DESIGN	FED.RD. DIV.NO.	FEDERAL AID		HIGHWAY NO.
BMCD	6	STP 2B23(003)VRU,ETC.		FM 490
GRAPHICS BMCD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BMCD	TEXAS	PHARR	WILLACY	1
CHECK BMCD	CONTROL	SECTION	JOB	
	1430	01	031,Etc.	

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT: STP 2B23(003)VRU,ETC.

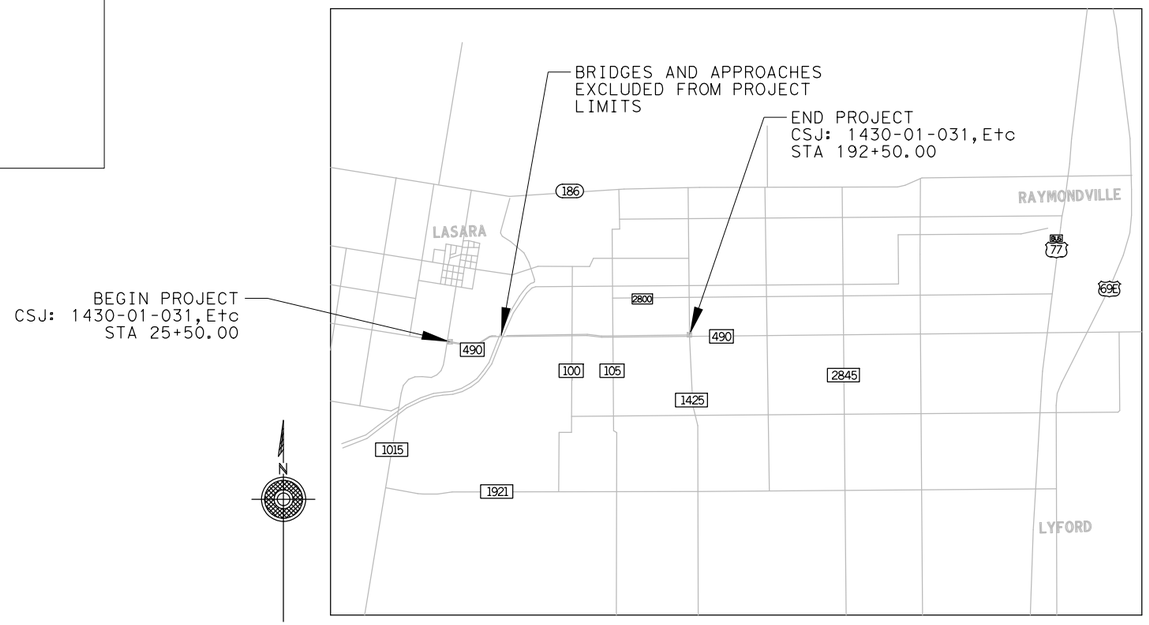
WILLACY COUNTY
FM 490

LIMITS: FROM: FM 1015
TO: FM 1425

HIGHWAY	DESIGN SPEED	CSJ	ROADWAY		TOTAL LENGTH	
			FEET	MILES	FEET	MILES
FM 490	65 MPH	1430-01-031,Etc	16,700.00	3.163	16,700.00	3.163

FOR THE CONSTRUCTION OF: CONSTRUCT PAVED SHOULDERS (1-4FT.) TO ADDRESS ROADWAY & LANE DEPARTURES

CONSISTING OF: GRADING, ACP, REMOVAL OF STRUCTURES AND REPLACEMENT OF EXISTING DRAINAGE CROSSINGS, ADDING PAVEMENT MARKINGS.



EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

T.D.L.R. Inspection Not Required

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 2022).

DESIGN SPEED = 65 MPH, AS-POSTED

HWY	YEAR	ADT
FM 490	2020	2,702
	2040	4,323

FINAL PLANS

DATE OF LETTING:_____
DATE WORK BEGAN:_____
DATE WORK COMPLETED AND ACCEPTED:_____
FINAL CONTRACT PRICE:_____
CONTRACTOR:_____
LIST OF APPROVED FIELD CHANGE ORDERS & SUPPLEMENTAL AGREEMENTS:

THIS IS TO CERTIFY THAT ALL CONSTRUCTION SUBSTANTIAL WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS SPECIFICATIONS AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED UNLESS OTHERWISE NOTED.

ANDRES ESPINOZA, P.E. DATE
SAN BENITO AREA ENGINEER

BURNS McDONNELL
13737 NOEL ROAD,
SUITE 700
DALLAS, TX 75240
ENGINEERING FIRM F-845

SUBMITTED FOR LETTING 04/25/2023

, P.E.
DESIGN ENGINEER/PROJECT MANAGER
BURNS & McDONNELL ENGINEERING CO, INC

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING 5/19/2023
DocuSigned by: Pedro R. Alvarez
EABA335C2DAA4C...
DISTRICT ENGINEER

SUBMITTED FOR LETTING 5/19/2023
DocuSigned by: Romualdo Mena Jr
DISTRICT CENTRAL DESIGN SUPERVISOR

I. GENERAL

II. TRAFFIC CONTROL PLAN

III. ROADWAY DETAILS

V. DRAINAGE DETAILS

VIII. TRAFFIC ITEMS

X. ENVIRONMENTAL ISSUES

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET WITH A # HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

SEAN P. CLARY, P.E. **P.E.** 04/25/2023 **DATE**

STATE OF TEXAS · SEAN CLARY · 122134 · LICENSED · PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET WITH A ## HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

ERIC J. CALVERT, P.E. **P.E.** 04/25/2023 **DATE**

STATE OF TEXAS · ERIC J. CALVERT · 91710 · LICENSED · PROFESSIONAL ENGINEER

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490

INDEX OF SHEETS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY / 2
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

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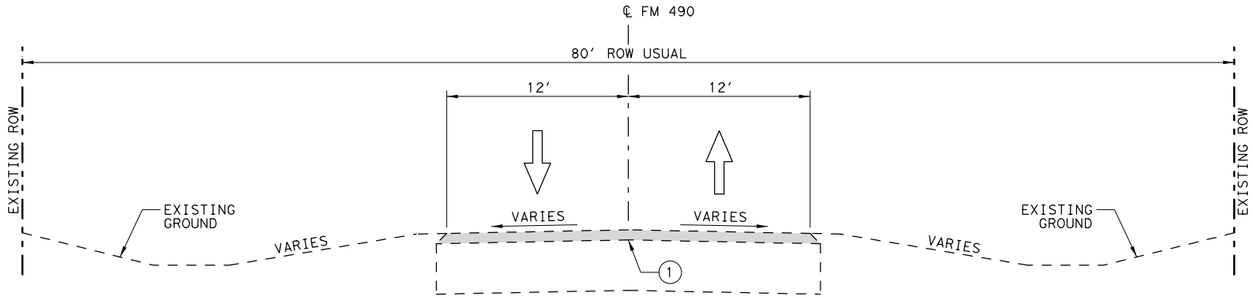
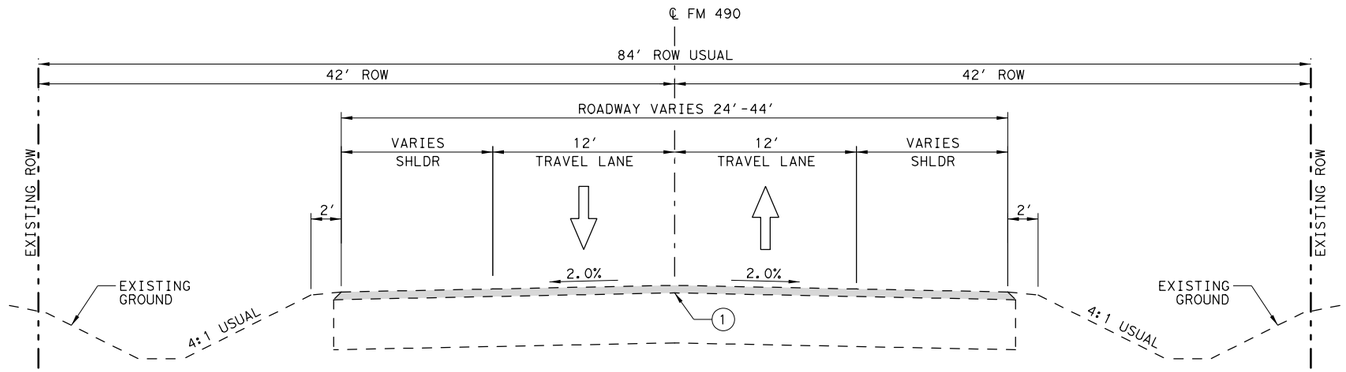


EXISTING FM 490

STA 25+50.00 TO STA 30+17.00

NTS

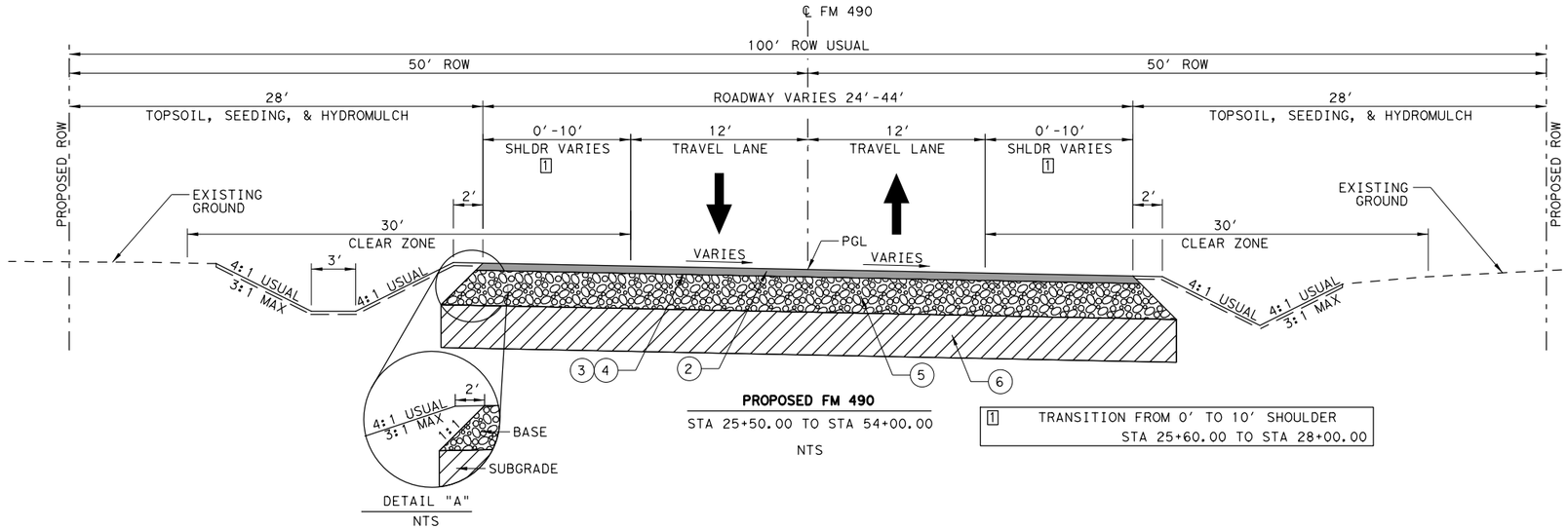


EXISTING FM 490*

STA 54+00.00 TO STA 63+25.00

NTS

*NOTE: TIE TO BR2023 (MAP #)
(FM 490 BRIDGE RECONSTRUCTION PROJECT
OVER DELTA LAKE DRAIN AND WILLACY COUNTY
MAIN CANAL)



PROPOSED FM 490

STA 25+50.00 TO STA 54+00.00

NTS

1 TRANSITION FROM 0′ TO 10′ SHOULDER
STA 25+60.00 TO STA 28+00.00

LEGEND

① EXISTING ASPHALT PAVEMENT
(2" SURFACE COURSE 6" FLEXIBLE BASE)
② 1.5" SP-D PG 76-22 SAC A (NO RAP/RAS)
③ ONE COURSE UNDERSEAL
AGGR (TY-B GR-4P SAC-B)
ASPH (TIER II)
④ PRIME COAT (MC-30)
⑤ 10.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
⑥ 12.0" STABILIZED SUBGRADE W/ 4% LIME (BY WT.)
⑦ 3" SP-D PG 76-22 SAC A (TWO LIFTS - BONDING COURSE BETWEEN LIFTS
⑧ 15.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
PROOF ROLL SUBGRADE

NOTES:

1. STATIONING IS BASED ON CORRESPONDING ROADWAY.
2. STATION LIMITS SHOWN ARE APPROXIMATE FOR NORMAL ROADWAY CONDITIONS. FOR TRANSITIONS AND SUPERELEVATIONS, SEE PLAN AND PROFILE SHEETS.
3. THE CROSS SLOPE VARIES. REFER TO APPROPRIATE PLAN AND PROFILE SHEETS FOR SPECIFIC SLOPES OF ROADWAY.
4. NOT TO SCALE.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

TYPICAL SECTIONS

SCALE = None

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031,Etc

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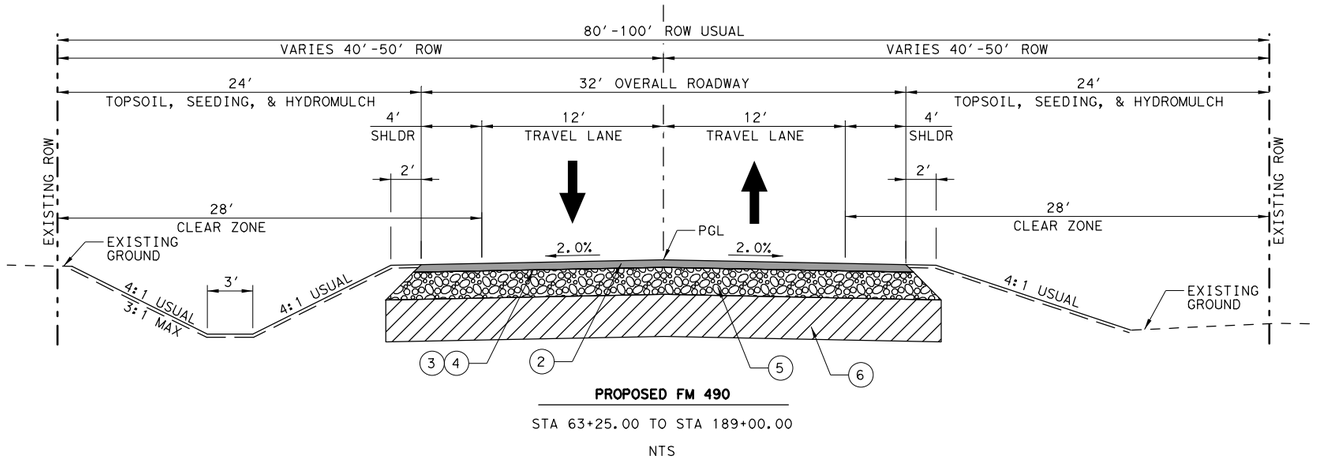
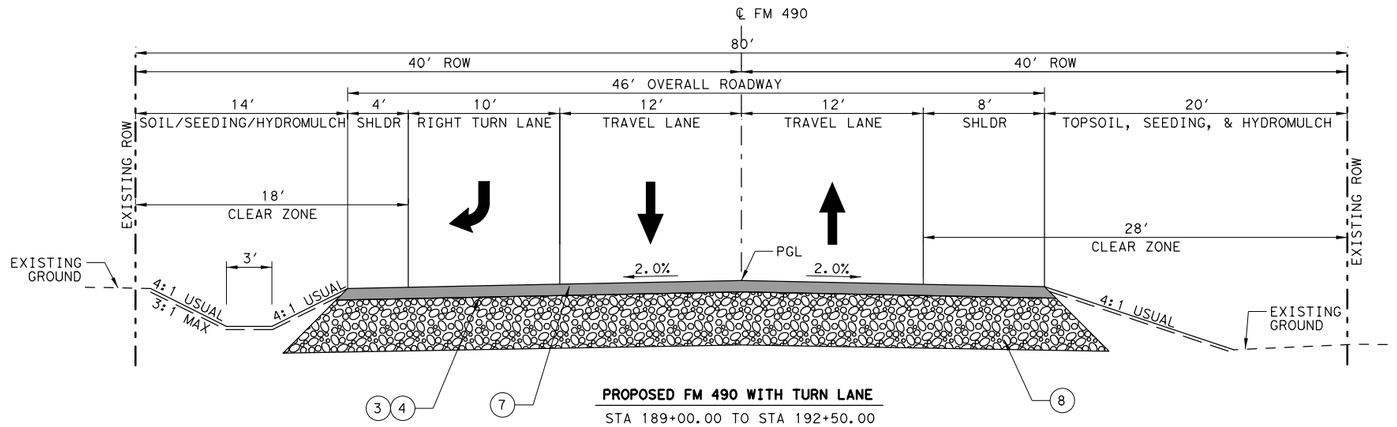


PROPOSED FM 490

STA 63+25.00 TO STA 189+00.00

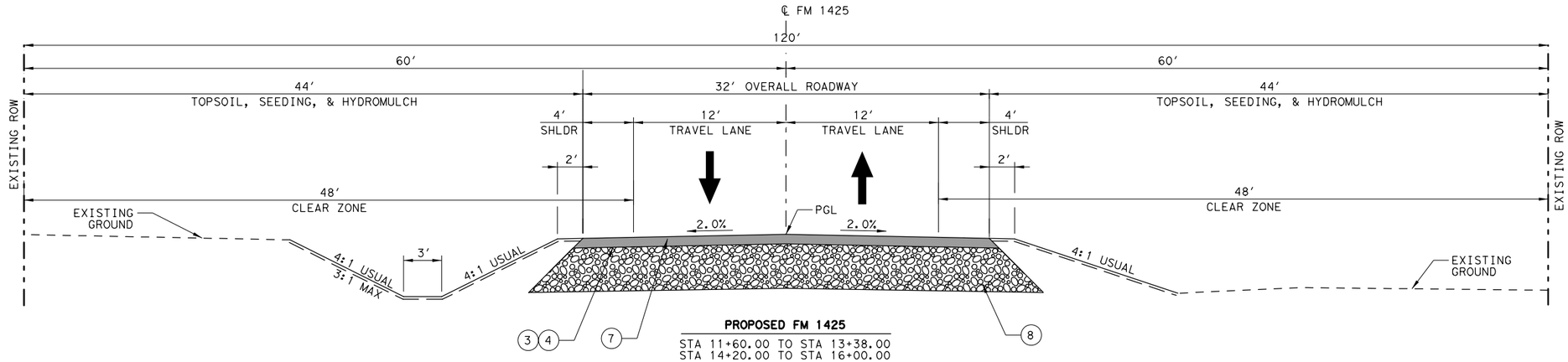
NTS



PROPOSED FM 490 WITH TURN LANE

STA 189+00.00 TO STA 192+50.00

NTS



PROPOSED FM 1425

STA 11+60.00 TO STA 13+38.00
STA 14+20.00 TO STA 16+00.00

NTS

LEGEND

① EXISTING ASPHALT PAVEMENT
(2" SURFACE COURSE 6" FLEXIBLE BASE)
② 1.5" SP-D PG 76-22 SAC A (NO RAP/RAS)
③ ONE COURSE UNDERSEAL
AGGR (TY-B GR-4P SAC-B)
ASPH (TIER II)
④ PRIME COAT (MC-30)
⑤ 10.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
⑥ 12.0" STABILIZED SUBGRADE W/ 4% LIME (BY WT.)
⑦ 3" SP-D PG 76-22 SAC A (TWO LIFTS - BONDING COURSE BETWEEN LIFTS
⑧ 15.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
PROOF ROLL SUBGRADE

NOTES:

1. STATIONING IS BASED ON CORRESPONDING ROADWAY.
2. STATION LIMITS SHOWN ARE APPROXIMATE FOR NORMAL ROADWAY CONDITIONS. FOR TRANSITIONS AND SUPERELEVATIONS, SEE PLAN AND PROFILE SHEETS.
3. THE CROSS SLOPE VARIES. REFER TO APPROPRIATE PLAN AND PROFILE SHEETS FOR SPECIFIC SLOPES OF ROADWAY.
4. NOT TO SCALE.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

TYPICAL SECTIONS

SCALE = None SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN MAW	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031,Etc

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Project Number:

County: Willacy **Control:** 1430-01-031, Etc.

Highway: FM 490

2014 SPECS GENERAL NOTES:

****

General Requirements and Covenants to ITEMS 1 thru 9:

For all pits or quarries, comply with the "Texas Aggregate Quarry and Pit Safety Act."

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination regarding TxDOT underground lines.

ITEM 2: Instructions to Bidders

Contractor questions on this project are to be addressed to the following individual(s):

Andres Espinoza, P.E., San Benito Area Engineer; Andres.Espinoza@txdot.gov
Gabriel Villareal, P.E., Assist. Area Engineer; Gabriel.Villarreal@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

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

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

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

ITEM 5: Control of the Work

The responsibility for the construction surveying on this contract will be in accordance with Article 5.9.3., "Method C."

Project Number:

County: Willacy **Control:** 1430-01-031, Etc.

Highway: FM 490

Prior to contract letting, bidders may obtain a free computerized transfer of files (from the Engineer's office) that contains the earthwork information. If copies of the actual cross-sections in additional to, or instead of the electronic files are requested, they will be available at the Engineer's office for borrowing by copying companies for the purpose of making copies for the bidder at the bidder's expense.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

ITEM 6: Control of Materials

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit 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: Legal Relations and Responsibilities

No significant traffic generator events identified.

Roadway or Lane closures during the following key dates and/or special events are prohibited:

- National Holidays
- The day before a National Holiday
- During emergency events such as natural disasters or as directed by the Engineer

ITEM 8: Prosecution and Progress

Working days will be computed and charged in accordance with Article 8.3.1.6. defined as

follows:

Work and time charges will continue until the start of the bird nesting season. Upon the start of the bird nesting season, work and time charges will stop for a maximum period of 120-Working days for the bird nesting season delay to be completed. Time charges in accordance with Article 8.3.1.4. will resume at the end of the 120-day bird nesting season delay or earlier if mutually agreed in writing by the Engineer and Contractor.

Where road closures or detours around structures are necessary to accomplish proposed work, the removal of existing structures and/or cutting of existing pavement will not be permitted until all precast members for the proposed structure have been cast, tested, and approved for use.

TxDOT is required to provide 10 working days advanced written notice of all proposed bridge widening, rehabilitation, or demolition work to the Texas Department of State Health Services (TDSHS) to allow them the opportunity to both verify information provided regarding asbestos containing materials and abatement and observe the demolition/renovation work. Considering that this notice will be provided TDSHS at the beginning of the project for all affected bridge work based on start and finish dates included in the Contractor's original submitted work schedule, any schedule changes proposed by the Contractor shall be submitted to TxDOT at least 15 days prior to the revised or original start date to accommodate the required coordination with TDSHS.

Prepare progress schedules using the Critical Path Method (CPM).

Working within the vicinity of known utility conflicts prior to the respective dates listed on Special Provision 000-1431 is solely the risk of the Contractor. The Department will not consider either monetary or time relief for inefficient work or any other impacts prior to the respective utility dates.

Early commencement of construction, or working out of phase, does not alter the utility relocation schedule proposed through this contract. All utility relocation dates will be incorporated into the Contractor’s baseline and progress schedule.

ITEM 100: Preparing Right of Way

Preparation of right of way will be done in accordance with the construction phasing shown on the Traffic Control Plans. Performance of this item will not be allowed outside of the project’s current construction phase without prior approval by the Engineer.

Removal of all existing vegetation and trees within the ROW will be subsidiary to prep ROW.

Project Number:

County: Willacy **Control:** 1430-01-031, Etc.

Highway: FM 490

ITEM 132: Embankment

Embankment (DENS CONT) shall be Type C with a max. PI of 40. Material used as embankment material in the top two feet below the bottom of Flexible Base shall meet the following requirements based on preliminary tests and such other tests found necessary by the Engineer.

1. The material shall be such as to produce a well-bonded embankment and shall have a minimum PI of 8 and a maximum PI of 30.

It is the Contractor's responsibility to advise the Engineer of the location of the source sufficiently in advance to avoid delay.

ITEM 160: Topsoil

Use topsoil as needed and directed by the Project Engineer for select problem areas. Unless otherwise approved by the Project Engineer, use topsoil from approved sources outside the right of way as per standard specifications. Existing topsoil is to be salvaged and retained for re-use on the project as topsoil.

ITEM 164: Seeding for Erosion Control

During drill seeding operations, application methods shall be in accordance with the method shown in the Standard Specification Book.

SS-1 Tacking Agent shall be a ratio of 2:1, two (Emulsion) to one (water) and applied at a rate of 0.05 gallons per square yard. The SS-1 Tacking Agent required for Drill Seed operations, will not be paid for directly, but will be subsidiary to Item 164 “Drill Seeding.” Watering shall not be used with the Drill Seed Method. A biodegradable tacking agent may be used in lieu of the SS-1 tacking agent in accordance with the manufacturer’s recommendations when approved by the Engineer.

Cool Season or Warm Season Grasses shall be included as part of Item 164 (See Table 3 and/or Table 4 in the Standard Specification Book or dates and seed type).

Seed mixture shall be as specified under Item 164.

ITEM 166: Fertilizer

Fertilizer rate is based on a rate of 100 Lbs. of Nitrogen per acre. The Nitrogen-Phosphorous Potassium (NPK) ratio shall include a minimum of 5% Phosphorous and 5% Potassium.

Fertilizer shall be homogenized.

ITEM 247: Flexible Base

Flexible Base Type E will be composed of caliche (argillaceous Limestone, calcareous or calcareous clay particles) and may contain stone, conglomerate, gravel, sand, or granular materials when these materials are in situ with the caliche.

Flexible Base (TY E GR 4) caliche shall conform to the following requirements:

Retained on Sq. Sieve:	Percent Retained
2”	0
½”	20-60
No. 4	40-75
No. 40	70-90
Max. PI	15
Max. Wet Ball PI	15
Wet Ball Mill Max. Amount	50
Min. Comp. Strength PSI	150 at 15 PSI lateral pressure
Triaxial Test	Tex-117-E

The Wet Ball Test (Tex-116-E) shall be run and the Plasticity Index of the material passing the No.40 sieve shall be determined (Wet Ball PI).

The percent of density as determined by Compaction Ratio (Tex-113-E) for the new Flexible Base shall be a minimum of 98%.

The Contractor's attention is called to the fact that certain existing and/or proposed structures may be within the limits of the Flexible Base. It shall be the Contractor's responsibility to perform construction operations without damage to these structures.

For water added under Item 247, the sulfate content will not exceed 3000-ppm and the chloride content will not exceed 3000-ppm.

Perform base ride quality testing for all base with only one lift of ACP or a seal coat as the final surface in accordance with Item 247. Perform base ride quality testing before placing the ACP or seal coat.

Project Number:

County: Willacy **Control:** 1430-01-031, Etc.

Highway: FM 490

Proof roll constructed flexible base in accordance with Item 216, “Proof Rolling.” Correct soft spots as directed.

ITEM 251: Reworking Base Courses

Quantities of Flexible Base to be salvaged, shown on the typical sections, are for estimating purposes only. All acceptable base material encountered in existing base is to be salvaged as directed by the Engineer regardless of the quantities involved.

Salvaged base shall be used in the bottom course on any of the proposed roadway and/or turnout sections.

Salvaged base may be used on any of the proposed driveway sections.

Proof roll the roadbed in accordance with Item 216, “Proof Rolling.” Correct soft spots as directed.

ITEM 260: Lime Treatment (Road-Mixed)

The Contractor's attention is called to the fact that certain existing and/or proposed structures are within the limits of the lime-treated Subgrade. Unless otherwise directed by the Engineer, these structures shall be installed before the final rolling of this Subgrade. It shall be the Contractor's responsibility to perform the proper lime treating operation without damage to these structures.

The slurry method of applying lime will be required, except when the lime is to be added to naturally wet materials as directed by the Engineer.

For this project, the Engineer will direct a random number of lime trucks to be check weighed.

The percent of density as determined by Tex-121-E for the new and salvage Flexible Base shall be a minimum of 98% for all courses.

Proof roll all constructed lime treated subgrade and bases courses in accordance with Item 216, “Proof Rolling.” Correct soft spots as directed. Correction of soft spots in the subgrade or base courses will be at the Contractor’s expense.

Contractor is to place an underseal and/or pavement course as indicated on plans within 14 calendar days of initial prime coat application. Otherwise, reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor’s expense.

Allow the mixture to mellow for a minimum period of 48 hours for all types of lime utilized. Additional time might be required due to sulfate and organic testing requirements, as directed by Engineer.

ITEM 275: Cement Treatment (Road-Mixed)

The Contractor's attention is called to the fact that certain existing and/or proposed structures are within the limits of the cement-treated Subgrade. Unless otherwise directed by the Engineer, these structures shall be installed before the final rolling of this Subgrade. It shall be the Contractor's responsibility to perform the proper cement treating operation without damage to these structures.

The percent of density as determined by Tex-120-E for the new and salvage Flexible Base shall be a minimum of 98% for all courses.

Proof roll all constructed cement treated subgrade and bases courses in accordance with Item 216, “Proof Rolling.” Correct soft spots as directed. Correction of soft spots in the subgrade or base courses will be at the Contractor’s expense.

Contractor is to place an underseal and/or pavement course as indicated on plans within 14 calendar days of initial prime coat application. Otherwise, reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor’s expense.

ITEM 3096: Asphalts, Oils, and Emulsions

Temporary ramps/detours and driveways may use Performance Grade Binder 64-22.

ITEM 302: Aggregates for Surface Treatments

Loc.	County	CSJ	Highway	Binder	SAC
1	Willacy	1430-01-031, Etc	FM 490	SPG 76-22	A

The aggregate for the surface treatment shall be surface dry before application unless otherwise directed by the Engineer.

Project Number:

County: Willacy **Control:** 1430-01-031, Etc.

Highway: FM 490

ITEM 310: Prime Coat

The Contractor shall exercise diligence in the application of asphalt by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

Do not apply subsequent courses over the initial prime coat no earlier than 12 hours after the prime coat was applied, unless otherwise authorized or directed by the Engineer.

ITEM 316: Seal Coat

In addition to cleaning by brooming of paved surfaces to be sealed as required by this Item, blading may also be necessary to clean dirt and grass from edges of the pavement and/or turnout areas. The cost of this blading will not be paid for directly but will be considered subsidiary to the various bid Items of the project.

The type and grade of asphalt as shown on the plans and/or as directed by the Engineer, shall be used on these projects. Asphalt cement will be used during the warm season. An emulsified asphalt will be used during the cooler season if permitted in writing by the Engineer. The emulsified asphalt, if used, shall be HFRS 2P. Estimated quantities shown for the bid Item is based on an average of the estimated rates of application for asphaltic cement and emulsified asphalt. These rates should be used for estimating and comparison purposes only.

The one or two-course surface treatment shall be in place for a sufficient period of time in the opinion of the Engineer, for the surface treatment to properly dry and cure before placing the Asphaltic Concrete Pavement.

Traffic will not be permitted on the surface treatment unless authorized by the Engineer.

When emulsified asphalt is used, do not apply subsequent courses over the surface treatment any earlier than the day after the surface treatment was applied, unless otherwise authorized or directed by the Engineer.

Contractor is to place ACP layer(s) as indicated on plans within 14-calendar days of seal coat placement unless otherwise directed by the Engineer.

ITEM 3077: Superpave Mixtures

The Contractor shall exercise diligence in the application of "Bonding Course" by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

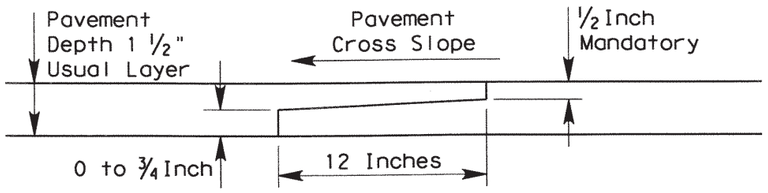
Blading (not to exceed more than 3-ft from the pavement edge) may also be necessary to clean dirt and grass from pavement edges and turnout areas as work under this bid Item. The cost of this blading will not be paid for directly but shall be considered subsidiary to this bid Item.

All surplus RAP from this project will remain the property of the Contractor.

Level-up will be placed before the surface course. An asphaltic concrete spreading and finishing machine and/or motor graders; when approved by the Engineer may be used to place the ACP level-up.

Aggregates used on shoulders and ramps are required to meet SAC requirements.

All unconfined longitudinal joints shall be constructed with a joint maker providing a maximum ½-inch vertical edge and a minimum 6:1 edge taper or as approved by the Engineer. The Engineer may waive this requirement when no impacts to the traveling public are foreseen.



NOTCHED WEDGE JOINT

The engineer may allow for variances to the dimensions shown.

Public and private driveways need to have a smooth vertical transition between the edge of pavement and the existing driveways. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 3077.

The use of RAP and RAS (recycled asphalt shingles) will not be allowed as part of the mix design for the final riding surface.

Use a release agent from the Department's MPL to clean and to coat the inside of truck beds for hauling equipment. Hauling equipment shall be cleaned prior to hauling material to job site. Submit a copy of the bill of lading to the Engineer as part of the QCP. Ensure the pavement is free from any spillage of hydraulic oil or diesel from construction equipment. The Department may reject trucks that contain any foreign material and suspend production if the pavement is contaminated by any pollutants mentioned above.

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SAC B aggregate must have material properties that require 10 or less on the magnesium sulfate soundness test and 20 or less on the Micro-Deval test.

ITEM 400: Excavation and Backfill for Structures

If the Contractor elects to cut pavement (existing/detour) for structural work beyond that required by the construction phasing shown in the plans and approved by the Engineer, it shall be restored at his expense and backfilled to its original condition or better in accordance with Item 400.

Unless shown otherwise in the plans, use a 1-ft depth for Item 400 Structural Excavation (Special) for gravel bedding needed below drainage structures with unstable material.

Structural Excavation Special (Gravel):

Use durable natural stone when tested in accordance with Tex-411-A, has weight loss of no more than 18% after 5 cycles of magnesium sulfate solution. Provide gravel conforming to an aggregate Grade No. 1 as shown on Table 4 of Article 421.2.

ITEM 416: Drilled Shaft Foundations

Payment for furnishing and installing anchor bolts mounted in drill shafts will be included in the unit price bid for the various diameter drill shafts.

The Contractor shall coordinate with the utility companies to verify utility locations before drilling foundations.

The Contractor shall form, or provide a smooth finish, the portions of drilled shaft that project above the ground line. Place a ¾ inch chamfer on the top edge of each pole foundation. This work will not be paid for directly but will be considered subsidiary to this bid Item.

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 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.

In the presence of excess ground water and/or unstable conditions in sub-grade soils prevents excavation to the line and depths indicated on the plans for "Drilled Shaft Foundation", other proposed methods of foundation installation such as casing, etc. shall be submitted for review and approved by the Engineer.

ITEM 420: Concrete Substructures

Pay bent concrete as plan quantity.

ITEM 421: Hydraulic Cement Concrete

Provide Sulfate Resistant Concrete for all concrete piling and drilled shafts.

Provide equipment at the batch plant for determining the free moisture and/or absorption of aggregates in accordance with applicable TXDOT Test.

Provide the following items for concrete batch inspection in accordance with specifications outlined in DMS-10101, "Computer Equipment":

(1) One Desktop Microcomputer or One Laptop Microcomputer
(2) One Integrated Printer/Scanner/Copier/Fax Unit
(3) Contractor-Furnished Software
(4) Hardware

Submit to the Engineer for approval the project locations for all Portland Cement concrete washout areas prior to starting any concrete work.

Fiber Reinforced Concrete is not permitted.

ITEM 427: Surface Finishes for Concrete

Provide surface finishes for concrete as follows:

(1) Bridge overpass and underpass structures – surface area I, opaque sealer coating (color to be determined by the Engineer).
(2) Bridge waterway crossings and bridge class box culvert structures – surface area II, opaque sealer coating (color to be determined by the Engineer).

Concrete traffic barrier/railing (roadway and bridge) and retaining wall coping - opaque sealer coating (color to be determined by the Engineer) to all exposed surfaces.

ITEM 432: Riprap

Provide Class "A" concrete minimum for riprap aprons placed around all box culvert and pipe safety end treatments. Provide ¼-inch thick dummy joints at least every 15-ft for riprap aprons placed around box and pipe culverts.

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Do not use fiber reinforced concrete RIPRAP on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 462: Concrete Box Culverts and Drains

Provide joints in pre-cast concrete box culverts using any of the methods specified in Item 464, except mortar joints.

Provide pre-cast concrete boxes to expedite traffic handling unless otherwise shown on the plans.

Provide the Area Engineer with the casting schedule of all pre-cast concrete boxes prior to beginning any fabrication.

ITEM 464: Reinforced Concrete Pipe

Use tongue and groove pipe where the RCP extends into the lime treated subgrade. The 4-foot depth restriction for heavy equipment passage over pipe structures is voided. The Contractor will be responsible for any construction damage to these facilities.

Do not use mortar joints.

All reinforced concrete pipe shall include rubber gaskets unless shown otherwise on the plans or directed by the Engineer.

ITEM 466: Headwalls and Wingwalls

Do not use pre-cast headwalls/wingwalls.

ITEM 467: Safety End Treatment

All Type II SET's shall have riprap, Class "A" minimum, aprons as shown on the plans. The Contractor may submit an alternate precast SET design for approval by the Engineer.

ITEM 496: Removing Structures

Submit a demolition plan in accordance with Item 496 and the plans for bridge structures identified for removal.

ITEM 502: Barricades, Signs, and Traffic Handling

Replace/relocate all regulatory signs removed due to construction operations with the same sign on fixed support(s) immediately upon its removal. First obtain Project Engineer approval before removing any regulatory roadway sign. Required flaggers are to be available to direct traffic during sign intermediate down time.

Relocate any Directional Sign Assemblies removed during construction operations immediately upon their removal.

These signs shall be relocated to a location in accordance with the Latest Version of the "Texas Manual on Uniform Traffic Control Devices". In no case will a sign be removed without a replacement sign and support(s) being readily available and a location established. Removal and relocation of these signs required for traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

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 "Safety Contingency" is not intended to be used in lieu of bid Items established by the contract.

Remove and dispose of all litter, debris, objectionable material, excess materials that accumulate at the base of all traffic control devices as directed by the Engineer.

ITEM 504: Field Office and Laboratory

For this project a field office will not be required at the project site.

The Contractor will furnish a Type D Structure (Asphalt Mix Laboratory) modified by the following.

Laboratory room:

The other room of this building will be used as a laboratory and will include access to a bathroom facility from the interior. The laboratory and bathroom facility will have the walls, ceiling and floor insulated such that the air temperature can always be maintained at 76 degrees Fahrenheit.

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Furnish for the Department's use in the asphalt laboratory one (1) desktop computer.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls

Before starting each phase of construction, review with the Engineer the SW3P used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SW3P. Location of Construction Exits are to be approved by the Engineer. After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control. Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

The Contractor Force Account "Erosion Control Maintenance" that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent BMP management reviews on the project. The "Erosion Control Maintenance" is not intended to be used in lieu of bid Items established by the contract.

ITEM 530: Intersections, Driveways, and Turnouts

Prime coat shall meet the requirements of Item 310.

Public and private driveways need to have a smooth vertical transition tie-in between the proposed driveway and the existing driveway. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 530.

ITEM 540: Metal Beam Guard Fence

The optional terminal anchor post with the terminal connector will be required as shown on the Metal Beam Guard Fence Standard.

Galvanize the rail elements supplied for this project using a Type II Zinc Coating.

ITEM 542: Removing Metal Beam Guard Fence

Dispose all metal beam guard fence materials unless shown otherwise in the plans.

ITEM 544: Guardrail End Treatments

Label “end treatment type” on backside of unit at time of installation.

ITEM 552: Wire Fence

Contractor is to repair any wire fence that is damaged by the Contractor’s construction operations to insure the retention of livestock, if any, in their respective pastures along the project.

ITEM 560: Mailbox Assemblies

Coordinate and verify final mailbox locations with TxDOT and the US Postmaster.

ITEM 585: Ride Quality for Pavement Surfaces

Use Surface Test Type "B" for service roads and ramps.

Quality control results shall be submitted to TxDOT the next working day after each day’s paving.

Pavement areas with public turnout intersections that carry major traffic volumes will not be subjected to inertial profiler testing. These areas shall be evaluated using the 10-ft. straightedge.

Diamond grinding shall be used to remove localized roughness.

Use Surface Test Type B pay adjustment schedule 3 to evaluate ride quality of the travel lanes in accordance with Item 585, “Ride Quality for Pavement Surfaces.” This includes ramps and service road travel lanes.

ITEMS 636: Signs

Complete sign blanks and panels shall be handled and stored at the job site in such a manner that corners, edges and faces are not damaged. Finished sign blanks shall be stored in either a

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weatherproof warehouse or outside and off the ground in a vertical position. All paper, cardboard and chemically treated separators and packaging shall be removed prior to outside storage.

ITEM 644: Small Roadside Sign Assemblies

All signs shall be installed as shown in the plans and in accordance with the current edition of the "Texas Manual on Uniform Traffic Control Devices" and the “Sign Crew Field Book” (SCFB).

All signs shall be erected according to the locations shown on the signing layout sheets except that a sign may be shifted in order to secure a more desirable location. All sign locations will be staked as shown in the plans and as approved. It is the intent of the plans to erect all roadside traffic signs with the sign edge a minimum of 6 feet from the edge of the shoulder, or if none, 12 feet from the edge of the travel lane. In curb and gutter sections, the sign edge shall be a minimum of 2 feet from the face of the curb.

For this project, aluminum type sign blanks as provided for under Item 636 will be required for all proposed signing installed under Item 644. Aluminum sign blanks less than 7.5 square feet shall be 0.08-inch-thick, sign blanks 7.5 to 15 square feet shall be 0.100-inch-thick and sign blanks greater than 15 square feet shall be 0.125 inch thick.

All excess excavation shall be spread uniformly inside the right of way as directed and shall be included in the price of these Items.

Sign types which design details are not shown on the plans shall conform with the latest edition of the Department's "Standard Highway Sign Design for Texas" Manual.

Signs shown to be removed shall include the complete sign installation and separate the sign post at the concrete foundation. The concrete foundation shall be disposed in accordance with this bid Item. Except for concrete foundations, all removed sign panels, sign posts, and hardware shall remain then property of the Department. All removed sign installations shall be completely disassembled. All salvageable sections of sign panels shall be recycled by TxDOT. The removed sign material will be required to be hauled to the maintenance yard closest to the project. No signs shall be removed without prior approval.

ITEM 658: Delineator and Object Marker Assemblies

Delineator assemblies shall be installed 8 feet from the edge of the shoulder unless restricted by some obstruction, in which case, the delineator assembly shall be placed between 2 and 8 feet from the edge of the shoulder.

Bi-directional object markers shall be in accordance with the D&OM standard sheets. The Contractor is directed to the standards when instructed where and how to install the object markers.

ITEMS 662 and 666: Work Zone Pavement Markings and Retroreflectorized Pavement Markings

All permanent pavement markings and work zone pavement markings for this project under these Items shall be 0.100 inches (100 mil) thick thermoplastic.

Any permanent pavement markings or non-removal work zone pavement markings lacking reflectivity in accordance with the requirements of Tex 828-B, or that fail to meet minimum retro reflectivity requirements for longitudinal pavement markings when required, will be addressed per the requirements of the specification. The roadway will be re-striped at no additional compensation.

Pavement surface preparation for markings and markers will not be paid for directly but shall be considered subsidiary to Item 666.

Prior to any striping operations, an on-site coordination meeting between all the parties involved will be required to review striping details and requirements to ensure quality work.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

ITEM 677: Eliminating Existing Pavement Markings and Markers

Asphalt and aggregate types and grades shall be as approved in writing when a surface treatment is used to eliminate existing pavement markings.

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SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002	110 6001	132 6006	216 6001	247 6225	260 6002	260 6011	275 6001	275 6031	310 6009	316 6005	316 6531	432 6045	530 6004	530 6005	530 6016	540 6002	544 6001	560 6025	690 6017	3077 6065	3077 6075
	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(DENS CONT)(TY C)	PROOF ROLLING	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	LIME (HYDRATED LIME (SLURRY))	LIME TRT (EXST MATL) (12")	CEMENT	CEMENT TREAT (NEW BASE) (10")	PRIME COAT (MC-30)	ASPH (TIER II)	AGGR (TY-B GR-4P SAC-B)	RIPRAP (MOW STRIP)(4 IN)	DRIVEWAYS (CONC)	DRIVEWAYS (ACP)	DRIVEWAYS (BASE)	MTL W-BEAM GD FEN (STEEL POST)	GUARDRAIL END TREATMENT (INSTALL)	RELOCATE EXISTING MAILBOX	REPLACE OF SPAN CABLE ASSM	SP MIXES SP-D SAC-A PG76-22	TACK COAT
	STA	CY	CY	HR	CY	TON	SY	TON	SY	GAL	GAL	CY	CY	SY	SY	SY	LF	EA	EA	LF	TON	GAL
CSJ 1430-01-031				8																		
SHEET 1 OF 16 BEGIN TO STA 32+00	7	1,049	258		840	54	3,084	31	3,085	592	889	25		98	48	52			1		245	
SHEET 2 OF 16 STA 32+00 TO STA 44+00	12	2,914	879		1,665	108	6,103	61	6,103	1,176	1,764	50	50				600	4			486	
SHEET 3 OF 16 STA 44+00 TO STA 54+00	10	1,587	864		1,391	90	5,098	51	5,099	983	1,474	41			40	43					406	
SHEET 4 OF 16 STA 63+25 TO 71+00	8	836	183		794	52	2,929	29	2,930	557	836	24	19				100	4			230	
SHEET 5 OF 16 STA 71+00 TO 83+00	12	2,979	53		1,225	80	4,518	45	4,519	859	1,289	36									355	
SHEET 6 OF 16 STA 83+00 TO 95+00	12	2,342	114		1,225	80	4,518	45	4,519	859	1,289	36			180	192					355	
SHEET 7 OF 16 STA 95+00 TO 107+00	12	2,999	22		1,225	80	4,518	45	4,519	859	1,289	36									355	
SHEET 8 OF 16 STA 107+00 TO 119+00	12	2,370	99		1,225	80	4,518	45	4,519	859	1,289	36			289	307			2		355	
SHEET 9 OF 16 STA 119+00 TO 131+00	12	2,232	201		1,225	80	4,518	45	4,518	859	1,289	36			92	100			1		355	
SHEET 10 OF 16 STA 131+00 TO 143+00	12	2,234	49		1,225	80	4,518	45	4,519	859	1,289	36			337	360					355	
SHEET 11 OF 16 STA 143+00 TO 155+00	12	2,064	57		1,225	80	4,518	45	4,519	859	1,289	36			69	74			1		355	
SHEET 12 OF 16 STA 155+00 TO 167+00	12	1,900	100		1,225	80	4,518	45	4,519	859	1,289	36									355	
SHEET 13 OF 16 STA 167+00 TO STA 179+00	12	1,009	673		1,225	80	4,518	45	4,519	859	1,289	36			55	59					355	
SHEET 14 OF 16 STA 179+00 TO 189+00	10	163	1,323		1,021	66	3,765	37	3,766	716	1,074	30									296	
SHEET 15 OF 16 STA 191+00 TO END	2	399	25		317			12	773	148	221	7									122	51
SHEET 16 OF 16 FM1425 INTERSECTION	4	1,087	91		1,159			42	2,800	551	826	23								150	455	192
PROJECT TOTALS	161	28,164	4,991	8	18,212	1,088	61,643	664	65,226	12,456	18,683	524	69	98	1,110	1,187	700	8	5	150	5,435	244

NOTES:
1. STATION 189+00 TO STATION 191+00 QUANTITIES ARE INCLUDED IN FM 1425 (SHEET 16) QUANTITIES
2. CEMENT TREATMENT OF 15" BASE ON FM 1425, INCLUDING FM 490 STATION 189+00 TO END, WILL BE CONSIDERED SUBSIDIARY TO ITEM 275-6031 CEMENT TREAT (NEW BASE)(10")

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	510 6003	662 6050	662 6075	662 6063	662 6095
	ONE-WAY TRAF CONT (PORT TRAF SIG)	WK ZN PAV MRK REMOV (REFL) TY II-A-A	WK ZN PAV MRK REMOV (W)24"(SLD)	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)
	MO	EA	LF	LF	LF
FM 490	1	285	36	4,785	11,400
PROJECT TOTALS	1	285	36	4,785	11,400

SUMMARY OF MOBILIZATION ITEMS

LOCATION	500 6001	502 6001
	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING
	LS	MO
CSJ 1430-01-031	1	8
PROJECT TOTALS	1	8

BASIS OF ESTIMATE:
1. 260-6002 4% BY WEIGHT OF SOIL
   UNIT WEIGHT OF SOIL IS 98 LB/CF
2. 275-6001 2% BY WEIGHT OF BASE
   UNIT WEIGHT OF BASE IS 135 LB/CF
3. 310-6009 APPLICATION RATE 0.2 GAL/SY
4. 316-6005 APPLICATION RATE 0.3 GAL/SY
5. 316-6531 APPLICATION RATE 120 SY/CY
6. 3077-6075 UNIT WEIGHT OF HMA 110LB/SY/IN
7. 3077-6075 APPLICATION RATE 0.07 GAL/SY

SUMMARY OF REMOVAL ITEMS

LOCATION	104 6017	105 6021	105 6043	106 6001	496 6004	496 6007	542 6001	542 6002	644 6078
	REMOVING CONC (DRIVEWAYS)	REMOVING STAB BASE AND ASPH PAV (0-4")	REMOVING STAB BASE & ASPH PAV (0-6")	OBLITERATING ABANDONED ROAD	REMOV STR (SET)	REMOV STR (PIPE)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE SM RD SN SUP&AM (SIGN ONLY)
	SY	SY	SY	STA	EA	LF	LF	EA	EA
SHEET 1 OF 15 BEGIN TO MATCHLINE B	98	48	2,297	1		102			5
SHEET 2 OF 15 MATCHLINE B TO MATCHLINE D			3,170	11					1
SHEET 3 OF 15 MATCHLINE D TO STA 54+00			2,750	10		126			3
SHEET 4 OF 15 STA 63+25 TO 71+00			2,055				92	4	2
SHEET 5 OF 15 STA 71+00 TO 83+00			3,212			138			
SHEET 6 OF 15 STA 83+00 TO 95+00		281	3,234			52			
SHEET 7 OF 15 STA 95+00 TO 107+00			3,241						1
SHEET 8 OF 15 STA 107+00 TO 119+00		304	3,211		2	322			4
SHEET 9 OF 15 STA 119+00 TO 131+00		79	3,203			43			
SHEET 10 OF 15 STA 131+00 TO 143+00		315	3,195		4	202			5
SHEET 11 OF 15 STA 143+00 TO 155+00			3,178			34			1
SHEET 12 OF 15 STA 155+00 TO 167+00			3,168						
SHEET 13 OF 15 STA 167+00 TO STA 179+00		59	3,175		2	119			1
SHEET 14 OF 15 STA 179+00 TO 188+50			2,521						3
SHEET 15 OF 15 FM1425 INTERSECTION			3,280		4	242			7
PROJECT TOTALS	98	1,086	44,890	21	12	1,380	92	4	33

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

SUMMARY OF QUANTITIES

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SPC	6	SEE TITLE SHEET	FM 490
DRAWN SPC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	6
CHECK MAW	CONTROL	SECTION	JOB	
	1430	01	031,Etc	

DATE: 4/25/2023
TIME: 5:36:29 PM
USER: sclary
FILE NAME: ...\Summaries\FM490-BMCD-SUM01.dgn
PENTABLE: SWAFM490 Pentable.tbl
SCALE: NI
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS1.pltt

SUMMARY OF DRAINAGE ITEMS

LOCATION	400 6002	400 6005	400 6010	402 6001	462 6006	464 6003	464 6005	464 6008	466 6178	467 6356	467 6358	467 6363	467 6388	467 6390	467 6395	1008 6001	1008 6002
	STRUCT EXCAV (BOX)	CEM STABIL BKFL	STRUCT EXCAV (SPECIAL)	TRENCH EXCAVATION PROTECTION	CONC BOX CULV (5 FT X 2 FT)	RC PIPE (CL III)(18 IN)	RC PIPE (CL III)(24 IN)	RC PIPE (CL III)(36 IN)	WINGWALL (PW - 1) (HW=3 FT)	SET (TY II) (18 IN) (RCP) (3:1) (C)	SET (TY II) (18 IN) (RCP) (4:1) (C)	SET (TY II) (18 IN) (RCP) (6:1) (P)	SET (TY II) (24 IN) (RCP) (3:1) (C)	SET (TY II) (24 IN) (RCP) (4:1) (C)	SET (TY II) (24 IN) (RCP) (6:1) (P)	PRSSR IRRIG PVC PIPE (18")	PRSSR IRRIG PVC PIPE (24")
	CY	CY	CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF	LF
SHEET 1 OF 16 BEGIN TO STA 32+50		33	15	102				102									102
SHEET 2 OF 16 STA 32+50 TO STA 44+00	116	46		78	68				2								
SHEET 3 OF 16 STA 44+00 TO STA 54+00		26	13	102		20	102					2				102	
SHEET 4 OF 16 STA 63+25 TO 71+00																	
SHEET 5 OF 16 STA 71+00 TO 83+00		36	18	138			138									138	
SHEET 6 OF 16 STA 83+00 TO 95+00						50					2						
SHEET 7 OF 16 STA 95+00 TO 107+00																	
SHEET 8 OF 16 STA 107+00 TO 119+00		25	12	95		167	156			2		8	2			95	
SHEET 9 OF 16 STA 119+00 TO 131+00						43						4					
SHEET 10 OF 16 STA 131+00 TO 143+00						15	197					2	4		4		
SHEET 11 OF 16 STA 143+00 TO 155+00						34						2					
SHEET 12 OF 16 STA 155+00 TO 167+00																	
SHEET 13 OF 16 STA 167+00 TO STA 179+00						79					2	2					
SHEET 14 OF 16 STA 179+00 TO 191+00						24	145					2	4				
SHEET 15 OF 16 STA 191+00 TO END																	
SHEET 16 OF 16 FM1425 INTERSECTION							67							2			
PROJECT TOTALS	116	167	59	515	68	432	805	102	2	2	4	22	10	2	4	335	102

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	644 6027	644 6028	644 6030	644 6033	666 6048	666 6318	666 6321	666 6343	668 6077	672 6009	672 6017	672 6018
	IN SM RD SN SUP&AM TYS80(1)SA(P)	IN SM RD SN SUP&AM TYS80(1)SA(P-BM)	IN SM RD SN SUP&AM TYS80(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(U)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	PREFAB PAV MRK TY C (W) (ARROW)	REFL PAV MRKR TY II-A-A	TRAFFIC BUTTON TY Y	TRAFFIC BUTTON TY B
	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA
SHEET 1 OF 15 BEGIN TO STA 32+50	1		3			711	711	1,420		18	178	178
SHEET 2 OF 15 STA 32+50 TO STA 43+50	1					350	1,850	2,200		28	463	88
SHEET 3 OF 15 STA 43+50 TO STA 54+00	1						2,100	2,100		27	525	
SHEET 4 OF 15 STA 63+25 TO 71+00			1			775	500	1,550		17	125	201
SHEET 5 OF 15 STA 71+00 TO 83+00						1,200		2,400		15		330
SHEET 6 OF 15 STA 83+00 TO 95+00						1,200		2,400		15		330
SHEET 7 OF 15 STA 95+00 TO 107+00	1					1,200		2,400		15		330
SHEET 8 OF 15 STA 107+00 TO 119+00	1	2	1			1,200		2,400		15		330
SHEET 9 OF 15 STA 119+00 TO 131+00						1,200		2,400		15		330
SHEET 10 OF 15 STA 131+00 TO 143+00	2	2	1			1,200		2,400		15		330
SHEET 11 OF 15 STA 143+00 TO 155+00	1					1,200		2,400		15		330
SHEET 12 OF 15 STA 155+00 TO 167+00						1,200		2,400		15		330
SHEET 13 OF 15 STA 167+00 TO STA 179+00	1					1,200		2,400		15		330
SHEET 14 OF 15 STA 179+00 TO 188+50	2		1			359	1,184	1,900		20	296	99
SHEET 15 OF 15 FM1425 INTERSECTION	3	2		2	58		1,382	1,600	1	18	346	
PROJECT TOTALS	14	6	7	2	58	12,995	7,727	32,370	1	263	1,933	3,536

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	160 6003	164 6023	164 6029	168 6001	506 6038	506 6039	506 6041	506 6043
	FURNISHING AND PLACING TOPSOIL (4")	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	CELL FBR MLCH SEED(TEMP)(WARM)	VEGETATIVE WATERING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	MG	LF	LF	LF	LF
SHEET 1 OF 15 BEGIN TO STA 32+50	4,118	4,118	4,118	67	1,444	1,444		
SHEET 2 OF 15 STA 32+50 TO STA 43+50	6,805	6,805	6,805	111	2,232	2,232		
SHEET 3 OF 15 STA 43+50 TO STA 54+00	6,495	6,495	6,495	106	2,092	2,092		
SHEET 4 OF 15 STA 63+25 TO 71+00	5,765	5,765	5,765	94	1,616	1,616	181	181
SHEET 5 OF 15 STA 71+00 TO 83+00	9,068	9,068	9,068	147	2,400	2,400	160	160
SHEET 6 OF 15 STA 83+00 TO 95+00	8,453	8,453	8,453	137	2,375	2,375		
SHEET 7 OF 15 STA 95+00 TO 107+00	7,733	7,733	7,733	126	2,400	2,400		
SHEET 8 OF 15 STA 107+00 TO 119+00	6,313	6,313	6,313	103	2,352	2,352	56	56
SHEET 9 OF 15 STA 119+00 TO 131+00	6,300	6,300	6,300	102	2,385	2,385		
SHEET 10 OF 15 STA 131+00 TO 143+00	6,077	6,077	6,077	99	2,345	2,345	56	56
SHEET 11 OF 15 STA 143+00 TO 155+00	6,340	6,340	6,340	103	2,386	2,386		
SHEET 12 OF 15 STA 155+00 TO 167+00	6,400	6,400	6,400	104	2,400	2,400		
SHEET 13 OF 15 STA 167+00 TO STA 179+00	6,347	6,347	6,347	103	2,388	2,388		
SHEET 14 OF 15 STA 179+00 TO 188+50	5,068	5,068	5,068	82	1,900	1,900	69	69
SHEET 15 OF 15 FM1425 INTERSECTION	4,827	4,827	4,827	78	1,451	1,451	84	84
PROJECT TOTALS	96,109	96,109	96,109	1,562	32,166	32,166	606	606

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490

SUMMARY OF QUANTITIES

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SPC	6	SEE TITLE SHEET	FM 490
DRAWN SPC	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY / 7
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

DATE: 4/25/2023
TIME: 9:33:27 AM
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SCALE: 1:1
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS1.pltt

SUMMARY OF EARTHWORK QUANTITIES (CSJ 1430-01-031)

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
25+40	25+50	14	0
25+50	26+00	70	0
26+00	26+50	66	1
26+50	27+00	52	4
27+00	27+50	42	5
27+50	28+00	32	15
28+00	28+50	29	26
28+50	29+00	52	23
29+00	29+50	75	22
29+50	30+00	90	32
30+00	30+50	109	41
30+50	31+00	128	40
31+00	31+50	140	31
31+50	32+00	150	18
32+00	32+50	162	8
32+50	33+00	219	3
33+00	33+50	286	1
33+50	34+00	151	0
34+00	34+50	16	0
34+50	35+00	36	0
35+00	35+50	58	0
35+50	36+00	84	0
36+00	36+50	46	0
36+50	37+00	165	5
37+00	37+50	307	14
37+50	38+00	261	22
38+00	38+50	216	30
38+50	39+00	184	36
39+00	39+50	164	41
39+50	40+00	142	54
40+00	40+50	116	67
40+50	41+00	91	75
41+00	41+50	71	85
41+50	42+00	53	90
42+00	42+50	33	95
42+50	43+00	21	96
43+00	43+50	19	84
43+50	44+00	13	73
44+00	44+50	7	82
44+50	45+00	3	97
45+00	45+50	3	98
45+50	46+00	6	90
46+00	46+50	17	76
46+50	47+00	31	63
47+00	47+50	41	50
47+50	48+00	53	35
48+00	48+50	63	29
48+50	49+00	63	26
49+00	49+50	70	24
49+50	50+00	102	19
50+00	50+50	129	16
50+50	51+00	136	22
51+00	51+50	141	30
51+50	52+00	147	32
52+00	52+50	147	28
52+50	53+00	142	22
53+00	53+50	140	15
53+50	54+00	146	10
54+00	63+25	0	0
63+25	63+50	16	26
63+50	64+00	33	44
64+00	64+50	35	35
64+50	65+00	38	26
65+00	65+50	43	16
65+50	66+00	55	9
66+00	66+50	67	4

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
66+50	67+00	74	2
67+00	67+50	76	1
67+50	68+00	76	2
68+00	68+50	70	3
68+50	69+00	62	4
69+00	69+50	58	3
69+50	70+00	49	3
70+00	70+50	42	3
70+50	71+00	42	2
71+00	71+50	43	3
71+50	72+00	78	2
72+00	72+50	111	2
72+50	73+00	109	3
73+00	73+50	113	4
73+50	74+00	122	3
74+00	74+50	130	2
74+50	75+00	136	1
75+00	75+50	139	1
75+50	76+00	136	1
76+00	76+50	136	1
76+50	77+00	141	1
77+00	77+50	144	1
77+50	78+00	146	1
78+00	78+50	144	1
78+50	79+00	139	2
79+00	79+50	136	2
79+50	80+00	131	2
80+00	80+50	128	2
80+50	81+00	131	2
81+00	81+50	133	3
81+50	82+00	128	3
82+00	82+50	118	4
82+50	83+00	107	6
83+00	83+50	90	7
83+50	84+00	77	6
84+00	84+50	74	6
84+50	85+00	78	6
85+00	85+50	81	8
85+50	86+00	74	9
86+00	86+50	67	10
86+50	87+00	63	11
87+00	87+50	64	11
87+50	88+00	77	10
88+00	88+50	95	7
88+50	89+00	106	5
89+00	89+50	111	3
89+50	90+00	98	3
90+00	90+50	90	2
90+50	91+00	102	2
91+00	91+50	113	2
91+50	92+00	117	1
92+00	92+50	119	2
92+50	93+00	120	2
93+00	93+50	123	1
93+50	94+00	127	0
94+00	94+50	133	0
94+50	95+00	143	0
95+00	95+50	154	0
95+50	96+00	158	0
96+00	96+50	153	0
96+50	97+00	144	0
97+00	97+50	138	0
97+50	98+00	134	0
98+00	98+50	128	0
98+50	99+00	119	1
99+00	99+50	110	1

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
99+50	100+00	105	2
100+00	100+50	102	2
100+50	101+00	97	3
101+00	101+50	97	3
101+50	102+00	105	2
102+00	102+50	112	2
102+50	103+00	117	1
103+00	103+50	119	1
103+50	104+00	120	1
104+00	104+50	121	1
104+50	105+00	119	1
105+00	105+50	122	1
105+50	106+00	132	0
106+00	106+50	143	0
106+50	107+00	150	0
107+00	107+50	144	0
107+50	108+00	132	0
108+00	108+50	113	0
108+50	109+00	90	3
109+00	109+50	99	3
109+50	110+00	114	0
110+00	110+50	109	1
110+50	111+00	107	2
111+00	111+50	105	2
111+50	112+00	102	2
112+00	112+50	102	3
112+50	113+00	102	4
113+00	113+50	97	5
113+50	114+00	88	7
114+00	114+50	83	10
114+50	115+00	83	11
115+00	115+50	89	8
115+50	116+00	94	7
116+00	116+50	96	5
116+50	117+00	97	2
117+00	117+50	93	3
117+50	118+00	86	3
118+00	118+50	76	6
118+50	119+00	69	12
119+00	119+50	64	17
119+50	120+00	58	18
120+00	120+50	53	16
120+50	121+00	67	11
121+00	121+50	89	9
121+50	122+00	90	9
122+00	122+50	92	11
122+50	123+00	99	12
123+00	123+50	97	11
123+50	124+00	95	8
124+00	124+50	96	4
124+50	125+00	100	3
125+00	125+50	98	4
125+50	126+00	92	6
126+00	126+50	88	8
126+50	127+00	92	9
127+00	127+50	102	8
127+50	128+00	110	6
128+00	128+50	113	5
128+50	129+00	112	5
129+00	129+50	107	5
129+50	130+00	102	6
130+00	130+50	103	6
130+50	131+00	113	4
131+00	131+50	118	1
131+50	132+00	115	0
132+00	132+50	114	0

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
132+50	133+00	110	1
133+00	133+50	103	1
133+50	134+00	99	1
134+00	134+50	98	2
134+50	135+00	96	2
135+00	135+50	89	2
135+50	136+00	77	5
136+00	136+50	76	5
136+50	137+00	95	1
137+00	137+50	103	0
137+50	138+00	103	0
138+00	138+50	100	1
138+50	139+00	96	1
139+00	139+50	95	2
139+50	140+00	90	3
140+00	140+50	86	3
140+50	141+00	83	3
141+00	141+50	79	3
141+50	142+00	77	3
142+00	142+50	68	4
142+50	143+00	64	5
143+00	143+50	63	7
143+50	144+00	59	8
144+00	144+50	62	6
144+50	145+00	62	6
145+00	145+50	61	6
145+50	146+00	63	6
146+00	146+50	66	5
146+50	147+00	66	5
147+00	147+50	68	4
147+50	148+00	77	3
148+00	148+50	87	1
148+50	149+00	98	0
149+00	149+50	108	0
149+50	150+00	113	0
150+00	150+50	108	0
150+50	151+00	99	0
151+00	151+50	97	0
151+50	152+00	98	0
152+00	152+50	102	0
152+50	153+00	108	0
153+00	153+50	107	0
153+50	154+00	104	0
154+00	154+50	97	0
154+50	155+00	91	0
155+00	155+50	90	0
155+50	156+00	92	0
156+00	156+50	94	0
156+50	157+00	91	0
157+00	157+50	86	1
157+50	158+00	80	2
158+00	158+50	79	2
158+50	159+00	78	2
159+00	159+50	70	4
159+50	160+00	64	6
160+00	160+50	64	7
160+50	161+00	64	8
161+00	161+50	65	8
161+50	162+00	67	7
162+00	162+50	70	7
162+50	163+00	75	7
163+00	163+50	80	6
163+50	164+00	83	5
164+00	164+50	82	6
164+50	165+00	81	5
165+00	165+50	82	5

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
165+50	166+00	88	4
166+00	166+50	89	4
166+50	167+00	86	4
167+00	167+50	86	4
167+50	168+00	82	6
168+00	168+50	77	8
168+50	169+00	73	9
169+00	169+50	67	8
169+50	170+00	65	8
170+00	170+50	65	8
170+50	171+00	65	8
171+00	171+50	62	9
171+50	172+00	57	12
172+00	172+50	52	18
172+50	173+00	47	23
173+00	173+50	39	28
173+50	174+00	33	37
174+00	174+50	35	36
174+50	175+00	33	34
175+00	175+50	23	37
175+50	176+00	20	34
176+00	176+50	13	40
176+50	177+00	5	48
177+00	177+50	4	52
177+50	178+00	3	60
178+00	178+50	2	69
178+50	179+00	1	77
179+00	179+50	1	82
179+50	180+00	1	83
180+00	180+50	1	84
180+50	181+00	1	88
181+00	181+50	1	96
181+50	182+00	2	102
182+00	182+50	2	105
182+50	183+00	2	102
183+00	183+50	2	91
183+50	184+00	3	81
184+00	184+50	3	74
184+50	185+00	2	69
185+00	185+50	1	61
185+50	186+00	1	51
186+00	186+50	6	42
186+50	187+00	15	33
187+00	187+50	23	27
187+50	188+00	28	24
188+00	188+50	34	18
188+50	189+00	34	10
189+00	189+50	68	14
189+50	190+00	207	27
190+00	190+50	196	27
190+50	191+00	93	13
191+00	191+50	110	6
191+50	192+00	128	4
192+00	192+50	68	2
11+60	12+00	60	1
12+00	12+90	144	2
12+90	14+80	249	13
14+80	15+00	22	2
15+00	16+00	141	5
TOTAL		28,164	4,991

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490

SUMMARY OF QUANTITIES

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SPC	6	SEE TITLE SHEET	FM 490

DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
SPC	TEXAS	PHR	WILLACY	8

CHECK	CONTROL	SECTION	JOB
MAW	1430	01	031, Etc

CHECK
MAW

DATE: 4/25/2023
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SCALE: 1:1
PENTABLE: SWAFM490 Pentable.tbl

SEAL COAT MATERIAL SELECTION TABLE

Contractor:
1) Provide materials according to the alternates selected for the roadway tier designations specified at various roadway locations shown on the plans;
2) Alternately supply selected binders from a higher tier, but only if the type of material is allowed for the designated tier; payment will only be made for the tier designated for the pavement;
3) Supply the aggregate type, grade and surface aggregate class that is shown to be allowed with the binder used; and
4) Adhere to the application season selected.

☐ Tier 1: Heavy Use (>5,000 ADT) Use only the selected materials.

Type	Asphalt Rubber (A-R) ☐ A-R Only	Asphalt Cement (A-C) ☐ A-C Only
Asphalt	☐ A-R Ty II ☐ SP 300-016&039 ☐ A-R Ty III	☐ AC-20-5TR ☐ AC-20XP ☐ AC-15P
Aggregate Type	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL
Aggregate Grade	☐ 3S ☐ 3non-lw ☐ 3 lw ☐ 4S ☐ 4P ☐ SP 302-013	☐ 3S ☐ 4S ☐ 5 ☐ 3non-lw ☐ 4P ☐ 5S ☐ 3 lw ☐ SP 302-1
Aggregate SAC	☐ *A* ☐ *B*	☐ *A* ☐ *B*

☒ Tier 2: Moderate Use (500-5,000 ADT)

Use this materials or any selected Tier 1 materials combinations of the allowed types

Type	Asphalt Cement (A-C) ☒ A-C Only	Asphalt Emulsion ☐ Emulsion Only
Asphalt	☒ AC-10-2TR ☒ AC-5 W/2% SBR ☒ AC-10 ☒ AC-10 W/2% SBR ☐ AC-15P	☐ CHFRS-2P ☐ CRS-2P ☐ HFRS-2P ☐ SP 300-016&039
Aggregate Type	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL ☒ Allow uncoated aggregate	☐ Ty A ☐ Ty B ☐ Ty C ☐ Ty D ☐ Ty E ☐ Ty L
Aggregate Grade	☐ 3S ☐ 4S ☐ 5 ☐ 3non-lw ☒ 4P ☐ 5S ☐ 3 lw ☒ SP 302-008	☐ 3S ☐ 4S ☐ 5S ☐ 3non-lw ☐ 4P ☐ 5 ☐ 3 lw ☐ SP 302-013
Aggregate SAC	☐ *A* ☒ *B*	☐ *A* ☐ *B*

☐ Tier 3: Moderate Use (<500 ADT) Use this materials or any selected Tier 1 or Tier 2 materials combinations of the allowed types

Type	Asphalt Cement (A-C) ☐ A-C Only	Asphalt Emulsion ☐ Emulsion Only
Asphalt	☐ AC-10-2TR ☐ AC-5 W/2% SBR ☐ AC-20XP ☐ SP 300-016&039 ☐ AC-10 W/2% SBR ☐ AC-15P	☐ CRS-2 ☐ CRS-2H ☐ HFRS-2 ☐ SP 300-016&039
Aggregate Type	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL	☐ Ty A ☐ Ty B ☐ Ty C ☐ Ty D ☐ Ty E ☐ Ty L
Aggregate Grade	☐ 3S ☐ 4S ☐ 5 ☐ 3non-lw ☐ 4P ☐ 5S ☐ 3 lw ☐ SP 302-013	☐ 3S ☐ 4S ☐ ☐ 3non-lw ☐ 4P ☐ 5 ☐ 3 lw ☐ SP 302-013
Aggregate SAC	☐ *A* ☐ *B*	☐ *A* ☐ *B*

Seasonal Alternates: Use these materials for work in cooler conditions as directed.

☒ CRS-2 ☒ HFRS-2 ☐ CRS-1P ☐ RS-1P ☐ RC-250 ☐ MC-800 ☐ AC-12-5-TR ☐ SP 300-016&032

Seal Coat Seasons: Refer to Item 316 for temperature and weather restrictions.

☒ Season 4: CRP, LRD, PHR	Apr 1 to Sept 30

Texas Department of Transportation
Design Division (Roadway)

SEAL COAT MATERIAL SELECTION TABLE "UNDERSEAL"

FILE: sctable.dgn	DN: TxDOT	CK: AM	DW: BGD	CK:		
©TxDOT June 2011	DIST	FEDERAL AID PROJECT				SHEET
REVISIONS	PHR					9
September 2020	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	WILLACY		1430	01	DIST. ECT.	FM 490

FILE: $FILE$
DATE: 5/25/2023 5:48:42 PM

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1430-01-031 **DISTRICT** Pharr **COUNTY** Willacy
HIGHWAY FM 490

											TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1430-01-025**		**1430-01-026**		**1430-01-031**				
		PROJECT ID		**A00122621**		**A00122622**		**A00176867**				
		COUNTY		**Willacy**		**Willacy**		**Willacy**				
		HIGHWAY		**FM 490**		**FM 490**		**FM 490**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL			
	100-6002	PREPARING ROW	STA	5.000		4.250		161.000			170.250	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY					98.000			98.000	
	105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	SY					1,086.000			1,086.000	
	105-6043	REMOVING STAB BASE & ASPH PAV (0-6")	SY					44,890.000			44,890.000	
	105-6045	REMOVING STAB BASE AND ASPH PAV (2"-8")	SY	1,083.000		850.000					1,933.000	
	106-6001	OBLITERATING ABANDONED ROAD	STA					21.000			21.000	
	110-6001	EXCAVATION (ROADWAY)	CY	387.000		704.000		28,164.000			29,255.000	
	110-6002	EXCAVATION (CHANNEL)	CY	41.000		191.000					232.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	248.000		57.000		4,991.000			5,296.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	2,668.000		1,977.000		96,109.000			100,754.000	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	SY	1,334.000		989.000		96,109.000			98,432.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY	1,334.000		989.000		96,109.000			98,432.000	
	168-6001	VEGETATIVE WATERING	MG	43.000		32.000		1,562.000			1,637.000	
	216-6001	PROOF ROLLING	HR					8.000			8.000	
	247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	CY	194.000		436.000		18,212.000			18,842.000	
	260-6002	LIME (HYDRATED LIME (SLURRY))	TON	13.000		30.000		1,088.000			1,131.000	
	260-6011	LIME TRT (EXST MATL) (12")	SY	740.000		1,657.000		61,643.000			64,040.000	
	275-6001	CEMENT	TON	7.000		17.000		664.000			688.000	
	275-6031	CEMENT TREAT (NEW BASE) (10")	SY	700.000		1,575.000		65,226.000			67,501.000	
	310-6009	PRIME COAT (MC-30)	GAL	245.000		551.000		12,456.000			13,252.000	
	316-6005	ASPH (TIER II)	GAL	245.000		551.000		18,683.000			19,479.000	
	316-6531	AGGR (TY-B GR-4P SAC-B)	CY	24.000		23.000		524.000			571.000	
	400-6002	STRUCT EXCAV (BOX)	CY					116.000			116.000	
	400-6005	CEM STABIL BKFL	CY	41.000		41.000		167.000			249.000	
	400-6010	STRUCT EXCAV (SPECIAL)	CY					59.000			59.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF					515.000			515.000	
	403-6001	TEMPORARY SPL SHORING	SF	2,600.000		3,750.000					6,350.000	
	416-6002	DRILL SHAFT (24 IN)	LF	660.000		590.000					1,250.000	
	420-6013	CL C CONC (ABUT)	CY	32.200		32.200					64.400	
	420-6029	CL C CONC (CAP)	CY	23.400		23.400					46.800	
	420-6037	CL C CONC (COLUMN)	CY	4.600		17.400					22.000	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	3,910.000		5,060.000					8,970.000	
	425-6010	PRESTR CONC SLAB BEAM (5SB12)	LF	751.340		976.340					1,727.680	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	66.000		74.000					140.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	20.000		18.000		69.000			107.000	
	450-6023	RAIL (TY SSTR)	LF	194.000		244.000					438.000	
	454-6020	SEALED EXPANSION JOINT (4 IN) (SEJ - B)	LF	93.000		93.000					186.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1430-01-031 **DISTRICT** Pharr **COUNTY** Willacy
HIGHWAY FM 490

			CONTROL SECTION JOB	**1430-01-025**		**1430-01-026**		**1430-01-031**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00122621**		**A00122622**		**A00176867**			
			COUNTY	**Willacy**		**Willacy**		**Willacy**			
			HIGHWAY	**FM 490**		**FM 490**		**FM 490**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	462-6006	CONC BOX CULV (5 FT X 2 FT)	LF					68.000		68.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF					432.000		432.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF					805.000		805.000	
	464-6008	RC PIPE (CL III)(36 IN)	LF					102.000		102.000	
	466-6178	WINGWALL (PW - 1) (HW=3 FT)	EA					2.000		2.000	
	467-6356	SET (TY II) (18 IN) (RCP) (3: 1) (C)	EA					2.000		2.000	
	467-6358	SET (TY II) (18 IN) (RCP) (4: 1) (C)	EA					4.000		4.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA			1.000		22.000		23.000	
	467-6388	SET (TY II) (24 IN) (RCP) (3: 1) (C)	EA					10.000		10.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA					2.000		2.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA					4.000		4.000	
	496-6004	REMOV STR (SET)	EA					12.000		12.000	
	496-6007	REMOV STR (PIPE)	LF					1,380.000		1,380.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000		1.000				2.000	
	500-6001	MOBILIZATION	LS	0.250		0.250		0.500		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000		4.000		8.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	78.000		78.000				156.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	78.000		78.000				156.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,210.000		809.000		32,166.000		34,185.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,210.000		809.000		32,166.000		34,185.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	78.000		87.000		606.000		771.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	78.000		87.000		606.000		771.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO					1.000		1.000	
	530-6004	DRIVEWAYS (CONC)	SY					98.000		98.000	
	530-6005	DRIVEWAYS (ACP)	SY	112.000				1,110.000		1,222.000	
	530-6016	DRIVEWAYS (BASE)	SY	112.000				1,187.000		1,299.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	187.500		187.500		700.000		1,075.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	2.000		2.000				4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	400.000		470.000		92.000		962.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	2.000				4.000		6.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000		8.000		12.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000		2.000				4.000	
	545-6026	CRASH CUSHION ATTEN (INSTALL) (QUAD)(N)	EA	2.000		2.000				4.000	
	560-6025	RELOCATE EXISTING MAILBOX	EA					5.000		5.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA					14.000		14.000	
	644-6028	IN SM RD SN SUP&AM TYS80(1)SA(P-BM)	EA					6.000		6.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA					7.000		7.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1430-01-031 **DISTRICT** Pharr **COUNTY** Willacy
HIGHWAY FM 490

			CONTROL SECTION JOB	**1430-01-025**		**1430-01-026**		**1430-01-031**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00122621**		**A00122622**		**A00176867**			
			COUNTY	**Willacy**		**Willacy**		**Willacy**			
			HIGHWAY	**FM 490**		**FM 490**		**FM 490**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA					2.000		2.000	
	644-6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA					33.000		33.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	6.000		8.000				14.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	9.000		12.000				21.000	
	662-6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA					285.000		285.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF					4,785.000		4,785.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF					36.000		36.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF					11,400.000		11,400.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF					58.000		58.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF					12,995.000		12,995.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	1,000.000		850.000		7,727.000		9,577.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	1,000.000		850.000		32,370.000		34,220.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA					1.000		1.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	13.000		11.000		263.000		287.000	
	672-6017	TRAFFIC BUTTON TY Y	EA	200.000		170.000		1,933.000		2,303.000	
	672-6018	TRAFFIC BUTTON TY B	EA					3,536.000		3,536.000	
	690-6017	REPLACE OF SPAN CABLE ASSM	LF					150.000		150.000	
	1008-6001	PRSSR IRRIG PVC PIPE (18")	LF					335.000		335.000	
	1008-6002	PRSSR IRRIG PVC PIPE (24")	LF					102.000		102.000	
	3077-6065	SP MIXESSP-DSAC-A PG76-22	TON	77.000		173.000		5,435.000		5,685.000	
	3077-6075	TACK COAT	GAL					244.000		244.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	14.000		14.000				28.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS					1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS					1.000		1.000	

GENERAL NOTES AND SPECIFICATIONS DATA:

USE A POWER-BROOM WHEN CLEANING THE ROADWAY AS NEEDED.

REMOVE & DISPOSE ALL MATERIAL NOT DEEMED SALVAGEABLE BY THE ENGINEER, UNLESS OTHERWISE SHOWN ON THE PLANS.

ON EXISTING PAVEMENT THAT WILL REMAIN IN PLACE, SAND BLAST OR SURFACE TREAT IN ORDER TO REMOVE EXISTING STRIPING.

DO NOT BLOCK DRAINAGE WHEN HANDLING & STOCKPILING EXCAVATED MATERIAL.

MAINTAIN ACCESS TO DRIVEWAYS AND INTERSECTIONS THROUGH ALL PHASES OF CONSTRUCTION.

MAINTAIN POSITIVE DRAINAGE DURING ALL PHASES OF CONSTRUCTION.

TRAFFIC CONTROL DEVICES:

AT THE COMMENCEMENT OF THE PROJECT, ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCEPTABLE CONDITION, AND MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT, AS PER GUIDELINES FOR TEMPORARY TRAFFIC CONTROL DEVICES AND FEATURES.

NOTIFY THE AREA ENGINEER(AE) IN WRITING(E-MAIL IS ACCEPTABLE) ONCE THE TRAFFIC CONTROL PLAN(TCP) AND ALL TRAFFIC CONTROL DEVICES HAVE BEEN INSTALLED AS PER PLANS ON THE PROJECT SO THAT THE DEPARTMENT'S RESPONSIBLE PERSON ACCOMPANIED BY THE CONTRACTOR'S RESPONSIBLE PERSON CAN CONDUCT A NIGHT INSPECTION ON THE SAID TCP AND TRAFFIC CONTROL DEVICES. COMMENCEMENT OF WORK WILL NOT BE AUTHORIZED NOR ALLOWED UNTIL THE AE NOTIFIES THE CONTRACTOR IN WRITING(E-MAIL IS ACCEPTABLE) TO PROCEED WITH THE WORK.

CONTRACTOR SHALL HAVE A SUFFICIENT AMOUNT OF TRAFFIC CONTROL DEVICES IN ACCEPTABLE CONDITION TO REPLACE ANY DAMAGED TRAFFIC CONTROL DEVICE WITHIN 24 HOURS OF NOTIFICATION.

PROVIDE ADDITIONAL SIGNS AND BARRICADES AS NECESSARY TO ADDRESS FIELD CONSTRUCTIBILITY & VISIBILITY. THESE ADDITIONAL SIGNS WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

REMOVE OR COMPLETELY COVER ALL EXISTING SIGNS WHICH ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLAN.

ADJUST STOP SIGNS AS NEEDED ON INTERSECTING STREETS DURING THE VARIOUS CONSTRUCTION PHASES. DO NOT REMOVE ANY EXISTING STOP SIGNS UNTIL TEMPORARY SIGNS ARE IN PLACE.

COORDINATE THE TRAFFIC CONTROL PLAN AND THE VARIOUS SEQUENCES OF CONSTRUCTION WITH ADJACENT CONSTRUCTION PROJECTS IF APPLICABLE, TO ENSURE THE UNINTERRUPTED AND SAFE FLOW OF TRAFFIC.

NOTIFY THE ENGINEER IN WRITING WHEN MAJOR TRAFFIC CHANGES ARE TO BE MADE. NOTIFICATIONS MUST BE GIVEN A MINIMUM OF THREE WORKING DAYS PRIOR TO THE CHANGE.

ALL WORK ZONE PAVEMENT MARKINGS FOR THIS PROJECT SHALL BE 0.100 INCHES (100 MIL) THICK THERMOPLASTIC.

SAFETY:

PROTECT EXPOSED PITS THAT MUST REMAIN OPEN DURING NON-WORKING HOURS AS PER OSHA REQUIREMENTS.

PROJECT SPECIFIC NOTES:

1. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH DELTA LAKE IRRIGATION DISTRICT, GENERAL MANAGER TROY ALLEN, (956) 262-2101.
2. IRRIGATION CROSSINGS SHALL BE COORDINATED AND COMPLETED BEFORE ANY ROADWAY CONSTRUCTION.
3. IF POSSIBLE, INSTALLATION OF IRRIGATION CROSSINGS SHALL OCCUR FROM MIDDLE OF AUGUST TO BEGINNING OF OCTOBER.

TRAFFIC CONTROL PLAN NOTES

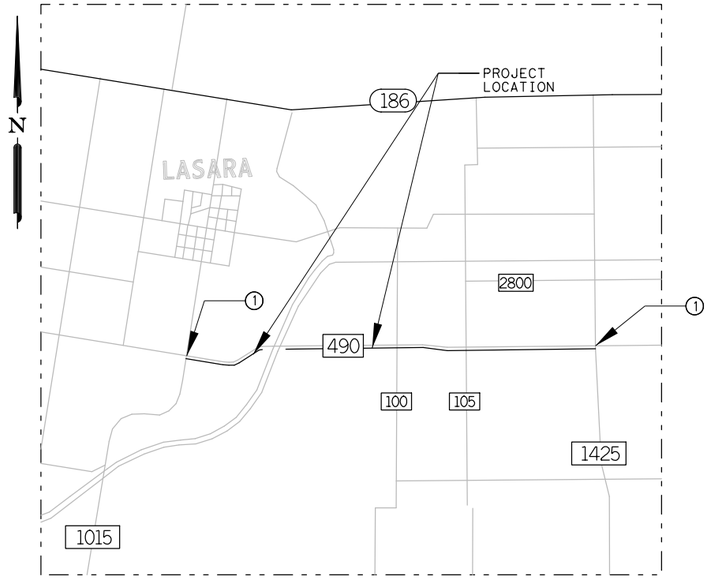
SHEET 1 OF 1 SHEETS

PHARR DISTRICT STANDARD

Texas Department of Transportation

Rev 03/22/2017

STATE	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			SHEET NO.
TEXAS	6	SEE TITLE SHEET			11
DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
PHR	WILLACY	1430	01	031, Etc	FM 490



PROJECT LIMIT SIGNAGE
FM 490 @ FROM FM 1015 TO FM 1425; EXCLUDING BRIDGES

① M PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

NOTES:

1. FM 490 FROM FM 1015 TO FM 1425 SHALL BE FULL ROADWAY CLOSURE. SEE TCP DETOUR ROUTE SHEET AND WZ(RCD)-13 FOR DETAILS OF CLOSURE AND DETOURING.

2. COORDINATION WITH BRIDGE REPLACEMENT CONTRACTOR IS REQUIRED TO MAINTAIN TRAFFIC CONTROL AS OUTLINED IN THE PLANS.

3. FM 1425 INTERSECTION SHALL BE PHASED CONSTRUCTION. SEE PHASED CONSTRUCTION SHEETS FOR DETAILS.

4. A PORTABLE CHANGEABLE MESSAGE SIGN WILL BE PLACED FOR ADVANCED NOTIFICATIONS SEVEN (7) DAYS BEFORE ROADS ARE CLOSED. SIGNS WILL REMAIN IN PLACE FOR SEVEN (7) DAYS AFTER CLOSURE. LOCATIONS ARE SHOWN ON PROJECT LIMITS SIGNAGE MAPS OR PLACEMENT WILL BE DIRECTED.

5. MAINTENANCE FOR LOCAL ACCESS IS REQUIRED.

TRAFFIC CONTROL PLAN

A. INSTALL ALL SIGNS AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE TRAFFIC CONTROL PLAN AND STANDARD BC SHEETS AS DIRECTED.

B. ADDITIONAL SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT FOR ALL SUCH SIGNS, BARRICADES, OR TRAFFIC CONTROL DEVICES SHALL BE CONSIDERED SUBSIDIARY TO THE ITEM 502-6001, "BARRICADES, SIGNS, AND TRAFFIC HANDLING".

C. WORK SITES SHOULD BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN, AND IN GOOD REPAIR.

D. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL ADJACENT PROPERTIES AT ALL TIMES AND IN ALL WEATHER CONDITIONS THROUGHOUT THE CONSTRUCTION OF IMPROVEMENTS.

E. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE PROJECT ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN IN THE SEQUENCE OF CONSTRUCTION.

F. COMPLETE ALL WORK ON THE PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.

G. ANY REQUEST TO ALTER THE SEQUENCE OF CONSTRUCTION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR WRITTEN APPROVAL PRIOR TO IMPLEMENTATION.

H. CONTRACTOR SHALL COORDINATE TRAFFIC CONTROL AND THE VARIOUS SEQUENCES OF CONSTRUCTION WITH ADJACENT BRIDGE PROJECT CONTRACTOR AND MAINTAIN ACCESS FOR BRIDGE CONTRACTOR TO ENSURE SAFE FLOW OF TRAFFIC.

SEQUENCE OF CONSTRUCTION (FM 1015 TO FM 1425)

CONTRACTOR SHALL RECONSTRUCT FM 490 IN THE FOLLOWING ORDER AND AS SEQUENCED BELOW:

1. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT, GENERAL MANAGER TROY ALLEN, (956) 262-2101.

2. IRRIGATION CROSSINGS SHALL BE COORDINATED AND COMPLETED BEFORE ANY ROADWAY CONSTRUCTION.

3. IF POSSIBLE, INSTALLATION OF IRRIGATION CROSSINGS SHALL OCCUR FROM MIDDLE OF AUGUST TO BEGINNING OF OCTOBER.

4. RECONSTRUCT FM 490 EAST OF BRIDGES, FROM EAST BRIDGE TO FM 1425.

5. RECONSTRUCT FM 490 WEST OF BRIDGES, FROM WEST BRIDGE TO FM 1015, AFTER COMPLETION OF EASTERN CONSTRUCTION.

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST 2 WEEKS PRIOR TO CLOSURE OF ANY ROADS.

1. SET DETOUR SIGNAGE IN ACCORDANCE TO THE TRAFFIC CONTROL PLAN AND PROJECT BARRICADES AS SHOWN AND IN ACCORDANCE WITH STANDARD BC SHEETS.

2. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED.

3. CLOSE ROAD TO ALL TRAFFIC. THE MINIMUM SIGNING FOR CLOSURE WILL CONSIST OF TYPE 3 BARRICADES AND ADVANCED SIGNING AS APPROVED.

4. RECONSTRUCT ROADWAY.

5. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.

6. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES AND PROJECT BARRICADES.

SEQUENCE OF CONSTRUCTION (FM 1425 INTERSECTION)

CONTRACTOR SHALL RECONSTRUCT FM 1425 INTERSECTION AS SEQUENCED BELOW:

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST 2 WEEKS PRIOR TO LANE CLOSURES.

1. SET ADVANCED WARNING SIGNAGE IN ACCORDANCE TO THE TRAFFIC CONTROL PLAN, BC SHEETS, AND TCP(2-8).

2. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED.

3. PORTABLE MESSAGE BOARDS SHALL BE PLACED AT ALL INTERSECTION APPROACHES. COORDINATE WITH TxDOT AREA OFFICE FOR MESSAGING.

4. RECONSTRUCT PROPOSED CROSS CULVERTS AND SAFETY END TREATMENTS.

5. INSTALL TEMPORARY TRAFFIC SIGNALS TO BE PROGRAMMED TOGETHER, AND LOCATED AS SHOWN ON FM 1425 INTERSECTION TCP LAYOUT.

6. PHASE 1 STAGE 1: RECONSTRUCT FM 1425 SOUTHBOUND. TRAFFIC IS ONE-LANE, TWO-WAY ON NORTHBOUND FM 1425

7. PHASE 1 STAGE 2: RECONSTRUCT FM 1425 NORTHBOUND AT MID INTERSECTION AS SHOWN ON TRAFFIC CONTROL PLANS. CONSTRUCT RAMP TO ELEVATED INTERSECTION ON THE EASTERN FM 490 LEG, 12:1 MAXIMUM GRADE.

8. PHASE 2 STAGE 1: RECONSTRUCT REMAINING FM 1425 NORTHBOUND.

9. PHASE 3 STAGE 1: RECONSTRUCT EASTERN FM 490 EASTBOUND.

10. PHASE 4 STAGE 1: RECONSTRUCT EASTERN FM 490 WESTBOUND.

11. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.

12. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES AND WORKZONE SIGNAGE.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490

TCP NARRATIVE

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SPC	6	SEE TITLE SHEET	FM 490
DRAWN SPC	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 12

DATE: 4/25/2023
TIME: 9:34:30 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-TCPNAR.dgn
PENTABLE: SWAI FM490 Pentable.tbl
SCALE: 1=1
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).plt

1

CW20-2D
48x48

2

M4-8
24x12

M1-6F
24x24

M6-1R
21x15

3

M4-8
24x12

M1-6F
24x24

M6-1L
21x15

4

M4-8
24x12

M1-6F
24x24

M5-1
21X15

5

M4-8
24x12

M1-6F
24x24

M5-1
21X15

6

M4-8
24x12

M1-6F
24x24

M6-3
21x15

7

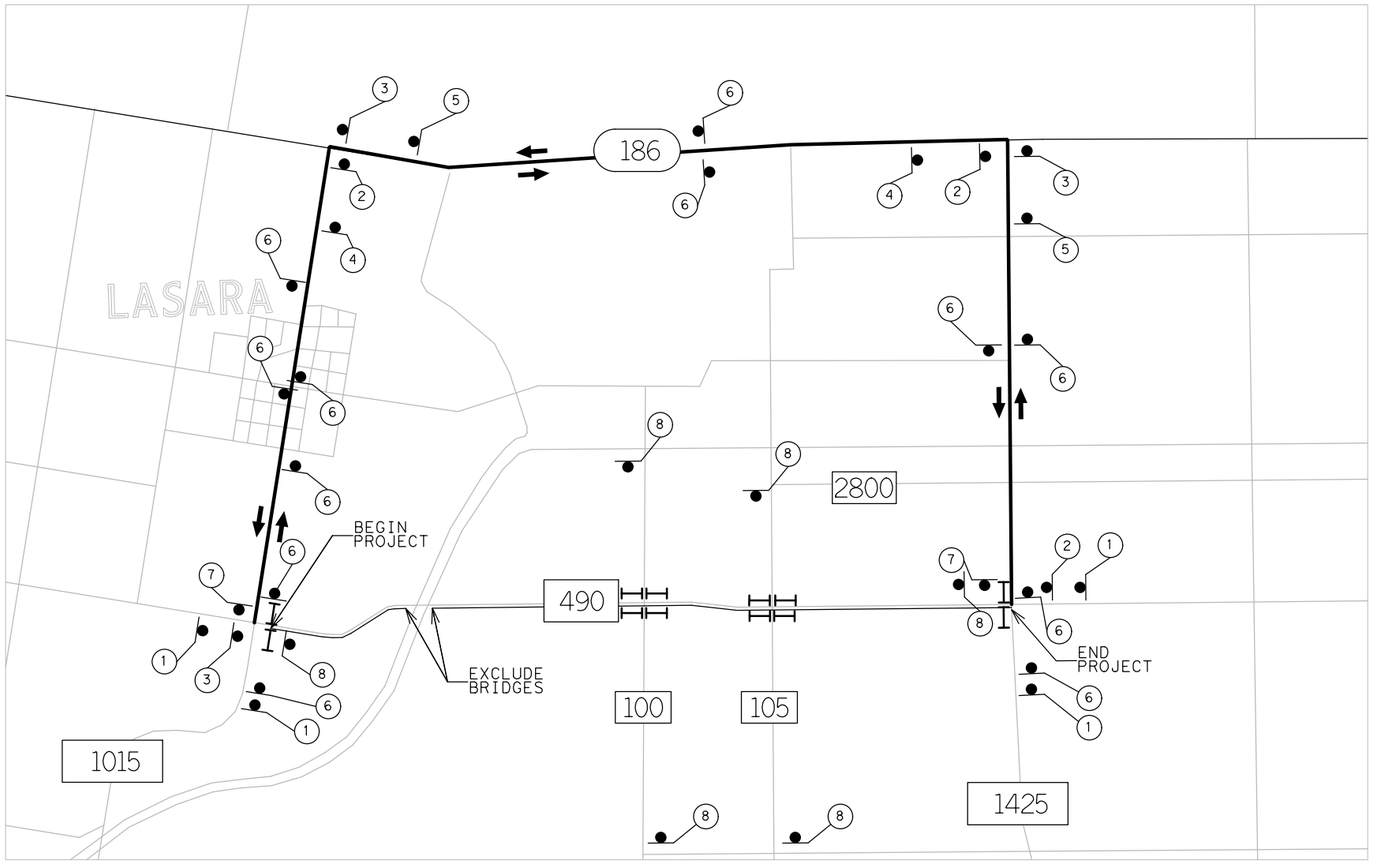
M4-8a
24x18

M1-6F
24x24

8

R11-4
60"X30"

M4-10R OR M4-10L
48"X18"



LEGEND

- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- SIGN
- PAVEMENT THIS PHASE
- PAVEMENT PREVIOUS PHASE
- TEMPORARY TRF SIGNAL
- CHANNELIZING DEVICE

NOTES:

1. ALL SIGNS, DEVICES, LOCATIONS AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) FOR MORE DETAILS OF REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. N.T.S.

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

TCP DETOUR ROUTE

SCALE = 1"=100'

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SPC	6	SEE TITLE SHEET	FM 490
DRAWN SPC	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 13

DATE: 4/25/2023
TIME: 9:34:45 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-DETOUR.dgn

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1#
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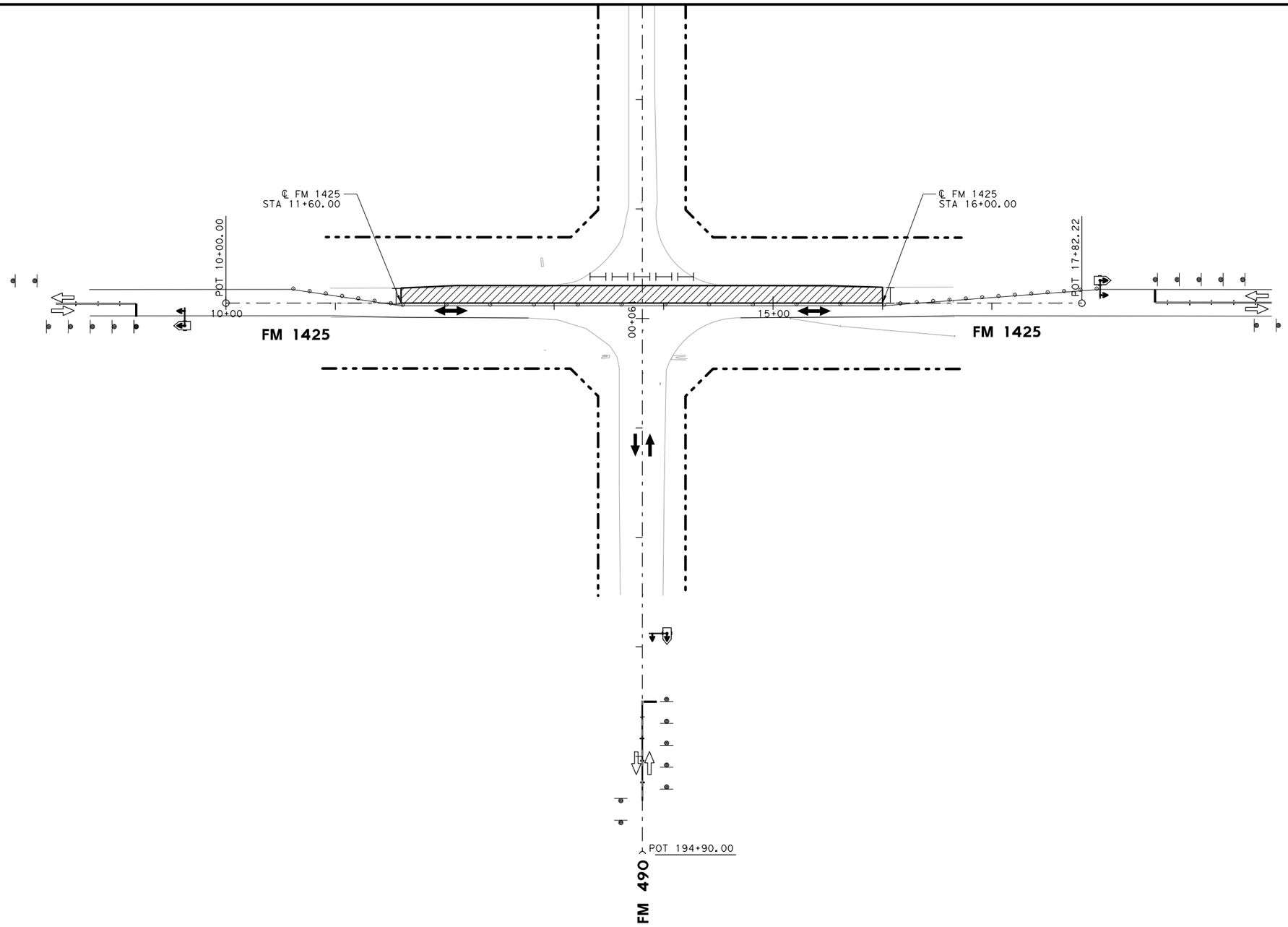

PHASE 1 STAGE 1: RECONSTRUCT FM 1425 SOUTHBOUND LANE

N

LEGEND

- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- SIGN
- PAVEMENT THIS PHASE
- PAVEMENT PREVIOUS PHASE
- TEMPORARY TRF SIGNAL
- CHANNELIZING DEVICE

NOTES:

1. ALL SIGNS, DEVICES, LOCATIONS AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) FOR MORE DETAILS OF REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. N.T.S.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 1425 INTERSECTION TRAFFIC CONTROL PLAN PHASE 1 STG 1

SCALE = None SHEET 1 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY / 14
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

DATE: 4/25/2023
TIME: 9:35:03 AM
USER: sclary
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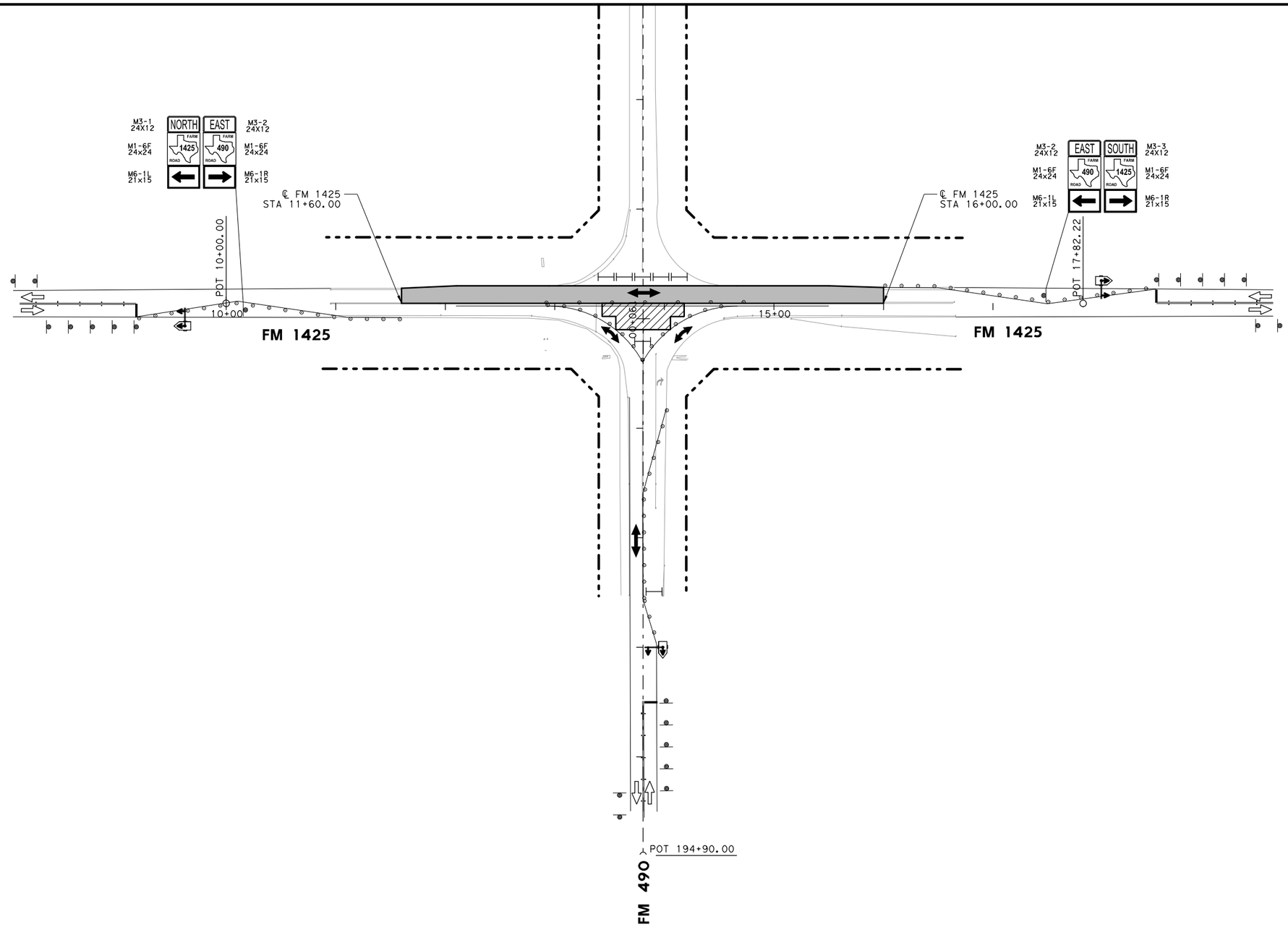

PHASE 1 STAGE 2: RECONSTRUCT
FM 1425 NORTHBOUND, MID-INTERSECTION

LEGEND

- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- SIGN
- PAVEMENT THIS PHASE
- PAVEMENT PREVIOUS PHASE
- TEMPORARY TRF SIGNAL
- CHANNELIZING DEVICE

NOTES:

1. ALL SIGNS, DEVICES, LOCATIONS AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) FOR MORE DETAILS OF REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. N.T.S.

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SUITE 700
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FM 1425
INTERSECTION TRAFFIC CONTROL PLAN
PHASE 1 STG 2

SCALE = None SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 15

DATE: 4/25/2023
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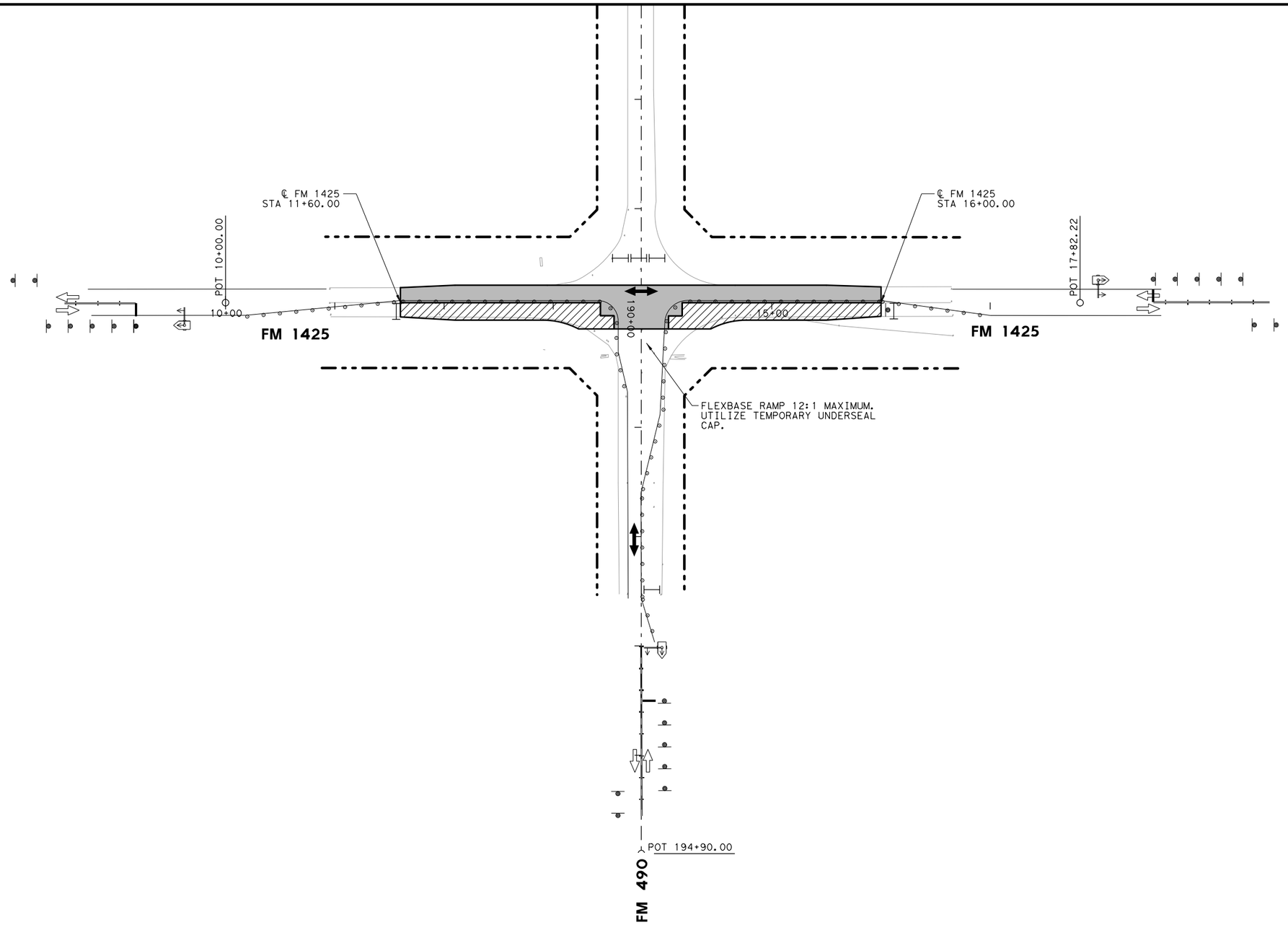

PHASE 2: RECONSTRUCT FM 1425 NORTHBOUND LANE

N

LEGEND

- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- SIGN
- PAVEMENT THIS PHASE
- PAVEMENT PREVIOUS PHASE
- TEMPORARY TRF SIGNAL
- CHANNELIZING DEVICE

NOTES:

1. ALL SIGNS, DEVICES, LOCATIONS AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) FOR MORE DETAILS OF REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. N.T.S.

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SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 1425 INTERSECTION TRAFFIC CONTROL PLAN PHASE 2

SCALE = None

SHEET 3 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LEH	6	SEE TITLE SHEET		FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	16
CHECK MAW	CONTROL	SECTION	JOB	
	1430	01	031,Etc	

DATE: 4/25/2023
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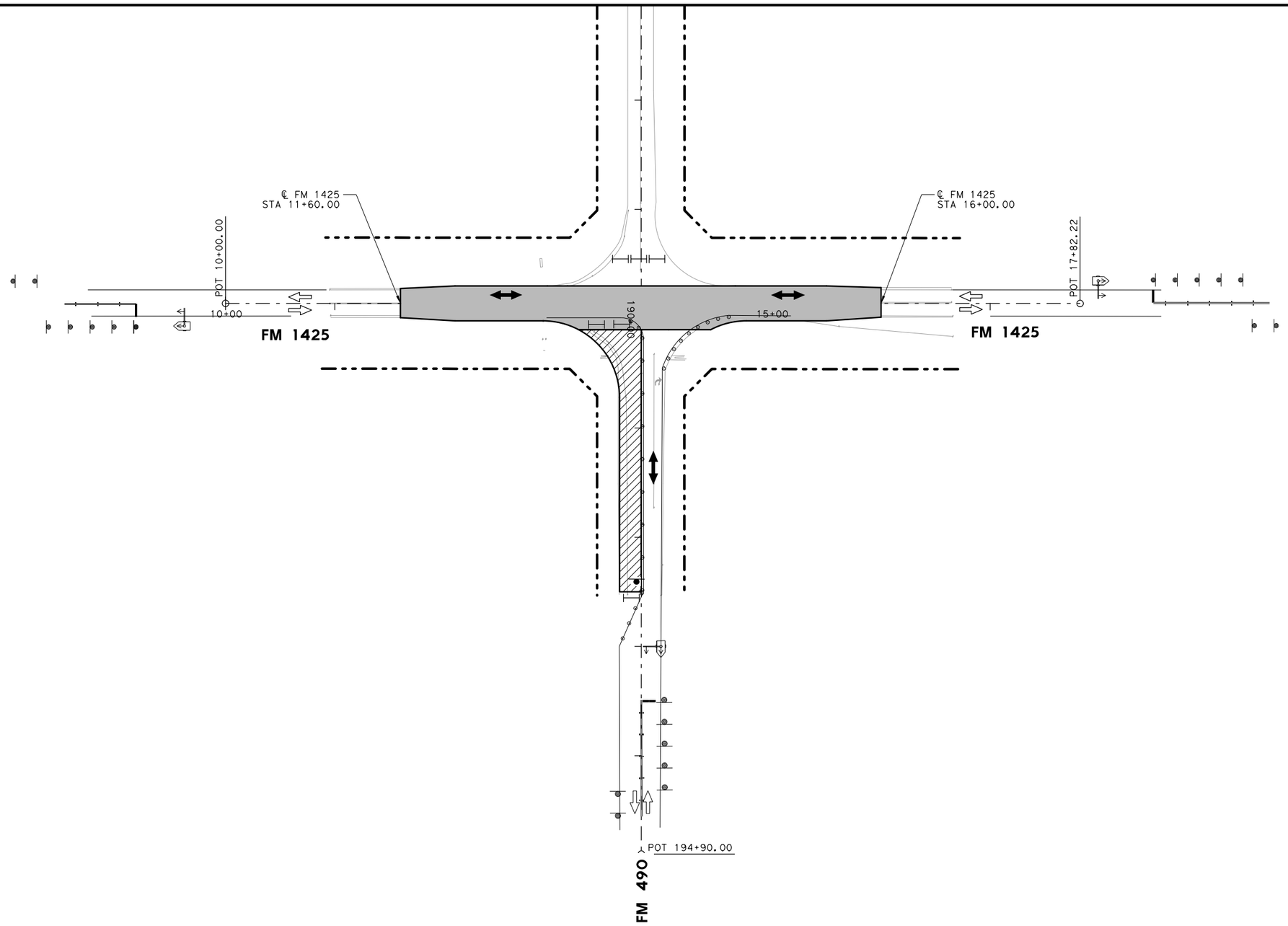

PHASE 3: RECONSTRUCT FM 490 EASTBOUND LANE

N

LEGEND

- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- SIGN
- PAVEMENT THIS PHASE
- PAVEMENT PREVIOUS PHASE
- TEMPORARY TRF SIGNAL
- CHANNELIZING DEVICE

NOTES:

1. ALL SIGNS, DEVICES, LOCATIONS AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) FOR MORE DETAILS OF REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. N.T.S.

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13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 1425 INTERSECTION TRAFFIC CONTROL PLAN PHASE 3

SCALE = None

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 17

DATE: 4/25/2023
TIME: 9:35:53 AM
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SCALE: 1:00
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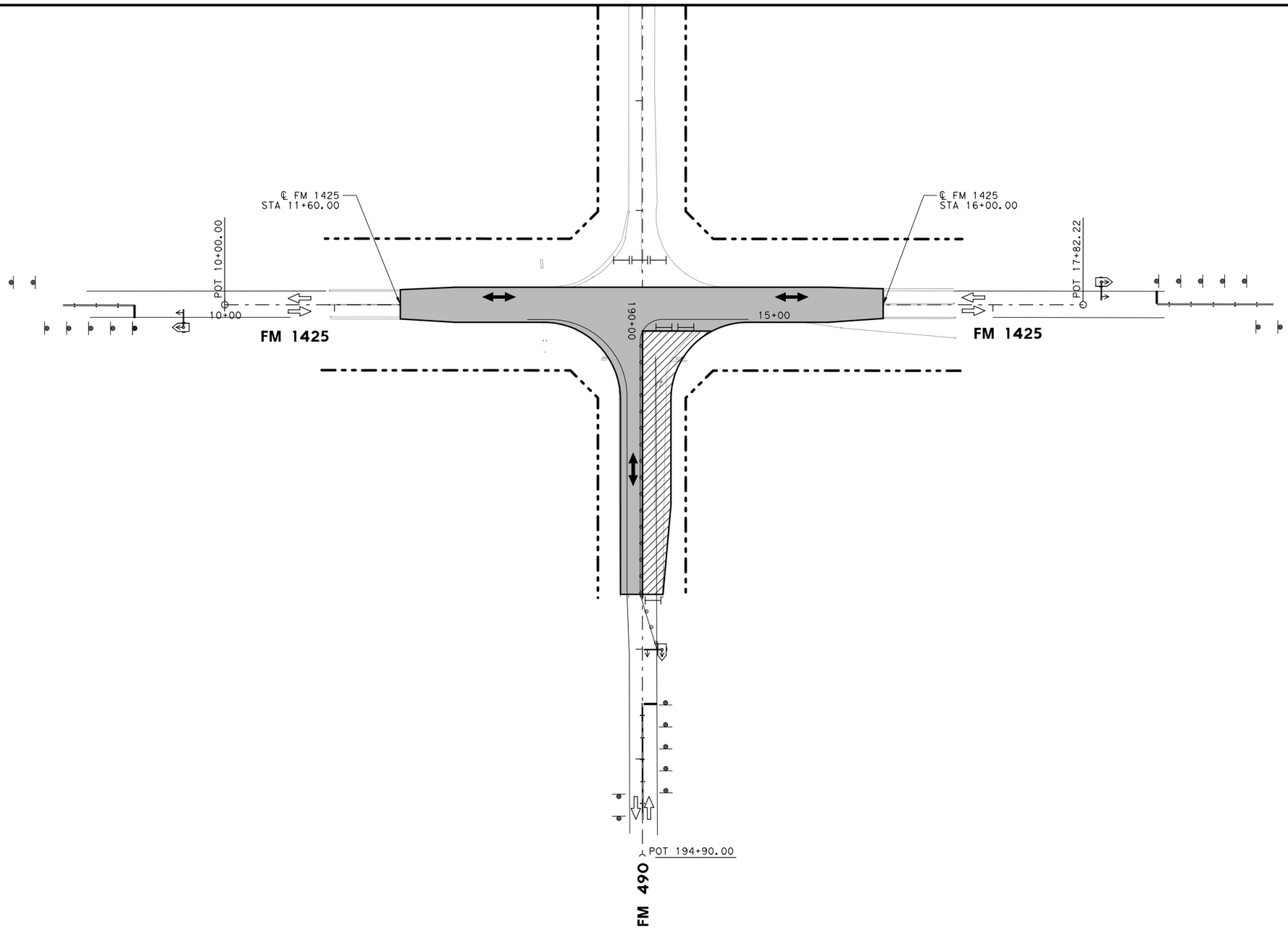

PHASE 4: RECONSTRUCT FM 490 WESTBOUND LANE AND TURN LANE

N

LEGEND

- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- SIGN
- PAVEMENT THIS PHASE
- PAVEMENT PREVIOUS PHASE
- TEMPORARY TRF SIGNAL
- CHANNELIZING DEVICE

NOTES:

1. ALL SIGNS, DEVICES, LOCATIONS AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) FOR MORE DETAILS OF REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. N.T.S.

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SEAN CLARY
122134
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04/25/2023

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13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 1425 INTERSECTION TRAFFIC CONTROL PLAN PHASE 4

SCALE = None SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 18

DATE: 4/25/2023
TIME: 9:36:09 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-TCP-PH_5.dgn
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SCALE: full
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

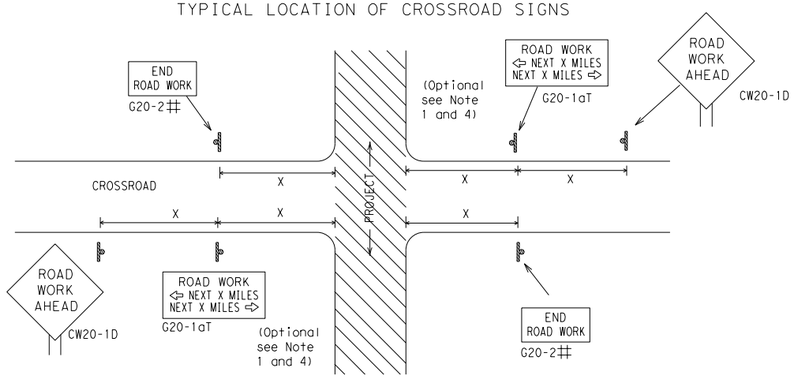
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		19

DATE:
FILE:

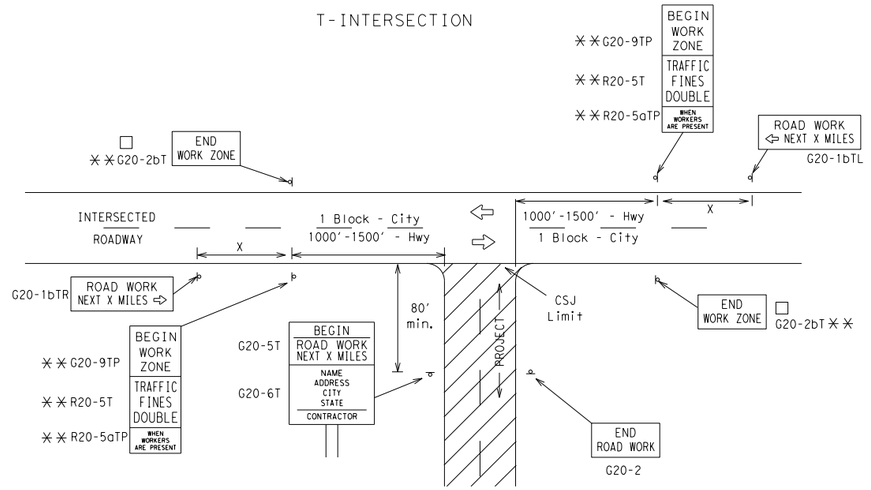
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

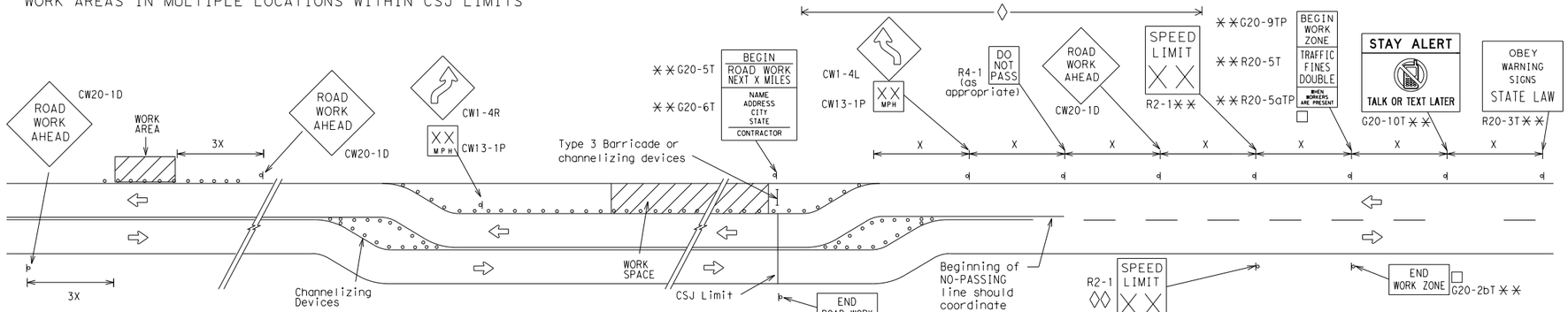
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

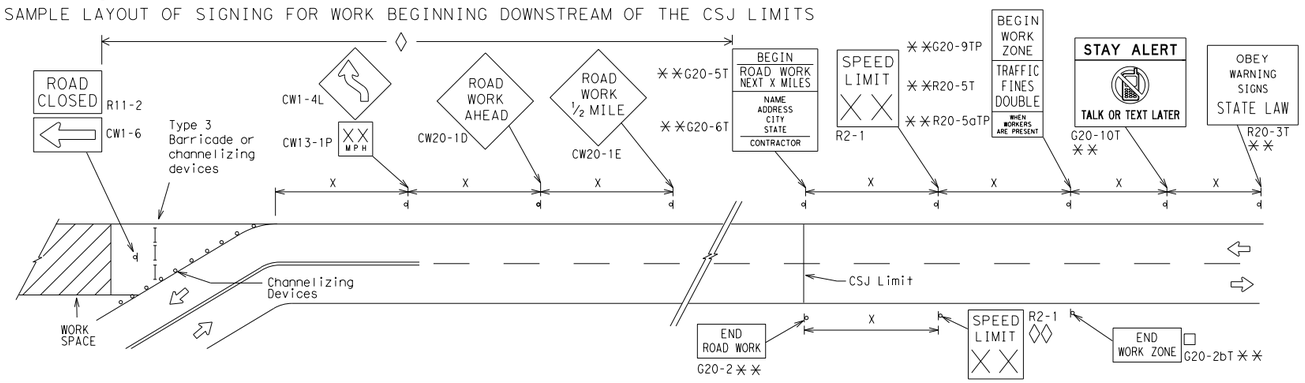
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	WILLACY		20

DATE:
FILE:

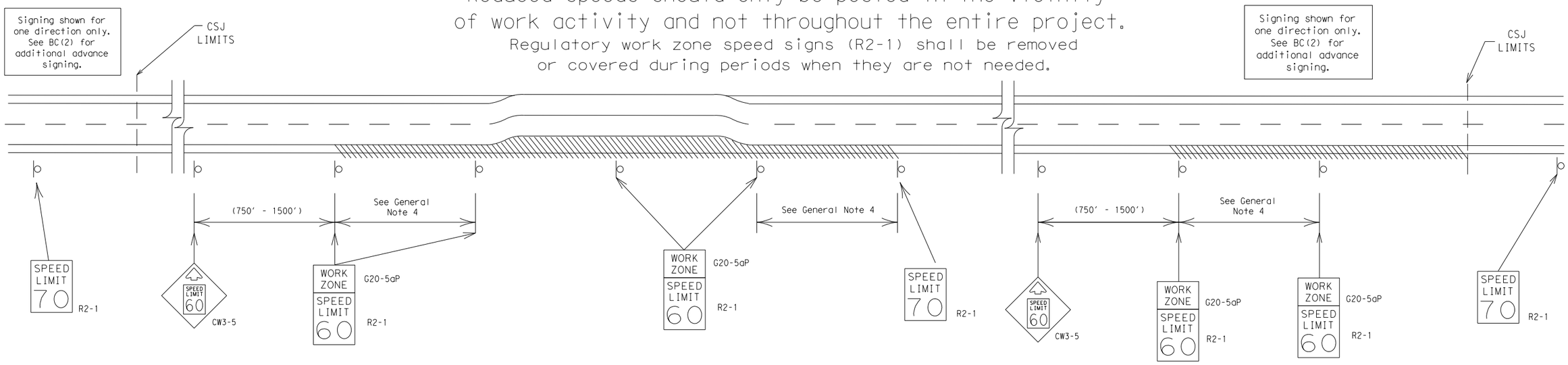
DATE:
FILE:

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

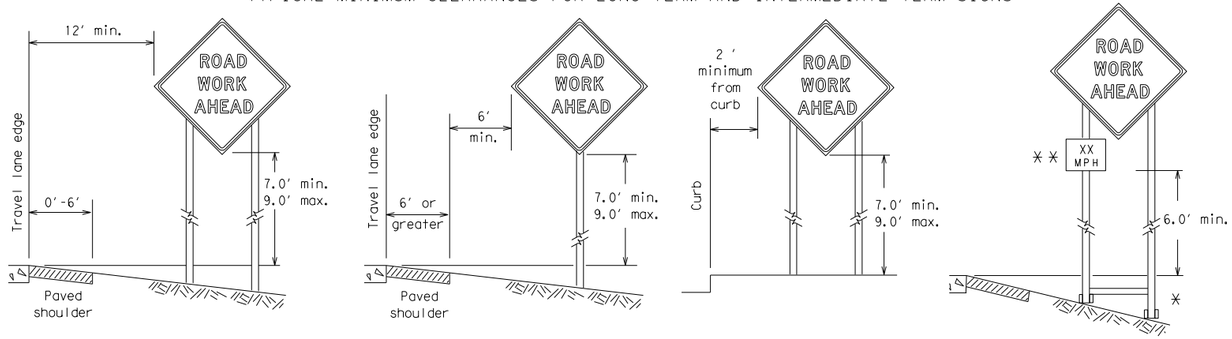
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		21

DATE:
FILE:

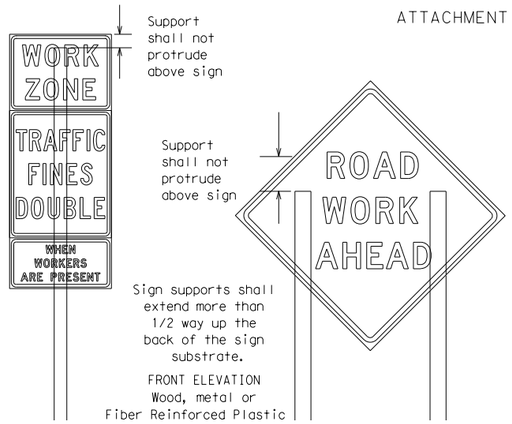
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



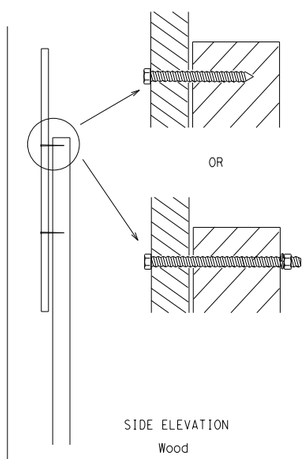
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

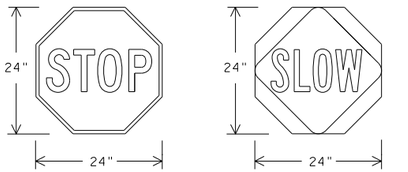
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	WILLACY		22

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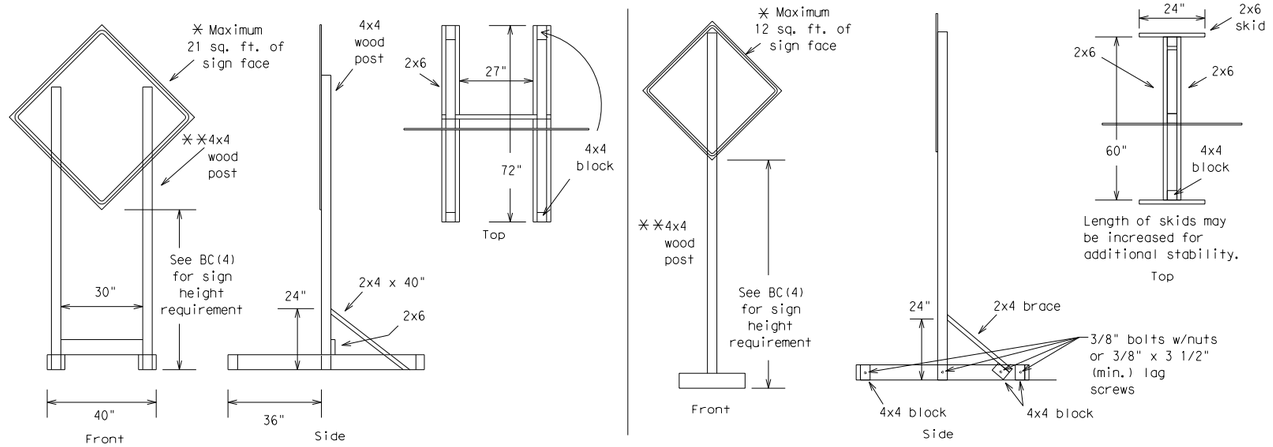
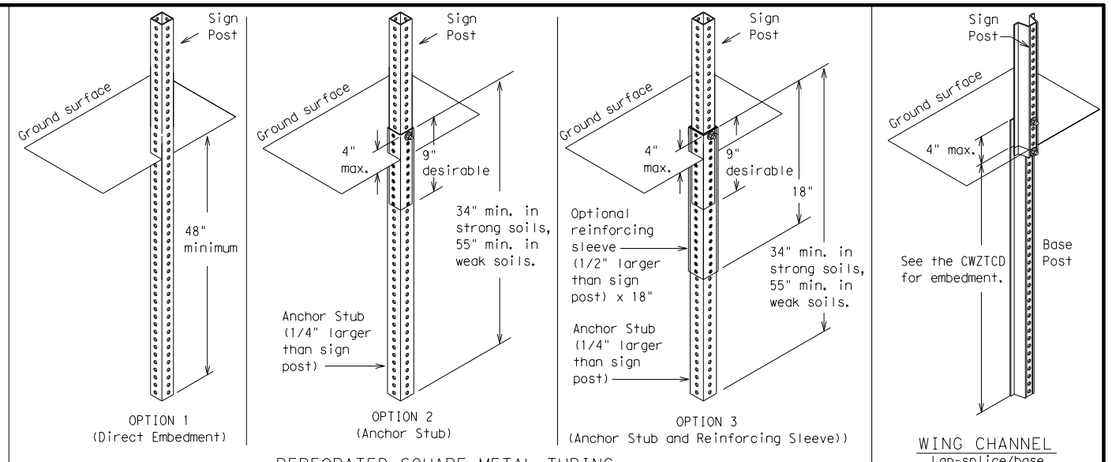


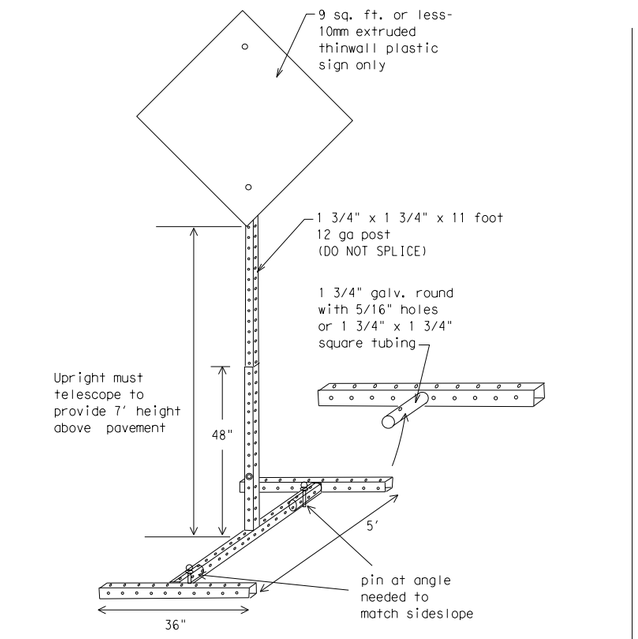
SKID MOUNTED WOOD SIGN SUPPORTS

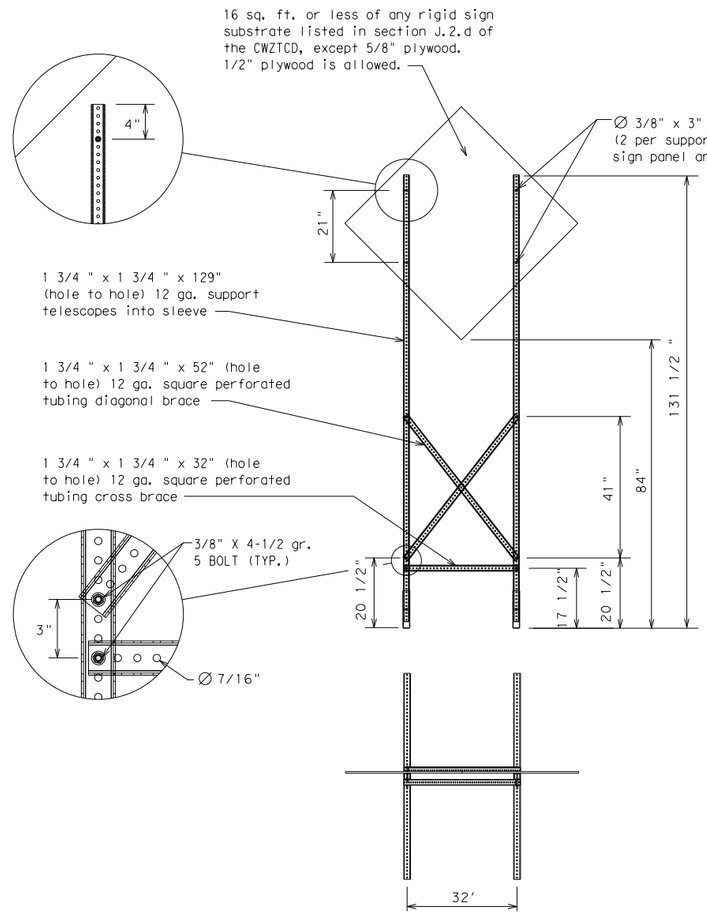
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

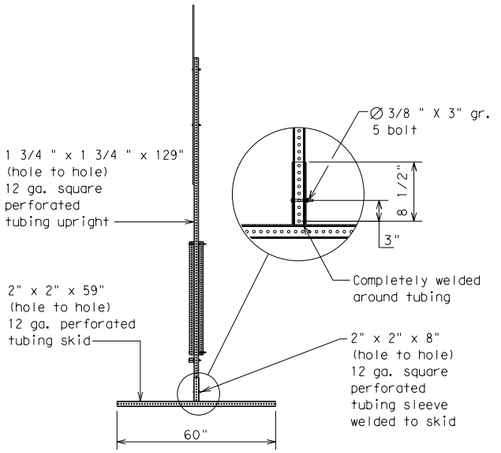


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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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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 *	

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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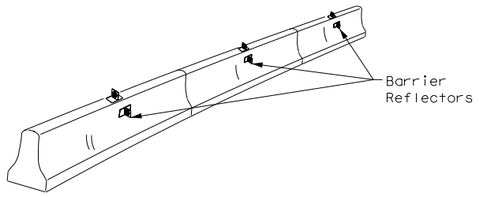
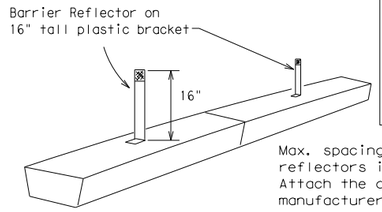
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

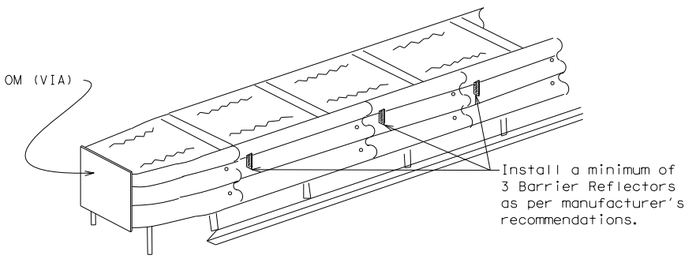


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

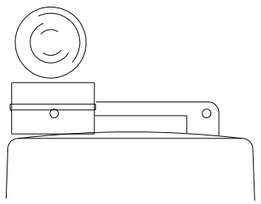


DELINEATION OF END TREATMENTS

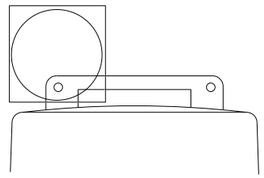
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

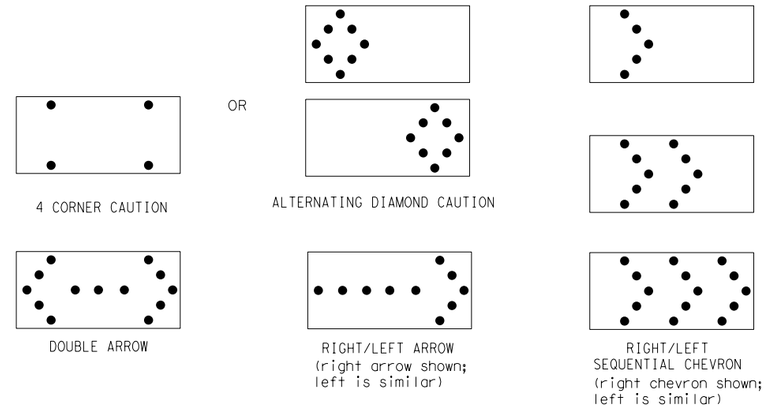
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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	1430	01	031,Etc	FM 490
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	WILLACY		25

101

DATE:
FILE:

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

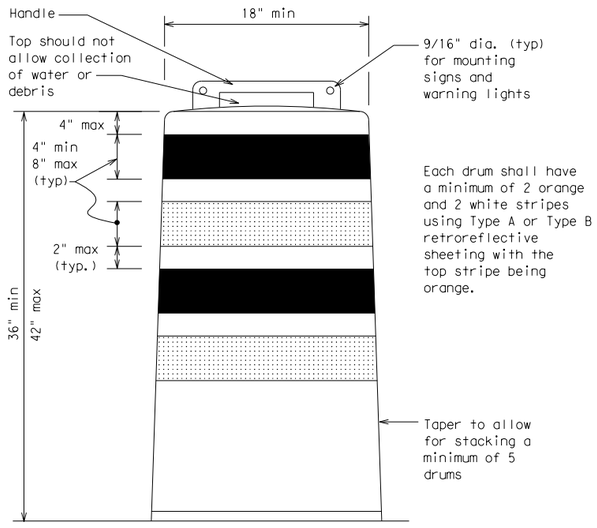
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

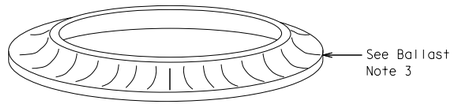
RETROREFLECTIVE SHEETING

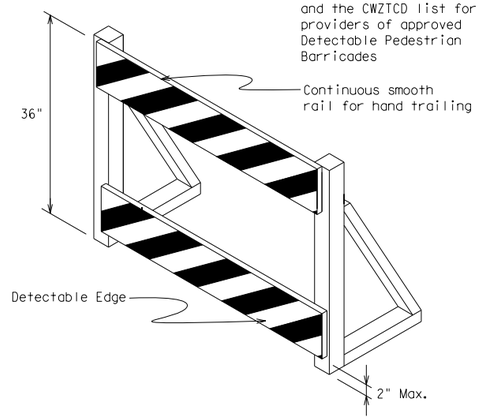
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

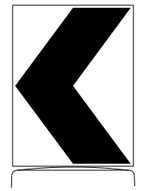




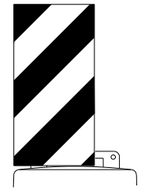


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	PHR	WILLACY		26
7-13				

DATE:
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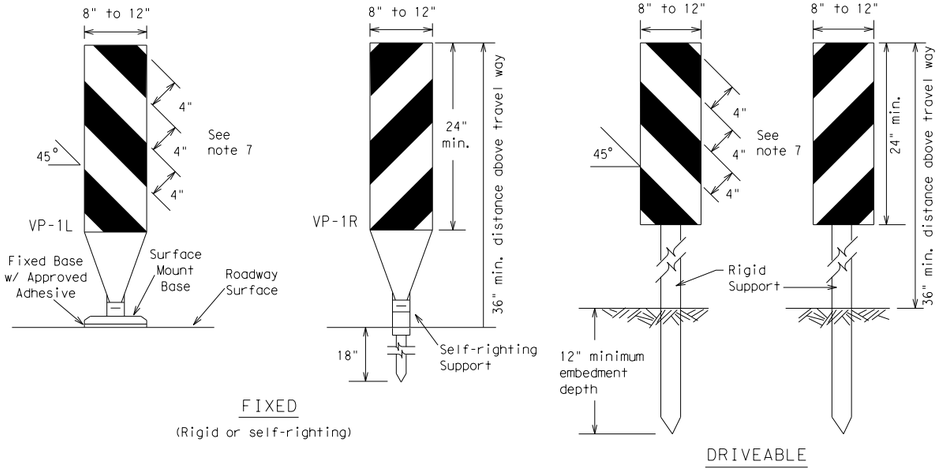
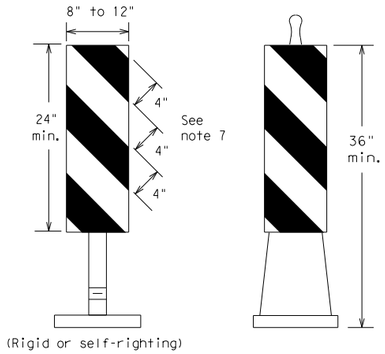


FIXED

(Rigid or self-righting)

DRIVEABLE

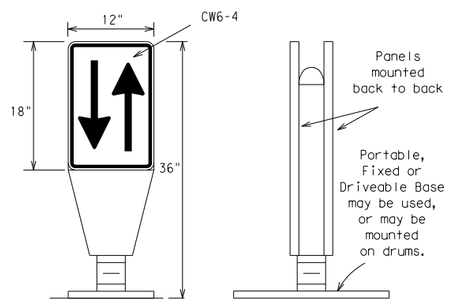


(Rigid or self-righting)

PORTABLE

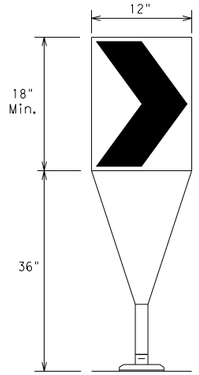
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

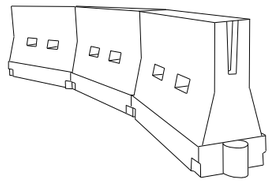
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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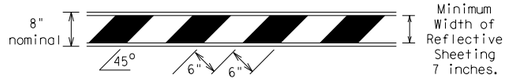
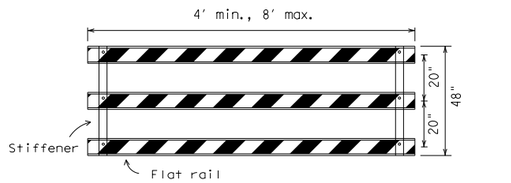
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



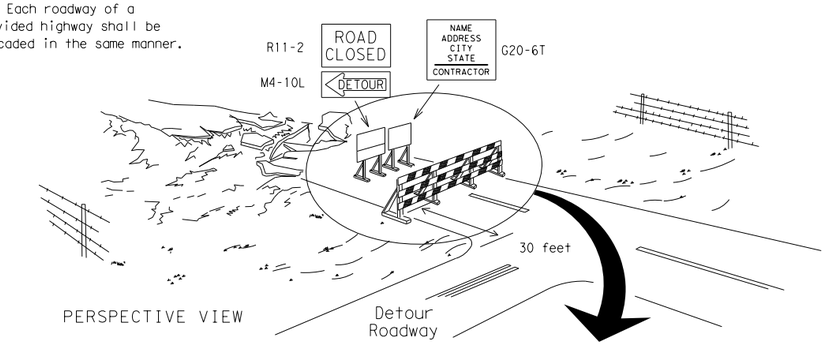
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

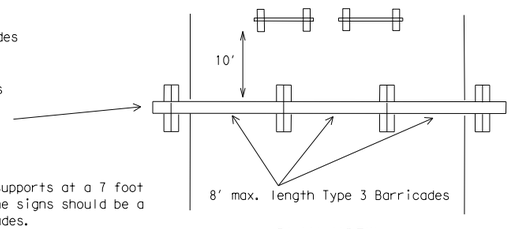
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

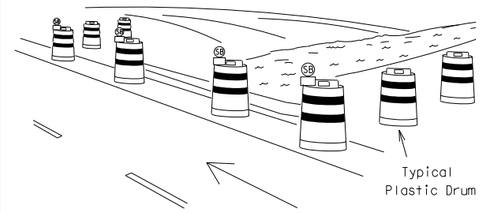
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

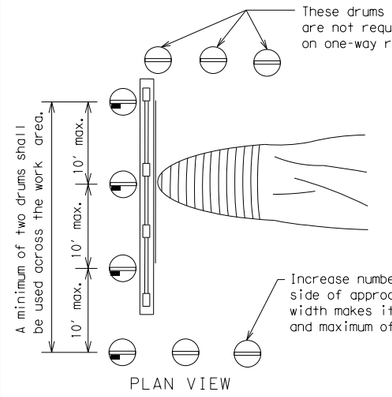
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

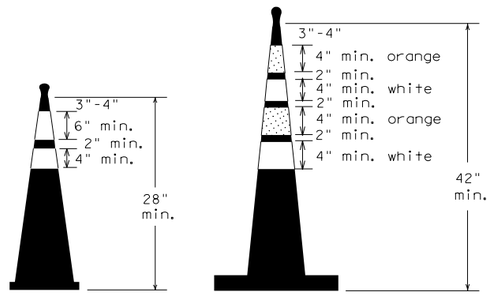
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



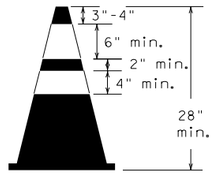
PLAN VIEW

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

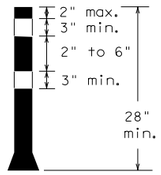
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

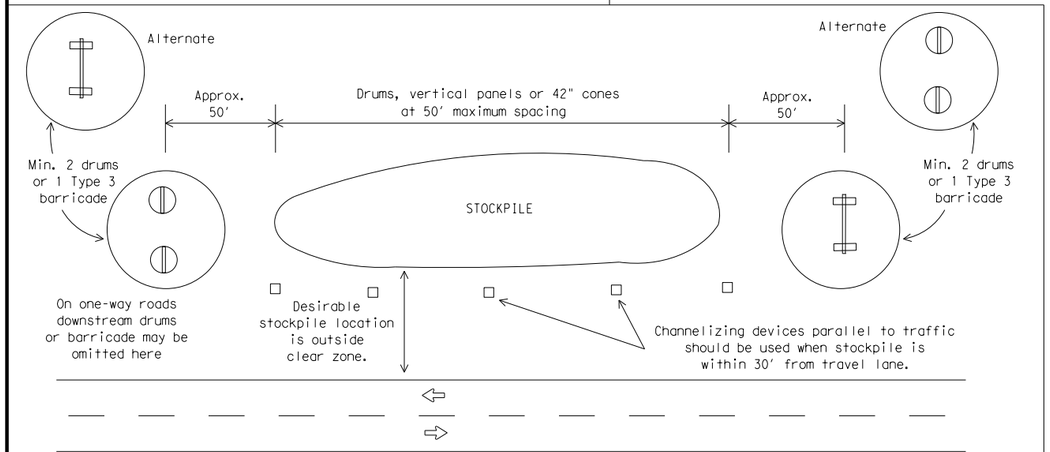


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

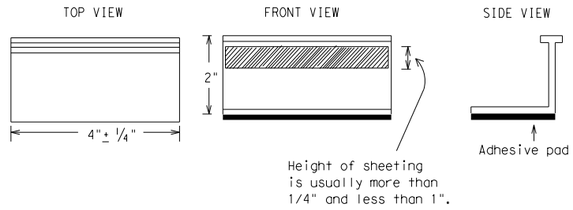
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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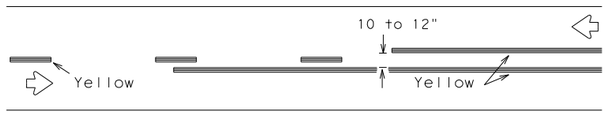
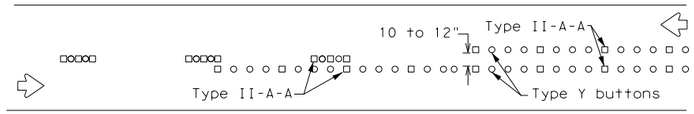
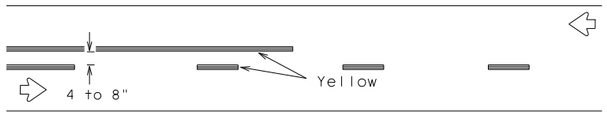
PAVEMENT MARKING PATTERNS



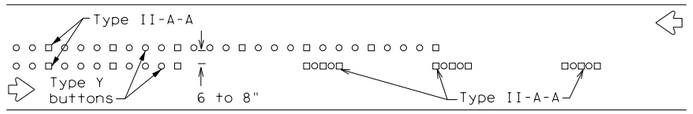
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



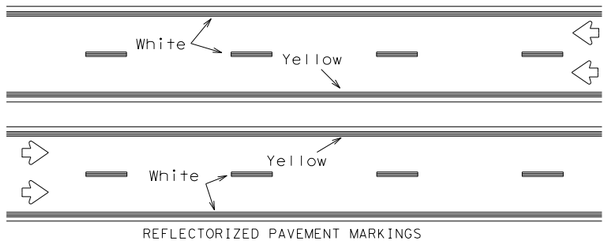
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



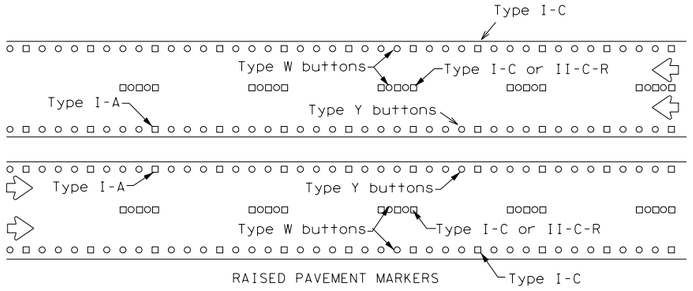
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

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



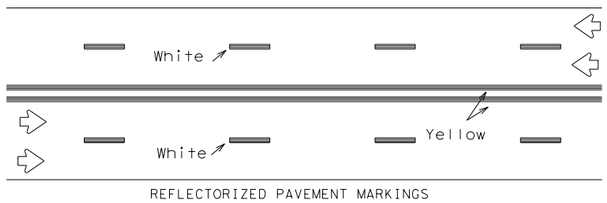
REFLECTORIZED PAVEMENT MARKINGS



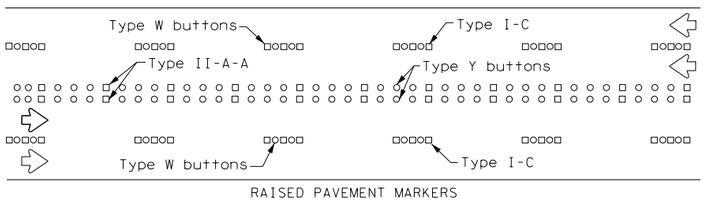
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



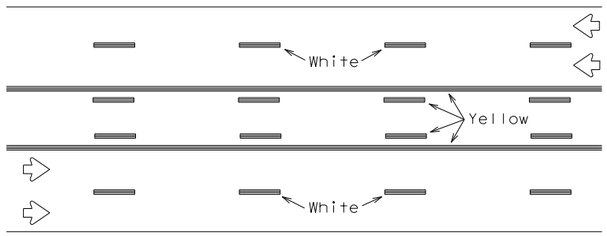
REFLECTORIZED PAVEMENT MARKINGS



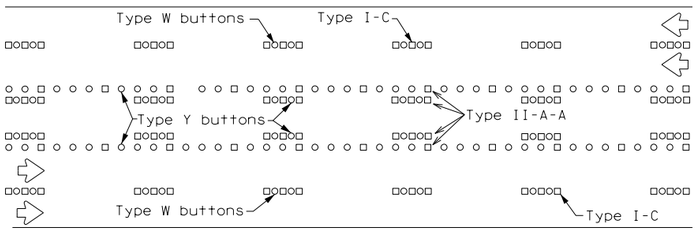
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

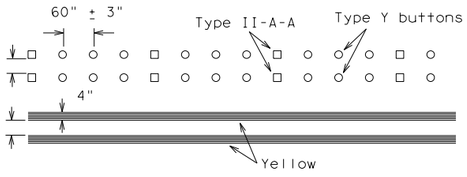
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

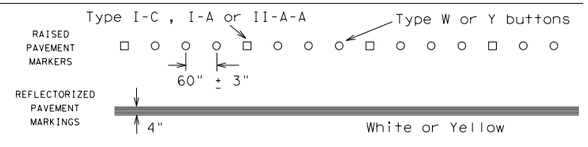
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

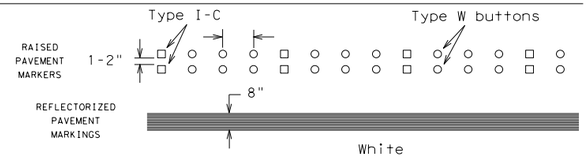


EDGE LINE OR SINGLE NO-PASSING LINE



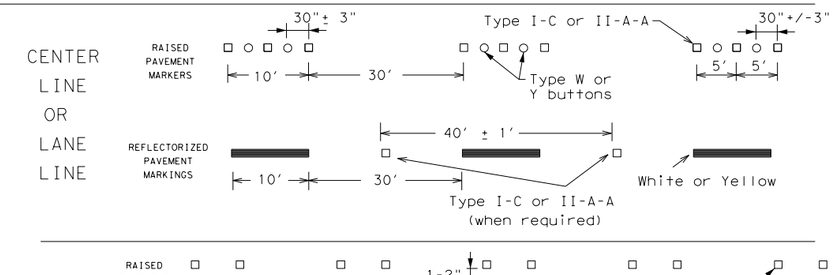
WIDE LINE

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

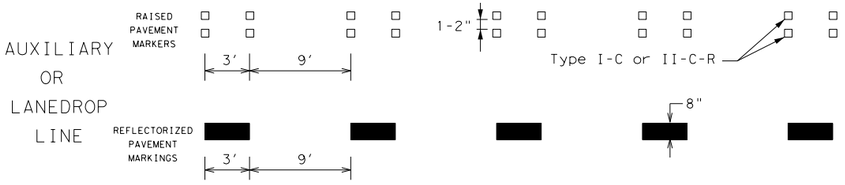


BROKEN LINES

CENTER LINE OR LANE LINE

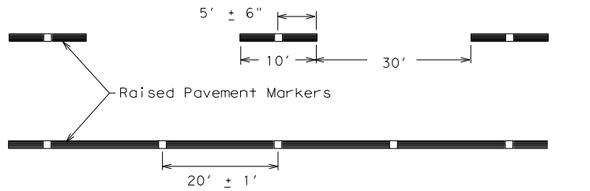


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

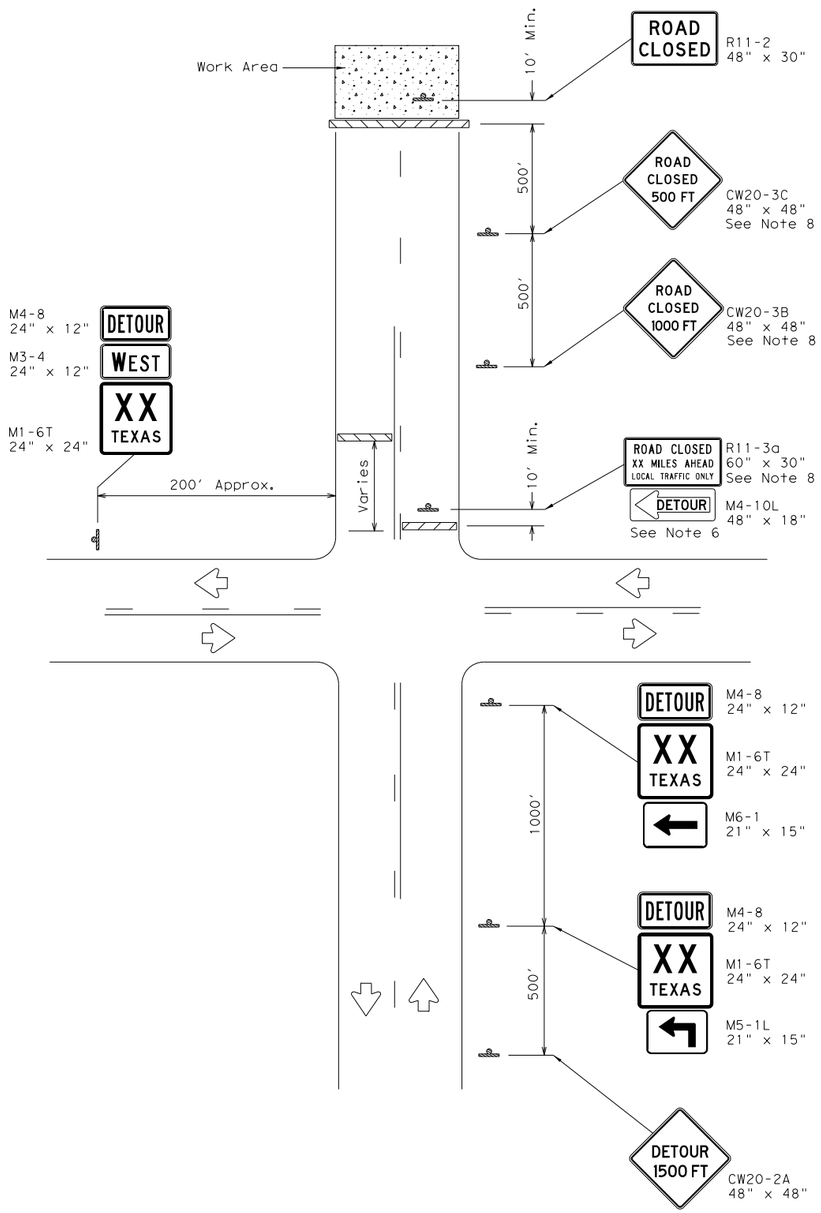
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

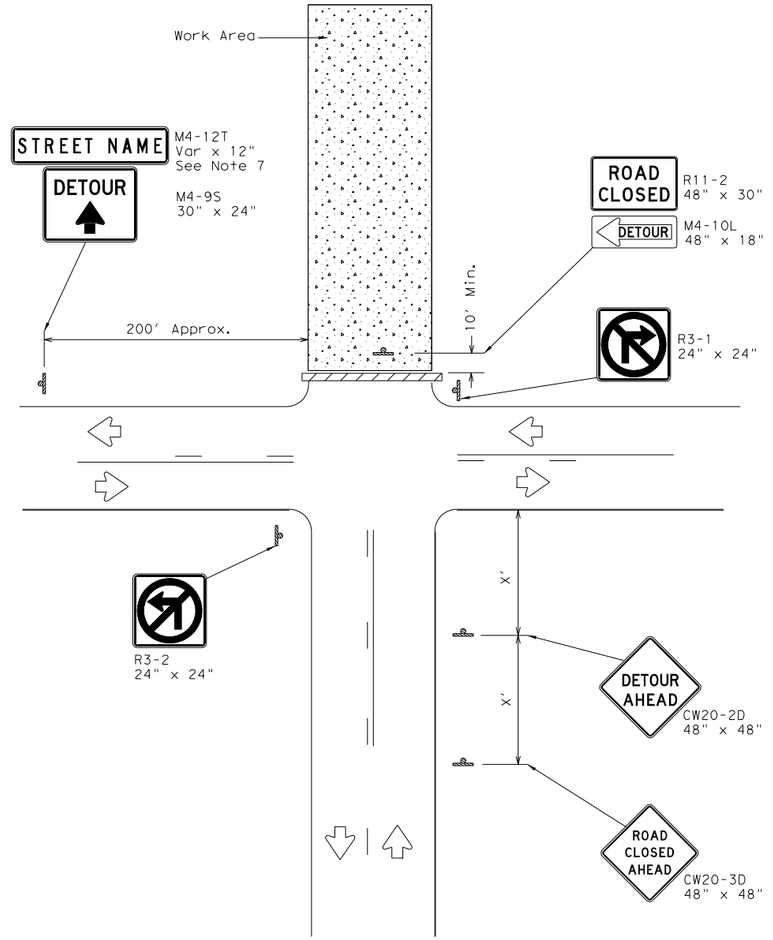
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21	1430	01	031,Etc	FM 490
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	PHR	WILLACY		30

DATE:
FILE:



ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

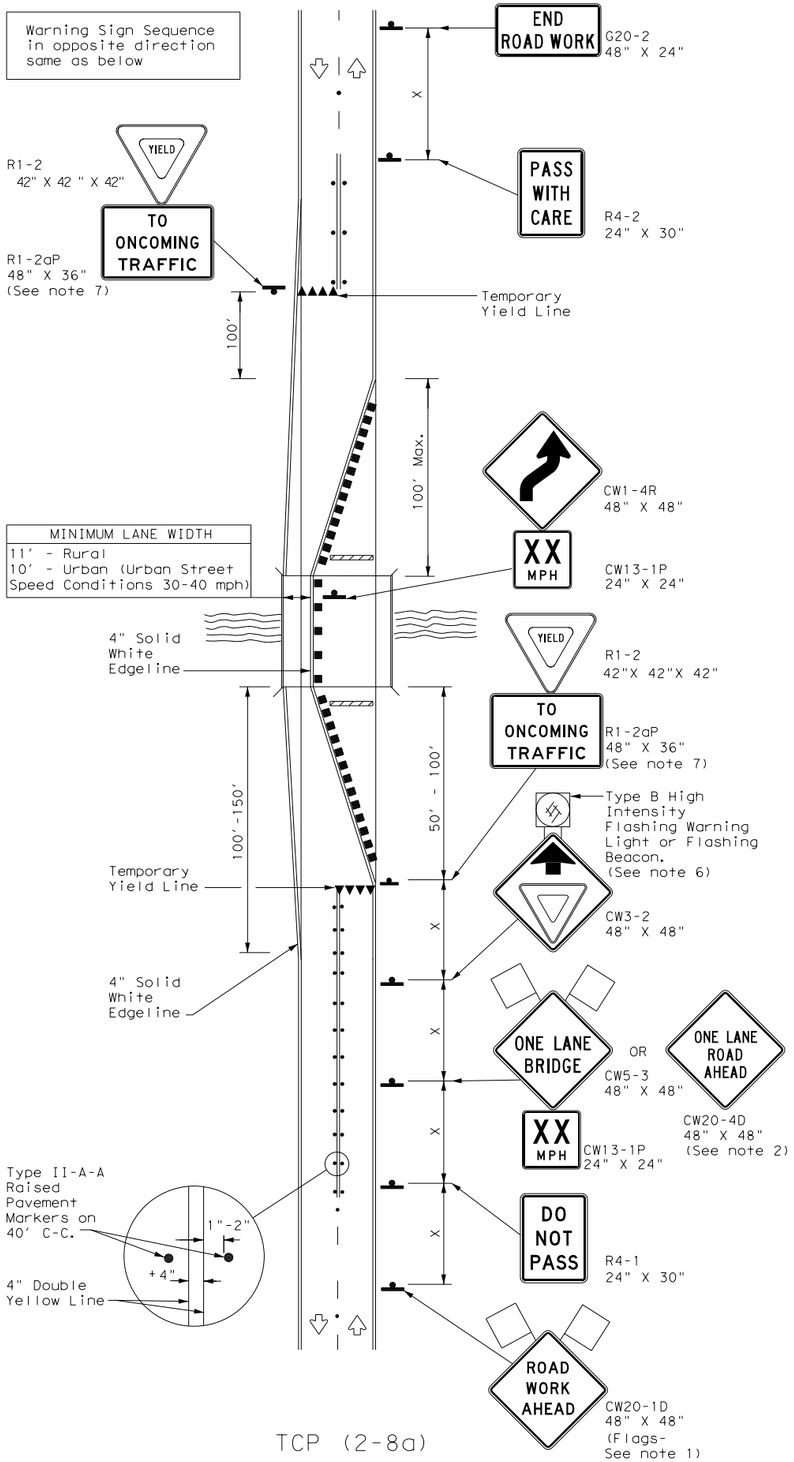
WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031, Etc	FM 490
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	PHR	WILLACY		31

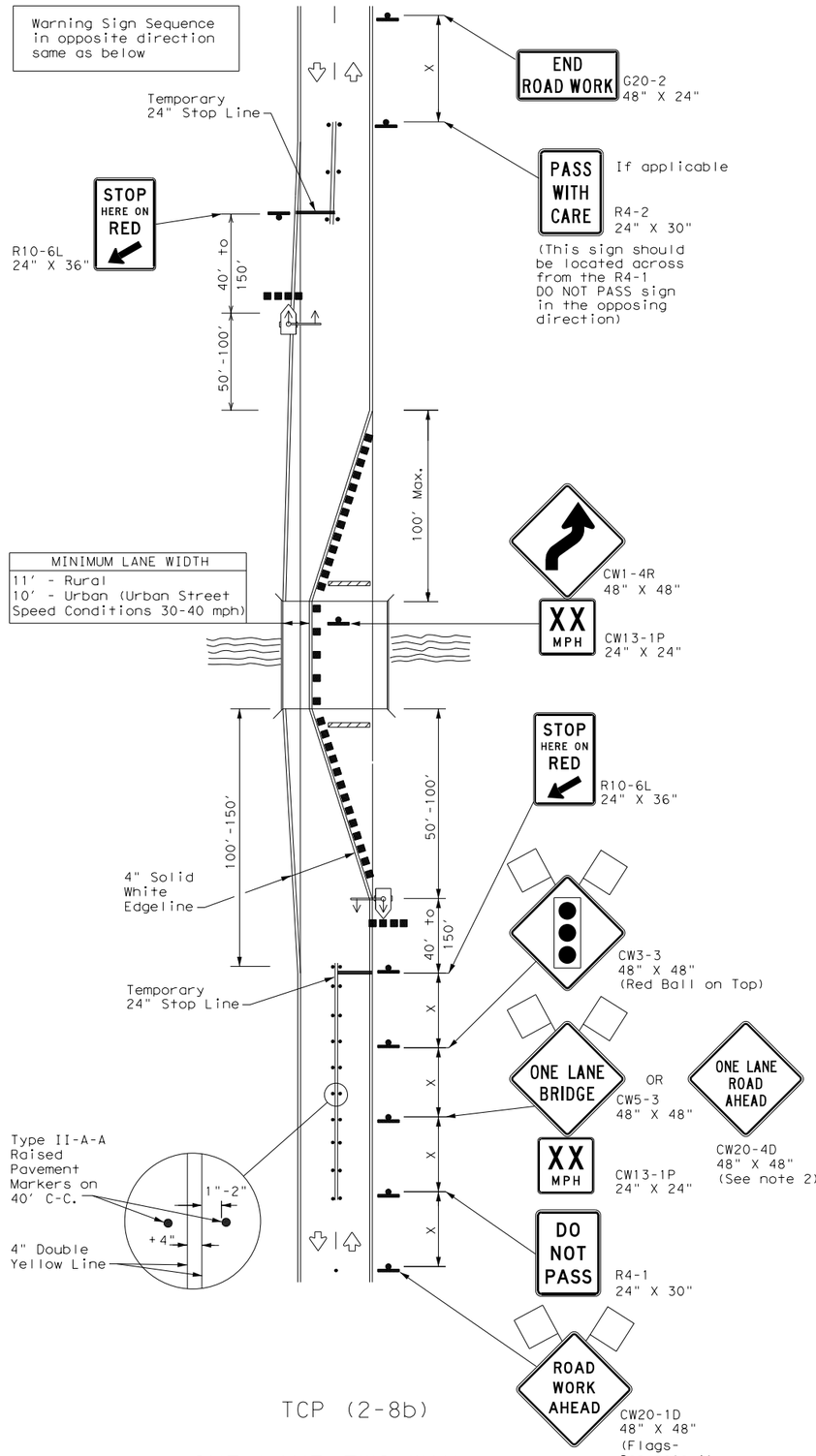
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



TCP (2-8a)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH YIELD SIGNS
(Less Than 2000 ADT-See Note 5)



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

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"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

✳ 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. When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
3. Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
4. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.

TCP (2-8a)

5. Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
6. If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
7. The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.

TCP (2-8b)

8. A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
9. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM ONE-LANE TWO-WAY CONTROL

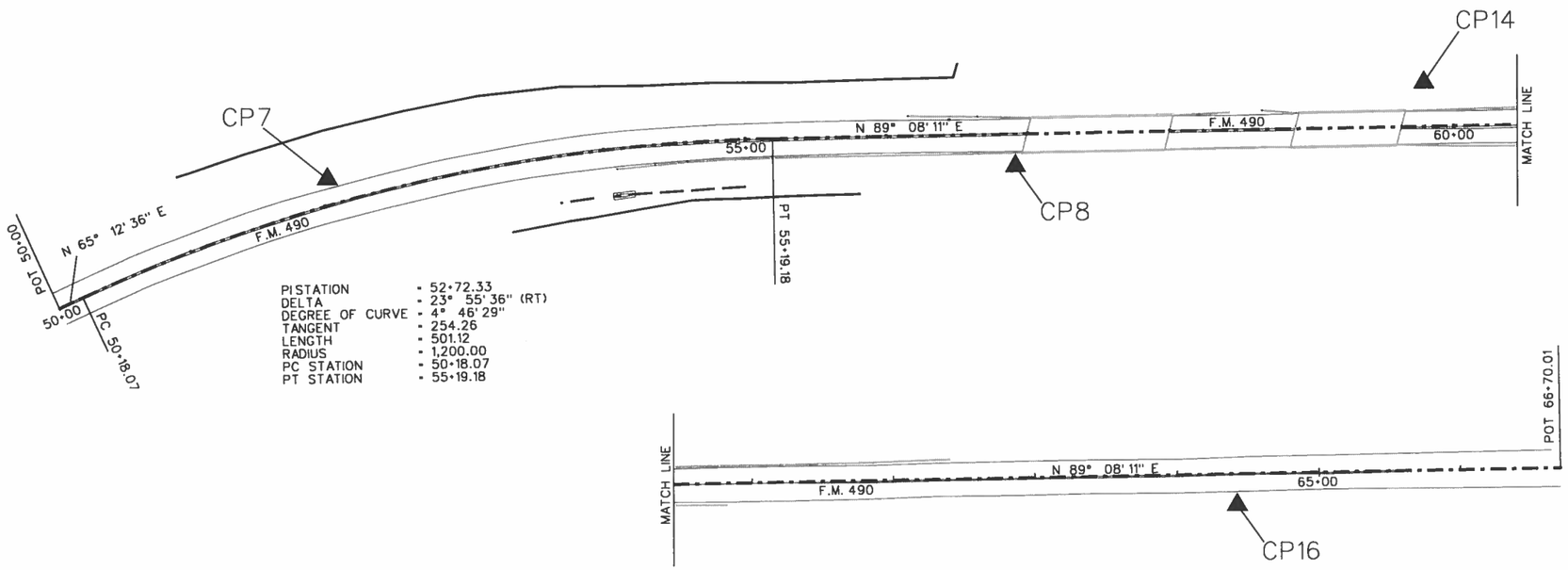
TCP(2-8)-18

FILE: tcp2-8-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	PHR	WILLACY		32
4-98 2-18				

GRAPHIC SCALE

0' 50' 100' 200'

1" = 100'



POINT	NORTHING	EASTING	ELEVATION	STATION	ALIGN	OFFSET	RT/LT	DESCRIPTION
CP7	16,690,555.18	1,179,033.82	46.66	52+06.49	FM 490	18.12'	RT.	5/8" CIRS Stamped "TNP RANDOM" set approximately 3150 feet east of the intersection of FM 490 & FM 1015, being approximately 6.7 feet north of the edge of pavement, being 27.5 feet south of a a 4' hog wire fence.
CP8	16,690,562.98	1,179,519.03	44.32	56+90.62	FM 490	22.33'	RT.	5/8" CIRS Stamped "TNP RANDOM" set approximately 3620 feet east of the centerline of the intersection of F.M. 490 & F.M. 1015, being 10 feet south of the south edge of pavement of F.M. 490, being 27 feet northeast of a 18" RCP and being 10.1 feet southwest of the southwest bridge corner.
CP14	16,690,620.94	1,179,807.13	47.27	59+79.57	FM 490	31.28'	LT.	5/8" CIRS Stamped "TNP RANDOM" set approximately 3900 feet east of the intersection of F.M. 490 & F.M. 1015, being 20.5 feet north of the north edge of pavement of F.M. 490 and being 20.3 feet northeast of the northeast corner of bridge.
CP16	16,690,574.76	1,180,270.02	39.81	64+41.71	FM 490	21.87'	RT.	5/8" CIRS Stamped "TNP RANDOM" set approximately 4365 feet east of the intersection of F.M. 490 & F.M. 1015, being 9.5 feet south of the south edge of pavement of F.M. 490 and being 414 feet east of a 72 inch RCP on the south side of F.M. 490.

▲ 5/8" IRON ROD WITH CAP STAMPED "TNP RANDOM"

DRAWING DATE: 02/07/2020

STATE OF TEXAS REGISTERED MARVIN KING 5581 PROFESSIONAL LAND SURVEYOR

08/25/2020

MARVIN KING, DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5581

NOTES:

1. BEARINGS OF LINES SHOWN HEREON REFER TO GRID NORTH OF THE TEXAS COORDINATE SYSTEM OF 1983 (SOUTH ZONE 4205; NAD83(2011) EPOCH 2010) AS DERIVED LOCALLY FROM TXDOT'S CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) VIA REAL TIME KINEMATIC (RTK) METHODS. AN AVERAGE COMBINATION FACTOR OF 1.00004 WAS USED TO SCALE GRID COORDINATES AND DISTANCES TO SURFACE. ALL COORDINATES SHOWN ARE SURFACE.

2. THE ELEVATIONS SHOWN ARE NAVD88 AND WERE DERIVED FROM THE ABOVE RTK OBSERVATIONS. ORTHOMETRIC HEIGHTS WERE CALCULATED BY APPLYING THE GEOID12B MODEL TO THE ELLIPSOID HEIGHTS.

3. FIELD SURVEYS WERE CONDUCTED BY TEAGUE NALL & PERKINS, INC., DECEMBER 2019

Texas Department of Transportation

TBPELS FIRM No. 10016-00

tnp teague nall & perkins

FM 490
HORIZONTAL & VERTICAL SURVEY CONTROL

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			FM 490
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PHARR	WILLACY	33
CONTROL	SECTION	JOB	
1430	01	031,Etc	

FM 490 CENTERLINE

Beginning chain FM490SWA1 description

Point FM49001 (A-B) N 16,690,131.12 E 1,176,235.09 Sta 22+90.00

Course from FM49001 to PC FM490SWA11 S 81° 00′ 36.00" E Dist 717.00

Curve Data (A-1)

Curve FM490SWA11					
P.I. Station	36+78.16	N	16,689,914.20	E	1,177,606.20
Delta =	37° 06′ 04.61"	(LT)			
Degree =	2° 51′ 53.24"				
Tangent =	671.16				
Length =	1,295.08				
Radius =	2,000.00				
External =	109.61				
Long Chord =	1,272.57				
Mid. Ord. =	103.91				
P.C. Station	30+07.00	N	16,690,019.08	E	1,176,943.28
P.T. Station	43+02.08	N	16,690,230.44	E	1,178,198.18
C.C.		N	16,691,994.51	E	1,177,255.81
Back = S	81° 00′ 36.00" E				
Ahead = N	61° 53′ 19.39" E				
Chord Bear = N	80° 26′ 21.69" E				

Course from PT FM490SWA11 to PC FM490SWA12 N 61° 53′ 19.39" E Dist 246.79

Curve Data (A-2)

Curve FM490SWA12					
P.I. Station	50+33.61	N	16,690,575.12	E	1,178,843.41
Delta =	27° 14′ 52.05"	(RT)			
Degree =	2° 51′ 53.24"				
Tangent =	484.73				
Length =	951.13				
Radius =	2,000.00				
External =	57.90				
Long Chord =	942.19				
Mid. Ord. =	56.27				
P.C. Station	45+48.87	N	16,690,346.73	E	1,178,415.86
P.T. Station	55+00.00	N	16,690,582.43	E	1,179,328.09
C.C.		N	16,688,582.66	E	1,179,358.23
Back = N	61° 53′ 19.39" E				
Ahead = N	89° 08′ 11.44" E				
Chord Bear = N	75° 30′ 45.41" E				

Course from PT FM490SWA12 to PC FM490SWA13 N 89° 08′ 11.44" E Dist 6,345.00

Curve Data (A-3)

Curve FM490SWA13					
P.I. Station	120+85.59	N	16,690,681.68	E	1,185,912.93
Delta =	9° 49′ 19.68"	(RT)			
Degree =	2° 02′ 46.60"				
Tangent =	240.59				
Length =	480.00				
Radius =	2,800.00				
External =	10.32				
Long Chord =	479.41				
Mid. Ord. =	10.28				
P.C. Station	118+45.00	N	16,690,678.05	E	1,185,672.37
P.T. Station	123+25.00	N	16,690,644.21	E	1,186,150.59
C.C.		N	16,687,878.37	E	1,185,714.57
Back = N	89° 08′ 11.44" E				
Ahead = S	81° 02′ 28.88" E				
Chord Bear = S	85° 57′ 08.72" E				

Course from PT FM490SWA13 to PC FM490SWA14 S 81° 02′ 28.88" E Dist 260.00

Curve Data (A-4)

Curve FM490SWA14					
P.I. Station	128+24.72	N	16,690,566.39	E	1,186,644.21
Delta =	9° 47′ 13.68"	(LT)			
Degree =	2° 02′ 46.60"				
Tangent =	239.73				
Length =	478.29				
Radius =	2,800.00				
External =	10.24				
Long Chord =	477.71				
Mid. Ord. =	10.21				
P.C. Station	125+85.00	N	16,690,603.72	E	1,186,407.41
P.T. Station	130+63.29	N	16,690,569.86	E	1,186,883.92
C.C.		N	16,693,369.57	E	1,186,843.43
Back = S	81° 02′ 28.88" E				
Ahead = N	89° 10′ 17.44" E				
Chord Bear = S	85° 56′ 05.72" E				

Course from PT FM490SWA14 to FM49002 N 89° 10′ 17.44" E Dist 6,426.71

Point FM49002 N 16,690,662.79 E 1,193,309.96 Sta 194+90.00

Ending chain FM490SWA1 description

FM 1425 CENTERLINE

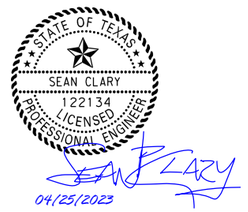
Beginning chain FM1425 description

Point FM142501 N 16,690,274.94 E 1,192,811.49 Sta 10+00.00

Course from FM142501 to FM142502 N 0° 49′ 31.10" W Dist 782.22

Point FM142502 N 16,691,057.07 E 1,192,800.23 Sta 17+82.22

Ending chain FM1425 description



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

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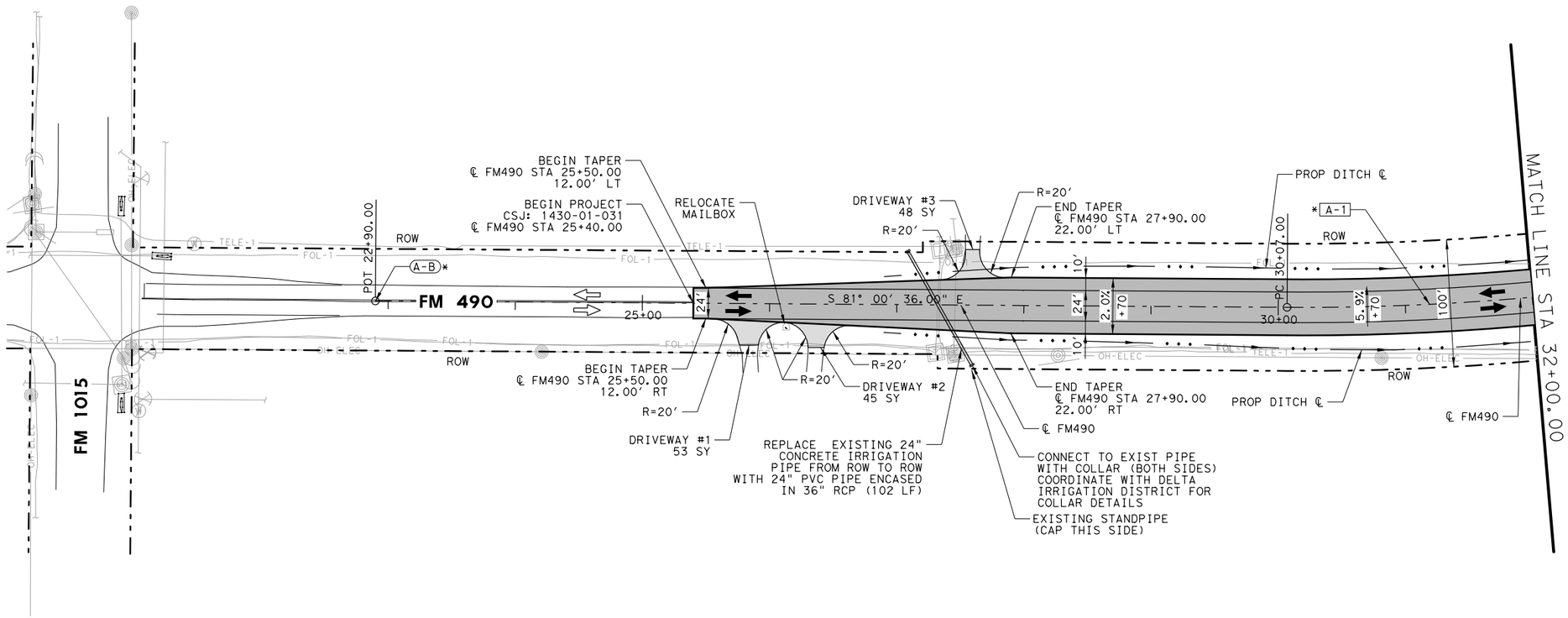
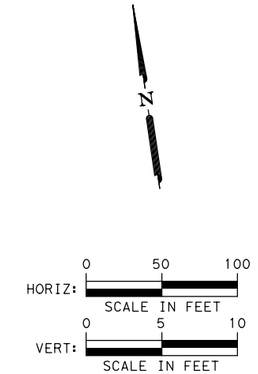


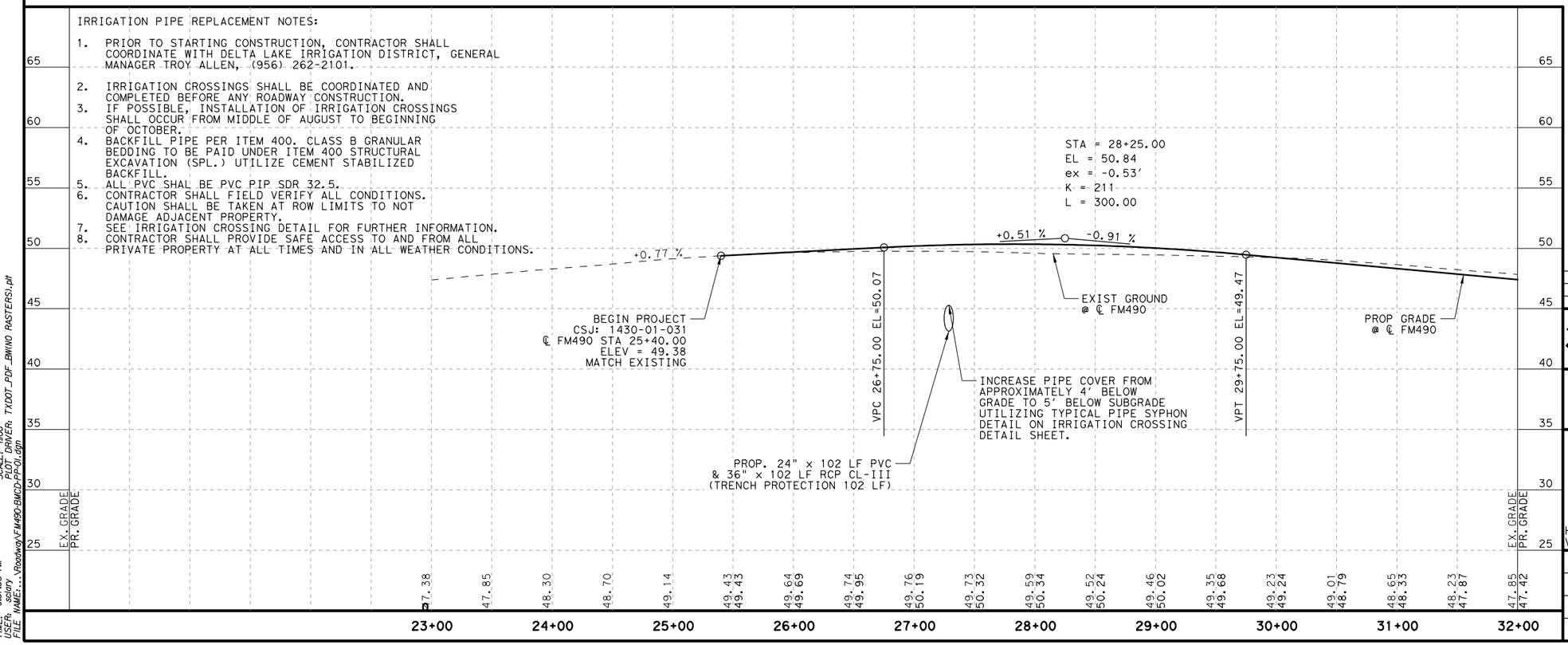


NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

IRRIGATION PIPE REPLACEMENT NOTES:

1. PRIOR TO STARTING CONSTRUCTION, CONTRACTOR SHALL COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT, GENERAL MANAGER TROY ALLEN, (956) 262-2101.
2. IRRIGATION CROSSINGS SHALL BE COORDINATED AND COMPLETED BEFORE ANY ROADWAY CONSTRUCTION.
3. IF POSSIBLE, INSTALLATION OF IRRIGATION CROSSINGS SHALL OCCUR FROM MIDDLE OF AUGUST TO BEGINNING OF OCTOBER.
4. BACKFILL PIPE PER ITEM 400. CLASS B GRANULAR BEDDING TO BE PAID UNDER ITEM 400 STRUCTURAL EXCAVATION (SPL.) UTILIZE CEMENT STABILIZED BACKFILL.
5. ALL PVC SHAL BE PVC PIP SDR 32.5.
6. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS. CAUTION SHALL BE TAKEN AT ROW LIMITS TO NOT DAMAGE ADJACENT PROPERTY.
7. SEE IRRIGATION CROSSING DETAIL FOR FURTHER INFORMATION.
8. CONTRACTOR SHALL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.



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STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

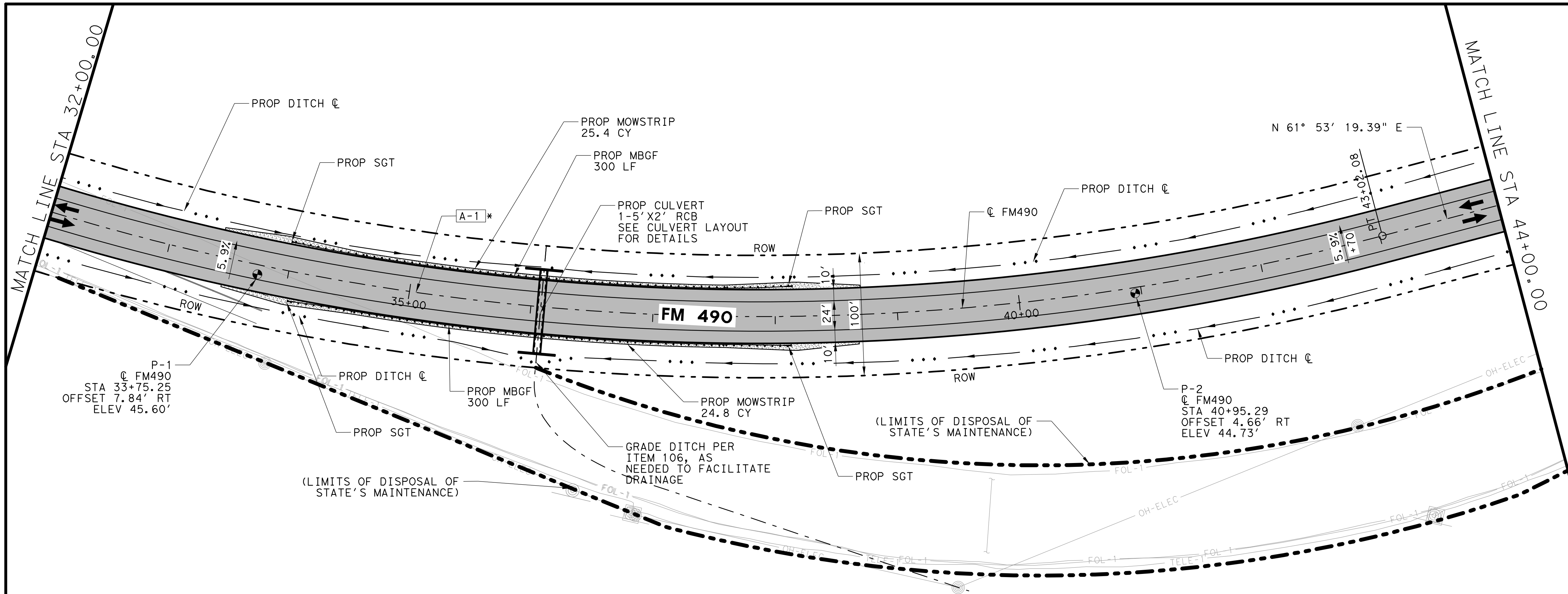
FM 490
PLAN AND PROFILE
BEGIN TO STA 32+00

HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

SHEET 1 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 35



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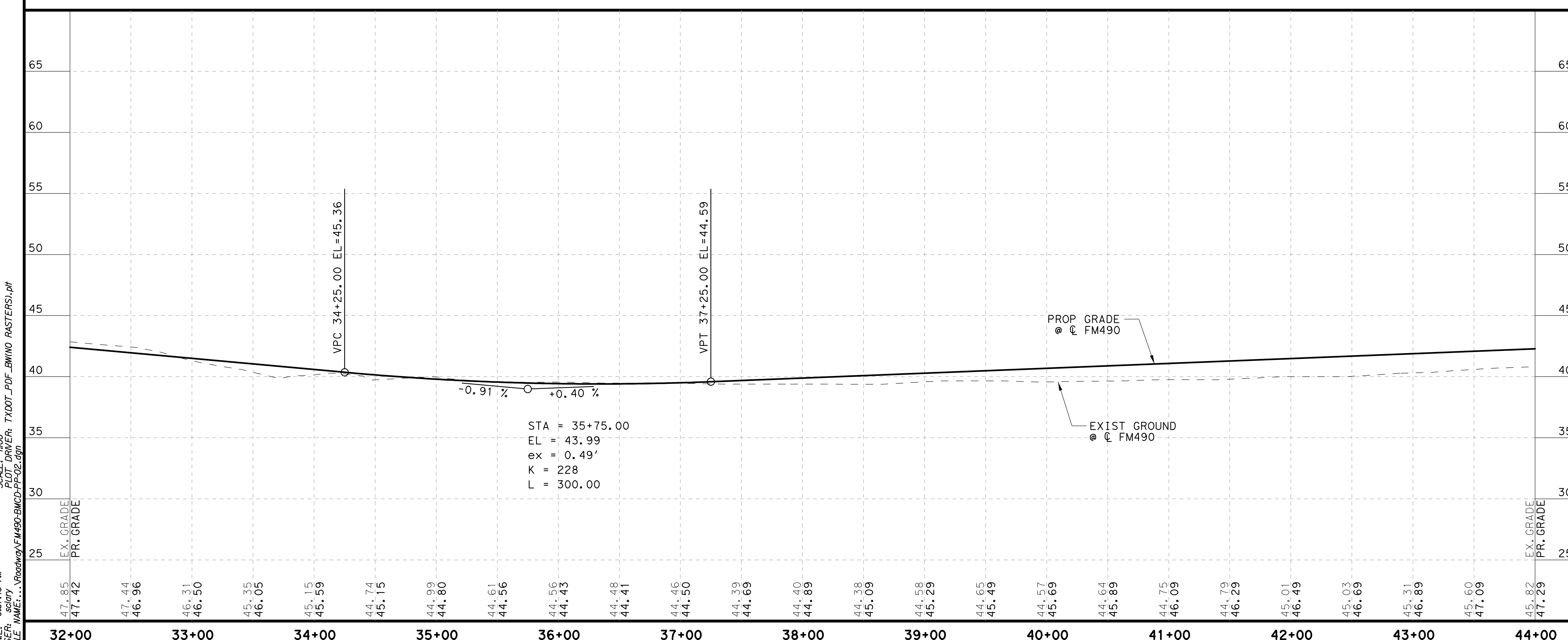
VERT: 0 5 10 SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.



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STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

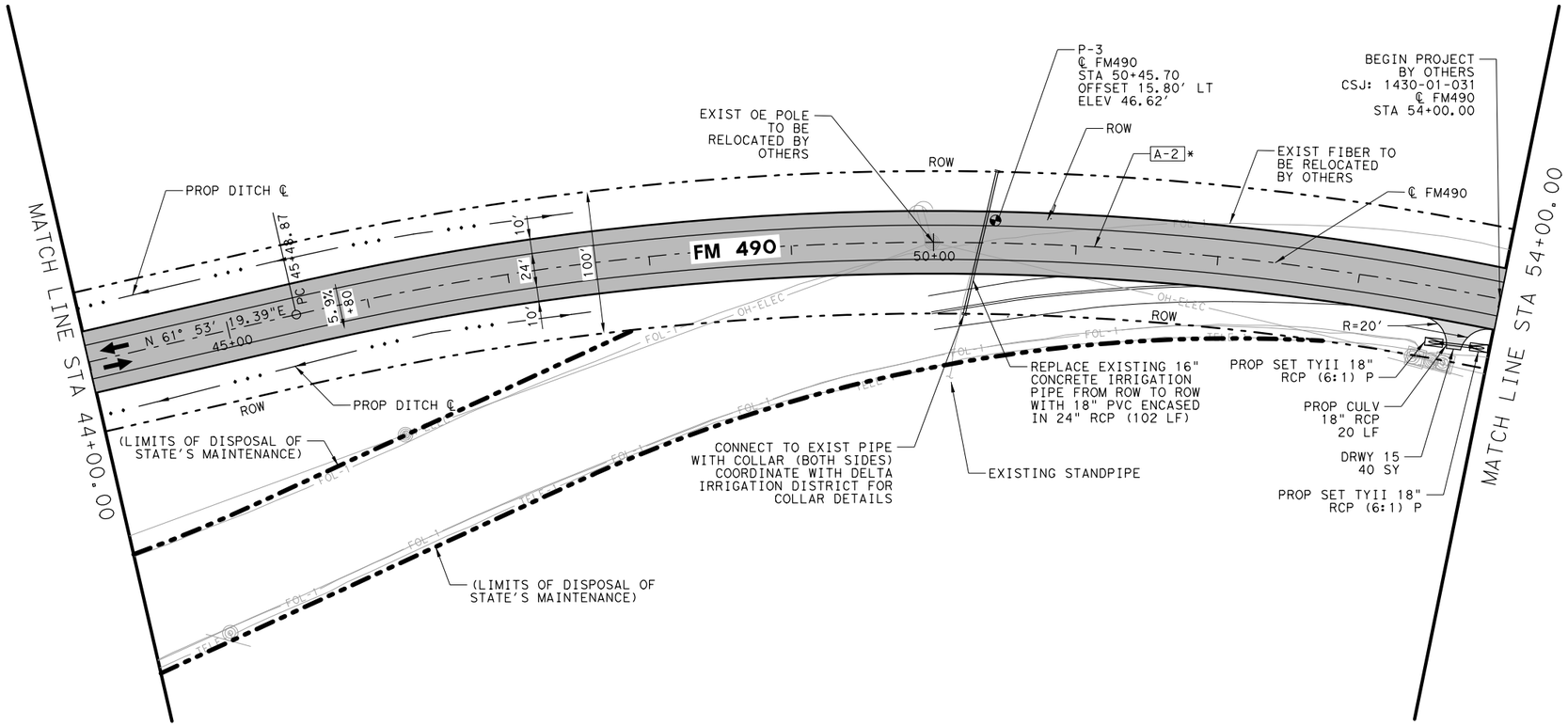
Texas Department of Transportation
© 2023

FM 490
PLAN AND PROFILE
STA 32+00 TO STA 44+00

HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

SHEET 2 OF 16

DESIGN LEH	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DRAWN JSR	6	SEE TITLE SHEET		FM 490
CHECK MAW	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	PHR	WILLACY	36
CHECK SPC	CONTROL	SECTION	JOB	
	1430	01	031,Etc	



LEGEND

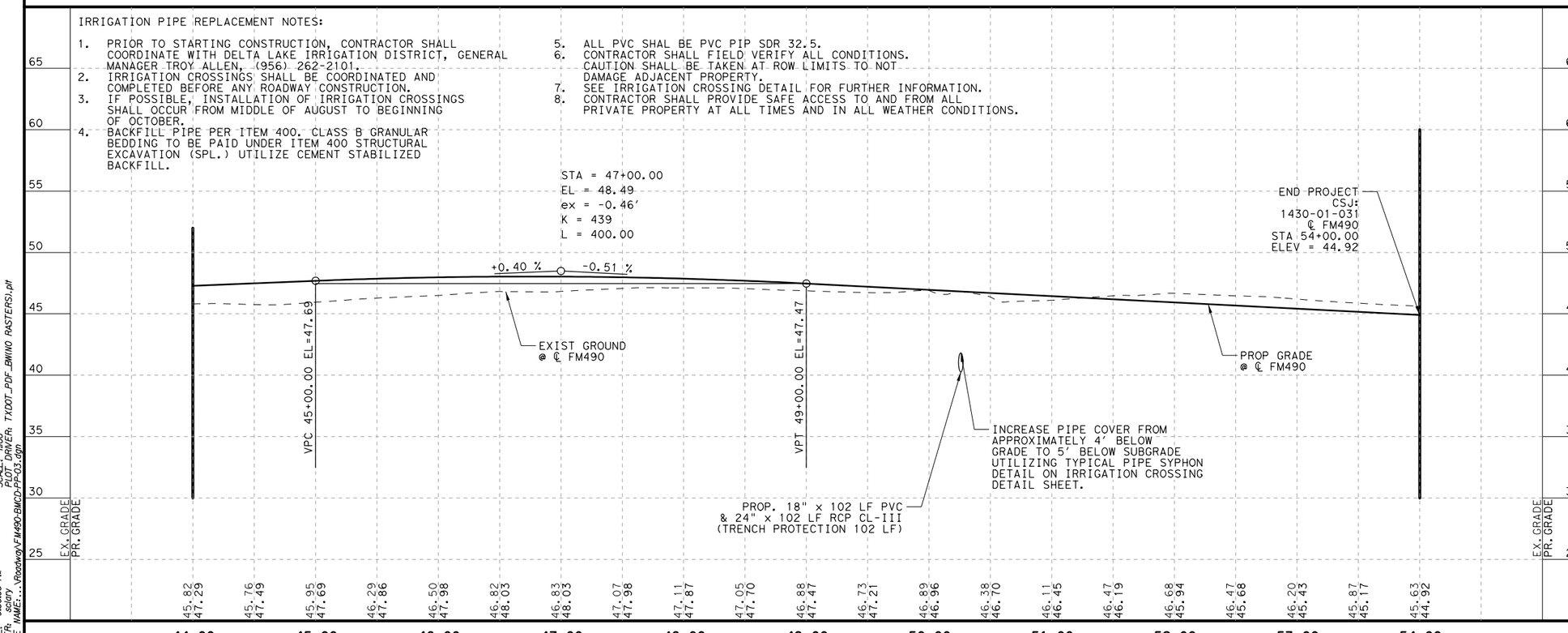
- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

IRRIGATION PIPE REPLACEMENT NOTES:

1. PRIOR TO STARTING CONSTRUCTION, CONTRACTOR SHALL COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT, GENERAL MANAGER TROY ALLEN, (956) 262-2101.
2. IRRIGATION CROSSINGS SHALL BE COORDINATED AND COMPLETED BEFORE ANY ROADWAY CONSTRUCTION.
3. IF POSSIBLE, INSTALLATION OF IRRIGATION CROSSINGS SHALL OCCUR FROM MIDDLE OF AUGUST TO BEGINNING OF OCTOBER.
4. BACKFILL PIPE PER ITEM 400. CLASS B GRANULAR BEDDING TO BE PAID UNDER ITEM 400 STRUCTURAL EXCAVATION (SPL.) UTILIZE CEMENT STABILIZED BACKFILL.
5. ALL PVC SHAL BE PVC PIP SDR 32.5.
6. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS. CAUTION SHALL BE TAKEN AT ROW LIMITS TO NOT DAMAGE ADJACENT PROPERTY.
7. SEE IRRIGATION CROSSING DETAIL FOR FURTHER INFORMATION.
8. CONTRACTOR SHALL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN AND PROFILE
STA 44+00 TO STA 54+00

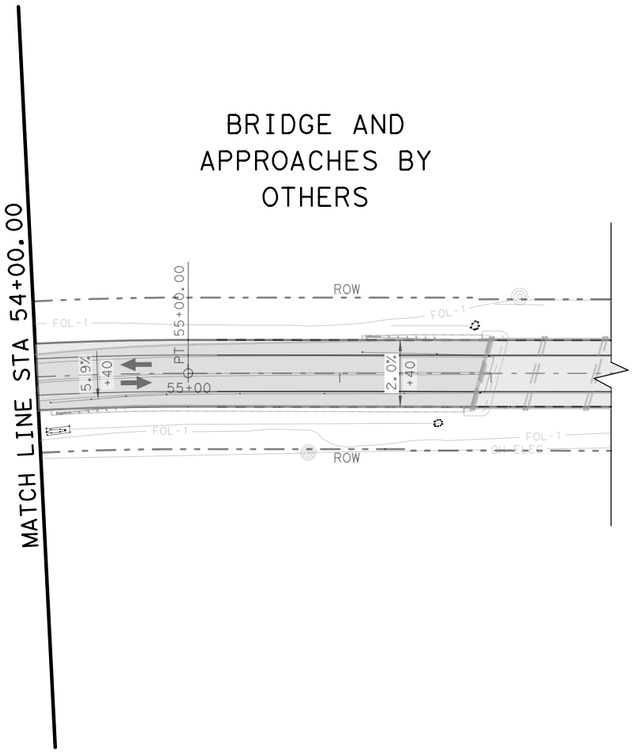
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

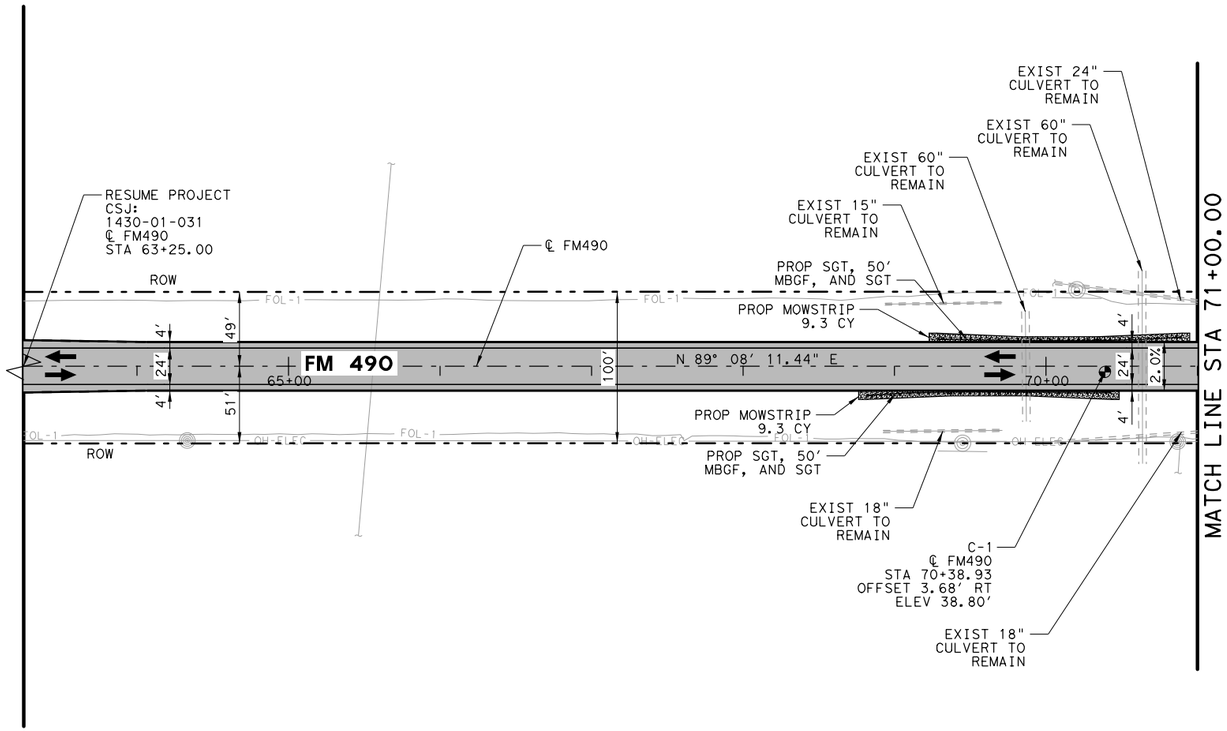
SHEET 3 OF 16

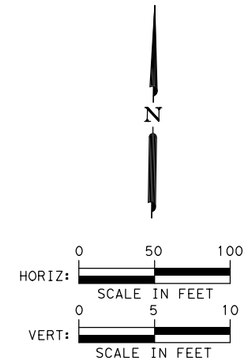
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 37

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1d00
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS).pltr
PLOT DATE: 4/25/2023
TIME: 9:38:08 AM
USER: scleary
FILE NAME: ...\Roadway\FM490-BMCD-PP-03.dgn

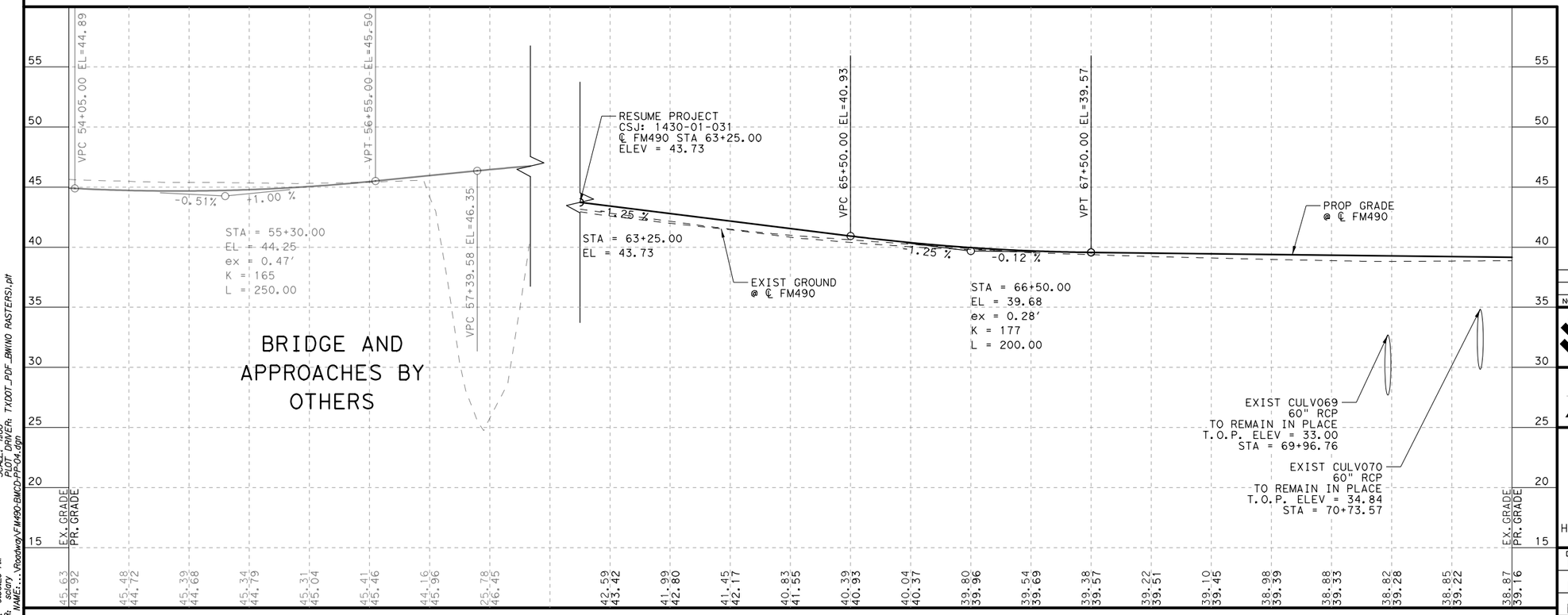


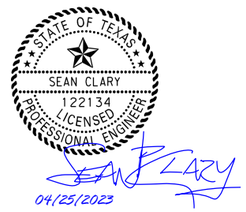




NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.





NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 63+25 TO STA 71+00

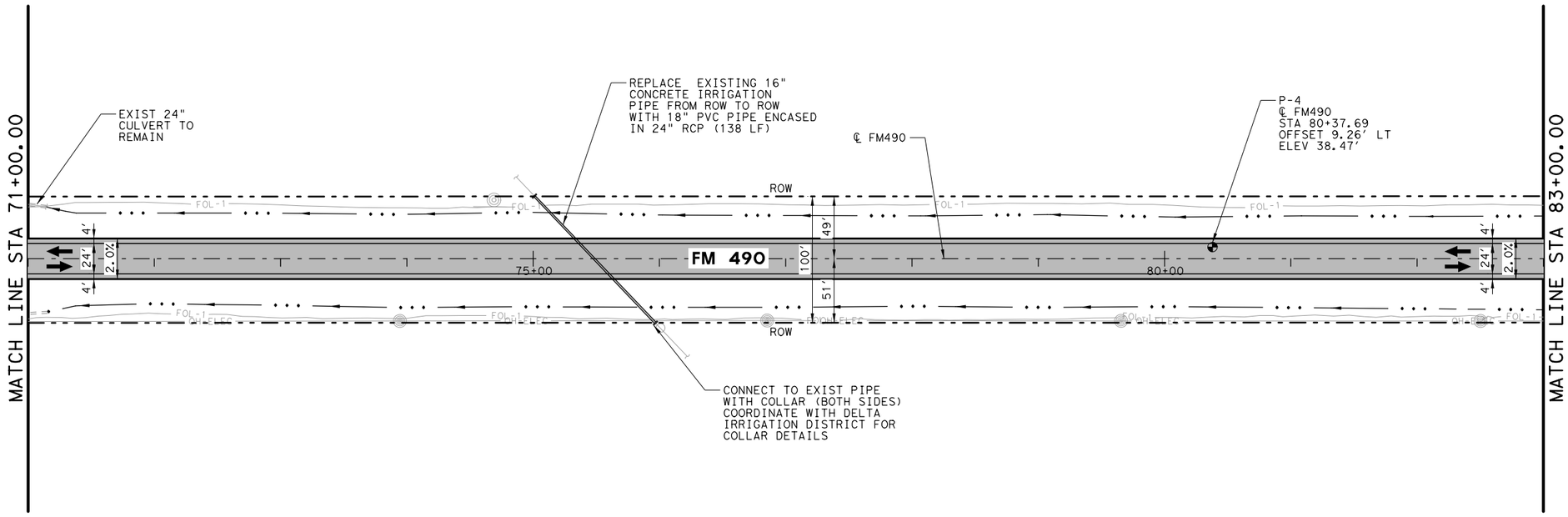
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

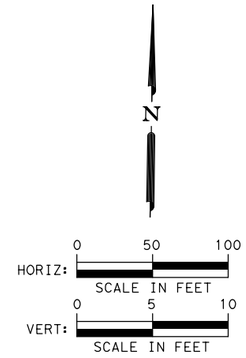
SHEET 4 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 38

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1d00
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS).pltr
FILE NAME: ...\Roadway\FM490-BMCD-PP-04.dgn
USER: sclary
TIME: 9:38:20 AM
DATE: 4/25/2023





LEGEND

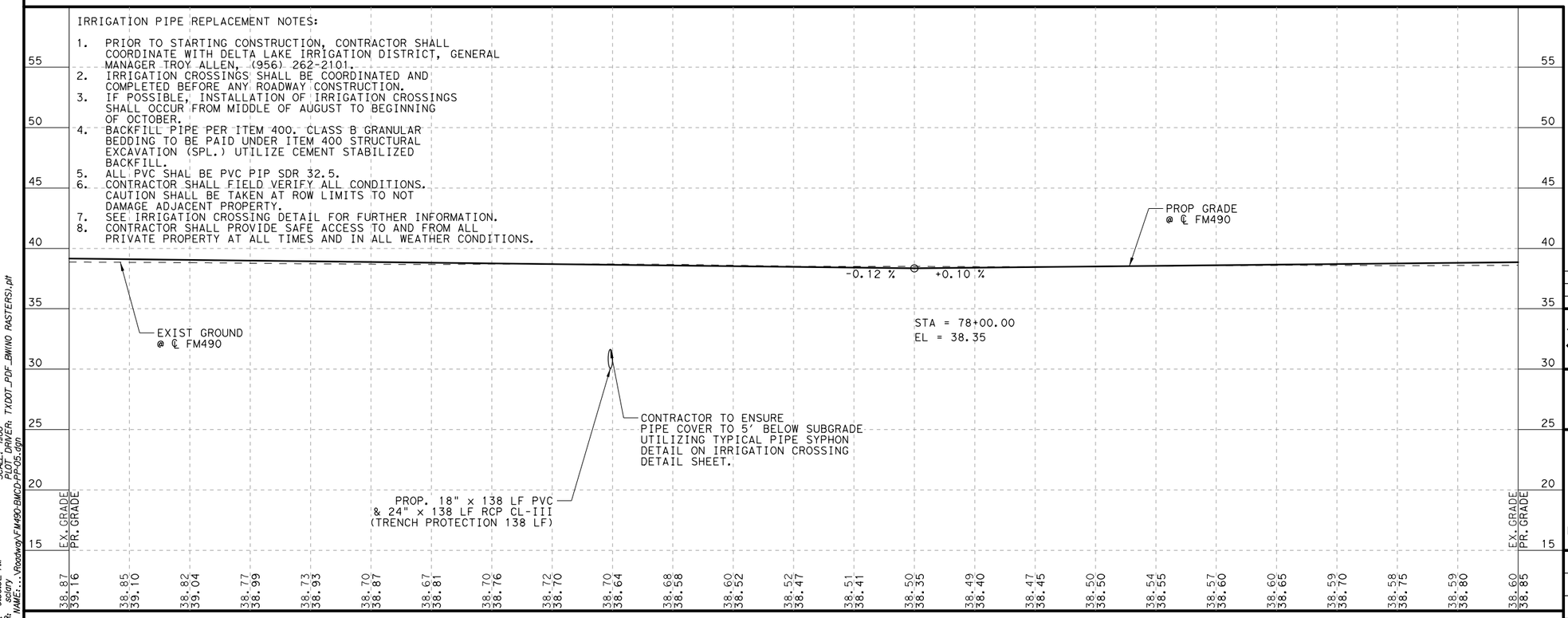
- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

IRRIGATION PIPE REPLACEMENT NOTES:

1. PRIOR TO STARTING CONSTRUCTION, CONTRACTOR SHALL COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT, GENERAL MANAGER TROY ALLEN, (956) 262-2101.
2. IRRIGATION CROSSINGS SHALL BE COORDINATED AND COMPLETED BEFORE ANY ROADWAY CONSTRUCTION.
3. IF POSSIBLE, INSTALLATION OF IRRIGATION CROSSINGS SHALL OCCUR FROM MIDDLE OF AUGUST TO BEGINNING OF OCTOBER.
4. BACKFILL PIPE PER ITEM 400. CLASS B GRANULAR BEDDING TO BE PAID UNDER ITEM 400 STRUCTURAL EXCAVATION (SPL.) UTILIZE CEMENT STABILIZED BACKFILL.
5. ALL PVC SHAL BE PVC PIP SDR 32.5.
6. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS. CAUTION SHALL BE TAKEN AT ROW LIMITS TO NOT DAMAGE ADJACENT PROPERTY.
7. SEE IRRIGATION CROSSING DETAIL FOR FURTHER INFORMATION.
8. CONTRACTOR SHALL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 71+00 TO STA 83+00

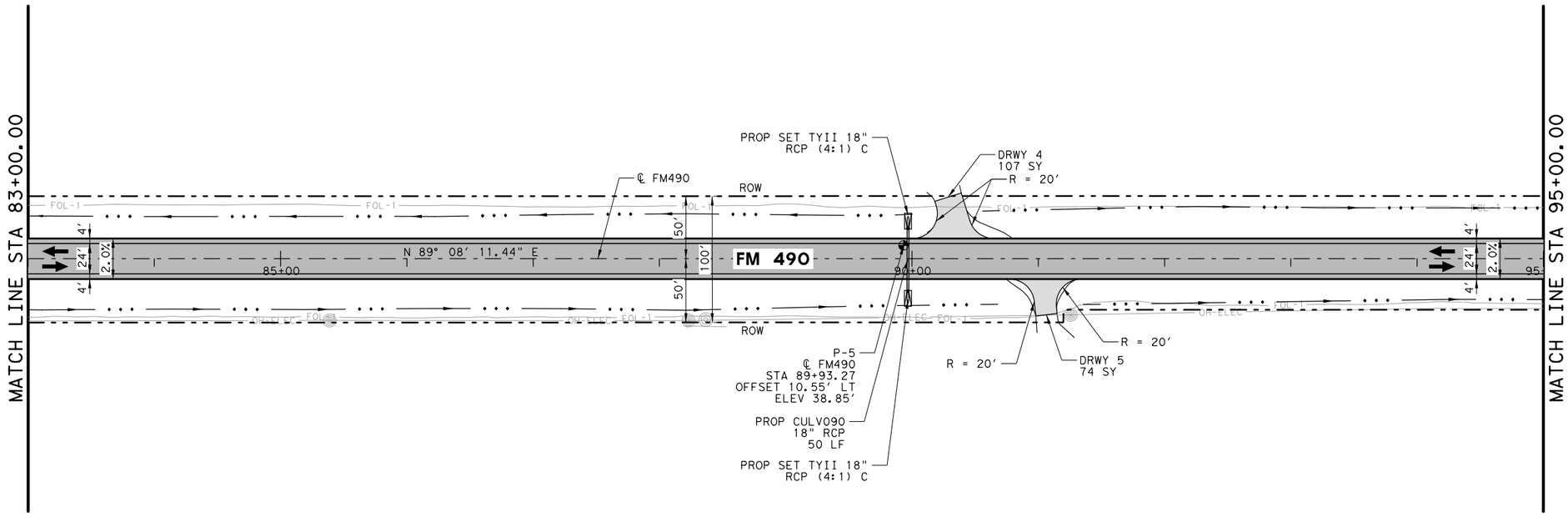
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

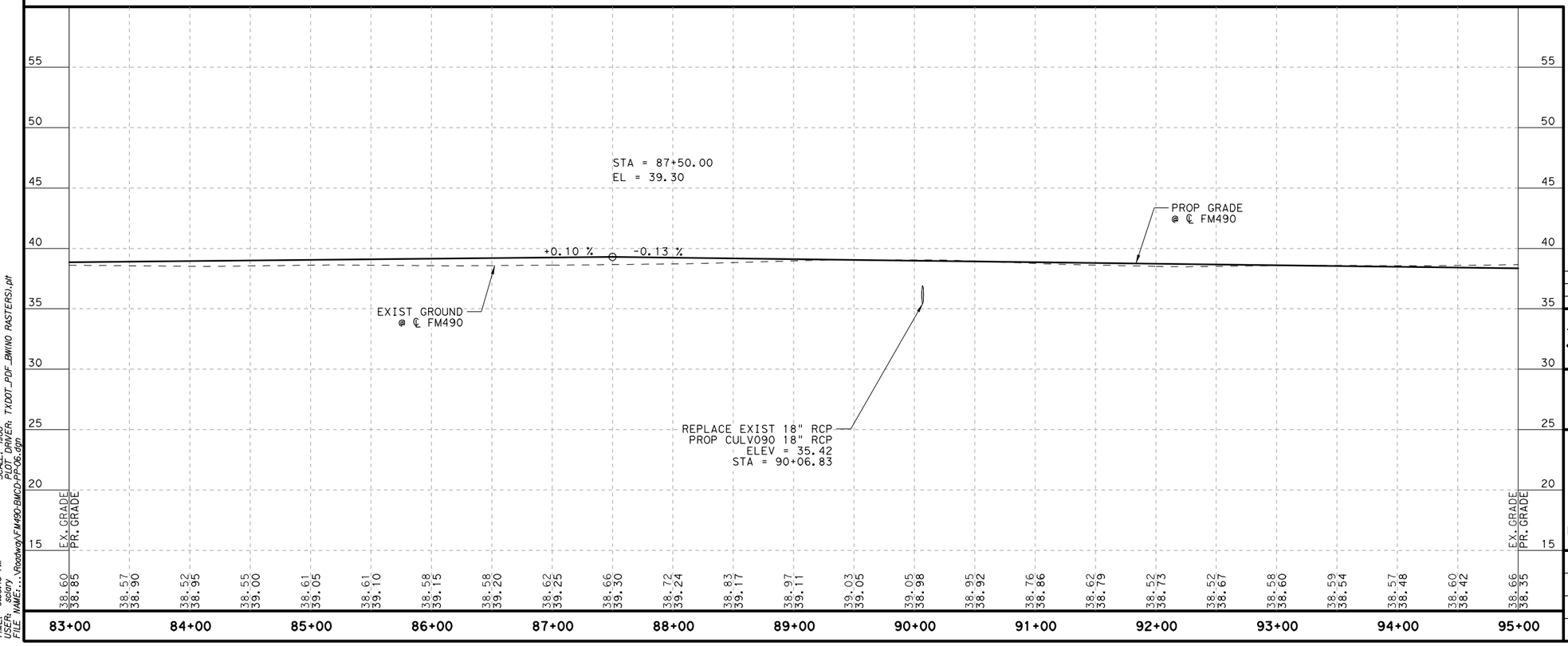
SHEET 5 OF 16

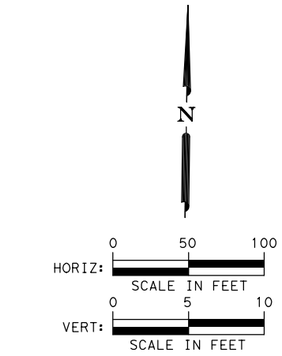
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 39

PENTABLE: SWA\FM490 Pentable.tbl
SCALE: 1x100
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS\.pltr
FILE NAME: ...\Roadway\FM490-BMCD-PP-05.dgn
USER: scary
TIME: 9:38:32 AM
DATE: 4/25/2023







LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

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DALLAS, TX, 75240
ENGINEERING FIRM F-845

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FM 490
PLAN & PROFILE
STA 83+00 TO STA 95+00

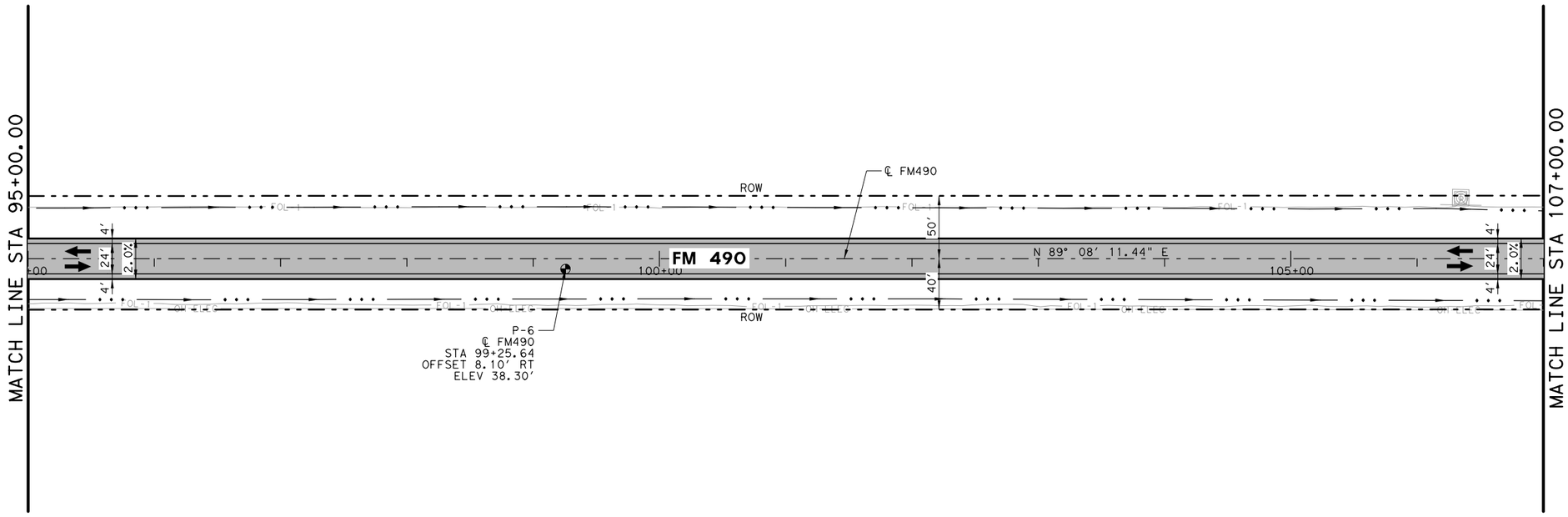
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

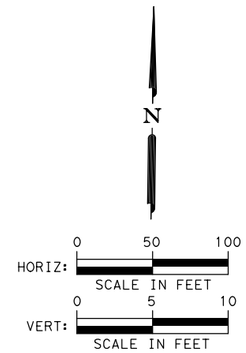
SHEET 6 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
CHECK SPC	1430	01	031, Etc

SHEET NO. 40

PENTABLE: SWA\FM490 Pentable.tbl
SCALE: 1d00
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS\.pltf
FILE NAME: ..\Roadway\FM490-BMCD-PP-06.dgn
USER: sclary
TIME: 9:38:45 AM
DATE: 4/25/2023



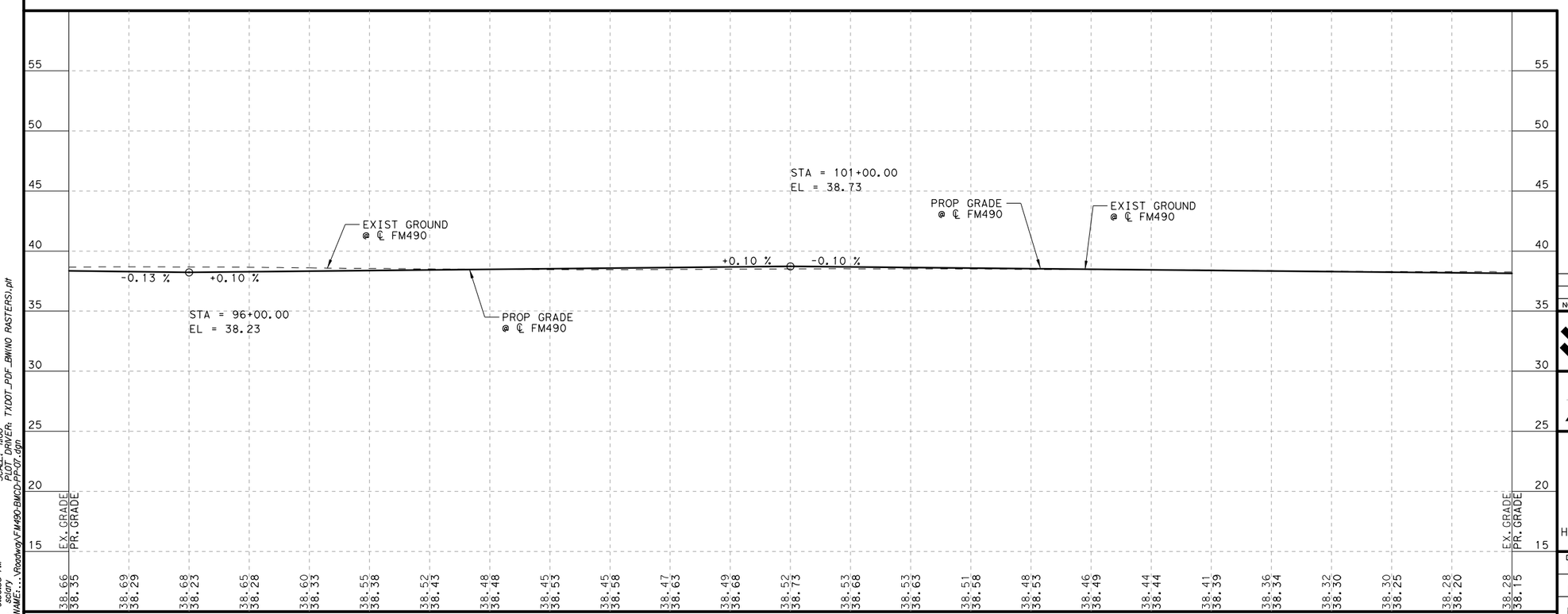


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.



STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 95+00 TO STA 107+00

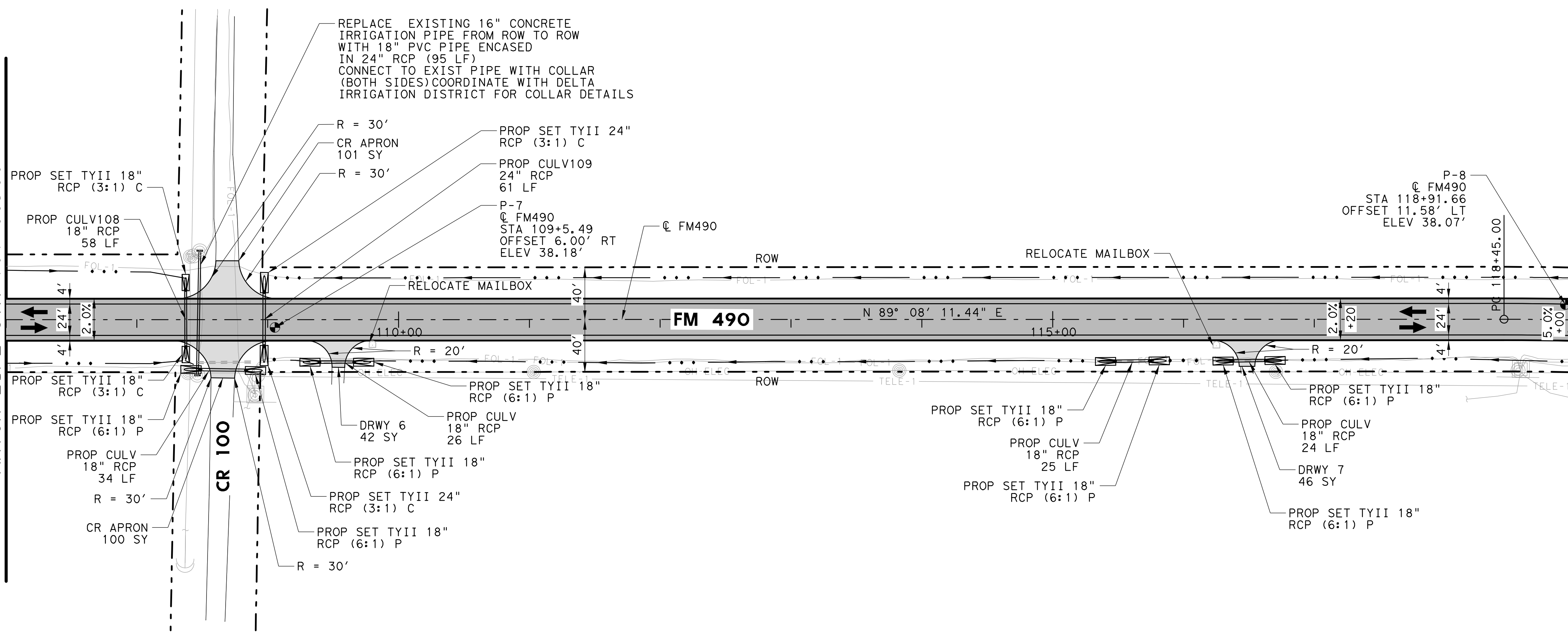
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

SHEET 7 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 41

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1d00
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS).pltt
FILE NAME: ...\Roadway\FM490-BMCD-PP-07.dgn
USER: sclary
TIME: 9:38:55 AM
DATE: 4/25/2023



N

HORIZ: 0 50 100 SCALE IN FEET

VERT: 0 5 10 SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

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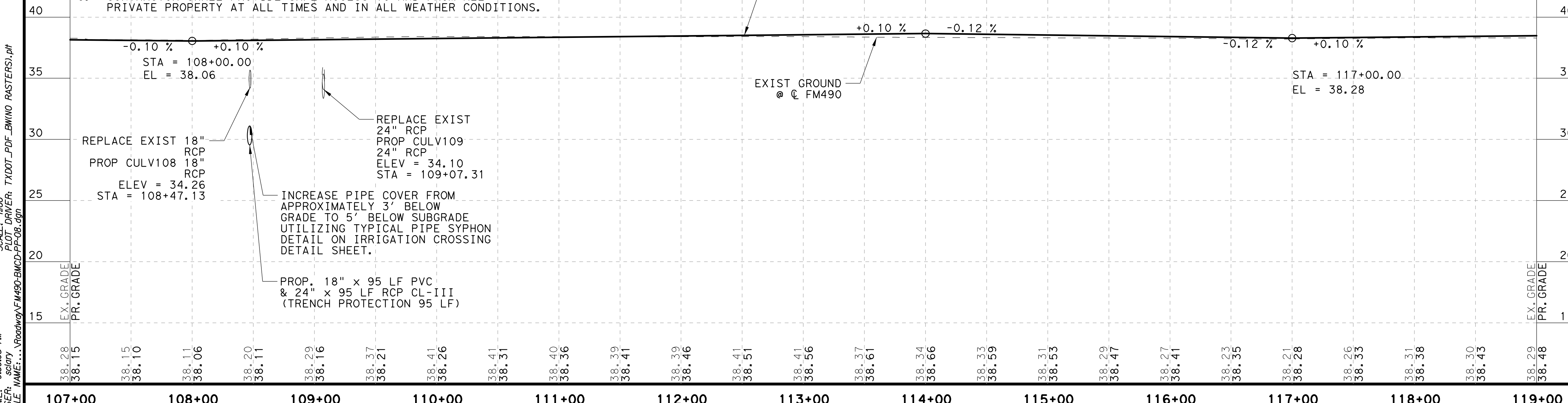

DATE: 4/25/2023
TIME: 9:39:05 AM
USER: sclary
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SCALE: 1:100
PLOT DRIVER: TXDOT_PDF_BW(NO RASTERS).plt

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
[illegible]
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
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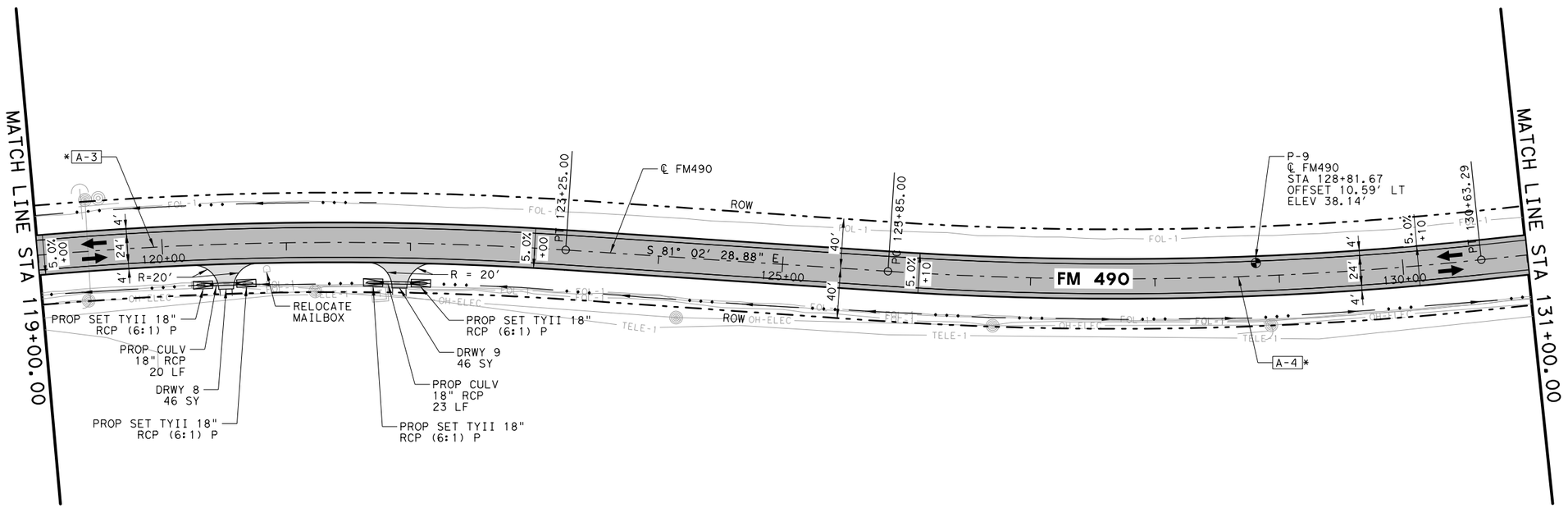
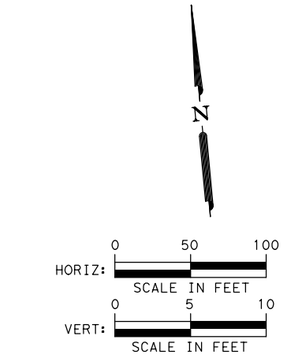
FM 490
PLAN & PROFILE
STA 107+00 TO STA 119+00

HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

SHEET 8 OF 16

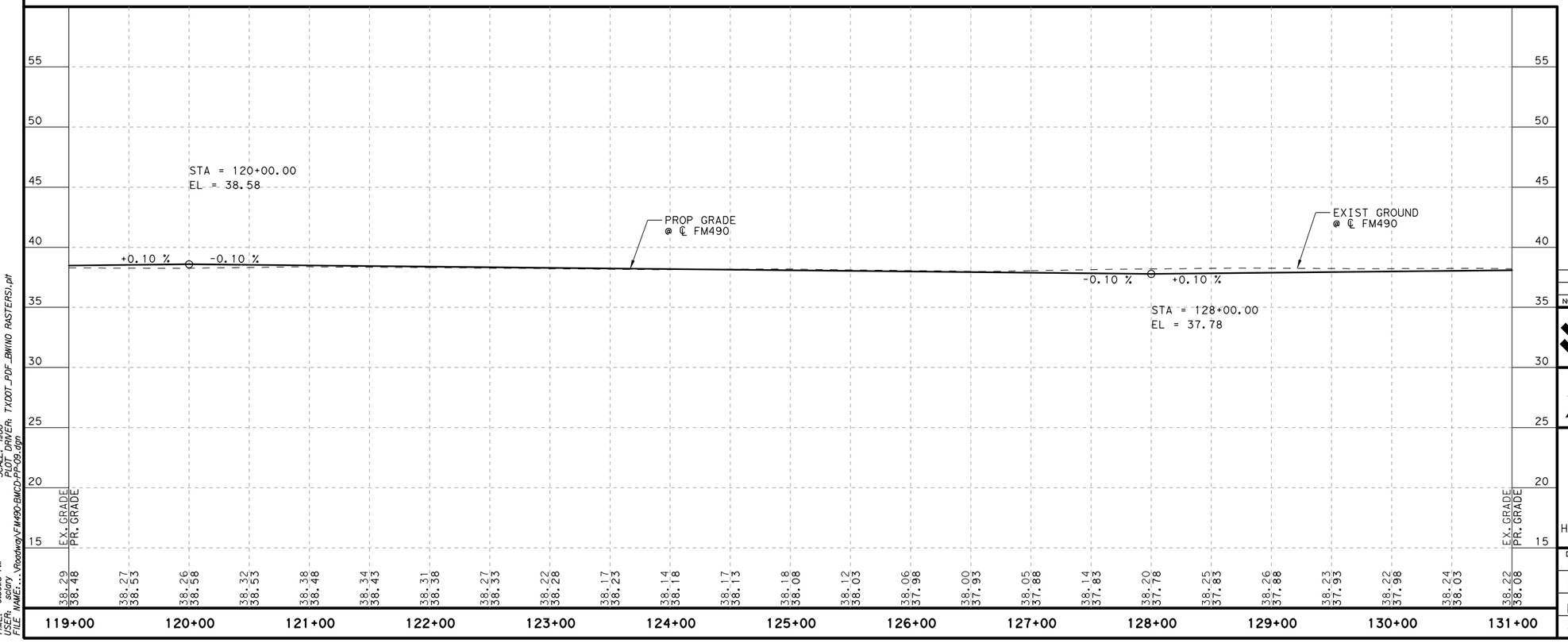
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LEH	6	SEE TITLE SHEET		FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	42
CHECK SPC	CONTROL	SECTION	JOB	
	1430	01	031, Etc	





NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.



STATE OF TEXAS
SEAN CLARY
122134
LICENSED PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 119+00 TO STA 131+00

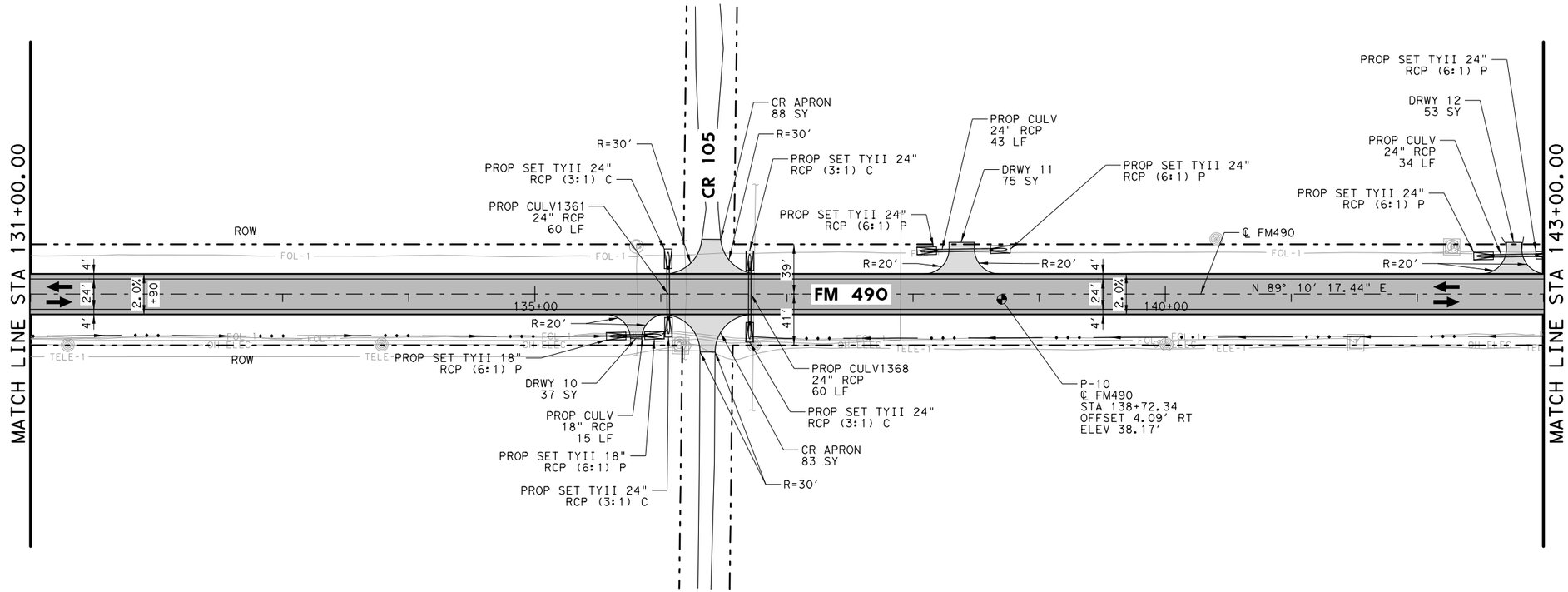
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

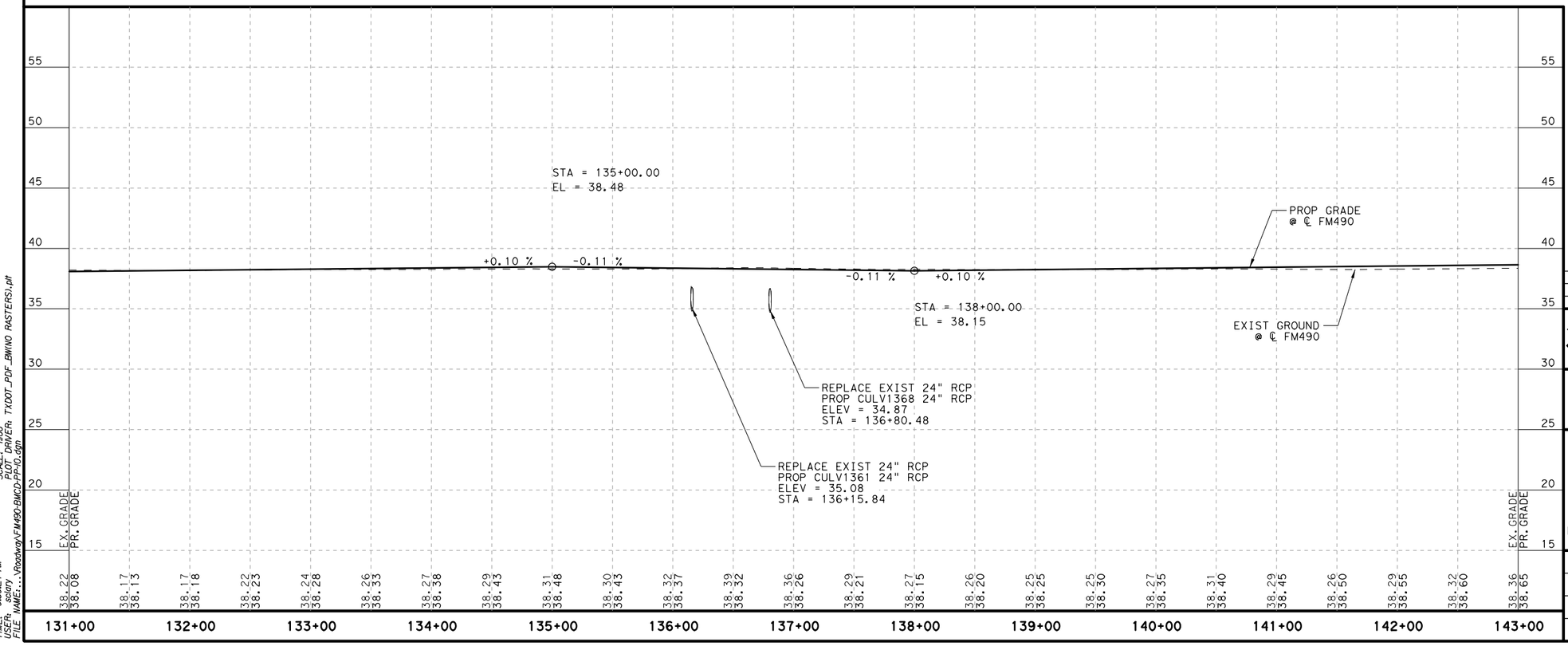
SHEET 9 OF 16

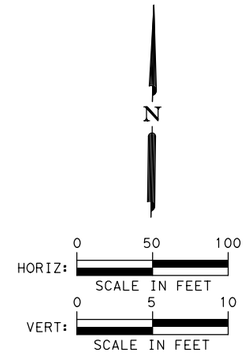
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
CHECK SPC	1430	01	031, Etc

SHEET NO. 43

PENTABLE: SWA\FM490 Pentable.tbl
SCALE: 1d00
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).pltt
DATE: 4/25/2023
TIME: 9:39:5 AM
USER: scary
FILE NAME: ...\Roadway\FM490-BMCD-PP-09.dgn







LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
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DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
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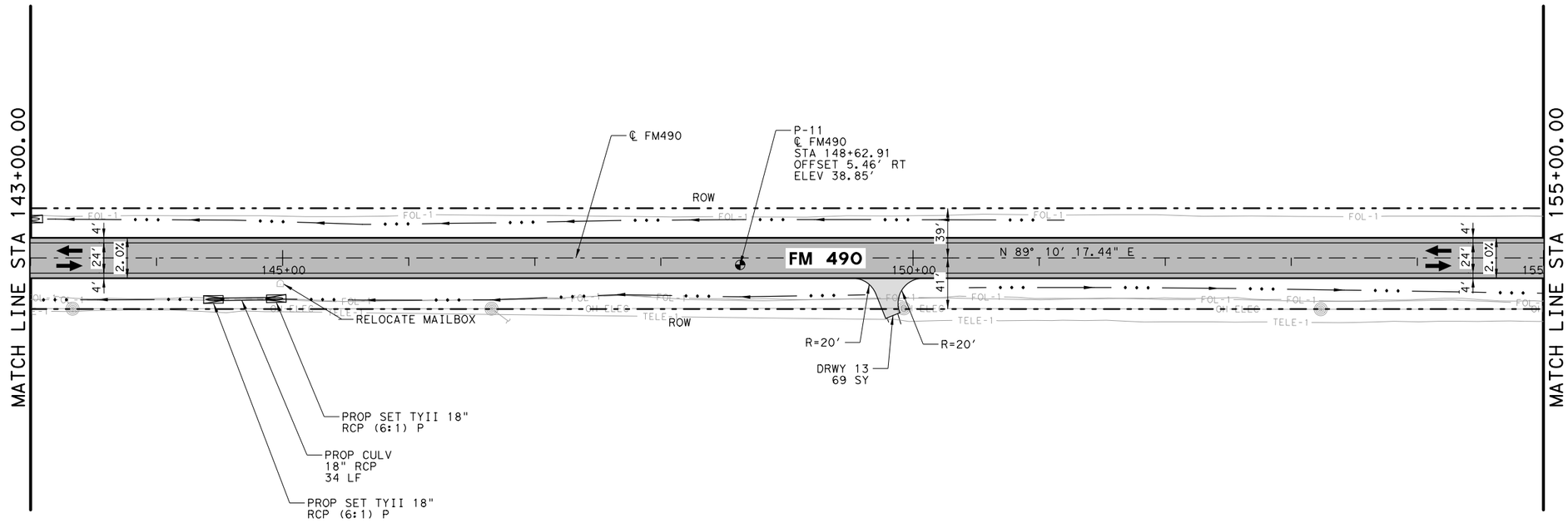
FM 490
PLAN & PROFILE
STA 131+00 TO STA 143+00

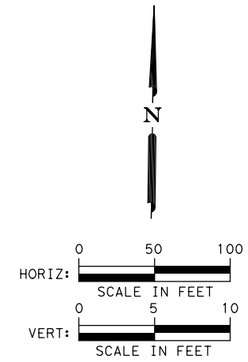
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

SHEET 10 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN	STATE	DISTRICT	COUNTY
LEH	TEXAS	PHR	WILLACY
CHECK	CONTROL	SECTION	JOB
MAW	1430	01	031, Etc
CHECK			SHEET NO.
SPC			44

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1x100
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS1.pltt
PLOT DATE: 4/25/2023
TIME: 9:39:24 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-PP-10.dgn



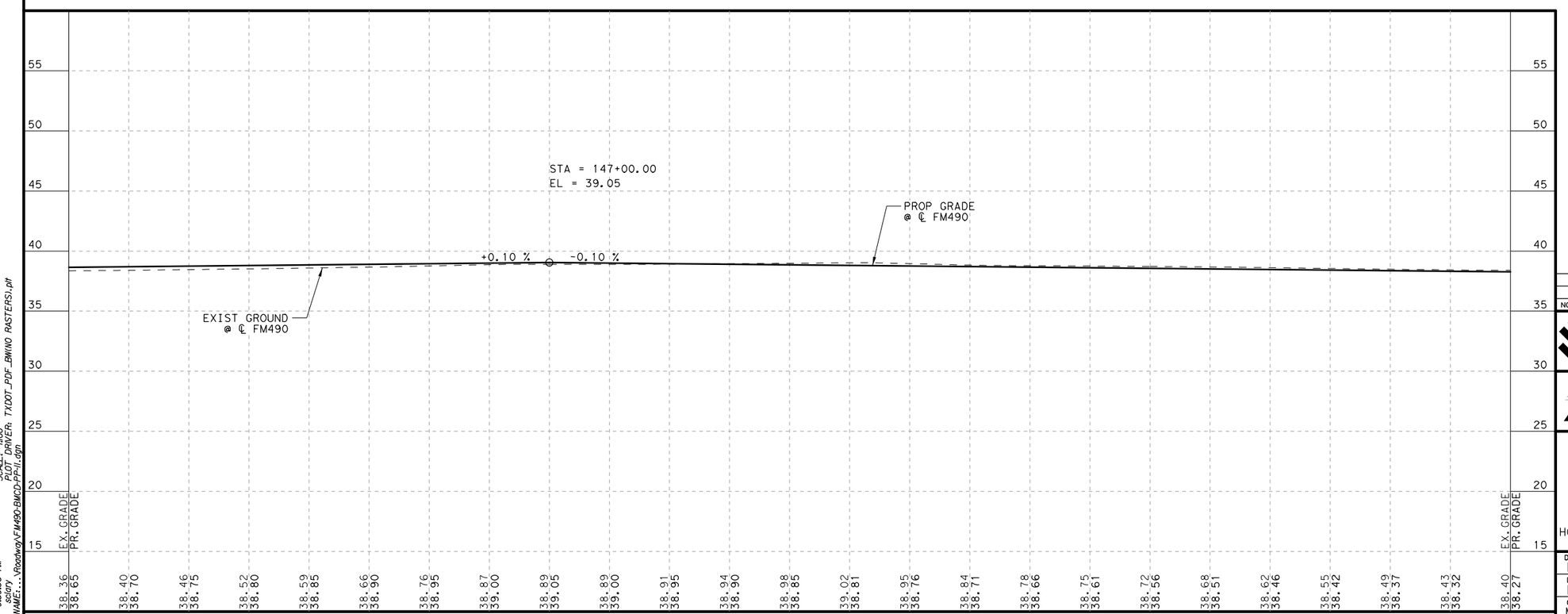


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.



STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 143+00 TO STA 155+00

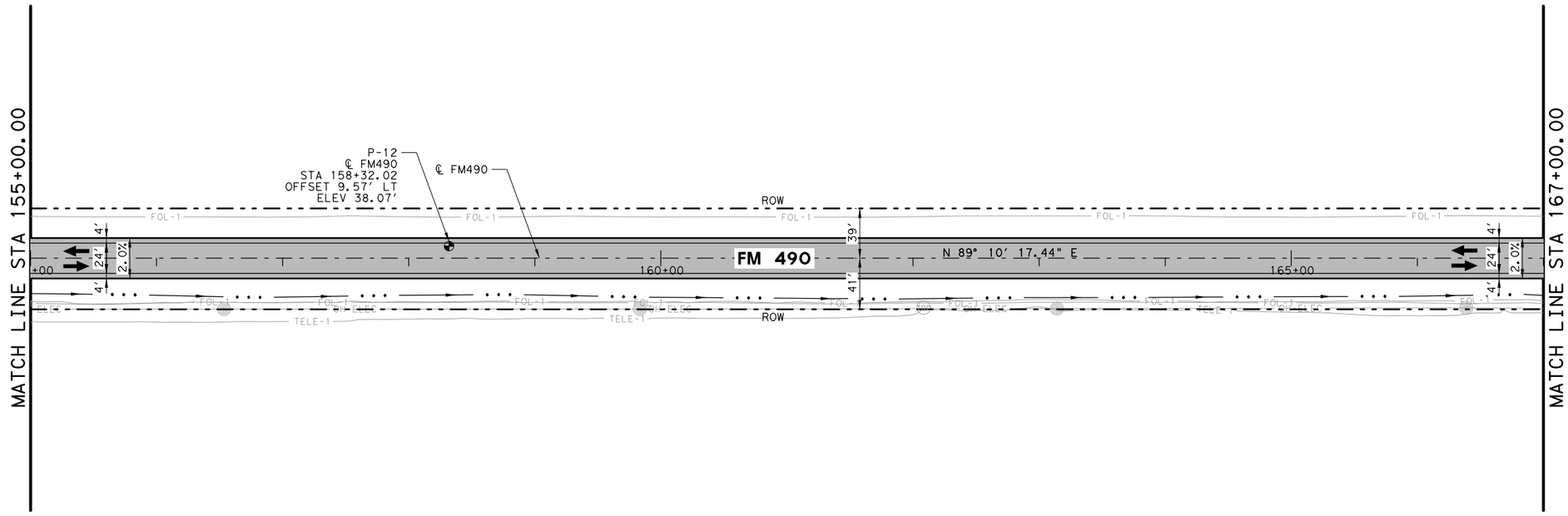
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

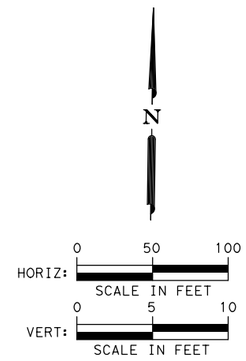
SHEET 11 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
CHECK SPC	1430	01	031, Etc

SHEET NO. 45

PENTABLE: SWA\FM490 Pentable.tbl
SCALE: 1in00
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).pltt
DATE: 4/25/2023
TIME: 9:39:33 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-PF-11.dgn



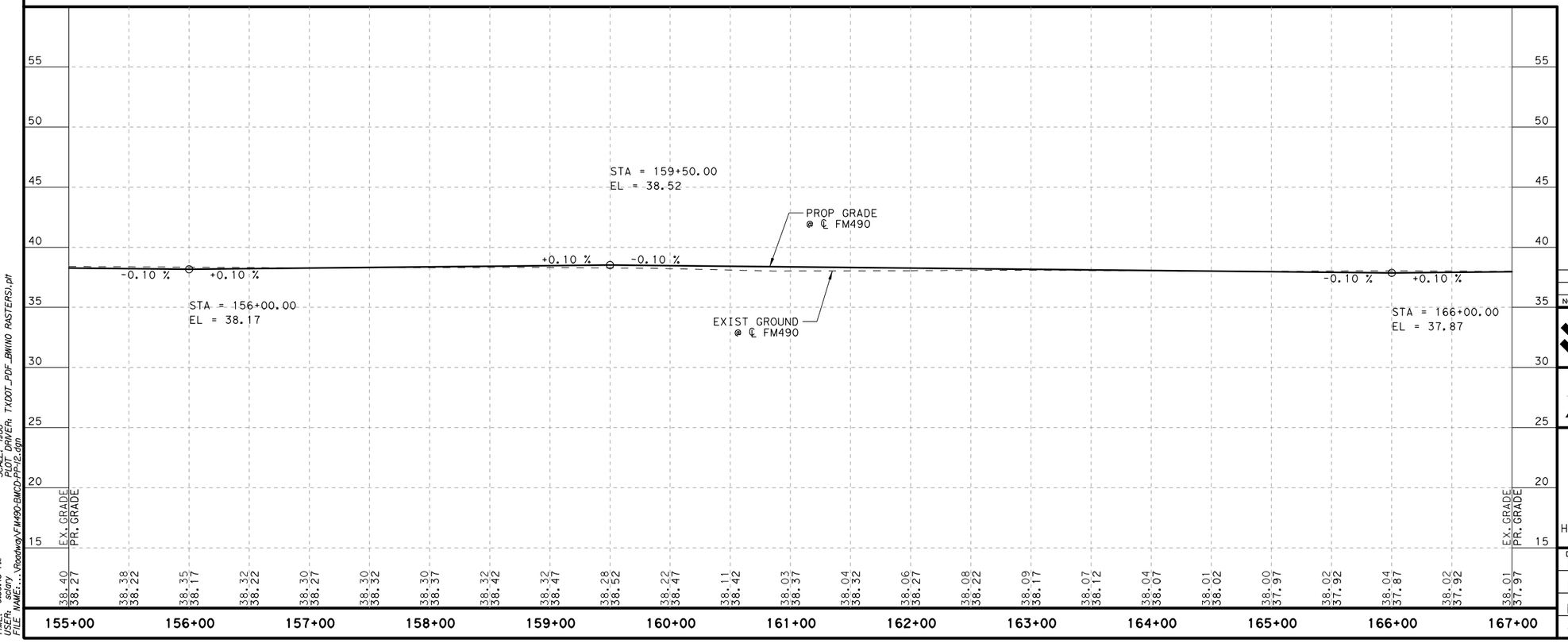


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.



STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 155+00 TO STA 167+00

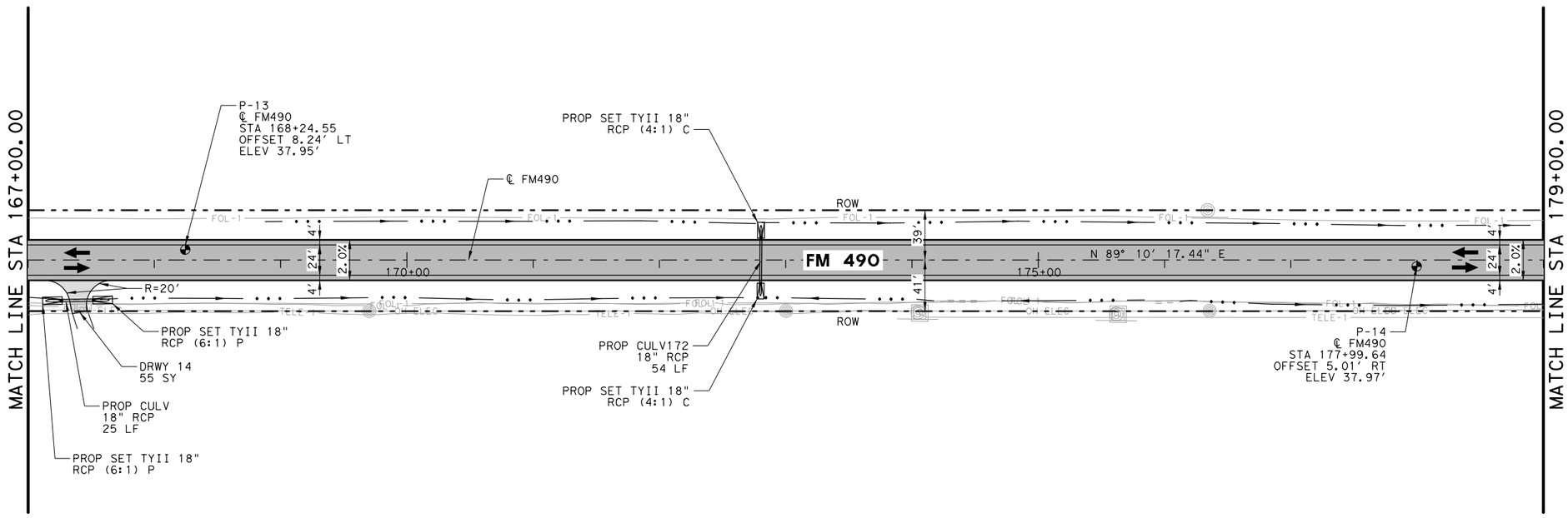
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

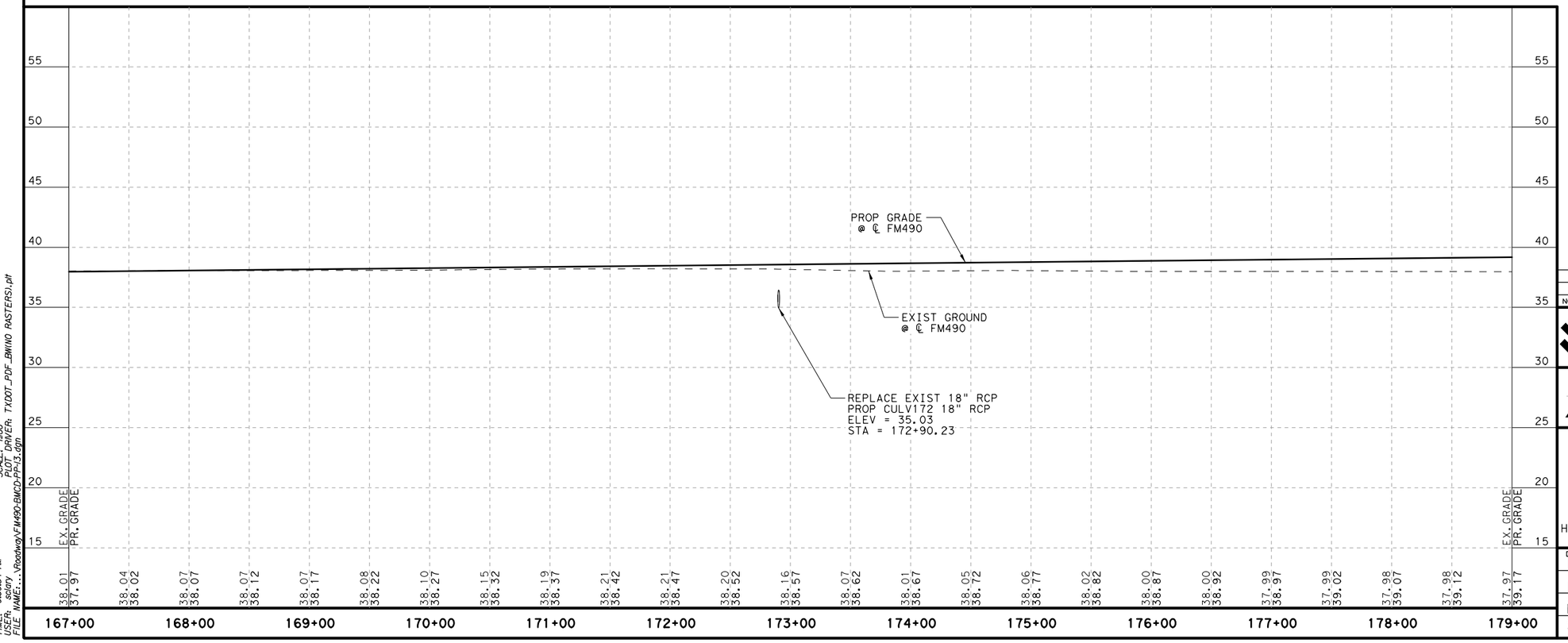
SHEET 12 OF 16

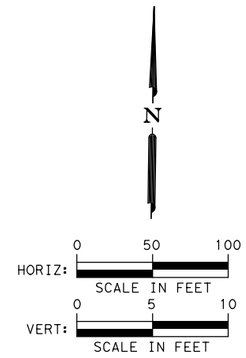
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
CHECK SPC	1430	01	031, Etc

SHEET NO. 46

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1:100
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).pltcfg
FILE NAME: ...\Roadway\FM490-BMCD-PP-12.dgn
USER: sclary
TIME: 9:39:45 AM
DATE: 4/25/2023







LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
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SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 167+00 TO STA 179+00

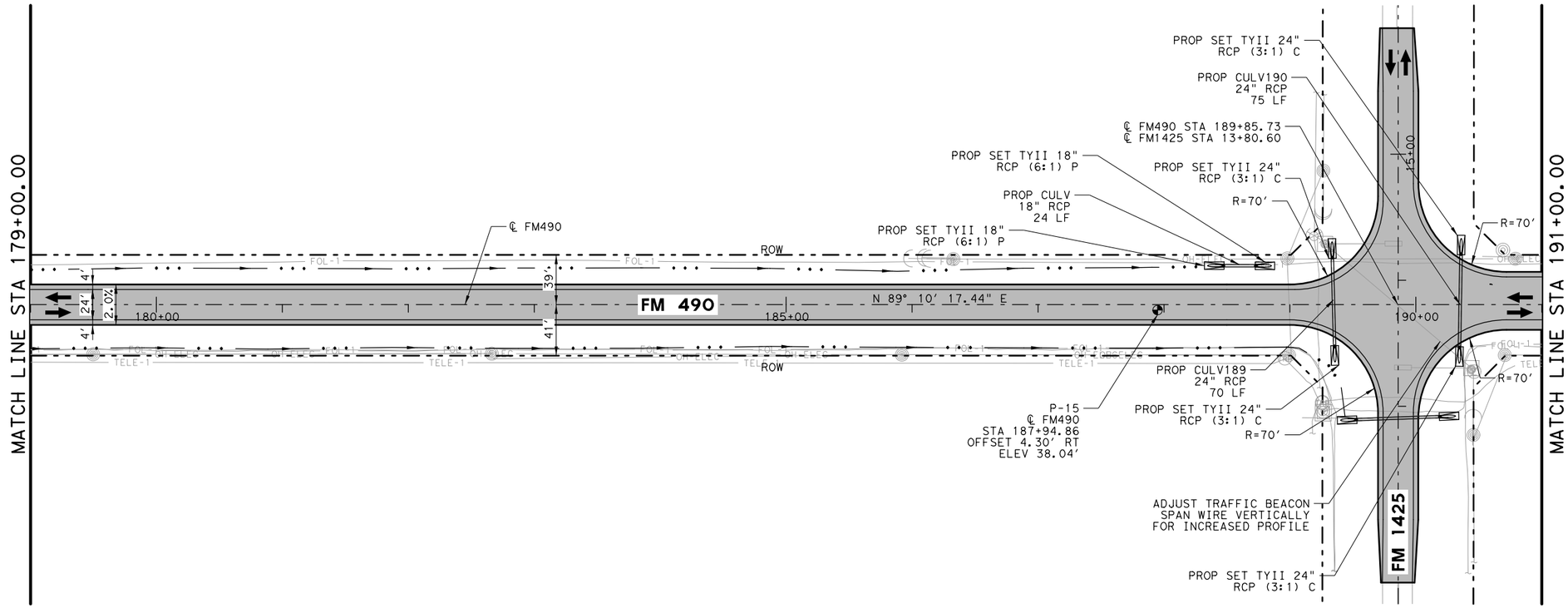
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

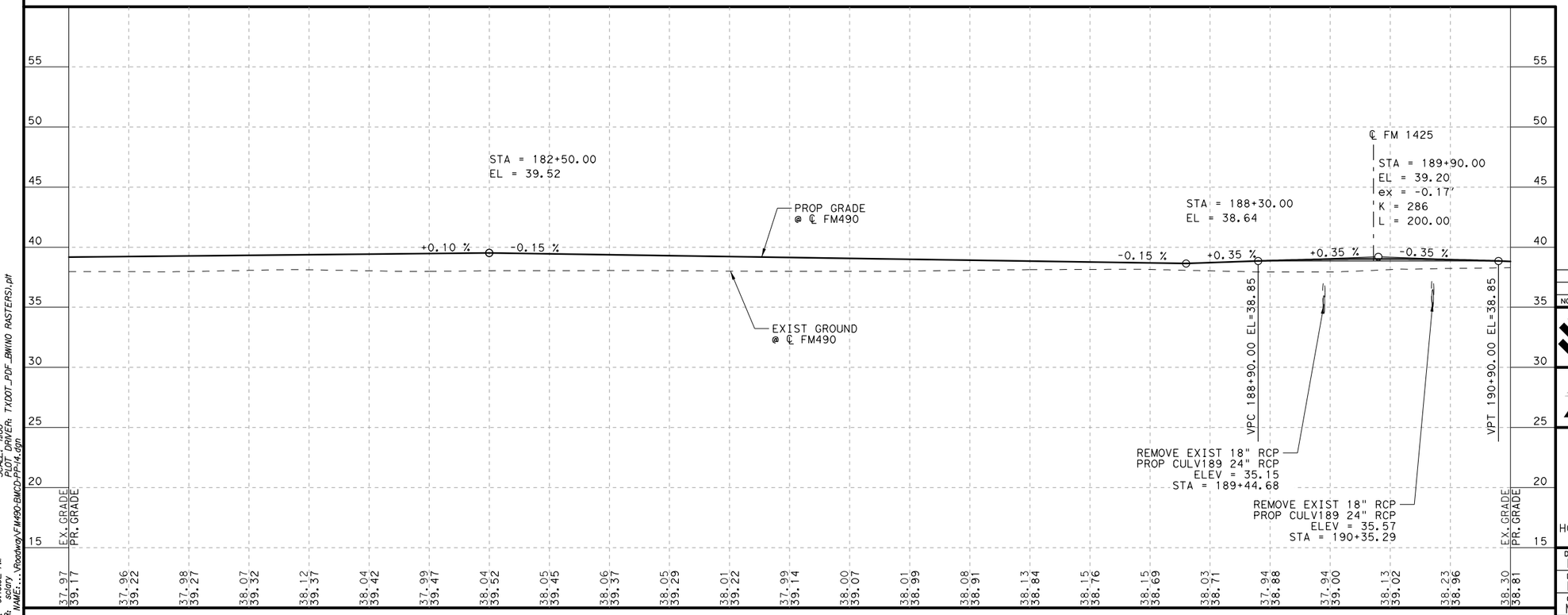
SHEET 13 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
CHECK SPC	1430	01	031, Etc

SHEET NO. 47

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1:100
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).pltt
FILE NAME: ...\Roadway\FM490-BMCD-PP-13.dgn
USER: salary
TIME: 9:39:54 AM
DATE: 4/25/2023





N

HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 5 10
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
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04/25/2023

NO.	DATE	REVISION	APPROVED

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DALLAS, TX, 75240
ENGINEERING FIRM F-845

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FM 490
PLAN & PROFILE
STA 179+00 TO STA 191+00

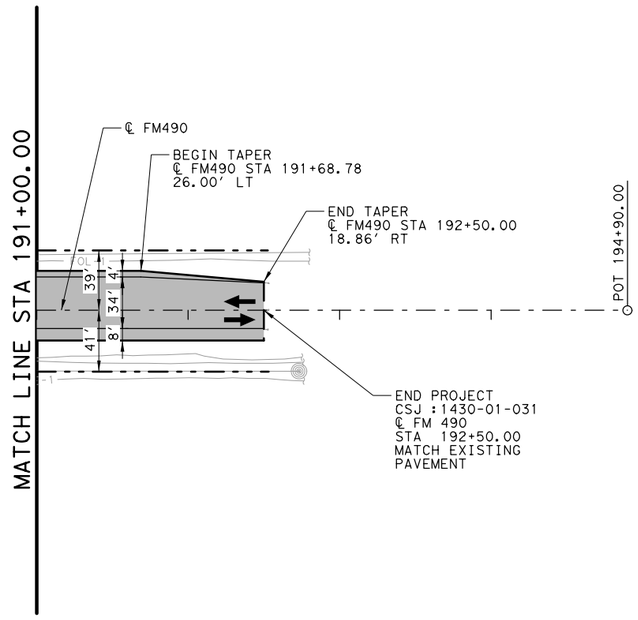
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

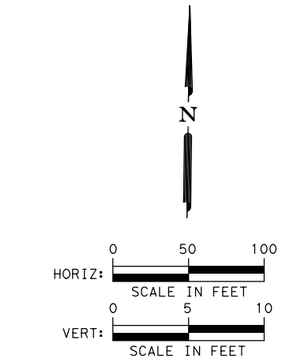
SHEET 14 OF 16

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 48

PENTABLE: SWA\FM490 Pentable.tbl
SCALE: 1x100
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).pltt
4/25/2023
9:46:02 AM
sclary
USER:
FILE: NAME:...\Roadway\FM490-BMCD-PP-14.dgn
DATE:
TIME:



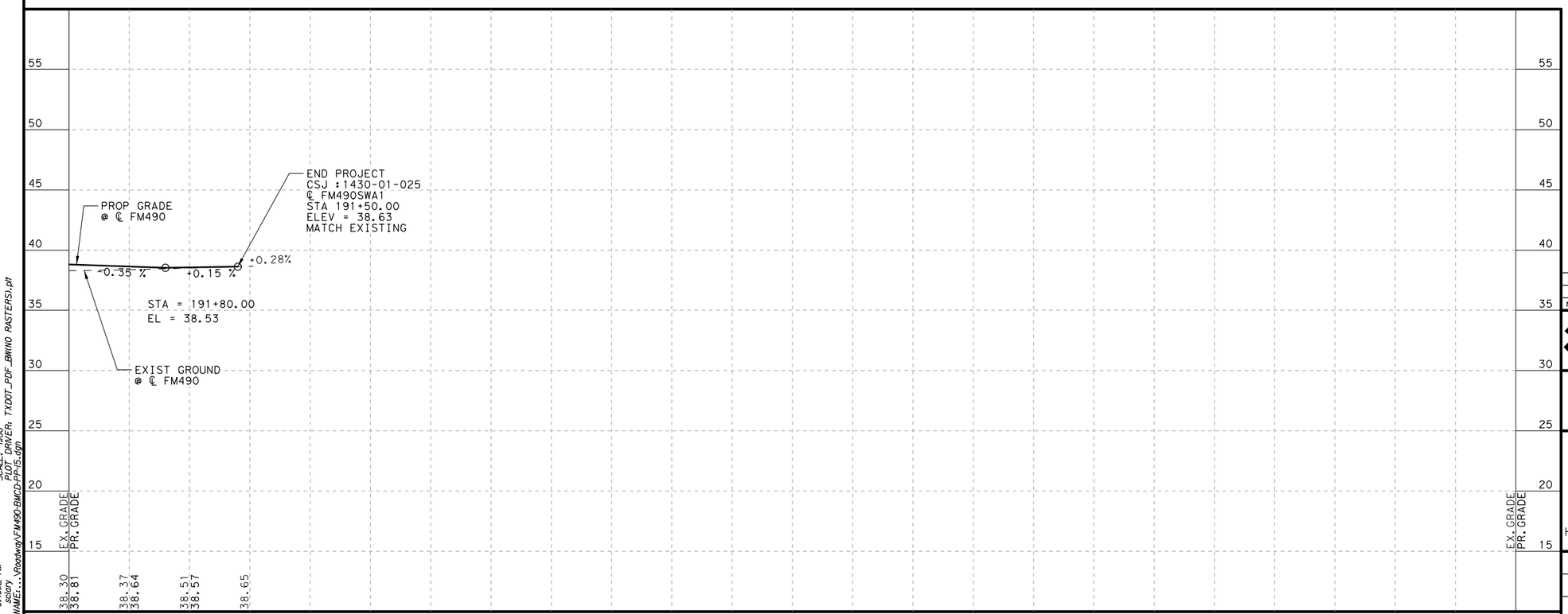


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PLAN & PROFILE
STA 191+00 TO END

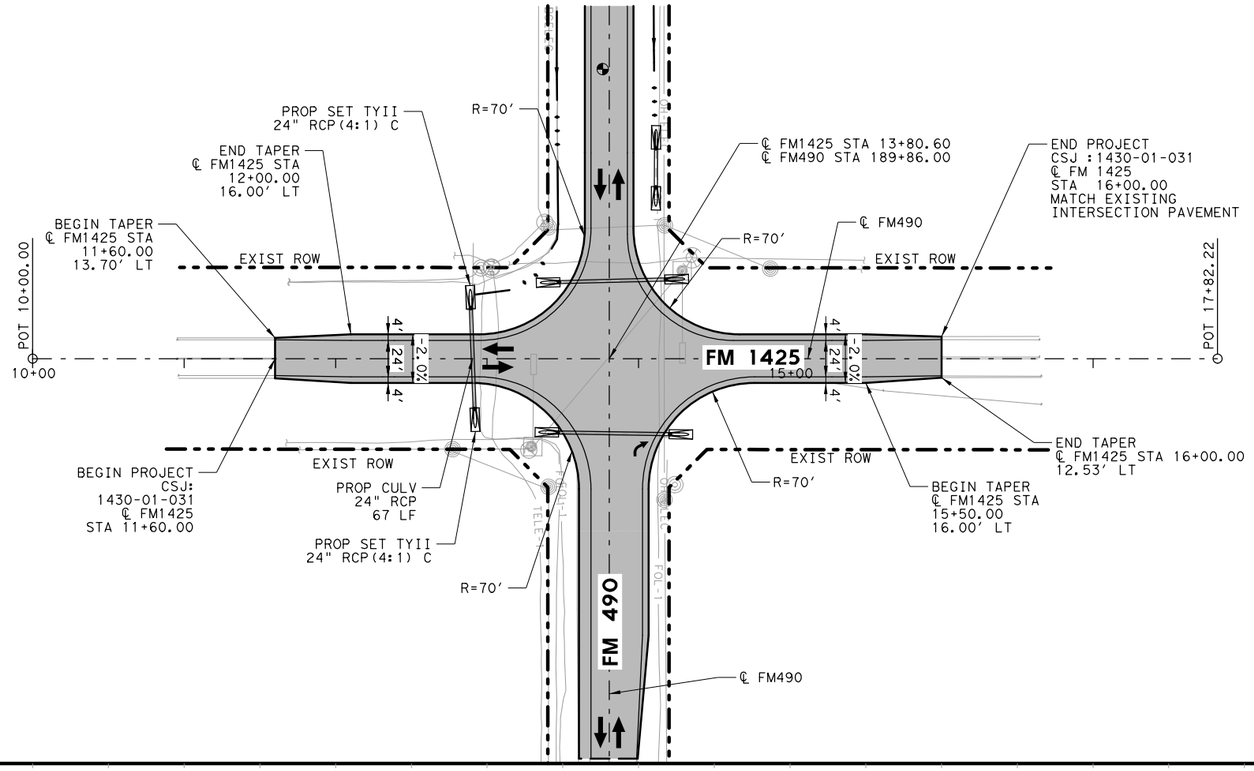
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

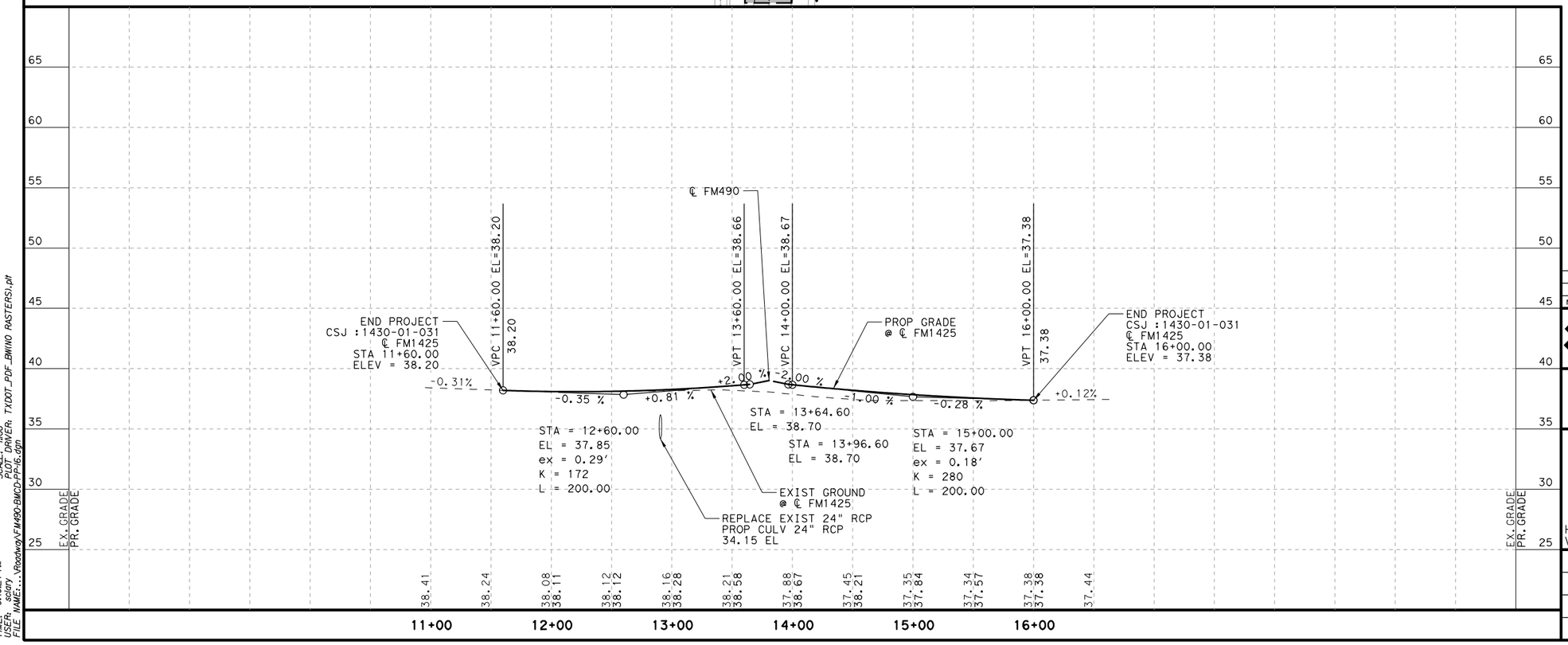
SHEET 15 OF 16

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 49

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1d00
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS1.pltt
FILE NAME: ...\Roadway\FM490-BMCD-PP-15.dgn
USER: sclary
TIME: 9:45:12 AM
DATE: 4/25/2023





N

HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 5 10
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. *SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
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04/25/2023

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FM 1425
PLAN AND PROFILE
BEGIN TO END

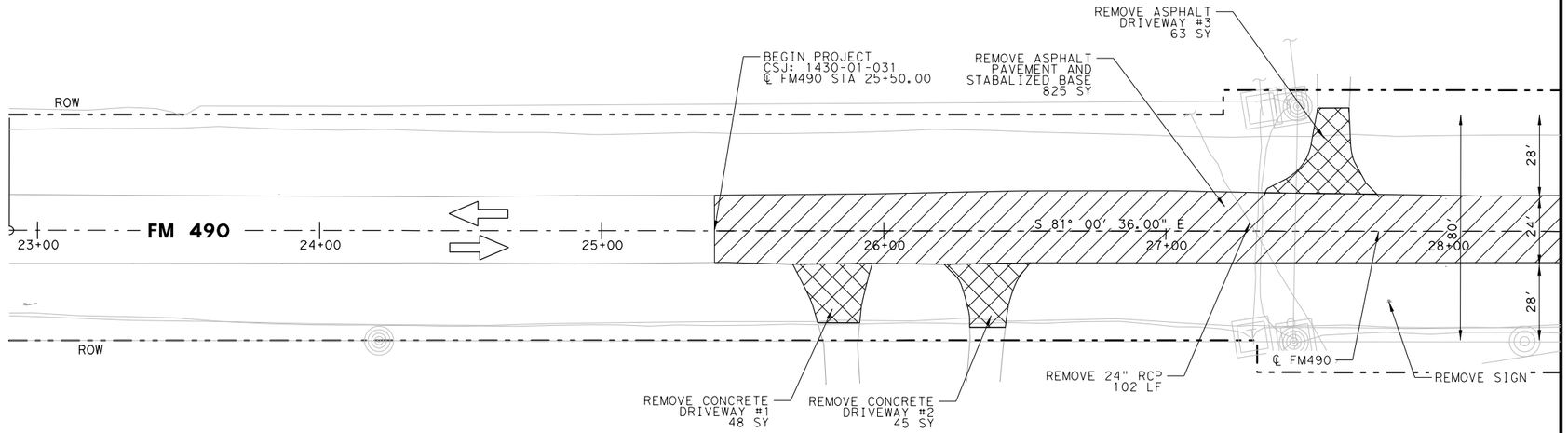
HORIZONTAL = 1"=100'
VERTICAL = 1"=10'

16 OF 16

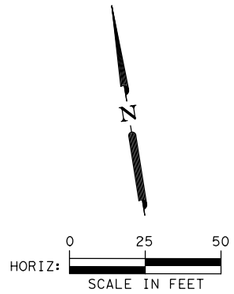
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 50

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1d00
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS1.pltt
DATE: 4/25/2023
TIME: 9:40:24 AM
USER: salary
FILE NAME: ...\Roadway\FM490-BMCD-PP-16.dgn

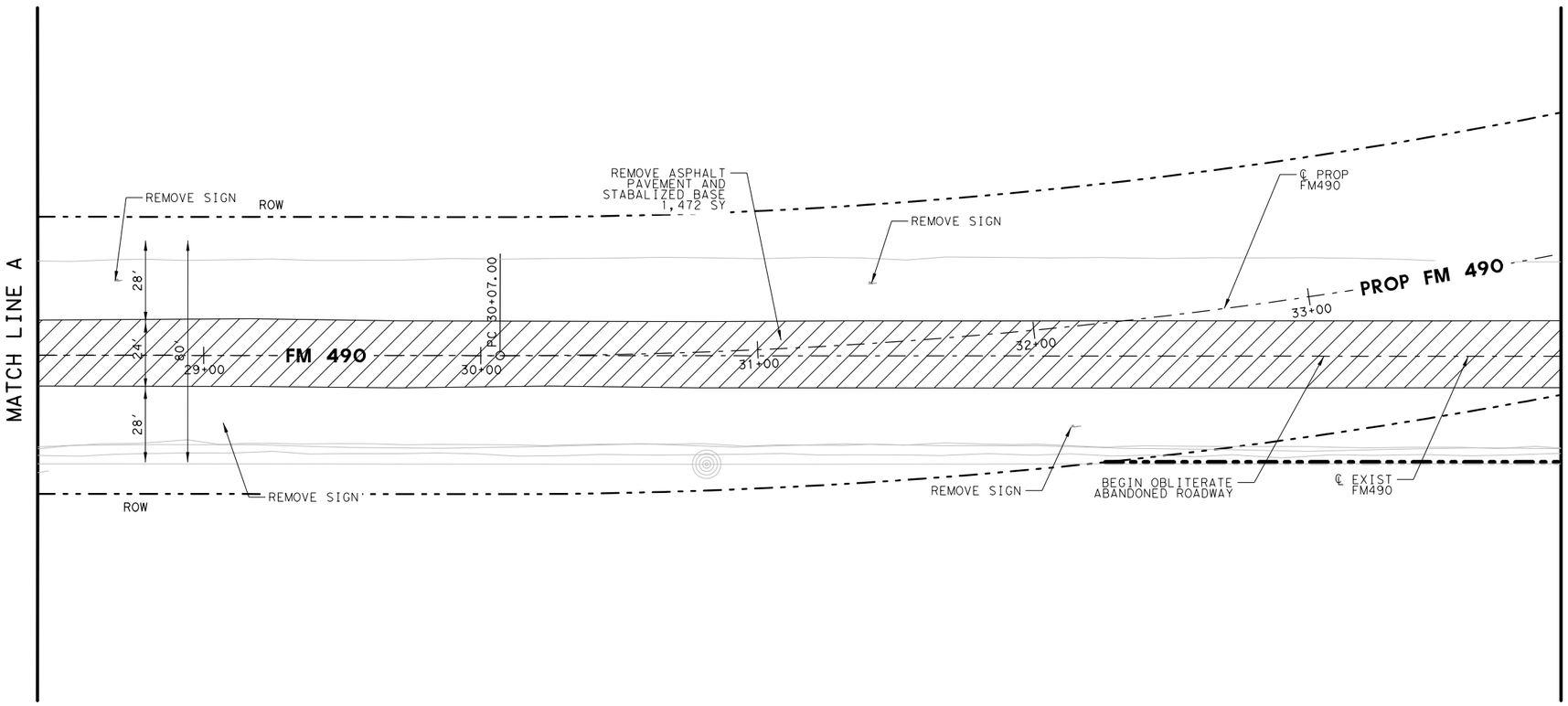


MATCH LINE A



LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



MATCH LINE B

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

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13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN

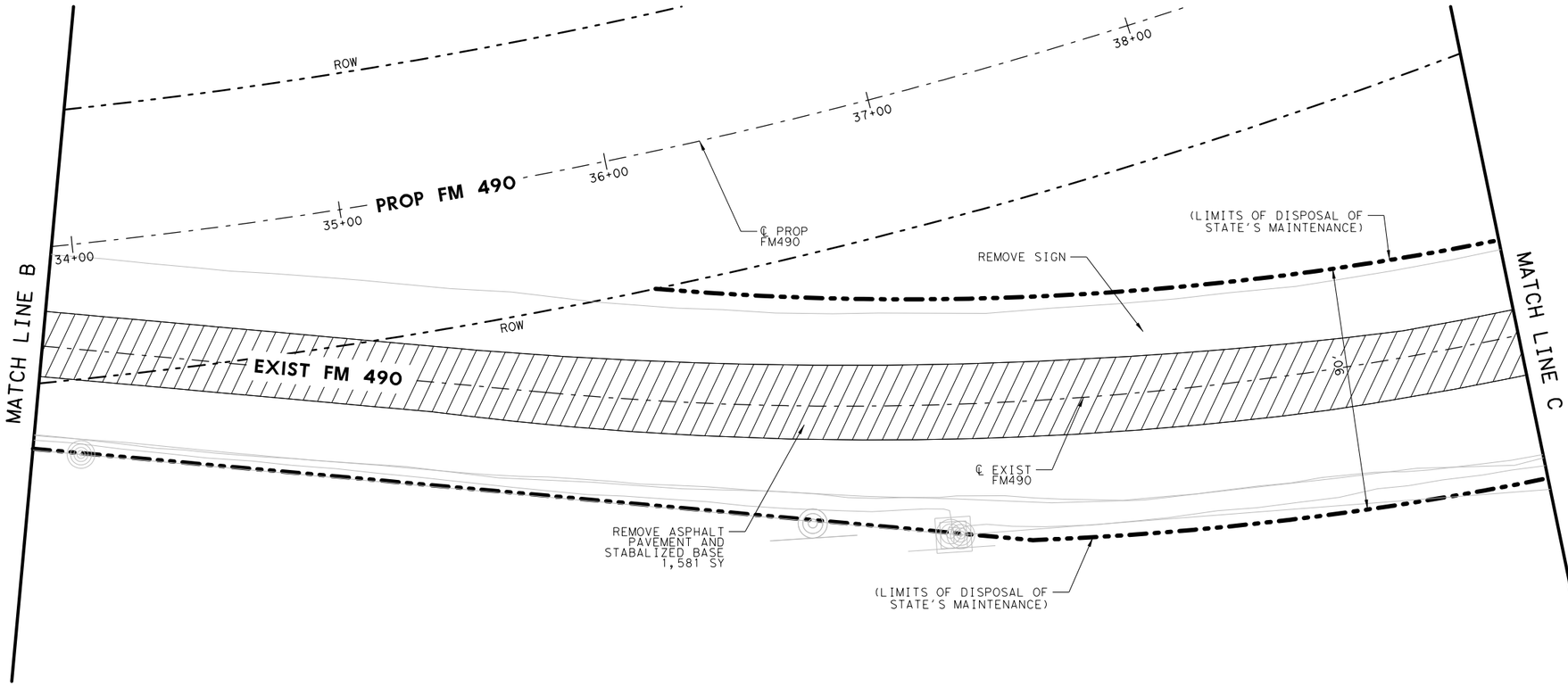
SCALE = 1"=50'

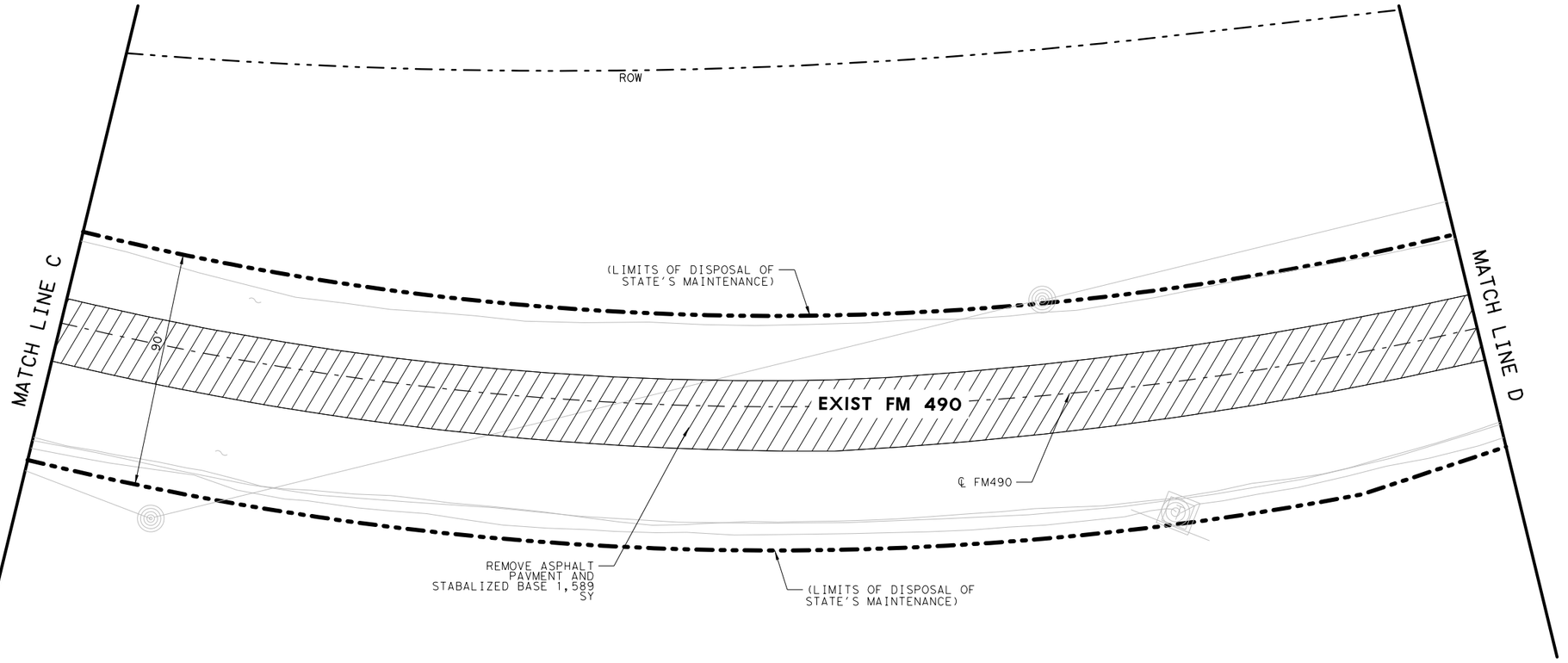
SHEET 1 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 51

DATE: 4/25/2023
TIME: 9:40:34 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-RW-01.dgn
PENTABLE: SWAFM490 Pentable.tbl
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BMINO RASTER3).pit





N

0 25 50
HORIZ: SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

STATE OF TEXAS
SEAN CLARY
122134
LICENSED PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

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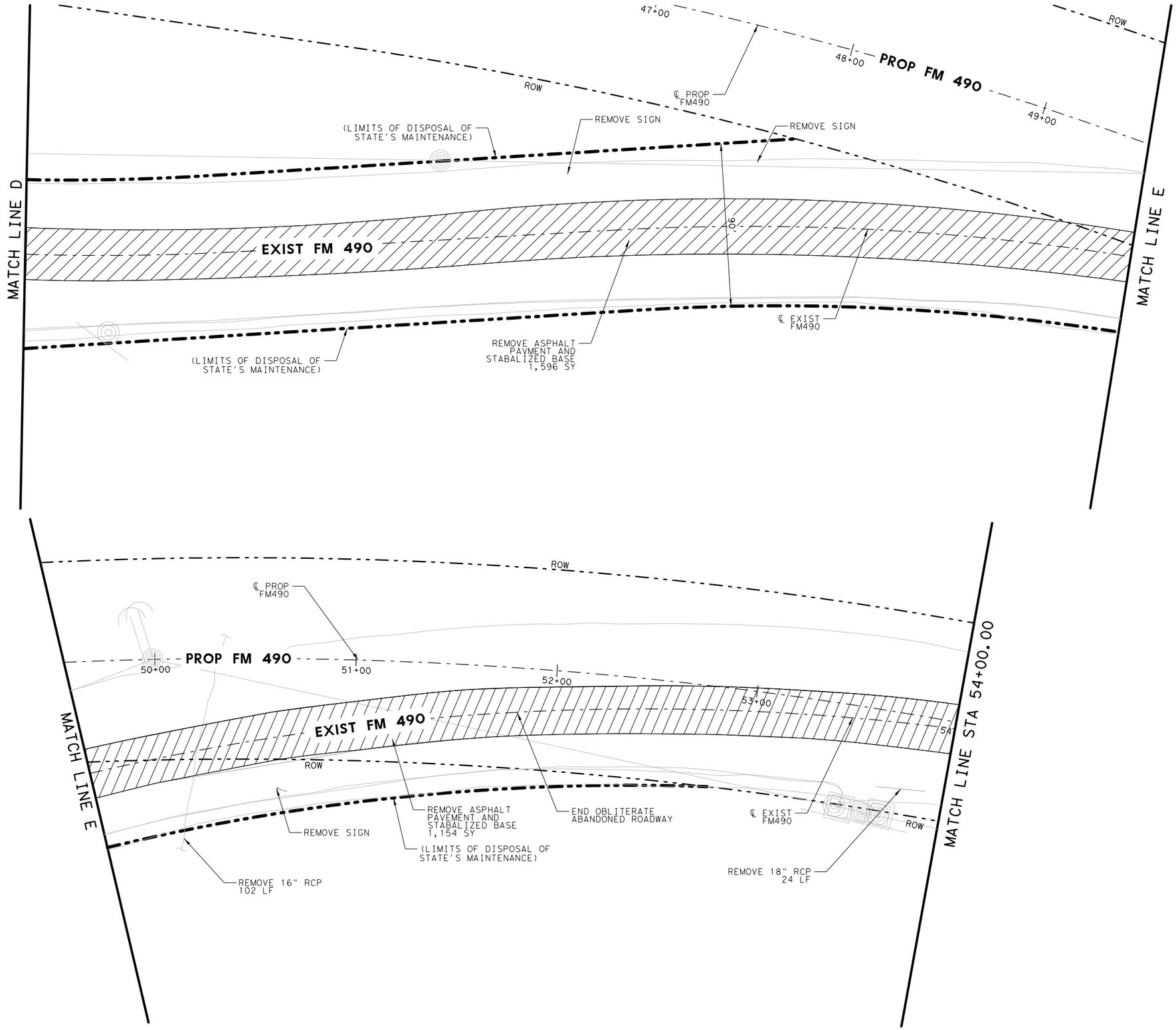
FM 490 REMOVAL PLAN

SCALE = 1"=50' SHEET 2 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 52

DATE: 4/25/2023
TIME: 9:40:45 AM
USER: sclary
FILE NAME:...\Roadway\FM490-BMCD-RMV-02.dgn
PEN TABLE: SWA FM490 Pentable.tbl
SCALE: H50_0788
PLOT DRIVER: TXDOT_PDF_BW.INO RASTERS).plt



PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1=50
PLOT DRIVER: TXDOT_PDF_BMtNO RASTERS).pltPLOT DRIVER: TXDOT_PDF_BMtNO RASTERS).plt
FILE NAME: ...\Roadway\FM490-BMCD-RW-03.dgn
DATE: 4/25/2023
TIME: 9:40:55 AM
USER: sclary

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

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ENGINEERING FIRM F-845

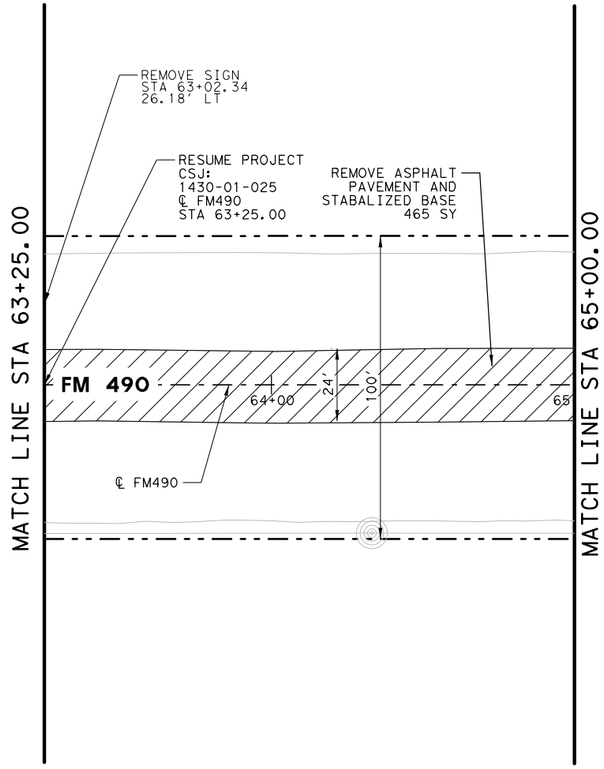
Texas Department of Transportation

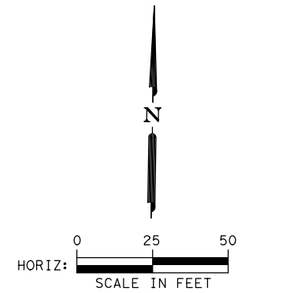
FM 490
REMOVAL PLAN

SCALE = 1"=50'
SHEET 3 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

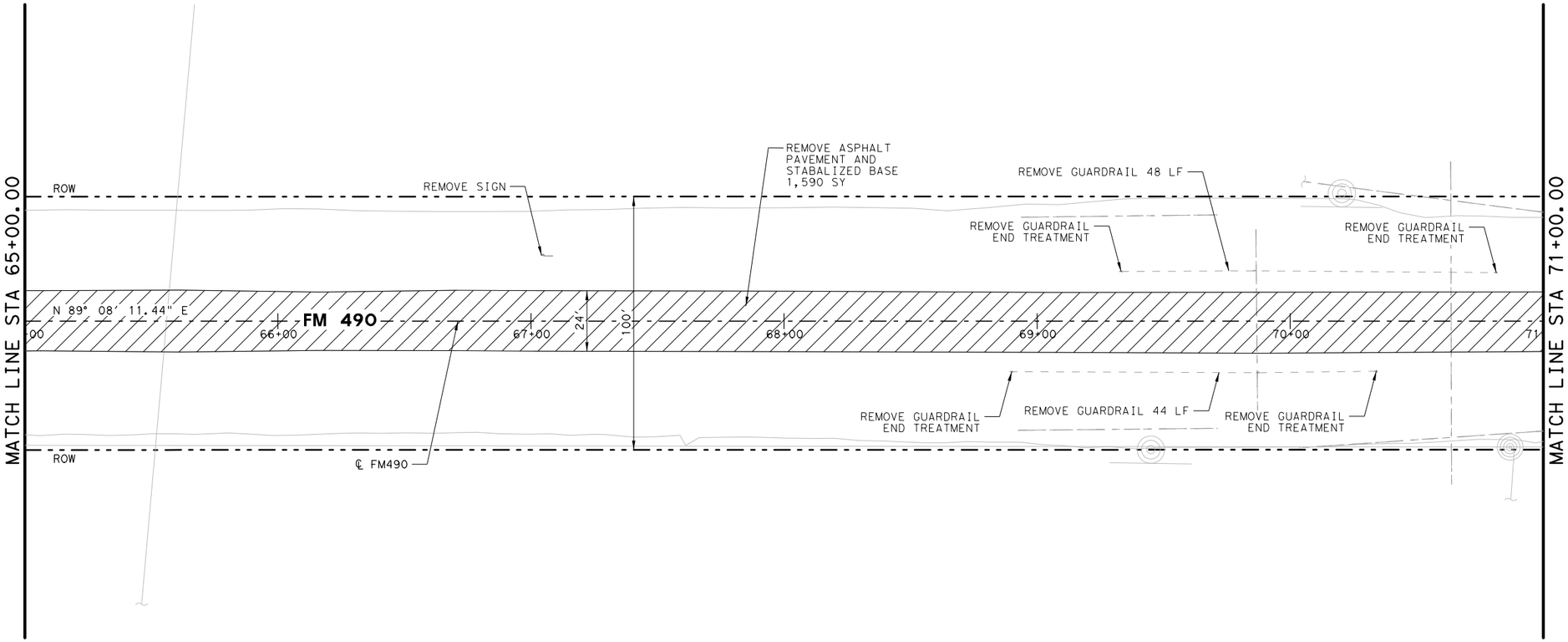
SHEET NO. 53





LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
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DALLAS, TX, 75240
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Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 63+25 TO STA 71+00

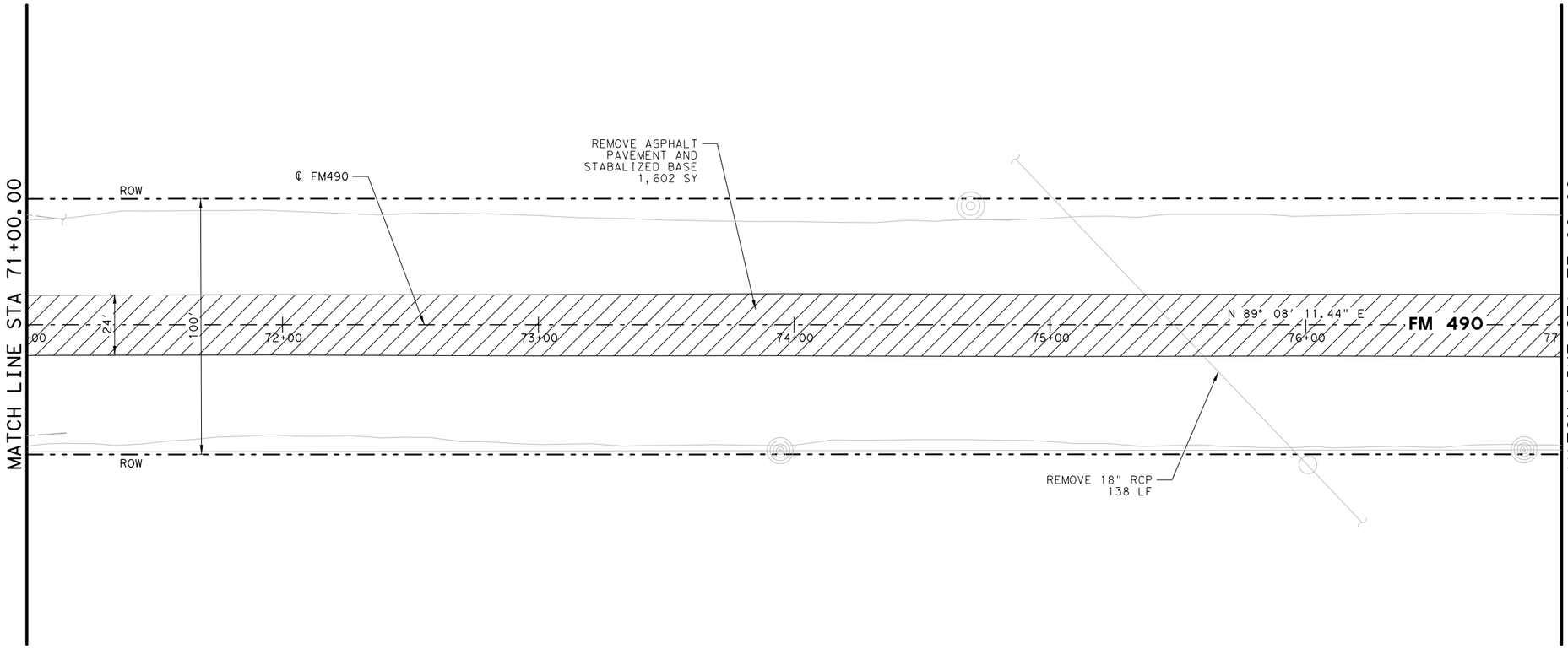
SCALE = 1"=50'

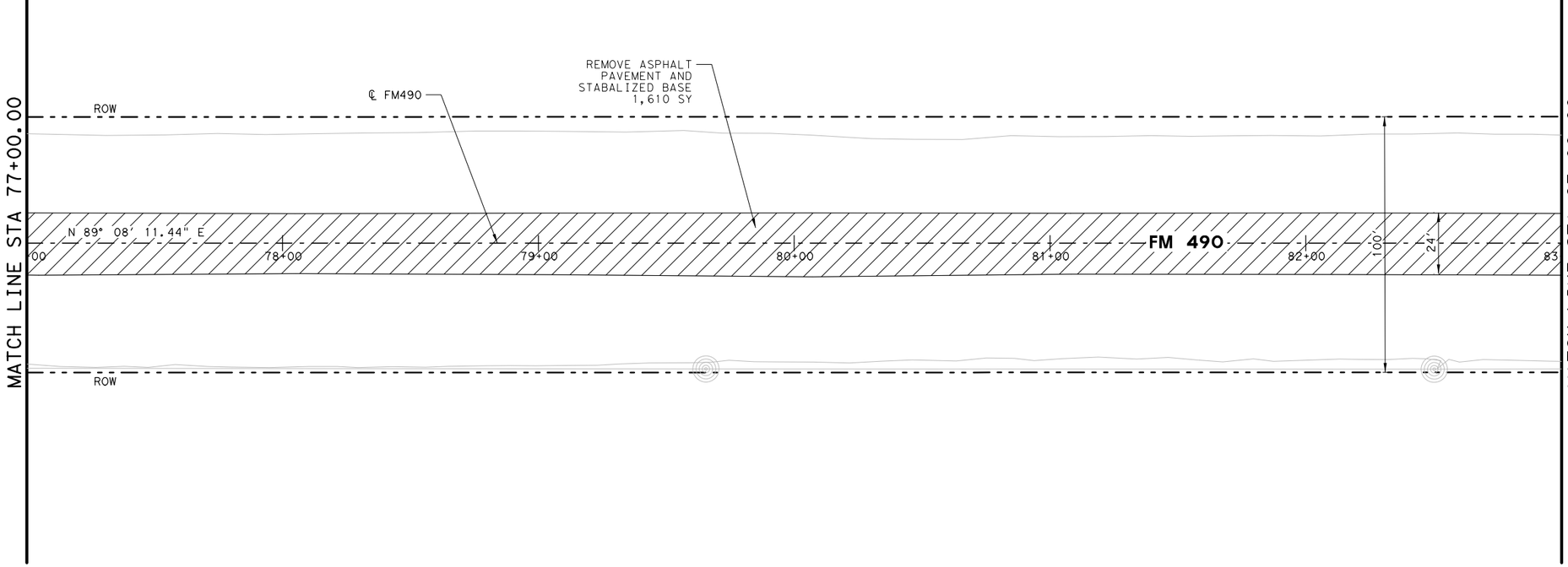
SHEET 4 OF 15

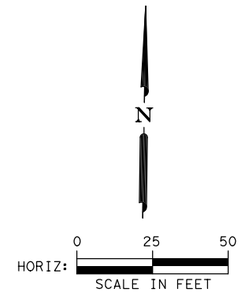
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 54

PENTABLE: SWAFM490 Pentable.tbl
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BMINO RASTER3).pltPLOT DRIVER: TXDOT_PDF_BMINO RASTER3).plt
DATE: 4/25/2023
TIME: 9:46:03 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-RMV-04.dgn

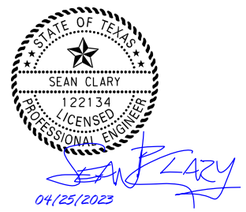






LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
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ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 71+00 TO STA 83+00

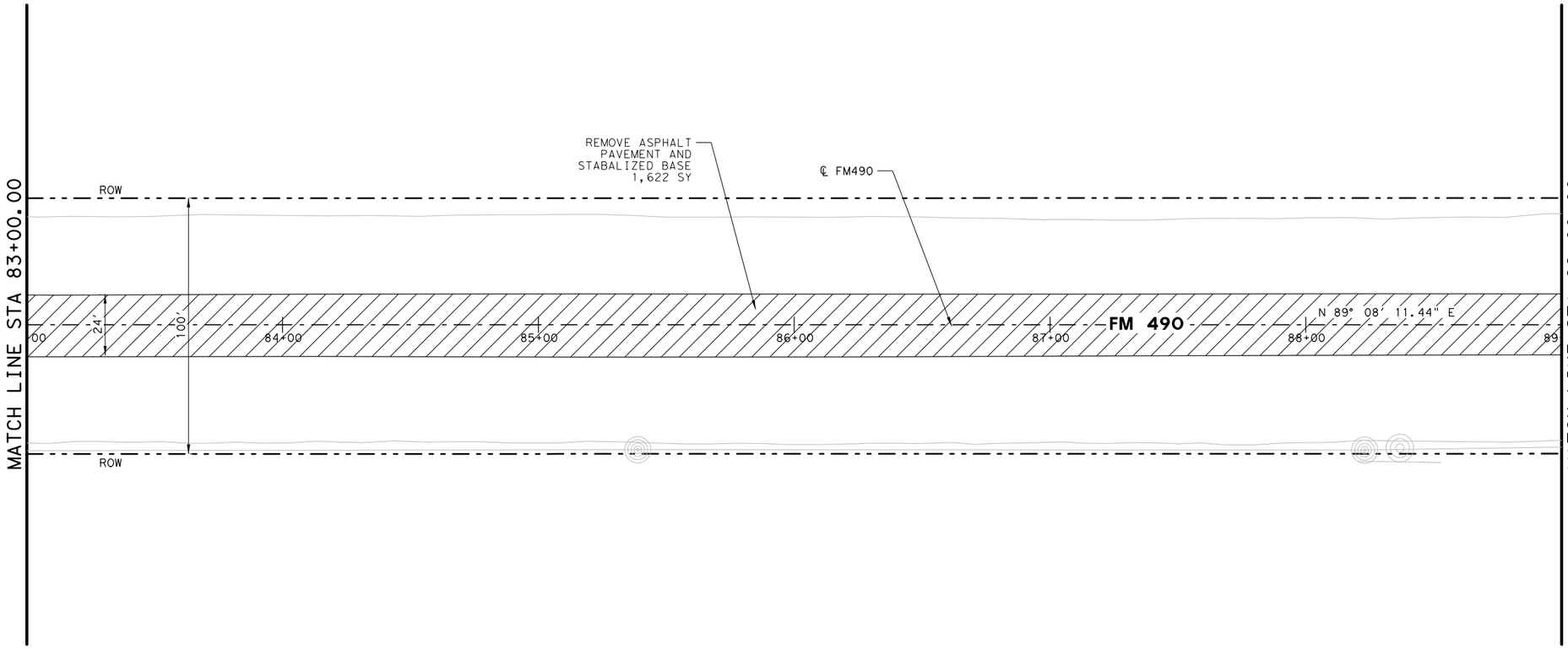
SCALE = 1"=50'

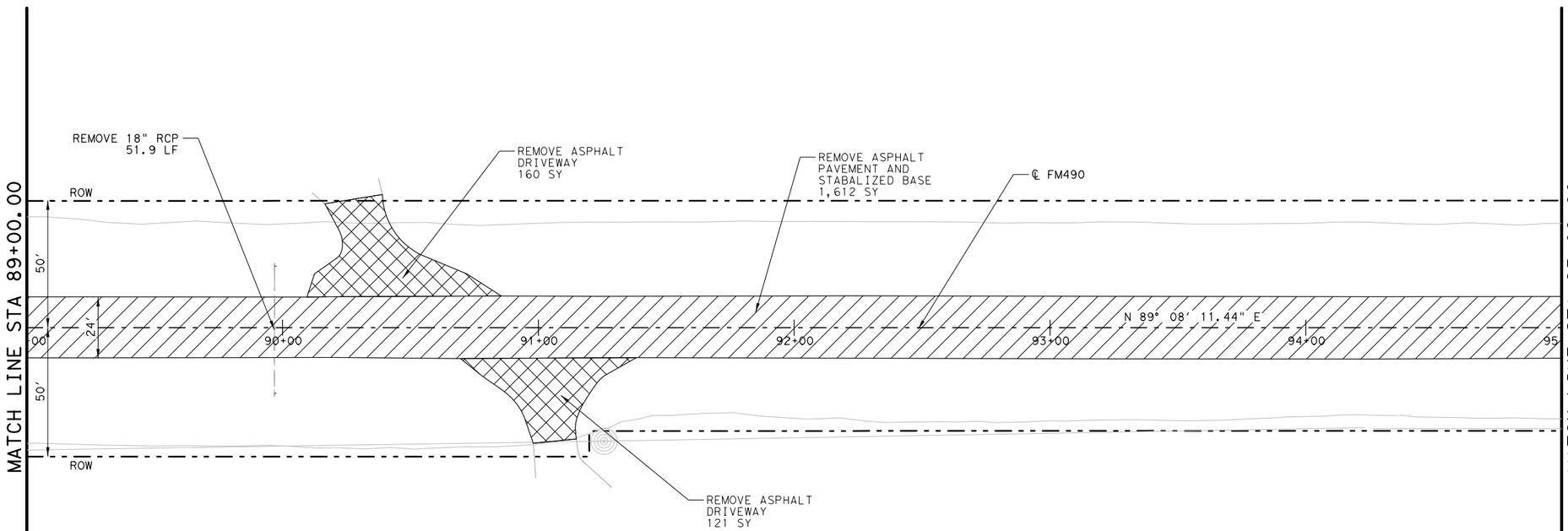
SHEET 5 OF 15

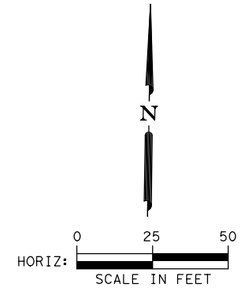
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 55

DATE: 4/25/2023
TIME: 9:41:11 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-RMV-05.dgn
PENTABLE: SWAFM490 Pentable.tbl
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BMINO RASTER3).plt

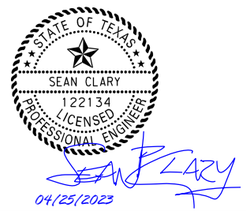






LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 83+00 TO STA 95+00

SCALE = 1"=50'

SHEET 6 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 56

DATE: 4/25/2023
TIME: 9:46:21 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-RM-06.dgn
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SCALE: 1:50
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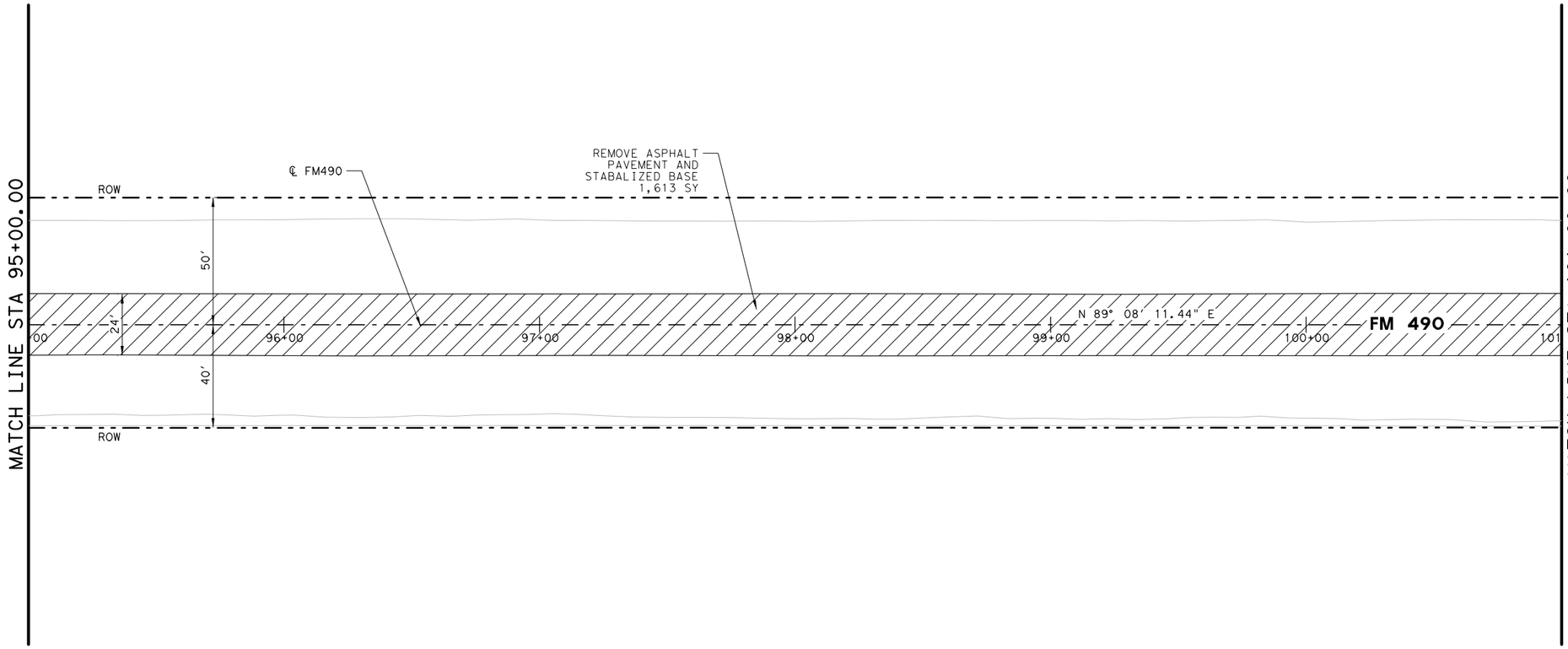
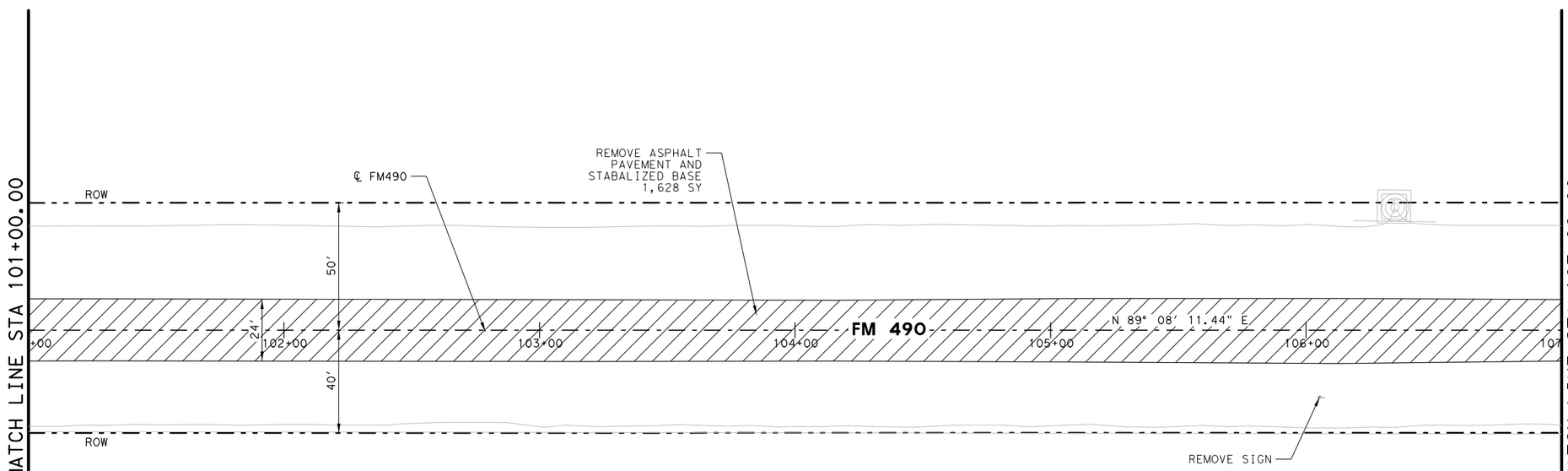
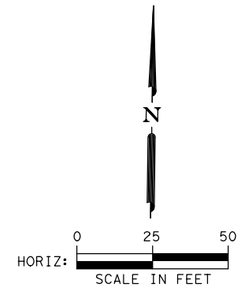
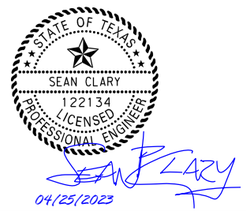






LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 95+00 TO STA 107+00

SCALE = 1"=50'

SHEET 7 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 57

DATE: 4/25/2023
TIME: 9:41:30 AM
USER: sclary
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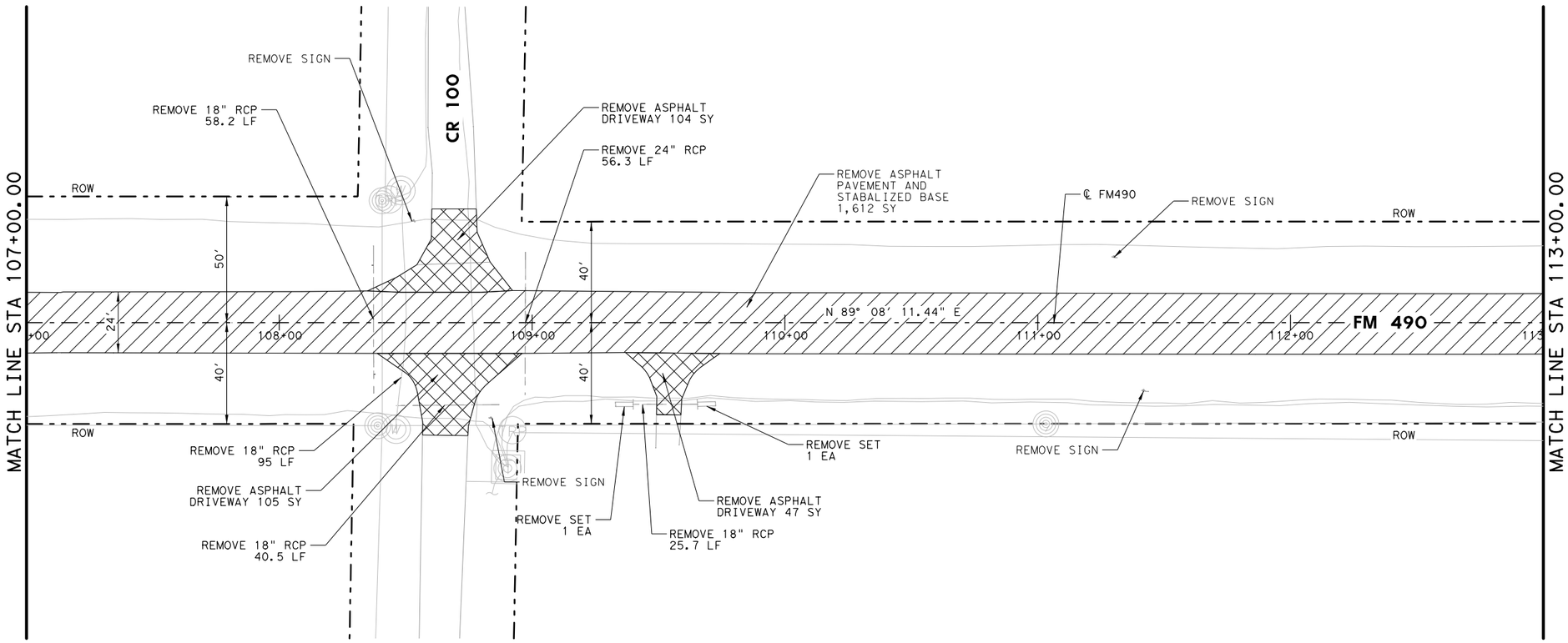

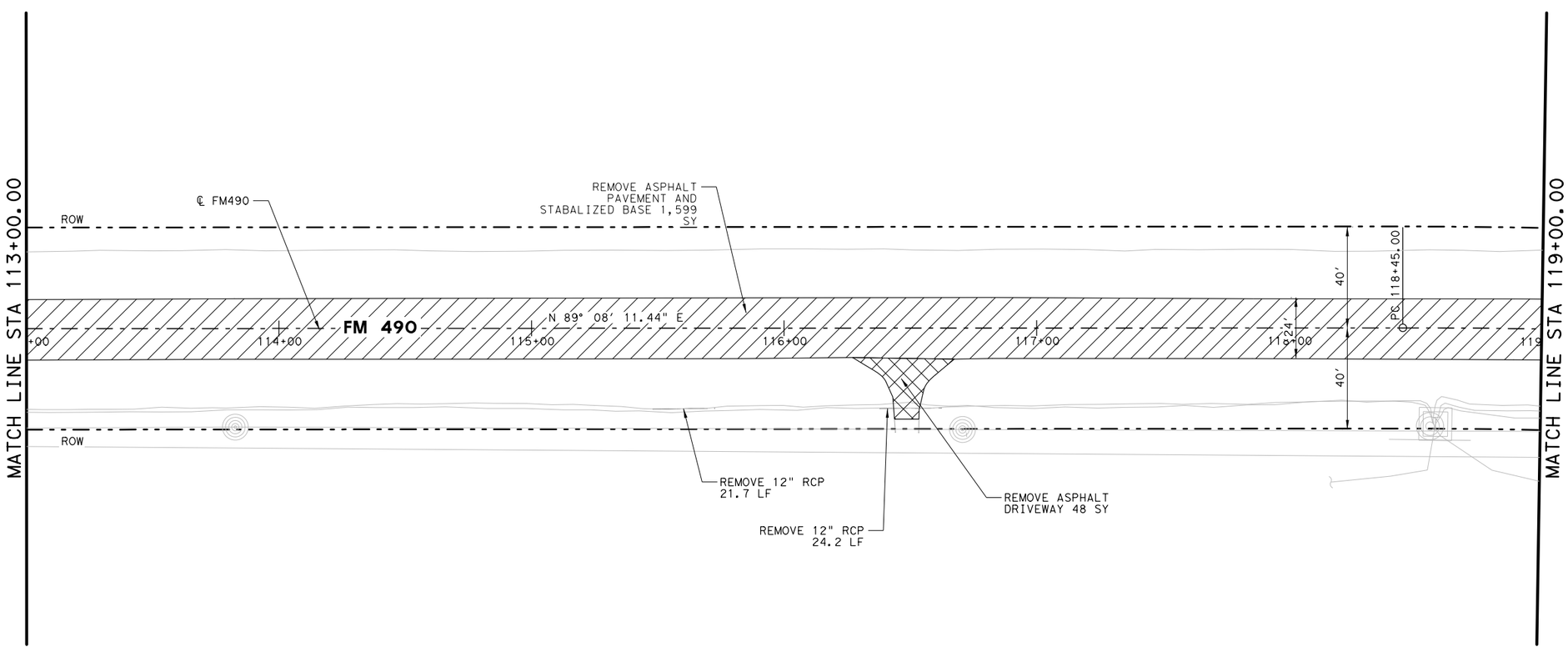

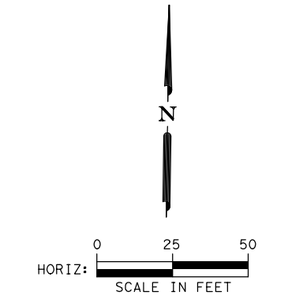

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 107+00 TO STA 119+00

SCALE = 1"=50'

SHEET 8 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 58

DATE: 4/25/2023
TIME: 9:41:40 AM
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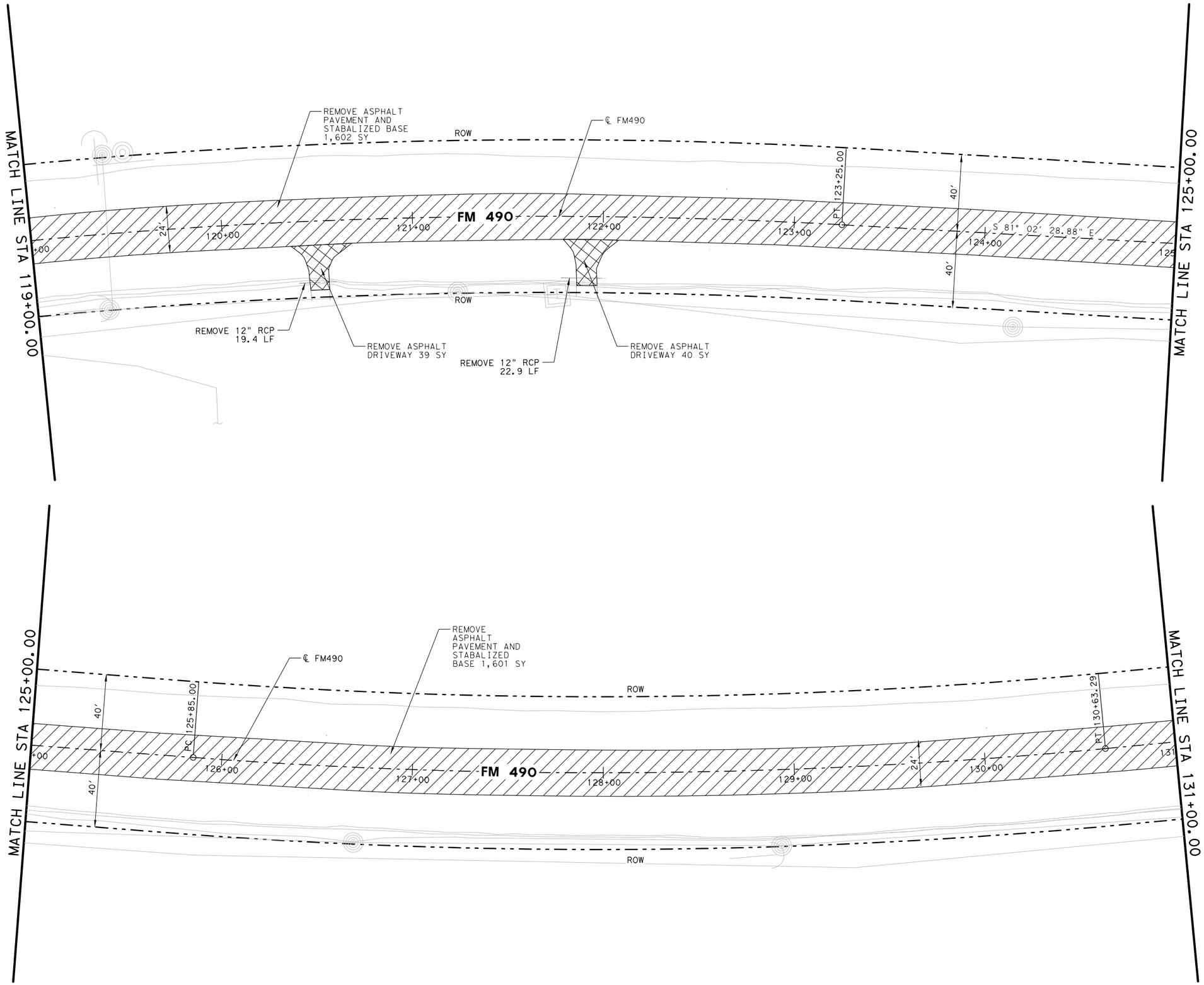

PENTABLE: SWA FM490 Pentable.tbl
SCALE: 1:50
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FILE NAME: ...\Roadway\FM490-BMCD-RM-09.dgn
DATE: 4/25/2023
TIME: 9:41:49 AM
USER: sclary

SEAN CLARY
122134
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

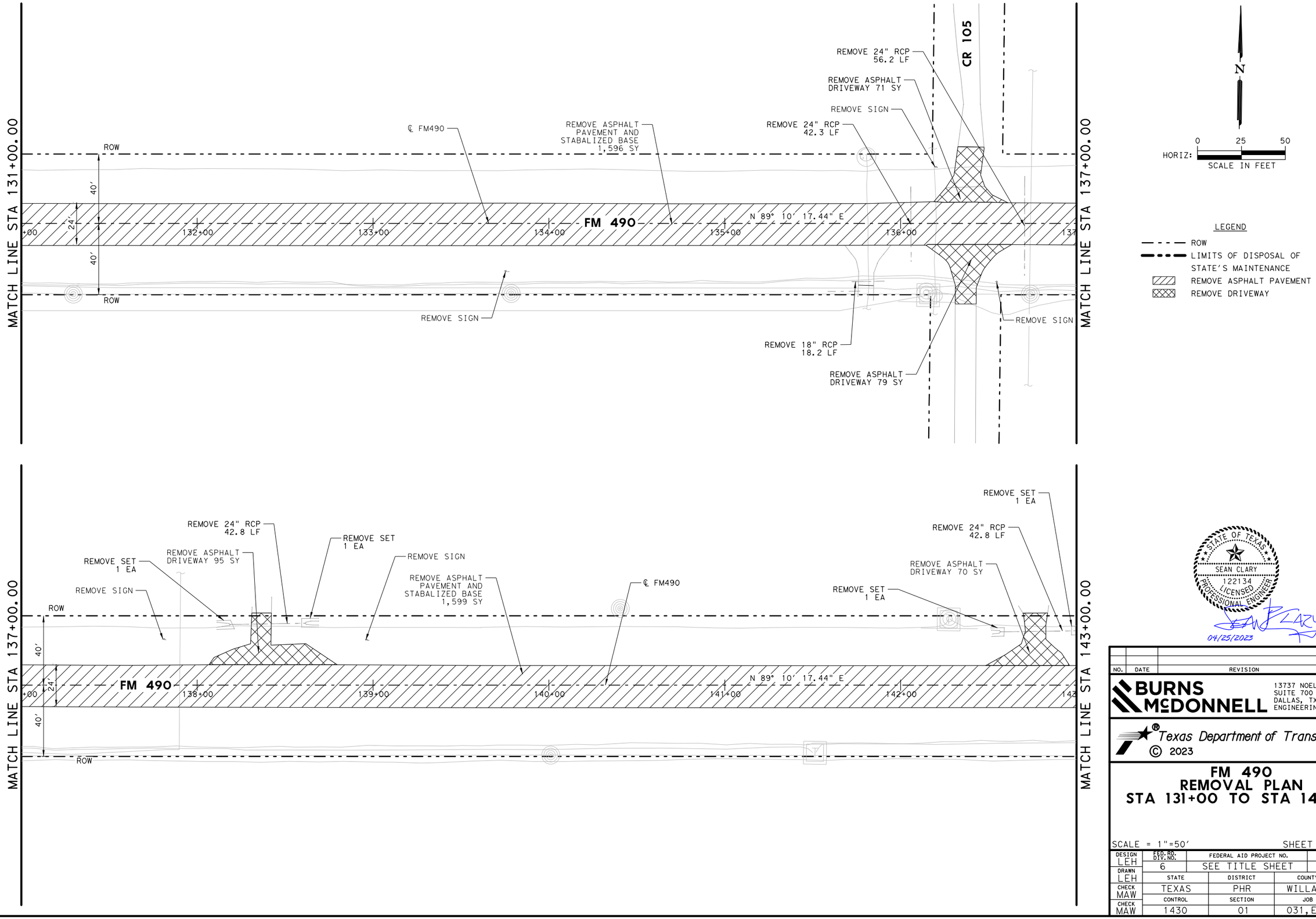
FM 490
REMOVAL PLAN
STA 119+00 TO TA 131+00

SCALE = 1"=50'

SHEET 9 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 59



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SCALE: 1=50
PLOT DRIVER: TXDOT_PDF_BMINO RASTERS).pltPENTABLE: SWA FM490 Pentable.tbl
SCALE: 1=50
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DATE: 4/25/2023
TIME: 9:41:56 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-RMV-10.dgn

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

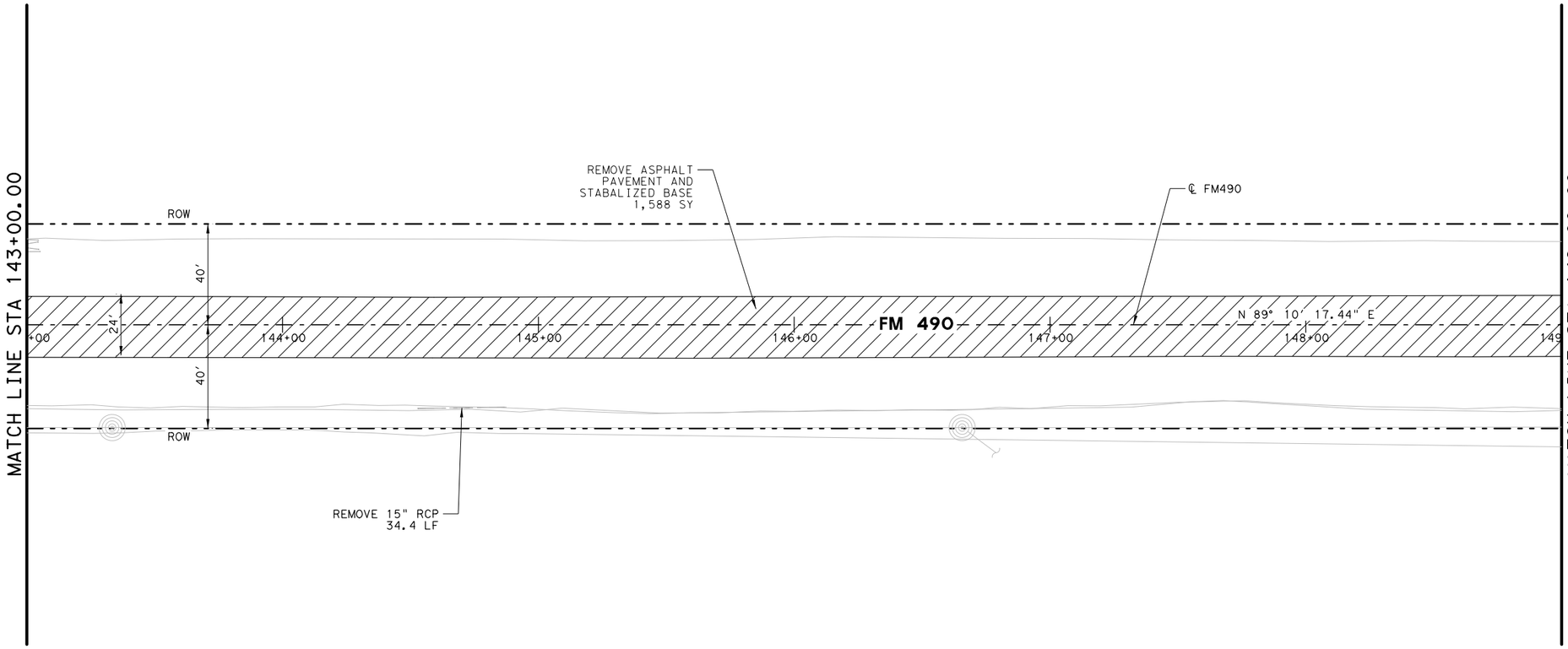
FM 490
REMOVAL PLAN
STA 131+00 TO STA 143+00

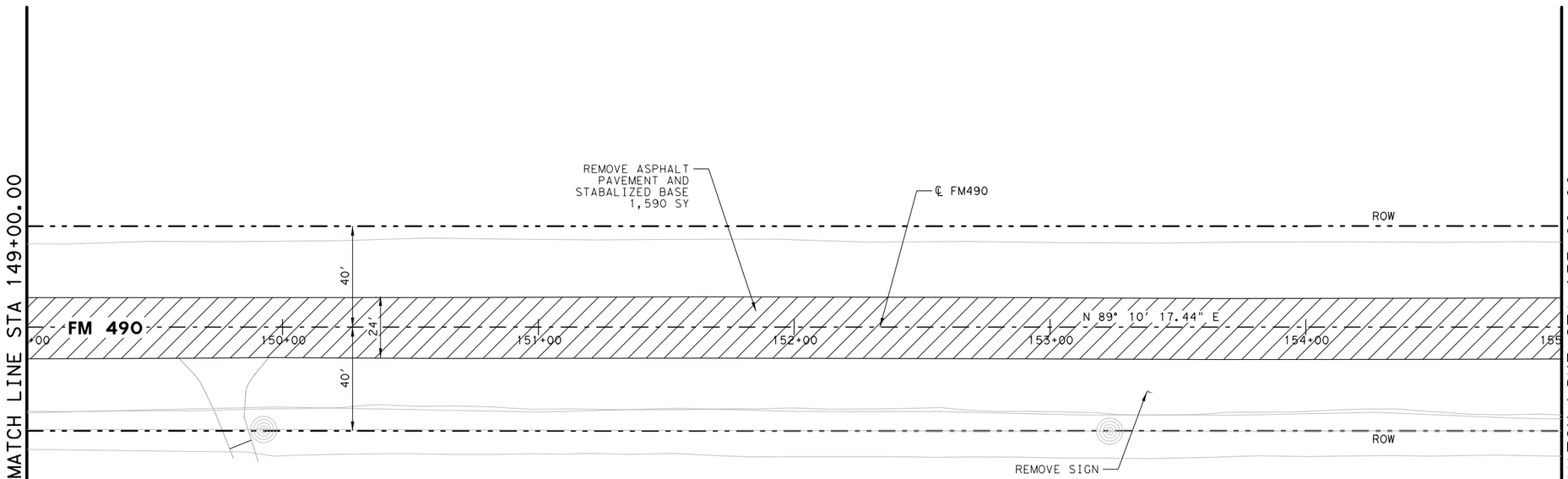
SCALE = 1"=50'

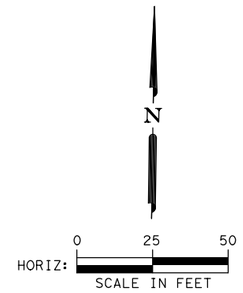
SHEET 10 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 60

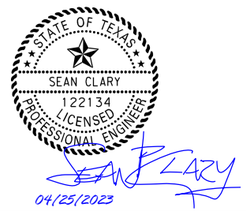






LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 143+00 TO STA 155+00

SCALE = 1"=50'

SHEET 11 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 61

DATE: 4/25/2023
TIME: 9:42:03 AM
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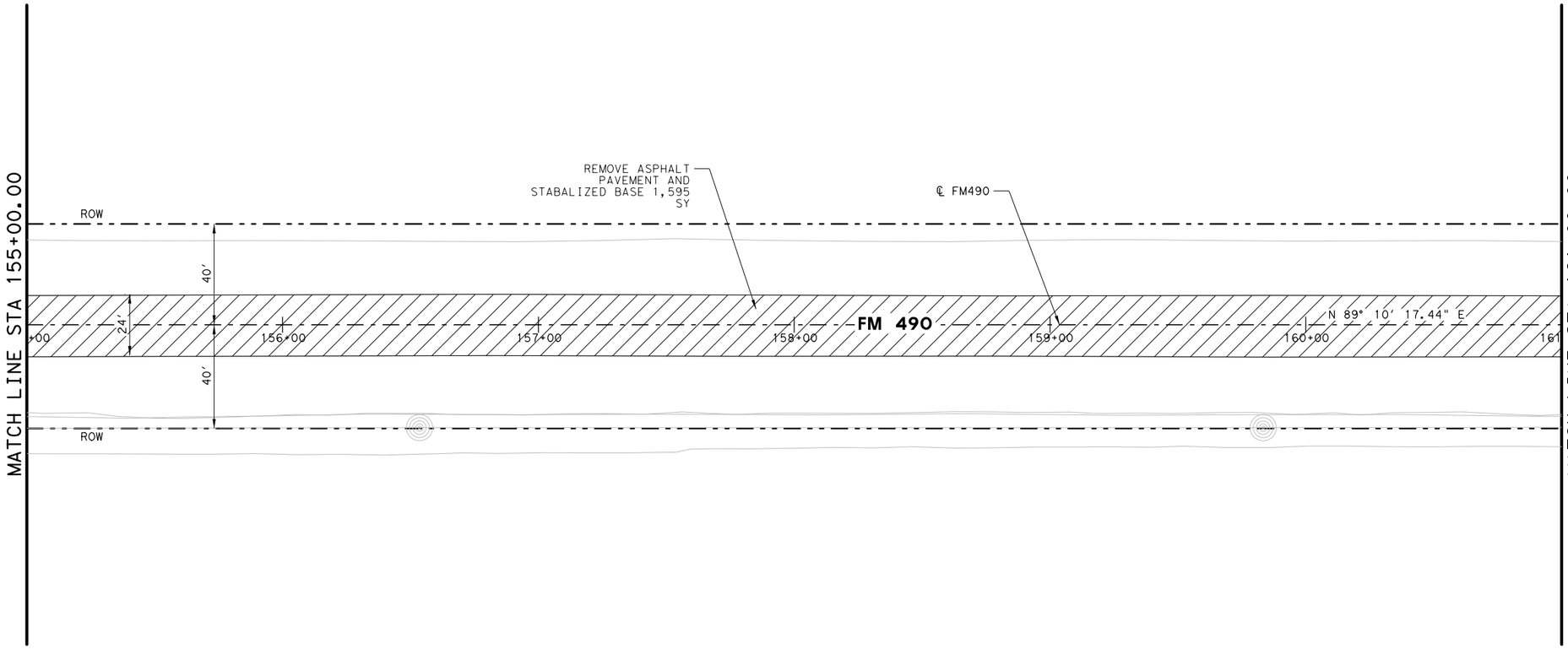
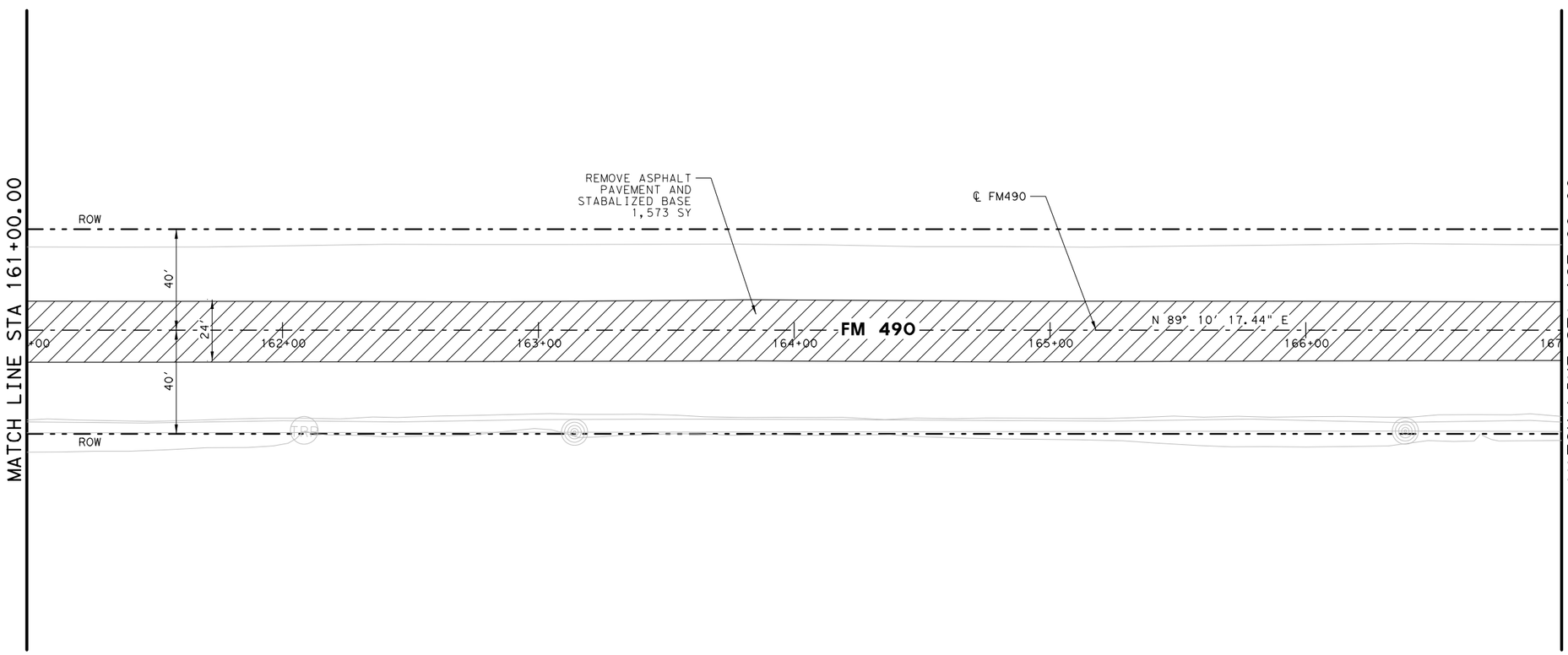
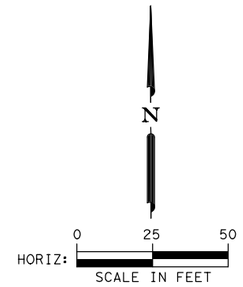
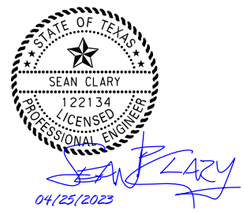






LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490
REMOVAL PLAN
STA 155+00 TO STA 167+00

SCALE = 1"=50'

SHEET 12 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 62

DATE: 4/25/2023
TIME: 9:42:14 AM
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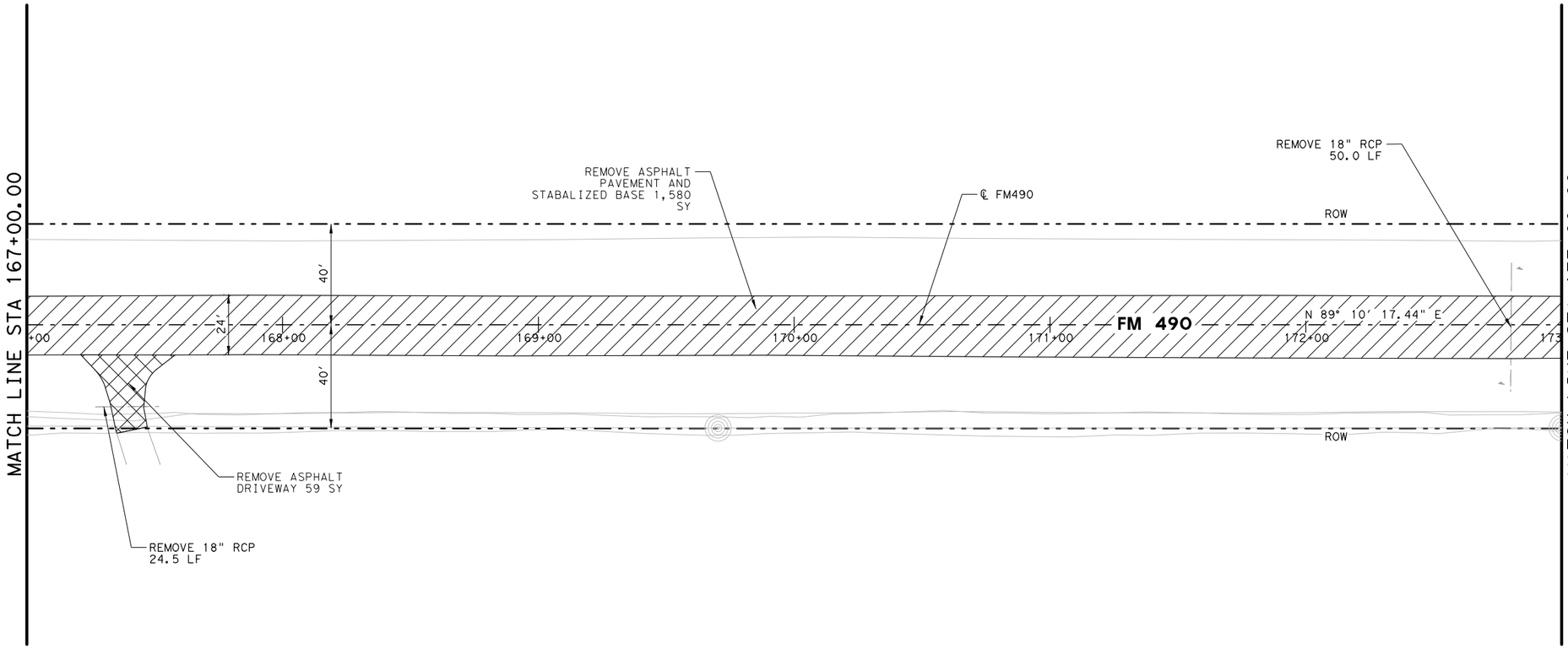

N

0 25 50

HORIZ: SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 167+00 TO STA 179+00

SCALE = 1"=50' SHEET 13 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 63

DATE: 4/25/2023
TIME: 9:46:25 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-RMV-13.dgn
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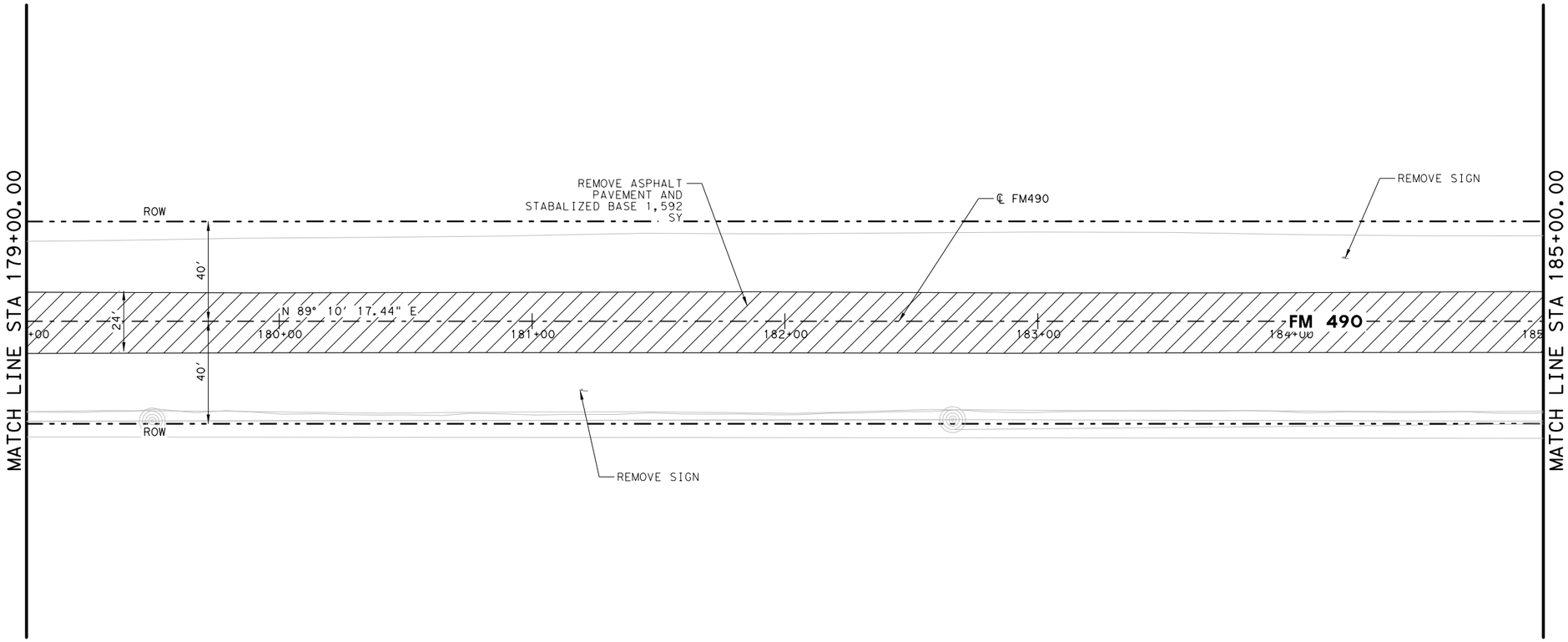
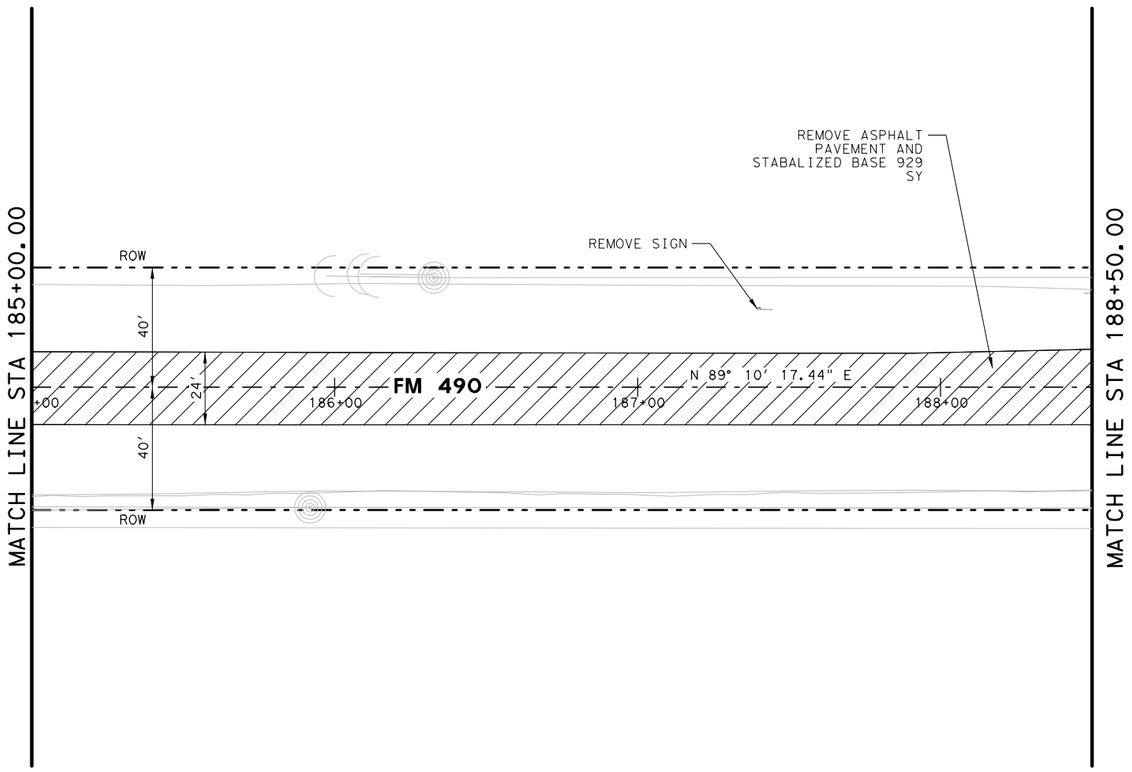
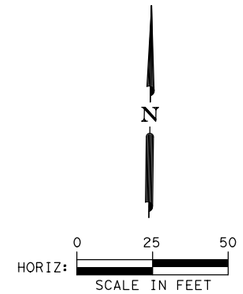
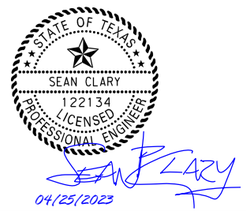






LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
REMOVAL PLAN
STA 179+00 TO STA 188+50

SCALE = 1"=50'

SHEET 14 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 64

DATE: 4/25/2023
TIME: 9:46:33 AM
USER: sclary
FILE NAME: ...\Roadway\FM490-BMCD-RW-14.dgn
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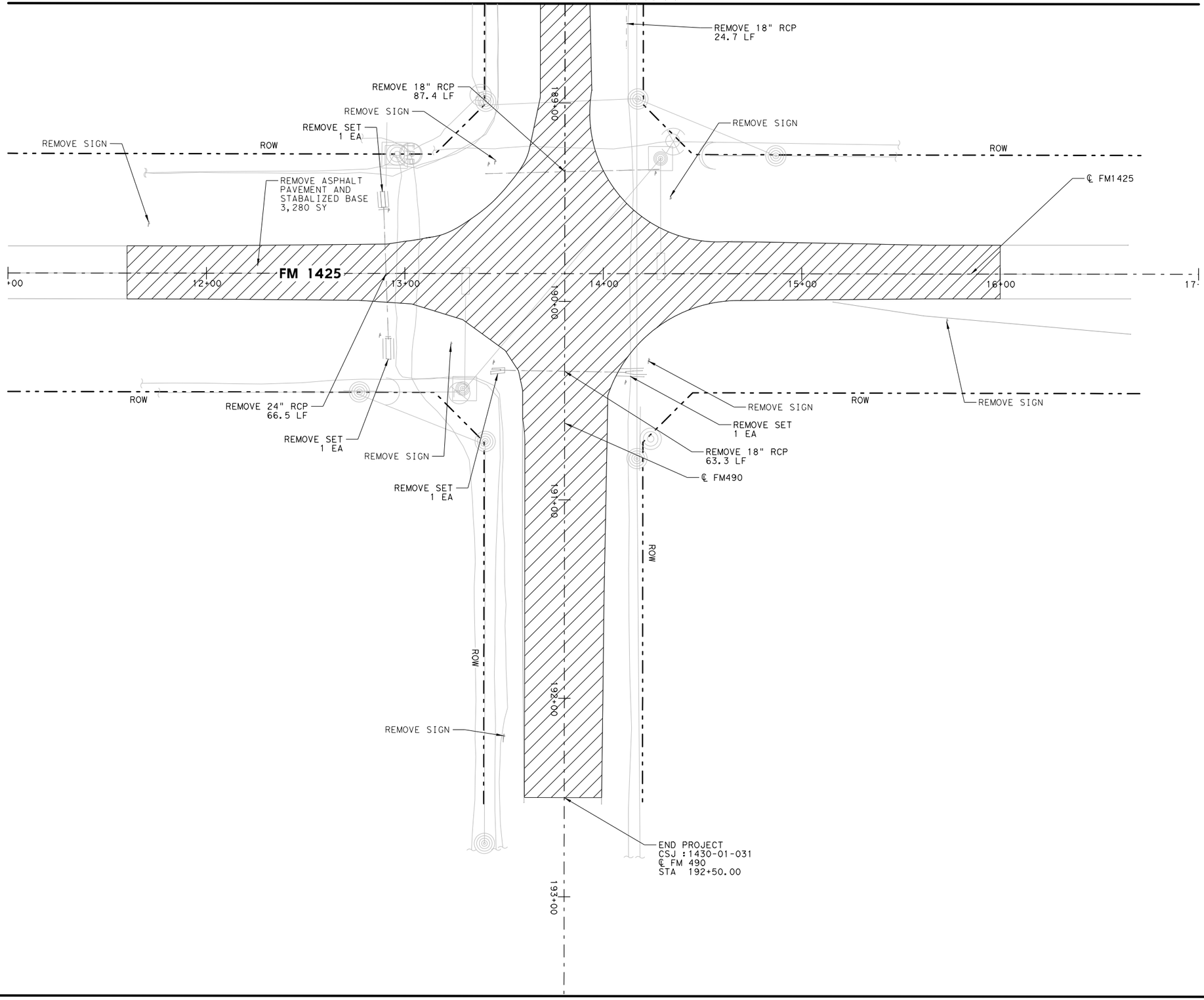
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BMINO RASTERS).plt

MATCH LINE STA 188+50.00



N

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 1425
REMOVAL PLAN

SCALE = 1"=50'

SHEET 15 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 65

DATE: 4/25/2023
TIME: 9:42:41 AM
USER: sclary
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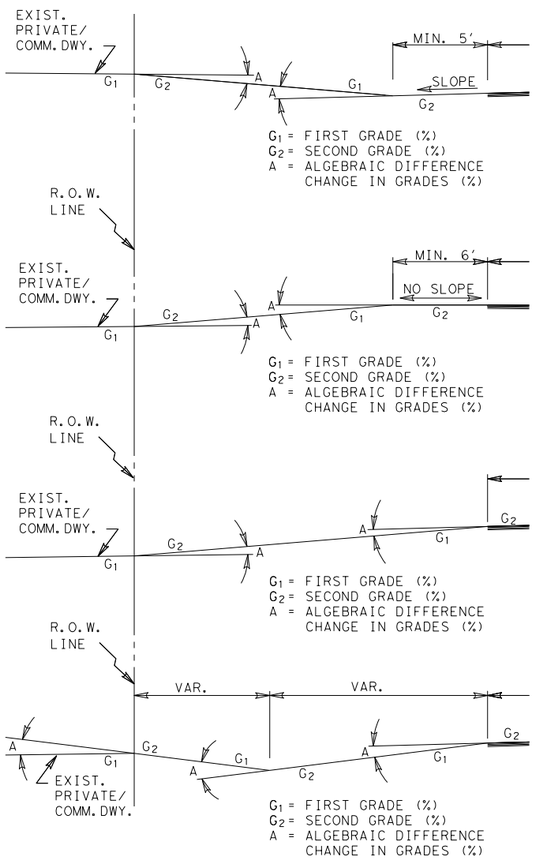
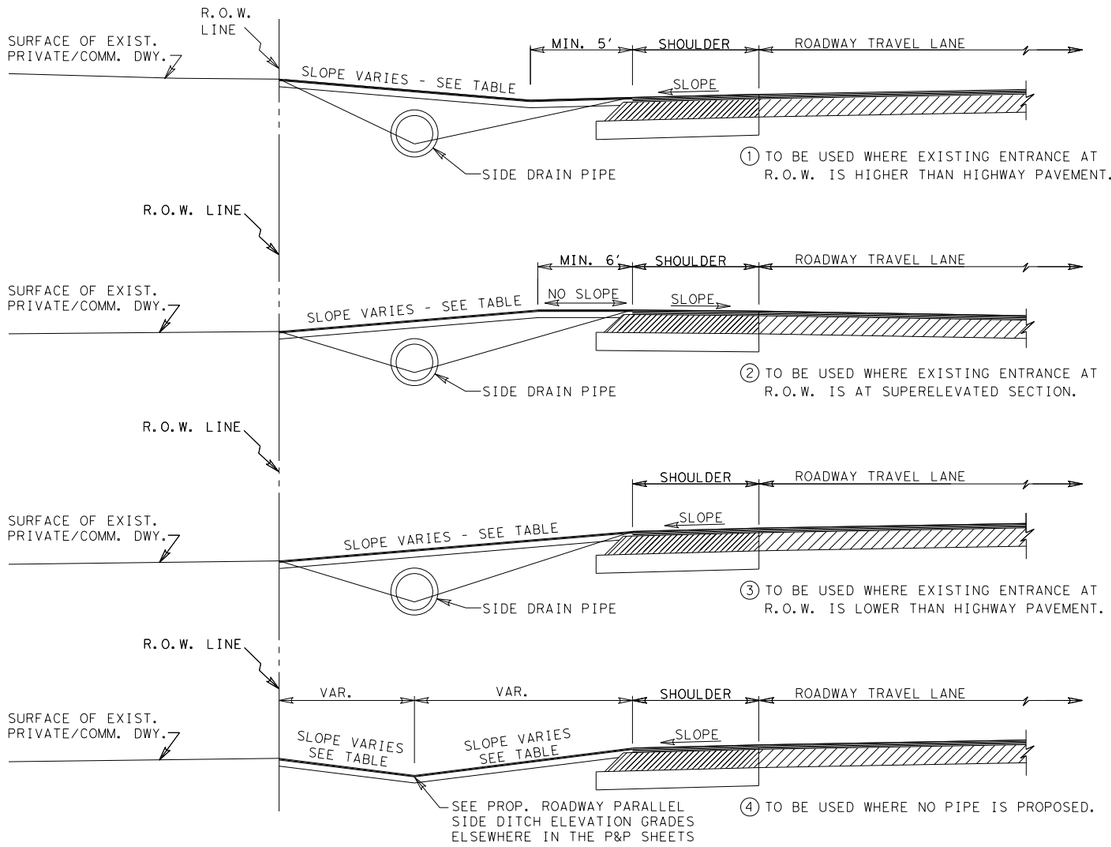
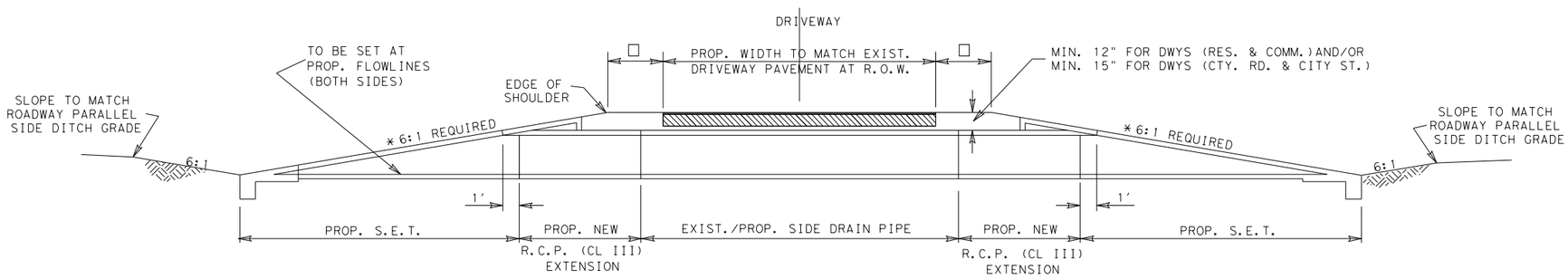




TYPICAL ENTRANCE PROFILE FOR DRIVEWAYS W/OUT C&G

PROPOSED DRIVEWAY SLOPE TABLE
COMMERCIAL DRIVEWAYS @ 12:1 MAX.
RESIDENTIAL DRIVEWAYS @ 8:1 MAX.

PROP. DWY ALGEBRAIC DIFFERENCE TABLE
COMMERCIAL DRIVEWAYS @ A = 6% DESIRABLE
RESIDENTIAL DRIVEWAYS @ A = 8% DESIRABLE
FORMULA, A=G2-G1



□ - 1' MIN. ON DRIVEWAYS (RES. & COMM.)
2' MIN. ON DRIVEWAYS (COUNTY RD. & CITY ST.)

* - 6:1 SLOPE REQUIRED

NOTES:

ALL ENTRANCES CONSTRUCTED ON THIS PROJECT ARE SUBJECT TO CONCURRENCE WITH EXISTING GOVERNING REGULATIONS AS SET OUT BY THE STATE - TEXAS TRANSPORTATION COMMISSION.

ENTRANCE'S BASE AND SURFACING MAY BE EXTENDED BEYOND R.O.W. LINE AS REQUIRED TO MEET EXISTING DRIVEWAY GRADE IN A SATISFACTORY MANNER OF WHICH NO STEEPER THAN 12:1 FOR COMMERCIAL DRIVEWAY AND 8:1 FOR RESIDENTIAL DRIVEWAY SLOPE WILL BE CONSTRUCTED.

ALL FLEXIBLE BASE USED FOR PRIVATE DRIVES & COMMERCIAL DRIVES WILL NOT REQUIRE LIME TREATMENT.

EXACT LOCATIONS, DIMENSIONS, AND TYPE TO BE ESTABLISHED DURING CONSTRUCTION BY THE ENGINEER.

PROP. WIDTH OF DRIVEWAYS TO MATCH EXISTING WIDTH AT R.O.W. LINE.

114 #/SY ACP (COMPACTED) IS EQUAL TO 1 IN. DEPTH,
171 #/SY ACP (COMPACTED) IS EQUAL TO 1½ IN. DEPTH.

SIDE DRAIN PIPES TO BE INSTALLED WHERE ROADWAY DITCH DRAINAGE IS NECESSARY, AS INDICATED ON PLANS AND/OR AS DIRECTED BY THE ENGINEER.

SIDE DRAIN PIPES TO BE INSTALLED WITH A MINIMUM OF 12" COVER WITH PROPOSED RESIDENTIAL & COMMERCIAL DRIVEWAY MATERIAL OR 15" COVER WITH PROPOSED COUNTY ROAD & CITY STREET ROADWAY MATERIAL.

AVERAGE DRIVEWAY DIMENSIONS SHOWN ON TABLE OF DRIVEWAYS (ELSEWHERE IN PLANS) ARE FOR ESTIMATING PURPOSES ONLY. ACTUAL DRIVEWAY DIMENSIONS MAY BE CHANGED BY THE ENGINEER BASED ON EXISTING FIELD CONDITIONS.

THE RATE OF PRIME COAT SHALL BE 0.10 GAL/SY FOR PRIVATE AND/OR COMMERCIAL DRIVEWAYS AND 0.20 GAL/SY FOR PUBLIC DRIVEWAYS (COUNTY ROADS AND/OR CITY STREETS).

TYPICALLY A CHANGE IN GRADE OF THREE PERCENT (3%) OR LESS AND A DISTANCE BETWEEN CHANGES IN GRADE OF AT LEAST ELEVEN FEET (11') ACCOMMODATES MOST VEHICLES. HOWEVER, LITERATURE SUGGESTS THAT A SIX PERCENT (6%) TO EIGHT PERCENT (8%) CHANGE IN GRADE MAY OPERATE EFFECTIVELY. INDIVIDUAL SITE CONDITIONS SHOULD BE EVALUATED TO ACCOMMODATE THE VEHICLE FLEET USING THE DRIVEWAY.

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

DRIVEWAY PROFILE DETAILS

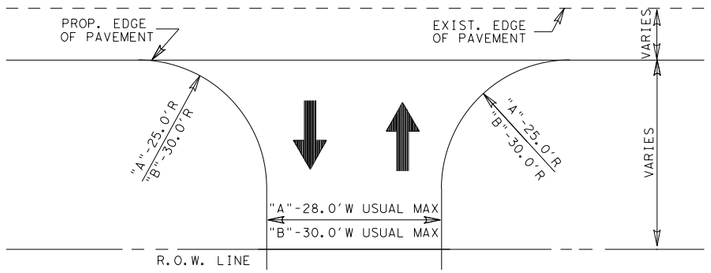
REV. 3/2020

DRIVEWAY1.DGN

FED. RD. DIV. NO.	FEDERAL - AID PROJECT NO.	FILE NO.	SHEET NO.
6	SEE TITLE SHEET		66

STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	1430	01	031,Etc	FM 490

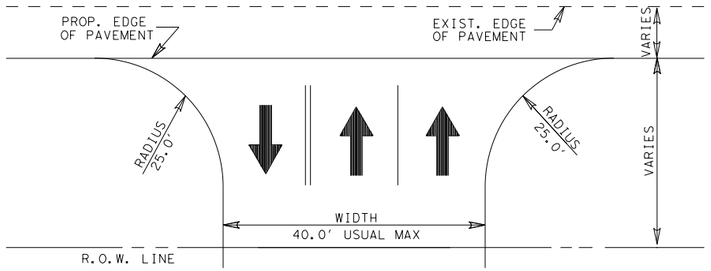
DESIGNS FOR TWO-WAY COMMERCIAL DRIVEWAYS



"A"- ONE ENTRY LANE AND ONE EXIT LANE, FEWER THAN 4 LARGE VEHICLES PER HOUR

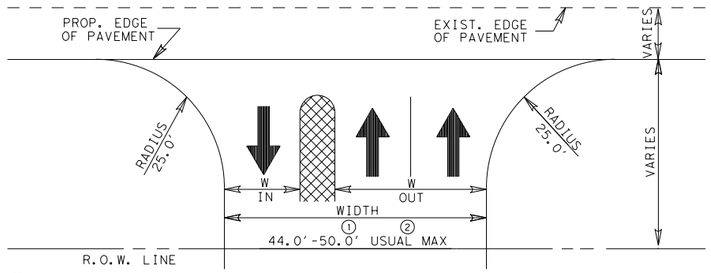
"B"- ONE ENTRY LANE AND ONE EXIT LANE, 4 OR MORE SINGLE UNIT VEHICLES(1) PER HOUR

(1) - *DRIVEWAY DESIGNS FOR LARGER VEHICLES WILL BE CONSIDERED ON A CASE BY CASE BASIS*



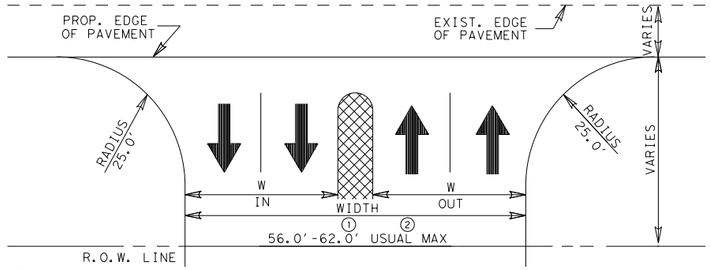
ONE ENTRY LANE AND TWO EXIT LANES (WITHOUT DIVIDERS)

DESIGNS FOR TWO-WAY COMMERCIAL DRIVEWAYS



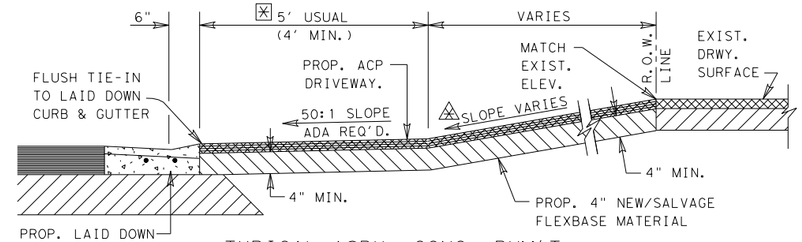
(1) - *4.0' WIDE DIVIDER, FACE-TO-FACE CURBS*
(2) - *10.0' WIDE DIVIDER, FACE-TO-FACE-CURBS*

ONE ENTRY LANE AND TWO EXIT LANES (WITH A DIVIDER)



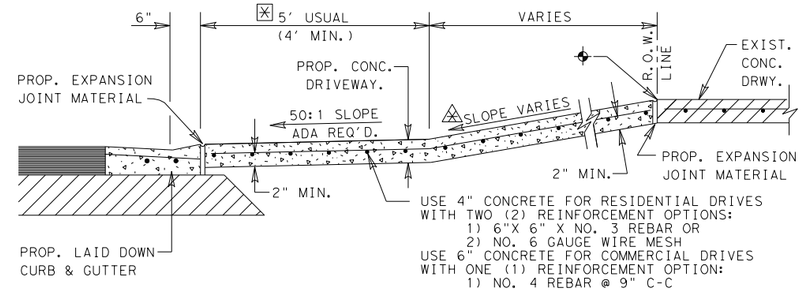
(1) - *4.0' WIDE DIVIDER, FACE-TO-FACE CURBS*
(2) - *10.0' WIDE DIVIDER, FACE-TO-FACE-CURBS*

TWO ENTRY LANES AND TWO EXIT LANES (WITH A DIVIDER)



TYPICAL ASPH. CONC. PVM'T. DRIVEWAY SECTION

N.T.S.



TYPICAL CONCRETE DRIVEWAY SECTION

N.T.S.

⊕ CONCRETE SHALL BE SAW CUT TO THE LIMITS OF REMOVAL WHERE APPLICABLE.

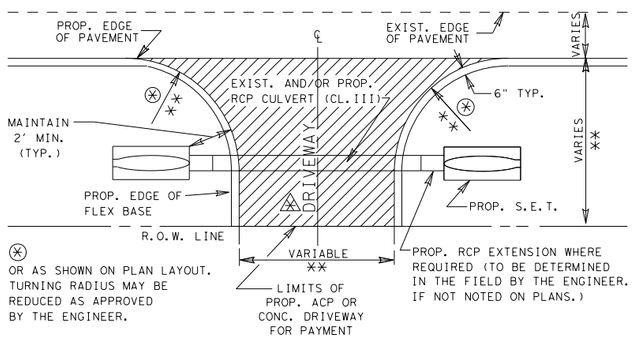
☒ PROP./FUTURE SIDEWALK CROSSING LOCATION UNLESS SHOWN ELSEWHERE ON P&P SHEETS. SEE P&P SHEETS FOR PROP. SIDEWALK LOCATION IF SIDEWALKS ARE INCLUDED AS PART OF PROJECT. REFER TO STATE STANDARDS - PEDESTRIAN FACILITIES - FOR ADDITIONAL REQUIREMENTS.

⚠ ENTRANCE'S BASE AND SURFACING MAY BE EXTENDED BEYOND R.O.W. LINE AS REQUIRED TO MEET EXISTING GRADE IN A SATISFACTORY MANNER OF WHICH NO STEEPER THAN 12:1 FOR COMMERCIAL DRIVEWAY AND 8:1 FOR RESIDENTIAL DRIVEWAY SLOPE WILL BE CONSTRUCTED.

PROP. DWY ALGEBRAIC DIFFERENCE TABLE
COMMERCIAL DRIVEWAYS @ A = 6% MAX. RESIDENTIAL DRIVEWAYS @ A = 8% MAX.

PROPOSED DRIVEWAY SLOPE TABLE
COMMERCIAL DRIVEWAYS @ 12:1 MAX. RESIDENTIAL DRIVEWAYS @ 8:1 MAX.

PRIVATE AND COMMERCIAL DRIVES WITHOUT CURB & GUTTER

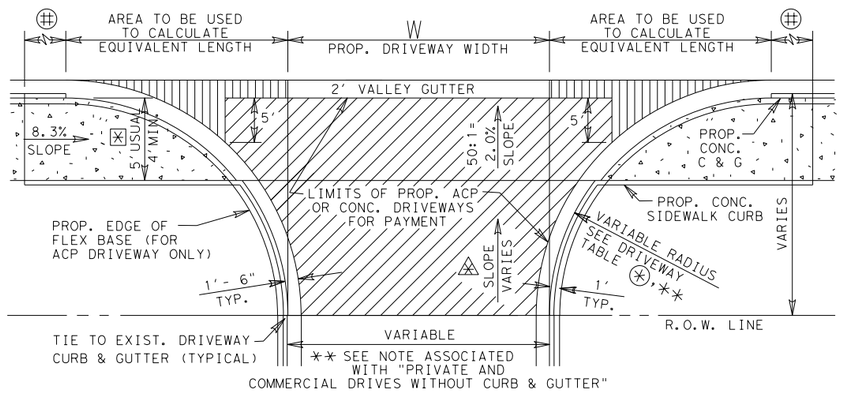


PLAN OF PRIVATE AND COMMERCIAL DRIVES

** FOR PRIVATE RESIDENTIAL DRIVES, TRY TO MATCH EXISTING WITH A MINIMUM WIDTH OF 12 FT. AND A MAXIMUM WIDTH OF 24 FT. WITH 15 FT. USUAL RADIUS. FOR COMMERCIAL DRIVES, USE ABOVE COMMERCIAL DRIVEWAY DETAILS.

⚠ SEE TYPICAL DRIVEWAY SECTIONS NOTES FOR DRIVEWAY SLOPE CRITERIA.

PRIVATE AND COMMERCIAL DRIVES WITH CURB & GUTTER



PLAN OF PRIVATE AND COMMERCIAL DRIVES

SEE P&P SHEETS FOR LOCATIONS OF DRIVES

N.T.S.

☒ PROP./FUTURE CONC. SIDEWALK LOCATION UNLESS SHOWN ELSEWHERE ON P&P SHEETS. REFER TO STATE STANDARDS - PEDESTRIAN FACILITIES - FOR ADDITIONAL REQUIREMENTS.

⊕ LIMITS OF SLOPE FOR PROP. CONC. CURB BASED ON 8.3% SLOPE FOR SIDEWALK.

⚠ SEE TYPICAL DRIVEWAY SECTIONS NOTES FOR DRIVEWAY SLOPE CRITERIA.

LF EQUIVALENT TABLE FOR PAYMENT LIMITS OF 2' VALLEY GUTTER

LF OF VALLEY GUTTER= W + X1 + X2

WHERE X1 AND X2 MAY VARY DEPENDING ON RADIUS

Prop. Driveway Radius	X1 or X2 (Sq Ft Area / 2') Equivalent LF Length
5'	1
8'	2
10'	4
12'	6
15'	9
18'	12
20'	15
22'	18
25'	24
28'	30
30'	34

SEE DRIVEWAY TABLE FOR LIMITS OF LAID DOWN CURB TO BE PAID FOR AS CURB AND GUTTER

DRIVEWAY TYPES

TY PB-1

EXIST. PRIVATE OR COMMERCIAL DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 4" NEW AND/OR SALVAGE FLEX. BASE, PRIMED AND SURFACED WITH 171#/SY ACP. (HMA-D PG 64-22 SAC B MEETING ITEM 340)

CONCRETE (RESIDENTIAL)

EXIST. PRIVATE DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 4" CONCRETE. TO BE PAID FOR BY THE SQ.YD.

CONCRETE (COMMERCIAL)

EXIST. BUSINESS DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 6" CONCRETE. TO BE PAID FOR BY THE SQ.YD.

PHARR DISTRICT STANDARD

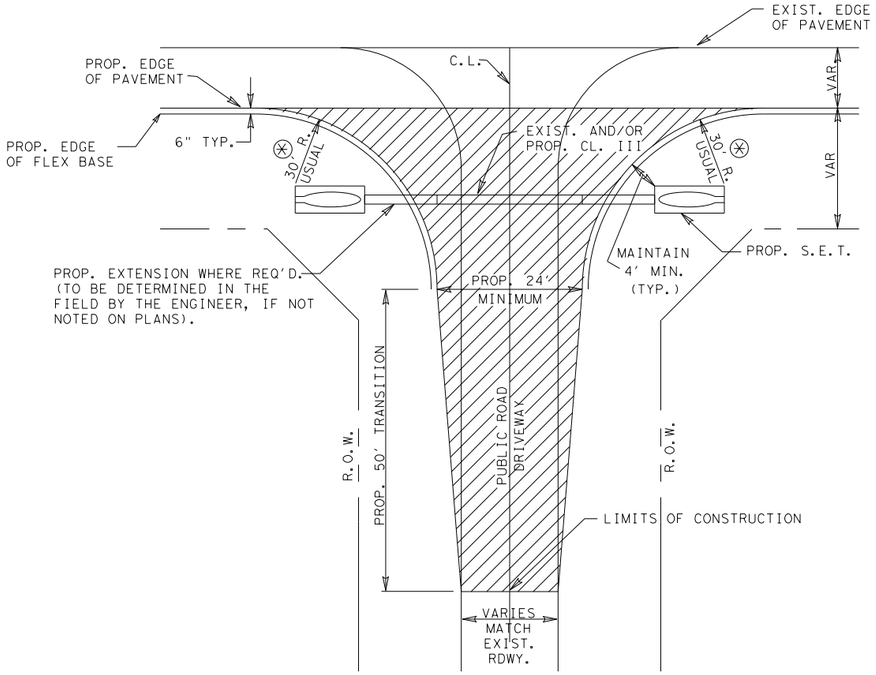
TEXAS DEPARTMENT OF TRANSPORTATION

DRIVEWAY DETAILS PRIVATE (RESIDENTIAL-COMMERCIAL)

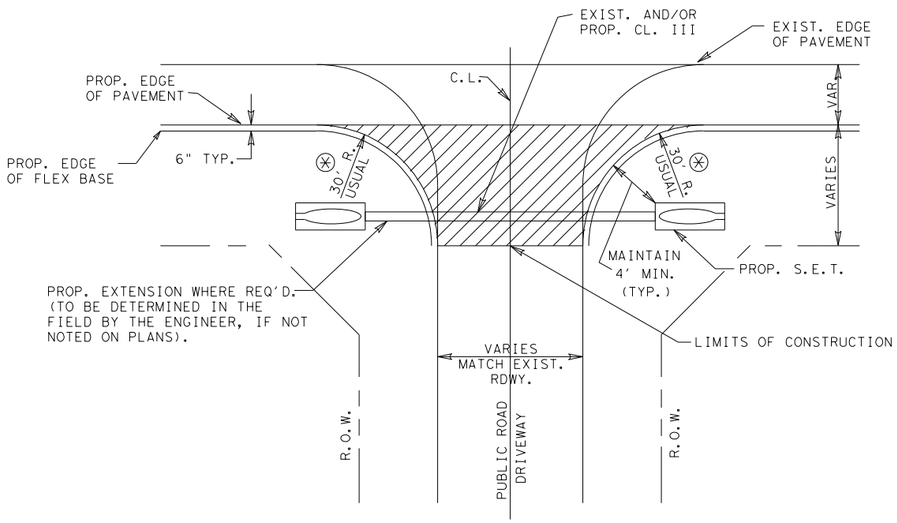
REV. 08/22

DRIVEWAY2.DGN

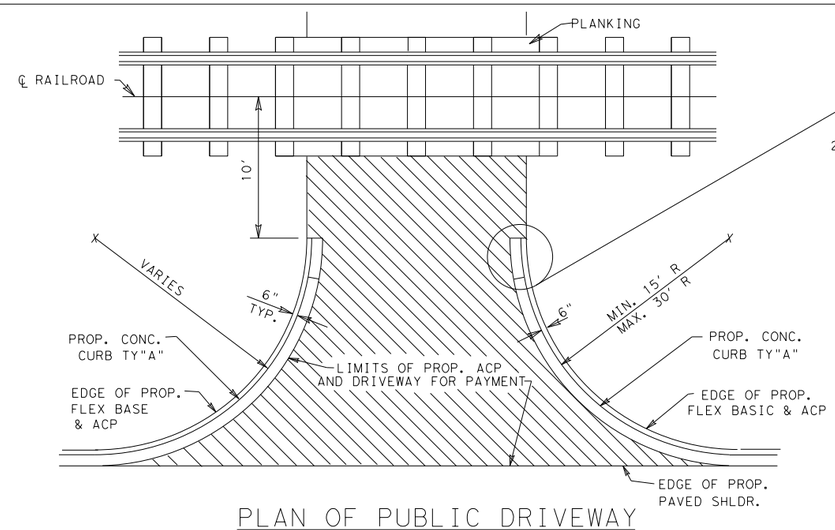
FED. RD. DIV. NO.	PROJECT NO.		FILE NO.			SHEET NO.
6	SEE TITLE SHEET					67
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	1430	01	031,Etc	FM 490



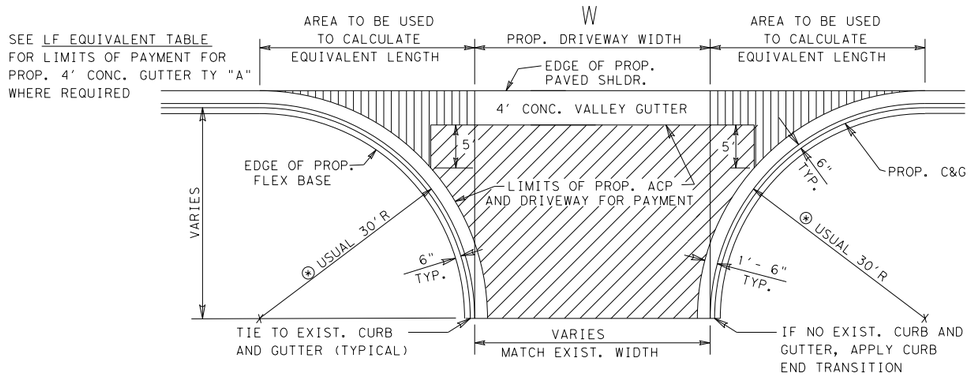
TYPICAL DETAIL
(WHEN EXIST. ROADWAY WIDTH LESS THAN 24'.)



TYPICAL DETAIL
(WHEN EXIST. ROADWAY WIDTH EQUAL TO OR GREATER THAN 24'.)



PLAN OF PUBLIC DRIVEWAY ADJACENT TO R.R. CROSSING



PLAN OF PUBLIC DRIVEWAY

LF EQUIVALENT TABLE FOR PAYMENT LIMITS OF 4' CONC. GUTTER TY."A"

LF OF VALLEY GUTTER= W + X1 + X2	
WHERE X1 AND X2 MAY VARY DEPENDING ON RADIUS	
Prop. Driveway Radius	X1 or X2 (Sq Ft Area / 4') Equivalent LF Length
10	3
15	7
20	12
25	19
30	27
35	37
40	48
45	61
50	75
55	91
60	109
65	127
70	148
75	170

TY PBS1

EXIST. UNPAVED PUBLIC DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 12" LIME TREAT. SUBGRADE, 8" FLEX. BASE 1% LIME, THEN PRIMED AND SURFACED WITH 171#/SY ACP. (HMA-D PG 64-22 SAC B MEETING ITEM 340)

TY PBS2

EXIST. DRIVEWAY TO BE CONSTRUCTED SAME AS PROPOSED ROADWAY.

GENERAL NOTES:

AVERAGE DIMENSIONS SHOWN ON TABLE OF DRIVEWAYS ARE FOR ESTIMATING PURPOSES ONLY.

LOCATIONS LISTED ON THE TABLE ARE APPROXIMATE, EXACT LOCATIONS, DIMENSIONS, AND TYPE TO BE ESTABLISHED DURING CONSTRUCTION BY THE ENGINEER AS REQUIRED.

Ⓚ SEE DRIVEWAY TABLE, TURNING RADIUS MAY BE REDUCED AS APPROVED BY THE ENGINEER.

SEE TABLE OF DRIVEWAYS FOR TOTAL LENGTH OF PROP. 4' CONC. VALLEY GUTTER FOR EACH LOCATION.

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

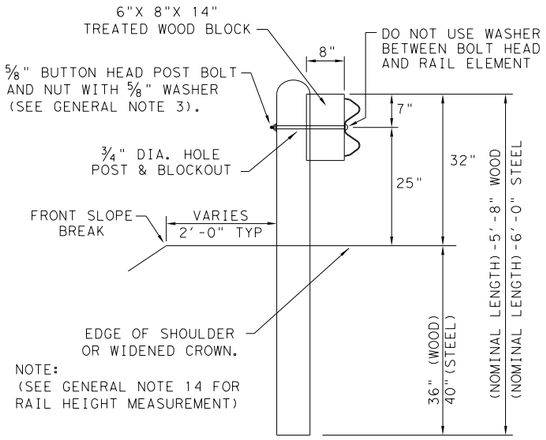
DRIVEWAY DETAILS PUBLIC (COUNTY ROAD-CITY STREET)

REV. 8/22

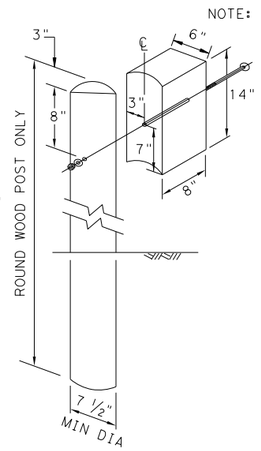
DRIVEWAY3.DGN

FED.RD. DIV.NO.	FEDERAL - AID PROJECT NO.		FILE NO.			SHEET NO.
6	SEE TITLE SHEET					68
STATE	STATE DIST.NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	1430	01	031,Etc	FM 490

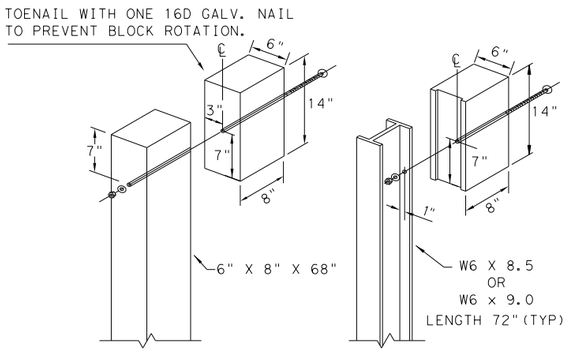
DATE:
FILE:



TYPICAL POST PLACEMENT



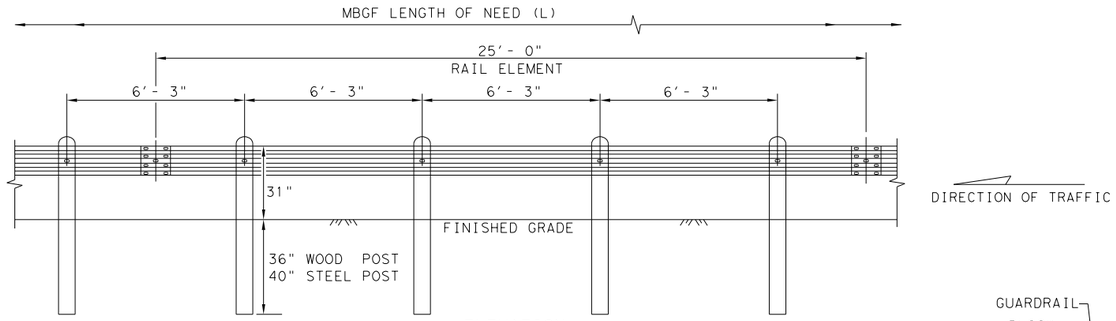
WOOD BLOCK TO
ROUND WOOD POST



WOOD BLOCK TO
RECTANGULAR WOOD POST

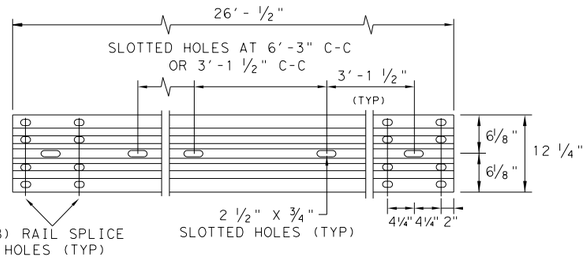
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

NOTE: ✳✳ "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



ELEVATION
MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH — VARIES

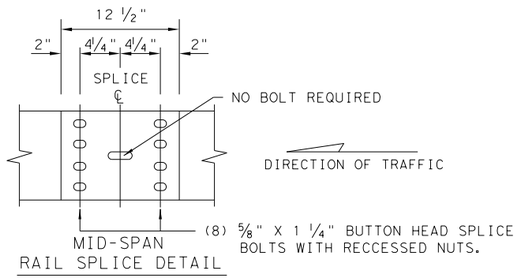
FBB01 = 1 ¼"
FBB02 = 2"

⅝"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

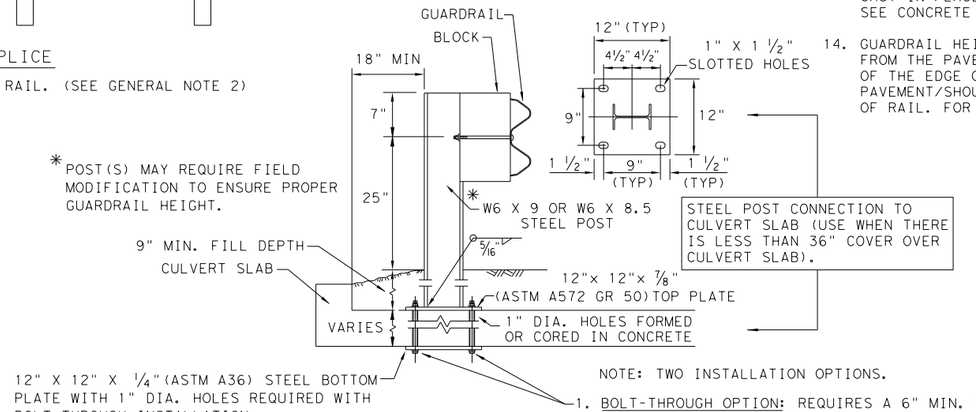
BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN
RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

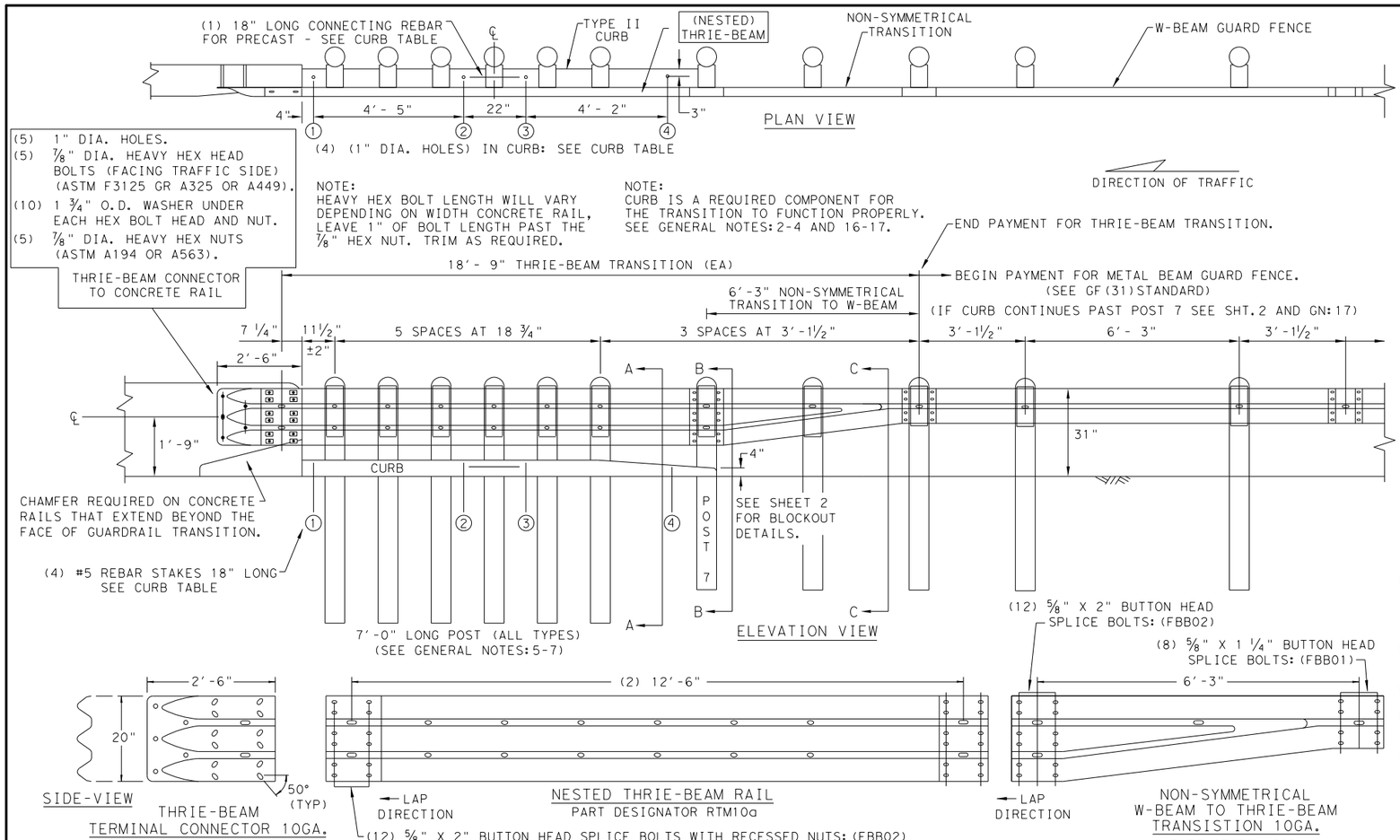
NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

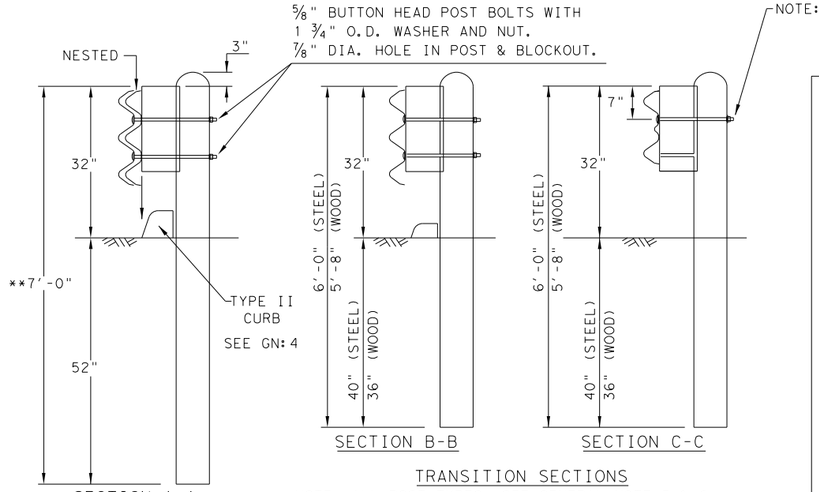
FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1430	01	031,Etc	FM 490	
	DIST	COUNTY		SHEET NO.	
	PHR	WILLACY		69	

DATE:
FILE:



GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.



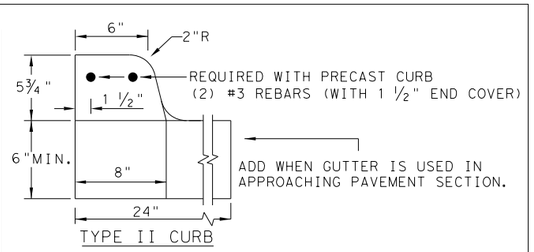
THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END.
USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

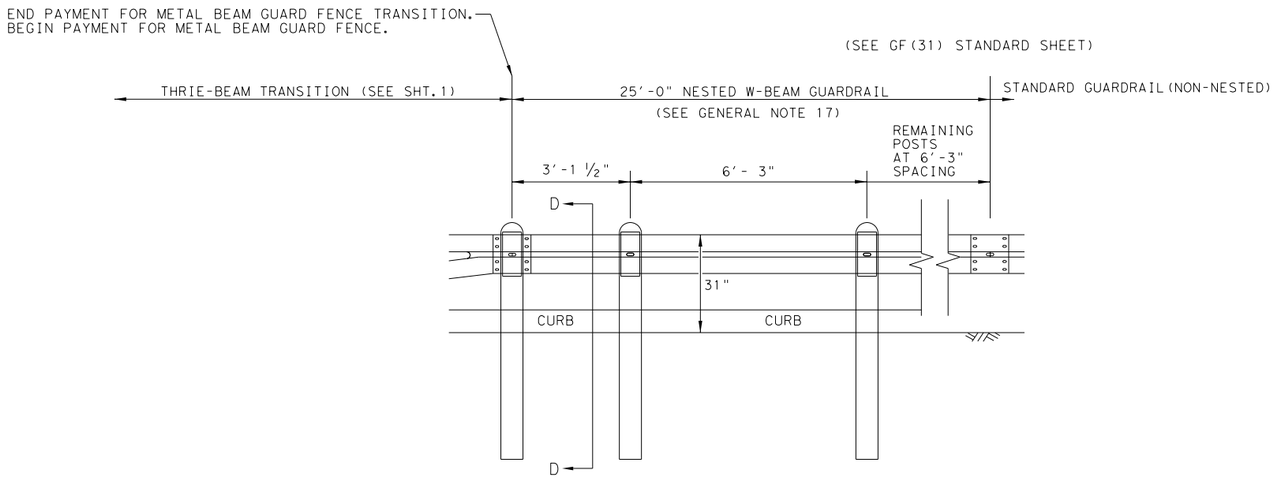
GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1430	01	031, Etc	FM 490	
	DIST	COUNTY		SHEET NO.	
	PHR	WILLACY		70	

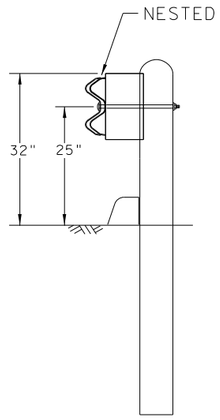
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE:
FILE:

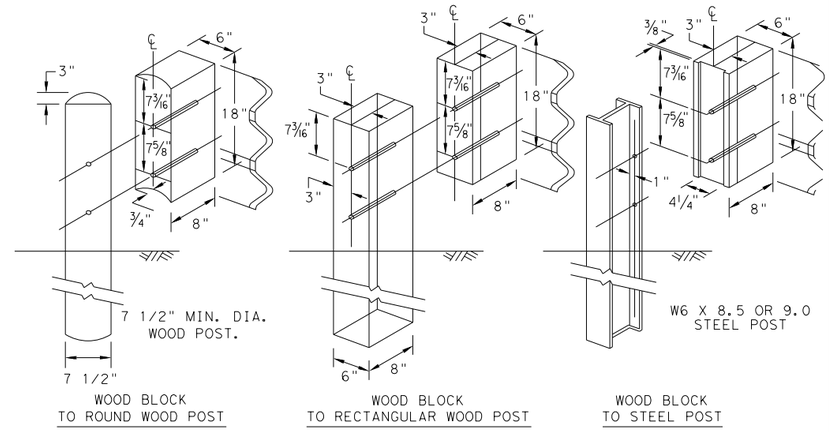
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

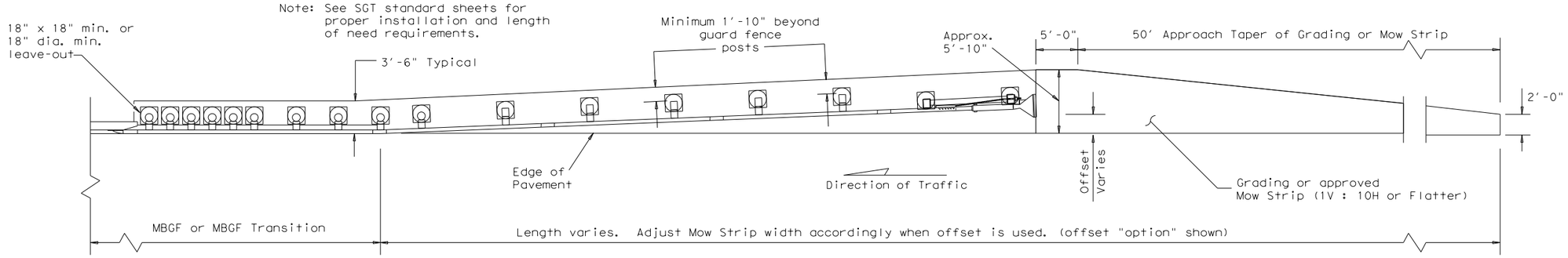
Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

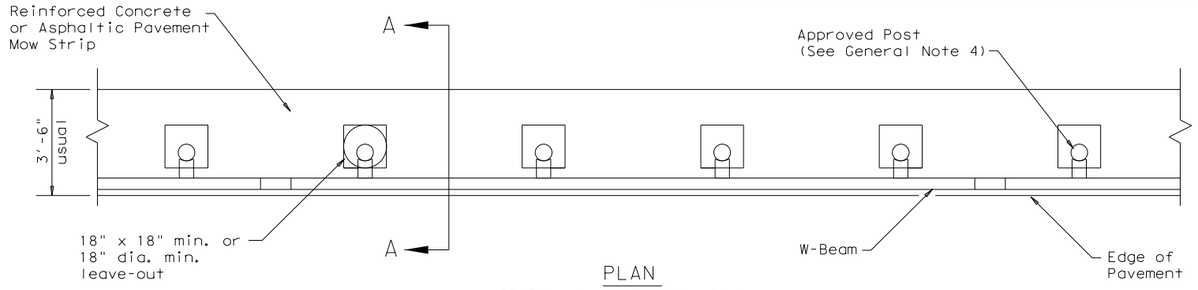
GF(31)TR TL3-20

FILE: gf31trtl320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1430	01	031, Etc	FM 490	
	DIST	COUNTY		SHEET NO.	
	PHR	WILLACY		71	

DATE:
FILE:

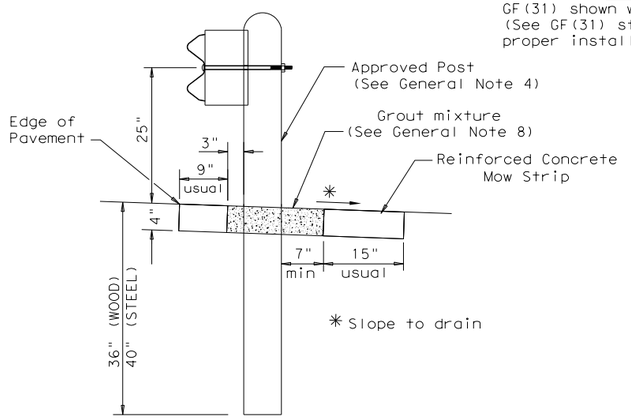


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



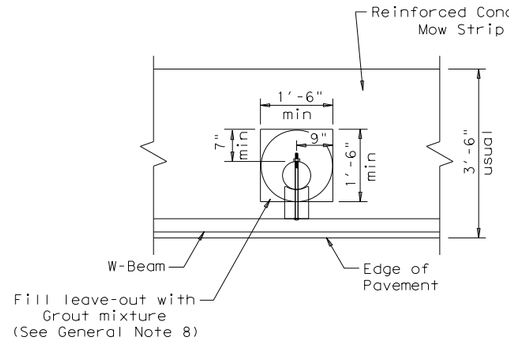
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



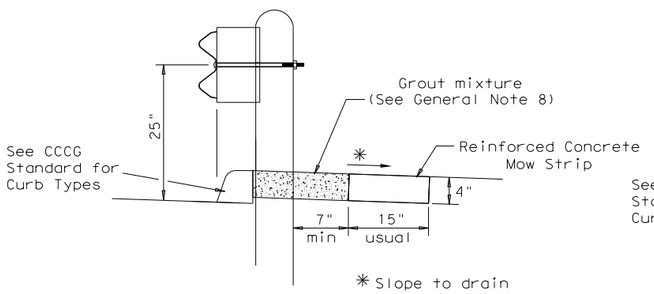
SECTION A-A

Typical



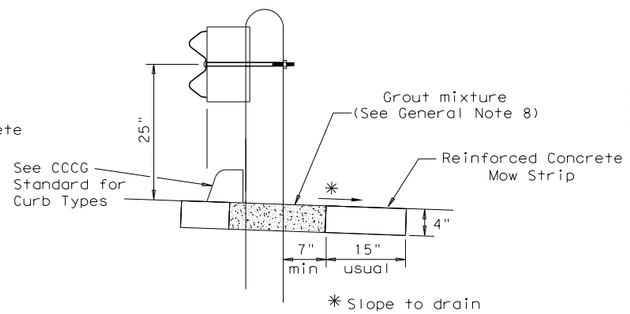
MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.



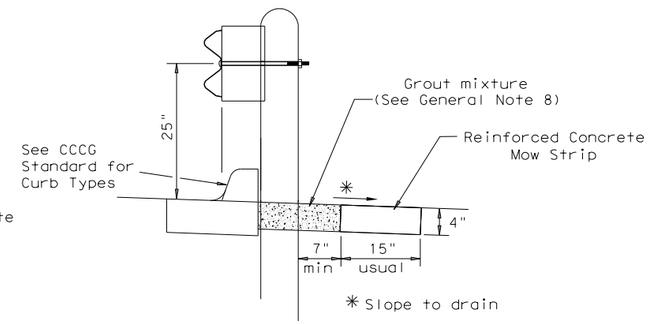
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

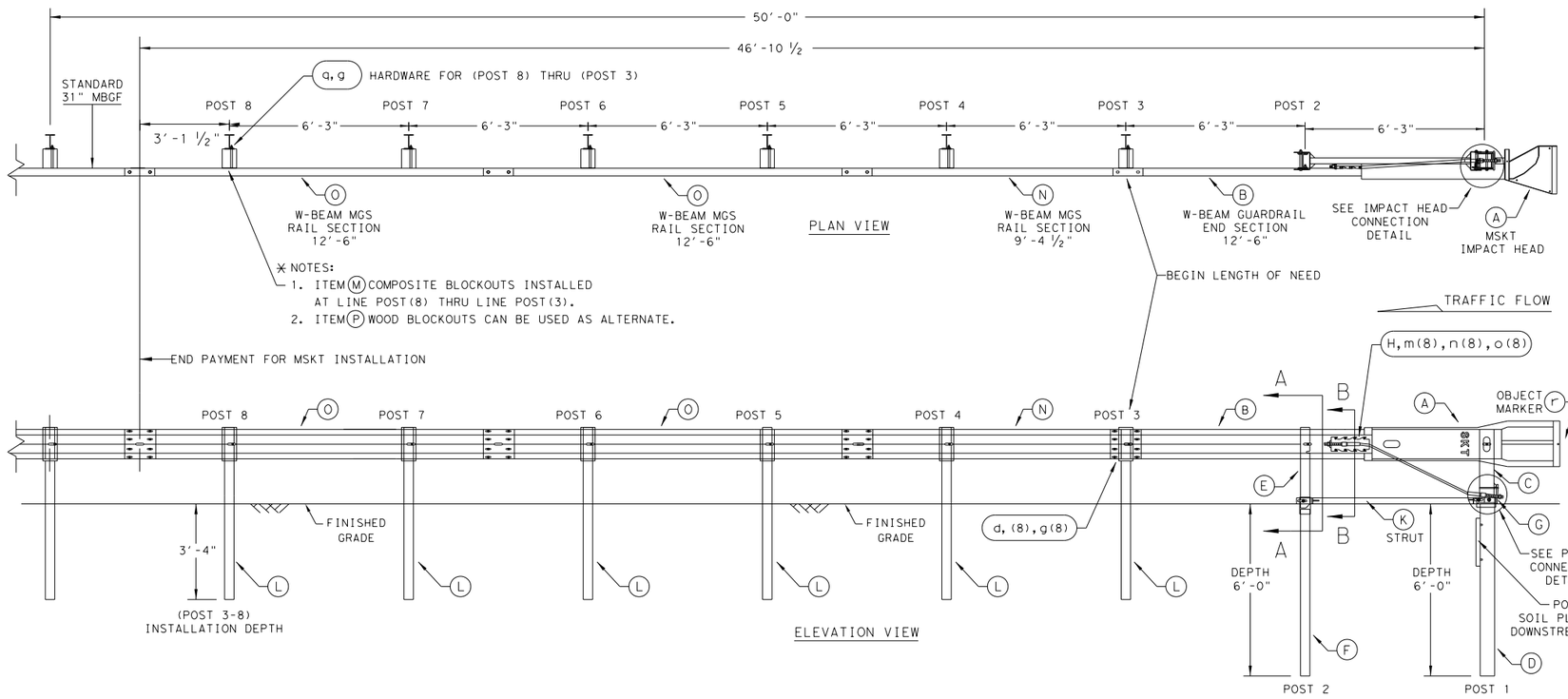
Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
REVISIONS	1430	01	031, Etc		FM 490	
	DIST	COUNTY			SHEET NO.	
	PHR	WILLACY			72	

DATE:
FILE:



NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

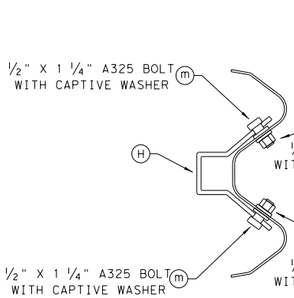
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

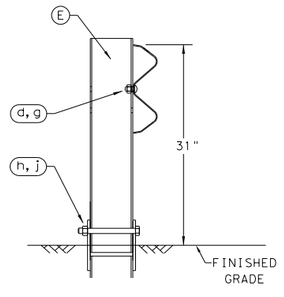
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: ✳

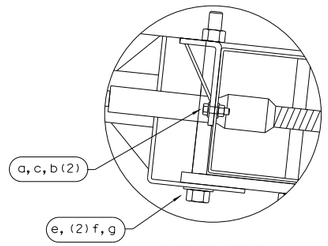
ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25'GUARD FENCE PANEL



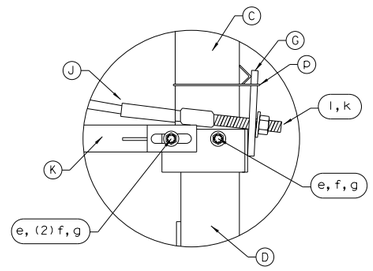
SECTION B-B
ANCHOR BRACKET



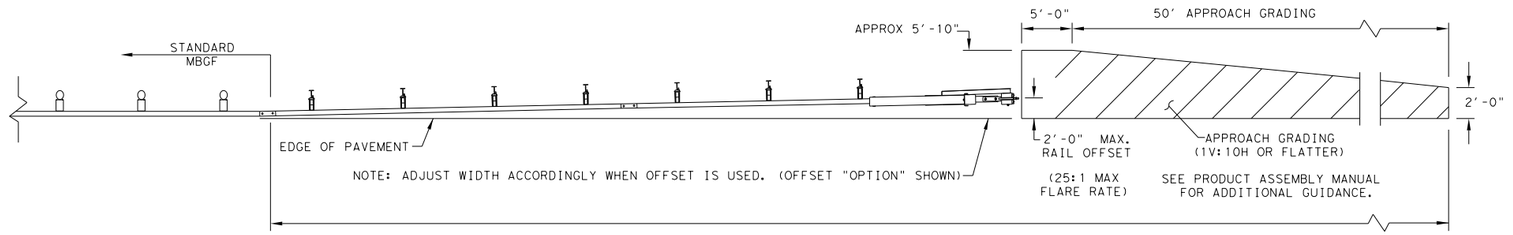
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1430	01	031,Etc	FM 490	
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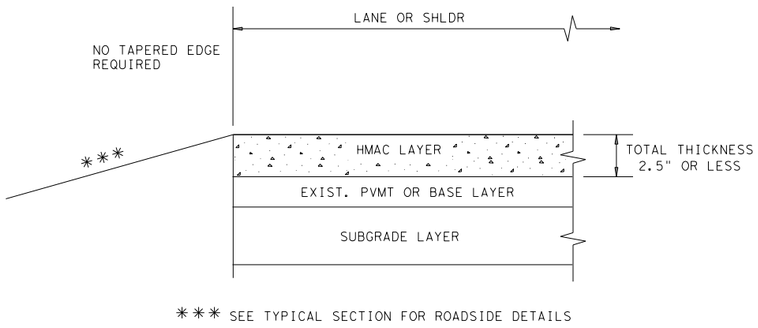
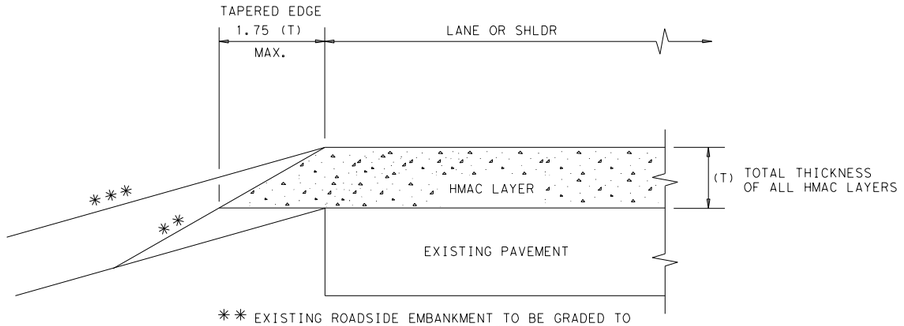


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

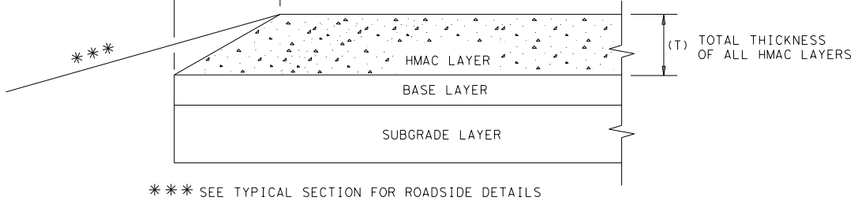
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

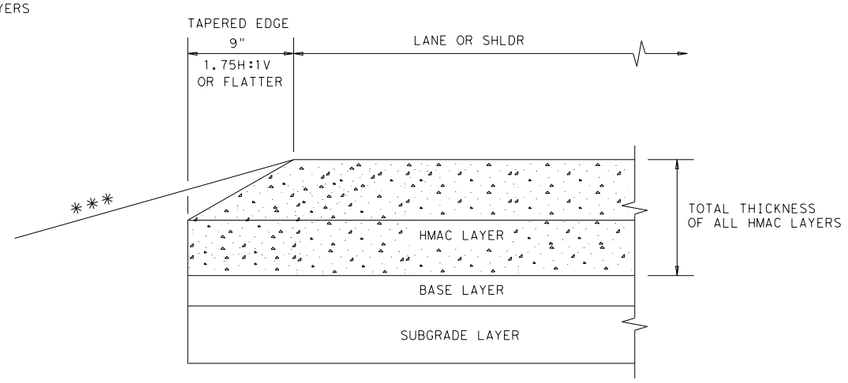
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation

Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:		
	CONT	SECT	JOB		HIGHWAY	
REVISIONS	1430	01	031,Etc		FM 490	
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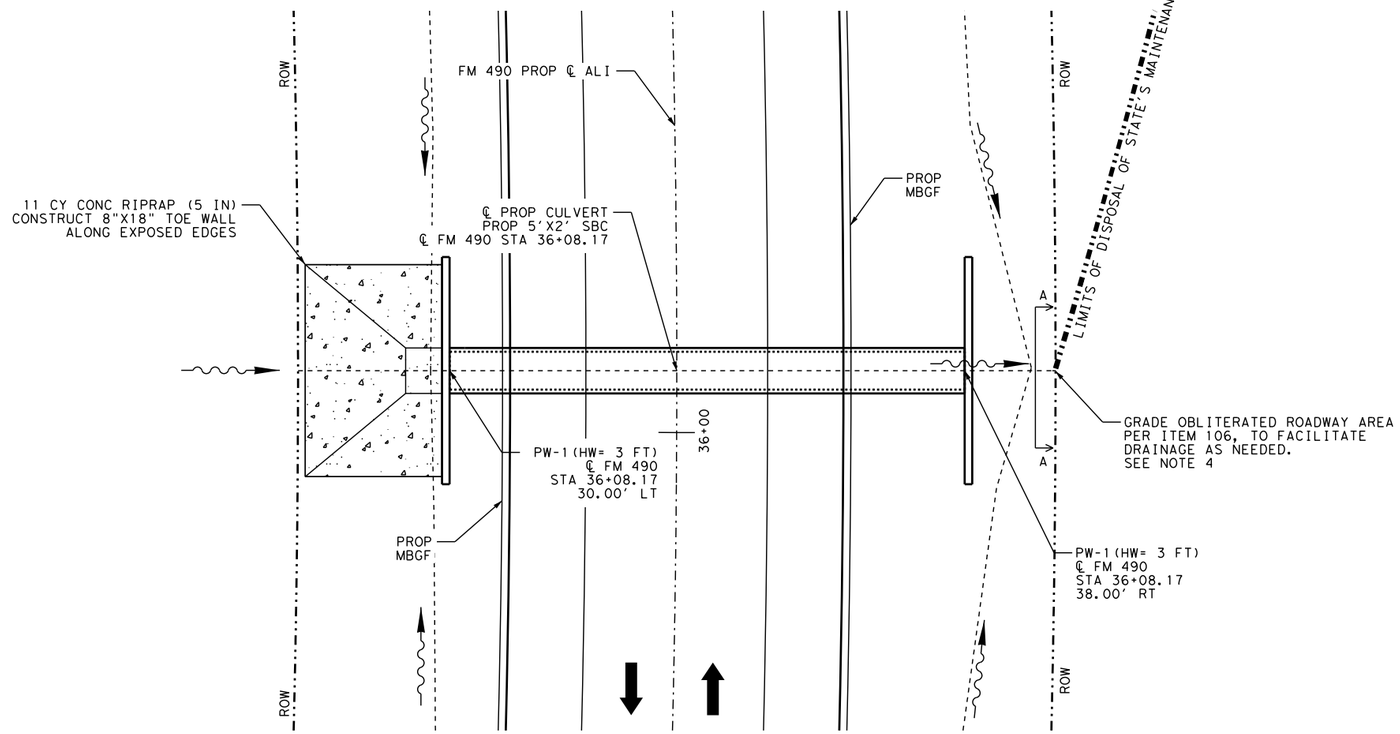


LEGEND

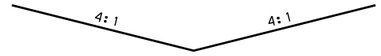
FLOW DIRECTION

NOTE:

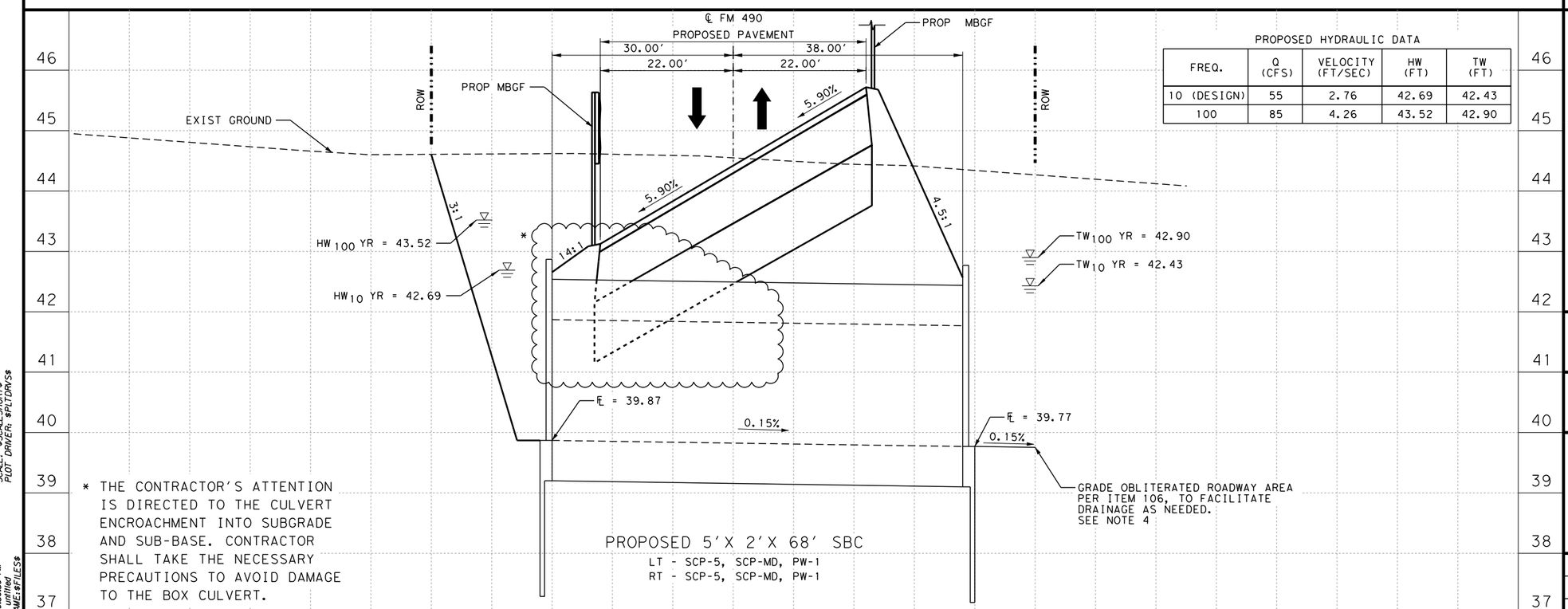
1. HYDRAULIC ANALYSIS COMPLETED USING HY-8 VERSION 7.60.
2. SEE ROADWAY CROSS-SECTIONS FOR DITCH LOCATIONS.
3. SEE ROADWAY LAYOUTS FOR DRAINAGE EASEMENT LOCATIONS AND LIMITS.
4. DESIGN BASED ON DITCH TO EXISTING OUTFALL AT 0.15% WITH 4:1 SIDE SLOPES FROM DOWNSTREAM FLOWLINE OF PROPOSED CULVERT.

HORIZ: 0 10 20 SCALE IN FEET

VERT: 0 1 2 SCALE IN FEET



TYPICAL SECTION A
N.T.S.



PROPOSED HYDRAULIC DATA

FREQ.	Q (CFS)	VELOCITY (FT/SEC)	HW (FT)	TW (FT)
10 (DESIGN)	55	2.76	42.69	42.43
100	85	4.26	43.52	42.90

* THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE CULVERT ENCROACHMENT INTO SUBGRADE AND SUB-BASE. CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO AVOID DAMAGE TO THE BOX CULVERT.

4/27/2023

Eric J. Calvert

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation

FM 490

CULVERT LAYOUT

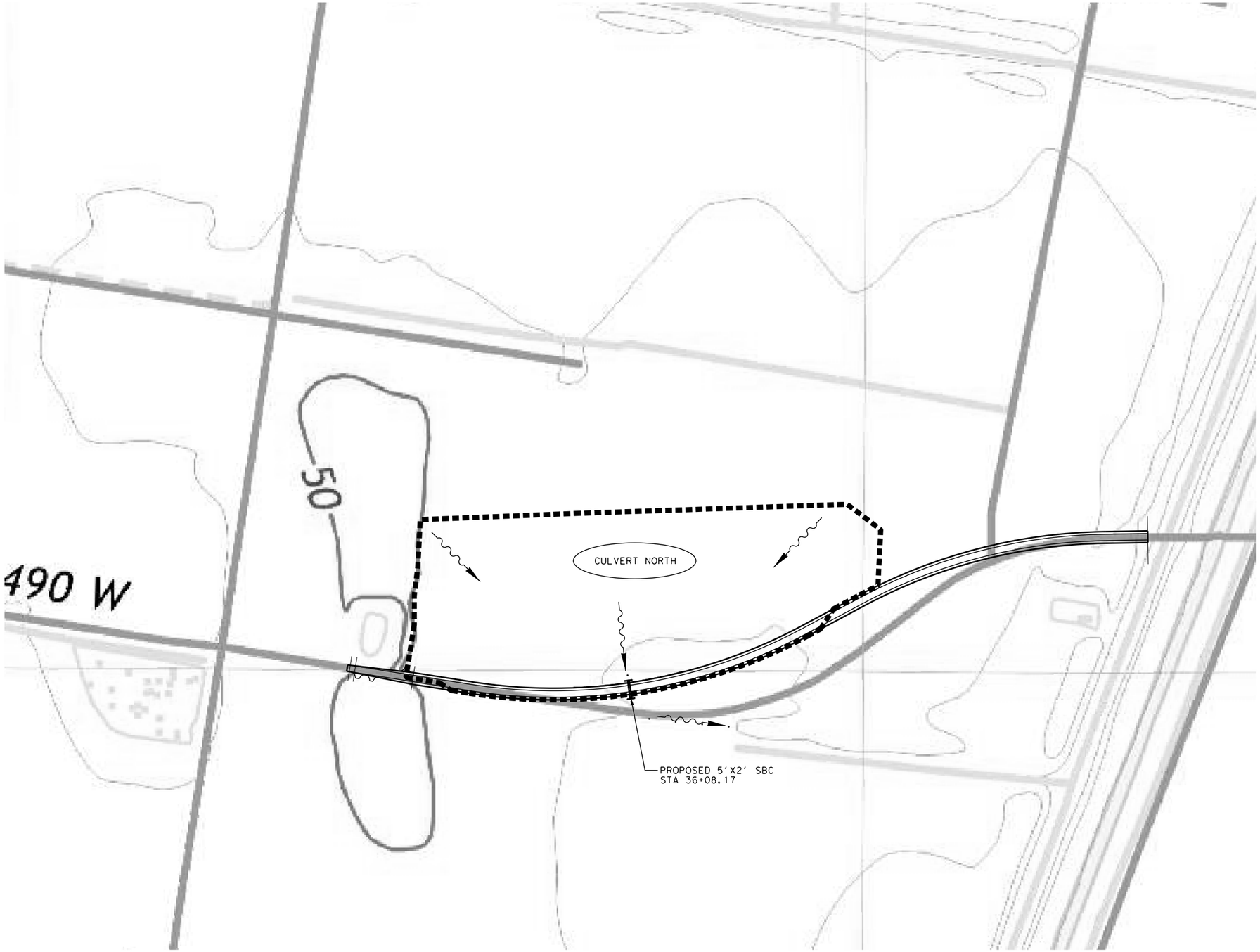
STA 36+08.17

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
DRAWN	6	(SEE TITLE SHEET)	FM 490
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	PHARR	WILLACY	
CHECK	CONTROL	SECTION	JOB	75
	1430	01	031, Etc	

PENTABLE: $PENTBL$$
SCALE: $SCALESHORT$$
PLOT DRIVER: $PLTDRV$$

DATE: 4/27/2023
TIME: 9:50:59 AM
USER: untitled
FILE NAME: $FILES$$



N

HORIZ: 0 200 400
SCALE IN FEET

LEGEND

FLOW DIRECTION

DRAINAGE BOUNDARY

DA ID — DRAINAGE ID

NOTES:

1. RUNOFF CALCULATED USING THE RATIONAL EQUATION AS SHOWN IN THE 2019 TxDOT HYDRAULIC DESIGN MANUAL.
2. E, B, AND D VALUES BASED ON THE EBDLKUP-2019-VC6.2.10.XLSM.

	10-YR	100-YR
e	0.7995	0.7635
b	92.4311	124.395
d	12.6314	12.1456

HYDROLOGIC DATA - RATIONAL METHOD

DRAINAGE AREA ID	AREA (AC)	C VALUE	TOTAL CA	Tc USED (MIN)	10-YR INTENSITY (IN/HR)	10-YR Q (CFS)	100-YR INTENSITY (IN/HR)	100-YR Q (CFS)
CULVERT NORTH	24.08	0.39	9.39	18.78	5.87	55.19	9.06	85.09

STATE OF TEXAS
ERIC J. CALVERT
91710
LICENSED
PROFESSIONAL ENGINEER

Eric J. Calvert

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation

FM 490

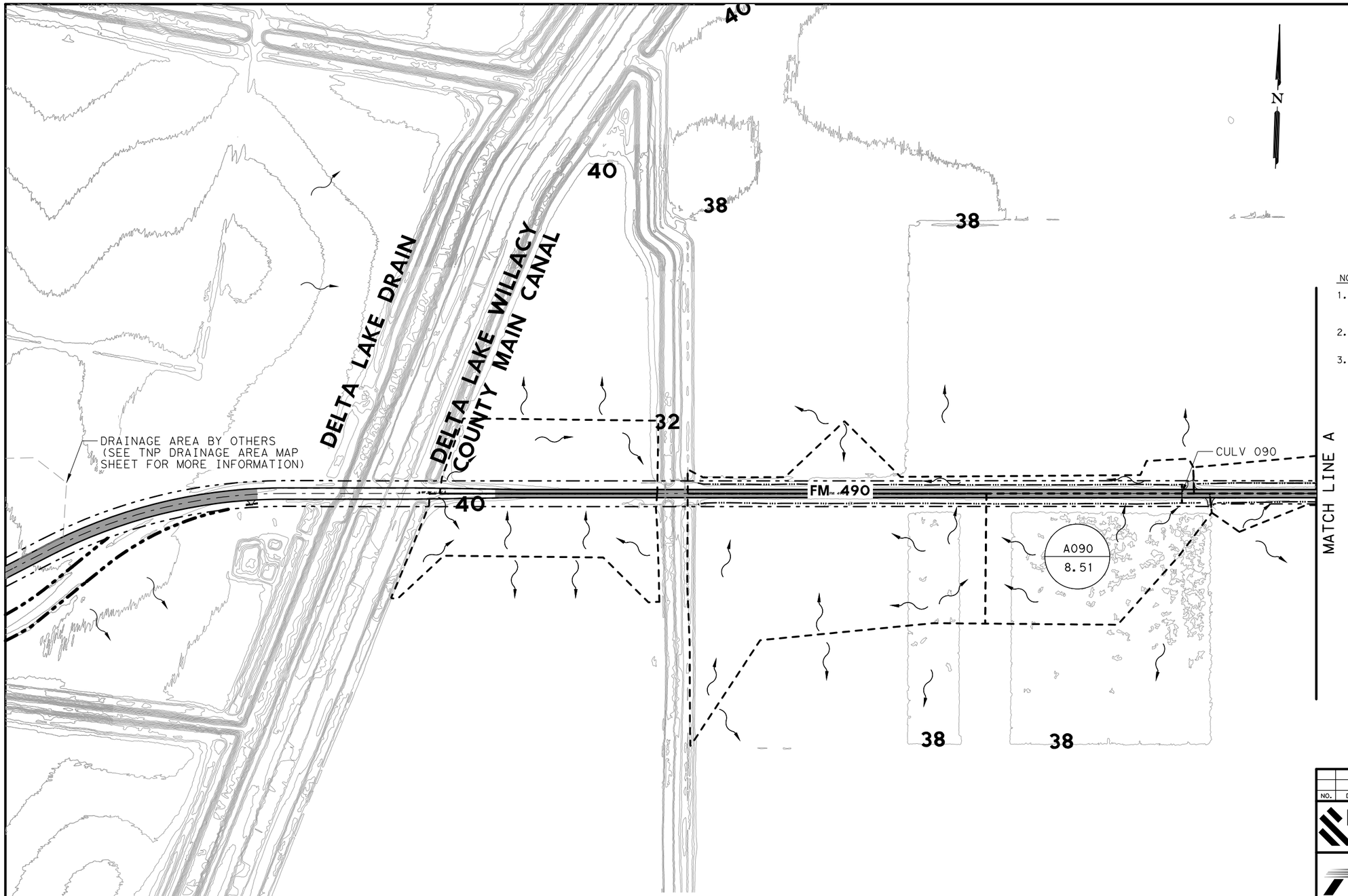
DRAINAGE AREA MAP

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DRAWN	6	(SEE TITLE SHEET)		FM 490
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	PHARR	WILLACY	76
CHECK	CONTROL	SECTION	JOB	
	1430	01	031, Etc	

PENTABLE: $PENTBL$
SCALE: $SCALESHORT$
PLOT DRIVER: $PLTDRVS$

DATE: 1/29/2023
TIME: 10:55:23 AM
USER: unfilled
FILE NAME: $FILES$



NOTES:

1. EXISTING 2-FT CONTOURS WAS REPROJECTED AT PROJECT LOCATION FROM TNRIS LIDAR DATA ONLINE FILES.
2. SOIL MAP WAS DOWNLOADED AT PROJECT LOCATION FROM USGS WEBSITE.
3. DRAINAGE AREAS ARE APPROXIMATE DUE TO INSUFFICIENT CONTOUR DATA TO DETERMINE FLOW IN SOME AREAS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

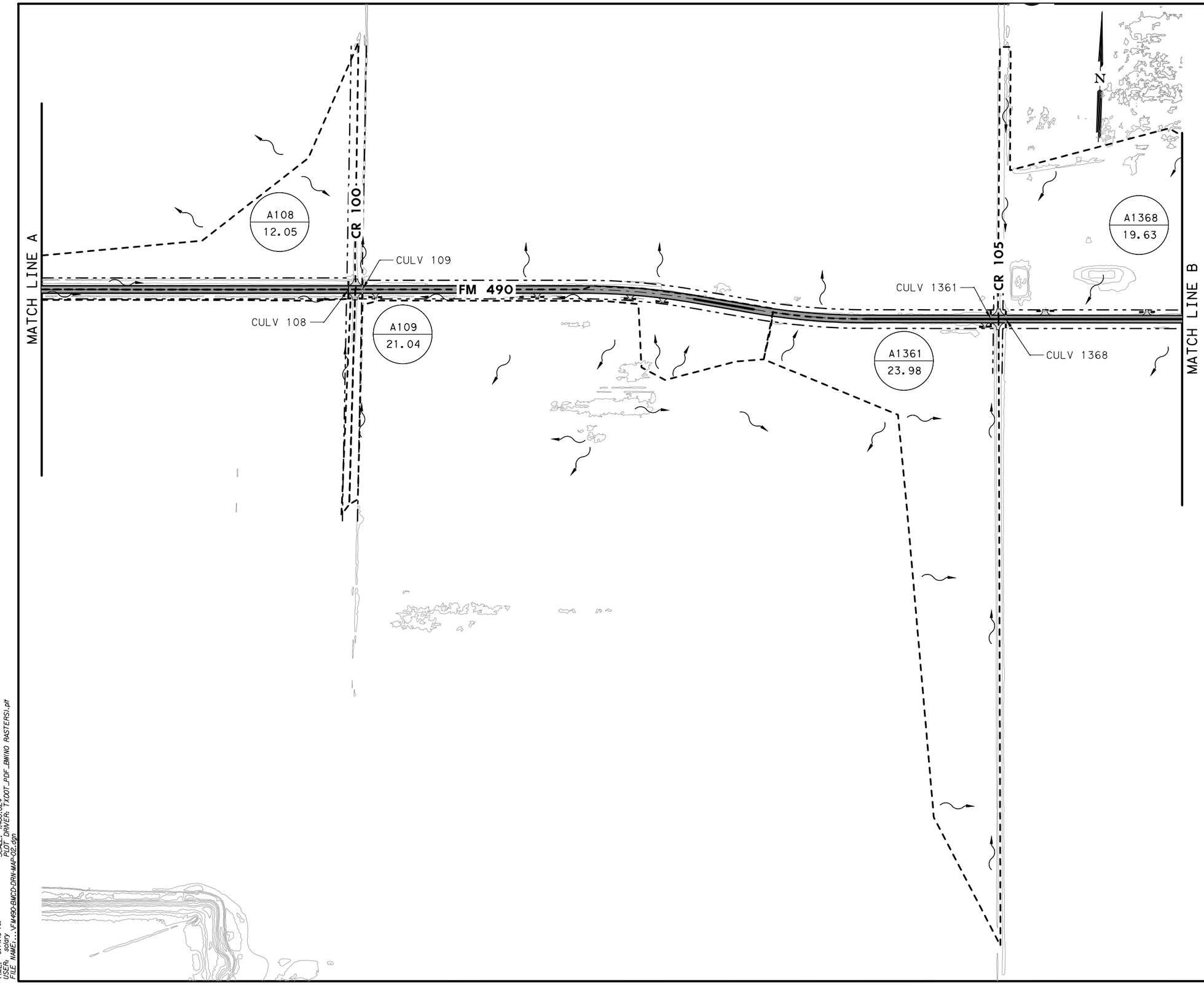
FM 490
DRAINAGE AREA MAP

HORIZONTAL = 1"=400'
VERTICAL = None

SHEET 1 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LEH	6	SEE TITLE SHEET		FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	77
CHECK SPC	CONTROL	SECTION	JOB	
	1430	01	031, Etc	

DATE: 4/25/2023
TIME: 9:44:34 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-DRN-MAP-01.dgn
PENTABLE: SWAFM490 Pentable.tbl
SCALE: 1:400
PLOT DRIVER: TXDOT_PDF_BW(NO RASTERS).pltt



LEGEND

XXXX / XXXX	DA ID / AREA (ACRES)
	DRAINAGE FLOW
	DRAINAGE AREA DELINEATION
	ROW
	LIMITS OF DISPOSAL OF STATE'S MAINTENANCE

NOTES:

1. EXISTING 2-FT CONTOURS WAS REPROJECTED AT PROJECT LOCATION FROM TNRIS LIDAR DATA ONLINE FILES.
2. SOIL MAP WAS DOWNLOADED AT PROJECT LOCATION FROM USGS WEBSITE.
3. DRAINAGE AREAS ARE APPROXIMATE DUE TO INSUFFICIENT CONTOUR DATA TO DETERMINE FLOW IN SOME AREAS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490
DRAINAGE AREA MAP

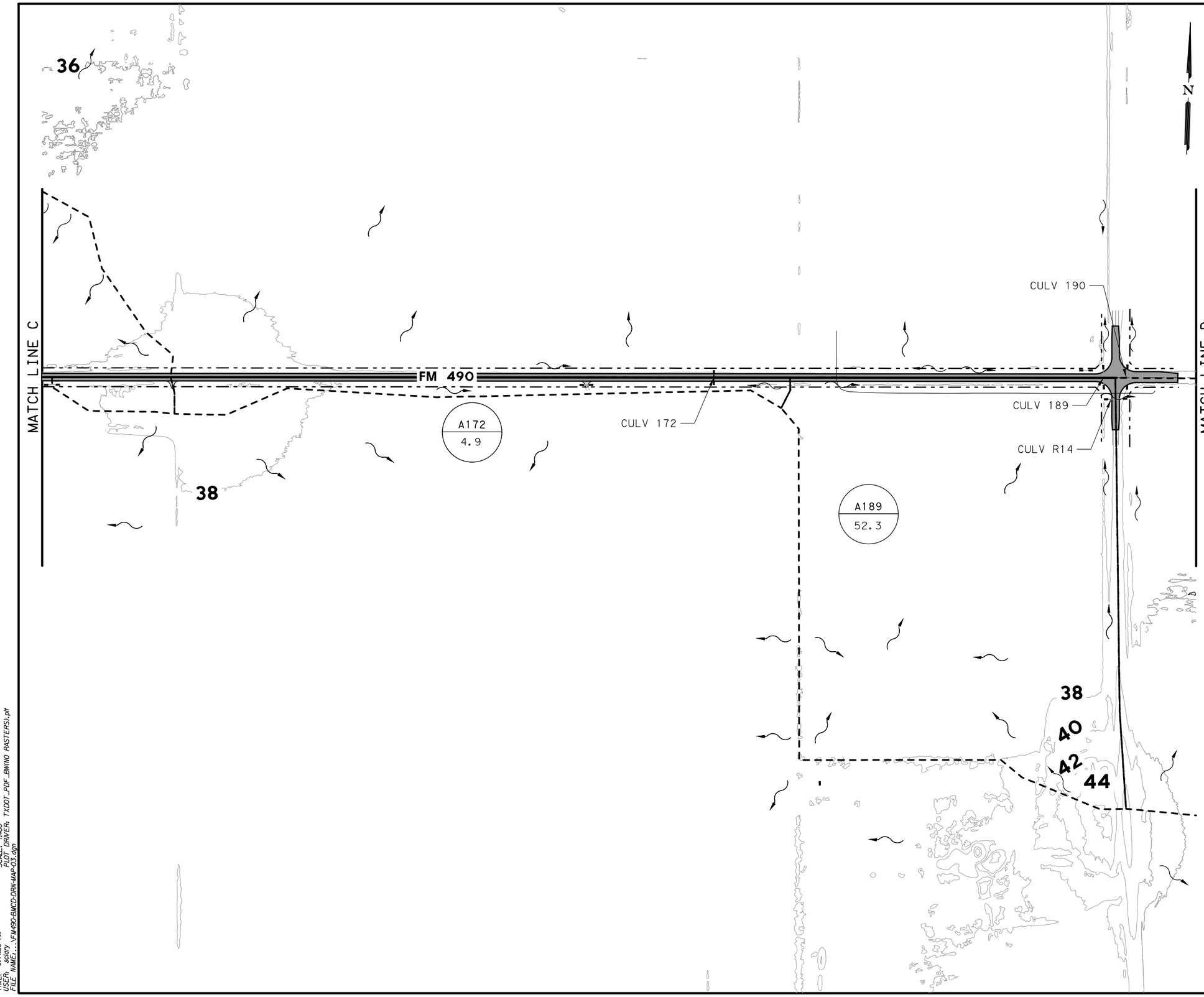
HORIZONTAL = 1"=400'
VERTICAL = None

SHEET 2 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 78

DATE: 4/25/2023
TIME: 9:44:49 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-DRN-MAP-02.dgn
PENTABLE: SWAFM490 Pentable.tbl
SCALE: 1:400.024
PLOT DRIVER: TXDOT_PDF_BW(NO RASTERS).pltt



HORIZ: 0 200 400
SCALE IN FEET

LEGEND

- XXXX / XXXX — DA ID / AREA (ACRES)
- DRAINAGE FLOW
- DRAINAGE AREA DELINEATION
- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE

NOTES:

1. EXISTING 2-FT CONTOURS WAS REPROJECTED AT PROJECT LOCATION FROM TNRIS LIDAR DATA ONLINE FILES.
2. SOIL MAP WAS DOWNLOADED AT PROJECT LOCATION FROM USGS WEBSITE.
3. DRAINAGE AREAS ARE APPROXIMATE DUE TO INSUFFICIENT CONTOUR DATA TO DETERMINE FLOW IN SOME AREAS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

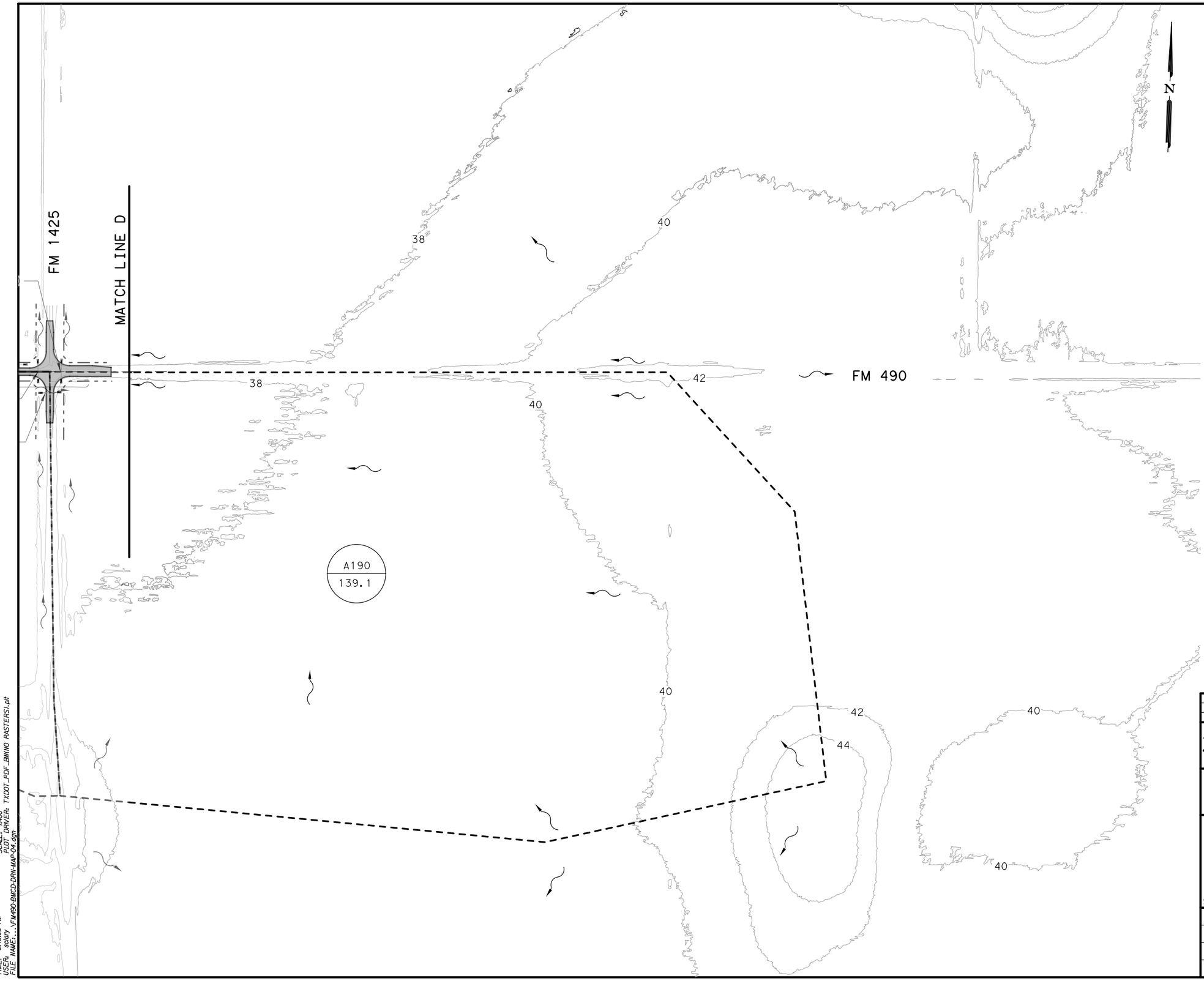
FM 490
DRAINAGE AREA MAP

HORIZONTAL = 1"=400'
VERTICAL = None

SHEET 3 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LEH	6	SEE TITLE SHEET		FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	79
CHECK SPC	CONTROL	SECTION	JOB	
	1430	01	031,Etc	

DATE: 4/25/2023
TIME: 9:44:59 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-DRN-MAP-03.dgn
PENTABLE: SWAT FM490 Pentable.tbl
SCALE: 1=400
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS1.pltt



0 200 400
HORIZ:
SCALE IN FEET

LEGEND

XXXX / XXXX — DA ID / AREA (ACRES)

DRAINAGE FLOW

DRAINAGE AREA DELINEATION

ROW

LIMITS OF DISPOSAL OF STATE'S MAINTENANCE

NOTES:

1. EXISTING 2-FT CONTOURS WAS REPROJECTED AT PROJECT LOCATION FROM TNRIS LIDAR DATA ONLINE FILES.
2. SOIL MAP WAS DOWNLOADED AT PROJECT LOCATION FROM USGS WEBSITE.
3. DRAINAGE AREAS ARE APPROXIMATE DUE TO INSUFFICIENT CONTOUR DATA TO DETERMINE FLOW IN SOME AREAS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490

DRAINAGE AREA MAP

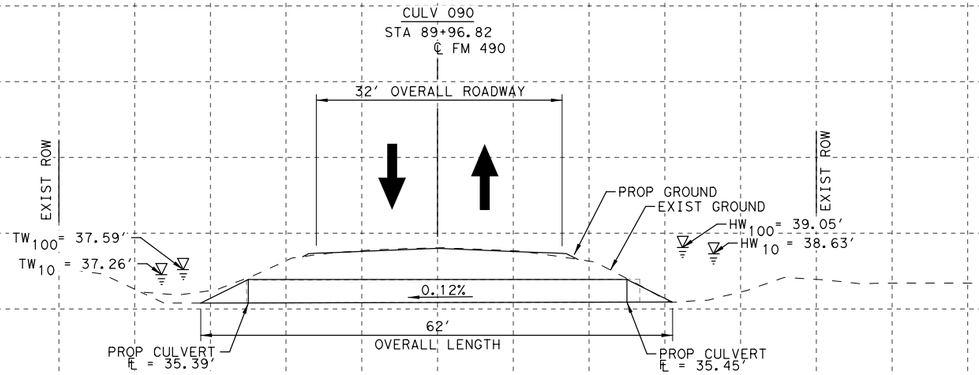
SCALE = 1"=400'

SHEET 4 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK SPC	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 80

DATE: 4/25/2023
TIME: 9:45:08 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-DRN-MAP-04.dgn
PENTABLE: SWAFM490 Pentable.tbl
SCALE: 1:400
PLOT DRIVER: TXDOT_PDF_BW(NO RASTERS).pltr

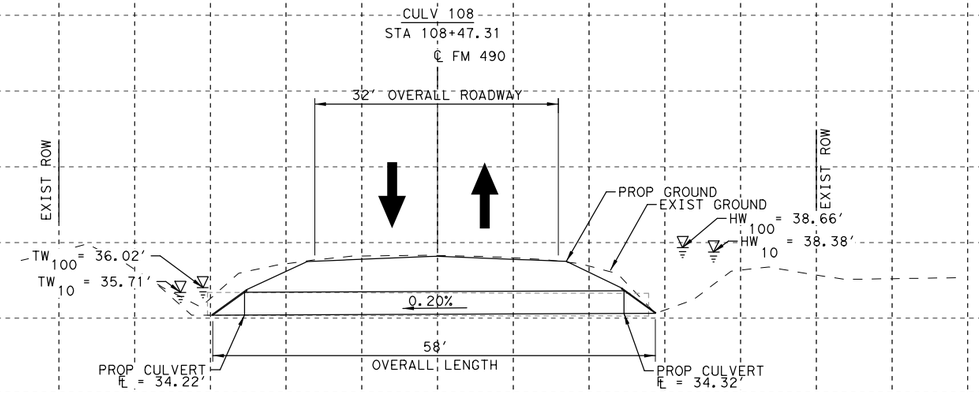


CULVERT HYDRAULIC ANALYSIS COMPUTATIONS

Culvert	Size (in)	No. Barrels	Length (ft)	Slope (%)	HW_{allow} (Elev. MSL)	HW10 (Elev. MSL)	HW_{100} (Elev. MSL)	TW10 (Elev. MSL)	TW_{100} (Elev. MSL)	VEL_{10} (ft/s)	VEL_{100} (ft/s)
CULV 090	18	1	50.00	0.12	38.99	38.63	39.05	37.26	37.59	6.22	6.99
CULV 108	18	1	50.00	0.20	38.57	38.38	38.66	35.71	36.02	1.53	1.73
CULV 109	24	1	50.00	0.54	38.15	37.15	38.25	35.81	36.24	1.46	1.68
CULV 1361	24	1	46.00	0.43	38.37	38.39	38.49	37.31	37.76	6.05	6.24
CULV 1368	24	1	49.00	0.39	38.29	37.89	38.39	36.39	36.73	7.32	7.35
CULV 172	18	1	46.00	0.07	38.55	36.63	37.47	36.02	36.23	4.75	6.49
CULV 189	24	1	70.00	0.53	38.95	38.08	38.48	37.95	38.48	5.69	6.50
CULV 190	24	1	75.00	0.63	38.99	38.90	39.01	38.44	38.99	6.56	6.78

SUMMARY OF QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6003	RC PIPE (CL III)(18 IN)	LF	50
467	6358	SET (TY II) (18 IN) (RCP) (4: 1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	60



SUMMARY OF QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6003	RC PIPE (CL III)(18 IN)	LF	50
467	6356	SET (TY II) (18 IN) (RCP) (3: 1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	61

HORIZ: 0 10 20 SCALE IN FEET

VERT: 0 5 10 SCALE IN FEET

LEGEND

--------- EXIST PIPE

NOTES:

1. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490
CULVERT PROFILE
CULV 090 & CULV 108

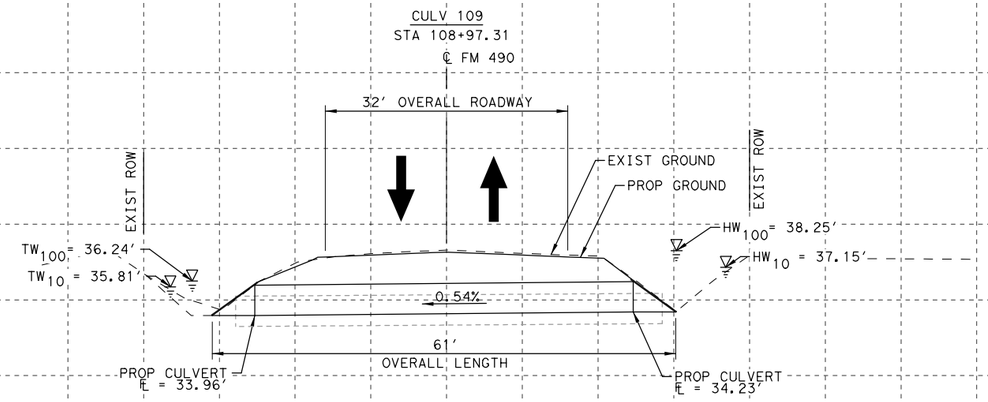
HORIZONTAL = 1"=20'
VERTICAL = 1"=10'

SHEET 1 OF 4

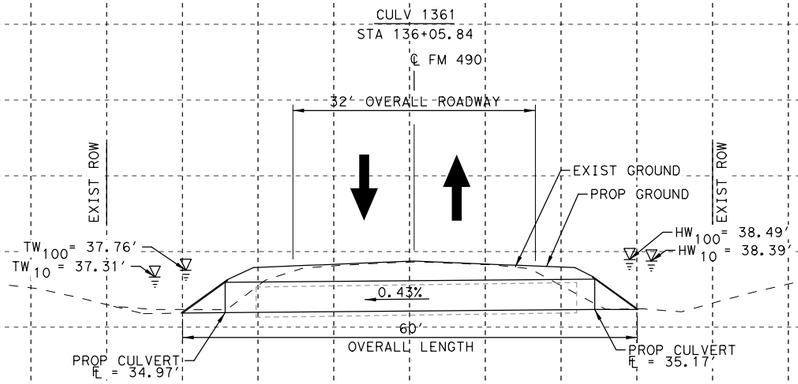
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 81

PENTABLE: SWA FM490 Pentable.tbl
SCALE: h20
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS).pltt
DATE: 4/25/2023
TIME: 9:45:57 AM
USER: scary
FILE NAME: ...\FM490-BMCD-CULV-01.dgn



SUMMARY OF QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6005	RC PIPE (CL III)(24 IN)	LF	50
467	6388	SET (TY II) (24 IN) (RCP) (3:1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	60



SUMMARY OF QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6005	RC PIPE (CL III)(24 IN)	LF	46
467	6388	SET (TY II) (24 IN) (RCP) (3:1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	46

HORIZ: 0 10 20
SCALE IN FEET

VERT: 0 5 10
SCALE IN FEET

LEGEND

--------- EXIST PIPE

NOTES:

1. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490
CULVERT PROFILE
CULV 109 & CULV 1361

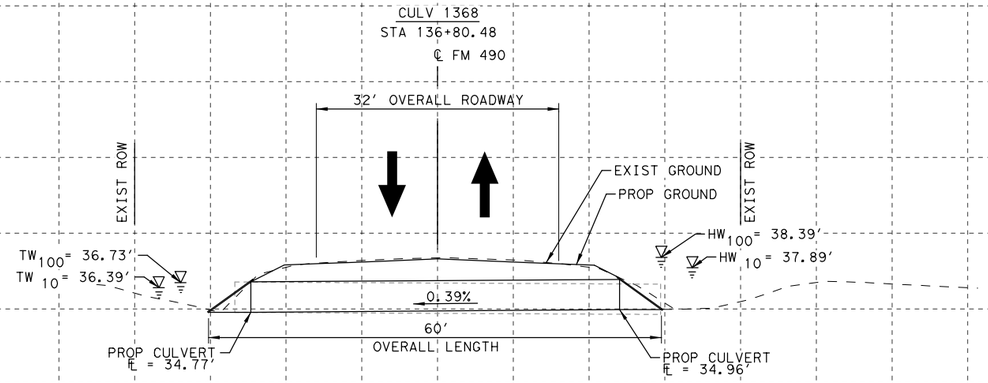
HORIZONTAL = 1"=20'
VERTICAL = 1"=10'

SHEET 2 OF 4

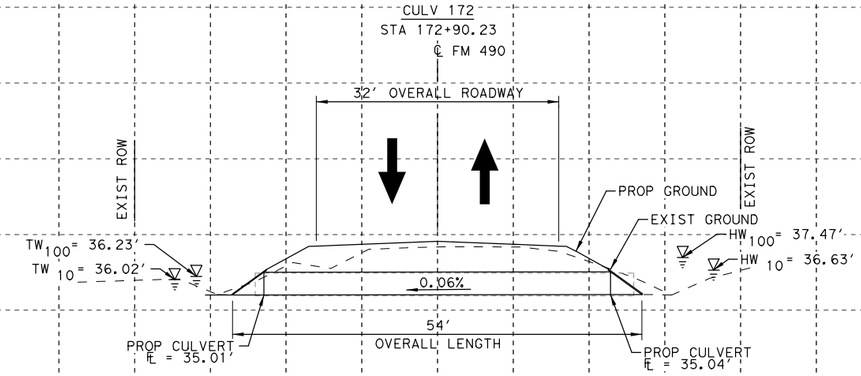
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 82

PENTABLE: SWA FM490 Pentable.tbl
SCALE: h20
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).pltt
PLOT DRIVER: TXDOT_PDF_BMCD-CULV-02.dgn
DATE: 4/25/2023
TIME: 9:45:27 AM
USER: sclary
FILE NAME: ...\FM490-BMCD-CULV-02.dgn



SUMMARY OF QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6005	RC PIPE (CL III)(24 IN)	LF	49
467	6388	SET (TY II) (24 IN) (RCP) (3:1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	57



SUMMARY OF QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6003	RC PIPE (CL III)(18 IN)	LF	46
467	6358	SET (TY II) (18 IN) (RCP) (4:1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	55

HORIZ: 0 10 20
SCALE IN FEET
VERT: 0 5 10
SCALE IN FEET

LEGEND

--------- EXIST PIPE

NOTES:

1. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
CULVERT PROFILE
CULV 1368 & CULV 172

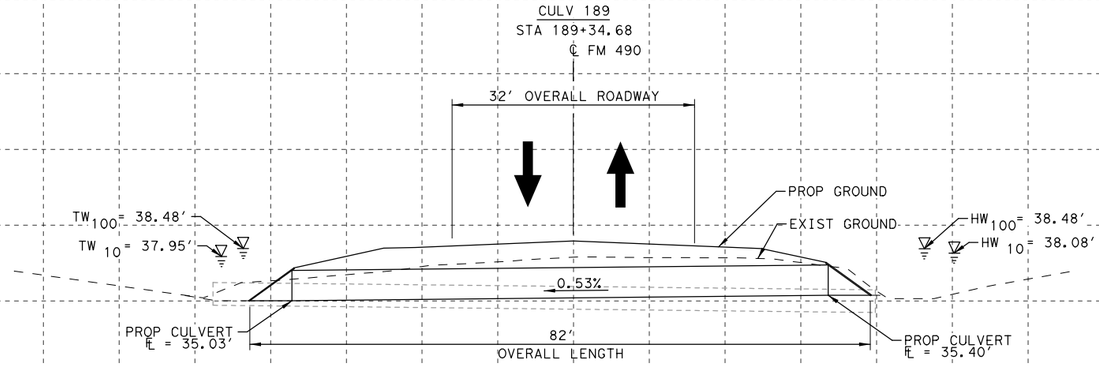
HORIZONTAL = 1"=20'
VERTICAL = 1"=10'

SHEET 3 OF 4

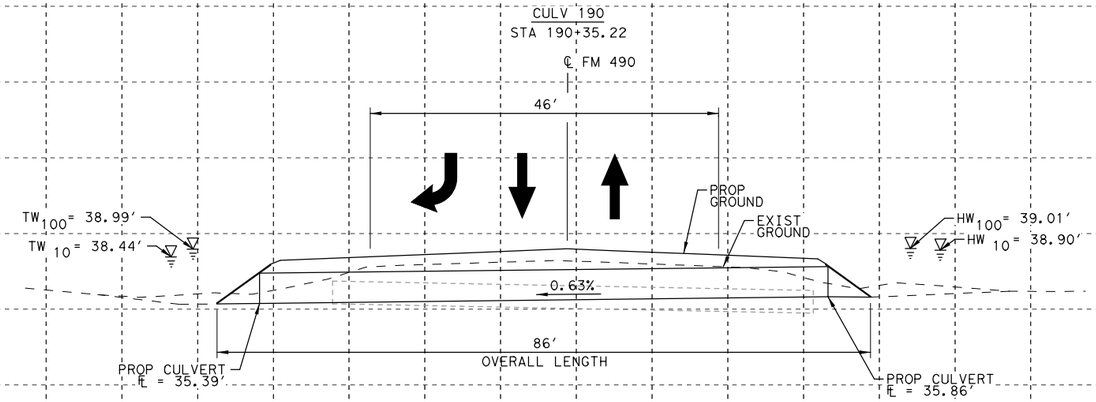
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 83

PENTABLE: SWA FM490 Pentable.tbl
SCALE: h20
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS).pltt
DATE: 4/25/2023
TIME: 9:45:35 AM
USER: scary
FILE NAME: ...\FM490-BMCD-CULV-03.dgn



SUMMARY OF QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6005	RC PIPE (CL III)(24 IN)	LF	70
467	6388	SET (TY II) (24 IN) (RCP) (3:1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	86



SUMMARY OF QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
464	6005	RC PIPE (CL III)(24 IN)	LF	75
467	6388	SET (TY II) (24 IN) (RCP) (3:1) (C)	EA	2
496	6004	REMOVE STR (SET)	EA	2
496	6007	REMOVE STR (PIPE)	LF	86

HORIZ: 0 10 20
SCALE IN FEET

VERT: 0 5 10
SCALE IN FEET

LEGEND

--------- EXIST PIPE

NOTES:

1. REFER TO DRAINAGE AREA MAPS SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490
CULVERT PROFILE
CULV 189 & CULV 190

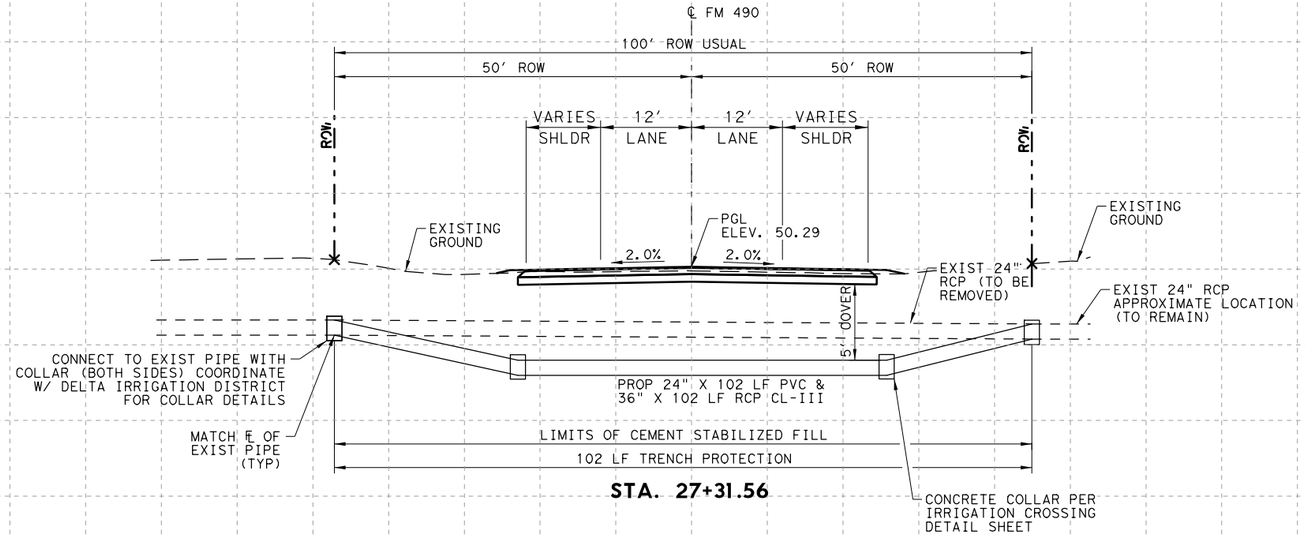
HORIZONTAL = 1"=20′
VERTICAL = 1"=10′

SHEET 4 OF 4

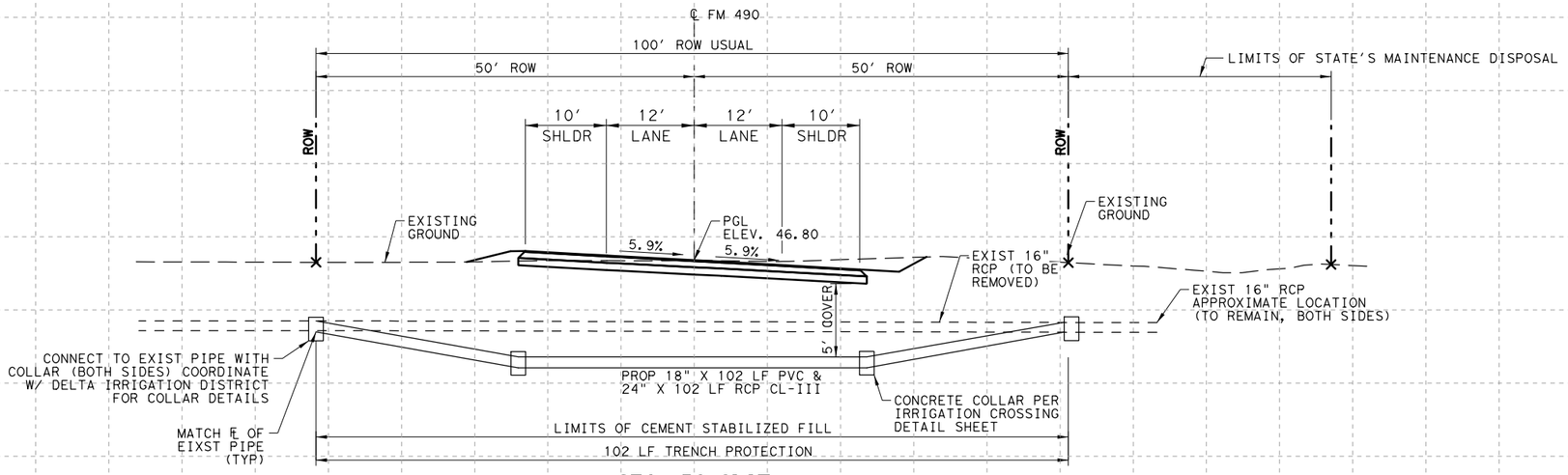
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031, Etc

SHEET NO. 84

PENTABLE: SWA FM490 Pentable.tbl
SCALE: h20
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS).pltt
PLOT DATE: 4/25/2023
TIME: 9:45:46 AM
USER: scary
FILE NAME: ...\FM490-BMCD-CULV-04.dgn



STA. 27+31.56



STA. 50+31.17

IRRIGATION PIPE REPLACEMENT NOTES:

1. COORDINATE WITH DELTA IRRIGATION DISTRICT PRIOR TO PIPE SHUTDOWN.
2. BACKFILL PIPE PER ITEM 400. CLASS B GRANULAR BEDDING TO BE PAID UNDER ITEM 400 STRUCTURAL EXCAVATION (SPL.) UTILIZE CEMENT STABILIZED BACKFILL.
3. ALL PVC SHALL BE PVC PIP SDR 32.5.
4. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS. CAUTION SHALL BE TAKEN AT ROW LIMITS TO NOT DAMAGE ADJACENT PROPERTY.
5. SEE IRRIGATION CROSSING DETAIL AND MISCELLANEOUS PIPE DETAILS FOR FURTHER INFORMATION.
6. CONTRACTOR SHALL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD, SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

IRRIGATION CROSSINGS

SCALE = None

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SPC	6	SEE TITLE SHEET	FM 490
DRAWN SPC	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK CAJ	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 85

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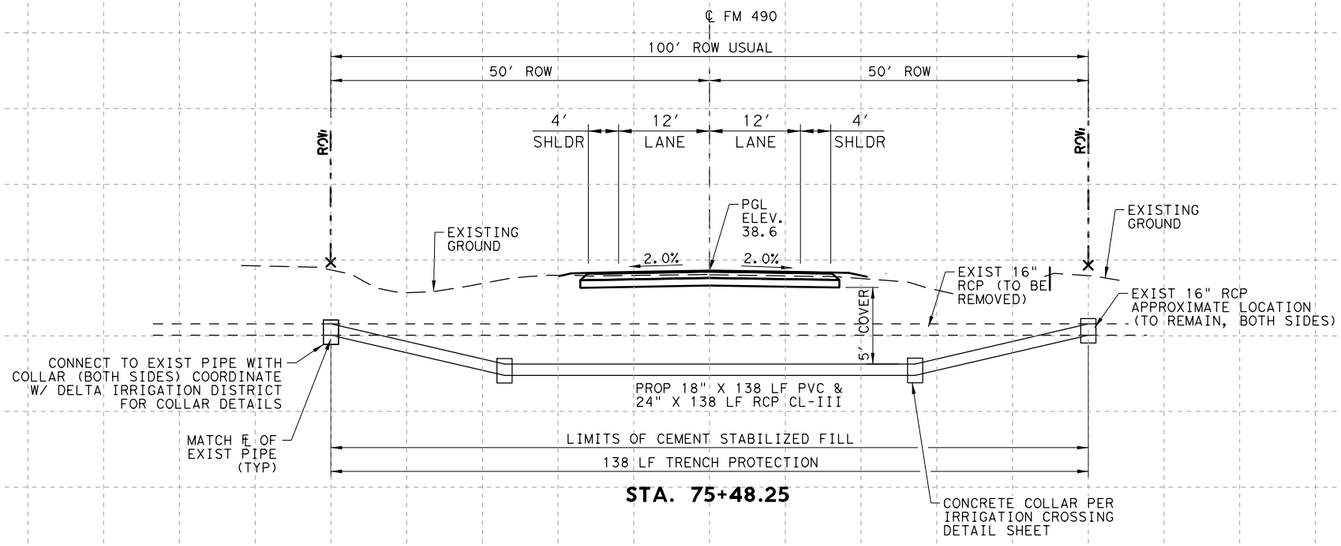
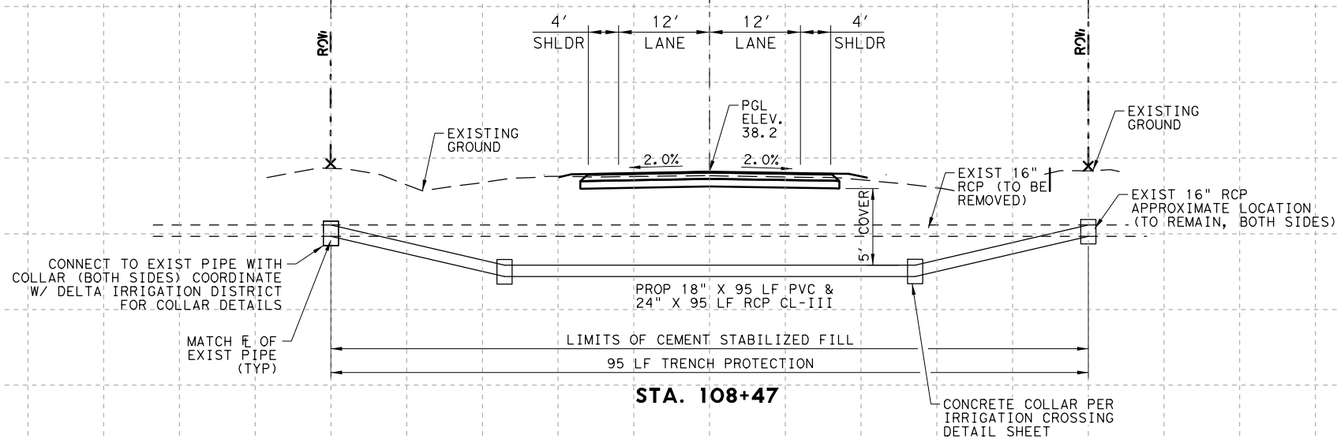


STA. 75+48.25



STA. 108+47

IRRIGATION PIPE REPLACEMENT NOTES:

1. COORDINATE WITH DELTA IRRIGATION DISTRICT PRIOR TO PIPE SHUTDOWN.
2. BACKFILL PIPE PER ITEM 400. CLASS B GRANULAR BEDDING TO BE PAID UNDER ITEM 400 STRUCTURAL EXCAVATION (SPL.) UTILIZE CEMENT STABILIZED BACKFILL.
3. ALL PVC SHALL BE PVC PIP SDR 32.5.
4. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS. CAUTION SHALL BE TAKEN AT ROW LIMITS TO NOT DAMAGE ADJACENT PROPERTY.
5. SEE IRRIGATION CROSSING DETAIL AND MISCELLANEOUS PIPE DETAILS FOR FURTHER INFORMATION.
6. CONTRACTOR SHALL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.

STATE OF TEXAS
SEAN CLARY
122134
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PROFESSIONAL ENGINEER
04/25/2023

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FM 490

IRRIGATION CROSSINGS

SCALE = None

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
SPC	6	SEE TITLE SHEET	FM 490
DRAWN SPC	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK CAJ	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 86

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FILE NAME: ...\Drainage\FM490-BMCD-RR-02.dgn
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DATE: 4/25/2023

DATE:
FILE:

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
CULVERT AT 36+08.17 (Both)	1 ~ 5'x 2'	5'	SCP-5	PW-1	0°	4:1	6"	6"	0.330'	2.833'	N/A	N/A	11.333'	6.000'	N/A	0.0	0.2	11.0	128

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

3/29/2023

STATE OF TEXAS
ERIC J. CALVERT
91710
LICENSED
PROFESSIONAL ENGINEER

Eric J. Calvert

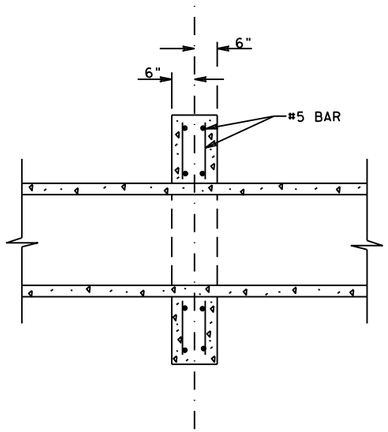
Texas Department of Transportation

Bridge Division Standard

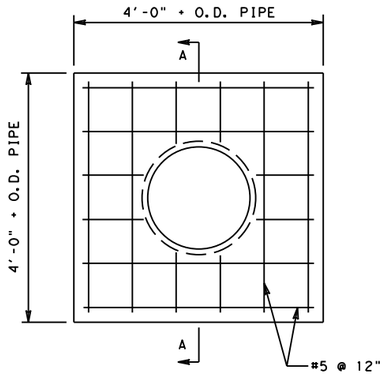
BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031, Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		87

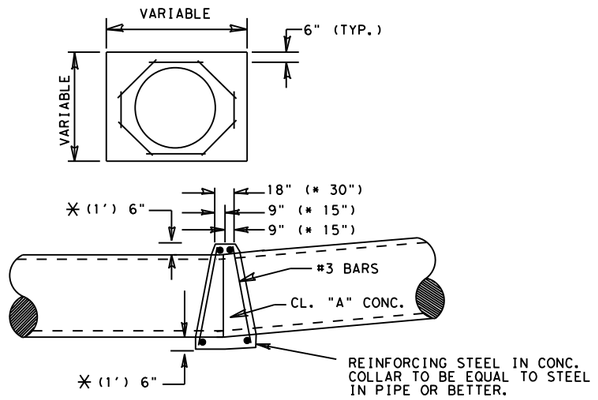


SECTION A-A



FRONT ELEVATION

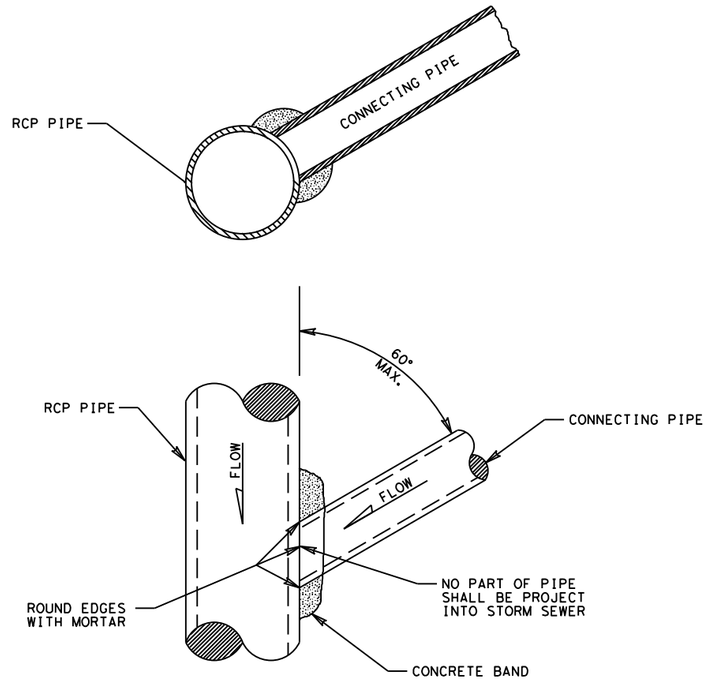
CONCRETE PIPE COLLAR



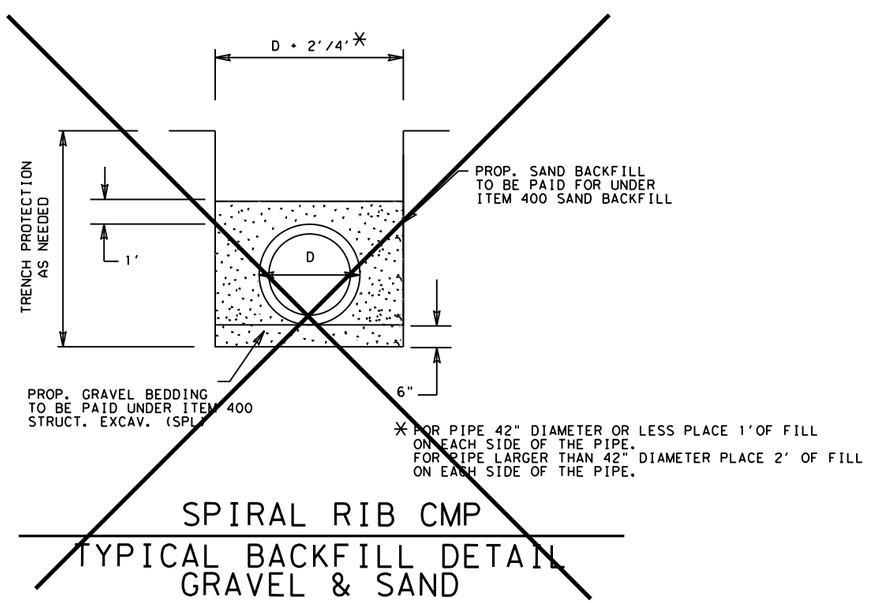
DETAIL FOR CONC. COLLARS DRAINAGE STRUCTURES AND PIPE SIPHONS (HORIZ. & VERT. BENDS)

NOTE: PROP. CONC. COLLAR WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE BIDS ITEMS INVOLVED.

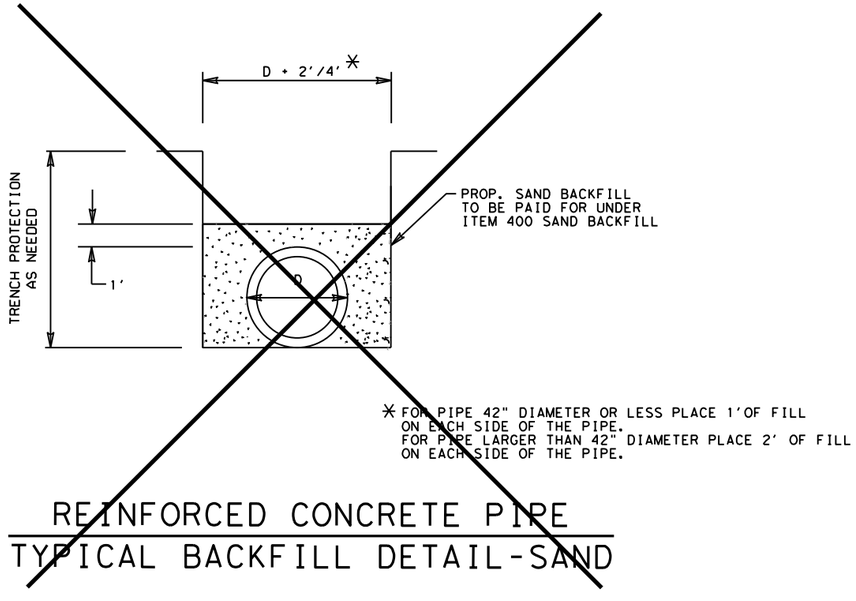
* FOR 42" DIAMETER AND LARGER PIPE



TYPICAL REINFORCED CONC. PIPE CONNECTION WITHOUT MANHOLE



SPIRAL RIB CMP TYPICAL BACKFILL DETAIL GRAVEL & SAND



REINFORCED CONCRETE PIPE TYPICAL BACKFILL DETAIL-SAND

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS PIPE DETAILS

REV. 8/14

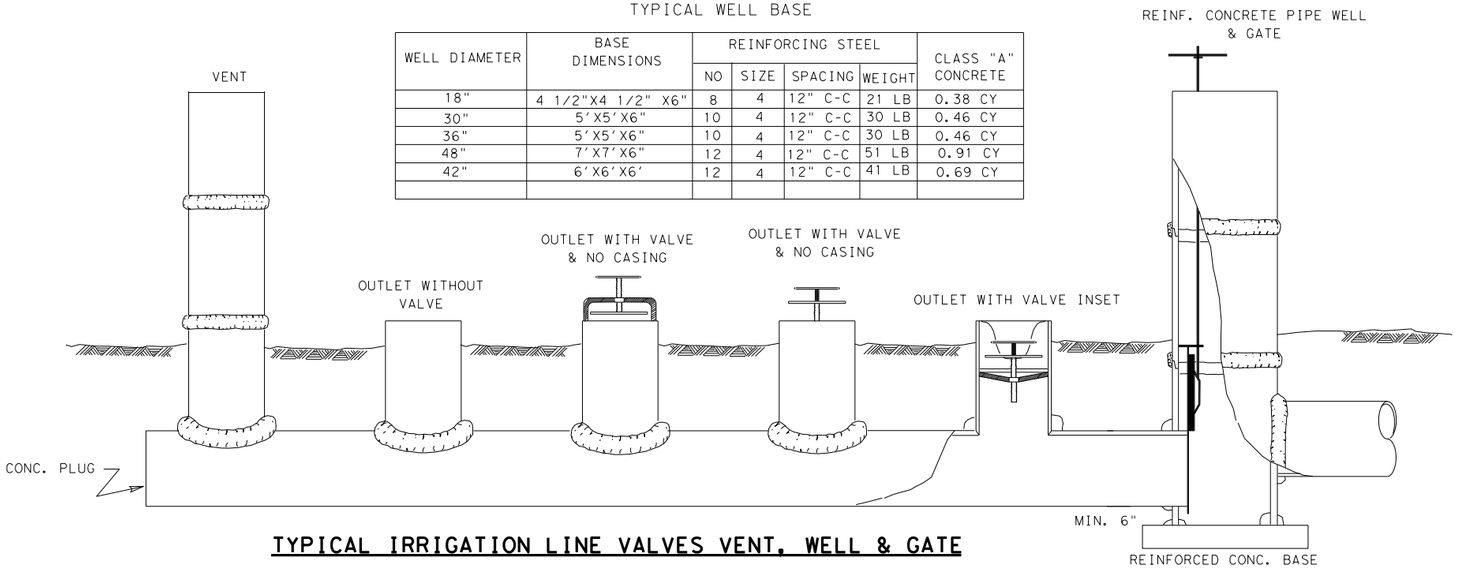
COLLAR.DGN

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		FILE NO.			SHEET NO.
6						88
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	1430	01	031,Etc.	FM 490

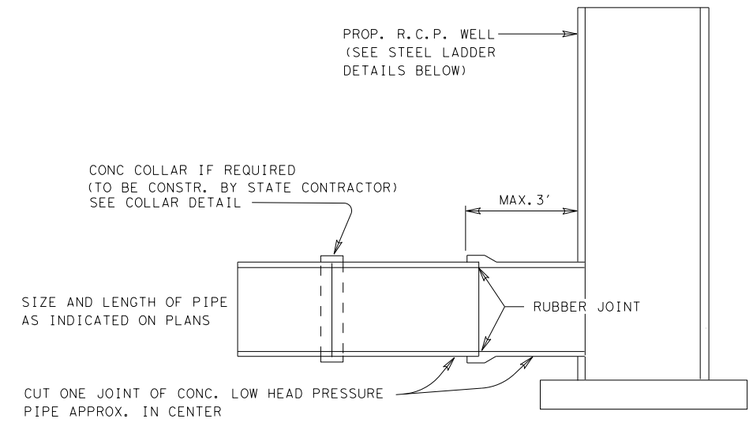
FILE: $FILE$ $TIME$
DATE: $DATE$

ESTIMATED QUANTITIES FOR
TYPICAL WELL BASE

WELL DIAMETER	BASE DIMENSIONS	REINFORCING STEEL				CLASS "A" CONCRETE
		NO	SIZE	SPACING	WEIGHT	
18"	4 1/2"X4 1/2" X6"	8	4	12" C-C	21 LB	0.38 CY
30"	5'X5'X6"	10	4	12" C-C	30 LB	0.46 CY
36"	5'X5'X6"	10	4	12" C-C	30 LB	0.46 CY
48"	7'X7'X6"	12	4	12" C-C	51 LB	0.91 CY
42"	6'X6'X6'	12	4	12" C-C	41 LB	0.69 CY



TYPICAL IRRIGATION LINE VALVES VENT, WELL & GATE



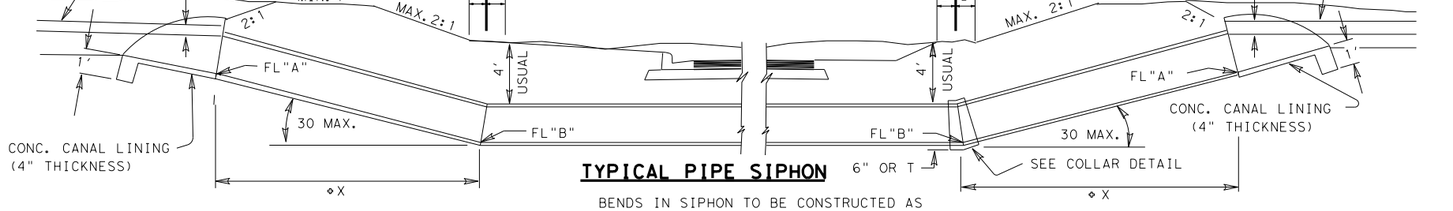
TYPICAL CONC. PIPE WELL DETAILS FOR CONNECTING CONC. LOW HEAD PRESSURE PIPE

GENERAL NOTES

HEIGHT OF RELOCATED WELLS AND VENTS TO BE EQUIVALENT TO THAT OF EXISTING STRUCTURES OR AS REQUIREDFOR PROPER OPERATION.

CONCRETE REQUIRED FOR BASE, PLUGS, OR CAPS WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED AS SUB-SIDIARY TO THE VARIOUS BID ITEMS OF THIS CONTRACT.

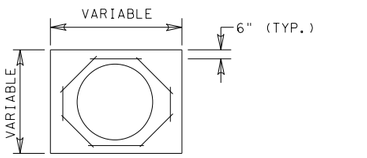
IN GENERAL THE PARTICULAR TYPE OR DESIGN OF THE EXISTING FACILITY TO BE EXTENDED OR RELOCATED SHALL BE DUPLICATED.

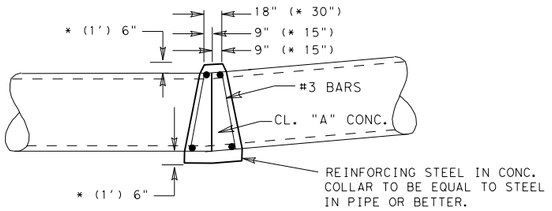


TYPICAL PIPE SIPHON

BENDS IN SIPHON TO BE CONSTRUCTED AS PROVIDED IN SPECIFICATIONS

◇ X AND FL "A" AS SHOWN ON PLANS ARE NOMINAL DESIGN DIMENSIONS AND MAY BE VARIED IN FIELD TO FIT EXISTING CONDITIONS.





DETAIL FOR CONC. COLLARS DRAINAGE STRUCTURES AND PIPE SIPHONS (HORIZ. & VERT. BENDS)

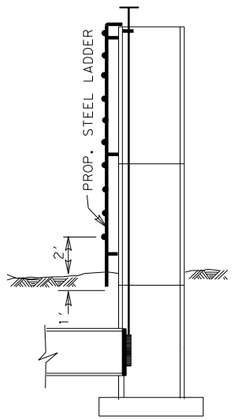
NOTE: PROP. CONC. COLLAR WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE BIDS ITEMS INVOLVED.

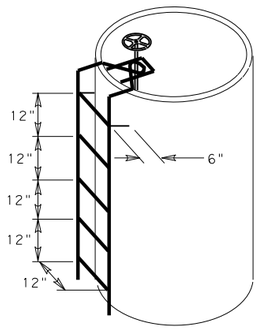
* FOR 42" AND LARGER PIPE

LADDER TO BE CONSTRUCTED OF ¾" DIA. REINF. STEEL. THE PARALLEL SIDEPIECES SPACED 12" APART TO BE HOOKED OVER TOP OF WELL AND STAND-OFFS WELDED AT TOP RUNG, AT THEIR MID-POINT AND BOTTOM. RUNGS TO BE WELDED TO SIDEPIECES AT 12" INTERVALS THE FIRST RUNG TO BE 2' FROM NATURAL GROUND.

STEEL LADDER TO BE PAID FOR AS SUBSIDIARY TO PRICE OF WELL.

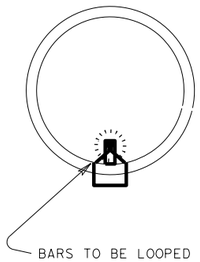
NOTE: COMMERCIAL FABRICATED OR CAST METAL STEPS MAY BE USED IF APPROVED BY THE ENGINEER AND/OR THE WATER DISTRICT INVOLVED.





STEEL LADDER DETAILS

TO BE USED ON ALL WELLS WITH GATES WHEN THE DISTANCE FROM NATURAL GROUND TO TOP OF WELL IS 6 FT. OR MORE.



PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

IRRIGATION CROSSING DETAIL

REV. 4/15

IRRIG1.DGN

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			FILE NO.			SHEET NO.
6	SEE TITLE SHEET						89
STATE	STATE DIST.NO.	COUNTY	CONT.	SECT.	JOB		HIGHWAY NO.
TEXAS	21	WILLACY	1430	01	031,Etc.		FM 490

DATE:
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

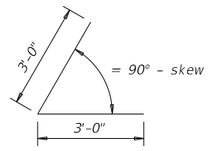
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

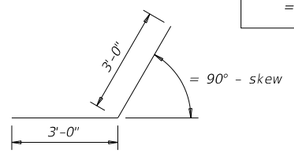
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2

WING DIMENSION FORMULAS:

(All values are in feet.)

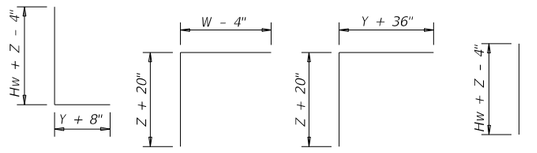
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

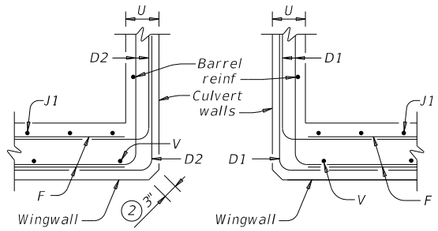
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

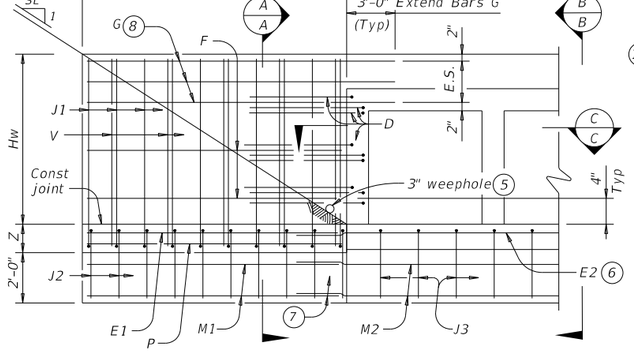
See applicable box culvert standard sheet for S, H, T, and U values.



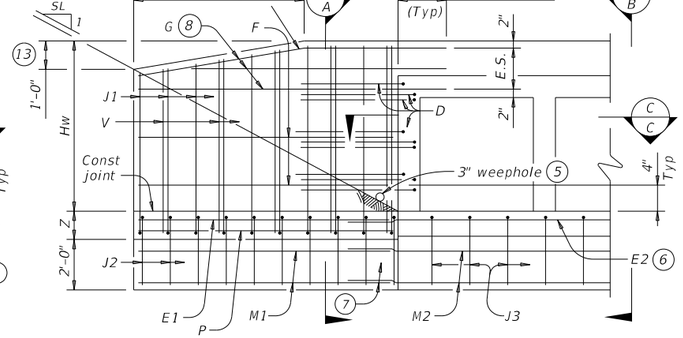
BARS J1 BARS J2 BARS J3 BARS V



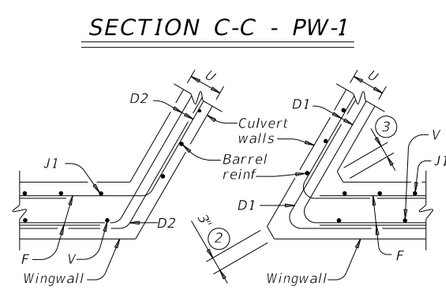
SECTION C-C - PW-1



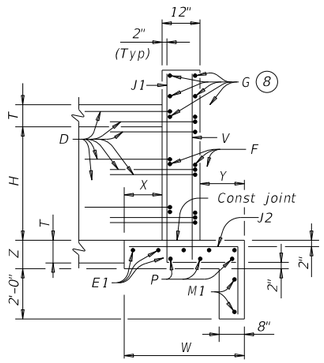
PARTIAL ELEVATION - PW-1



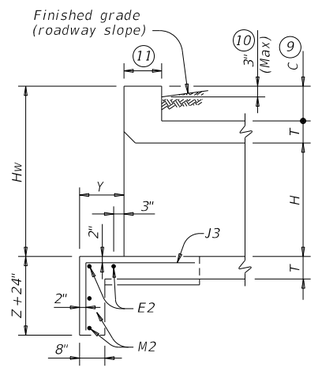
PARTIAL ELEVATION - PW-2



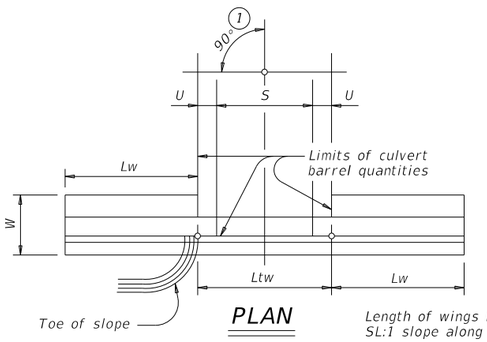
SECTION C-C - PW-2



SECTION A-A
(Showing wing reinforcement.)

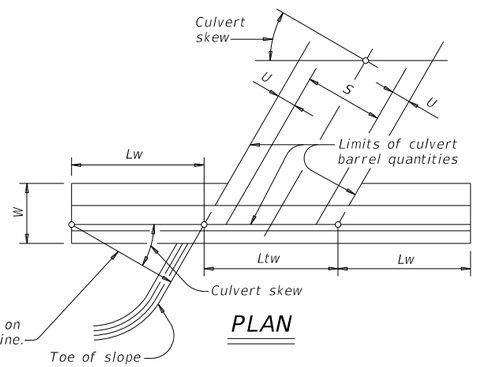


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		90

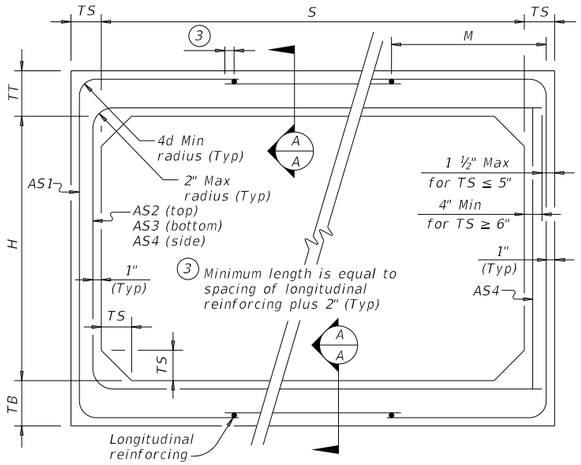
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	–	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	–	–	–	5.1
5	2	6	6	6	3 – 5	44	0.16	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	–	–	–	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	–	–	–	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	–	–	–	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	–	–	–	5.1
5	3	8	7	6	< 2	–	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	–	–	–	5.7
5	3	6	6	6	3 – 5	36	0.14	0.17	0.16	0.14	–	–	–	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	–	–	–	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	–	–	–	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	–	–	–	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	–	–	–	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	–	–	–	5.7
5	4	8	7	6	< 2	–	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	–	–	–	6.3
5	4	6	6	6	3 – 5	45	0.14	0.19	0.18	0.14	–	–	–	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	–	–	–	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	–	–	–	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	–	–	–	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	–	–	–	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	–	–	–	6.3
5	5	8	7	6	< 2	–	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	–	–	–	6.9
5	5	6	6	6	3 – 5	45	0.14	0.21	0.20	0.14	–	–	–	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	–	–	–	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	–	–	–	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	–	–	–	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	–	–	–	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	–	–	–	6.9

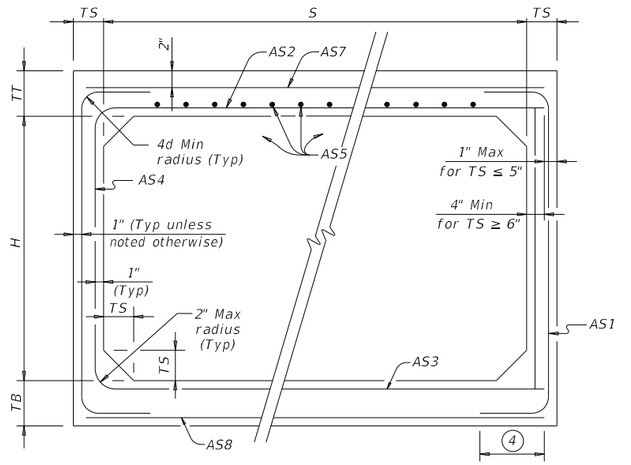
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

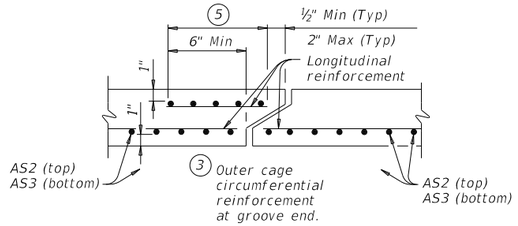
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

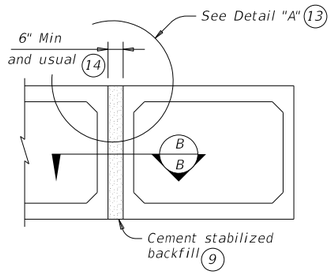
SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

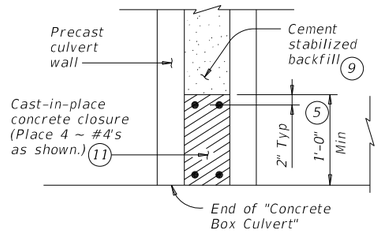
SCP-5

FILE: scp05sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		91

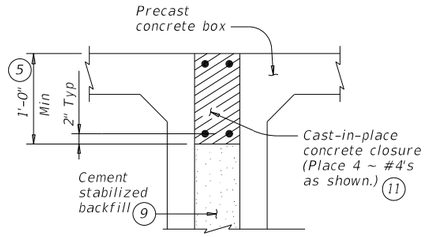
DATE:
FILE:



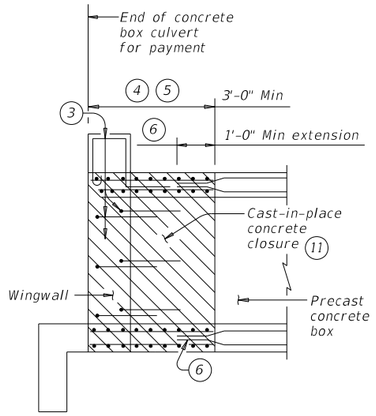
MULTIPLE UNIT PLACEMENT



SECTION B-B

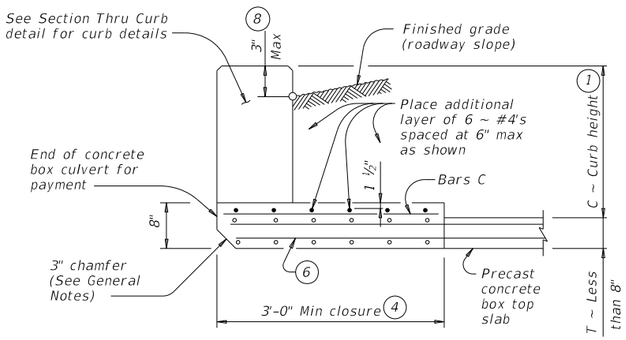


DETAIL "A" (13)

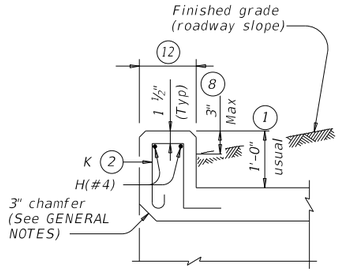


WINGWALL CONNECTION

(Also applies to safety end treatment.)

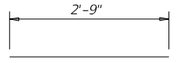


SECTION THRU TOP SLABS LESS THAN 8"



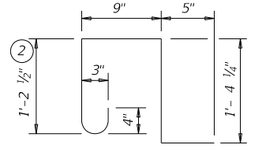
SECTION THRU CURB

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



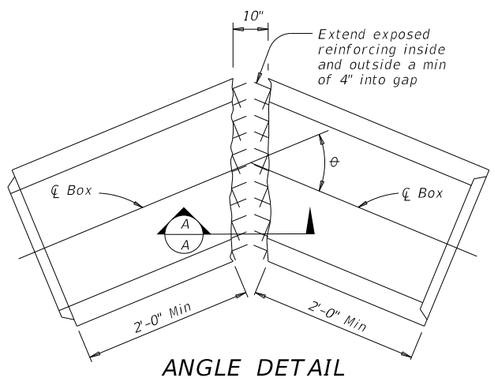
BARS C (#4)

(Spa = 1'-0" Max)

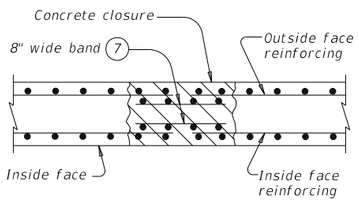


BARS K (#4)

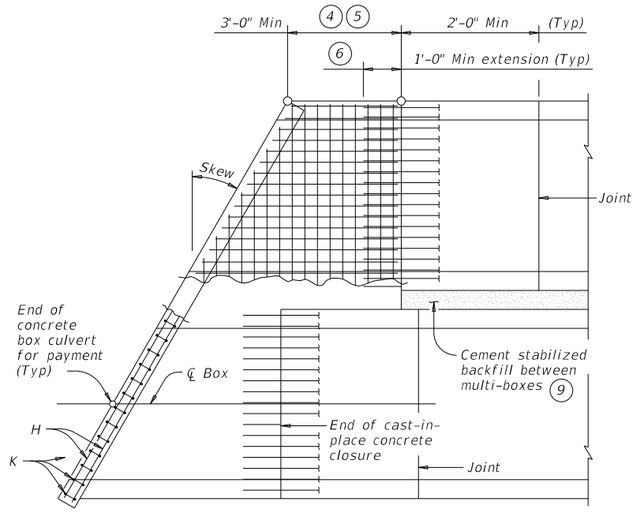
(Spa = 1'-0" Max)
(Length = 4'-2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
4. Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
5. For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
6. Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
7. Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is considered part of the box culvert for payment.
11. Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
12. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out-to-out of bars.

HL93 LOADING

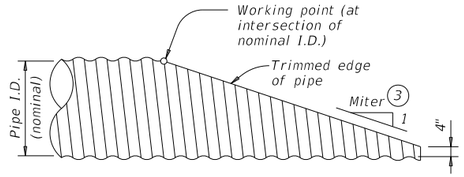
Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

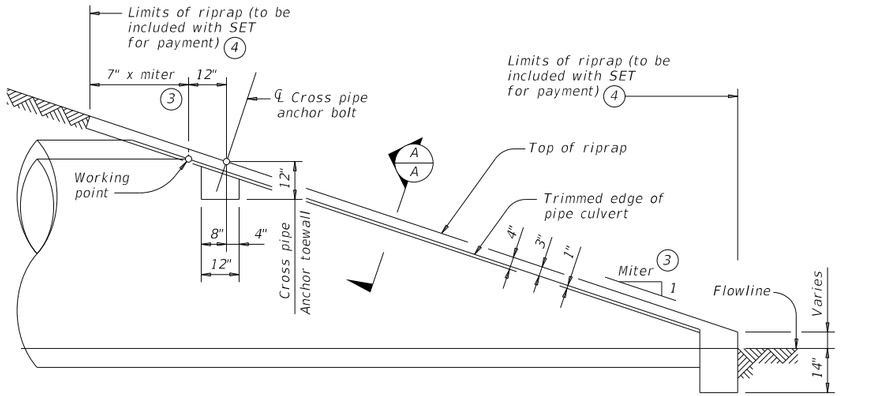
FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		92



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

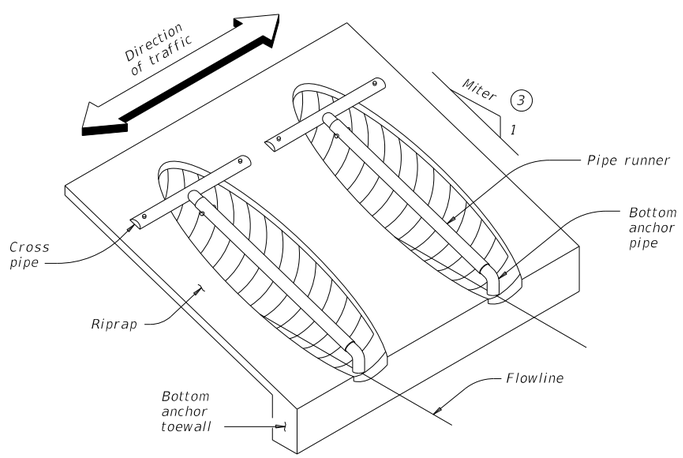
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

DATE:
FILE:

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

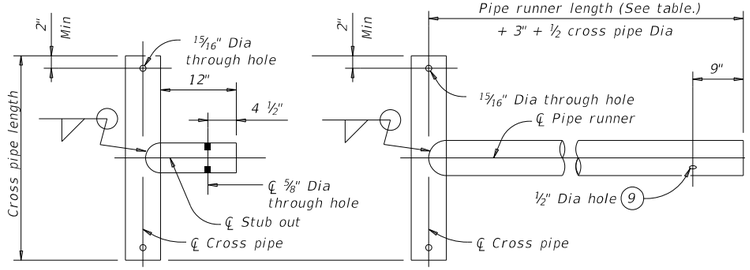
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

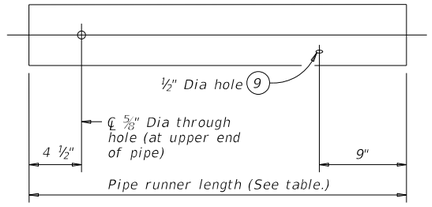
FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		93

DATE:
FILE:



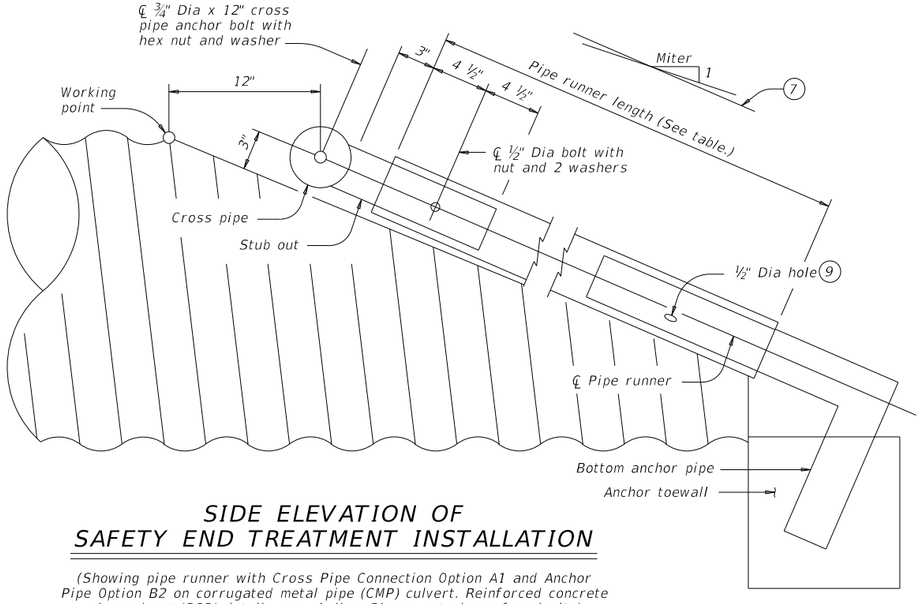
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



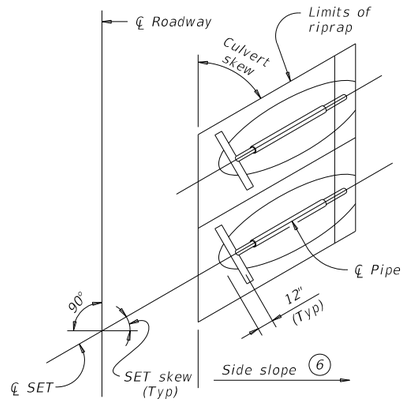
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

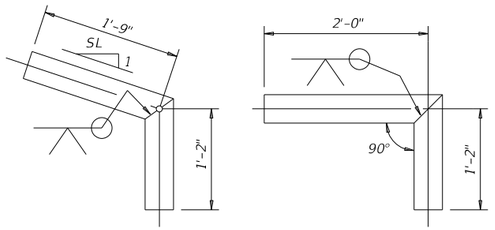


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

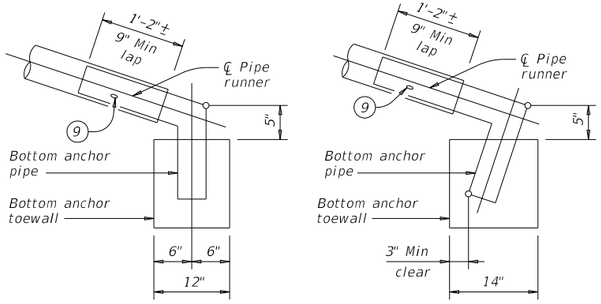


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

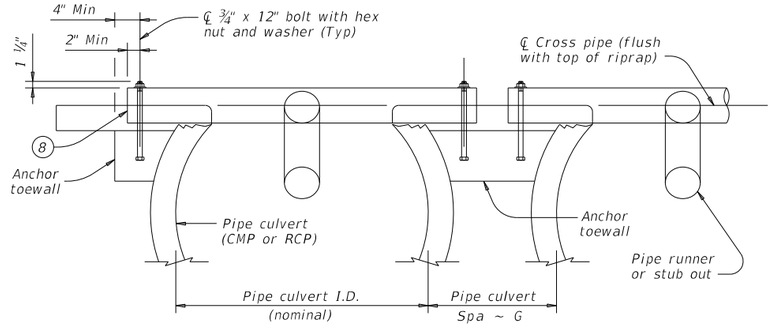
BOTTOM ANCHOR PIPE DETAILS (10)



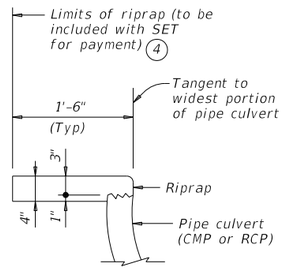
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Texas Department of Transportation

Bridge Division Standard

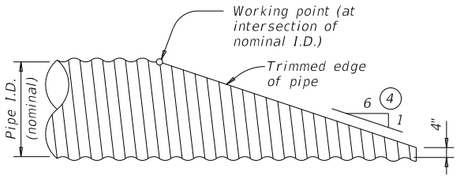
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF	
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1430	01	031,Etc	FM 490	
	DIST	COUNTY		SHEET NO.	
	PHR	WILLACY		94	

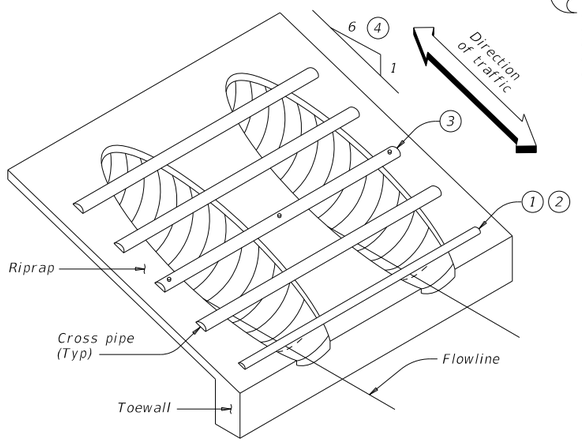
DATE:
FILE:



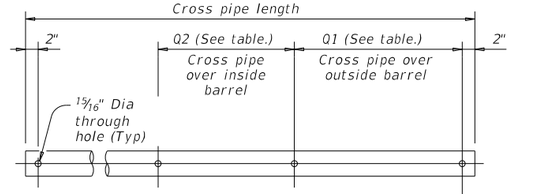
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

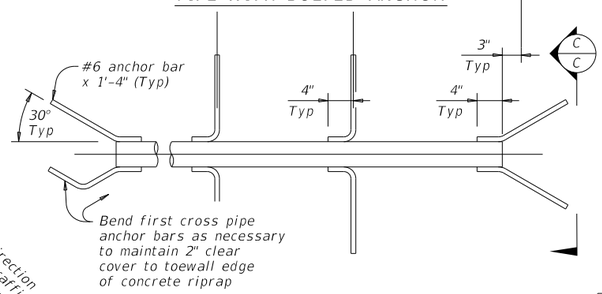
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



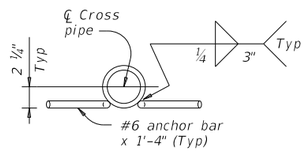
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

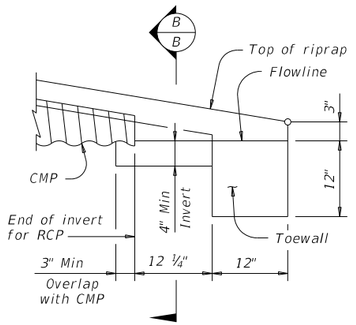


PIPE WITH ANCHOR BARS



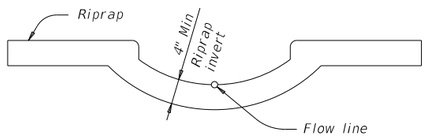
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

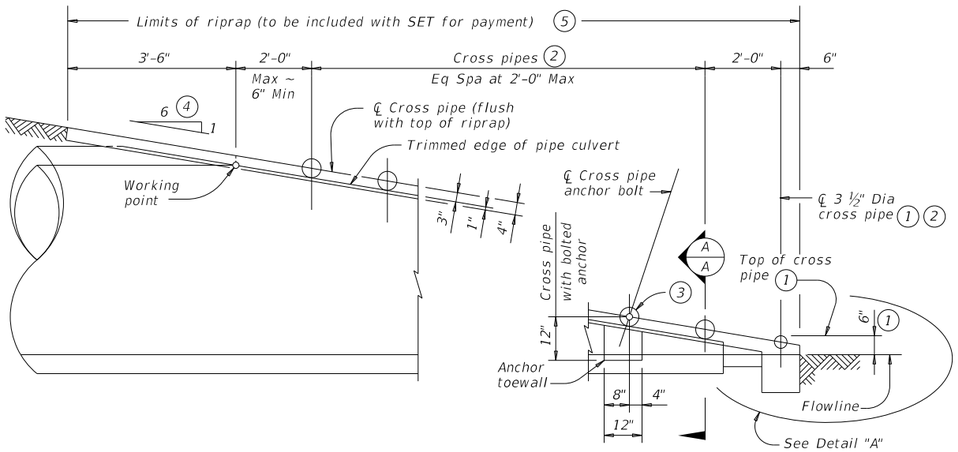
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

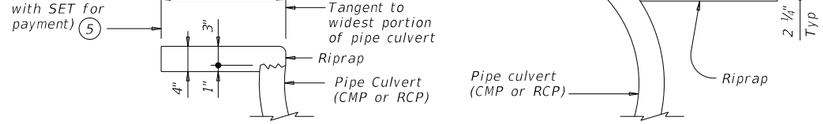
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



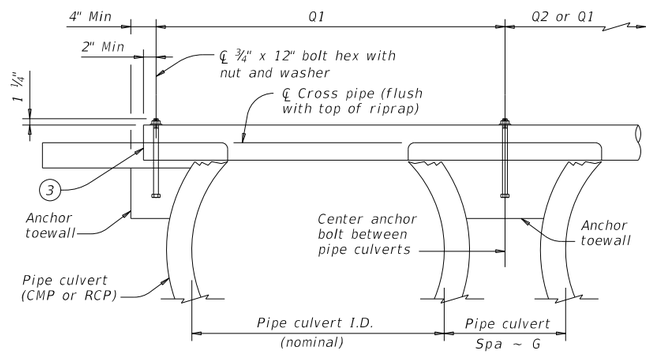
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

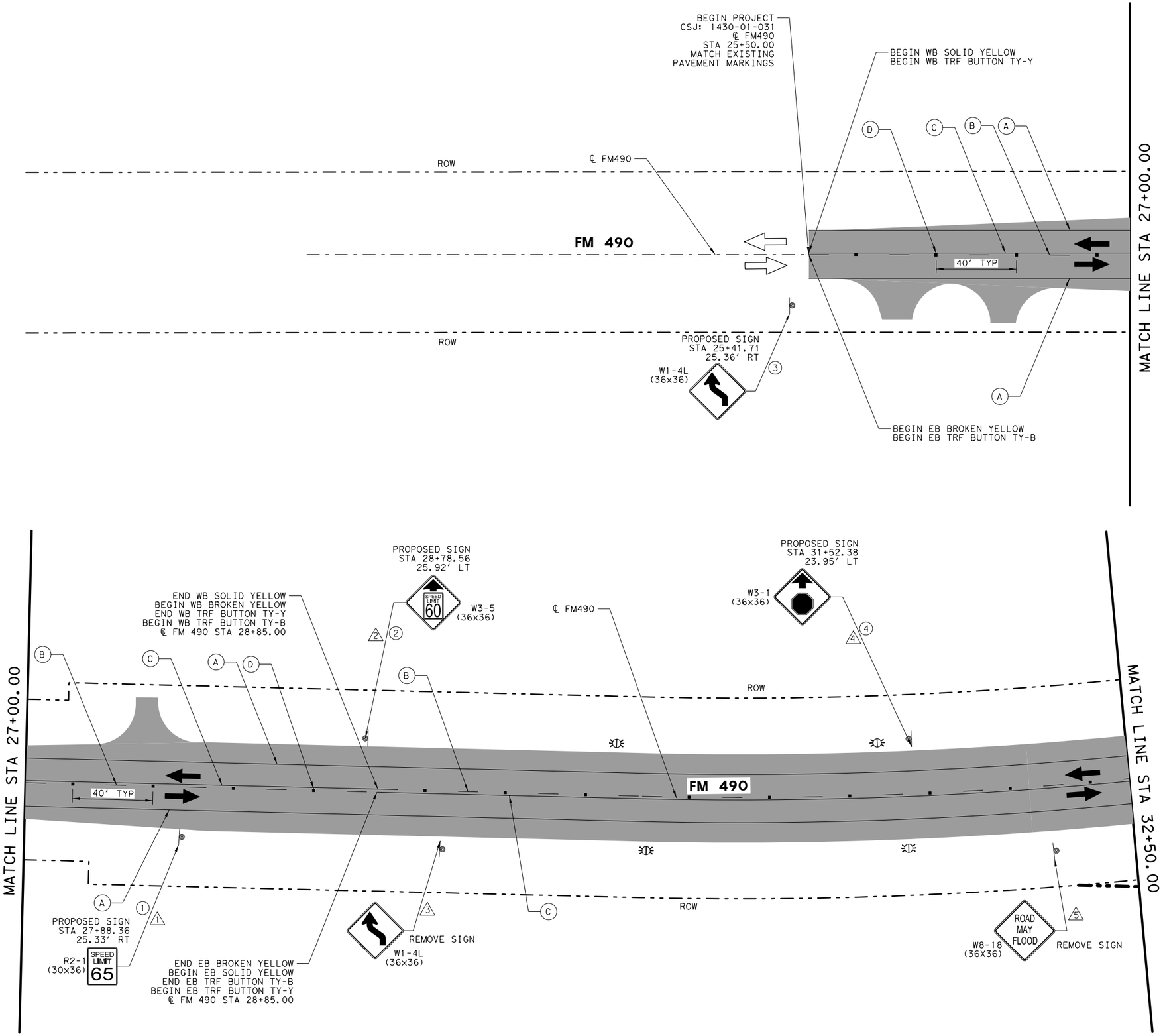
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		95



N

HORIZ: 0 25 50

SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

SEAN CLARY
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490 PAVEMENT MARKING AND SIGNING PLAN BEGIN TO STA 32+50

SCALE = 1"=50'

SHEET 1 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 96

DATE: 4/25/2023
TIME: 9:47:01 AM
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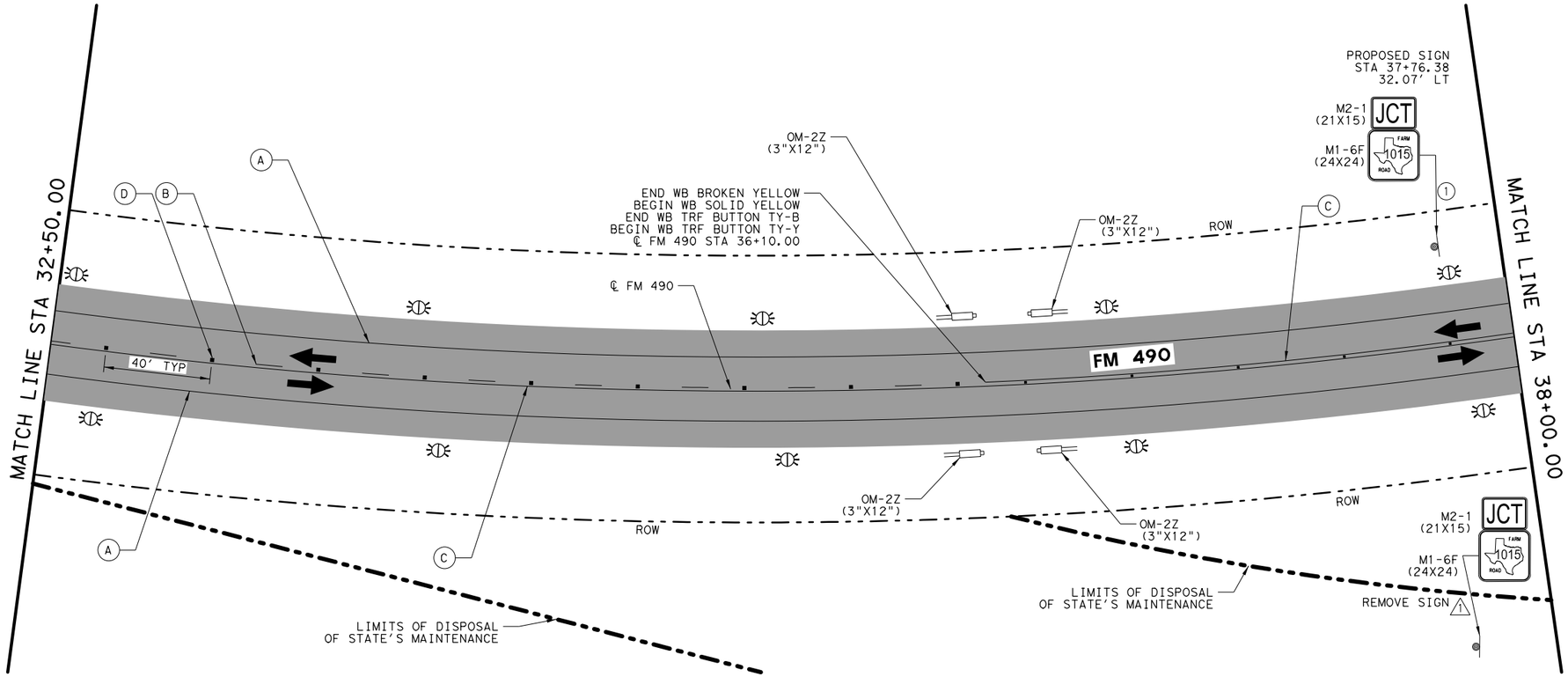

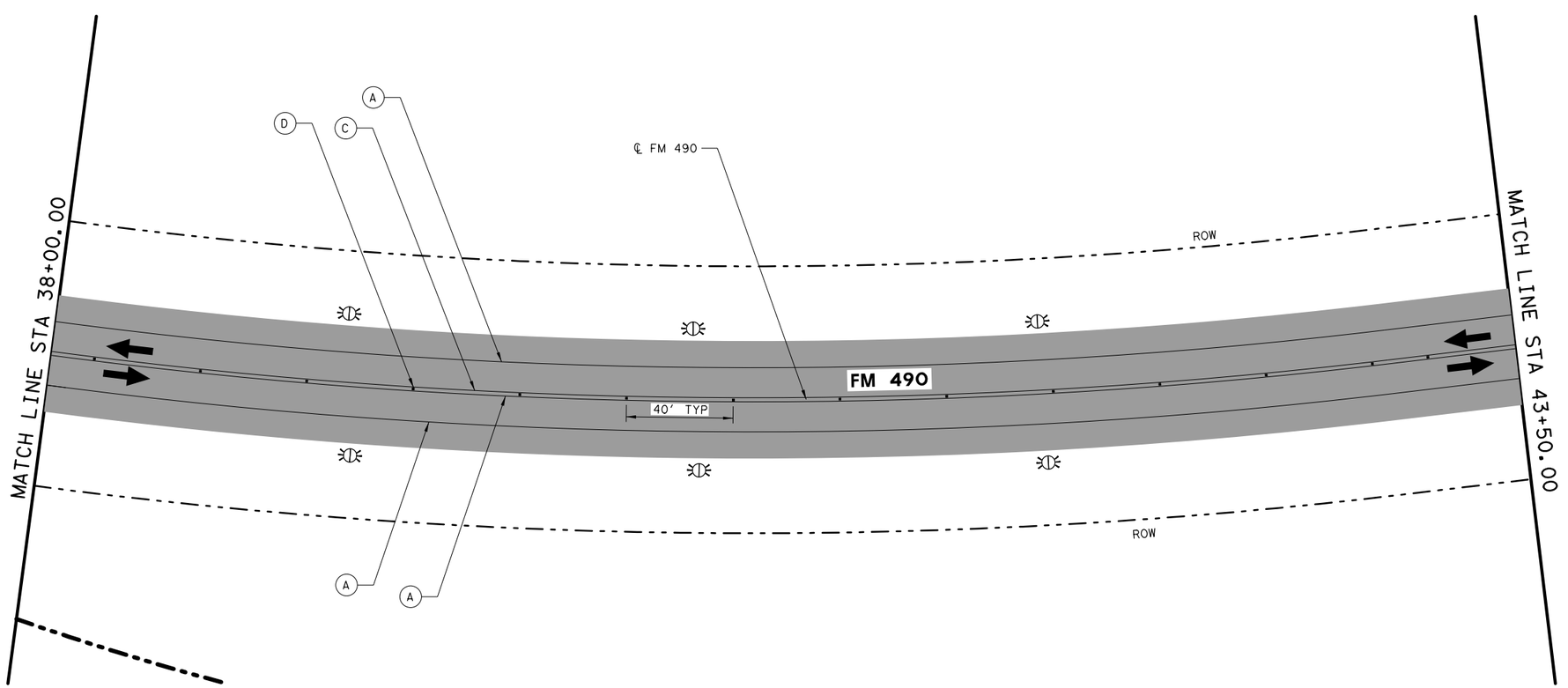

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 32+50 TO STA 43+50

SCALE = 1"=50'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL 1430	SECTION 01	JOB 031,Etc

SHEET NO. 97

DATE: 4/25/2023
TIME: 9:47:08 AM
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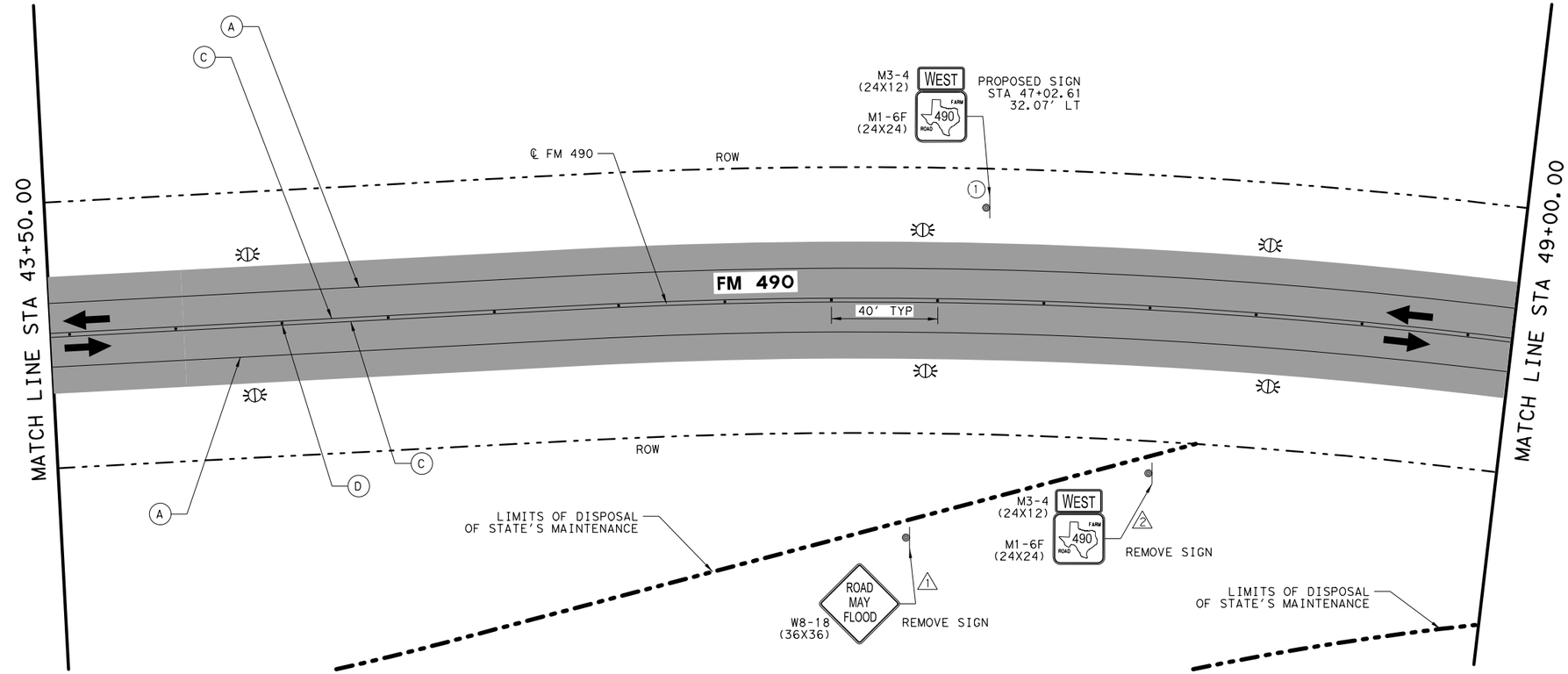
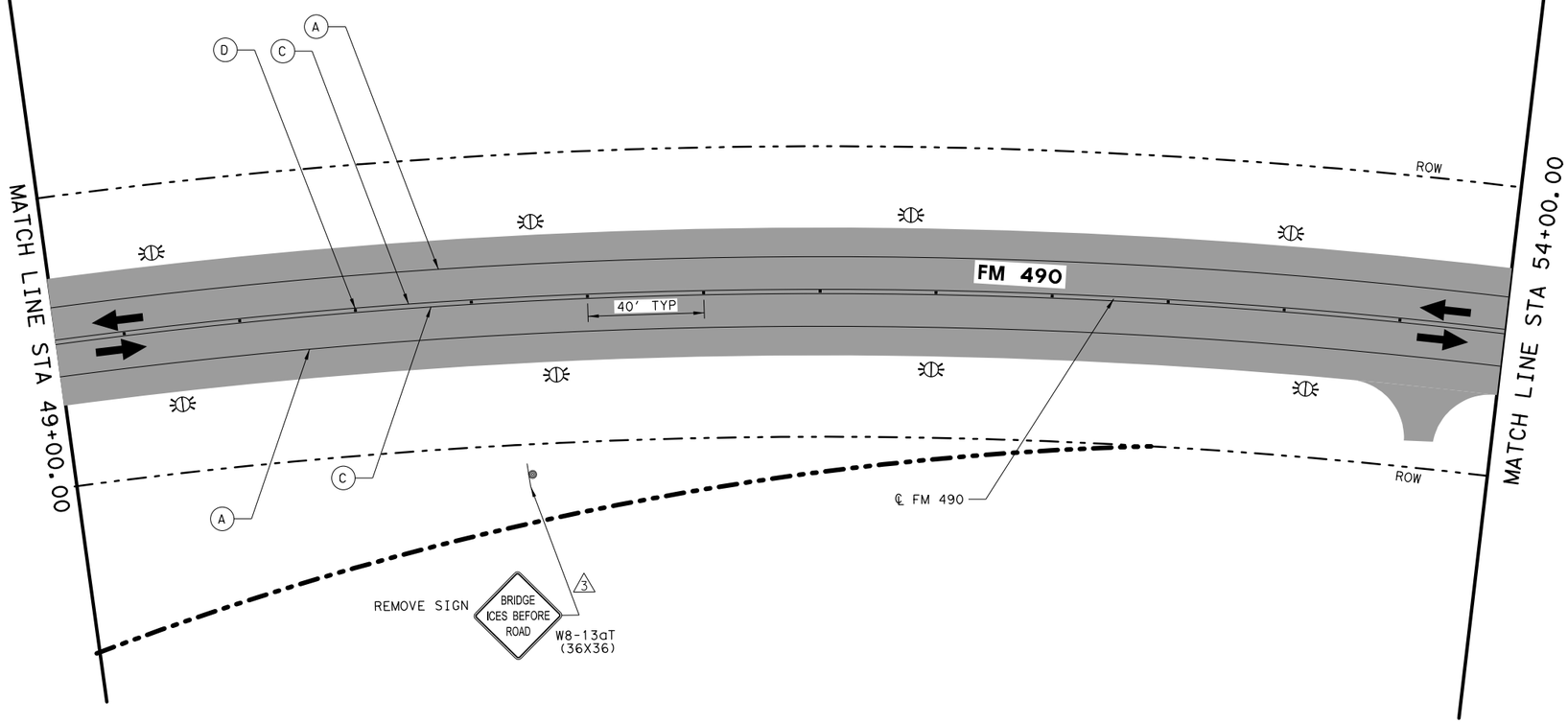
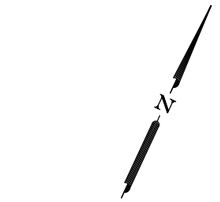
PLOT DRIVER: TXDOT_PDF_BMKNO RASTERS1.pltf







LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490 PAVEMENT MARKING AND SIGNING PLAN STA 43+50 TO STA 54+00

SCALE = 1"=50'

SHEET 3 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK SPC	CONTROL 1430	SECTION 01	JOB 031,Etc

SHEET NO. 98

DATE: 4/25/2023
TIME: 9:47:15 AM
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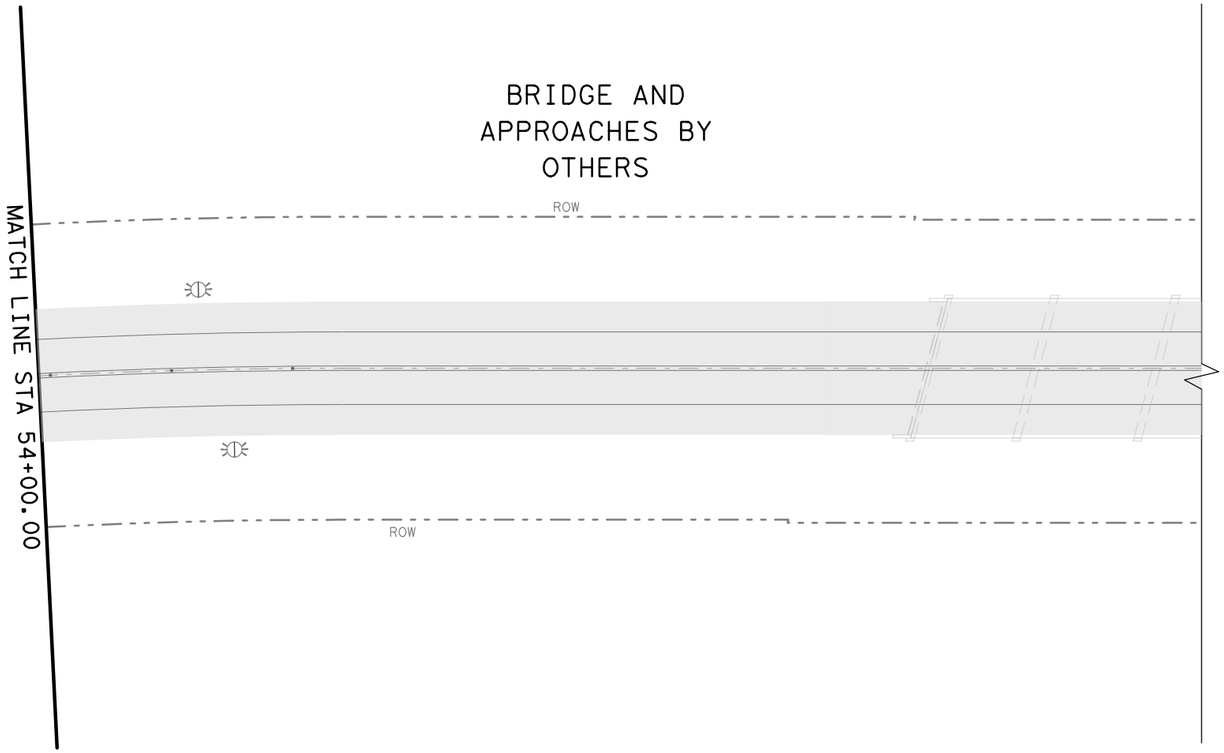
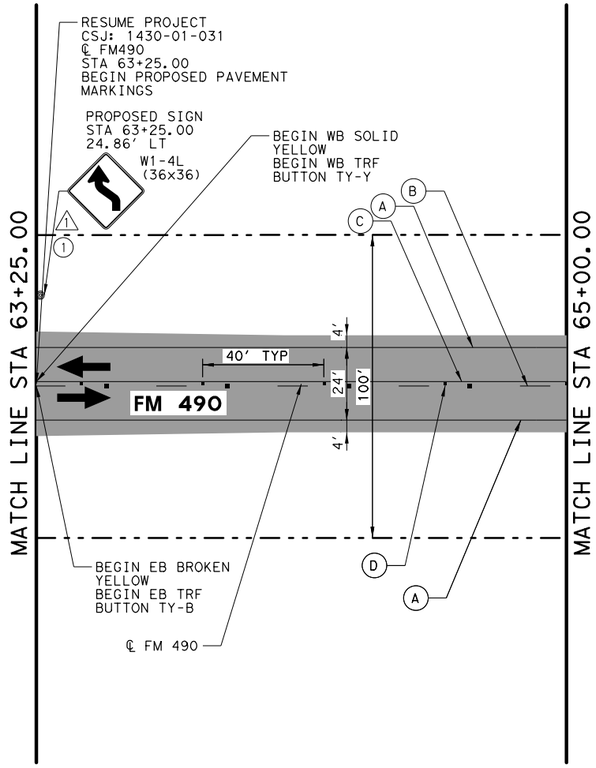
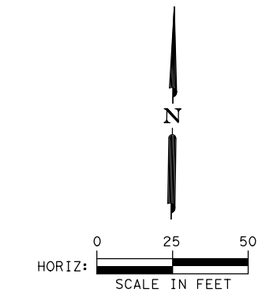




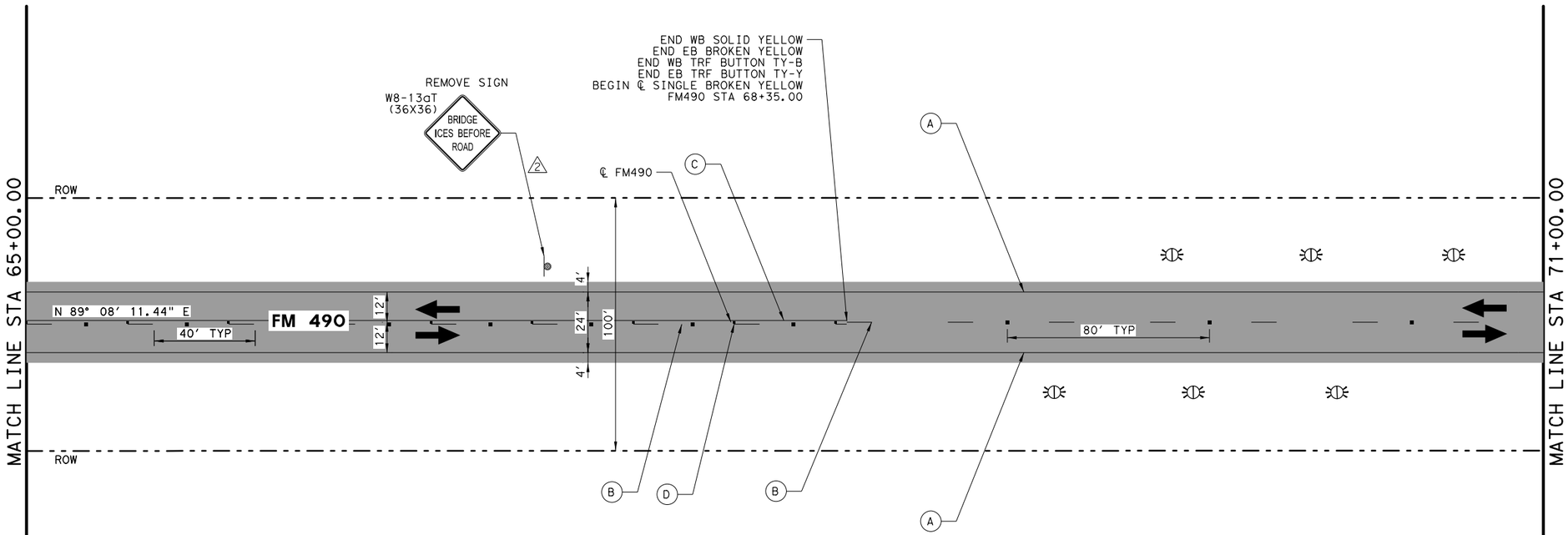


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.



STATE OF TEXAS
SEAN CLARY
122134
LICENSED PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490 PAVEMENT MARKING AND SIGNING PLAN STA 63+25 TO STA 71+00

SCALE = 1"=50'

SHEET 4 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL 1430	SECTION 01	JOB 031,Etc

SHEET NO. 99

DATE: 4/25/2023
TIME: 9:47:20 AM
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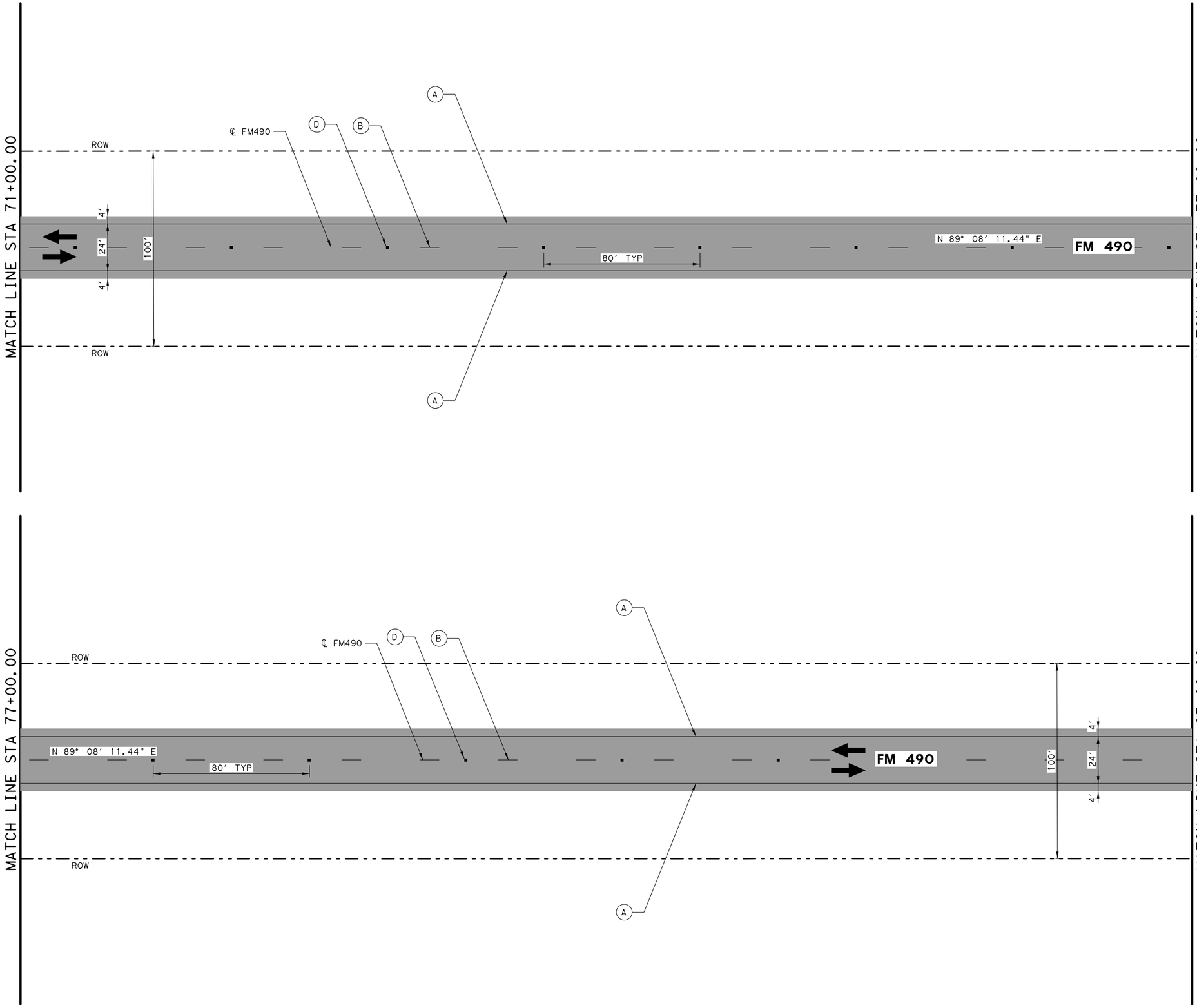
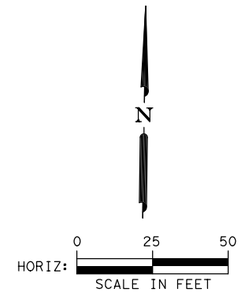
PLOT DRIVER: TXDOT_PDF_BMKNO RASTERS1.pltt





LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490 PAVEMENT MARKING AND SIGNING PLAN STA 71+00 TO STA 83+00

SCALE = 1"=50'

SHEET 5 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 100

DATE: 4/25/2023
TIME: 9:47:27 AM
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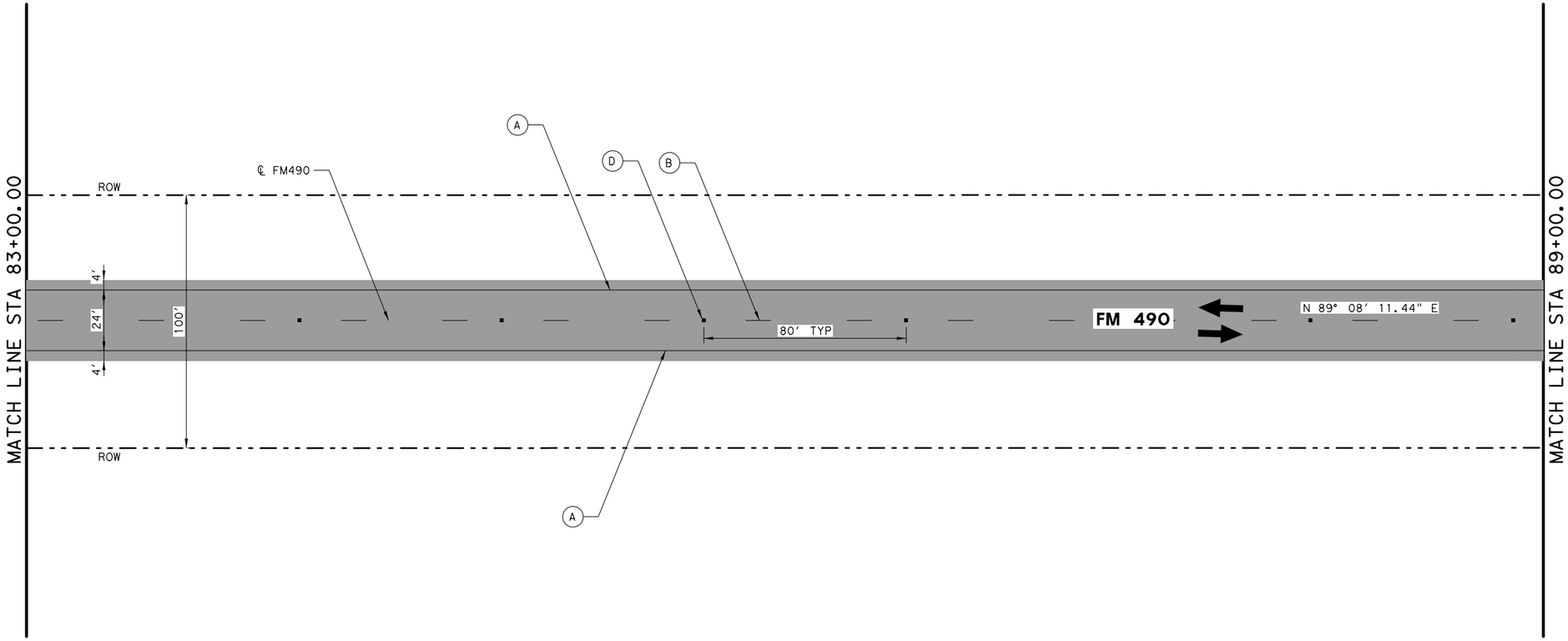

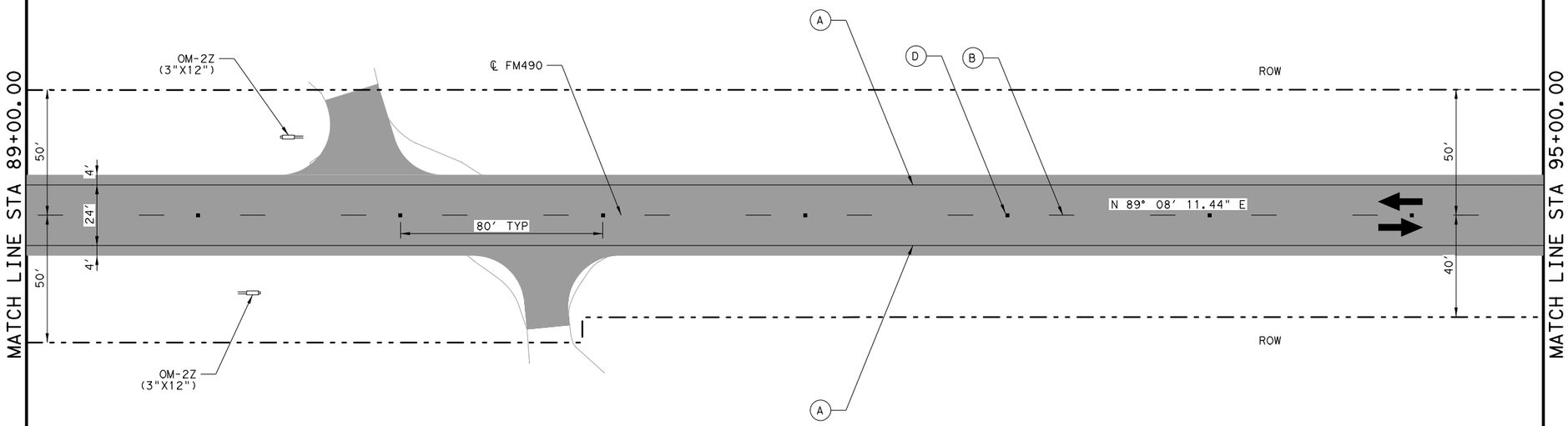

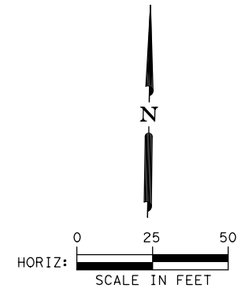

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40′ C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

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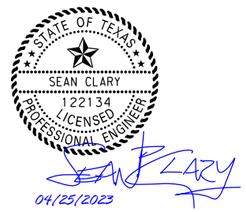
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 83+00 TO STA 95+00

SCALE = 1"=50′ SHEET 6 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL 1430	SECTION 01	JOB 031,Etc

SHEET NO. 101

DATE: 4/25/2023
TIME: 9:47:34 AM
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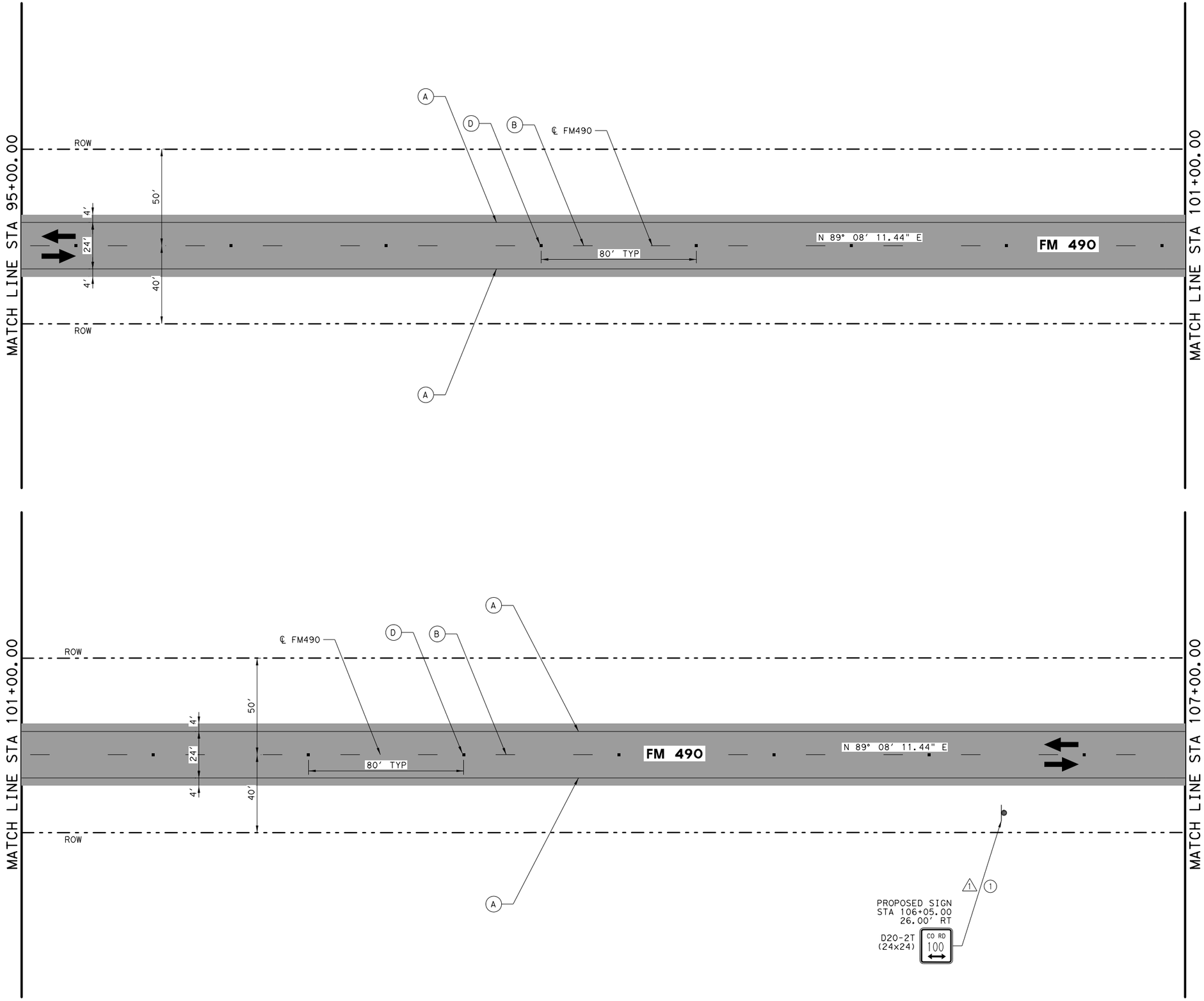

N

HORIZ: 0 25 50

SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

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STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

SEAN CLARY
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
© 2023

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 95+00 TO STA 107+00

SCALE = 1"=50' SHEET 7 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 102

DATE: 4/25/2023
TIME: 9:47:41 AM
USER: sclary
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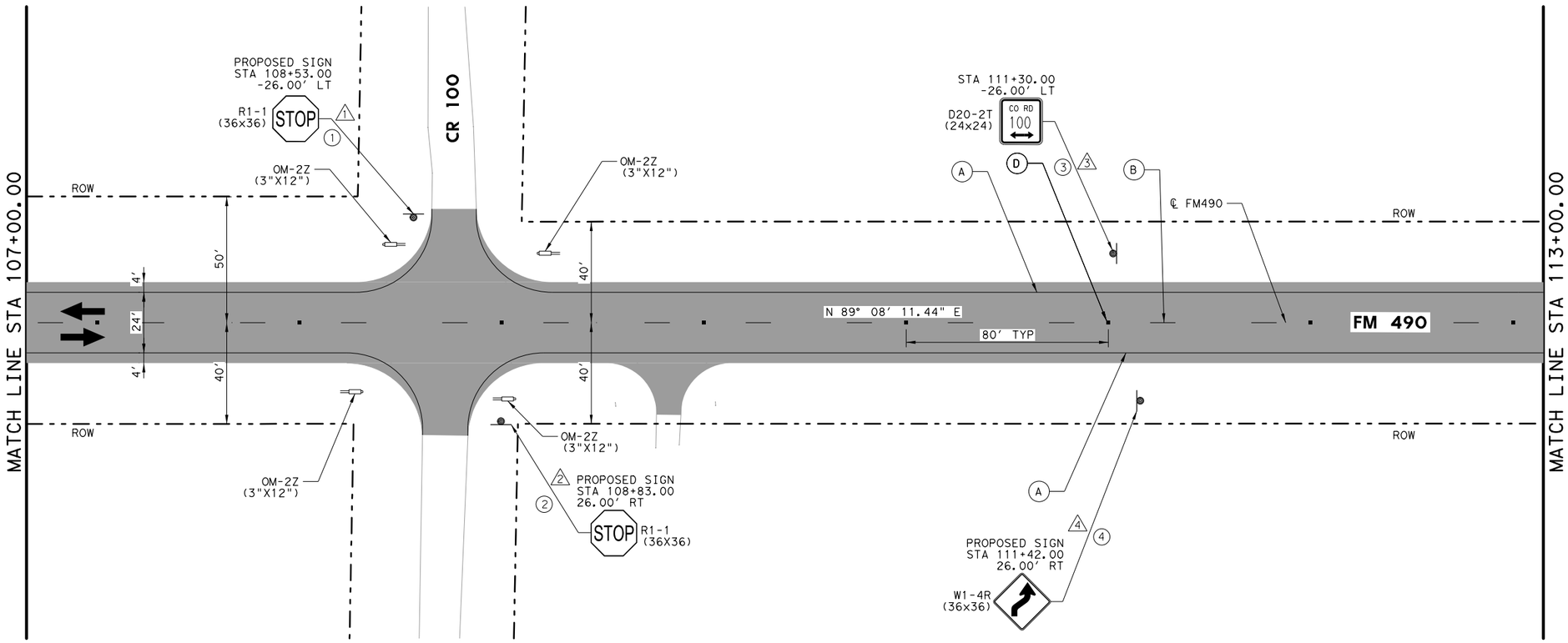
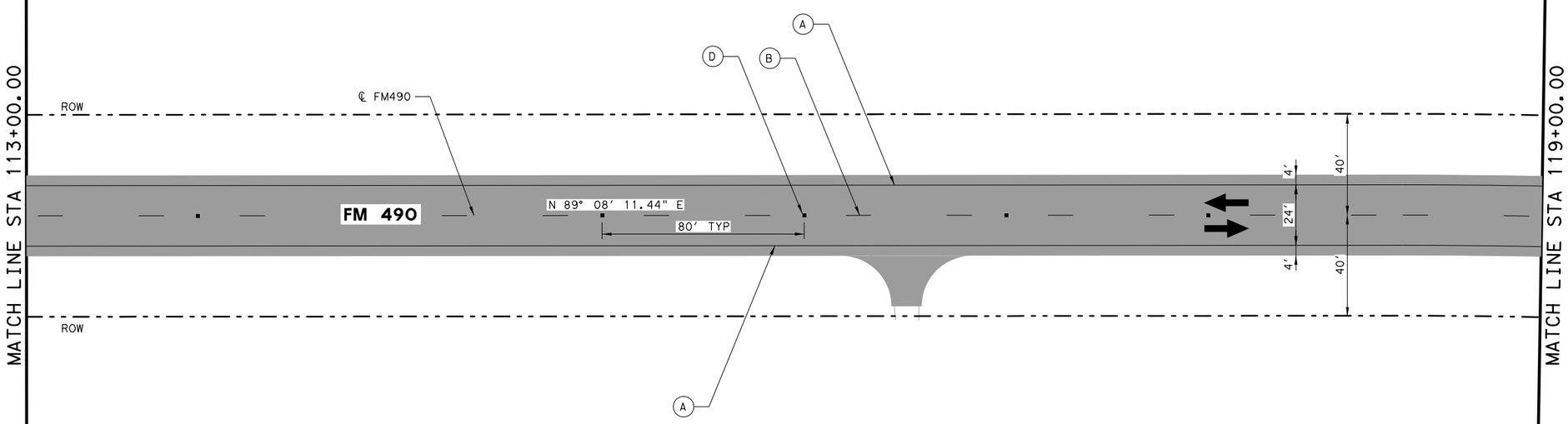
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BMKNO RASTERS1.pltt





N

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

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2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 107+00 TO STA 119+00

SCALE = 1"=50' SHEET 8 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 103

DATE: 4/25/2023
TIME: 9:47:48 AM
USER: sclary
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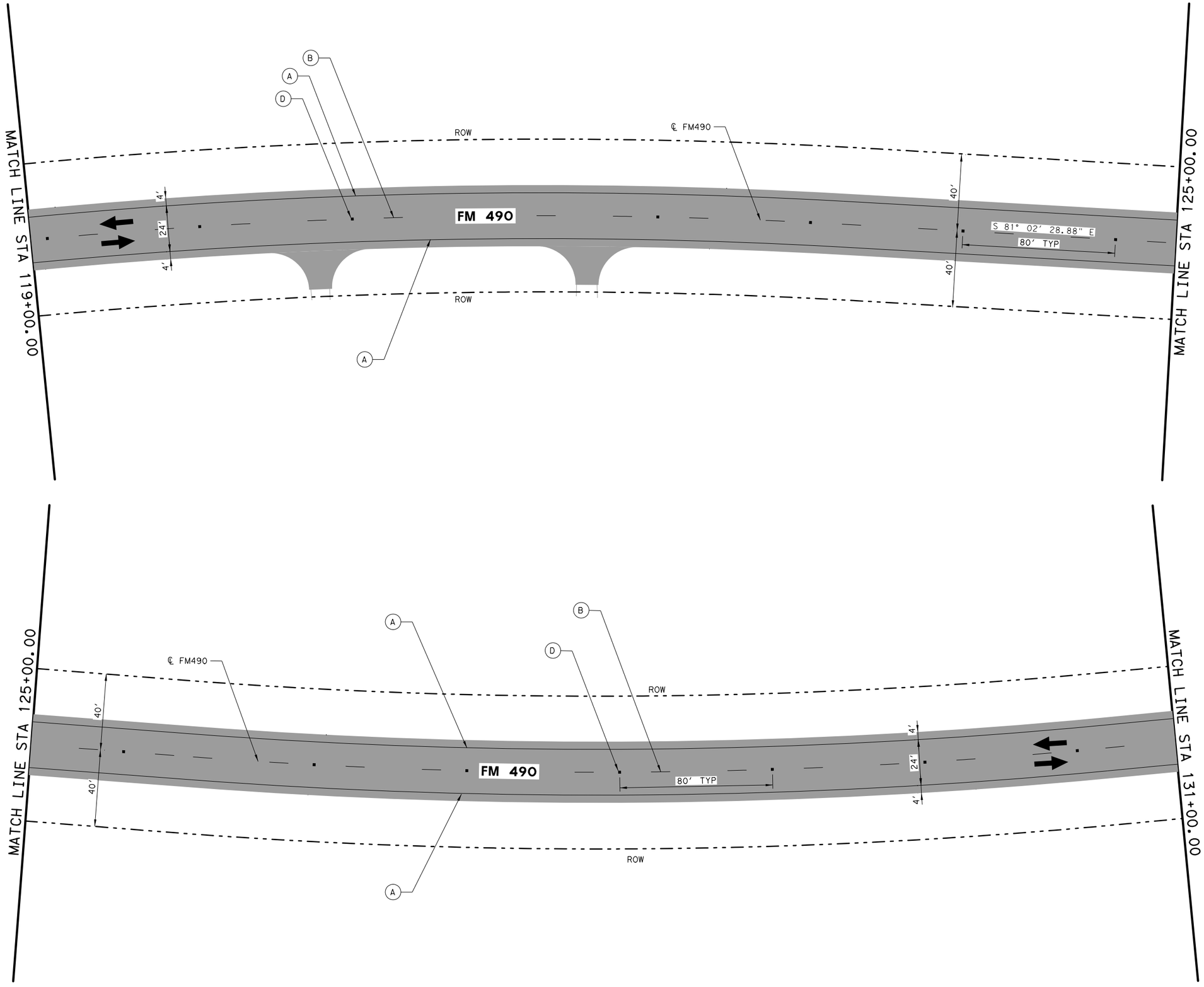
PLOT DRIVER: TXDOT_PDF_BMKNO RASTERS1.pltt



N

HORIZ: 0 25 50

SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

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2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 119+00 TO TA 131+00

SCALE = 1"=50' SHEET 9 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 104

DATE: 4/25/2023
TIME: 9:47:54 AM
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FILE NAME: ...\FM490-BMCD-PM-09.dgn
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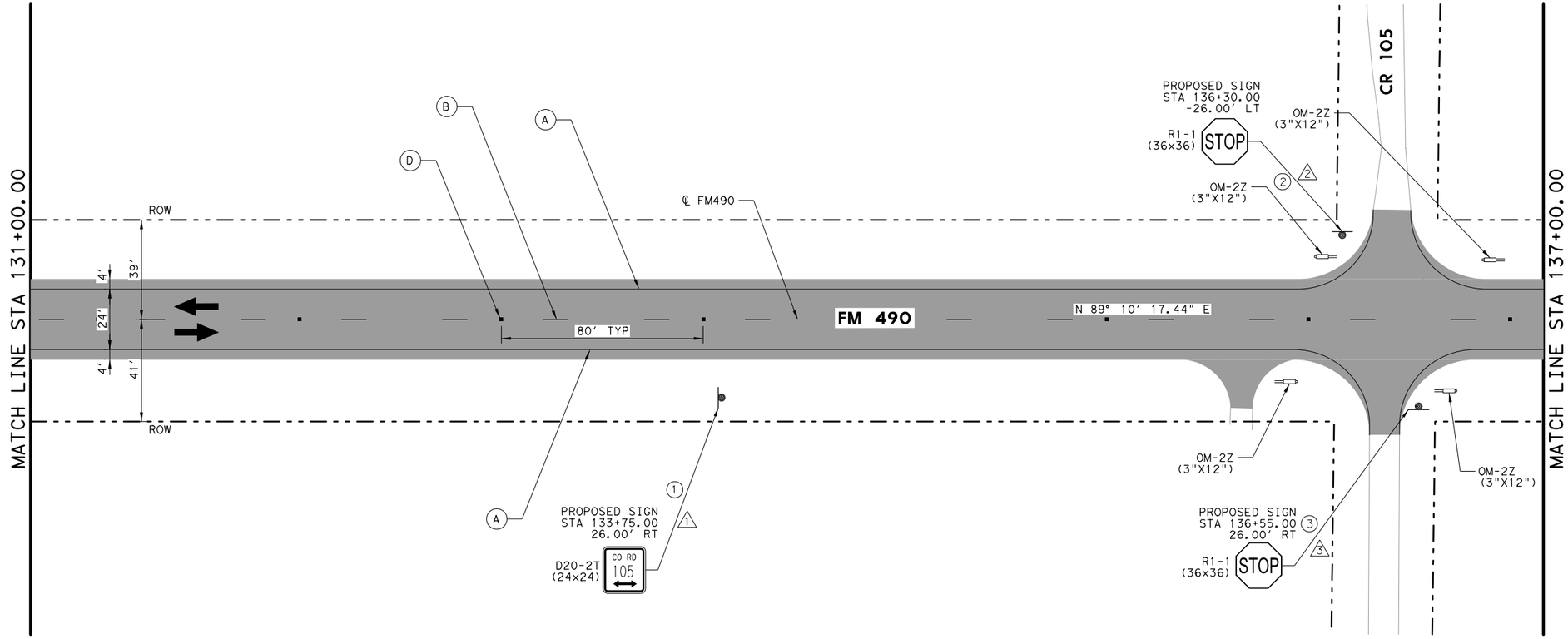
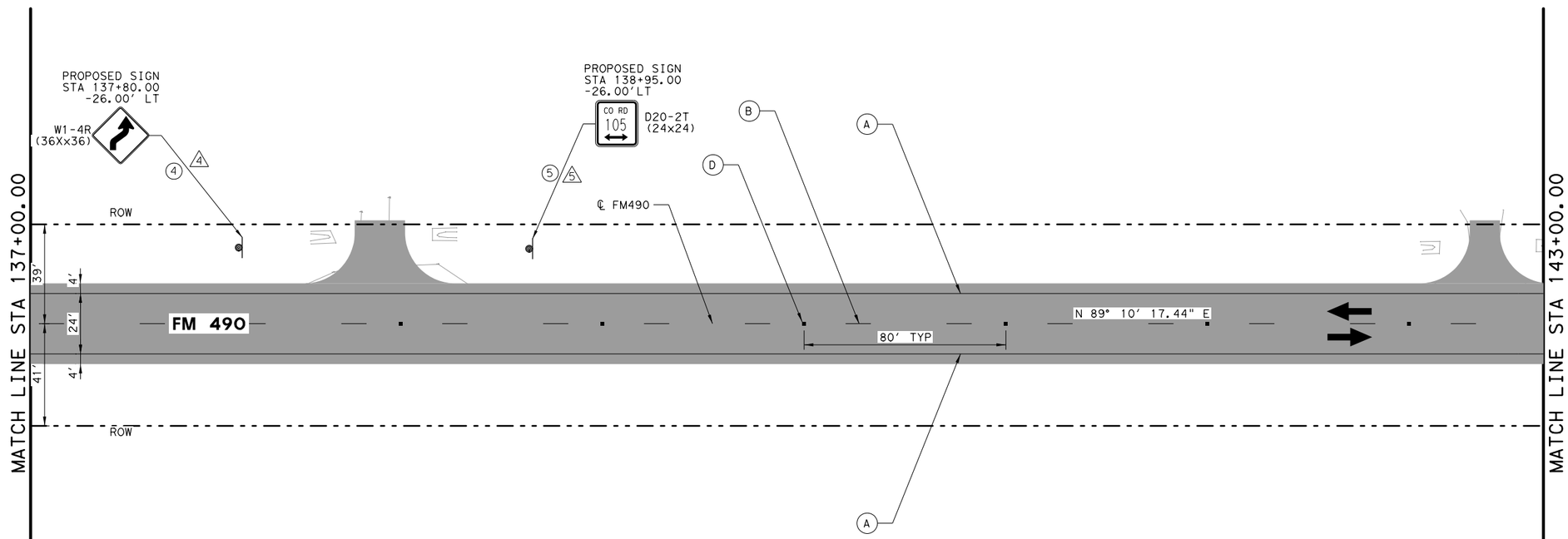
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BMKNO RASTERS1.pltt





N

0 25 50

HORIZ:

SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

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2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 131+00 TO STA 143+00

SCALE = 1"=50' SHEET 10 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 105

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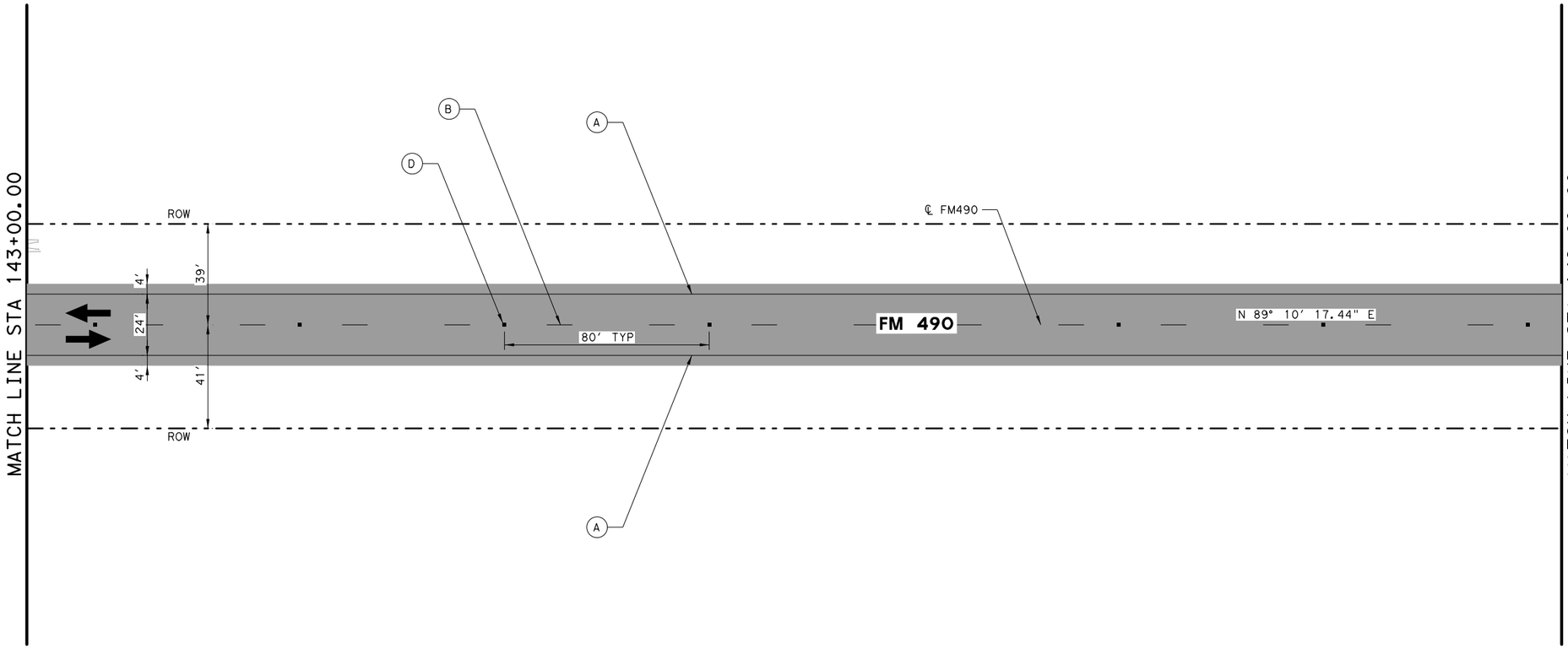
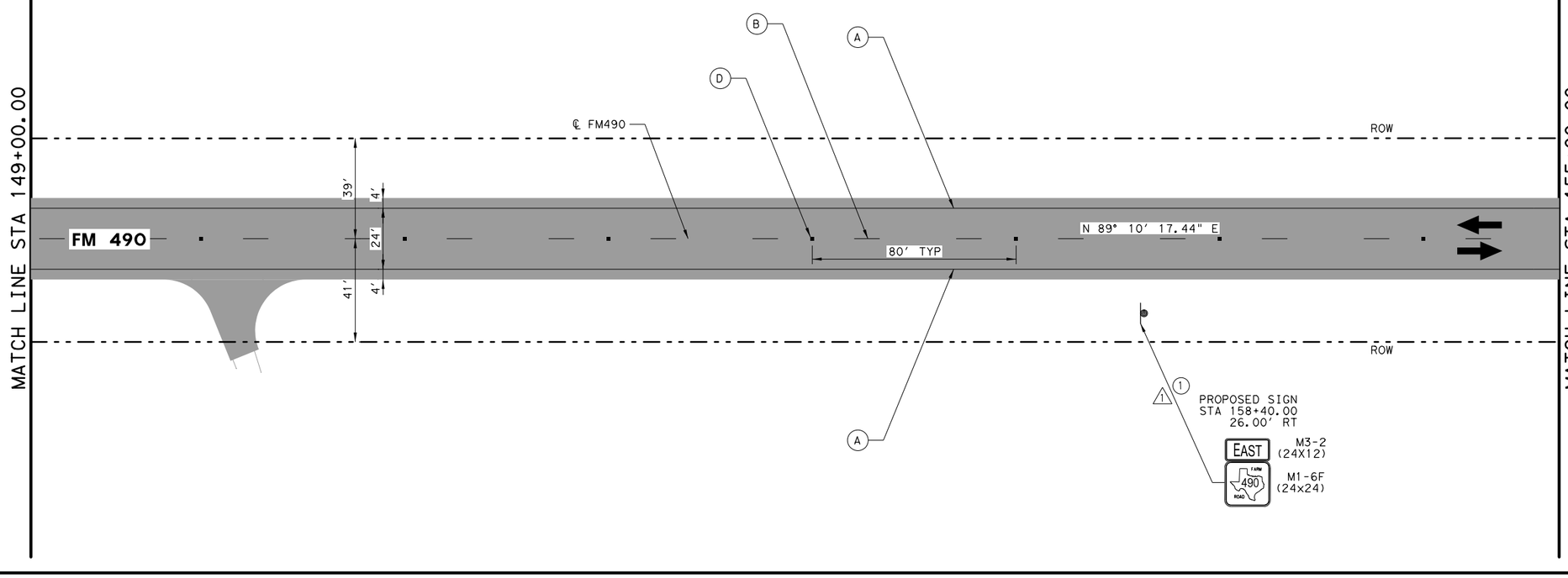
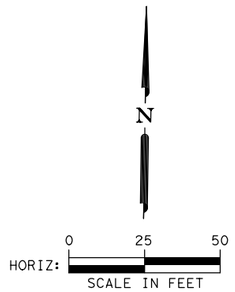




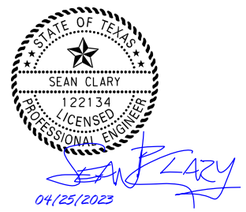


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40′ C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 143+00 TO STA 155+00

SCALE = 1"=50′ SHEET 11 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL 1430	SECTION 01	JOB 031,Etc

SHEET NO. 106

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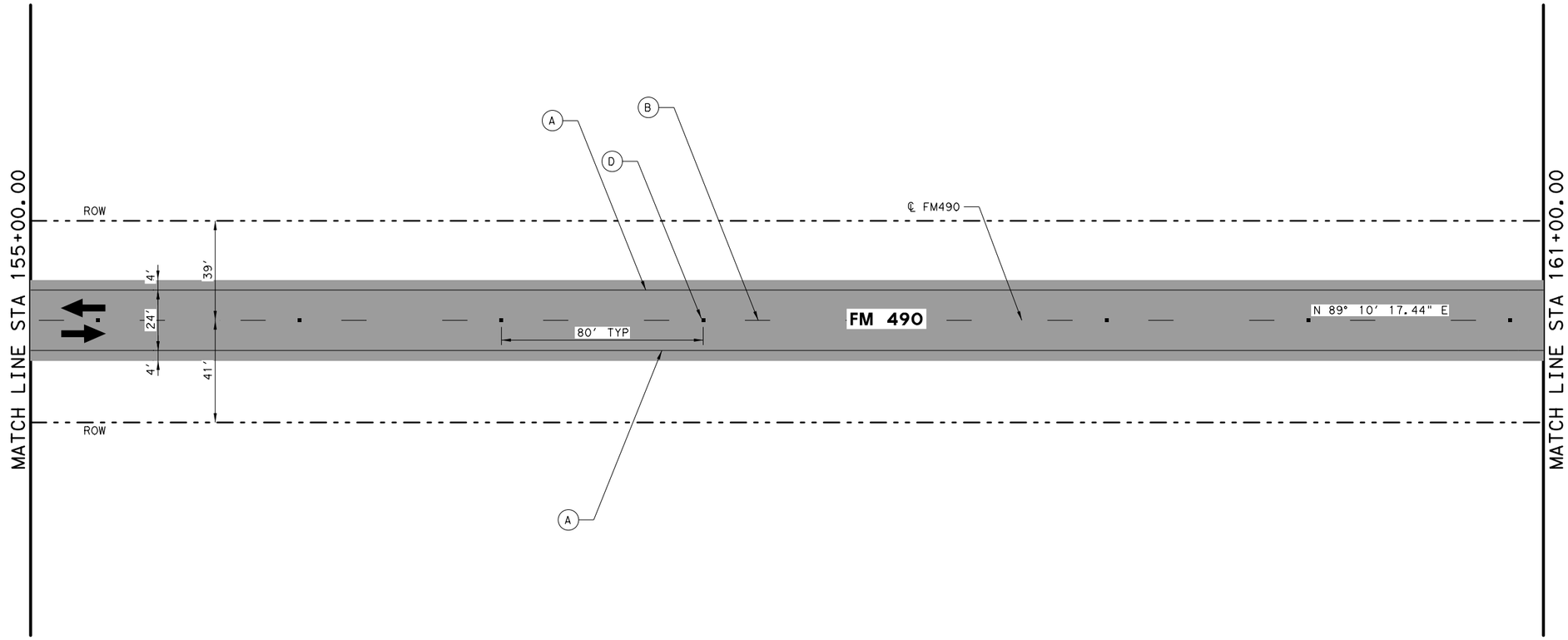
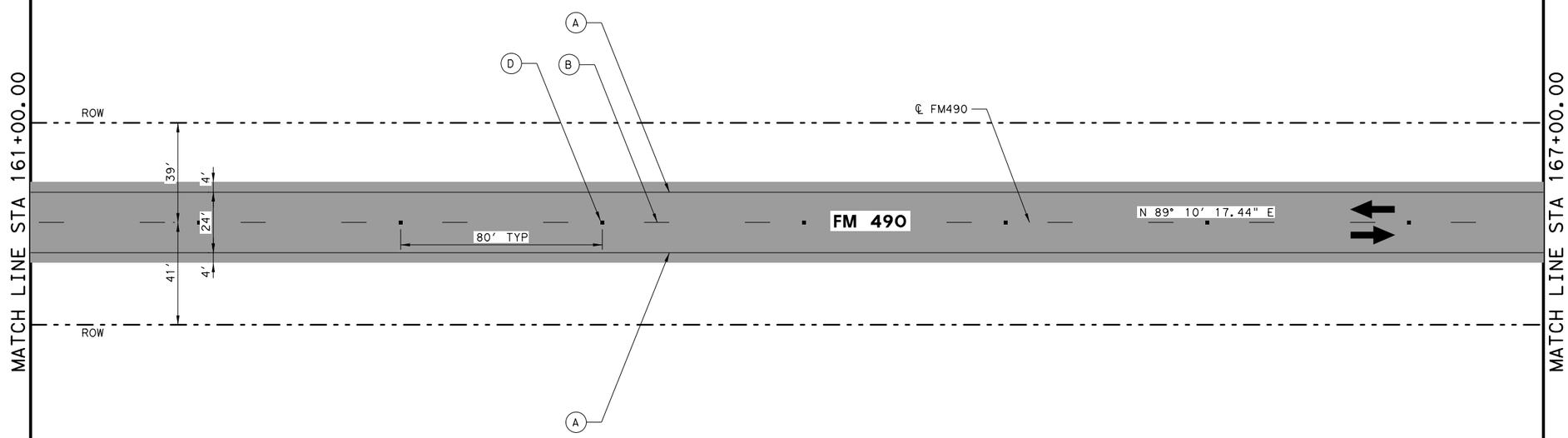
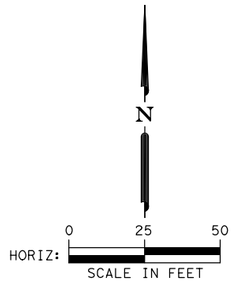




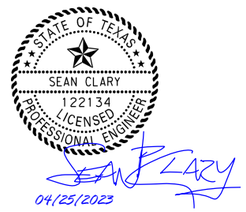


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 155+00 TO STA 167+00

SCALE = 1"=50'

SHEET 12 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 107

DATE: 4/25/2023
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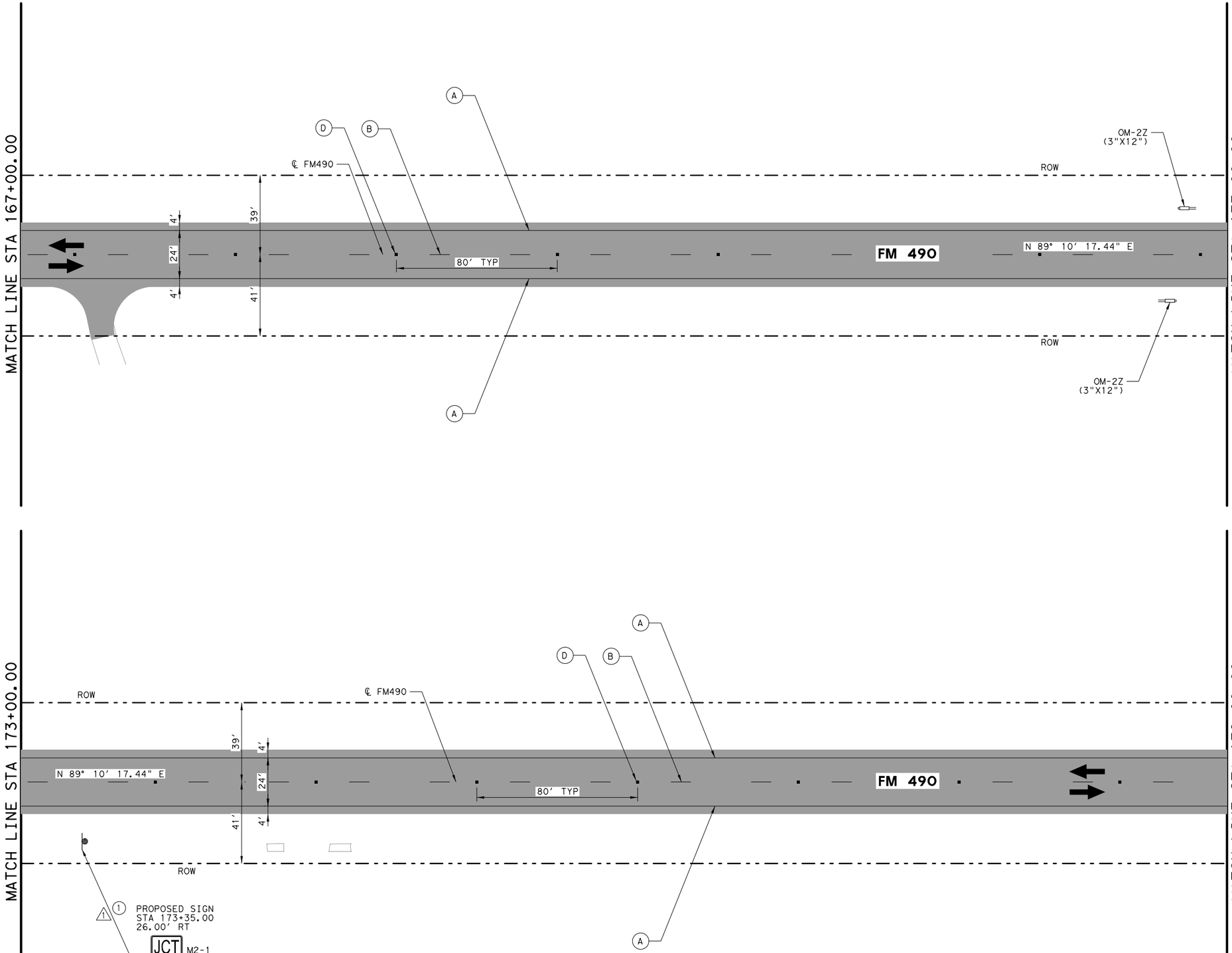
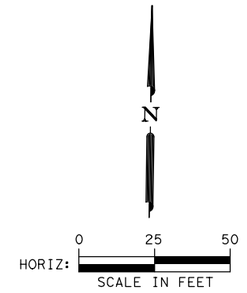


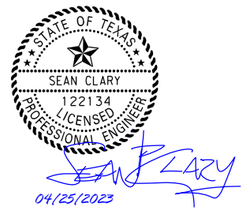


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40′ C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490 PAVEMENT MARKING AND SIGNING PLAN STA 167+00 TO STA 179+00

SCALE = 1"=50′ SHEET 13 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 108

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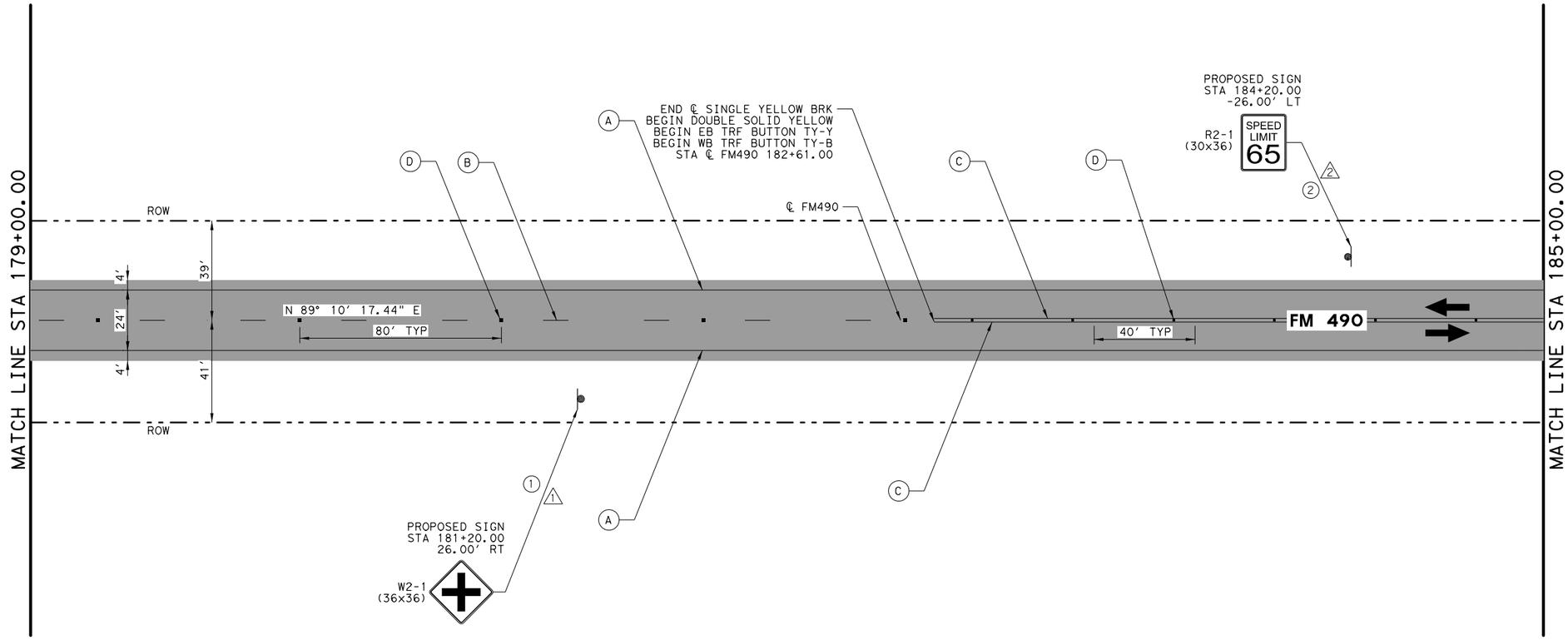
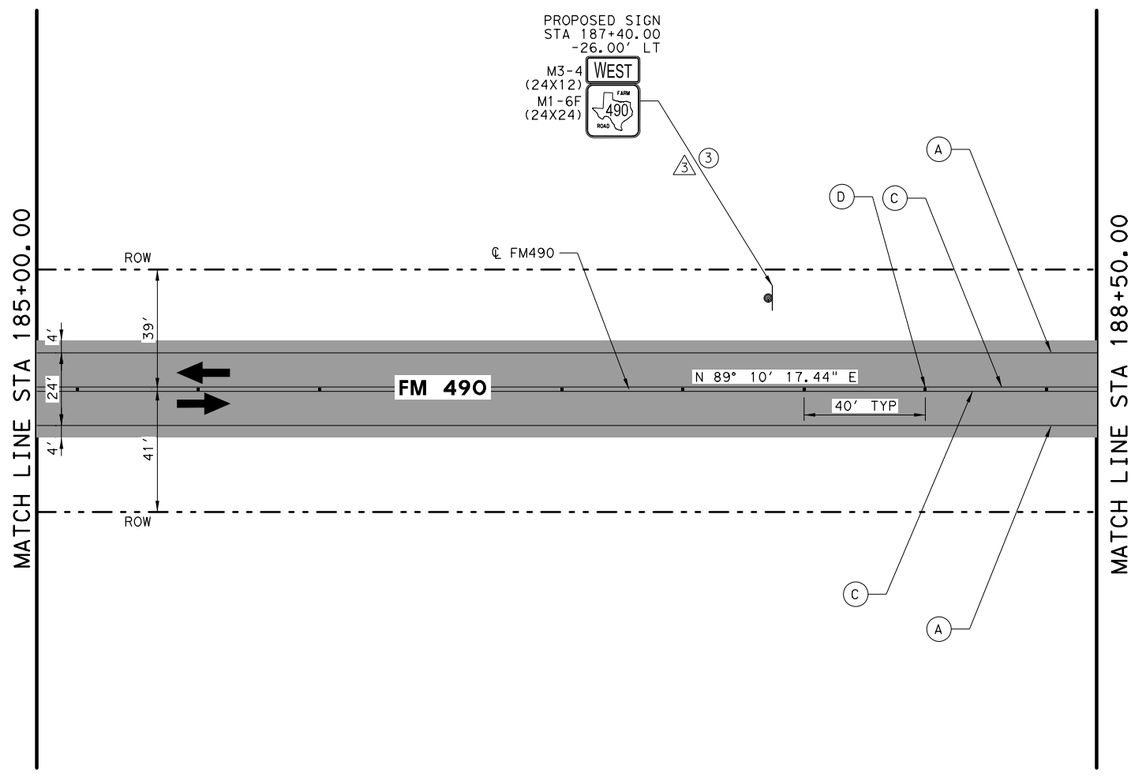
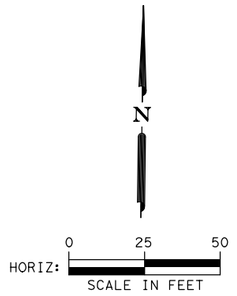




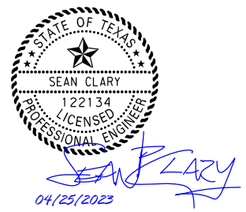


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.



NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
PAVEMENT MARKING AND SIGNING PLAN
STA 179+00 TO STA 188+50

SCALE = 1"=50'

SHEET 14 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 109

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TIME: 9:46:36 AM
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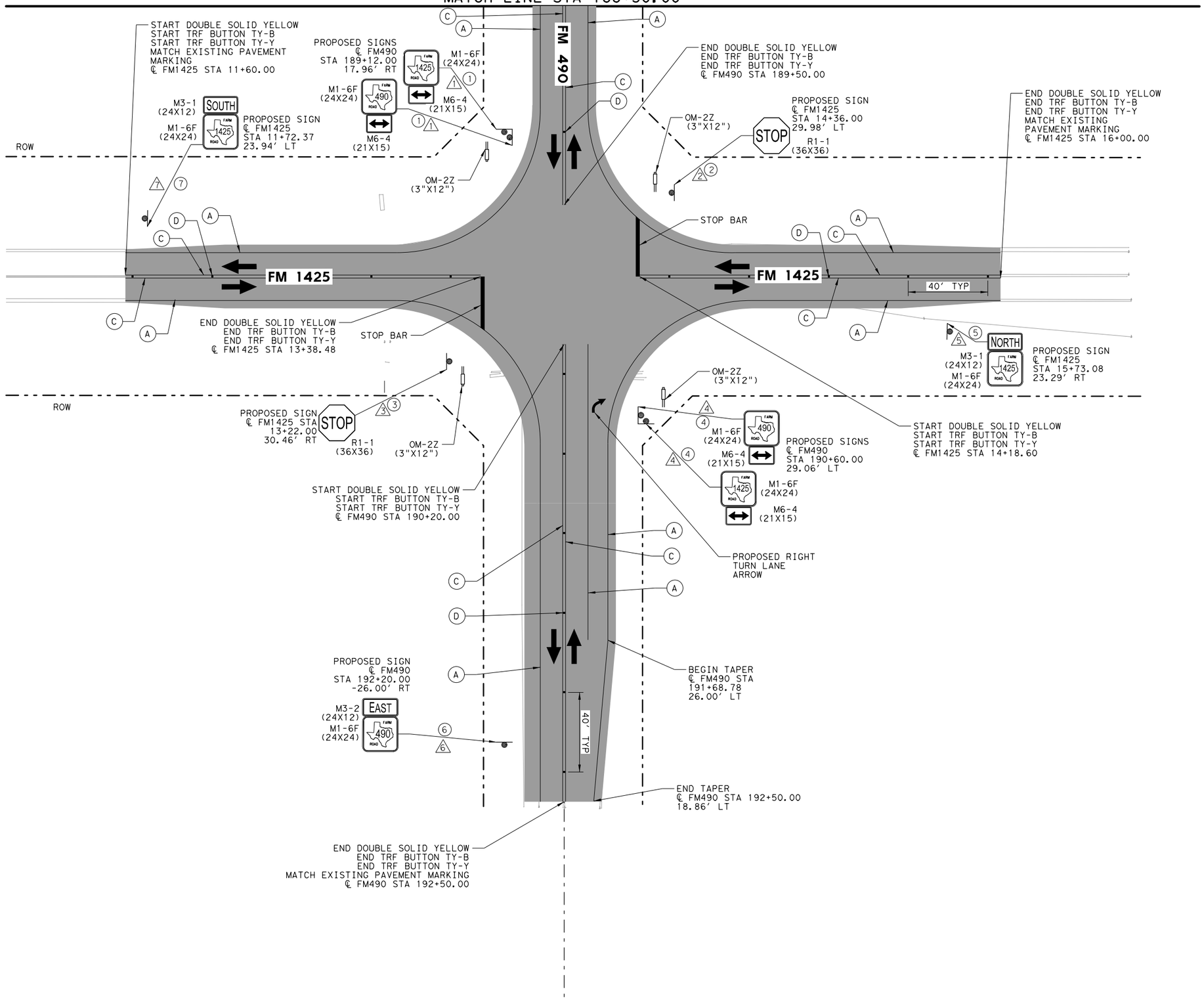

N

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED ROADWAY
- PROPOSED PROJECT BY OTHERS
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- (A) REF PROF PAV MRK TY I W 6" (SLD)
- (B) RE PM W/RET REQ TY I Y 6" (BRK)
- (C) RE PM W/RET REQ TY I Y 6" (SLD)
- (D) RAISED PAV MARK (TY II-A-A) @ 40' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- INSTALL SIGN

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 1425
PAVEMENT MARKING AND SIGNING PLAN

SCALE = 1"=50'

SHEET 15 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY / SHEET NO.
	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB / 110
CHECK MAW	1430	01	031,Etc

DATE: 4/25/2023
TIME: 9:48:45 AM
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SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS1.pltt

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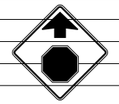
DATE:
FILE:

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1	1	R2-1		30X36	A		S80	1	SA	P		
1	2	W3-5		36X36	A		S80	1	SA	T		
1	3	W1-4L		36X36	A		S80	1	SA	T		
1	4	W3-1		36X36	A		S80	1	SA	T		
2	1	M2-1		21X15	A		S80	1	SA	P		
2	1	M1-6F		24X24	A		S80	1	SA	P		
3	1	M3-4		24X12	A		S80	1	SA	P		
3	1	M1-6F		24X24	A		S80	1	SA	P		
4	1	W1-4L		36X36	A		S80	1	SA	T		
7	1	D20-2T		24X24	A		S80	1	SA	P		
8	1	R1-1		36X36	A		S80	1	SA	P	BM	
8	2	R1-1		36X36	A		S80	1	SA	P	BM	

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

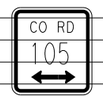
SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
4-16 8-16	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		111

18

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
8	3	D20-2T		24X24	A		S80	1	SA	P		
8	4	W1-4R		36X36	A		S80	1	SA	T		
10	1	D20-2T		24X24	A		S80	1	SA	P		
10	2	R1-1		36X36	A		S80	1	SA	P	BM	
10	3	R1-1		36X36	A		S80	1	SA	P	BM	
10	4	W1-4R		36X36	A		S80	1	SA	T		
10	5	D20-2T		24X24	A		S80	1	SA	P		
11	1	M3-2		24X12	A		S80	1	SA	P		
11	1	M1-6F		24X24	A		S80	1	SA	P		
13	1	M2-1		21X15	A		S80	1	SA	P		
13	1	M1-6F		24X24	A		S80	1	SA	P		

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

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

http://www.txdot.gov/

NOTE:

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

DATE:
FILE:

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
4-16 8-16	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		112

TB

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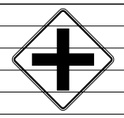
DATE:
FILE:

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
14	1	W2-1		36X36	A		S80	1	SA	T		
14	2	R2-1		30X36	A		S80	1	SA	P		
14	3	M3-4		24X12	A		S80	1	SA	P		
14	3	M1-6F		24X24	A		S80	1	SA	P		
15	1	M1-6F		24X24	A		S80	1	SA	U		
15	1	M6-4		21X15	A		S80	1	SA	U		
15	1	M1-6F		24X24	A		S80	1	SA	U		
15	1	M6-4		21X15	A		S80	1	SA	U		
15	2	R1-1		36X36	A		S80	1	SA	P	BM	
15	3	R1-1		36X36	A		S80	1	SA	P	BM	
15	4	M1-6F		24X24	A		S80	1	SA	U		
15	4	M6-4		21X15	A		S80	1	SA	U		

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
4-16 8-16	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		113

TB

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DATE:
FILE:

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
15	4	M1-6F	FARM 490 ROAD	24X24	A		S80	1	SA	U		
15	4	M6-4		21X15	A		S80	1	SA	U		
15	5	M3-1	NORTH	24X12	A		S80	1	SA	P		
15	5	M1-6F	FARM 1425 ROAD	24X24	A		S80	1	SA	P		
15	6	M3-2	EAST	24X12	A		S80	1	SA	P		
15	6	M1-6F	FARM 490 ROAD	24X24	A		S80	1	SA	P		
15	7	M3-3	SOUTH	24X12	A		S80	1	SA	P		
15	7	M1-6F	FARM 1425 ROAD	24X24	A		S80	1	SA	P		

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

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NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
4-16 8-16	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		114

TB

SUMMARY OF SIGN REMOVAL

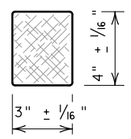
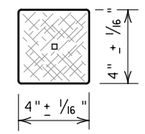
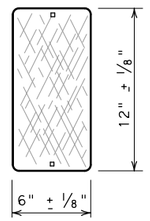
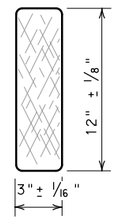
PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	644 6078 REMOVE SM RD SN SUP & AM (EA)	SHEET TOTAL
1	1	R2-1	SPEED LIMIT	1	
	2	W3-5	CAUTION 60 MPH	1	
	3	W1-4L	REVERSE CURVE	1	
	4	W3-1	CAUTION STOP AHEAD	1	
	5	W8-18	CAUTION ROAD MAY FLOOD	1	5
2	1	M2-1	JCT		
	1	M1-6F	TEXAS FARM ROAD 1015 ROUTE MARKER	1	1
3	1	W8-18	CAUTION ROAD MAY FLOOD	1	
	2	M3-4	WEST		
	2	M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER	1	
	3	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	1	3
4	1	W1-4L	REVERSE CURVE	1	
	2	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	1	2
7	1	D20-2T	COUNTY ROAD	1	1
8	1	R1-1	STOP SIGN	1	
	2	R1-1	STOP SIGN	1	
	3	D20-2T	COUNTY ROAD	1	
	4	W1-4R	REVERSE CURVE	1	4
10	1	D20-2T	COUNTY ROAD	1	
	2	R1-1	STOP SIGN	1	
	3	R1-1	STOP SIGN	1	
	4	W1-4R	REVERSE CURVE	1	
	5	D20-2T	COUNTY ROAD	1	5
11	1	M3-2	EAST		
	1	M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER	1	1
13	1	M2-1	JCT		
	1	M1-6F	TEXAS FARM ROAD 1425 ROUTE MARKER	1	1
14	1	W2-1	CROSSROADS	1	
	2	R2-1	SPEED LIMIT	1	
	3	M3-4	WEST		
	3	M1-6F	TEXAS FARM ROAD ROUTE MARKER		
	3	R12-1T	WEIGHT LIMIT GROSS 58,420 LBS	1	3
15	1	M1-6F	TEXAS FARM ROAD ROUTE MARKER		
	1	M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	1	M1-6F	TEXAS FARM ROAD ROUTE MARKER		
	1	M6-4	DOUBLE HEAD DIRECTIONAL ARROW	1	
	2	R1-1	STOP SIGN	1	
	3	R1-1	STOP SIGN	1	
	4	M1-6F	TEXAS FARM ROAD ROUTE MARKER		
	4	M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	4	M1-6F	TEXAS FARM ROAD ROUTE MARKER		
	4	M6-4	DOUBLE HEAD DIRECTIONAL ARROW	1	
	5	M3-1	NORTH		
	5	M1-6F	TEXAS FARM ROAD 1425 ROUTE MARKER	1	
	6	M3-2	EAST		
	6	M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER		
	6	R12-1T	WEIGHT LIMIT GROSS 58,420 LBS	1	
	7	M3-3	SOUTH		
	7	M1-6F	TEXAS FARM ROAD 1425 ROUTE MARKER	1	7
			TOTAL	33	

Texas Department of Transportation

SUMMARY TABLE OF SMALL SIGNS TO BE REMOVED

CONT	SECT	JOB	HIGHWAY
1430	01	031, Etc	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		115

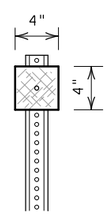
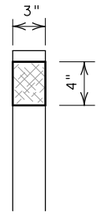
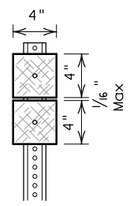
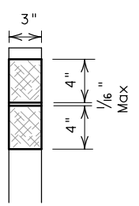
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

NOTE

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

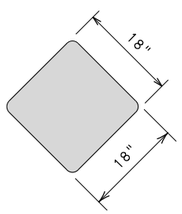
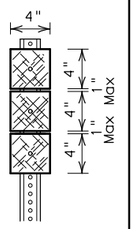
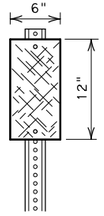
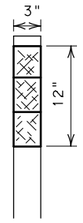
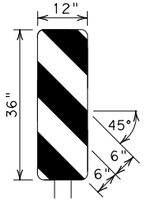
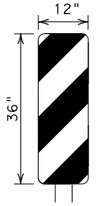
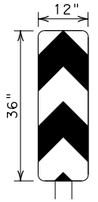
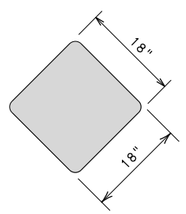
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

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

DIRECTION
If Required
BI = Bi-Directional

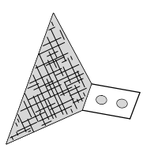
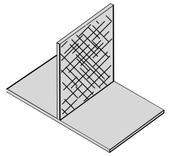
OBJECT MARKERS

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

DEPARTMENTAL MATERIAL SPECIFICATIONS

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

BARRIER REFLECTORS (BRF)

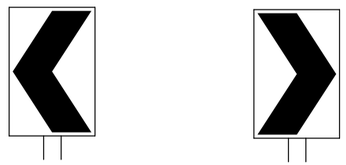
	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING	Yellow, White, Red
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

CHEVRONS

DEVICE

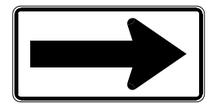


W1-8

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

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

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

NOTE

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

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031, Etc	FM 490
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHR	WILLACY		116

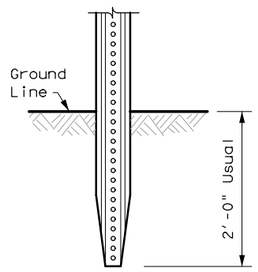
DATE:
FILE:

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

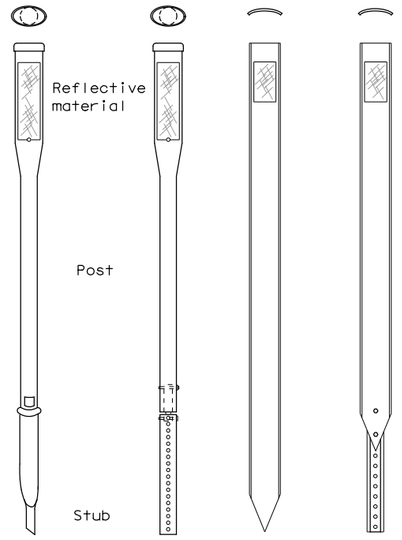


NOTES

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

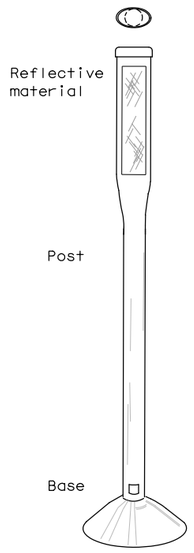
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



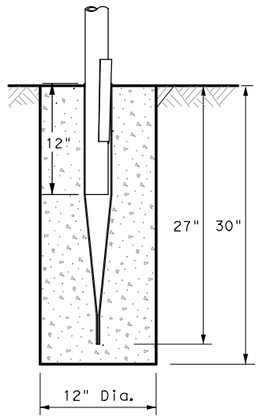
SURFACE MOUNT

NOTES

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

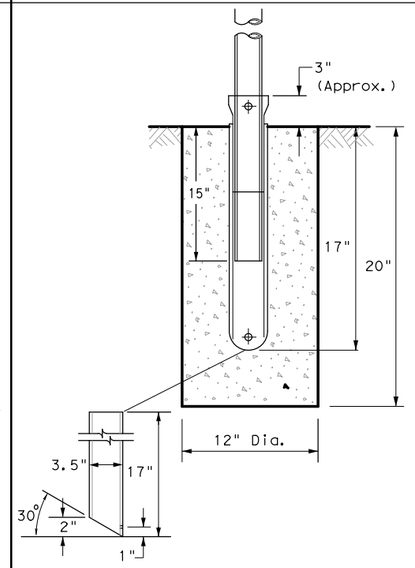
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

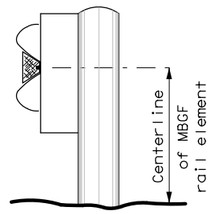
NOTE

1. Install per manufacturer's recommendations.

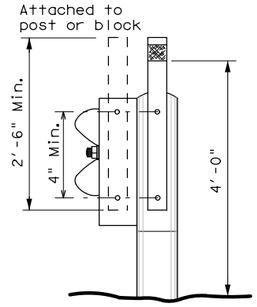
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

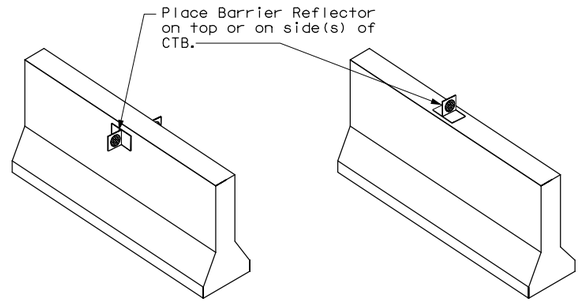
GF1



GF2



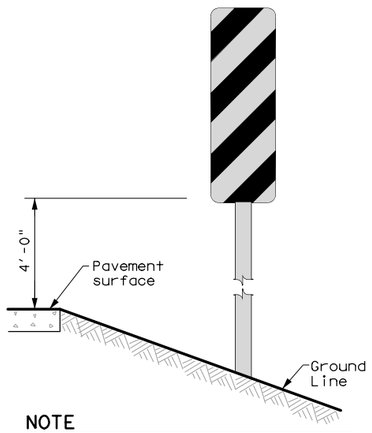
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

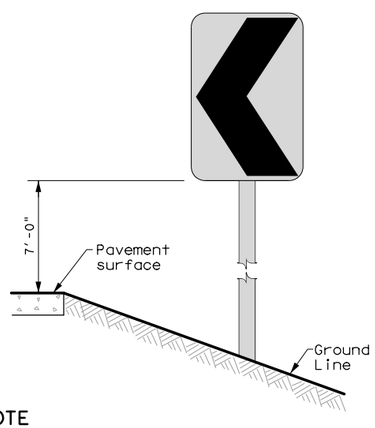
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

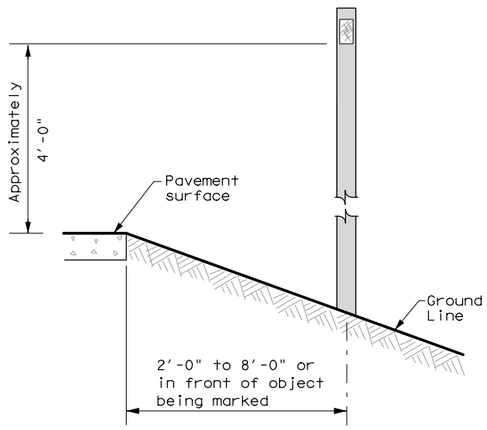
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHR	WILLACY		117

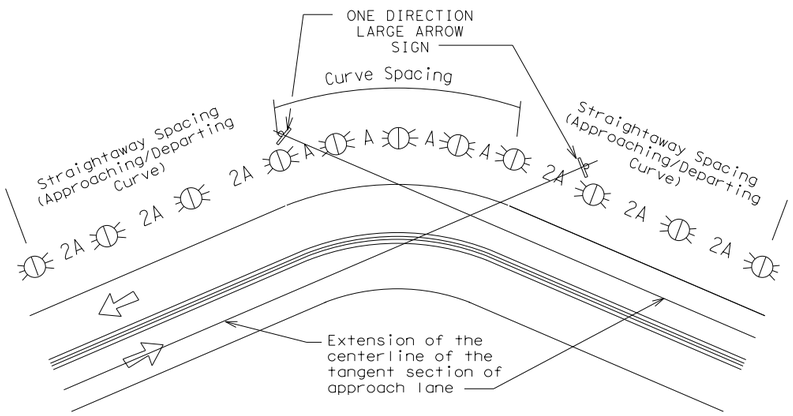
20B

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

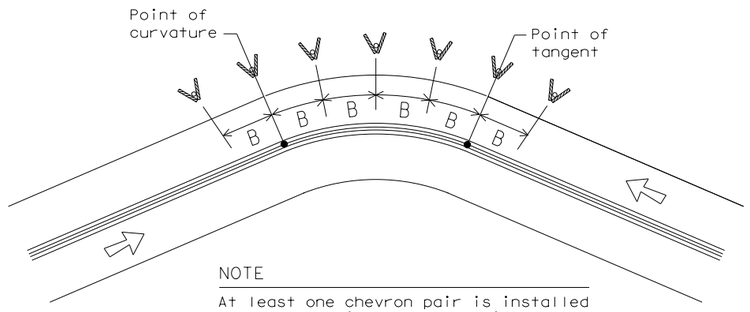
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

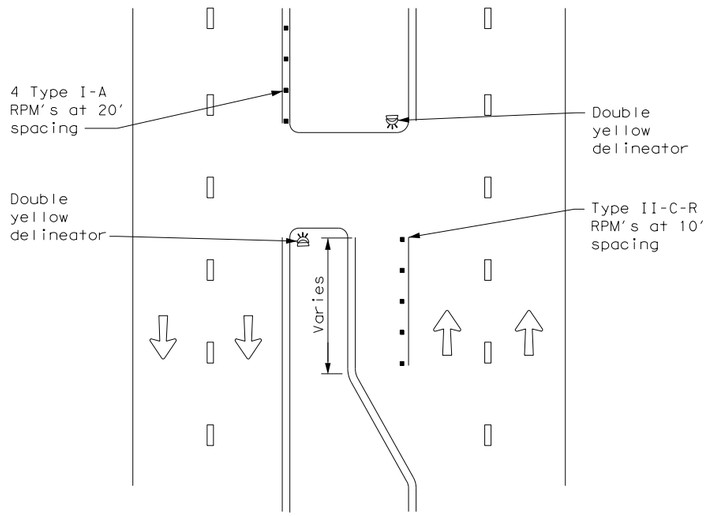
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		118

DATE:
FILE:

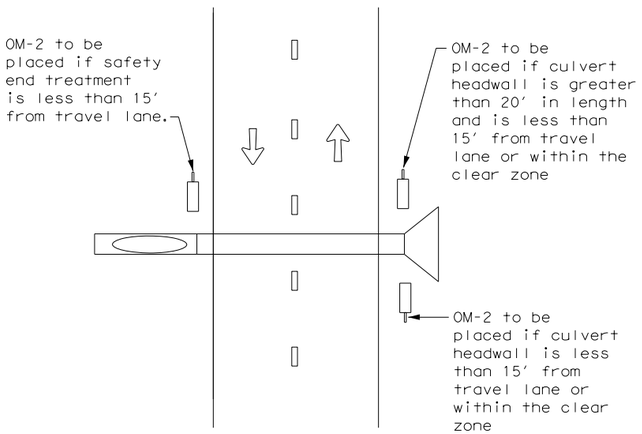
20C

CROSSOVERS



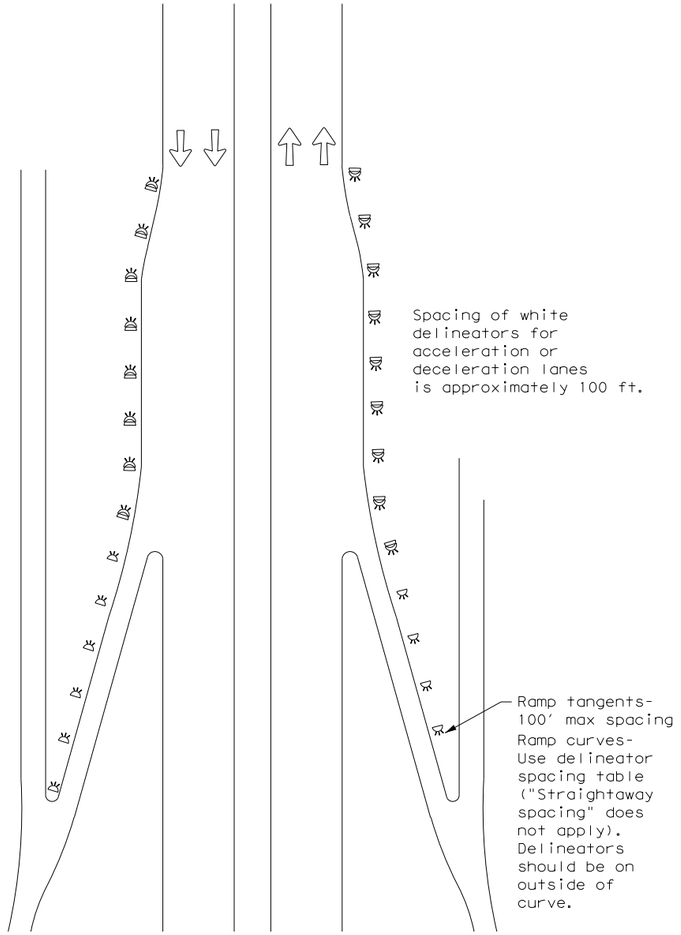
DETAIL 1

FOR CULVERTS WITH MBGF



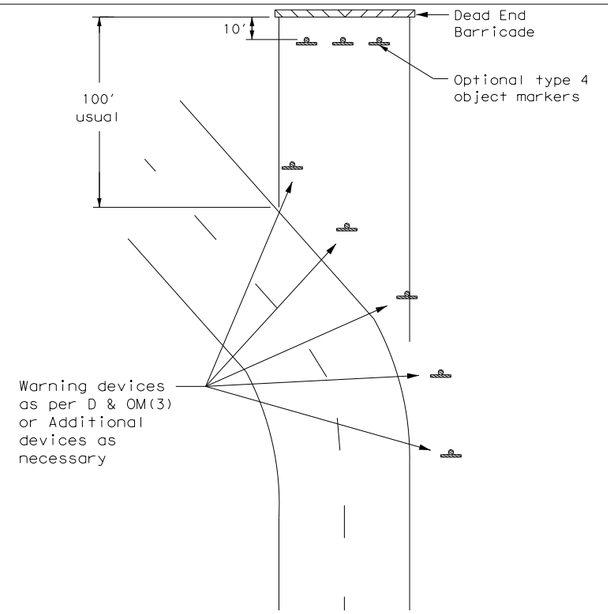
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



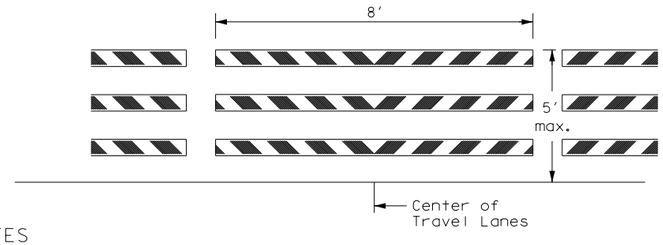
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

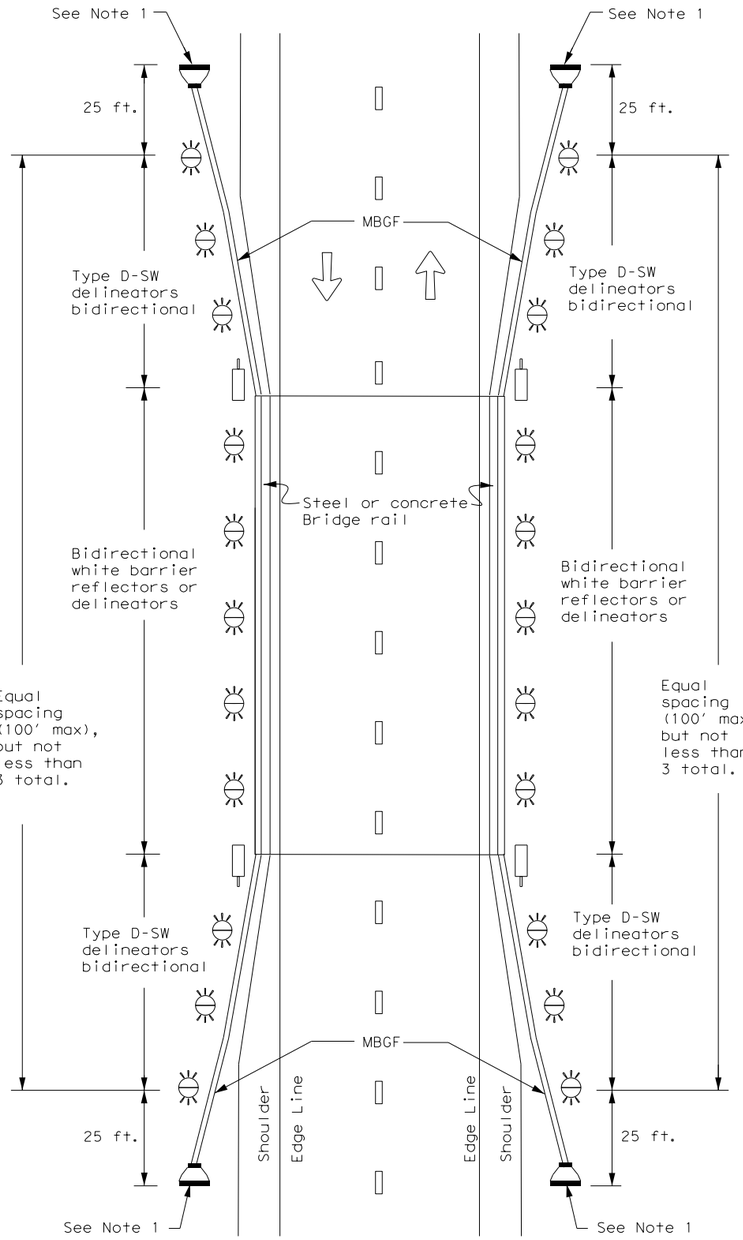
FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
3-15	DIST	COUNTY		SHEET NO.
7-20	PHR	WILLACY		119

20D

DATE:
FILE:

DATE:
FILE:

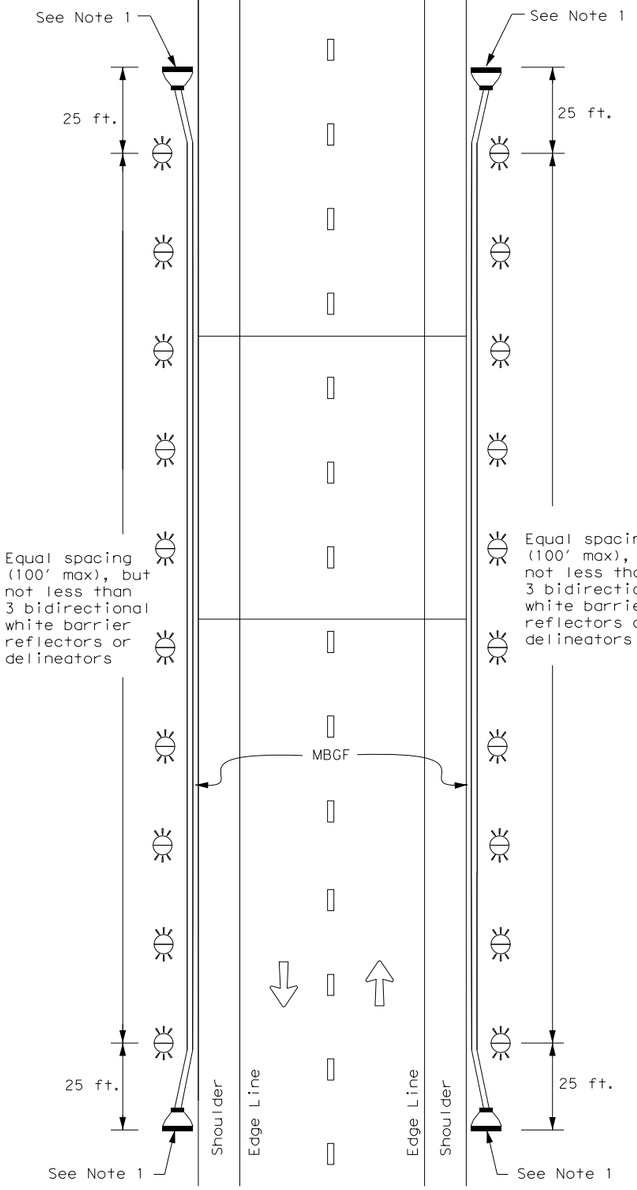
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

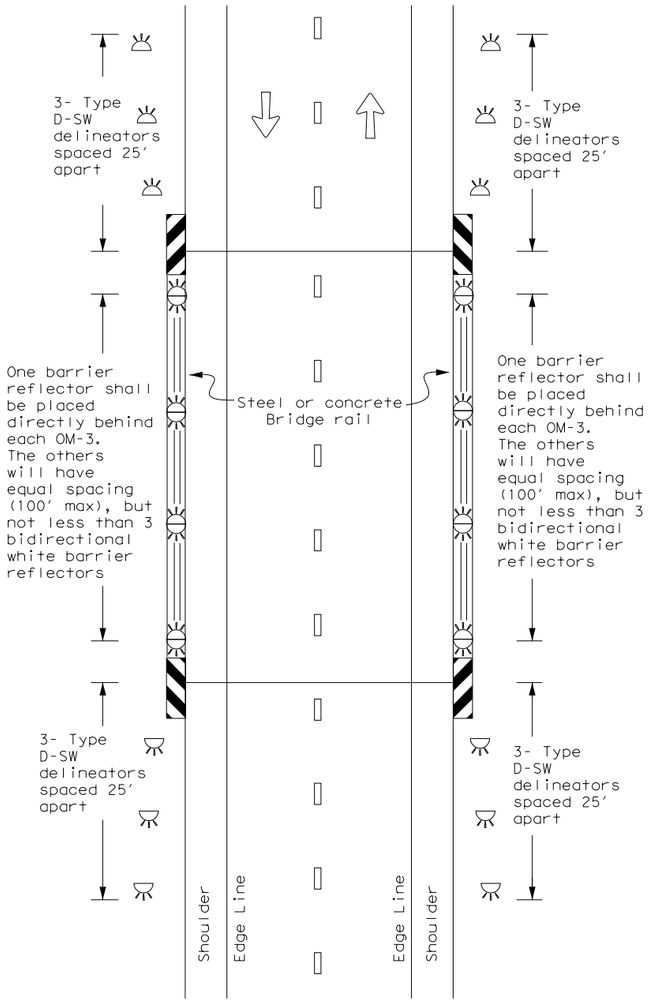
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
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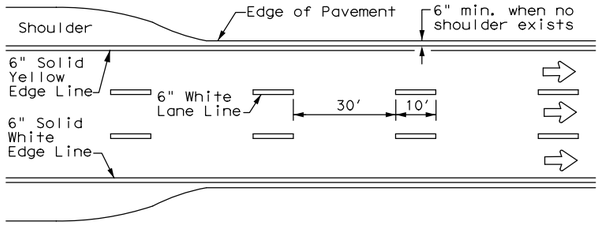
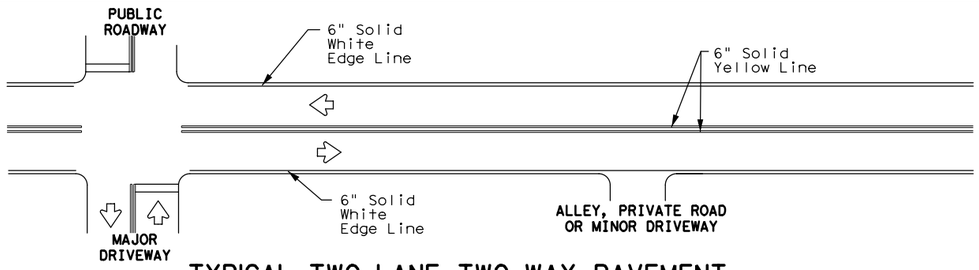
7-20	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		120

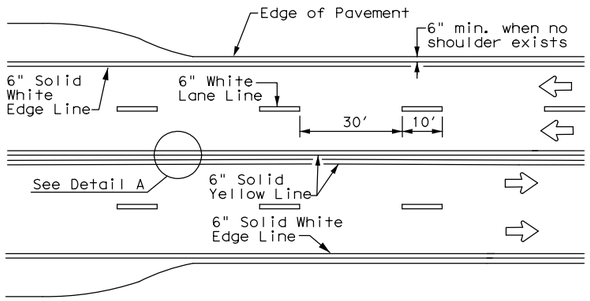
20E

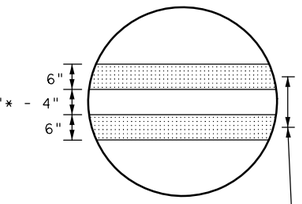


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





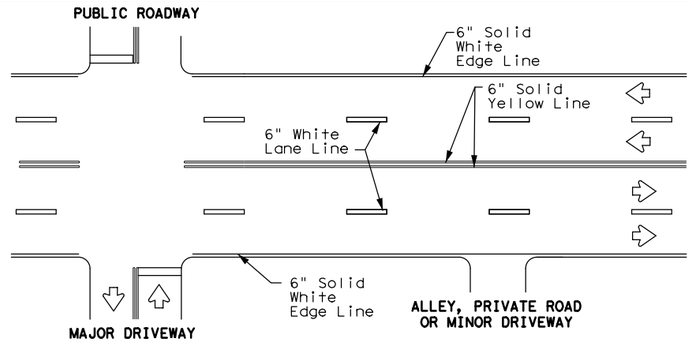
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

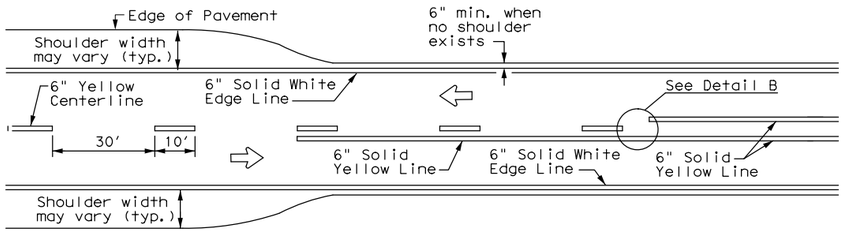
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

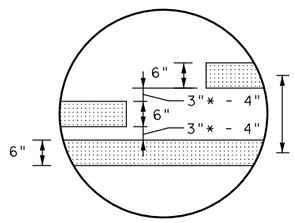
** 8" minimum for restripe projects when approved by the Engineer.



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



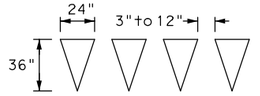
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

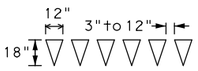
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

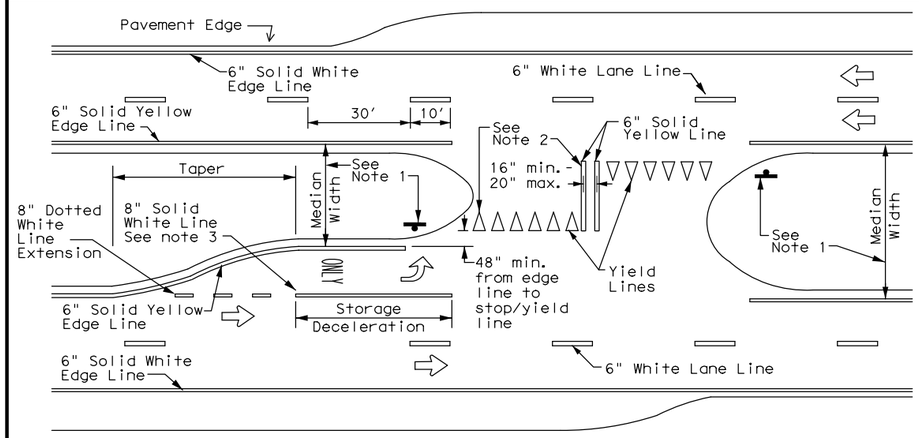


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

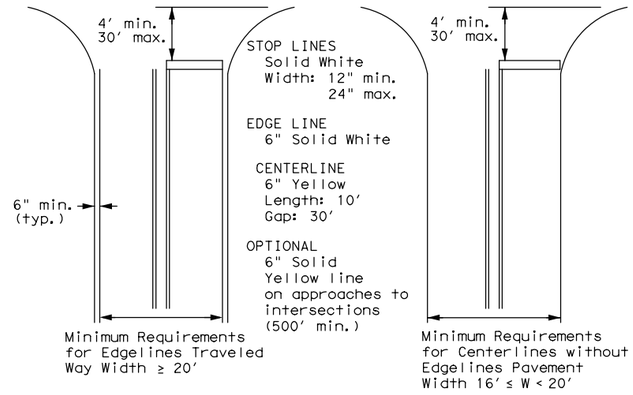
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

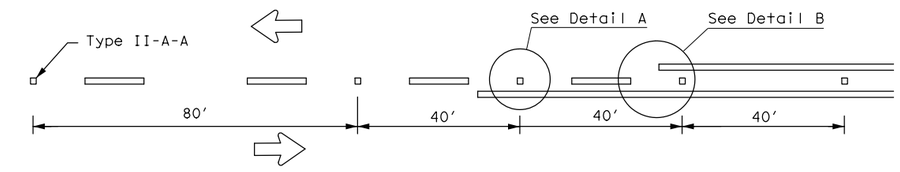
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	PHR	WILLACY		121
5-00 2-12				

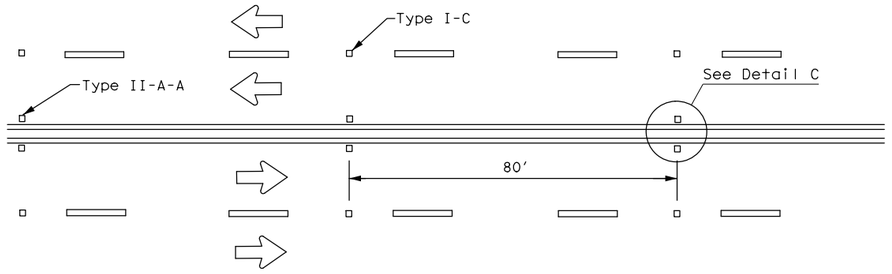
22A

DATE:
FILE:

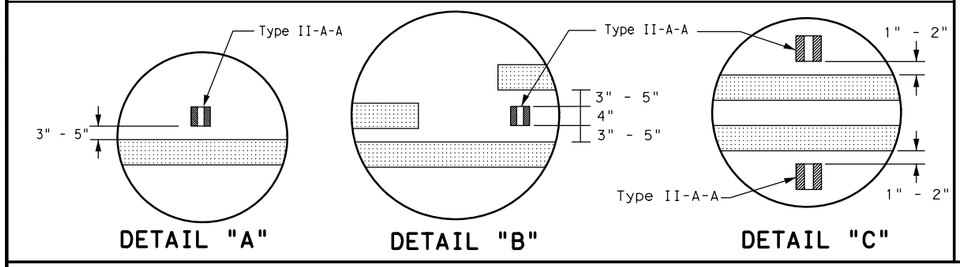
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



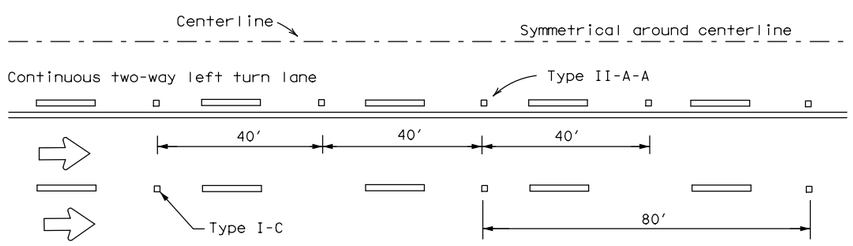
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



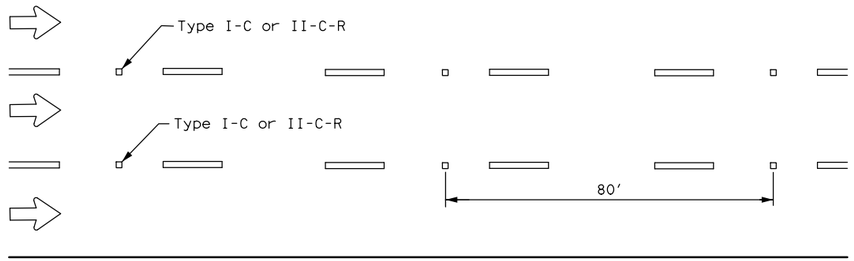
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



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



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



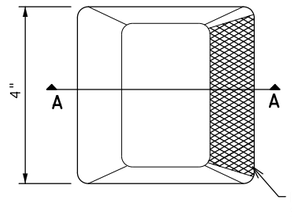
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

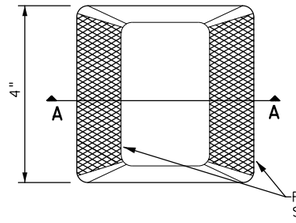
See Note 3.

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

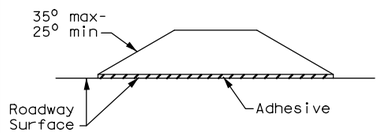
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

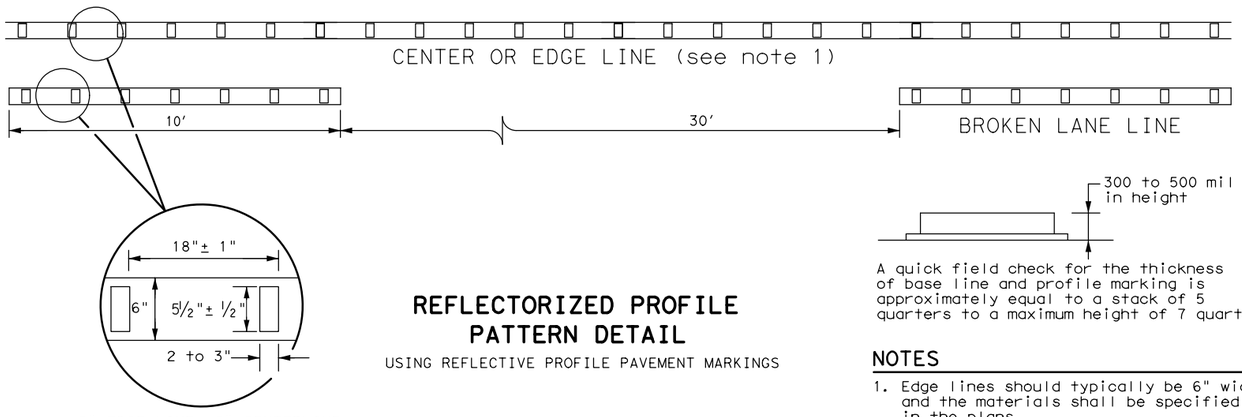


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

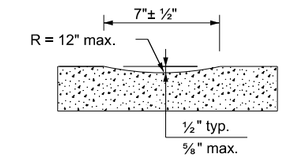
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	PHR	WILLACY		122
5-00 2-12				

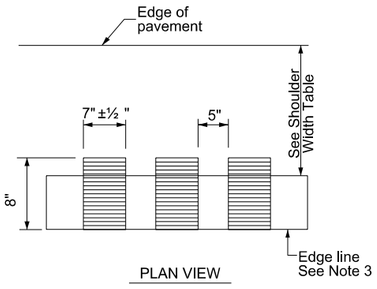
22B

DATE:
FILE:

DATE:
FILE:

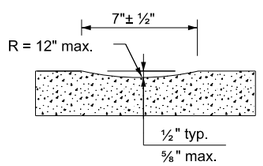


PROFILE VIEW
OPTION 1

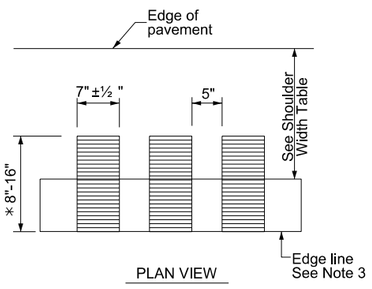


PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



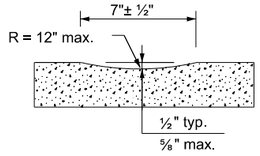
PROFILE VIEW
OPTION 2



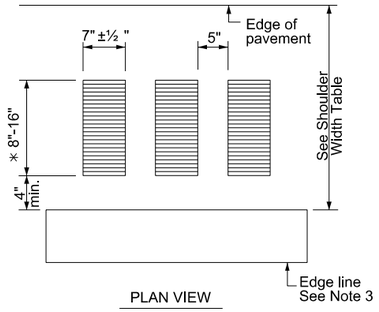
PLAN VIEW

∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



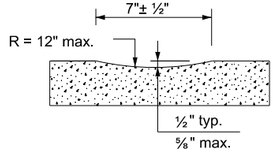
PROFILE VIEW
OPTION 3



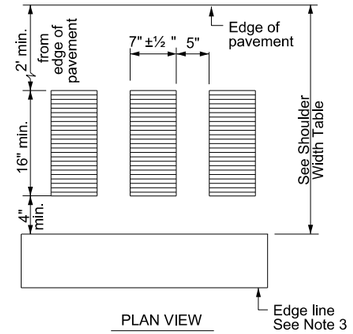
PLAN VIEW

∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

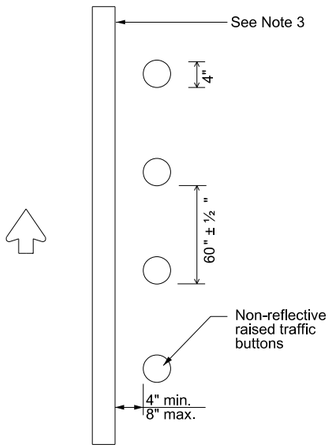


PROFILE VIEW
OPTION 4



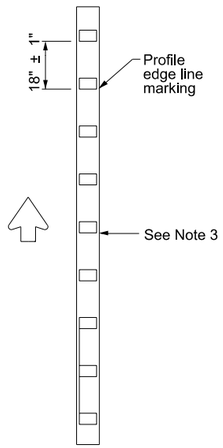
PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



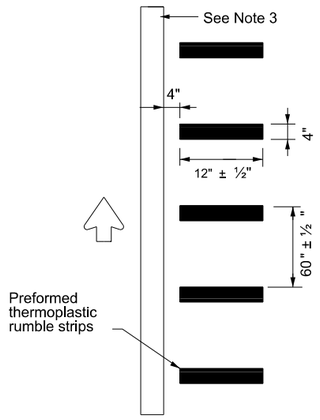
PLAN VIEW
OPTION 5

RAISED EDGE LINE (Rumble Strips)



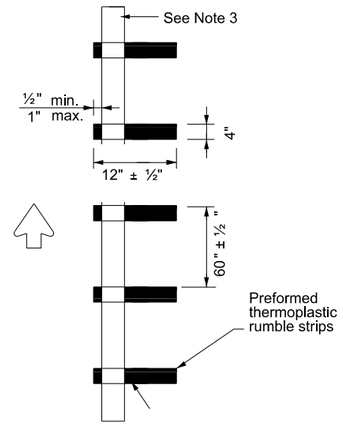
PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS (Rumble Strips)



PLAN VIEW
OPTION 7

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)



PLAN VIEW
OPTION 8

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, 6 or 8	Option 1, 2, 3 5, 6 or 7	Option 2, 4, 5 6 or 7

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edgeline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble strip.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

Texas Department of Transportation

Traffic Safety Division Standard

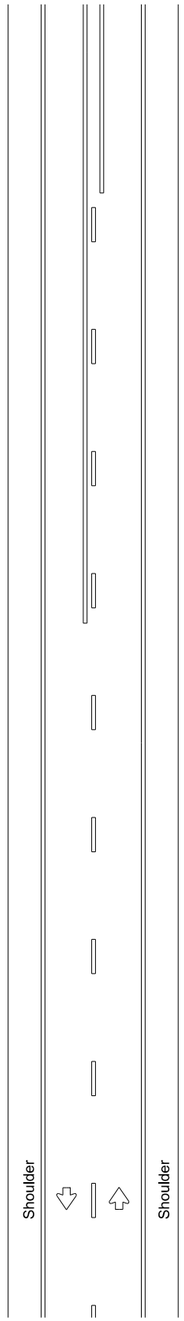
EDGE LINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS

RS(2)-23

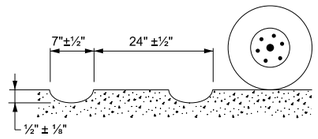
FILE: rs(2)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031, Etc	FM 490
10-13 1-23	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		123

DATE:
FILE:

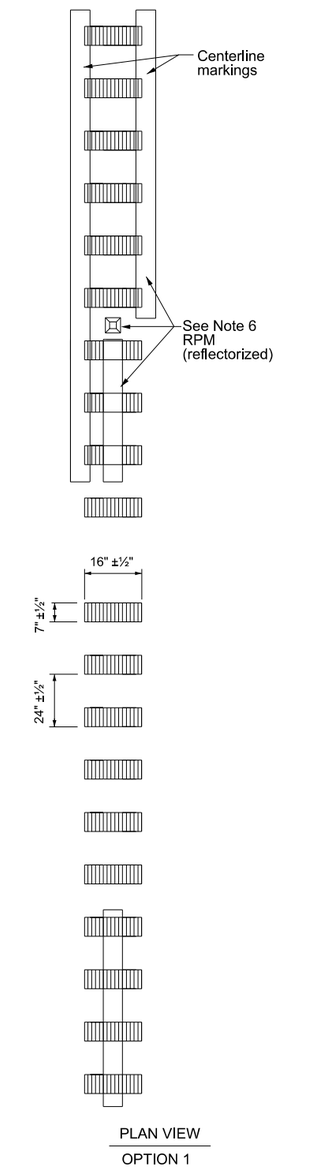
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

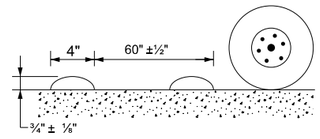


PROFILE VIEW

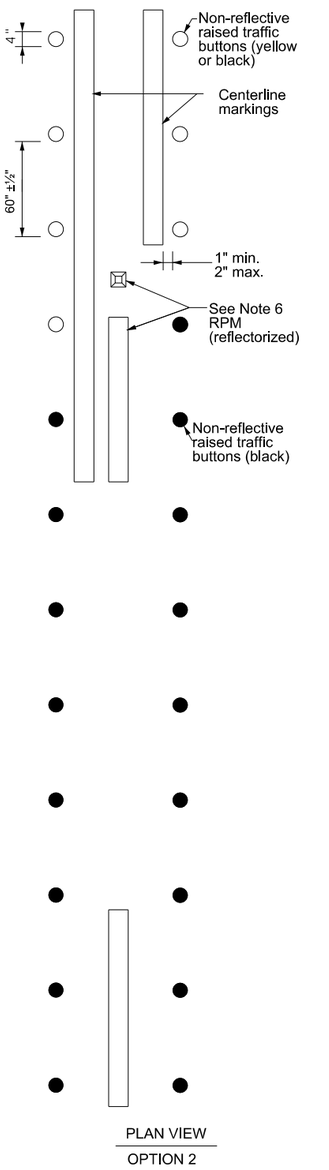


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

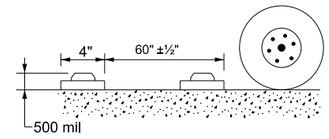


PROFILE VIEW

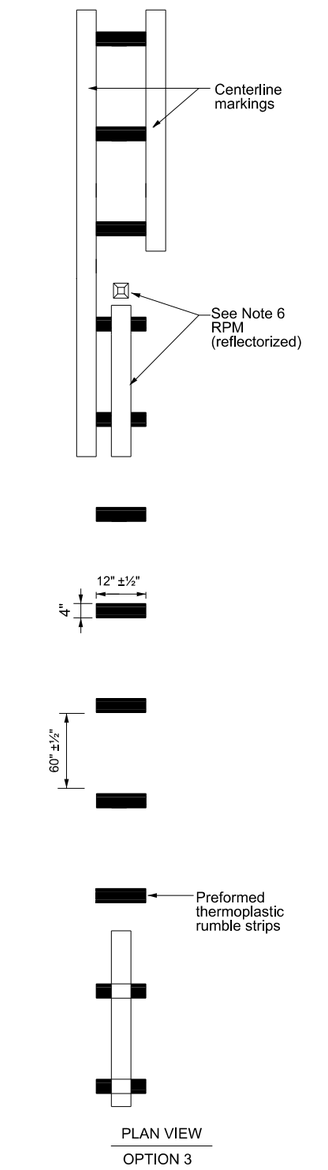


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

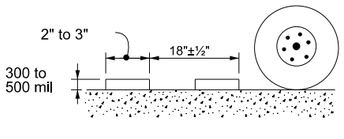


PROFILE VIEW

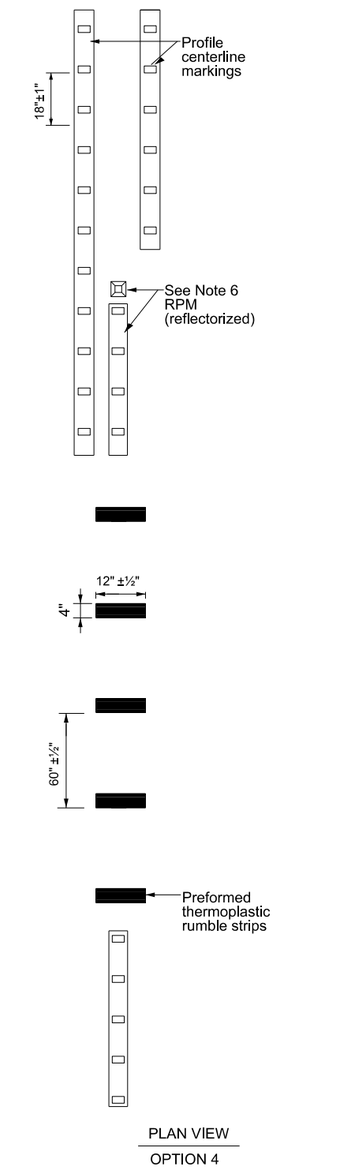


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC RUMBLE STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edge line rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections or driveways with high usage of large trucks.
6. Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.
12. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

13. See standard sheet RS(2).

Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS RS(4)-23

FILE: rs(4)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
10-13	DIST	COUNTY		SHEET NO.
1-23	PHR	WILLACY		124

DATE:
FILE:

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

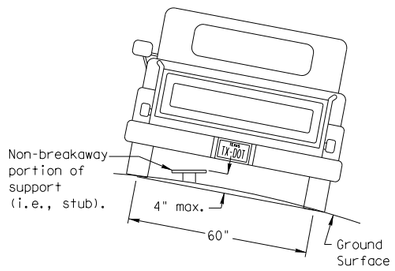
Post Type
- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Walled Tubing (see SMD(TWT))
- 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
- S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

Anchor Type
- UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
- UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
- WS = Wedge Anchor Steel - (see SMD(TWT))
- WP = Wedge Anchor Plastic (see SMD(TWT))
- SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
- SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

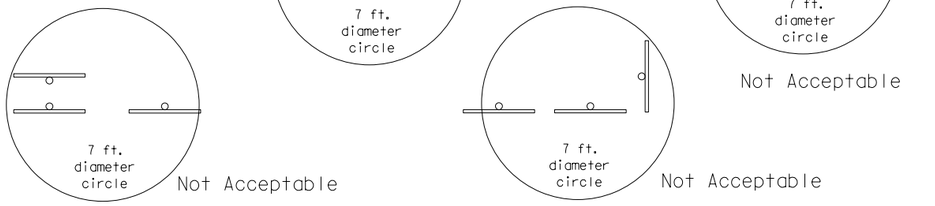
Sign Mounting Designation
- P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
- IF REQUIRED
- 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



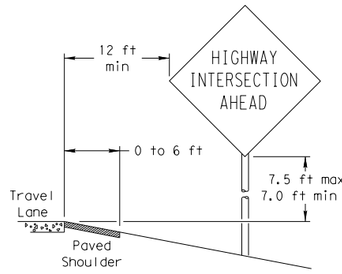
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



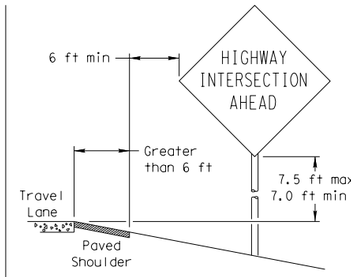
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

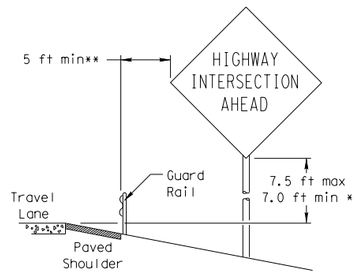
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



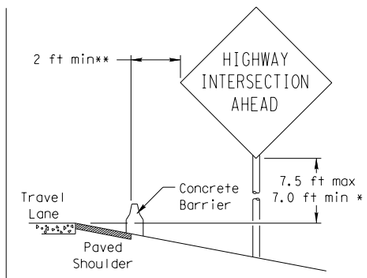
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



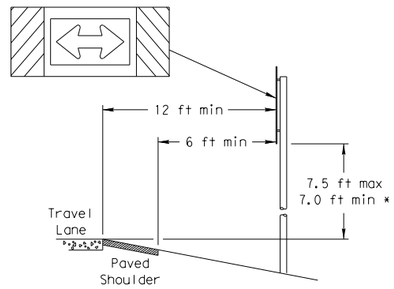
BEHIND GUARDRAIL



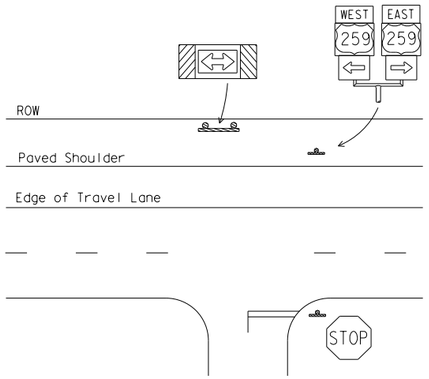
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

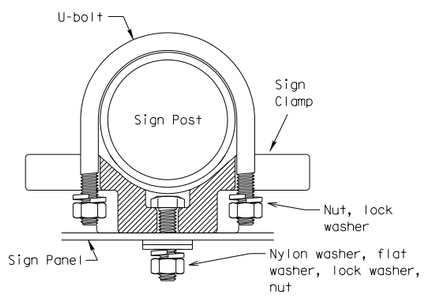
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

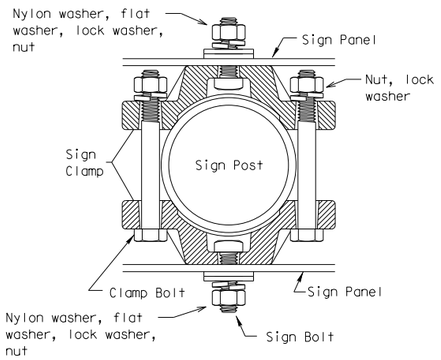
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



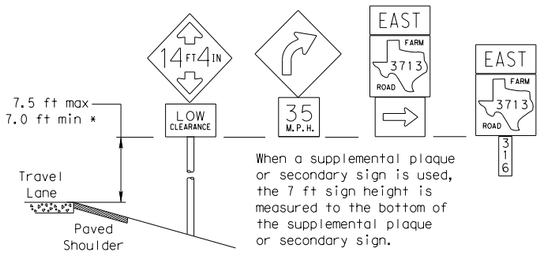
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

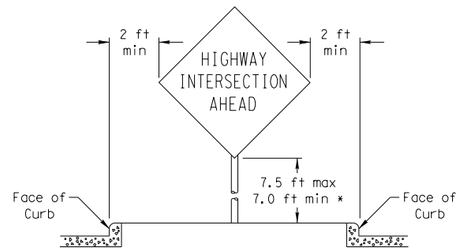
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



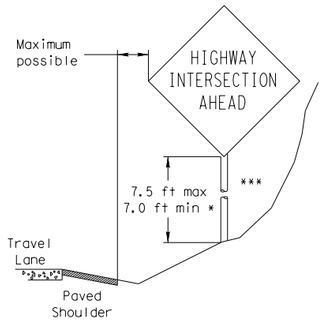
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

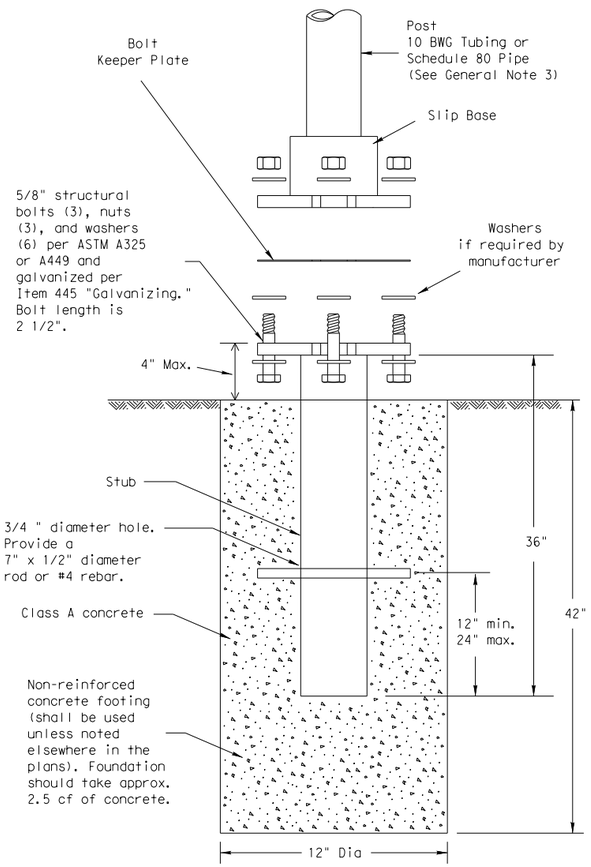
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1430	01	031,Etc	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		125

26A

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

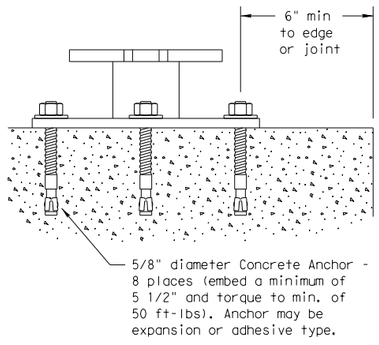
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

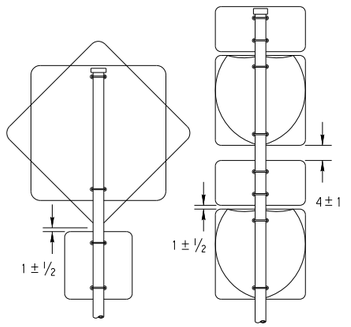
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

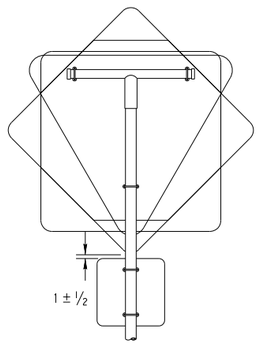
CONT	SECT	JOB	HIGHWAY
1430	01	031,Etc	FM 490

DIST	COUNTY	SHEET NO.
PHR	WILLACY	126

DATE:
FILE:



SM RD SGN ASSM TY XXXXX(1)XX(P)



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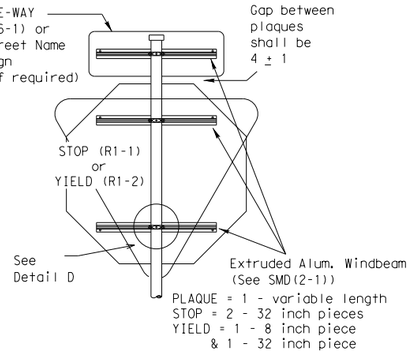
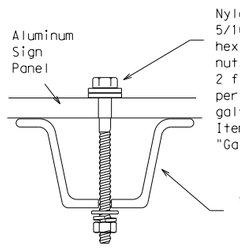
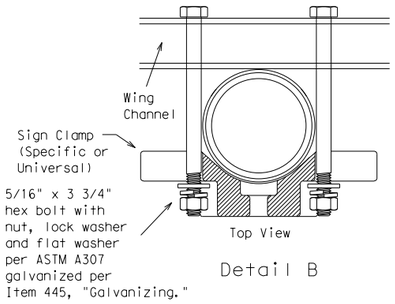


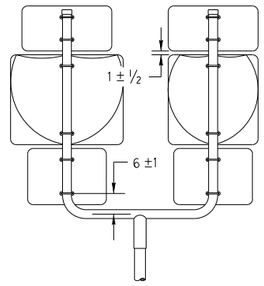
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



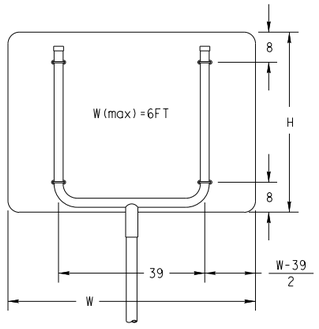
Detail A



Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



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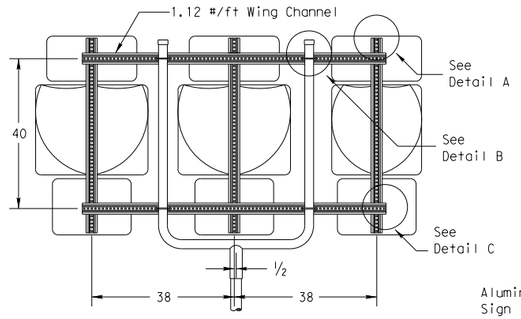
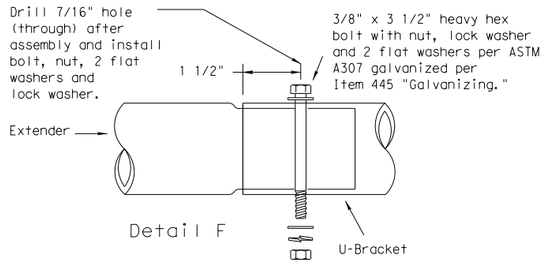
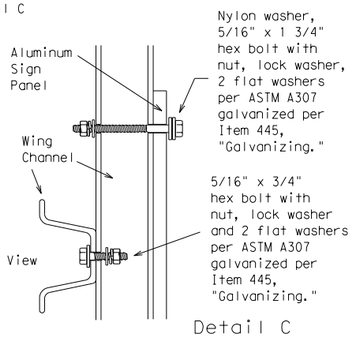


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

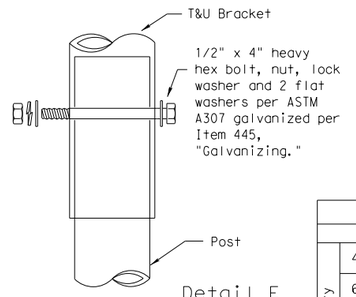


Detail F

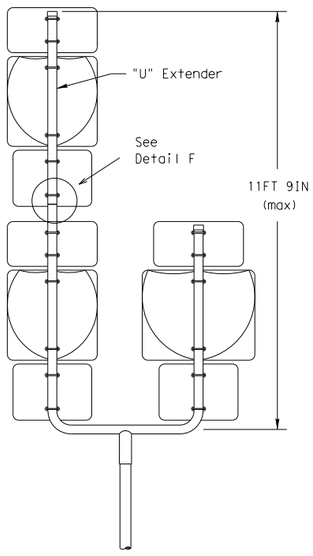
Splices shall only be allowed behind the sign substrate.



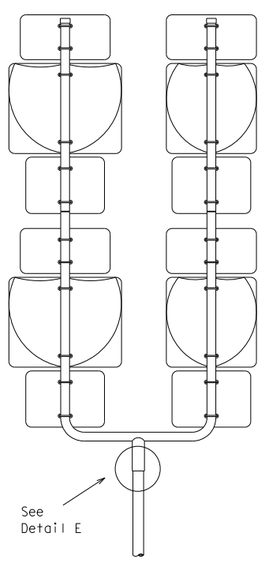
Detail C



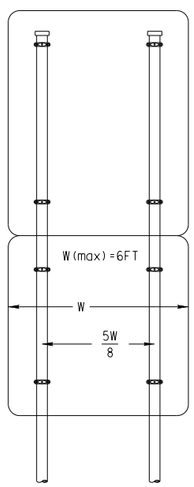
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

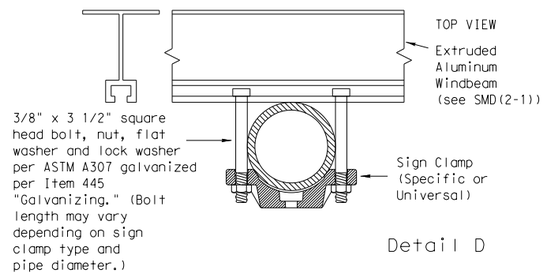


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

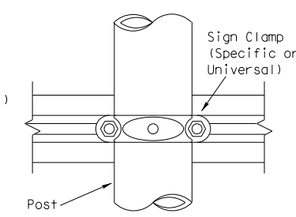


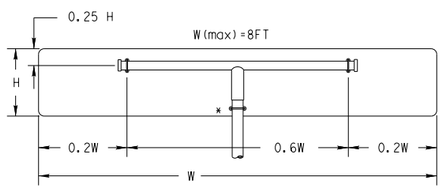
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

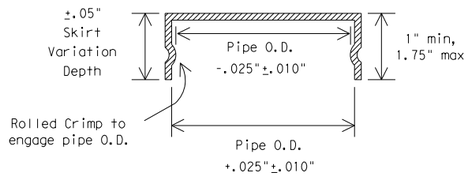




All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

CONT	SECT	JOB	HIGHWAY
1430	01	031,Etc	FM 490

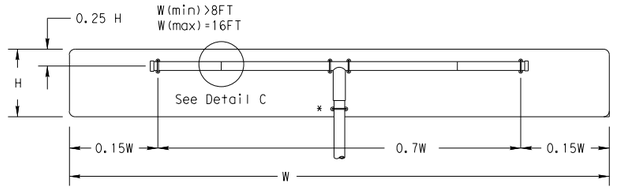
DIST	COUNTY	SHEET NO.
PHR	WILLACY	127

9-08 REVISIONS

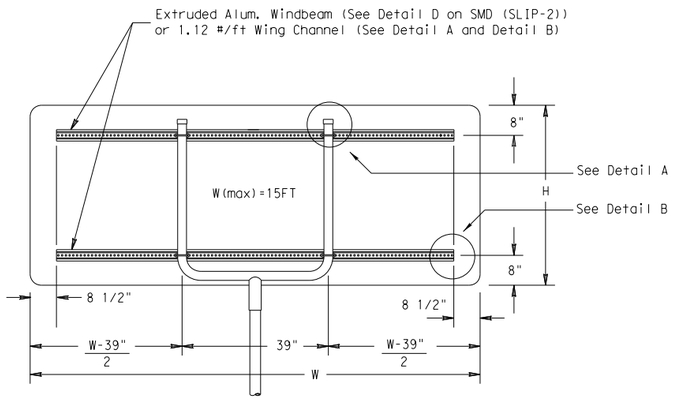
DATE:
FILE:

26C

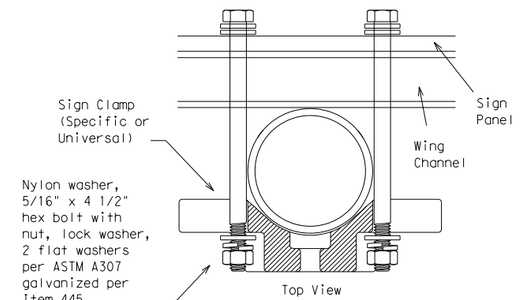
DATE:
FILE:



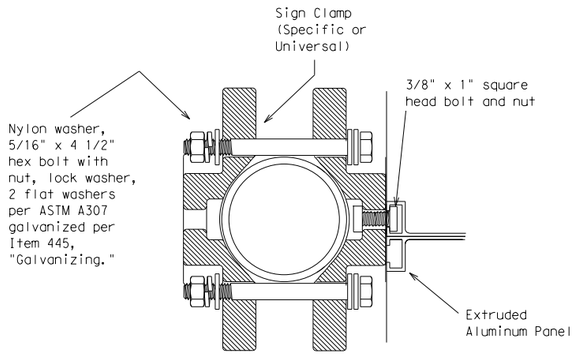
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



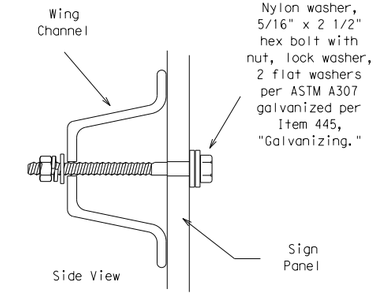
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



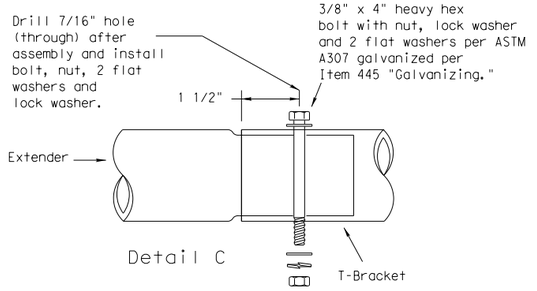
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

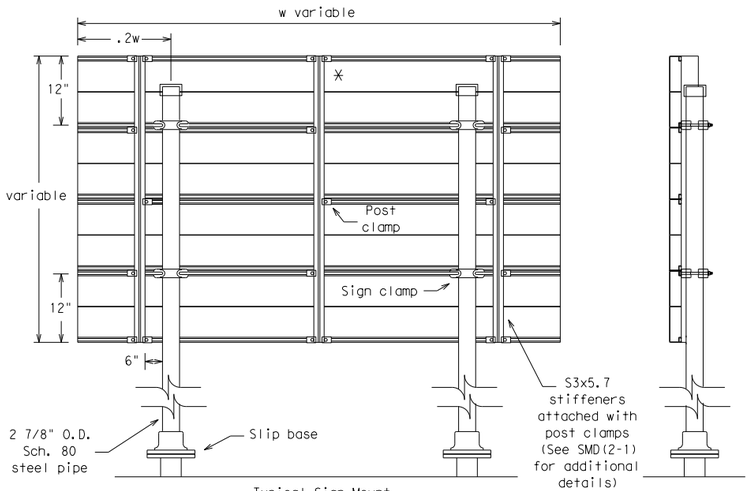


Detail B



Detail C

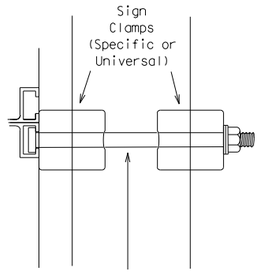
Splices shall only be allowed behind the sign substrate.



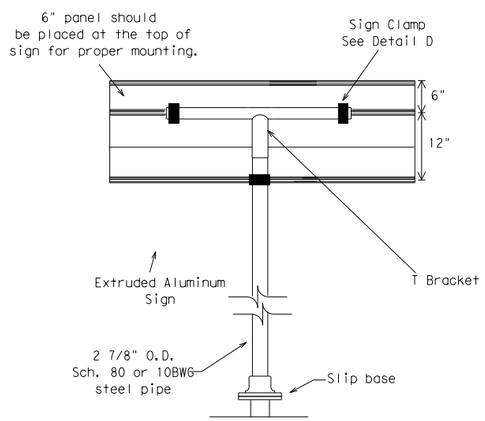
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

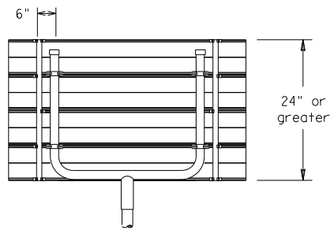
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS
9-08

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

CONT	SECT	JOB	HIGHWAY
1430	01	031,Etc	FM 490

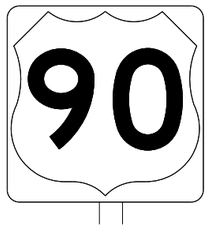
DIST	COUNTY	SHEET NO.
PHR	WILLACY	128

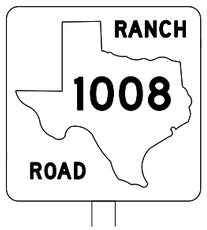
26D

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

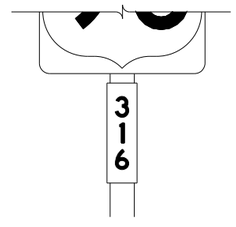


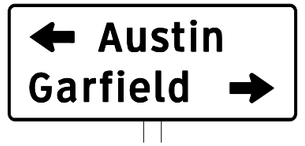


TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING





TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

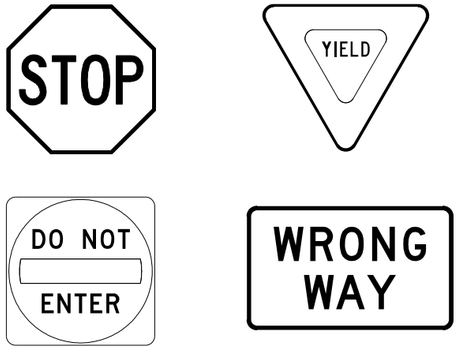
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHR	WILLACY		129

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

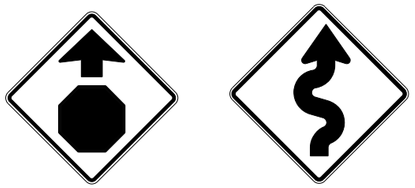
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

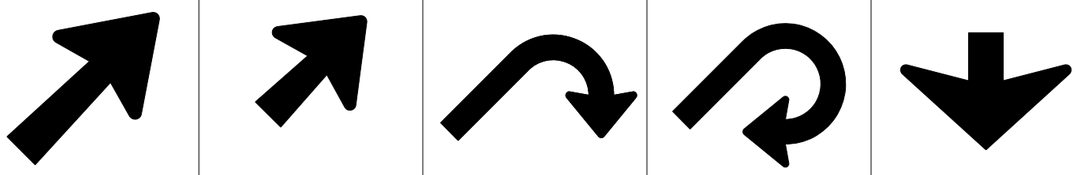
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031, Etc	FM 490
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHR	WILLACY		130

DATE:
FILE:

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



Type A | Type B | E-3 | E-4 | Down Arrow

TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

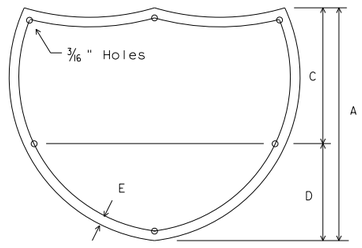
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

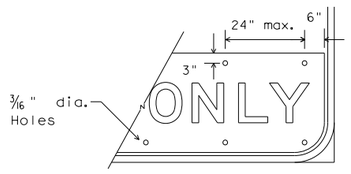
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

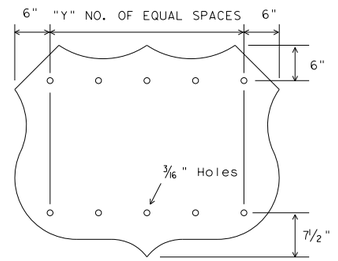


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

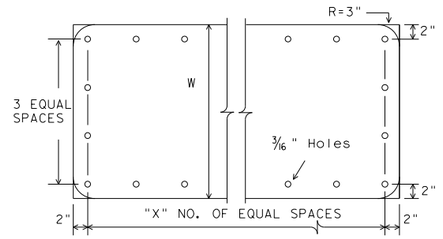


EXIT ONLY PANEL



U.S. ROUTE MARKERS

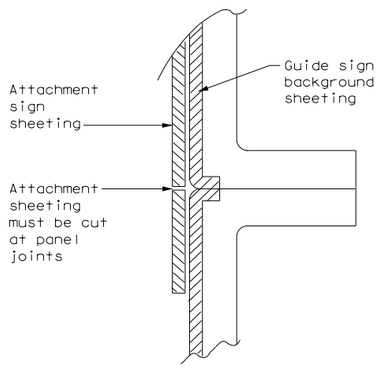
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



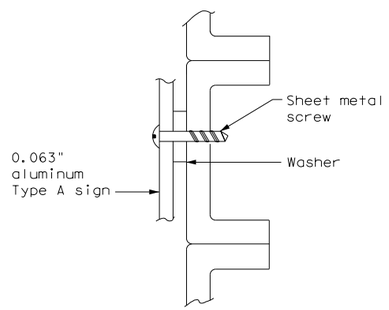
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

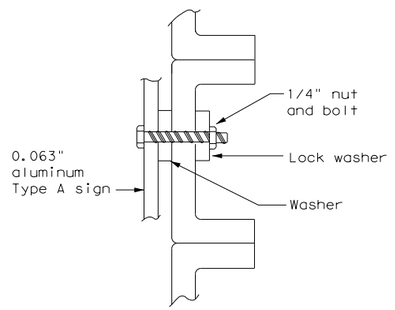
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

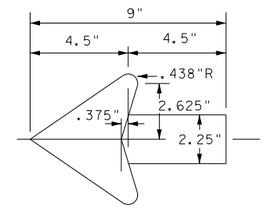
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

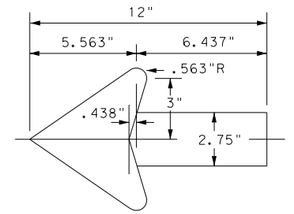
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1430	01	031,Etc	FM 490
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHR	WILLACY		131

During the planning phase of project development, the following Environmental Permits, Issues and Commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities as additional environmental clearances may be required.

I. Clean Water Act, Section 402; Stormwater Pollution Prevention

Action Items Required : ☐ No Action Required

1. ☒ The contractor must implement the SW3P by installing Best Management Practices (BMPs) as indicated in the construction plans and maintained appropriately throughout construction. BMPs must be in place prior to the start of construction. The SW3P may need to be revised as necessary as construction progresses.

2. ☒ For all construction PSL's off the ROW, the contractor must certify compliance with all applicable laws, rules and regulations pertaining to the preservation of cultural resources, natural resources and the environment.

3. ☒ Based on the acreage of impact, select the appropriate box below:

   ☐ This project will disturb less than 1 acre of soil and is not part of a larger common plan of development; therefore, a NOI and TPDES Site Notice are not required for this project.

   or

   ☒ This project will disturb equal to or more than 1 acre of soil but less than 5 acres; therefore a NOI is not required but a TPDES Site Notice is required. The Construction Site Notice (CSN) is required to be posted at the construction site in a publicly accessible location for review by the public, TCEQ, EPA and other Inspectors.

   or

   ☐ This project will disturb equal to or more than 5 acres of soil and will require a NOI and TPDES Site Notice. The NOI and Site Notice are required to be posted at the construction site in a publicly accessible location.

4. ☐ Need to address MS4 requirements (Cameron & Hidalgo Counties only) ☐ MS4 requirements not needed

II. Clean Water Act, Sections 401 and 404 Compliance

Action Items Rquired : ☐ No Action Required

1. ☒ Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet areas is prohibited unless specified in the USACE permit and approved by the Engineer. The contractor shall adhere to all agreements, mitigation plans, and BMPs required by the NWP as regulated by the USACE.

   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 (1/10th to <1/2 acre, 1/3 in tidal waters)

   ☐ Individual 404 Permit Required

   ☐ Other Nationwide Permit Required: NWP#_____

2. ☒ The contractor is responsible for obtaining new or revised Section 404 permit(s) for Contractor initiated changes in construction methods that change Impacts To Waters Of The U.S., including wetlands. The Contractor will ensure that the water quality of the State will be maintained and not degraded.

3. ☒ Best Management Practices for applicable Section 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

☒ Temporary Vegetation	☐ Interceptor Swale	☐ Mulch Filter Berms and/or Socks
☐ Blankets, Matting	☐ Diversion Dike	☐ Compost Filter Berms and/or Socks
☒ Mulch	☐ Erosion Control Compost	☐ Compost Blankets
☐ Sodding		

Category II (Sedimentation Control)

☒ Silt Fence	☒ Hay (Straw) Bale Dike	☐ Mulch Filter Berms and/or Socks
☐ Rock Berm	☐ Brush Berms	☐ Compost Filter Berms and/or Socks
☐ Triangular Filter Dike	☐ Sediment Basins	☐ Stone Outlet Sediment Traps
☐ Sand Bag Berm	☒ Erosion Control Compost	

General Condition 21 - Category III BMPs required

Category III (Post-Construction TSS Control)

☐ Vegetative Filter Strips	☐ Wet Basins	☐ Mulch Filter Berms and/or Socks
☐ Retention/Irrigation	☐ Grassy Swales	☐ Compost Filter Berms and/or Socks
☐ Extended Detention Basin	☐ Vegetation-Lined Ditches	☐ Sand Filter Systems
☐ Constructed Wetlands	☐ Erosion Control Compost	☐ Sedimentation Chambers

II. Clean Water Act, Sections 401 and 404 Compliance - Continued:

4. ☒ The Contractor's designated and qualified Contractor Responsible Person Environmental (CRPe) will monitor the project site daily to ensue compliance with SW3P and TPDES General Permit TXR 150000. Daily Monitoring Reports shall be provided to TxDOT within 48 hours, in accordance with Item 506.3.1.

5. ☒ Other Project Specific Actions:

   1. Contractor must sweep roadway and remove loose aggregate upon completed daily operations.
   2. Contractor shall not place removed aggregate along adjacent grass areas.
   3. The project locations and limits are near a storm crossing. No PSL's are allowed in the stream areas.
   4. Project shall have erosion control logs and/or silt fence placed to prevent soils from reaching stream areas.

III. Cultural Resources

Action Items Required : ☐ No Action Required

1. ☒ Refer to the 2014 TxDOT Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges, Item 7.7.1., 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.

2. ☐ Other Project Specific Actions:

IV. Vegetation Resources

Action Items Required : ☐ No Action Required

1. ☒ In accordance with the 2014 TxDOT Standard Specifications; Item 164 - Seeding For Erosion Control; provide and install temporary or permanent seeding for erosion control as shown on the plans or as directed by the Engineer for all seeding and replanting of right of way where possible. (Required for Rural Settings)

2. ☒ In accordance with Executive Order 13112 on invasive species and the Executive Memorandum on Beneficial Landscaping, native species of plants shall be used for all seeding and replanting of right of way where possible for rural roadways. (Required for Rural Settings)

3. ☒ Preserve vegetation where possible throughout the project and minimize clearing, grubbing and excavation within stream banks, bed and approach sections.

4. ☐ Other Project Specific Actions:

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

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

Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	
CONTROL	SECTION	JOB	SHEET NO.
1430	01	031, Etc	132

Date Printed: X-X-XX

V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds

Action Items Required : ☐ No Action Required

1.☒ Under the Migratory Bird Treaty Act (MBTA) of 1918, codified at 16 U.S.C. § 703-712 and as enforced by the USFWS, the proposed construction work will not remove active nests from bridges, trees, ground and other structures during migratory bird nesting season, (February 1st. through October 1st.). If the Contractor needs to perform work within the right of way during nesting season, a qualified Biologist shall conduct a survey to determine if active nests are present. If present, the Contractor shall maintain a buffer zone around the nest(s) as directed by the Biologist. The buffer zone will be protected from clearing and disturbance until such time as the Biologist has determined that the nest(s) is no longer active. Prior to the nesting season, existing bridges and culverts should be treated against migratory bird nesting by utilizing Bird Exclusion Methods. Bird Exclusion Methods should be monitored and maintained throughout the nesting season. Refer to Standard Bird Exclusion Details.

2.☒ There is the potential for the presence of state-listed species & species of concern in the project area and state law prohibits the taking (incidental or otherwise) of state-listed species. Taking is defined as the collection, hooking, hunting, netting, shooting, or share by any means or devices. If any listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately.

3.☒ Other Project Specific Actions:

1. Federal & State Listed Species:

Black-Spotted Newt	(Notophthalmus meridionalis)
Mexican Burrowing Toad	(Rhinophrynus dorsalis)
Mexican Treefrog	(Smilisca baudinii)
Sheep Frog	(Hypopachus variolosus)
South Texas Siren	(Siren sp.)
White-Lipped Frog	(Leptodactylus fragilis)
Mexican Goby	(Ctenogobius claytonii)
Texas Horned Lizard	(Phrynosoma cornutum)
Ocelot	(Leopardus pardalis)
Jaguarundi	(Puma yagouaroundi)
Plains Spotted Skunk	(Spilogale putorius interrupta)
Texas Indigo Snake	(Drymarchon melanurus erebennus)
Texas Tortoise	(Gopherus berlandieri)
Mexican Mud-Plantain	(Heteranthera mexicana)
Vasey's Adelia	(Adelia vaseyi)
Saint Joseph's Staff	(Hippeastrum johnsonii)
Falfurrias Milkvine	(Matelea radiata)

2. No work shall occur from dusk to dawn. Construction and maintenance activiities will occur only during daylight hours.
3. See EPIC sheet supplemental for TPWD BMP's.

VI. Hazardous Materials on Contamination Issues

Action Items Required : ☐ No Action Required

General (applies to all projects):

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

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the HCA.

Maintain an adequate supply of on-site spill response materials as indicated in the MSDS. In the event of a spill, take immediate action to mitigate the spill as indicated in the MSDS and in accordance with safe work practices. Contact the TxDOT Pharr 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 (identified as not normal)
- Trash piles, drums, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of contaminant substances

Any other evidence indicating possible hazardous materials or contamination discovered on site.

1.☒ If potentially hazardous material and/or contaminated media (i.e.: soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, assure that such materials and contamination are handled according to applicable federal and state regulations, cease work in the immediate area and contact the Engineer immediately.

Date Printed: X-X-XX

VI. Hazardous Materials on Contamination Issues - Continued:

2. Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action required.
If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.

3. Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a Texas Department of State Health Services (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 abatement activities and/or demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

4.☐ The Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and an Asbestos Consultant in order to minimize construction delays and subsequent claims.

VII. Other Environmental Issues

Action Items Required : ☐ No Action Required

1. ☒ Noise

Contractor shall make every reasonable effort to minimize construction noise through abatement measures such as work hour controls and proper maintenance of equipment mufflers.

2. ☒ Air

Contractor shall practice common dust control techniques such as surface chemical treatment or watering of unpaved road surfaces and vehicle speed reduction shall be implemented to minimize and prevent airborne dust during construction.

Contractor should minimize MSAT by utilizing measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increase use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

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

Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	SHEET NO.
CONTROL	SECTION	JOB	
1430	01	031, Etc	133

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):
1430-01-031, Etc

1.2 PROJECT LIMITS:

From: FM 1015

To: FM 1425 (EXCLUDING BRIDGES AND APPROACHES)

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 97°54'45.42" ,(Long) 26°27'00.75"

END: (Lat) 97°54'45.88" ,(Long) 26°27'05.59"

1.4 TOTAL PROJECT AREA (Acres): 37.4

1.5 TOTAL AREA TO BE DISTURBED (Acres): 20.7

1.6 NATURE OF CONSTRUCTION ACTIVITY:
ROADWAY WIDENING AND RECONSTRUCTION CONSISTING OF EXCAVATION, EMBANKMENT AND GRADING.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
DELFINA FINE SANDY LOAM	MOD WELL DRAINED, MOD WATER TRANSMITION
HIDALGO SANDY CLAY LOAM	WELL DRAINED, MOD HIGH WATER TRANSMITION
RAYMONDVILLE CLAY LOAM	MOD WELL DRAINED, MOD WATER TRANSMITION

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	NONE, DITCHES

* 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

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		134
STATE	STATE DIST.	COUNTY	
TEXAS	PHR	WILLACY	
CONT.	SECT.	JOB	HIGHWAY NO.
1430	01	031, Etc	FM 490

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
- X ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

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
  - X 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
PERMANENT SEEDING	PROJECT LIMITS	PROJECT LIMITS

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: _____

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

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 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
SEAN CLARY
122134
LICENSED
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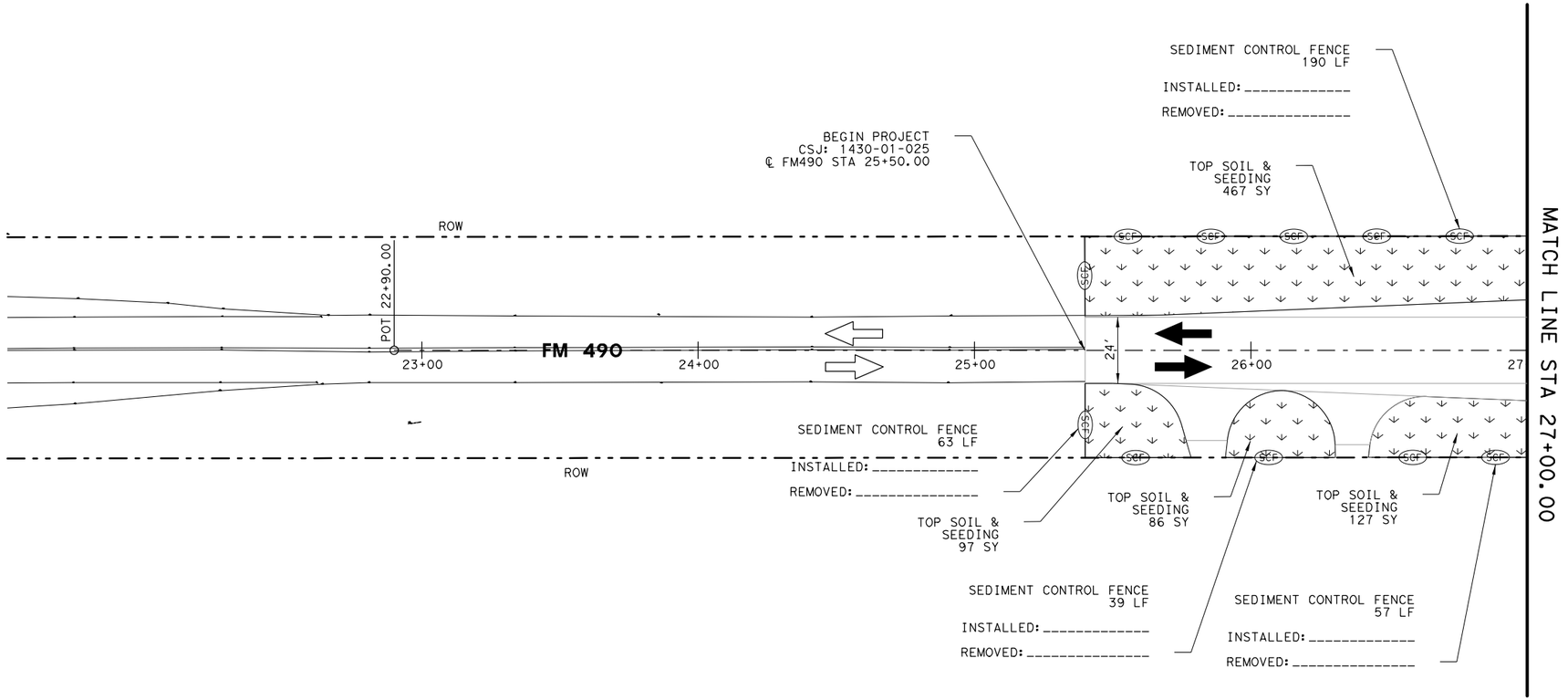
04/25/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		135
STATE	STATE DIST.	COUNTY	
TEXAS	PHR	WILLACY	
CONT.	SECT.	JOB	HIGHWAY NO.
1430	Ø1	Ø31, Etc	FM 490



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HORIZ:
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — EROSION CONTROL LOG
- SEEDING (PERM, TEMP)

NOTES:

1. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
2. SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS (AS REQUIRED) TO BE LOCATED AT DOWNSTREAM ROW LINE OR AT PROPOSED GRADING LIMITS OR AS PER DIRECTION OF THE ENGINEER.
3. PLACEMENT OF SEDIMENT CONTROL FENCE IN AREAS OTHER THAN AS SHOWN ON THESE SHEETS SHALL BE PER THE DIRECTION OF THE ENGINEER.
4. THE LOCATION OF EC AND OTHER SOIL STABILIZATION PRACTICES WILL BE BASED ON SITE SPECIFIC FIELD CONDITIONS AS NEEDED. QUANTITIES SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED TO MEET FIELD CONDITIONS.
5. BEFORE CONSTRUCTION BEGINS, OUTFALL AREAS WILL BE PROTECTED IN ACCORDANCE WITH ITEM 506 AND AS SHOWN IN THE PLANS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
SW3P PLAN
BEGIN TO STA 32+50

SCALE = 1"=50' SHEET 1 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	136
CHECK MAW	CONTROL	SECTION	JOB	
	1430	01	031, Etc	

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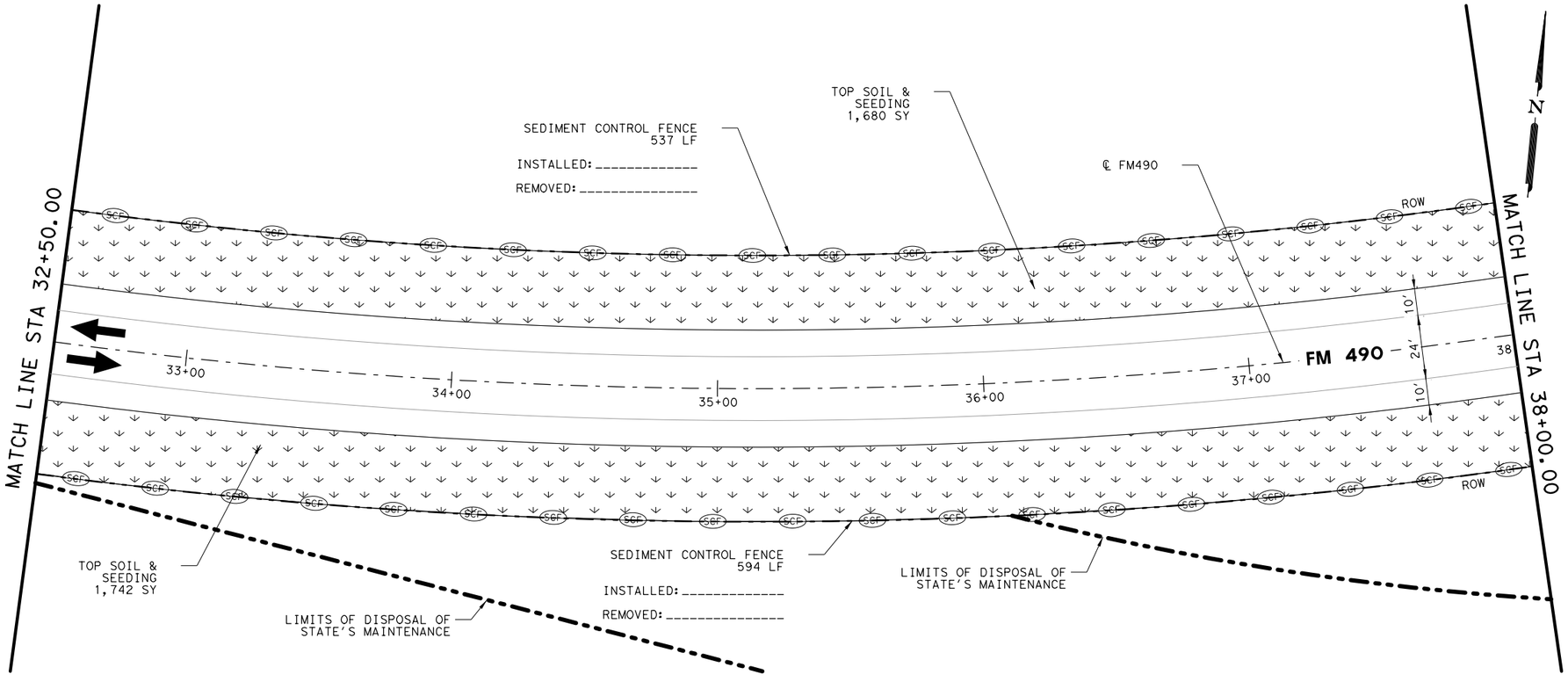

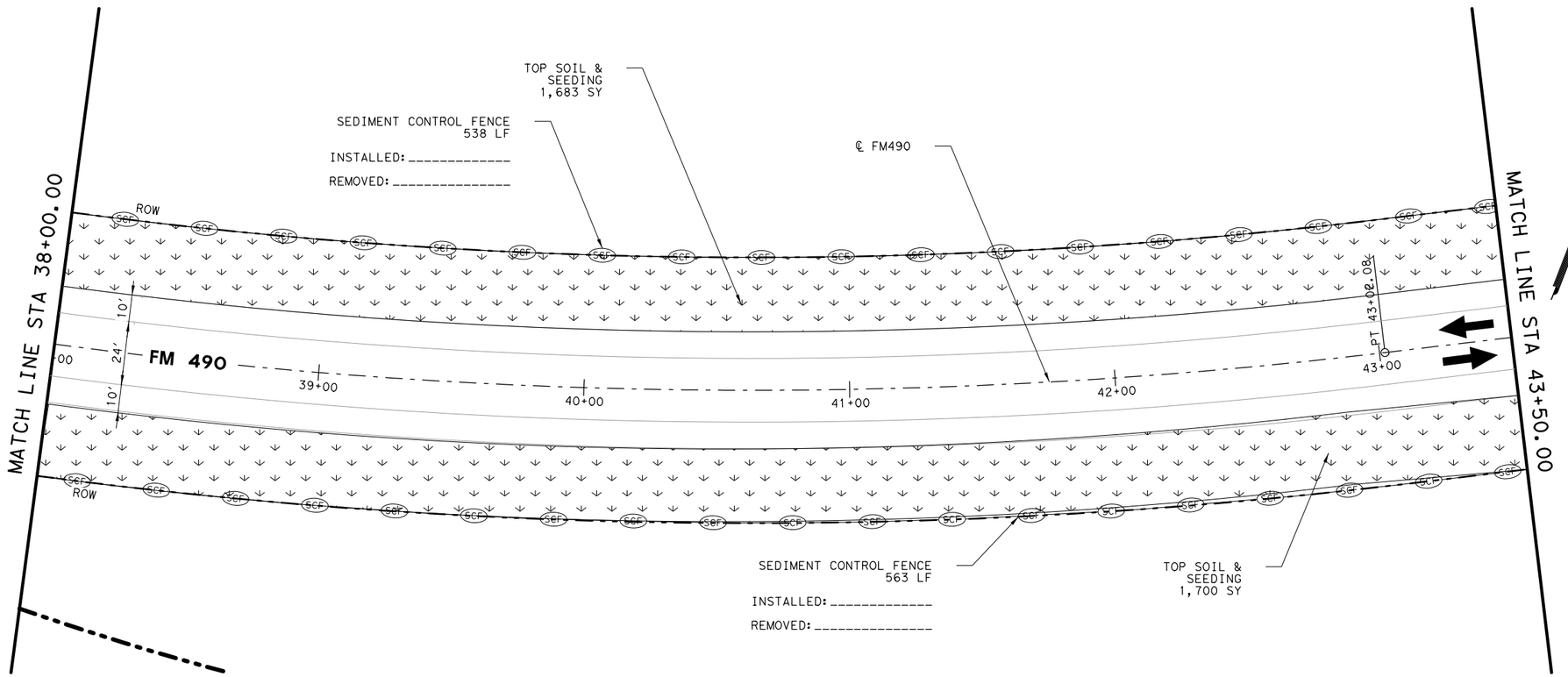

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HORIZ:
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
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4. THE LOCATION OF EC AND OTHER SOIL STABILIZATION PRACTICES WILL BE BASED ON SITE SPECIFIC FIELD CONDITIONS AS NEEDED. QUANTITIES SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED TO MEET FIELD CONDITIONS.
5. BEFORE CONSTRUCTION BEGINS, OUTFALL AREAS WILL BE PROTECTED IN ACCORDANCE WITH ITEM 506 AND AS SHOWN IN THE PLANS.

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
SW3P PLAN
STA 32+50 TO STA 43+50

SCALE = 1"=50'
SHEET 2 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 137

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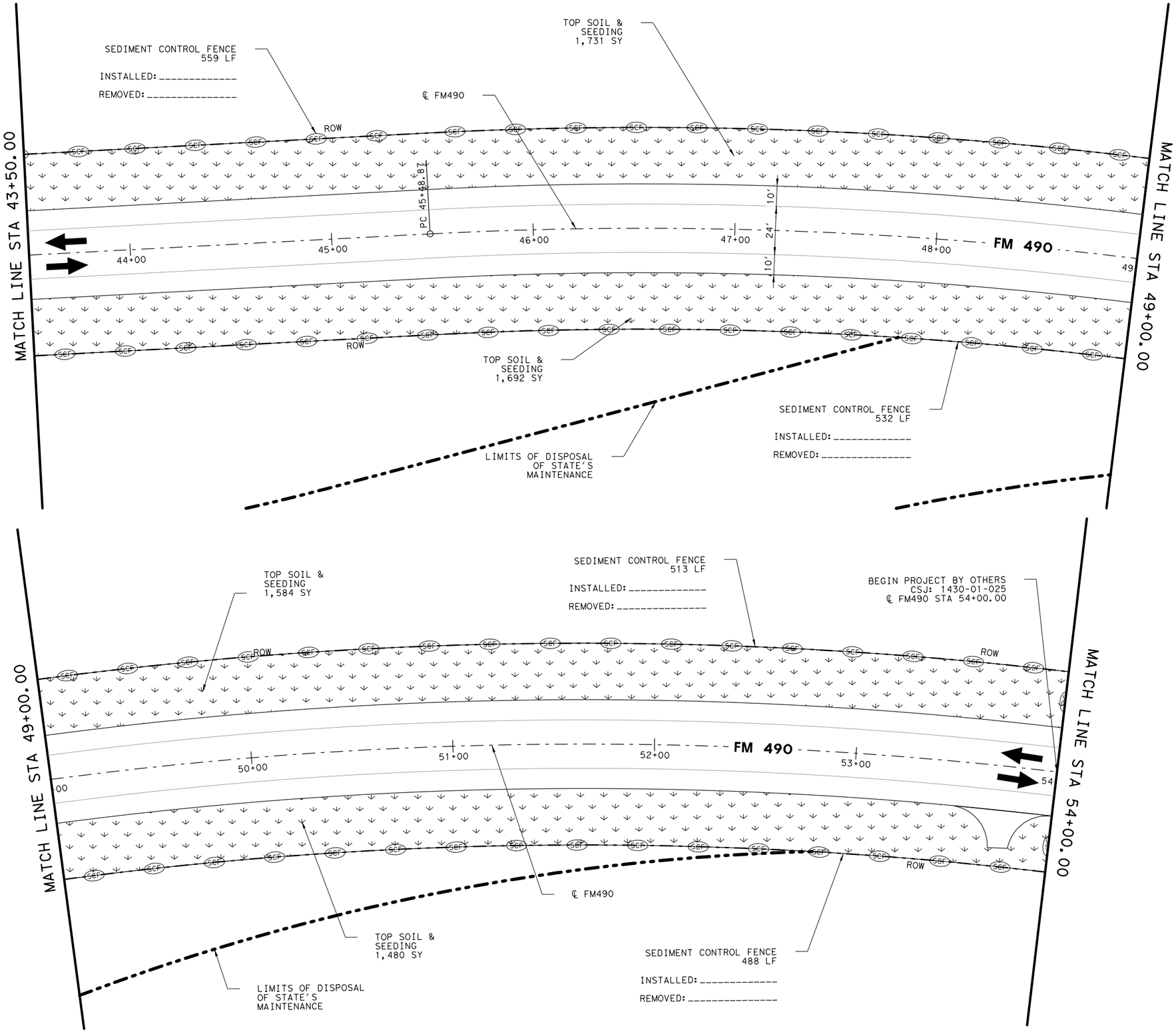

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
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STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 490
SW3P PLAN
STA 43+50 TO STA 54+00

SCALE = 1"=50'

SHEET 3 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN JSR	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031, Etc

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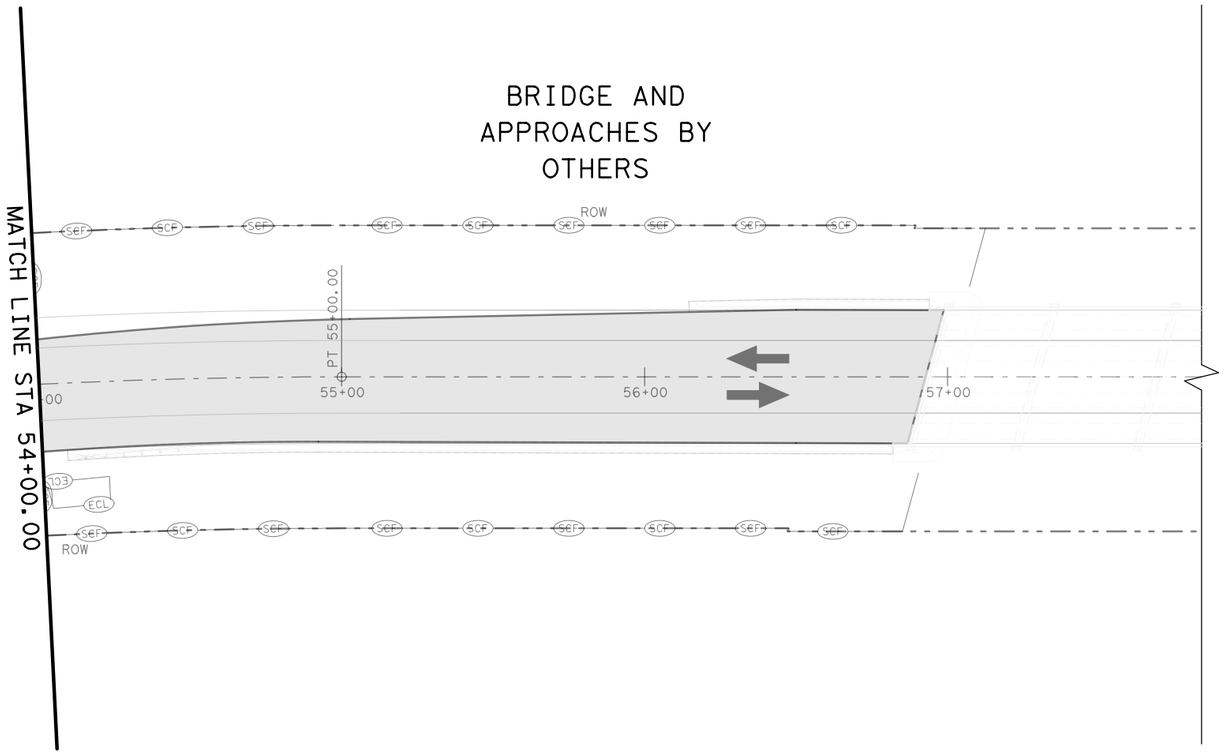

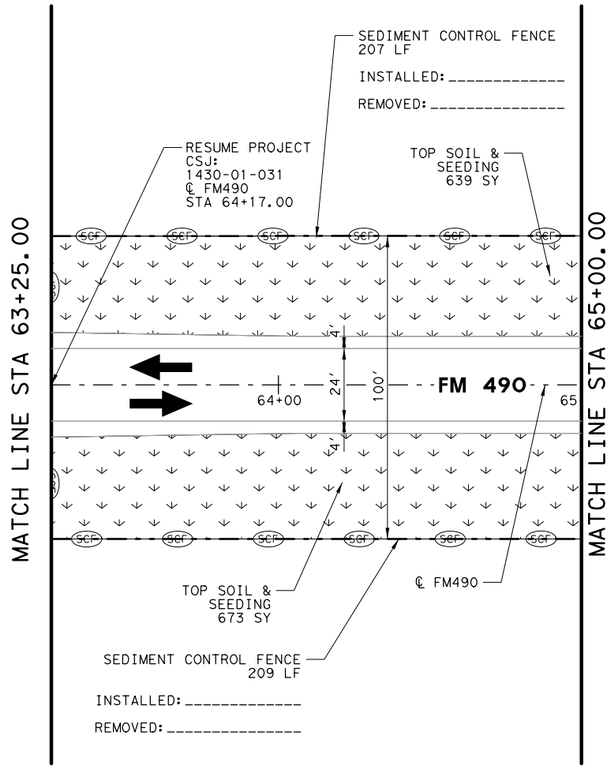

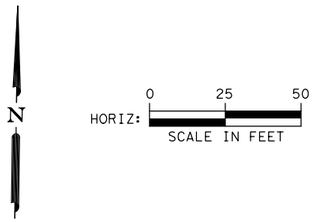

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — EROSION CONTROL LOG
- SEEDING (PERM, TEMP)

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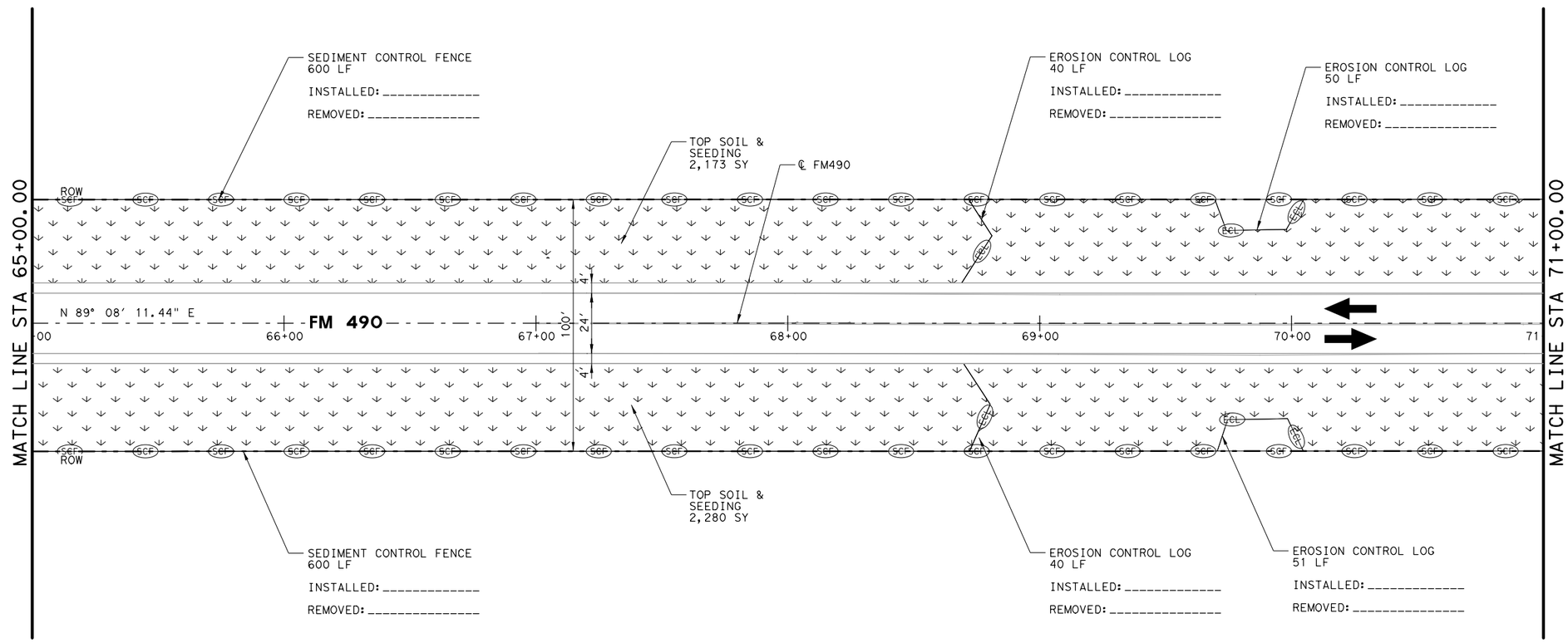

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
SW3P PLAN
STA 63+25 TO STA 71+00

SCALE = 1"=50' SHEET 4 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN	STATE	DISTRICT	COUNTY
LEH	TEXAS	PHR	WILLACY
CHECK	CONTROL	SECTION	JOB
MAW	1430	01	031,Etc
CHECK			SHEET NO.
MAW			139

DATE: 4/25/2023
TIME: 9:51:46 AM
USER: sclary
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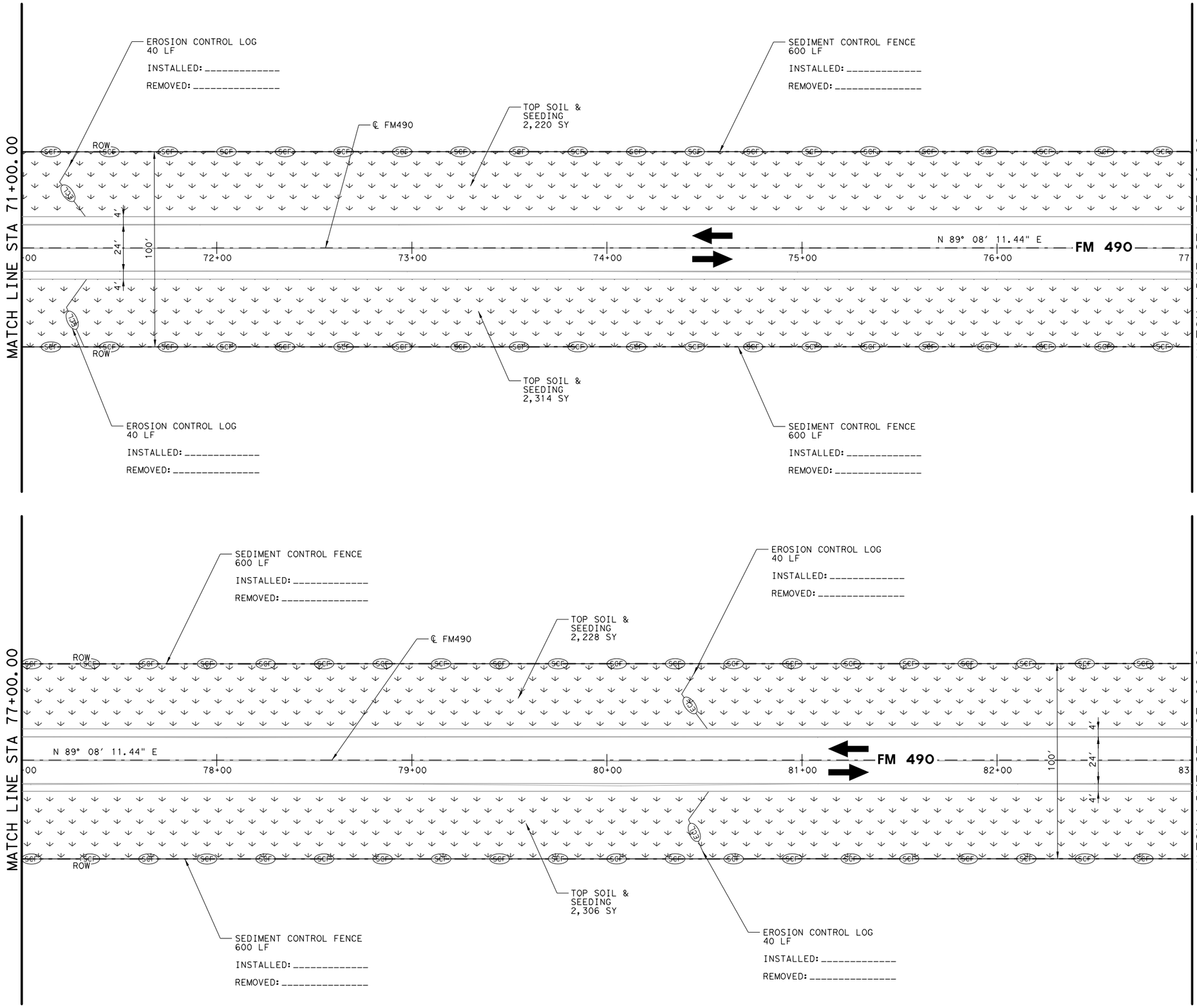

N

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — EROSION CONTROL LOG
- SEEDING (PERM, TEMP)

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SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
SW3P PLAN
STA 71+00 TO STA 83+00

SCALE = 1"=50' SHEET 5 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 140

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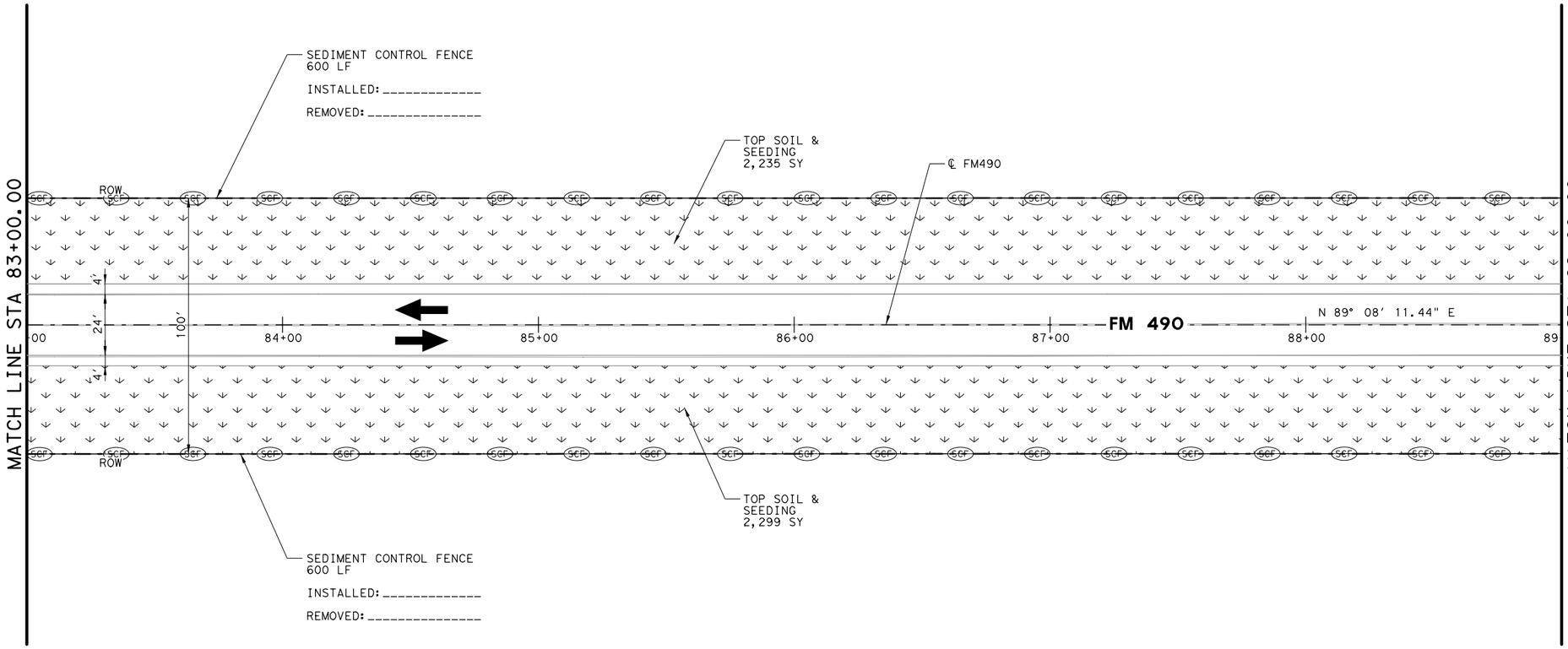

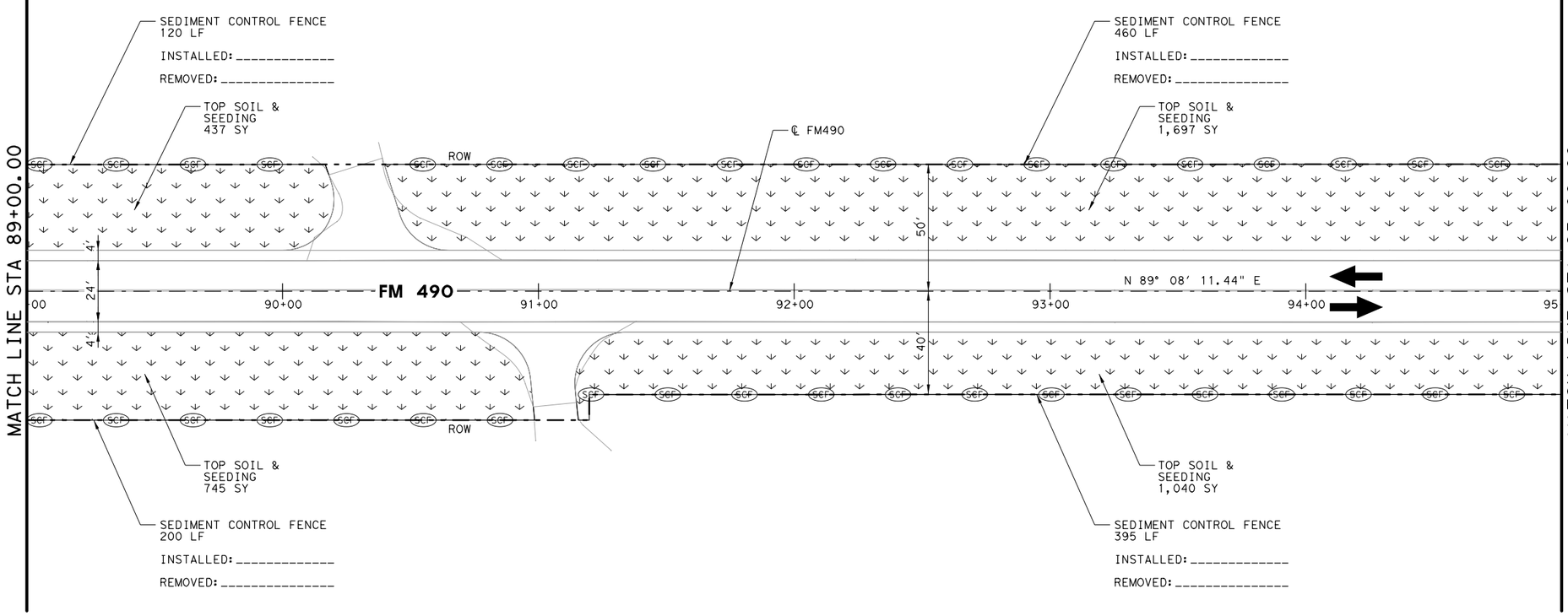

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HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — EROSION CONTROL LOG
- SEEDING (PERM, TEMP)

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STATE OF TEXAS
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BURNS McDONNELL
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SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
SW3P PLAN
STA 83+00 TO STA 95+00

SCALE = 1"=50' SHEET 6 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 141

DATE: 4/25/2023
TIME: 9:51:59 AM
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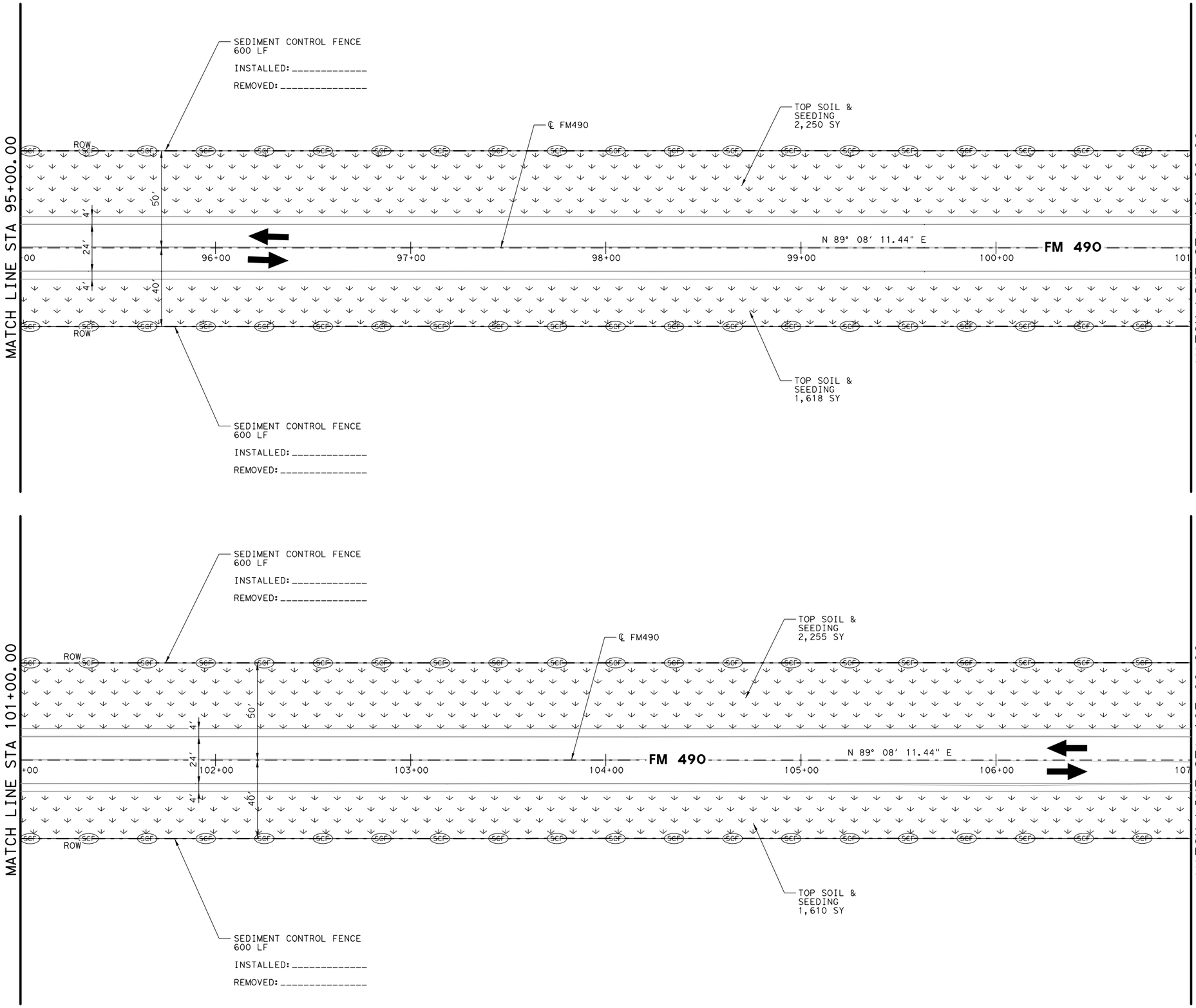

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HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
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FM 490
SW3P PLAN
STA 95+00 TO STA 107+00

SCALE = 1"=50' SHEET 7 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 142

DATE: 4/25/2023
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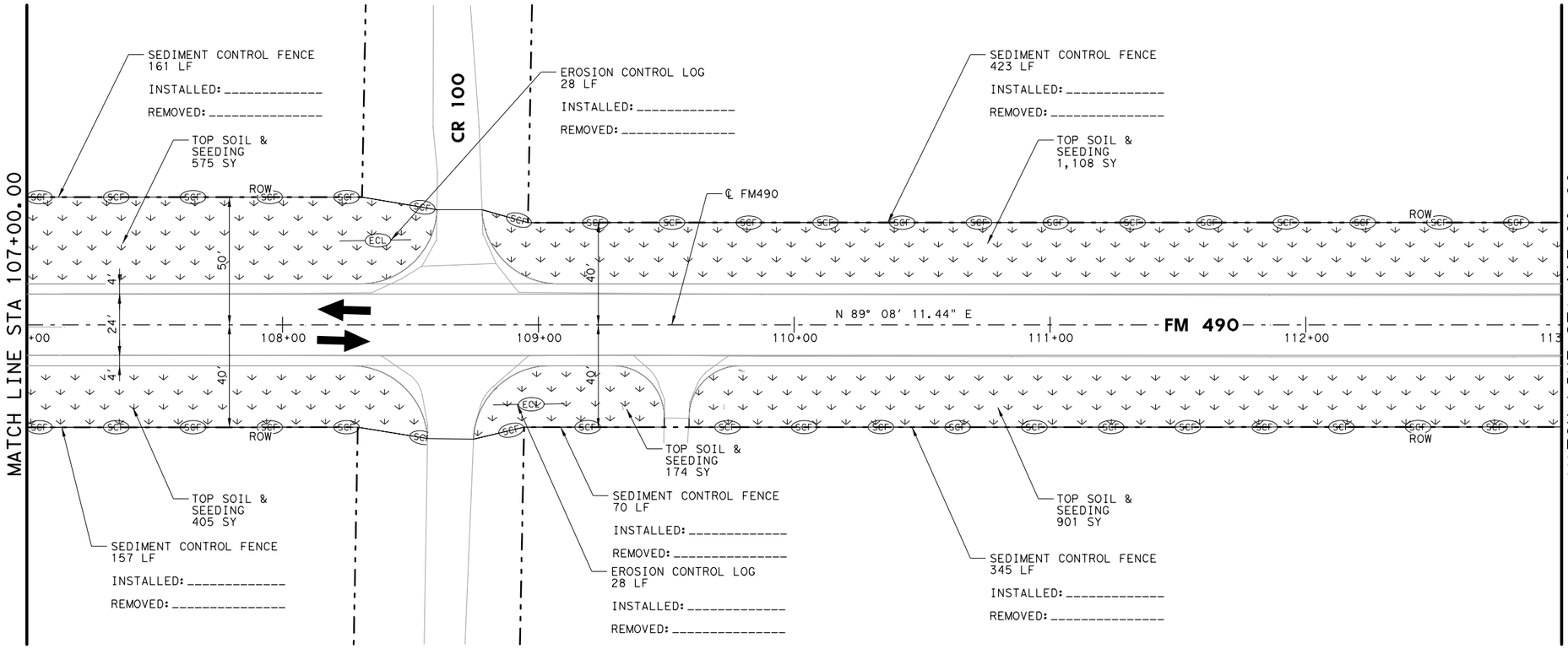

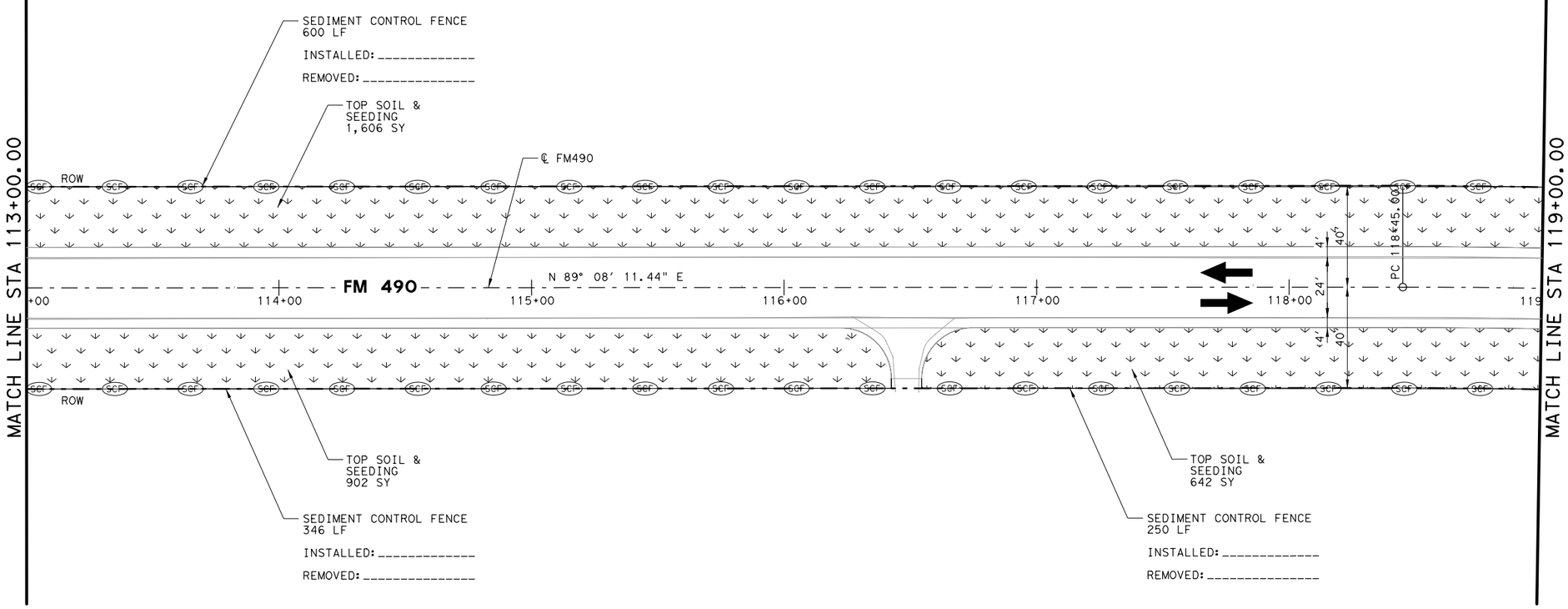

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HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
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- SEEDING (PERM, TEMP)

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STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

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FM 490
SW3P PLAN
STA 107+00 TO STA 119+00

SCALE = 1"=50' SHEET 8 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 143

DATE: 4/25/2023
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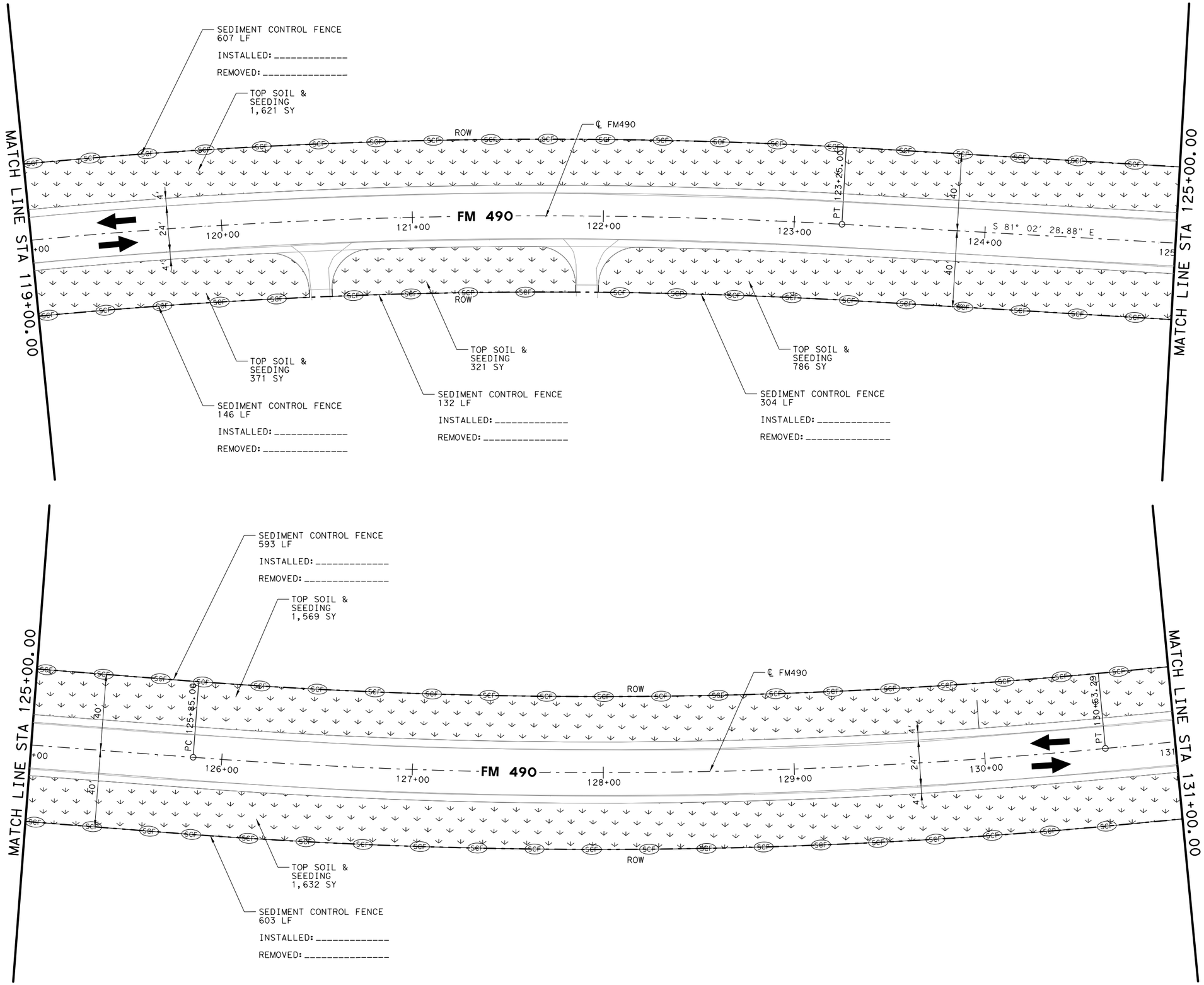

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- (SCF) SEDIMENT CONTROL FENCE
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- SEEDING (PERM, TEMP)

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STATE OF TEXAS
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122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

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FM 490
SW3P PLAN
STA 119+00 TO TA 131+00

SCALE = 1"=50' SHEET 9 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	144
CHECK MAW	CONTROL	SECTION	JOB	
	1430	01	031,Etc	

DATE: 4/25/2023
TIME: 9:52:19 AM
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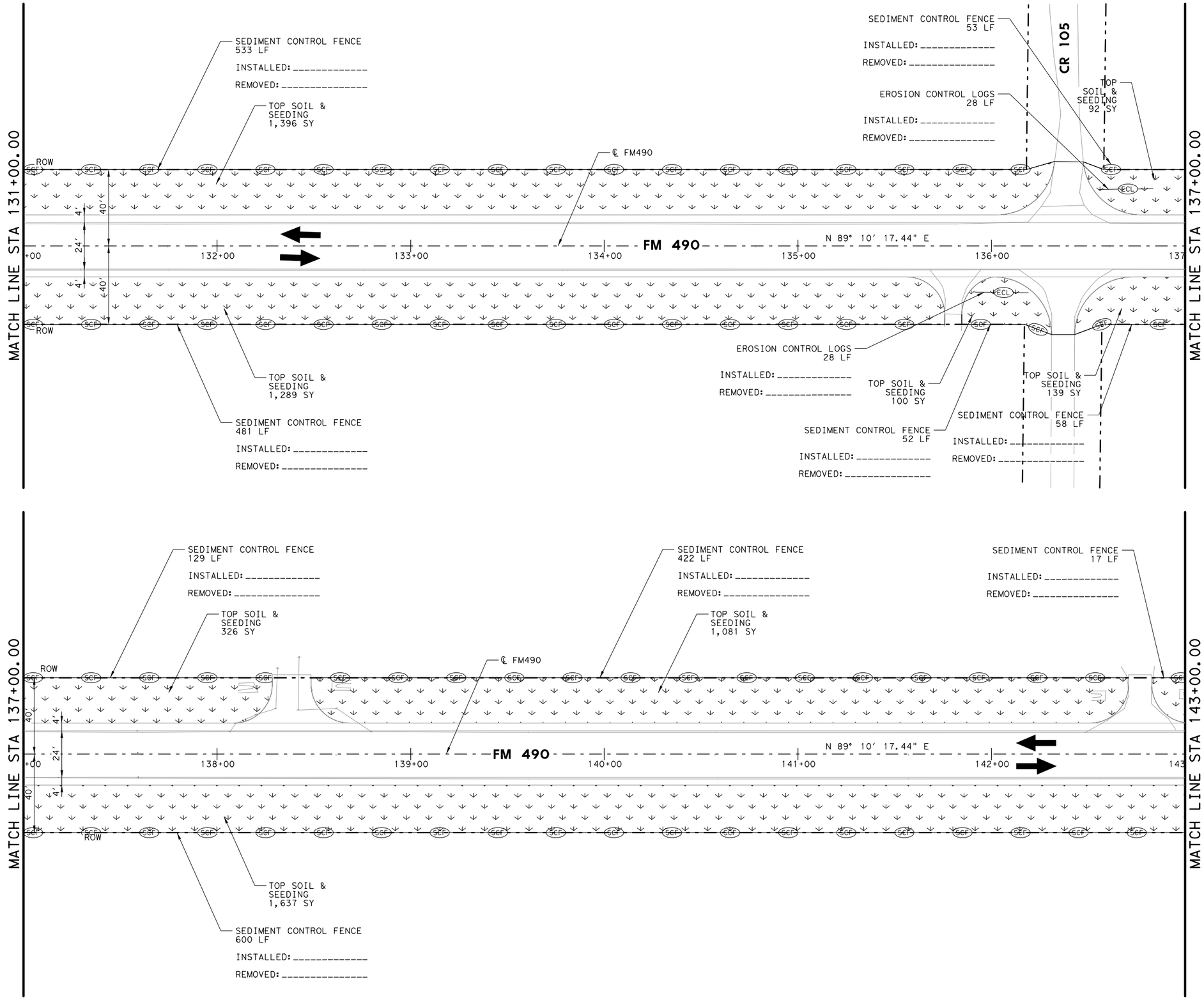

N

0 25 50
HORIZ:
SCALE IN FEET

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
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FM 490
SW3P PLAN
STA 131+00 TO STA 143+00

SCALE = 1"=50'

SHEET 10 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

SHEET NO. 145

DATE: 4/25/2023
TIME: 9:52:25 AM
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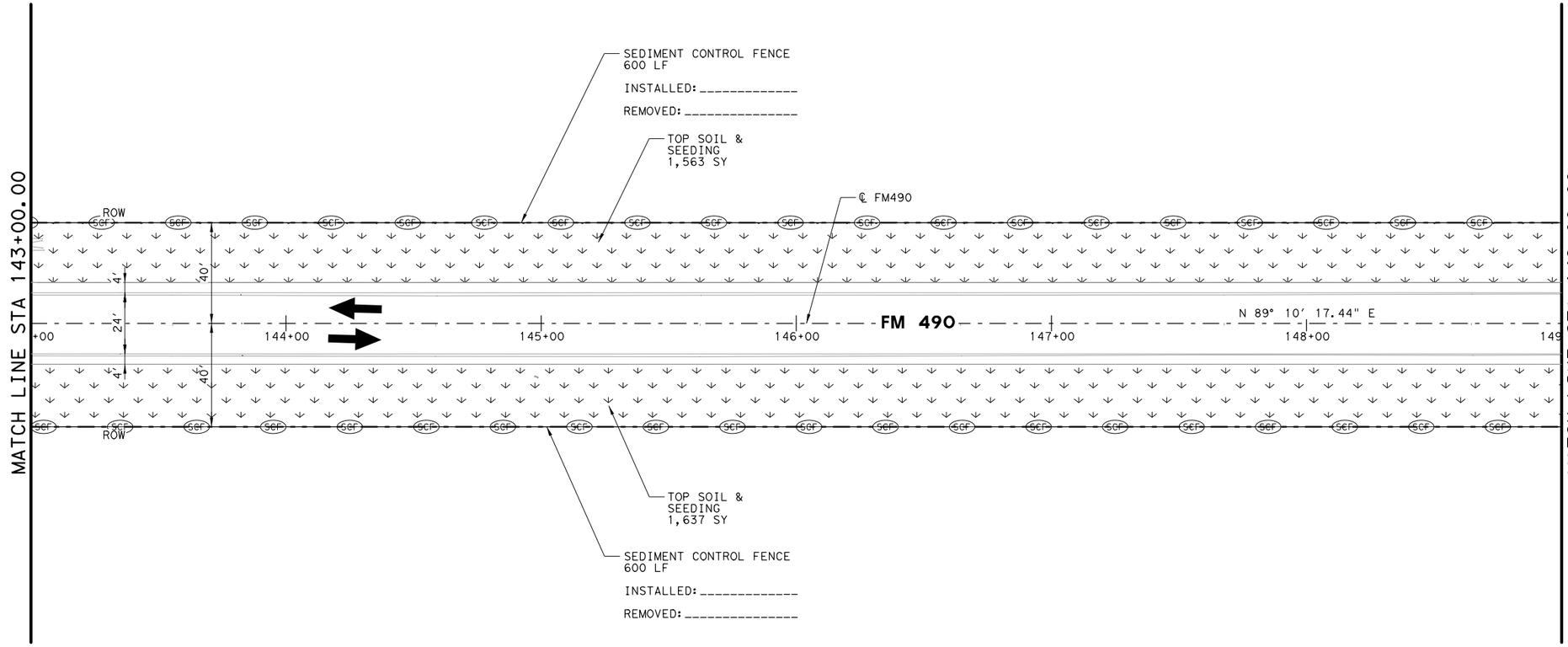

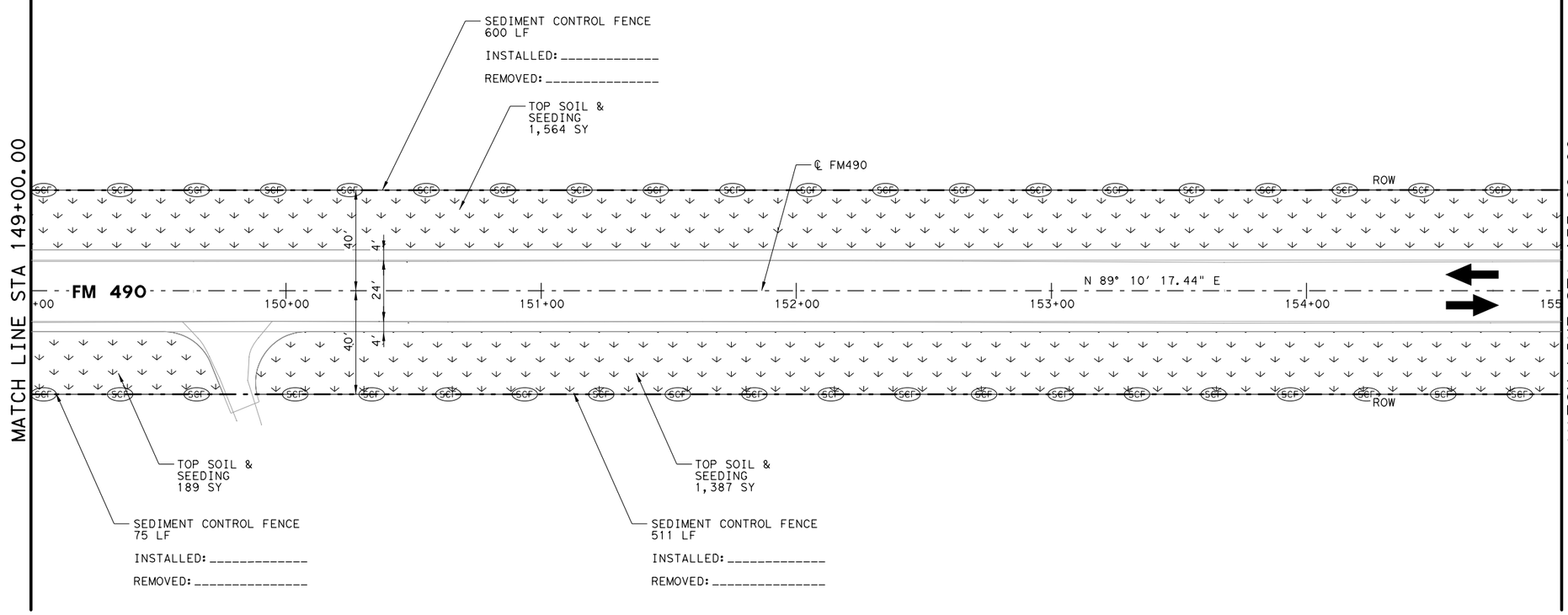

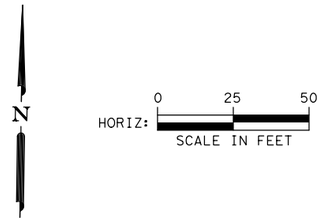

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- (SCF) SEDIMENT CONTROL FENCE
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NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

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FM 490
SW3P PLAN
STA 143+00 TO STA 155+00

SCALE = 1"=50' SHEET 11 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN	STATE	DISTRICT	COUNTY
LEH	TEXAS	PHR	WILLACY
CHECK	CONTROL	SECTION	JOB
MAW	1430	01	031,Etc
CHECK			
MAW			

SHEET NO. 146

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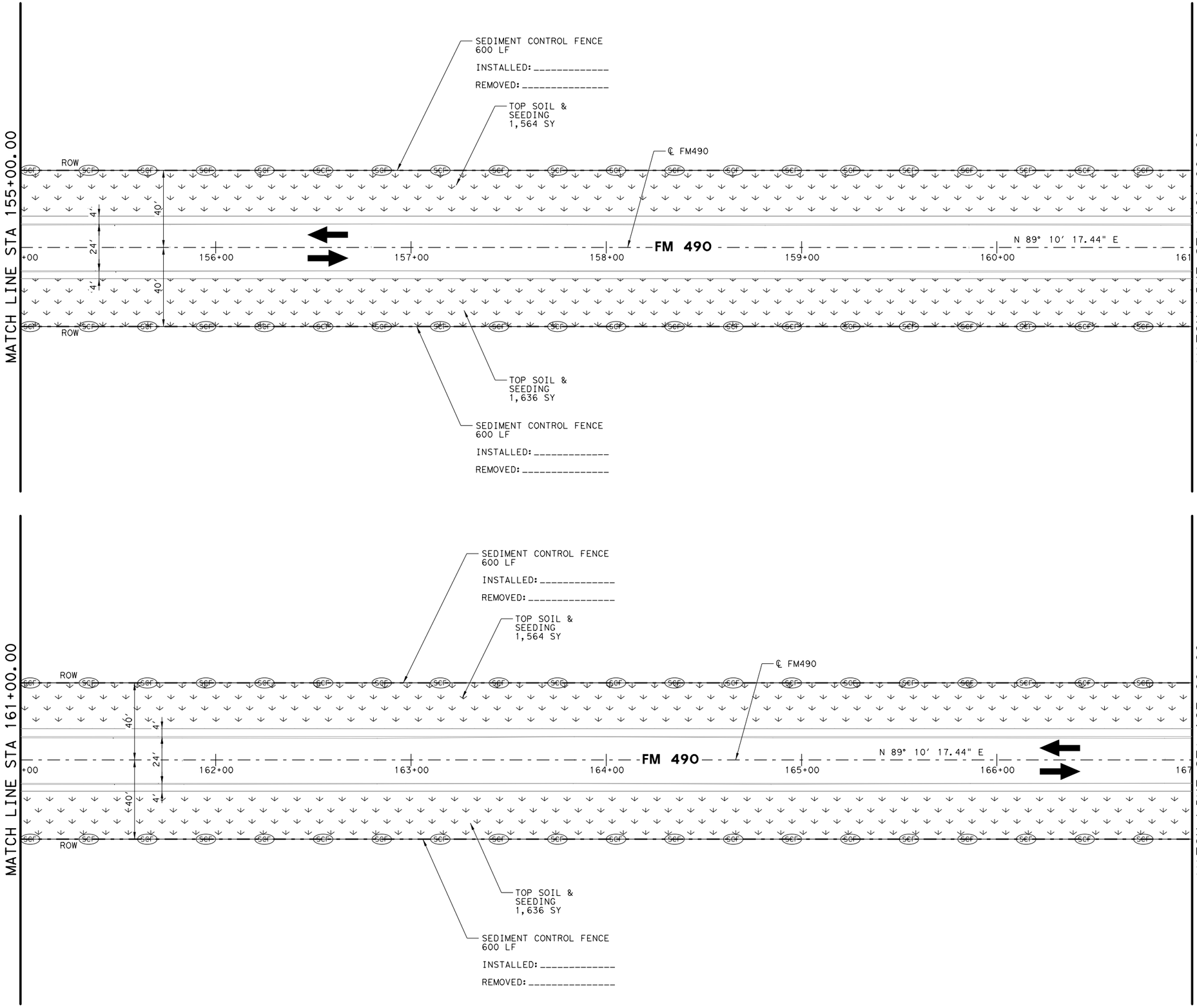

0 25 50
HORIZ:
SCALE IN FEET

N

LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
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SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
04/25/2023

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
© 2023

FM 490
SW3P PLAN
STA 155+00 TO STA 167+00

SCALE = 1"=50'
SHEET 12 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN	STATE	DISTRICT	COUNTY
LEH	TEXAS	PHR	WILLACY
CHECK	CONTROL	SECTION	JOB
MAW	1430	01	031,Etc
CHECK			
MAW			

SHEET NO. 147

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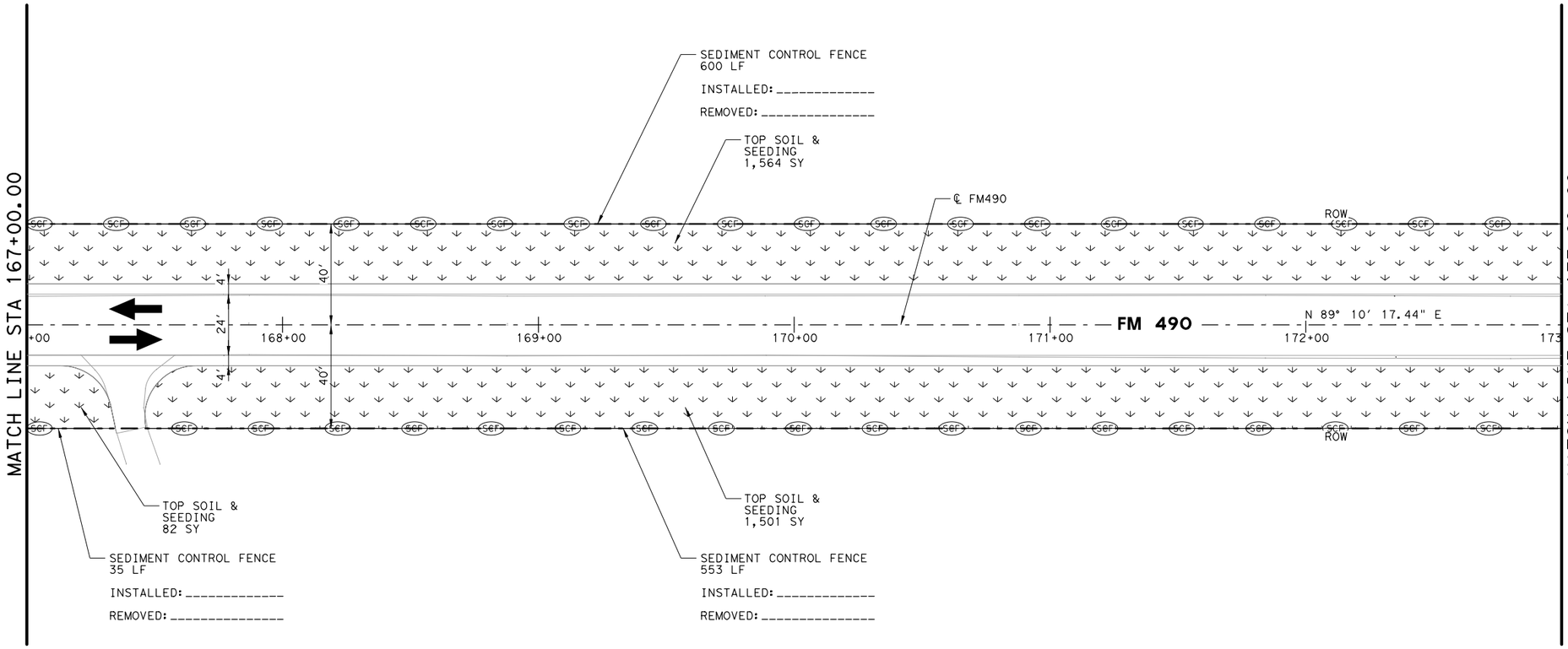
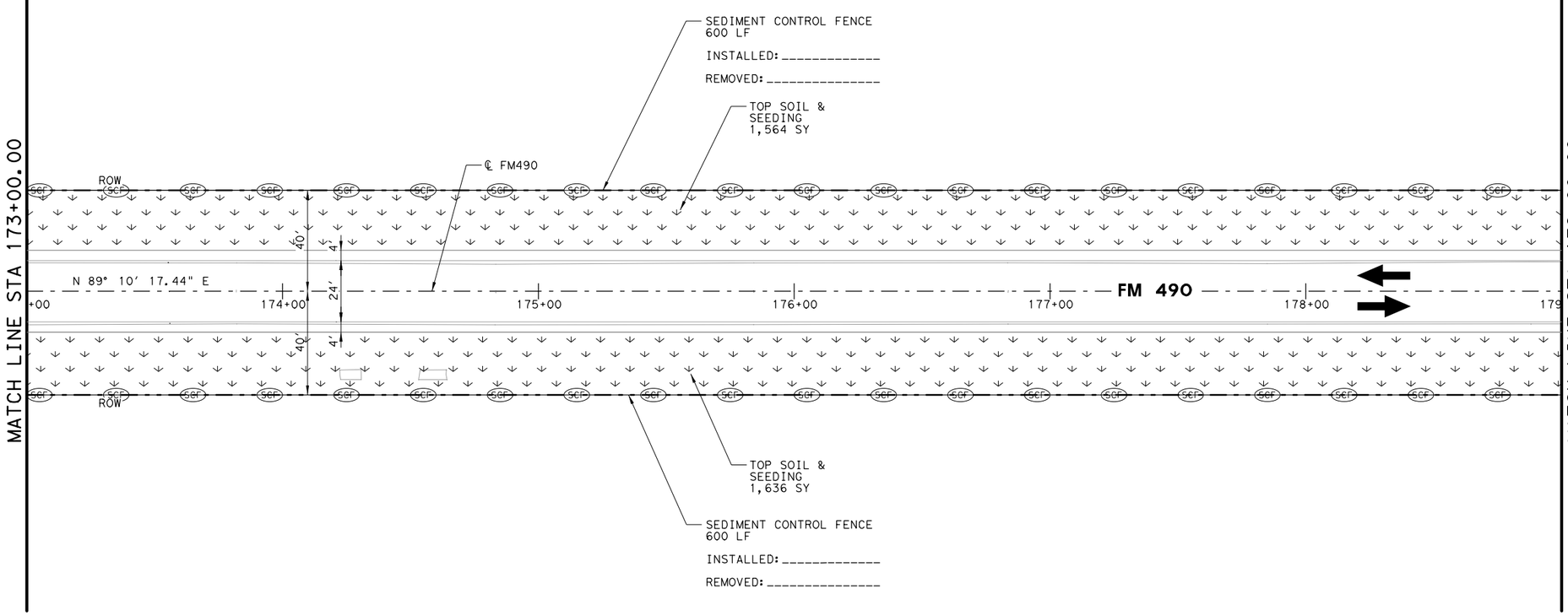
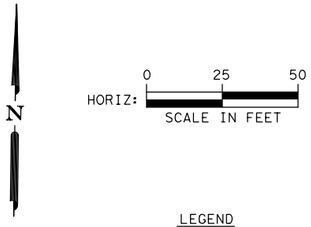




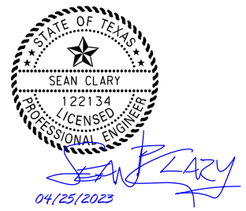


LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
- (SCF) SEDIMENT CONTROL FENCE
- (ECL) EROSION CONTROL LOG
- SEEDING (PERM, TEMP)

NOTES:

1. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
2. SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS (AS REQUIRED) TO BE LOCATED AT DOWNSTREAM ROW LINE OR AT PROPOSED GRADING LIMITS OR AS PER DIRECTION OF THE ENGINEER.
3. PLACEMENT OF SEDIMENT CONTROL FENCE IN AREAS OTHER THAN AS SHOWN ON THESE SHEETS SHALL BE PER THE DIRECTION OF THE ENGINEER.
4. THE LOCATION OF EC AND OTHER SOIL STABILIZATION PRACTICES WILL BE BASED ON SITE SPECIFIC FIELD CONDITIONS AS NEEDED. QUANTITIES SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED TO MEET FIELD CONDITIONS.
5. BEFORE CONSTRUCTION BEGINS, OUTFALL AREAS WILL BE PROTECTED IN ACCORDANCE WITH ITEM 506 AND AS SHOWN IN THE PLANS.



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SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490
SW3P PLAN
STA 167+00 TO STA 179+00

SCALE = 1"=50' SHEET 13 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MAW	TEXAS	PHR	WILLACY	148
CHECK MAW	CONTROL	SECTION	JOB	
	1430	01	031,Etc	

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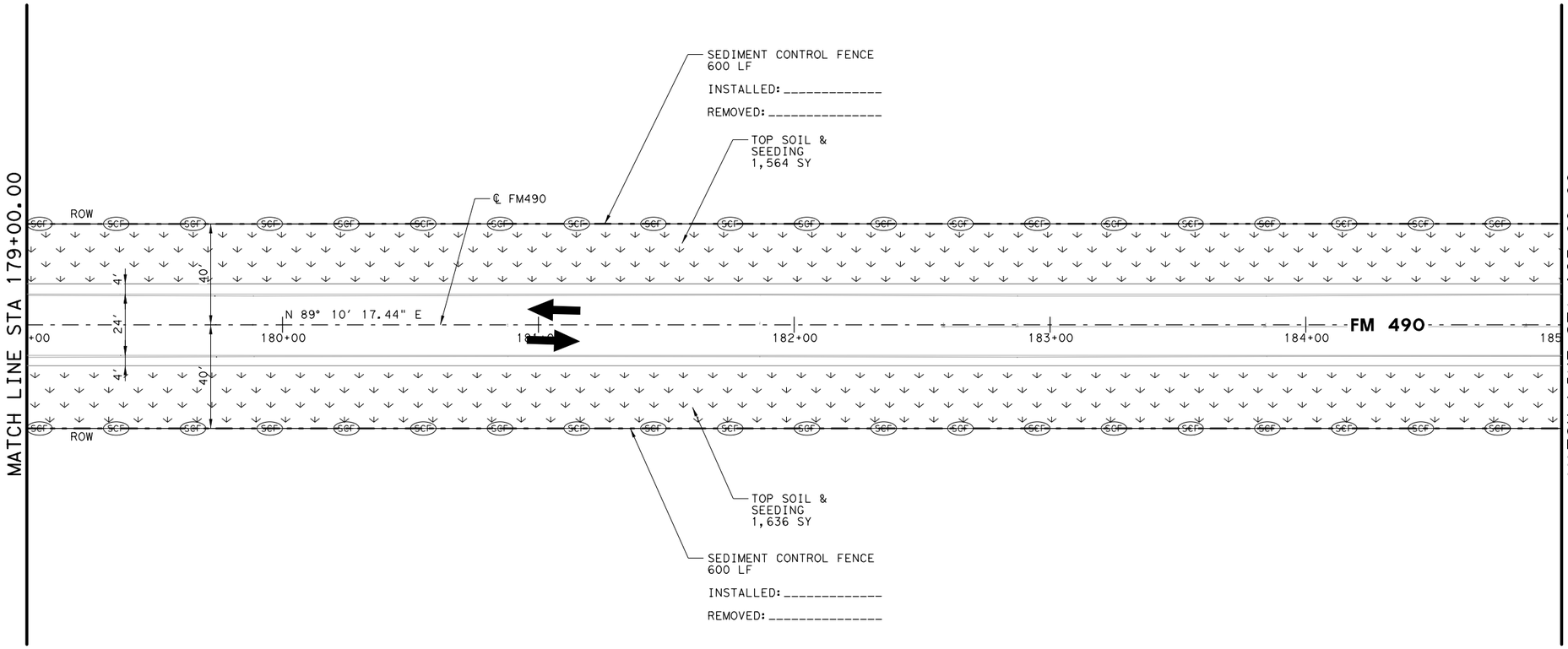

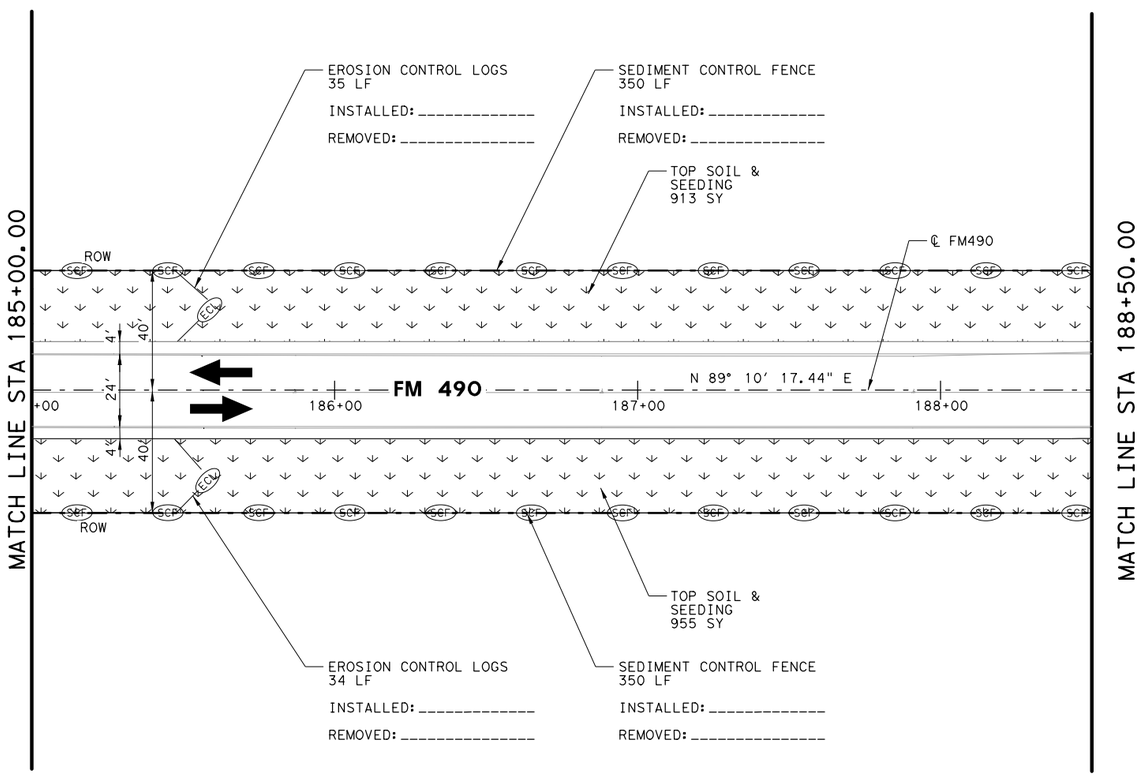

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LEGEND

- ROW
- LIMITS OF DISPOSAL OF STATE'S MAINTENANCE
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW
- DIRECTION OF FLOW
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FM 490
SW3P PLAN
STA 179+00 TO STA 188+50

SCALE = 1"=50'

SHEET 14 OF 15

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

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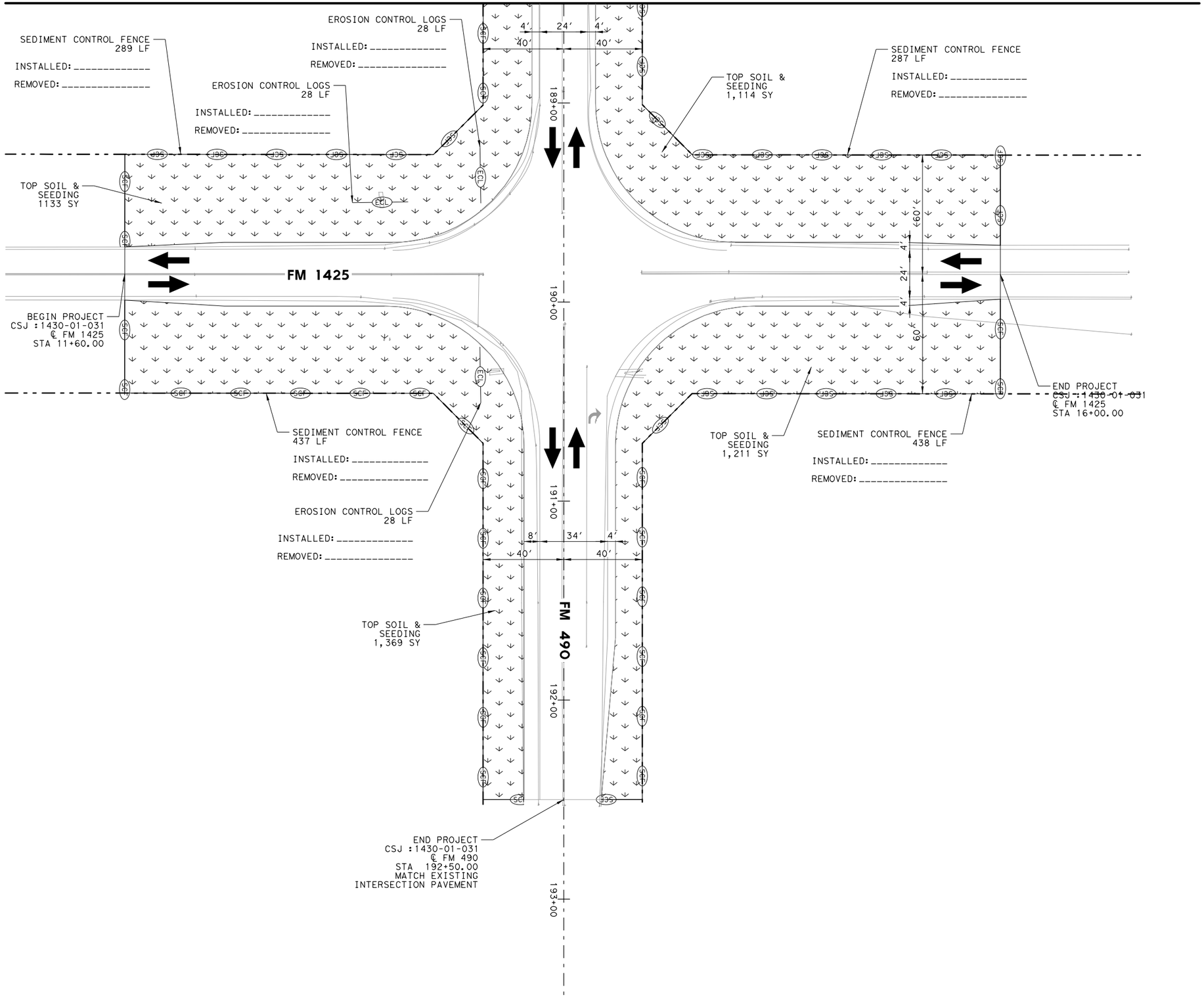

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DALLAS, TX, 75240
ENGINEERING FIRM F-845

FM 1425
SW3P PLAN
STA 188+50 TO END

SCALE = 1"=50' SHEET 15 OF 15

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	FM 490
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHR	WILLACY
CHECK MAW	CONTROL	SECTION	JOB
	1430	01	031,Etc

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TPWD BMPs

Under Section 12.0011 of the Texas Parks and Wildlife Code, Texas Parks and Wildlife Department (TPWD) is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources."

The purpose of this section is to provide beneficial management practices (BMP) that should be implemented during construction, and maintenance activities statewide for transportation projects with the goal of avoidance and minimization of impacts to natural resources. Statewide Standard BMP pertain to all fish and wildlife species, including state-listed species and other Species of Greatest Conservation Need (SGCN). Implementing the recommendations as outlined below will improve conservation of species and their habitat.

☒ General Design/Construction BMPs

- ☒ Prior to start of construction, information will be provided to personnel of the potential for all state-listed threatened species or other SGCN to occur within the project area and should be advised of relevant rules and regulations to protect plants, fish, and wildlife.
- ☒ Contractor should 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.
- ☒ Contractors should install wildlife exclusion fencing and should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.
- ☒ Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas.
- ☒ Contractor should use woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
- ☒ Project staging areas, stockpiles, temporary construction easements, and other project related sites should be situated in previously disturbed areas to avoid or minimize impacts to sensitive or unique habitats including intact native vegetation, floodplains, riparian corridors, wetlands, playa lakes, and habitat for wildlife species.
- ☐ When lighting is added, consider wildlife impacts from light pollution and incorporating dark-sky practices into design strategies. Minimize sky glow by focusing light downward, with full cutoff luminaries to avoid light emitting above the horizontal. The minimum amount of night-time lighting needed for safety and security should be used.

☒ Vegetation BMPs

- ☒ Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided. Impacted vegetation should be replaced with in-kind on- site replacement /restoration of native vegetation.
- ☐ It is strongly recommended that trees greater than 12 inches in diameter at breast height (DBH) that are removed be replaced. TPWD's experience indicates that for ecologically effective replacement, a ratio of three trees for every one (3:1) lost should be provided to either on-site or off-site. Trees less than 12 inches DBH should be replaced at a 1:1 ratio.
- ☒ The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.
- ☒ The use of seed mix that contains seeds from only regional ecotype native species is recommended

☒ Invasive Species BMPs

- ☐ For all work in water bodies designated as 3/32 infested 5/32 or 3/32 positive 5/32 for invasive zebra (Dreissena polymorpha) OR quagga mussels (Dreissena bugensis) as well as waters downstream of these lakes, all machinery, equipment, vessels, or vehicles coming in contact with such waters should be cleaned prior to leaving the site to remove any mud, plants, organisms, or debris, water drained (if applicable), and dried completely before use in another water body to prevent the potential spread of invasive mussels.
- ☒ Care should be taken to prevent the spread of aquatic and terrestrial invasive plants during construction activities.
- ☒ Care should be taken to avoid the spread of aquatic invasive plants such as giant Salvinia (Salvinia molesta), common salvinia (Salvinia minima), hydrilla (Hydrilla verticillata), water hyacinth (Eichhornia spp.), Eurasian watermilfoil (Myriophyllum spicatum), water lettuce (Pistia stratiotes), and alligatorweed (Alternanthera philoxeroides) from infested water bodies into areas not currently infested. All machinery, equipment, vessels, boat trailers, or vehicles coming in contact with waters containing aquatic invasive plant species should be cleaned prior to leaving the site to remove all aquatic plant material and dried completely before use on another water body to prevent the potential spread of invasive plants. Removed plants should be transported for disposal in a secure manner to prevent dispersal.
- ☒ Only native or non-invasive plants should be planted. Care should be taken to avoid mowing invasive giant reed (Arundo donax), which spreads by fragmentation, and to clean equipment if inadvertently mowed to prevent spread. If using hay bales for sediment control, use locally grown weed-free hay to prevent the spread of invasive species. Leave the hay bales in place and allow them to break down, as this acts as mulch assisting in revegetation.

☐ Stream Crossings BMPs

- ☐ Riparian buffer zones should remain undisturbed.

☐ Dewatering BMPs

- ☐ Impact avoidance measures for aquatic organisms, including all native fish and freshwater mussel species, regardless of state-listing status, should be considered during project planning and construction activities.

☐ Wildlife Crossing BMPs

- ☐ Incorporate wildlife crossings with fencing, particularly in areas that bisect wildlife travel corridors or seasonal movement routes to avoid further habitat fragmentation and minimize wildlife-vehicle interactions.

☐ Rare Plant BMPs

- ☐ Avoid impacts and minimize unavoidable impacts. Plant locations should be protected with temporary barrier fencing and contractors should be instructed to avoid protected areas. Conducting construction outside of the growing season or after a plant has produced mature fruit is the preferred way to avoid/minimize impacts to SGCN plant populations. Staging areas, stockpiles, and other project related sites on TxDOT ROW should not impact SGCN plant populations. After construction begins, minimize herbicide use near SGCN plant populations (if possible, use hand-held spot sprayers, several meters from rare plants, on still or days with little wind).

Pharr District Contact No. 956-702-6100

☐ Rare Plants BMPs (Continued)

- ☐ If there are unintended impacts to SGCN populations, these impacts should be reported to TPWD Transportation Staff.
- ☐ During project period, conduct work during times of the year when plants are dormant and/or conditions minimize disturbance of the habitat.

☒ Bird BMPs

- ☒ Avoid vegetation clearing activities during the general bird nesting season, February 15th to October 1st to minimize adverse impacts to birds.
- ☒ Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.
- ☒ Minimize extended human presence near nesting birds during construction and maintenance activities. Protect sensitive habitat areas with temporary barriers or fencing to limit human foot- traffic and off-road vehicle use to alert and discourage contractors from causing any unintentional impacts.
- ☒ Minimize construction noise above ambient levels during general bird nesting season to minimize adverse impacts on birds.
- ☒ Minimize construction lighting during the general bird nesting season by scheduling work activities between dawn and dusk.

☐ Rookeries BMPs

- ☐ In general, nesting dates for herons and egrets range from early February to late August in Texas, depending on the species. Great blue herons (GBHE) (Ardea herodis) are usually the first to nest. When GBHE get disrupted from the nest and abandon nesting, then the other species of herons and egrets may not attempt to nest at the colony that year.
- ☐ If rookeries are encountered, avoid and minimize disturbance during nesting to protect rookery species and their habitat.
- ☐ Vegetation clearing in a primary buffer area of 300 meters (984 feet) from a rookery or heronry periphery should be avoided. Utilizing areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot-traffic or machinery use should not occur within this buffer area during the nesting season.
- ☐ Clearing activities or construction using heavy machinery in a secondary buffer area of 1000 meters (3281 feet) from the heronry periphery should be avoided during the breeding season (courting and nesting).

Revised 02/24/2022

List of Abbreviations

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

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	
CONTROL	SECTION	JOB	SHEET NO.
1430	01	031, Etc	151

Date Printed: $DATE$

☐ Fish BMPs

- ☐ The following Fish BMP apply to projects for all fish species in waters of the state to minimize impacts to water quality and aquatic passage from transportation projects.
- ☐ For projects in waters of the state and work is adjacent to water: follow Water Quality and Stream Crossing BMPs.
- ☐ For projects in waters of the state and work is in the water: follow Water Quality, Stream Crossing, and Dewatering BMP.

☐ Aquatic Invertebrate BMPs

- ☐ For projects within the range of a SGCN or state-listed species and work is adjacent to water: Water Quality and Stream Crossing BMP
- ☐ For projects within the range of a SGCN or state-listed species and work is in the water: Water Quality, Stream Crossing, and Dewatering BMP.
- ☐ For spring-seep associated caddisflies (Cheumatopsyche morsei, Chimarra holzenthali, and Hydroptila ouachita): Avoid or minimize impacts to the natural riparian buffer along stream channel including native shrubs and trees.

☐ Crayfish BMP

- ☐ For projects within the range of a SGCN or state-listed species and work is adjacent to water: Water Quality and Stream Crossing BMP.
- ☐ For projects within the range of a SGCN or state-listed species and work is in the water: Water Quality, Stream Crossing, and Dewatering BMP.
- ☐ Avoid or minimize impacts to the natural riparian buffer that provides terrestrial and aquatic plant matter for the diet of most crayfish species.

☐ Freshwater Mussel BMP

- ☐ In addition to Water Quality and Stream Crossing BMP, follow the most recent, $^{7}/_{32}$ TPWD$^{9}/_{32}$ TxDOT Annual Work Plan for Pre-Construction Surveys, Aquatic Resources Relocations, and Other Best Management Practices to Avoid, Minimize, and Mitigate Impacts to Freshwater Resources.$^{9}/_{32}$
- ☐ When work is adjacent to the water: Water Quality BMP implemented as part of the Texas Commission on Environmental Quality (TCEQ) Stormwater Pollution Prevention Plan (SWPPP) for a construction general permit or any conditions of the 401 Water Quality Certification for the project will be implemented.

☐ Insect Pollinator BMP

- ☐ Deep soil disturbances, such as, tilling or deep disking in areas that host aggregations of ground- nesting bees should be avoided. Tilling and disking also may promote the invasion or germination of non-native plants. Different species of native ground-nesting bees prefer different soil conditions, although research suggests that many ground nesting bees prefer sandy, loamy sand or sandy loam soils. In areas with these soil types consider leaving open patches of soil.
- ☐ Allow dead trees to stand (so long as they do not pose a risk to property or people) and protect shrubs and herbaceous plants with pithy or hollow stems (e.g., cane fruits, sumac, elderberry), as these provide nesting habitat for tunnel-nesting native bees.
  Retain dead or dying branches whenever it is safe and practical at the edges of the ROW. Wood- boring beetle larvae often fill dead trees and branches with narrow tunnels into which tunnel- nesting bees will establish nests. Additionally, bumble bees may choose to nest in wood piles.
- ☐ Retain rotting logs at edges of the ROW where some bee species may burrow tunnels in which to nest.

☐ Insect Pollinator BMP (Continued)

- ☐ Protect sloped or well-drained ground sites where plants are sparse and direct access to soil is available. These are the areas where ground-nesting bees may dig nests. Turning the soil destroys all ground nests that are present at that depth and hinders the emergence of bees that are nesting deeper in the ground.
- ☐ Protect grassy thickets, or other areas of dense, low cover from mowing or other disturbance. These are the sites where bumble bees might find the nest cavities they need, as well as annual and perennial wildflowers that can provide important food resources.
- ☐ Where available and economical, native plants and seed should be procured from local eco-type providers. Seed mixes should be diverse and include as many ecoregion natives as possible ensuring full season floral resources. Species by Texas ecoregion can be found in the Texas Management Recommendations for Native Insect Pollinators in Texas document: https://tpwd.texas.gov/publications/pwdpubs/media/pwd*bk*w7000*1813.pdf
- ☐ Planting at least three different native flowering plants within each of three blooming periods are recommended (spring, summer, early fall) in high rainfall regions of Texas. In drier regions of the state, a target of three native flowering plants within each of two blooming periods can be used.

☐ Small Mammal BMP

For Coues' rice rat (Oryzomys couesi aquaticus):

- ☐ Minimize impacts to wetland, resaca, oxbow Conversion of property containing cave or cliff features to transportation purposes should be avoided.lake, and marsh habitats
- ☐ Water Quality BMP

☐ Fossorial Mammal BMP

- ☐ When a construction zone is adjacent to active BTPD burrows or pocket gopher mounds, erect barriers to discourage individuals moving through or into the construction area.
- ☐ When seeding or revegetation is planned in an area adjacent to BTPD burrows or pocket gopher mounds, a vegetative barrier should be considered in the planting to discourage dispersal into the ROW.

☐ Bat BMP

- ☐ For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
- ☐ For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
- ☐ If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
- ☐ Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F AND minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area.

Pharr District Contact No. 956-702-6100

☐ Bat BMP (Continued)

- ☐ If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features.
- ☐ Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1 through October 31. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warms periods (nighttime temperatures = 55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
- ☐ Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
- ☐ Retain mature, large diameter hardwood forest species and native/ornamental palm trees.
- ☐ In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.

☐ Aquatic Amphibian and Reptile BMP

For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:

- ☐ Minimize impacts to wetlands, temporary and permanent open water features, including depressions, and riverine habitats.
- ☐ Maintain the existing hydrologic regime and any connections between wetlands and other aquatic features.
- ☐ Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
- ☐ Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
- ☐ Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
- ☐ When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and refugia/overwinter sites (e.g., brush and debris piles, crayfish burrows, aquatic logjams, and leaf packs).

Revised 02/24/2022

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Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	SHEET NO.
CONTROL	SECTION	JOB	
1430	01	031,Etc	152

Date Printed: $DATE$

☐ Aquatic Amphibian and Reptile BMP (Continued)

- ☐ If gutters and curbs are part of the roadway design, install gutters that do not include the side box inlet and include sloped (i.e., mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

For projects that require acquisition of additional ROW and work within that new ROW is in water or will permanently impact a water feature, implement BMP for projects within existing ROW above plus those below:

- ☐ For sections of roadway adjacent to wetlands or other aquatic features, install wildlife barriers that prevent climbing. Barriers should terminate at culvert openings in order to funnel animals under the road. The barriers should be of the same length as the adjacent feature or 80 feet long in each direction, or whichever is the lesser of the two.
- ☐ For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs.
- ☐ When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature. Biotechnical streambank stabilization methods using live native vegetation, or a combination of vegetative and structural materials should be used.

☒ Terrestrial Amphibian and Reptile BMP

- ☒ For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling
- ☒ Avoid or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, and leaf litter. If avoidance or minimization is not practicable, consider removing cover objects prior to the start of the project and replace them at project completion.
- ☒ Examine heavy equipment stored on site before use, particularly after rain events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge.
- ☐ Due to increased activity (mating) of reptiles and amphibian during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (March-May) season.
  Also, timing ground disturbing activities before October when reptiles and amphibians become less active and may be using burrows in the project area is also encouraged.
- ☐ If Texas tortoises (Gopherus berlandieri) or box turtles (Terrepene spp.) are present in a project area, they should be removed from the area and relocated between 100 and 200 meters from the project area. After removal of the individuals, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude reentry by turtles, tortoises, and other reptiles. The exclusion fence should be constructed and maintained as follows:

  - The exclusion fence should be constructed with metal flashing or drift fence material.
  - Rolled erosion control mesh material should not be used.
  - The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
  - The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.

☒ Terrestrial Amphibian and Reptile BMP (Continued)

- ☒ After project is complete, revegetate disturbed areas with an appropriate locally sourced native seed mix. If erosion control blankets or mats will be used, the product should not contain nylon netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.

☐ Black-spotted newt/Mexican Burrowing toad/ Mexican treefrog/ Strecker's chorus frog/White-lipped frog/Woodhouse's toad

- ☐ Aquatic Amphibian and Reptile BMP
- ☐ Terrestrial Amphibian and Reptile BMP
- ☐ Water Quality BMP
- ☐ Vegetation BMP

☒ Sheep Frog

- ☒ Minimize disturbance to burrows or downed woody debris
- ☒ Aquatic Amphibian and Reptile BMP
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Water Quality BMP
- ☒ Vegetation BMP

☒ South Texas Siren (Large Form)

- ☒ Minimize impacts to warm, shallow waters with vegetative cover such as ponds and ditches
- ☒ Aquatic Amphibian and Reptile BMP
- ☒ Water Quality BMP

☐ Black-striped snake/ Eastern box turtle/Northern cat-eyed snake/Plateau spot-tailed earless lizard/ Reticulate collared lizard/ Slender glass lizard/ Speckler racer/Tamaulipan spot-tailed earless lizard/ Texas Indigo snake/ Western box turtle/Western hognose snake/Western massasauga

- ☐ Terrestrial Amphibian and Reptile BMP
- ☐ Vegetation BMP

☐ Rio Grande River Cooter

- ☐ Aquatic Amphibian and Reptile BMP
- ☐ Water Quality BMP

☐ Texas Horned Lizard

- ☐ Avoid harvester ant mounds in the selection of Project Specific Locations (PSLs).
- ☐ Terrestrial Amphibian and Reptile BMP
- ☐ Vegetation BMP

☐ Texas Tortoise

- ☐ Utility trenches should be covered overnight or visually inspected before filling to avoid burial of the species
- ☐ Terrestrial Amphibian and Reptile BMP
- ☐ Vegetation BMP

Pharr District Contact No. 956-702-6100

OTHER PERTINENT INFORMATION

☐ Trifold Available

- ☐ Ocelot information
- ☐ Pelican information
- ☐ Ashy dogweed

☐ Stockcards Available

- ☐ Mitigatory Bird Treaty Act
- ☐ Texas Tortoise
- ☐ Harvester Ants and Horn Lizards

Revised 02/24/2022

List of Abbreviations

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

Texas Department of Transportation

PHARR DISTRICT

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6	SEE TITLE SHEET		FM 490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	SHEET NO.
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1430	01	031,Etc	153

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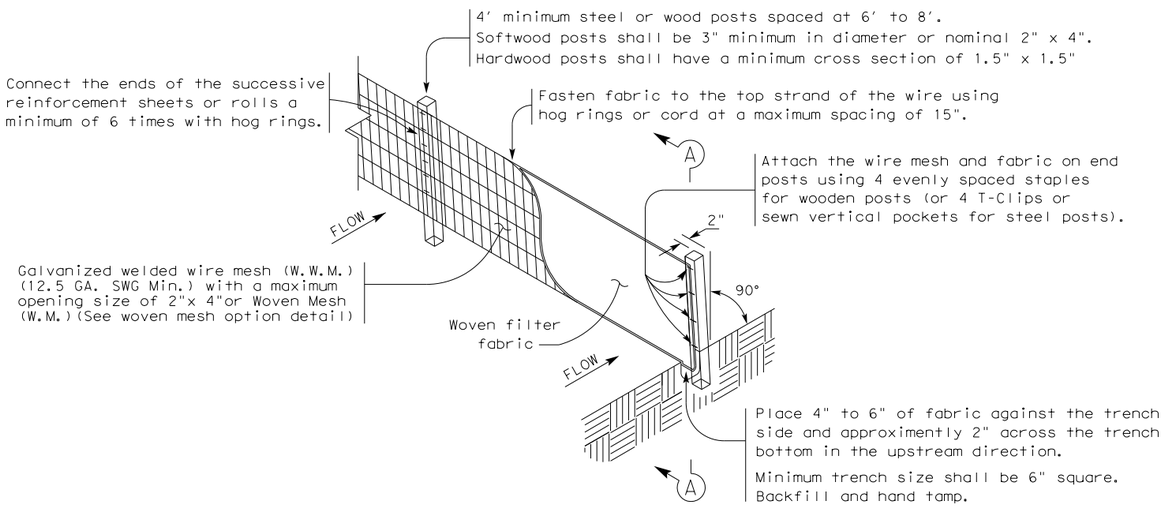
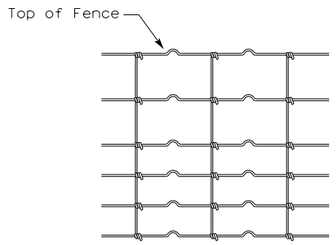
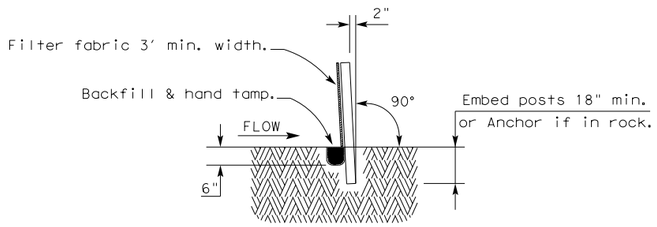


TEMPORARY SEDIMENT CONTROL FENCE

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.

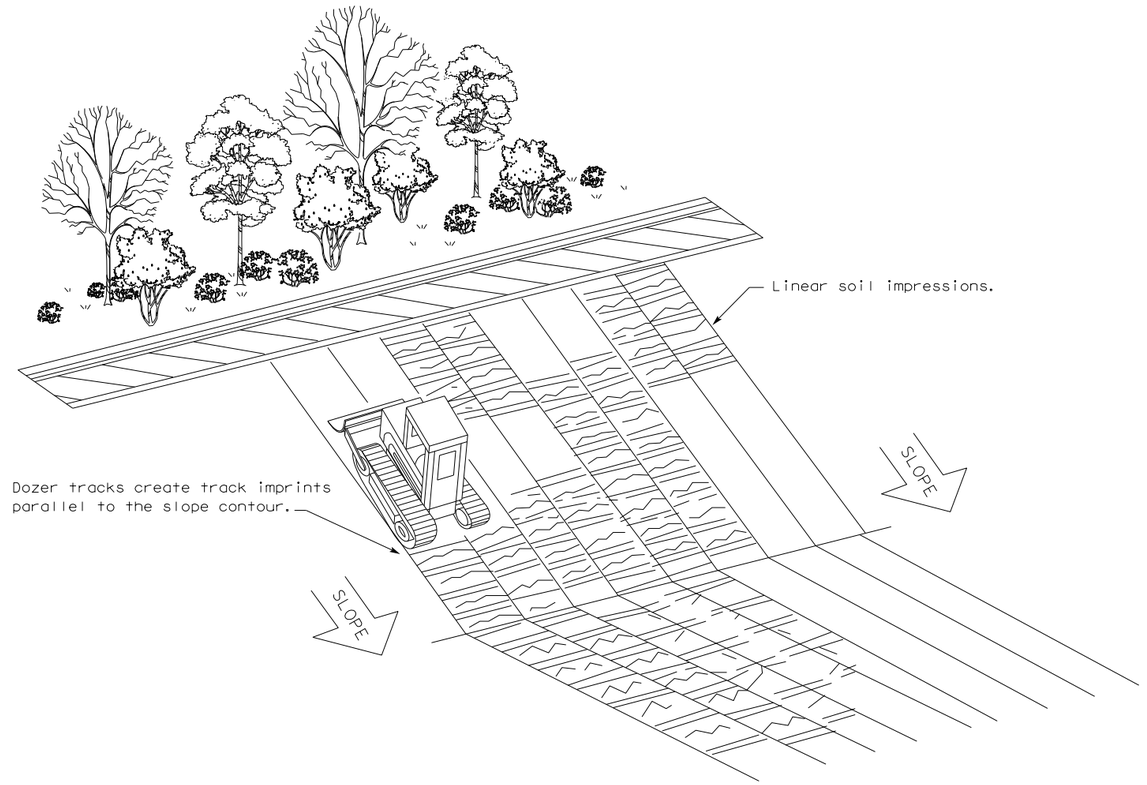
LEGEND

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

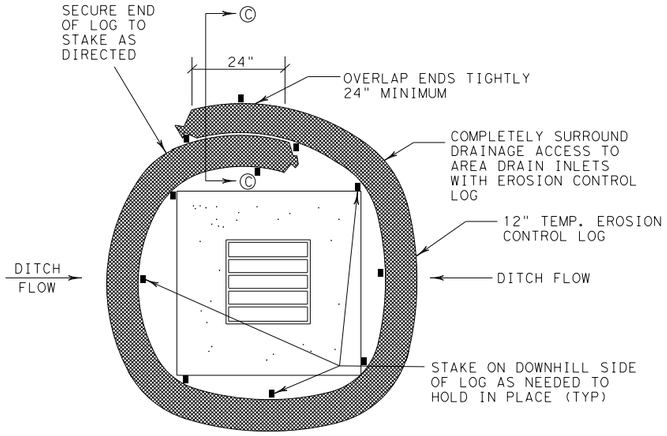
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

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	1430	01	031,Etc		FM 490		
	DIST	COUNTY			SHEET NO.		
	PHR	WILLACY			154		

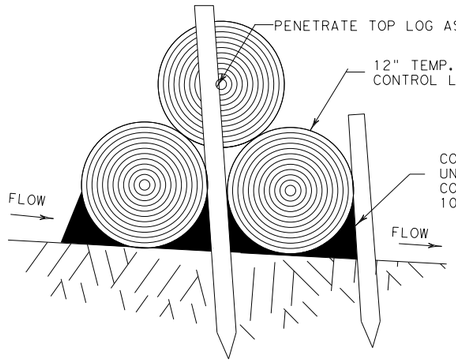
DATE
FILE



DROP INLET SEDIMENT TRAP

NTS

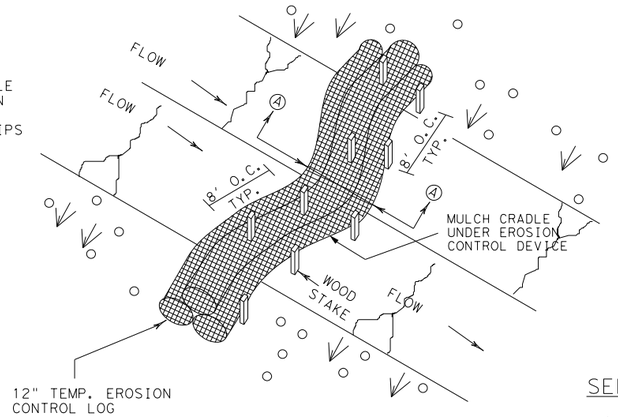
DI-ST



SECTION A-A

DITCH LINE SEDIMENT TRAP A-A

DL-ST



DITCH LINE SEDIMENT TRAP

DL-ST

PLANS SHEET LEGEND

DI-ST — DROP INLET SEDIMENT TRAP

DL-ST — DITCH LINE SEDIMENT TRAP

BOCI-ST — BACK OF CURB INLET SEDIMENT TRAP

ROW-ST — RIGHT OF WAY SEDIMENT TRAP

CI-ST — CURB INLET SEDIMENT TRAP

SEDIMENT BASIN & TRAP USAGE GUIDELINES

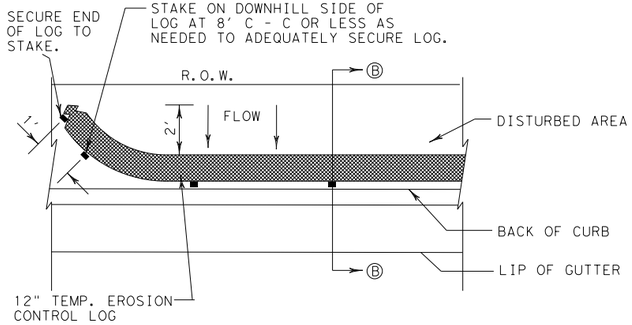
A sediment trap may be used to precipitate sediment out of runoff draining from an unstabilized area.

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).

Sediment traps should be placed in the following locations:

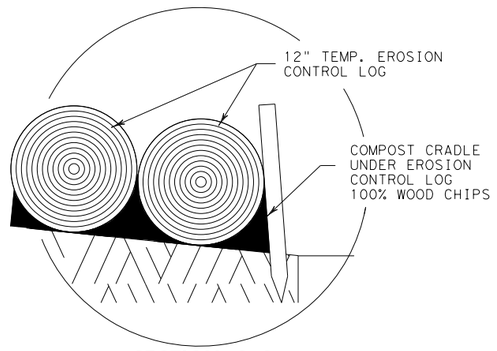
1. Immediately preceding drain inlets
2. Just before the drainage enters a water course
3. Just before the drainage leaves the right of way
4. Just before the drainage leaves the construction limits where drainage flows away from the project

The trap should be cleaned when the capacity has been reduced by ½ or the sediment has accumulated to a depth of 1', whichever is less. Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for seperately.



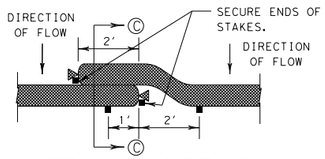
PLAN VIEW

NTS



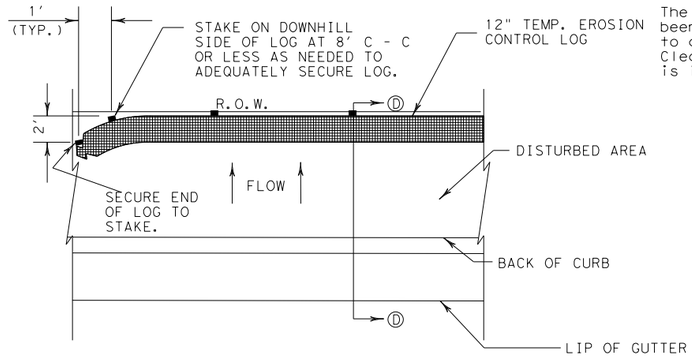
SECTION C-C

OVERLAP WITH COMPOST CRADLE



OVERLAP DETAIL PLAN VIEW

NTS

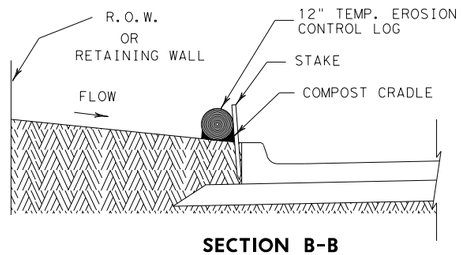


PLAN VIEW

NTS

GENERAL NOTES

1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 30' FOR 12" DIAMETER LOGS.
2. 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.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" X 2" WOOD 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG.
5. COMPOST CRADLE MATERIAL IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.

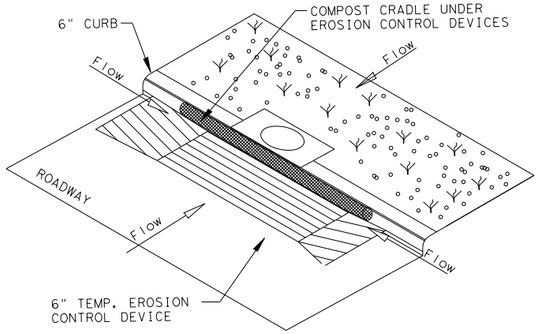


SECTION B-B

BACK OF CURB INLET SEDIMENT TRAP

NTS

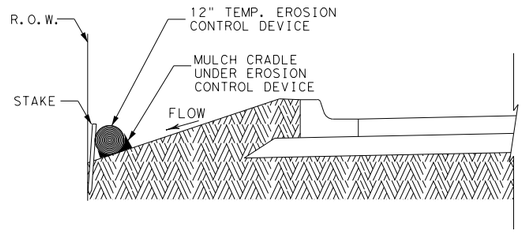
BOCI-ST



CURB INLET SEDIMENT TRAP

NTS

CI-ST



SECTION D-D

RIGHT-OF-WAY SEDIMENT TRAP

NTS

ROW-ST

PHARR DISTRICT STANDARD

Texas Department of Transportation

TEMPORARY EROSION CONTROL LOGS

TECL-17 (PHR)

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 490
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PHARR	WILLACY	155
CONTROL	SECTION	JOB	
1430	01	031, Etc	

LEVELS DISPLAYED

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63