FED.RD. DIV.NO.	FEDERAL PROJECT NO.		SHEET NO.
6	CM 2023(611), ETC.		1
STATE	STATE DIST.	COUNTY	
TEXAS	18	DALLAS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0092	02	137, ETC.	IH 45, ETC.

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

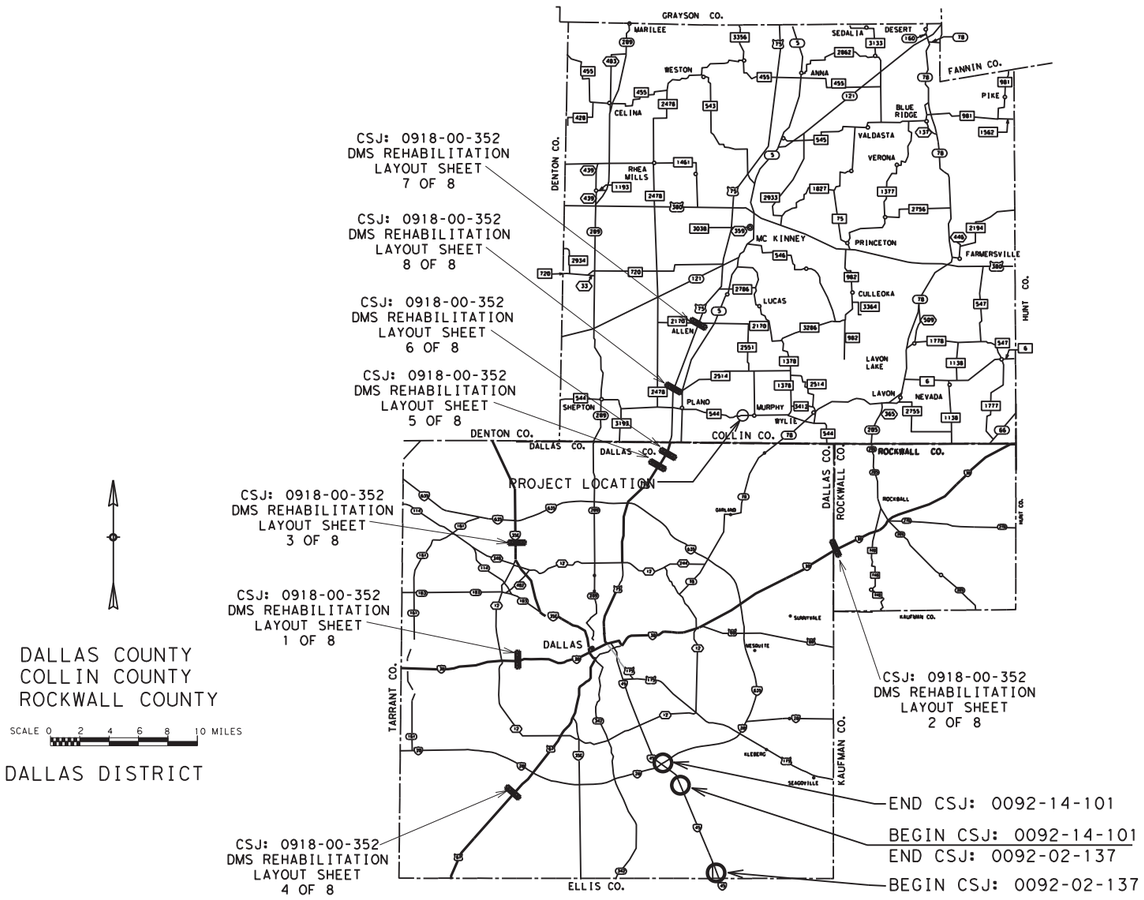
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT:

CCSJ: 0092-02-137	CSJ: 0092-14-101	CSJ: 0918-00-352
CM 2023(611)	CM 2023(611)	F 2023(610)
IH 45	IH 45	VARIOUS ROADWAYS
FROM ELLIS COUNTY LINE	FROM SOUTH OF IH 20	VARIOUS LOCATIONS
TO SOUTH OF IH 20	TO NORTH OF IH 20	IN DALLAS DISTRICT

DALLAS, ROCKWALL, AND COLLIN COUNTIES

TYPE: UPGRADE TO FIBER OPTIC DATA TRANSMISSION AND DEPLOYMENT OF ADDITIONAL CCTV, AND REHABILITATION OF DYNAMIC MESSAGE SIGNS



DALLAS COUNTY
COLLIN COUNTY
ROCKWALL COUNTY

SCALE 0 2 4 6 8 10 MILES

DALLAS DISTRICT

NOTE:

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 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, JULY 5, 2022)

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMEND _____ 2/17/2023
DocuSigned by: Eyad Fanous , P.E.
7C074158193648D...
SUPERVISOR

RECOMMEND _____ 2/21/2023
DocuSigned by: Brandi A. Bush , P.E.
83A34C9C0641432...
IGINEER

RECOMMEND _____ 2/21/2023
DocuSigned by: JEFFREY BUSH , P.E.
345B765EB03F406...
IS

RECOMMEND _____ 2/21/2023
DocuSigned by: Cesson Clemons , P.E.
A879E0D10CD6464...
IEER

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

Eduardo Torrens Soto 02/17/2023
Signature of Registrant & Date

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: YES
UPRR: IH45 AT MILLERS FERRY RD

DATE: 2/17/2023

INDEX OF SHEETS

* 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
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. $DATE$
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation
© $YEAR$

IH45 ITS UPGRADE
INDEX OF SHEETS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DSN	6	(SEE TITLE SHEET)		HWY
GRAPHICS GRP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CT	TEXAS	DST	CTY	2
CHECK	CONTROL	SECTION	JOB	
	C	S	J	

DATE: $DATE$
FILE: $FILE$

DATE: $DATE$

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 areas for this project, as shown on the plans are:

- 1.4927 acres (IH 45 from Ellis County Line to IH 20)
- 0.0004 acres (IH 30 at Cockrell Hill Rd)
- 0.0004 acres (IH 30 at Sapphire Bay Blvd)
- 0.0004 acres (IH 35E at Royal Ln)
- 0.0013 acres (US 67 at E Danieldale Rd)
- 0.0011 acres (US 75 at Collins Blvd)
- 0.0011 acres (US 75 at Galatyn Pkwy)
- 0.0010 acres (US 75 at McDermott Dr)
- 0.0010 acres (US 75 at E Park Blvd)
-

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

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

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

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

CSJ: 0092-02-137, etc. **Sheet 3**

County: Dallas, etc.

Highway: IH 45, etc.

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

All contractor questions will be reviewed by the Engineer or Construction Manager. 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.

The Contractor shall ensure that the existing Dallas District ITS System remains operational throughout the construction duration with a minimal lapse (48 hours maximum per outage) in video or data transmission unless otherwise approved by the Engineer.

To minimize "down time" to the Dallas District ITS System, the relocation of ITS poles, ITS cabinets, cameras, RVSD's, radios, antennas, and power conductors shall be performed during a single weekend (9:00 pm Friday through 5:00 am Monday).

Contact the TxDOT Freeway Management Office (214-320-6602) at least 48 hours in advance of performing any work on this project that disconnects or reconnects existing TxDOT "ITS" radios. TxDOT "ITS" personnel must be on-site while this work is performed.

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 a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

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

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

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

Item 7:

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: 0092-02-137, etc. **Sheet 3A**

County: Dallas, etc.

Highway: IH 45, 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 120 day construction delay is included in this contract through Special Provision 008-004. 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.

The Lane Closure Assessment Fee is shown on the following table. The fee applies to the Contractor for closures or obstructions that overlap into restricted hour traffic for each hour or portion thereof, per lane, regardless of the length of the lane closure or obstruction.

Table 1
Lane Closure Assessment Fee Table

Roadway	Amount Per Lane Per Hour
IH 45	$2000
IH 30	$3500
IH 35E	$5500
US 67	$2000
US 75	$5500

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.

CSJ: 0092-02-137, etc. **Sheet 3B**

County: Dallas, etc.

Highway: IH 45, etc.

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 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.

The Contractor may begin closing 1 Lane of the *NBML/SBML or EBML/WBML’s* at *9* PM. The Contractor must have *2 or more NBML/SBML or EBML/WBML’s* open by *7 AM* and all the *NBML/SBML/EBML/WBML’s* open by *9 AM.* Full Freeway closures are not allowed unless otherwise approved in writing by the Engineer.

The lane closure disincentive fee is shown on the following table. 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.

Main Lane Disincentive

*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

Traffic Control Plans with Lane Closures causing backups of 20 minutes or greater in duration will be modified by the Engineer up to and including removal of the lane closure and adjustment of lane closure times.

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.

Items 618, 6016:

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.

CSJ: 0092-02-137, etc. **Sheet 3C**

County: Dallas, etc.

Highway: IH 45, etc.

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.

“ITS” conduit shall be installed a minimum of 42 inches deep, when trenching methods are used, and a minimum of 60 inches deep when bored under existing pavement, unless shown otherwise in the plans.

When trenching through rocky soil, place “ITS” conduit on a two-inch sand cushion and backfill with a minimum of six inches of sand.

The minimum bending radius for all “ITS” conduits supplied on this project shall be 18 inches, or as approved.

Install a permanent non-metallic pull cord, with a minimum tensile strength of 600 pounds, in all new “ITS” conduits. For conduits installed for future use, plug conduits using a mechanical conduit plug. Ensure that the mechanical plug creates a water and airtight seal. This work will not be paid for directly but will be subsidiary to this item.

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, 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 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 LED 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.

Each Type A or D ground box 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 or Transocket shall be mounted facing the roadway and the service enclosure shall be mounted on the opposite side of the service pole or pedestal.

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

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

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

CSJ: 0092-02-137, etc. **Sheet 3D**

County: Dallas, etc.

Highway: IH 45, etc.

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.

For existing services that are being upgraded to stainless steel service enclosures on existing supports, the Contractor shall provide a new enclosure with new components and all incidentals necessary to securely mount it to the support. If the proposed amperage loads of the upgraded services are higher than the existing loads, the Contractor shall coordinate with the utility company to ensure that their existing transformer and service conductors are of sufficient capacity.

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

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

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: Fiber Optic Cable

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

All fiber optic trunk cables and the insulated tracer wires will be installed in multiduct conduit. Electrical conductors will be installed in one 3 inch conduit (or 2 inch conduit if shown on plans) and any non-fiber communications cables are to be installed in the second 3 inch conduit (or 2 inch conduit if shown on plans).

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

Extra cable length will be included in each run, to provide adequate slack, at each ground box, camera pole, communications hub, dynamic message sign, or radar vehicle sensing device, as determined or shown in the plans.

Existing cables to be removed and salvaged shall be neatly coiled and strapped. Salvaged cables shall be delivered to the TxDOT Cedar Hill Maintenance Yard or as directed by the Engineer.

Item 6010: CCTV Field Equipment

The cables and harnesses will enter at the bottom of the CCTV housing. The CCTV will have gaskets, at entry points, to prevent moisture entry.

Item 6027: Preparation of Existing Conduits, Ground Boxes, or Manholes:

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.

Item 6028: Installation of Dynamic Message Sign System:

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.

Install provided communication cables (fiber or copper as applicable) between the DMS and the DMS controller cabinet for the operation of the sign. This work will not be paid for separately, but will be considered subsidiary to Item 6028.

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.

CSJ: 0092-02-137, etc. **Sheet 3E**

County: Dallas, etc.

Highway: IH 45, etc.

Item 6032: ITS System Integration:

Any system integration work required for the temporary ITS system will not be paid for separately, but will be considered subsidiary to this item.

Item 6062: ITS Radio

Removal of existing ISDN equipment will not be paid for directly, but shall be considered subsidiary to this item.

Lowering and raising of existing high mast CCTV pole assembly ring for the purpose of relocating and testing 5 GHz Ethernet Radios will be considered subsidiary to this item. Give 24 hours' notice before lowering any high mast rings

Item 6093: Existing Traffic Management Equipment

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 6185:

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

TCP 1 Series	Scenario	Required TMA
(1-1)-18 / (1-2)-18		1
(1-4)-18 / (1-5)-18 / (1-6)-18		1

TCP 6 Series	Scenario		Required TMA/TA	
(6-1)-12	A	B	1	2

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

County: Dallas, etc.

Highway: IH 45, etc.

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

Item 6186: ITS Ground Box:

The Contractor shall provide a total of 4 keyed sockets for the locking security bolts for the project. This work will not be paid for directly, but is subsidiary to this Item.

Item 6304: ITS RVSD:

An external RS-232 / RS-485 communication port installed in the CCTV / RVSD pole mount cabinet shall be an acceptable method to meet the requirements of Section 2.8.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0092-02-137 **DISTRICT** Dallas **COUNTY** Dallas
HIGHWAY IH 45, Various

			CONTROL SECTION JOB	**0092-02-137**		**0092-14-101**		**0918-00-352**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00177073**		**A00177076**		**A00130452**			
			COUNTY	**Dallas**		**Dallas**		**Dallas**			
			HIGHWAY	**IH 45**		**IH 45**		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	416-6006	DRILL SHAFT (48 IN)	LF	189.000						189.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	11.250						11.250	
	500-6001	MOBILIZATION	LS	0.400		0.200		0.400		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	7.000		2.000		7.000		16.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	285.000		20.000				305.000	
	506-6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	190.000		225.000				415.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	475.000		245.000				720.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	830.000		460.000				1,290.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	830.000		460.000				1,290.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	200.000						200.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF					50.000		50.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	200.000				50.000		250.000	
	618-6029	CONDT (PVC) (SCH 40) (3")	LF	47,727.000		2,442.000		185.000		50,354.000	
	618-6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	2,945.000		615.000				3,560.000	
	618-6074	CONDT (RM) (3")	LF	995.000						995.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	4,378.000						4,378.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	47,593.000		3,117.000				50,710.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF					540.000		540.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	8,358.000				1,362.000		9,720.000	
	620-6011	ELEC CONDR (NO.4) BARE	LF					1,673.000		1,673.000	
	620-6012	ELEC CONDR (NO.4) INSULATED	LF					5,637.000		5,637.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	10.000				3.000		13.000	
	628-6151	ELC SRV TY D 120/240 060(NS)SS(N)PS(U)	EA	6.000						6.000	
	6000-6098	INSTALL CIRCUIT BREAKER	EA	4.000						4.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	10.000		5.000		2.000		17.000	
	6007-6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	1,715.000						1,715.000	
	6007-6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	47,190.000		3,237.000				50,427.000	
	6007-6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	52,262.000		3,237.000				55,499.000	
	6007-6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	9.000						9.000	
	6007-6098	FIBER OPTIC PATCH PANEL (36 POSITION)	EA			1.000				1.000	
	6007-6099	FIBER OPTIC PATCH PANEL (48 POSITION)	EA			1.000				1.000	
	6007-6101	FIBER OPTIC PATCH PANEL (96 POSITION)	EA	9.000						9.000	
	6007-6102	RELOCATE FIBER OPTIC CABLE	LF					285.000		285.000	
	6008-6027	ITS GRND MNT CAB (TY 4) (CONF 2)	EA	9.000						9.000	
	6010-6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	6.000						6.000	
	6010-6004	CCTV MOUNT (POLE)	EA	6.000						6.000	
	6016-6006	ITS MULTI-DUCT CND (PVC-40)	LF	45,640.000		2,306.000				47,946.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0092-02-137 **DISTRICT** Dallas **COUNTY** Dallas
HIGHWAY IH 45, Various

			CONTROL SECTION JOB	**0092-02-137**		**0092-14-101**		**0918-00-352**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00177073**		**A00177076**		**A00130452**			
			COUNTY	**Dallas**		**Dallas**		**Dallas**			
			HIGHWAY	**IH 45**		**IH 45**		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	6016-6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	2,239.000		615.000				2,854.000	
	6016-6013	ITS MULTI-DUCT CND (RMC)	LF	995.000						995.000	
	6027-6003	CONDUIT (PREPARE)	LF					3,503.000		3,503.000	
	6027-6008	GROUND BOX (PREPARE)	EA					18.000		18.000	
	6028-6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA					8.000		8.000	
	6062-6042	RELOCATE ITS RADIO	EA	6.000						6.000	
	6064-6055	ITS POLE (60 FT)(90 MPH)	EA	6.000						6.000	
	6064-6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	9.000						9.000	
	6093-6010	REMOVE EXIST FIB OPT DMS SYS(TY-2)	EA					8.000		8.000	
	6185-6002	TMA (STATIONARY)	DAY	20.000		5.000		5.000		30.000	
	6186-6006	ITS GND BOX(PCAST) TY 1 (243660)W/APRN	EA	64.000		7.000				71.000	
	6186-6012	ITS GND BOX(PCAST) TY 2 (366060)W/APRN	EA	14.000						14.000	
	6304-6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	9.000						9.000	
	04	PRIMARY LINE EXTENSION, CONNECTION: PUBLIC UTILITY FORCE ACCOUNT (NON-PARTICIPATING)	LS	1.000						1.000	
	06	MATERIAL FURNISHED BY STATE (PARTICIPATING)	LS	1.000		1.000		1.000		3.000	
	12	RAILROAD FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000						1.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		1.000		3.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		1.000		3.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000		1.000		3.000	

ITS SUMMARY - CSJ:0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	SHEET 1	SHEET 2	SHEET 3	SHEET 4	SHEET 5	SHEET 6	SHEET 7	SHEET 8	SHEET 9	SHEET 10	SHEET 11	SHEET 12	SHEET 13	SHEET 14	SHEET 15	SHEET 16	SHEET 17	SHEET 18
416	6006	DRILL SHAFT (48 IN)	LF	21					21						21				21		
432	6001	RIPRAP (CONC)(4IN)	CY	1.25					1.25						1.25				1.25		
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1142	1103	838	1102	511	1687	1073	1097	1092	1012	1770	1676	998	1099	962	1663	76	900
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	34		70		42	360	47			85	65		105		142		90	172
618	6074	CONDT (RM)(3")	LF			196		599													
620	6007	ELEC CONDR (NO. 8) BARE	LF	80					538					761	408				115		
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1001	1113	1134	1112	1187	1285	1135	1107	1102	1112	1114	1146	1118	1109	1119	1318	1098	1087
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	160					1076					1522	816				230		
624	6010	GROUND BOX TY D (162922) W/APRON	EA	1					1					3					1		
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA						1					1							
6000	6098	INSTALL CIRCUIT BREAKER	EA	1					1										1		
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	35					150						158				60		
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1226	1133	1194	1132	1257	1146	1165	1127	1122	1142	1144	1130	1148	1129	1149	1008	1138	1117
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1371	1133	1194	1132	1257	1761	1165	1127	1122	1142	1144	1368	1148	1129	1149	1708	1138	1117
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1					1						1				1		
6007	6101	FIBER OPTIC PATCH PANEL (96 POSITION)	EA	1					1						1				1		
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1					1						1				1		
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA						1						1						
6010	6004	CCTV MOUNT (POLE)	EA						1						1						
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1062	1103	838	1102	511	1588	1073	1097	1092	1012	1099	1278	998	1099	962	1663	988	900
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	34		70		42	38	47			85			105		142		90	172
6016	6013	ITS MULTI-DUCT CND (RMC)	LF			196		599													
6064	6019	ITS POLE (40 FT)(90 MPH)	EA	1															1		
6064	6055	ITS POLE (60 FT)(90 MPH)	EA						1						1						
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1					1						1				1		
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1			1	5	2	2	2	1	2	2	1	1	1	1	2	2	1
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	2	1	3			1						1				1		
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1					1						1				1		
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2					2						2				2		
	**	RS-237/RS-422 TERMINAL SERVER	EA	1					1						1				1		
	**	PORT EXPANDER	EA	1					1						1				1		

ITS SUMMARY - CSJ:0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	SHEET 19	SHEET 20	SHEET 21	SHEET 22	SHEET 23	SHEET 24	SHEET 25	SHEET 26	SHEET 27	SHEET 28	SHEET 29	SHEET 30	SHEET 31	SHEET 32	SHEET 33	SHEET 34
416	6006	DRILL SHAFT (48 IN)	LF					21				21					21		
416	6023	DRILL SHAFT (SIGN MTS)(54 IN)	LF																
432	6001	RIPRAP (CONC)(4IN)	CY					1.25				1.25					1.25		
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1095	1092	1056	940	1963	917	1092	920	2078	995	1044	994	1094	1322	1094	1098
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF			30	150	70	173		168	62	100	44	104		148		
618	6074	CONDT (RM)(3")	LF	200															
620	6007	ELEC CONDR (NO. 8) BARE	LF					417				823					128		
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1515	1102	1101	1100	1371	1105	1102	1108	1173	1110	1103	1113	1104	1199	1104	1108
620	6010	ELEC CONDR (NO. 6) INSULATED	LF					834				1646					256		
624	6010	GROUND BOX TY D (162922) W/APRON	EA					2				1							
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA					1				1							
6000	6098	INSTALL CIRCUIT BREAKER	EA														1		
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF					125				579					45		
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1340	1122	1131	1120	1159	1135	1122	1148	1076	1140	1133	1143	1124	1144	1124	1128
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1340	1122	1131	1120	1876	1135	1122	1148	1494	1140	1133	1143	1124	1560	1124	1128
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA					1				1					1		
6007	6101	FIBER OPTIC PATCH PANEL (96 POSITION)	EA					1				1					1		
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA					1				1					1		
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA					1				1							
6010	6004	CCTV MOUNT (POLE)	EA					1				1							
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1095	1092	1056	940	1741	917	1092	920	1404	995	1044	994	1094	1292	1094	1098
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF			30	150		173		168		100	44	104		148		
6016	6013	ITS MULTI-DUCT CND (RMC)	LF	200															
6064	6019	ITS POLE (40 FT)(90 MPH)	EA														1		
6064	6055	ITS POLE (60 FT)(90 MPH)	EA					1				1							
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA					1				1					1		
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	3	1	2	1	2	1	1	2	1	2	2	2	1	2	1	1
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA					1				1					1		
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA					1				1					1		
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA					2				2					2		
	**	RS-237/RS-422 TERMINAL SERVER	EA					1				1					1		
	**	PORT EXPANDER	EA					1				1					1		

ITS & DMS REHABILITATION
SUMMARY

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	5
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/2/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS SUMMARY.dgn

ITS SUMMARY - CSJ:0092-02-137												
ITEM	CODE	DESCRIPTION	UNIT	SHEET 35	SHEET 36	SHEET 37	SHEET 38	SHEET 39	SHEET 40	SHEET 41	SHEET 42	TOTAL
416	6006	DRILL SHAFT (48 IN)	LF			21			21			189
432	6001	RIPRAP (CONC)(4IN)	CY			1.25			1.25			11.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1056	1046	2051	1320	1002	1282	888	487	47727
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	36	44	133		120	132	204	15	2945
618	6074	CONDT (RM)(3")	LF									995
620	6007	ELEC CONDR (NO. 8) BARE	LF			904			204			4378
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1107	1105	1223	1335	1137	1147	1112	512	47593
620	6010	ELEC CONDR (NO. 6) INSULATED	LF			1410			408			8358
624	6010	GROUND BOX TY D (162922) W/APRON	EA						1			10
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA			1			1			6
6000	6098	INSTALL CIRCUIT BREAKER	EA									4
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF			445			118			1715
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1137	1135	1151	1365	1167	1142	1152	45	47190
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1137	1135	2211	1365	1167	1418	1152	532	52262
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA			1			1			9
6007	6101	FIBER OPTIC PATCH PANEL (96 POSITION)	EA			1			1			9
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA			1			1			9
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA			1			1			6
6010	6004	CCTV MOUNT (POLE)	EA			1			1			6
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1056	1046	1406	1320	1002	1102	888	487	45640
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	36	44	78		120		204	15	2239
6016	6013	ITS MULTI-DUCT CND (RMC)	LF									995
6064	6055	ITS POLE (60 FT)(90 MPH)	EA			1			1			6
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA			1			1			9
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2	1	2	2	1	2	1	1	64
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA			1			1			14
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA			1			1			9
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA			2			2			18
	**	RS-237/RS-422 TERMINAL SERVER	EA			1			1			9
	**	PORT EXPANDER	EA			1			1			9

ITS SUMMARY - CSJ:0092-14-101							
ITEM	CODE	DESCRIPTION	UNIT	SHEET 42	SHEET 43	SHEET 44	TOTAL
618	6029	CONDT (PVC) (SCH 40) (3")	LF	465	972	1005	2442
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	116	262	237	615
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	601	1254	1262	3117
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	641	1294	1302	3237
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	641	1294	1302	3237
6007	6098	FIBER OPTIC PATCH PANEL (36 POSITION)	EA			1	1
6007	6099	FIBER OPTIC PATCH PANEL (48 POSITION)	EA			1	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	465	972	869	2306
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	116	262	237	615
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1	3	3	7
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA			2	2

ITS & DMS REHABILITATION

SUMMARY

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	5A
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/2/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS SUMMARY.dgn

ITEM	CODE	DESCRIPTION	UNIT	Sheet 1	Sheet 2	Sheet 3	Sheet 4	Sheet 5	Sheet 6	Sheet 7	Sheet 8	TOTAL
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO									7
618	6029	CONDT (PVC) (SCH 40) (3")	LF				40	45	60	20	20	185
620	6009	ELEC CONDR (NO. 6) BARE	LF	195	345							540
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	135	240	45	294	135	177	156	180	1362
620	6011	ELEC CONDR (NO. 4) BARE	LF			15	256	453	629	142	178	1673
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	510	795		549	1284	1785	315	399	5637
624	6010	GROUND BOX TY D (162922)W/APRON	EA				1			1	1	3
6007	6102	RELOCATE FIBER OPTIC CABLE*	LF			35		83	45	57	65	285
6027	6003	CONDUIT (PREPARE)	LF	210	425	20	354	471	1681	149	193	3503
6027	6008	GROUND BOX (PREPARE)	EA	2	2	1	1	4	4	2	2	18
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1	1	1	1	1	1	1	1	8
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1	1	1	1	1	1	1	1	8
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1	1	1	1	1	1	1	1	8
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1	1	1	1	1	1	1	1	8
**		PORT EXPANDER	EA	1	1				1			3

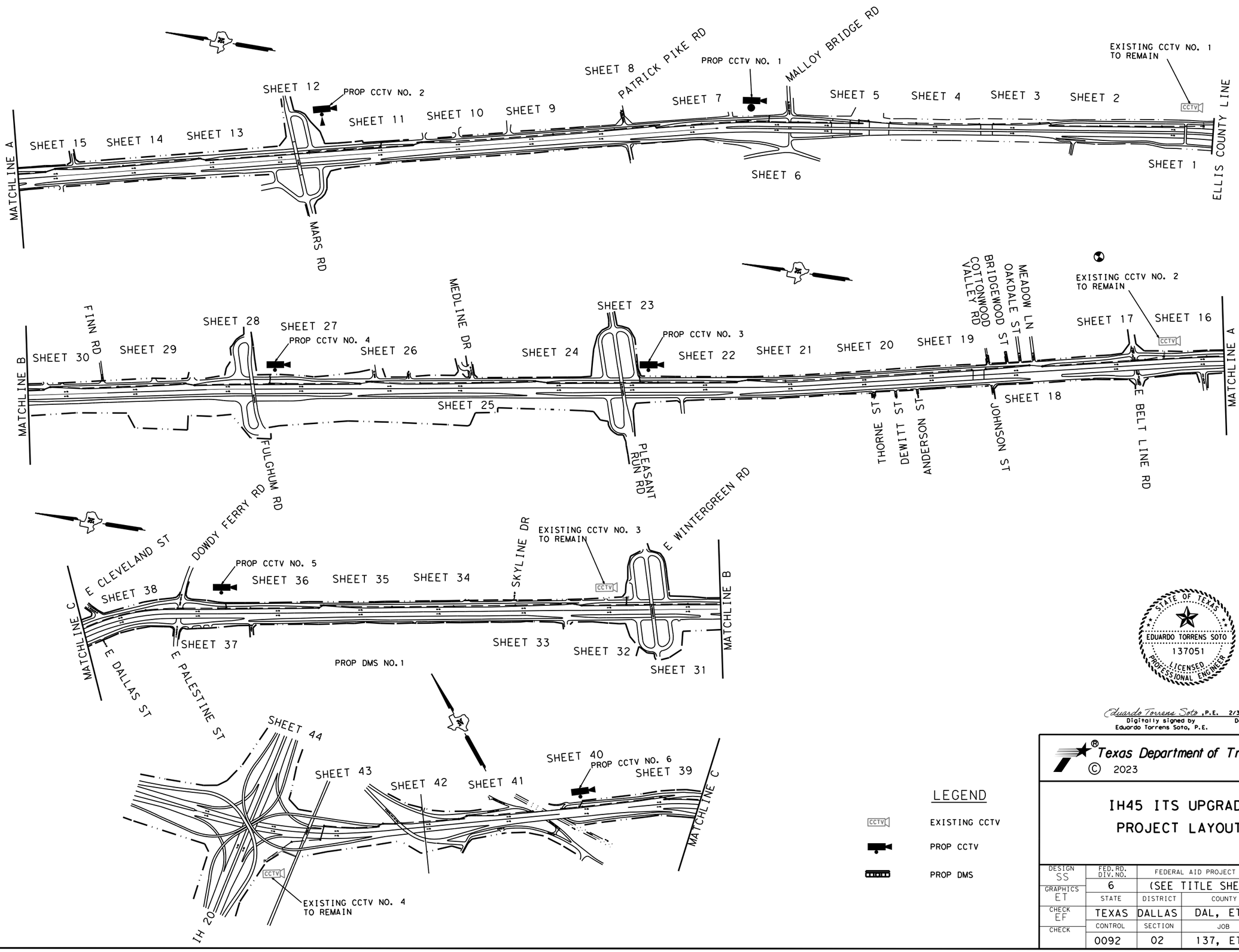
DATE: 3/2/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS SUMMARY.dgn

Texas Department of Transportation

ITS & DMS REHABILITATION
SUMMARY

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	5B
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	



LEGEND

- CCTV — EXISTING CCTV
- PROP CCTV
- PROP DMS

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto ,P.E. 2/3/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

Texas Department of Transportation
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IH45 ITS UPGRADE
PROJECT LAYOUT

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC
GRAPHICS: ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: EF	TEXAS	DALLAS	DAL, ETC.	6
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023
FILE: T:\DALTRAFSD\Eddie Torrens\0092-02-137 IH 45\DGN\IH 45 Wireless to ITS - Project Layout.dgn

DATE: 2/3/2023

Elec. Service ID	Electrical Service Description	Sheet #	Existing/ Proposed	Service *Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Lighting Contactor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
01	ELC SRV TY T (120/240) 060 (NS)GS(N)TP(O)	7	E	1 1/4"	3/#6	N/A	2P/60	N/A	100	HUB #1 RVSD	2P/50 1P/20	40 15	11.4
02	ELC SRV TY D (120/240) 060 (NS)SS(N)PS(U)	12	P	1 1/4"	3/#6	N/A	2P/60	N/A	100	CCTV #2 HUB #2	1P/20 2P/50	15 40	11.4
03	ELC SRV TY D (120/240) 060 (NS)SS(N)PS(U)	17	P	1 1/4"	3/#6	N/A	2P/60	N/A	100	CCTV #3 HUB #3	1P/20 2P/50	15 40	11.4
04	ELC SRV TY T (120/240) 060 (NS)GS(N)TP(O)	22	E	1 1/4"	3/#6	N/A	2P/60	N/A	100	HUB #4 RVSD	2P/50 1P/20	40 15	11.4
05	ELC SRV TY D (120/240) 060 (NS)SS(N)PS(U)	29	P	1 1/4"	3/#6	N/A	2P/60	N/A	100	CCTV #5 HUB #5	1P/20 2P/50	15 40	11.4
06	ELC SRV TY D (120/240) 060 (NS)SS(N)PS(U)	33	P	1 1/4"	3/#6	N/A	2P/60	N/A	100	CCTV #6 HUB #6	1P/20 2P/50	15 40	11.4
07	ELC SRV TY T (120/240) 060 (NS)GS(N)TP(O)	38	E	1 1/4"	3/#6	N/A	2P/60	N/A	100	HUB #7 RVSD	2P/50 1P/20	40 15	11.4
08	ELC SRV TY D (120/240) 060 (NS)SS(N)PS(U)	43	P	1 1/4"	3/#6	N/A	2P/60	N/A	100	CCTV #8 HUB #8	1P/20 2P/50	15 40	11.4
09	ELC SRV TY D (120/240) 060 (NS)SS(N)PS(U)	46	P	1 1/4"	3/#6	N/A	2P/60	N/A	100	CCTV #9 HUB #9	1P/20 2P/50	15 40	11.4

* VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY VARY DUE TO UTILITY COMPANY REQUIREMENTS.

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

IH45 ITS UPGRADE
ELECTRICAL SERVICE SUMMARY

SCALE: 1"=100' SHEET 1 OF 1

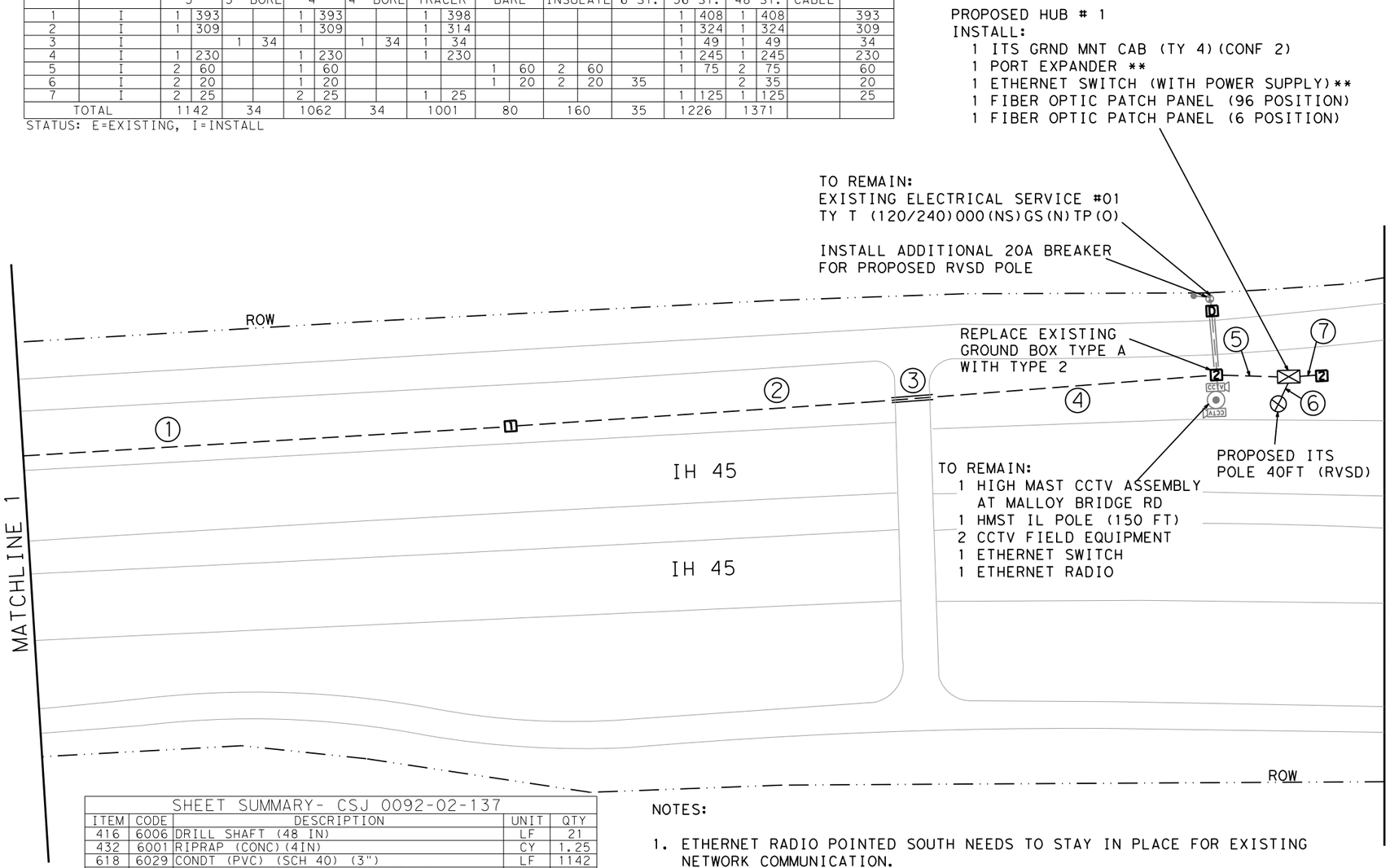
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	6A
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023
FILE: T:\DALTRAFSD\Eddie Torrens\0092-02-137 IH 45\DGN\IH 45 ELEC SERV SUMM.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"	CONDUIT ITEM 618 PVC SCHD 40 3" BORE	CONDUIT ITEM 6016 ITS MDC SCHD 40 4"	CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER	CONDR (NO. 8) BARE	CONDR (NO. 6) INSULATE	FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1 393		1 393		1 398				1 408	1 408		393
2	I	1 309		1 309		1 314				1 324	1 324		309
3	I		1 34		1 34	1 34				1 49	1 49		34
4	I	1 230		1 230		1 230				1 245	1 245		230
5	I	2 60		1 60			1 60	2 60		1 75	2 75		60
6	I	2 20		1 20			1 20	2 20	35		2 35		20
7	I	2 25		2 25		1 25				1 125	1 125		25
TOTAL		1142	34	1062	34	1001	80	160	35	1226	1371		

STATUS: E=EXISTING, I=INSTALL



0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1142
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	34
620	6007	ELEC CONDR (NO. 8) BARE	LF	80
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1001
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	160
624	6010	GROUND BOX TY D (162922) W/APRON	EA	1
6000	6098	INSTALL CIRCUIT BREAKER	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	35
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1226
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1371
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96 POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1062
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	34
6064	6019	ITS POLE (40 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	2
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

NOTES:

1. ETHERNET RADIO POINTED SOUTH NEEDS TO STAY IN PLACE FOR EXISTING NETWORK COMMUNICATION.
2. EHERNET RADIO POINTED NORTH TO BELT LINE RD TO POINT DOWN TO PROPOSED RVSD POLE.
3. INSTALL ETHERNET RADIO REMOVAL FROM IH 20 - IH45 HIGH MAST THAT WAS POINTED SOUTH AND INSTALL ON PROPOSED RVSD POLE TO POINT UP TO MALLOY BRIDGE HIGH MAST.

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

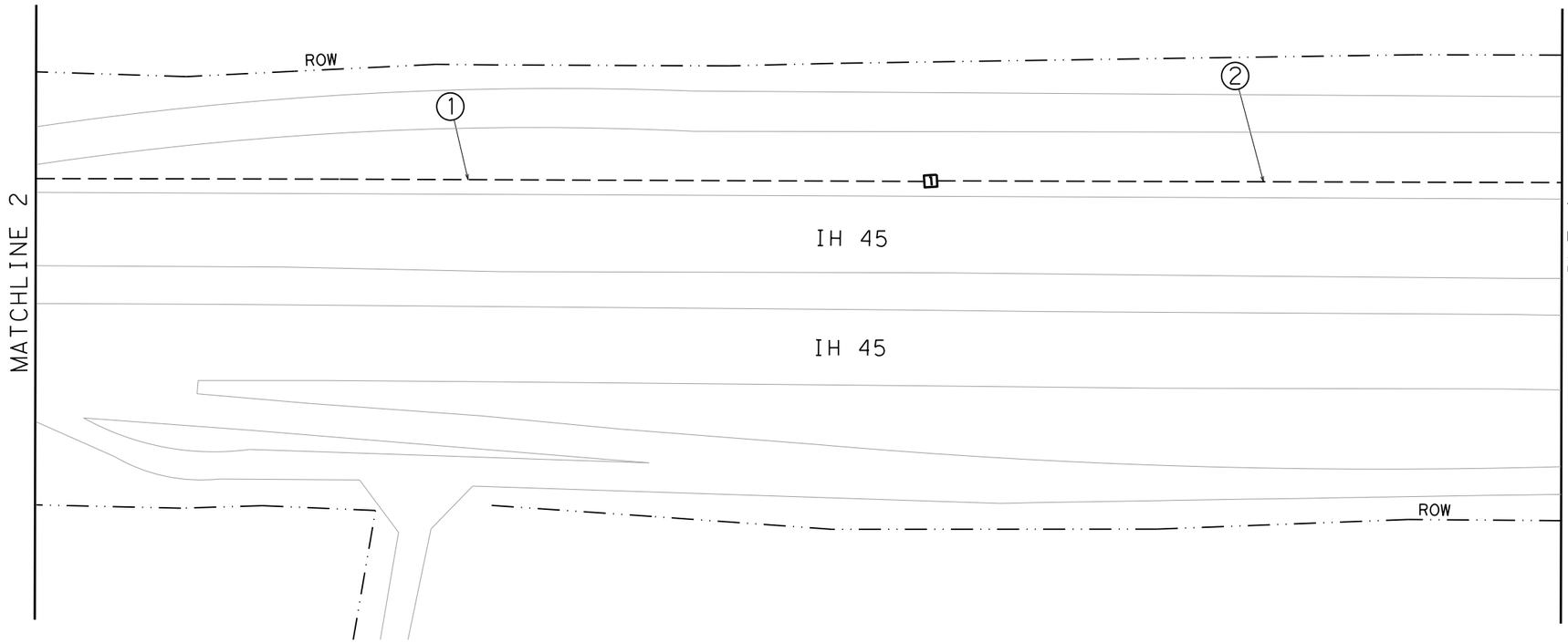
IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 1 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	7
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 1.dgn

SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1103
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1113
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1133
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1133
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1103
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1



CONDUIT AND CABLE CHART- CSJ 0092-02-137																								
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007						ITEM 6004		RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.		SINGLE MODE 36 ST.		SINGLE MODE 48 ST.		ITS COM. CABLE		
1	I	1	647			1	647			1	652							1	662	1	662			647
2	I	1	456			1	456			1	461							1	471	1	471			456
TOTAL		1103				1103				1113								1133		1133				

STATUS: E=EXISTING, I=INSTALL

SCALE
0 50 100 FEET

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 2 OF 44

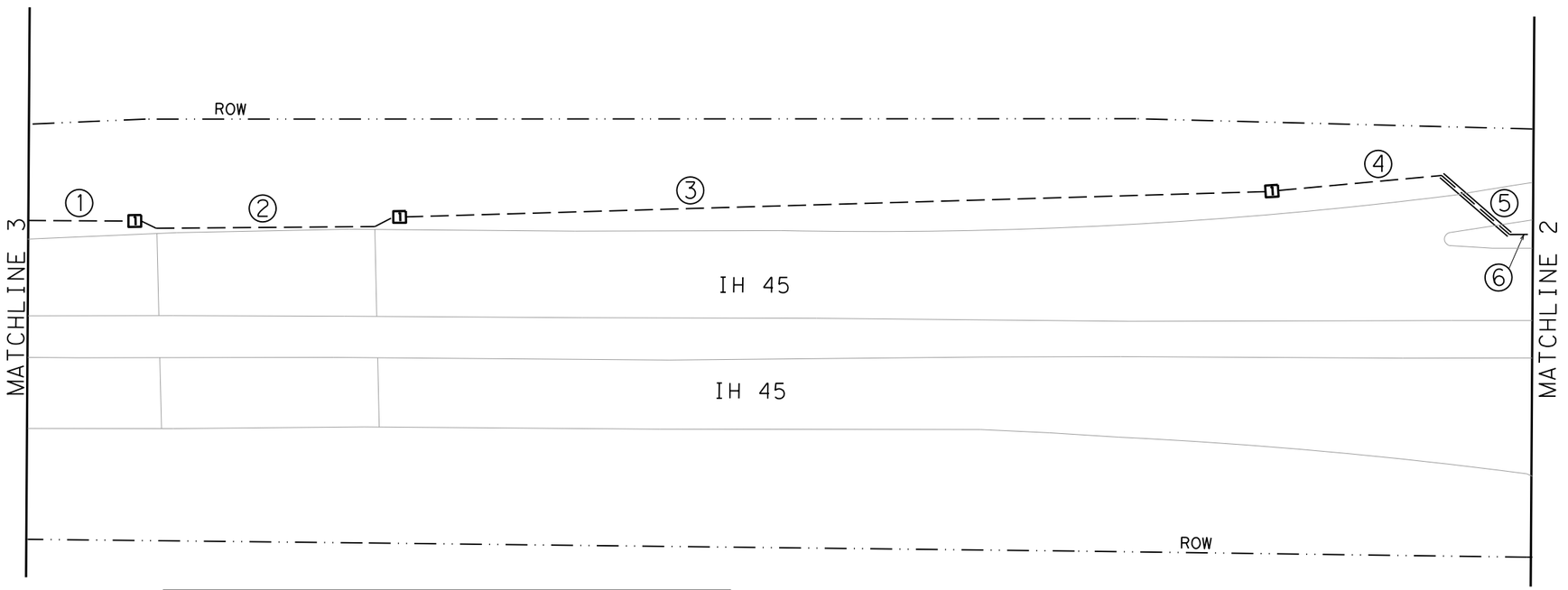
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	8
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 2.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618						CONDUIT ITEM 6016						ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		3" RM		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		4" RM		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.		SINGLE MODE 36 ST.		SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	78					1	78					1	83							1	93	1	93		78
2	I					1	196					1	196	1	201							1	211	1	211		196
3	I	1	638					1	638					1	643							1	653	1	653		638
4	I	1	112					1	112					1	117							1	127	1	127		112
5	I			1	70					1	70			1	75							1	85	1	85		70
6	I	1	10					1	10					1	15							1	25	1	25		10
TOTAL		838		70		196		838		70		196		1134								1194		1194			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	838
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	70
618	6074	CONDT (RM)(3")	LF	196
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1134
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1194
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1194
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	838
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	70
6016	6013	ITS MULTI-DUCT CND (RMC)	LF	196
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	3

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

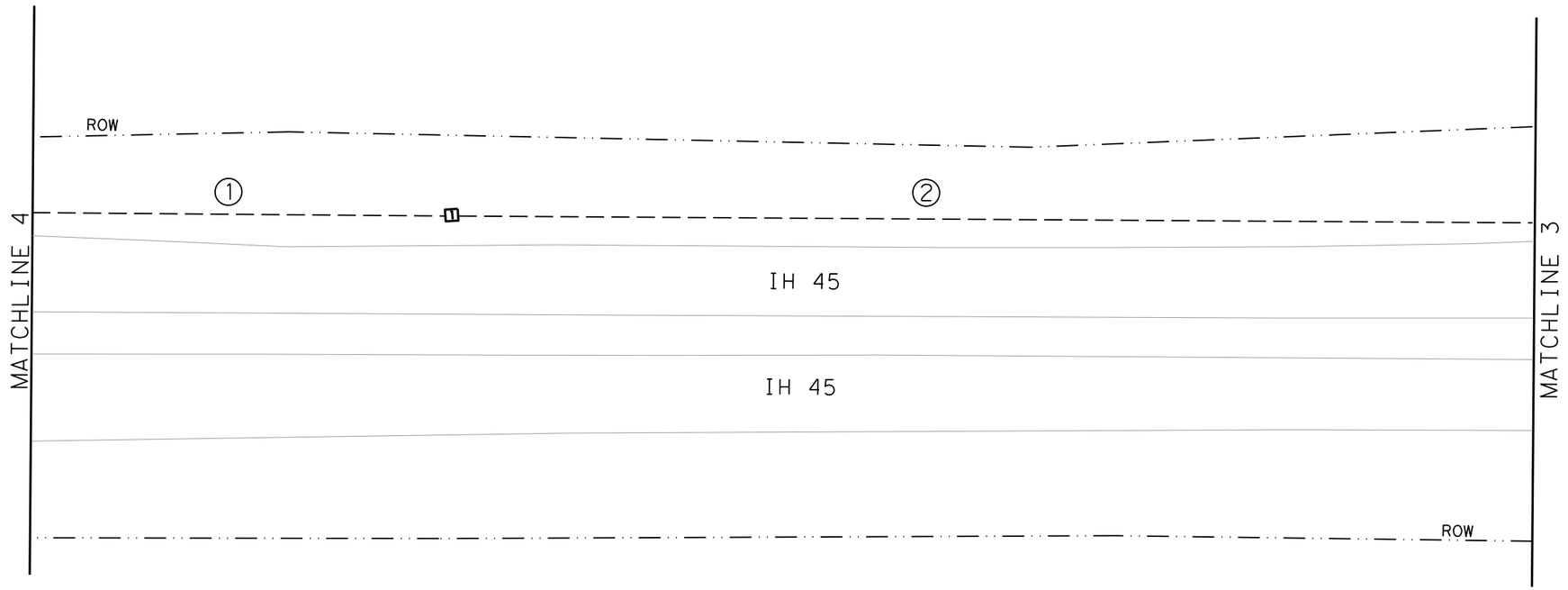
SCALE: 1"=100' SHEET 3 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	9
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 3.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																					
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.		SINGLE MODE 36 ST.		SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	309			1	309			1	314							1	324	1	324		309
2	I	1	793			1	793			1	798							1	808	1	808		793
TOTAL		1102				1102				1112								1132		1132			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1102
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1112
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1132
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1132
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1102
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 4 OF 44

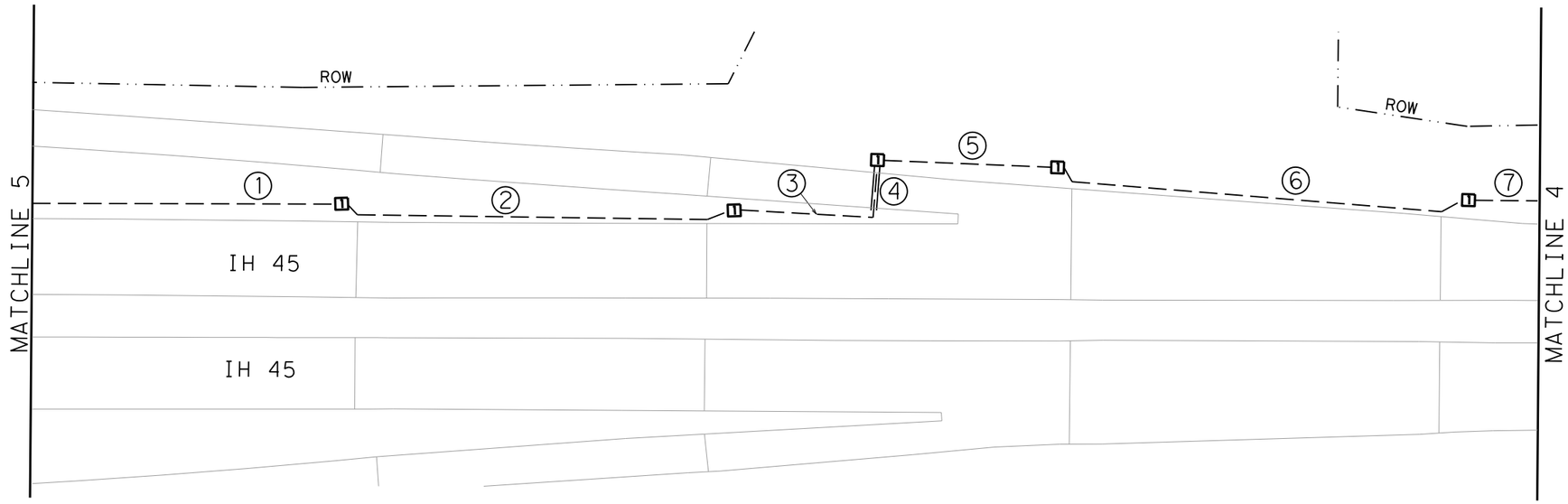
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	10
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 4.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618						CONDUIT ITEM 6016						ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		3" RM		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		4" RM		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.		SINGLE MODE 36 ST.		SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	226					1	226					1	231						1	241	1	241		226
2	I					1	290					1	290	1	295						1	305	1	305		290
3	I	1	101					1	101					1	106						1	116	1	116		101
4	I			1	42					1	42			1	47						1	57	1	57		42
5	I	1	132					1	132					1	137						1	147	1	147		132
6	I					1	309					1	309	1	314						1	324	1	324		309
7	I	1	52					1	52					1	57						1	67	1	67		52
TOTAL		511		42		599		511		42		599		1187							1257		1257			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	511
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	42
618	6074	CONDT (RM) (3")	LF	599
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1187
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1257
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1257
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	511
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	42
6016	6013	ITS MULTI-DUCT CND (RMC)	LF	599
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	5

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 5 OF 44

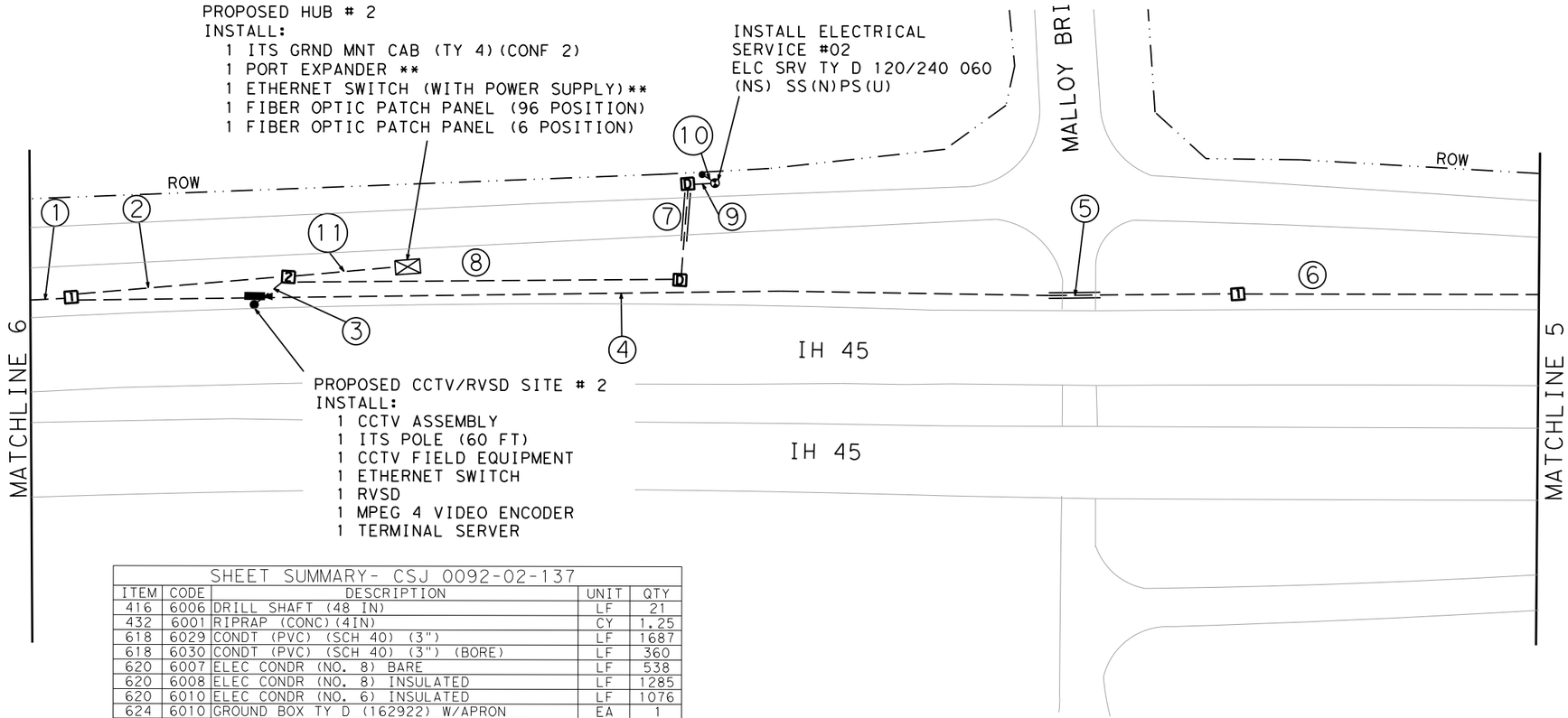
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	11
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 5.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"		CONDUIT ITEM 618 PVC SCHD 40 3" BORE		CONDUIT ITEM 6016 ITS MDC SCHD 40 4"		CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE		FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.		ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1	30			1	30			1	35						30	1	45		30
2	I	2	159			2	159			1	164							2	174		159
3	I	2	33			1	33					1	38	2	38	48		1	48		33
4	I	1	814			1	814			1	819						829	1	829		814
5	I			1	38			1	38	1	43						53	1	53		38
6	I	1	219			1	219			1	224						234	1	234		219
7	I	1	35	1	36							1	76	2	76						71
8	I			1	286							1	291	2	291						286
9	I	1	20									1	25	2	25						20
10	I	1	11									1	16	2	16						11
11	I	2	87			2	87					1	92	2	92	102		2	102		87
TOTAL		1687		360		1588		38		1285		538		1076		150	1146	1761			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1687
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	360
620	6007	ELEC CONDR (NO. 8) BARE	LF	538
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1285
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1076
624	6010	GROUND BOX TY D (162922) W/APRON	EA	1
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA	1
6000	6098	INSTALL CIRCUIT BREAKER	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	150
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1146
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1761
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1588
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	38
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	
6064	6055	ITS POLE (60 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6074	6001	COMMUNICATION HUB CABINET	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation
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IH45 ITS UPGRADE
LAYOUT

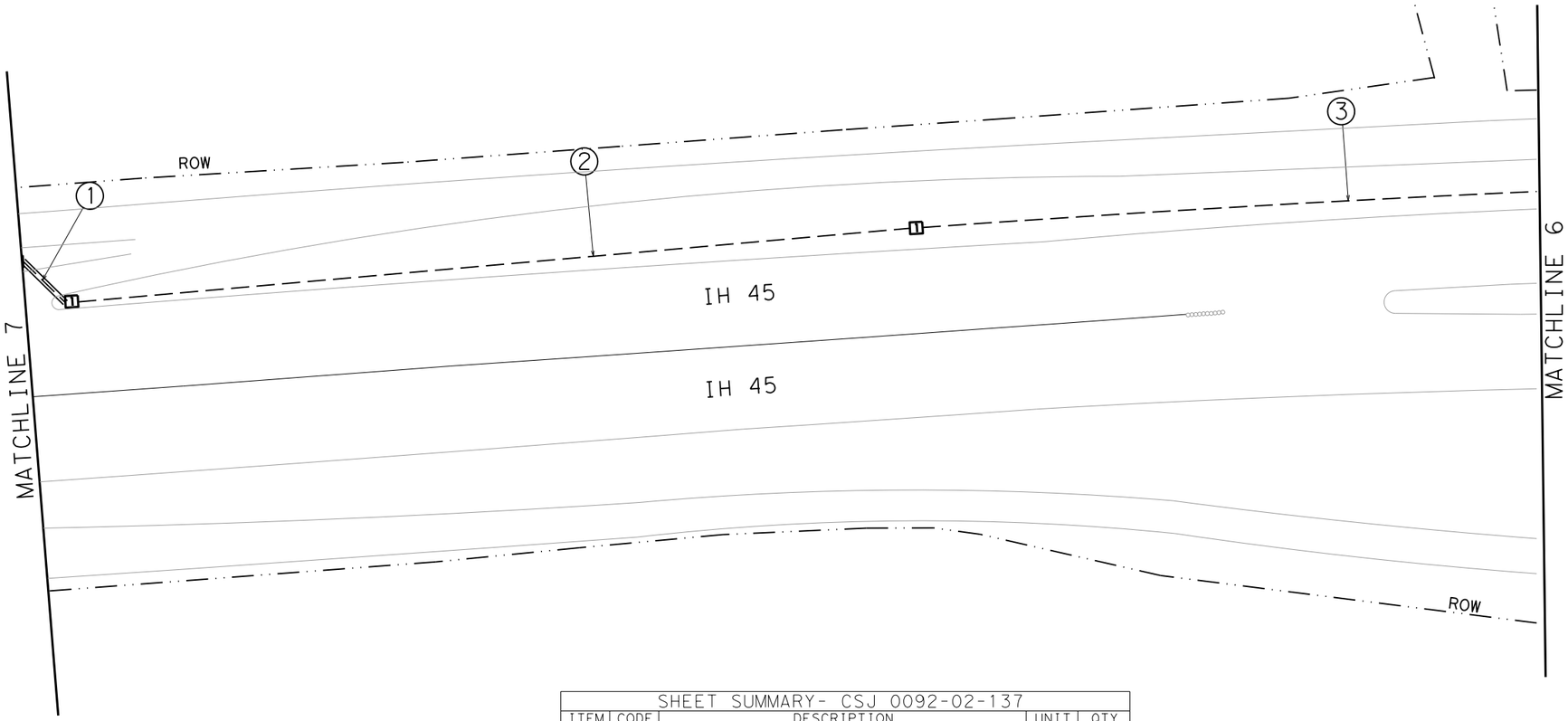
SCALE: 1"=100' SHEET 6 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SS	6	(SEE TITLE SHEET)	IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS / DAL, ETC.	12
CHECK	CONTROL	SECTION / JOB	
	0092	02 / 137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 6.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																									
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620								FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.		SINGLE MODE 36 ST.		SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I			1	47			1	47	1	52							62		1	62			47
2	I	1	618			1	618			1	623							633		1	633			618
3	I	1	455			1	455			1	460							470		1	470			455
TOTAL		1073		47		1073		47		1135								1165		1165				

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1073
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	47
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1135
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1165
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1165
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1073
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	47
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

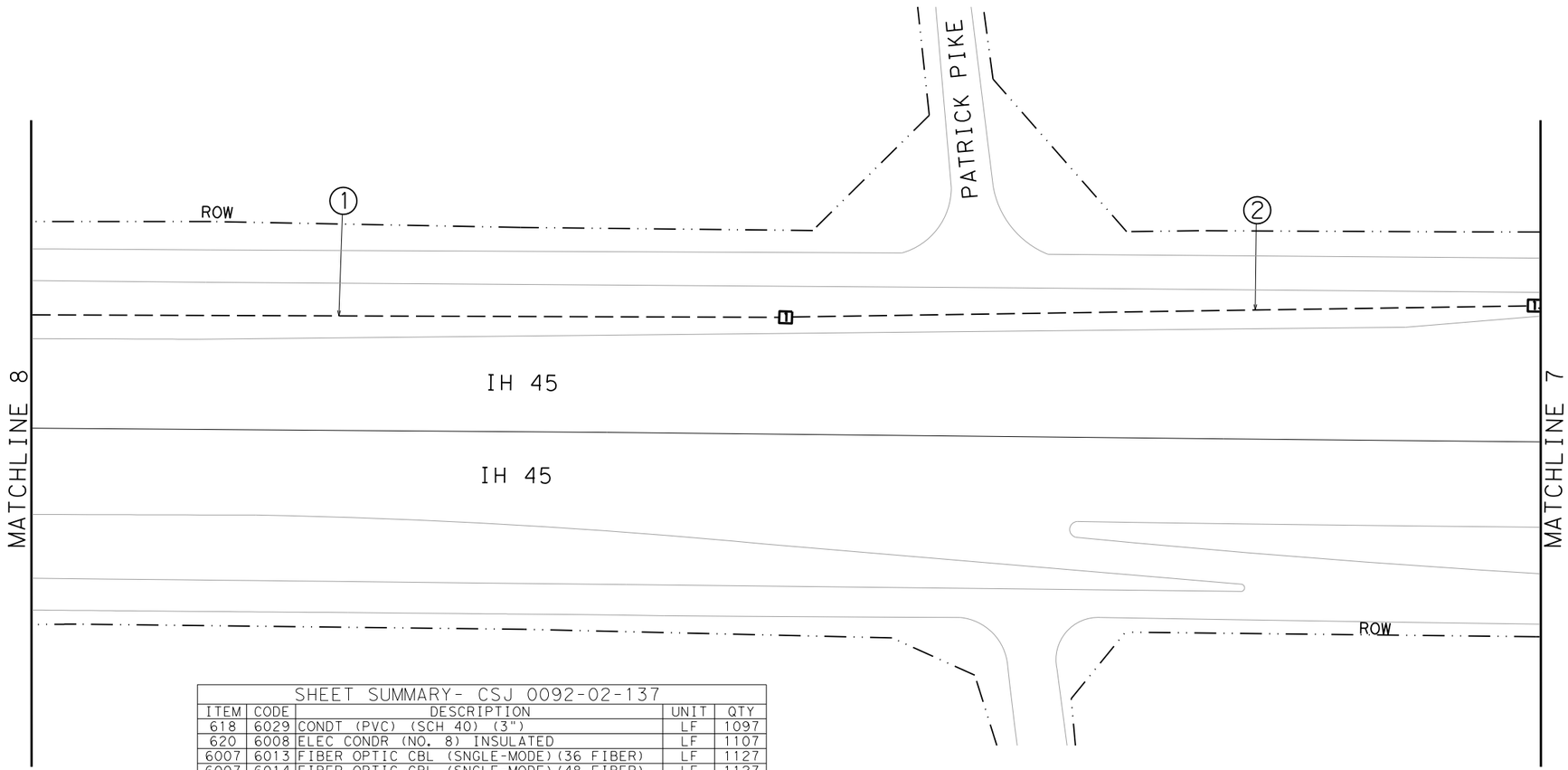
SCALE: 1"=100' SHEET 7 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	13
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 7.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																	
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.		SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	551			1	551			1	556						566	1	566			551
2	I	1	546			1	546			1	551						561	1	561			546
TOTAL		1097				1097				1107							1127	1127				

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1097
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1107
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1127
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1127
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1097
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

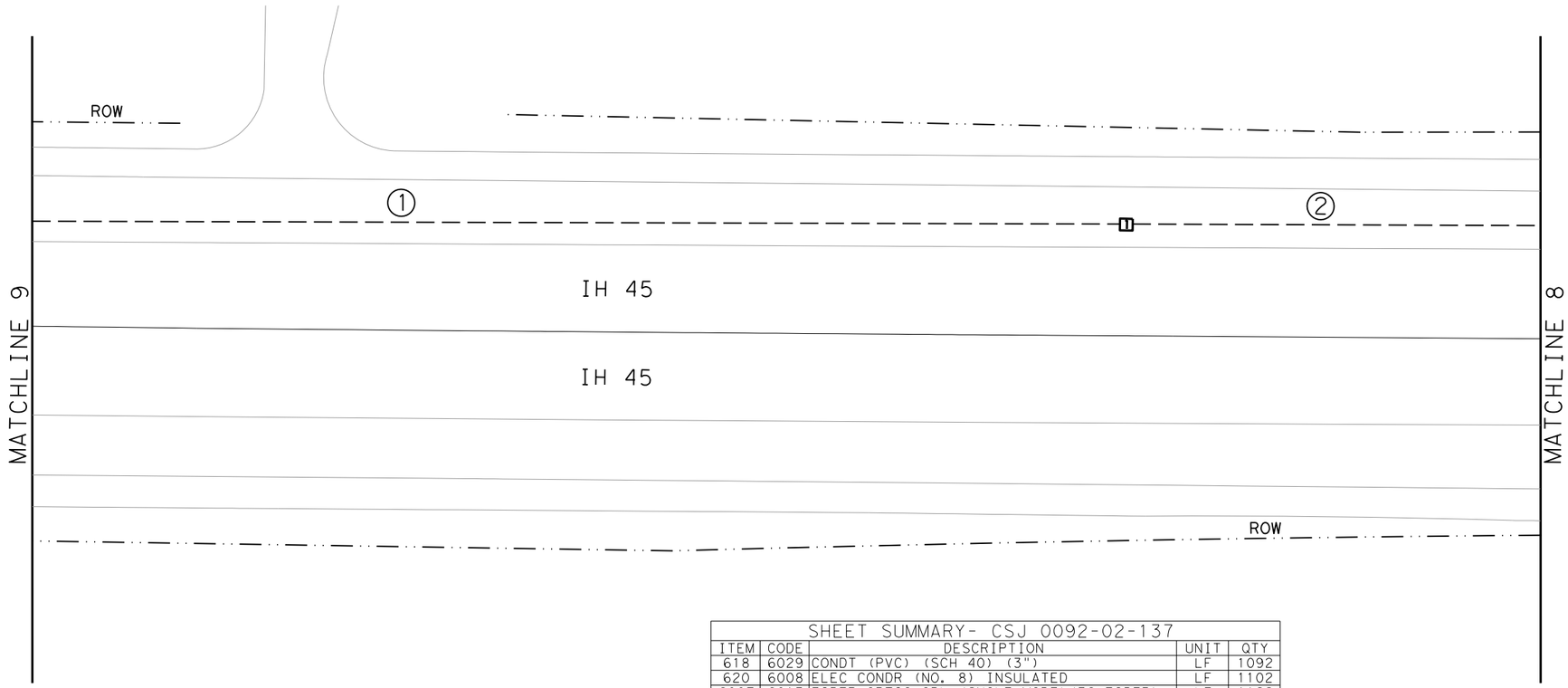
SCALE: 1"=100' SHEET 8 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	14
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

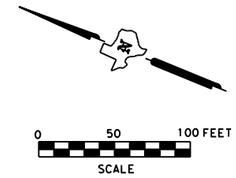
DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 8.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																			
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007				ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	794			1	794			1	799						809	1	809		794
2	I	1	298			1	298			1	303						313	1	313		298
TOTAL		1092				1092				1102							1122	1122			

STATUS: E=EXISTING, I=INSTALL

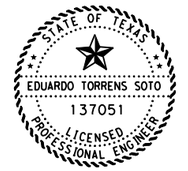


SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1092
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1102
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1122
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1122
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1092
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)



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IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 9 OF 44

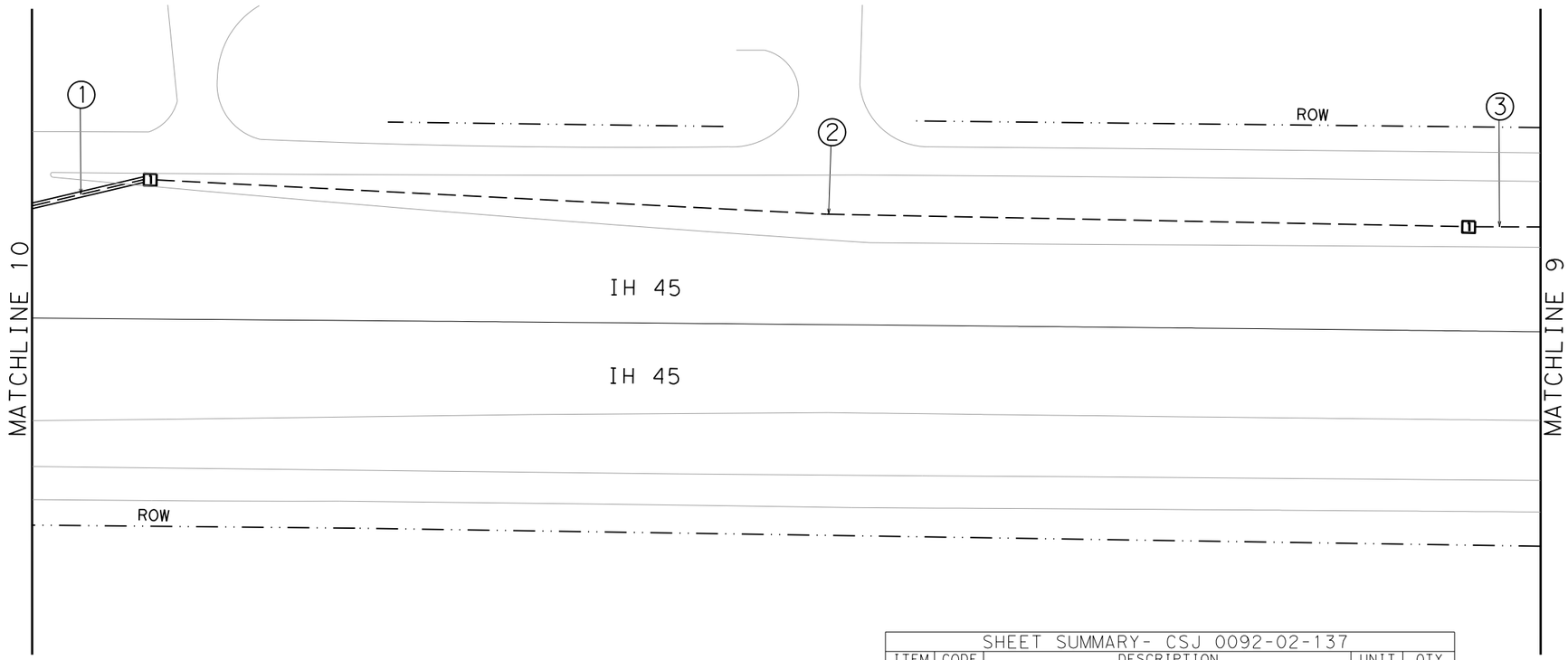
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	15
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 9.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"		CONDUIT ITEM 618 PVC SCHD 40 3" BORE		CONDUIT ITEM 6016 ITS MDC SCHD 40 4"		CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE		FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.		ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I			1	85			1	85	1	90						100	1	100		85
2	I	1	962			1	962			1	967						977	1	977		962
3	I	1	50			1	50			1	55						65	1	65		50
TOTAL		1012		85		1012		85		1112							1142	1142			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1012
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	85
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1112
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1142
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1142
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1012
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	85
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 3/1/2023
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Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 10 OF 44

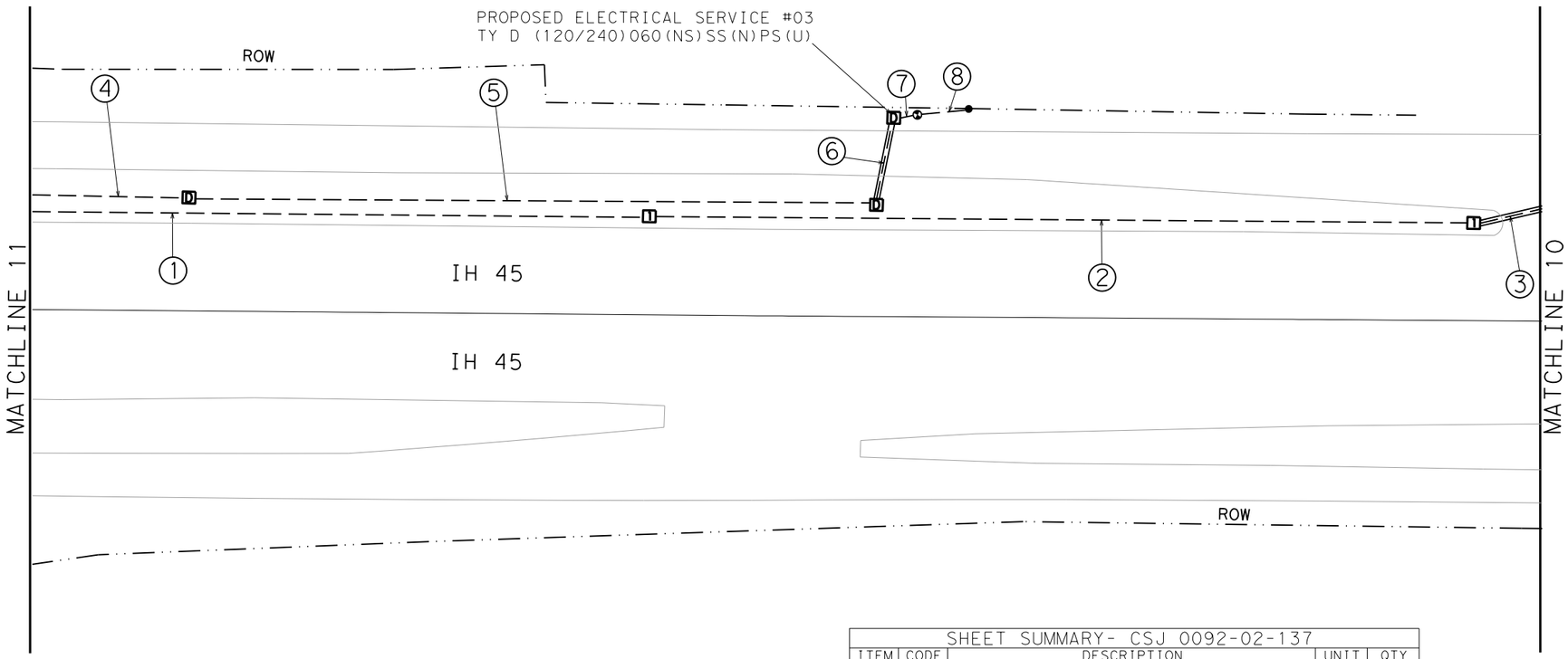
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	16
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 10.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007				ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	451			1	451			1	456						466	1	466		451
2	I	1	600			1	600			1	605						615	1	615		600
3	I	1	48			1	48			1	53						63	1	63		48
4	I	1	115									1	120	2	120						115
5	I	1	501									1	506	2	506						501
6	I			1	65							1	70	2	70						65
7	I	1	17									1	22	2	22						17
8	I	1	38									1	43	2	43						38
TOTAL		1770		65		1099				1114		761		1522			1144	1144			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1770
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	65
620	6007	ELEC CONDR (NO. 8) BARE	LF	761
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1114
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1522
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
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1144
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1144
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1099
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

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Eduardo Torrens Soto ,P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 11 OF 44

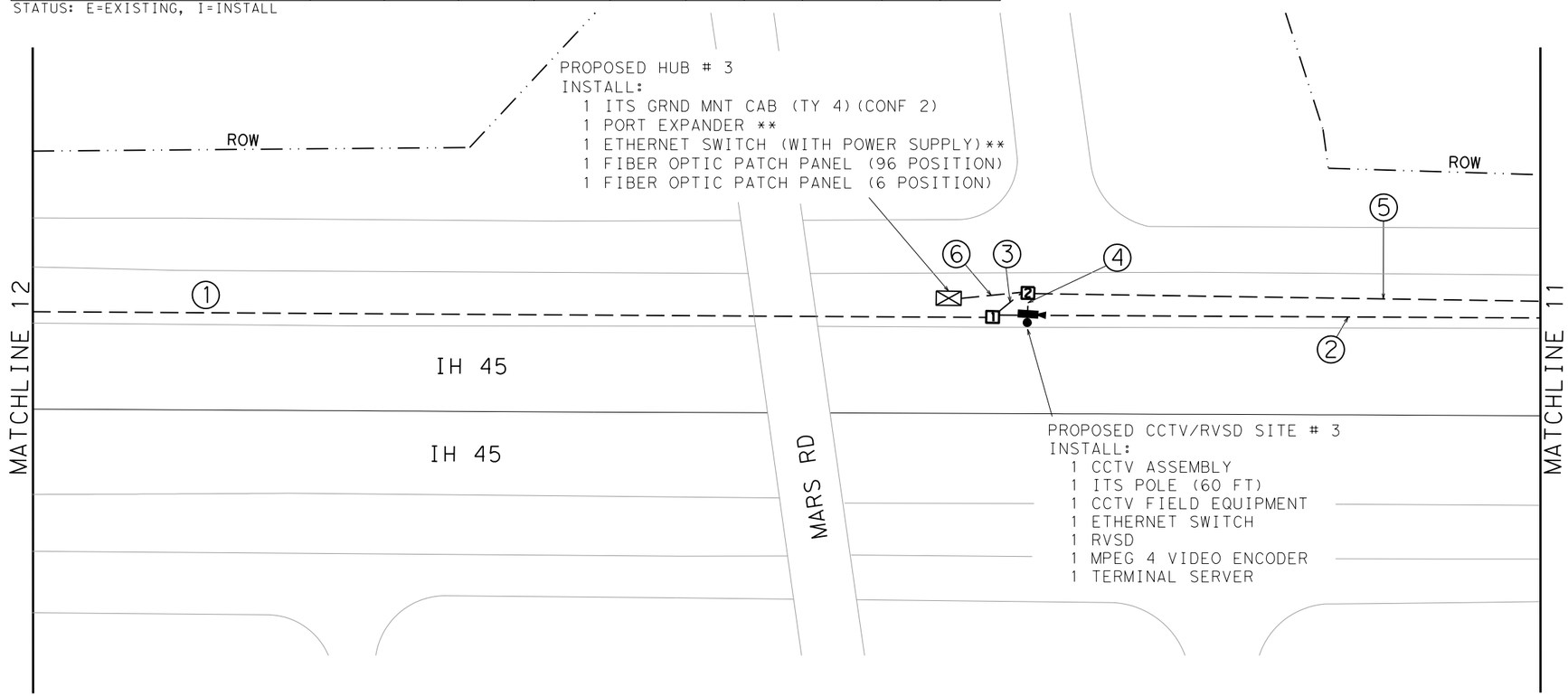
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	17
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 11.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007				ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	701			1	701			1	706						716	1	716		701
2	I	1	399			1	399			1	404						414	1	414		399
3	I	2	31			2	31			1	36					46		2	46		31
4	I	1	24									1	29	2	29	39					24
5	I	1	374									1	379	2	379						374
6	I	2	58			2	58									73		2	73		58
TOTAL		1676				1278				1146		408		816		158	1130	1368			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1676
620	6007	ELEC CONDR (NO. 8) BARE	LF	408
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1146
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	816
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	158
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1130
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1368
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1278
6064	6055	ITS POLE (60 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 12 OF 44

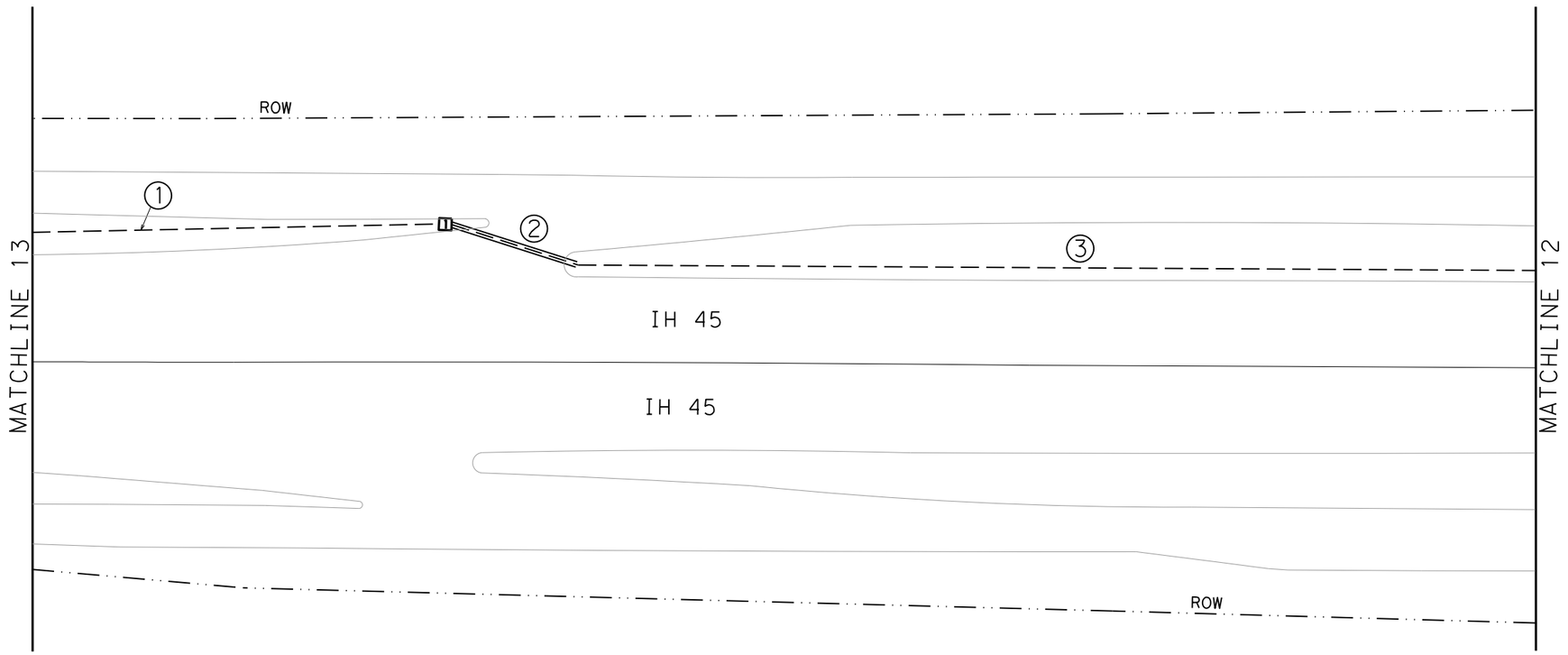
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	18
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 12.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"		CONDUIT ITEM 618 PVC SCHD 40 3" BORE		CONDUIT ITEM 6016 ITS MDC SCHD 40 4"		CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE		FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.		ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1	301			1	301			1	306						316	1	316		301
2	I			1	105			1	105	1	110						120	1	120		105
3	I	1	697			1	697			1	702						712	1	712		697
TOTAL		998		105		998		105		1118							1148	1148			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	998
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	105
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1118
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1148
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1148
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	998
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	105
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

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Eduardo Torrens Soto, P.E. 3/1/2023
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Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

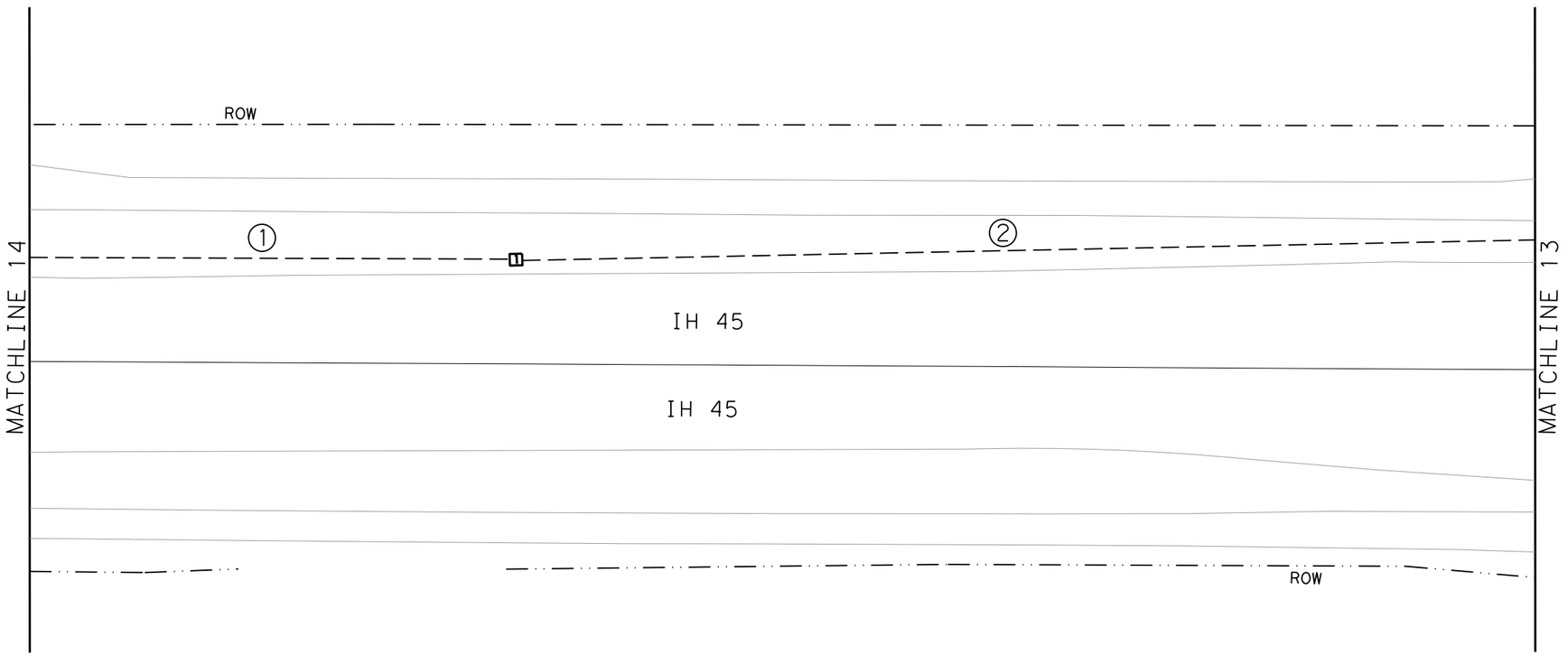
SCALE: 1"=100' SHEET 13 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	19
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 13.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																		
RUN #	CONDITION	CONDUIT ITEM 618		CONDUIT ITEM 618		CONDUIT ITEM 6016		CONDUIT ITEM 6016		ELECTRIC CONDUCTOR ITEM 620		ELECTRIC CONDUCTOR ITEM 620		ELECTRIC CONDUCTOR ITEM 620		FIBER CABLE ITEM 6007	FIBER CABLE ITEM 6007	FIBER CABLE ITEM 6007		ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	355			1	355			1	360						370	1	370		355
2	I	1	744			1	744			1	749						759	1	759		744
TOTAL		1099				1099				1109							1129	1129			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1099
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1109
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1129
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1129
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1099
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 14 OF 44

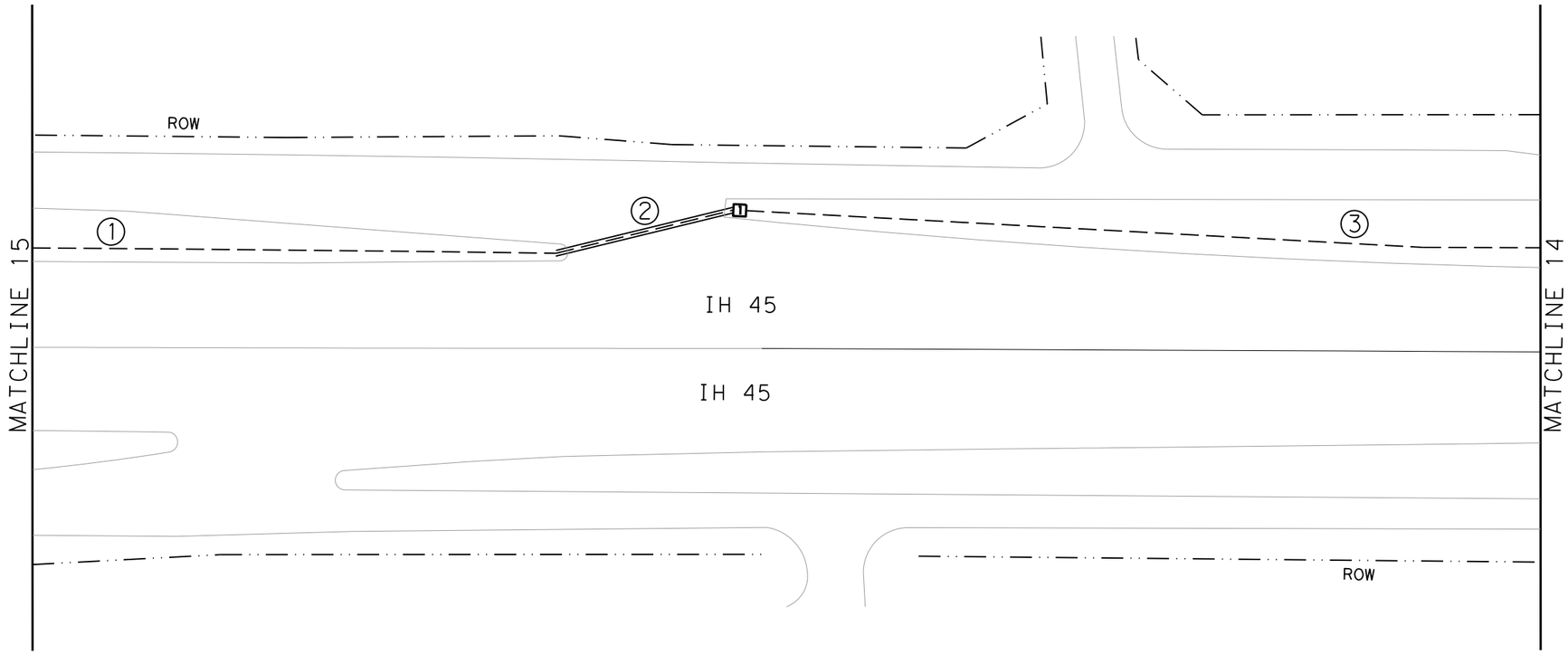
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	20
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 14.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618		CONDUIT ITEM 6016		ELECTRIC CONDUCTOR ITEM 620			FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"	PVC SCHD 40 3" BORE	ITS MDC SCHD 40 4"	ITS MDC SCHD 40 4" BORE	CONDR (NO. 8) TRACER	CONDR (NO. 8) BARE	CONDR (NO. 6) INSULATE	SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1 378		1 378		1 383				393	393		378
2	I		1 142		1 142	1 147				157	157		142
3	I	1 584		1 584		1 589				599	599		584
TOTAL		962	142	962	142	1119				1149	1149		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	962
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	142
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1119
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1149
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1149
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	962
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	142
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

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Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 15 OF 44

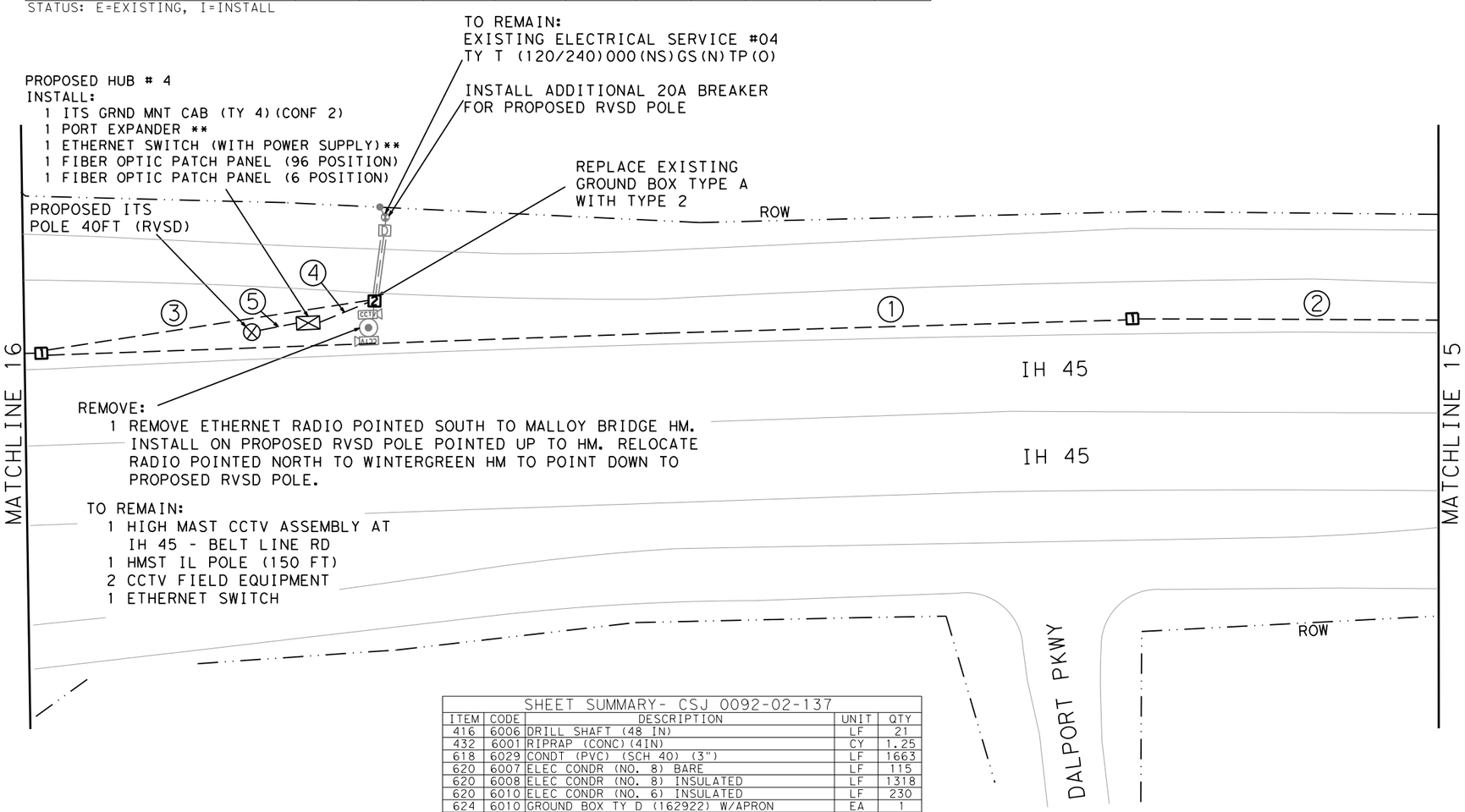
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	21
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 15.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"	CONDUIT ITEM 618 PVC SCHD 40 3" BORE	CONDUIT ITEM 6016 ITS MDC SCHD 40 4"	CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER	CONDR (NO. 8) BARE	CONDR (NO. 6) INSULATE	FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1 844		1 844		1 849				859	1 859		844
2	I	1 134		1 134		1 139				149	1 149		134
3	I	2 260		2 260		1 265					2 275		260
4	I	2 60		2 60		1 65	1 65	2 65			2 75		60
5	I	1 45		1 45			1 50	2 50	60				45
TOTAL		1663		1663		1318	115	230	60	1008	1708		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1663
620	6007	ELEC CONDR (NO. 8) BARE	LF	115
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1318
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	230
624	6010	GROUND BOX TY D (162922) W/APRON	EA	1
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA	1
6000	6098	INSTALL CIRCUIT BREAKER	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	60
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1008
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1708
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96 POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1663
6064	6019	ITS POLE (40 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
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LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 16 OF 44

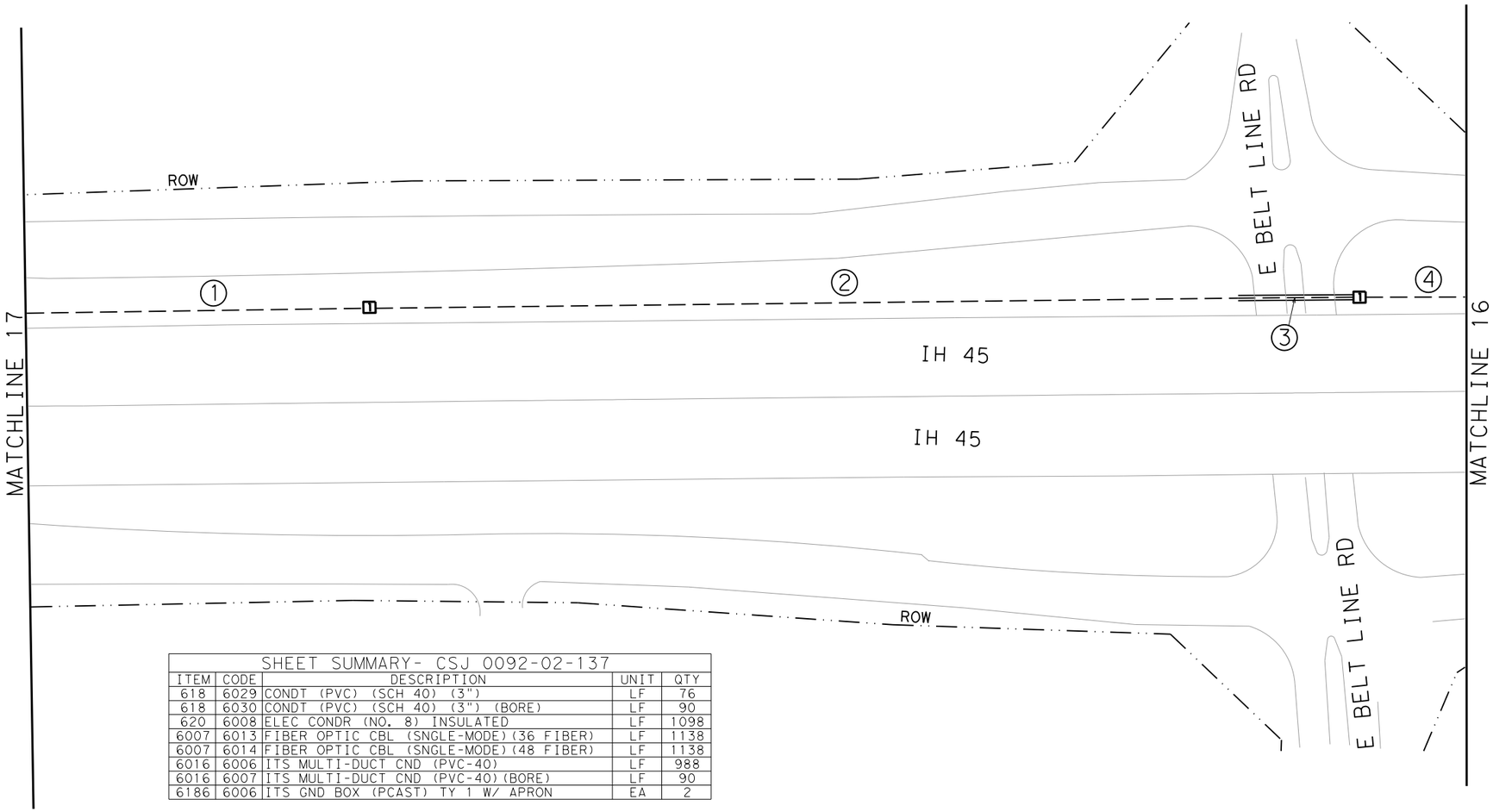
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	22
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 16.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"	CONDUIT ITEM 618 PVC SCHD 40 3" BORE	CONDUIT ITEM 6016 ITS MDC SCHD 40 4"	CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE	FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1 260		1 260		1 265				275	275		260
2	I	1 652		1 652		1 657				667	667		652
3	I		1 90		1 90	1 95				105	105		90
4	I	1 76		1 76		1 81				91	91		76
TOTAL		76	90	988	90	1098				1138	1138		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	76
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	90
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1098
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1138
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1138
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	988
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	90
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

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Eduardo Torrens Soto, P.E. 3/1/2023
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Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 17 OF 44

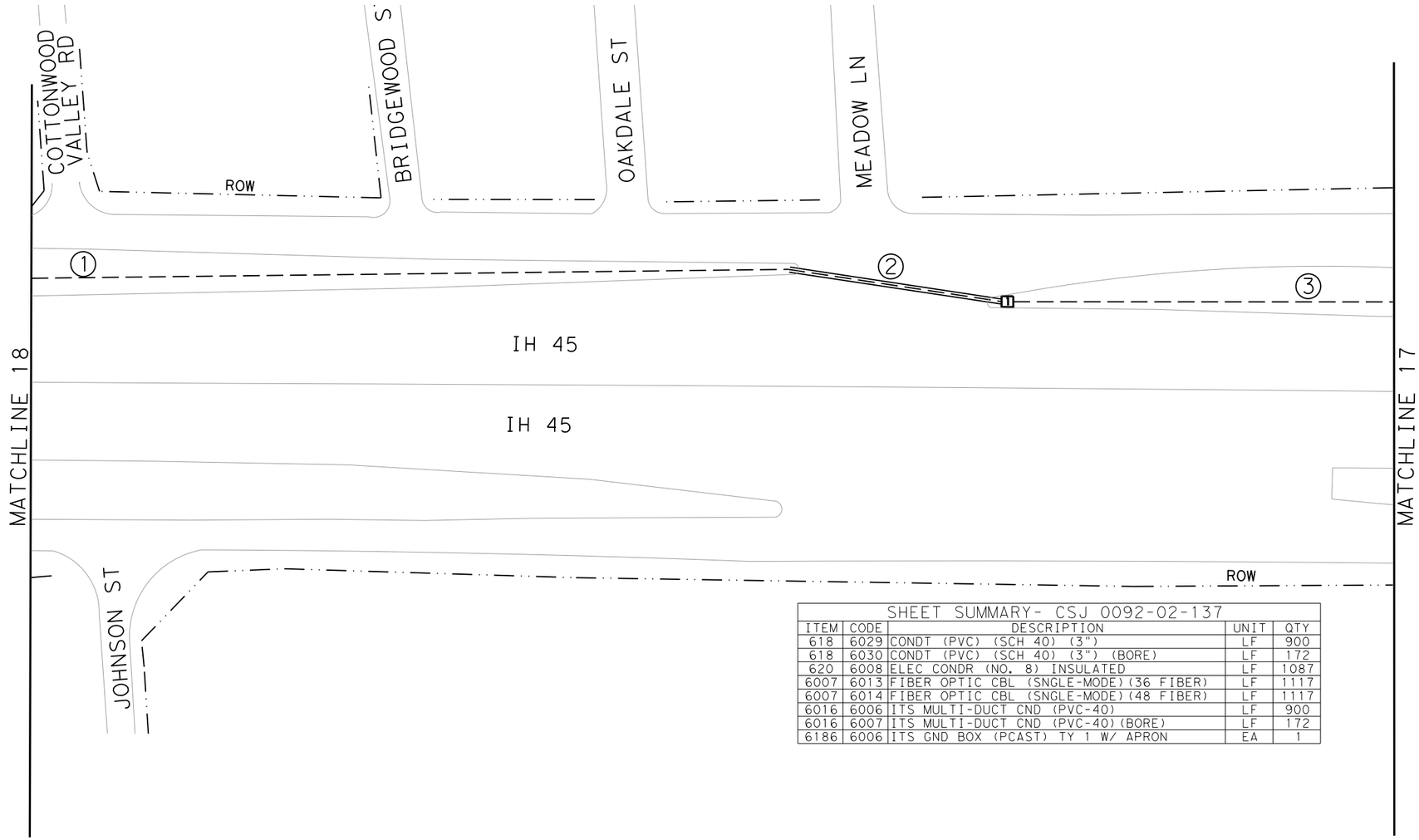
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SS	6	(SEE TITLE SHEET)	IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS / DAL, ETC.	23
CHECK	CONTROL	SECTION / JOB	
	0092	02 / 137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 17.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"	CONDUIT ITEM 618 PVC SCHD 40 3" BORE	CONDUIT ITEM 6016 ITS MDC SCHD 40 4"	CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE	FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1 598		1 598		1 603				613	613		598
2	I		1 172		1 172	1 177				187	187		172
3	I	1 302		1 302		1 307				317	317		302
TOTAL		900	172	900	172	1087				1117	1117		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	900
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	172
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1087
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1117
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1117
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	900
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	172
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 18 OF 44

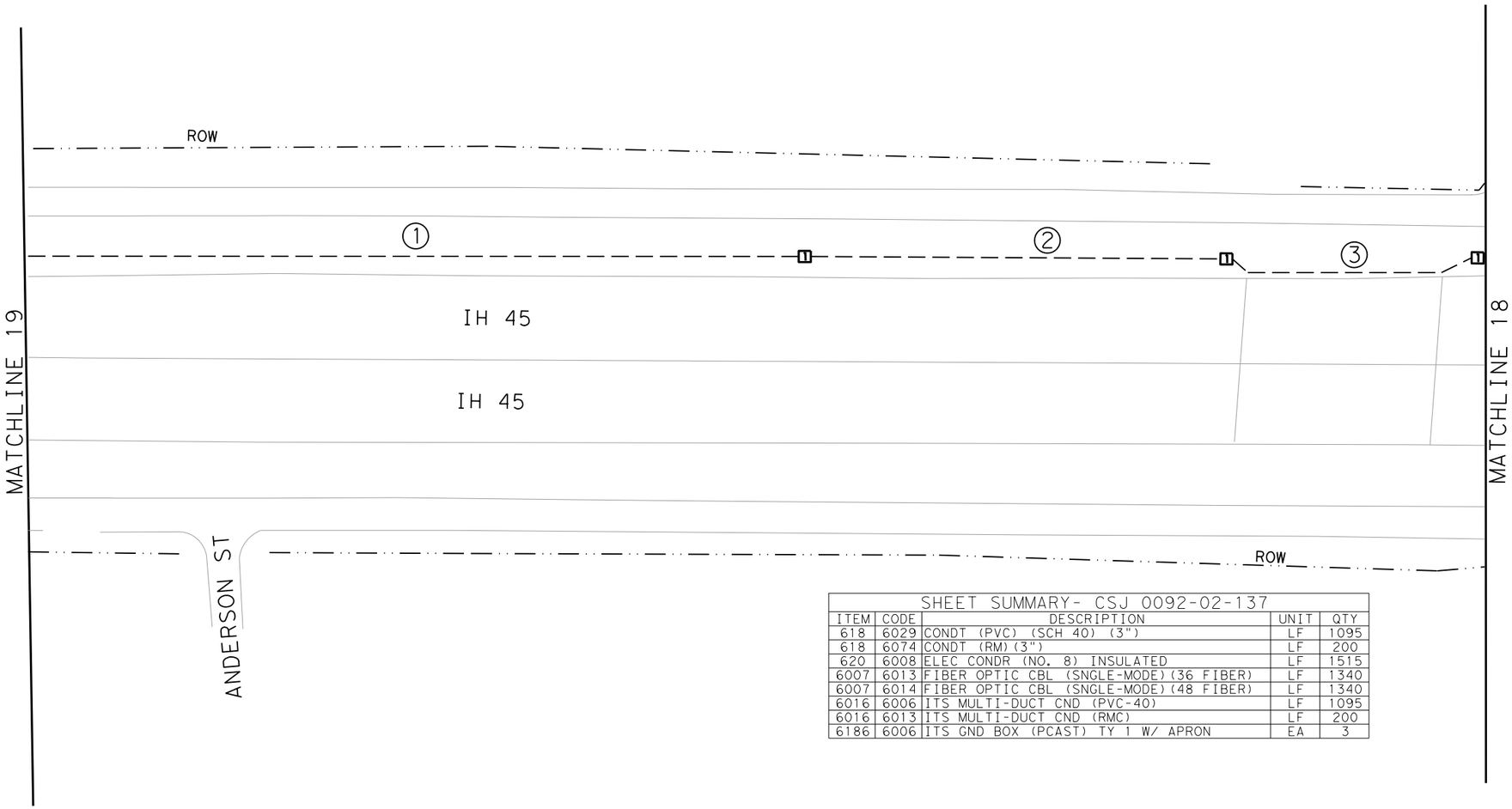
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	24
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 18.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618						CONDUIT ITEM 6016						ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		3" RM		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		4" RM		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	595					1	595					1	600						610	610		595
2	I	1	500					1	500					1	505						515	515		500
3	I					1	200					1	200	2	205						215	215		200
TOTAL		1095				200		1095				200		1515							1340	1340		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1095
618	6074	CONDT (RM)(3")	LF	200
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1515
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1340
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1340
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1095
6016	6013	ITS MULTI-DUCT CND (RMC)	LF	200
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	3

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 19 OF 44

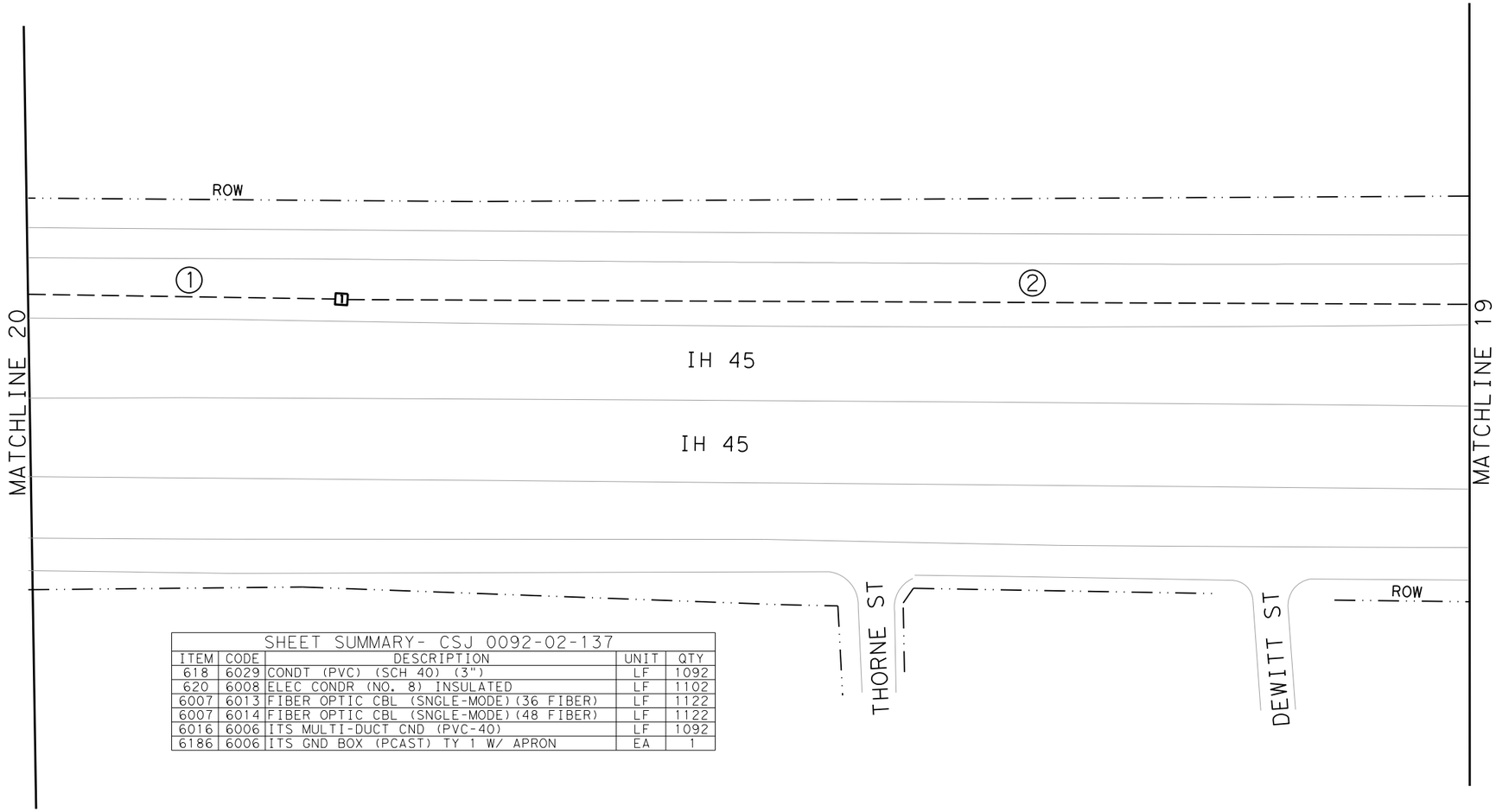
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	25
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 19.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"	CONDUIT ITEM 618 PVC SCHD 40 3" BORE	CONDUIT ITEM 6016 ITS MDC SCHD 40 4"	CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE	FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1 235		1 235		1 240				250	250		235
2	I	1 857		1 857		1 862				872	872		857
TOTAL		1092		1092		1102				1122	1122		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1092
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1102
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1122
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1122
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1092
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E.
Date

IH45 ITS UPGRADE
LAYOUT

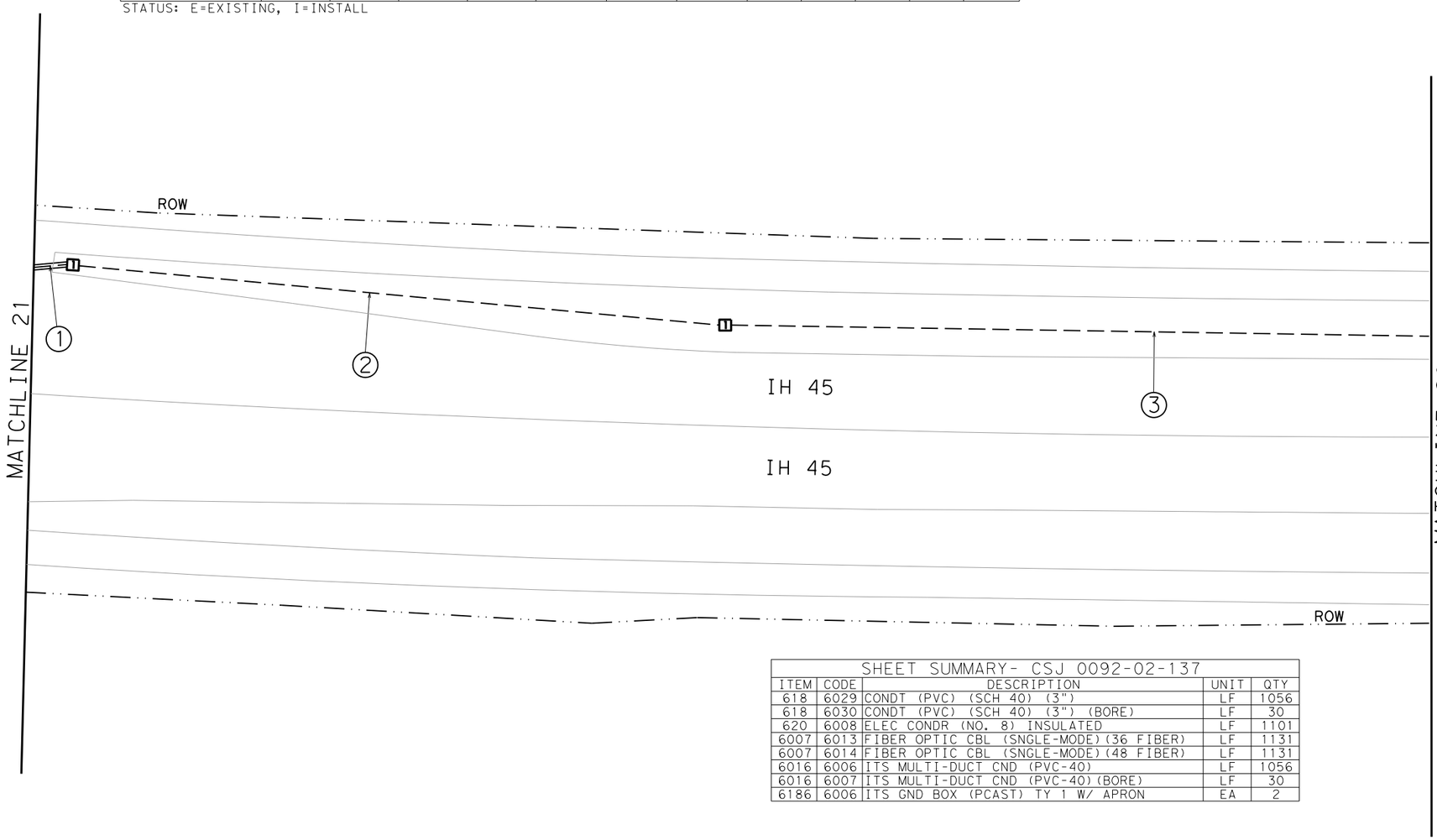
SCALE: 1"=100' SHEET 20 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	26
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 20.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																									
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620								FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I			1	30			1	30	1	35						45	45		30
2	I	1	506			1	506			1	511						521	521		506
3	I	1	550			1	550			1	555						565	565		550
TOTAL		1056		30		1056		30		1101							1131	1131		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1056
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	30
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1101
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1131
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1131
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1056
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	30
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

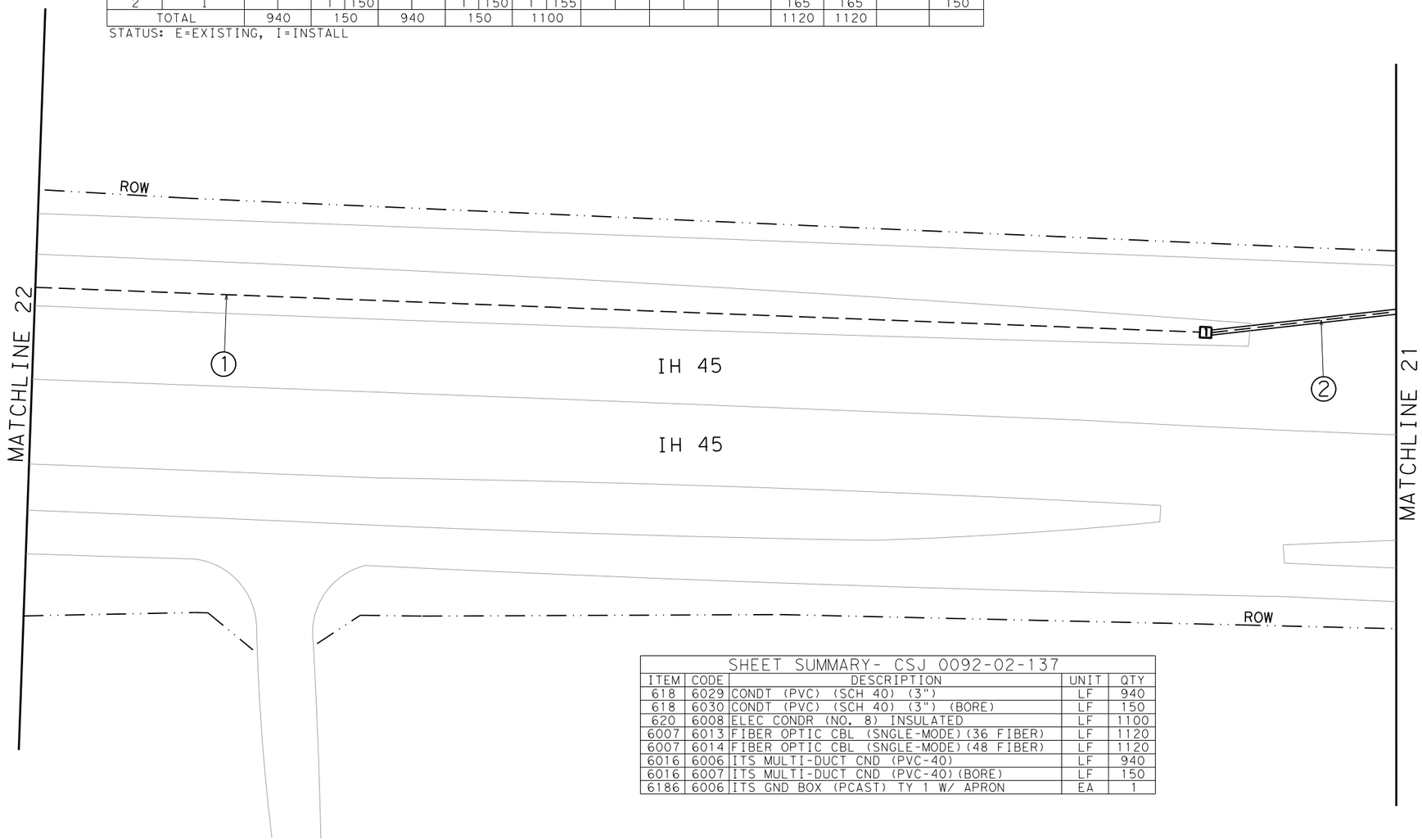
SCALE: 1"=100' SHEET 21 OF 44

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	27
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 21.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																		
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	940			1	940			1	945						955	955		940
2	I			1	150			1	150	1	155						165	165		150
TOTAL		940		150		940		150		1100							1120	1120		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	940
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	150
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1100
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1120
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1120
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	940
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	150
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 22 OF 44

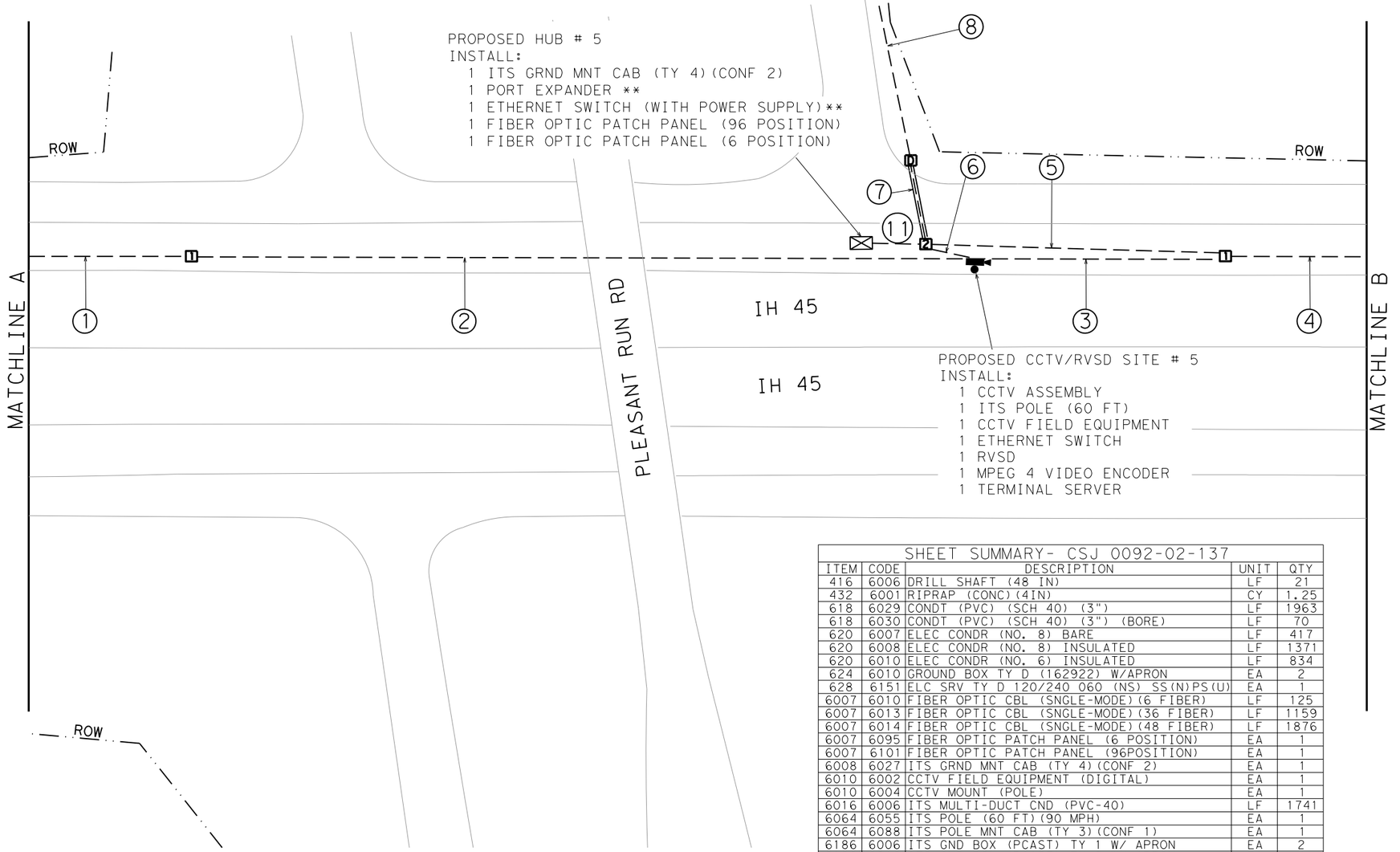
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	28
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 22.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.				ITS COM. CABLE	
1	I	1	135			1	135			1	140						150	1	150				135
2	I	1	643			1	643			1	648						658	1	658				643
3	I	1	205			1	205			1	210						220	1	220				205
4	I	1	116			1	116			1	121						131	1	131				116
5	I	2	247			2	247			1	252							2	262				247
6	I	1	42			1	42					1	47	2	47	57		1	57				42
7	I			1	70							1	75	2	75								70
8	I	1	186									1	191	2	191								186
9	I	1	13									1	18	2	18								13
10	I	1	23									1	28	2	28								23
11	I	2	53			2	53					1	58	2	58	68		2	68				53
TOTAL		1963		70		1741				1371		417		834		125	1159	1876					

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1963
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	70
620	6007	ELEC CONDR (NO. 8) BARE	LF	417
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1371
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	834
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
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	125
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1159
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1876
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1741
6064	6055	ITS POLE (60 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E.
Date

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IH45 ITS UPGRADE
LAYOUT

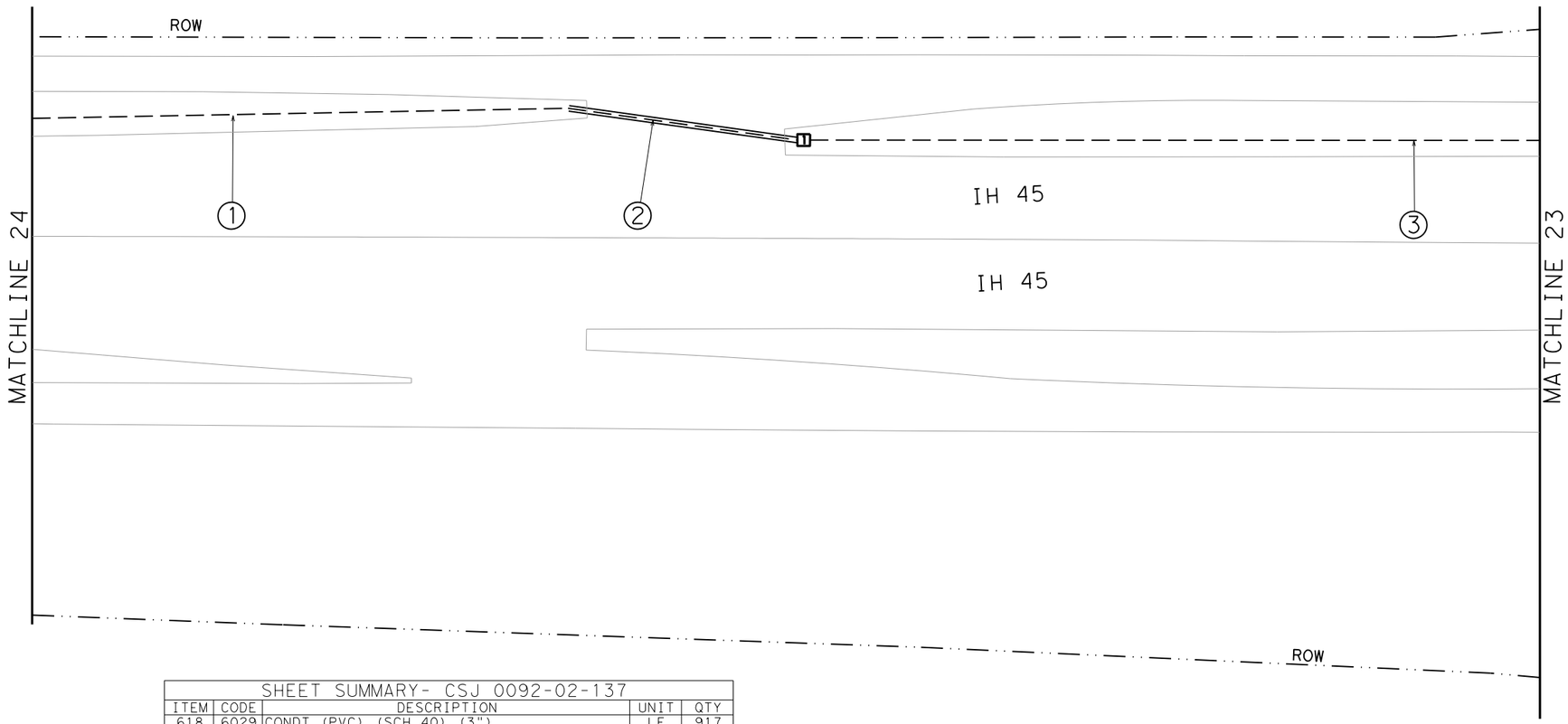
SCALE: 1"=100' SHEET 23 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	29
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

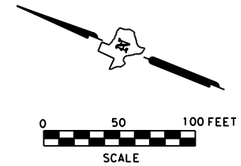
DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 23.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																							
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	383			1	383			1	388						398	398		383
2	I			1	173			1	173	1	178						188	188		173
3	I	1	534			1	534			1	539						549	549		534
TOTAL		917		173		917		173		1105							1135	1135		

STATUS: E=EXISTING, I=INSTALL

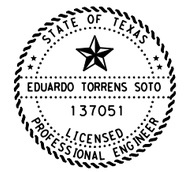


SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	917
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	173
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1105
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1135
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1135
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	917
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	173
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)



Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

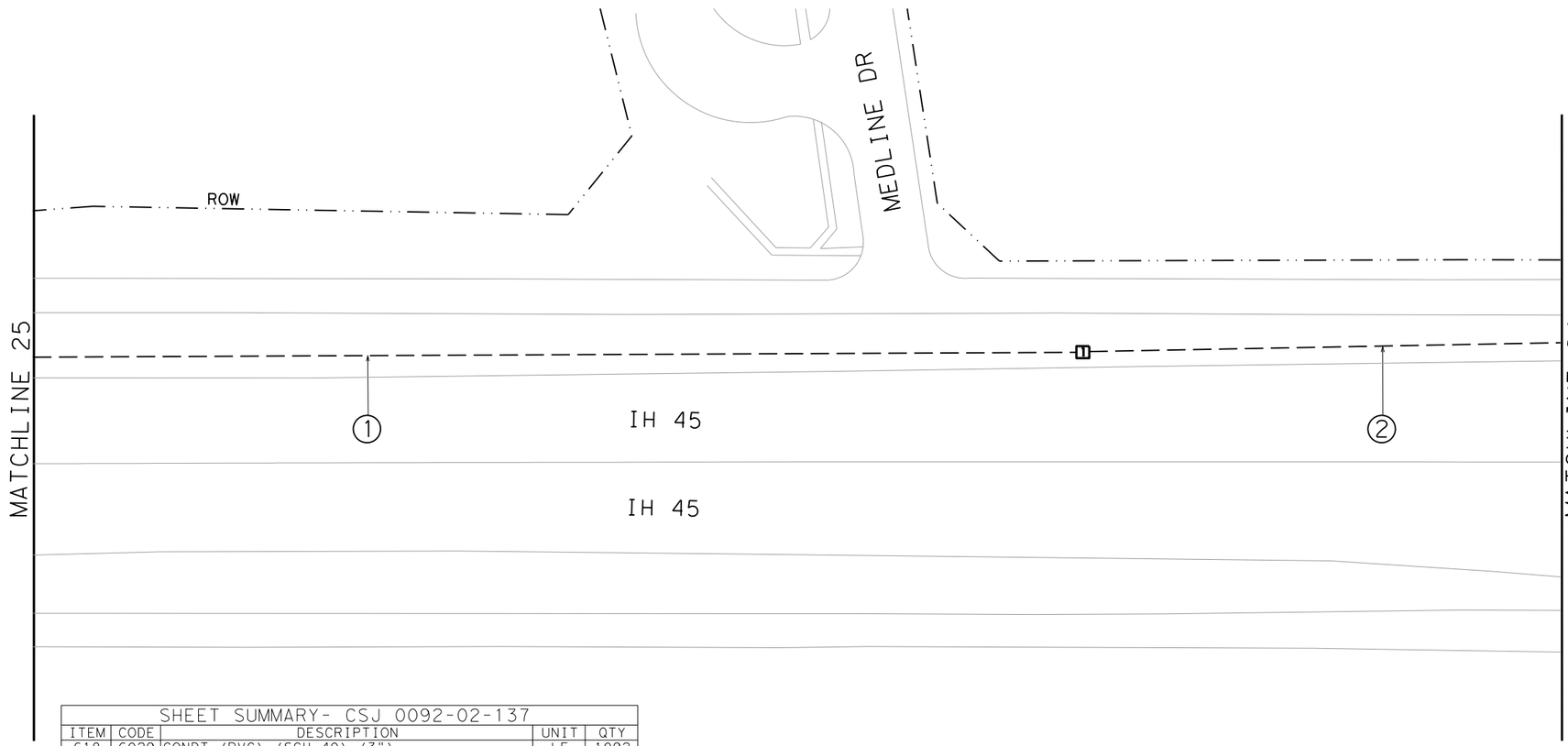
SCALE: 1"=100' SHEET 24 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	30
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

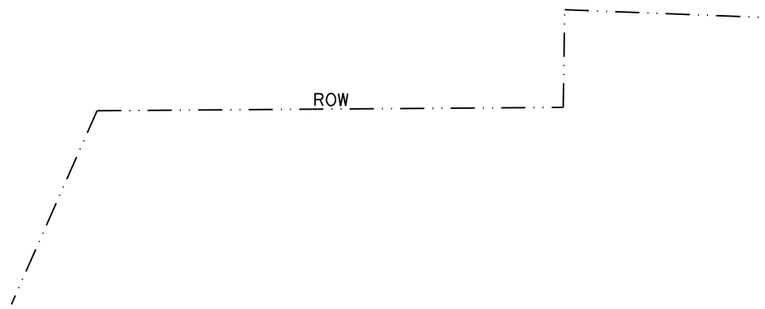
DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 24.dgn

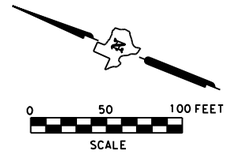
CONDUIT AND CABLE CHART- CSJ 0092-02-137																			
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	752			1	752			1	757						767	767		752
2	I	1	340			1	340			1	345						355	355		340
TOTAL		1092				1092				1102							1122	1122		

STATUS: E=EXISTING, I=INSTALL



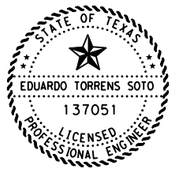
SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1092
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1102
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1122
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1122
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1092
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)



Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 25 OF 44

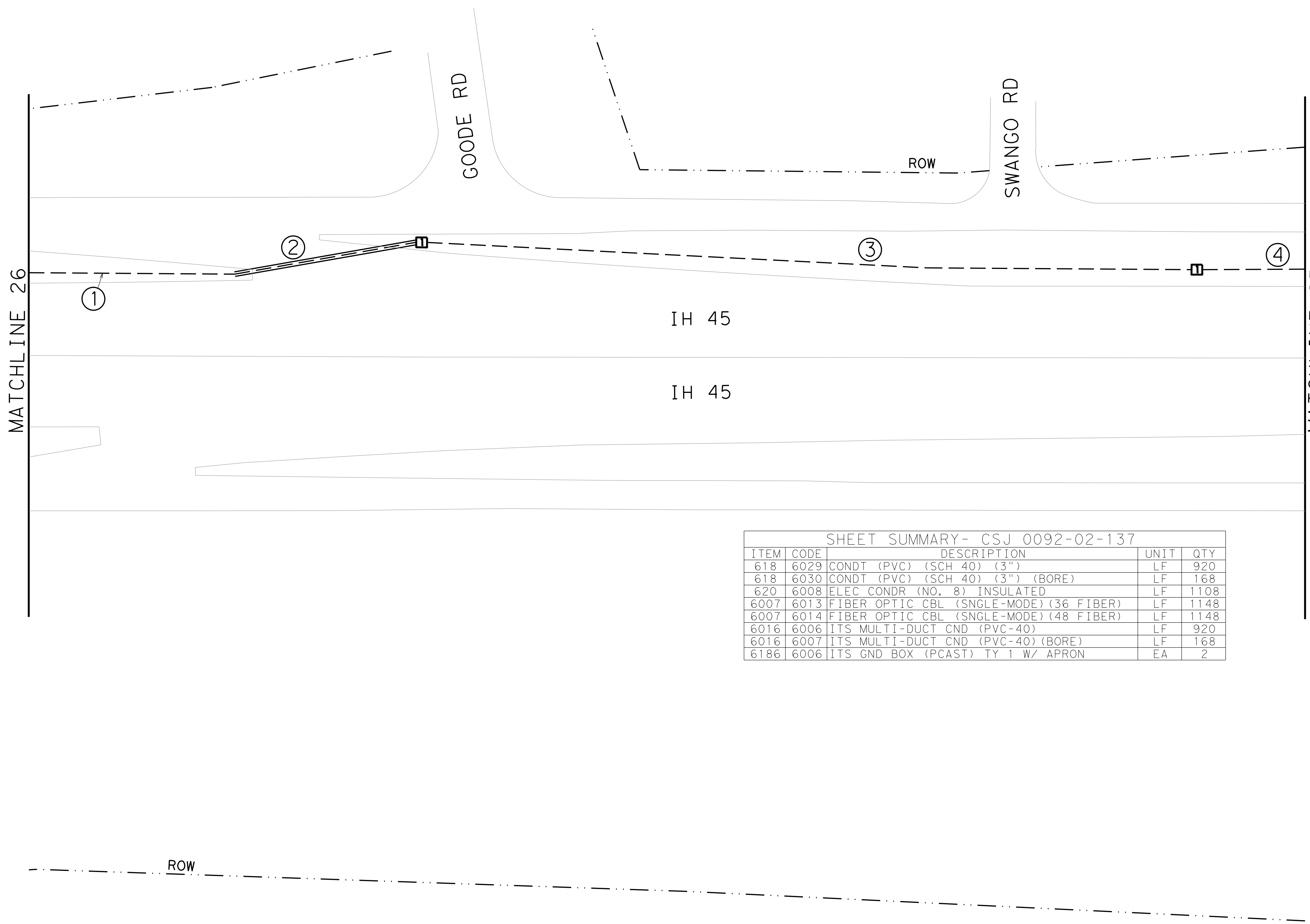
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	31
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

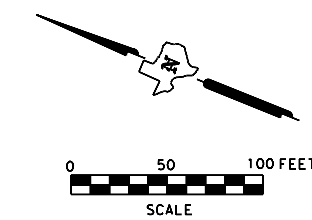
DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 25.dgn

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"	CONDUIT ITEM 618 PVC SCHD 40 3" BORE	CONDUIT ITEM 6016 ITS MDC SCHD 40 4"	CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE	FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1 170		1 170		1 175				185	185		170
2	I		1 168		1 168	1 173				183	183		168
3	I	1 660		1 660		1 665				675	675		660
4	I	1 90		1 90		1 95				105	105		90
TOTAL		920	168	920	168	1108				1148	1148		

CONDUIT AND CABLE CHART- CSJ 0092-02-137

STATUS: E=EXISTING, I=INSTALL





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	920
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	168
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1108
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1148
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1148
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	920
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	168
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED
PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E.
Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100'

SHEET 26 OF 44

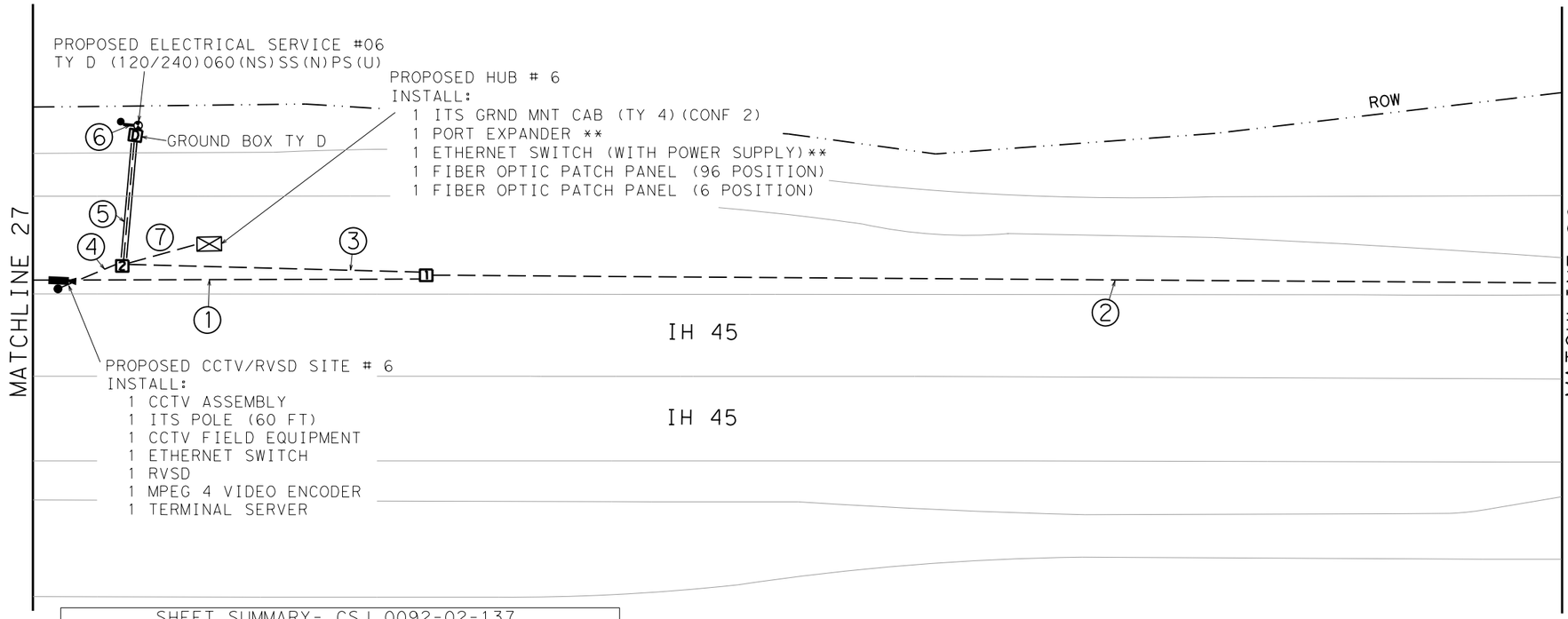
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	32
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 26.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.		SINGLE MODE 36		SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	446			1	446			1	451							461	1	461			446
2	I	1	600			1	600			1	605							615	1	615			600
3	I	2	112			2	112			1	117								2	127			112
4	I	1	482									1	487	2	487	497							482
5	I			1	62							1	67	2	67								62
6	I	1	192									1	197	2	197								192
7	I	2	67			2	67					1	72	2	72	82			2	82			67
TOTAL		2078		62		1404				1173		823		1646		579		1076	1494				

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	2078
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	62
620	6007	ELEC CONDR (NO. 8) BARE	LF	823
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1173
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1646
624	6010	GROUND BOX TY D (162922) W/APRON	EA	1
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	579
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1076
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1494
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1404
6064	6055	ITS POLE (60 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/2/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 27 OF 44

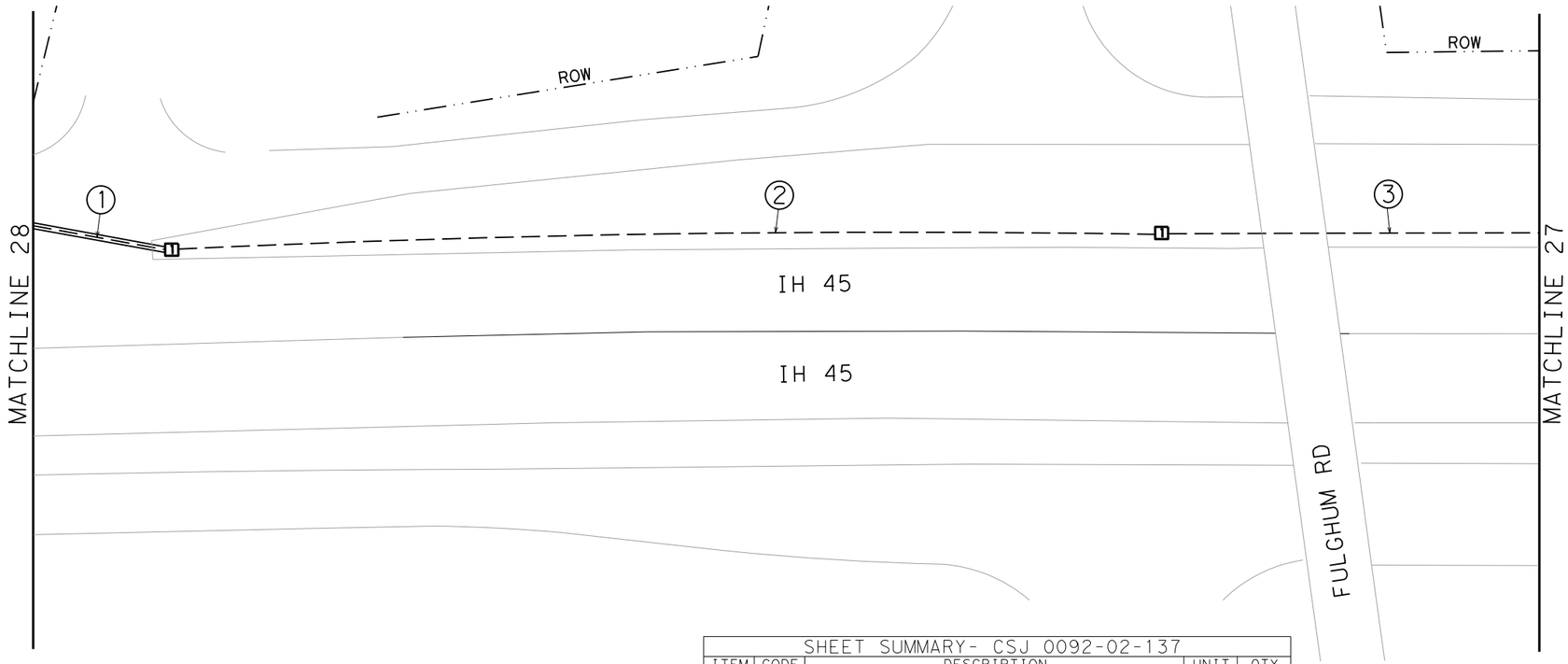
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	33
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/2/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 27.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

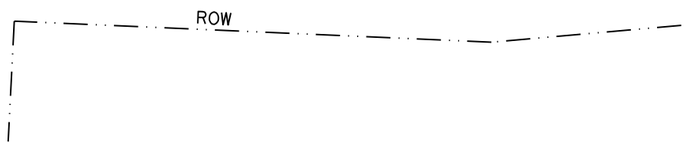
RUN #	CONDITION	CONDUIT ITEM 618		CONDUIT ITEM 618		CONDUIT ITEM 6016		CONDUIT ITEM 6016		ELECTRIC CONDUCTOR ITEM 620		ELECTRIC CONDUCTOR ITEM 620		ELECTRIC CONDUCTOR ITEM 620		FIBER CABLE ITEM 6007	FIBER CABLE ITEM 6007	FIBER CABLE ITEM 6007	ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I			1	100			1	100	1	105						115	115		100
2	I	1	695			1	695			1	700						710	710		695
3	I	1	300			1	300			1	305						315	315		300
TOTAL		995		100		995		100		1110							1140	1140		

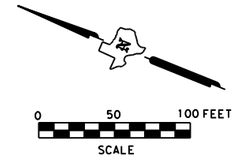
STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

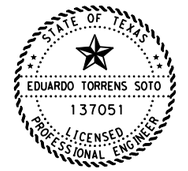
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	995
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	100
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1110
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1140
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1140
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	995
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	100
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)



Eduardo Torrens Soto, P.E. 3/1/2023
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IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 28 OF 44

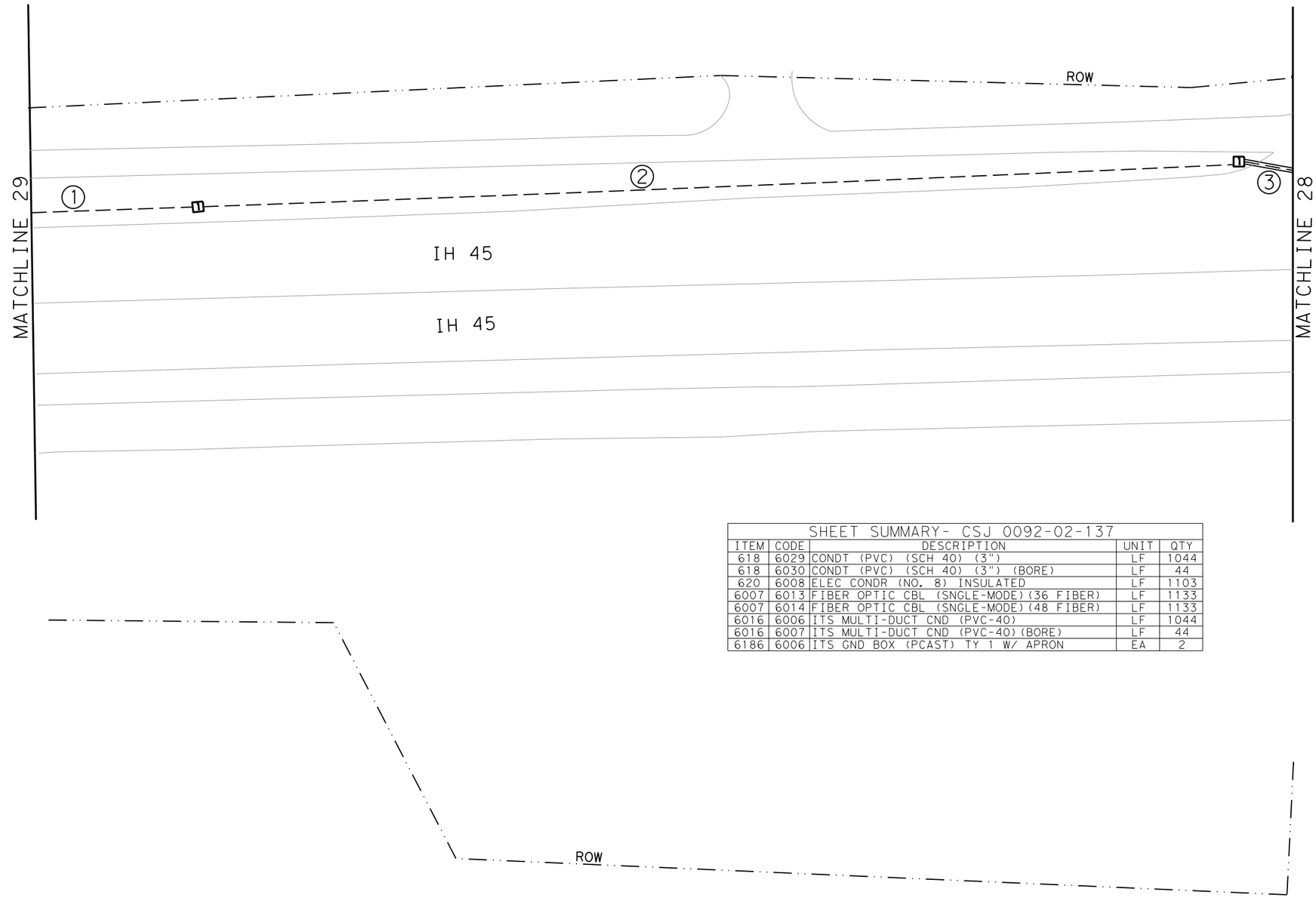
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	34
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 28.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"	CONDUIT ITEM 618 PVC SCHD 40 3" BORE	CONDUIT ITEM 6016 ITS MDC SCHD 40 4"	CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE	ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER	CONDR (NO. 8) BARE	CONDR (NO. 6) INSULATE	FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1 142		1 142		1 147				157	157		142
2	I	1 902		1 902		1 907				917	917		902
3	I		1 44		1 44	1 49				59	59		44
TOTAL		1044	44	1044	44	1103				1133	1133		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1044
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	44
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1103
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1133
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1133
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1044
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	44
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

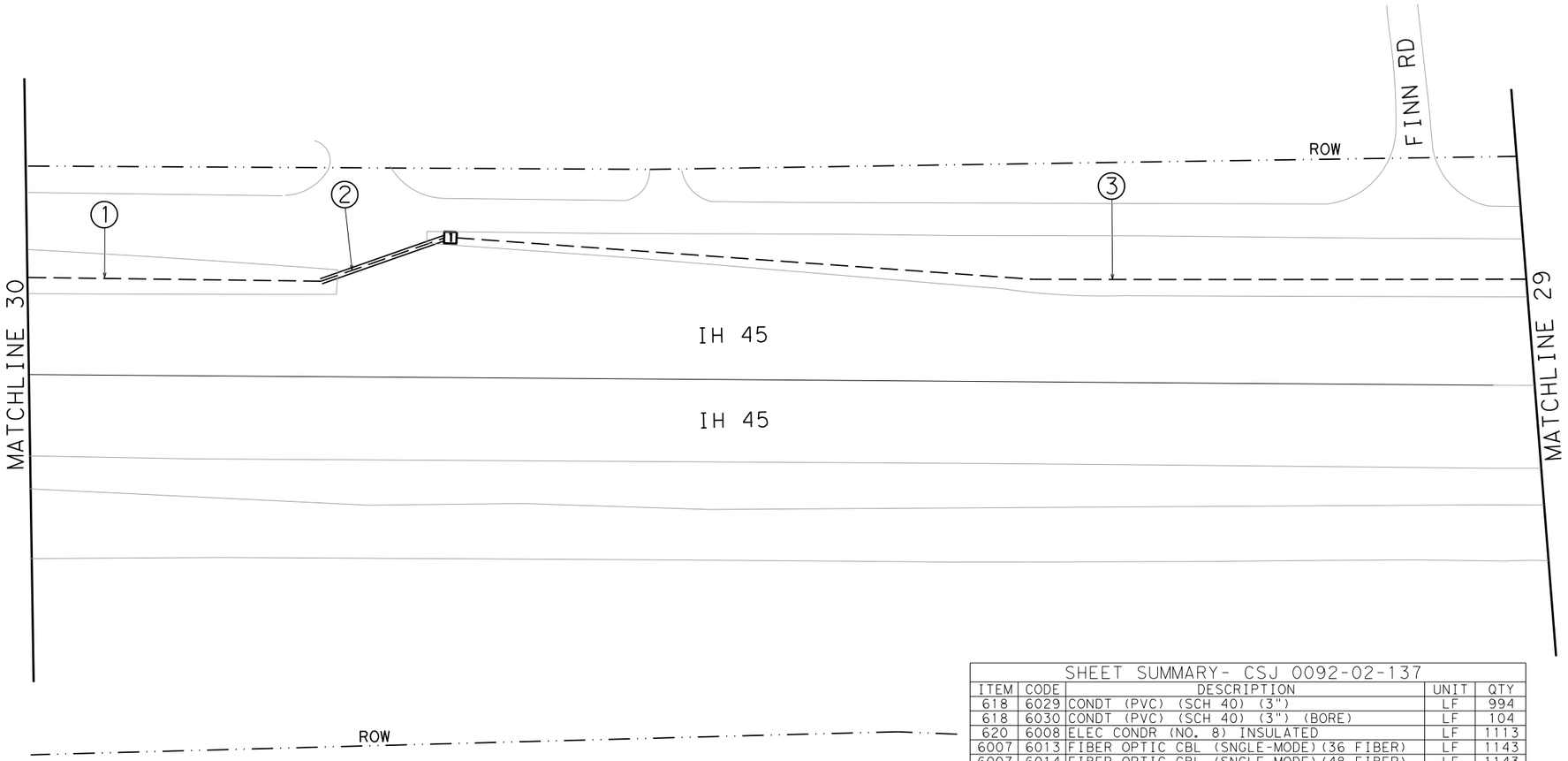
SCALE: 1"=100' SHEET 29 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	35
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 29.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																									
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620								FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	210			1	210			1	215						225	225		210
2	I			1	104			1	104	1	109						119	119		104
3	I	1	784			1	784			1	789						799	799		784
TOTAL		994		104		994		104		1113							1143	1143		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	994
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	104
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1113
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1143
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1143
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	994
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	104
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

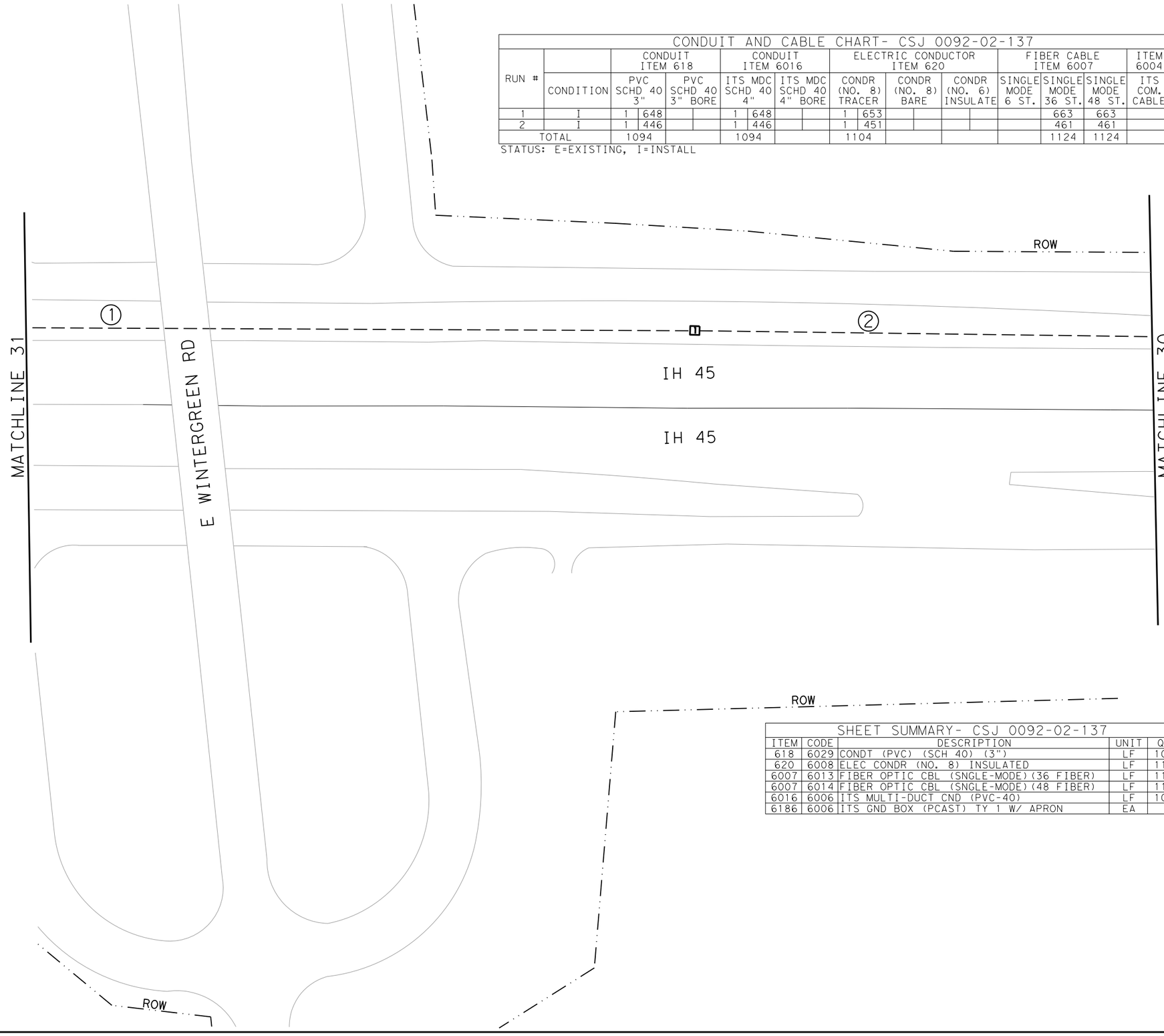
SCALE: 1"=100' SHEET 30 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	36
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 30.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																
RUN #	CONDITION	CONDUIT ITEM 618		CONDUIT ITEM 6016		ELECTRIC CONDUCTOR ITEM 620			FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"	PVC SCHD 40 3" BORE	ITS MDC SCHD 40 4"	ITS MDC SCHD 40 4" BORE	CONDR (NO. 8) TRACER	CONDR (NO. 8) BARE	CONDR (NO. 6) INSULATE	SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1 648		1 648		1 653				663	663		648
2	I	1 446		1 446		1 451				461	461		446
TOTAL		1094		1094		1104				1124	1124		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1094
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1104
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1124
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1124
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1094
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

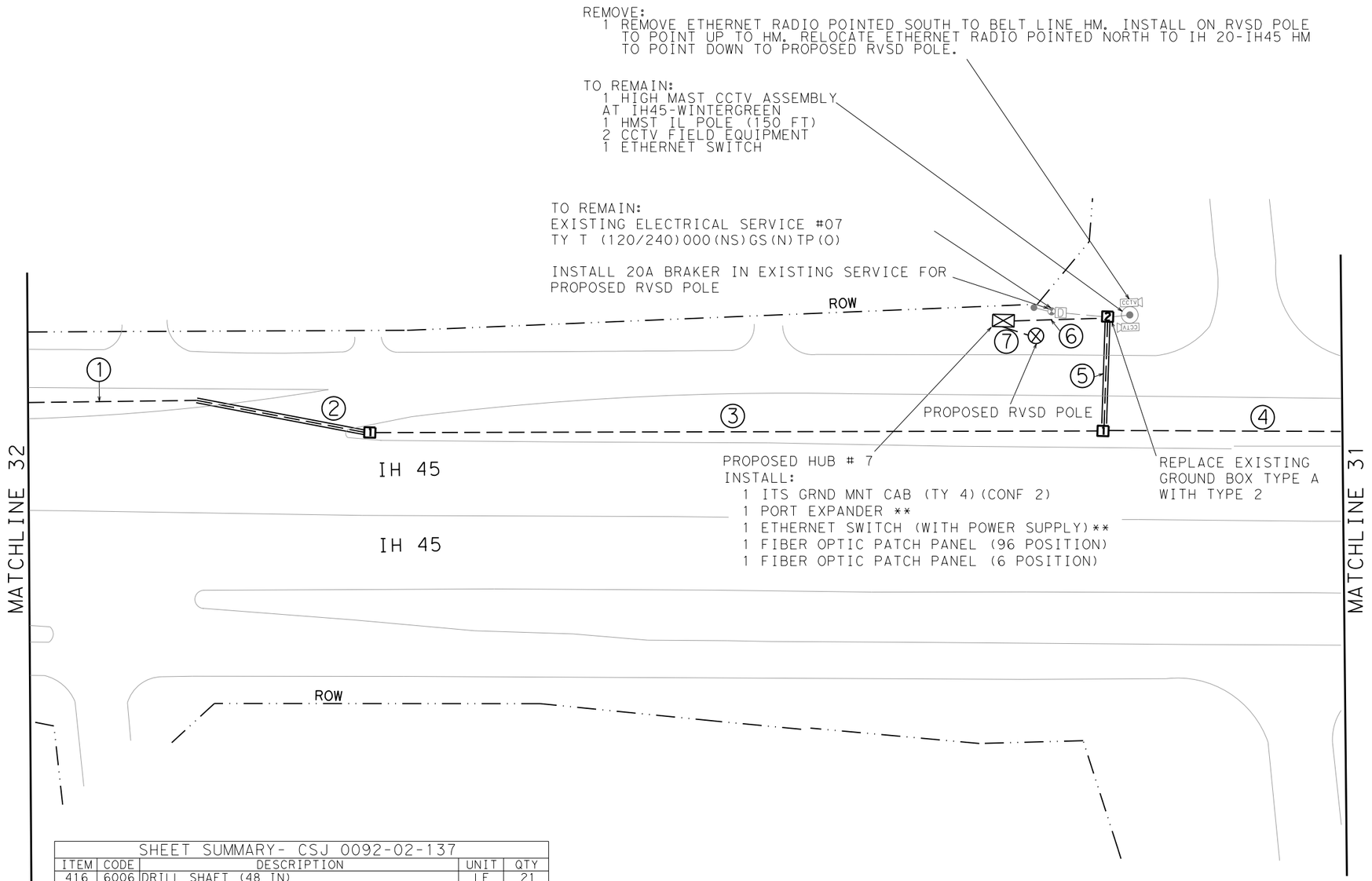
Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 31 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	37
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 31.dgn



0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1322
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	148
620	6007	ELEC CONDR (NO. 8) BARE	LF	128
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1199
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	256
6000	6098	INSTALL CIRCUIT BREAKER	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	45
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1144
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1560
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1292
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	148
6064	6019	ITS POLE (40 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007				ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	132			1	132			1	137						147	1	147		132
2	I			1	148			1	148	1	153						163	1	163		148
3	I	1	608			1	608			1	613						623	1	623		608
4	I	1	196			1	196			1	201						211	1	211		196
5	I	2	90			2	90			1	95							2	105		90
6	I	2	88			2	88					1	93	2	93			2	103		88
7	I	1	30									1	35	2	35	45					30
TOTAL		1322		148		1292		148		1199		128		256		45	1144	1560			

STATUS: E=EXISTING, I=INSTALL

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

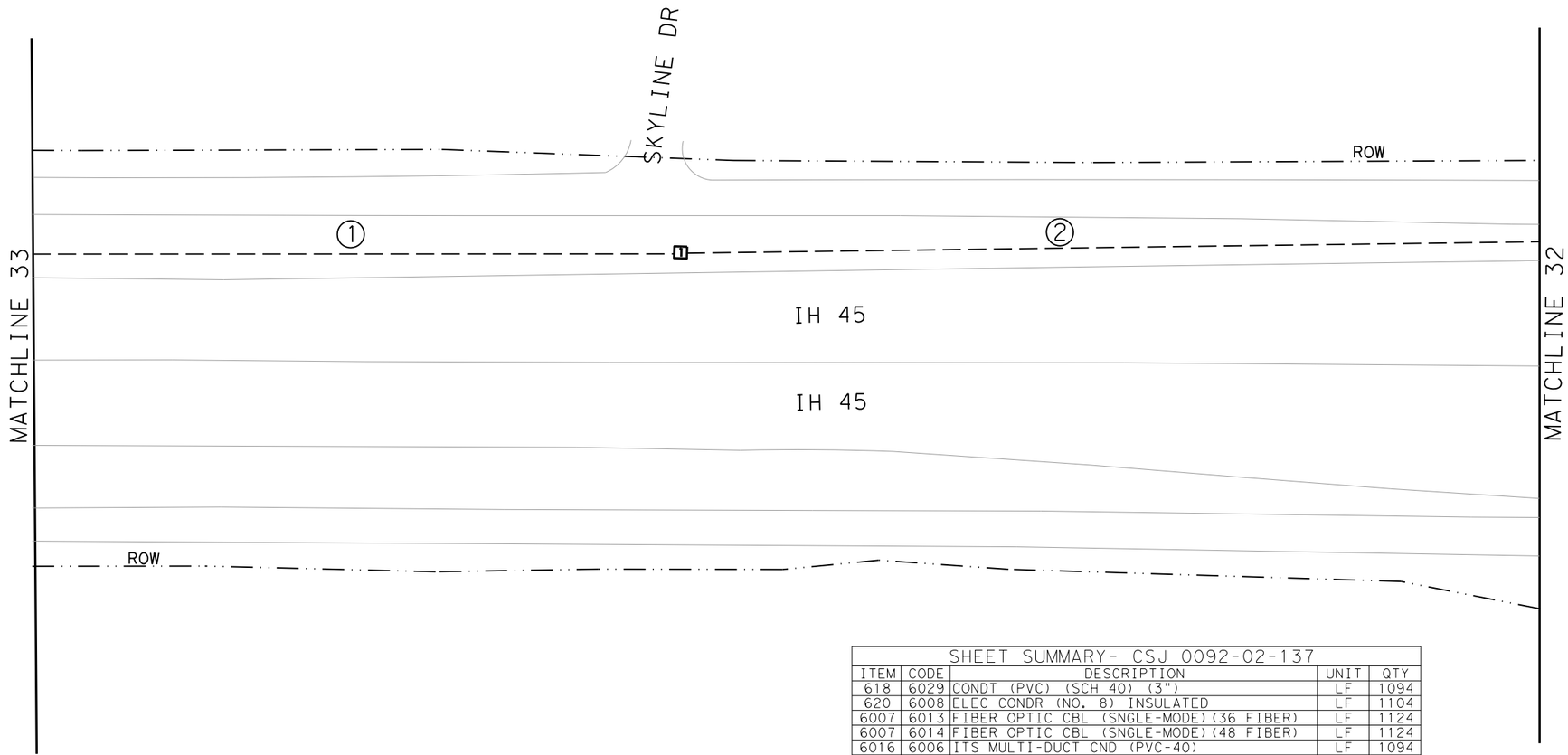
SCALE: 1"=100' SHEET 32 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	38
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

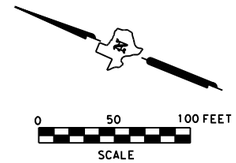
DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 32.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																		
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	470			1	470			1	475						485	485		470
2	I	1	624			1	624			1	629						639	639		624
TOTAL		1094				1094				1104							1124	1124		

STATUS: E=EXISTING, I=INSTALL

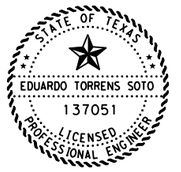


SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1094
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1104
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1124
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1124
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1094
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)



Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 33 OF 44

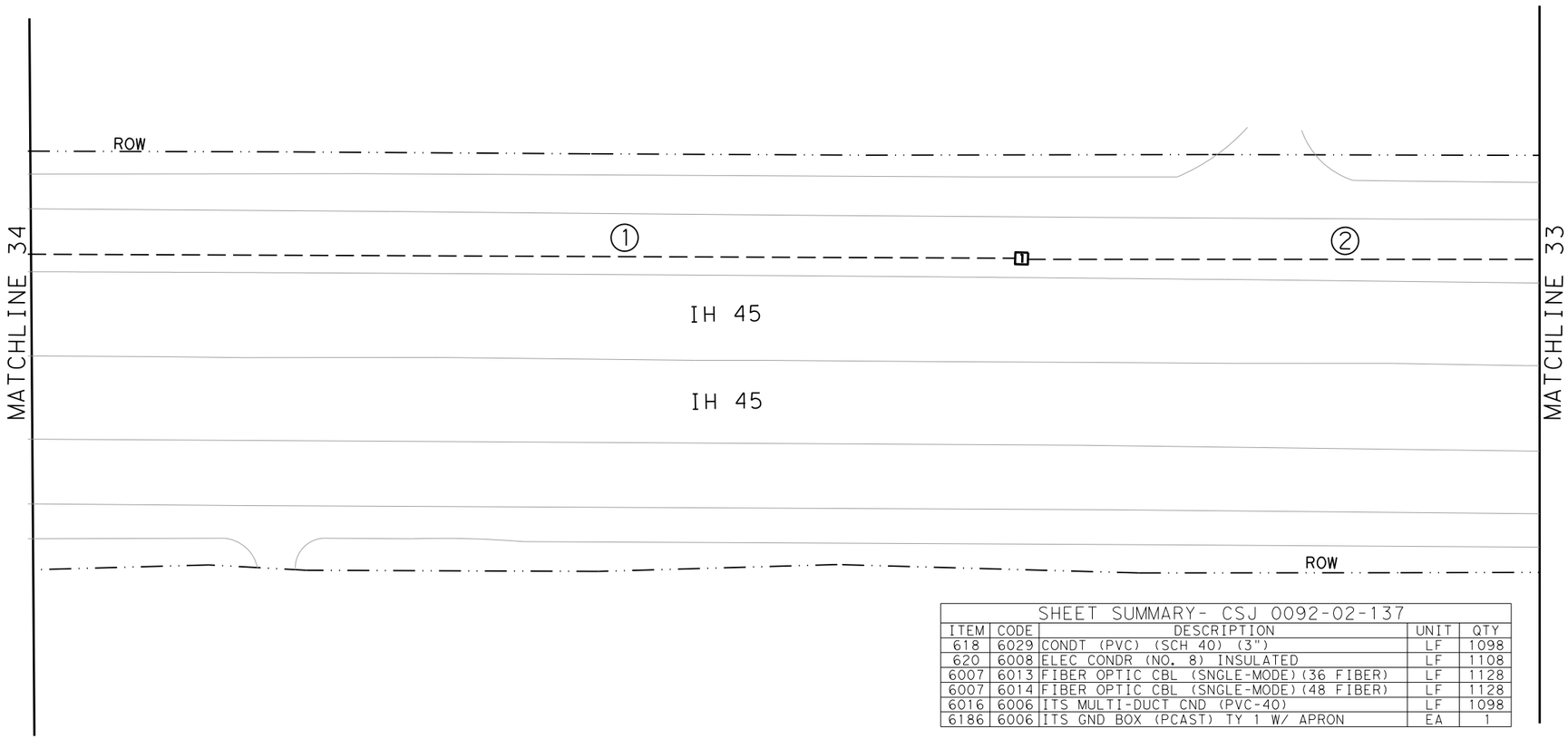
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	39
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 33.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"		CONDUIT ITEM 618 PVC SCHD 40 3" BORE		CONDUIT ITEM 6016 ITS MDC SCHD 40 4"		CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) BARE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) INSULATE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 6) BARE		FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 36 ST.	FIBER CABLE ITEM 6007 SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1	722			1	722			1	727								737	737		722
2	I	1	376			1	376			1	381								391	391		376
TOTAL		1098		0		1098				1108									1128	1128		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1098
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1108
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1128
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1128
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1098
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 34 OF 44

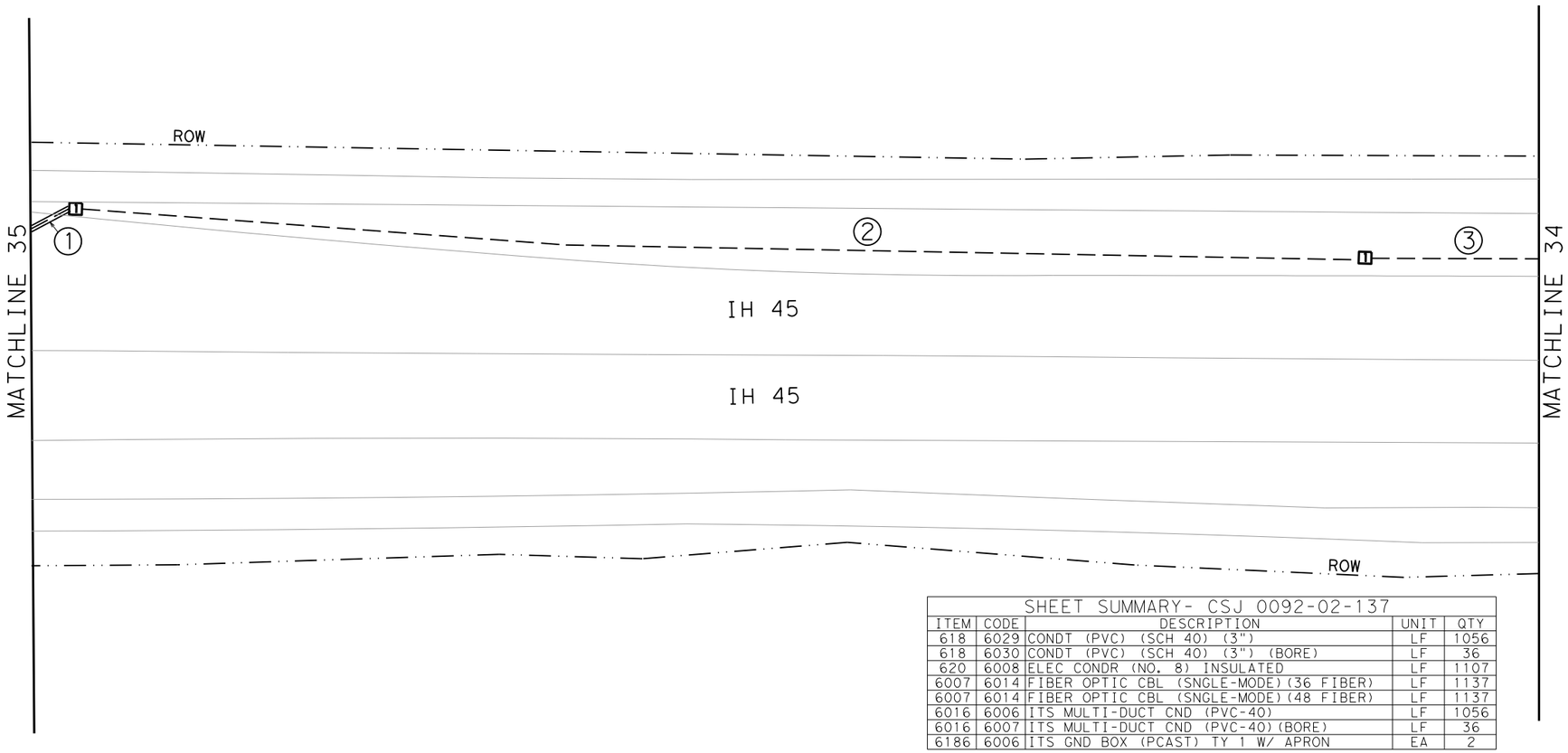
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	40
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 34.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620								FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE				SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I			1	36			1	36	1	41								51	51		36
2	I	1	934			1	934			1	939								949	949		934
3	I	1	122			1	122			1	127								137	137		122
TOTAL		1056		36		1056		36		1107									1137	1137		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1056
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	36
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1107
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1137
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1137
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1056
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	36
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 35 OF 44

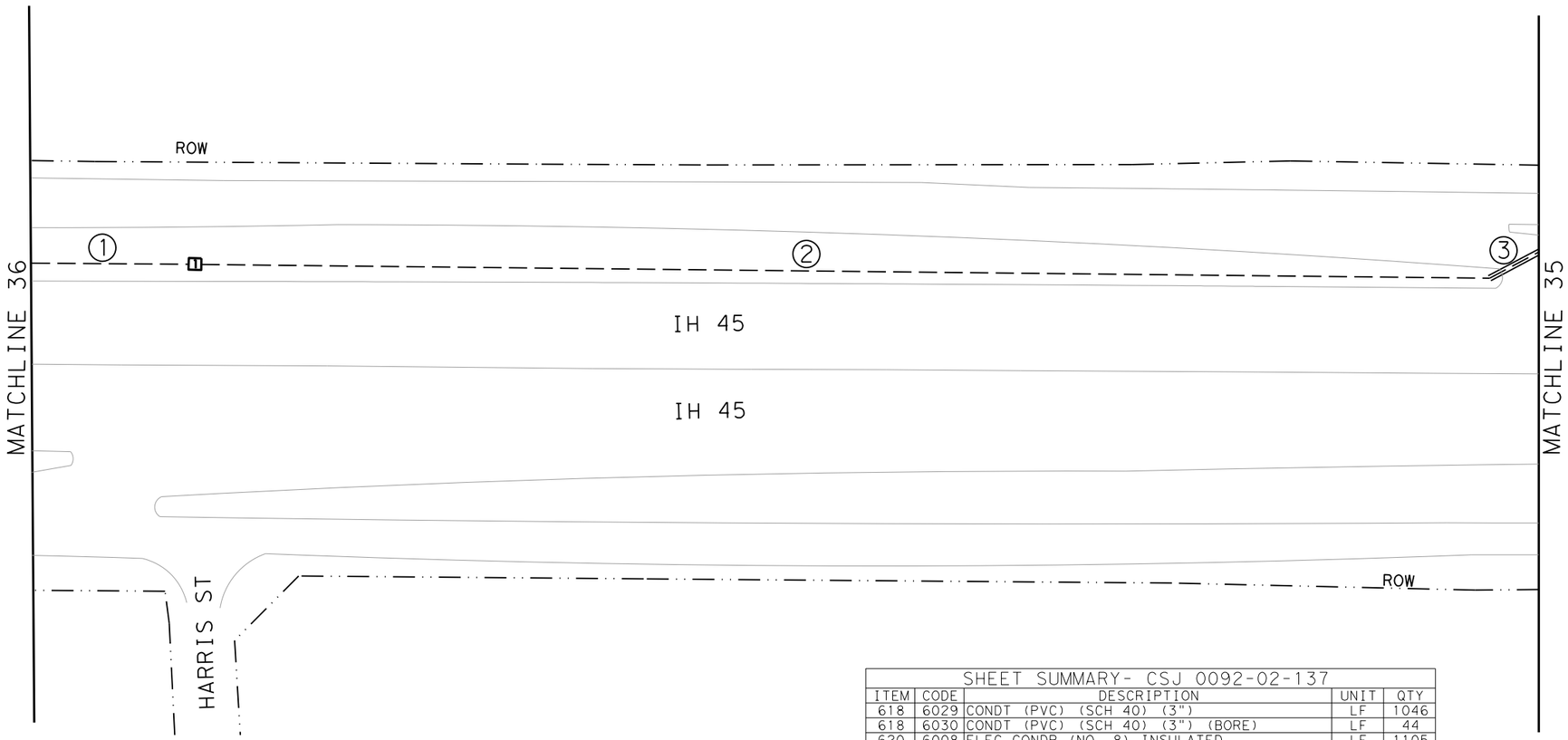
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	41
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 35.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	116			1	116			1	121						131	131		116
2	I	1	930			1	930			1	935						945	945		930
3	I			1	44			1	44	1	49						59	59		44
TOTAL		1046		44		1046		44		1105							1135	1135		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1046
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	44
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1105
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1135
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1135
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1046
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	44
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

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Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 36 OF 44

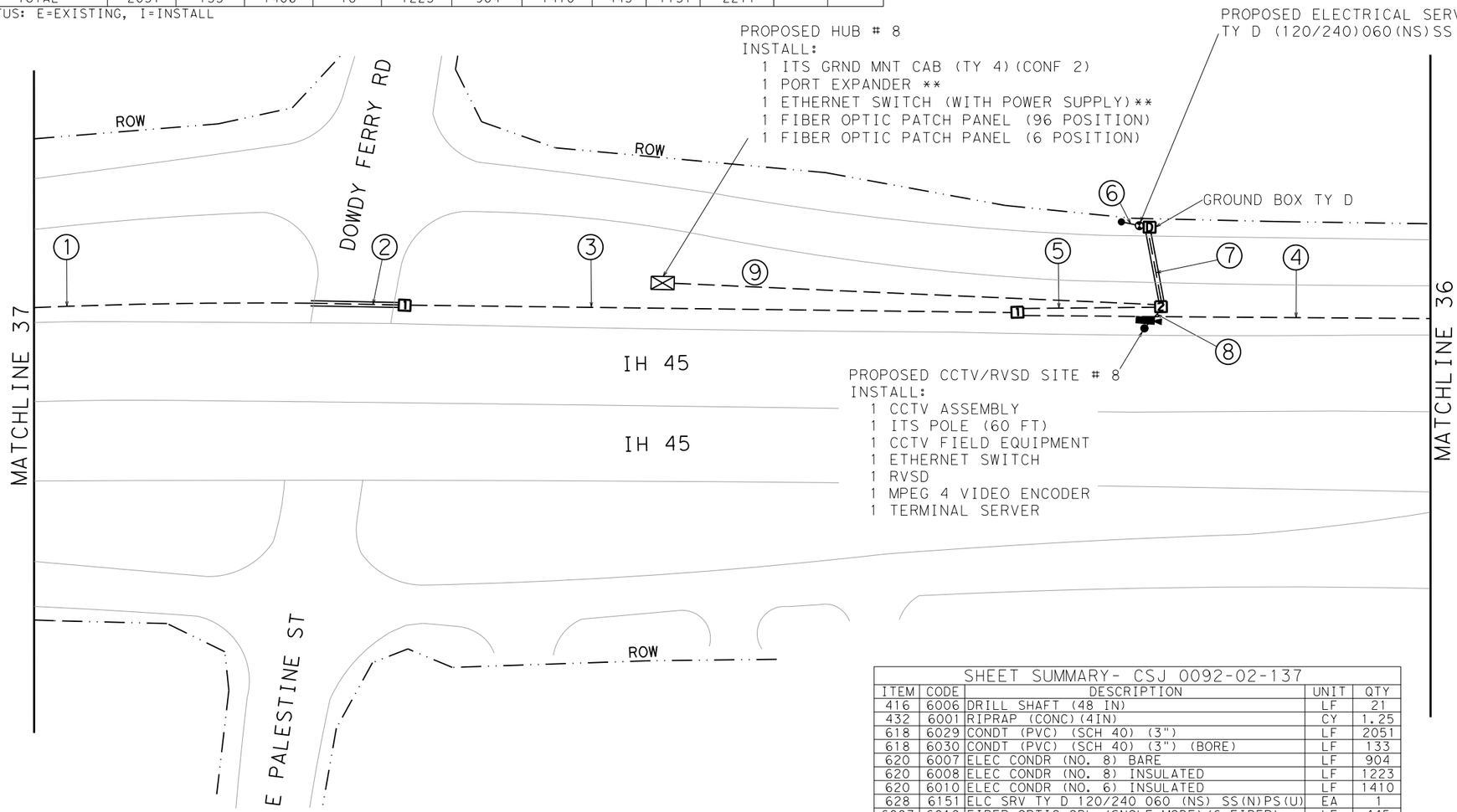
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	42
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 36.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007				ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	211			1	211			1	216						226	1	226		211
2	I			1	78			1	78	1	83						93	1	93		78
3	I	1	482			1	482			1	487						497	1	497		482
4	I	1	320			1	320			1	325						335	1	335		320
5	I	2	107							1	112							2	122		107
6	I	1	16									1	21	2	21						16
7	I			1	55							1	60	2	60						55
8	I	1	22									1	27	2	27	37					22
9	I	2	393			1	393					2	398	3	398	408		2	408		393
TOTAL		2051		133		1406		78		1223		904		1410		445	1151	2211			

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	2051
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	133
620	6007	ELEC CONDR (NO. 8) BARE	LF	904
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1223
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1410
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	445
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1151
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	2211
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1406
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	78
6064	6055	ITS POLE (60 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

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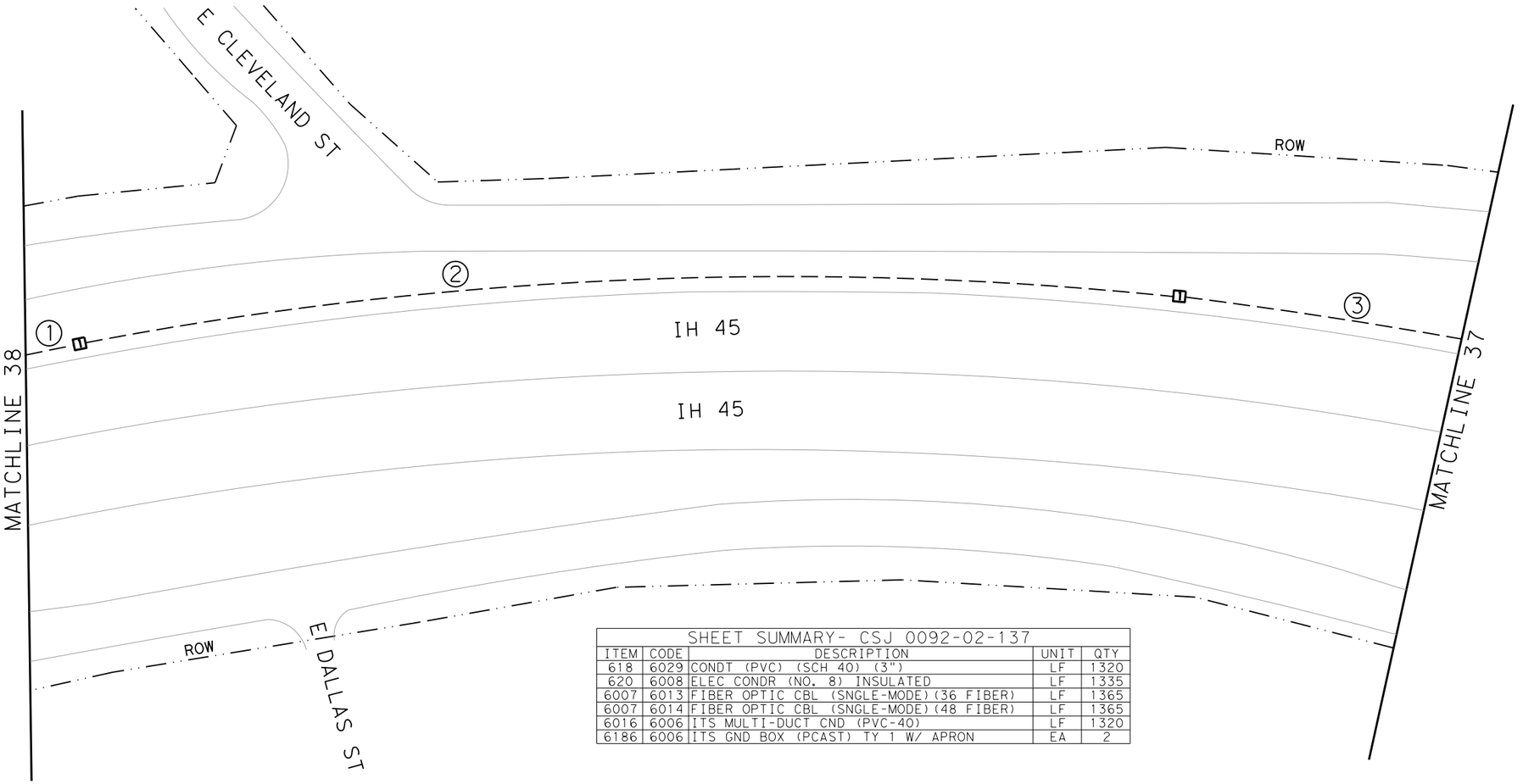
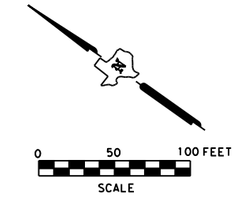
IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 37 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	43
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 37.dgn





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1320
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1335
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1365
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1365
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1320
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2

CONDUIT AND CABLE CHART- CSJ 0092-02-137																								
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	42			1	42			1	47						57	57		42
2	I	1	850			1	850			1	855						865	865		850
3	I	1	428			1	428			1	433						443	443		428
TOTAL		1320				1320				1335							1365	1365		

STATUS: E=EXISTING, I=INSTALL

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED
PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 38 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	44
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 38.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137

RUN #		CONDUIT ITEM 618		CONDUIT ITEM 6016		ELECTRIC CONDUCTOR ITEM 620			FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
	CONDITION	PVC SCHD 40 3"	PVC SCHD 40 3" BORE	ITS MDC SCHD 40 4"	ITS MDC SCHD 40 4" BORE	CONDR (NO. 8) TRACER	CONDR (NO. 8) BARE	CONDR (NO. 6) INSULATE	SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1 572		1 572		1 577				587	587		572
2	I		1 120		1 120	1 125				135	135		120
3	I	1 430		1 430		1 435				445	445		430
TOTAL		1002	120	1002	120	1137				1167	1167		

STATUS: E=EXISTING, I=INSTALL

LEGEND

— — —	PROPOSED CONDUIT
— — —	EXISTING CONDUIT
☐	EXISTING GROUND BOX (TYPE)
◐	EXISTING ELECTRICAL SERVICE
◐	PROPOSED ELECTRICAL SERVICE
▭	EXISTING DMS
CCTV	EXISTING CCTV
▷	EXISTING RVSD
╪	EXISTING RADIO
▬	PROPOSED DMS
1	PROPOSED GROUND BOX TYPE 1
2	PROPOSED GROUND BOX TYPE 2
#	CONDUIT LABEL
●	PROPOSED CCTV & RVSD
☒	PROPOSED ITS HUB CABINET
⊗	PROPOSED ITS POLE 40FT (RVSD)

SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1002
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	120
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1137
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1167
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1167
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1002
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	120
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

EDUARDO TORRENS SOTO
137051

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E.
Date

IH45 ITS UPGRADE
LAYOUT

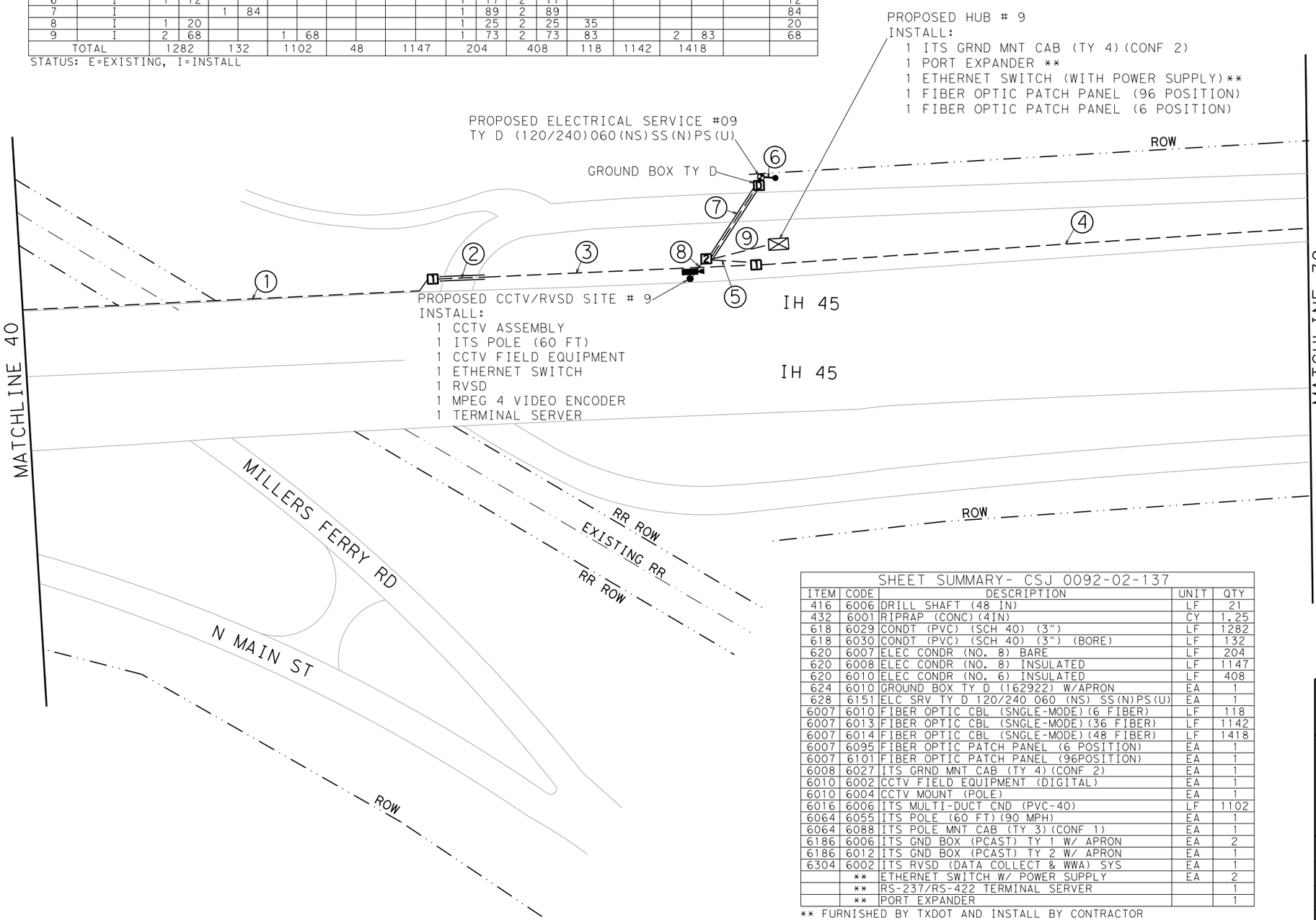
SCALE: 1"=100'
SHEET 39 OF 44

DESIGN SS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS ET	6	(SEE TITLE SHEET)		IH 45, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	45
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 39.dgn

CONDUIT AND CABLE CHART- CSJ 0092-02-137																										
RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620								FIBER CABLE ITEM 6007						ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.		SINGLE MODE 36 ST.		SINGLE MODE 48 ST.		ITS COM. CABLE	
1	I	1	297			1	297			1	302							312		1	312			297
2	I			1	48			1	48	1	53							63		1	63			48
3	I	1	235			1	235			1	240							250		1	250			235
4	I	1	502			1	502			1	507							517		1	517			502
5	I	2	40							1	45									2	55			40
6	I	1	12									1	17	2	17									12
7	I			1	84							1	89	2	89									84
8	I	1	20									1	25	2	25	35								20
9	I	2	68			1	68					1	73	2	73	83				2	83			68
TOTAL		1282		132		1102		48		1147		204		408		118		1142		1418				

STATUS: E=EXISTING, I=INSTALL



0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

SHEET SUMMARY- CSJ 0092-02-137				
ITEM	CODE	DESCRIPTION	UNIT	QTY
416	6006	DRILL SHAFT (48 IN)	LF	21
432	6001	RIPRAP (CONC)(4IN)	CY	1.25
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1282
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	132
620	6007	ELEC CONDR (NO. 8) BARE	LF	204
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1147
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	408
624	6010	GROUND BOX TY D (162922) W/APRON	EA	1
628	6151	ELC SRV TY D 120/240 060 (NS) SS(N)PS(U)	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	118
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1142
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1418
6007	6095	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6101	FIBER OPTIC PATCH PANEL (96POSITION)	EA	1
6008	6027	ITS GRND MNT CAB (TY 4)(CONF 2)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6010	6004	CCTV MOUNT (POLE)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	1102
6064	6055	ITS POLE (60 FT)(90 MPH)	EA	1
6064	6088	ITS POLE MNT CAB (TY 3)(CONF 1)	EA	1
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	2
6186	6012	ITS GND BOX (PCAST) TY 2 W/ APRON	EA	1
6304	6002	ITS RVSD (DATA COLLECT & WWA) SYS	EA	1
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2
	**	RS-237/RS-422 TERMINAL SERVER		1
	**	PORT EXPANDER		1

** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

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IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 40 OF 44

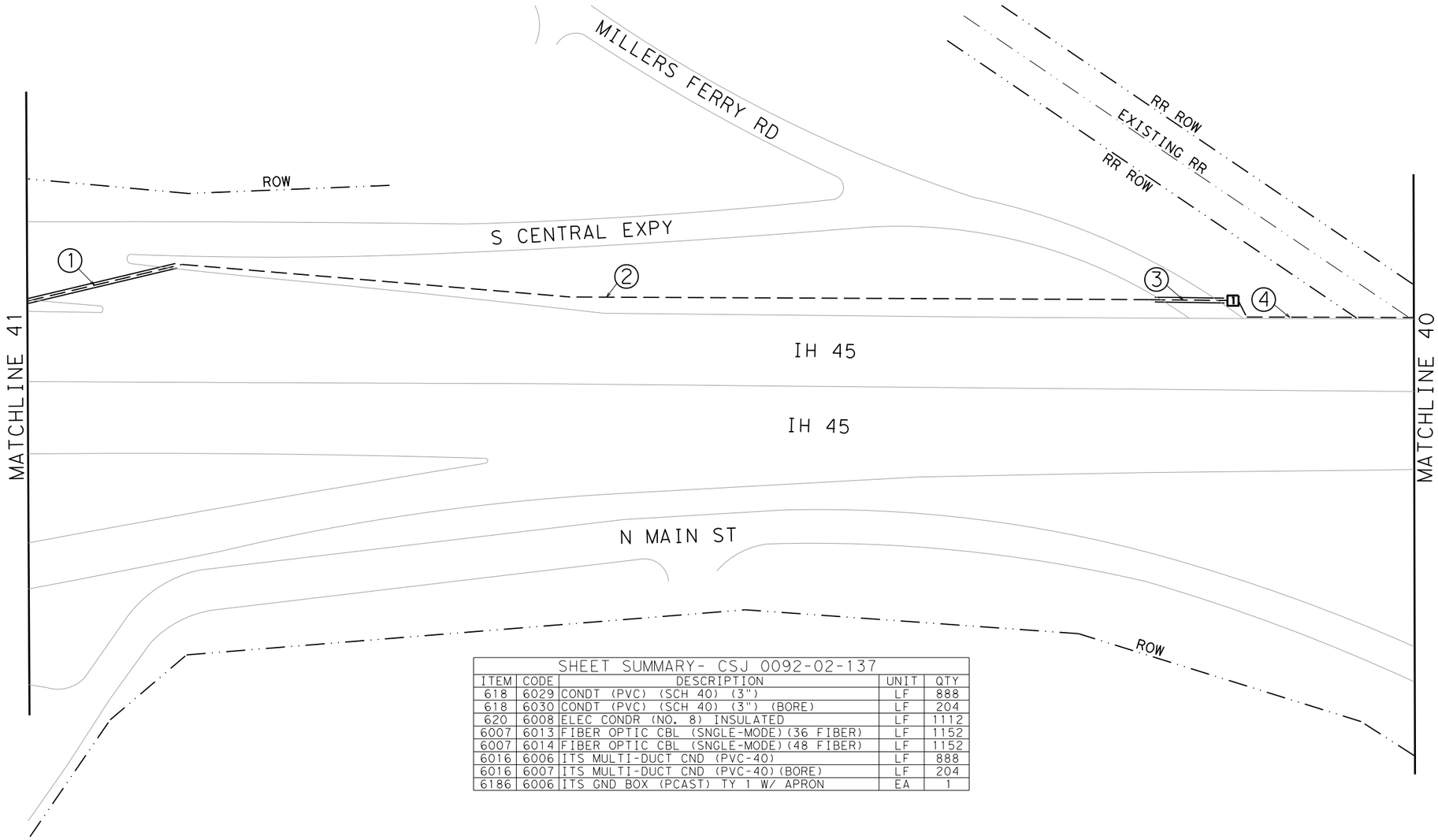
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	46
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirman\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 40.dgn

CONDUIT AND CABLE CHART - CSJ 0092-02-137

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I			1	134			1	134	1	139						149	149		134
2	I	1	800			1	800			1	805						815	815		800
3	I			1	70			1	70	1	75						85	85		70
4	I	1	88			1	88			1	93						103	103		88
TOTAL		888		204		888		204		1112							1152	1152		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY- CSJ 0092-02-137

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	888
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	204
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1112
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1152
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1152
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	888
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	204
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E.
Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 41 OF 44

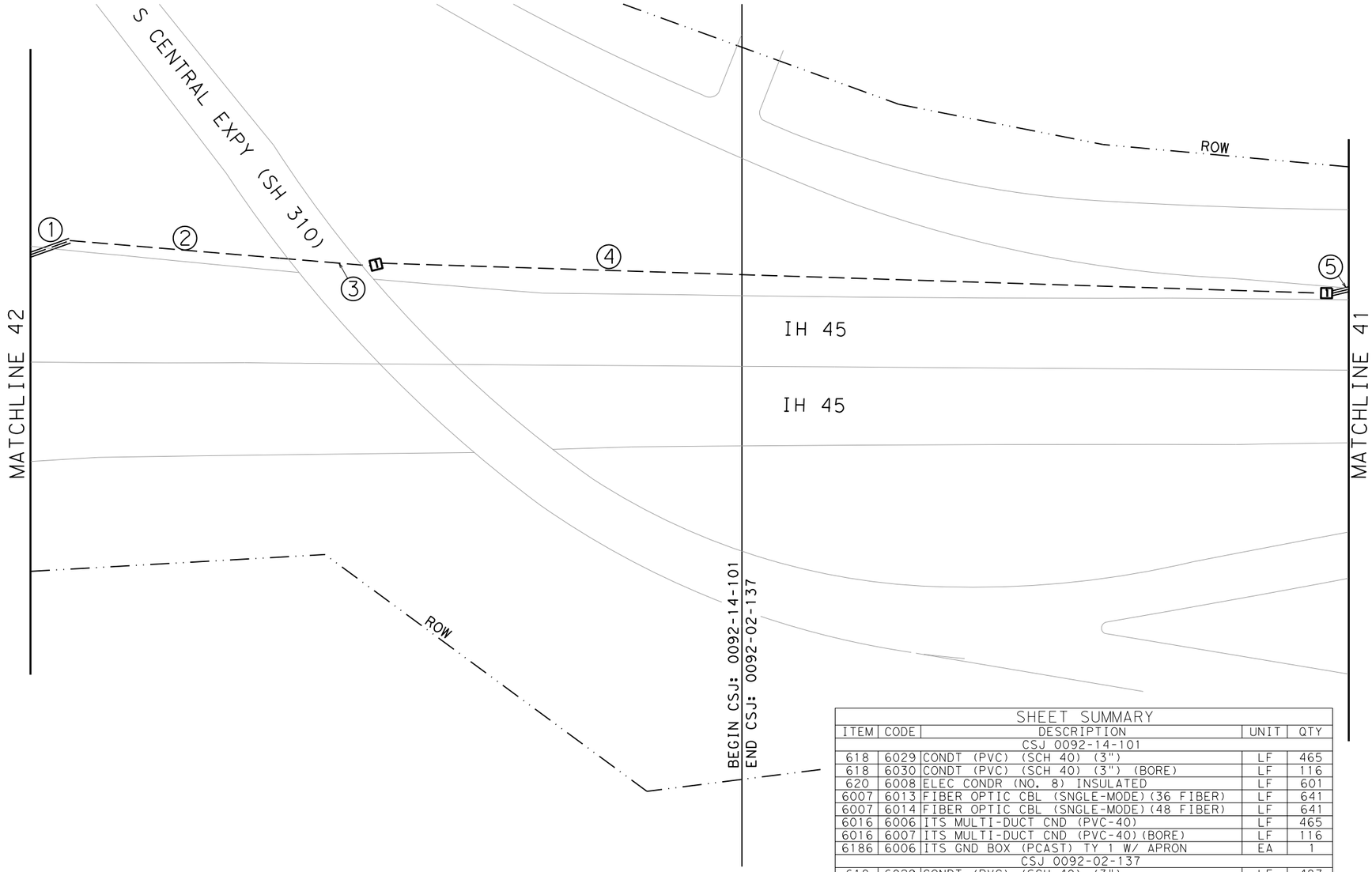
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	47
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 41.dgn

CONDUIT AND CABLE CHART

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
CSJ 0092-14-101																				
1	I			1	36			1	36	1	41						51	51		36
2	I	1	160			1	160			1	165						175	175		160
3	I			1	80			1	80	1	85						95	95		80
4	I	1	305			1	305			1	310						320	320		305
0092-14-101 TOTAL		465		116		465		116		601							641	641		
CSJ 0092-02-137																				
4	I	1	487			1	487			1	492						15	502		487
5	I			1	15			1	15	1	20						30	30		15
0092-02-137 TOTAL		487		15		487		15		512							45	532		

STATUS: E=EXISTING, I=INSTALL



SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
CSJ 0092-14-101				
618	6029	CONDT (PVC) (SCH 40) (3")	LF	465
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	116
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	601
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	641
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	641
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	465
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	116
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1
CSJ 0092-02-137				
618	6029	CONDT (PVC) (SCH 40) (3")	LF	487
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	15
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	512
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	45
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	532
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	487
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	15
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	1

0 50 100 FEET
SCALE

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 42 OF 44

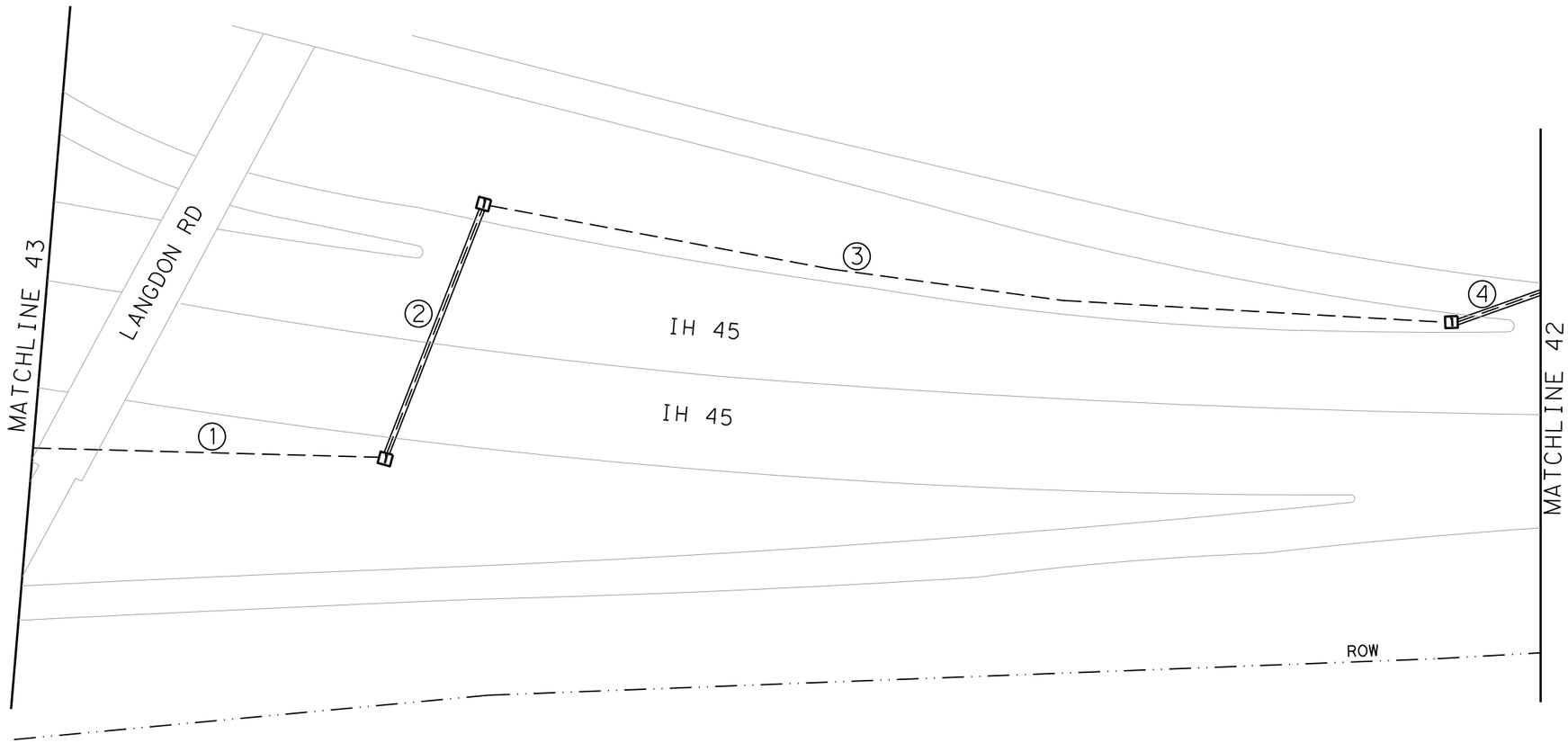
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	48
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

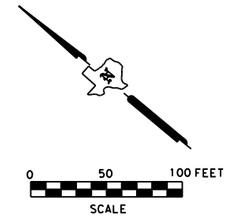
DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 42.dgn

CONDUIT AND CABLE CHART - CSJ 0092-14-101

RUN #	CONDITION	CONDUIT ITEM 618				CONDUIT ITEM 6016				ELECTRIC CONDUCTOR ITEM 620						FIBER CABLE ITEM 6007			ITEM 6004	RUN LENGTH
		PVC SCHD 40 3"		PVC SCHD 40 3" BORE		ITS MDC SCHD 40 4"		ITS MDC SCHD 40 4" BORE		CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITS COM. CABLE	
1	I	1	258			1	258			1	263						273	273		258
2	I			1	194			1	194	1	199						209	209		194
3	I	1	714			1	714			1	719						729	729		714
4	I			1	68			1	68	1	73						83	83		68
TOTAL		972		262		972		262		1254							1294	1294		

STATUS: E=EXISTING, I=INSTALL





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

SHEET SUMMARY - CSJ 0092-14-101

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	972
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	262
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1254
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1294
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1294
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	972
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	262
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	3

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto ,P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 43 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	49
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 43.dgn

SHEET SUMMARY- CSJ 0092-14-101

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	1005
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	237
620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1262
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1302
6007	6014	FIBER OPTIC CBL (SNGLE-MODE)(48 FIBER)	LF	1302
6007	6098	FIBER OPTIC PATCH PANEL (36 POSITION)	EA	1
6007	6099	FIBER OPTIC PATCH PANEL (48 POSITION)	EA	1
6016	6006	ITS MULTI-DUCT CND (PVC-40)	LF	869
6016	6007	ITS MULTI-DUCT CND (PVC-40)(BORE)	LF	237
6186	6006	ITS GND BOX (PCAST) TY 1 W/ APRON	EA	3
	**	ETHERNET SWITCH W/ POWER SUPPLY	EA	2

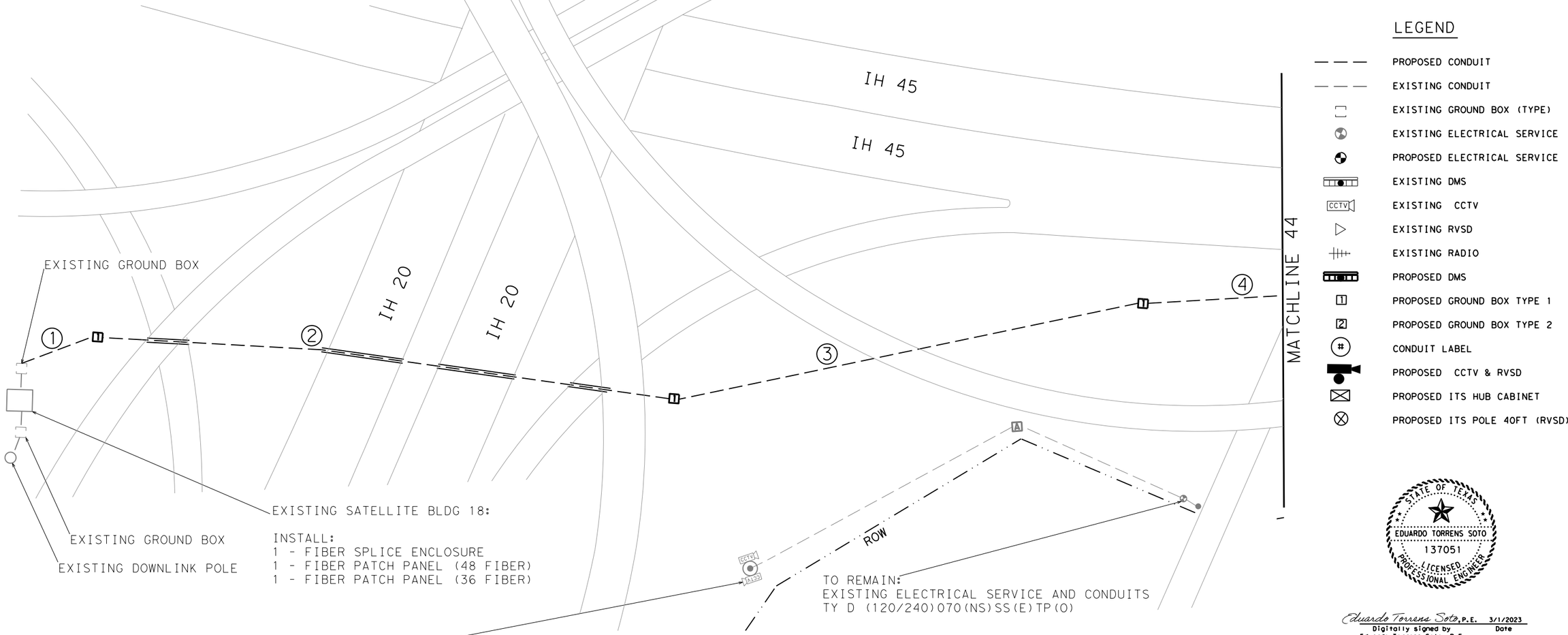
** FURNISHED BY TXDOT AND INSTALL BY CONTRACTOR

CONDUIT AND CABLE CHART- CSJ 0092-14-101

RUN #	CONDITION	CONDUIT ITEM 618 PVC SCHD 40 3"		CONDUIT ITEM 618 PVC SCHD 40 3" BORE		CONDUIT ITEM 6016 ITS MDC SCHD 40 4"		CONDUIT ITEM 6016 ITS MDC SCHD 40 4" BORE		ELECTRIC CONDUCTOR ITEM 620 CONDR (NO. 8) TRACER		CONDR (NO. 8) BARE		CONDR (NO. 6) INSULATE		FIBER CABLE ITEM 6007 SINGLE MODE 6 ST.	SINGLE MODE 36 ST.	SINGLE MODE 48 ST.	ITEM 6004 ITS COM. CABLE	RUN LENGTH
1	I	1	80			1	80			1	85						95	95		80
2	I	1	325	1	237	1	325	1	237	1	567						577	577		562
3	I	1	464			1	464			1	469						479	479		464
4	I	1	136			1				1	141						151	151		136
TOTAL		1005		237		869		237		1262							1302	1302		

STATUS: E=EXISTING, I=INSTALL

0 50 100 FEET
SCALE



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- PROPOSED ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING CCTV
- EXISTING RVSD
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED GROUND BOX TYPE 1
- PROPOSED GROUND BOX TYPE 2
- CONDUIT LABEL
- PROPOSED CCTV & RVSD
- PROPOSED ITS HUB CABINET
- PROPOSED ITS POLE 40FT (RVSD)

NOTES:
1. CONTACT THE TXDOT FREEWAY MANAGEMENT OFFICE (214-320-6602) AT LEAST 48 HOURS IN ADVANCE OF PERFORMING ANY WORK ON THIS PROJECT THAT DISCONNECTS OR REONNECTS EXISTING TXDOT "ITS" FIBER OPTIC CABLE OR TXDOT "ITS" RADIOS. TXDOT "ITS" PERSONNEL MUST BE ON-SITE WHILE THIS WORK IS PERFORMED.

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED
PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 ITS UPGRADE
LAYOUT

SCALE: 1"=100' SHEET 44 OF 44

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	50
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\IH 45 Wireless to Fiber ITS Upgrade (0092-02-137)\Sheets\IH 45 - ITS - Sheet 44.dgn

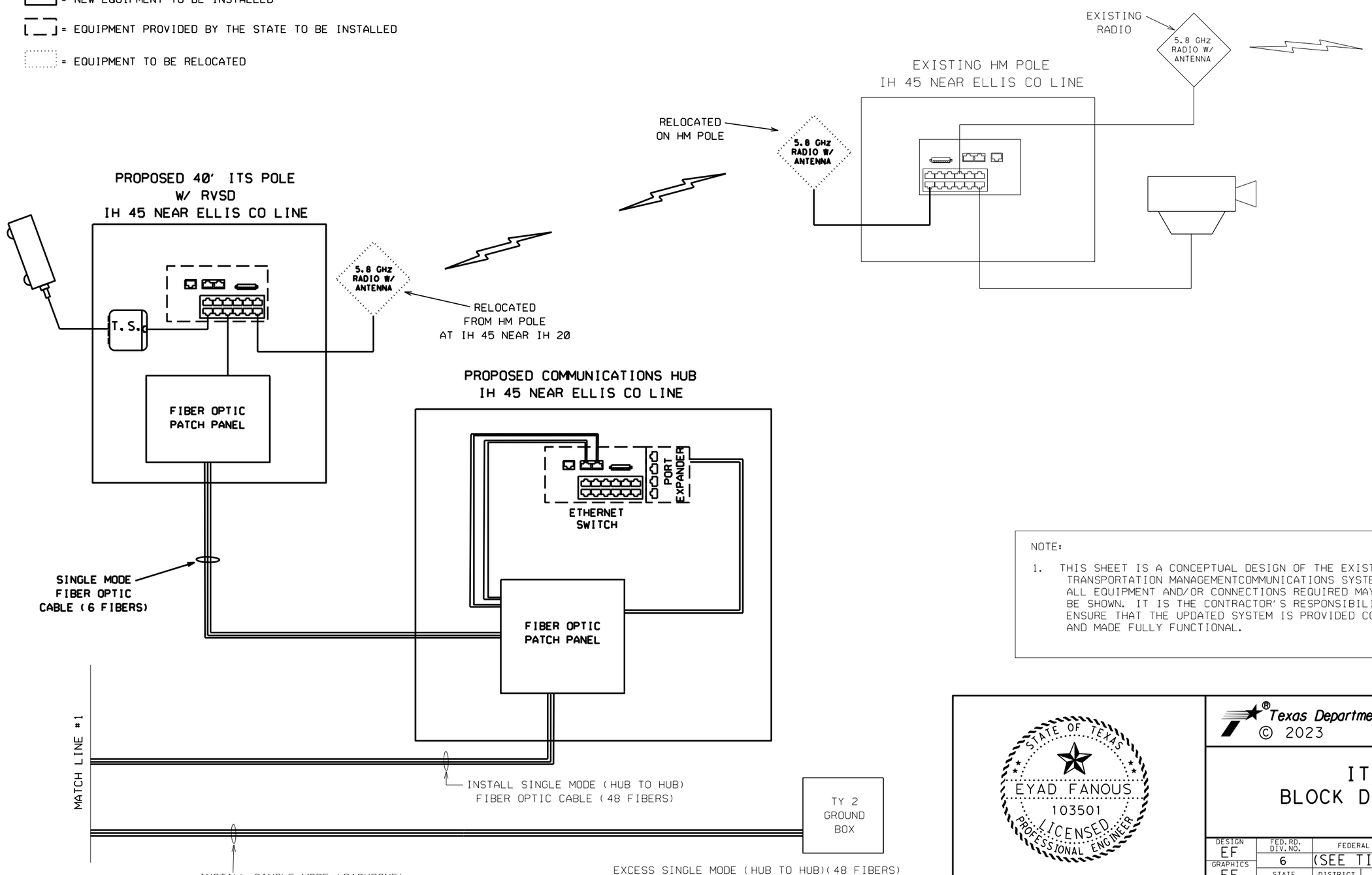
LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED



NOTE:

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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/3/23
Signature Date

ITS BLOCK DIAGRAM

SHEET 1 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	51
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023

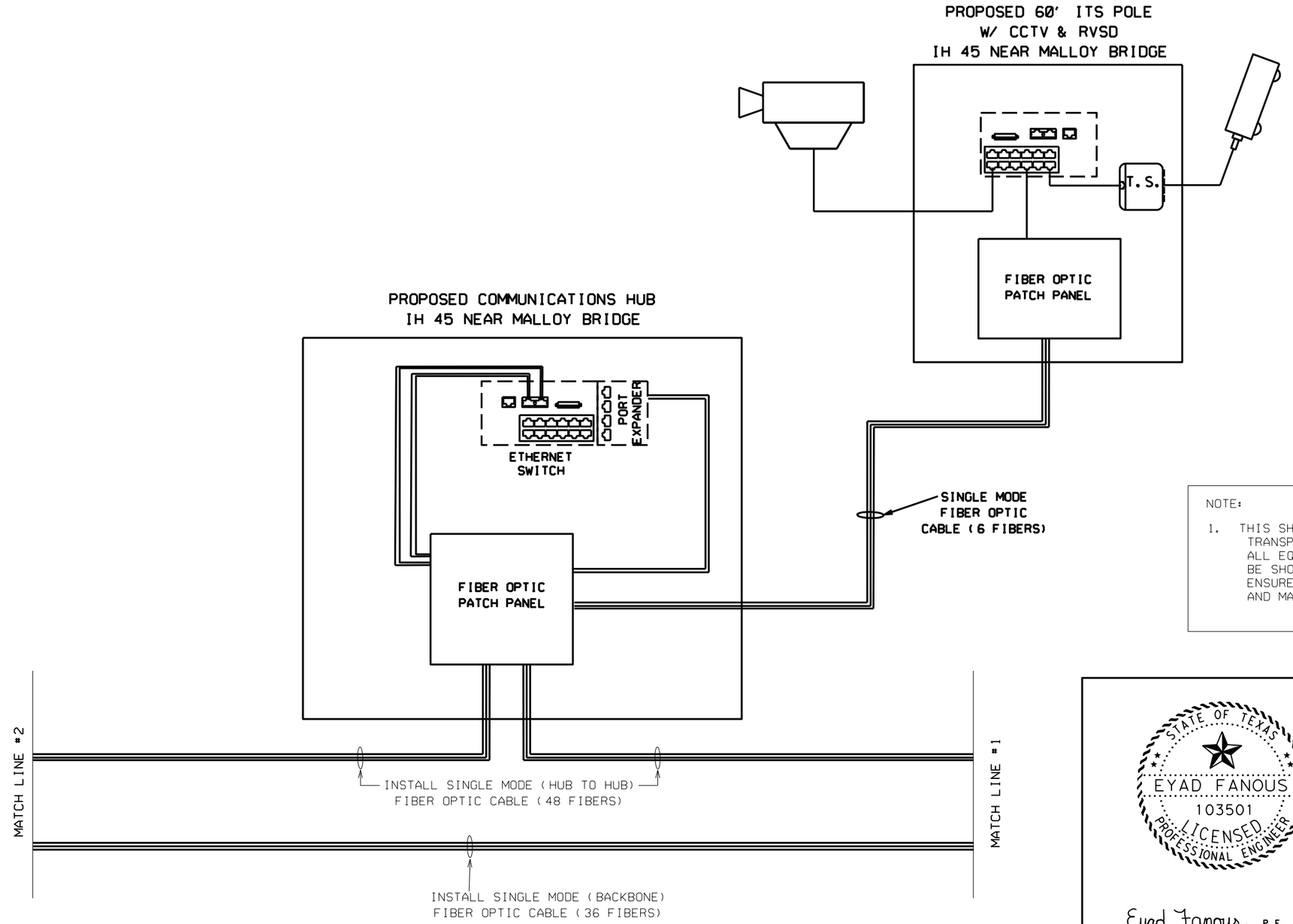
LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED



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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/3/23
Signature Date

Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 2 OF 10

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	52
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023

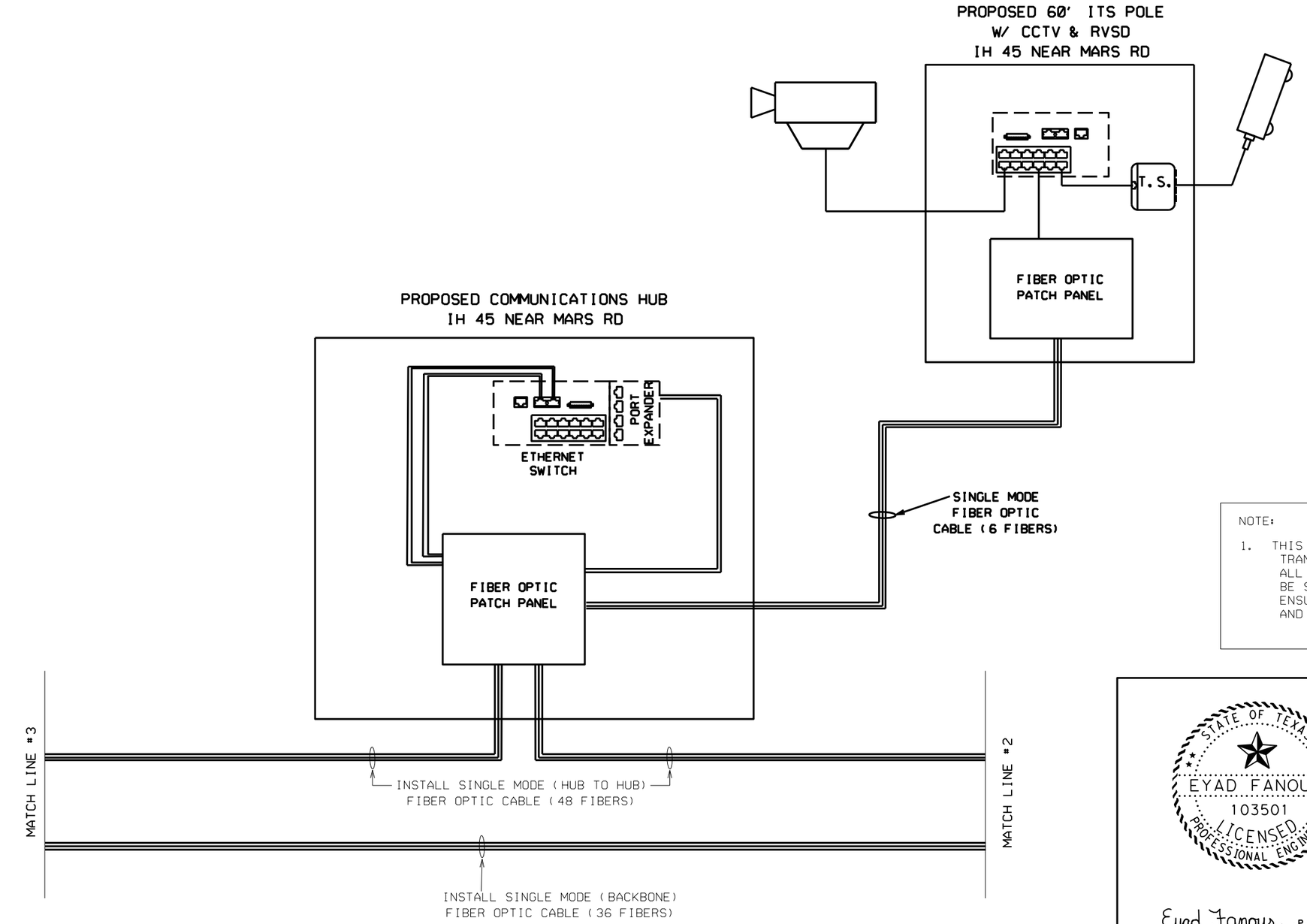
LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED



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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous, P.E. 2/3/23
Signature Date

Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 3 OF 10

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	53
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/3/2023

LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED

EXISTING HM POLE
IH 45 NEAR DALPORT PKWY

5.8 GHz RADIO W/ ANTENNA

RELOCATED ON HM POLE

PROPOSED 40' ITS POLE W/ RVSD
IH 45 NEAR DALPORT PKWY

RELOCATED FROM HM POLE

5.8 GHz RADIO W/ ANTENNA

T.S.

FIBER OPTIC PATCH PANEL

PROPOSED COMMUNICATIONS HUB
IH 45 NEAR DALPORT PKWY

PORT EXPANDER

ETHERNET SWITCH

FIBER OPTIC PATCH PANEL

SINGLE MODE FIBER OPTIC CABLE (6 FIBERS)

MATCH LINE #4

MATCH LINE #3

INSTALL SINGLE MODE (HUB TO HUB) FIBER OPTIC CABLE (48 FIBERS)

INSTALL SINGLE MODE (BACKBONE) FIBER OPTIC CABLE (36 FIBERS)

NOTE:

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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/3/23
Signature Date

ITS BLOCK DIAGRAM

SHEET 4 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	54
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023

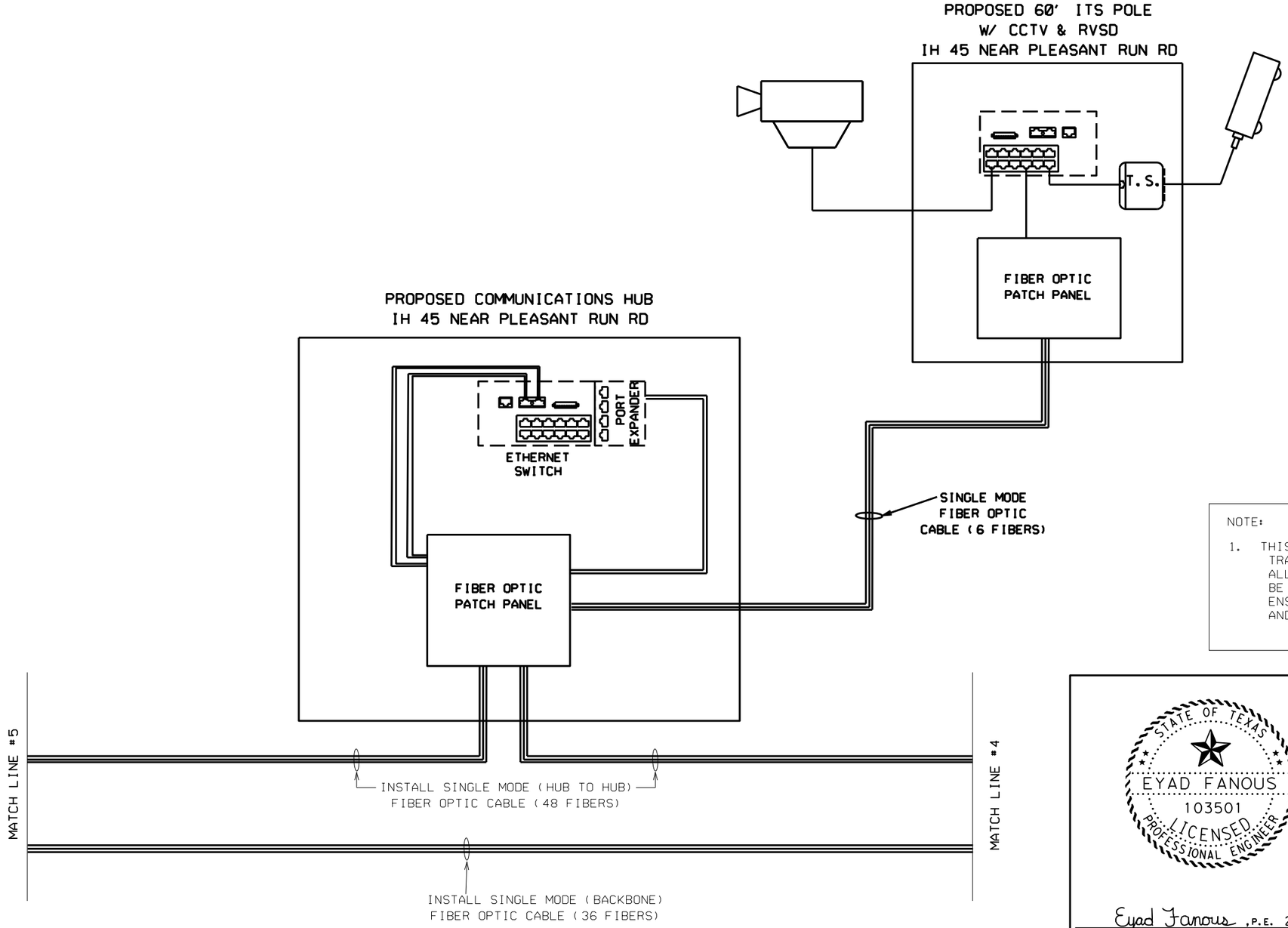
LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED



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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/3/23
Signature Date

DATE: 2/3/2023

Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 5 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	55
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

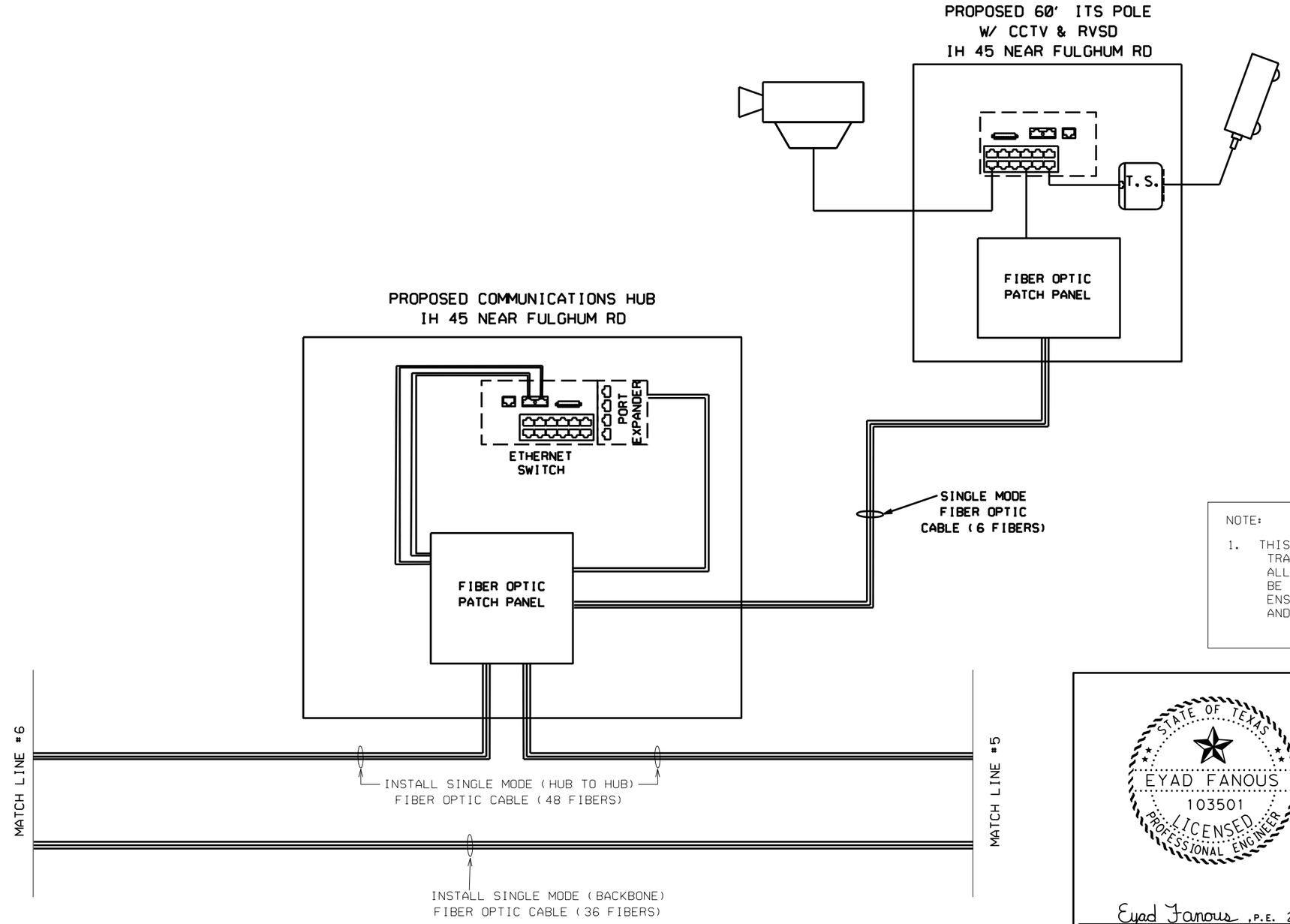
LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED



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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous, P.E. 2/3/23
Signature Date

Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 6 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	56
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/3/2023

LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED

EXISTING HM POLE
IH 45 NEAR E WINTERGREEN RD

5.8 GHz RADIO W/ ANTENNA

RELOCATED ON HM POLE

PROPOSED 40' ITS POLE W/ RVSD
IH 45 NEAR E WINTERGREEN RD

RELOCATED FROM HM POLE

5.8 GHz RADIO W/ ANTENNA

T.S.

FIBER OPTIC PATCH PANEL

SINGLE MODE FIBER OPTIC CABLE (6 FIBERS)

PROPOSED DMS
IH 45 NEAR SKYLINE DR

DMS COM CABLE

DMS CONTROL

FIBER OPTIC PATCH PANEL

PROPOSED COMMUNICATIONS HUB
IH 45 NEAR E WINTERGREEN RD

ETHERNET SWITCH

PORT EXPANDER

FIBER OPTIC PATCH PANEL

MATCH LINE #7

MATCH LINE #6

INSTALL SINGLE MODE (HUB TO HUB) FIBER OPTIC CABLE (48 FIBERS)

INSTALL SINGLE MODE (BACKBONE) FIBER OPTIC CABLE (36 FIBERS)

NOTE:

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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous, P.E. 2/3/23
Signature Date

DATE: 2/3/2023

Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 7 OF 10

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	57
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

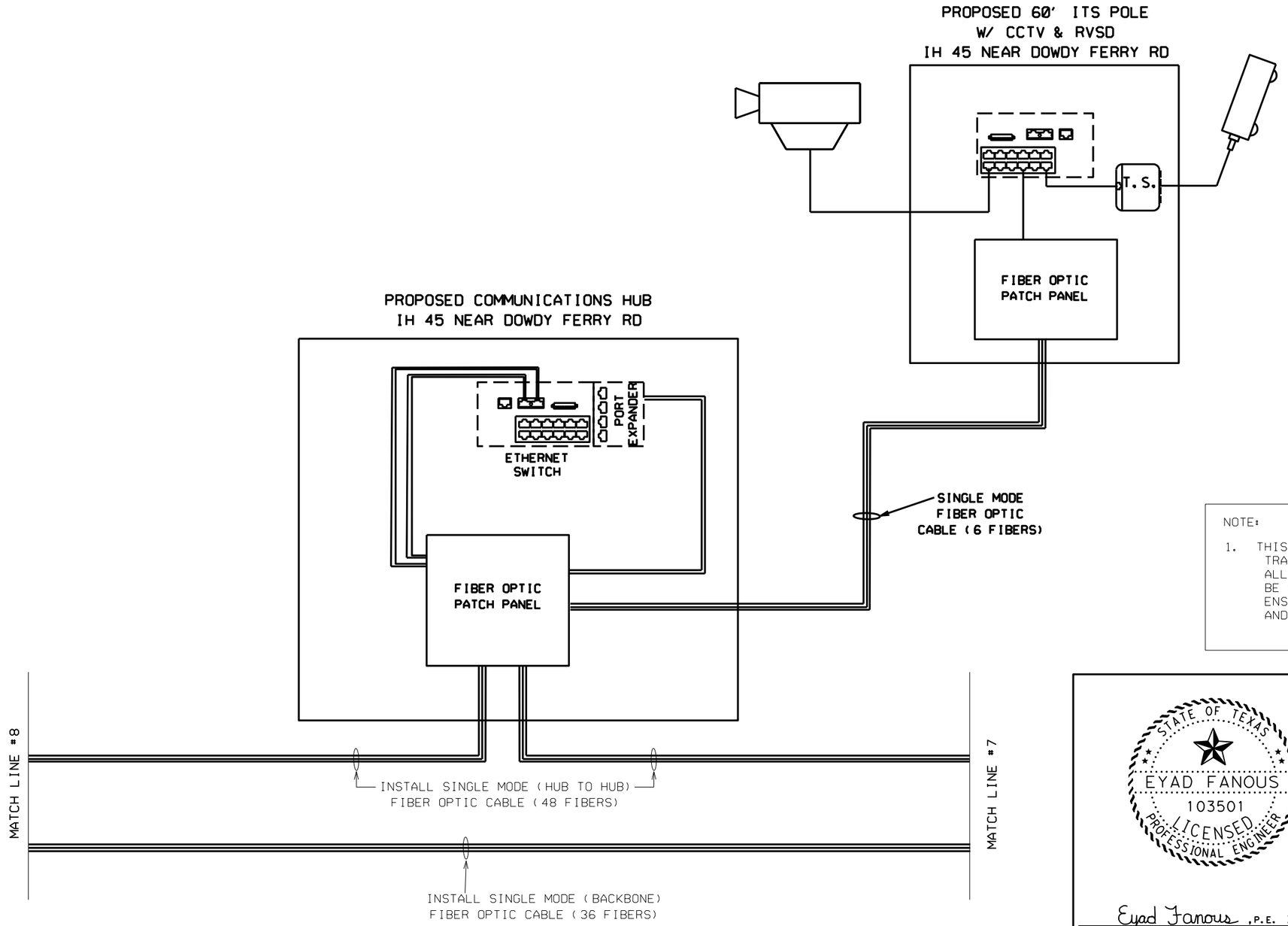
LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED



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STATE OF TEXAS
EYAD FANOUS
103501
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PROFESSIONAL ENGINEER

Eyad Fanous, P.E. 2/3/23
Signature Date

Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 8 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	58
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/3/2023

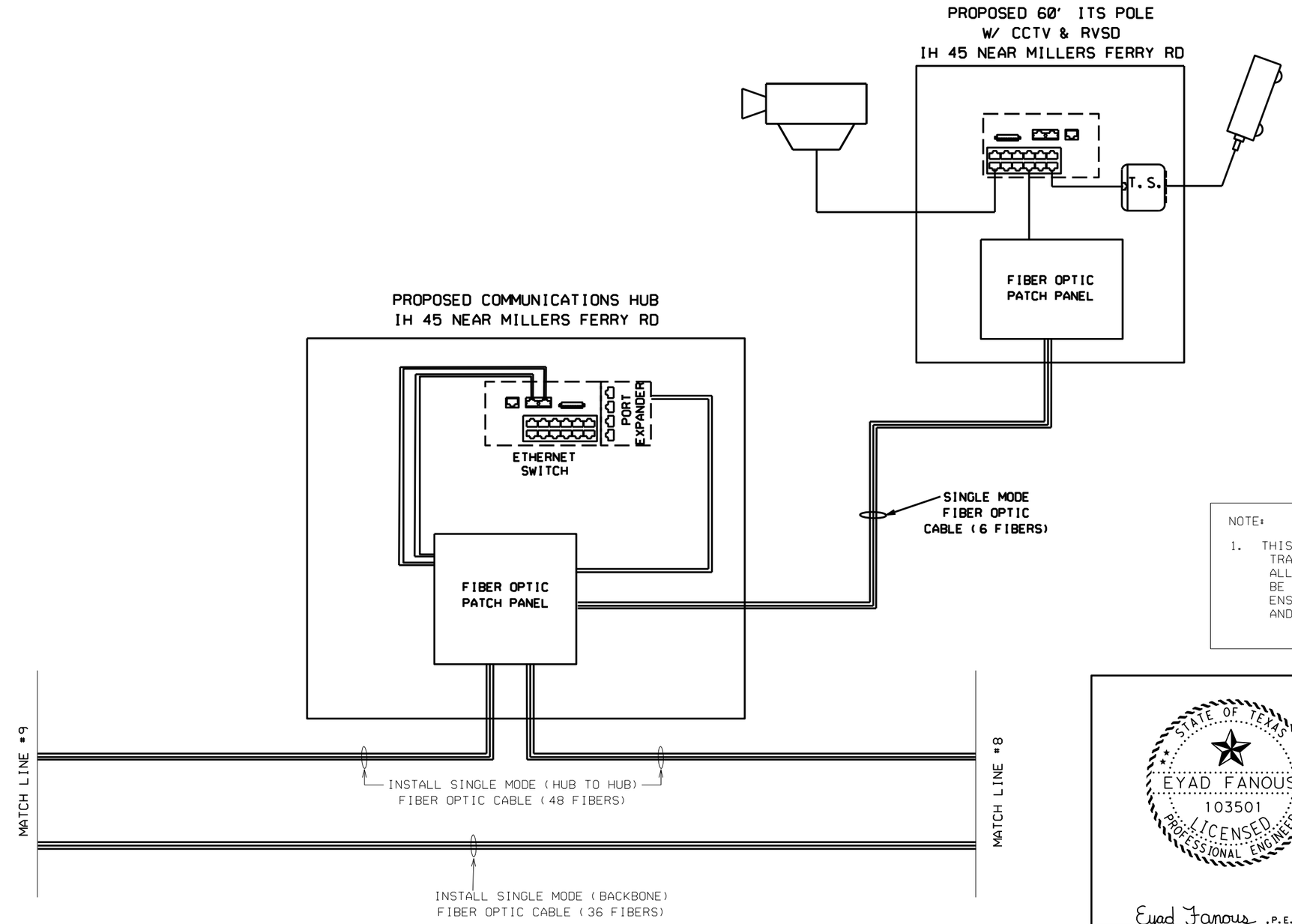
LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED



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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/3/23
Signature Date

Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 9 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	59
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023

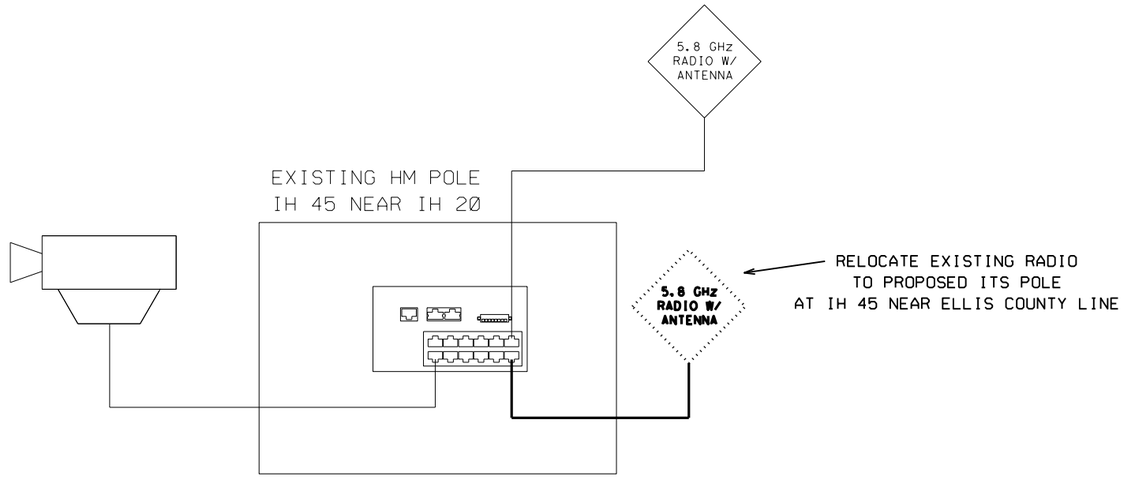
LEGEND

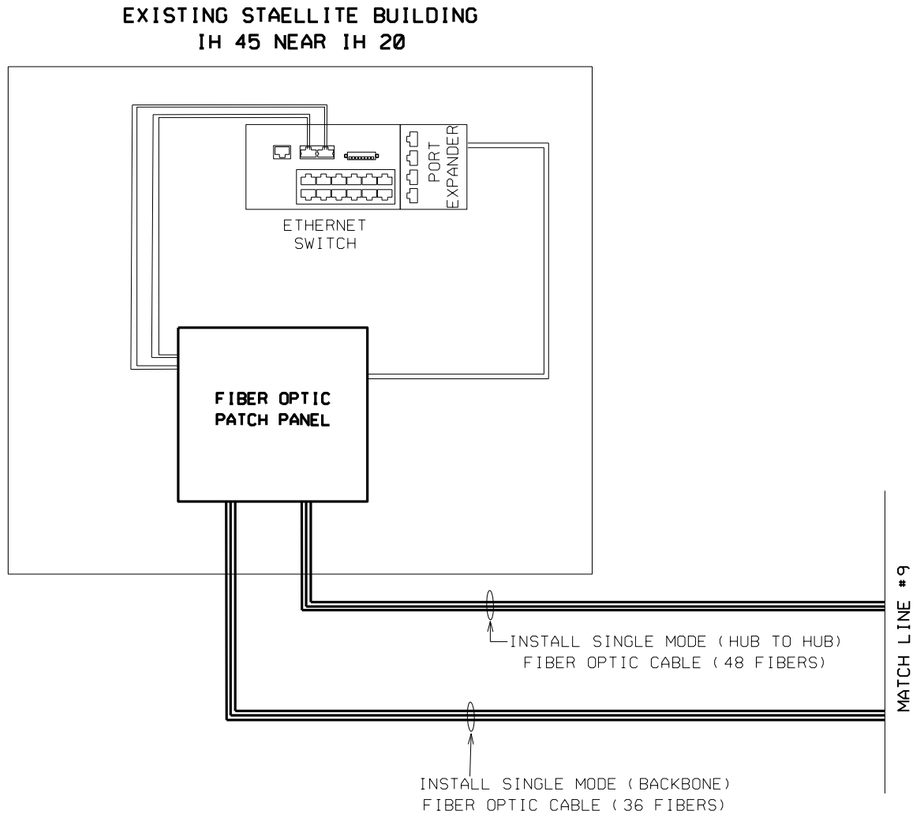
= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= EQUIPMENT PROVIDED BY THE STATE TO BE INSTALLED

= EQUIPMENT TO BE RELOCATED





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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/3/23
Signature Date

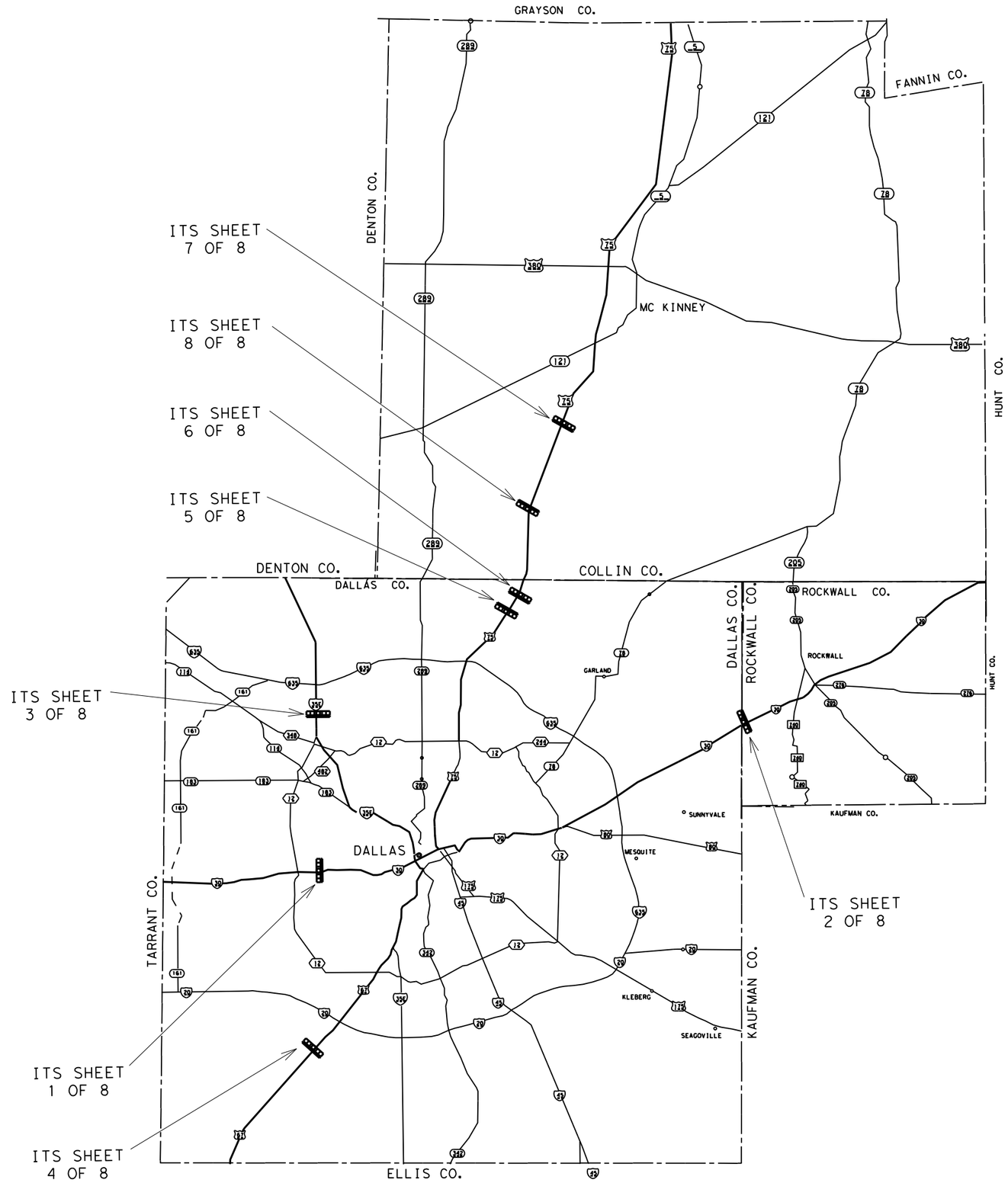
Texas Department of Transportation

ITS BLOCK DIAGRAM

SHEET 10 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	60
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023



LEGEND	
	EXISTING DMS TO BE REPLACED

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

DMS REHABILITATION
PROJECT LAYOUT

NOT TO SCALE SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	61
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
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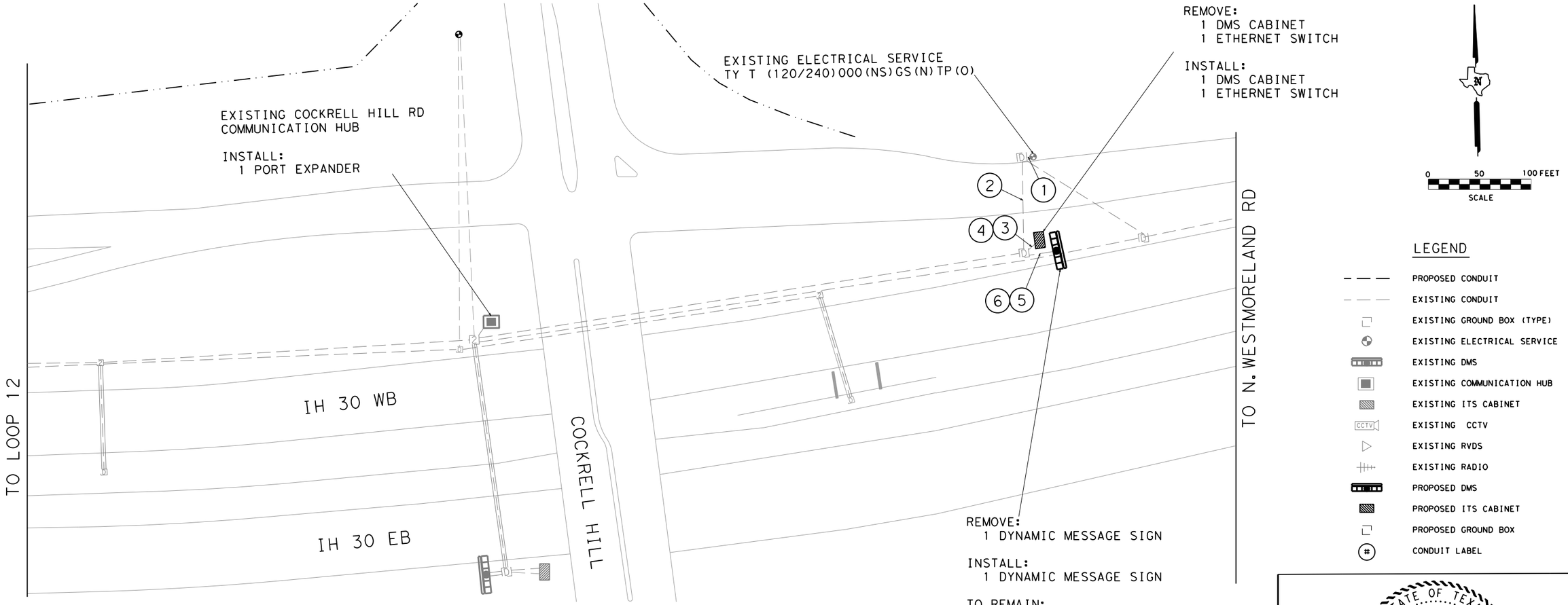


NOTES:
1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. DISCONNECT FIBER FROM EXISTING CABINET AND REROUTE TO PROPOSED GROUND MOUNTED CABINET.
4. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
5. FOR DMS MOUNTING DETAILS, SEE HORIZONTAL-ZEE-MOUNT DMS ATTACHMENT TO OVERHEAD SIGN SUPPORT.
6. CONDUIT PREP. INCLUDES REMOVAL OF EXISTING COMM. CABLE.
7. ETHERNET SWITCH FROM EXISTING DMS TO BE SALVAGED AND RETURNED TO TXDOT AT 4777 E. HWY 80 IN MESQUITE. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 6) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING			3	@	25				1	@	25			20
2	EXISTING			3	@	125				1	@	125			120
3	EXISTING			3	@	20	3	@	20	1	@	20			15
4	EXISTING												EXIST.	20	15
5	EXISTING						3	@	25	1	@	25			20
6	EXISTING													55	20
TOTAL				***510			***135			***195				75	

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6009	ELEC CONDR (NO. 6) BARE	LF	195
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	135
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	510
624	6010	GROUND BOX TY D (162922)W/APRON	EA	
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	
6027	6003	CONDUIT (PREPARE)	LF	210
6027	6008	GROUND BOX (PREPARE)	EA	2
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1
**		PORT EXPANDER	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto ,P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

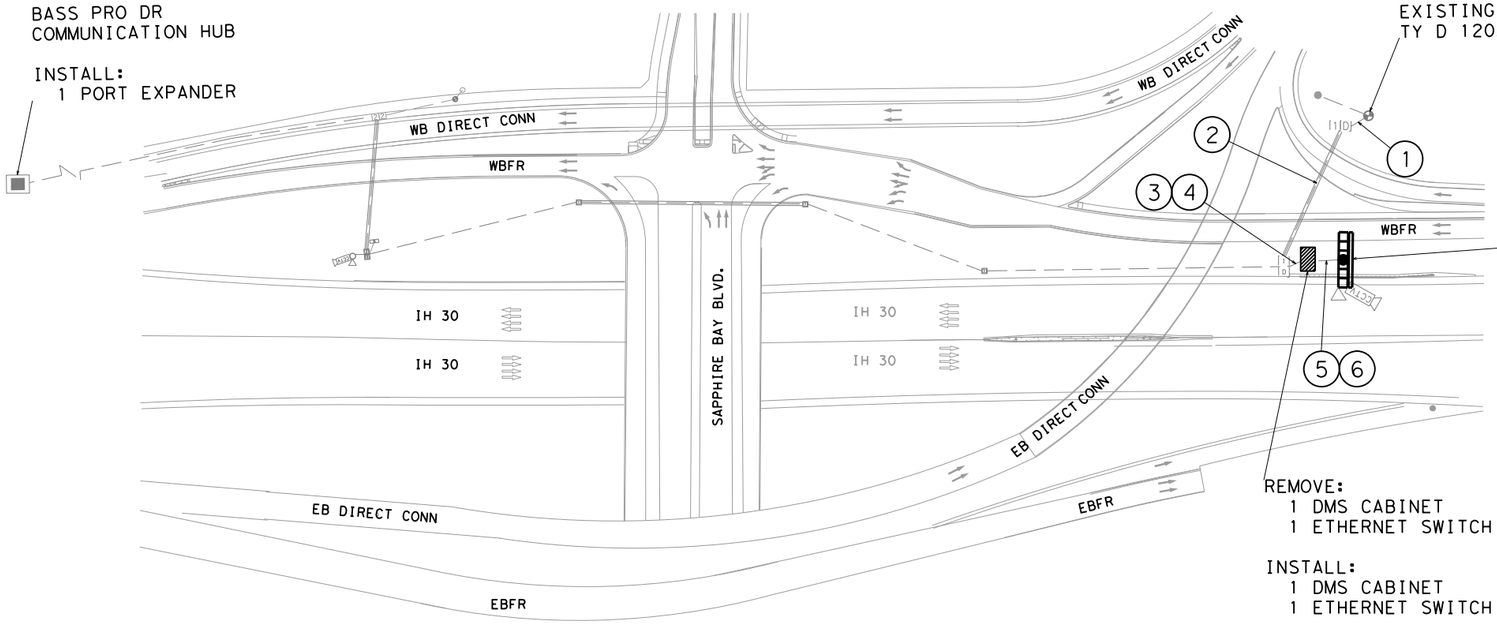
Texas Department of Transportation

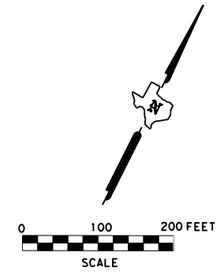
DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	62
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\DMS Refurb (0918-00-352)\Sheets\DMS Refurb Design.dgn





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING COMMUNICATION HUB
- EXISTING ITS CABINET
- EXISTING CCTV
- EXISTING RVDS
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED ITS CABINET
- PROPOSED GROUND BOX
- (#) CONDUIT LABEL

NOTES:
1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. DISCONNECT FIBER FROM EXISTING CABINET AND REROUTE TO PROPOSED GROUND MOUNTED CABINET.
4. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
5. FOR DMS MOUNTING DETAILS, SEE HORIZONTAL-ZEE-MOUNT DMS ATTACHMENT TO OVERHEAD SIGN SUPPORT.
6. CONDUIT PREP. INCLUDES REMOVAL OF EXISTING COMM. CABLE.
7. ETHERNET SWITCH FROM EXISTING DMS TO BE SALVAGED AND RETURNED TO TXDOT AT 4777 E. HWY 80 IN MESQUITE. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 6) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING			3	@	40				1	@	40			35
2	EXISTING			3	@	195				1	@	195			190
3	EXISTING			3	@	30				1	@	30			25
4	EXISTING												EXIST.	30	25
5	EXISTING						3	@	80	1	@	80			75
6	EXISTING													110	75
TOTAL				***795			***240			***345				140	

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6009	ELEC CONDR (NO. 6) BARE	LF	345
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	240
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	795
624	6010	GROUND BOX TY D (162922)W/APRON	EA	
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	
6027	6003	CONDUIT (PREPARE)	LF	425
6027	6008	GROUND BOX (PREPARE)	EA	2
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1
**		PORT EXPANDER	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	63
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
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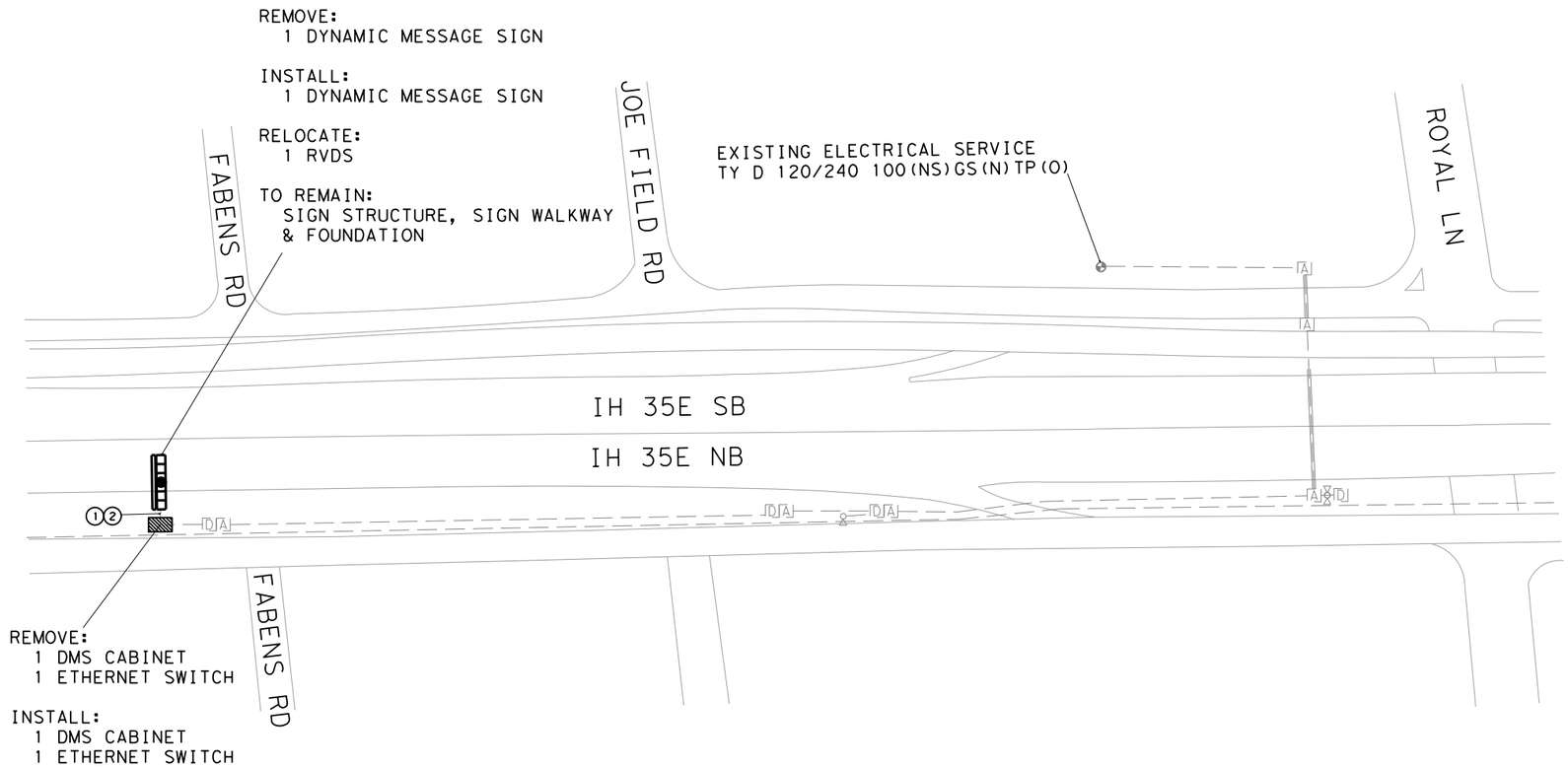

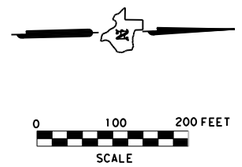

LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING COMMUNICATION HUB
- EXISTING ITS CABINET
- EXISTING CCTV
- EXISTING RVDS
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED ITS CABINET
- PROPOSED GROUND BOX
- (#) CONDUIT LABEL

NOTES:
1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. DISCONNECT FIBER FROM EXISTING CABINET AND REROUTE TO PROPOSED GROUND MOUNTED CABINET.
4. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
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CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 4) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING						3	@	15	1	@	15			10
2	EXISTING													45	10
TOTAL							***45			***15				45	20

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6009	ELEC CONDR (NO. 6) BARE	LF	
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	45
620	6011	ELEC CONDR (NO. 4) BARE	LF	15
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	
624	6010	GROUND BOX TY D (162922)W/APRON	EA	
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	35
6027	6003	CONDUIT (PREPARE)	LF	20
6027	6008	GROUND BOX (PREPARE)	EA	1
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

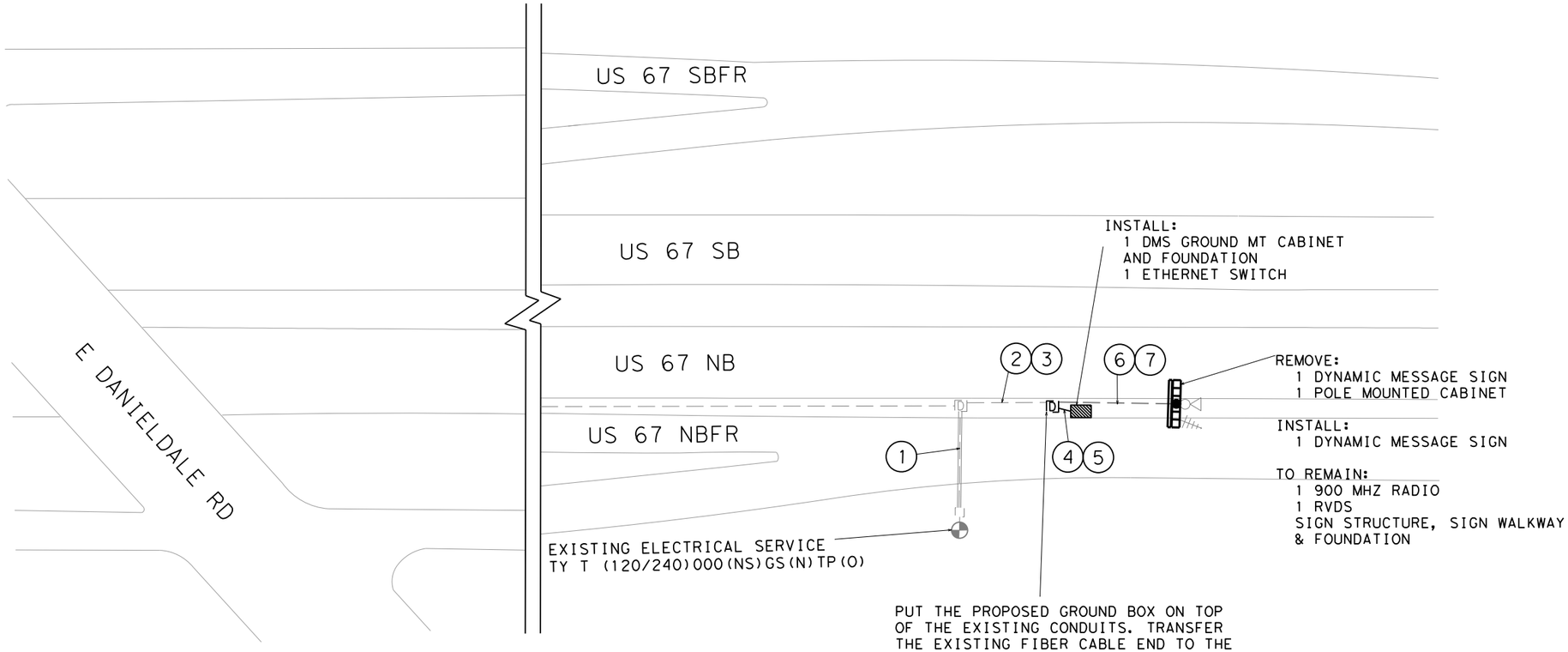
Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

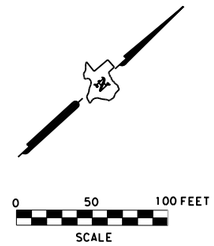
DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	64
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DAL\TRAFSD\Sirwan\DMS Refurb (0918-00-352)\Sheets\DMS Refurb Dsign.dgn





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING COMMUNICATION HUB
- EXISTING ITS CABINET
- EXISTING CCTV
- EXISTING RVDS
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED ITS CABINET
- PROPOSED GROUND BOX
- (#) CONDUIT LABEL

NOTES:
1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
4. FOR DMS MOUNTING DETAILS, SEE HORIZONTAL-ZEE-MOUNT DMS ATTACHMENT TO OVERHEAD SIGN SUPPORT.
5. CONDUIT PREP. INCLUDES REMOVAL OF EXISTING COMM. CABLE.
6. ETHERNET SWITCH FROM EXISTING DMS TO BE SALVAGED AND RETURNED TO TXDOT AT 4777 E. HWY 80 IN MESQUITE. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 4) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING			3	@	83				1	@	83			78
2	EXISTING			3	@	75				1	@	75			70
3	EXISTING														70
4	INSTALL	20		3	@	25	3	@	25	1	@	25			20
5	INSTALL	20												25	20
6	EXISTING						3	@	73	1	@	73			68
7	EXISTING													103	68
TOTAL		40		***549			***294			***256				128	394

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	40
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	294
620	6011	ELEC CONDR (NO. 4) BARE	LF	256
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	549
624	6010	GROUND BOX TY D (162922)W/APRON	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	
6027	6003	CONDUIT (PREPARE)	LF	354
6027	6008	GROUND BOX (PREPARE)	EA	1
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

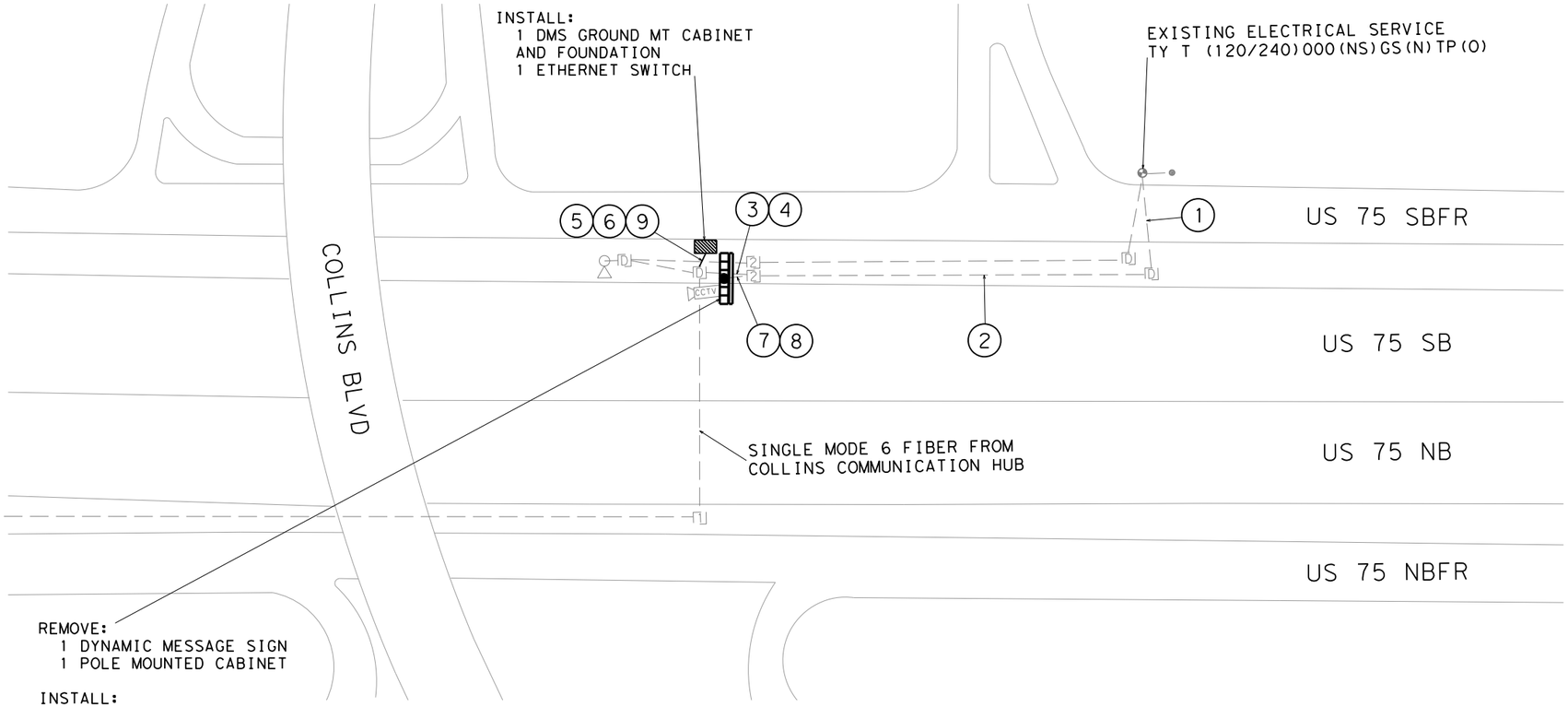
Texas Department of Transportation

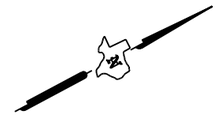
DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	65
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\DMS Refurb (0918-00-352)\Sheets\DMS Refurb Dsign.dgn





LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING COMMUNICATION HUB
- EXISTING ITS CABINET
- EXISTING CCTV
- EXISTING RVDS
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED ITS CABINET
- PROPOSED GROUND BOX
- (#) CONDUIT LABEL

NOTES:
1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. DISCONNECT FIBER FROM EXISTING DMS SIGN, PULL BACK AND REROUTE TO PROPOSED GROUND MOUNTED CABINET.
4. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
5. FOR DMS MOUNTING DETAILS, SEE HORIZONTAL-ZEE-MOUNT DMS ATTACHMENT TO OVERHEAD SIGN SUPPORT.
6. CONDUIT PREP. INCLUDES REMOVAL OF EXISTING COMM. CABLE.
7. ETHERNET SWITCH FROM EXISTING DMS TO BE SALVAGED AND RETURNED TO TXDOT AT 4777 E. HWY 80 IN MESQUITE. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 4) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING			3	@	75				1	@	75			70
2	EXISTING			3	@	290				1	@	290			285
3	EXISTING													43	38
4	EXISTING			3	@	43				1	@	43			38
5	INSTALL	15												20	15
6	INSTALL	15		3	@	20				1	@	20			15
7	EXISTING													55	20
8	EXISTING						3	@	25	1	@	25			20
9	INSTALL	15					3	@	20						15
TOTAL		45		***1284			***135			***453				118	516

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	45
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	135
620	6011	ELEC CONDR (NO. 4) BARE	LF	453
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	1284
624	6010	GROUND BOX TY D (162922)W/APRON	EA	
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	83
6027	6003	CONDUIT (PREPARE)	LF	471
6027	6008	GROUND BOX (PREPARE)	EA	4
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

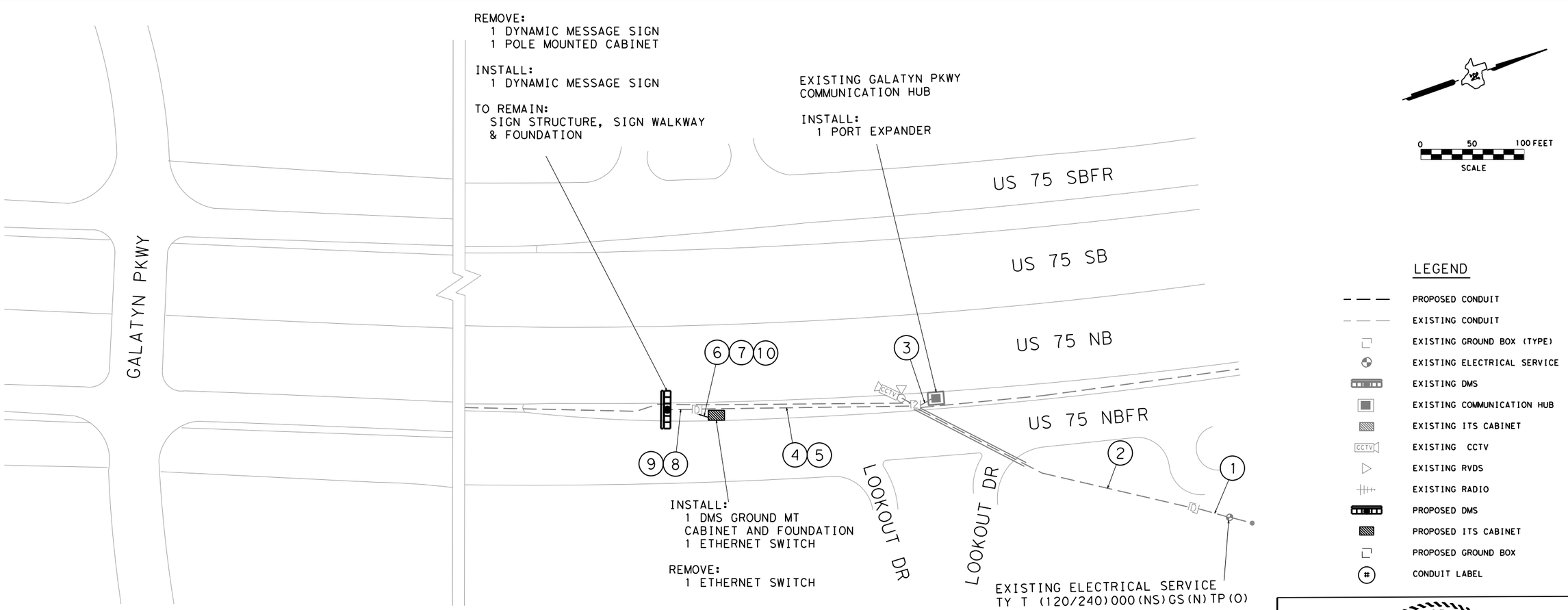
Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	66
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\DMS Refurb (0918-00-352)\Sheets\DMS Refurb Dsign.dgn



NOTES:
1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. DISCONNECT FIBER FROM EXISTING DMS SIGN, PULL BACK AND REROUTE TO PROPOSED GROUND MOUNTED CABINET.
4. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
5. FOR DMS MOUNTING DETAILS, SEE HORIZONTAL-ZEE-MOUNT DMS ATTACHMENT TO OVERHEAD SIGN SUPPORT.
6. CONDUIT PREP. INCLUDES REMOVAL OF EXISTING COMM. CABLE.
7. ETHERNET SWITCH FROM EXISTING DMS TO BE SALVAGED AND RETURNED TO TXDOT AT 4777 E. HWY 80 IN MESQUITE. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 4) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING			3	@	40				1	@	40			35
2	EXISTING			3	@	290				1	@	290			285
3	EXISTING														20
4	EXISTING			3	@	215				1	@	215			210
5	EXISTING														210
6	INSTALL	20		3	@	25	3	@	25	1	@	25			20
7	INSTALL	20												25	20
8	EXISTING						3	@	34	1	@	34			29
9	EXISTING													34	29
10	INSTALL	20		3		25				1	@	25			20
TOTAL		60		***1785			***177			***629				59	878

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	60
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	177
620	6011	ELEC CONDR (NO. 4) BARE	LF	629
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	1785
624	6010	GROUND BOX TY D (162922)W/APRON	EA	
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	45
6027	6003	CONDUIT (PREPARE)	LF	1681
6027	6008	GROUND BOX (PREPARE)	EA	4
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1
**		PORT EXPANDER	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

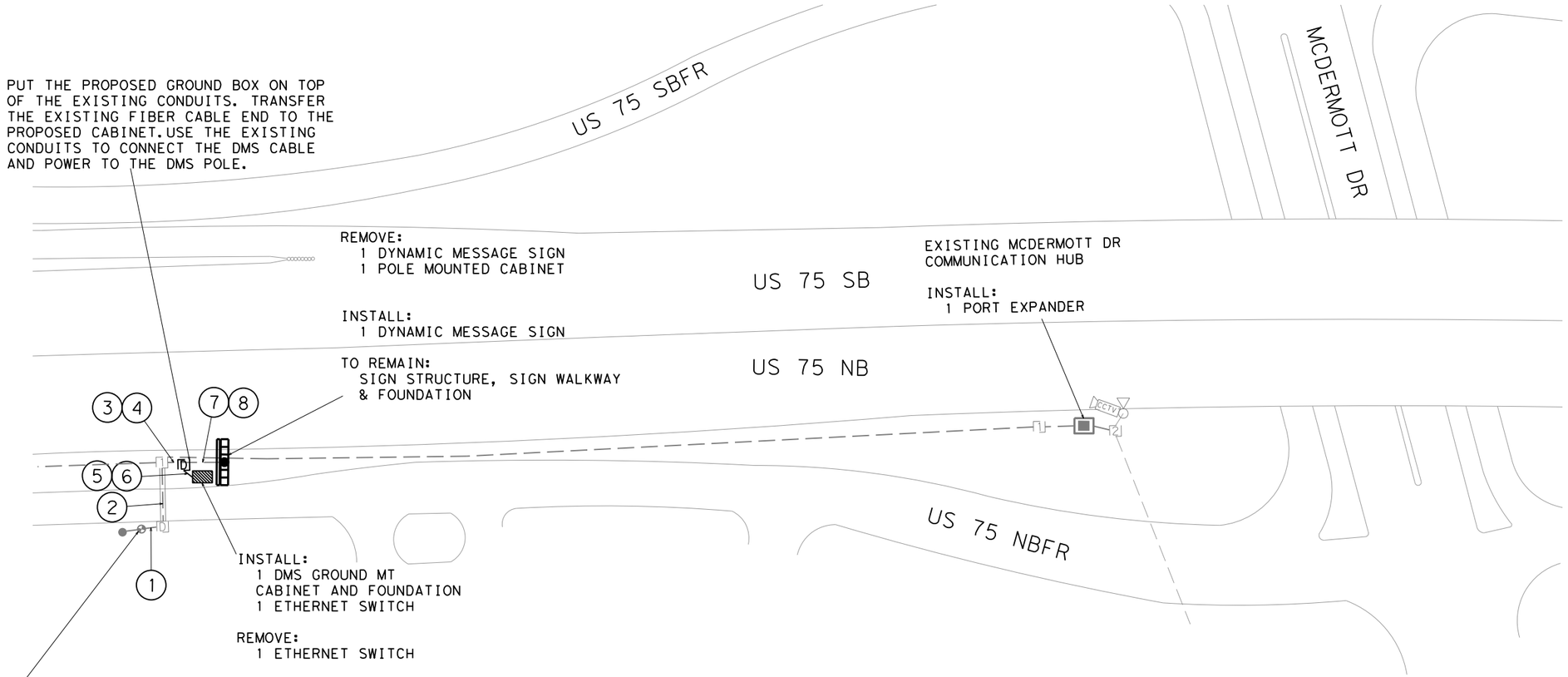
Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	67
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: T:\DALTRAFSD\Sirwan\DMS Refurb (0918-00-352)\Sheets\DMS Refurb Dsign.dgn



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING COMMUNICATION HUB
- EXISTING ITS CABINET
- EXISTING CCTV
- EXISTING RVDS
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED ITS CABINET
- PROPOSED GROUND BOX
- (#) CONDUIT LABEL

NOTES:

1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. DISCONNECT FIBER FROM EXISTING CABINET AND REROUTE TO PROPOSED GROUND MOUNTED CABINET.
4. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
5. FOR DMS MOUNTING DETAILS, SEE HORIZONTAL-ZEE-MOUNT DMS ATTACHMENT TO OVERHEAD SIGN SUPPORT.
6. CONDUIT PREP. INCLUDES REMOVAL OF EXISTING COMM. CABLE.
7. RELOCATE ETHERNET SWITCH FROM EXISTING DMS TO NEW DMS CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 4) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING			3	@	19				1	@	19			14
2	EXISTING			3	@	56				1	@	56			51
3	EXISTING			3	@	15				1	@	15			10
4	EXISTING												Exist.		10
5	INSTALL	10		3	@	15	3	@	15	1	@	15			10
6	INSTALL	10											Exist.	15	10
7	EXISTING						3	@	37	1	@	37			32
8	EXISTING													67	32
TOTAL		20		***315			***156			***142				82	169

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	20
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	156
620	6011	ELEC CONDR (NO. 4) BARE	LF	142
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	315
624	6010	GROUND BOX TY D (162922)W/APRON	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	57
6027	6003	CONDUIT (PREPARE)	LF	149
6027	6008	GROUND BOX (PREPARE)	EA	2
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

Texas Department of Transportation

DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 7 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	68
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
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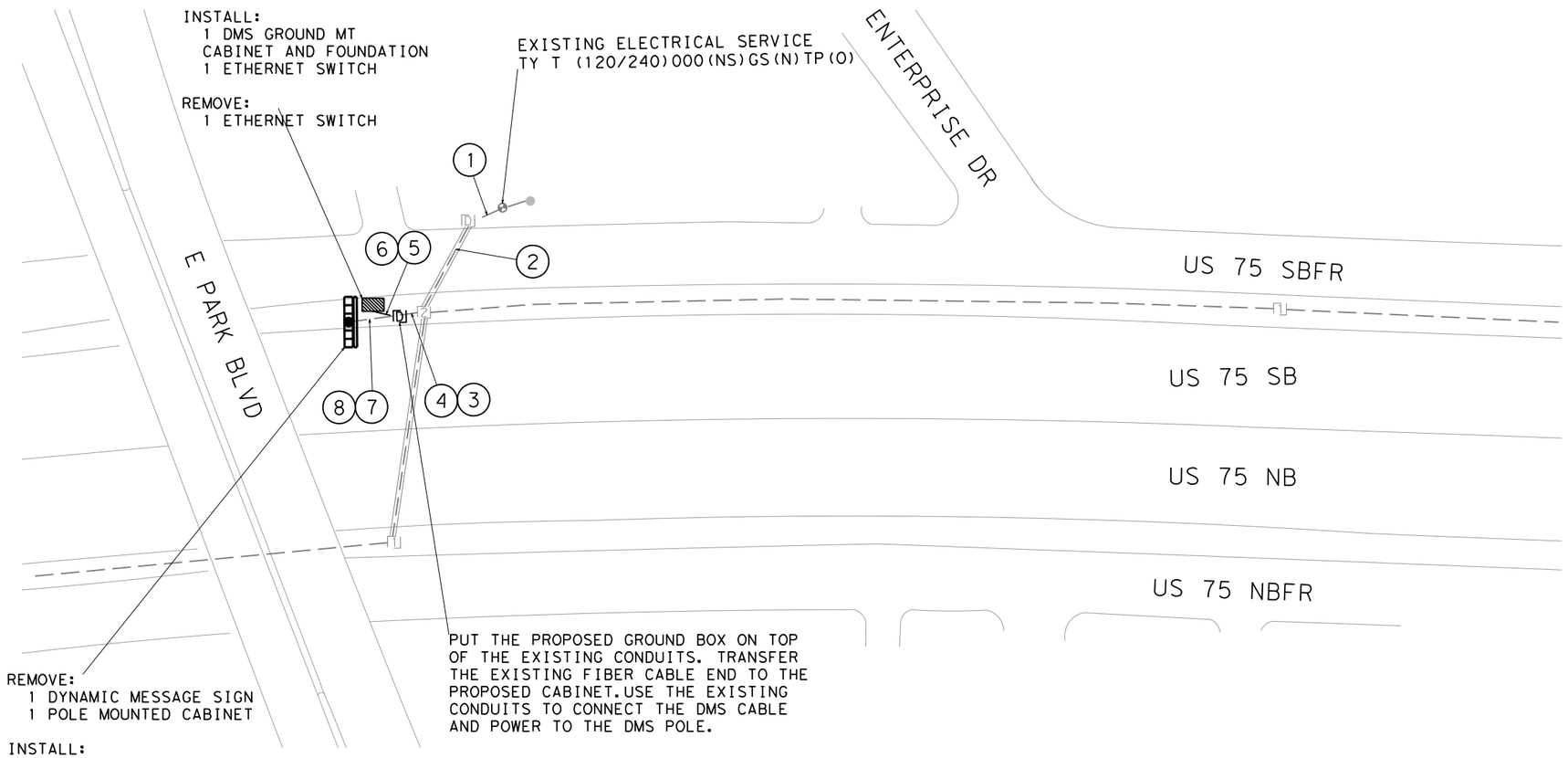
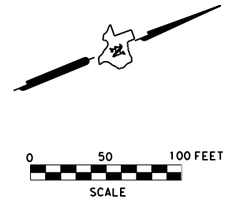




LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- EXISTING GROUND BOX (TYPE)
- EXISTING ELECTRICAL SERVICE
- EXISTING DMS
- EXISTING COMMUNICATION HUB
- EXISTING ITS CABINET
- EXISTING CCTV
- EXISTING RVDS
- EXISTING RADIO
- PROPOSED DMS
- PROPOSED ITS CABINET
- PROPOSED GROUND BOX
- (#) CONDUIT LABEL

NOTES:

1. DMS GROUND MT CABINET FOUNDATION DESIGN SHALL BE BASED ON STANDARD ITS(21) TYPE 4 CABINET SIZE.
2. EXISTING DMS SIGNS SHALL BECOME PROPERTY OF THE CONTRACTOR AFTER TXDOT HAS REMOVED SALVAGED PARTS. CONTRACTOR MUST DISCARD THE REMAINING PARTS OF THE DMS EQUIPMENT.
3. DISCONNECT FIBER FROM EXISTING CABINET AND REROUTE TO PROPOSED GROUND MOUNTED CABINET.
4. REPLACE EXISTING DMS POWER CONDUCTORS WITH NEW CONDUCTORS AS SHOWN.
5. FOR DMS MOUNTING DETAILS, SEE HORIZONTAL-ZEE-MOUNT DMS ATTACHMENT TO OVERHEAD SIGN SUPPORT.
6. CONDUIT PREP. INCLUDES REMOVAL OF EXISTING COMM. CABLE.
7. RELOCATE ETHERNET SWITCH FROM EXISTING DMS TO NEW DMS CABINET. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6028.

CONDUIT AND CABLE CHART

Run #	CONDUIT ITEM 618			CABLE ITEM 620									FIBER (LF)	*	RUN LENGTH
	CONDITION	CONDT (PVC) (SCHD 40) (3")	CONDT (PVC) (SCHD 40) (3") BORE	ELEC CONDR (NO. 4) INSULATED			ELEC CONDR (NO. 6) INSULATED			ELEC CONDR (NO. 4) BARE			SINGLE MODE 6	DMS COMM. CABLE	
1	EXISTING			3	@	25				1	@	25			20
2	EXISTING			3	@	78				1	@	78			73
3	EXISTING			3	@	15				1	@	15			10
4	EXISTING												Exist.		10
5	INSTALL	10		3	@	15	3	@	15	1	@	15			10
6	INSTALL	10											Exist.	15	10
7	EXISTING						3	@	45	1	@	45			40
8	EXISTING													75	40
TOTAL		20		***399			***180			***178				90	213

* PROVIDED BY DMS VENDOR, INSTALLATION SUBSIDIARY TO ITEM 6028
STATUS: E=EXISTING, I=INSTALL
*** NEW CONDUCTORS TO BE INSTALLED IN EXISTING CONDUIT.

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
618	6029	CONDT (PVC) (SCH 40) (3")	LF	20
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	180
620	6011	ELEC CONDR (NO. 4) BARE	LF	178
620	6012	ELEC CONDR (NO. 4) INSULATED	LF	399
624	6010	GROUND BOX TY D (162922)W/APRON	EA	1
6007	6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	
6007	6102	RELOCATE FIBER OPTIC CABLE	LF	65
6027	6003	CONDUIT (PREPARE)	LF	193
6027	6008	GROUND BOX (PREPARE)	EA	2
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6093	6010	REMOVE EXIST FIB OPT DMS SYS (TY 2)	EA	1
**		LED DMS FIELD EQUIPMENT (W/ CABINET)	EA	1
**		ETHERNET SWITCH W/ POWER SUPPLY	EA	1

** EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 3/1/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

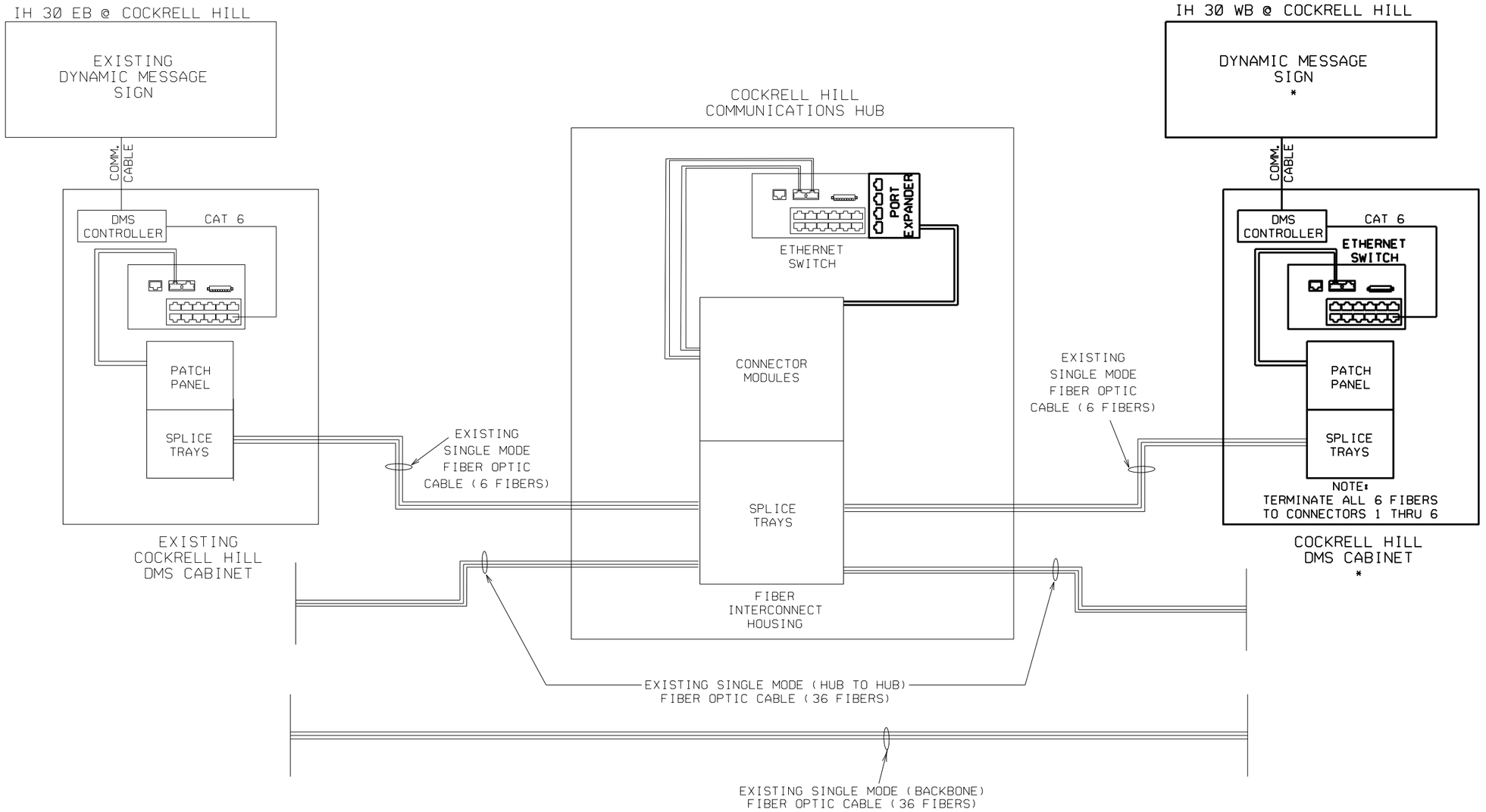
Texas Department of Transportation

DMS REHABILITATION
LAYOUT

SCALE: 1"=100' SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
SS	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS ET	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK EF	TEXAS	DALLAS	DAL, ETC.	69
CHECK	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 3/1/2023
FILE: I:\DALTRAFSD\Sirwan\DMS Refurb (0918-00-352)\Sheets\DMS Referb Dsign.dgn



LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

* = TO BE PROVIDED BY TXDOT

NOTES:

1. SEE FIBER TERMINATION CHARTS FOR INFORMATION ON FIBER SPLICING AND TERMINATIONS.
2. 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.
3. ALL STATE SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED ON THE PLANS.
4. POWER CABLES FOR ETHERNET SWITCHES AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.

STATE OF TEXAS
EYAD FANOUS
103501
LICENSED PROFESSIONAL ENGINEER

Eyad Fanous, P.E. 2/27/23
Signature Date

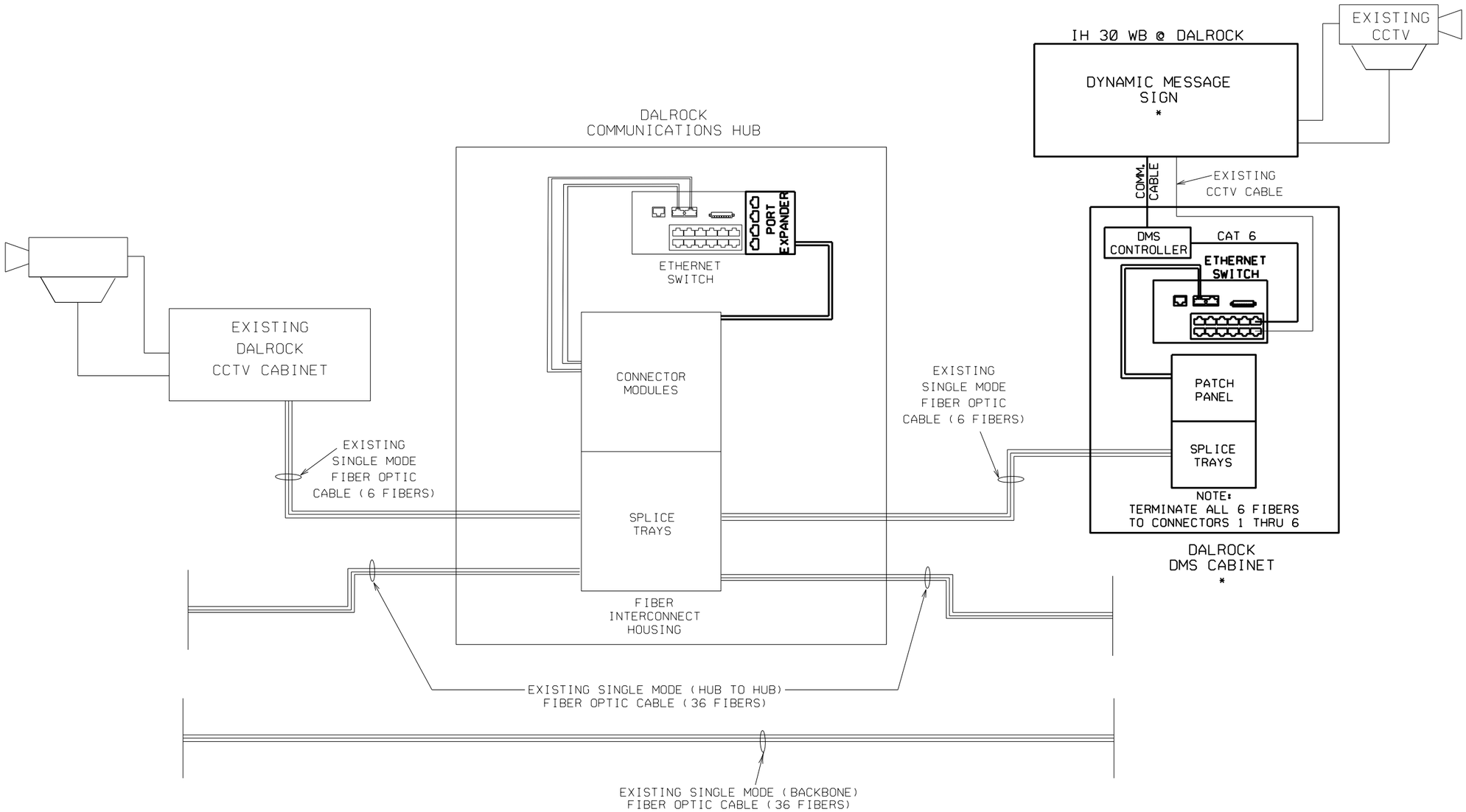
Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION BLOCK DIAGRAM

SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69A
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/27/2023



LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

* = TO BE PROVIDED BY TXDOT

NOTES:

1. SEE FIBER TERMINATION CHARTS FOR INFORMATION ON FIBER SPLICING AND TERMINATIONS.
2. 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.
3. ALL STATE SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED ON THE PLANS.
4. POWER CABLES FOR ETHERNET SWITCHES AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.

STATE OF TEXAS
EYAD FANOUS
103501
LICENSED PROFESSIONAL ENGINEER

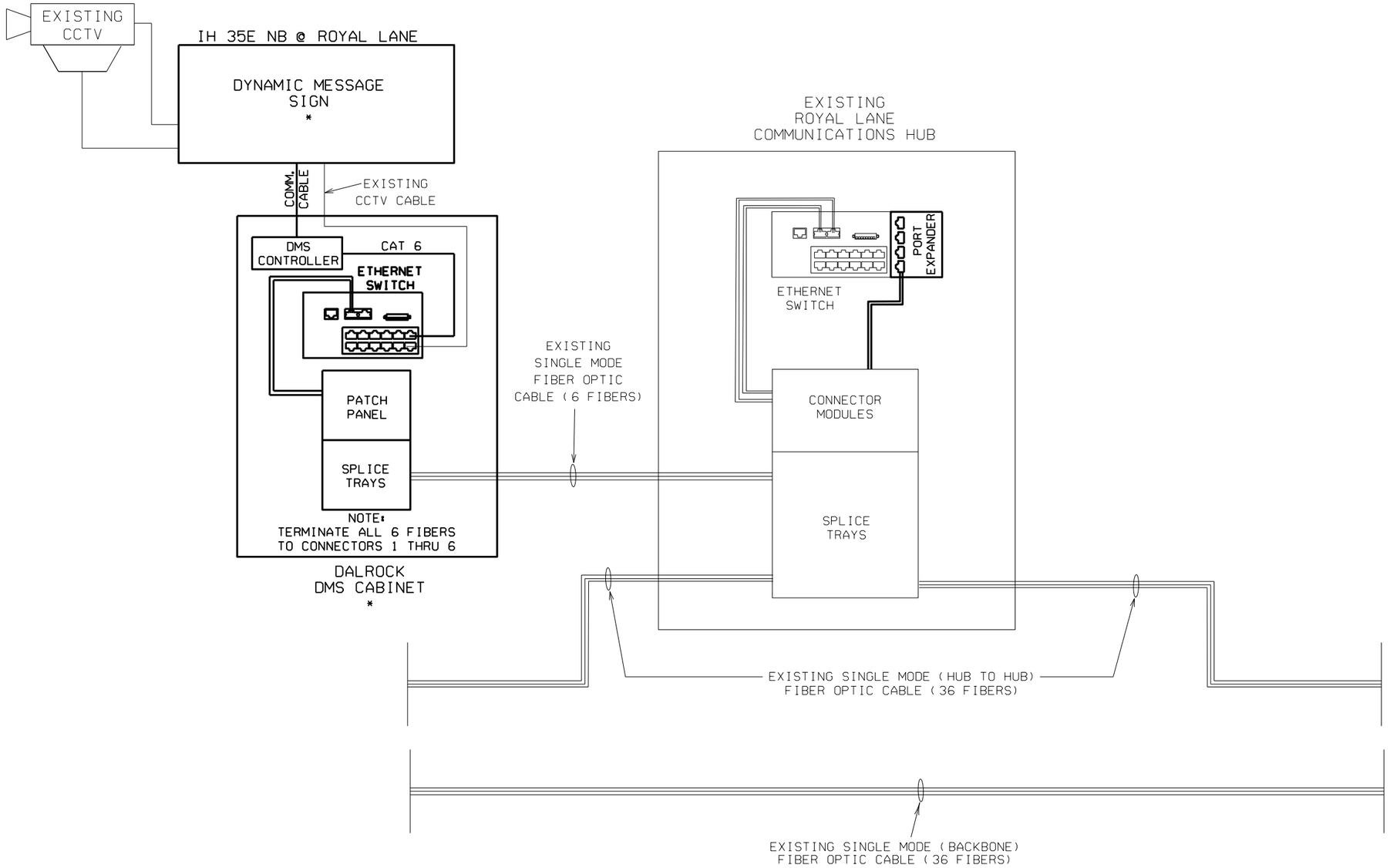
Eyad Fanous ,P.E. 2/27/23
Signature Date

Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION BLOCK DIAGRAM
SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69B
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/27/2023



LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

* = TO BE PROVIDED BY TXDOT

NOTES:

1. SEE FIBER TERMINATION CHARTS FOR INFORMATION ON FIBER SPLICING AND TERMINATIONS.
2. 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.
3. ALL STATE SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED ON THE PLANS.
4. POWER CABLES FOR ETHERNET SWITCHES AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.

STATE OF TEXAS
EYAD FANOUS
103501
LICENSED PROFESSIONAL ENGINEER

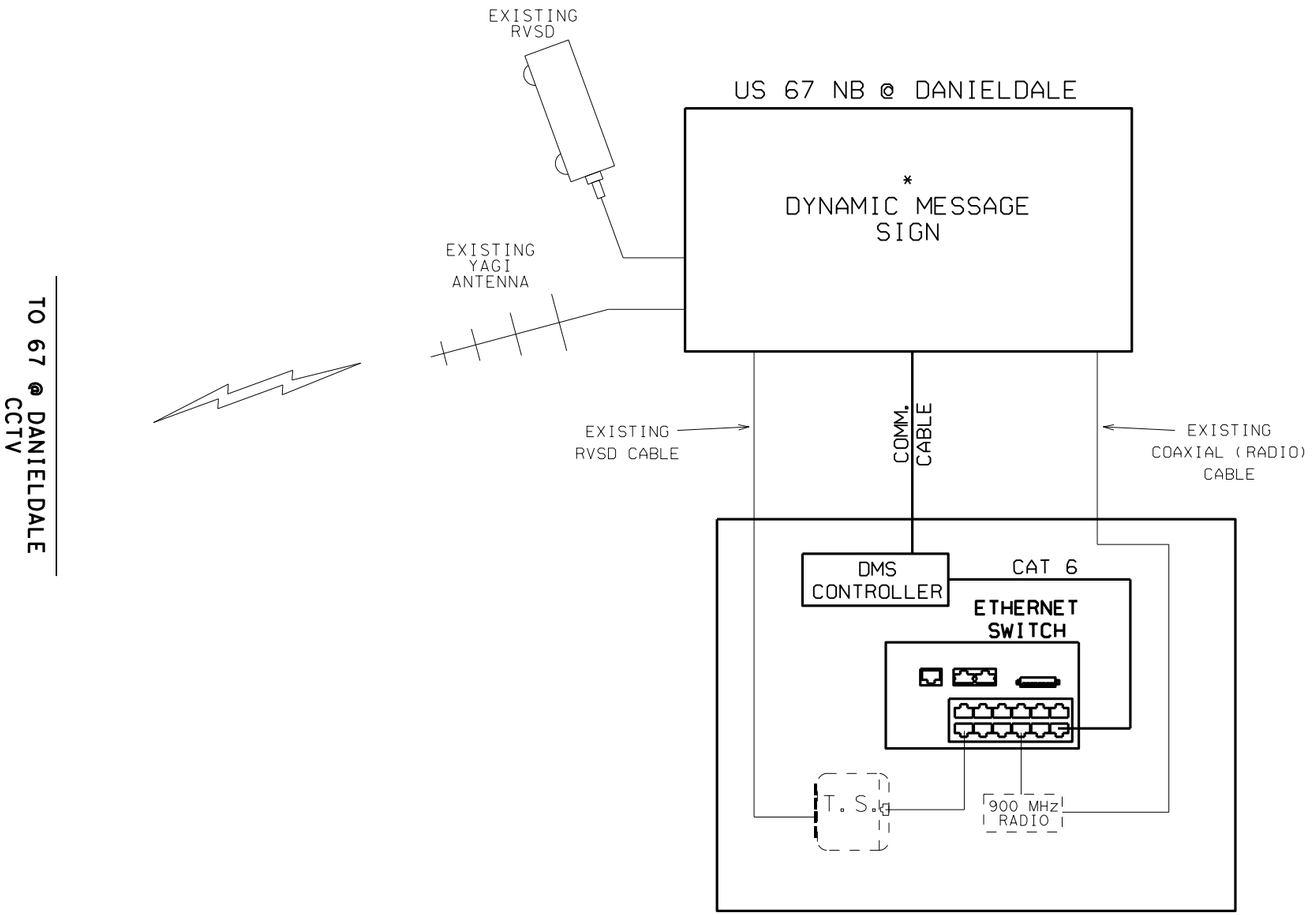
Eyad Fanous ,P.E. 2/27/23
Signature Date

Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION BLOCK DIAGRAM
SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69C
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/27/2023



DANIELDALE
DMS CABINET
*

LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

= RELOCATED EQUIPMENT

* = 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 STATE SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED ON THE PLANS.

STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

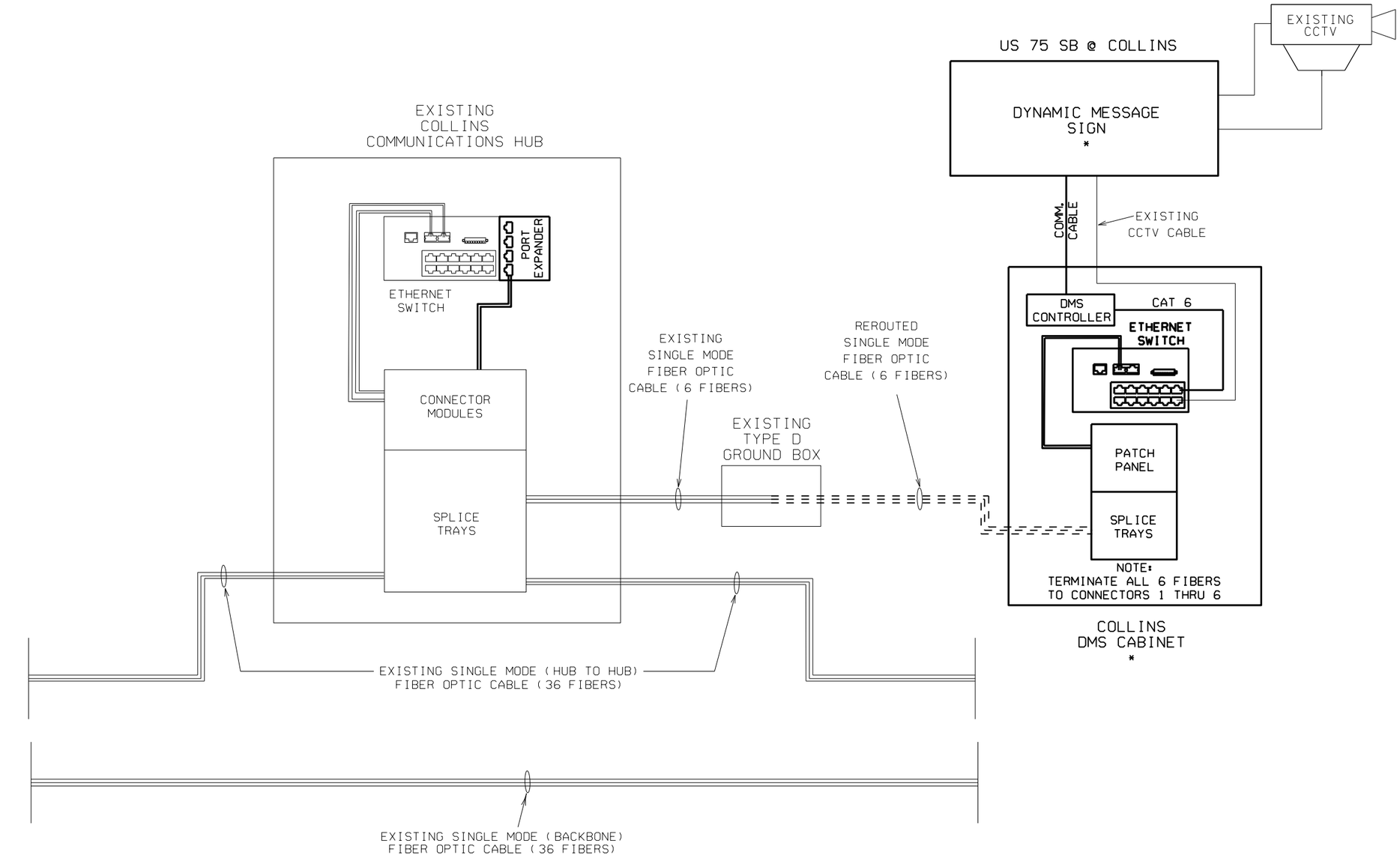
Eyad Fanous, P.E. 2/27/23
Signature Date

Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION
BLOCK DIAGRAM
SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69D
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/27/2023



LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

– – – = FIBER TO BE REROUTED

* = TO BE PROVIDED BY TXDOT

NOTES:

1. SEE FIBER TERMINATION CHARTS FOR INFORMATION ON FIBER SPLICING AND TERMINATIONS.
2. 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.
3. ALL STATE SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED ON THE PLANS.
4. POWER CABLES FOR ETHERNET SWITCHES AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.

STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

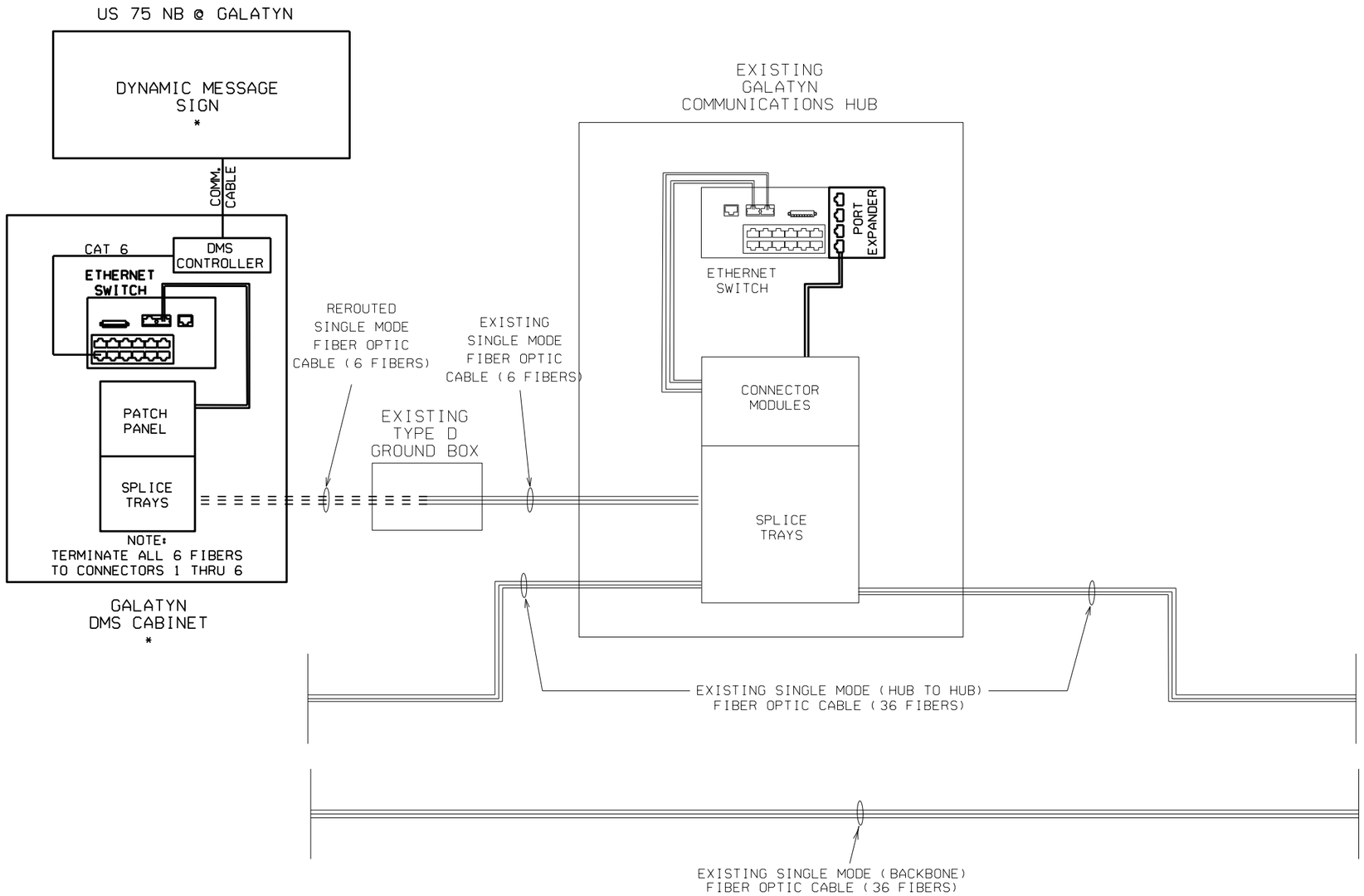
Eyad Fanous ,P.E. 2/27/23
Signature Date

Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION
BLOCK DIAGRAM
SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69E
CHECK CMB	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/27/2023



LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

– – – = FIBER TO BE REROUTED

* = TO BE PROVIDED BY TXDOT

NOTES:

1. SEE FIBER TERMINATION CHARTS FOR INFORMATION ON FIBER SPLICING AND TERMINATIONS.
2. 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.
3. ALL STATE SUPPLIED EQUIPMENT SHALL BE CONFIGURED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED ON THE PLANS.
4. POWER CABLES FOR ETHERNET SWITCHES AND NEW FIBER JUMPERS SHALL BE FURNISHED BY THE CONTRACTOR.

STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/27/23
Signature Date

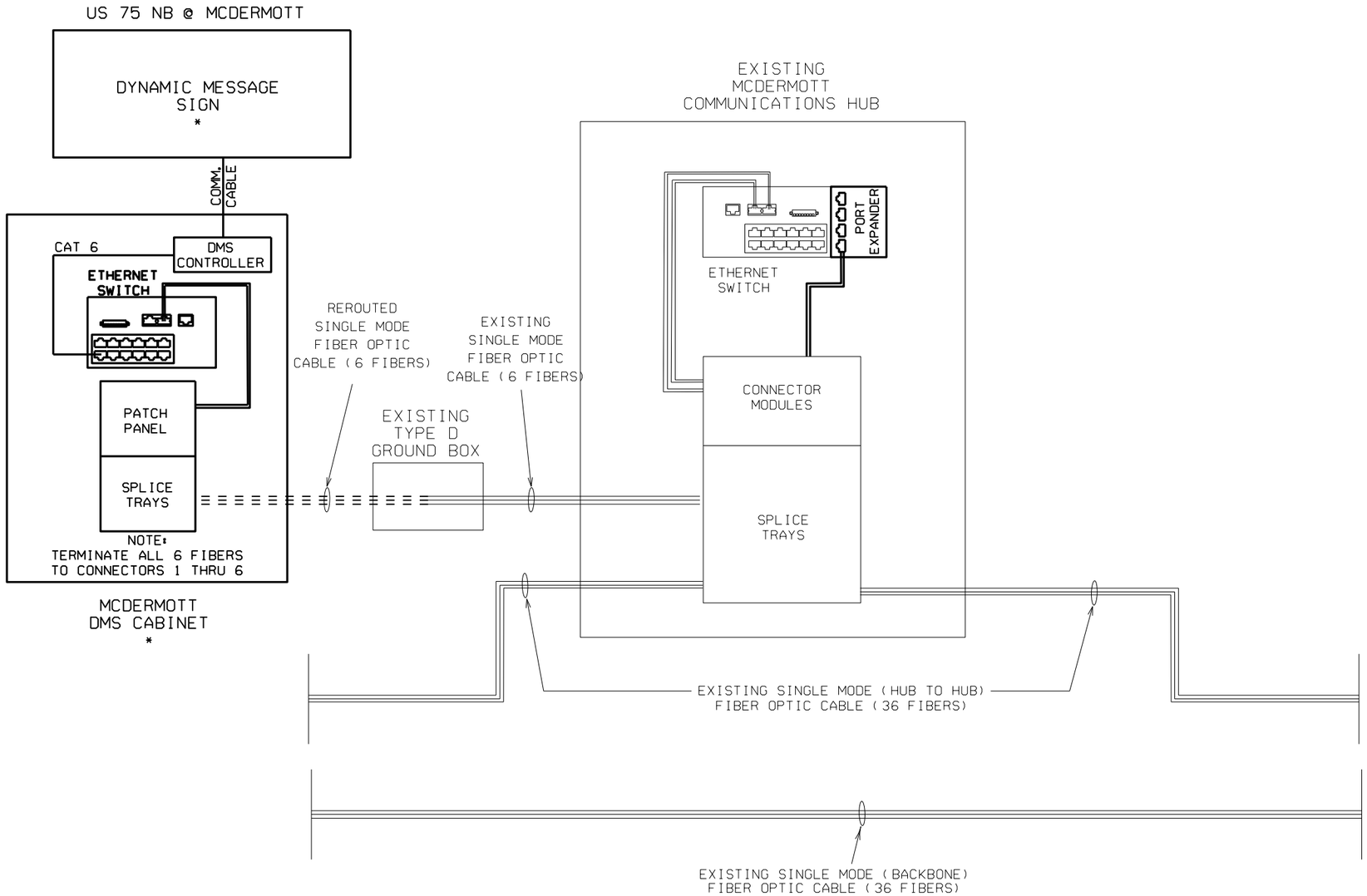
Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION
BLOCK DIAGRAM

SHEET 6 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69F
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/27/2023



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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED
PROFESSIONAL ENGINEER

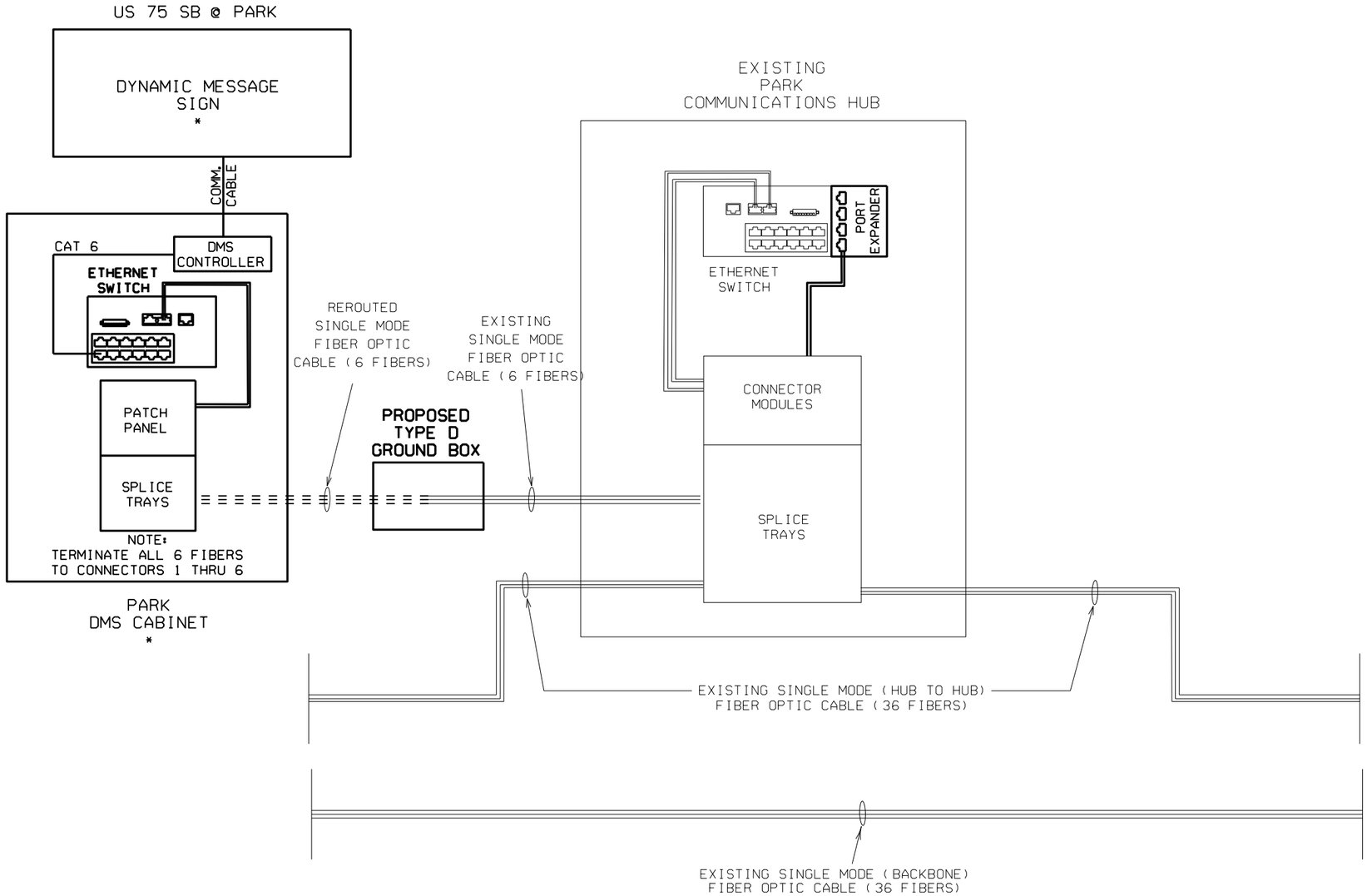
Eyad Fanous ,P.E. 2/27/23
Signature Date

Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION BLOCK DIAGRAM
SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69G
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/27/2023



LEGEND

= EXISTING EQUIPMENT TO REMAIN

= NEW EQUIPMENT TO BE INSTALLED

– – – = FIBER TO BE REROUTED

* = TO BE PROVIDED BY TXDOT

NOTES:

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STATE OF TEXAS
EYAD FANOUS
103501
LICENSED PROFESSIONAL ENGINEER

Eyad Fanous ,P.E. 2/27/23
Signature Date

Texas Department of Transportation

DMS REHABILITATION
COMMUNICATION BLOCK DIAGRAM

SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EF	6	(SEE TITLE SHEET)		IH 45, ETC.
GRAPHICS EF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ETS	TEXAS	DAL	DALLAS, ETC.	69H
CHECK CMB	CONTROL 0092	SECTION 02	JOB 137, ETC.	

DATE: 2/27/2023

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

Notes To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from its relative position.
3. All areas should be addressed thoroughly and verify the necessary pay items are set up to support actions needed.

Filled Out: XX/XX/XXXX
Prepared by: Name/Section

I. STORMWATER POLLUTION PREVENTION PLAN-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List adjacent MS 4 Operator(s) that receive discharges from this project. They need to be notified prior to construction activities.
(Note: Leave blank only if no adjacent MS 4 Operator(s) are affected.)

1. City of Dallas Phase I MS4 contact Kevin Hurley
2. City of Hutchins Phase II MS4 contact Scott Metcalf, Director of Utilities
3. City of Wilmer Phase II MS4 contact Douglas Jistel, Public Works Director
4. Dallas County Phase II MS4 contact Lissa Shepard, Senior Bridge Engineer
5. City of Duncanville Phase II MS4 contact Greg Ramey, Public Works Director
6. City of Richardson Phase II MS4 contact Bill Alsup, Env. Health Director
7. City of Allen Phase II MS4 contact William Nahas, Stormwater Program Manager
8. City of Plano Phase I MS4 contact Echo Rexroad, Env. Quality Manager

☐ 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.

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.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS TREATY ACT.

☐ No Action Required ☒ Required Action

Action Number:

1. The following species could occur in the project area: Woodhouse's toad, slender glass lizard, Texas garter snake. Follow the BMPs and Special Notes listed below to protect these species.

2. Contractor to implement the following BMPs from "Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources" available at https://ftp.txdot.gov/pub/txdot-info/env/toolkit/300-01-bmp.pdf
   a. Section 2.6.1 Aquatic Amphibian and Reptile BMP (barrier fencing not required)
   b. Section 2.6.2 Terrestrial Amphibian and Reptile BMP
   c. Section 1.4 Water Quality BMP
   d. Section 1.2 Vegetation BMP

Special Notes:

1. Avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.

2. If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

3. The Migratory Bird Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade or transport any migratory bird, nest, young, feather or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure or trees where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corp of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):
Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Safety Data Sheets (SDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the SDS. In the event of a spill, take actions to mitigate the spill as indicated in the SDS, 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.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

GENERAL NOTE:

Any change orders and/or deviations from the final design must be reported to the Engineer prior to commencement of construction activities, as additional environmental clearance may be required.

LAST REVISION: 1/15/15

 Texas Department of Transportation
Dallas District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		IH 45
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	Dallas	
CONTROL	SECTION	JOB	SHEET NO.
0092	02	137, etc.	70

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
CSJ 0092-02-137. CM 2023(611)

1.2 PROJECT LIMITS:
From: ELLIS COUNTY LINE

To: SOUTH F IH 20

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 32.5475 ,(Long) 96.8222

END: (Lat) 32.6419 ,(Long) 96.8230

1.4 TOTAL PROJECT AREA (Acres): 2.22

1.5 TOTAL AREA TO BE DISTURBED (Acres): 2.22

1.6 NATURE OF CONSTRUCTION ACTIVITY:
UPGRADE TO FIBER OPTIC DATA TRANSMISSION AND DEPLOYMENT OF ADDITIONAL CCTV

1.7 MAJOR SOIL TYPES:

Soil Type	Description
UNKNOWN	

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 2.5.)

☒ 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
NONE	

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
NONE

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. $DATE$
Digitally signed by Eduardo Torrens Soto, P.E.
Date

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	(SEE TITTLE SHEET)		71
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	DAL, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0092	02	137, ETC.	IH 45, ETC.

STORMWATER POLLUTION PREVENTION 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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

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
NONE		

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
- ☐ Other: _____
- ☐ Other: _____
- ☐ 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: _____
- ☐ 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
NONE		

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 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 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. $DATE$
Digitally signed by Eduardo Torrens Soto, P.E.
Date

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

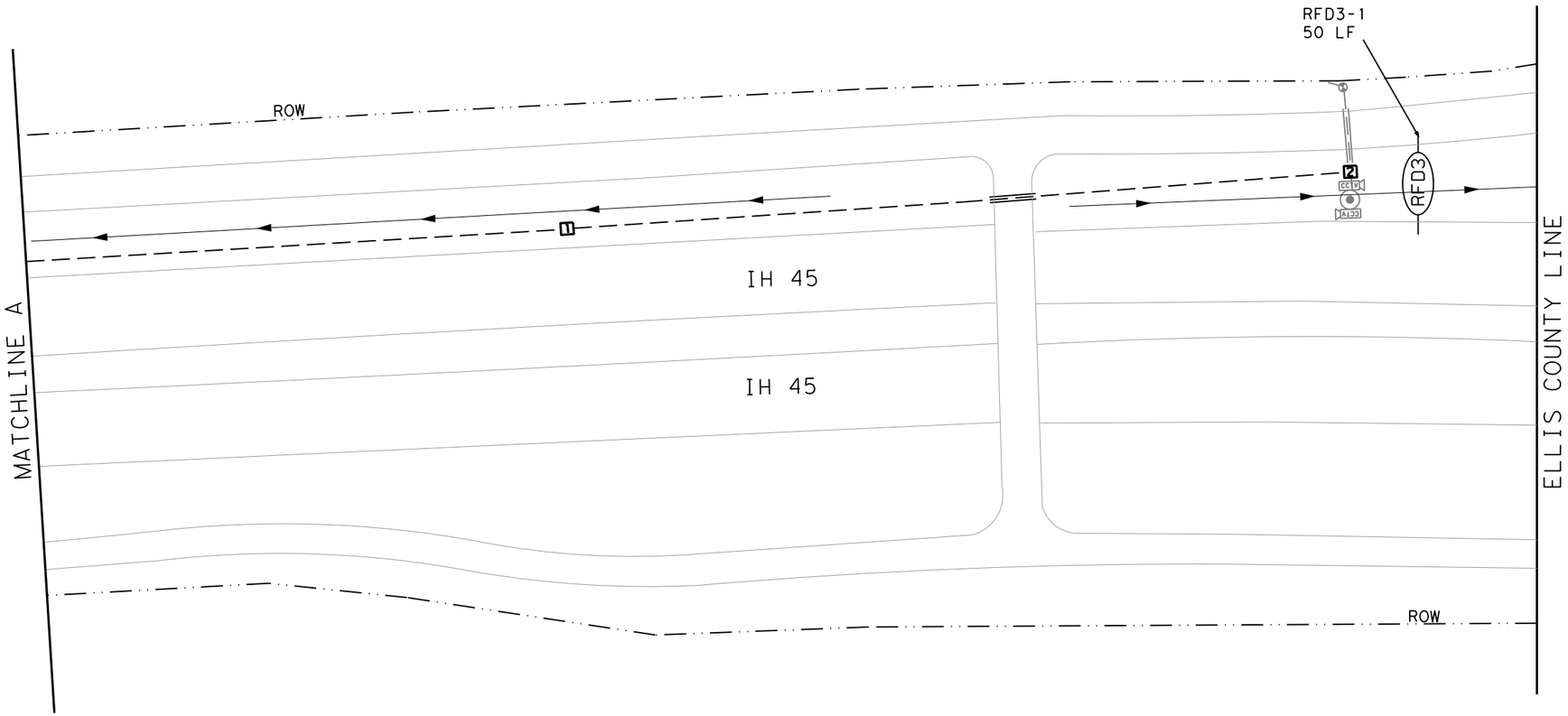
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	(SEE TITTLE SHEET)		72
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	DAL, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0092	02	137, ETC.	IH 45, ETC.

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD3-1		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

NOTES:

1. BMPs SHALL BE INSTALLED NO SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREAS.
2. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
3. EXISTING VEGETATION PRESERVED WITHIN THE RIGHT OF WAY SERVES AS AN ADDITIONAL SEDIMENTATION BMP.
4. CONTRACTOR SHALL MAINTAIN TRAFFIC SURFACES FREE OF PROJECT SEDIMENTATION AND LOOSE MATERIALS.

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Eduardo Torrens Soto, P.E. 2/3/2023
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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 1 OF 44

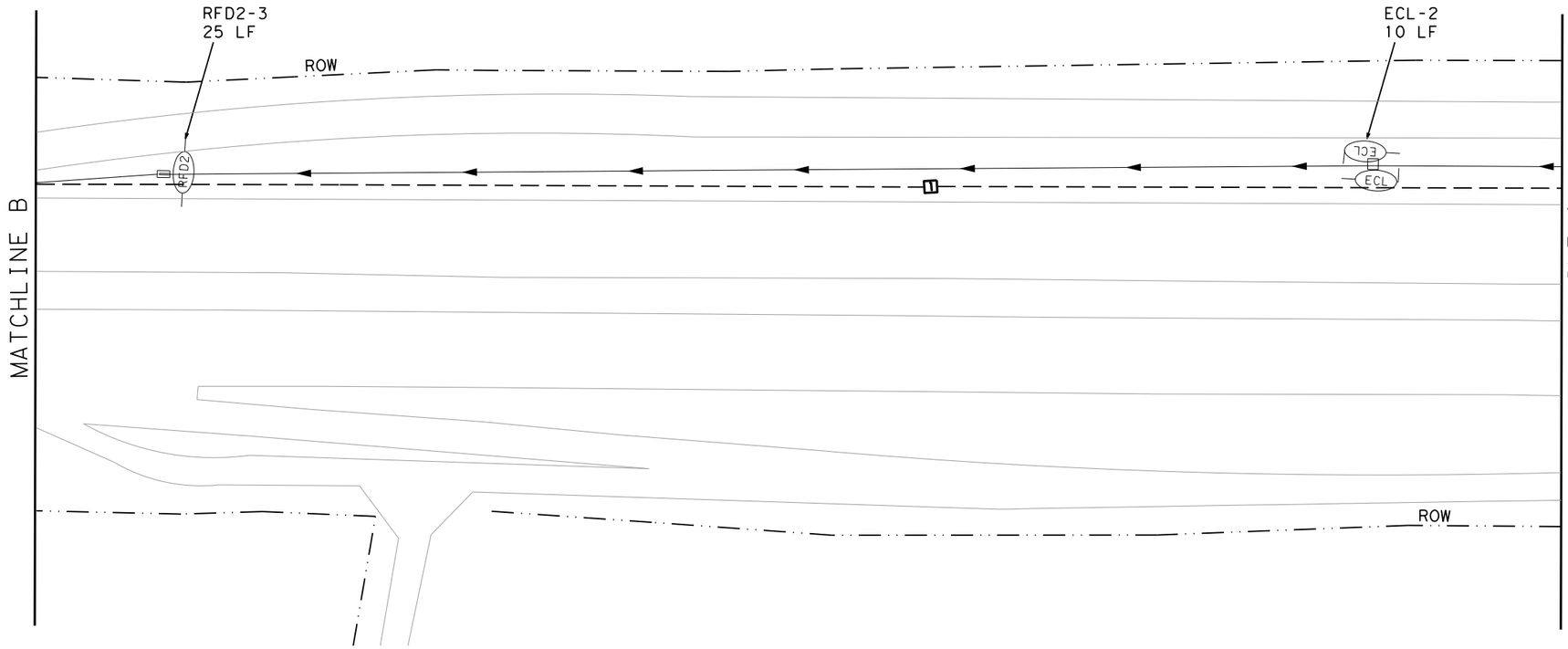
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C1$	TEXAS	18	DALLAS,ETC.	73
	CONTROL	SECTION	JOB	
CHECK $C2$	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 1.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ELC-2		
RFD2-3		



LEGEND

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- EXISTING CONDUIT
- (ECL) EROSION CONTROL LOG
- (RFD2) ROCK FILTER DAM (TY 2)
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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 2 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	74
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
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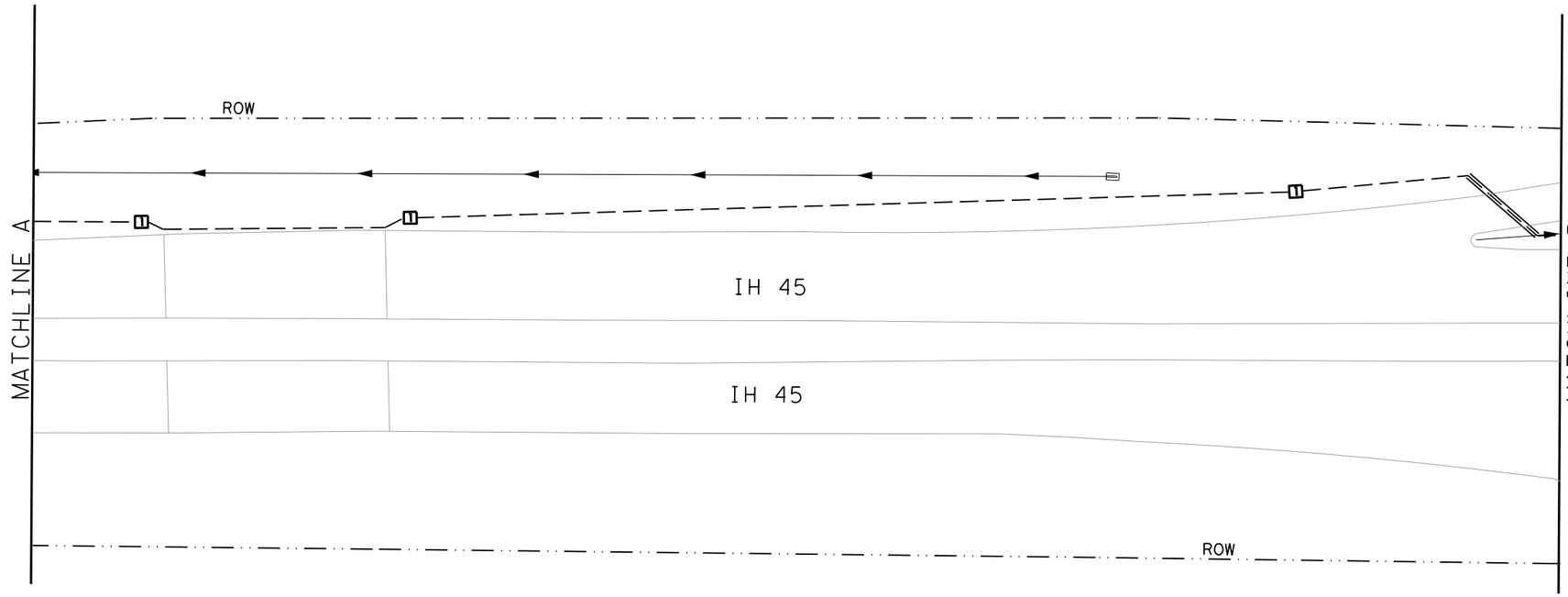

LEGEND

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- EXISTING CONDUIT
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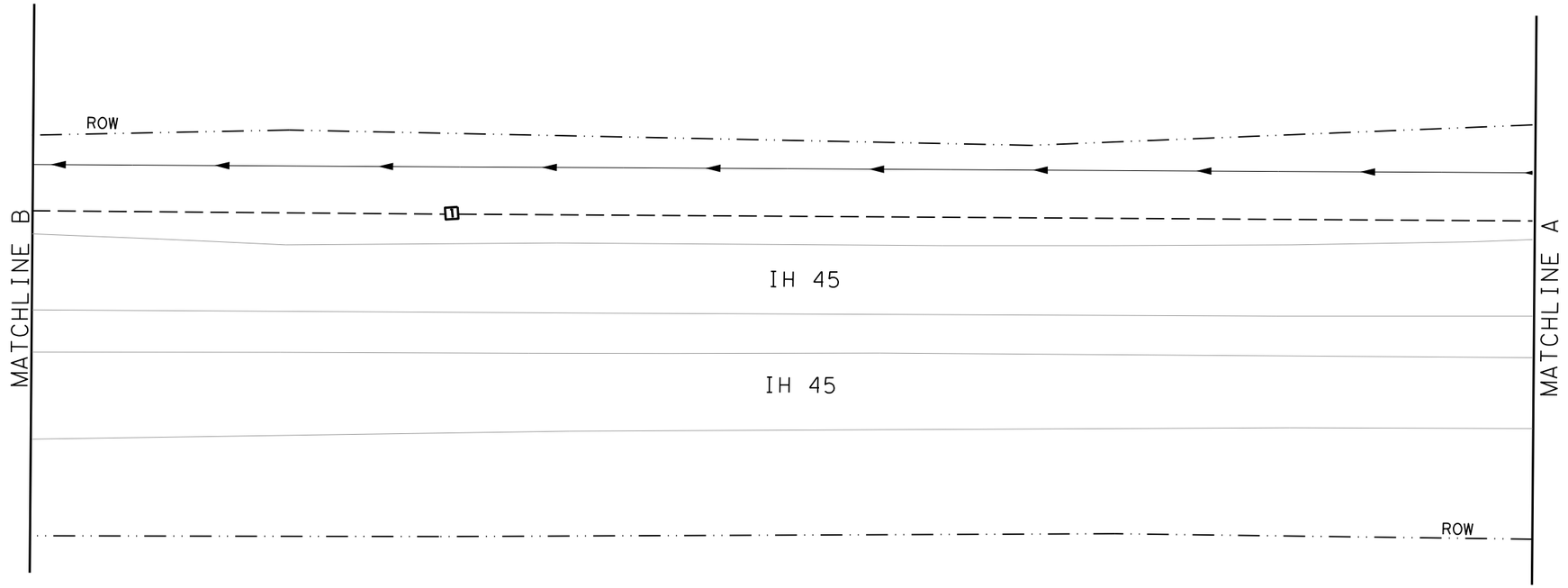
Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 3 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	75
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 3.dgn



LEGEND

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Texas Department of Transportation

IH45 SW3P
LAYOUT

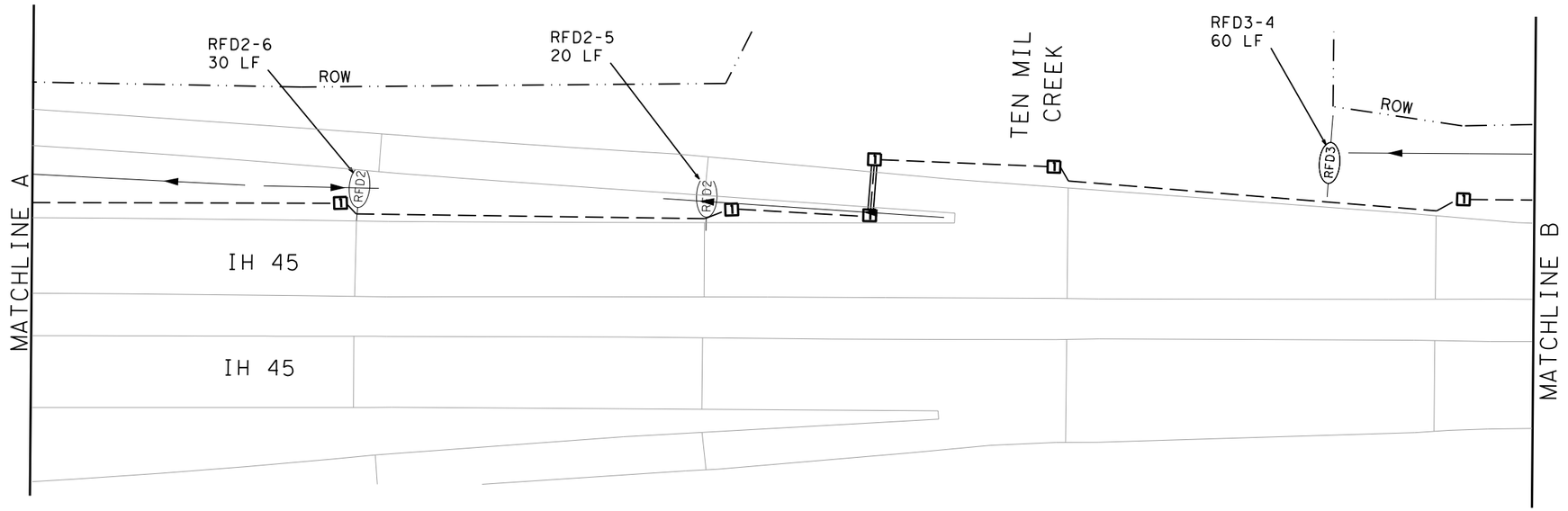
SCALE: 1"=100' SHEET 4 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	76
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 4.dgn

DATE DISTURBED	DATE STABILIZED

BMP #	INSTALL DATE	REMOVE DATE
RFD3-4		
RFD2-5		
RFD2-6		



LEGEND

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 5 OF 44

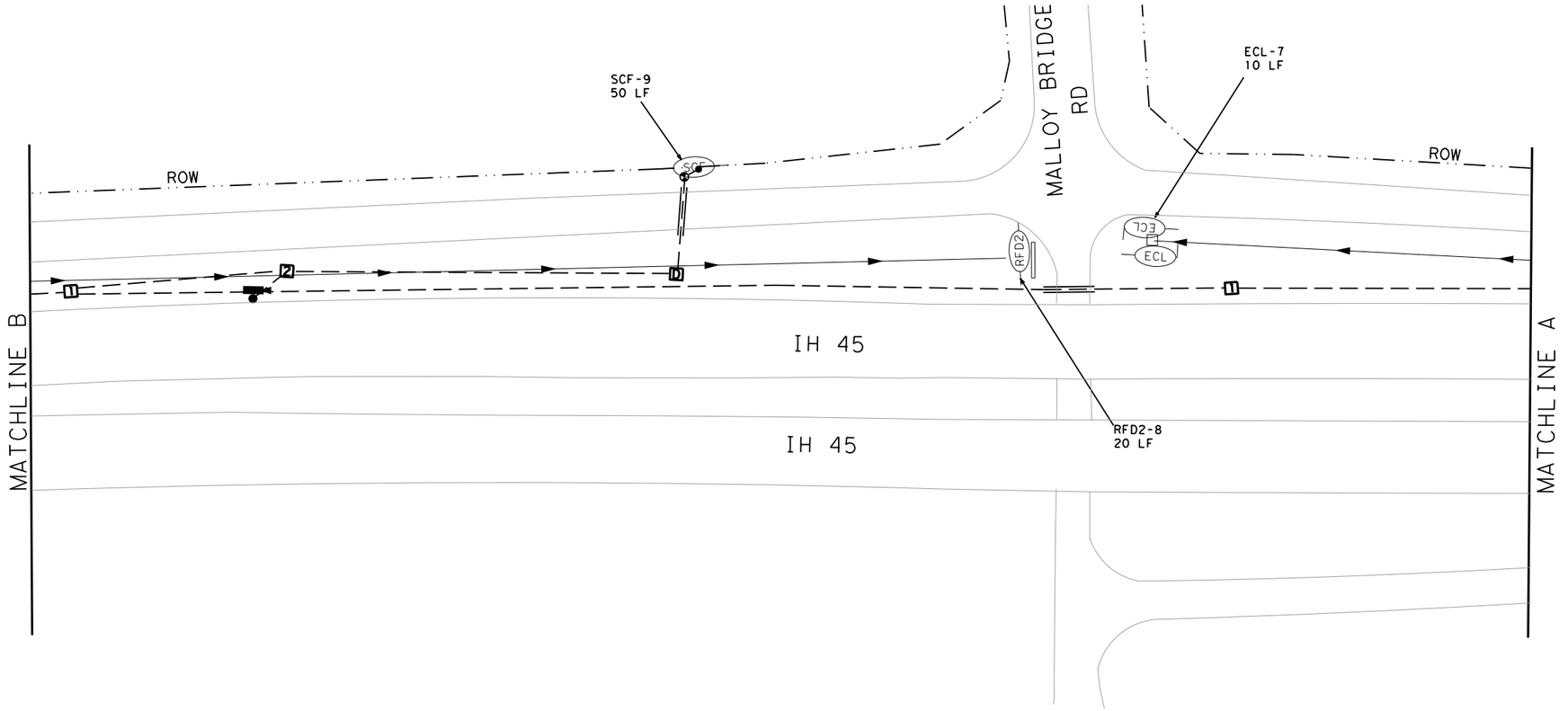
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C1$	TEXAS	18	DALLAS,ETC.	77
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 5.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-7		
RFD2-8		
SCL-9		



LEGEND

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- EXISTING CONDUIT
- (ECL) EROSION CONTROL LOG
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Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 6 OF 44

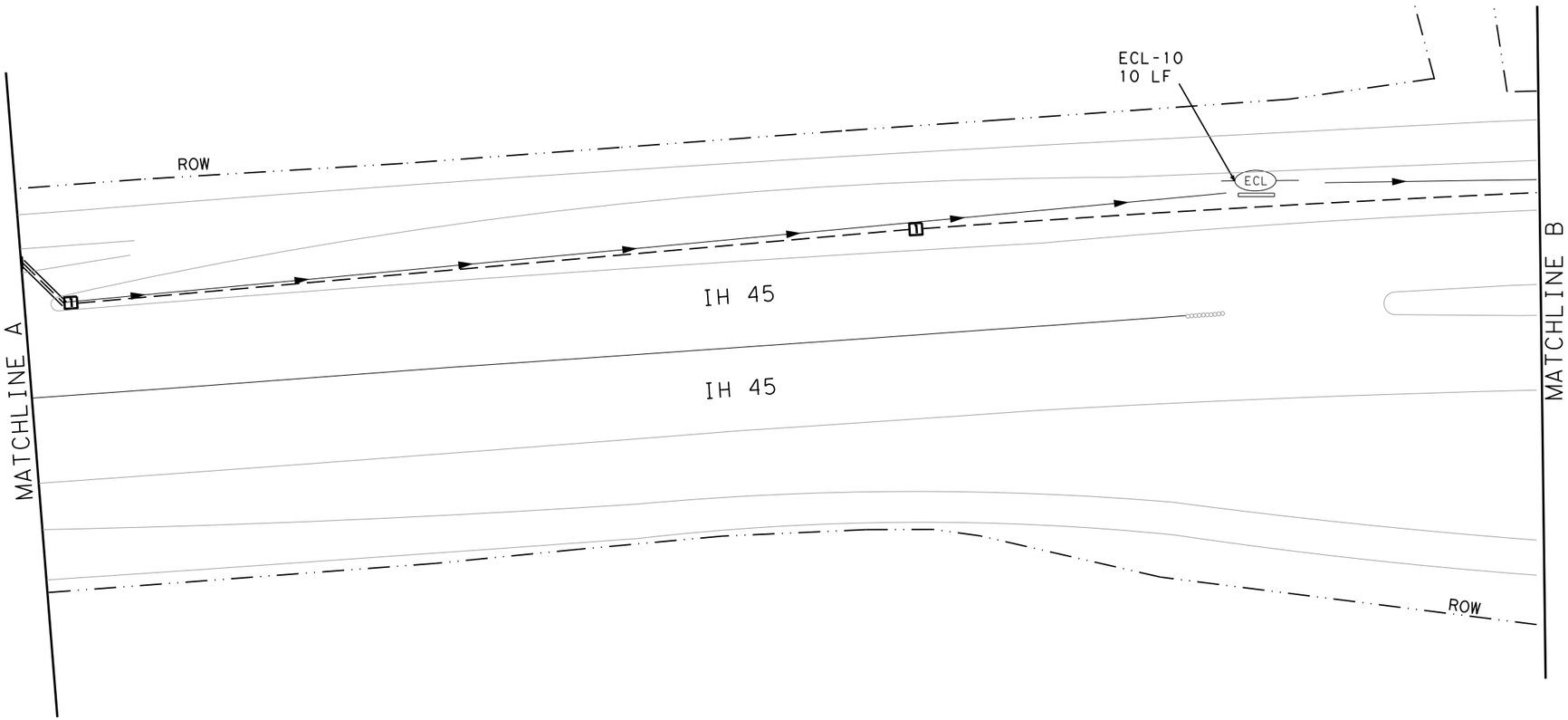
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	78
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 6.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-10		



LEGEND

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 7 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	79
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
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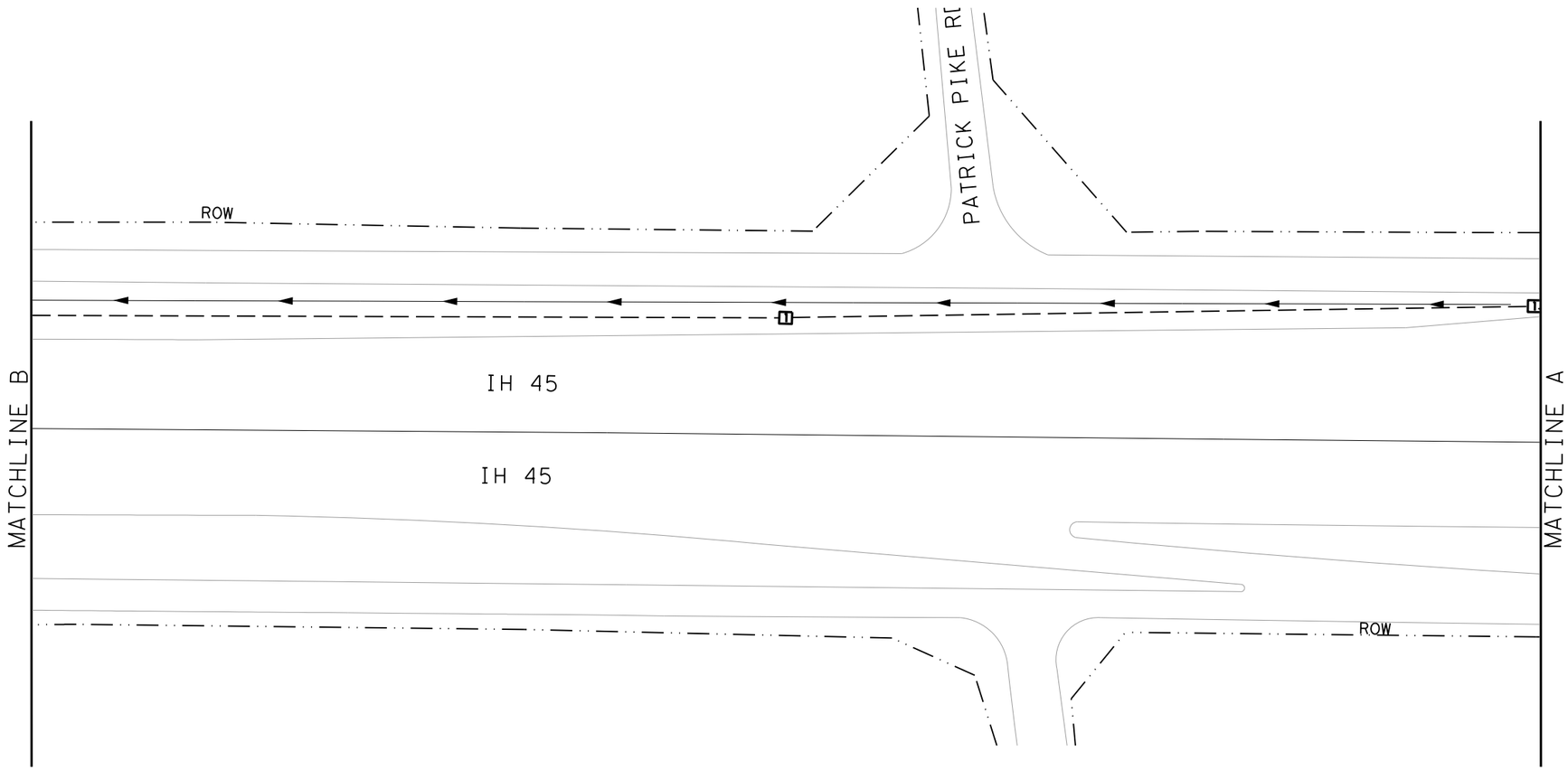

LEGEND

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 8 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	80
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
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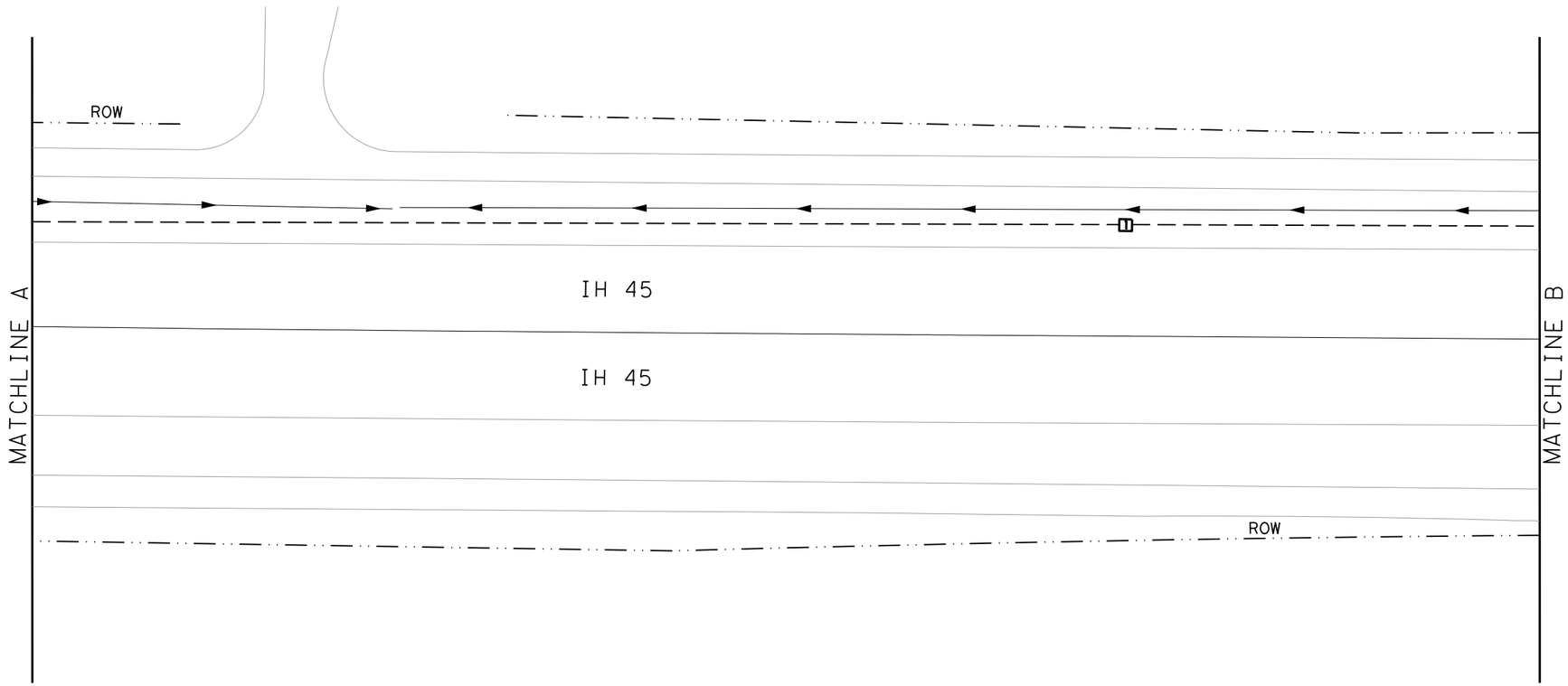

LEGEND

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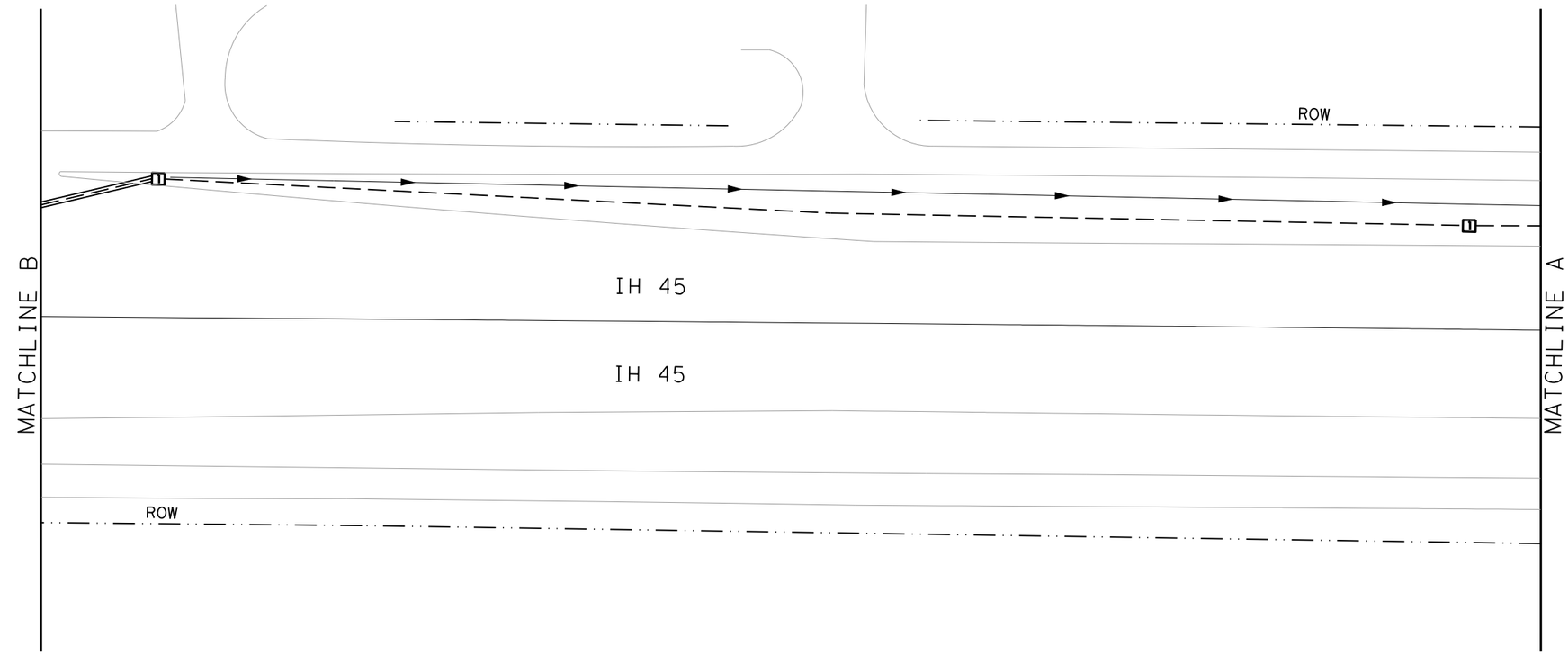
Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 9 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	81
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 9.dgn



LEGEND

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Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 10 OF 44

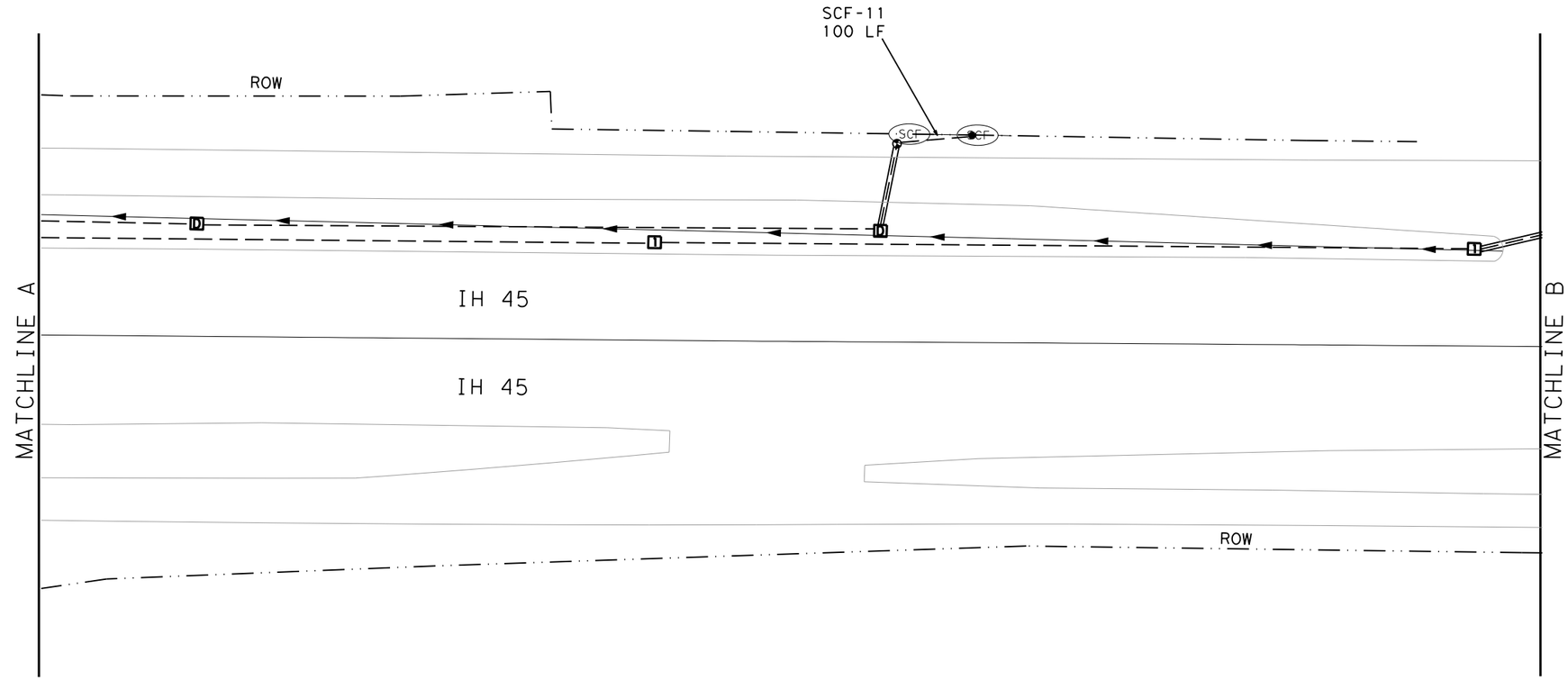
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	82
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 10.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
SCF-11		



LEGEND

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 11 OF 44

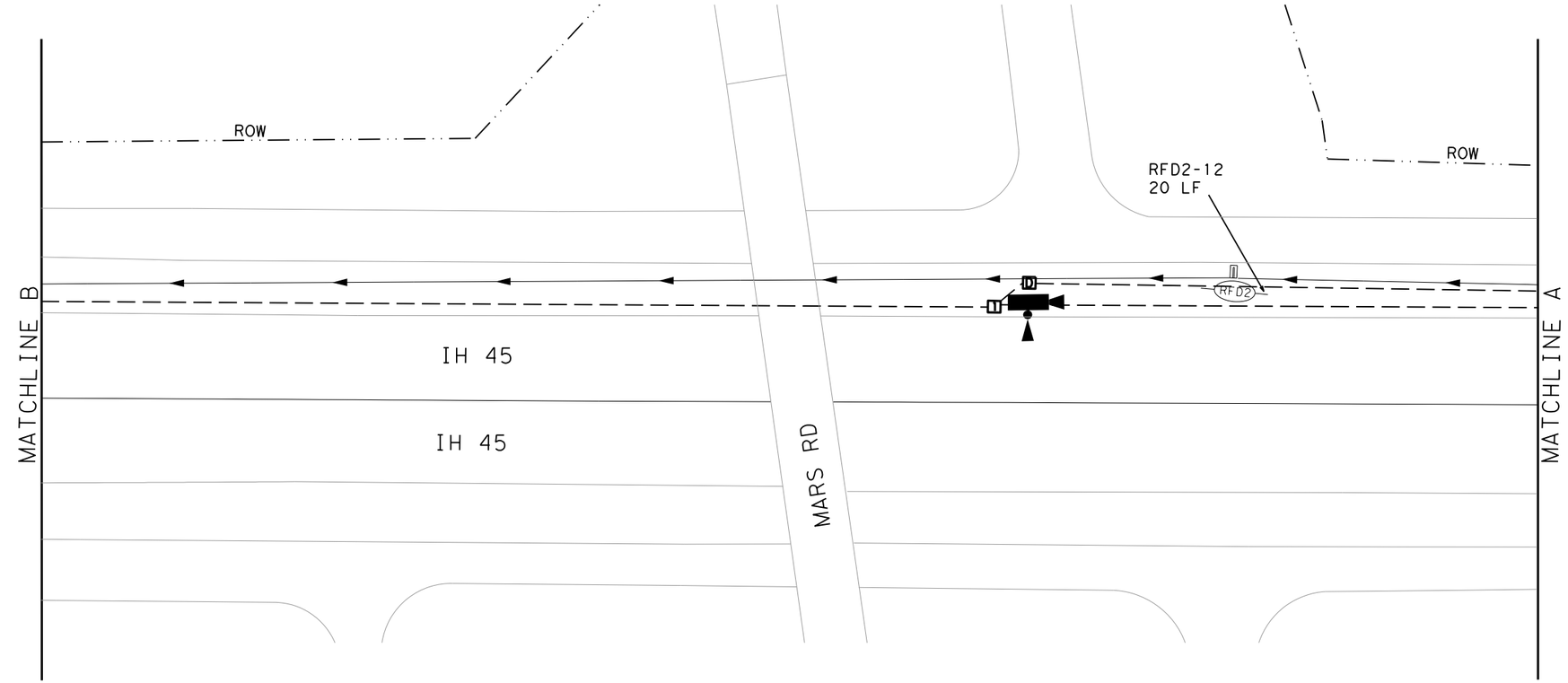
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	83
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyegrout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 11.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-12		



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PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 12 OF 44

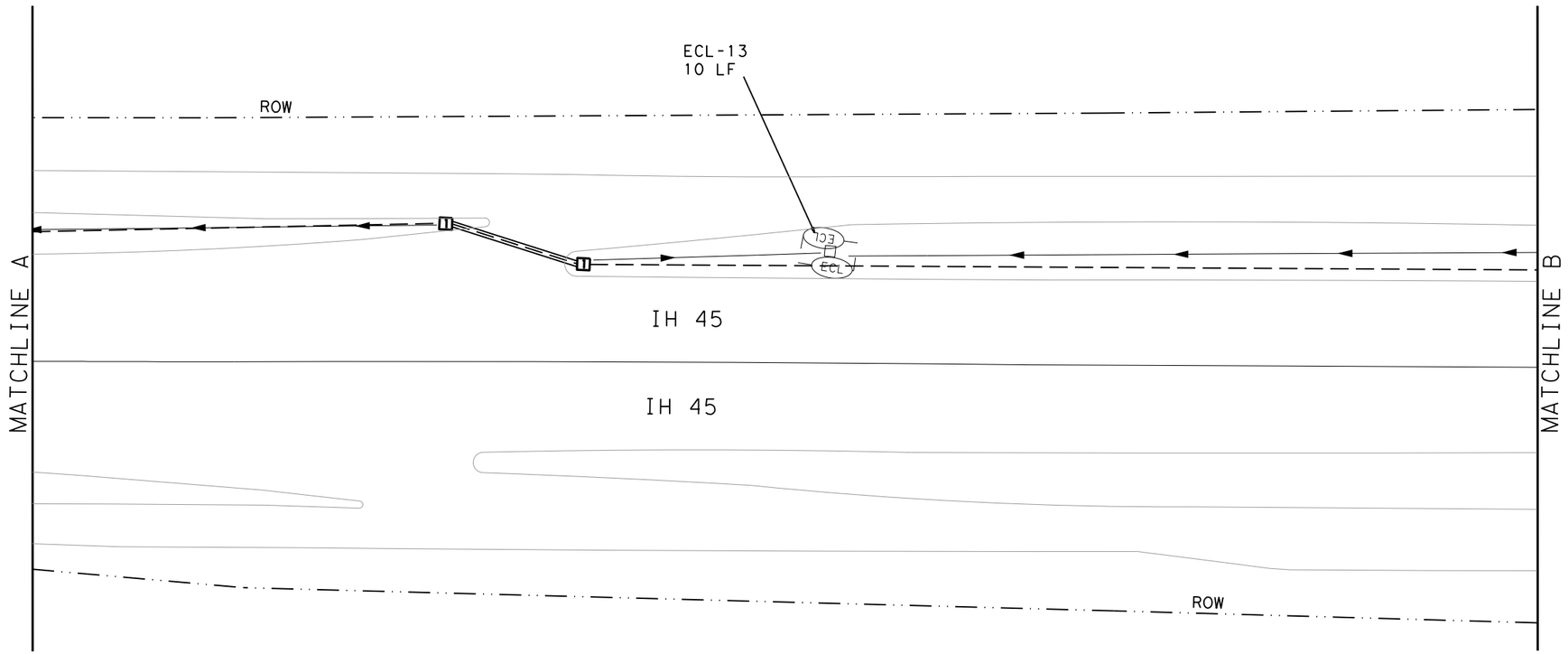
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	84
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 12.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-13		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

NOTES:

1. BMPs SHALL BE INSTALLED NO SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREAS.
2. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
3. EXISTING VEGETATION PRESERVED WITHIN THE RIGHT OF WAY SERVES AS AN ADDITIONAL SEDIMENTATION BMP.
4. CONTRACTOR SHALL MAINTAIN TRAFFIC SURFACES FREE OF PROJECT SEDIMENTATION AND LOOSE MATERIALS.

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 13 OF 44

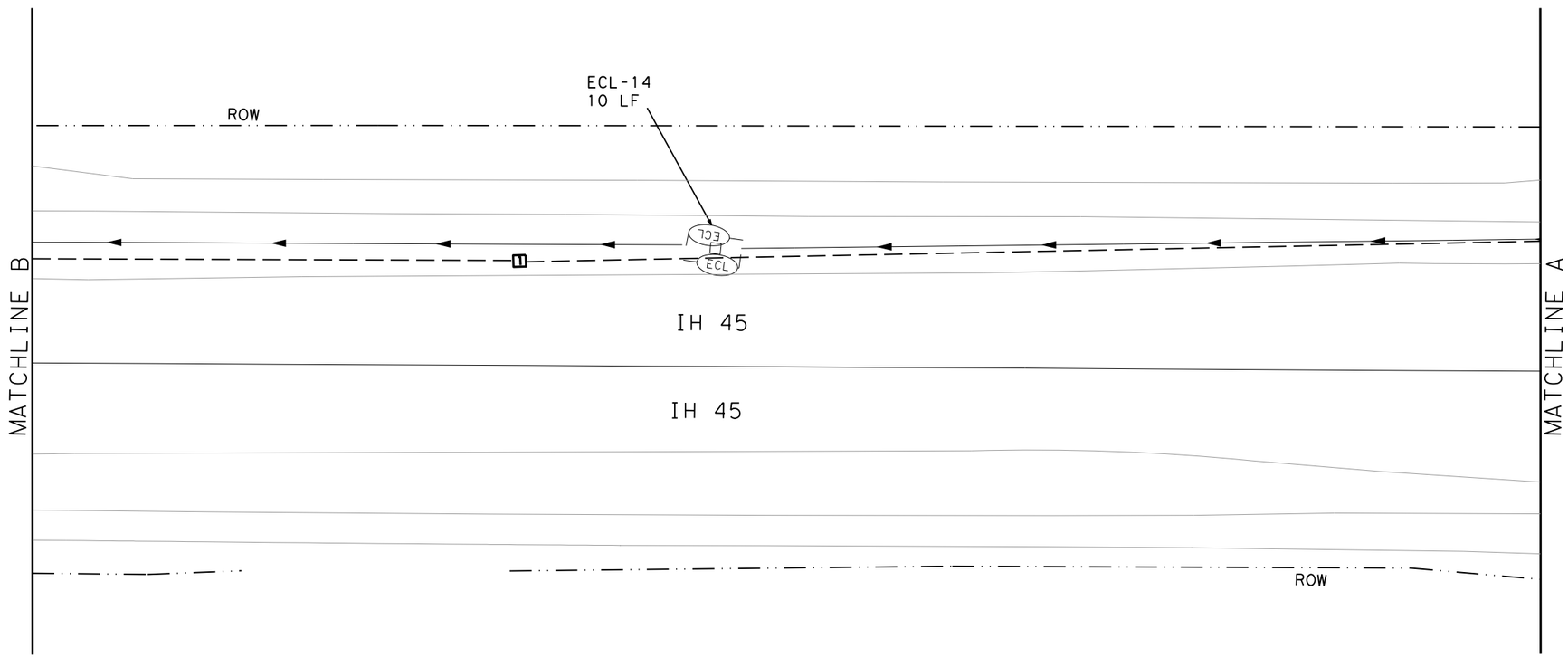
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	85
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 13.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-14		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 14 OF 44

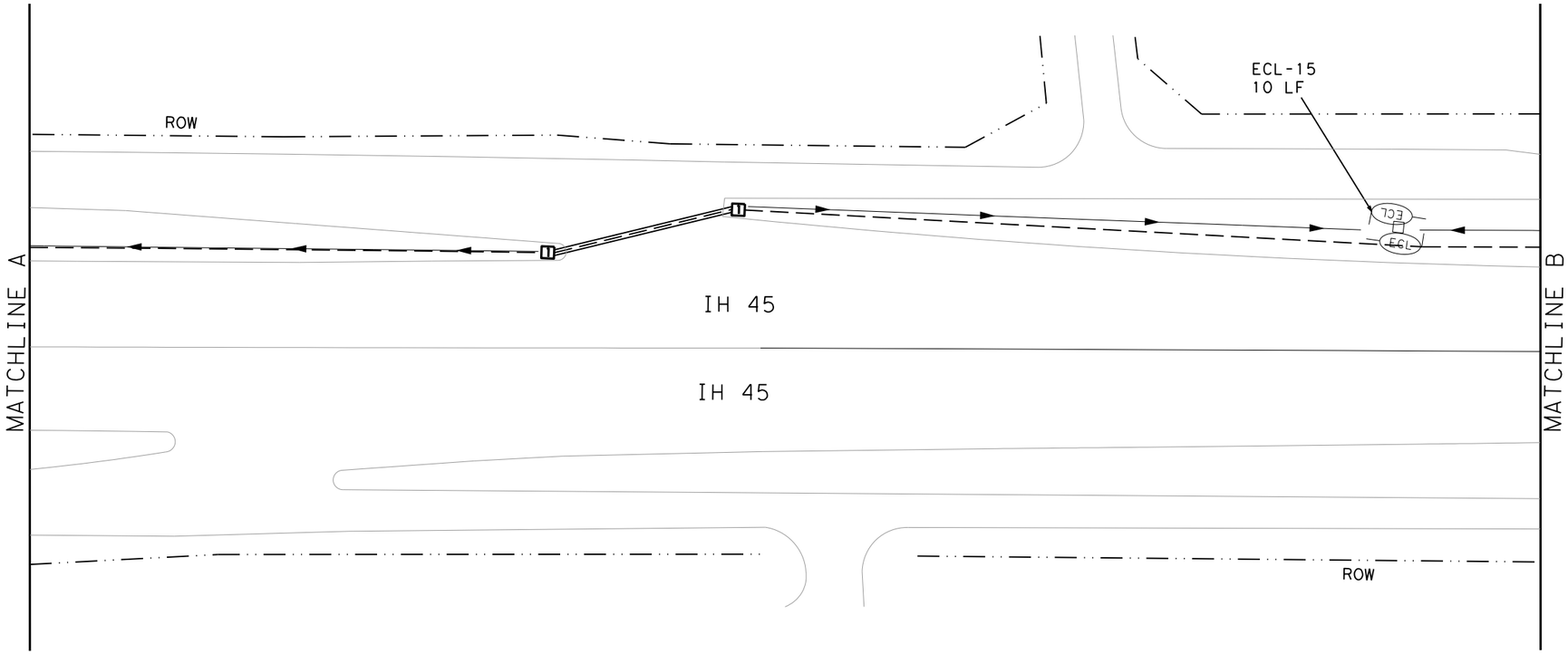
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	86
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 14.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-15		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
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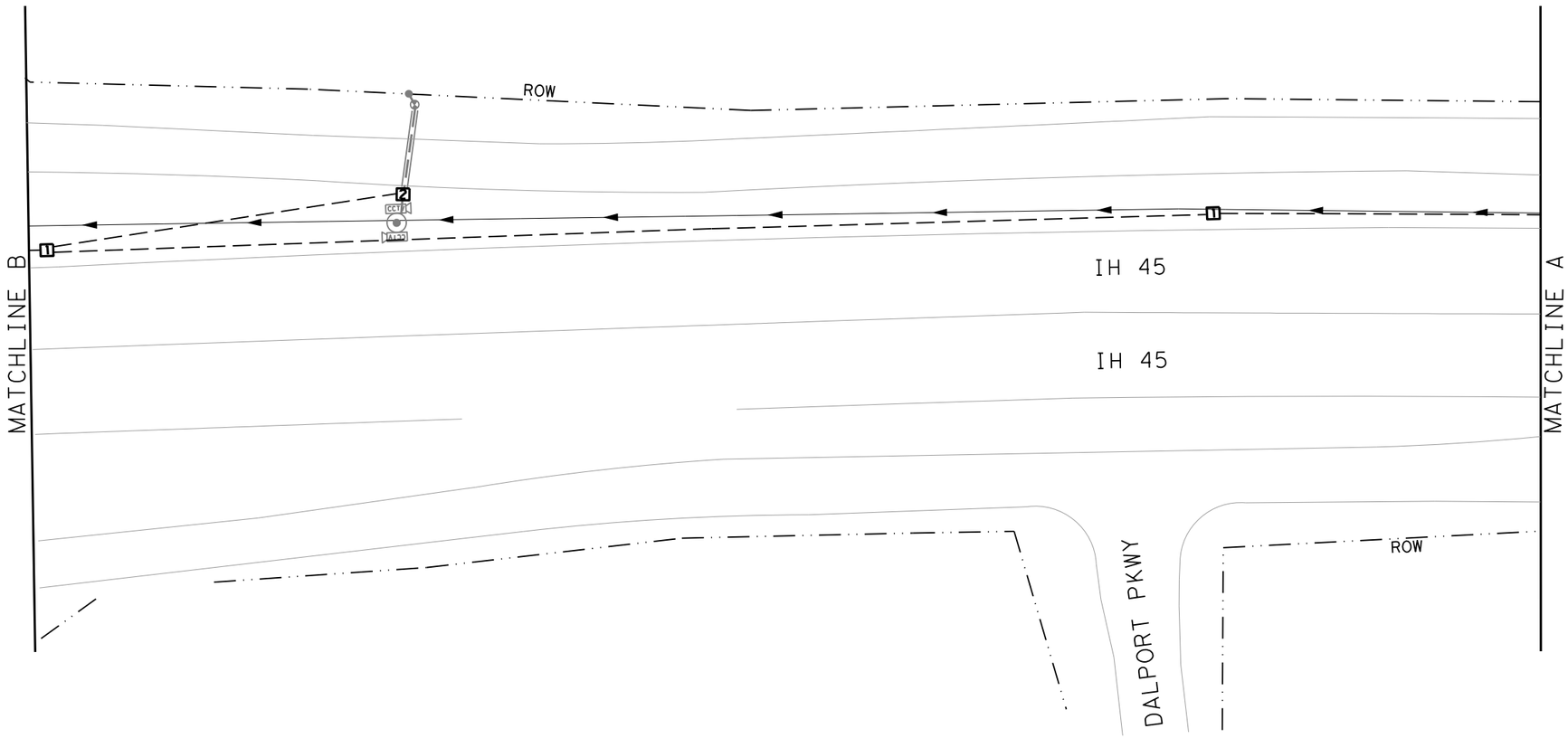
Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 15 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	87
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 15.dgn



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
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IH45 SW3P
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SCALE: 1"=100' SHEET 16 OF 44

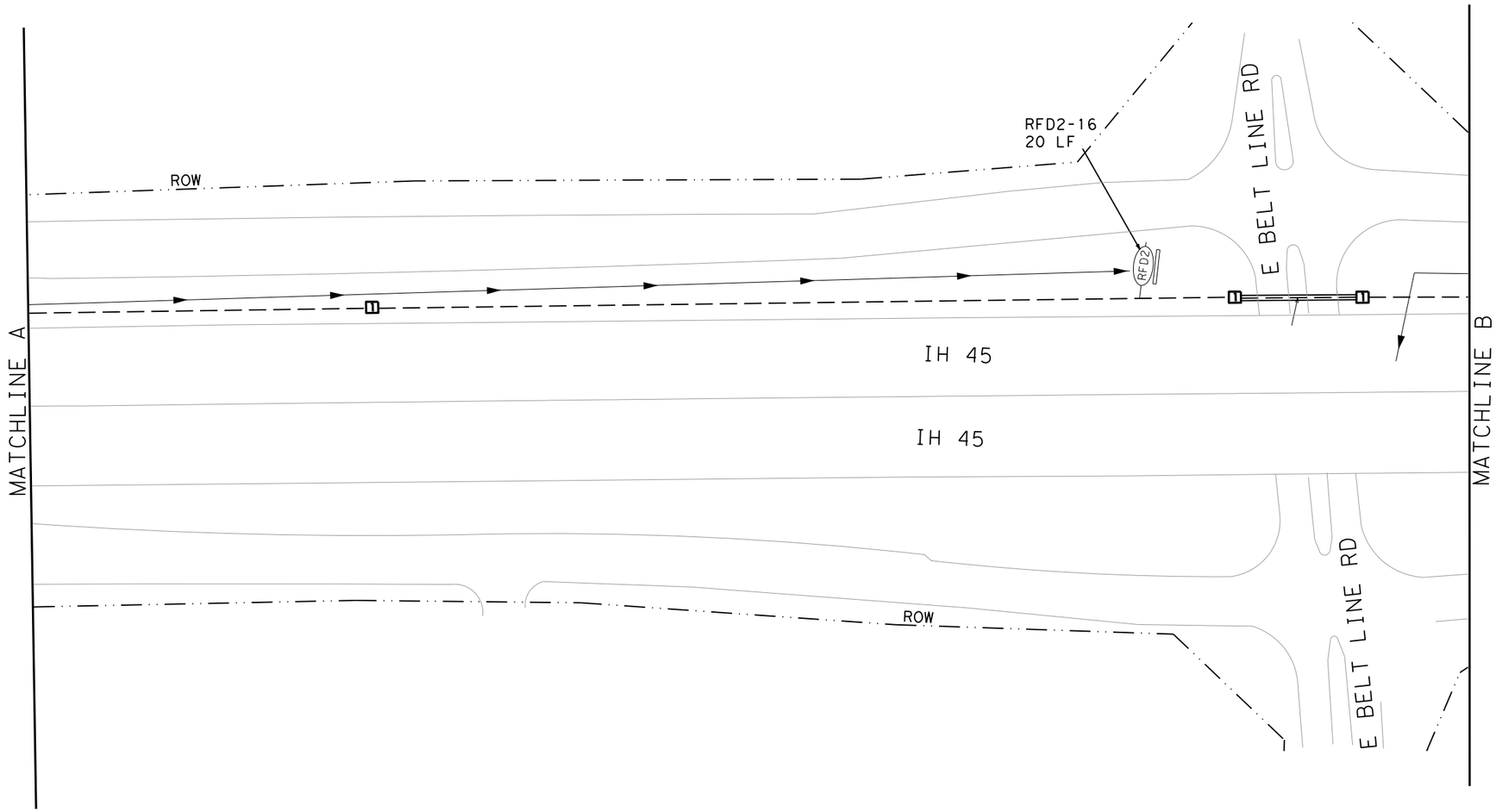
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	88
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 16.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-16		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
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Texas Department of Transportation

IH45 SW3P
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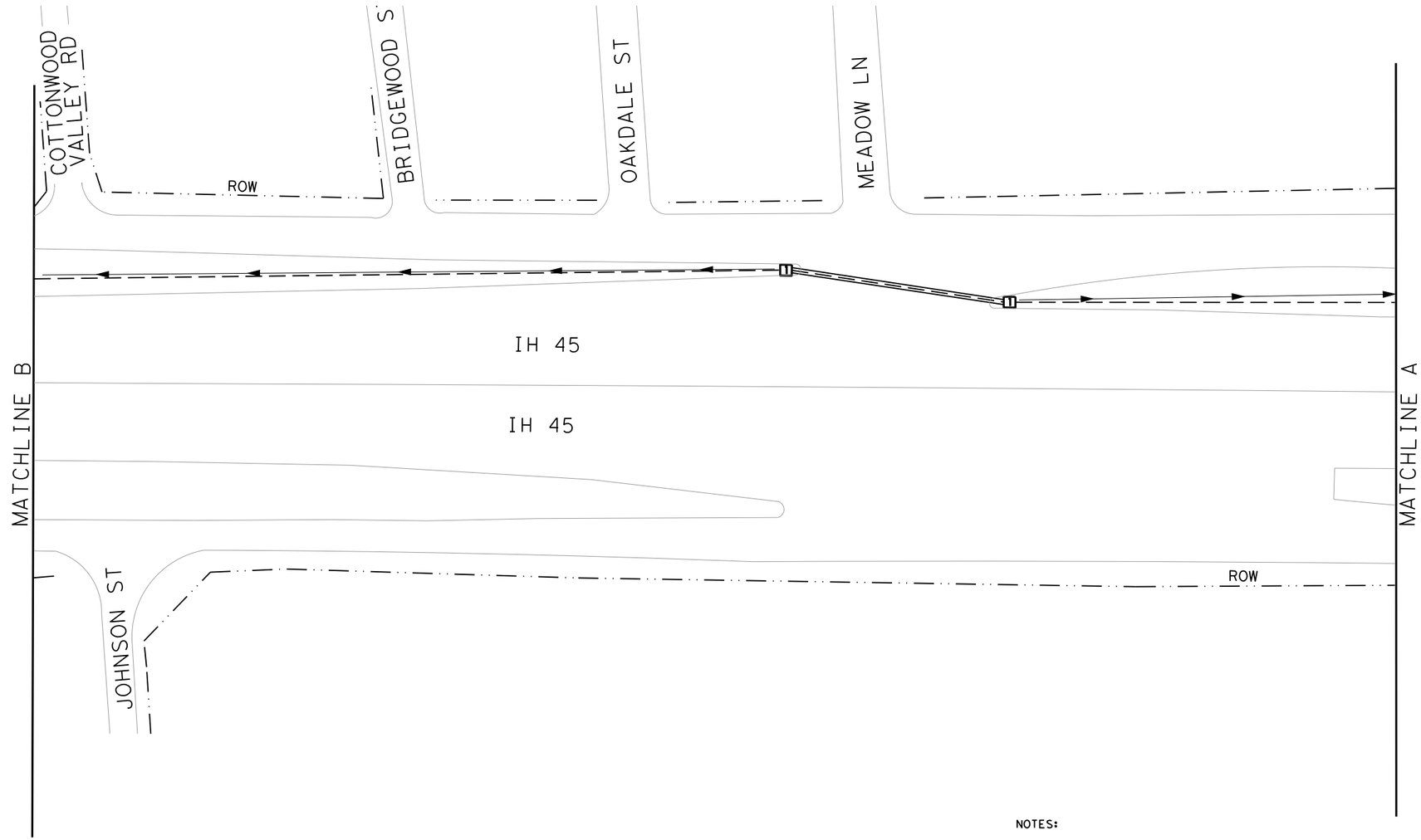
SCALE: 1"=100' SHEET 17 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	89
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 17.dgn



LEGEND

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- EXISTING CONDUIT
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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 18 OF 44

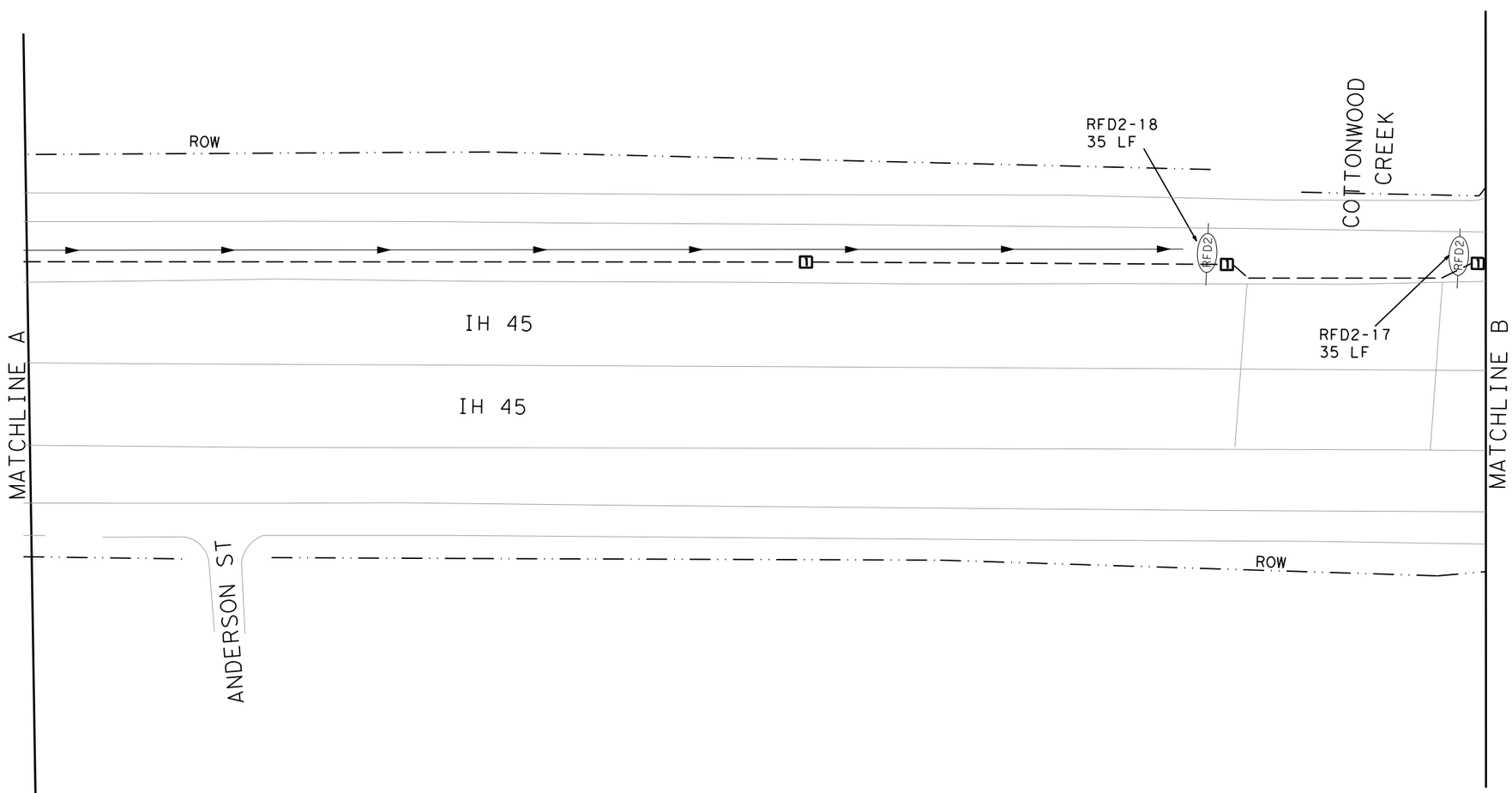
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	90
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 18.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-17		
RFD2-18		



LEGEND

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- EXISTING CONDUIT
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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 19OF 44

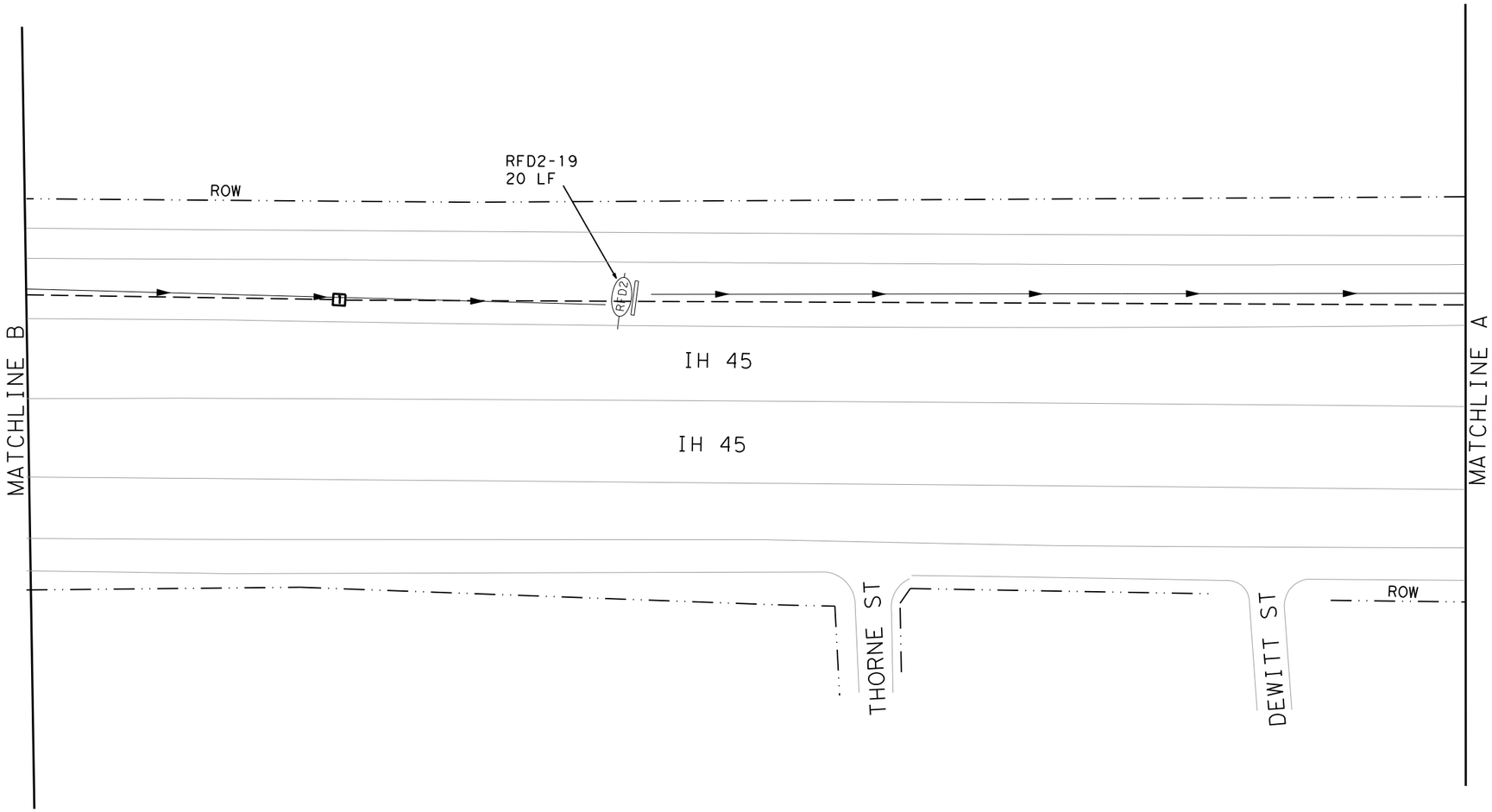
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	91
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyerout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 19.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-19		



LEGEND

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- EXISTING CONDUIT
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Eduardo Torrens Soto, P.E.

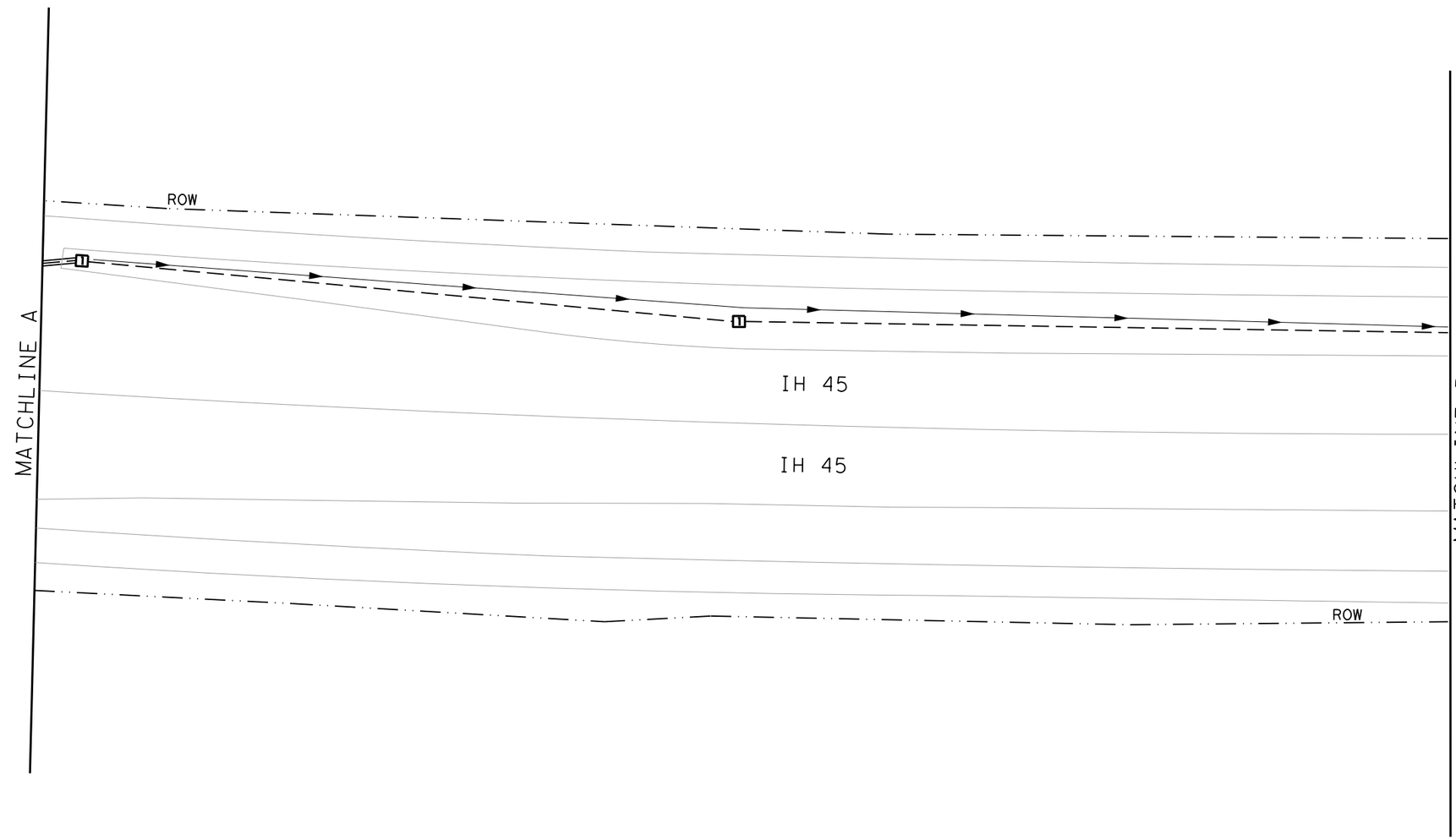
IH45 SW3P

LAYOUT

SCALE: 1"=100' SHEET 20 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45, ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS, ETC.	92
	CONTROL	SECTION	JOB	
	0092	02	137, ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 20.dgn



LEGEND

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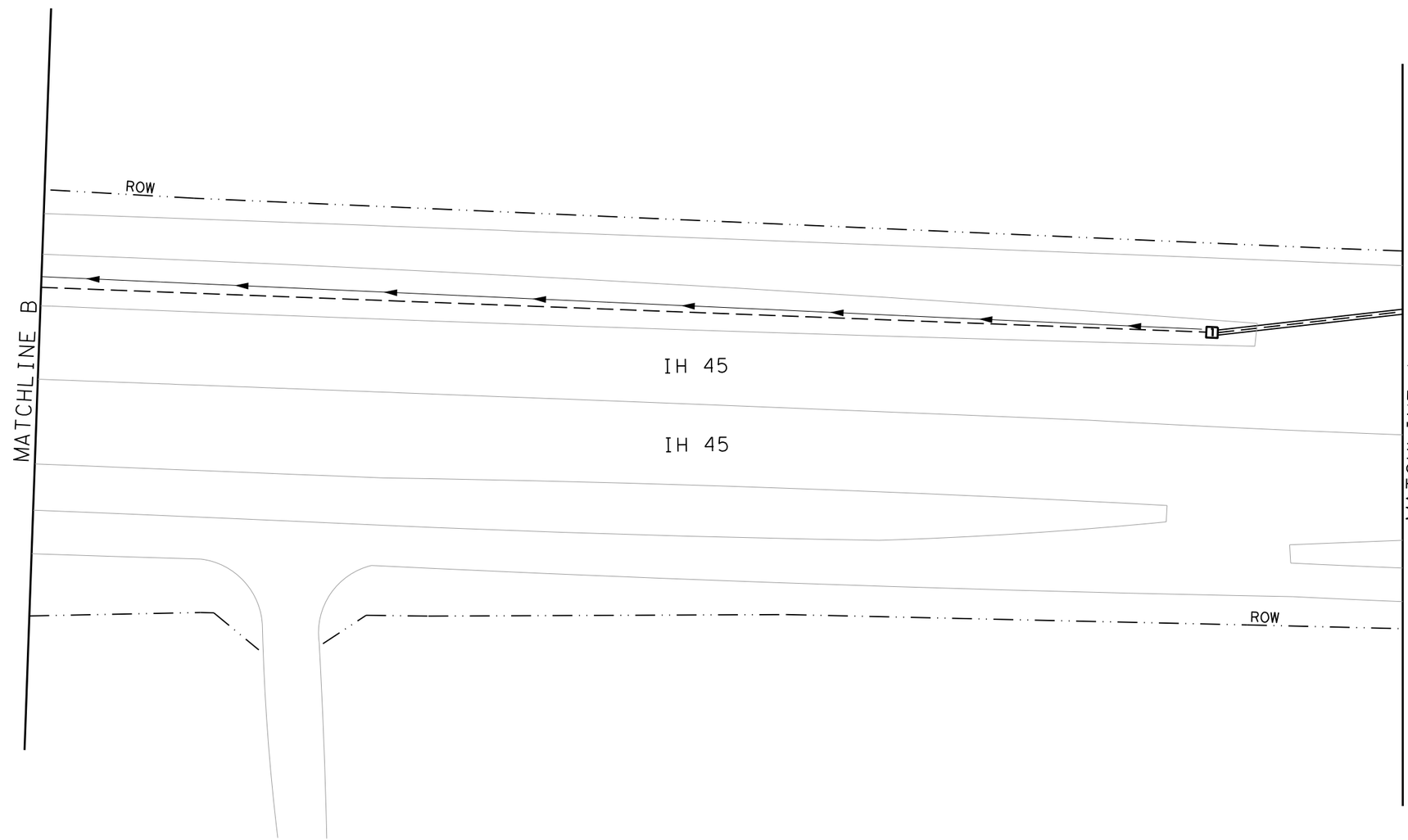
IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 21 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	93
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyerout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 21.dgn



LEGEND

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 22 OF 44

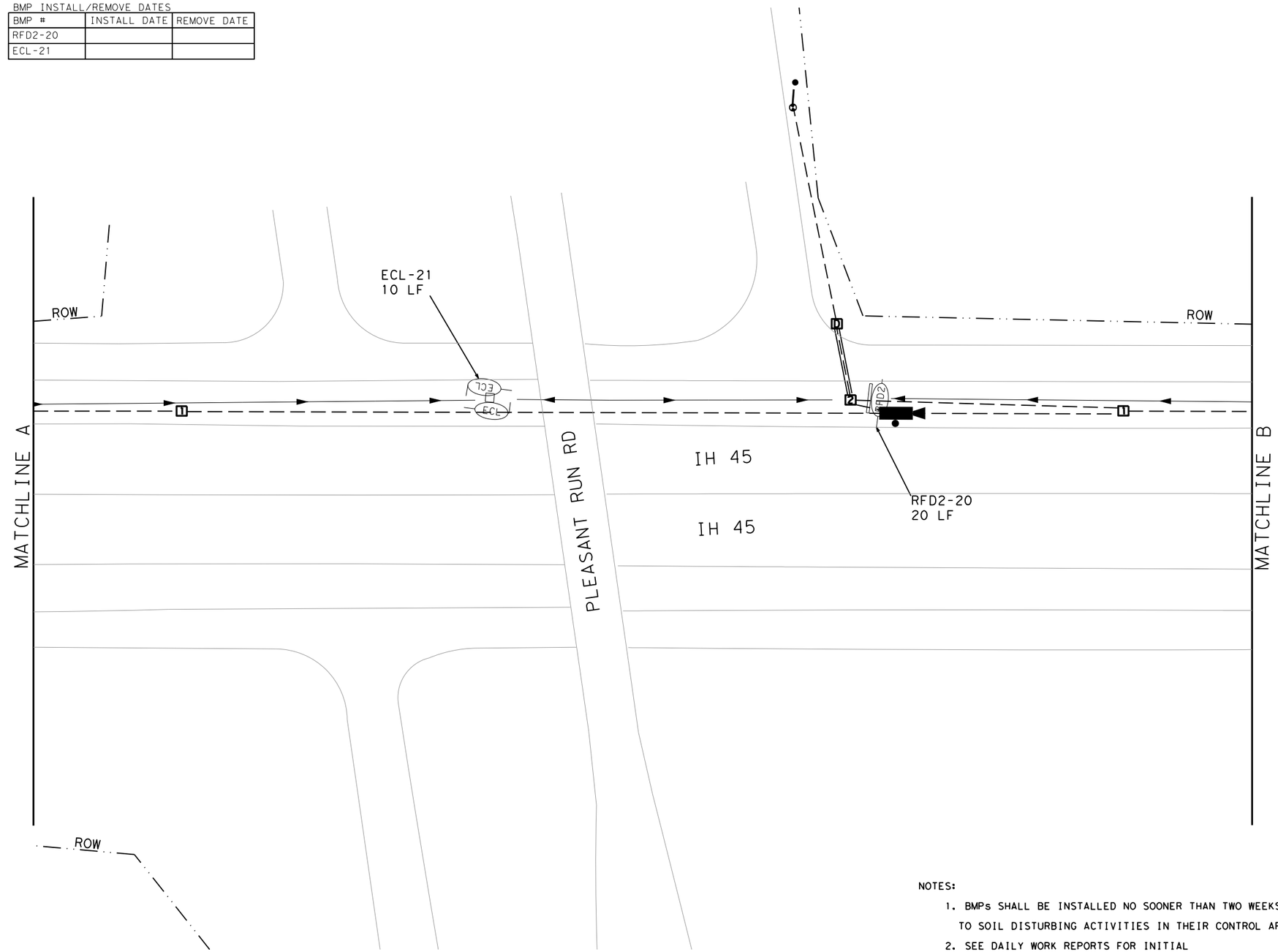
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	94
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 22.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-20		
ECL-21		



LEGEND

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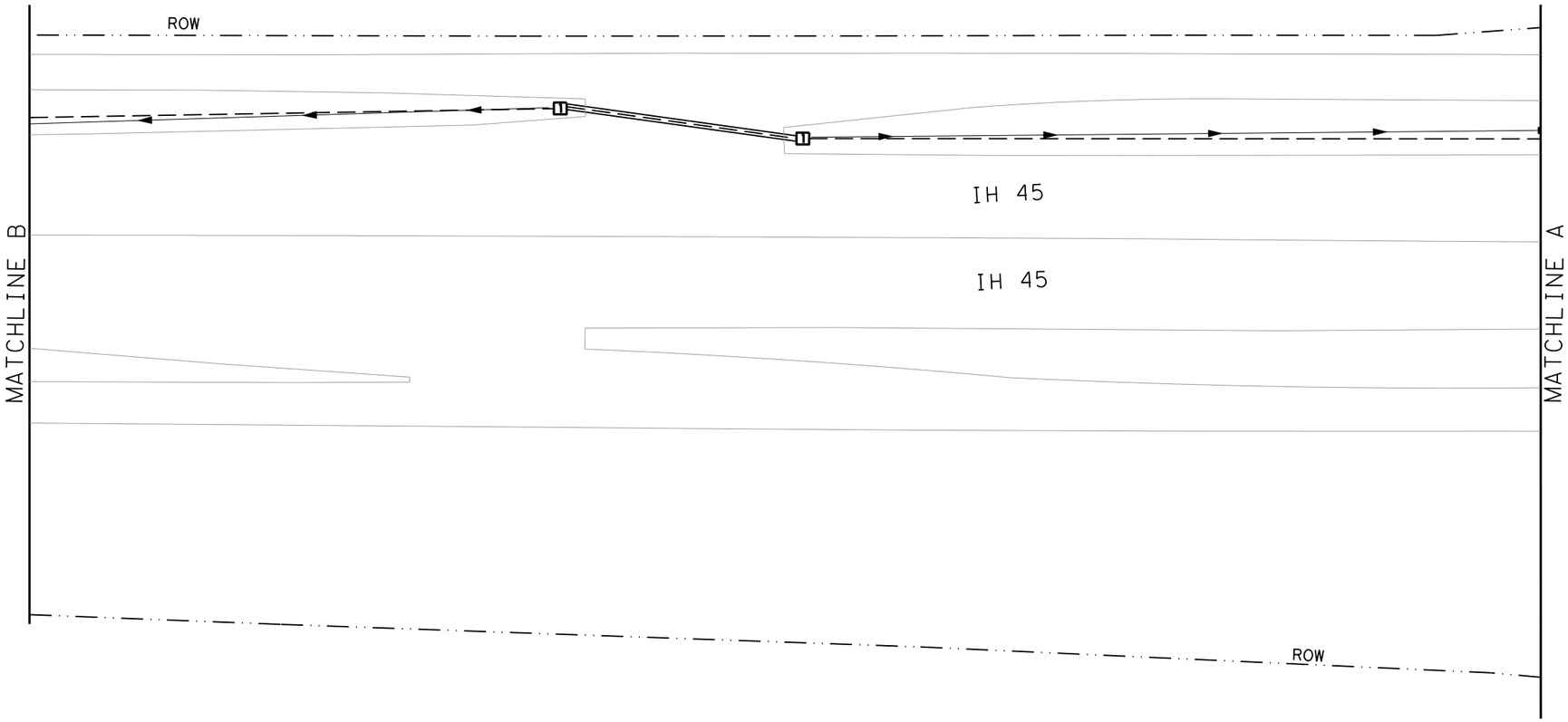
IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 23 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	95
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 23.dgn



LEGEND

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 24 OF 44

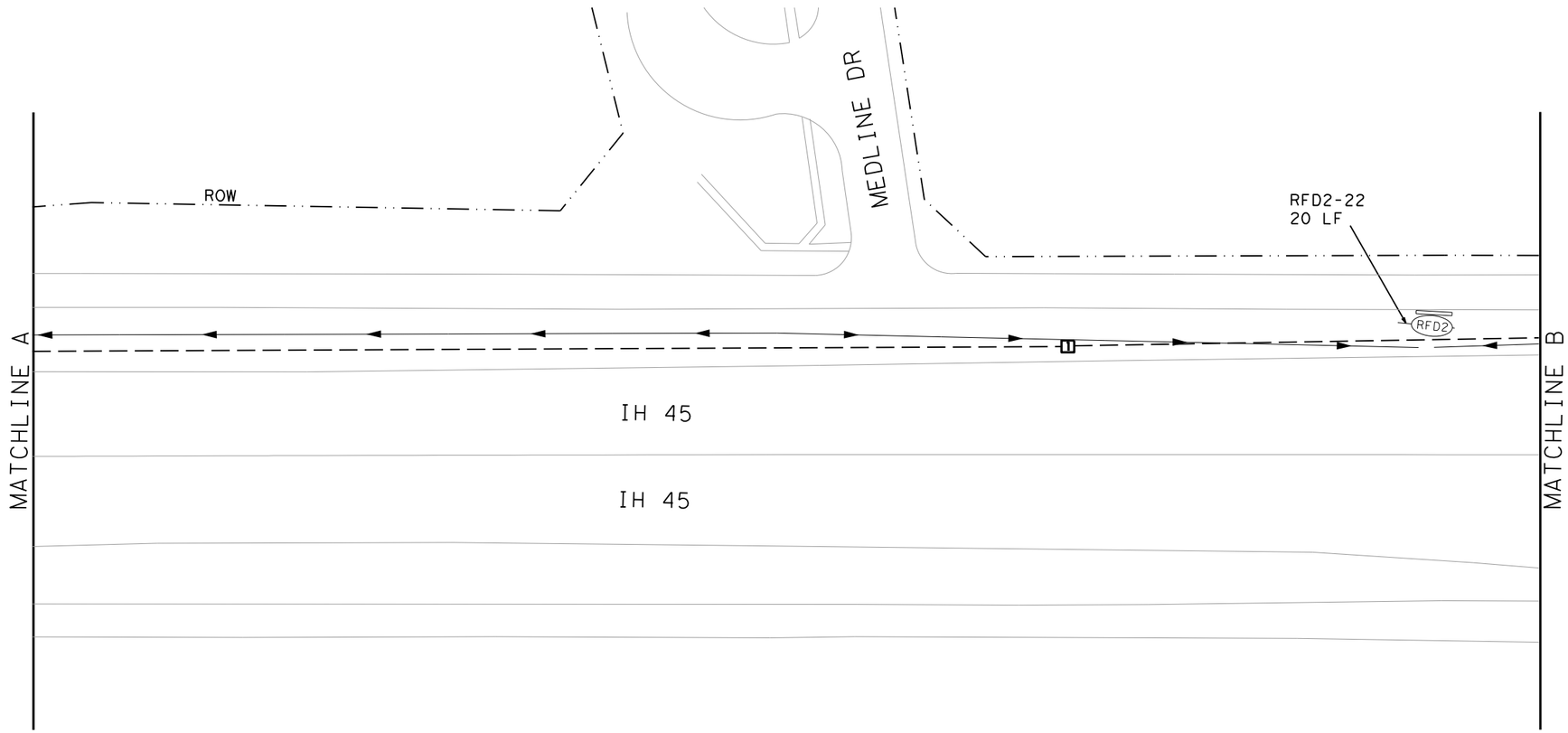
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	96
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyegrout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 24.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-22		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

NOTES:

1. BMPs SHALL BE INSTALLED NO SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREAS.
2. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
3. EXISTING VEGETATION PRESERVED WITHIN THE RIGHT OF WAY SERVES AS AN ADDITIONAL SEDIMENTATION BMP.
4. CONTRACTOR SHALL MAINTAIN TRAFFIC SURFACES FREE OF PROJECT SEDIMENTATION AND LOOSE MATERIALS.

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Eduardo Torrens Soto, P.E.
Date

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 25 OF 44

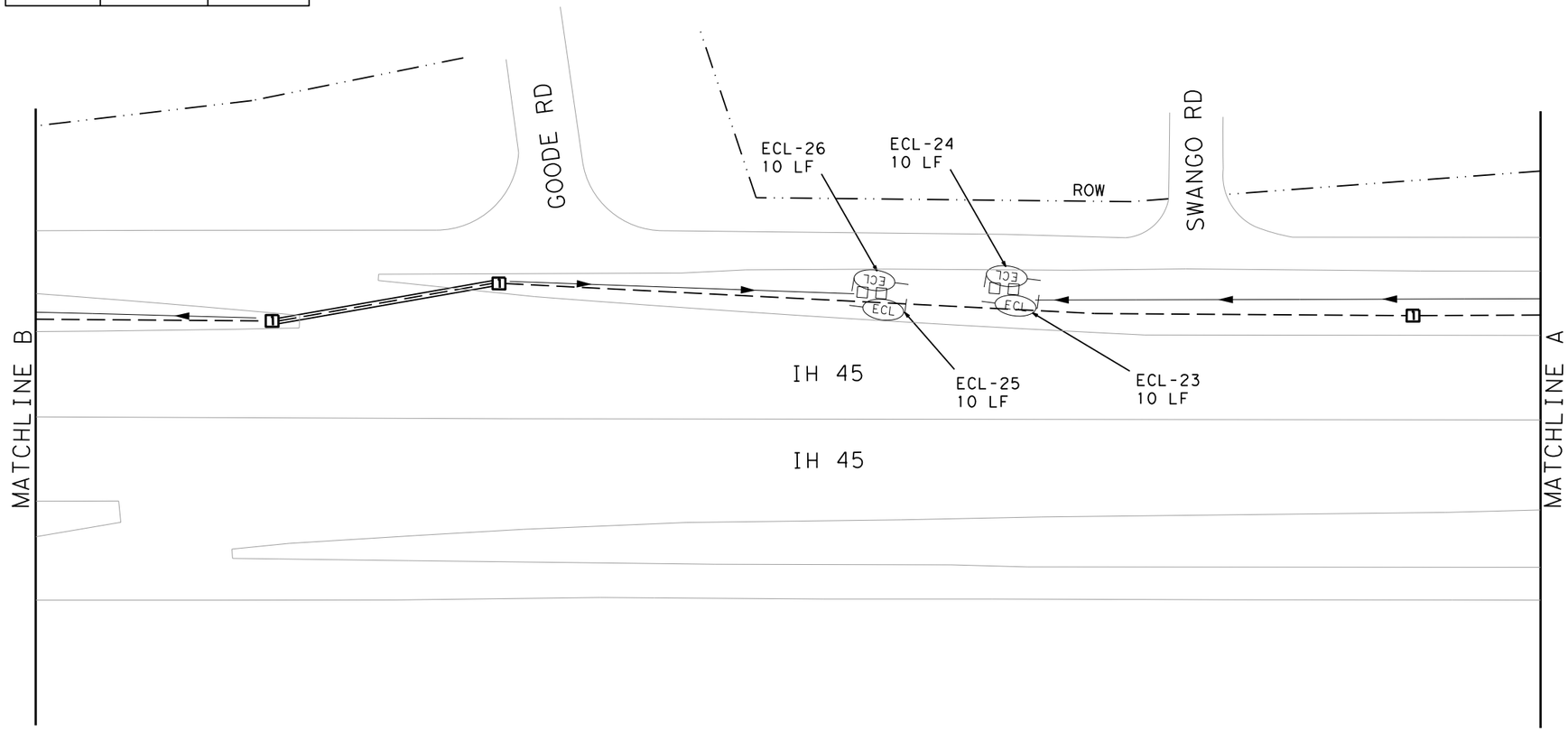
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	97
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 25.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-23		
ECL-24		
ECL-25		
ECL-26		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- (ECL) EROSION CONTROL LOG
- (RFD2) ROCK FILTER DAM (TY 2)
- (RFD3) ROCK FILTER DAM (TY 3)
- (SCF) SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

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STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

Texas Department of Transportation

IH45 SW3P

LAYOUT

SCALE: 1"=100' SHEET 26 OF 44

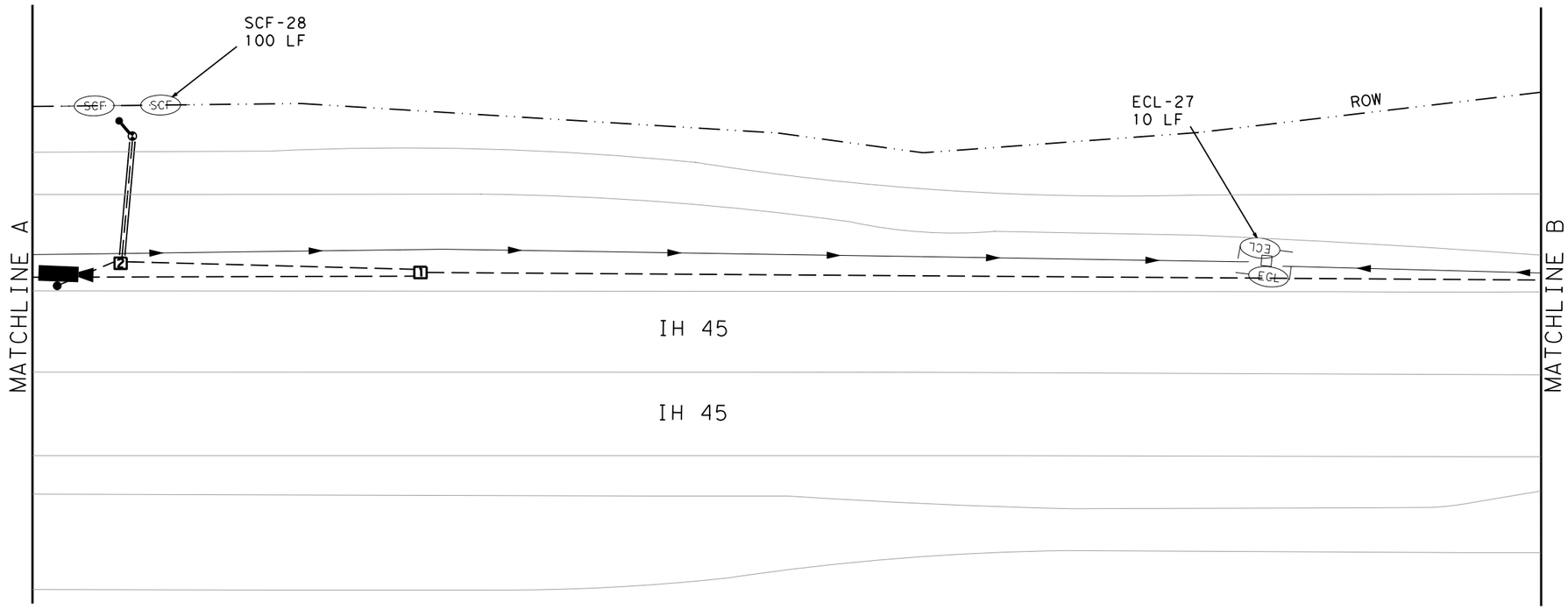
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	98
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyerout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 26.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-27		
SCF-28		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

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STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 27 OF 44

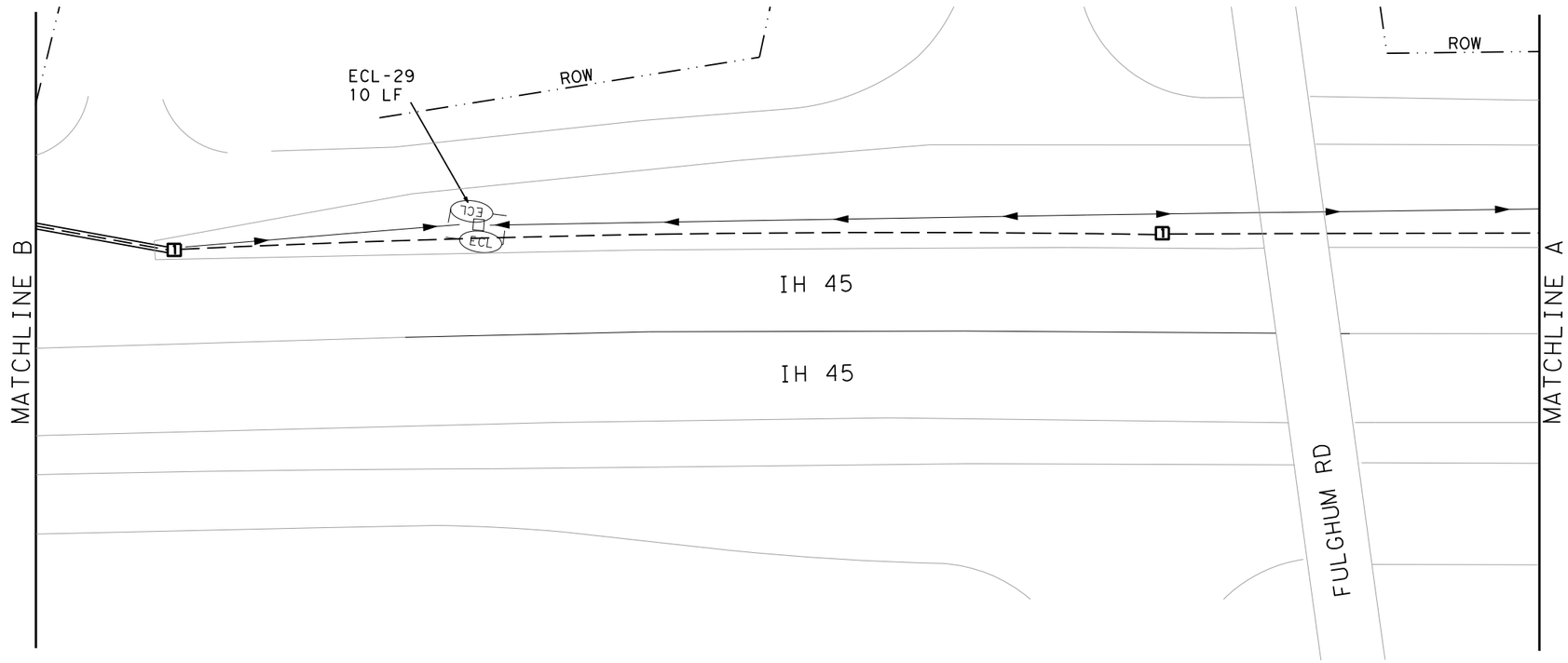
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	99
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 27.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-29		



NOTES:

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LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
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IH45 SW3P

LAYOUT

SCALE: 1"=100' SHEET 28 OF 44

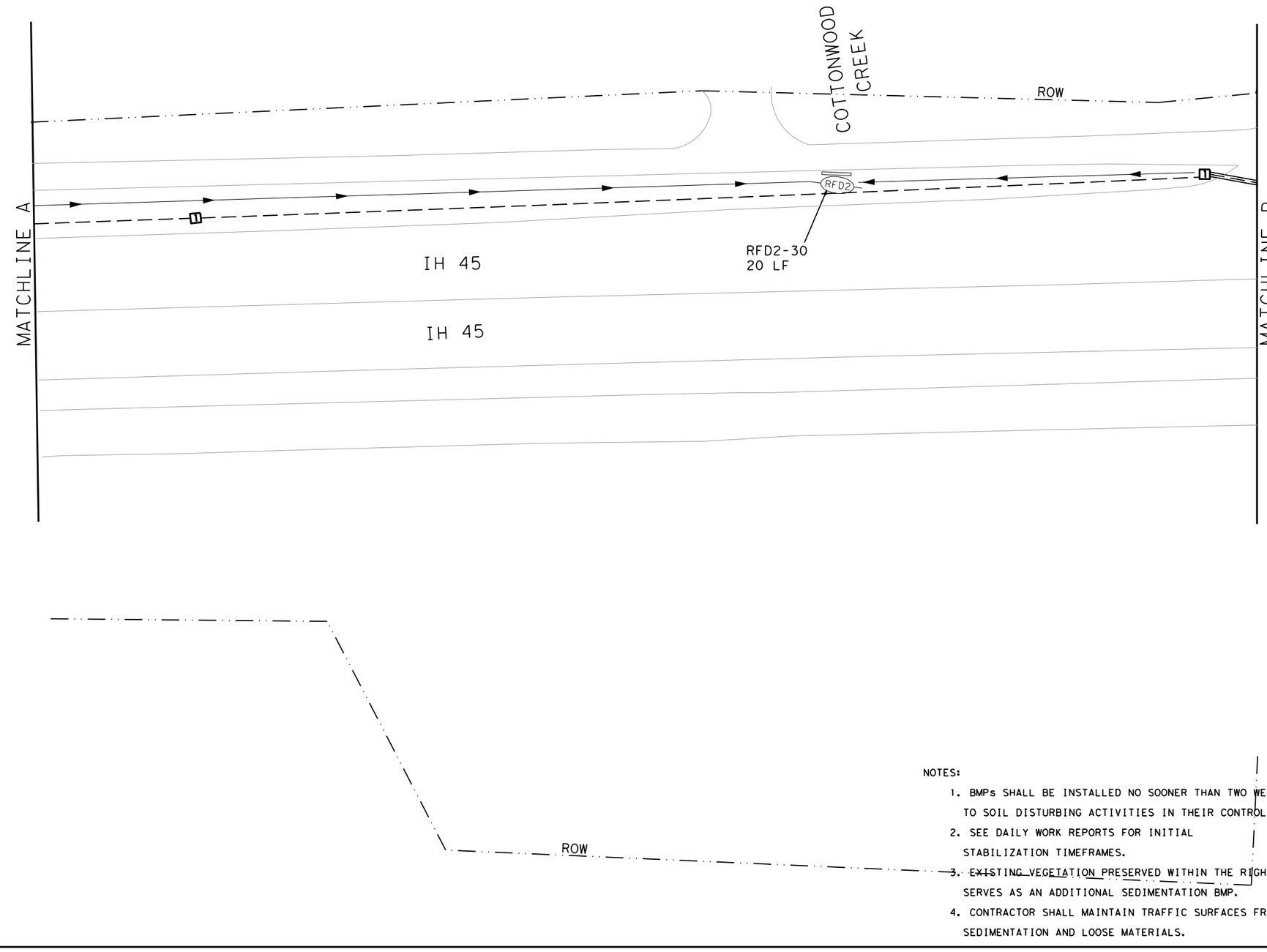
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	100
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 28.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-30		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
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- FLOW ARROWS

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Eduardo Torrens Soto, P.E. 2/3/2023
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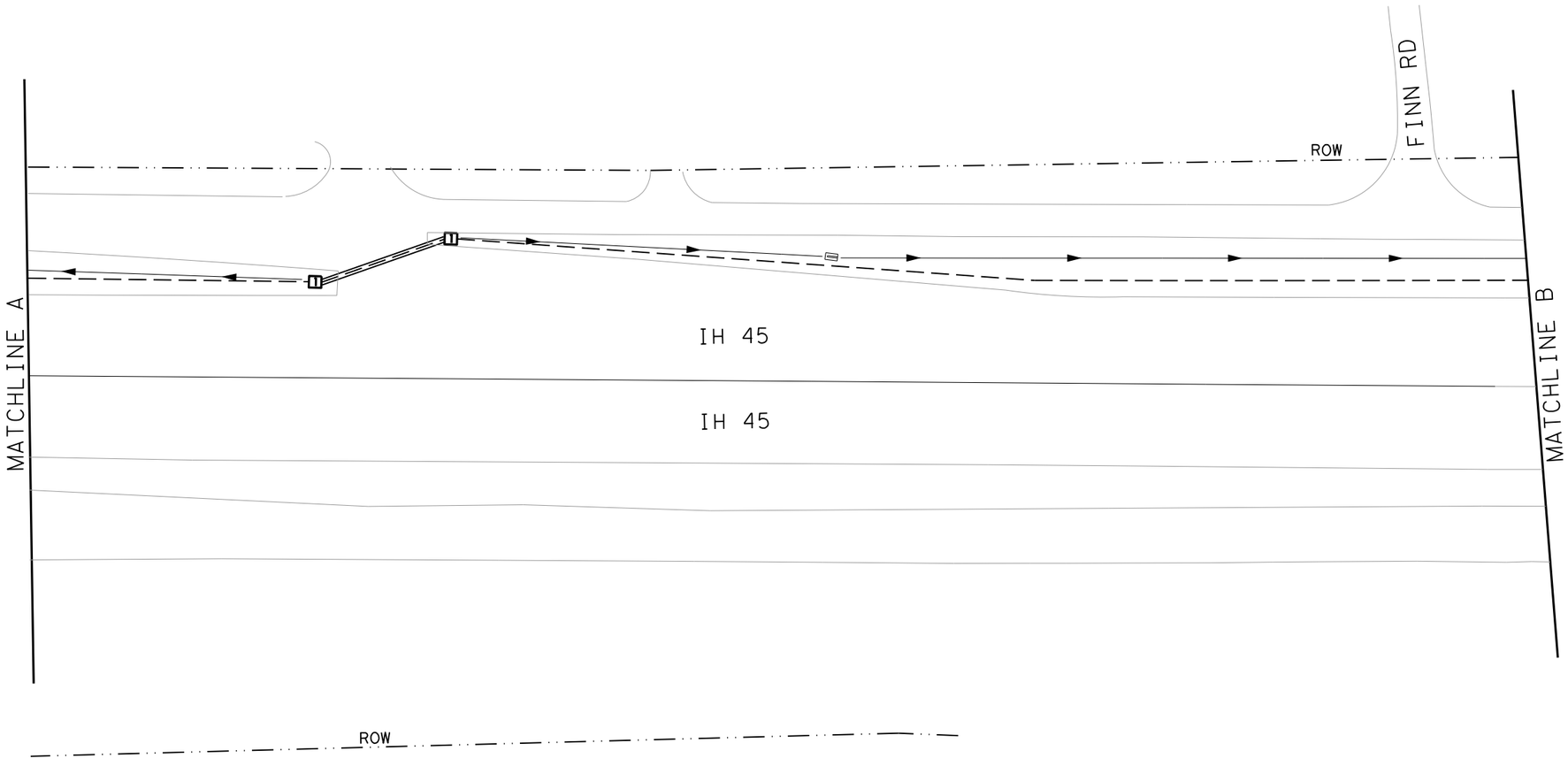
Date

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 29 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C1$	TEXAS	18	DALLAS,ETC.	101
	CONTROL	SECTION	JOB	
CHECK $C2$	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 29.dgn



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
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- COMPOST AND PERM SOD
- FLOW ARROWS

STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 2/3/2023
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Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 30 OF 44

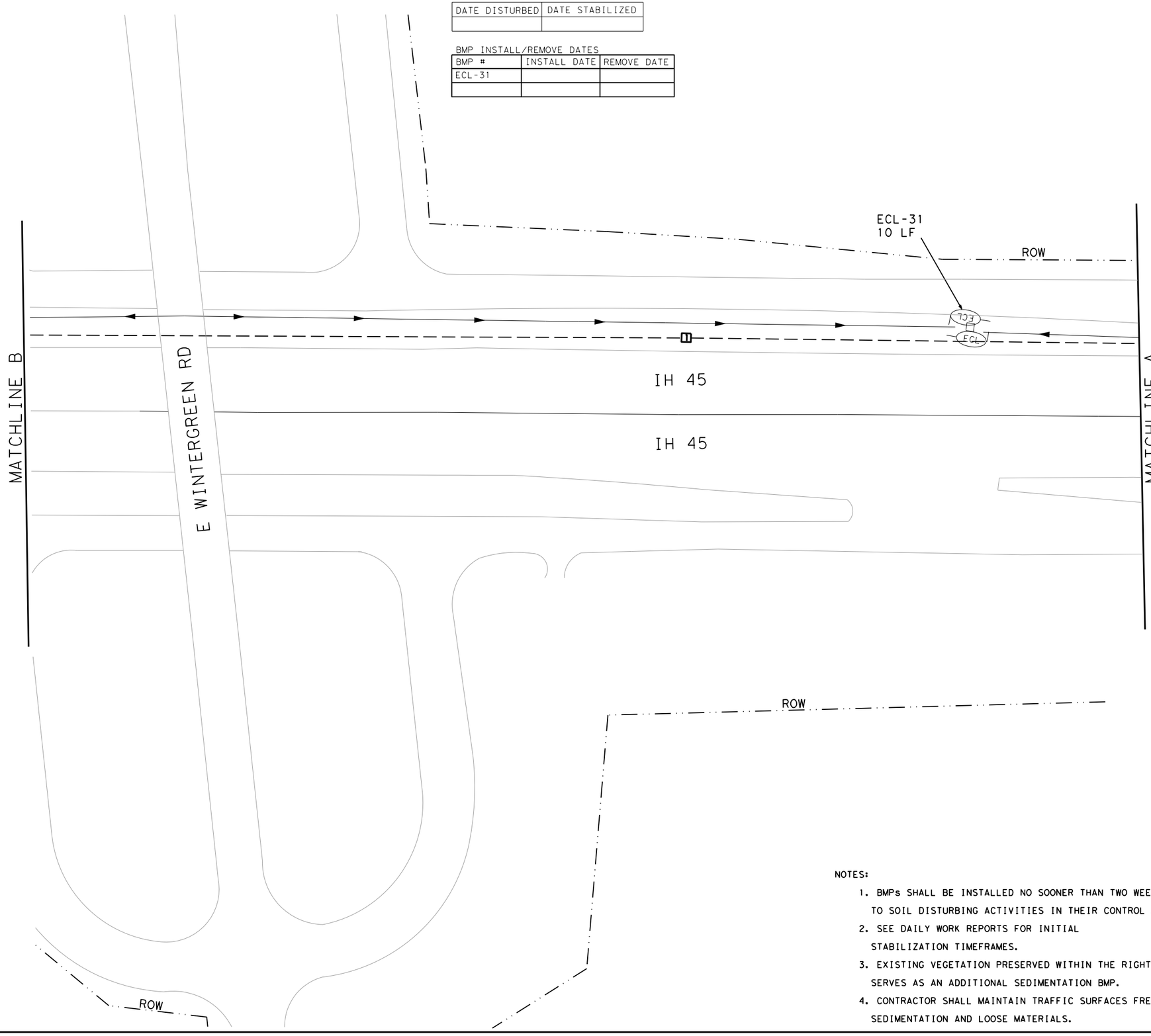
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	102
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 30.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-31		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- (ECL) EROSION CONTROL LOG
- (RFD2) ROCK FILTER DAM (TY 2)
- (RFD3) ROCK FILTER DAM (TY 3)
- (SCF) SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

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STATE OF TEXAS
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Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 31 OF 44

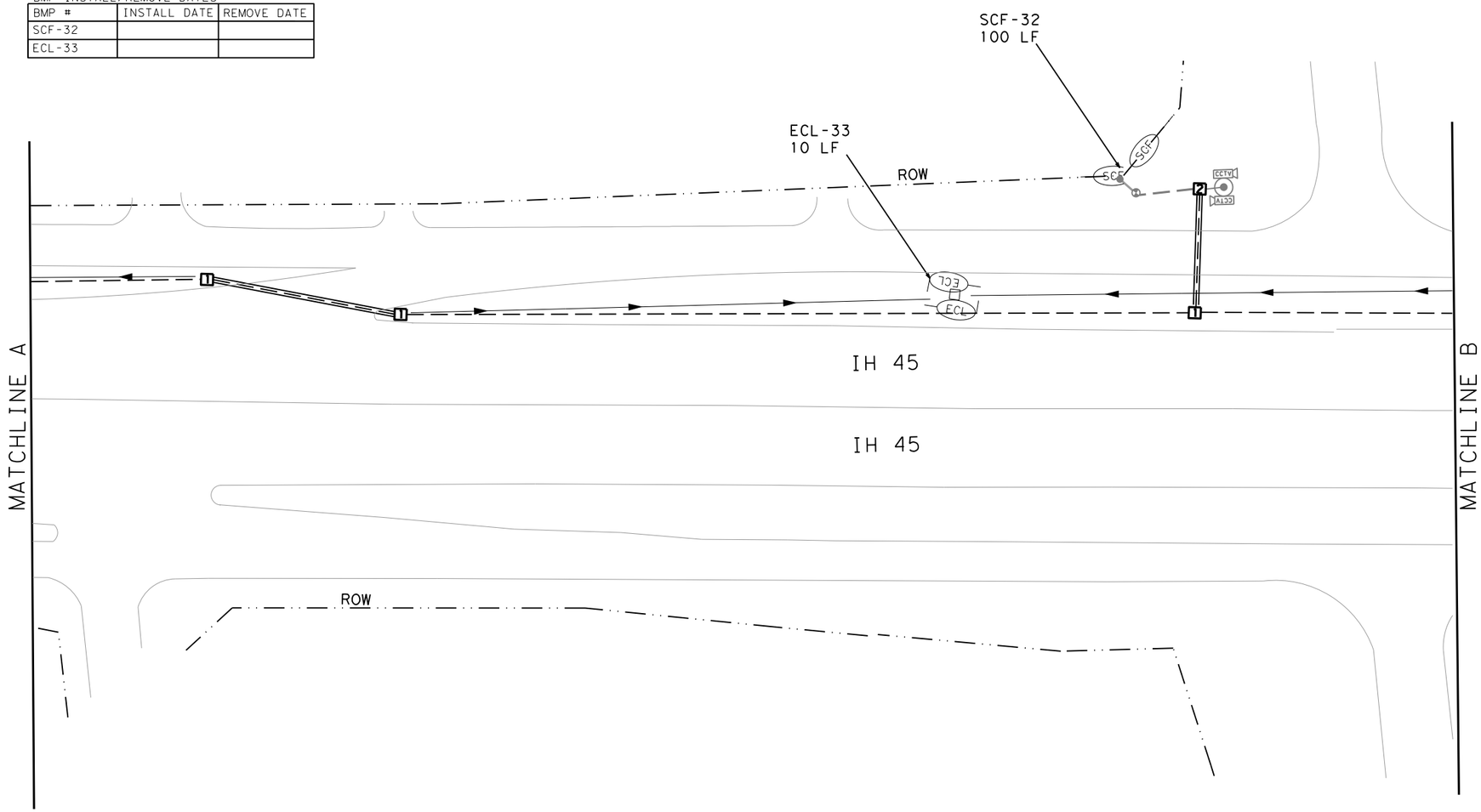
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	103
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 31.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
SCF-32		
ECL-33		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- (ECL) EROSION CONTROL LOG
- (RFD2) ROCK FILTER DAM (TY 2)
- (RFD3) ROCK FILTER DAM (TY 3)
- (SCF) SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

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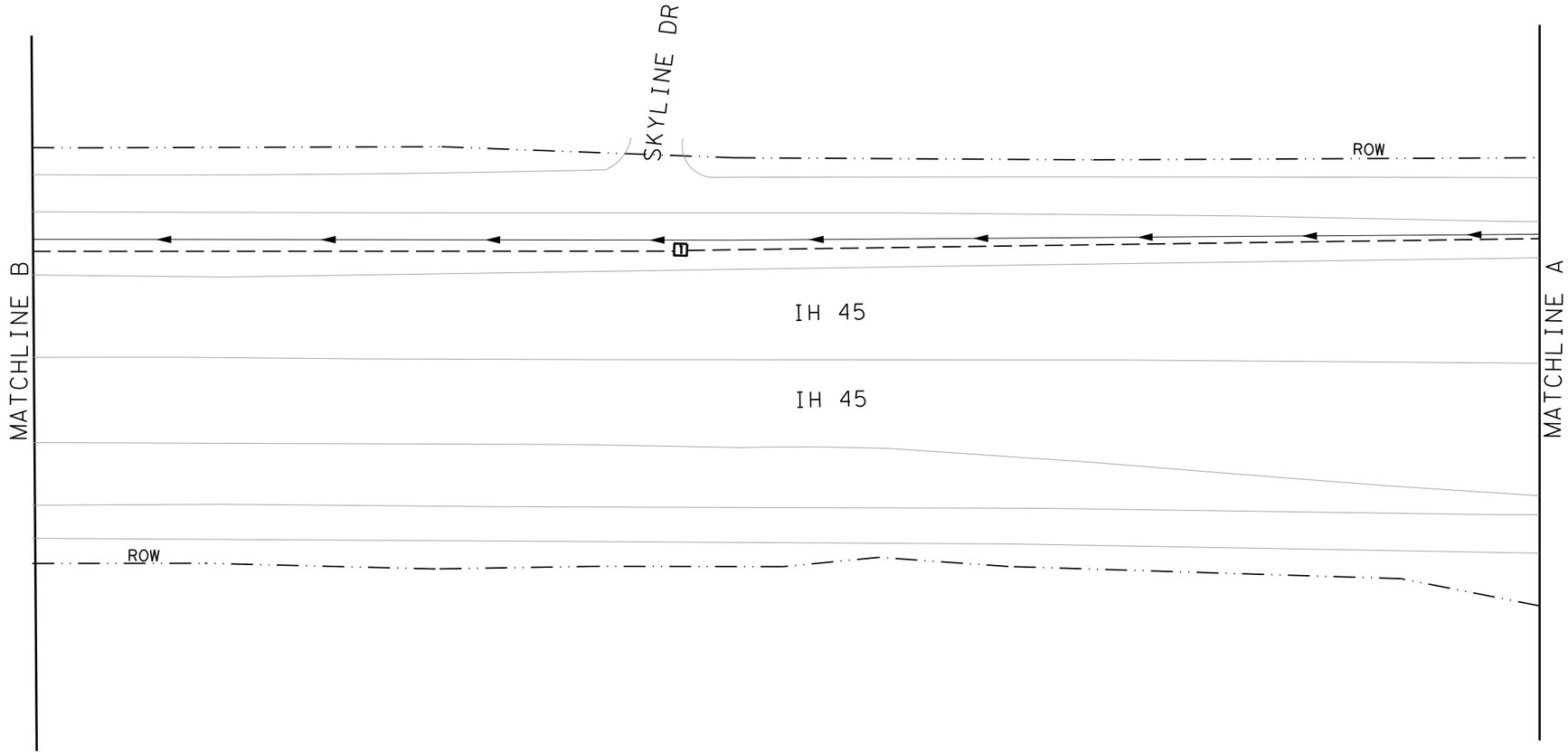
Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 32 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	104
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyerout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 32.dgn



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
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- COMPOST AND PERM SOD
- FLOW ARROWS

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
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Eduardo Torrens Soto, P.E. 2/3/2023
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Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 33 OF 44

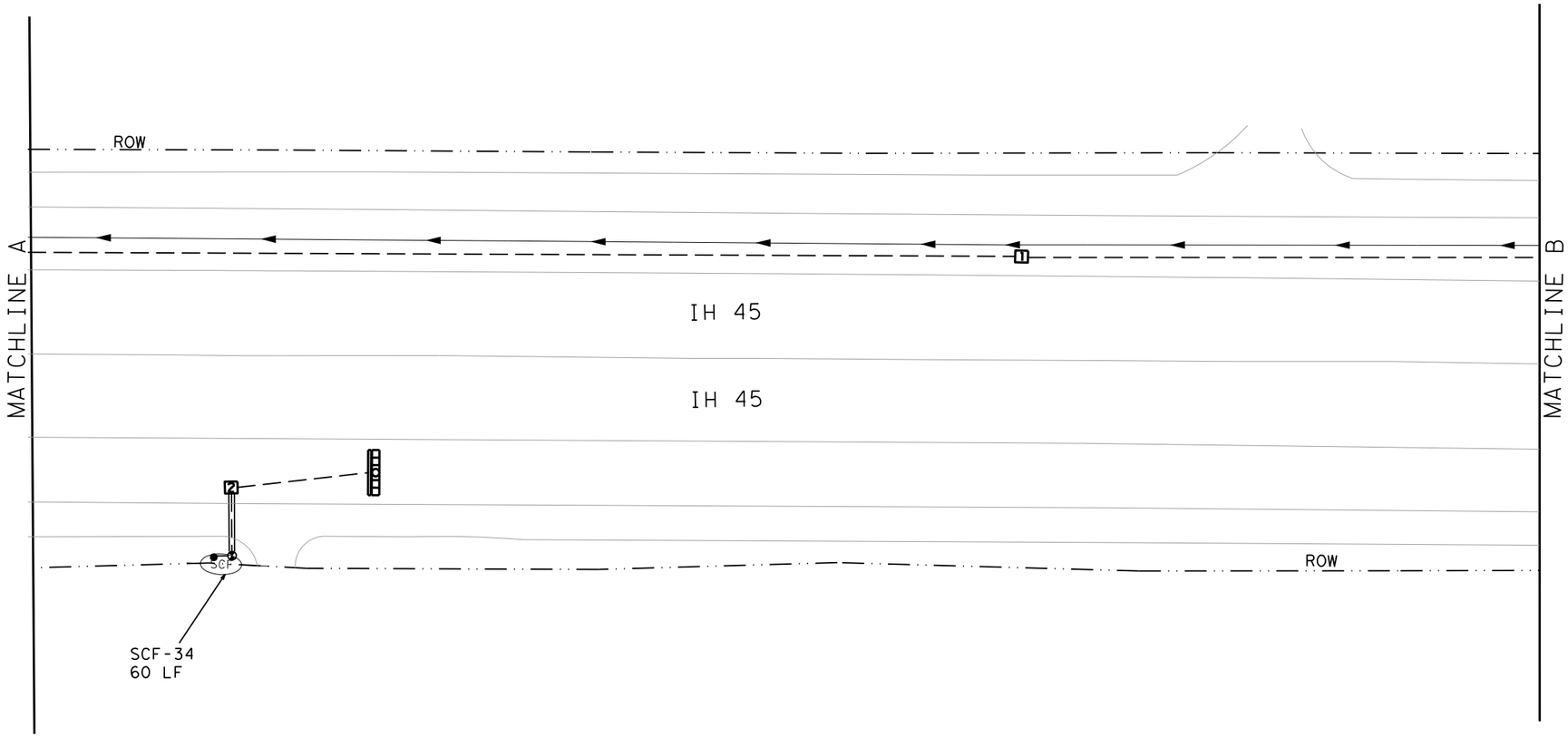
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	105
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 33.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
SCF-34		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
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- FLOW ARROWS

STATE OF TEXAS
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Eduardo Torrens Soto, P.E.

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 34 OF 44

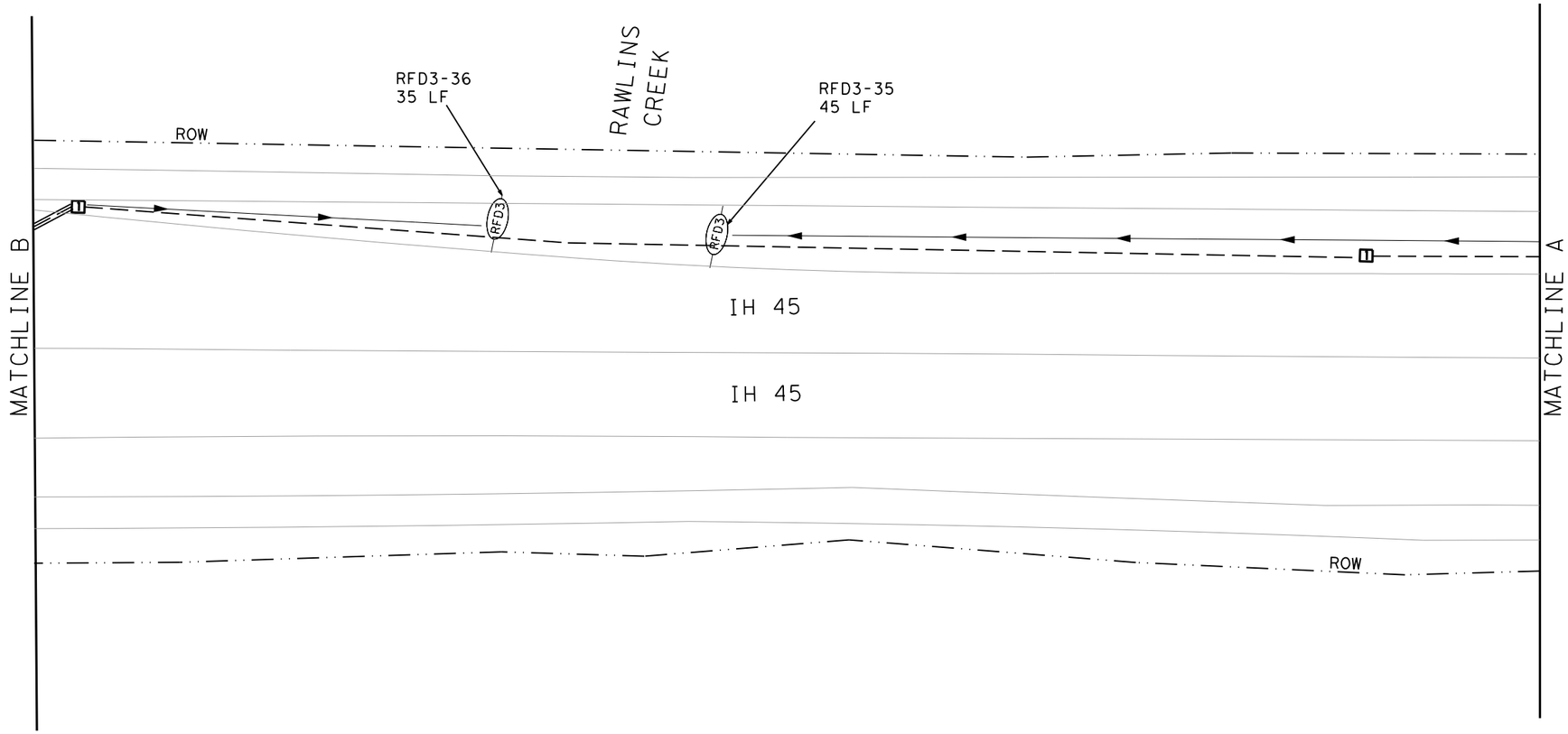
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	106
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 34.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD3-35		
RFD3-36		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
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- COMPOST AND PERM SOD
- FLOW ARROWS

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Date

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 35 OF 44

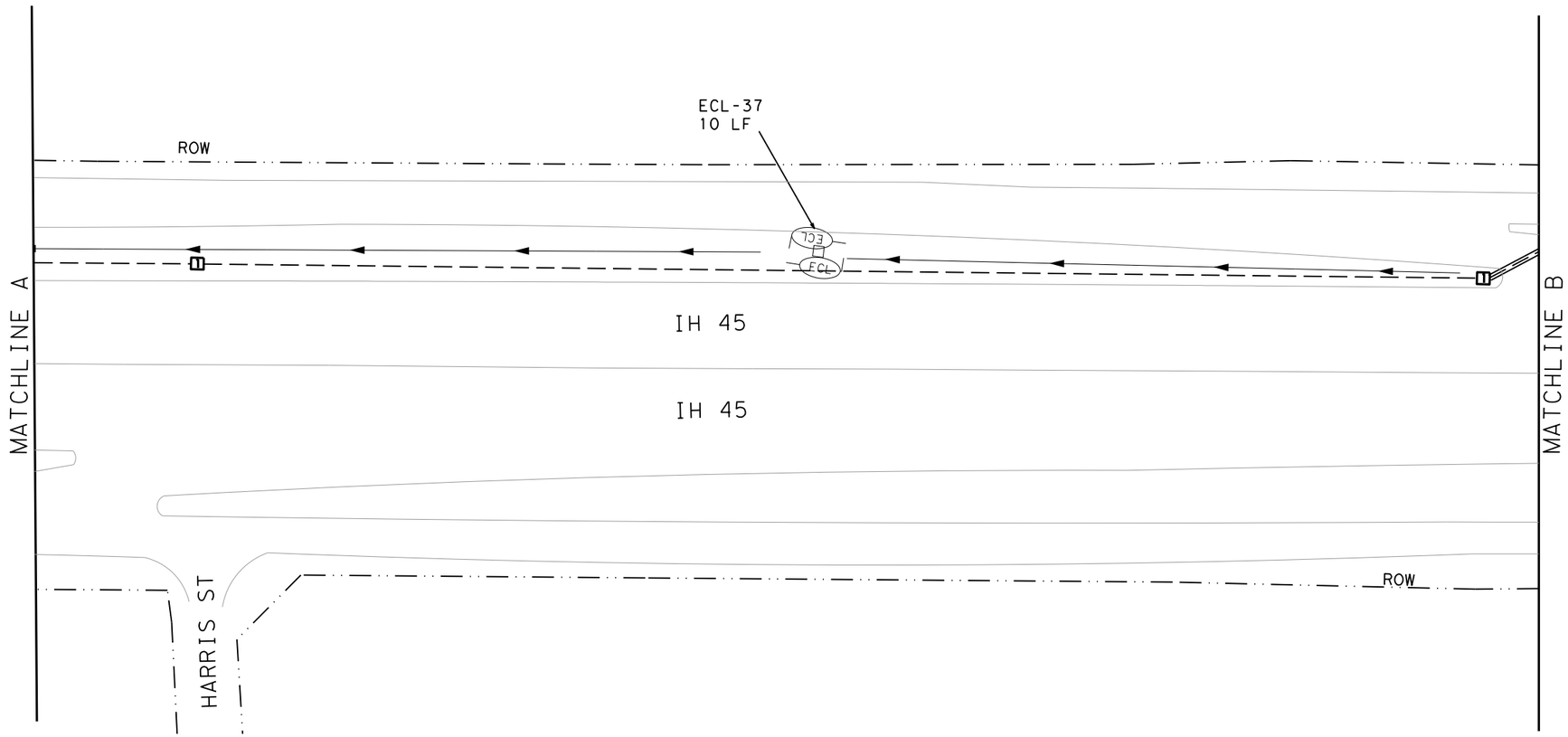
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	107
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 35.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
ECL-37		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

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IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 36 OF 44

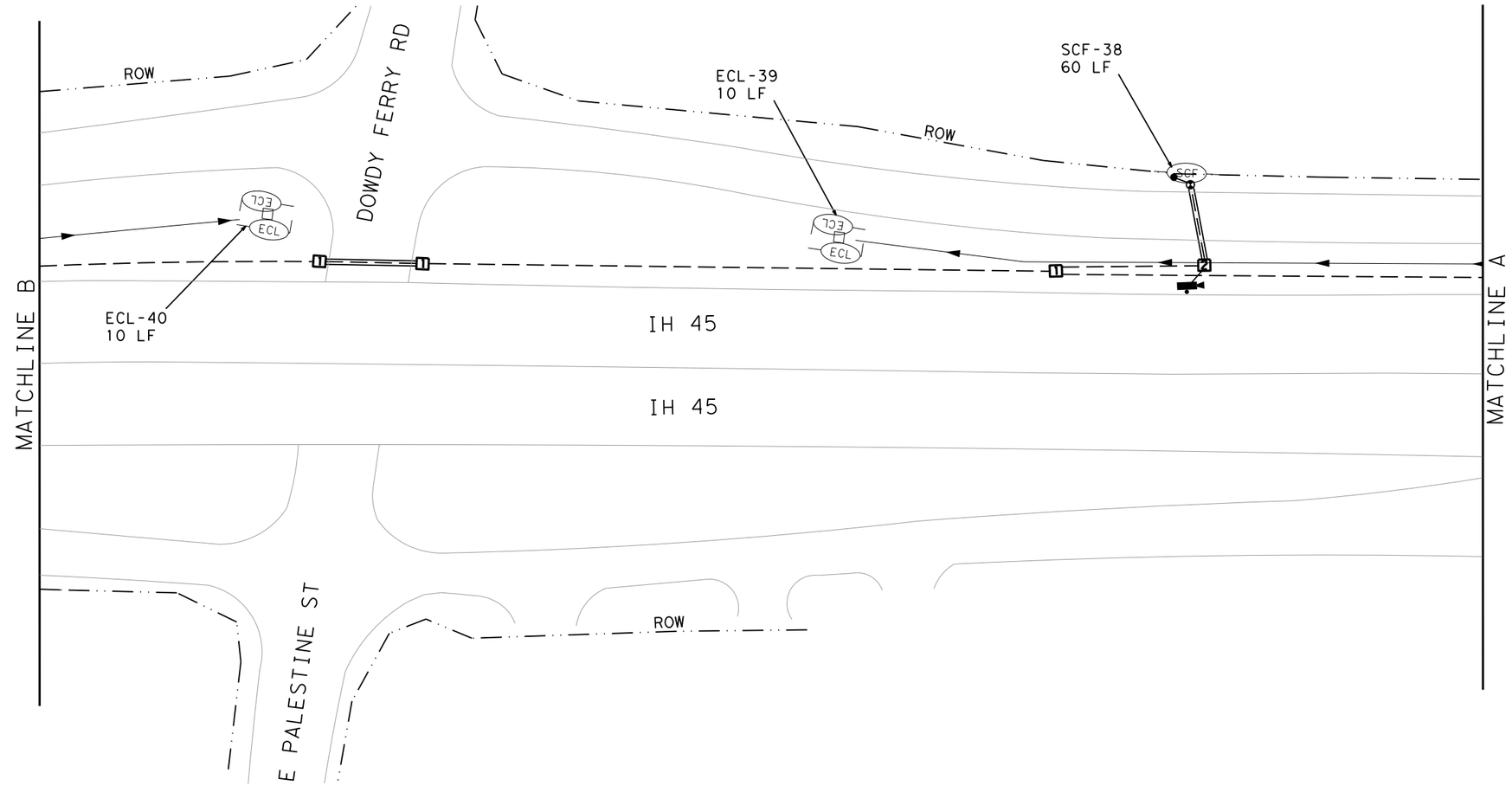
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	108
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 36.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
SCF-38		
ECL-39		
ECL-40		



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- SCF — SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

NOTES:

1. BMPs SHALL BE INSTALLED NO SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREAS.
2. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
3. EXISTING VEGETATION PRESERVED WITHIN THE RIGHT OF WAY SERVES AS AN ADDITIONAL SEDIMENTATION BMP.
4. CONTRACTOR SHALL MAINTAIN TRAFFIC SURFACES FREE OF PROJECT SEDIMENTATION AND LOOSE MATERIALS.

STATE OF TEXAS
EDUARDO TORRENS SOTO
137051
LICENSED PROFESSIONAL ENGINEER

Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Eduardo Torrens Soto, P.E. — Date

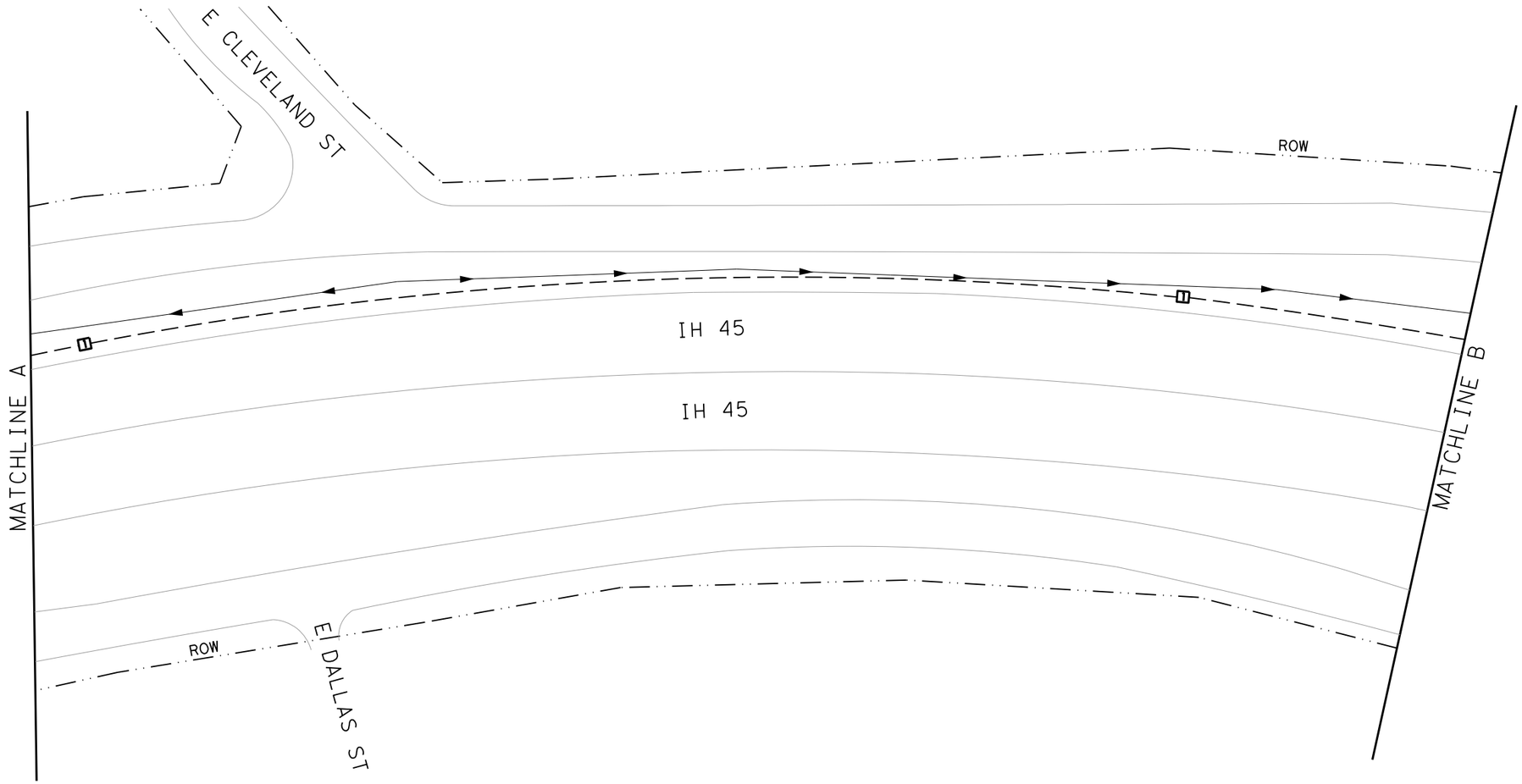
Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 37 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	109
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 37.dgn



LEGEND

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- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
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Eduardo Torrens Soto, P.E.

Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 38 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	110
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 38.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
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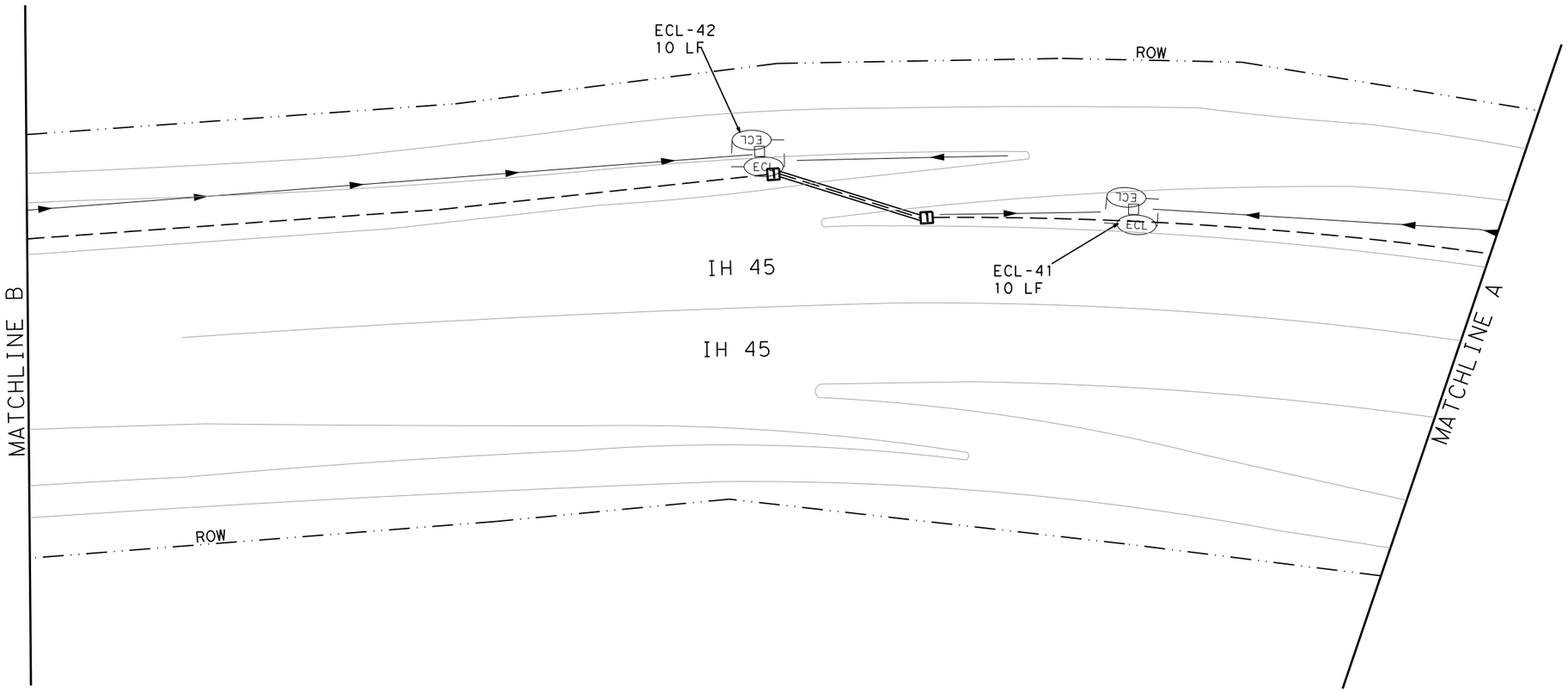
ECL-42		



LEGEND

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- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
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Eduardo Torrens Soto, P.E.

Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 39 OF 44

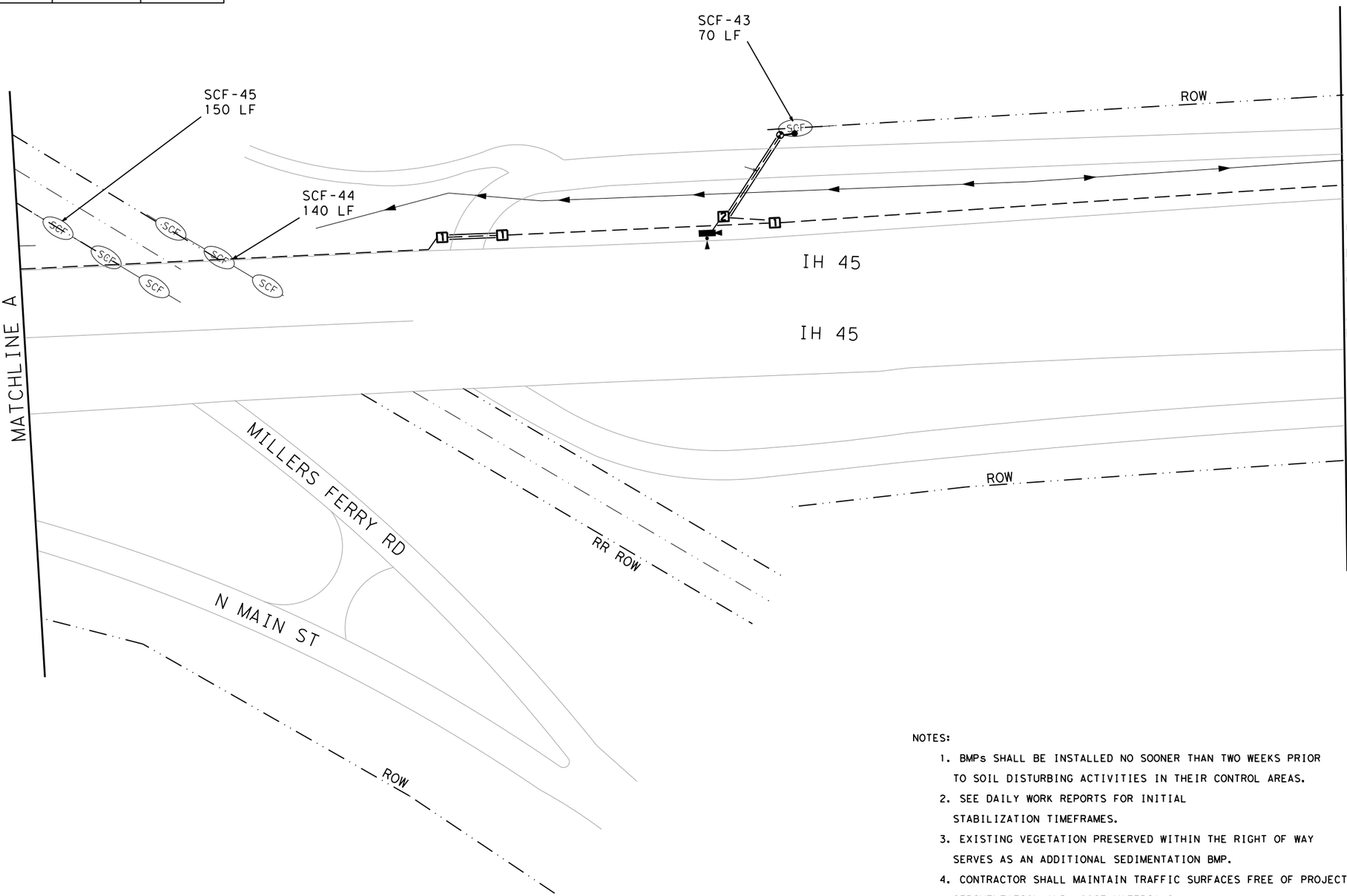
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	111
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 39.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
SCF-43		
SCF-44		
SCF-45		



LEGEND

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- EXISTING CONDUIT
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- FLOW ARROWS

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Eduardo Torrens Soto, P.E.

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 40 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	112
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
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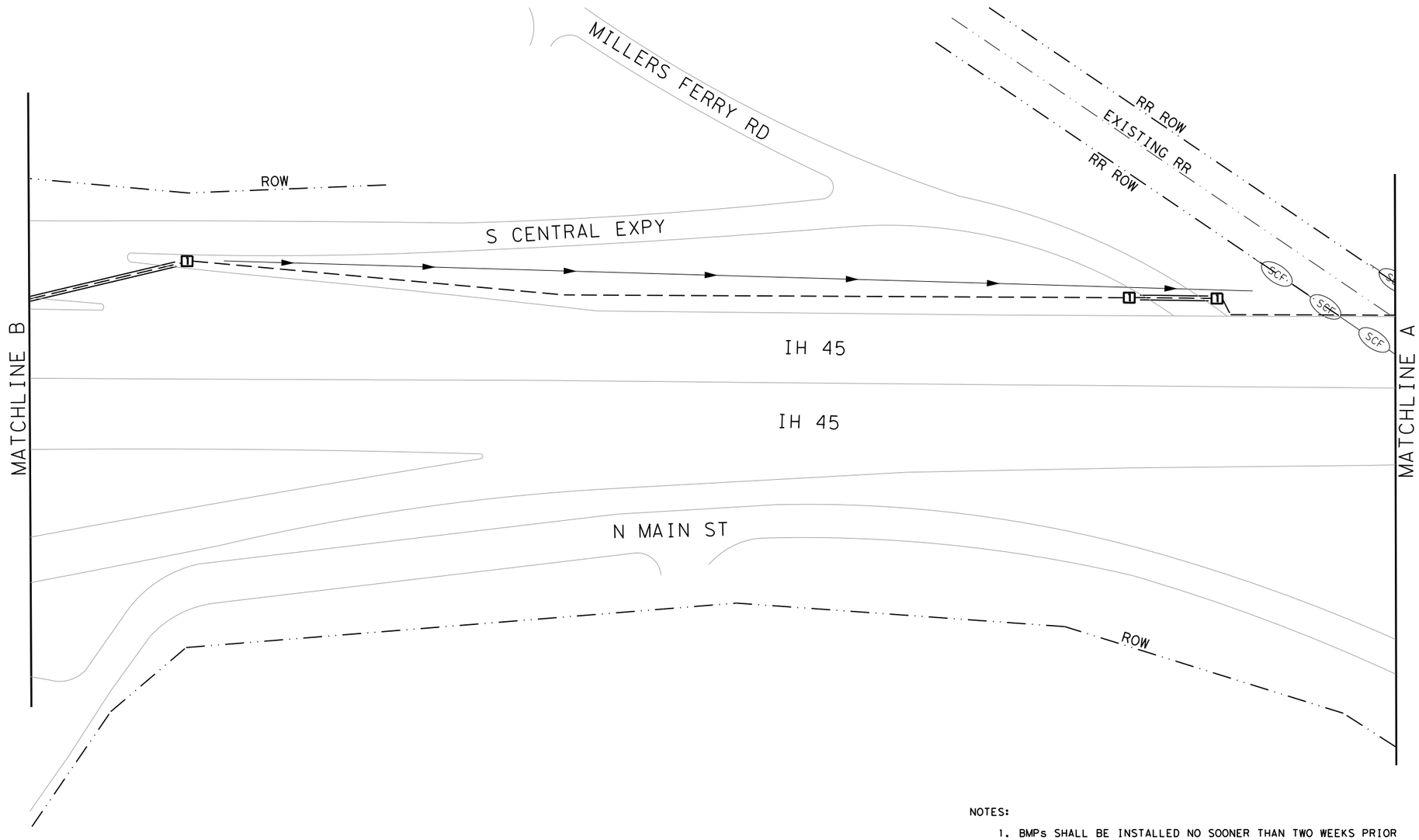

LEGEND

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- EXISTING CONDUIT
- ECL — EROSION CONTROL LOG
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Digitally signed by Date
Eduardo Torrens Soto, P.E.

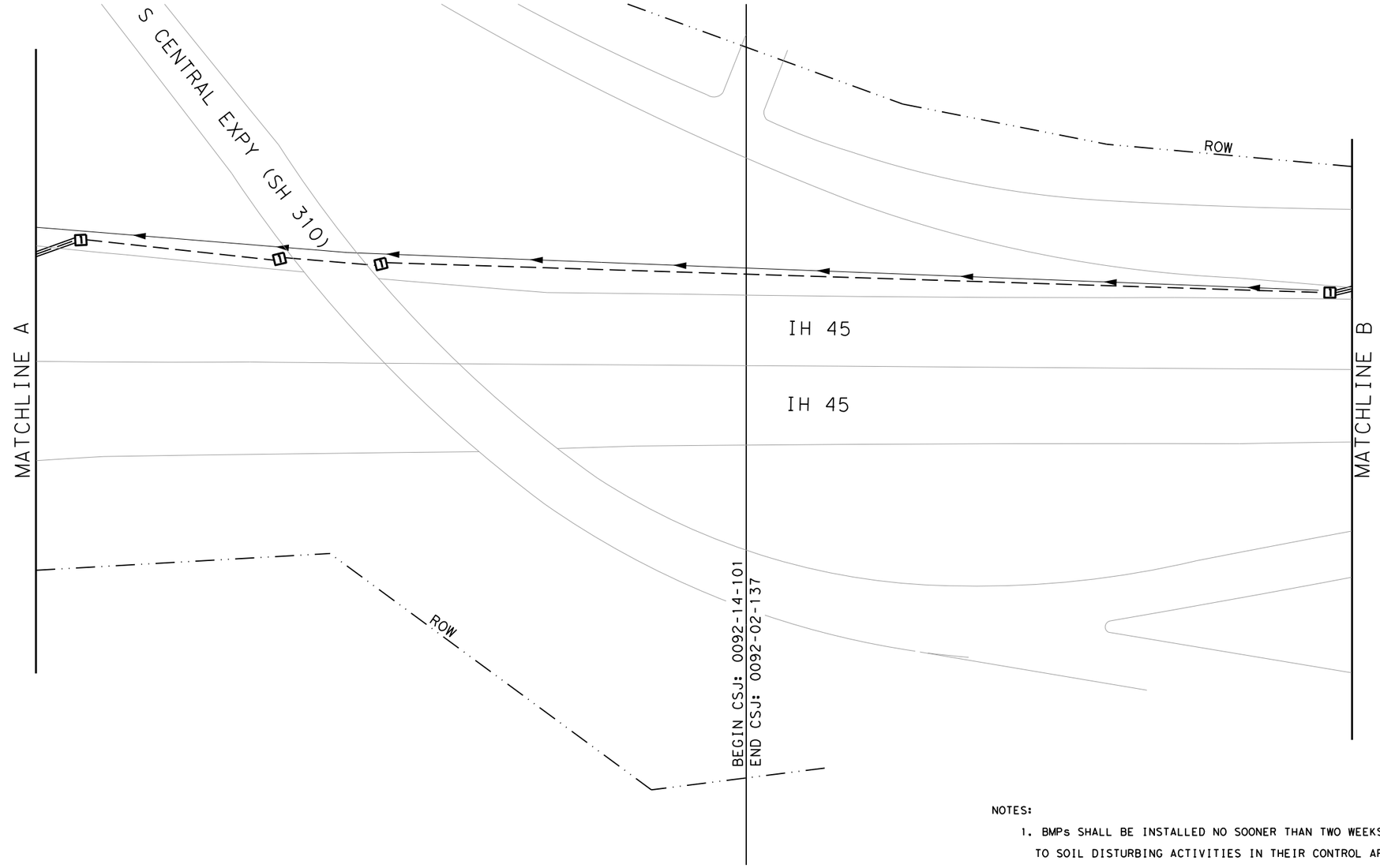
Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 41 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	113
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyarout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 41.dgn



LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- (ECL) EROSION CONTROL LOG
- (RFD2) ROCK FILTER DAM (TY 2)
- (RFD3) ROCK FILTER DAM (TY 3)
- (SCF) SEDIMENT CONTROL FENCE
- COMPOST AND PERM SOD
- FLOW ARROWS

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Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Eduardo Torrens Soto, P.E. Date

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 42 OF 44

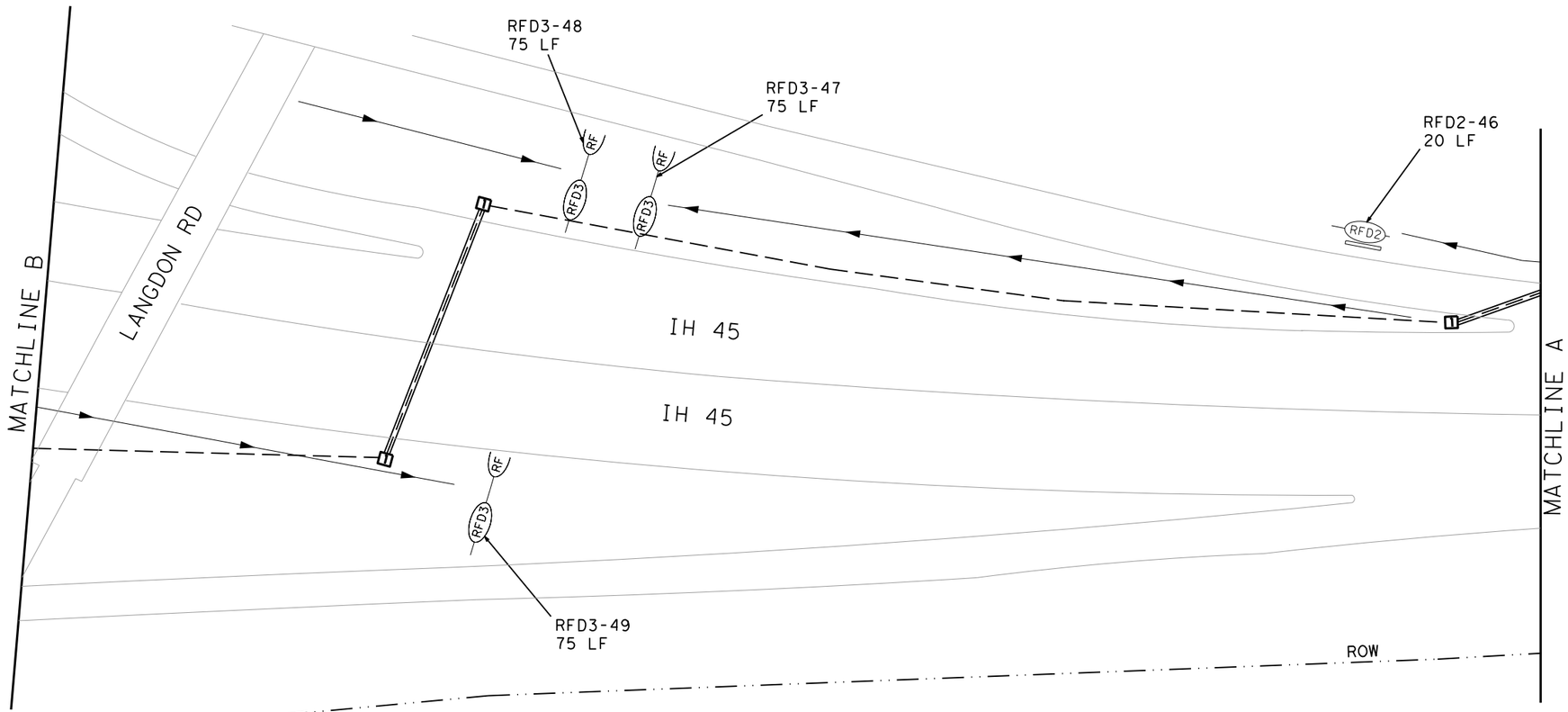
DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C2$	TEXAS	18	DALLAS,ETC.	114
	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyerout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 42.dgn

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
RFD2-46		
RFD3-47		
RFD3-48		
RFD3-49		



LEGEND

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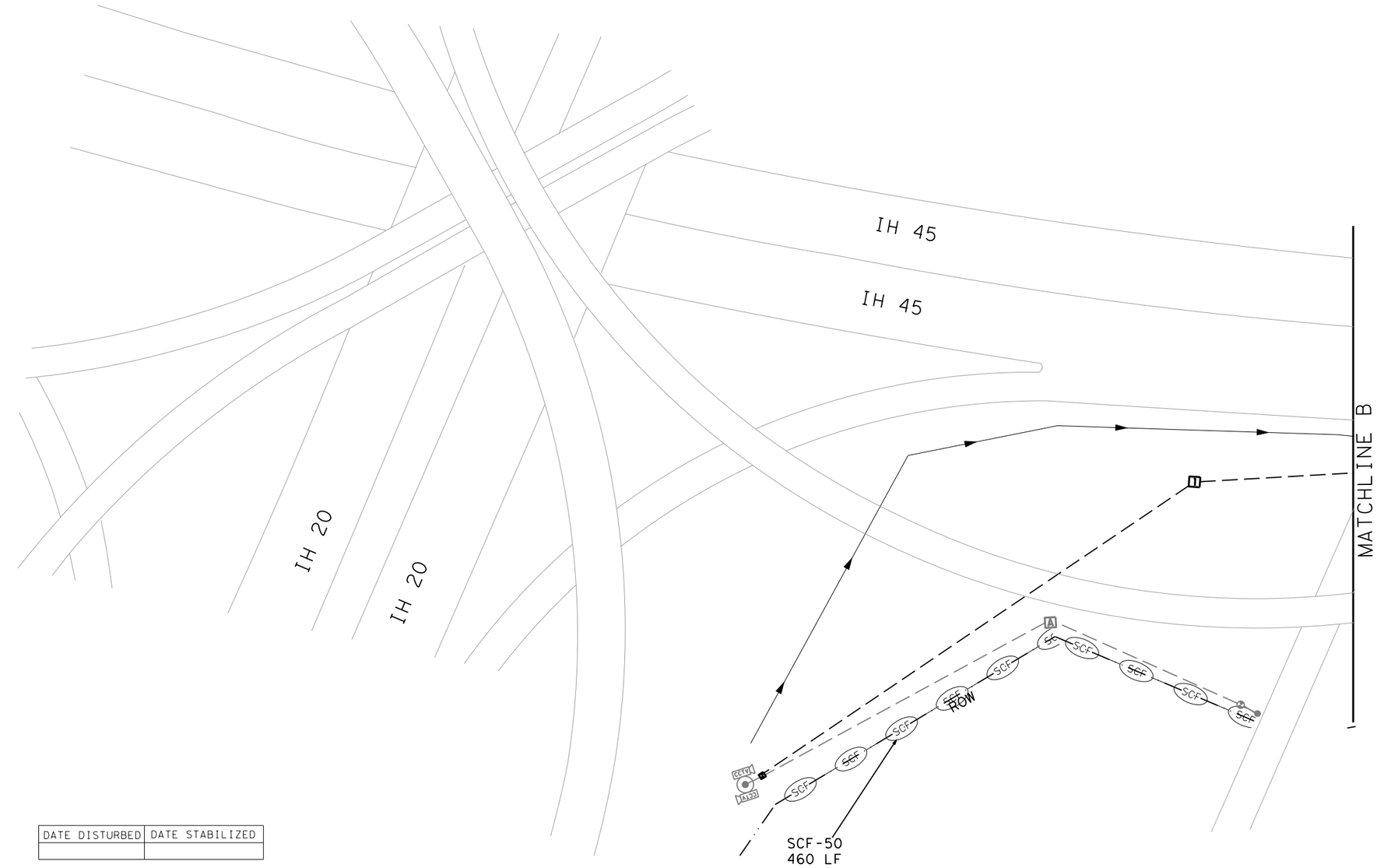
Texas Department of Transportation

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 43 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK $C1$	TEXAS	18	DALLAS,ETC.	115
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyearout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 43.dgn



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- COMPOST AND PERM SOD
- FLOW ARROWS

DATE DISTURBED	DATE STABILIZED

BMP INSTALL/REMOVE DATES

BMP #	INSTALL DATE	REMOVE DATE
SCF-50		

NOTES:

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Eduardo Torrens Soto, P.E. 2/3/2023
Digitally signed by Date
Eduardo Torrens Soto, P.E.

IH45 SW3P
LAYOUT

SCALE: 1"=100' SHEET 44 OF 44

DESIGN DSN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS GRP	6	(SEE TITLE SHEET)		IH 45,ETC.
CHECK $C1$	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	18	DALLAS,ETC.	116
CHECK $C2$	CONTROL	SECTION	JOB	
	0092	02	137,ETC.	

DATE: 2/3/2023
FILE: C:\Users\cyerout\Desktop\IH 45\Layout Sheets\IH 45 - SW3P - Sheet 44.dgn

DATE:
FILE:

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

DOT #: See chart
Crossing Type: See chart
RR Company Owning Track at Crossing: UPRR
Operating RR Company at Track: UPRR
RR MP: See chart
RR Subdivision: See chart
City: See chart
County: See chart
CSJ at this Crossing: 0092-02-137
Highway/Roadway name crossing the railroad: See chart
# of regularly scheduled trains per day at this crossing: 0
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: <1%

Scope of Work at this Crossing to Be Performed by State Contractor:

Mount conduit to overpass for fiber optic cable.

Scope of Work at this Crossing to Be Performed by Railroad Company:

Flagging.

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

None.

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 4

On this project, night or weekend flagging is:

☐ Expected
☐ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

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

Contact Information for Flagging:

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

☐ OTHERS

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

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

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

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

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

Railroad Protective Liability		
☐	Not Required	
☒	Non - Bridge Projects	$2,000,000 / $6,000,000
☐	Bridge Projects	$5,000,000 / $10,000,000
☐	Other	

DOT NO.	763645R	763643C
Crossing Type	RR UNDER	RR UNDER
RR Company	UPRR	UPRR
Operating RR Co	UPRR	UPRR
RR MP	254.289	254.870
RR Sub	ENNIS	ENNIS
City	HUTCHINS	HUTCHINS
County	DALLAS	DALLAS
CSJ	0092-02-137	0092-02-137
Highway	IH 45	IH 45
trains per day	0	0
switches per day	0	0

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☐ Not Required
☒ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
☐ Required: UPRR Maintenance Consent Letter. TxDOT CST to assist.
☐ Required: Contractor to obtain (see Item 5, Article 8.4)
With the following railroad companies: UPRR

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

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

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☒ Not Required
☐ Required: Contact Information for Construction Inspection:

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call the UPRR Railroad Emergency Line
at 800-848-8715
Location: see chart

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:		
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0092	02	137	IH 45		
9/2021	DIST	COUNTY		SHEET NO.		
	DAL	DALLAS		116A		

PART 1 - GENERAL

1.01 DESCRIPTION

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

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

1.02 REQUEST FOR INFORMATION / CLARIFICATION

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

1.03 PLANS / SPECIFICATIONS

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

PART 2 - UTILITIES AND FIBER OPTIC

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

PART 3 - CONSTRUCTION

3.01 GENERAL

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

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

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

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

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

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

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

3.02 RAILROAD OPERATIONS

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

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

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

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

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

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

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

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

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

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

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

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

3.04 INSURANCE

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

3.05 RAILROAD SAFETY ORIENTATION

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

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

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

3.06 COOPERATION

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

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

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

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

3.08 APPROVAL OF REDUCED CLEARANCES

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

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

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

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0092	02	137	IH 45
	DIST	COUNTY		SHEET NO.
	18	DALLAS		116B

DATE:
FILE:

3.09 MAINTENANCE OF RAILROAD FACILITIES

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

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

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

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

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

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

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

3.11 RAILROAD REPRESENTATIVES

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

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

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

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

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

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

3.12 COMMUNICATIONS AND SIGNAL LINES

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

3.13 TRAFFIC CONTROL

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

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

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

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

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

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

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

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

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

3.15 RAILROAD FLAGGING

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

3.16 CLEANING OF RIGHT-OF-WAY

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

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0092	02	137	IH 45
	DIST	COUNTY		SHEET NO.
	18	DALLAS		116C

DATE:
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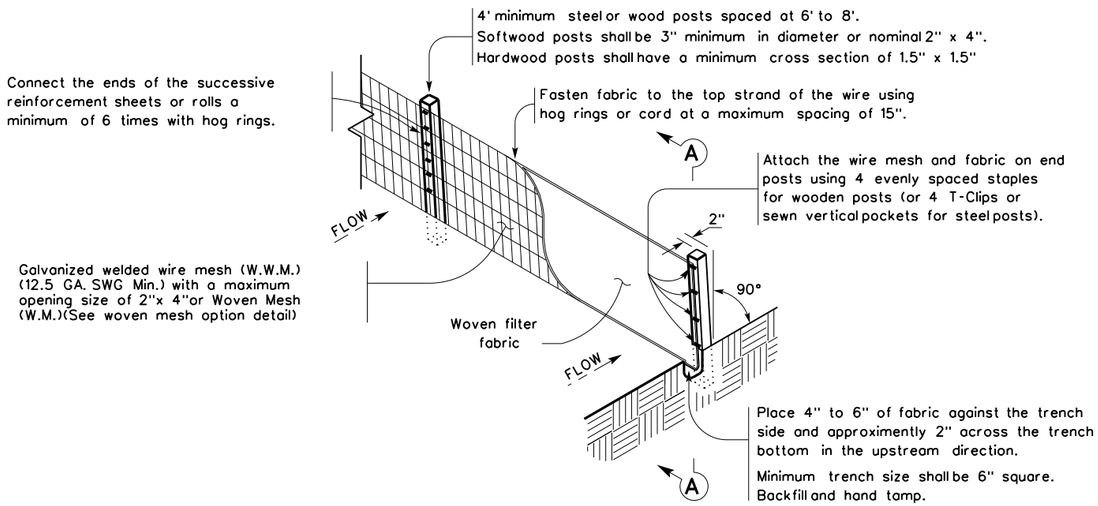
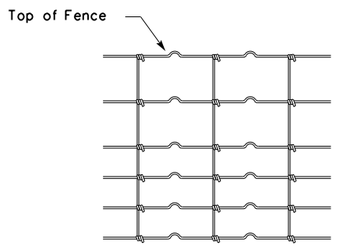
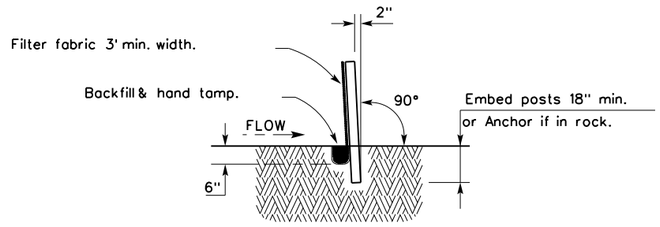


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

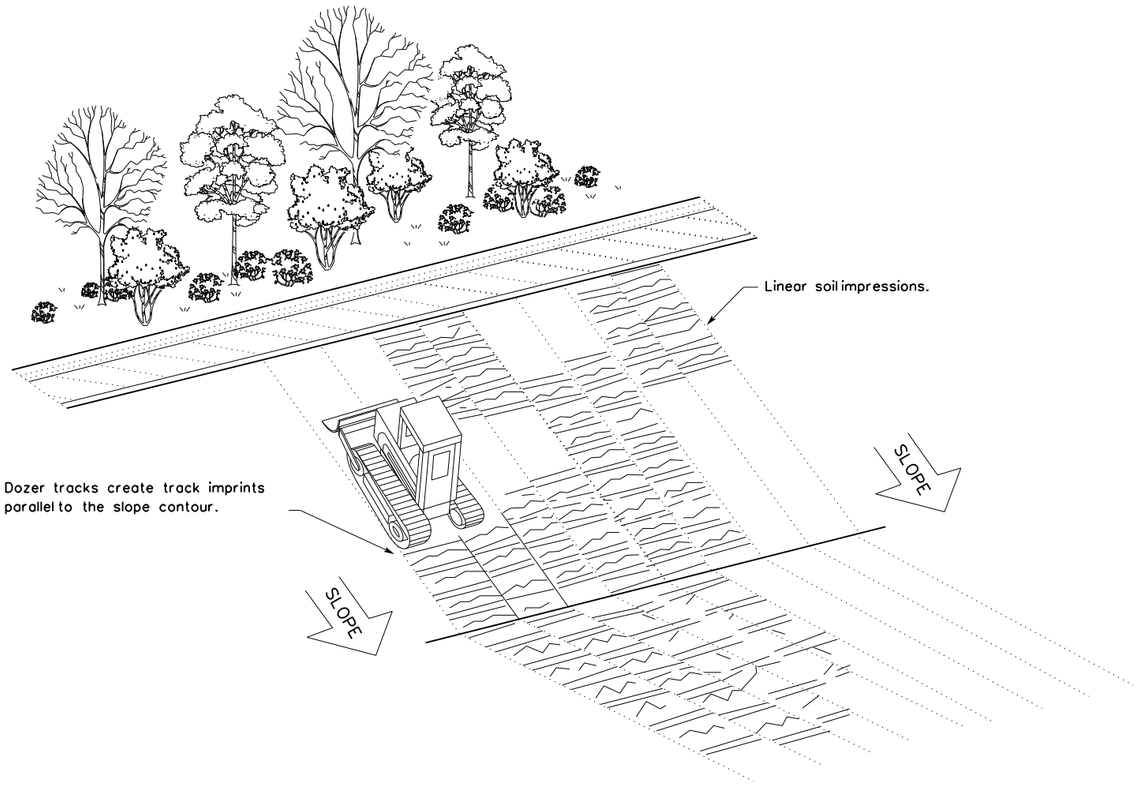
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM	DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0092	02	137,ETC.		IH 45,ETC.	
	DIST	COUNTY			SHEET NO.	
	18	DALLAS,ETC.			117	

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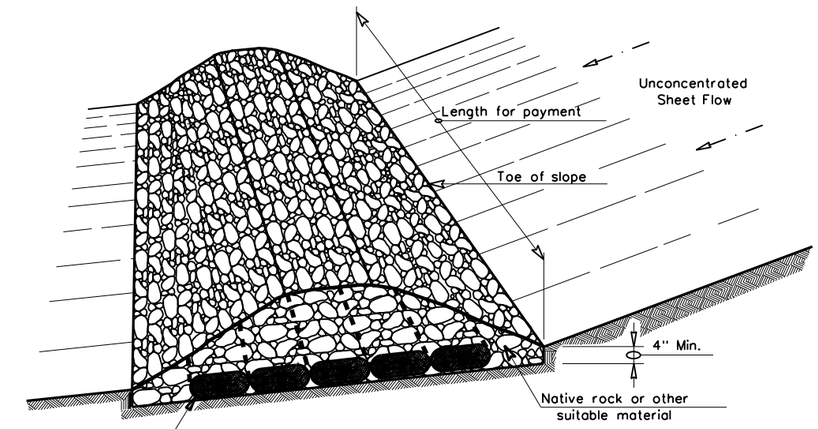
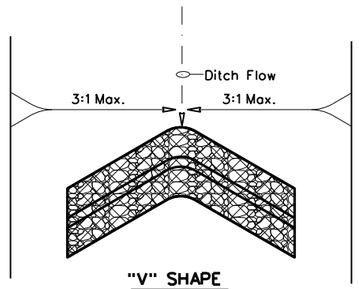
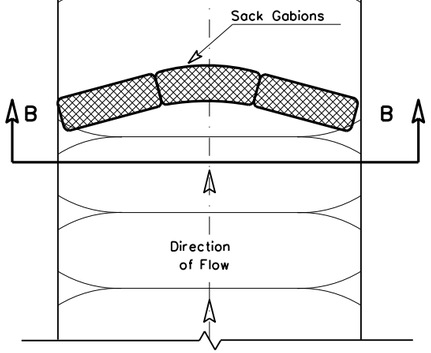


FILTER DAM AT TOE OF SLOPE

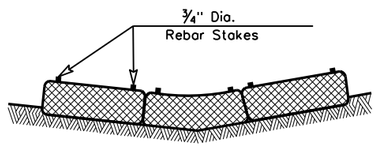
RFD1



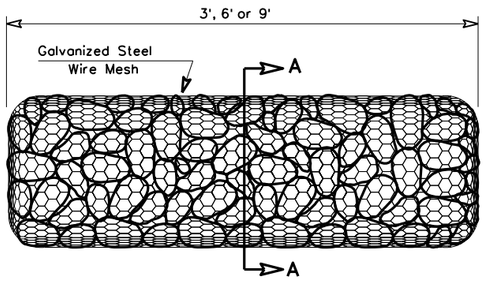
"V" SHAPE PLAN VIEW



PLAN VIEW

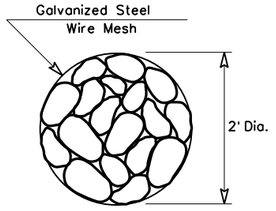


SECTION B-B

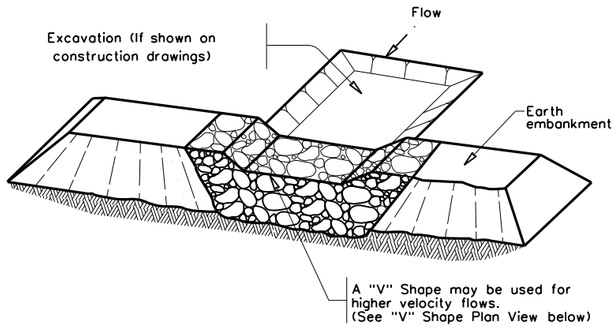


TYPE 4 (SACK GABIONS)

RFD4

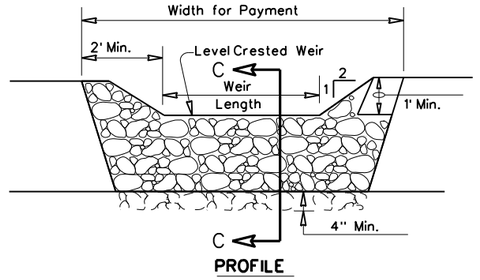


SECTION A-A

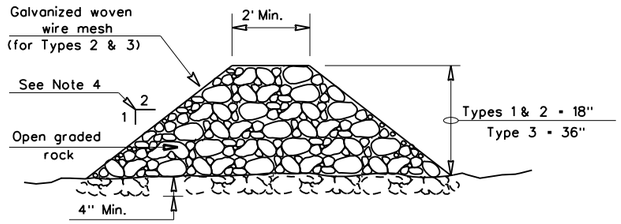


FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

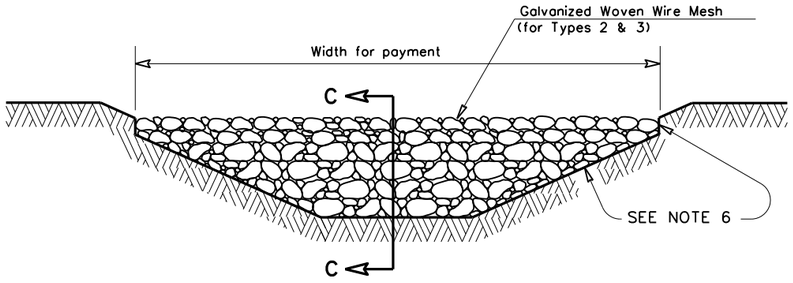
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0092	02	137,ETC.		IH 45,ETC.		
	DIST	COUNTY			SHEET NO.		
	18	DALLAS,ETC.			118		

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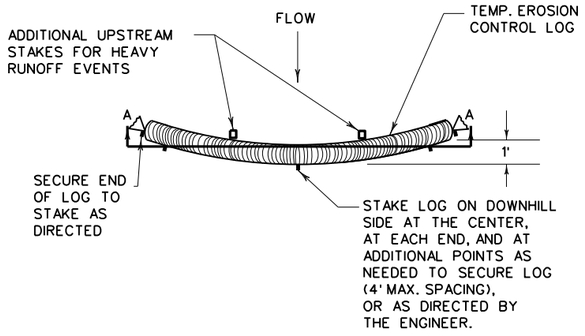
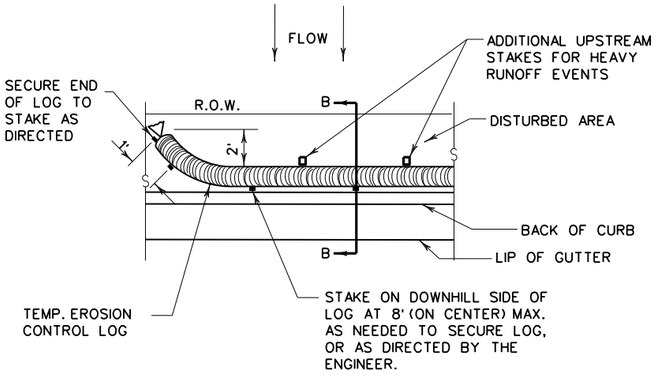


PLAN VIEW



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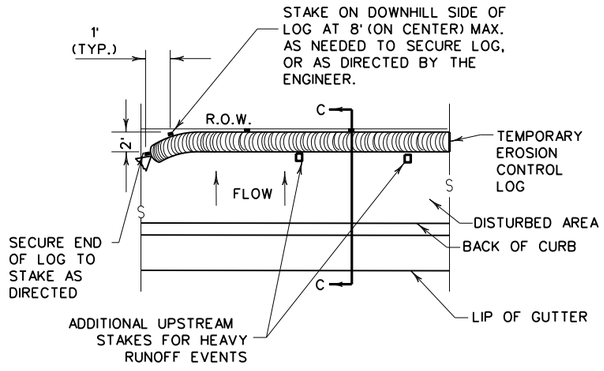

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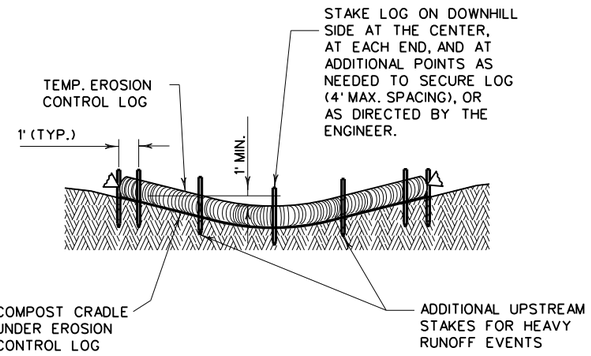
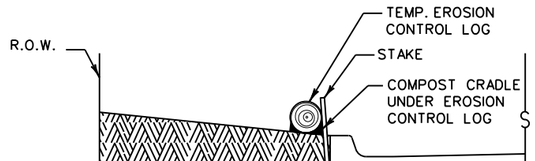


SECTION A-A

EROSION CONTROL LOG DAM

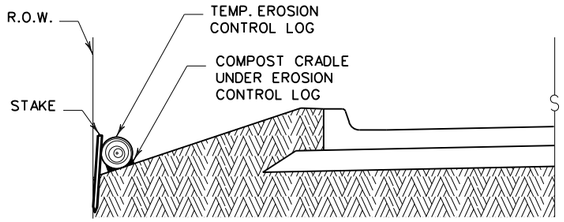
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

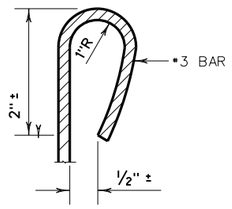
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR •3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

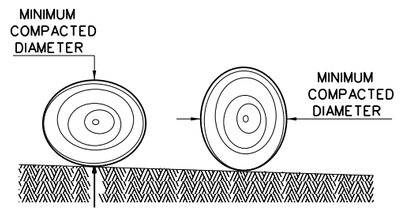
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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	0092	02	137,ETC.	IH 45,ETC.	
	DIST	COUNTY		SHEET NO.	
	18	DALLAS,ETC.		119	

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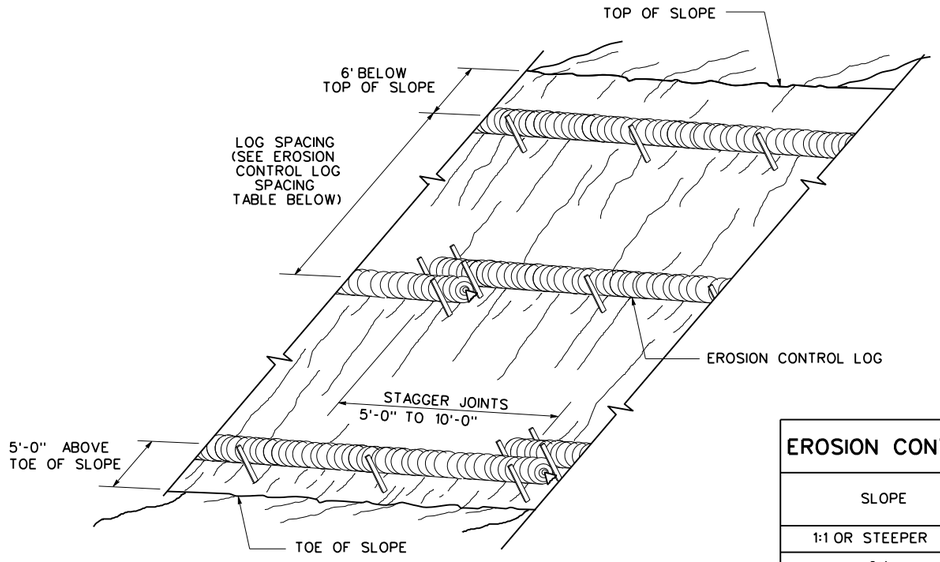
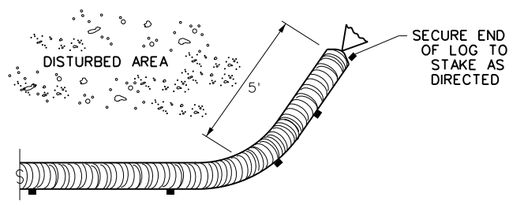


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

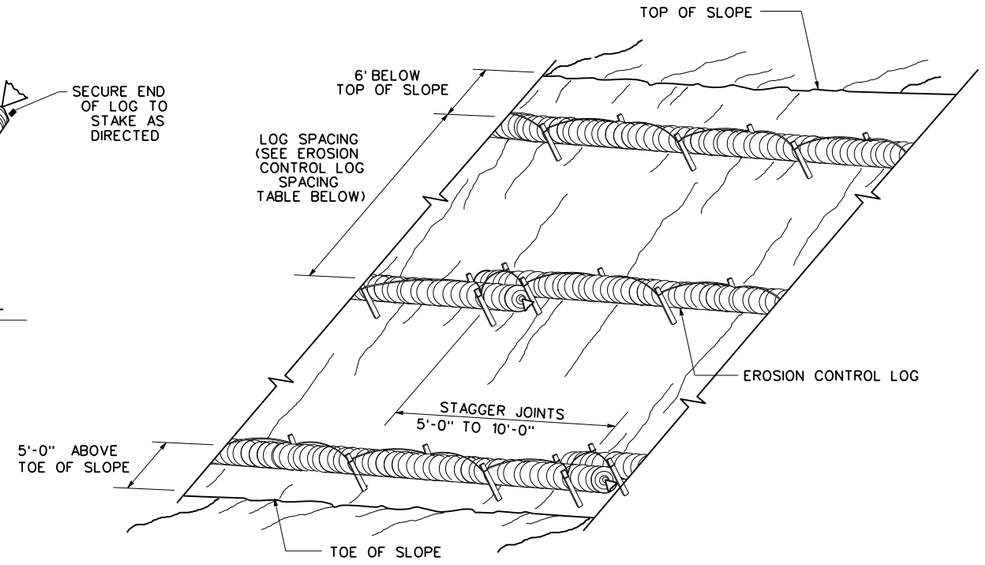
CL-SST



END SECTION RAP DETAIL

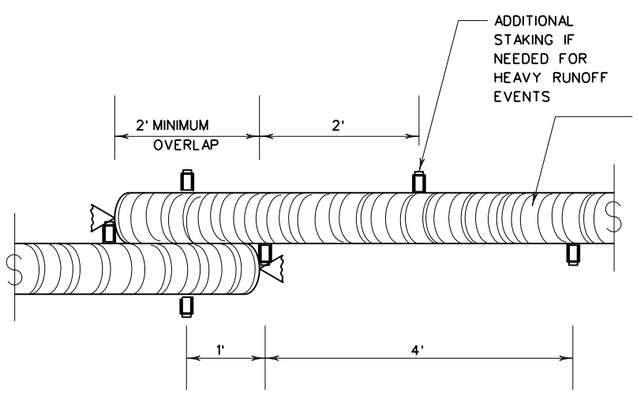
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

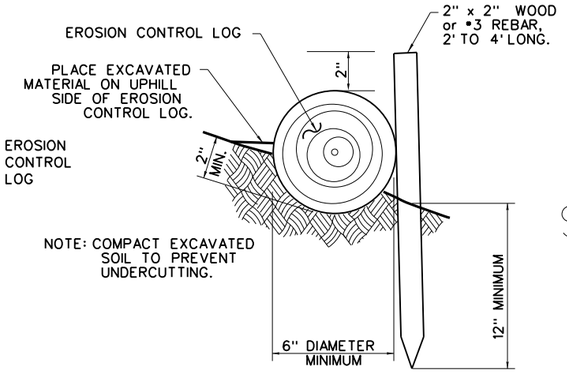
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

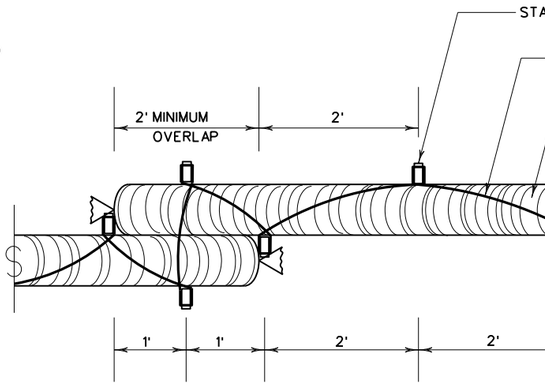


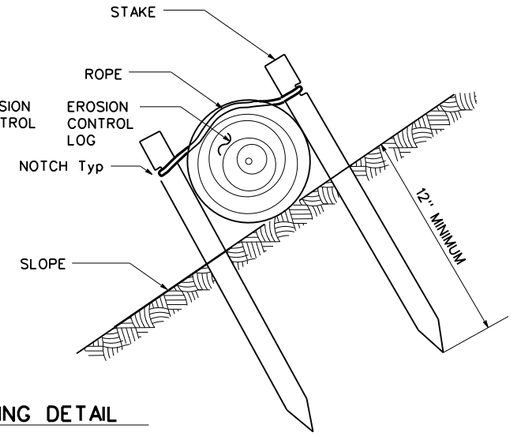


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

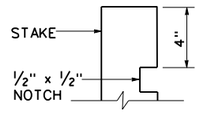
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
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	18	DALLAS,ETC.		120

DATE:
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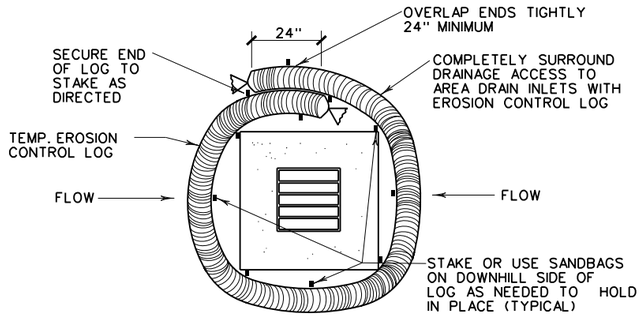
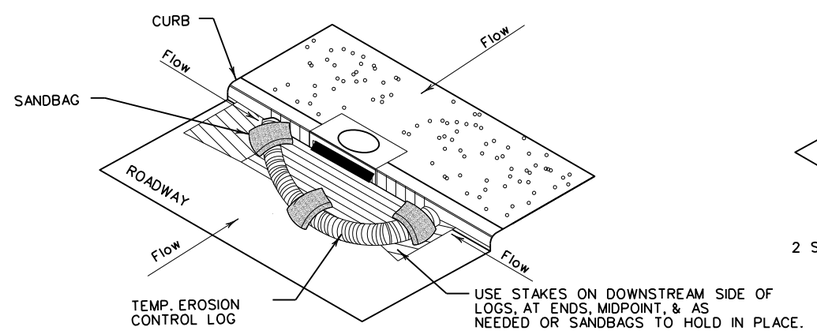


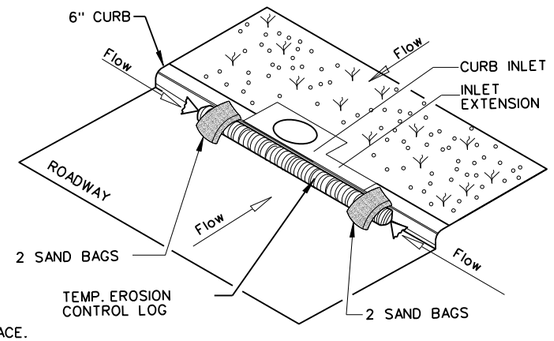
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

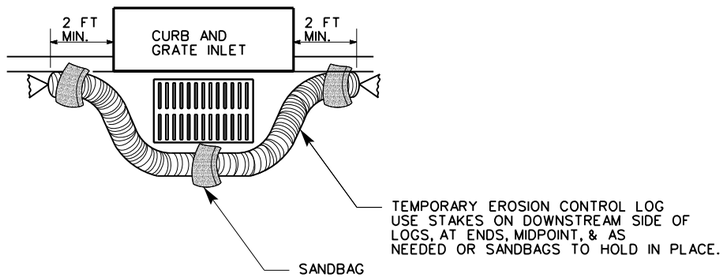
CL-CI



EROSION CONTROL LOG AT CURB INLET

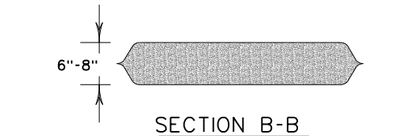
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

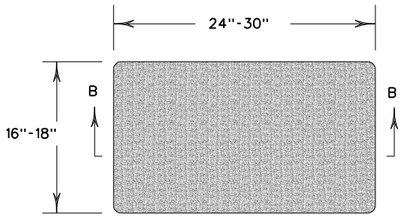


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

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Texas Department of Transportation

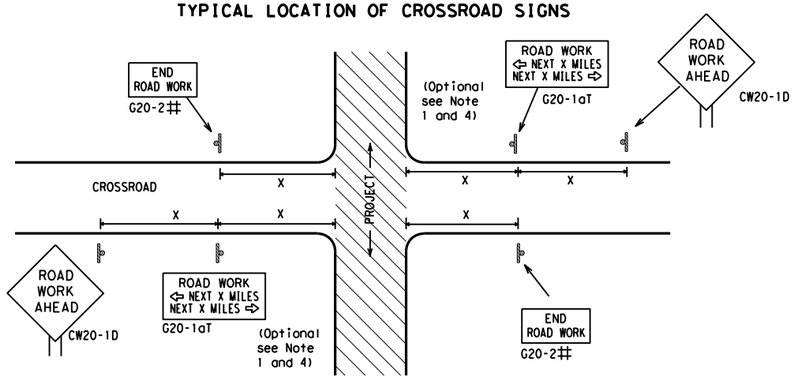
Traffic Safety Division Standard

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	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		122

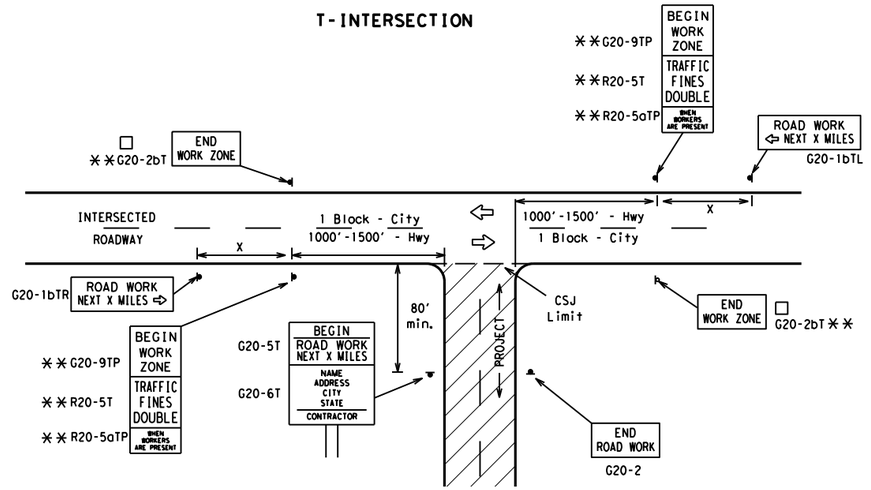
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

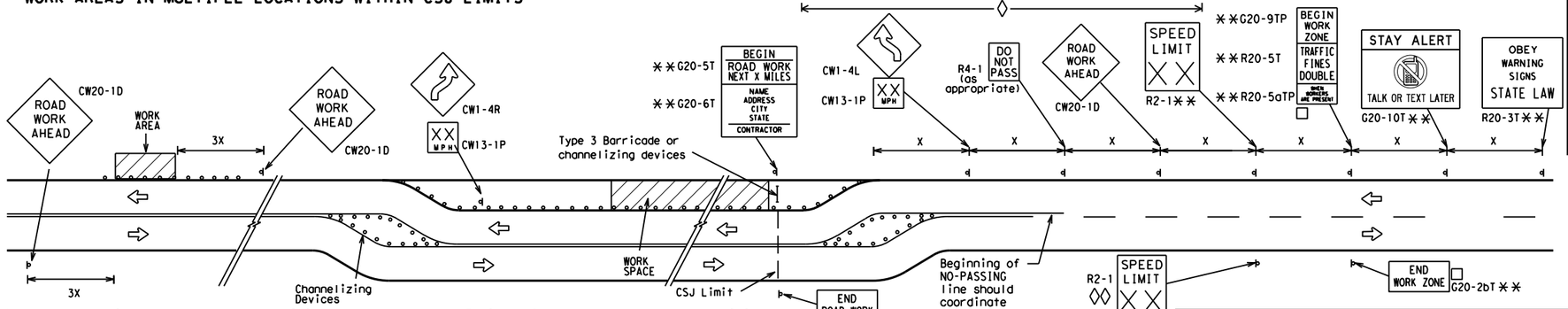
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

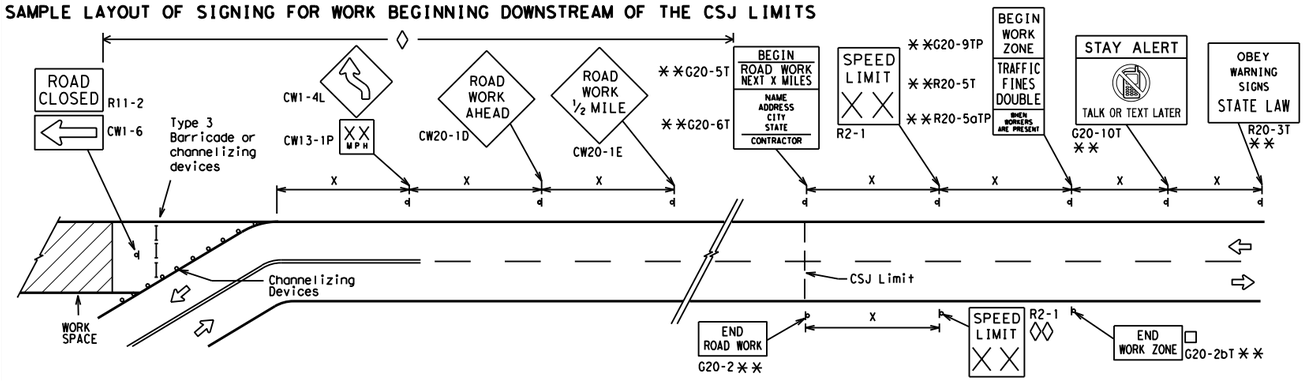
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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 DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0092	02	137, ETC.	IH 45, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DALLAS, ETC.		123

DATE:
FILE:

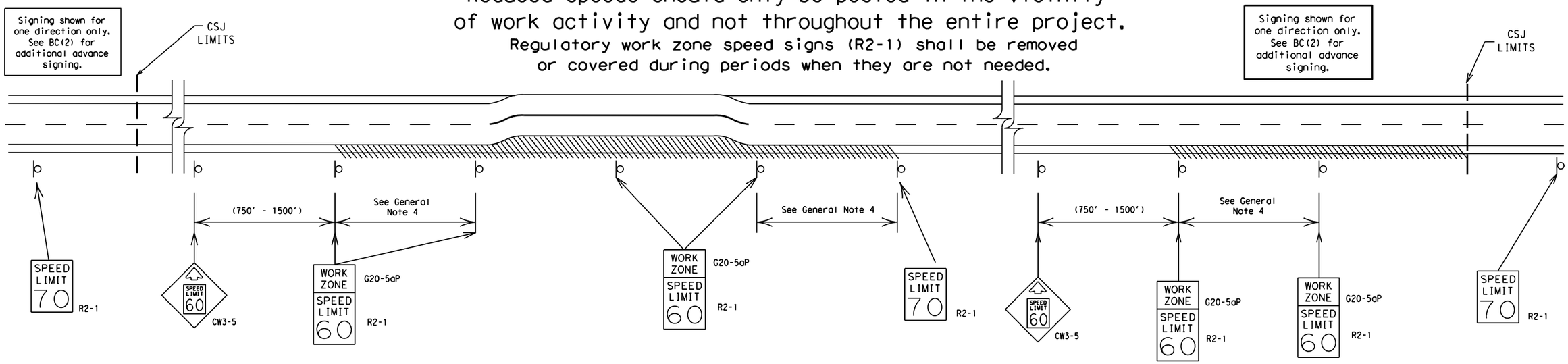
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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7-13 5-21	DAL	DALLAS, ETC.		124

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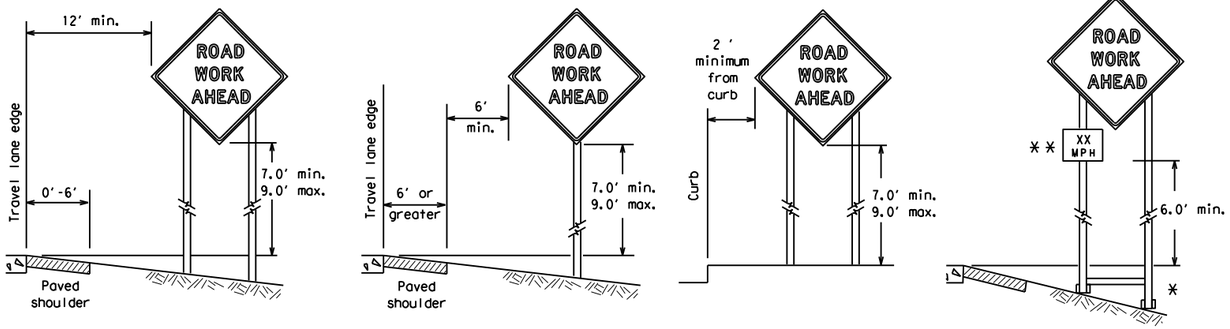
FILE:

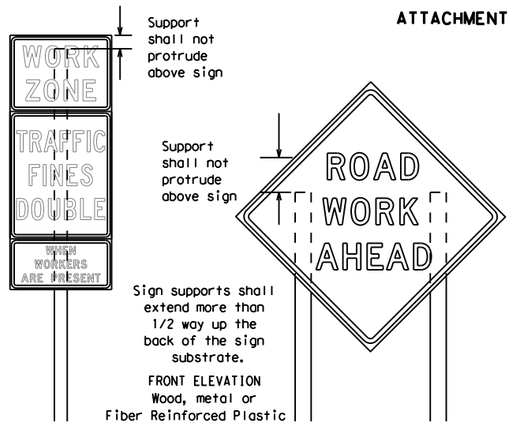
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

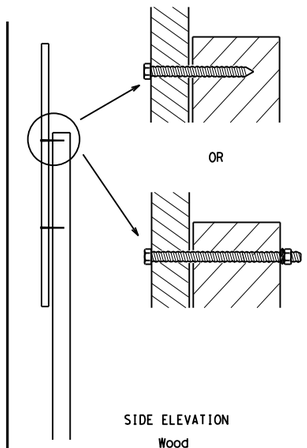


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





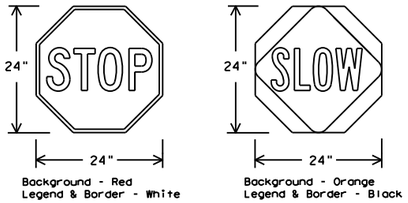
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	02	137, ETC.	IH 45, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DALLAS, ETC.		125

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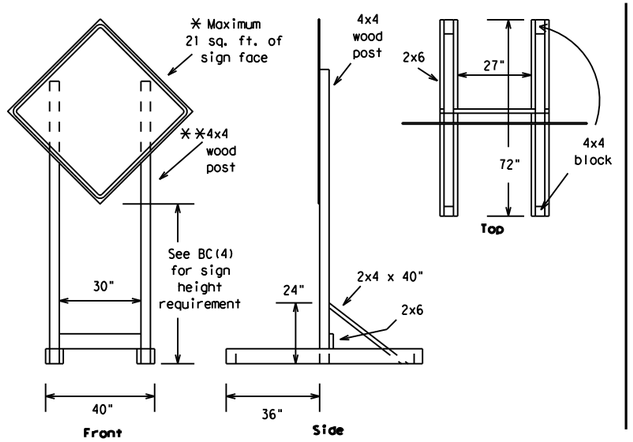
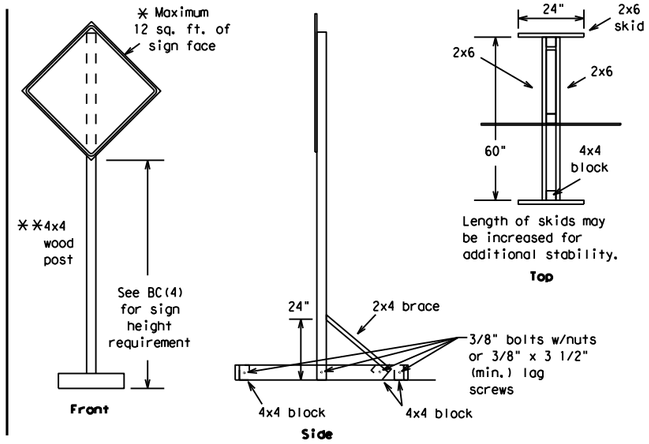
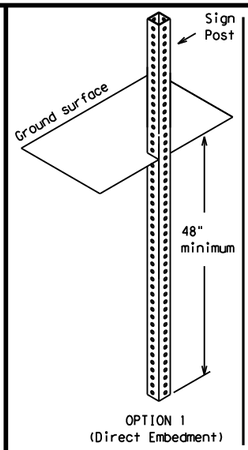
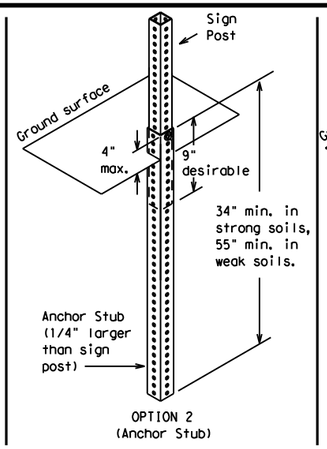


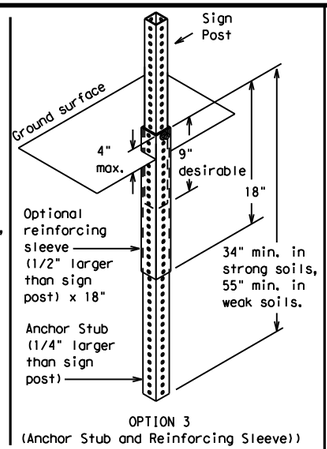


SKID MOUNTED WOOD SIGN SUPPORTS

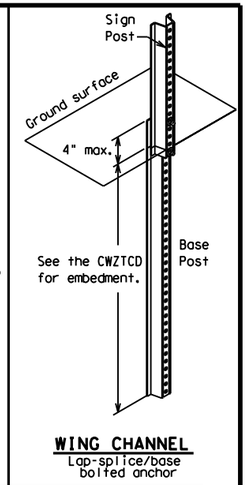
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







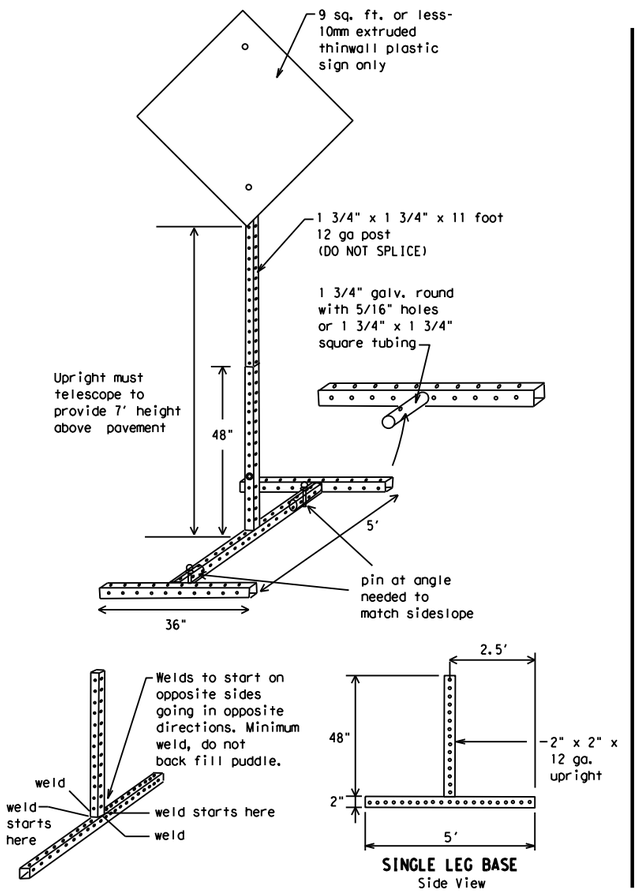
PERFORATED SQUARE METAL TUBING

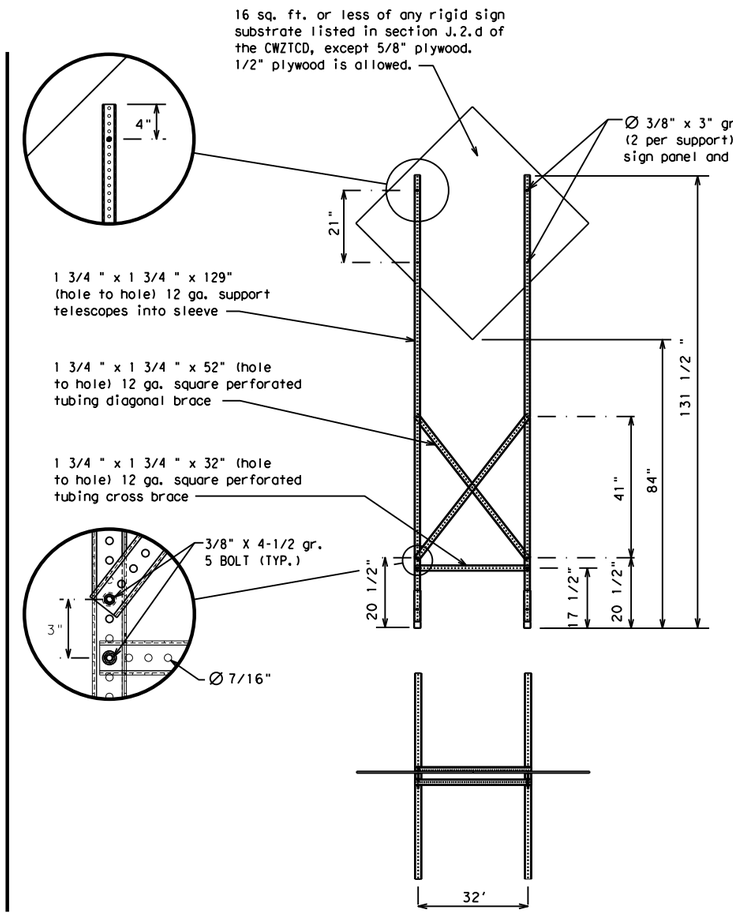


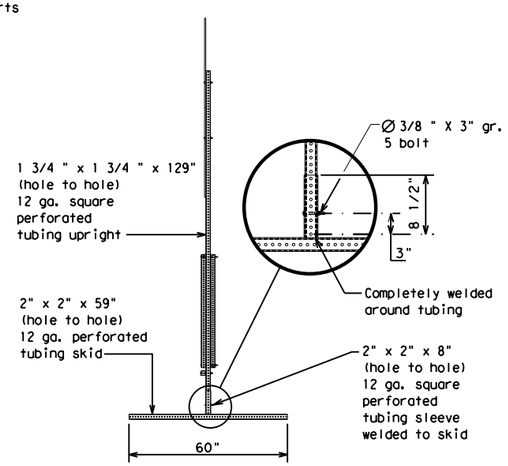
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0092	02	137, ETC.	IH 45, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DALLAS, ETC.		126

DATE:
FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0092	02	137, ETC.	IH 45, ETC.
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		DAL	DALLAS, ETC.		127

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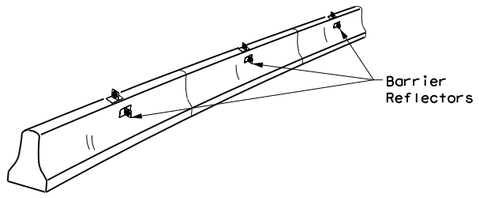
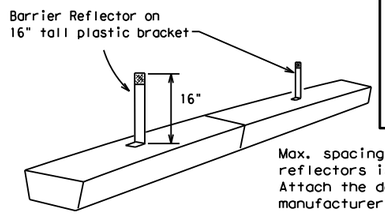
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

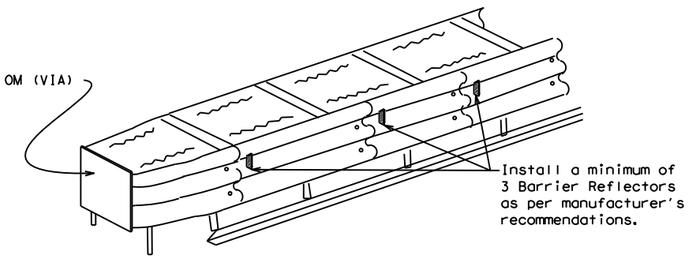


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

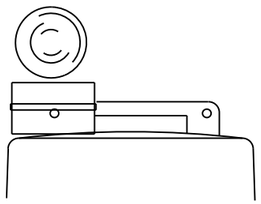


DELINEATION OF END TREATMENTS

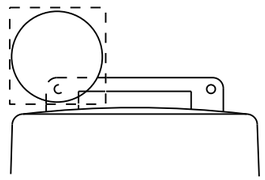
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

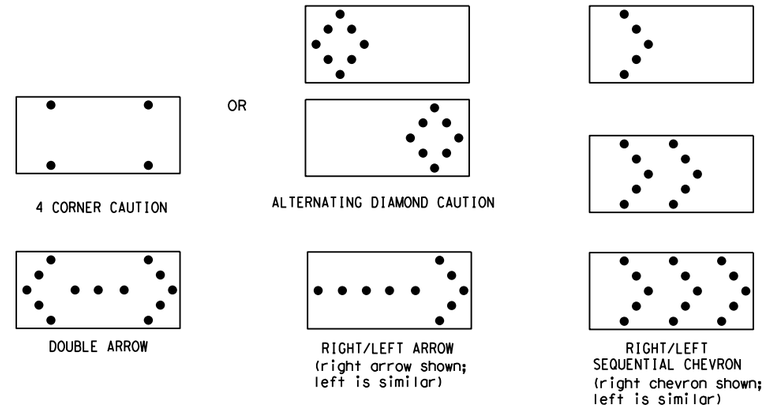
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	02	137, ETC.	IH 45, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DALLAS, ETC.		128

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

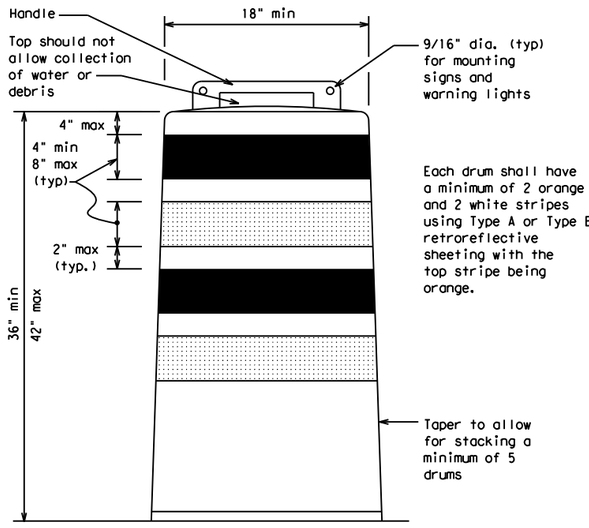
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

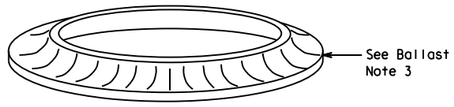
RETROREFLECTIVE SHEETING

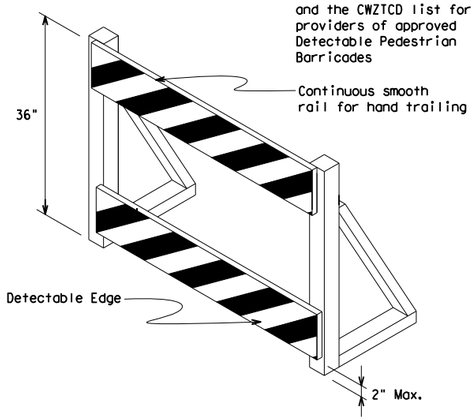
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

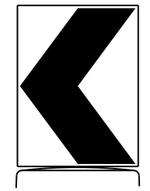




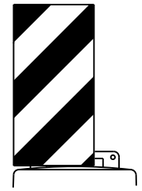


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	02	137, ETC.	IH 45, ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	DAL	DALLAS, ETC.		129
7-13				

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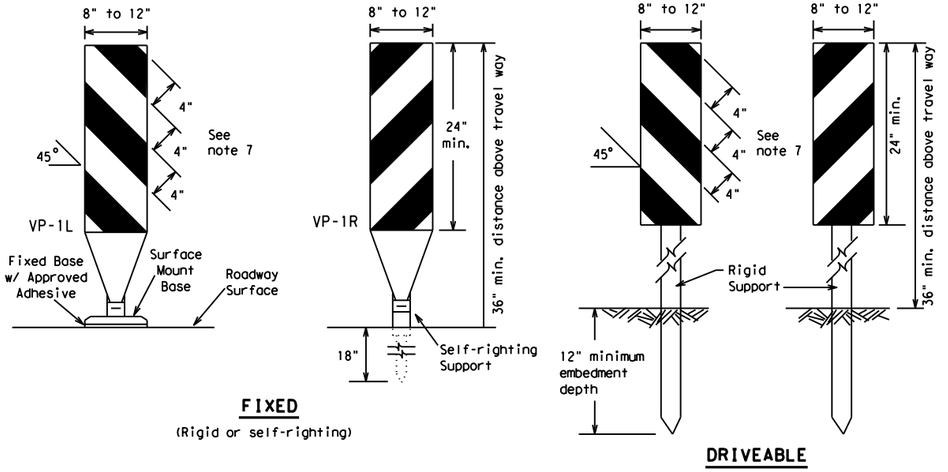
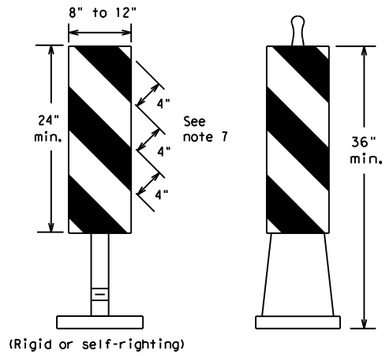


FIXED
(Rigid or self-righting)

DRIVEABLE

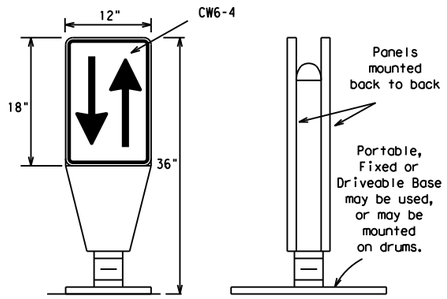


(Rigid or self-righting)

PORTABLE

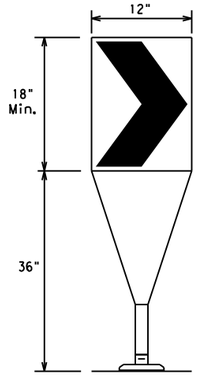
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



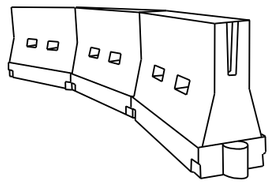
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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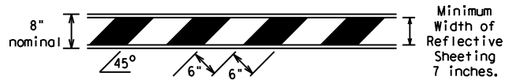
REVISIONS	0092	02	137, ETC.	IH 45, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DALLAS, ETC.		130

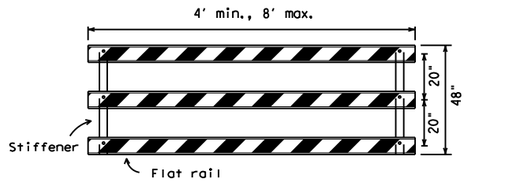
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



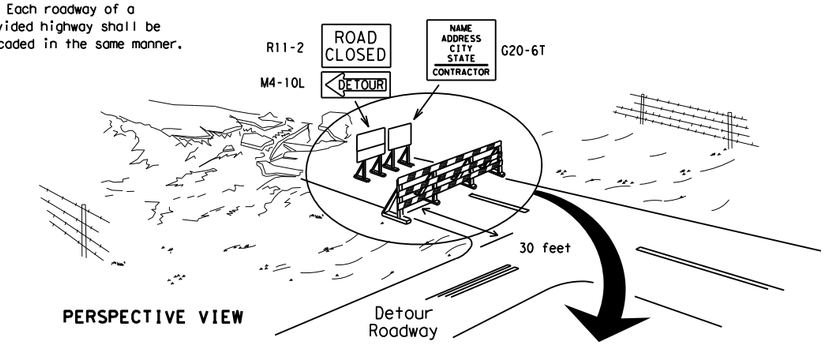
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

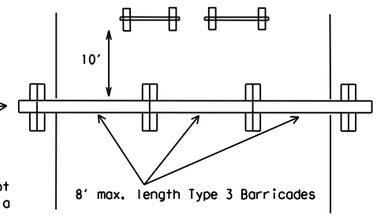
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

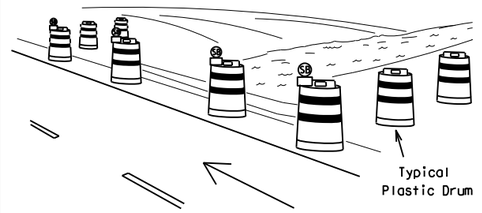
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

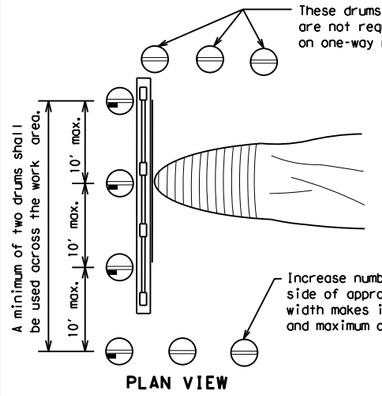
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

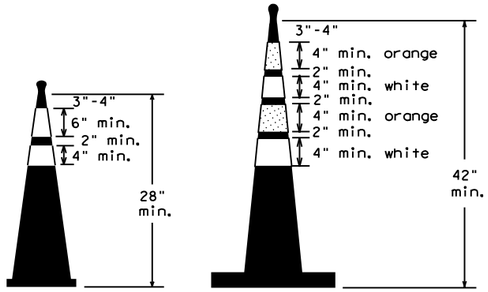
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

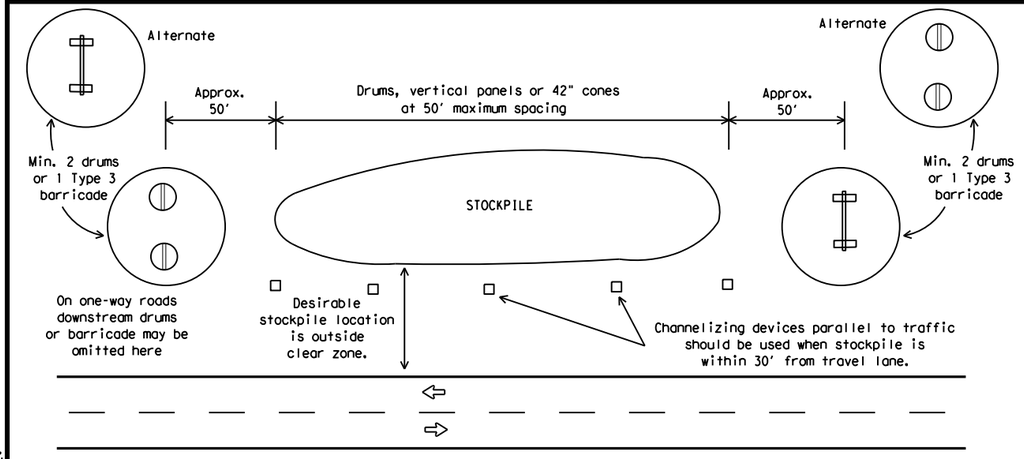
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
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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.

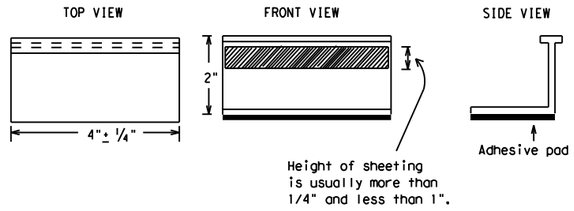
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

BC(11)-21

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	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		132

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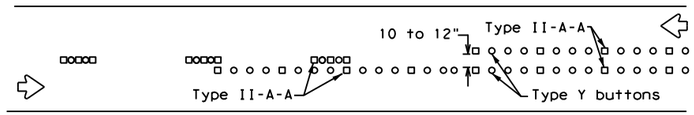
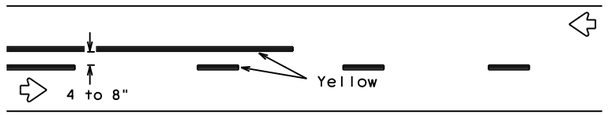
DATE:
FILE:

PAVEMENT MARKING PATTERNS

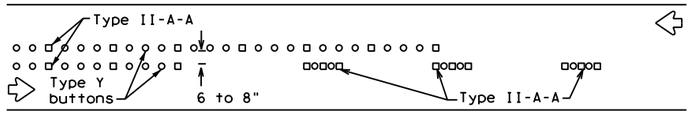
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



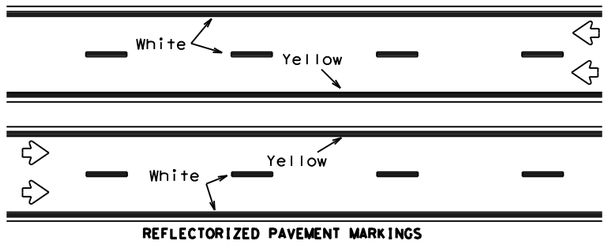
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



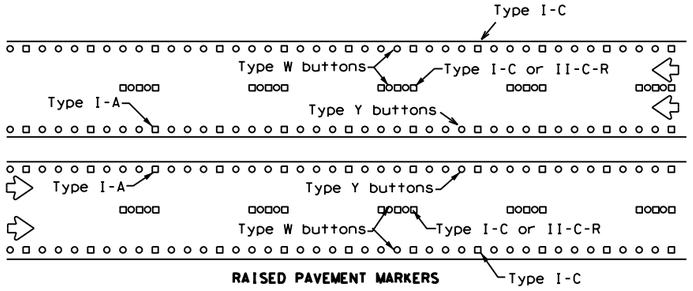
RAISED PAVEMENT MARKERS - PATTERN B

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

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



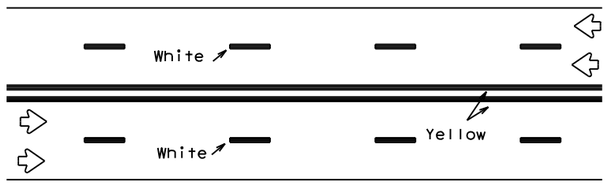
REFLECTORIZED PAVEMENT MARKINGS



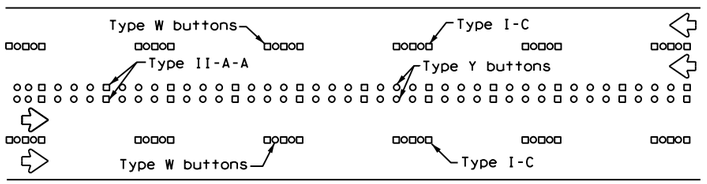
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



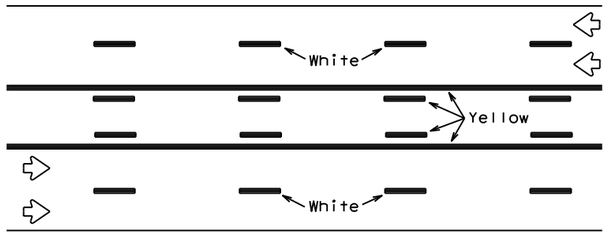
REFLECTORIZED PAVEMENT MARKINGS



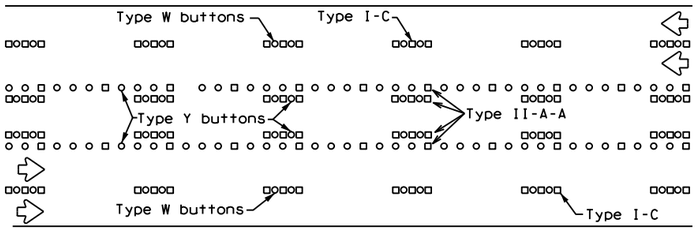
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

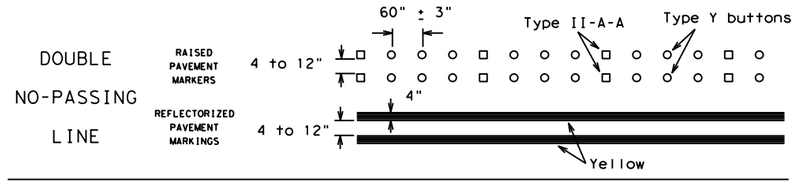
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

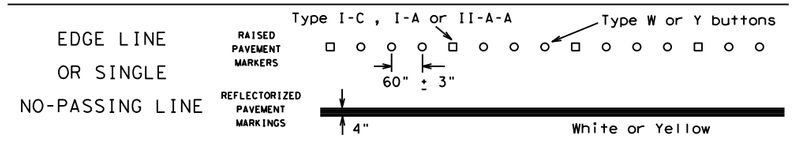
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

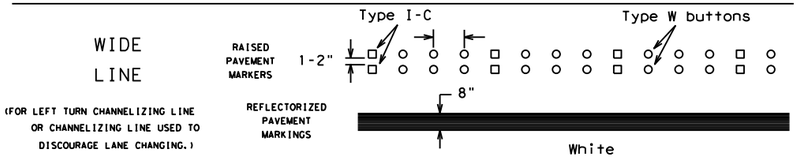


EDGE LINE OR SINGLE NO-PASSING LINE



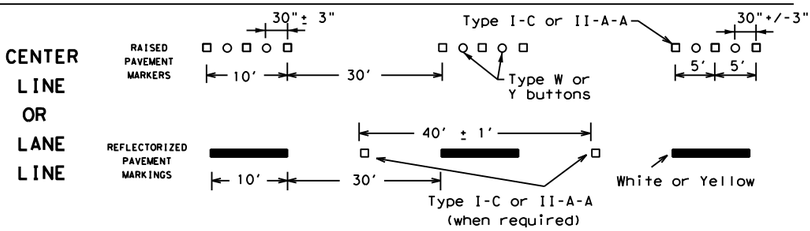
WIDE LINE

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

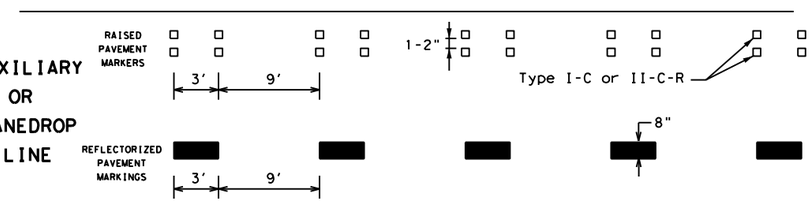


BROKEN LINES

CENTER LINE OR LANE LINE

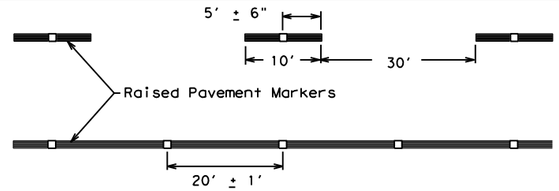


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

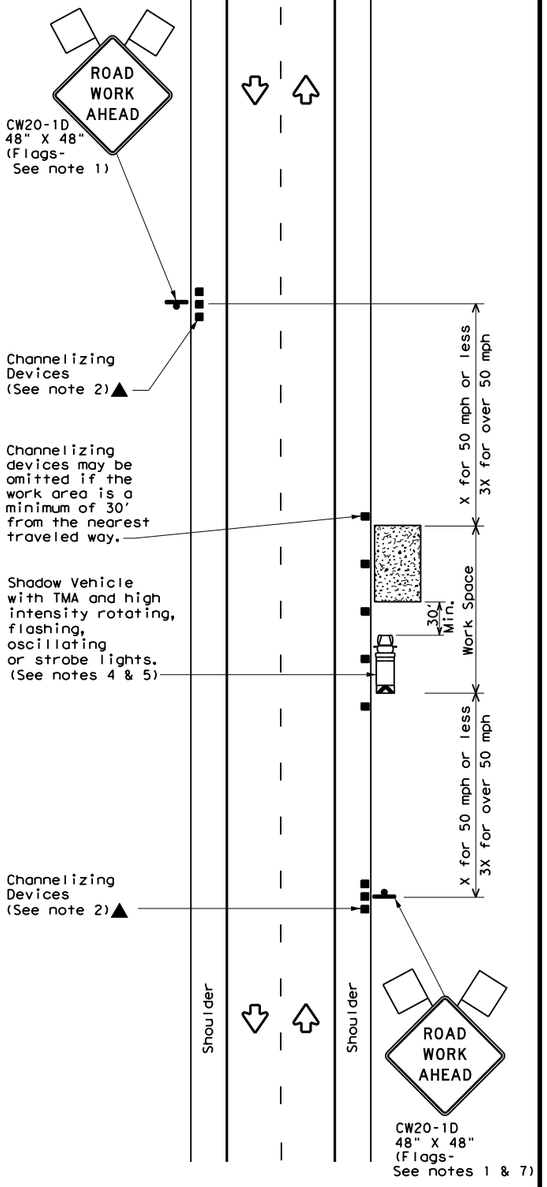
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		133

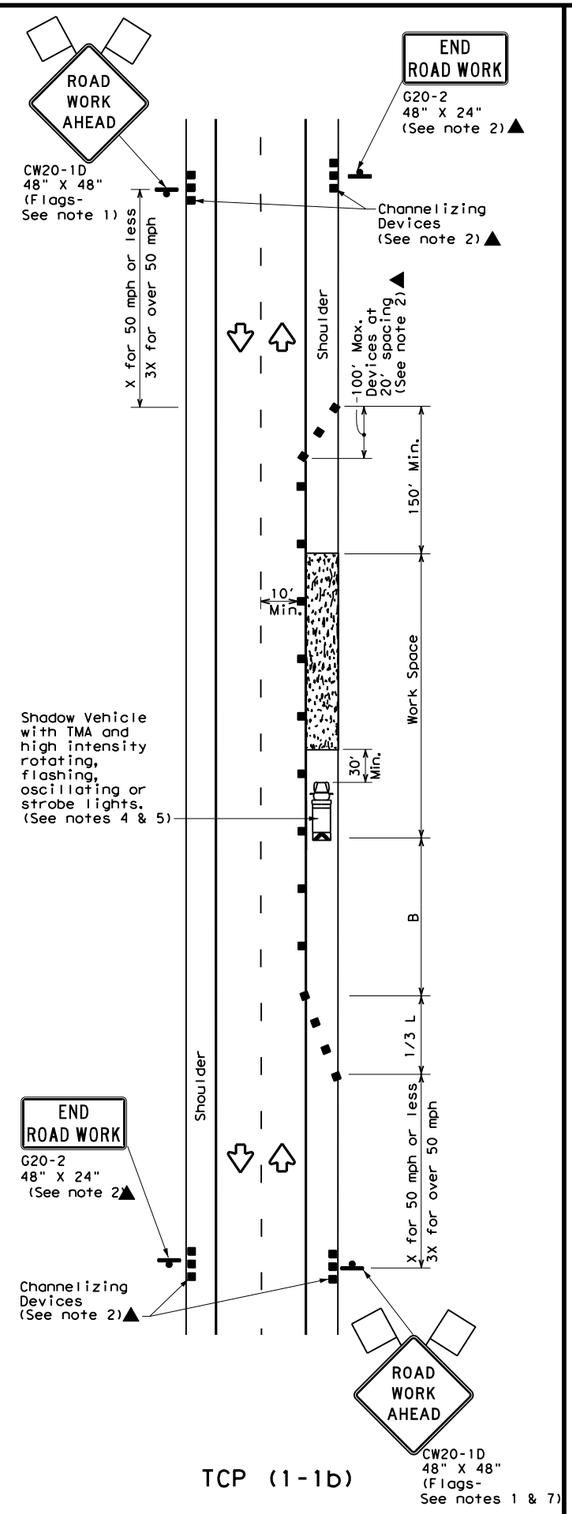
106

DATE:
FILE:



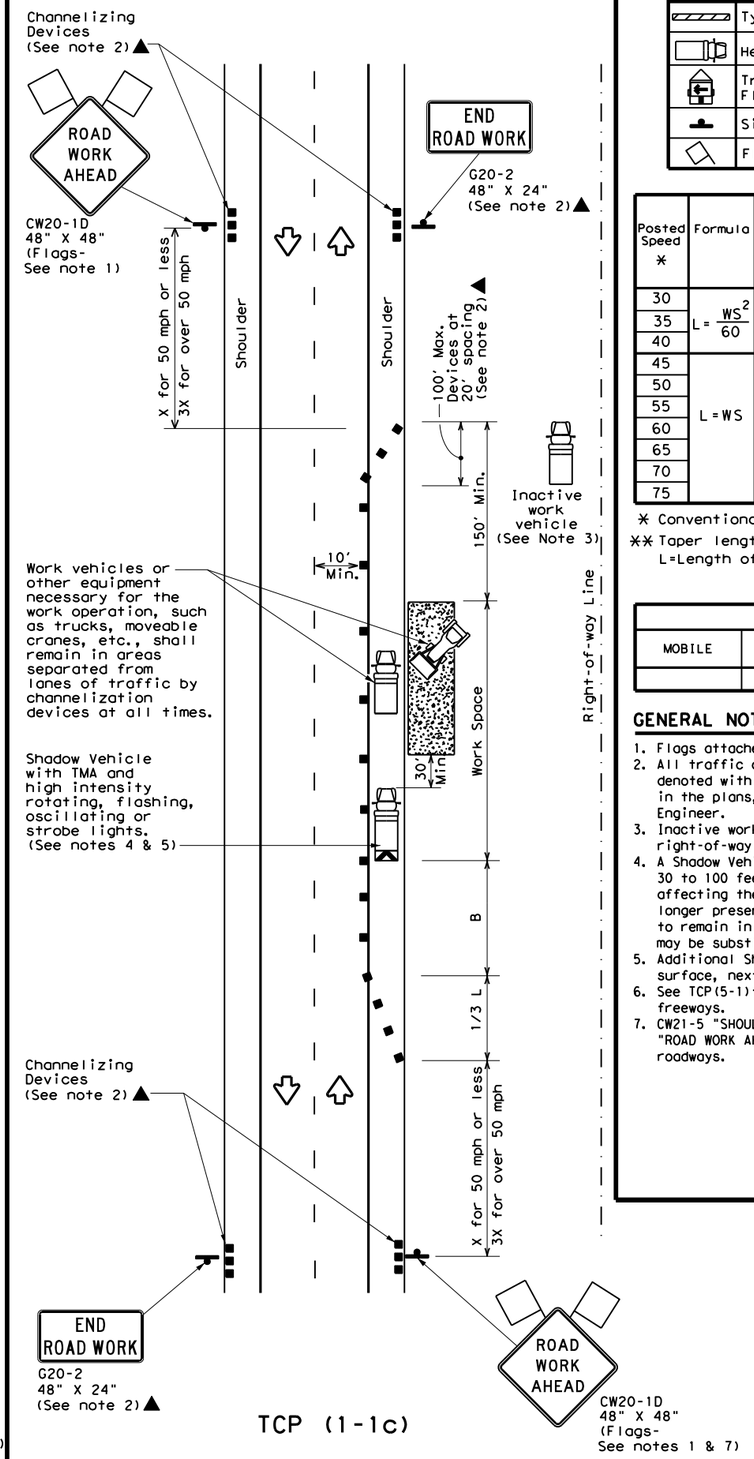
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		134

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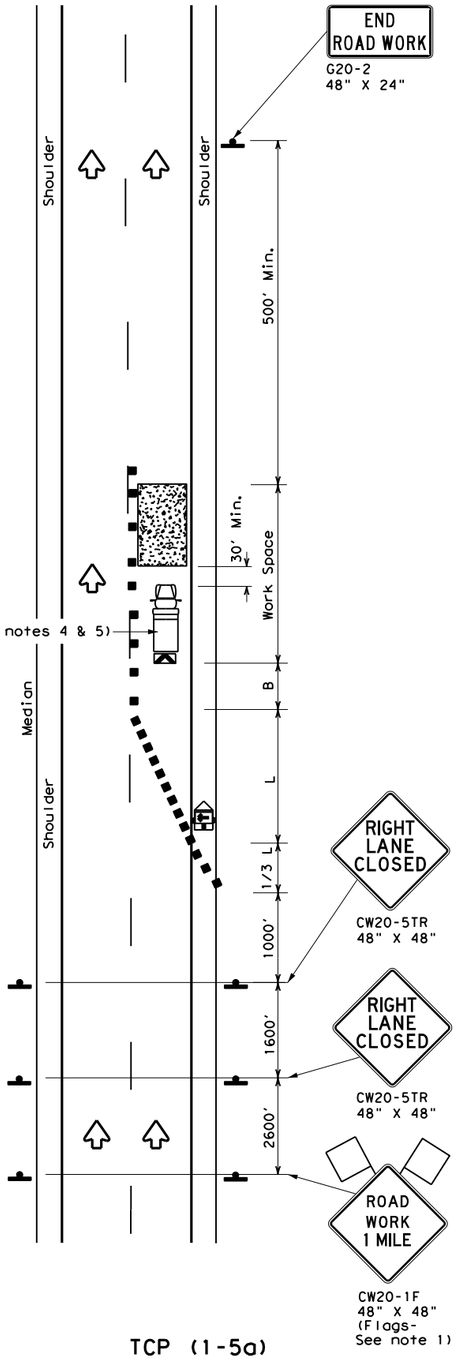
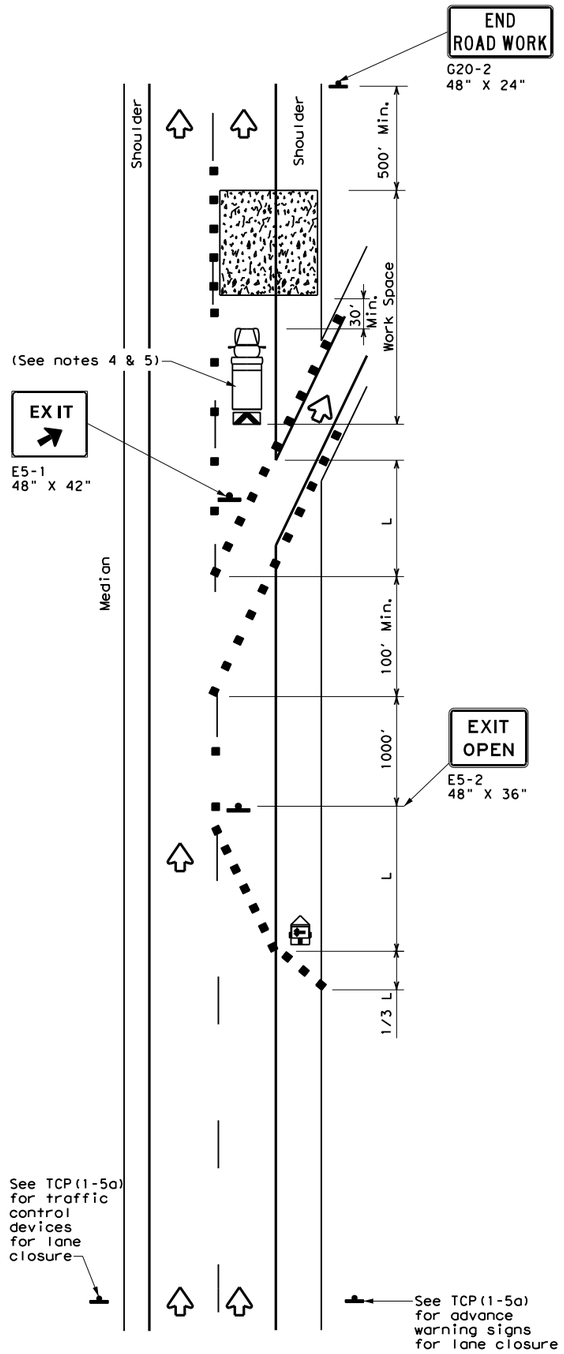


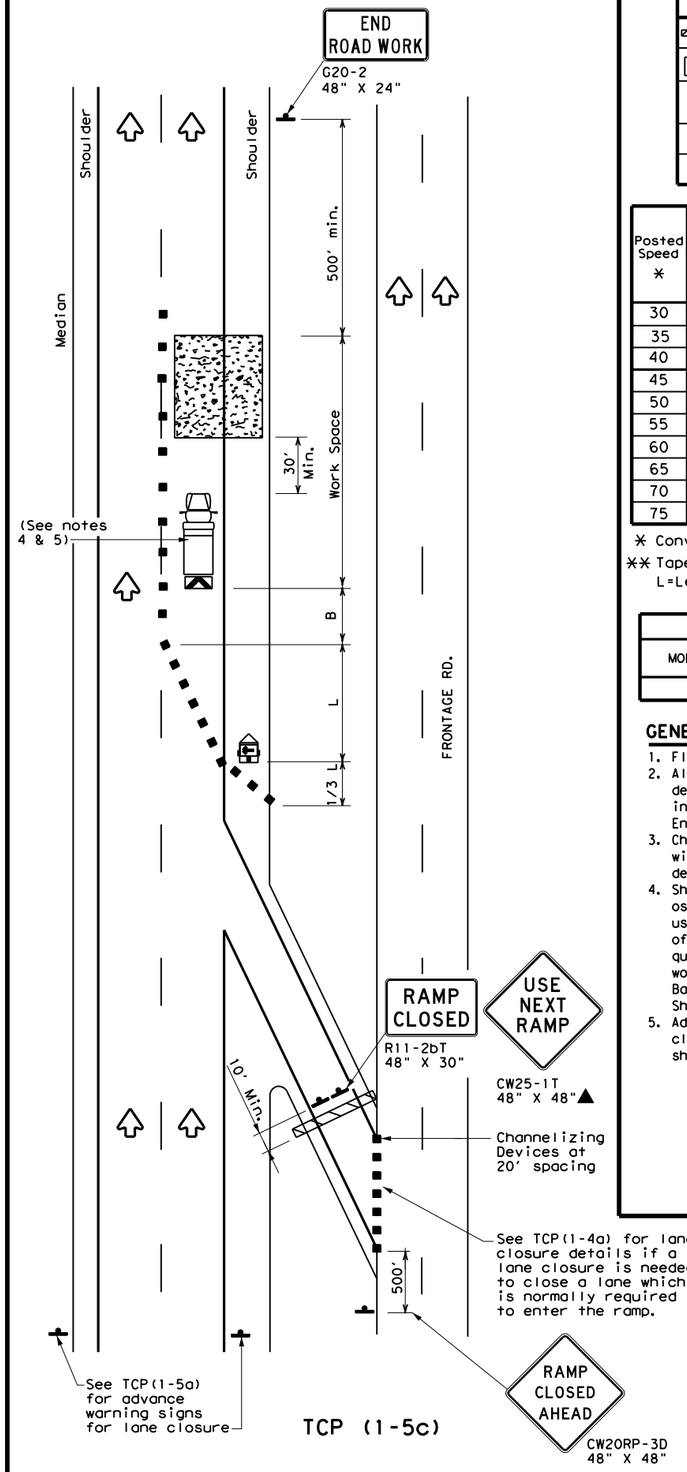
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		135

DATE:
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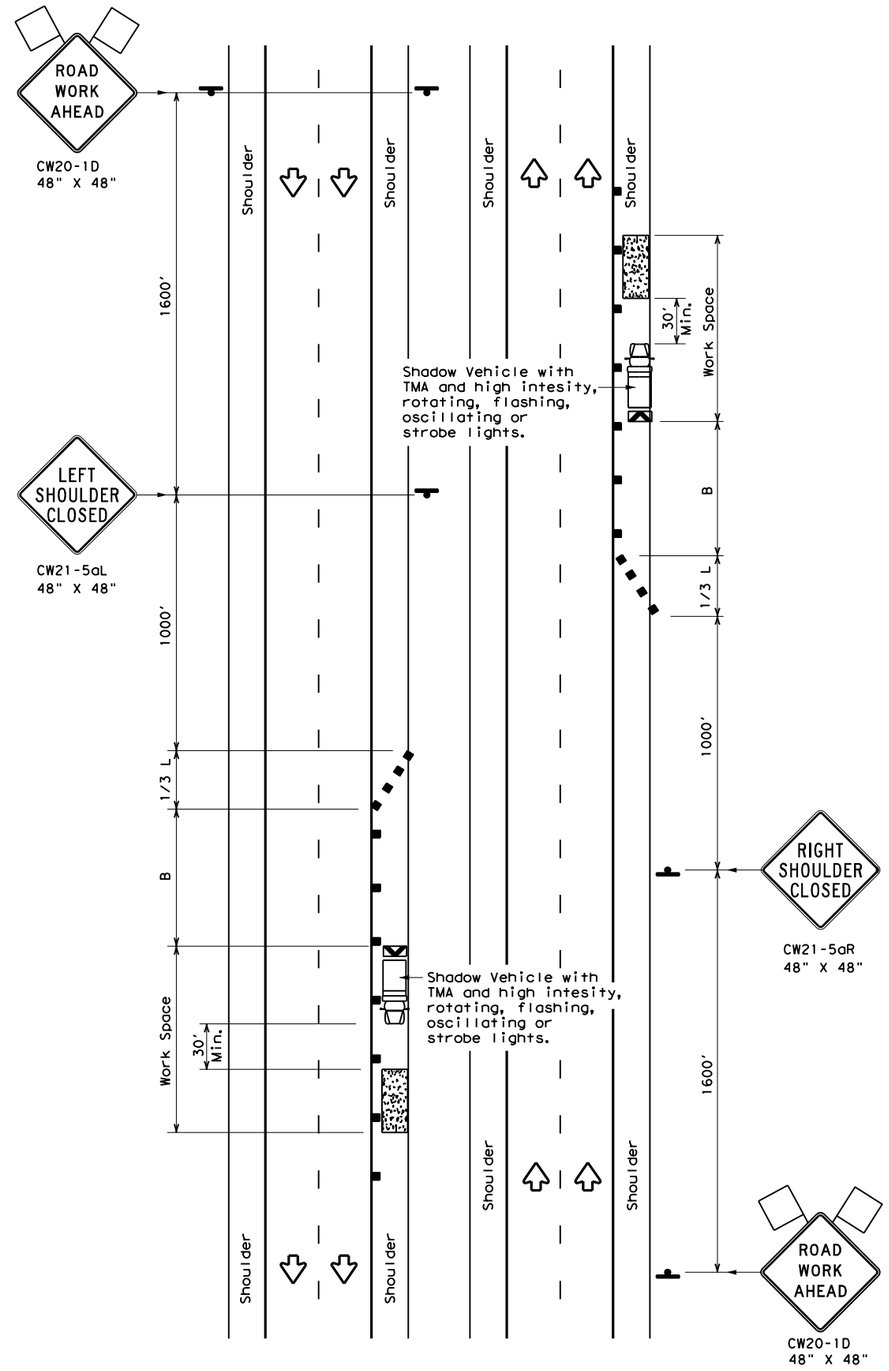
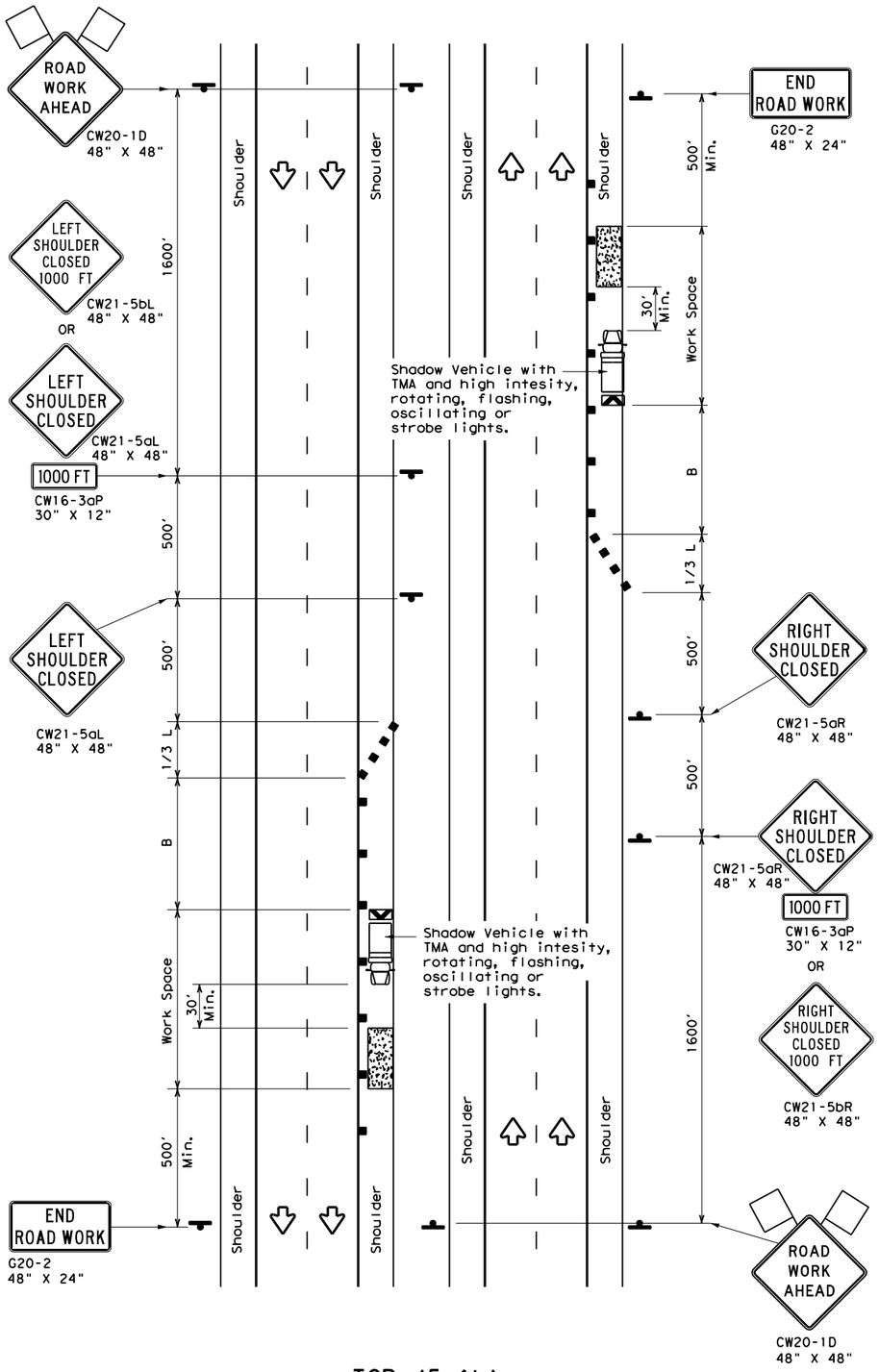


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

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

Texas Department of Transportation

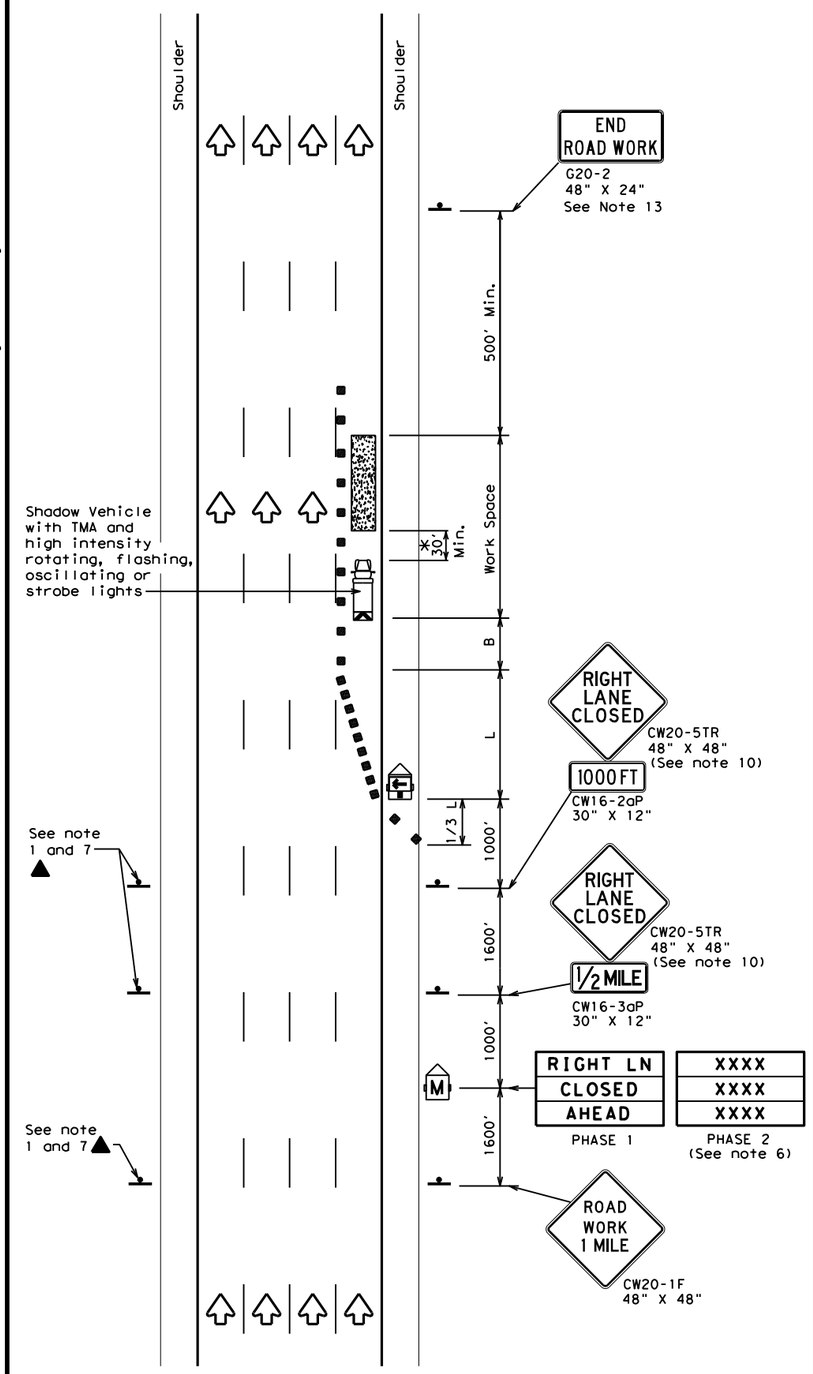
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

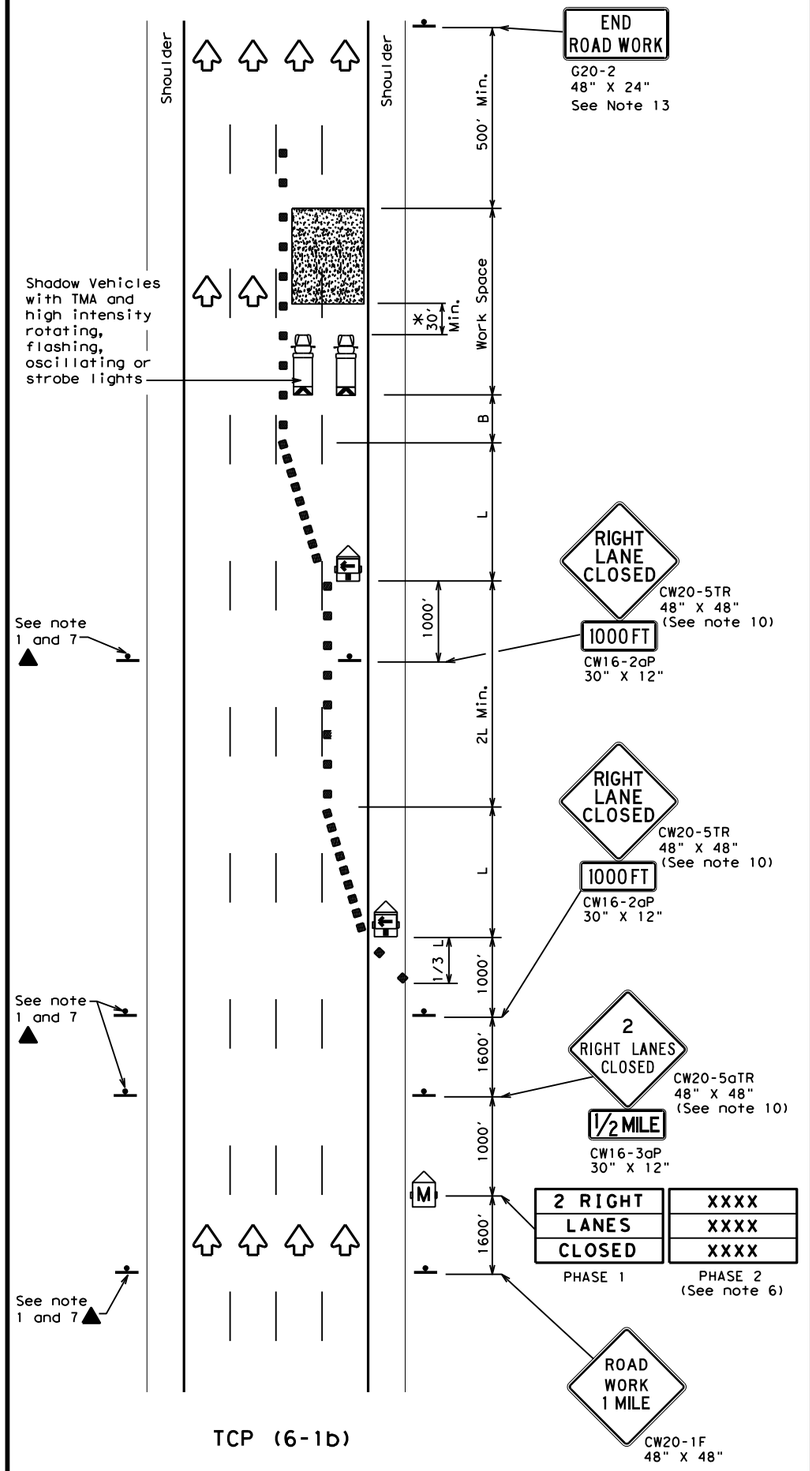
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		136

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	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		137

DATE:
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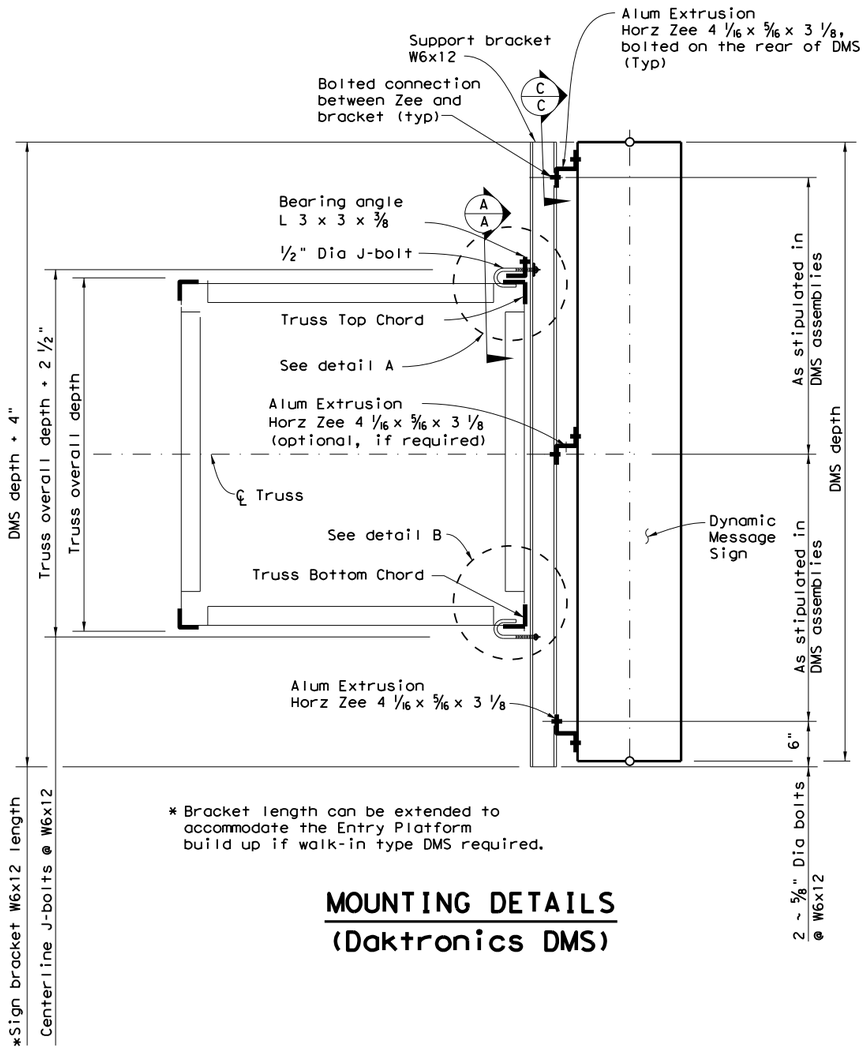
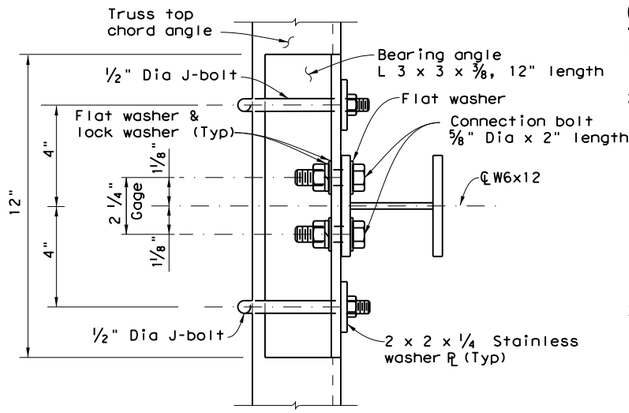
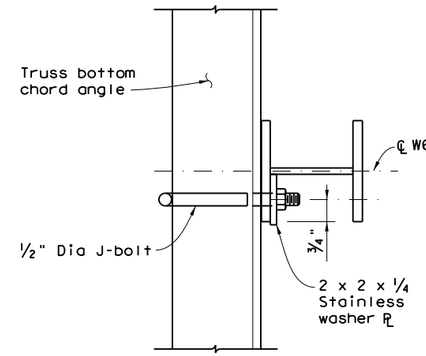


* Bracket length can be extended to accommodate the Entry Platform build up if walk-in type DMS required.

MOUNTING DETAILS (Daktronics DMS)



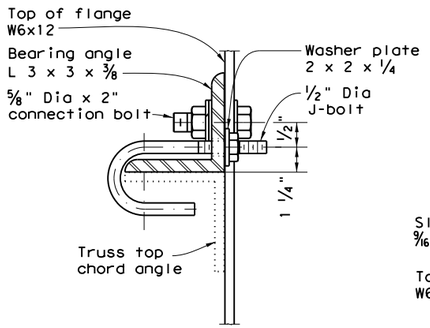
TOP VIEW TRUSS TOP CONNECTION



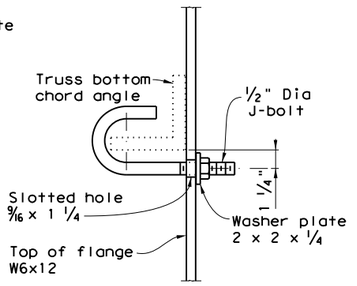
TOP VIEW TRUSS BOTTOM CONNECTION

GENERAL NOTES:

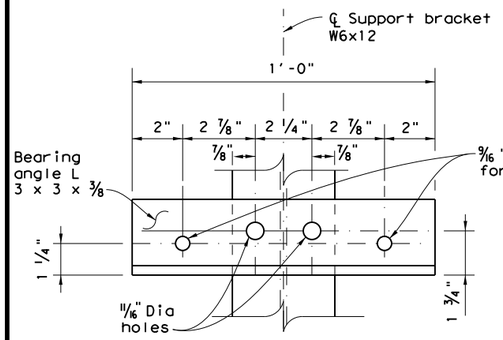
1. Determine the adequacy of the overhead sign support structure to support the dynamic message sign (DMS) prior to attaching the sign to the truss.
2. Designed according to the 1994 edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 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

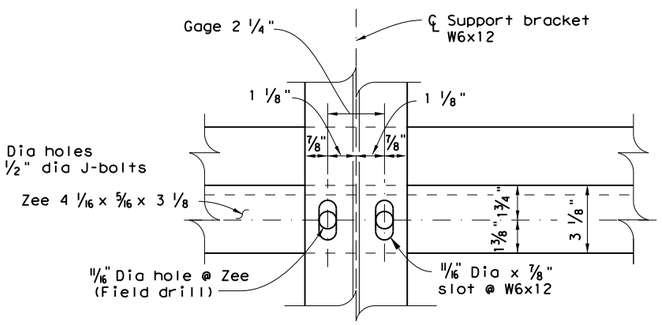


DETAIL B

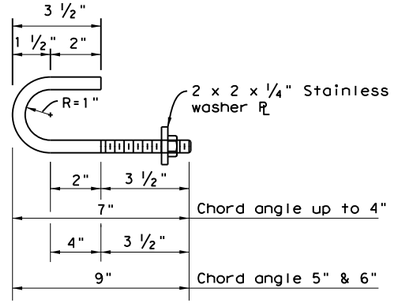


SECTION A-A

(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	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		138

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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

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		DIST	COUNTY		SHEET NO.
		DAL	DALLAS, ETC.		139

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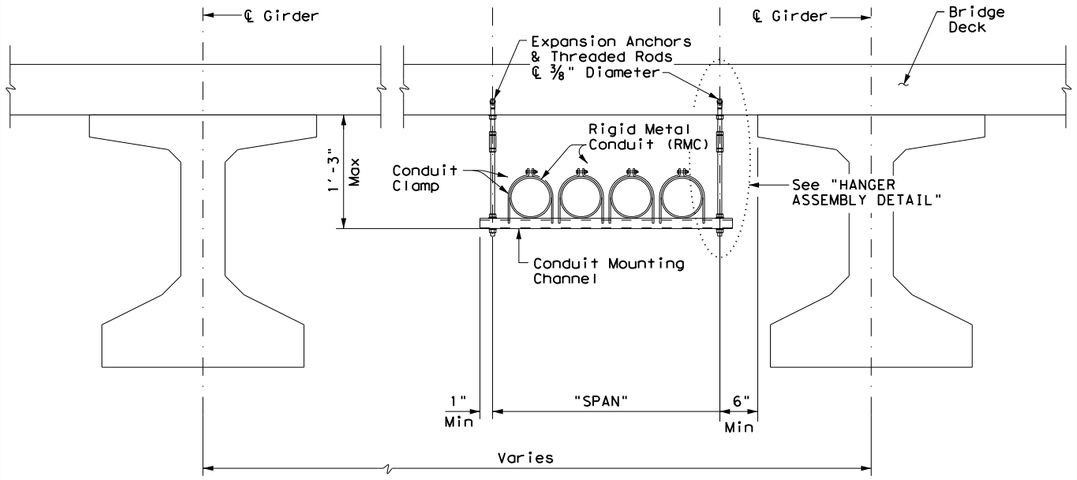
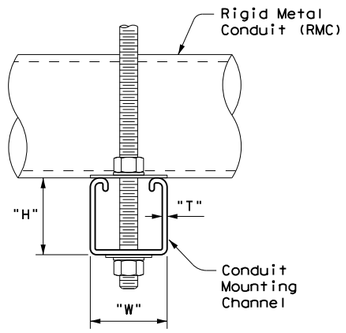
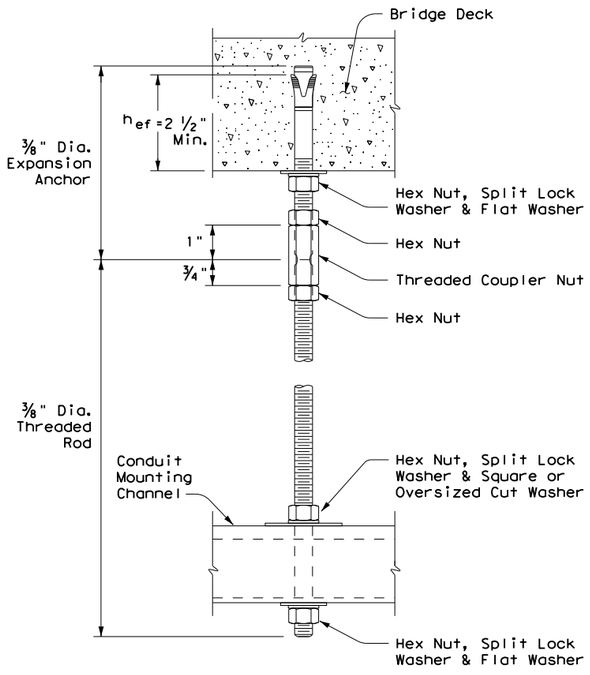


CONDUIT HANGING DETAIL

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.

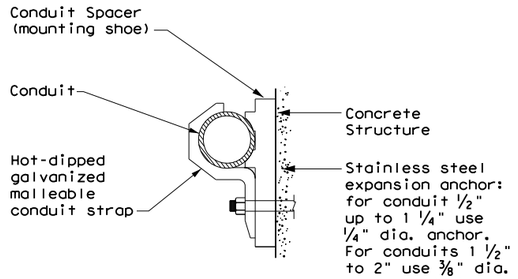
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

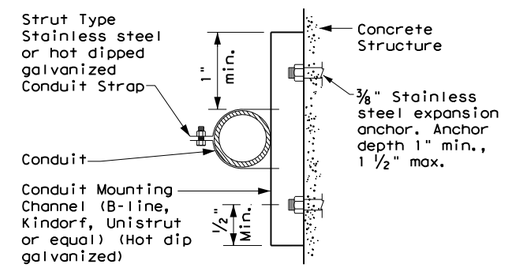




HANGER ASSEMBLY DETAIL

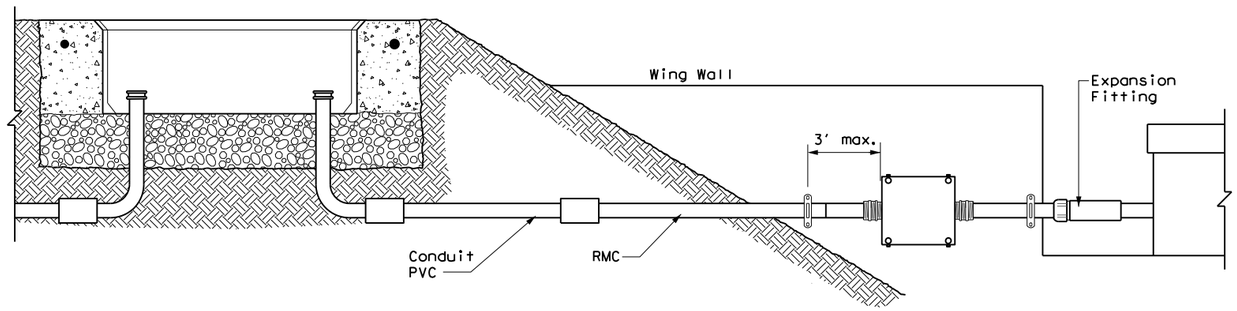
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





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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REVISIONS	0092	02	137, ETC.	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DALLAS, ETC.		140

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

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

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

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

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

B. CONSTRUCTION METHODS

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

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

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

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

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

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

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

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

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

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

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

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

C. TEMPORARY WIRING

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

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

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

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

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

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

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

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

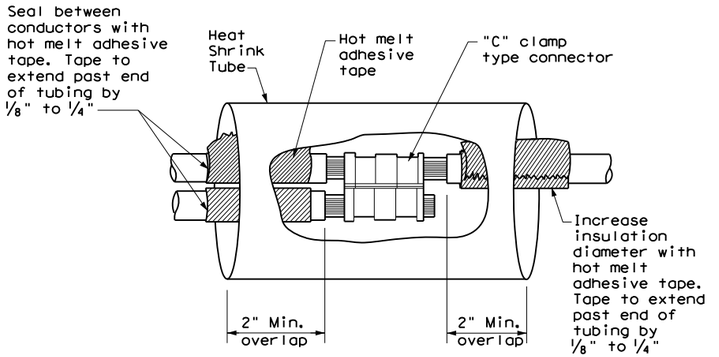
3. Install ground rods so the imprinted part number is at the upper end of the rod.

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

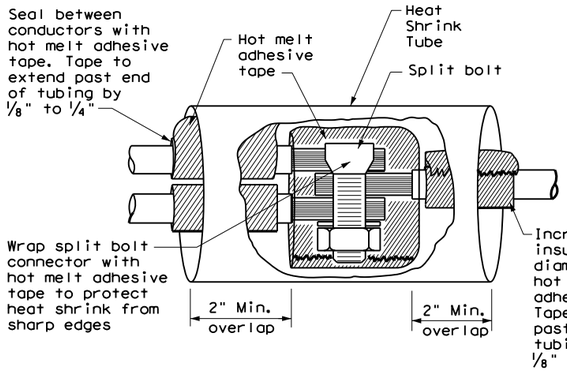
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

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

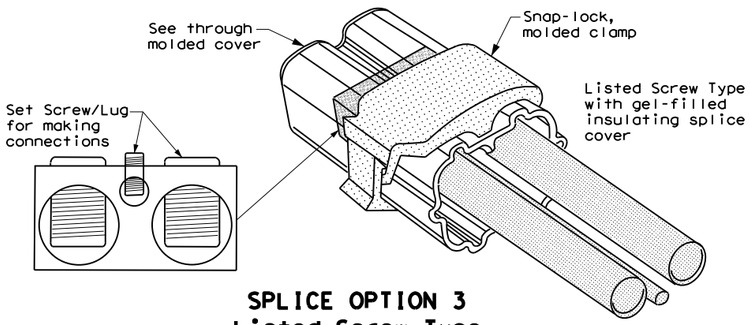
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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		DAL	DALLAS, ETC.		141

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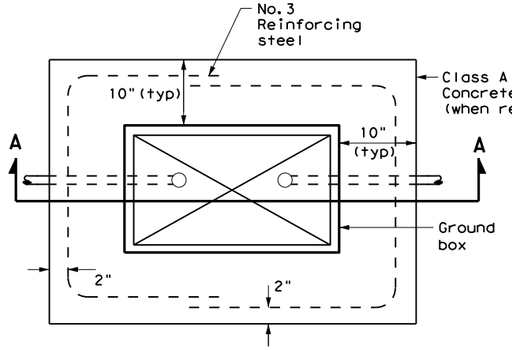
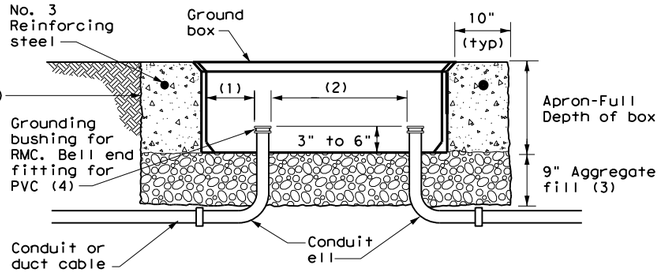


PLAN VIEW



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.

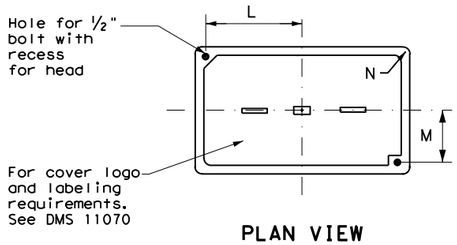
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(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



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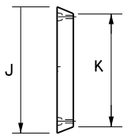

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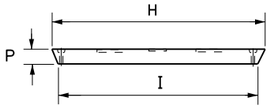

SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

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

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

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

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

B. CONSTRUCTION METHODS

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

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

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

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

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

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

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

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SERVICE ASSEMBLY ENCLOSURE

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

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

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

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

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

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

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

PHOTOELECTRIC CONTROL

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

*ELECTRICAL SERVICE DATA

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

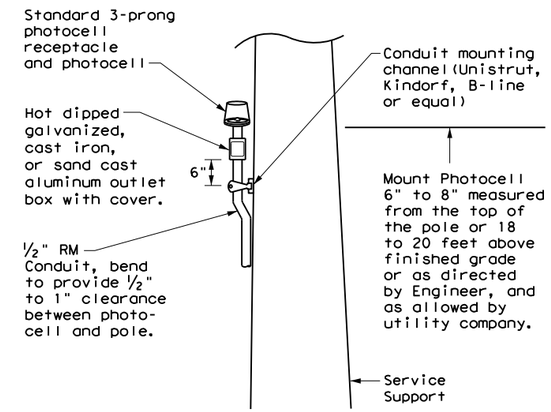
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

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

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

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

- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating
  000 indicates main lug only/
  Typically Type T
- (SS)= Safety Switch Ahead of Meter-Check with Utility
- (NS)= No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type
  - GS= Galvanized steel("off the shelf")
  - SS= Stainless steel(Custom Enclosure)See MPL
  - AL= Aluminum (Custom Enclosure)See MPL
- Photocell Mounting Location
  - (E)= Inside Service/Enclosure Mounted
  - (T)= Top of pole
  - (L)= Luminaire mounted
  - (N)= None/No Photocell or Lighting Contactor Required
- Service Support Type
  - GC= Granite concrete
  - OC= Other concrete
  - TP= Timber pole
  - SP= Steel pole
  - SF= Steel frame
  - OT= Pole by others or paid for separately
  - EX= Existing pole
  - TS= Service on traffic signal pole
  - PS= Pedestal Service
- O= Overhead Service Feed from Utility
- U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

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

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Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

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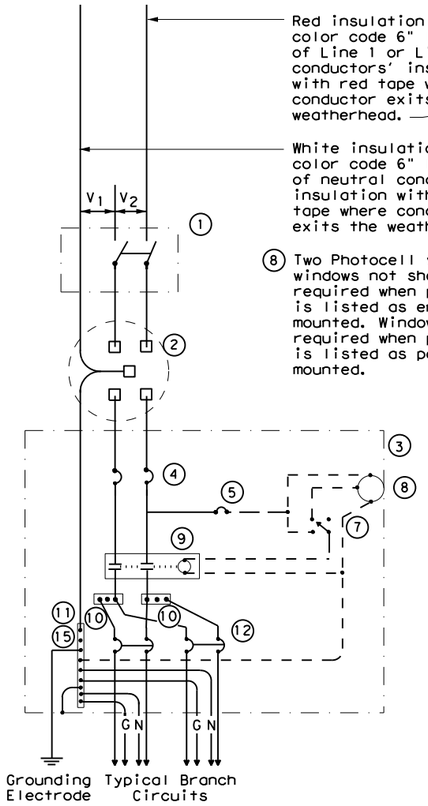
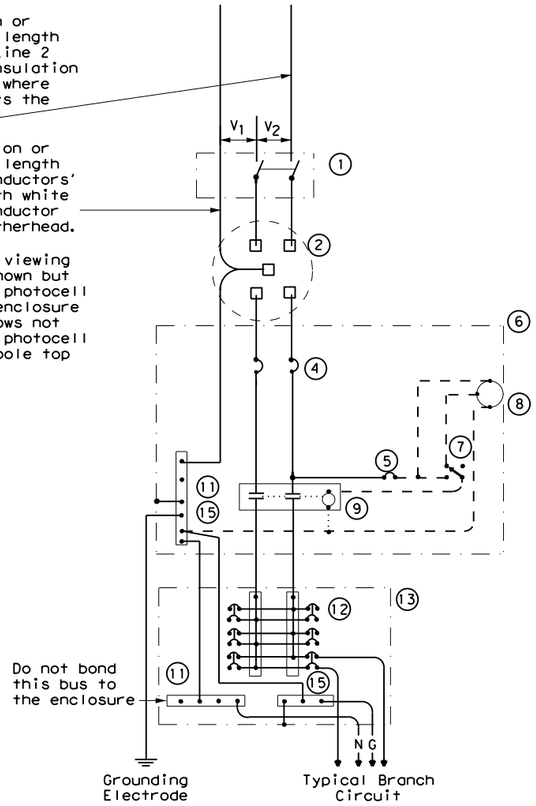
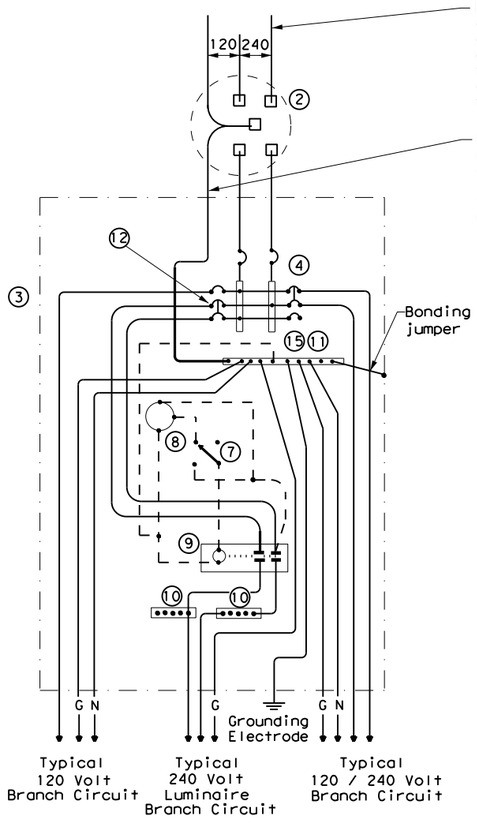


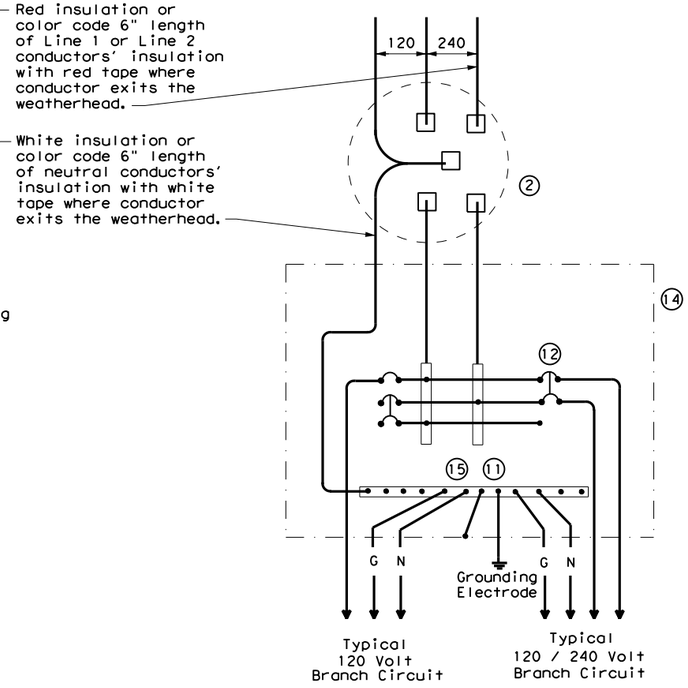
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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PEDESTAL SERVICE NOTES

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

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

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

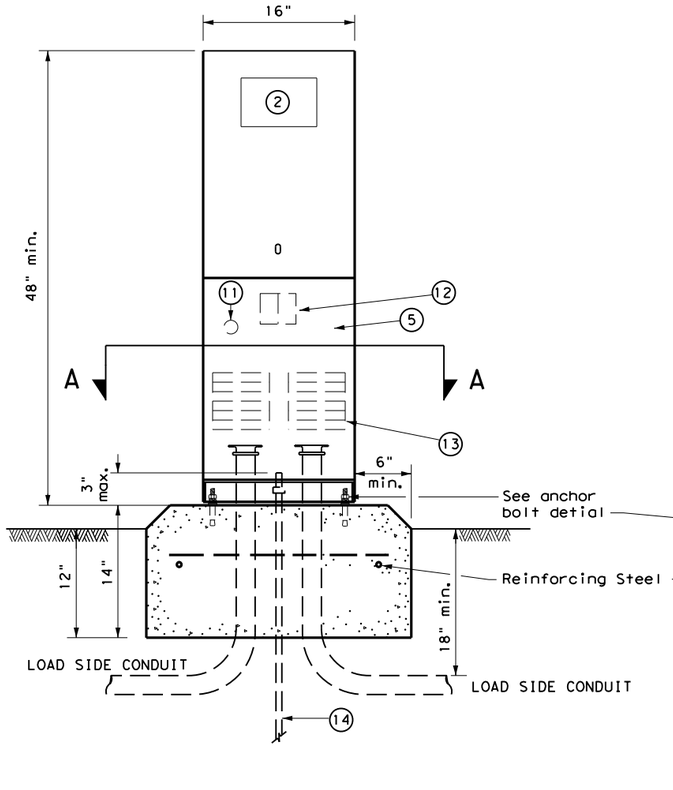
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

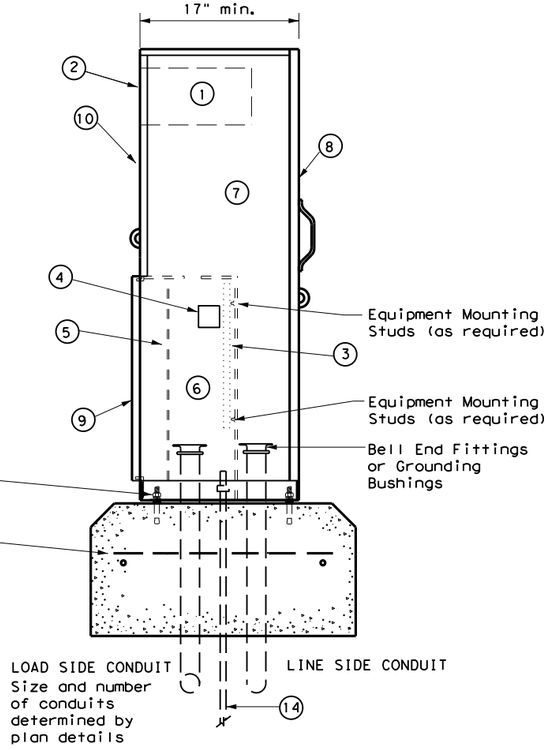
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to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

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

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

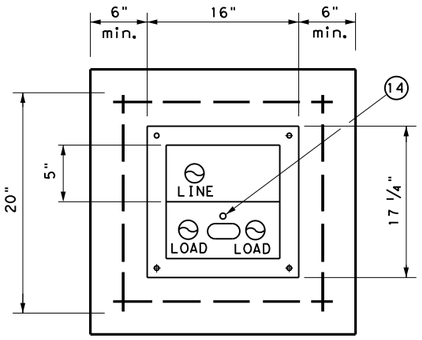


FRONT VIEW

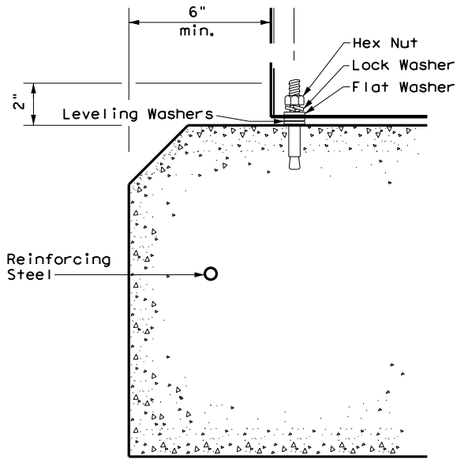


SIDE VIEW

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



SECTION A-A



ANCHOR BOLT DETAIL

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS
ED(9)-14

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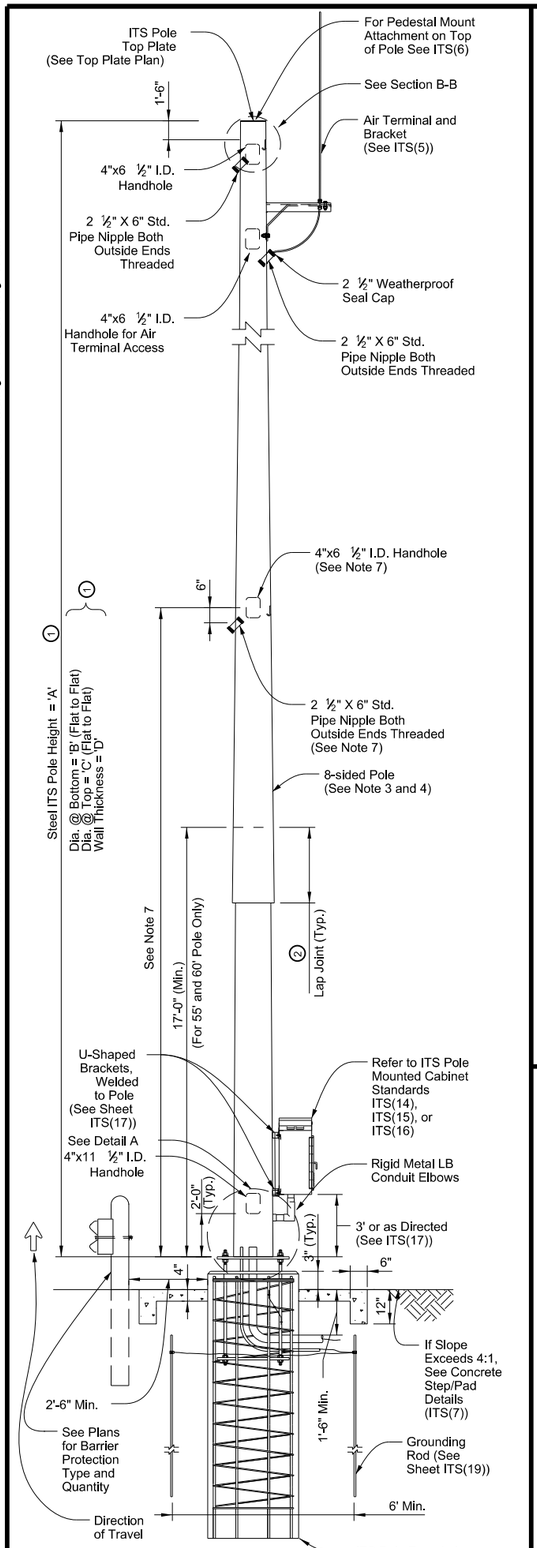
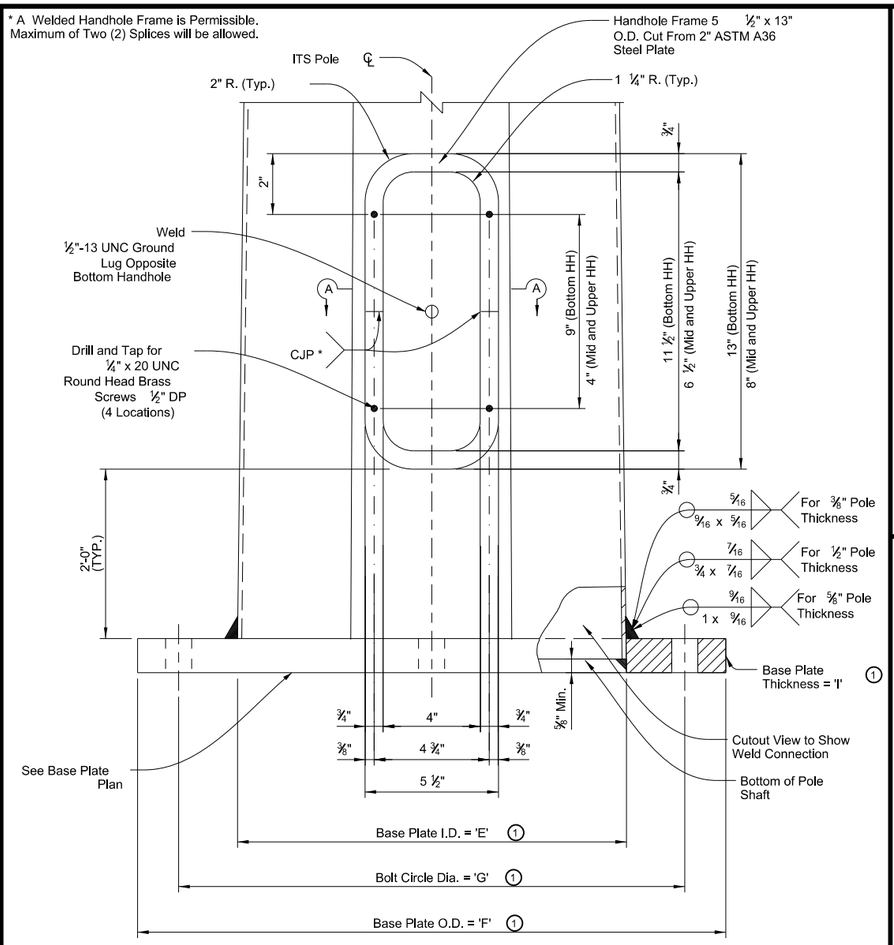
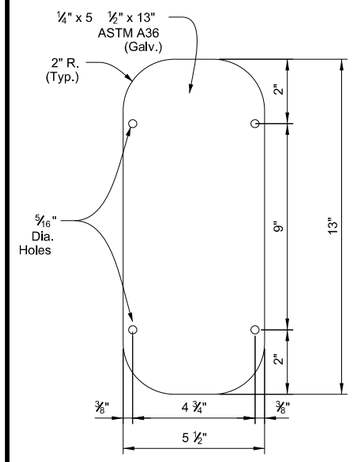


ITS Pole with Cabinet

* A Welded Handhole Frame is Permissible.
Maximum of Two (2) Splices will be allowed.

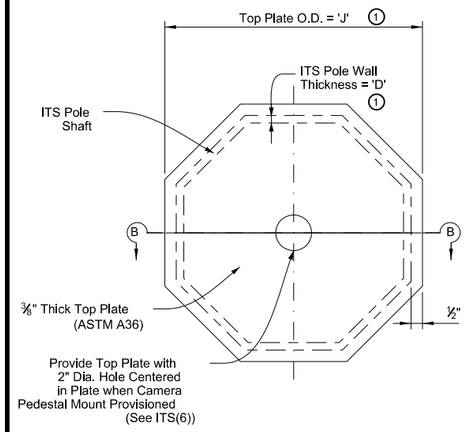


Detail A

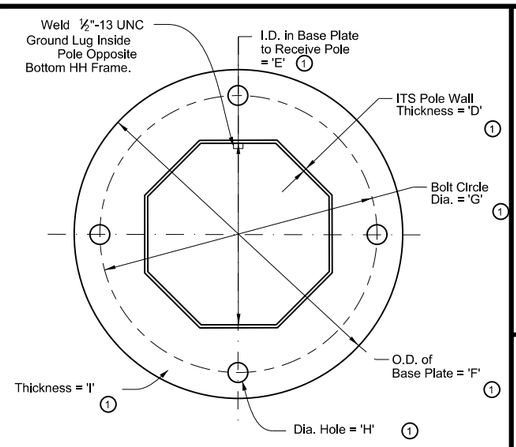


Handhole Cover Plate Detail

(Bottom Handhole)

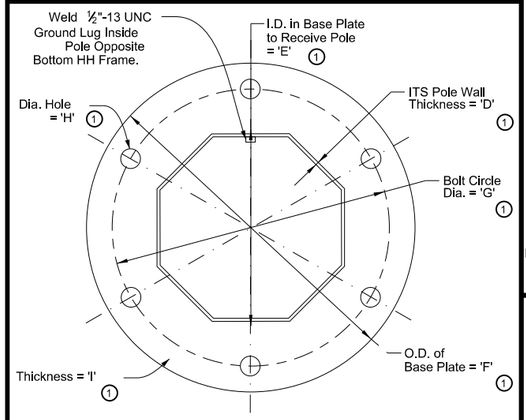


Top Plate Plan



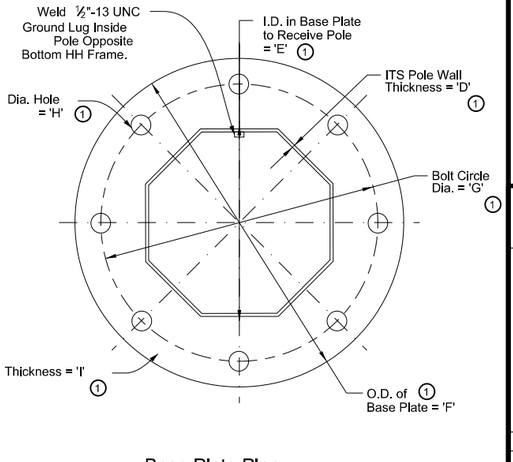
Base Plate Plan

4 Bolt Base Plate (ASTM A36)



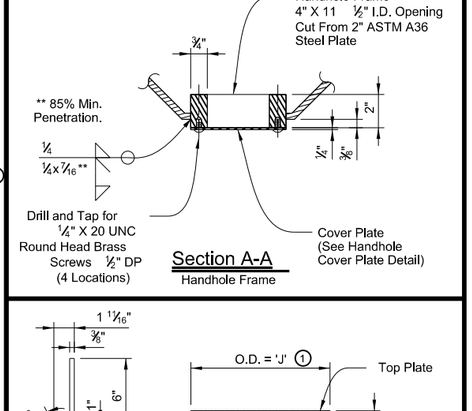
Base Plate Plan

6 Bolt Base Plate (ASTM A36)



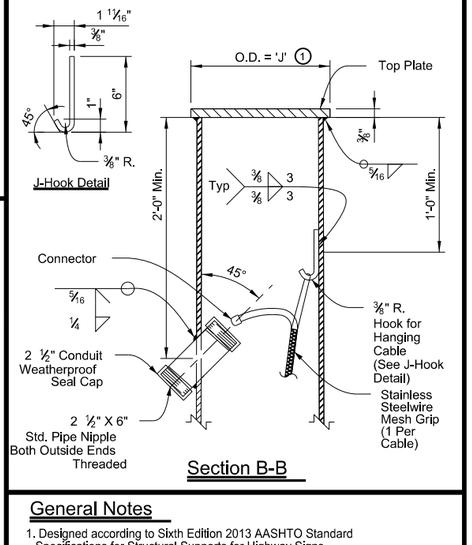
Base Plate Plan

8 Bolt Base Plate (ASTM A36)



Section A-A

Handhole Frame



Section B-B

General Notes

1. Designed according to Sixth Edition 2013 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications.
2. Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
3. Deviation from the design criteria, values, and dimensions shown herein and on ITS(4), constitutes an alternative design and will require submission of shop drawings and calculations for approval, sealed by a Texas Professional Engineer.
4. Direct substitution of twelve sided or round poles, matching the design criteria, values, and dimensions shown herein, require submission of shop drawings for approval to confirm design criteria and values on ITS(4) is met.
5. Locate handholes opposite of the direction of travel.
6. Appropriate number of anchor bolts for base plate determined by height of pole. See 'L' on sheet ITS(4).
7. Location for ITS equipment mount may vary by device. Locate mid span handhole and pipe nipple to accommodate location for ITS equipment as identified in the plans or per manufacturer recommendations. Identify location for mid span handhole and pipe nipple on shop drawings for approval.

Reference Notes:

(1) See tables on Sheet ITS(4) for values of dimension variables.

(2) See lap joint note for 55' and 60' pole heights on ITS(4) at the bottom of each table.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE DETAILS OCTAGONAL POLE (EIGHT SIDED POLE)

ITS(1)-15

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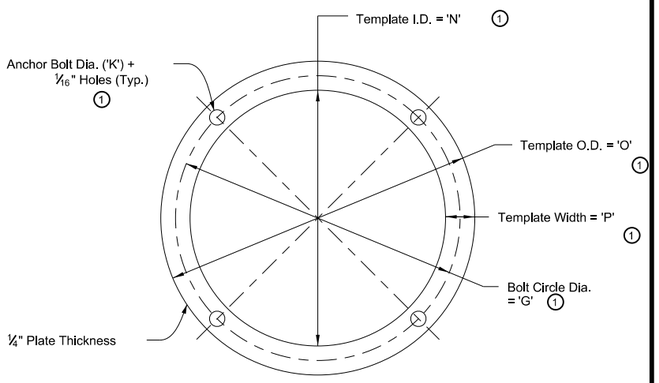
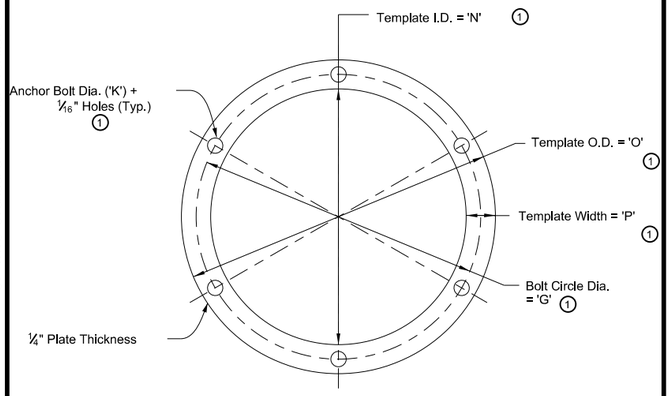


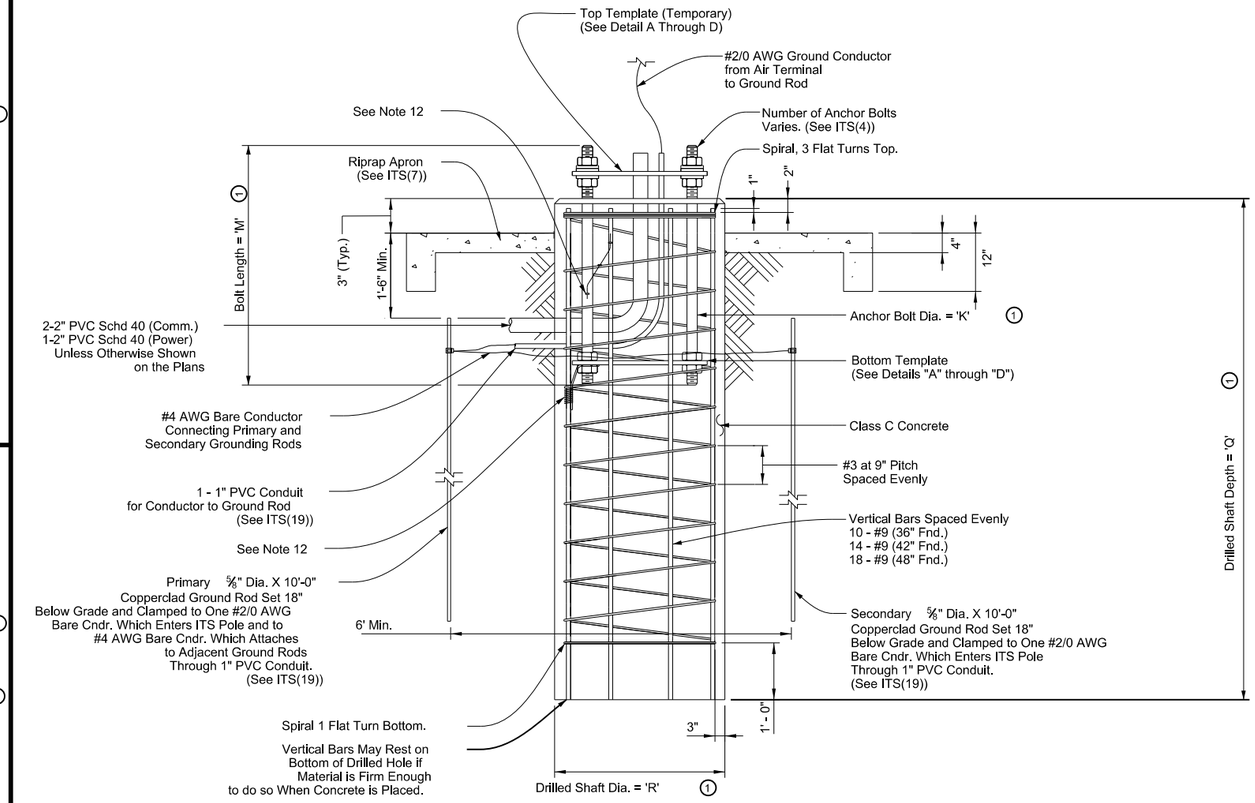
Top and Bottom Template (Four Bolt)

Detail A



Top and Bottom Template (Six Bolt)

Detail B



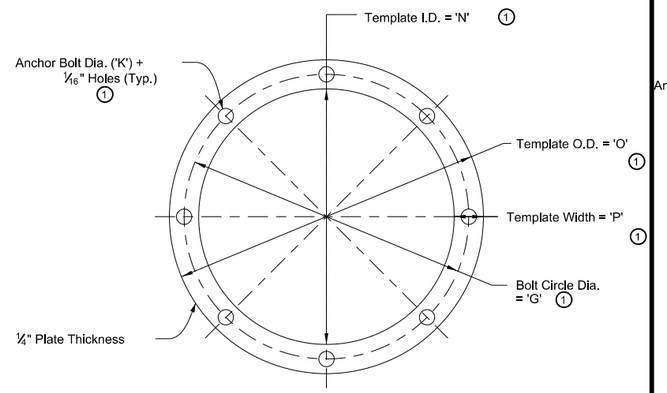
Foundation Details (Typical)

Elevation

Not to Scale

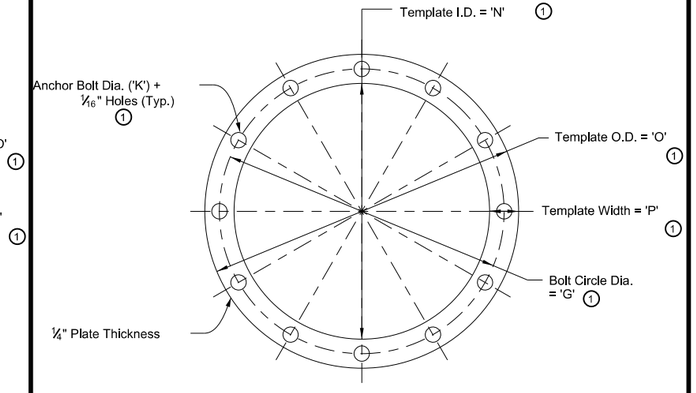
General Notes:

1. Drilled shaft concrete shall be Class "C" (f'c = 3,600 PSI) in accordance with Item 416, "Drilled Shaft Foundations."
2. Reinforcing bars shall be Grade 60 (Fy = 60 KSI) and conform to ASTM A-615. All reinforcing shall conform to Item 440, "Reinforcing Steel."
3. Provide ASTM A-36 steel for templates. Top and bottom templates need not be galvanized.
4. Anchor bolts shall be rigidly held in position during concrete placement using steel templates at the top and bottom. Top templates shall remain in place until the concrete has cured in place beyond initial set time.
5. Lubricate and tighten anchor bolts, when erecting pole, in accordance with Item 449, "Anchor Bolts."
6. Anchor bolts shall conform to ASTM F1554 Grade 55, or ASTM A193 B7 with ASTM A194 Grade 2H or A563 heavy hex nuts with F436 washers. Galvanize a minimum of the top end thread length plus 6 inches 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."
7. All vertical reinforcement shall be carried to the bottom of the drilled shaft.
8. Place three flat turns of the spiral bar at the top and one flat turn at the bottom of the drilled shaft.
9. Drilled shaft shall be measured by the linear foot and paid under Item 416, "Drill Shaft Foundations."
10. If rock is encountered, the drilled shaft to extend a minimum of two diameters into solid rock.
11. Location for conduit entering foundation may vary. Orient conduit entering foundation to coincide with location of ground boxes and primary ground rod.
12. Bond anchor bolts to rebar with #2/0 AWG jumper and two mechanical connectors or by bending No. 3 bar on bottom template as shown and wire tightly with ten turns of No. 10 wire or one mechanical connector. Mechanical connectors shall be UL Listed for concrete encasement.



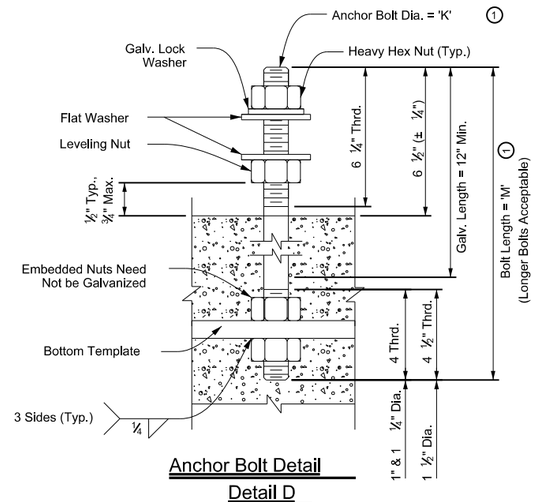
Top and Bottom Template (Eight Bolt)

Detail C



Top and Bottom Template (Twelve Bolt)

Detail D



Anchor Bolt Detail

Detail D

Reference Notes:

(1) See tables on Sheet ITS(4) for values of dimension variables.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE FOUNDATION DETAILS

ITS(3)-16

FILE: its(3)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS April 2016	0092	02	137,ETC	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DAL, ETC.		147

DATE:
FILE:

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TABLE 1: ITS POLE - 90 MPH (W/ 2 SOLAR PANELS) (4)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)(10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO.OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH - TEXAS CONE PENETROMETER (N - BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-1/4	1-1/2	9	1	4	29	14	18	2	12	11	10	36
	30	13	9	1/2	13-1/16	24	19	1-9/16	1-1/2	10	1-1/4	4	35	16-1/2	21-1/2	2-1/2	15	13	10	36
	40	15	9	1/2	15-1/16	26	21	1-9/16	1-1/2	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	17	14	11	42
	45	16	10	1/2	16-1/16	27	22	1-9/16	1-1/2	11	1-1/4	6	35	19-1/2	24-1/2	2-1/2	18	16	12	42
	50	17	10	1/2	17-1/16	28	23	1-9/16	1-1/2	11	1-1/4	6	35	20-1/2	25-1/2	2-1/2	19	16	12	42
	55 (6)(7)	19	11	5/8	19-1/16	30	25	1-13/16	2	12	1-1/2	6	40	22	28	3	21	18	13	42
	60 (6)(7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	6	40	23	29	3	21	19	14	48

TABLE 2: ITS POLE - 110 MPH (W/ 2 SOLAR PANELS) (4)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)(10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO.OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH - TEXAS CONE PENETROMETER (N - BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-1/4	1-1/2	9	1	4	29	14	18	2	14	12	10	36
	30	13	9	1/2	13-1/16	24	19	1-9/16	1-3/4	10	1-1/4	6	35	16-1/2	21-1/2	2-1/2	18	15	11	36
	40	15	9	1/2	15-1/16	25	21	1-9/16	1-3/4	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	20	17	12	42
	45	16	10	1/2	17-1/16	27	22	1-9/16	1-3/4	11	1-1/4	8	35	19-1/2	24-1/2	2-1/2	21	18	13	42
	50	17	10	1/2	18-1/16	28	23	1-9/16	1-3/4	11	1-1/4	8	35	20-1/2	25-1/2	2-1/2	22	19	14	42
	55 (7)	19	11	5/8	19-1/16	30	25	1-9/16	2	12	1-1/4	8	35	22-1/2	27-1/2	2-1/2	24	20	14	42
	60 (7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	6	40	23	29	3	25	21	15	48

TABLE 3: ITS POLE - 130 MPH (W/ 1 SOLAR PANEL) (5)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)(10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO.OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH - TEXAS CONE PENETROMETER (N - BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-9/16	1-3/4	9	1-1/4	4	35	13-1/2	18-1/2	2-1/2	16	14	10	36
	30	13	9	1/2	15-1/16	24	19	1-9/16	1-3/4	10	1-1/4	6	35	16-1/2	21-1/2	2-1/2	18	16	11	36
	40	15	9	1/2	15-1/16	26	21	1-9/16	1-3/4	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	21	18	13	42
	45	16	10	1/2	16-1/16	27	22	1-9/16	1-3/4	11	1-1/4	8	35	19-1/2	24-1/2	2-1/2	23	19	14	42
	50	17	10	1/2	17-1/16	28	23	1-9/16	2	11	1-1/2	8	40	20	26	3	24	20	14	42
	55 (7)	19	11	5/8	19-1/16	30	25	1-13/16	2	12	1-1/2	8	40	22	28	3	27	22	15	42
	60 (7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	8	40	23	29	3	28	23	16	48

TABLE 4: ITS POLE WITH STIFFENERS - 90 MPH (W/ 4 SOLAR PANELS) (8)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO.OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH - TEXAS CONE PENETROMETER (N - BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	30	13	9	3/8	13-1/16	28	22	1-1/4	1-3/4	10	1	8	29	20	24	2	17	15	11	42
	40	15	9	1/2	15-1/16	30	24	1-1/4	2	10	1	8	29	22	26	2	20	17	12	42
	45	16	10	1/2	16-1/16	31	25	1-9/16	2	11	1-1/4	8	35	22-1/2	27-1/2	2-1/2	21	18	13	42
	50	17	10	1/2	17-1/16	32	26	1-9/16	2	11	1-1/4	8	35	23-1/2	28-1/2	2-1/2	21	18	13	42
12 sided	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	21	18	13	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2	13	1-1/4	12	35	25-1/2	30-1/2	2-1/2	22	19	14	48

TABLE 5: ITS POLE WITH STIFFENERS - 110 MPH (W/ 4 SOLAR PANELS) (8)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO.OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH - TEXAS CONE PENETROMETER (N - BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	30	13	9	1/2	13-1/16	28	22	1-9/16	2-1/4	10	1-1/4	8	35	19-1/2	24-1/2	2-1/2	20	17	12	42
	40	16	10	1/2	16-1/16	31	25	1-9/16	2-1/4	11	1-1/4	8	35	22-1/2	27-1/2	2-1/2	24	20	14	42
	45	17	11	1/2	17-1/16	32	26	1-9/16	2-1/4	12	1-1/4	8	35	23-1/2	28-1/2	2-1/2	25	21	15	42
	50	18	11	1/2	18-1/16	32	26	1-13/16	2-1/2	12	1-1/2	8	40	23	29	3	25	21	15	48
12 SIDED	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2-1/4	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	24	21	15	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2-1/4	13	1-1/4	12	35	25-1/2	30-1/2	2-1/2	25	22	15	48

TABLE 6: ITS POLE WITH STIFFENERS - 130 MPH (W/ 3 SOLAR PANELS) (9)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO.OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH - TEXAS CONE PENETROMETER (N - BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	30	13	9	1/2	13-1/16	28	22	1-9/16	2-1/2	10	1-1/4	8	35	19-1/2	24-1/2	2-1/2	23	19	14	42
	40	16	10	1/2	16-1/16	31	25	1-9/16	2-1/2	11	1-1/2	8	40	22	28	3	25	21	14	42
	45	17	11	1/2	17-1/16	32	26	1-13/16	2-1/2	12	1-1/2	8	40	23	29	3	26	22	16	48
	50	18	11	1/2	18-1/16	33	27	1-13/16	2-1/2	12	1-1/2	8	40	24	30	3	27	23	16	48
12 SIDED	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2-1/4	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	26	22	16	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2-1/4	13	1-1/4	12	35	25 1/2	30 1/2	2-1/2	27	23	16	48

General Notes:

1. Designed according to Sixth Edition 2013 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto.

2. Table 1 and Table 4 design wind speed equals 90 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.

3. Table 2 and Table 5 design wind speed equals 110 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.

4. Table 3 and Table 6 design wind speed equals 130 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.

5. Recommended embedment lengths are for information purposes only. Foundation embedment depth is based off Texas Cone Penetrometer Value N = 10 blows/ft. for soft soils and up to 40 blows/ft. for hard soils. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations" unless otherwise shown on the plans.

6. Deviation from the design criteria and values contained in the tables above constitute and alternative design and will require submission of shop drawings and calculations for approval, sealed by a Texas Professional Engineer.

7. 12-sided or round poles as a direct substitution for 8-sided and round poles as a direct substitution for 12-sided poles, meeting the design criteria and values contained in the tables above, require submission of shop drawings for approval.

Reference Notes

(1) See the following ITS Pole Standard sheets:
- 8-sided Pole - ITS(1)
- 12-sided Pole - ITS(2)

(2) Provision for 2" Dia. opening in top plate for poles requiring cameras mounted on top.
- See ITS Pole Mounting Details - ITS(6)

(3) See ITS Pole Foundation Details - ITS(3)

(4) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Two 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

(5) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- One 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

(6) Pole heights at 55 Ft. and 60 Ft. located in the AMA, CHS, and LBB Districts, will require special design and design values shown shall not be used. Submit shop drawings for pole design and supporting calculations for 55 Ft. and 60 Ft. pole heights signed and sealed by a Texas Professional Engineer for approval.

(7) Ensure minimum nominal splice length is 1.5 times the average pole diameter at the splice to the nearest inch. Ensure longitudinal seam welds that will be in contact at a slip joint splice are ground smooth for the length of splice plus a minimum of six inches. Ensure a 100% longitudinal seam weld for a length of 1.5 pole diameter plus a minimum of 6 inches in outer sections at splices and at base plate. Provide 85% penetration in longitudinal seam welds at other pole sections.

(8) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Four 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

Refer to ITS(4A) for stiffening plate details at the pole to base plate connection.

(9) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Three 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

Refer to ITS(4A) for stiffening plate details at the pole to base plate connection.

(10) When solar panels are not provisioned in the plans, ITS pole wall thickness may be reduced by 1/8".

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE DESIGN DETAILS DATA LOOKUP TABLE

ITS(4)-15

FILE: its(4)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	02	137,ETC	IH 45, ETC.
	DIST	COUNTY		SHEET NO.
	DAL	DAL, ETC.		148

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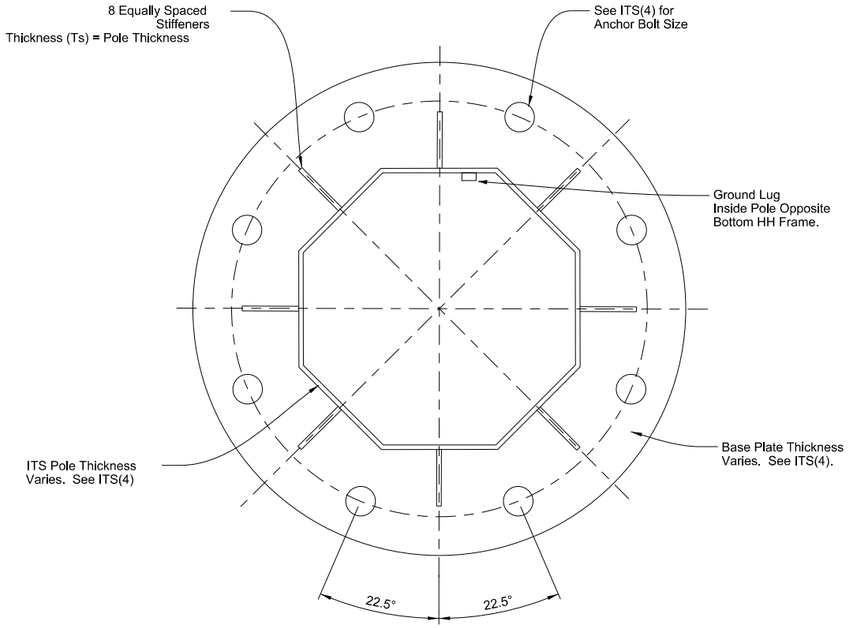
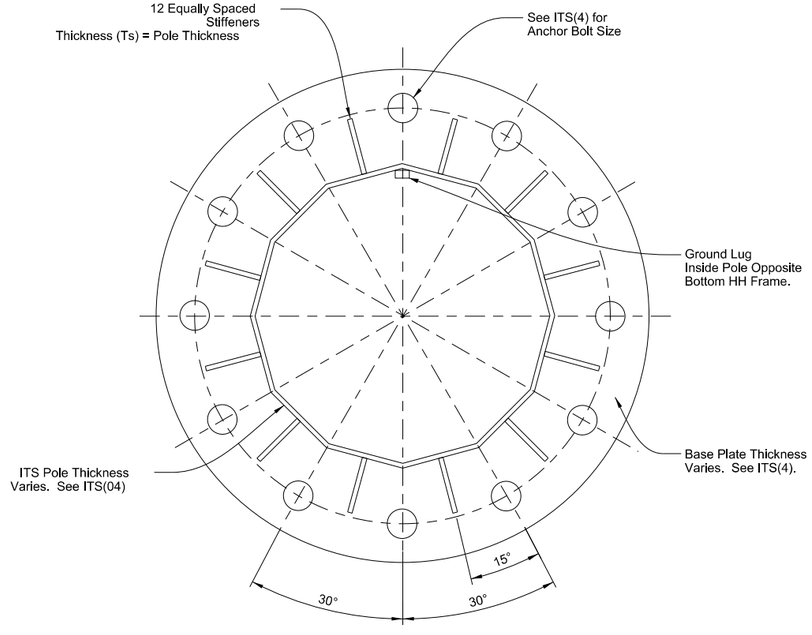


8-sided Pole Base Plate Detail



12-sided Pole Base Plate Detail

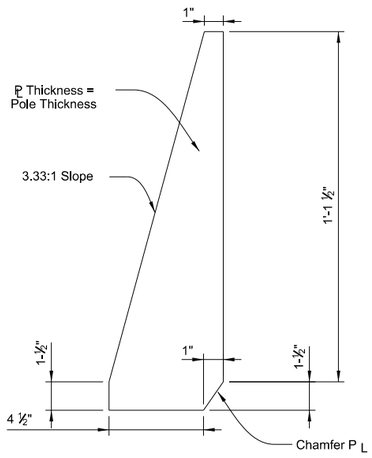
General Notes:

1. Steel stiffening plates shall conform to ASTM A36.
2. Make all welds conform to Item 441, "Steel Structures."
3. Galvanize in accordance with Item 445, "Galvanizing" unless otherwise noted.
4. Submit shop drawings detailing stiffening plate orientation along with ITS equipment intended for mounting for review and approval prior to fabrication.
5. HH = Handhole
6. T = Thickness

Reference Notes:

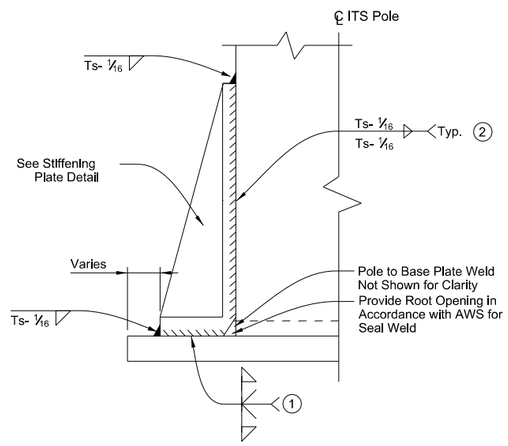
(1) Complete Joint Penetration Weld per AWS

(2) Wrap Fillet Weld Around Tip of Stiffener



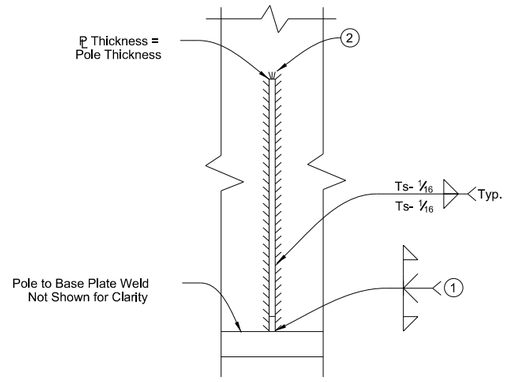
Stiffening Plate Detail

Not to Scale



Stiffening Detail - Elevation View

Not to Scale



Stiffening Detail - Front View

Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE STIFFENER PLATE DETAILS

ITS(4A)-15

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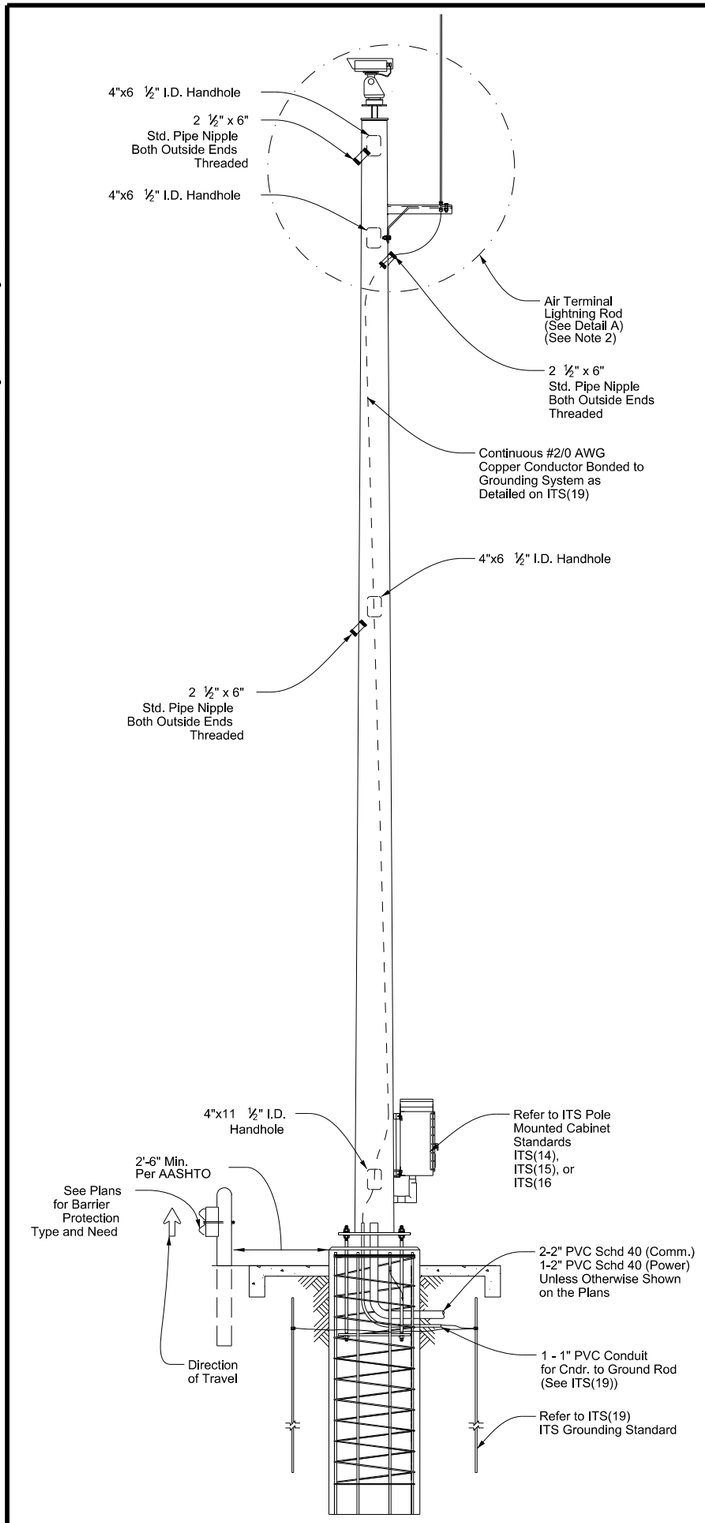
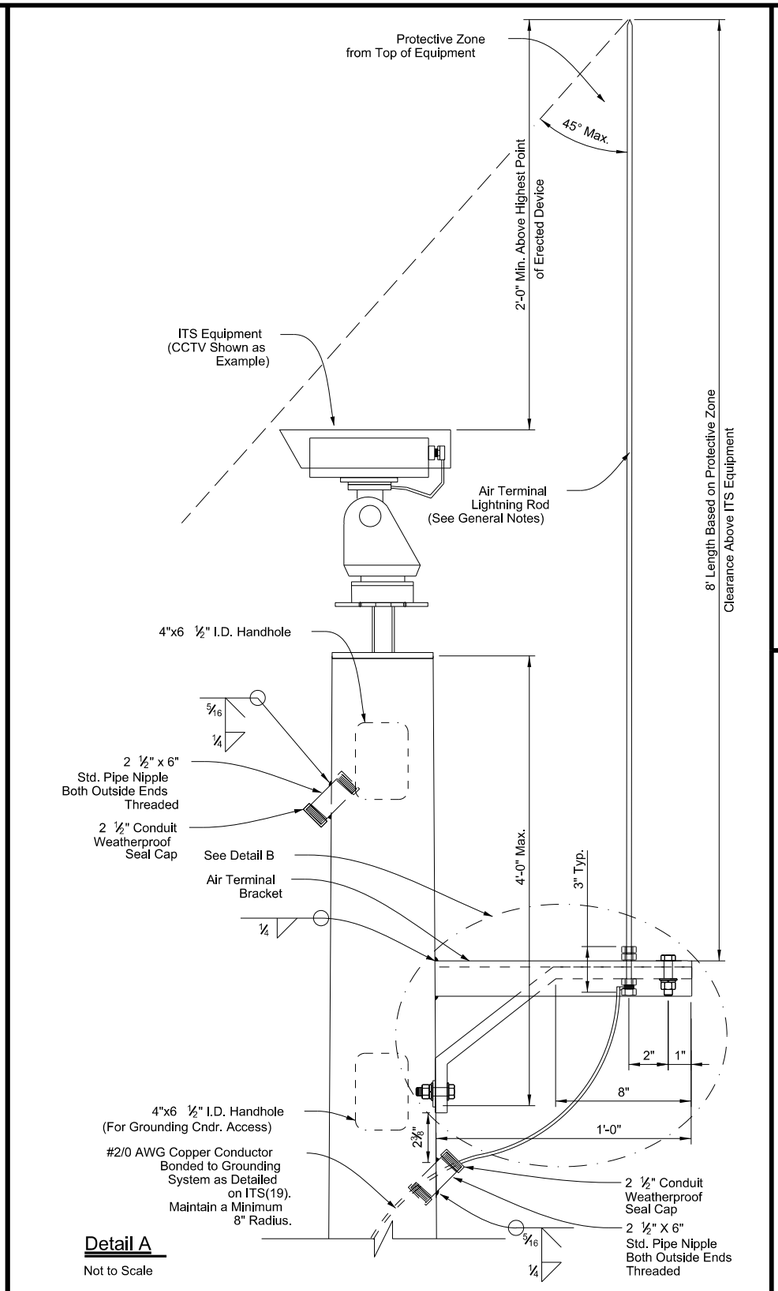
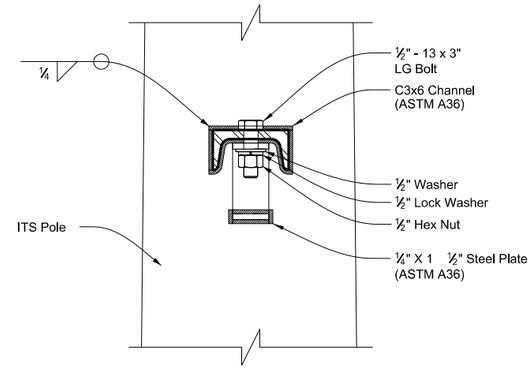


ITS Pole with Cabinet



Detail A

Not to Scale



Section A-A

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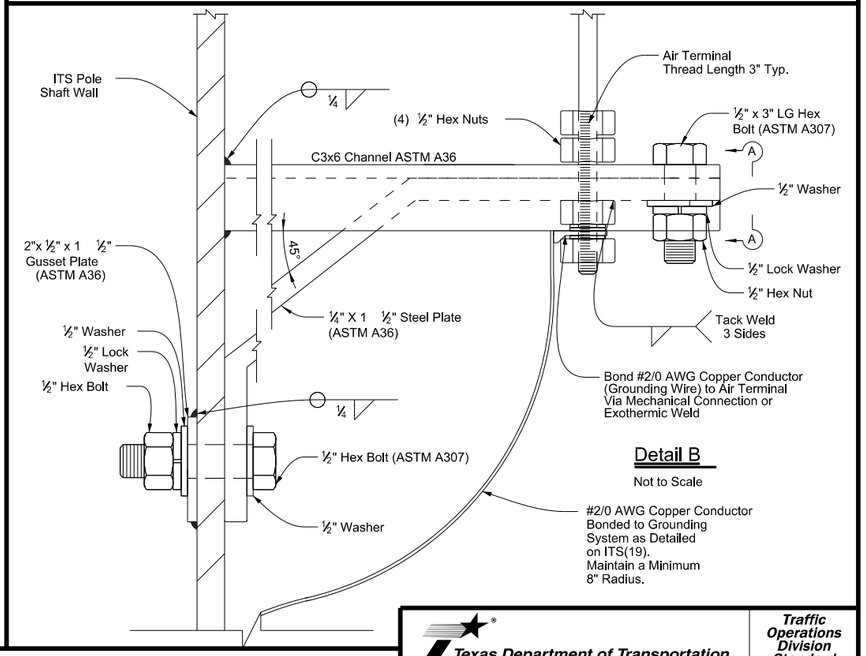

Detail B

Not to Scale

General Notes:

1. Provide lightning protection using air terminals on structures utilizing the rolling sphere method. Provide lightning protection system consisting of air terminals, down conductor, and grounding system installed in accordance with NFPA 780 and tested in accordance with IEEE 142. Meet the following requirements:
   A. Position - in center of least utilized field of view.
   B. Height - camera equipment to be within 45 degree protective zone of air terminal.
   C. Material - ½" ETP alloy 110 copper air terminal (Class II)
   D. Clearance - 24" minimum height above highest point of ITS equipment.
   E. Bonding - attach air terminal to bracket by exothermic weld or with approved clamping.
   F. Structure wind rating in accordance with TxDOT WV & IZ (LTS2013).
   G. Galvanize air terminal bracket in accordance with Item 445, "Galvanizing."
2. Alternative orientation for air terminal and pole mounted cabinet due to project specific needs to be indicated on the plans and detailed in shop drawing submittal for approval.
3. Weld air terminal bracket to ITS pole in accordance with Item 448 "Structural Field Welding." Bracket may be welded by the fabricator in the shop prior to delivery. A bolted connection for the air terminal bracket is acceptable in lieu of a welded connection with approval by the Engineer and detailed in the shop drawings.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE AIR TERMINAL DETAILS

ITS(5)-15

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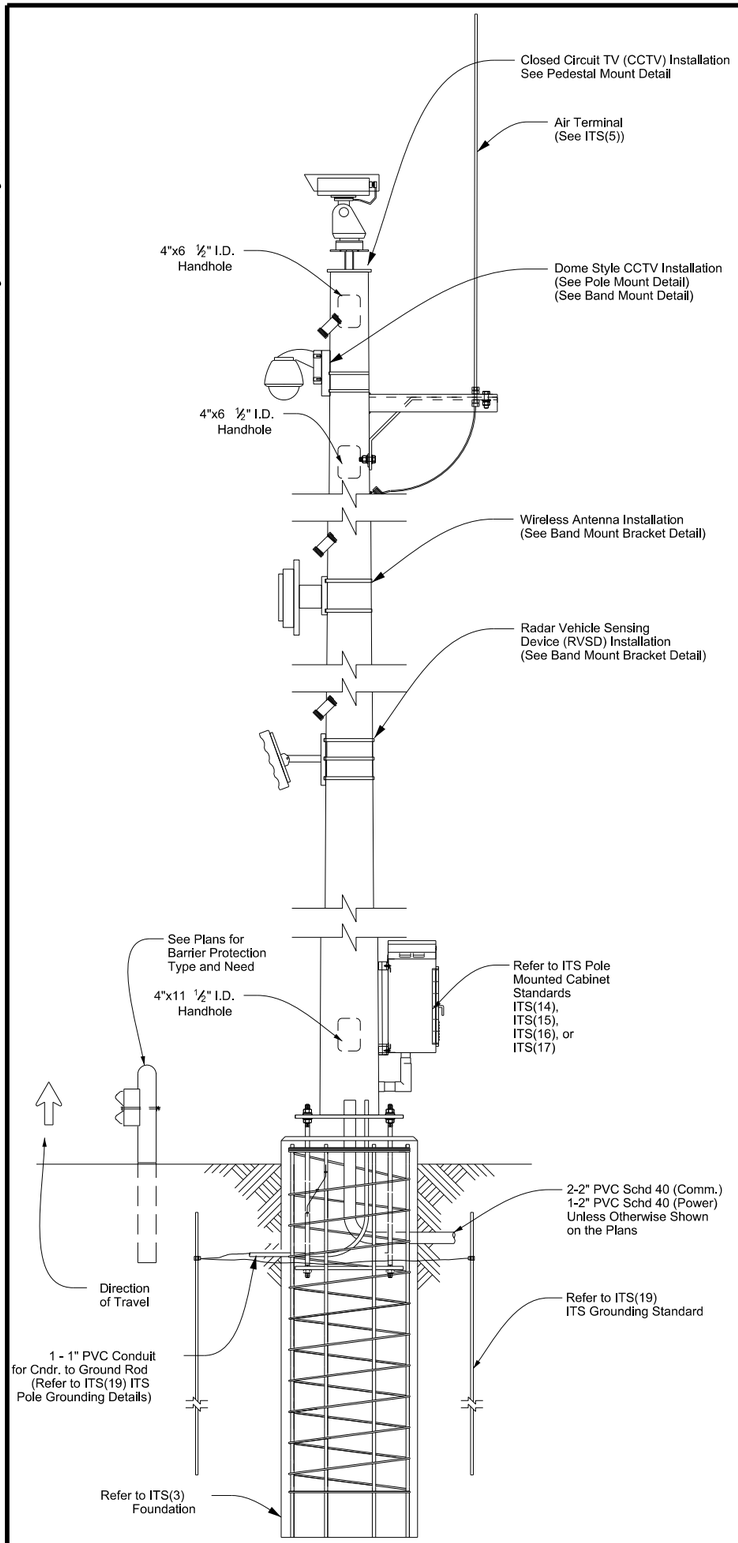
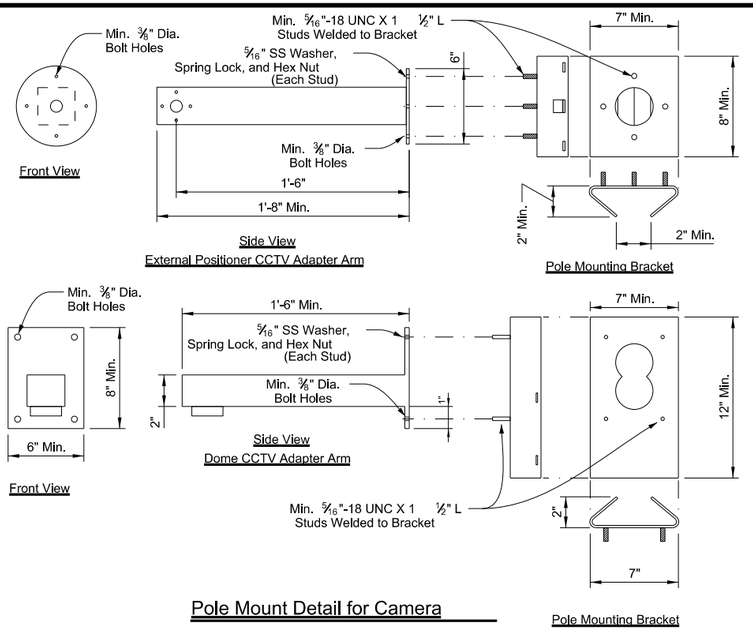
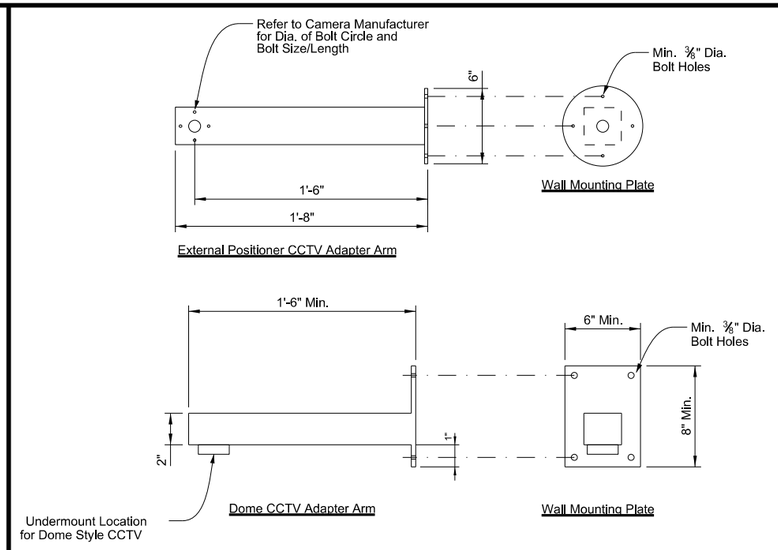


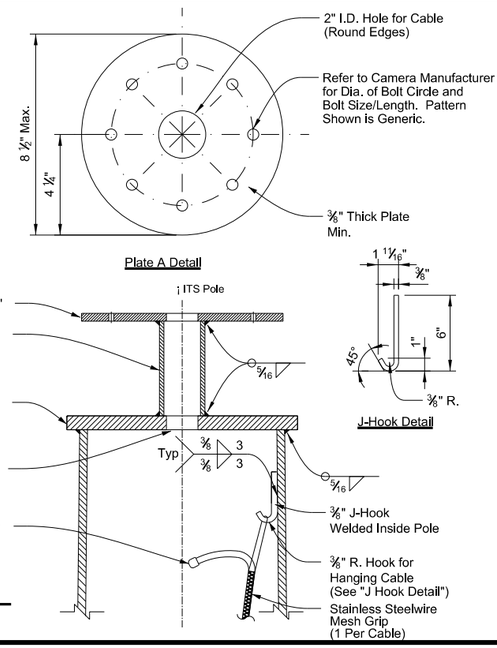
ITS Pole with Cabinet



Pole Mount Detail for Camera

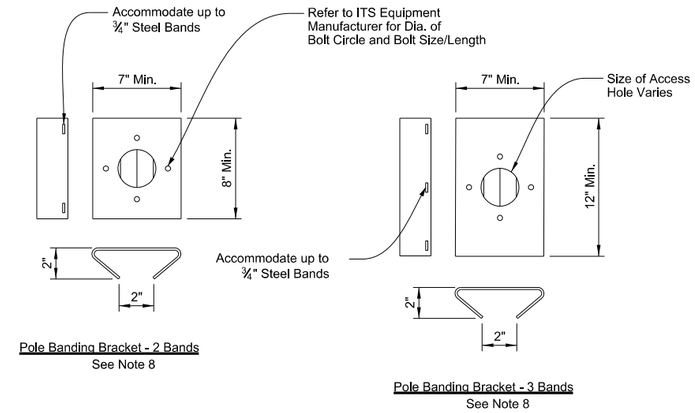


Wall Mount Detail



Pedestal Mount

Pole Top Detail



Band Mount Bracket Details

General Notes:

1. Designed according to Sixth Edition AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications.
2. Hang all cabling inside ITS pole structure with stainless steel wire mesh grips.
3. Bolt positioning in the pedestal top plate (Plate "A") for the pan/tilt base must be determined in the field per camera manufacturers recommendations. This will allow positioning of the camera to maximize coverage area. The Engineer will determine the camera's blind zone at each location.
4. Provide pedestal top plate and Plate "A" that conform to ASTM A36.
5. Make all welds conform to Item 441 and AWSD 1.1 (Structural Welding). Repair damaged galvanized coating per Item 445, "Galvanizing."
6. Galvanize parts in accordance with Item 445, "Galvanizing" unless otherwise noted.
7. The type of ITS equipment shown to be mounted to the ITS pole is intended to represent the most common ITS equipment applications and should not be treated as all inclusive. Other ITS equipment applications may exist that are project specific.
8. Mounting brackets are intended to be diagrammatic and for information only, and are not all inclusive. Contractor responsible for submitting mounting bracket design for approval by the Engineer prior to fabrication. Mounting bracket designed to support a maximum 35 Lbs. Off-the-shelf mounting brackets are acceptable and shall be submitted by shop drawing for approval.
9. Mounting heights to be determined in the field based on manufacturer recommendations.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE EQUIPMENT MOUNTING DETAILS

ITS(6)-15

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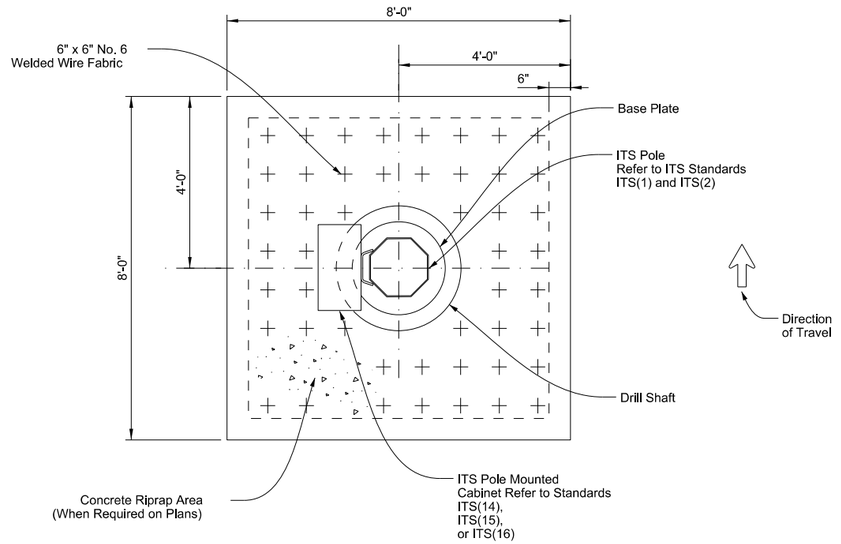
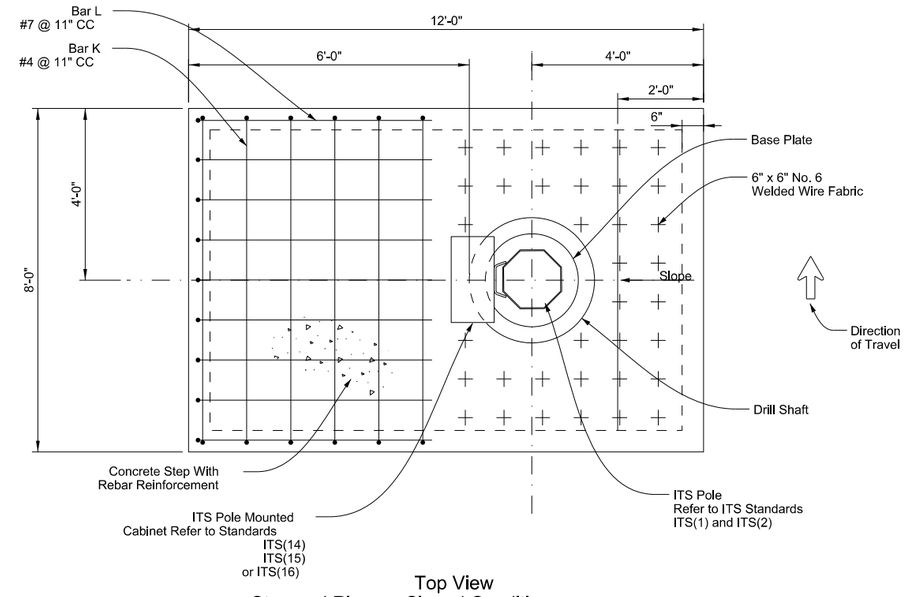


Top View
Riprap - Non-Sloped Conditions



Top View
Step and Riprap - Sloped Conditions

General Notes:

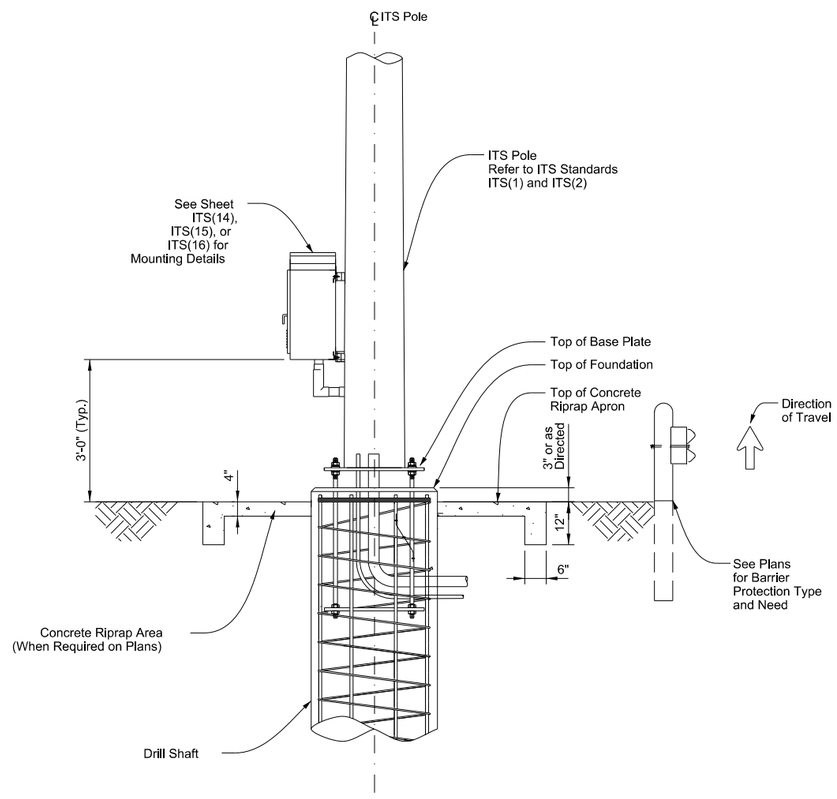
1. For non-sloped grassy areas, an 8' x 8' concrete riprap apron shall be poured around ITS pole foundations (see detail on this sheet), estimated at 1.25 CY per site, paid for under Item 432 "Riprap."

2. For sloped grassy areas, a concrete "step" (for maintenance personnel to access cabinet) shall be poured as part of the riprap apron. The step shall vary in height depending on slope, but shall extend 6' horizontally from ITS pole drilled shaft foundation and be the same width as riprap apron (8'). Step shall be poured at same time as riprap apron (see detail on this sheet). Any additional concrete necessary to fabricate step (over and above the 1.25 CY) shall be considered subsidiary to the various bid items and no direct payment shall be made.

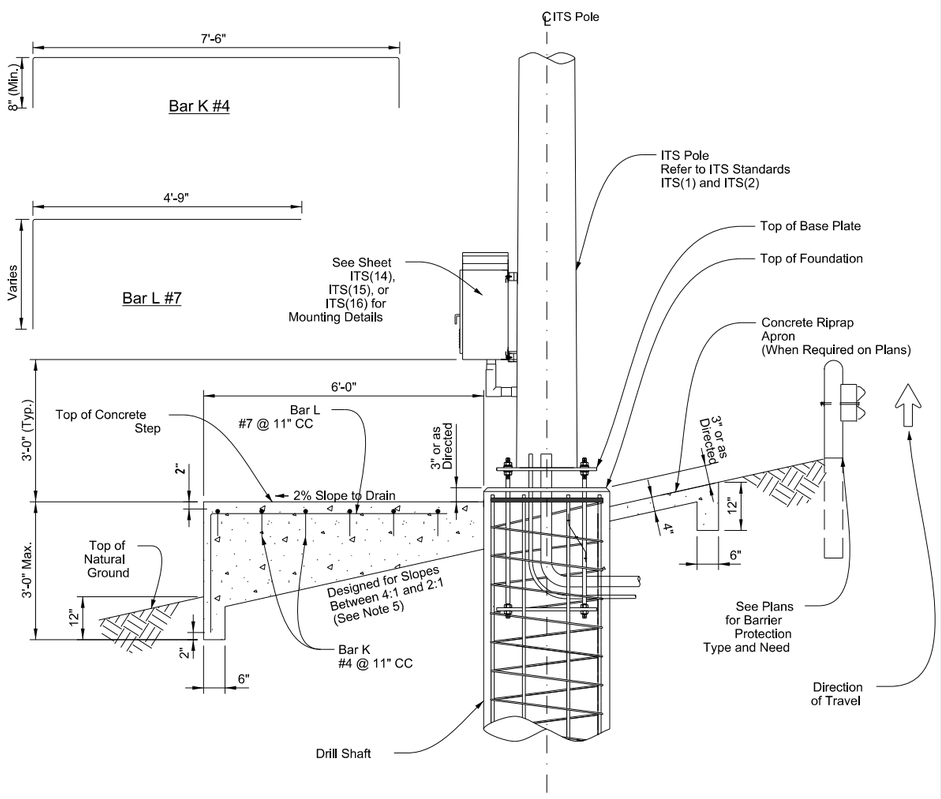
3. For sloped areas where riprap exists, a 6' (horizontal from drilled shaft foundation) x 4' wide step shall be installed (see detail this sheet). Concrete for step shall be considered subsidiary to the various bid items and no direct payment shall be made.

4. Cabinet orientation may vary depending on field conditions or project constraints. Accommodate configuration of platform according to cabinet orientation.

5. Slopes greater than a 2:1 or when 3'-0" Max. step wall height is exceeded, an alternative design with safety railing is required and shall be detailed in the shop drawings for approval.



Elevation View
Riprap Apron Detail - Non-Sloped Conditions



Elevation View
Riprap Apron/Step Detail - Sloped Conditions
(Slopes Exceeding 4:1)

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE RIPRAP DETAILS

ITS(7)-15

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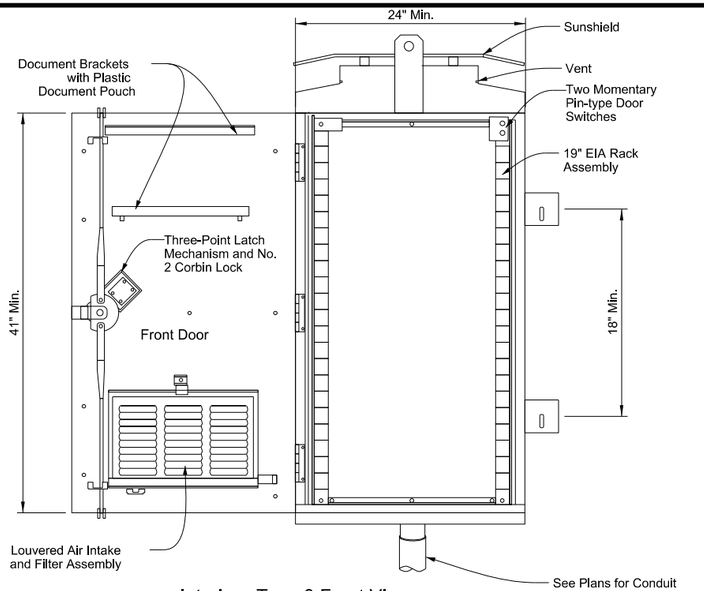
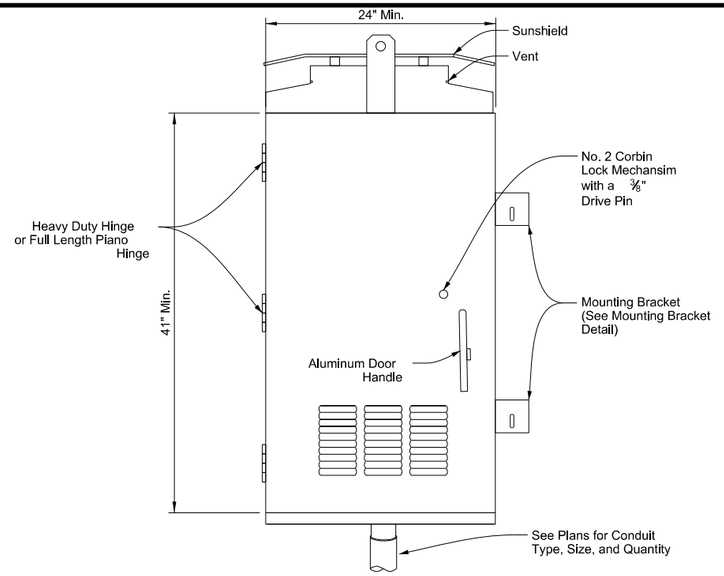


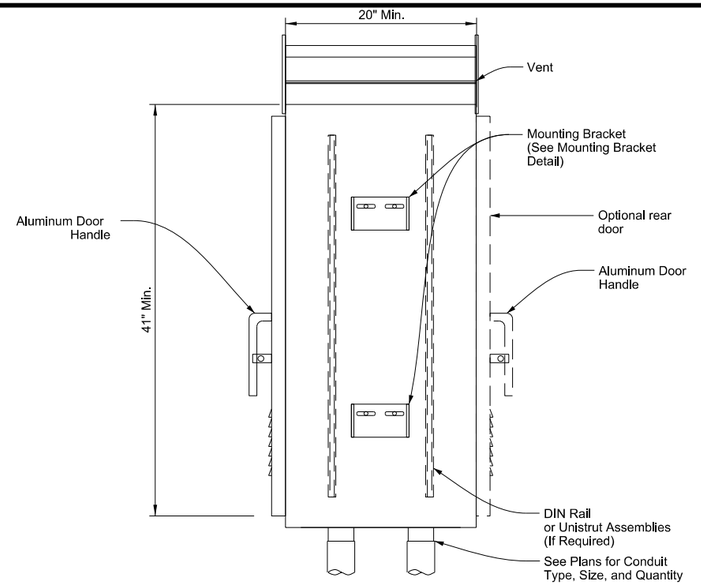
Interior - Type 3 Front View

Not to Scale



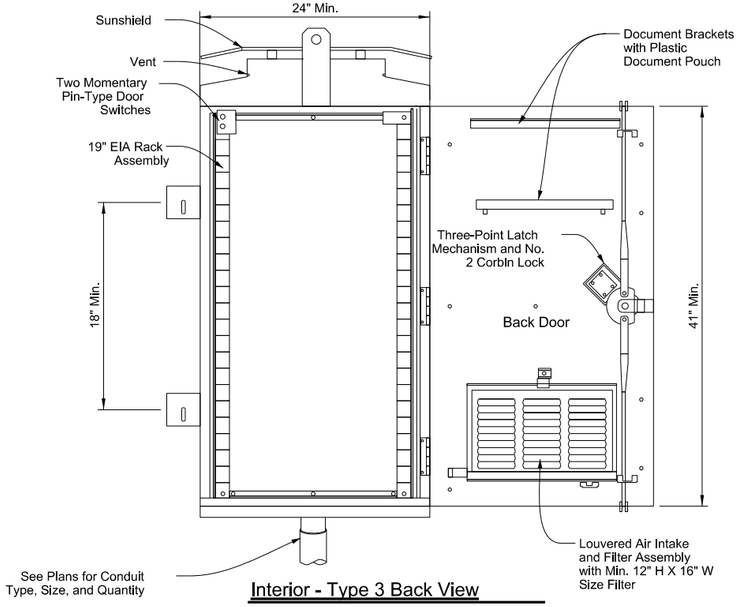
Pole Mounted Cabinet - Type 3 Front View

Not to Scale



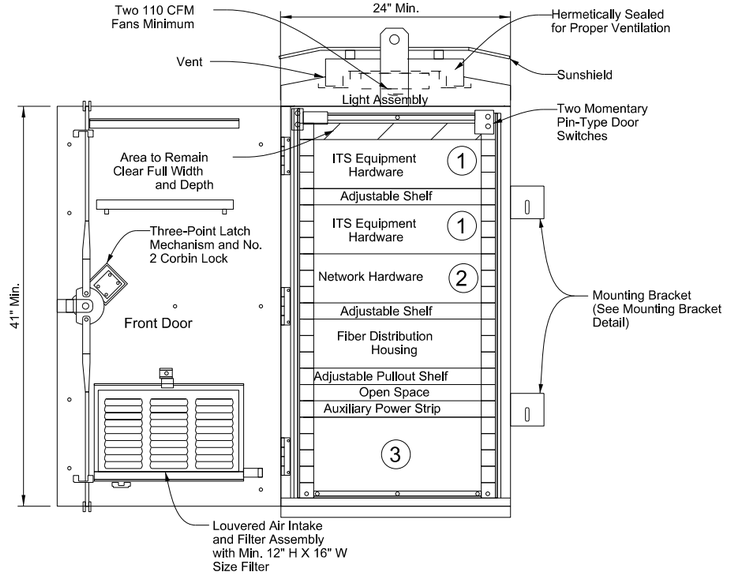
Pole Mounted Cabinet - Type 3 Side View

Not to Scale



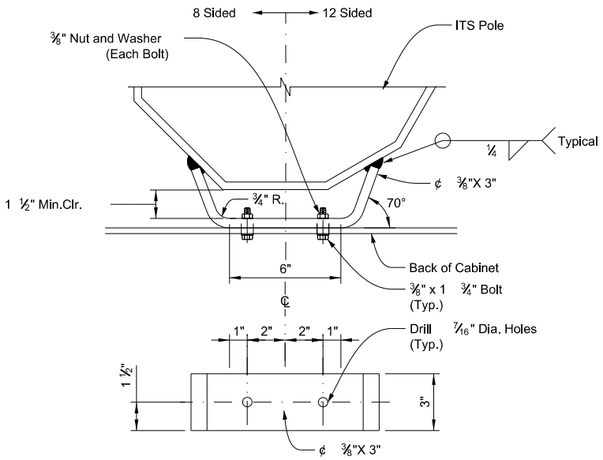
Interior - Type 3 Back View

Not to Scale



Interior - Type 3 With Rack Front View

Not to Scale



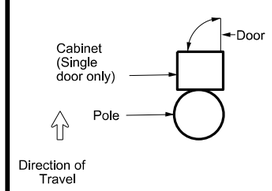
Note:
ITS Pole May be Round, Octagonal (8 Sided), or Dodecahedron (12 Sided).
See ITS(1), and ITS(2) for Details.

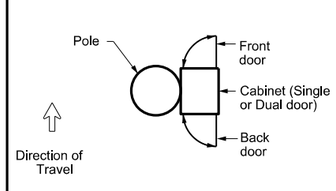
Mounting Bracket Detail

Not to Scale

General Notes:

1. Layout of hardware equipment and configuration shown is diagrammatic in nature and intended to represent a preferred Type 3 pole mounted cabinet setup. Hardware needed for each Type 3 cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for configuring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
2. Mount cabinet as detailed on ITS(16) or ITS(17). Orientation of cabinet on ITS pole may vary depending on field conditions. Mount the pole mounted cabinet to the backside of the ITS pole, to allow maintenance personnel to access the cabinet while being able to view oncoming traffic. A dual door configuration (configuration 2) is detailed above.
3. For ITS pole sites located on slopes greater than 4H:1V, Mount the cabinet to the backside of the ITS pole as detailed on ITS(7). Mounting height to accommodate maintenance pad for easy access.
4. All dimensions are approximate and represent minimum cabinet dimensions.
5. Provide conduit entrances at the bottom of the cabinet.
6. Paid under Special Specification "ITS Pole with Cabinet" (Configuration 1) with single door.
   Paid under Special Specification "ITS Pole with Cabinet" (Configuration 2) with dual door





Orientation of Type 3 Cabinet on ITS Pole (Typical)

Not to Scale

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, 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

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE MOUNTED CABINET TYPE 3 DETAILS

ITS(16)-15

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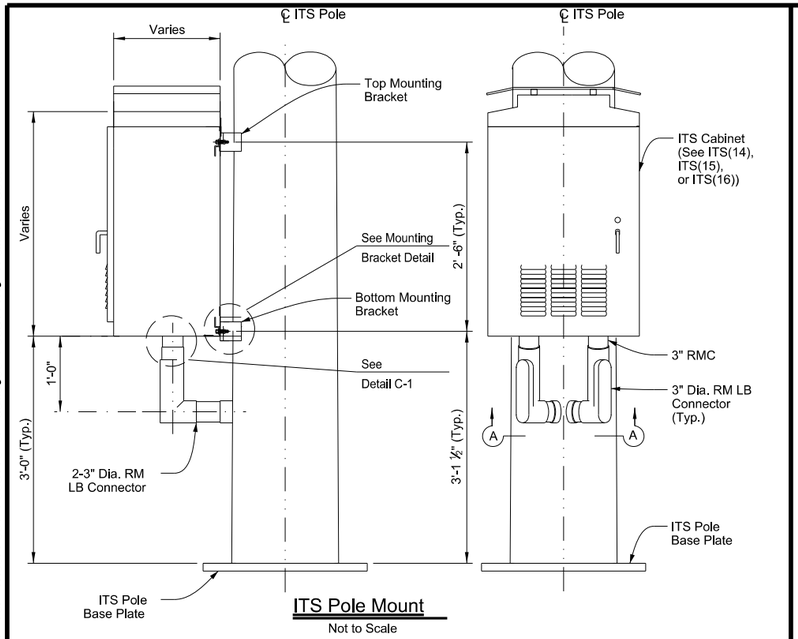
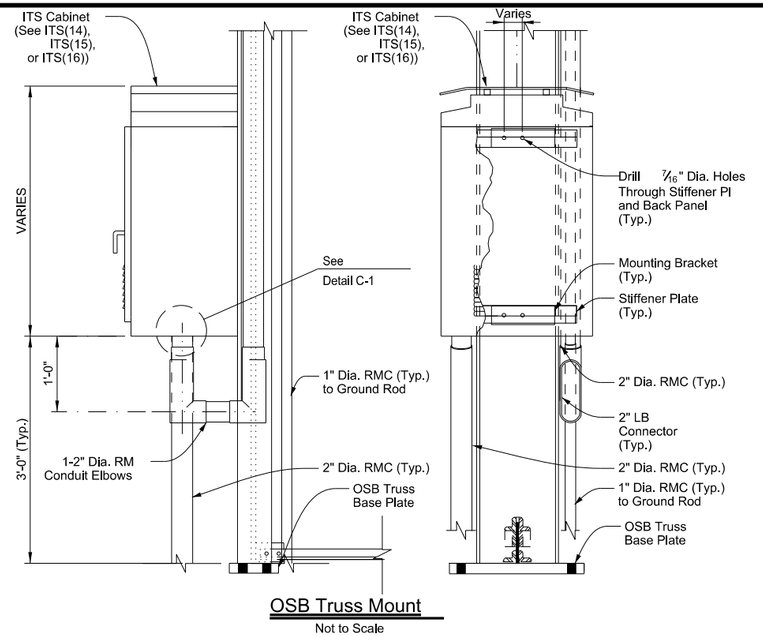


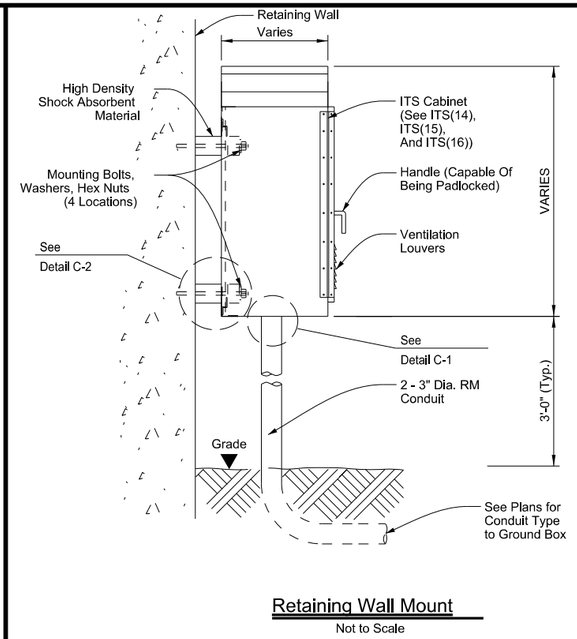
ITS Pole Mount

Not to Scale



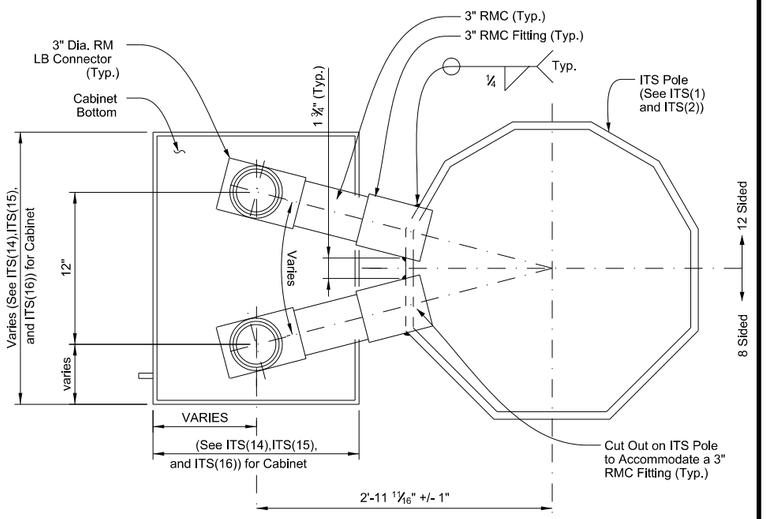
OSB Truss Mount

Not to Scale



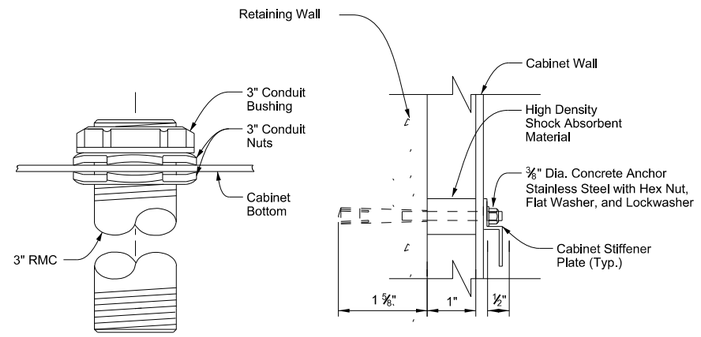
Retaining Wall Mount

Not to Scale



Section A-A

Not to Scale

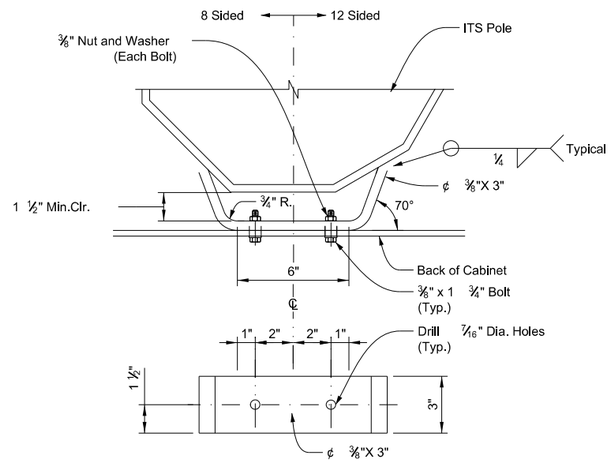


Detail C-1

Detail C-2

Detail C-1 and C-2

Not to Scale



Note:
ITS Pole May be Round, Octagonal (8 Sided), or Dodecahedron (12 Sided).
See ITS(1), and ITS(2) for Details.

Mounting Bracket Detail

Not to Scale

General Notes:

1. Mount cabinet as detailed on ITS(14), ITS(15), ITS(16), or ITS(17). Orientation of cabinet on ITS pole may vary depending on field conditions. Mount the pole mounted cabinet to the backside of the ITS pole, to allow maintenance personnel to access the cabinet while being able to view oncoming traffic.
2. For ITS pole sites located on slopes greater than 4V:1H, mount the cabinet to the backside of the ITS pole as detailed on ITS(7). Mounting height to accommodate maintenance pad for easy access.
3. All dimensions are approximate and represent minimum dimensions.
4. Provide conduit entrances at the bottom of the cabinet.

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Traffic Operations Division Standard

ITS POLE MOUNTED CABINET MISC. MOUNTING DETAILS

ITS(17)-15

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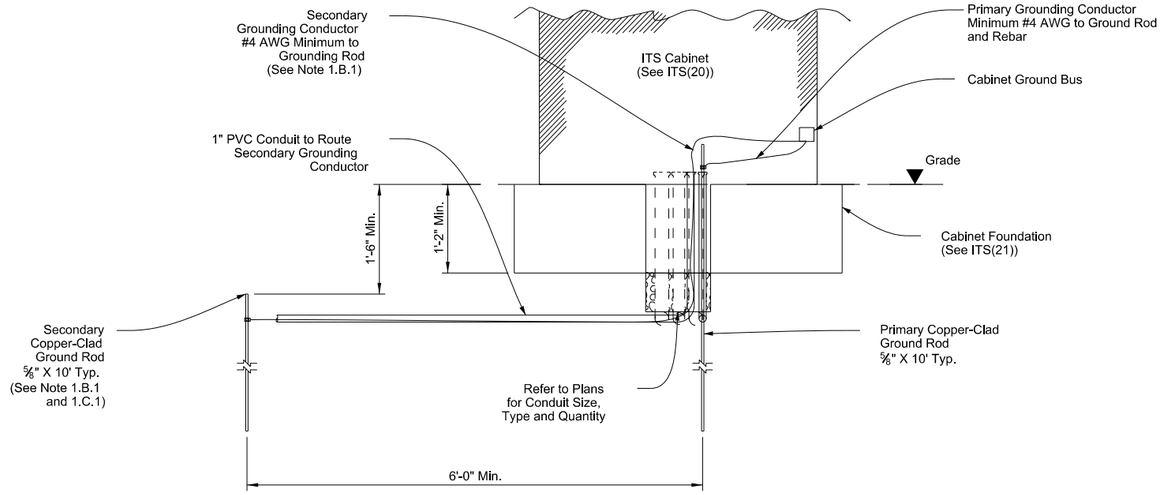
General Notes:

1. Grounding System:
   - A. Description:
     1. Provide ground system consisting of copper wires, ground rods, and concrete-encased grounding electrodes (Ufers), of the configuration 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 specified 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 specified in UL 467.
           1) Diameter: ⅝ in.
           2) Length: 10 Ft.

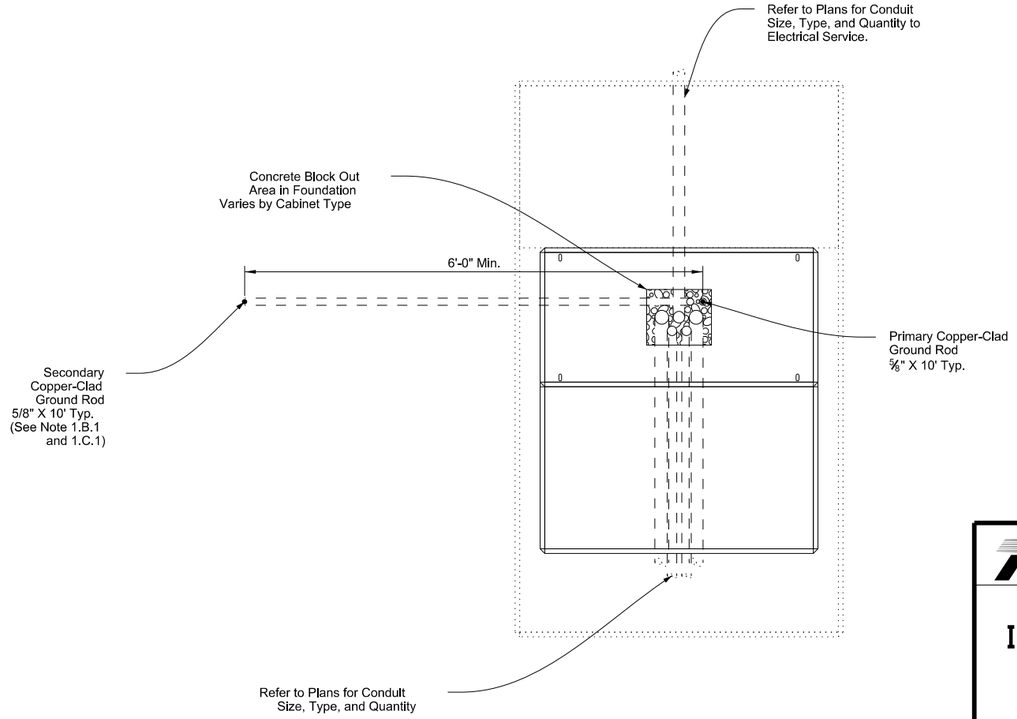
2. Installation:
   - A. Install grounding components and systems in accordance with the requirements specified in UL 467, IEEE 81, and IEEE 142.
   - B. System Grounding:
     1. Ground Rods:
        a. Drive ground rods into the ground until the tops of the rods are approximately 18 in. below finished 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 specified 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

Texas Department of Transportation

Traffic Operations Division Standard

ITS CABINET GROUNDING DETAILS

ITS(18)-15

FILE: its(18)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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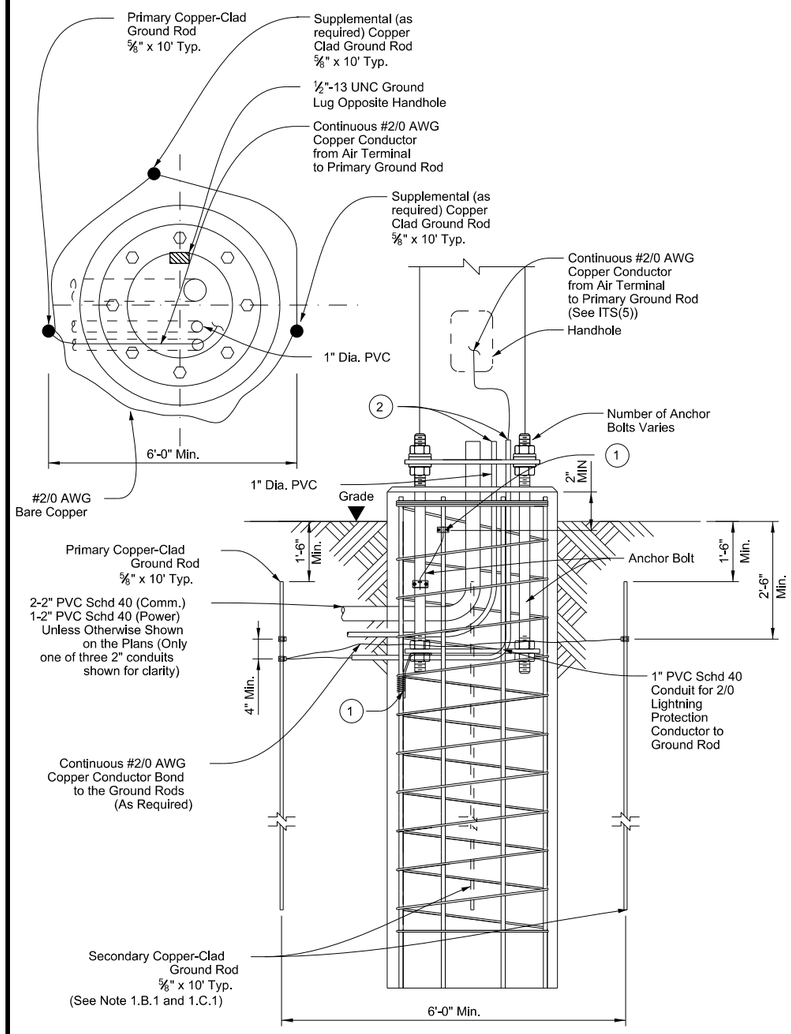
FILE:

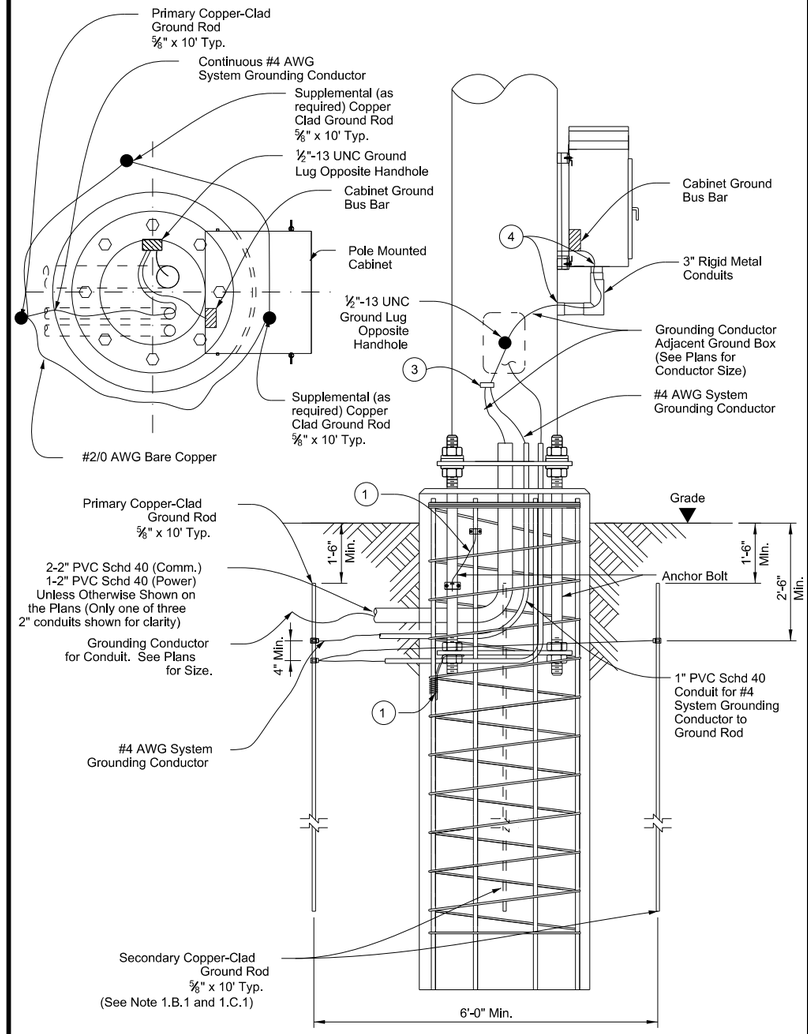
General Notes:

1. Grounding System:
   - A. Description:
     1. Provide ground system consisting of copper wires, ground rods, and concrete-encased grounding electrodes (Ufers), of the configuration 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. Provide up to 2 additional supplemental ground rods if necessary to achieve a resistance not greater than 5 Ohms to ground. If a total of 3 ground rods is needed then install as as part of a ground ring.
     2. If a ground ring is required, provide a minimum conductor length of 20 ft. placed at a minimum depth of 30 in..
   - C. Design Criteria:
     1. The grounding system of the ITS pole may be bonded below grade to the grounding systems of other nearby equipment to meet the specified grounding resistance. A minimum of one ground rod for the ITS pole is still required.
     2. Separately measure the grounding resistance of each system before bonding together 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) Provide prequalified copper conductors appearing on the Material Producers List according to Item 618.
     2. Ground Compression Connectors:
        a. Provide molds, thermite packages, and other material for exothermic welding of grounding connections.
        b. Provide listed compression connectors fully rated to carry 100% of the cable rating and that meet IEEE 837. Provide compression materials from a single manufacturer througout the project.
     3. Ground Rods:
        a. Provide copper-clad steel ground rods conforming to the requirements specified In DMS 11040.
           1) Diameter: ⅝ in.
           2) Length: 10 ft.
2. Installation:
   - A. Install grounding components and systems in accordance with the requirements specified in IEEE 142.
   - B. System Grounding:
     1. Ground Rods:
        a. Drive ground rods into the ground until the tops of the rods are a minimum of 18 in. below finished 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, so conductors will be connected below grade.
     2. Conductors:
        a. Provide minimum No. 2/0 AWG ground wire for lightning protection from air terminal.
        b. Provide minimum No. 4 AWG ground wire for system and equipment grounding.
        c. Using suitable fasteners, securely attach exposed ground wires to structural supports at not more than 2 ft. intervals, where applicable.
        d. Bends in ground wires greater than 45 degrees are unacceptable.
     3. Cable Connections:
        a. Use exothermic-welded connections or listed compression connectors 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 specified 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.



Grounding System

Not to Scale



Grounding System with Pole Mounted Cabinet

Not to Scale

Reference Notes:

1. Bond anchor bolts to rebar with #2/0 AWG jumper and two mechanical connectors or by bending No. 3 bar on bottom template as shown and wire tightly with ten turns of No. 10 wire or one mechanical connector. Mechanical connectors shall be UL Listed for concrete encasement.
2. Cut PVC approximately 1 in. above concrete and install bell or bushing. Align conduit as close as possible to point of attachment to base plate to minimize bends in #2/0 wire.
3. Bond grounding conductors via cadweld or mechanical connector, rated for size and number of conductors.
4. Provide and install a grounding type bushing on metal conduit terminations. 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.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE GROUNDING DETAILS

ITS(19)-17

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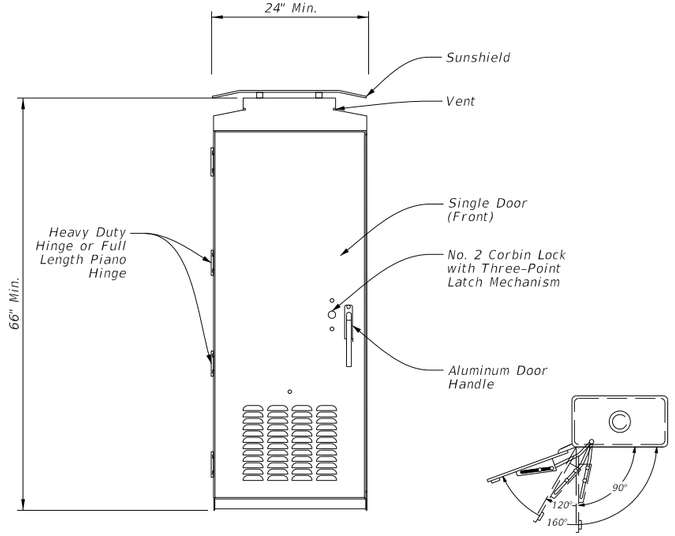
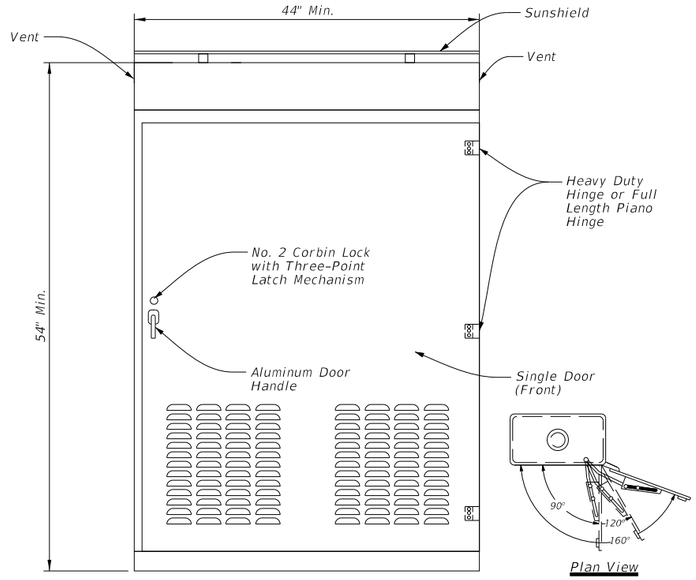


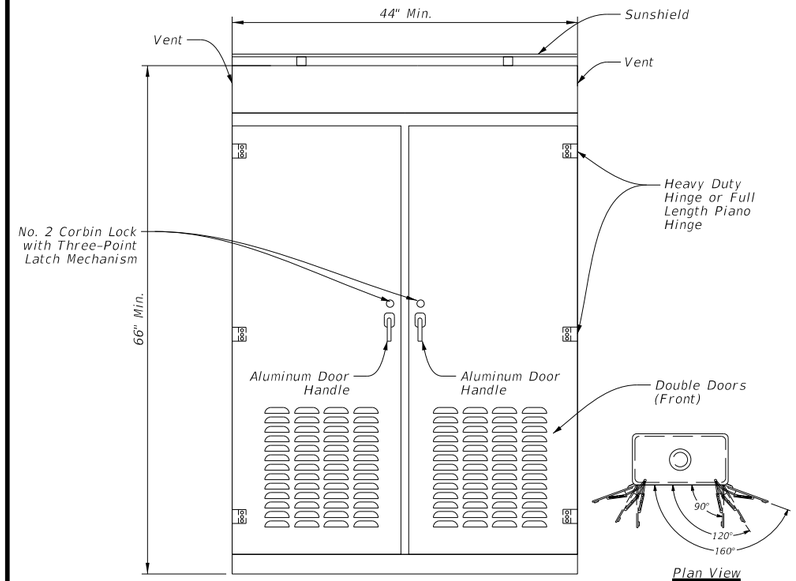
Plan View
Door Stop Detail
(3 Positions)

Type 4 (Small) Cabinet
Front View



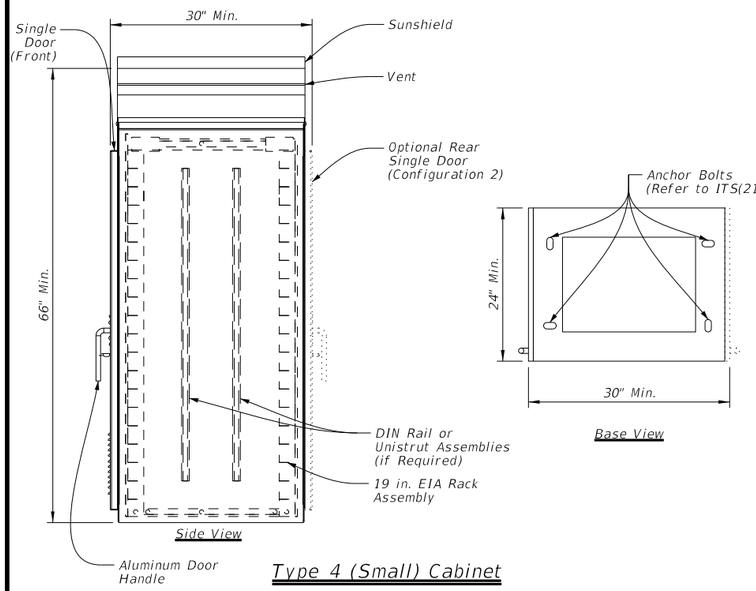
Plan View
Door Stop Detail
(3 Positions)

Type 5 (Medium) Cabinet
Front View

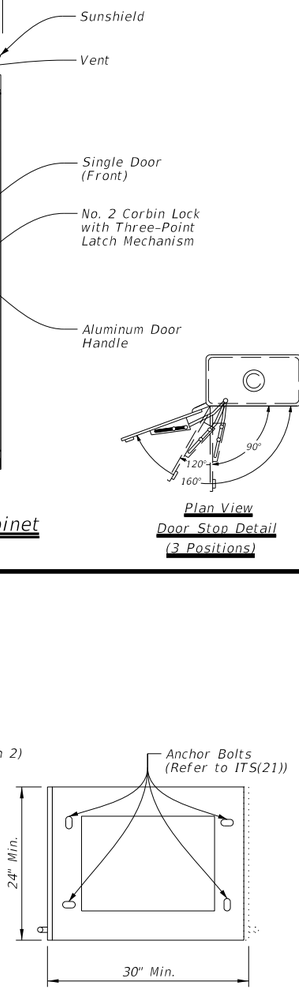


Plan View
Door Stop Detail
(3 Positions)

Type 6 (Large) Cabinet
Front View

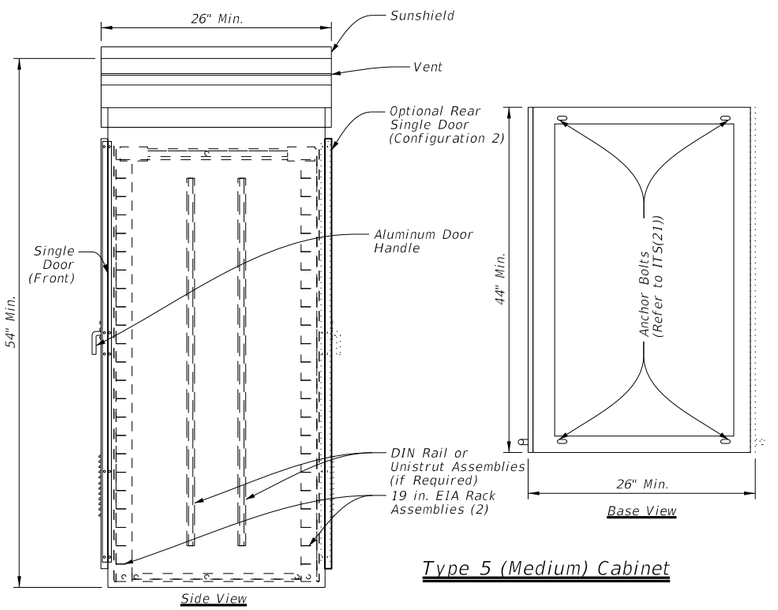


Side View



Base View

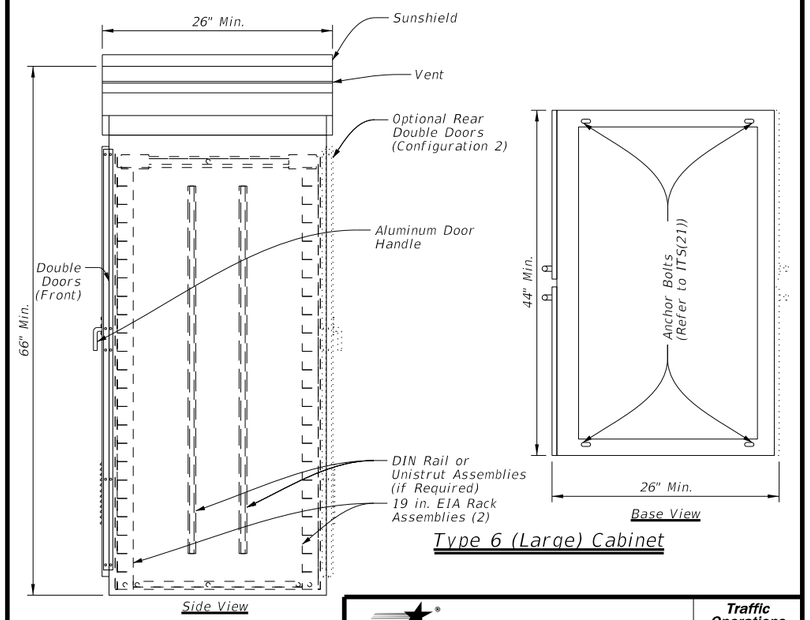
Type 4 (Small) Cabinet



Side View

Base View

Type 5 (Medium) Cabinet



Side View

Base View

Type 6 (Large) Cabinet

General Notes:

1. Cabinet hardware equipment and door configuration 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 configuring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and specifications. The contractor may alter the cabinet configuration 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 Specification "ITS Ground Mounted Cabinet" (Configuration 1) with single door. Paid under Special Specification "ITS Ground Mounted Cabinet" (Configuration 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.

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND MOUNTED CABINET ELEVATION DETAILS

ITS(20)-15

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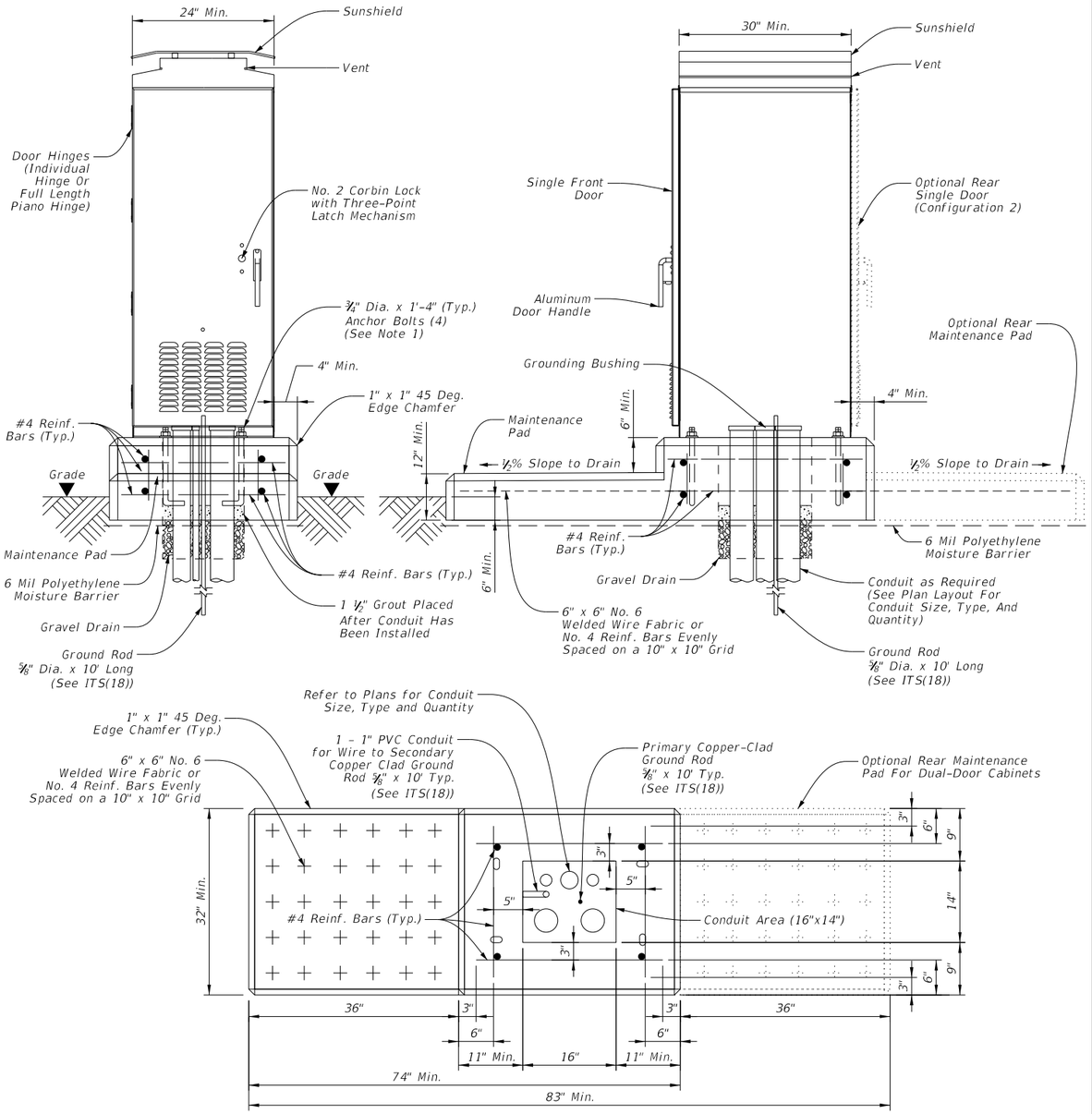
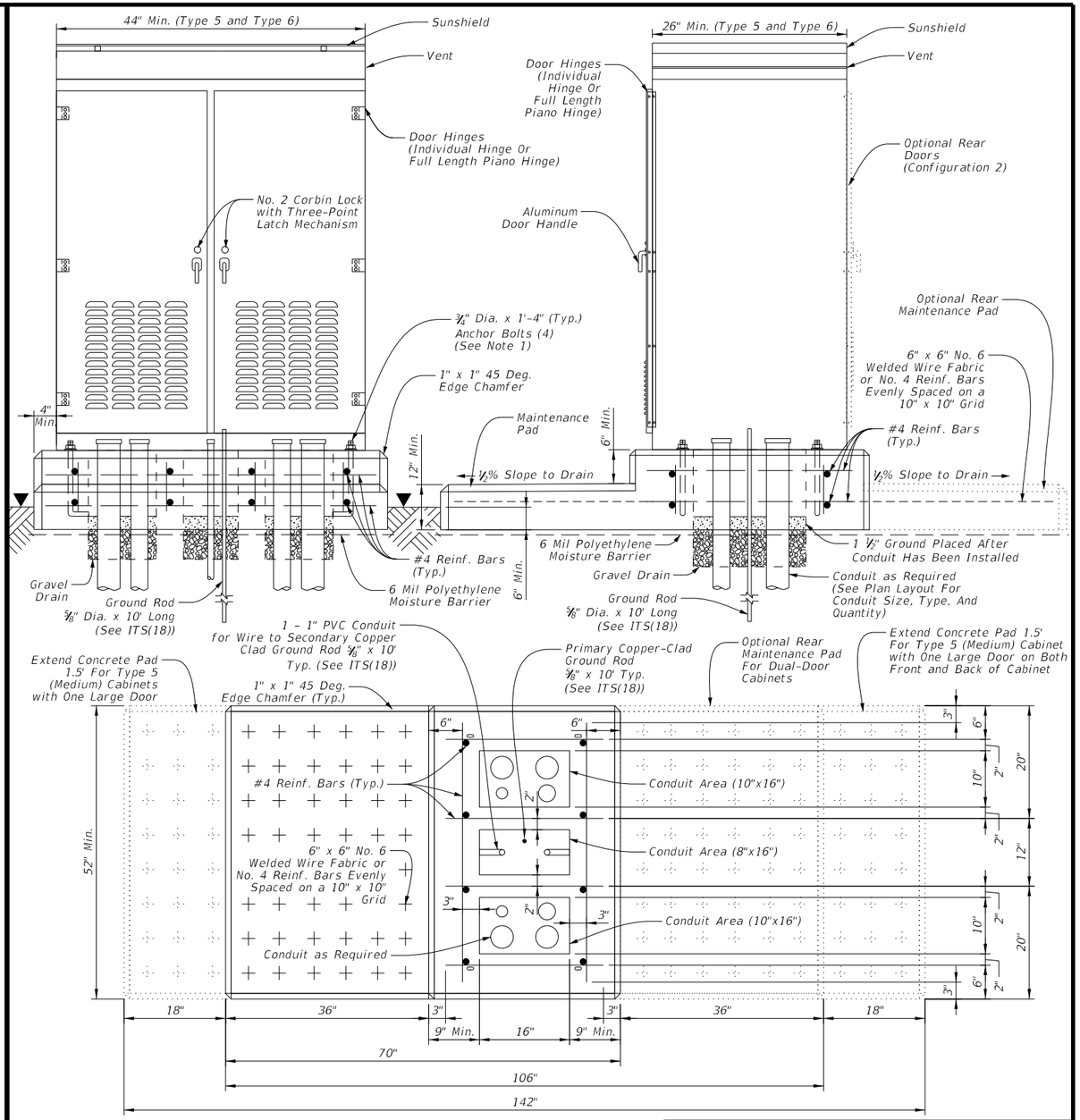


Type 4 (Small) Cabinet



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 fit 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 Specification "ITS Ground Mounted Cabinet.
8. Ground cabinet as required in cabinet specifications 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.

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND MOUNTED CABINET FOUNDATION DETAILS

ITS(21)-15

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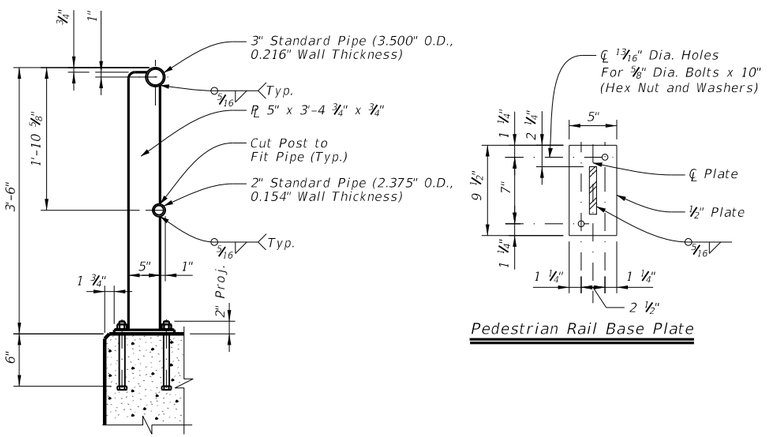
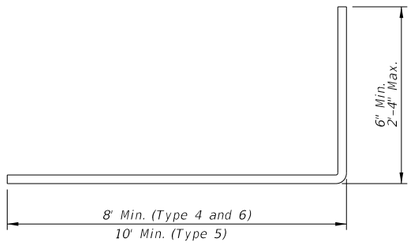
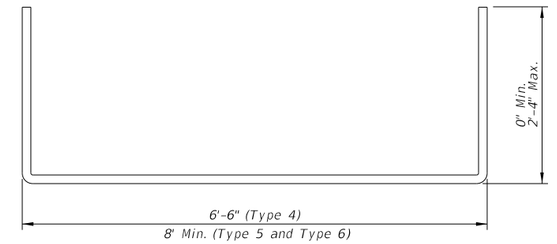


Detail "A"
Pedestrian Rail

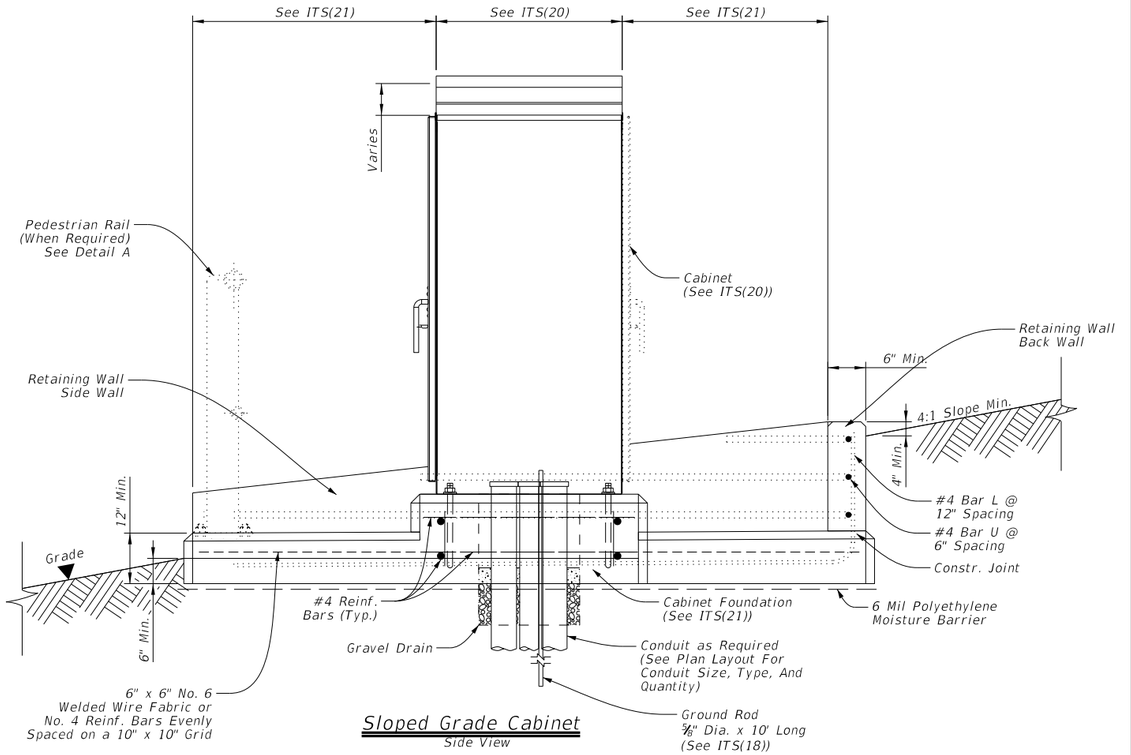
Pedestrian Rail Base Plate



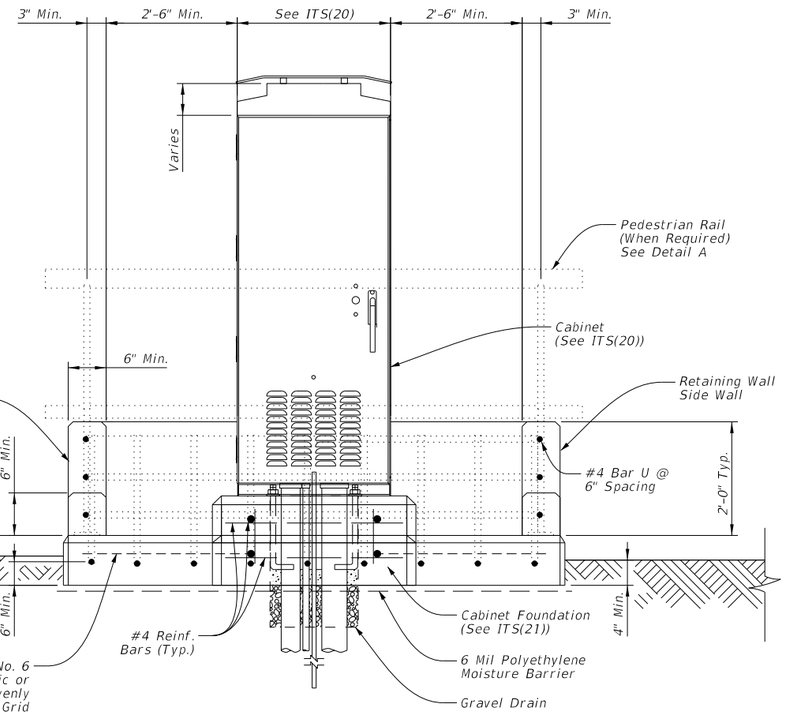
Reinforcement Bar L
#4 Bar @ 12" Spacing



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 fit 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 Specification "ITS Ground Mounted Cabinet."
8. Ground cabinet as required in cabinet specifications 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 5/8" 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

FILE: its(22)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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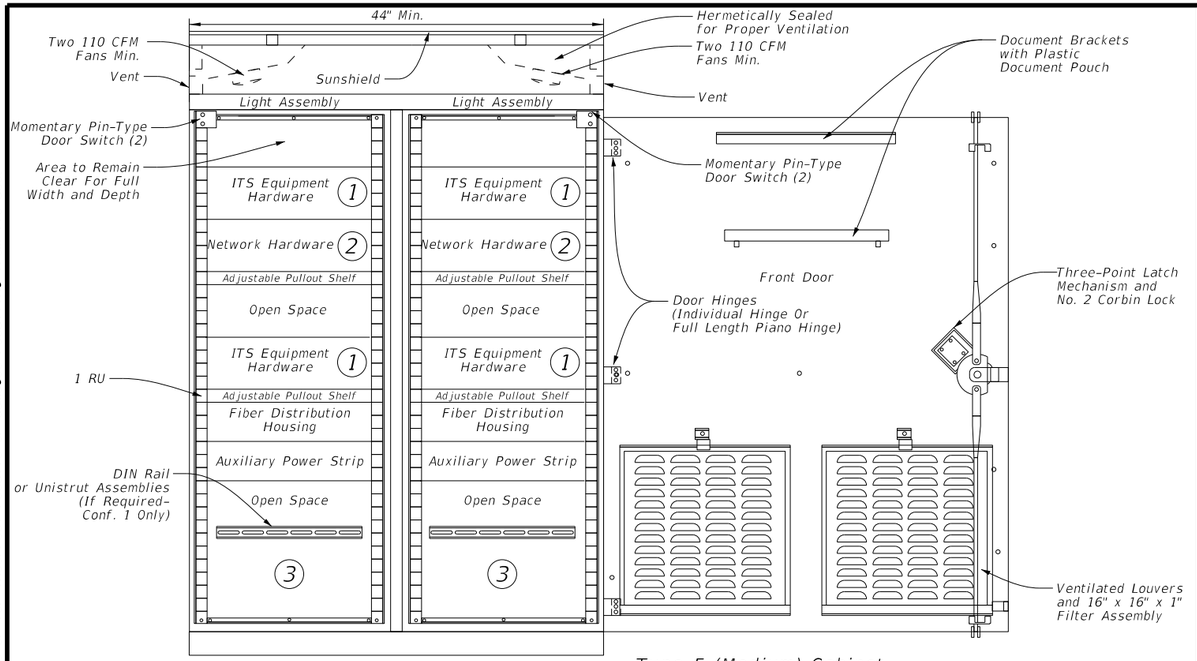
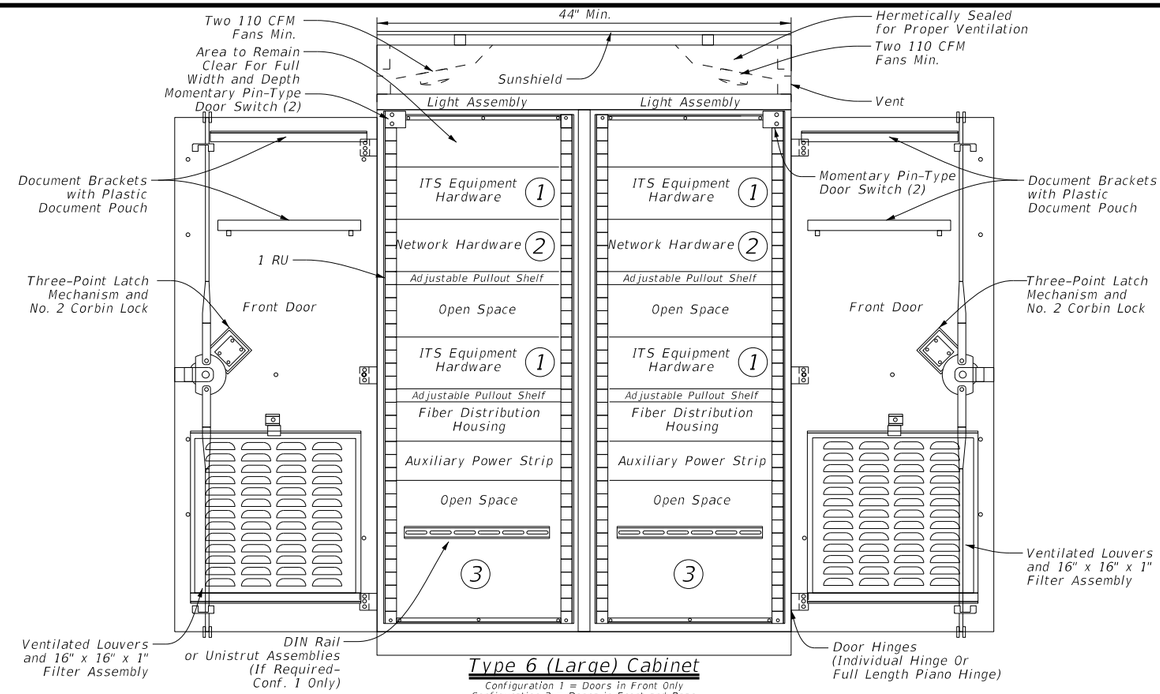


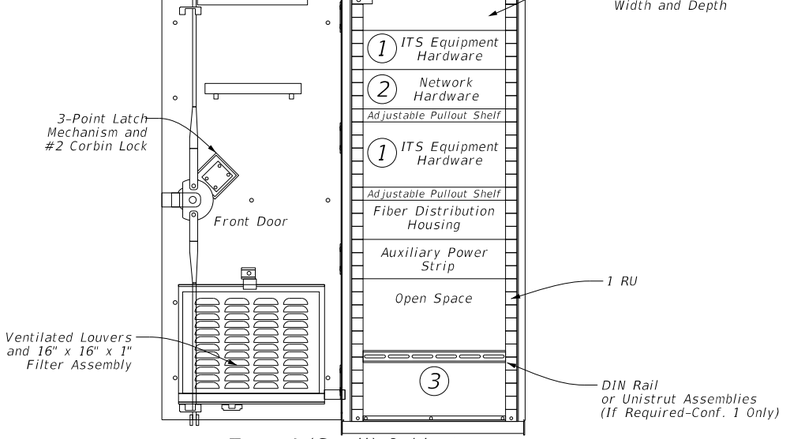
Type 5 (Medium) Cabinet

Configuration 1 = Doors in Front Only
Configuration 2 = Doors in Front and Rear.



Type 6 (Large) Cabinet

Configuration 1 = Doors in Front Only
Configuration 2 = Doors in Front and Rear.



Type 4 (Small) Cabinet

Configuration 1 = Doors in Front Only
Configuration 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 Identification (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 configuration 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 configuring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and specifications. The contractor may alter the cabinet configuration 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 Specification "ITS Ground Mounted Cabinet" (Configuration 1) with single door.
   Paid under Special Specification "ITS Ground Mounted Cabinet" (Configuration 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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Traffic Operations Division Standard

ITS GROUND MOUNTED CABINET INTERIOR DETAILS

ITS(23)-15

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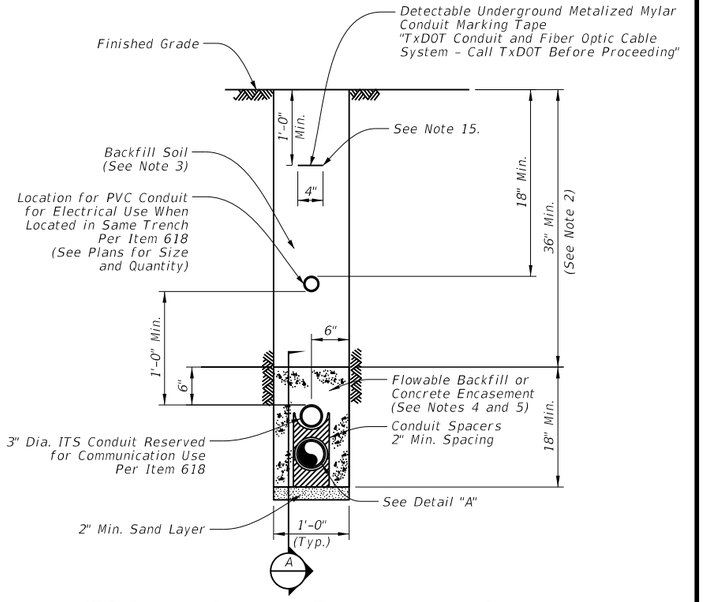
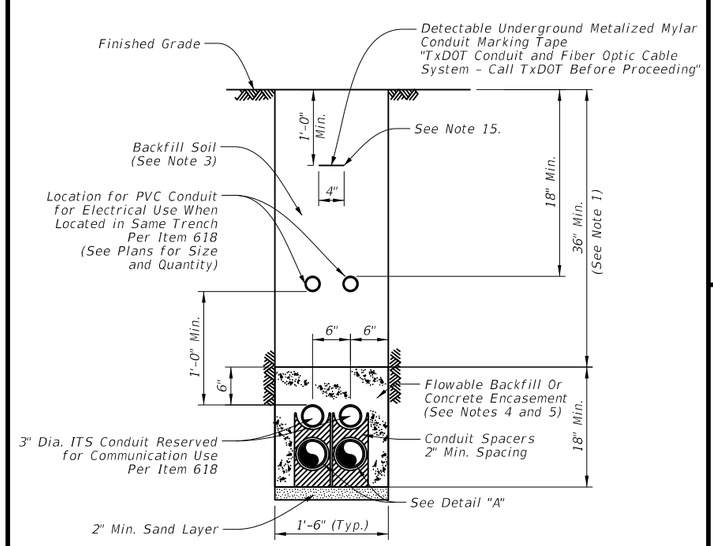


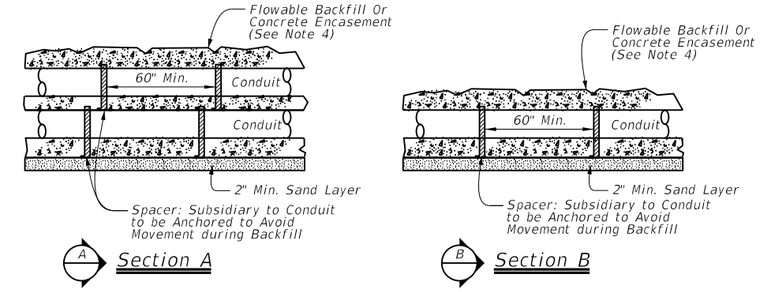
ITS Conduit Backbone Trench Vertical Spacing

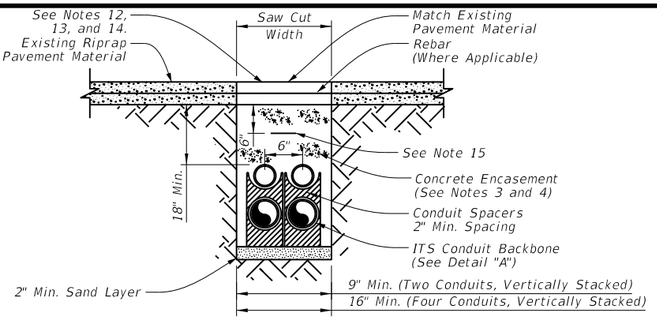
Two Conduit System



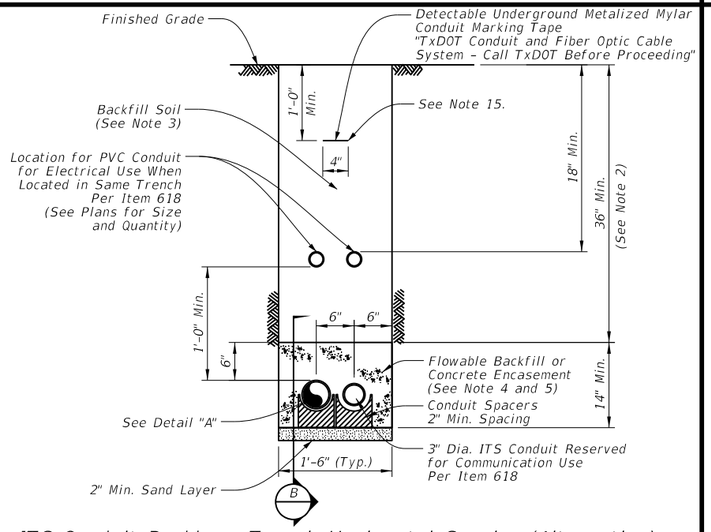
ITS Conduit Backbone Trench Vertical Spacing

Four Conduit System



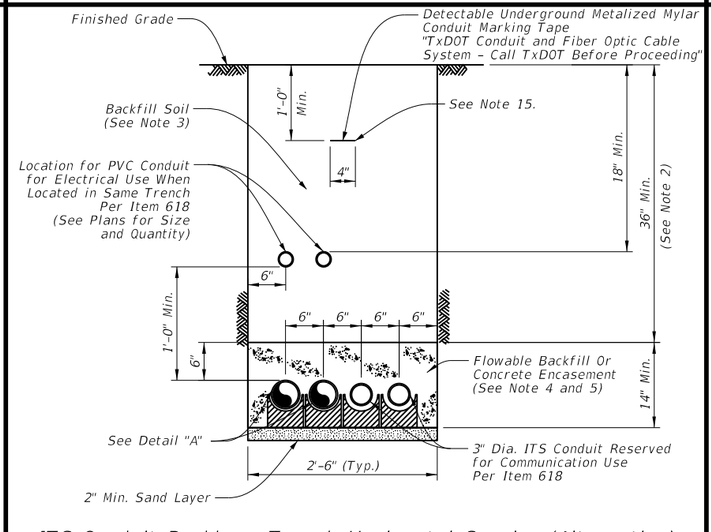


Open Cut Trenching Details



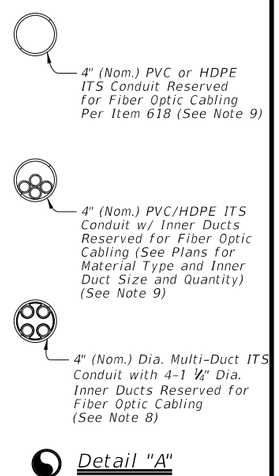
ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

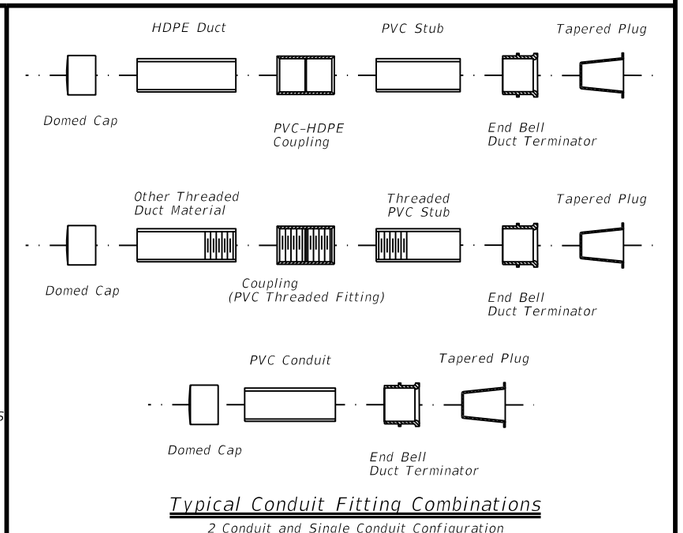
Two Conduit System



ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

Four Conduit System





Typical Conduit Fitting Combinations

2 Conduit and Single Conduit Configuration

SHEET 1 OF 2

General Notes:

1. Construct the ITS conduit backbone system by vertically spacing conduit, unless field constraints, obstructions, or utility conflicts require horizontal spacing of conduits. Both vertical and horizontal spacing configurations have been detailed for contractor information for construction.
2. Install ITS conduit backbone system a minimum of 42 inches from finished grade to the top of the conduit unless otherwise directed or to avoid conflicts or field 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 backfilling in accordance with Item 400, "Excavation and Backfill for Structures."
4. When a trench depth greater than 24 inches can be achieved from the finished grade to the top of ITS conduit, encase the conduits with flowable backfill in accordance with Item 401, "Flowable Backfill." 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 field 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 Specification "ITS Multi-Duct Conduit" or as shown on the plans.
7. Provide ITS PVC conduit identified for electrical and communication use in accordance with Item 618, "Conduit."
8. Provide ITS multi-duct conduit identified for fiber optic communication use in accordance with Special Specification "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 identified in the plans to carry fiber 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 fiber optic cabling and will be paid for under Item 620, "Electrical Conductors."
11. Provide a flat 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
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Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT TRENCH DETAILS

ITS(27)-16

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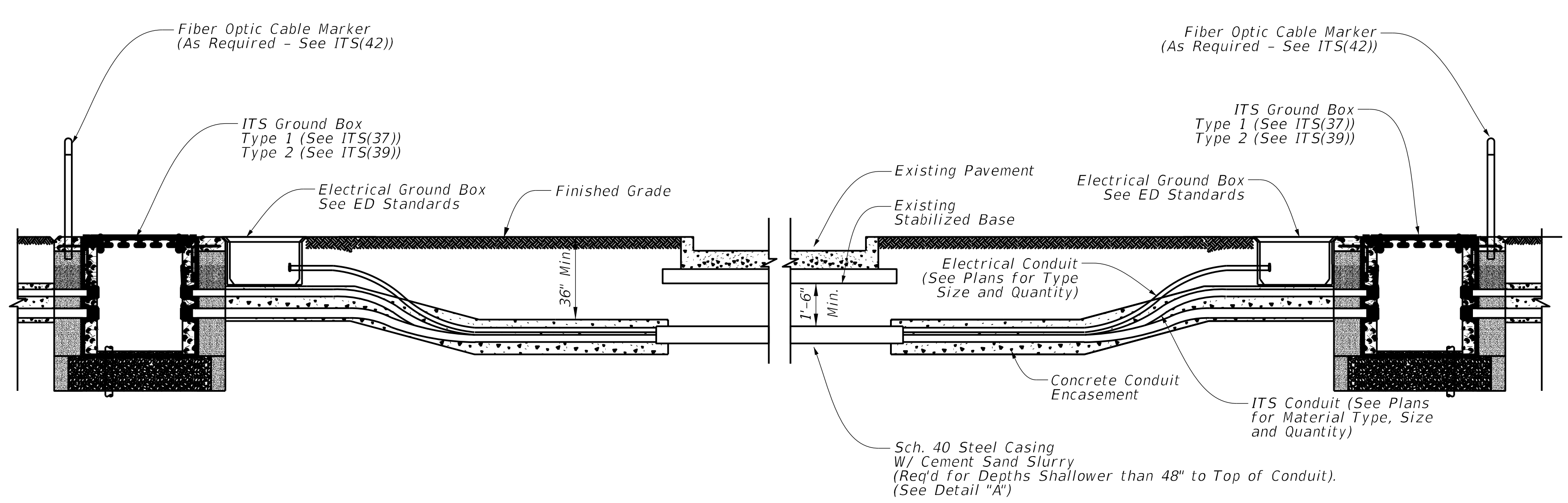
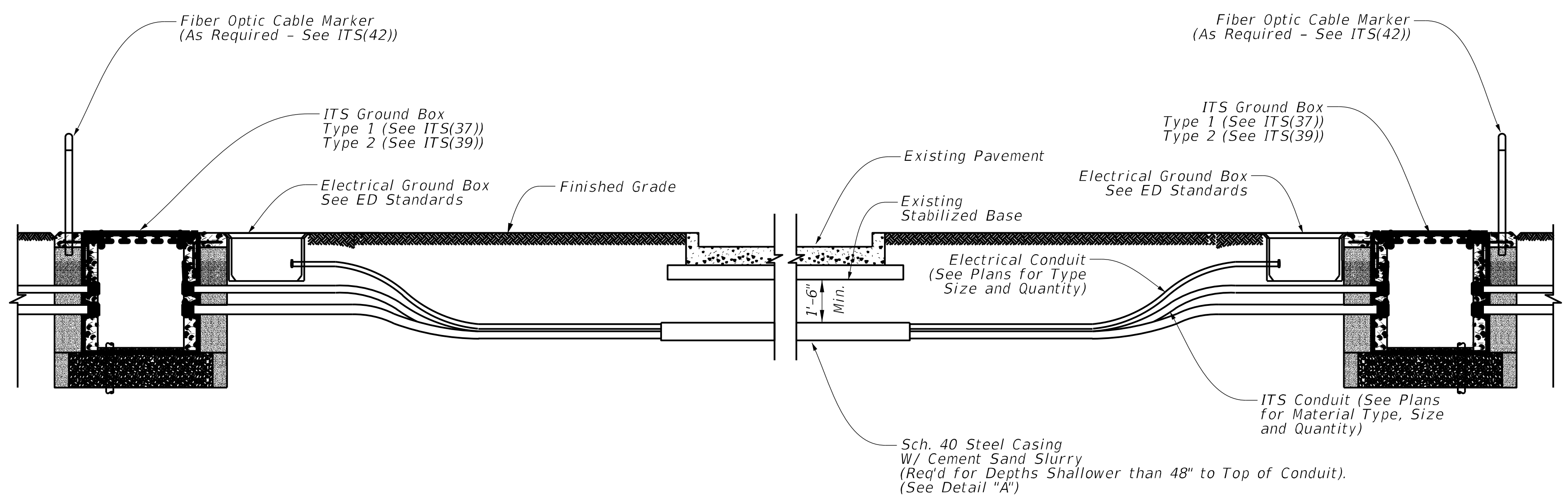
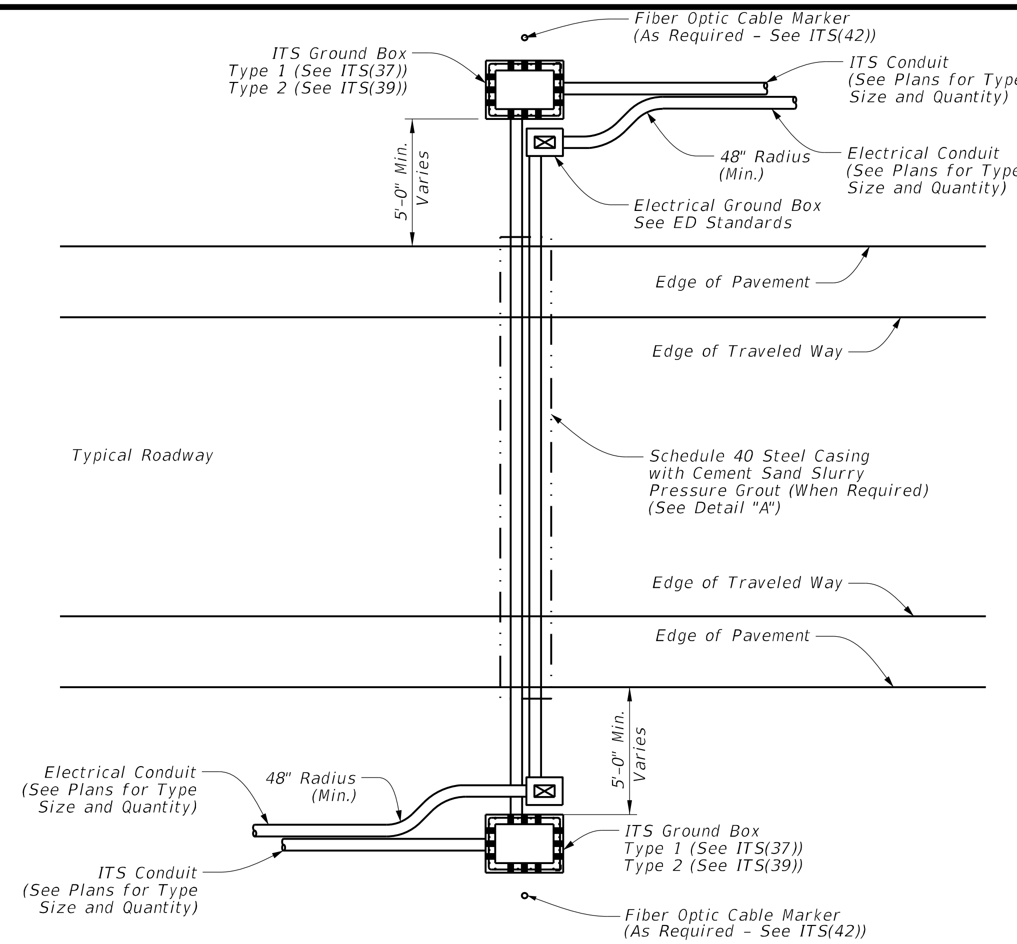


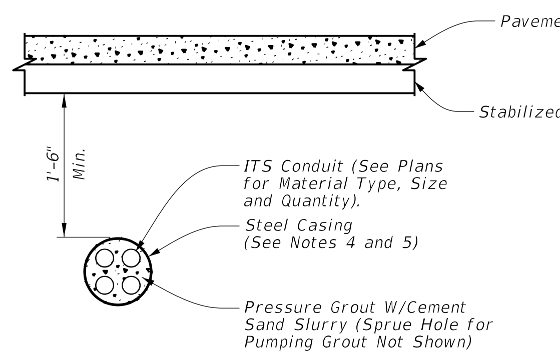
Typical Conduit Installation Jacking or Boring Beneath Existing Roadway



Typical Conduit Installation Jacking or Boring Beneath Existing Roadway (Where Concrete Encasement Not Required)



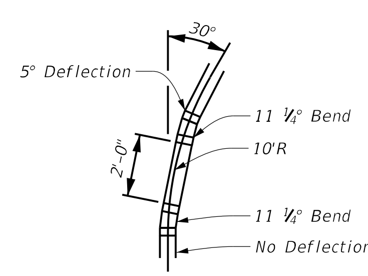
Bore Under Pavement



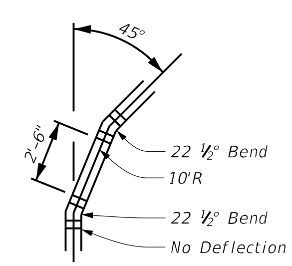
Steel Casing Detail "A"

General Notes:

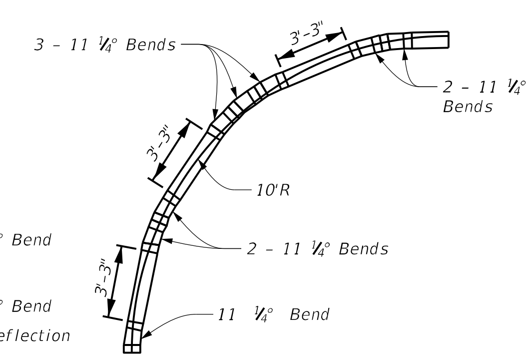
1. Typical conduit installation details for jacking or boring beneath existing roadway is diagrammatic in nature. Roadway cross-slopes may vary for each crossing.
2. Jack or bore in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box" except for measurement and payment.
3. Furnishing and installation of pressure grouting will not be paid for directly but considered incidental to Special Specification "ITS Multi-Duct Conduit" or Item 618, "Conduit."
4. When boring under pavement shallower than 48 inches from finished 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 Specification, "ITS Multi-Duct Conduit" or Item 618, "Conduit."
5. When a depth greater than 48 inches can be achieved from finished 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 fittings 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
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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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	DAL		DALLAS, ETC.	162

253

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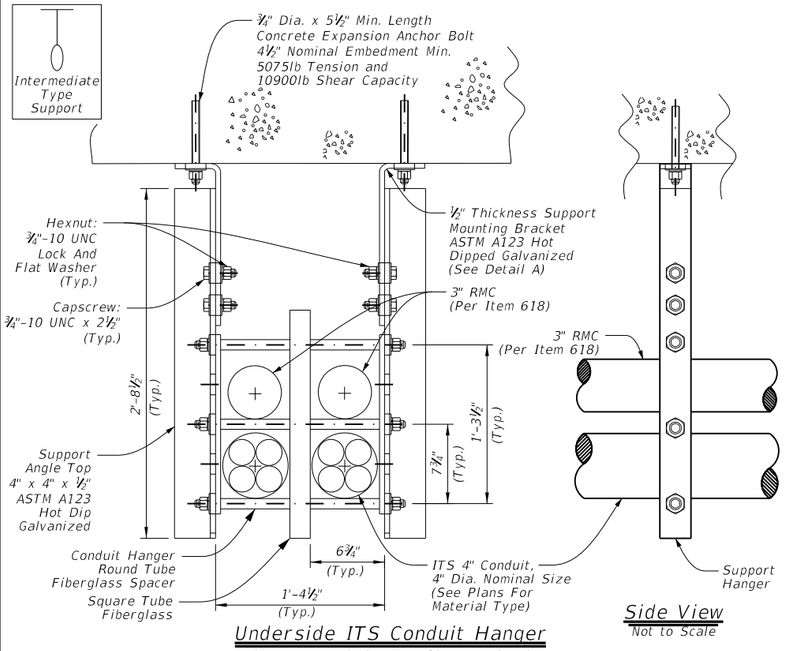
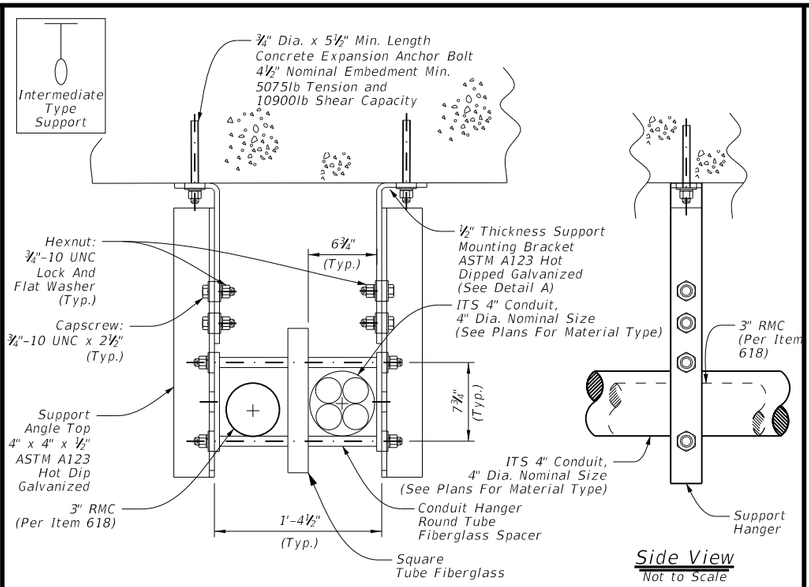
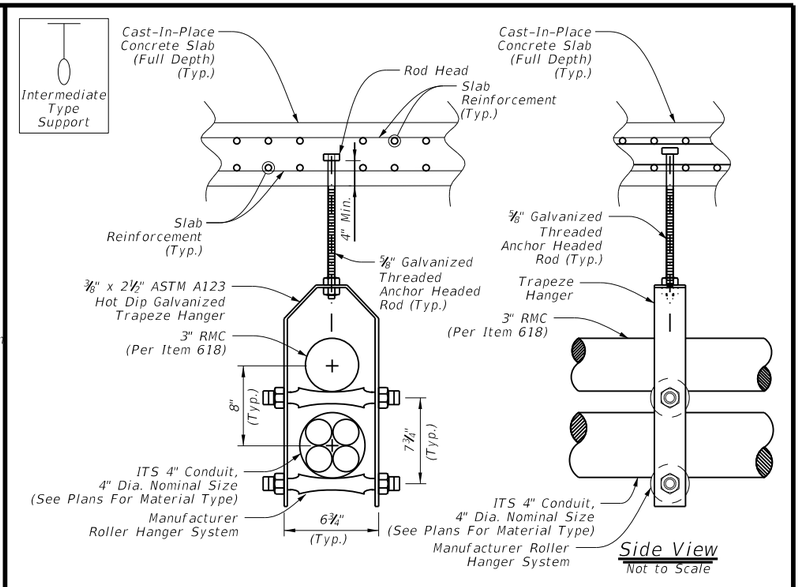


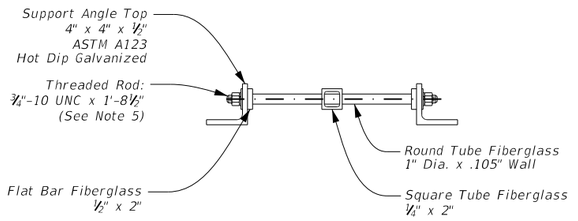
Underside ITS Conduit Hanger
(2x2 Conduit Configuration)



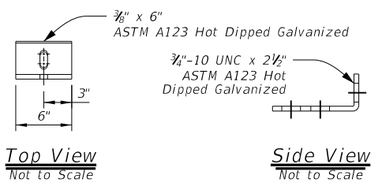
Underside ITS Conduit Hanger
(2x1 Conduit Configuration)



Underside ITS Conduit Roller Hanger
For New Construction
(1x2 Conduit Configuration)



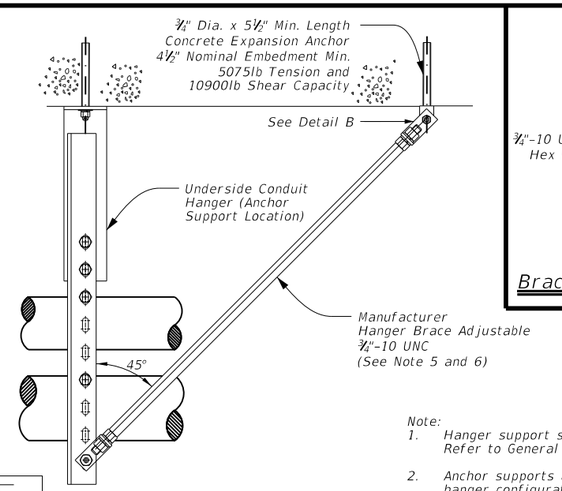
Underside ITS Conduit Hanger Spacer - Top View (Typ.)



Detail A
Support Mounting Bracket Detail

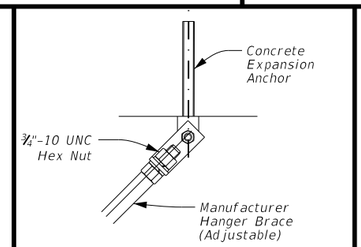
General Notes:

1. Use commercially designed multiple conduit support hangers as an alternative to the hanger details on this sheet, or standard sheet ED(2)-14 may be used. Verify sufficient tension and shear capacity before proposed substitution. Submit hanger details and specifications to the Engineer for approval prior to using on project.
2. Refer to the contract plans for conduit design and hanger configuration requirements. For two (2) conduit configurations, use the typical underside hanger or roller hanger system.
3. Maximum spacing of intermediate conduit hangers is 5'-0" C-C.
4. Hangers vary in length, but do not allow conduit to hang below bridge beams. Refer to ITS(30) for minimum clearance requirement below bridge deck.
5. Ensure all conduit hanger steel shapes conform to ASTM A36 and expansion anchors conform to ASTM A307 and are supplied with minimum of one nut and washer per bolt. Galvanize all steel plate, shapes, and hardware per Item 445, "Galvanizing".
6. Use angle bracing on both sides of conduit support for conduit anchor point hangers.
7. Refer to ITS(32) for expansion-deflection joint details.
8. Provide a minimum of two (2) expansion joints at all bridges. Ensure expansion joint spacing does not exceed manufacturer recommendations.
9. Select conduit lengths so that couplings do not coincide with conduit hanger locations.
10. Allowable types of outer duct material for above ground ITS conduit include rigid metallic conduit (RMC) and fiberglass.
11. Refer to ITS(30) for anchor details through pre-stressed concrete panels.
12. Bond all external structure conduit throughout entire length of run and ground at ground box locations according to ITS(38).

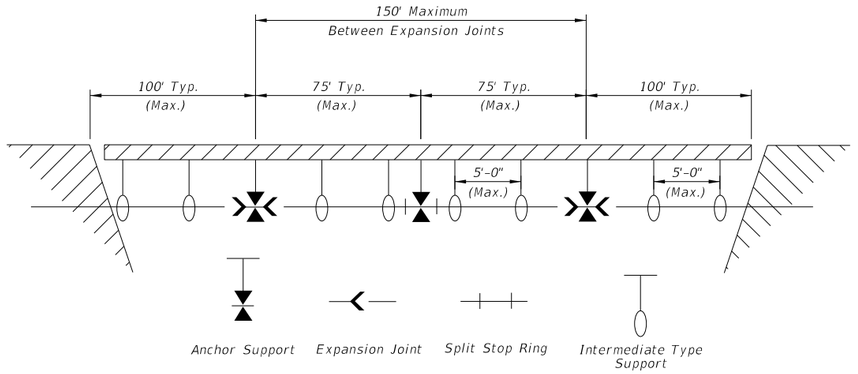


Note:
1. Hanger support shown is a typical configuration. Refer to General Note 1 on this sheet.
2. Anchor supports are required for all conduit hanger configurations.

Underside ITS Conduit
Anchor Hanger Support (Typ.)



Detail B
Brace Mounting Bracket Detail



Notes:
1. Install conduit supports within 3'-0" of all enclosures and conduit terminations.
2. The number of intermediate supports varies based upon the distance between anchor supports.

Underside Anchor Hanger Support Spacing (Typ.) *

* Refer To BICSI Outside Plant Design Reference Manual (OSPDRM) For Conduit Hanger Expansion Joint Placement

Sheet Details
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Texas Department of Transportation

Traffic Safety Division Standard

ITS CONDUIT HANGER DETAILS

ITS(29)-22

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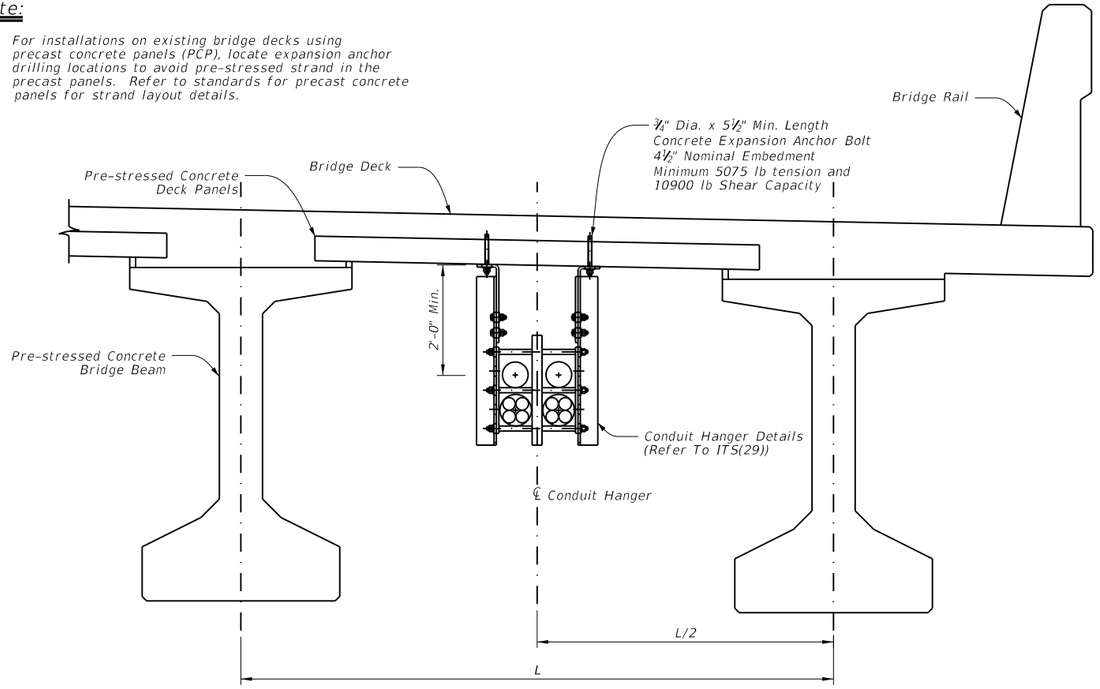
Note:

1. For installations on existing bridge decks using precast concrete panels (PCP), locate expansion anchor drilling locations to avoid pre-stressed strand in the precast panels. Refer to standards for precast concrete panels for strand layout details.

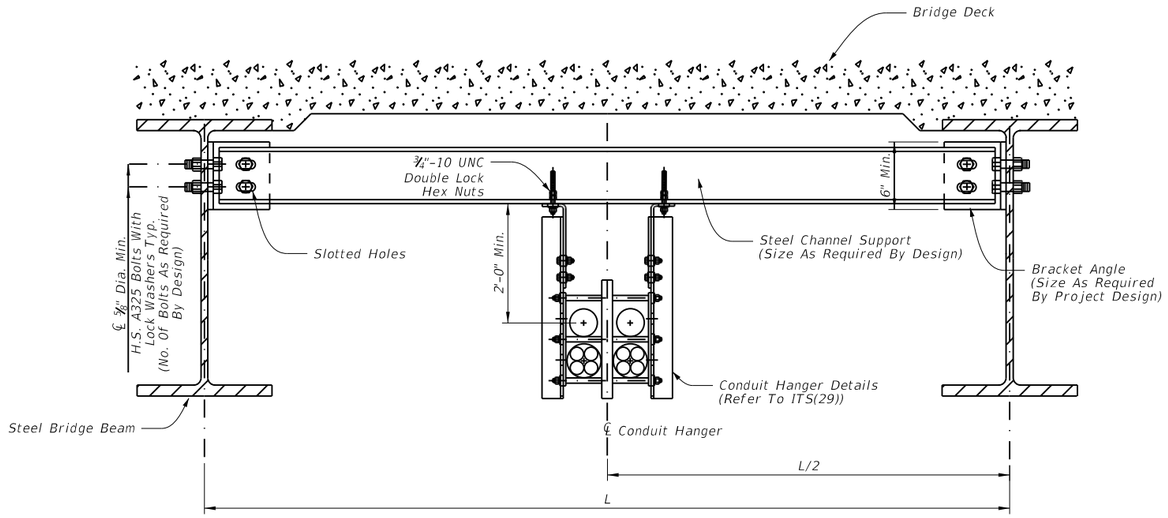


Structure Mounted ITS Conduit – Concrete Bridge Deck With Precast Panels

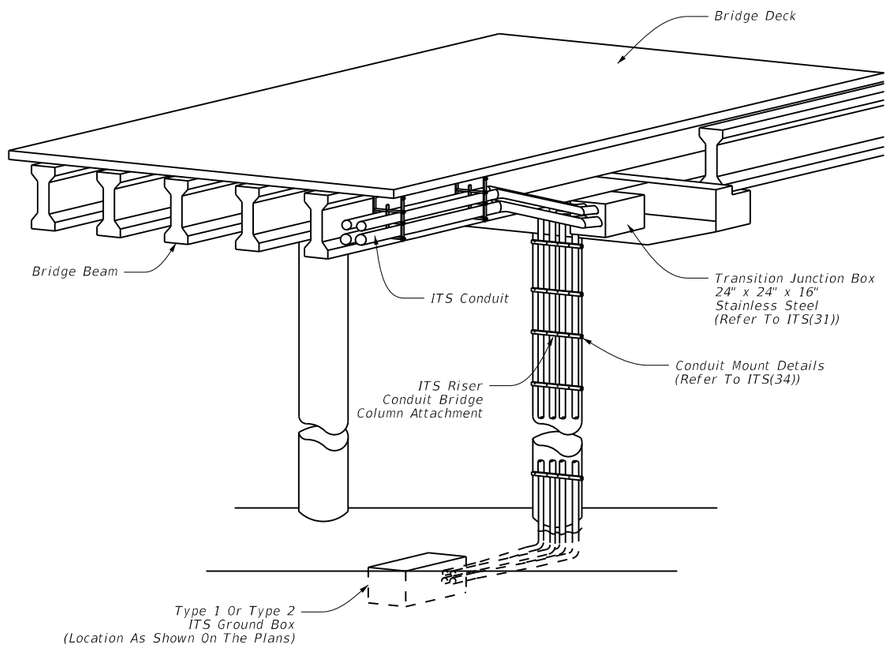
Refer To ITS(29) For General Notes

Note:

1. Position conduit hanger height to avoid conflicts with diaphragms in the conduit runs.



Typical Alternate Conduit Hanger Support (Steel I-Beam Mount)



Underside Conduit Hanger Transition Detail

General Notes:

1. The alternative mounting conduit hanger support mounting detail for steel I-Beam structures as shown is a suggested detail for steel structures. Submit details for the configuration shown on this sheet via shop drawings and include structural load analysis, support member and connection design. Seal all calculations and shop drawings by a Texas P.E.
2. Conduit hanger support mounting details for concrete bridge deck with precast panels as shown are a suggested method for pre-stressed concrete beam structures. Submit any deviation from these details via shop drawing and include structural load analysis, support member, and connection design. Seal all calculations and shop drawings by a Texas P.E.
3. Locate auxiliary conduit hanger supports for steel structures at a maximum 5'-0" spacing.
4. For conduit loads located between beams exceeding 5 lbs per ft, furnish structural load analysis calculations for adjacent beams in the shop drawing submission.
5. Submit design details for structure with cathodic protection in the shop drawing submission.
6. Do not extend conduit hangers below the bottom of the bridge beams (any exceptions at end spans are subject to approval).
7. Drilling in pre-stressed beams or field welding of steel beams is not permitted. Submit any exceptions on a case by case basis for evaluation and approval by the Engineer.
8. Ensure all conduit hanger assemblies are furnished and supplied by the conduit hanger manufacturer.
9. Galvanize all hardware and structural steel that is not stainless steel. Ensure all bolt hardware used to secure hangers to steel structures conforms to A325 for high strength. Ensure all expansion anchors conform to ASTM A307. Separate dissimilar materials for use of galvanized hardware with weathering steel girders.
10. Select conduit lengths so that couplings do no coincide with conduit hanger locations.
11. Refer to Special Specification, "ITS Multi-Duct Conduit" or Item 618 "Conduit", for details on conduit mandreling and other testing required upon conduit installation.
12. Provide a flat pull cord in each conduit and inner duct to allow for installation of future cables to match 1250 lbs-ft tension. Refer to ITS(27) for additional conduit details.
13. Provide a transition junction box for conduit access located outside the abutments for bridge spans < 800 ft. For bridge spans > 800 ft., locate an additional junction box for conduit access near the mid-span/pier.
14. Provide ITS conduit of the type and configuration shown on the plans in accordance with Special Specification, "ITS Multi-Duct Conduit" or Item 618 "Conduit". Ensure all other conduit is in accordance with Item 618 "Conduit" and as shown on the plans.
15. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

Texas Department of Transportation

Traffic Operations Division Standard

STRUCTURE MOUNTED ITS CONDUIT

ITS(30)-16

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	DAL	DALLAS, ETC.		164

Sheet Details
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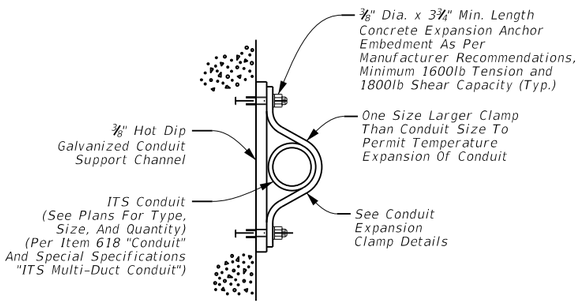
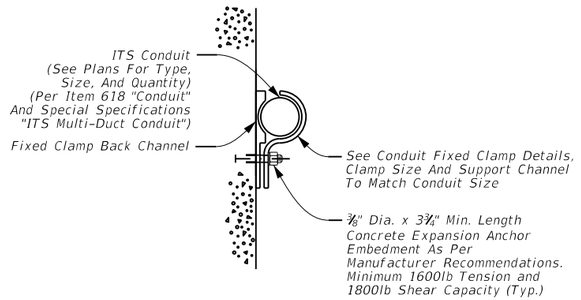
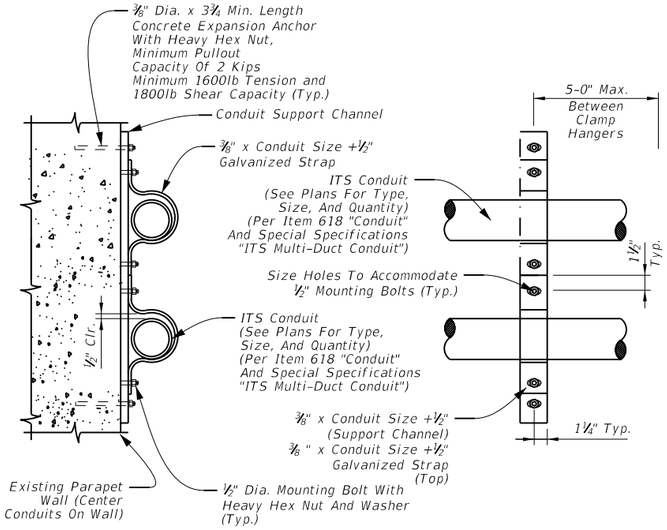


Conduit Expansion Clamp



Conduit Fixed Clamp

Conduit Clamp Details (Typ.)

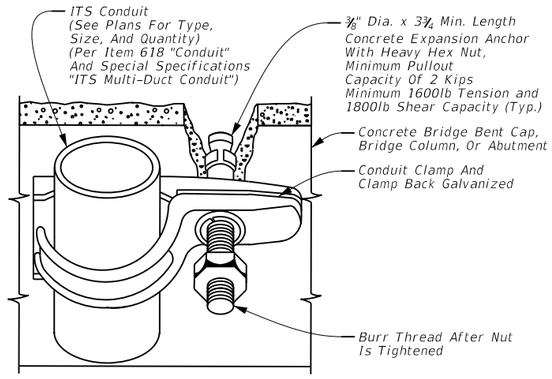


Side View

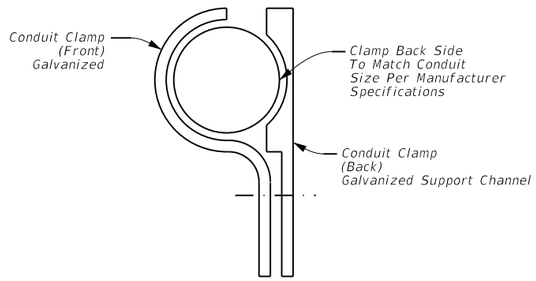
Top View

Elevation View

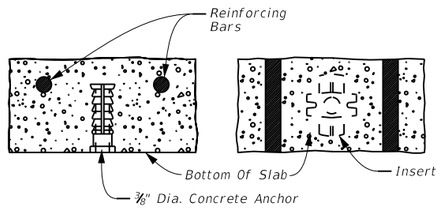
Conduit Expansion Clamp Details



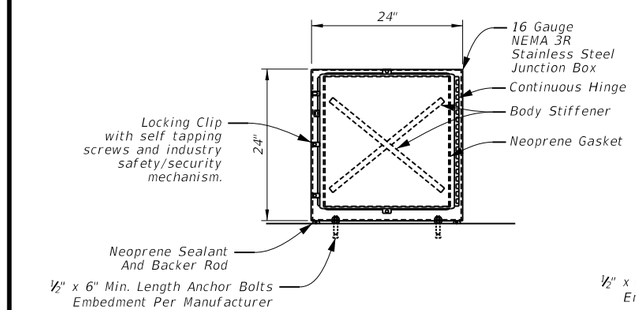
Conduit Fixed Clamp Back Channel



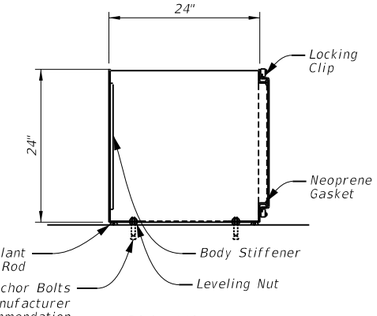
Conduit Fixed Clamp Details
Side View



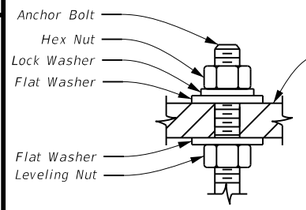
Conduit Fixed Clamp Concrete Insert Detail



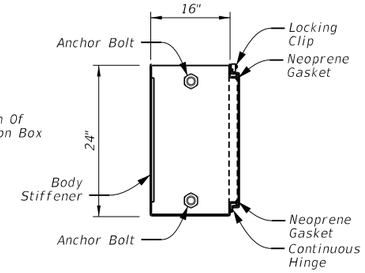
Front View



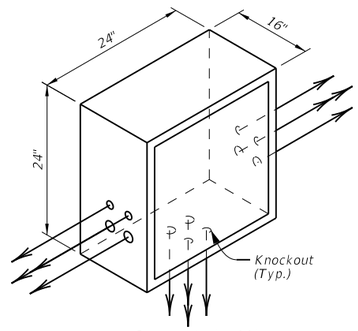
Side View



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 specifications. 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
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Texas Department of Transportation

Traffic Operations Division Standard

PARAPET MOUNTED ITS CONDUIT AND TRANSITION BOX DETAIL

ITS(31)-16

FILE: its(31)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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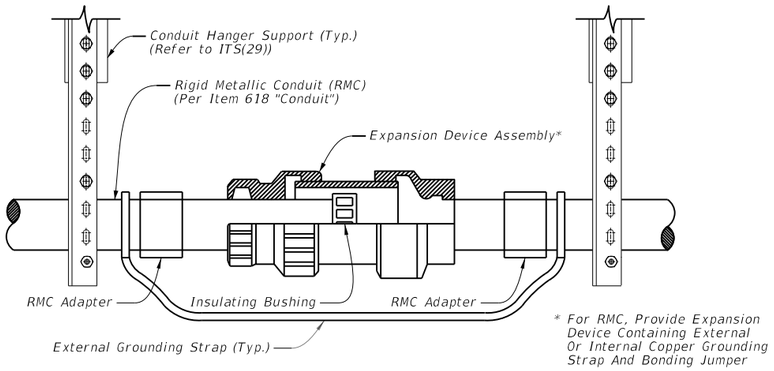
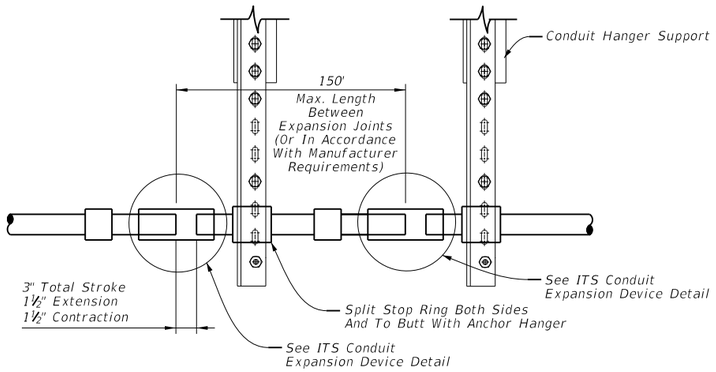
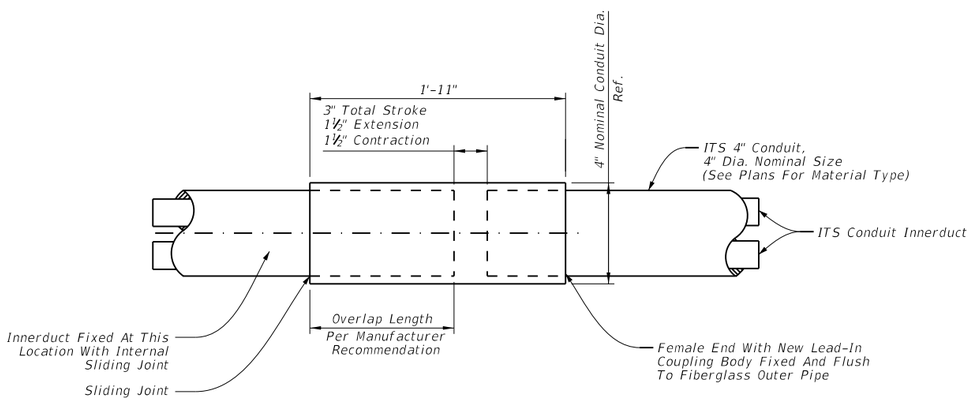


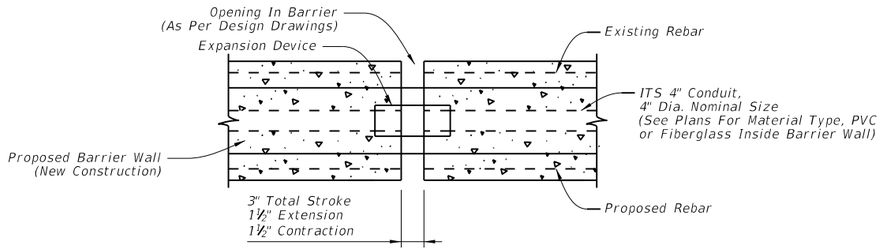
RMC Conduit Expansion Device Detail (Typ.)



ITS Conduit Expansion Device Placement (Typ.)



ITS Conduit Expansion Device Detail



ITS Conduit In New Construction Barrier Wall Expansion And Deflection Joint Fitting (Typ.)

General Notes:

1. Install expansion device at all open joints, at each end of bridge abutments and between bridge bents, allowing for 3" movement.
2. Provide a minimum of two (2) expansion joints at all bridges. Ensure expansion joint spacing does not exceed manufacturer recommendations.
3. Ensure conduit lengths are selected so that couplings do not coincide with hanger locations.
4. Ensure all rigid metallic conduit (RMC) expansion devices are constructed per manufacturer specifications.
5. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

Sheet Details
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Traffic Operations Division Standard

EXPANSION / DEFLECTION JOINT

ITS(32)-16

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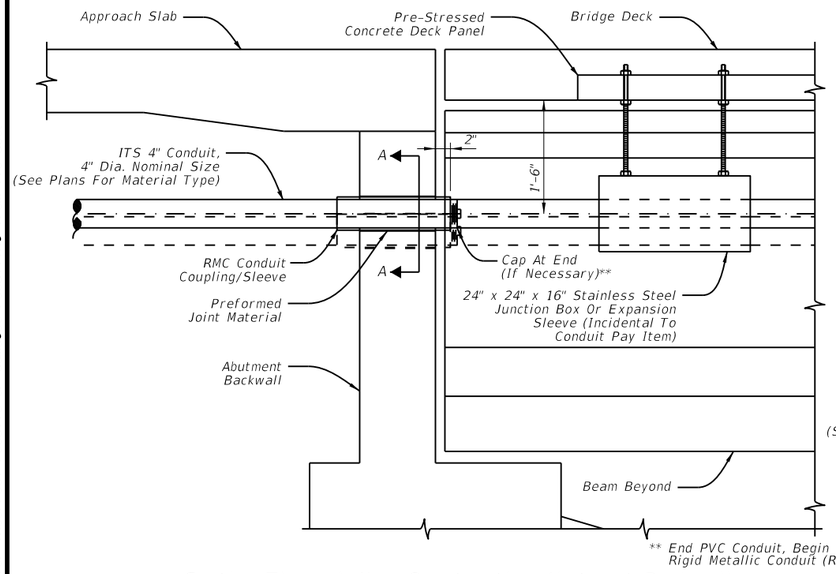
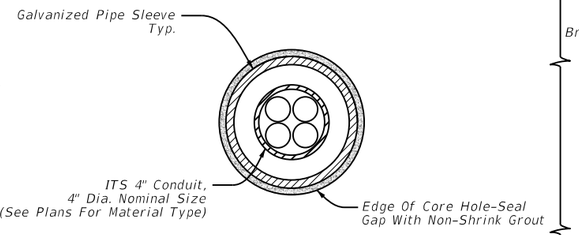


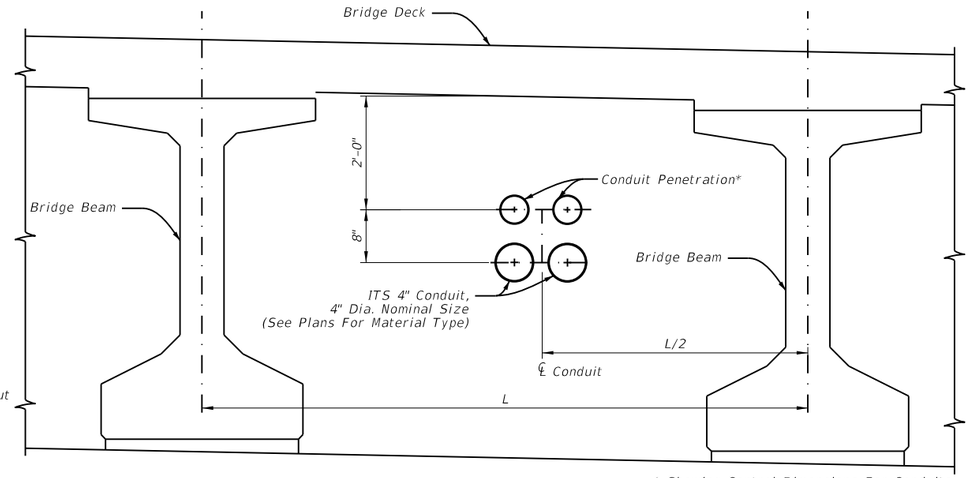
Section Through New Construction Abutment Backwall

Standard Notes:

1. If constant conduit elevation is maintained from the abutment backwall to the underside conduit hangers, provide an expansion joint sleeve (same size as conduit) with one travel overlap. If conduit elevation varies from the abutment backwall to the underside conduit hangers, provide an abutment wall mounted transition junction box (NEMA 3R rated).
2. Provide separate pipe sleeve for each conduit through abutment backwall. Size sleeve per manufacturer recommendations.



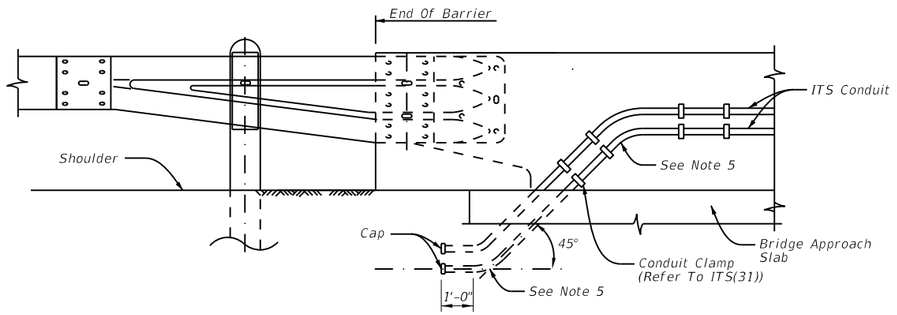
Section A-A (Typical Pipe Sleeve)



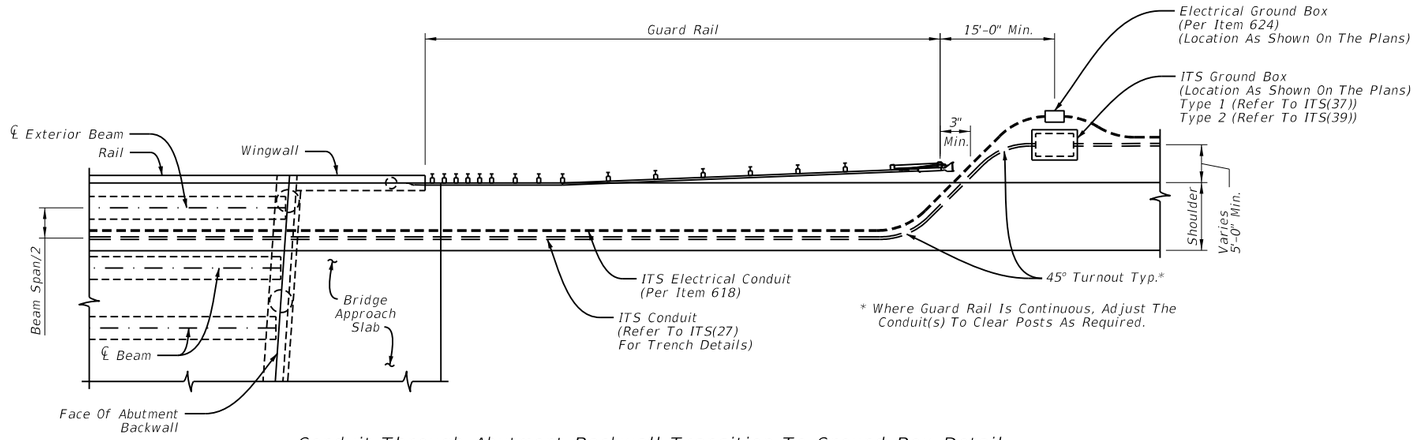
* Showing Control Dimensions For Conduits Thru Abutment Backwall. 2 x 2 Conduit Configuration Shown.

Abutment Elevation

ITS Conduit Transition At Bridge Abutment Detail



Parapet Mounted Conduit Transition To Ground Detail



* Where Guard Rail Is Continuous, Adjust The Conduit(s) To Clear Posts As Required.

Conduit Through Abutment Backwall Transition To Ground Box Detail

General Notes:

1. An alternative option to conduit mountings shown is conduit encased within parapet or bridge structure at crossings. Submit shop drawings and specifications to the engineer for approval.
2. Install expansion sleeves at bridge expansion joints and per manufacturer recommendations.
3. For conduit crossings over bridges, provide ITS communications junction boxes at 1000' maximum spacing and electrical junction boxes at 450' maximum spacing.
4. Keep all junction boxes sufficiently clear of guard rail or other obstructions to maintain clear access.
5. Install conduit sweep at an angle that accommodates cable bend radius. Do not exceed 45 degrees to the shoulder line. Refer to ITS(28) for conduit turn-out details.
6. Do not install junction boxes within paved shoulder area.
7. Ensure all work is in compliance with the latest edition of NFPA 70, National Electrical Code.
8. Junction boxes and associated appurtenances are incidental to ITS conduit.
9. For installation requiring ITS conduit transition within mechanically stabilized earth (MSE) walls with select fill, locate conduit to avoid reinforced straps. Refer to retaining wall standards for further details.
10. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

Sheet Details
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Traffic Operations Division Standard

ITS CONDUIT TRANSITION AT ABUTMENT

ITS(33)-16

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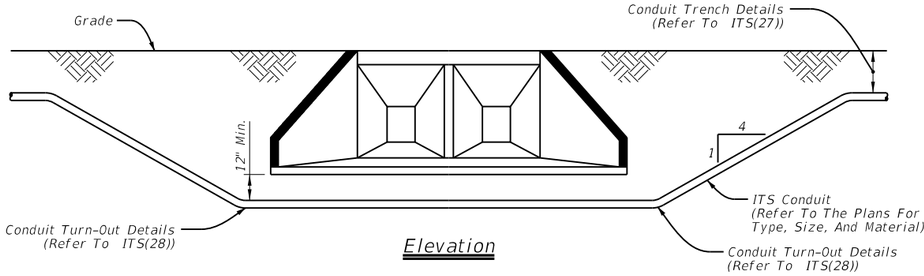
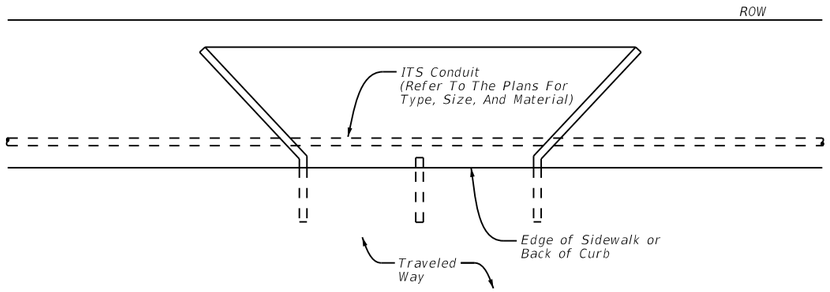
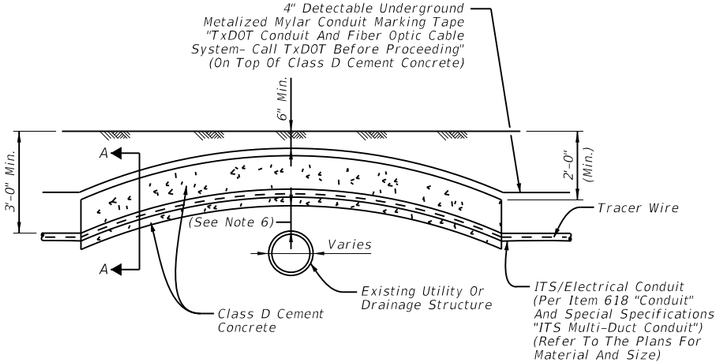


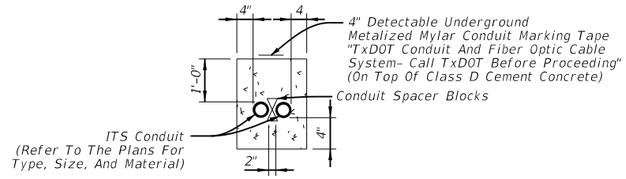
Elevation



Plan View

Conduit Bored Under Culvert



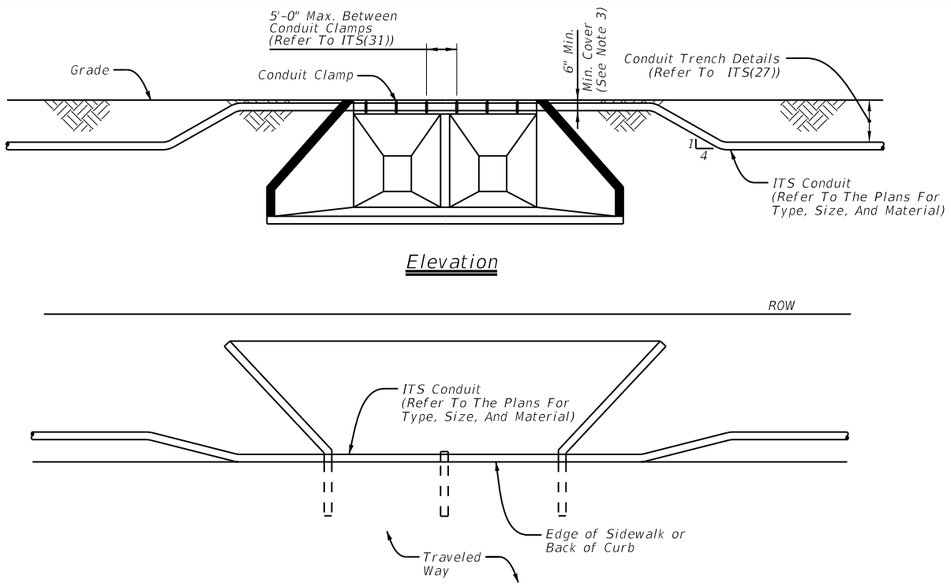


Section A-A

Conduit Installation Detail Above
Existing Drain Pipes Or Utilities

General Notes:

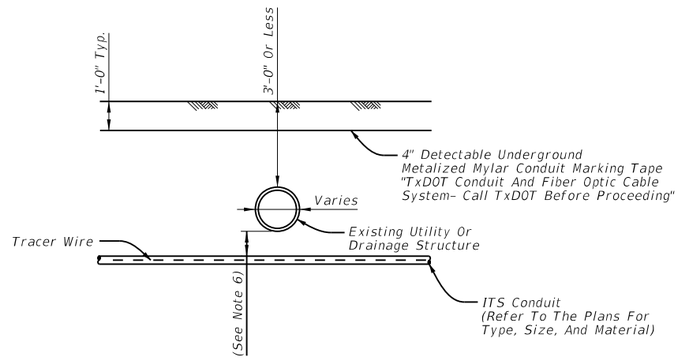
1. With approval from the field engineer adjust the final burial depth of conduit(s) in circumstances requiring traversal of non-movable object conflicts.
2. Where conduits are to be installed over existing underground infrastructure (i.e., existing utility or drainage structure) which are less than 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.



Elevation

Plan View

Conduit Attached To Culvert Headwall



Conduit Installation Detail Below
Existing Drain Pipes Or Utilities

Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT OBSTRUCTION CROSSING

ITS(35)-16

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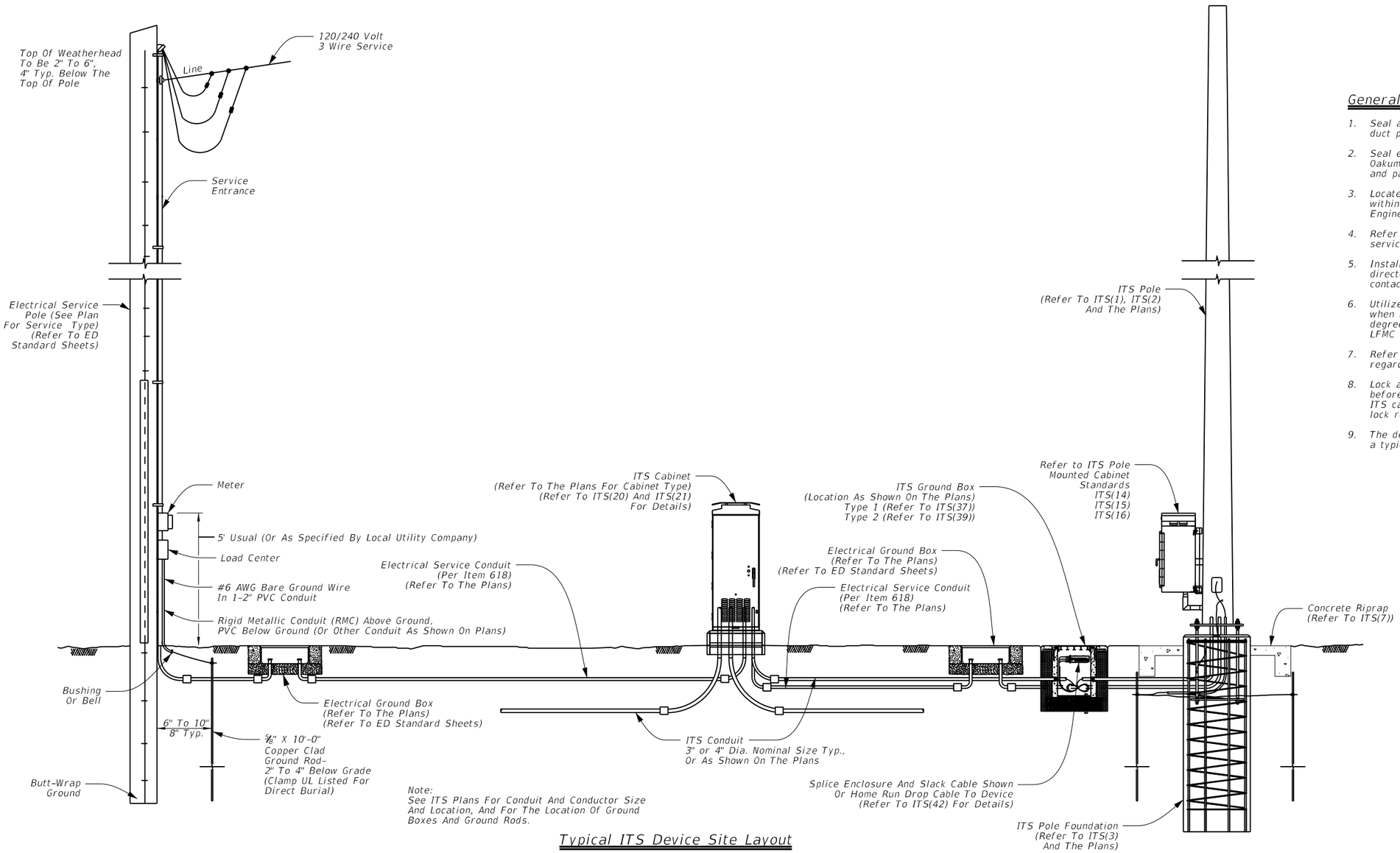

Typical ITS Device Site Layout

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 flexible 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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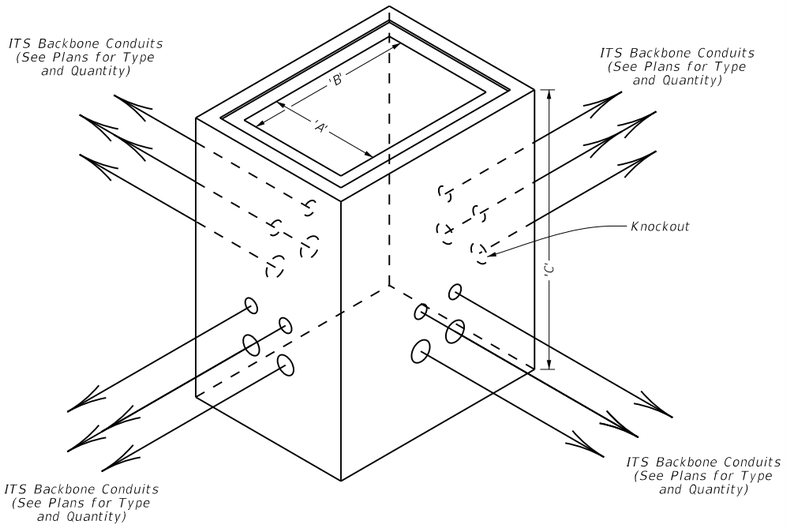
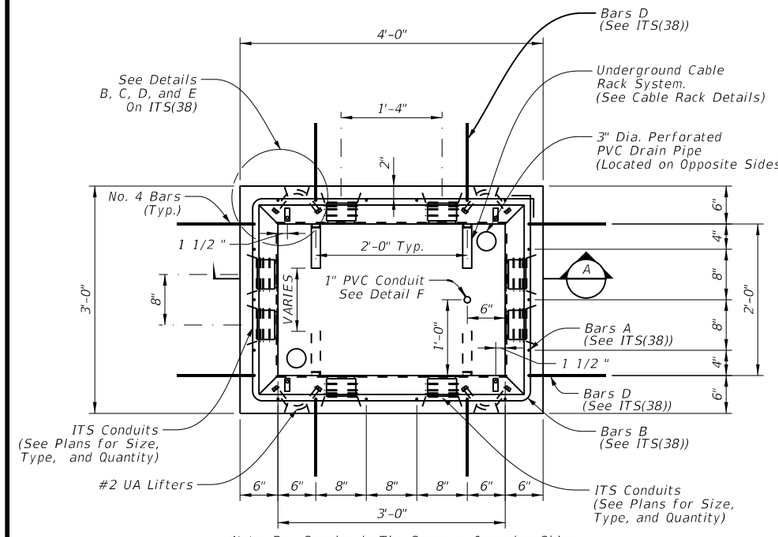


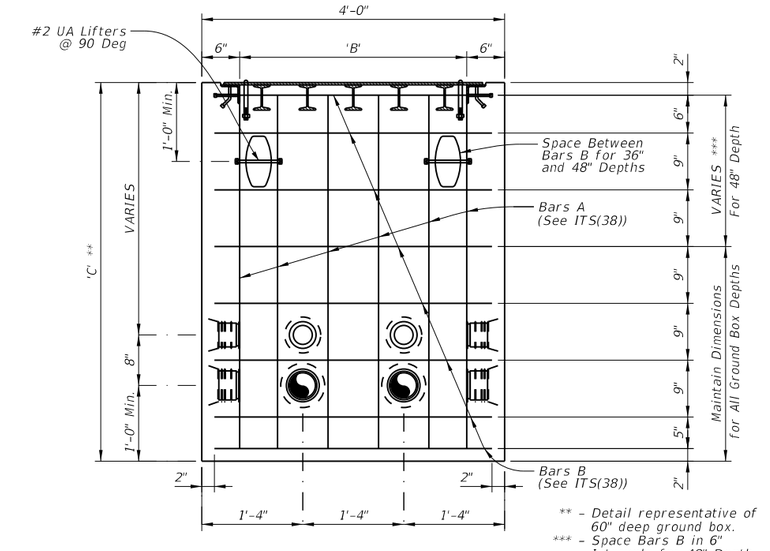
See Ground Box Schedule for A, B, and C Dimensions

Type 1 Ground Box Isometric View



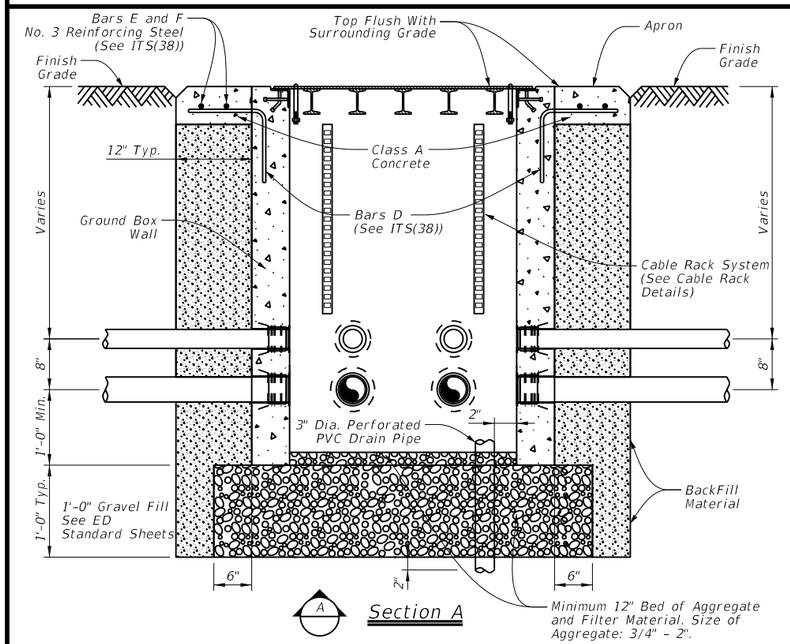
Note: Bar Spacing is The Same on Opposing Sides.

Type 1 Ground Box Plan View

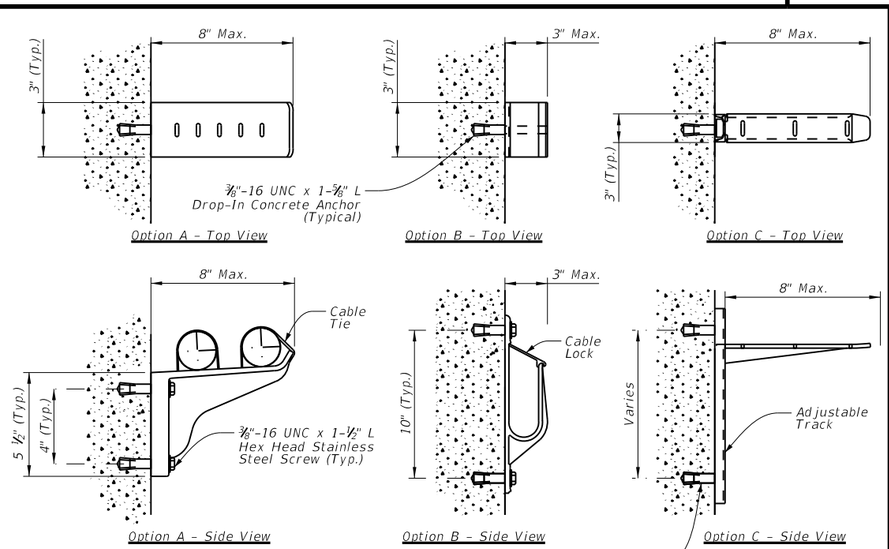


** – Detail representative of 60" deep ground box.
*** – Space Bars B in 6" Intervals for 48" Depth

Type 1 Ground Box Elevation View

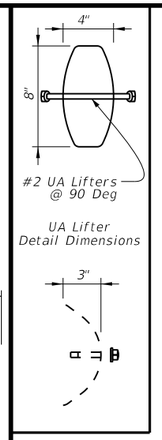


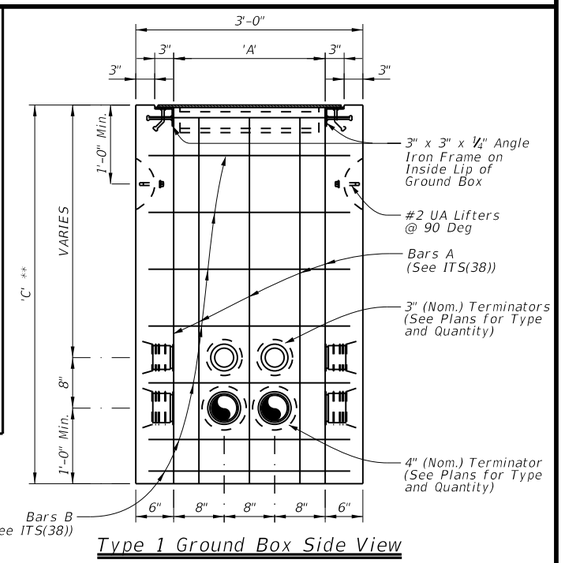
Section A



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 configuration 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 identified 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 Specification, "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 Specification, "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 field of the appropriate number and size of conduit at each location, as directed by the Engineer.
9. Provide a bell fitting on the end of each conduit to ensure a flush fit inside the ground box.
10. Concrete grout around the knockout (inside and out) and around the conduit and bell fitting to ensure a neat watertight fit after the conduit and bell fitting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
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 identified 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 field. When mounting cable racks in the field, 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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Traffic Safety Division Standard

ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(37)-22

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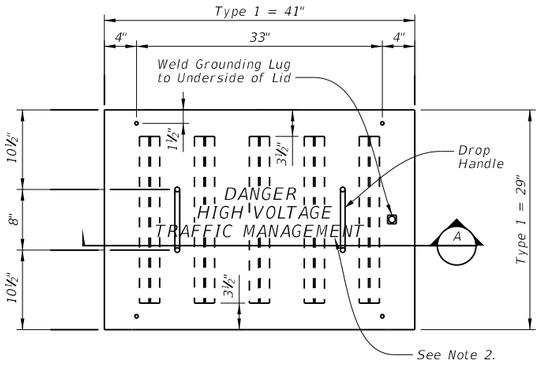
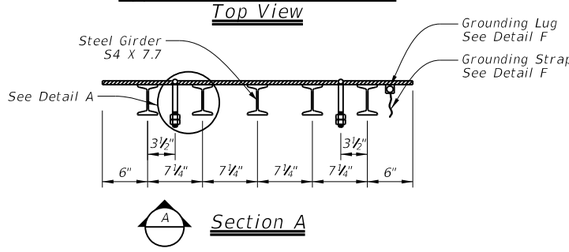
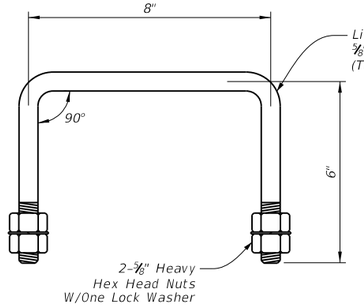


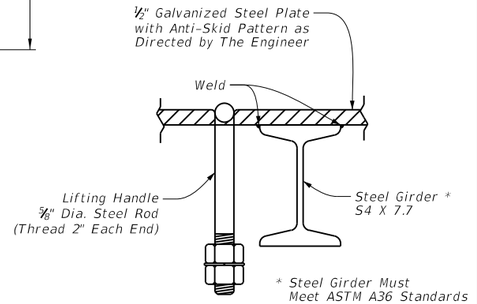
Type 1 Steel Cover Details
Top View



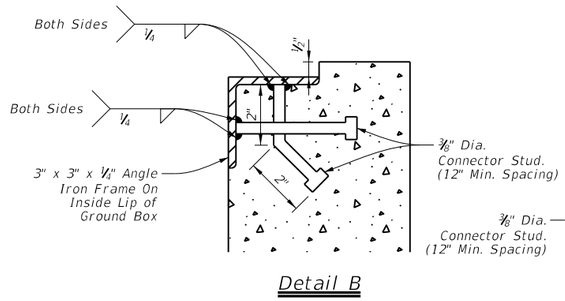
Section A



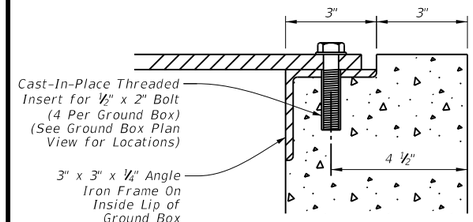
Drop Handle Detail



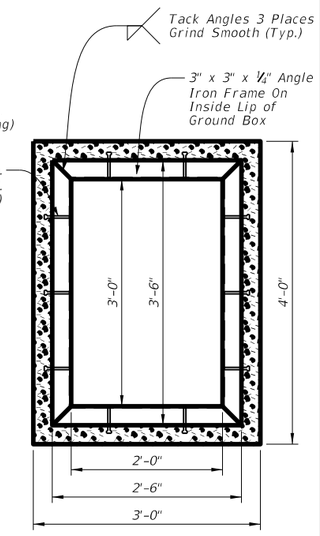
Detail A



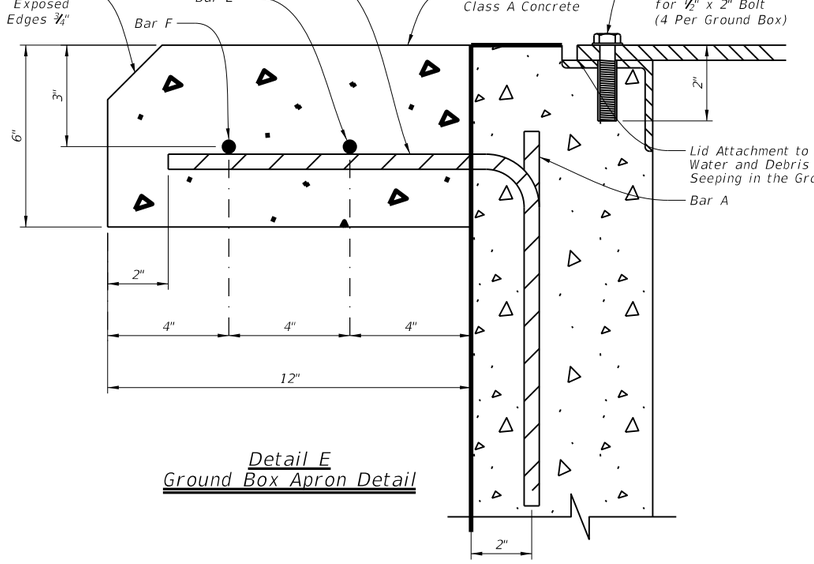
Detail B



Detail C
Lid Attachment Detail



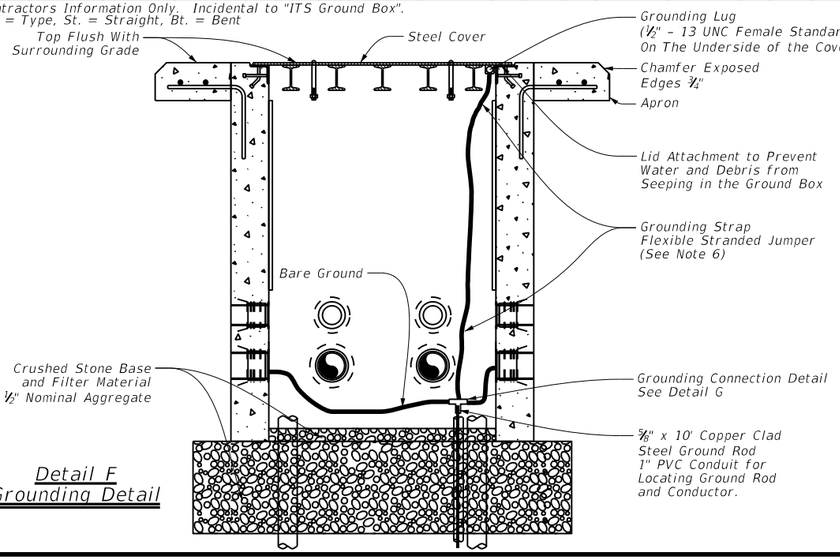
Detail D



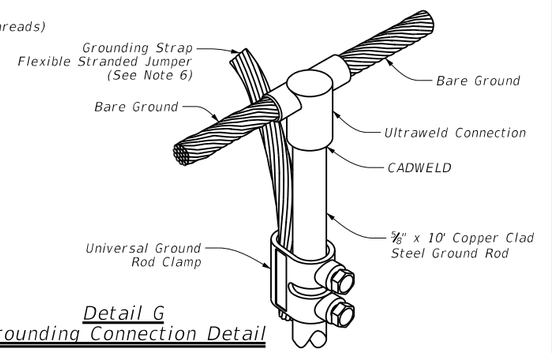
Detail E
Ground Box Apron Detail

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 flexible 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 traffic, 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 certification 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 fits properly on the ground box, and no undue noise results when traffic contacts the cover.

Sheet Details
Not to Scale

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(38)-17

FILE: its(38)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	DAL	DALLAS, ETC.		171

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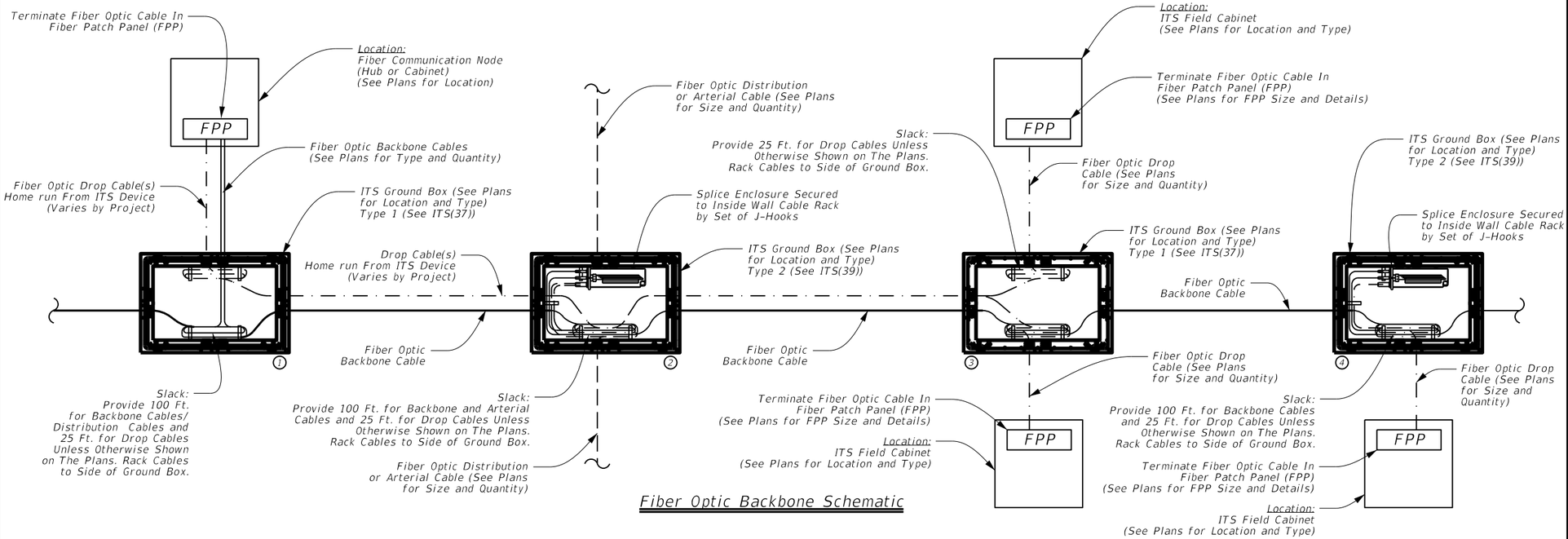
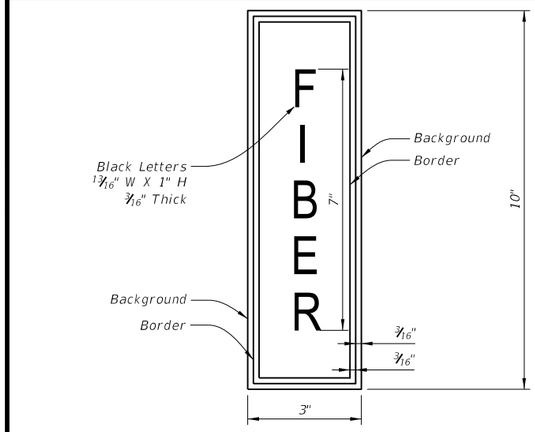
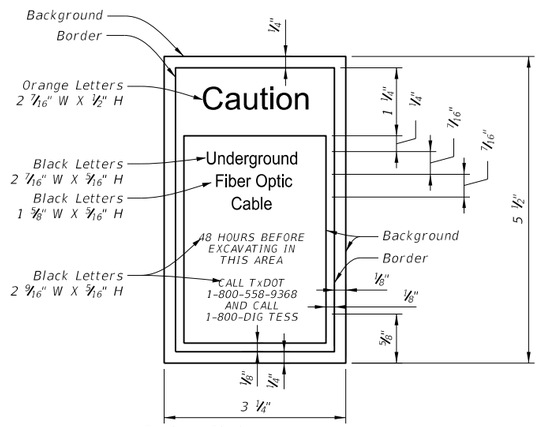


Fiber Optic Backbone Schematic



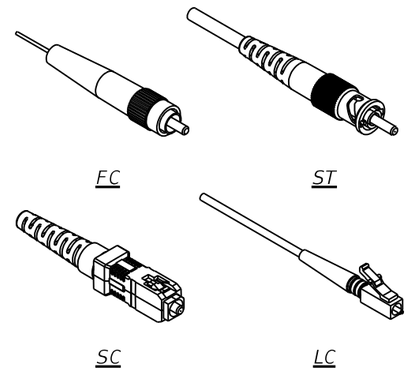
Border - Black
Background - Orange Reflective

Fiber Decal Details



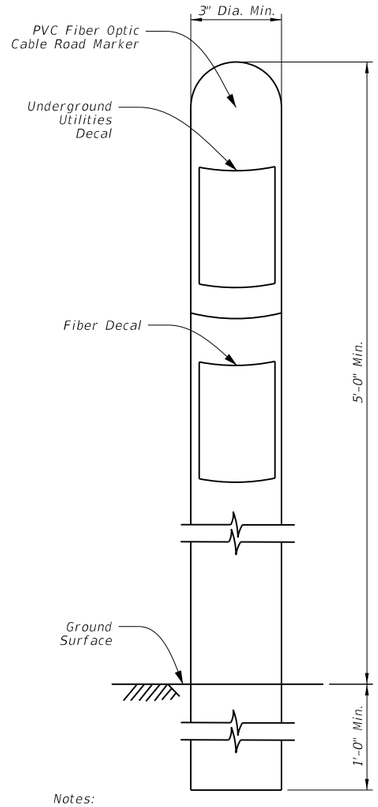
Border - Black
Symbol - Black
Background - Orange Reflective

Underground Utilities Decal Details



Fiber Optic Connectors

Note - Details are diagrammatic and may vary by manufacturer.



Notes:
1. Space fiber optic cable road markers at maximum 1000' intervals or at significant changes in direction such as a 90 degree turn.
2. Provide all orange fiber optic cable road markers for non-splice locations.
3. Provide orange fiber optic cable road markers with white dome for splice locations.
4. Locate marker within concrete apron of fiber 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 field equipment cabinets to communication node.
4. Fiber architecture for splicing drop cable from ITS field equipment cabinet.

General Notes:

1. The fiber optic backbone schematic shown is diagrammatic only and intended to represent the various fiber optic communication architectures seen across the state and may not show all configurations seen. Connection of ITS field 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 fiber communication schematic details and fiber termination information shown on the plans for further information.
2. Install a flat pull cord in all empty conduits and inner-ducts identified 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 specification "ITS Fiber Optic Cable".
3. Color code each type of fiber optic cable to identify the cable as a "backbone" (green or blue), "distribution" (red), or "drop" (orange or yellow).
4. Terminate fibers at fiber 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 identified in the plans to carry fiber 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 fiber 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 fiber count (Example: 48F SM or 48 SMF), and sequential length markings at maximum 3 FT increments.

Sheet Details
Not to Scale

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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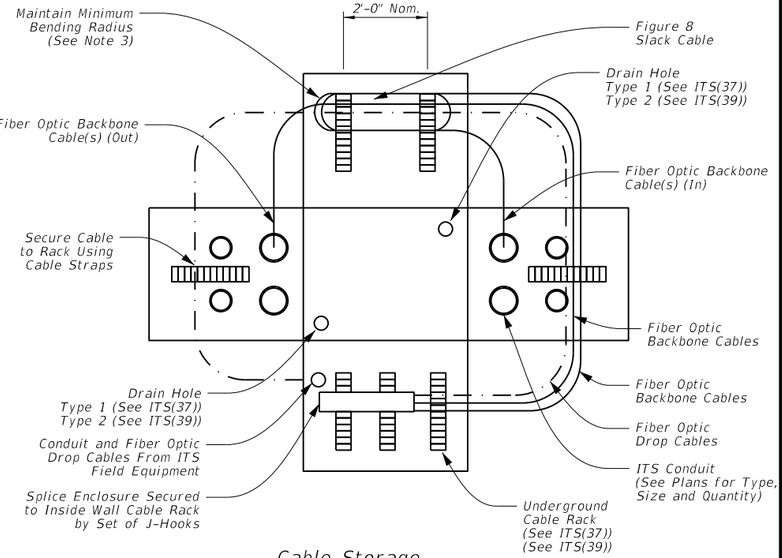
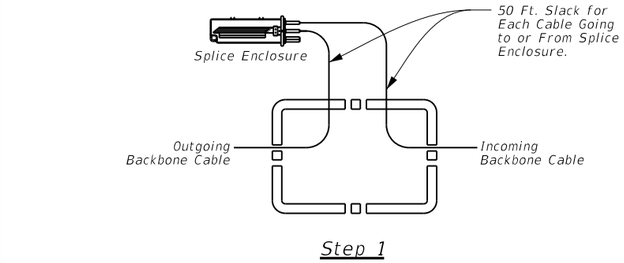
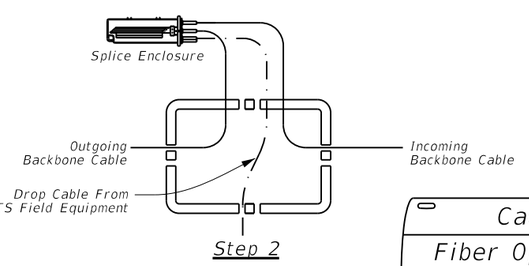


Cable Storage

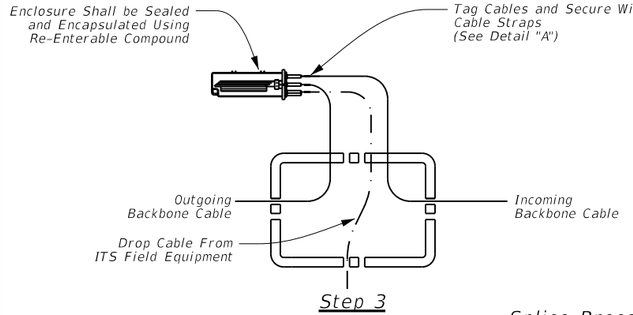
Top View - Ground Box Walls Folded Down for Clarity



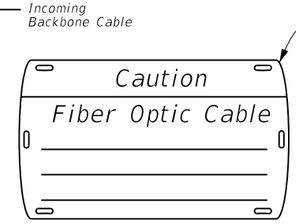
Step 1



Step 2



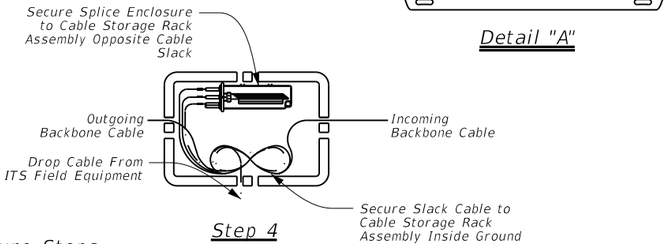
Step 3



Fiber Optic Cable Tag

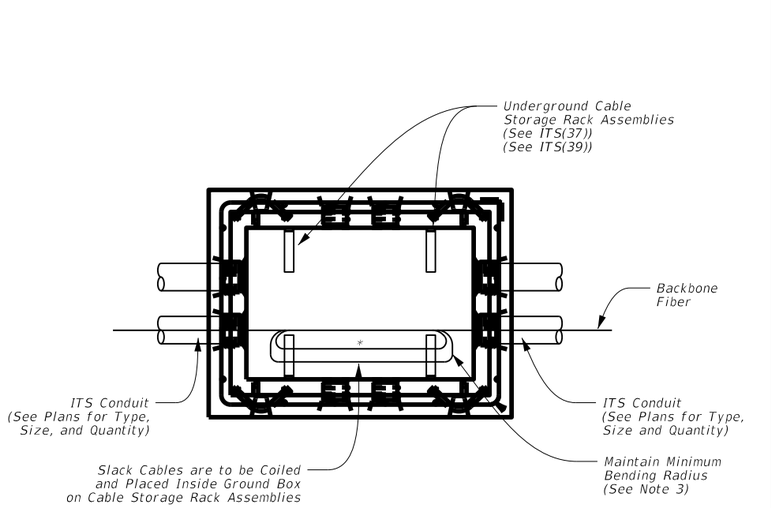
Panduit Inc. No. PST-FO
Hellerman-Tyton No. CST2003x2
Self-Lam Tag or Approved Equal

Detail "A"



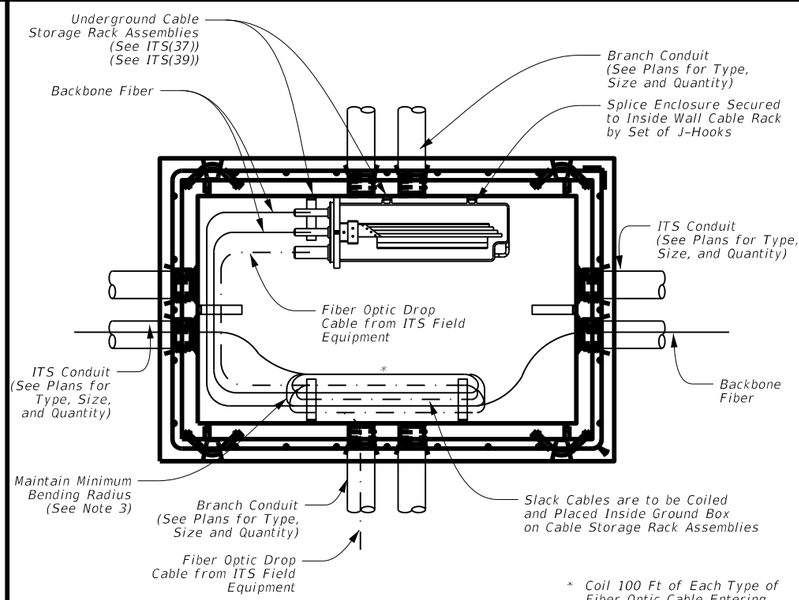
Step 4

Splice Procedure Steps



Type "1" Ground Box

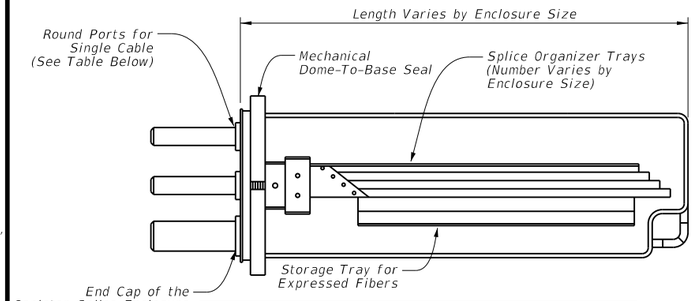
* Coil 25 Ft of Fiber Optic Cable for Slack



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 fiber optic cable diameter during installation, relocation, and removal and a minimum of 10 times the fiber 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 Specification, "ITS Fiber Optic Cable."
7. Submit all splice locations to the field engineer for approval before beginning work.
8. Provide splice enclosures designed to seal, bond, anchor, and protect fiber optic cable splices. Provide splice enclosures designed to handle mechanical and fusion type splices. Provide splice enclosures with port configurations 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 fiber optic cable tags for each fiber optic cable entering a ground box, ITS field equipment cabinet (ground and pole), and hub building or communication node as detailed above. Provide information including fiber 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 fiber when securing to cable.

Sheet Details
Not to Scale

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS FIBER OPTIC CABLE MISCELLANEOUS DETAILS

ITS(43)-16

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