FINAL PLANS

NAME OF CONTRACTOR: _____

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

SUMMARY OF CHANGE ORDERS:

# STATE OF TEXAS
## DEPARTMENT OF TRANSPORTATION

# PLANS OF PROPOSED
# STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECTS
STP 2B24(025)HES, ETC
CCSJ: 0047-07-245, ETC

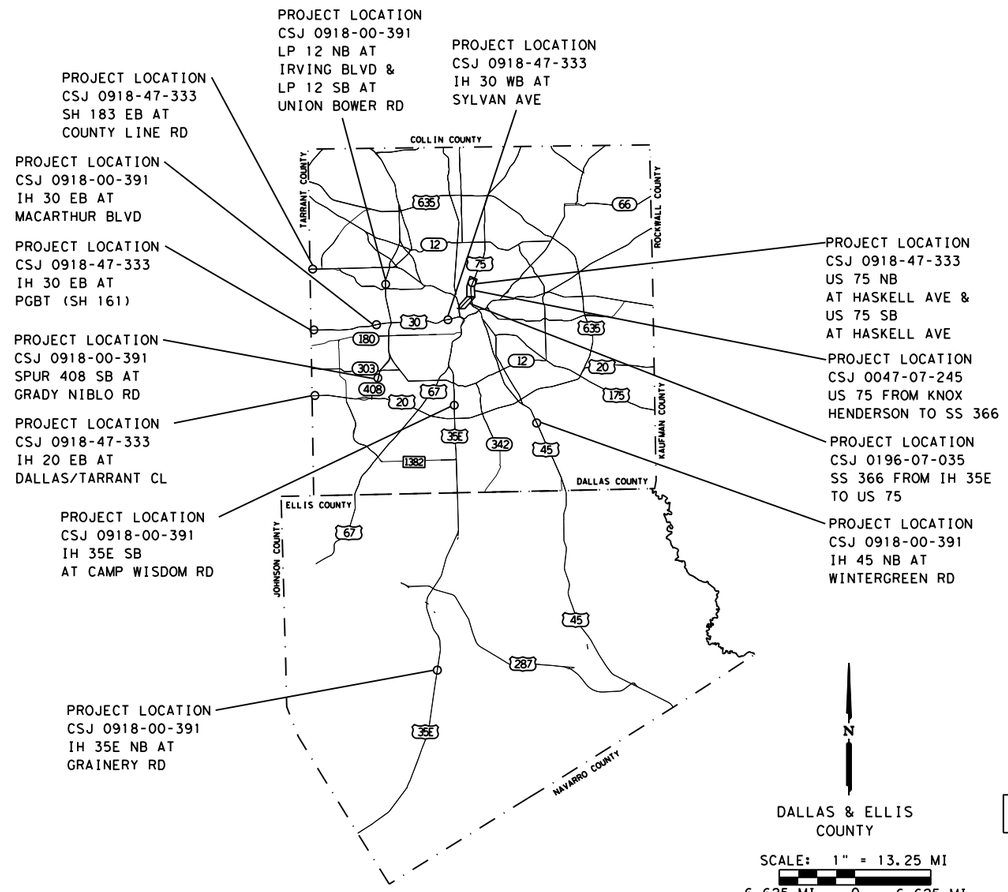
| DESIGN | FED.RD. DIV.NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|---|---|---|---|---|
| GRAPHICS | 6 | STP 2B24(025)HES,ETC | | US 75,ETC |
| | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK | TEXAS | DALLAS | DALLAS,ETC | 1 |
| CHECK | CONTROL | SECTION | JOB | |
| | 0047 | 07 | 245,ETC | |

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

TDLR review not required.

| CSJ: 0047-07-245 | CSJ: 0196-07-035 | CSJ: 0918-00-391 | CSJ: 0918-47-333 |
|---|---|---|---|
| US 75 FROM KNOX HENDERSON TO SS 366 DALLAS COUNTY | SS 366 FROM IH 35E TO US 75 DALLAS COUNTY | VARIOUS ROADWAYS IN DALLAS & ELLIS COUNTIES | VARIOUS ROADWAYS IN DALLAS COUNTY |

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENT PROJECTS AND CORRIDOR TRAFFIC MANAGEMENT CONSISTING OF WRONG WAY DRIVER SYSTEMS, DMS REFURBISHMENT, AND NEW DMS INSTALLATIONS




N

DALLAS & ELLIS COUNTY

SCALE: 1" = 13.25 MI

6.625 MI 0 6.625 MI

DALLAS DISTRICT

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED PROFESSIONAL ENGINEER

02/23/2024

TRAF·IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 2/26/2024
DocuSigned by: Eyad Fanous , P.E.
TRAFFIC DESIGN SUPERVISOR
7C074158193648D...

APPROVED FOR LETTING 2/26/2024
DocuSigned by: JEFFREY BUSH , P.E.
DIRECTOR OF OPERATIONS
345B765EB03F406...

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

_____, P.E.
Signature of Registrant & Date

# INDEX OF SHEETS



STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

KEVIN D. TYER, P.E. — P.E. — 03/13/2024 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
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER

ELIZABETH SHELTON, P.E. — P.E. — 03/13/2024 DATE

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

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |


TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


Texas Department of Transportation



INDEX OF SHEETS

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 2 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## 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 listed in Table 1. 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).

**Table 1 - Disturbed Area Per Location**

| Roadway | Area (Acres) |
|---|---|
| US 75 | 0.050 |
| IH 20 | 0.005 |
| SH 183 | 0.020 |
| IH 30 at Sylvan | 0.040 |
| SS 366 | 0.010 |
| IH 30 at SH 161 | 0.010 |
| IH 30 at MacArthur | 0.005 |
| SS 408 | 0.005 |
| IH 35E at Camp Wisdom | 0.005 |
| SL 12 | 0.005 |
| IH 45 at Wintergreen | 0.005 |
| IH 35E at Grainery | 0.005 |

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

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



**CSJ: 0047-07-245, etc** **Sheet 3**

**County: Dallas, etc**

**Highway: US 75, etc**

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address: https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors or Contractor questions on this project are to be addressed to the following individual(s):

Engineer's Email: Christopher.Blain@txdot.gov
Construction Manager's Email: Eric.Herman@txdot.gov
Construction Record-Keeper's Email: Anthony.Block@txdot.gov

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

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

Provide as-built cable interconnection diagrams and communication network schematics at least 30 days prior to the start of data communications testing.

All materials and services not expressly called for in the specification or not shown in the plans, which may be necessary for complete and proper construction of the "ITS" Network, will be performed, furnished and installed at no cost to the Department.

Contact the TxDOT Freeway Management Office (214-320-6602) at least 48 hours in advance of performing any work on this project that impacts the operation of the District ITS. TxDOT "ITS" personnel must be on-site during removal and installation of DMS's, as well as during interconnection of new Wrong Way Driver System (WWDS) to the District ITS.

**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 (214-320-6205) 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.

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

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.

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 the project.

**Item 6:**

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit an original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

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

**Item 7:**

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.



**CSJ: 0047-07-245, etc** **Sheet 3**A

**County: Dallas, etc**

**Highway: US 75, etc**

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 10:00pm 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.

**Item 8:**

A 90 day construction delay is included in this contract through Special Provision 008-056. This delay is included for material acquisition

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

Nighttime work is allowed in accordance with Article 8.3.3.

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.

**Item 416:**

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.

Pole foundations will be paid for once regardless of extra work caused by obstructions.

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

At locations where rock is encountered, drilled shaft foundations will extend a minimum of five feet into rock, which may be at a depth less than the drilled shaft lengths as shown on the plans or as directed.

All drilled shaft foundations will be based on the lengths shown on the plans or those established in writing. Adequate calculations for measurements of foundations have been made in accordance with Item 9: Measurement and Payment, Article 9.1 of the

Standard Specifications. Increases or decreases in the quantities required by change in design will be measured as specified and the revised quantities will be the basis for payment.

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

**Item 421:**

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.

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.

**Item 440:**

Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strip and Rip Rap Items as approved. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved.

**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: 0047-07-245, etc** **Sheet 3**B

**County: Dallas, etc**

**Highway: US 75, 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.

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 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.

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 the police department.

For the work to be done on this project, the Contractor may begin closing main lanes of TxDOT roadways at 9:00 PM. The Contractor must have all main lanes open by 5:00 AM. Full Freeway closures are not allowed unless otherwise approved in writing by the Engineer.

The main lane closure disincentive fees are shown in Table 2. The fee applies to the Contractor for closures that are outside the times specified above for each hour, regardless of the length of the lane closure or obstruction.

**Table 2 - Main Lane Closure Disincentive Fees**

| *No. of ML's Closed | **Cost Deduction/Hr |
|---|---|
| 1 | $ 1,000.00 |
| 2 | $ 2,000.00 |
| 3 | $ 3,000.00 |
| 4 | $ 4,000.00 |
| 5+ | $ 5,000.00 |

*Main Lanes include all Thru lanes including HOV/Managed Lanes

**Deducted costs will be prorated by rounding up to the nearest 15-minute increment.

Work in other areas of the project is not restricted to this time frame.

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.

**Item 540:**

Furnish one type of post throughout the project except as specifically noted in the plans.

**Items 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. After the work is completed, the Contractor shall restore any curbs or walkways, which have been removed, to their original condition and to the satisfaction of the engineer.

Where a trench is cut through the surfaced parking shoulder, median or driveways for laying conduit, the base and surfacing will be replaced with similar materials equal in appearance and quality to the original construction.

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

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").

When holes are drilled through concrete structures, use a coring device. Do not use masonry or concrete drills.

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

If the Contractor chooses to combine multiple conduits into one bore, the Contractor will install a casing around the conduits. The casing will not be paid for directly, but will be considered subsidiary to this item.

Install, for each “ITS” conduit run with fiber optic cables, a metallic underground warning tape, as detailed in the plans. This warning tape will be imprinted with “CAUTION BURIED FIBER OPTIC CABLE.” This will not be paid for directly, but will be considered subsidiary to Item 618: Conduit. The warning tape does not need to be installed when conduit is bored under a roadway section or landscaped area. At locations where the



**CSJ: 0047-07-245, etc** **Sheet 3** C

**County: Dallas, etc**

**Highway: US 75, etc**

Contractor chooses to bore conduit underground, in areas where trenching methods can be used, the Contractor will install the metallic underground warning tape.

**Items 620, 6004:**

The equipment grounding conductor smaller than 4 AWG shall be a bare wire or identified with continuous green colored jacket insulation. Grounded conductors (Neutral) smaller than 4 AWG 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. White phasing tape is not allowed to be used to signify a neutral on any conductor 6 AWG and smaller as per TxDOT specifications and the NEC.

All communication cables will be color-coded consistently, or permanently labeled, between all connections and splices, to ensure immediate identification. The Contractor will submit a chart or list identifying all cables, in a logical and sequential manner prior to installation, for the Engineer’s approval.

Insulated tracer wire shall have Orange colored insulation and shall be labeled as a “Tracer Wire”. For fiber duct banks with multi-duct conduits, tracer wire shall be installed in one innerduct.

The Contractor will install and leave coiled, at the base of the new Dynamic Message Sign structure, a minimum of 30 feet of electrical conductors, fiber optic cable, and communication cable for the selected DMS vendor’s use when installing the signs. The ends of all cables and conductors will be taped and protected, as required by the National Electric Code and TxDOT Standard Sheets.

**Item 624:**

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

Unless designated otherwise on the plans, Type D ground boxes without aprons shall be installed 12 inches below grade and covered with excavated material. The Contractor will be responsible for providing the latitude and longitude of each ground box. This work will not be paid for directly, but is subsidiary to this Item.

**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.

The Meter Base and Service Enclosure shall be mounted facing the roadway for pedestal services.

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.

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.

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.
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.

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

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

Step-Down Transformer:

The Contractor shall furnish and install a shielded pedestal mounted dry-type step-down transformer at locations shown on the plans. Actual transformer dimensions and weight shall determine mounting configuration and shall be approved before installation. Concrete pad dimensions shown on plans can be adjusted to fit approved model.

The step-down transformer shall meet the following minimum requirements:

•Rated for 10 kVA, with a primary voltage of 480 and a secondary voltage of 120/240 volts, single-phase, 3-wire.
•Electrostatically shielded for transient voltage protection.
•Transformer shall be insulated for up to 180 Degrees Celsius.
•Housed in a lockable stainless steel NEMA Type 3R enclosure.
•Contain primary and secondary molded case thermal magnetic bolt-in circuit breakers as shown on plans.
•Provided with two 5% full capacity taps below nominal.

Each step-down transformer installation will not be paid for directly but shall be considered subsidiary to Item 628.



**CSJ: 0047-07-245, etc** **Sheet 3D**

**County: Dallas, etc**

**Highway: US 75, etc**

**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.

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 650:**

The DMS sign support structure locations shown on the plans may be adjusted to fit field conditions. The tower heights shown on the plans are to be used for bidding purposes only. Prior to fabrication, the Contractor, in cooperation with the Engineer, will take finished grade elevations at the tower locations and will determine their exact height for fabrication, in accordance with the details shown on the plans.

All sign support quantities, pipe and structural steel, will be based on the dimensions shown on the approved shop drawings, or those established in writing. Calculations for measurement of the sign support quantities will be made from the approved shop drawings, in accordance with Item 9: Measurement and Payment, Article 9.1, of the Standard Specifications. Increases and decreases in quantities by change in design, after the shop drawings are approved, will be measured as specified, and the revised quantities will be the basis for payment.

Provide field galvanizing equipment, ASTM A780 (Stick only) or approved alternatives, at all times. Make repairs to galvanized surfaces according to the above specifications, at locations where damage has occurred.

All towers and trusses will be matched and marked for erection by the fabricator.

After the sign supports, with signs attached, have been erected, individual units requiring cleaning will be washed with a cleaning solution. The cleaning solution will be capable of removing all grease, oil, dirt smears, streaks, and other foreign particles.

**Item 654:**

Provide a continuous 48 inch wide sign walkway on the overhead ‘T’ mount Dynamic Message Sign structure as shown on the plans, or as directed.

The type of sign walkway will be specified on the plans and will be paid for on a per linear foot basis.

**Item 672:**

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

**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 690:**

Multiple single conductors in the same conduit shall be considered one (1) cable for the purpose of removals and installation.

**Item 6000:**

New circuit breakers for existing electrical services shall be furnished by the Contractor and shall be compatible with the existing service equipment. A Licensed Master Electrician or Unrestricted Journeyman shall be required to make modifications to existing services.

**Item 6007:**

The single mode fiber optic cable will be installed continuous, without splices, from the communications hub to the DMS cabinet or WWDS cabinet as shown on the plans, or as directed. No splicing of fiber optic cable will be permitted in ground boxes unless shown in the plans or approved by the Engineer.

All fiber optic pigtails and jumpers shall have ST connectors. These connectors will not be paid for separately, but will be considered subsidiary to Item 6007.

Extra cable length will be included in each run, to provide adequate slack, at each ground box, communications hub, DMS or WWDS cabinet, as determined or shown in the plans.

**Item 6027:**

The Contractor is responsible for damage done to existing cable during the preparation of existing conduit. The Contractor will repair or replace damage done to existing cables. The repairing or replacing of damage to existing cables will be done at the expense of the Contractor, and to the satisfaction of the Engineer.



**CSJ: 0047-07-245, etc** **Sheet 3E**

**County: Dallas, etc**

**Highway: US 75, etc**

**Item 6028:**

Two 12 inch Yellow LED flashing beacons shall be installed and made operational on each DMS installed on this project. The beacons are included with the DMS and shall be configured to flash alternately.

The LED Dynamic Message Signs installed on this project shall be configured to operate remotely from DalTrans using the vendor's proprietary software. Prior to completion of this project, the Contractor shall demonstrate complete operability of all DMS's installed on this project at the DalTrans Traffic Management Center.

If communication cannot be achieved from the DMS to DalTrans, due to existing fiber or radio or hardware issues, on items not provided by the Contractor, then the Contractor will, at a minimum, demonstrate local communication directly to the DMS.

The Contractor will ensure that, during construction, the attachment of the DMS to the truss structure will not interfere with the structure bolt heads.

The Contractor shall provide vertical support brackets, bearing angles, and J-bolts to connect the new DMS to the existing overhead sign support structure.

Provide local warehouse storage for all DMS's to be installed on this project from the time of delivery by the manufacturer to the time of final installation. Assume responsibility for all sign components during receiving, storage, transport, and final installation, as required in Item 6: Control of Materials, Article 6.6 and 6.7.

**Item 6093:**

Existing cables and conductors for equipment to be removed and salvaged shall not be cut at the equipment entry points, but shall be cut at the maximum practical distance from the equipment to allow for reuse. Cables shall be neatly coiled and strapped as part of the salvaged equipment. Salvaged equipment other than DMS signs shall be delivered to the TxDOT Cedar Hill Maintenance Yard or as directed by the Engineer.

Existing DMS signs shall become the property of the Contractor after TxDOT directed salvageable parts have been removed by the Contractor and delivered to TxDOT.

TransGuide shall be considered to be DalTrans for this project.

Existing DMS's shown to be removed in the plans shall be considered Type 2 DMS's for this project.

**Item 6123:**

If required to supplement new Ethernet Switches, installation of new Ethernet Switch Port Expanders will not be paid for separately, but will be considered subsidiary to this item. Power Cables for new Ethernet Switches and Ethernet Patch Cables to connect new and existing Ethernet Switches will be considered 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 2 Series | Scenario | | Required TMA/TA | |
|---|---|---|---|---|
| (2-1)-18 / (2-2)-18 / (2-4)-18 / (2-5)-18 / (2-6)-18 | All | | 1 | |
| (2-3)-23 | A | B | 1 | 2 |

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

| TCP 6 Series | Scenario | | Required TMA/TA | |
|---|---|---|---|---|
| (6-1)-12 | A | B | 1 | 2 |
| (6-2)-12 / (6-3)-12 | All | | 1 | |
| (6-4)-12 | A | B | 1 | 2 |
| (6-5)-12 | A | B | 1 | 2 |
| (6-6)-12 / (6-7)-12 | All | | 1 Per Lane | |
| (6-8)-14 / (6-9)-14 | All | | 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.

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.



**CSJ: 0047-07-245, etc** **Sheet 3F**

**County: Dallas, etc**

**Highway: US 75, etc**

**Item 6414:**

The Wrong Way Driver System (WWDS) provided shall be capable of communicating with the TxDOT Lone Star Central Management Software at the DalTrans Traffic Management Center. The WWDS shall include the necessary networking equipment to establish and maintain communications between the field system and DalTrans. State furnished Ethernet switches will be used for locations with fiber communications and Contractor furnished cellular modems will be used for locations with wireless communications.

# Estimate & Quantity Sheet

**CONTROLLING PROJECT ID** 0047-07-245 **DISTRICT** Dallas **COUNTY** Dallas
**HIGHWAY** SS 366, US 75, Various

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **CONTROL SECTION JOB** | **0047-07-245** | | **0196-07-035** | | **0918-00-391** | | **0918-47-333** | | TOTAL EST. | TOTAL FINAL |
| | | | **PROJECT ID** | **A00177564** | | **A00177565** | | **A00189288** | | **A00177085** | | | |
| | | | **COUNTY** | **Dallas** | | **Dallas** | | **Dallas** | | **Dallas** | | | |
| | | | **HIGHWAY** | **US 75** | | **SS 366** | | **Various** | | **Various** | | | |
| **ALT** | **BID CODE** | **DESCRIPTION** | **UNIT** | EST. | FINAL | EST. | FINAL | EST. | FINAL | EST. | FINAL | | |
| | 104-6009 | REMOVING CONC (RIPRAP) | SY | | | 2.000 | | | | | | 2.000 | |
| | 416-6007 | DRILL SHAFT (54 IN) | LF | | | | | | | 87.000 | | 87.000 | |
| | 420-6002 | CL A CONC (MISC) | CY | | | | | | | 0.500 | | 0.500 | |
| | 432-6002 | RIPRAP (CONC)(5 IN) | CY | | | 0.280 | | | | | | 0.280 | |
| | 432-6045 | RIPRAP (MOW STRIP)(4 IN) | CY | | | | | | | 14.150 | | 14.150 | |
| | 500-6001 | MOBILIZATION | LS | 0.250 | | 0.250 | | 0.250 | | 0.250 | | 1.000 | |
| | 502-6001 | BARRICADES, SIGNS AND TRAFFIC HANDLING | MO | 2.000 | | 2.000 | | 2.000 | | 2.000 | | 8.000 | |
| | 506-6042 | BIODEG EROSN CONT LOGS (INSTL) (18") | LF | | | | | | | 140.000 | | 140.000 | |
| | 506-6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | | | | | | | 140.000 | | 140.000 | |
| | 540-6002 | MTL W-BEAM GD FEN (STEEL POST) | LF | | | | | | | 350.000 | | 350.000 | |
| | 540-6016 | DOWNSTREAM ANCHOR TERMINAL SECTION | EA | | | | | | | 3.000 | | 3.000 | |
| | 544-6001 | GUARDRAIL END TREATMENT (INSTALL) | EA | | | | | | | 4.000 | | 4.000 | |
| | 544-6003 | GUARDRAIL END TREATMENT (REMOVE) | EA | | | | | | | 1.000 | | 1.000 | |
| | 618-6023 | CONDT (PVC) (SCH 40) (2") | LF | 1,040.000 | | | | | | | | 1,040.000 | |
| | 618-6029 | CONDT (PVC) (SCH 40) (3") | LF | 1,095.000 | | | | 278.000 | | | | 1,373.000 | |
| | 618-6046 | CONDT (PVC) (SCH 80) (2") | LF | | | 300.000 | | | | 2,025.000 | | 2,325.000 | |
| | 618-6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 150.000 | | 140.000 | | | | 690.000 | | 980.000 | |
| | 618-6053 | CONDT (PVC) (SCH 80) (3") | LF | | | | | | | 920.000 | | 920.000 | |
| | 618-6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 360.000 | | | | | | 520.000 | | 880.000 | |
| | 618-6064 | CONDT (RM) (1") | LF | | | 165.000 | | | | | | 165.000 | |
| | 620-6007 | ELEC CONDR (NO.8) BARE | LF | 880.000 | | 500.000 | | | | | | 1,380.000 | |
| | 620-6008 | ELEC CONDR (NO.8) INSULATED | LF | 2,745.000 | | 1,000.000 | | | | 2,905.000 | | 6,650.000 | |
| | 620-6009 | ELEC CONDR (NO.6) BARE | LF | 1,825.000 | | | | 1,920.000 | | 750.000 | | 4,495.000 | |
| | 620-6010 | ELEC CONDR (NO.6) INSULATED | LF | 3,955.000 | | | | 4,194.000 | | 3,660.000 | | 11,809.000 | |
| | 620-6011 | ELEC CONDR (NO.4) BARE | LF | | | | | | | 2,570.000 | | 2,570.000 | |
| | 620-6012 | ELEC CONDR (NO.4) INSULATED | LF | | | | | 1,887.000 | | 6,215.000 | | 8,102.000 | |
| | 624-6010 | GROUND BOX TY D (162922)W/APRON | EA | 11.000 | | 8.000 | | 1.000 | | 19.000 | | 39.000 | |
| | 628-6047 | ELC SRV TY A 240/480 060(NS)SS(E)TP(O) | EA | | | | | | | 1.000 | | 1.000 | |
| | 628-6151 | ELC SRV TY D 120/240 060(NS)SS(N)PS(U) | EA | | | | | | | 3.000 | | 3.000 | |
| | 628-6249 | ELC SRV TY D 120/240 100(NS)SS(N)PS(U) | EA | | | | | | | 1.000 | | 1.000 | |
| | 644-6004 | IN SM RD SN SUP&AM TY10BWG(1)SA(T) | EA | 5.000 | | 2.000 | | | | | | 7.000 | |
| | 644-6012 | IN SM RD SN SUP&AM TY10BWG(1)SB(T) | EA | | | 4.000 | | | | | | 4.000 | |
| | 644-6030 | IN SM RD SN SUP&AM TYS80(1)SA(T) | EA | 4.000 | | | | | | | | 4.000 | |
| | 644-6066 | IN SM RD SN SUP&AM (RAIL MOUNT) | EA | | | 1.000 | | | | | | 1.000 | |
| | 644-6067 | IN SM RD SN SUP&AM (INST SIGN ONLY) | EA | 1.000 | | | | | | | | 1.000 | |
| | 644-6076 | REMOVE SM RD SN SUP&AM | EA | 3.000 | | | | | | | | 3.000 | |
| | 644-6078 | REMOVE SM RD SN SUP&AM (SIGN ONLY) | EA | 2.000 | | | | | | | | 2.000 | |

# Estimate & Quantity Sheet

**CONTROLLING PROJECT ID** 0047-07-245 **DISTRICT** Dallas **COUNTY** Dallas
**HIGHWAY** SS 366, US 75, Various

| | | | | | | | | | | | | | TOTAL EST. | TOTAL FINAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **CONTROL SECTION JOB** | | **0047-07-245** | | **0196-07-035** | | **0918-00-391** | | **0918-47-333** | | | | |
| | | **PROJECT ID** | | **A00177564** | | **A00177565** | | **A00189288** | | **A00177085** | | | | |
| | | **COUNTY** | | **Dallas** | | **Dallas** | | **Dallas** | | **Dallas** | | | | |
| | | **HIGHWAY** | | **US 75** | | **SS 366** | | **Various** | | **Various** | | | | |
| **ALT** | **BID CODE** | **DESCRIPTION** | **UNIT** | EST. | FINAL | EST. | FINAL | EST. | FINAL | EST. | FINAL | | | |
| | 650-6028 | INS OH SN SUP(30 FT BAL TEE) | EA | | | | | | | 4.000 | | | 4.000 | |
| | 650-6029 | INS OH SN SUP(30 FT BAL TEE)(RECT TUBE) | EA | | | | | | | 1.000 | | | 1.000 | |
| | 654-6006 | SIGN WALKWAY (48 IN) WITH HNDRL | LF | | | | | | | 184.000 | | | 184.000 | |
| | 658-6015 | INSTL DEL ASSM (D-SW)SZ (BRF)GF1 | EA | | | | | | | 36.000 | | | 36.000 | |
| | 672-6010 | REFL PAV MRKR TY II-C-R | EA | 210.000 | | 84.000 | | | | | | | 294.000 | |
| | 678-6033 | PAV SURF PREP FOR MRK (RPM) | EA | 210.000 | | 84.000 | | | | | | | 294.000 | |
| | 687-6001 | PED POLE ASSEMBLY | EA | 11.000 | | 13.000 | | | | | | | 24.000 | |
| | 690-6009 | REMOVAL OF CABLES | LF | | | | | 1,391.000 | | | | | 1,391.000 | |
| | 6000-6098 | INSTALL CIRCUIT BREAKER | EA | 4.000 | | | | | | | | | 4.000 | |
| | 6001-6001 | PORTABLE CHANGEABLE MESSAGE SIGN | DAY | 30.000 | | 30.000 | | 30.000 | | 30.000 | | | 120.000 | |
| | 6004-6031 | ITS COM CBL (ETHERNET) | LF | 400.000 | | | | | | | | | 400.000 | |
| | 6007-6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 2,095.000 | | | | | | 19,371.000 | | | 21,466.000 | |
| | 6007-6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 2.000 | | | | | | 7.000 | | | 9.000 | |
| | 6007-6102 | RELOCATE FIBER OPTIC CABLE | LF | | | | | 127.000 | | | | | 127.000 | |
| | 6027-6003 | CONDUIT (PREPARE) | LF | 1,065.000 | | | | 1,789.000 | | 17,211.000 | | | 20,065.000 | |
| | 6027-6008 | GROUND BOX (PREPARE) | EA | 10.000 | | | | 12.000 | | 38.000 | | | 60.000 | |
| | 6028-6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | | | | | 7.000 | | 6.000 | | | 13.000 | |
| | 6093-6010 | REMOVE EXIST FIB OPT DMS SYS(TY-2) | EA | | | | | 7.000 | | | | | 7.000 | |
| | 6123-6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 5.000 | | | | 9.000 | | 9.000 | | | 23.000 | |
| | 6185-6002 | TMA (STATIONARY) | DAY | 30.000 | | 30.000 | | 30.000 | | 30.000 | | | 120.000 | |
| | 6414-6001 | WIRELESS WWD SYSTEM | EA | 6.000 | | 5.000 | | | | | | | 11.000 | |
| | 6414-6002 | WWD LED SIGNS | EA | 12.000 | | 10.000 | | | | | | | 22.000 | |
| | 6414-6004 | WWD CELLULAR MODEM | EA | 2.000 | | 5.000 | | | | | | | 7.000 | |
| | 6414-6005 | WWD SOLAR POWER SYSTEM | EA | 2.000 | | 5.000 | | | | | | | 7.000 | |
| | 14 | PUBLIC UTILITY FORCE ACCT WORK (PARTICIPATING) | LS | | | | | | | 1.000 | | | 1.000 | |
| | 16 | MATERIAL FURNISHED BY THE STATE (PARTICIPATING) | LS | 1.000 | | | | 1.000 | | 1.000 | | | 3.000 | |
| | 18 | LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING) | LS | 1.000 | | 1.000 | | 1.000 | | 1.000 | | | 4.000 | |
| | | SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING) | LS | 1.000 | | 1.000 | | 1.000 | | 1.000 | | | 4.000 | |
| | | EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART) | LS | | | | | | | 1.000 | | | 1.000 | |

## SUMMARY OF QUANTITIES - PROJECT TOTAL

| ITEM NO. | DESC CODE | DESCRIPTION | UNIT | US 75 WWDS CSJ 0047-07-245 | SS 366 WWDS CSJ 0196-07-035 | DMS REFURBISHMENT CSJ 0918-00-391 | DMS INSTALLATION CSJ 0918-47-333 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 104 | 6009 | REMOVING CONC (RIPRAP) | SY | 0 | 2 | 0 | 0 | 2 |
| 416 | 6007 | DRILL SHAFT (54 IN) | LF | 0 | 0 | 0 | 87 | 87 |
| 420 | 6002 | CL A CONC (MISC) | CY | 0 | 0 | 0 | 0.5 | 0.5 |
| 432 | 6002 | RIPRAP (CONC)(5 IN) | CY | 0 | 0.28 | 0 | 0 | 0.28 |
| 432 | 6045 | RIPRAP (MOW STRIP)(4 IN) | CY | 0 | 0 | 0 | 14.15 | 14.15 |
| 500 | 6001 | MOBILIZATION | LS | 0.25 | 0.25 | 0.25 | 0.25 | 1 |
| 502 | 6001 | BARRICADES, SIGNS AND TRAFFIC HANDLING | MO | 2 | 2 | 2 | 2 | 8 |
| 506 | 6041 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 0 | 0 | 0 | 140 | 140 |
| 506 | 6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 0 | 0 | 0 | 140 | 140 |
| 540 | 6002 | MTL W-BEAM GD FEN (STEEL POST) | LF | 0 | 0 | 0 | 350 | 350 |
| 540 | 6016 | DOWNSTREAM ANCHOR TERMINAL SECTION | EA | 0 | 0 | 0 | 3 | 3 |
| 544 | 6001 | GUARDRAIL END TREATMENT (INSTALL) | EA | 0 | 0 | 0 | 4 | 4 |
| 544 | 6003 | GUARDRAIL END TREATMENT (REMOVE) | EA | 0 | 0 | 0 | 1 | 1 |
| 618 | 6023 | CONDT (PVC) (SCH 40) (2") | LF | 1040 | 0 | 0 | 0 | 1040 |
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 1095 | 0 | 278 | 0 | 1373 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 0 | 300 | 0 | 2025 | 2325 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 150 | 140 | 0 | 690 | 980 |
| 618 | 6053 | CONDT (PVC) (SCH 80) (3") | LF | 0 | 0 | 0 | 920 | 920 |
| 618 | 6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 360 | 0 | 0 | 520 | 880 |
| 618 | 6064 | CONDT (RM) (1") | LF | 0 | 165 | 0 | 0 | 165 |
| 620 | 6007 | ELEC CONDR (NO. 8) BARE | LF | 880 | 500 | 0 | 0 | 1380 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 2745 | 1000 | 0 | 2905 | 6650 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 1825 | 0 | 1920 | 750 | 4495 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 3955 | 0 | 4194 | 3660 | 11809 |
| 620 | 6011 | ELEC CONDR (NO. 4) BARE | LF | 0 | 0 | 0 | 2570 | 2570 |
| 620 | 6012 | ELEC CONDR (NO. 4) INSULATED | LF | 0 | 0 | 1887 | 6215 | 8102 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 11 | 8 | 1 | 19 | 39 |
| 628 | 6047 | ELC SRV TY A 240/480 060(NS)SS(E)TP(O) | EA | 0 | 0 | 0 | 1 | 1 |
| 628 | 6151 | ELC SRV TY D 120/240 060(NS)SS(N)PS(U) | EA | 0 | 0 | 0 | 3 | 3 |
| 628 | 6249 | ELC SRV TY D 120/240 125(NS)SS(N)PS(U) | EA | 0 | 0 | 0 | 1 | 1 |
| 644 | 6004 | IN SM RD SN SUP&AM TY10BWG(1)SA(T) | EA | 5 | 2 | 0 | 0 | 7 |
| 644 | 6012 | IN SM RD SN SUP&AM TY10BWG(1)SB(T) | EA | 0 | 4 | 0 | 0 | 4 |
| 644 | 6030 | IN SM RD SN SUP&AM TYS80(1)SA(T) | EA | 4 | 0 | 0 | 0 | 4 |
| 644 | 6066 | IN SM RD SN SUP&AM (RAIL MOUNT) | EA | 0 | 1 | 0 | 0 | 1 |
| 644 | 6067 | IN SM RD SN SUP&AM (INST SIGN ONLY) | EA | 1 | 0 | 0 | 0 | 1 |
| 644 | 6076 | REMOVE SM RD SN SUP&AM | EA | 3 | 0 | 0 | 0 | 3 |
| 644 | 6078 | REMOVE SM RD SN SUP&AM (SIGN ONLY) | EA | 2 | 0 | 0 | 0 | 2 |
| 650 | 6028 | INS OH SN SUP(30 FT BAL TEE) | EA | 0 | 0 | 0 | 4 | 4 |
| 650 | 6029 | INS OH SN SUP(30 FT BAL TEE)(RECT TUBE) | EA | 0 | 0 | 0 | 1 | 1 |
| 654 | 6006 | SIGN WALKWAY (48 IN) WITH HNDRL | LF | 0 | 0 | 0 | 184 | 184 |
| 658 | 6015 | INSTL DEL ASSM (D-SW)SZ (BR)GF1 | EA | 0 | 0 | 0 | 36 | 36 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 210 | 84 | 0 | 0 | 294 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 210 | 84 | 0 | 0 | 294 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 11 | 13 | 0 | 0 | 24 |
| 690 | 6009 | REMOVAL OF CABLES | LF | 0 | 0 | 1391 | 0 | 1391 |
| 6000 | 6098 | INSTALL CIRCUIT BREAKER | EA | 4 | 0 | 0 | 0 | 4 |
| 6001 | 6001 | PORTABLE CHANGEABLE MESSAGE SIGN | DAY | 30 | 30 | 30 | 30 | 120 |
| 6004 | 6031 | ITS COM CBL (ETHERNET) | LF | 400 | 0 | 0 | 0 | 400 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 2095 | 0 | 0 | 19371 | 21466 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 2 | 0 | 0 | 7 | 9 |
| 6007 | 6102 | RELOCATE FIBER OPTIC CABLE | LF | 0 | 0 | 127 | 0 | 127 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 1065 | 0 | 1789 | 17211 | 20065 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 10 | 0 | 12 | 38 | 60 |

## SUMMARY OF QUANTITIES - PROJECT TOTAL (CONT.)

| ITEM NO. | DESC CODE | DESCRIPTION | UNIT | US 75 WWDS CSJ 0047-07-245 | SS 366 WWDS CSJ 0196-07-035 | DMS REFURBISHMENT CSJ 0918-00-391 | DMS INSTALLATION CSJ 0918-47-333 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 0 | 0 | 7 | 6 | 13 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 0 | 0 | 7 | 0 | 7 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 5 | 0 | 9 | 9 | 23 |
| 6185 | 6002 | TMA (STATIONARY) | DAY | 30 | 30 | 30 | 30 | 120 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 6 | 5 | 0 | 0 | 11 |
| 6414 | 6002 | LED WWD SIGNS | EA | 12 | 10 | 0 | 0 | 22 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 2 | 5 | 0 | 0 | 7 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 2 | 5 | 0 | 0 | 7 |

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# SUMMARY OF QUANTITIES PROJECT TOTAL

(SHEET 1 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 5 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245, ETC | US 75, ETC |

## SUMMARY OF QUANTITIES FOR US 75 WWDS (CSJ 0047-07-245)

| PLAN SHEET NUMBER | 618 6023 | 618 6029 | 618 6047 | 618 6054 | 620 6007 | 620 6008 | 620 6009 | 620 6010 | 624 6010 | 644 6004 | @ | 644 6030 | 644 6067 | 644 6076 | 644 6078 | 672 6010 | 678 6033 | 687 6001 | & | 6000 6098 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CONDT (PVC) (SCH 40) (2") | CONDT (PVC) (SCH 40) (3") | CONDT (PVC) (SCH 80) (2") (BORE) | CONDT (PVC) (SCH 80) (3") (BORE) | ELEC CONDR (NO. 8) BARE | ELEC CONDR (NO. 8) INSULATED | ELEC CONDR (NO. 6) BARE | ELEC CONDR (NO. 6) INSULATED | GROUND BOX TY D (162922) W/APRON | IN SM RD SN SUP&AM TY10BWG(1) SA(T) | RED RETRO-REFLECTIVE TAPE ON SIGN POST | IN SM RD SN SUP&AM TYS80(1)SA (T) | IN SM RD SN SUP&AM (INST SIGN ONLY) | REMOVE SM RD SN SUP&AM | REMOVE SM RD SN SUP&AM (SIGN ONLY) | REFL PAV MRKR TY II-C-R | PAV SURF PREP FOR MRK (RPM) | PED POLE ASSEMBLY | DRILL SHAFT (TRF SIG POLE) (24 IN) | INSTALL CIRCUIT BREAKER |
| | LF | LF | LF | LF | LF | LF | LF | LF | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | LF | EA |
| 38 | 70 | | 55 | | 135 | 310 | | | 2 | | | | | | 2 | 28 | 28 | 3 | 18 | |
| 39 | 525 | 310 | | 165 | | 335 | 700 | 1710 | 3 | 4 | 2 | | | 2 | | 70 | 70 | 3 | 18 | 1 |
| 40 | | 240 | | 195 | | 230 | 665 | 1325 | 2 | 1 | | 1 | | | | 28 | 28 | 1 | 6 | |
| 41 | 40 | 410 | | | 230 | 675 | 460 | 920 | 1 | | | 1 | | | | 28 | 28 | 1 | 6 | 2 |
| 42 | 385 | 135 | 95 | | 495 | 1125 | | | 3 | | | 1 | | | | 28 | 28 | 1 | 6 | 1 |
| 43 | 20 | | | | 20 | 70 | | | | | | 1 | 1 | 1 | | 28 | 28 | 2 | 12 | |
| | | | | | | | | | | | | | | | | | | | | |
| PROJECT TOTAL | 1040 | 1095 | 150 | 360 | 880 | 2745 | 1825 | 3955 | 11 | 5 | 2 | 4 | 1 | 3 | 2 | 210 | 210 | 11 | 66 | 4 |

@ SUBSIDIARY TO ITEM 644.

& SUBSIDIARY TO ITEM 687.

## SUMMARY OF QUANTITIES FOR US 75 WWDS (CSJ 0047-07-245) (CONT.)

| PLAN SHEET NUMBER | 6004 6031 | 6007 6010 | 6007 6095 | 6027 6003 | # | 6027 6008 | 6123 6001 | 6414 6001 | 6414 6002 | * | * | * | * | ** | 6414 6004 | 6414 6005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ITS COM CBL (ETHERNET) | FIBER OPTIC CBL (SNGLE-MODE) (6 FIBER) | FIBER OPTIC PATCH PANEL (6 POSITION) | CONDUIT (PREPARE) | CONCRETE GROUT FILL AT CONDUIT OPENINGS | GROUND BOX (PREPARE) | ETHERNET SWITCH (INSTALL ONLY) | WIRELESS WWD SYSTEM | LED WWD SIGNS | NEMA 3R ENCLOSURE | THERMAL DETECTOR | WHITE LED ILLUMINATOR | HIGH RESOLUTION CAMERA | HARDENED ETHERNET SWITCH | WWD CELLULUAR MODEM | WWD SOLAR POWER SYSTEM |
| | LF | LF | EA | LF | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA |
| 38 | | | | | | | | 1 | 2 | 1 | 2 | 2 | 2 | | 1 | 1 |
| 39 | | 620 | 1 | 105 | 1 | 2 | 2 | 1 | 3 | 1 | 2 | 2 | 2 | 2 | | |
| 40 | | 870 | 1 | 465 | 1 | 4 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | | |
| 41 | 240 | 605 | | 475 | 1 | 3 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | | |
| 42 | 160 | | | 20 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | | |
| 43 | | | | | | | | 1 | 1 | 1 | 2 | 2 | 2 | | 1 | 1 |
| | | | | | | | | | | | | | | | | |
| PROJECT TOTAL | 400 | 2095 | 2 | 1065 | 4 | 10 | 5 | 6 | 12 | 6 | 12 | 12 | 12 | 5 | 2 | 2 |

# SUBSIDIARY TO ITEM 6027.

* SUBSIDIARY TO ITEM 6414.

** FURNISHED BY TXDOT. INSTALLED IN EXISTING COMM HUB AND/OR PROPOSED WWD CABINET BY CONTRACTOR.

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# SUMMARY OF QUANTITIES US 75 WWDS

(SHEET 2 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 5A |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## SUMMARY OF QUANTITIES FOR SS 366 WWDS (CSJ 0196-07-035)

| PLAN SHEET NUMBER | 104 6009 | 432 6002 | 618 6046 | 618 6047 | 618 6064 | 620 6007 | 620 6008 | 624 6010 | 644 6004 | 644 6012 | 644 6066 | @ | 672 6010 | 678 6033 | 687 6001 | & |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REMOVING CONC (RIPRAP) | RIPRAP (CONC) (5 IN) | CONDT (PVC) (SCH 80) (2") | CONDT (PVC) (SCH 80) (2") (BORE) | CONDT (RM) (1") | ELEC CONDR (NO. 8) BARE | ELEC CONDR (NO. 8) INSULATED | GROUND BOX TY D (162922) W/APRON | IN SM RD SN SUP&AM TY10BWG(1) SA(T) | IN SM RD SN SUP&AM TY10BWG(1) SB(T) | IN SM RD SN SUP&AM (RAIL MOUNT) | RED RETRO-REFLECTIVE TAPE ON SIGN POST | REFL PAV MRKR TY II-C-R | PAV SURF PREP FOR MRK (RPM) | PED POLE ASSEMBLY | DRILL SHAFT (TRF SIG POLE) (24 IN) |
| | SY | CY | LF | LF | LF | LF | LF | EA | EA | EA | EA | EA | EA | EA | EA | LF |
| 47 | | | 20 | | | 20 | 40 | 1 | 2 | | | 2 | 28 | 28 | 3 | 18 |
| 48 | 2 | 0.28 | 55 | 75 | | 150 | 300 | 2 | | | | | 14 | 14 | 3 | 18 |
| 49 | | | 10 | 65 | 165 | 85 | 170 | 2 | | | | | 14 | 14 | 2 | 12 |
| 50 | | | 195 | | | 215 | 430 | 2 | | 2 | | 2 | 14 | 14 | 3 | 18 |
| 51 | | | 20 | | | 30 | 60 | 1 | | 2 | 1 | 2 | 14 | 14 | 2 | 12 |
| | | | | | | | | | | | | | | | | |
| PROJECT TOTAL | 2 | 0.28 | 300 | 140 | 165 | 500 | 1000 | 8 | 2 | 4 | 1 | 6 | 84 | 84 | 13 | 78 |

@ SUBSIDIARY TO ITEM 644.

& SUBSIDIARY TO ITEM 687.

## SUMMARY OF QUANTITIES FOR SS 366 WWDS (CSJ 0196-07-035) (CONT.)

| PLAN SHEET NUMBER | 6414 6001 | 6414 6002 | * | * | * | * | 6414 6004 | 6414 6005 |
|---|---|---|---|---|---|---|---|---|
| | WIRELESS WWD SYSTEM | LED WWD SIGNS | NEMA 3R ENCLOSURE | THERMAL DETECTOR | WHITE LED ILLUMINATOR | HIGH RESOLUTION CAMERA | WWD CELLULAR MODEM | WWD SOLAR POWER SYSTEM |
| | EA | EA | EA | EA | EA | EA | EA | EA |
| 47 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| 48 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| 49 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| 50 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| 51 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| | | | | | | | | |
| PROJECT TOTAL | 5 | 10 | 10 | 10 | 10 | 10 | 5 | 5 |

* SUBSIDIARY TO ITEM 6414.

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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# SUMMARY OF QUANTITIES SS 366 WWDS

(SHEET 3 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 5B |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## SUMMARY OF QUANTITIES FOR DMS REFURBISHMENT (CSJ 0918-00-391)

| ITEM NO. | DESC CODE | DESCRIPTION | UNIT | IH 30 EB AT MACARTHUR BLVD | IH 35E NB AT GRAINERY RD | IH 35E SB AT CAMP WISDOM | IH 45 NB AT WINTERGREEN RD | LP 12 NB AT IRVING BLVD | LP 12 SB AT UNION BOWER RD | SPUR 408 SB AT GRADY NIBLO RD | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | | 74 | 34 | 26 | 36 | 76 | 32 | 278 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 295 | 410 | 299 | 73 | 76 | 684 | 83 | 1920 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 885 | 1356 | 963 | 219 | 228 | 294 | 249 | 4194 |
| 620 | 6012 | ELEC CONDR (NO.4) INSULATED | LF | | | | | | 1887 | | 1887 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | | | | 1 | | | | 1 |
| 690 | 6009 | REMOVAL OF CABLES | LF | 245 | 323 | 237 | | | 586 | | 1391 |
| 6007 | 6102 | RELOCATE FIBER OPTIC CABLE | LF | | | 34 | | 36 | 57 | | 127 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 282 | 256 | 262 | 40 | 289 | 606 | 54 | 1789 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 12 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 |
| | ** | DMS COMM CABLE | LF | 77 | 144 | 82 | 73 | 76 | 98 | 83 | 633 |
| | ** | ETHERNET SWITCH | EA | 2 | | 2 | | 2 | 1 | 2 | 9 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 | | 2 | | 2 | 1 | 2 | 9 |
| | ** | ETHERNET SWITCH PORT EXPANDER | EA | 1 | | | | | | | 1 |

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| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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# SUMMARY OF QUANTITIES DMS REFURBISHMENT

(SHEET 4 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 5C |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## SUMMARY OF QUANTITIES FOR DMS INSTALLATION (CSJ 0918-47-333)

| ITEM NO. | DESC CODE | DESCRIPTION | UNIT | IH 20 EB AT DALLAS/ TARRANT CL | IH 30 EB AT PGBT (SH 161) | IH 30 WB AT SYLVAN AVE | SH 183 EB AT COUNTY LINE RD | US 75 NB/SB AT HASKELL AVE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| 416 | 6007 | DRILL SHAFT (54 IN) | LF | 19 | 28 | 19 | 21 | | 87 |
| 420 | 6002 | CL A CONC (MISC) | CY | | | 0.5 | | | 0.5 |
| 432 | 6045 | RIPRAP (MOW STRIP)(4 IN) | CY | 5.75 | 1.50 | 3.15 | 3.75 | | 14.15 |
| 506 | 6041 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 30 | 30 | 30 | 30 | 20 | 140 |
| 506 | 6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 30 | 30 | 30 | 30 | 20 | 140 |
| 540 | 6002 | MTL W-BEAM GD FEN (STEEL POST) | LF | 150 | 75 | 25 | 100 | | 350 |
| 540 | 6016 | DOWNSTREAM ANCHOR TERMINAL SECTION | EA | | 1 | 1 | 1 | | 3 |
| 544 | 6001 | GUARDRAIL END TREATMENT (INSTALL) | EA | 1 | 1 | 1 | 1 | | 4 |
| 544 | 6003 | GUARDRAIL END TREATMENT (REMOVE) | EA | 1 | | | | | 1 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 90 | 340 | 1125 | 400 | 70 | 2025 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 100 | 70 | 365 | 155 | | 690 |
| 618 | 6053 | CONDT (PVC) (SCH 80) (3") | LF | 175 | 265 | 290 | 45 | 145 | 920 |
| 618 | 6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 240 | 70 | | 210 | | 520 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 375 | 245 | 2070 | 215 | | 2905 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 205 | 55 | 90 | 55 | 345 | 750 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 990 | 165 | 270 | 165 | 2070 | 3660 |
| 620 | 6011 | ELEC CONDR (NO.4) BARE | LF | | 375 | 1495 | 545 | 155 | 2570 |
| 620 | 6012 | ELEC CONDR (NO.4) INSULATED | LF | | 1125 | 2990 | 1635 | 465 | 6215 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 3 | 2 | 9 | 5 | | 19 |
| 628 | 6047 | ELC SRV TY A 240/480 060(NS)SS(E)TP(O) | EA | | | 1 | | | 1 |
| 628 | 6151 | ELC SRV TY D 120/240 060(NS)SS(N)PS(U) | EA | 1 | 1 | | 1 | | 3 |
| 628 | 6249 | ELC SRV TY D 120/240 100(NS)SS(N)PS(U) | EA | | | | | 1 | 1 |
| 650 | 6028 | INS OH SN SUP(30 FT BAL TEE) | EA | 1 | 1 | 1 | 1 | | 4 |
| 650 | 6029 | INS OH SN SUP(30 FT BAL TEE)(RECT TUBE) | EA | | | | | 1 | 1 |
| 654 | 6006 | SIGN WALKWAY (48 IN) WITH HNDRL | LF | 46 | 46 | 46 | 46 | | 184 |
| 658 | 6015 | INSTL DEL ASSM (D-SW)SZ (BR)GF1 | EA | 15 | 8 | 3 | 10 | | 36 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 7835 | 3450 | 2230 | 4081 | 1775 | 19371 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 1 | 1 | 2 | 2 | 1 | 7 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 7050 | 2845 | 1820 | 3606 | 1890 | 17211 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 13 | 9 | 3 | 6 | 7 | 38 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 | 1 | 1 | 1 | 2 | 6 |
| | ** | DYNAMIC MESSAGE SIGN (DMS) | EA | 1 | 1 | 1 | 1 | 2 | 6 |
| | ** | EQUIPMENT CABINET (DMS)(FOUNDATION MTD) | EA | 1 | 1 | 1 | 1 | 1 | 5 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 | 2 | 1 | 2 | 2 | 9 |
| | ** | ETHERNET SWITCH | EA | 2 | 2 | 1 | 2 | 2 | 9 |
| | ** | ETHERNET SWITCH PORT EXPANDER | EA | | 1 | | | | 1 |

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# SUMMARY OF QUANTITIES DMS INSTALLATION

(SHEET 5 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 5D |
| STATE | DIST. | COUNTY |
| TEXAS | DAL | DALLAS, ETC |
| CONT. | SECT. | JOB / HIGHWAY NO. |
| 0047 | 07 | 245,ETC / US 75, ETC |

# 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<br>FRP = Fiberglass<br>TWT = Thin-Wall<br>10BWG = 10 BWG<br>S80 = Sch 80 | POSTS<br>1 or 2<br>*SEE NOTE 4 | ANCHOR TYPE<br>UA=Universal Conc<br>UB=Universal Bolt<br>SA=Slipbase-Conc<br>SB=Slipbase-Bolt<br>WS=Wedge Steel<br>WP=Wedge Plastic | MOUNTING DESIGNATION<br>PREFABRICATED<br>P = "Plain"<br>T = "T"<br>U = "U" | 1EXT or 2EXT = # of Ext<br>BM = Extruded Wind Beam<br>WC = 1.12 #/ft Wing Channel<br>EXAL= Extruded Alum Sign Panels | BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)<br>TY = TYPE<br>TY N<br>TY S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | S21, S22 | R5-1A | WRONG WAY | 48"X36" | X | | 10BWG | 1 | SA | T | | |
| 39 | S24, S25 | R5-1 | DO NOT ENTER | 48"X48" | X | | 10BWG | 1* | SA | T | | |
| 40 | S12 | R5-1A | WRONG WAY | 48"X36" | X | | 10BWG | 1 | SA | T | | |
| 47 | S1, S2 | R5-1 | DO NOT ENTER | 48"X48" | X | | 10BWG | 1* | SA | T | | |
| 50 | S3, S4 | R5-1 | DO NOT ENTER | 48"X48" | X | | 10BWG | 1* | SB | T | | |
| 51 | S5, S6 | R5-1 | DO NOT ENTER | 48"X48" | X | | 10BWG | 1* | SB | T | | |



DATE:
FILE:

| 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).
4. Install red retro-reflective tape on sign post. Materials and labor are subsidiary to item 644.

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 | | 0047 | 07 | 245,ETC | US 75,ETC |
| 4-16 | | DIST | COUNTY | | SHEET NO. |
| 8-16 | | DAL | DALLAS,ETC | | 6 |

DATE:
FILE:

## BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

## WORKER SAFETY NOTES:

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

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

## COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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



Texas Department of Transportation

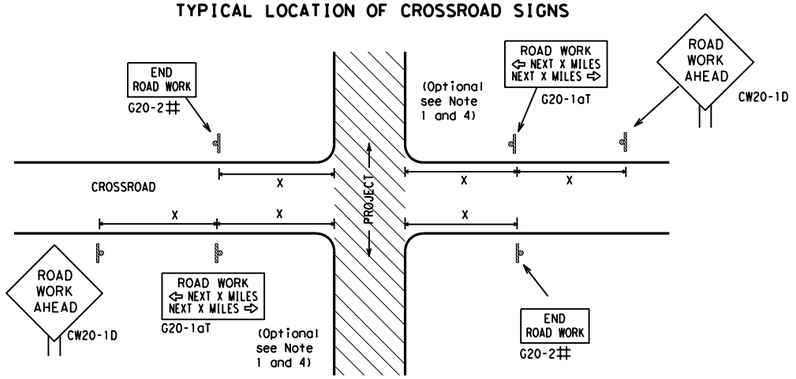
Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

# BC(1)-21

| FILE: bc-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 7 |

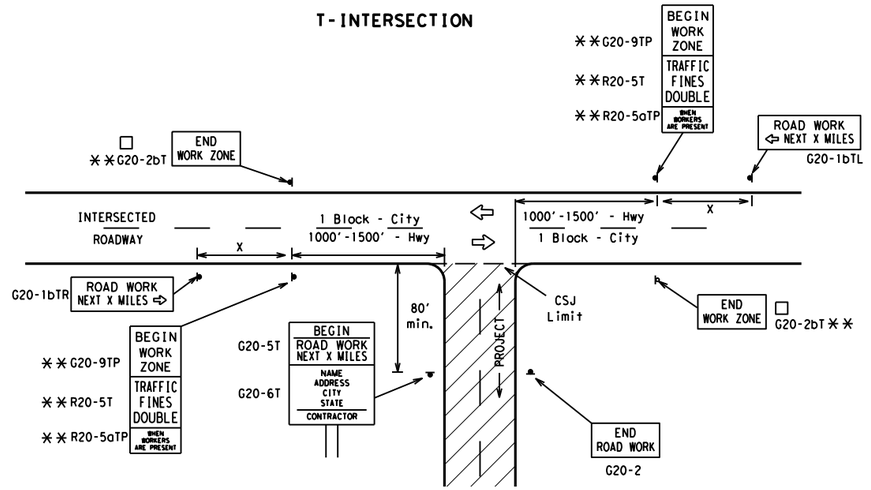
## TYPICAL LOCATION OF CROSSROAD SIGNS




# 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] |

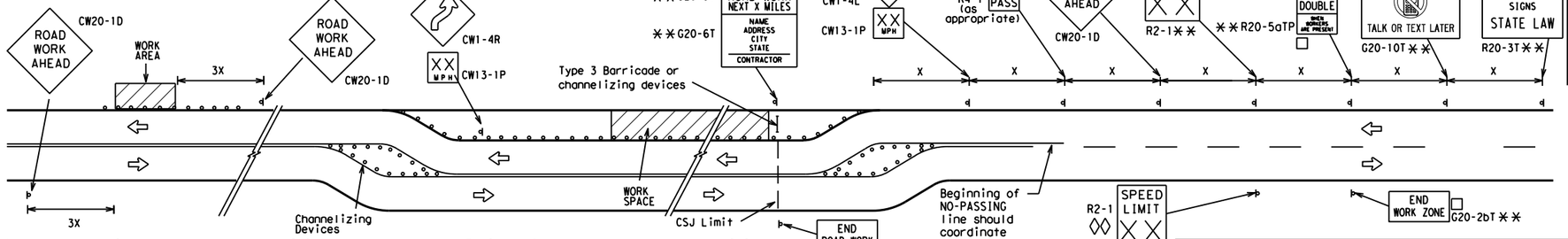
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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

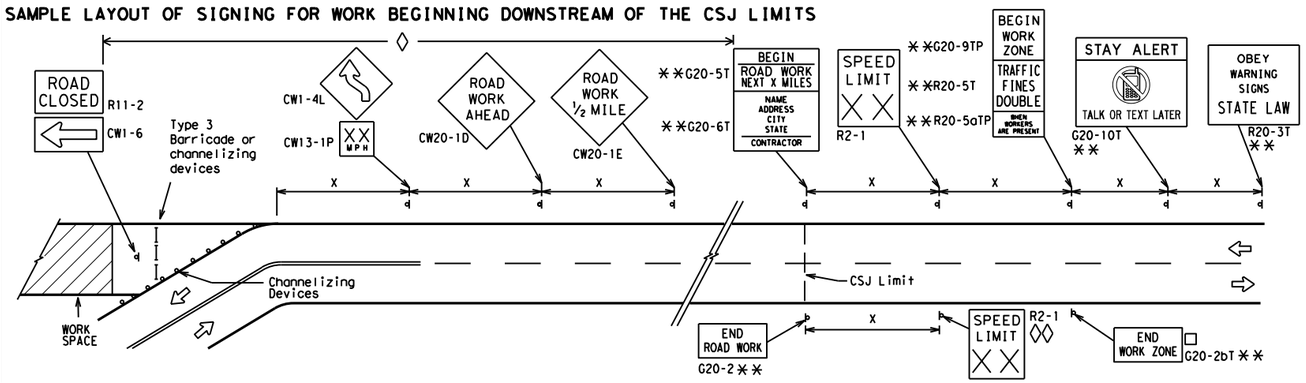



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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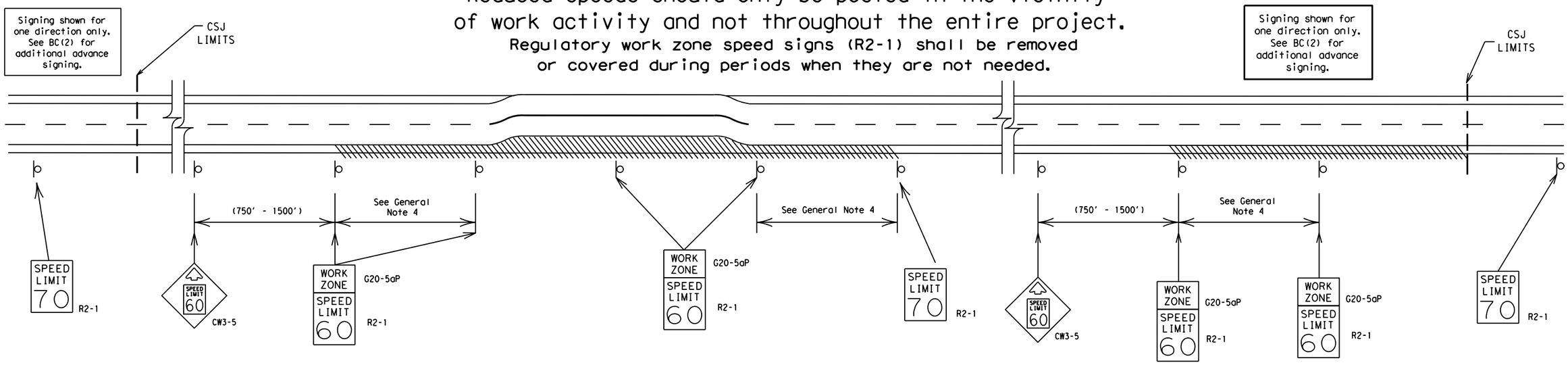
# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

**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

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## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

## BC(3)-21

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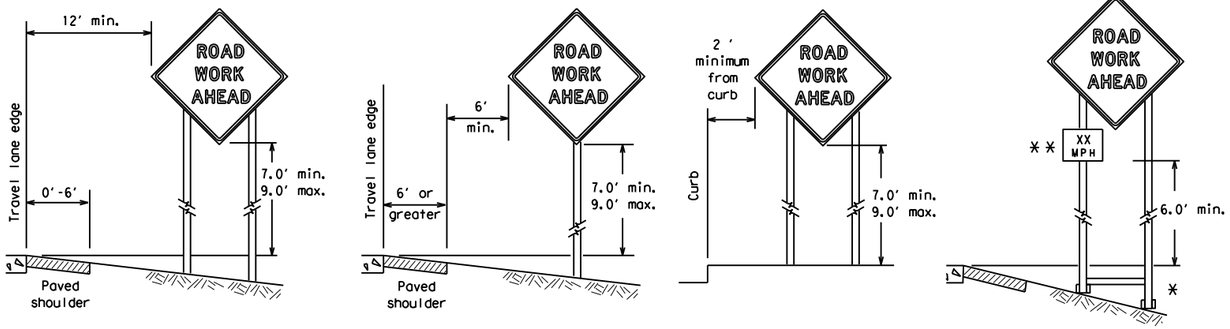
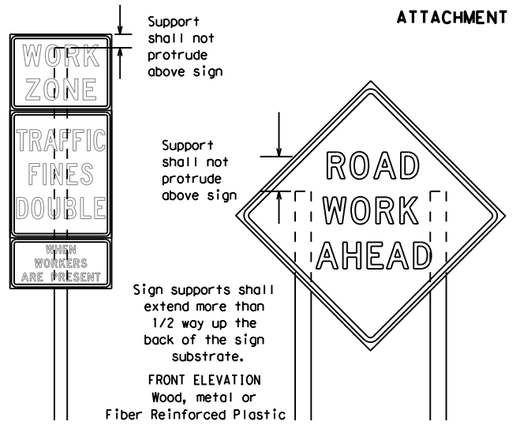
## TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

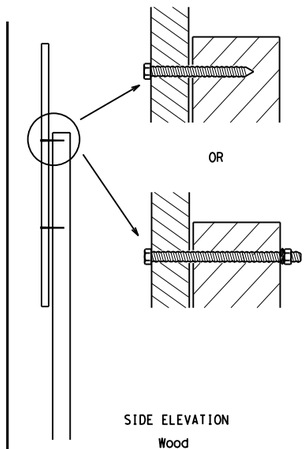



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

## ATTACHMENT FOR SIGN SUPPORTS



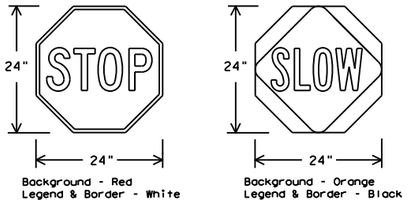

Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

## STOP/SLOW PADDLES

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




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

## CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

## GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

## SIGN MOUNTING HEIGHT

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

## SIZE OF SIGNS

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

## SIGN SUBSTRATES

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

## REFLECTIVE SHEETING

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

## SIGN LETTERS

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

## REMOVING OR COVERING

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

## SIGN SUPPORT WEIGHTS

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

## FLAGS ON SIGNS

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



Texas Department of Transportation | Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

# BC(4)-21

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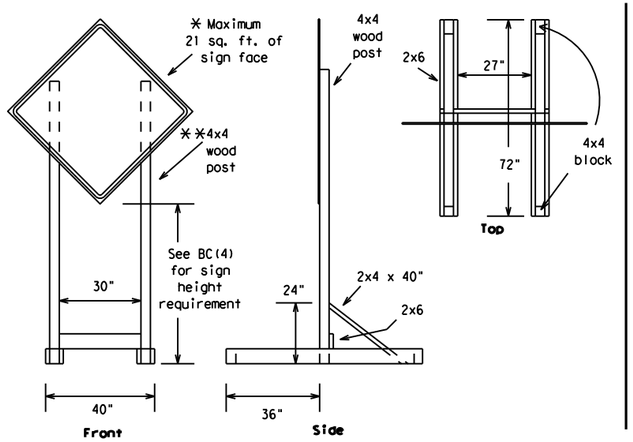
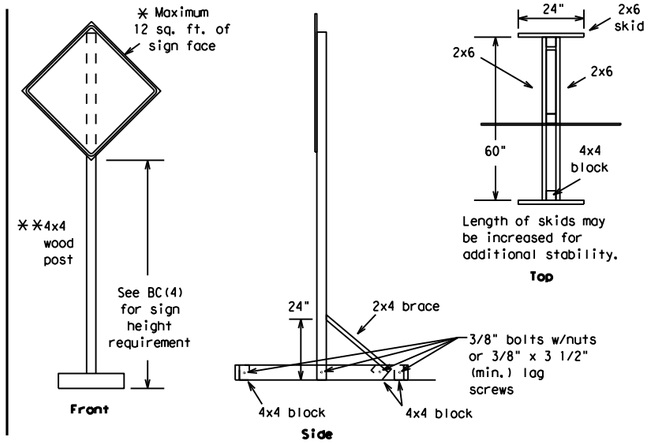
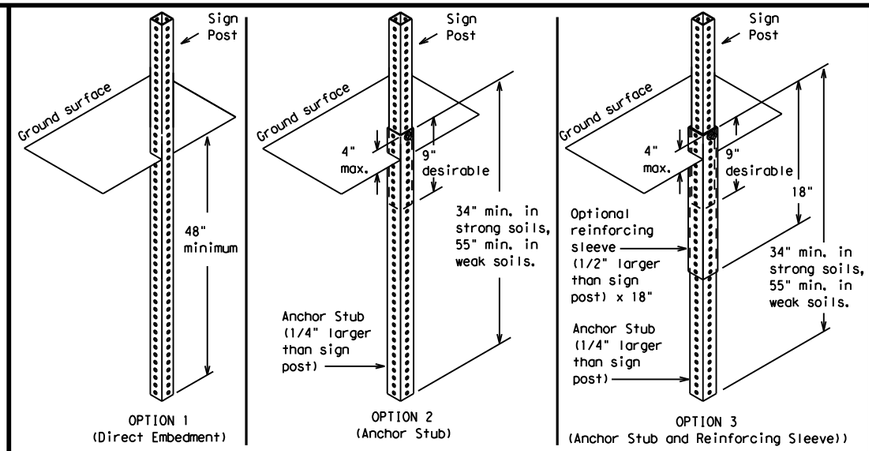


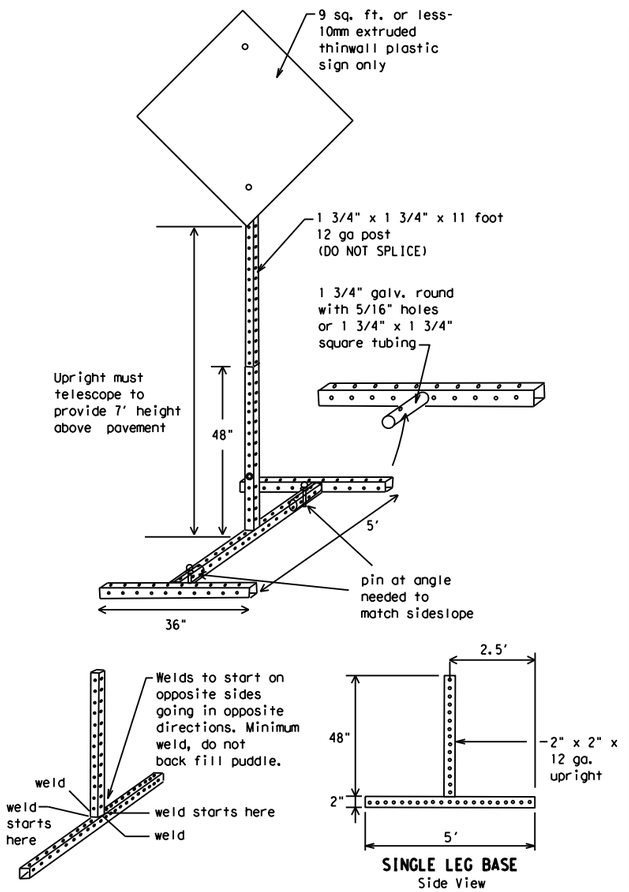

# SKID MOUNTED WOOD SIGN SUPPORTS

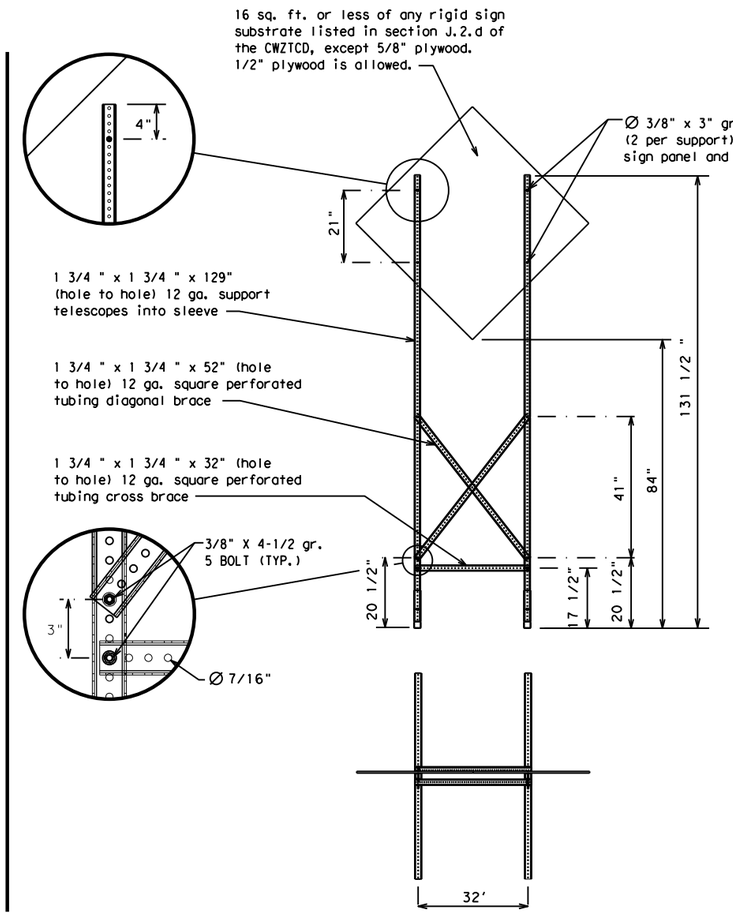
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

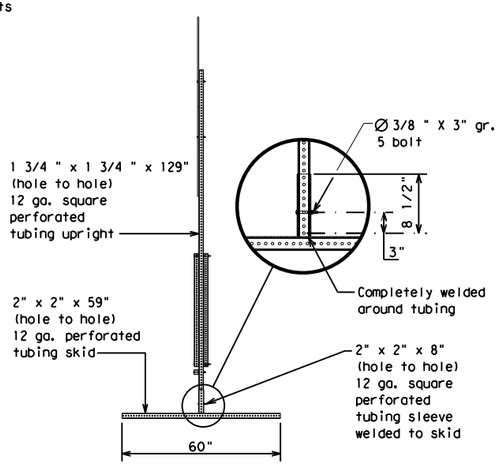



# GROUND MOUNTED SIGN SUPPORTS

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




# SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

## WEDGE ANCHORS

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

## OTHER DESIGNS

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

## GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

## BC(5)-21

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

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

### Other Condition List

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

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

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

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

### Location List

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

### Warning List

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

### ** Advance Notice List

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

** See Application Guidelines Note 6.

### APPLICATION GUIDELINES

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

### WORDING ALTERNATIVES

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

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

### FULL MATRIX PCMS SIGNS

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



Texas Department of Transportation

Traffic Safety Division Standard

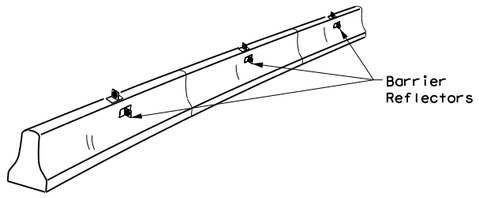
# BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

# BC(6)-21

| FILE: bc-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 9-07 8-14 | DIST | COUNTY | | SHEET NO. |
| 7-13 5-21 | DAL | DALLAS,ETC | | 12 |

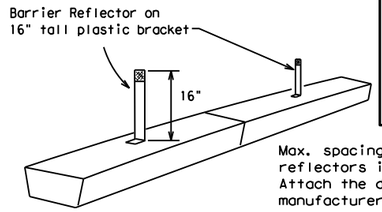
100

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




## CONCRETE TRAFFIC BARRIER (CTB)

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

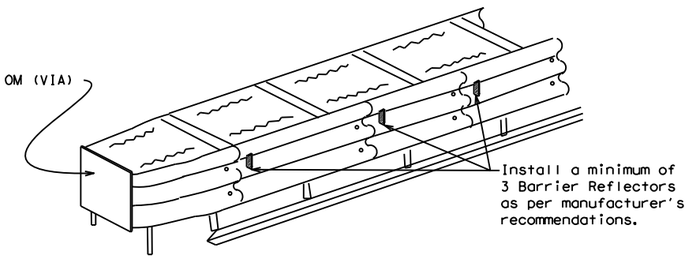



Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

## LOW PROFILE CONCRETE BARRIER (LPCB)

**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**

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



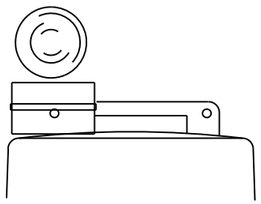

## DELINEATION OF END TREATMENTS

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**

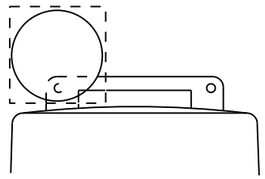
End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

# BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

## WARNING LIGHTS



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

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

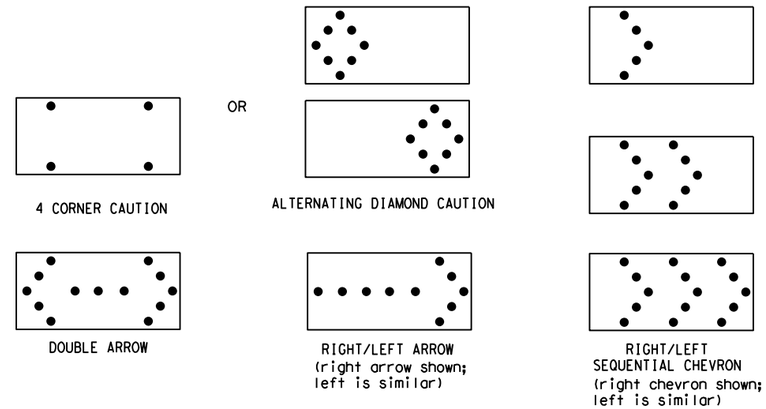
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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|---|---|---|---|---|
| © TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 9-07 8-14 | DIST | COUNTY | | SHEET NO. |
| 7-13 5-21 | DAL | DALLAS,ETC | | 13 |

DATE:
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101

DATE:
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## GENERAL NOTES

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

## GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

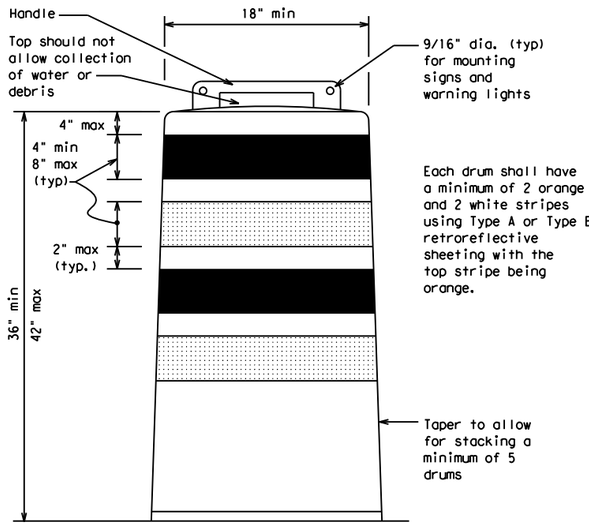
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

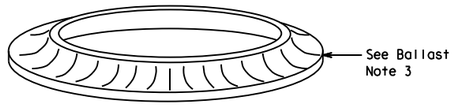
## RETROREFLECTIVE SHEETING

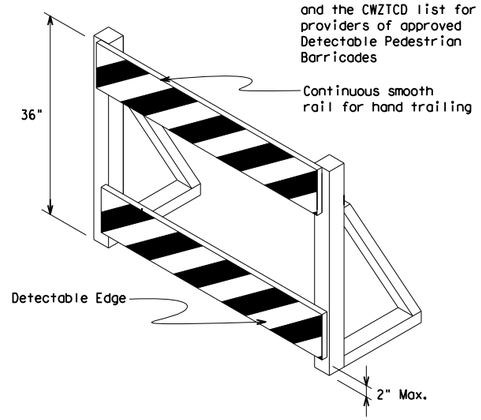
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

## BALLAST

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

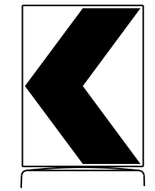


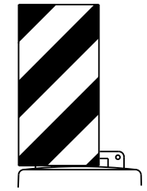




## DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

## SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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



Texas Department of Transportation | Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

## BC(8)-21

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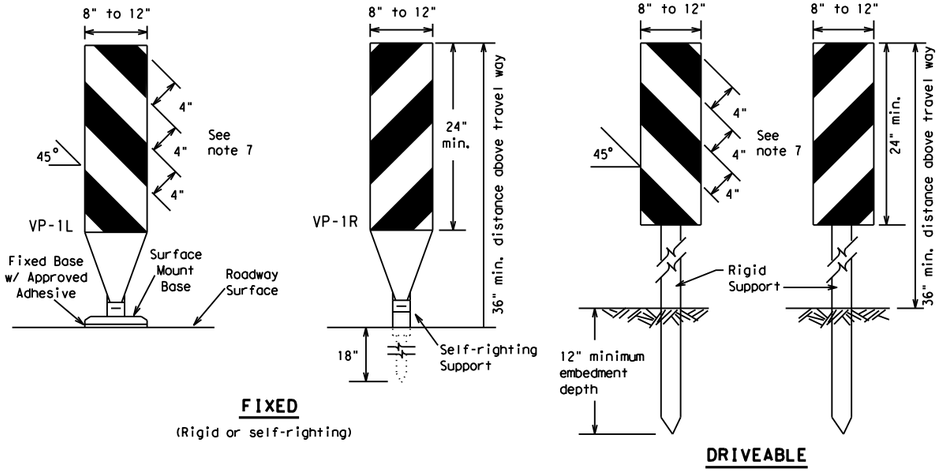
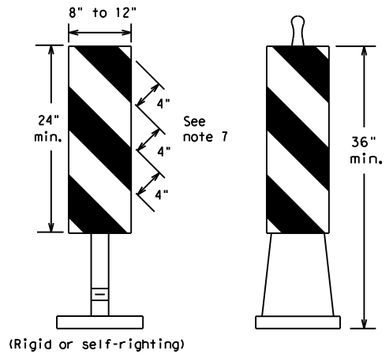



**FIXED**
(Rigid or self-righting)

**DRIVEABLE**

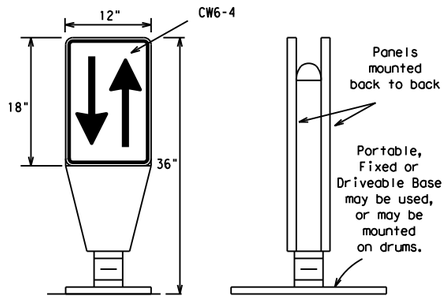



(Rigid or self-righting)

**PORTABLE**

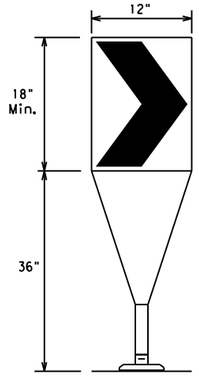
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



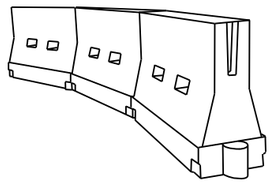

Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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Texas Department of Transportation | Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

# BC(9)-21

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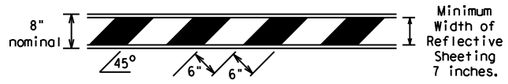
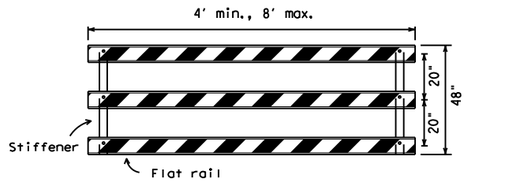
## TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



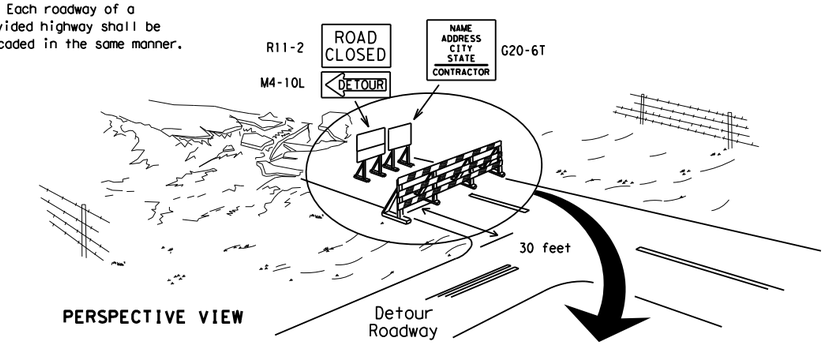

TYPICAL STRIPING DETAIL FOR BARRICADE RAIL




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

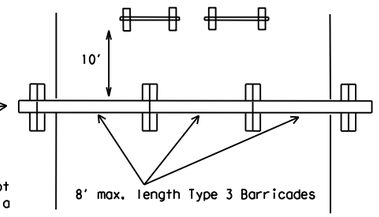
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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




PERSPECTIVE VIEW

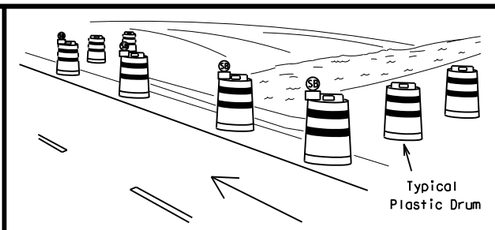
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.




PLAN VIEW

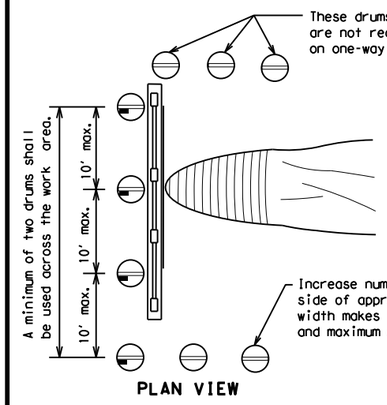
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION




PERSPECTIVE VIEW

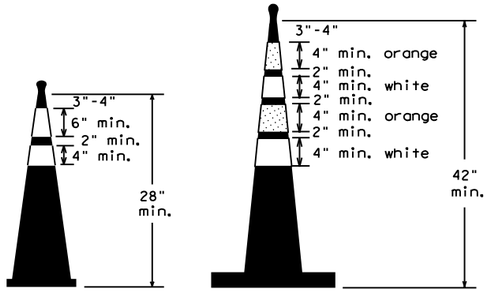
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



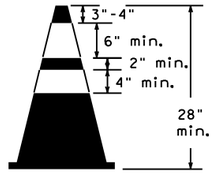

PLAN VIEW

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

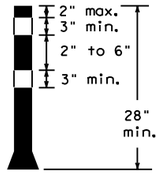
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS




Two-Piece cones




One-Piece cones

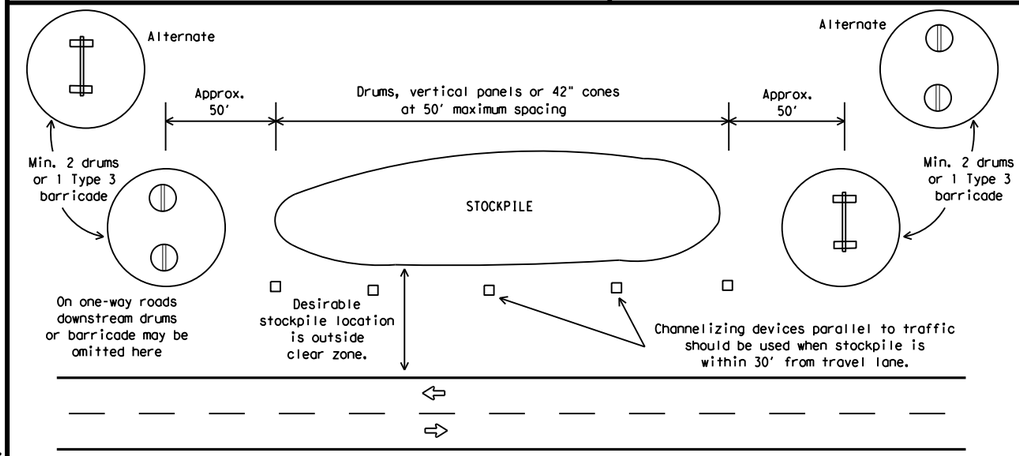



Tubular Marker

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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Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

## BC(10)-21

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# WORK ZONE PAVEMENT MARKINGS

## GENERAL

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

## RAISED PAVEMENT MARKERS

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

## PREFABRICATED PAVEMENT MARKINGS

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

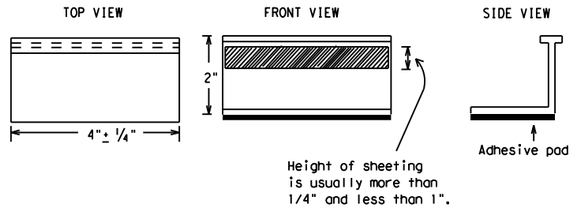
## MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

## REMOVAL OF PAVEMENT MARKINGS

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

# Temporary Flexible-Reflective Roadway Marker Tabs




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

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

## RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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



Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

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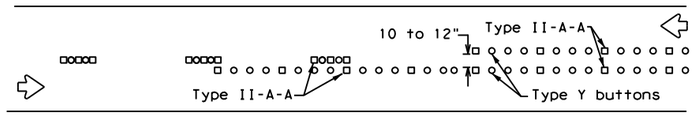
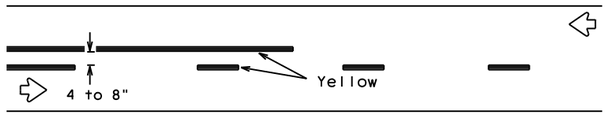
# PAVEMENT MARKING PATTERNS

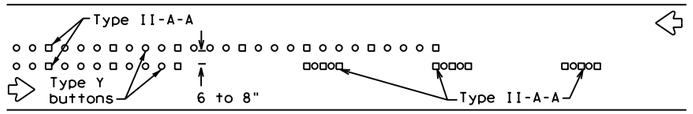

REFLECTORIZED PAVEMENT MARKINGS - PATTERN A




RAISED PAVEMENT MARKERS - PATTERN A



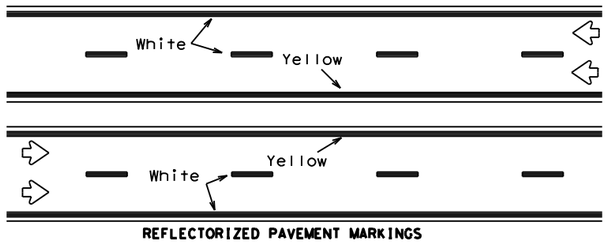

REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



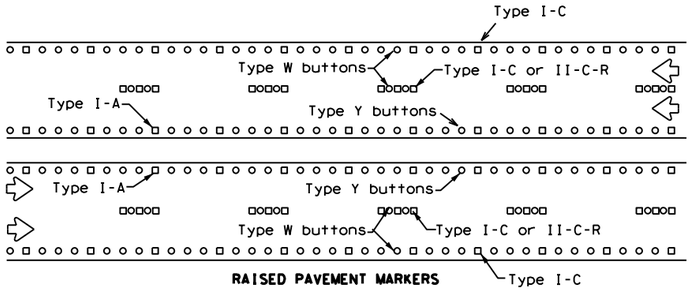

RAISED PAVEMENT MARKERS - PATTERN B

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



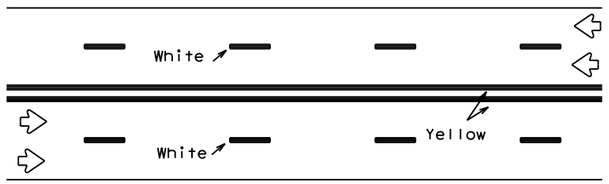

REFLECTORIZED PAVEMENT MARKINGS



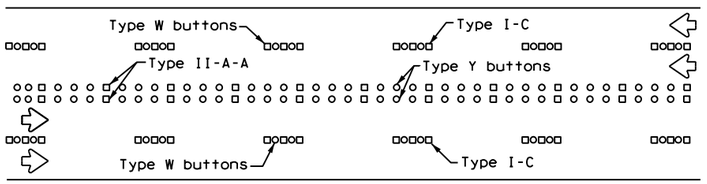

RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



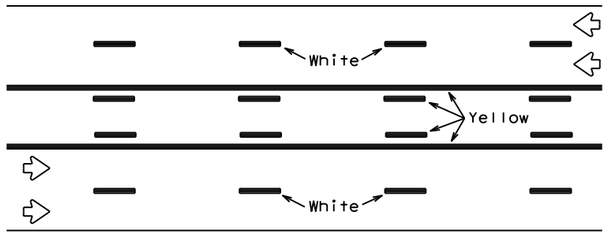

REFLECTORIZED PAVEMENT MARKINGS



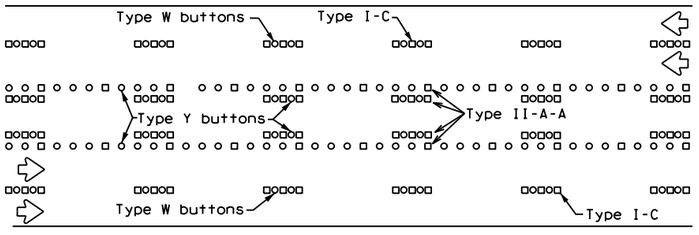

RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS




REFLECTORIZED PAVEMENT MARKINGS




RAISED PAVEMENT MARKERS

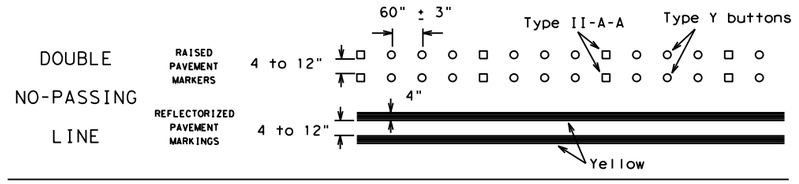
Prefabricated markings may be substituted for reflectorized pavement markings.

## TWO-WAY LEFT TURN LANE

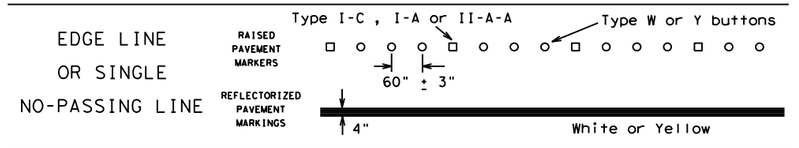
# STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

## SOLID LINES

DOUBLE NO-PASSING LINE

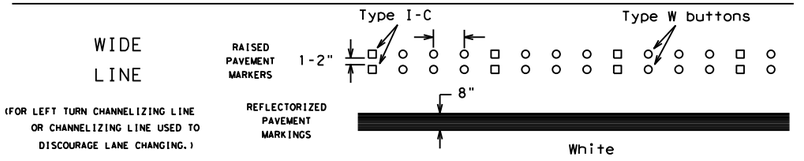



EDGE LINE OR SINGLE NO-PASSING LINE



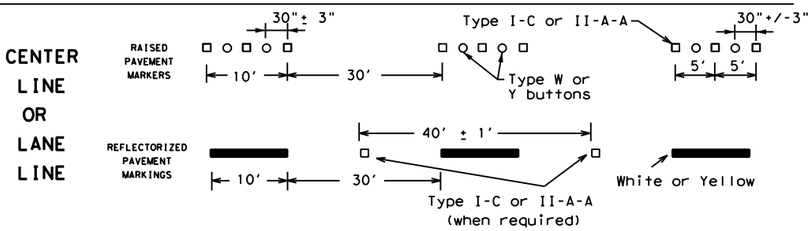

WIDE LINE

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

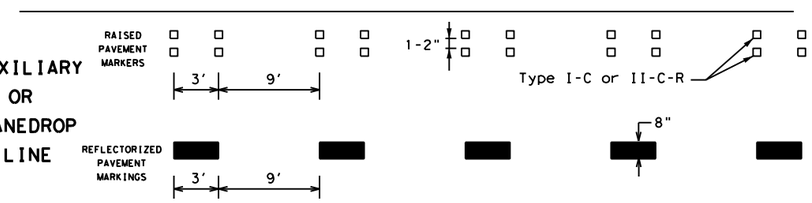



## BROKEN LINES

CENTER LINE OR LANE LINE

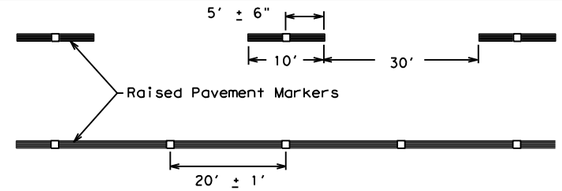



AUXILIARY OR LANEDROP LINE




### 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

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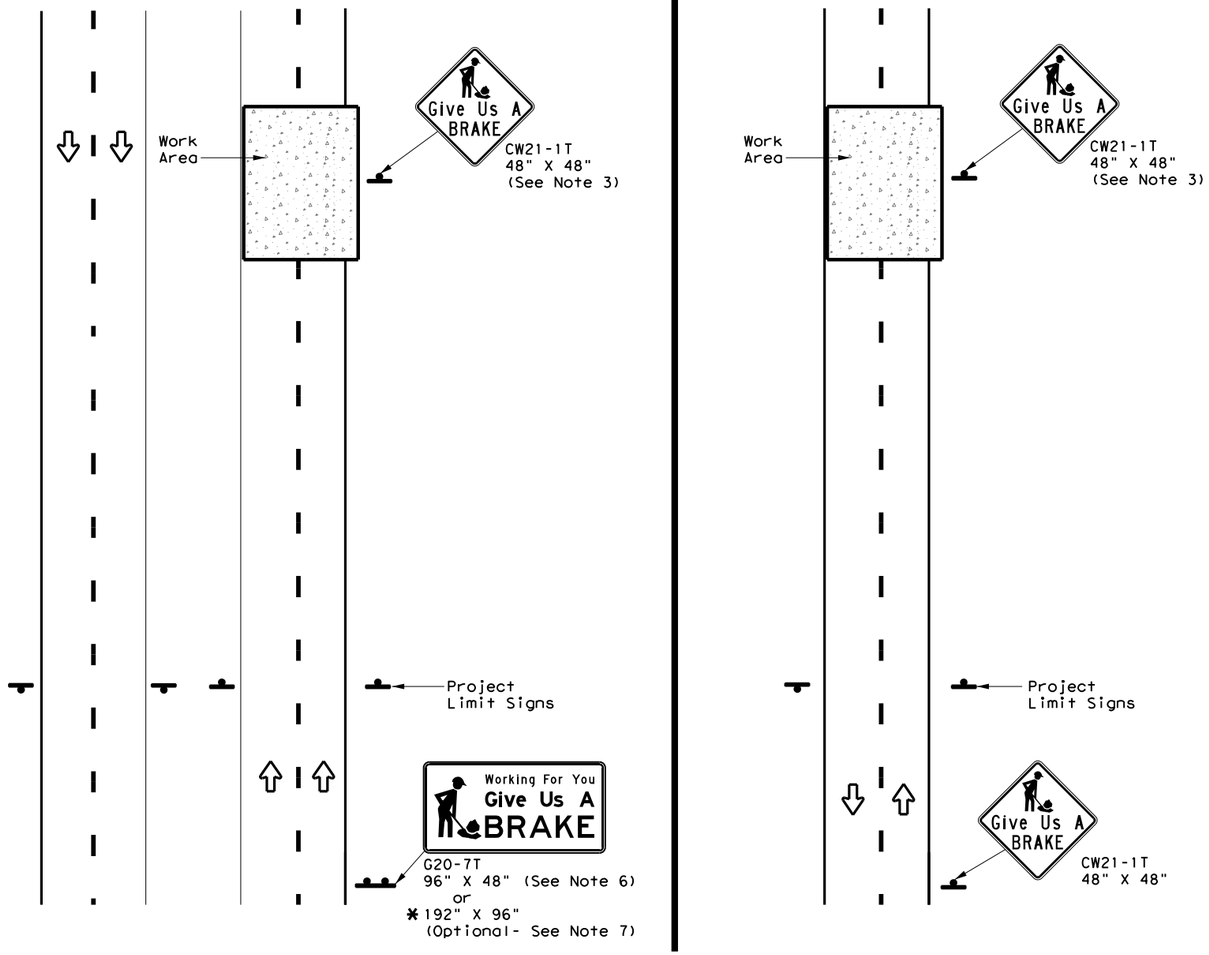
# BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

## BC(12)-21

| FILE: bc-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT February 1998 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 18 |




DIVIDED HIGHWAY




UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

DATE:
FILE:

## SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

| LEGEND | |
|---|---|
| | Sign |
| | Large Sign |
| | Traffic Flow |

| DEPARTMENTAL MATERIAL SPECIFICATIONS | |
|---|---|
| PLYWOOD SIGN BLANKS | DMS-7100 |
| ALUMINUM SIGN BLANKS | DMS-7110 |
| SIGN FACE MATERIALS | DMS-8300 |

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

## GENERAL NOTES

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

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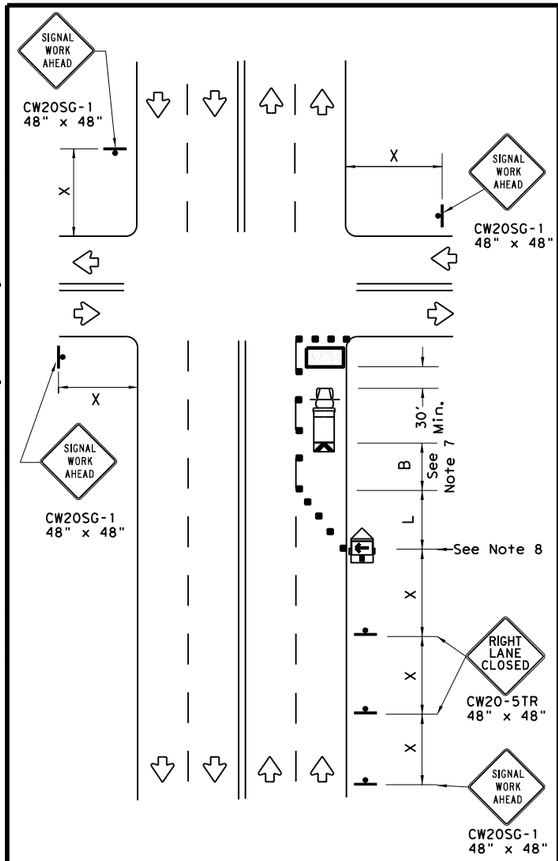
# WORK ZONE "GIVE US A BRAKE" SIGNS

# WZ(BRK)-13

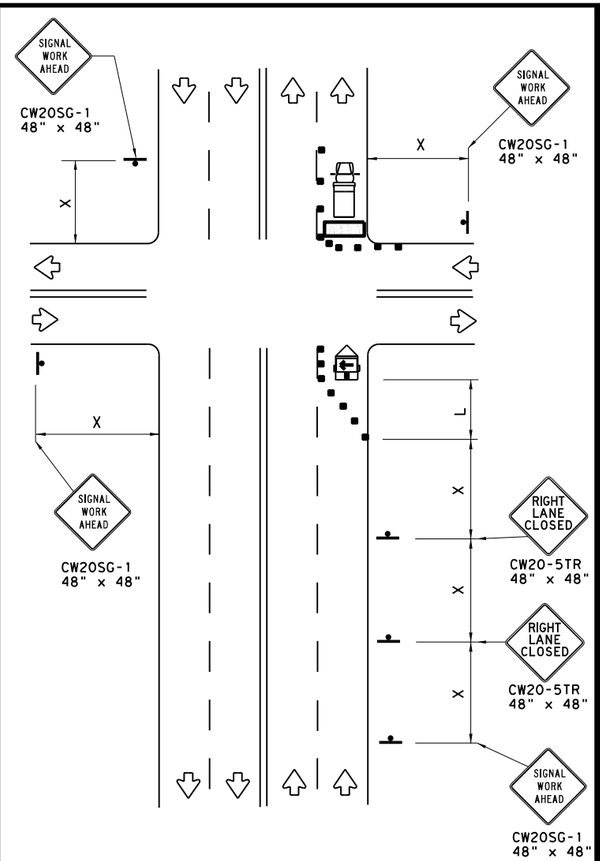
| FILE: wzbrk-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT August 1995 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 6-96 5-98 7-13 | DIST | COUNTY | | SHEET NO. |
| 8-96 3-03 | DAL | DALLAS,ETC | | 19 |

DATE:
FILE:



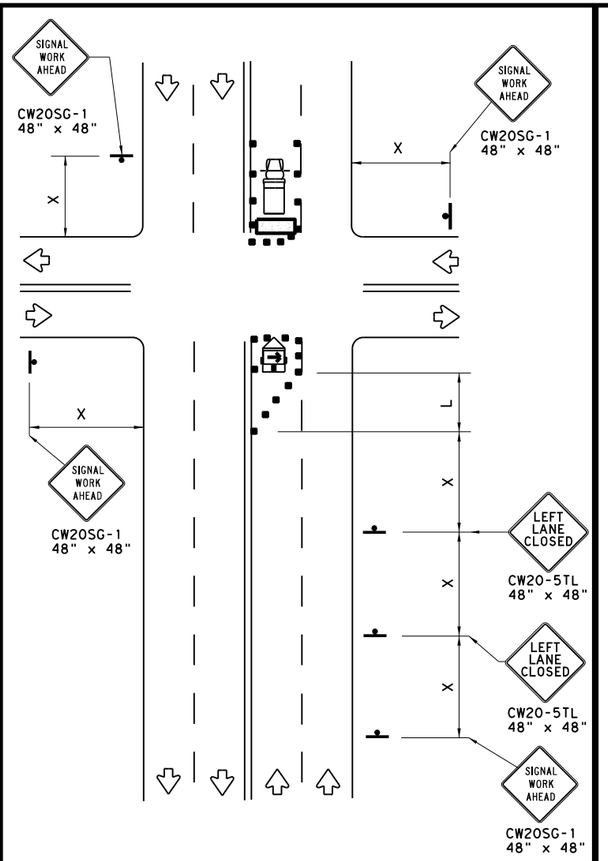

## NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



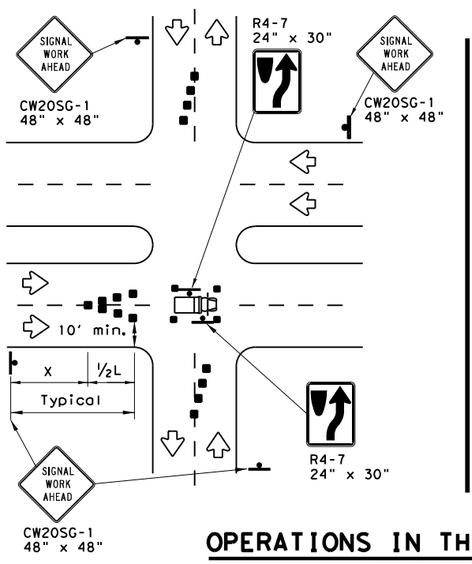

## FAR SIDE RIGHT LANE CLOSURE

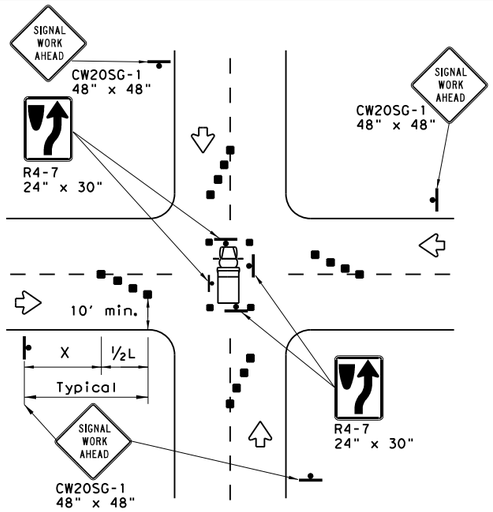
SHORT DURATION OR SHORT TERM STATIONARY




## FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY




## 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.



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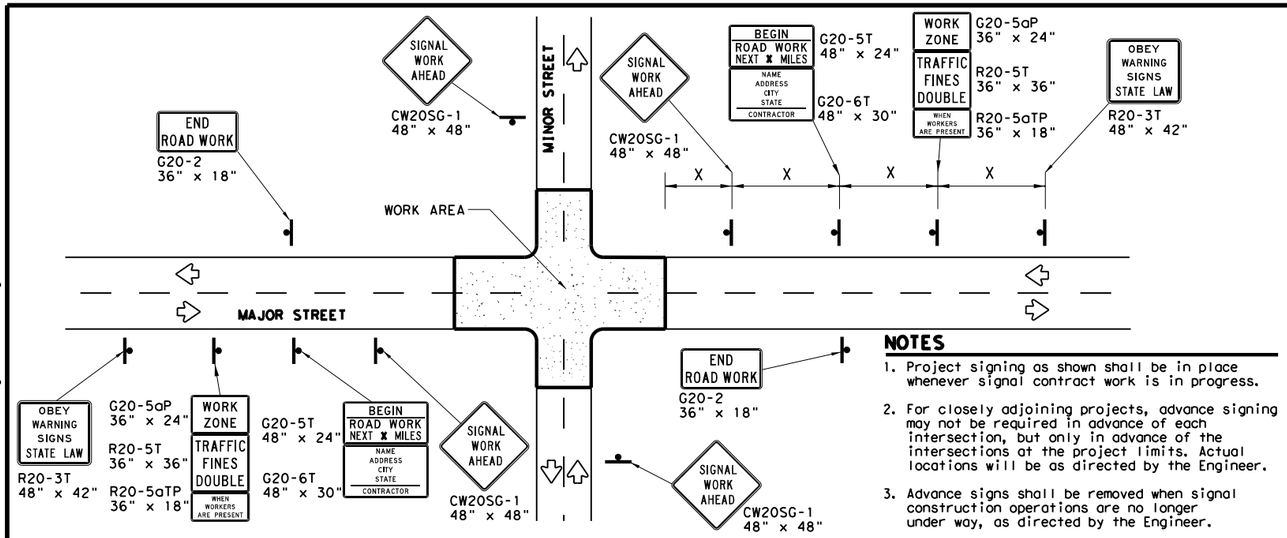
# TRAFFIC SIGNAL WORK TYPICAL DETAILS

## WZ(BTS-1)-13

| FILE: wzbts-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT April 1992 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 2-98 10-99 7-13 | DIST | COUNTY | | SHEET NO. |
| 4-98 3-03 | DAL | DALLAS,ETC | | 20 |




# TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

## NOTES

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

## GENERAL NOTES FOR WORK ZONE SIGNS

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

## DURATION OF WORK

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

## SIGN MOUNTING HEIGHT

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

## REMOVING OR COVERING

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

## REFLECTIVE SHEETING

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

## SIGN SUPPORT WEIGHTS

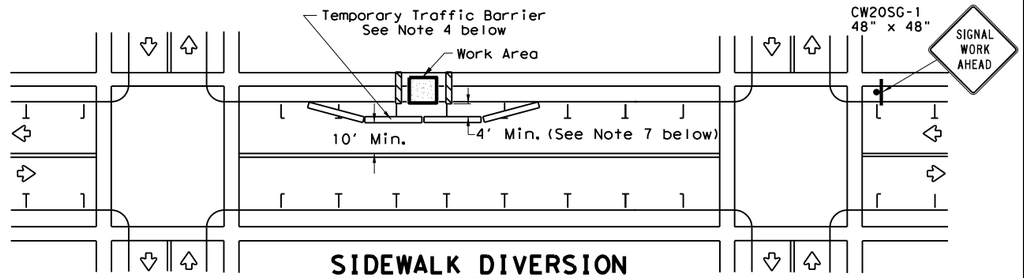
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

| LEGEND | |
|---|---|
| | Sign |
| | Channelizing Devices |
| | Type 3 Barricade |

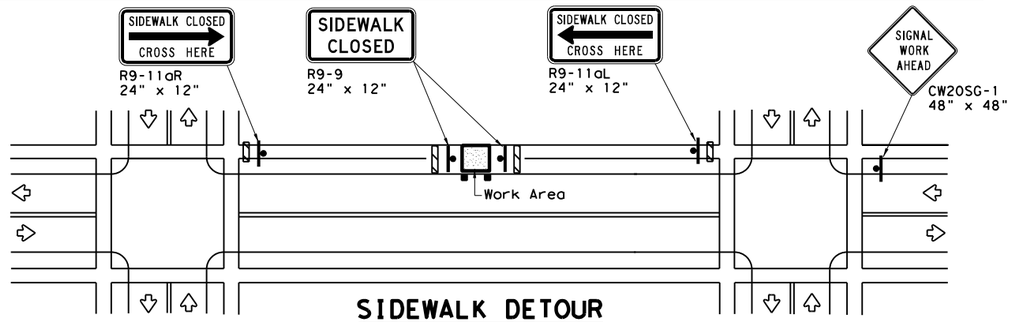
| DEPARTMENTAL MATERIAL SPECIFICATIONS | |
|---|---|
| SIGN FACE MATERIALS | DMS-8300 |
| FLEXIBLE ROLL-UP REFLECTIVE SIGNS | DMS-8310 |

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

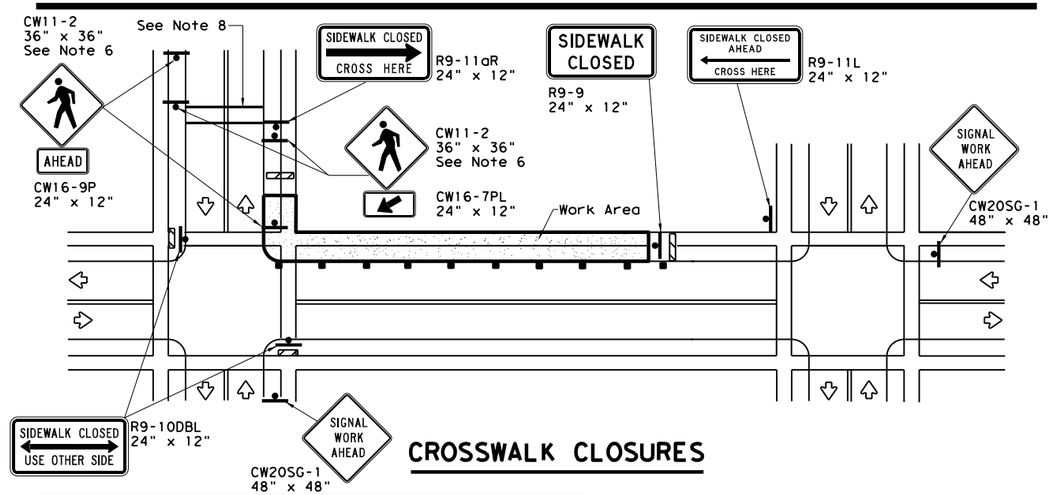
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm




## SIDEWALK DIVERSION




## SIDEWALK DETOUR




## CROSSWALK CLOSURES

## PEDESTRIAN CONTROL

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



Texas Department of Transportation

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# TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

# WZ(BTS-2)-13

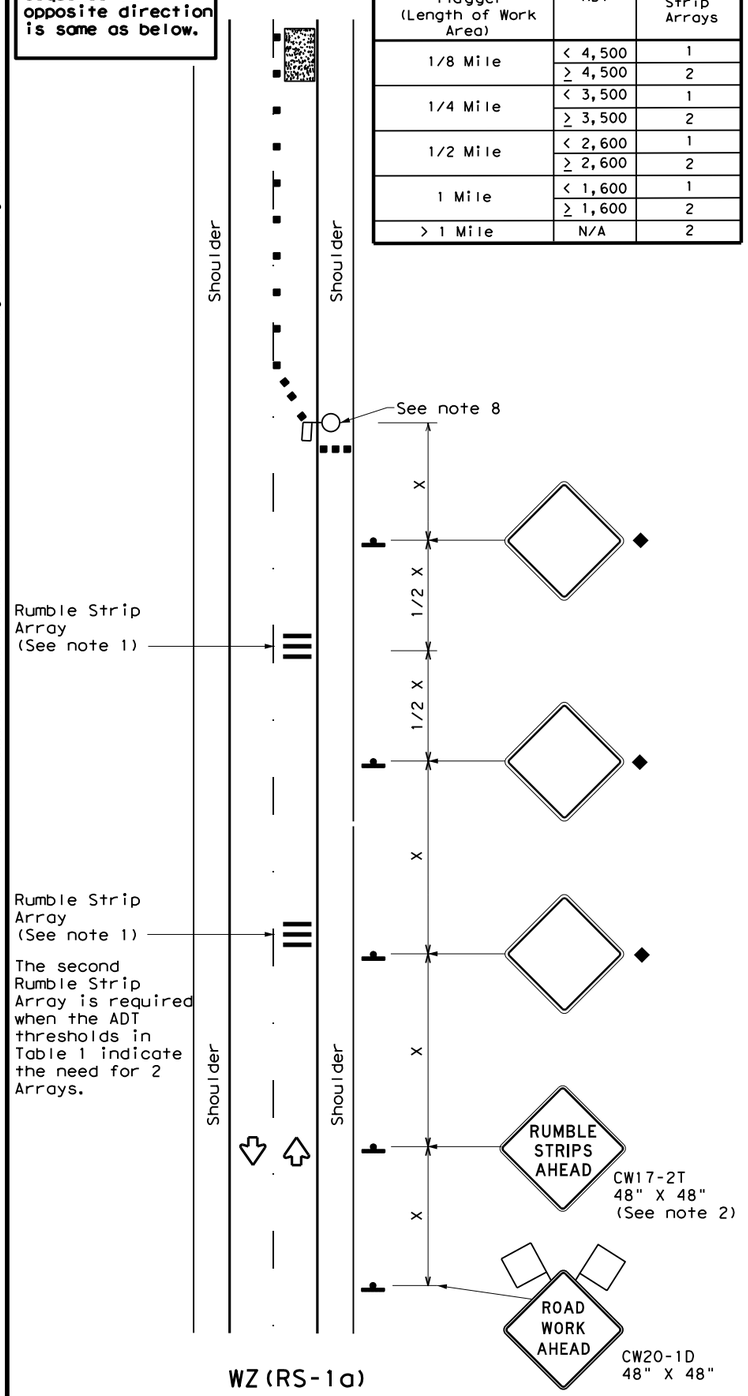
| FILE: wzbts-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT April 1992 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 2-98 10-99 7-13 | DIST | COUNTY | | SHEET NO. |
| 4-98 3-03 | DAL | DALLAS,ETC | | 21 |

DATE:
FILE:

DATE:
FILE:

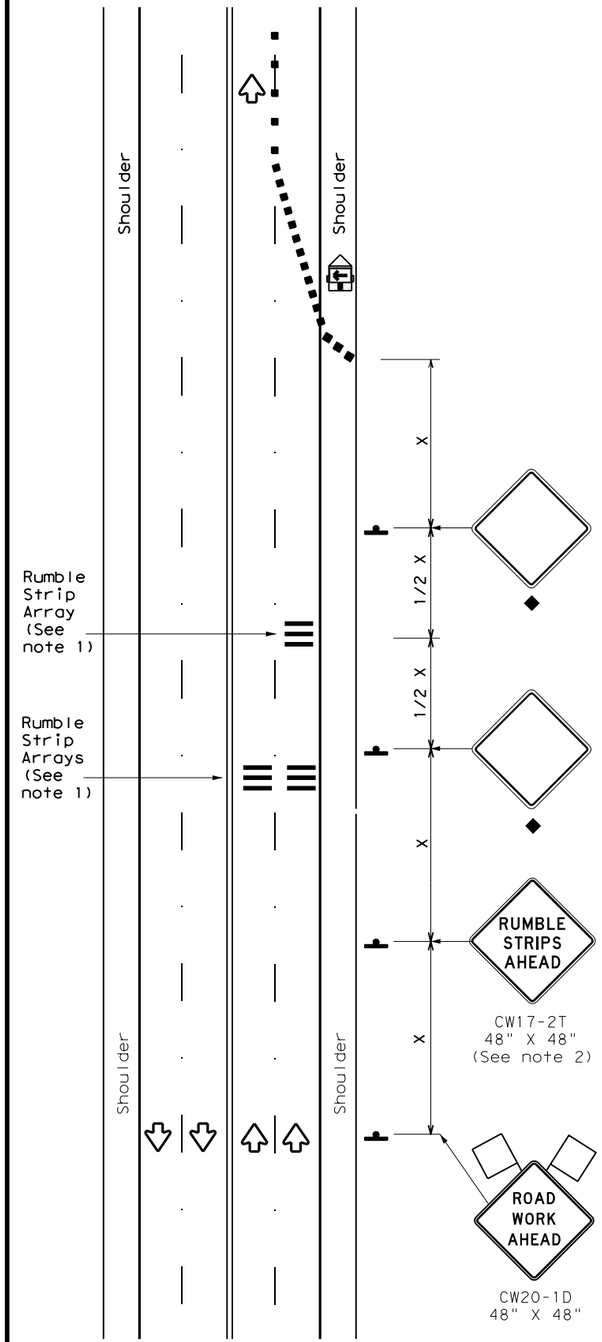
**Warning sign and rumble strip sequence in opposite direction is same as below.**

| TABLE 1 | | |
|---|---|---|
| Flagger to Flagger (Length of Work Area) | ADT | # of Rumble Strip Arrays |
| 1/8 Mile | < 4,500 | 1 |
| | ≥ 4,500 | 2 |
| 1/4 Mile | < 3,500 | 1 |
| | ≥ 3,500 | 2 |
| 1/2 Mile | < 2,600 | 1 |
| | ≥ 2,600 | 2 |
| 1 Mile | < 1,600 | 1 |
| | ≥ 1,600 | 2 |
| > 1 Mile | N/A | 2 |




WZ(RS-1a)

## RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION




WZ(RS-1b)

## RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

## GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

| LEGEND | | | |
|---|---|---|---|
| | Type 3 Barricade | | Channelizing Devices |
| | Heavy Work Vehicle | | Truck Mounted Attenuator (TMA) |
| | Trailer Mounted Flashing Arrow Panel | 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 |
| | ✓ | ✓ | | |

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

| TABLE 2 | |
|---|---|
| Speed | Approximate distance between strips in an array |
| ≤ 40 MPH | 10' |
| > 40 MPH & ≤ 55 MPH | 15' |
| = 60 MPH | 20' |
| ≥ 65 MPH | * 35' + |

Texas Department of Transportation

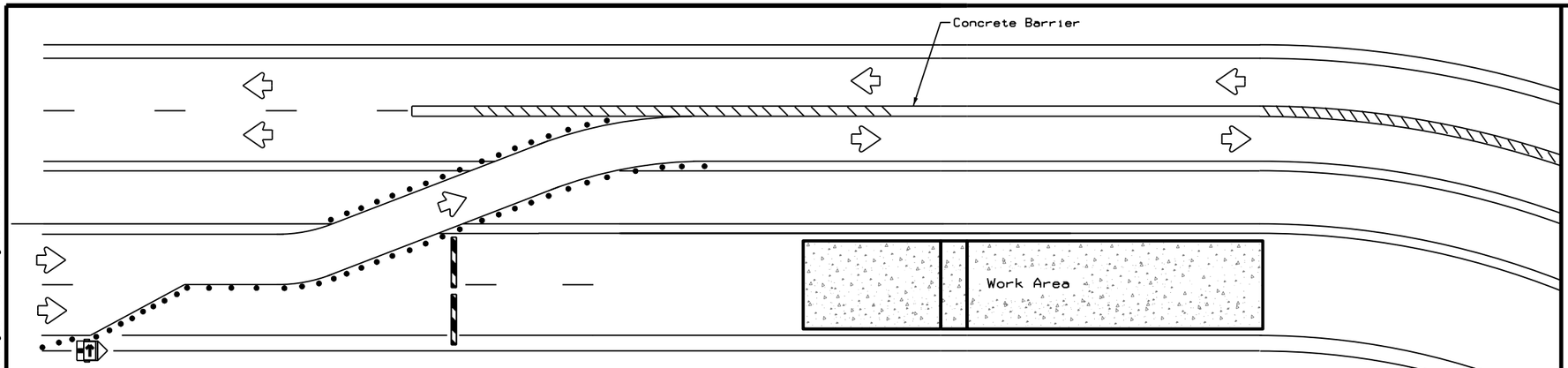
Traffic Safety Division Standard

# TEMPORARY RUMBLE STRIPS

## WZ(RS)-22

| FILE: wzrs22.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT November 2012 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 2-14 1-22 4-16 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 22 |

117




## NOTES:

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

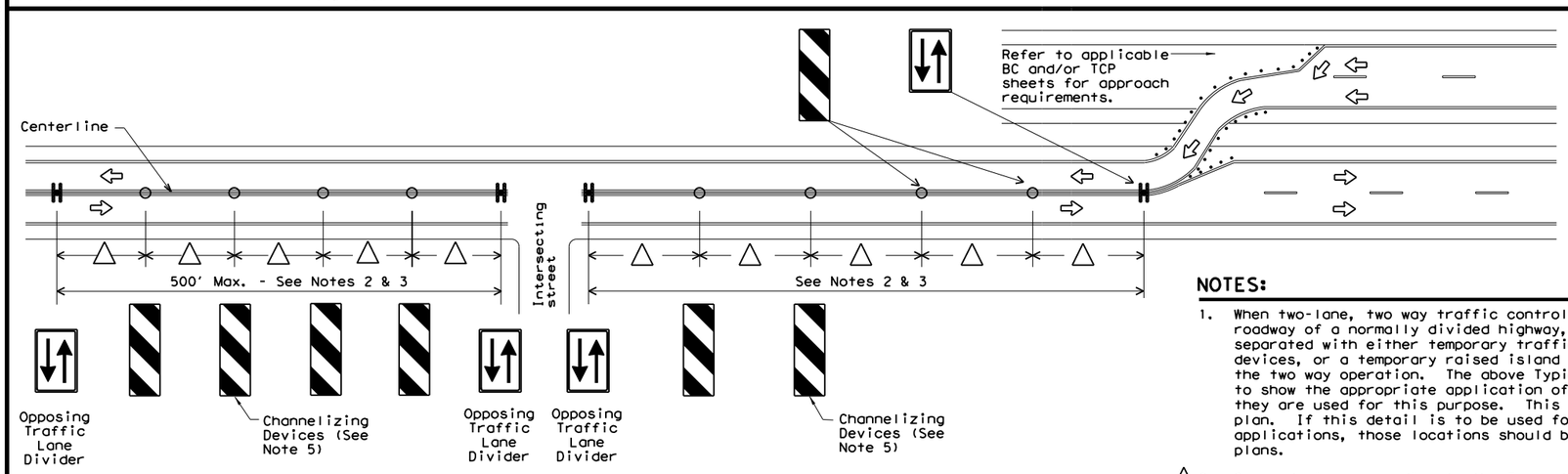
# BARRIER DELINEATION WITH MODULAR GLARE SCREENS

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

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

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

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




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

## NOTES:

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

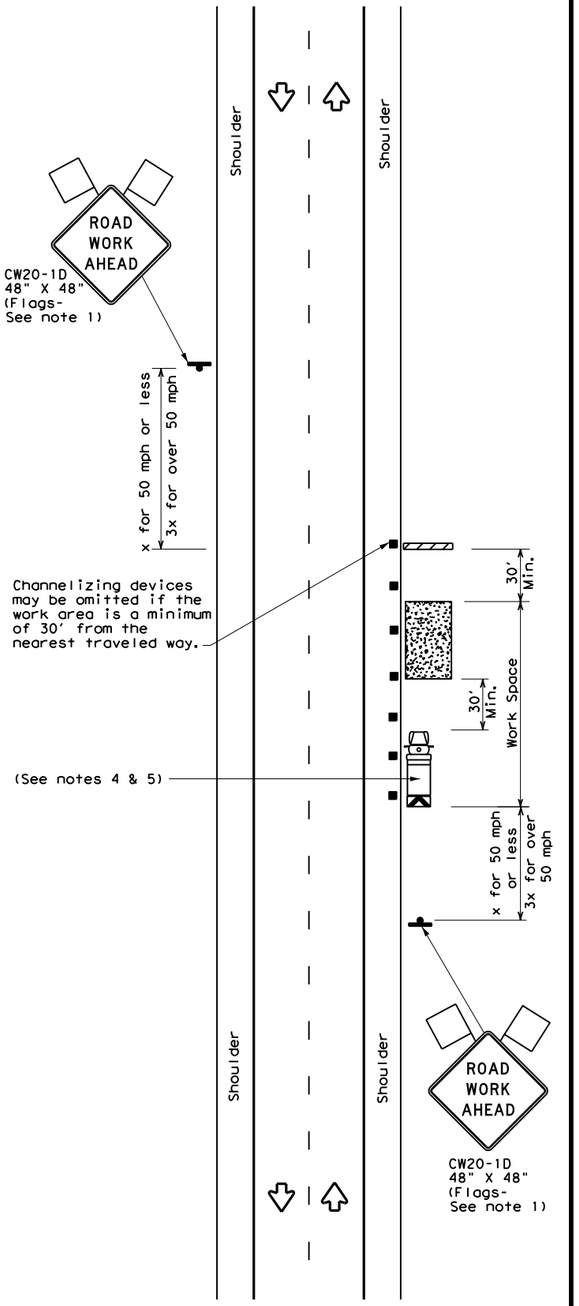
# TRAFFIC CONTROL PLAN TYPICAL DETAILS

# WZ(TD)-17

| FILE: wztd-17.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 1998 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 4-98 2-17 3-03 7-13 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 23 |

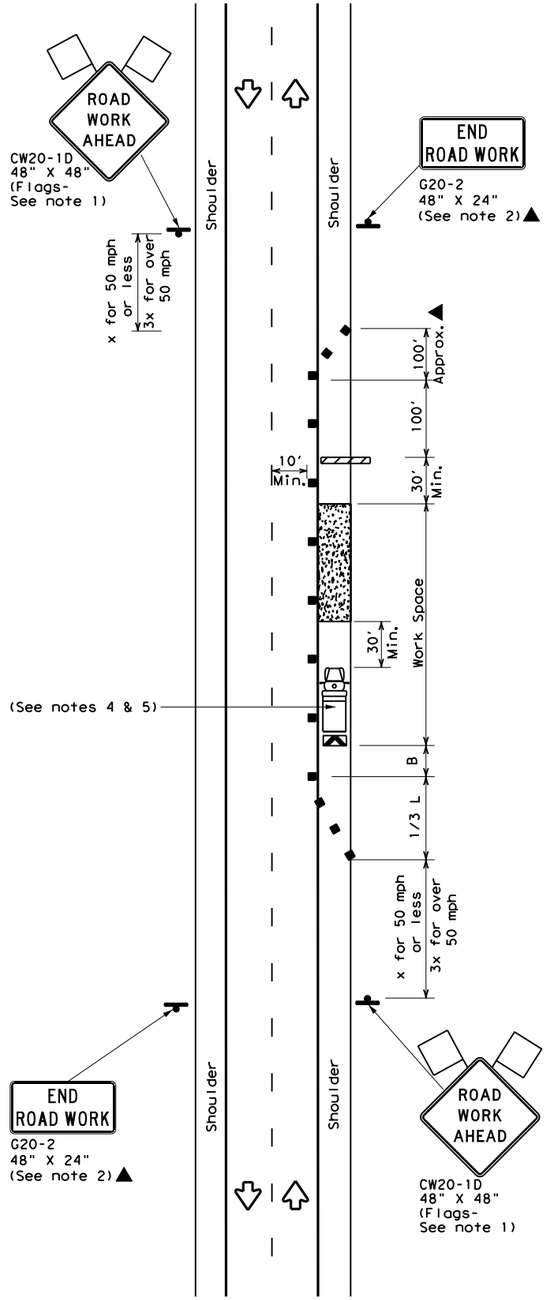
DATE:
FILE:

DATE:
FILE:



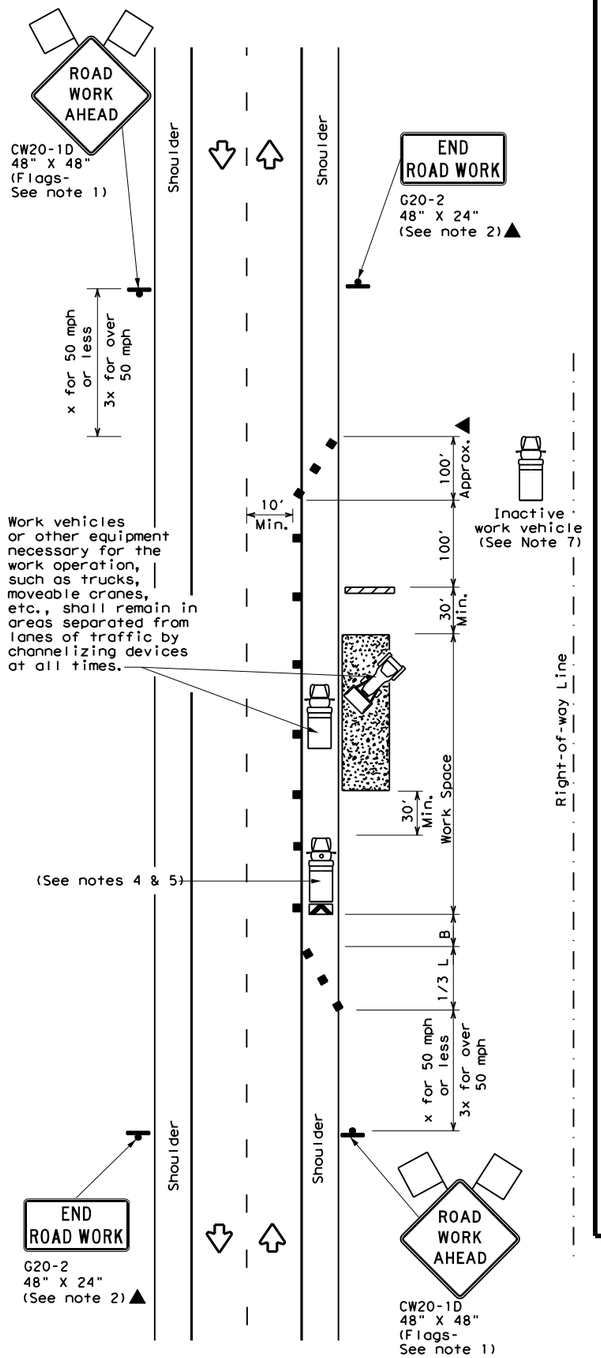

TCP (2-1a)

## WORK SPACE NEAR SHOULDER
Conventional Roads




TCP (2-1b)

## WORK SPACE ON SHOULDER
Conventional Roads




TCP (2-1c)

## WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

## GENERAL NOTES

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

Texas Department of Transportation

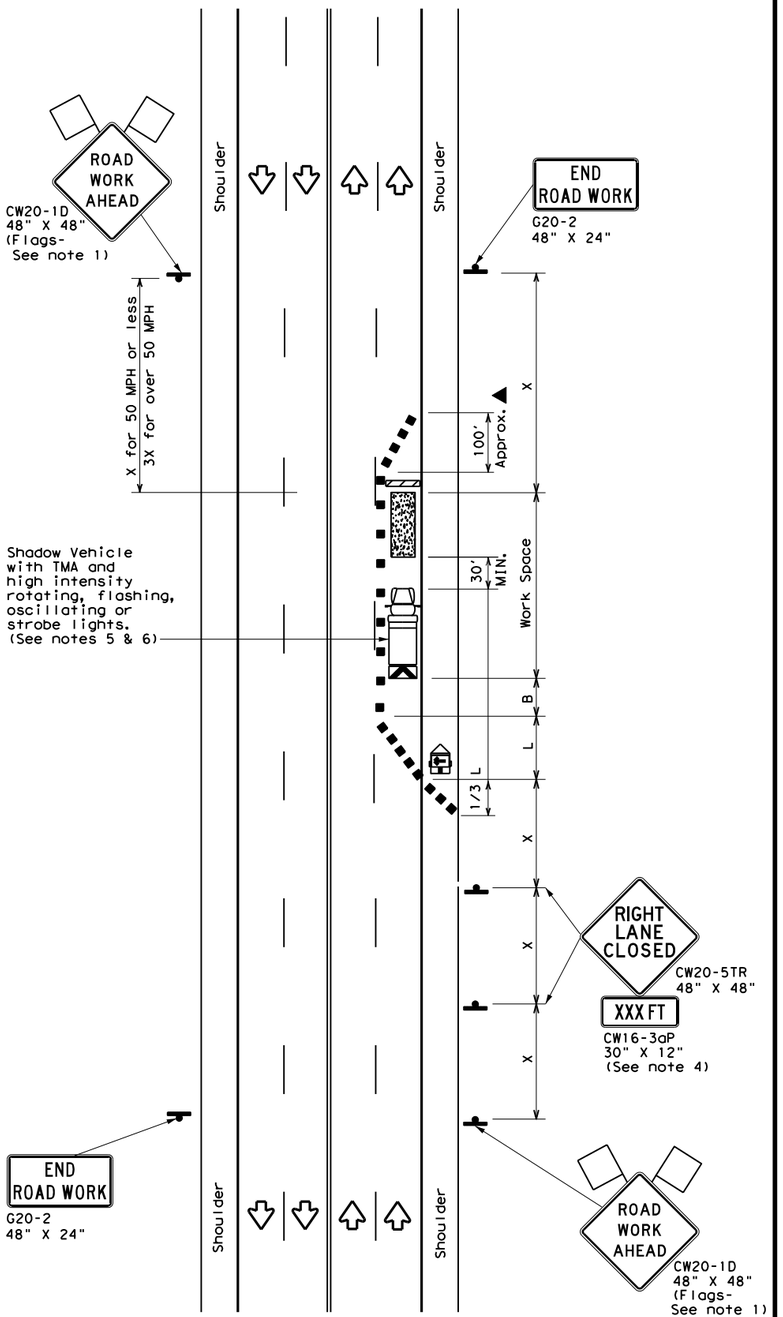
Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

# TCP(2-1)-18

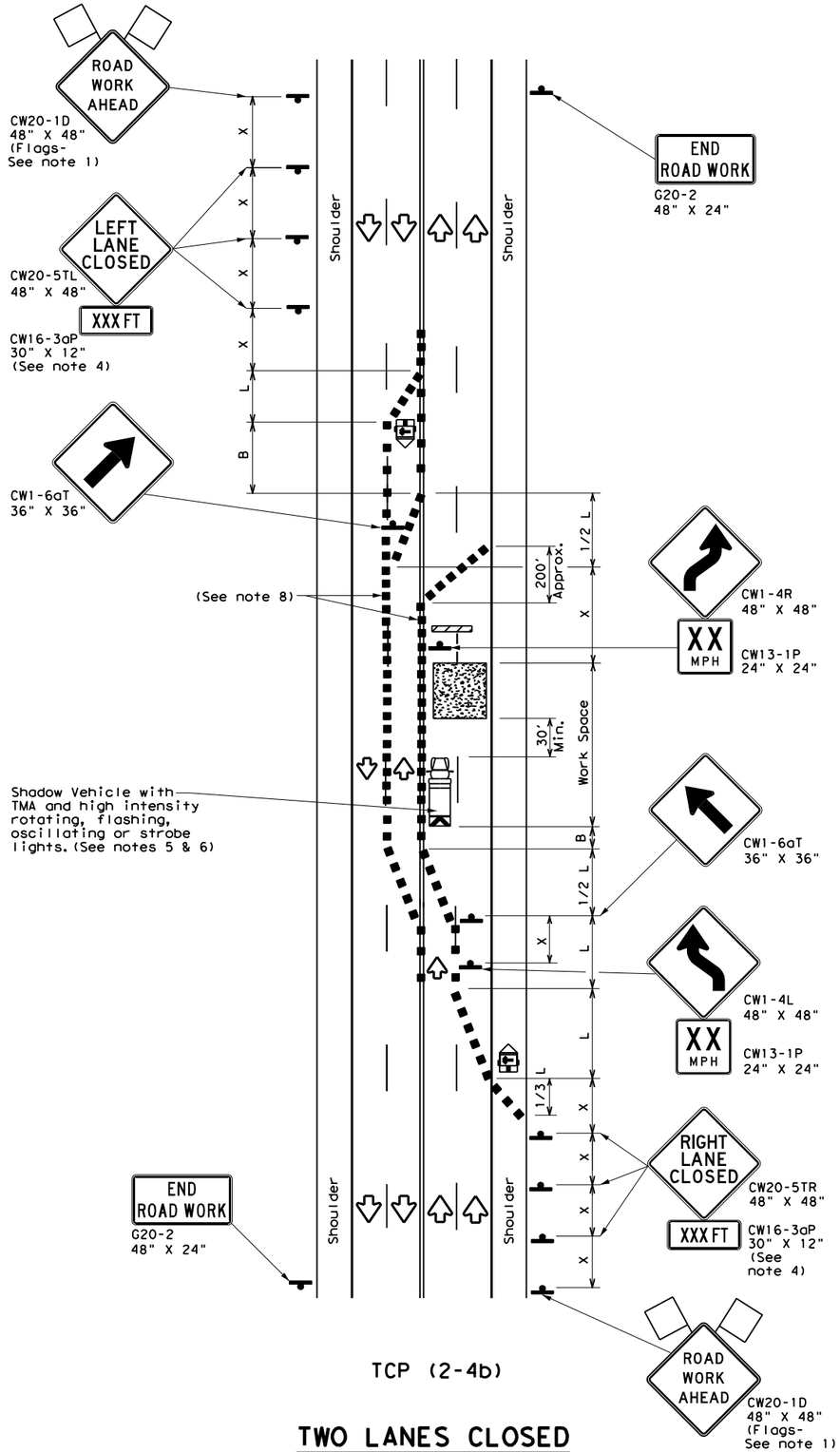
| FILE: tcp2-1-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 2-94 4-98 | DIST | COUNTY | | SHEET NO. |
| 8-95 2-12 | DAL | DALLAS,ETC | | 24 |
| 1-97 2-18 | | | | |

DATE:
FILE:




TCP (2-4a)

## ONE LANE CLOSED




TCP (2-4b)

## TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

## GENERAL NOTES

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

### TCP (2-4a)

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

### TCP (2-4b)

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

Texas Department of Transportation

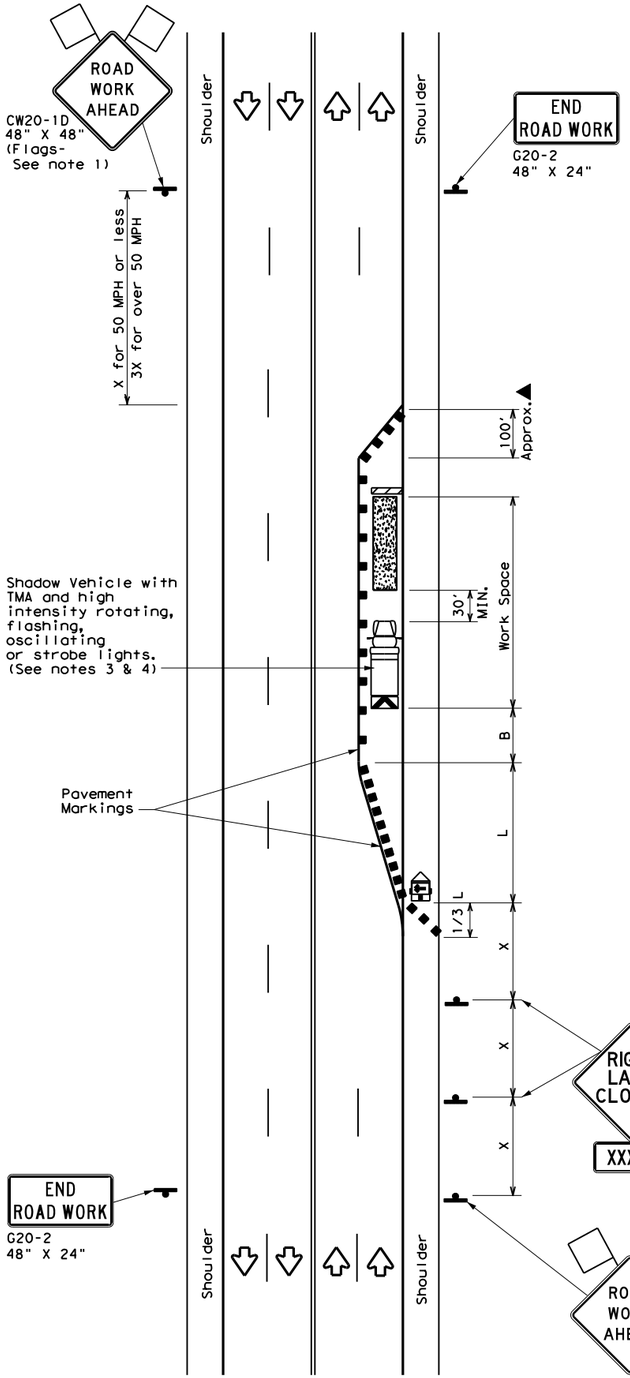
Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

# TCP(2-4)-18

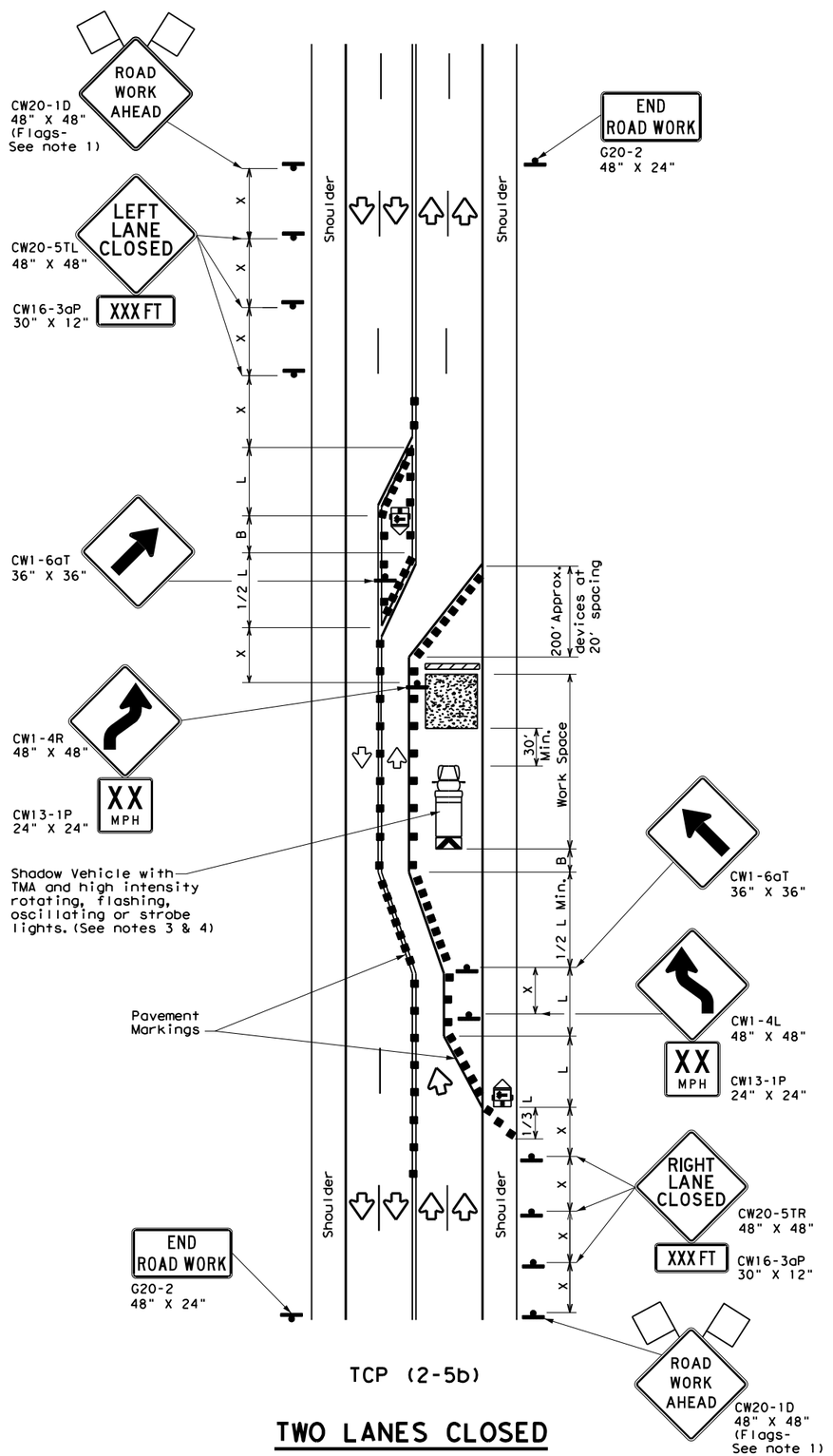
| FILE: tcp2-4-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 8-95 3-03 | 0047 | 07 | 245,ETC | US 75,ETC |
| 1-97 2-12 | DIST | COUNTY | | SHEET NO. |
| 4-98 2-18 | DAL | DALLAS,ETC | | 25 |

DATE:
FILE:




TCP (2-5a)

## ONE LANE CLOSED




TCP (2-5b)

## TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

## GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. 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 epoxure 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 substitutued for the Shadow Vehicle and TMA.
4. 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.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

### TCP (2-5a)

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

### TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation

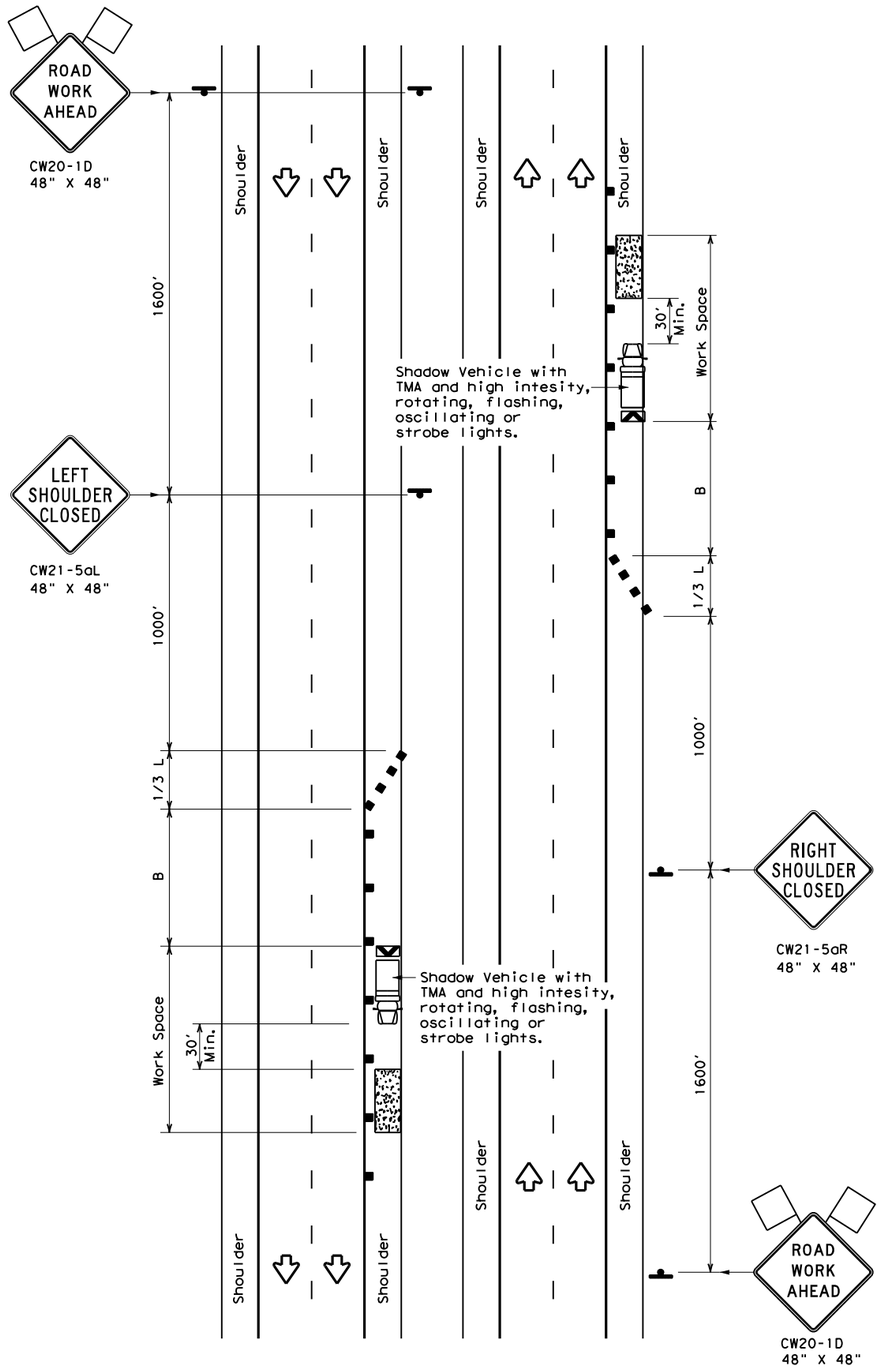
Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

# TCP(2-5)-18

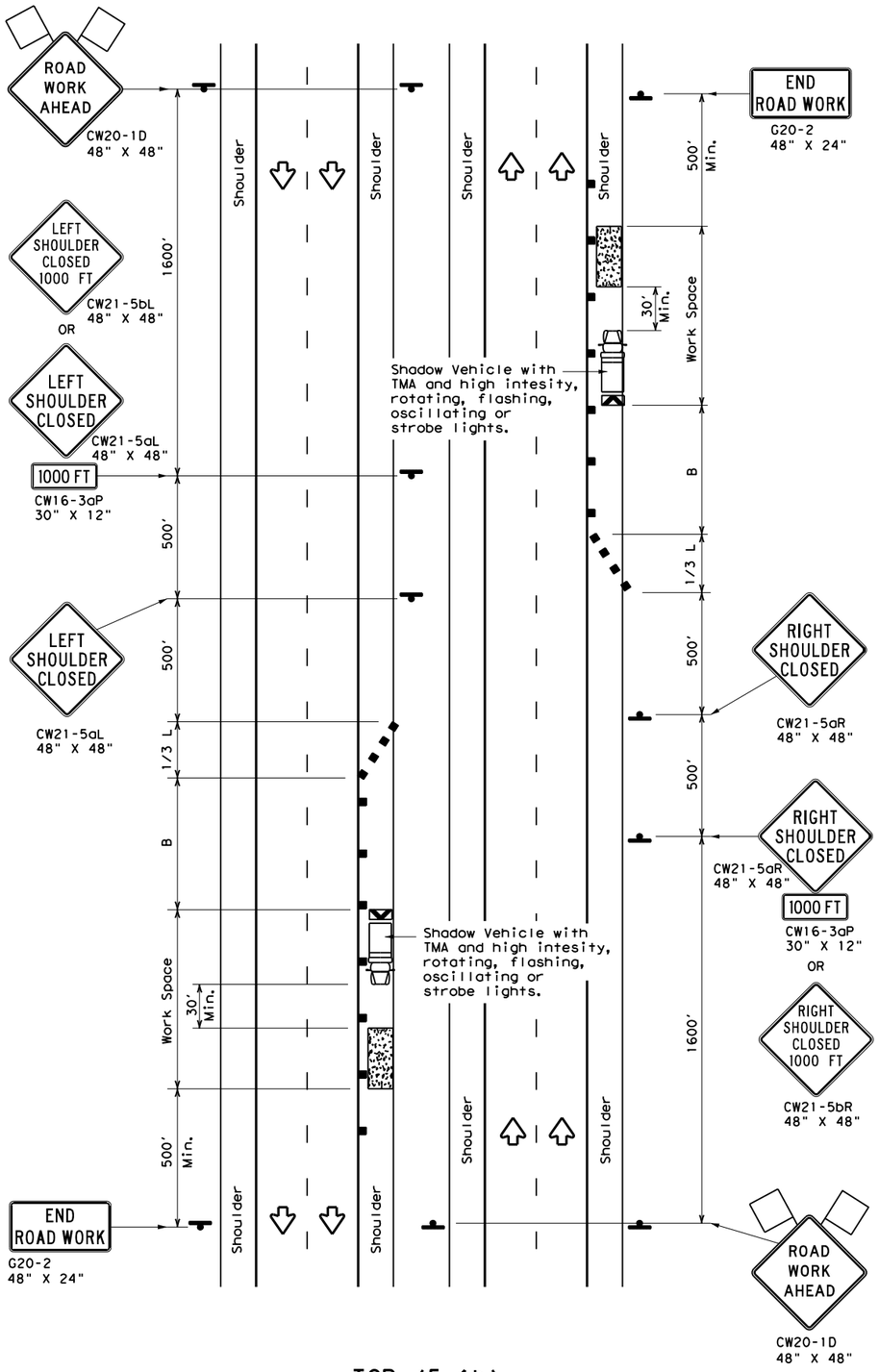
| FILE: tcp2-5-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 8-95 2-12 | 0047 | 07 | 245,ETC | US 75,ETC |
| 1-97 3-03 | DIST | COUNTY | | SHEET NO. |
| 4-98 2-18 | DAL | DALLAS,ETC | | 26 |

DATE:
FILE:




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

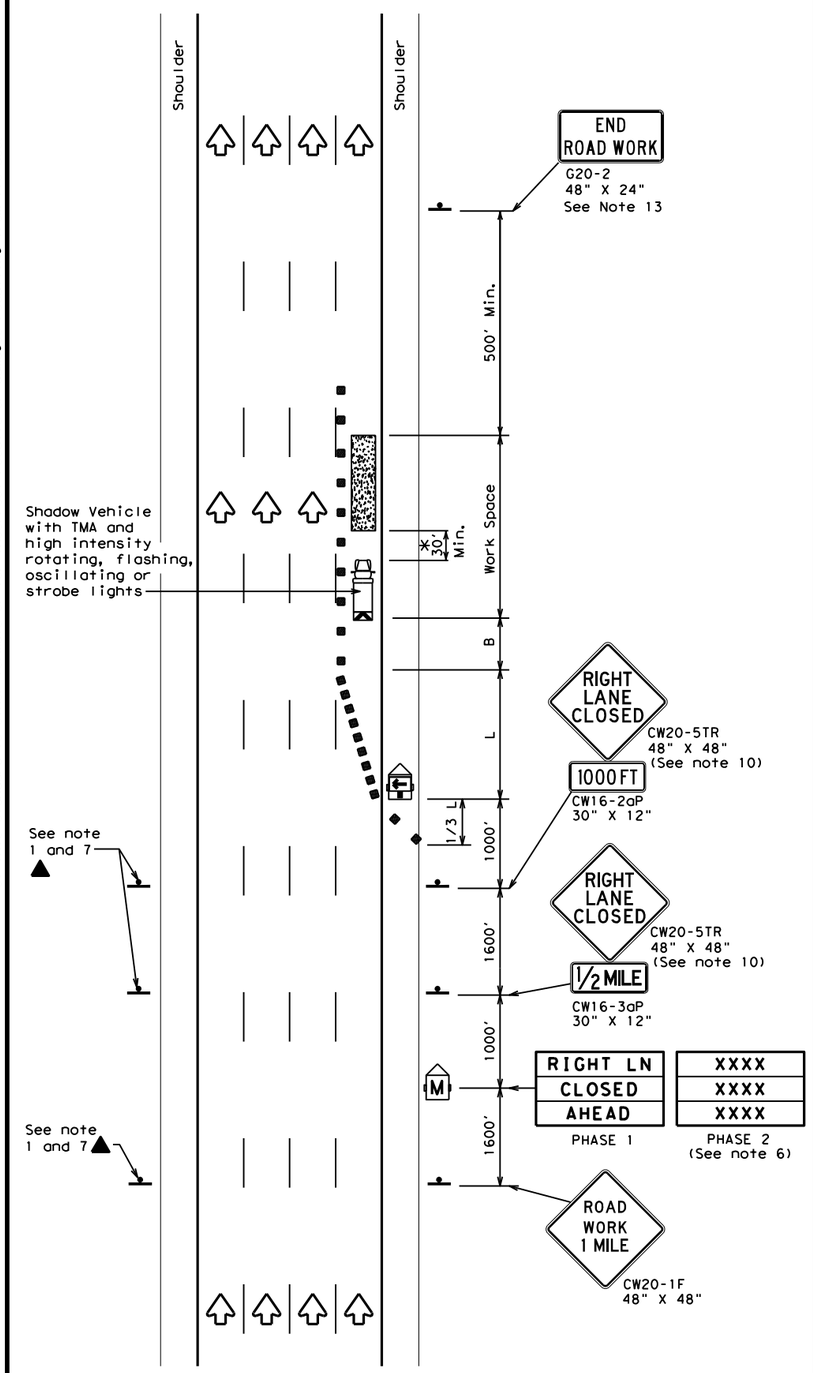
*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

## TCP(5-1)-18

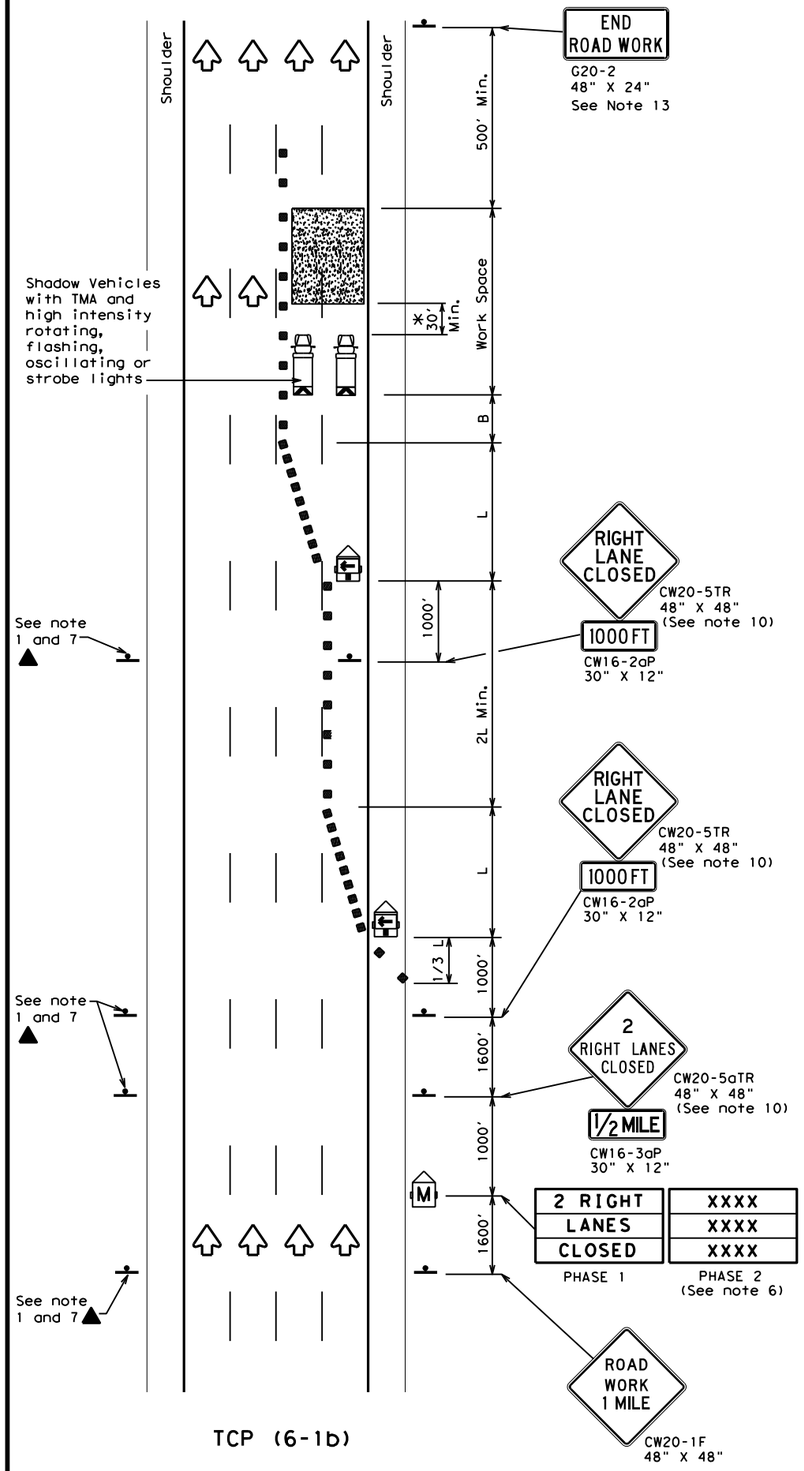
| FILE: tcp5-1-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT February 2012 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 2-18 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 27 |

DATE:
FILE:




TCP (6-1a)

## TYPICAL FREEWAY ONE LANE CLOSURE




TCP (6-1b)

## TYPICAL FREEWAY TWO LANE CLOSURE

| 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 "L" ** 10' Offset | 11' Offset | 12' Offset | Suggested Maximum Spacing of Channelizing Devices On a Taper | On a Tangent | Suggested Longitudinal Buffer Space "B" |
|---|---|---|---|---|---|---|---|
| 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' |

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

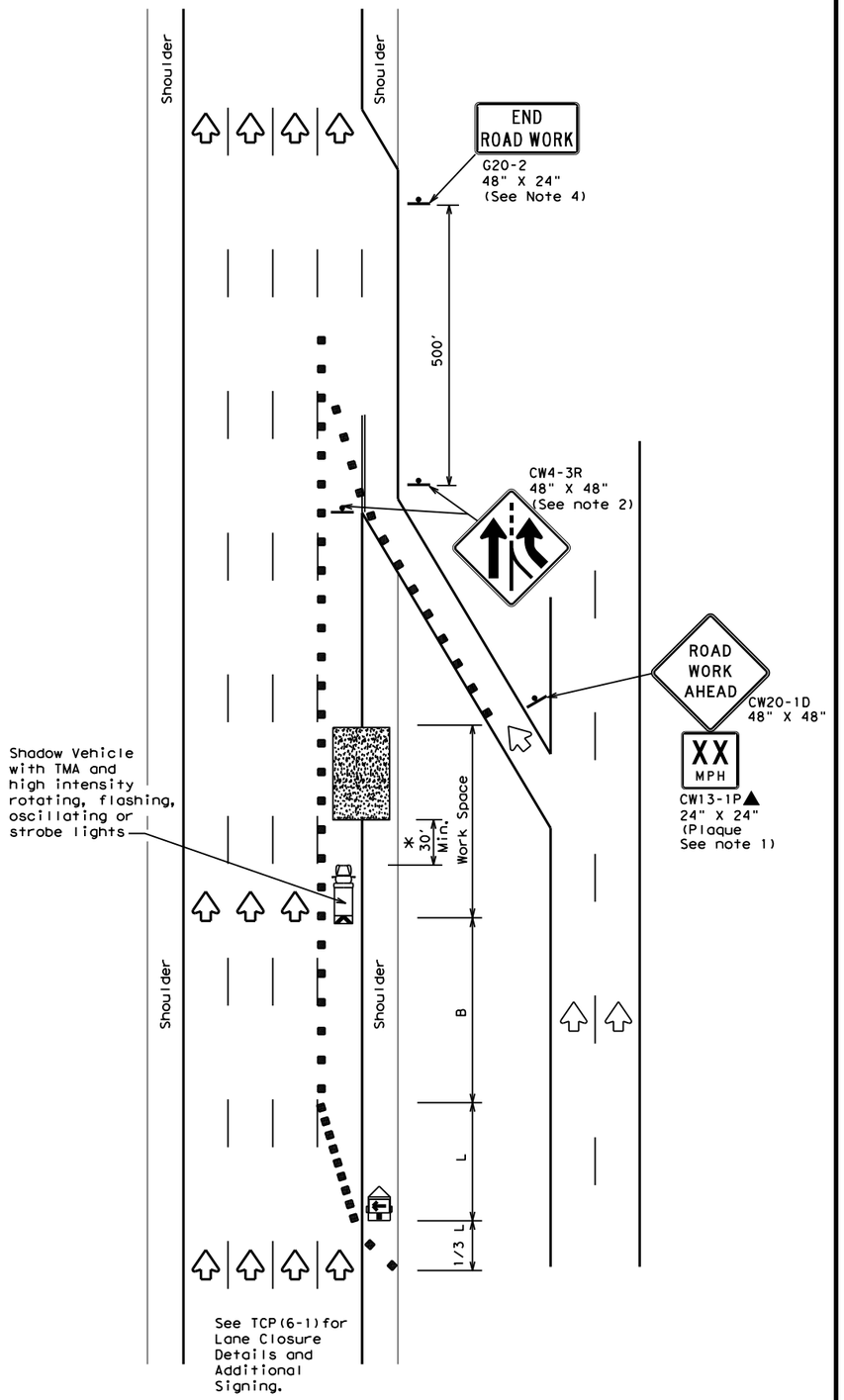
*Texas Department of Transportation*
*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

## TCP(6-1)-12

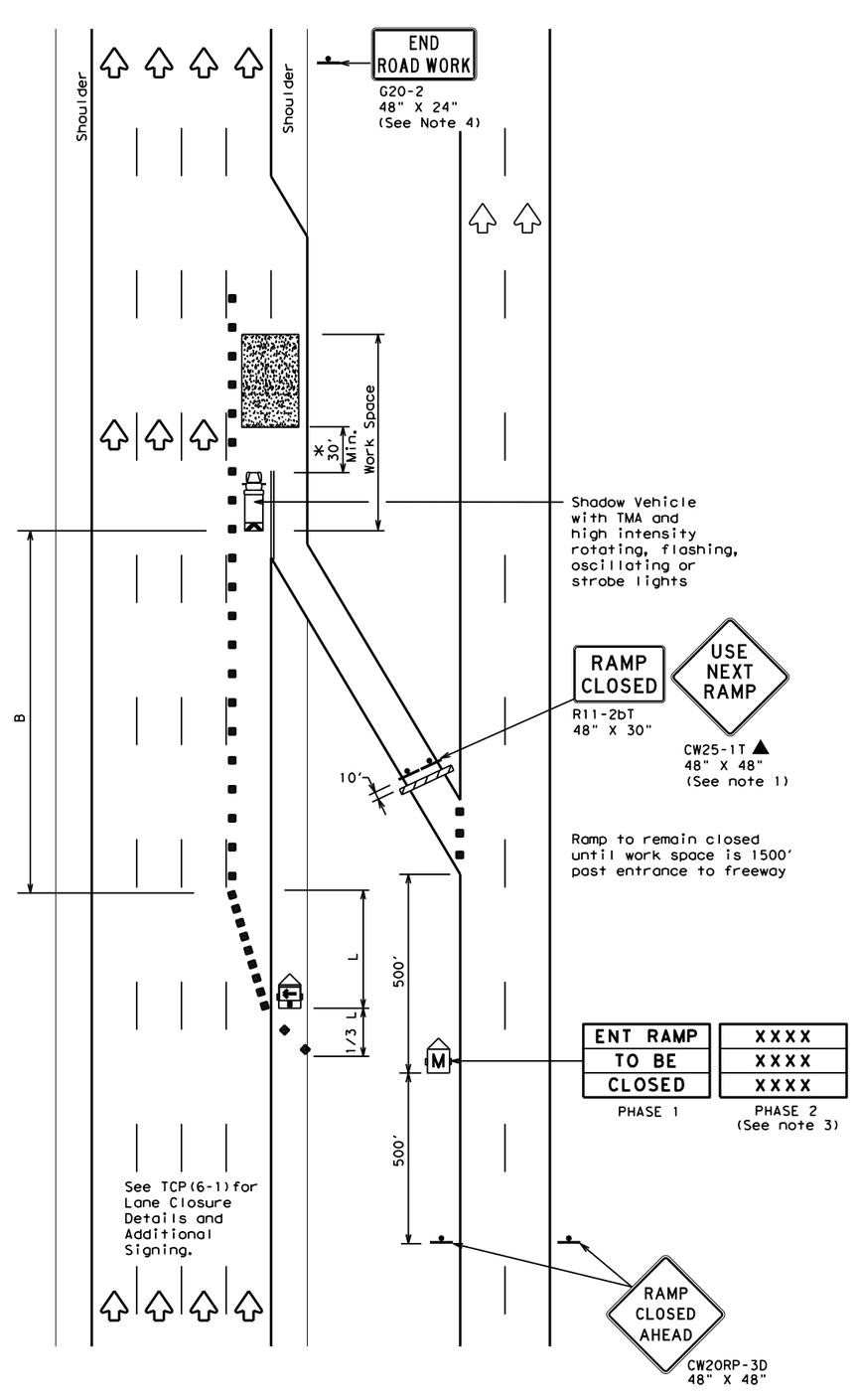
| FILE: tcp6-1.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 1998 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 8-12 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 28 |

DATE:
FILE:




TCP (6-2a)

## ENTRANCE RAMP OPEN
## WORK WITHIN 500' OF RAMP




TCP (6-2b)

## ENTRANCE RAMP CLOSED

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

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" ** 10' Offset | 11' Offset | 12' Offset | Suggested Maximum Spacing of Channelizing Devices: On a Taper | On a Tangent | Suggested Longitudinal Buffer Space "B" |
|---|---|---|---|---|---|---|---|
| 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' |

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

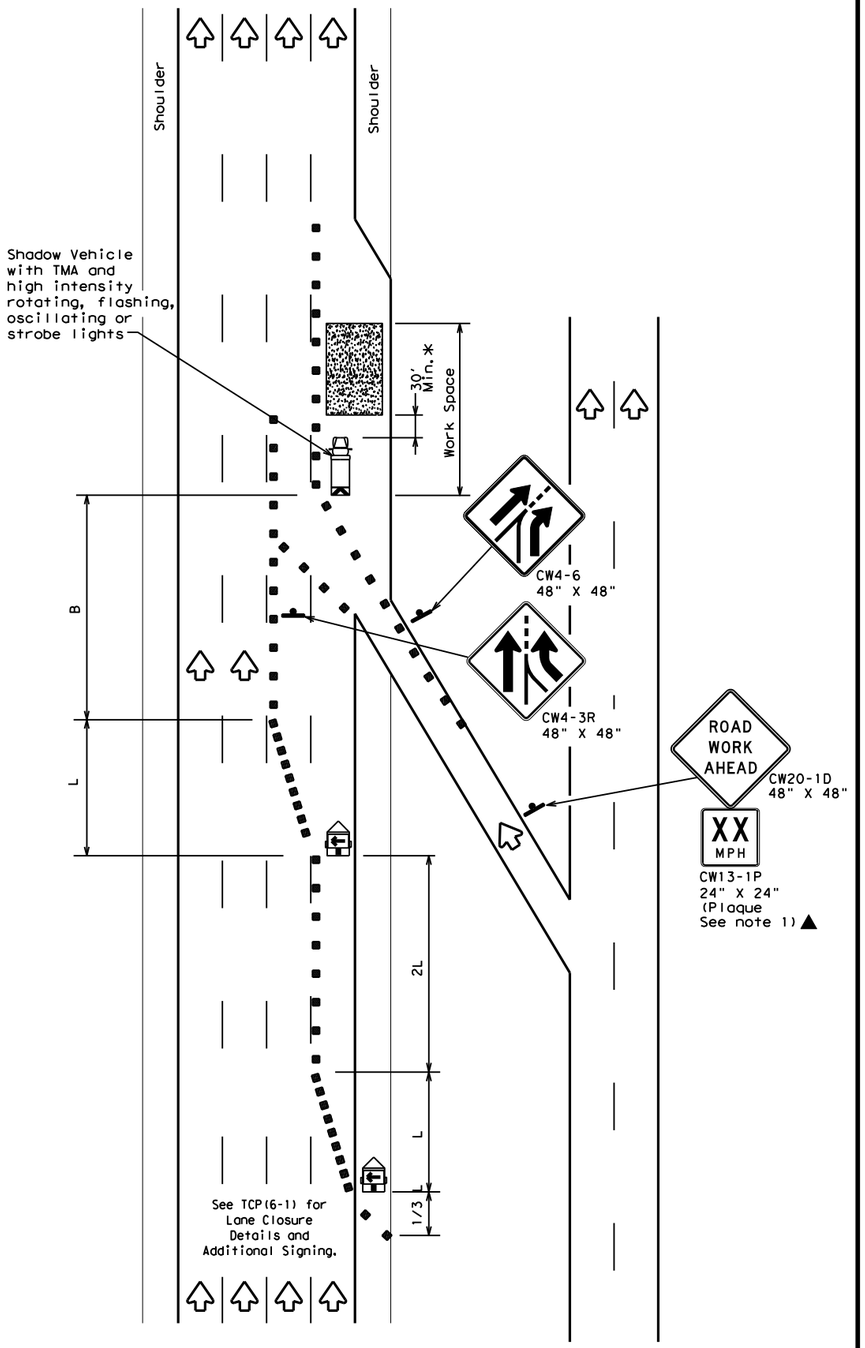
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

*Texas Department of Transportation*
*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN
# WORK AREA NEAR RAMP

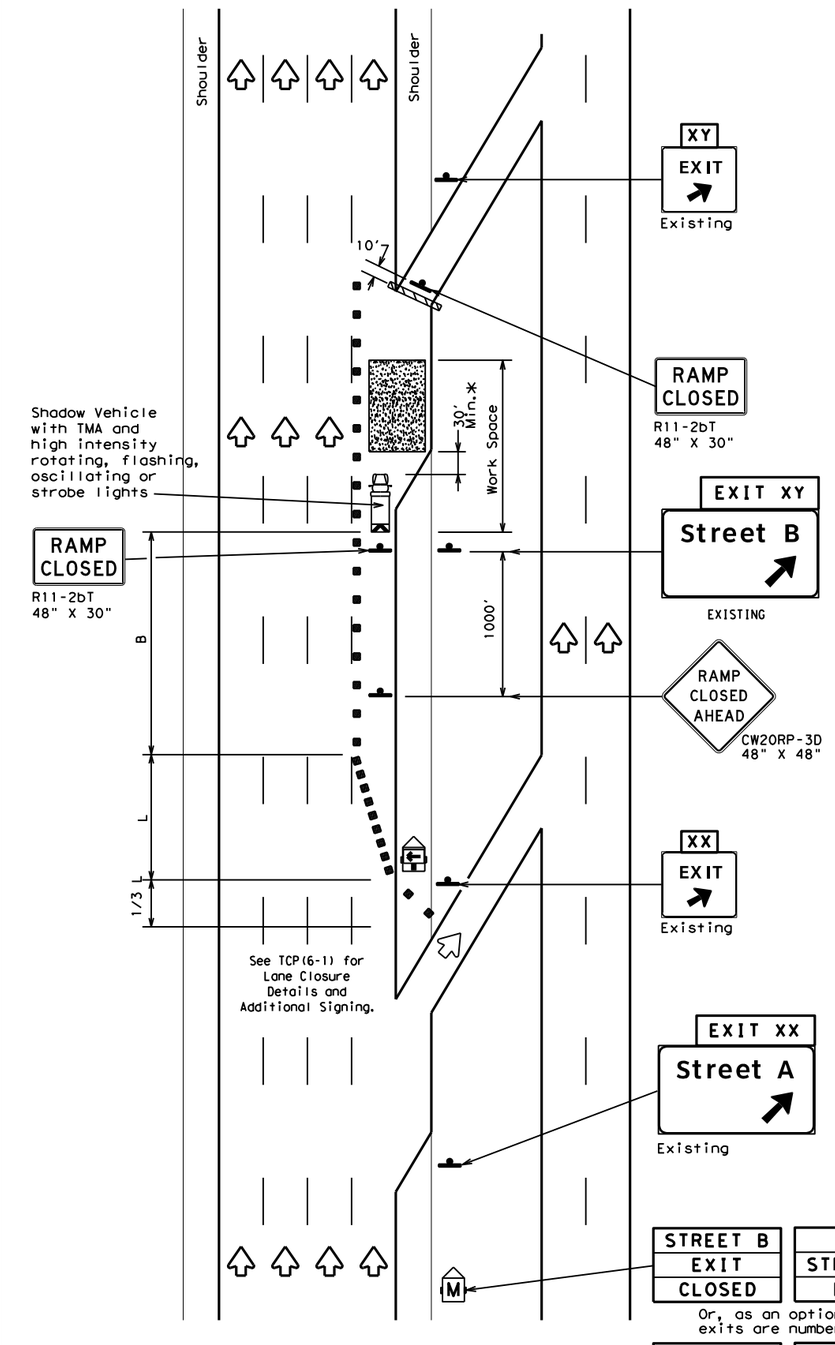
## TCP(6-2)-12

| FILE: tcp6-2.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 1994 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 1-97 8-98 | DIST | COUNTY | | SHEET NO. |
| 4-98 8-12 | DAL | DALLAS,ETC | | 29 |




TCP (6-3a)

## ENTRANCE RAMP OPEN




TCP (6-3b)

## EXIT RAMP CLOSED

## TRAFFIC EXITS PRIOR TO CLOSED RAMP

| 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 "L" ** 10' Offset | 11' Offset | 12' Offset | Suggested Maximum Spacing of Channelizing Devices: On a Taper | On a Tangent | Suggested Longitudinal Buffer Space "B" |
|---|---|---|---|---|---|---|---|
| 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' |

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

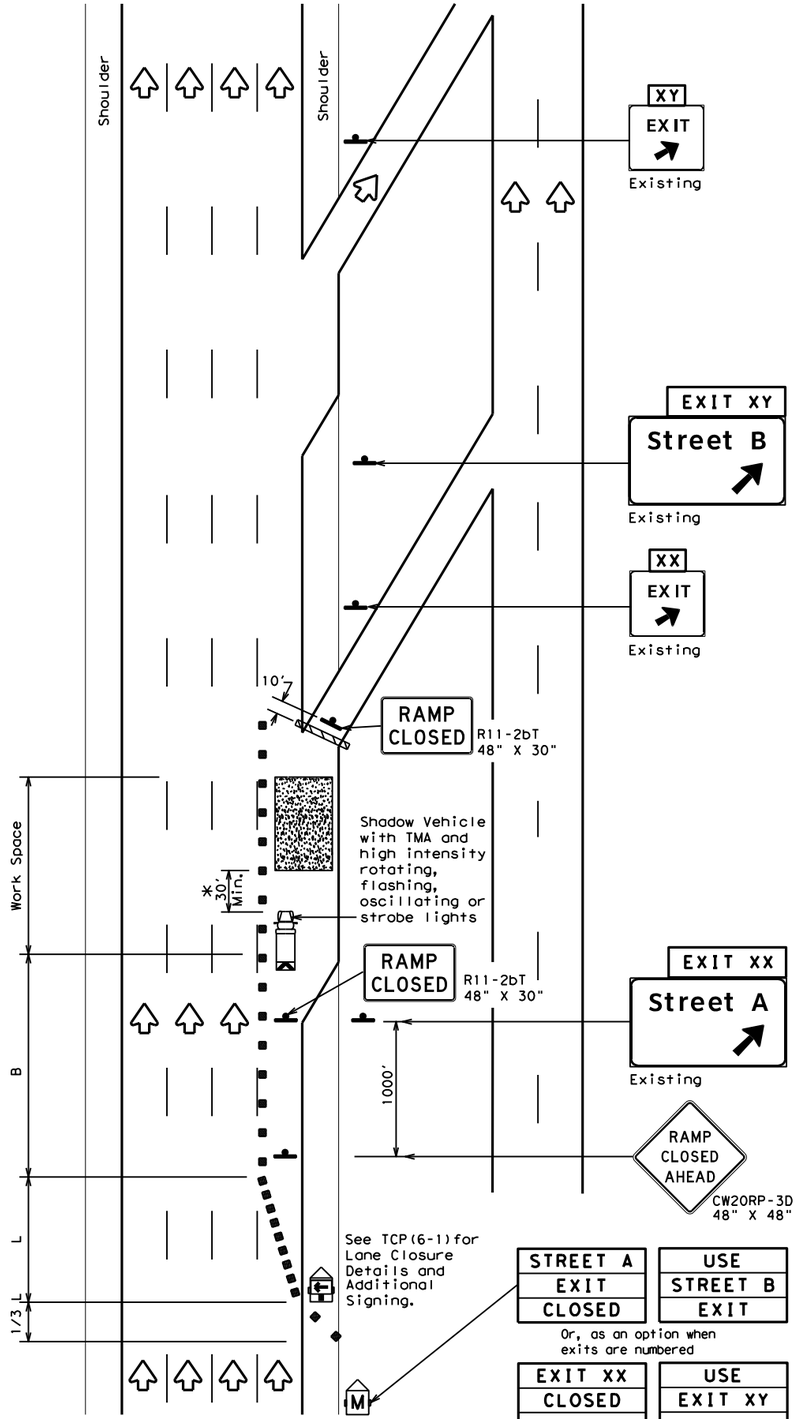
# TRAFFIC CONTROL PLAN
# WORK AREA BEYOND RAMP

## TCP(6-3)-12

| FILE: tcp6-3.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 1994 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 1-97 8-98 | DIST | COUNTY | | SHEET NO. |
| 4-98 8-12 | DAL | DALLAS,ETC | | 30 |

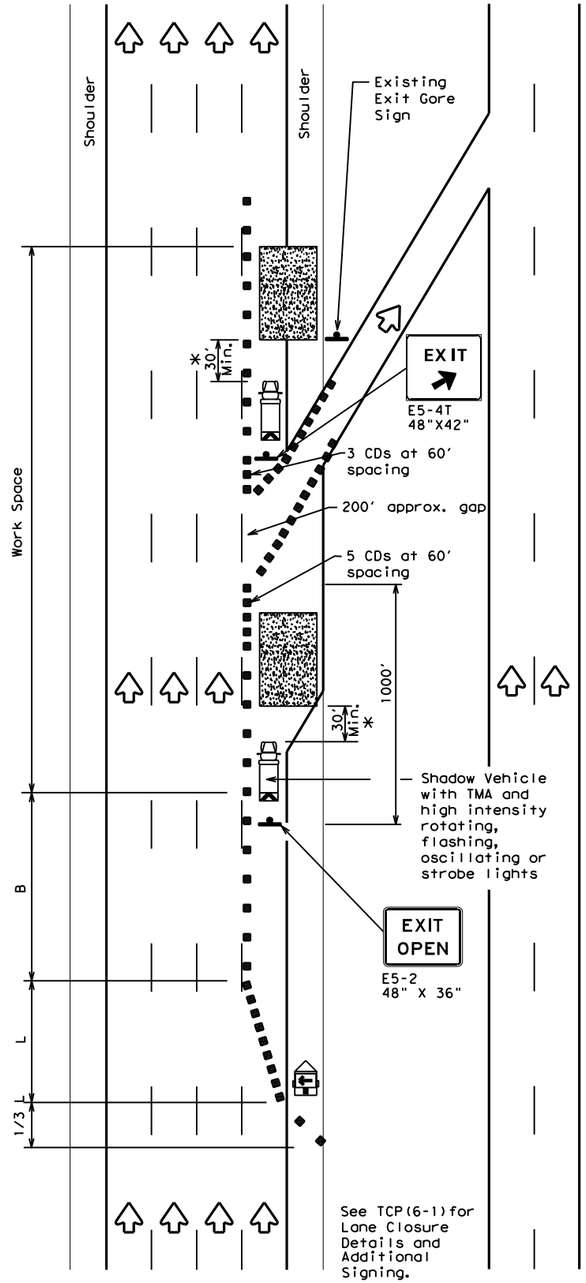
DATE:
FILE:

DATE:
FILE:




TCP (6-4a)

## EXIT RAMP CLOSED
## TRAFFIC EXITS PAST CLOSED RAMP




TCP (6-4b)

## EXIT RAMP OPEN

### LEGEND

| | | | |
|---|---|---|---|
| | Type 3 Barricade | | Channelizing Devices (CDs) |
| | 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 "L" ** 10' Offset | 11' Offset | 12' Offset | Suggested Maximum Spacing of Channelizing Devices: On a Taper | On a Tangent | Suggested Longitudinal Buffer Space "B" |
|---|---|---|---|---|---|---|---|
| 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' |

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

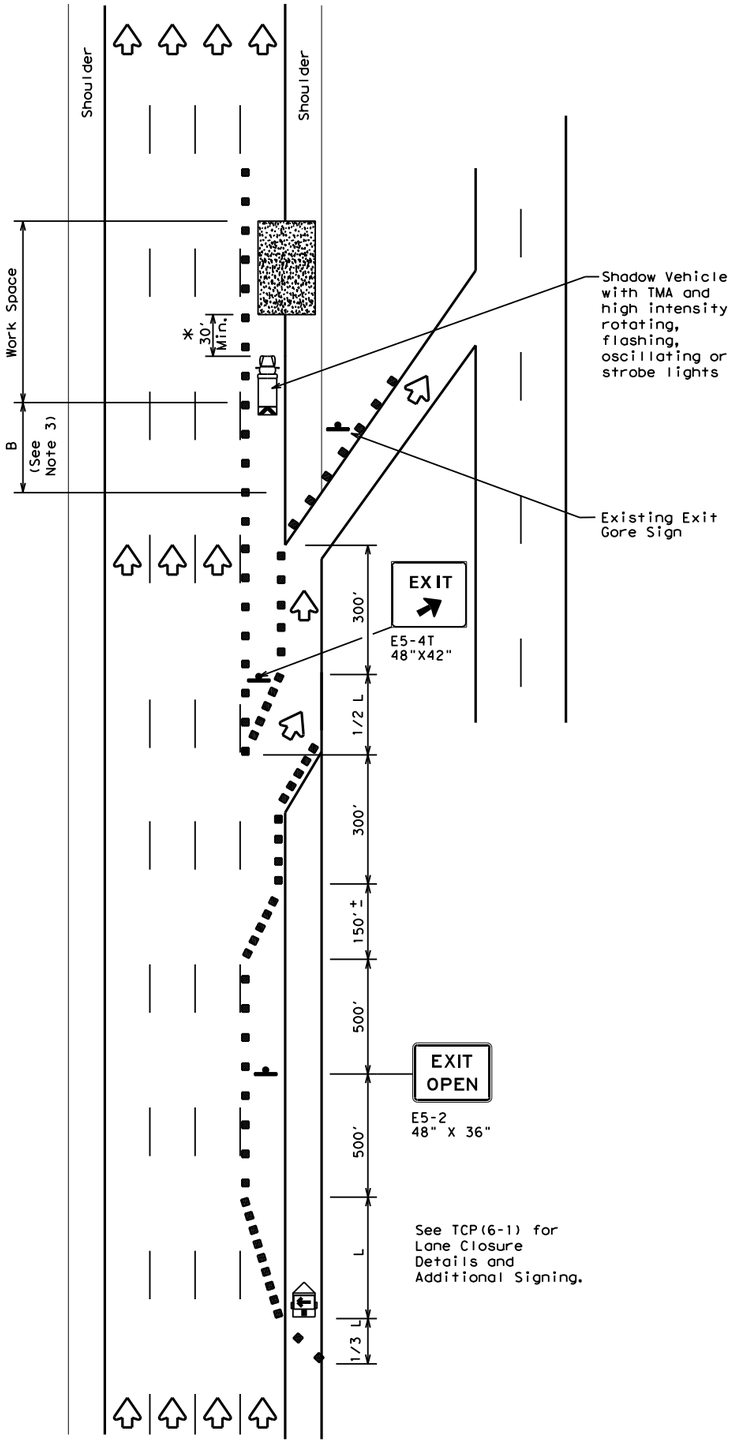
*Texas Department of Transportation*
*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN
# WORK AREA AT EXIT RAMP

## TCP(6-4)-12

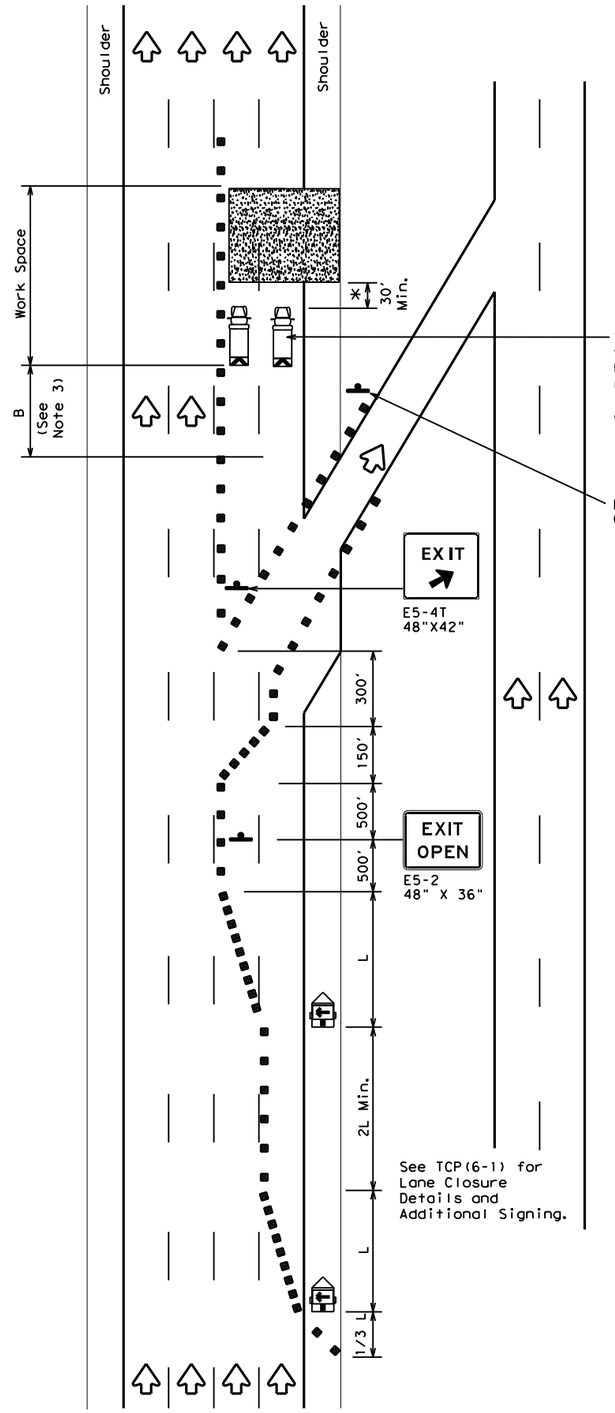
| FILE: tcp6-4.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT Feburary 1994 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 1-97 8-98 | DIST | COUNTY | | SHEET NO. |
| 4-98 8-12 | DAL | DALLAS,ETC | | 31 |

DATE:
FILE:




TCP (6-5a)

## EXIT RAMP OPEN




TCP (6-5b)

## EXIT RAMP OPEN
## TWO LANE CLOSURE WITHIN 1500' PAST EXIT RAMP

| 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 "L" ** 10' Offset | 11' Offset | 12' Offset | Suggested Maximum Spacing of Channelizing Devices: On a Taper | On a Tangent | Suggested Longitudinal Buffer Space "B" |
|---|---|---|---|---|---|---|---|
| 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' |

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
3. If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

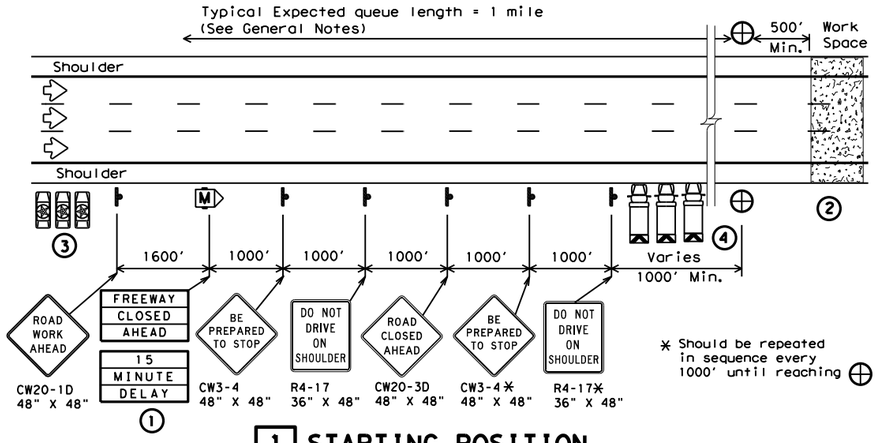
*Texas Department of Transportation*
*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN
# WORK AREA BEYOND EXIT RAMP

## TCP(6-5)-12

| FILE: tcp6-5.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT Feburary 1998 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 1-97 8-98 | DIST | COUNTY | | SHEET NO. |
| 4-98 8-12 | DAL | DALLAS,ETC | | 32 |

DATE:
FILE:



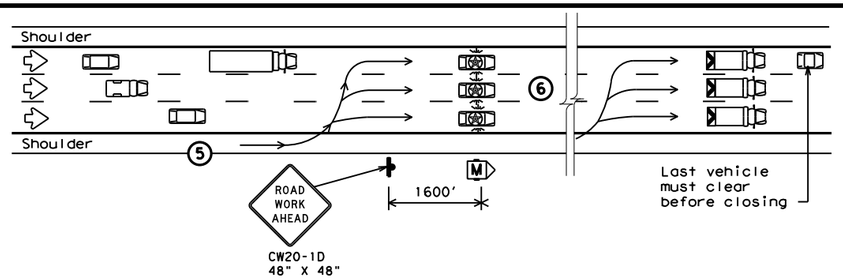

## 1 STARTING POSITION

(1) Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.

(2) Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.

(3) There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.

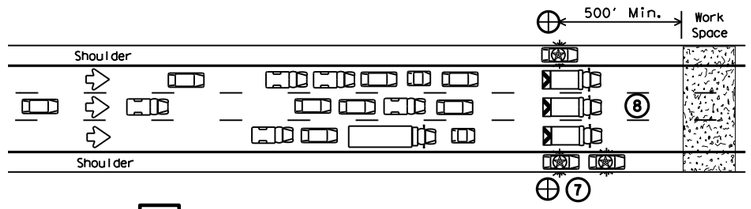
(4) One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.




## 2 REDUCING SPEED OPERATION

(5) Starting position of the LEOVs should be in advance of the most distant warning signs.

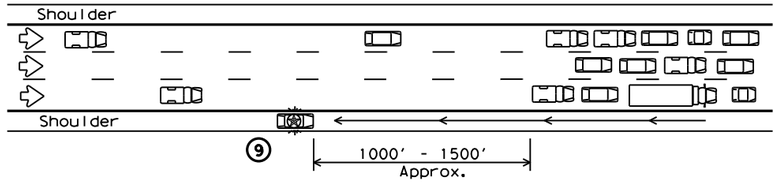
(6) Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.




## 3 ALL TRAFFIC STOPPED AT CP

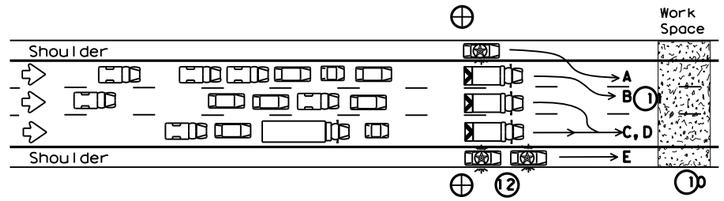
(7) Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

(8) The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.




## 4 WARNING THE TRAFFIC QUEUE

(9) The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed 1/4 mile or more in advance of the queue.




## 5 RELEASING STOPPED TRAFFIC

(10) All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.

(11) When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.

(12) The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.

(13) LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

| LEGEND | | | |
|---|---|---|---|
| ■ ■ | Channelizing Devices | ⊕ | Control Position (CP) |
| (M) | Portable Changeable Message Sign (PCMS) | | Barrier Vehicle with Truck Mounted Attenuator |
| | Law Enforcement Officer's Vehicle(LEOV) | | Traffic Flow |

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

## GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.

2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.

3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9 ).

4. The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.

5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.

6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.

7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

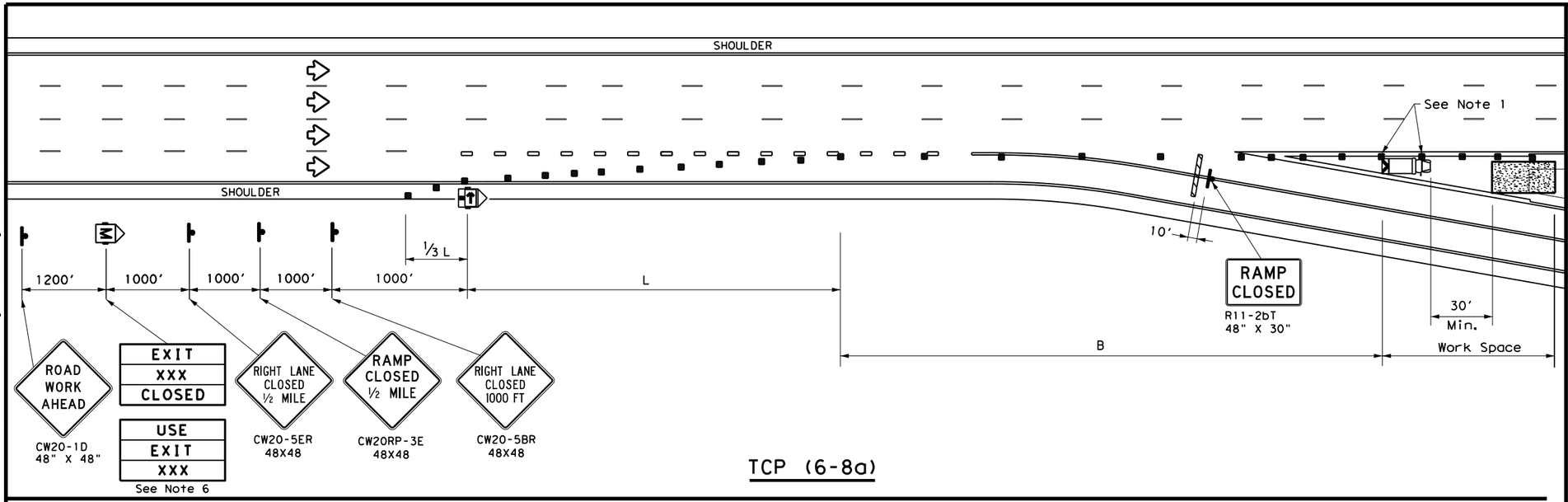
THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

*Texas Department of Transportation*
*Traffic Operations Division Standard*

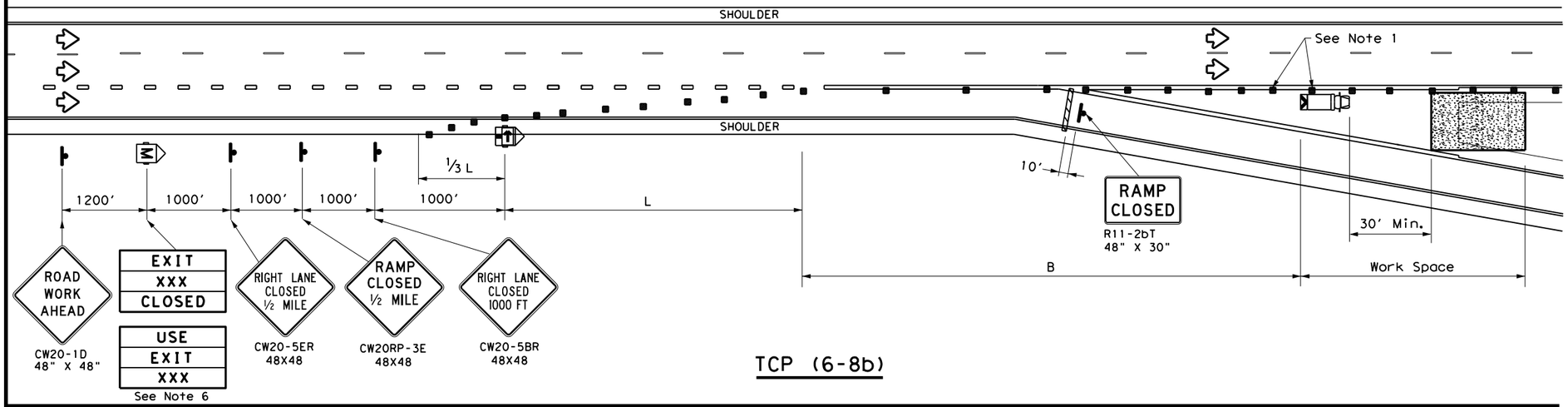
# TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

## TCP(6-7)-12

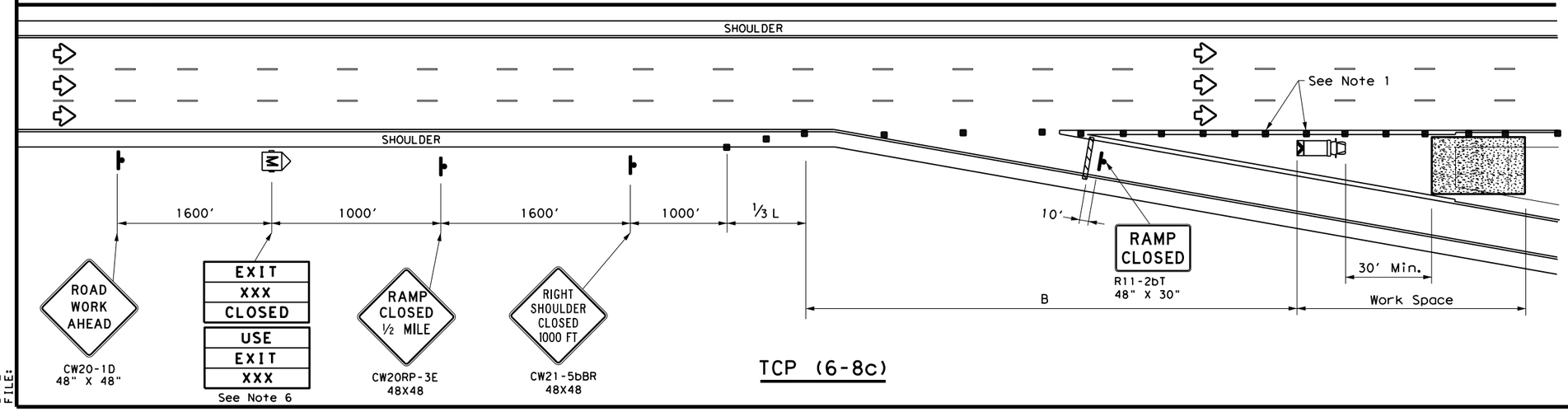
| FILE: tcp6-7.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 1998 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 1-97 8-12 | DIST | COUNTY | | SHEET NO. |
| 4-98 | DAL | DALLAS,ETC | | 33 |




TCP (6-8a)




TCP (6-8b)




TCP (6-8c)

DATE:
FILE:

## LEGEND

| | | | |
|---|---|---|---|
| | Type 3 Barricade | ▪▪ | Channelizing Devices (CDs) |
| | 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 "L" ** 10' Offset | 11' Offset | 12' Offset | Suggested Maximum Spacing of Channelizing Devices On a Taper | On a Tangent | Suggested Longitudinal Buffer Space "B" |
|---|---|---|---|---|---|---|---|
| 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' |

** 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. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

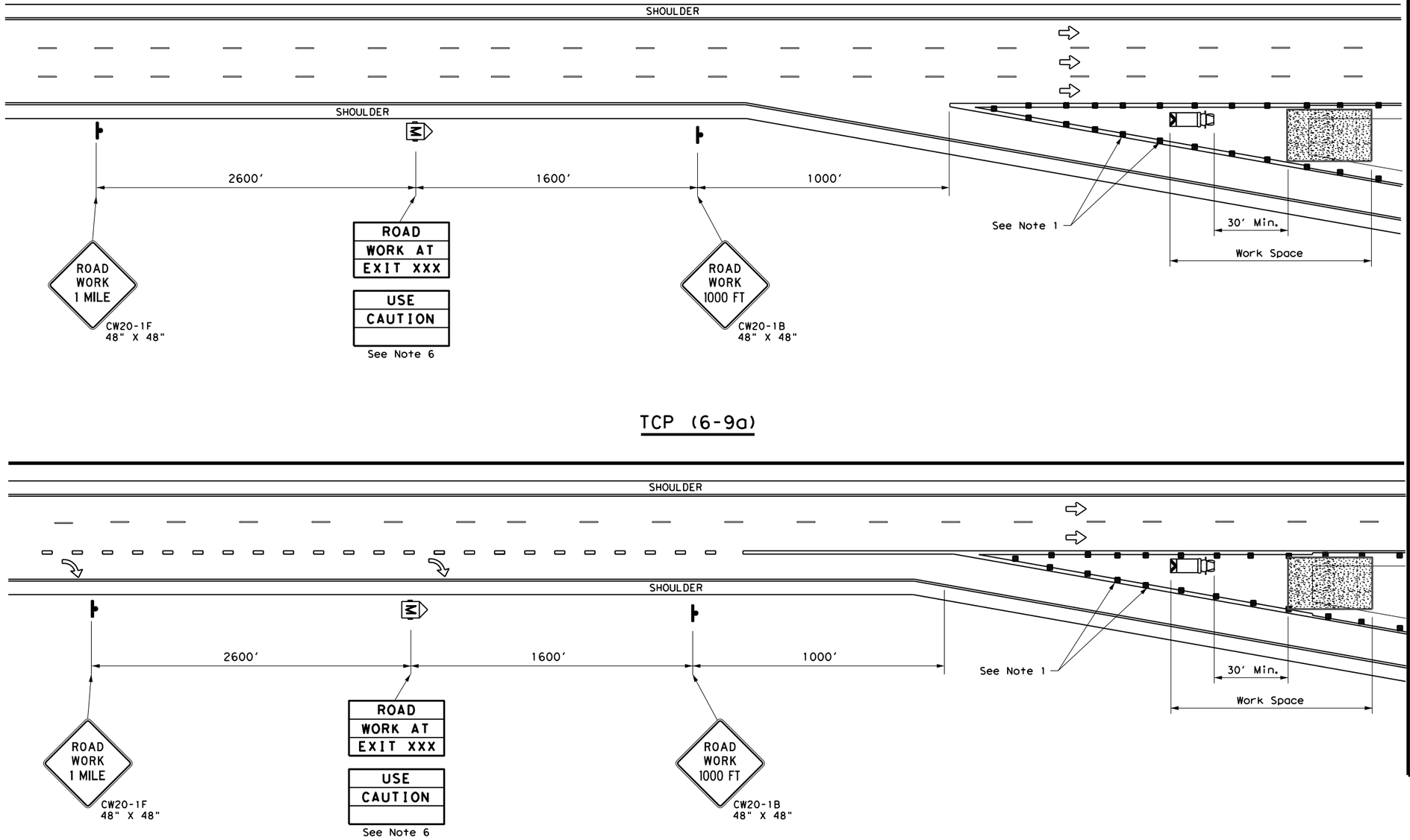
Traffic Operations Division Standard

# WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

## TCP(6-8)-14

| FILE: tcp6-8.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 2014 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 34 |

DATE:
FILE:




TCP (6-9a)




TCP (6-9b)

| LEGEND | | | |
|---|---|---|---|
| | Type 3 Barricade | | Channelizing Devices (CDs) |
| | 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 "L" ** 10' Offset | 11' Offset | 12' Offset | Suggested Maximum Spacing of Channelizing Devices On a Taper | On a Tangent | Suggested Longitudinal Buffer Space "B" |
|---|---|---|---|---|---|---|---|
| 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' |

** 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. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) and TCP(6-8)for traffic control details.
5. Truck mounted attenuators are required.
6. The PCMS may be omitted if replaced with a "ROAD WORK ½ MILE" (CW20-1E).
7. Roadway ADT should be less than 10,000.

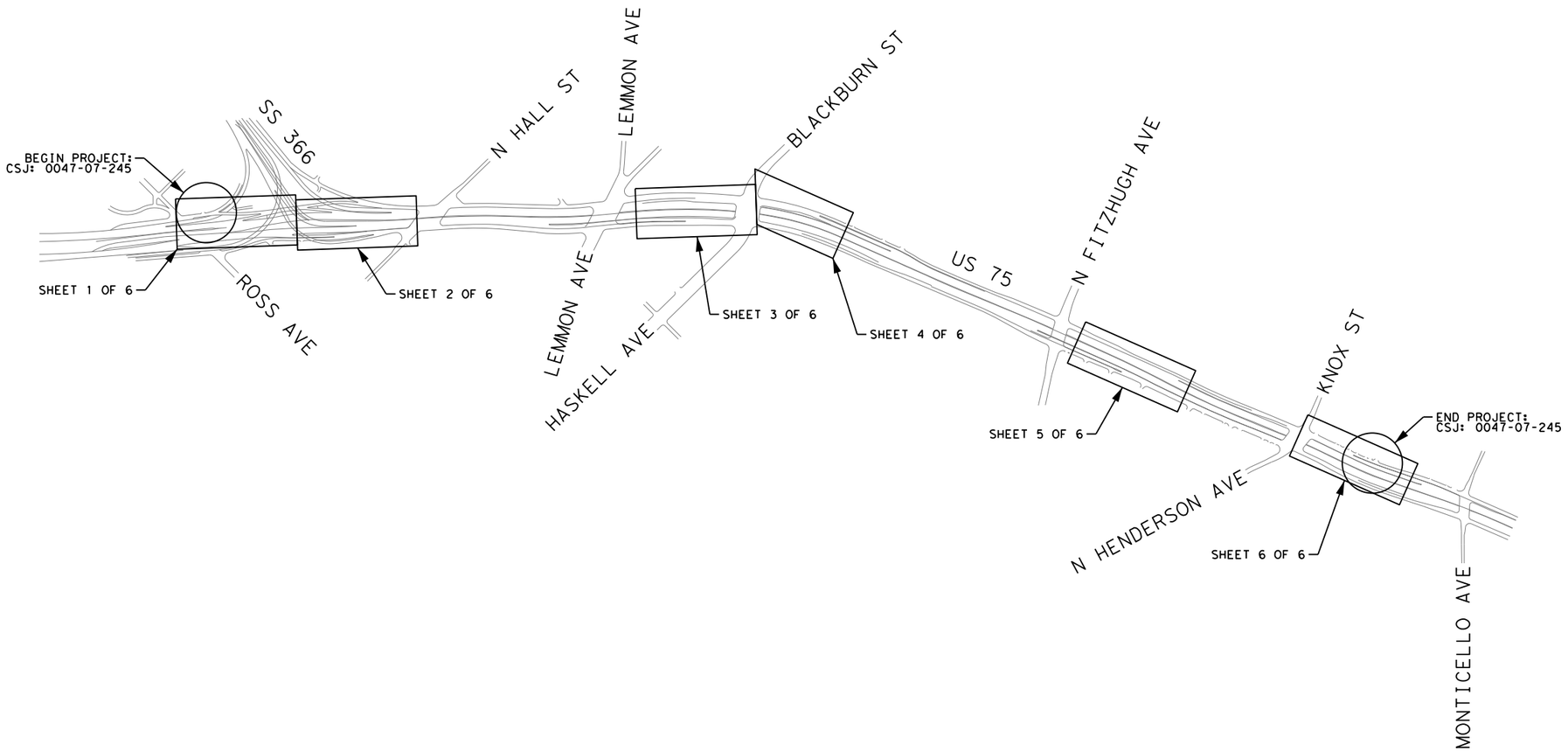
Texas Department of Transportation

Traffic Operations Division Standard

# WORK IN EXIT GORE FOR ADT LESS THAN 10,000

## TCP(6-9)-14

| FILE: tcp6-9.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
|  | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 35 |




STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 0.25 MILE

0.125 0 0.125

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# US 75 WWDS
# PROJECT LAYOUT

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 36 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

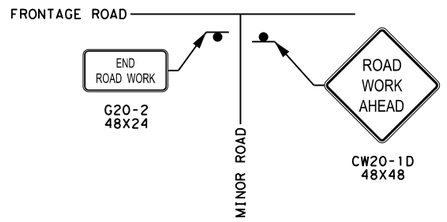
NOTES:

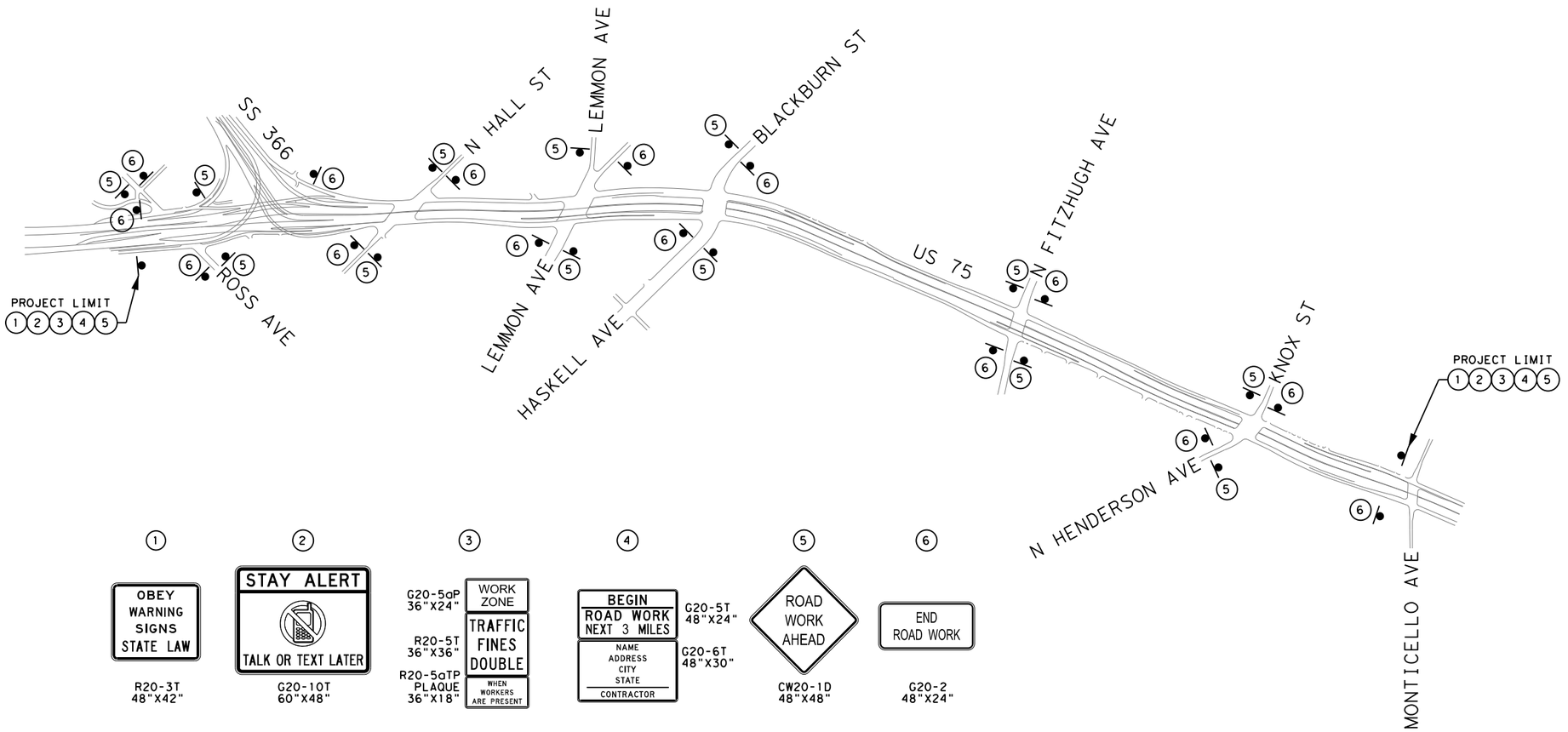
1. TRAFFIC CONTROL SHALL BE HANDLED BY DAILY SIGNING DEPENDING UPON EACH WORK LOCATION OR AS DIRECTED BY THE ENGINEER.
2. CW20-1D (48X48) AND G20-2 (48X24) SHALL BE PLACED AT ALL ACCESS POINTS TO/FROM THE ACTIVE CONSTRUCTION SITE (FOR EXAMPLE, ALL INTERSECTION ROAD APPROACHES ALLOWING TRAFFIC TO ENTER/EXIT THE WORK ZONE) OR AS DIRECTED BY THE ENGINEER.
3. DUPLICATE SIGNS SHALL BE ERECTED ON BOTH THE INSIDE AND THE OUTSIDE SHOULDERS OF THE FREEWAY OR AS DIRECTED BY THE ENGINEER.
4. ALL SIGN PLACEMENT SHALL BE IN ACCORDANCE WITH BC AND TCP STANDARD PLAN SHEETS.

LEGEND

WORK ZONE SIGN

ADVANCE WORK ZONE SIGNING FOR INTERSECTING ROAD APPROACH








02/23/2024

SCALE: 1" = 0.25 MILE

0.125 0 0.125

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |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HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


Texas Department of Transportation



# US 75 WWDS TCP LAYOUT

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 37 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

| CONDUIT AND CABLE RUNS | | | | | | | |
|---|---|---|---|---|---|---|---|
| RUN | RUN LENGTH (FT) | CONDUIT STATUS | CONDUIT | | ELECTRICAL | | |
| | | | 0618 6023 | 0618 6047 | 0620 6007 | 0620 6008 | 6414 * |
| | | | CONDT (PVC) (SCHD 40) (2") | CONDT (PVC) (SCHD 80) (2") (BORE) | ELEC CONDR (NO. 8) BARE | ELEC CONDR (NO. 8) INSULATED | ETHERNET CABLE AND CONNECTIONS |
| WW1 | 5 | PROP | | | 1 | 2 | 2 |
| 1A | 16 | PROP | 1 | | 1 | 4 | 1 |
| WW2 | 5 | PROP | | | 1 | 4 | 1 |
| 1B | 18 | PROP | 1 | | 1 | 2 | 1 |
| 1C | 48 | PROP | | 1 | 1 | 2 | 1 |
| 1D | 29 | PROP | 1 | | 1 | 2 | 1 |
| WW3 | 5 | PROP | | | 1 | 2 | 1 |

EXISTING SIGNS TO REMAIN

S01, S02, S07, S08

S09, S10

S12

S05, S06

S11

EXISTING SIGNS TO BE REMOVED (SIGN ONLY)

S03, S04

PROPOSED SIGNS

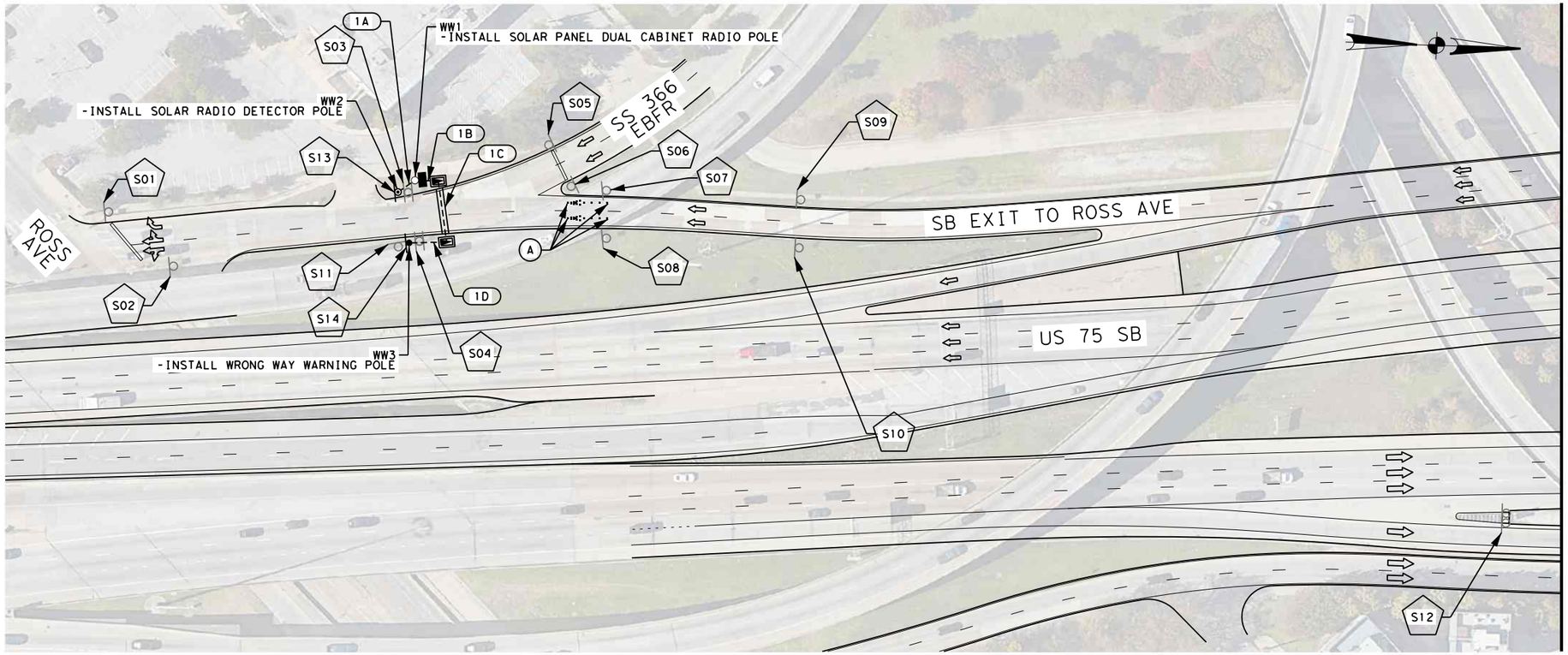
S13, S14

| ESTIMATED QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | CODE | DESCRIPTION | UNIT | TOTAL |
| 618 | 6023 | CONDT (PVC) (SCH 40) (2") | LF | 70 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 55 |
| 620 | 6007 | ELEC CONDR (NO. 8) BARE | LF | 135 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 310 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 2 |
| 644 | 6078 | REMOVE SM RD SN SUP&AM (SIGN ONLY) | EA | 2 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 28 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 28 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 3 |
| | & | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 18 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| | * | NEMA 3R ENCLOSURE | EA | 1 |
| | * | THERMAL DETECTOR | EA | 2 |
| | * | WHITE LED ILLUMINATOR | EA | 2 |
| | * | HIGH RESOLUTION CAMERA | EA | 2 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 1 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 1 |

& SUBSIDIARY TO ITEM 687.
* SUBSIDIARY TO ITEM 6414.

LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING ELECTRICAL SERVICE CENTER
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED PED POLE WITH WWD SENSORS
- PROPOSED PED POLE WITH SOLAR PANELS
- PROPOSED ITS POLE MNT CAB (TY 1)(CONF 2)
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL
- A REFL PAV MRKR TY II-C-R




MATCH LINE - A-A

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER
02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

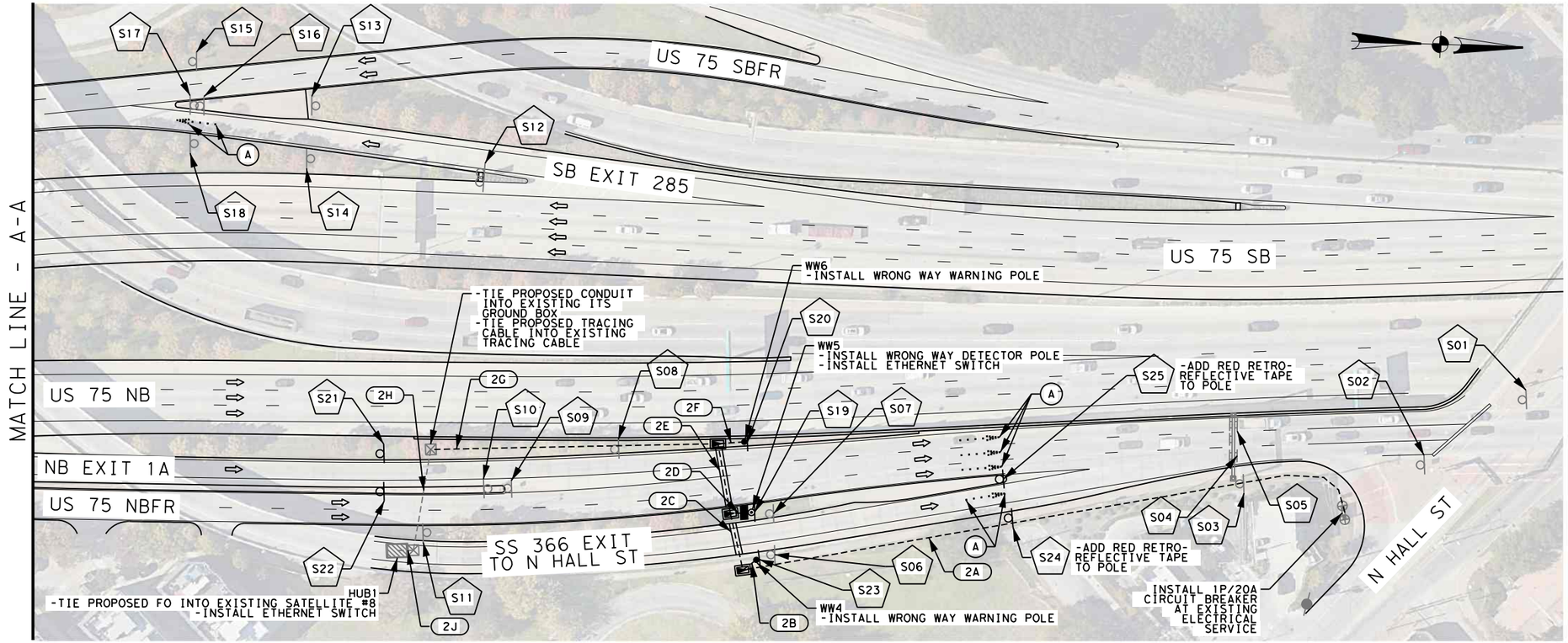

Texas Department of Transportation



# US 75 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 1 OF 6)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 38 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |



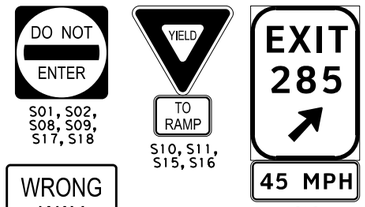

## LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING ELECTRICAL SERVICE CENTER
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED PED POLE WITH WWD SENSORS
- PROPOSED PED POLE WITH SOLAR PANELS
- PROPOSED ITS POLE MNT CAB (TY 1)(CONF 2)
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL
- (A) REFL PAV MRKR TY II-C-R

NOTE:

1. FIBER SLACK IS INCLUDED IN ESTIMATED QUANTITIES (100' PER CABLE PER SPLICE, 25' PER CABLE PER GROUND BOX WITHOUT A SPLICE, AND 25' PER CABLE PER POLE).

### EXISTING SIGNS TO REMAIN




S01, S02, S08, S09, S17, S18 — S10, S11, S15, S16 — S12 — S03, S04, S05, S13, S14

### EXISTING SIGNS TO BE REMOVED


S06, S07

### PROPOSED SIGNS


S19, S20, S23 — S21, S22 — S24, S25

| ESTIMATED QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | CODE | DESCRIPTION | UNIT | TOTAL |
| 618 | 6023 | CONDT (PVC) (SCH 40) (2") | LF | 525 |
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 310 |
| 618 | 6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 165 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 335 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 700 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 1710 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 3 |
| 644 | 6004 | IN SM RD SN SUP&AM TY10BWG(1)SA(T) | EA | 4 |
| | @ | RED RETRO-REFLECTIVE TAPE ON SIGN POST | EA | 2 |
| 644 | 6076 | REMOVE SM RD SN SUP&AM | EA | 2 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 70 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 70 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 3 |
| | & | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 18 |
| 6000 | 6098 | INSTALL CIRCUIT BREAKER | EA | 1 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 620 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 1 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 105 |
| | # | CONCRETE GROUTE FILL AT CONDUIT OPENINGS | EA | 1 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 2 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 3 |
| | * | NEMA 3R ENCLOSURE | EA | 1 |
| | * | THERMAL DETECTOR | EA | 2 |
| | * | WHITE LED ILLUMINATOR | EA | 2 |
| | * | HIGH RESOLUTION CAMERA | EA | 2 |
| | ** | HARDENED ETHERNET SWITCH | EA | 2 |

@ SUBSIDIARY TO ITEM 644.
& SUBSIDIARY TO ITEM 687.
# SUBSIDIARY TO ITEM 6027.
* SUBSIDIARY TO ITEM 6414.
** FURNISHED BY TXDOT. INSTALLED IN EXISTING SATELLITE #8 AND WWD CABINET BY CONTRACTOR.

| CONDUIT AND CABLE RUNS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CONDUIT | | | | FIBER | ELECTRICAL | | |
| RUN | RUN LENGTH (FT) | CONDUIT STATUS | 0618 6023 CONDT (PVC) (SCHD 40) (2") | 0618 6029 CONDT (PVC) (SCHD 40) (3") | 0618 6054 CONDT (PVC) (SCHD 80) (3") (BORE) | EXISTING ITS CONDUIT | 6007 6010 FIBER OPTIC CBL (6 SMF) | 0620 6008 ELEC CONDR (NO. 8) INS TRACER | 0620 6009 ELEC CONDR (NO. 6) BARE | 0620 6010 ELEC CONDR (NO. 6) INSULATED |
| 2A | 496 | PROP | 1 | | | | | | 1 | 2 |
| 2B | 14 | PROP | | 1 | | | | | 1 | 2 |
| WW4 | 5 | PROP | | | | | | | 1 | 2 |
| 2C | 45 | PROP | | | 1 | | | | 1 | 4 |
| 2D | 17 | PROP | | 2 | | | 1 | 1 | 1 | 4 |
| WW5 | 5 | PROP | | | | | 1 | 1 | 1 | 4 |
| 2E | 56 | PROP | | | 2 | | 1 | 1 | 1 | 4 |
| 2F | 21 | PROP | | 1 | | | | | 1 | 4 |
| WW6 | 5 | PROP | | | | | | | 1 | 4 |
| 2G | 226 | PROP | | 1 | | | 1 | 1 | | |
| 2H | 81 | EXIST | | | | 1 | 1 | | | |
| 2J | 13 | EXIST | | | | 1 | 1 | | | |
| HUB1 | 5 | EXIST | | | | | 1 | | | |


02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |

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HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# US 75 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 2 OF 6)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 39 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## CONDUIT AND CABLE RUNS

| RUN | RUN LENGTH (FT) | CONDUIT STATUS | CONDUIT | | EXISTING ITS CONDUIT | FIBER | ELECTRICAL | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 0618 6029 | 0618 6054 | | 6007 6010 | 0620 6008 | 0620 6009 | 0620 6010 |
| | | | CONDT (PVC) (SCHD 40) (3") | CONDT (PVC) (SCHD 80) (3") (BORE) | | FIBER OPTIC CBL (6 SMF) | ELEC CONDR (NO. 8) INS TRACER | ELEC CONDR (NO. 6) BARE | ELEC CONDR (NO. 6) INSULATED |
| 3D | 82 | EXIST | | | 1 | 1 | | 1 | 2 |
| 3E | 268 | EXIST | | | 1 | 1 | | 1 | 2 |
| 3F | 60 | EXIST | | | 1 | 1 | | 1 | 2 |
| 3G | 11 | EXIST | | | 1 | 1 | | 1 | 2 |
| 3H | 98 | PROP | 2 | | | 1 | 1 | 1 | 2 |
| 3J | 92 | PROP | | 2 | | 1 | 1 | 1 | 2 |
| 3K | 14 | PROP | 2 | | | 1 | 1 | 1 | 2 |
| WW7 | 5 | PROP | | | | 1 | 1 | 1 | 2 |

## ESTIMATED QUANTITIES

| ITEM | CODE | DESCRIPTION | UNIT | TOTAL |
|---|---|---|---|---|
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 240 |
| 618 | 6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 195 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 230 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 665 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 1325 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 2 |
| 644 | 6004 | IN SM RD SN SUP&AM TY10BWG(1)SA(T) | EA | 1 |
| 644 | 6030 | IN SM RD SN SUP&AM TYS80(1)SA(T) | EA | 1 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 28 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 28 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 1 |
| | & | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 6 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 870 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 1 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 465 |
| | # | CONCRETE GROUTE FILL AT CONDUIT OPENINGS | EA | 1 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 4 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 1 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| | * | NEMA 3R ENCLOSURE | EA | 1 |
| | * | THERMAL DETECTOR | EA | 2 |
| | * | WHITE LED ILLUMINATOR | EA | 2 |
| | * | HIGH RESOLUTION CAMERA | EA | 2 |
| | ** | HARDENED ETHERNET SWITCH | EA | 1 |

& SUBSIDIARY TO ITEM 687.
# SUBSIDIARY TO ITEM 6027.
* SUBSIDIARY TO ITEM 6414.
** FURNISHED BY TXDOT. INSTALLED IN WWD CABINET BY CONTRACTOR.

### EXISTING SIGNS TO REMAIN

S01, S02, S06, S07

S03, S04, S05, S09

S08

### PROPOSED SIGNS

S10, S11

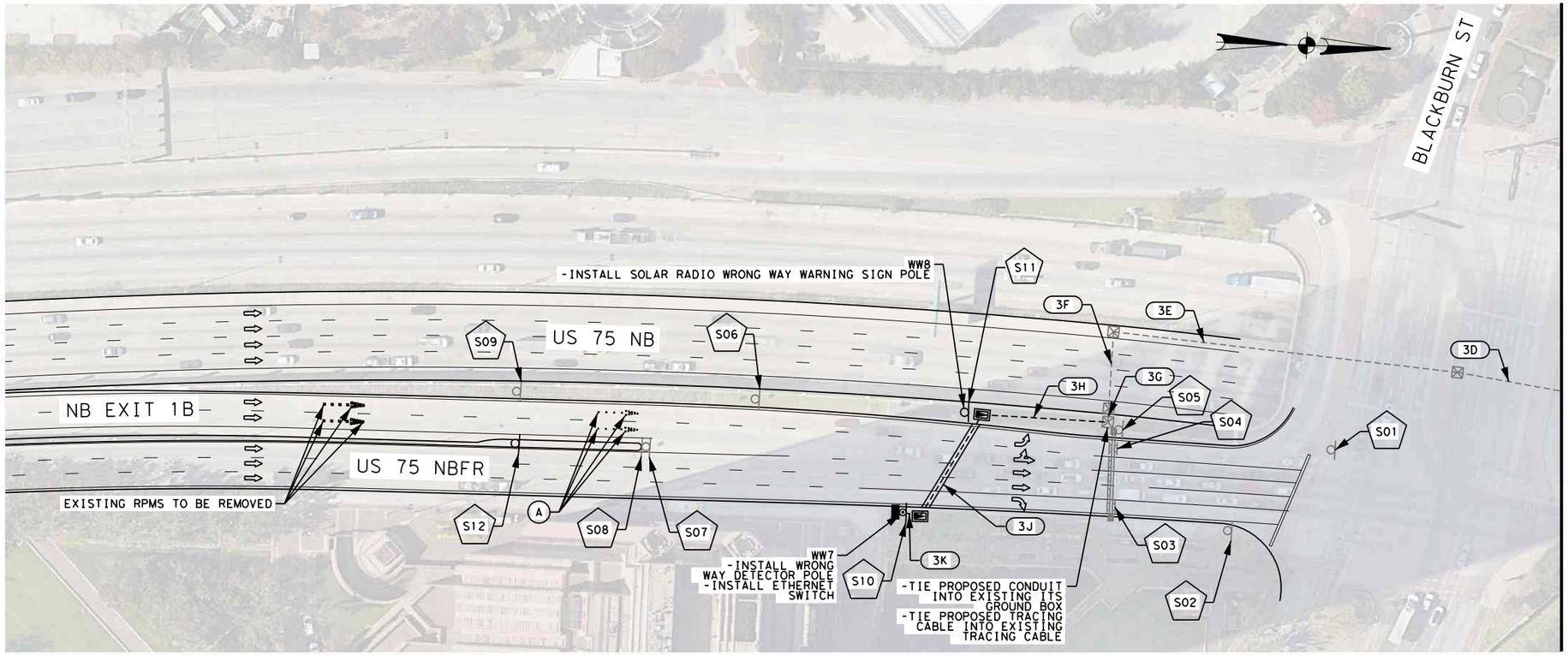
S12

### LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING ELECTRICAL SERVICE CENTER
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED PED POLE WITH WWD SENSORS
- PROPOSED PED POLE WITH SOLAR PANELS
- PROPOSED ITS POLE MNT CAB (TY 1)(CONF 2)
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL
- (A) REFL PAV MRKR TY II-C-R

NOTE:

1. FIBER SLACK IS INCLUDED IN ESTIMATED QUANTITIES (100' PER CABLE PER SPLICE, 25' PER CABLE PER GROUND BOX WITHOUT A SPLICE, AND 25' PER CABLE PER POLE).




STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED PROFESSIONAL ENGINEER
02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
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832.399.1100
TEXAS PE FIRM REG # F-18726

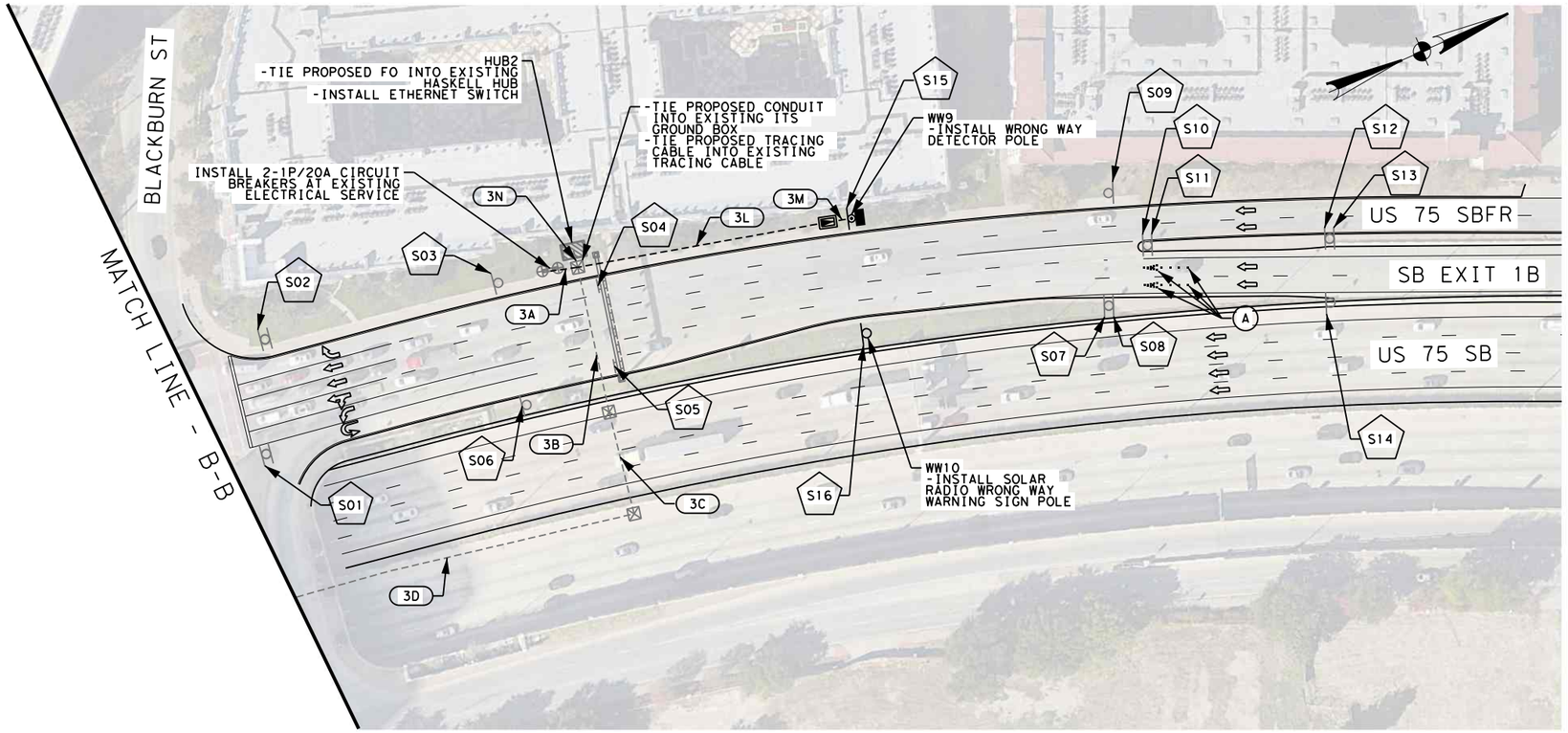

Texas Department of Transportation



# US 75 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 3 OF 6)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 40 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |



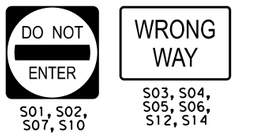

LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING ELECTRICAL SERVICE CENTER
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED PED POLE WITH WWD SENSORS
- PROPOSED PED POLE WITH SOLAR PANELS
- PROPOSED ITS POLE MNT CAB (TY 1)(CONF 2)
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL
- A REFL PAV MRKR TY II-C-R

NOTE:

1. FIBER SLACK IS INCLUDED IN ESTIMATED QUANTITIES (100' PER CABLE PER SPLICE, 25' PER CABLE PER GROUND BOX WITHOUT A SPLICE, AND 25' PER CABLE PER POLE).

EXISTING SIGNS TO REMAIN




S01, S02, S07, S10 — S03, S04, S05, S06, S12, S14 — S08, S09, S11 — S13

PROPOSED SIGNS


S15, S16

CONDUIT AND CABLE RUNS

| RUN | RUN LENGTH (FT) | CONDUIT STATUS | CONDUIT 0618 6023 CONDT (PVC) (SCHD 40) (2") | CONDUIT 0618 6029 CONDT (PVC) (SCHD 40) (3") | EXISTING ITS CONDUIT | FIBER 6007 6010 FIBER OPTIC CBL (6 SMF) | COMM 6004 6031 ITS COM CBL (ETHERNET) | ELECTRICAL 0620 6008 ELEC CONDR (NO. 8) INS TRACER | ELECTRICAL 0620 6007 ELEC CONDR (NO. 8) BARE | ELECTRICAL 0620 6008 ELEC CONDR (NO. 8) INSULATED | ELECTRICAL 0620 6009 ELEC CONDR (NO. 6) BARE | ELECTRICAL 0620 6010 ELEC CONDR (NO. 6) INSULATED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3A | 19 | PROP | 2 | | | | | | 1 | 2 | 1 | 2 |
| 3B | 103 | EXIST | | | 1 | 1 | | | | | 1 | 2 |
| 3C | 73 | EXIST | | | 1 | 1 | | | | | 1 | 2 |
| 3D | 241 | EXIST | | | 1 | 1 | | | | | 1 | 2 |
| 3L | 176 | PROP | | 2 | | | 1 | 1 | 1 | 2 | | |
| 3M | 17 | PROP | | 2 | | | 1 | 1 | 1 | 2 | | |
| WW9 | 5 | PROP | | | | | 1 | 1 | 1 | 2 | | |
| 3N | 12 | EXIST | | | 1 | 1 | 1 | | | | | |
| HUB2 | 5 | EXIST | | | | 1 | 1 | | | | | |

ESTIMATED QUANTITIES

| ITEM | CODE | DESCRIPTION | UNIT | TOTAL |
|---|---|---|---|---|
| 618 | 6023 | CONDT (PVC) (SCH 40) (2") | LF | 40 |
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 410 |
| 620 | 6007 | ELEC CONDR (NO. 8) BARE | LF | 230 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 675 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 460 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 920 |
| 624 | 6010 | GROUND BOX TY D (162922) W/APRON | EA | 1 |
| 644 | 6030 | IN SM RD SN SUP&AM TYS80(1)SA(T) | EA | 1 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 28 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 28 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 1 |
| | & | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 6 |
| 6000 | 6098 | INSTALL CIRCUIT BREAKER | EA | 2 |
| 6004 | 6031 | ITS COM CBL (ETHERNET) | LF | 240 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE) (6 FIBER) | LF | 605 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 475 |
| | # | CONCRETE GROUTE FILL AT CONDUIT OPENINGS | EA | 1 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 3 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 1 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| | * | NEMA 3R ENCLOSURE | EA | 1 |
| | * | THERMAL DETECTOR | EA | 2 |
| | * | WHITE LED ILLUMINATOR | EA | 2 |
| | * | HIGH RESOLUTION CAMERA | EA | 2 |
| | ** | HARDENED ETHERNET SWITCH | EA | 1 |

& SUBSIDIARY TO ITEM 687.
# SUBSIDIARY TO ITEM 6027.
* SUBSIDIARY TO ITEM 6414.
** FURNISHED BY TXDOT. INSTALLED IN WWD CABINET BY CONTRACTOR.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
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Texas Department of Transportation



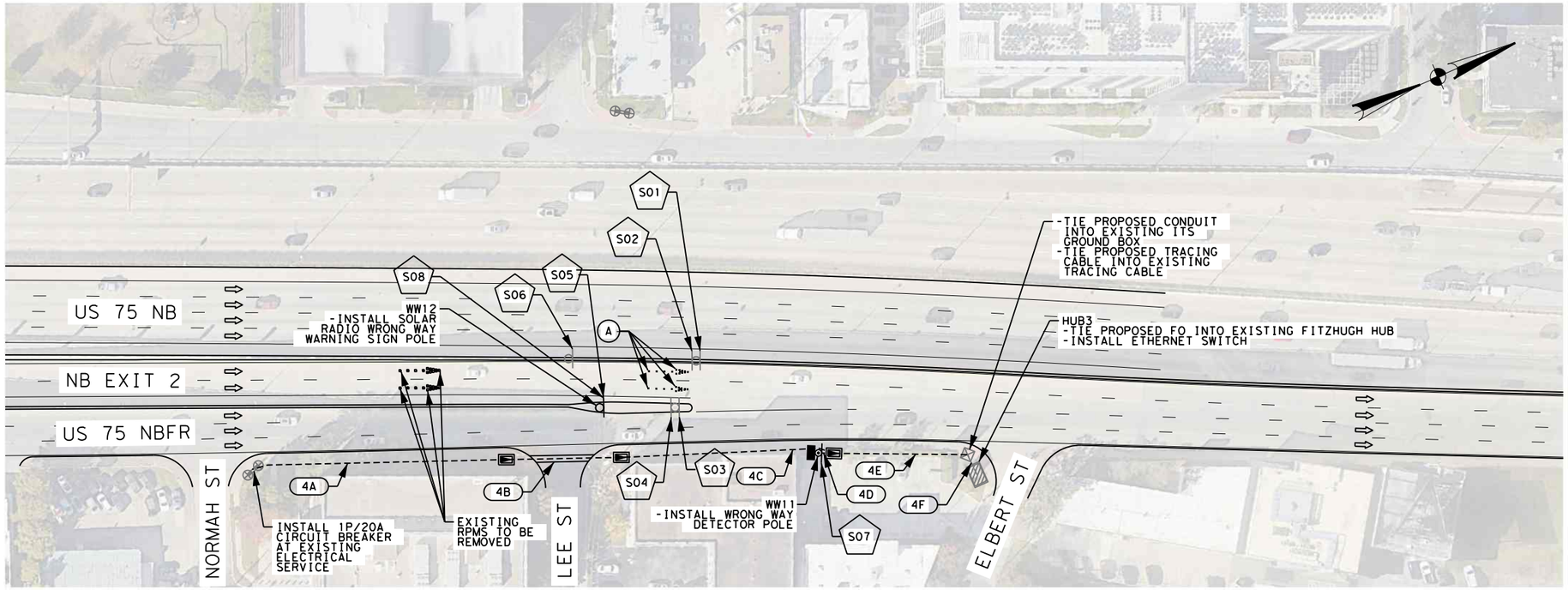
# US 75 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 4 OF 6)

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 41 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




## LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING ELECTRICAL SERVICE CENTER
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED PED POLE WITH WWD SENSORS
- PROPOSED PED POLE WITH SOLAR PANELS
- PROPOSED ITS POLE MNT CAB (TY 1)(CONF 2)
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- TRAFFIC FLOW
- S## — SIGN LABEL
- ## — CONDUIT RUN LABEL
- A — REFL PAV MRKR TY II-C-R

## EXISTING SIGNS TO REMAIN


S01, S03 | S02, S04 | S06

## EXISTING SIGNS TO BE REMOVED


S05

## PROPOSED SIGNS


S07, S08

| CONDUIT AND CABLE RUNS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CONDUIT | | | | COMM | ELECTRICAL | | |
| RUN | RUN LENGTH (FT) | CONDUIT STATUS | 0618 6023 CONDT (PVC) (SCHD 40) (2") | 0618 6029 CONDT (PVC) (SCHD 40) (3") | 0618 6047 CONDT (PVC) (SCHD 80) (2") (BORE) | EXISTING ITS CONDUIT | 6004 6031 ITS COM CBL (ETHERNET) | 0620 6008 ELEC CONDR (NO. 8) INS TRACER | 0620 6007 ELEC CONDR (NO. 8) BARE | 0620 6008 ELEC CONDR (NO. 8) INSULATED |
| 4A | 200 | PROP | 1 | | | | | | 1 | 2 |
| 4B | 89 | PROP | | | 1 | | | | 1 | 2 |
| 4C | 165 | PROP | 1 | | | | | | 1 | 2 |
| 4D | 12 | PROP | | 2 | | | 1 | 1 | 1 | 2 |
| WW11 | 5 | PROP | | | | | 1 | 1 | 1 | 2 |
| 4E | 103 | PROP | | 1 | | | 1 | 1 | | |
| 4F | 17 | EXIST | | | | 1 | 1 | | | |
| HUB3 | 5 | EXIST | | | | | 1 | | | |

| ESTIMATED QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | CODE | DESCRIPTION | UNIT | TOTAL |
| 618 | 6023 | CONDT (PVC) (SCH 40) (2") | LF | 385 |
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 135 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 95 |
| 620 | 6007 | ELEC CONDR (NO. 8) BARE | LF | 495 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 1125 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 3 |
| 644 | 6030 | IN SM RD SN SUP&AM TYS80(1)SA(T) | EA | 1 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 28 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 28 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 1 |
| | & | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 6 |
| 6000 | 6098 | INSTALL CIRCUIT BREAKER | EA | 1 |
| 6004 | 6031 | ITS COM CBL (ETHERNET) | LF | 160 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 20 |
| | # | CONCRETE GROUTE FILL AT CONDUIT OPENINGS | EA | 1 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 1 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| | * | NEMA 3R ENCLOSURE | EA | 1 |
| | * | THERMAL DETECTOR | EA | 2 |
| | * | WHITE LED ILLUMINATOR | EA | 2 |
| | * | HIGH RESOLUTION CAMERA | EA | 2 |
| | ** | HARDENED ETHERNET SWITCH | EA | 1 |

& SUBSIDIARY TO ITEM 687.
# SUBSIDIARY TO ITEM 6027.
* SUBSIDIARY TO ITEM 6414.
** FURNISHED BY TXDOT. INSTALLED IN EXISTING FITZHUGH HUB AND WWD CABINET BY CONTRACTOR.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 100'
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| NO. | DATE | REVISION | APPROV. |
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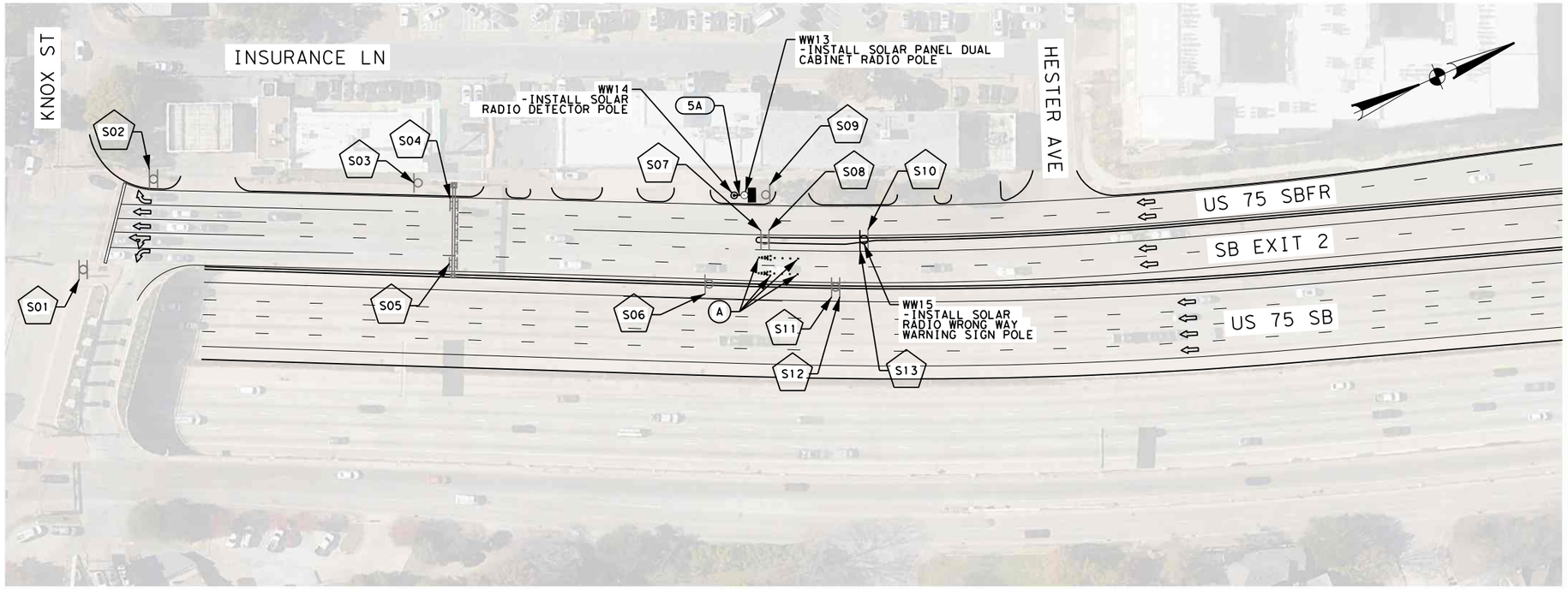
Texas Department of Transportation



# US 75 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 5 OF 6)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 42 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING ELECTRICAL SERVICE CENTER
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED PED POLE WITH WWD SENSORS
- PROPOSED PED POLE WITH SOLAR PANELS
- PROPOSED ITS POLE MNT CAB (TY 1)(CONF 2)
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL
- A REFL PAV MRKR TY II-C-R

NOTE:

1. EXISTING S10 SIGN POST TO BE REMOVED AND SIGN TO BE REUSED. INSTALL EXISTING SIGN (SIGN ONLY) ON PROPOSED WW15 SIGN POST, AS SHOWN.

EXISTING SIGNS
TO REMAIN


S01, S02, S06, S07


S03, S04, S05, S11


S08, S09, S12

EXISTING SIGNS
TO BE REUSED

S10
(SEE NOTE 1)

PROPOSED SIGNS


S13

| CONDUIT AND CABLE RUNS | | | | | | |
|---|---|---|---|---|---|---|
| RUN | RUN LENGTH (FT) | CONDUIT STATUS | CONDUIT | ELECTRICAL | | |
| | | | 0618 6023 | 0620 6007 | 0620 6008 | 6414 * |
| | | | CONDT (PVC) (SCHD 40) (2") | ELEC CONDR (NO. 8) BARE | ELEC CONDR (NO. 8) INSULATED | ETHERNET CABLE AND CONNECTIONS |
| WW13 | 5 | PROP | | 1 | 2 | 2 |
| 5A | 8 | PROP | 2 | 1 | 4 | 1 |
| WW14 | 5 | PROP | | 1 | 4 | 1 |

| ESTIMATED QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | CODE | DESCRIPTION | UNIT | TOTAL |
| 618 | 6023 | CONDT (PVC) (SCH 40) (2") | LF | 20 |
| 620 | 6007 | ELEC CONDR (NO. 8) BARE | LF | 20 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 70 |
| 644 | 6030 | IN SM RD SN SUP&AM TYS80(1)SA(T) | EA | 1 |
| 644 | 6067 | IN SM RD SN SUP&AM (INST SIGN ONLY) | EA | 1 |
| 644 | 6076 | REMOVE SM RD SN SUP&AM | EA | 1 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 28 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 28 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 2 |
| | & | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 12 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 1 |
| | * | NEMA 3R ENCLOSURE | EA | 1 |
| | * | THERMAL DETECTOR | EA | 2 |
| | * | WHITE LED ILLUMINATOR | EA | 2 |
| | * | HIGH RESOLUTION CAMERA | EA | 2 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 1 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 1 |

& SUBSIDIARY TO ITEM 687.
* SUBSIDIARY TO ITEM 6414.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# US 75 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 6 OF 6)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 43 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## LEGEND

FOC = FIBER OPTIC CABLE

FO = FIBER OPTIC

SM = SINGLE-MODE

PPP = PRETERMINATED PATCH PANEL

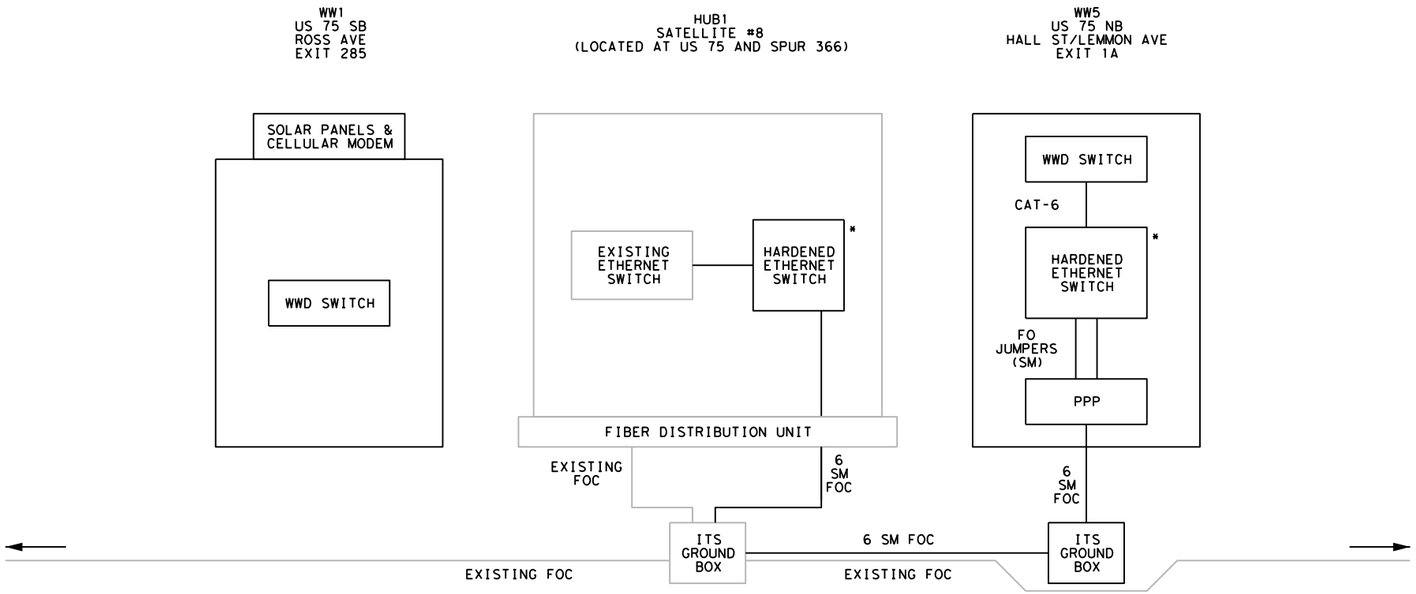
WWD = WRONG WAY DETECTION

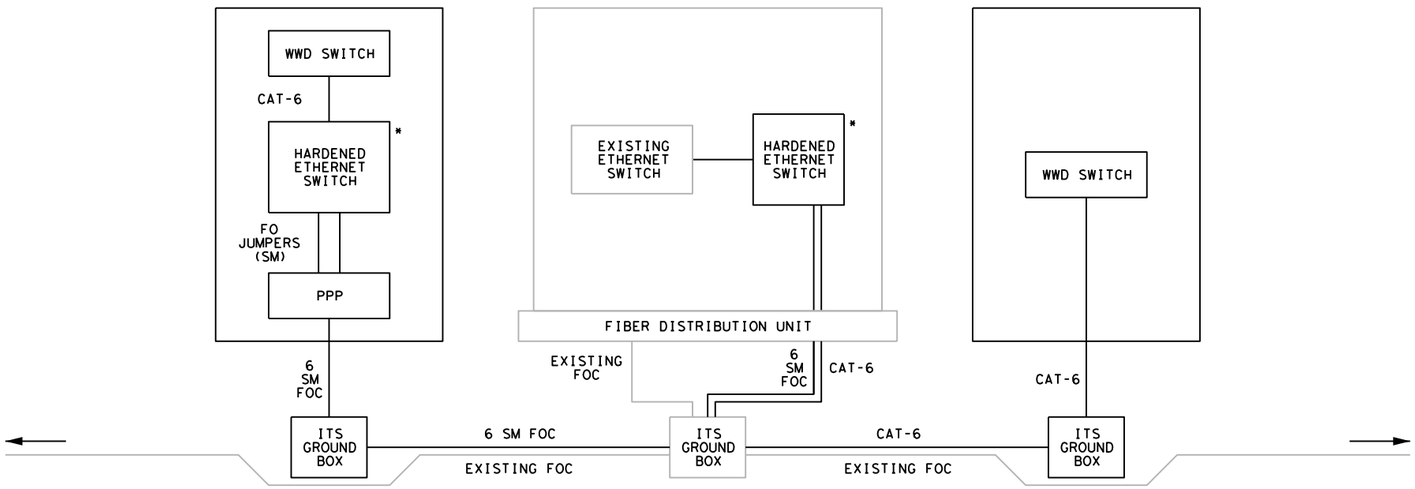
EXISTING

PROPOSED

* PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

NOTE:
SOME REQUIRED EQUIPMENT IS OMITTED FROM DIAGRAM FOR CLARITY.




STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED PROFESSIONAL ENGINEER
02/23/2024

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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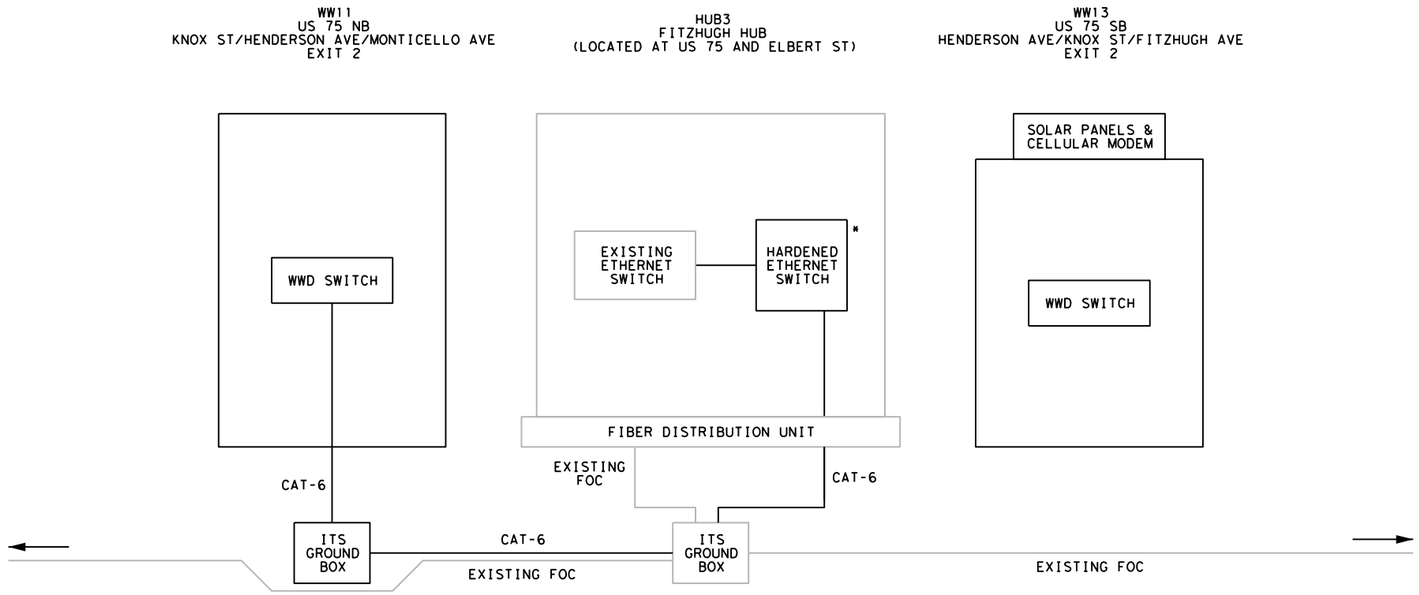
Texas Department of Transportation



# US 75 WWDS TMS SCHEMATIC

(SHEET 1 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 44 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

FOC = FIBER OPTIC CABLE

FO = FIBER OPTIC

SM = SINGLE-MODE

PPP = PRETERMINATED PATCH PANEL

WWD = WRONG WAY DETECTION

EXISTING

PROPOSED

* PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

NOTE:
SOME REQUIRED EQUIPMENT IS OMITTED FROM DIAGRAM FOR CLARITY.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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832.399.1100
TEXAS PE FIRM REG # F-18726

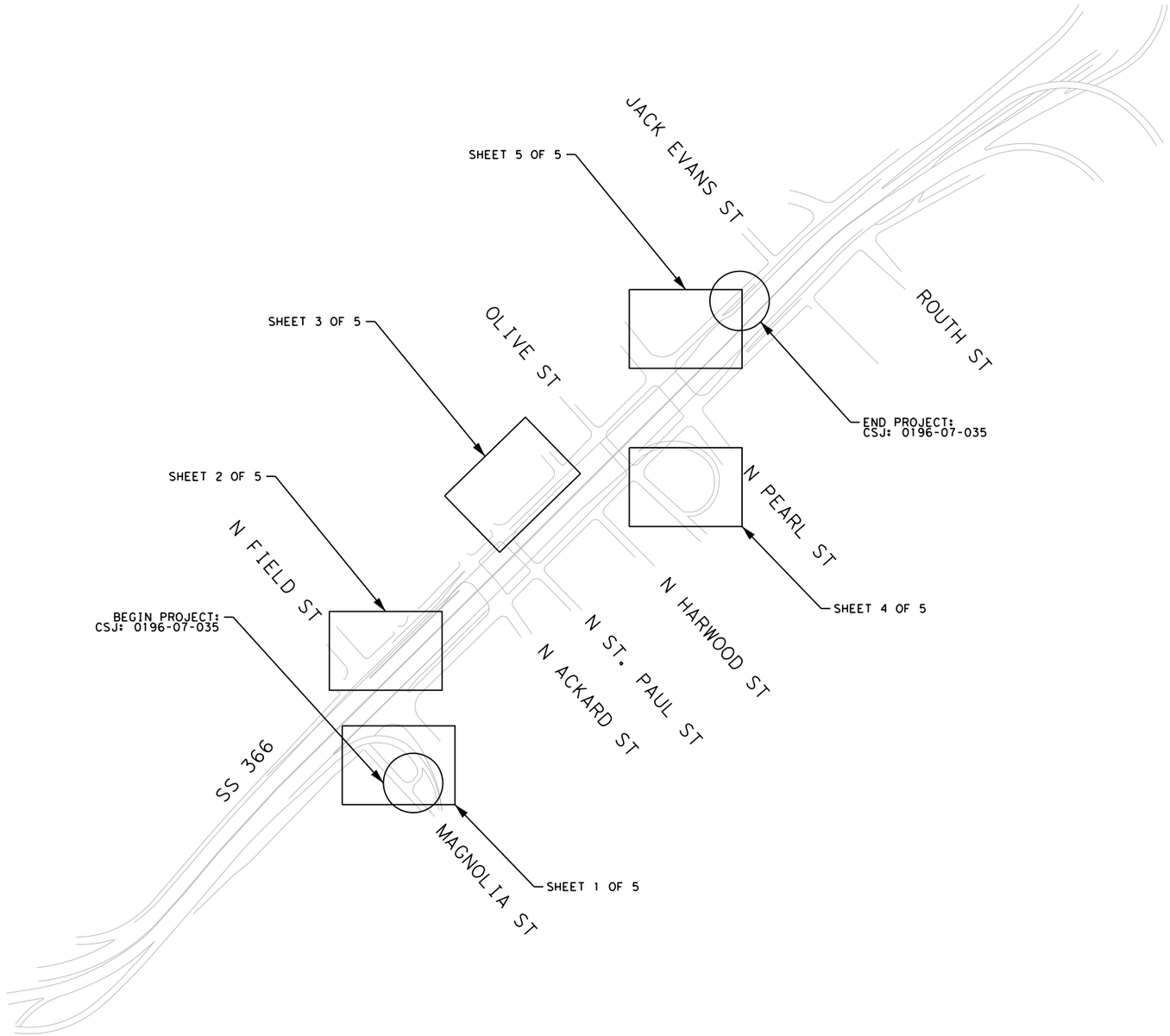
Texas Department of Transportation



# US 75 WWDS
# TMS
# SCHEMATIC

(SHEET 2 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 45 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 0.50 MILE

.25 0 .25

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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TRAF·IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# SS 366 WWDS
# PROJECT LAYOUT

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 46 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 20 |
| 620 | 6007 | ELEC CONDR (NO.8) BARE | LF | 20 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 40 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 1 |
| 644 | 6004 | IN SM RD SN SUP&AM TY10BWG(1)SA(T) | EA | 2 |
| *** | | RED RETROREFLECTIVE TAPE ON SIGN POST | EA | 2 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 28 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 28 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 3 |
| ** | | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 18 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| * | | NEMA 3R ENCLOSURE | EA | 2 |
| * | | THERMAL DETECTOR | EA | 2 |
| * | | WHITE LED ILLUMINATOR | EA | 2 |
| * | | HIGH RESOLUTION CAMERA | EA | 2 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 1 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 1 |

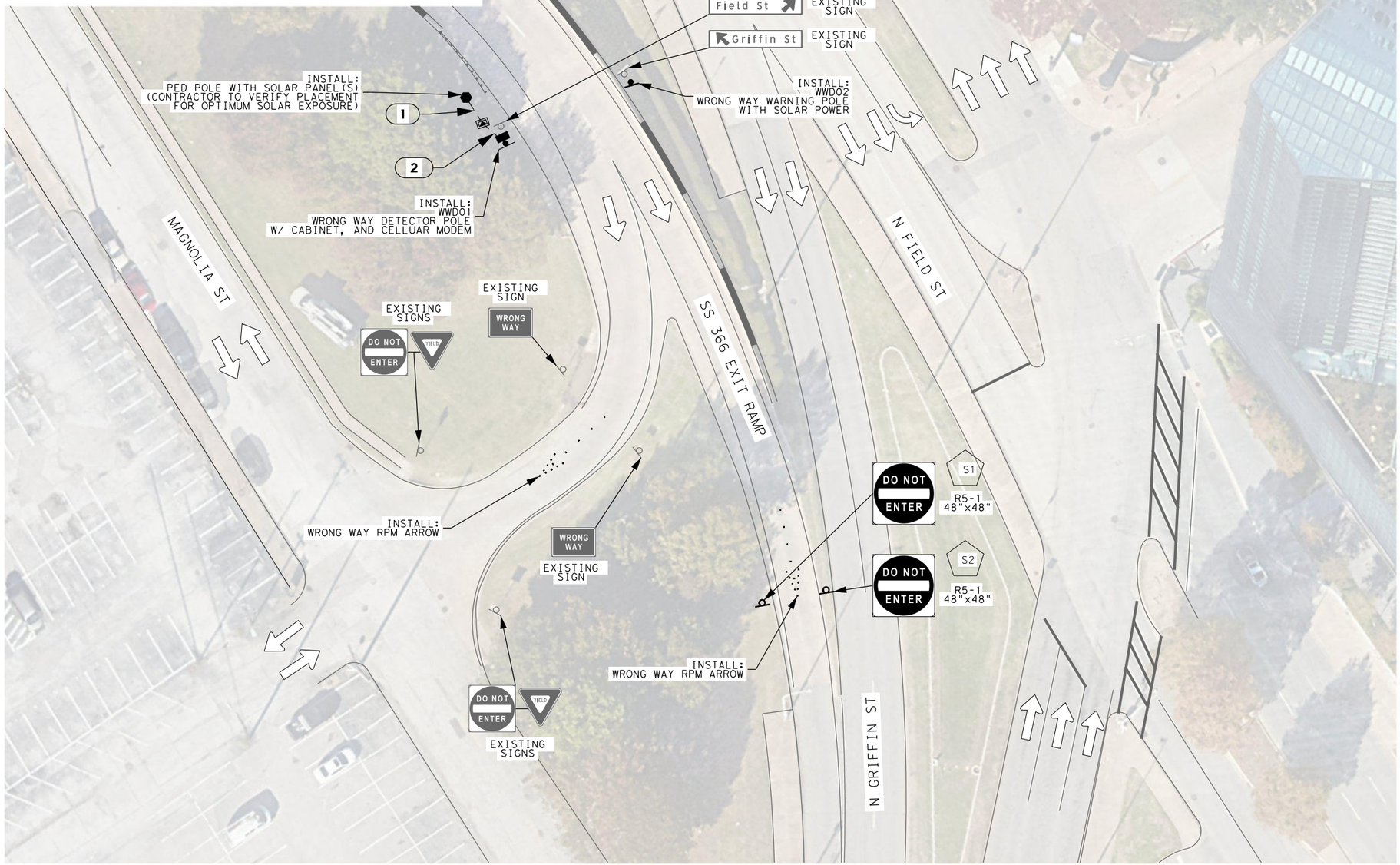
*SUBSIDIARY TO WIRELESS WWD SYSTEM

**SUBSIDIARY TO PED POLE ASSEMBLY

***SUBSIDIARY TO SMALL SIGN ASSEMBLY

## CONDUIT AND CABLE CHART
### WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 | | CABLE STATUS | ITEM 620 | | | | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 80) (2") | | | ELEC CONDR (NO. 8) BARE | | ELEC CONDR (NO. 8) INSULATED | | | |
| | | QTY | LF | | Qty | LF | Qty | LF | | |
| 1 | I | 1 | 10 | I | 1 | 10 | 2 | 20 | 10 | 1 |
| 2 | I | 1 | 10 | I | 1 | 10 | 2 | 20 | 10 | 2 |
| TOTALS | | | 20 | | | 20 | | 40 | | |




## LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING POWER POLE
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED WW DETECTOR POLE
- PROPOSED GROUND BOX TY D
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED ITS GROUND BOX TY 1
- PROPOSED ITS GROUND BOX TY 1 W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- PROPOSED REMOTE SOLAR POLE
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL

NOTES:
1. RAMP WRONG WAY PAVEMENT MARKINGS SHALL BE APPLIED PER TXDOT STANDARDS

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 40'
20 0 20

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |


OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


Texas Department of Transportation



# SS 366 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 1 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 47 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## SHEET SUMMARY

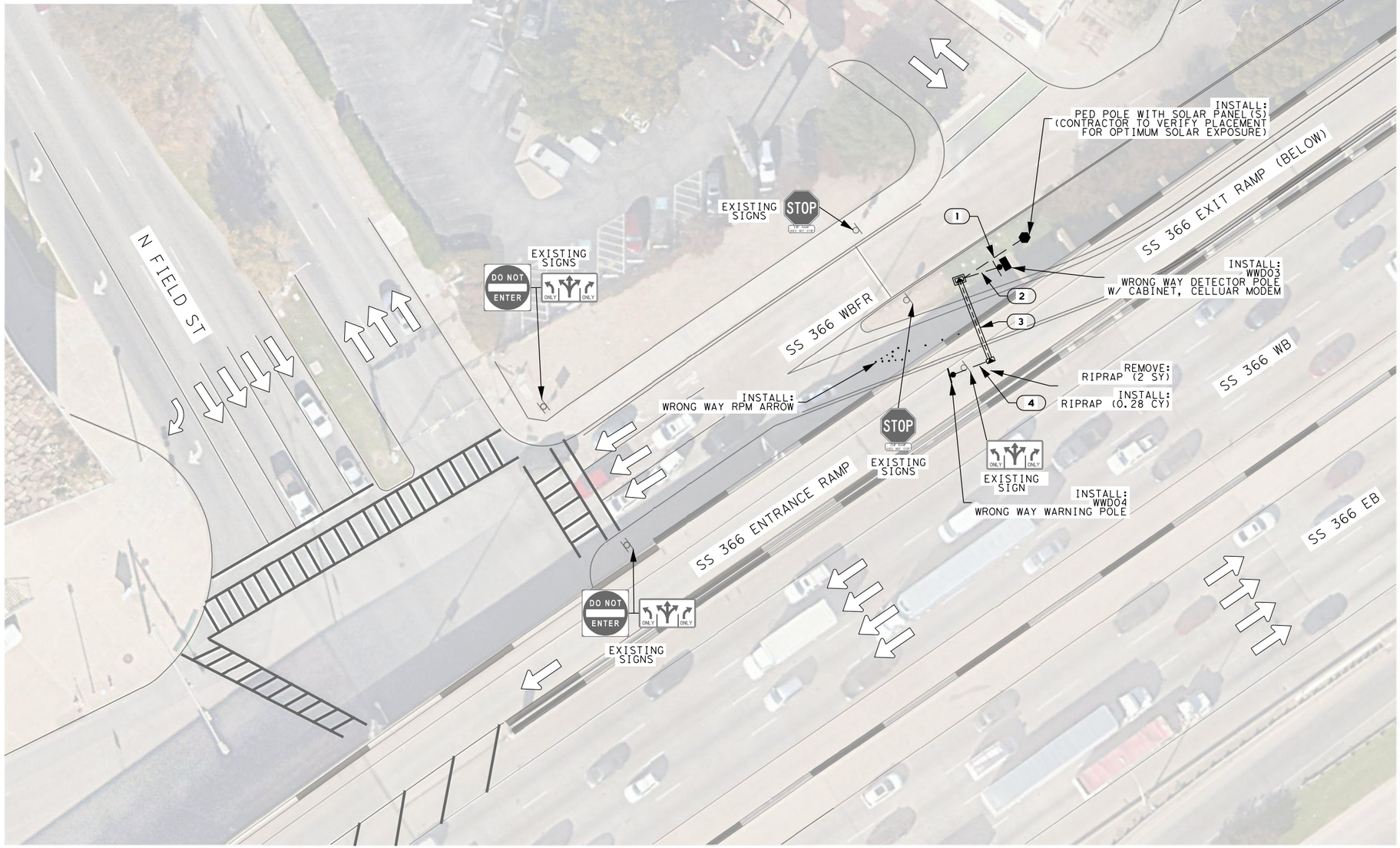
| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 104 | 6009 | REMOVING CONC (RIPRAP) | SY | 2 |
| 432 | 6002 | RIPRAP (CONC)(5 IN) | CY | 0.28 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 55 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 75 |
| 620 | 6007 | ELEC CONDR (NO.8) BARE | LF | 150 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 300 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 2 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 14 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 14 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 3 |
| ** | | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 18 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| * | | NEMA 3R ENCLOSURE | EA | 2 |
| * | | THERMAL DETECTOR | EA | 2 |
| * | | WHITE LED ILLUMINATOR | EA | 2 |
| * | | HIGH RESOLUTION CAMERA | EA | 2 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 1 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 1 |

*SUBSIDIARY TO WIRELESS WWD SYSTEM

**SUBSIDIARY TO PED POLE ASSEMBLY

## CONDUIT AND CABLE CHART
### WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 | | | | CABLE STATUS | ITEM 620 | | | | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 80) (2") | | CONDT (PVC) (SCHD 80) (2") (BORE) | | | ELEC CONDR (NO. 8) BARE | | ELEC CONDR (NO. 8) INSULATED | | | |
| | | QTY | LF | QTY | LF | | Qty | LF | Qty | LF | | |
| 1 | I | 1 | 30 | | | I | 1 | 35 | 2 | 70 | 30 | 1 |
| 2 | I | | | 1 | 15 | I | 1 | 20 | 2 | 40 | 15 | 2 |
| 3 | I | | | 1 | 60 | I | 1 | 65 | 2 | 130 | 60 | 3 |
| 4 | I | 1 | 25 | | | I | 1 | 30 | 2 | 60 | 25 | 4 |
| TOTALS | | | 55 | | 75 | | | 150 | | 300 | | |




## LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING POWER POLE
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED WW DETECTOR POLE
- PROPOSED GROUND BOX TY D
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED ITS GROUND BOX TY 1
- PROPOSED ITS GROUND BOX TY 1 W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- PROPOSED REMOTE SOLAR POLE
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL

NOTES:
1. RAMP WRONG WAY PAVEMENT MARKINGS SHALL BE APPLIED PER TXDOT STANDARDS

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 40'
20 0 20

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

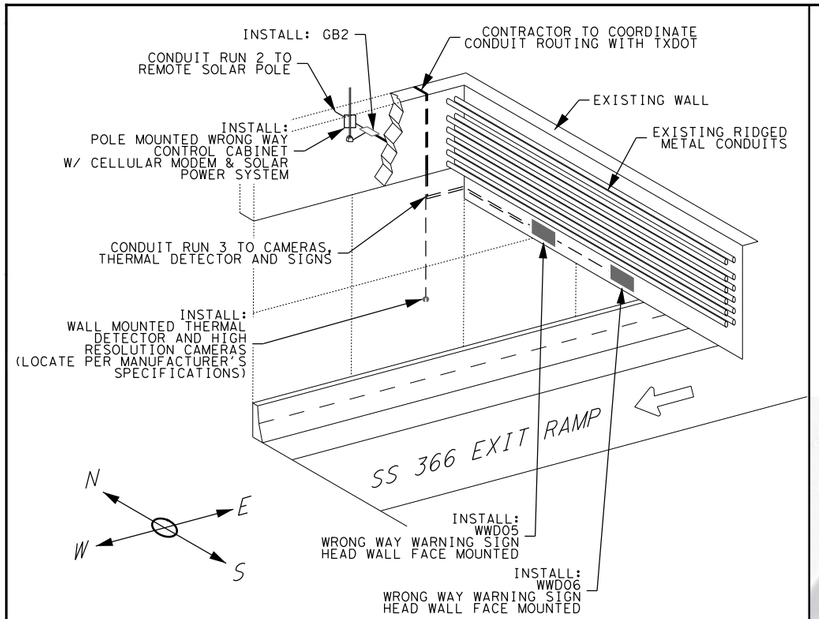

Texas Department of Transportation



# SS 366 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 2 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 48 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |



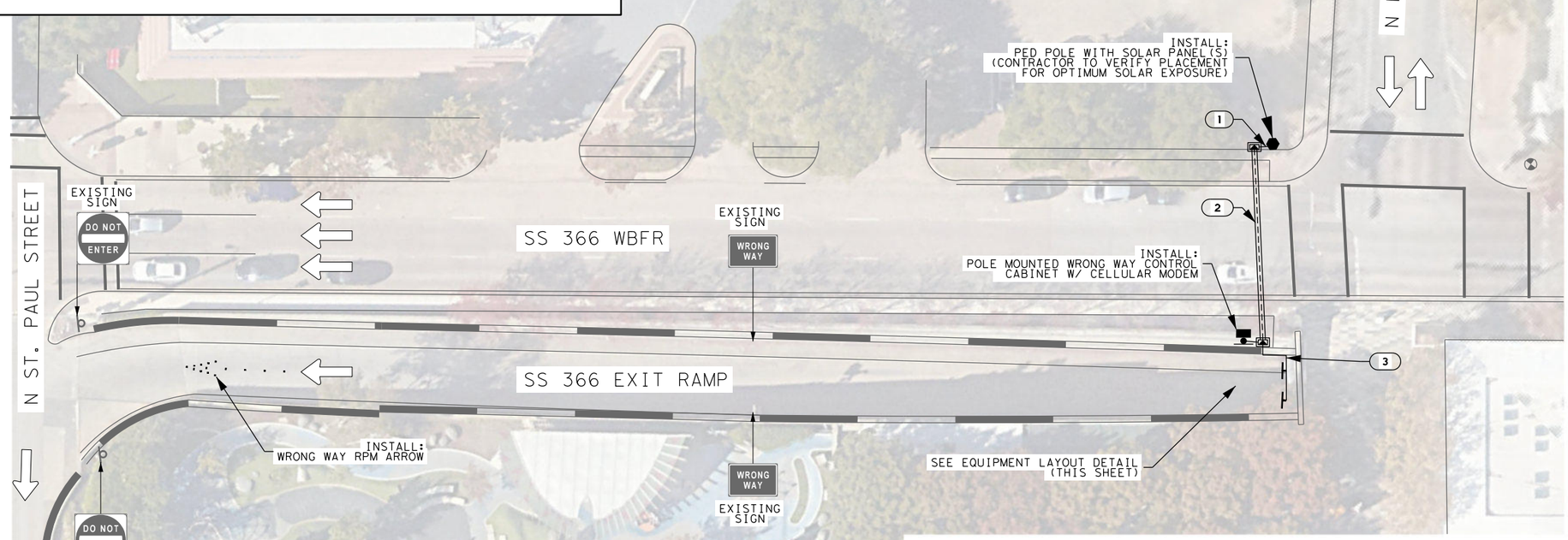

EQUIPMENT LAYOUT DETAIL

## SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 10 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 65 |
| 618 | 6064 | CONDT (RM) (1") | LF | 165 |
| 620 | 6007 | ELEC CONDR (NO.8) BARE | LF | 85 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 170 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 2 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 14 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 14 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 2 |
| ** | | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 12 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| * | | NEMA 3R ENCLOSURE | EA | 2 |
| * | | THERMAL DETECTOR | EA | 2 |
| * | | WHITE LED ILLUMINATOR | EA | 2 |
| * | | HIGH RESOLUTION CAMERA | EA | 2 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 1 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 1 |

*SUBSIDIARY TO WIRELESS WWD SYSTEM

**SUBSIDIARY TO PED POLE ASSEMBLY




## LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING POWER POLE
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED WW DETECTOR POLE
- PROPOSED GROUND BOX TY D
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED ITS GROUND BOX TY 1
- PROPOSED ITS GROUND BOX TY 1 W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- PROPOSED REMOTE SOLAR POLE
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL

NOTES:
1. RAMP WRONG WAY PAVEMENT MARKINGS SHALL BE APPLIED PER TXDOT STANDARDS

## CONDUIT AND CABLE CHART
### WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 0618 CONDT (RM) (1") QTY | CONDT (RM) (1") LF | CONDT (PVC) (SCHD 80) (2") QTY | CONDT (PVC) (SCHD 80) (2") LF | CONDT (PVC) (SCHD 80) (2") (BORE) QTY | CONDT (PVC) (SCHD 80) (2") (BORE) LF | CABLE STATUS | ITEM 620 ELEC CONDR (NO. 8) BARE QTY | ELEC CONDR (NO. 8) BARE LF | ELEC CONDR (NO. 8) INSULATED QTY | ELEC CONDR (NO. 8) INSULATED LF | SUB TO ITEM 6414 WWD SYSTEM/ CONTROL CABLES* QTY | WWD SYSTEM/ CONTROL CABLES* LF | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | I | | | 1 | 10 | | | I | 1 | 15 | 2 | 30 | | | 10 | 1 |
| 2 | I | | | | | 1 | 65 | I | 1 | 70 | 2 | 140 | | | 65 | 2 |
| 3 | I | 3 | 165 | | | | | I | | | | | 3 | 180 | 55 | 3 |
| TOTALS | | | 165 | | 10 | | 65 | | | 85 | | 170 | | 180 | | |

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |


OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726




STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 40'
20 0 20

# SS 366 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 3 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 49 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 195 |
| 620 | 6007 | ELEC CONDR (NO. 8) BARE | LF | 215 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 430 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 2 |
| 644 | 6012 | IN SM RD SN SUP&AM TY10BWG(1)SB(T) | EA | 2 |
| *** | | RED RETROREFLECTIVE TAPE ON SIGN POST | EA | 2 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 14 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 14 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 3 |
| ** | | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 18 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| * | | NEMA 3R ENCLOSURE | EA | 2 |
| * | | THERMAL DETECTOR | EA | 2 |
| * | | WHITE LED ILLUMINATOR | EA | 2 |
| * | | HIGH RESOLUTION CAMERA | EA | 2 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 1 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 1 |

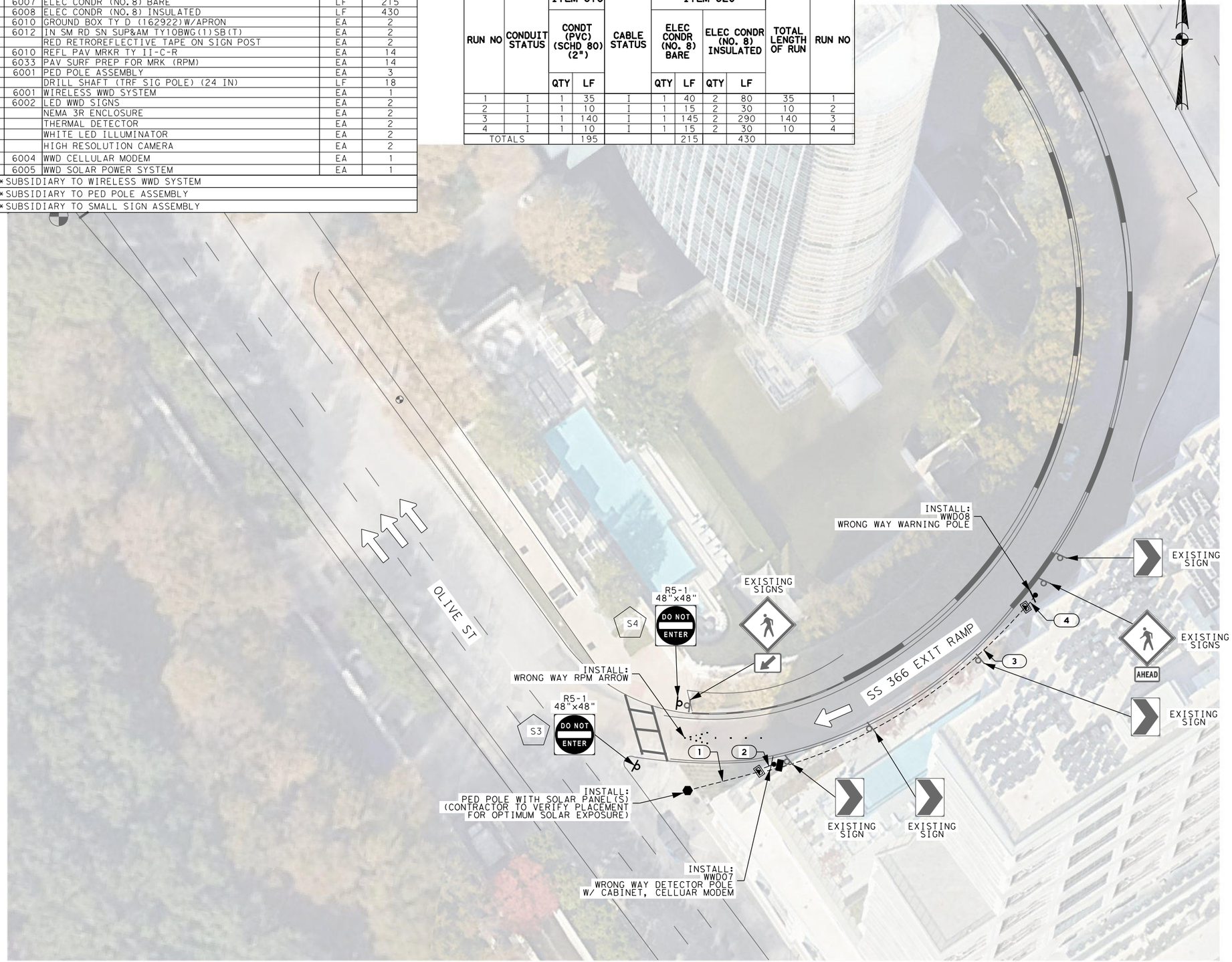
*SUBSIDIARY TO WIRELESS WWD SYSTEM

**SUBSIDIARY TO PED POLE ASSEMBLY

***SUBSIDIARY TO SMALL SIGN ASSEMBLY

## CONDUIT AND CABLE CHART
### WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 CONDT (PVC) (SCHD 80) (2") QTY | ITEM 618 CONDT (PVC) (SCHD 80) (2") LF | CABLE STATUS | ITEM 620 ELEC CONDR (NO. 8) BARE QTY | ITEM 620 ELEC CONDR (NO. 8) BARE LF | ITEM 620 ELEC CONDR (NO. 8) INSULATED QTY | ITEM 620 ELEC CONDR (NO. 8) INSULATED LF | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | I | 1 | 35 | I | 1 | 40 | 2 | 80 | 35 | 1 |
| 2 | I | 1 | 10 | I | 1 | 15 | 2 | 30 | 10 | 2 |
| 3 | I | 1 | 140 | I | 1 | 145 | 2 | 290 | 140 | 3 |
| 4 | I | 1 | 10 | I | 1 | 15 | 2 | 30 | 10 | 4 |
| TOTALS | | | 195 | | | 215 | | 430 | | |




## LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING POWER POLE
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED WW DETECTOR POLE
- PROPOSED GROUND BOX TY D
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED ITS GROUND BOX TY 1
- PROPOSED ITS GROUND BOX TY 1 W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- PROPOSED REMOTE SOLAR POLE
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL

NOTES:
1. RAMP WRONG WAY PAVEMENT MARKINGS SHALL BE APPLIED PER TXDOT STANDARDS

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 40'
20 0 20

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471


TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


Texas Department of Transportation


# SS 366 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 4 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 50 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 20 |
| 620 | 6007 | ELEC CONDR (NO.8) BARE | LF | 30 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 60 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 1 |
| 644 | 6012 | IN SM RD SN SUP&AM TY10BWG(1)SB(T) | EA | 2 |
| *** | | RED RETROREFLECTIVE TAPE ON SIGN POST | EA | 2 |
| 644 | 6066 | IN SM RD SN SUP&AM (RAIL MOUNT) | EA | 1 |
| 672 | 6010 | REFL PAV MRKR TY II-C-R | EA | 14 |
| 678 | 6033 | PAV SURF PREP FOR MRK (RPM) | EA | 14 |
| 687 | 6001 | PED POLE ASSEMBLY | EA | 2 |
| ** | | DRILL SHAFT (TRF SIG POLE) (24 IN) | LF | 12 |
| 6414 | 6001 | WIRELESS WWD SYSTEM | EA | 1 |
| 6414 | 6002 | LED WWD SIGNS | EA | 2 |
| * | | NEMA 3R ENCLOSURE | EA | 2 |
| * | | THERMAL DETECTOR | EA | 2 |
| * | | WHITE LED ILLUMINATOR | EA | 2 |
| * | | HIGH RESOLUTION CAMERA | EA | 2 |
| 6414 | 6004 | WWD CELLULAR MODEM | EA | 1 |
| 6414 | 6005 | WWD SOLAR POWER SYSTEM | EA | 1 |

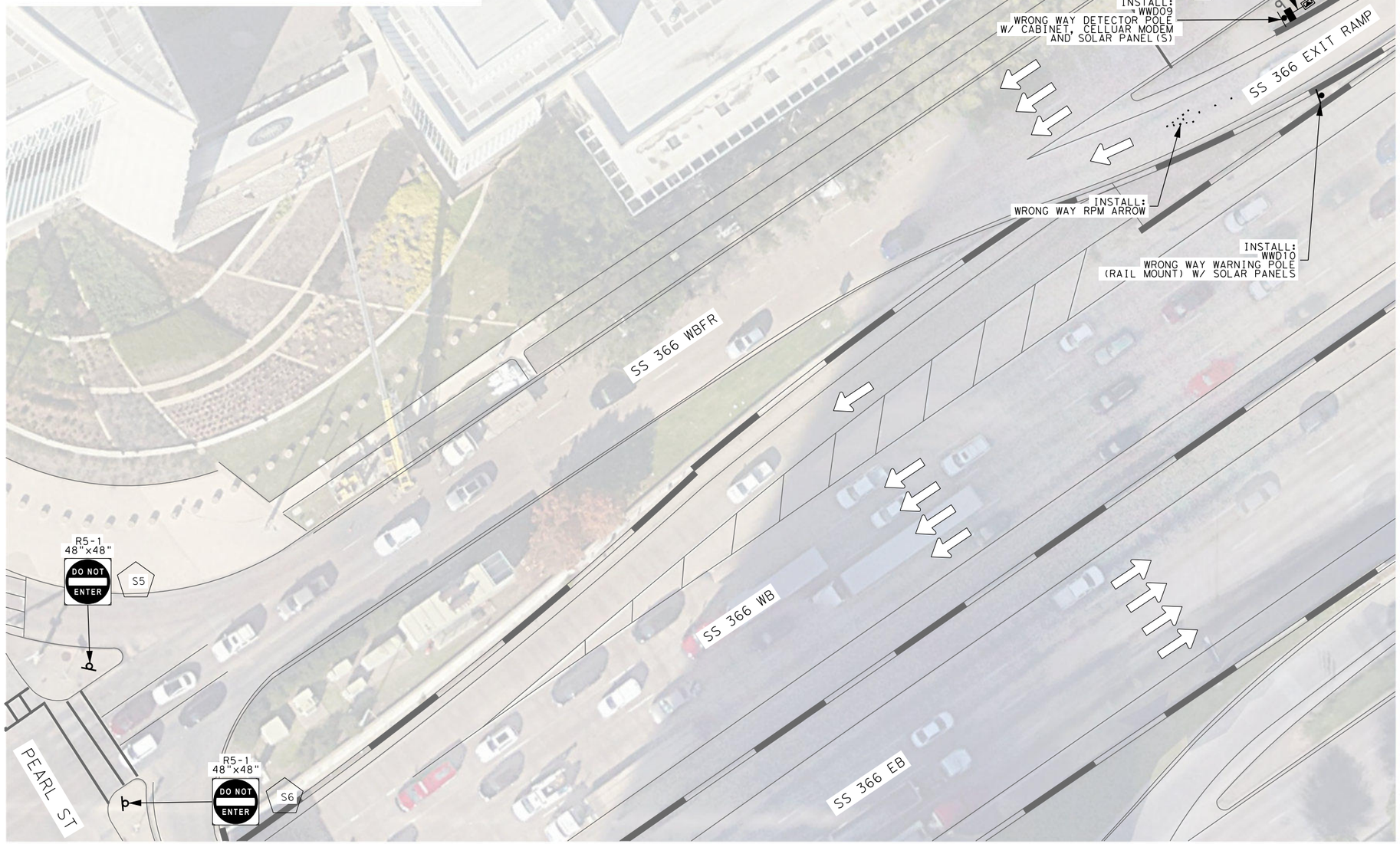
*SUBSIDIARY TO WIRELESS WWD SYSTEM

**SUBSIDIARY TO PED POLE ASSEMBLY

***SUBSIDIARY TO SMALL SIGN ASSEMBLY

## CONDUIT AND CABLE CHART
## WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 CONDT (PVC) (SCHD 80) (2") QTY | ITEM 618 CONDT (PVC) (SCHD 80) (2") LF | CABLE STATUS | ITEM 620 ELEC CONDR (NO. 8) BARE Qty | ITEM 620 ELEC CONDR (NO. 8) BARE LF | ITEM 620 ELEC CONDR (NO. 8) INSULATED Qty | ITEM 620 ELEC CONDR (NO. 8) INSULATED LF | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | I | 1 | 10 | I | 1 | 15 | 2 | 30 | 10 | 1 |
| 2 | I | 1 | 10 | I | 1 | 15 | 2 | 30 | 10 | 2 |
| TOTALS | | | 20 | | | 30 | | 60 | | |




## LEGEND

- EXISTING SIGN ON POST
- EXISTING OVERHEAD SIGN
- EXISTING ITS GROUND BOX
- EXISTING ITS CONDUIT
- EXISTING COMM HUB BUILDING
- EXISTING POWER POLE
- PROPOSED SIGN ON POST
- PROPOSED WW WARNING POLE
- PROPOSED WW DETECTOR POLE
- PROPOSED GROUND BOX TY D
- PROPOSED GROUND BOX TY D W/ APRON
- PROPOSED ITS GROUND BOX TY 1
- PROPOSED ITS GROUND BOX TY 1 W/ APRON
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- PROPOSED REMOTE SOLAR POLE
- TRAFFIC FLOW
- S## SIGN LABEL
- ## CONDUIT RUN LABEL

NOTES:
1. RAMP WRONG WAY PAVEMENT MARKINGS SHALL BE APPLIED PER TXDOT STANDARDS

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

SCALE: 1" = 40'
20 0 20

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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| | | | |
| | | | |

OTHON ENGINEERING
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TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

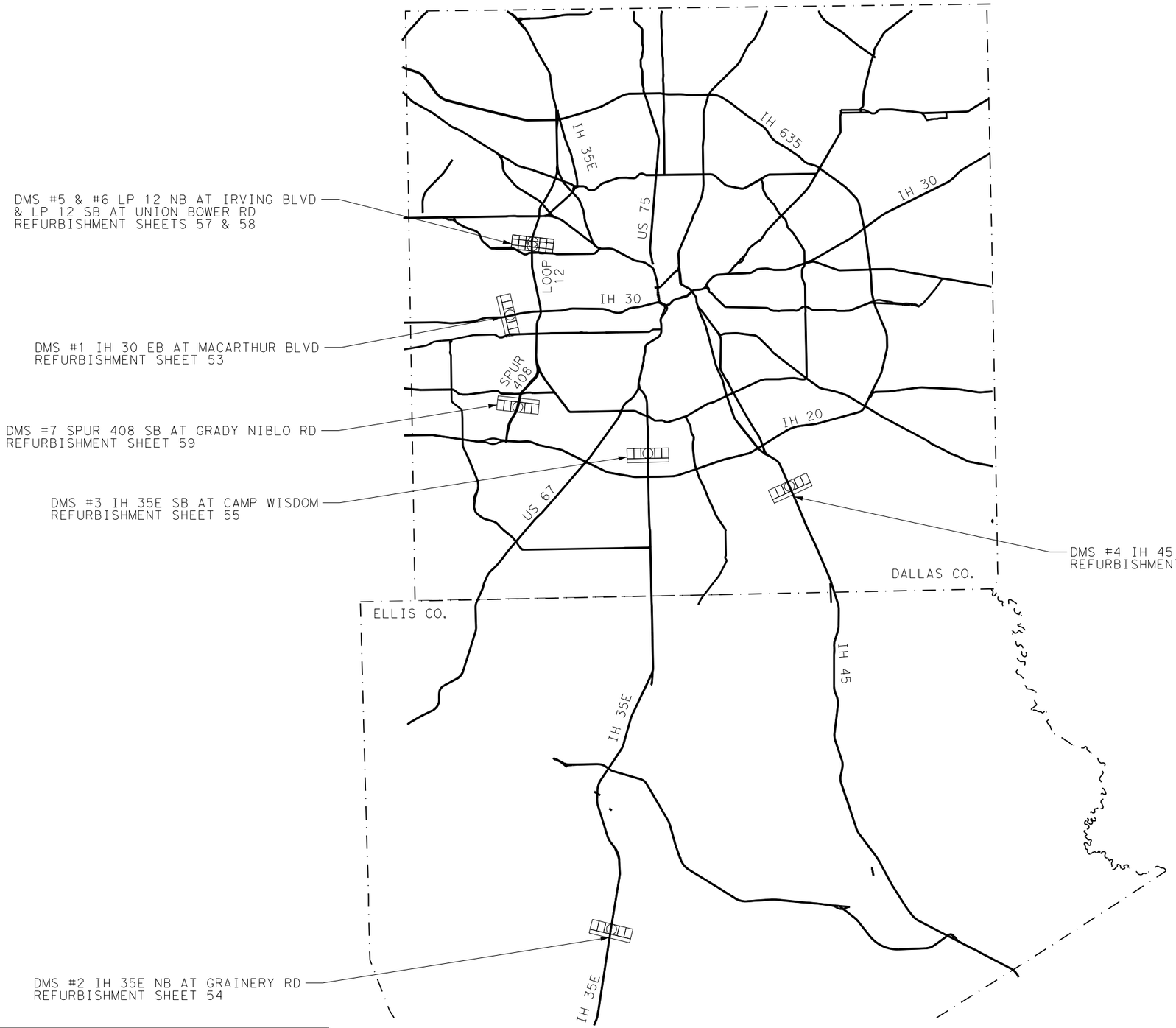

Texas Department of Transportation


# SS 366 WWDS TRAFFIC MANAGEMENT SYSTEM LAYOUT

(SHEET 5 OF 5)

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 51 |

| STATE | DIST. | COUNTY | |
|---|---|---|---|
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




N. T. S.

| LEGEND | |
|---|---|
| | EXISTING DMS TO BE REPLACED |

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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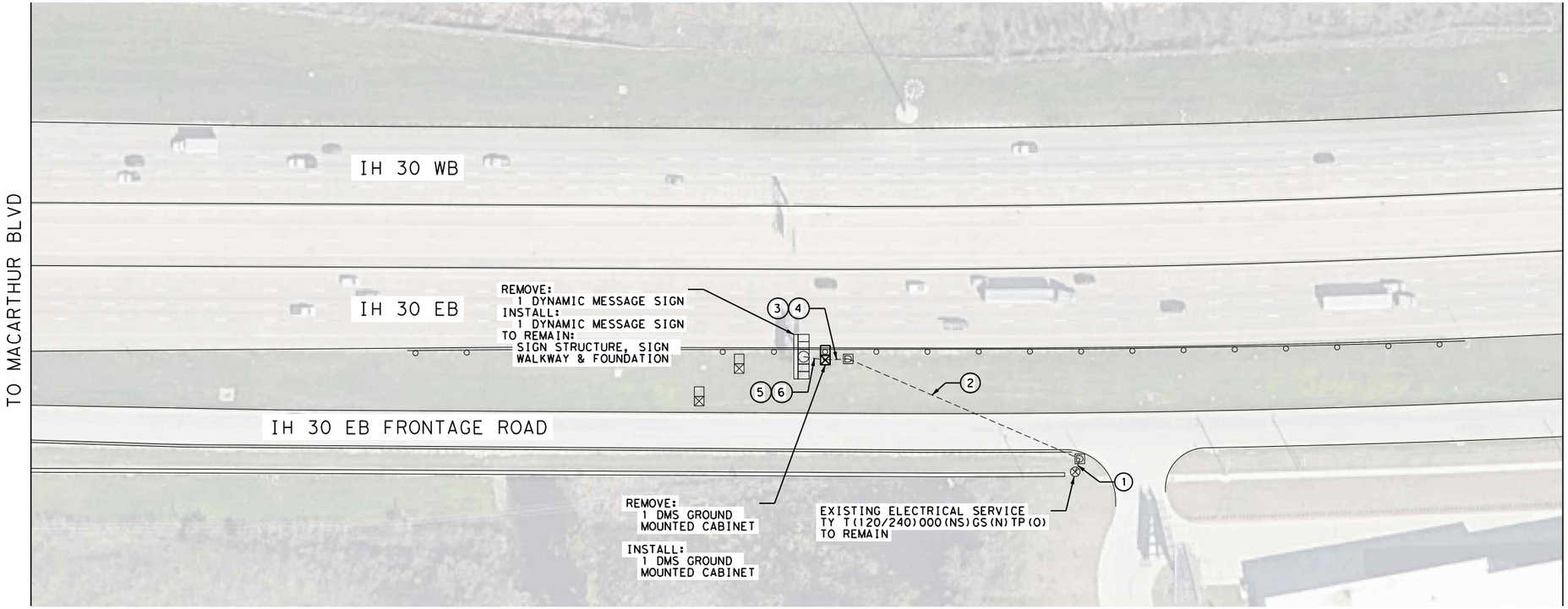
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


Texas Department of Transportation



# DMS REFURBISHMENT PROJECT LAYOUT

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 52 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




| LEGEND | |
|---|---|
| ⊗ | EXISTING ELECTRICAL SERVICE |
| ----- | EXISTING CONDUIT |
| —○— | EXISTING METAL BEAM GUARD FENCE |
| ▣ | EXISTING TYPE D GROUND BOX W/ APRON |
| ⊠ | EXISTING DMS GROUND MOUNTED CABINET AND FOUNDATION |
| ----- | PROPOSED CONDUIT |
| ⊠ | PROPOSED DMS GROUND MOUNTED CABINET AND FOUNDATION |

NOTES:

1. EXISTING DMS SIGN SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT DIRECTED SALVAGEABLE PARTS HAVE BEEN REMOVED BY THE CONTRACTOR AND DELIVERED TO TXDOT. CONTACT CRAIG BURGAN (214-320-6602) PRIOR TO REMOVAL FOR WHAT PARTS SHALL BE SALVAGED.
2. NEW DMS CABINET ANCHOR BOLTS, IF NEEDED, SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR AND SHALL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
3. REMOVE ALL POWER CABLES BETWEEN EXISTING GROUND BOX AND THE EXISTING ELECTRICAL SERVICE. REMOVE DMS COMM. CABLE WITHIN THE DMS POLE.
4. FOR DMS MOUNTING DETAILS, SEE STANDARD DMS (HZ-1,2)-21.
5. REPLACE ALL POWER CABLES WITH NEW CONDUCTORS AS SHOWN.
6. REMOVE RS-232 FO MODEMS FROM EXISTING DMS AND HUB CABINETS. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
7. INSTALL PORT EXPANDER IN EXISTING HUB CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6123.

| CONDUIT AND CABLE CHART | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| RUN NO. | RUN LENGTH (FT) | CONDUIT (LF) | ELECTRICAL CONDUCTOR (LF) (ITEM 620) | | | | | | DMS COMM. CABLE (LF) * |
| | | CONDT (PVC) (SCHD 40) (2") | ELEC CONDR (NO. 6) INSULATED | | | ELEC CONDR (NO. 6) BARE | | | |
| 1 | 11 | EXISTING | 3 | @ | 16 | 1 | @ | 16 | |
| 2 | 197 | EXISTING | 3 | @ | 202 | 1 | @ | 202 | |
| 3 | 19 | EXISTING | 3 | @ | 24 | 1 | @ | 24 | |
| 4 | 19 | EXISTING | | | | | | | 24 |
| 5 | 18 | EXISTING | 3 | @ | 53 | 1 | @ | 53 | |
| 6 | 18 | EXISTING | | | | | | | 53 |
| | | | | | | | | | |
| TOTAL | | | 885 | | | 295 | | | 77 |

* TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028.

| SHEET SUMMARY OF QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | DESC CODE | DESCRIPTION | UNIT | QTY |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 295 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 885 |
| 690 | 6009 | REMOVAL OF CABLES | LF | 245 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 282 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 2 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 |
| | ** | DMS COMM CABLE | LF | 77 |
| | ** | ETHERNET SWITCH | EA | 2 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |
| | ** | ETHERNET SWITCH PORT EXPANDER | EA | 1 |

** FURNISHED BY TXDOT, INSTALLATION BY CONTRACTOR

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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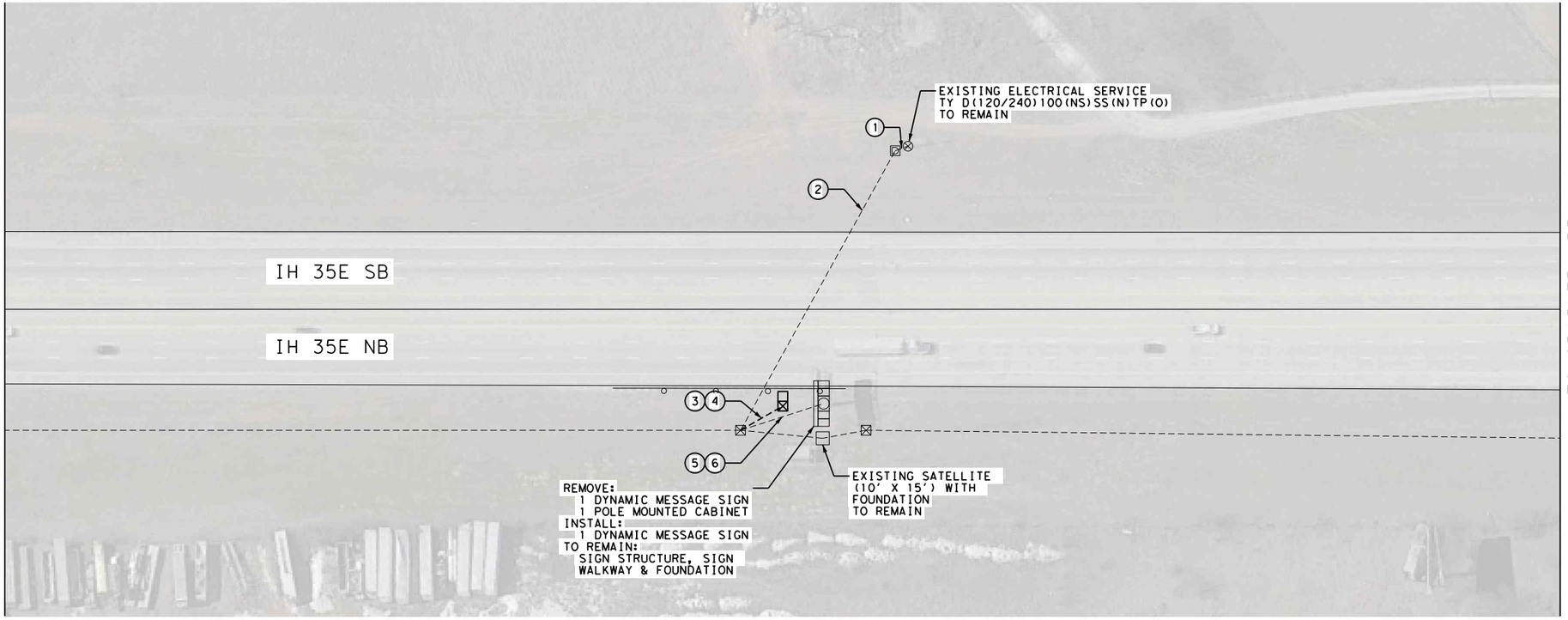
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# DMS REFURBISHMENT LAYOUT IH 30 EB AT MACARTHUR BLVD

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 53 |

| STATE | DIST. | COUNTY | |
|---|---|---|---|
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING TYPE D GROUND BOX W/ APRON
- EXISTING TYPE 2 GROUND BOX W/ APRON
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT
- EXISTING METAL BEAM GUARD FENCE
- PROPOSED CONDUIT
- PROPOSED DMS GROUND MOUNTED CABINET AND FOUNDATION

NOTES:

1. EXISTING DMS SIGN SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT DIRECTED SALVAGEABLE PARTS HAVE BEEN REMOVED BY THE CONTRACTOR AND DELIVERED TO TXDOT. CONTACT CRAIG BURGAN (214-320-6602) PRIOR TO REMOVAL FOR WHAT PARTS SHALL BE SALVAGED.
2. DMS GROUND MOUNTED CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
3. PULL BACK EXISTING ETHERNET CABLE FROM DMS SIGN HOUSING ASSEMBLY TO GROUND BOX AND REINSTALL IN RUN 4 TO NEW DMS GROUND MOUNT CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
4. FOR DMS MOUNTING DETAILS, SEE STANDARD DMS (HZ-1,2)-21.
5. REPLACE ALL POWER CABLES WITH NEW CONDUCTORS AS SHOWN.

CONDUIT AND CABLE CHART

| RUN NO. | RUN LENGTH (FT) | CONDUIT (LF) (ITEM 618) | | ELECTRICAL CONDUCTOR (LF) (ITEM 620) | | | | | | ETHERNET CABLE | DMS COMM. CABLE (LF) * |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 40) (2") | CONDT (PVC) (SCHD 40) (3") | ELEC CONDR (NO. 6) INSULATED | | | ELEC CONDR (NO. 6) BARE | | | | |
| 1 | 10 | EXISTING | | 3 | @ | 15 | 1 | @ | 15 | | |
| 2 | 246 | | EXISTING | 3 | @ | 251 | 1 | @ | 251 | | |
| 3 | 37 | | 37 | 6 | @ | 42 | 1 | @ | 42 | | |
| 4 | 37 | | 37 | | | | | | | EXISTING | 42 |
| 5 | 67 | | EXISTING | 3 | @ | 102 | 1 | @ | 102 | | |
| 6 | 67 | | EXISTING | | | | | | | EXISTING | 102 |
| | | | | | | | | | | | |
| TOTAL | | | 74 | 1356 | | | 410 | | | | 144 |

* TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028.

SHEET SUMMARY OF QUANTITIES

| ITEM | DESC CODE | DESCRIPTION | UNIT | QTY |
|---|---|---|---|---|
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 74 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 410 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 1356 |
| 690 | 6009 | REMOVAL OF CABLES | LF | 323 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 256 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 2 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 |
| | ** | DMS COMM CABLE | LF | 144 |
| | * | RELOCATE ETHERNET CABLE | LF | 104 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 |

* SUBSIDIARY TO ITEM 6028

** FURNISHED BY TXDOT, INSTALLATION BY CONTRACTOR

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 100'

50 0 50

| NO. | DATE | REVISION | APPROV. |
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TEXAS PE FIRM REG # F-18726

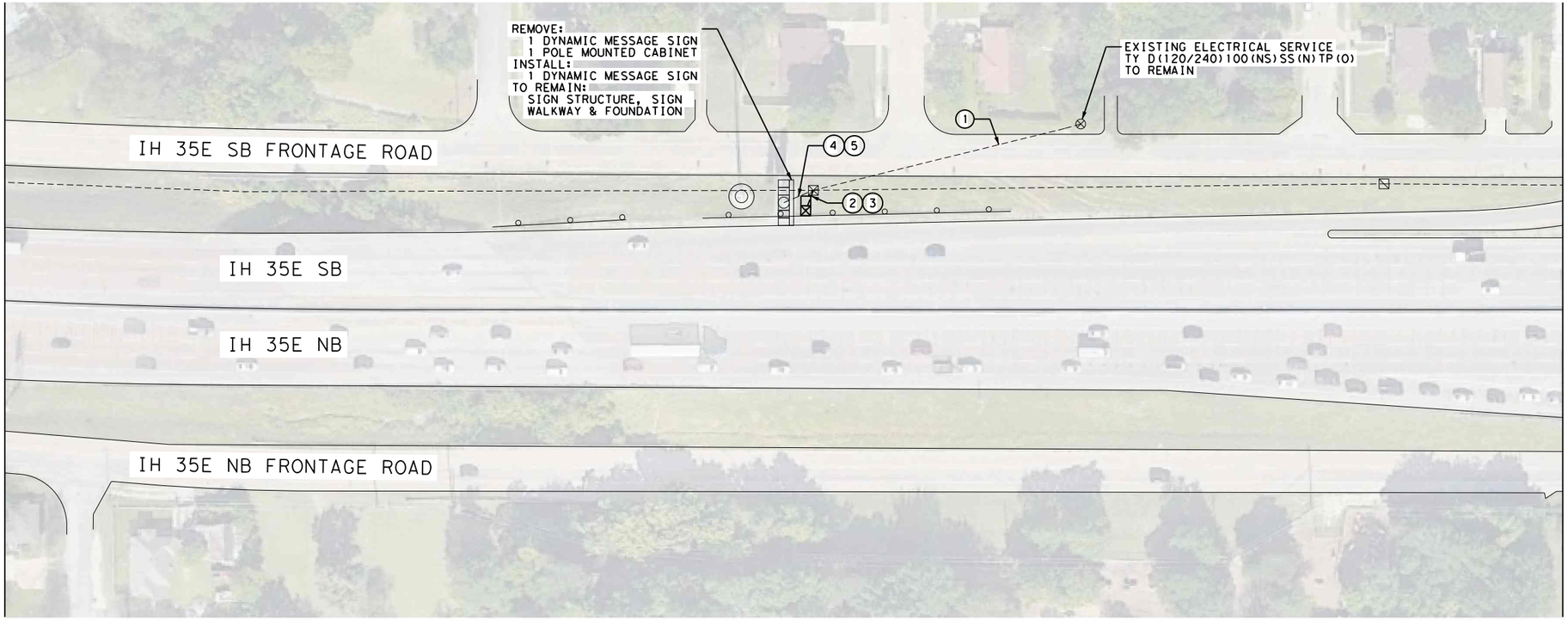
Texas Department of Transportation



# DMS REFURBISHMENT LAYOUT IH 35E NB AT GRAINERY RD

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 54 |

| STATE | DIST. | COUNTY | |
|---|---|---|---|
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING TYPE 1 GROUND BOX W/ APRON
- EXISTING TYPE 2 GROUND BOX W/ APRON
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT
- EXISTING METAL BEAM GUARD FENCE
- PROPOSED CONDUIT
- PROPOSED DMS GROUND MOUNTED CABINET AND FOUNDATION

NOTES:

1. EXISTING DMS SIGN SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT DIRECTED SALVAGEABLE PARTS HAVE BEEN REMOVED BY THE CONTRACTOR AND DELIVERED TO TXDOT. CONTACT CRAIG BURGAN (214-320-6602) PRIOR TO REMOVAL FOR WHAT PARTS SHALL BE SALVAGED.
2. DMS GROUND MOUNTED CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
3. REMOVE ALL POWER CABLES BETWEEN EXISTING GROUND BOXES AND THE EXISTING ELECTRICAL SERVICE. REMOVE DMS COMM. CABLE WITHIN THE DMS POLE.
4. FOR DMS MOUNTING DETAILS, SEE STANDARD DMS (HZ-1,2)-21.
5. REPLACE ALL POWER CABLES WITH NEW CONDUCTORS AS SHOWN.
6. PULL BACK EXISTING FIBER CABLE FROM DMS SIGN HOUSING ASSEMBLY TO GROUND BOX AND REINSTALL IN RUN 3 TO NEW DMS GROUND MOUNT CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
7. REMOVE MEDIA CONVERTERS FROM DMS SIGN HOUSING ASSEMBLY AND HUB CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

| RUN NO. | RUN LENGTH (FT) | CONDUIT (LF) (ITEM 618) | ELECTRICAL CONDUCTOR (LF) (ITEM 620) | | | | | | SM 6 FIBER CABLE | DMS COMM. CABLE (LF) * |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 40) (3") | ELEC CONDR (NO. 6) INSULATED | | | ELEC CONDR (NO. 6) BARE | | | | |
| 1 | 212 | EXISTING | 3 | @ | 217 | 1 | @ | 217 | | |
| 2 | 17 | 17 | 6 | @ | 22 | 1 | @ | 22 | EXISTING | |
| 3 | 17 | 17 | | | | | | | EXISTING | 22 |
| 4 | 25 | EXISTING | 3 | @ | 60 | 1 | @ | 60 | | |
| 5 | 25 | EXISTING | | | | | | | | 60 |
| | | | | | | | | | | |
| TOTAL | | 34 | 963 | | | 299 | | | | 82 |

* TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028.

SHEET SUMMARY OF QUANTITIES

| ITEM | DESC CODE | DESCRIPTION | UNIT | QTY |
|---|---|---|---|---|
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 34 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 299 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 963 |
| 690 | 6009 | REMOVAL OF CABLES | LF | 237 |
| 6007 | 6102 | RELOCATE FIBER OPTIC CABLE | LF | 34 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 262 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 1 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 |
| | ** | DMS COMM CABLE | LF | 82 |
| | ** | ETHERNET SWITCH | EA | 2 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |

** FURNISHED BY TXDOT, INSTALLATION BY CONTRACTOR

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER
02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

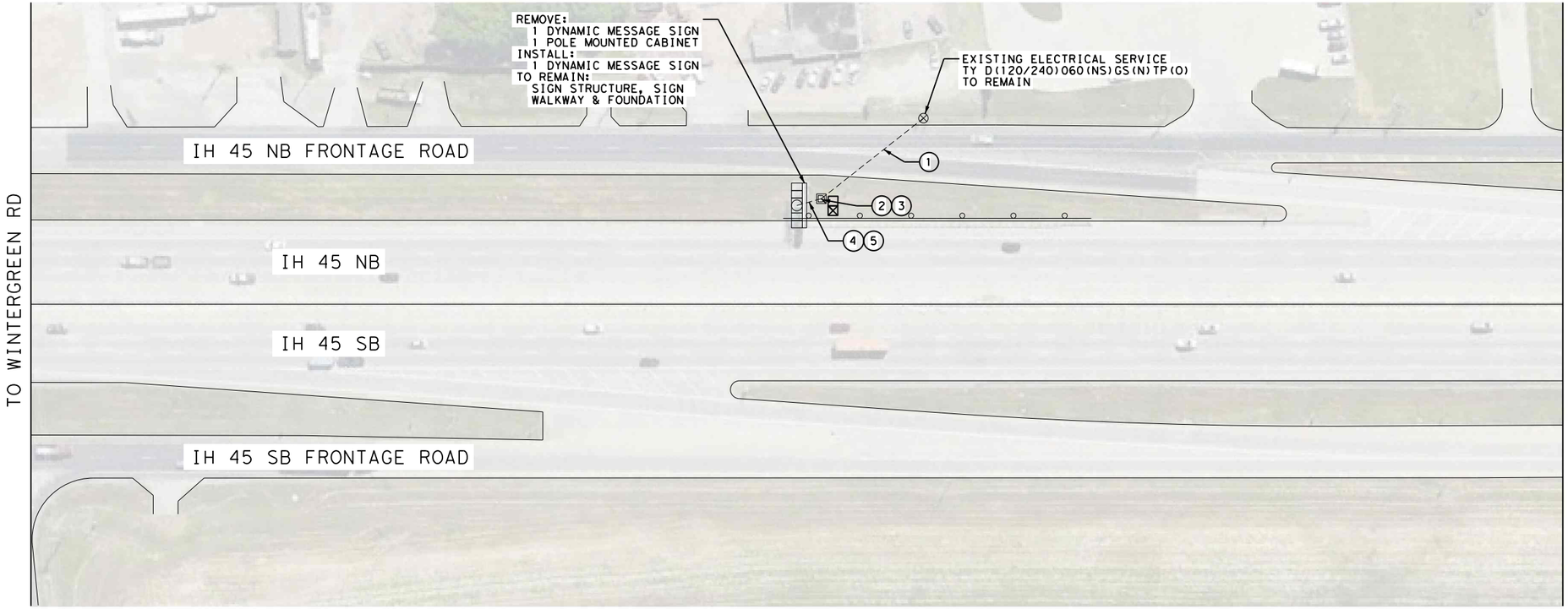
Texas Department of Transportation


# DMS REFURBISHMENT LAYOUT IH 35E SB AT CAMP WISDOM

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 55 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




| LEGEND | |
|---|---|
| ⊗ | EXISTING ELECTRICAL SERVICE |
| ----- | EXISTING CONDUIT |
| —○— | EXISTING METAL BEAM GUARD FENCE |
| ▣ | EXISTING TYPE D GROUND BOX W/ APRON |
| ----- | PROPOSED CONDUIT |
| ⊠ | PROPOSED DMS GROUND MOUNTED CABINET AND FOUNDATION |

NOTES:

1. EXISTING DMS SIGN SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT DIRECTED SALVAGEABLE PARTS HAVE BEEN REMOVED BY THE CONTRACTOR AND DELIVERED TO TXDOT. CONTACT CRAIG BURGAN (214-320-6602) PRIOR TO REMOVAL FOR WHAT PARTS SHALL BE SALVAGED.
2. DMS GROUND MOUNTED CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
3. PULL BACK EXISTING POWER CONDUCTORS FROM DMS HOUSING ASSEMBLY TO GROUND BOX AND REINSTALL IN RUN 2 TO NEW DMS GROUND MOUNT CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
4. FOR DMS MOUNTING DETAILS, SEE STANDARD DMS (HZ-1,2)-21.
5. RELOCATE ETHERNET SWITCH FROM EXISTING DMS HOUSING ASSEMBLY TO NEW GROUND MOUNTED DMS CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
6. RELOCATE EXISTING RADIO INTERFACE EQUIPMENT AND CABLE FROM DMS SIGN HOUSING ASSEMBLY TO NEW DMS GROUND MOUNT CABINET. NEW CABLE, IF NEEDED, SHALL BE FURNISHED BY THE CONTRACTOR. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
7. RELOCATE EXISTING RVSD INTERFACE EQUIPMENT AND CABLE FROM DMS SIGN HOUSING ASSEMBLY TO NEW DMS GROUND MOUNT CABINET. NEW CABLE, IF NEEDED, SHALL BE FURNISHED BY THE CONTRACTOR. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
8. IF CONTRACTOR CANNOT LOCATE THE EXISTING GROUND BOX IN THE FIELD, THE CONTRACTOR SHALL INTERCEPT THE EXISTING CONDUIT AND INSTALL A NEW GROUND BOX, SUBSIDIARY TO ITEM 6027.

| CONDUIT AND CABLE CHART | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RUN NO. | RUN LENGTH (FT) | CONDUIT (LF) (ITEM 618) | | ELECTRICAL CONDUCTOR (LF) (ITEM 620) | | | | | | ETHERNET CABLE | DMS COMM. CABLE (LF) * |
| | | CONDT (PVC) (SCHD 40) (2") | CONDT (PVC) (SCHD 40) (3") | ELEC CONDR (NO. 6) INSULATED | | | ELEC CONDR (NO. 6) BARE | | | | |
| 1 | 78 | EXISTING | | | | | | | | | |
| 2 | 13 | | 13 | 3 | @ | 18 | 1 | @ | 18 | | |
| 3 | 13 | | 13 | | | | | | | | 18 |
| 4 | 20 | | EXISTING | 3 | @ | 55 | 1 | @ | 55 | | |
| 5 | 20 | | EXISTING | | | | | | | EXISTING | 55 |
| | | | | | | | | | | | |
| TOTAL | | | 26 | 219 | | | 73 | | | | 73 |

* TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028.

| SHEET SUMMARY OF QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | DESC CODE | DESCRIPTION | UNIT | QTY |
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 26 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 73 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 219 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 1 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 40 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 1 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 |
| | ** | DMS COMM CABLE | LF | 73 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 |

** FURNISHED BY TXDOT, INSTALLATION BY CONTRACTOR

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER
02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
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TEXAS PE FIRM REG # F-18726

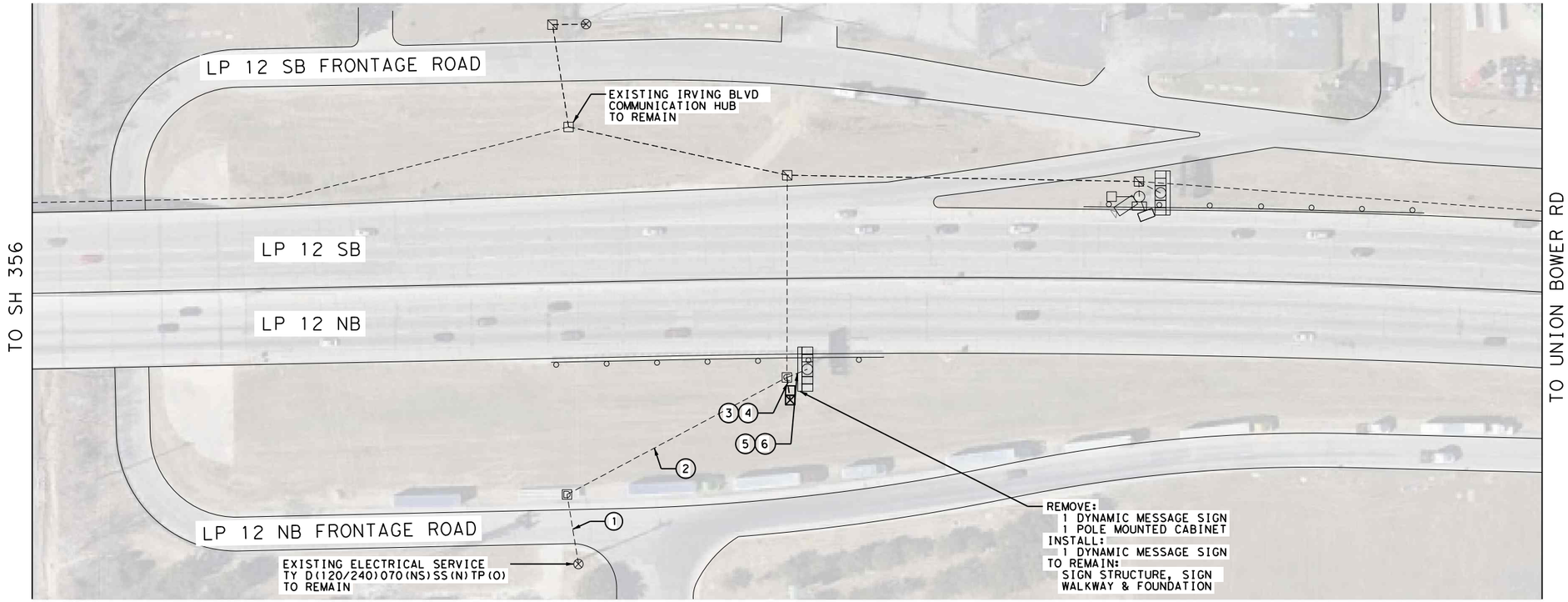
Texas Department of Transportation


# DMS REFURBISHMENT LAYOUT IH 45 NB AT WINTERGREEN RD

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 56 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING TYPE C GROUND BOX W/ APRON
- EXISTING TYPE D GROUND BOX W/ APRON
- EXISTING TYPE 1 GROUND BOX W/ APRON
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT
- EXISTING METAL BEAM GUARD FENCE
- PROPOSED CONDUIT
- PROPOSED DMS GROUND MOUNTED CABINET AND FOUNDATION

NOTES:

1. EXISTING DMS SIGN SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT DIRECTED SALVAGEABLE PARTS HAVE BEEN REMOVED BY THE CONTRACTOR AND DELIVERED TO TXDOT. CONTACT CRAIG BURGAN (214-320-6602) PRIOR TO REMOVAL FOR WHAT PARTS SHALL BE SALVAGED.
2. DMS GROUND MOUNTED CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
3. PULL BACK EXISTING POWER CONDUCTORS FROM DMS SIGN HOUSING ASSEMBLY TO GROUND BOX AND REINSTALL IN RUN 3 TO NEW DMS GROUND MOUNT CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
4. FOR DMS MOUNTING DETAILS, SEE STANDARD DMS (HZ-1,2)-21.
5. PULL BACK EXISTING FIBER CABLE FROM DMS SIGN HOUSING ASSEMBLY TO GROUND BOX AND REINSTALL IN RUN 4 TO NEW DMS GROUND MOUNT CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
6. REMOVE MEDIA CONVERTERS FROM DMS SIGN HOUSING ASSEMBLY AND HUB CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
7. INSTALL ETHERNET SWITCH IN EXISTING HUB CABINET AND CONNECT TO EXISTING ETHERNET SWITCH.

CONDUIT AND CABLE CHART

| RUN NO. | RUN LENGTH (FT) | CONDUIT (LF) (ITEM 618) | | ELECTRICAL CONDUCTOR (LF) (ITEM 620) | | | | | | SM 6 FIBER CABLE | DMS COMM. CABLE (LF) * |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 40) (2") | CONDT (PVC) (SCHD 40) (3") | ELEC CONDR (NO. 6) INSULATED | | | ELEC CONDR (NO. 6) BARE | | | | |
| 1 | 56 | | EXISTING | | | | | | | | |
| 2 | 197 | | EXISTING | | | | | | | | |
| 3 | 18 | | 18 | 3 | @ | 23 | 1 | @ | 23 | | |
| 4 | 18 | | 18 | | | | | | | EXISTING | 23 |
| 5 | 18 | EXISTING | | 3 | @ | 53 | 1 | @ | 53 | | |
| 6 | 18 | EXISTING | | | | | | | | EXISTING | 53 |
| | | | | | | | | | | | |
| TOTAL | | 16 | 36 | 228 | | | 76 | | | | 76 |

* TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028.

SHEET SUMMARY OF QUANTITIES

| ITEM | DESC CODE | DESCRIPTION | UNIT | QTY |
|---|---|---|---|---|
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 36 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 76 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 228 |
| 6007 | 6102 | RELOCATE FIBER OPTIC CABLE | LF | 36 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 289 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 2 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 |
| | ** | DMS COMM CABLE | LF | 76 |
| | ** | ETHERNET SWITCH | EA | 2 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |

** FURNISHED BY TXDOT, INSTALLATION BY CONTRACTOR

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

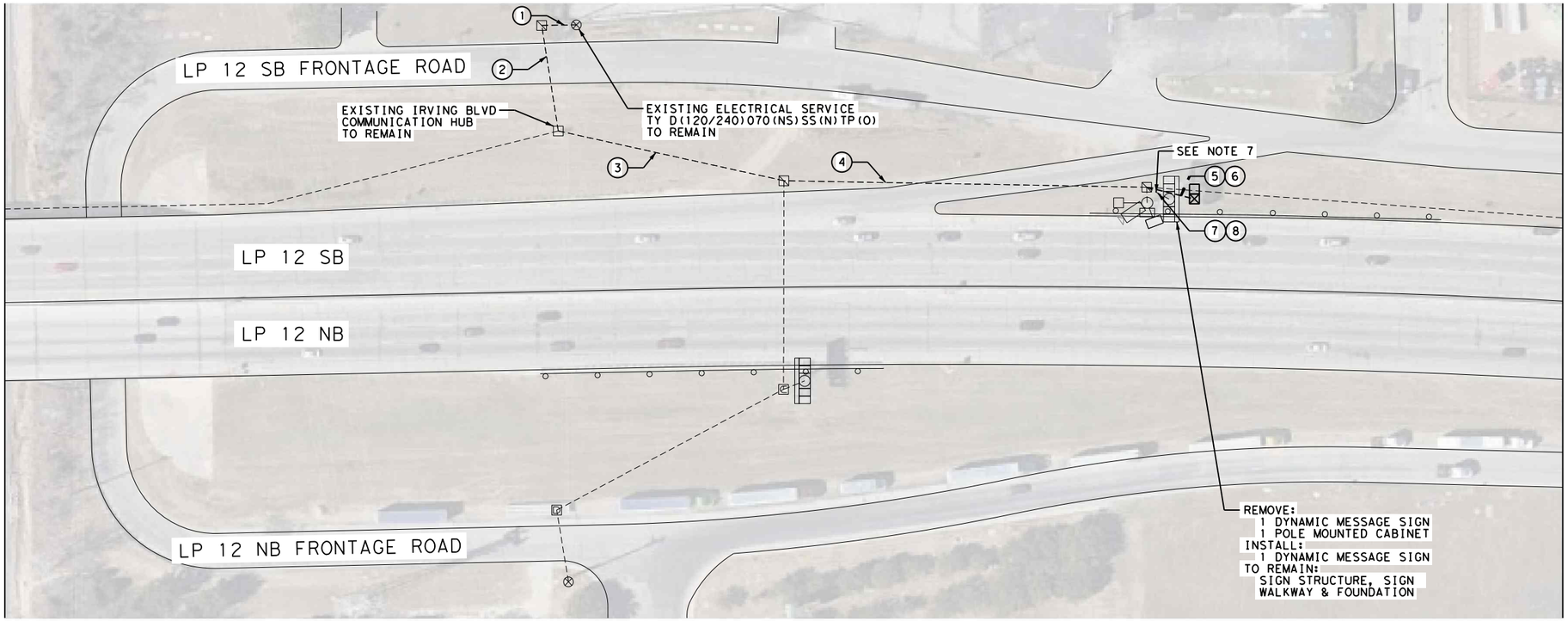
Texas Department of Transportation


# DMS REFURBISHMENT LAYOUT LP 12 NB AT IRVING BLVD

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 57 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




| LEGEND | |
|---|---|
| | EXISTING TYPE C GROUND BOX W/ APRON |
| | EXISTING TYPE D GROUND BOX W/ APRON |
| | EXISTING TYPE 1 GROUND BOX W/ APRON |
| ⊗ | EXISTING ELECTRICAL SERVICE |
| ----- | EXISTING CONDUIT |
| ——○—— | EXISTING METAL BEAM GUARD FENCE |
| ----- | PROPOSED CONDUIT |
| ⊠ | PROPOSED DMS GROUND MOUNTED CABINET AND FOUNDATION |

NOTES:

1. EXISTING DMS SIGN SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT DIRECTED SALVAGEABLE PARTS HAVE BEEN REMOVED BY THE CONTRACTOR AND DELIVERED TO TXDOT. CONTACT CRAIG BURGAN (214-320-6602) PRIOR TO REMOVAL FOR WHAT PARTS SHALL BE SALVAGED.
2. DMS GROUND MOUNTED CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
3. REMOVE ALL POWER CABLES BETWEEN EXISTING GROUND BOXES AND THE EXISTING ELECTRICAL SERVICE. REMOVE DMS COMM. CABLE WITHIN THE DMS POLE.
4. FOR DMS MOUNTING DETAILS, SEE STANDARD DMS (HZ-1,2)-21.
5. REPLACE ALL POWER CABLES WITH NEW CONDUCTORS AS SHOWN.
6. PULL BACK EXISTING FIBER CABLE FROM DMS SIGN HOUSING ASSEMBLY TO GROUND BOX AND REINSTALL IN RUN 6 TO NEW DMS GROUND MOUNT CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
7. REMOVE RS-232 FO MODEMS FROM DMS SIGN HOUSING ASSEMBLY AND HUB CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

| CONDUIT AND CABLE CHART | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RUN NO. | RUN LENGTH (FT) | CONDUIT (LF) (ITEM 618) | | ELECTRICAL CONDUCTOR (LF) (ITEM 620) | | | | | | | | | SM 6 FIBER CABLE | DMS COMM. CABLE (LF) * |
| | | CONDT (PVC) (SCHD 40) (2") | CONDT (PVC) (SCHD 40) (3") | ELEC CONDR (NO. 4) INSULATED | | | ELEC CONDR (NO. 6) BARE | | | ELEC CONDR (NO. 6) INSULATED | | | | |
| 1 | 27 | EXISTING | | 3 | @ | 32 | 1 | @ | 32 | | | | | |
| 2 | 82 | | EXISTING | 3 | @ | 87 | 1 | @ | 87 | | | | | |
| 3 | 178 | | EXISTING | 3 | @ | 183 | 1 | @ | 18 | | | | EXISTING | |
| 4 | 279 | | EXISTING | 3 | @ | 284 | 1 | @ | 28 | | | | EXISTING | |
| 5 | 38 | | 38 | 3 | @ | 43 | 1 | @ | 43 | 3 | @ | 43 | | |
| 6 | 38 | | 38 | | | | | | | | | | EXISTING | 43 |
| 7 | 20 | EXISTING | | | | | 1 | @ | 55 | 3 | @ | 55 | | |
| 8 | 20 | EXISTING | | | | | | | | | | | | 55 |
| | | | | | | | | | | | | | | |
| TOTAL | | 16 | 76 | 1887 | | | 684 | | | 294 | | | | 98 |

* TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028.

| SHEET SUMMARY OF QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | DESC CODE | DESCRIPTION | UNIT | QTY |
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 76 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 684 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 294 |
| 620 | 6012 | ELEC CONDR (NO.4) INSULATED | LF | 1887 |
| 690 | 6009 | REMOVAL OF CABLES | LF | 586 |
| 6007 | 6102 | RELOCATE FIBER OPTIC CABLE | LF | 57 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 606 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 3 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 |
| | ** | DMS COMM CABLE | LF | 98 |
| | ** | ETHERNET SWITCH | EA | 1 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 1 |

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SCALE: 1" = 100'

50 0 50

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TEXAS PE FIRM REG # F-18726

Texas Department of Transportation

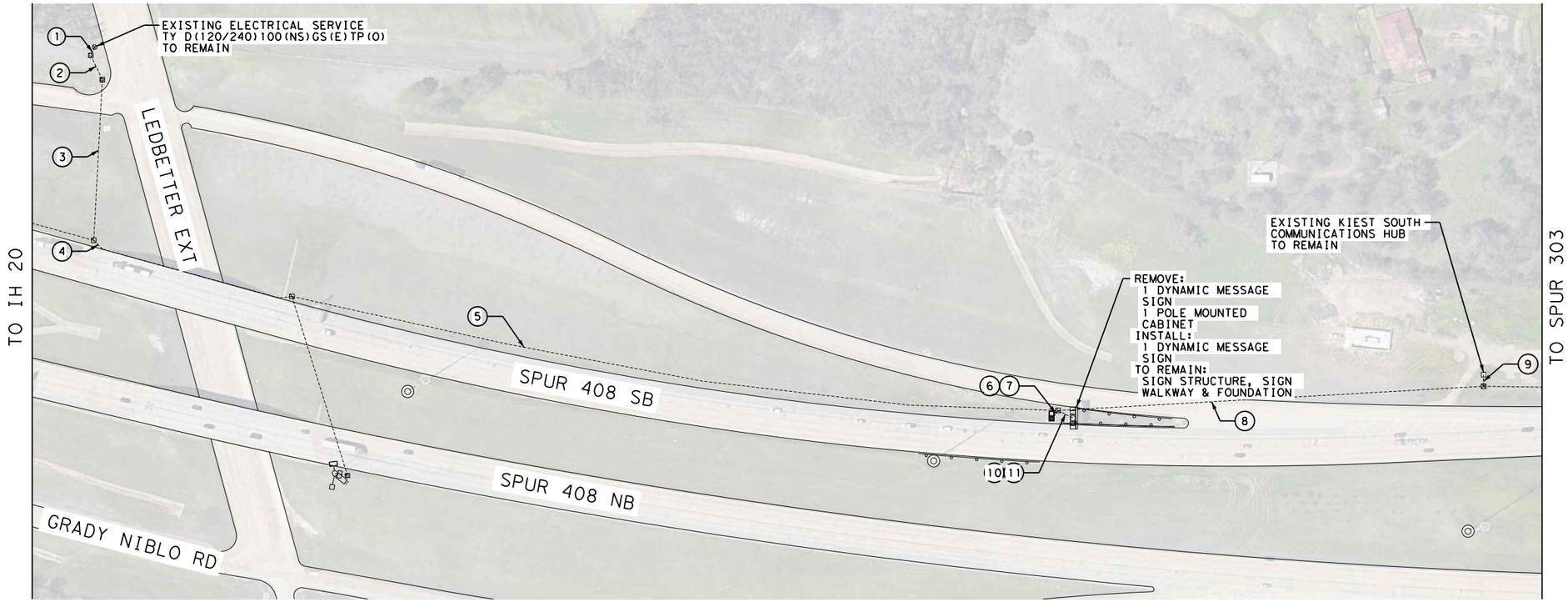


# DMS REFURBISHMENT LAYOUT LP 12 SB AT UNION BOWER RD

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 58 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




| LEGEND | |
|---|---|
| ▣ | EXISTING TYPE D GROUND BOX W/ APRON |
| ▣ | EXISTING TYPE 1 GROUND BOX W/ APRON |
| ▣ | EXISTING TYPE 2 GROUND BOX W/ APRON |
| ⊗ | EXISTING ELECTRICAL SERVICE |
| ---------- | EXISTING CONDUIT |
| ——o——o—— | EXISTING METAL BEAM GUARD FENCE |
| - - - - - | PROPOSED CONDUIT |
| ⊠ | PROPOSED DMS GROUND MOUNTED CABINET AND FOUNDATION |

NOTES:

1. EXISTING DMS SIGN SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT DIRECTED SALVAGEABLE PARTS HAVE BEEN REMOVED BY THE CONTRACTOR AND DELIVERED TO TXDOT. CONTACT CRAIG BURGAN (214-320-6602) PRIOR TO REMOVAL FOR WHAT PARTS SHALL BE SALVAGED.
2. DMS GROUND MOUNTED CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
3. PULL BACK EXISTING POWER CONDUCTORS FROM DMS SIGN HOUSING ASSEMBLY TO GROUND BOX AND REINSTALL IN NEW RUN 7 TO NEW DMS GROUND MOUNT CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.
4. FOR DMS MOUNTING DETAILS, SEE STANDARD DMS (HZ-1,2)-21.
5. REMOVE EXISTING LIMITED DISTANCE MODEMS IN DMS HOUSING ASSEMBLY AND HUB. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028
6. INSTALL ETHERNET SWITCH IN EXISTING HUB CABINET AND CONNECT TO EXISTING ETHERNET SWITCH.

CONDUIT AND CABLE CHART

| RUN NO. | RUN LENGTH (FT) | CONDUIT (LF) (ITEM 618) | | ELECTRICAL CONDUCTOR (LF) (ITEM 620) | | | | | | DMS COMM. CABLE (LF) * |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 40) (2") | CONDT (PVC) (SCHD 40) (3") | ELEC CONDR (NO. 6) INSULATED | | | ELEC CONDR (NO. 6) BARE | | | |
| 1 | 14 | EXISTING | | | | | | | | |
| 2 | 43 | | EXISTING | | | | | | | |
| 3 | 255 | | EXISTING | | | | | | | |
| 4 | 331 | | EXISTING | | | | | | | |
| 5 | 1230 | | EXISTING | | | | | | | |
| 6 | 16 | | 16 | | | | | | | 21 |
| 7 | 16 | | 16 | 3 | @ | 21 | 1 | @ | 21 | |
| 8 | 676 | | EXISTING | | | | | | | |
| 9 | 18 | | EXISTING | | | | | | | |
| 10 | 27 | | EXISTING | | | | | | | 62 |
| 11 | 27 | | EXISTING | 3 | @ | 62 | 1 | @ | 62 | |
| | | | | | | | | | | |
| TOTAL | | 16 | 32 | 249 | | | 83 | | | 83 |

* TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028.

SHEET SUMMARY OF QUANTITIES

| ITEM | DESC CODE | DESCRIPTION | UNIT | QTY |
|---|---|---|---|---|
| 618 | 6029 | CONDT (PVC) (SCH 40) (3") | LF | 32 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 83 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 249 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 54 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 1 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| | ** | LED DMS FIELD EQUIPMENT (W/CABINET) | EA | 1 |
| | ** | DMS COMM CABLE | LF | 83 |
| | ** | ETHERNET SWITCH | EA | 2 |
| 6093 | 6010 | REMOVE EXIST FIB OPT DMS SYS (TY-2) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |

** FURNISHED BY TXDOT, INSTALLATION BY CONTRACTOR

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87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

SCALE: 1" = 200'
100 0 100

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14811 ST. MARY'S LANE, SUITE 180
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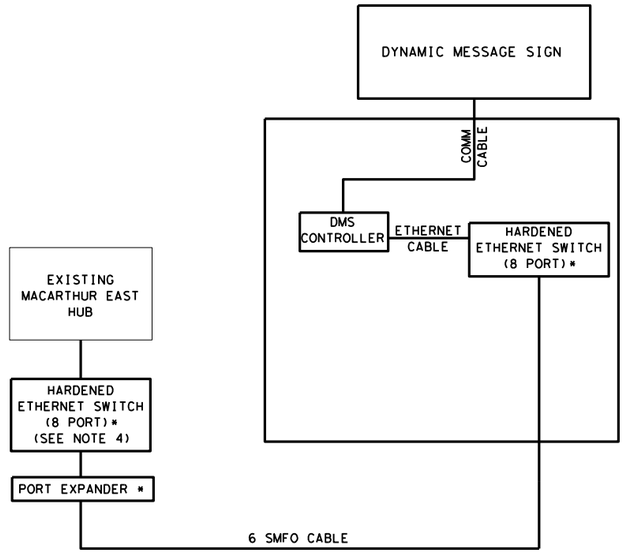
TEXAS PE FIRM REG # F-18726



# DMS REFURBISHMENT LAYOUT SPUR 408 SB AT GRADY NIBLO RD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 59 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING EQUIPMENT TO REMAIN
- NEW EQUIPMENT TO BE INSTALLED
- ETHERNET CABLE TO BE REROUTED
- * TO BE PROVIDED BY TXDOT

NOTES:

1. THIS SHEET IS A CONCEPTUAL DESIGN OF THE EXISTING TRANSPORTATION MANAGEMENT COMMUNICATIONS SYSTEM. ALL EQUIPMENT AND/OR CONNECTIONS REQUIRED MAY NOT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE UPDATED SYSTEM IS PROVIDED COMPLETE AND MADE FULLY FUNCTIONAL.
2. ALL TXDOT SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED IN THE PLANS.
3. POWER CABLES FOR ETHERNET SWITCHES AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.
4. REPLACE EXISTING SWITCH IN MACARTHUR EAST HUB WITH THE NEW SWITCH AND PORT EXPANDER.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER
02/23/2024

| NO. | DATE | REVISION | APPROV. |
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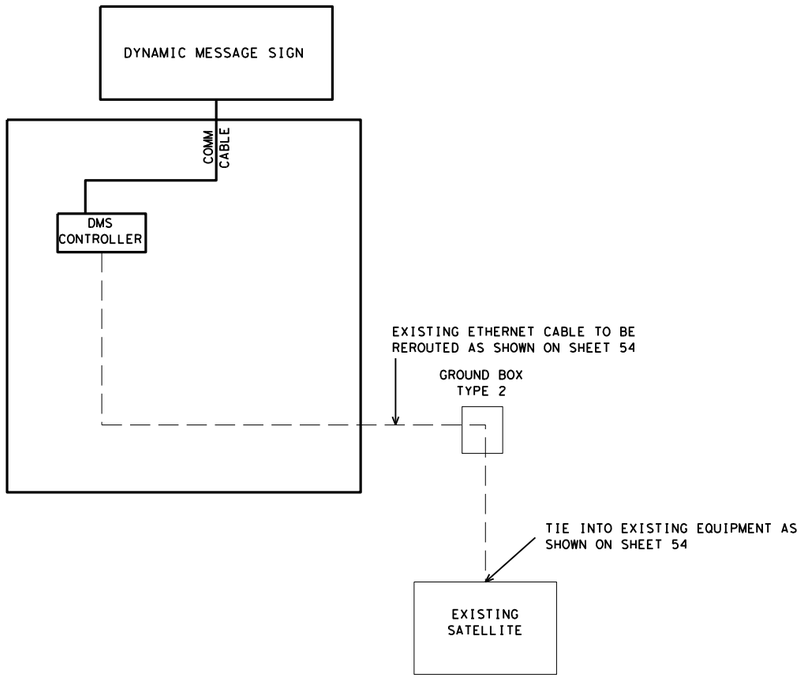
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# COMMUNICATION BLOCK DIAGRAM IH 30 EB AT MACARTHUR BLVD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 60 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING EQUIPMENT TO REMAIN
- NEW EQUIPMENT TO BE INSTALLED
- — — ETHERNET CABLE TO BE REROUTED
- * TO BE PROVIDED BY TXDOT

NOTES:

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2. ALL TXDOT SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED IN THE PLANS.




02/23/2024

| NO. | DATE | REVISION | APPROV. |
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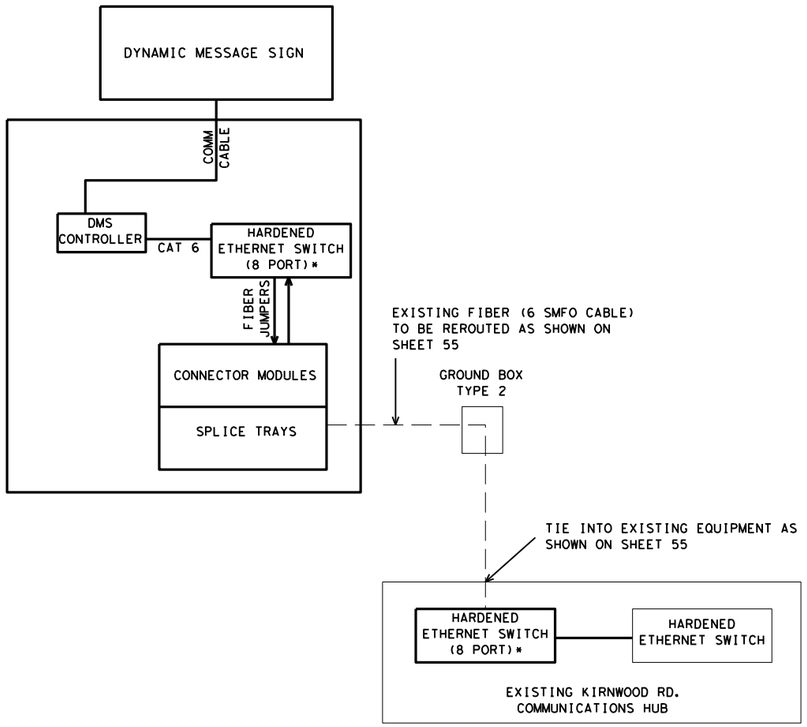
# COMMUNICATION BLOCK DIAGRAM IH 35E NB AT GRAINERY RD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 61 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING EQUIPMENT TO REMAIN
- NEW EQUIPMENT TO BE INSTALLED
- — — FIBER OPTIC CABLE TO BE REROUTED
- * TO BE PROVIDED BY TXDOT

NOTES:

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2. ALL TXDOT SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED IN THE PLANS.
3. POWER CABLES FOR ETHERNET SWITCHES, ETHERNET JUMPER CABLES, AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

| NO. | DATE | REVISION | APPROV. |
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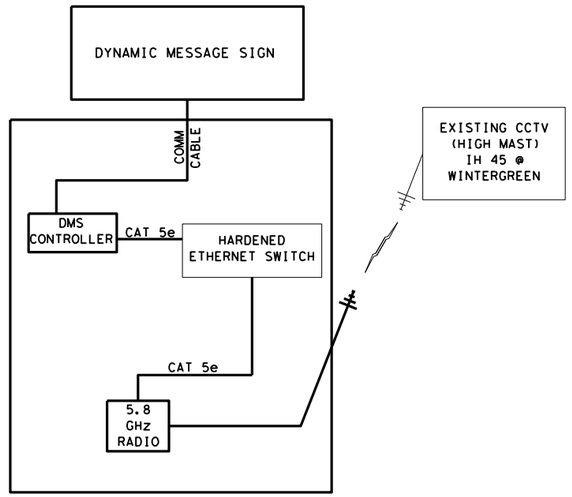
Texas Department of Transportation



# COMMUNICATION BLOCK DIAGRAM IH 35E SB AT CAMP WISDOM

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 62 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING EQUIPMENT TO REMAIN
- NEW EQUIPMENT TO BE INSTALLED
- * TO BE PROVIDED BY TXDOT

NOTES:

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2. ALL TXDOT SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED IN THE PLANS.

STATE OF TEXAS
KEVIN D. TYER
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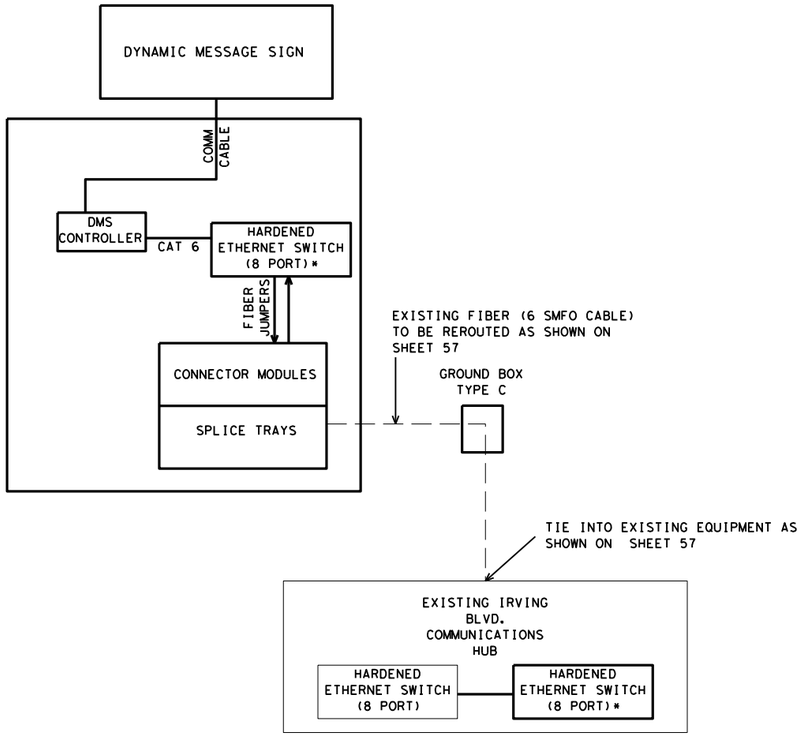
Texas Department of Transportation



# COMMUNICATION BLOCK DIAGRAM IH 45 NB AT WINTERGREEN RD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 63 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING EQUIPMENT TO REMAIN
- NEW EQUIPMENT TO BE INSTALLED
- — — FIBER OPTIC CABLE TO BE REROUTED
- * TO BE PROVIDED BY TXDOT

NOTES:

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2. ALL TXDOT SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED IN THE PLANS.
3. POWER CABLES FOR ETHERNET SWITCHES, ETHERNET JUMPER CABLES, AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.

STATE OF TEXAS
KEVIN D. TYER
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LICENSED
PROFESSIONAL ENGINEER

02/23/2024

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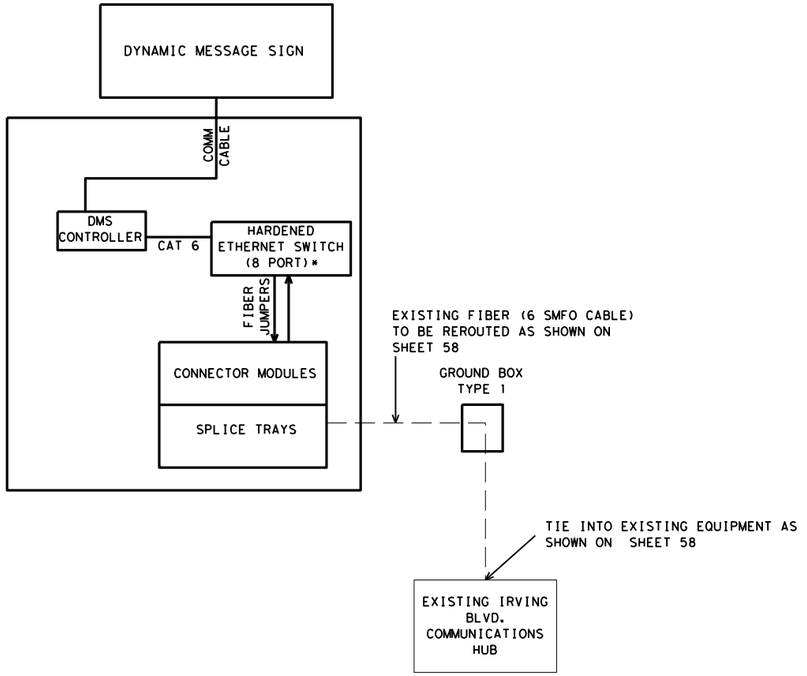
# COMMUNICATION BLOCK DIAGRAM LP 12 NB AT IRVING BLVD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 64 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




LEGEND

- EXISTING EQUIPMENT TO REMAIN
- NEW EQUIPMENT TO BE INSTALLED
- — — FIBER OPTIC CABLE TO BE REROUTED
- * TO BE PROVIDED BY TXDOT

NOTES:

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2. ALL TXDOT SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED IN THE PLANS.
3. POWER CABLES FOR ETHERNET SWITCHES AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.


| NO. | DATE | REVISION | APPROV. |
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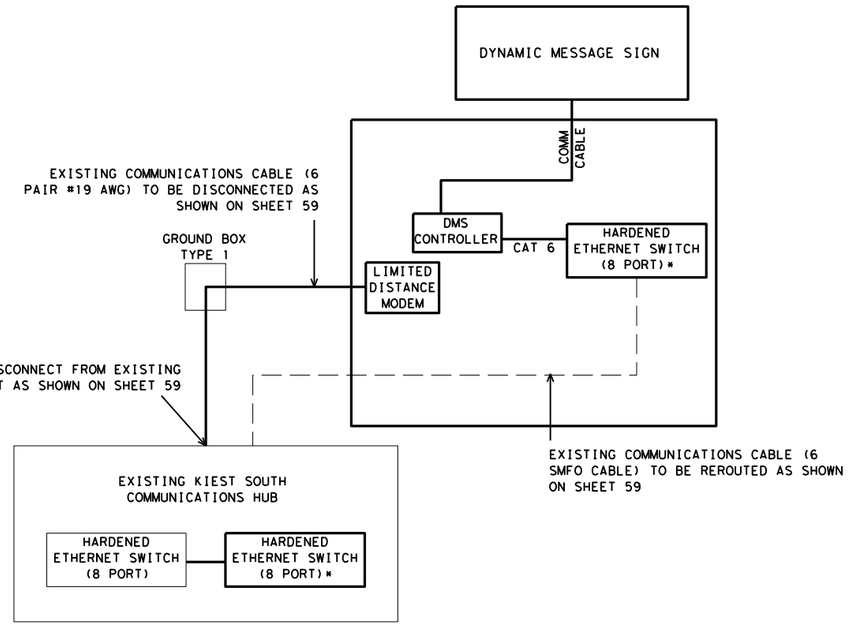
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# COMMUNICATION BLOCK DIAGRAM LP 12 SB AT UNION BOWER RD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 65 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




| LEGEND | |
|---|---|
| | EXISTING EQUIPMENT TO REMAIN |
| | NEW EQUIPMENT TO BE INSTALLED |
| — — | FIBER OPTIC CABLE TO BE REROUTED |
| * | TO BE PROVIDED BY TXDOT |

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2. ALL TXDOT SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED IN THE PLANS.
3. POWER CABLES FOR ETHERNET SWITCHES, ETHERNET JUMPERS CABLES, AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.


| NO. | DATE | REVISION | APPROV. |
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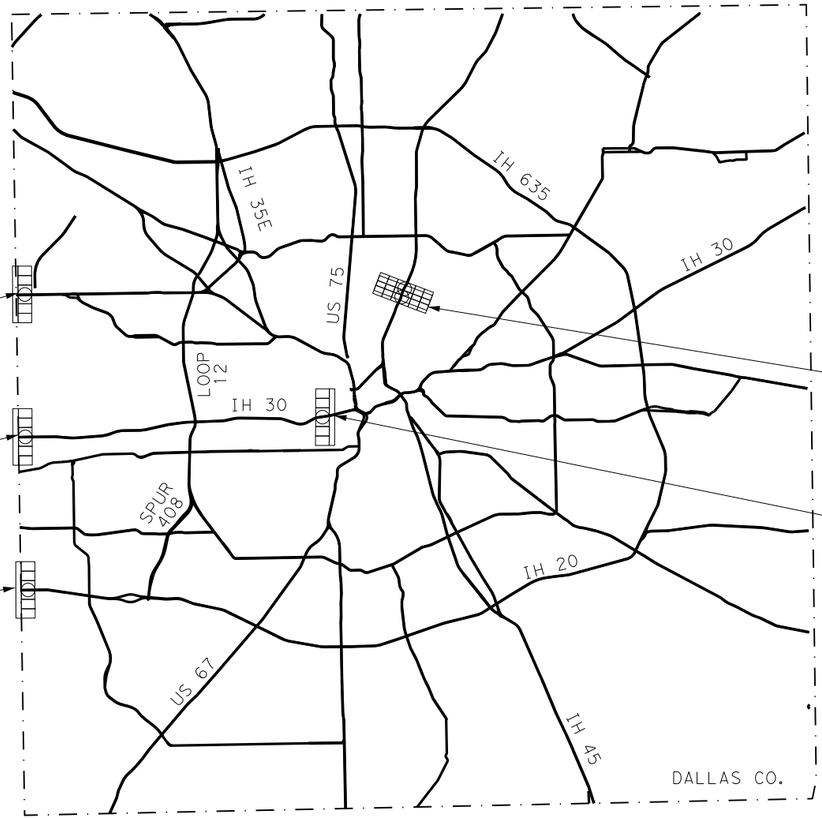
# COMMUNICATION BLOCK DIAGRAM SPUR 408 SB AT GRADY NIBLO RD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 66 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

N. T. S.




DMS #4 EB SH 183 AT COUNTY LINE RD
INSTALLATION SHEETS 75 & 76

DMS #2 EB IH 30 AT PGBT (SH 161)
INSTALLATION SHEETS 71 & 72

DMS #1 EB IH 20 AT
DALLAS/TARRANT COUNTY LINE
INSTALLATION SHEETS 69 & 70

DMS #5 & #6 US 75 AT HASKELL AVE
INSTALLATION SHEET 77

DMS #3 WB IH 30 AT SYLVAN AVE
INSTALLATION SHEETS 73 & 74

| LEGEND | |
|---|---|
| | DMS TO BE INSTALLED |

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER

02/23/2024

| NO. | DATE | REVISION | APPROV. |
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TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# DMS INSTALLATION PROJECT LAYOUT

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 67 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

| SHEET NUMBER | ELEC. SERVICE ID | ELECTRICAL SERVICE DESCRIPTION | SERVICE CONDUIT SIZE | SERVICE CONDUCTOR NO./SIZE | SAFETY SWITCH AMPS | MAIN CKT. BKR. POLE/AMPS | TWO-POLE CONTACTOR AMPS | PANELBD/ LOADCENTER AMP RATING | BRANCH CIRCUIT ID | BRANCH CKT. BKR POLE/AMP | BRANCH CIRCUIT AMPS | KVA LOAD | 2:1 STEP DOWN TRANSFORMER KVA | STEP DOWN XFMR PRIMARY/ SECONDARY CIRCUIT BREAKER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 69 | 1 | ELC SRV TY D 120/240 060 (NS)SS(N)PS(U) | 2" | 3/#4 | N/A | 2P/60 | N/A | 100 | DMS | 2P/50 | 40 | 11.5 | N/A | N/A |
| | | | | | | | | | SPARE | 1P/20 | 16 | | | |
| | | | | | | | | | | | | | | |
| 71 | 2 | ELC SRV TY D 120/240 060 (NS)SS(N)PS(U) | 2" | 3/#4 | N/A | 2P/60 | N/A | 100 | DMS | 2P/50 | 40 | 11.5 | N/A | N/A |
| | | | | | | | | | SPARE | 1P/20 | 16 | | | |
| | | | | | | | | | | | | | | |
| 73 | 3 | ELC SRV TY A 240/480 060 (NS)SS(E)TP(O) (PHOTOCELL NOT REQUIRED) | 1.5" | 3/#6 | N/A | 2P/60 | N/A | N/A | DMS | 2P/30 | 20 | 9.6 | 10.0 | 2P/30 (PRIMARY) 2P/50 (SECONDARY) |
| | | | | | | | | | | | | | | |
| 75 | 4 | ELC SRV TY D 120/240 060 (NS)SS(N)PS(U) | 2" | 3/#4 | N/A | 2P/60 | N/A | 100 | DMS | 2P/50 | 40 | 11.5 | N/A | N/A |
| | | | | | | | | | SPARE | 1P/20 | 16 | | | |
| | | | | | | | | | | | | | | |
| 77 | 5 | ELC SRV TY D 120/240 100(NS)SS(N)PS(U) | 2" | 3/#2 | N/A | 2P/100 | N/A | 100 | DMS NB | 2P/40 | 32 | 17.3 | N/A | N/A |
| | | | | | | | | | DMS SB | 2P/40 | 32 | | | |
| | | | | | | | | | SPARE | 1P/20 | 16 | | | |

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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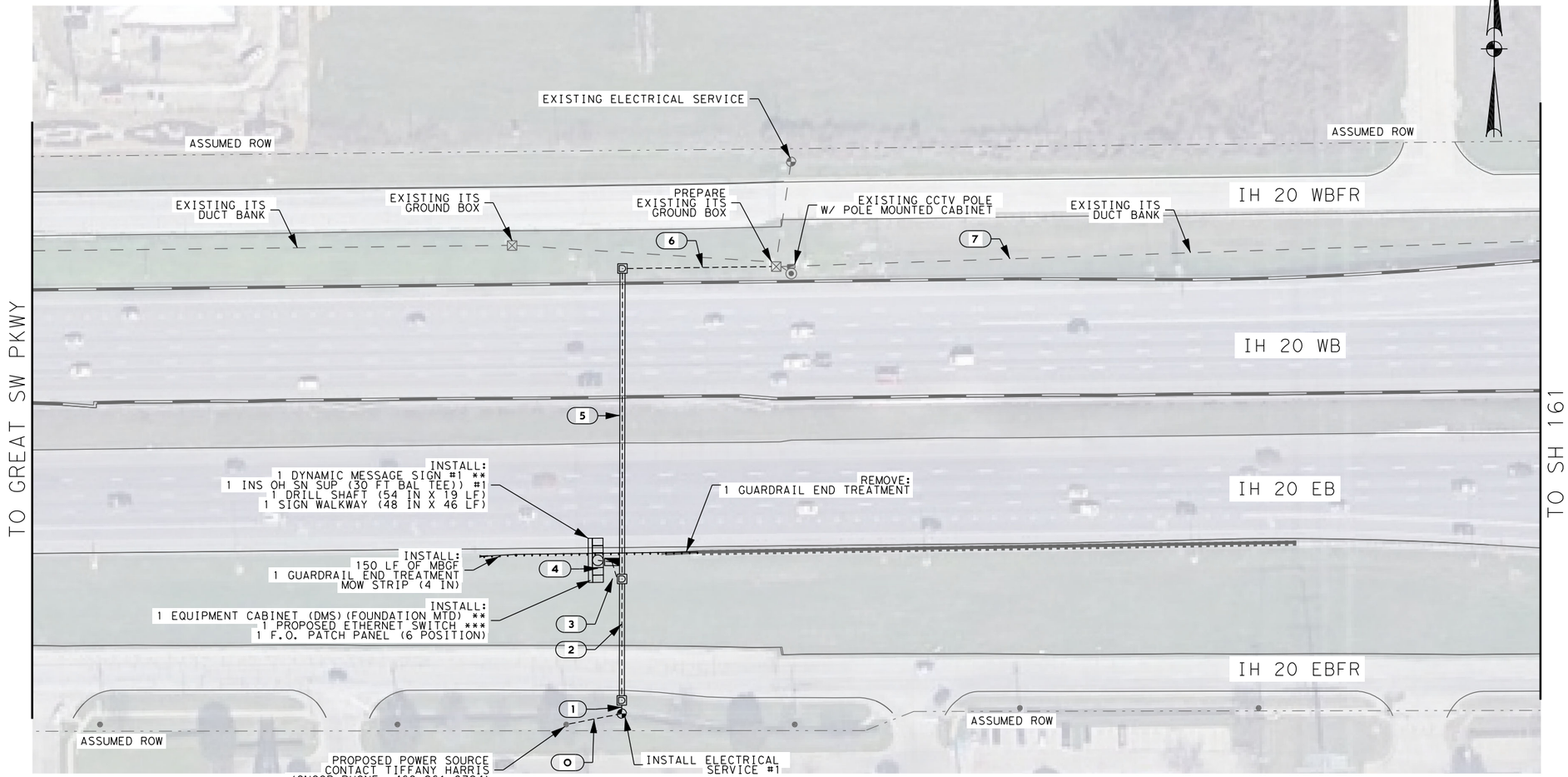
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726



# DMS INSTALLATION ELECTRICAL SERVICE DATA SUMMARY

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 68 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




## LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 100'
50 0 50

## CONDUIT AND CABLE CHART
### WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 | | | | | | | | ITEM 6027 | | CABLE STATUS | ITEM 620 | | | | | | ITEM 6028 | | ITEM 6007 | | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 80) (2") | | CONDT (PVC) (SCHD 80) (2") (BORE) | | CONDT (PVC) (SCHD 80) (3") | | CONDT (PVC) (SCHD 80) (3") (BORE) | | PREPARE CONDUIT | | | ELEC CONDR (NO. 6) BARE | | ELEC CONDR (NO. 6) INSULATED | | ELEC CONDR (NO. 8) INSULATED (TRACER) | | DMS COMM CABLE* | | FO CBL (6 SMF) | | | |
| | | QTY | LF | QTY | LF | Qty | LF | Qty | LF | QTY | LF | | QTY | LF | QTY | LF | QTY | LF | QTY | LF | QTY | LF | | |
| 1 | I | 1 | 15 | | | | | | | | | I | 1 | 20 | 3 | 60 | | | | | | | 15 | 1 |
| 2 | I | | | 1 | 100 | | | | | | | I | 1 | 105 | 3 | 315 | | | | | | | 100 | 2 |
| 3 | I | 1 | 20 | | | 1 | 20 | | | | | I | 1 | 25 | 3 | 75 | | | | | 1 | 45 | 20 | 3 |
| 4 | I | | | | | 2 | 30 | | | | | I | 1 | 55 | 3 | 165 | | | 1 | 55 | | | 15 | 4 |
| 5 | I | | | | | | | 1 | 240 | | | I | | | 1 | 245 | 1 | 245 | | | 1 | 265 | 240 | 5 |
| 6 | I | | | | | 1 | 125 | | | | | I | | | 1 | 130 | 1 | 130 | | | 1 | 150 | 125 | 6 |
| 7 | I | | | | | | | | | 1 | 7050 | I | | | | | | | | | 1 | 7375 | 7050 | 7 |
| O** | I | 1 | 55 | | | | | | | | | I | CONDUCTORS INSTALLED BY ONCOR | | | | | | | | | | 55 | O** |
| TOTALS | | | 90 | | 100 | | 175 | | 240 | | 7050 | | | 205 | | 990 | | 375 | | 55 | | 7835 | | |

*TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028
**RUN INCLUDES 10' OF VERTICAL RISER INSTALLED ON UTILITY POLE

NOTES:

1. THE CONTRACTOR SHALL CONNECT THE PROPOSED DMS #1 TO THE EXISTING ROBINSON HUB VIA 6 SMFO. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING CONNECTIVITY TO THE HUB.
2. DMS GROUND MOUNTED FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS (21) TYPE 4 CABINET SIZE.
3. CONDUIT RUN 7 REPRESENTS THE ESTIMATED TOTAL LENGTH OF EXISTING CONDUIT BETWEEN THE PROPOSED DMS AND THE EXISTING ROBINSON ROAD FIBER HUB.

## SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 416 | 6007 | DRILL SHAFT (54 IN) | LF | 19 |
| 432 | 6045 | RIPRAP (MOW STRIP)(4 IN) | CY | 5.75 |
| 506 | 6041 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 30 |
| 506 | 6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 30 |
| 540 | 6002 | MTL W-BEAM GD FEN (STEEL POST) | LF | 150 |
| 544 | 6001 | GUARDRAIL END TREATMENT (INSTALL) | EA | 1 |
| 544 | 6003 | GUARDRAIL END TREATMENT (REMOVE) | EA | 1 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 90 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 100 |
| 618 | 6053 | CONDT (PVC) (SCH 80) (3") | LF | 175 |
| 618 | 6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 240 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 375 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 205 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 990 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 3 |
| 628 | 6151 | ELC SRV TY D 120/240 060(NS)SS(N)PS(U) | EA | 1 |
| 650 | 6028 | INS OH SN SUP(30 FT BAL TEE) | EA | 1 |
| 654 | 6006 | SIGN WALKWAY (48 IN) WITH HNDRL | LF | 46 |
| 658 | 6015 | INSTL DEL ASSM (D-SW)SZ(BRF)GF1 | EA | 15 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 7835 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 1 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 7050 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 13 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| ** | | DYNAMIC MESSAGE SIGN (DMS) | EA | 1 |
| ** | | EQUIPMENT CABINET (DMS)(FOUNDATION MTD) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |
| *** | | ETHERNET SWITCH | EA | 2 |

** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6028
*** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6123

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

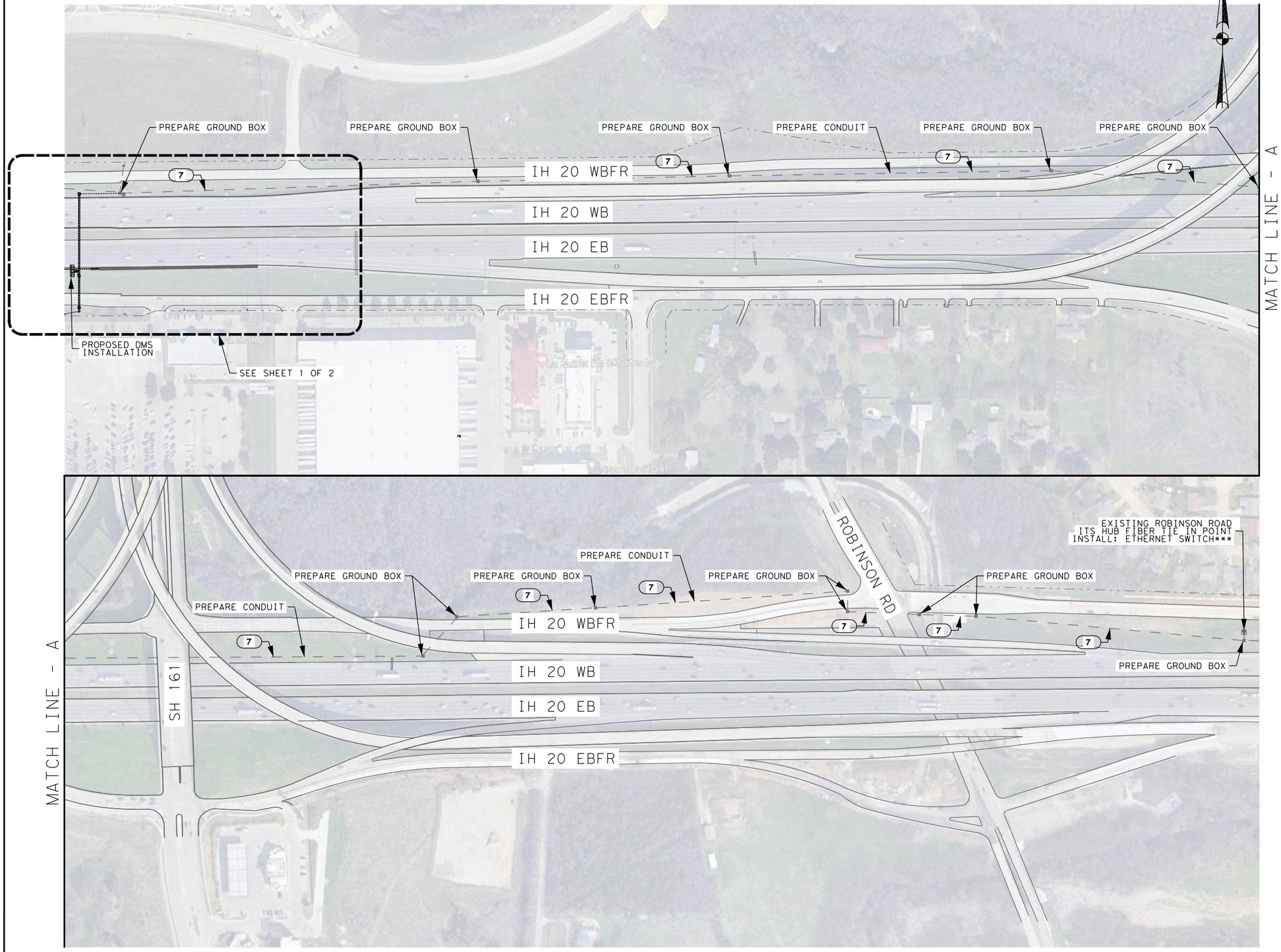
TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726




# DMS INSTALLATION LAYOUT EB IH 20 AT DALLAS/ TARRANT COUNTY LINE

(SHEET 1 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 69 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




## LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

NOTES:
1. CONDUIT AND GROUND BOX PREPARATION WILL BE PAID UNDER ITEM 6027.

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

SCALE: 1" = 300'
150 0 150

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |

OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

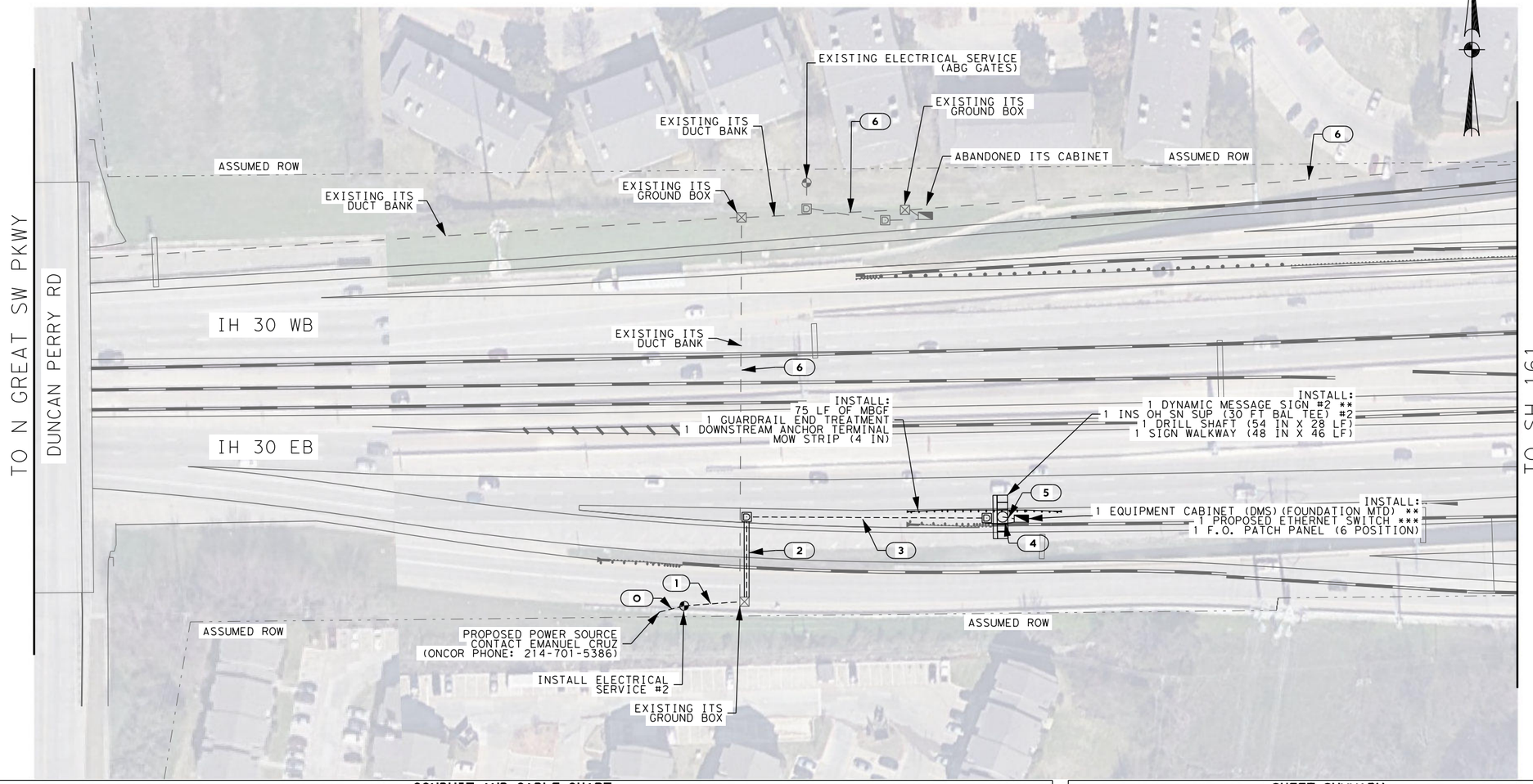
TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# DMS INSTALLATION LAYOUT EB IH 20 AT DALLAS/ TARRANT COUNTY LINE

(SHEET 2 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 70 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




## LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
3/12/2024

SCALE: 1" = 100'
50 0 50

## CONDUIT AND CABLE CHART
## WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 CONDT (PVC) (SCHD 80) (2") QTY | LF | CONDT (PVC) (SCHD 80) (2") (BORE) QTY | LF | CONDT (PVC) (SCHD 80) (3") Qty | LF | CONDT (PVC) (SCHD 80) (3") (BORE) Qty | LF | ITEM 6027 PREPARE CONDUIT QTY | LF | CABLE STATUS | ITEM 680 ELEC CONDR (NO. 4) BARE QTY | LF | ELEC CONDR (NO. 6) BARE QTY | LF | ELEC CONDR (NO. 4) INSULATED QTY | LF | ELEC CONDR (NO. 6) INSULATED QTY | LF | ELEC CONDR (NO. 8) INSULATED (TRACER) QTY | LF | ITEM 6028 DMS COMM CABLE* QTY | LF | ITEM 6007 FO CBL (6 SMF) QTY | LF | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | I | 1 | 50 | | | | | | | | | I | 1 | 55 | | | 3 | 165 | | | | | | | | | 50 | 1 |
| 2 | I | | | 1 | 70 | | | 1 | 70 | | | I | 1 | 75 | | | 3 | 225 | | | | | | | 1 | 95 | 70 | 2 |
| 3 | I | 1 | 200 | | | 1 | 200 | | | | | I | 1 | 205 | | | 3 | 615 | | | 1 | 205 | | | 1 | 225 | 200 | 3 |
| 4 | I | 1 | 35 | | | 1 | 35 | | | | | I | 1 | 40 | | | 3 | 120 | | | 1 | 40 | | | 1 | 60 | 35 | 4 |
| 5 | I | | | | | 2 | 30 | | | | | I | | | 1 | 55 | | | 3 | 165 | | | 1 | 55 | | | 15 | 5 |
| 6 | E | | | | | | | | | 1 | 2845 | I | | | | | | | | | | | | | 1 | 3070 | 2845 | 6 |
| O** | I | 1 | 55 | | | | | | | | | I | CONDUCTORS INSTALLED BY ONCOR | | | | | | | | | | | | | | 55 | O** |
| TOTALS | | | 340 | | 70 | | 265 | | 70 | | 2845 | | | 375 | | 55 | | 1125 | | 165 | | 245 | | 55 | | 3450 | | |

*TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028
**RUN INCLUDES 10' OF VERTICAL RISER INSTALLED ON UTILITY POLE

NOTES:

1. THE CONTRACTOR SHALL CONNECT THE PROPOSED DMS #2 TO THE EXISTING PGBT/SH-161 HUB CABINET VIA 6 SMFO. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING CONNECTIVITY TO THE HUB.
2. DMS GROUND MOUNTED FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS (21) TYPE 4 CABINET SIZE.
3. CONDUIT RUN 6 REPRESENTS THE ESTIMATED TOTAL LENGTH OF EXISTING CONDUIT BETWEEN THE PROPOSED DMS AND THE EXISTING PGBT/SH-161 HUB CABINET.

## SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QTY |
|---|---|---|---|---|
| 416 | 6007 | DRILL SHAFT (54 IN) | LF | 28 |
| 432 | 6045 | RIPRAP (MOW STRIP)(4 IN) | CY | 1.5 |
| 506 | 6041 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 30 |
| 506 | 6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 30 |
| 540 | 6002 | MTL W-BEAM GD FEN (STEEL POST) | LF | 75 |
| 540 | 6016 | DOWNSTREAM ANCHOR TERMINAL SECTION | EA | 1 |
| 544 | 6001 | GUARDRAIL END TREATMENT (INSTALL) | EA | 1 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 340 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 70 |
| 618 | 6053 | CONDT (PVC) (SCH 80) (3") | LF | 265 |
| 618 | 6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 70 |
| 620 | 6008 | ELEC CONDR (NO.8) INSULATED | LF | 245 |
| 620 | 6009 | ELEC CONDR (NO.6) BARE | LF | 55 |
| 620 | 6010 | ELEC CONDR (NO.6) INSULATED | LF | 165 |
| 620 | 6011 | ELEC CONDR (NO.4) BARE | LF | 375 |
| 620 | 6012 | ELEC CONDR (NO.4) INSULATED | LF | 1125 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 2 |
| 628 | 6151 | ELC SRV TY D 120/240 060(NS)SS(N)PS(U) | EA | 1 |
| 650 | 6028 | INS OH SN SUP(30 FT BAL TEE) | EA | 1 |
| 654 | 6006 | SIGN WALKWAY (48 IN) WITH HNDRL | LF | 46 |
| 658 | 6015 | INSTL DEL ASSM (D-SW)SZ (BRF)GF1 | EA | 8 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 3450 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 1 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 2845 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 9 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| ** | | DYNAMIC MESSAGE SIGN (DMS) | EA | 1 |
| ** | | EQUIPMENT CABINET (DMS)(FOUNDATION MTD) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |
| *** | | ETHERNET SWITCH | EA | 2 |
| *** | | ETHERNET SWITCH PORT EXPANDER | EA | 1 |

** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6028
*** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6123

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726



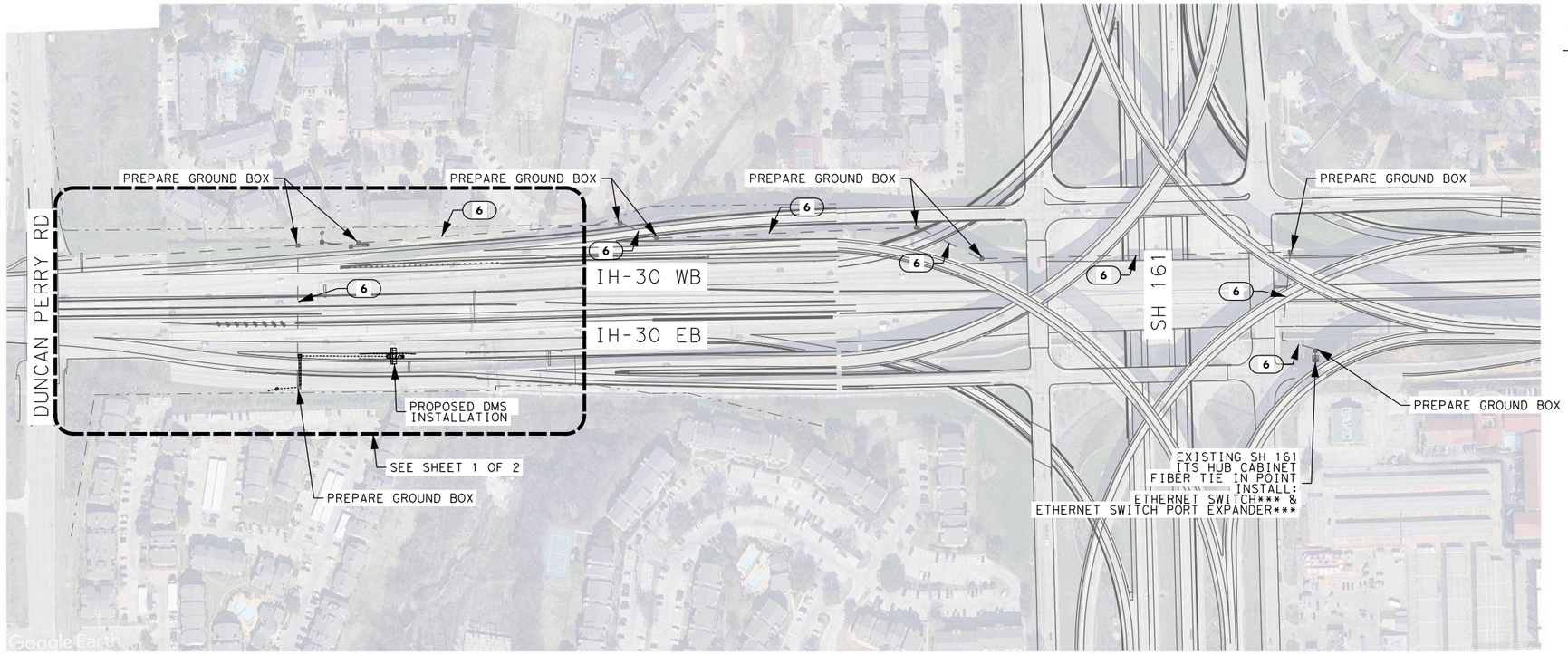

# DMS INSTALLATION LAYOUT
# EB IH 30 AT SH 161

(SHEET 1 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 71 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




## LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

NOTES:
1. CONDUIT AND GROUND BOX PREPARATION WILL BE PAID UNDER ITEM 6027.

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
3/13/2024

SCALE: 1" = 300'
150 0 150

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# DMS INSTALLATION LAYOUT
# EB IH 30 AT SH 161

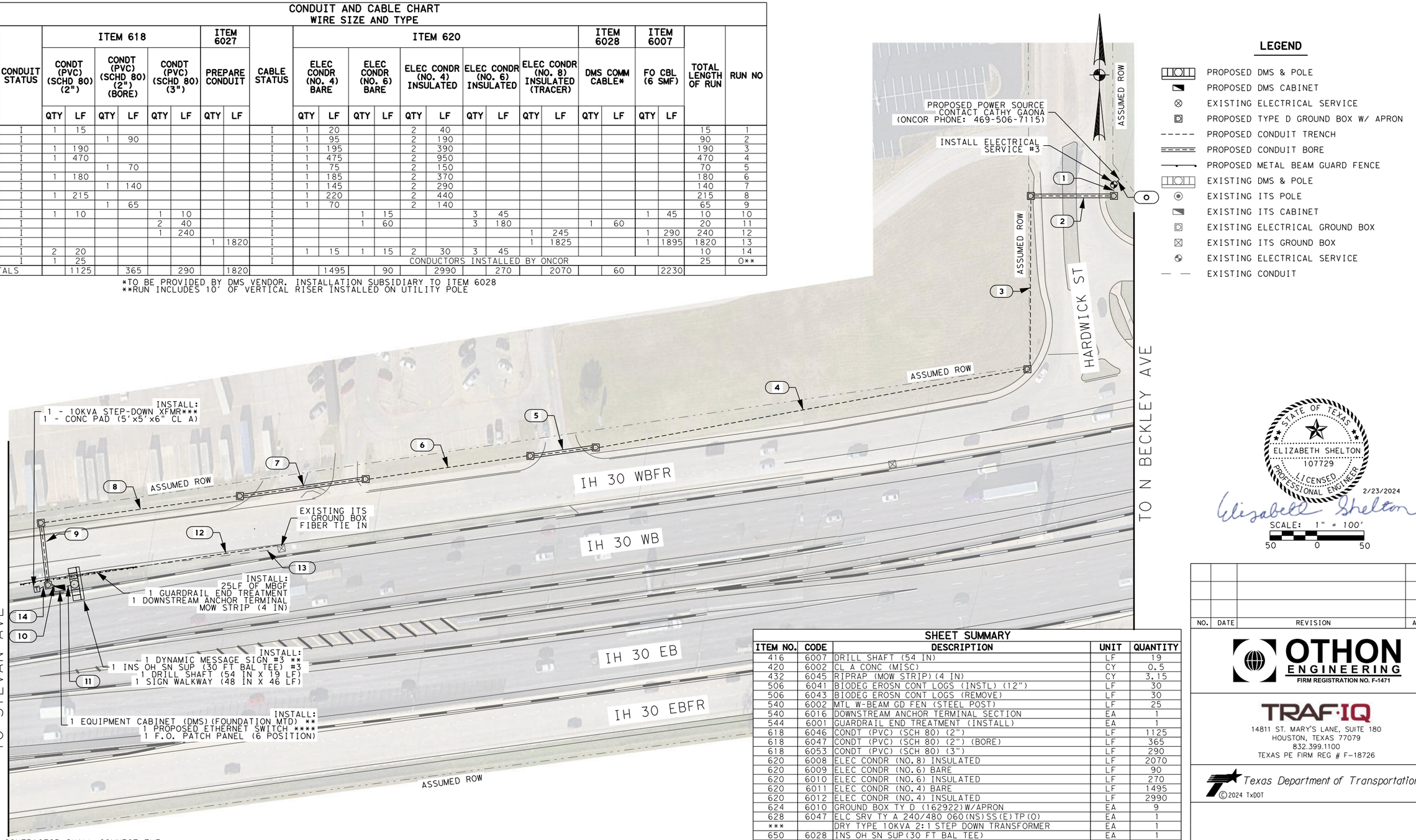
(SHEET 2 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 72 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

## CONDUIT AND CABLE CHART
### WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 | | | | | | ITEM 6027 | | CABLE STATUS | ITEM 620 | | | | | | | | | | ITEM 6028 | | ITEM 6007 | | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 80) (2") | | CONDT (PVC) (SCHD 80) (2") (BORE) | | CONDT (PVC) (SCHD 80) (3") | | PREPARE CONDUIT | | | ELEC CONDR (NO. 4) BARE | | ELEC CONDR (NO. 6) BARE | | ELEC CONDR (NO. 4) INSULATED | | ELEC CONDR (NO. 6) INSULATED | | ELEC CONDR (NO. 8) INSULATED (TRACER) | | DMS COMM CABLE* | | FO CBL (6 SMF) | | | |
| | | QTY | LF | QTY | LF | QTY | LF | QTY | LF | | QTY | LF | QTY | LF | QTY | LF | QTY | LF | QTY | LF | QTY | LF | QTY | LF | | |
| 1 | I | 1 | 15 | | | | | | | I | 1 | 20 | | | 2 | 40 | | | | | | | | | 15 | 1 |
| 2 | I | | | 1 | 90 | | | | | I | 1 | 95 | | | 2 | 190 | | | | | | | | | 90 | 2 |
| 3 | I | 1 | 190 | | | | | | | I | 1 | 195 | | | 2 | 390 | | | | | | | | | 190 | 3 |
| 4 | I | 1 | 470 | | | | | | | I | 1 | 475 | | | 2 | 950 | | | | | | | | | 470 | 4 |
| 5 | I | | | 1 | 70 | | | | | I | 1 | 75 | | | 2 | 150 | | | | | | | | | 70 | 5 |
| 6 | I | 1 | 180 | | | | | | | I | 1 | 185 | | | 2 | 370 | | | | | | | | | 180 | 6 |
| 7 | I | | | 1 | 140 | | | | | I | 1 | 145 | | | 2 | 290 | | | | | | | | | 140 | 7 |
| 8 | I | 1 | 215 | | | | | | | I | 1 | 220 | | | 2 | 440 | | | | | | | | | 215 | 8 |
| 9 | I | | | 1 | 65 | | | | | I | 1 | 70 | | | 2 | 140 | | | | | | | | | 65 | 9 |
| 10 | I | 1 | 10 | | | 1 | 10 | | | I | | | 1 | 15 | | | 3 | 45 | | | | | 1 | 45 | 10 | 10 |
| 11 | I | | | | | 2 | 40 | | | I | | | 1 | 60 | | | 3 | 180 | | | 1 | 60 | | | 20 | 11 |
| 12 | I | | | | | 1 | 240 | | | I | | | | | | | | | 1 | 245 | | | 1 | 290 | 240 | 12 |
| 13 | I | | | | | | | 1 | 1820 | I | | | | | | | | | 1 | 1825 | | | 1 | 1895 | 1820 | 13 |
| 14 | I | 2 | 20 | | | | | | | I | 1 | 15 | 1 | 15 | 2 | 30 | 3 | 45 | | | | | | | 10 | 14 |
| O** | I | 1 | 25 | | | | | | | I | CONDUCTORS INSTALLED BY ONCOR | | | | | | | | | | | | | | 25 | O** |
| TOTALS | | | 1125 | | 365 | | 290 | | 1820 | | | 1495 | | 90 | | 2990 | | 270 | | 2070 | | 60 | | 2230 | | |

*TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028
**RUN INCLUDES 10' OF VERTICAL RISER INSTALLED ON UTILITY POLE




### LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

NOTES:

1. THE CONTRACTOR SHALL CONNECT THE PROPOSED DMS #3 TO THE EXISTING CCTV CABINET AT SYLVAN AVE VIA 6 SMFO. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING CONNECTIVITY TO THE HUB.
2. DMS GROUND MOUNTED FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS (21) TYPE 4 CABINET SIZE.
3. CONDUIT RUN 13 REPRESENTS THE ESTIMATED TOTAL LENGTH OF EXISTING CONDUIT BETWEEN THE PROPOSED DMS AND THE EXISTING CCTV CABINET AT SYLVAN AVE.
4. INSTALL NO. 3 REBAR AT 18" O.C.E.W. FOR CONCRETE PAD.

### SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 416 | 6007 | DRILL SHAFT (54 IN) | LF | 19 |
| 420 | 6002 | CL A CONC (MISC) | CY | 0.5 |
| 432 | 6045 | RIPRAP (MOW STRIP)(4 IN) | CY | 3.15 |
| 506 | 6041 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 30 |
| 506 | 6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 30 |
| 540 | 6002 | MTL W-BEAM GD FEN (STEEL POST) | LF | 25 |
| 540 | 6016 | DOWNSTREAM ANCHOR TERMINAL SECTION | EA | 1 |
| 544 | 6001 | GUARDRAIL END TREATMENT (INSTALL) | EA | 1 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 1125 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 365 |
| 618 | 6053 | CONDT (PVC) (SCH 80) (3") | LF | 290 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 2070 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 90 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 270 |
| 620 | 6011 | ELEC CONDR (NO. 4) BARE | LF | 1495 |
| 620 | 6012 | ELEC CONDR (NO. 4) INSULATED | LF | 2990 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 9 |
| 628 | 6047 | ELC SRV TY A 240/480 060(NS)SS(E)TP(O) | EA | 1 |
| *** | | DRY TYPE 10KVA 2:1 STEP DOWN TRANSFORMER | EA | 1 |
| 650 | 6028 | INS OH SN SUP(30 FT BAL TEE) | EA | 1 |
| 654 | 6006 | SIGN WALKWAY (48 IN) WITH HNDRL | LF | 46 |
| 658 | 6015 | INSTL DEL ASSM (D-SW)SZ (BRF)GF1 | EA | 3 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 2230 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 2 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 1820 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 3 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| ** | | DYNAMIC MESSAGE SIGN (DMS) | EA | 1 |
| ** | | EQUIPMENT CABINET (DMS) (FOUNDATION MTD) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 1 |
| **** | | ETHERNET SWITCH | EA | 1 |

** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6028
*** TO BE SUPPLIED BY CONTRACTOR, SUBSIDIARY TO ITEM 628
**** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6123

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

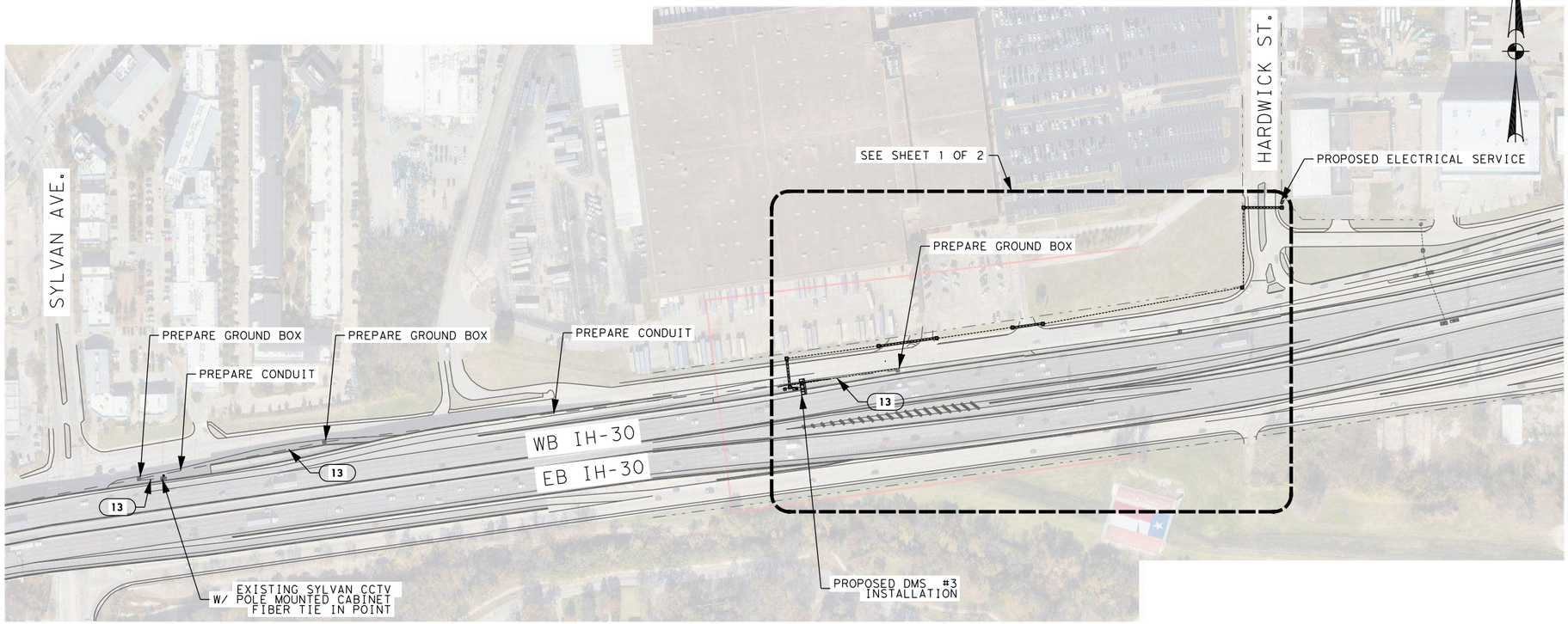

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


Texas Department of Transportation


# DMS INSTALLATION LAYOUT WB IH 30 AT SYLVAN AVE

(SHEET 1 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 73 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




## LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

NOTES:
1. CONDUIT AND GROUND BOX PREPARATION WILL BE PAID UNDER ITEM 6027.

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

SCALE: 1" = 300'
150 0 150

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation

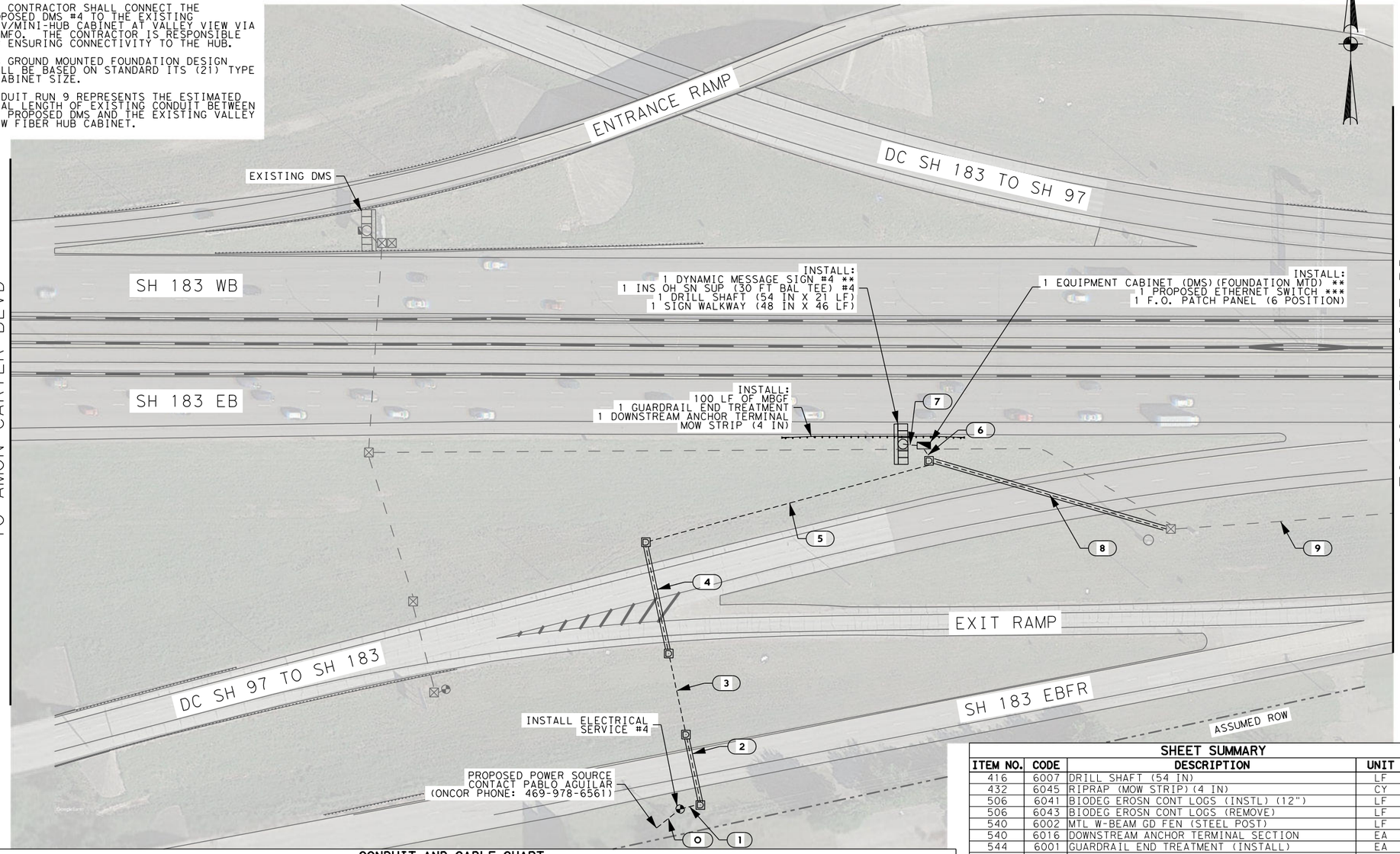

# DMS INSTALLATION LAYOUT
# WB IH 30 AT SYLVAN AVE

(SHEET 2 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 74 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

NOTES:

1. THE CONTRACTOR SHALL CONNECT THE PROPOSED DMS #4 TO THE EXISTING CCTV/MINI-HUB CABINET AT VALLEY VIEW VIA 6 SMFO. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING CONNECTIVITY TO THE HUB.
2. DMS GROUND MOUNTED FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS (21) TYPE 4 CABINET SIZE.
3. CONDUIT RUN 9 REPRESENTS THE ESTIMATED TOTAL LENGTH OF EXISTING CONDUIT BETWEEN THE PROPOSED DMS AND THE EXISTING VALLEY VIEW FIBER HUB CABINET.




## LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

SCALE: 1" = 100'
50 0 50

## CONDUIT AND CABLE CHART
## WIRE SIZE AND TYPE

| RUN NO | CONDUIT STATUS | ITEM 618 CONDT (PVC) (SCHD 80) (2") QTY | ITEM 618 CONDT (PVC) (SCHD 80) (2") LF | ITEM 618 CONDT (PVC) (SCHD 80) (2") (BORE) QTY | ITEM 618 CONDT (PVC) (SCHD 80) (2") (BORE) LF | ITEM 618 CONDT (PVC) (SCHD 80) (3") Qty | ITEM 618 CONDT (PVC) (SCHD 80) (3") LF | ITEM 618 CONDT (PVC) (SCHD 80) (3") (BORE) Qty | ITEM 618 CONDT (PVC) (SCHD 80) (3") (BORE) LF | ITEM 6027 PREPARE CONDUIT QTY | ITEM 6027 PREPARE CONDUIT LF | CABLE STATUS | ITEM 620 ELEC CONDR (NO. 4) BARE QTY | ITEM 620 ELEC CONDR (NO. 4) BARE LF | ITEM 620 ELEC CONDR (NO. 6) BARE QTY | ITEM 620 ELEC CONDR (NO. 6) BARE LF | ITEM 620 ELEC CONDR (NO. 4) INSULATED QTY | ITEM 620 ELEC CONDR (NO. 4) INSULATED LF | ITEM 620 ELEC CONDR (NO. 6) INSULATED QTY | ITEM 620 ELEC CONDR (NO. 6) INSULATED LF | ITEM 620 ELEC CONDR (NO. 8) INSULATED (TRACER) QTY | ITEM 620 ELEC CONDR (NO. 8) INSULATED (TRACER) LF | ITEM 6028 DMS COMM CABLE* QTY | ITEM 6028 DMS COMM CABLE* LF | ITEM 6007 FO CBL (6 SMF) QTY | ITEM 6007 FO CBL (6 SMF) LF | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | I | 1 | 15 | | | | | | | | | I | 1 | 20 | | | 3 | 60 | | | | | | | | | 15 | 1 |
| 2 | I | | | 1 | 60 | | | | | | | I | 1 | 65 | | | 3 | 195 | | | | | | | | | 60 | 2 |
| 3 | I | 1 | 70 | | | | | | | | | I | 1 | 75 | | | 3 | 225 | | | | | | | | | 70 | 3 |
| 4 | I | | | 1 | 95 | | | | | | | I | 1 | 100 | | | 3 | 300 | | | | | | | | | 95 | 4 |
| 5 | I | 1 | 260 | | | | | | | | | I | 1 | 265 | | | 3 | 795 | | | | | | | | | 260 | 5 |
| 6 | I | 1 | 15 | | | 1 | 15 | | | | | I | 1 | 20 | | | 3 | 60 | | | | | | | 1 | 40 | 15 | 6 |
| 7 | I | | | | | 2 | 30 | | | | | I | | | 1 | 55 | | | 3 | 165 | | | 1 | 55 | | | 15 | 7 |
| 8 | I | | | | | | | 1 | 210 | | | I | | | | | | | | | 1 | 215 | | | 1 | 235 | 210 | 8 |
| 9 | E | | | | | | | | | 1 | 3606 | I | | | | | | | | | | | | | 1 | 3806 | 3606 | 9 |
| O** | I | 1 | 40 | | | | | | | | | I | CONDUCTORS INSTALLED BY ONCOR | | | | | | | | | | | | | | 40 | O** |
| TOTALS | | | 400 | | 155 | | 45 | | 210 | | 3606 | | | 545 | | 55 | | 1635 | | 165 | | 215 | | 55 | | 4081 | | |

*TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028
**RUN INCLUDES 10' OF VERTICAL RISER INSTALLED ON UTILITY POLE

## SHEET SUMMARY

| ITEM NO. | CODE | DESCRIPTION | UNIT | QTY |
|---|---|---|---|---|
| 416 | 6007 | DRILL SHAFT (54 IN) | LF | 21 |
| 432 | 6045 | RIPRAP (MOW STRIP)(4 IN) | CY | 3.75 |
| 506 | 6041 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 30 |
| 506 | 6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 30 |
| 540 | 6002 | MTL W-BEAM GD FEN (STEEL POST) | LF | 100 |
| 540 | 6016 | DOWNSTREAM ANCHOR TERMINAL SECTION | EA | 1 |
| 544 | 6001 | GUARDRAIL END TREATMENT (INSTALL) | EA | 1 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 400 |
| 618 | 6047 | CONDT (PVC) (SCH 80) (2") (BORE) | LF | 155 |
| 618 | 6053 | CONDT (PVC) (SCH 80) (3") | LF | 45 |
| 618 | 6054 | CONDT (PVC) (SCH 80) (3") (BORE) | LF | 210 |
| 620 | 6008 | ELEC CONDR (NO. 8) INSULATED | LF | 215 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 55 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 165 |
| 620 | 6011 | ELEC CONDR (NO. 4) BARE | LF | 545 |
| 620 | 6012 | ELEC CONDR (NO. 4) INSULATED | LF | 1635 |
| 624 | 6010 | GROUND BOX TY D (162922)W/APRON | EA | 5 |
| 628 | 6151 | ELC SRV TY D 120/240 060(NS)SS(N)PS(U) | EA | 1 |
| 650 | 6028 | INS OH SN SUP(30 FT BAL TEE) | EA | 1 |
| 654 | 6006 | SIGN WALKWAY (48 IN) WITH HNDRL | LF | 46 |
| 658 | 6015 | INSTAL DEL ASSM (D-SW)SZ(BRF)GF1 | EA | 10 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 4081 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 2 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 3606 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 6 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 1 |
| ** | | DYNAMIC MESSAGE SIGN (DMS) | EA | 1 |
| ** | | EQUIPMENT CABINET (DMS)(FOUNDATION MTD) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |
| *** | | ETHERNET SWITCH | EA | 2 |

** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6028
*** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6123

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471


TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726



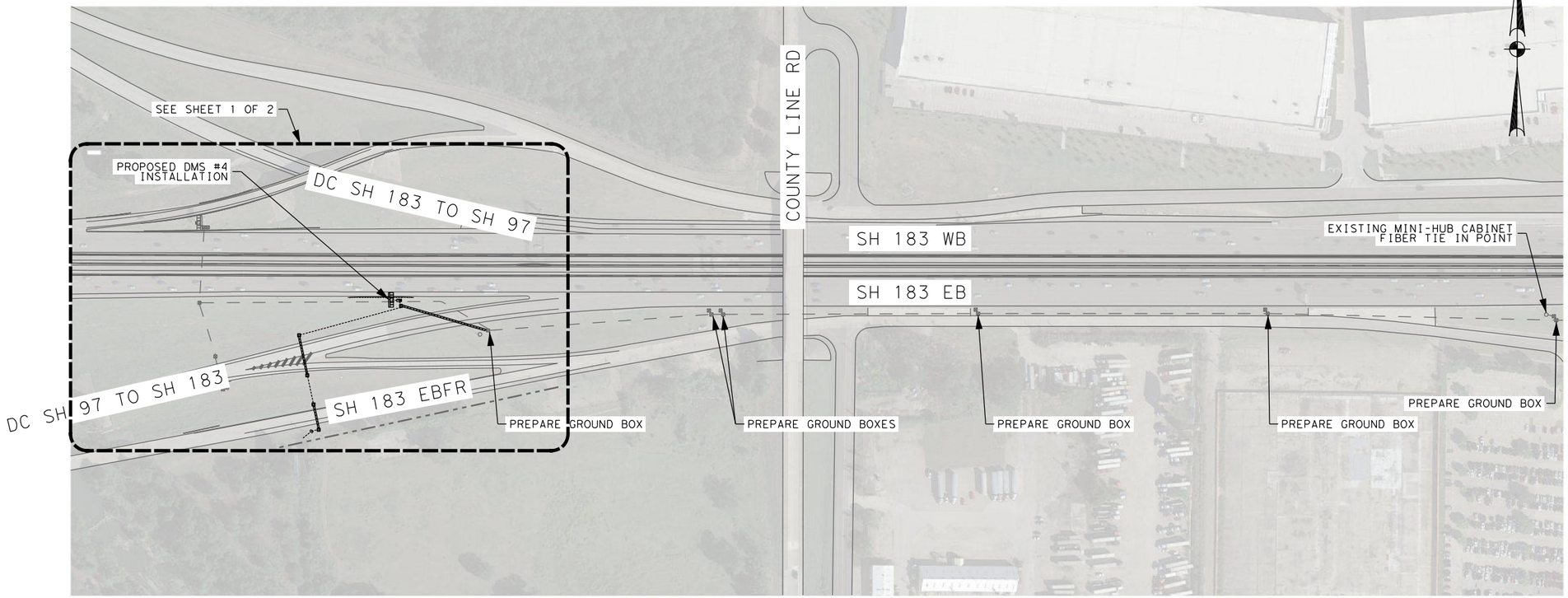

# DMS INSTALLATION LAYOUT EB SH 183 AT COUNTY LINE RD

(SHEET 1 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 75 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




## LEGEND

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

NOTES:
1. CONDUIT AND GROUND BOX PREPARATION WILL BE PAID UNDER ITEM 6027.

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 300'
150 0 150

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

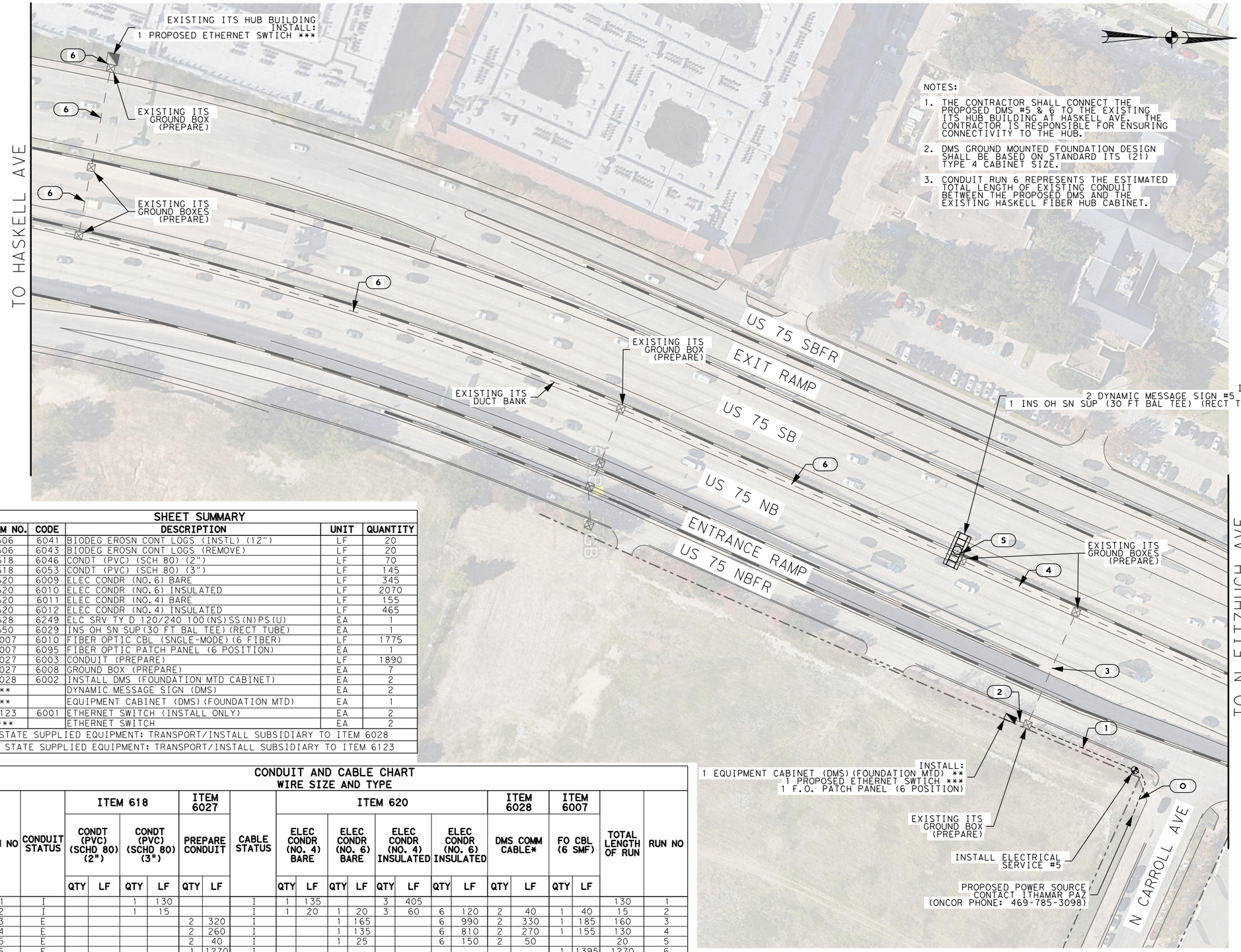
Texas Department of Transportation


# DMS INSTALLATION LAYOUT EB SH 183 AT COUNTY LINE RD

(SHEET 2 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 76 |

| STATE | DIST. | COUNTY | |
|---|---|---|---|
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




NOTES:

1. THE CONTRACTOR SHALL CONNECT THE PROPOSED DMS #5 & 6 TO THE EXISTING ITS HUB BUILDING AT HASKELL AVE. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING CONNECTIVITY TO THE HUB.
2. DMS GROUND MOUNTED FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS (21) TYPE 4 CABINET SIZE.
3. CONDUIT RUN 6 REPRESENTS THE ESTIMATED TOTAL LENGTH OF EXISTING CONDUIT BETWEEN THE PROPOSED DMS AND THE EXISTING HASKELL FIBER HUB CABINET.

**LEGEND**

- PROPOSED DMS & POLE
- PROPOSED DMS CABINET
- EXISTING ELECTRICAL SERVICE
- PROPOSED TYPE D GROUND BOX W/ APRON
- PROPOSED CONDUIT TRENCH
- PROPOSED CONDUIT BORE
- PROPOSED METAL BEAM GUARD FENCE
- EXISTING DMS & POLE
- EXISTING ITS POLE
- EXISTING ITS CABINET
- EXISTING ELECTRICAL GROUND BOX
- EXISTING ITS GROUND BOX
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT

**SHEET SUMMARY**

| ITEM NO. | CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 506 | 6041 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 20 |
| 506 | 6043 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 20 |
| 618 | 6046 | CONDT (PVC) (SCH 80) (2") | LF | 70 |
| 618 | 6053 | CONDT (PVC) (SCH 80) (3") | LF | 145 |
| 620 | 6009 | ELEC CONDR (NO. 6) BARE | LF | 345 |
| 620 | 6010 | ELEC CONDR (NO. 6) INSULATED | LF | 2070 |
| 620 | 6011 | ELEC CONDR (NO. 4) BARE | LF | 155 |
| 620 | 6012 | ELEC CONDR (NO. 4) INSULATED | LF | 465 |
| 628 | 6249 | ELC SRV TY D 120/240 100(NS)SS(N)PS(U) | EA | 1 |
| 650 | 6029 | INS OH SN SUP(30 FT BAL TEE)(RECT TUBE) | EA | 1 |
| 6007 | 6010 | FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER) | LF | 1775 |
| 6007 | 6095 | FIBER OPTIC PATCH PANEL (6 POSITION) | EA | 1 |
| 6027 | 6003 | CONDUIT (PREPARE) | LF | 1890 |
| 6027 | 6008 | GROUND BOX (PREPARE) | EA | 7 |
| 6028 | 6002 | INSTALL DMS (FOUNDATION MTD CABINET) | EA | 2 |
| ** | | DYNAMIC MESSAGE SIGN (DMS) | EA | 2 |
| ** | | EQUIPMENT CABINET (DMS)(FOUNDATION MTD) | EA | 1 |
| 6123 | 6001 | ETHERNET SWITCH (INSTALL ONLY) | EA | 2 |
| *** | | ETHERNET SWITCH | EA | 2 |

** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6028

*** STATE SUPPLIED EQUIPMENT: TRANSPORT/INSTALL SUBSIDIARY TO ITEM 6123

**CONDUIT AND CABLE CHART**
**WIRE SIZE AND TYPE**

| RUN NO | CONDUIT STATUS | ITEM 618 | | | | ITEM 6027 | | CABLE STATUS | ITEM 620 | | | | | | | | ITEM 6028 | | ITEM 6007 | | TOTAL LENGTH OF RUN | RUN NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CONDT (PVC) (SCHD 80) (2") | | CONDT (PVC) (SCHD 80) (3") | | PREPARE CONDUIT | | | ELEC CONDR (NO. 4) BARE | | ELEC CONDR (NO. 6) BARE | | ELEC CONDR (NO. 4) INSULATED | | ELEC CONDR (NO. 6) INSULATED | | DMS COMM CABLE* | | FO CBL (6 SMF) | | | |
| | | QTY | LF | QTY | LF | QTY | LF | | QTY | LF | QTY | LF | QTY | LF | QTY | LF | QTY | LF | QTY | LF | | |
| 1 | I | | | 1 | 130 | | | I | 1 | 135 | | | 3 | 405 | | | | | | | 130 | 1 |
| 2 | I | | | 1 | 15 | | | I | 1 | 20 | 1 | 20 | 3 | 60 | 6 | 120 | 2 | 40 | 1 | 40 | 15 | 2 |
| 3 | E | | | | | 2 | 320 | I | | | 1 | 165 | | | 6 | 990 | 2 | 330 | 1 | 185 | 160 | 3 |
| 4 | E | | | | | 2 | 260 | I | | | 1 | 135 | | | 6 | 810 | 2 | 270 | 1 | 155 | 130 | 4 |
| 5 | E | | | | | 2 | 40 | I | | | 1 | 25 | | | 6 | 150 | 2 | 50 | | | 20 | 5 |
| 6 | E | | | | | 1 | 1270 | I | | | | | | | | | | | 1 | 1395 | 1270 | 6 |
| O** | I | 1 | 70 | | | | | I | CONDUCTORS INSTALLED BY ONCOR | | | | | | | | | | | | 70 | O** |
| TOTALS | | | 70 | | 145 | | 1890 | | | 155 | | 345 | | 465 | | 2070 | | 690 | | 1775 | | |

*TO BE PROVIDED BY DMS VENDOR. INSTALLATION SUBSIDIARY TO ITEM 6028
**RUN INCLUDES 10' OF VERTICAL RISER INSTALLED ON UTILITY POLE

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

SCALE: 1" = 100'
50 0 50

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |


OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

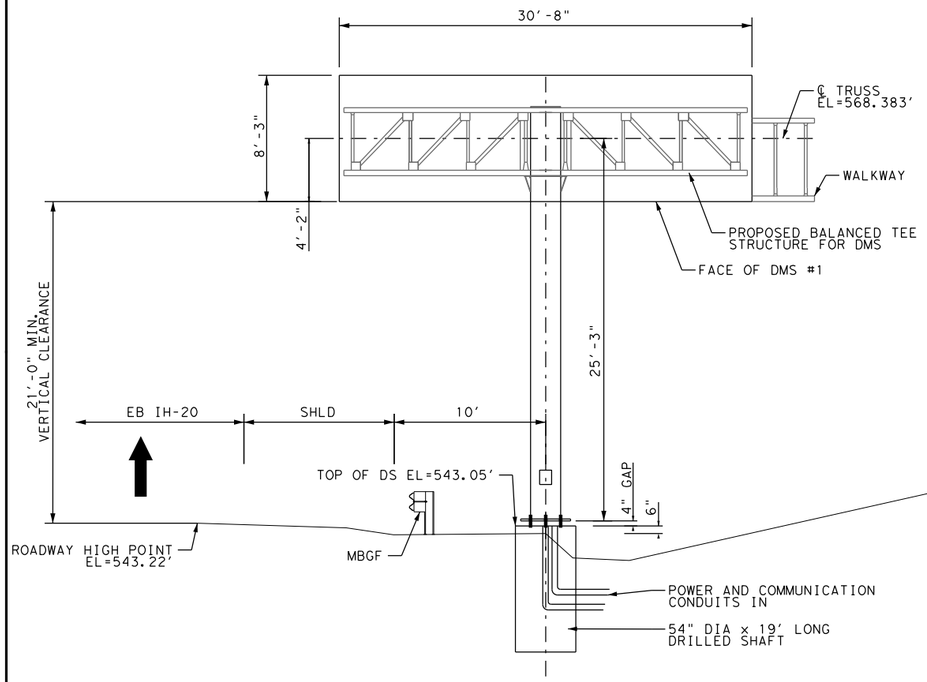



# DMS INSTALLATION LAYOUT US 75 AT HASKELL AVE

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 77 |

| STATE | DIST. | COUNTY |
|---|---|---|
| TEXAS | DAL | DALLAS, ETC |

| CONT. | SECT. | JOB | HIGHWAY NO. |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75, ETC |




DESIGN DATA

| | |
|---|---|
| SPAN LENGTH | 30′-8" |
| DESIGN WIND HEIGHT | 27′-11" |
| TOWER HEIGHT | 25′-3" |

DESIGN LOADS

| | |
|---|---|
| MOMENT | 348.89 KIP-FT. |
| TORSION | 211.58 KIP-FT. |

STRUCTURAL DATA

| | |
|---|---|
| STRUCTURE CODE | COSS-Z3 & Z3I-10 |
| TRUSS SIZE | 4.5′ x 4.5′ |
| TOWER SIZE | 30" DIA. x 0.281" |

WALKWAY

| | |
|---|---|
| LENGTH | 46 L.F. |

FOUNDATION DATA

| | |
|---|---|
| LENGTH | 19 FT. |
| DIAMETER | 54" DIA. |
| ANCHOR BOLTS | 2" DIA. |

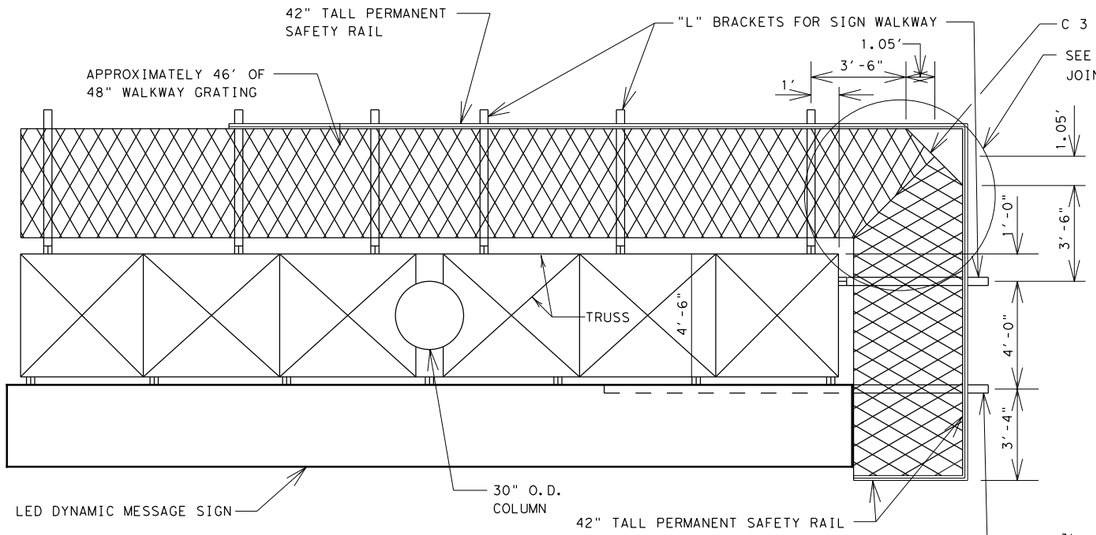
IH-20 EBFR

NOTES:

1. THIS SIGN IS DESIGNED FOR WIND ZONE 3 AND A SPAN LENGTH OF 35′ DUE TO THE INCREASED WEIGHT OF THE DYNAMIC MESSAGE SIGN.
2. THE BOLT CIRCLE FOR THE OVERHEAD SIGN SUPPORT SHALL BE ROTATED 3.0 DEGREES OFF A LINE PERPENDICULAR TO THE CENTERLINE OF THE ROADWAY IN ORDER TO POSITION THE DMS FOR OPTIMAL VIEWING.
3. THE CONTRACTOR SHALL SUBMIT THE STRUCTURAL DESIGN AND MOUNTING DETAILS OF THE DMS WALKWAY AND PLATFORM PRIOR TO FABRICATION FOR APPROVAL.
4. SHOP DRAWINGS AND STRUCTURAL DESIGN MUST BE COMPLETED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND BE SUBMITTED BEARING ENGINEER'S SEAL, SIGNATURE, AND DATE. THEY SHALL INCLUDE STRUCTURAL DESIGN AND MOUNTING DETAILS OF THE DMS WALKWAY PLATFORM AND STRUCTURAL DESIGN AND MOUNTING DETAILS FOR MOUNTING THE DMS TO THE TRUSS. DMS SIGN EXCEEDS TxDOT MOUNTING STANDARD (DMS(TM-1)-16) WEIGHT LIMIT OF 3,600 LBS AND SHALL BE ACCOUNTED FOR IN THE STRUCTURAL DESIGN.
5. DMS WALKWAY PLATFORM HAS 42" TALL PERMANENT SAFETY RAIL AND THE SPACING OF THE HANDRAIL UPRIGHTS (VERTICAL MEMBERS) SHALL NOT EXCEED 24" CENTER TO CENTER.
6. THE CONTRACTOR WILL PERFORM A SITE SURVEY 800 LF IN ADVANCE OF THE PROPOSED DYNAMIC MESSAGE SIGN LOCATION. THIS SURVEY WILL BE PERFORMED IN ORDER TO DETERMINE THE VERTICAL ANGLE OF THE SIGN FOR OPTIMUM VIEWING, BASED ON THE MANUFACTURER'S RECOMMENDATIONS.
7. INFORMATION PROVIDED UNDER "DESIGN DATA" LIST A REQUIRED MINIMUM DESIGN CRITERIA. ALL TXDOT PROVIDED COMPONENTS HAVE BEEN VERIFIED TO MEET THIS MINIMUM.
8. THE CONTRACTOR WILL PERFORM A SITE SURVEY 800 LF IN ADVANCE OF THE PROPOSED DYNAMIC MESSAGE SIGN LOCATION. THIS SURVEY WILL BE PERFORMED IN ORDER TO DETERMINE THE VERTICAL ANGLE OF THE SIGN FOR OPTIMUM VIEWING, BASED ON MANUFACTURER'S RECOMMENDATIONS.
9. THE CONTRACTOR SHALL VERIFY ALL STRUCTURE CLEARANCES PRIOR TO FABRICATION OF THE STRUCTURE.

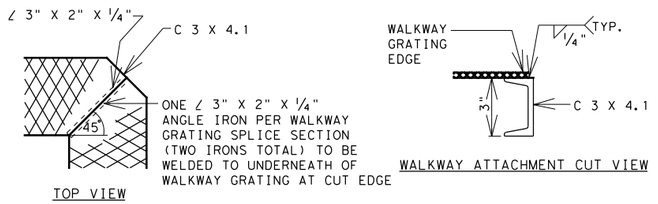
STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 10′
5 0 5




TOP VIEW

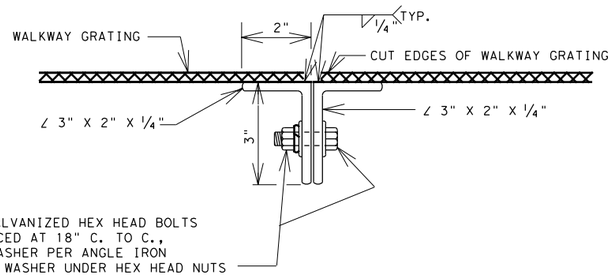
ENTRY PLATFORM SUPPORT (S4 X 7.7 I-BEAM) TO SPAN AND BOLT TO TWO DMS MOUNTING STRUCTURAL MEMBERS.




TOP VIEW




WALKWAY ATTACHMENT CUT VIEW




3/8"-16NC GALVANIZED HEX HEAD BOLTS & NUTS SPACED AT 18" C. TO C., ONE FLAT WASHER PER ANGLE IRON & ONE LOCK WASHER UNDER HEX HEAD NUTS

WALKWAY SPLICE END VIEW

WALKWAY JOINT DETAILS

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

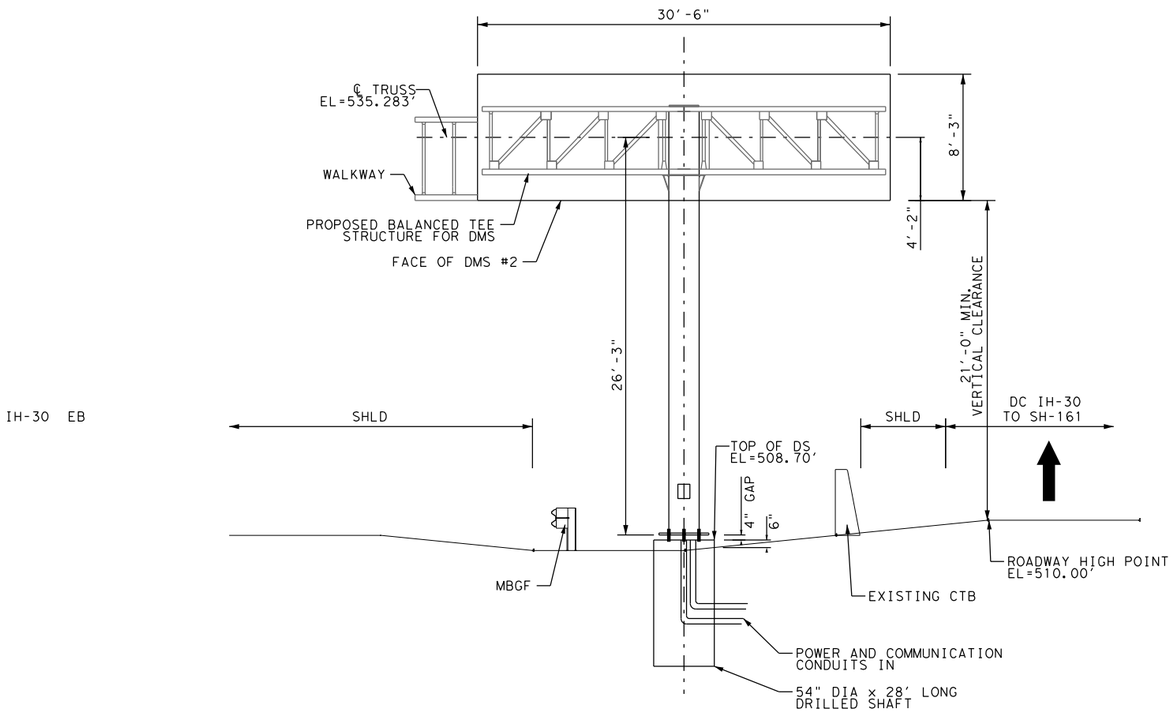
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# DMS INSTALLATION ELEVATION LAYOUT EB IH 20 AT DALLAS/ TARRANT COUNTY LINE

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 78 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




DESIGN DATA

| | |
|---|---|
| SPAN LENGTH | 30′-8" |
| DESIGN WIND HEIGHT | 27′-4" |
| TOWER HEIGHT | 26′-3" |

DESIGN LOADS

| | |
|---|---|
| MOMENT | 361.68 KIP-FT. |
| TORSION | 211.58 KIP-FT. |

STRUCTURAL DATA

| | |
|---|---|
| STRUCTURE CODE | COSS-Z3 & Z3I-10 |
| TRUSS SIZE | 4.5′ x 4.5′ |
| TOWER SIZE | 30" DIA. x 0.281" |

WALKWAY

| | |
|---|---|
| LENGTH | 46 L.F. |

FOUNDATION DATA

| | |
|---|---|
| LENGTH | 28 FT. |
| DIAMETER | 54" DIA. |
| ANCHOR BOLTS | 2" DIA. |

NOTES:

1. THIS SIGN IS DESIGNED FOR WIND ZONE 3 AND A SPAN LENGTH OF 35′ DUE TO THE INCREASED WEIGHT OF THE DYNAMIC MESSAGE SIGN.
2. THE BOLT CIRCLE FOR THE OVERHEAD SIGN SUPPORT SHALL BE ROTATED 3.0 DEGREES OFF A LINE PERPENDICULAR TO THE CENTERLINE OF THE ROADWAY IN ORDER TO POSITION THE DMS FOR OPTIMAL VIEWING.
3. THE CONTRACTOR SHALL SUBMIT THE STRUCTURAL DESIGN AND MOUNTING DETAILS OF THE DMS WALKWAY AND PLATFORM PRIOR TO FABRICATION FOR APPROVAL.
4. SHOP DRAWINGS AND STRUCTURAL DESIGN MUST BE COMPLETED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND BE SUBMITTED BEARING ENGINEER'S SEAL, SIGNATURE, AND DATE. THEY SHALL INCLUDE STRUCTURAL DESIGN AND MOUNTING DETAILS OF THE DMS WALKWAY PLATFORM AND STRUCTURAL DESIGN AND MOUNTING DETAILS FOR MOUNTING THE DMS TO THE TRUSS. DMS SIGN EXCEEDS TXDOT MOUNTING STANDARD (DMS(TM-1)-16) WEIGHT LIMIT OF 3,600 LBS AND SHALL BE ACCOUNTED FOR IN THE STRUCTURAL DESIGN.
5. DMS WALKWAY PLATFORM HAS 42" TALL PERMANENT SAFETY RAIL AND THE SPACING OF THE HANDRAIL UPRIGHTS (VERTICAL MEMBERS) SHALL NOT EXCEED 24" CENTER TO CENTER.
6. THE CONTRACTOR WILL PERFORM A SITE SURVEY 800 LF IN ADVANCE OF THE PROPOSED DYNAMIC MESSAGE SIGN LOCATION. THIS SURVEY WILL BE PERFORMED IN ORDER TO DETERMINE THE VERTICAL ANGLE OF THE SIGN FOR OPTIMUM VIEWING, BASED ON THE MANUFACTURER'S RECOMMENDATIONS.
7. INFORMATION PROVIDED UNDER "DESIGN DATA" LIST A REQUIRED MINIMUM DESIGN CRITERIA. ALL TXDOT PROVIDED COMPONENTS HAVE BEEN VERIFIED TO MEET THIS MINIMUM.
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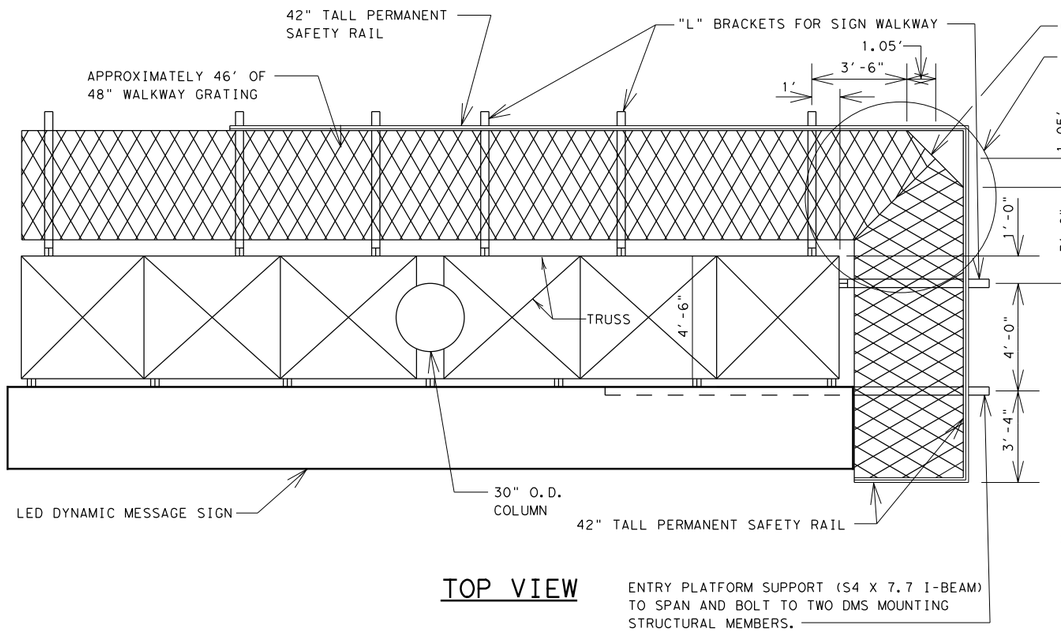
9. THE CONTRACTOR SHALL VERIFY ALL STRUCTURE CLEARANCES PRIOR TO FABRICATION OF THE STRUCTURE.

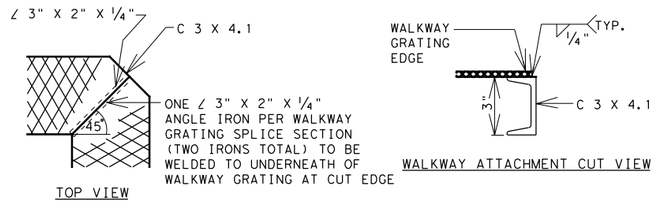
STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
3/13/2024

SCALE: 1" = 10′
5 0 5




TOP VIEW

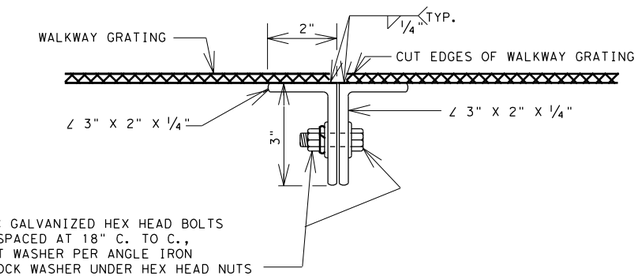
ENTRY PLATFORM SUPPORT (S4 X 7.7 I-BEAM) TO SPAN AND BOLT TO TWO DMS MOUNTING STRUCTURAL MEMBERS.




TOP VIEW




WALKWAY ATTACHMENT CUT VIEW




WALKWAY SPLICE END VIEW

WALKWAY JOINT DETAILS

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

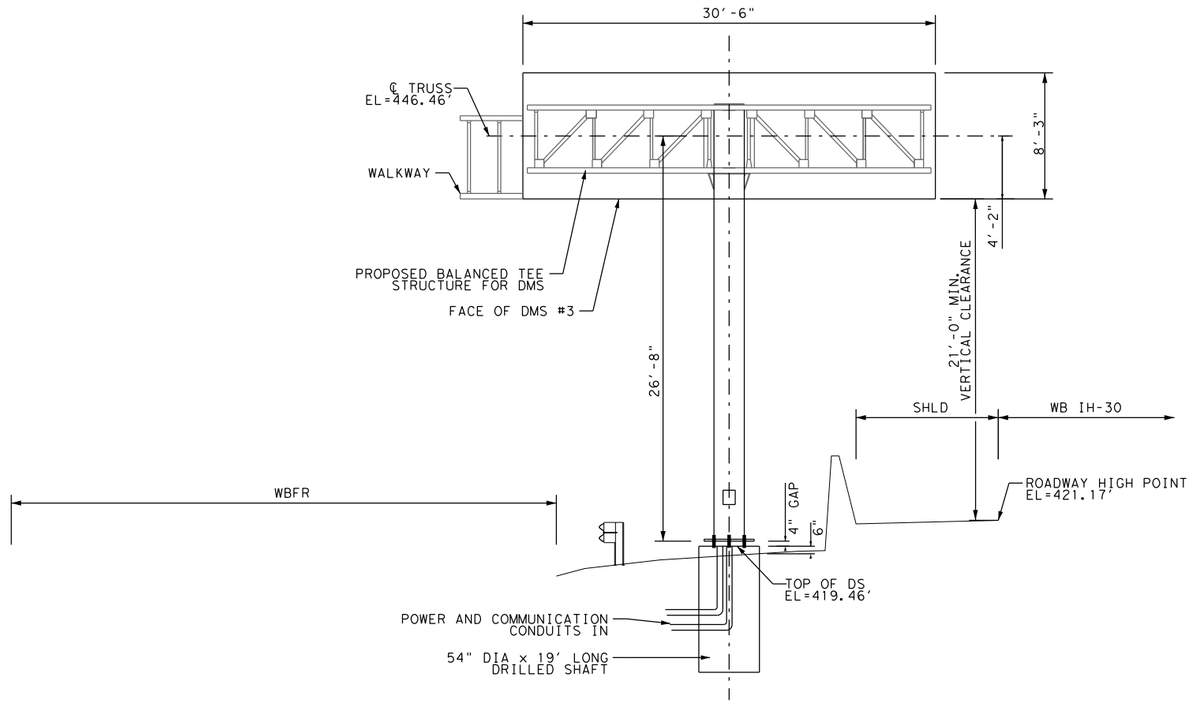
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# DMS INSTALLATION ELEVATION LAYOUT EB IH 30 AT SH 161

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 79 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




DESIGN DATA

| | |
|---|---|
| SPAN LENGTH | 30'-8" |
| DESIGN WIND HEIGHT | 29'-3" |
| TOWER HEIGHT | 26'-8" |

DESIGN LOADS

| | |
|---|---|
| MOMENT | 361.68 KIP-FT. |
| TORSION | 211.58 KIP-FT. |

STRUCTURAL DATA

| | |
|---|---|
| STRUCTURE CODE | COSS-Z3 & Z3I-10 |
| TRUSS SIZE | 4.5' x 4.5' |
| TOWER SIZE | 30" DIA. x 0.281" |

WALKWAY

| | |
|---|---|
| LENGTH | 46 L.F. |

FOUNDATION DATA

| | |
|---|---|
| LENGTH | 19 FT. |
| DIAMETER | 54" DIA. |
| ANCHOR BOLTS | 2" DIA. |

NOTES:

1. THIS SIGN IS DESIGNED FOR WIND ZONE 3 AND A SPAN LENGTH OF 35' DUE TO THE INCREASED WEIGHT OF THE DYNAMIC MESSAGE SIGN.
2. THE BOLT CIRCLE FOR THE OVERHEAD SIGN SUPPORT SHALL BE ROTATED 3.0 DEGREES OFF A LINE PERPENDICULAR TO THE CENTERLINE OF THE ROADWAY IN ORDER TO POSITION THE DMS FOR OPTIMAL VIEWING.
3. THE CONTRACTOR SHALL SUBMIT THE STRUCTURAL DESIGN AND MOUNTING DETAILS OF THE DMS WALKWAY AND PLATFORM PRIOR TO FABRICATION FOR APPROVAL.
4. SHOP DRAWINGS AND STRUCTURAL DESIGN MUST BE COMPLETED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND BE SUBMITTED BEARING ENGINEER'S SEAL, SIGNATURE, AND DATE. THEY SHALL INCLUDE STRUCTURAL DESIGN AND MOUNTING DETAILS OF THE DMS WALKWAY PLATFORM AND STRUCTURAL DESIGN AND MOUNTING DETAILS FOR MOUNTING THE DMS TO THE TRUSS. DMS SIGN EXCEEDS TXDOT MOUNTING STANDARD (DMS(TM-1)-16) WEIGHT LIMIT OF 3,600 LBS AND SHALL BE ACCOUNTED FOR IN THE STRUCTURAL DESIGN.
5. DMS WALKWAY PLATFORM HAS 42" TALL PERMANENT SAFETY RAIL AND THE SPACING OF THE HANDRAIL UPRIGHTS (VERTICAL MEMBERS) SHALL NOT EXCEED 24" CENTER TO CENTER.
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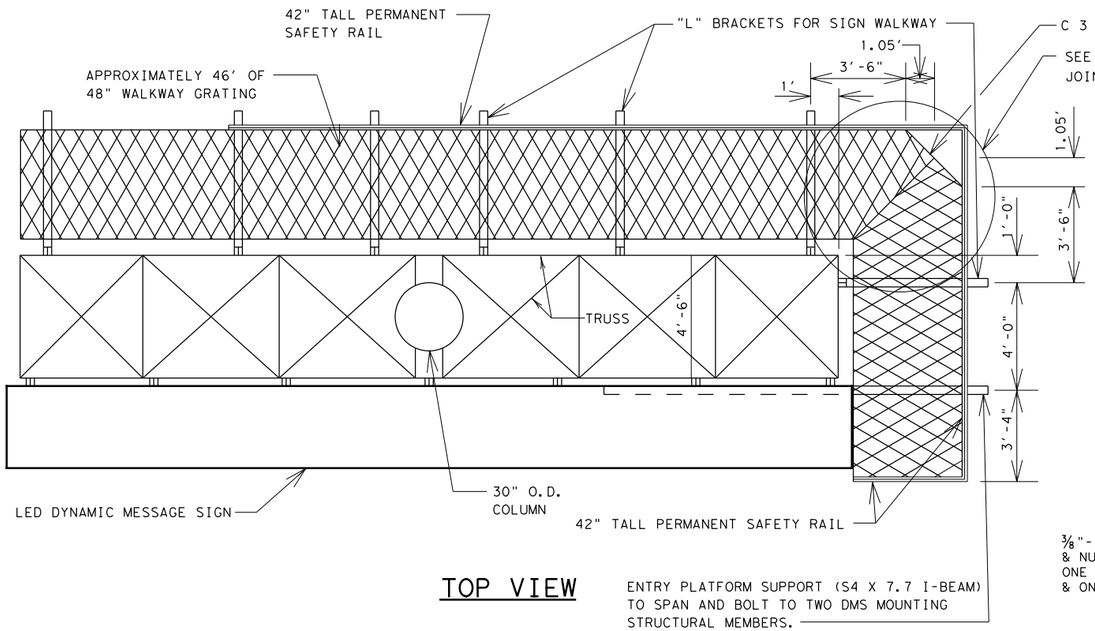
9. THE CONTRACTOR SHALL VERIFY ALL STRUCTURE CLEARANCES PRIOR TO FABRICATION OF THE STRUCTURE.

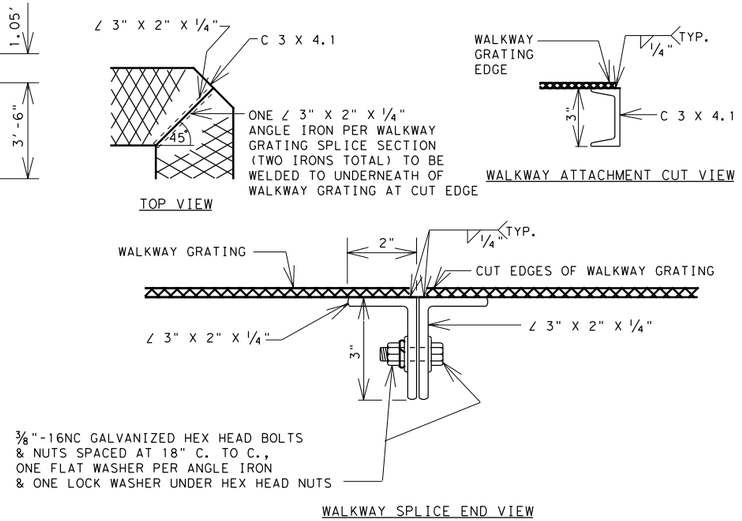
STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/29/2024

SCALE: 1" = 10'
5 0 5




TOP VIEW

ENTRY PLATFORM SUPPORT (S4 X 7.7 I-BEAM) TO SPAN AND BOLT TO TWO DMS MOUNTING STRUCTURAL MEMBERS.




WALKWAY JOINT DETAILS

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

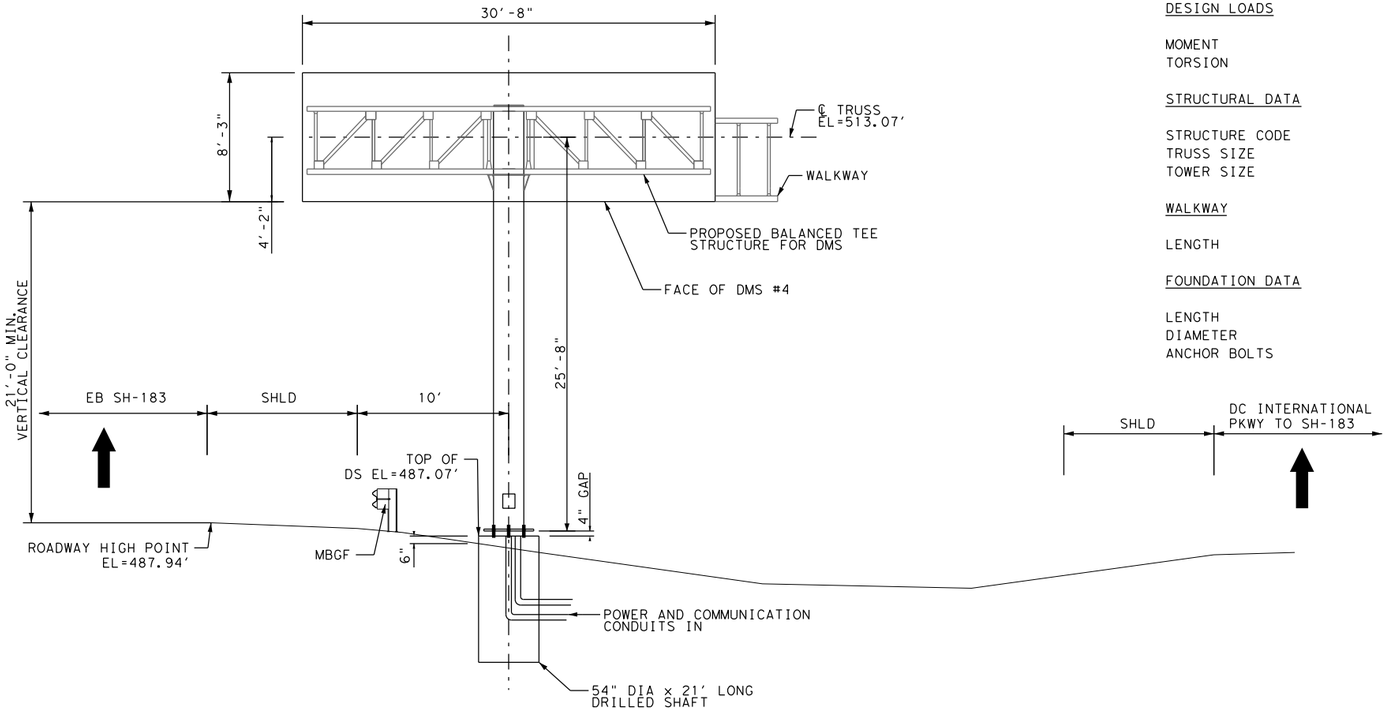
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# DMS INSTALLATION ELEVATION LAYOUT WB IH 30 AT SYLVAN AVE

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 80 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |







| DESIGN DATA | |
|---|---|
| SPAN LENGTH | 30'-8" |
| DESIGN WIND HEIGHT | 29'-10" |
| TOWER HEIGHT | 25'-8" |

| DESIGN LOADS | |
|---|---|
| MOMENT | 348.89 KIP-FT. |
| TORSION | 211.58 KIP-FT. |

| STRUCTURAL DATA | |
|---|---|
| STRUCTURE CODE | COSS-Z3 & Z3I-10 |
| TRUSS SIZE | 4.5' x 4.5' |
| TOWER SIZE | 30" DIA. x 0.281" |

| WALKWAY | |
|---|---|
| LENGTH | 46 L.F. |

| FOUNDATION DATA | |
|---|---|
| LENGTH | 21 FT. |
| DIAMETER | 54" DIA.. |
| ANCHOR BOLTS | 2" DIA. |

NOTES:

1. THIS SIGN IS DESIGNED FOR WIND ZONE 3 AND A SPAN LENGTH OF 35' DUE TO THE INCREASED WEIGHT OF THE DYNAMIC MESSAGE SIGN.
2. THE BOLT CIRCLE FOR THE OVERHEAD SIGN SUPPORT SHALL BE ROTATED 3.0 DEGREES OFF A LINE PERPENDICULAR TO THE CENTERLINE OF THE ROADWAY IN ORDER TO POSITION THE DMS FOR OPTIMAL VIEWING.
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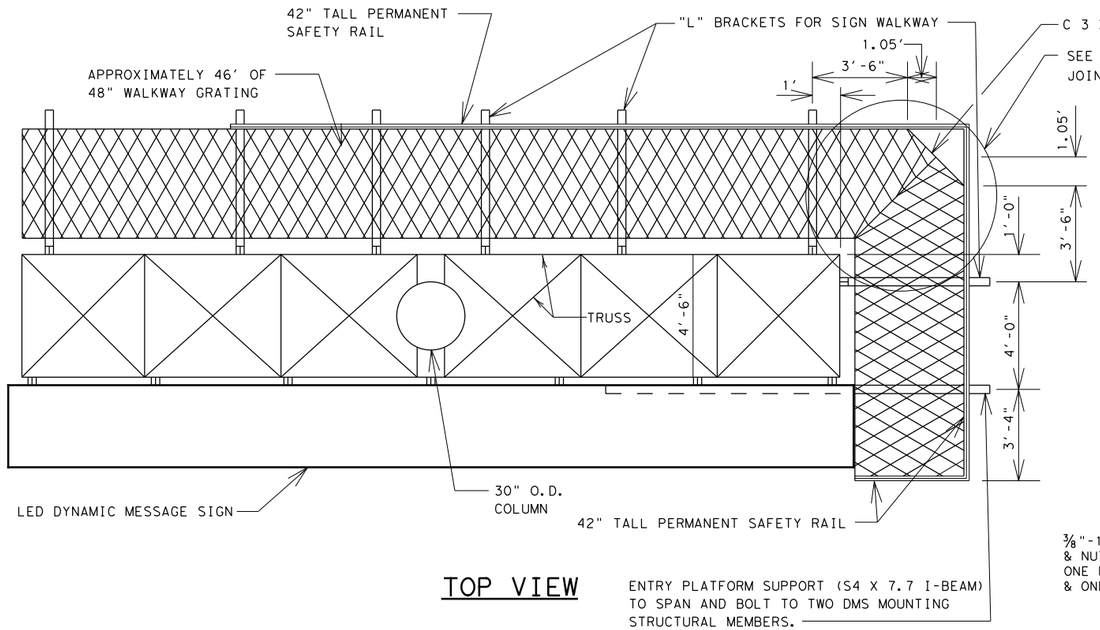
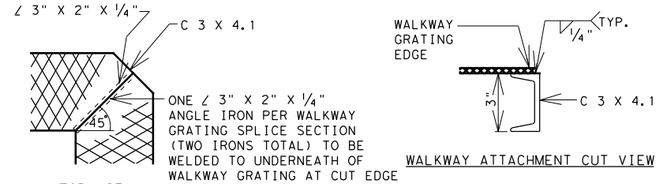
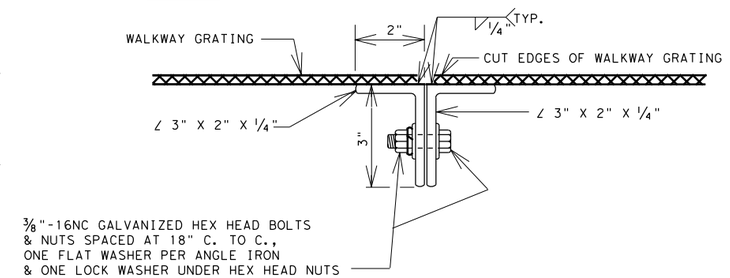
9. THE CONTRACTOR SHALL VERIFY ALL STRUCTURE CLEARANCES PRIOR TO FABRICATION OF THE STRUCTURE.




TOP VIEW

ENTRY PLATFORM SUPPORT (S4 X 7.7 I-BEAM) TO SPAN AND BOLT TO TWO DMS MOUNTING STRUCTURAL MEMBERS.




WALKWAY JOINT DETAILS

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024

SCALE: 1" = 10'
5 0 5

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



# DMS INSTALLATION ELEVATION LAYOUT EB SH 183 AT COUNTY LINE RD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 81 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

DESIGN DATA

| | |
|---|---|
| SPAN LENGTH | 30′-6" |
| DESIGN WIND HEIGHT | 25′-8" |
| TOWER HEIGHT | 22′-3" |

DESIGN LOADS

| | |
|---|---|
| MOMENT | 336.11 KIP-FT. |
| TORSION | 40.67 KIP-FT. |

STRUCTURAL DATA

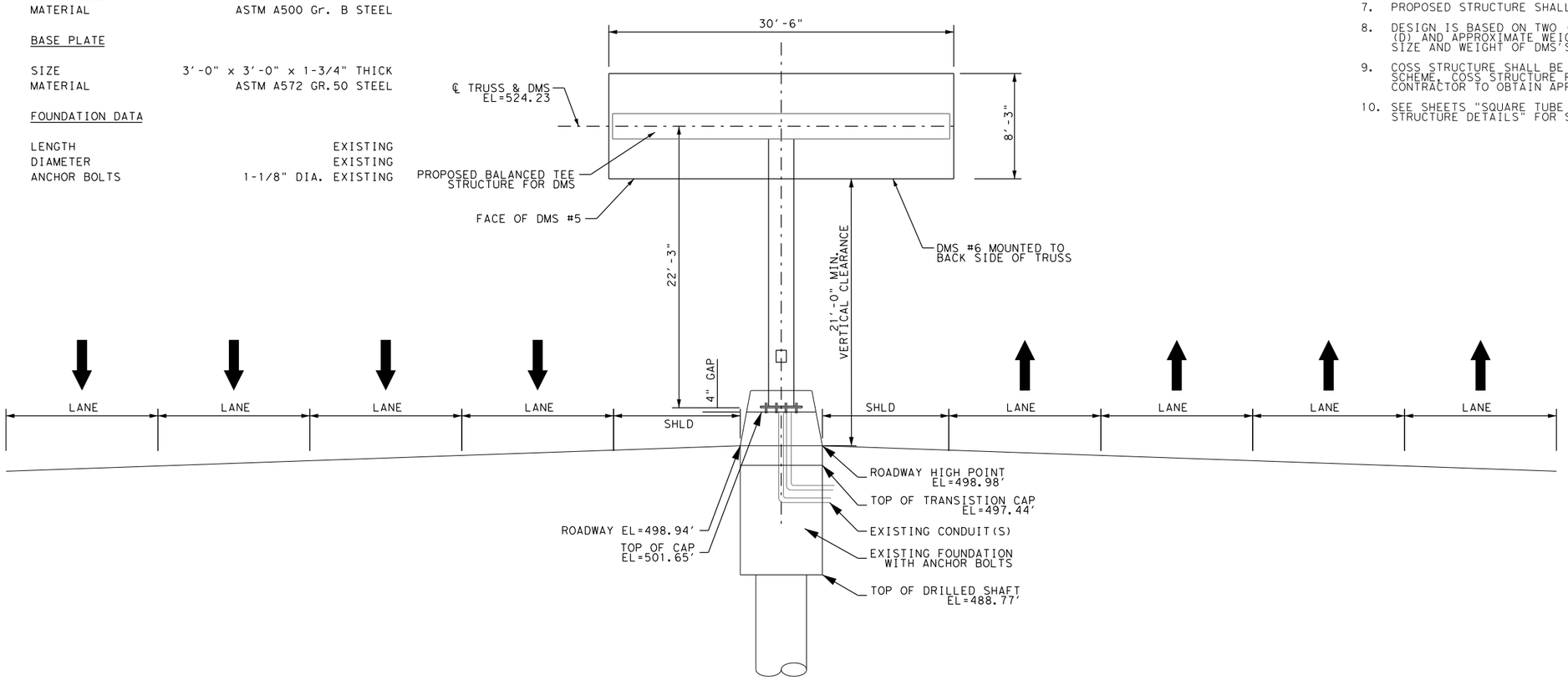
| | |
|---|---|
| STRUCTURE CODE | CUSTOM |
| TRUSS SIZE | 24" x 24" x 0.625" |
| TOWER SIZE | 24" x 24" x 0.625" |
| MATERIAL | ASTM A500 Gr. B STEEL |

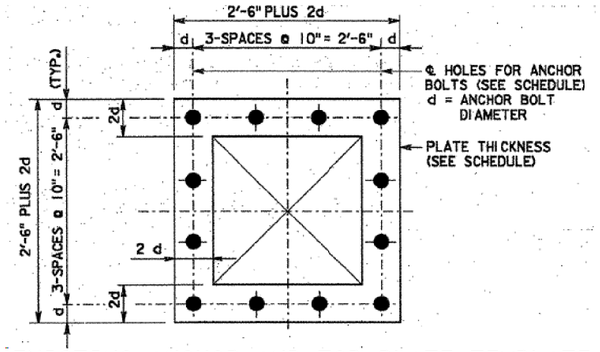
BASE PLATE

| | |
|---|---|
| SIZE | 3′-0" x 3′-0" x 1-3/4" THICK |
| MATERIAL | ASTM A572 GR.50 STEEL |

FOUNDATION DATA

| | |
|---|---|
| LENGTH | EXISTING |
| DIAMETER | EXISTING |
| ANCHOR BOLTS | 1-1/8" DIA. EXISTING |




EXISTING ANCHOR AND TOP PLATE TEMPLATE

NOTES:

1. TOWER AND BASE PLATE DESIGNED FOR WIND ZONE 4 WITH ICE AND THE INCREASED WEIGHT OF TWO DYNAMIC MESSAGE SIGNS.
2. SHOP DRAWINGS AND STRUCTURAL DESIGN MUST BE COMPLETED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND BE SUBMITTED BEARING ENGINEER'S SEAL, SIGNATURE, AND DATE. THEY SHALL INCLUDE STRUCTURAL DESIGN AND MOUNTING DETAILS FOR MOUNTING TWO (2) DMS TO THE TRUSS. DMS SIGN EXCEEDS TXDOT MOUNTING STANDARD (DMS(TM-1)-16) WEIGHT LIMIT OF 3,600 LBS AND SHALL BE ACCOUNTED FOR IN THE STRUCTURAL DESIGN.
3. INFORMATION PROVIDED UNDER "DESIGN DATA" LIST A REQUIRED MINIMUM DESIGN CRITERIA. ALL TXDOT PROVIDED COMPONENTS HAVE BEEN VERIFIED TO MEET THIS MINIMUM.
4. THE CONTRACTOR WILL PERFORM A SITE SURVEY 800 LF IN ADVANCE OF THE PROPOSED DYNAMIC MESSAGE SIGN LOCATION. THIS SURVEY WILL BE PERFORMED IN ORDER TO DETERMINE THE VERTICAL ANGLE OF THE SIGN FOR OPTIMUM VIEWING, BASED ON MANUFACTURER'S RECOMMENDATIONS.
5. THE CONTRACTOR SHALL VERIFY ALL STRUCTURE CLEARANCES PRIOR TO FABRICATION OF THE STRUCTURE.
6. EXISTING STRUCTURE AND ELEVATION DATA TAKEN FROM AS-BUILT DATA CSJ 0047-07-122.
7. PROPOSED STRUCTURE SHALL SUPPORT TWO DMS'S (NORTH AND SOUTH BOUND FACING).
8. DESIGN IS BASED ON TWO (2) FURNISHED DMS'S 8.25′ (H) X 30.5′ (W) X 2.25′ (D) AND APPROXIMATE WEIGHT OF 3600 LBS. PER DMS. CONTRACTOR SHALL VERIFY SIZE AND WEIGHT OF DMS'S PRIOR TO FABRICATION.
9. COSS STRUCTURE SHALL BE POWDER COATED TO MATCH EXISTING CORRIDOR COLOR SCHEME. COSS STRUCTURE PAINT CODE 79-62 DARK BRONZE, PER AS BUILTS. CONTRACTOR TO OBTAIN APPROVAL FROM TXDOT PRIOR TO FABRICATION.
10. SEE SHEETS "SQUARE TUBE TEE DMS STRUCTURE" AND "SQUARE TUBE TEE DMS STRUCTURE DETAILS" FOR STRUCTURAL DETAILS.

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
3/7/2024

SCALE: 1" = 10′
5 0 5

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

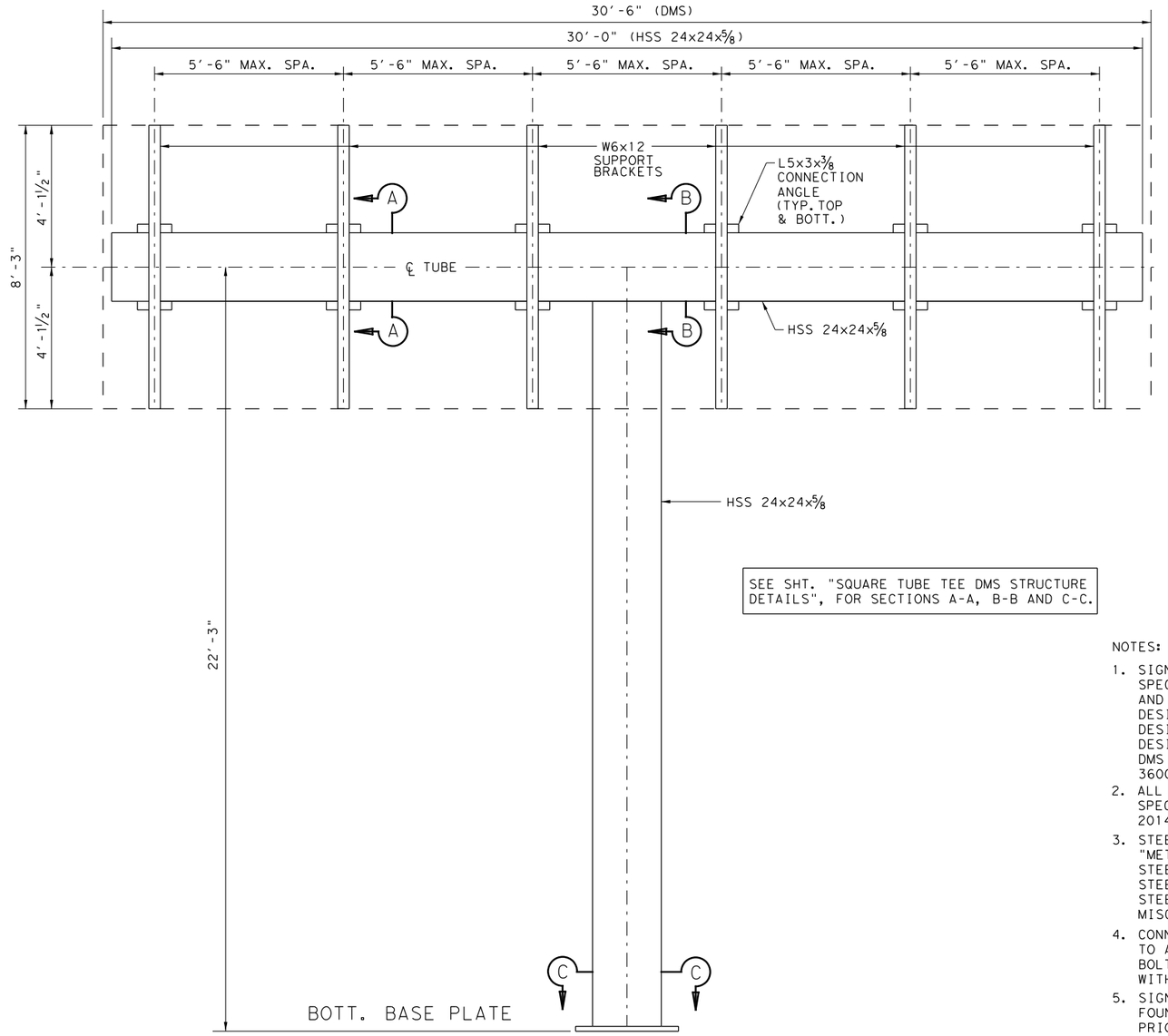
TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


Texas Department of Transportation



# DMS INSTALLATION ELEVATION LAYOUT US 75 AT HASKELL AVE

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 82 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




SEE SHT. "SQUARE TUBE TEE DMS STRUCTURE DETAILS", FOR SECTIONS A-A, B-B AND C-C.

## DMS TEE STRUCTURE ELEVATION

NOTES:

1. SIGN SUPPORT DESIGNED ACCORDING TO 1985 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.
   DESIGN WIND LOAD = 70 MPH (ZONE 4)
   DESIGN HEIGHT LESS THAN OR EQUAL TO 30 FT.
   DESIGN DMS: STRUCTURE DESIGNED FOR (2) DMS′s MOUNTED BACK TO BACK. DMS LENGTH = 30.5 FT. DMS HEIGHT = 8.25 FT. DMS DEAD LOAD IS 3600 LBS PER DMS.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH TEXAS STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES 2014.
3. STEEL FOR THE STRUCTURE SHALL CONFORM TO ITEM 442, "METAL FOR STRUCTURES".
   STEEL FOR HSS TUBE SHALL CONFORM TO ASTM A500 GR.B.
   STEEL FOR W SHAPES SHALL CONFORM TO ASTM A36.
   STEEL FOR BASE PLATE SHALL CONFORM T ASTM A572 GR.50.
   MISCELLANEOUS STEEL TO SHALL CONFORM TO ASTM A36.
4. CONNECTION BOLTS SHALL CONFORM TO ASTM A325. NUTS TO CONFORM TO ASTM A563 GR.DH. WASHERS TO CONFORM TO ASTM F436. ALL CONNECTION BOLTS, NUTS AND WASHERS SHALL BE HOT DIPPED GALVNISED IN ACCORDANCE WITH ITEM 445, "GALVANIZING".
5. SIGN STRUCTURE TO BE PLACED ON EXISTING 1⅛" DIA. ANCHOR BOLTS AND FOUNDATION. CONTRACTOR TO VERIFY ANCHOR BOLT DIAMETER AND SPACING PRIOR TO FABRICATION OF BASE PLATE.
6. W6X12 SUPPORT BRACKETS SHALL BE HOT DIPPED GALVANIZED FOLLOWING FABRICATION IN ACCORDANCE WITH ITEM 445, "GALVANIZING.
7. THE EXTERIOR AND INTERIOR OF THE TEE STRUCTURE SHALL BE SHOP PAINTED FOLLOWING FABRICATION IN ACCORDANCE WITH ITEM 446, "FIELD CLEANING AND PAINTING STEEL" WITH THE EXCEPTION OF THE AREA OF NEAR THE FIELD WELDED JOINT.
   EXTERIOR PAINT SHALL BE SYSTEM III WITH GLIDDEN PAINT #79-62 (DARK BRONZE)APPEARANCE COAT COLOR.
   INTERIOR PAINT SYSTEM SHAL BE LONG OIL ALKYD PRIMER WITH MINIMUM DRY THICKNESS = 2.0 MIL (FOR THE INTERIOR OF THE SQUARE TUBING).
8. EXTERIOR SURFACES WITHIN 4 INCHES OF THE FIELD WELDED JOINT SHALL BE SHIPPED FREE OF PAINT. THESE UNPAINTED SURFACES SHALL BE BLAST CLEANED AND COATED WITH RAW LINSEED OIL. AFTER WELDING IS COMPLETED, THE AREAS SHALL BE CLEANED AND PAINTED USING PAINT PROTECTION SYSTEM III. THE APPEARANCE COAT USED FOR THE FIELD PAINTING SHALL MATCH THE SHOP APPLIED APPEARANCE COAT TO THE SATISFACTION OF THE ENGINEER.
9. FOR ADDITIONAL DMS MOUNTING DETAILS, SEE STANDARD SHEET DMS(HZ-2)-21, "DMS-TO-TRUSS MOUNTING WITH HORIZONTAL ZEE EXTRUSIONS".

STATE OF TEXAS
BENNETT B. ANDERSON
80559
LICENSED PROFESSIONAL ENGINEER
03/07/2024

| NO. | DATE | REVISION | APPROV. |
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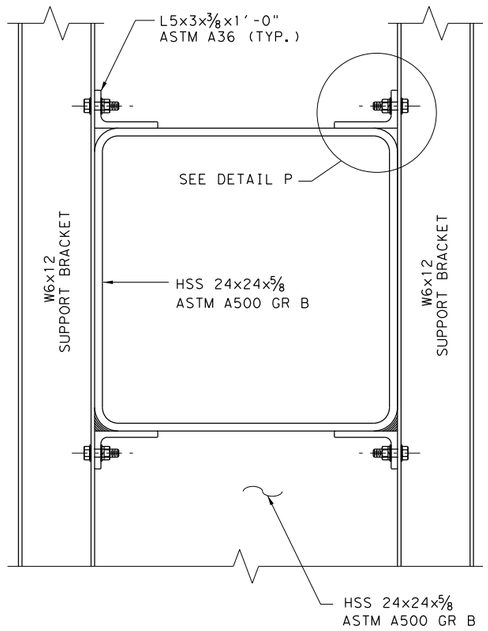
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

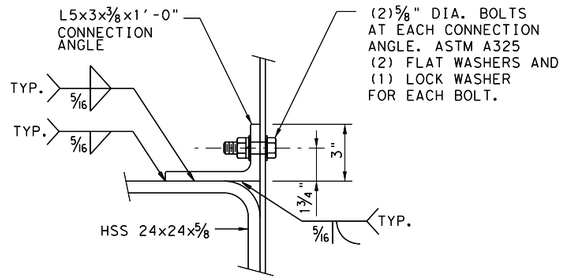
Texas Department of Transportation


# SQUARE TUBE TEE DMS STRUCTURE US 75 AT HASKELL AVE

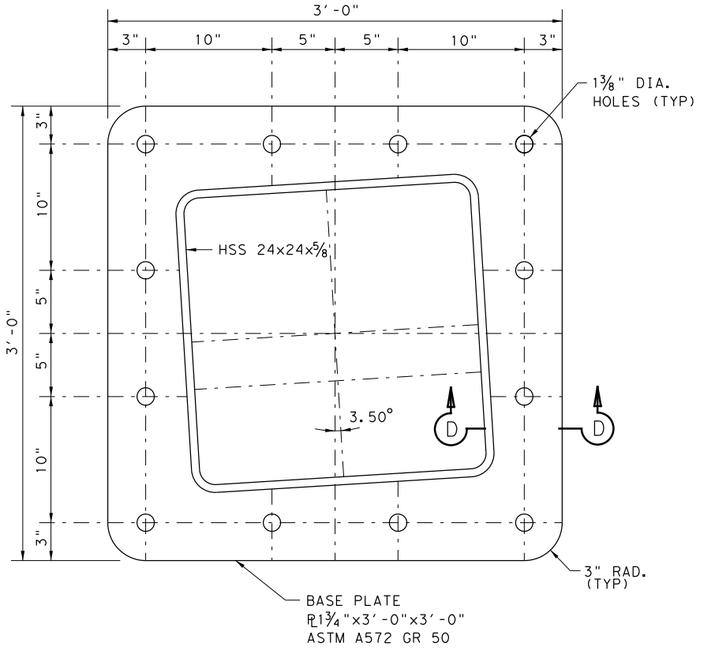
| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 82A |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |



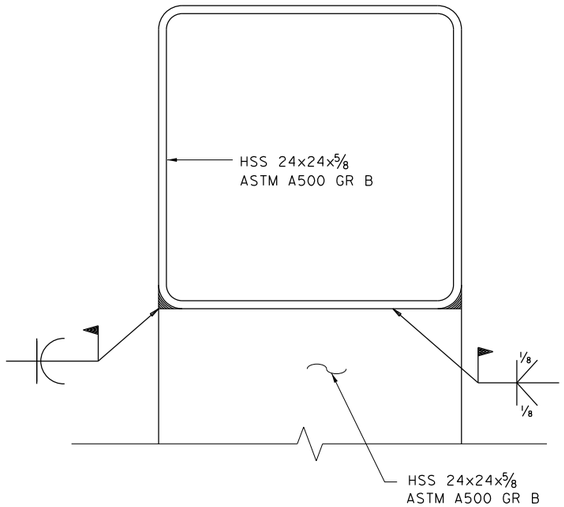

## SECTION A-A



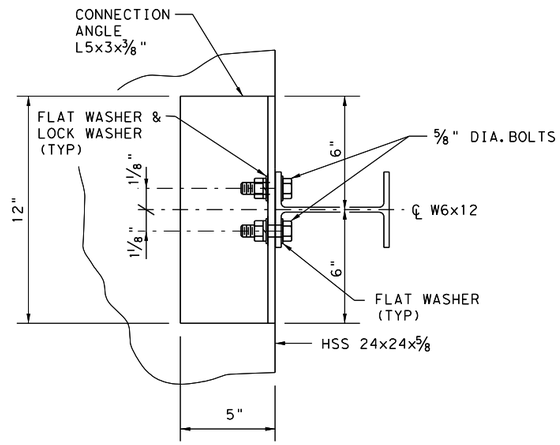

## DETAIL P



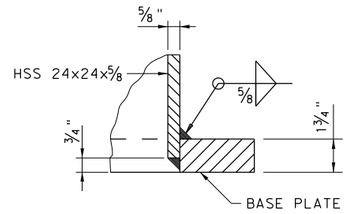

## SECTION C-C




## SECTION B-B




## CONNECTION TOP VIEW




## SECTION D-D

STATE OF TEXAS
BENNETT B. ANDERSON
80559
LICENSED
PROFESSIONAL ENGINEER
03/07/2024

| NO. | DATE | REVISION | APPROV. |
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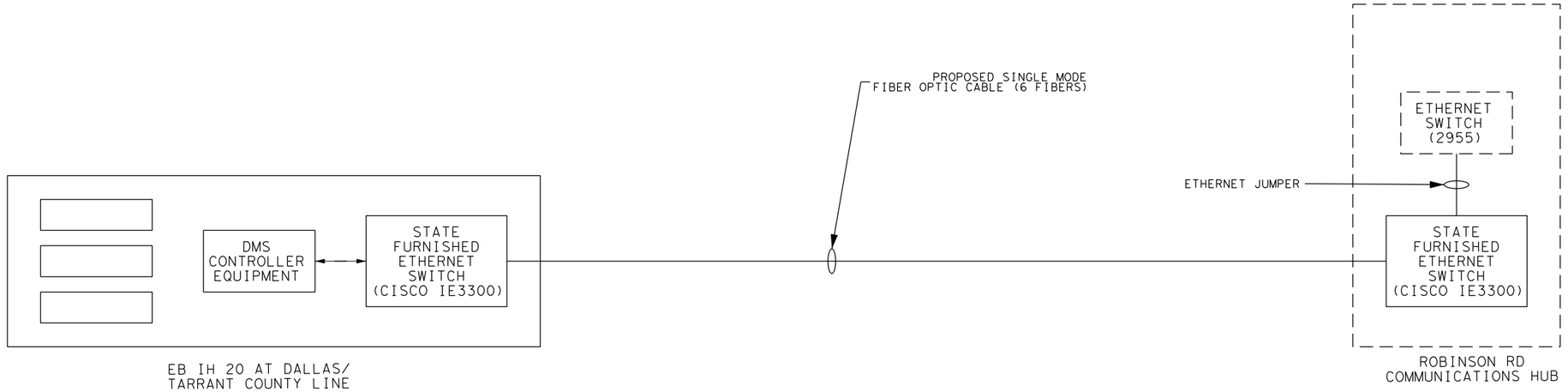
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF·IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# SQUARE TUBE TEE DMS STRUCTURE DETAILS US 75 AT HASKELL AVE

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 82B |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




EB IH 20 AT DALLAS/
TARRANT COUNTY LINE
DMS #1

ROBINSON RD
COMMUNICATIONS HUB

NOTES:
1. THIS SHEET IS A CONCEPTUAL DESIGN OF THE TRANSPORTATION MANAGEMENT COMMUNICATIONS SYSTEM. ALL EQUIPMENT AND/OR CONNECTIONS REQUIRED MAY NOT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE SYSTEM PROVIDED IS COMPLETE AND MADE FULLY FUNCTION.

2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CABLES AND FIBER OPTIC JUMPERS TO MAKE THE CONNECTIONS. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY NOT TO DAMAGE THE EXISTING ITS EQUIPMENT. ANY DAMAGED EQUIPMENT SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.

## LEGEND

| | |
|---|---|
| | PROPOSED EQUIPMENT |
| | EXISTING EQUIPMENT |
| T.S. | TERMINAL SERVER |

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

| NO. | DATE | REVISION | APPROV. |
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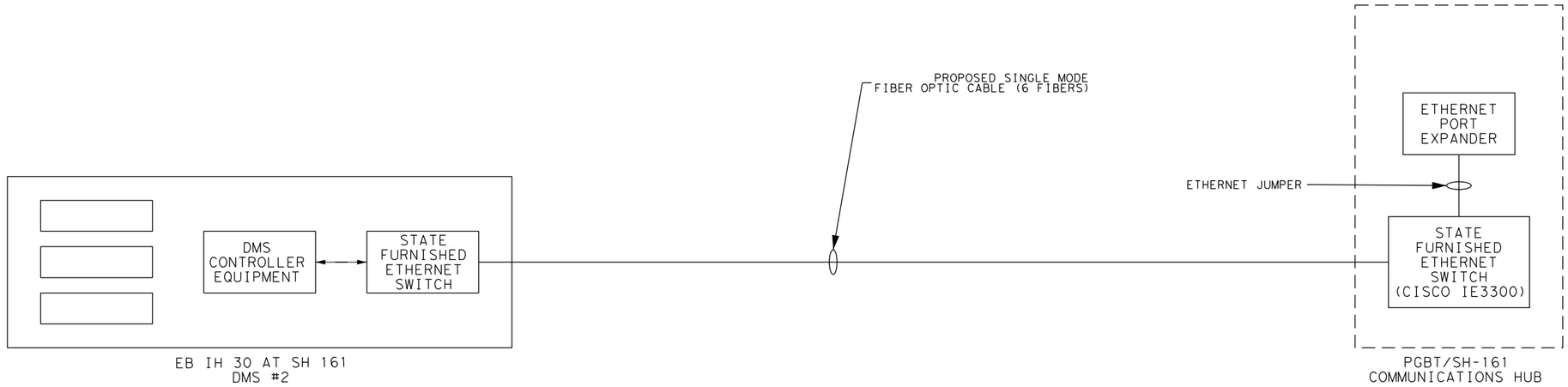
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# COMMUNICATION BLOCK DIAGRAM EB IH 20 AT DALLAS/ TARRANT COUNTY LINE

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 83 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




EB IH 30 AT SH 161
DMS #2

PGBT/SH-161
COMMUNICATIONS HUB

NOTES:
1. THIS SHEET IS A CONCEPTUAL DESIGN OF THE TRANSPORTATION MANAGEMENT COMMUNICATIONS SYSTEM. ALL EQUIPMENT AND/OR CONNECTIONS REQUIRED MAY NOT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE SYSTEM PROVIDED IS COMPLETE AND MADE FULLY FUNCTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CABLES AND FIBER OPTIC JUMPERS TO MAKE THE CONNECTIONS. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY NOT TO DAMAGE THE EXISTING ITS EQUIPMENT. ANY DAMAGED EQUIPMENT SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REPLACE THE EXISTING CISCO IE3000 WITH THE STATE SUPPLIED CISCO IE3300 AND PORT EXPANDER WITHIN THE PGBT/SH-161 COMMUNICATION HUB.

## LEGEND

- PROPOSED EQUIPMENT
- EXISTING EQUIPMENT
- T.S. — TERMINAL SERVER

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

| NO. | DATE | REVISION | APPROV. |
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
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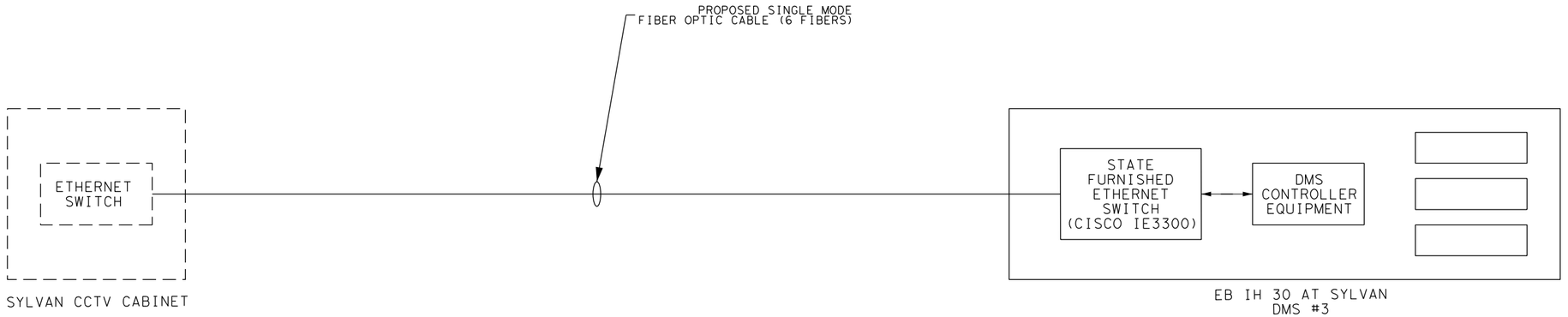
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# COMMUNICATION BLOCK DIAGRAM EB IH 30 AT SH 161

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 84 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




NOTES:
1. THIS SHEET IS A CONCEPTUAL DESIGN OF THE TRANSPORTATION MANAGEMENT COMMUNICATIONS SYSTEM. ALL EQUIPMENT AND/OR CONNECTIONS REQUIRED MAY NOT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE SYSTEM PROVIDED IS COMPLETE AND MADE FULLY FUNCTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CABLES AND FIBER OPTIC JUMPERS TO MAKE THE CONNECTIONS. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY NOT TO DAMAGE THE EXISTING ITS EQUIPMENT. ANY DAMAGED EQUIPMENT SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.

## LEGEND

- PROPOSED EQUIPMENT
- EXISTING EQUIPMENT
- T.S. — TERMINAL SERVER

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED
PROFESSIONAL ENGINEER
2/23/2024

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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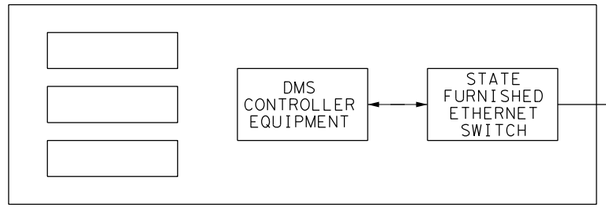
OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF·IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# COMMUNICATION BLOCK DIAGRAM WB IH 30 AT SYLVAN AVE

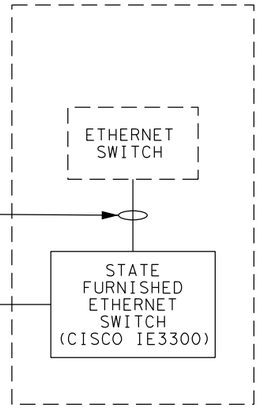
| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 85 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




EB SH 183 AT COUNTY LINE RD
DMS #4

PROPOSED SINGLE MODE
FIBER OPTIC CABLE (6 FIBERS)

ETHERNET JUMPER




VALLEY VIEW
MINI-HUB CABINET

NOTES:
1. THIS SHEET IS A CONCEPTUAL DESIGN OF THE TRANSPORTATION MANAGEMENT COMMUNICATIONS SYSTEM. ALL EQUIPMENT AND/OR CONNECTIONS REQUIRED MAY NOT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE SYSTEM PROVIDED IS COMPLETE AND MADE FULLY FUNCTION.

2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CABLES AND FIBER OPTIC JUMPERS TO MAKE THE CONNECTIONS. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY NOT TO DAMAGE THE EXISTING ITS EQUIPMENT. ANY DAMAGED EQUIPMENT SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.

## LEGEND

- PROPOSED EQUIPMENT
- EXISTING EQUIPMENT
- T.S. — TERMINAL SERVER


2/23/2024

Elizabeth Shelton

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
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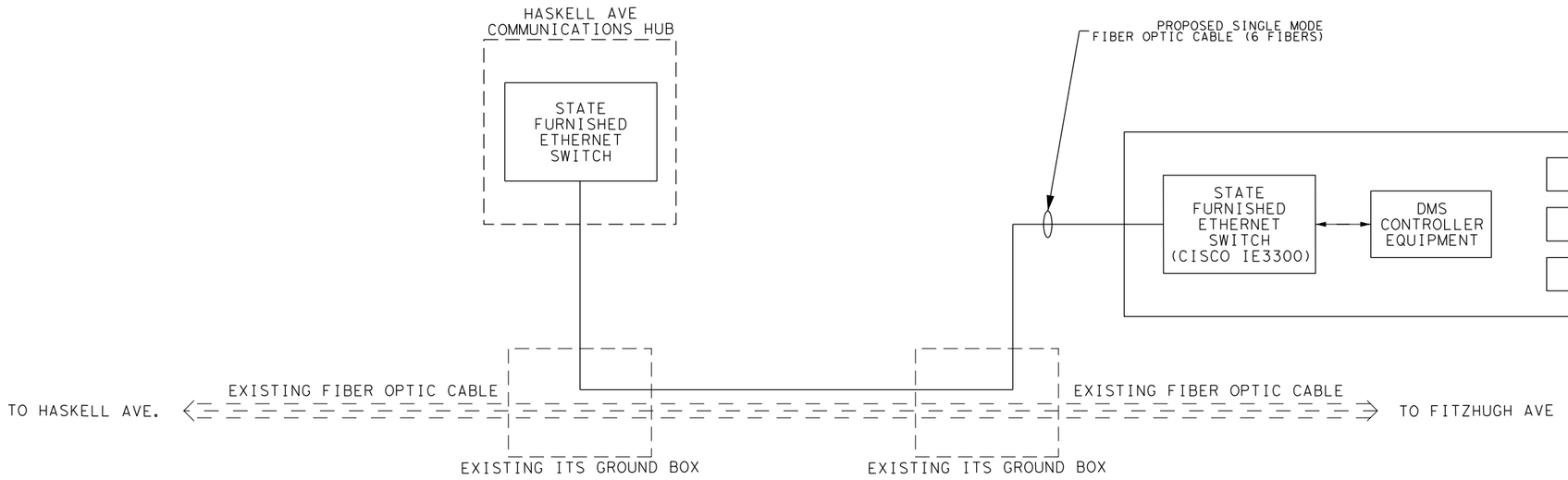
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# COMMUNICATION BLOCK DIAGRAM EB SH 183 AT COUNTY LINE RD

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 86 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

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1. THIS SHEET IS A CONCEPTUAL DESIGN OF THE TRANSPORTATION MANAGEMENT COMMUNICATIONS SYSTEM. ALL EQUIPMENT AND/OR CONNECTIONS REQUIRED MAY NOT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE SYSTEM PROVIDED IS COMPLETE AND MADE FULLY FUNCTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CABLES AND FIBER OPTIC JUMPERS TO MAKE THE CONNECTIONS. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY NOT TO DAMAGE THE EXISTING ITS EQUIPMENT. ANY DAMAGED EQUIPMENT SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.
3. INFORMATION CONCERNING THE EXISTING FIBER NETWORK WAS NOT AVAILABLE DURING THE DESIGN PHASE.

## LEGEND

- PROPOSED EQUIPMENT
- EXISTING EQUIPMENT
- T.S. — TERMINAL SERVER

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024
Elizabeth Shelton

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation


# COMMUNICATION BLOCK DIAGRAM US 75 AT HASKELL AVE

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 87 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

# DRILLING LOG



WinCore Version 3.3

| | | | | | |
|---|---|---|---|---|---|
| County | Dallas | Hole | B-01 | District | Dallas |
| Highway | IH 30 | Structure | Dynamic Message Signs | Date | 7/6/23 |
| CSJ | 0918-47-333 | Station | | Grnd. Elev. | 539.96 ft |
| | | Offset | | GW Elev. | N/A |

| Elev. (ft) | Texas Cone Penetrometer | Strata Description | Triaxial Test: Lateral Press. (psi) | Triaxial Test: Deviator Stress (psi) | Properties: MC LL PI | Properties: Wet Den. (pcf) | Additional Remarks |
|---|---|---|---|---|---|---|---|
| | | CLAY, lean, soft to stiff, light brown. (CL) | | | | | PP=4.50+ |
| 5 | 10 (6) 11 (6) | | | | | | PP=4.25 |
| 10 | 10 (6) 11 (6) | | | | | | PP=4.50 |
| 15 | 15 (6) 14 (6) | | | | | | PP=4.50+ |
| 20 | 6 (6) 9 (6) | | | | | | N=5-6-7 |
| 517. | | SHALE, hard, dark gray. | | | | | |
| 25 | 50 (2) 50 (2.5) | | | | | | N=33-46-50/3.5in |
| 30 | 50 (2) 50 (1.5) | | | | | | N=34-50/5in |
| 35 | 50 (1.5) 50 (1.5) | | | | | | N=17-26-50/3.5in |
| 40 | 50 (2) 50 (1.5) | | | | | | N=23-25-48 |
| 45 | 50 (1.75) 50 (1.5) | | | | | | N=27-48-50/3.5in |
| 490. 50 | 50 (1) 50 (0.38) | | | | | | N=27-50/5.75in |
| 55 | | | | | | | |
| 60 | | | | | | | |

**Remarks:** SPT and TCP tests performed using automatic hammer with 170lb weight and 24in drop. Soil/rock consistency description is based on TCP values and rating per TxDOT Geotechnical Manual Northing: 6931915.393 & Easting: 2418894.381.

The ground water elevation was not determined during the course of this boring.

**Driller:** DR **Logger:** TL **Organization:** EST, Inc.

J:_TX_Melissa_Geotechnical\2021 Geotech Texas Projects\23-03255 - TxDOT Dallas District DMS Borings\D - BORING LOGS\Wincore logs.clg

# DRILLING LOG



WinCore Version 3.3

| | | | | | |
|---|---|---|---|---|---|
| County | Dallas | Hole | B-02 | District | Dallas |
| Highway | IH 30 | Structure | Dynamic Message Signs | Date | 7/13/23 |
| CSJ | 0918-47-333 | Station | | Grnd. Elev. | 510.83 ft |
| | | Offset | | GW Elev. | N/A |

| Elev. (ft) | Texas Cone Penetrometer | Strata Description | Triaxial Test: Lateral Press. (psi) | Triaxial Test: Deviator Stress (psi) | Properties: MC LL PI | Properties: Wet Den. (pcf) | Additional Remarks |
|---|---|---|---|---|---|---|---|
| | | CLAY, lean, sandy, dark gray and light brown. (CL) | | | | | N=2-6-21 |
| 506.8 5 | 4 (6) 4 (6) | | | | | | N=11-5-3 |
| | | CLAY, fat, very soft to stiff, light brown. (CH) | | | | | |
| 10 | 3 (6) 4 (6) | | | | | | N=2-3-5 |
| 15 | 9 (6) 14 (6) | | | | | | N=3-5-6 |
| 492.8 | | SHALE, soft, dark gray. | | | | | |
| 20 | 50 (1.5) 50 (1) | | | | | | N=20-38-50/4.75in |
| 25 | 50 (4) 50 (2) | | | | | | N=17-23-38 |
| 30 | 50 (3.5) 50 (2.5) | | | | | | N=15-21-26 |
| 35 | 50 (5.5) 50 (3) | | | | | | N=22-29-46 |
| 470.8 40 | 50 (2.5) 50 (2) | | | | | | N=24-32-50/4in |
| | | SAND, clayey, very dense, dark gray. (SC) | | | | | |
| 45 | 50 (2.25) 50 (0.5) | | | | | | N=22-39-50/4in |
| 460.8 50 | 50 (0.5) 50 (1.5) | | | | | | N=50/1in |
| 55 | | | | | | | |
| 60 | | | | | | | |

**Remarks:** SPT and TCP tests performed using automatic hammer with 170lb weight and 24in drop. Soil/rock consistency description is based on TCP values and rating per TxDOT Geotechnical Manual Northing: 6962305.032 & Easting: 2418907.108.

The ground water elevation was not determined during the course of this boring.

**Driller:** DR **Logger:** TL **Organization:** EST, Inc.

J:_TX_Melissa_Geotechnical\2021 Geotech Texas Projects\23-03255 - TxDOT Dallas District DMS Borings\D - BORING LOGS\Wincore logs.clg

| NO. | DATE | REVISION | APPROV. |
|---|---|---|---|
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OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726

Texas Department of Transportation



## CORE LOGS

(SHEET 1 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
|---|---|---|
| 6 | STP 2B24(025)HES | 88 |

| STATE | DIST. | COUNTY | |
|---|---|---|---|
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

# DRILLING LOG



WinCore Version 3.3

| | | | | | |
|---|---|---|---|---|---|
| County | Dallas | Hole | B-03 | District | Dallas |
| Highway | IH 30 | Structure | Dynamic Message Signs | Date | 7/5/23 |
| CSJ | 0918-47-333 | Station | | Grnd. Elev. | 484.74 ft |
| | | Offset | | GW Elev. | 461.74 ft |

| Elev. (ft) | LOG | Texas Cone Penetrometer | Strata Description | Triaxial Test: Lateral Press. (psi) | Triaxial Test: Deviator Stress (psi) | Properties: MC | LL | PI | Wet Den. (pcf) | Additional Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CLAY, lean, soft to very stiff, dark brown and light brown. (CL) | | | | | | | |
| 5 | | 7 (6) 7 (6) | | | | | | | | |
| 10 | | 10 (6) 12 (6) | | | | | | | | N=3-2-2 |
| 15 | | 19 (6) 28 (6) | | | | | | | | N=6-10-13 |
| 464.7 20 | | 28 (6) 50 (4.5) | | | | | | | | N=16-18-24 |
| | | | SAND, clayey, very dense, dark gray. (SC) | | | | | | | |
| 25 | | 50 (3) 50 (2) | | | | | | | | N=20-39-50/3.5in |
| 30 | | 50 (3) 50 (2.5) | | | | | | | | N=24-41-50/3in |
| 35 | | 50 (2.5) 50 (1) | | | | | | | | N=24-50/4.75in |
| 444.7 40 | | 50 (0.5) 50 (0) | | | | | | | | N=25-50/4in |
| 45 | | | | | | | | | | |
| 50 | | | | | | | | | | |
| 55 | | | | | | | | | | |
| 60 | | | | | | | | | | |

**Remarks:** SPT and TCP tests performed using automatic hammer with 170lb weight and 24in drop. Soil/rock consistency description is based on TCP values and rating per TxDOT Geotechnical Manual Northing: 6990491.834 & Easting: 2418955.98.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

**Driller:** DR **Logger:** TL **Organization:** EST, Inc.

J:_TX_Melissa_Geotechnical\2021 Geotech Texas Projects\23-03255 - TxDOT Dallas District DMS Borings\D - BORING LOGS\Wincore logs.clg

# DRILLING LOG



WinCore Version 3.3

| | | | | | |
|---|---|---|---|---|---|
| County | Dallas | Hole | B-04 | District | Dallas |
| Highway | IH 30 | Structure | Dynamic Message Signs | Date | 7/13/23 |
| CSJ | 0918-47-333 | Station | | Grnd. Elev. | 419.71 ft |
| | | Offset | | GW Elev. | 384.71 ft |

| Elev. (ft) | LOG | Texas Cone Penetrometer | Strata Description | Triaxial Test: Lateral Press. (psi) | Triaxial Test: Deviator Stress (psi) | Properties: MC | LL | PI | Wet Den. (pcf) | Additional Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CLAY, lean, soft, dark brown and light brown. (CL) | | | | | | | N=6-9-11 |
| 5 | | 7 (6) 6 (6) | | | | | | | | |
| 10 | | 5 (6) 6 (6) | | | | | | | | |
| 15 | | 5 (6) 6 (6) | | | | | | | | |
| 20 | | 9 (6) 12 (6) | | | | | | | | |
| 25 | | 10 (6) 9 (6) | | | | | | | | |
| 391.7 | | | SAND, clayey, compact, brown. (SC) | | | | | | | |
| 30 | | 22 (6) 25 (6) | | | | | | | | |
| 384.7 35 | | 39 (6) 42 (6) | SAND, silty, dense to very dense, brown and gray. | | | | | | | |
| 40 | | 48 (6) 46 (6) | | | | | | | | |
| 45 | | 50 (1.75) 50 (1) | | | | | | | | |
| 369.7 50 | | 50 (3) 50 (1.5) | | | | | | | | |
| 55 | | | | | | | | | | |
| 60 | | | | | | | | | | |

**Remarks:** SPT and TCP tests performed using automatic hammer with 170lb weight and 24in drop. Soil/rock consistency description is based on TCP values and rating per TxDOT Geotechnical Manual Northing: 6966509.145 & Easting: 2481727.555.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

**Driller:** DR **Logger:** TL **Organization:** EST, Inc.

J:_TX_Melissa_Geotechnical\2021 Geotech Texas Projects\23-03255 - TxDOT Dallas District DMS Borings\D - BORING LOGS\Wincore logs.clg

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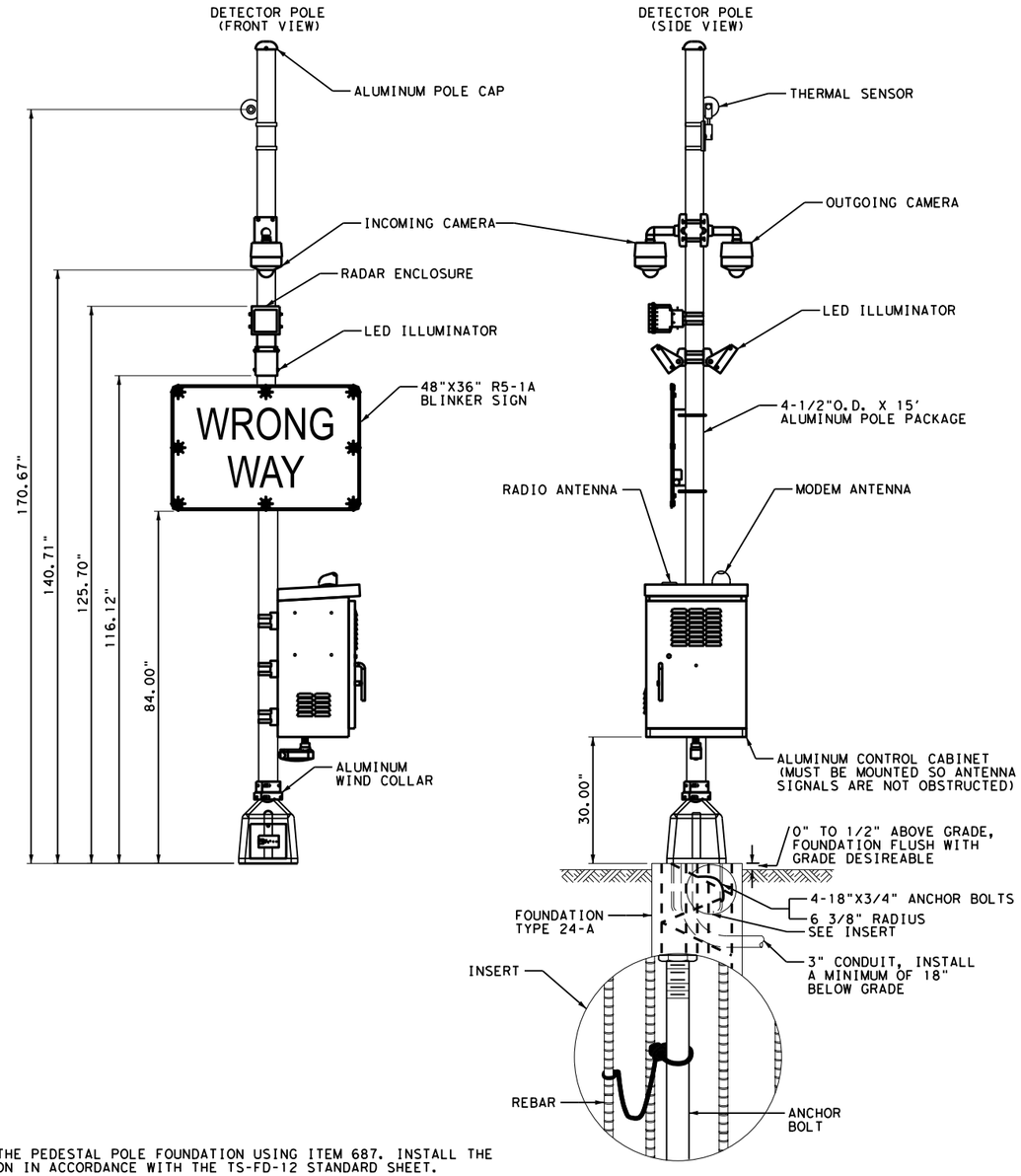
TEXAS PE FIRM REG # F-18726

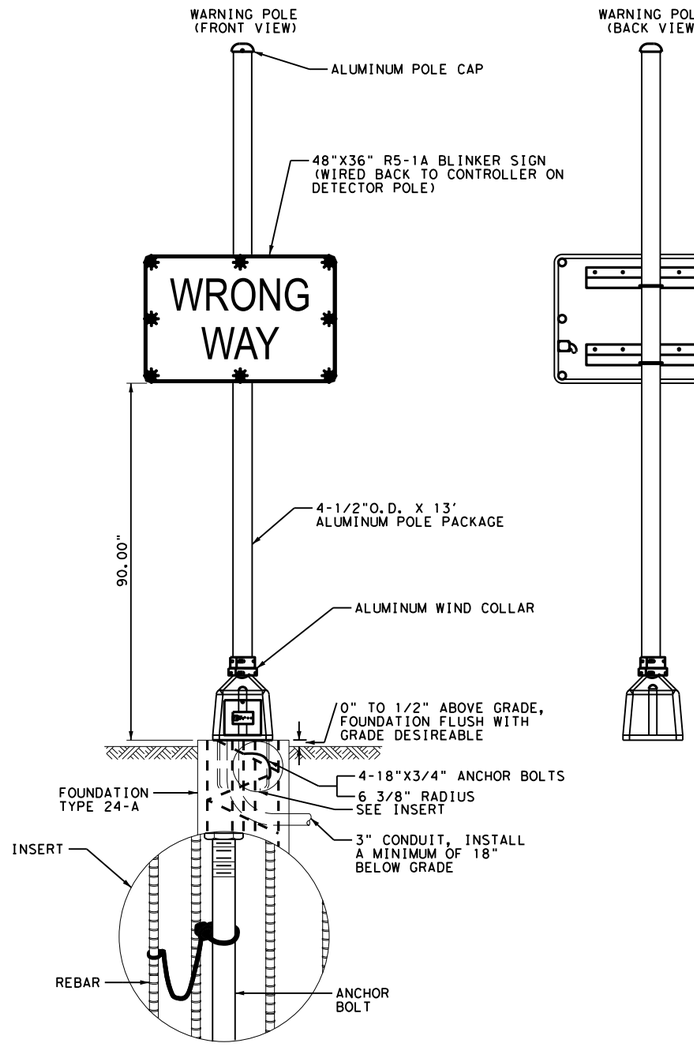
Texas Department of Transportation


## CORE LOGS

(SHEET 2 OF 2)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 89 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




NOTE:

1. PAY FOR THE PEDESTAL POLE FOUNDATION USING ITEM 687. INSTALL THE FOUNDATION IN ACCORDANCE WITH THE TS-FD-12 STANDARD SHEET.
2. BOND ANCHOR BOLTS TO REBAR CAGE, TWO LOCATIONS USING #3 BAR OR #6 AWG COPPER JUMPER. MECHANICAL CONNECTORS SHALL BE UL LISTED FOR CONCRETE ENCASEMENT. MECHANICAL CONNECTORS NOT SHOWN.
3. PER MANUFACTURER'S RECOMMENDATIONS, ENGAGE ALL THREADS ON THE PEDESTAL POLE BASE AND PIPE UNLESS THE PIPE IS FULLY SEATED INTO THE BASE. USE A POLE AND BASE COLLAR ASSEMBLY TO ADD STRENGTH AND PREVENT LOOSENING THE CONNECTION.
4. SEE FOUNDATION TYPE 24-A ON STANDARD SHEET TS-FD-12 FOR FOUNDATION STRUCTURE DESIGN DETAILS.
5. CONTROL CABINET HEIGHT MAY VARY.
6. SNAP LOCKS ARE PROVIDED, STANDARD 3/4" S/S BANDING IS RECOMMENDED.
7. J-BOLTS NOT SHOWN.
8. ALL DIMENSIONS ARE FOR REFERENCE ONLY.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED
PROFESSIONAL ENGINEER
02/23/2024

| NO. | DATE | REVISION | APPROV. |
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Texas Department of Transportation

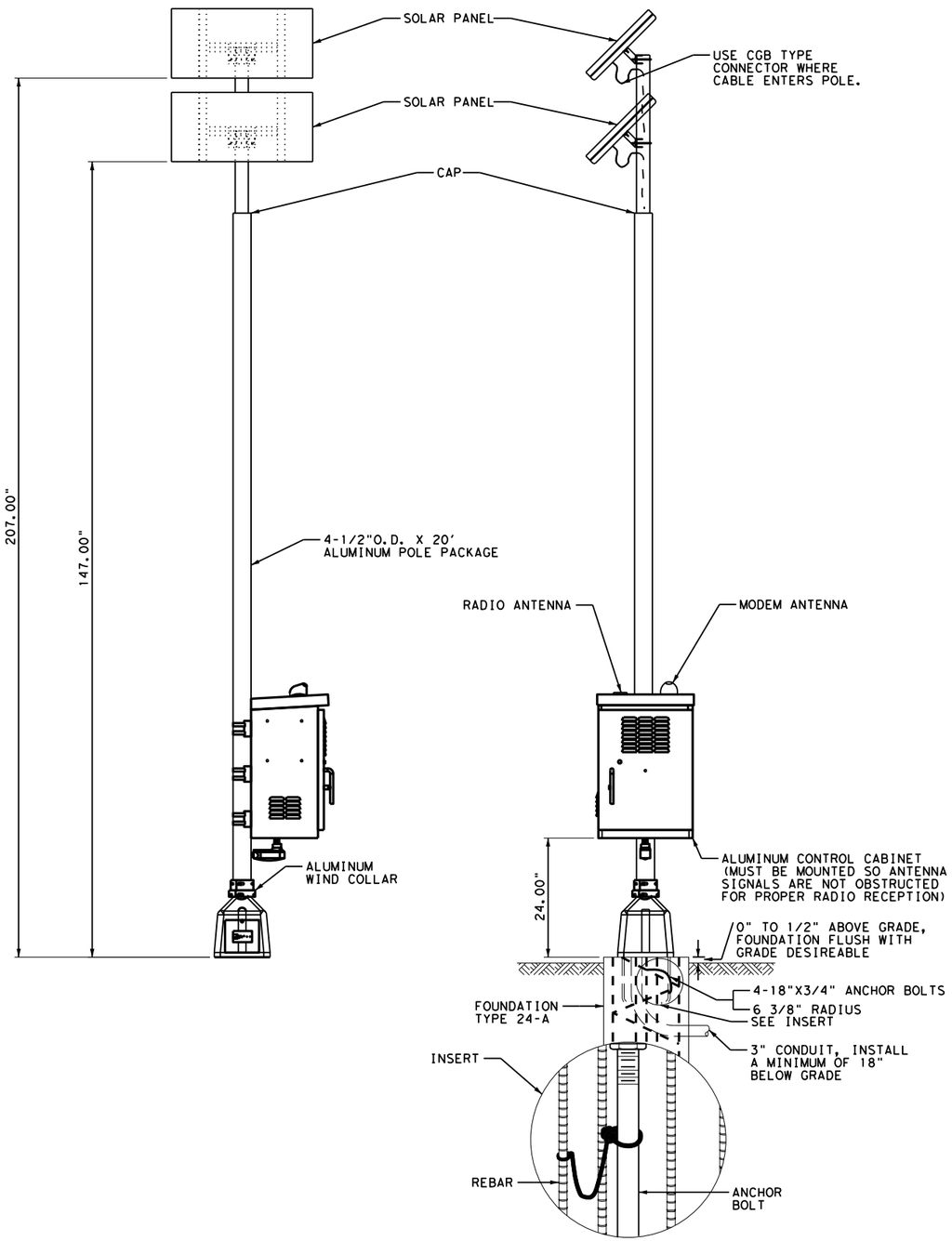

# TYPICAL WRONG WAY DRIVER SYSTEM EQUIPMENT

(SHEET 1 OF 4)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 90 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

SOLAR PANEL DUAL CABINET RADIOPOLE (FRONT VIEW)

SOLAR PANEL DUAL CABINET RADIO POLE (SIDE VIEW)




NOTE:

1. PAY FOR THE PEDESTAL POLE FOUNDATION USING ITEM 687. INSTALL THE FOUNDATION IN ACCORDANCE WITH THE TS-FD-12 STANDARD SHEET.
2. BOND ANCHOR BOLTS TO REBAR CAGE, TWO LOCATIONS USING #3 BAR OR #6 AWG COPPER JUMPER. MECHANICAL CONNECTORS SHALL BE UL LISTED FOR CONCRETE ENCASEMENT. MECHANICAL CONNECTORS NOT SHOWN.
3. PER MANUFACTURER'S RECOMMENDATIONS, ENGAGE ALL THREADS ON THE PEDESTAL POLE BASE AND PIPE UNLESS THE PIPE IS FULLY SEATED INTO THE BASE. USE A POLE AND BASE COLLAR ASSEMBLY TO ADD STRENGTH AND PREVENT LOOSENING THE CONNECTION.
4. SEE FOUNDATION TYPE 24-A ON STANDARD SHEET TS-FD-12 FOR FOUNDATION STRUCTURE DESIGN DETAILS.
5. CONTROL CABINET HEIGHT MAY VARY.
6. WORM CLAMPS ARE PROVIDED, STANDARD 3/4" S/S BANDING IS RECOMMENDED.
7. J-BOLTS NOT SHOWN.
8. ALL DIMENSIONS ARE FOR REFERENCE ONLY.
9. ORIENT SOLAR PANEL TOWARDS SOUTHERN SKY FOR MAXIMUM SOLAR EXPOSURE.

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED PROFESSIONAL ENGINEER

02/23/2024

| NO. | DATE | REVISION | APPROV. |
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TEXAS PE FIRM REG # F-18726

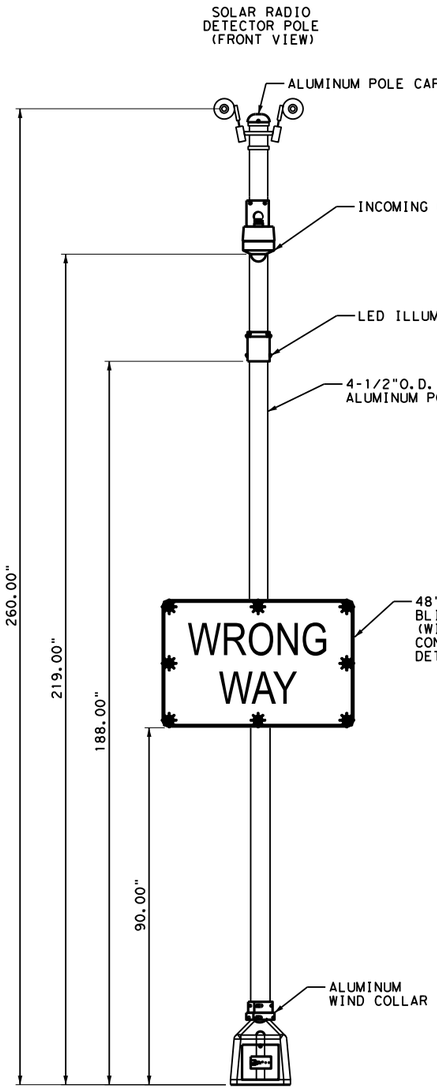

Texas Department of Transportation

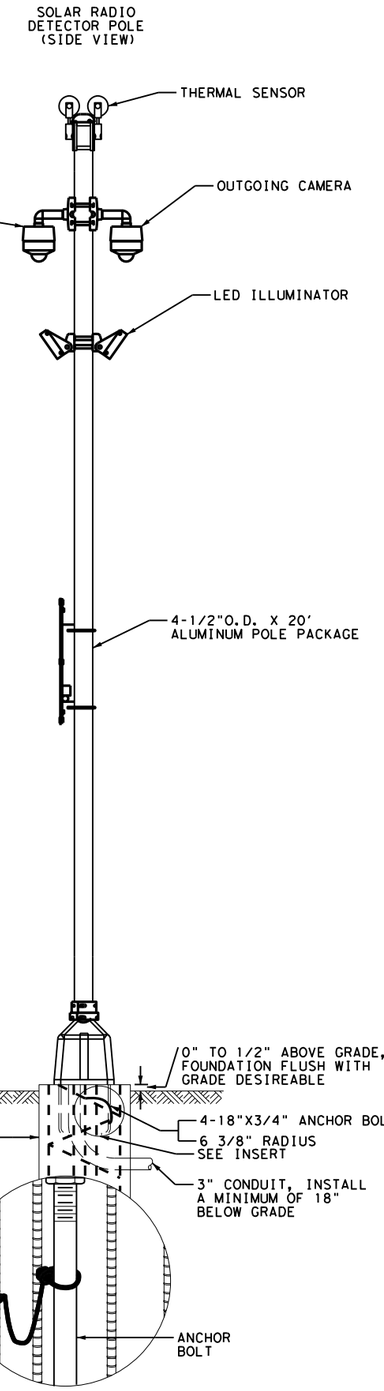


# TYPICAL WRONG WAY DRIVER SYSTEM EQUIPMENT

(SHEET 2 OF 4)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 91 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |




NOTE:

1. PAY FOR THE PEDESTAL POLE FOUNDATION USING ITEM 687. INSTALL THE FOUNDATION IN ACCORDANCE WITH THE TS-FD-12 STANDARD SHEET.
2. BOND ANCHOR BOLTS TO REBAR CAGE, TWO LOCATIONS USING #3 BAR OR #6 AWG COPPER JUMPER. MECHANICAL CONNECTORS SHALL BE UL LISTED FOR CONCRETE ENCASEMENT. MECHANICAL CONNECTORS NOT SHOWN.
3. PER MANUFACTURER'S RECOMMENDATIONS, ENGAGE ALL THREADS ON THE PEDESTAL POLE BASE AND PIPE UNLESS THE PIPE IS FULLY SEATED INTO THE BASE. USE A POLE AND BASE COLLAR ASSEMBLY TO ADD STRENGTH AND PREVENT LOOSENING THE CONNECTION.
4. SEE FOUNDATION TYPE 24-A ON STANDARD SHEET TS-FD-12 FOR FOUNDATION STRUCTURE DESIGN DETAILS.
5. WORM CLAMPS ARE PROVIDED, STANDARD 3/4" S/S BANDING IS RECOMMENDED.
6. J-BOLTS NOT SHOWN.
7. ALL DIMENSIONS ARE FOR REFERENCE ONLY.


02/23/2024

| NO. | DATE | REVISION | APPROV. |
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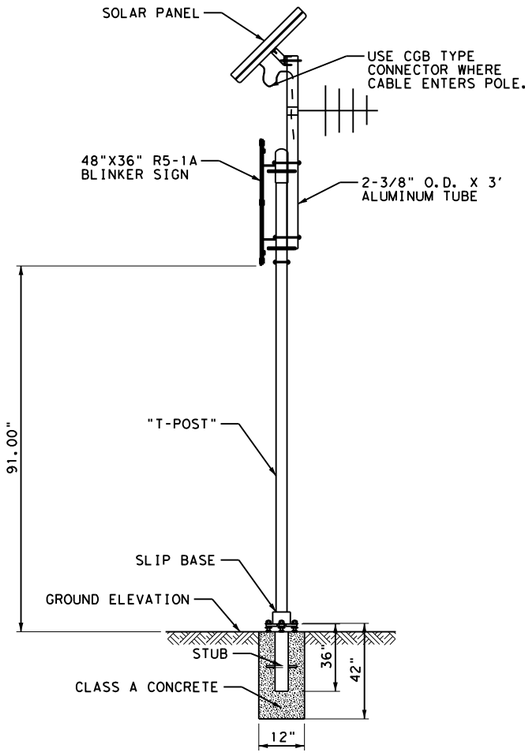
# TYPICAL WRONG WAY DRIVER SYSTEM EQUIPMENT

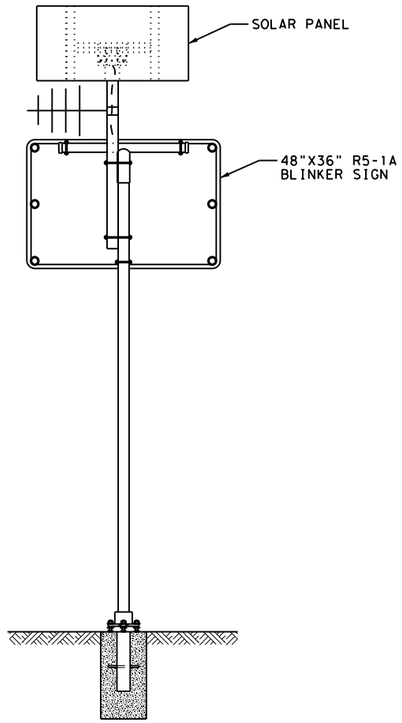
(SHEET 3 OF 4)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 92 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

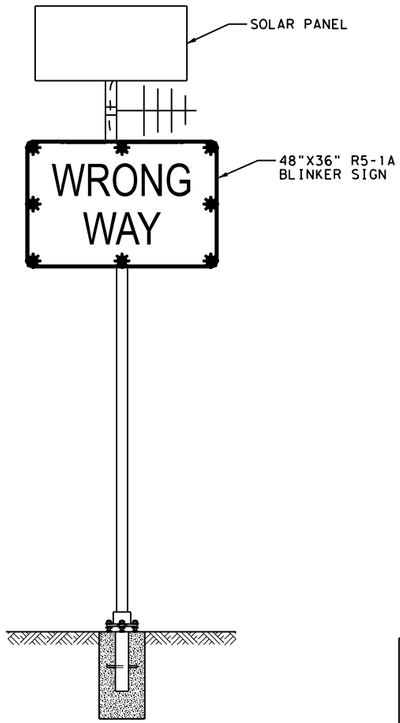
SOLAR RADIO WWD
WARNING SIGN POLE
(SIDE VIEW)




SOLAR RADIO WWD
WARNING SIGN POLE
(REAR VIEW)




SOLAR RADIO WWD
WARNING SIGN POLE
(REAR VIEW)




NOTE:

1. WORM CLAMPS ARE PROVIDED, STANDARD 3/4" S/S BANDING IS RECOMMENDED.
2. ALL DIMENSIONS ARE FOR REFERENCE ONLY.
3. ORIENT SOLAR PANEL TOWARDS SOUTHERN SKY FOR MAXIMUM SOLAR EXPOSURE.


02/23/2024

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# TYPICAL WRONG WAY DRIVER SYSTEM EQUIPMENT

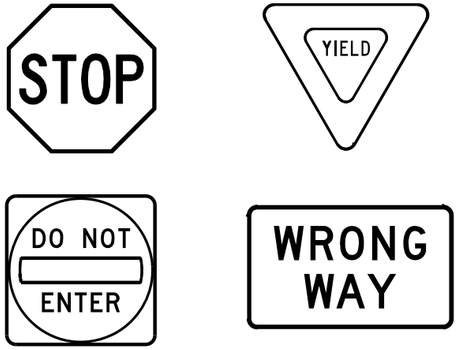
(SHEET 4 OF 4)

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 93 |
| STATE | DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245,ETC | US 75, ETC |

DATE:
FILE:

## REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

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




REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

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

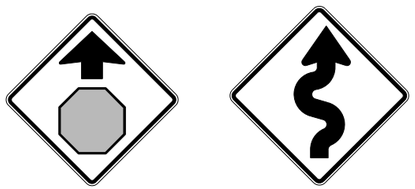
## REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

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


TYPICAL EXAMPLES

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

## REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

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

## REQUIREMENTS FOR SCHOOL SIGNS


TYPICAL EXAMPLES

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

## GENERAL NOTES

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

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

# TYPICAL SIGN REQUIREMENTS

# TSR(4)-13

| FILE: tsr4-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT October 2003 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 12-03 7-13 9-08 | 0047 | 07 | 245, ETC | US 75, ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS, ETC | | 94 |

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# SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

**Post Type**

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

**Number of Posts (1 or 2)**

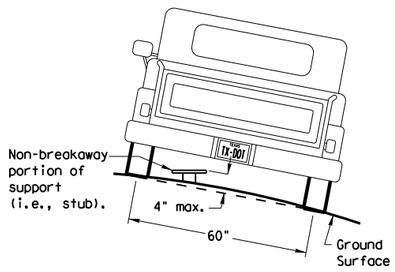
**Anchor Type**

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

**Sign Mounting Designation**

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

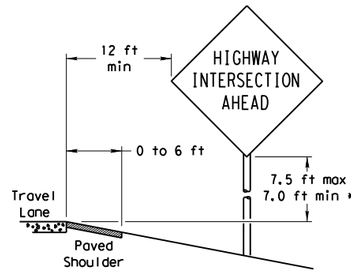
# REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT




To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

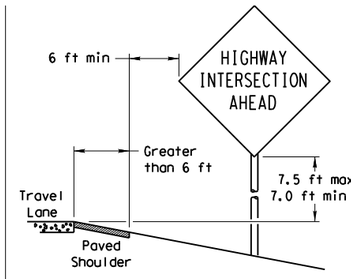
# SIGN LOCATION

## PAVED SHOULDERS




**LESS THAN 6 FT. WIDE**

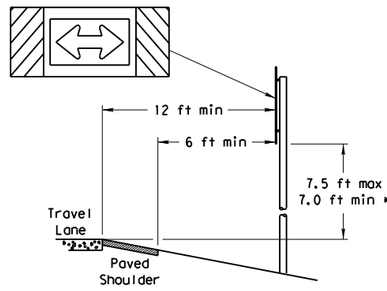
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



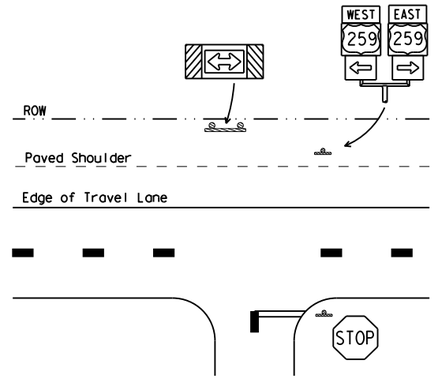

**GREATER THAN 6 FT. WIDE**

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

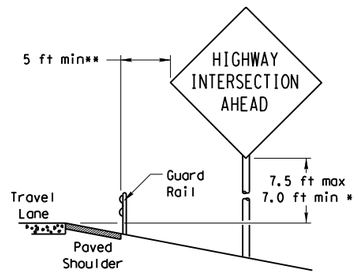
## T-INTERSECTION



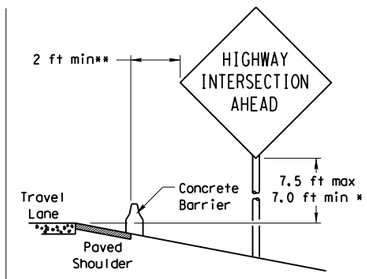

When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.




## BEHIND BARRIER



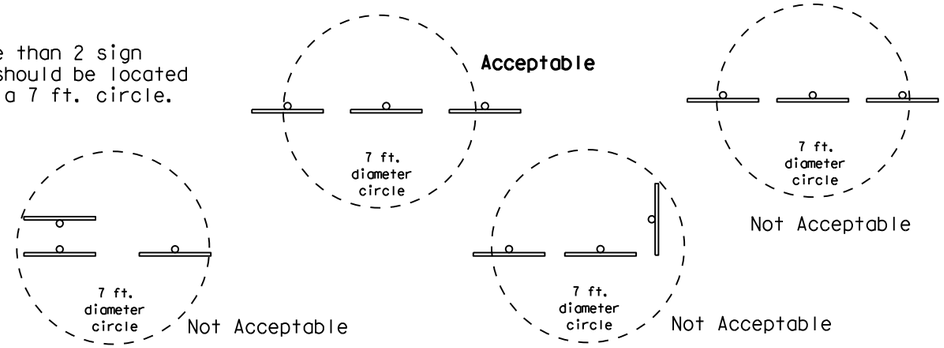

**BEHIND GUARDRAIL**




**BEHIND CONCRETE BARRIER**

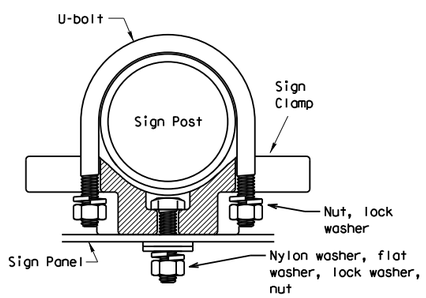
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.




# TYPICAL SIGN ATTACHMENT DETAIL

## Single Signs

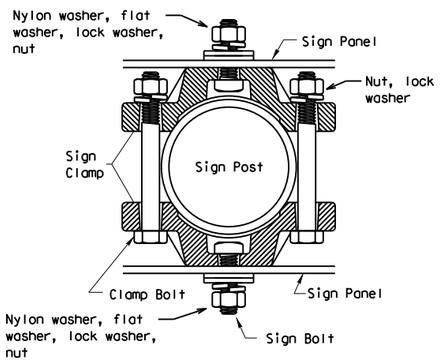



Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

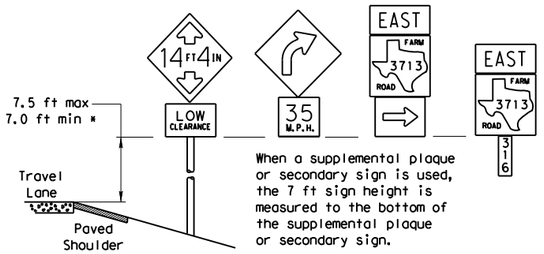
Sign clamps may be either the specific size clamp or the universal clamp.

## Back-to-Back Signs



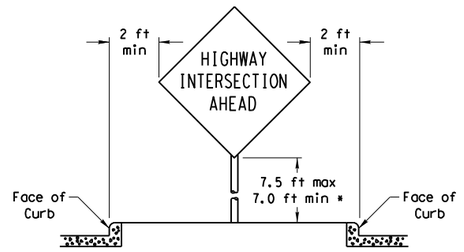

| Pipe Diameter | Approximate Bolt Length | |
|---|---|---|
| | Specific Clamp | Universal Clamp |
| 2" nominal | 3" | 3 or 3 1/2" |
| 2 1/2" nominal | 3 or 3 1/2" | 3 1/2 or 4" |
| 3" nominal | 3 1/2 or 4" | 4 1/2" |

## SIGNS WITH PLAQUES



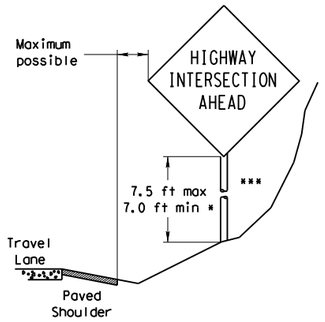

When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

## CURB & GUTTER OR RAISED ISLAND




## RESTRICTED RIGHT-OF-WAY

**(When 6 ft min. is not possible.)**




Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

*Texas Department of Transportation*
*Traffic Operations Division*

# SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

## SMD(GEN)-08

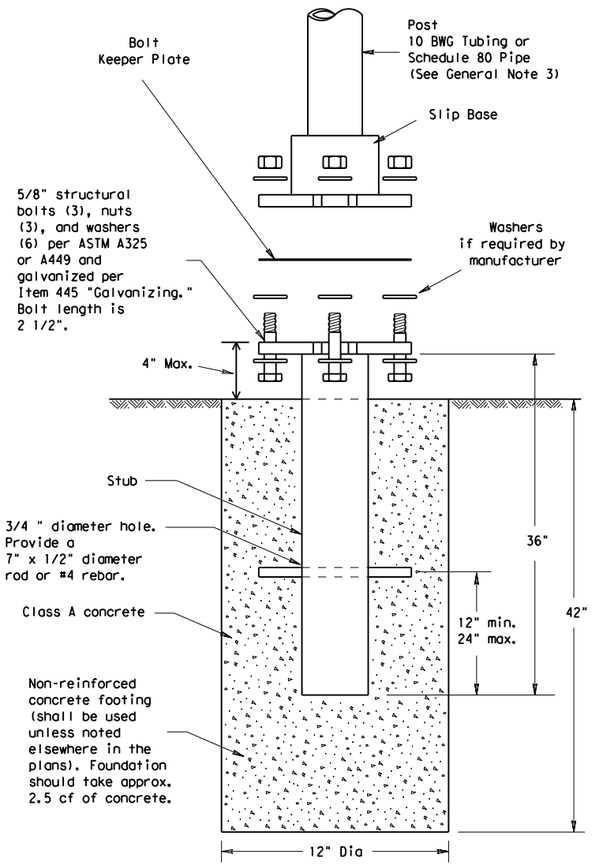


| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|

| REVISIONS | CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|---|
| 9-08 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 95 |

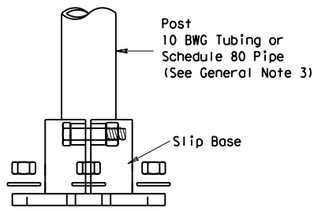
DATE:
FILE:

# TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

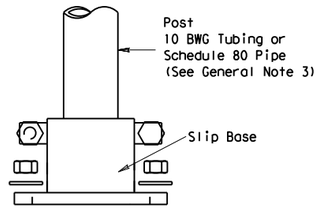



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

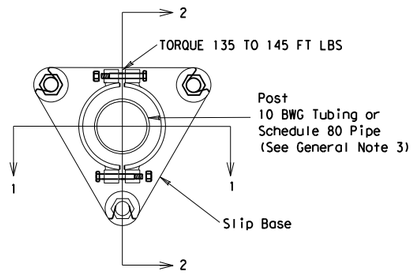
**NOTE**
**The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.**




SIDE VIEW 1-1




SIDE VIEW 2-2




TOP VIEW

DETAIL A

GENERAL NOTES:

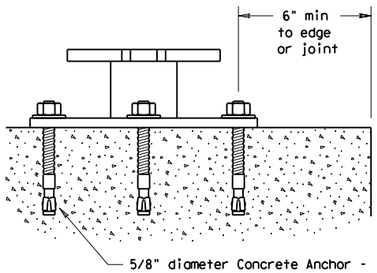
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
   46,000 PSI minimum yield strength
   62,000 PSI minimum tensile strength
   21% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is:
   http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

## CONCRETE ANCHOR




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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

ADDED DETAIL A FOR CLAMP BASE
10-2010

DATE:
FILE:

*Texas Department of Transportation*
*Dallas District Standard*

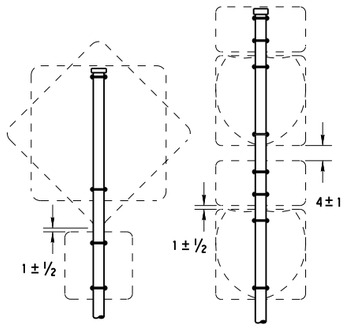
# SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

## SMD(SLIP-1)-08(DAL)

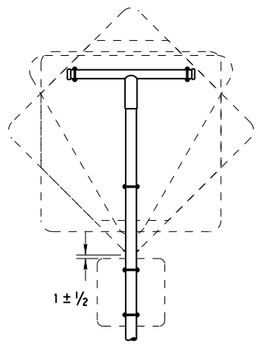


| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|

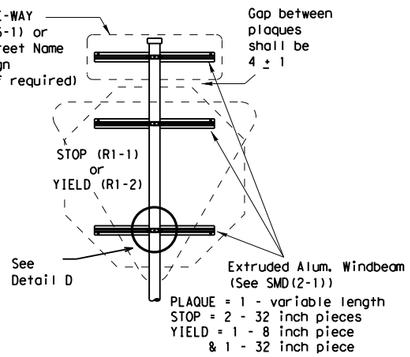
| REVISIONS | CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|---|
| 9-08 | 0047 | 07 | 245,ETC | US 75,ETC |
| 12-10 (DISTRICT) ADDED CLAMP BASE DETAIL FOR SLIP BASE INSTALLATION | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 96 |



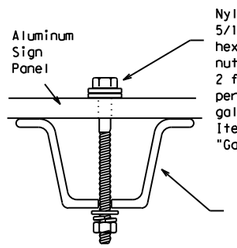

SM RD SGN ASSM TY XXXXX(1)XX(P)



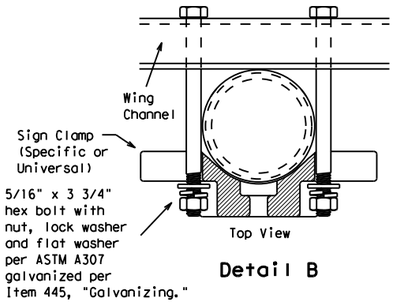

SM RD SGN ASSM TY XXXXX(1)XX(T)



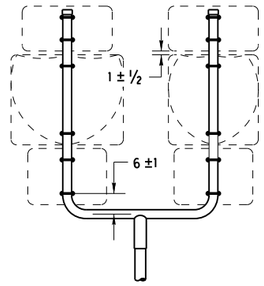

SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



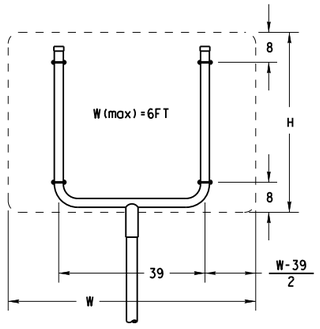

**Detail A**



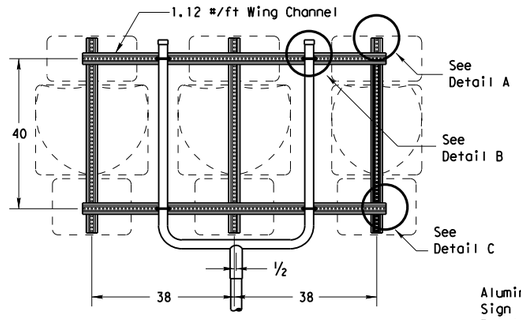

**Detail B**



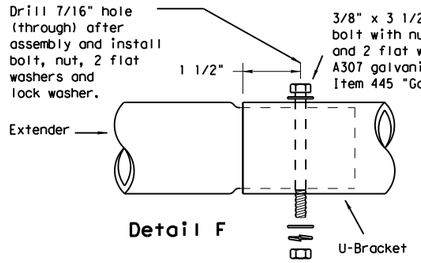

SM RD SGN ASSM TY XXXXX(1)XX(U)




SM RD SGN ASSM TY XXXXX(1)XX(U)

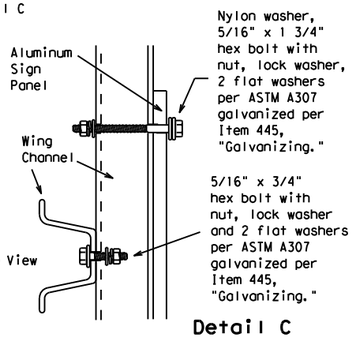



SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

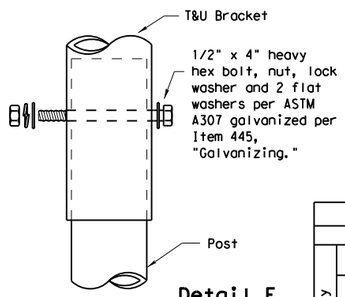



**Detail F**

Splices shall only be allowed behind the sign substrate.




**Detail C**



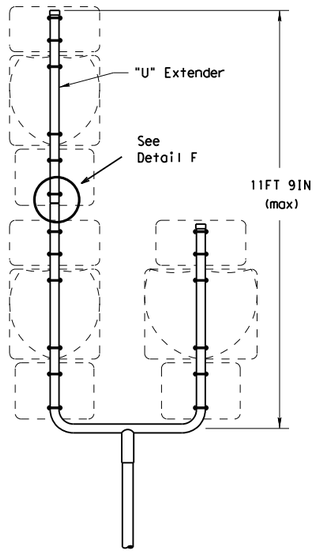

**Detail E**

**GENERAL NOTES:**

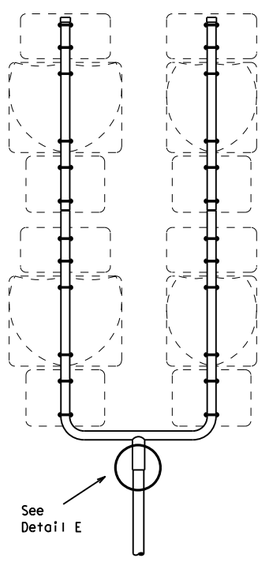
1.

| SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|---|---|---|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |

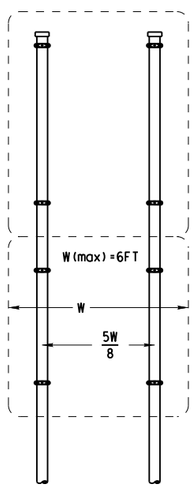
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



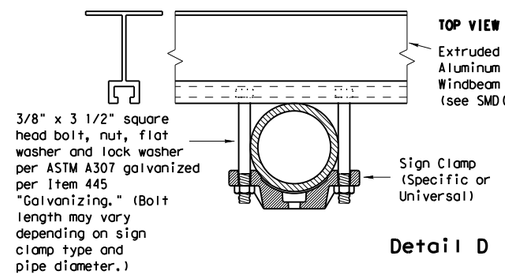

SM RD SGN ASSM TY S80(1)XX(U-1EXT)



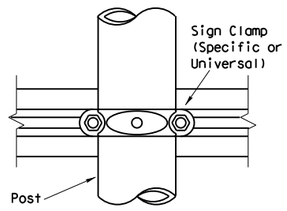

SM RD SGN ASSM TY S80(1)XX(U-2EXT)



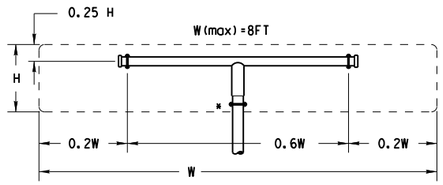

SM RD SGN ASSYM TY XXXXX(2)XX(P)




**Detail D**



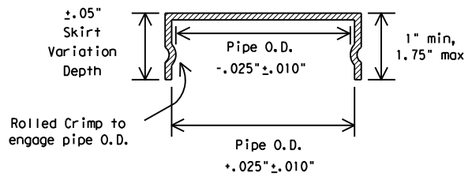

| REQUIRED SUPPORT | | |
|---|---|---|
| | SIGN DESCRIPTION | SUPPORT |
| Regulatory | 48-inch STOP sign (R1-1) | TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM) |
| | 60-inch YIELD sign (R1-2) | TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM) |
| | 48x16-inch ONE-WAY sign (R6-1) | TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM) |
| | 36x48, 48x36, and 48x48-inch signs | TY 10BWG(1)XX(T) |
| | 48x60-inch signs | TY S80(1)XX(T) |
| Warning | 48x48-inch signs (diamond or square) | TY 10BWG(1)XX(T) |
| | 48x60-inch signs | TY S80(1)XX(T) |
| | 48-inch Advance School X-ing sign (S1-1) | TY 10BWG(1)XX(T) |
| | 48-inch School X-ing sign (S2-1) | TY 10BWG(1)XX(T) |
| | Large Arrow sign (W1-6 & W1-7) | TY 10BWG(1)XX(T) |




All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

## FRICTION CAP DETAIL




Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

# SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

## SMD(SLIP-2)-08



| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|
| CONT | SECT | JOB | HIGHWAY |
| 0047 | 07 | 245,ETC | US 75,ETC |
| DIST | COUNTY | | SHEET NO. |
| DAL | DALLAS,ETC | | 97 |

9-08 REVISIONS

DATE:
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DATE:
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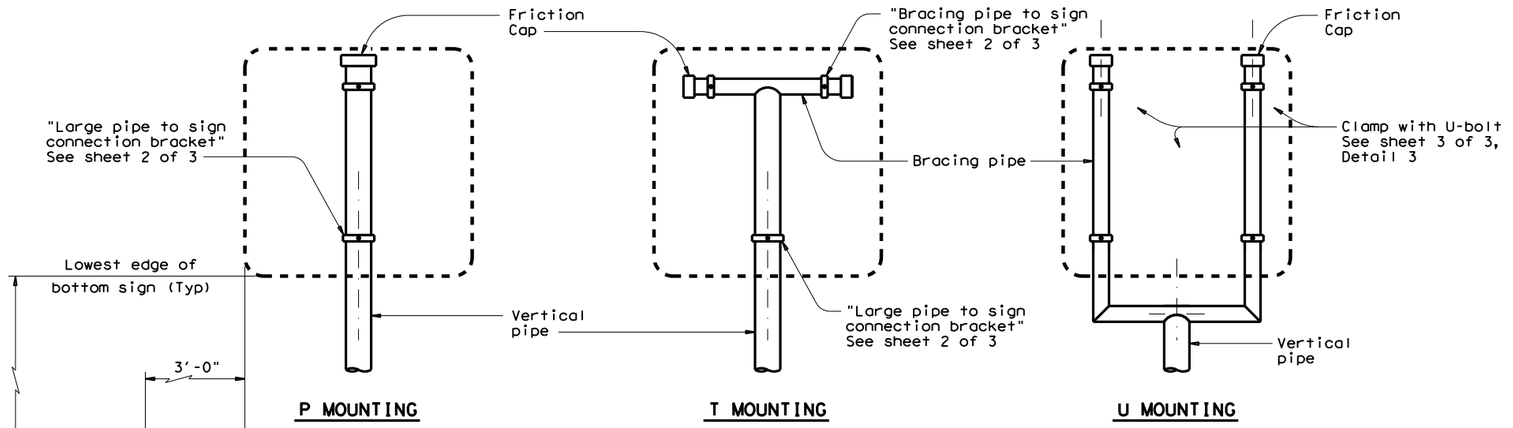
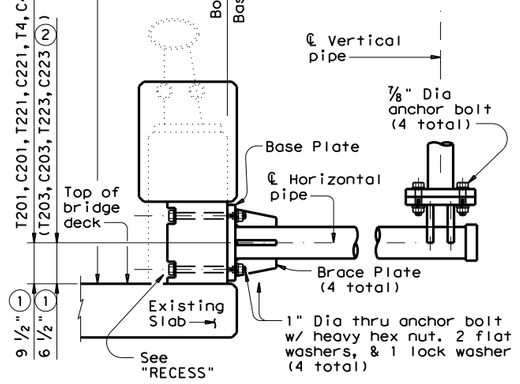
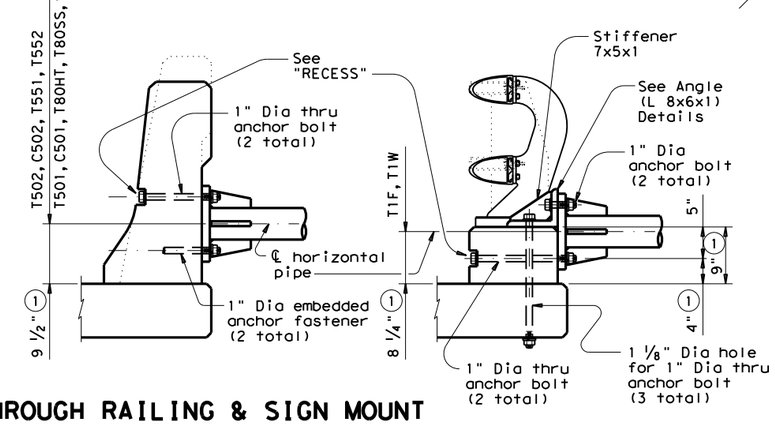


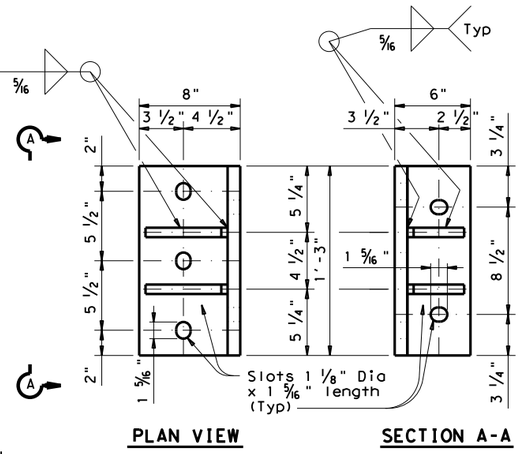

## VARIOUS SIGN ATTACHMENTS

(Mounting NOT deviated from SHSD)



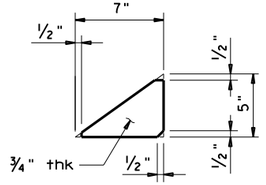




## LONGITUDINAL SECTION THROUGH RAILING & SIGN MOUNT




PLAN VIEW

SECTION A-A

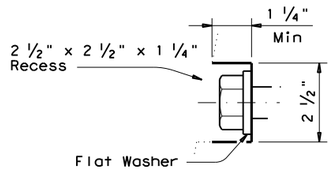



STIFFENER

## ANGLE (L 8x6x1) DETAILS

① Increase 2" for structure with overlay.

② Attached at ℄ post.




## RECESS

| PIPE SIZE AND THICKNESS | | | |
|---|---|---|---|
| Pipe Placement / Design Wind Speed | Horizontal | Vertical | Bracing |
| 90 mph | 5" X-Strong (.375") | 4" X-Strong (.337") | 2 ½" Standard (.203") |
| 130 mph | 6" X-Strong (.432") | 5" X-Strong (.375") | 3" X-Strong (.300") |

## GENERAL NOTES:

Design conforms to 2013 AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design 3-second gust wind speeds of 90 mph and 130 mph with a 1.14 gust factor, and a wind importance factor of 1.0 (50-year mean recurrence interval) for the supporting structures. For mounting connection between sign panel and pipe, wind importance factors of 0.71 and 0.54, for 90 mph and 130 mph winds, respectively, are applied to adjust the wind speeds to a 10-year mean recurrence interval.

See standard sheet WV & IZ(LTS2013) for the boundaries of each design wind zone. All mounting shall be based on 130 mph wind speed design except when located in 90 mph wind zone. Maximum panel area is 30 sq. ft. Maximum design height is 50 ft, with design height defined as the distance between natural ground (average elevation of surrounding terrain) and the center of sign(s) at the mounting location.

Material for pipe shall be ASTM A53 Grade B, or A501. Structural steel plates shall be ASTM A36, A572 Grade 50, or A588. Bolts used to connect pipe and mounting bracket, and wind beam to sign panel shall be ASTM A307. Anchor bolts shall be ASTM A325 or A193 B7. Each anchor bolt shall be provided with 2 flat washers, 1 lock washer, and 1 heavy hex nut. All parts shall be galvanized in accordance with Standard Specifications Item 445, "Galvanizing".

Attach horizontal pipe at least 2'-0" from the edge of any nearby drain slot.

Contractor shall verify applicable field dimensions before fabrication. Holes drilled through the railing parapet wall shall be drilled with rotary (coring or masonry drill) type equipment. Percussion (star) drilling shall not be allowed. Anchorage for pipe attached to rail shall be placed using an anchoring system approved by the engineer. Installation of anchor fasteners including hole depth, diameter and material shall be in accordance with the manufacturers' recommendation.

Each embedded anchor fastener shall resist an allowable design loading (after applying the reduction factors of bolt spacing and bolt edge distance) of:

| | 130 mph | 90 mph |
|---|---|---|
| Tension | 12.5 kips | 7.5 kips |
| Shear | 9.0 kips | 5.0 kips |

Each anchoring system shall provide a capacity to resist the required tension and shear acting simultaneously.

For sign connection to mounting, shop drill holes on sign blank in accordance with the current Standard Highway Sign Designs for Texas (SHSD). Additional hole(s) needed to meet a stipulated-type mounting may be field drilled. For multi-sign or back-to-back signs mounting, the engineer shall determine the proper type which ensures each individual mounting meets requirements.

Refer to Standard sheets SMD(GEN), SMD(SLIP-2 and SMD(2-1) for details not covered here.



Texas Department of Transportation

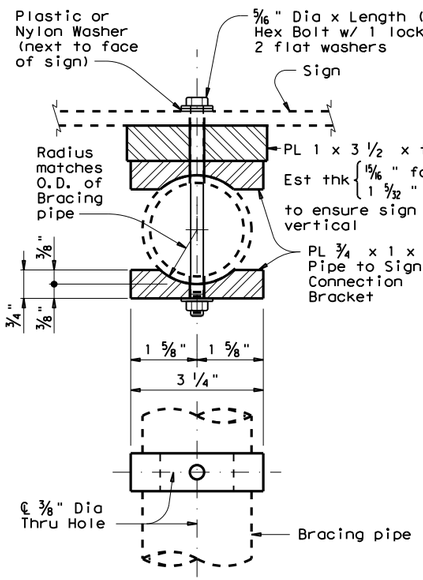
Traffic Operations Division Standard

# BRIDGE RAILING SIGN MOUNT DETAILS

## SMD(BR-1)-14

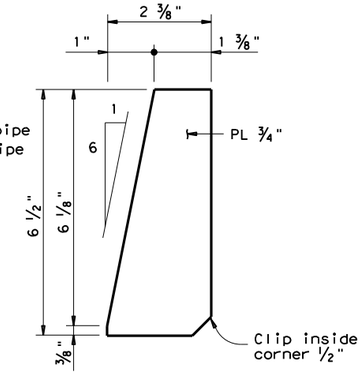
| FILE: smdbr-14.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT August 2014 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245, ETC | US 75, ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS, ETC | | 98 |

DATE:
FILE:

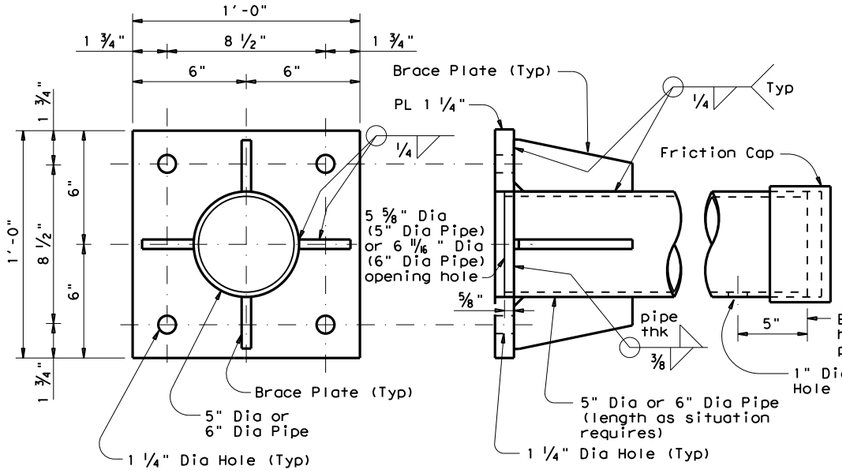



## BRACING PIPE TO SIGN CONNECTION BRACKET DETAILS

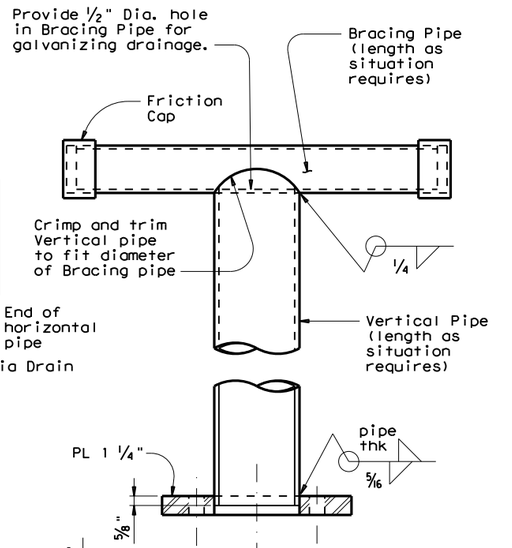
(Showing T Mounting)




## BRACE PLATE DETAILS

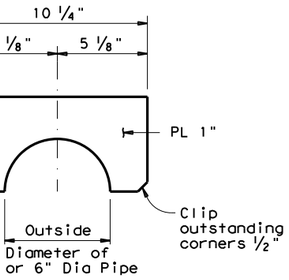



## BASE PLATE DETAILS

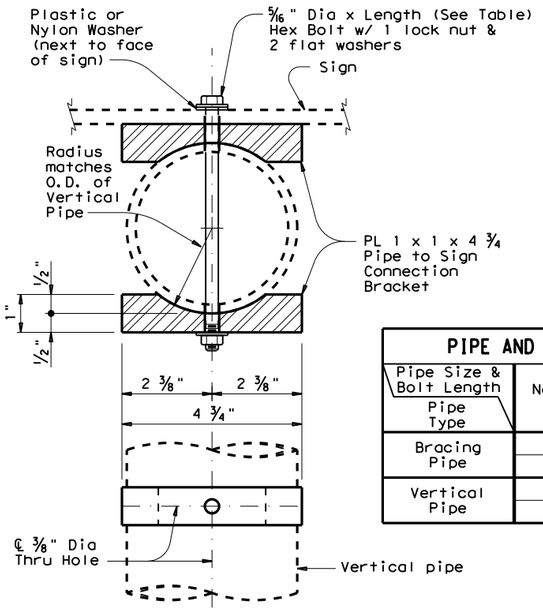



## SIGN POLE & POLE BASE PLATE DETAILS

(Showing only T Mounting)



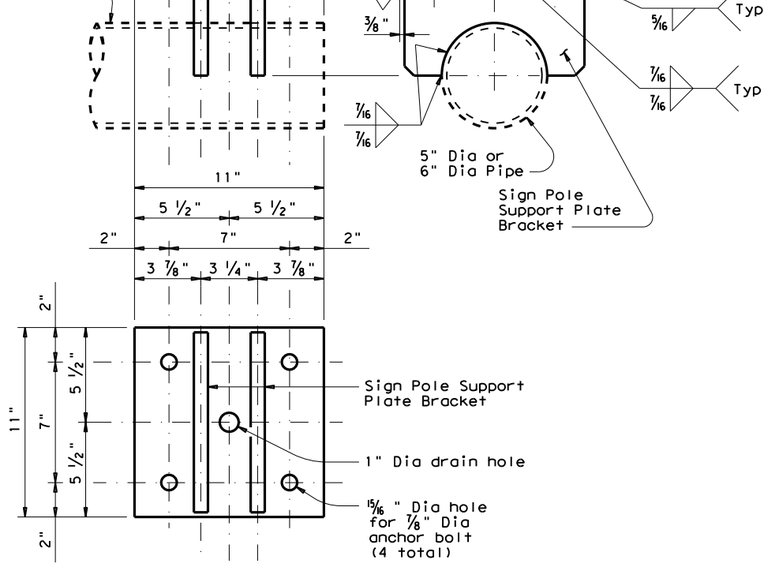

## SIGN POLE SUPPORT PLATE BRACKET DETAILS




| PIPE AND BOLT SPECIFICATIONS | | |
|---|---|---|
| Pipe Size & Bolt Length / Pipe Type | Nominal Pipe Dia (in.) | Bolt Length (in.) |
| Bracing Pipe | 2 1/2 | 6 |
| | 3 | 7 |
| Vertical Pipe | 4 | 7 |
| | 5 | 8 |

## LARGE PIPE TO SIGN CONNECTION BRACKET DETAILS

(Showing P or T Mounting)




## SIGN POLE SUPPORT PLATE DETAILS

SHEET 2 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

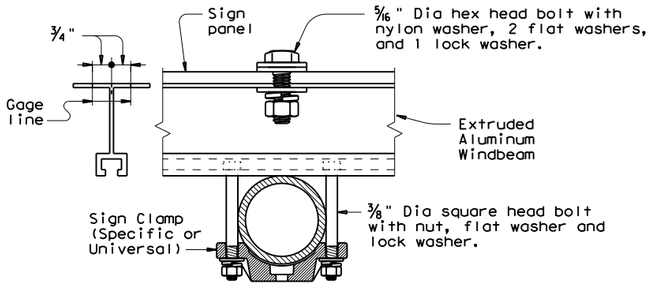
# BRIDGE RAILING SIGN MOUNT DETAILS

## SMD(BR-2)-14

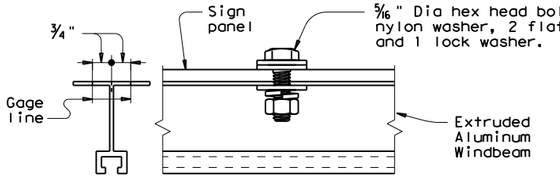
| FILE: smdbr-14.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT August 2014 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 99 |

26H

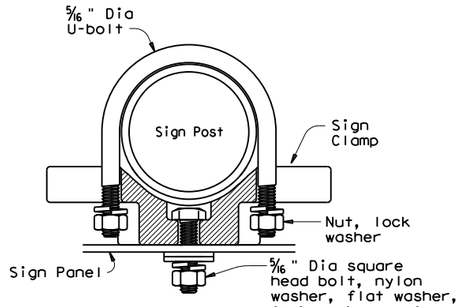
DATE:
FILE:




**DETAIL 1**




**DETAIL 2**

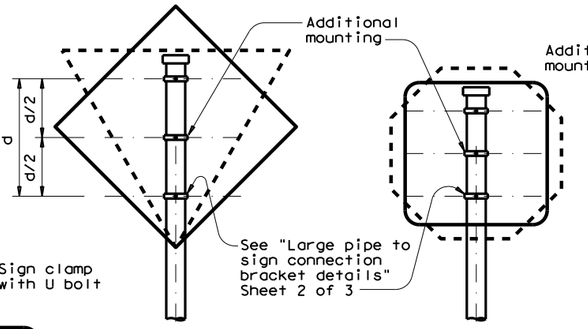



**DETAIL 3**

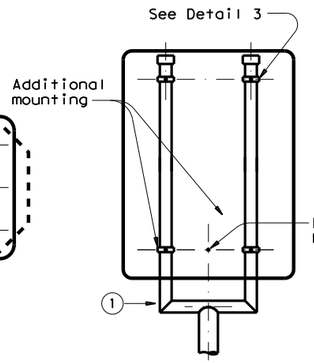
| SIGN SHAPE | SQUARE | | | HORIZONTAL RECTANGLE | | | VERTICAL RECTANGLE | | | DIAMOND | | | OCTAGON | | | EQUILATERAL TRIANGLE | | | INTERSTATE SHIELD | PENTAGON (SCHOOL) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of Sign Mounting on SHSD / Design Wind Speed | P | T | U | P | T | U | P | T | U | P | T | U | P | T | U | P | T | U | P | P | T |
| 90 mph | | | | | (Type 23) 60"x48" | (Type 3) 72"x36" 78"x36"<br>(Type 23) 72"x30" 84"x24" | | (Type 2) 36"x48"<br>(Type 32) 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" 48"x72"<br>(Type 3) 48"x84" | | | (Type 3) 60"x60" | | | | | | | | | (Type Special) 45"x36" | | |
| 130 mph | (Type 1) 30"x30" 36"x36" | (Type 3) 48"x48" | | (Type 1) 36"x24" 36"x30" | (Type 23) 48"x42" 54"x42" 60"x30" 66"x36" 84"x24"<br>(Type 3) 60"x48" | (Type 3) 72"x36" 78"x36"<br>(Type 23) 72"x30" 84"x24" | (Type 1) 30"x36" 30"x42" | (Type 3) 36"x48" 36"x60" 36"x72" 42"x60" 48"x54" 48"x60"<br>(Type 4) 48"x72" 48"x84" | (Type 3) 48"x60" | (Type 1) 36"x36" | (Type 3) 48"x48" 60"x60" | | | | | (Type 1) 48"x48" | | | (Type Special) 36"x36" 45"x36" | | |

Notes:
1. Drill holes in addition to the hole pattern of the Standard Highway Sign Designs for Texas (SHSD) at specified locations to meet a stipulated-type mounting indicated in the parenthesis ( ).
2. "Blank" in the above table indicates all other signs excluded from stipulated mounting shall be mounted in accordance with SHSD.

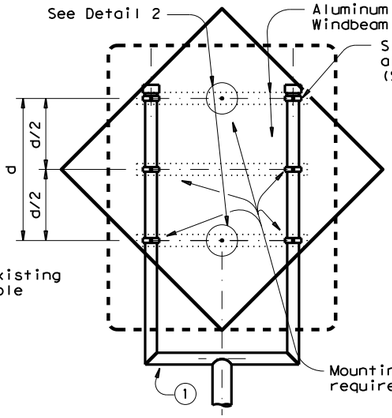
(1) In lieu of welding, the Fabricator may bend bracing pipe elbows if the following conditions are met:
a. Spacing between vertical bracing pipes is equal to or greater than 2'-6".
b. Bending radius is 12".
c. The distance between the lowest clamp and centerline of horizontal bent pipe is 13" max.

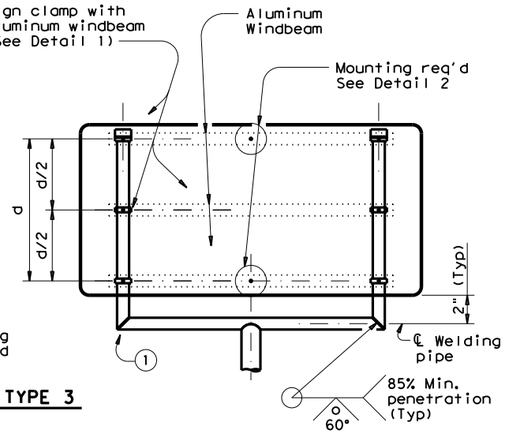



**TYPE 1**

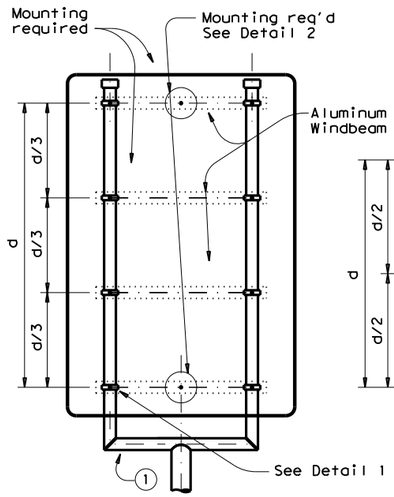



**TYPE 2**

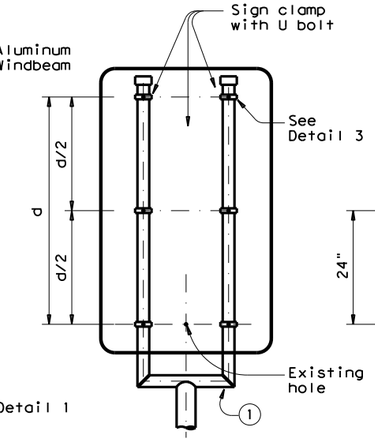


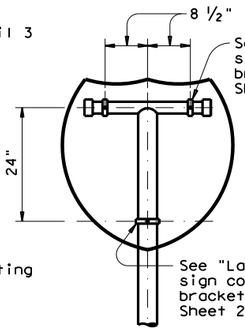

**TYPE 3**



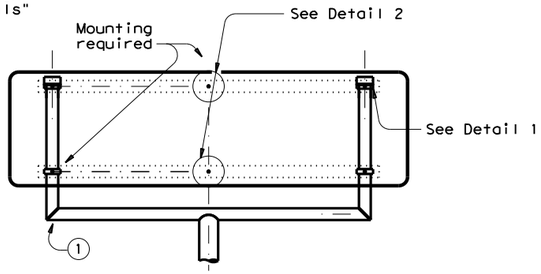

**TYPE 4**




**TYPE 32**




**TYPE SPECIAL**




**TYPE 23**

SHEET 3 OF 3

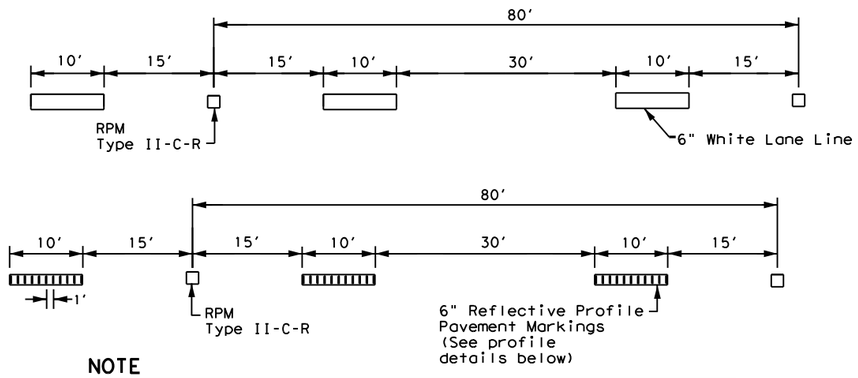
Texas Department of Transportation — Traffic Operations Division Standard

# BRIDGE RAILING SIGN MOUNT DETAILS

## SMD(BR-3)-14

| FILE: smdbr-14.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT August 2014 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 100 |

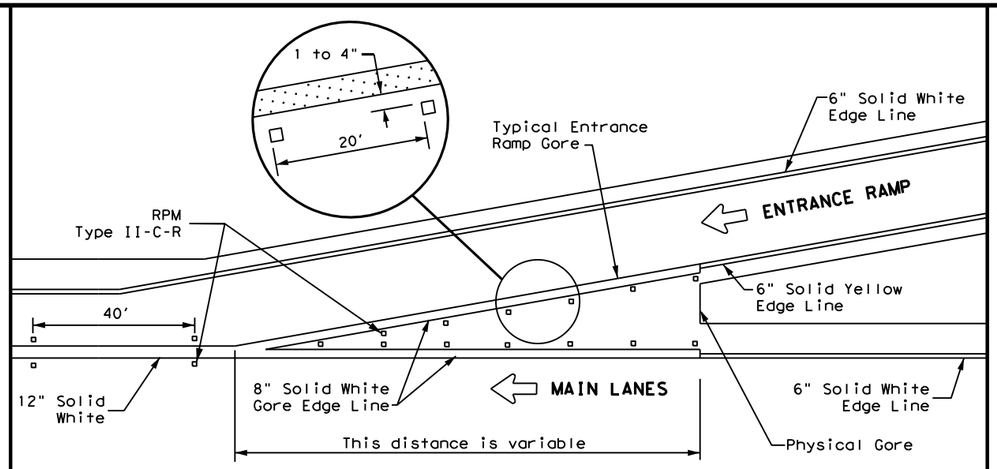
DATE:
FILE:




**NOTE**

Reflectorized raised pavement markers Type II-C-R shall be spaced on 80' centers with the clear face toward normal traffic and the red face toward wrong way traffic. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.

## TRAFFIC LANE LINES PAVEMENT MARKING




## TYPICAL ENTRANCE RAMP GORE MARKING

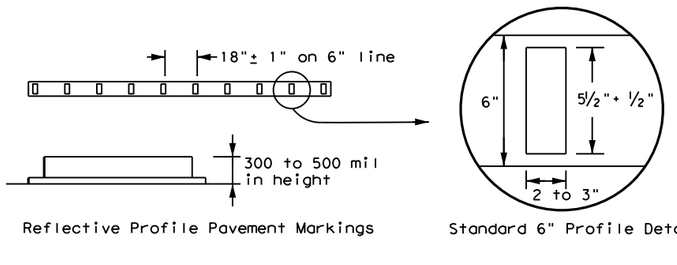
| MATERIAL SPECIFICATIONS | |
|---|---|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240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

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

| LEGEND | |
|---|---|
| ⇦ | Traffic flow |
| ↱ | Pavement marking arrows (white) |
| ▫ | Reflectorized Raised Markers (RPM) Type II-C-R |

**GENERAL NOTE**

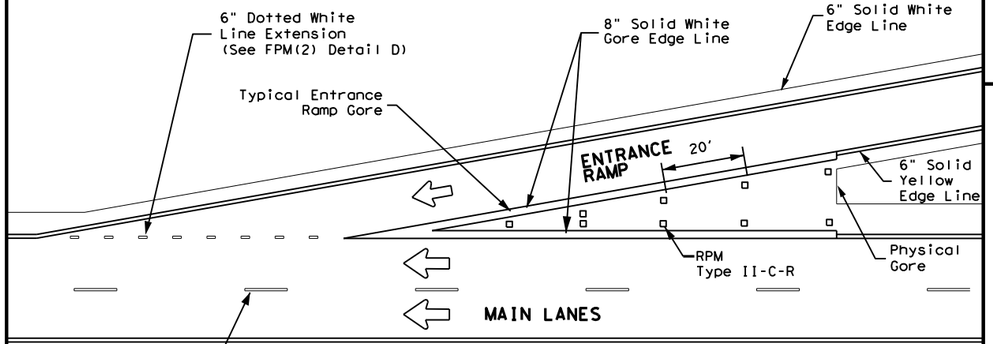
On concrete pavements the raised pavement markers shall be placed to one side of the longitudinal joints.




**NOTE**

Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

## EDGE LINE PAVEMENT MARKINGS




**NOTE**

See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

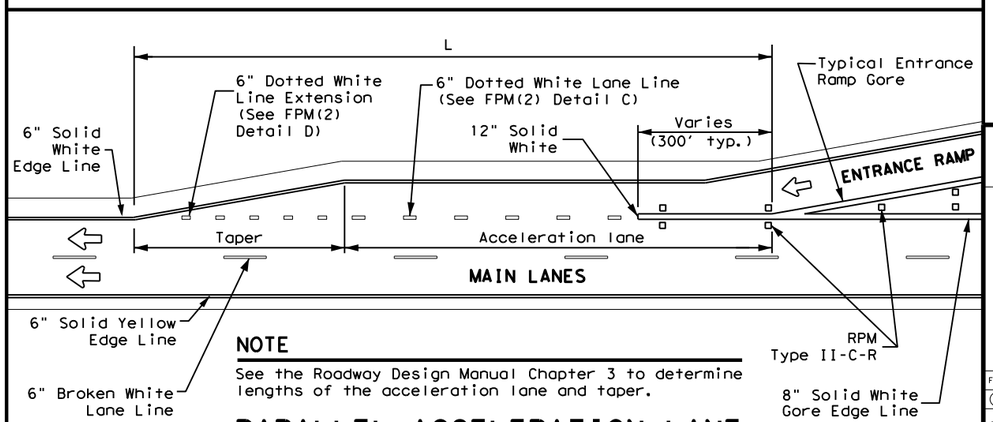
## TAPERED ACCELERATION LANE




**NOTES**

1. Reflectorized raised pavement markers Type-II-C-R in the wrong way arrow shall have the clear face toward normal traffic and the red face toward the wrong way traffic.
2. Red reflectorized wrong way arrows, not to exceed two, may be placed on exit ramps. Locations of the arrows shall be as shown in the plans or as directed by the engineer.

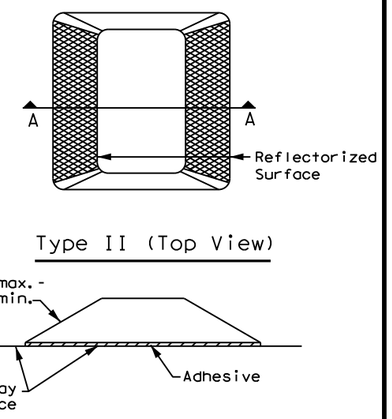
## WRONG WAY ARROW




**NOTE**

See the Roadway Design Manual Chapter 3 to determine lengths of the acceleration lane and taper.

## PARALLEL ACCELERATION LANE




SECTION A

## REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation — Traffic Safety Division Standard

# TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

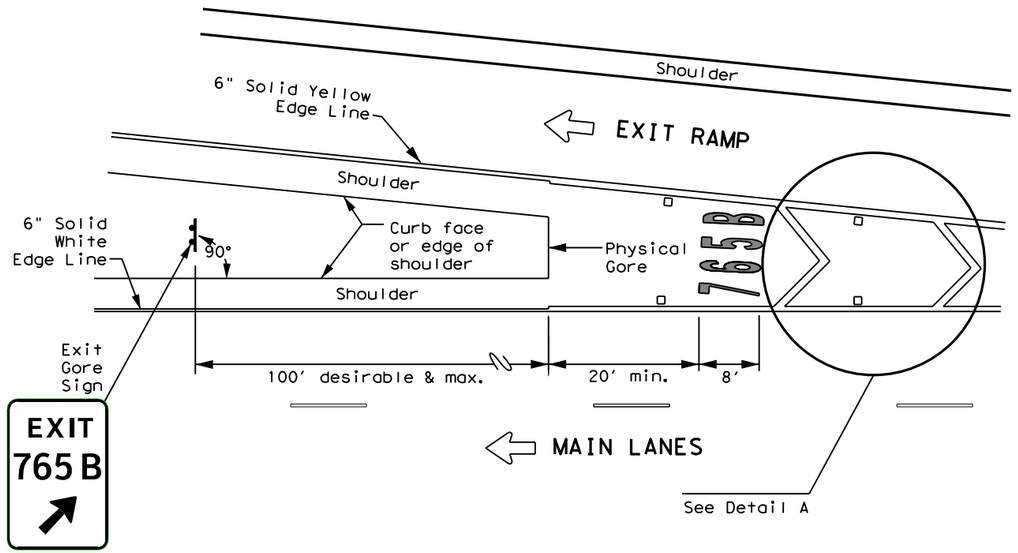
# FPM(1)-22

| FILE: fpm(1)-22.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT October 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 5-74 8-00 2-12 | DIST | COUNTY | | SHEET NO. |
| 4-92 2-08 10-22 | DAL | DALLAS,ETC | | 101 |
| 5-00 2-10 | | | | |

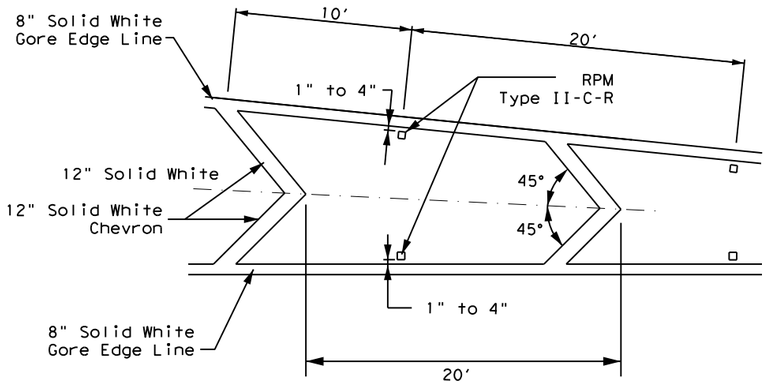
23A

## EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white exit number pavement markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Section 12 at http://www.txdot.gov




## MARKINGS WITH EXIT NUMBER




## NOTES

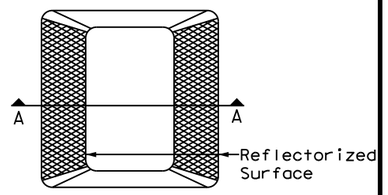
1. Raised pavement markers shall be centered between each chevron or neutral area line.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

## DETAIL A

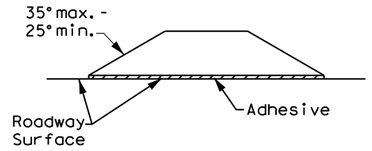
| MATERIAL SPECIFICATIONS | |
|---|---|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240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

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

| LEGEND | |
|---|---|
| ⇦ | Traffic flow |
| ▫ | Reflectorized Raised Markers (RPM) Type II-C-R |

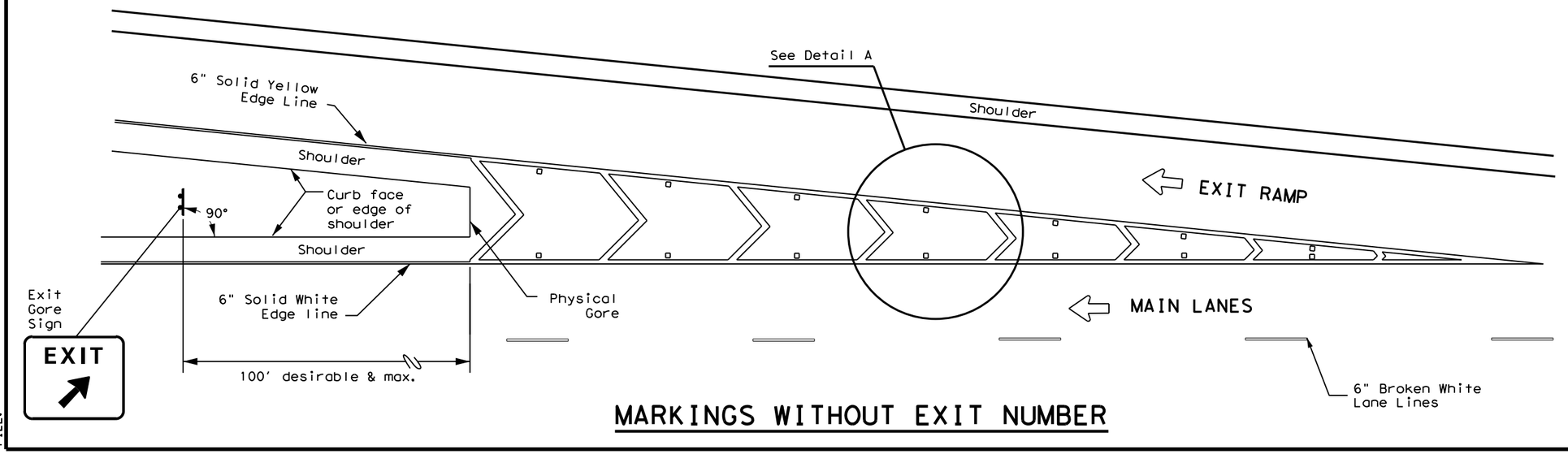



Type II (Top View)




SECTION A

## REFLECTORIZED RAISED PAVEMENT MARKER (RPM)




## MARKINGS WITHOUT EXIT NUMBER

Texas Department of Transportation

Traffic Safety Division Standard

## EXIT GORE PAVEMENT MARKINGS

## FPM(5)-22

| FILE: fpm(5)-22.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT October 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 9-19 10-22 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 102 |

23E

DATE:
FILE:

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FILE:

## GENERAL NOTES:

1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.

2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.

3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.

4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.

5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".

6. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.

7. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."

8. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.

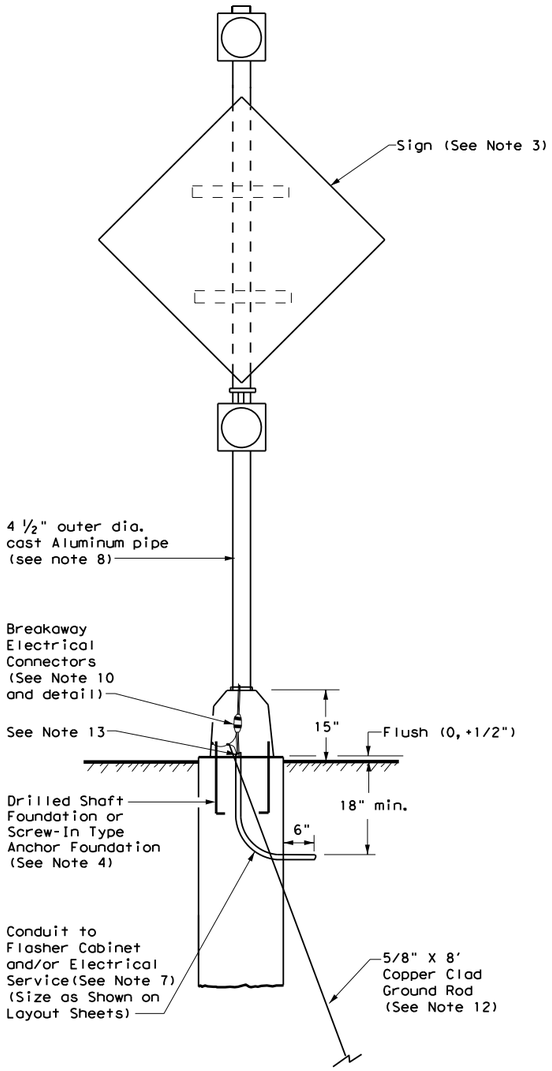
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening of connection.

10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

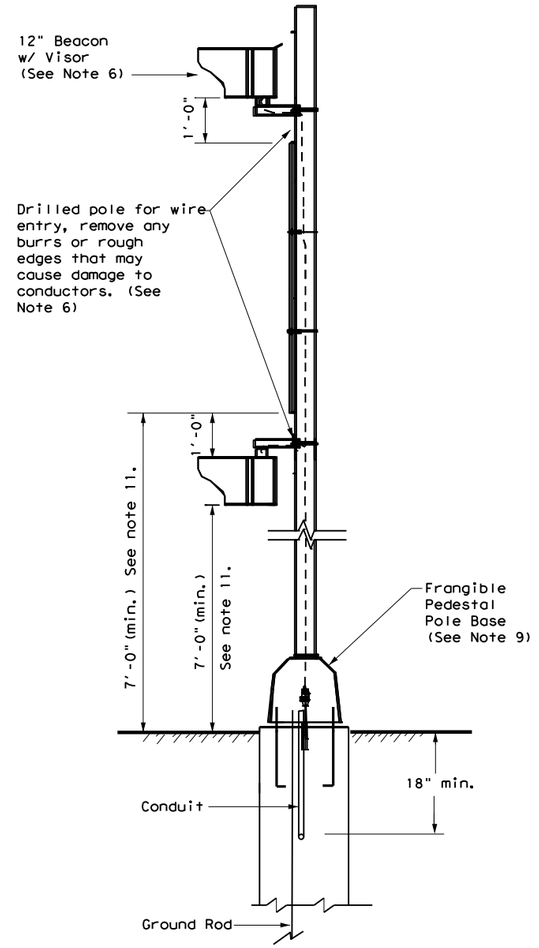
11. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.

12. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.

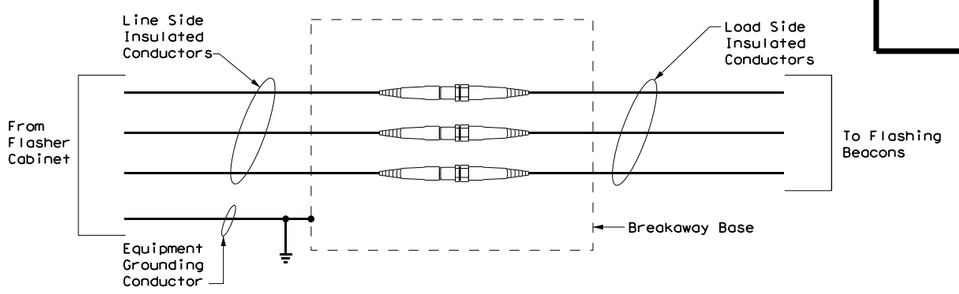
13. Ensure height of conduit and ground rod is below top of anchor bolts.



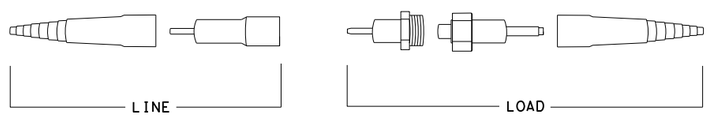

FRONT




SIDE




NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS




NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

# ROADSIDE FLASHING BEACON ASSEMBLY

## RFBA-13

| FILE: rfba-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT January 1992 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 5-93 12-04 10-93 3-13 4-98 | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 103 |

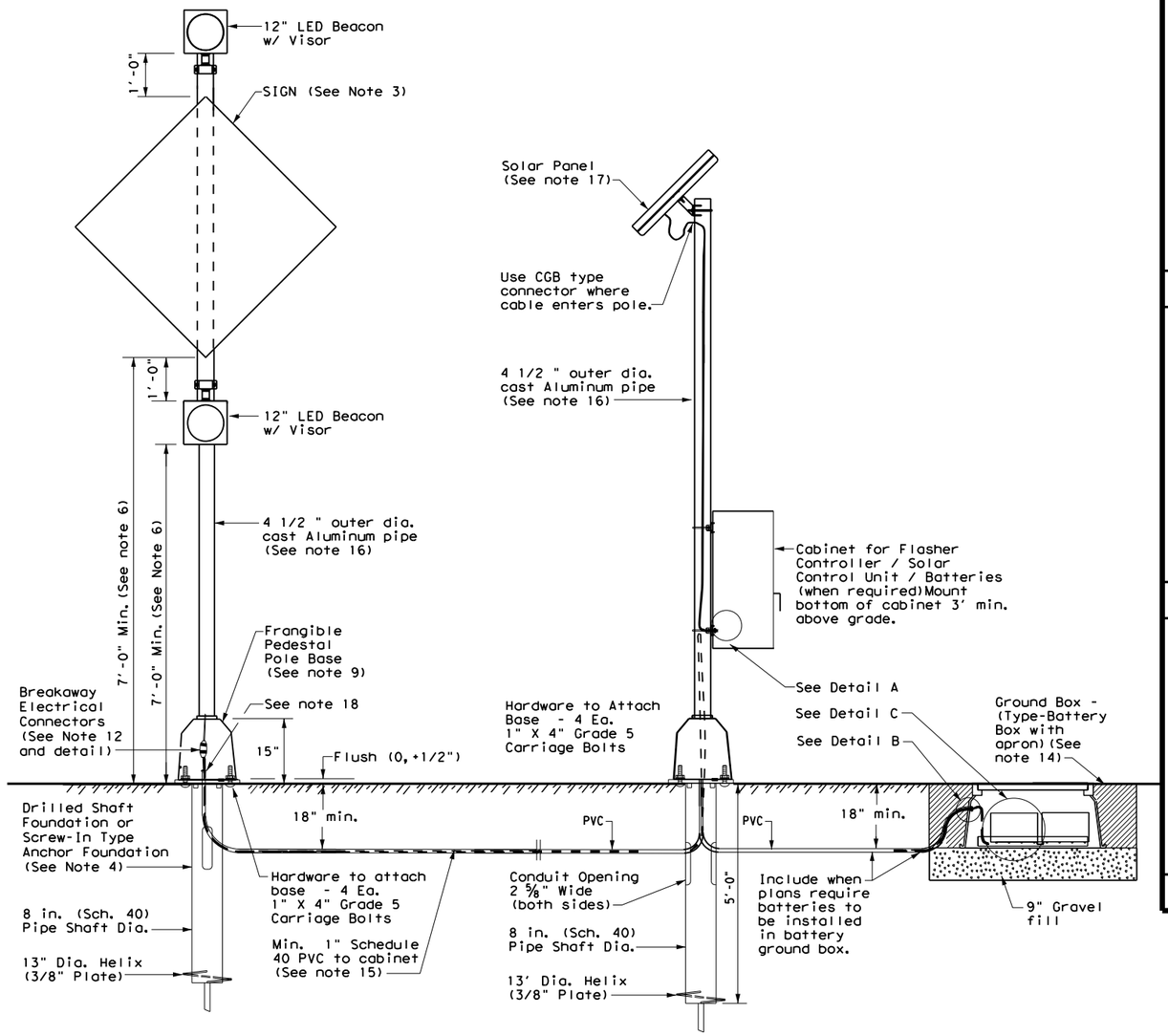
DATE:
FILE:

## GENERAL NOTES:

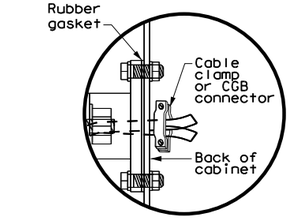
1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
6. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
7. Use materials specifically designed for attaching cabinets, beacon heads, solar panels, etc., to poles.
8. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening on connection.
10. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
11. Install the cable clamp in the bottom third of the back of the cabinet. See Detail A.
12. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies". Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse (slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
13. Install the batteries in a battery box. Place the batteries on a 3/16" thick plastic sheet and connect together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and 3/16 " plastic sheet are subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies." When required, install batteries in the flasher cabinet. Wire batteries according to manufacturers recommendations. Provide the number of batteries as required by the manufacturer.
14. See standard sheet Electrical Details (ED) for additional requirements regarding the installation of ground boxes/battery boxes, conduit, and cabinets.
15. Unless otherwise shown on the plans or recommended by the manufacturer, use the following table to determine the wire size from cabinet to beacons.

| Distance from Cabinet to Beacons (ft.) | Minimum Required Wire Size (AWG) |
|---|---|
| 0 - 35 | #14 |
| 35 - 60 | #12 |
| 60 - 100 | #10 |
| > 100 | #8 |

16. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
17. Orient solar panel for optimum exposure to sunlight (face to the south). Prior to installation, check the location to ensure there is no overhead obstruction that would block the solar panel from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
18. Ensure height of conduit is below top of anchor bolts.

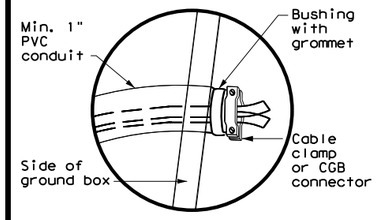



## DETAIL FOR SOLAR PANEL, CABINET, AND BATTERIES LOCATED OUT OF CLEAR ZONE ON SEPARATE ALUMINUM POLE ASSEMBLY

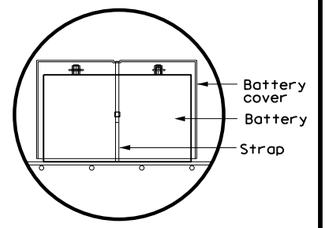



Pull conductors to remove slack in run between cabinet and ground box. Clamp cable at conduit end in ground box and in cabinet at entry as shown.

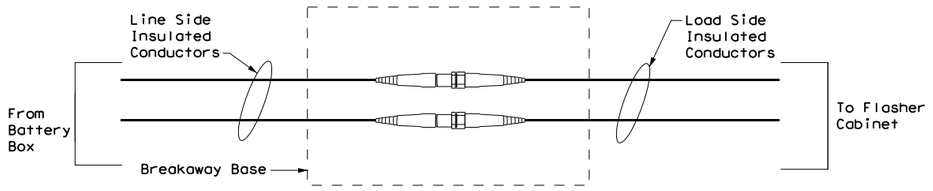
## DETAIL A



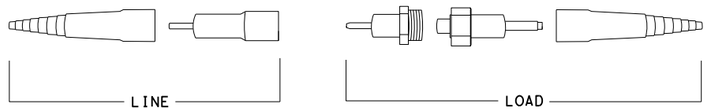

## DETAIL B




## DETAIL C




## NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS




## NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

# SOLAR POWERED ROADSIDE FLASHING BEACON ASSEMBLY DETAILS (ALUMINUM)

# SPRFBA(3)-13

| FILE: spb3-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT May 2003 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 12-04 | DIST | COUNTY | | SHEET NO. |
| 3-13 | DAL | DALLAS,ETC | | 104 |

75C

DATE:
FILE:

## GENERAL NOTES FOR ALL ELECTRICAL WORK

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

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

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

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

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

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

## CONDUIT

A. MATERIALS

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

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

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

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

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

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

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

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

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

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

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

B. CONSTRUCTION METHODS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

# ELECTRICAL DETAILS CONDUITS & NOTES

## ED(1)-14

| FILE: ed1-14.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT October 2014 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 105 |

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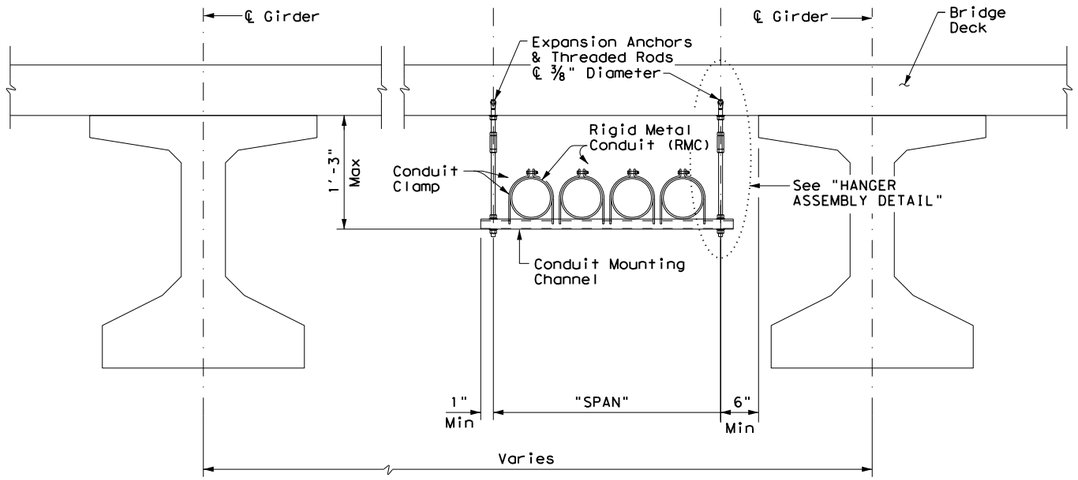
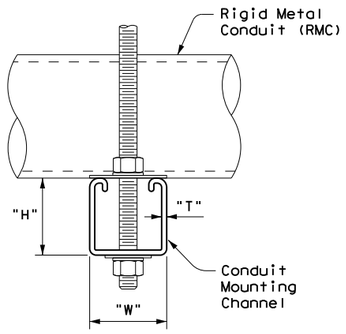
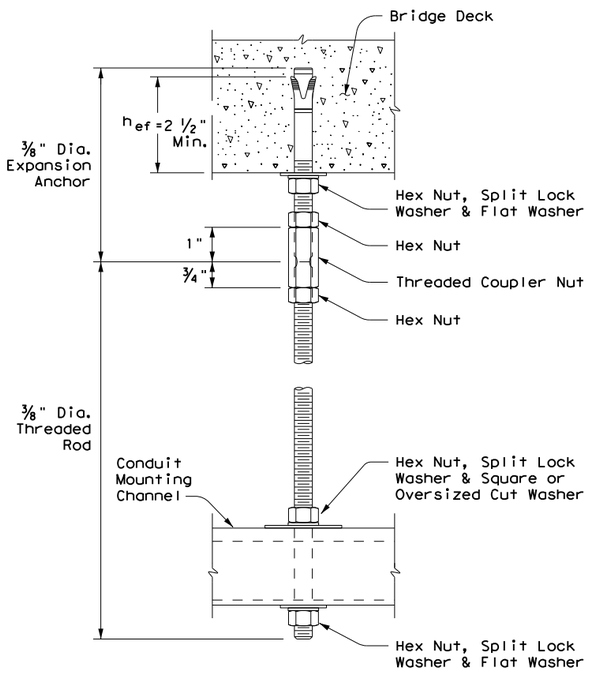



CONDUIT HANGING DETAIL

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

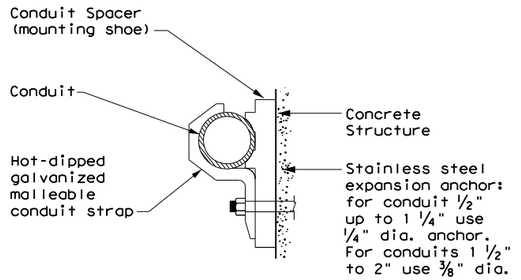
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

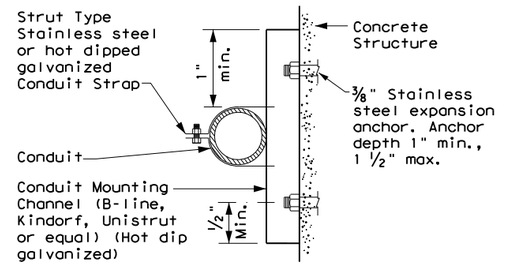



HANGER ASSEMBLY DETAIL

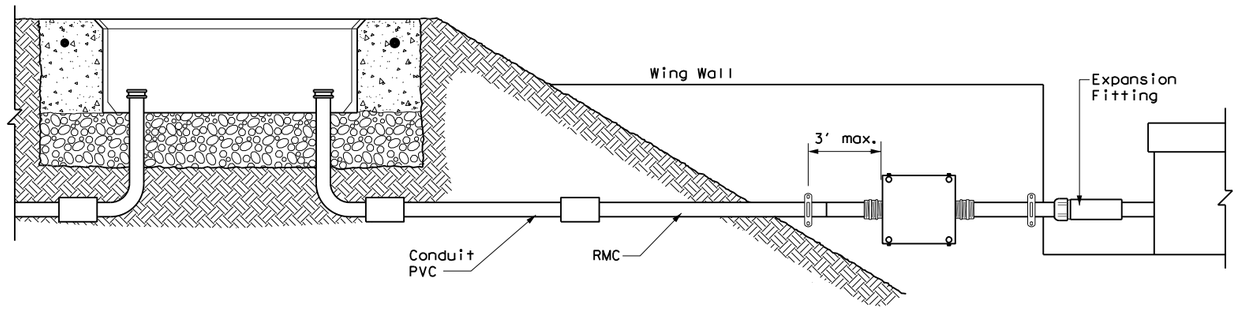
## ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT




## CONDUIT MOUNTING OPTIONS

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




## TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

### EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.

2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.

3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.

4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.

5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, ($h_{ef}$), as shown. Increase ($h_{ef}$)as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.

6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth ($h_{ef}$). No lateral loads shall be introduced after conduit installation.

Texas Department of Transportation

Traffic Operations Division Standard

# ELECTRICAL DETAILS
# CONDUIT SUPPORTS

## ED(2)-14

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| | DAL | DALLAS,ETC | | 106 |

71B

## ELECTRICAL CONDUCTORS

### A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

### B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.
12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

### C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

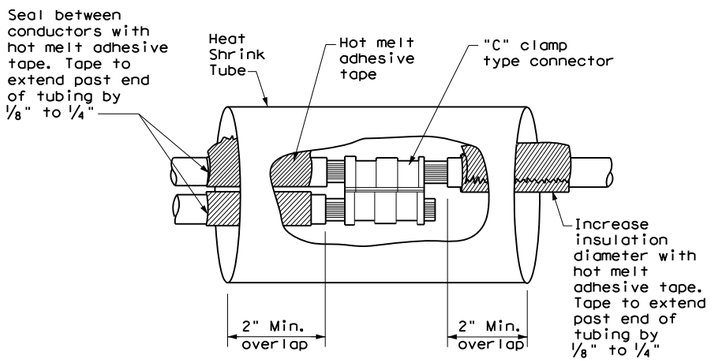
## GROUND RODS & GROUNDING ELECTRODES

### A. MATERIAL INFORMATION

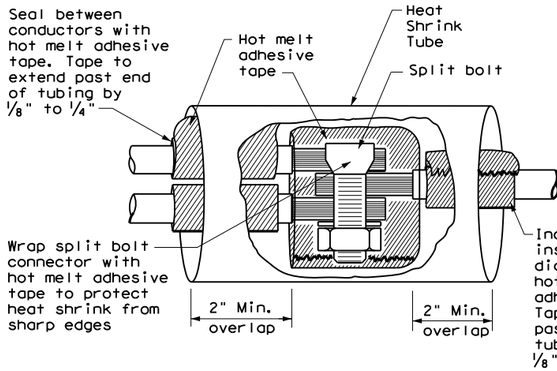
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in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

### B. CONSTRUCTION METHODS

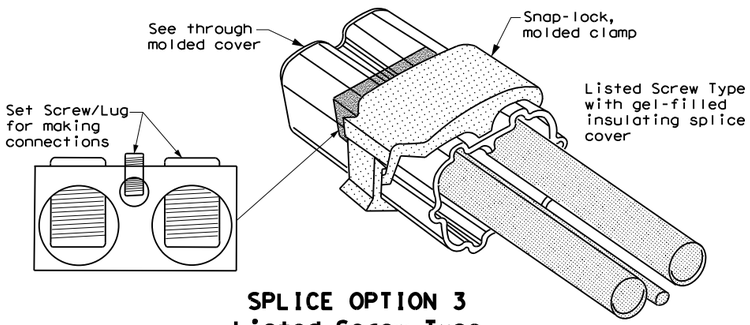
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.




**SPLICE OPTION 1**
**Compression Type**




**SPLICE OPTION 2**
**Split Bolt Type**




**SPLICE OPTION 3**
**Listed Screw Type**

Texas Department of Transportation

Traffic Operations Division Standard

# ELECTRICAL DETAILS CONDUCTORS

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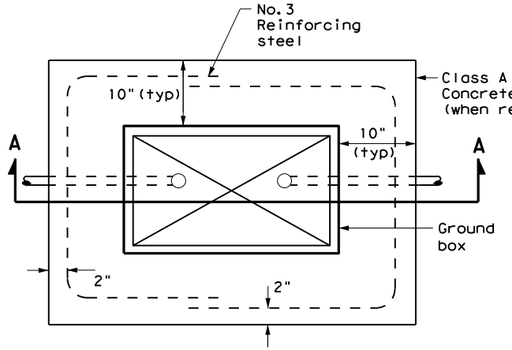
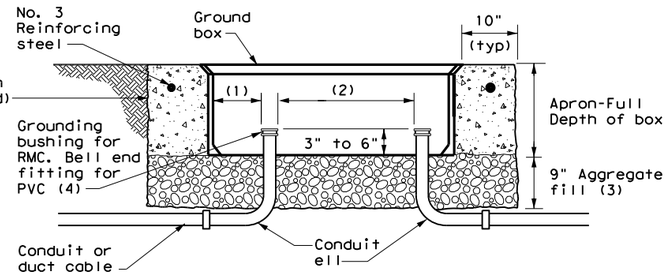



PLAN VIEW




SECTION A - A

## APRON FOR GROUND BOX

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

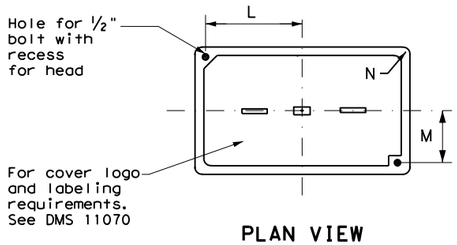
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

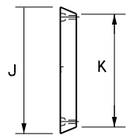
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

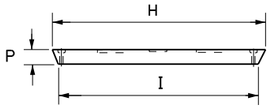
| GROUND BOX COVER DIMENSIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TYPE | DIMENSIONS (INCHES) | | | | | | | |
| | H | I | J | K | L | M | N | P |
| A, B & E | 23 1/4 | 23 | 13 3/4 | 13 1/2 | 9 7/8 | 5 1/8 | 1 3/8 | 2 |
| C & D | 30 1/2 | 30 1/4 | 17 1/2 | 17 1/4 | 13 1/4 | 6 3/4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




PLAN VIEW




END




SIDE

## GROUND BOX COVER

## GROUND BOXES

A. MATERIALS

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

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

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

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

B. CONSTRUCTION METHODS

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

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

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

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

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

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

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

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

# ELECTRICAL DETAILS
# GROUND BOXES

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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

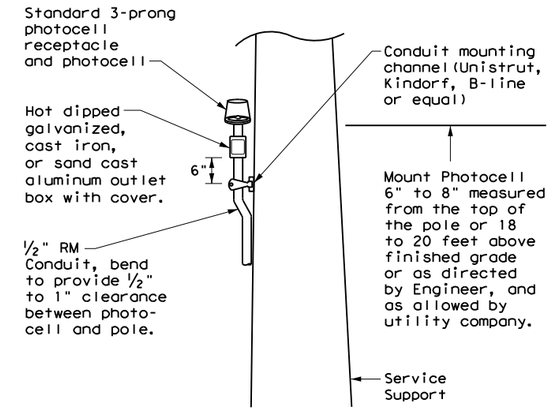
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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.

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# ELECTRICAL DETAILS SERVICE NOTES & DATA

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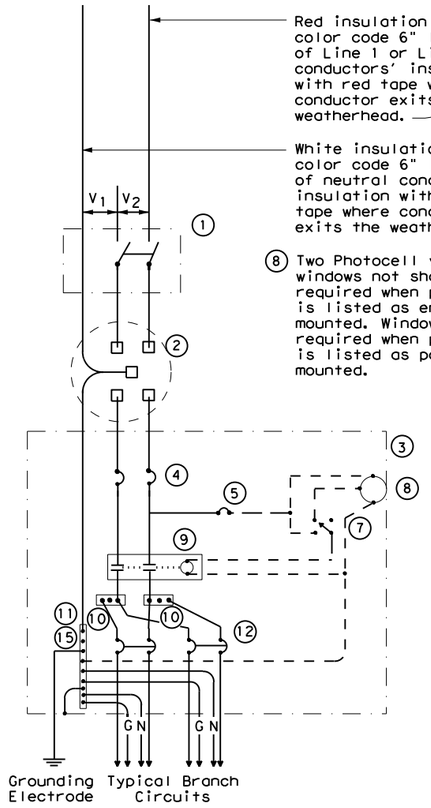
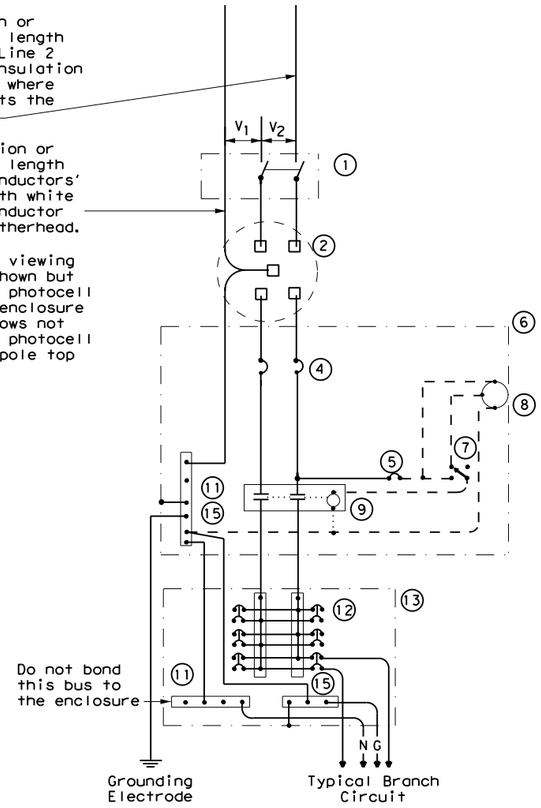
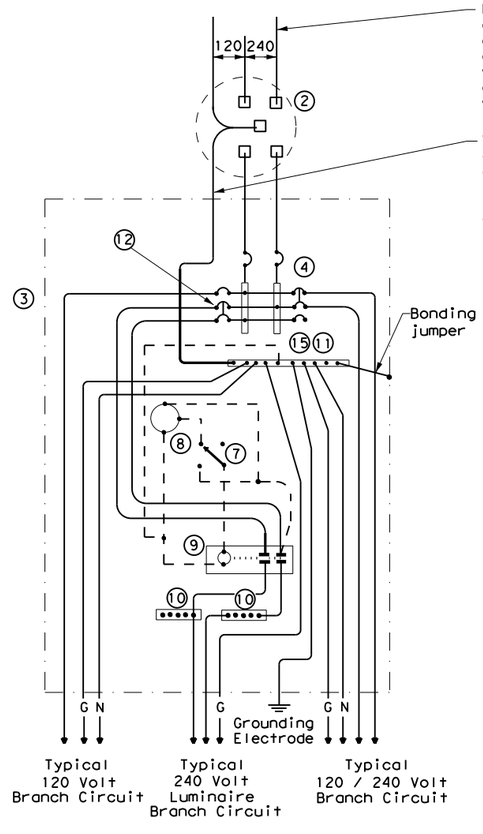


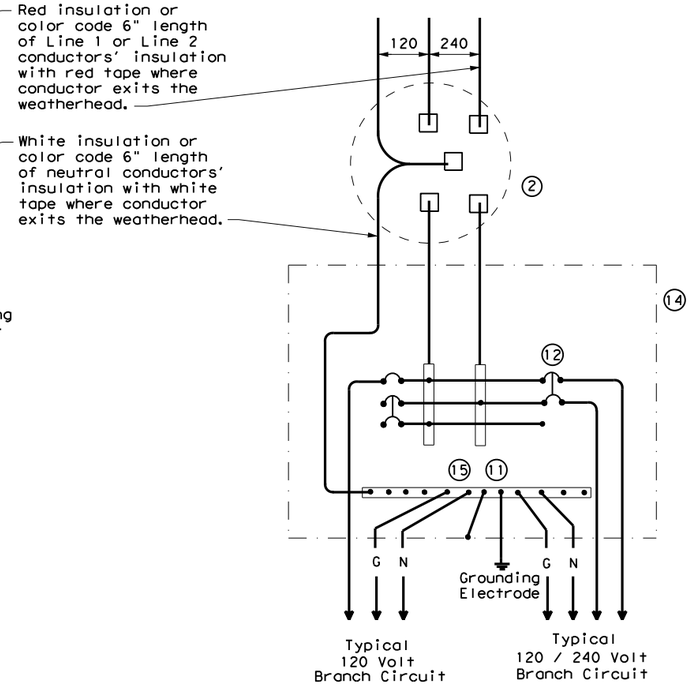

SCHEMATIC TYPE A
THREE WIRE




SCHEMATIC TYPE C
THREE WIRE




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




SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

# ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

# ED(6)-14

| FILE: ed6-14.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
|  | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 110 |

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## PEDESTAL SERVICE NOTES

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

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

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

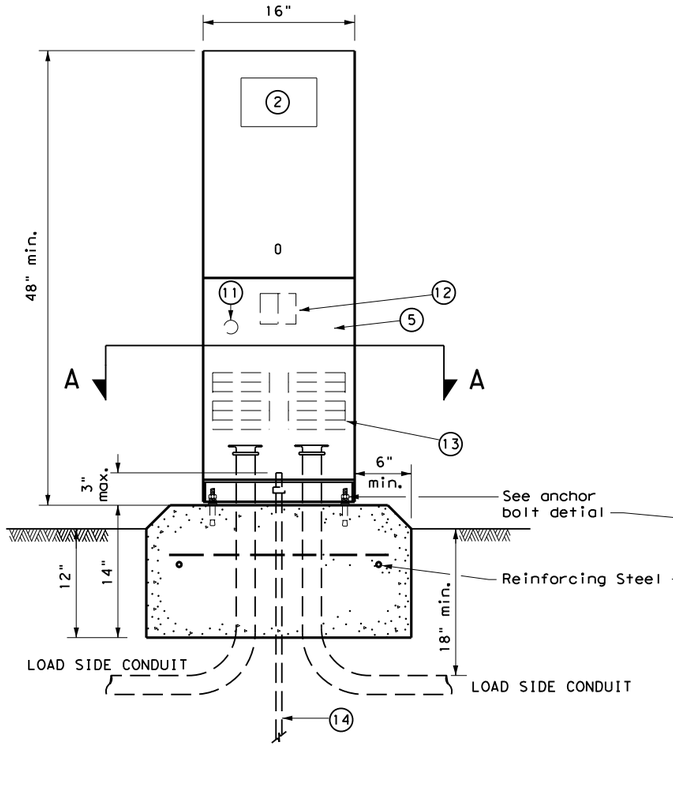
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

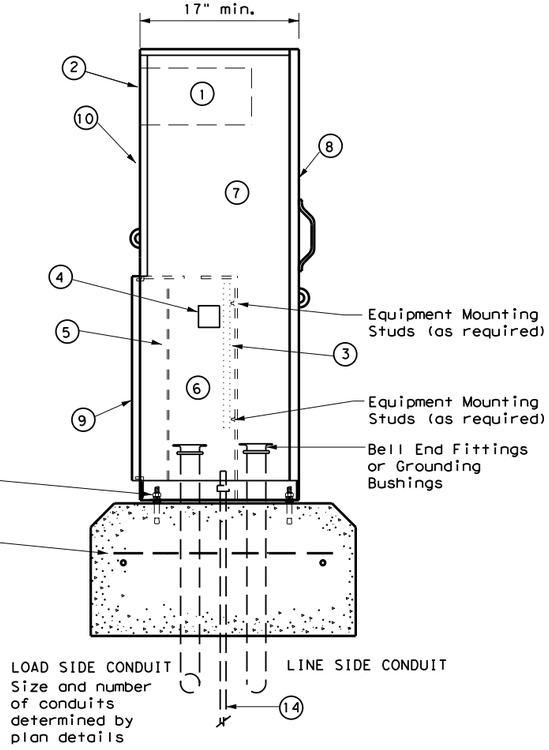
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to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

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

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

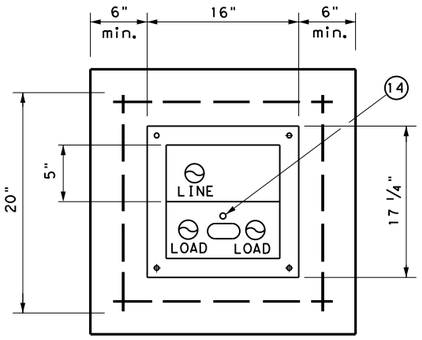



FRONT VIEW

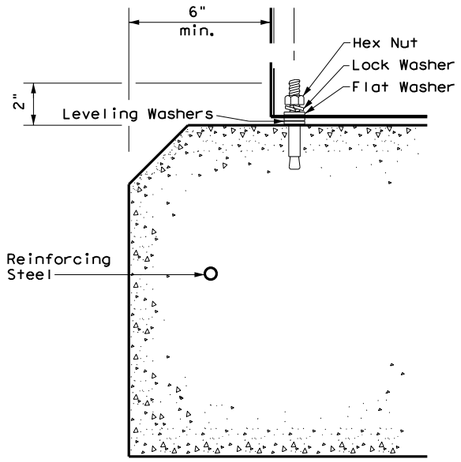



SIDE VIEW

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




SECTION A-A




ANCHOR BOLT DETAIL

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

Texas Department of Transportation

Traffic Operations Division Standard

# ELECTRICAL DETAILS
# ELECTRICAL SERVICE SUPPORT
# PEDESTAL SERVICE TYPE PS

# ED(9)-14

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FILE: ed9-14.dgn | | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT | | |
| ©TxDOT October 2014 | | CONT | SECT | JOB | HIGHWAY | | |
| REVISIONS | | 0047 | 07 | 245,ETC | US 75,ETC | | |
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| | | DAL | DALLAS,ETC | | 111 | | |

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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.

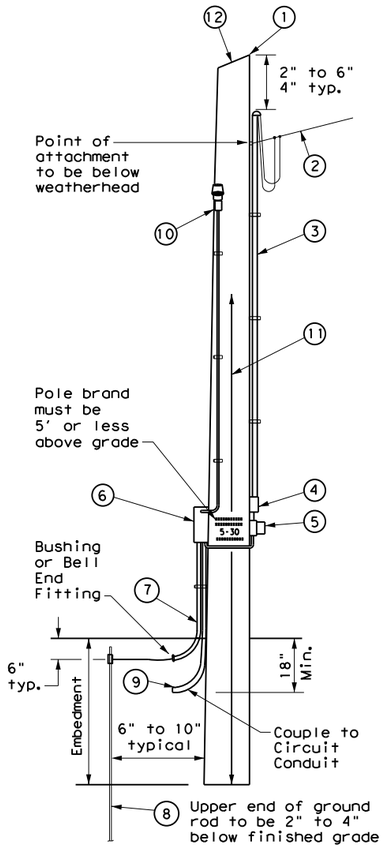
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(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.

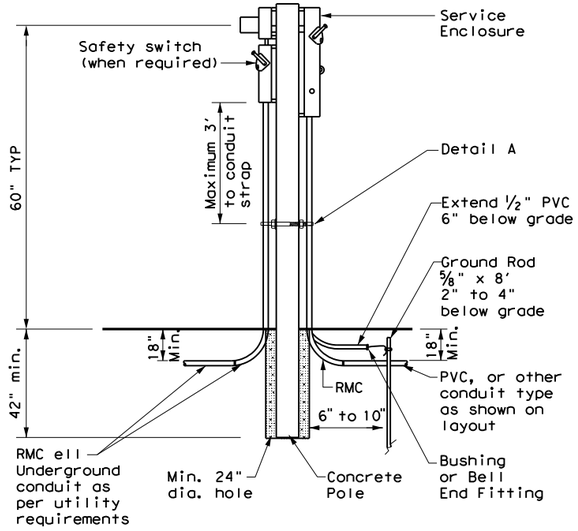



## SERVICE SUPPORT TYPE TP (O)

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

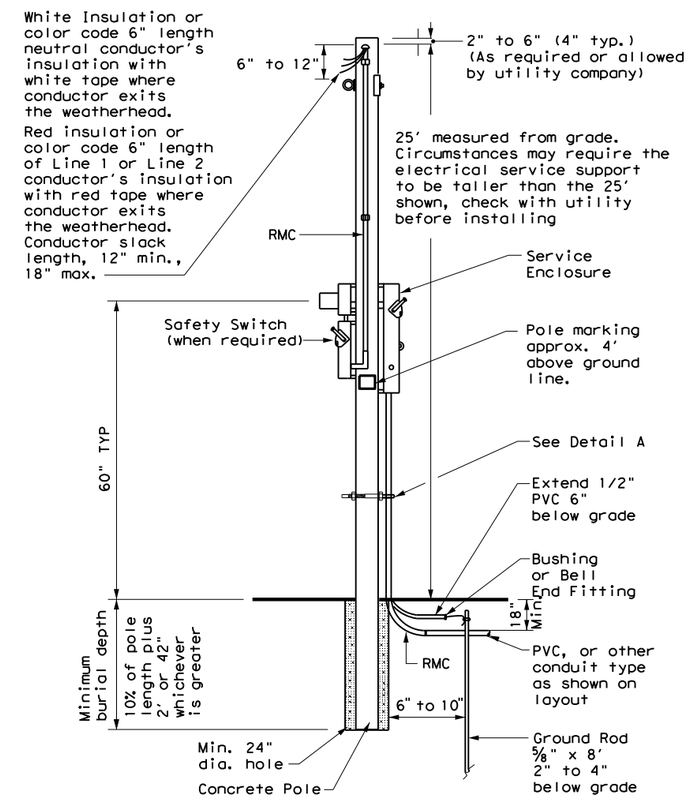
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

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.



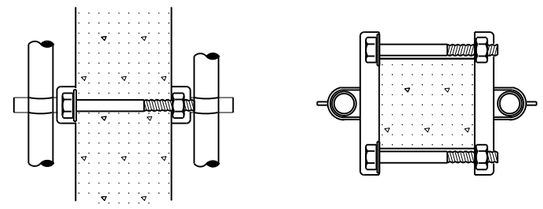

## CONCRETE SERVICE SUPPORT

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

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|---|---|---|---|---|
| © TxDOT October 2014 | CONT | SECT | JOB | HIGHWAY |
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| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS, ETC | | 112 |

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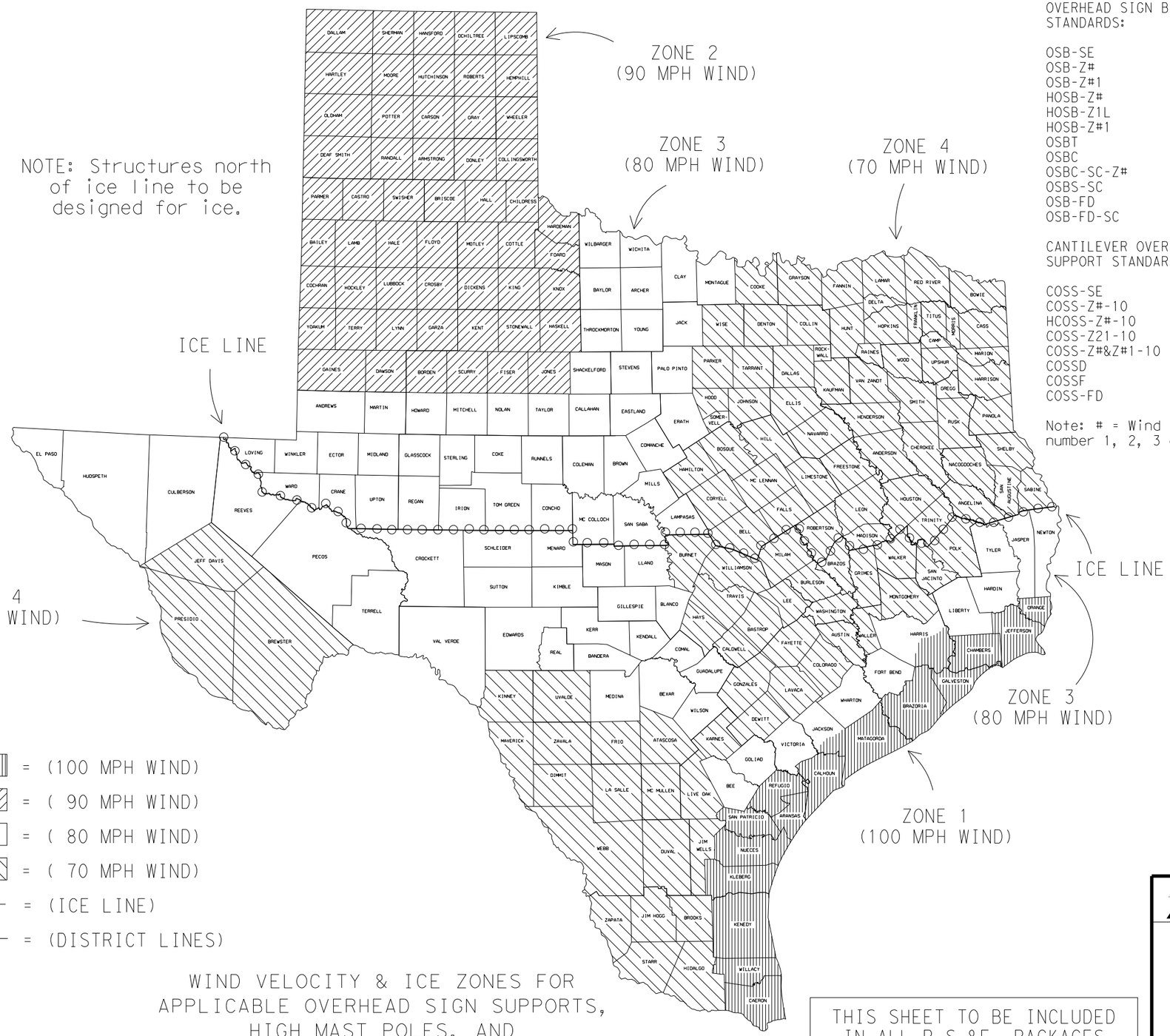


LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = ( 90 MPH WIND)
ZONE 3 - = ( 80 MPH WIND)
ZONE 4 - = ( 70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

## APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

# WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

Texas Department of Transportation

Traffic Operations Division Standard

# WIND VELOCITY AND ICE ZONES

## WV & IZ-14

| FILE: windice.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT April 1996 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds. | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 113 |

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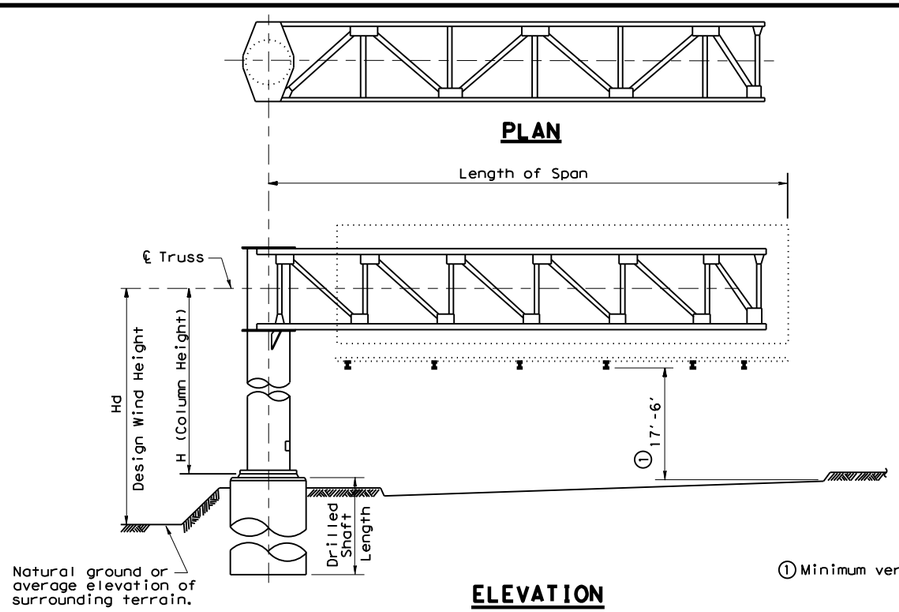
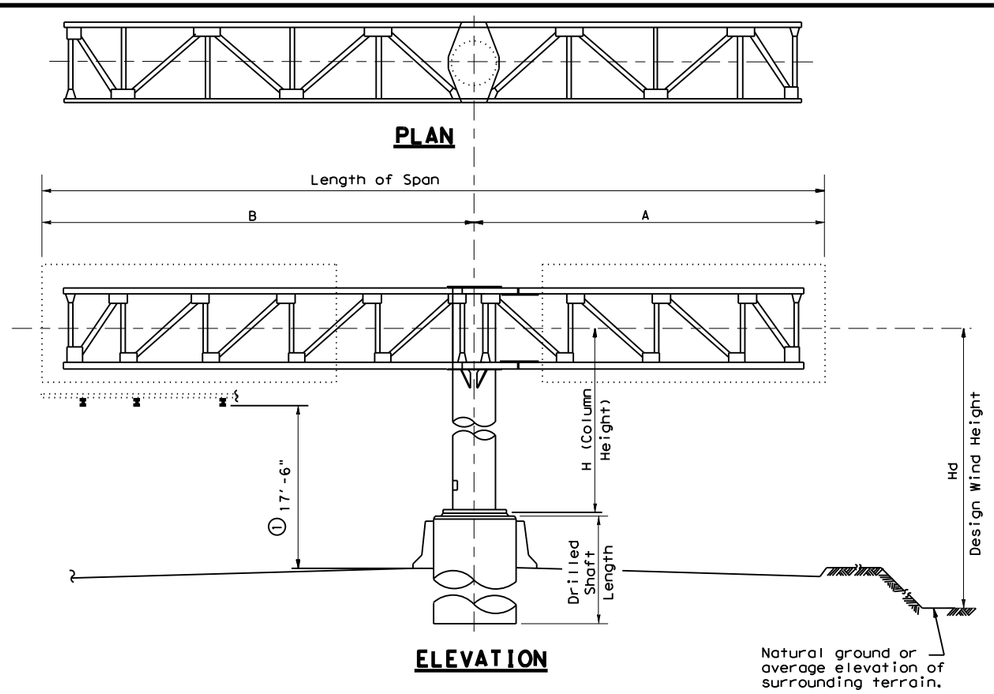



① Minimum vertical clearance




SELECTION EXAMPLE CANTILEVER SPAN

Given: Cantilever Span = 33′; Column Height, H = 23.3.′; Design Wind Height, Hd = 27′; Avg. Penetrometer Value, N = 15 (clay type soil); Hill County

Step 1: Select applicable COSS standard.
From Wind Velocity and Ice Zone sheet (WV & IZ-96) determine that Hill County is in Zone 4 (70 mph) and is above the ice line. Since Design Wind Height is less than 30′, use standard COSS-Z4 & Z4I. If Design Wind Height is more than 30′, use COSS-Z3 & Z3I. NOTE: In Zone 1 if Design Wind Height is greater than 30′ use HCOSS-Z1.

Step 2: Determine tower details from COSS-Z4 & Z4I. Use column height to nearest tabulated value' i.e., 23′. Round span length up to the nearest tabulated value, i.e., 35′.
Tower details are:
Tower pipe 24" Dia with min. wall thickness = 0.312"
Base plate 33 ¾" Dia x 1 ¾"
Anchor bolts 8~1 ¾" Dia on 29 ⅜" bolt circle
Horizontal deflection of tower at ℄ truss = 0.889". During installation, double nuts at base plate may be used to plumb tower to compensate for horizontal deflection.
Design Moment = 244 Kip-ft
Design Torsion = 162 Kip-ft

Step 3: Determine truss details from COSS-Z4 & Z4I.
Read from small table at bottom of sheet for span = 35′.
Truss design width, W and depth, D = 4.0′x 4.0′.
Chord L 3 x 3 x 5/16 (HYC) with 6 bolt connection at tower
D.L. Diag. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W. L. Diag. L 3 x 3 x 5/16 (HYC) with 2 bolt connection
D. L. Vert. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W. L. Strut. L 2 x 2 x 5/16 (HYC) with 1 bolt connection
Bolts are ⅝" Dia high strength with 5~¾" Dia bolt alternate for chord connection at tower.
D.L. of truss = 50 lb/ft
Truss deflection at free end = 3.2". The fabricator shall compensate for this deflection by offsetting bolt holes between the upper and lower chords at the truss-to-tower connection.

Step 4: Determine foundation details. Use standard COSSF.
From COSSF with 24" Dia pipe and 1 ¾" Dia anchor bolts:
Anchor Bolts 1 ¾" Dia x 3′-10"
Drilled Shaft Dia 42"
Vertical Reinforcing 12 ~ #10 bars
Spiral C = #4 at 6" pitch Grade 60.
Misc. handhole, base plate, anchor bolt, and foundation details are shown on COSSF.

Step 5: Determine drilled shaft length from COSS-FD.
Enter the appropriate graph (for 42" Dia drilled shaft in clay soil) from the bottom with N = 15. Proceed upward interpolating moment curves (solid lines) to locate 244 Kip-ft. Project to the left side of the graph to determine the required embedment length, i.e., 12′.
Repeat the procedure for torsion curves (dashed lines) to locate 162 Kip-ft. The embedment length required to satisfy torsion is 14′. Add 3′-0" to the longer length to obtain a required drilled shaft length of 17′.

SELECTION EXAMPLE DOUBLE CANTILEVER SPAN

Given: Short span, A = 9′; Long Span, B = 25′; Total Cantilever Span = 34′; Column Height, H = 24′; Design Wind Height, Hd = 26′; Avg. Penetrometer Value, N = 20 (clay type soil); Wheeler County.

Step 1: Select applicable COSS standard.
From Wind Velocity and Ice Zone sheet determine that Wheeler County is in Zone 2 (90 mph) and is above the ice line. Since Design Wind Height is less than 30′ use standard COSS-Z2I. If Design Wind Height is more than 30′, use HCOSS-Z1.

Step 2: Determine tower details from COSS-Z2I.
Use column height = 24′. Round total span length up to the next longer tabulated length span, i.e., 35′. If total span length is greater than 40′, a special design would be required.
Tower details are:
Tower pipe 30" Dia with min. wall thickness = 0.310"
Base Plate 40 ½" Dia x 1 ¾"
Anchor bolts 8 ~ 2" Dia on 35 ¾" bolt circle
Horizontal deflection of tower at ℄ truss = 0.574-0.316 = 0.26". During installation, double nuts at base plate may be used to plumb tower and compensate for horizontal deflection.
Design Moment = 403 Kip-ft (use total span = 35′)
Design Torsion = 136 Kip-ft (use long span = 25′)

Step 3: Determine truss details from COSS-Z2I.
Read from small table at bottom of sheet 2 of 2 for Span A = 9′ (use 10′):
Chord L 3 x 3 x 3/16 (HYC) with 3 bolt connection at splice
D.L. Diag. L 2 x 2 x 3/16 (HYC) with 2 bolt connection
W.L. Diag. L 3 x 3 x 3/16 (HYC) with 2 bolt connection
D.L. Vert. L 2 x 2 x 3/16 (HYC) with 2 bolt connection
W.L. Strut. L 2 x 2 x 3/16 (HYC) with 1 bolt connection
Bolts are ⅝" Dia high strength.
D.L. of truss = 42 lb/ft.
Span B = 25′:
Chord L 3 x 3 x 1/4 (HYC) with 4 bolt connection at tower
D.L. Diag. L 2 x 2 x 3/16 (HYC) with 2 bolt connection
W.L. Diag. L 3 x 3 x 3/16 (HYC) with 2 bolt connection
D.L. Vert. L 2 x 2 x 3/16 (HYC) with 2 bolt connection
W.L. Strut. L 2 x 2 x 3/16 (HYC) with 1 bolt connection
Bolts are ⅝" Dia high strength with 3 ~ ¾" Dia bolt alternate for chord connection at tower.
D.L. of truss = 47 lb/ft.
Truss defl. at free end = 0.2" for Span A, = 1.3" for Span B.
The fabricator shall compensate for deflections by offsetting bolt holes between upper and lower chords at splice and at truss-to-tower connection. Top chord shall be shortened between the tower and the splice to achieve the required offset.

Step 4: Determine foundation details. Use standard COSSF.
From COSSF with 30" Dia pipe and 2" Dia anchor bolts:
Anchor bolts 2" Dia x 4′-3"
Drilled shaft Dia 54"
Vertical Reinforcing 18 ~ #10 bars
Spiral C = #4 at 6" pitch Grade 60
Misc. handhole, base plate, anchor bolt, and foundation details are shown on COSSF.

Step 5: Determine drilled shaft length from COSS-FD.
Enter the appropriate graph (for 54" Dia drilled shaft in clay type soil) from the bottom with N = 20. Proceed upward interpolating moment curves (solid lines) to locate 403 Kip-ft. Project to the left side of graph to determine required embedment length, i.e., 13′.
Repeat the procedure for the torsion curves (dashed lines) to locate 136 Kip-ft. Embedment length required to satisfy torsion is 9′.
Add 3′ to the longer length to obtain required drilled shaft length of 16′.

Texas Department of Transportation
Traffic Operations Division

# CANTILEVER OVERHEAD SIGN SUPPORTS SELECTION EXAMPLES

## COSS-SE


REVISIONS

| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0047 | 07 | 245, ETC | US 75, ETC |

| DIST | COUNTY | SHEET NO. |
|---|---|---|
| DAL | DALLAS, ETC | 114 |

# ZONE 3 WITH AND WITHOUT ICE 80 MPH WIND

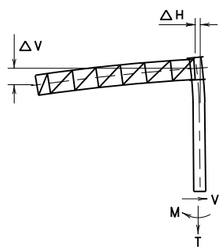
| TOWER HEIGHT (ft) | 10′ SPAN | | | | | | | | | | | | 15′ SPAN | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOWER PIPE | | | ANCHOR BOLTS | | | BASE PLATE | TRUSS | DESIGN LOADS | | | | TOWER PIPE | | | ANCHOR BOLTS | | | BASE PLATE | TRUSS | DESIGN LOADS | | | |
| | O.D. (in) | WALL THICK (in) | DEFL ΔH (in) | SIZE DIA (in) | NO. | BOLT CIR DIA | SIZE (in) | DEFL ΔV (in) | SHEAR V (Kips) | TORSION T (K-ft) | MOMENT M (K-ft) | | O.D. (in) | WALL THICK (in) | DEFL ΔH (in) | SIZE DIA (in) | NO. | BOLT CIR DIA | SIZE (in) | DEFL ΔV (in) | SHEAR V (Kips) | TORSION T (K-ft) | MOMENT M (K-ft) | |
| 14′ | 16 | 0.250 | 0.105 | 1 ¼ | 6 | 20 ½" | 24 x1¼ | 0.2 | 3.59 | 16.19 | 49.87 | | 16 | 0.250 | 0.235 | 1 ⅜ | 8 | 20 ¾" | 24½x1⅜ | 0.5 | 5.40 | 37.56 | 76.63 | |
| 15′ | | | 0.120 | | | | | | 3.61 | | 53.42 | | | | 0.270 | | | | | 0.6 | 5.41 | | 81.91 | |
| 16′ | | | 0.137 | | | | | | 3.62 | | 57.00 | | | | 0.308 | | | | | 0.6 | 5.43 | | 87.23 | |
| 17′ | | | 0.154 | | | | | | 3.64 | | 60.59 | | | | 0.347 | | | | | 0.7 | 5.45 | | 92.57 | |
| 18′ | | | 0.173 | | | | | | 3.66 | | 64.21 | | | | 0.389 | | | | 24½x1⅜ | 0.7 | 5.46 | | 97.94 | |
| 19′ | | | 0.193 | | 6 | | | | 3.67 | | 67.85 | | | | 0.434 | | | | 24½x1½ | 0.7 | 5.48 | | 103.33 | |
| 20′ | | | 0.214 | | 8 | | | | 3.69 | | 71.51 | | | | 0.481 | | | | | 0.8 | 5.50 | | 108.75 | |
| 21′ | | | 0.235 | | | | | | 3.71 | | 75.18 | | 0.250 | 0.530 | | | | | | | 5.51 | | 114.19 | |
| 22′ | | | 0.258 | | | | | 0.2 | 3.73 | | 78.88 | | 0.281 | 0.521 | 1 ⅜ | | | 20 ¾" | 24½x1½ | | 5.53 | | 119.66 | |
| 23′ | | | 0.282 | | | | | 0.3 | 3.74 | | 82.59 | | 0.281 | 0.569 | 1 ½ | | | 21" | 25 x1⅝ | | 5.55 | | 125.14 | |
| 24′ | | | 0.308 | | | | | | 3.76 | | 86.33 | | 0.281 | 0.620 | | | | | | | 5.56 | | 130.65 | |
| 25′ | | | 0.334 | | | | 24 x1¼ | | 3.78 | | 90.08 | | 0.312 | 0.610 | | | | | | | 5.58 | | 136.18 | |
| 26′ | | | 0.361 | | | | 24 x1⅜ | | 3.79 | | 93.85 | | 0.312 | 0.660 | | | | | 25 x1⅝ | | 5.60 | | 141.73 | |
| 27′ | | | 0.389 | | | | | | 3.81 | | 97.64 | | 0.312 | 0.711 | | | | | 25 x1¾ | | 5.62 | | 147.30 | |
| 28′ | | | 0.419 | | | | | | 3.83 | | 101.44 | | 0.344 | 0.699 | | | | | | | 5.63 | | 152.89 | |
| 29′ | | | 0.449 | | | | | | 3.84 | | 105.26 | | 0.344 | 0.750 | | | | | | | 5.65 | | 158.50 | |
| 30′ | | | 0.481 | | | | | | 3.86 | | 109.11 | | 0.344 | 0.802 | 1 ½ | | | 21" | 25 x1¾ | | 5.67 | | 164.12 | |
| 31′ | | | 0.513 | | | | 24 x1⅜ | | 3.88 | | 112.96 | | 0.375 | 0.791 | 1 ¾ | | | 21 ½" | 26 x1⅞ | | 5.68 | | 169.77 | |
| 32′ | 16 | 0.250 | 0.547 | 1 ¼ | 8 | 20 ½" | 24 x1½ | 0.3 | 3.89 | 16.19 | 116.84 | | 16 | 0.375 | 0.843 | 1 ¾ | 8 | 21 ½" | 26 x1⅞ | 0.8 | 5.70 | 37.56 | 175.43 | |

| TOWER HEIGHT (ft) | 20′ SPAN | | | | | | | | | | | | 25′ SPAN | | | | | | | | | | | | TOWER HEIGHT (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOWER PIPE | | | ANCHOR BOLTS | | | BASE PLATE | TRUSS | DESIGN LOADS | | | | TOWER PIPE | | | ANCHOR BOLTS | | | BASE PLATE | TRUSS | DESIGN LOADS | | | | |
| | O.D. (in) | WALL THICK (in) | DEFL ΔH (in) | SIZE DIA (in) | NO. | BOLT CIR DIA | SIZE (in) | DEFL ΔV (in) | SHEAR V (Kips) | TORSION T (K-ft) | MOMENT M (K-ft) | | O.D. (in) | WALL THICK (in) | DEFL ΔH (in) | SIZE DIA (in) | NO. | BOLT CIR DIA | SIZE (in) | DEFL ΔV (in) | SHEAR V (Kips) | TORSION T (K-ft) | MOMENT M (K-ft) | | |
| 14′ | 20 | 0.250 | 0.213 | 1 ¼ | 8 | 24 ½" | 28 x1¼ | 0.7 | 7.43 | 69.08 | 107.16 | | 20 | 0.281 | 0.308 | 1 ½ | 8 | 25" | 29 x1½ | 1.3 | 9.14 | 107.68 | 135.49 | | 14′ |
| 15′ | | | 0.244 | 1 ¼ | | 24 ½" | 28 x1¼ | 0.7 | 7.43 | | 113.96 | | | 0.281 | 0.354 | | | | | 1.4 | 9.17 | | 144.13 | | 15′ |
| 16′ | | | 0.278 | 1 ⅜ | | 24 ¾" | 28½x1⅜ | 0.8 | 7.45 | | 121.17 | | | 0.281 | 0.403 | | | | | 1.4 | 9.19 | | 152.86 | | 16′ |
| 17′ | | | 0.314 | | | | | 0.8 | 7.47 | | 128.42 | | | 0.281 | 0.455 | 1 ½ | | 25" | 29 x1½ | 1.5 | 9.21 | | 161.65 | | 17′ |
| 18′ | | | 0.352 | | | | | 0.9 | 7.49 | | 135.72 | | | 0.312 | 0.460 | 1 ¾ | | 25 ⅜" | 29¾x1⅝ | 1.5 | 9.23 | | 170.51 | | 18′ |
| 19′ | | | 0.392 | 1 ⅜ | | 24 ¾" | 28½x1⅜ | 0.9 | 7.51 | | 143.06 | | | 0.312 | 0.513 | | | | | 1.5 | 9.25 | | 179.43 | | 19′ |
| 20′ | | | 0.435 | 1 ½ | | 25" | 29 x1½ | 1.0 | 7.53 | | 150.43 | | | 0.312 | 0.568 | | | | 29¾x1¾ | 1.6 | 9.27 | | 188.39 | | 20′ |
| 21′ | | | 0.479 | | | | | 1.0 | 7.55 | | 157.84 | | | 0.312 | 0.627 | | | | | 1.6 | 9.29 | | 197.41 | | 21′ |
| 22′ | | | 0.526 | | | | | 1.1 | 7.57 | | 165.28 | | | 0.344 | 0.628 | | | | | 1.6 | 9.31 | | 206.47 | | 22′ |
| 23′ | 0.250 | 0.575 | | | | | 29 x1½ | | 7.60 | | 172.75 | | | 0.344 | 0.686 | | | | 29¾x1¾ | 1.7 | 9.34 | | 215.57 | | 23′ |
| 24′ | 0.281 | 0.560 | | | | | 29 x1⅝ | | 7.62 | | 180.26 | | | 0.344 | 0.747 | | | | 29¾x1⅞ | | 9.36 | | 224.71 | | 24′ |
| 25′ | 0.281 | 0.607 | 1 ½ | | | 25" | 29 x1⅝ | | 7.64 | | 187.79 | | | 0.375 | 0.748 | | | | 29¾x1⅞ | | 9.38 | | 233.89 | | 25′ |
| 26′ | 0.281 | 0.657 | 1 ¾ | | | 25 ⅜" | 29¾x1⅝ | | 7.66 | | 195.35 | | | 0.375 | 0.809 | 1 ¾ | | 25 ⅜" | 29¾x1⅞ | 1.7 | 9.40 | | 243.10 | | 26′ |
| 27′ | 0.310 | 0.640 | | | | | 29¾x1¾ | | 7.68 | | 202.94 | | | 0.375 | 0.872 | 2 | | 25 ¾" | 30½x 2 | 1.8 | 9.42 | | 252.34 | | 27′ |
| 28′ | 0.310 | 0.688 | | | | | | | 7.70 | | 210.55 | | | 0.406 | 0.870 | | | | | | 9.44 | | 261.62 | | 28′ |
| 29′ | 0.310 | 0.738 | | | | | | | 7.72 | | 218.20 | | | 0.406 | 0.933 | | | | | | 9.46 | | 270.93 | | 29′ |
| 30′ | 0.340 | 0.721 | | | | | 29¾x1¾ | | 7.74 | | 225.86 | | | 0.406 | 0.999 | | | | 30½x 2 | | 9.48 | | 280.27 | | 30′ |
| 31′ | 0.340 | 0.770 | | | | | 29¾x1⅞ | | 7.77 | | 233.56 | | | 0.441 | 0.992 | | | | 30½x2¼ | | 9.50 | | 289.64 | | 31′ |
| 32′ | 20 | 0.340 | 0.821 | 1 ¾ | 8 | 25 ⅜" | 29¾x1⅞ | 1.1 | 7.79 | 69.08 | 241.27 | | 20 | 0.441 | 1.057 | 2 | 8 | 25 ¾" | 30½x2¼ | 1.8 | 9.53 | 107.68 | 299.04 | | 32′ |

# ZONE 3 WITH AND WITHOUT ICE 80 MPH WIND

| TOWER HEIGHT (ft) | 30′ SPAN | | | | | | | | | | | | 35′ SPAN | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOWER PIPE | | | ANCHOR BOLTS | | | BASE PLATE | TRUSS | DESIGN LOADS | | | | TOWER PIPE | | | ANCHOR BOLTS | | | BASE PLATE | TRUSS | DESIGN LOADS | | | |
| | O.D. (in) | WALL THICK (in) | DEFL ΔH (in) | SIZE DIA (in) | NO. | BOLT CIR DIA | SIZE (in) | DEFL ΔV (in) | SHEAR V (Kips) | TORSION T (K-ft) | MOMENT M (K-ft) | | O.D. (in) | WALL THICK (in) | DEFL ΔH (in) | SIZE DIA (in) | NO. | BOLT CIR DIA | SIZE (in) | DEFL ΔV (in) | SHEAR V (Kips) | TORSION T (K-ft) | MOMENT M (K-ft) | |
| 14′ | 24 | 0.250 | 0.289 | 1 ½ | 8 | 29" | 33 x1½ | 1.6 | 11.00 | 155.44 | 167.11 | | 30 | 0.250 | 0.210 | 1 ¾ | 8 | 35 ⅜" | 39¾x1½ | 1.5 | 12.87 | 211.58 | 202.48 | |
| 15′ | | 0.250 | 0.331 | 1 ½ | | 29" | 33 x1½ | 1.6 | 11.03 | | 177.27 | | | | 0.241 | | | | | 1.6 | 12.90 | | 213.97 | |
| 16′ | | 0.281 | 0.338 | 1 ¾ | | 29 ⅜" | 33¾x1½ | 1.6 | 11.05 | | 187.54 | | | | 0.275 | | | | | 1.6 | 12.93 | | 225.63 | |
| 17′ | | | 0.381 | | | | 33¾x1½ | 1.7 | 11.08 | | 197.93 | | 0.250 | 0.310 | | | | | | 1.7 | 12.97 | | 237.46 | |
| 18′ | | | 0.428 | | | | 33¾x1½ | 1.8 | 11.10 | | 208.40 | | 0.281 | 0.310 | | | | | | 1.7 | 13.00 | | 249.43 | |
| 19′ | | 0.281 | 0.477 | | | | 33¾x1⅝ | | 11.13 | | 218.97 | | | 0.346 | | | | | | 1.7 | 13.03 | | 261.52 | |
| 20′ | | 0.312 | 0.477 | | | | 33¾x1⅝ | | 11.15 | | 229.60 | | | 0.383 | | | | | | 1.8 | 13.06 | | 273.72 | |
| 21′ | | | 0.526 | | | | 33¾x1⅝ | 1.8 | 11.18 | | 240.31 | | | 0.422 | | | | | | 1.8 | 13.09 | | 286.04 | |
| 22′ | | | 0.577 | | | | 33¾x1¾ | 1.9 | 11.20 | | 251.08 | | | 0.463 | | | | | | 1.9 | 13.12 | | 298.44 | |
| 23′ | | | 0.631 | | | | 33¾x1¾ | 2.0 | 11.23 | | 261.91 | | | 0.507 | 1 ¾ | | | 35 ⅜" | 39¾x1½ | 2.0 | 13.16 | | 310.94 | |
| 24′ | | 0.312 | 0.687 | 1 ¾ | | 29 ⅜" | 33¾x1¾ | | 11.25 | | 272.80 | | | 0.552 | 2 | | | 35 ¾" | 40½x1⅝ | 2.0 | 13.19 | | 323.51 | |
| 25′ | | 0.344 | 0.679 | 2 | | 29 ¾" | 34½x1¾ | | 11.28 | | 283.74 | | | 0.598 | | | | | 40½x1⅝ | 2.1 | 13.22 | | 336.16 | |
| 26′ | | | 0.735 | | | | 34½x 2 | 2.0 | 11.30 | | 294.73 | | | 0.647 | | | | | 40½x1⅝ | 2.2 | 13.25 | | 348.89 | |
| 27′ | | | 0.792 | | | | | 2.1 | 11.33 | | 305.77 | | | 0.698 | | | | | 40½x1¾ | 2.2 | 13.28 | | 361.68 | |
| 28′ | | | 0.852 | | | | | 2.2 | 11.36 | | 316.85 | | 0.281 | 0.751 | | | | | | 2.3 | 13.31 | | 374.53 | |
| 29′ | | 0.344 | 0.914 | | | | | | 11.38 | | 327.97 | | 0.310 | 0.726 | | | | | | 2.2 | 13.35 | | 387.45 | |
| 30′ | | 0.375 | 0.901 | | | | | | 11.41 | | 339.13 | | | 0.777 | | | | | | 2.2 | 13.38 | | 400.42 | |
| 31′ | | 0.375 | 0.962 | | | | | 2.2 | 11.43 | | 350.34 | | | 0.830 | | | | | | 2.3 | 13.41 | | 413.45 | |
| 32′ | 24 | 0.375 | 1.023 | 2 | 8 | 29 ¾" | 34½x 2 | 2.3 | 11.44 | 155.44 | 361.13 | | 30 | 0.310 | 0.884 | 2 | 8 | 35 ¾" | 40½x1¾ | 2.4 | 13.44 | 211.58 | 426.53 | |

| TOWER HEIGHT (ft) | 40′ SPAN | | | | | | | | | | | | TOWER HEIGHT (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOWER PIPE | | | ANCHOR BOLTS | | | BASE PLATE | TRUSS | DESIGN LOADS | | | | |
| | O.D. (in) | WALL THICK (in) | DEFL ΔH (in) | SIZE DIA (in) | NO. | BOLT CIR DIA | SIZE (in) | DEFL ΔV (in) | SHEAR V (Kips) | TORSION T (K-ft) | MOMENT M (K-ft) | | |
| 14′ | 30 | 0.280 | 0.260 | 1 ¾ | 8 | 35 ⅜" | 39⅞x1½ | 2.1 | 14.65 | 276.72 | 242.20 | | 14′ |
| 15′ | | | 0.298 | 1 ¾ | | 35 ⅜" | 39⅞x1½ | 2.2 | 14.68 | | 254.69 | | 15′ |
| 16′ | | | 0.339 | 1 ¾ | | 35 ⅜" | 39⅞x1½ | 2.3 | 14.71 | | 267.44 | | 16′ |
| 17′ | | | 0.383 | 2 | | 35 ¾" | 40½x1½ | 2.4 | 14.75 | | 280.40 | | 17′ |
| 18′ | | | 0.429 | | | | 40½x1⅝ | 2.5 | 14.78 | | 293.56 | | 18′ |
| 19′ | | 0.280 | 0.478 | | | | | 2.6 | 14.81 | | 306.90 | | 19′ |
| 20′ | | 0.312 | 0.478 | | | | | 2.6 | 14.84 | | 320.39 | | 20′ |
| 21′ | | | 0.527 | | | | 40½x1⅝ | 2.6 | 14.87 | | 334.02 | | 21′ |
| 22′ | | | 0.578 | | | | 40½x1¾ | 2.7 | 14.90 | | 347.79 | | 22′ |
| 23′ | | | 0.632 | | | | | 2.8 | 14.94 | | 361.67 | | 23′ |
| 24′ | | | 0.688 | | | | | 2.9 | 14.97 | | 375.66 | | 24′ |
| 25′ | | 0.312 | 0.747 | | | | 40½x1¾ | 3.0 | 15.00 | | 389.75 | | 25′ |
| 26′ | | 0.340 | 0.736 | | | | 40½x 2 | 3.0 | 15.03 | | 403.94 | | 26′ |
| 27′ | | | 0.794 | 2 | | 35 ¾" | 40½x 2 | 3.0 | 15.06 | | 418.22 | | 27′ |
| 28′ | | | 0.854 | 2 ¼ | | 36" | 41 x 2 | 3.1 | 15.09 | | 432.57 | | 28′ |
| 29′ | | | 0.916 | | | | | 3.2 | 15.13 | | 447.01 | | 29′ |
| 30′ | | 0.340 | 0.980 | | | | | | 15.16 | | 461.52 | | 30′ |
| 31′ | | 0.375 | 0.963 | | | | | | 15.19 | | 476.10 | | 31′ |
| 32′ | 30 | 0.375 | 1.026 | 2 ¼ | 8 | 36" | 41 x 2 | 3.2 | 15.22 | 276.72 | 490.75 | | 32′ |




ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

## TRUSS DETAILS

| SPAN | 10′, 15′, & 20′ | 25′ | 30′ | 35′ | 40′ |
|---|---|---|---|---|---|
| W x D = WIDTH x DEPTH | 4.0 x 4.0 | 4.0 x 4.0 | 4.0 x 4.0 | 4.5 x 4.5 | 4.5 x 4.5 |
| CHORD-①, Unless Otherwise Shown | L 3 x 3 x 3/16 ② [3] | L 3 x 3 x 1/4 ② [4] | L 3 x 3 x 1/4 [6] | L 3 x 3 x 5/16 [7] | L3 1/2x3 1/2x 5/16 [9] |
| DEAD LOAD DIAGONAL-② | L 2 x 2 x 3/16 [2] | L 2 x 2 x 3/16 [2] | L 2 x 2 x 3/16 [2] | L 2 x 2 x 3/16 [2] | L 2 x 2 x 3/16 [3] |
| WIND LOAD DIAGONAL-② | L2 1/2x2 1/2x 3/16 [2] | L2 1/2x2 1/2x 3/16 [2] | L 3 x 3 x 1/4 [2] | L 3 x 3 x 1/4 [2] | L 3 x 3 x 1/4 [3] |
| DEAD LOAD VERTICAL-② | L 2 x 2 x 3/16 [2] | L 2 x 2 x 3/16 [2] | L 2 x 2 x 3/16 [2] | L2 1/2x2 1/2x 3/16 [2] | L2 1/2x2 1/2x 3/16 [2] |
| WIND LOAD STRUT-② | L 2 x 2 x 3/16 [1] | L 2 x 2 x 3/16 [1] | L 2 x 2 x 3/16 [1] | L 2 x 2 x 3/16 [1] | L 2 x 2 x 3/16 [1] |
| TRUSS DEAD LOAD | 38 lb/ft | 43 lb/ft | 45 lb/ft | 53 lb/ft | 62 lb/ft |
| SIZE H. S. BOLTS IN CONNECTION | 5/8" DIA | 5/8" DIA | 5/8" DIA | 5/8" DIA | 5/8" DIA |
| NO. & SIZE OF H.S. BOLTS IN CHORD ANGLE TO TOWER CONNECTION PLATE | 3 ~ 5/8" DIA ea | 4 ~ 5/8" DIA or 3 ~ 3/4" DIA ea | 6 ~ 5/8" DIA or 5 ~ 3/4" DIA ea | 7 ~ 5/8" DIA or 5 ~ 3/4" DIA ea | 9 ~ 5/8" DIA or 7 ~ 3/4" DIA ea |

① "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures".

② "Carbon Steel" for non-bridge structures per Item 442, "Metal For Structures".

GENERAL NOTES :

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

Steel for tower pipe shall conform to ASTM A53 Grade B or to ASTM A501. Tower pipe wall thickness shown is the minimum allowable. Fabricator may use the wall thickness shown or pipe of the same diameter with greater wall thickness.

All connection bolts shall conform to Item 447, "Structural Bolting". All structural steel, connection bolts, nuts and washers shall be galvanized in accordance with the Specifications.

Compensate for truss deflection at free end by offsetting upper and lower bolt holes at truss-to-tower connection.

For truss details see standard drawing COSSD.

For base and foundation details see standard drawing COSSF.

For cantilever truss lengths falling between those shown use sizes called for in the next longer span.

Truss and towers for cantilever sign supports are designed for the equivalent area of a 10′-0" deep sign panel over 100% of the span length. Design includes 3 pounds per foot squared for sign panel and 20 pounds per foot for lights and 50 pounds per foot for walkways all placed as specified for the design sign panel.

Details called for hereon are applicable for Design Wind Heights up to 30′ inclusive.

Number of High Strength bolts required in truss connection or splice are indicated in brackets, e.g. [3], after the member size.

Deflections shown include the design loads for Truss, Sign Panel, Lights and Walkways.

Texas Department of Transportation
Traffic Operations Division

# CANTILEVER OVERHEAD SIGN SUPPORTS

# COSS-Z3 & Z3I-10

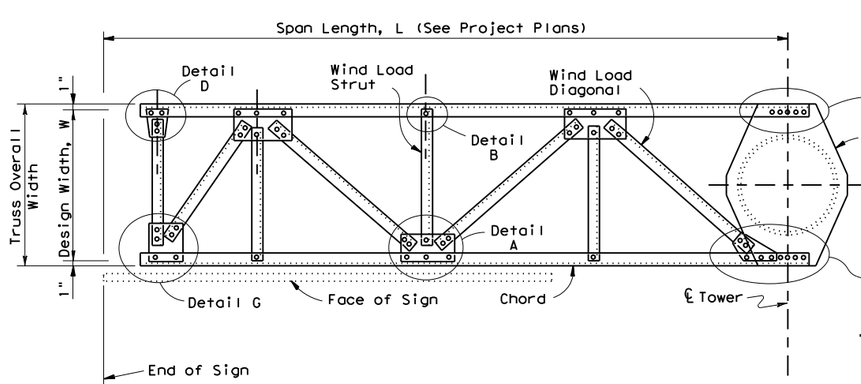


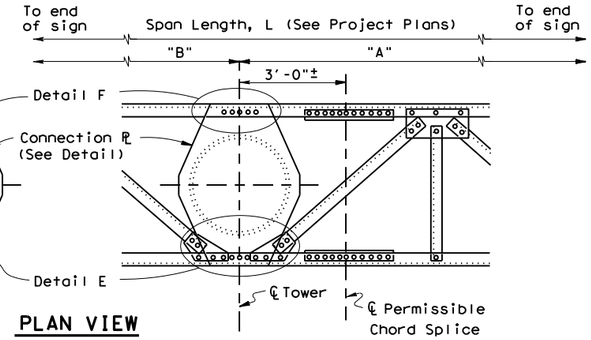
| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|
| REVISIONS | | | |
| 4-10 | | | |

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0047 | 07 | 245,ETC | US 75,ETC |
| DIST | COUNTY | | SHEET NO. |
| DAL | DALLAS,ETC | | 115 |

DATE:
FILE:

DATE:
FILE:



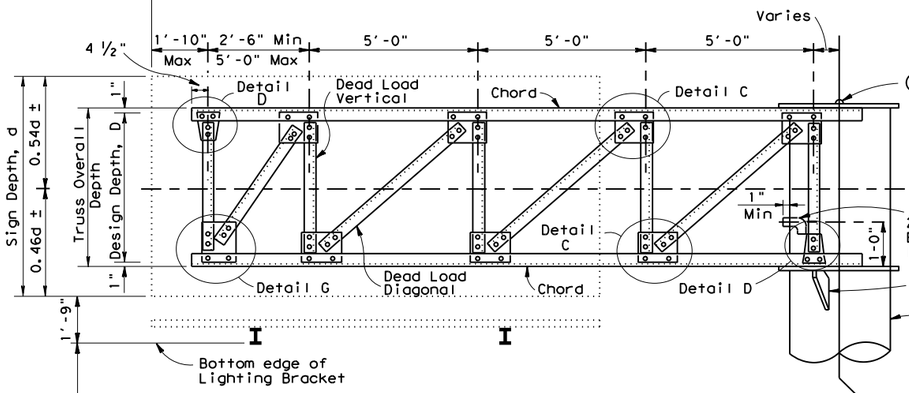




PLAN VIEW

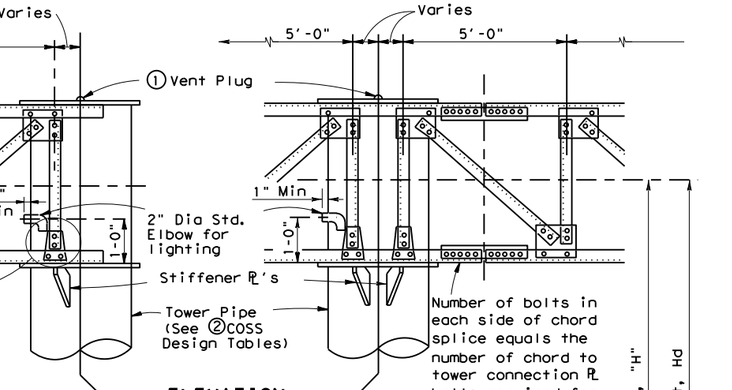
GENERAL NOTES:

Design conforms to 1975 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and Interim revisions thereto. Connection details are typical only. Actual size of member and number of bolts will vary. The details on this sheet are intended as a guide only. See "Cantilever Overhead Sign Supports" or "High Level Cantilever Overhead Sign Supports" sheets for number of bolts and size of members.

Gusset plates to be same thickness as thickest web member in connection.




SINGLE CANTILEVER

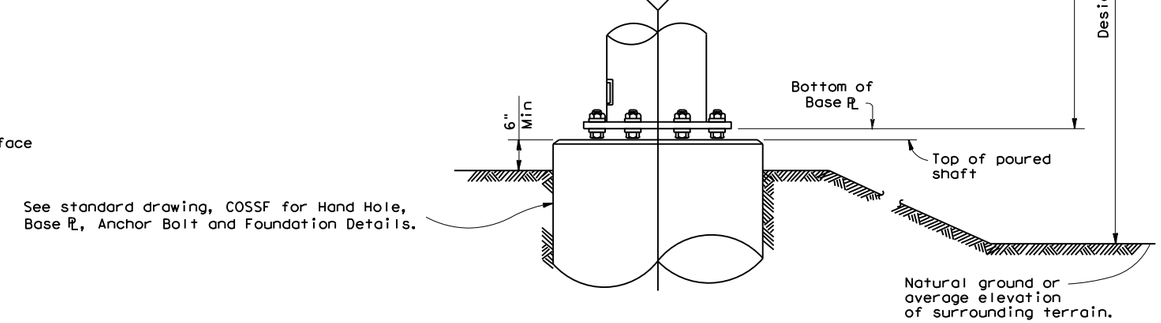






ELEVATION

DOUBLE CANTILEVER




① Note: Cap shall be solid steel sheet ⅜" nominal thickness. Drill, tap and plug galvanizing vent. Weld plate to pipe with ⅜" weld all around.

② For COSS design tables see standard drawing, "Cantilever Overhead Sign Supports" or "High Level Cantilever Overhead Sign Supports".



Texas Department of Transportation
Traffic Operations Division

# CANTILEVER OVERHEAD SIGN SUPPORT DETAILS

## COSSD



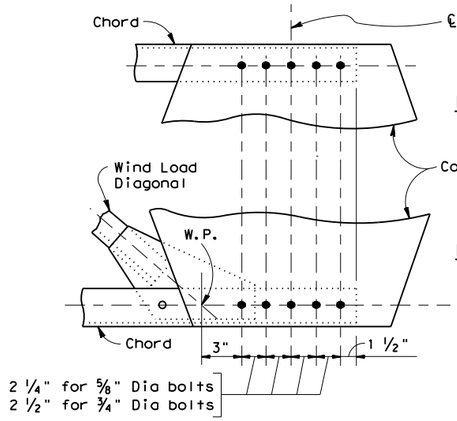
REVISIONS

| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0047 | 07 | 245, ETC | US 75, ETC |

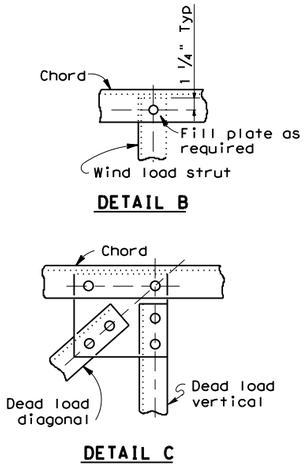
| DIST | COUNTY | SHEET NO. |
|---|---|---|
| DAL | DALLAS, ETC | 116 |

66A

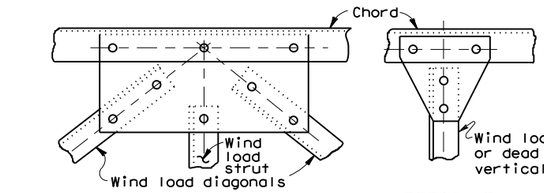



SINGLE CANTILEVER

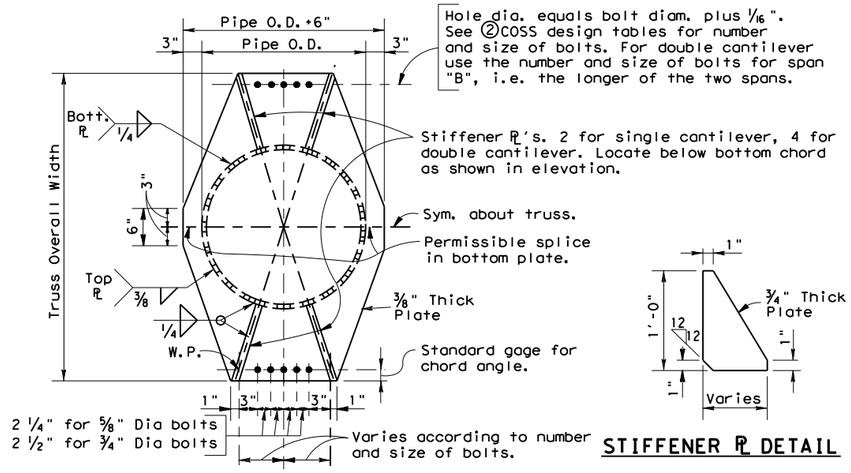
DOUBLE CANTILEVER




CONNECTION DETAILS



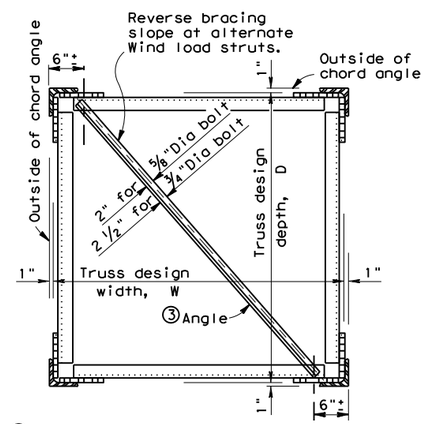

| TOTAL NO. OF BOLTS IN DIAG'S. IN JOINT | NUMBER OF BOLTS REQD. IN GUSSET ℄ TO CHORD CONNECTION |
|---|---|
| 0 | 2 |
| 2 | 2 |
| 3 | 3 |
| 4 | 3 |
| 5 | 4 |
| 6 | 4 |
| 8 | 5 |
| 10 | 6 |




CONNECTION PLATE DETAIL



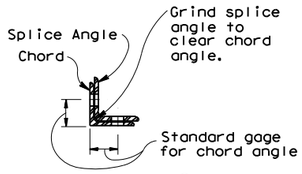

STIFFENER ℄ DETAIL



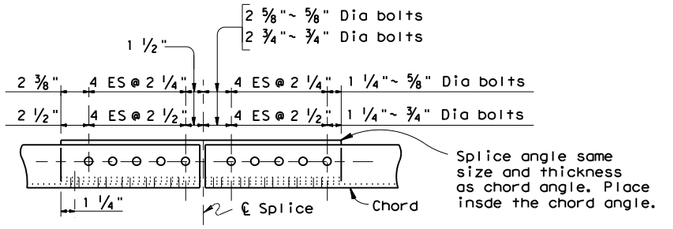

③2" x 2" x 3/16" angle for ⅝" Dia bolts [1]
2 ½" x 2" x 3/16" angle for ¾" Dia bolts [1]

TRUSS SECTION

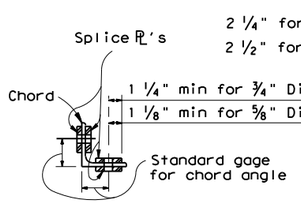
(DIAGONALS NOT SHOWN)



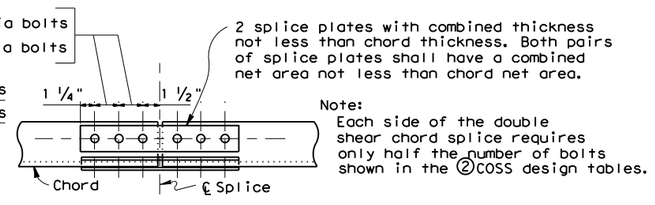

SECTION ON ℄ SPLICE




SINGLE SHEAR CHORD SPLICE



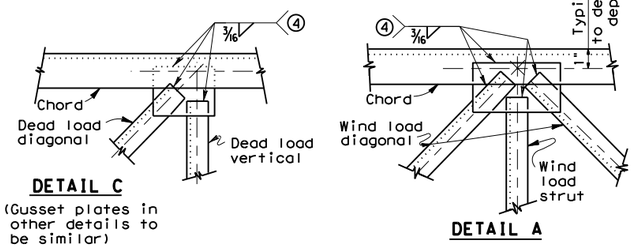

SECTION ON ℄ SPLICE




Note:
Each side of the double shear chord splice requires only half the number of bolts shown in the ②COSS design tables.

DOUBLE SHEAR CHORD SPLICE

SPLICE DETAILS




ALTERNATE WELDED CONNECTION DETAILS

| ④MINIMUM LENGTH OF 3/16" FILLET WELD REQUIRED | | |
|---|---|---|
| NUMBER OF BOLTS | TO REPLACE ⅝" DIA BOLTS | TO REPLACE ¾" DIA BOLTS |
| 1 | 2" | 3" |
| 2 | 4" | 6" |
| 3 | 6" | 9" |
| 4 | 8" | 11 ½" |
| 5 | 10" | 14 ½" |
| 6 | 12" | 17 ½" |
| 7 | 14" | 20" |

SHEET 2 OF 2

Texas Department of Transportation
Traffic Operations Division

# CANTILEVER OVERHEAD SIGN SUPPORT DETAILS

COSSD


REVISIONS

| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0047 | 07 | 245, ETC | US 75, ETC |
| DIST | COUNTY | | SHEET NO. |
| DAL | DALLAS, ETC | | 117 |

DATE:
FILE:

Washers shall conform to ASTM F436.

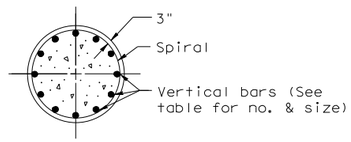
| ANCHOR BOLT DIA. | WASHER DIMENSIONS | | | | HOLE IN BASE PLATE |
|---|---|---|---|---|---|
| | OUTSIDE DIAMETER | HOLE DIAMETER | THICKNESS | | |
| d | | | MIN. | MAX. | |
| 1 ½" or less | 2d | d + ⅛" | 0.136" | 0.177" | d + ¼" |
| 1 ¾" | 2d - ⅛" | d + ⅛" | 0.178" | 0.280" | d + 5/16" |
| 2" | 2d - ¼" | d + ⅛" | 0.178" | 0.280" | d + 5/16" |
| Over 2" | 2d - ½" | d + ⅛" | 0.240" | 0.340" | d + 5/16" |

| ANCHOR BOLT SIZE | | | | |
|---|---|---|---|---|
| DIA | BOLT ① LENGTH | THREAD ① LENGTH | PROJECTION LENGTH | GALVAN. ① LENGTH |
| 1 ¼" | 2'-11" | 5" | 5 ¼" | 11 ¼" |
| 1 ⅜" | 3'-1" | 5 ½" | 5 ¾" | 11 ¾" |
| 1 ½" | 3'-4" | 6" | 6 ¼" | 1'-0 ¼" |
| 1 ¾" | 3'-10" | 7" | 7 ¼" | 1'-1 ¼" |
| 2" | 4'-3" | 8" | 8 ¼" | 1'-2 ¼" |
| 2 ¼" | 4'-9" | 9" | 9 ¼" | 1'-3 ¼" |
| 2 ½" | 5'-2" | 10" | 10 ¼" | 1'-4 ¼" |
| 2 ¾" | 5'-8" | 11" | 11 ¼" | 1'-5 ¼" |
| 3" | 6'-1" | 1'-0" | 1'-0 ¼" | 1'-6 ¼" |
| | | | | |
| | | | | |

① Anchor Bolt Fabrication Tolerances:
Bolt Length ~ ±½"
Thread Length ~ ±½"
Galvanized Length ~ -¼"

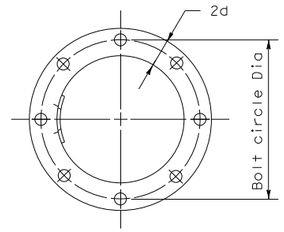
② Thread lenght applies to upper and lower threads

| | PIPE OUTSIDE DIAMETER | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 16" | | | 20" | | | 24" | | | 30" | | |
| ANCHOR BOLT SIZE | BOLT CIRCLE DIA | DRILLED SHAFT SIZE | DRILLED SHAFT REINF | BOLT CIRCLE DIA | DRILLED SHAFT SIZE | DRILLED SHAFT REINF | BOLT CIRCLE DIA | DRILLED SHAFT SIZE | DRILLED SHAFT REINF | BOLT CIRCLE DIA | DRILLED SHAFT SIZE | DRILLED SHAFT REINF |
| 1 ¼"Dia x 2'-11" | 20 ½" | 36" Dia | 14-#8 (A) | 24 ½" | 36" Dia | 14-#8 (A) | | | | | | |
| 1 ⅜"Dia x 3'-1" | 20 ¾" | 36" Dia | 12-#9 (A) | 24 ¾" | 42" Dia | 14-#9 (A) | | | | | | |
| 1 ½"Dia x 3'-4" | 21" | 36" Dia | 12-#9 (A) | 25" | 42" Dia | 14-#9 (A) | 29" | 42" Dia | 14-#9 (C) | | | |
| 1 ¾"Dia x 3'-10" | 21 ½" | 36" Dia | 10-#10(A) | 25 ⅜" | 42" Dia | 12-#10(B) | 29 ⅜" | 48" Dia | 16-#10(C) | 35 ⅜" | 54" Dia | 18-#10(C) |
| 2"Dia x 4'-3" | 22" | 36" Dia | 12-#10(A) | 25 ¾" | 42" Dia | 12-#10(B) | 29 ¾" | 48" Dia | 16-#10(C) | 35 ¾" | 54" Dia | 18-#10(C) |
| 2 ¼"Dia x 4'-9" | 22 ½" | 42" Dia | 12-#11(A) | 26" | 42" Dia | 10-#11(B) | 30" | 48" Dia | 14-#11(C) | 36" | 54" Dia | 14-#11(D) |
| 2 ½"Dia x 5'-2" | | | | 26 ½" | 42" Dia | 12-#11(B) | 30 ½" | 48" Dia | 16-#11(C) | 36 ½" | 54" Dia | 16-#11(D) |
| 2 ¾"Dia x 5'-8" | | | | | | | 31 ½" | 48" Dia | 18-#11(D) | 37" | 54" Dia | 20-#11(D) |
| 3"Dia x 6'-1" | | | | | | | | | | 37 ½" | 54" Dia | 24-#11(D) |
| | | | | | | | | | | | | |

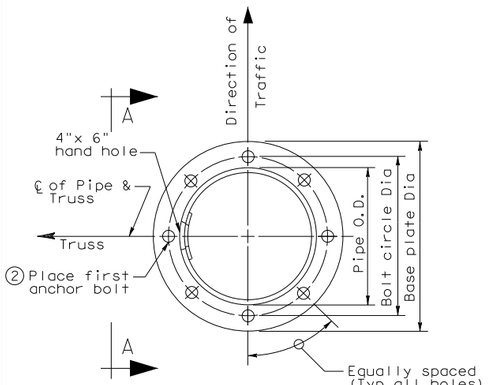



SECTION

A = #3 Plain spiral at 6" pitch (Grade 40)
B = #4 Plain spiral at 6" pitch (Grade 40)
C = #4 Plain spiral at 6" pitch (Grade 60)
D = #4 Plain spiral at 3 ½" pitch (Grade 60)

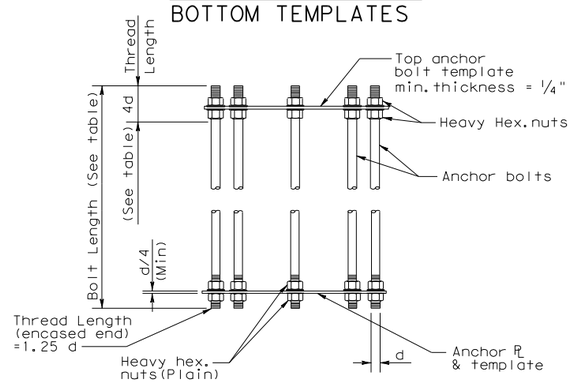



TOP VIEW OF TOP & BOTTOM TEMPLATES

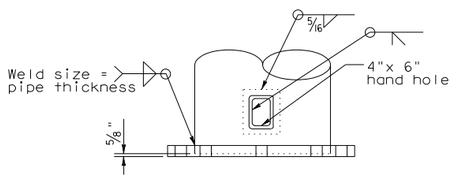



PLAN

② See "Cantilever Overhead Sign Support" or "High Lever Cantilever Overhead Sign Support" sheets for number and size.




ANCHOR BOLT ASSEMBLY
(PRIOR TO INSTALLATION)

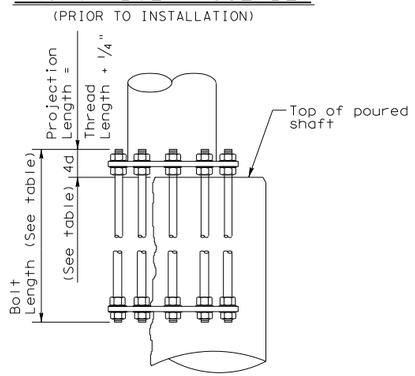



Cut 5" x 7" hole in pipe. Center 4" x 6" hand hole in ⅜" x 8" x 10" back up plate. Provide attachable cover made from section cut from pipe.

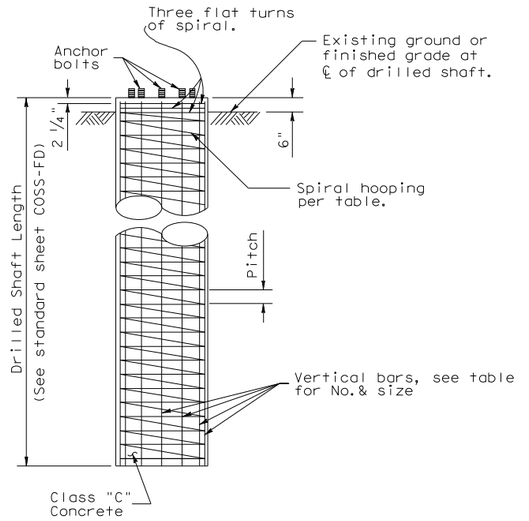
VIEW A-A

③ BASE PLATE & HANDHOLE DETAILS

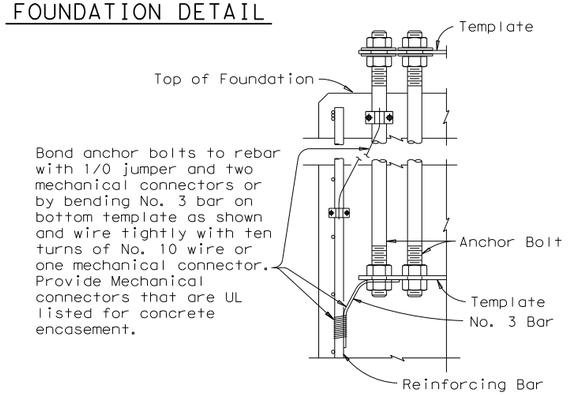
③ See "Cantilever Overhead Sign Support" or "High Level Cantilever Overhead Sign Support" sheets for Diameter and thickness of base plate.




BEARING SEAT ELEVATION




FOUNDATION DETAIL




LIGHTNING PROTECTION SYSTEM

## GENERAL NOTES

1. Concrete shall be Class "C".
2. Reinforcing shall conform to Item 440, "Reinforcing Steel".
3. Anchor bolts and nuts for anchor bolts shall be "Alloy Steel" per Item 449, "Anchor Bolts".
4. Anchor bolts shall be rigidly held in position during concrete placement using steel templates at the top and bottom. The top templates shall be removed after the concrete has set.
5. Lubricate and tighten anchor bolts when erecting the structure per Item 449, "Anchor Bolts". After the structure has been aligned in its final position and the anchor bolts have been properly tightened, tack weld anchor bolt nuts to washer, and tack weld washers to base plate. Galvanizing in tack welded areas shall be repaired in accordance with Item 445, "Galvanizing".
6. All vertical reinforcing shall be carried to the bottom of the Drilled Shaft.

Texas Department of Transportation

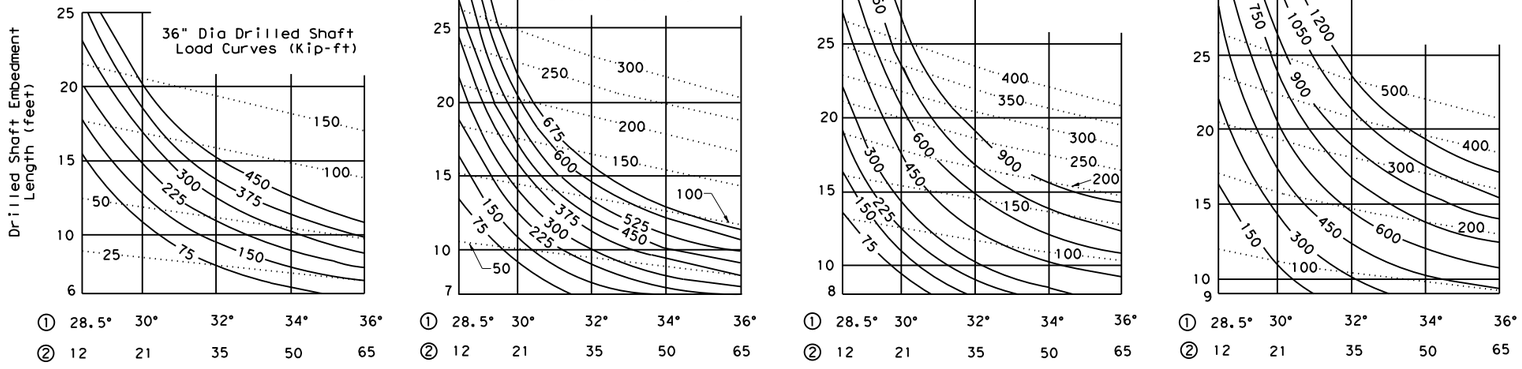
Traffic Safety Division Standard

# CANTILEVER OVERHEAD SIGN SUPPORT FOUNDATION

# COSSF-21

| FILE: cossf-21.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT November 2007 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| 8-21 | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 118 |

DATE:
FILE:




① Ø = Angle of internal friction of soil (degrees)

② N = Texas cone penetrometer value (blows per ft)

④ C(psi) = Cohesive shear strength of soil (psi)

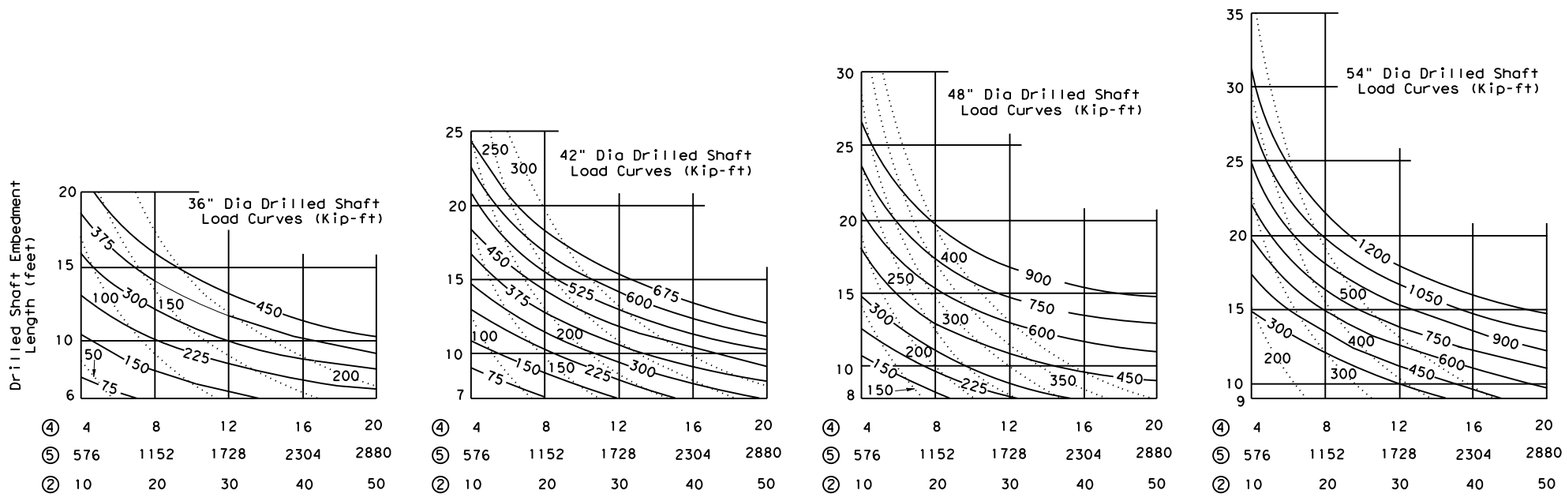
⑤ C(psf) = Cohesive shear strength of soil (psf)

## ③ SUBMERGED SAND SOIL (COHESIONLESS)

Moment ——————

Torsion ·····

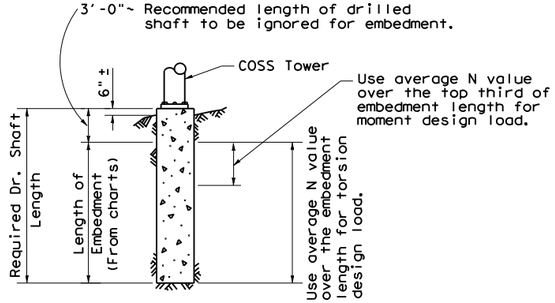
③ Note:
For unsubmerged sands and clayey sands the charts for clay soil will give a conservative foundation design.




## CLAY SOIL (COHESIVE)

Moment ——————

Torsion ·····




## PROCEDURE:

1. Determine design moment and torsion, and the required drilled shaft diameter as outlined in the selection example sheet COSS-SE.
2. Make an initial estimate of the required embedment length.
3. From soil exploration data determine type of soil and average N value or soil property along the upper third of the drilled shaft.
4. Enter chart (for the correct shaft diameter and soil type) from the bottom at the average N value or soil property determined in step 3.
5. Proceed vertically into chart and locate intersection with design moment. Interpolate between moment curves (solid lines) as needed.
6. From intersection point turn 90° to left and read embedment length along vertical scale.
7. If embedment length differs significantly from estimated value return to step 3 with the embedment length determined in step 6.
8. From soil exploration data determine average N value or soil property over the entire length of the embedment.
9. Enter chart (for correct shaft diameter and soil type) from the bottom at the average N value or soil property determined in step 8.
10. Proceed vertically into chart and locate intersection with design torsion. Interpolate between torsion curves (dashed lines) as needed.
11. From intersection point turn 90° to left and read embedment length along vertical scale.
12. Compute the required length of drilled shaft by adding 3'-0" to longer embedment length required for moment or torsion.

## GENERAL NOTES:

These charts are for use with Cantilever Overhead Sign Supports with one shaft per tower.

Solid curves are base moment in Kip-ft.

Dash curves are base torsion in Kip-ft.

Minimum embedment of drilled shaft is two diameters.

Add 3'-0" to the required embedment length to determine the required length of drilled shaft.

Texas Department of Transportation
Traffic Operations Division

# FOUNDATION EMBEDMENT SELECTION CHARTS

# COSS-FD

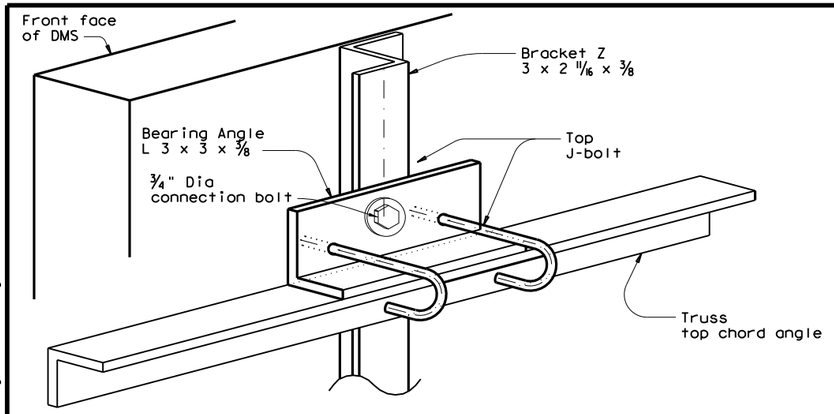


REVISIONS

DATE:
FILE:

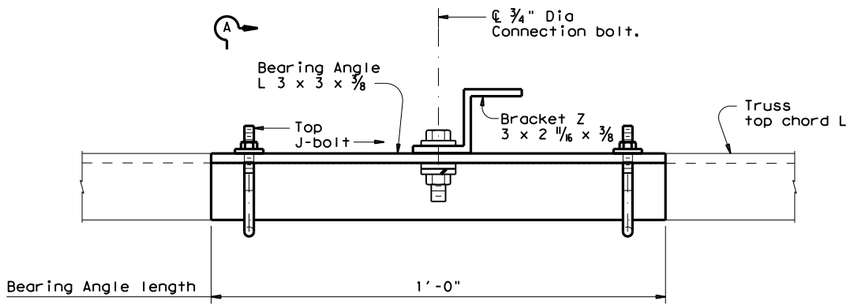
| DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|
| CONT | SECT | JOB | HIGHWAY |
| 0047 | 07 | 245, ETC | US 75, ETC |
| DIST | COUNTY | | SHEET NO. |
| DAL | DALLAS, ETC | | 119 |

DATE:
FILE:



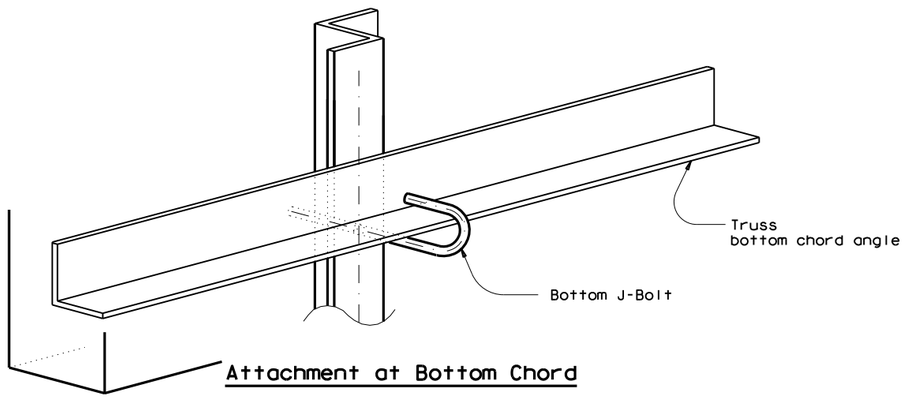

## Attachment at Top Chord

(Showing Chord Angle 3")



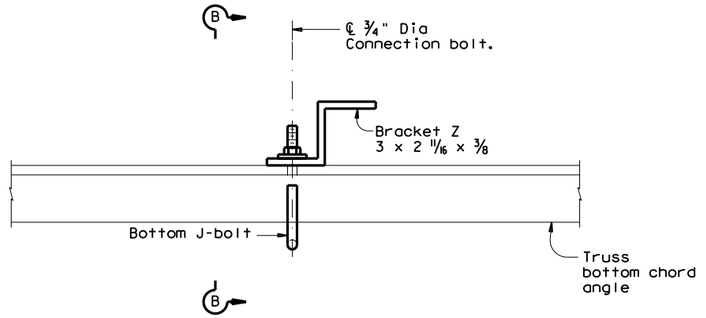

## Attachment at Top Chord

(Showing Chord Angle 3")




## Attachment at Bottom Chord

ISOMETRIC VIEW

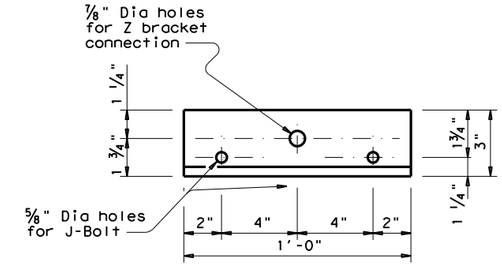



## Attachment at Bottom Chord

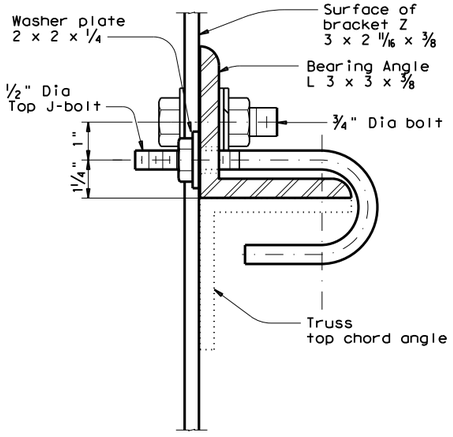
PLAN VIEW

## GENERAL NOTES:

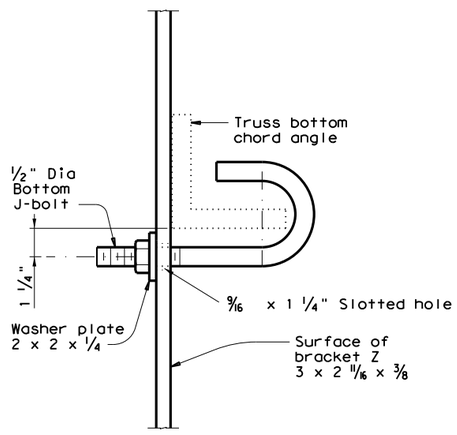
1. Application of the mounting detailed on Sheet 1 of 3 is limited to a dynamic message sign (DMS) attachment that is not in conflict with the truss connection bolts at the point(s) of attachment. The overhead sign structure must have adequate capacity to support the DMS. A determination of adequacy shall be made prior to attaching the DMS supports to the truss.
2. Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. The Design Sustained Wind Velocity is 100 mph with a gust factor of 1.3. Connections are designed for a DMS weight of 3600 lbs and a design Effective Projected Area (EPA) of 441 sq ft, with the EPA based on a DMS nominal width of 30.5 feet and nominal depth of 8.25 feet plus four top and bottom 1'-8" square flashing beacons. The EPA includes drag coefficients of 1.7 (applied to sign area) and 1.2 (applied to flashing beacon area). A horizontal eccentricity of 1.0 ft from the face of the truss to the center of gravity of the DMS for attachment of DMS is assumed. An even number of Z brackets, spaced at 5 ft max., is assumed to transfer forces through the connection.
3. All structural steel shall conform to ASTM A36, A572 Gr 50 or A588. Connection bolts shall conform to ASTM A325 or A449. Each connection bolt shall be provided with 1 heavy hex nut, 2 flat washers, and 1 lock washer. J bolts and washer plate both shall be Type 304 stainless steel, with bolt minimum yield strength of 50 ksi and an elongation of 16 percent in 2 inches. All parts except stainless steel shall be galvanized.
4. Contractor shall verify applicable field dimensions before fabrication.




## BEARING ANGLE 3 x 3 x 3/8

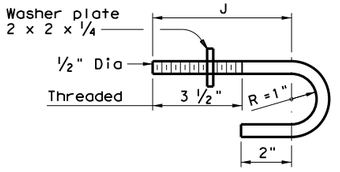



## SECTION A-A




## SECTION B-B

| Chord Angle | J |
|---|---|
| 3", 3 1/2", 4" | 5 1/2" |
| 5" and 6" | 7 1/2" |




## TOP & BOTTOM J-BOLT

SHEET 1 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

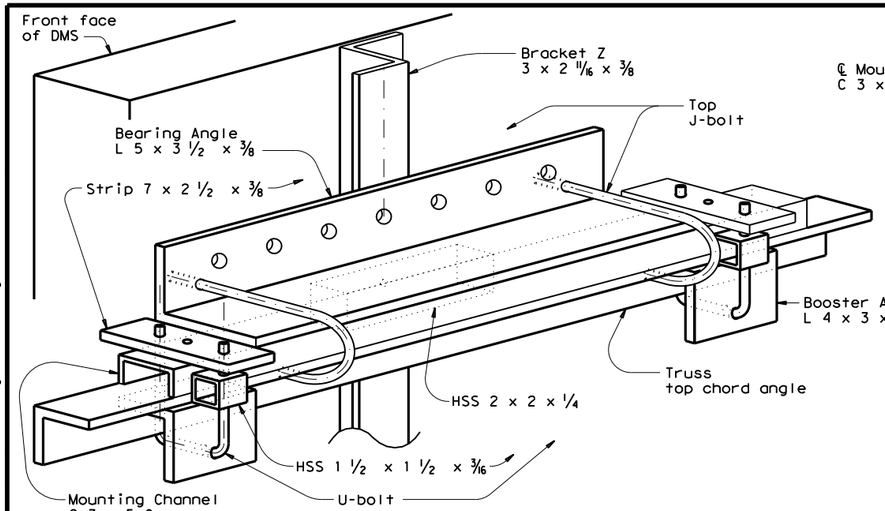
# DMS-TO-TRUSS MOUNTING AT OVERHEAD SIGN SUPPORTS (NON BUILD-UP)

# DMS(TM-1)-16

| FILE: dms-tm-16.dgn | DN: TxDOT | CK: | DW: TxDOT | CK: |
|---|---|---|---|---|
| ©TxDOT June 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 120 |

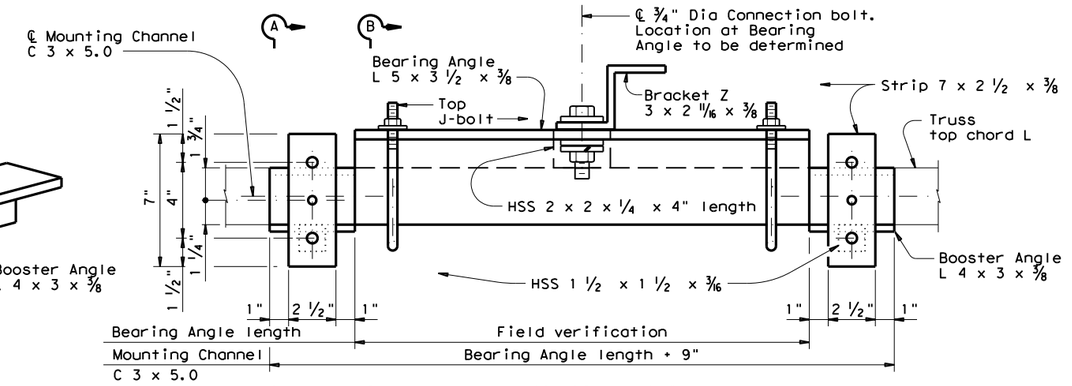
29C

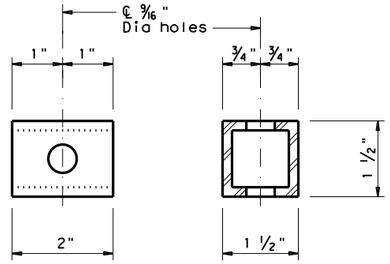
DATE:
FILE:



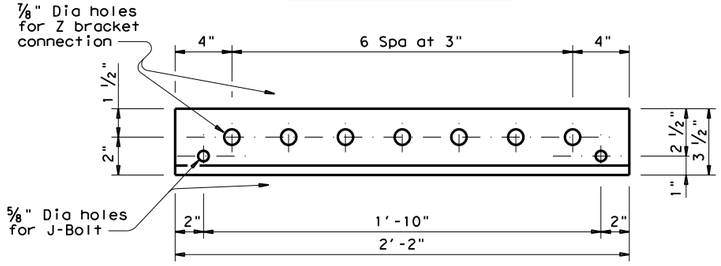

## Built-up Attachment at Top Chord

(Showing Chord Angle 3")

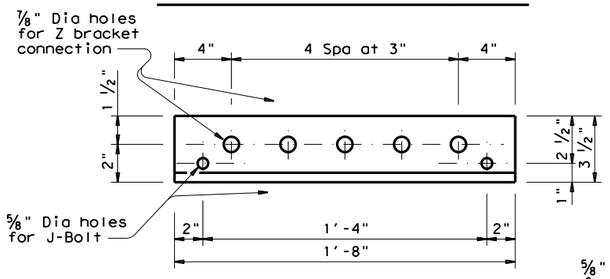


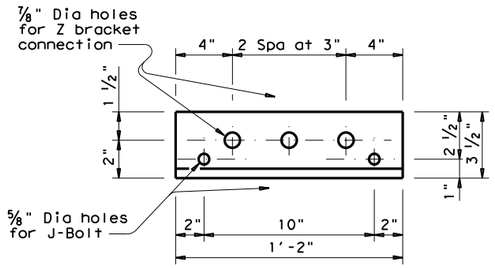

## ISOMETRIC VIEW



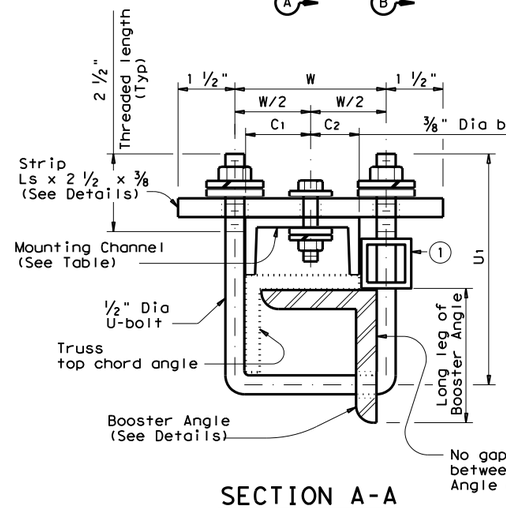

## BEARING ANGLE 5 x 3 1/2 x 3/8




## BEARING ANGLE 5 x 3 1/2 x 3/8




## BEARING ANGLE 5 x 3 1/2 x 3/8




## SECTION A-A

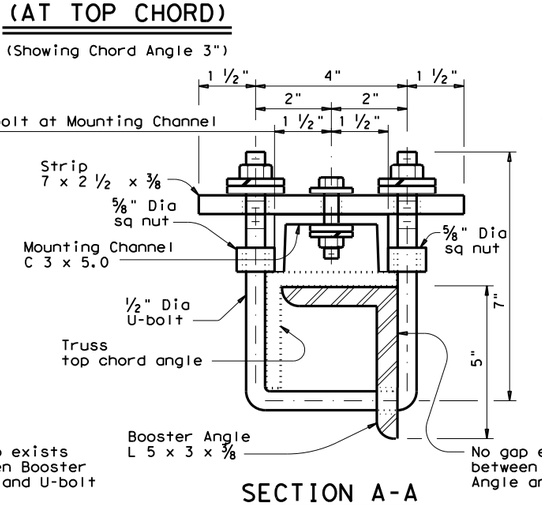
(Showing Chord Angle 3",4",5" & 6")

| Chord Angle | U1 | W | C1 | C2 | Mounting Channel |
|---|---|---|---|---|---|
| 3" | 7" | 4" | 1 3/4" | 1 1/4" | C3 x 5.0 |
| 4" | 8" | 5" | 2 1/4" | 1 3/4" | C4 x 7.25 |
| 5" | 9" | 6" | 2 3/4" | 2 1/4" | C5 x 9.0 |
| 6" | 10 1/2" | 7" | 3 1/4" | 2 3/4" | C6 x 13 |

## PLAN VIEW (AT TOP CHORD)

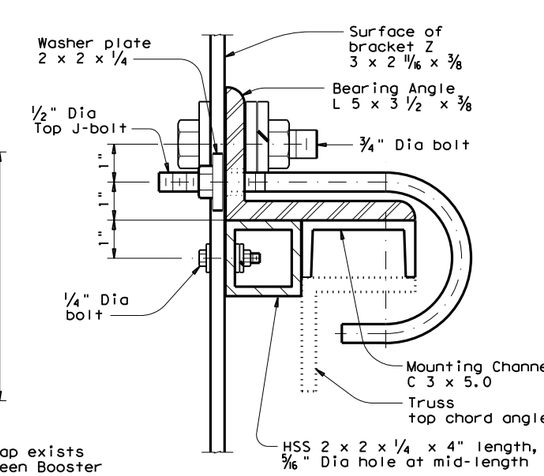
(Showing Chord Angle 3")



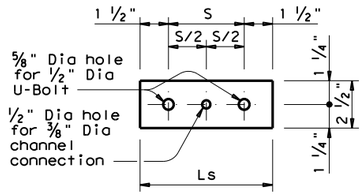




## SECTION A-A

(Showing Chord Angle 3 1/2")

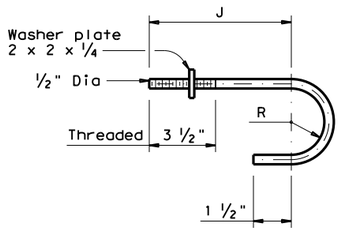



## SECTION B-B



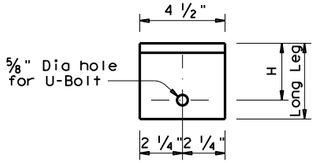

## Strip Ls x 2 1/2 x 3/8

| Chord Angle | S | Ls |
|---|---|---|
| 3" | 4" | 7" |
| 3 1/2" | 4" | 7" |
| 4" | 5" | 8" |
| 5" | 6" | 9" |
| 6" | 7" | 10" |




## TOP J-BOLT

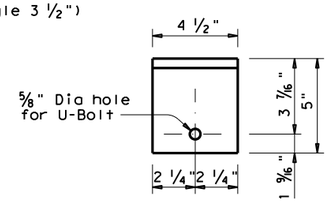
| Chord Angle | J | R |
|---|---|---|
| 3 & 3 1/2" | 7" | 1 3/4" |
| 4 & 5" | 8" | 2" |
| 6" | 9" | 2 1/4" |




## BOOSTER ANGLE

(For Chord Angle 3",4",5" and 6")

| Chord Angle | Booster Angle | H |
|---|---|---|
| 3" | 4 x 3 x 3/8 | 3" |
| 4" | 5 x 3 1/2 x 3/8 | 3 13/16" |
| 5" | 6 x 4 x 3/8 | 4 13/16" |
| 6" | 7 x 4 x 3/8 | 5 5/8" |




## BOOSTER ANGLE 5 x 3 x 3/8

(For Chord Angle 3 1/2")

SHEET 2 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

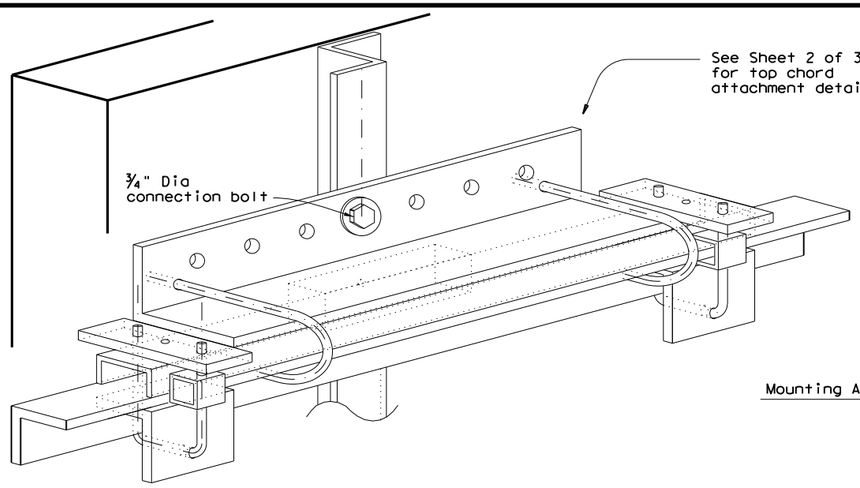
# DMS-TO-TRUSS MOUNTING AT OVERHEAD SIGN SUPPORTS (WITH BUILD-UP)

# DMS(TM-2)-16

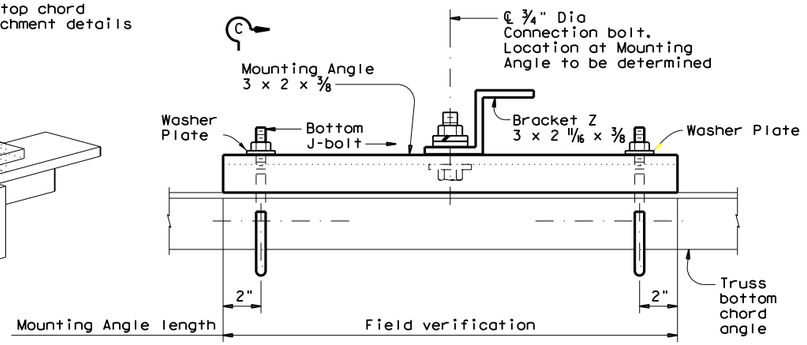
| FILE: dms-tm-16.dgn | DN: TxDOT | CK: | DW: TxDOT | CK: |
|---|---|---|---|---|
| ©TxDOT JUNE 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 121 |

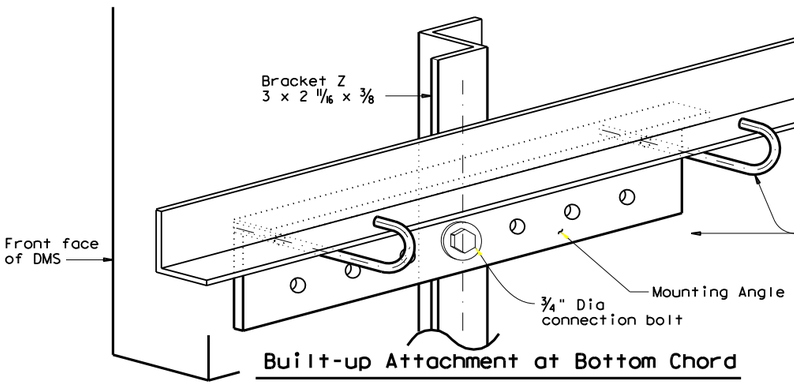
29D

DATE:
FILE:




## Built-up Attachment at Top Chord

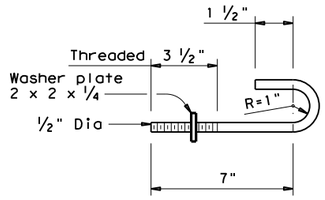


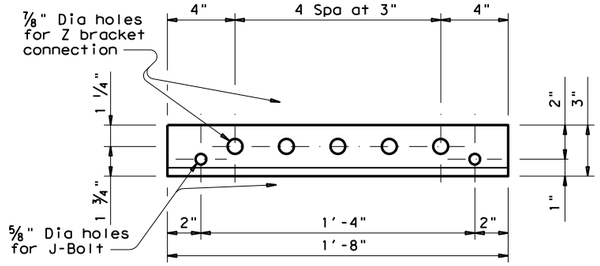

## Built-up Attachment at Bottom Chord

## ISOMETRIC VIEW

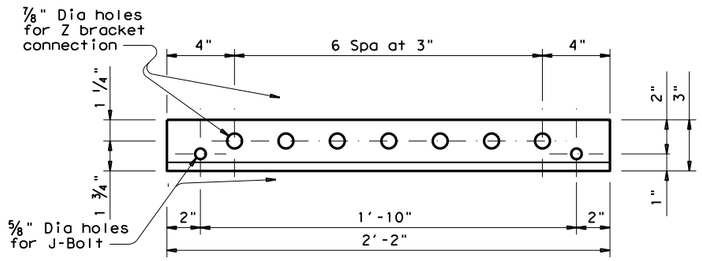
## PLAN VIEW (AT BOTTOM CHORD)



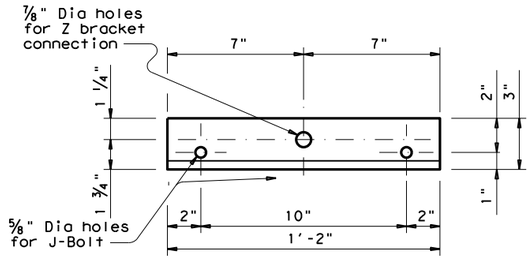

## BOTTOM J-BOLT




## MOUNTING ANGLE 3 x 2 x ⅜




## MOUNTING ANGLE 3 x 2 x ⅜




## MOUNTING ANGLE 3 x 2 x ⅜

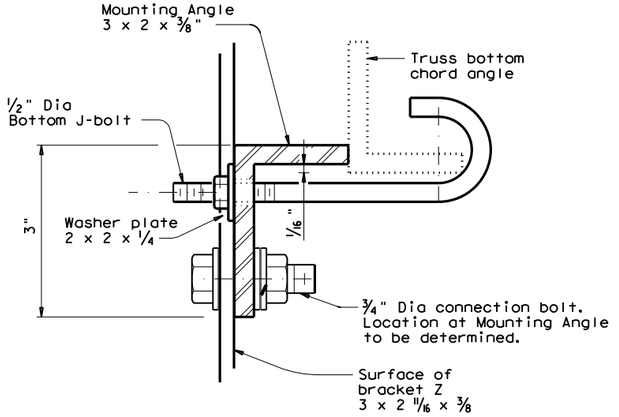
## GENERAL NOTES:

1. Application of the built-up detailed on Sheet 2 and 3 of 3 is limited to the dynamic message sign (DMS) attachment which is in conflict with the truss connection bolts at the point(s) of attachment. The overhead sign structure must have adequate capacity to support the DMS. A determination of adequacy shall be made prior to attaching the DMS supports to the truss.

2. Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. The Design Sustained Wind Velocity is 100 mph with a gust factor of 1.3. Connections are designed for a DMS weight of 3600 lbs and a design Effective Projected Area (EPA) of 441 sq ft, with the EPA based on a DMS nominal width of 30.5 feet and nominal depth of 8.25 feet plus four top and bottom 1'-8" square flashing beacons. The EPA includes drag coefficients of 1.7 (applied to sign area) and 1.2 (applied to flashing beacon area). A horizontal eccentricity of 1.0 ft from the face of the truss to the center of gravity of the DMS for attachment of DMS is assumed. An even number of Z brackets, spaced at 5 ft max., is assumed to transfer forces through the connection.

3. All structural steel shall conform to ASTM A36, A572 Gr 50 or A588. Connection bolts shall conform to ASTM A325 or A449. Each connection bolt shall be provided with 1 heavy hex nut, 2 flat washers, and 1 lock washer. U bolts shall conform to ASTM A307 with 2 hex nuts, 2 flat washers and 2 lock washers. Hollow structural section (HSS) shall conform to ASTM A500, A501, or A847. J bolts and washer plate both shall be Type 304 stainless steel, with bolt minimum yield strength of 50 ksi and an elongation of 16 percent in 2 inches. All parts, except stainless steel shall be galvanized.

4. Contractor shall verify applicable field dimensions before fabrication. Various lengths of bearing and mounting angle are provided for suitable mounting. Contractor shall determine the proper bearing and mounting angle length, and the connection along the length at Z bracket to accommodate J-bolt hook. Contractor may substitute HSS for the mounting channel as long as the HSS has equal or greater thickness at the mounting channel. Limit HSS height to achieved mounting clearance.




## SECTION C-C

SHEET 3 OF 3

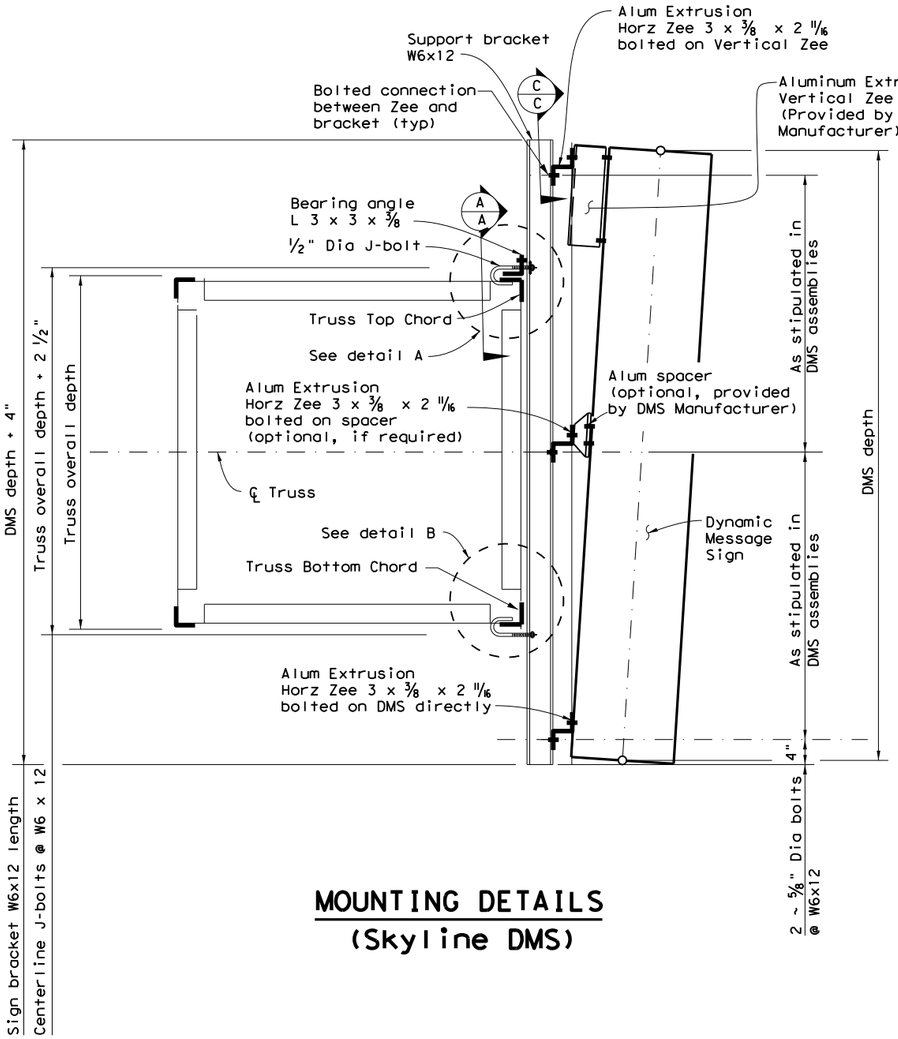
Texas Department of Transportation

Traffic Operations Division Standard

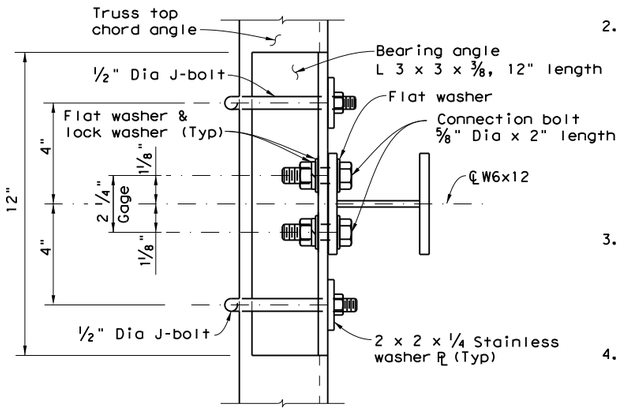
# DMS-TO-TRUSS MOUNTING AT OVERHEAD SIGN SUPPORTS (WITH BUILD-UP) DMS(TM-3)-16

| FILE: dms-tm-16.dgn | DN: TxDOT | CK: | DW: TxDOT | CK: |
|---|---|---|---|---|
| ©TxDOT JUNE 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 122 |

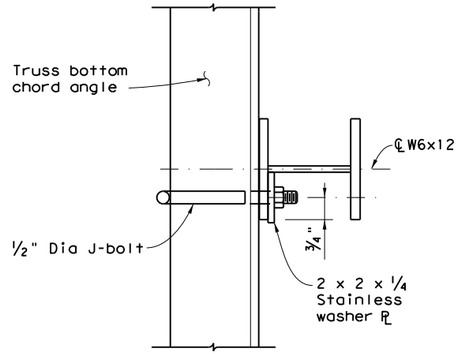
29E




## MOUNTING DETAILS
## (Skyline DMS)



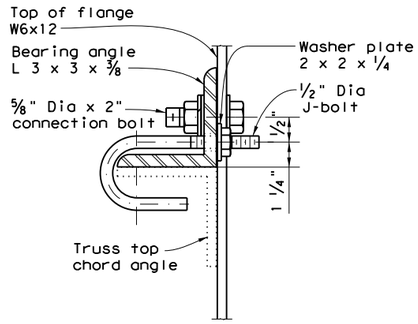

## TOP VIEW
## TRUSS TOP CONNECTION



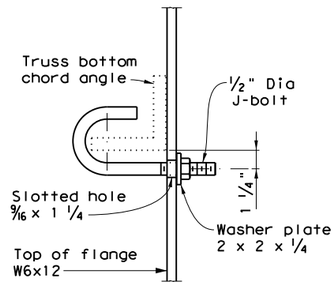

## TOP VIEW
## TRUSS BOTTOM CONNECTION

## GENERAL NOTES:

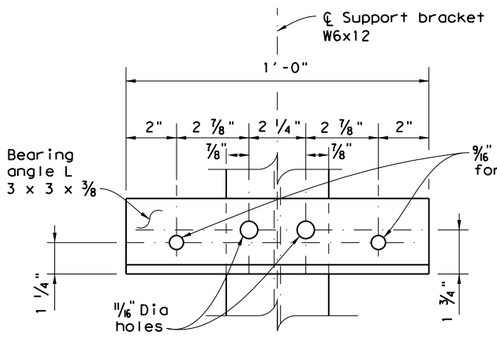
1. Determine the adequacy of the overhead sign support structure to support the dynamic message sign (DMS) prior to attaching the sign to the truss.
2. Designed according to the 1994 edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions. Designed for a Sustained (Fastest Mile) Wind Velocity of 100 mph with a gust factor of 1.3. Connections are designed for a DMS weight of 3800 lbs. The structural support is designed for an Effective Projected Area (EPA) of 441 sq. ft. based on a DMS nominal width of 30.5 feet and nominal depth of 8.25 feet, with a drag coefficient of 1.7 applied, plus four 1'-8" square flashing beacons with a drag coefficient of 1.2. DMS attachment is designed for a horizontal eccentricity of 1.3 ft. from the face of the truss to the center of gravity of the DMS. Provide an even number of sign supporting brackets (6 minimum), W6x12, spaced at 5'-6" max. The maximum distance between the sign edge to the nearest supporting bracket is 2'-3".
3. Verify applicable field dimensions before fabrication. Determine the required number and spacing of sign support brackets, along with the Aluminum Extrusion Vertical and Horizontal Zees provided by the DMS manufacturer, to connect the DMS to the truss. For the J-bolt connection of DMS to overhead sign structure, align each arranged sign bracket with its bearing angle to avoid conflict with the truss connection bolts at the point of attachment.
4. Provide structural steel meeting the requirements of ASTM A36, A572 Gr 50 or A588. Provide connection bolts meeting the requirements of ASTM F3125, Grade A325 or A449 with 1 heavy hex nut, 2 flat washers, and 1 lock washer. Provide Type 304 stainless steel J bolt and washer plate, with bolt minimum yield strength of 50 ksi and an elongation of 16 percent in 2 inches. Galvanize all parts except stainless steel.
5. Prior to the initialization of DMS mounting, the DMS manufacturer must provide and install the 6061-T6 Aluminum Extrusion Vertical and Horizontal Zees, 3 x ⅜ x 2 11/16, and the specified Aluminum Spacers (if any) to the back of the DMS.
6. The sign support bracket attached to the truss shown here is an example only. Adjust the bracket position along the truss depth to achieve the required vertical clearance to be confirmed by the Engineer.
7. When the structure is to be exposed to a highly corrosive environment, provide elastomeric spacer to separate aluminum alloy parts from direct contact with steel.



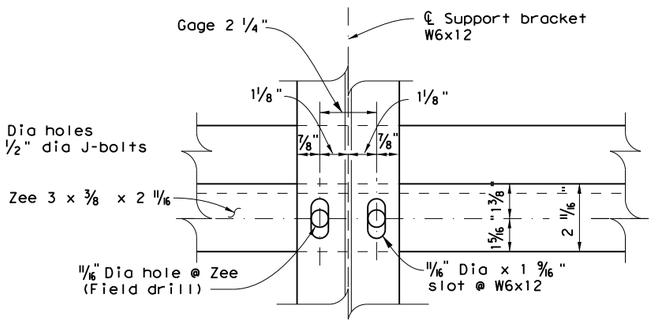

## DETAIL A



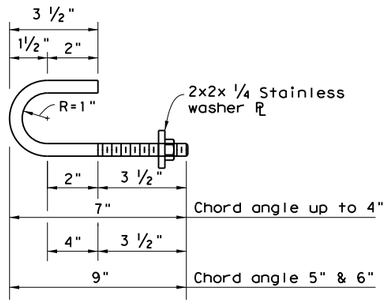

## DETAIL B




## SECTION A-A
(Truss chord angle not shown)




## SECTION C-C




## ½" Dia J-BOLT

Texas Department of Transportation

Traffic Safety Division Standard

# DMS-TO-TRUSS MOUNTING WITH HORIZONTAL ZEE EXTRUSIONS

# DMS(HZ-1)-21

| FILE: dms(hz-1)-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 2021 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 123 |

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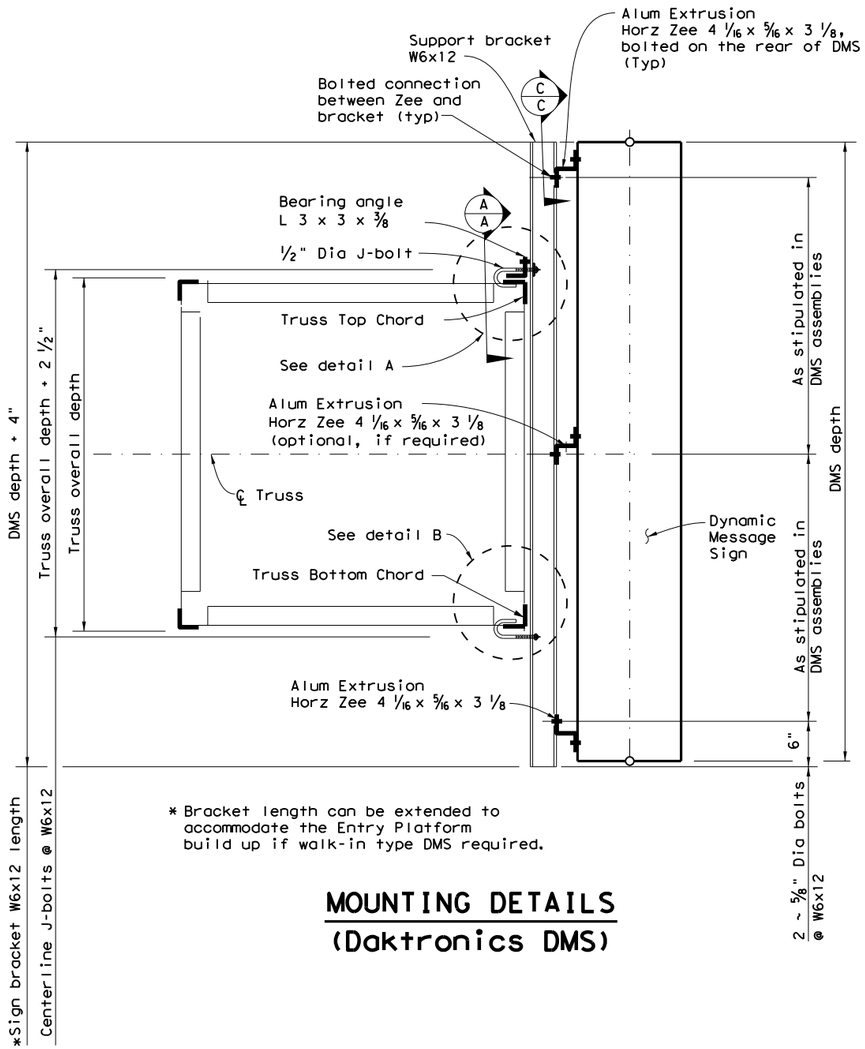
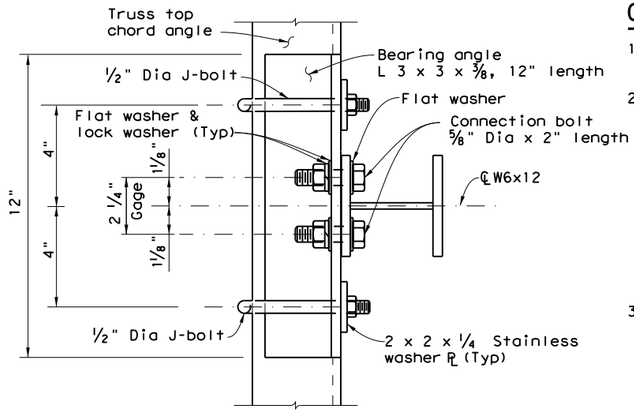
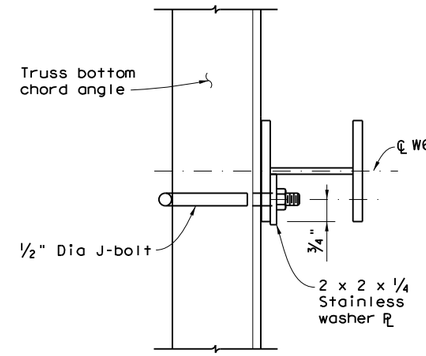



* Bracket length can be extended to accommodate the Entry Platform build up if walk-in type DMS required.

## MOUNTING DETAILS (Daktronics DMS)



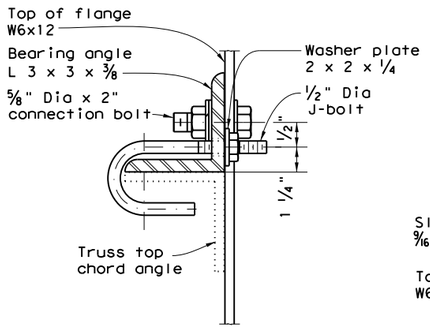

## TOP VIEW TRUSS TOP CONNECTION



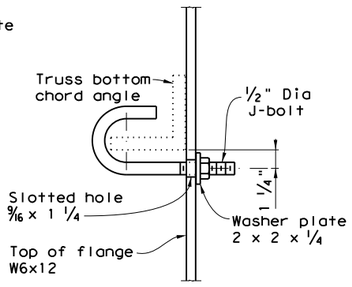

## TOP VIEW TRUSS BOTTOM CONNECTION

## GENERAL NOTES:

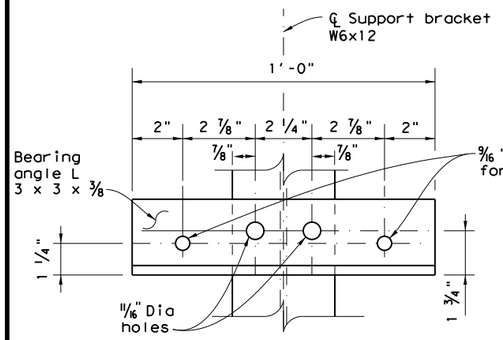
1. Determine the adequacy of the overhead sign support structure to support the dynamic message sign (DMS) prior to attaching the sign to the truss.
2. Designed according to the 1994 edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions. Designed for a Sustained (Fastest Mile) Wind Velocity of 100 mph with a gust factor of 1.3. Connections are designed for a DMS weight of 3800 lbs. The structural support is designed for an Effective Projected Area (EPA) of 399 sq. ft. based on a DMS nominal width of 29.1 feet and nominal depth of 7.8 feet, with a drag coefficient of 1.7 applied, plus four 1'-8" square flashing beacons with a drag coefficient of 1.2. DMS attachment is designed for a horizontal eccentricity of 2.4 ft. from the face of the truss to the center of gravity of the DMS. Provide an even number of sign supporting brackets (6 minimum), W6x12, spaced at 5'-6" max. The maximum distance between the sign edge to the nearest supporting bracket is 2'-3".
3. Verify applicable field dimensions before fabrication. Determine the required number and spacing of sign support brackets, along with the Aluminum Extrusion Horizontal Zees provided by the DMS manufacturer, to connect the DMS to the truss. For the J-bolt connection of DMS to overhead sign structure, align each arranged sign bracket with its bearing angle to avoid conflict with the truss connection bolts at the point of attachment.
4. Provide structural steel meeting the requirements of ASTM A36, A572 Gr 50 or A588. Provide connection bolts meeting the requirements of ASTM F3125, Grade A325 or A449 with 1 heavy hex nut, 2 flat washers, and 1 lock washer. Provide Type 304 stainless steel J bolt and washer plate, with bolt minimum yield strength of 50 ksi and an elongation of 16 percent in 2 inches. Galvanize all parts except stainless steel
5. Prior to the initialization of DMS mounting, the DMS manufacturer must provide and install the 6061-T6 Aluminum Extrusion Horizontal Zees, 4 1/16 x 5/16 x 3 1/8.
6. The sign support bracket attached to the truss shown here is an example only. Adjust the bracket position along the truss depth to achieve the required vertical clearance to be confirmed by the Engineer.
7. When the structure is to be exposed to a highly corrosive environment, provide elastomeric spacer to separate aluminum alloy parts from direct contact with steel.




## DETAIL A

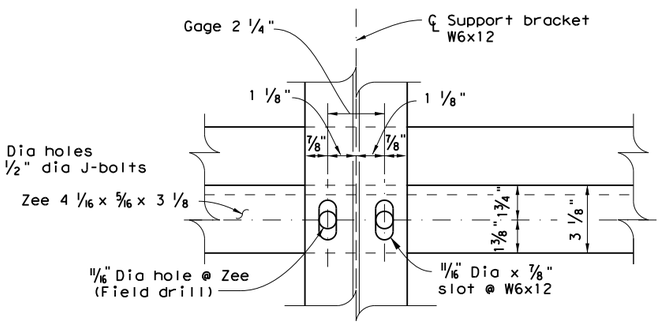



## DETAIL B

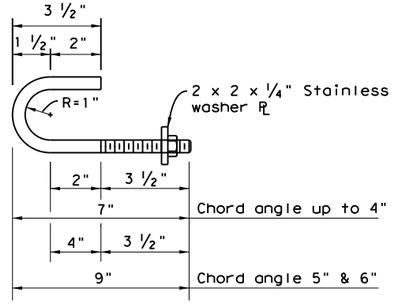



## SECTION A-A

(Truss chord angle not shown)




## SECTION C-C




## 1/2" Dia J-BOLT

Texas Department of Transportation

Traffic Safety Division Standard

# DMS-TO-TRUSS MOUNTING WITH HORIZONTAL ZEE EXTRUSIONS

## DMS(HZ-2)-21

| FILE: dms(hz-2)-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 2021 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 124 |

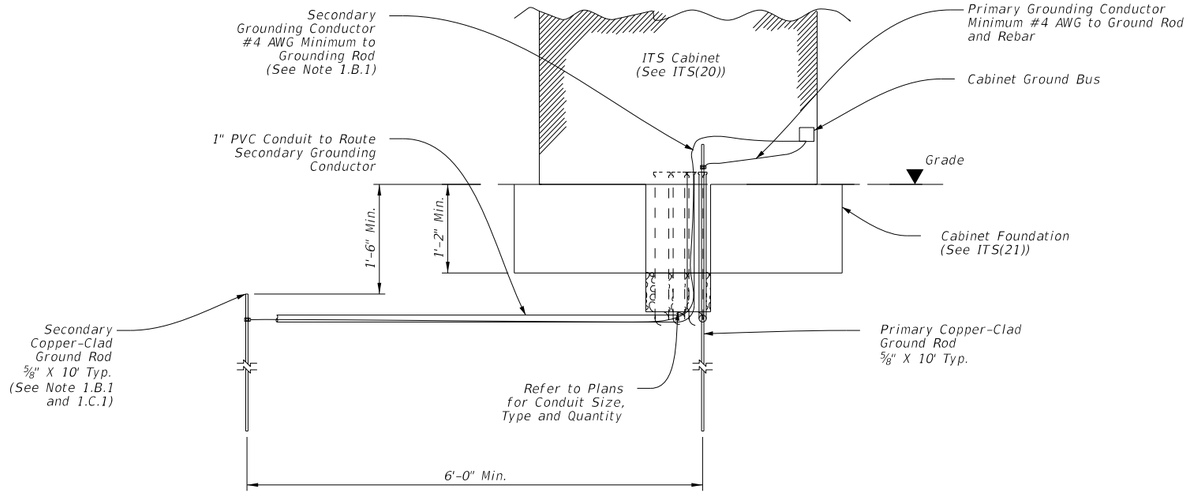
DATE:
FILE:

## General Notes:

1. Grounding System:
   - A. Description:
     1. Provide ground system consisting of copper wires, ground rods, and concrete-encased grounding electrodes (Ufers), of the con guration shown to minimize potential gradient irregularities, drain leakage, and fault currents to earth.
   - B. Performance:
     1. Provide a grounding system, consisting of a minimum one ground rod, having a resistance not greater than 5 Ohms to ground. Additional ground rods may be added to the system to achieve less than 5 Ohms resistance.
   - C. Design Criteria:
     1. The combined ground resistance of separate systems bonded together below grade may be used to meet the speci ed ground resistance, but the minimum number of rods indicated shall still be provided.
     2. Measure the resistance of systems requiring separate ground resistance separately before bonding below grade.
     3. Only provide UL-approved materials listed for grounding systems.
     4. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
     5. Submit product data for the materials and products used to perform the work of this section.
   - D. Materials:
     1. Conductors:
        - a. Bare Ground Conductor:
          1) For No. 8 AWG or larger bare ground wire sizes, provide soft drawn copper, Class A or Class B, stranded wire meeting the requirements of ASTM B 8.
     2. Ground Compression Connectors:
        - a. Provide molds, thermite packages, and other material for ground compression connectors that are full-rated to carry 100% of the cable rating and which meet IEEE 837.
          1) Provide the compression materials from a single manufacturer throughout the project.
        - b. Provide the items necessary for connecting cable to ground rods.
     3. Ground Rods:
        - a. Provide copper-clad steel ground rods conforming to the requirements speci ed in UL 467.
          1) Diameter: ⅝ in.
          2) Length: 10 Ft.

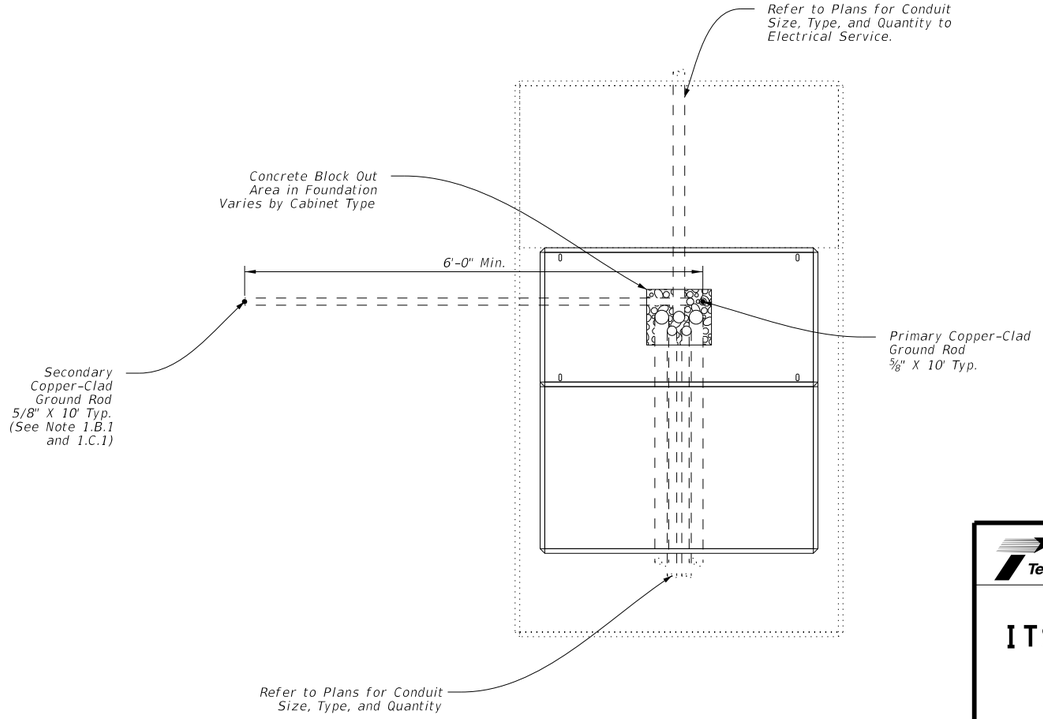
2. Installation:
   - A. Install grounding components and systems in accordance with the requirements speci ed in UL 467, IEEE 81, and IEEE 142.
   - B. System Grounding:
     1. Ground Rods:
        - a. Drive ground rods into the ground until the tops of the rods are approximately 18 in. below nished grade.
        - b. If multiple ground rods are needed to meet the minimum resistance of 5 Ohms, space ground rods as evenly as possible, at least 6 feet apart, and so conductors will be connected below grade.
     2. Conductors:
        - a. Provide minimum No. 4 AWG ground wire for system and equipment grounding.
        - b. Using suitable fasteners, securely attach exposed ground wires to structural supports at not more than 2 ft. intervals, where applicable.
        - c. Bends in ground wires greater than 45 degrees are unacceptable.
     3. Cable Connections:
        - a. Use approved exothermic-welded connections for conductor splices and connections between conductors and other components.

3. Testing:
   - A. Resistance Test:
     1. Test Procedure:
        - a. The ground-resistance measurements of each ground Rod shall be taken.
          1) The resistance to ground shall be measured in accordance with the fall-of-potential method speci ed in IEEE 81 and IEEE 142.
          2) Ground-resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds.
        - b. Test reports shall be prepared that indicate the location of the ground rod, the grounding system, and the resistance and soil conditions at the time the test was performed.
     2. Acceptance Criteria:
        - a. The grounding system must have a resistance not greater than 5 Ohms.
        - b. Do not energize any part of the electrical distribution system prior to the resistance testing of that system's ground rods and grounding system, and submission of the test results for approval.
     3. Inspections:
        - a. Prepare and submit as-built record drawings of the grounding system as installed and test reports for approval.




Ground Mounted Cabinet – Side View

(Slab & Base)
Not to Scale




Ground Mounted Cabinet – Top View

(Slab & Base)
Not to Scale

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Traffic Operations Division Standard

# ITS CABINET GROUNDING DETAILS

## ITS(18)-15

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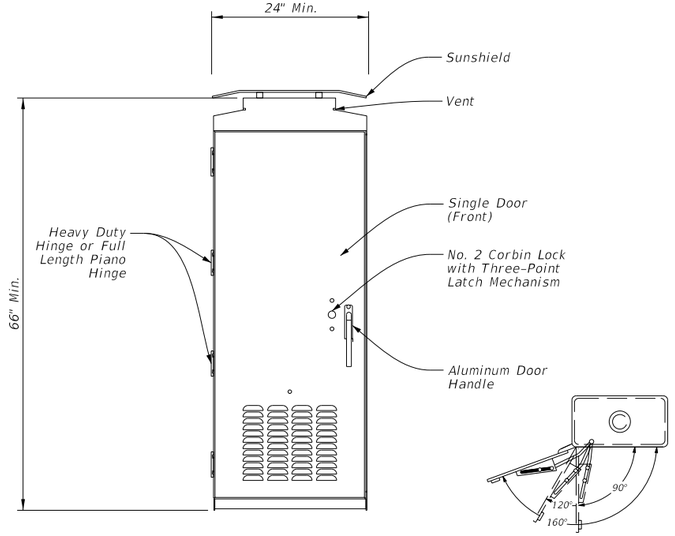
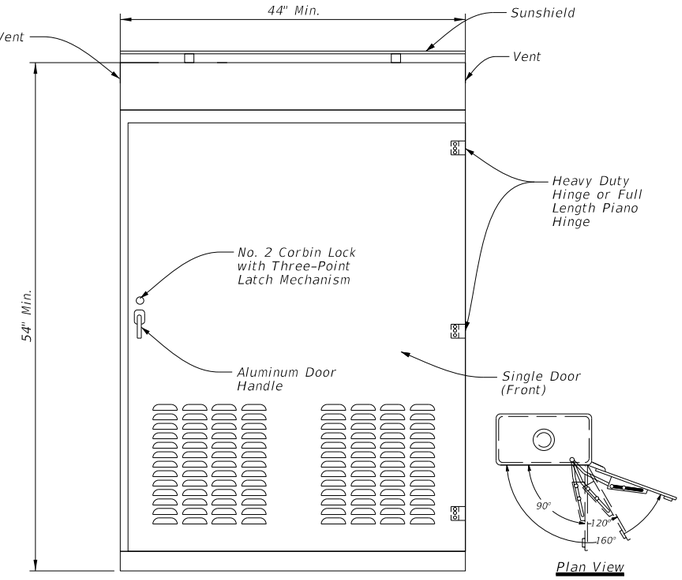



Type 4 (Small) Cabinet
Front View



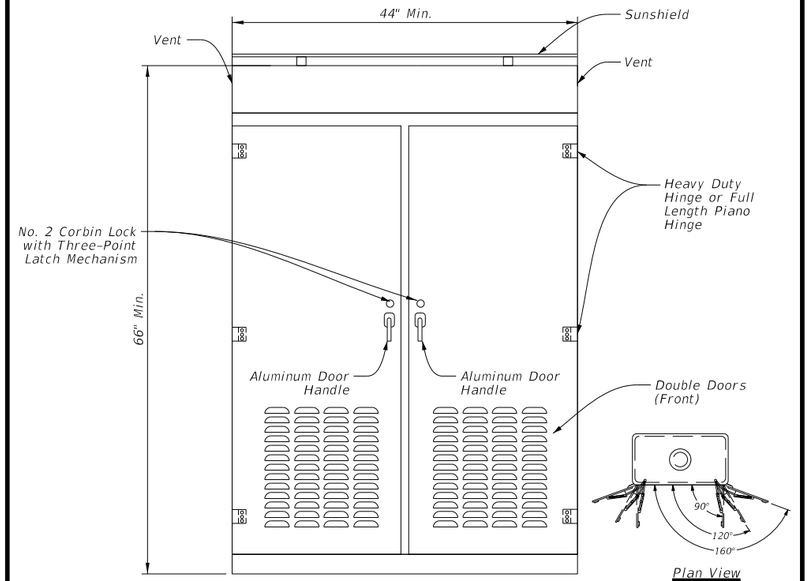

Plan View
Door Stop Detail
(3 Positions)




Type 5 (Medium) Cabinet
Front View



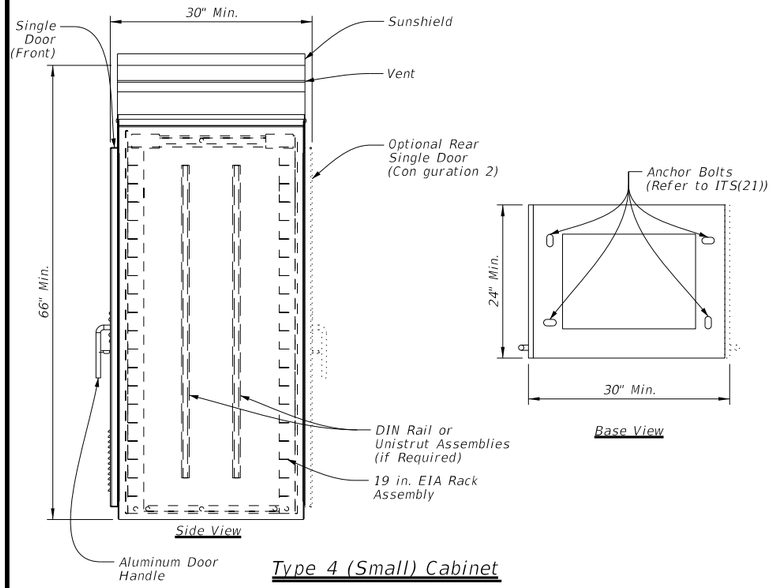

Plan View
Door Stop Detail
(3 Positions)




Type 6 (Large) Cabinet
Front View




Plan View
Door Stop Detail
(3 Positions)

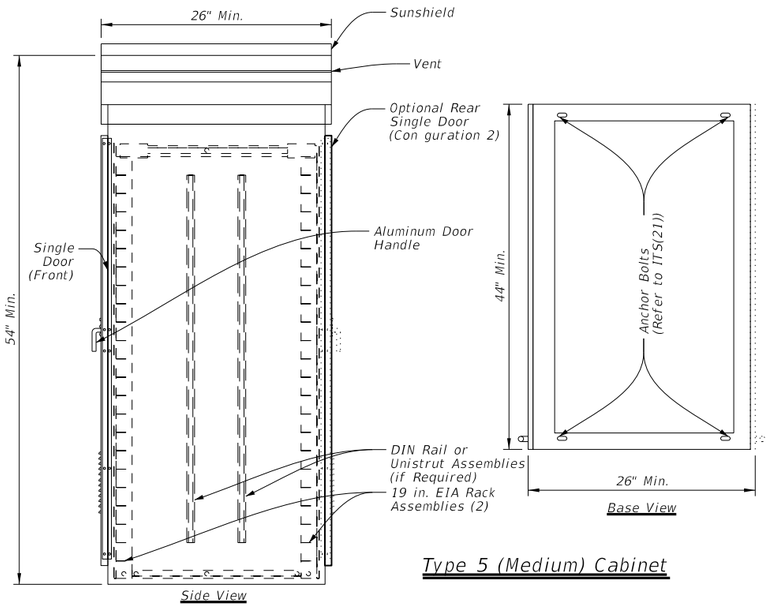



Side View




Base View

Type 4 (Small) Cabinet

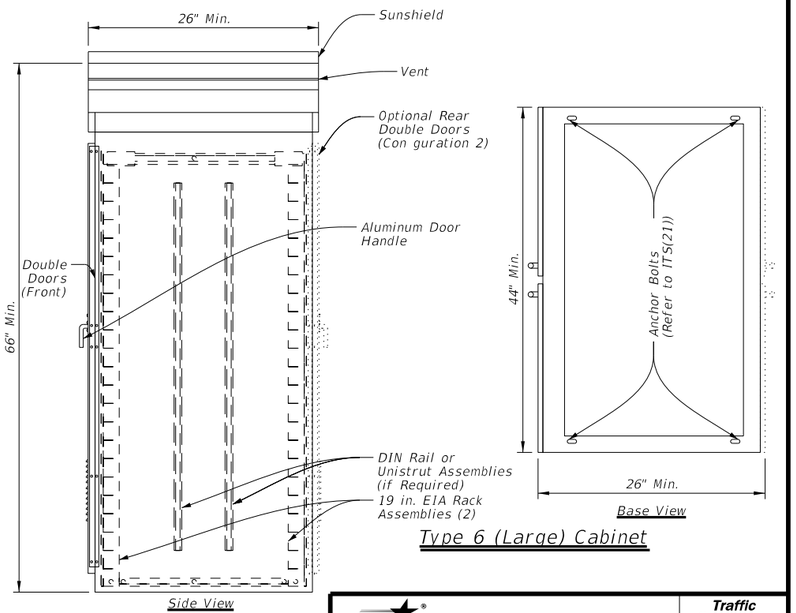



Side View




Base View

Type 5 (Medium) Cabinet




Side View




Base View

Type 6 (Large) Cabinet

## General Notes:

1. Cabinet hardware equipment and door con guration shown is diagrammatic in nature and intended to represent a preferred ground mounted cabinet setup. Door orientation may vary and will be noted in the plans. The contractor will be responsible for con guring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and speci cations. The contractor may alter the cabinet con guration shown to maximize space and ensure easy access for maintenance.
2. All dimensions are approximate and represent minimum dimensions.
3. Provide conduit entrances at the bottom of the cabinet.
4. Paid under Special Speci cation "ITS Ground Mounted Cabinet" (Con guration 1) with single door. Paid under Special Speci cation "ITS Ground Mounted Cabinet" (Con guration 2) for rear door option.
5. Sunshield to be mounted to cabinet using nuts, bolts, and spacers. Water proof sealant to be used at cabinet surface/bolt contact points.

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# ITS GROUND MOUNTED CABINET ELEVATION DETAILS

# ITS(20)-15

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DATE:
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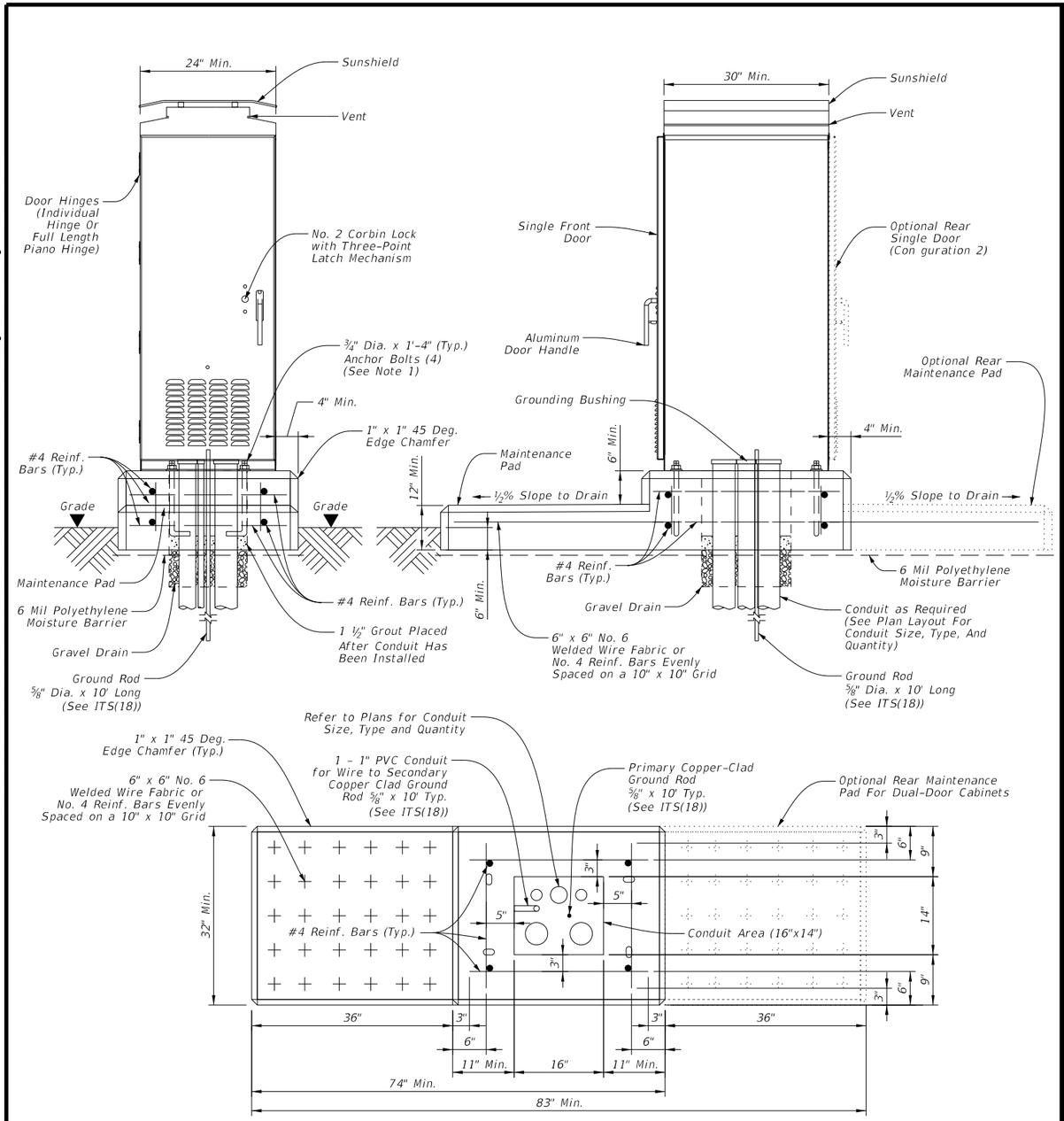
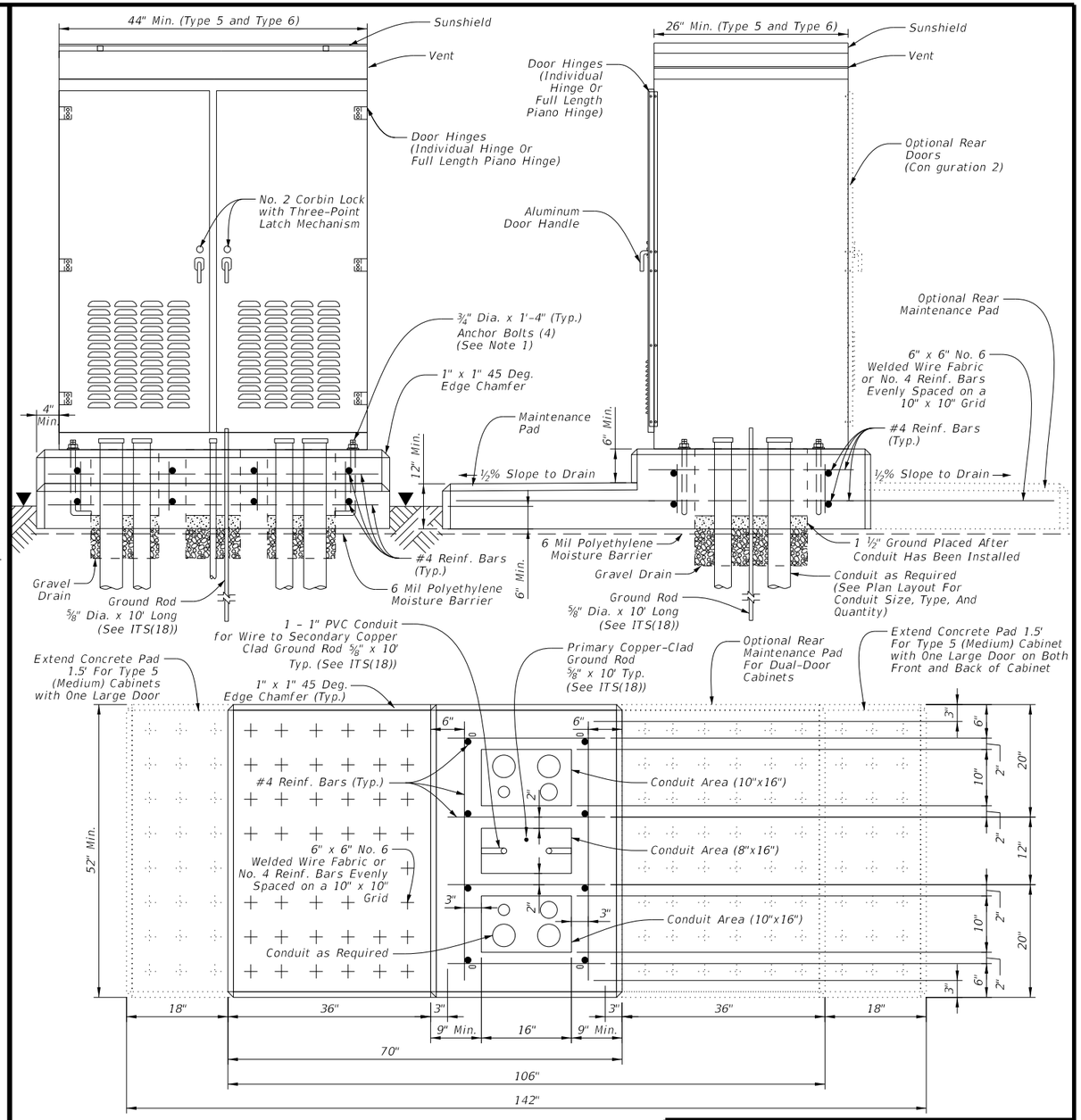



Type 4 (Small) Cabinet




Type 5 (Medium) & Type 6 (Large) Cabinet

## General Notes:

1. Details of anchor bolt location to be furnished by the cabinet manufacturer. Size and length of anchor bolts shown in details may vary by manufacturer.
2. Modify concrete base dimensions to t required cabinet type.
3. Ensure conduit area has gravel drain, 12" depth, course aggregate, grade No. 1.
4. All concrete to be Class "A" in accordance with Item 421.
5. Set the cabinet foundation level with the pavement surface, in unpaved area. The foundation shall be a minimum of 4" above surrounding grade, or as approved by the Engineer.
6. Furnish any additional concrete which may be necessary to stabilize foundation at unusual locations.
7. Foundation will be subsidiary to Special Speci cation "ITS Ground Mounted Cabinet.
8. Ground cabinet as required in cabinet speci cations and as detailed on ITS(18) in accordance with the National Electric Code (NEC).
9. Treat cabinet foundation with moisture sealant.
10. Type 5 cabinet foundation will have a slightly larger foundation than Type 6. See foundation notes on details.
11. Drain pipe shall be screened for drainage portion below foundation in gravel.

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# ITS GROUND MOUNTED CABINET FOUNDATION DETAILS

# ITS(21)-15

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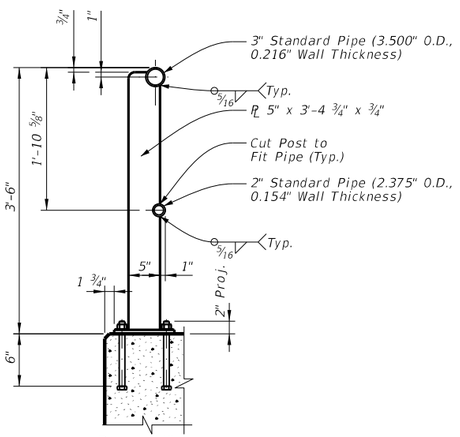
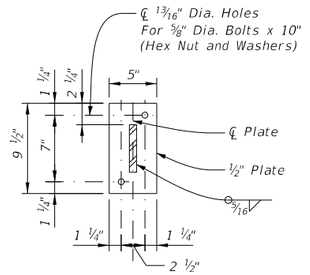
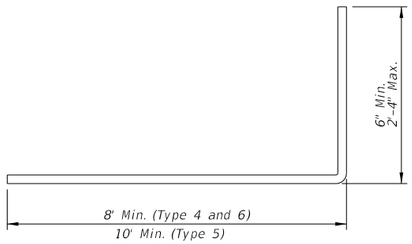


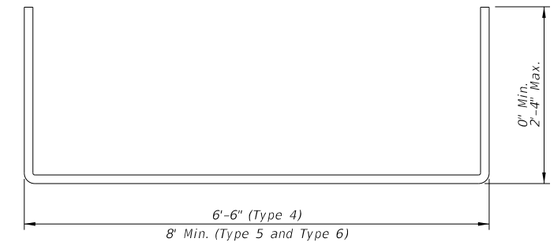

Detail "A"
Pedestrian Rail



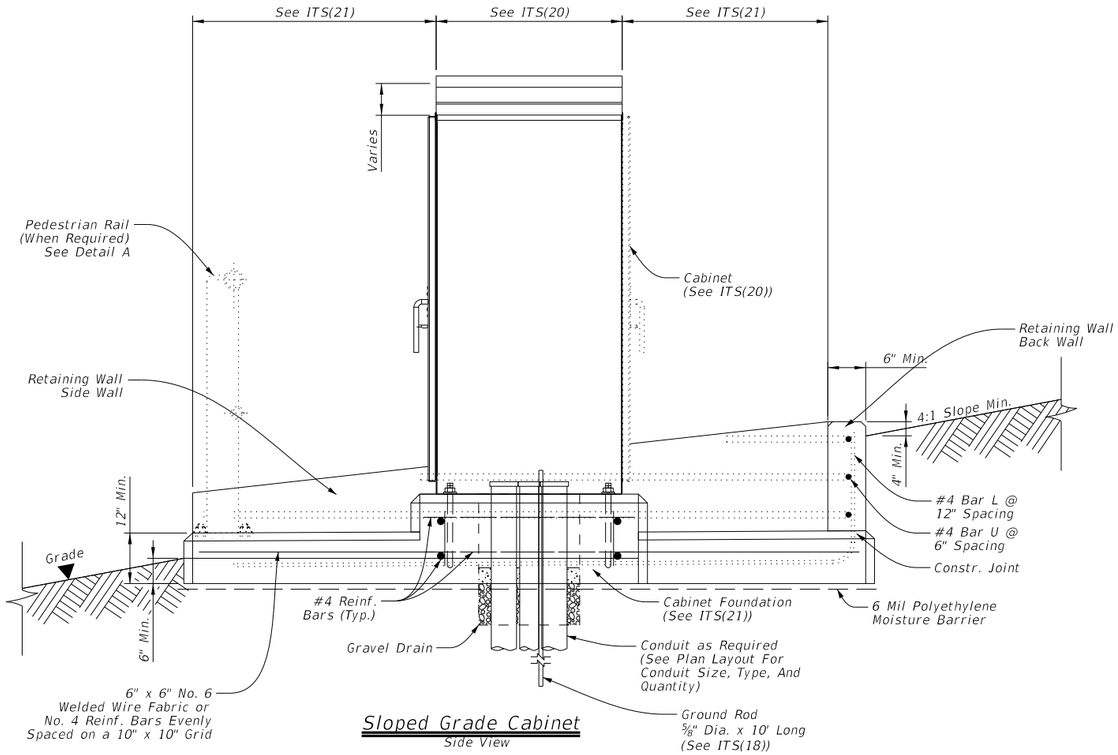

Pedestrian Rail Base Plate



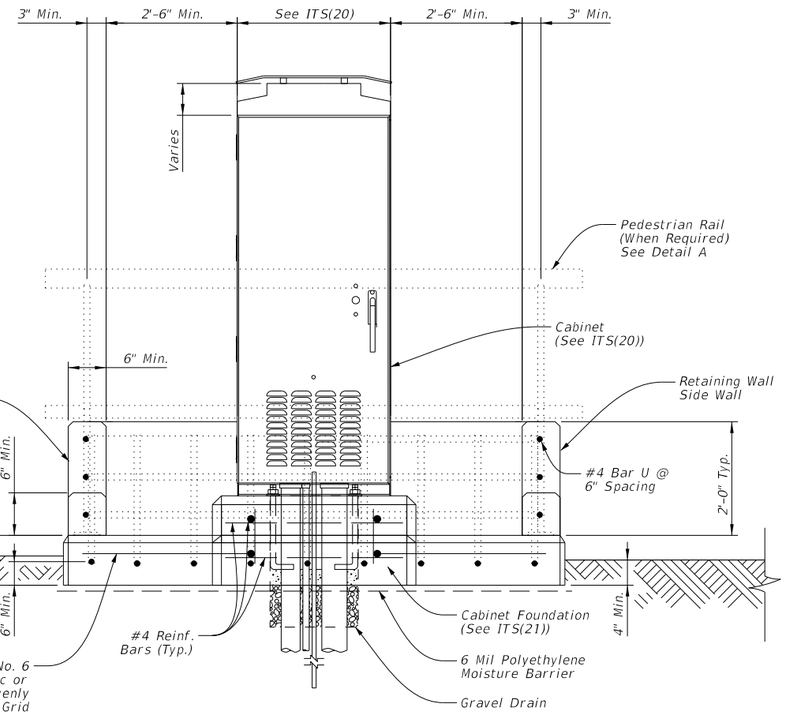

Reinforcement Bar L
#4 Bar @ 12" Spacing




Reinforcement Bar U
#4 Bar @ 6" Spacing




Sloped Grade Cabinet
Side View




Sloped Grade Cabinet
Front View

## General Notes:

1. Details of anchor bolt location to be furnished by the cabinet manufacturer. See ITS(21) for size and type of anchor bolts. May vary by manufacturer.
2. Modify concrete base dimensions to t required cabinet type.
3. Ensure conduit area has gravel drain, 12" depth, course aggregate, Grade No. 1.
4. All concrete to be Class "A" in accordance with Item 421.
5. Set the cabinet foundation level with the pavement surface, in unpaved area. The foundation shall be a minimum of 6" above surrounding grade, or as approved by the Engineer.
6. Furnish any additional concrete which may be necessary to stabilize foundation at unusual locations.
7. Foundation will be considered subsidiary to Special Speci cation "ITS Ground Mounted Cabinet."
8. Ground cabinet as required in cabinet speci cations and as per National Electric Code (NEC).
9. Treat cabinet foundation with moisture sealant.
10. Type 5 cabinet foundation will have a slightly larger foundation than Type 6. See foundation notes on details.
11. Drain pipe shall be screened for drainage portion below foundation in gravel.
12. Pipe for pipe rail must conform to ASTM A53 GR B, or A500 GR B. Posts and plates must be ASTM A36. All steel components to be galvanized unless otherwise shown in plans.
13. Pedestrian rail anchor bolts must be ⅝" diameter ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Threaded rods may be 0.557" minimum diameter with rolled threads. Nuts must conform to A563 requirements.
14. Exposed edges of pipe rail and pipe rail posts must be rounded or chamfered to approximately 1/16" by grinding. Provide an end cap at either end of pipe railing.
15. Welded wire mesh not required in maintenance pad area when retaining wall rebar is integrated into maintenance pad.

Texas Department of Transportation

Traffic Operations Division Standard

# ITS GROUND MOUNTED CABINET FOUNDATION ON SLOPE DETAILS

# ITS(22)-15

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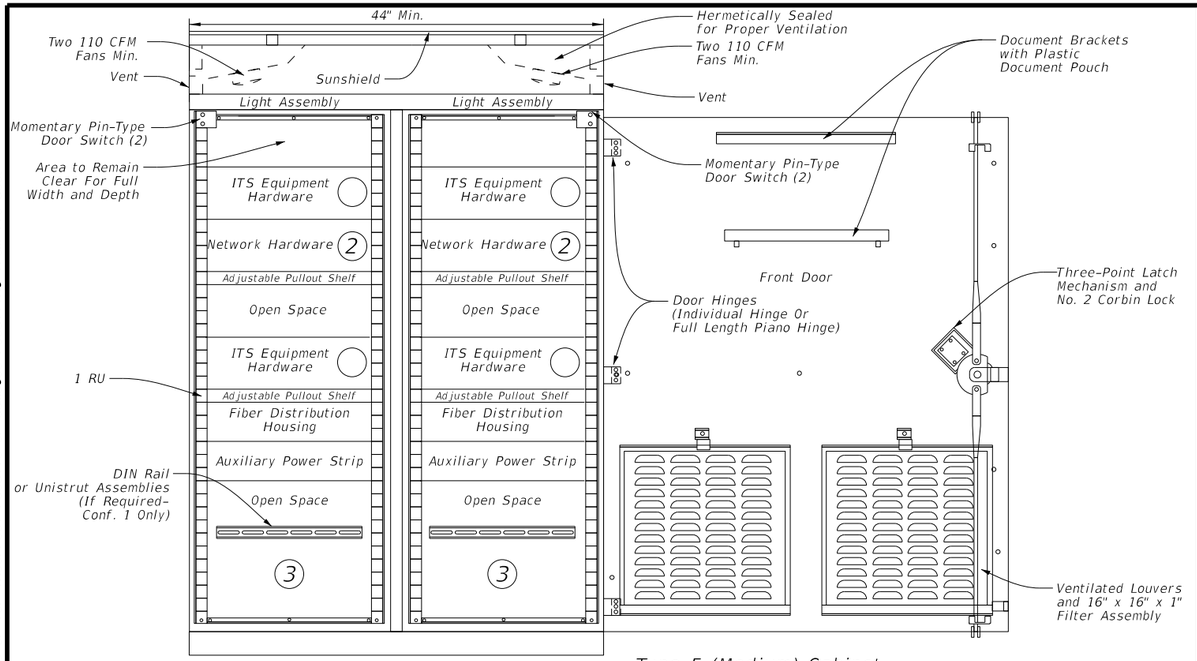
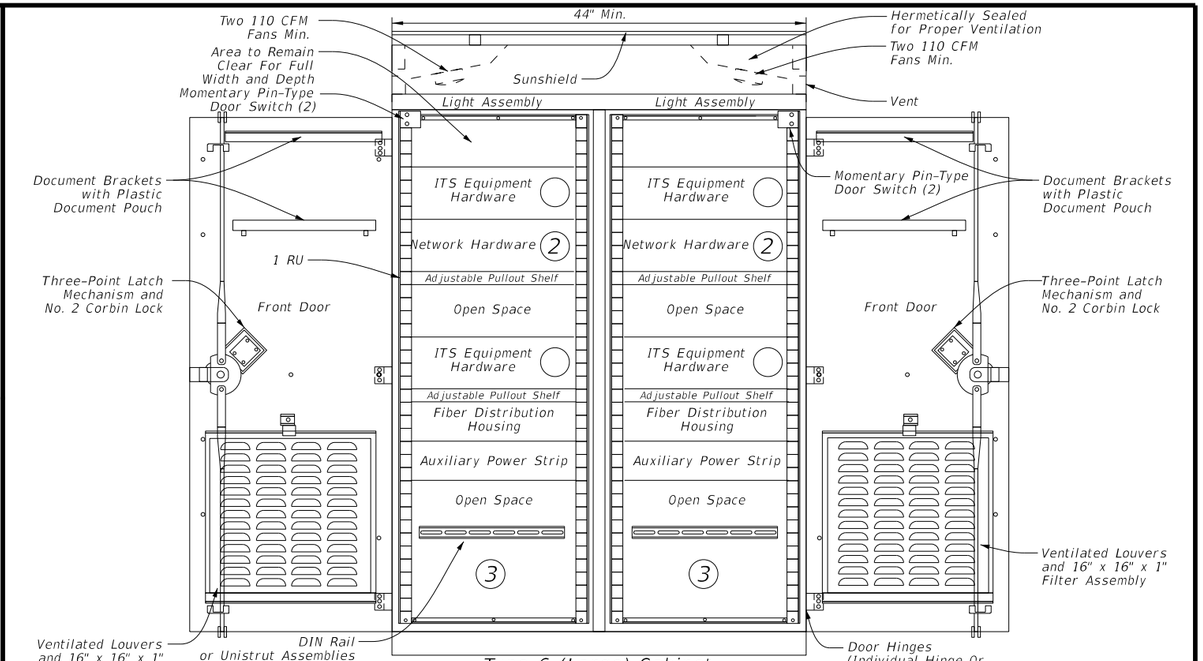


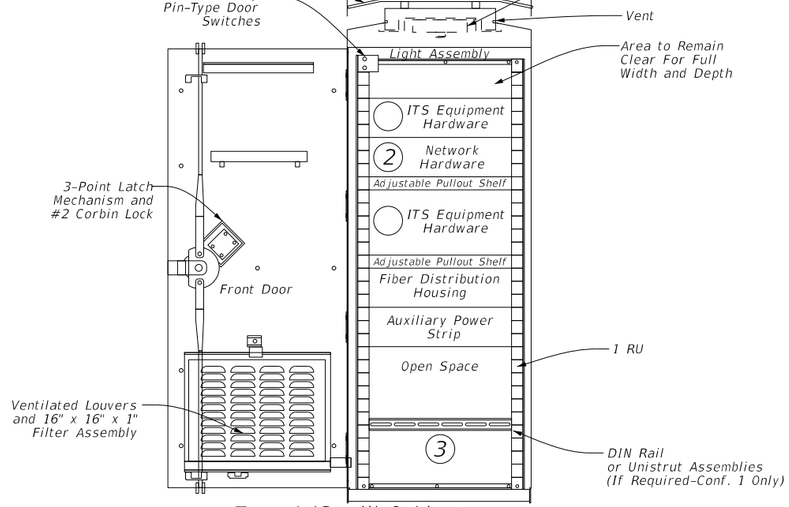

Type 5 (Medium) Cabinet

Con guration 1 = Doors in Front Only
Con guration 2 = Doors in Front and Rear.




Type 6 (Large) Cabinet

Con guration 1 = Doors in Front Only
Con guration 2 = Doors in Front and Rear.




Type 4 (Small) Cabinet

Con guration 1 = Doors in Front Only
Con guration 2 = Doors in Front and Rear.

| Typical Equipment Layout Legend | |
|---|---|
| | Example Equipment |
| 1 | CCTV Interface Panel, Radar Vehicle Sensing Device (RVSD) Equipment, DMS/LCS Controller Environmental Sensor Station (ESS) Equipment, Bluetooth Equipment, Highway Advisory Radio (HAR), Ramp Meter or Inductive Loop Card Rack, Automatic Vehicle Identi cation (AVI) Equipment, or ITS Radio Equipment (See General Note 1) |
| 2 | Ethernet Switch, Video Encoder, Terminal Server, Fiber Optic Transceivers, or Media Conversion Equipment (See General Note 1) |
| 3 | Power Distribution Assembly, Service Entrance Breakers, Primary AC Power, Auxiliary Power Strip, Ground Bus Bar Surge Protection Equipment, Solar Power System (If Required) |

## General Notes:

1. Layout of hardware equipment and con guration shown is diagrammatic in nature and intended to represent a preferred ground mounted cabinet setup. Hardware needed for each cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for con guring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and speci cations. The contractor may alter the cabinet con guration shown to maximize space and ensure easy access for maintenance.
2. All dimensions are approximate and represent minimum dimensions.
3. Provide conduit entrances at the bottom of the cabinet.
4. Paid under Special Speci cation "ITS Ground Mounted Cabinet" (Con guration 1) with single door. Paid under Special Speci cation "ITS Ground Mounted Cabinet" (Con guration 2) for rear door option.
5. RU = rack unit.
6. Contractor to remove the cabinet removable center support, which ensures cabinet rigidity during shipping, during installation.

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# ITS GROUND MOUNTED CABINET INTERIOR DETAILS

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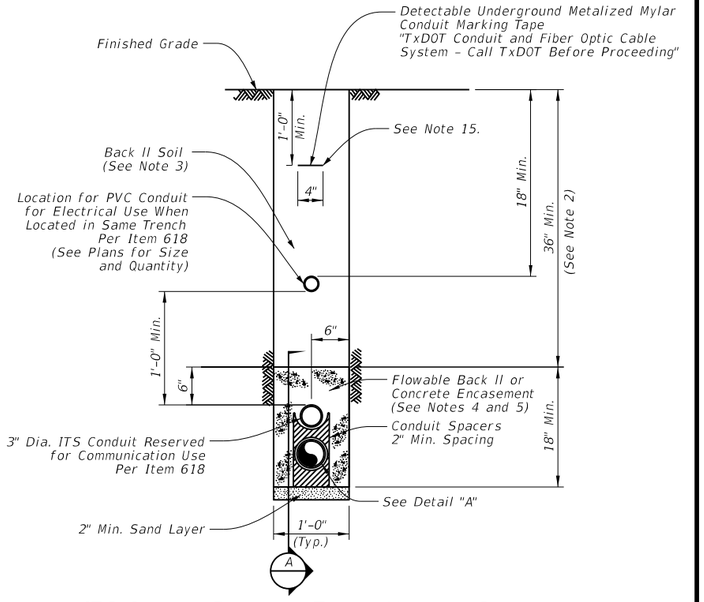
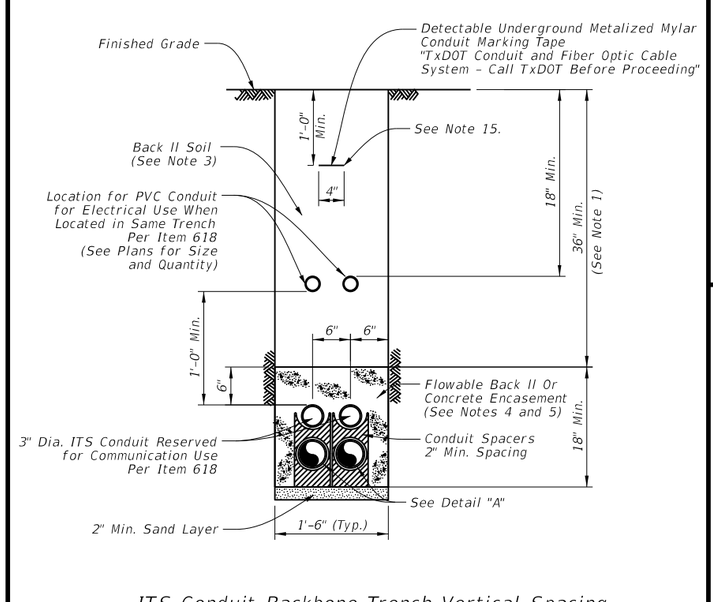


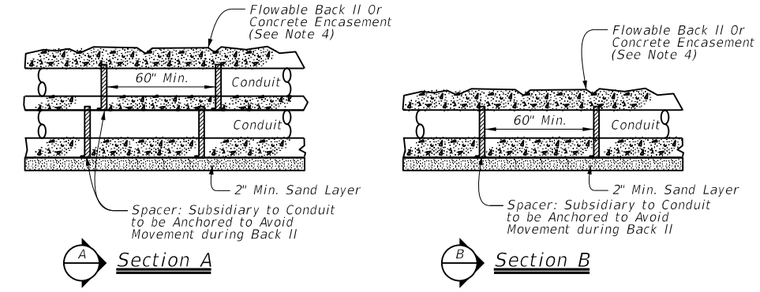

## ITS Conduit Backbone Trench Vertical Spacing

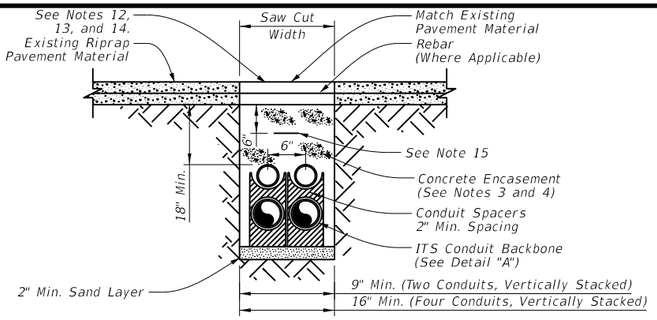
Two Conduit System



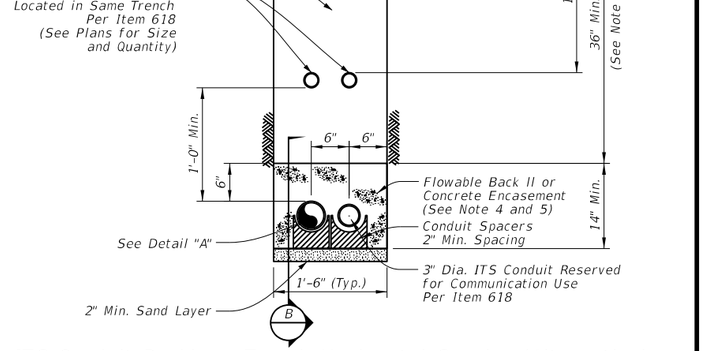

## ITS Conduit Backbone Trench Vertical Spacing

Four Conduit System



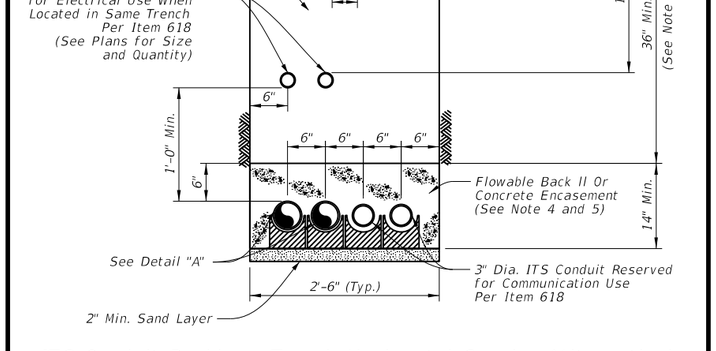




## Open Cut Trenching Details



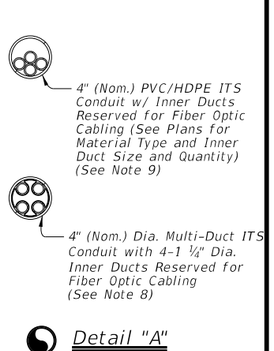

## ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

Two Conduit System



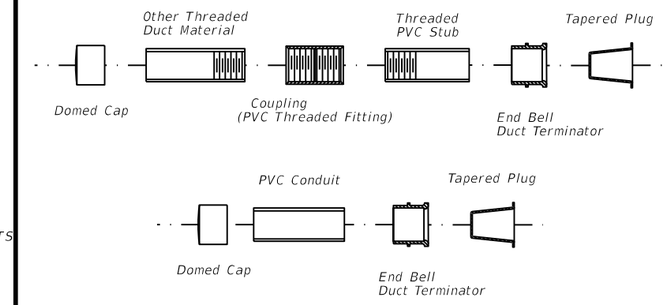

## ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

Four Conduit System




## Detail "A"

Conduit Types
(See Plans for Type and Quantity)




## Typical Conduit Fitting Combinations

2 Conduit and Single Conduit Con guration

SHEET 1 OF 2

## General Notes:

1. Construct the ITS conduit backbone system by vertically spacing conduit, unless eld constraints, obstructions, or utility con icts require horizontal spacing of conduits. Both vertical and horizontal spacing con gurations have been detailed for contractor information for construction.
2. Install ITS conduit backbone system a minimum of 42 inches from nished grade to the top of the conduit unless otherwise directed or to avoid con icts or eld conditions such as utilities or obstructions. Vary depth of the trench in order to pass over/under any existing utilities. Refer to ITS Conduit Obstruction Crossing Standard ITS(35) for further detail.
3. Perform trench excavation and back lling in accordance with Item 400, "Excavation and Back Fill for Structures."
4. When a trench depth greater than 24 inches can be achieved from the nished grade to the top of ITS conduit, encase the conduits with owable back fill in accordance with Item 401, "Flowable Back Fill." Use Class B concrete as a substitute in accordance with Item 421, "Hydraulic Cement Concrete" at the discretion of the Engineer.
5. When a trench depth of less than 24 inches is required due to eld conditions, encase the conduits in Class B concrete in accordance with Item 421, "Hydraulic Cement Concrete."
6. Concrete encasement will be paid for under Special Speci cation "ITS Multi-Duct Conduit" or as shown on the plans.
7. Provide ITS PVC conduit identi ed for electrical and communication use in accordance with Item 618, "Conduit."
8. Provide ITS multi-duct conduit identi ed for ber optic communication use in accordance with Special Speci cation "ITS Multi-Duct Conduit."
9. Conduit per Item 618, "Conduit" (See Plans for Material Type and Quantity).
10. Provide a single 1/C #14 insulated wire in conduit runs which have been identi ed in the plans to carry ber optic cable. Provide UL listed solid copper wire with orange color low density polyethylene insulation suitable for conduit installation rated for temperature range -20 C to 60 C and a voltage rating of 600V. This wire will serve as a tracer, or locate, wire for locating underground conduit containing ber optic cabling and will be paid for under Item 620, "Electrical Conductors."
11. Provide a at pull cord in all empty conduits and innerducts. Provide a pull cord with a tensile strength of 1,250 Lbs. minimum and have foot markings to determine length installed. Pull cord and installation to be subsidiary to various bid items.
12. Remove saw cut width to accommodate conduit installation.
13. Replace rebar as necessary, lapped and tied a minimum of 3 inches to existing rebar.
14. Replace broken pavement materials with similar materials to exact shape, and thickness of existing.
15. Place marking tape a minimum of 1 foot – 0 inches below grade when no other electrical marking tape required, or 8 inches below electrical marking tape when provisioned under Item 618.
16. Provide a 1/C #8 insulated grounding conductor within one inner duct of a pre-assembled multi-duct when no other grounding conductor is provisioned for in the plans.

## Sheet Details

Not to Scale

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Traffic Operations Division Standard

# ITS CONDUIT TRENCH DETAILS

# ITS(27)-16

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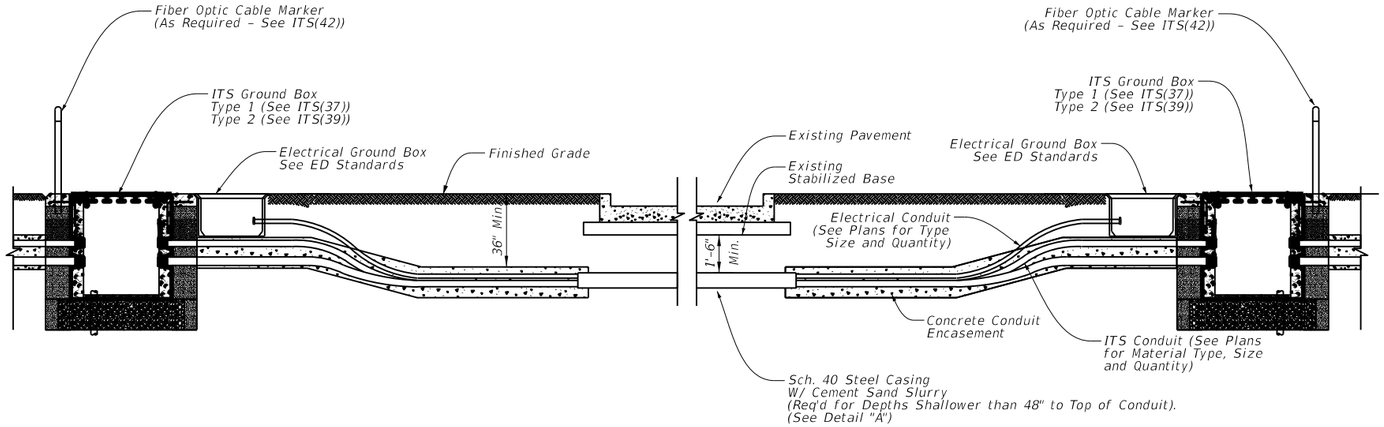
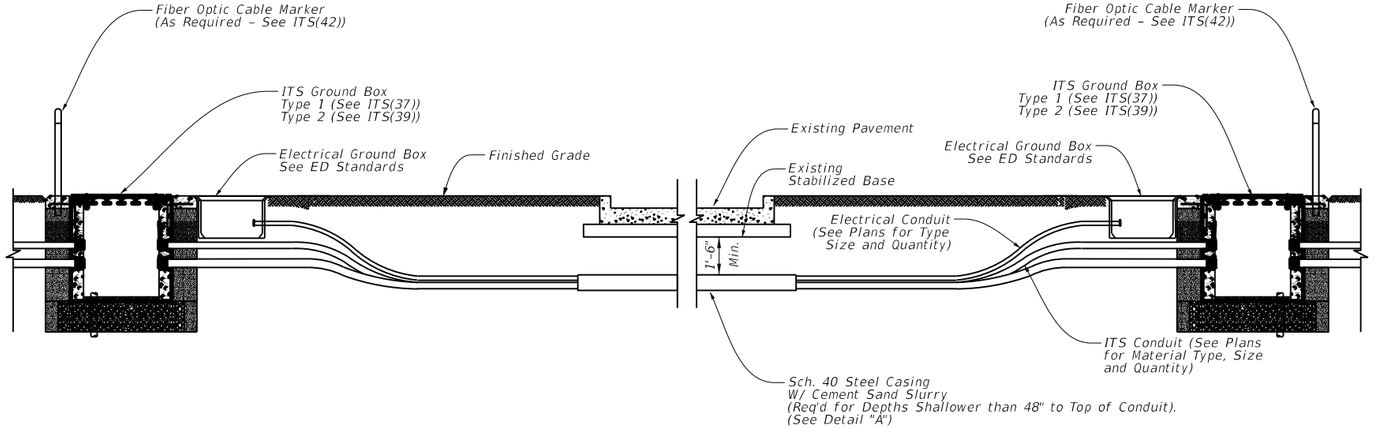
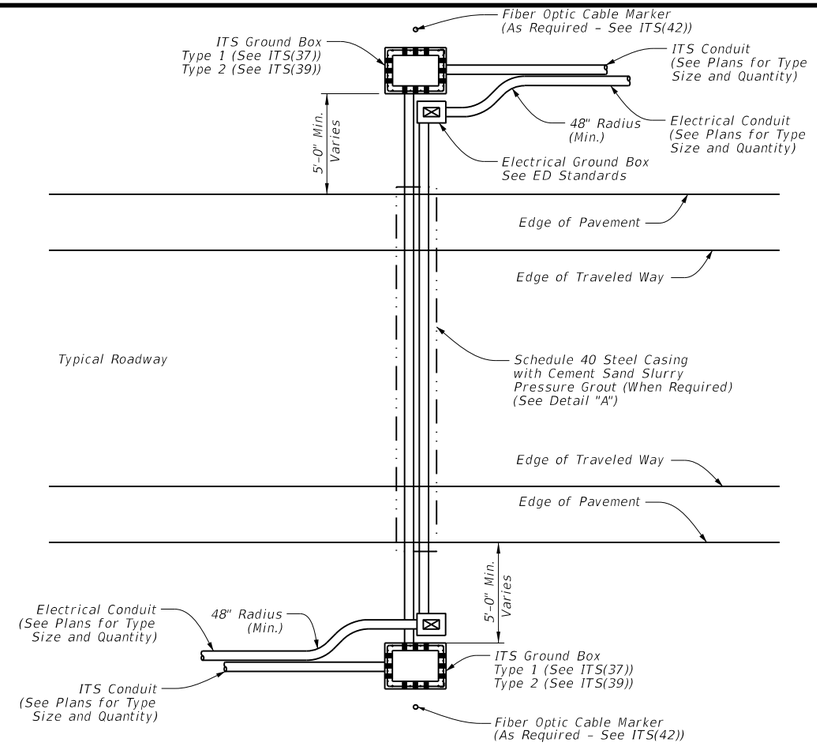


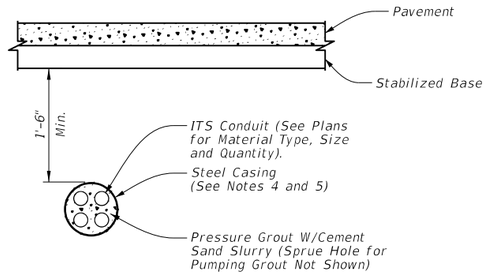

*Typical Conduit Installation Jacking or Boring Beneath Existing Roadway*




*Typical Conduit Installation Jacking or Boring Beneath Existing Roadway (Where Concrete Encasement Not Required)*



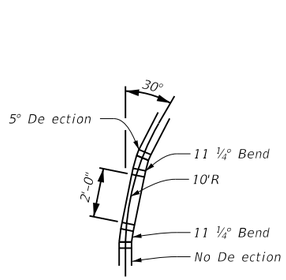

*Bore Under Pavement*



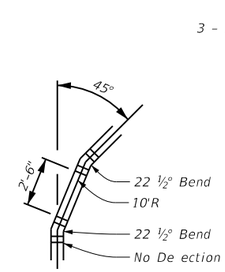

*Steel Casing Detail "A"*

## General Notes:

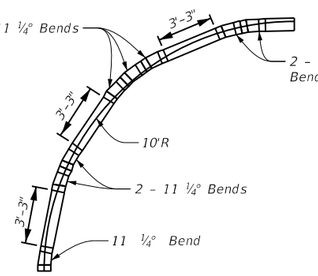
1. Typical conduit installation details for jacking or boring beneath existing roadway is diagrammatic in nature. Roadway cross-slopes may vary for each crossing.
2. Jack or bore in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box" except for measurement and payment.
3. Furnishing and installation of pressure grouting will not be paid for directly but considered incidental to Special Speci cation "ITS Multi-Duct Conduit" or Item 618, "Conduit."
4. When boring under pavement shallower than 48 inches from nished grade to top of conduit, provide Schedule 40 steel casing under pavement to encase the conduit system. Provide steel casing of a size to accommodate ITS conduit and electrical conduit as shown in the plans. Provide a minimum 20 percent void space around all conduits. Steel casing will not be paid for directly but considered incidental to Special Speci cation, "ITS Multi-Duct Conduit" or Item 618, "Conduit."
5. When a depth greater than 48 inches can be achieved from nished grade to top of conduit, provide Schedule 80 PVC. No steel casing required unless otherwise directed.
6. Ensure all conduit bends are in conformance with the latest edition of the National Electrical Code.
7. Provide GPS coordinate points to the District for all ground boxes installed, and shifts or deviations of the conduit alignment from the plans required to avoid obstructions or utilities. Take GPS coordinate points at the start of the transition, at the point of curvature, and at the end of the transition at the point of tangency. Document the turnout radius and installed depth. Provide GPS coordinate points in NAD83 coordinate system and be accurate to 5 feet.




*30° Turnout Detail*




*45° Turnout Detail*




*90° Turnout Detail*

Provide this arrangement of conduit and ttings or approved equal at all 30°, 45°, and 90° bends, horizontal and vertical, to achieve a nominal 10' conduit radius for pre-assembled multi-duct conduit. See Note 7.

*Sheet Details*
*Not to Scale*

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

# ITS CONDUIT BORE AND STEEL CASING DETAILS

# ITS(28)-16

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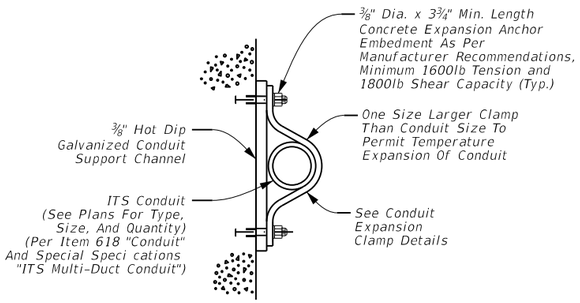
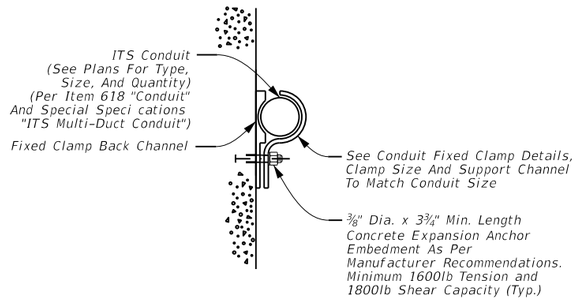
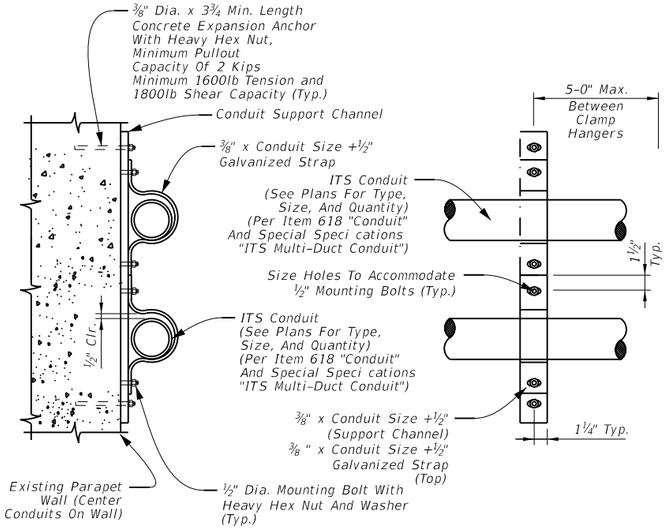



Conduit Expansion Clamp




Conduit Fixed Clamp

Conduit Clamp Details (Typ.)

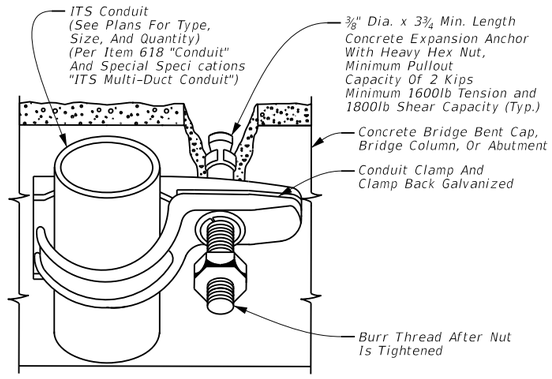



Side View

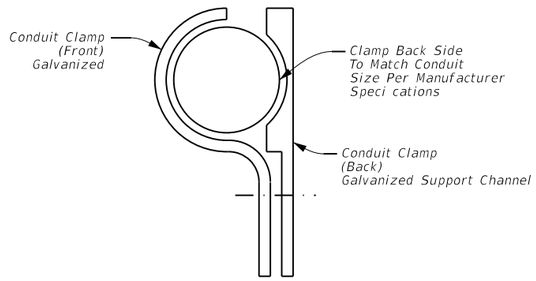
Top View

Elevation View

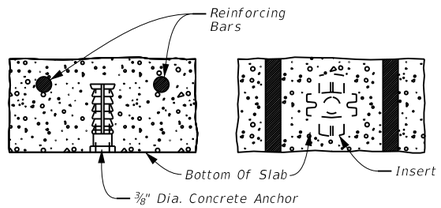
Conduit Expansion Clamp Details



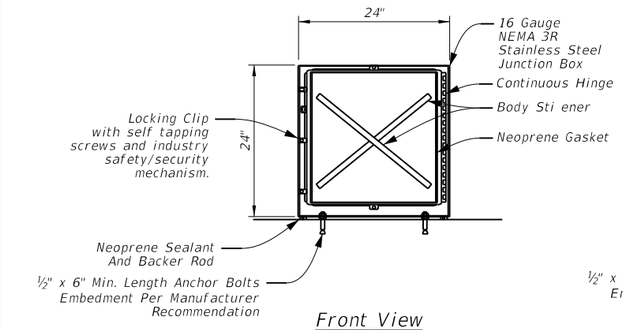

Conduit Fixed Clamp Back Channel



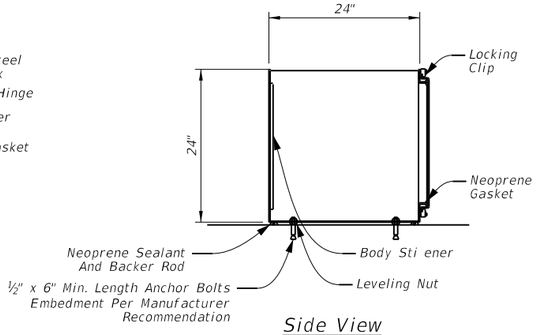

Conduit Fixed Clamp Details
Side View



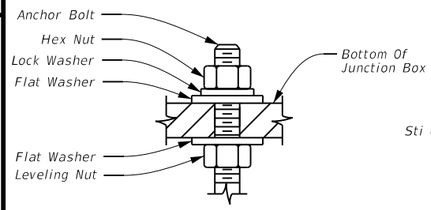

Conduit Fixed Clamp Concrete Insert Detail



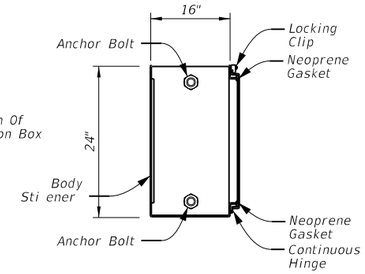

Front View



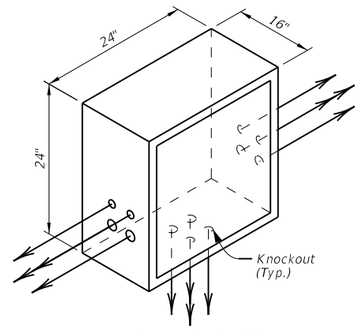

Side View




Anchor Bolt Detail
(May Vary On Mounting Scenario)




Top View




Isometric View

## 24" X 24" X 16" Stainless Steel Transition Junction Box Detail

Notes:
1. Transition box as depicted is top mount. Actual anchor fasteners and knockout location will vary based upon mount location and manufacturer recommendations.
2. Secure the transition box cover using self tapping screws with industry safety/security mechanism.
3. Typical knockout locations shown are for diagrammatic purposes only. The number of transition boxes required at a given location will vary depending on the number of conduits and cable storage requirements for cabling run(s).

## General Notes:

1. Ensure all duct/conduit bends are in accordance with the latest version of the NFPA 70, National Electrical Code and as recommended by the manufacturer.
2. Utilize separate transition junction boxes for communications and electrical conduit runs.
3. Maintain constant slope in all duct/conduit runs.
4. Ensure maximum spacing of conduit clamps is 5'-0" C-C.
5. Galvanize all hardware, including anchor bolts, nuts, and washers per TxDOT Item 445, "Galvanizing". Ensure all expansion anchors conform to ASTM A307.
6. Provide a minimum NEMA 3R junction boxes. Construct all junction boxes in accordance with manufacturer speci cations. Install junction boxes in accordance with the latest edition of NFPA 70, National Electrical Code.
7. Junction boxes and associated appurtenances are incidental to ITS conduit.
8. Install all conduit sweeps into junction boxes in accordance with allowable bend radius of the installed cable.
9. Install conduit support within 3'-0" of all enclosures and conduit terminations.
10. Refer to ED standard sheets for additional details on parapet mounted conduit.

Sheet Details
Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

# PARAPET MOUNTED ITS CONDUIT AND TRANSITION BOX DETAIL

# ITS(31)-16

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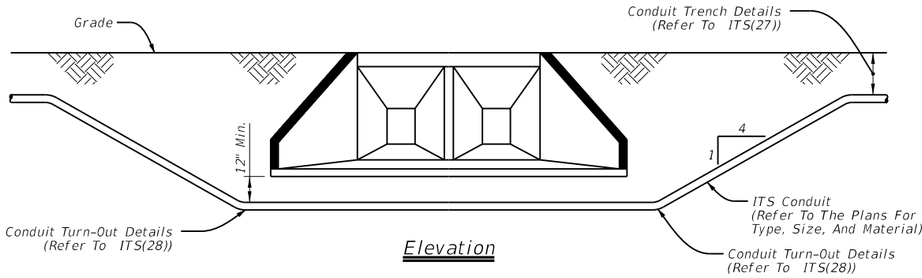
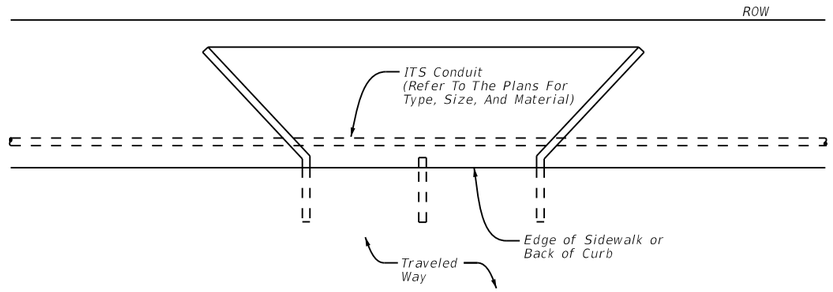
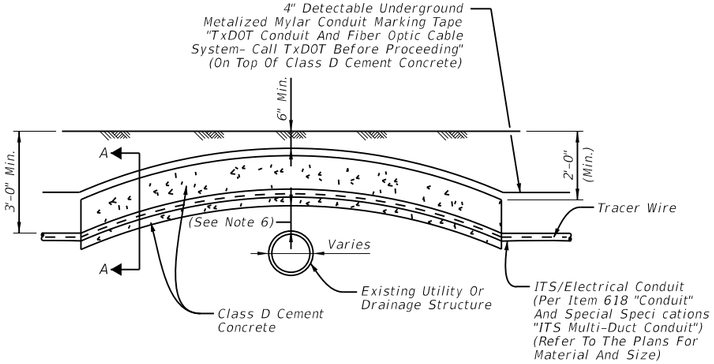


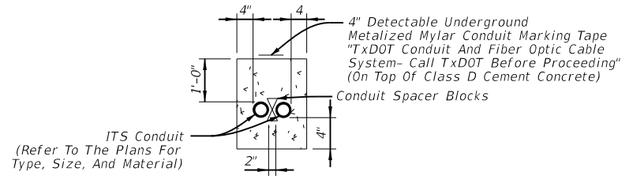

Elevation




Plan View

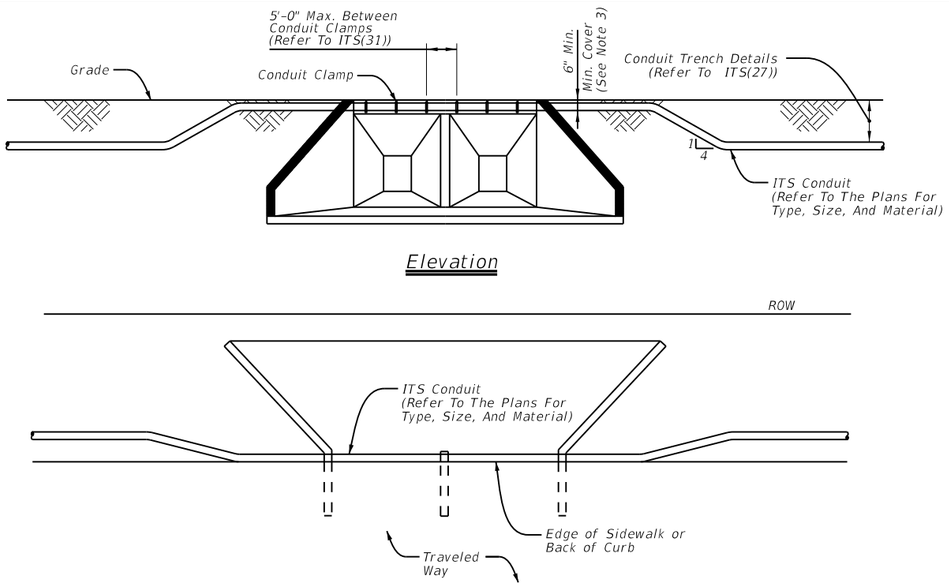
Conduit Bored Under Culvert




Section A-A

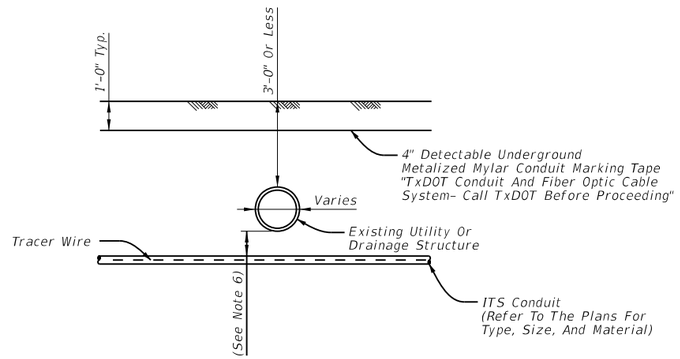
Conduit Installation Detail Above
Existing Drain Pipes Or Utilities




Elevation

Plan View

Conduit Attached To Culvert Headwall




Conduit Installation Detail Below
Existing Drain Pipes Or Utilities

## General Notes:

1. With approval from the field engineer adjust the final burial depth of conduit(s) in circumstances requiring traversal of non-movable object conflicts.
2. Where conduits are to be installed over existing underground infrastructure (i.e., existing utility or drainage structure) which are less than 3'-0" deep, encase conduit in Class D cement concrete in accordance with Item 421, "Hydraulic Cement Concrete", for the entire length of the conduit that is installed at a depth of less than 3'-0".
3. If depth of cover over encasement is less than 6", install the conduit to pass beneath the underground infrastructure.
4. Refer to the plans for type, size and configuration of all conduits. Refer to ITS(27) and ITS(28) for further installation details.
5. It is the responsibility of the contractor to verify all existing underground infrastructure. The contractor is responsible for any damage to any underground infrastructure during construction. Verify all utility locations at least 100' in advance of trenches, plowing or boring, and make changes in conduit placement in the event of conflict.
6. If proposed conduit is crossing or in close proximity to an existing underground utility, maintain a minimum clearance of 1'-6" vertical, 1'-6" horizontal or a clearance dictated by municipal code and or utility owner.
7. Install underground warning tape directly above all conduits per ITS(27) standard.
8. Do not install communications and electric cables in the same conduit. Separate conduits installed within the same trench based on NFPA 70, National Electrical Code. Refer to ITS(27) for additional conduit installation details.
9. Ensure all work is in compliance with the latest edition of NFPA 70, National Electrical Code.
10. Utilize PVC conduit for all underground applications as required by design. Transition with a conduit coupling to RMC conduit or other as required by design that is approved for above ground applications.
11. Do not exceed a rise:run ratio of 1:4 for conduit sloped through increases or decreases in elevation.

Sheet Details
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# ITS CONDUIT OBSTRUCTION CROSSING

# ITS(35)-16

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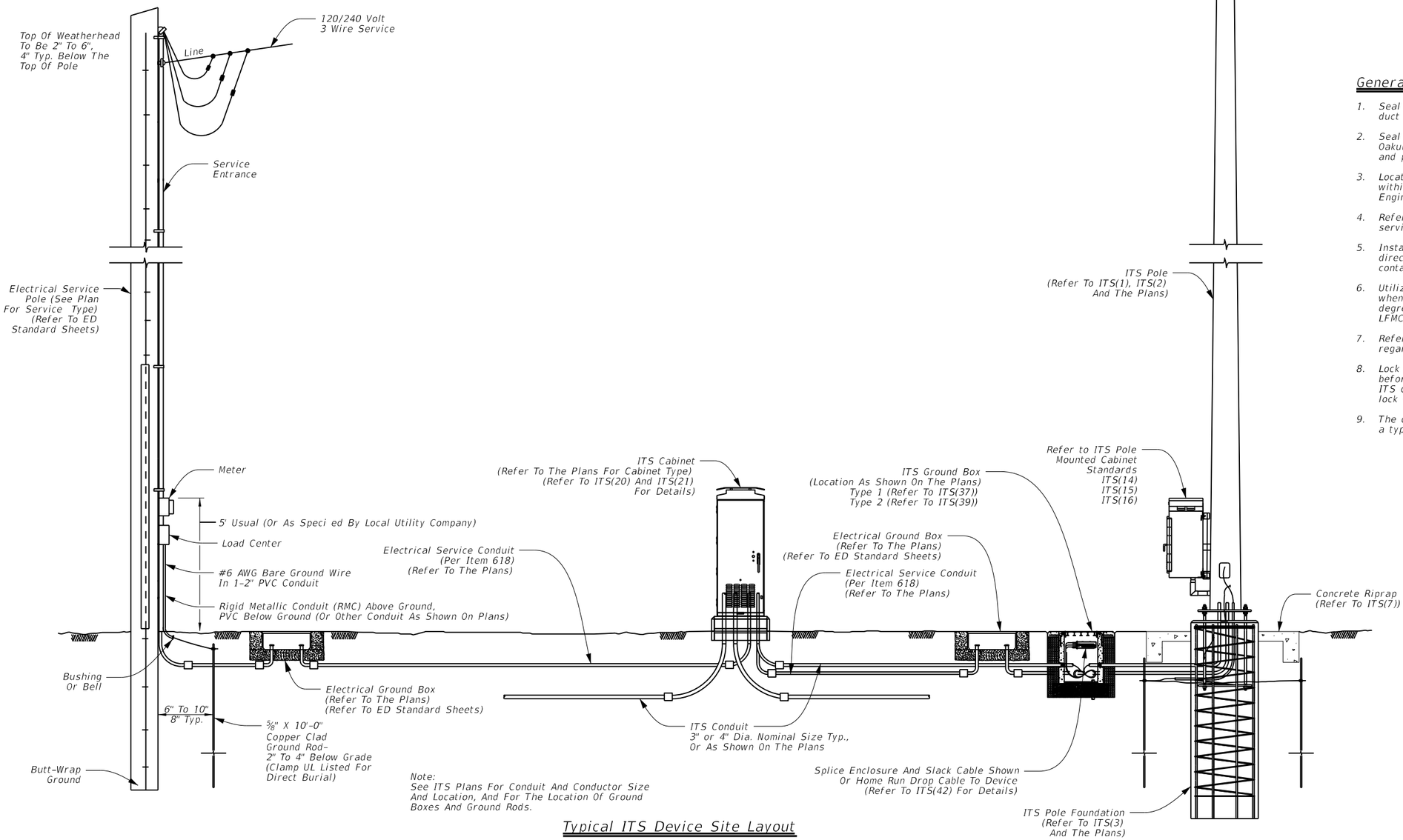


Typical ITS Device Site Layout

## General Notes:

1. Seal all ITS communications conduits with waterproof duct plugs and seals.
2. Seal ends of all conduit entries into ITS cabinets with Oakum or other as approved by the District representative and pack with duct sealant.
3. Locate ground boxes for electrical and ITS communications within 5'-0" of cabinet enclosure, or as directed by the Engineer.
4. Refer to ED standard sheets for additional notes regarding electrical service.
5. Install service pole ground rod at alternate location when directed by the engineer. Maintain a minimum of 8'-0" in contact with the earth.
6. Utilize liquidtight exible metal conduit (LFMC), as required when meter and service enclosure are mounted 90 to 180 degrees to each other. Refer to ED standard sheets for details on LFMC use.
7. Refer to ITS(21), ITS(37) and ITS(39) for details regarding conduit depth and entry into ITS ground boxes.
8. Lock all enclosures and bolt all ground box covers before power is applied to the circuit. Refer to the ITS cabinet references indicated on this sheet for cabinet lock requirements.
9. The detail shown is diagrammatic and is intended to represent a typical layout from electrical service to ITS devices.

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Traffic Operations Division Standard

# TYPICAL ITS DEVICE SITE LAYOUT

# ITS(36)-16

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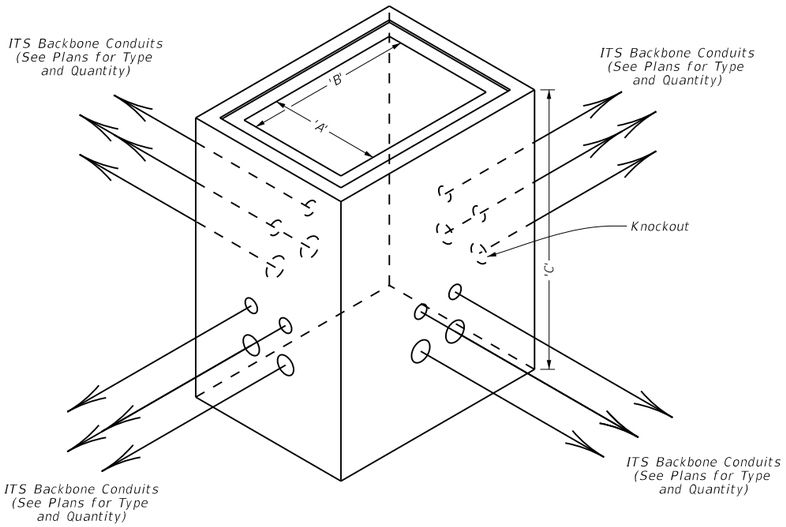
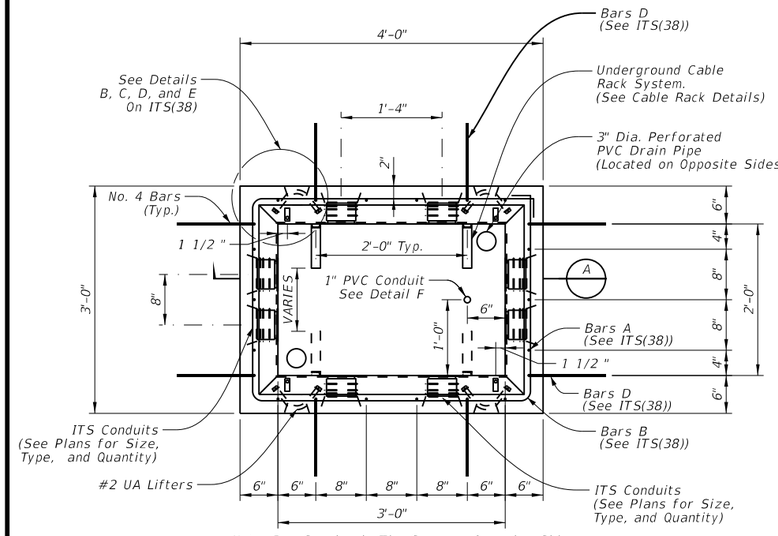


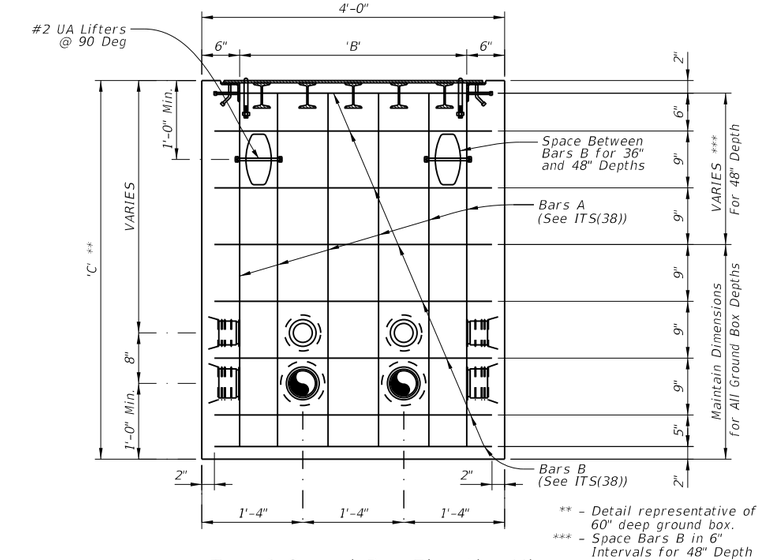

See Ground Box Schedule for A, B, and C Dimensions

Type 1 Ground Box Isometric View



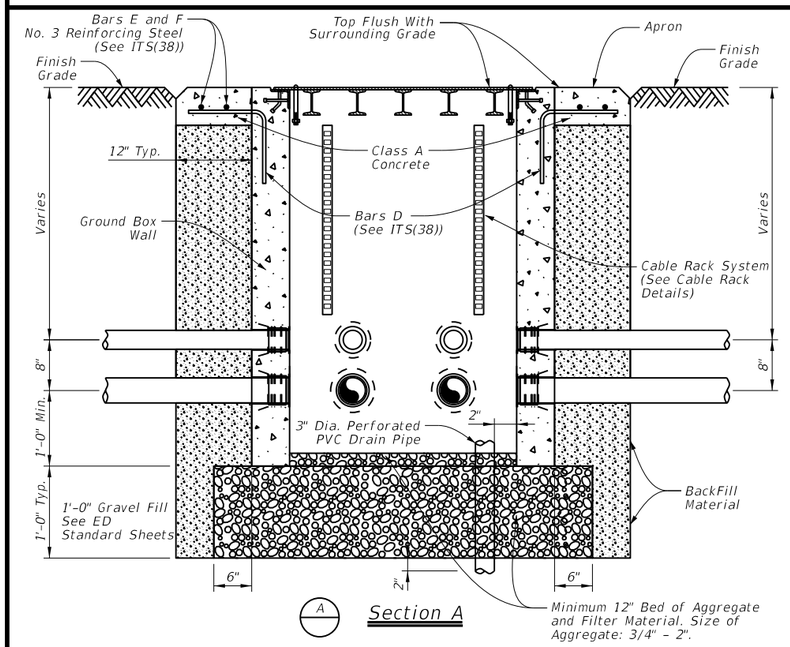

Note: Bar Spacing is The Same on Opposing Sides.

Type 1 Ground Box Plan View



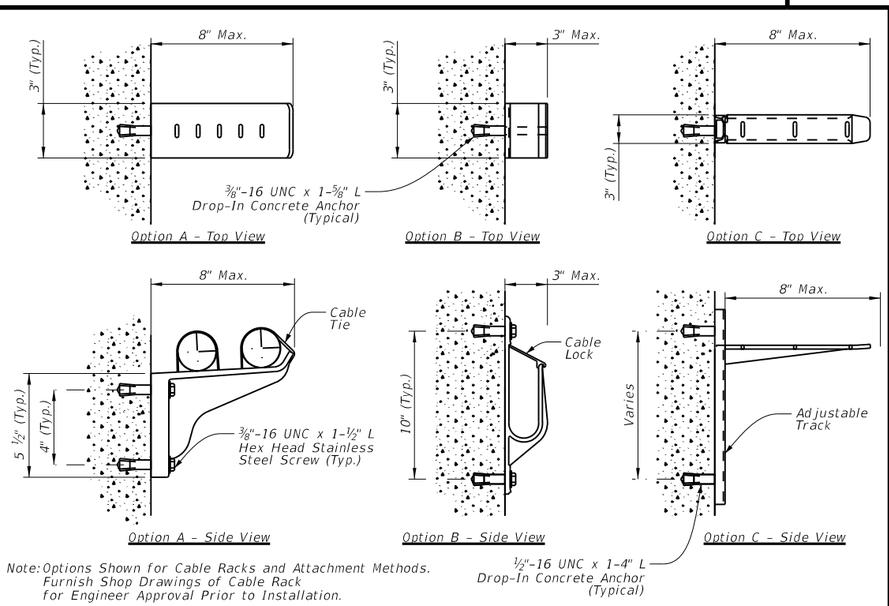

** – Detail representative of 60" deep ground box.
*** – Space Bars B in 6" Intervals for 48" Depth

Type 1 Ground Box Elevation View



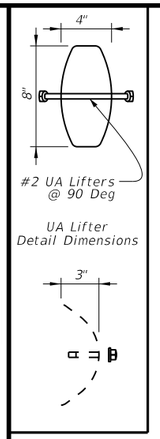

A

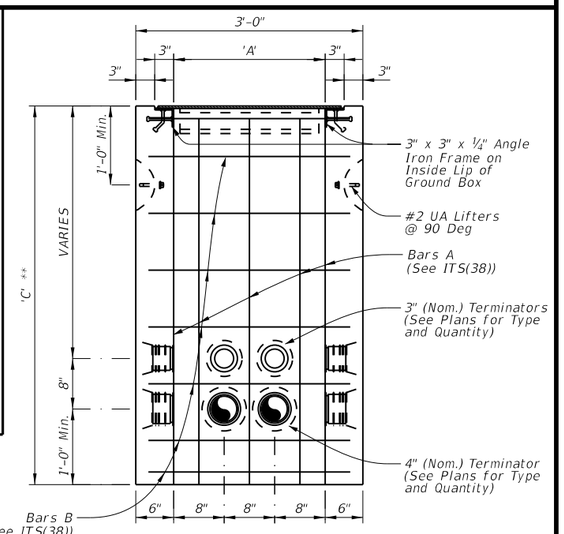
Section A




Note: Options Shown for Cable Racks and Attachment Methods. Furnish Shop Drawings of Cable Rack for Engineer Approval Prior to Installation.

Type 1 Cable Rack Details




Type 1 Ground Box Side View

** – Detail representative of 60" deep ground box.

SHEET 1 OF 2

## General Notes:

1. Conduit entry points shown represent the standard con guration for backbone conduit as detailed on ITS(27). Additional conduits may be required as shown on the plans.
2. Provide Class A concrete for Type "1" ground boxes.
3. Provide terminators for the PVC conduit 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 identi ed on the plans to enter the box.
4. Provide terminators appropriately sized for the conduits indicated on the plans. Provide terminators with an air tight and water tight connection.
5. Closed bottom Type "1" ground boxes are acceptable in lieu of open bottom boxes. Provide two 3" Dia. perforated PVC drain pipes on opposite corners to optimize water drainage. Provide 12-inch bed of aggregate that extends 6 inches in all directions from the perimeter of the box for closed bottom boxes. Aggregate bed will be subsidiary to Special Speci cation, "ITS Ground Box."
6. Install all open bottom Type "1" ground boxes on a 12-inch bed of aggregate that extends 6 inches in all directions from the perimeter of the box. Aggregate bed will be subsidiary to Special Speci cation, "ITS Ground Box."
7. Cap and seal terminators that do not have conduits attached.
8. When additional conduit entry points are needed to accommodate existing conduit, core drill conduit knockouts in the eld of the appropriate number and size of conduit at each location, as directed by the Engineer.
9. Provide a bell tting on the end of each conduit to ensure a ush t inside the ground box.
10. Concrete grout around the knockout (inside and out) and around the conduit and bell tting to ensure a neat watertight t after the conduit and bell tting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
11. Install a nylon string and plug all unused conduits with tug-plugs sized for the particular conduits. Provide split innerduct plugs in conduits or innerducts with cables to seal the innerduct around the cables to prevent water and dirt from entering.
12. Provide steel (ASTM A-153), glass reinforced nylon, or equivalent cable rack assemblies designed to support the amount of cable storage slack identi ed in the plans. Locate cable rack system on one side only (longer length side) to allow access to the inside of the ground box. Cable racks may be installed at the factory or in the eld. When mounting cable racks in the eld, seal all penetrations to the concrete side wall to prevent moisture penetration. Ground metallic cable rack systems to grounding system inside ground box in accordance with the National Electrical Code.

| Ground Box Schedule | | | |
|---|---|---|---|
| Ground Box Type | 'A' Width Inside (Inches) | 'B' Length Inside (Inches) | 'C' Depth Inside (Inches) |
| Type 1 | 24 | 36 | 36, 48, 60 |

Sheet Details
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Texas Department of Transportation

Traffic Safety Division Standard

# ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

## ITS(37)-22

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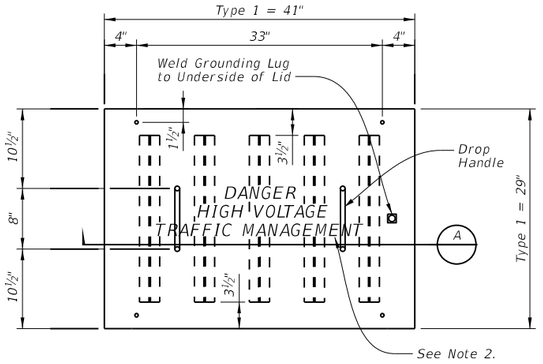
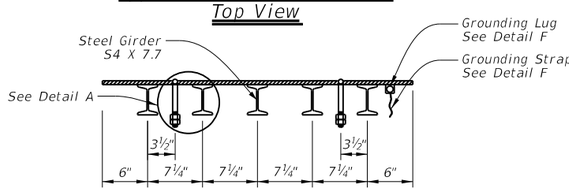
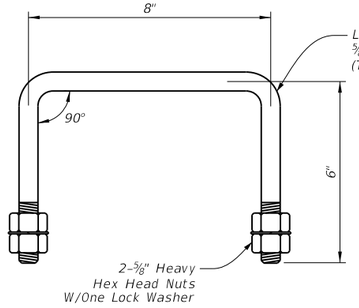


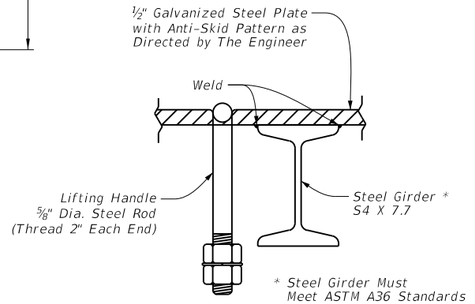

Type 1 Steel Cover Details
Top View



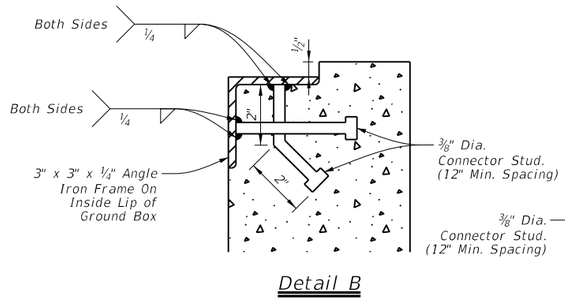

Section A




Drop Handle Detail

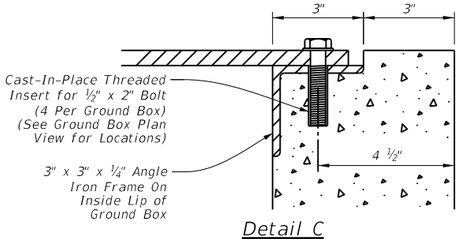



Detail A

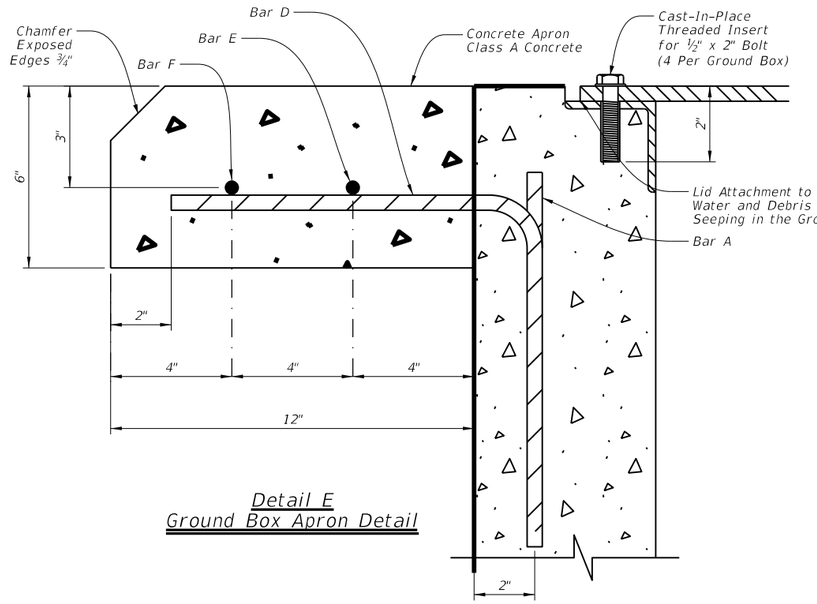



Detail B

Detail D



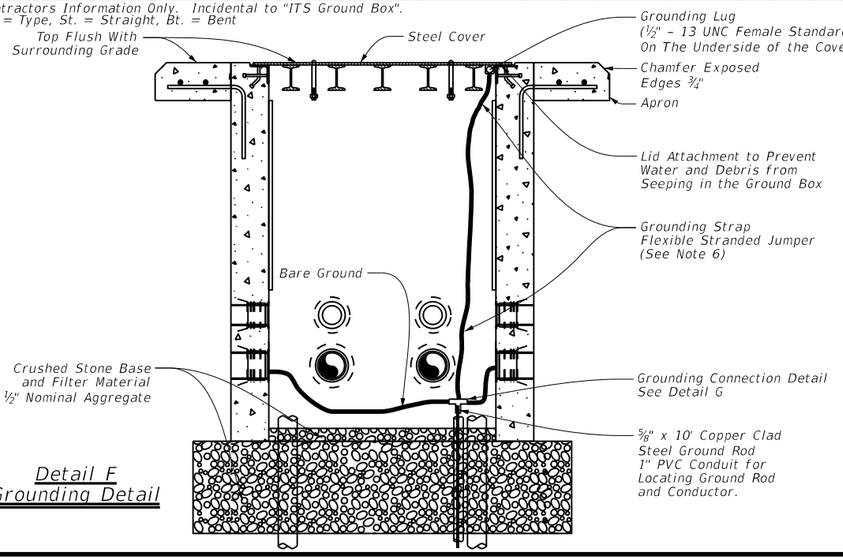

Detail C
Lid Attachment Detail



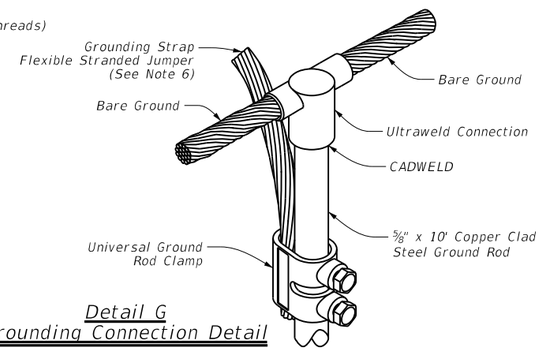

Detail E
Ground Box Apron Detail

| Ground Box Type 1 | BAR A | | | | | BAR B | | | | | BAR D | | | | | BAR E | | | | | BAR F | | | | | TOTALS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Size | Ty. | Length | Weight | No. | Size | Ty. | Length | Weight | No. | Size | Ty. | Length | Weight | No. | Size | Ty. | Length | Weight | No. | Size | Ty. | Length | Weight | Steel * LBS. | Conc. * CY |
| 36" Depth | 22 | #4 | St. | 2'-8" | 39.3 | 5 | #4 | Bt. | 13'-2" | 44.1 | 8 | #4 | Bt. | 2'-0" | 10.7 | 1 | #3 | Bt. | 17'-2" | 6.5 | 1 | #3 | Bt. | 19'-10" | 7.5 | 108.1 | .67 |
| 48" Depth | 22 | #4 | St. | 3'-8" | 54.0 | 7 | #4 | Bt. | 13'-2" | 61.8 | 8 | #4 | Bt. | 2'-0" | 10.7 | 1 | #3 | Bt. | 17'-2" | 6.5 | 1 | #3 | Bt. | 19'-10" | 7.5 | 140.5 | .89 |
| 60" Depth | 22 | #4 | St. | 4'-8" | 68.8 | 8 | #4 | Bt. | 13'-2" | 70.6 | 8 | #4 | Bt. | 2'-0" | 10.7 | 1 | #3 | Bt. | 17'-2" | 6.5 | 1 | #3 | Bt. | 19'-10" | 7.5 | 164.1 | 1.11 |

* - For Contractors Information Only. Incidental to "ITS Ground Box".
Legend: Ty. = Type, St. = Straight, Bt. = Bent




Detail F
Grounding Detail




Detail G
Grounding Connection Detail

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.

## General Notes:

1. See ITS(37) for additional Type "1" ground box details.
2. Hot-dip galvanized steel covers after all welds are made.
3. Label top of cover with the words "DANGER HIGH VOLTAGE TRAFFIC MANAGEMENT" using template-guided, hand-welded lettering at a height of 2 inches to ensure neatness.
4. Provide all Type "1" ground boxes with a securable, tamper-proof cover equipped with a bolting system that positively secures the cover in place.
5. Ground steel covers in accordance with the National Electrical Code.
6. Ground covers to the grounding cable using a split-bolt kearney clamp, and a minimum 8-foot long exible stranded jumper the same size as the grounding conductor. Terminate to metal ground box cover with a tank ground type lug as approved and directed by the Engineer.
7. Provide Type "1" ground box and cover designed for heavy duty loading in accordance with AASHTO H20 loading when located where the box may experience deliberate, continuous vehicular tra c, such as near the shoulder or an auxiliary lane, or immediately adjacent to the unprotected edge of pavement.
8. Provide a Type "1" ground box and cover tested by a laboratory independent of the manufacturer certifying loading requirements are met. Provide certi cation of such tests to the Engineer for approval.
9. Provide a steel or cast iron cover in accordance with Item 471, Article 471.2, "Frames, Grates, Rings, and Covers." Provide covers with the number of drop handles shown. Provide Class "A" concrete for ground box construction and aprons.
10. Fabricate cover so to ts properly on the ground box, and no undue noise results when tra c contacts the cover.

Sheet Details
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SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

# ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

# ITS(38)-17

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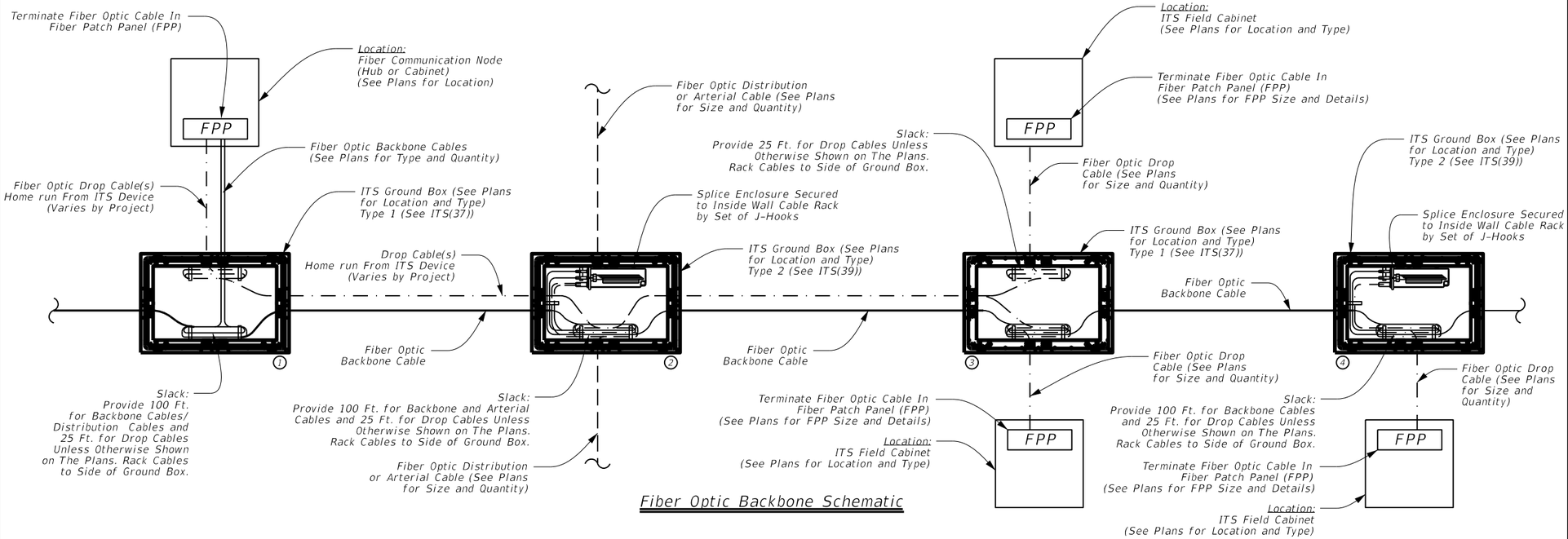
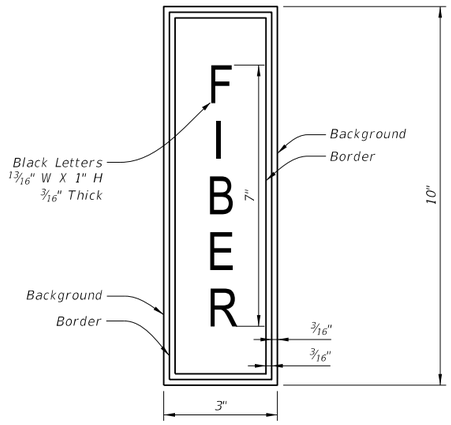
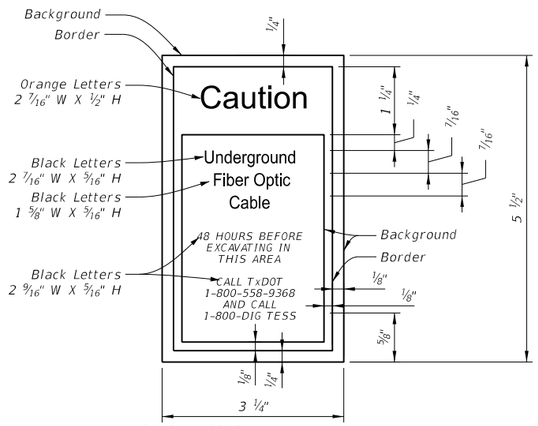



## Fiber Optic Backbone Schematic



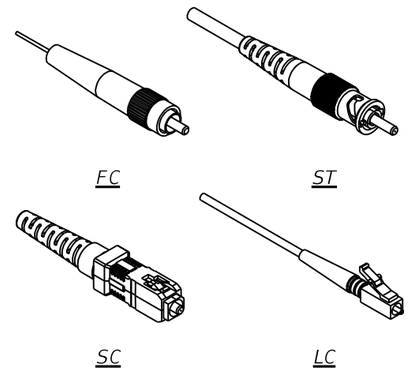

Border – Black
Background – Orange Re ective

## Fiber Decal Details



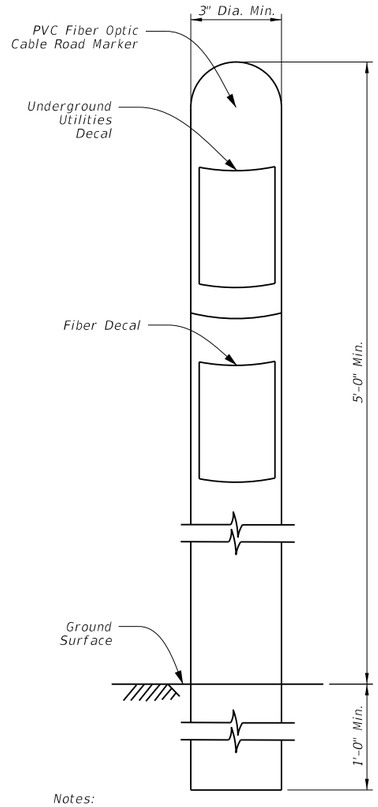

Border – Black
Symbol – Black
Background – Orange Re ective

## Underground Utilities Decal Details




## Fiber Optic Connectors

Note – Details are diagrammatic and may vary by manufacturer.




Notes:
1. Space ber optic cable road markers at maximum 1000' intervals or at signi cant changes in direction such as a 90 degree turn.
2. Provide all orange ber optic cable road markers for non-splice locations.
3. Provide orange ber optic cable road markers with white dome for splice locations.
4. Locate marker within concrete apron of ber ground box.

## Fiber Optic Cable Road Markers

## Reference Notes:

1. Fiber architecture at communication node.
2. Fiber architecture for splicing arterial distribution cables.
3. Fiber architecture for home run of drop cables from ITS eld equipment cabinets to communication node.
4. Fiber architecture for splicing drop cable from ITS eld equipment cabinet.

## General Notes:

1. The ber optic backbone schematic shown is diagrammatic only and intended to represent the various ber optic communication architectures seen across the state and may not show all con gurations seen. Connection of ITS eld equipment to ITS communication nodes or hubs is achieved through home run drop cables or spliced to the backbone in a splice enclosure. Refer to ber communication schematic details and ber termination information shown on the plans for further information.
2. Install a at pull cord in all empty conduits and inner-ducts identi ed for communication use. The pull cord must have a tensile strength of 1,250 lbs minimum and have foot markings to determine length installed. Furnish and installation of pull cord will be subsidiary to special speci cation "ITS Fiber Optic Cable".
3. Color code each type of ber optic cable to identify the cable as a "backbone" (green or blue), "distribution" (red), or "drop" (orange or yellow).
4. Terminate bers at ber patch panel (FPP), also referred to as patch panel, with SC connectors for new installations. When connecting to existing FPP, terminate with FC or ST connectors as shown on the plans. Provide connector adaptors as required to accommodate existing equipment if information is not provided in the plans.
5. Provide a list showing cable number assignments and highway or facility that the cable services.
6. Provide a single 1/C #14 insulated wire in conduit runs which have been identi ed in the plans to carry ber optic cable. Provide UL listed solid copper wire with orange color low density polyethylene insulation suitable for conduit installation rated for temperature range -20 C to 60 C and a voltage rating of 600V. This wire will serve as a tracer, or locate, wire for locating underground conduit containing ber optic cabling and will be paid for under Item 620, "Electrical Conductors."
7. Ensure each cable is marked on the outer jacket with a label detailing the manufacturer's name, the date of manufacturer (month/year), the ber count (Example: 48F SM or 48 SMF), and sequential length markings at maximum 3 FT increments.

Sheet Details
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SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

# ITS FIBER OPTIC CABLE MISCELLANEOUS DETAILS

# ITS(42)-16

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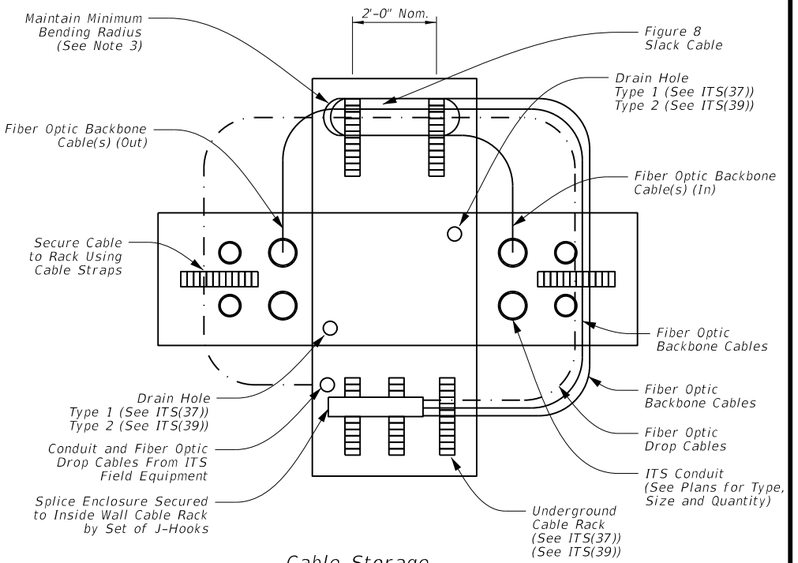
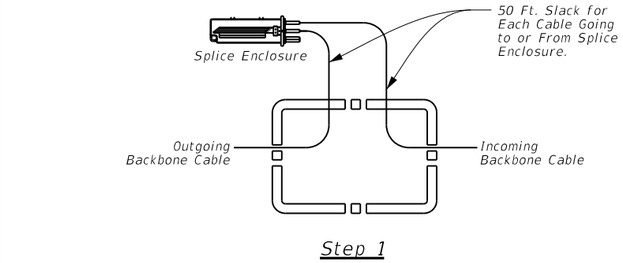
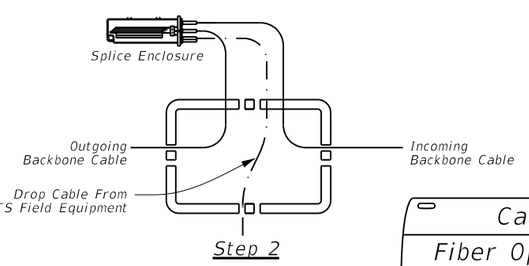



## Cable Storage

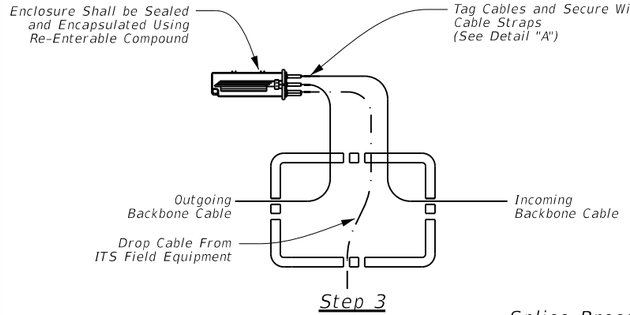
Top View - Ground Box Walls Folded Down for Clarity



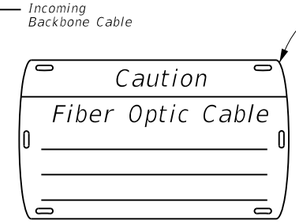

Step 1




Step 2



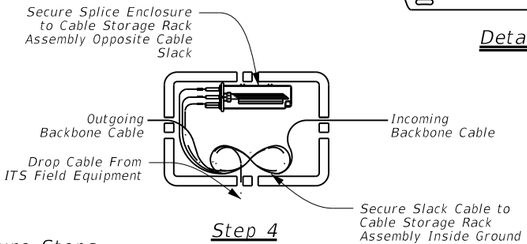

Step 3




Fiber Optic Cable Tag

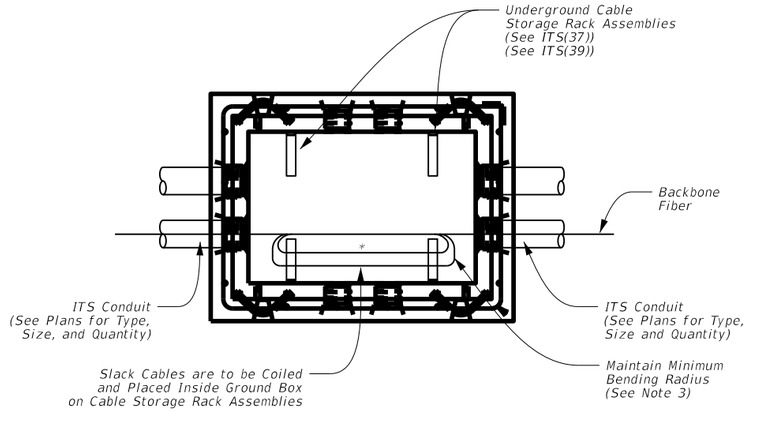
Panduit Inc. No. PST-FO
Hellerman-Tyton No. CST2003x2
Self-Lam Tag or Approved Equal

Detail "A"



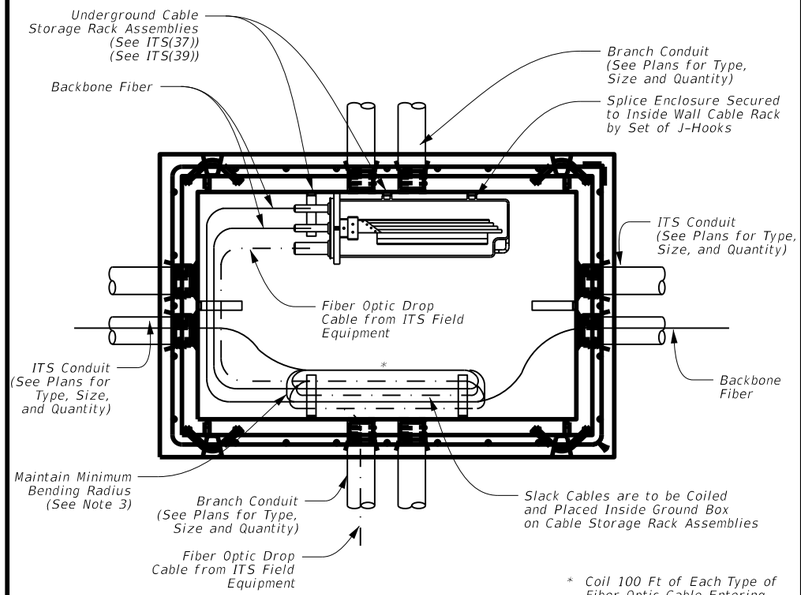

Step 4

## Splice Procedure Steps



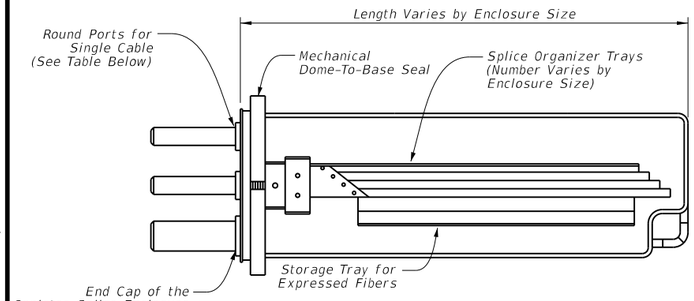

## Type "1" Ground Box

* Coil 25 Ft of Fiber Optic Cable for Slack




## Type "2" Ground Box with Splice

* Coil 100 Ft of Each Type of Fiber Optic Cable Entering the Ground Box




| Splice Enclosure Sizes | | | |
|---|---|---|---|
| Type | No. of Ports | Port Capacity | Fiber Use |
| 1 | 4 | 2 - Up to 144 Sm | Backbone |
| | | 2 - Up to 48 Sm | Drop |
| 2 | 6 | 4 - Up to 144 Sm | Backbone/Arterial |
| | | 2 - Up to 48 Sm | Drop |
| 3 | 8 | 4 - Up to 144 Sm | Backbone/Arterial |
| | | 4 - Up to 48 Sm | Drop |

## Splice Enclosure Fiber Accommodations

### General Notes:

1. Conduit entry points to the Type 1 and Type 2 ground boxes are diagrammatic. Refer to ITS ground box standards, ITS(37) and ITS(39), for more information. Additional conduits may be required as shown on the plans.
2. Type 2 ground boxes are to be used, as shown on the plans, when splice enclosures are required.
3. Maintain a minimum bend radius of 20 times the ber optic cable diameter during installation, relocation, and removal and a minimum of 10 times the ber optic cable diameter when in operation.
4. Caulk all conduit around the top of the cable ducts with an engineer approved caulking compound to seal clearance between the cables and ducts. Place conduit plugs in all vacant conduits or inner-ducts.
5. Provide cable straps that will withstand ultra-violet exposure and do not damage cables when tightening.
6. All incidental equipment necessary for the cable installation and mounting of splice enclosure within the ground box will be incidental to Special Speci cation, "ITS Fiber Optic Cable."
7. Submit all splice locations to the eld engineer for approval before beginning work.
8. Provide splice enclosures designed to seal, bond, anchor, and protect ber optic cable splices. Provide splice enclosures designed to handle mechanical and fusion type splices. Provide splice enclosures with port con gurations for the sizes detailed above.
9. Provide splice enclosures designed for underground placement with a sealing system preventing water penetration when submerged under 10 ft. of water.
10. Furnish, install, and secure ber optic cable tags for each ber optic cable entering a ground box, ITS eld equipment cabinet (ground and pole), and hub building or communication node as detailed above. Provide information including ber optic type, count, origin, and destination on the cable tag. Use UV resistant tie-wraps for securing the tag to the cable. Provide tie-wraps that do not damage ber when securing to cable.

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Texas Department of Transportation

Traffic Operations Division Standard

# ITS FIBER OPTIC CABLE MISCELLANEOUS DETAILS

# ITS(43)-16

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## FOUNDATION DESIGN TABLE

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

## NOTES:

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

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

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

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

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

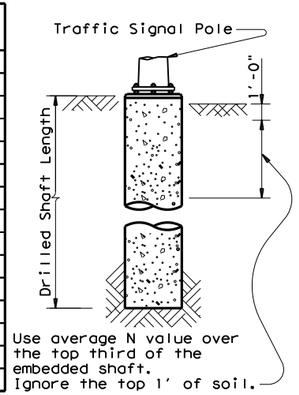
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

## FOUNDATION SUMMARY TABLE ③

| LOCATION IDENTIFICATION | AVG. N BLOW /ft. | FDN TYPE | NO. EA | DRILLED SHAFT LENGTH ⑥ (FEET) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 24-A | 30-A | 36-A | 36-B | 42-A |
| CSJ: 0047-07-245 | | | | | | | | |
| ROSS AVE SB EXIT 285 | 10 | 24-A | 3 | 18 | | | | |
| HALL ST/ LEMMON AVE NB EXIT 1A | 10 | 24-A | 3 | 18 | | | | |
| HASKELL AVE/ BLACKBURN ST/ FITZHUGH AVE NB EXIT 1B | 10 | 24-A | 1 | 6 | | | | |
| HASKELL AVE/ BLACKBURN ST/ LEMMON AVE SB EXIT 1B | 10 | 24-A | 1 | 6 | | | | |
| KNOX ST/ HENDERSON AVE/ MONTICELLO AVE NB EXIT 2 | 10 | 24-A | 1 | 6 | | | | |
| HENDERSON AVE/ KNOX ST/ FITZHUGH AVE SB EXIT 2 | 10 | 24-A | 2 | 12 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL DRILLED SHAFT LENGTHS | | | | 66 | | | | |

## 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' |



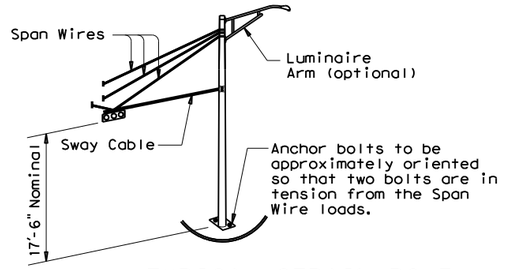

Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

## ANCHOR BOLT & TEMPLATE SIZES

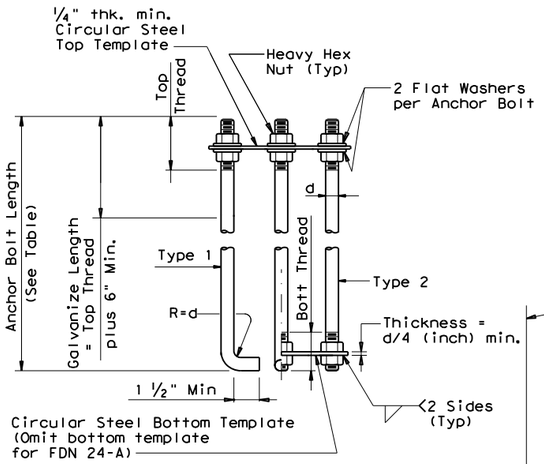
| BOLT DIA IN. | ⑦ BOLT LENGTH | TOP THREAD | BOTTOM THREAD | BOLT CIRCLE | R2 | R1 |
|---|---|---|---|---|---|---|
| ¾" | 1'-6" | 3" | — | 12 ¾" | 7 ⅛" | 5 ⅝" |
| 1 ½" | 3'-4" | 6" | 4" | 17" | 10" | 7" |
| 1 ¾" | 3'-10" | 7" | 4 ½" | 19" | 11 ¼" | 7 ¾" |
| 2" | 4'-3" | 8" | 5" | 21" | 12 ½" | 8 ½"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

⑦ Min dimensions given, longer bolts are acceptable.

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



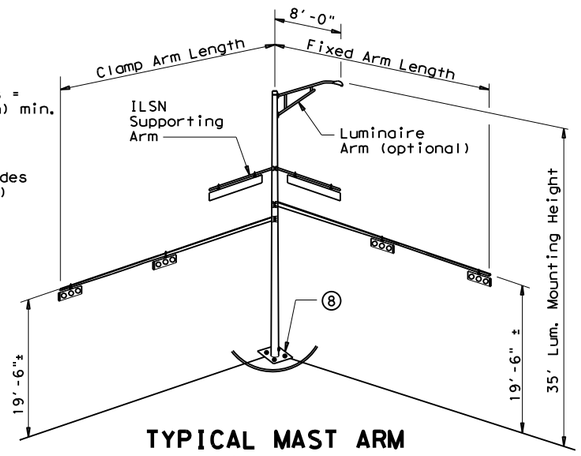

## TYPICAL STRAIN POLE ASSEMBLY



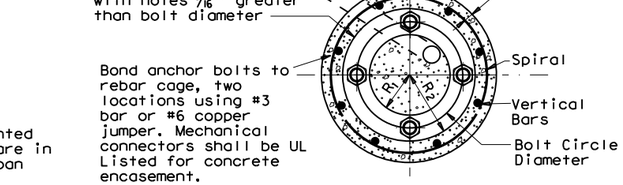

HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

## ANCHOR BOLT ASSEMBLY

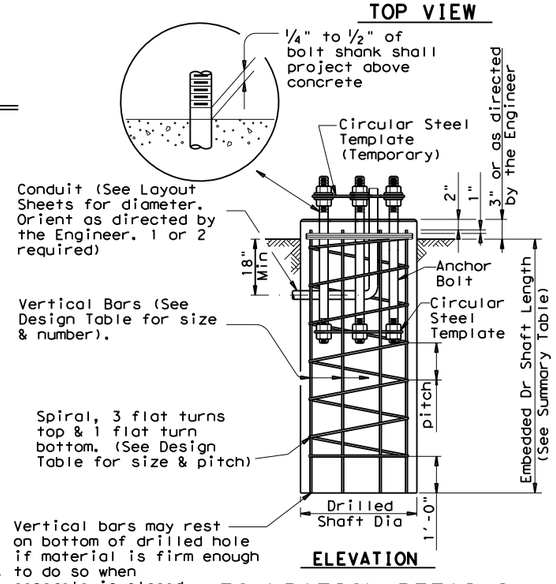
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.




## TYPICAL MAST ARM ASSEMBLY




TOP VIEW




ELEVATION

## FOUNDATION DETAILS

## GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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


TRAF-IQ
14811 ST. MARY'S LANE, SUITE 180
HOUSTON, TEXAS 77079
832.399.1100
TEXAS PE FIRM REG # F-18726


*The "Foundation Summary Table" was completed under my responsible supervision.*

STATE OF TEXAS
KEVIN D. TYER
87924
LICENSED PROFESSIONAL ENGINEER

02/23/2024

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 |
| | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 139 |

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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) |

## NOTES:

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

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

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

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

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

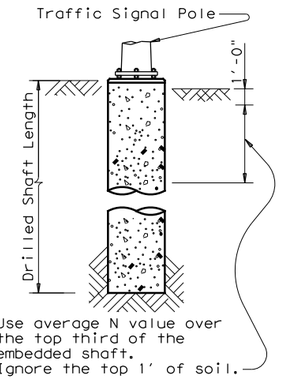
(6) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

## FOUNDATION SUMMARY TABLE (3)

| LOCATION IDENTIFICATION | AVG. N BLOW /ft. | FDN TYPE | NO. EA | DRILLED SHAFT LENGTH (6) (FEET) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 24-A | 30-A | 36-A | 36-B | 42-A |
| EB SS366@FIELD | | | | | | | | |
| WWD01 | | 24-A | 1 | 6 | | | | |
| WWD02 | | 24-A | 1 | 6 | | | | |
| REMOTE SOLAR | | 24-A | 1 | 6 | | | | |
| WB SS366@FIELD | | | | | | | | |
| WWD03 | | 24-A | 1 | 6 | | | | |
| WWD04 | | 24-A | 1 | 6 | | | | |
| REMOTE SOLAR | | 24-A | 1 | 6 | | | | |
| WB SS366@ST PAUL | | | | | | | | |
| CONTROL CAB. | | 24-A | 1 | 6 | | | | |
| REMOTE SOLAR | | 24-A | 1 | 6 | | | | |
| EB SS366@OLIVE | | | | | | | | |
| WWD07 | | 24-A | 1 | 6 | | | | |
| WWD08 | | 24-A | 1 | 6 | | | | |
| REMOTE SOLAR | | 24-A | 1 | 6 | | | | |
| WB SS366@PEARL | | | | | | | | |
| WWD09 | | 24-A | 1 | 6 | | | | |
| REMOTE SOLAR | | 24-A | 1 | 6 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL DRILLED SHAFT LENGTHS | | | | 78 | | | | |

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

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

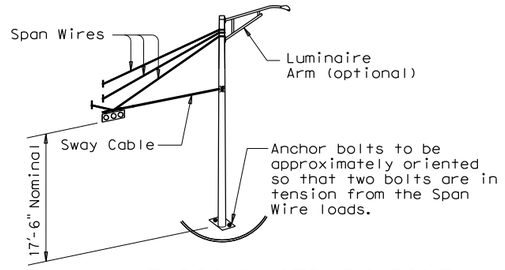



## ANCHOR BOLT & TEMPLATE SIZES

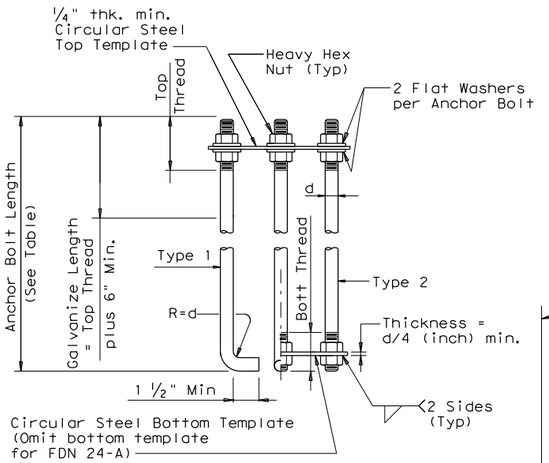
| BOLT DIA IN. | (7) BOLT LENGTH | TOP THREAD | BOTTOM THREAD | BOLT CIRCLE | R2 | R1 |
|---|---|---|---|---|---|---|
| ¾" | 1'-6" | 3" | — | 12 ¾" | 7 ⅛" | 5 ⅝" |
| 1 ½" | 3'-4" | 6" | 4" | 17" | 10" | 7" |
| 1 ¾" | 3'-10" | 7" | 4 ½" | 19" | 11 ¼" | 7 ¾" |
| 2" | 4'-3" | 8" | 5" | 21" | 12 ½" | 8 ½"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

(7) Min dimensions given, longer bolts are acceptable.

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



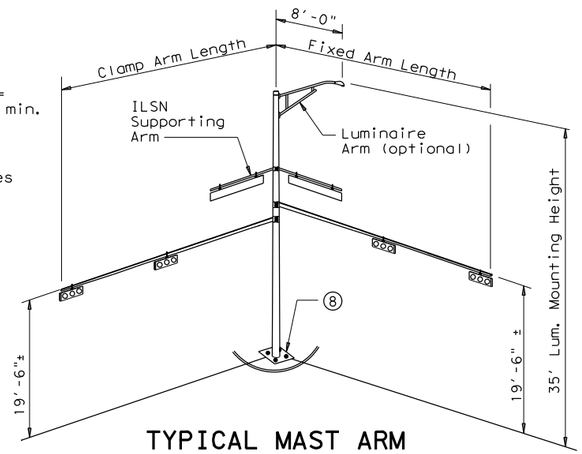

## TYPICAL STRAIN POLE ASSEMBLY



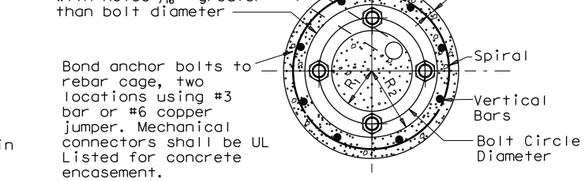

HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

## ANCHOR BOLT ASSEMBLY

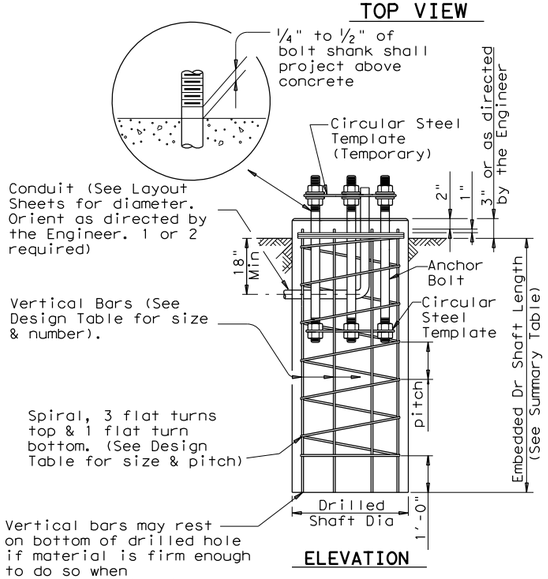
(8) Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.




## TYPICAL MAST ARM ASSEMBLY




TOP VIEW




ELEVATION

## FOUNDATION DETAILS

## GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

OTHON ENGINEERING
FIRM REGISTRATION NO. F-1471

STATE OF TEXAS
ELIZABETH SHELTON
107729
LICENSED PROFESSIONAL ENGINEER
2/23/2024

Elizabeth Shelton

Texas Department of Transportation
Traffic Operations Division

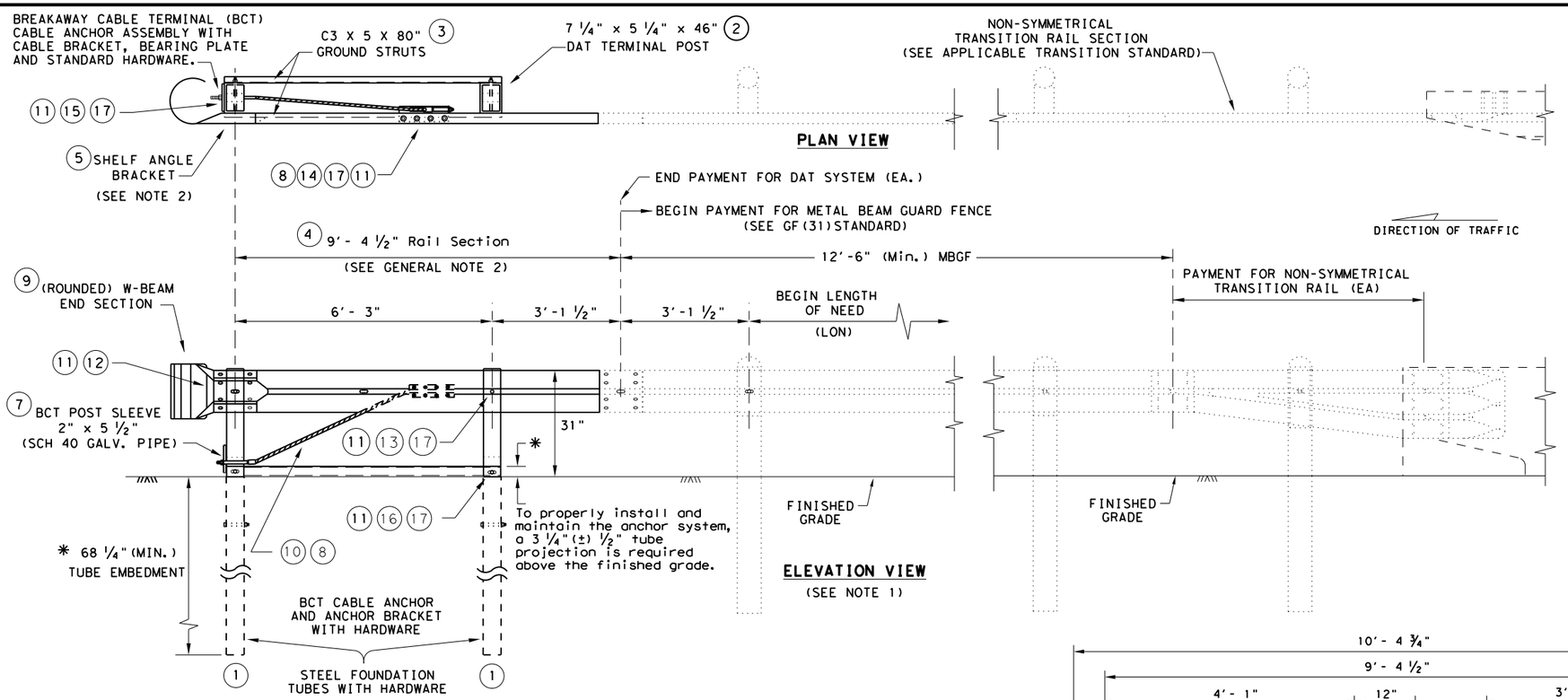
# TRAFFIC SIGNAL POLE FOUNDATION

# TS-FD-12



| REVISIONS | DN: MS | CK: JSY | DW: MAO/MMF | CK: JSY/TEB |
|---|---|---|---|---|
| 5-96 11-98 1-12 | CONT | SECT | JOB | HIGHWAY |
| | 0047 | 07 | 245,ETC | US 75, ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS, ETC | | 140 |

DATE:
FILE:




## DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

## GENERAL NOTES

1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

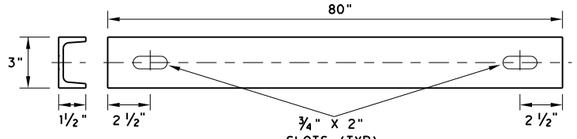
## MOW STRIP INSTALLATION

IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

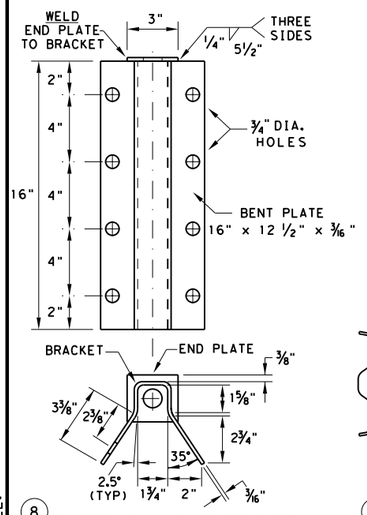
| # | (DAT) PARTS LIST | QTY |
|---|---|---|
| (1) | STEEL FOUNDATION TUBE | 2 |
| (2) | DAT TERMINAL POST | 2 |
| (3) | CHANNEL STRUT | 2 |
| (4) | TERMINAL RAIL ELEMENT | 1 |
| (5) | SHELF ANGLE BRACKET | 1 |
| (6) | BCT BEARING PLATE | 1 |
| (7) | BCT POST SLEEVE | 1 |
| (8) | GUARDRAIL ANCHOR BRACKET | 1 |
| (9) | (ROUNDED) W-BEAM END SECTION | 1 |
| (10) | BCT CABLE ANCHOR | 1 |
| (11) | RECESSED NUT, GUARDRAIL | 20 |
| (12) | 1 1/4" BUTTON HEAD BOLT | 4 |
| (13) | 10" BUTTON HEAD BOLT | 2 |
| (14) | 5/8" X 2" HEX HEAD BOLT | 8 |
| (15) | 5/8" X 8" HEX HEAD BOLT | 4 |
| (16) | 5/8" X 10" HEX HEAD BOLT | 2 |
| (17) | 5/8" FLAT WASHER | 18 |



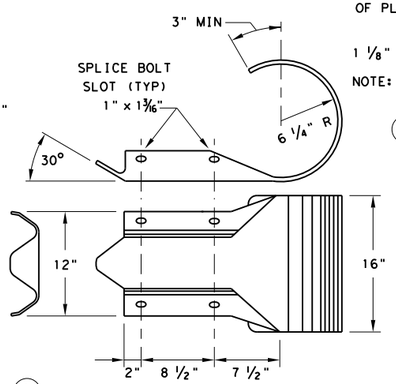

(4) **TERMINAL RAIL ELEMENT FOR DAT**



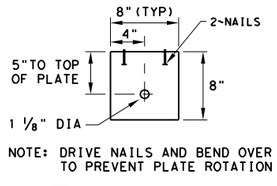

(3) **CHANNEL STRUT**
C3 X 5 X 80", GRADE A36




(8) **GUARDRAIL ANCHOR BRACKET**

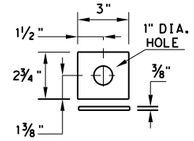



(9) **W-BEAM END SECTION (ROUNDED) (12 GA.)**

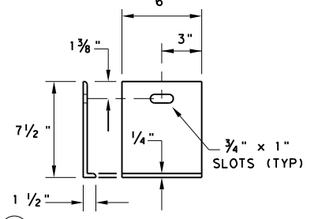



NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

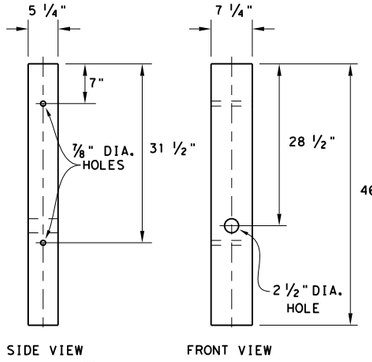
(6) **BEARING PLATE**
8"x 8"x 5/8" R



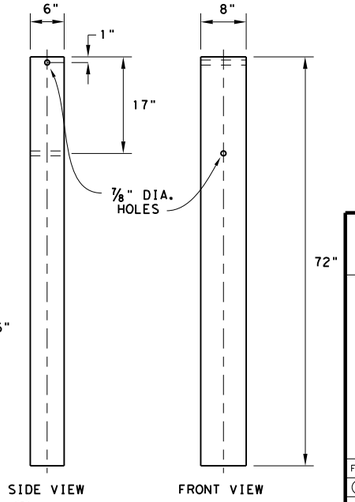

**END PLATE**




(5) **SHELF ANGLE BRACKET**




(2) **TERMINAL POST**
7 1/4"x 5 1/4"x 46" WOOD POST




(1) **STEEL FOUNDATION TUBE**
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation

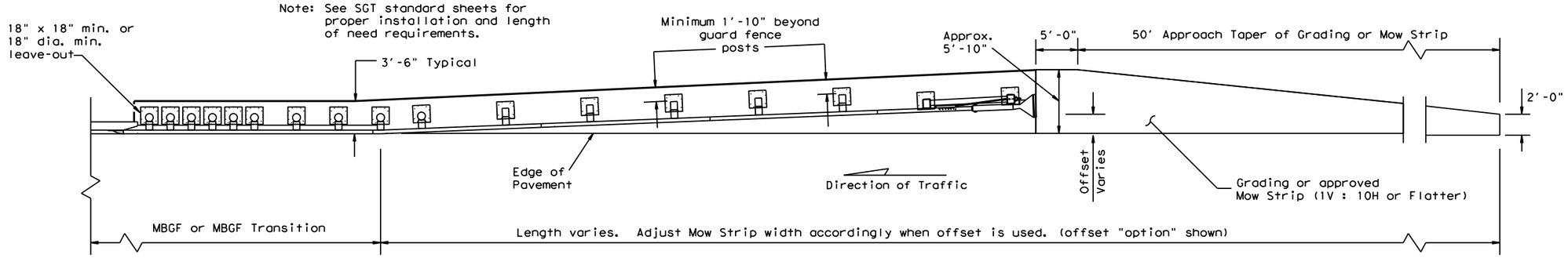
Design Division Standard

# METAL BEAM GUARD FENCE
## (DOWNSTREAM ANCHOR TERMINAL)
## TL-3 MASH COMPLIANT

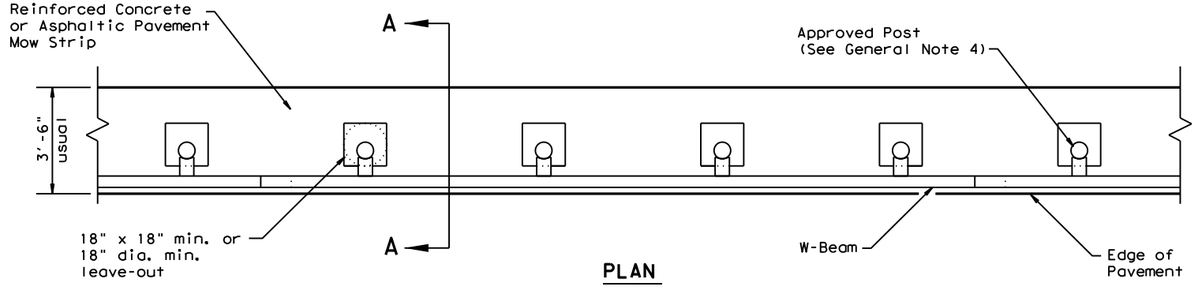
# GF(31)DAT-19

| FILE: gf31dat19.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CGL/AG |
|---|---|---|---|---|
| ©TxDOT: NOVEMBER 2019 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 141 |

DATE:
FILE:

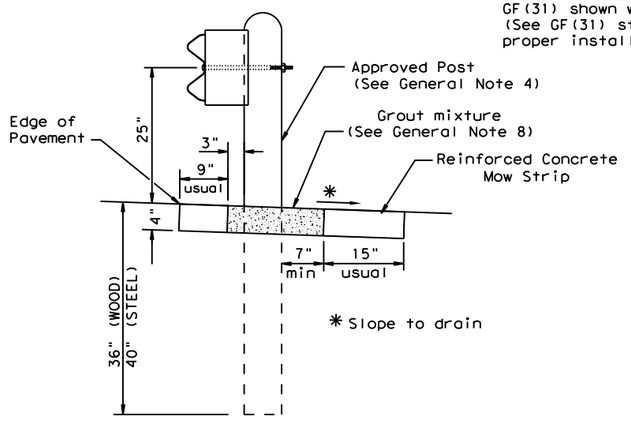



## GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



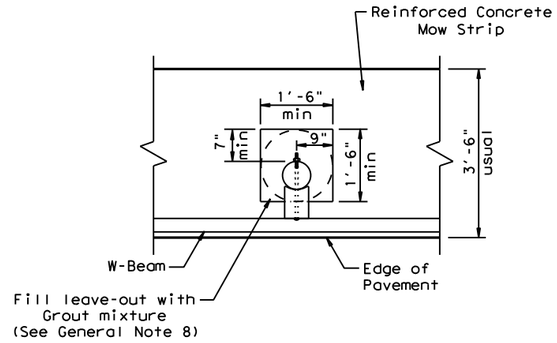

**PLAN**

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



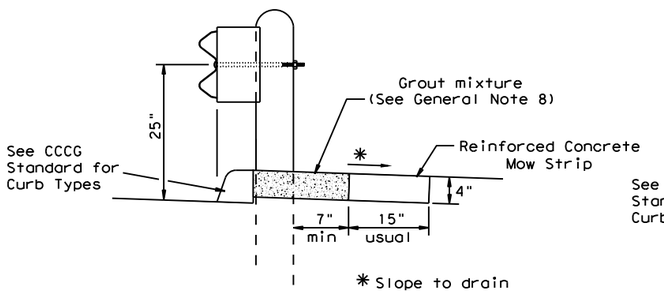

**SECTION A-A**

Typical



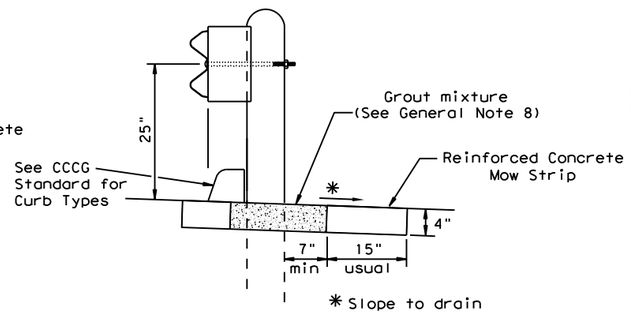

**MOW STRIP DETAIL**

Reinforced Concrete Mow Strip
with 18" x 18" Square or
18" Dia. minimum leave-out.



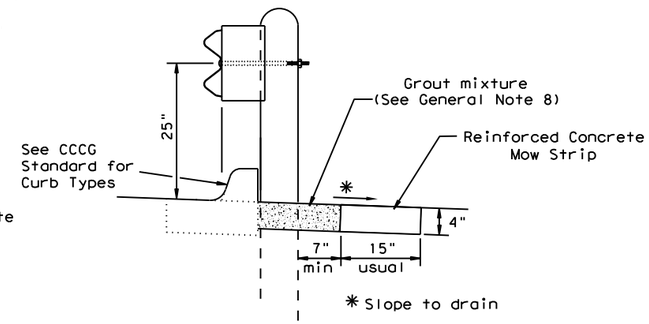

**CURB OPTION (1)**

This option will increase the post embedment throughout the system.




**CURB OPTION (2)**

Curb shown on top of mow strip




**CURB OPTION (3)**

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

## GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

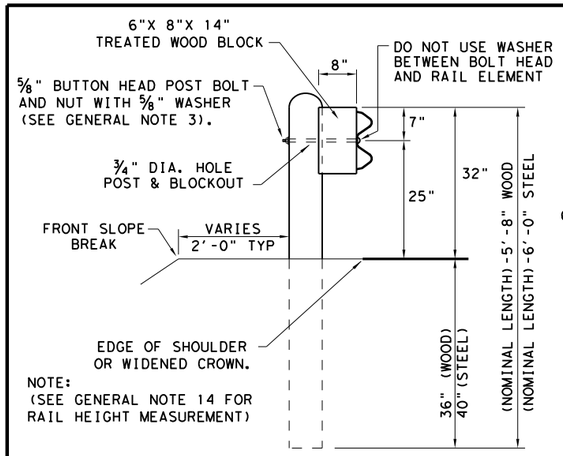
Design Division Standard

# METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

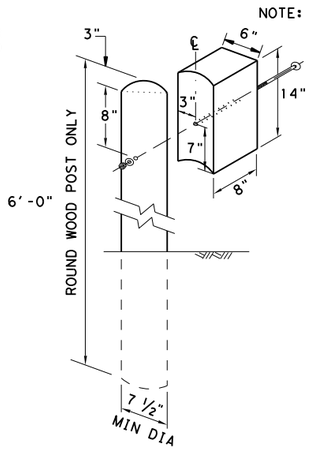
# GF(31)MS-19

| | | | | | | |
|---|---|---|---|---|---|---|
| FILE: gf31ms19.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CGL/AG | | |
| ©TxDOT: NOVEMBER 2019 | CONT | SECT | JOB | | HIGHWAY | |
| REVISIONS | 0047 | 07 | 245,ETC | | US 75,ETC | |
| | DIST | COUNTY | | | SHEET NO. | |
| | DAL | DALLAS,ETC | | | 142 | |

DATE:
FILE:

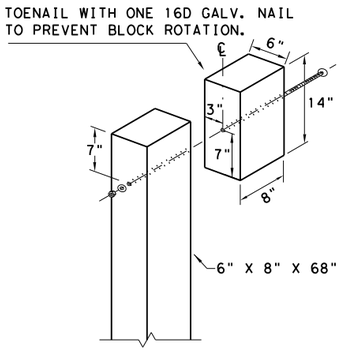



**TYPICAL POST PLACEMENT**

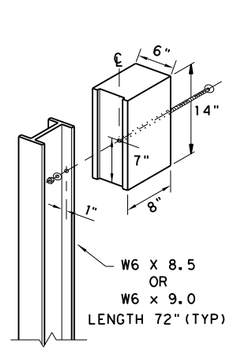



**WOOD BLOCK TO ROUND WOOD POST**

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

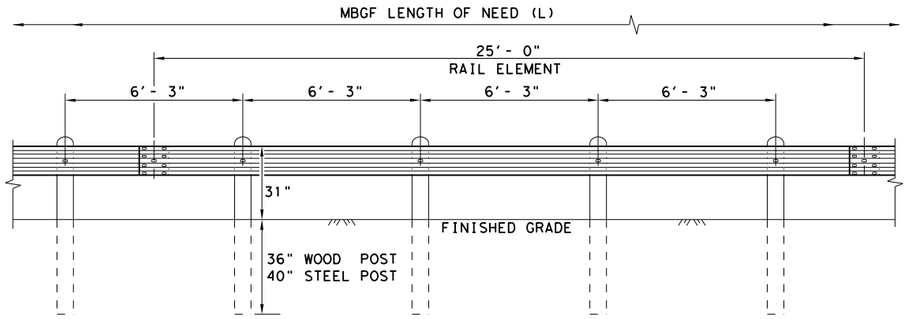



**WOOD BLOCK TO RECTANGULAR WOOD POST**




**ROUTED WOOD BLOCK TO I-BEAM STEEL POST**

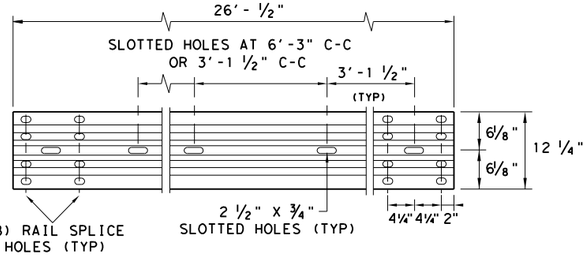
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.




DIRECTION OF TRAFFIC

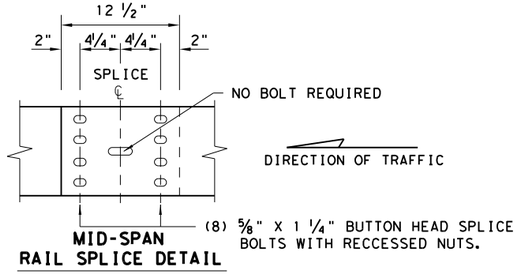
**ELEVATION MID-SPAN RAIL SPLICE**

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)




**ELEVATION 25'- 0" (NOM.) W-BEAM SECTION**

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

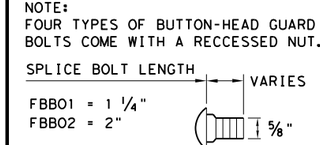



DIRECTION OF TRAFFIC

**MID-SPAN RAIL SPLICE DETAIL**

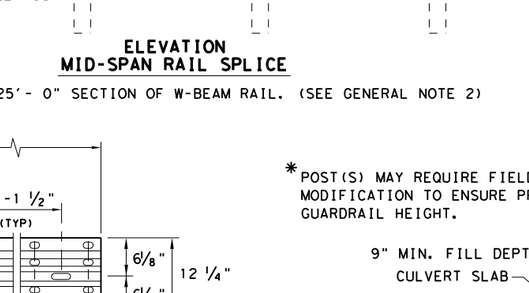
NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.




**BUTTON HEAD BOLT**

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.




*POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

**LOW FILL CULVERT POST**

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

## GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation

Design Division Standard

# METAL BEAM GUARD FENCE
# TL-3 MASH COMPLIANT
# GF(31)-19

| | | | | |
|---|---|---|---|---|
| FILE: gf3119.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CGL/AG |
| ©TxDOT: NOVEMBER 2019 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 143 |

DATE:
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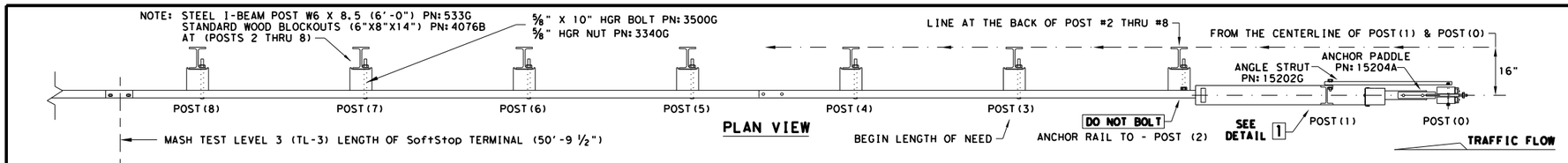
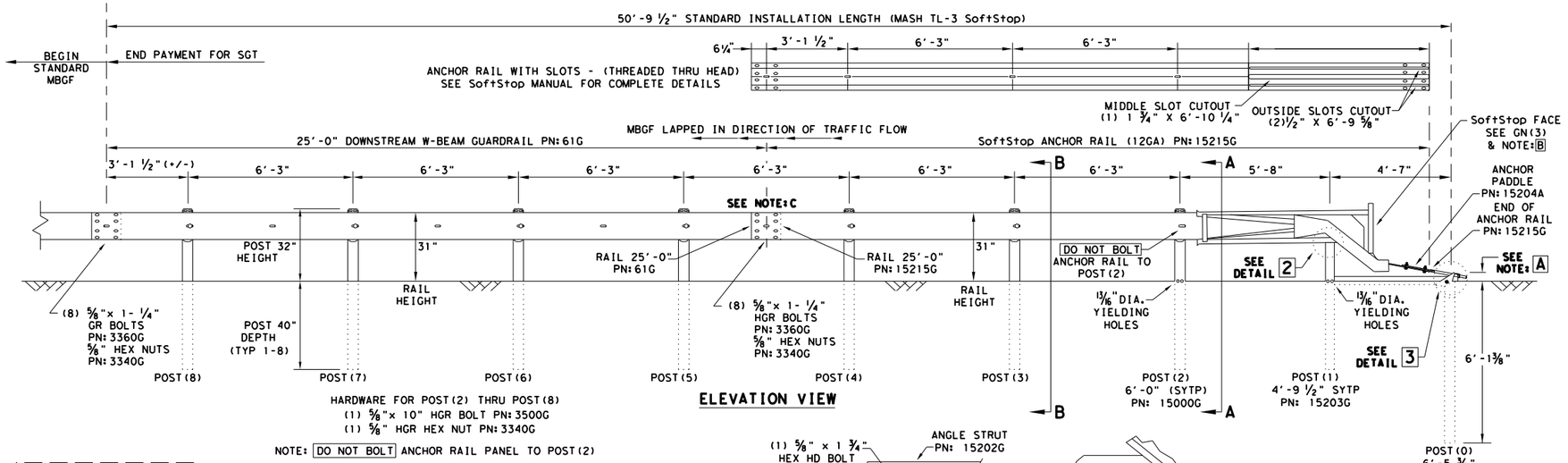
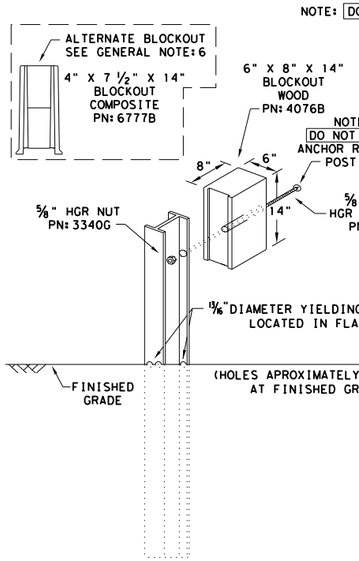


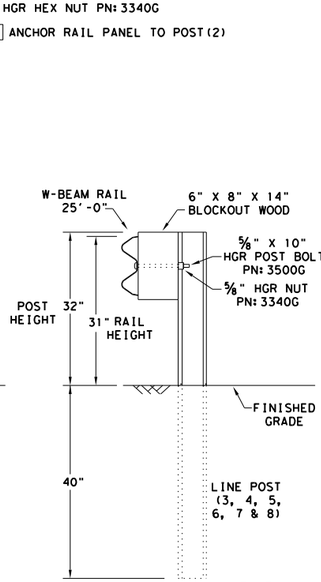




**ISOMETRIC VIEW POST(1 & 2)**

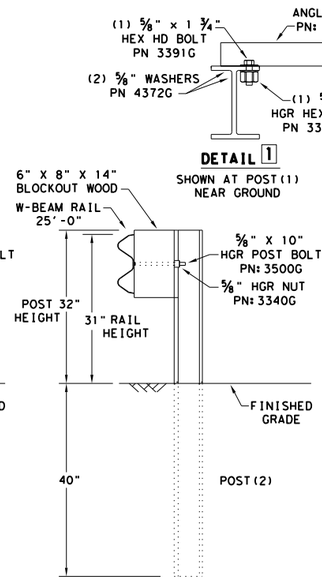
W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)




**SECTION VIEW B-B**

6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G




**SECTION VIEW A-A**

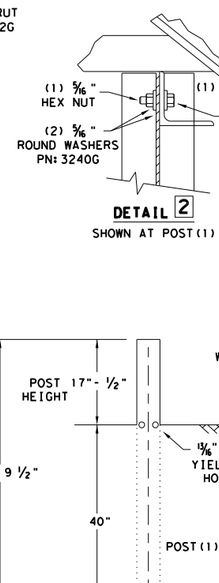
6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)




**DETAIL 1**

SHOWN AT POST(1) NEAR GROUND




**DETAIL 2**

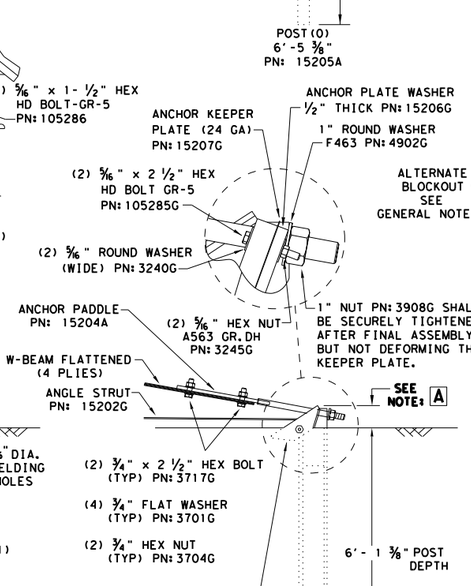
SHOWN AT POST(1)




**FRONT VIEW POST(1)**

4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

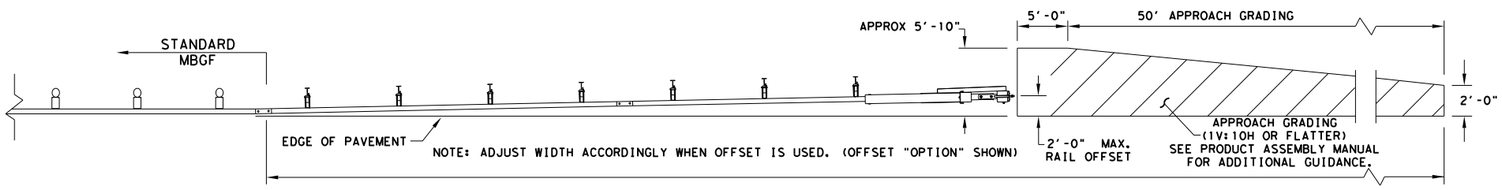
NOTE: NO BLOCKOUT INSTALLED AT POST(1)




**DETAIL 3**
**AT POST(0)**

6'-5 ⅜" (W6 X 15)
I-BEAM POST PN: 15205A

TRAFFIC FLOW




**APPROACH GRADING AT GUARDRAIL END TREATMENTS**

## GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

| | |
|---|---|
| NOTE: A | THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE. |
| NOTE: B | PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)<br>PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) |
| NOTE: C | W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5)<br>GUARDRAIL PANEL 25'-0" PN: 61G<br>ANCHOR RAIL 25'-0" PN: 15215G<br>LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW. |

| PART | QTY | MAIN SYSTEM COMPONENTS |
|---|---|---|
| 620237B | 1 | PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.) |
| 15208A | 1 | SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH) |
| 15215G | 1 | SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS |
| 61G | 1 | SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0") |
| 15205A | 1 | POST #0 - ANCHOR POST (6'- 5 ⅜") |
| 15203G | 1 | POST #1 - (SYTP) (4'- 9 ½") |
| 15000G | 1 | POST #2 - (SYTP) (6'- 0") |
| 533G | 6 | POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0") |
| 4076B | 7 | BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14") |
| 6777B | 7 | BLOCKOUT - COMPOSITE (4" x 7 ½" x 14") |
| 15204A | 1 | ANCHOR PADDLE |
| 15207G | 1 | ANCHOR KEEPER PLATE (24 GA) |
| 15206G | 1 | ANCHOR PLATE WASHER ( ½" THICK ) |
| 15201G | 2 | ANCHOR POST ANGLE (10" LONG) |
| 15202G | 1 | ANGLE STRUT |
| | | **HARDWARE** |
| 4902G | 1 | 1" ROUND WASHER F436 |
| 3908G | 1 | 1" HEAVY HEX NUT A563 GR.DH |
| 3717G | 2 | ¾" x 2 ½" HEX BOLT A325 |
| 3701G | 4 | ¾" ROUND WASHER F436 |
| 3704G | 2 | ¾" HEAVY HEX NUT A563 GR.DH |
| 3360G | 16 | ⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR |
| 3340G | 25 | ⅝" W-BEAM RAIL SPLICE NUTS HGR |
| 3500G | 7 | ⅝" x 10" HGR POST BOLT A307 |
| 3391G | 1 | ⅝" x 1 ¾" HEX HD BOLT A325 |
| 4489G | 1 | ⅝" x 9" HEX HD BOLT A325 |
| 4372G | 4 | ⅝" WASHER F436 |
| 105285G | 2 | ⅝" x 2 ½" HEX HD BOLT GR-5 |
| 105286G | 1 | ⅝" x 1 ½" HEX HD BOLT GR-5 |
| 3240G | 6 | ⅝" ROUND WASHER (WIDE) |
| 3245G | 3 | ⅝" HEX NUT A563 GR.DH |
| 5852B | 1 | HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B |

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

# TRINITY HIGHWAY SOFTSTOP END TERMINAL MASH - TL-3

# SGT(10S)31-16

| | | | | |
|---|---|---|---|---|
| FILE: sgt10s3116 | DN: TxDOT | CK: KM | DW: VP | CK: MB/VP |
| © TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 144 |

DATE:
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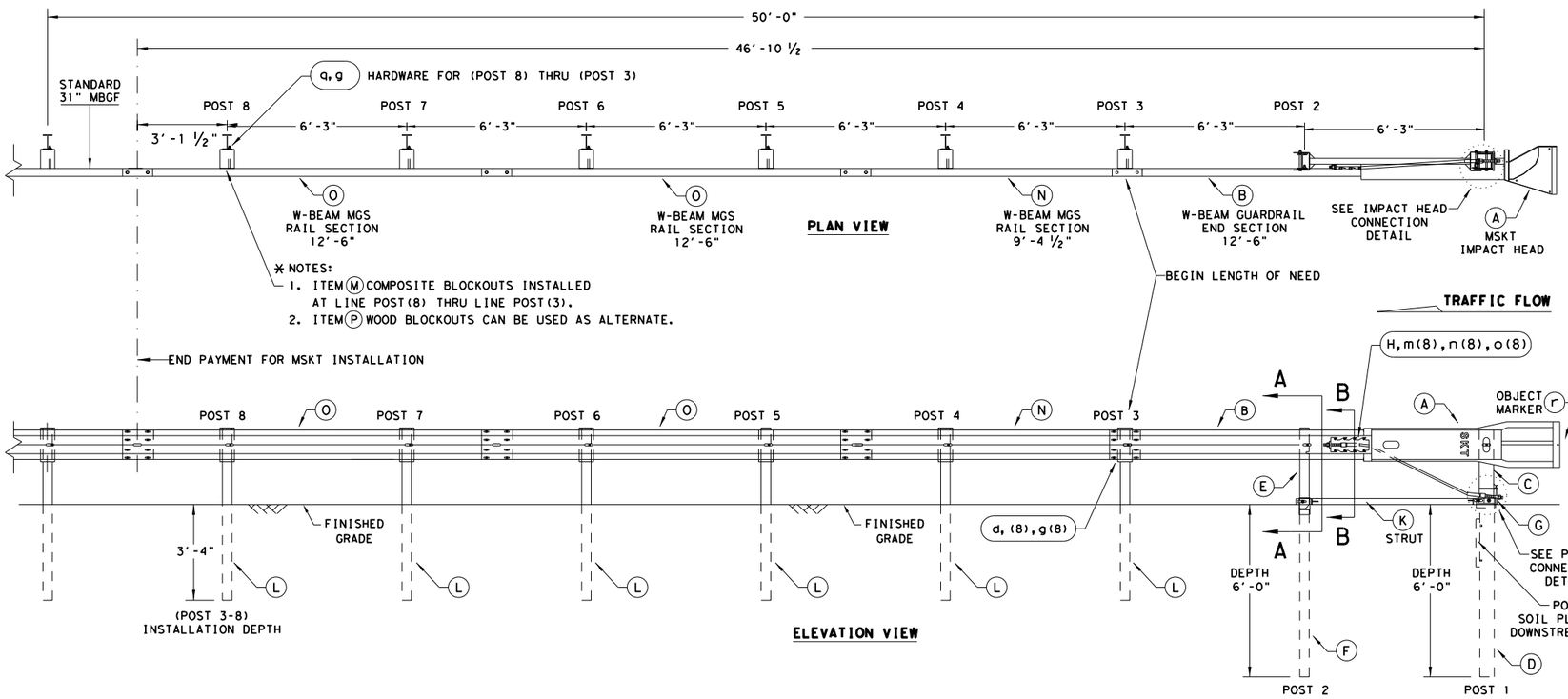
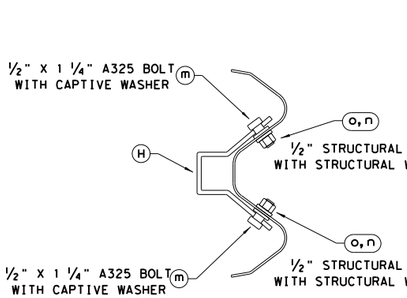
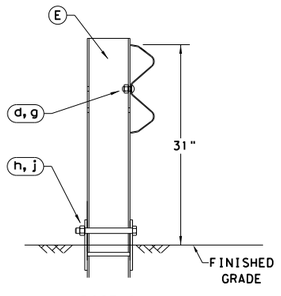


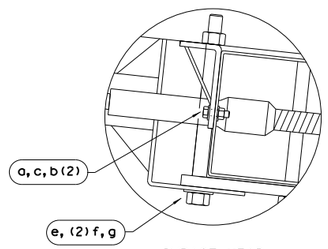

NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



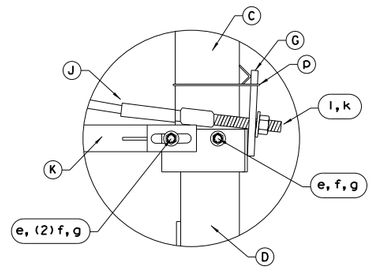

SECTION B-B
ANCHOR BRACKET



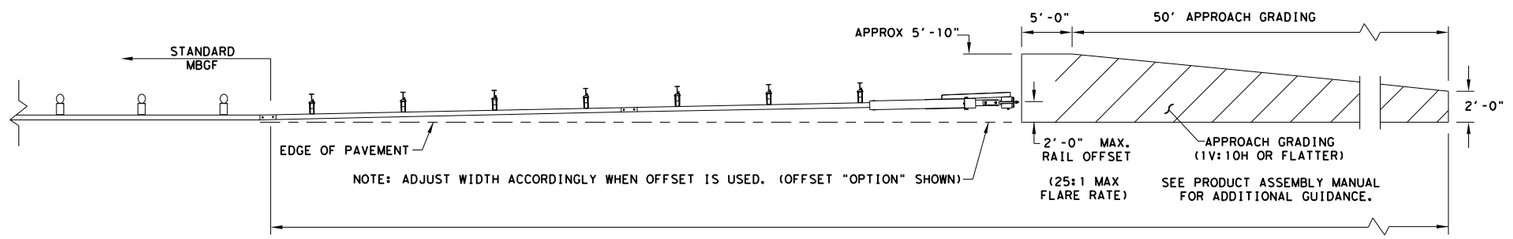

POST 2
SECTION A-A




IMPACT HEAD
CONNECTION DETAIL




POST 1
CONNECTION DETAIL




TRAFFIC FLOW

APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

## GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

| ITEM | QTY | MAIN SYSTEM COMPONENTS | ITEM NUMBERS |
|---|---|---|---|
| A | 1 | MSKT IMPACT HEAD | MS3000 |
| B | 1 | W-BEAM GUARDRAIL END SECTION, 12 Ga. | SF1303 |
| C | 1 | POST 1 - TOP (6" X 6" X ⅛" TUBE) | MTPHP1A |
| D | 1 | POST 1 - BOTTOM (6' W6X15) | MTPHP1B |
| E | 1 | POST 2 - ASSEMBLY TOP | UHP2A |
| F | 1 | POST 2 - ASSEMBLY BOTTOM (6' W6X9) | HP2B |
| G | 1 | BEARING PLATE | E750 |
| H | 1 | CABLE ANCHOR BOX | S760 |
| J | 1 | BCT CABLE ANCHOR ASSEMBLY | E770 |
| K | 1 | GROUND STRUT | MS785 |
| L | 6 | W6x9 OR W6x8.5 STEEL POST | P621 |
| M | 6 | COMPOSITE BLOCKOUTS | CBSP-14 |
| N | 1 | W-BEAM MGS RAIL SECTION (9'-4 ½") | G12025 |
| O | 2 | W-BEAM MGS RAIL SECTION (12'-6") | G1203A |
| P | 6 | WOOD BLOCKOUT 6" X 8" X 14" | P675 |
| Q | 1 | W-BEAM MGS RAIL SECTION (25'-0") | G1209 |
| | | **SMALL HARDWARE** | |
| a | 2 | ⅝" x 1" HEX BOLT (GRD 5) | B5160104A |
| b | 4 | ⅝" WASHER | W0516 |
| c | 2 | ⅝" HEX NUT | N0516 |
| d | 25 | ⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2) | B580122 |
| e | 2 | ⅝" Dia. x 9" HEX BOLT (GRD A449) | B580904A |
| f | 3 | ⅝" WASHER | W050 |
| g | 33 | ⅝" Dia. H.G.R NUT | N050 |
| h | 1 | ¾" Dia. x 8 ½" HEX BOLT (GRD A449) | B340854A |
| j | 1 | ¾" Dia. HEX NUT | N030 |
| k | 2 | 1 ANCHOR CABLE HEX NUT | N100 |
| l | 2 | 1 ANCHOR CABLE WASHER | W100 |
| m | 8 | ½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER | SB12A |
| n | 8 | ½" STRUCTURAL NUTS | N012A |
| o | 8 | 1 ⅛" O.D. x ⅜" I.D. STRUCTURAL WASHERS | W012A |
| p | 1 | BEARING PLATE RETAINER TIE | CT-100ST |
| q | 6 | ⅝" x 10" H.G.R. BOLT | B581002 |
| r | 1 | OBJECT MARKER 18" X 18" | E3151 |

SEE NOTES: *

ALTERNATIVE ITEMS NOT SHOWN. * *
* ITEM(P) 8" WOOD-BLOCKOUT
* * ITEM(Q) 25'GUARD FENCE PANEL

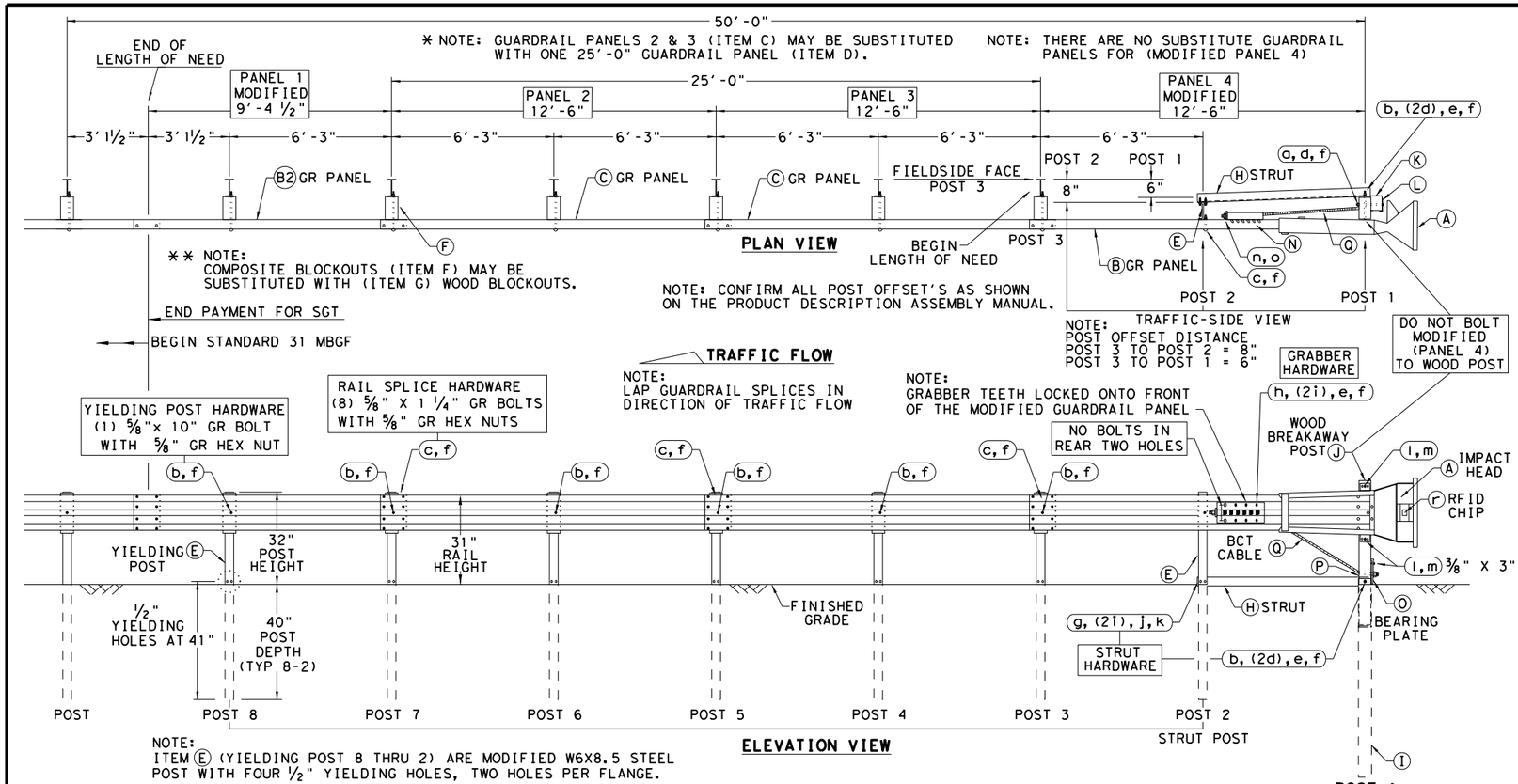
Texas Department of Transportation

Design Division Standard

# SINGLE GUARDRAIL TERMINAL
# MSKT-MASH-TL-3
# SGT(12S)31-18

| | | | | | |
|---|---|---|---|---|---|
| FILE: sgt12s3118.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CL | |
| © TxDOT: APRIL 2018 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 0047 | 07 | 245, ETC | US 75, ETC | |
| | DIST | COUNTY | | SHEET NO. | |
| | DAL | DALLAS, ETC | | 145 | |

DATE:
FILE:

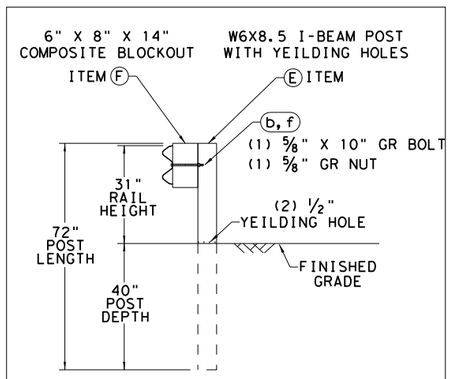



## GENERAL NOTES

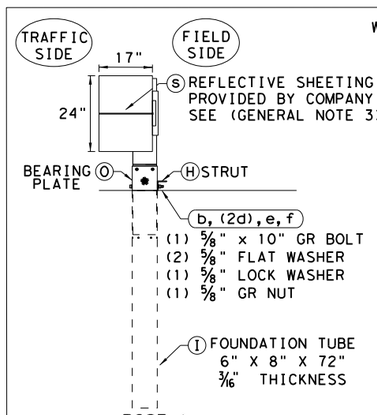
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

| ITEM | QTY | MAIN SYSTEM COMPONENTS | ITEM # |
|---|---|---|---|
| A | 1 | SGET IMPACT HEAD | SIH1A |
| B | 1 | MODIFIED GUARDRAIL PANEL 12'-6" 12GA | 126SPZGP |
| B2 | 1 | MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA | GP94 |
| C | 2 | STANDARD GUARDRAIL PANEL 12'-6" 12GA | GP126 |
| D | 1 | STANDARD GUARDRAIL PANEL 25'-0" 12GA | GP25 |
| E | 7 | MODIFIED YIELDING I-BEAM POST W6x8.5 | YP6MOD |
| F | 6 | COMPOSITE BLOCKOUT 6" X 8" X 14" | CBO8 |
| G | 6 | WOOD BLOCKOUT 6" X 8" X 14" | WBO8 |
| H | 1 | STRUT 3" X 3" X 80" x 1/4" A36 ANGLE | STR80 |
| I | 1 | FOUNDATION TUBE 6" X 8" X 72" x 3/16" | FNDT6 |
| J | 1 | WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50" | WBRK50 |
| K | 1 | WOOD STRIKE BLOCK | WSBLK14 |
| L | 1 | STRIKE PLATE 1/4" A36 BENT PLATE | SPLT8 |
| M | 1 | REINFORCEMENT PLATE 12 GA. GR55 | REPLT17 |
| N | 1 | GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2" | GGR17 |
| O | 1 | BEARING PLATE 8" X 8 5/8" X 5/8" A36 | BPLT8 |
| P | 1 | PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.) | PSLV4 |
| Q | 1 | BCT CABLE 3/4" X 81" LENGTH | CBL81 |
| | | **SMALL HARDWARE** | |
| a | 1 | 5/8" X 12" GUARDRAIL BOLT 307A HDG | 12GRBLT |
| b | 7 | 5/8" X 10" GUARDRAIL BOLT 307A HDG | 10GRBLT |
| c | 33 | 5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG | 1GRBLT |
| d | 3 | 5/8" FLAT WASHER F436 A325 HDG | 58FW436 |
| e | 1 | 5/8" LOCK WASHER HDG | 58LW |
| f | 39 | 5/8" GUARDRAIL HEX NUT HDG | 58HN563 |
| g | 2 | 1/2" X 2" STRUT BOLT A325 HDG | 2BLT |
| h | 6 | 1/2" X 1 1/4" PLATE BOLT A325 HDG | 125BLT |
| i | 16 | 1/2" FLAT WASHER F436 A325 HDG | 12FWF436 |
| j | 8 | 1/2" LOCK WASHER HDG | 12LW |
| k | 8 | 1/2" HEX NUT A563 HDG | 12HN563 |
| l | 4 | 3/8" X 3" HEX LAG SCREW GR5 HDG | 38LS |
| m | 4 | 3/8" FLAT WASHER F436 A325 HDG | 38FW844 |
| n | 2 | 1" FLAT WASHER F436 A325 HDG | 1FWF436 |
| o | 2 | 1" HEX NUT A563DH HDG | 1HN563 |
| p | 1 | 18" TO 24" LONG ZIP TIE RATED 175-200LB | ZPT18 |
| q | 1 | 1 1/2" X 4" SCH-40 PVC PIPE | PSPCR4 |
| r | 1 | RFID CHIP RATED MIL-STD-810F | RFID810F |
| s | 1 | IMPACT HEAD REFLECTIVE SHEETING | RS30M |

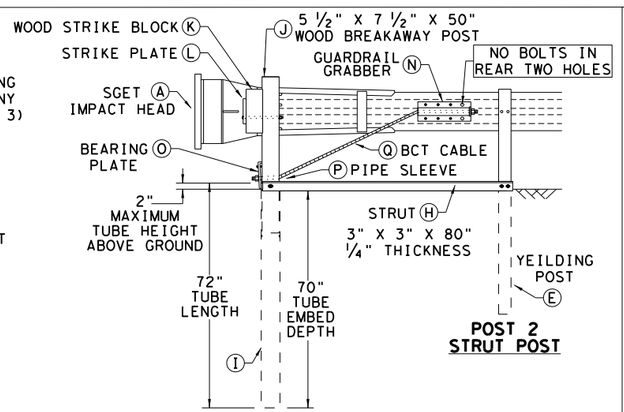
ALTERNATIVE ITEMS
* D
** G
NOTE: SEE PLAN VIEW




SIDE VIEW
POST 8 - POST 3 (TYP)

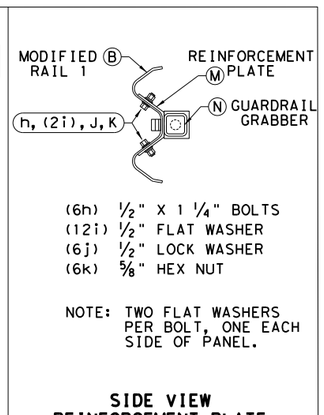



POST 1
FRONT END VIEW

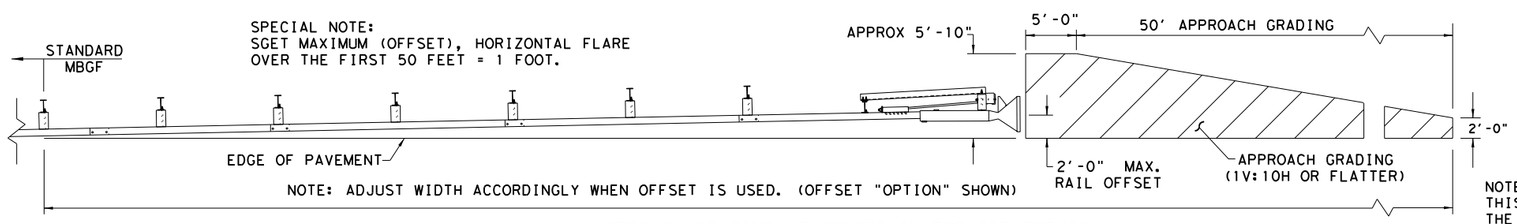



POST 1
FIELD SIDE VIEW

POST 2
STRUT POST




SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER




APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

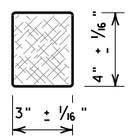
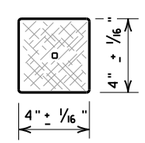
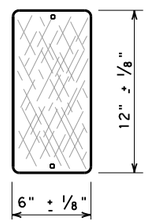
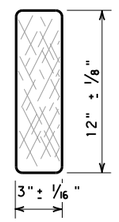
Texas Department of Transportation

Design Division Standard

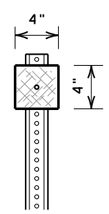
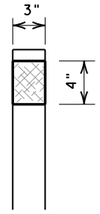
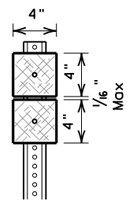
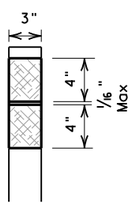
# SPIG INDUSTRY, LLC
# SINGLE GUARDRAIL TERMINAL
# SGET - TL-3 - MASH
# SGT(15)31-20

| FILE: sgt153120.dgn | DN: TxDOT | CK: KM | DW: VP | CK: VP |
|---|---|---|---|---|
| © TxDOT: APRIL 2020 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC |
| | DIST | COUNTY | | SHEET NO. |
| | DAL | DALLAS,ETC | | 146 |

## REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

## DELINEATORS

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

## D & OM DESCRIPTIVE CODES

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

**NUMBER OF REFLECTORS**
S = Single
D = Double

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

**REFLECTOR UNIT SIZE**
1 or 2

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

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

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

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

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

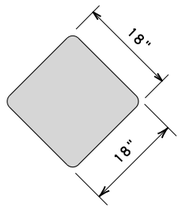
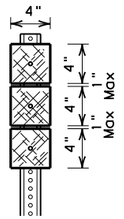
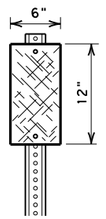
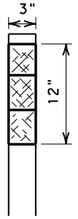
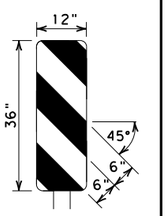
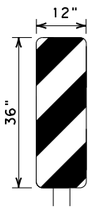
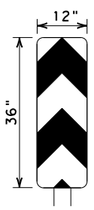
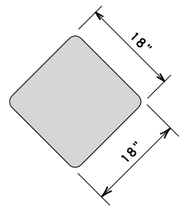
**NUMBER OF REFLECTORS OR DIRECTION**
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

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

**DIRECTION**
If Required
BI = Bi-Directional

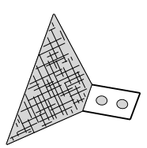
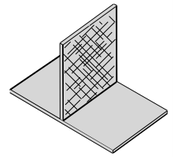
## OBJECT MARKERS

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

## DEPARTMENTAL MATERIAL SPECIFICATIONS

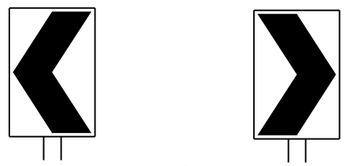
| | |
|---|---|
| FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES) | DMS-4400 |
| SIGN FACE MATERIALS | DMS-8300 |
| DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS | DMS-8600 |

## BARRIER REFLECTORS (BRF)

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

## CHEVRONS

DEVICE



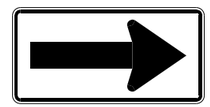
W1-8

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

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

## ONE DIRECTION LARGE ARROW

DEVICE



W1-6

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

## NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

# DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

# D & OM(1)-20

| FILE: dom1-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
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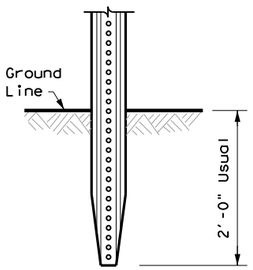
20A

DATE:
FILE:

# POST TYPE AND SUPPORT FOUNDATION DETAILS

## WING CHANNEL (WC)

### GND

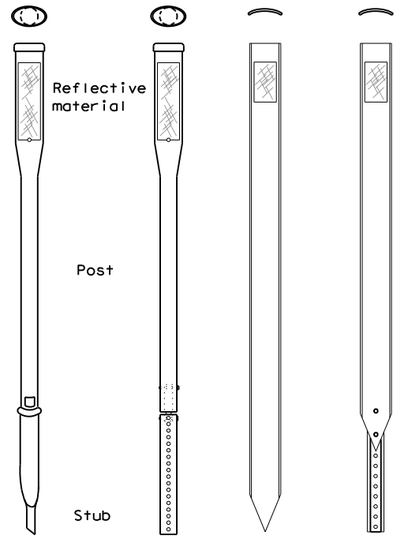



**NOTES**

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

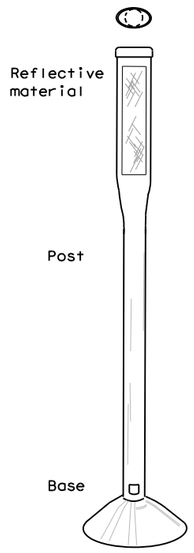
## FLEXIBLE POSTS (YFLX, WFLX)

### GND




EMBEDDED

### SRF



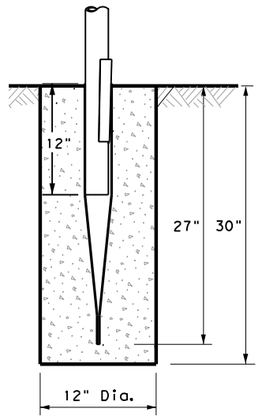

SURFACE MOUNT

**NOTES**

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

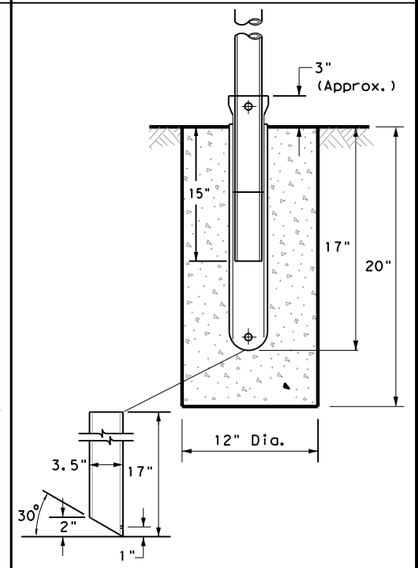
## WEDGE ANCHOR SYSTEMS

### WAS




STEEL

### WAP




PLASTIC

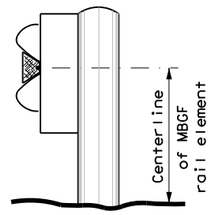
**NOTE**

1. Install per manufacturer's recommendations.

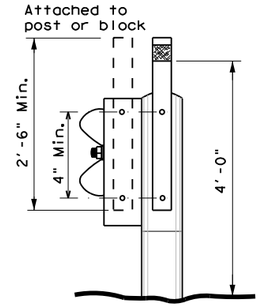
# TYPE OF BARRIER MOUNTS

## GUARD FENCE ATTACHMENT

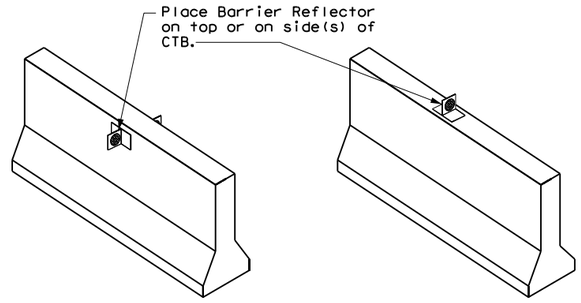
### GF1




### GF2



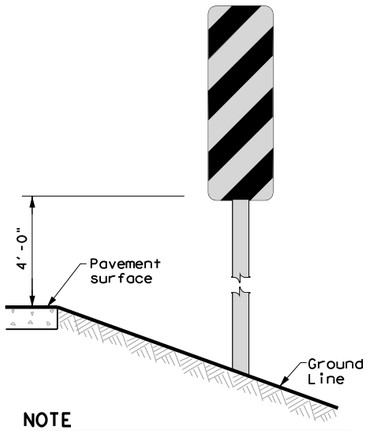

## CONCRETE TRAFFIC BARRIER (CTB)




**GENERAL NOTES**

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

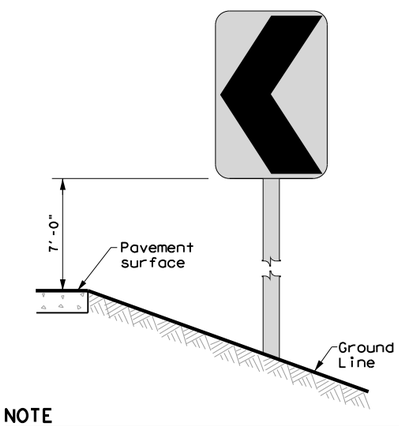
## TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS




**NOTE**

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

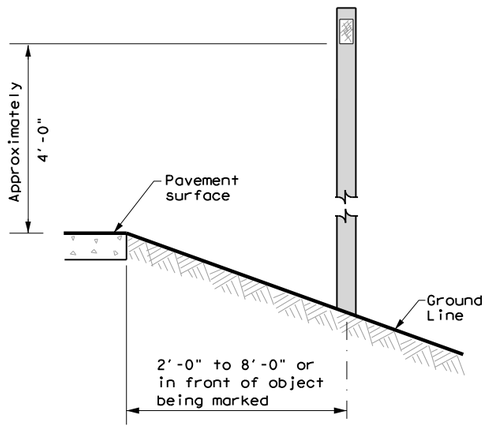
## CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN




**NOTE**

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

## DELINEATORS AND TYPE 2 OBJECT MARKERS




See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

# DELINEATOR & OBJECT MARKER INSTALLATION

# D & OM(2)-20

| FILE: dom2-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
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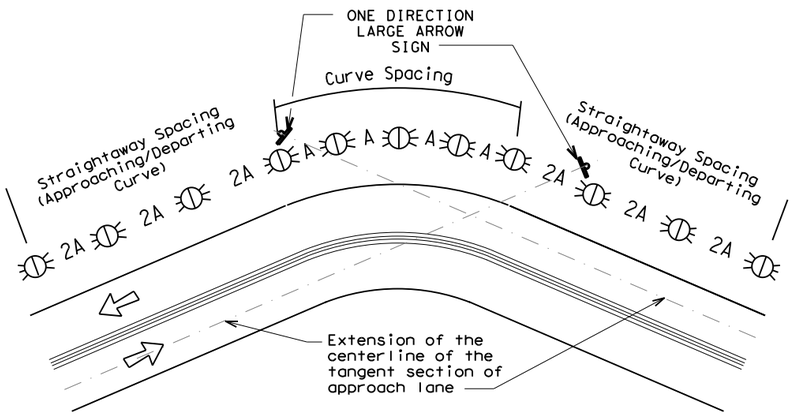
## MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

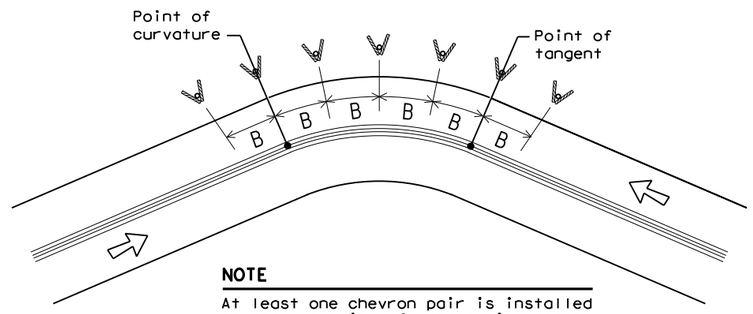
## SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES




**NOTE**

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

## SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES




**NOTE**

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

## DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

## DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

## DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

## NOTES

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

| LEGEND | |
|---|---|
| | Bi-directional Delineator |
| | Delineator |
| | Sign |

Texas Department of Transportation

Traffic Safety Division Standard

# DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

# D & OM(3)-20

| FILE: dom3-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
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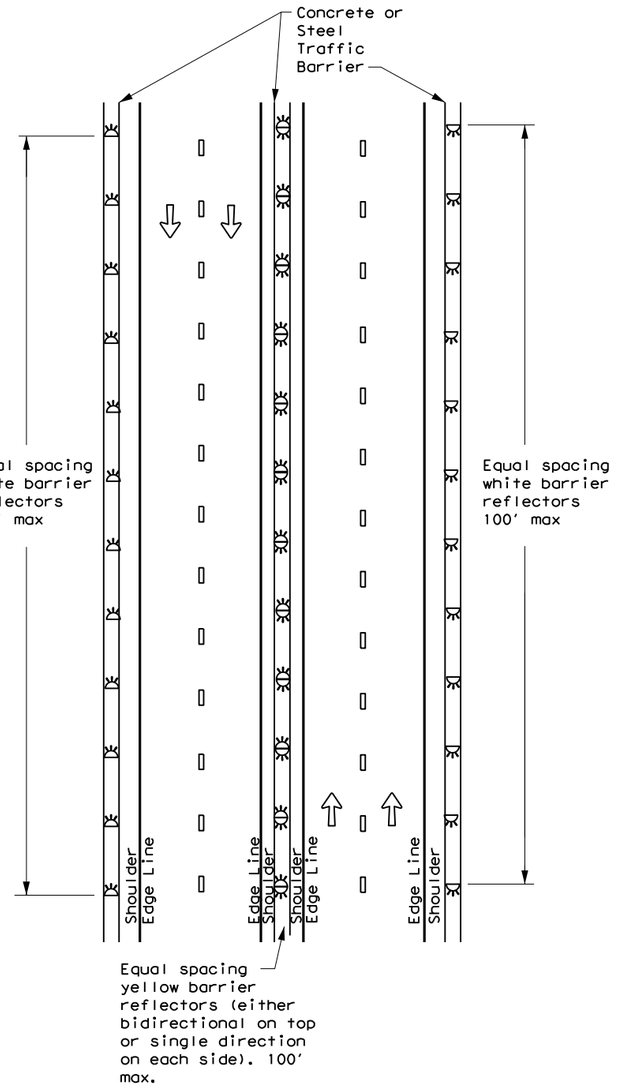
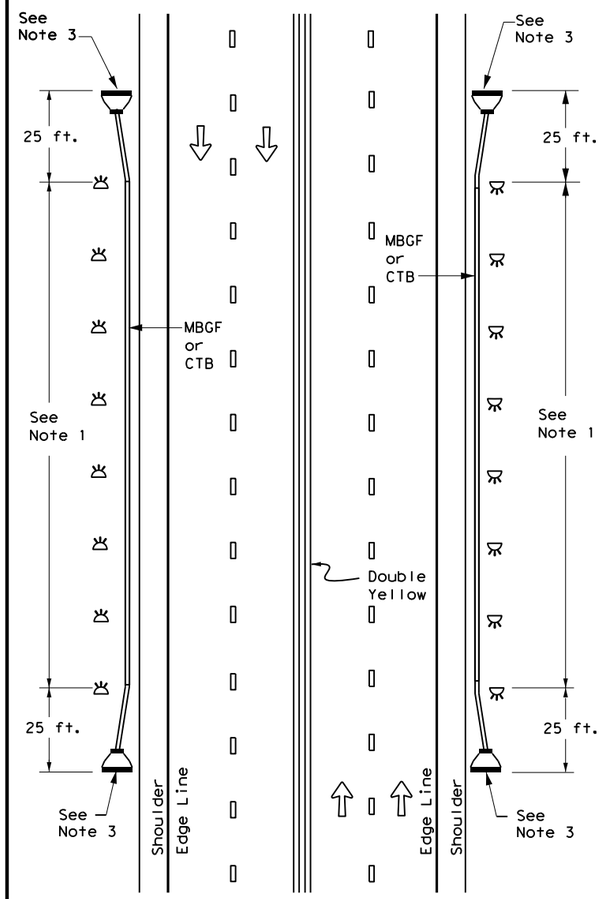
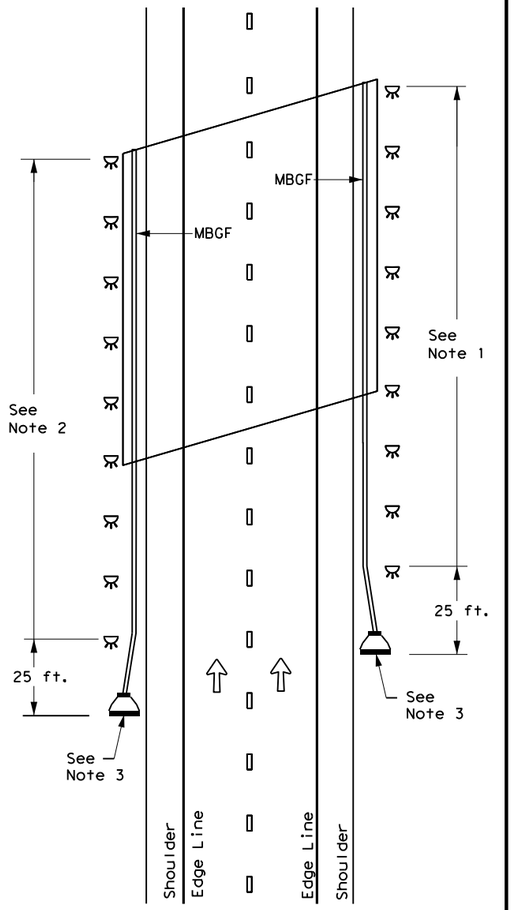
## CONTINUOUS CONCRETE OR STEEL BARRIER



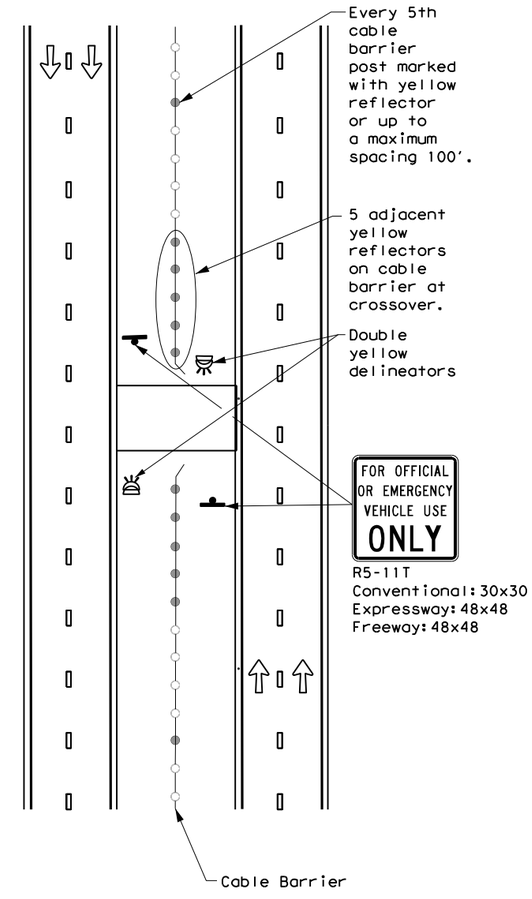

## MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)




## DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)




## EMERGENCY CROSSOVER




## NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

## LEGEND

| | |
|---|---|
| | Bidirectional Delineator |
| | Delineator |
| | OM-3 |
| | OM-2 |
| | Terminal End |
| | Traffic Flow |

Texas Department of Transportation

Traffic Safety Division Standard

# DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

# D & OM(6)-20

| FILE: dom6-20.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
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| 7-20 | DIST | COUNTY | | SHEET NO. |
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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 MS 4 - CONTACT KEVIN HURLEY

☐ 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: NWP# 3(a)

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. Follow Special Notes.

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, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, 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.

## 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 | STP 2B24(025)HES | | US75 |
| STATE | DISTRICT | COUNTY | |
| TEXAS | DALLAS | DALLAS | |
| CONTROL | SECTION | JOB | SHEET NO. |
| 0047 | 07 | 245 etc. | 151 |

## STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

### 1.0 SITE/PROJECT DESCRIPTION

### 1.1 PROJECT CONTROL SECTION JOB (CSJ):

0047-07-245, ETC

### 1.2 PROJECT LIMITS:

US 75 FROM KNOX HENDERSON TO SS 366; SS 366 FROM IH35E TO US 75; VARIOUS DMS REFURBISHMENT AND INSTALLATION LOCATIONS

### 1.3 PROJECT COORDINATES:

BEGIN: (Lat) VARIOUS ,(Long) VARIOUS

END: (Lat) VARIOUS ,(Long) VARIOUS

### 1.4 TOTAL PROJECT AREA (Acres): _____

### 1.5 TOTAL AREA TO BE DISTURBED (Acres): _____

### 1.6 NATURE OF CONSTRUCTION ACTIVITY:

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENT PROJECTS AND CORRIDOR TRAFFIC MANAGEMENT CONSISTING OF WRONG WAY DRIVERS SYSTEMS, DMS REFURBISHMENTS, AND NEW DMS INSTALLATIONS.

### 1.7 MAJOR SOIL TYPES:

| Soil Type | Description |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

### 1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- ☐ PSLs determined during preconstruction meeting
- ☐ PSLs determined during construction
- ☐ No PSLs planned for construction

| Type | Sheet #s |
|---|---|
| | |
| | |
| | |
| | |
| | |

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

### 1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

- ☐ Mobilization
- ☐ Install sediment and erosion controls
- ☐ Blade existing topsoil into windrows, prep ROW, clear and grub
- ☐ Remove existing pavement
- ☐ Grading operations, excavation, and embankment
- ☐ Excavate and prepare subgrade for proposed pavement widening
- ☐ Remove existing culverts, safety end treatments (SETs)
- ☐ Remove existing metal beam guard fence (MBGF), bridge rail
- ☐ Install proposed pavement per plans
- ☐ Install culverts, culvert extensions, SETs
- ☐ Install mow strip, MBGF, bridge rail
- ☐ Place flex base
- ☐ Rework slopes, grade ditches
- ☐ Blade windrowed material back across slopes
- ☐ Revegetation of unpaved areas
- ☐ Achieve site stabilization and remove sediment and erosion control measures
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

### 1.10 POTENTIAL POLLUTANTS AND SOURCES:

- ☐ Sediment laden stormwater from stormwater conveyance over disturbed area
- ☐ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- ☐ Solvents, paints, adhesives, etc. from various construction activities
- ☐ Transported soils from offsite vehicle tracking
- ☐ Construction debris and waste from various construction activities
- ☐ Contaminated water from excavation or dewatering pump-out water
- ☐ Sanitary waste from onsite restroom facilities
- ☐ Trash from various construction activities/receptacles
- ☐ Long-term stockpiles of material and waste
- ☐
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

### 1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

| Tributaries | Classified Waterbody |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |

* Add (*) for impaired waterbodies with pollutant in ().

### 1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- X Perform SWP3 inspections
- X Maintain SWP3 records and update to reflect daily operations
- ☐ Other: _____
- ☐ Other: _____

### 1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- X Day To Day Operational Control
- X Maintain schedule of major construction activities
- X Install, maintain and modify BMPs
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

## STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)



July 2023 Sheet 1 of 2

*Texas Department of Transportation*

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 152 |
| STATE | STATE DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245, ETC | US 75, ETC |

## STORMWATER POLLUTION PRVENTION PLAN (SWP3):

### 2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

### 2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

**T / P**

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

### 2.2 SEDIMENT CONTROL BMPs:

**T / P**

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

### 2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

| Type | Stationing | |
|---|---|---|
| | From | To |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

### 2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

### 2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

### 2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

| Type | Stationing | |
|---|---|---|
| | From | To |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

### 2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

### 2.8 DEWATERING:

### 2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

### 2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

**STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)**

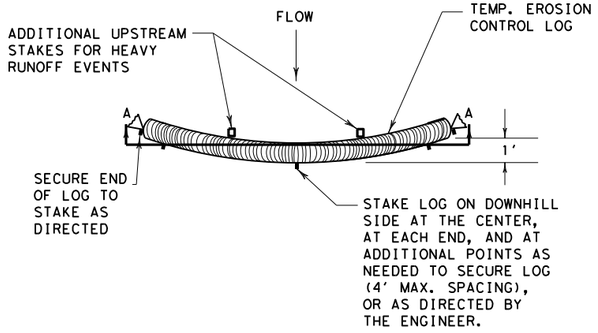


July 2023 Sheet 2 of 2

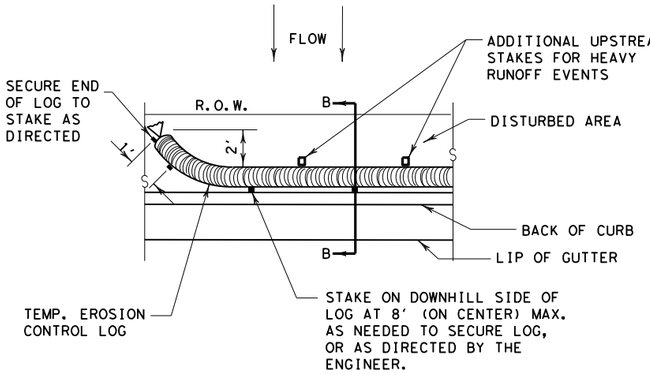
*Texas Department of Transportation*

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| 6 | STP 2B24(025)HES | | 153 |
| STATE | STATE DIST. | COUNTY | |
| TEXAS | DAL | DALLAS, ETC | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0047 | 07 | 245, ETC | US 75, ETC |

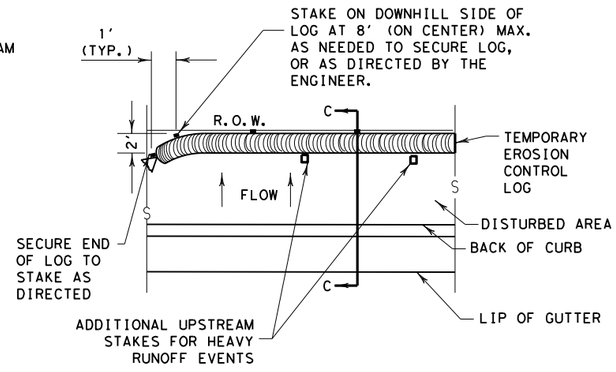
DATE:
FILE:



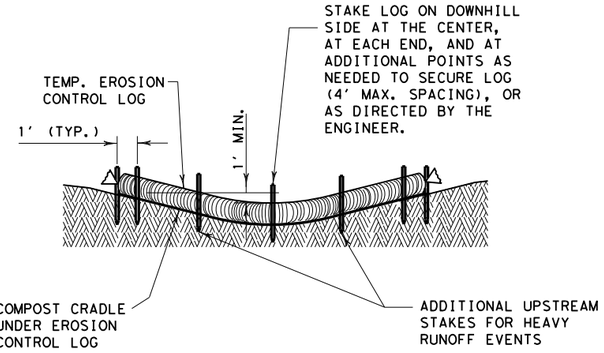

PLAN VIEW




PLAN VIEW



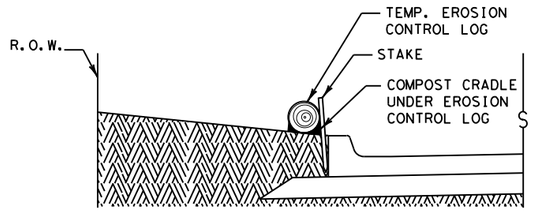

PLAN VIEW




SECTION A-A

EROSION CONTROL LOG DAM

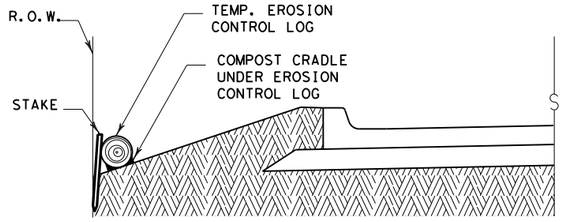
CL-D




SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

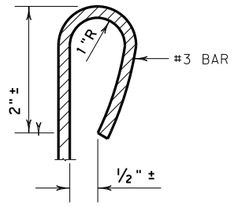
CL-BOC




SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW




REBAR STAKE DETAIL

## 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.

## 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 |

## 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.

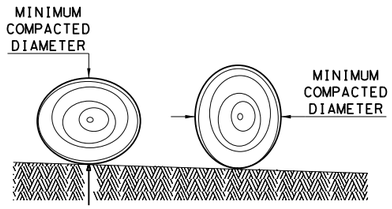
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

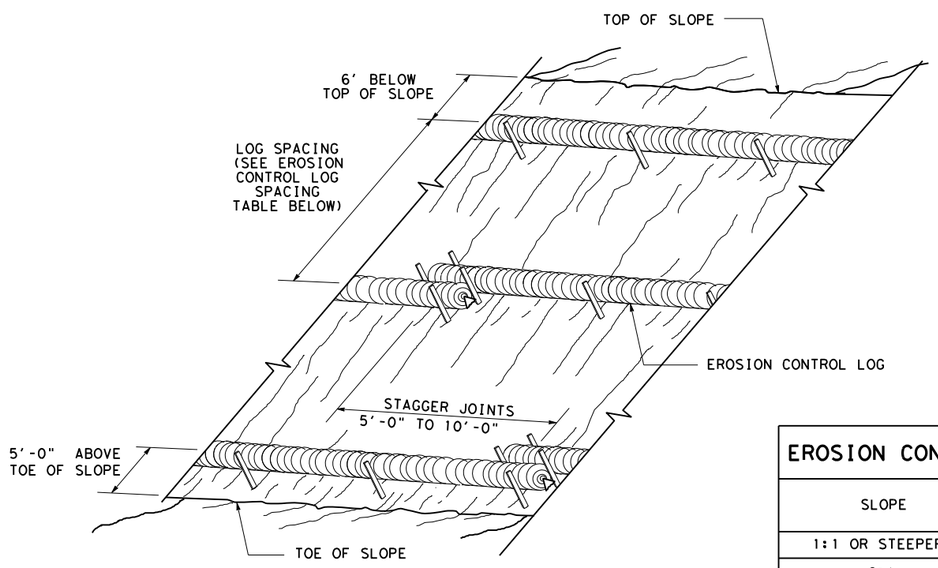
# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

## EROSION CONTROL LOG

## EC(9)-16

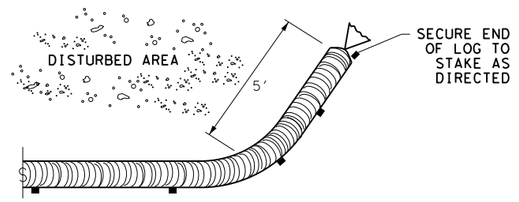
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FILE: ec916 | | DN: TxDOT | CK: KM | DW: LS/PT | CK: LS | | |
| © TxDOT: JULY 2016 | | CONT | SECT | JOB | HIGHWAY | | |
| REVISIONS | | 0047 | 07 | 245,ETC | US 75,ETC | | |
| | | DIST | COUNTY | | SHEET NO. | | |
| | | DAL | DALLAS,ETC | | 154 | | |

DATE:
FILE:




## EROSION CONTROL LOGS ON SLOPES
## STAKE AND TRENCHING ANCHORING

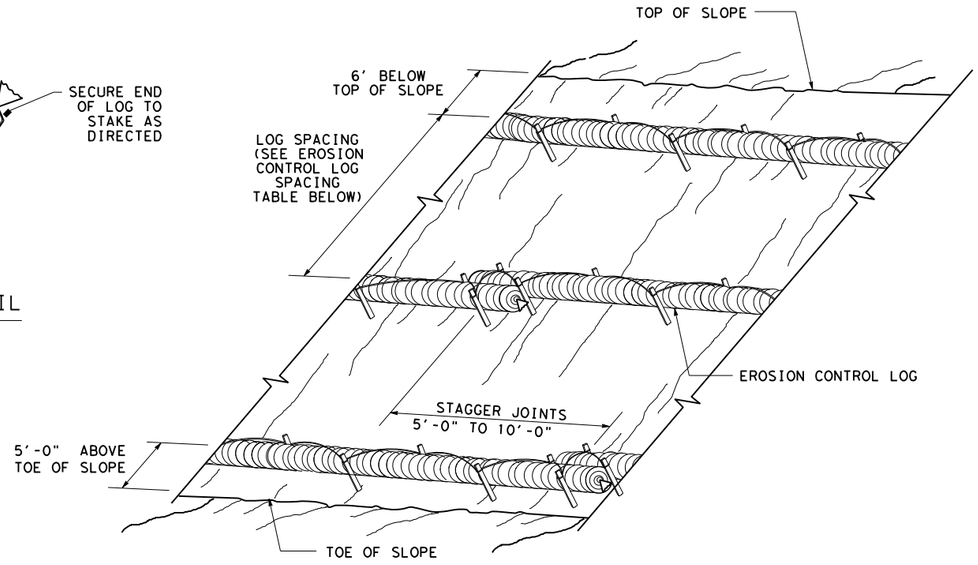
CL-SST




END SECTION RAP DETAIL

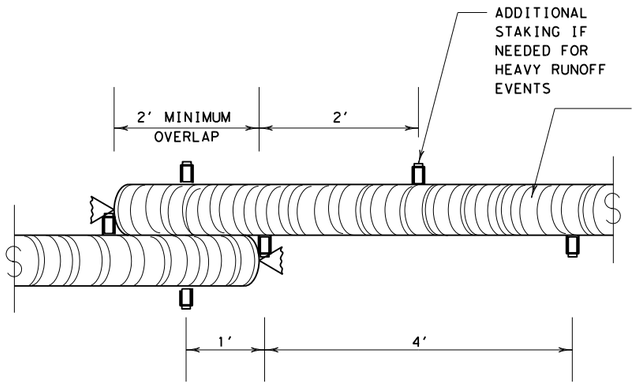
| EROSION CONTROL LOG SPACING TABLE | | | | |
|---|---|---|---|---|
| SLOPE | LOG DIAMETER | | | |
| | 6" | 8" | 12" | 18" |
| 1:1 OR STEEPER | 5' | 10' | 15' | 20' |
| 2:1 | 10' | 20' | 30' | 40' |
| 3:1 | 15' | 30' | 45' | 60' |
| 4:1 OR FLATTER | 20' | 40' | 60' | 80' |

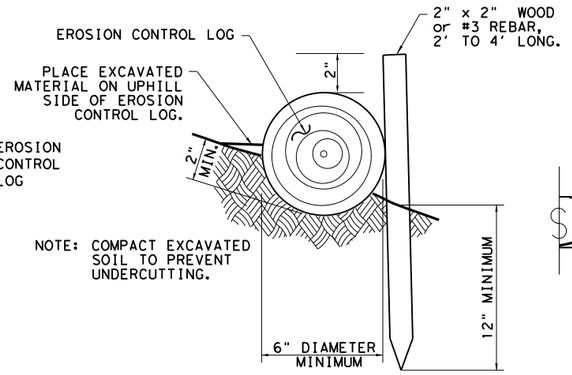
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART




## EROSION CONTROL LOGS ON SLOPES
## STAKE AND LASHING ANCHORING

CL-SSL

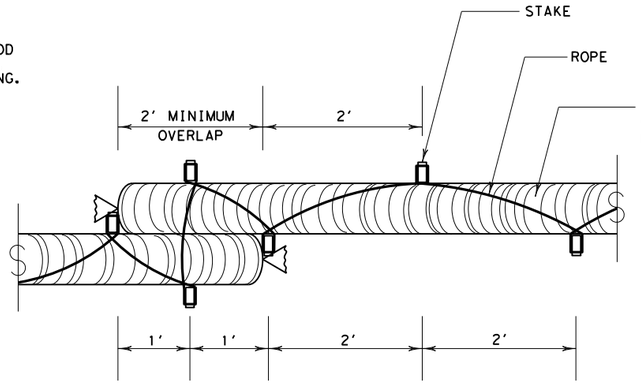


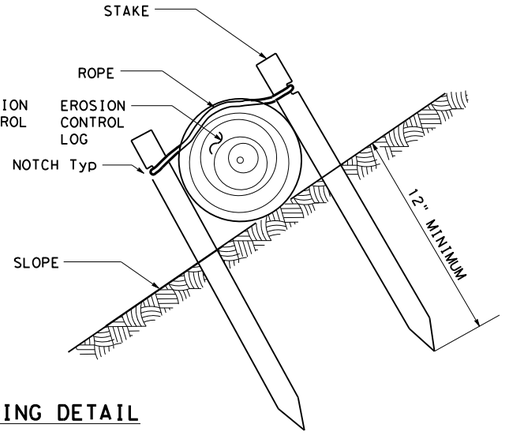




## STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

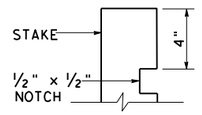
| TRENCH DEPTH TABLE | |
|---|---|
| LOG DIAMETER | DEPTH |
| 6" | 2" |
| 8" | 3" |
| 12" | 4" |
| 18" | 5" |




## STAKE AND LASHING ANCHORING DETAIL

CL-SSL




## STAKE NOTCH DETAIL



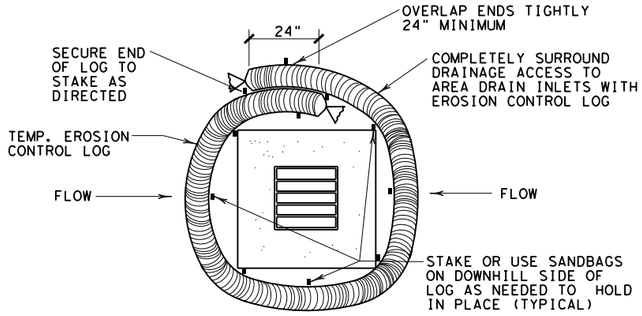
Texas Department of Transportation

Design Division Standard

# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
## EROSION CONTROL LOG
## EC(9)-16

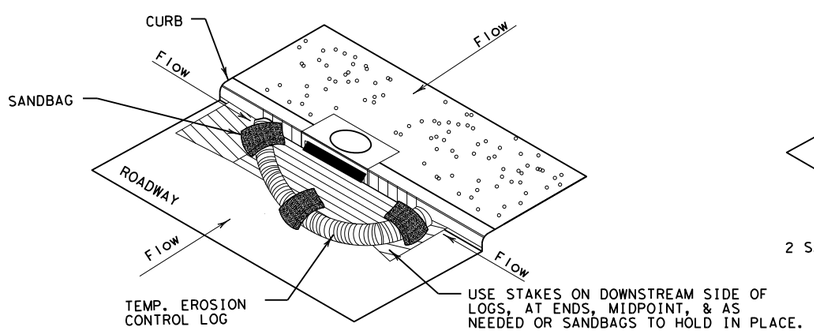
| | | | | | |
|---|---|---|---|---|---|
| FILE: ec116 | DN: TxDOT | CK: KM | DW: LS/PT | CK: LS | |
| © TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 0047 | 07 | 245,ETC | US 75,ETC | |
| | DIST | COUNTY | | SHEET NO. | |
| | DAL | DALLAS,ETC | | 155 | |

DATE:
FILE:



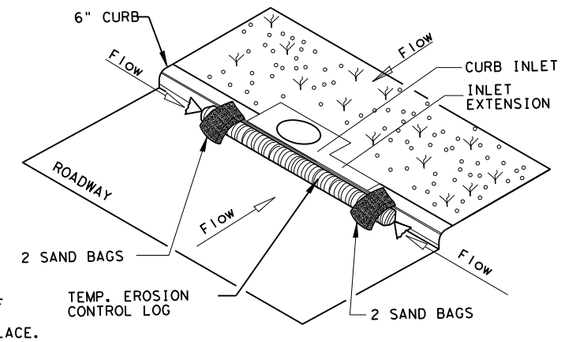

## EROSION CONTROL LOG AT DROP INLET

CL-DI




## EROSION CONTROL LOG AT CURB INLET

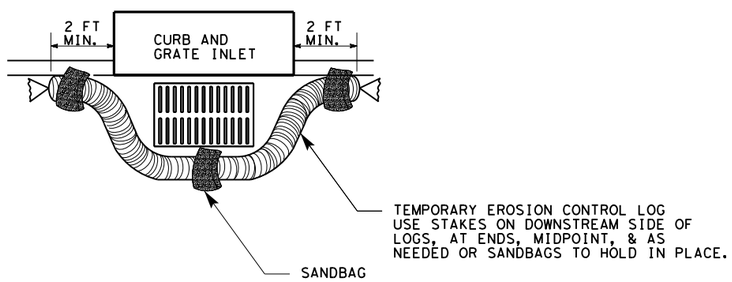
CL-CI




## EROSION CONTROL LOG AT CURB INLET

CL-CI

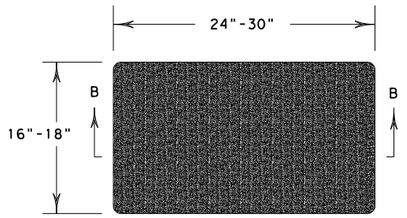
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.




## EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI


SECTION B-B




SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

## EROSION CONTROL LOG

## EC(9)-16

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FILE: ec916 | DN: TxDOT | | CK: KM | | DW: LS/PT | | CK: LS |
| © TxDOT: JULY 2016 | CONT | SECT | JOB | | HIGHWAY | | |
| REVISIONS | 0047 | 07 | 245,ETC | | US 75,ETC | | |
| | DIST | COUNTY | | | | | SHEET NO. |
| | DAL | DALLAS,ETC | | | | | 156 |