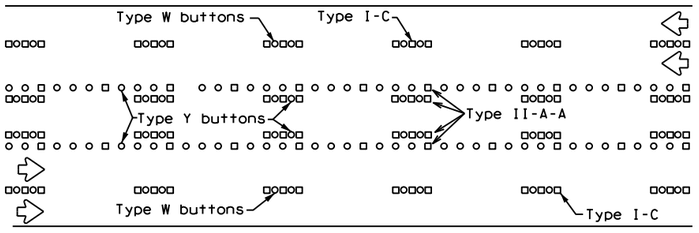
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

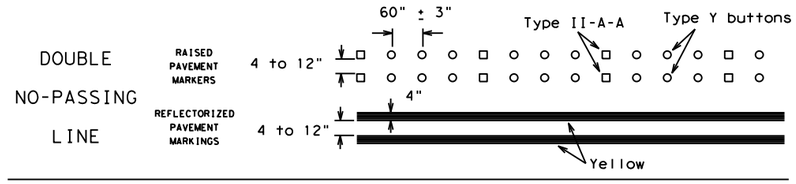
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

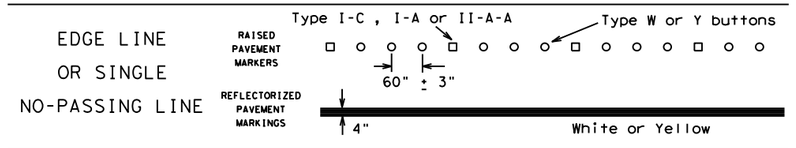
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

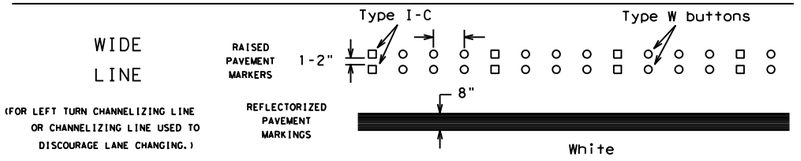


EDGE LINE OR SINGLE NO-PASSING LINE



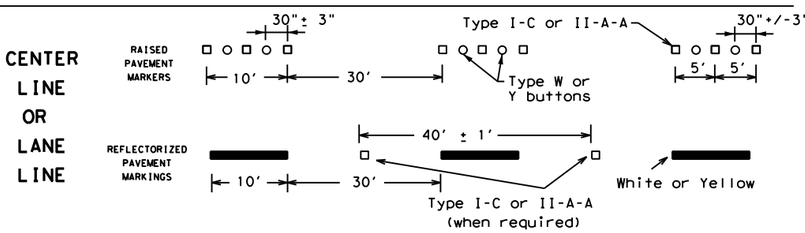
WIDE LINE

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

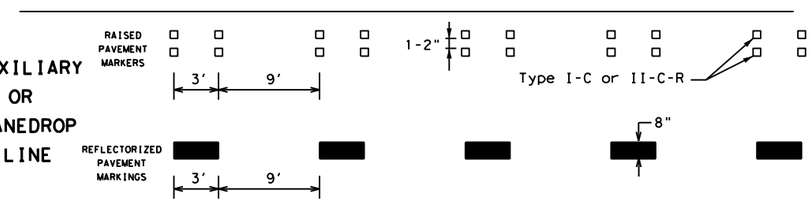


BROKEN LINES

CENTER LINE OR LANE LINE

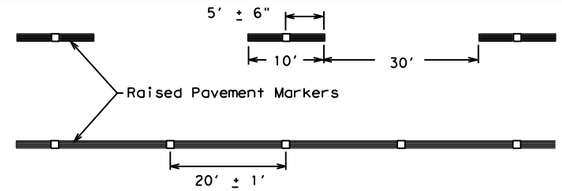


AUXILIARY OR LANEDROP LINE



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."

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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106

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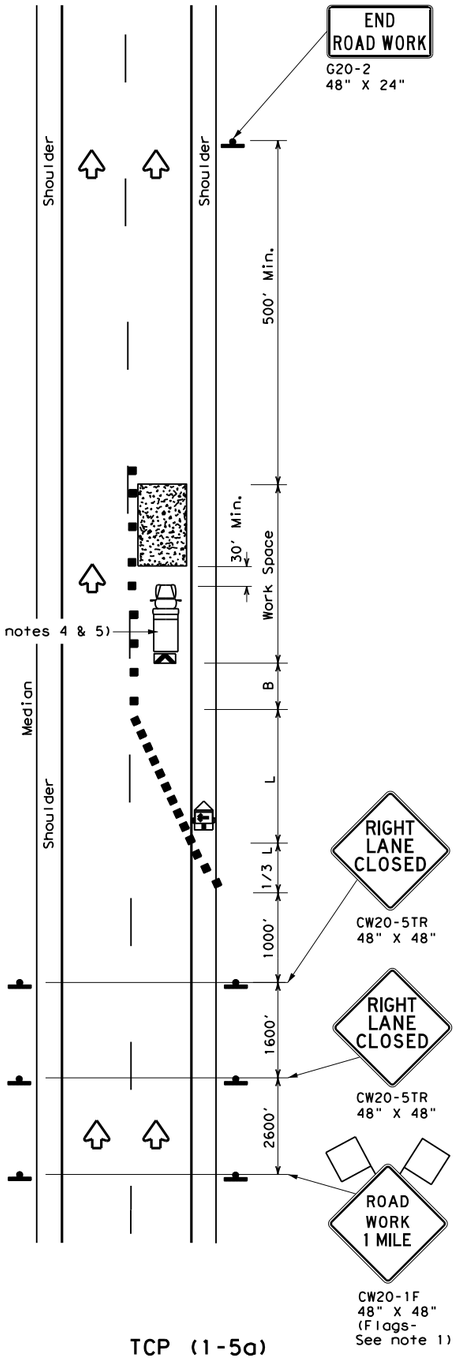
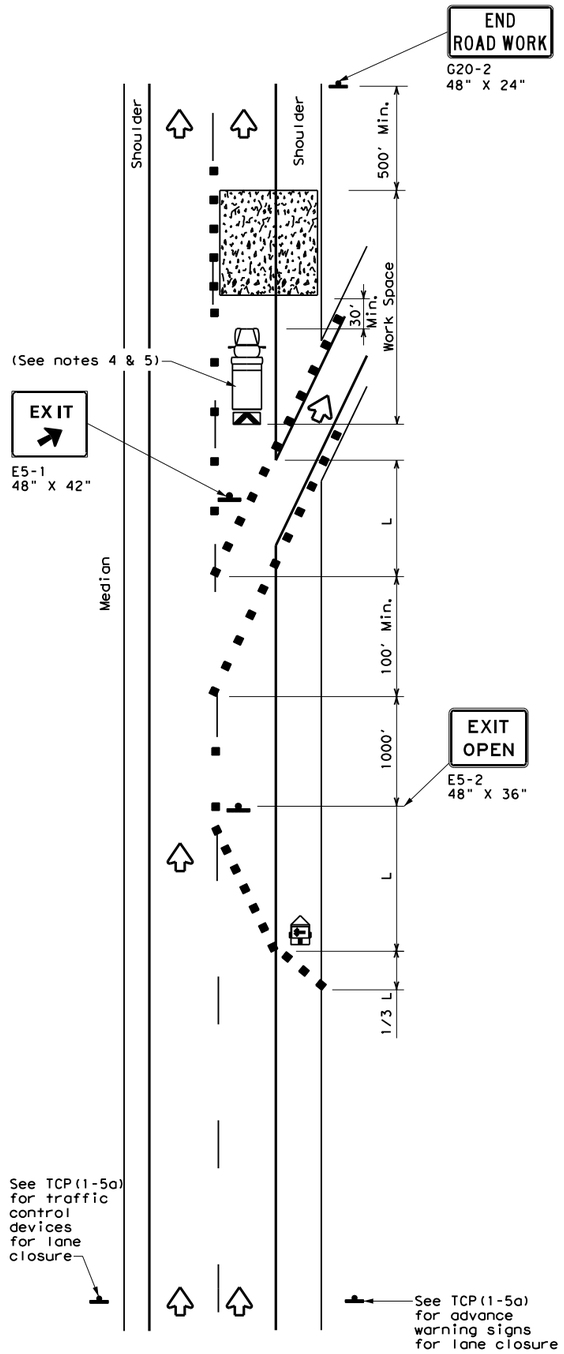


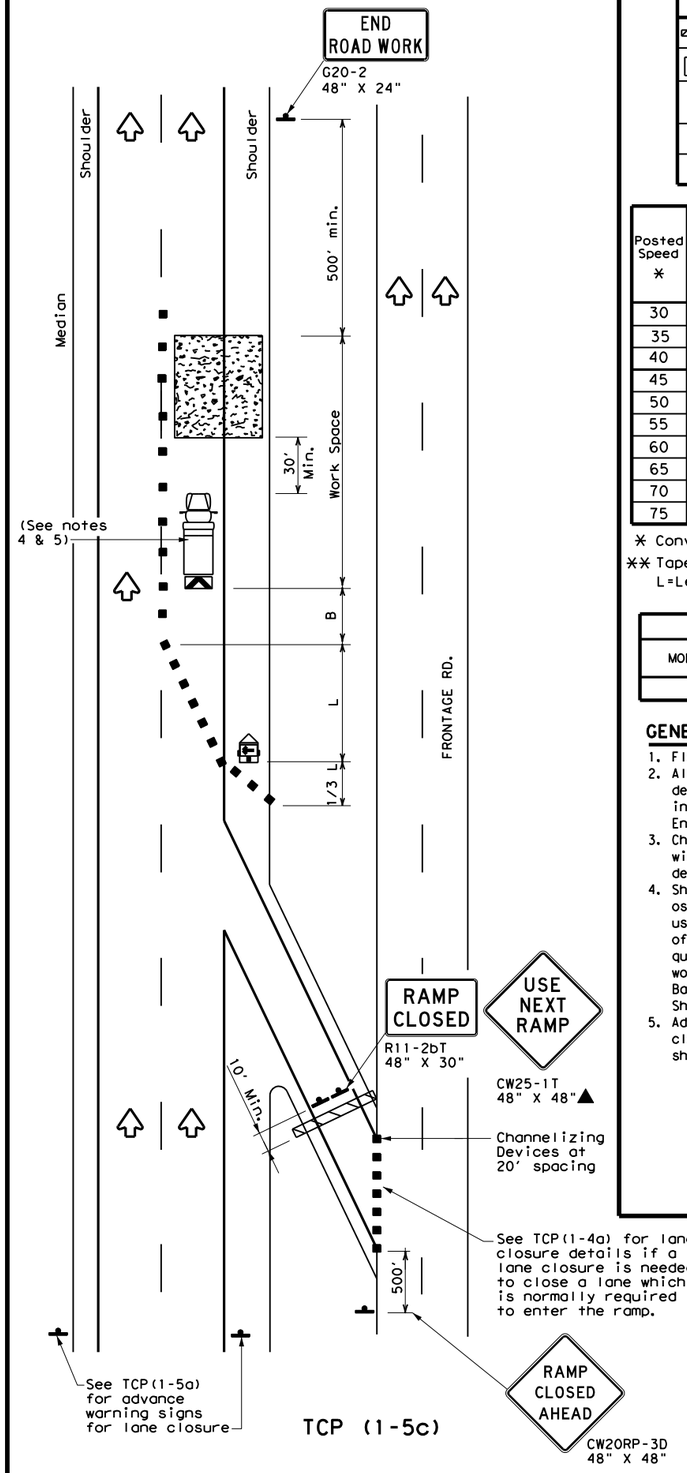
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

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©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		24

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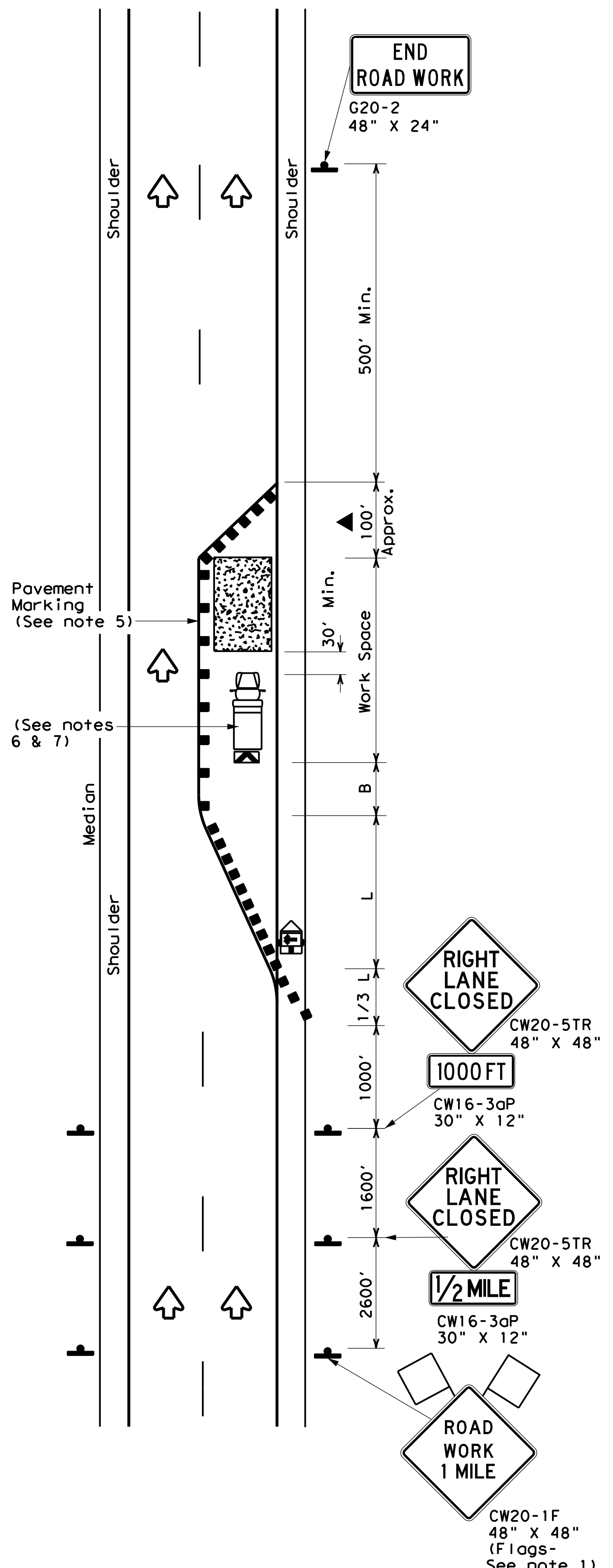
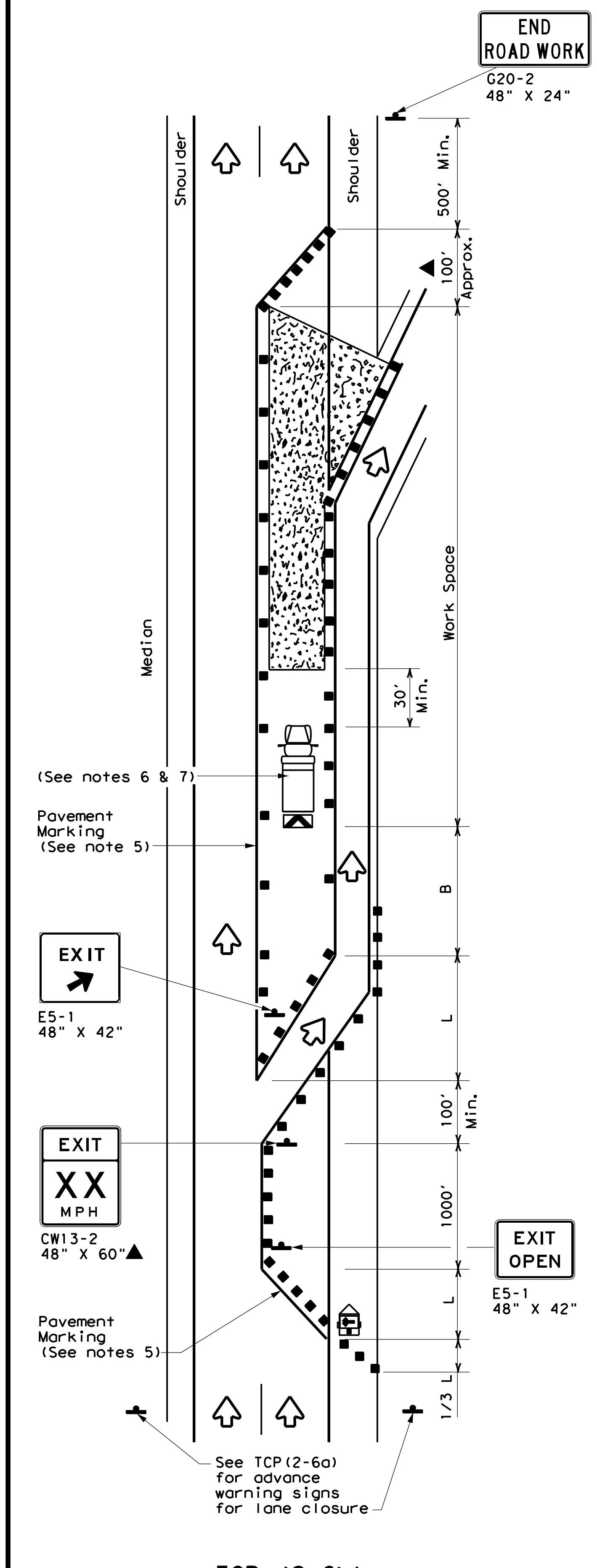


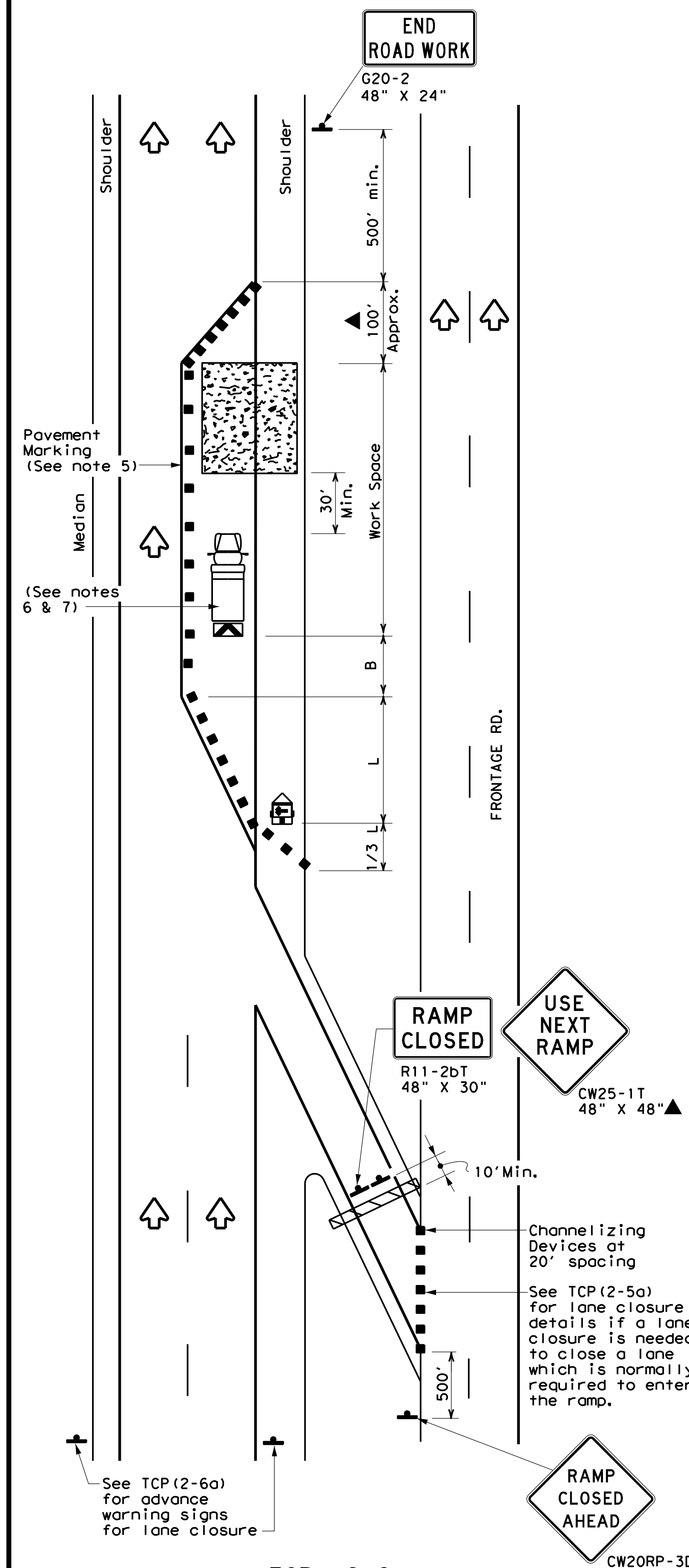
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. 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.
7. 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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

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© TxDOT	December 1985	CONT	SECT	JOB		HIGHWAY		
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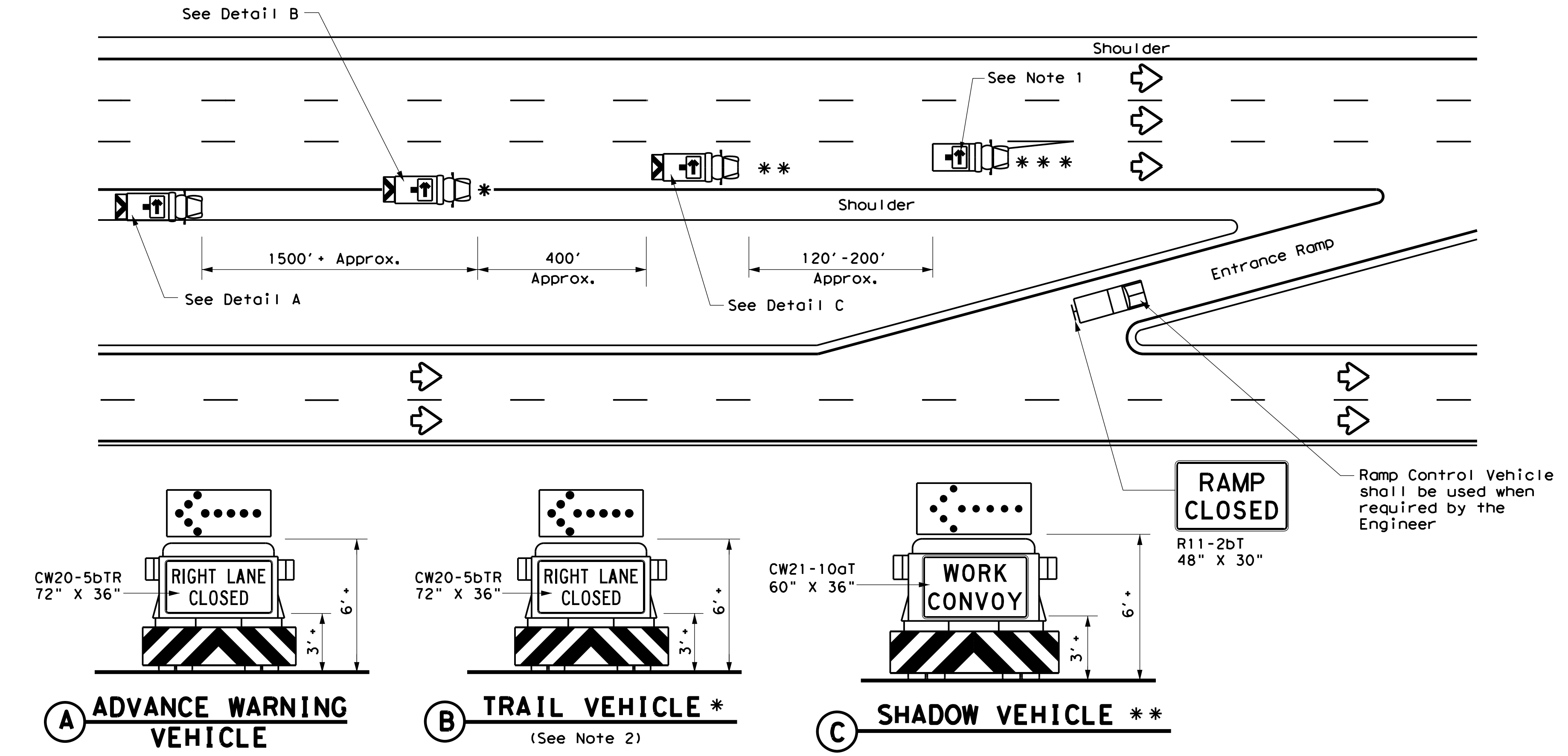
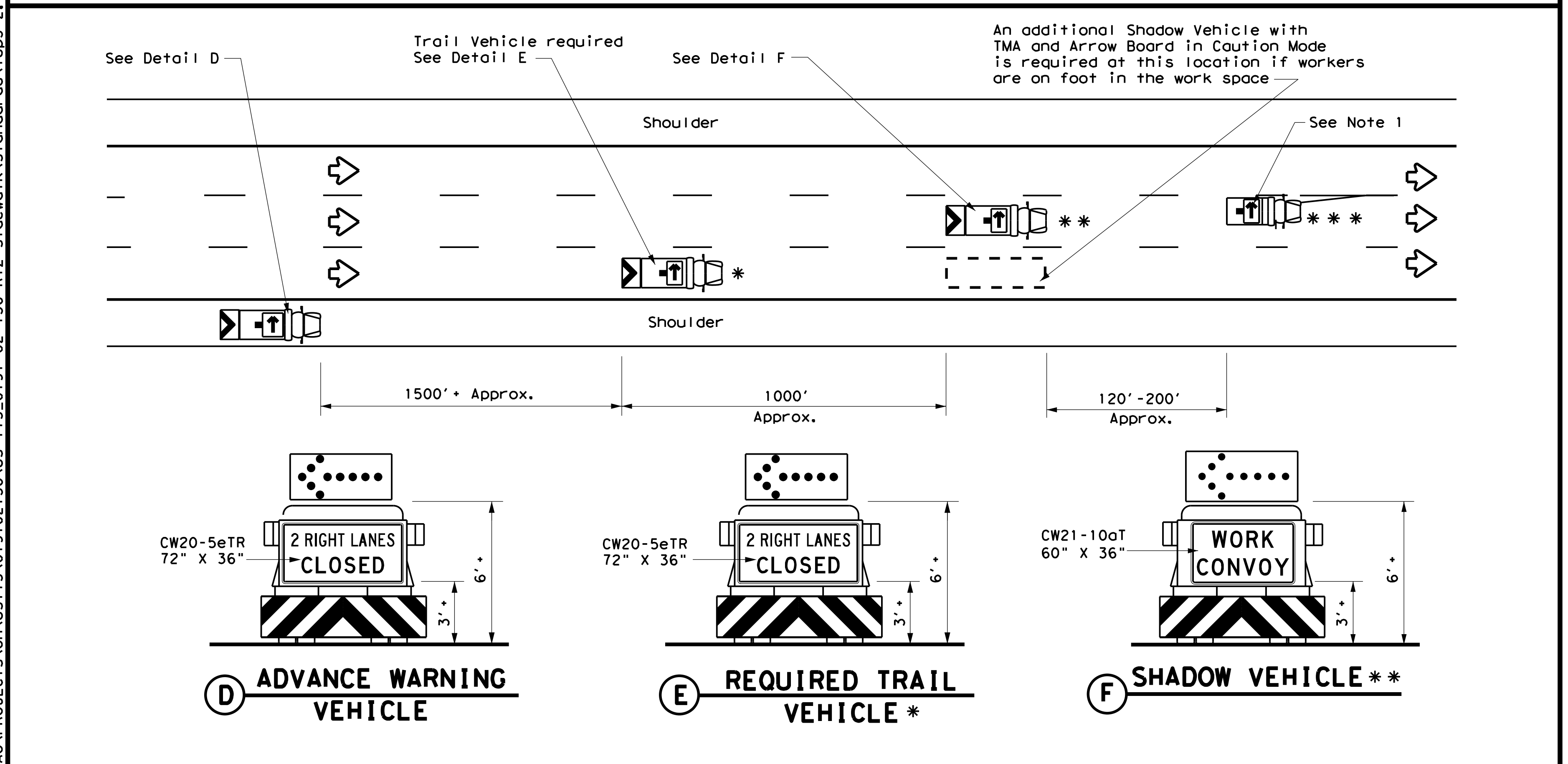


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

LEGEND

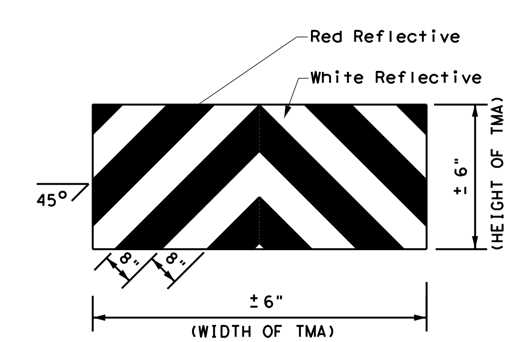
Symbol	Description	Arrow Board Display	
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle	(arrow)	RIGHT Directional
(symbol)	Heavy Work Vehicle	(arrow)	LEFT Directional
(symbol)	Truck Mounted Attenuator (TMA)	(arrow)	Double Arrow
(symbol)	Traffic Flow	(symbol)	CAUTION (Alternating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

TYPICAL USAGE

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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176

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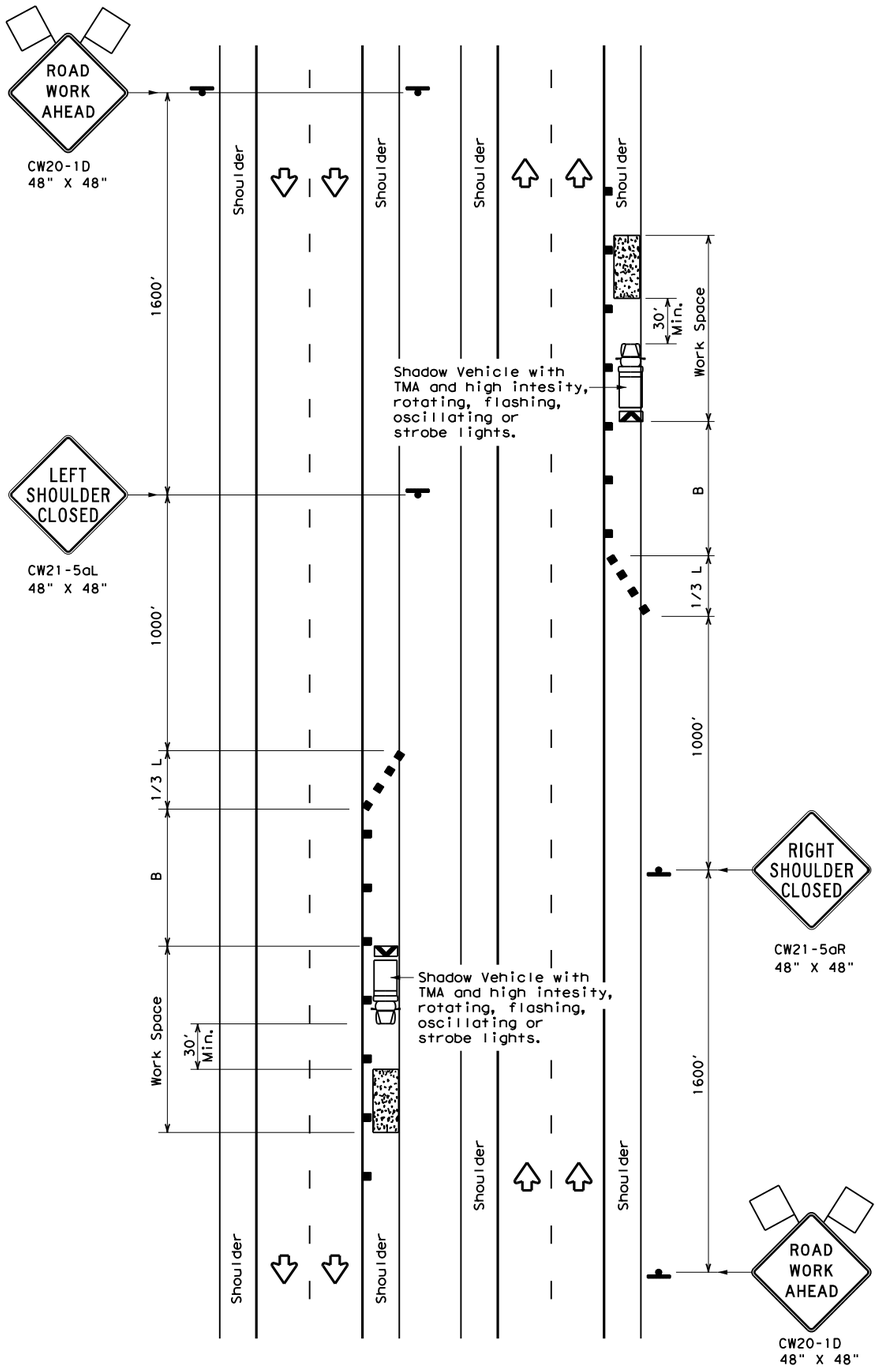
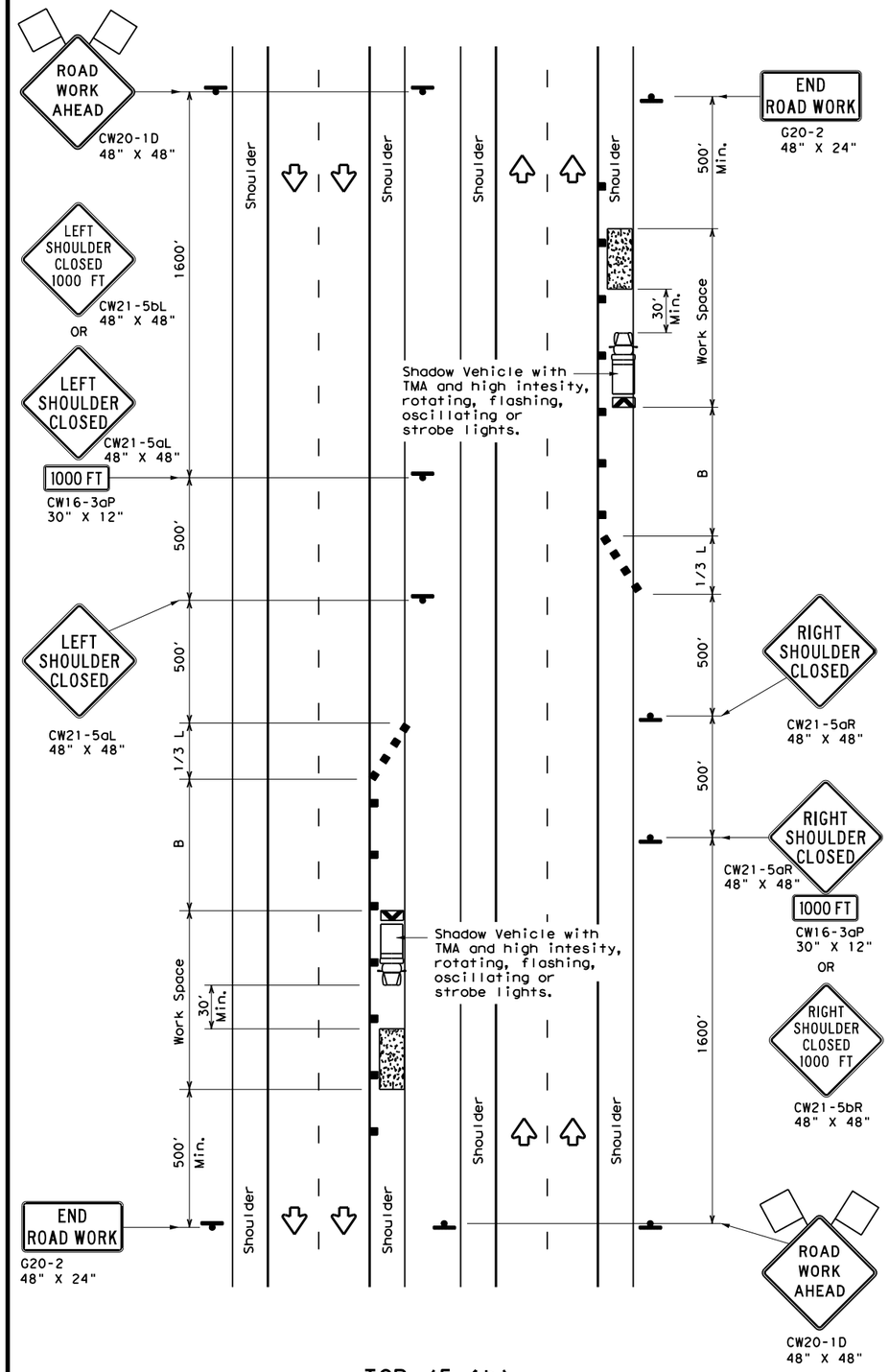


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

* 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
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

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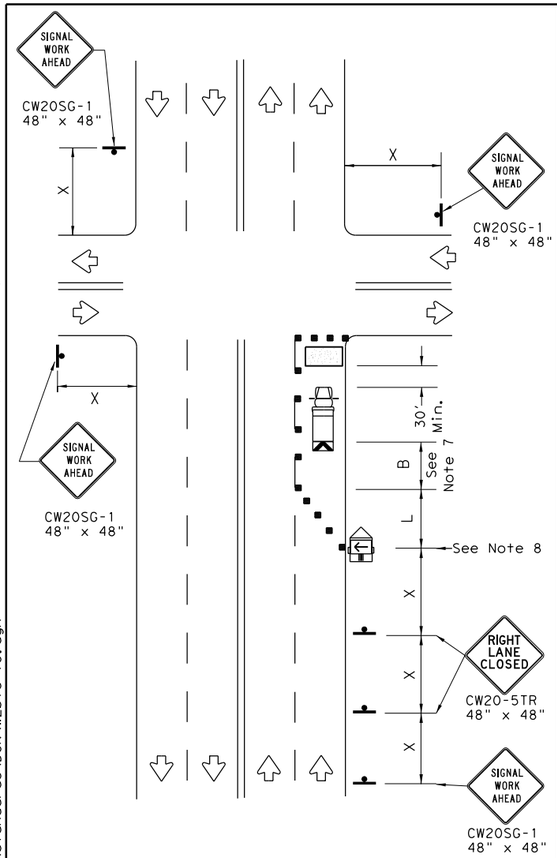
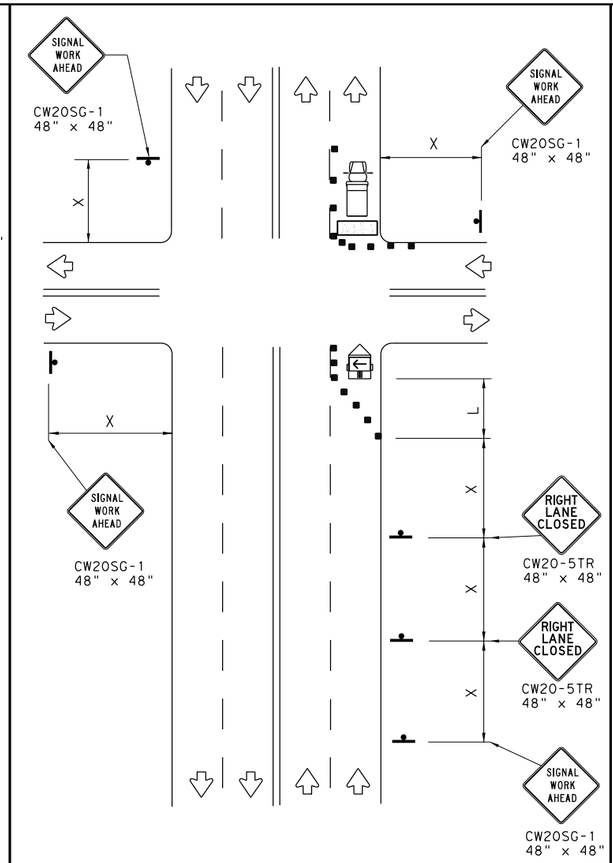


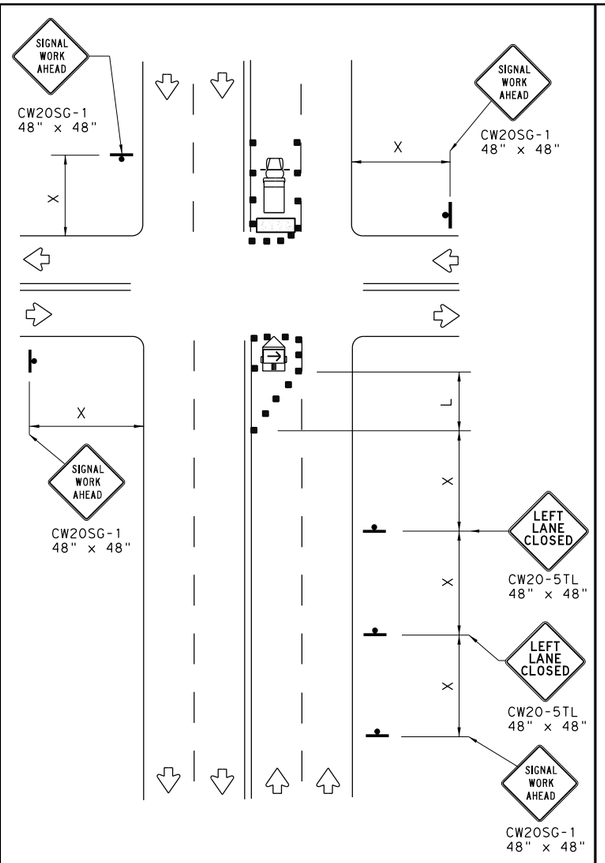
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



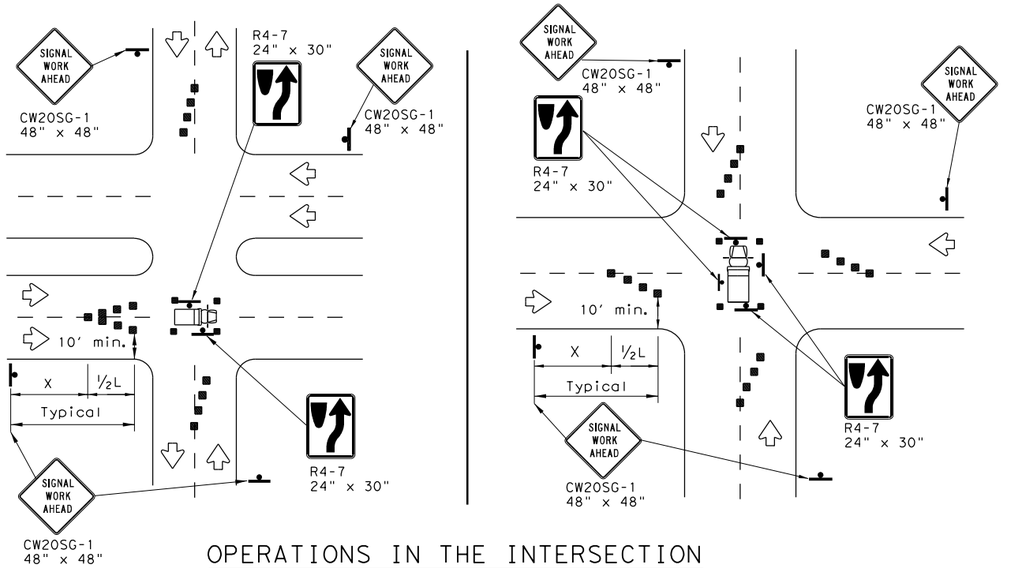
FAR SIDE RIGHT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



OPERATIONS IN THE INTERSECTION

SHORT DURATION

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	DAL	KAUFMAN		28

114

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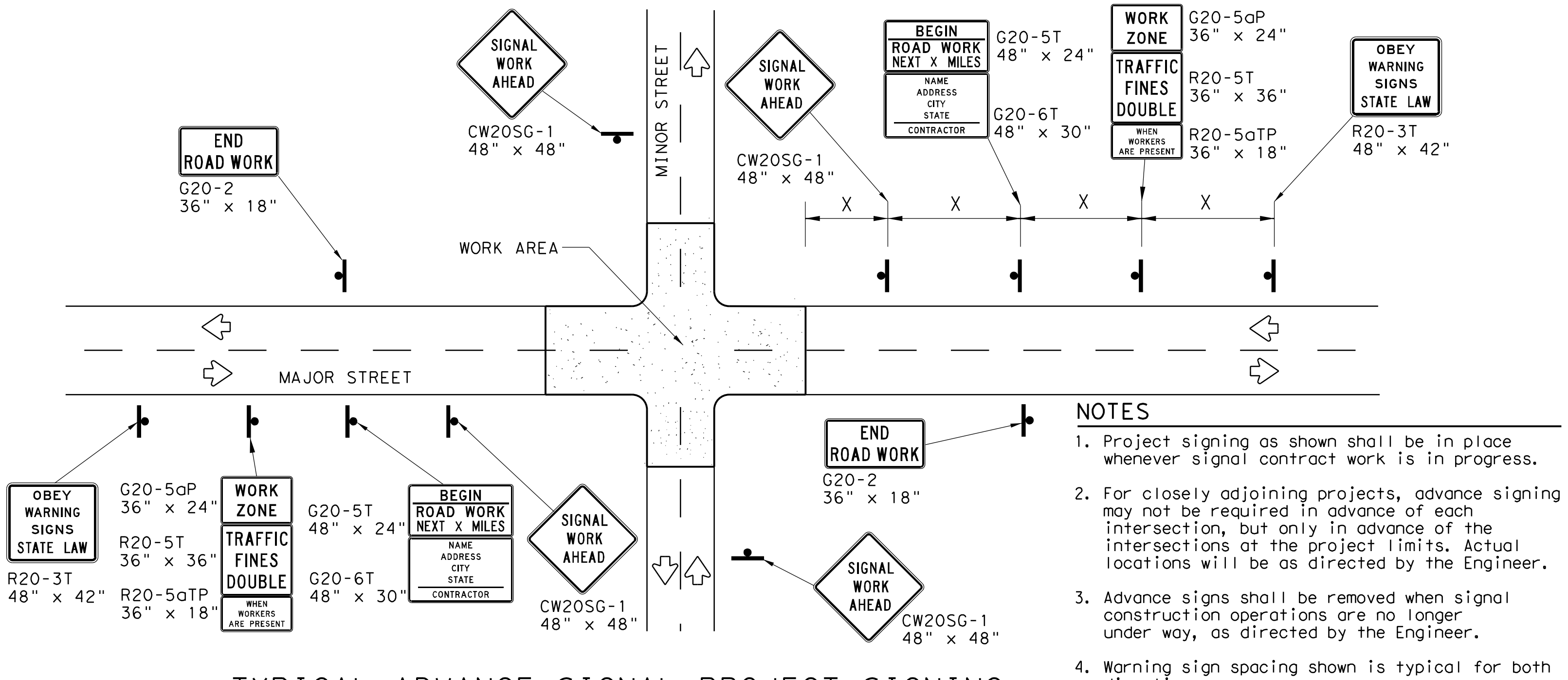


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

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

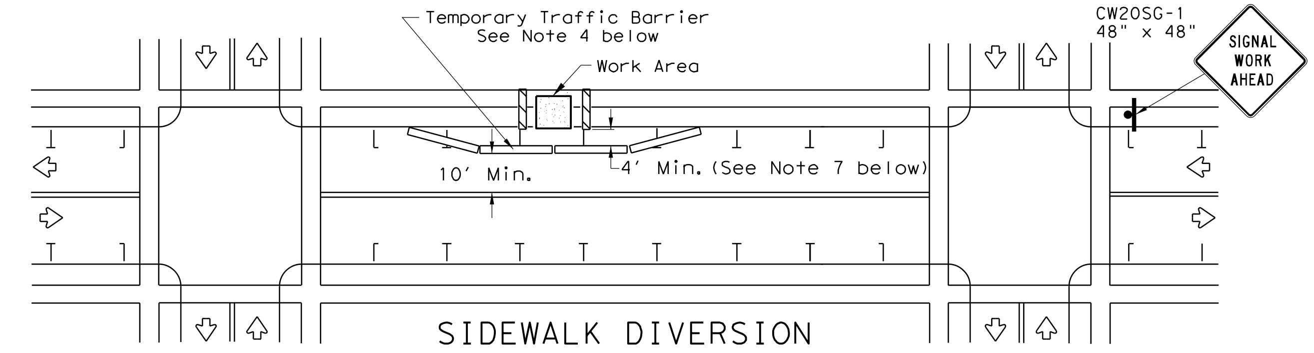
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

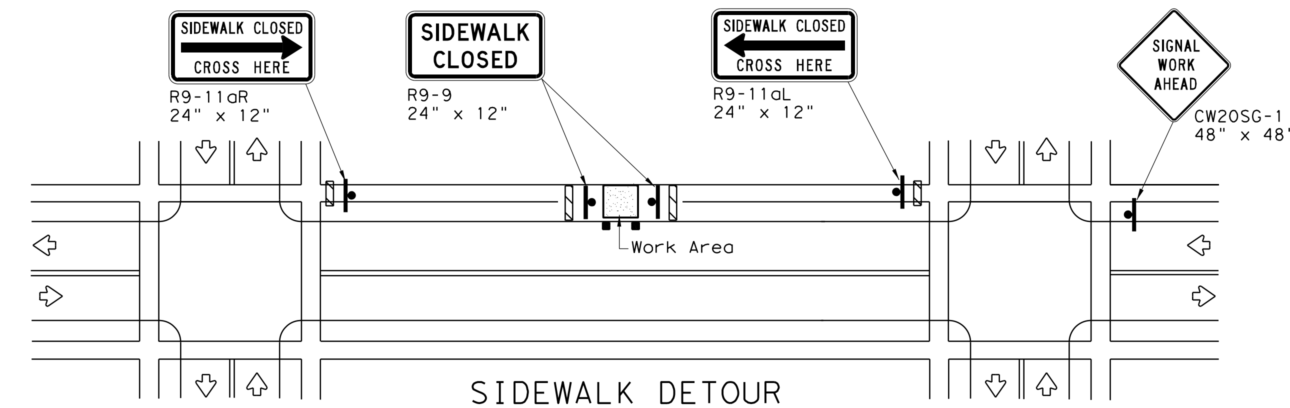
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

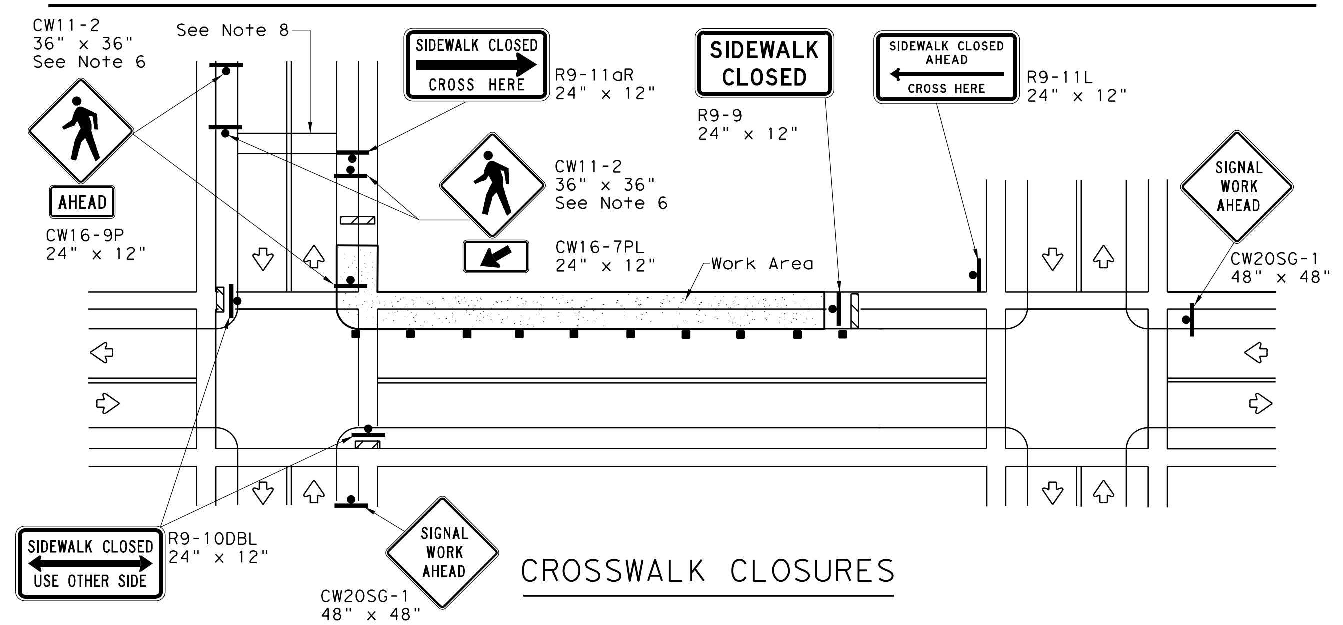
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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.

SHEET 2 OF 2

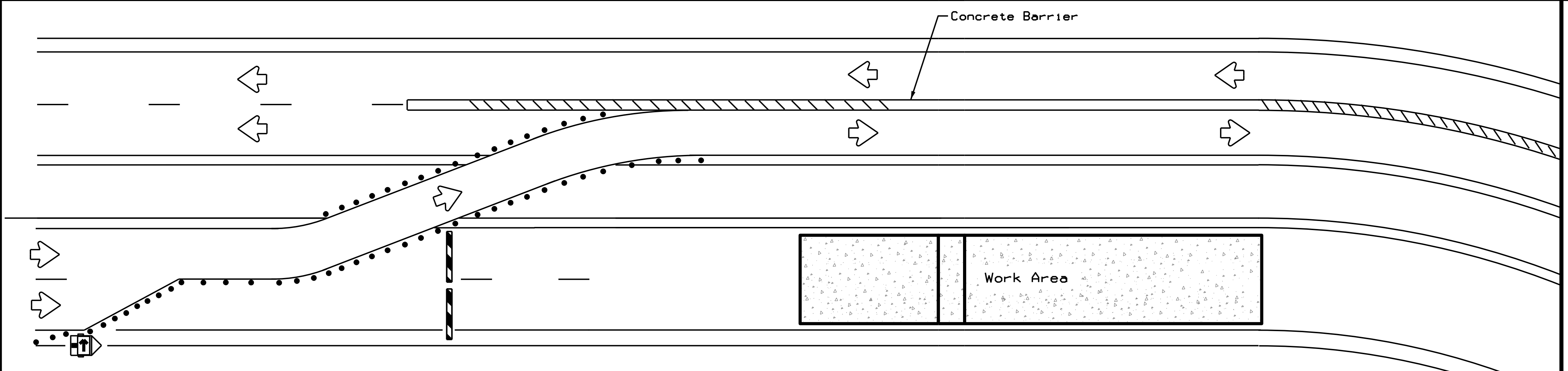
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC	US 80, ETC.
2-98 10-99 7-13	DIST		COUNTY	SHEET NO.
4-98 3-03	DAL		KAUFMAN	29

115



NOTES:

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

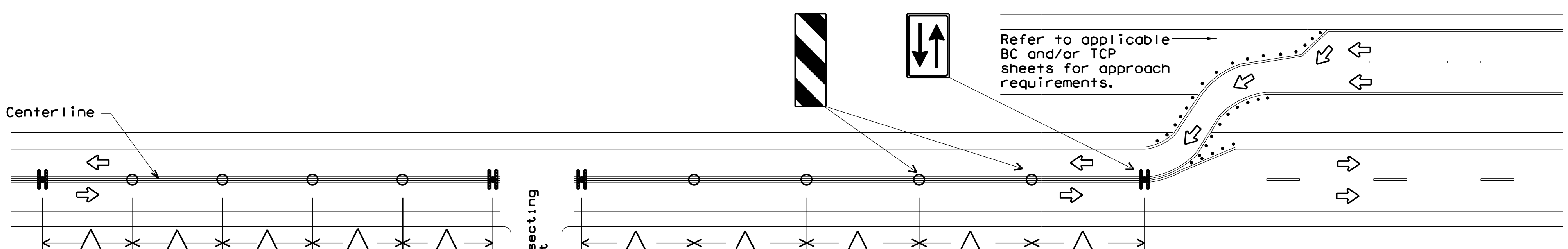
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

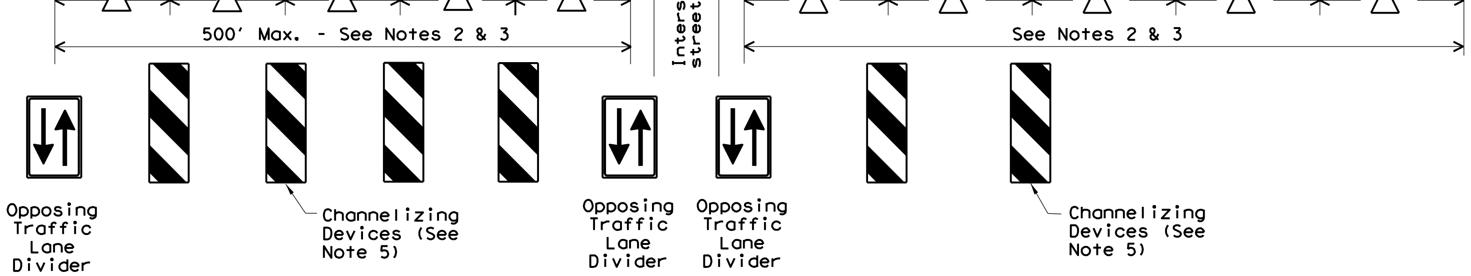
LEGEND	
(symbol)	Type 3 Barricade
• • •	Channelizing Devices
(symbol)	Trailer Mounted Flashing Arrow Board
(symbol)	Sign
\\\\	Safety glare screen

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

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

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





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

NOTES:

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

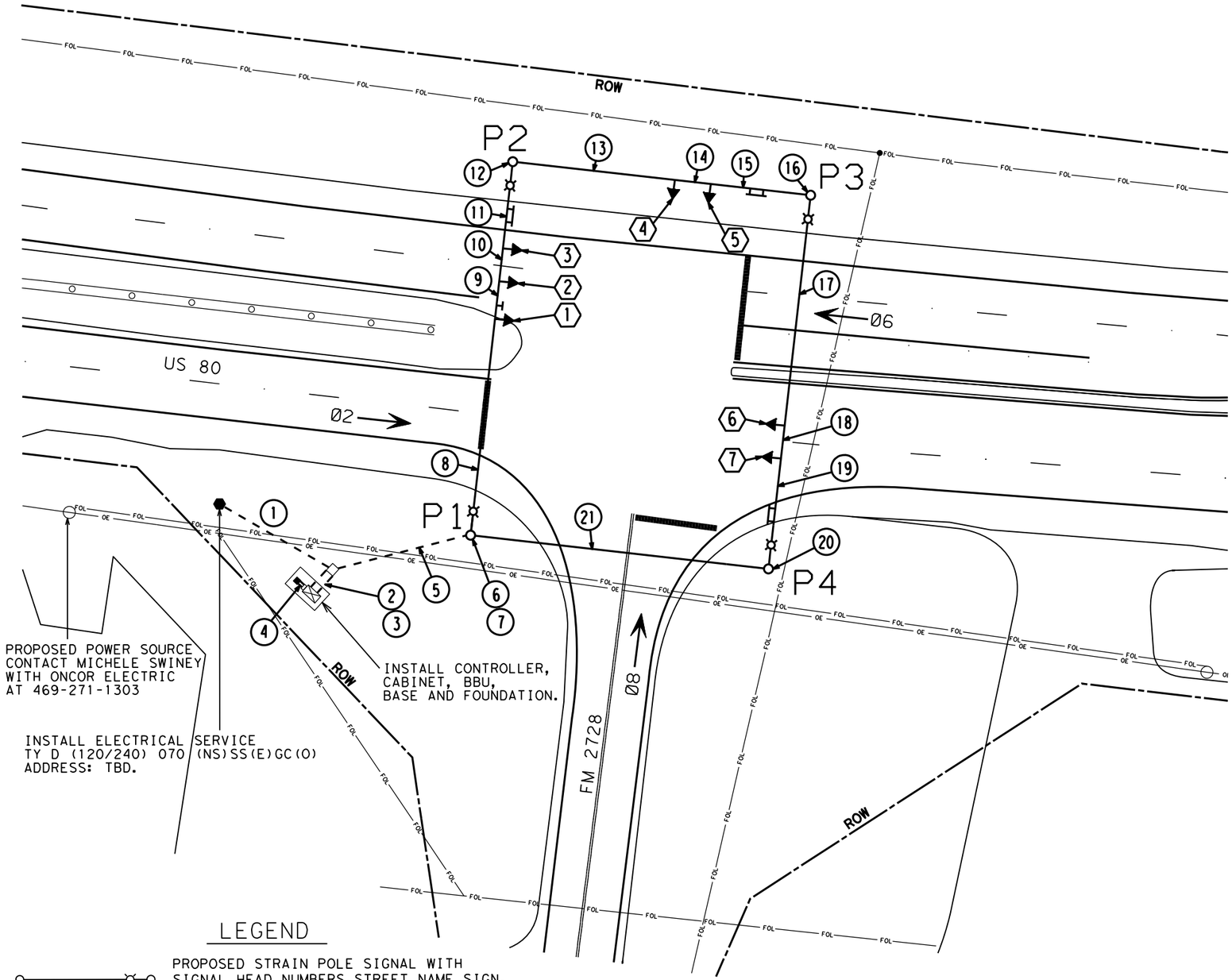
DATE: 5/25/2022 8:35:29 AM
FILE: T:\DALAO\PROJECTS\On\US175\0197021366\US 175_0197-02-136 RTZ Sidewalk\Standards\wztd-17.dgn

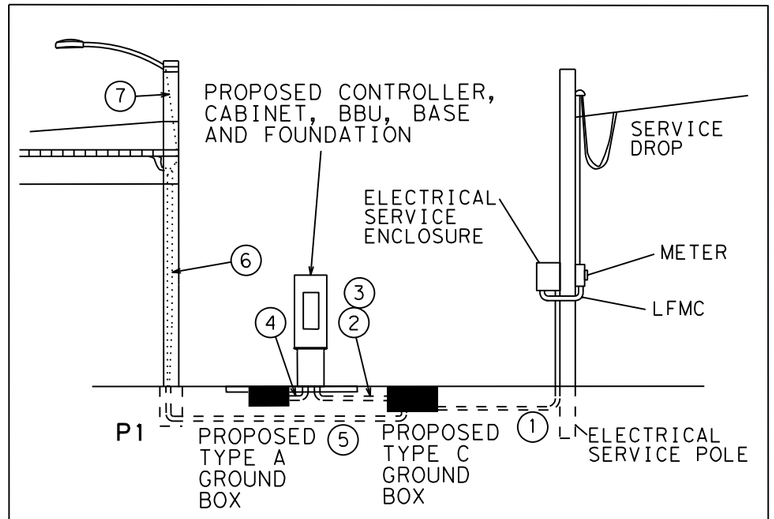
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		30





DETAILS AT CONTROLLER

LEGEND

PROPOSED STRAIN POLE SIGNAL WITH SIGNAL HEAD NUMBERS, STREET NAME SIGN, AND 250 WATT EQ LED LUMINAIRE

P1 SIGNAL POLE NUMBER

(4) PROPOSED CONDUIT WITH RUN NUMBER

PROPOSED TYPE A GROUND BOX

PROPOSED TYPE C GROUND BOX

ROW RIGHT OF WAY

OE OVERHEAD POWER LINE

FOL FOL UNDERGROUND FIBER OPTIC

0 10 20 30 40

SCALE (FT.)

STATE OF TEXAS
JASON J. PASCOE
144646
LICENSED
PROFESSIONAL ENGINEER

Jason J Pascoe, P.E. 5/25/2022
Digitally signed by Jason J. Pascoe, P.E. Date

Texas Department of Transportation
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TRAFFIC SIGNAL LAYOUT
US 80 AT FM 2728 (WEST)

SCALE: 1"=40' SHEET 1 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JJP	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS JJP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	31
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

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CONDUIT RUNS

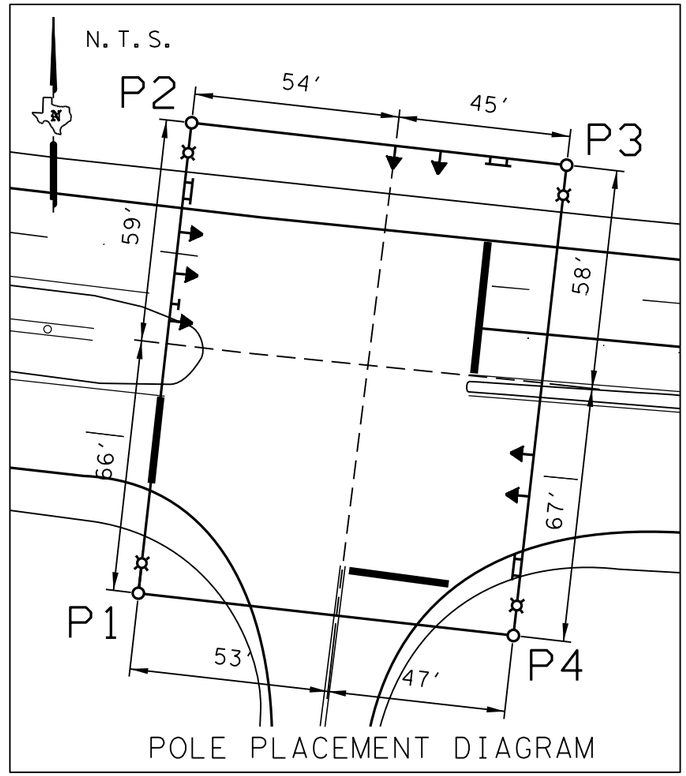
RUN #	CONDUIT TYPE (LF)					WIRE SIZE AND TYPE (EA)						RUN LENGTH (LF)	RUN #
						CONDUCTORS (ITEM 620)				SIGNAL CABLE			
	2" PVC SCH 40	3" PVC SCH 40	4" PVC SCH 40	INSIDE POLE (LF)	OH (LF)	NO. 4 XHHW	NO. 6 XHHW	NO. 6 BARE	NO. 8 XHHW	7 CNDR TY-A 14 AWG ITEM 684	RADAR CABLE ITEM 6292 *		
1	44						2	1	4			44	1
2			11					1		4		11	2
3	11						2	1				11	3
4**		2@7										7	4
5			48					1	4	4		48	5
6				20					4	4		20	6
7				10					4			10	7
8					72				2	3		72	8
9					13				2	2		13	9
10					11				2	2		11	10
11					29				2	1		29	11
12				10					4			10	12
13					54				2	1		54	13
14					12				2	1		12	14
15					34				2			34	15
16				10					2			10	16
17					77							77	17
18					11					1		11	18
19					37					1		37	19
20				10					2			10	20
21					100				2	1		100	21
TOTALS	55	14	59				110	114	1218	823			TOTALS

*ALL RADAR CABLE IS SUBSIDIARY TO ITEM 6292.
COLUMN IS TO BE FILLED IN AT TIME OF INSTALLATION.

** SPARE CONDUIT AS REQUIRED ON TS-CF-04

SIGNAL POLE FOUNDATIONS

POLE NUMBER	POLE HEIGHT	POLE TYPE	FND. TYPE WIND ZONE 80 MPH	DRILLED SHAFT LENGTH 36"DIA TYPE A ITEM 416 (LF)	LUM ARM (EA)
P1	34′	D	36-B	15	1
P2	34′	D	36-B	15	1
P3	34′	D	36-B	15	1
P4	34′	D	36-B	15	1
TOTAL				60	4



POLE PLACEMENT DIAGRAM

GROUND BOX SUMMARY

ITEM NO.	DESCRIPTION	UNIT	QTY.
624	TYPE A (122311) W/ APRON	EA	1
624	TYPE C (162911) W/ APRON	EA	1

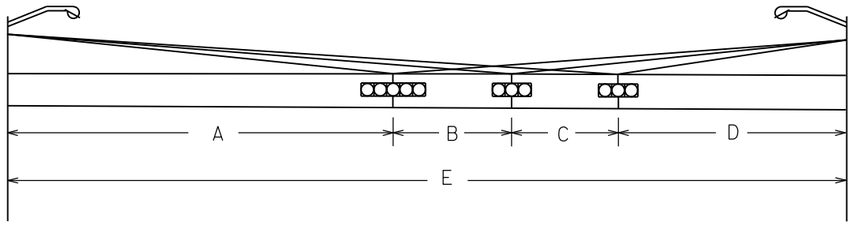
STEEL CABLE SUMMARY (ITEM 625)

DESCRIPTION	UNIT	QTY.
ZINC-COAT STL WIRE STRAND (3/16")	LF	800
ZINC-COAT STL WIRE STRAND (5/16")	LF	860

SIGNAL HEAD & POLE PLACEMENT (FEET)

SPAN	A	B	C	D	E	NO. OF HEADS
P1 TO P2*	72	13	11	29	125	3
P2 TO P3*	54		12	34	100	2
P3 TO P4*	77		11	37	125	2
P4 TO P1*					100	0

*USE AN 8′-0" SAG WHEN INSTALLING SIGNAL HEADS



STRAIN POLE — ELEVATION VIEW — STRAIN POLE

STATE OF TEXAS
JASON J. PASCOE
144646
LICENSED PROFESSIONAL ENGINEER

Jason J Pascoe, P.E. 5/25/2022
Digitally signed by Jason J. Pascoe, P.E. Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT
US 80 AT FM 2728 (WEST)

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JJP	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS JJP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	32
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

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ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION(SEE ED(5))	SERVICE CONDUIT SIZE (PVC) (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP	FOUR-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
TY D (120/240)070(NS)SS(E)GC(O)	1 1/4"	3/#4	N/A	2P/70	30	100	T.S. Lighting Lighting	1P/50 2P/20 2P/20	<7.1

SIGNAL HEADS(ITEM 682)

SIGNAL HEAD NUMBER	SIGNAL HEAD TYPE	BACK PLATE			12" INDICATION VEH SIG SECT WITH LED LAMP					
		3 SEC	4 SEC	5 SEC	~~G~~	G	~~Y~~	Y	~~R~~	R
		EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.
1	H4FLT		1				2		2	
2	H3	1				1		1		1
3	H3	1				1		1		1
4	H4LT		1		1	1		1		1
5	H3	1				1		1		1
6	H3	1				1		1		1
7	H3	1				1		1		1
TOTALS		5	2		1	6	2	6	2	6

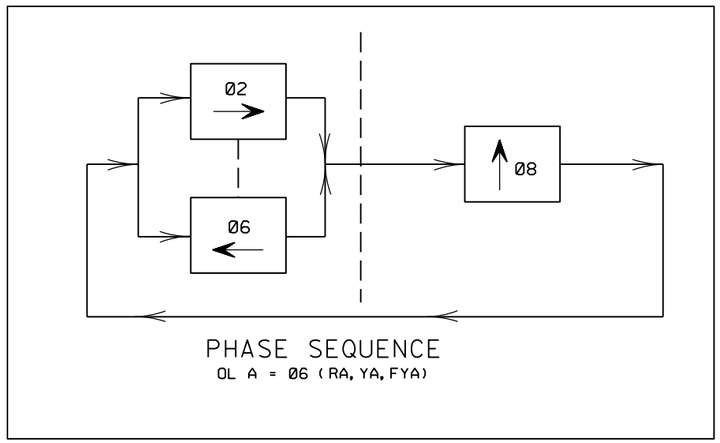
H3 H4LT H4FLT

DETECTION ZONE DETAILS

APPROACH	TYPE OF DETECTION	ADVANCE DETECTION ZONE LOCATIONS
06	PRESENCE AND ADVANCE	565' AND 410' FROM THE STOPBAR
02	PRESENCE AND ADVANCE	565' AND 410' FROM THE STOPBAR
08	PRESENCE ONLY	N/A

CABLE TERMINATION CHART

CNDR. COLOR	CABLE 1 SPAN P1-P2 TO CNTRL. 7 CNDR.	CABLE 2 SPAN P1-P2 TO CNTRL. 7 CNDR.	CABLE 3 SPAN P2-P3 TO CNTRL. 7 CNDR.	CABLE 4 SPAN P3-P4 TO CNTRL. 7 CNDR.
BLACK	SPARE	SPARE	SPARE	SPARE
WHITE	S. COMMON	S. COMMON	S. COMMON	S. COMMON
RED	SH 1 OL A~~<R~~	SH 2,3 Ø6 R	SH 4,5 Ø8 R	SH 6,7 Ø2 R
GREEN	SH 1 OL A~~<SY~~	SH 2,3 Ø6 G	SH 4,5 Ø8~~<G~~/G	SH 6,7 Ø2 G
ORANGE	SH 1 OL A~~<FY~~	SH 2,3 Ø6 Y	SH 4,5 Ø8 Y	SH 6,7 Ø2 Y
BLUE	SPARE	SPARE	SPARE	SPARE
WHITE/ BLACK	SPARE	SPARE	SPARE	SPARE
RED/ BLACK				
GRN/ BLACK				
ORANGE/ BLACK				
BLUE/ BLACK				
BLACK/ WHITE				
RED/ WHITE				
GRN/ WHITE				
BLUE/ WHITE				
BLACK/ RED				



PHASE SEQUENCE

OL A = Ø6 (RA, YA, FYA)

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STATE OF TEXAS
JASON J. PASCOE
144646
LICENSED PROFESSIONAL ENGINEER

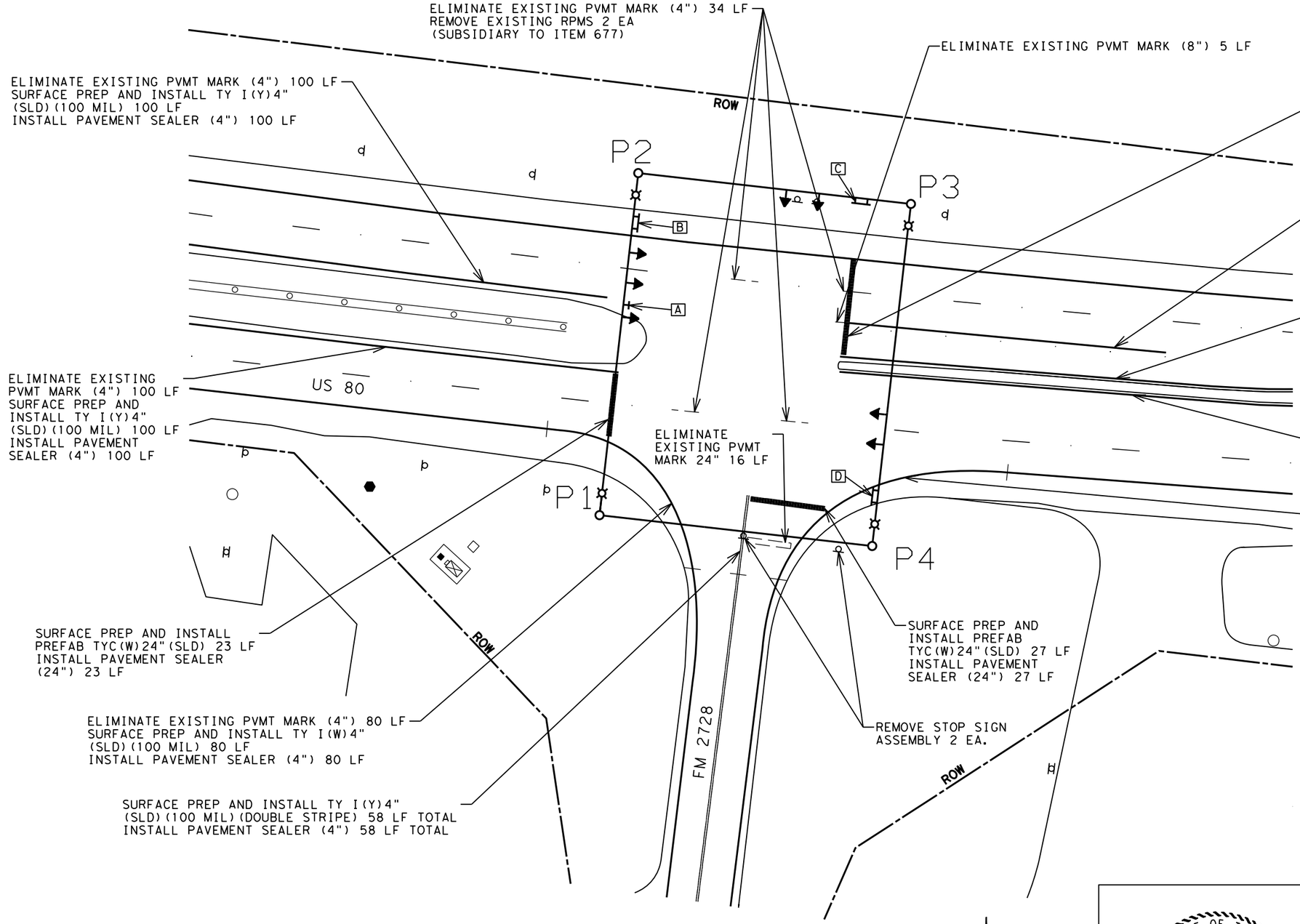
Jason J Pascoe, P.E. 5/25/2022
Digitally signed by Jason J. Pascoe, P.E. Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT
US 80 AT FM 2728 (WEST)

SHEET 3 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JJP	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS JJP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	33
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	



NOTES:

1. PAVEMENT MARKINGS ARE EXISTING TO REMAIN UNLESS OTHERWISE NOTED.

LEGEND

PROPOSED STRAIN POLE SIGNAL WITH SIGNAL HEADS, STREET NAME SIGN, AND 250 WATT EQ LED LUMINAIRE

P1 SIGNAL POLE NUMBER

ROW RIGHT OF WAY

[D] PROPOSED SIGN DESIGNATION

N

0 10 20 30 40

SCALE (FT.)

STATE OF TEXAS
JASON J. PASCOE
144646
LICENSED
PROFESSIONAL ENGINEER

Jason J Pascoe, P.E. 5/25/2022
Digitally signed by Date
Jason J. Pascoe, P.E.

Texas Department of Transportation

PAVEMENT MARKING AND SIGNING LAYOUT US 80 AT FM 2728 (WEST)

SCALE: 1"=40' SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JJP	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS JJP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	34
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

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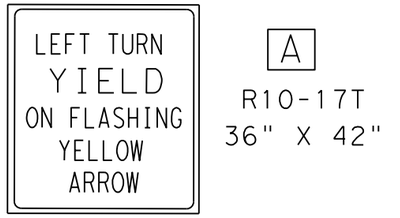
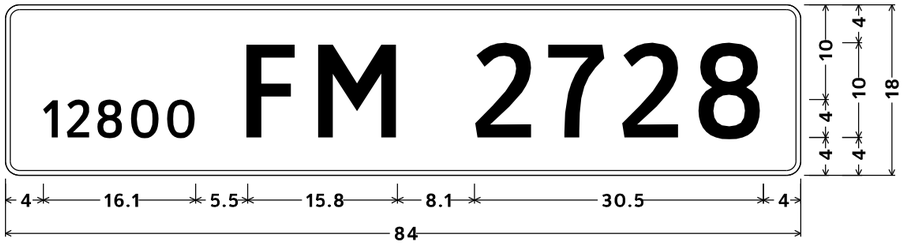


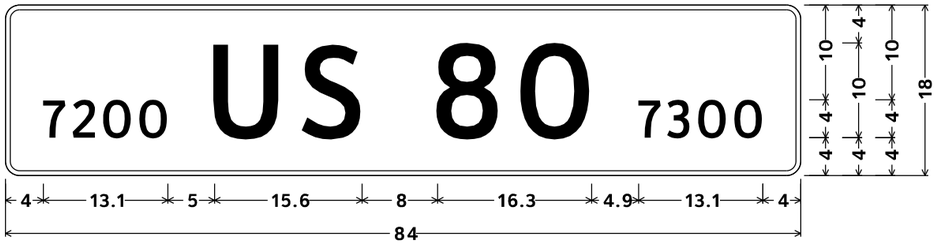
A

R10-17T
36" X 42"



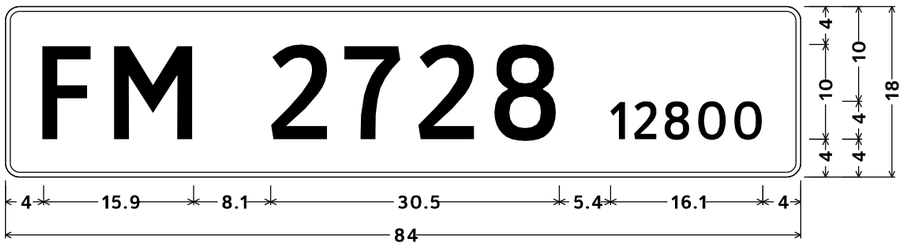
B

D3-1G(6) 10in;
1.5" Radius, 0.5" Border, White on Green;
"12800", ClearviewHwy-3-W; "FM 2728", ClearviewHwy-3-W;



C

D3-1G(6) 10in;
1.5" Radius, 0.5" Border, White on Green;
"7200", ClearviewHwy-3-W; "US 80", ClearviewHwy-3-W; "7300", ClearviewHwy-3-W;



D

D3-1G(6) 10in;
1.5" Radius, 0.5" Border, White on Green;
"FM 2728", ClearviewHwy-3-W; "12800", ClearviewHwy-3-W;

SIGNING AND PAVEMENT MARKING ITEMS			
BID ITEM	DESCRIPTION	LF	EA
644	REMOVE SM RD SN SUP & AM		2
666	REFL PAV MRK TY I(W)8"(SLD)(100 MIL)	116	
666	PAVEMENT SEALER 4"	673	
666	PAVEMENT SEALER 8"	116	
666	PAVEMENT SEALER 24"	85	
666	RE PM W/RET REQ TY I(W)4"(SLD)(100 MIL)	179	
666	RE PM W/RET REQ TY I(Y)4"(SLD)(100 MIL)	494	
668	PREFAB PAV MRK TY C (W)(24")(SLD)	85	
672	REFL PAV MRK TY I-C		6
677	ELIM EXT PAV MRK & MRKS(4")	649	
677	ELIM EXT PAV MRK & MRKS(8")	121	
677	ELIM EXT PAV MRK & MRKS(24")	16	
678	PAV SURF PREP FOR MRK (4")	673	
678	PAV SURF PREP FOR MRK (8")	116	
678	PAV SURF PREP FOR MRK (24")	85	
678	PAV SURF PREP FOR MRK (RPM)		6
*	REMOVE RPM		9

* REMOVAL OF RPM WILL NOT BE PAID DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 677.

NOTES:

1. SIGNS SHALL CONFORM TO SPECIFICATIONS DETAILED ON STANDARD TSR(4)

STATE OF TEXAS
JASON J. PASCOE
144646
LICENSED PROFESSIONAL ENGINEER

Jason J Pascoe, P.E. 5/25/2022
Digitally signed by Date
Jason J. Pascoe, P.E.

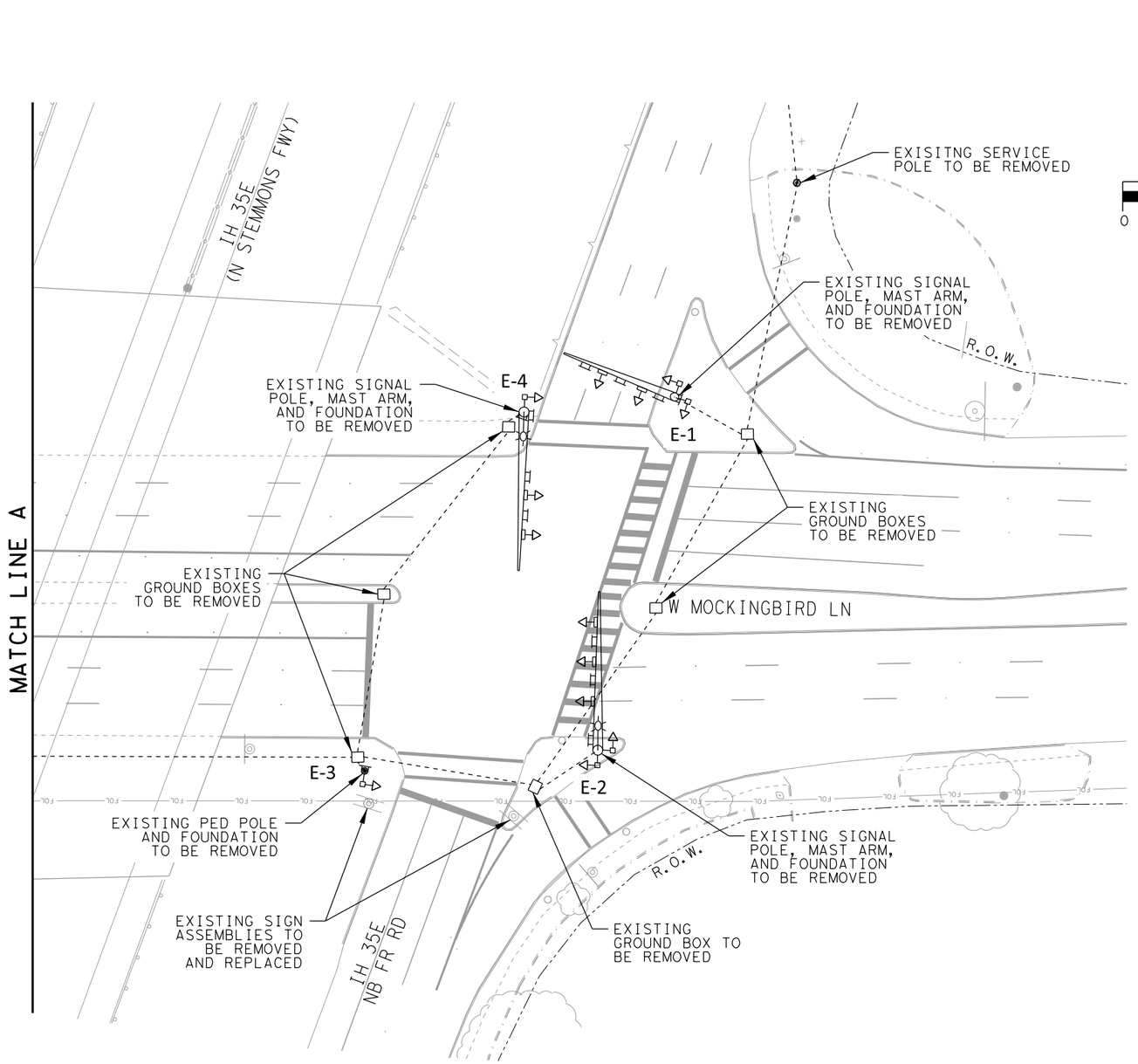
Texas Department of Transportation

PAVEMENT MARKING AND SIGNING LAYOUT
US 80 AT FM 2728 (WEST)

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JJP	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS JJP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	35
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

FILE: T:\DALTRAFSD\Jason Pascoe\FM2728 Pvmt Marking.dgn



LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING PEDESTAL (PED)
- EXISTING SIGNAL HEAD
- EXISTING PED HEAD
- EXISTING SIGNAL MOUNTED SIGN
- EXISTING CONDUIT
- EXISTING GROUND BOX
- EXISTING LUMINAIRE
- EXISTING GROUND MOUNTED SIGN
- E-# EXISTING POLE NUMBER

NOTES:

1. THE INFORMATION ON THESE DRAWINGS REGARDING THE RIGHT OF WAY, TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR INCLUSIVE.
2. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL OPERATIONS UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.
3. ALL SIGNAL POLES AND MAST ARMS CALLED TO BE REMOVED, AND THEIR ATTACHED SIGNAL HEADS, SIGNS AND OTHER EQUIPMENT TO BE SALVAGED AND RETURNED TO THE CITY OF DALLAS SIGNAL SHOP.
4. THE EXISTING GROUND BOXES CALLED TO BE REMOVED, SHALL BE BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
5. THE EXISTING FOUNDATION SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
6. ELIMINATE ALL EXISTING PAVEMENT MARKINGS ALONG INTERSECTION 100' FROM STOP BAR. REFER TO PAVEMENT MARKING SHEET FOR DETAILS.
7. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE ITEM 531 QTYS AND PROPOSED RAMP AND SIDEWALK LAYOUTS).

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED
PROFESSIONAL ENGINEER

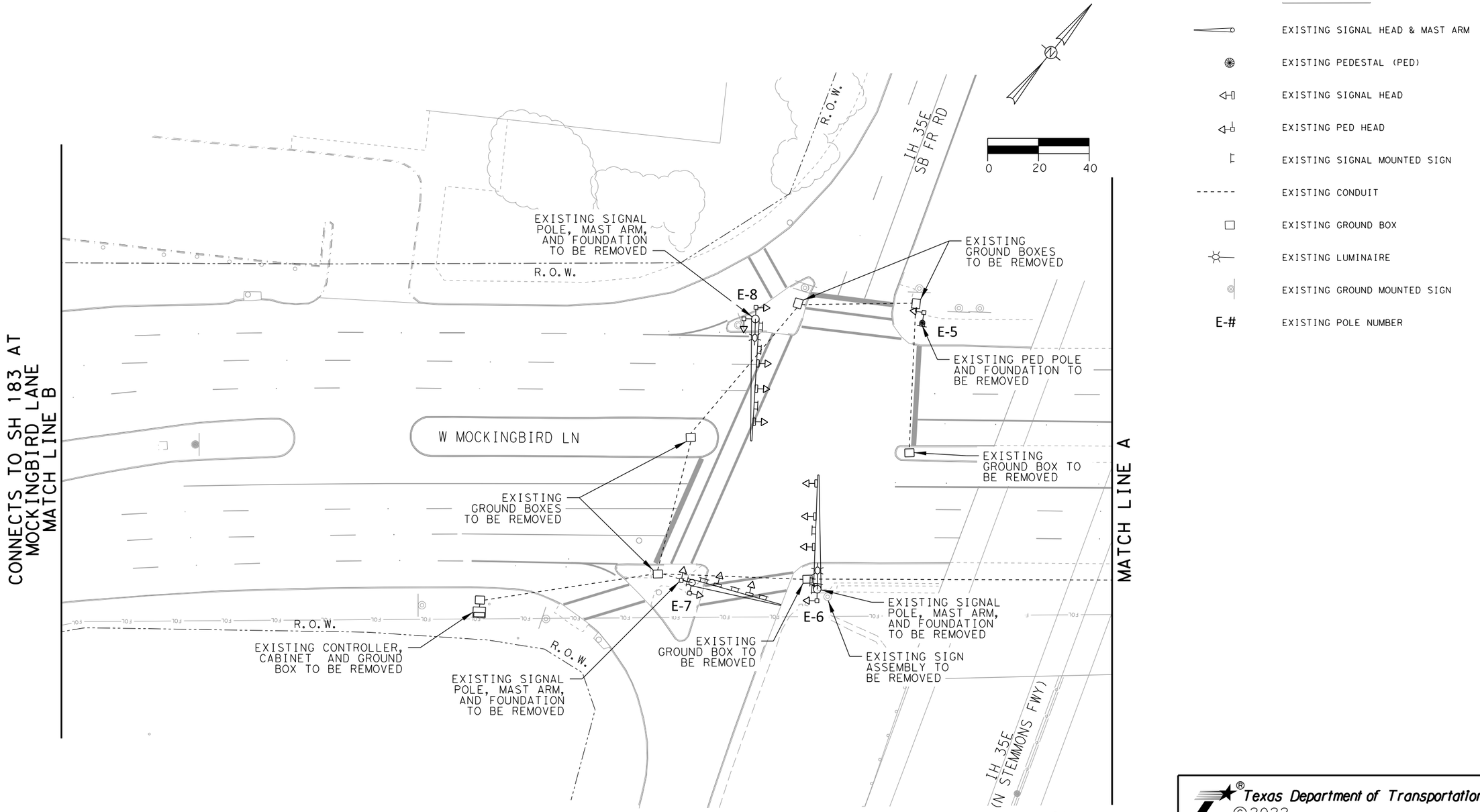
Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

EXISTING CONDITION AND REMOVALS
IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	36
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				



LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING PEDESTAL (PED)
- EXISTING SIGNAL HEAD
- EXISTING PED HEAD
- EXISTING SIGNAL MOUNTED SIGN
- EXISTING CONDUIT
- EXISTING GROUND BOX
- EXISTING LUMINAIRE
- EXISTING GROUND MOUNTED SIGN
- E-# EXISTING POLE NUMBER

NOTES:

1. THE INFORMATION ON THESE DRAWINGS REGARDING THE RIGHT OF WAY, TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR INCLUSIVE.
2. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL OPERATIONS UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.
3. ALL SIGNAL POLES AND MAST ARMS CALLED TO BE REMOVED, AND THEIR ATTACHED SIGNAL HEADS, SIGNS AND OTHER EQUIPMENT TO BE SALVAGED AND RETURNED TO THE CITY OF DALLAS SIGNAL SHOP.
4. THE EXISTING GROUND BOXES CALLED TO BE REMOVED, SHALL BE BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
5. THE EXISTING FOUNDATION SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
6. ELIMINATE ALL EXISTING PAVEMENT MARKINGS ALONG INTERSECTION 100' FROM STOP BAR. REFER TO PAVEMENT MARKING SHEET FOR DETAILS.
7. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE ITEM 531 QTYS AND PROPOSED RAMP AND SIDEWALK LAYOUTS).

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

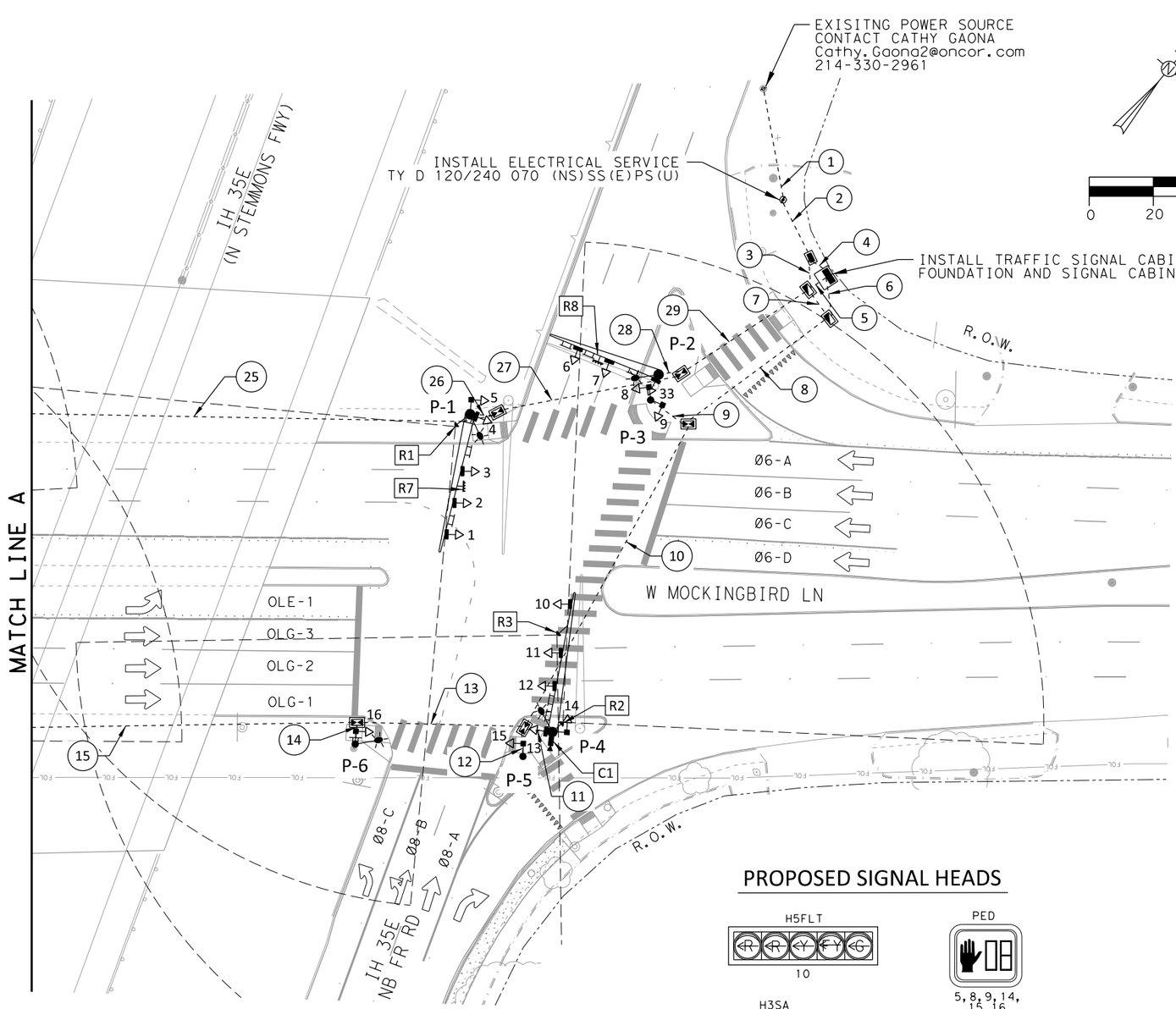
Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

EXISTING CONDITION AND REMOVALS
IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	37
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				



LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING GROUND MOUNTED SIGN
- PROPOSED SIGNAL HEAD & MAST ARM
- PROPOSED PEDESTAL (PED)
- PROPOSED LUMINAIRE POLE
- 8 — PROPOSED SIGNAL HEAD AND LABEL
- 8 — PROPOSED PED HEAD AND LABEL
- PROPOSED SIGNAL MOUNTED SIGN
- # — PROPOSED CONDUIT AND LABEL
- PROPOSED CONTROLLER AND CABINET
- PROPOSED GROUND BOX TY A W/ APRON
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED GROUND BOX TY 1 W/ APRON
- PROPOSED LUMINAIRE
- PROPOSED PRESENCE RADAR DETECTOR
- PROPOSED ADVANCE RADAR DETECTOR
- C# — PROPOSED CCTV CAMERA AND LABEL
- PROPOSED ELECTRICAL SERVICE
- P-# — PROPOSED POLE LABEL
- R# — PROPOSED RADAR LABEL

PROPOSED SIGNAL HEADS

H5FLT (R R Y FY G) — 10

PED — 5, 8, 9, 14, 15, 16

H3SA (R Y ↺) — 1, 12

V3 (R Y G) — 4, 33

V3SA (R Y ↺) — 13

H3 (R Y G) — 2, 3, 6, 7, 11

NOTES:

1. THE INFORMATION ON THESE DRAWINGS REGARDING THE RIGHT OF WAY, TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR INCLUSIVE.
2. CONTRACTOR TO CONTACT CITY OF DALLAS TRAFFIC MANAGEMENT CENTER AT 214-670-3095 AND TXDOT TRAFFIC SIGNAL OFFICE AT 214-320-6682 48 HOURS IN ADVANCE TO COORDINATE WORK.
3. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, RADAR DETECTORS, CONDUIT, GROUND BOXES, AND CONNECTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
4. CONTRACTOR SHALL COORDINATE WITH ONCOR CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT Cathy Gaona AT Cathy.Gaona2@oncor.com OR 469-506-7115.
5. RADAR DETECTION EQUIPMENT, CONTROLLER CABINET EQUIPMENT, CELLULAR MODEM, ETHERNET SWITCH WILL BE SUPPLIED BY THE CITY OF DALLAS. CONTACT MR. ALFRED LEMON AT 214-670-4812(O) OR 214-213-6121(M) TO SCHEDULE PICKUP.
6. INSTALL BASE-MOUNTED CONTROLLER CABINET (TY 332) AND FOUNDATION.
7. SIGNAL POLES SHALL BE GALVANIZED STEEL FINISH AND SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BLACK POWDERED ALUMINUM VISORS AND NON-VENTED RETROREFLECTIVE BACKPLATES.
8. BATTERY BACKUP UNIT WILL BE FURNISHED AND INSTALLED BY THE CITY OF DALLAS.

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation
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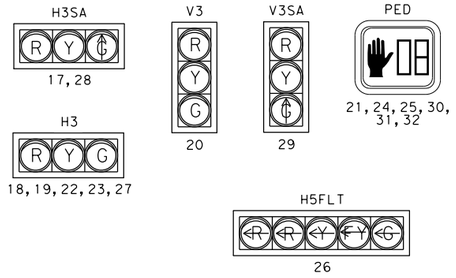
TRAFFIC SIGNAL LAYOUT

IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 5

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	38
CHECK LDL	CONTROL 0095	SECTION 05	JOB 063, ETC.	

PROPOSED SIGNAL HEADS



LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING GROUND MOUNTED SIGN
- PROPOSED SIGNAL HEAD & MAST ARM
- PROPOSED PEDESTAL (PED)
- PROPOSED LUMINAIRE POLE
- 8 PROPOSED SIGNAL HEAD AND LABEL
- 8 PROPOSED PED HEAD AND LABEL
- PROPOSED SIGNAL MOUNTED SIGN
- # PROPOSED CONDUIT AND LABEL
- PROPOSED CONTROLLER AND CABINET
- PROPOSED GROUND BOX TY A W/ APRON
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED GROUND BOX TY 1 W/ APRON
- PROPOSED LUMINAIRE
- PROPOSED PRESENCE RADAR DETECTOR
- PROPOSED ADVANCE RADAR DETECTOR
- C# PROPOSED CCTV CAMERA AND LABEL
- PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED POLE LABEL
- R# PROPOSED RADAR LABEL

NOTES CONTINUED:

9. RADAR DETECTION ZONES TO BE PROGRAMMED BY THE CITY OF DALLAS. CONTACT Srinivasa Veeramallu AT 214-670-5892 WITH 1 WEEK NOTICE TO SCHEDULE PROGRAMMING AND ACTIVATION.
10. 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.
11. ALL SIGNAL CABLES SHALL BE WIRED IN ACCORDANCE WITH THE CABINET PREPARATION NOTES SUPPLIED BY THE CITY OF DALLAS.
12. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX SLOPE). IF THE DISTANCE FROM 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 SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
13. IF SIGNAL POLES CAN NOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO DISCUSS NEW LOCATIONS.
14. ALL WORKS HAVE TO BE PERFORMED BETWEEN 9:00 AND 15:00 DURING WEEKDAYS.

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation
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TRAFFIC SIGNAL LAYOUT

IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	39
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				

CONDUIT AND CABLE CHART

RUN NO.	ITEM 618 CONDUIT TYPE					ITEM 620 ELECTRICAL CONDUCTORS			ITEM 684 TRAFFIC SIGNAL CABLE			ITEM 6292*** RADAR CABLE		ITEM 6004	ITEM 6007	TOTAL LENGTH OF RUN	FILL PERCENT	RUN NO.
	2" PVC* SCH 80 (Trench)	3" PVC SCH 80 (BORE)	3" PVC SCH 80 (Trench)	4" PVC SCH 80 (BORE)	4" PVC SCH 80 (TRENCH)	NO. 8 XHHW	NO. 6 BARE	NO. 4 XHHW	TY-A 20 CNDR. 14 AWG	TY-A 10 CNDR. 14 AWG	TY-C 2 CNDR. 12 AWG	PRESENCE DETECTION	ADVANCE DETECTION	ETHERNET CABLE##	FIBER OPTIC 12 SM#			
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	%	
1	34					TO BE INSTALLED BY THE POWER COMPANY										34		1
2	19					4	1	2								19	10.1%	2
3	10					4	1									10	5.8%	3
4	8						1	2								8	4.9%	4
5			7**		7		1		3	3	4	3	2			7	23.0%	5
6			13**		13		1		3	4	8	3	2			13	27.3%	6
			13											1	1	13	1.2%	
7			11			2	1									11	1.5%	7
8				48		2	1		3	1	8	3	2			48	22.6%	8
		48												1	1	48	1.2%	
9			13				1				2					13	2.5%	9
10				108		2	1		3	2	6	3	2			108	23.2%	10
		108												1	1	108	1.2%	
11	8		8			2	1		1	1	1	2		1		8	21.0%	11
12			9				1			1	1					9	4.4%	12
13				52		2	1		2		4	1	2			52	13.0%	13
		53													1	53	0.7%	
14			7			2	1				1					7	2.6%	14
15				214		2	1		2	1	3	1	2			214	14.2%	15
		214													1	214	0.7%	
16	8		8			2	1		1	1		1	1			8	18.9%	16
17				62		2	1		1		2		1			62	6.4%	17
		62													1	62	0.7%	
18	8		8			2	1		1	1	1		1			8	17.9%	18
19			8				1				1					8	1.4%	19
20				127												127	0.0%	20
21	14		14			2	1		1	1	1	2				14	20.4%	21
22			5				1			1	1					5	4.4%	22
23				62		2	1		1	2	2	2				62	11.0%	23
24			10			2	1				1					10	2.6%	24
25				235		2	1		1	1	3	2				235	9.9%	25
26	8		8			2	1		1	3	1	1	1			8	28.8%	26
27				55		2	1		2		4	3	1			55	14.0%	27
28	7		7			2	1		1	1			1			7	16.4%	28
29				38		2	1		3	4	4	3	2			38	25.5%	29
30		39					1								1	39	1.0%	30
31			6				1				1					6	1.4%	31
TOTAL (LF)	124	524	155	1001	20	2026	1092	54	1696	1145	3448	1727	1108	237	737			

* THERE ARE A 2" SPARE CONDUIT FROM EACH SIGNAL POLE TO THE NEAREST GROUND BOX

** 3" CONDUITS TO REMAIN EMPTY TO SATISFY TS-CF-21

*** PROVIDED BY THE CITY AND INSTALLED BY THE CONTRACTOR

INCLUDE 200' SLACK CABLE IN THE GROUND BOX ADJACENT TO THE CONTROLLER CABINET

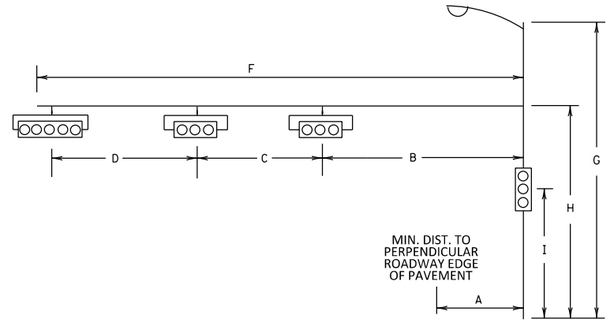
INCLUDE 15' SLACK CABLE COILED IN EACH OF THE GROUND BOXES AND CABINET

SIGNAL HEAD & POLE PLACEMENT

POLE NUMBER	STATUS	FOUNDATION TYPE	DRILLED SHAFT LENGTH (FT)				DIMENSIONS (FT)								
			24" DIA SUB TO ITEM 687	30" DIA ITEM 416	36" DIA ITEM 416	48" DIA ITEM 416	A	B	C	D	E	F	G	H	I
P-1	I	36-A			13		10	18	10	10	-	44	30	19	13
P-2	I	36-A			13		5	16	10	-		36	30	19	13
P-3	I	24-A	6				5	PED POLE							
P-4	I	36-A			13		5	14	10	15	-	44	30	19	13
P-5	I	24-A	6				6	PED POLE							
P-6	I	30-A		11			9	LUMINAIRE POLE							
P-7	I	36-A			13		13	23	10	10	-	48	30	19	13
P-8	I	36-A			13		7	15	11	-	-	36	30	19	13
P-9	I	24-A	6				3	PED POLE							
P-10	I	36-A			13		5	19	10	15	-	48	30	19	13
P-11	I	24-A	6				5	PED POLE							
P-12	I	30-A		11			8	LUMINAIRE POLE							
P-13	I	24-A	6				8	PED POLE							
TOTAL			24	22	78	0									

* PED POLE DRILL SHAFT FOUNDATION IS SUBSIDIARY TO ITEM 687-6001

STATUS: I=INSTALL; E=EXISTING



STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

IH 35E AT MOCKINGBIRD LN

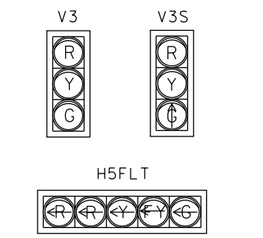
SHEET 3 OF 5

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	40
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

DATE:
FILE:

VEHICLE AND PEDESTRIAN SIGNAL HEADS

POLE NO.		P1					P2			P3		P4					P5	P6	P7					P8				P9	P10					P11	P12	P13	TOTAL
SIGNAL HEAD NUMBER		1	2	3	4	5	6	7	33	8	9	10	11	12	13	14	15	16	17	18	19	20	22	23	34	24	25	26	27	28	29	30	31	32	21	
SIGNAL HEAD TYPE		H3SA	H3	H3	V3	PED	H3	H3	V3	PED	PED	H5FLT	H3	H3	V3SA	PED	PED	PED	H3SA	H3	H3	V3	H3	H3	V3	PED	PED	H5FLT	H3	H3	V3SA	PED	PED	PED	PED	
NON-VENTED BACK PLATE	3 SEC	1	1	1	1		1	1	1				1	1	1				1	1	1	1	1	1	1				1	1	1					20
	5 SEC											1																1								2
LED SIGNAL LAMPS	VEHICLE (12") R	1	1	1	1		1	1	1				1	1	1				1	1	1	1	1	1	1				1	1	1					20
	VEHICLE (12") Y	1	1	1	1		1	1	1				1	1	1				1	1	1	1	1	1	1				1	1	1					20
	VEHICLE (12") G		1	1	1		1	1	1				1							1	1	1	1	1	1				1							14
	VEHICLE (12") RA											2																2								4
	VEHICLE (12") YA											2																2								4
	VEHICLE (12") GA	1										1		1	1				1									1			1	1				8
	COUNT DOWN					1				1	1					1	1	1								1	1					1	1	1	1	12
RADAR	RPDD	1								PED POLE		2					PED POLE	LUM. POLE	1								PED POLE	2				PED POLE	LUM. POLE	PED POLE	6
	RADD	1						1											1				1													4
CCTV CAMERA		1										1																								1
LUMINAIRE		1						1				1						1	1				1							1				1		8



CABLE TERMINATION CHART

CNDR. COLOR	CABLE 1 FROM POLE P1 TO CNTRL. 20 CNDR.	CABLE 2 FROM POLE P2 TO CNTRL. 20 CNDR.	CABLE 3 FROM POLE P3 TO CNTRL. 10 CNDR.	CABLE 4 FROM POLE P4 TO CNTRL. 20 CNDR.	CABLE 5 FROM POLE P5 TO CNTRL. 10 CNDR.	CABLE 6 FROM POLE P6 TO CNTRL. 10 CNDR.	CABLE 7 FROM POLE P7 TO CNTRL. 20 CNDR.	CABLE 8 FROM POLE P8 TO CNTRL. 20 CNDR.	CABLE 9 FROM POLE P9 TO CNTRL. 10 CNDR.	CABLE 10 FROM POLE P10 TO CNTRL. 20 CNDR.	CABLE 11 FROM POLE P11 TO CNTRL. 10 CNDR.	CABLE 12 FROM POLE P12 TO CNTRL. 10 CNDR.	CABLE 13 FROM POLE P13 TO CNTRL. 10 CNDR.
BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
RED	SH 1, 2, 3, 4 PHASE 6-R	SH 6, 7, 33 PHASE 8-R	SPARE	SH 11, 12, 13 OL G-R	SPARE	SPARE	SH 17, 18, 19, 20 PHASE 2-R	SH 22, 23, 34 PHASE 4-R	SPARE	SH 27, 28, 29 OL C-R	SPARE	SPARE	SPARE
GREEN	SH 1, 2, 3, 4 PHASE 6-G/GA	SH 6, 7, 33 PHASE 8-G	SPARE	SH 11, 12, 13 OL G-G/GA	SPARE	SPARE	SH 17, 18, 19, 20 PHASE 2-G/GA	SH 22, 23, 34 PHASE 4-G	SPARE	SH 27, 28, 29 OL C-G/GA	SPARE	SPARE	SPARE
ORANGE	SH 1, 2, 3, 4 PHASE 6-Y	SH 6, 7, 33 PHASE 8-Y	SPARE	SH 11, 12, 13 OL G-Y	SPARE	SPARE	SH 17, 18, 19, 20 PHASE 2-Y	SH 22, 23, 34 PHASE 4-Y	SPARE	SH 27, 28, 29 OL C-Y	SPARE	SPARE	SPARE
BLUE	PH 5 PHASE 6-DW	SPARE	PH 8 PHASE 6-DW	PH 14 PHASE 8-DW	PH 15 OL G-DW	PH 16 OL G-DW	SPARE	PH 24 PHASE 2-DW	PH 25 PHASE 4-DW	PH 30 PHASE 4-DW	PH 31 OL C-DW	PH 32 OL C-DW	PH 21 PHASE 2-DW
WHITE/ BLACK	PH 5 PHASE 6-W	SPARE	PH 8 PHASE 6-W	PH 14 PHASE 8-W	PH 15 OL G-W	PH 16 OL G-W	SPARE	PH 24 PHASE 2-W	PH 25 PHASE 4-W	PH 30 PHASE 4-W	PH 31 OL C-W	PH 32 OL C-W	PH 21 PHASE 2-W
RED/BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
GREEN/ BLACK	SPARE	SPARE	PH 9 PHASE 8-DW	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
ORANGE/ BLACK	SPARE	SPARE	PH 9 PHASE 8-W	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
BLUE/ BLACK	SPARE	SPARE		SPARE			SPARE	SPARE		SPARE			
BLACK/WHITE	SPARE	SPARE		SPARE			SPARE	SPARE		SPARE			
RED/WHITE	SPARE	SPARE		SH 10 OL E-RA			SPARE	SPARE		SH 26 OL A-RA			
GREEN/WHITE	SPARE	SPARE		SH 10 OL E-GA			SPARE	SPARE		SH 26 OL A-GA			
BLUE/WHITE	SPARE	SPARE		SH 10 OL E-YA			SPARE	SPARE		SH 26 OL A-YA			
BLACK/RED	SPARE	SPARE		SPARE			SPARE	SPARE		SPARE			
WHITE/RED	SPARE	SPARE		SPARE			SPARE	SPARE		SPARE			
ORANGE/RED	SPARE	SPARE		SPARE			SPARE	SPARE		SPARE			
BLUE/RED	SPARE	SPARE		SH 10 OL E-FYA			SPARE	SPARE		SH 26 OL A-FYA			
RED/GREEN	SPARE	SPARE		SPARE			SPARE	SPARE		SPARE			

* APS PUSH BUTTON COMMON FOR PEDESTRIAN PHASE ARE ON 2/C TYPE C#12 AWG CABLES AND ARE NOT SHOWN IN THIS CHART.

CABLES INSIDE POLES (LF)

POLE NUMBER	ITEM 684				ITEM 620	ITEM 6004	ITEM 6292	
	SIGNAL CABLES		PED HEADS	APS UNITS	LUMINAIRE	CCTV CAMERA*	RADAR CABLE**	
	TY-A 14 AWG 7 CNDR	TY-A 14 AWG 5 CNDR	TY-A 14 AWG 5 CNDR	TY-C 12 AWG 2 CNDR	NO. 12 XHHW	ETHERNET CABLE	PRESENCE DETECTION	ADVANCE DETECTION
P1		147	10	5	80		19	47
P2		95			80			38
P3			20	10				
P4	58	91	10	5	80	27	70	
P5			10	5				
P6			10	5	80			
P7		165	10	5	80		19	57
P8		94	10	5	80			42
P9			10	5				
P10	63	101	10	5	80		74	
P11			10	5				
P12			10	5	80			
P13			10	5				
TOTAL	121	693	130	65	640	27	182	184

* INSTALL 3' BELOW THE LUMINAIRE ARM; INCLUDE 15' SLACK CABLE.

** PROVIDED BY THE CITY AND INSTALLED BY THE CONTRACTOR

GROUND BOX SUMMARY (ITEM 624)		
DESCRIPTION	UNIT	QTY
GROUND BOX TY A (122311) W/APRON	EA	2
GROUND BOX TY D (162922) W/APRON	EA	9
ITS GND BOX (POLY) TY 1 (243624)W/APRN	EA	2
REMOVE GROUND BOX	EA	13

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

IH 35E AT MOCKINGBIRD LN

SHEET 4 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	41
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

DATE:
FILE:

APS MESSAGE CHART

POLE	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-1	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD
P-3	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND 'IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD
P-3	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND IH 35E FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND IH 35E FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-4	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND IH 35E FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND IH 35E FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-5	O.L. G	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD
P-6	O.L. G	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS NORTHBOUND IH 35E FRONTAGE ROAD
P-13	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD
P-8	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD
P-9	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT SOUTHBOUND IH 35E FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT SOUTHBOUND IH 35E FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-10	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT SOUTHBOUND IH 35E FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT SOUTHBOUND IH 35E FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-11	O.L. C	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD
P-12	O.L. C	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND IH 35E FRONTAGE ROAD, WALK SIGN IS ON TO CROSS SOUTHBOUND IH 35E FRONTAGE ROAD

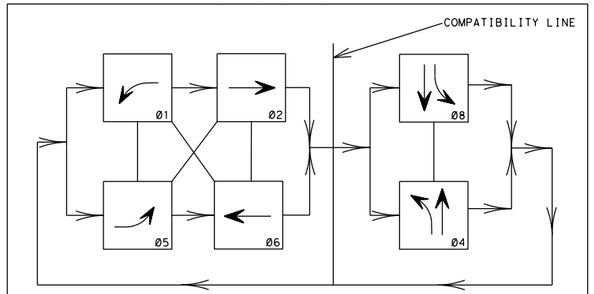
*COUNTDOWN SPEECH MESSAGE="OFF" FOR ALL UNITS

RADAR DETECTION ZONE DETAILS

RADAR NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	PHASE	RADAR TYPE	SETBACK/FURTHEST LANE DISTANCE
R1	P-1	18'	OLG & OLE	PRESENCE	STOPBAR - 60'
R2	P-4	18'	PHASE 6	PRESENCE	STOPBAR - 55'
R3	P-4	18'	PHASE 8	PRESENCE	STOPBAR - 50'
R4	P-7	18'	OLC & OLA	PRESENCE	STOPBAR - 60'
R5	P-10	18'	PHASE 2	PRESENCE	STOPBAR - 55'
R6	P-11	18'	PHASE 4	PRESENCE	STOPBAR - 60'
R7	P-1 MAST ARM	19'	PHASE 6	ADVANCE	SETBACK - 400'
R8	P-2 MAST ARM	19'	PHASE 8	ADVANCE	SETBACK - 400'
R9	P-7 MAST ARM	19'	PHASE 2	ADVANCE	SETBACK - 400'
R10	P-9 MAST ARM	19'	PHASE 4	ADVANCE	SETBACK - 400'

* FOR INFORMATION ONLY, RADAR WILL BE INSTALLED AS DIRECTED BY THE ENGINEER

PHASE SEQUENCE
DIAMOND OPERATION



01 & 05 ARE PROTECTED/ PERMISSIVE LEFT TURN PHASE.
OL A=01+03; OL C=01+02+03; OL E=05+07; OL G=05+06+07

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION SEE (ED (5)-14)	SERVICE CONDUIT SIZE (SCH 80)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BKR. POLE/AMP	FOUR-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	KVA LOAD
ELC SRV TY D 120/240 070 (NS)SS(E)PS(U)	2" - PVC	3 - #4	N/A	2P/70	30	100	T.S.	1P/50	<7.1
							LIGHTING	2P/20	
							LIGHTING	2P/20	

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED
PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

DATE:
FILE:

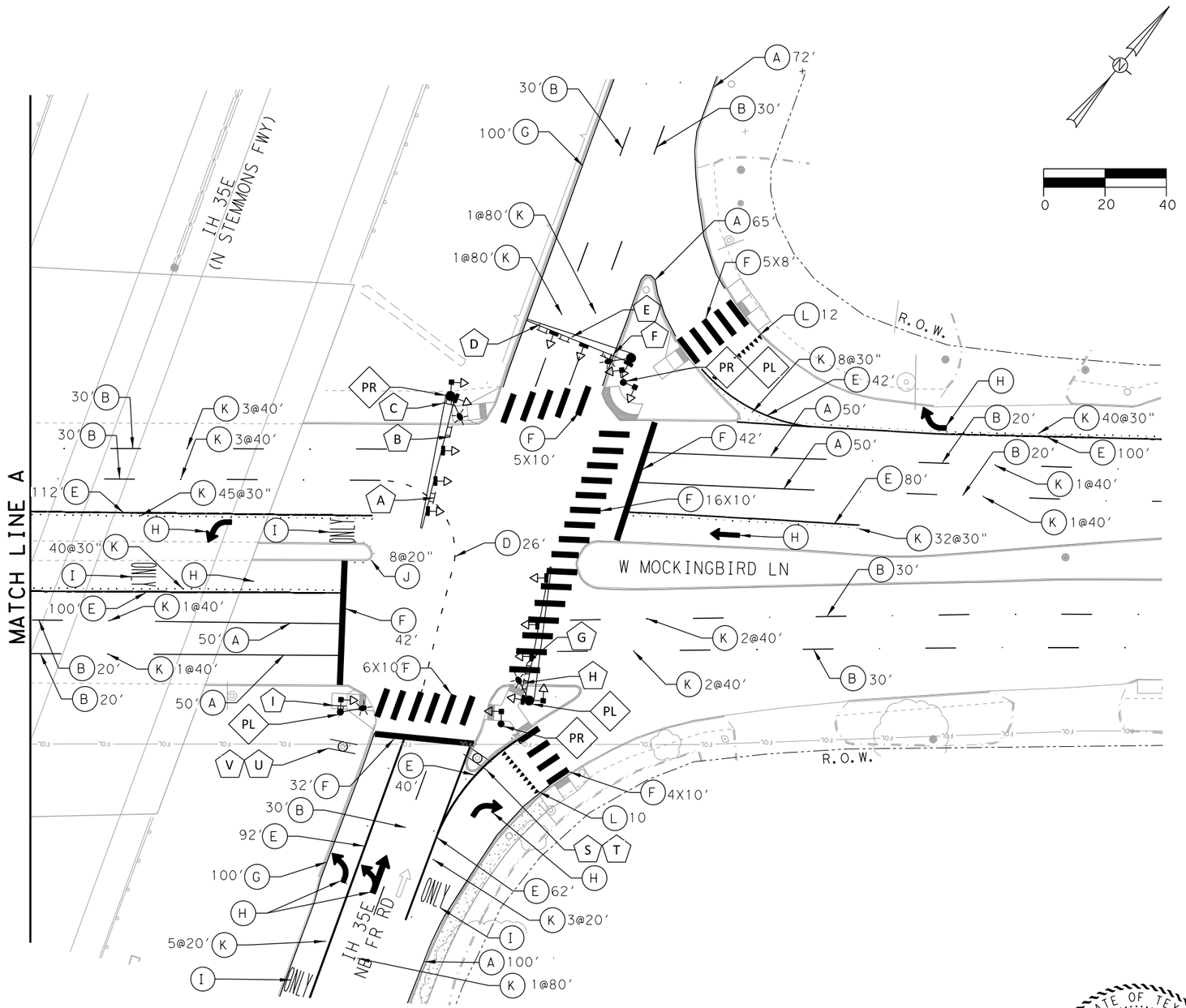
Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

IH 35E AT MOCKINGBIRD LN

SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	42
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	



LEGEND

- (A) RE PM W/ RET REQ TY I (W) 4" (SLD) (090 MIL)
- (B) RE PM W/ RET REQ TY I (W) 4" (BRK) (090 MIL)
- (D) REFL PAV MRK TY I (W) 6" (DOT) (090 MIL)
- (E) REFL PAV MRK TY I (W) 8" (SLD) (090 MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (090 MIL)
- (G) RE PM W/ RET REQ TY I (Y) 4" (SLD) (090 MIL)
- (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 II-C-R
- (L) REFL PAV MRK TY I (W) 18" (YLD TRI)(090 MIL)
- (P)(X) PROPOSED SIGN NUMBER

NOTES:

1. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALK SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB AND RAMPS, AND OTHER MISCELLANEOUS MATERIAL. SIDEWALK QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAYMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAP.
3. REFER TO THE CITY OF DALLAS 251-D STANDARDS FOR ADDITIONAL INFORMATION REGARDING TYPICAL PAVEMENT MARKING PLACEMENT.
4. LANE WIDTH MATCH EXISTING LANES. ALL PROPOSED PAVEMENT SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE TO REFRESH THE INTERSECTION PAVEMENT MARKINGS.

- NOTES CONTINUED ON NEXT SHEET.

DATE:
FILE:

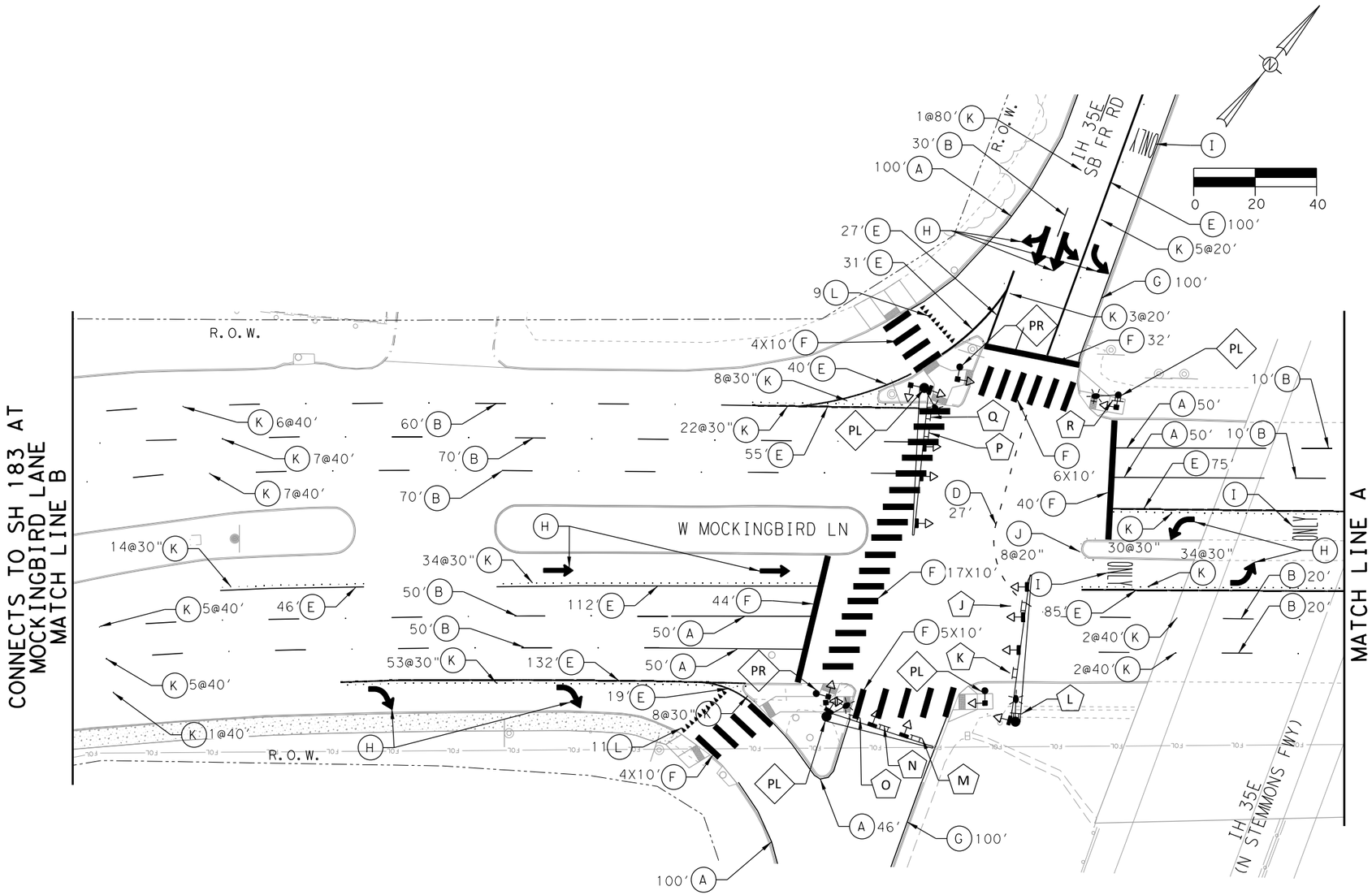
STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

PAVEMENT MARKING AND SIGNING LAYOUT
IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	43
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				



LEGEND

A	RE PM W/ RET REQ TY I (W) 4" (SLD) (090 MIL)
B	RE PM W/ RET REQ TY I (W) 4" (BRK) (090 MIL)
D	REFL PAV MRK TY I (W) 6" (DOT) (090 MIL)
E	REFL PAV MRK TY I (W) 8" (SLD) (090 MIL)
F	REFL PAV MRK TY I (W) 24" (SLD) (090 MIL)
G	RE PM W/ RET REQ TY I (Y) 4" (SLD) (090 MIL)
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 II-C-R
L	REFL PAV MRK TY I (W) 18" (YLD TRI)(090 MIL)
P X	PROPOSED SIGN NUMBER

NOTES CONTINUED:

5. ELIMINATE ALL EXISTING PAVEMENT MARKING 100′ IN EACH DIRECTION FROM STOP BAR.
6. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE NOTED.
7. PREPARE SURFACE AND INSTALL PAVEMENT MARKINGS 100′ IN EACH DIRECTION FROM STOP BAR.
8. STRIPING CONTRACTOR SHALL CONTACT COD TRANSPORTATION OPERATION AND TxDOT TRAFFIC SIGNAL OFFICE AT LEAST 24 HOURS IN ADVANCE OF MOBILIZATION. COD STAFF MUST BE PRESENT TO CONFIRM LAYOUT PRIOR TO THE APPLICATION OF ANY PAVEMENT MARKINGS.
9. RAMP LANDINGS AND PROPOSED SIDEWALKS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND THEY SHOULD DRAIN TOWARDS THE STREET WITHOUT PONDING IN THE RAMP OR GUTTER AREA.
10. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND REPLACEMENTS OF ANY DAMAGED IRRIGATION EQUIPMENT.

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

PAVEMENT MARKING AND SIGNING LAYOUT IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40′ SHEET 2 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	44
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

SIGNING AND PAVEMENT MARKING ITEMS
IH 35E AT MOCKINGBIRD LN

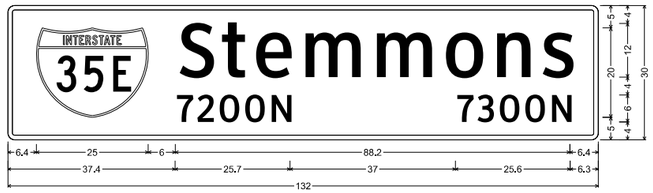
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	NB IH 35E	SB IH 35E	TOTAL
529	6002	CONC CURB (TY II)	LF		8	8
529	6008	CONC CURB & GUTTER (TY II)	LF	19		19
531	6001	CONC SIDEWALKS (4")	SY		1	1
531	6004	CURB RAMPS (TY 1)	EA	3	2	5
531	6005	CURB RAMPS (TY 2)	EA	2	2	4
531	6008	CURB RAMPS (TY 5)	EA	1		1
531	6016	CURB RAMPS (TY 21)	EA			
531	6017	CURB RAMPS (TY 22)	EA	1	2	3
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA			
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2		2
666	6017	REFL PAV MRK TY I (W)6"(DOT)(090MIL)	LF	26	27	53
666	6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	628	722	1350
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	476	476	952
666	6098	REF PAV MRK TY I(W)18"(YLD TRI)(090MIL)	EA	22	20	42
666	6224	PAVEMENT SEALER 4"	LF	927	1036	1963
666	6225	PAVEMENT SEALER 6"	LF	26	27	53
666	6226	PAVEMENT SEALER 8"	LF	628	722	1350
666	6230	PAVEMENT SEALER 24"	LF	476	476	952
666	6231	PAVEMENT SEALER (ARROW)	EA	6	7	13
666	6232	PAVEMENT SEALER (WORD)	EA	4	3	7
666	6234	PAVEMENT SEALER (DBL ARROW)	EA	1	2	3
666	6236	PAVEMENT SEALER (UTURN ARROW)	EA			0
666	6243	PAVEMENT SEALER (YLD TRI)	EA	22	20	42
666	6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF	290	390	680
666	6302	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	LF	437	446	883
666	6314	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	LF	200	200	400
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	6	7	13
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	1	2	3
668	6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA			0
668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	4	3	7
672	6009	REFL PAV MRKR TY II-A-A	EA	8	8	16
672	6010	REFL PAV MRKR TY II-C-R	EA	166	240	406
677	6001	ELIM EXT PAV MRK & MRKS (4")	EA	927	1036	1963
677	6002	ELIM EXT PAV MRK & MRKS (6")	EA	26	27	53
677	6003	ELIM EXT PAV MRK & MRKS (8")	EA	628	722	1350
677	6005	ELIM EXT PAV MRK & MRKS (12")	EA	328	338	666
677	6007	ELIM EXT PAV MRK & MRKS (24")	EA	116	244	360
677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	6	7	13
677	6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	1	2	3
677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	4	3	7
678	6001	PAV SURF PREP FOR MRK (4")	EA	927	1036	1963
678	6002	PAV SURF PREP FOR MRK (6")	EA	26	27	53
678	6004	PAV SURF PREP FOR MRK (8")	EA	628	722	1350
678	6008	PAV SURF PREP FOR MRK (24")	EA	476	476	952
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	6	7	13
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	1	2	3
678	6012	PAV SURF PREP FOR MRK (UTURN ARR)	EA			0
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	4	3	7
678	6022	PAV SURF PREP FOR MRK (18")(YLD TRI)	EA	22	20	42
678	6033	PAV SURF PREP FOR MRK (RPM)	EA	174	248	422

SIGN SUMMARY

SIGN *	SIGN TYPE	SIGN LEGEND	STATUS	SUPPORT	DIMENSION (IN x IN)
A	R6-2R	ONE WAY RIGHT	I	P-1 MAST ARM	30" X 36"
B	D3-1aG	7200 N STEMMONS 7300 N	I	P-1 MAST ARM	132" X30"
C	R9-3	NO PED CROSSING	I	P-1	24" X24"
D	I-5 M6-1G	AIRPORT ARROW RIGHT	I	P-2 MAST ARM	24" X 24" 21" X 15"
E	R3-8LMS	LANE ASSIGNMENT	I	P-2 MAST ARM	48" X 30"
F	D3-1aG	1100 W MOCKINGBIRD 1200 W	I	P-2 MAST ARM	114" X30"
G	R6-2L	ONE WAY LEFT	I	P-4 MAST ARM	30" X 36"
H	D3-1aG	7300 N STEMMONS 7200 N	I	P-4 MAST ARM	132" X30"
I	R9-3	NO PED CROSSING	I	P-6	24" X24"
J	R6-2R	ONE WAY RIGHT	I	P-7 MAST ARM	30" X 36"
K	D3-1aG	7300 N STEMMONS 7200 N	I	P-7 MAST ARM	132" X30"
L	R9-3	NO PED CROSSING	I	P-13	24" X24"
M	I-5 M6-1G	AIRPORT ARROW LEFT	I	P-8 MAST ARM	24" X 24" 21" X 15"
N	R3-8(MOD)	LANE ASSIGNMENT	I	P-8 MAST ARM	48" X 30"
O	D3-1aG	1200 W MOCKINGBIRD 1100 W	I	P-8 MAST ARM	114" X30"
P	R6-2L	ONE WAY LEFT	I	P-10 MAST ARM	30" X 36"
Q	D3-1aG	7300 N STEMMONS 7200 N	I	P-10 MAST ARM	132" X30"
R	R9-3	NO PED CROSSING	I	P-12	24" X24"
S	R5-1	DO NOT ENTER	I	GROUNND MOUNTED	48" X48"
T	R3-5R	RIGHT ONLY	I	GROUNND MOUNTED	30" X36"
U	R5-1	DO NOT ENTER	I	GROUNND MOUNTED	48" X48"
V	R3-8L	LANE ASSIGNMENT	I	GROUNND MOUNTED	36" X36"
PL	R6-10eL	APS SIGN LEFT ARROW	I	7 APS UNITS	9" X15"
PR	R6-10eR	APS SIGN RIGHT ARROW	I	5 APS UNITS	9" X15"

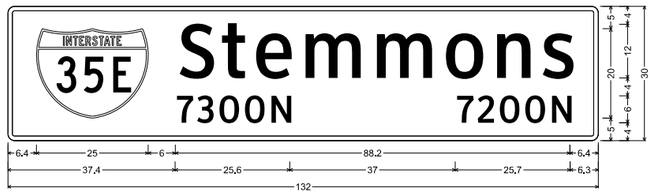
* ALL SIGNS TO BE PROVIDED AND INSTALLED BY THE CONTRACTOR (SUB TO ITEM 680).
STATUS: I=INSTALL; E=EXISTING, R=RELOCATED

B, Q



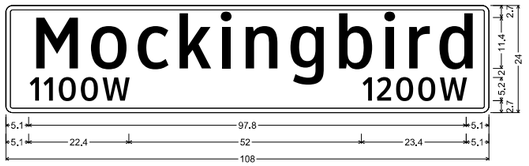
D3-1aG 12in (For overhead mount only):
1.5" Radius, 1.0" Border, White on, Green:
INTERSTATE 35 E: "Stemmons", ClearviewHwy-3-W: "7200N", ClearviewHwy-3-W: "7300N", ClearviewHwy-3-W:

H, K



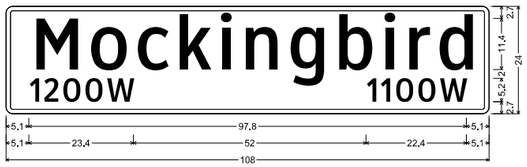
D3-1aG 12in (For overhead mount only):
1.5" Radius, 1.0" Border, White on, Green:
"Stemmons", ClearviewHwy-3-W: "7300N", ClearviewHwy-3-W: "7200N", ClearviewHwy-3-W:

F



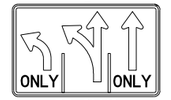
D3-1G 12in (For overhead mount only):
1.5" Radius, 1.0" Border, White on, Green:
"Mockingbird", ClearviewHwy-3-W: "1100W", ClearviewHwy-3-W: "1200W", ClearviewHwy-3-W:

O



D3-1G 12in (For overhead mount only):
1.5" Radius, 1.0" Border, White on, Green:
"Mockingbird", ClearviewHwy-3-W: "1200W", ClearviewHwy-3-W: "1100W", ClearviewHwy-3-W:

E

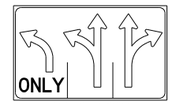


R3-8LMS
48"X30"

C, I, L, R

R9-3
24"X24"

N



R3-8(MOD)
48"X30"

S, U

R5-1
48"X48"

G, P

R6-2L
30"X36"

A, J

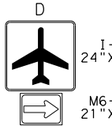
R6-2R
30"X36"

M

I-5
24"X24"

M6-1G
21"X15"

D



I-5
24"X24"

M6-1G
21"X15"

PL

R6-10eL
9"X15"

PR

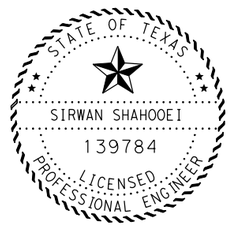
R6-10eR
9"X15"

T

R3-5R
30"X36"

V

R3-8L
36"X36"



Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Date
Sirwan Shahooei, P.E.

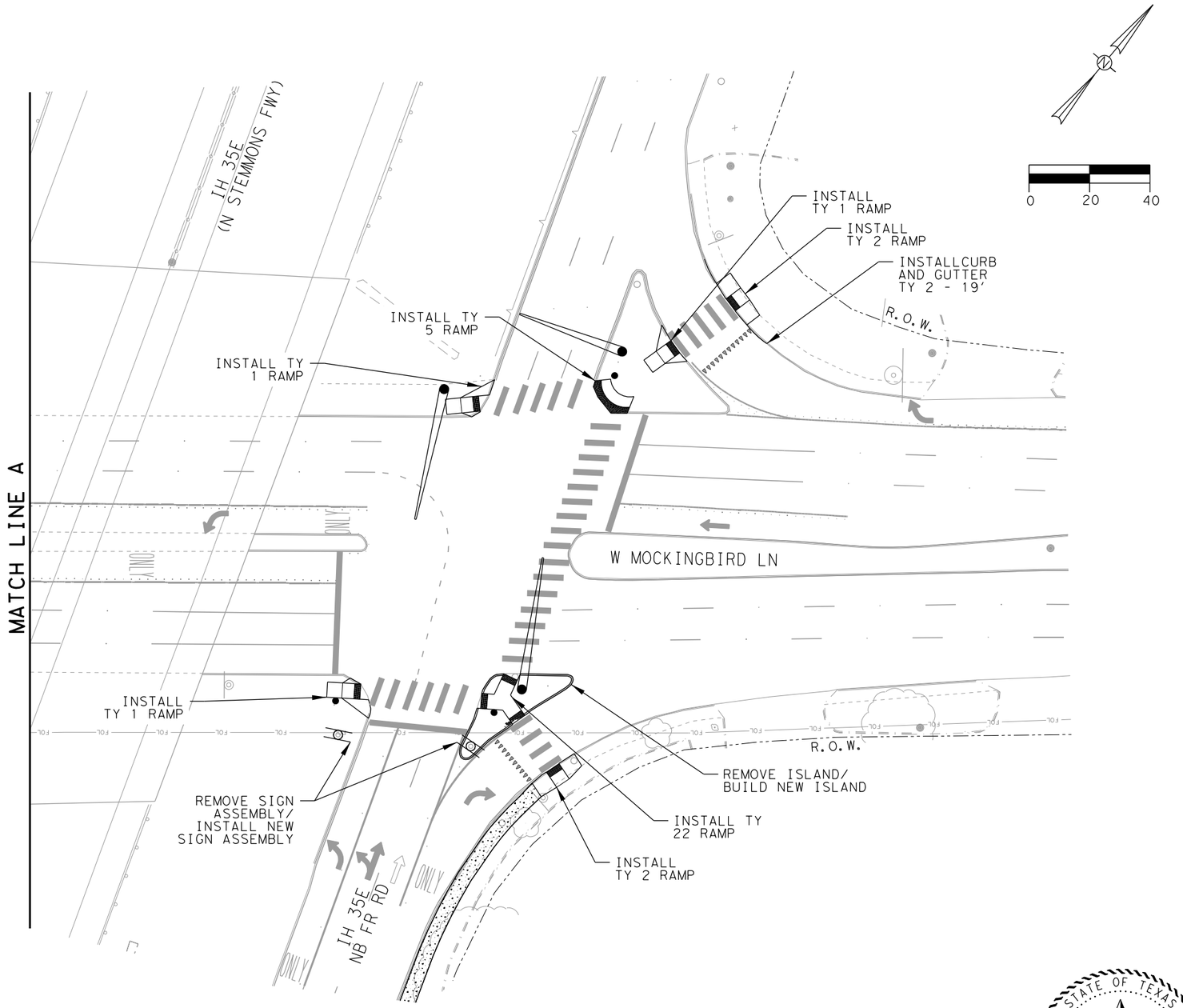
Texas Department of Transportation

PAVEMENT MARKING AND SIGNING LAYOUT
IH 35E AT MOCKINGBIRD LN

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	45
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

DATE:
FILE:



DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED
PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Date
Sirwan Shahooei, P.E.

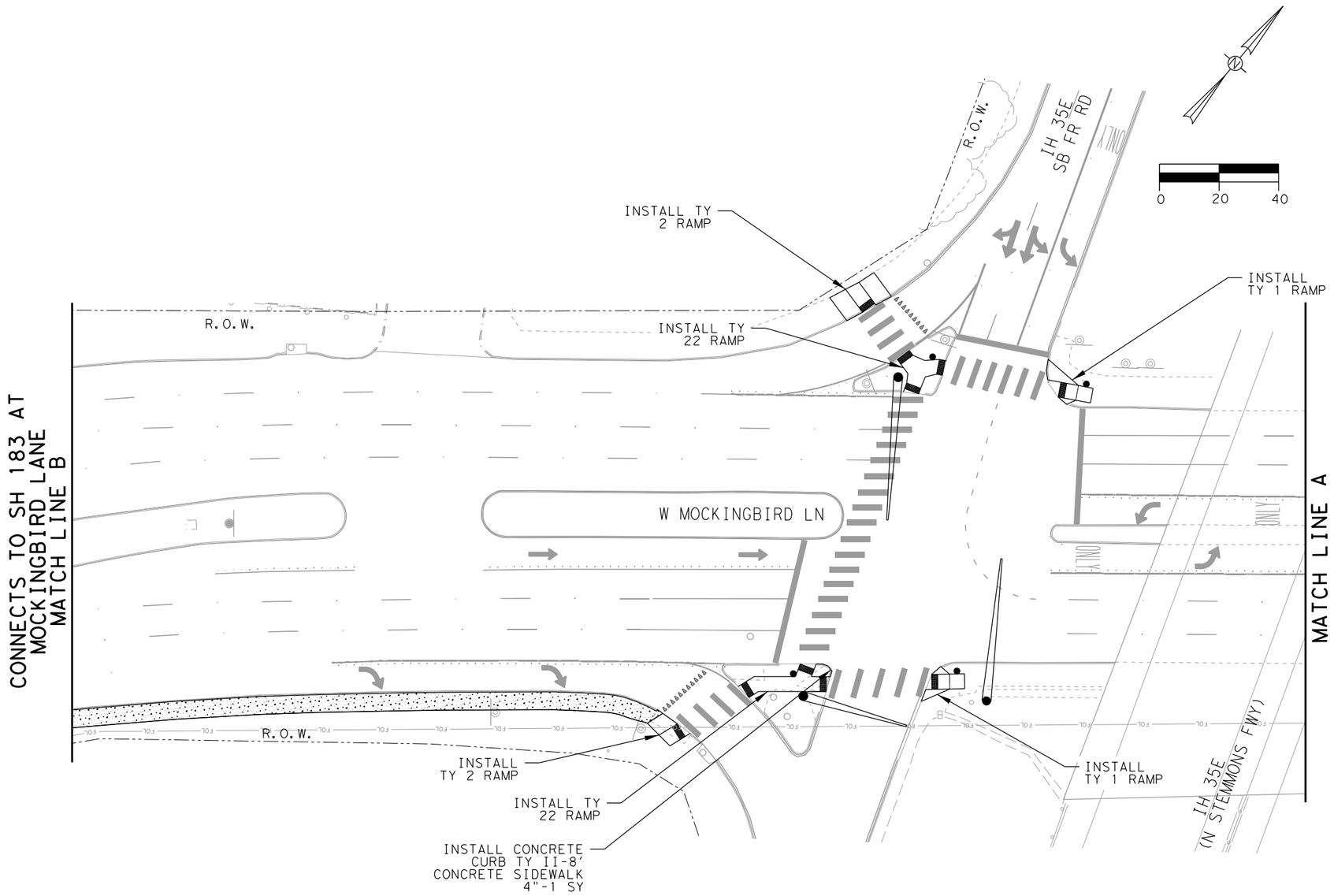
Texas Department of Transportation

ADA RAMP LAYOUT

IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	46
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	



STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E.
Date

DATE:
FILE:

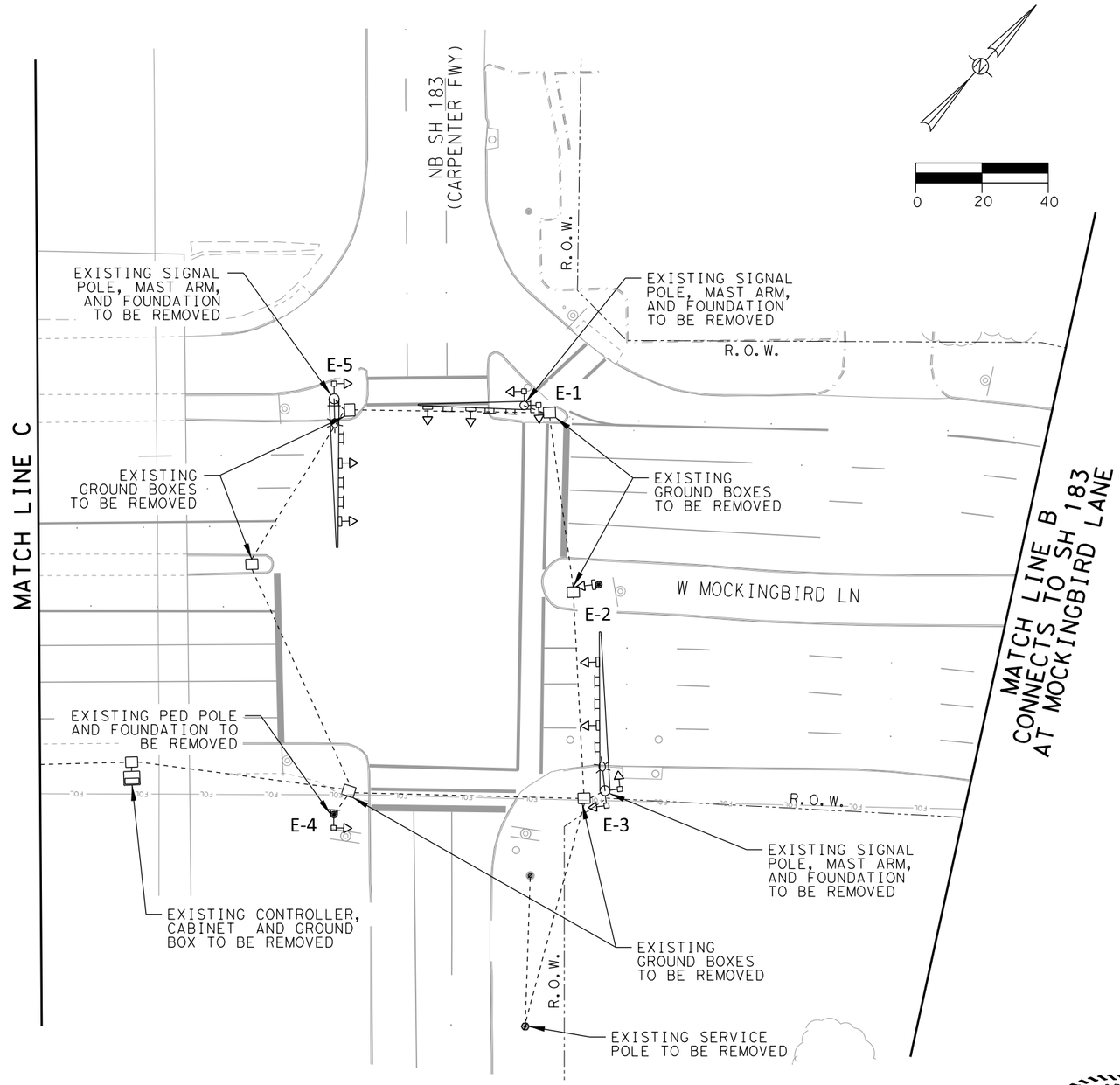
Texas Department of Transportation

ADA RAMP LAYOUT

IH 35E AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	47
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				



LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING PEDESTAL (PED)
- EXISTING SIGNAL HEAD
- EXISTING PED HEAD
- EXISTING SIGNAL MOUNTED SIGN
- EXISTING CONDUIT
- EXISTING GROUND BOX
- EXISTING LUMINAIRE
- EXISTING GROUND MOUNTED SIGN
- E-# EXISTING POLE NUMBER

NOTES:

1. THE INFORMATION ON THESE DRAWINGS REGARDING THE RIGHT OF WAY, TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR INCLUSIVE.
2. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL OPERATIONS UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.
3. ALL SIGNAL POLES AND MAST ARMS CALLED TO BE REMOVED, AND THEIR ATTACHED SIGNAL HEADS, SIGNS AND OTHER EQUIPMENT TO BE SALVAGED AND RETURNED TO THE CITY OF DALLAS SIGNAL SHOP.
4. THE EXISTING GROUND BOXES CALLED TO BE REMOVED, SHALL BE BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
5. THE EXISTING FOUNDATION SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
6. ELIMINATE ALL EXISTING PAVEMENT MARKINGS ALONG INTERSECTION 100' FROM STOP BAR. REFER TO PAVEMENT MARKING SHEET FOR DETAILS.
7. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE ITEM 531 QTYS AND PROPOSED RAMP AND SIDEWALK LAYOUTS).

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

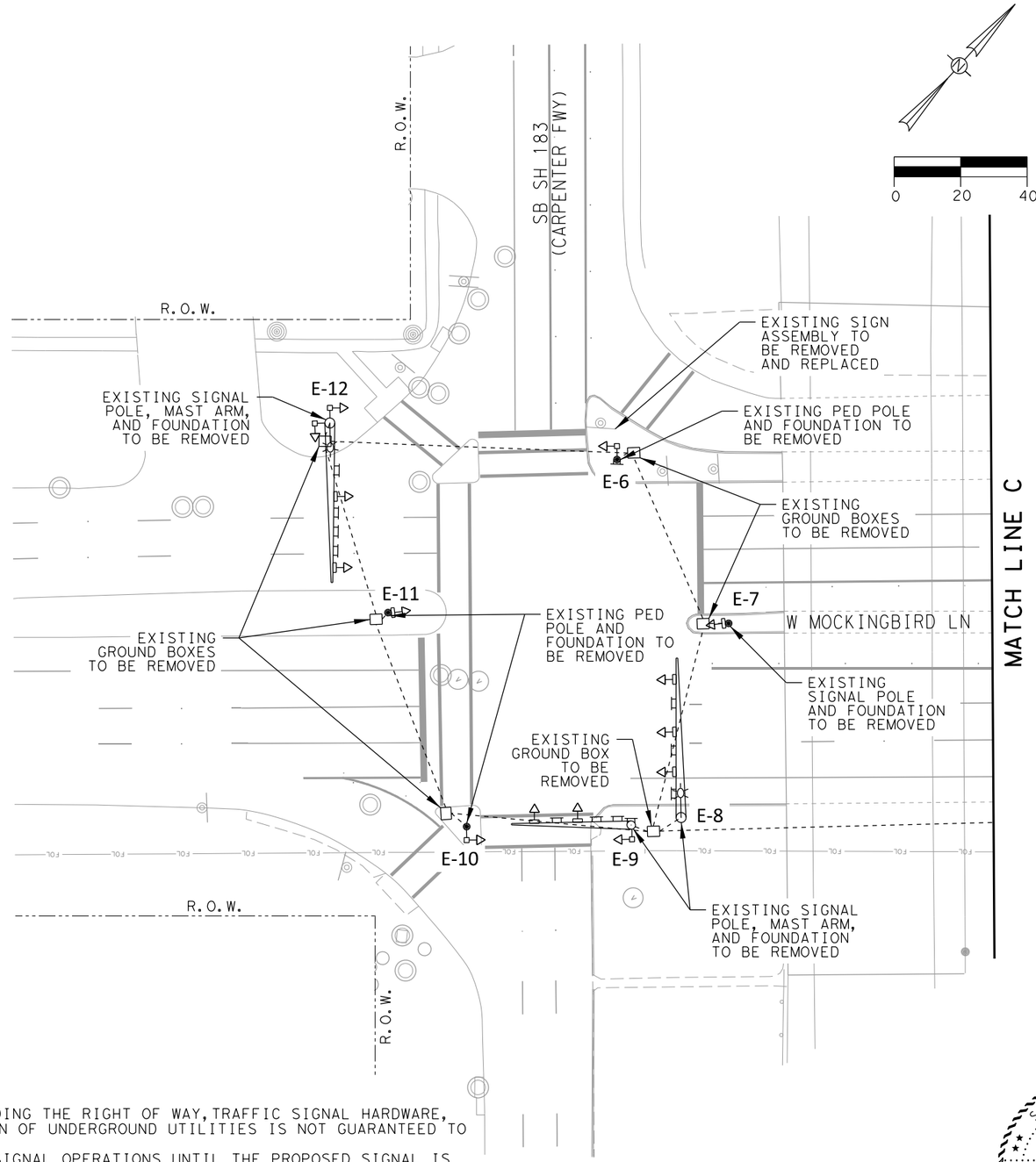
Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

EXISTING CONDITION AND REMOVALS
SH 183 AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	48
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				



LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING PEDESTAL (PED)
- EXISTING SIGNAL HEAD
- EXISTING PED HEAD
- EXISTING SIGNAL MOUNTED SIGN
- EXISTING CONDUIT
- EXISTING GROUND BOX
- EXISTING LUMINAIRE
- EXISTING GROUND MOUNTED SIGN
- E-# EXISTING POLE NUMBER

NOTES:

1. THE INFORMATION ON THESE DRAWINGS REGARDING THE RIGHT OF WAY, TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR INCLUSIVE.
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4. THE EXISTING GROUND BOXES CALLED TO BE REMOVED, SHALL BE BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
5. THE EXISTING FOUNDATION SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED AND FINISHED TO SIMILAR CONDITION IN THE SURROUNDING AREA.
6. ELIMINATE ALL EXISTING PAVEMENT MARKINGS ALONG INTERSECTION 100' FROM STOP BAR. REFER TO PAVEMENT MARKING SHEET FOR DETAILS.
7. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE ITEM 531 QTYS AND PROPOSED RAMP AND SIDEWALK LAYOUTS).

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED
PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

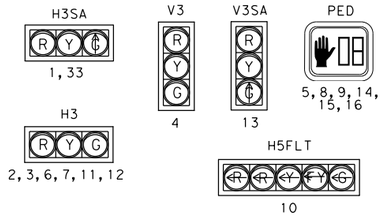
Texas Department of Transportation

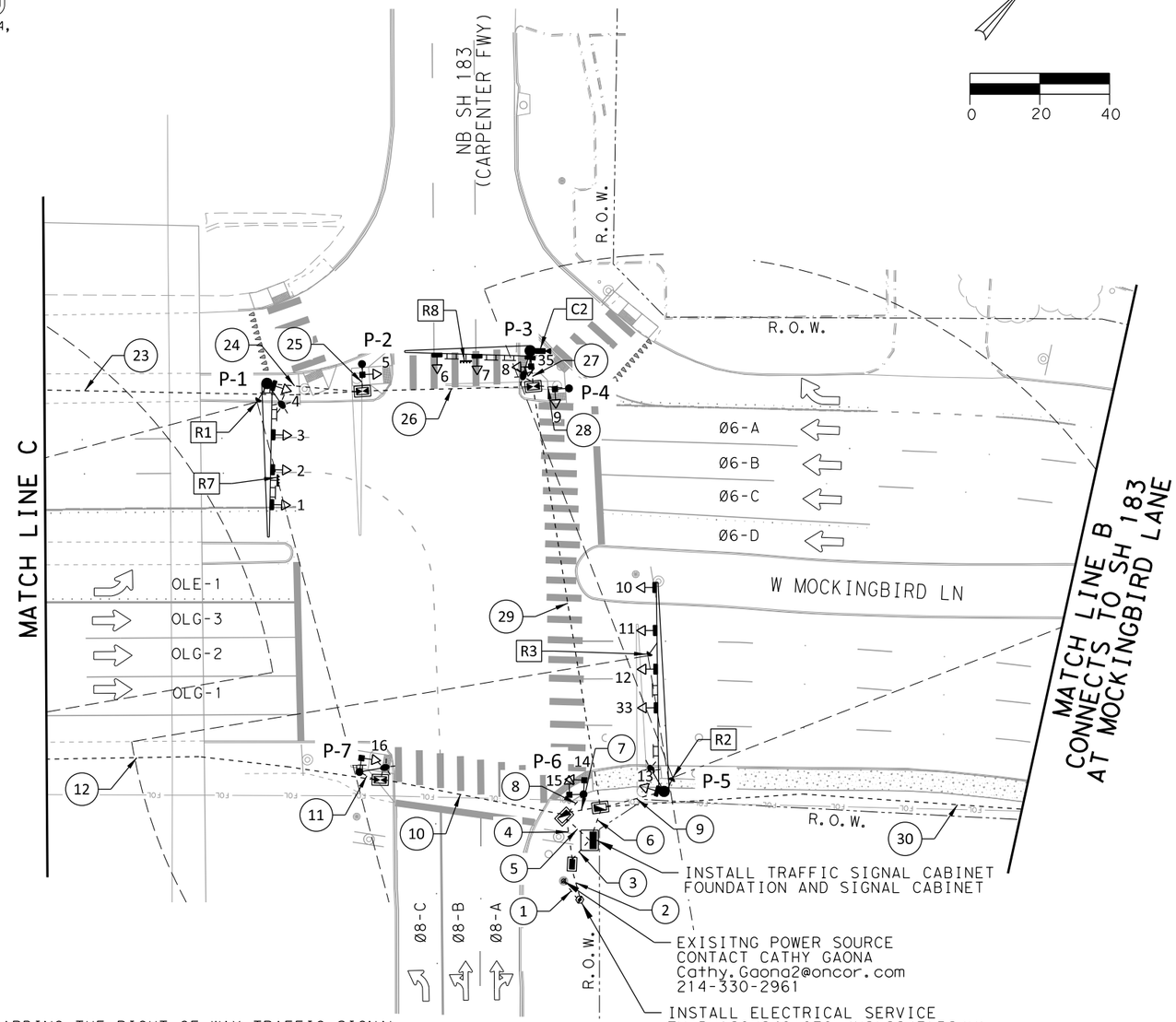
EXISTING CONDITION AND REMOVALS
SH 183 AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	49
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				

PROPOSED SIGNAL HEADS





LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING GROUND MOUNTED SIGN
- PROPOSED SIGNAL HEAD & MAST ARM
- PROPOSED PEDESTAL (PED)
- PROPOSED LUMINAIRE POLE
- 8 — PROPOSED SIGNAL HEAD AND LABEL
- 8 — PROPOSED PED HEAD AND LABEL
- PROPOSED SIGNAL MOUNTED SIGN
- # ---- PROPOSED CONDUIT AND LABEL
- PROPOSED CONTROLLER AND CABINET
- PROPOSED GROUND BOX TY A W/ APRON
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED GROUND BOX TY 1 W/ APRON
- PROPOSED LUMINAIRE
- PROPOSED PRESENCE RADAR DETECTOR
- PROPOSED ADVANCE RADAR DETECTOR
- C# — PROPOSED CCTV CAMERA AND LABEL
- PROPOSED ELECTRICAL SERVICE
- P-# — PROPOSED POLE LABEL
- R# — PROPOSED RADAR LABEL

NOTES:

1. THE INFORMATION ON THESE DRAWINGS REGARDING THE RIGHT OF WAY, TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR INCLUSIVE.
2. CONTRACTOR TO CONTACT CITY OF DALLAS TRAFFIC MANAGEMENT CENTER AT 214-670-3095 AND TXDOT TRAFFIC SIGNAL OFFICE AT 214-320-6682 48 HOURS IN ADVANCE TO COORDINATE WORK.
3. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, RADAR DETECTORS, CONDUIT, GROUND BOXES, AND CONNECTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
4. CONTRACTOR SHALL COORDINATE WITH ONCOR CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT Cathy Gaona AT Cathy.Gaona2@oncor.com OR 469-506-7115.
5. RADAR DETECTION EQUIPMENT, CONTROLLER CABINET EQUIPMENT, CELLULAR MODEM, ETHERNET SWITCH WILL BE SUPPLIED BY THE CITY OF DALLAS. CONTACT MR. ALFRED LEMON AT 214-670-4812(O) OR 214-213-6121(M) TO SCHEDULE PICKUP.
6. INSTALL BASE-MOUNTED CONTROLLER CABINET (TY 332) AND FOUNDATION.
7. SIGNAL POLES SHALL BE GALVANIZED STEEL FINISH AND SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BLACK POWDERED ALUMINUM VISORS AND NON-VENTED RETROREFLECTIVE BACKPLATES.
8. BATTERY BACKUP UNIT WILL BE FURNISHED AND INSTALLED BY THE CITY OF DALLAS.

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED
PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

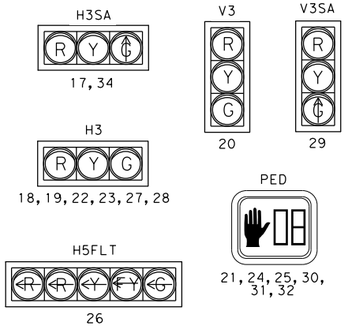
TRAFFIC SIGNAL LAYOUT

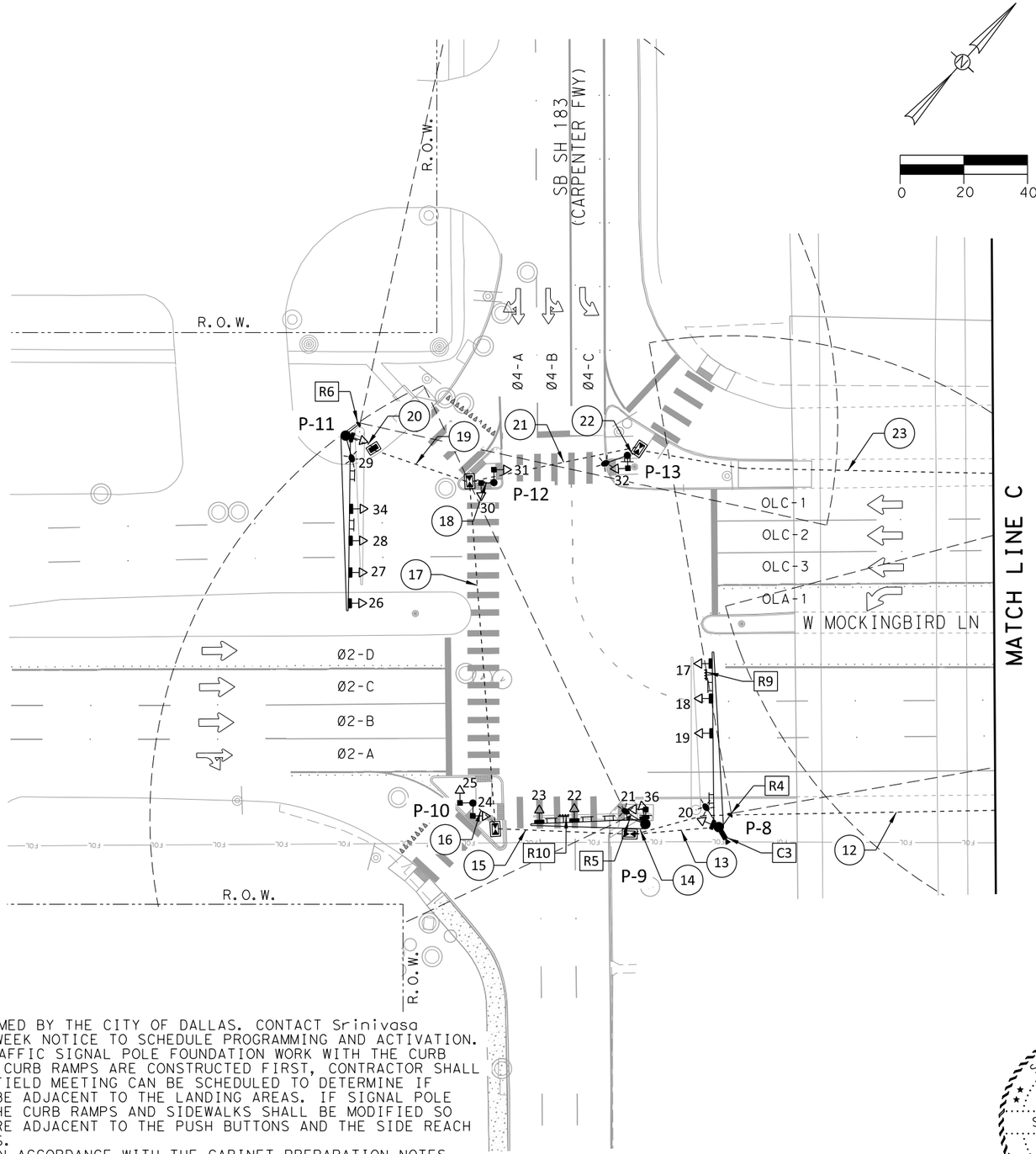
SH 183 AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	50
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				

PROPOSED SIGNAL HEADS





LEGEND

- EXISTING SIGNAL HEAD & MAST ARM
- EXISTING GROUND MOUNTED SIGN
- PROPOSED SIGNAL HEAD & MAST ARM
- PROPOSED PEDESTAL (PED)
- PROPOSED LUMINAIRE POLE
- 8 — PROPOSED SIGNAL HEAD AND LABEL
- 8 — PROPOSED PED HEAD AND LABEL
- PROPOSED SIGNAL MOUNTED SIGN
- # ---- PROPOSED CONDUIT AND LABEL
- PROPOSED CONTROLLER AND CABINET
- PROPOSED GROUND BOX TY A W/ APRON
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED GROUND BOX TY 1 W/ APRON
- PROPOSED LUMINAIRE
- PROPOSED PRESENCE RADAR DETECTOR
- PROPOSED ADVANCE RADAR DETECTOR
- C# — PROPOSED CCTV CAMERA AND LABEL
- PROPOSED ELECTRICAL SERVICE
- P-# — PROPOSED POLE LABEL
- R# — PROPOSED RADAR LABEL

NOTES CONTINUED:

9. RADAR DETECTION ZONES TO BE PROGRAMMED BY THE CITY OF DALLAS. CONTACT Srinivasa Veeramallu AT 214-670-5892 WITH 1 WEEK NOTICE TO SCHEDULE PROGRAMMING AND ACTIVATION.
10. 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.
11. ALL SIGNAL CABLES SHALL BE WIRED IN ACCORDANCE WITH THE CABINET PREPARATION NOTES SUPPLIED BY THE CITY OF DALLAS.
12. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX SLOPE). IF THE DISTANCE FROM 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 SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
13. IF SIGNAL POLES CAN NOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO DISCUSS NEW LOCATIONS.
14. ALL WORKS HAVE TO BE PERFORMED BETWEEN 9:00 AND 15:00 DURING WEEKDAYS.

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

SH 183 AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	51
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

CONDUIT AND CABLE CHART

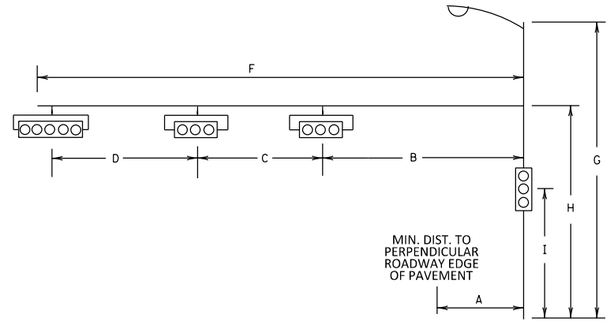
RUN NO.	ITEM 618 CONDUIT TYPE					ITEM 620 ELECTRICAL CONDUCTORS			ITEM 684 TRAFFIC SIGNAL CABLE			ITEM 6292*** RADAR CABLE		ITEM 6010	ITEM 6007	TOTAL LENGTH OF RUN	FILL PERCENT	RUN NO.
	2" PVC* SCH 80 (Trench)	3" PVC SCH 80 (BORE)	3" PVC SCH 80 (Trench)	4" PVC SCH 80 (BORE)	4" PVC SCH 80 (TRENCH)	NO. 8 XHHW	NO. 6 BARE	NO. 4 XHHW	TY-A 20 CNDR. 14 AWG	TY-A 10 CNDR. 14 AWG	TY-C 2 CNDR. 12 AWG	PRESENCE DETECTION	ADVANCE DETECT ION	ETHERNET CABLE##	FIBER OPTIC 12 SM#			
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	%	
1	6					TO BE INSTALLED BY THE POWER COMPANY										6		1
2	8					4	1	2								8	10.1%	2
3	8						1	2								8	4.9%	3
4	12					4	1									12	5.8%	4
5			9**		9		1		2	5	6	2	2	1		9	23.8%	5
6			8**		8		1		4	5	6	4	2			8	32.1%	6
			8											1	1	8	1.2%	
7			8			2	1									8	1.5%	7
8			5				1			2	2					5	8.6%	8
9	17		17			2	1		1			2				17	14.6%	9
10				51		2	1		2	3	4	2	2	1		51	19.6%	10
11			8			2	1			1	1					8	5.6%	11
12				208		2	1		2	2	3	2	2	1		208	17.2%	12
13	26		26			2	1		1			1	1	1		26	15.2%	13
14	5		5			2	1		1		1	1	1			5	16.1%	14
15				41			1			2	2					41	5.0%	15
16			10				1			2	2					10	8.6%	16
17				106												106	0.0%	17
18			10				1			2	2					10	8.6%	18
19	30			30		2	1		1			1				30	8.2%	19
20			9			2	1		1			1				9	8.9%	20
21				52		2	1		1	2	2	1				52	10.0%	21
22			5			2	1			1	1					5	5.6%	22
23				202		2	1		1	3	3	1				202	12.4%	23
24	27		27			2	1		1			1	1			27	14.6%	24
25			8				1			1	1					8	4.4%	25
26				49		2	1		2	4	4	2	1			49	20.2%	26
27	9		9			2	1		1		1		1	1		9	14.3%	27
28			9				1			1	1					9	4.4%	28
29				118		2	1		3	5	6	2	2	1		118	27.8%	29
30		325													1	325	0.7%	30
TOTAL (LF)	148	325	181	857	17	1728	952	32	1397	2312	2720	1287	904	534	533			

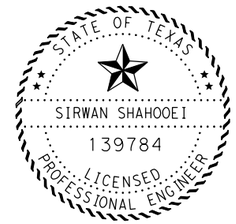
* THERE ARE A 2" SPARE CONDUIT FROM EACH SIGNAL POLE TO THE NEAREST GROUND BOX
** 3" CONDUITS TO REMAIN EMPTY TO SATISFY TS-CF-21
*** PROVIDED BY THE CITY AND INSTALLED BY THE CONTRACTOR
# INCLUDE 200' SLACK CABLE IN THE GROUND BOX ADJACENT TO THE CONTROLLER CABINET
INCLUDE 15' SLACK CABLE COILED IN EACH OF THE GROUND BOXES AND CABINET

SIGNAL HEAD & POLE PLACEMENT

POLE NUMBER	STATUS	FOUNDATION TYPE	DRILLED SHAFT LENGTH (FT)				DIMENSIONS (FT)								
			24" DIA SUB TO ITEM 687	30" DIA ITEM 416	36" DIA ITEM 416	48" DIA ITEM 416	A	B	C	D	E	F	G	H	I
P-1	I	36-A			13		5	15	10	10	-	44	30	19	13
P-2	I	24-A	6				9	PED POLE							
P-3	I	36-A			13		4	15	12	-	-	36	30	19	13
P-4	I	24-A	6					PED POLE							
P-5	I	48-A				22	8	24	11	11	12	60	30	19	13
P-6	I	24-A	6				9	PED POLE							
P-7	I	30-A		11			10	LUMINAIRE POLE							
P-8	I	48-A				22	9	29	11	11	-	55	30	19	13
P-9	I	36-A			13		11	22	11	-	-	36	30	19	13
P-10	I	24-A	6				10	PED POLE							
P-11	I	48-A				22	18	23	10	10	11	55	30	19	13
P-12	I	24-A	6				3	PED POLE							
P-13	I	30-A		11			7	LUMINAIRE POLE							
TOTAL			30	22	39	66									

* PED POLE DRILL SHAFT FOUNDATION IS SUBSIDIARY TO ITEM 687-6001
STATUS: I=INSTALL; E=EXISTING





Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E.
Date

DATE:
FILE:

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

SH 183 AT MOCKINGBIRD LN

SHEET 3 OF 5

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	52
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

VEHICLE AND PEDESTRIAN SIGNAL HEADS

POLE NO.			P-1				P-2	P-3				P-4	P-5					P-6		P-7	P-8				P-9				P-10		P-11					P-12		P-13	TOTAL
SIGNAL HEAD NUMBER			1	2	3	4	5	6	7	35	8	9	10	11	12	33	13	14	15	16	17	18	19	20	21	22	23	36	24	25	26	27	28	34	29	30	31	32	
SIGNAL HEAD TYPE			H3SA	H3	H3	V3	PED	H3	H3	V3	PED	PED	H5FLT	H3	H3	H3SA	V3SA	PED	PED	PED	H3SA	H3	H3	V3	PED	H3	H3	V3	PED	PED	H5FLT	H3	H3	H3SA	V3SA	PED	PED	PED	
NON-VENTED BACK PLATE		3 SEC	1	1	1	1		1	1	1				1	1	1	1				1	1	1	1		1	1	1				1	1	1	1				22
		5 SEC											1																		1								2
LED SIGNAL LAMPS	VEHICLE (12")	R	1	1	1	1		1	1	1				1	1	1	1				1	1	1	1		1	1	1				1	1	1	1				22
		Y	1	1	1	1		1	1	1				1	1	1	1				1	1	1	1		1	1	1				1	1	1	1				22
		G		1	1	1		1	1	1				1								1	1	1		1	1	1				1	1						15
		RA											2																		2								4
		YA											2																		2								4
		GA	1										1		1	1	1				1										1		1	1	1				10
	COUNT DOWN						1				1	1						1	1	1					1				1	1						1	1	1	12
RADAR	RPDD		1				PED POLE	2				PED POLE	2					PED POLE		LUM. POLE	1				1				PED POLE		2					PED POLE		LUM. POLE	6
	RADD		1					1													1					1													4
CCTV CAMERA			1					1													1																		2
LUMINAIRE			1					1					1					1		1	1				1						1							1	8

CABLE TERMINATION CHART

CNDR. COLOR	CABLE 1 FROM POLE P1 TO CNTRL. 20 CNDR.	CABLE 2 FROM POLE P2 TO CNTRL. 10 CNDR.	CABLE 3 FROM POLE P3 TO CNTRL. 20 CNDR.	CABLE 4 FROM POLE P4 TO CNTRL. 10 CNDR.	CABLE 5 FROM POLE P5 TO CNTRL. 20 CNDR.	CABLE 6 FROM POLE P6 TO CNTRL. 10 CNDR.	CABLE 7 FROM POLE P7 TO CNTRL. 10 CNDR.	CABLE 8 FROM POLE P8 TO CNTRL. 20 CNDR.	CABLE 9 FROM POLE P9 TO CNTRL. 20 CNDR.	CABLE 10 FROM POLE P10 TO CNTRL. 20 CNDR.	CABLE 11 FROM POLE P11 TO CNTRL. 20 CNDR.	CABLE 12 FROM POLE P12 TO CNTRL. 10 CNDR.	CABLE 13 FROM POLE P13 TO CNTRL. 10 CNDR.
BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
RED	SH 1,2,3,4 PHASE 6-R	SPARE	SH 6,7,35 PHASE 8-R	SPARE	SH 11,12,13,33 OL G-R	SPARE	SPARE	SH 17,18,19,20 PHASE 2-R	SH 22,23,36 PHASE 4-R	SPARE	SH 27,28,29,34 OL C-R	SPARE	SPARE
GREEN	SH 1,2,3,4 PHASE 6-G/GA	SPARE	SH 6,7,35 PHASE 8-G	SPARE	SH 11,12,13,33 OL G-G/GA	SPARE	SPARE	SH 17,18,19,20 PHASE 2-G/GA	SH 22,23,36 PHASE 4-G	SPARE	SH 27,28,29,34 OL C-G/GA	SPARE	SPARE
ORANGE	SH 1,2,3,4 PHASE 6-Y	SPARE	SH SH 6,7,35 PHASE 8-Y	SPARE	SH 11,12,13,33 OL G-Y	SPARE	SPARE	SH 17,18,19,20 PHASE 2-Y	SH 22,23,36 PHASE 4-Y	SPARE	SH 27,28,29,34 OL C-Y	SPARE	SPARE
BLUE	SPARE	PH 5 PHASE 6-DW	PH 8 PHASE 6-DW	PH 9 PHASE 8-DW	SPARE	PH 14 PHASE 8-DW	PH 16 OL G-DW	SPARE	PH 21 PHASE 2-DW	PH 24 PHASE 2-DW	SPARE	PH 30 PHASE 4-DW	PH 32 OL C-DW
WHITE/ BLACK	SPARE	PH 5 PHASE 6-W	PH 8 PHASE 6-W	PH 9 PHASE 8-W	SPARE	PH 14 PHASE 8-W	PH 16 OL G-W	SPARE	PH 21 PHASE 2-W	PH 24 PHASE 2-W	SPARE	PH 30 PHASE 4-W	PH 32 OL C-W
RED/BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
GREEN/ BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	PH 15 OL G-DW	SPARE	SPARE	SPARE	PH 25 PHASE 4-DW	SPARE	PH 31 OL C-DW	SPARE
ORANGE/ BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	PH 15 OL G-W	SPARE	SPARE	SPARE	PH 25 PHASE 4-W	SPARE	PH 31 OL C-W	SPARE
BLUE/ BLACK	SPARE		SPARE		SPARE			SPARE	SPARE		SPARE		
BLACK/WHITE	SPARE		SPARE		SPARE			SPARE	SPARE		SPARE		
RED/WHITE	SPARE		SPARE		SH 10 OL E-RA			SPARE	SPARE		SH 26 OL A-RA		
GREEN/WHITE	SPARE		SPARE		SH 10 OL E-GA			SPARE	SPARE		SH 26 OL A-GA		
BLUE/WHITE	SPARE		SPARE		SH 10 OL E-YA			SPARE	SPARE		SH 26 OL A-YA		
BLACK/RED	SPARE		SPARE		SPARE			SPARE	SPARE		SPARE		
WHITE/RED	SPARE		SPARE		SPARE			SPARE	SPARE		SPARE		
ORANGE/RED	SPARE		SPARE		SPARE			SPARE	SPARE		SPARE		
BLUE/RED	SPARE		SPARE		SH 10 OL E-FYA			SPARE	SPARE		SH 26 OL A-FYA		
RED/GREEN	SPARE		SPARE		SPARE			SPARE	SPARE		SPARE		

* APS PUSH BUTTON COMMON FOR PEDESTRIAN PHASE ARE ON 2/C TYPE C#12 AWG CABLES AND ARE NOT SHOWN IN THIS CHART.

CABLES INSIDE POLES (LF)

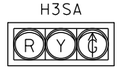
POLE NUMBER	ITEM 684				ITEM 620	ITEM 6004	ITEM 6292	
	SIGNAL CABLES		PED HEADS	APS UNITS	LUMINAIRE	CCTV CAMERA*	RADAR CABLE**	
	TY-A 14 AWG 7 CNDR	TY-A 14 AWG 5 CNDR	TY-A 14 AWG 5 CNDR	TY-C 12 AWG 2 CNDR	NO. 12 XHHW	ETHERNET CABLE	PRESENCE DETECTION	ADVANCE DETECTION
P1		144			80		19	47
P2			10	5				
P3		95	10	5	80	27		39
P4			10	5				
P5	78	162			80		81	
P6			20	10				
P7			10	5	80			
P8		189			80	27	19	63
P9		108	10	5	80		19	45
P10			20	10				
P11	72	156			80		19	
P12			20	10				
P13			10	5	80			
TOTAL	150	854	120	60	640	54	157	194

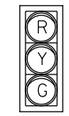
* INSTALL 3' BELOW THE LUMINAIRE ARM; INCLUDE 15' SLACK CABLE.

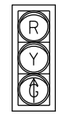
** PROVIDED BY THE CITY AND INSTALLED BY THE CONTRACTOR

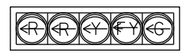
DATE:
FILE:

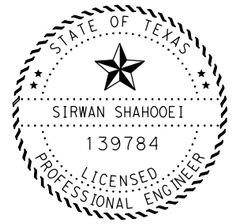
GROUND BOX SUMMARY (ITEM 624)		
DESCRIPTION	UNIT	QTY
GROUND BOX TY A (122311) W/APRON	EA	2
GROUND BOX TY D (162922) W/APRON	EA	7
ITS GND BOX (POLY) TY 1 (243624)W/APRN	EA	2
REMOVE GROUND BOX	EA	13











Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

SH 183 AT MOCKINGBIRD LN

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	53
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

APS MESSAGE CHART

POLE	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-2	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND SH 183 FRONTAGE ROAD , WALK SIGN IS ON TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD
P-3	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND SH 183 FRONTAGE ROAD , WALK SIGN IS ON TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD
P-4	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND SH 183 FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND SH 183 FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-6	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND SH 183 FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT NORTHBOUND SH 183 FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-6	O.L. G	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND SH 183 FRONTAGE ROAD , WALK SIGN IS ON TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD
P-7	O.L. G	BUTTON PUSH ON DW	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	NORTHBOUND SH 183 FRONTAGE ROAD , WALK SIGN IS ON TO CROSS NORTHBOUND SH 183 FRONTAGE ROAD
P-9	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND SH 183 FRONTAGE ROAD , WALK SIGN IS ON TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD
P-10	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND SH 183 FRONTAGE ROAD, WALK SIGN IS ON TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD
P-10	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT SH SOUTHBOUND SH 183 FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT SH SOUTHBOUND SH 183 FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-12	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS MOCKINGBIRD LANE AT SOUTHBOUND SH 183 FRONTAGE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS MOCKINGBIRD LANE AT SOUTHBOUND SH 183 FRONTAGE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	MOCKINGBIRD LANE, WALK SIGN IS ON TO CROSS MOCKINGBIRD LANE
P-12	O.L. C	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND SH 183 FRONTAGE ROAD, WALK SIGN IS ON TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD
P-13	O.L. C	BUTTON PUSH ON DW	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD AT MOCKINGBIRD LANE
		LOCATOR TONE	SLOW TICK
		WALK INDICATOR*	SOUTHBOUND SH 183 FRONTAGE ROAD, WALK SIGN IS ON TO CROSS SOUTHBOUND SH 183 FRONTAGE ROAD

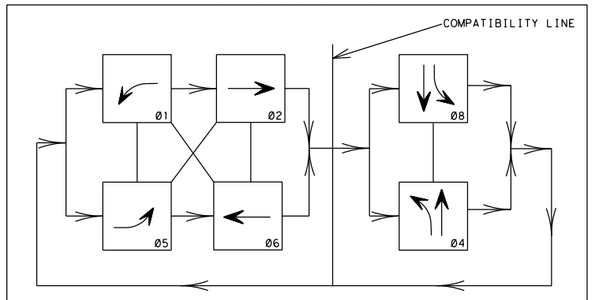
*COUNTDOWN SPEECH MESSAGE="OFF" FOR ALL UNITS

RADAR DETECTION ZONE DETAILS

RADAR NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	PHASE	TYPE	SETBACK/FURTHEST LANE DISTANCE
R1	P-1	18′	OLG & OLE	PRESENCE	STOPBAR - 45′
R2	P-4	18′	PHASE 6	PRESENCE	STOPBAR - 65′
R3	P-4	18′	PHASE 8	PRESENCE	STOPBAR - 35′
R4	P-8	18′	OLC & OLA	PRESENCE	STOPBAR - 60′
R5	P-9	18′	PHASE 2	PRESENCE	STOPBAR - 55′
R6	P-11	18′	PHASE 4	PRESENCE	STOPBAR - 50′
R7	P-1 MAST ARM	19′	PHASE 6	ADVANCE	SETBACK - 400′
R8	P-3 MAST ARM	19′	PHASE 8	ADVANCE	SETBACK - 400′
R9	P-8 MAST ARM	19′	PHASE 2	ADVANCE	SETBACK - 400′
R10	P-9 MAST ARM	19′	PHASE 4	ADVANCE	SETBACK - 400′

* FOR INFORMATION ONLY, RADAR WILL BE INSTALLED AS DIRECTED BY THE ENGINEER

PHASE SEQUENCE
DIAMOND OPERATION



01 & 05 ARE PROTECTED/ PERMISSIVE LEFT TURN PHASE.
OL A=01+03; OL C=01+02+03; OL E=05+07; OL G=05+06+07

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION SEE (ED (5)-14)	SERVICE CONDUIT SIZE (SCH 80)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BKR. POLE/AMP	FOUR-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	KVA LOAD
ELC SRV TY D 120/240 070 (NS)SS(E)PS(U)	2" - PVC	3 - #4	N/A	2P/70	30	100	T.S.	1P/50	<7.1
							LIGHTING	2P/20	
							LIGHTING	2P/20	

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED
PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

DATE:
FILE:

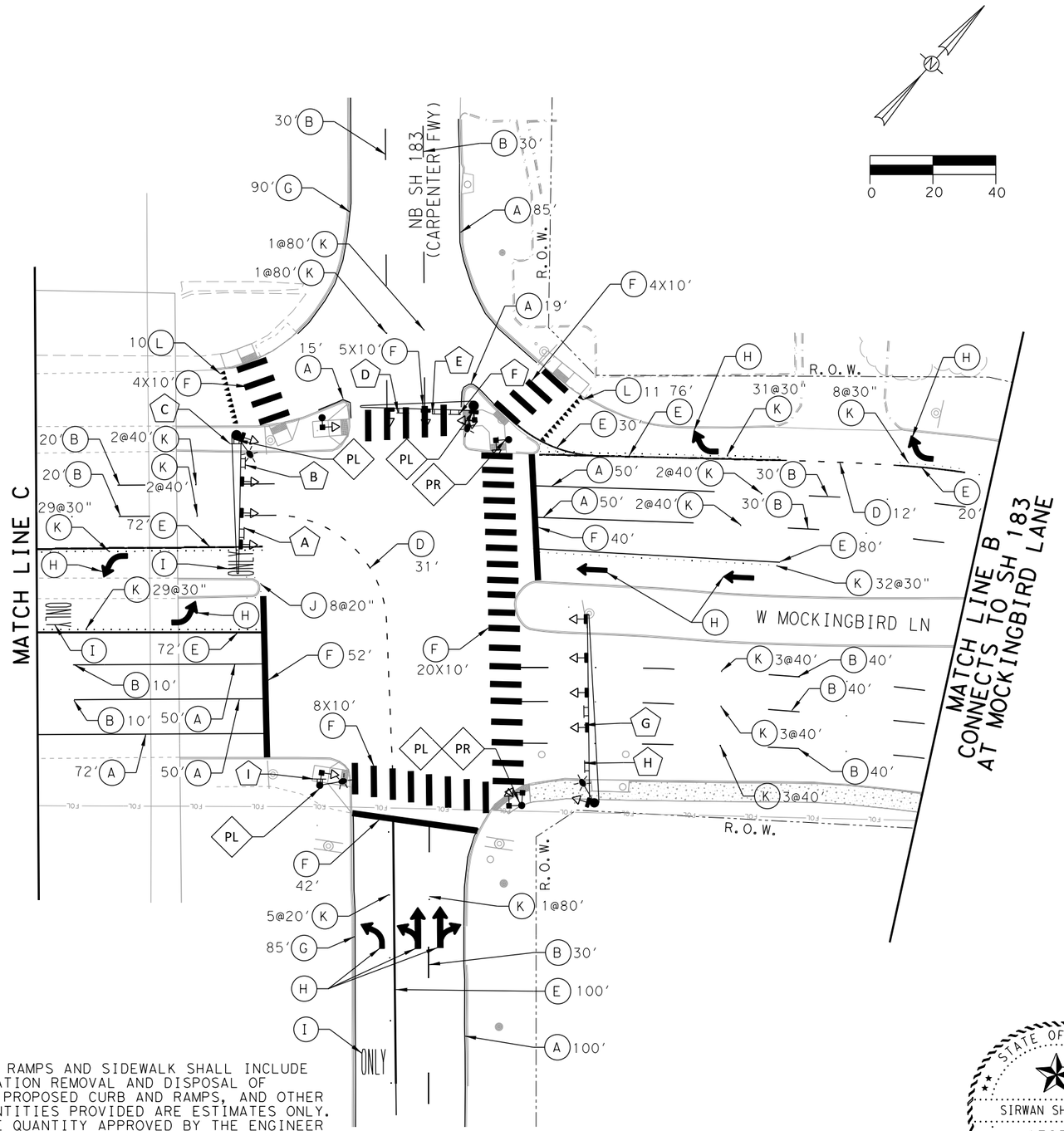
Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

SH 183 AT MOCKINGBIRD LN

SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	54
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	



LEGEND

- (A) RE PM W/ RET REQ TY I (W) 4" (SLD) (090 MIL)
- (B) RE PM W/ RET REQ TY I (W) 4" (BRK) (090 MIL)
- (D) REFL PAV MRK TY I (W) 6" (DOT) (090 MIL)
- (E) REFL PAV MRK TY I (W) 8" (SLD) (090 MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (090 MIL)
- (G) RE PM W/ RET REQ TY I (Y) 4" (SLD) (090 MIL)
- (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 II-C-R
- (L) REFL PAV MRK TY I (W) 18" (YLD TRI) (090 MIL)
- (P)(X) PROPOSED SIGN NUMBER

NOTES:

1. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALK SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB AND RAMPS, AND OTHER MISCELLANEOUS MATERIAL. SIDEWALK QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAYMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAP.
3. REFER TO THE CITY OF DALLAS 251-D STANDARDS FOR ADDITIONAL INFORMATION REGARDING TYPICAL PAVEMENT MARKING PLACEMENT.
4. LANE WIDTH MATCH EXISTING LANES. ALL PROPOSED PAVEMENT SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE TO REFRESH THE INTERSECTION PAVEMENT MARKINGS.

- NOTES CONTINUED ON NEXT SHEET.

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

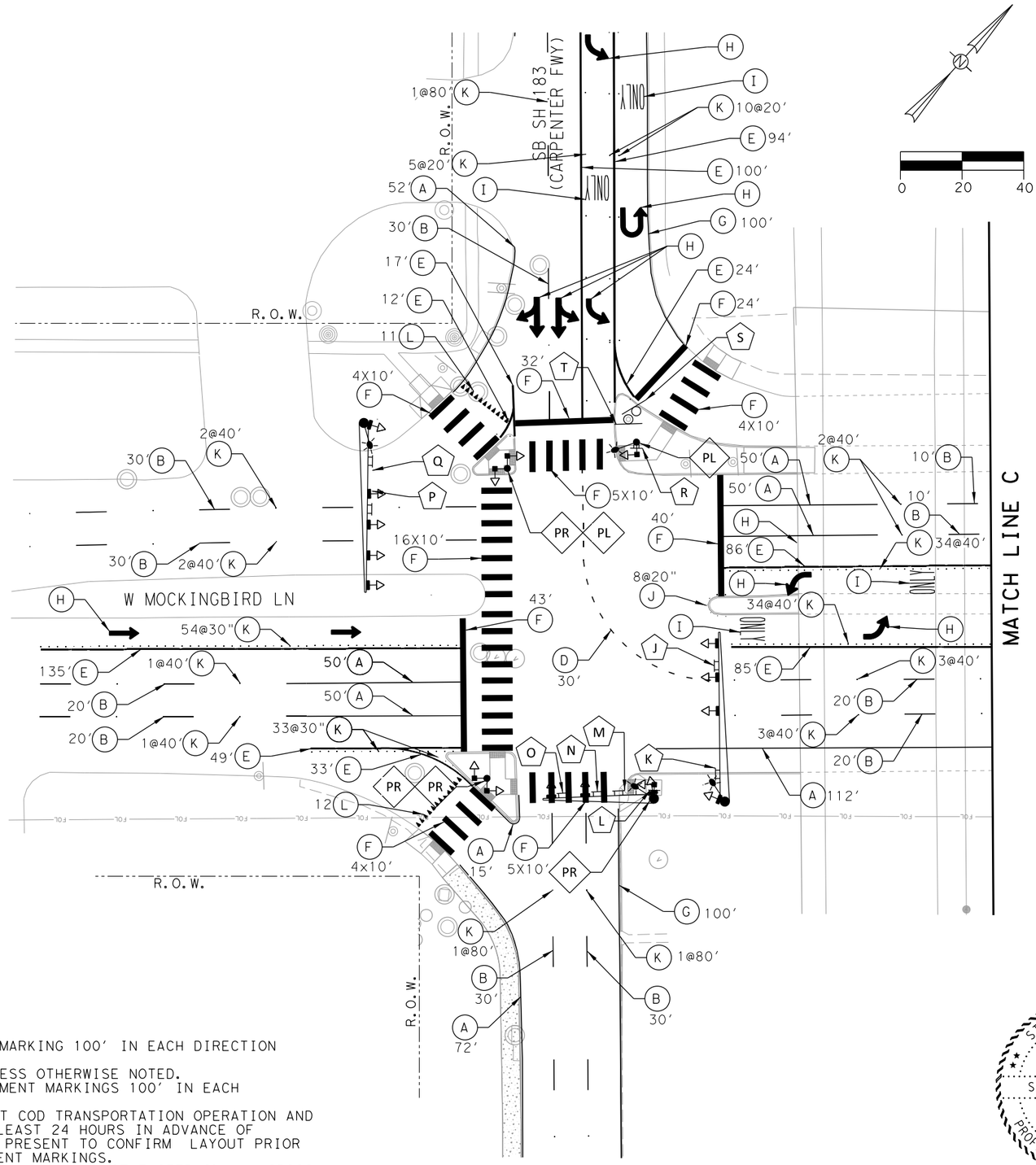
Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

PAVEMENT MARKING AND SIGNING LAYOUT
SH 183 AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	55
CHECK LDL	CONTROL 0095	SECTION 05	JOB 063, ETC.	



LEGEND

A	RE PM W/ RET REQ TY I (W) 4" (SLD) (090 MIL)
B	RE PM W/ RET REQ TY I (W) 4" (BRK) (090 MIL)
D	REFL PAV MRK TY I (W) 6" (DOT) (090 MIL)
E	REFL PAV MRK TY I (W) 8" (SLD) (090 MIL)
F	REFL PAV MRK TY I (W) 24" (SLD) (090 MIL)
G	RE PM W/ RET REQ TY I (Y) 4" (SLD) (090 MIL)
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 II-C-R
L	REFL PAV MRK TY I (W) 18" (YLD TRI) (090 MIL)
P X	PROPOSED SIGN NUMBER

NOTES CONTINUED:

5. ELIMINATE ALL EXISTING PAVEMENT MARKING 100′ IN EACH DIRECTION FROM STOP BAR.
6. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE NOTED.
7. PREPARE SURFACE AND INSTALL PAVEMENT MARKINGS 100′ IN EACH DIRECTION FROM STOP BAR.
8. STRIPING CONTRACTOR SHALL CONTACT COD TRANSPORTATION OPERATION AND TxDOT TRAFFIC SIGNAL OFFICE AT LEAST 24 HOURS IN ADVANCE OF MOBILIZATION. COD STAFF MUST BE PRESENT TO CONFIRM LAYOUT PRIOR TO THE APPLICATION OF ANY PAVEMENT MARKINGS.
9. RAMP LANDINGS AND PROPOSED SIDEWALKS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND THEY SHOULD DRAIN TOWARDS THE STREET WITHOUT PONDING IN THE RAMP OR GUTTER AREA.
10. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND REPLACEMENTS OF ANY DAMAGED IRRIGATION EQUIPMENT.

DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

Texas Department of Transportation

PAVEMENT MARKING AND SIGNING LAYOUT SH 183 AT MOCKINGBIRD LN

SCALE: 1"=40′ SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	56
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

SIGNING AND PAVEMENT MARKING ITEMS
SH 183 AT MOCKINGBIRD LN

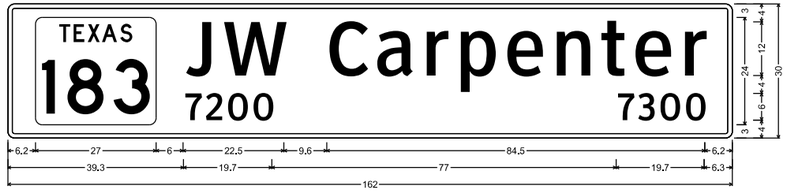
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	NB SH 183	SB SH 183	TOTAL
529	6002	CONC CURB (TY II)	LF	25	100	125
529	6008	CONC CURB & GUTTER (TY II)	LF			
531	6001	CONC SIDEWALKS (4")	SY	22	10	32
531	6004	CURB RAMPS (TY 1)	EA	3	2	5
531	6005	CURB RAMPS (TY 2)	EA	2	2	4
531	6008	CURB RAMPS (TY 5)	EA	1		1
531	6016	CURB RAMPS (TY 21)	EA		1	1
531	6017	CURB RAMPS (TY 22)	EA	1	2	3
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA		1	1
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA		1	1
666	6017	REFL PAV MRK TY I (W)6"(DOT)(090MIL)	LF	31	30	61
666	6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	450	635	1085
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	544	519	1063
666	6098	REF PAV MRK TY I(W)18"(YLD TRI)(090MIL)	EA	21	23	44
666	6224	PAVEMENT SEALER 4"	LF	996	901	1897
666	6225	PAVEMENT SEALER 6"	LF	31	30	61
666	6226	PAVEMENT SEALER 8"	LF	450	635	1085
666	6230	PAVEMENT SEALER 24"	LF	544	519	1063
666	6231	PAVEMENT SEALER (ARROW)	EA	7	6	13
666	6232	PAVEMENT SEALER (WORD)	EA	3	4	7
666	6234	PAVEMENT SEALER (DBL ARROW)	EA	2	2	4
666	6236	PAVEMENT SEALER (UTURN ARROW)	EA		1	1
666	6243	PAVEMENT SEALER (YLD TRI)	EA	21	23	44
666	6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF	330	250	580
666	6302	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	LF	491	451	942
666	6314	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	LF	175	200	375
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	7	6	13
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	2	2	4
668	6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA		1	1
668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	3	4	7
672	6009	REFL PAV MRKR TY II-A-A	EA	8	8	16
672	6010	REFL PAV MRKR TY II-C-R	EA	190	213	403
677	6001	ELIM EXT PAV MRK & MRKS (4")	EA	996	901	1897
677	6002	ELIM EXT PAV MRK & MRKS (6")	EA	31	30	61
677	6003	ELIM EXT PAV MRK & MRKS (8")	EA	450	635	1085
677	6005	ELIM EXT PAV MRK & MRKS (12")	EA	410	410	820
677	6007	ELIM EXT PAV MRK & MRKS (24")	EA	134	108	242
677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	7	7	14
677	6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	2	2	4
677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	3	4	7
678	6001	PAV SURF PREP FOR MRK (4")	EA	996	901	1897
678	6002	PAV SURF PREP FOR MRK (6")	EA	31	30	61
678	6004	PAV SURF PREP FOR MRK (8")	EA	450	635	1085
678	6008	PAV SURF PREP FOR MRK (24")	EA	544	519	1063
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	7	6	13
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	2	2	4
678	6012	PAV SURF PREP FOR MRK (UTURN ARR)	EA		1	1
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	3	4	7
678	6022	PAV SURF PREP FOR MRK (18")(YLD TRI)	EA	21	23	44
678	6033	PAV SURF PREP FOR MRK (RPM)	EA	198	221	419

SIGN SUMMARY

SIGN *	SIGN TYPE	SIGN LEGEND	STATUS	SUPPORT	DIMENSION (IN x IN)
A	R6-2R	ONE WAY RIGHT	I	P-1 MAST ARM	30" X 36"
B	D3-1aG	7200 J W CARPENTER 7300	I	P-1 MAST ARM	162" X30"
C	R9-3	NO PED CROSSING	I	P-1	24" X24"
D	R3-8(MOD)	LANE ASSIGNMENT	I	P-3 MAST ARM	48" X 30"
E	I-5 M6-1G	AIRPORT ARROW RIGHT	I	P-3 MAST ARM	24" X 24" 21" X 15"
F	D3-1aG	1000 W MOCKINGBIRD 1100 W	I	P-3 MAST ARM	114" X30"
G	R6-2L	ONE WAY LEFT	I	P-5 MAST ARM	30" X 36"
H	D3-1aG	7300 J W CARPENTER 7200	I	P-5 MAST ARM	162" X30"
I	R9-3	NO PED CROSSING	I	P-7	24" X24"
J	R6-2R	ONE WAY RIGHT	I	P-8 MAST ARM	30" X 36"
K	D3-1aG	7300 J W CARPENTER 7200	I	P-8 MAST ARM	162" X30"
L	R9-3	NO PED CROSSING	I	P-9	24" X24"
M	D3-1aG	1100 W MOCKINGBIRD 1000 W	I	P-9 MAST ARM	114" X30"
N	I-5 M6-1G	AIRPORT ARROW RIGHT	I	P-9 MAST ARM	24" X 24" 21" X 15"
O	R3-8(MOD)	LANE ASSIGNMENT	I	P-9 MAST ARM	48" X 30"
P	R6-2L	ONE WAY LEFT	I	P-11 MAST ARM	30" X 36"
Q	D3-1aG	7200 J W CARPENTER 7300	I	P-11 MAST ARM	162" X30"
R	R9-3	NO PED CROSSING	I	P-13	24" X24"
S	R1-5cL	STOP HERE FOR PEDESTRIANS	I	GROUNND MOUNTED	24" X30"
T	R5-1	DO NOT ENTER	I	GROUNND MOUNTED	48" X48"
PL	R6-10eL	APS SIGN LEFT ARROW	I	5 APS UNITS	9" X15"
PR	R6-10eR	APS SIGN RIGHT ARROW	I	7 APS UNITS	9" X15"

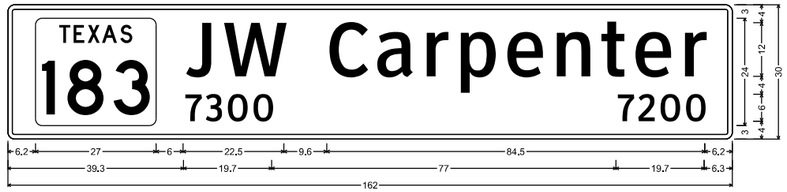
* ALL SIGNS TO BE PROVIDED AND INSTALLED BY THE CONTRACTOR (SUB TO ITEM 680).
STATUS: I=INSTALL; E=EXISTING, R=RELOCATED

B, Q



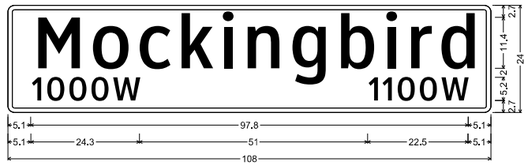
D3-1aG 12in (For overhead mount only);
1.5" Radius, 1.0" Border, White on, Green;
State Highway 183 M1-6T3; "JW Carpenter", ClearviewHwy-3-W; "7200", ClearviewHwy-3-W; "7300", ClearviewHwy-3-W;

H, K



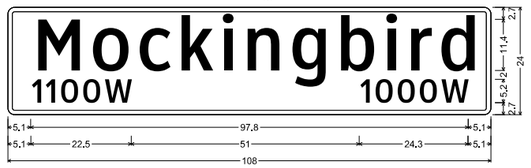
D3-1aG 12in (For overhead mount only);
1.5" Radius, 1.0" Border, White on, Green;
State Highway 183 M1-6T3; "JW Carpenter", ClearviewHwy-3-W; "7300", ClearviewHwy-3-W; "7200", ClearviewHwy-3-W;

F



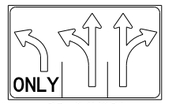
D3-1G 12in (For overhead mount only);
1.5" Radius, 1.0" Border, White on, Green;
"Mockingbird", ClearviewHwy-3-W; "1000W", ClearviewHwy-3-W; "1100W", ClearviewHwy-3-W;

M



D3-1G 12in (For overhead mount only);
1.5" Radius, 1.0" Border, White on, Green;
"Mockingbird", ClearviewHwy-3-W; "1100W", ClearviewHwy-3-W; "1000W", ClearviewHwy-3-W;

D, O



R3-8(MOD)
48"X30"

C, I, L, R

R9-3
24"X24"

G, P

R6-2L
30"X36"

A, J

R6-2R
30"X36"

N

I-5
24"X24"

M6-1G
21"X15"

E

I-5
24"X24"

M6-1G
21"X15"

PL

R6-10eL
9"X15"

PR

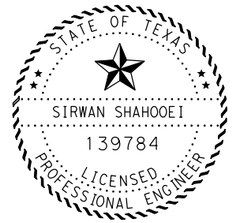
R6-10eR
9"X15"

S

R1-5cL
24"X30"

T

R5-1
48"X48"



Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

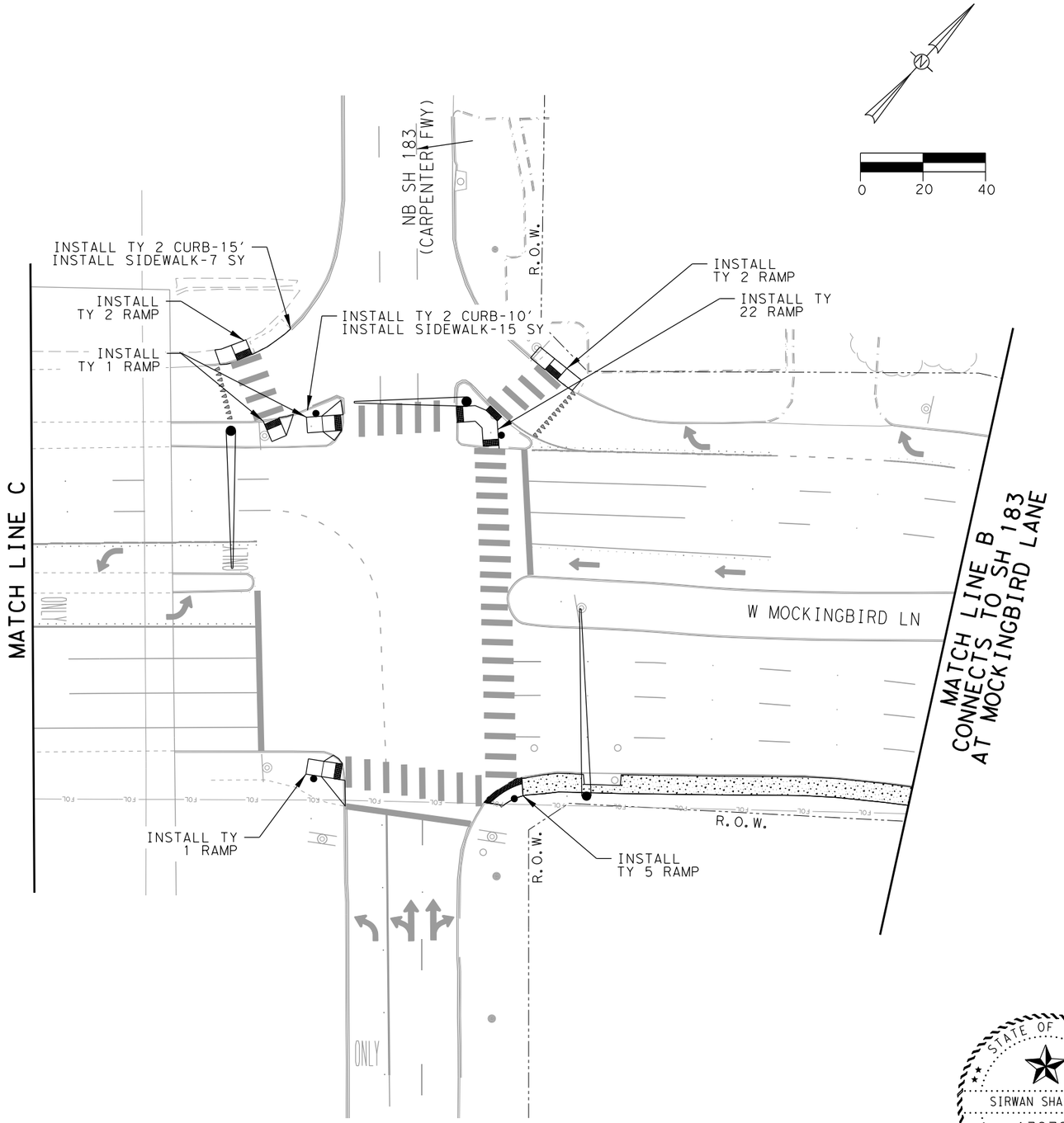
Texas Department of Transportation

PAVEMENT MARKING AND SIGNING LAYOUT
SH 183 AT MOCKINGBIRD LN

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
SS	TEXAS	18	KAUFMAN, ETC.	57
CHECK	CONTROL	SECTION	JOB	
CMC	0095	05	063, ETC.	
CHECK				
LDL				

DATE:
FILE:



STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E. Date

DATE:
FILE:

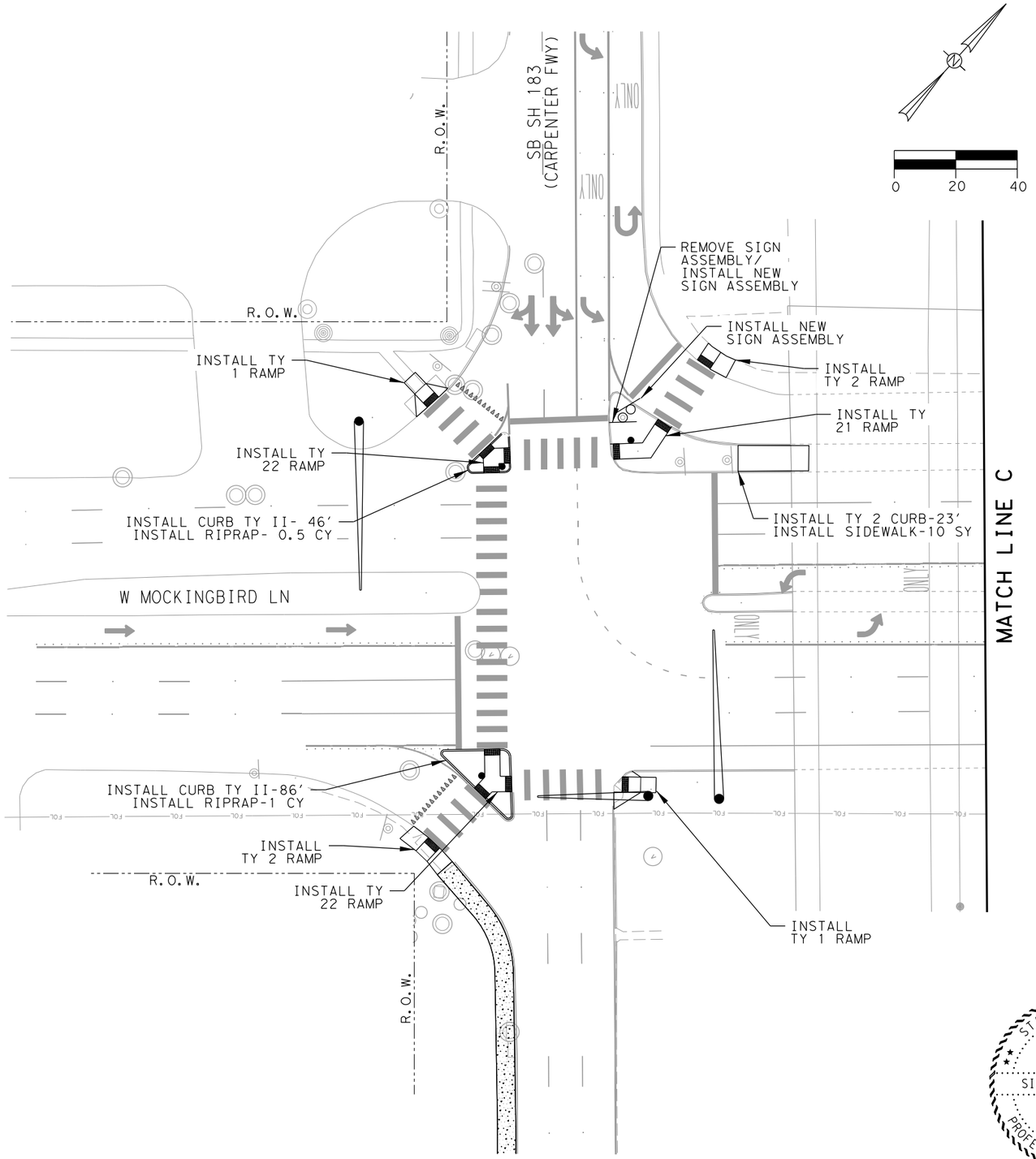
Texas Department of Transportation

ADA RAMP LAYOUT

SH 183 AT MOCKINGBIRD LN

SCALE: 1"=40' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	58
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	



DATE:
FILE:

STATE OF TEXAS
SIRWAN SHAHOOEI
139784
LICENSED PROFESSIONAL ENGINEER

Sirwan Shahooei, P.E. 6/1/2022
Digitally signed by Sirwan Shahooei, P.E.
Date

Texas Department of Transportation

ADA RAMP LAYOUT

SH 183 AT MOCKINGBIRD LN

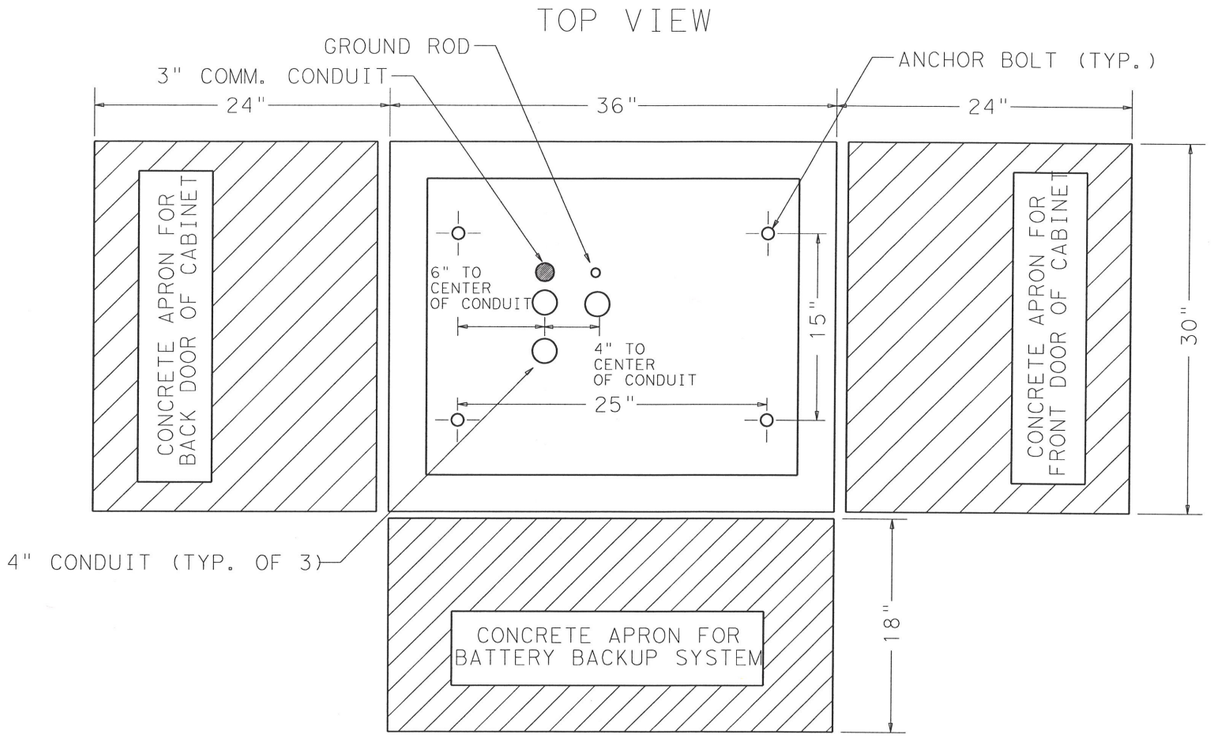
SCALE: 1"=40' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS SS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CMC	TEXAS	18	KAUFMAN, ETC.	59
CHECK LDL	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

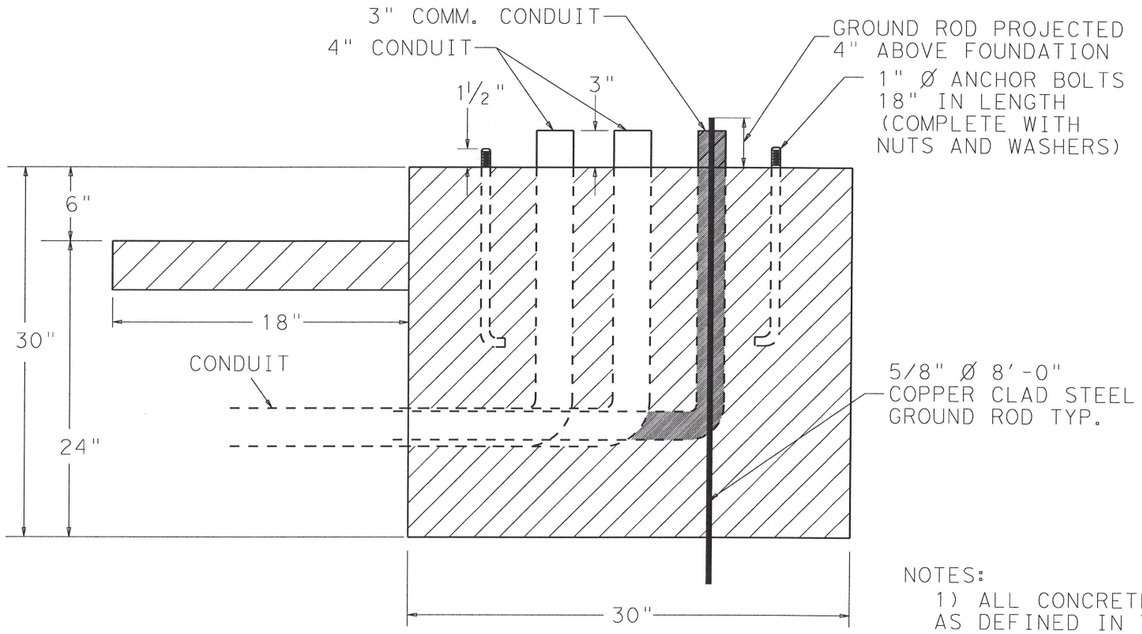
BASE MOUNTED CONTROLLER CABINET FOUNDATION DETAILS

(FOR TYPE 332, 352i CONTROLLER CABINETS)

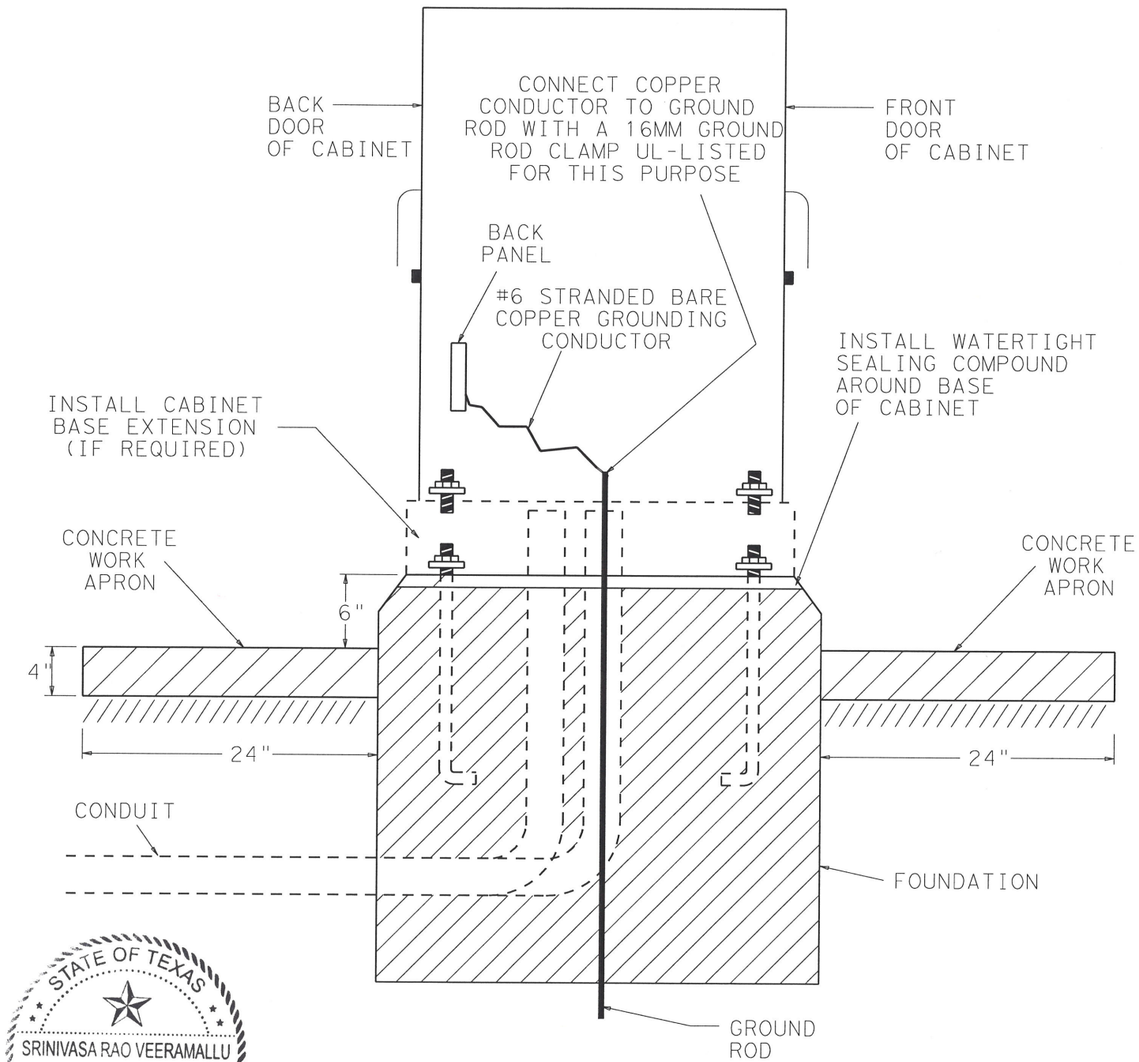
TOP VIEW



FRONT VIEW



SIDE VIEW



STATE OF TEXAS
SRINIVASA RAO VEERAMALLU
125424
LICENSED
PROFESSIONAL ENGINEER

3/15/2022

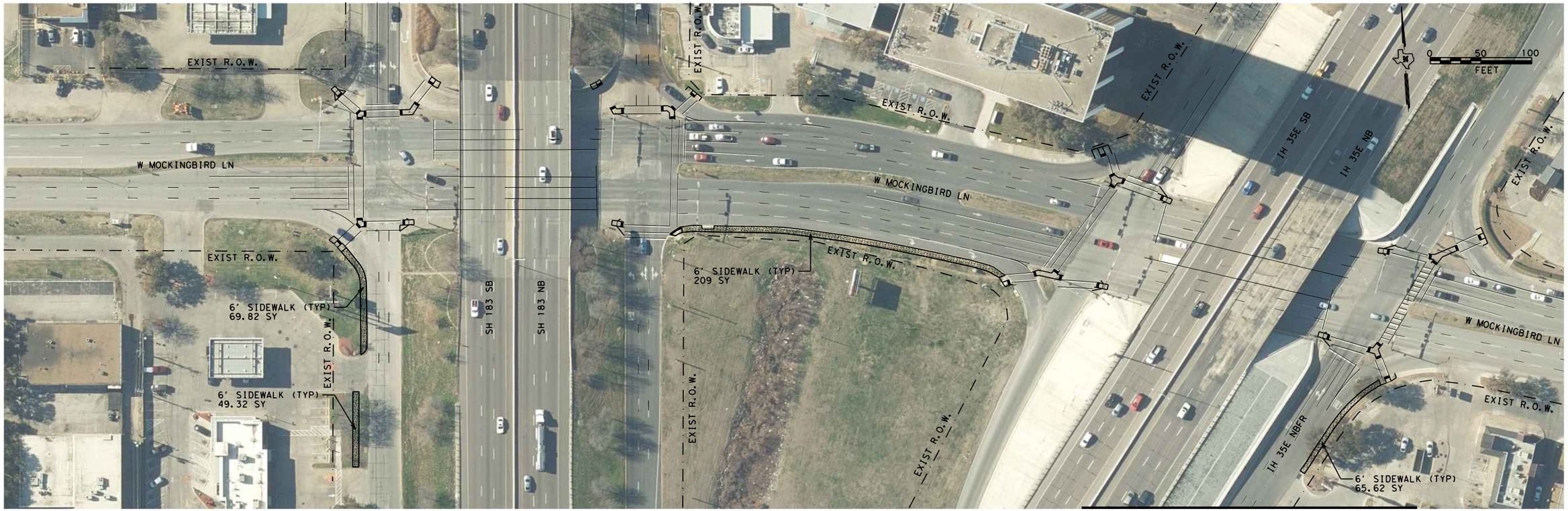
NOTES:

1) ALL CONCRETE SHALL BE EITHER CLASS A OR CLASS C AS DEFINED IN THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS' "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" ITEM 7.4.5
2) ADDITIONAL GROUND RODS MAY BE NEEDED TO ACHIEVE LESS THAN 5 OHMS RESISTANCE TO GROUND.

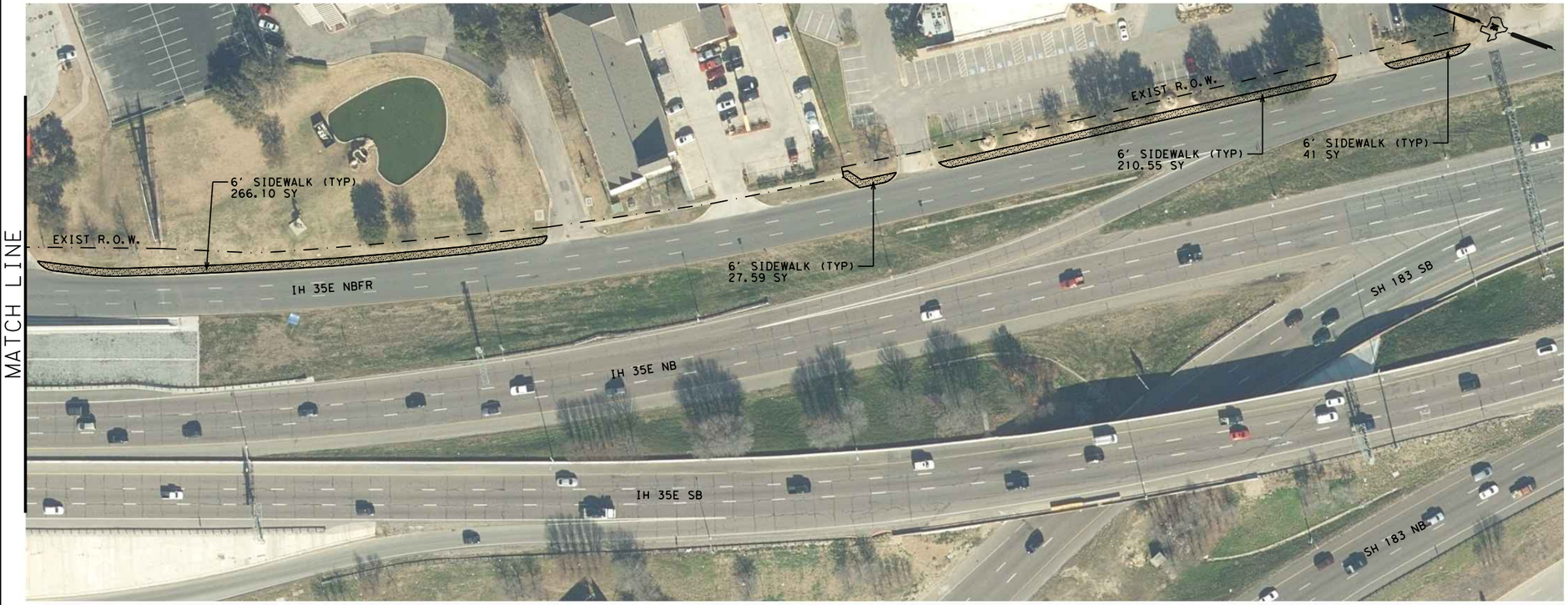
VERSION 1.2

CITY OF DALLAS
DEPARTMENT OF TRANSPORTATION

CITY OF DALLAS
2022 TRAFFIC SIGNAL CONSTRUCTION DESIGN SPECIFICATIONS



MATCH LINE



STATE OF TEXAS
DUNG HUY NGUYEN
128595
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant, P.E. & Date 5/24/2022

Texas Department of Transportation

IH 35E

PLAN LAYOUT

SCALE: 1"=100' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DN	TEXAS	DAL	KAUFMAN, ETC.	
CHECK	CONTROL	SECTION	JOB	61
CHECK	0095	05	063, ETC.	

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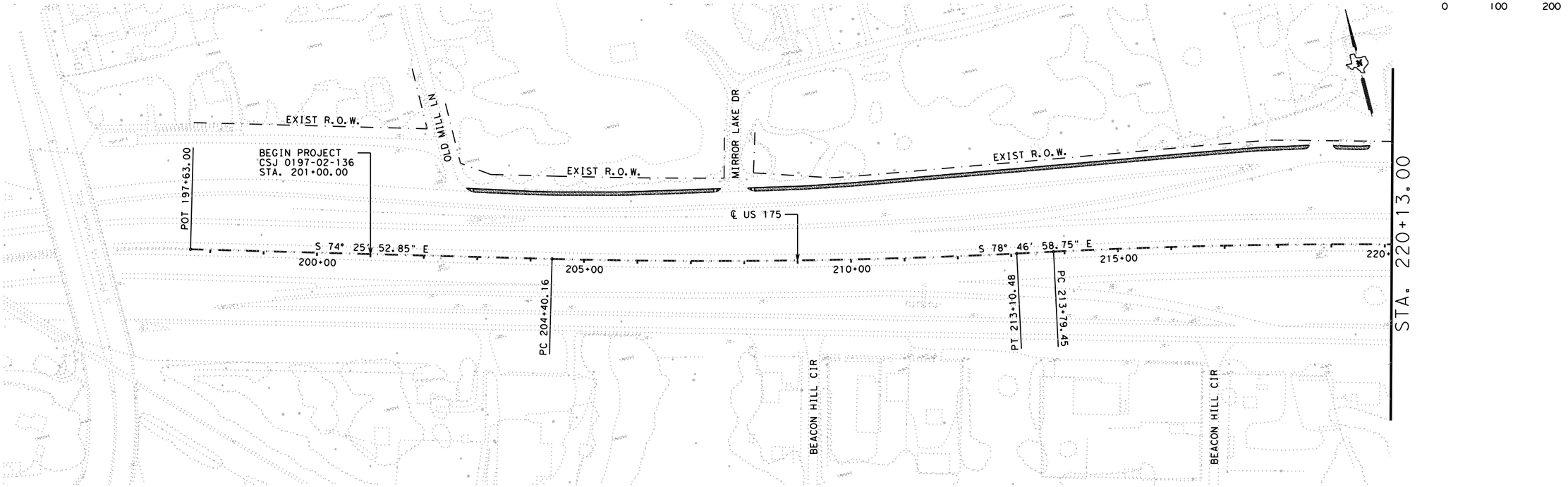
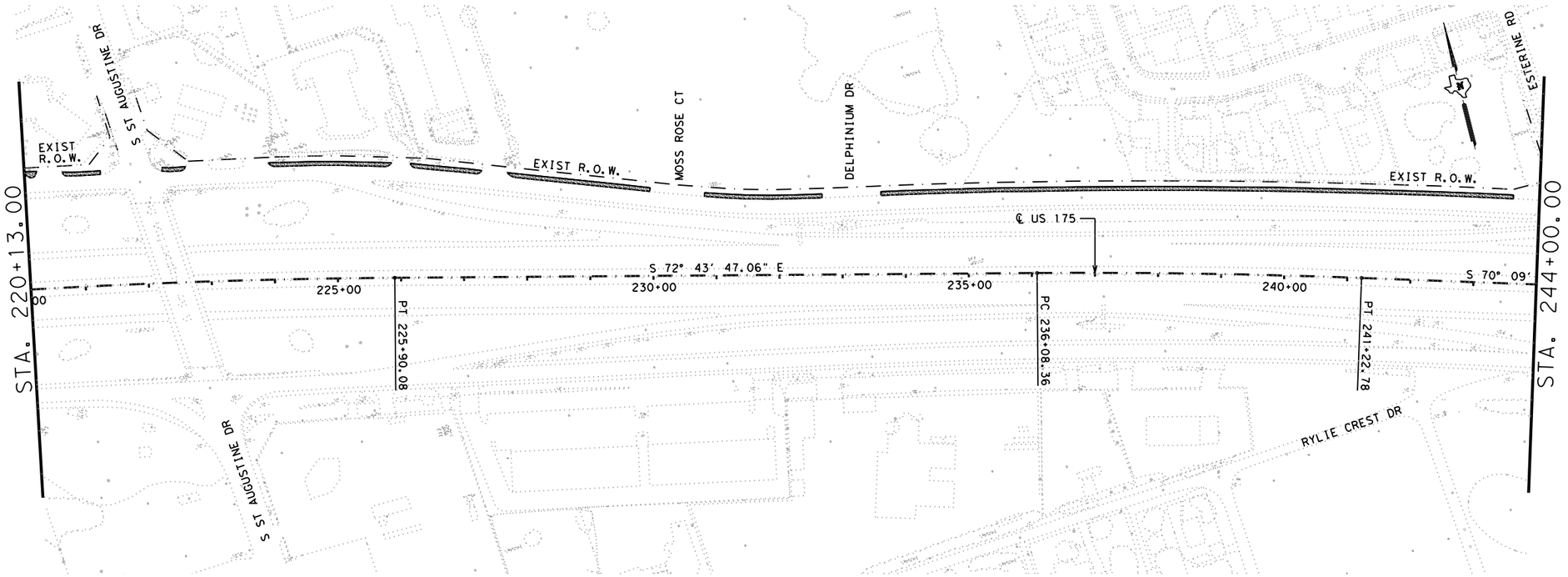
8:34:46 AM
5/25/2022





STATE OF TEXAS
DUNG HUY NGUYEN
128595
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant & Date, P.E. 5/25/2022

Texas Department of Transportation

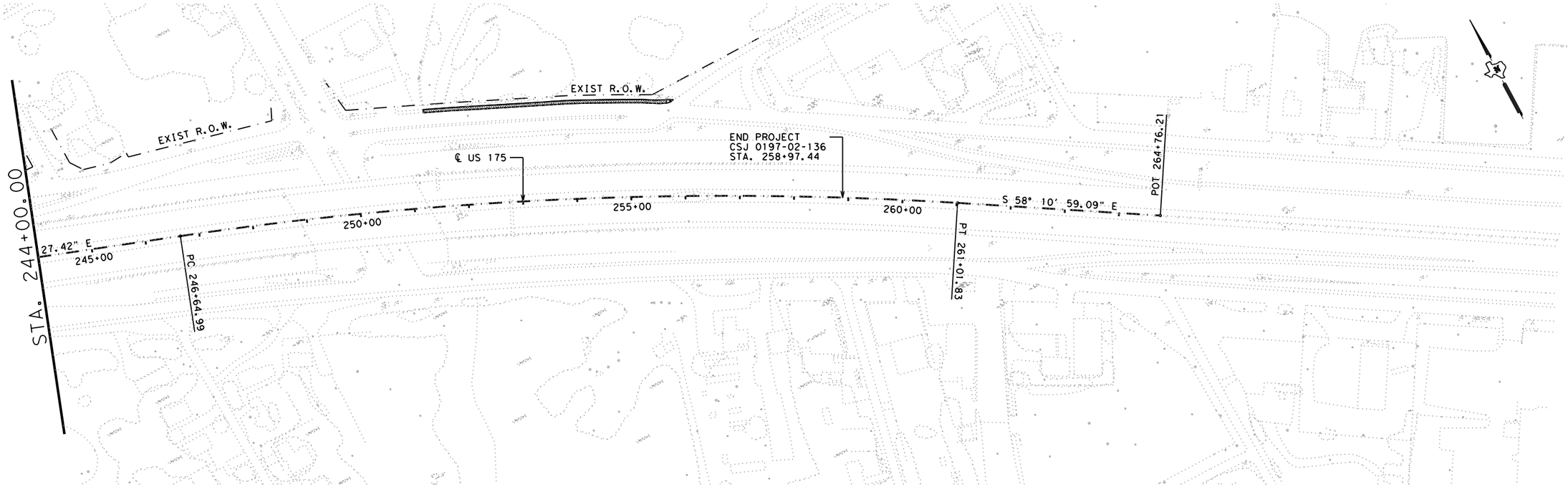
US 175

PROJECT LAYOUT

SCALE: 1"=200' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	62
CHECK	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

$FILE$
$PLTDRV$ PEN



STATE OF TEXAS
DUNG HUY NGUYEN
128595
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant, P.E. & Date 5/25/2022

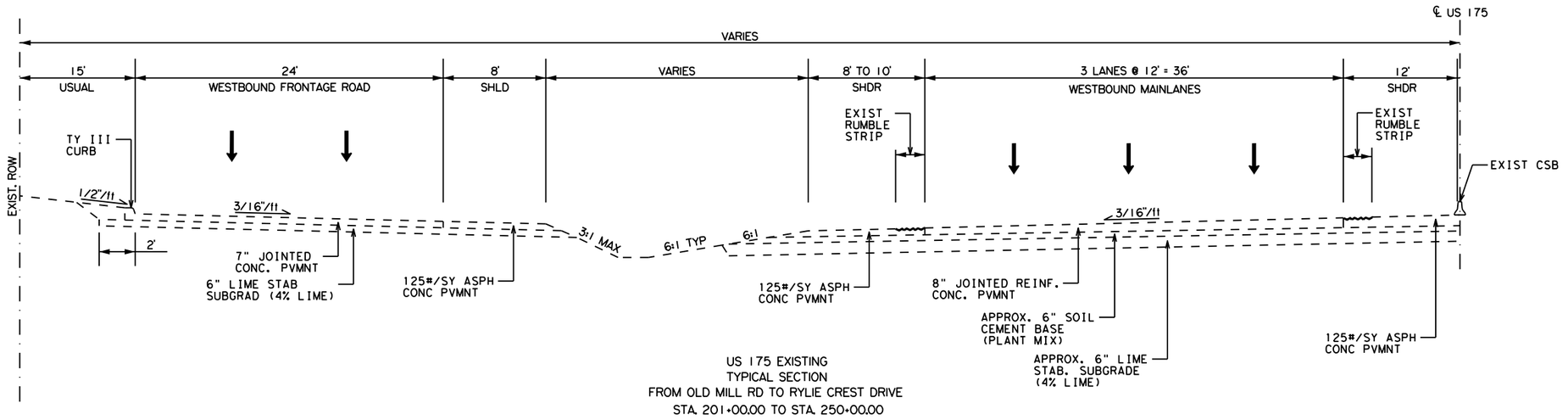
Texas Department of Transportation

US 175

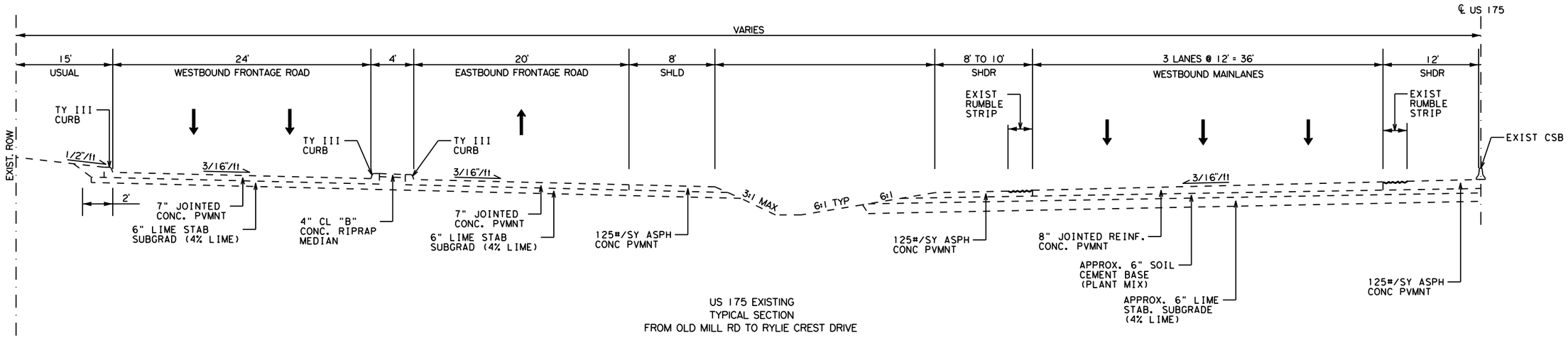
PROJECT LAYOUT

SCALE: 1"=200' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	
CHECK	CONTROL	SECTION	JOB	63
	0095	05	063, ETC.	



US 175 EXISTING
TYPICAL SECTION
FROM OLD MILL RD TO RYLIE CREST DRIVE
STA. 201+00.00 TO STA. 250+00.00



US 175 EXISTING
TYPICAL SECTION
FROM OLD MILL RD TO RYLIE CREST DRIVE
STA. 250+00.00 TO STA. 258+97.44

STATE OF TEXAS
DUNG HUY NGUYEN
128595
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant & P.E. 5/25/2022 Date

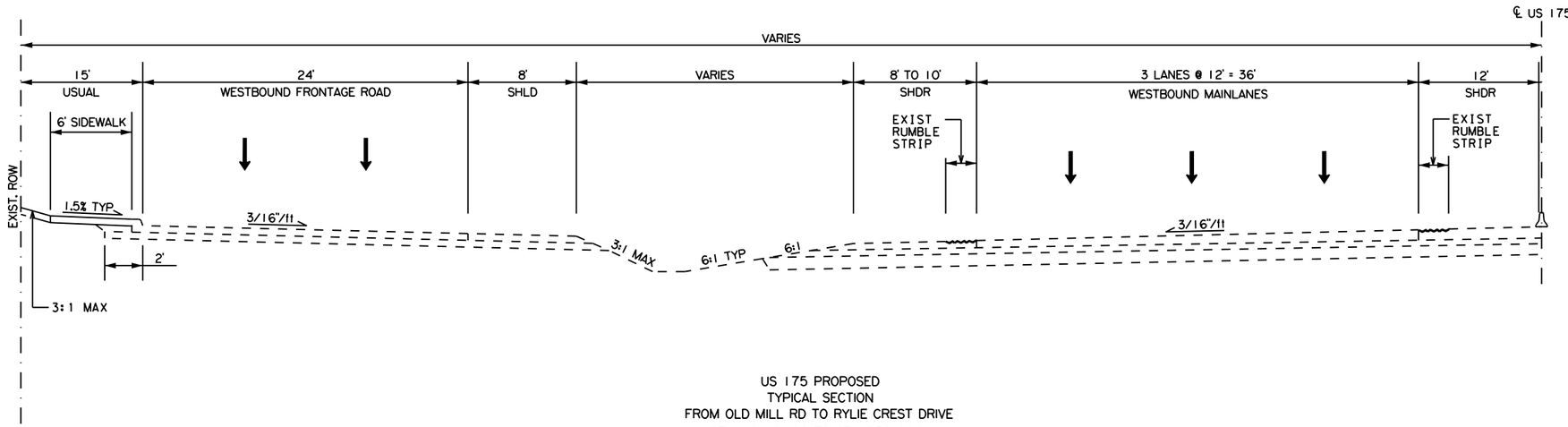
Texas Department of Transportation

US 175
EXISTING TYPICAL SECTIONS

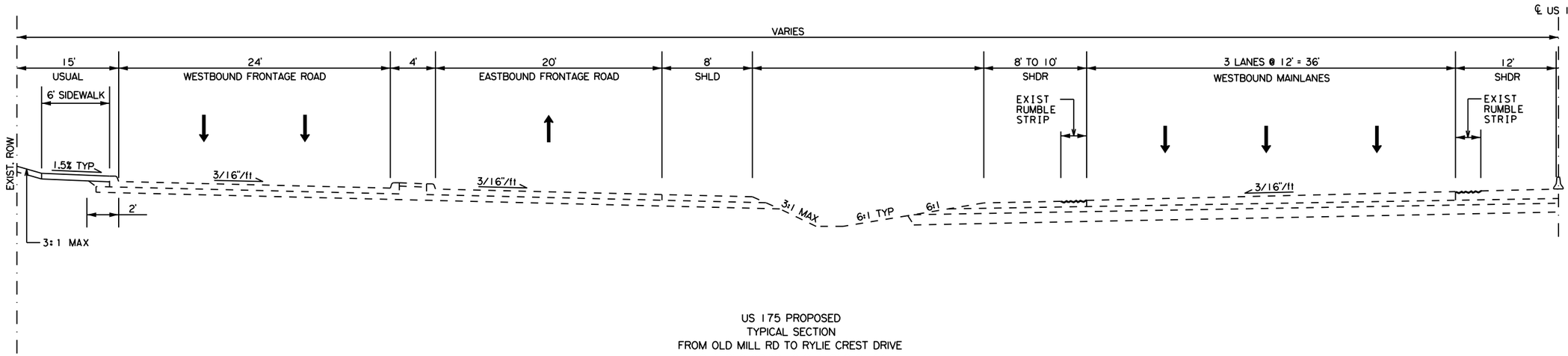
N. T. S.

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	64
CHECK	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	



US 175 PROPOSED
TYPICAL SECTION
FROM OLD MILL RD TO RYLIE CREST DRIVE
STA. 201+00.00 TO STA. 250+00.00



US 175 PROPOSED
TYPICAL SECTION
FROM OLD MILL RD TO RYLIE CREST DRIVE
STA. 250+00.00 TO STA. 258+97.44

STATE OF TEXAS
DUNG HUY NGUYEN
128595
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant & Date — P.E. 5/25/2022

Texas Department of Transportation

US 175
PROPOSED TYPICAL SECTIONS

N. T. S.

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	65
CHECK	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

GENERAL NOTES:

1. INSTALL BARRICADES AND ADVANCED WARNING SIGNS PER BC STANDARDS, TCP STANDARDS WORK ZONE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER. THE SIGNS, BARRICADES, OR OTHER WARNING DEVICES SHOWN SHALL BE CONSIDERED MINIMUM AND ADDITIONAL SIGNS, BARRICADES, OR WARNING DEVICES DEEMED NECESSARY BY THE ENGINEER OR DICTATED BY FIELD CONDITIONS SHALL BE PROVIDED ACCORDING TO ALL APPLICABLE STANDARDS. ADDITIONAL SIGNS OR BARRICADES WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO THE BID ITEM "BARRICADES, SIGNS, AND TRAFFIC HANDLING"

2. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL ONLY BE PLACED IN AREAS WHERE SOIL DISTURBANCE IS EXPECTED TO OCCUR WITHIN TWO WEEKS. INSTALL STORM WATER POLLUTION PREVENTION (SW3P) DEVICES PRIOR TO INITIATING SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL BE REMOVED IN EACH AREA WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT OR AS APPROVED BY THE ENGINEER.

3. SUBMIT A DETAILED SCHEDULE OF WORK TO THE PROJECT ENGINEER FOR APPROVAL PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN ON THE TCP SEQUENCE OF WORK (SEE BELOW).

4. SUBMIT ANY REQUEST TO ALTER SEQUENCE OF OPERATION OF TRAFFIC CONTROL PLANS TO THE ENGINEER FOR WRITTEN APPROVAL PRIOR TO BEGIN OF CONSTRUCTION ADDITIONAL COST OR TIME IS AT THE EXPENSE OF THE CONTRACTOR.

5. MAINTAIN TEMPORARY SIGNS WITHIN THE PROJECT LIMITS AND COVER OR REMOVE ANY EXISTING SIGN OR PAVEMENT MARKING THAT CONFLICTS WITH TCP TO AVOID CONFUSION FOR THE TRAVELING PUBLIC.TEMPORARY SIGNING SHALL BE PLACED AS NEEDED DURING ALL PHASES. PAYMENT FOR THIS WORK SHALL BE SUBSIDIARY TO ITEM 502 BARRICADES.

6. THE COMPLETE CLOSURE OF ANY ROADWAY REQUIRES THE APPROVAL OF THE ENGINEER.

7. MAINTAIN TEMPORARAY DRAINAGE THROUGHOUT ALL PHASES OF CONSTRUCTION. THIS WORK WILL BE SUBSIDIARY TO VARIOUS BID ITEMS.

8. PROVIDE ACCESS TO PRIVATE PROPERTY AT ALL TIMES. MATERIALS, MAINTENANCE AND LABOR IS SUBSIDAIRY.

SUGGESTED SEQUENCE OF CONSTRUCTION:

PHASE 1

1. INSTALL ADVANCED WARNING SIGNS, WORK ZONE SIGNAGE, AND CHANNELIZING DEVICES

2. CONSTRUCT SIDEWALKS AND PEDESTRIAN CURB RAMPS AS SHOWN IN PLANS

PHASE 2

1. INSTALL PERMANENT SOD AS SHOWN IN PLANS

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128595
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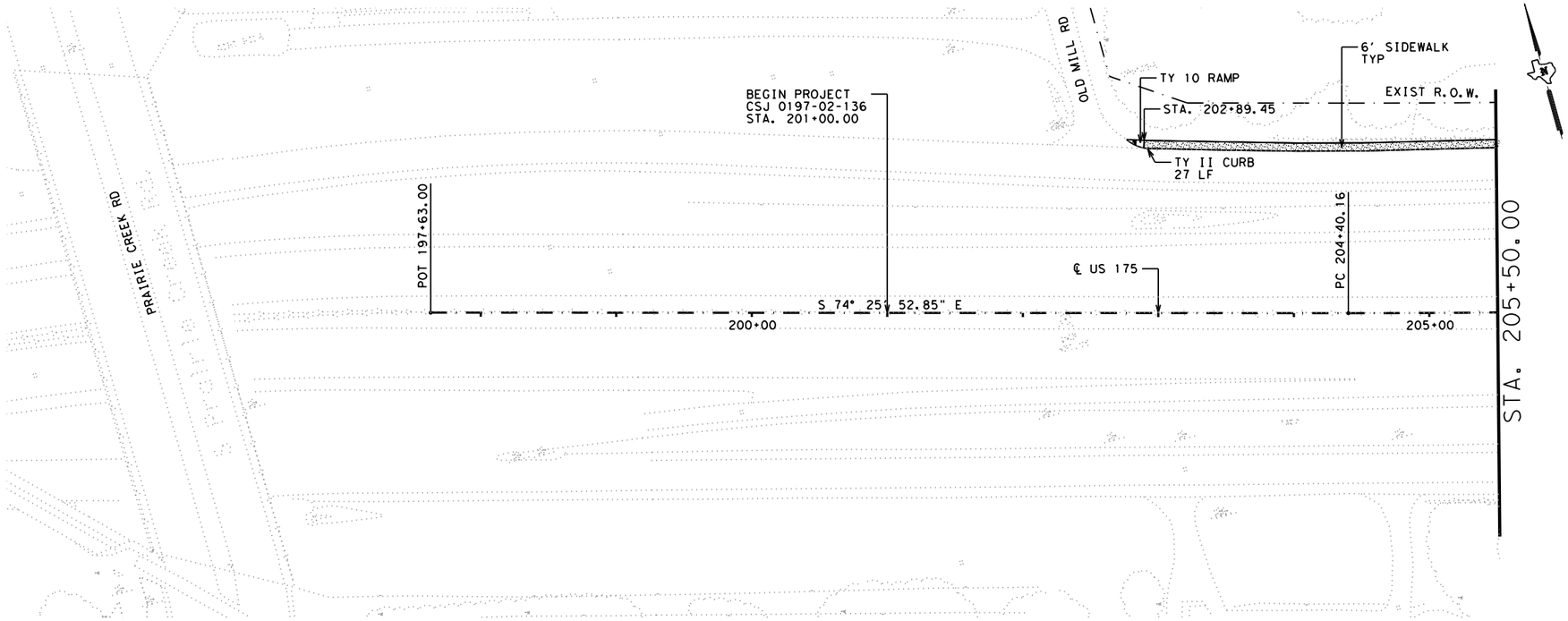
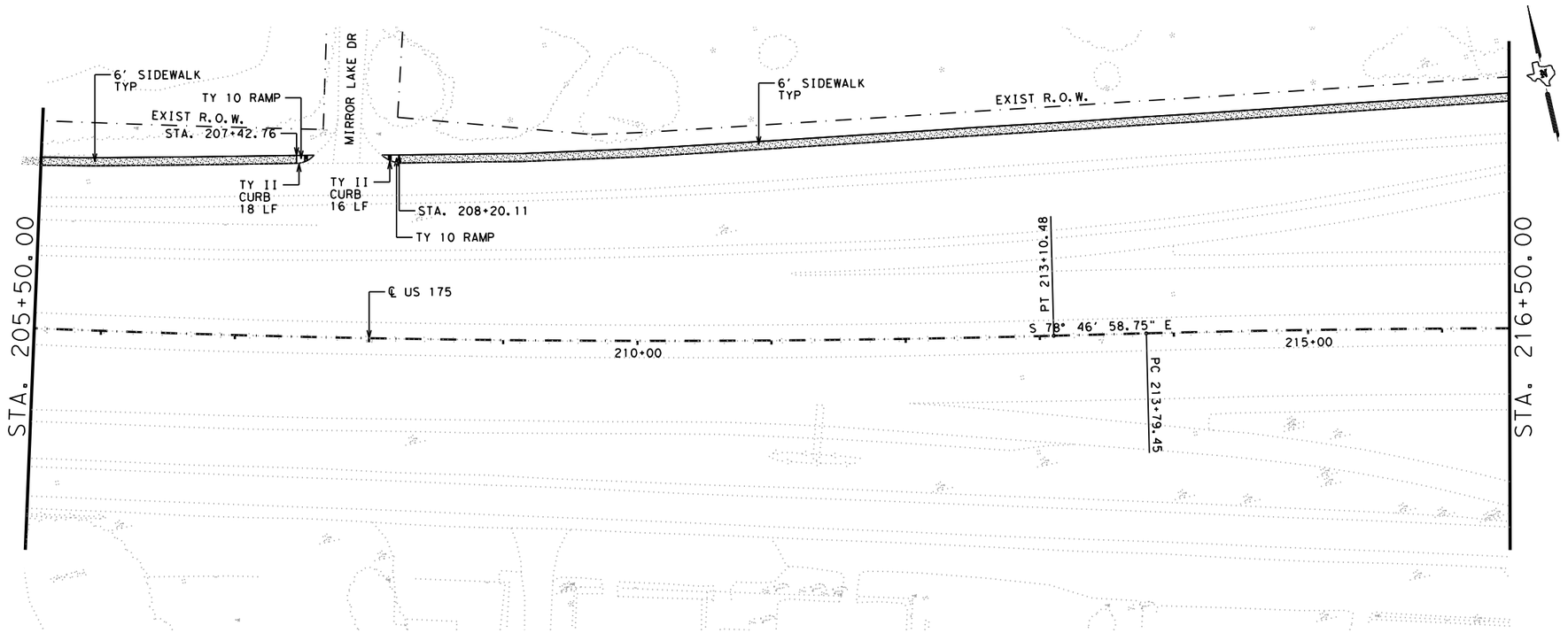
TCP NARRATIVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	66
CHECK	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	





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128595
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PROFESSIONAL ENGINEER
STATE OF TEXAS

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PLAN LAYOUT

SCALE: 1"=100' SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
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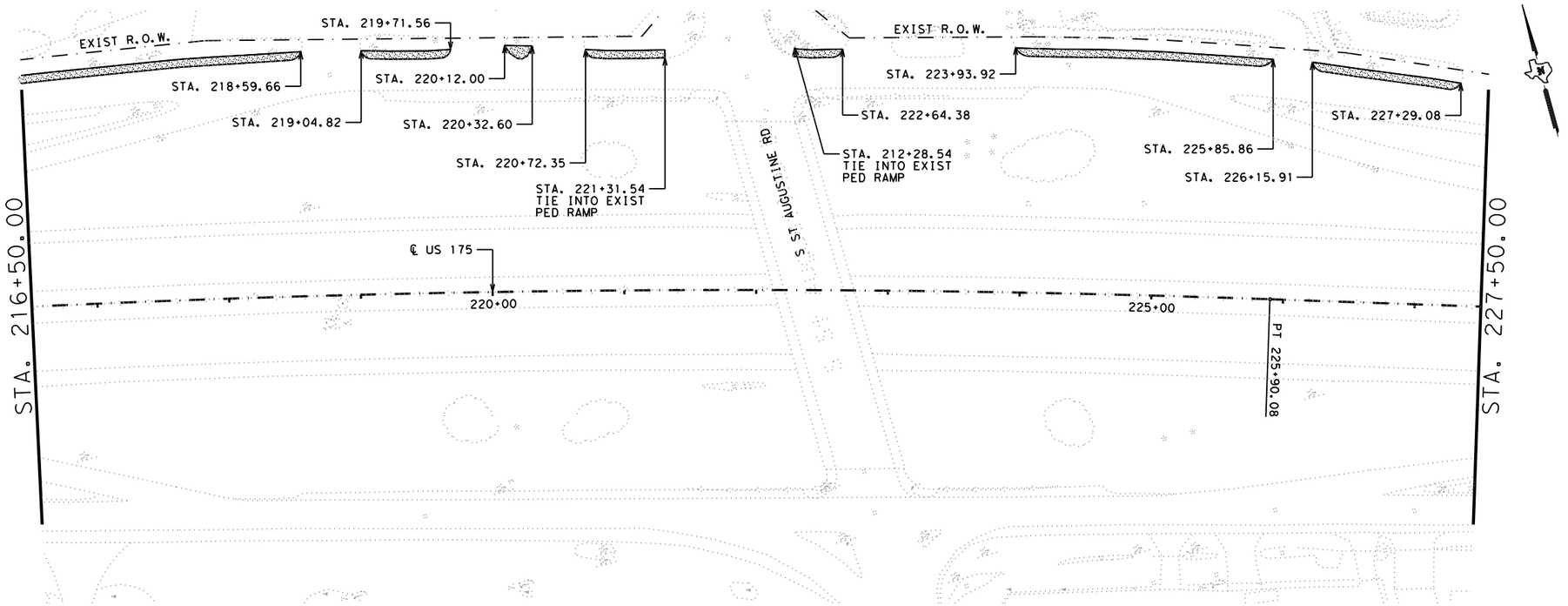

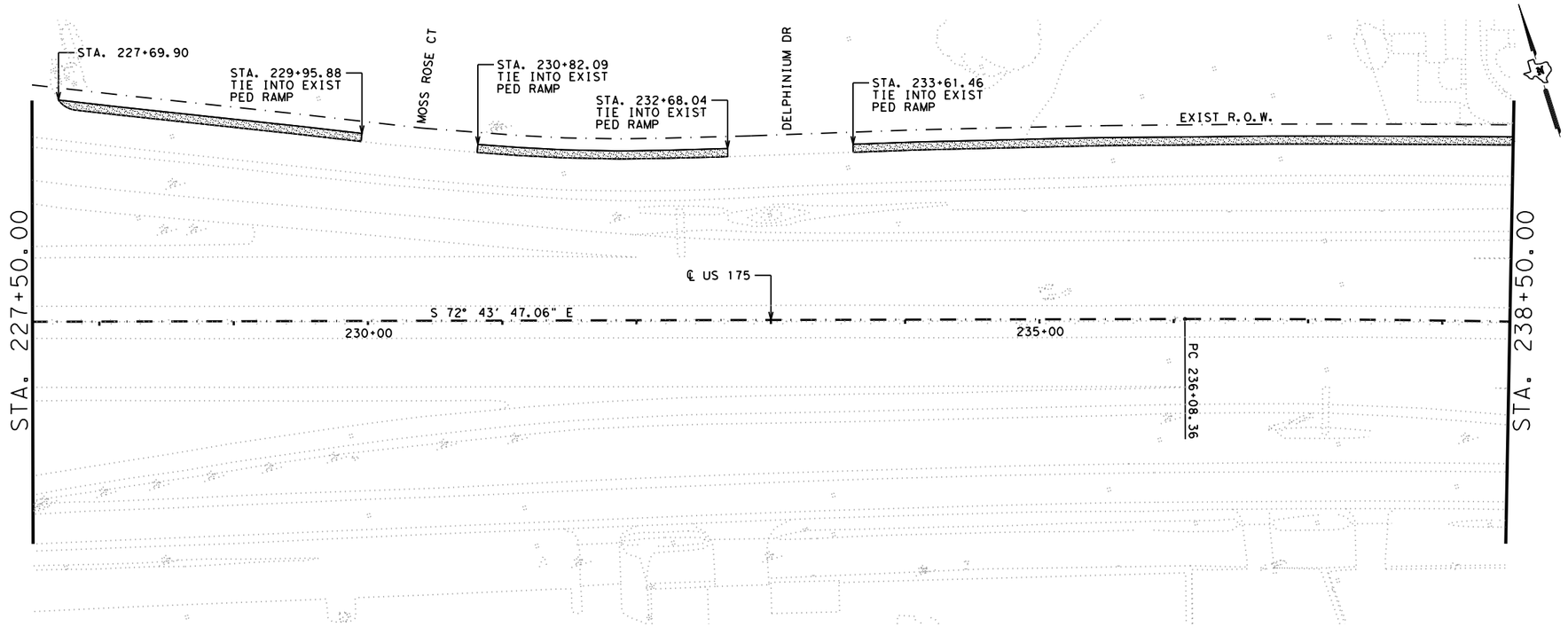

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128595
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US 175

PLAN LAYOUT

SCALE: 1"=100' SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
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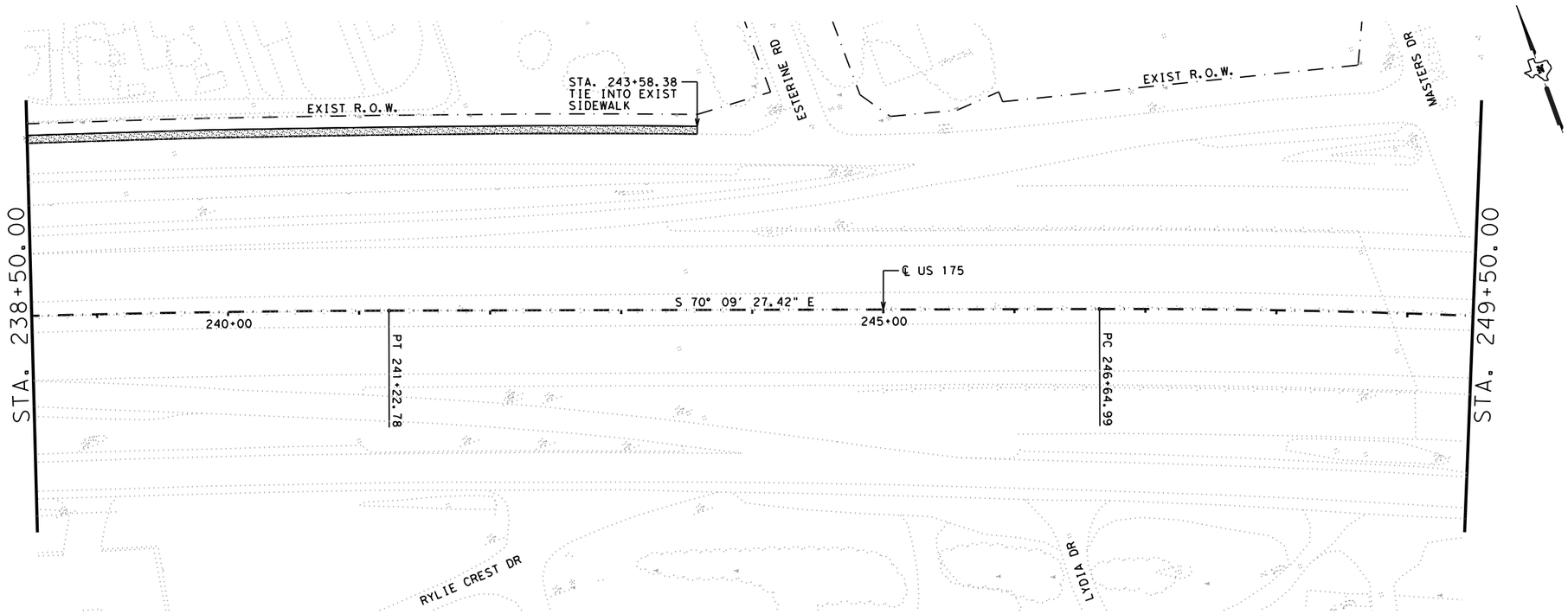

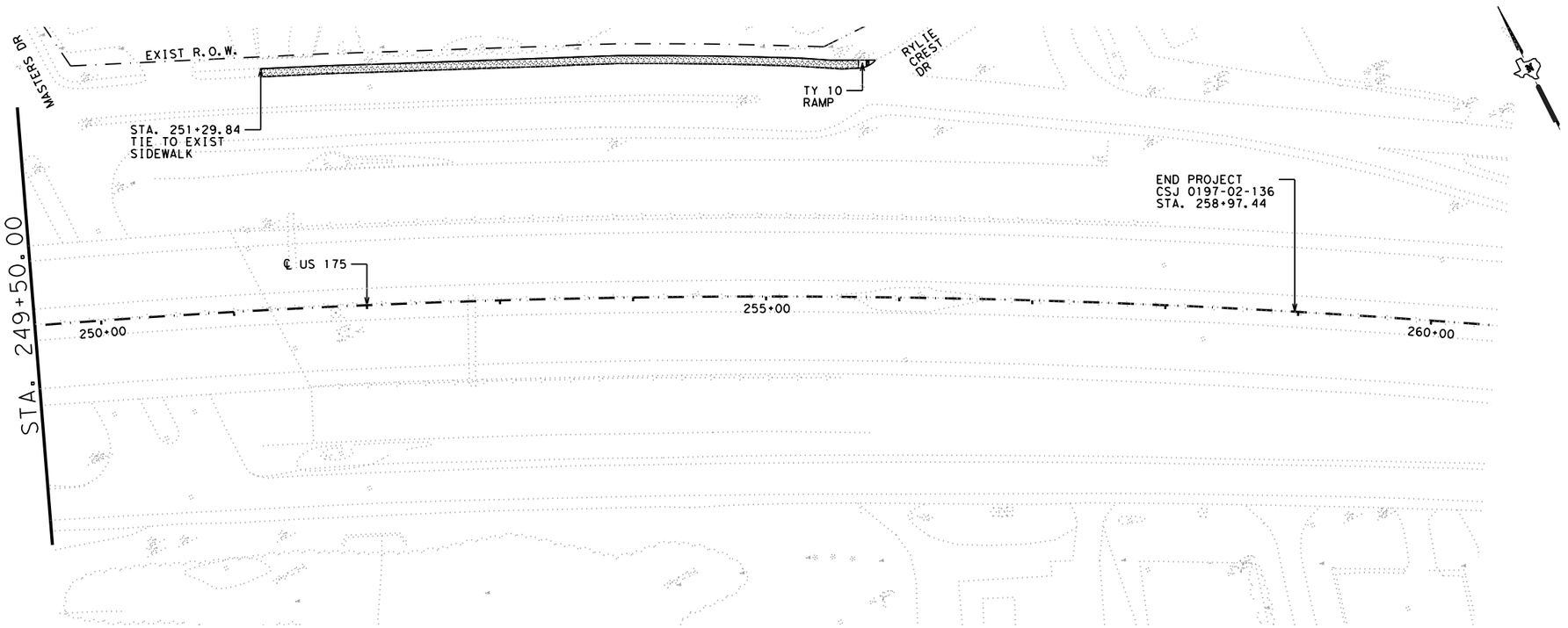

0 50 100
FEET

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US 175

PLAN LAYOUT

SCALE: 1"=100' SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
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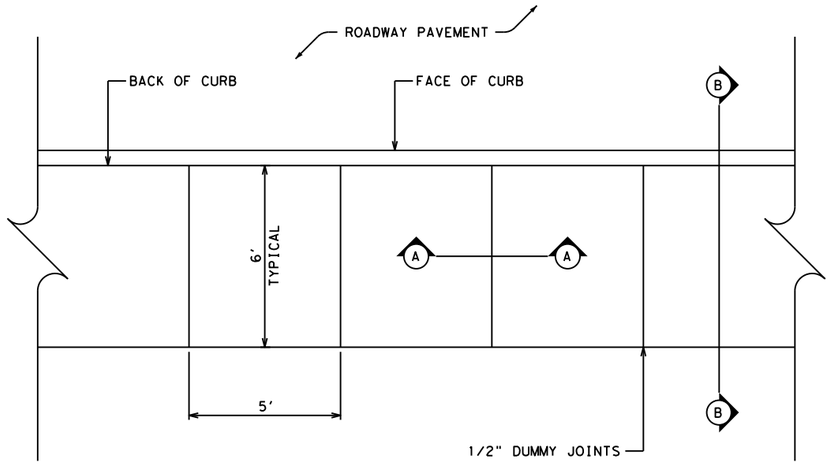
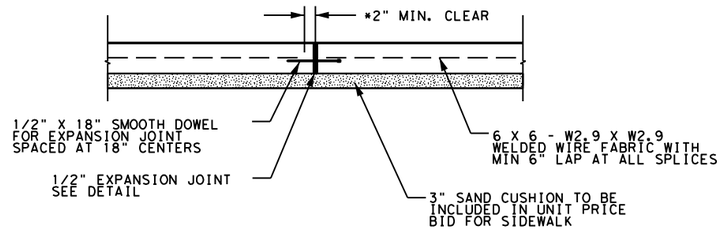
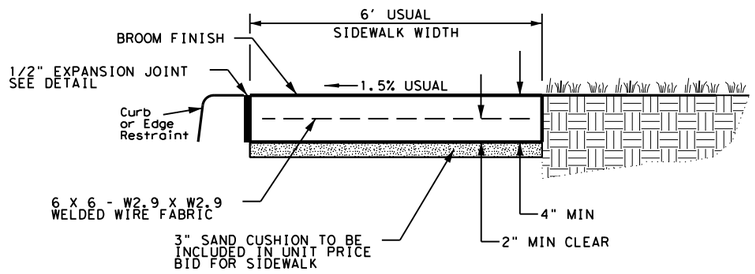


SIDEWALK DETAIL



SIDEWALK SECTION "A-A"

NOTES:
PROVIDE A 1/2" EXPANSION JOINT AT 20' CENTERS AND BETWEEN ANY ADJACENT CURB OR CONCRETE CONNECTION.
THE JOINT IS CONSIDERED SUBSIDIARY TO THE SIDEWALK.

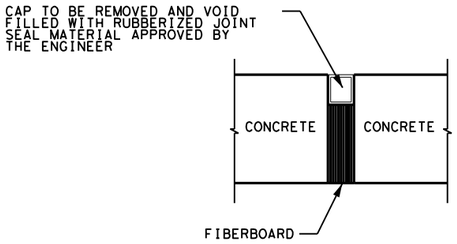


SIDEWALK SECTION "B-B"

NOTES:
PROVIDE A 1/2" EXPANSION JOINT BETWEEN THE SIDEWALK AND ANY ADJACENT CURB OR CONCRETE.
THE JOINT IS CONSIDERED SUBSIDIARY TO THE SIDEWALK.

IF THE CROSS SLOPE OF ANY SIDEWALK EXCEEDS 2%, THE CONTRACTOR WILL REMOVE AND REPLACE AT THEIR OWN EXPENSE.

*MEASURED FROM EDGE OF EXPANSION JOINT MATERIAL TO REBAR.



EXPANSION JOINT DETAIL

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US 175

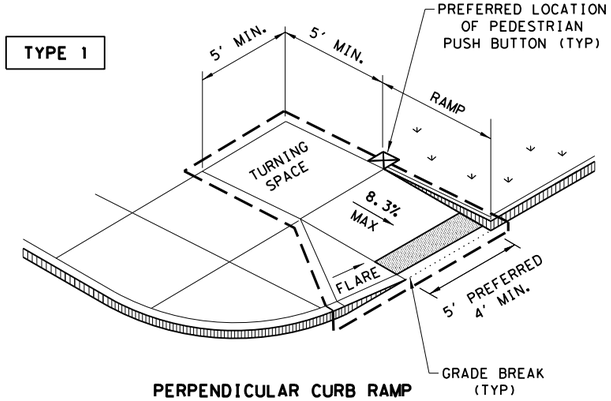
MISCELLANEOUS ROADWAY DETAILS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DN	6	SEE TITLE SHEET		US 80, ETC.
GRAPHICS DN	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	KAUFMAN, ETC.	70
CHECK	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

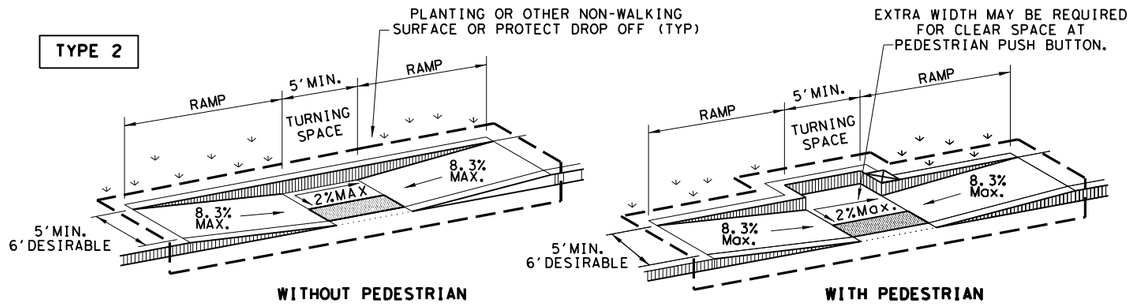
DATE: 5/25/2022
FILE: T:\DALAO\PROJECTS\0nUS175\0197021360US_175_0197-02-136 RTZ Sidewalk\Standards\ped18.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

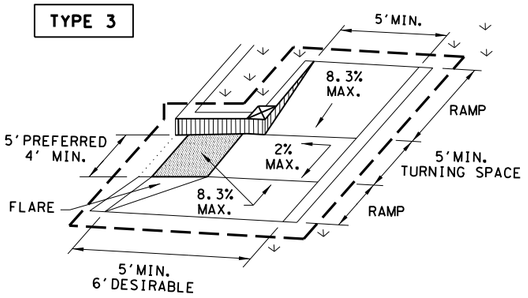


WITHOUT PEDESTRIAN PUSH BUTTON

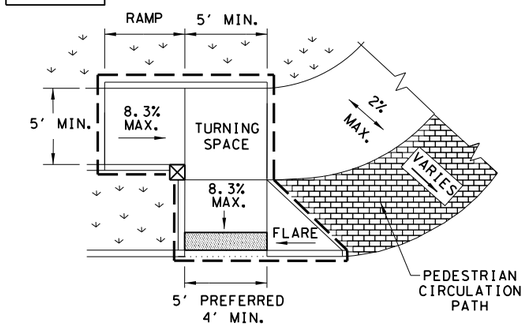
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

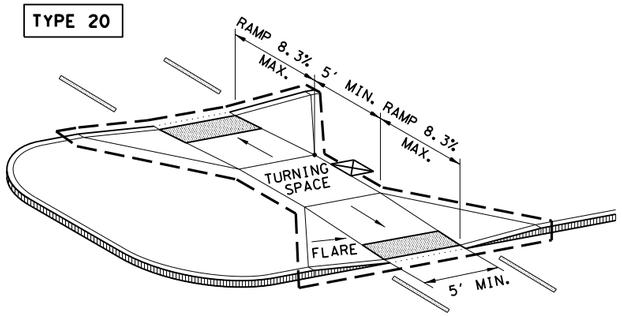


TYPE 6



COMBINATION CURB RAMPS

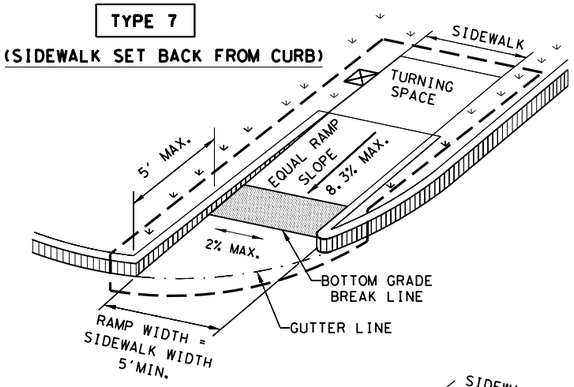
TYPE 20



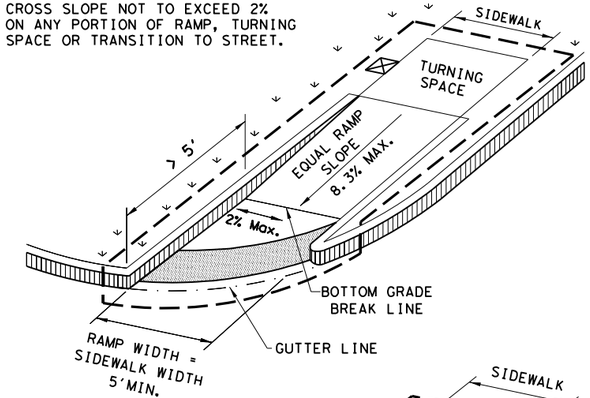
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

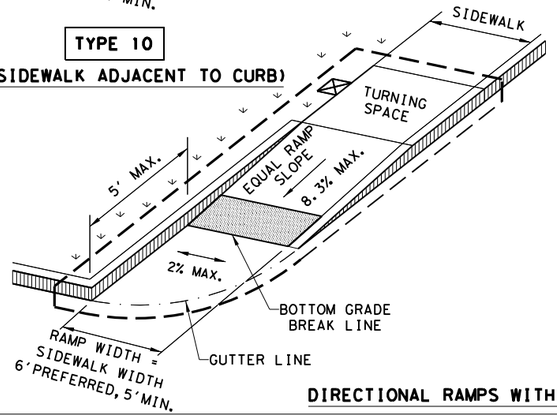


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

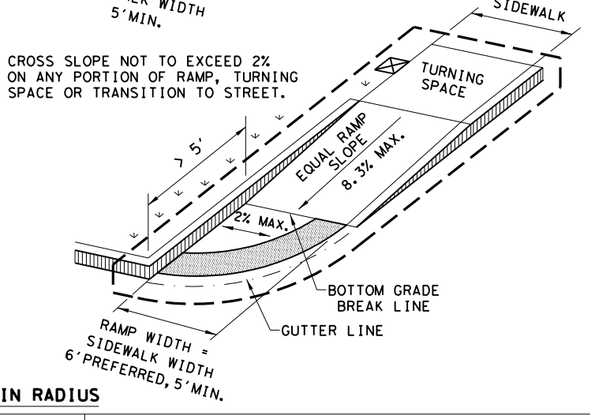


TYPE 10

(SIDEWALK ADJACENT TO CURB)

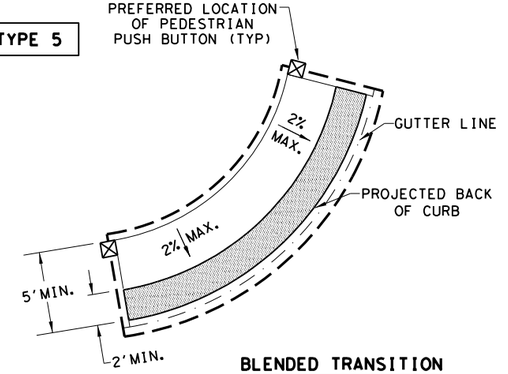


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

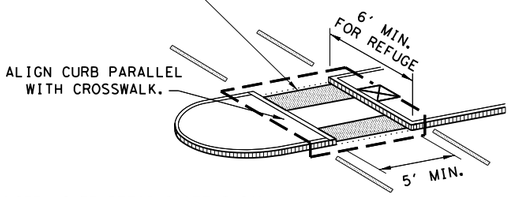
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

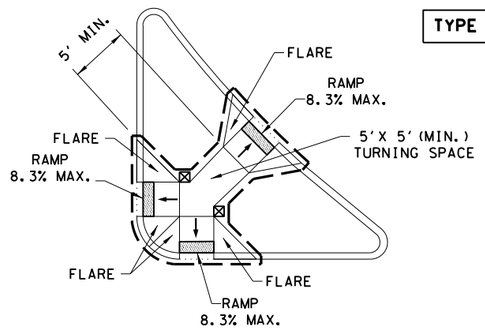
TYPE 21

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.



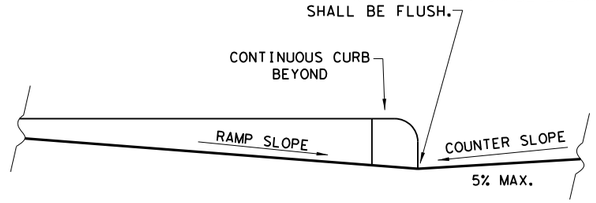
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

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

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	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		71

DATE: 5/25/2022
FILE: T:\DALAO\PROJECTS\On\US175\0197021 36\US 175_0197-02-136 RTZ Sidewalks\Standards\ped18.dgn

GENERAL NOTES

CURB RAMPS

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

DETECTABLE WARNING MATERIAL

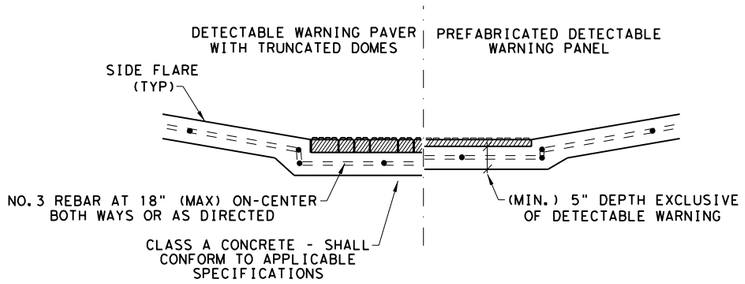
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

DETECTABLE WARNING PAVERS (IF USED)

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

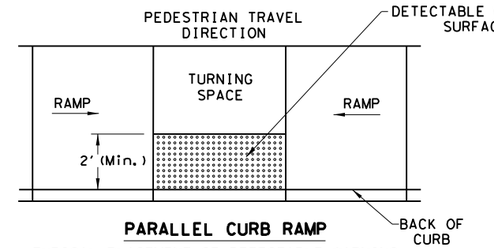
SIDEWALKS

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



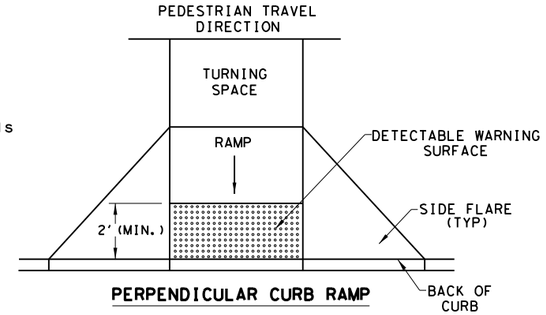
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



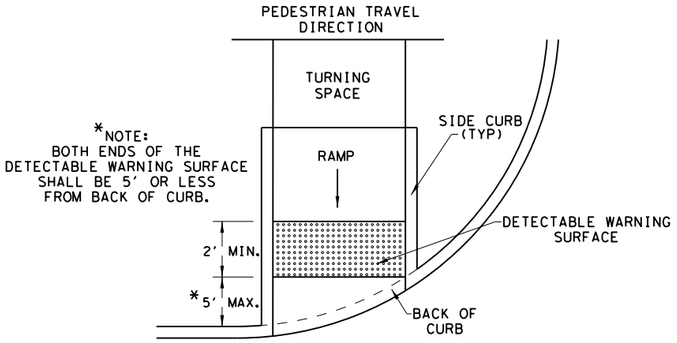
PARALLEL CURB RAMP

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.

SHEET 2 OF 4

Texas Department of Transportation | Design Division Standard

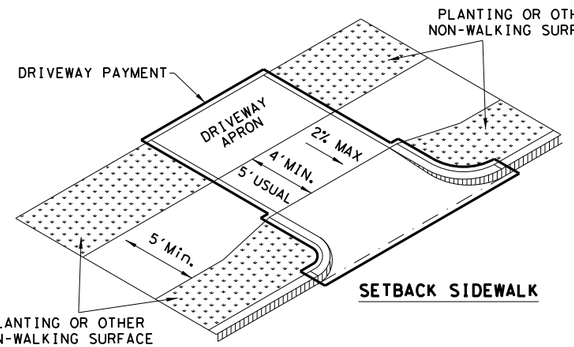
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

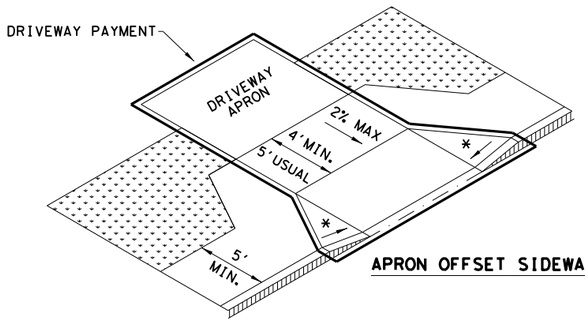
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0095	05	063, ETC.		US 80, ETC.
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST		COUNTY		SHEET NO.
	DAL		KAUFMAN, ETC.		72

DATE: 5/25/2022
FILE: T:\DAL\AO\PROJECTS\On\US175\0197021360\US 175_0197-02-136 RTZ Sidewalk\Standards\ped18.dgn

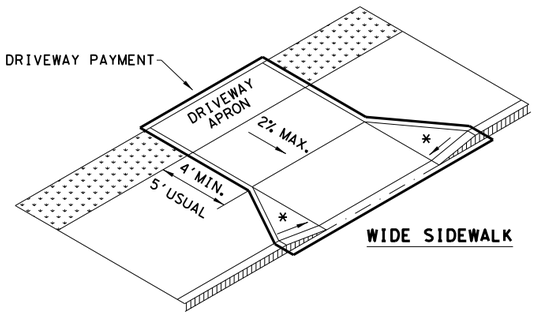
SIDEWALK TREATMENT AT DRIVEWAYS



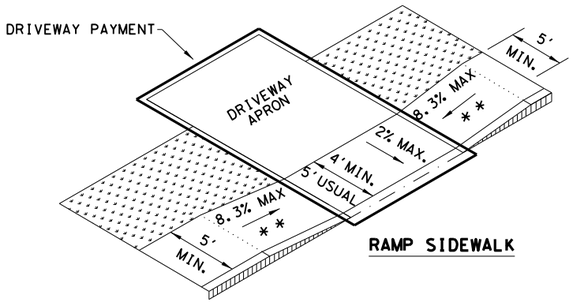
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

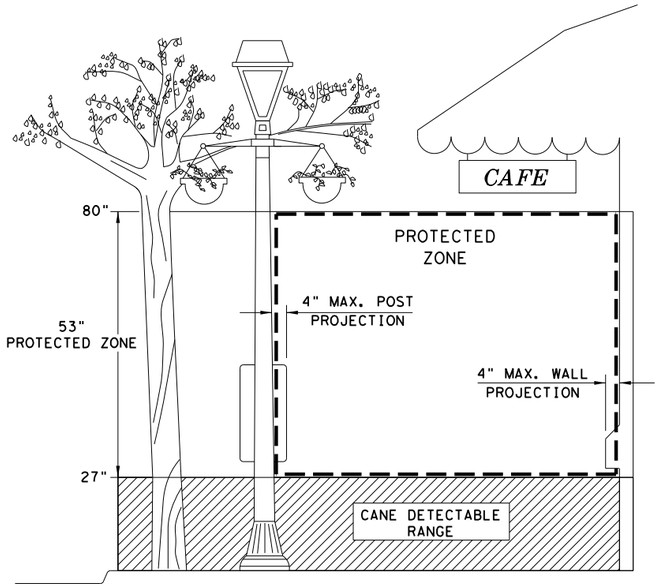


RAMP SIDEWALK

NOTES:

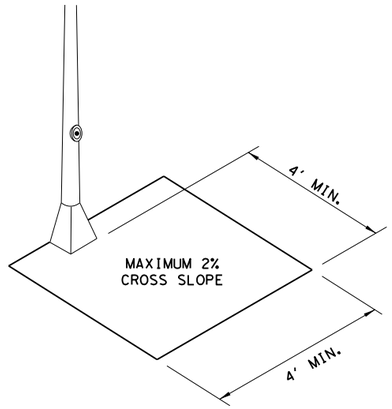
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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

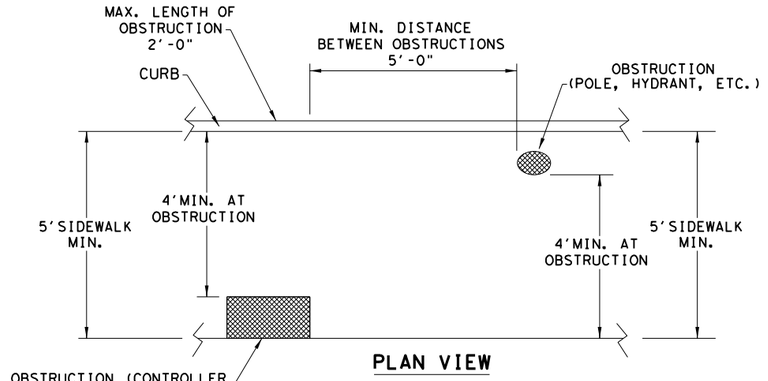


PROTECTED ZONE

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



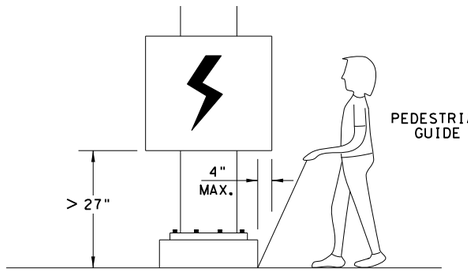
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



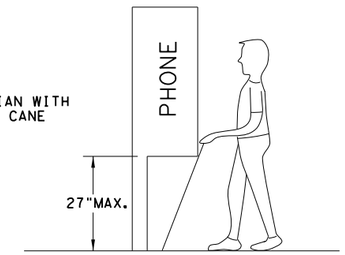
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

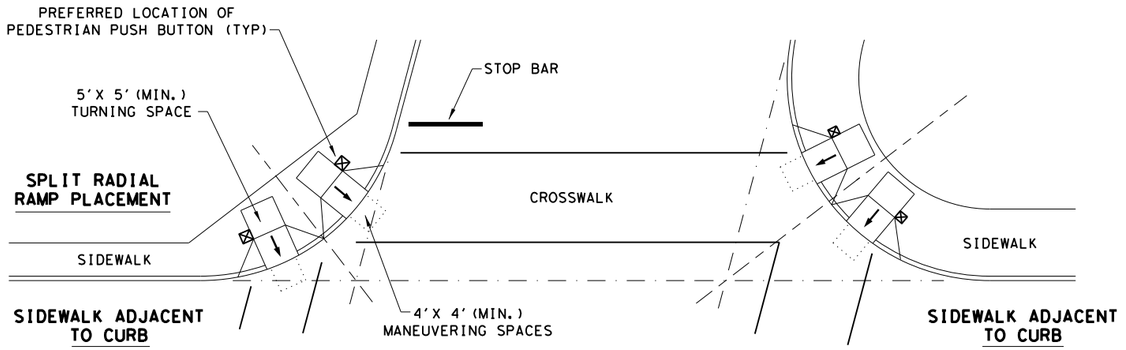
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		73

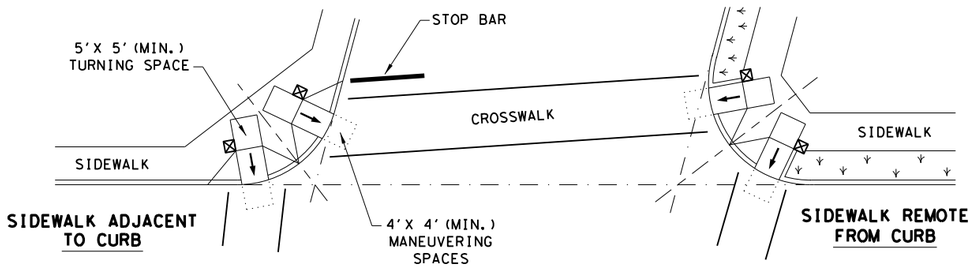
DATE: 5/25/2022
FILE: T:\DAL\OV\PROJECTS\On\US175\0197021 36\US 175_0197-02-136 RTZ Sidewalk\Standards\ped18.dgn

TYPICAL CROSSING LAYOUTS

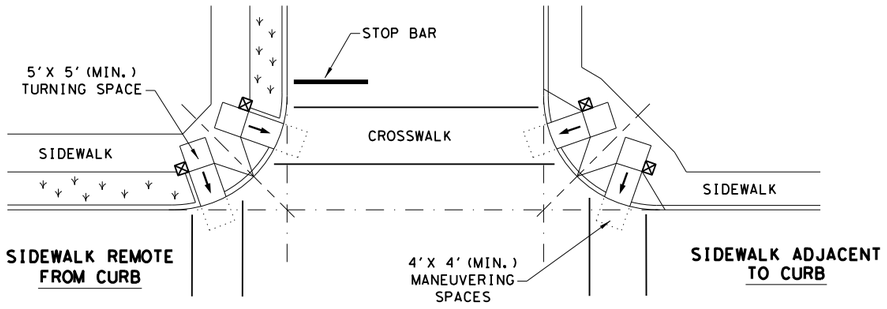
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



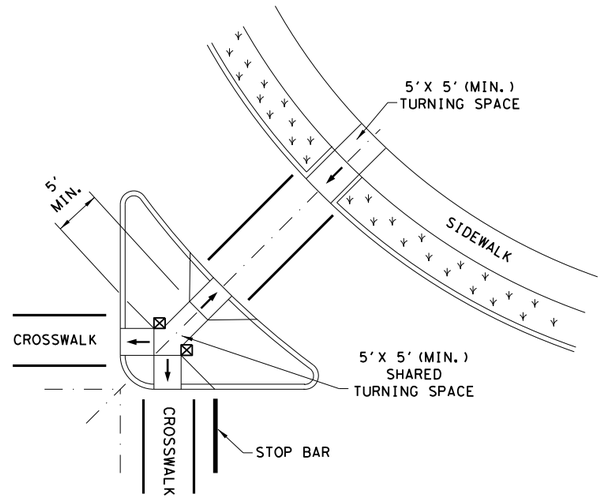
SKEWED INTERSECTION WITH "LARGE" RADIUS



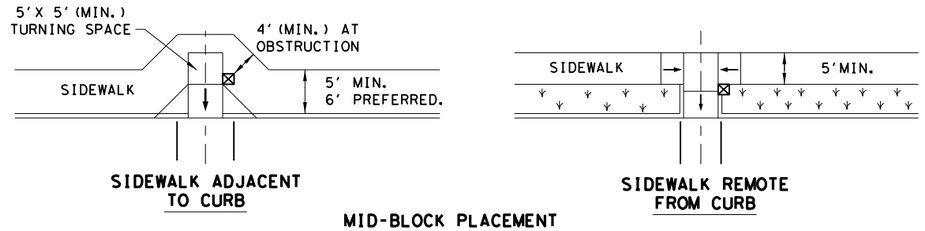
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

SHEET 4 OF 4

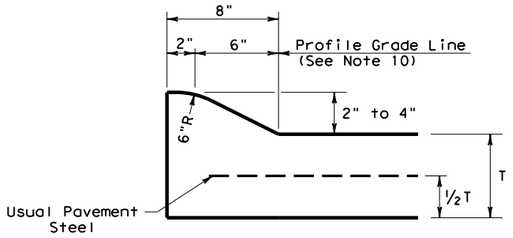
Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

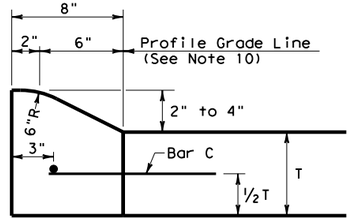
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		74

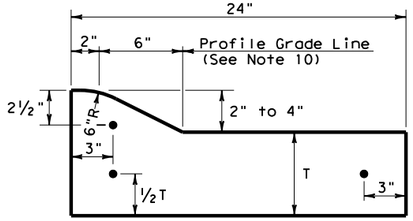
DATE: 5/25/2022
FILE: T:\DALAO\PROJECTS\On\US175\0197021 36\US 175_0197-02-136 RTZ Sidewalk\Standards\cccg21.dgn



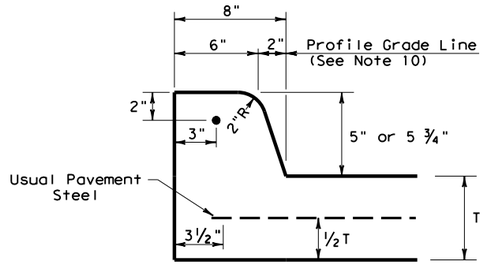
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



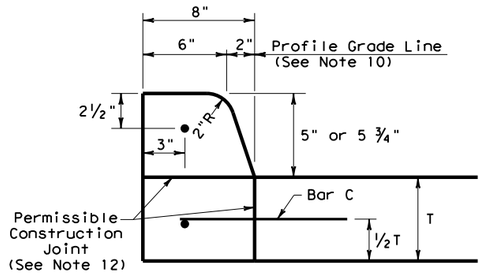
TYPE I CURB
2" - 4" HEIGHT



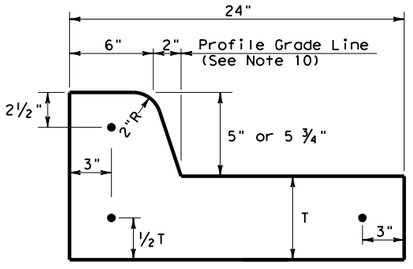
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



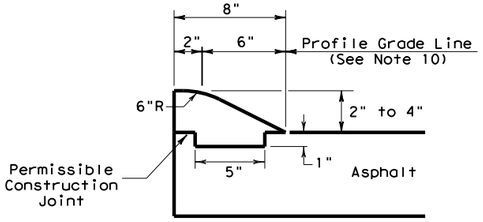
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



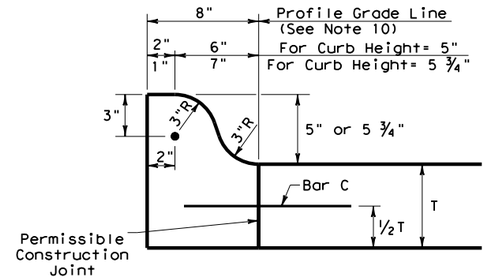
TYPE II CURB
5" - 5 ¾" HEIGHT



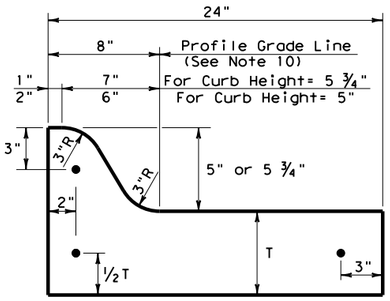
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



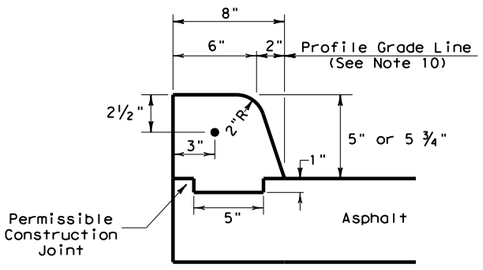
TYPE III CURB (KEYED)
2" - 4" HEIGHT



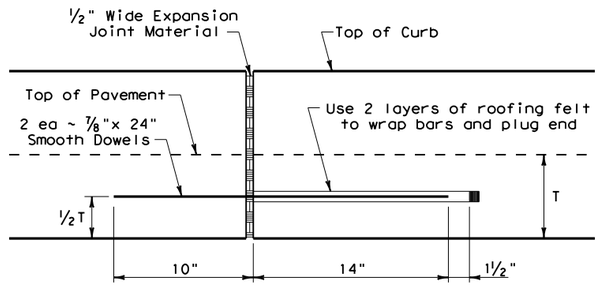
TYPE IIa CURB
5" - 5 ¾" HEIGHT



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

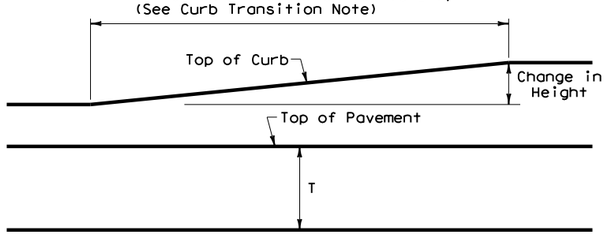


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

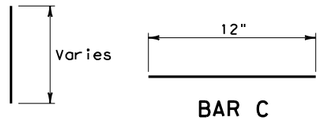
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



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 the 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 used as needed to support curb reinforcing steel during concrete placement.



BAR B
BAR C

Texas Department of Transportation
Design Division Standard

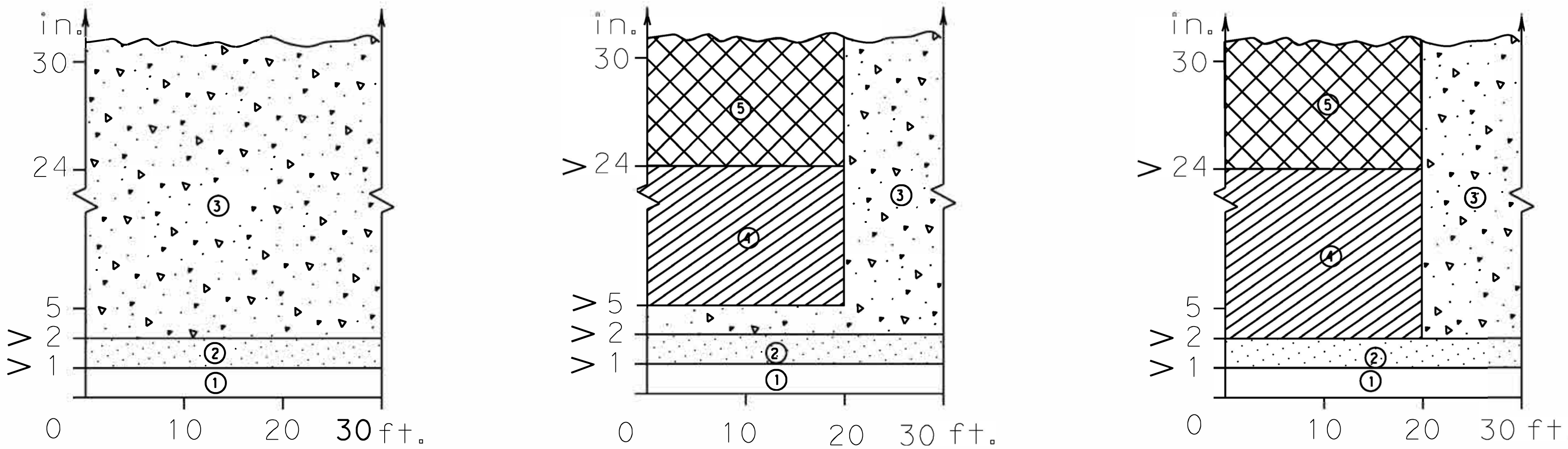
CONCRETE CURB AND CURB AND GUTTER

CCCG-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		75

DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

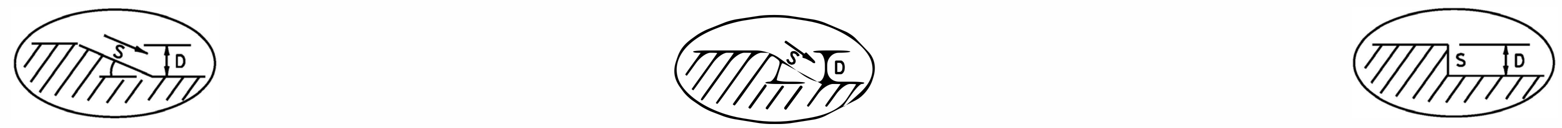
Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

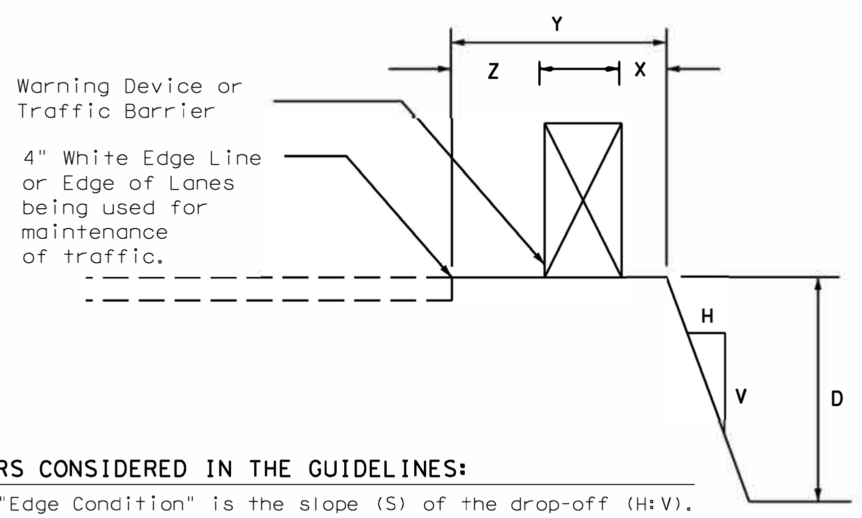


Edge Condition I
S = (3:1) (or flatter)

Edge Condition II
S = ((2.99):1) to (1:1)

Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

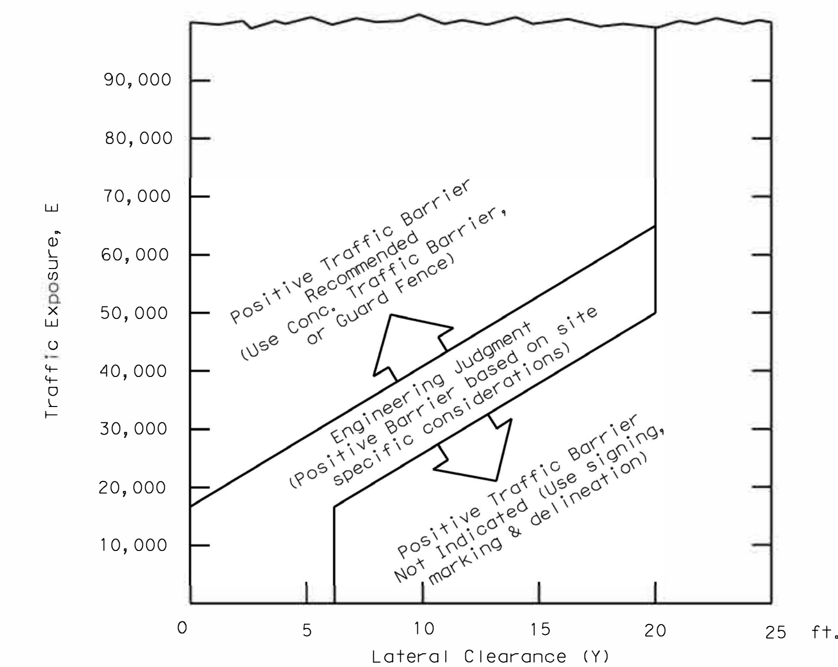
1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".
2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.
3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

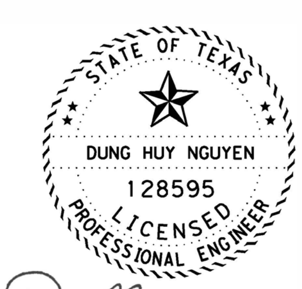
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.
2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.
3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularily those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.
4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▩)



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.



P.E. 5/25/2022
Signature of Registrant & Date

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

EDGECON-21

FILE: edgecon.dgn		DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB		HIGHWAY
REVISIONS 03-01 08-01 9-21	0095	05	063, ETC.		US 80, ETC.
	DIST		COUNTY		SHEET NO.
	DAL		KAUFMAN, ETC.		76

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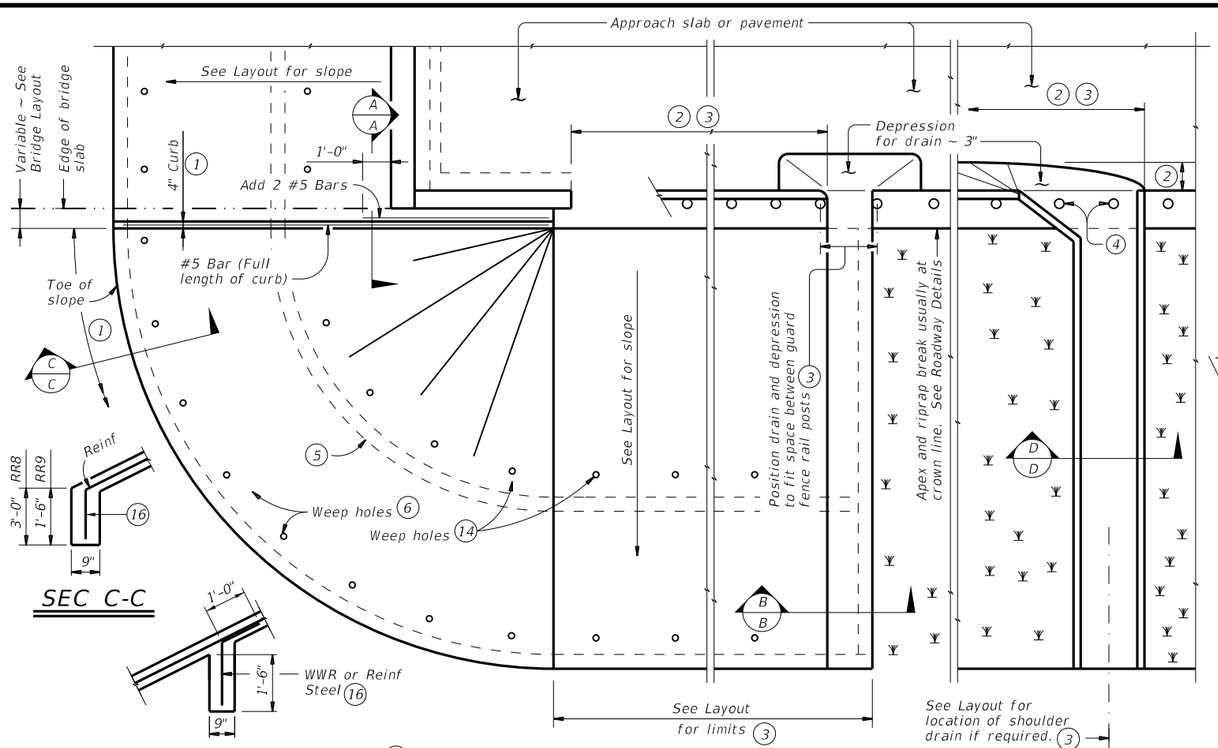
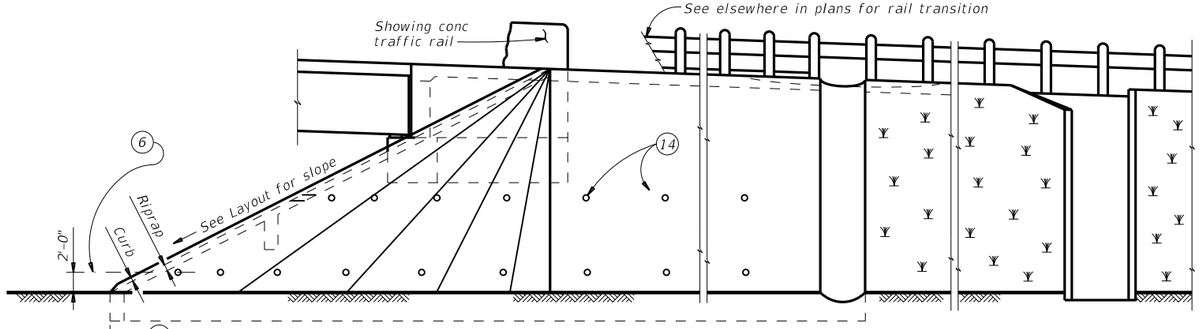


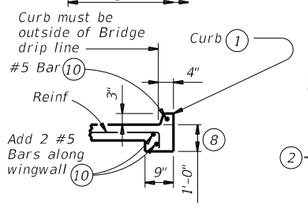
PLAN

SEC C-C

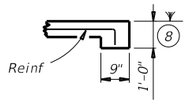
INTERMEDIATE TOEWALL (5)



ELEVATION

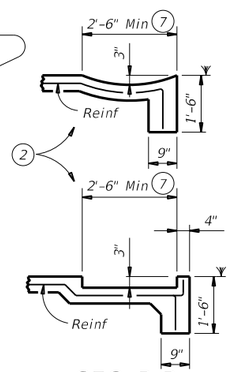


SEC A-A



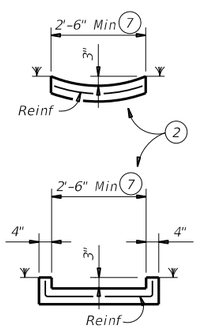
SEC B-B

(No drain)



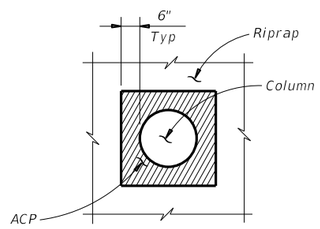
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

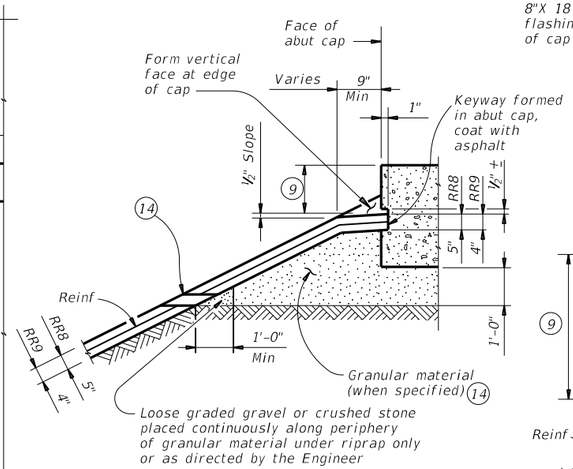
(Shoulder drain)



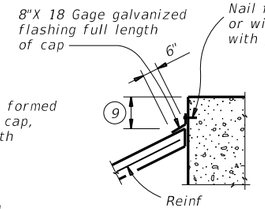
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

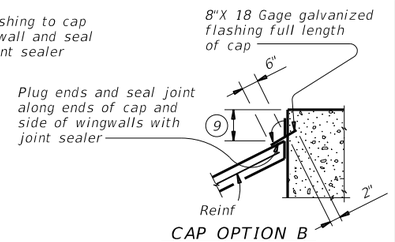
(As directed by the Engineer)



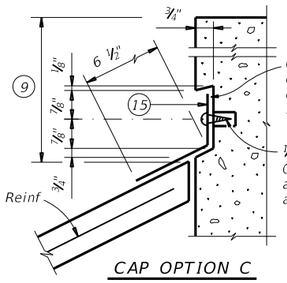
SHOWING KEYWAY OPTION



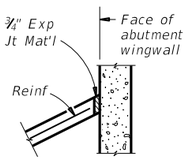
CAP OPTION A



CAP OPTION B

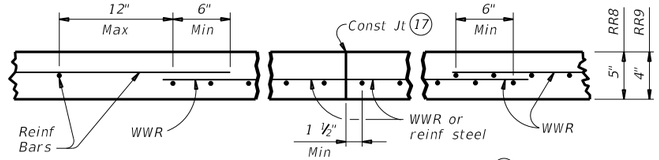


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

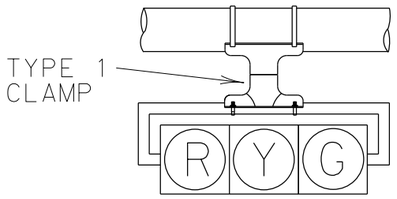
Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		77



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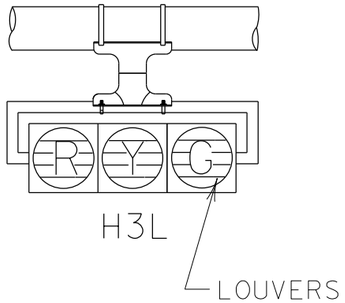

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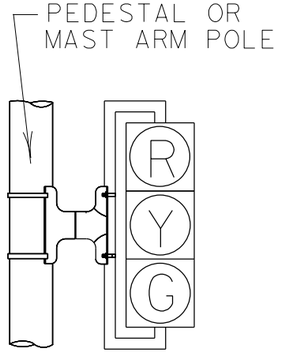
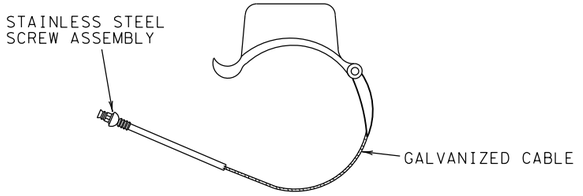
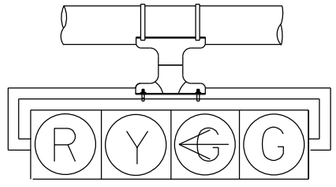


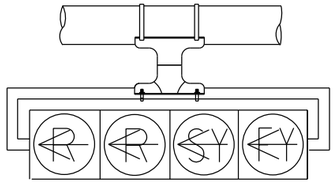
V3



TYPE 1 AND 2 CLAMPS



H4LT



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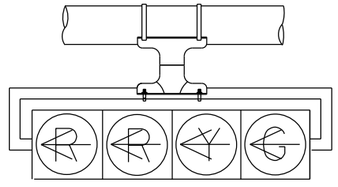

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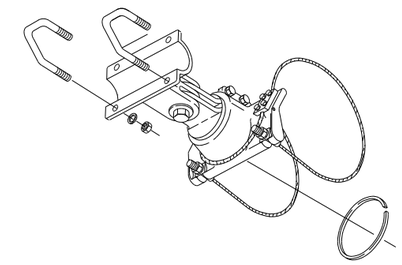
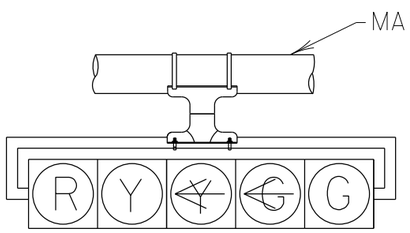


TYPE 2 CLAMP KIT

SHALL BE INSTALLED WHEN ROTATION ABOUT
THE HORIZONTAL AND VERTICAL AXES ARE NEEDED.



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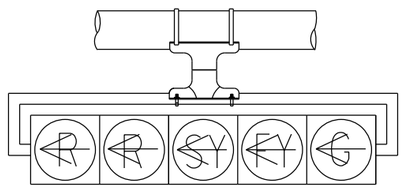

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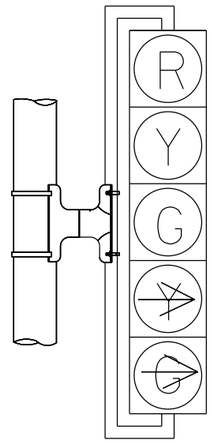


V5RT

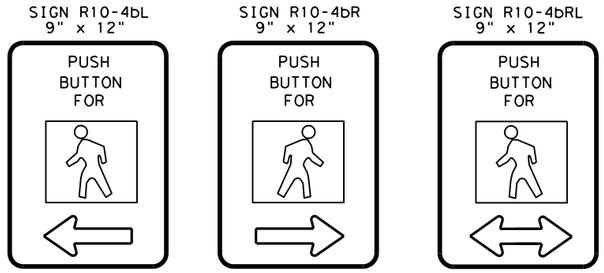
NOTES:

1. VEHICLE SIGNAL HEADS SHALL BE MOUNTED WITH TYPE 1 CLAMP AND APPROPRIATE TUBING.
2. ALL POLE MOUNTED VEHICLE HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
3. THE SIGNAL HEADS SHOWN ARE NOT MEANT TO REFLECT ALL POSSIBLE SIGNAL HEADS, BUT ARE REPRESENTATIVE OF SIGNAL HEADS COMMONLY IN USE. SEE THE TRAFFIC SIGNAL LAYOUT FOR REQUIRED SIGNAL HEADS, AND THE NUMBER AND ORIENTATION OF LOUVERS.

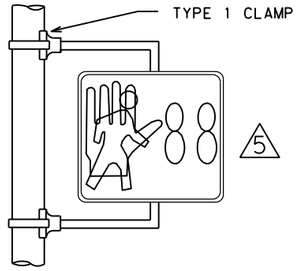
DALLAS DISTRICT STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	(SEE TITLE SHEET)		078
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	KAUFMAN	
CONT.	SECT.	JOB	HIGHWAY NO.
0095	05	063, ETC	US 80, ETC.

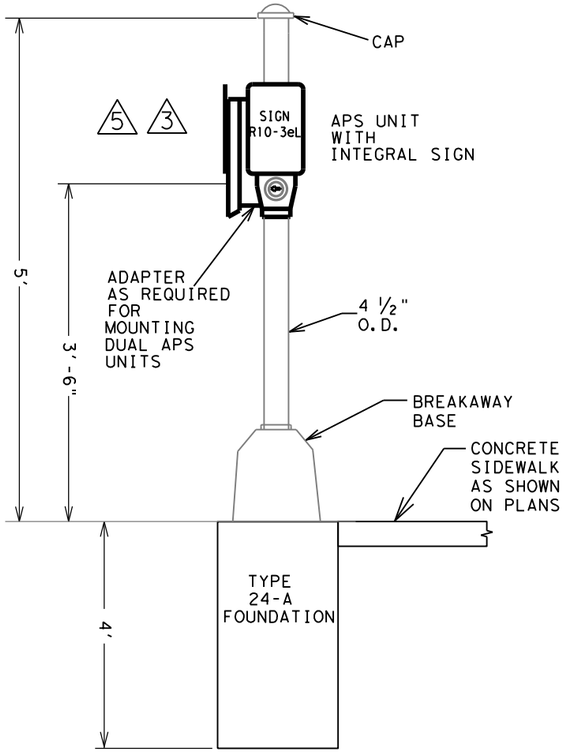
TRAFFIC SIGNAL HEAD DETAILS (DAL)



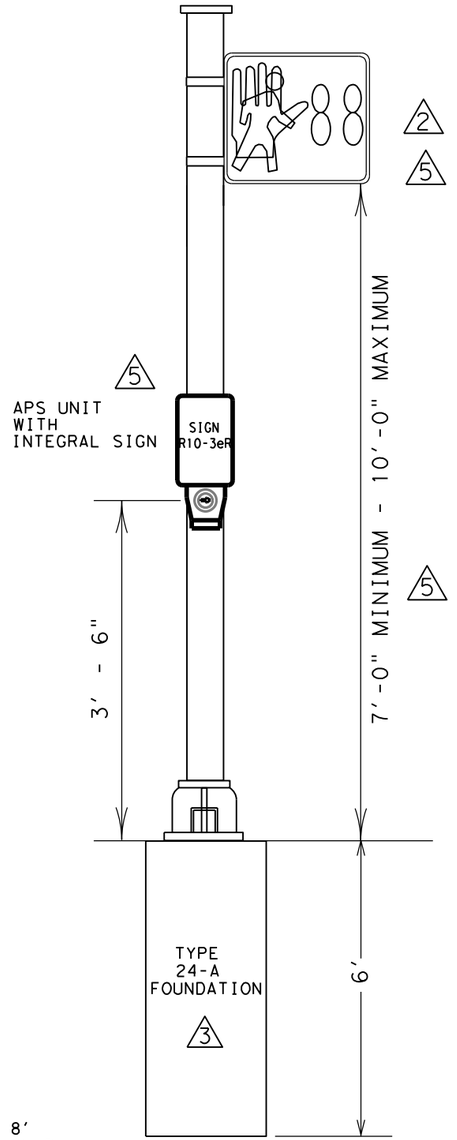
PEDESTRIAN PUSHBUTTON
SIGN DETAILS



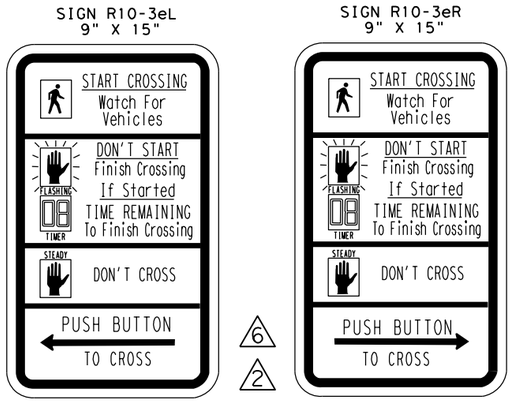
PEDESTRIAN SIGNAL HEAD MOUNTING
FOR ONE PEDESTRIAN SIGNAL HEAD
152A



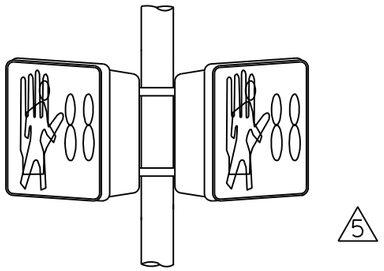
PEDESTRIAN PUSH BUTTON POLE



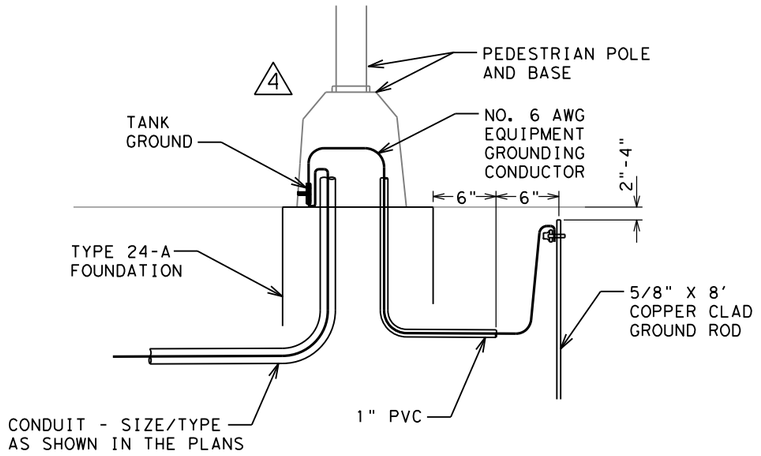
PEDESTAL POLE



COUNTDOWN PEDESTRIAN PUSHBUTTON
SIGN DETAILS

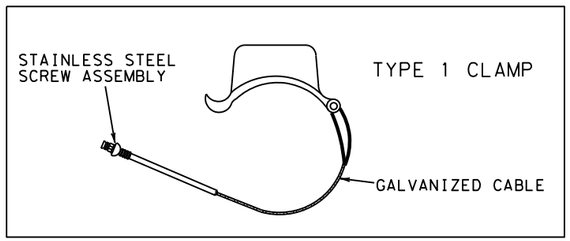


PEDESTRIAN SIGNAL HEAD MOUNTING
FOR TWO PEDESTRIAN SIGNAL HEADS
143C



PEDESTRIAN PUSH BUTTON POLE
GROUNDING DETAILS

NOTE: EITHER TYPE 1 CLAMPS OR CLAM SHELL MOUNTING HARDWARE MAY BE USED AS APPROVED BY THE ENGINEER. FOR CLAM SHELLS, USE ICC P/N 4805 OR McCAIN QUICKMOUNT OR APPROVED EQUAL.



1 ALTERNATIVE MOUNTING METHOD
revised 12-92

2 ALTERNATIVE PEDESTRIAN SIGNAL HEAD AND SIGNING
revised 10-08

3 PEDESTRIAN PUSH BUTTON POLE
revised 01-11

4 PEDESTRIAN PUSH BUTTON POLE GROUNDING DETAILS
revised 09-15

5 APS UNIT ADDED
"SYMBOLS ONLY" PEDESTRIAN SIGNAL HEAD REMOVED
MOUNTING HARDWARE NOTES REVISED
MOUNTING HEIGHT REVISED
revised 06-17

6 APS SIGN REVISED
revised 11-20

NOTES:

5
1. ALL PEDESTRIAN SIGNAL HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
2. ALL WIRING FOR PEDESTRIAN SIGNALS SHALL BE TOTALLY ENCLOSED WITHIN THE SIGNAL MOUNTING HARDWARE.
3. ALL PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON SIGNS SHALL DISPLAY THE SYMBOLIZED MESSAGES SHOWN ABOVE.

NOTE:

THE POLES ON THIS DRAWING ARE SHOWN AS AN EXAMPLE ONLY. POLES OF SIMILAR DESIGN FOR ANY CROSS SECTION WHICH MEET THE SPECIFICATIONS AND REQUIREMENTS SHOWN ON THESE DRAWINGS AND ARE APPROVED BY THE ENGINEER WILL BE DEEMED ACCEPTABLE.

DALLAS DISTRICT STANDARD

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	(SEE TITLE SHEET)		79
STATE	STATE DIST.	COUNTY	
TEXAS	18	KAUFMAN, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0095	05	063, ETC.	US 80, ETC.

PEDESTRIAN SIGNAL HEAD DETAILS (DAL)

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.

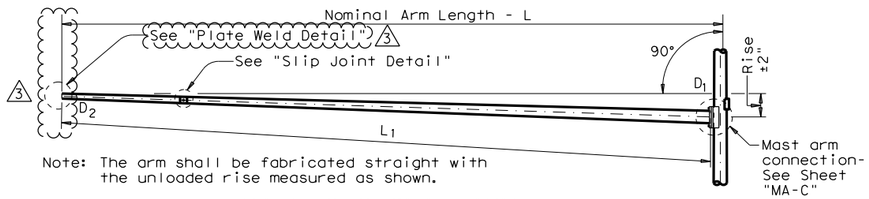
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	(1) thk	D_B	D_{19}	D_{24}	D_{30}	(1) thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	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.

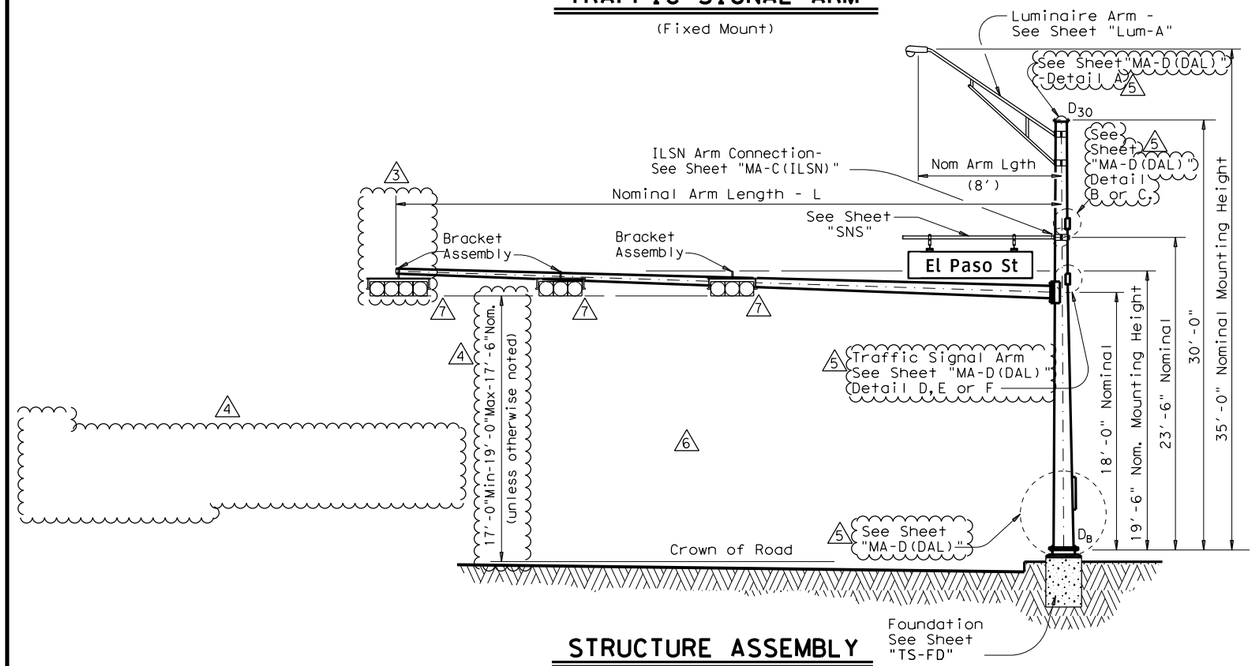
(2) D_2 may be increased by up to 1" for polygonal arms.



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

TRAFFIC SIGNAL ARM

(Fixed Mount)



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	4	36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80	3	44S-80		44-80	
48	48L-80	2	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) 1 Bracket Assembly		2 Bracket Assemblies		3 Bracket Assemblies	
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	4	36III-80	
40			(2) 40II-80		40III-80	
44			44II-80		44III-80	3
48					48III-80	2

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	9

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 1/2"	3'-4"	
1 3/4"	3'-10"	9

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.

MODIFICATIONS:

(1) REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY. (2/12)

(2) ADDITIONAL OPTION. (3/12)

(3) REPLACED TENON DETAIL WITH PLATE WELD DETAIL. (2/12)

(4) REVISED MINIMUM SIGNAL HEIGHT. (3/12)

(5) REPLACED "MA-D" WITH "MA-D(DAL)". (2/12)

(6) REMOVED TABLE OF DIMENSIONS "A". (2/12)

(7) REMOVED CGB CONNECTORS. (2/12)

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

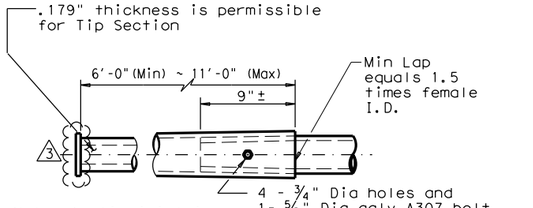
SMA-80(1)-12(DAL)

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

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0095	05	063, ETC	US80, ETC
DIST	COUNTY		SHEET NO.
18	KAUFMAN, ETC		80

122A



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.

4 - ¾" Dia holes and 1- ⅝" Dia galv A307 bolt. Tack weld nut to thread projection after making joint. Repair damaged galvanizing in accordance with Item 445, "Galvanizing".

SLIP JOINT DETAIL

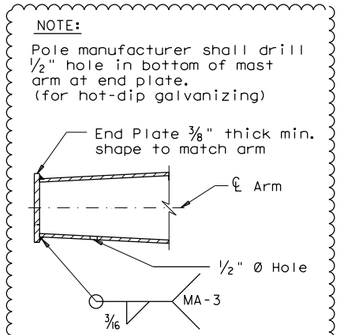
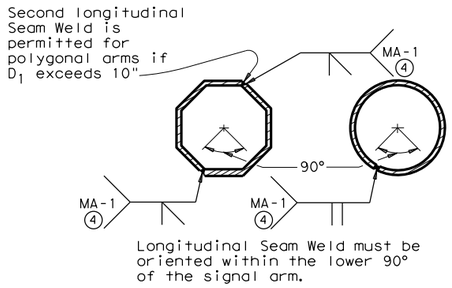


PLATE WELD DETAIL

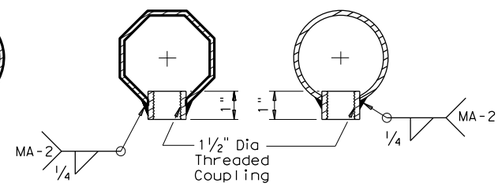
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

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).

⑤ See Standard Sheet "MA-D(DAL)" 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.

③ REPLACED TENON DETAIL WITH PLATE WELD DETAIL(2/12).

⑤ REPLACED "MA-D" WITH "MA-D(DAL)"(2/12).

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

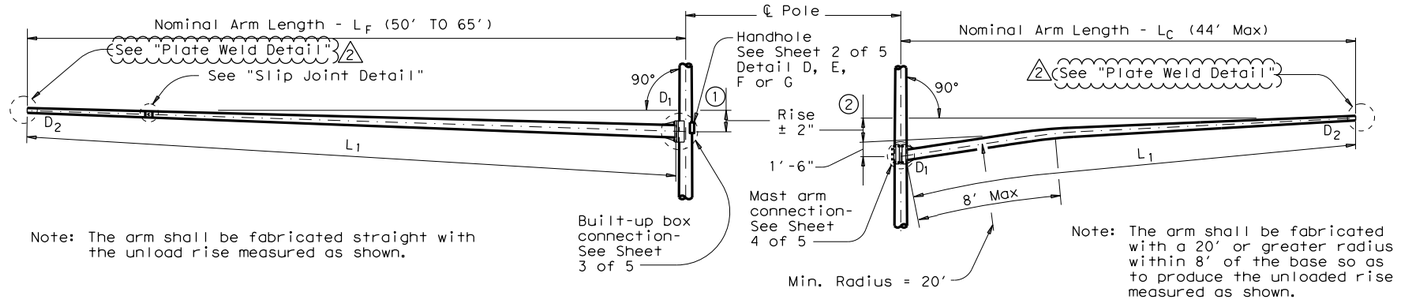
SMA-80(2)-12(DAL)

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

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0095	05	063,ETC	US80, ETC
DIST	COUNTY		SHEET NO.
18	KAUFMAN, ETC		81

122B



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

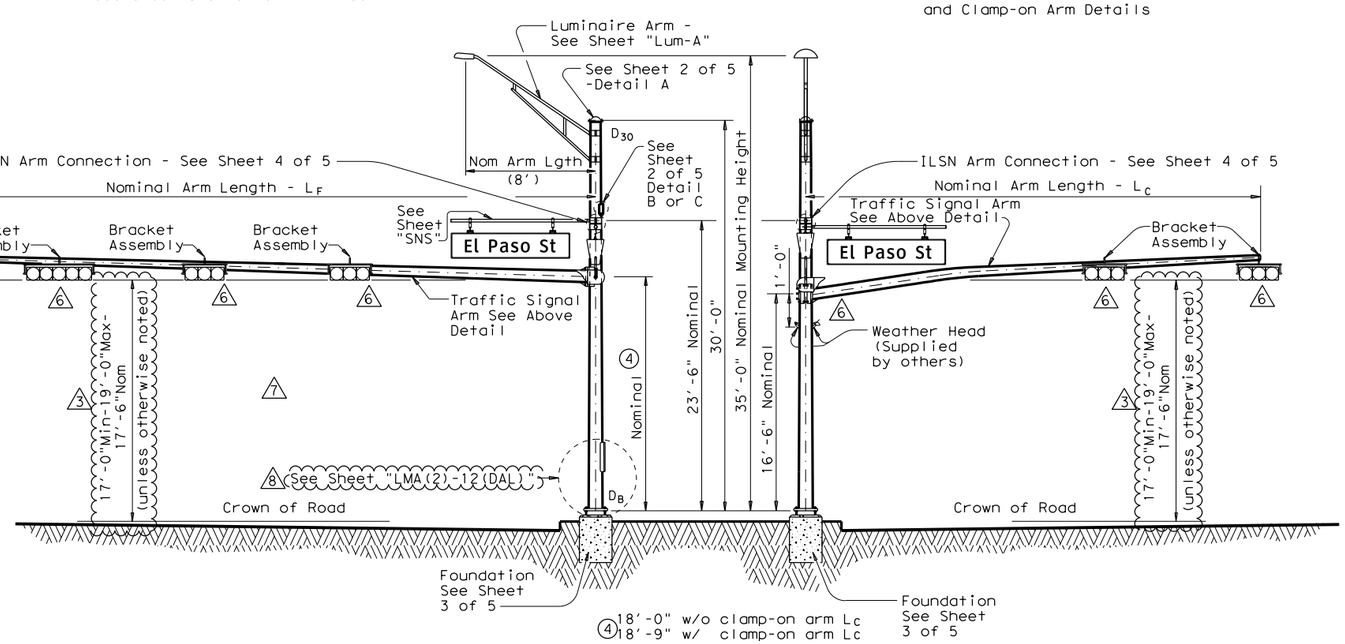
Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

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



4 18'-0" w/o clamp-on arm Lc
18'-9" w/ clamp-on arm Lc

ELEVATION
(Showing fixed mount arm)

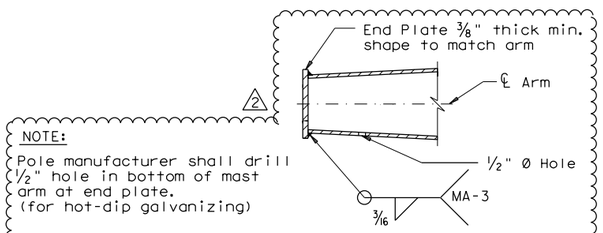
STRUCTURE ASSEMBLY

ELEVATION
(Showing clamp-on arm)

MODIFICATIONS:

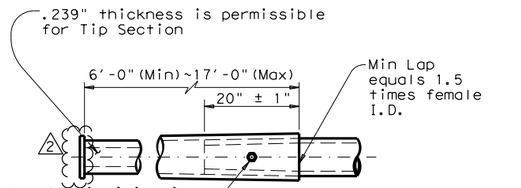
1. NOT USED
2. REPLACED TENON DETAIL WITH PLATE WELD DETAIL. (2/12)
3. REVISED MINIMUM SIGNAL HEIGHT. (3/12)
4. REMOVED "MA-D" REFERENCE. (2/12)
5. REMOVED TABLE OF DIMENSIONS "A". (2/12)
6. REMOVED CGB CONNECTORS. (2/12)
7. REMOVED THREADED COUPLING FOR CGB CONNECTOR. (2/12)
8. REVISED THE ELEVATION OF ACCESS COMPARTMENT. (3/12)

5



NOTE:
Pole manufacturer shall drill ½" hole in bottom of mast arm at end plate. (for hot-dip galvanizing)

PLATE WELD 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.

4 Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "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 SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE) LMA(1)-12(DAL)

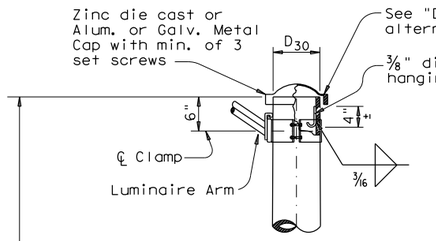
Sheet 1 of 5

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS
4-20-01
1-12

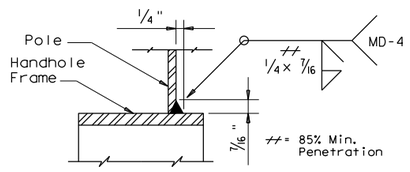
CONT	SECT	JOB	HIGHWAY
0095	05	063,ETC	US80, ETC
DIST	COUNTY		SHEET NO.
18	KAUFMAN, ETC		82

131A

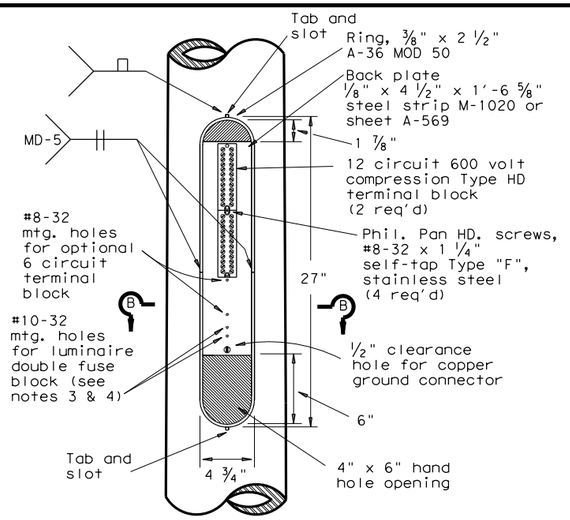


DETAIL A

(for pole with luminaire)



DETAIL H

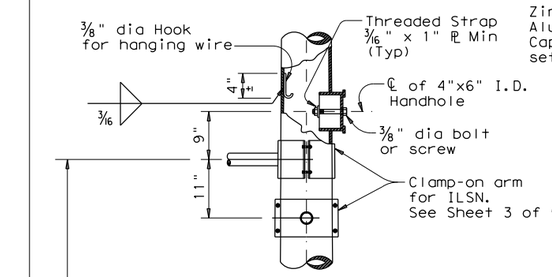


ACCESS COMPARTMENT

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

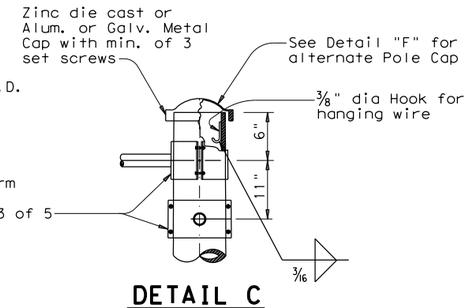
(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(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.

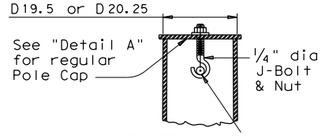


DETAIL B

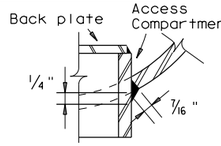
(If ILSN applied)



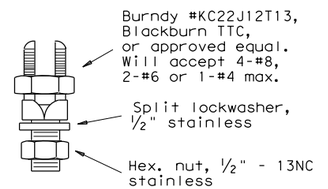
DETAIL C



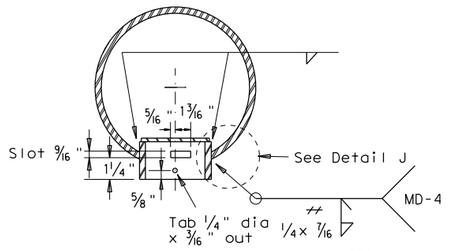
SECTION Y-Y



DETAIL J

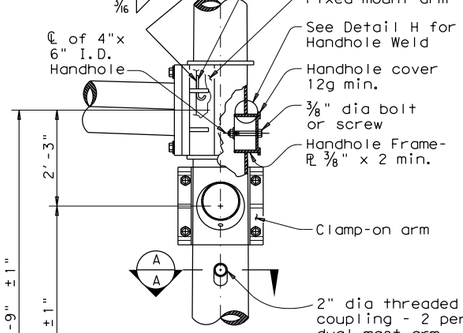


COPPER GROUND CONNECTOR



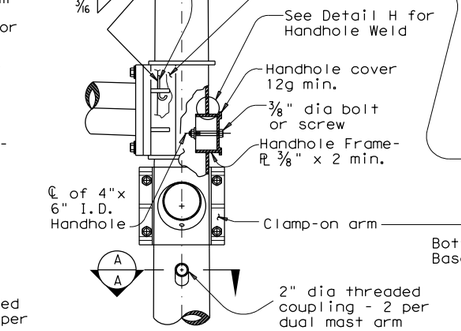
SECTION B-B

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



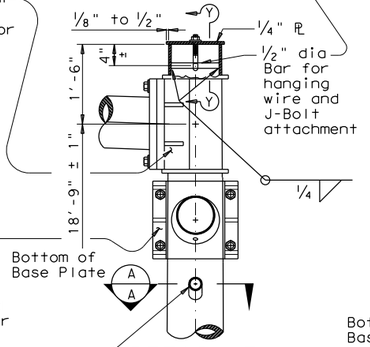
DETAIL D

(for 30' pole with luminaire and ILSN sign)



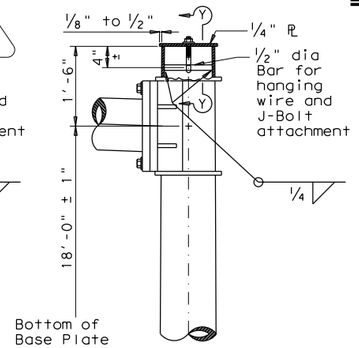
DETAIL E

(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)

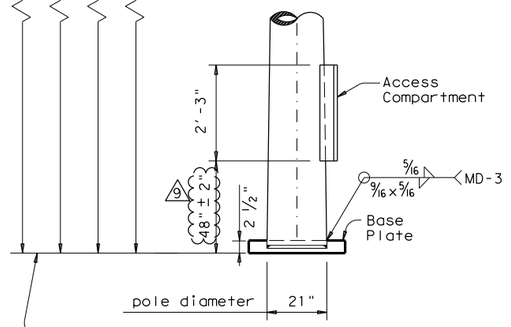


DETAIL G

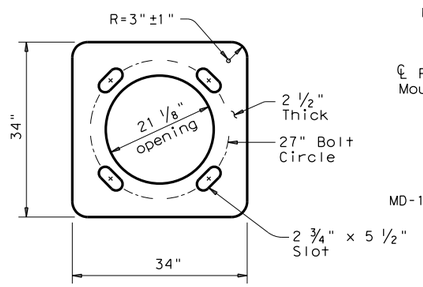
(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

ACCESS COMPARTMENT NOTES:

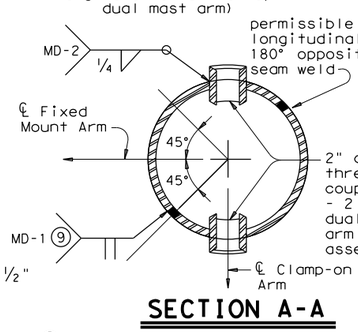
1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20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



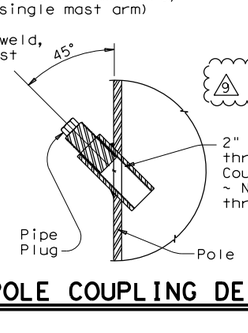
POLE ELEVATION



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.

(9) REVISED THE ELEVATION OF ACCESS COMPARTMENT (2/12).

Texas Department of Transportation

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

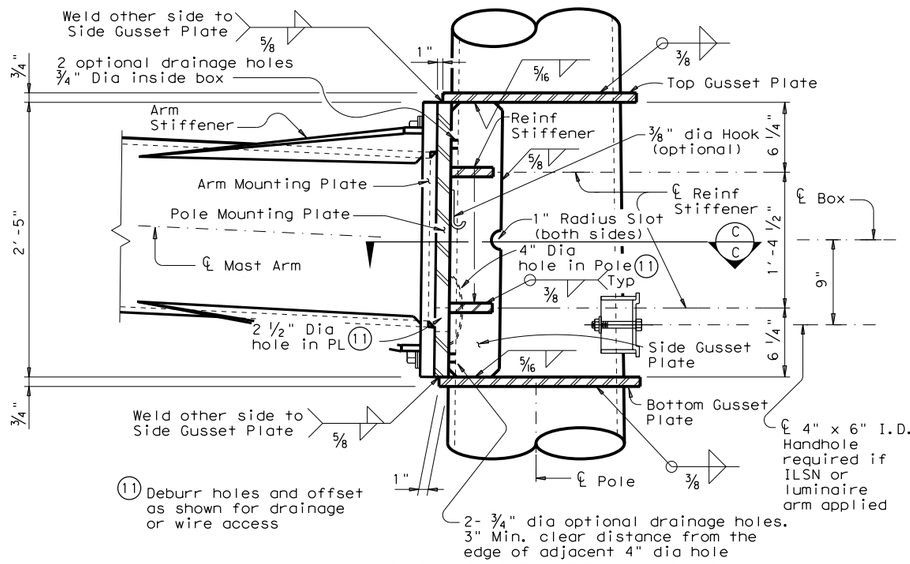
Sheet 2 of 5 — LMA(2)-12(DAL)

DN: JK	CK: GRB	DW: FDN	CK: CAL

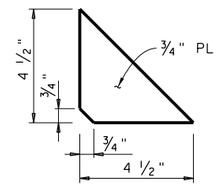
REVISIONS: 4-20-01, 1-12

CONT	SECT	JOB	HIGHWAY
0095	05	063,ETC	US80, ETC
DIST	COUNTY		SHEET NO.
18	KAUFMAN, ETC		83

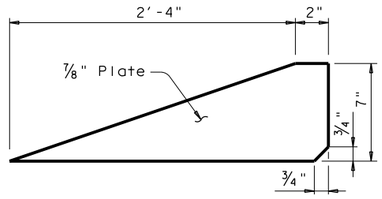
131B



BUILT-UP BOX CONNECTION

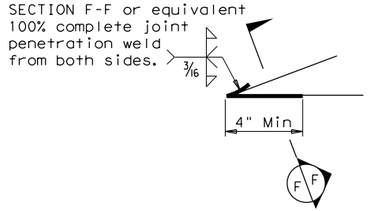


REINFORCING STIFFENER



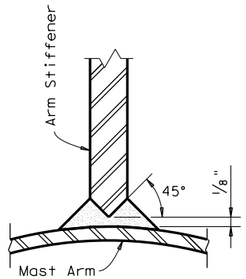
ARM STIFFENER

(Cut to match arm inclination and taper)



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.

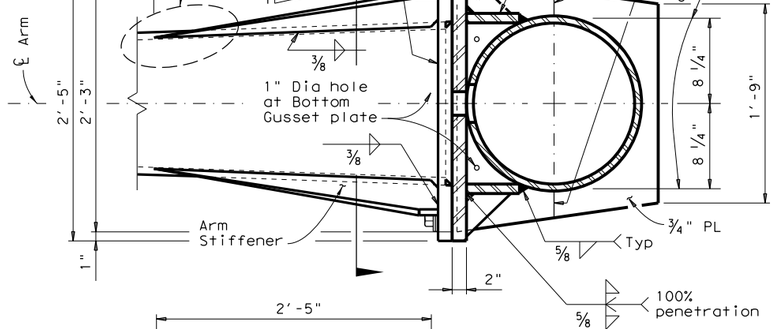
(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

GENERAL NOTES:

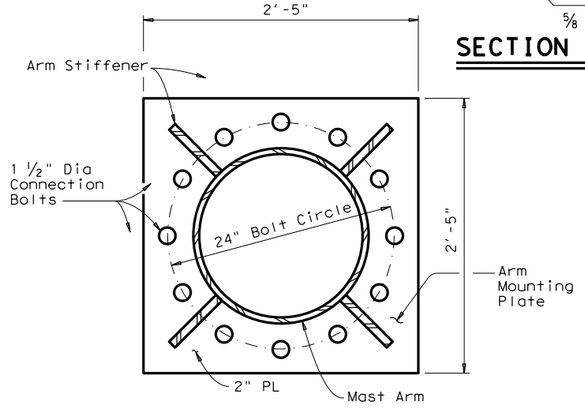
Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, 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.

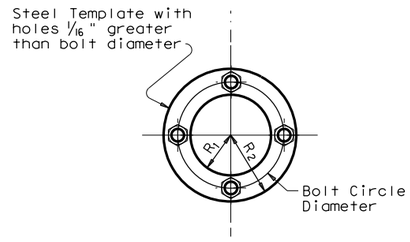


SECTION C-C



SECTION D-D

NUT ANCHOR (TYPE 2)



TEMPLATE DETAIL

ANCHOR BOLT ASSEMBLY

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 Loads.

(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.

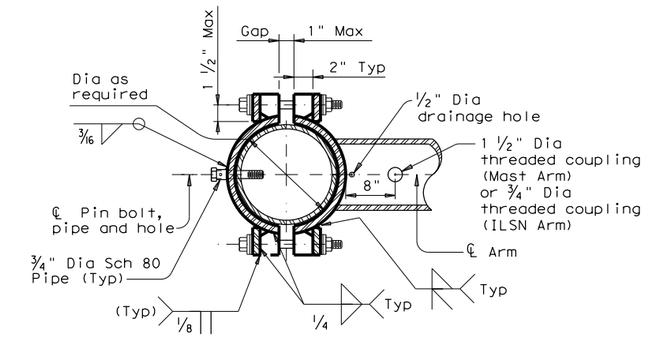
Texas Department of Transportation

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

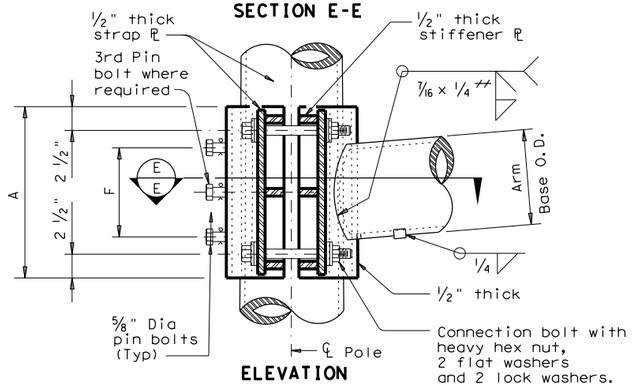
Sheet 3 of 5 LMA(3)-12

REVISIONS	DN: JK	CK: GRB	DW: FDN	CK: CAL
4-20-01 1-12	CONT	SECT	JOB	HIGHWAY
	0095	05	063,ETC	US80, ETC
	DIST	COUNTY		SHEET NO.
	18	KAUFMAN, ETC		84

131C



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"

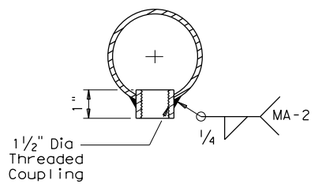
D1 = Arm Base O.D.
D2 = Arm End O.D.
L1 = Shaft Length
Lc = Clamp-on Arm Length

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

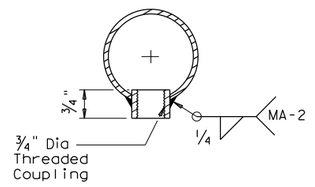
CLAMP-ON ARM CONNECTION

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



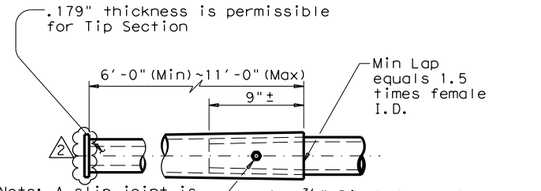
ILSN ARM COUPLING DETAIL

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.

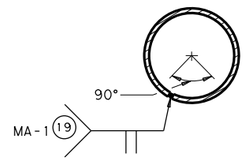
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have 3/16" diameter holes for a ⅛" diameter galvanized cotter pin. Back clamp plate shall be furnished with 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.



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.

2 REPLACED TENON DETAIL WITH PLATE WELD DETAIL (2/12).

Texas Department of Transportation

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(DAL)

REVISIONS
4-20-01
1-12

DN: JK	CK: GRB	DW: FDN	CK: CAL

CONT	SECT	JOB	HIGHWAY
0095	05	063, ETC	US80, ETC
DIST	COUNTY		SHEET NO.
18	KAUFMAN, ETC		85

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		50S		50	
55	55L	2	55S		55	
60	60L	1	60S		60	
65	65L		65S		65	
Dual Mast Arm						
Lf ft. / Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50 / 20	5020L		5020S		5020	
24	5024L		5024S		5024	
28	5028L		5028S		5028	
32	5032L		5032S		5032	
36	5036L		5036S		5036	
40	5040L		5040S		5040	
44	5044L		5044S		5044	
55 / 20	5520L		5520S		5520	
24	5524L		5524S		5524	
28	5528L		5528S		5528	
32	5532L		5532S		5532	
36	5536L		5536S		5536	
40	5540L		5540S		5540	
44	5544L		5544S		5544	
60 / 20	6020L		6020S		6020	
24	6024L		6024S		6024	
28	6028L		6028S		6028	
32	6032L		6032S		6032	
36	6036L		6036S		6036	
40	6040L		6040S		6040	
44	6044L		6044S		6044	
65 / 20	6520L		6520S		6520	
24	6524L		6524S		6524	
28	6528L		6528S		6528	
32	6532L		6532S		6532	
36	6536L		6536S		6536	
40	6540L		6540S		6540	
44	6544L		6544S		6544	

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet) 48-A
MOCKINGBIRD LN @ CARPENTER FWY			
P-5	10	1	22
P-8	10	1	22
P-11	10	1	22
Total Drill Shaft Length			66

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.

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) 1 4 Bracket Assemblies	
ft.	Designation	Quantity
50	50IV	
55	55III	2
60	60IV	1
65	65IV	

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	

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) 1 Bracket Assembly and 1clamp w/bolts and washers		Type II Arm (2 Signals) 2 Bracket Assemblies and 1clamp w/bolts and washers		Type III Arm (3 Signals) 3 Bracket Assemblies and 1clamp 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) 1 Bracket Assembly and 1clamp w/bolts and washers		Type II Arm (2 Signals) 2 Bracket Assemblies and 1clamp w/bolts and washers		Type III Arm (3 Signals) 3 Bracket Assemblies and 1clamp w/bolts and washers	
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"	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.

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

1 REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY(2/12).

Texas Department of Transportation

LONG MAST ARM ASSEMBLY PARTS LIST LMA(5)-12(DAL)

Sheet 5 of 5

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS
4-20-01 1-12

CONT	SECT	JOB	HIGHWAY
0095	05	063,ETC	US80, ETC
DIST	COUNTY		SHEET NO.
18	KAUFMAN, ETC		86

131E

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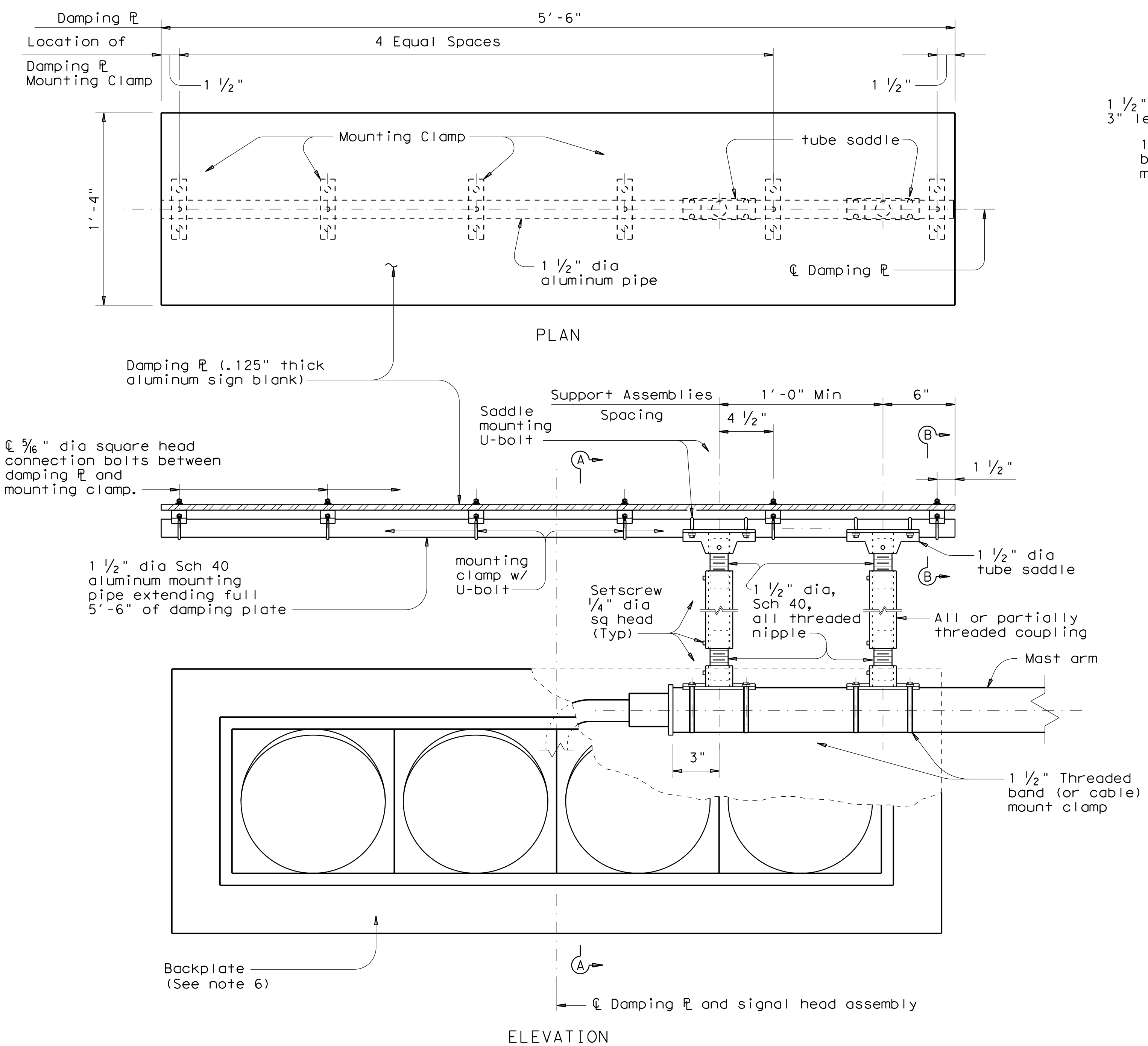
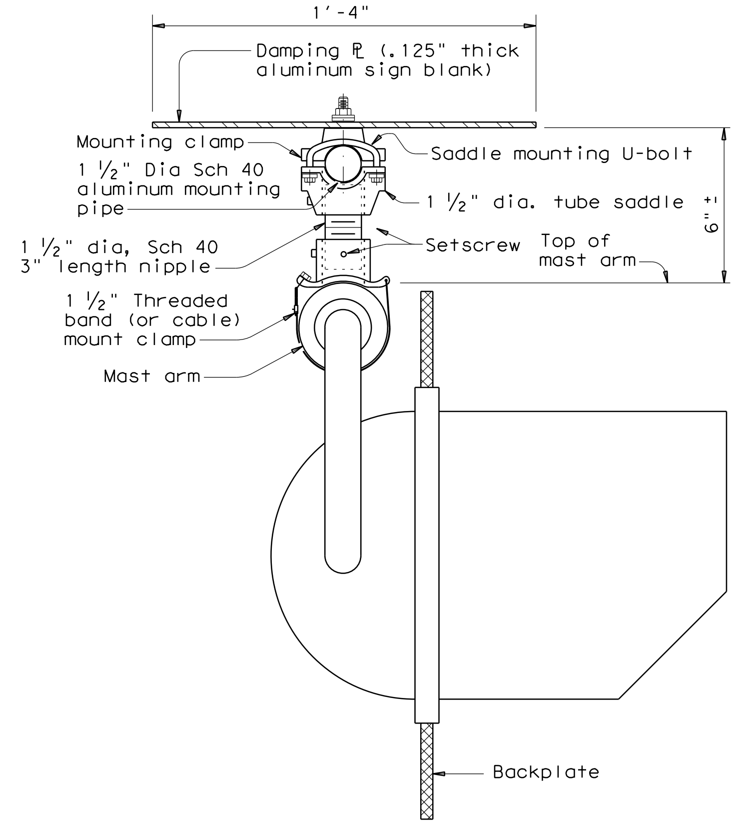


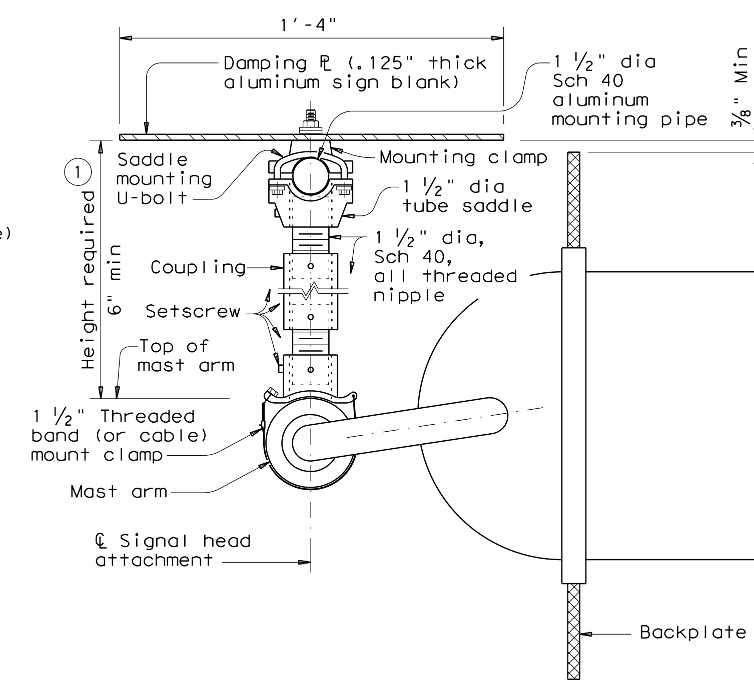
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

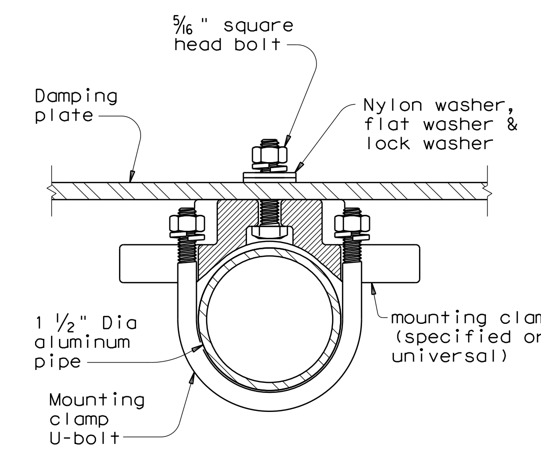


SECTION A-A

(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.
2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.
3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.
4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".
5. Contractor will verify applicable field dimensions before the installation.
6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.



SECTION B-B

(Showing damping plate attachment)

(1) Recommended supporting assemblies to achieve required height for horizontal section heads

Height required	One nipple each length	Two nipples each length	plus	One coupling each length
6"-6 ¾"	3"	-		-
7"-8 ½"	4"	-		-
9"-10 ½"	6"	-		-
11"-15 ½"	-	4"		5"
16"-24"	-	6"		10"

Texas Department of Transportation

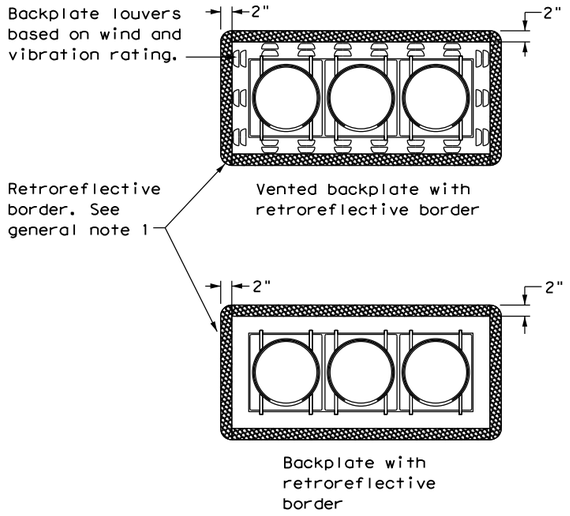
Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

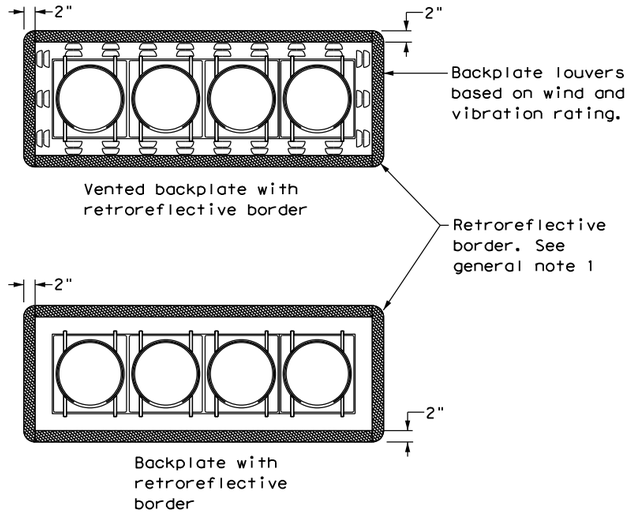
MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 6-20	0095	05	063, ETC	US 80, ETC.
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	87

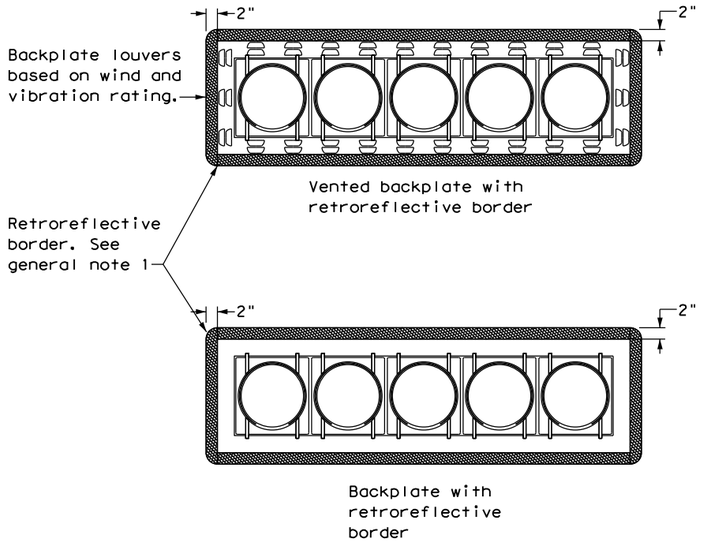
DATE:
FILE:



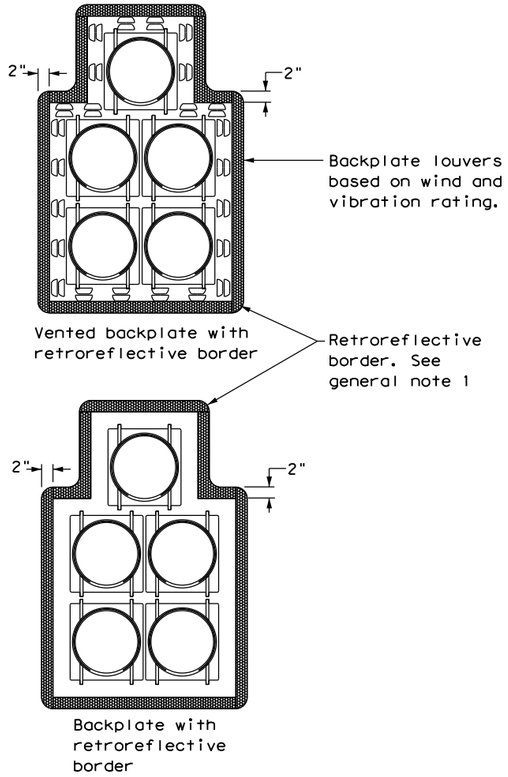
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



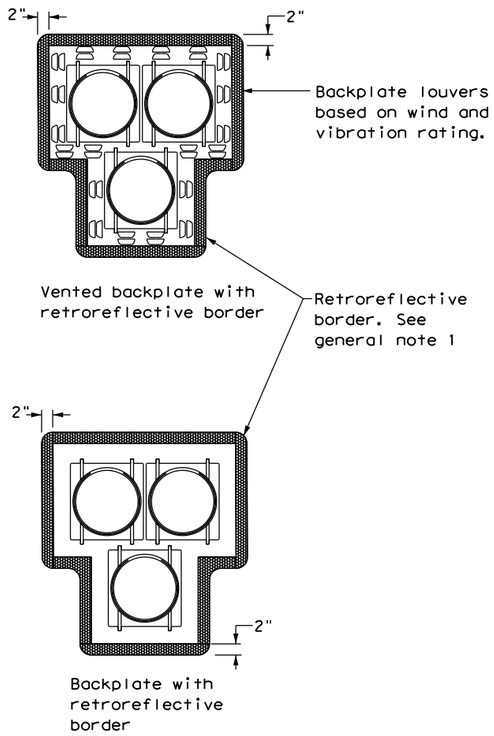
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



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

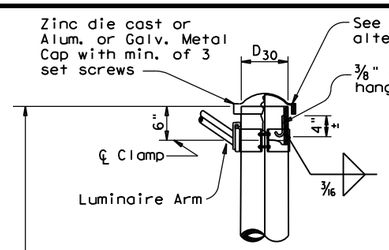
Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

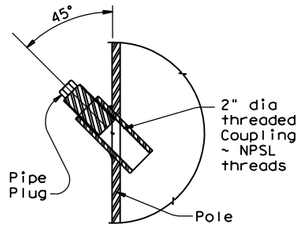
TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		88

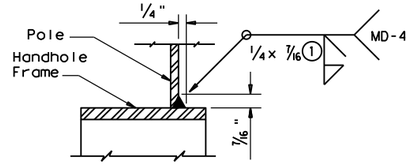


DETAIL A

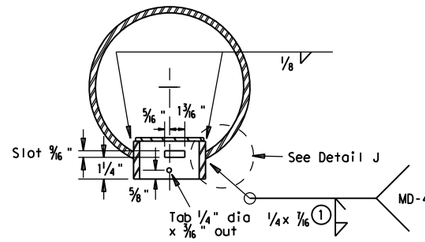
(for pole with luminaire)



POLE COUPLING DETAIL

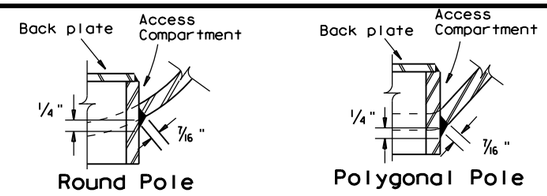


DETAIL G

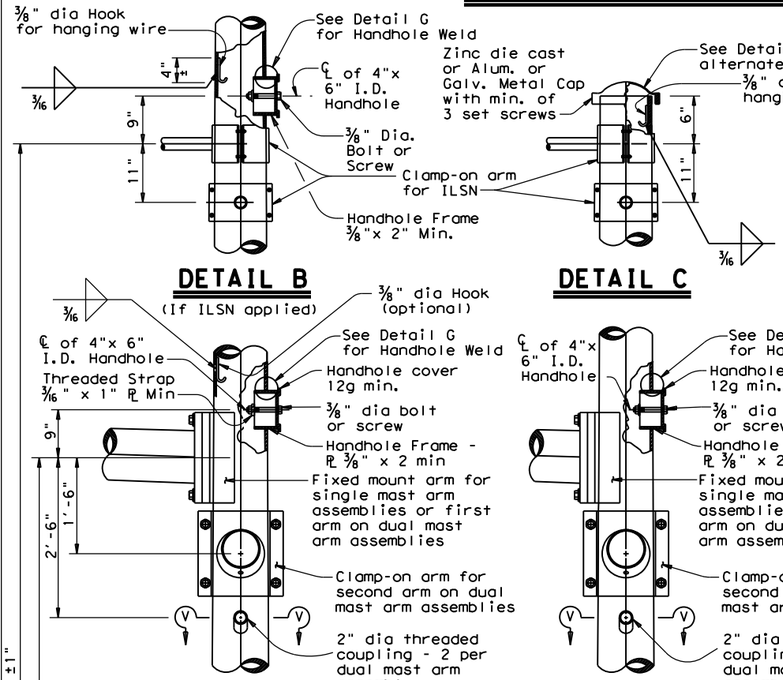


SECTION X-X

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



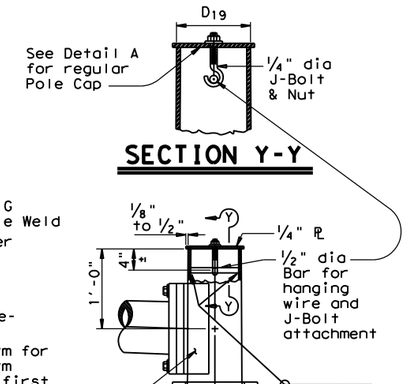
DETAIL J



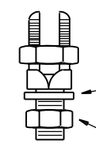
DETAIL B

(If ILSN applied)

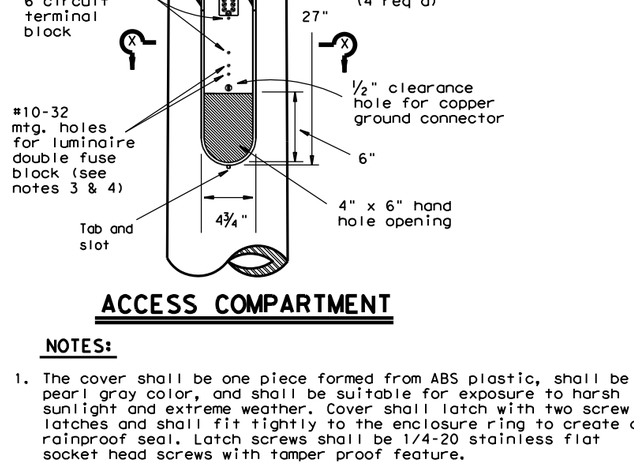
DETAIL C



SECTION Y-Y



COPPER GROUND CONNECTOR



ACCESS COMPARTMENT

DETAIL D

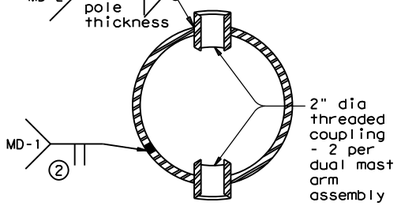
(for 30' pole with luminaire and ILSN sign)

DETAIL E

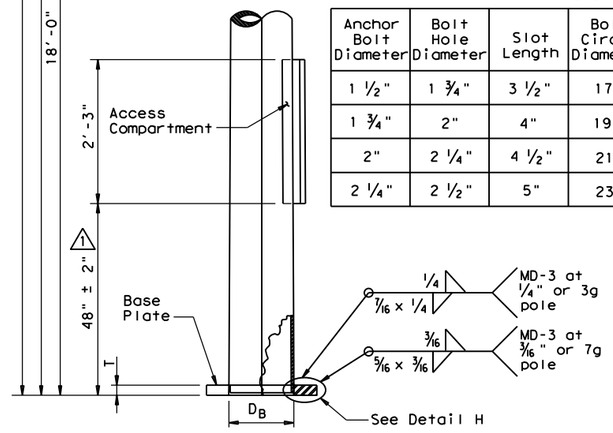
(for 24' pole with ILSN sign and no luminaire)

DETAIL F

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

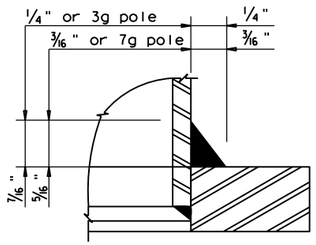


SECTION V-V

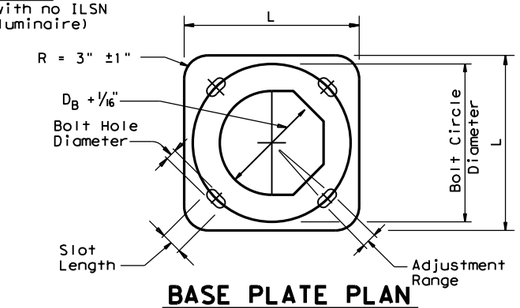


POLE ELEVATION

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.

1 REVISED THE ELEVATION OF ACCESS COMPARTMENT (2/12).

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 SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12(DAL)

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

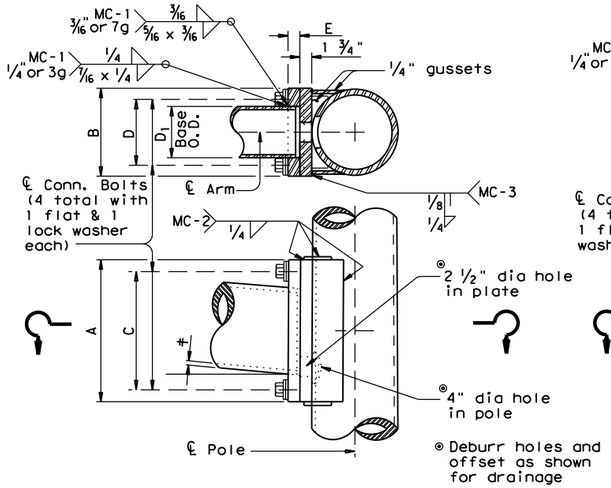
REVISIONS
8-99
1-12

CONT	SECT	JOB	HIGHWAY
0095	05	063, ETC.	US 80, ETC.
DIST	COUNTY		SHEET NO.
DAL	KAUFMAN, ETC.		89

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:

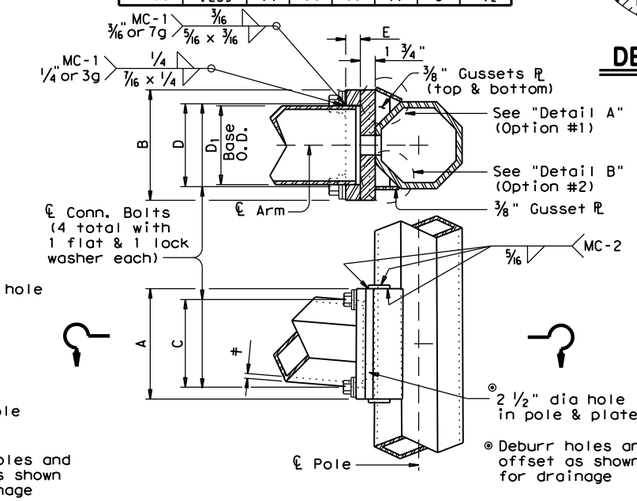
ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 3/4	1
7.5	.179	13	9	10	6	1 3/4	1
8.0	.179	14	10	11	7	2	1 1/4
9.0	.179	16	11	13	8	2	1 1/4
9.5	.179	17	12	14	9	2	1 1/4
9.5	.239	18	12	15	9	2	1 1/4
10.0	.239	18	12	15	9	2	1 1/4
10.5	.239	18	13	15	10	3	1 1/2
11.0	.239	18	13	15	10	3	1 1/2



FIXED MOUNT DETAIL 1

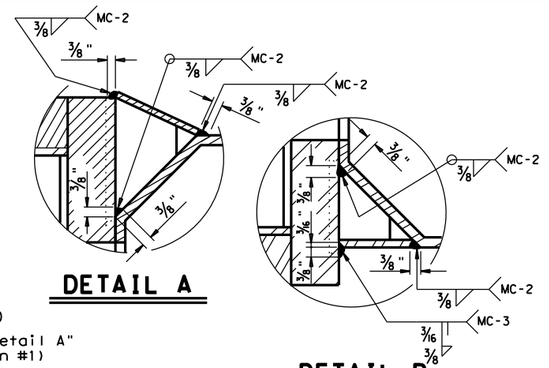
ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3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

ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 3/4	1 1/4
7.5	.179	11	11	8	8	1 3/4	1 1/4
8.0	.179	11	11	8	8	2	1 1/4
9.0	.179	13	13	10	10	2	1 1/4
10.0	.179	13	13	10	10	2	1 1/4
9.5	.239	13	13	10	10	2	1 1/4
10.0	.239	14	14	11	11	2	1 1/2
11.0	.239	14	14	11	11	3	1 1/2
11.5	.239	14	14	11	11	3	1 1/2



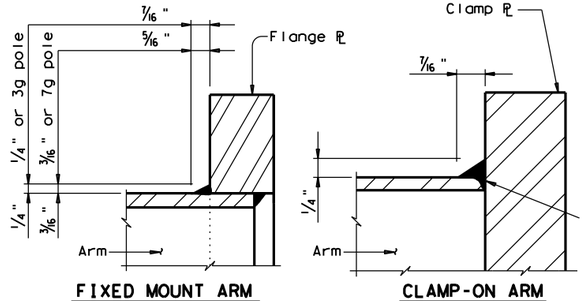
FIXED MOUNT DETAIL 2

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



DETAIL A

DETAIL B



FIXED MOUNT ARM

CLAMP-ON ARM

ARM BASE WELD DETAILS

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

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

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

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

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

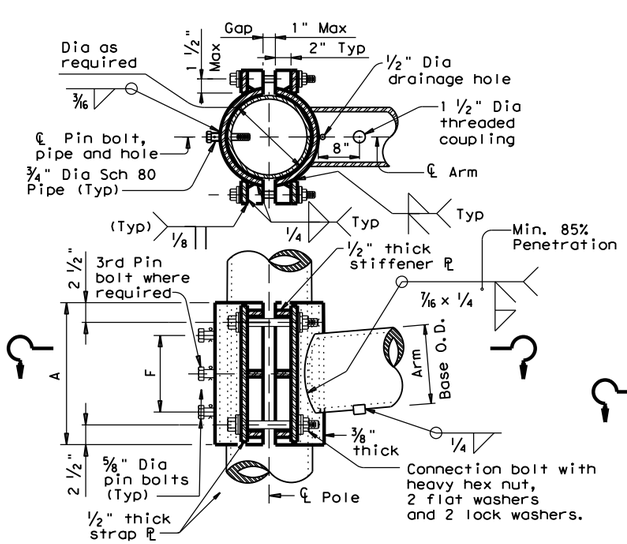
Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

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

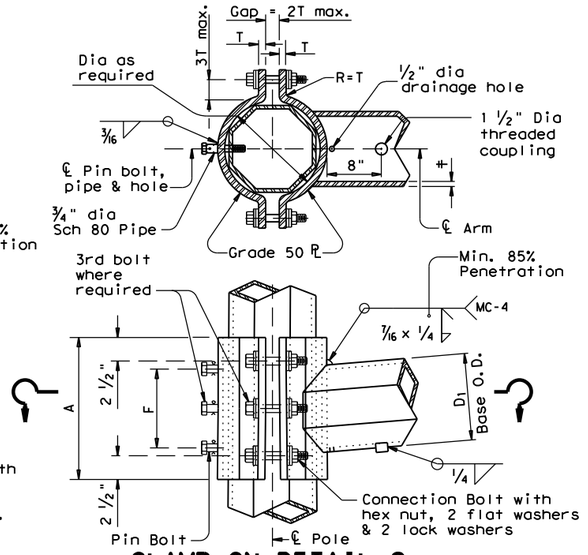
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

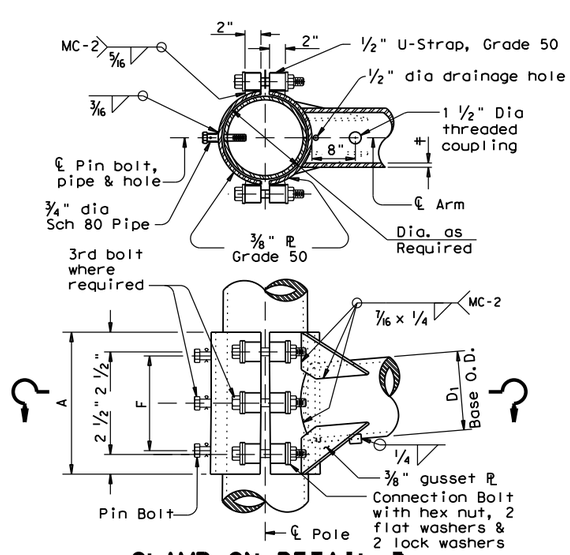
Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4" dia pipe shall have 3/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



CLAMP-ON DETAIL 1



CLAMP-ON DETAIL 2



CLAMP-ON DETAIL 3

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

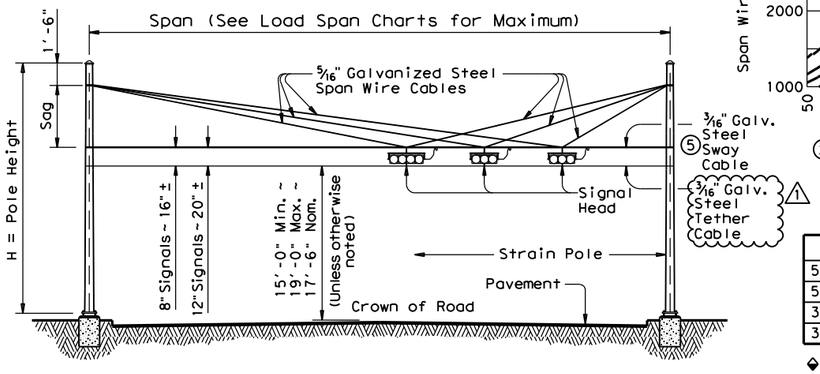
REVISIONS
5-96
5-09
1-12

DN: MS	CK: JSY	DW: MMF	CK: JSY
CONT	SECT	JOB	HIGHWAY
0095	05	063, ETC.	US 80, ETC.
DIST	COUNTY		SHEET NO.
DAL	KAUFMAN, ETC.		90

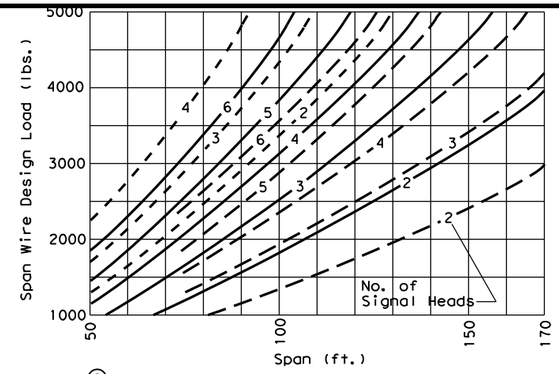
126A

STRAIN POLE DESCRIPTION	Pole Type	Foundation Type	Maximum Permissible Span Wire Load (lbs.)
26' Pole	A	36-A	5200
30' Pole	B	36-A	4600
30' Pole with Lum.	B	36-A	4400
30' Pole with 20' Mast Arm	C	36-B	5600
30' Pole with 24' Mast Arm	C	36-B	5500
30' Pole with 28' Mast Arm	C	36-B	5300
30' Pole with 32' Mast Arm	C	36-B	5100
30' Pole with 36' Mast Arm	C	36-B	4900
30' Pole with 20' Mast Arm & Lum.	C	36-B	5300
30' Pole with 24' Mast Arm & Lum.	C	36-B	5200
30' Pole with 28' Mast Arm & Lum.	C	36-B	5000
30' Pole with 32' Mast Arm & Lum.	C	36-B	4800
30' Pole with 36' Mast Arm & Lum.	C	36-B	4500
34' Pole	D	36-B	5600
34' Pole with Lum.	D	36-B	5400

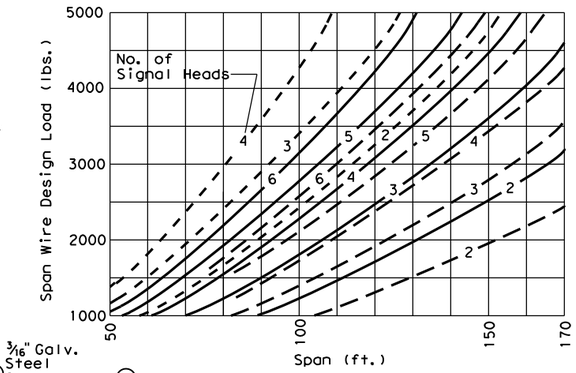
② Numbers on Load Span Charts indicate the number of signal heads on the span. The total span wire design load is based on one 5-section head and one or more additional 3-section head(s). Design wind pressures on cables are assumed as 1.0 lb/ft. Weight of span wire cables (one per signal head) is assumed as 0.65 lb/ft which includes an allowance for conductor cables and miscellaneous hardware. The effect of the sway cable on load distribution is ignored as it is assumed to break at design wind conditions. When a pole supports 2 spans, the span wire design loads for both spans should be added vectorially to determine the design load for that pole.



STRAIN POLE ELEVATIONS HORIZONTAL SIGNALS



② SIGNALS WITH 12-INCH LENS

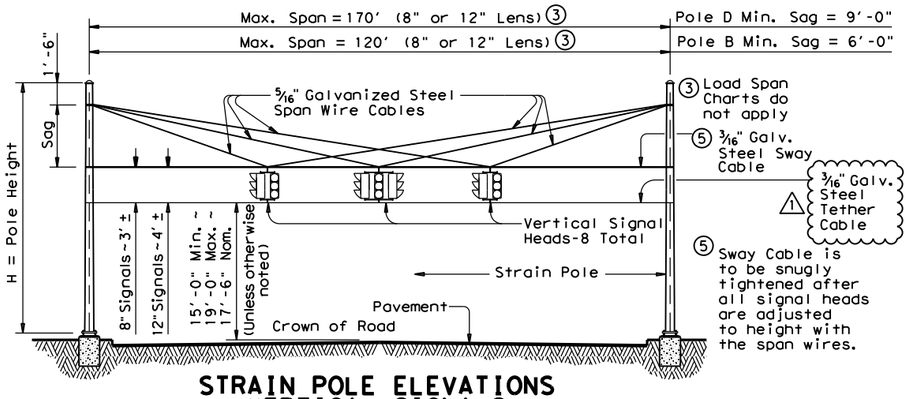


② SIGNALS WITH 8-INCH LENS

Signal Head Type	Wt. Per Head	Wind Area ◆
5-Section, 12" Lens	125 lbs	9.6 sq. ft.
5-Section, 8" Lens	70 lbs	4.8 sq. ft.
3-Section, 12" Lens	75 lbs	5.64 sq. ft.
3-Section, 8" Lens	45 lbs	3.0 sq. ft.

◆ Effective projected design wind area (actual area times drag coefficient)

- - - - - - Sag = 4'-6" (26' or 30' Pole)
——— Sag = 8'-0" (30' or 34' Pole)
— — — · Sag = 11'-6" (34' Pole)



STRAIN POLE ELEVATIONS VERTICAL SIGNALS

(Mast arms are not used with vertical signals)

SHIPPING PARTS LIST

Poles (Without Traffic Signal Arm)

Pole Type	Strain poles with Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap, 2 clamp-on simplex and 1 pipe plug.			Strain poles without Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap and 1 pipe plug.		
	Description	Designation	Quantity	Description	Designation	Quantity
A				26' Strain Pole	SP 26 A-80	
B	30' Strain Pole	SPL 30 B-80		30' Strain Pole	SP 30 B-80	
D	34' Strain Pole	SPL 34 D-80	4	34' Strain Pole	SP 34 D-80	

Poles (With Traffic Signal Arm)

Pole Type	Strain poles with Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap, clamp-on simplex and 3 pipe plugs.			Strain poles without Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap and 3 pipe plugs.		
	Description	Designation	Quantity	Description	Designation	Quantity
C	30' SPw/TS Arm	SPL 30 C-80		30' SPw/TS Arm	SP 30 C-80	

Traffic Signal Arms (For Type C poles)

Nominal Arm Length	Type I Arm (1 Signal): Ship each Type I Arm with the following hardware attached: 2 CGB Connectors, 1 clamp with bolts and washers		Type II Arm (2 Signals): Ship each Type II Arm with the following hardware attached: 1 Bracket Assembly ①, 3 CGB Connectors and 1 clamp with bolts and washers		Type III Arm (3 Signals): Ship each Type III Arm with the following hardware attached: 2 Bracket Assemblies ①, 4 CGB Connectors and 1 clamp with bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24 II -80			
28	28I-80		28 II -80			
32			32 II -80		32 III -80	
36			36 II -80		36 III -80	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Templates may be removed for shipment. Quantity
1 ¾"	3'-10"	
2"	4'-3"	4

Luminaire Arms

Nominal Arm Length	Quantity
8' Arm	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".

① See Sheet "DMA-80"

Pole Type	ROUND POLES D_B in.	D_T in.	(4)thk in.	H ft.	POLYGONAL POLES D_B in.	D_T in.	(4)thk in.	H ft.
A	12.5	8.9	.239	26	13.0	9.0	.239	26
B	13.5	9.3	.239	30	14.0	9.0	.239	30
C	15.5	11.3	.239	30	16.0	11.0	.239	30
D	15.5	10.7	.239	34	16.0	11.0	.239	34

④ Thickness shown are minimum, thicker materials may be used.

D_B = Pole Base O.D. D_T = Pole Top O.D. H = Pole Height

MODIFICATIONS:

⚠1 ADDED BOTTOM STEEL TETHER CABLE. (2/12)

SHEET 1 OF 2

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES STRAIN POLE ASSEMBLIES

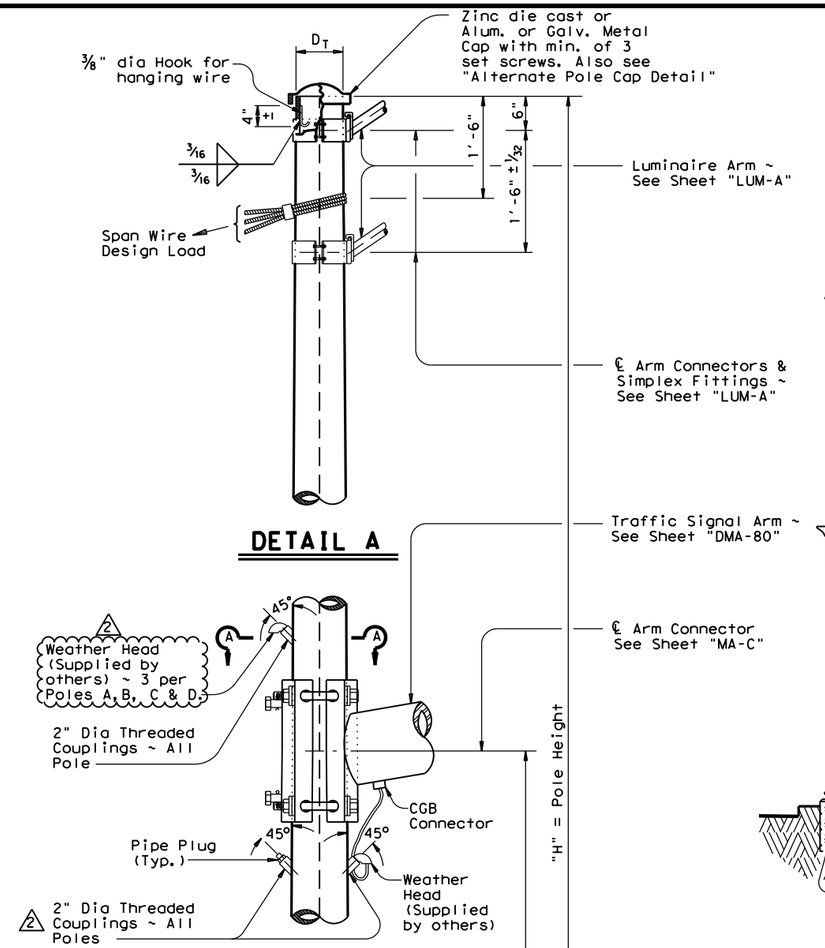
(80 MPH WIND ZONE)

SP-80(1)-12(DAL)

DN: MS	CK: JSY	DW: BR	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
6-96	0095	05	063, ETC.	US 80, ETC.
1-12	DIST	COUNTY		SHEET NO.
	18	KAUFMAN, ETC.		91

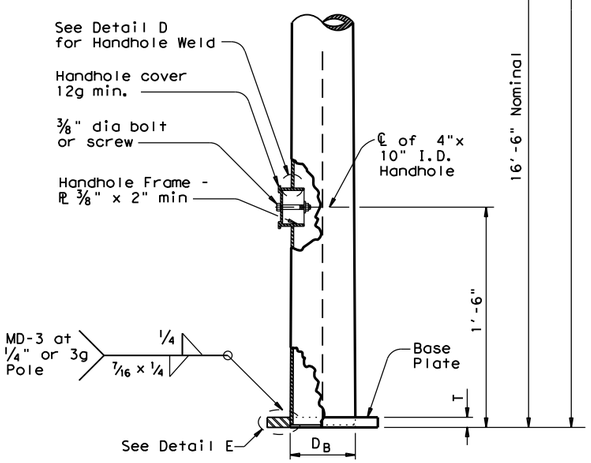
120A

FILE: T:\DALTRAFSD\Jason Pascoe\FM2728 Signal Layout.dgn



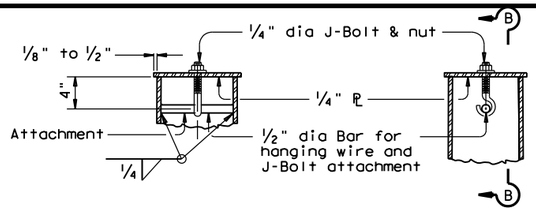
DETAIL A

DETAIL B



DETAIL C

POLE ELEVATION



SECTION B-B

ALTERNATE POLE CAP DETAIL

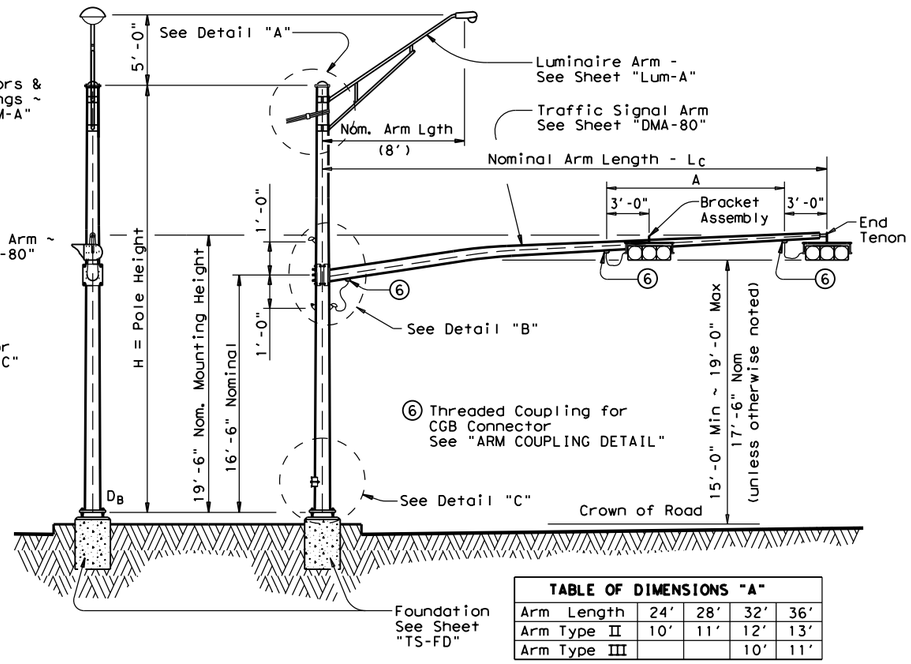
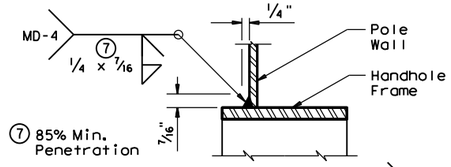
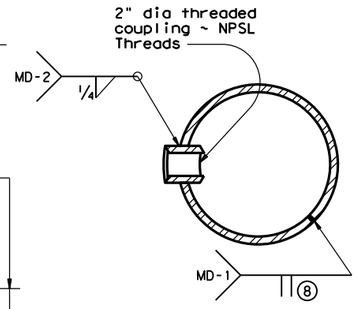


TABLE OF DIMENSIONS "A"				
Arm Length	24'	28'	32'	36'
Arm Type II	10'	11'	12'	13'
Arm Type III			10'	11'

STRUCTURE ASSEMBLY

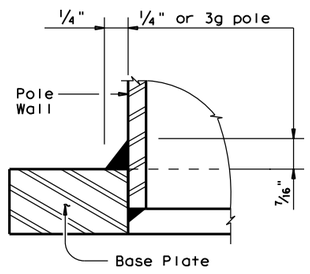


DETAIL D



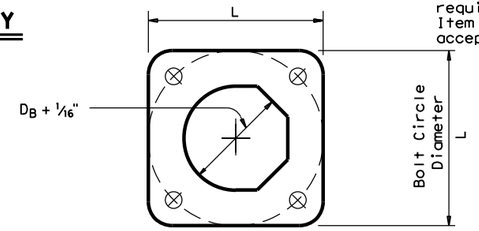
SECTION A-A

(Pole Coupling and Seam Weld Details)

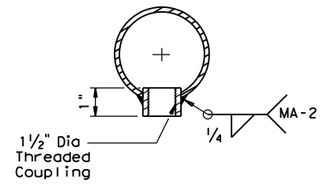


DETAIL E

8 60% Min. penetration, except 100% penetration within 6" of circumferential base welds.



BASE PLATE PLAN



ARM COUPLING DETAIL

2 CHANGED TO 3 WEATHERHEAD ACCESS POINTS FOR POLES A, B, C AND D(3/12).

MATERIALS	
Round Shafts or Polygonal Shafts 9	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 10
Plates 9	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 except where noted
Pin Bolts	ASTM A325
Pipe 9	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Steel Cable	ASTM A475, 7 Wire Utilities Grade
Misc. Hardware	Galvanized steel or stainless steel or as noted

9 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.

10 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.

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. The maximum permissible span wire design loads tabulated are calculated at a stress load of 1.4 times the basic allowable stress. A simultaneous wind on the pole, mast arm, and luminaire is also included.

See standard sheet "DMA-80" for details of clamp-on traffic signal arms, sheet "MA-C" for traffic signal arm connection details, sheet "LUM-A" for luminaire arm and connection details, and sheet "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. 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.

Foundation Type	Anchor Bolt Diameter	Bolt Hole Diameter	Bolt Circle Diameter	Base ℞ Dim. L x T
36-A	1 3/4"	2"	19"	19" x 1 3/4"
36-B	2"	2 1/4"	21"	21" x 2"

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES STRAIN POLE ASSEMBLIES

(80 MPH WIND ZONE)

SP-80(2)-12(DAL)

REVISIONS
6-96
1-12

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

CONT	SECT	JOB	HIGHWAY
0095	05	063, ETC.	US 80, ETC.
DIST	COUNTY		SHEET NO.
18	KAUFMAN, ETC.		92

120B

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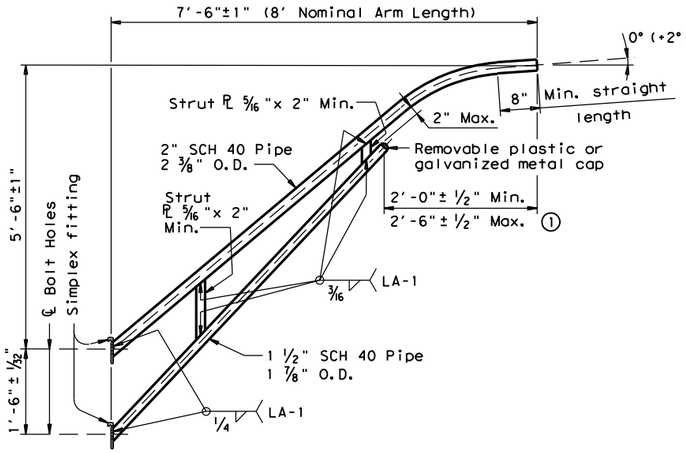
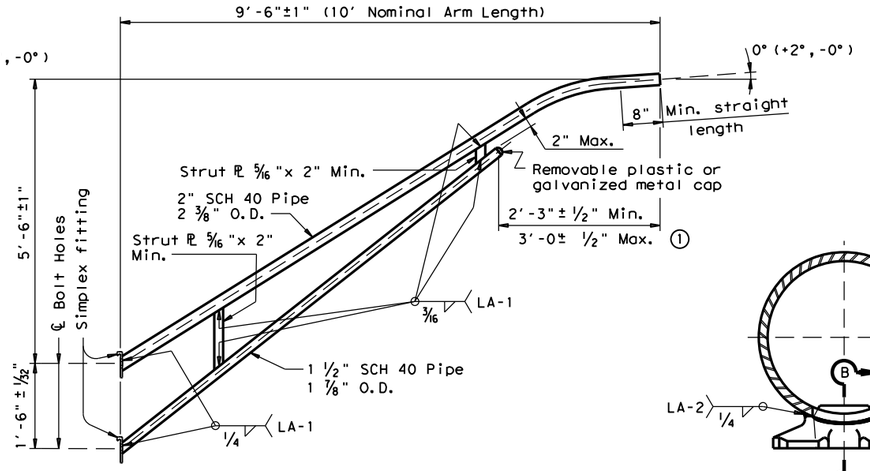
DATE:
FILE:



8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM

DIRECT ATTACHMENT DETAIL

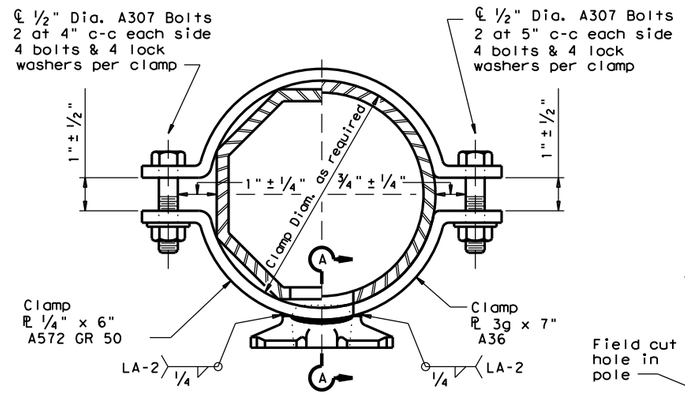
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(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.

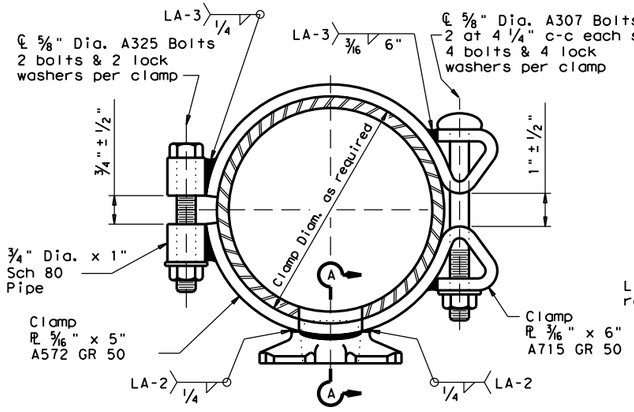
(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(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.



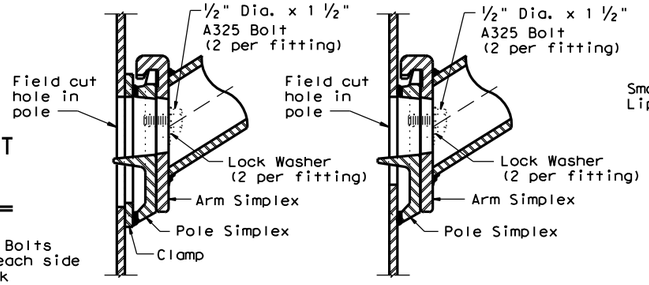
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

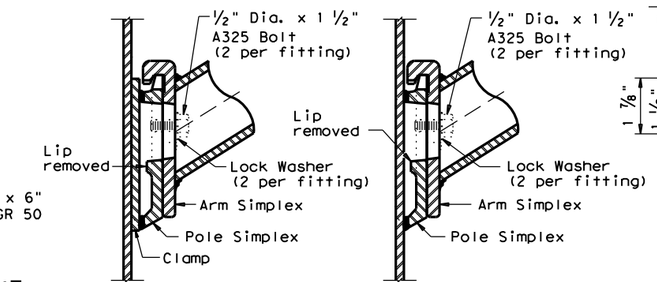
CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)



POLE SIMPLEX DETAIL

UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING

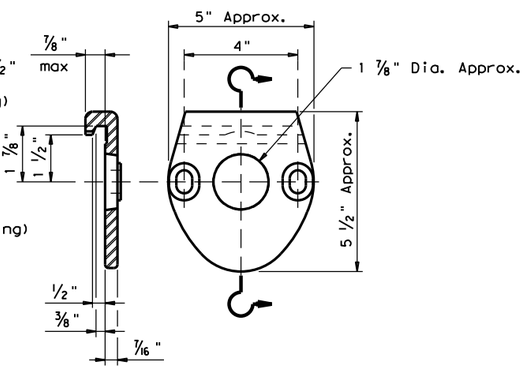


LOWER SIMPLEX FITTING

SECTON A-A

LOWER SIMPLEX FITTING

SECTON B-B



ARM SIMPLEX DETAIL

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.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

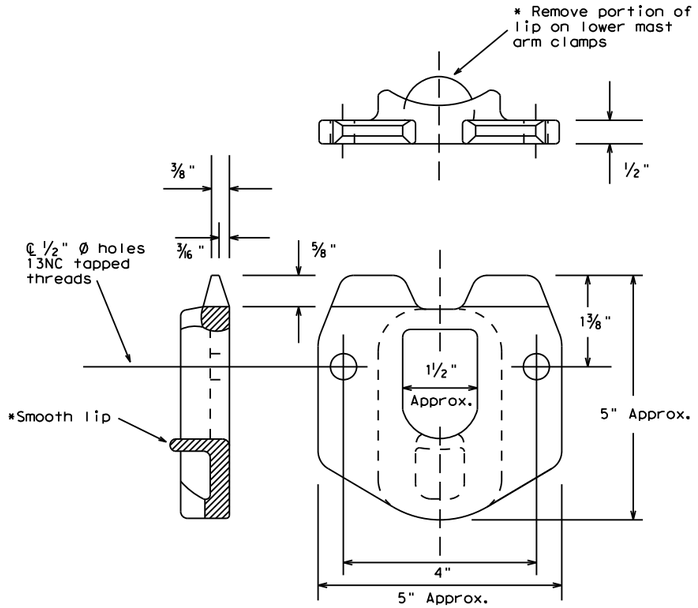
LUM-A-12

DN: LEH	CK: JSY	DW: LTT	CK: TEB

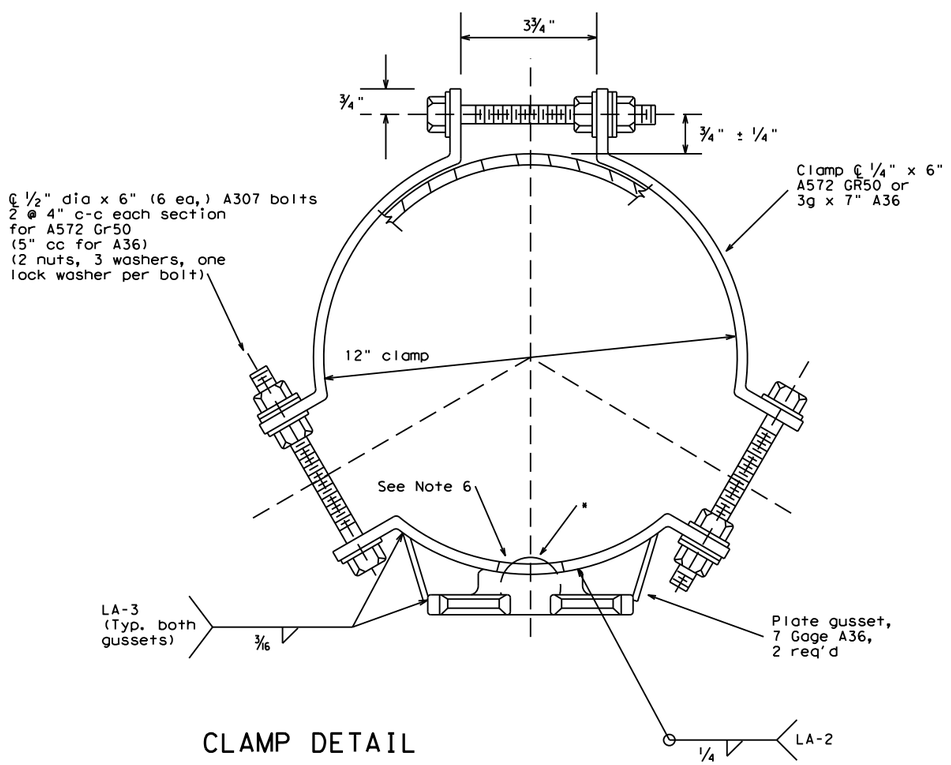
REVISIONS
5-96
1-99
1-12

CONT	SECT	JOB	HIGHWAY
0095	05	063, ETC.	US 80, ETC.
DIST	COUNTY		SHEET NO.
DAL	KAUFMAN, ETC.		93

DATE:
FILE:



POLE SIMPLEX DETAILS



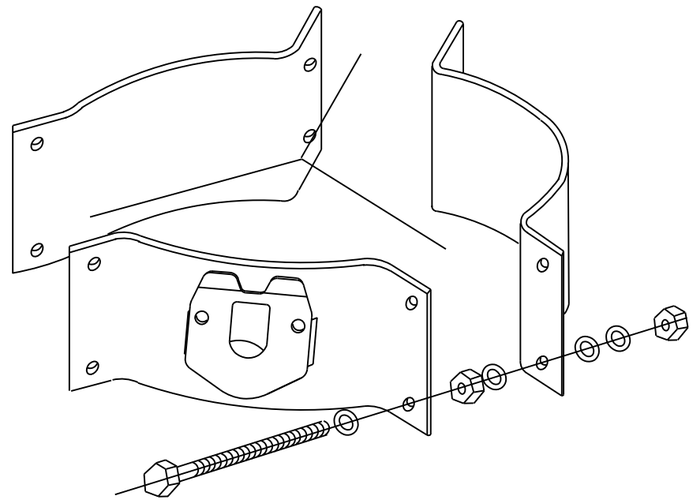
CLAMP DETAIL

OTHER MATERIALS:

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

GENERAL NOTES:

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



PROJECTION

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

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

©TxDOT	DN: KAB	CK: RES	DW: FDN	CK: CAL
REVISIONS	CONT	SECT	JOB	HIGHWAY
11-99	0095	05	063, ETC.	US 80, ETC.
1-12	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		94

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DATE:
FILE:

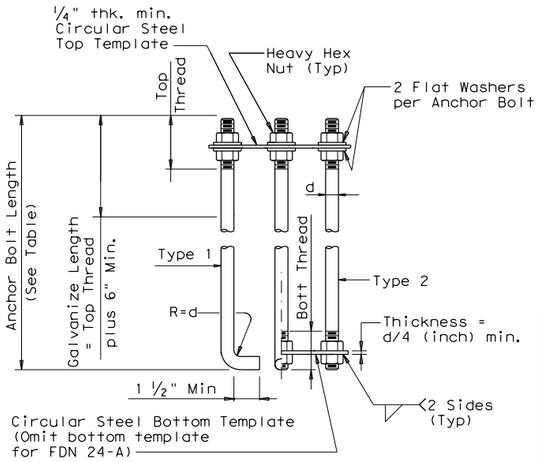
FOUNDATION DESIGN TABLE

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

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

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

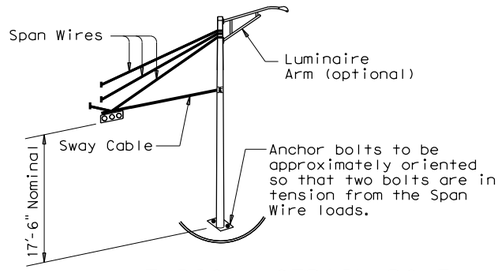
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



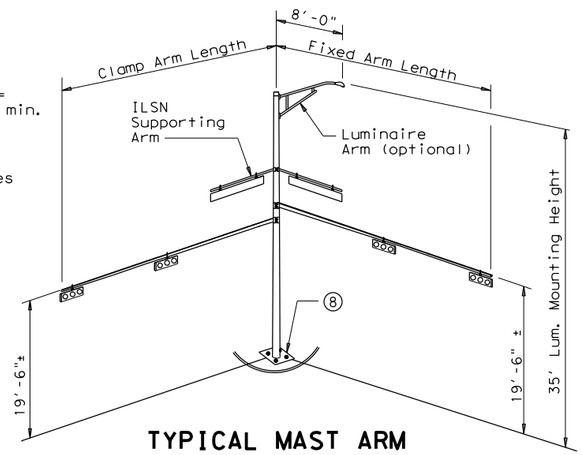
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

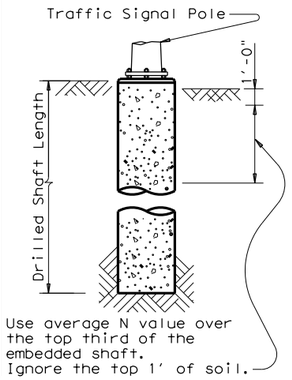
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



NOTES:

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

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

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

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

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

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

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

⑦ Min dimensions given, longer bolts are acceptable.

FOUNDATION DETAILS

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
IH 35E AT MOCKINGBIRD LN								
P1	10	36-A	1			13		
P2	10	36-A	1			13		
P3	10	24-A	1	6				
P4	10	36-A	1			13		
P5	10	24-A	1	6				
P6	10	24-A	1		11			
P7	10	36-A	1			13		
P8	10	36-A	1			13		
P9	10	24-A	1	6				
P10	10	36-A	1			13		
P11	10	24-A	1	6				
P12	10	24-A	1		11			
P13	10	24-A	1	6				
SH 183 AT MOCKINGBIRD LN								
P1	10	36-A	1			13		
P2	10	24-A	1	6				
P3	10	36-A	1			13		
P4	10	24-A	1	6				
P6	10	24-A	1	6				
P7	10	24-A	1		11			
P9	10	24-A	1	6				
P10	10	36-A	1			13		
P12	10	24-A	1	6				
P13	10	24-A	1		11			
US 80 AT FM 2728 (WEST)								
P1	10	36-A	1			13		
P2	10	36-A	1			15		
P3	10	36-A	1			15		
P4	10	36-A	1			13		
TOTAL DRILLED SHAFT LENGTHS				60	44	173		

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

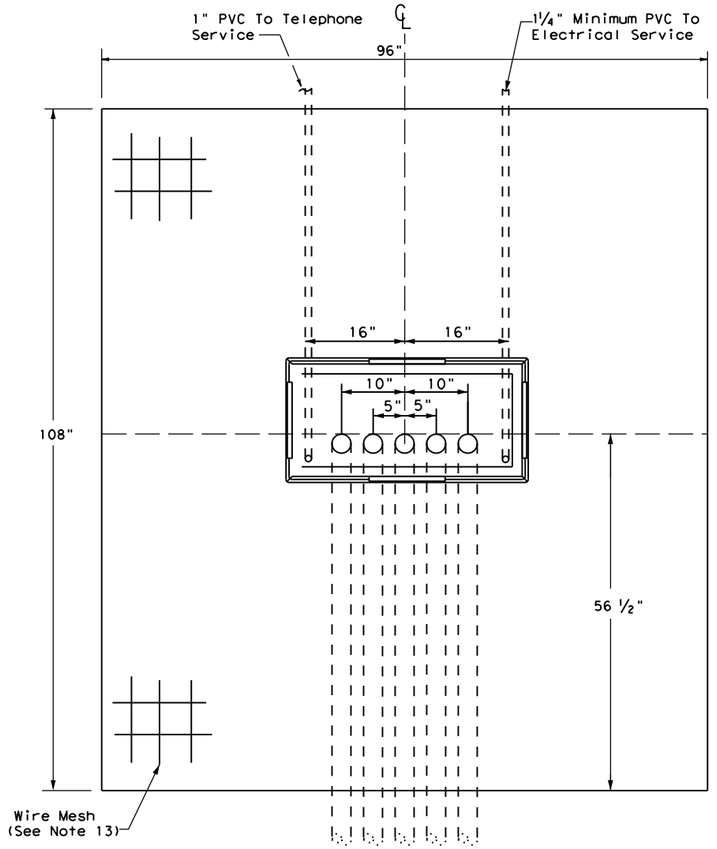
Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation
Traffic Operations Division

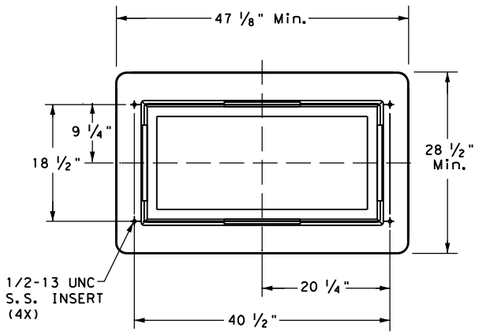
TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

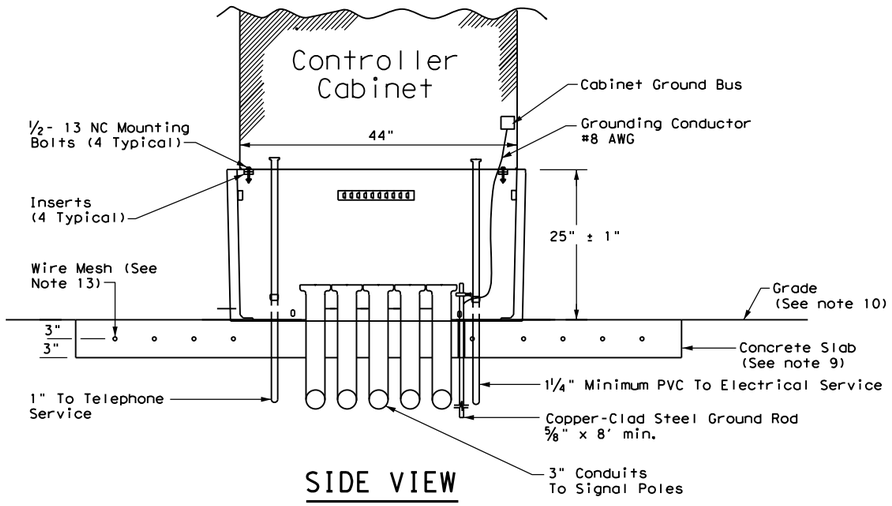
REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-99 1-12	CONT	SECT	JOB	HIGHWAY
	0095	05	063, ETC	US80, ETC
	DIST	COUNTY		SHEET NO.
	18	KAUFMAN, ETC		95



TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-21

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12-04	DIST	COUNTY		SHEET NO.
2-21	DAL	KAUFMAN, ETC.		96

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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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		DIST	COUNTY		SHEET NO.
		DAL	KAUFMAN, ETC.		97

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.

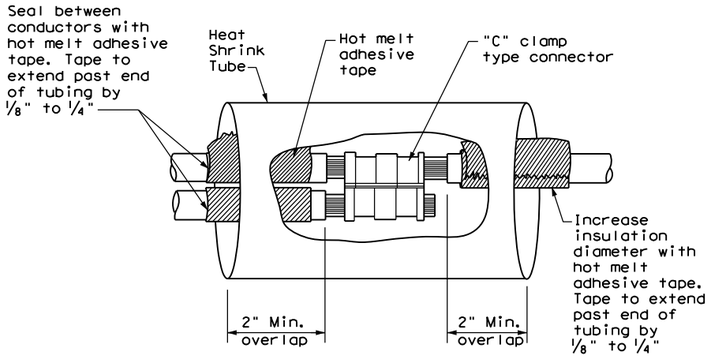
GROUND RODS & GROUNDING ELECTRODES

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.



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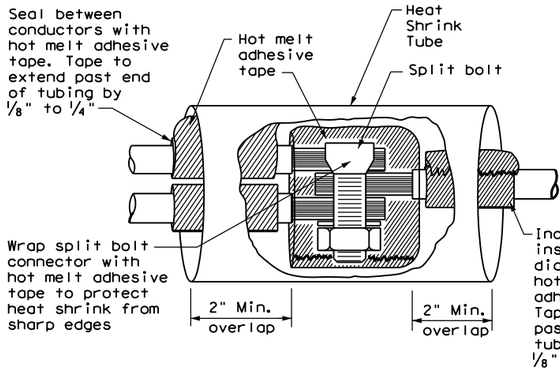
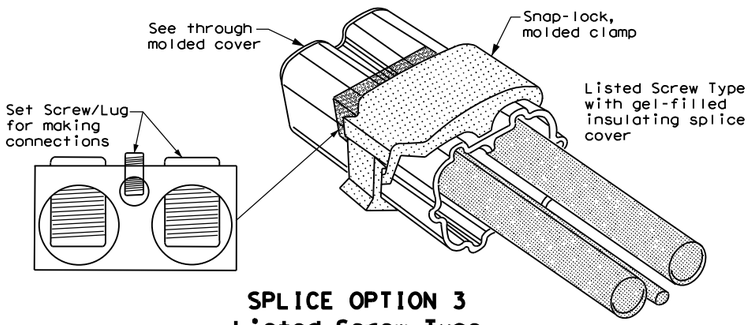
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

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Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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		DAL	KAUFMAN, ETC.		98

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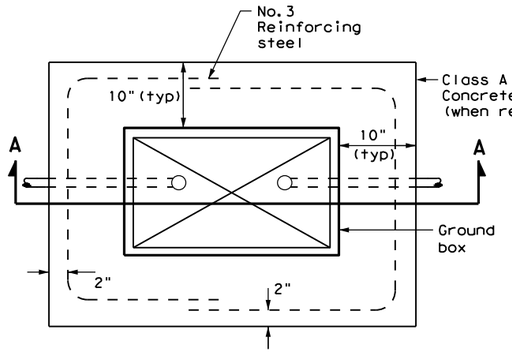
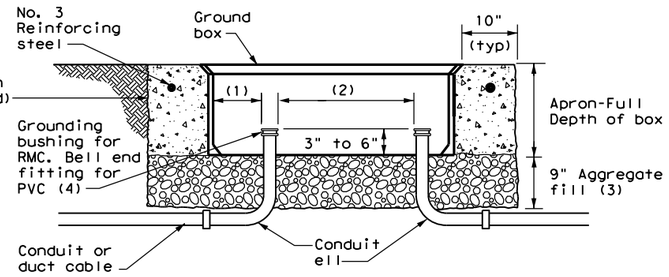


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

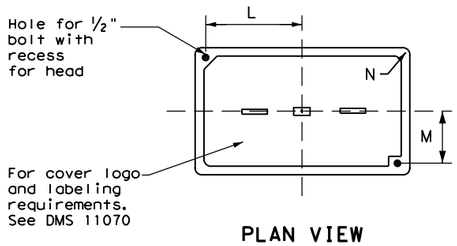
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

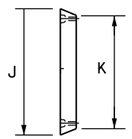
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

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



PLAN VIEW



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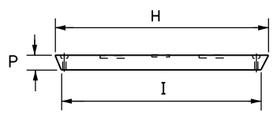

SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

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

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

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

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

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

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

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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

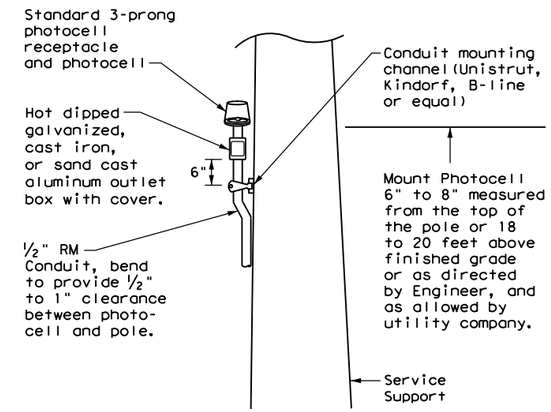
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

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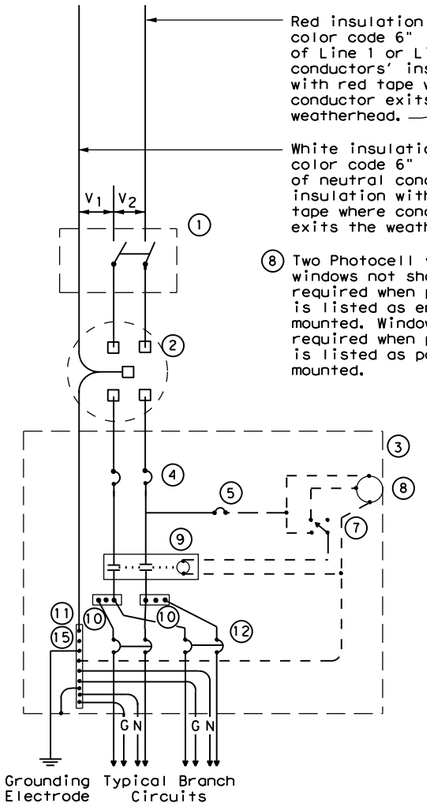
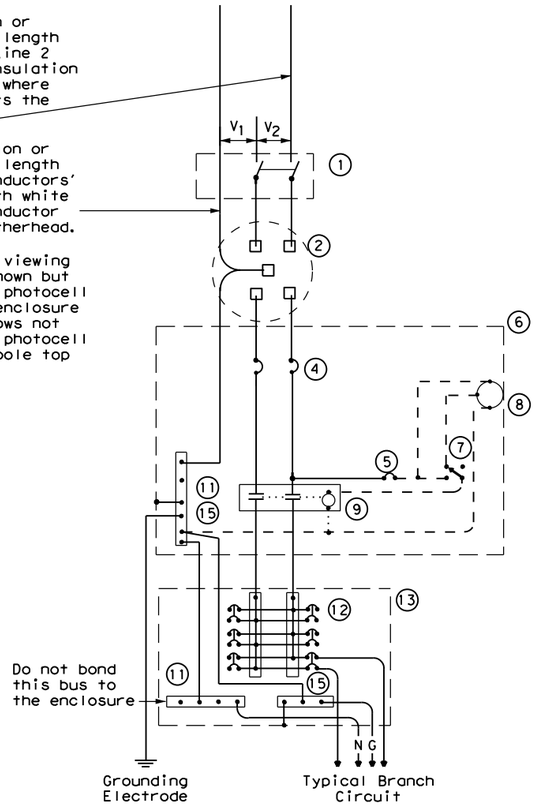
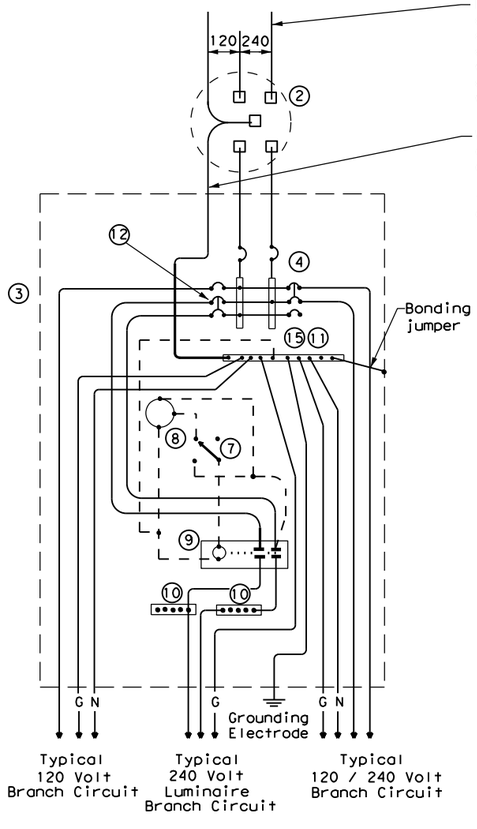


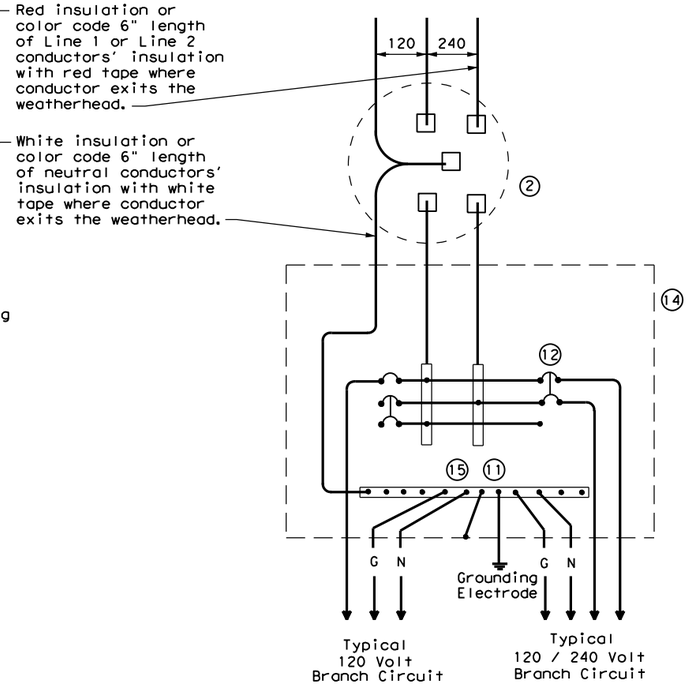
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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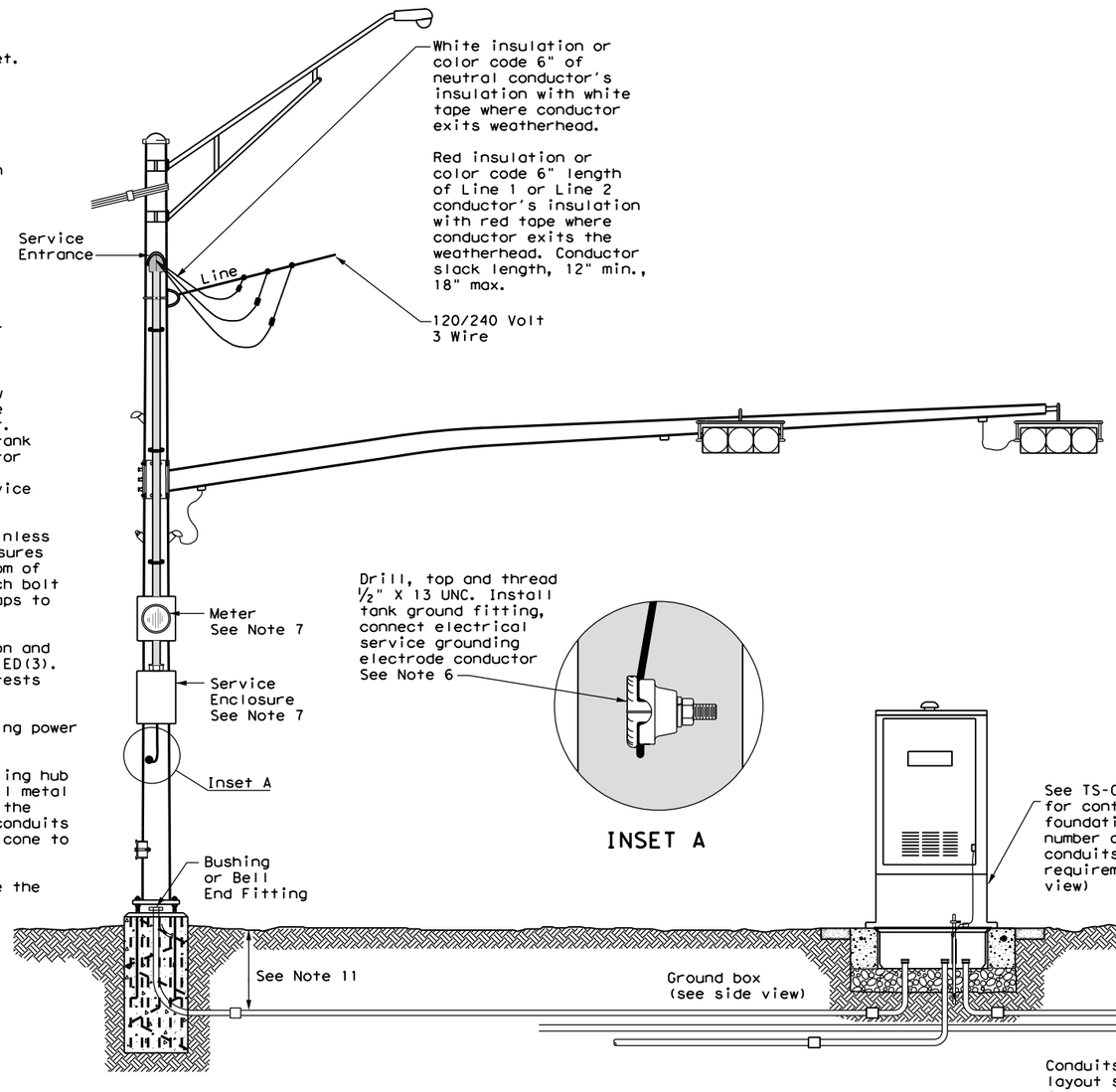
TRAFFIC SIGNAL NOTES

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".

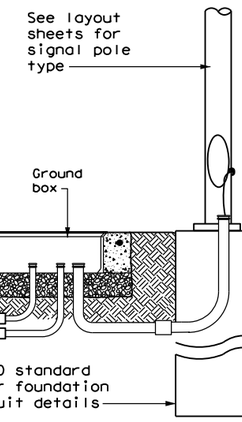


SIGNAL POLE WITH SERVICE

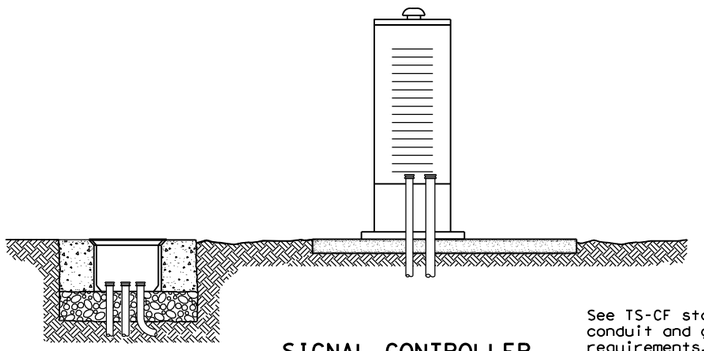
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A

SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

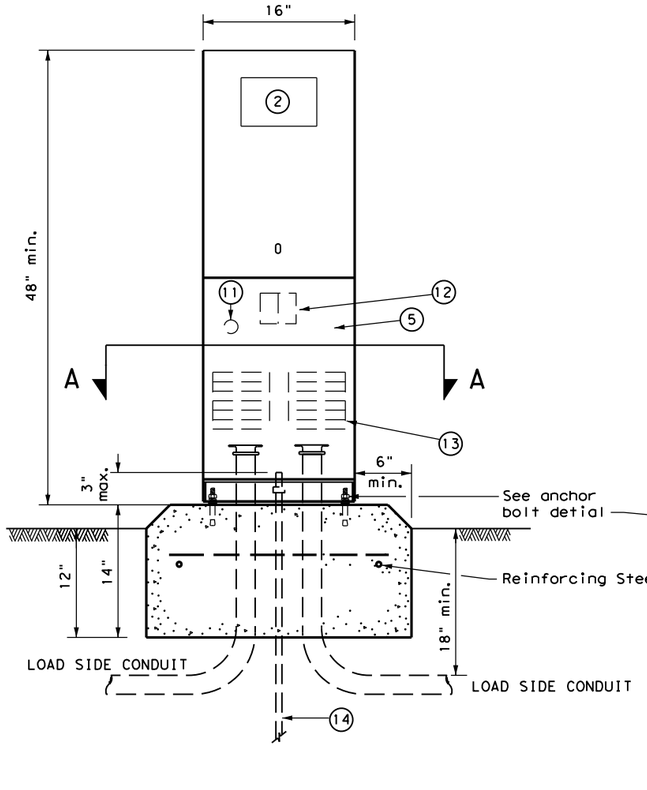
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 11/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

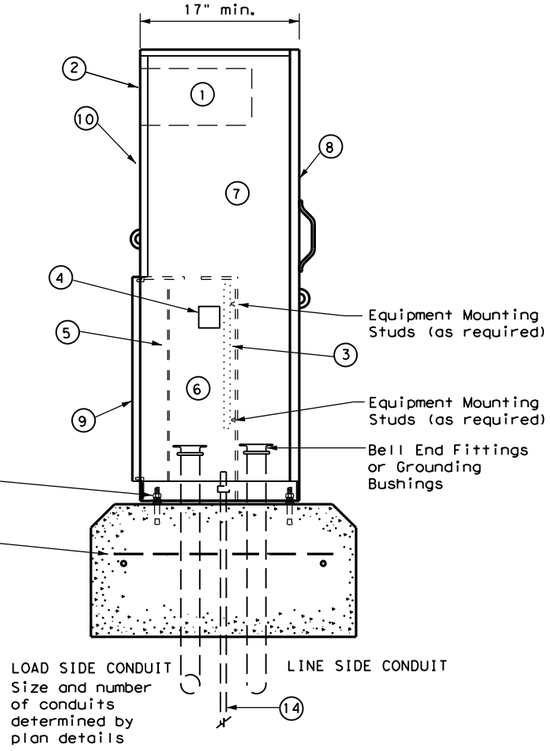
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

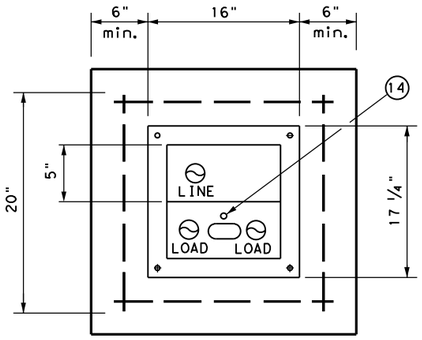


FRONT VIEW

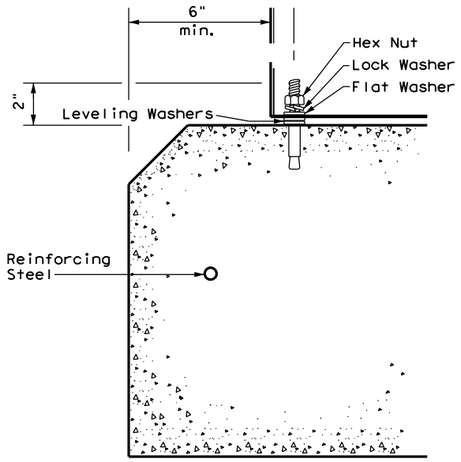


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

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TIMBER POLE (TP) SERVICE SUPPORT NOTES

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

(1) Class 5 pole, height as required

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

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

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

(7) 6 AWG bare grounding electrode conductor in 1/2 in. PVC to ground rod - extend 1/2 in. PVC 6 in. underground.

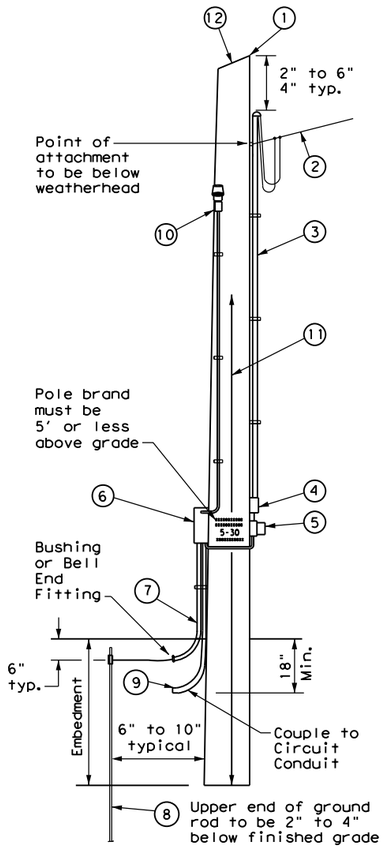
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

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

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

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

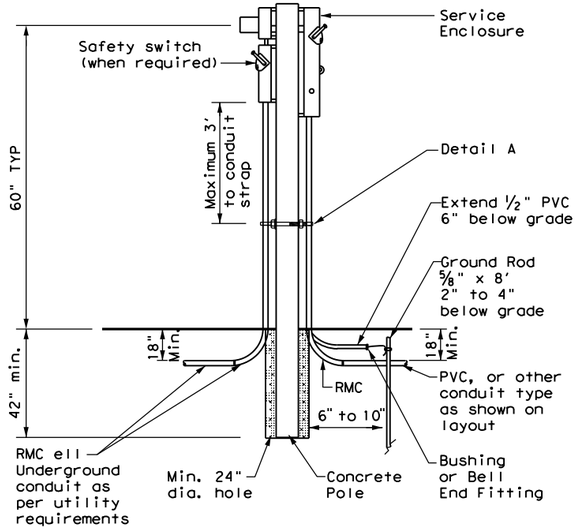


SERVICE SUPPORT TYPE TP (O)

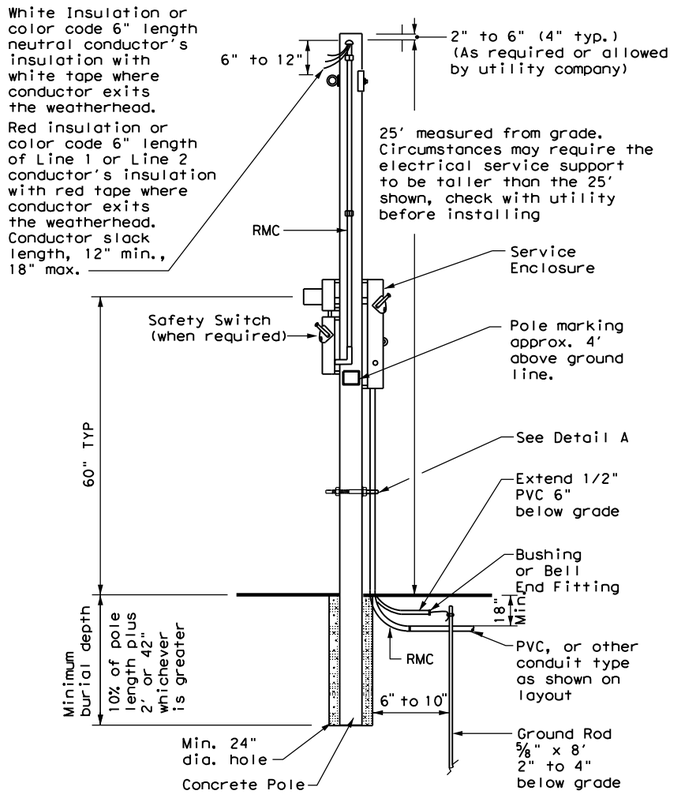
GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

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

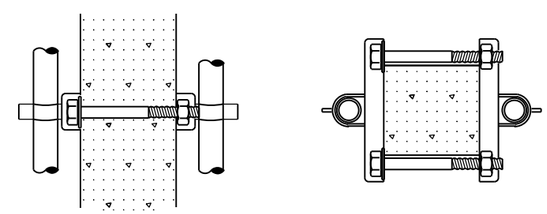
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4'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



CONCRETE SERVICE SUPPORT
Underground (U)



CONCRETE SERVICE SUPPORT
Overhead (O)



DETAIL A

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

Texas Department of Transportation

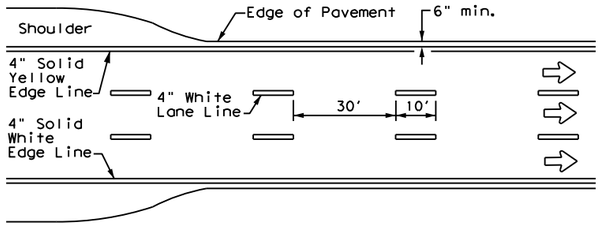
Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

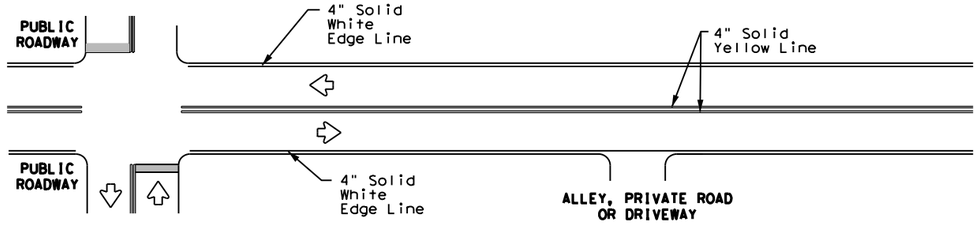
ED(10)-14

FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		104

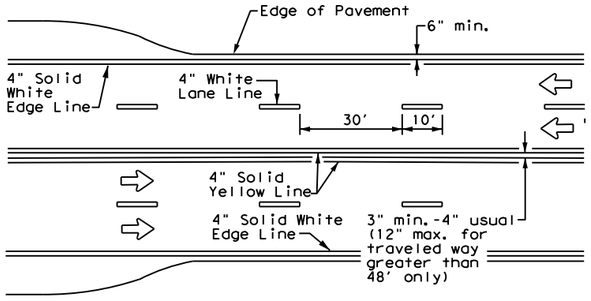
71K



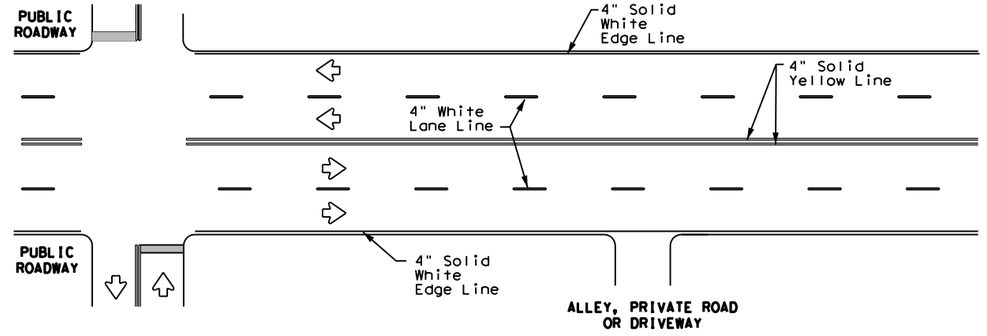
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



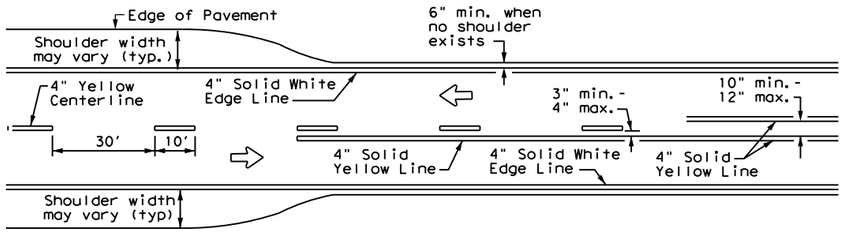
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



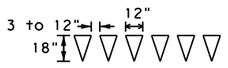
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



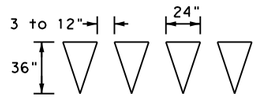
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

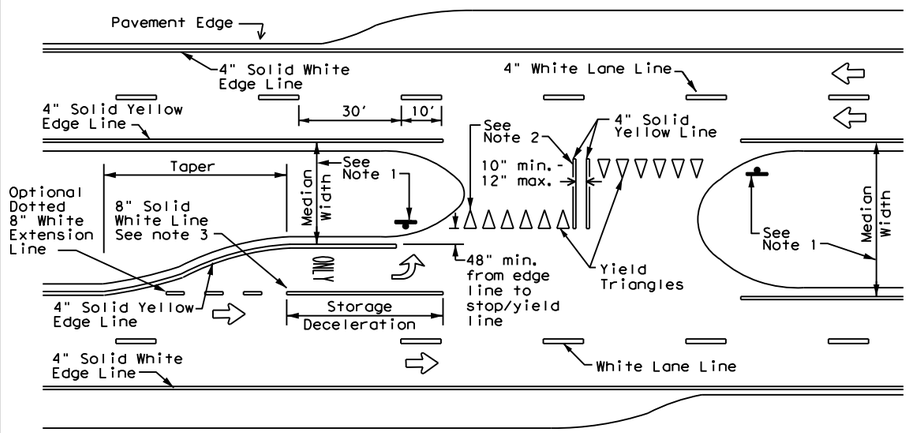


For posted speed on road being marked equal to or less than 40 MPH.



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

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

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

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

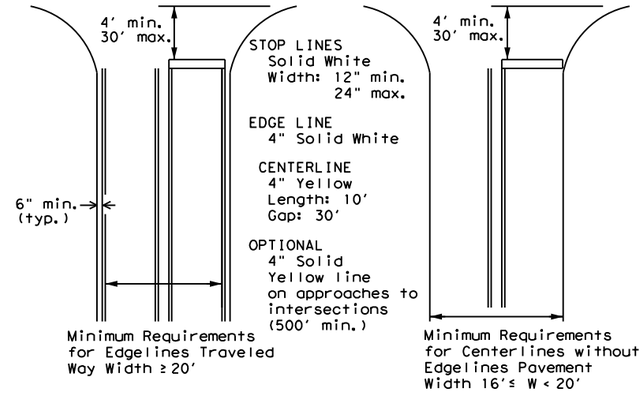
GENERAL NOTES

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

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

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

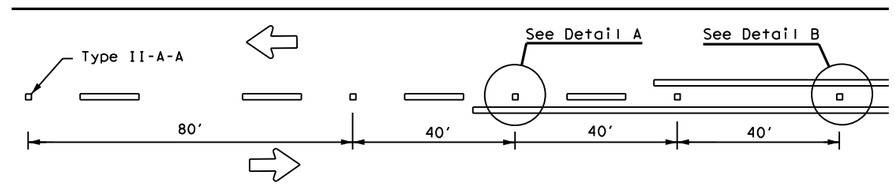
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0095	05	063, ETC.	US 80, ETC.
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	DAL	KAUFMAN, ETC.		105

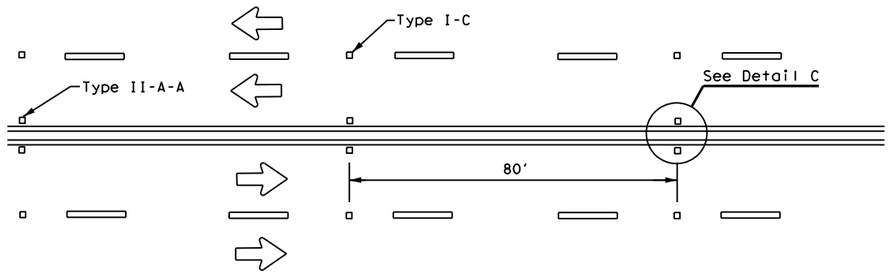
DATE:
FILE:

22A

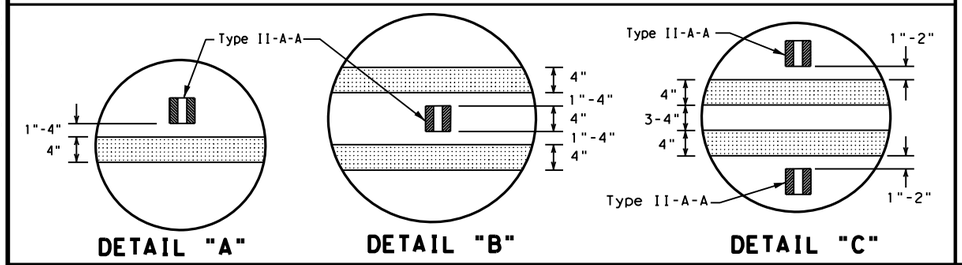
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



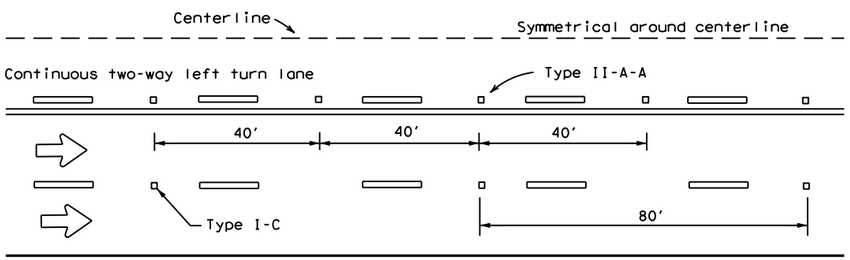
CENTERLINE FOR ALL TWO LANE ROADWAYS



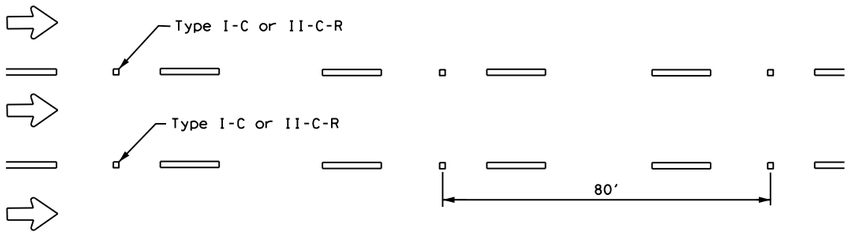
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

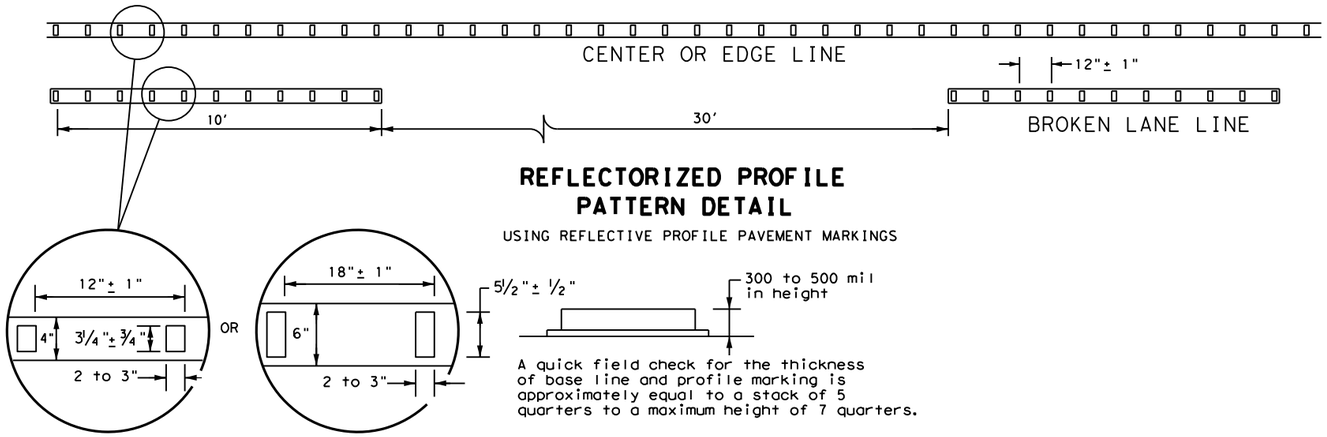


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

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



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.

4" EDGE LINE, CENTER LINE OR LANE LINE

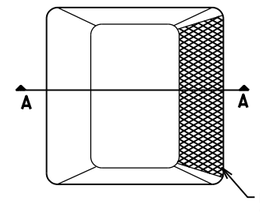
OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

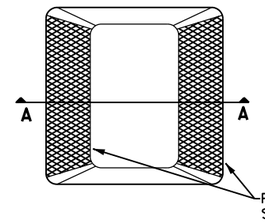
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

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

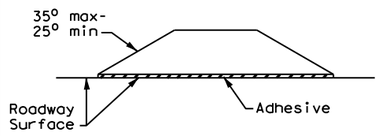
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

GENERAL NOTES

1. All raised pavement markers placed in 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.

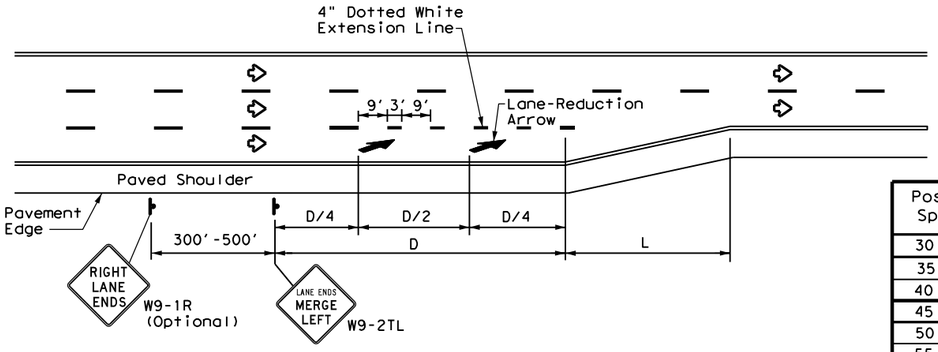
Texas Department of Transportation — Traffic Safety Division Standard

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

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0095	05	063, ETC.	US 80, ETC.
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	DAL	KAUFMAN, ETC.		106

22B

DATE:
FILE:

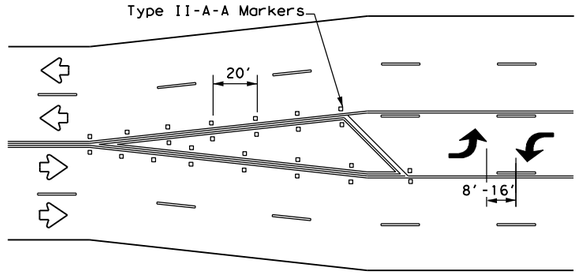


LANE REDUCTION

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	

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 W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
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.



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

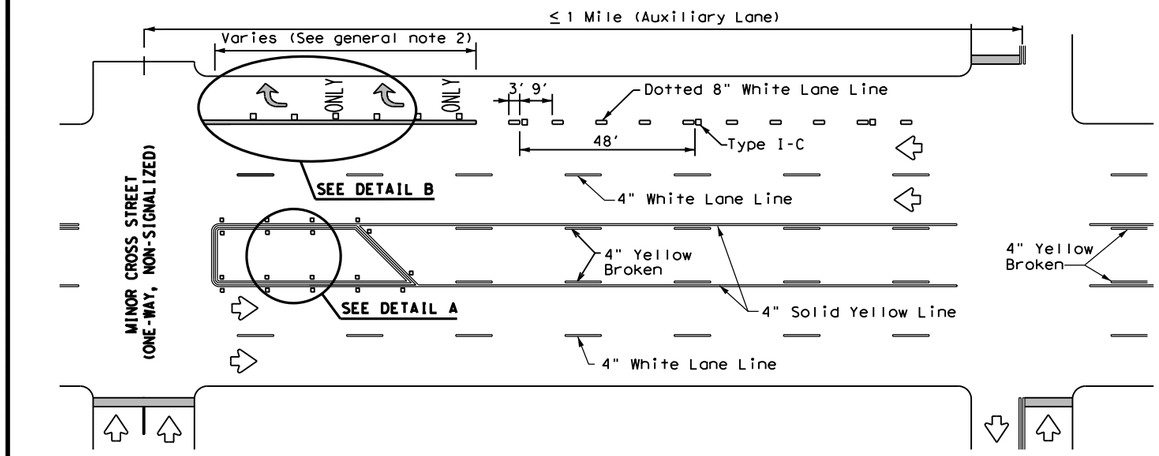
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

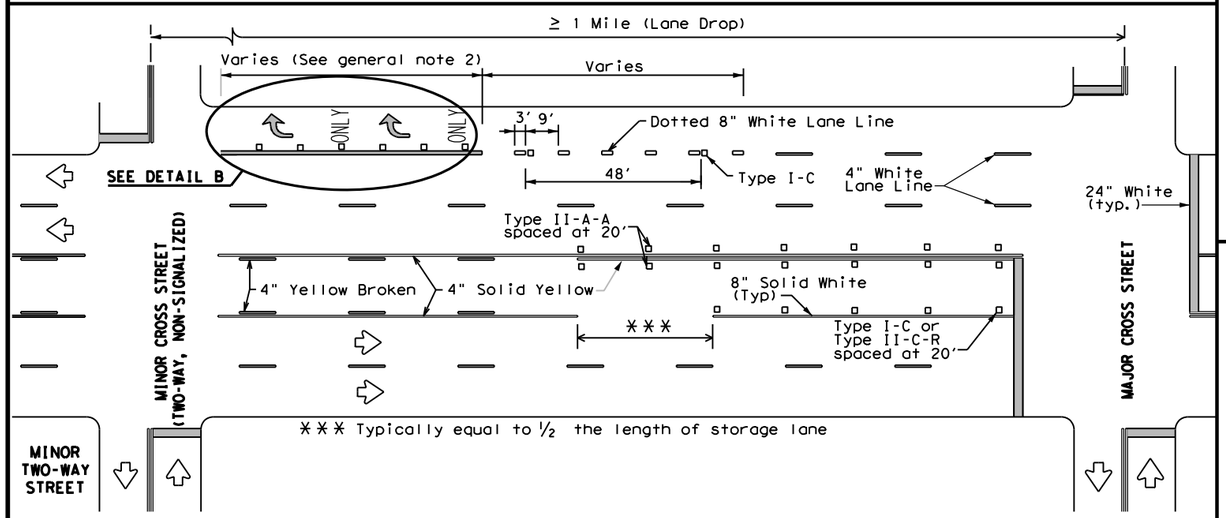
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

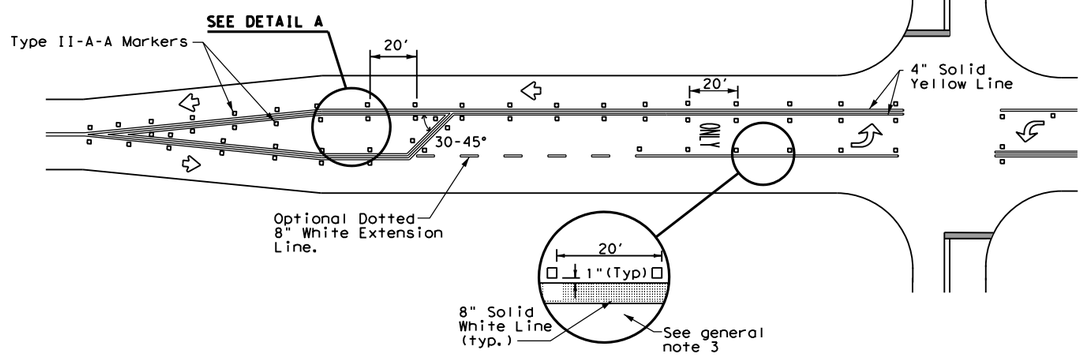
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



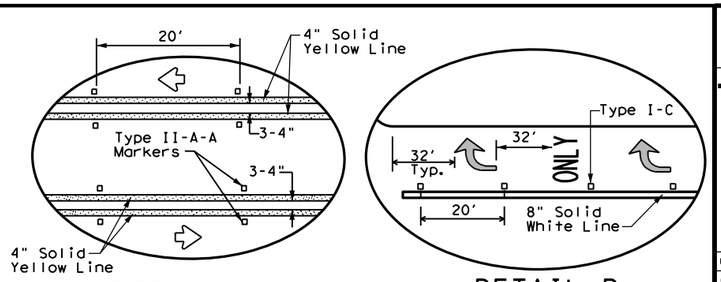
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



Texas Department of Transportation

Traffic Safety Division Standard

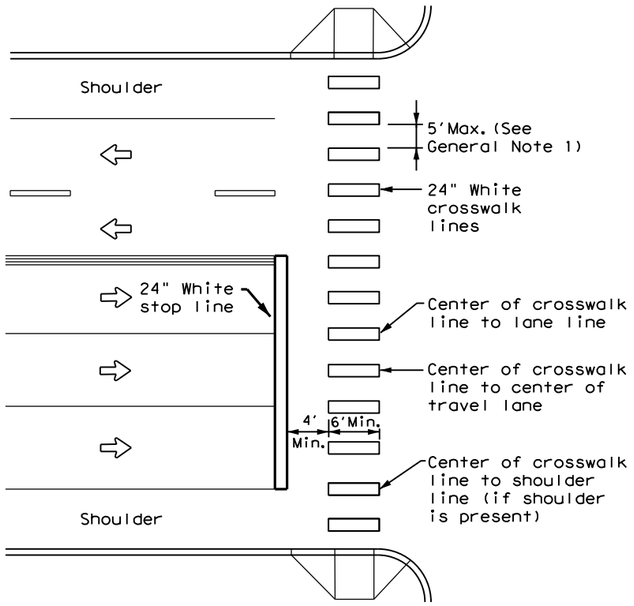
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	DAL	KAUFMAN, ETC.		107
3-03 6-20				

22C

DATE:
FILE:

DATE:
FILE:



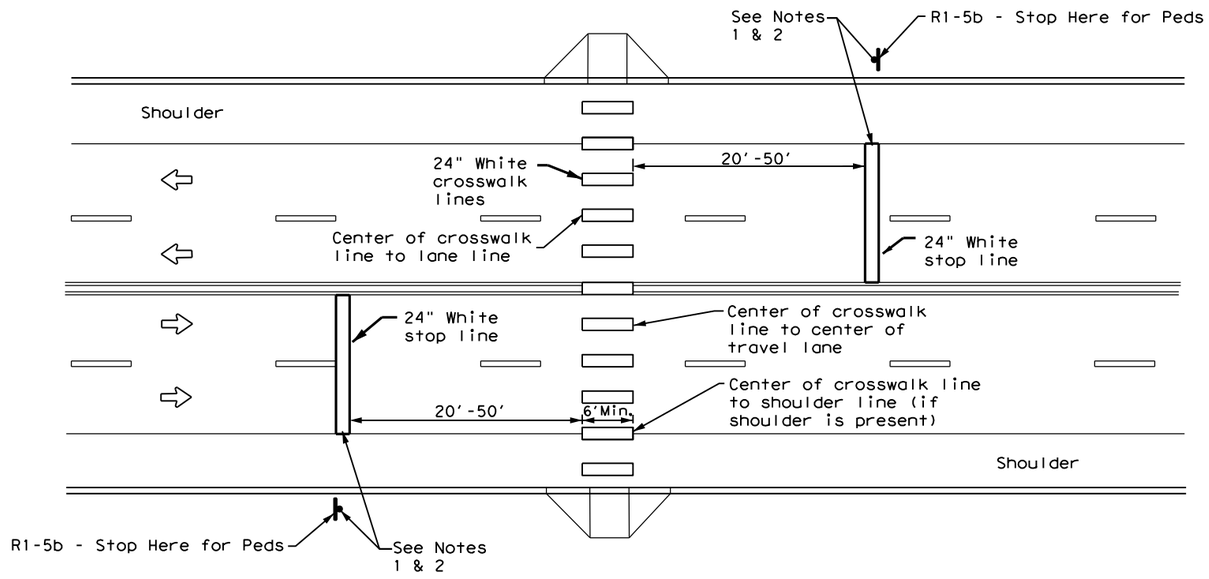
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

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" signs at unsignalized mid block cross walks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

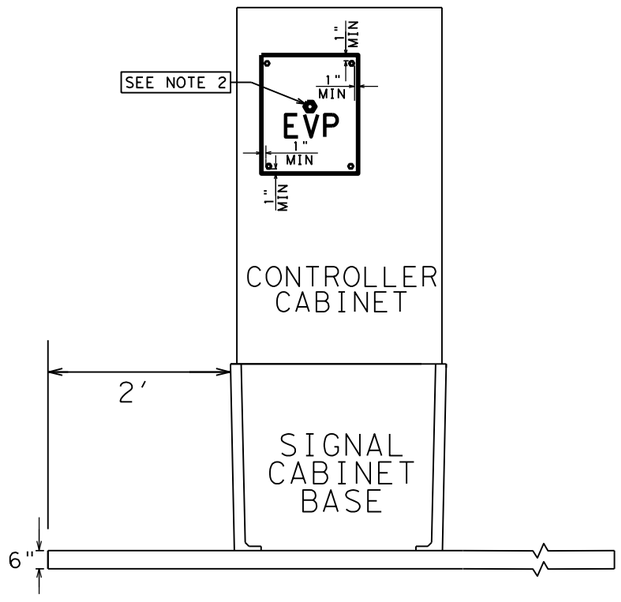
PM(4)-22

FILE: pm4-22.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-22	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		108

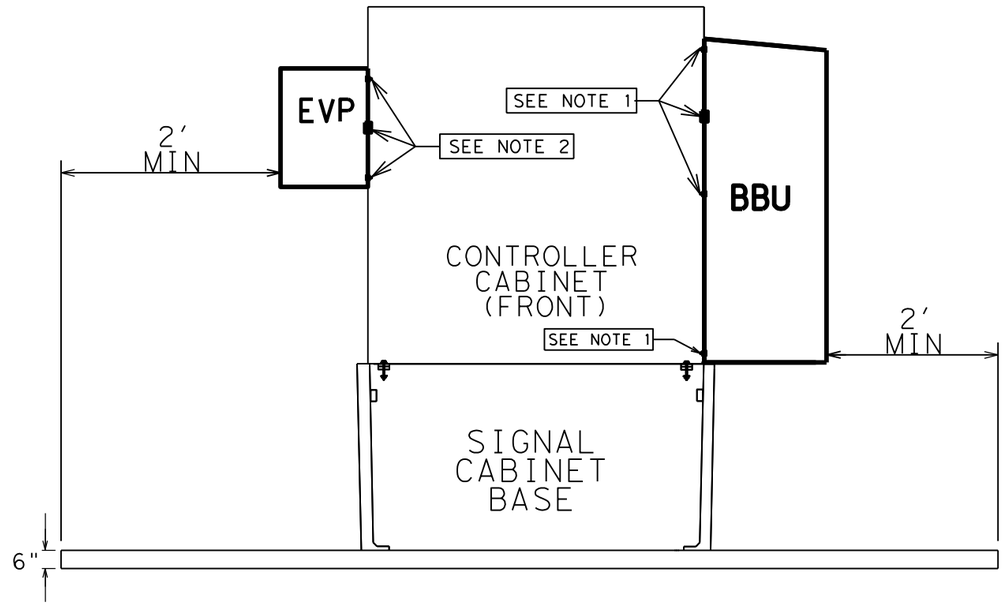
22D

NOTES:

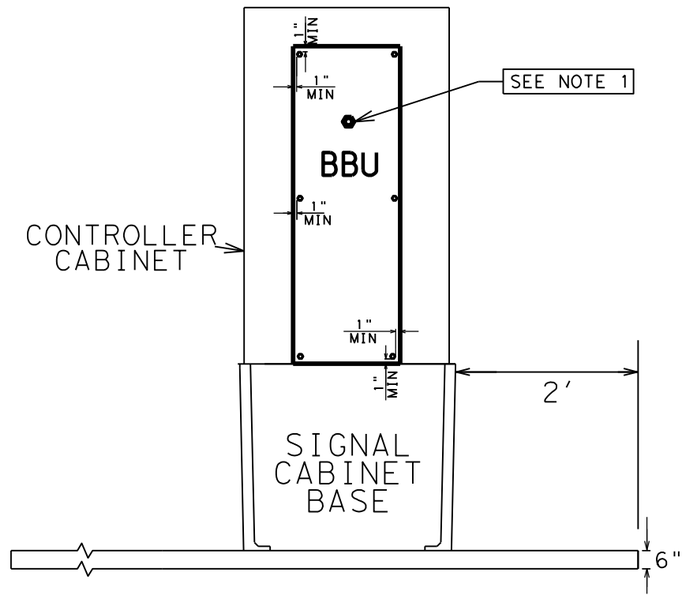
1. INSTALL 1½" ALL THREAD NIPPLE WITH BONDING BUSHINGS ON BOTH ENDS AND 6 EA OF ½" X 1½" 13 UNC MOUNTING BOLTS BETWEEN THE TWO CABINETS (SIGNAL AND BBU).
2. INSTALL 2 " FITTING FOR EVP CABLES/WIRES AND 4 EA OF ½" X 1½" 13 UNC MOUNTING BOLTS BETWEEN THE TWO CABINETS (SIGNAL AND EVP).
3. USE SILICON SEALANT TO SEAL BETWEEN THE CABINETS OF THE CONTROLLER, EVP AND BBU UNIT.
4. THE ABOVE WORK PERFORMED AND MATERIALS FURNISHED WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO PERTINENT ITEMS.



SIDE VIEW (EVP)



ELEVATION VIEW

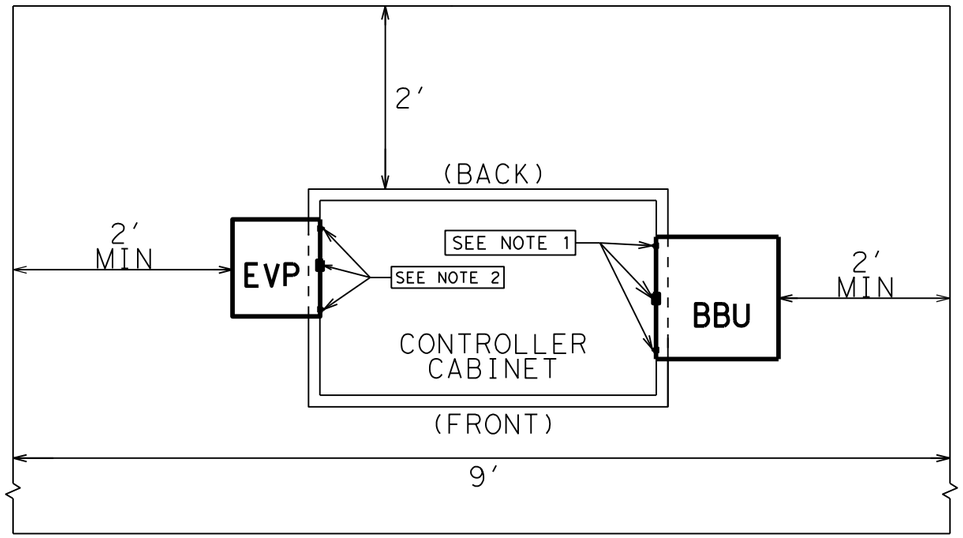


SIDE VIEW (BBU)

REQUIRED CABLE/CONDUCTORS FOR EVP			
QUANTITY EACH	WIRE SIZE	COLOR	FUNCTION
1	#14	BLACK	120 VAC FOR EVP
1	#14	RED	120 VAC FOR FAN & CABINET LIGHT
1	#14	WHITE	AC NEUTRAL
1	#14	GREEN	CHASIS GROUND
1	#18	GRAY	LOGIC GROUND
4	#18	BLUE	PREEMPT COMMANDS
4	-	-	CABLE FROM DETECTOR UNIT

REQUIRED CONDUCTORS FOR BBU			
QUANTITY EACH	WIRE SIZE	COLOR	FUNCTION
1	-	BLACK	120 VAC FROM SERVICE
1	-	WHITE	AC NEUTRAL FROM SERVICE
1	#6	BLACK	120 VAC TO CONTROLLER
1	#6	WHITE	AC NEUTRAL TO CONTROLLER
1	#6	GREEN	GROUND

LEGEND:
EVP-EMERGENCY VEHICLE PREEMPTION CABINET.
BBU-BATTERY BACKUP UNIT.



PLAN VIEW

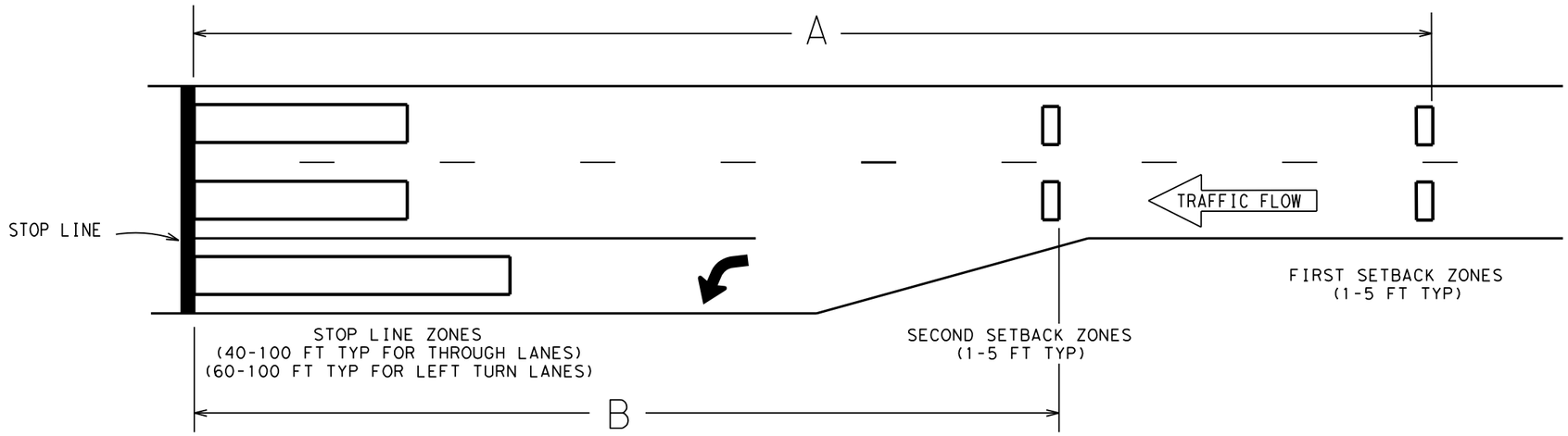
INSTALLATION OF BBU/EVP

EXTERNAL SIDE MOUNT CABINET INSTALLATION DETAILS

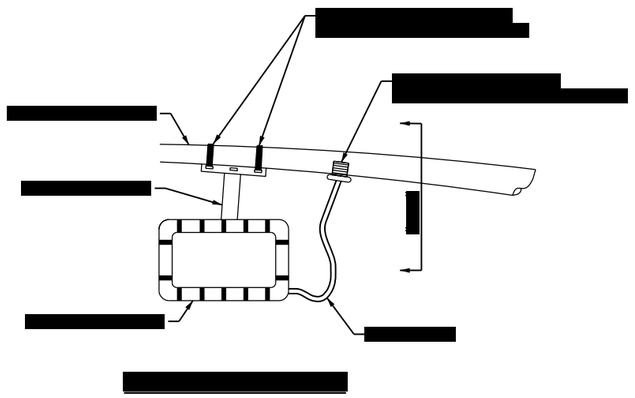
DALLAS DISTRICT STANDARD

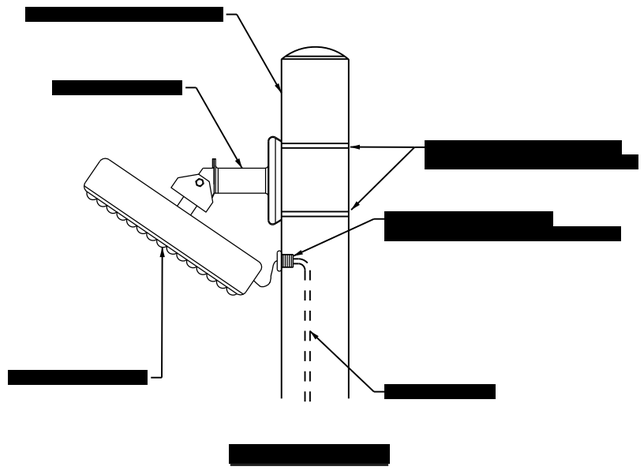
N. T. S.

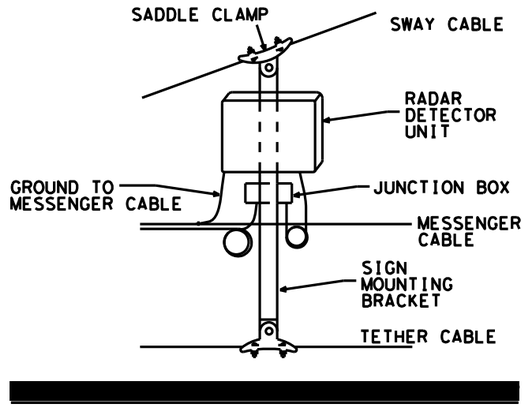
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	(SEE TITLE SHEET)		US 80, ETC.
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	DAL	KAUFMAN, ETC.	109
CONTROL	SECTION	JOB	
0095	05	063, ETC.	

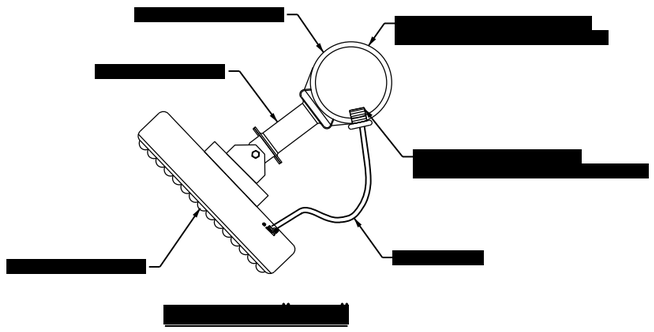


APPROACH SPEED LIMIT (MPH)	DISTANCE A (FT)	DISTANCE B (FT)	MINIMUM RANGE OF DETECTION (LF)
45	360	245	400
50	405	300	440
55	445	325	490
60	485	355	530
65	525	380	575
70	565	410	620









NOTES:

1. THE RADAR SENSOR MOUNTING BRACKET MUST BE ADJUSTABLE TO TILT UP, DOWN, LEFT, RIGHT, AND TO ROTATE.

2. THE RADAR DETECTOR UNITS SHOWN ARE NOT INTENDED TO REPRESENT ANY SPECIFIC BRAND OR PRODUCT, AND ALTERNATE MOUNTING METHODS MAY BE SUBMITTED FOR APPROVAL.

DALLAS DISTRICT STANDARD

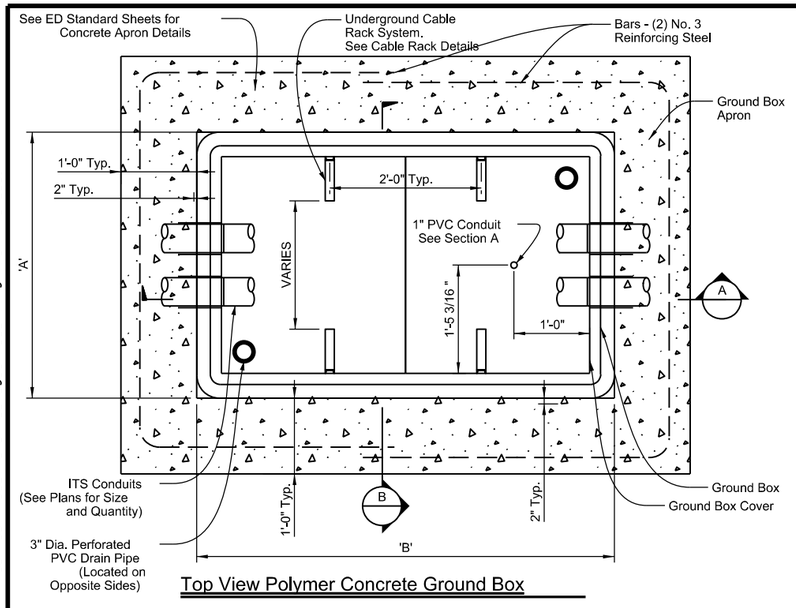
Texas Department of Transportation

Dallas District

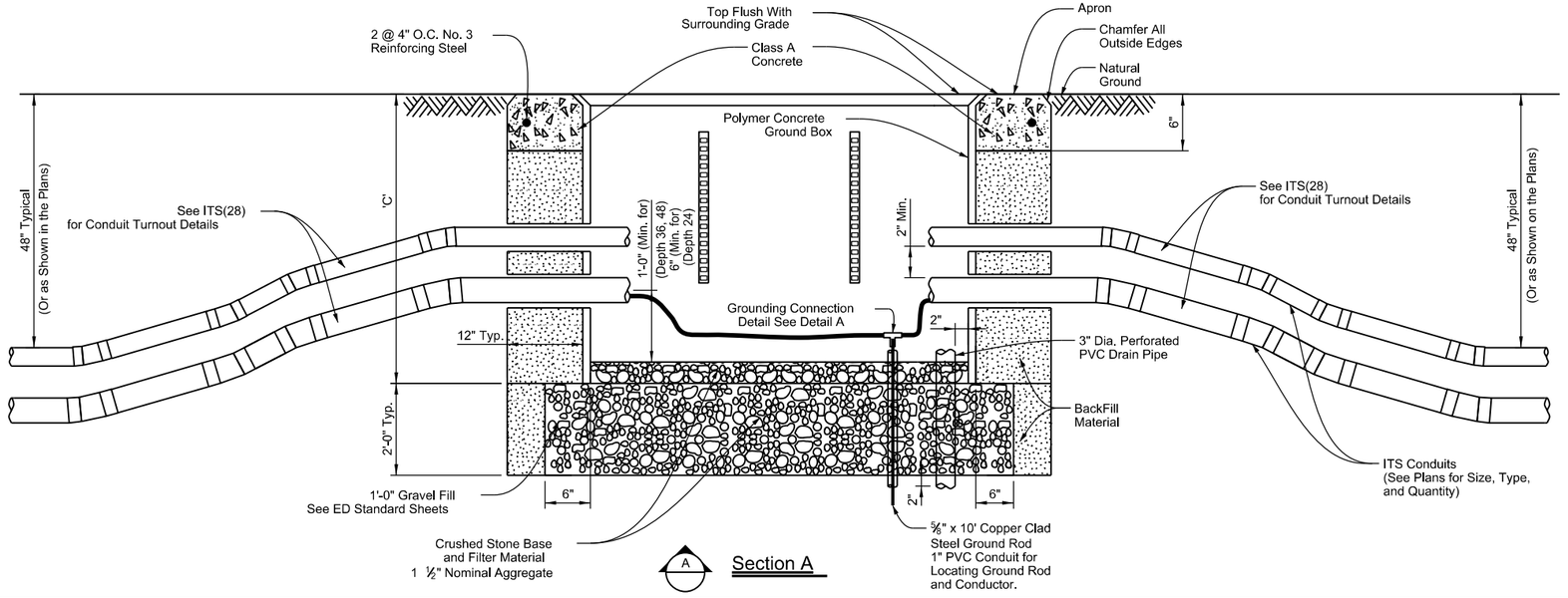
RADAR VEHICLE DETECTION SYSTEM
RVDS-18 (DAL)

©TxDOT May 2018	DN: EF	CK: ---	DW: EF	CK: TRF-Aus.
REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	(SEE TITLE SHEET)		US 80, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	KAUFMAN, ETC.	110
	CONTROL	SECTION	JOB	
	0095	05	063, ETC.	

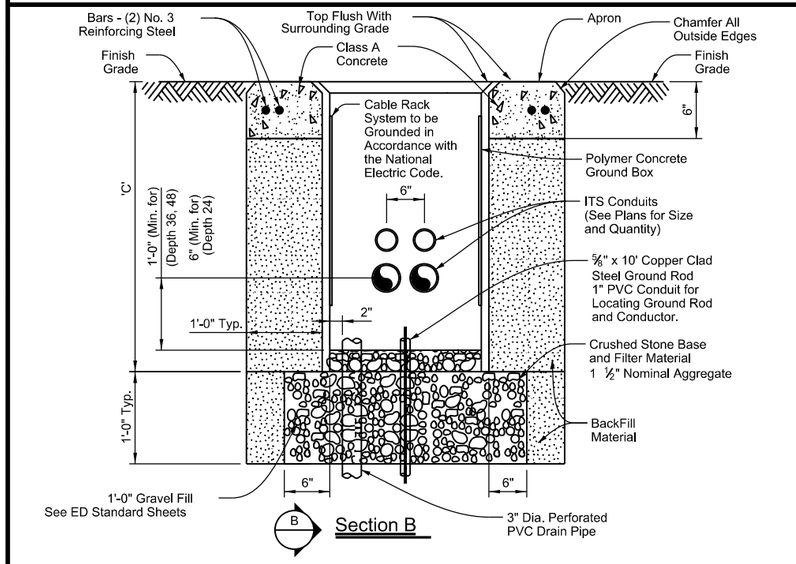
DATE:
FILE:



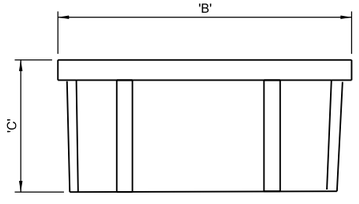
Top View Polymer Concrete Ground Box



Section A



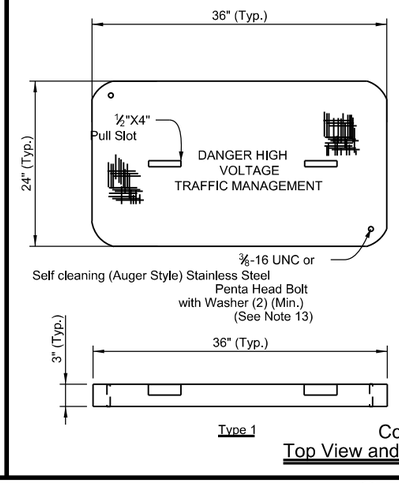
Section B



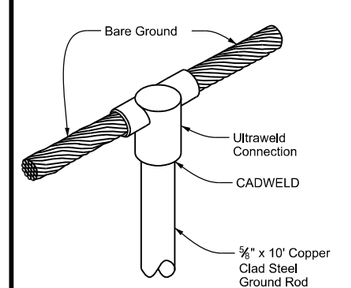
Ground Box Schedule					
Ground Box Type	'A' * Width (Outside) (Inches)	'B' * Length (Outside) (Inches)	'C' Depth (Outside) (Inches)	Size #3 Bars (Apron)	
				Length	Weight
Type 1	26	38	24, 36, 48	24'-0"	9.12
Type 2	40	63	24, 36, 48	32'-8"	12.45

* - Tolerance of +/- 1.5"

Side View
Typical Ground Box



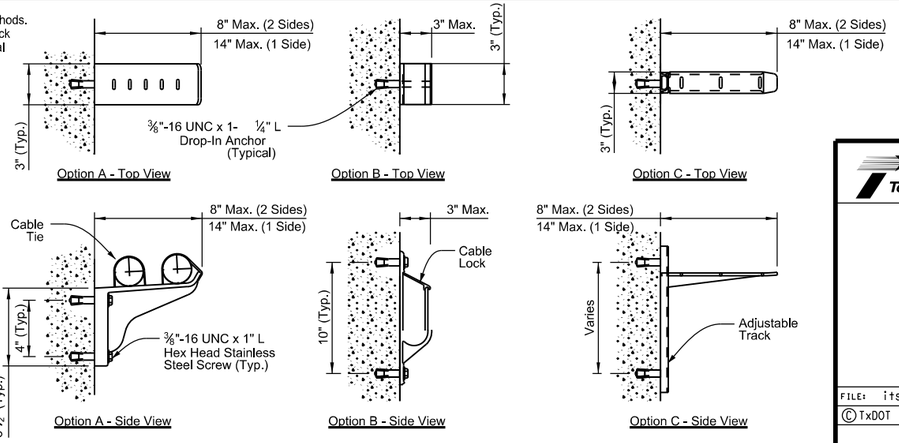
Cover
Top View and Side View



Note - All grounding connections to be CADWELD or approved equal. This work will not be paid for directly, but is considered incidental to ITS ground box.

Detail A
Grounding Connection Detail

Note:
Options Shown for Cable Racks and Attachment Methods. Furnish Shop Drawings of Cable Rack and Cable Rack Grounding System (If Applicable) for Engineer Approval Prior to Installation.



Cable Rack Details

General Notes:

1. Conduit shown is for example only. Additional conduits may be required as shown on the plans.
2. Provide polymer concrete ground box and cover.
3. Provide Type "2" ground boxes when splice enclosure is required, as shown on the plans.
4. Terminate conduits through the side of the ground box.
5. Provide terminators for conduits cast in the walls and placed symmetrically about the centerline of the box at the depths shown, unless otherwise noted, for the number of conduits identified on the plans to enter the box.
6. Provide terminators appropriately sized for the conduits indicated on the plans. Provide terminators with an air tight and water tight connection.
7. Provide ground box with open bottom. Provide two 3" Dia. perforated PVC drain pipes on opposite corners and extend 2" below bottom of gravel bed to optimize water drainage.
8. Install ground box on a 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box. Crushed stone will be subsidiary to special specification, "ITS Ground Box."
9. When additional conduit entry points are needed to accommodate existing conduit, core drill conduit knockouts in the field of the appropriate number and size of conduit at each location, as directed by the Engineer.
10. Provide a bell fitting on the end of each conduit to ensure a flush fit inside the ground box.
11. Concrete grout around the knockout (inside and out) and around the conduit and bell fitting to ensure a neat watertight fit after the conduit and bell fitting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
12. Label top of cover with the words "DANGER HIGH VOLTAGE TRAFFIC MANAGEMENT."
13. Equip all covers with a bolting system that will positively secure the cover in place.
14. Backfill in accordance with Item 400, "Excavation and Backfill for Structures."
15. Provide p olymer concrete ground boxes and covers for off roadway applications subject to occasional non-deliberate heavy vehicular traffic, such as driveways, along sidewalks, parking lots and behind non-mountable curb. Meet American National Standards Institute (ANSI) / Society of Cable Telecommunications Engineers (SCTE) Tier 22 loading requirements when located in these areas.
16. Provide steel (ASTM A-153), glass reinforced nylon, or equivalent cable rack assemblies designed to support the amount of cable storage slack and splice enclosures identified in the plans. Locate cable rack system on any side but allow for sufficient access to the inside of the ground box. Cable racks may be installed at the factory or in the field. When mounting cable racks in the field, seal all penetrations to the side wall to prevent moisture penetration. Ground metallic cable rack systems to grounding system inside ground box in accordance with the National Electrical Code.

Sheet Details
Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX POLYMER CONCRETE

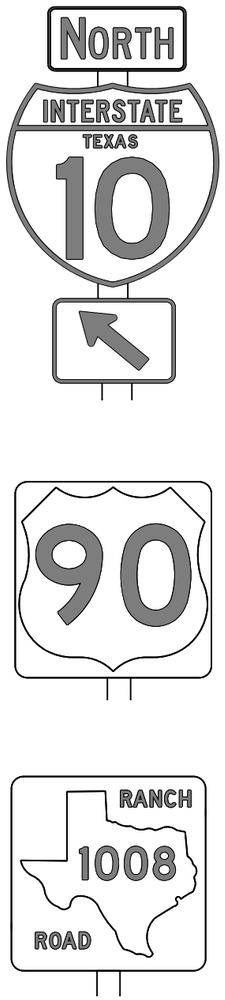
ITS(41)-16

FILE: its(41)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT FEBRUARY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		111

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

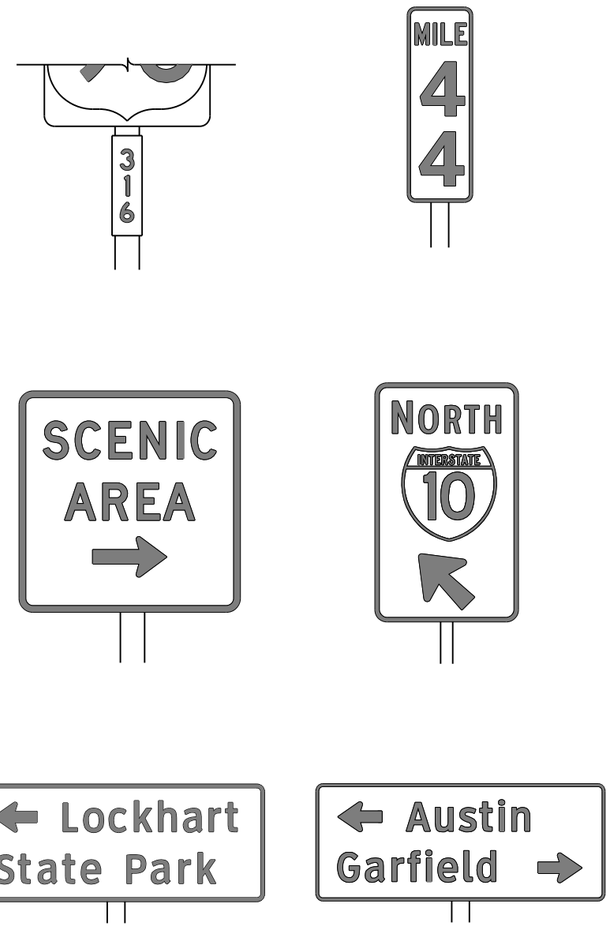
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

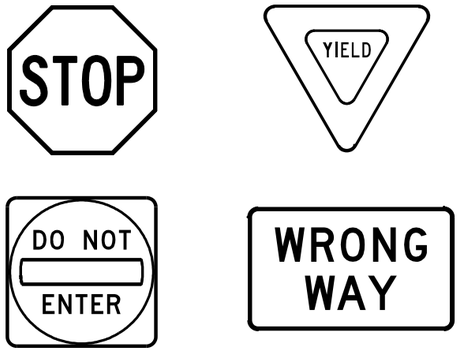
TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	KAUFMAN, ETC.		112

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

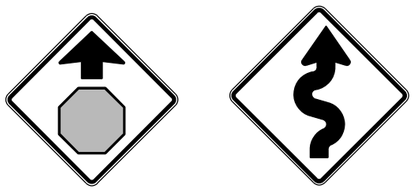
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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	0095	05	063, ETC.	US 80, ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	KAUFMAN, ETC.		113

DATE:
FILE:

DATE:
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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.

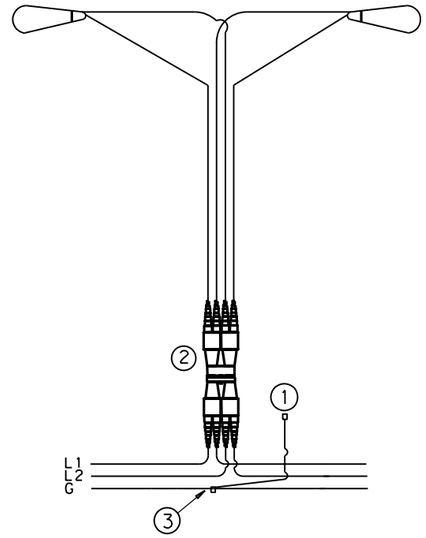
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

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.

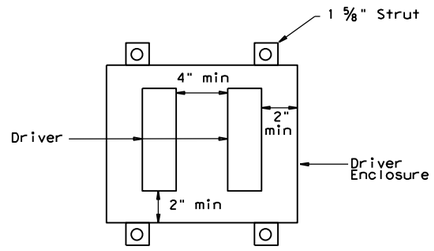
   c. Install drivers with at least 2 inches of space from enclosure walls.

   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

FILE: rid1-20.dgn	DN:	CK:	DW:	CK:
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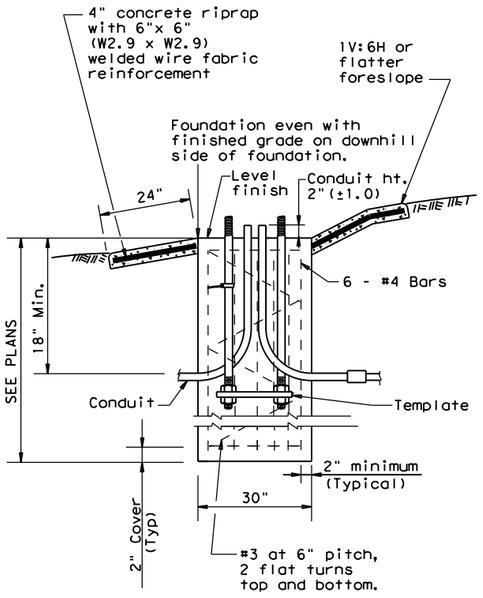
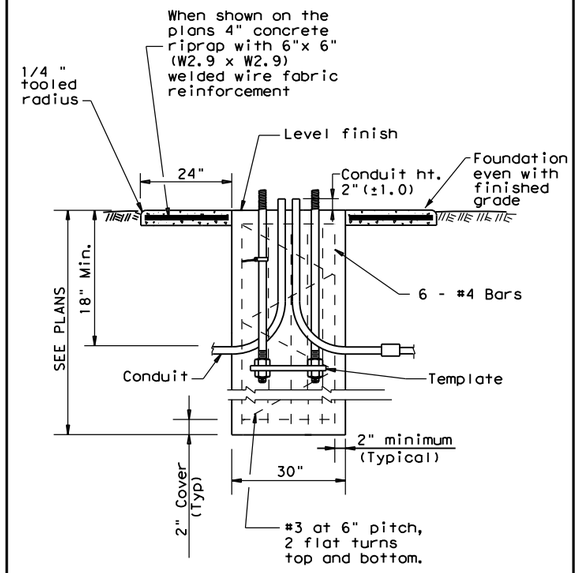
72A



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′

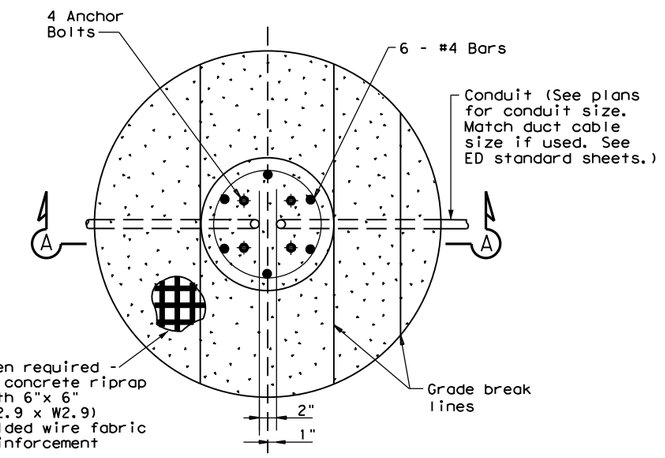
TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

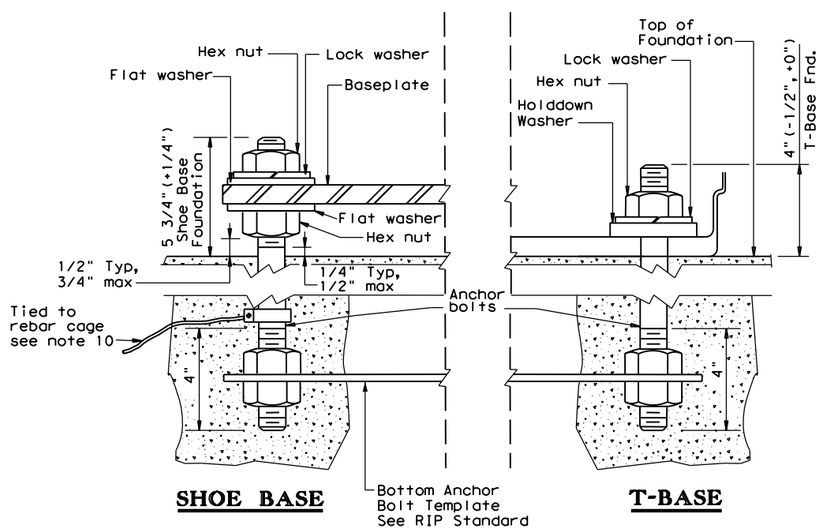
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

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.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

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.

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)
RID(2)-20

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SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation Pole	A1	A2	Luminaire	Quantity	T-Base Designation Pole	A1	A2	Luminaire	Quantity	CSB/SSCB Mounted Designation Pole	A1	A2	Luminaire	Quantity
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	
	(Type SA 50 S - 10 - 10)			(400W EQ) LED		(Type SA 50 T - 10 - 10)			(400W EQ) LED		(Type SP 48 S - 10 - 10)			(400W EQ) LED	
	(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 Pole	A1	A2	Luminaire	Quantity

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

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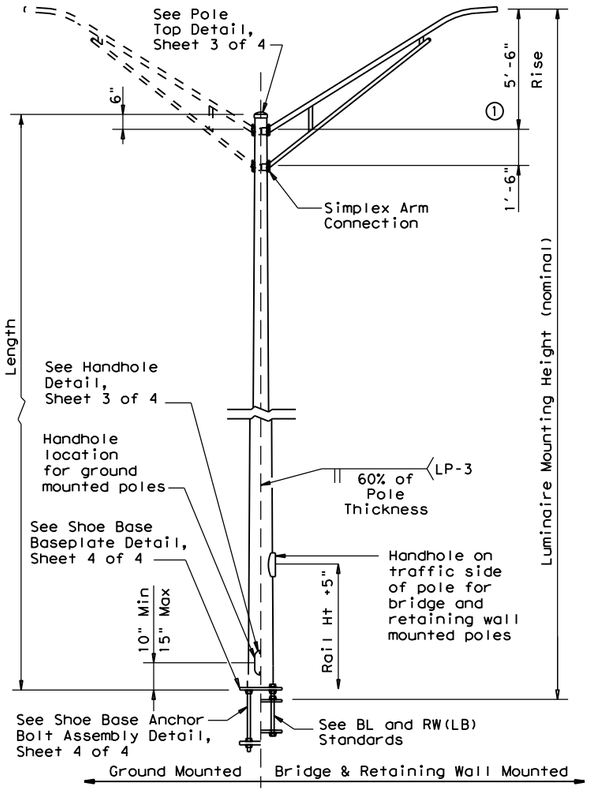
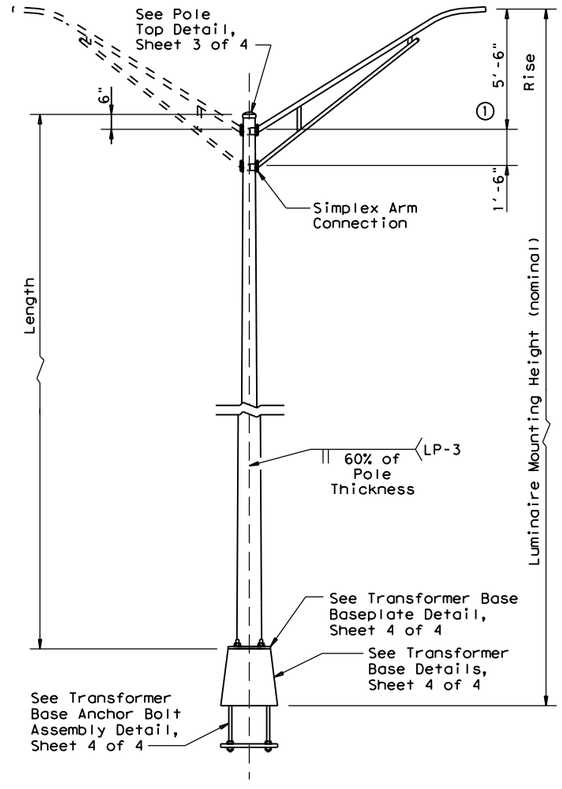


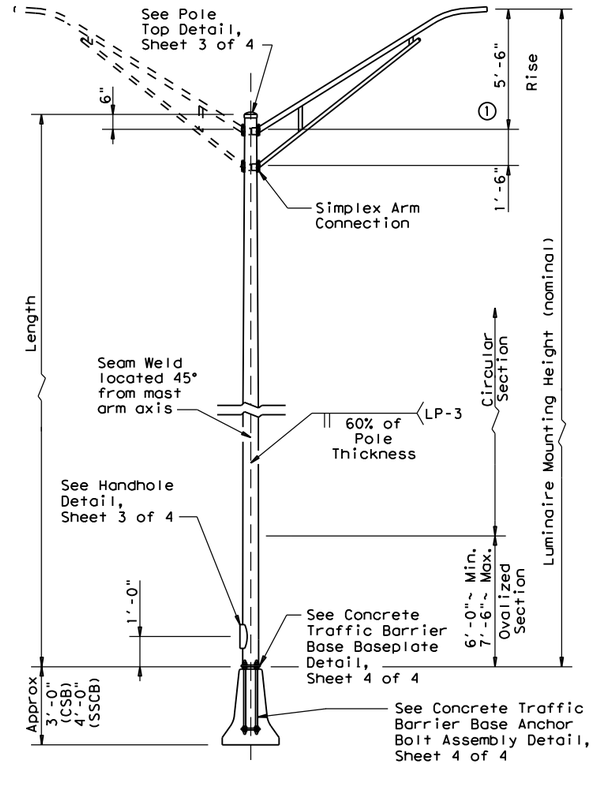
SHOE BASE POLE

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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Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(2)-19

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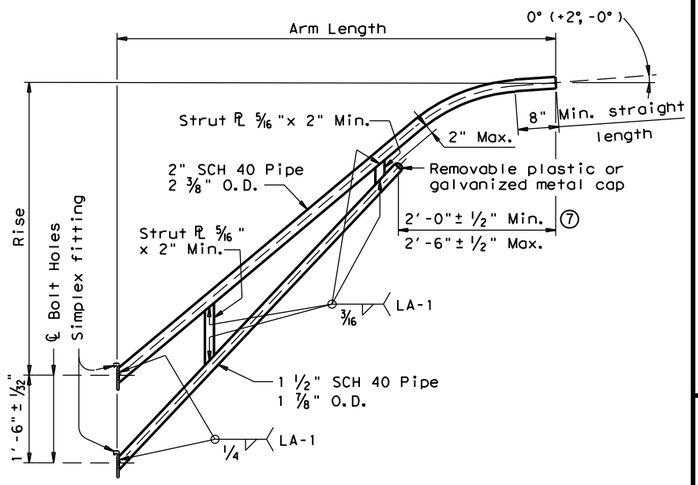
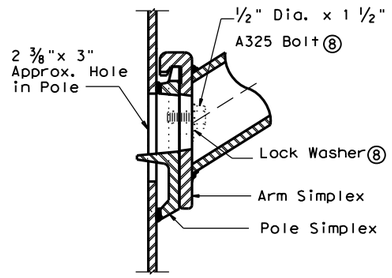


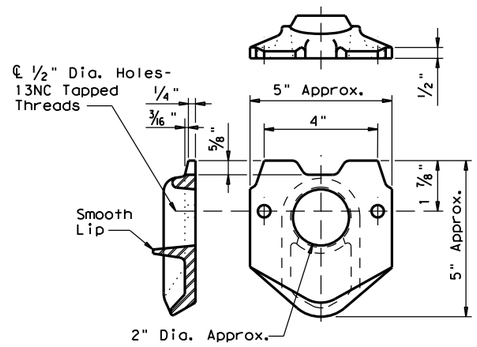
LUMINAIRE ARM

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"

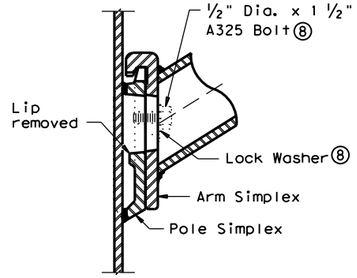
ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"



UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

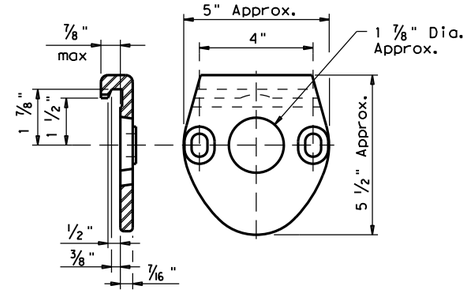


POLE SIMPLEX DETAIL ⑨



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.

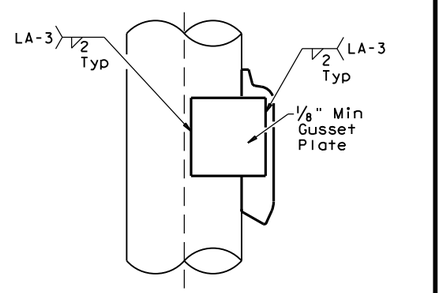
⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

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.

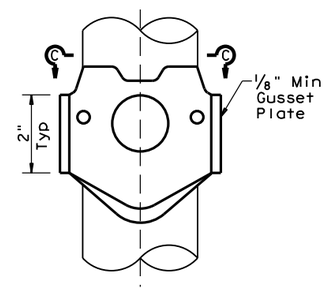
⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

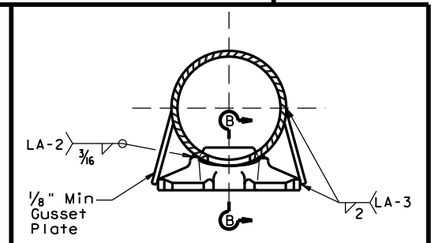
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted



SIDE

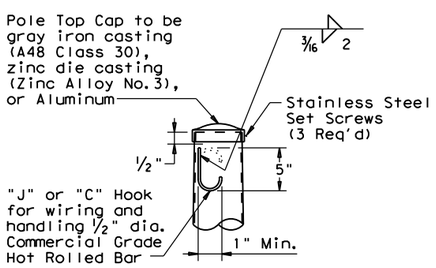


ELEVATION

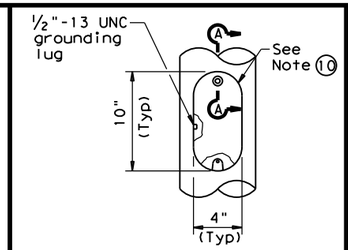


SECTION C-C

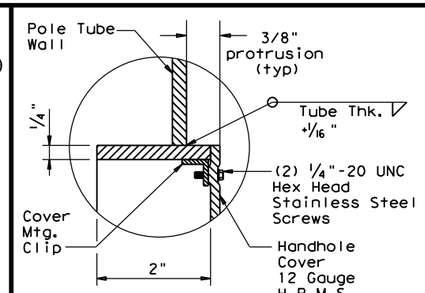
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

Texas Department of Transportation

Traffic Safety Division Standard

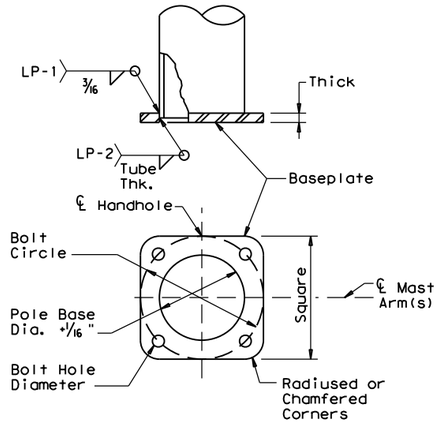
ROADWAY ILLUMINATION POLES

RIP(3)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
7-17	DIST	COUNTY		SHEET NO.
12-19	DAL	KAUFMAN, ETC.		118

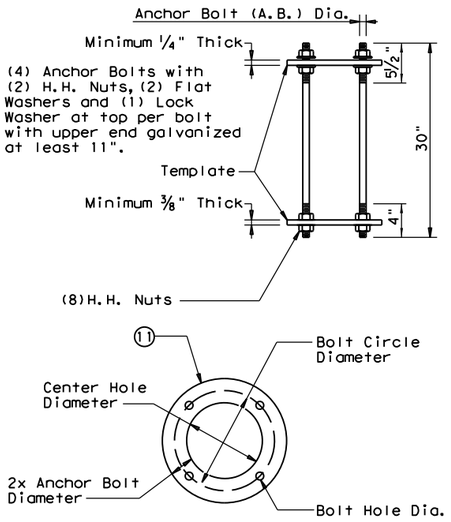
73C

DATE:
FILE:



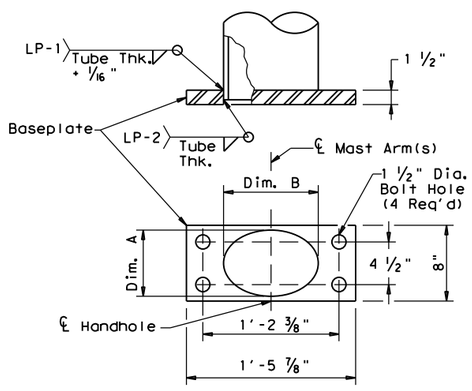
SHOE BASE BASEPLATE

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"



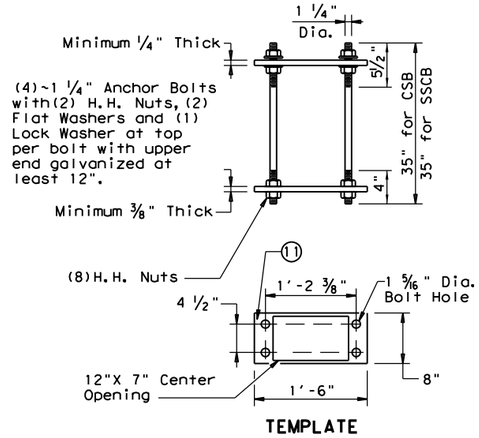
SHOE BASE ANCHOR BOLT ASSEMBLY

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"



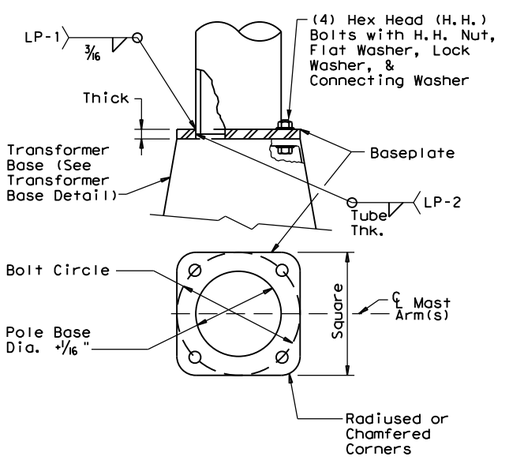
CONCRETE TRAFFIC BARRIER BASE BASEPLATE

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"



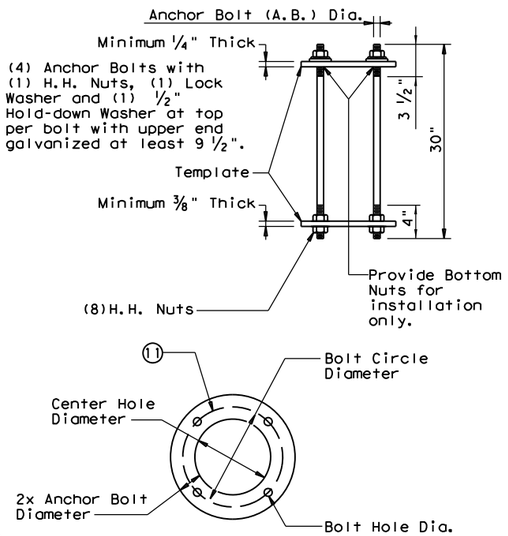
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

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

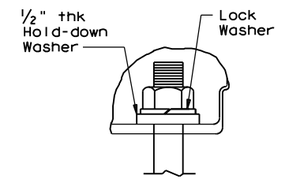
TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B



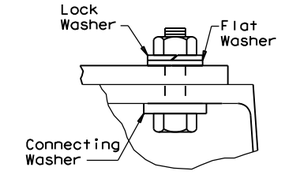
TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE DETAILS

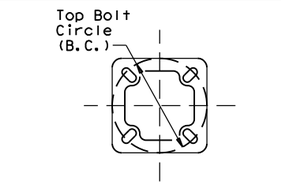
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



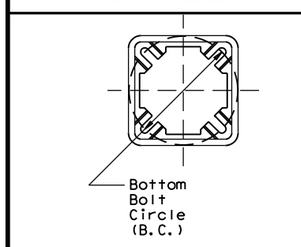
DETAIL A



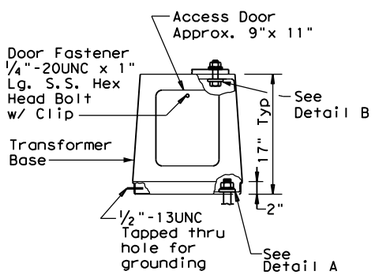
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

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"

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-17 12-19	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		119

730

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 damage resulting from its use.

Notes To Designer:
1. Do not alter Sheet Design or Font style,size or weight - match text attributes.
2. If additional space is needed for a numbered section,fence and adjust sections up or down as needed for proportioning and readability but do not relocate from its relative position.
3. All areas should be addressed thoroughly and verify the necessary pay items are set up to support actions needed.

Filled Out: XX/XX/XXXX
Prepared by: Name/Section

I. STORMWATER POLLUTION PREVENTION PLAN-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 adjacent MS 4 Operator(s) that receive discharges from this project. They need to be notified prior to construction activities.

(Note: Leave blank only if no adjacent MS 4 Operator(s) are affected.)

1. City of Dallas Phase I MS4 contact Kevin Hurley

2.

☐ No Action Required ☒ Required Action

Action Number:

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. No equipment is allowed in any sream channel below the ordinary High Water Mark except on approved temporary stream crossings or drill pads.

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:

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.

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 for applicable 401 General Conditions:

(Note: If CORP Permit not required, do not check boxes.)

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 Number:

1.

2.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.

Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751 & 752 in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action Number:

1.

2.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS TREATY ACT.

☐ No Action Required ☒ Required Action

Action Number:

1. The following species could occur in the project area: Woodhouse's toad and Texas garter snake. Follow the BMPs and Special Notes listed below to protect these species.

2. Contractor to implement the following BMPs from "Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources" available at https://ftp.txdot.gov/pub/txdot-info/eng/toolkit/300-01-bmp.pdf.
a. Section 2.6.1 Aquatic Amphibian and Reptile BMP (barrier fencing not required)
b. Section 2.6.2 Terrestrial Amphibian and Reptile BMP
c. Section 1.4 Water Quality BMP
d. Section 1.2 Vegetation BMP

Special Notes:

1. Avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.
2. If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.
3. The Migratory Bird Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade or transport any migratory bird, nest, young, feather or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure or trees where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

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 Corp 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 Safety Data Sheets (SDS) 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 SDS. In the event of a spill, take actions to mitigate the spill as indicated in the SDS, iin 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, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation(s) or replacement(s) (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 Number:

1.

2.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

GENERAL NOTE:

Any change orders and/or deviations from the final design must be reported to the Engineer prior to commencement of construction activities, as additional environmental clearance may be required.

LAST REVISION: 1/15/15

 Texas Department of Transportation
Dallas District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		US 80, etc.
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	Kaufman & Dallas	
CONTROL	SECTION	JOB	SHEET NO.
0095	05	063, etc.	120

A. GENERAL SITE DATA

1. PROJECT LIMITS: *VARIOUS LOCATIONS*

US 80 AT FM 2728 :	*Latitude (N):* 32.72184	*Longitude (W):* -96.16834
SH 183 AT MOCKINGBIRD LN :	*Latitude (N):* 32.81752	*Longitude (W):* -96.87095
IH 35E AT MOCKINGBIRD LN :	*Latitude (N):* 32.81887	*Longitude (W):* -96.86925
US 175 FROM RYLIE CREST DR :	*Latitude (N):* 32.70088	*Longitude (W):* -96.65042
TO OLD MILL LN :	*Latitude (N):* 32.70404	*Longitude (W):* -96.66308

2. PROJECT SITE MAPS:

- *Project Location Map: The Title Sheet*
- *Drainage Patterns: Drainage Area Maps N/A*
- *Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Typical Sections N/A*
- *Location of Erosion and Sediment Controls: SW3P Site Maps N/A*
- *Surface Waters and Discharge Locations: Drainage and Culvert Layouts N/A*
- *Project Specific Location(s) (PSL): To be determined by the project Construction Personnel. Location(s) shown on SW3P Site Map (if PSL location(s) is within one mile of project) and information located in project SW3P Binder (Reference Item #10 below).*

3. PROJECT DESCRIPTION:
TRAFFIC SIGNAL AND SIDEWALK INSTALLATION

4. MAJOR SOIL DISTURBING ACTIVITIES:
1. *DRILLED SHFT FOR SIGNAL POLES.*
2. *INSTALL GROUND BOXES.*
3. *INSTALL CONDUITS.*
4. *INSTALL CONTROLLER FOUNDATION.*
5. *INSTALL CURB RAMPS.*
6. *INSTALL ELECTRICAL SERVICE POLES.*
7. *INSTALL SIDEWALK*

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
N/A

6. TOTAL PROJECT AREA: *7.91* Acres

7. TOTAL AREA TO BE DISTURBED: *1.4470* Acres *(18.3%)*

US 80 AT FM 2728 :	*0.0100 ACRES*
SH 183 AT MOCKINGBIRD LN :	*0.1700 ACRES*
IH 35E AT MOCKINGBIRD LN :	*0.1800 ACRES*
US 175 FROM RYLIE CREST DR TO OLD MILL LN :	*1.0870 ACRES*

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION:	*N/A*
AFTER CONSTRUCTION:	*N/A*

9. NAME OF RECEIVING WATERS:
N/A

10. PROJECT SW3P Binder:

A. For projects disturbing one to five acres, TxDOT will maintain a SW3P Binder at the project field office (if there is not a project field office, should be kept at the Area Office) which contains the following: Index Sheet, TCEQ Signature Authority, TxDOT's and Contractor's Small Construction Site Notice, SW3P Inspector Qualification Statements, EPIC Sheet, SW3P Sheet, Site Location Maps, Inspection and Maintenance Reports (Form 2118), Construction Stage Gate Checklists(s) (CSGC), Stored Material Lists specifying associated control measures and the Appendix which contains the TPDES Construction General Permit, TxDOT and Contractor MS4 Operator Notification(s) and the Construction PSL Permits per all applicable requirements.

B. For projects disturbing 5 acres or more, TxDOT will follow the actions listed in (10.A.) above with the addition of the following: TxDOT and Contractor Notice Of Intent (N.O.I.) and Fee Payment Form, TxDOT and Contractor Large Construction Site Notice (to be used instead of Small Site Notice), and TPDES Permit Coverage Notice.

C. For projects disturbing less than one acre, actions described in (10.A.) and (10.B.) above are not required. Acreage is calculated by adding Total Area To Be Disturbed Acres on project (See #7 above) and the PSL(s) acreage located within one mile of project.

FILE NAME

DATE

DESIGNER

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

____ TEMPORARY SEEDING
____ MULCHING (Hay or Straw)
____ BUFFER ZONES
____ PLANTING
____ SEEDING
P SODDING
____ PRESERVATION OF NATURAL RESOURCES
____ FLEXIBLE CHANNEL LINER
____ RIGID CHANNEL LINER
____ SOIL RETENTION BLANKET
____ COMPOST MANUFACTURED TOPSOIL
____ VERTICAL TRACKING
____ OTHER: *(Specify Practice)*

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

T SILT FENCES
T EROSION CONTROL LOGS
____ EROSION CONTROL COMPOST BERMS (Low Velocity)
____ ROCK FILTER DAMS
____ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
____ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
____ DIVERSION DIKE AND SWALE COMBINATIONS
____ PIPE SLOPE DRAINS
____ PAVED FLUMES
____ ROCK BEDDING AT CONSTRUCTION EXIT
____ TIMBER MATTING AT CONSTRUCTION EXIT
____ CHANNEL LINERS
____ SEDIMENT TRAPS
____ SEDIMENT BASINS
____ STORM INLET SEDIMENT TRAP
____ STONE OUTLET STRUCTURES
____ CURBS AND GUTTERS
____ STORM SEWERS
____ VELOCITY CONTROL DEVICES
____ OTHER: *(Specify Practice)*

NOTE: TOP OF BMP'S SHOULD NOT BE HIGHER THAN ROADWAY ELEVATION AS NOT TO FLOOD ROADWAY UNLESS PRIOR APPROVAL FROM ENGINEER IS OBTAINED.

3. STORM WATER MANAGEMENT: *(Example Below - May be used as applicable, or revised)*

A. Storm water drainage will be provided by ditches, inlets, and storm water systems which carry drainage within the R.O.W. to the lows within the roadway and project site which drains to natural facilities.

B. Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4 :1 or flatter slopes with permanent vegetative cover.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

N/A

5. NON-STORM WATER DISCHARGES:
Filter non-storm water discharges, or hold in retention basins, before being allowed to mix with storm water. These discharges consist of, but not limited to, non-polluted ground water, spring water, foundation or footing drain water, water used for dust control or pavement washing and vehicle washwater containing no detergents.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
Maintain all erosion and sediment controls in good working order. Perform any necessary cleaning/repairs/replacements at the earliest possible date prior to next rain event, but no later than 7 calendar days. Ensure the surrounding ground has dried sufficiently to prevent damage from equipment. "Too Wet" is the only reason for not adhering to timeframes described. When construction activities permanently or temporarily cease and are not expected to resume for 14 or more days on a disturbed portion of the site, stabilization measures must be initiated immediately.

2. INSPECTION:
A TxDOT Inspector will perform a regularly scheduled SW3P inspection every 7 calendar days. An Inspection and Maintenance Report, signed by the TxDOT Inspector and the Contractor, will be filed for each inspection. Revise/clean/repair/replace each BMP control device in accordance with the current Field Inspection and Maintenance Report (Form 2118) and Item 1 (Maintenance) above.

3. WASTE MATERIALS:
On a daily basis, or as may be directed, collect all waste materials, trash and debris from the construction site and deposit into a metal dumpster having a secure cover and which meets all state and local city solid waste management requirements. Empty the dumpster as required by regulation, or as may be directed, at a local approved landfill site. Do not bury construction waste on the construction project site.

4. HAZARDOUS WASTE & SPILL REPORTING:
As a minimum, any products in the following categories are considered to be hazardous: Paints, Acids, Solvents, Fuels, Asphalt Products, Chemical Additives for Soil Stabilization, and Concrete Curing Compounds or Additives. When storing hazardous material on the project site, or at a Project Specific Location, take all practicable precaution to prevent and/or contain any spillage of these materials. In the event of a spill, contact the spill coordinator immediately.

5. SANITARY WASTE:
Use a licensed sanitary waste management contractor to collect all sanitary waste from portable units as may be required by local regulation, or as directed.

6. CONSTRUCTION VEHICLE TRACKING:
On a regular basis, or as may be directed, dampen haul roads for dust control and construct construction entrances/exits. Provide for a motorized broom or vacuum type sweeper to be available on a daily basis, or as may be directed, to remove sediment from paved roadways on project, abutting and traversing the project site.

7. MANAGEMENT PRACTICES:
A. Construct disposal areas, stockpiles, haul roads and PSL's in a manner that will minimize and control the amount of sediment that may enter receiving waters. Do not locate disposal areas in any wetland, waterbody or streambed.
B. Locate construction staging areas, vehicle maintenance and PSL's areas in a manner to minimize the runoff of pollutants.
C. When working in or near a wetland, install and maintain operating soil erosion and sediment controls at all times during construction and isolate the work from the wetland.
D. Clear all waterways as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.
E. Procedures and/or practices should be taken to control dust.
F. Sediment to be removed from roadways daily or when work begins after weather events if construction activities have ceased due to weather event.

STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 6/3/22
Signature Date

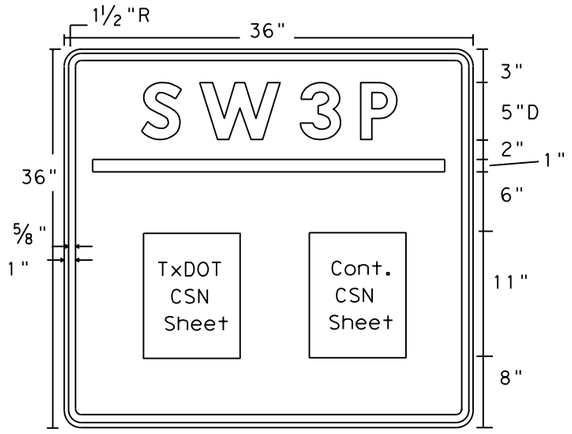
Texas Department of Transportation

DALLAS DISTRICT ENVIRONMENTAL

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

TEMPLATE REVISION DATE: 02/07/18

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		US 80, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DHN	TEXAS	DALLAS	KAUFMAN, ETC.	121
CHECK APM	CONTROL 0095	SECTION 05	JOB 063, ETC.	



SW3P SIGN

TxDOT & Contractor Construction Site Note (CSN)

Sign Dimensions

36" X 36"

Letters - White
Numbers - White
Border - White
Background - Blue

GENERAL NOTES:

1. The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", (TMUTCD) latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
2. Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.
3. CSN Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry. (See Figure 1).
4. SW3P Signs should be placed just inside the ROW line at the project limits at a readable height. It may be placed perpendicular or parallel to ROW line. If the sign cannot be placed outside the clear zone, it will be mounted per TMUTCD requirements.
5. Final location of the signs will be as approved by the Engineer.

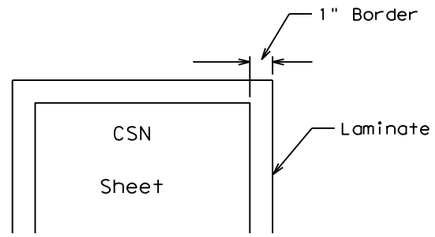
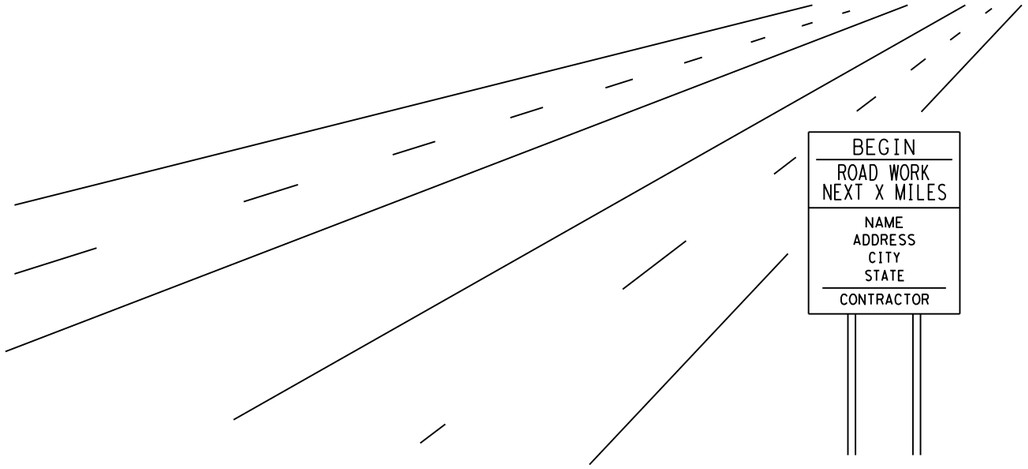
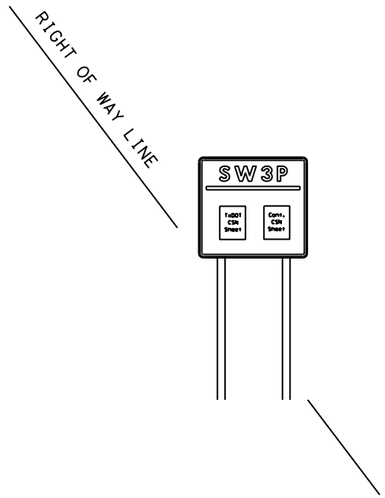


Figure 1





DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

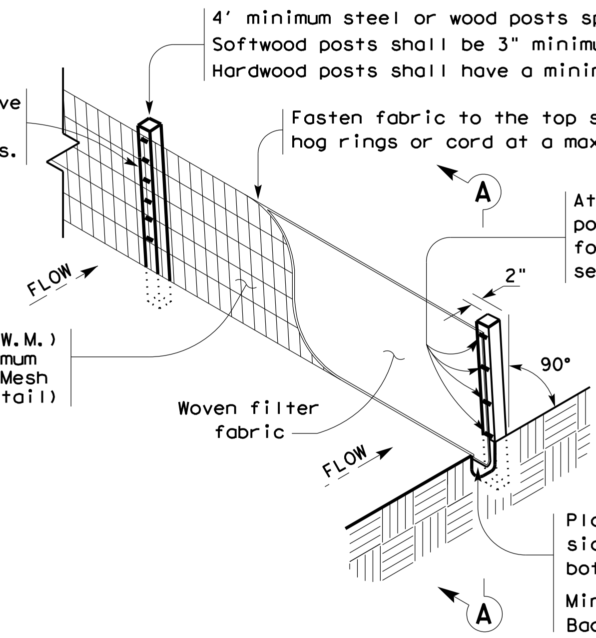
Texas Department of Transportation
DALLAS DISTRICT STANDARD

SW3P SIGN SHEET

FILE:	DN: TxDOT	CK:	DW:	CK:	
© TxDOT 2016	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISION DATE: 10-16-15	18	SEE TITLE SHEET			122
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	DALLAS		0095	05	063, ETC.	US 80, ETC.

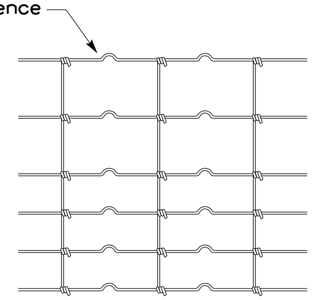
LEVELS DISPLAYED

PATH:



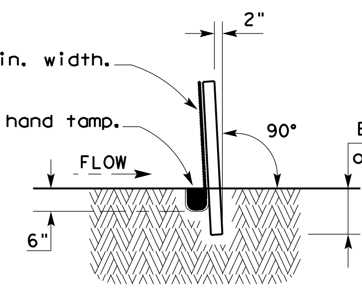
TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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



SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

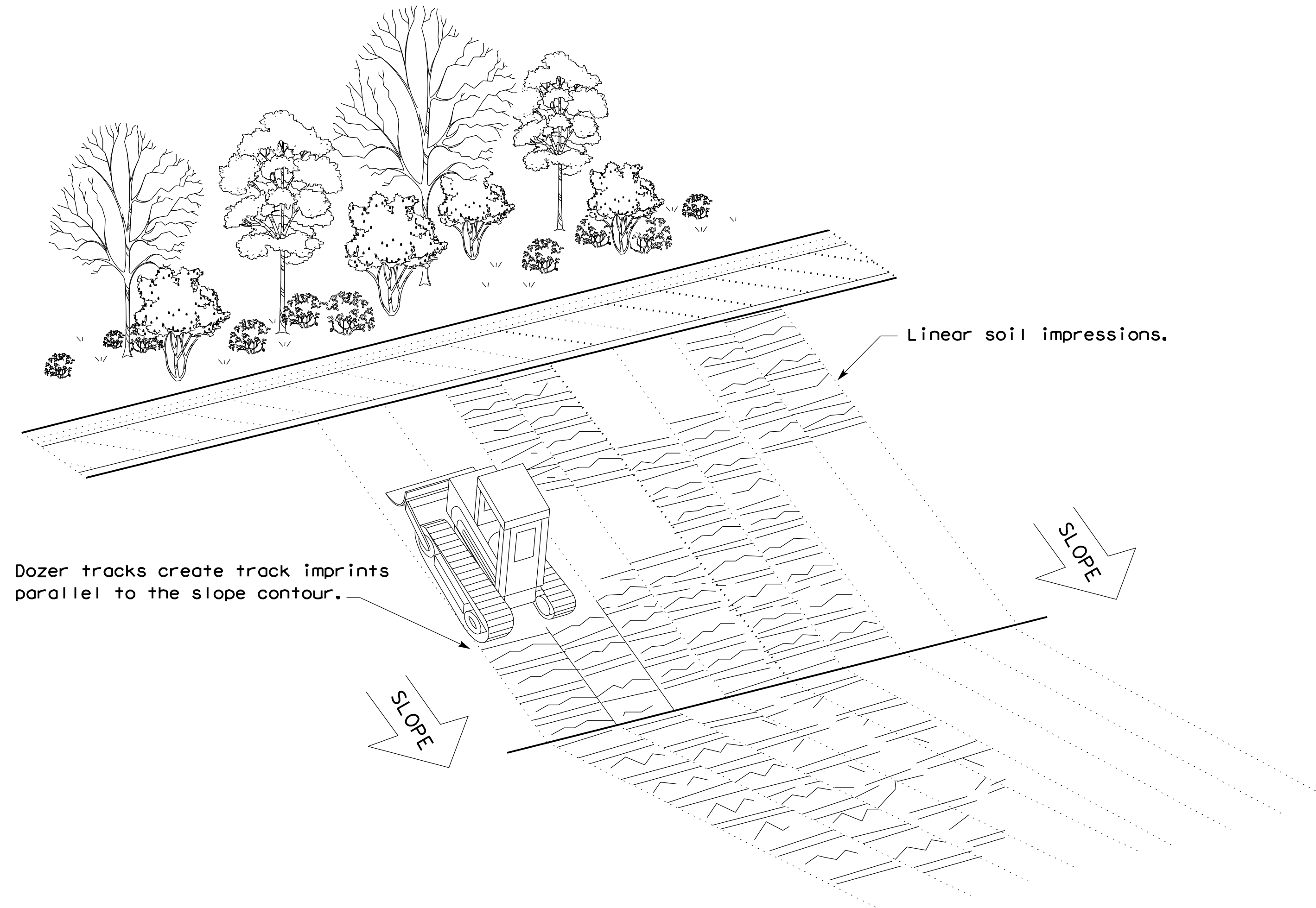
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

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

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0095	05	063, ETC.	US 80, ETC.	
	DIST	COUNTY		SHEET NO.	
	DAL	KAUFMAN, ETC.		123	

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DATE: 5/25/2022
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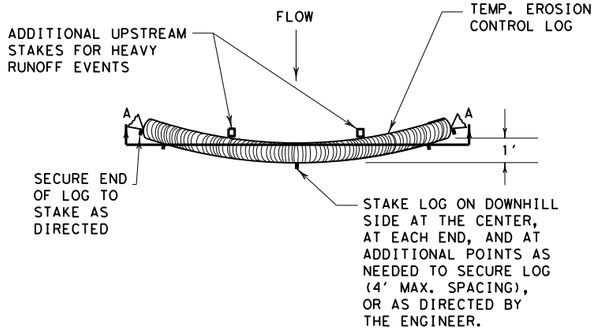
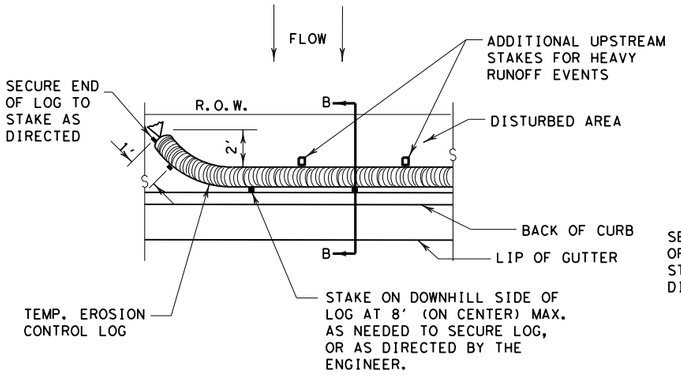
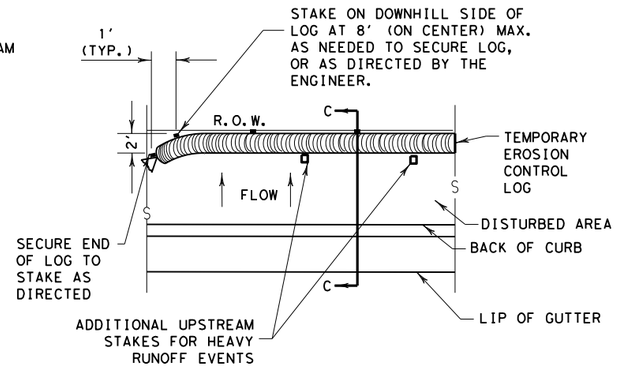


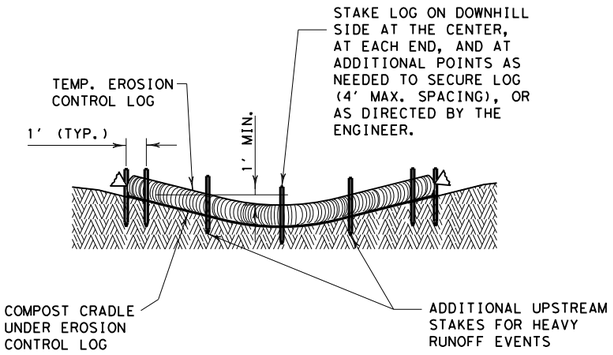
PLAN VIEW



PLAN VIEW



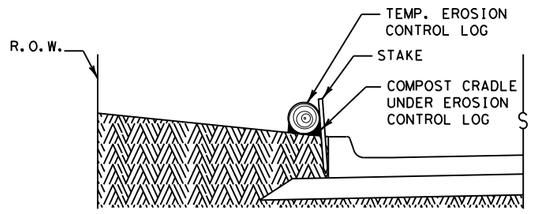
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

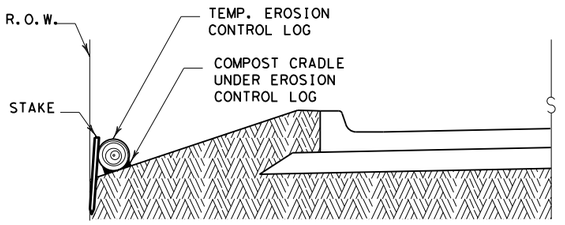
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

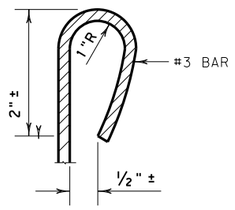
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

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

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.

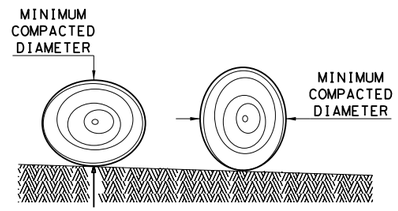
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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	0095	05	063, ETC.		US 80, ETC.		
	DIST	COUNTY				SHEET NO.	
	DAL	KAUFMAN, ETC.				124	

DATE: 5/25/2022
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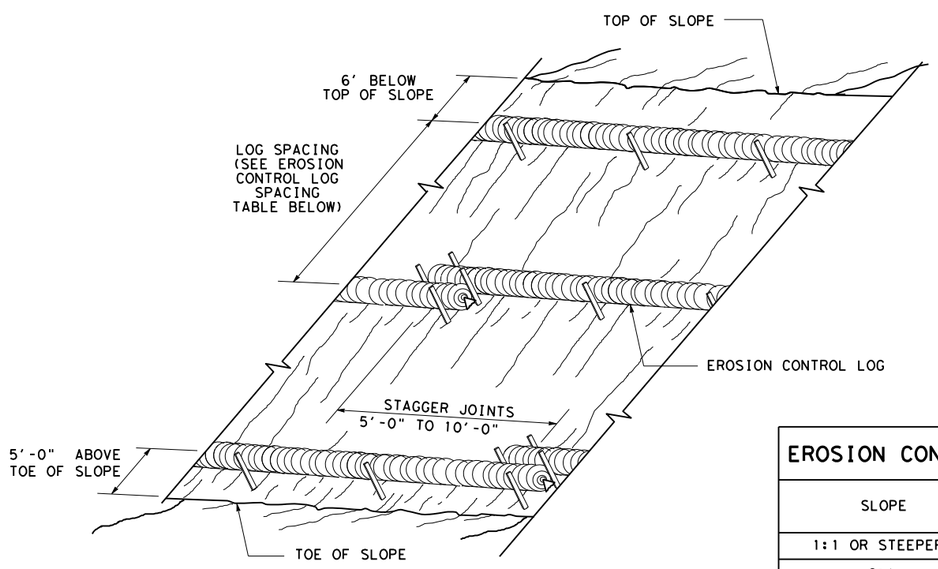
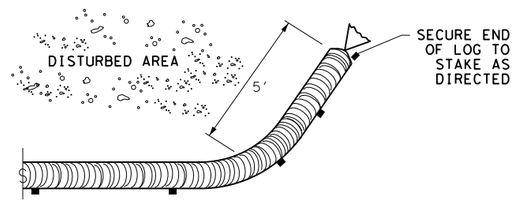


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

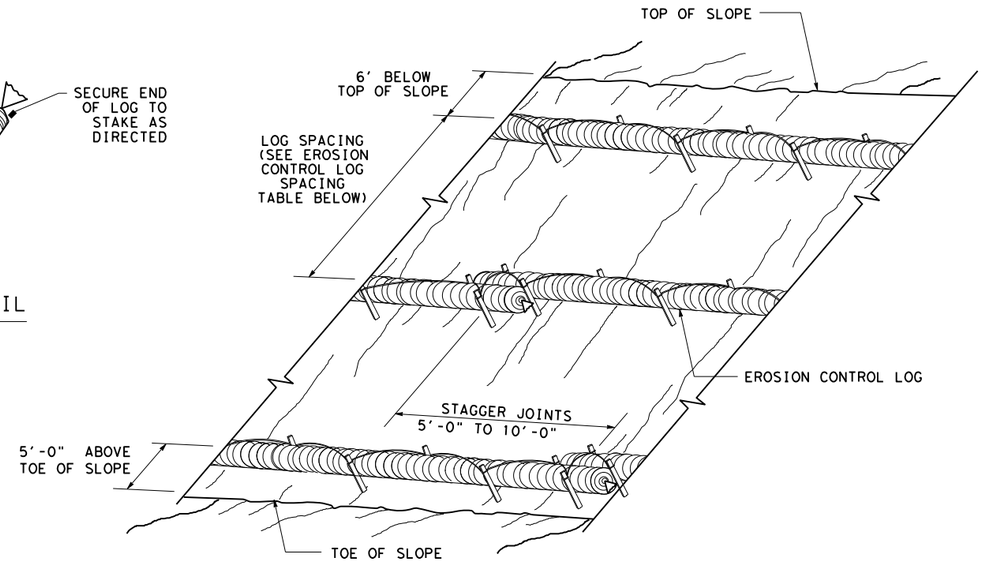
CL-SST



END SECTION RAP DETAIL

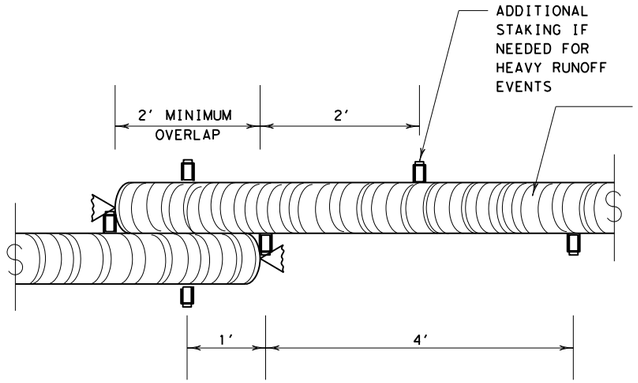
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

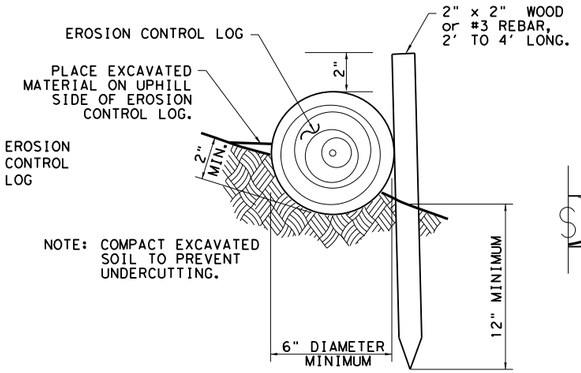
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

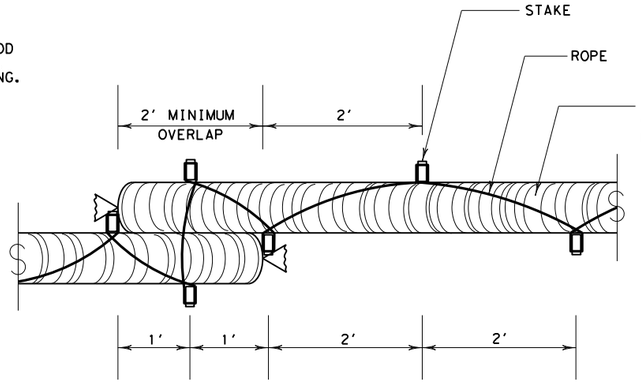


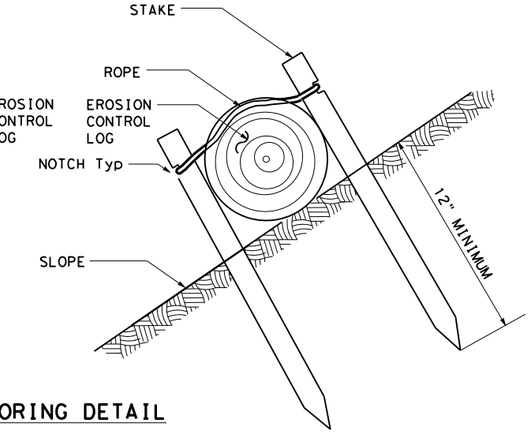


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

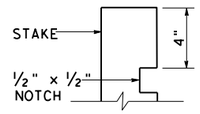
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation | Design Division Standard

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

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0095	05	063, ETC.	US 80, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN, ETC.		125

DATE: 5/25/2022
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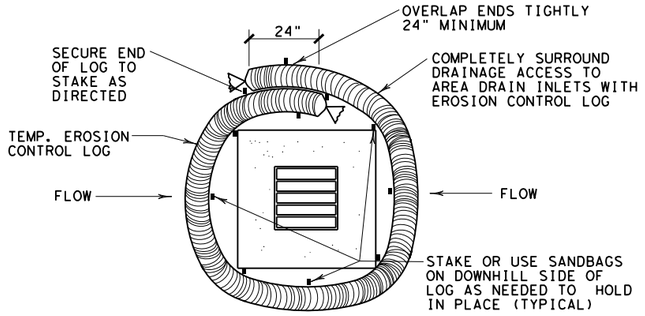
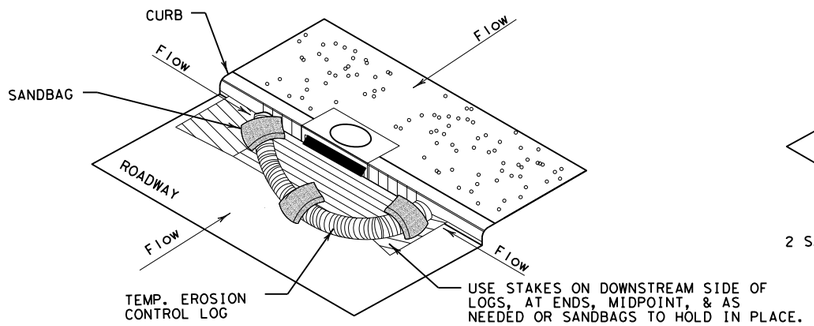


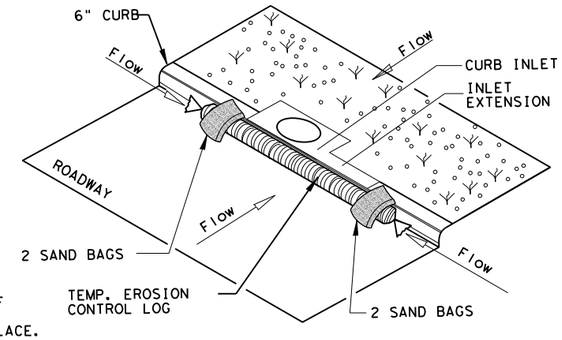
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

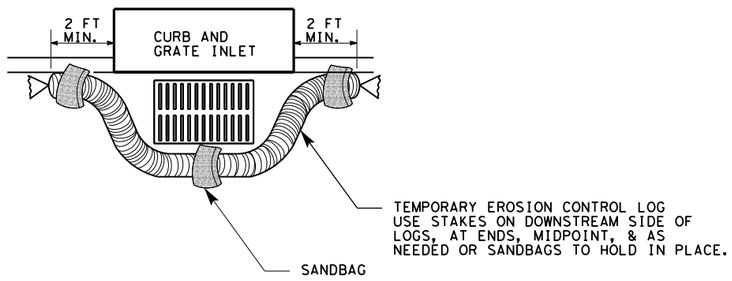
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

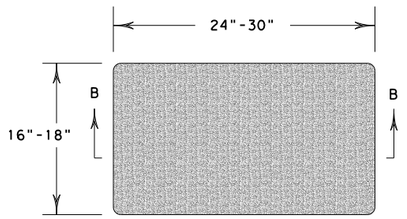
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS		
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0095	05	063, ETC.		US 80, ETC.	
	DIST	COUNTY			SHEET NO.	
	DAL	KAUFMAN, ETC.			126	