FEDERAL AID PROJECT NO.			
STP 2B24(196)HES			
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT: STP 2B24(196)HES

FM 490
WILLACY COUNTY

FM 490 DESIGN SPEED = 65 MPH
A.D.T. (2021)= 1,263
A.D.T. (2041)= 1,768
FM 88 DESIGN SPEED = 65 MPH
FM 1015 DESIGN SPEED = 55 MPH

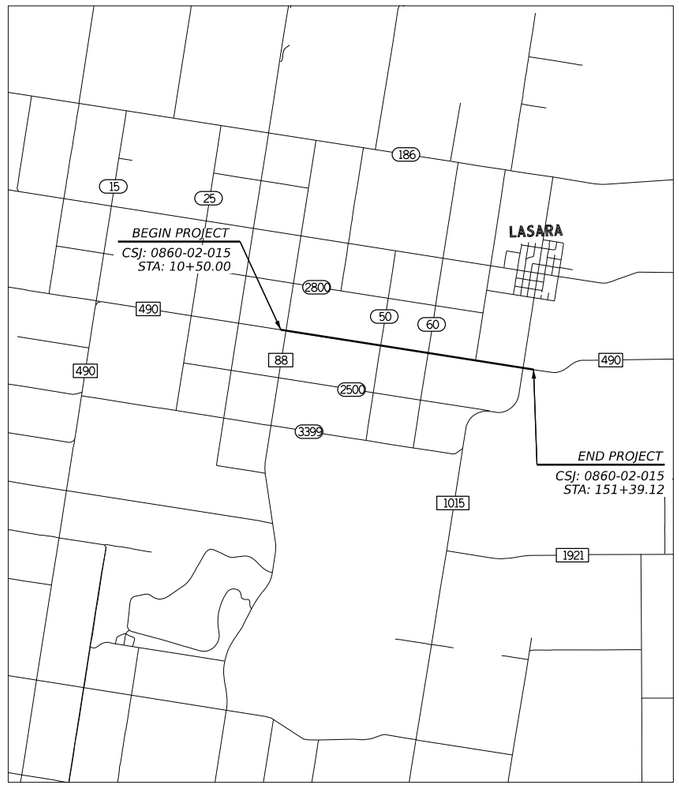
LIMITS: FROM 0.05 MI. WEST OF FM 88 TO 0.10 MI. EAST OF FM 1015

HIGHWAY	DESIGN SPEED	CSJ	ROADWAY		TOTAL LENGTH	
			FEET	MILES	FEET	MILES
FM 490	65 MPH	0860-02-015	14,089.12	2.67	14089.12	2.67

FOR THE CONSTRUCTION OF PAVED SHOULDERS (4FT) TO ADDRESS ROADWAY & LANE DEPARTURES

CONSISTING OF GRADING, ACP, MINOR DRAINAGE, PAVEMENT MARKINGS.

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".



EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: MISSOURI PACIFIC RAILROAD (ABANDONED)

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

SUBMITTED FOR LETTING 1/31/2024

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

TEXAS DEPARTMENT OF TRANSPORTATION

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

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, OCTOBER 23, 2023)

RECOMMENDED FOR LETTING 4/5/2024
DocuSigned by: Pedro R. Alvarez
EABA335C2DAA48C...
ER

SUBMITTED FOR LETTING 4/5/2024
DocuSigned by: Romualdo Mena Jr
8D395A956F70440...
DISTRICT CENTRAL DESIGN SUPERVISOR

DATE: $DATE$ 3:29:13 PM
FILE: $FILE$

CK
DW
CK
DW

I. GENERAL

1	TITLE SHEET
2	INDEX OF SHEETS
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6–10	PROPOSED TYPICAL SECTIONS
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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.

Kristen Harper — P.E. — 5/1/2024

KRISTEN E. HARPER, P.E. — DATE

*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. — 5/1/2024

SEAN P. CLARY, P.E. — DATE

LEGEND
D - DISTRICT STANDARD
S - STATE STANDARD

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		2

DATE: 5/1/2024
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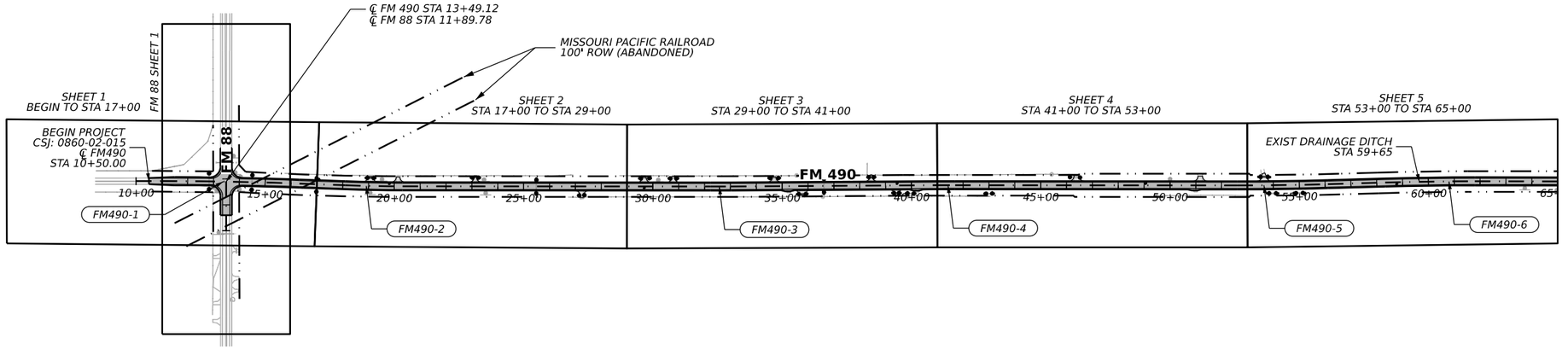
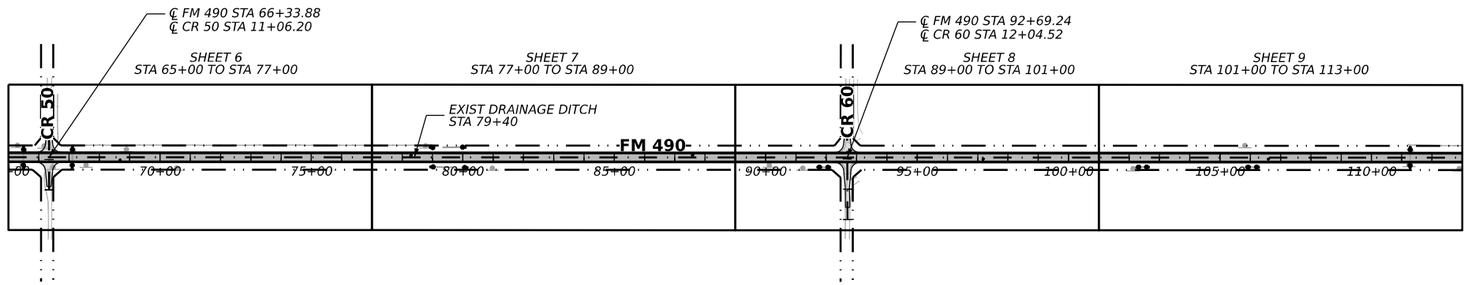
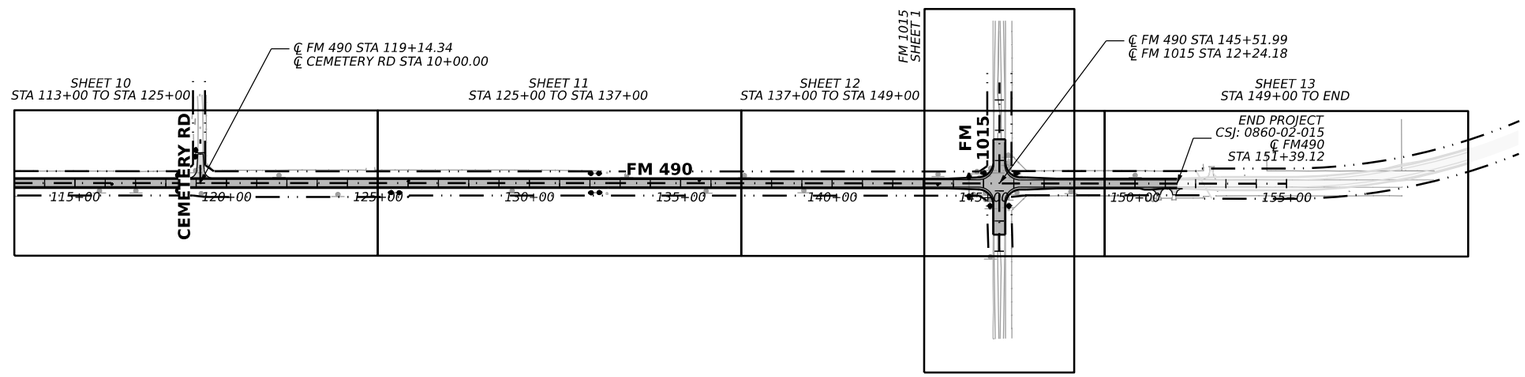






LEGEND

FM490-# HORIZONTAL ALIGNMENT CURVE

ROW

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS, SIGNING & PAVEMENT MARKING SHEETS AND ROADWAY PLAN & PROFILE SHEETS FOR MORE INFORMATION.

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

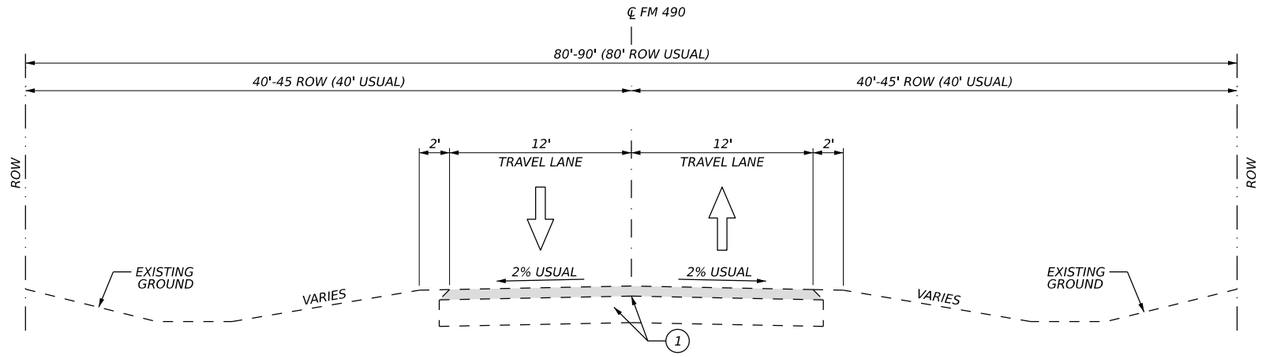
FM 490

PROJECT LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		3

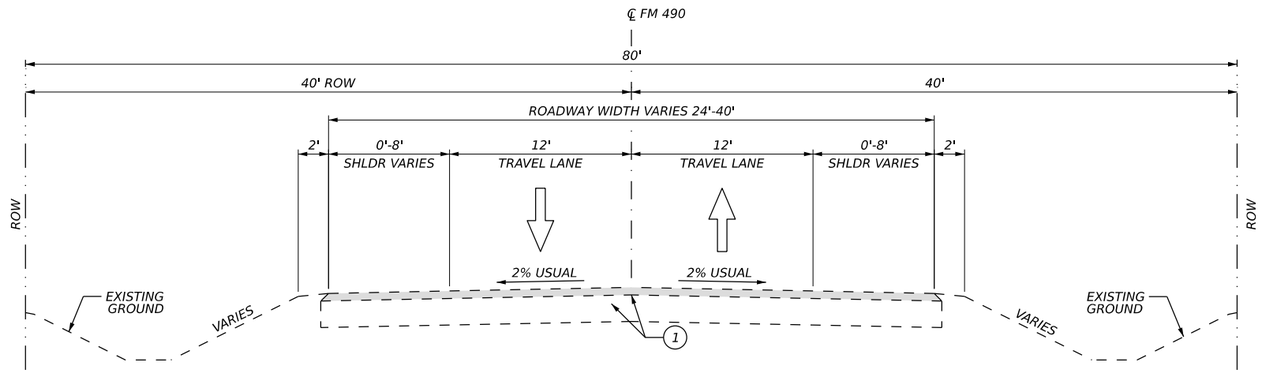
DATE: 1/31/2024
FILE: ...\General\FM490-BMCD-PRJ-01.dgn



EXISTING FM 490

STA 10+50.00 TO STA 142+84.00
STA 147+57.00 TO STA 151+39.12

NTS



EXISTING FM 490

STA 142+84.00 TO STA 147+57.00

NTS

LEGEND

1. EXISTING ASPHALT PAVEMENT (2" SURFACE COURSE, FLEXIBLE BASE VARIES 7"-21")
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
5. 10.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
6. 12.0" STABILIZED SUBGRADE W/ 6% LIME (BY WT.)
7. 3" SP-D PG 76-22 SAC A (NO RAP/RAS) (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. OVERALL EXISTING GRADE TO BE MAINTAINED THROUGHOUT PROJECT LIMITS, INCLUDING AREAS NOT DISTURBED.
5. UTILIZE ASPHALT MILLINGS FOR BACKFILL OF PAVEMENT EDGES.
6. NOT TO SCALE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

EXISTING TYPICAL SECTIONS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		4

DATE: 1/31/2024
FILE: ...\General\FM490-BMCD-TYP-01.dgn

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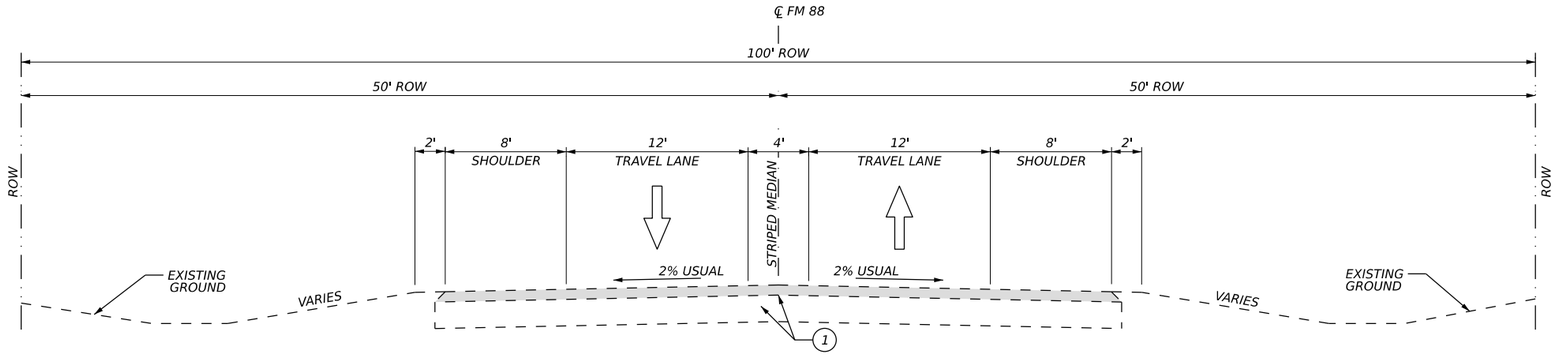
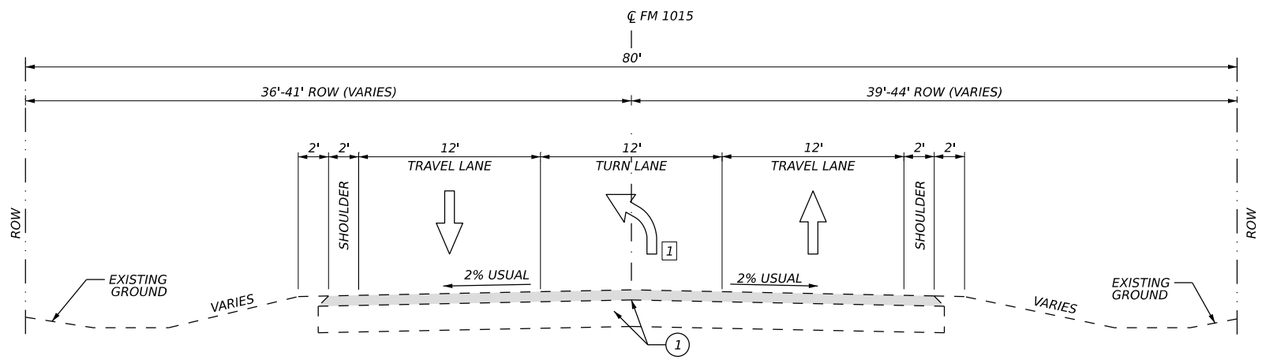
CK
DW



EXISTING FM 88

STA 10+00.00 TO STA 11+32.80
STA 12+44.82 TO STA 13+73.46

NTS



1 ARROW MIRRORED FOR NORTH INTERSECTION APPROACH AT FM 490

EXISTING FM 1015

STA 10+55.00 TO STA 11+62.20
STA 12+86.20 TO STA 14+10.00

NTS

LEGEND

1. EXISTING ASPHALT PAVEMENT (2" SURFACE COURSE, FLEXIBLE BASE VARIES 7"-21")
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
5. 10.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
6. 12.0" STABILIZED SUBGRADE W/ 6% LIME (BY WT.)
7. 3" SP-D PG 76-22 SAC A (NO RAP/RAS) (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. OVERALL EXISTING GRADE TO BE MAINTAINED THROUGHOUT PROJECT LIMITS, INCLUDING AREAS NOT DISTURBED.
5. UTILIZE ASPHALT MILLINGS FOR BACKFILL OF PAVEMENT EDGES.
6. NOT TO SCALE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

EXISTING TYPICAL SECTIONS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		5

DATE: 1/31/2024
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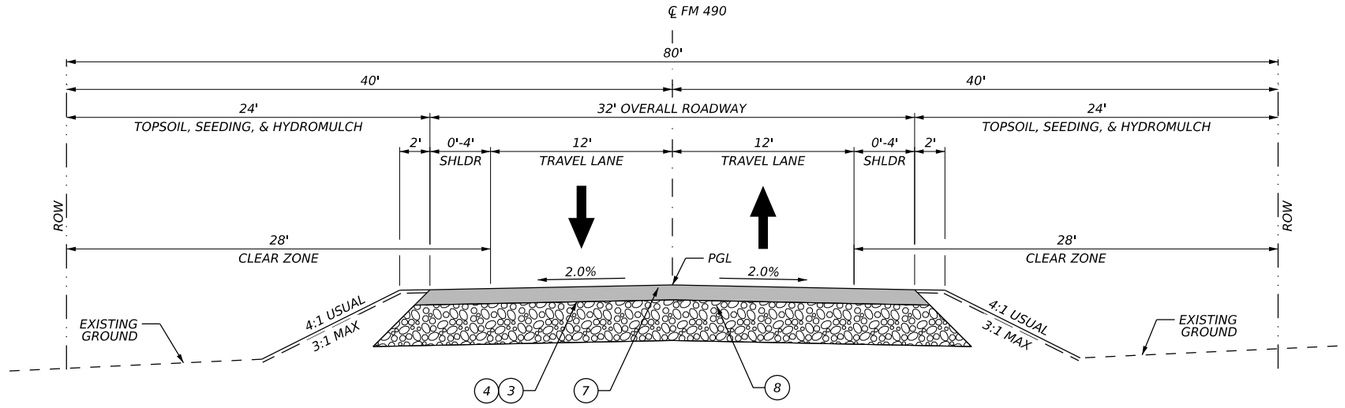
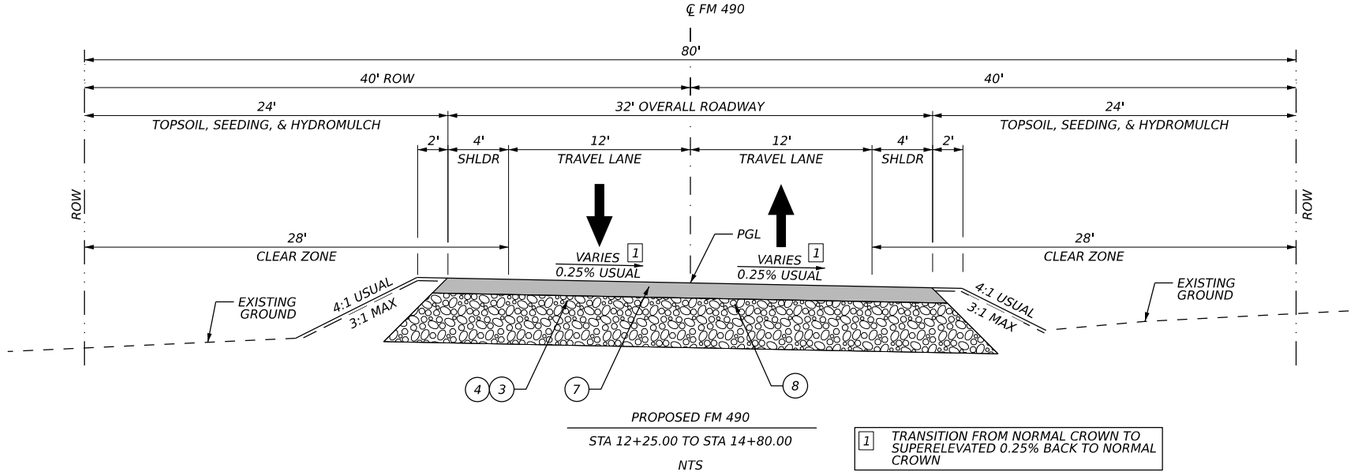


PROPOSED FM 490

BEGIN TO STA 12+25.00
STA 14+80.00 TO 17+10.00
STA 139+80.00 TO STA 143+82.00
STA 147+41.82 TO END

NTS

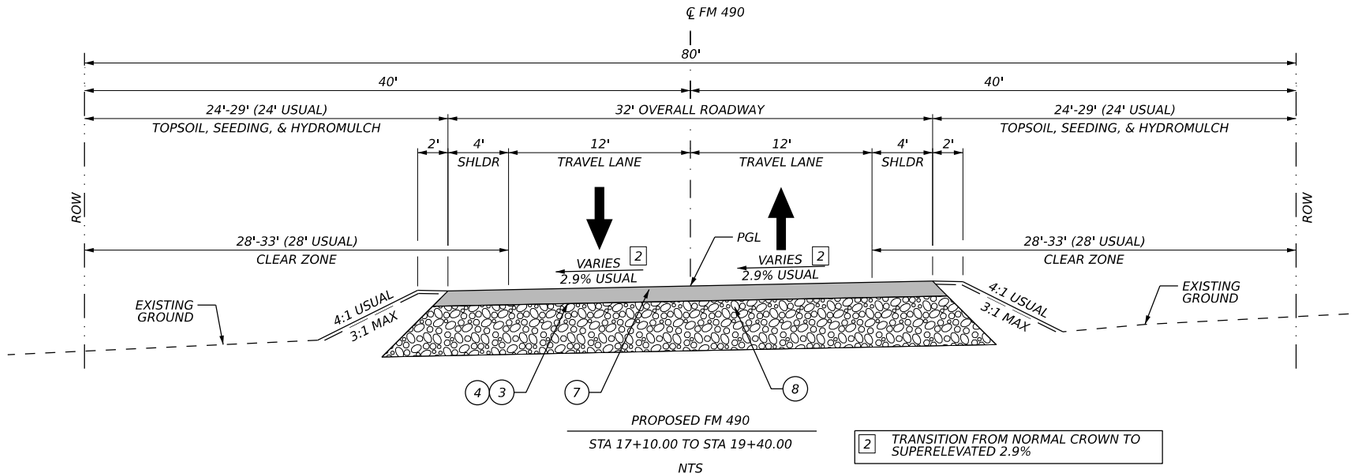


PROPOSED FM 490

STA 12+25.00 TO STA 14+80.00

NTS

1 TRANSITION FROM NORMAL CROWN TO SUPERELEVATED 0.25% BACK TO NORMAL CROWN



PROPOSED FM 490

STA 17+10.00 TO STA 19+40.00

NTS

2 TRANSITION FROM NORMAL CROWN TO SUPERELEVATED 2.9%

LEGEND

1. EXISTING ASPHALT PAVEMENT (2" SURFACE COURSE, FLEXIBLE BASE VARIES 7"-21")
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
5. 10.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
6. 12.0" STABILIZED SUBGRADE W/ 6% LIME (BY WT.)
7. 3" SP-D PG 76-22 SAC A (NO RAP/RAS) (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.
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4. OVERALL EXISTING GRADE TO BE MAINTAINED THROUGHOUT PROJECT LIMITS, INCLUDING AREAS NOT DISTURBED.
5. UTILIZE ASPHALT MILLINGS FOR BACKFILL OF PAVEMENT EDGES.
6. NOT TO SCALE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		6

DATE: 1/31/2024
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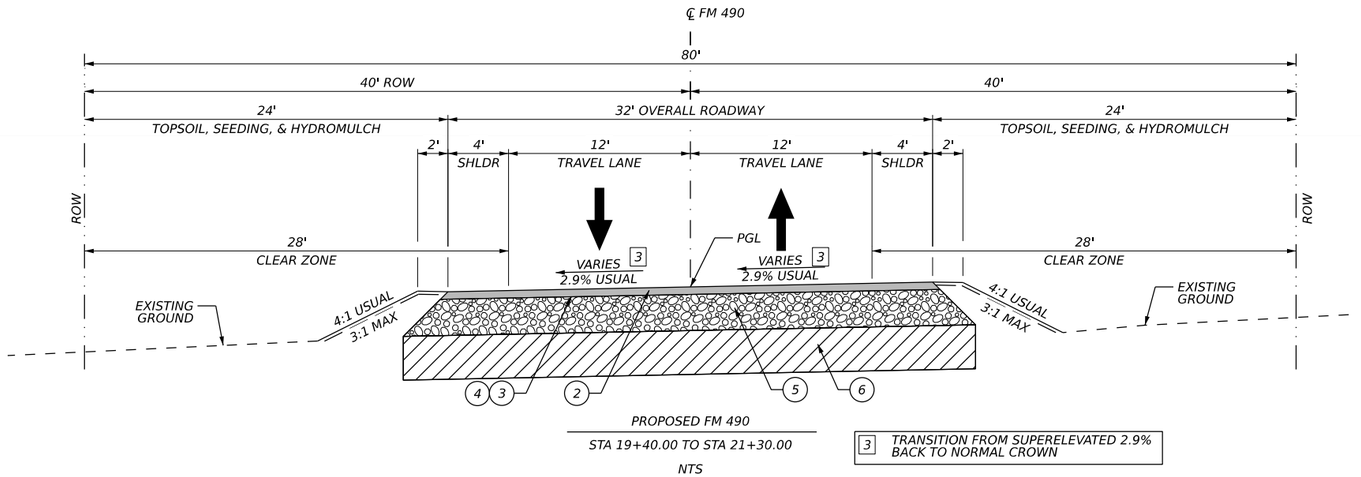
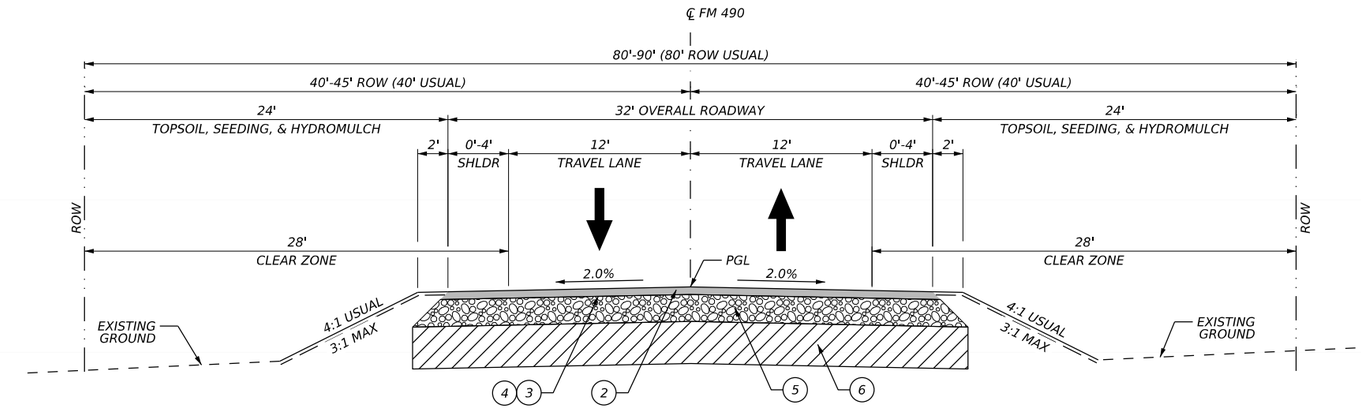
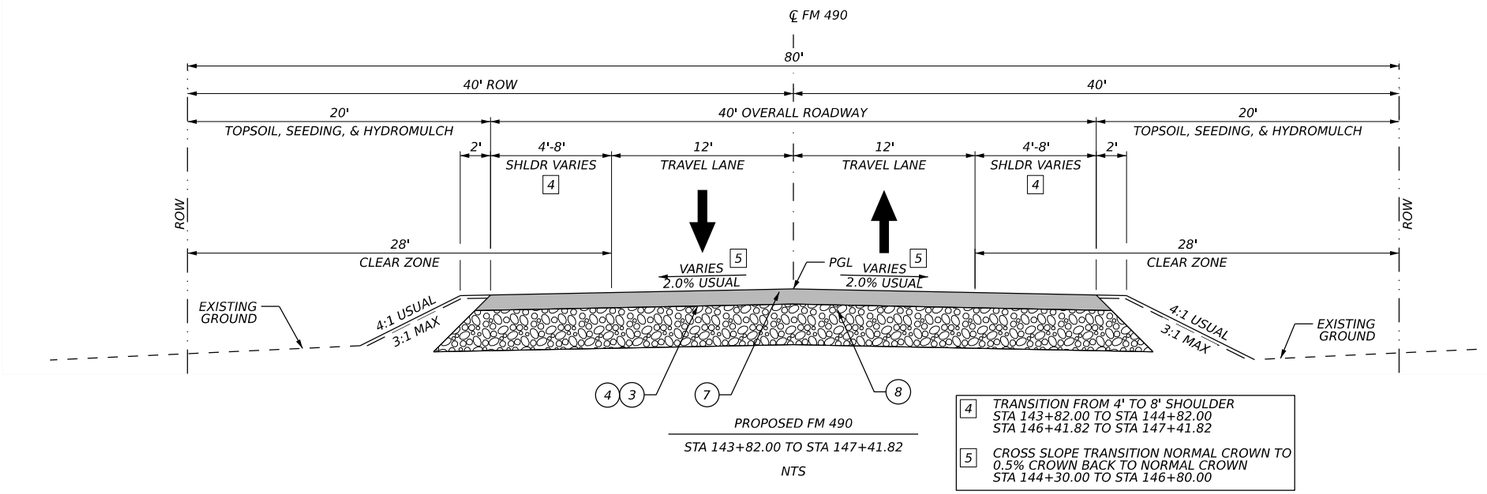






LEGEND

1. EXISTING ASPHALT PAVEMENT (2" SURFACE COURSE, FLEXIBLE BASE VARIES 7"-21")
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
5. 10.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
6. 12.0" STABILIZED SUBGRADE W/ 6% LIME (BY WT.)
7. 3" SP-D PG 76-22 SAC A (NO RAP/RAS) (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. OVERALL EXISTING GRADE TO BE MAINTAINED THROUGHOUT PROJECT LIMITS, INCLUDING AREAS NOT DISTURBED.
5. UTILIZE ASPHALT MILLINGS FOR BACKFILL OF PAVEMENT EDGES.
6. NOT TO SCALE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

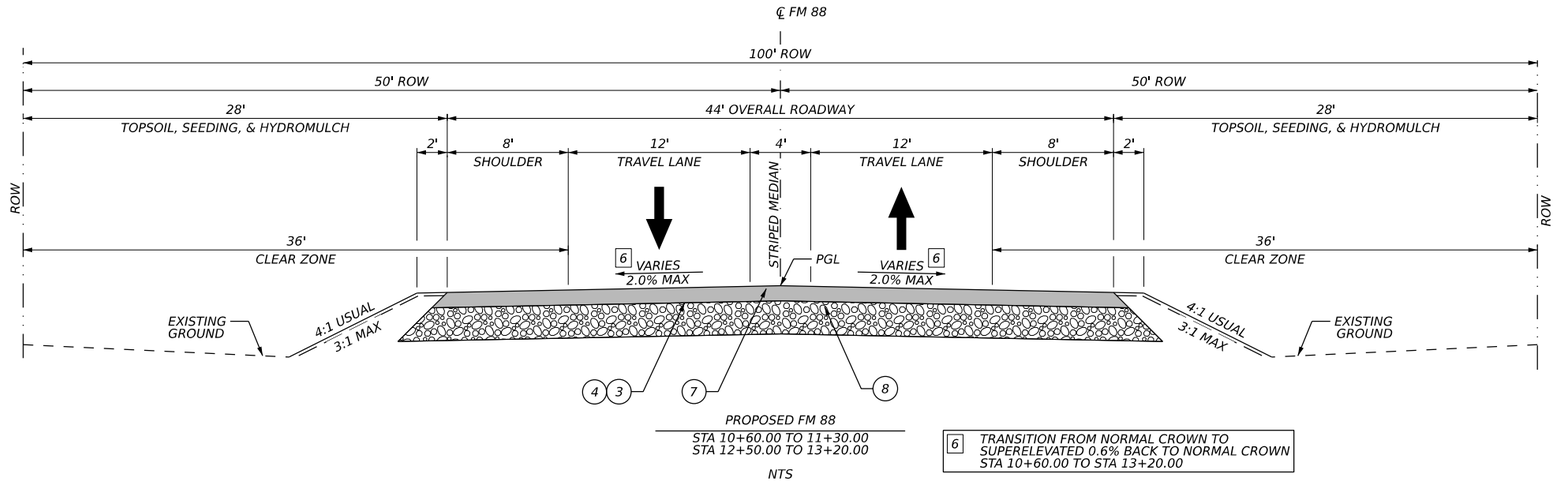
FM 490

PROPOSED TYPICAL SECTIONS

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		7

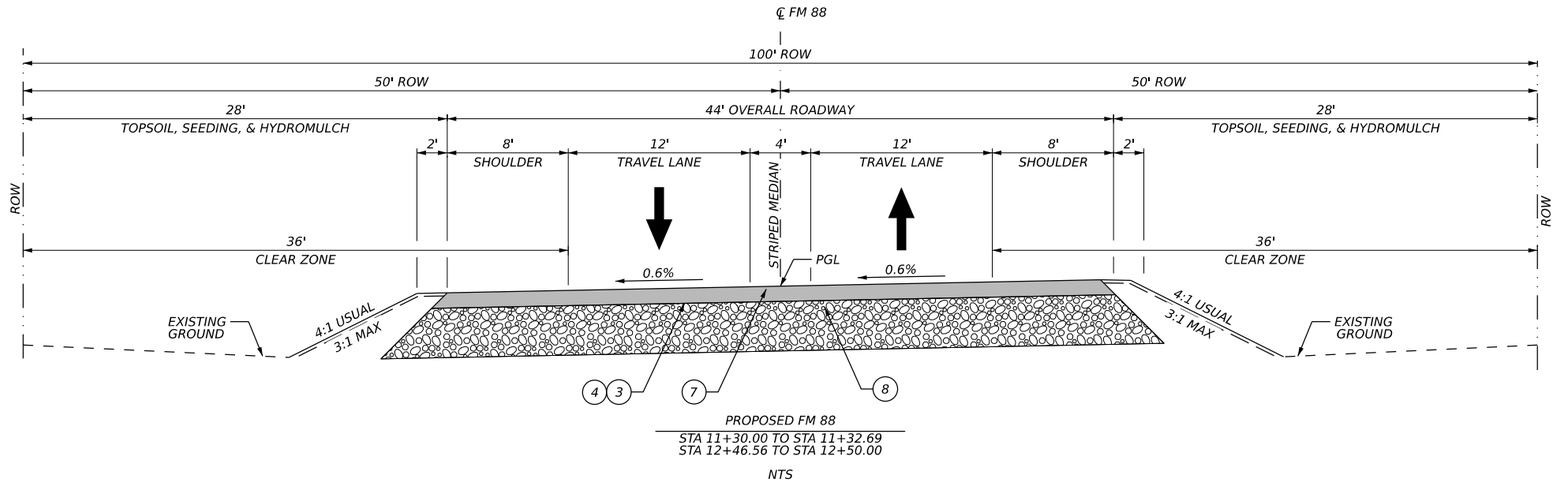
DATE: 1/31/2024
FILE: ...\General\FM490-BMCD-TYP-04.dgn



PROPOSED FM 88
STA 10+60.00 TO 11+30.00
STA 12+50.00 TO 13+20.00

NTS

6 TRANSITION FROM NORMAL CROWN TO SUPERELEVATED 0.6% BACK TO NORMAL CROWN STA 10+60.00 TO STA 13+20.00



PROPOSED FM 88
STA 11+30.00 TO STA 11+32.69
STA 12+46.56 TO STA 12+50.00

NTS

LEGEND

1. EXISTING ASPHALT PAVEMENT (2" SURFACE COURSE, FLEXIBLE BASE VARIES 7"-21")
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
5. 10.0" TY E GR-4 BASE W/ 2% CEMENT (BY WT.)
6. 12.0" STABILIZED SUBGRADE W/ 6% LIME (BY WT.)
7. 3" SP-D PG 76-22 SAC A (NO RAP/RAS) (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. OVERALL EXISTING GRADE TO BE MAINTAINED THROUGHOUT PROJECT LIMITS, INCLUDING AREAS NOT DISTURBED.
5. UTILIZE ASPHALT MILLINGS FOR BACKFILL OF PAVEMENT EDGES.
6. NOT TO SCALE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

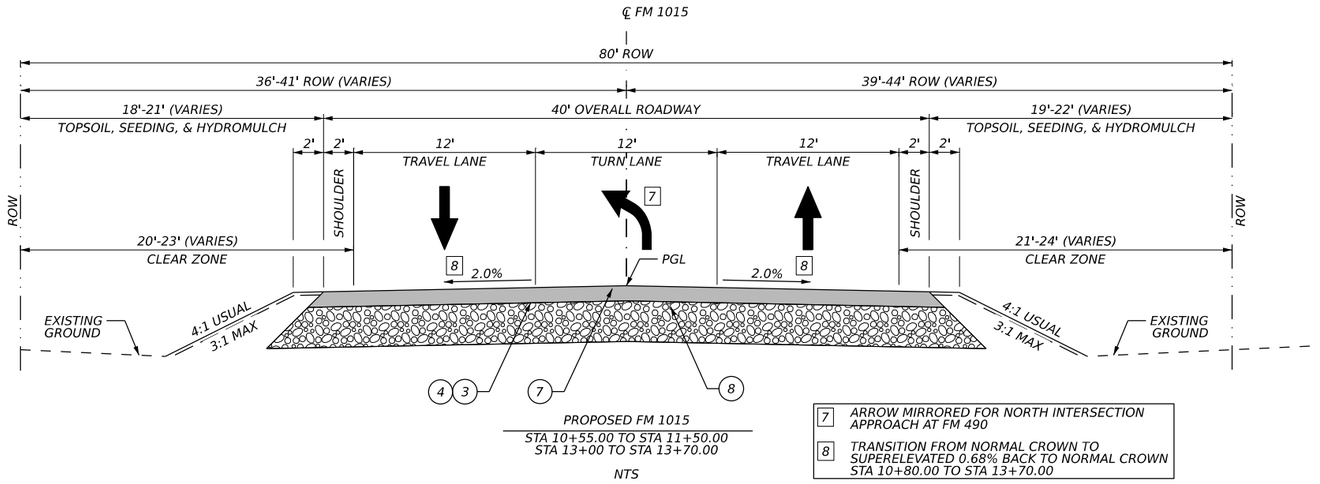
Texas Department of Transportation

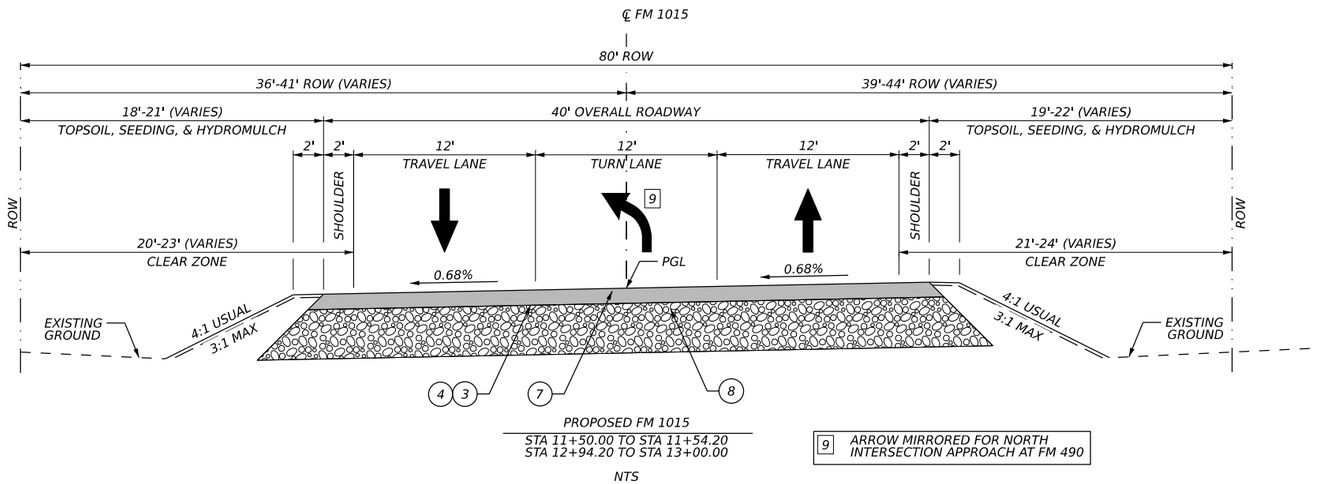
FM 490

PROPOSED TYPICAL SECTIONS

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		8

DATE: 1/31/2024
FILE: ...\General\FM490-BMCD-TYP-05.dgn





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FM 490

PROPOSED TYPICAL SECTIONS

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		9

DATE: 1/31/2024
FILE: ...\General\FM490-BMCD-TYP-06.dgn

CK
DW
CK
DW

Project Number:

County: Willacy **Control:** 0860-02-015

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.

Information found on TxDOT's FTP server will be considered for informational purposes only.
Index of /pub/txdot-info/Pre-Letting Responses/Pharr District/21-Pharr District (Construction) (state.tx.us)

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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."

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

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

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

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

ITEM 7: 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 8.3.1.4. Standard Workweek.

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).

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.

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.

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ITEM 134: Backfilling Pavement Edges

Areas to be backfilled shall extend approximately 3-ft out from the edges of the proposed overlay. Final slopes shall be uniform and smooth. The 100-foot station payment includes backfilling of both sides.

Backfill shall be milled asphalt from the project corridor.

Any additional backfill material necessary due to pre-existing edge conditions or to replace existing fill removed during blading operations will not be paid for directly. It will be considered subsidiary to this bid Item.

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:

Table 1: Gradation Requirements for Flexible Base

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).

Flexible Base (TY E GR 4) caliche shall meet minimum compressive strength specified on Table 1 Gradation Requirements for Flexible Base above.

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.

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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	0860-02-015	FM 490	SPG 76-22	A

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

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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.

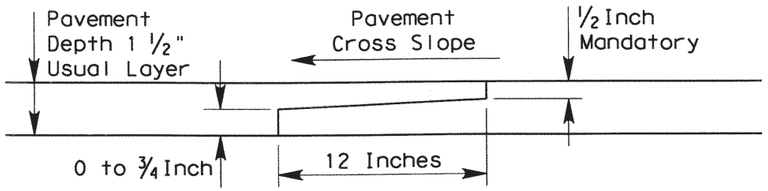
Blading (not to exceed more than 3-ft from the pavement edge) may also be necessary to clean dirt and grass from pavement edges and turnout areas as work under this bid Item. The cost of this blading will not be paid for directly but shall be considered subsidiary to this bid Item.

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 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.

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

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.

Project Number:

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

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 502: Barricades, Signs, and Traffic Handling

Shadow vehicles equipped with Truck-Mounted Attenuators are required for traffic handling. See notes for Item 6185: Truck Mounted Attenuator/Trailer Attenuator, for additional references pertaining to the TMAs.

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

Furnish (1) Field Office (Type C).

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.

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.

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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 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.

ITEM 610: Roadway Illumination Assemblies

Luminaires shown on the proposed Traffic Signal installation layout sheets may be shown at an angle for clarity. All luminaires shown shall be installed perpendicular to the main roadway under construction.

In addition to ED (3)-14, each cable for luminaires shall be identified in each ground box, pole base, or other accessible location with yellow electrical tape wrapped around the cable. The tape marking shall be at least 2 inches.

All luminaires on traffic signal poles shall be rated for 240 vac. All safety lighting poles shall be serviced for 480 vac.

Luminaires installed on traffic signal poles will not be paid for directly but shall be considered subsidiary to the various bid Items of the project.

A. Submittals. Following the electronic shop drawing submittal process (see https://www.txdot.gov/business/resources/highway/bridge/shop-drawing-submittal-cycle.html & chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://ftp.txdot.gov/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf), the Contractor shall submit to the Engineer, for approval, fabrication drawings and calculations for the poles. The drawings and calculations shall be sealed by a Texas registered or licensed Professional Engineer (P.E.).

B. Luminaire Structural Support Requirements. Lighting poles, arms, and anchor bolt assemblies shall have a 25-year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the current edition of the AASHTO Design Specifications. For transformer base poles, the fabricator shall include transformer base and connecting hardware in calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.

ITEM 618: Conduit

All conduit ends in pole bases, controllers and ground boxes shall be plugged with 4 to 6 inches of polyurethane sealant or its equivalent after cables are in place.

Conduit shall be placed in a straight line not to exceed 2.0 feet in any direction. The depth of the conduit shall be 2.0 feet except when crossing a roadway where the depth shall not be more than 3.0 feet nor less than 1.0 foot below the bottom of the base material in the roadway when placed

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by the jacking or boring method. Any evidence of damage to the roadway during the jacking or boring operation shall be sufficient grounds to stop the method being used.

Conduit runs under paved roadways or driveways shall be jacked or bored and then pushed across. At these locations, galvanized rigid metal may be used. All other runs shall be made by trenching. Existing pavement which will be removed, reconstructed, or overlaid with new pavement may be trenched across. Trenches for conduit runs shall be a minimum 2 feet deep and 4 inches wide. The conduit shall be placed on a 2-inch sand cushion and then backfilled with a minimum of 6 inches sand fill. The remainder of the trench shall be backfilled with flexible base, soil or two-sack concrete as required by location of conduit on the project or as directed. The top 3 inches shall match the existing surface material.

All conduit elbows and rigid extensions required to be installed on PVC conduit systems will not be paid for separately but will be considered subsidiary to the various bid Items.

Use materials from prequalified Material Producer List as shown on the Texas Department of Transportation (TxDOT) - Construction Division's (CST) Material Producer List. Category is "Roadway Illumination and Electrical Supplies."

ITEM 620: Electrical Conductors

For Flashing Beacons (Item 685) and Ped poles (Item 687) within the project, provide single-pole breakaway disconnects.

Use Bussman HEBW, Littelfuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors.

For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz-Shawmut FEBN, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

ITEM 621: Tray Cable

Connect luminaires on traffic signal poles using a 4-conductor tray cable with conductor colors of red, black, and green #12 AWG (XHHW). The white (neutral) conductor will not be needed and will be capped.

ITEM 628: Electrical Services

Arrange for and cooperate with the utility company to provide electrical power for the service(s) shown and as required by the plans. A meter will be required on all electrical services.

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 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

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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.

ITEM 680: Highway Traffic Signals

The installation of highway traffic signals shall consist of the following principal Items:

1. Furnishing and installing post mounted flashing beacon controller(s) and cabinet(s).
2. Furnishing and installing steel strain poles, electrical service, luminaries, signal heads and cables, galvanized steel span wire and conduit runs.
3. Removal and disposal of existing flashing beacon material specified in the plans.
4. All other Items not listed above which are needed to provide for complete flashing beacon installations and for proper operation as called for in the plans and specifications shall be furnished and installed.

Any deviation of location for proposed signal work shall be as approved.

All wiring not covered by the plans and specifications shall be in accordance with the latest edition of the National Electrical Code,

Existing Utilities

The exact location of existing underground utilities shall be verified with the utility companies prior to construction to avoid conflict with or damage to these utilities.

Coordination with the utility companies will be required to make any adjustments, due to utility conflicts, as defined in the specifications or deemed necessary.

Uniformity in Equipment

1. All flashing beacon controllers furnished shall be by the same manufacturer.
2. All flashing beacon heads furnished shall be by the same manufacturer.
3. All signal fittings and pipe brackets shall be of an approved metallic material and of the same design and manufacturer.
4. All traffic signal poles furnished shall be by the same manufacturer.

Handling of Traffic

Roads and streets shall always be kept open to traffic. The installation of flashing beacon heads, steel strain poles and conduit runs shall be arranged so as to permit the continuous movement of traffic in both directions at all times.

All construction operations shall be conducted to provide the least possible interference to traffic as shown on the plans, as provided for in the specifications and/or as directed. All signing, barricading, and handling of traffic shall conform to the current edition of the "Texas Manual on Uniform Traffic Control Devices".

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Sequence of work

1. The existing flashing beacon installation(s) shall always remain in operation during construction of the proposed flashing beacon installation(s) or modification(s).
2. The complete removal of the specified existing flashing beacon installation or specified Items will be required when the proposed flashing beacon installation(s) are in place and operational.
3. All labor, tools, and materials used to remove the specified existing flashing beacon material shall not be paid for directly but be considered subsidiary to the various items of work.
4. Final inspection shall be performed in conjunction with the district signal shop.

ITEM 682: Vehicle and Pedestrian Signal Heads

All flashing beacon heads shall be covered with burlap from the time of installation until they are placed in operation. All flashing beacon heads shall be of polycarbonate material and yellow in color. Flashing beacon heads shall have standard detachable visors. LEDs shall be furnished for all traffic signal heads.

Flashing beacon heads shall be positioned carefully to provide the best view of head indications to motorists. All beacon heads shall be installed to a neat overall appearance.

Nominal height for flashing beacon heads above pavement surface shall be 18 feet 6 inches, plus/minus 3 inches.

ITEM 684: Traffic Signal Cables

All signal cable shall be #12 AWG; 2/c loop. Lead-In shall be #14 AWG shielded and loop wires in pavement.

ITEM 686: Traffic Signal Pole Assemblies (Steel)

The locations for the proposed traffic signal poles are approximate. The exact locations will be determined in the field in coordination with the District Signal Shop.

Erection and/or removal of poles and luminaries located near any overhead electrical power lines shall be accomplished using established industry and utility safety practices. The appropriate utility company shall be consulted with prior to beginning such work.

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ITEM 6185: Truck Mounted Attenuator/Trailer Attenuator

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for the project, provide 2 additional shadow vehicle(s) with TMA.

Therefore, 2 total shadow vehicles with TMA will be required on this project for the type of work as shown on the plans. The Contractor will be responsible for determining if one or more of his construction operations will be ongoing at the same time and thus determine the total number of TMAs needed for the project.

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SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002 PREPARING ROW	134 6002 BACKFILL (TY B)	216 6001 PROOF ROLLING	247 6225 FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	260 6002 LIME (HYDRATED LIME (SLURRY))	260 6011 LIME TRT (EXST MATL) (12")	275 6001 CEMENT	275 6031 CEMENT TREAT (NEW BASE) (10")	275 6076 CEMENT TREAT(NEW BASE)(15")	310 6009 PRIME COAT (MC-30)	316 6005 ASPH (TIER II)	316 6531 AGGR (TY-B GR-4P SAC-B)	400 6008 CUT & RESTORE ASPH PAVING	530 6004 DRIVEWAYS (CONC)	530 6005 DRIVEWAYS (ACP)	530 6016 DRIVEWAYS (BASE)	560 6025 RELOCATE EXISTING MAILBOX	3077 6065 SP MIXES SP-D SAC-A PG76-22	3077 6075 TACK COAT
	STA	STA	HR	CY	TON	SY	TON	SY	SY	GAL	GAL	CY	SY	SY	SY	SY	EA	TON	GAL
CSJ 0860-02-015			8																
SHEET 1 OF 13 BEGIN TO STA 17+00	7	7		1,259		0	46		3,023	568	853	24						469	197
SHEET 2 OF 13 STA 17+00 TO STA 29+00	12	12		1,386	95	3,592	51	399	932	860	1,290	36			211	283		426	60
SHEET 3 OF 13 STA 29+00 TO STA 41+00	12	12		1,256	120	4,522	46	502	0	866	1,298	36	13		302	409	2	357	0
SHEET 4 OF 13 STA 41+00 TO 53+00	12	12		1,252	119	4,506	46	501	0	862	1,294	36	13		126	164	1	356	0
SHEET 5 OF 13 STA 53+00 TO 65+00	12	12		1,247	119	4,490	45	499	0	859	1,289	36			73	95		354	0
SHEET 6 OF 13 STA 65+00 TO 77+00	12	12		1,247	119	4,490	45	499	0	859	1,289	36			458	551		354	0
SHEET 7 OF 13 STA 77+00 TO 89+00	12	12		1,247	119	4,490	45	499	0	859	1,289	36	13					354	0
SHEET 8 OF 13 STA 89+00 TO 101+00	12	12		1,247	119	4,490	45	499	0	859	1,289	36	13		556	679		354	0
SHEET 9 OF 13 STA 101+00 TO 113+00	12	12		1,247	119	4,490	45	499	0	859	1,289	36	13					354	0
SHEET 10 OF 13 STA 113+00 TO 125+00	12	12		1,247	119	4,490	45	499	0	859	1,289	36	13		239	286		354	0
SHEET 11 OF 13 STA 125+00 TO 137+00	12	12		1,247	119	4,490	45	499	0	859	1,289	36						354	0
SHEET 12 OF 13 STA 137+00 TO 149+00	12	12		2,160	28	1,048	79	116	4,485	1,046	1,570	44						781	293
SHEET 13 OF 13 STA 149+00 TO END	2	2		387		0	14		928	172	259	7		95			1	142	60
FM 88 INTERSECTION (SHEET 1 OF 1)	3	3		337		0	12		808	147	221	6						121	51
FM 1015 INTERSECTION (SHEET 1 OF 1)	3	3		407		0	15		977	178	267	7						147	61
PROJECT TOTALS	**147**	**147**	**8**	**17,173**	**1,195**	**45,098**	**624**	**5,011**	**11,153**	**10,712**	**16,075**	**448**	**78**	**95**	**1,965**	**2,467**	**4**	**5,277**	**722**

SUMMARY OF REMOVAL ITEMS

LOCATION	104 6017 REMOVING CONC (DRIVEWAYS)	105 6021 REMOVING STAB BASE AND ASPH PAV (0-4")	105 6075 REMOV STAB BASE AND ASPH PAV (10"-18")	496 6004 REMOV STR (SET)	496 6005 REMOV STR (WINGWALL)	496 6007 REMOV STR (PIPE)	644 6076 REMOVE SM RD SN SUP&AM	658 6060 REMOVE DELIN & OBJECT MARKER ASSMS	680 6004 REMOVING TRAFFIC SIGNALS
	SY	SY	SY	EA	EA	LF	EA	EA	EA
CSJ 0860-02-015									
SHEET 1 OF 13 BEGIN TO STA 17+00			2,080				7	6	
SHEET 2 OF 13 STA 17+00 TO STA 29+00		188	3,192	2	2	21	6	2	
SHEET 3 OF 13 STA 29+00 TO STA 41+00		273	3,190			123	1	2	
SHEET 4 OF 13 STA 41+00 TO 53+00		101	3,212			85	4		
SHEET 5 OF 13 STA 53+00 TO 65+00		42	3,248			29	2		
SHEET 6 OF 13 STA 65+00 TO 77+00		418	3,358				4	4	
SHEET 7 OF 13 STA 77+00 TO 89+00			3,331	2		94			
SHEET 8 OF 13 STA 89+00 TO 101+00		501	3,303			81	3		
SHEET 9 OF 13 STA 101+00 TO 113+00			3,215			81		2	
SHEET 10 OF 13 STA 113+00 TO 125+00		223	3,206			92	4	2	
SHEET 11 OF 13 STA 125+00 TO 137+00			3,210				4		
SHEET 12 OF 13 STA 137+00 TO 149+00			4,115	3			12	3	
SHEET 13 OF 13 STA 149+00 TO END	97		691				1		
FM 88 (SHEET 1 OF 1) BEGIN TO END			1,071		2		3		
FM 1015 (SHEET 1 OF 1) BEGIN TO END			1,078	2			7	4	1
PROJECT TOTALS	**97**	**1,746**	**41,500**	**9**	**4**	**606**	**58**	**25**	**1**

SUMMARY OF MOBILIZATION ITEMS

LOCATION	500 6001 MOBILIZATION	502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING
	LS	MO
CSJ 0860-02-015	1	11
PROJECT TOTALS	**1**	**11**

SUMMARY OF DRAINAGE ITEMS

LOCATION	400 6005 CEM STABIL BKFL	400 6010 STRUCT EXCAV (SPECIAL)	402 6001 TRENCH EXCAVATION PROTECTION	464 6038 RC PIPE (CL III)(18 IN)(SPL)	464 6039 RC PIPE (CL III)(24 IN)(SPL)	464 6040 RC PIPE (CL III)(30 IN)(SPL)	467 6326 SET (TY II) (12 IN) (RCP) (6: 1) (P)	467 6356 SET (TY II) (18 IN) (RCP) (3: 1) (C)	467 6363 SET (TY II) (18 IN) (RCP) (6: 1) (P)	467 6374 SET (TY II) (21 IN) (RCP) (6: 1) (P)	467 6388 SET (TY II) (24 IN) (RCP) (3: 1) (C)	467 6395 SET (TY II) (24 IN) (RCP) (6: 1) (P)	480 6001 CLEAN EXIST CULVERTS	1008 6001 PRSSR IRRIG PVC PIPE (18")	1008 6002 PRSSR IRRIG PVC PIPE (24")	1008 6003 PRSSR IRRIG PVC PIPE (12")	1008 6006 PRSSR IRRIGATION PVC PIPE (15")
	CY	CY	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF DW-PHR	LF DW-PHR	LF DW-PHR	LF
CSJ 0860-02-015																	
SHEET 1 OF 13 BEGIN TO STA 17+00								6					3				
SHEET 2 OF 13 STA 17+00 TO STA 29+00				24			2	2	4				3				
SHEET 3 OF 13 STA 29+00 TO STA 41+00	21	11	81	129				2	14				6			81	
SHEET 4 OF 13 STA 41+00 TO 53+00	28	13	85		85		2		2				2				85
SHEET 5 OF 13 STA 53+00 TO 65+00					28							6	2				
SHEET 6 OF 13 STA 65+00 TO 77+00											4		2				
SHEET 7 OF 13 STA 77+00 TO 89+00	24	12	94	94								4	2			94	
SHEET 8 OF 13 STA 89+00 TO 101+00	27	12	81		81				2				1	81			
SHEET 9 OF 13 STA 101+00 TO 113+00	33	14	81			81			4		2		3		81		
SHEET 10 OF 13 STA 113+00 TO 125+00	37	15	92			92		2	2				2		92		
SHEET 11 OF 13 STA 125+00 TO 137+00									4	2			2				
SHEET 12 OF 13 STA 137+00 TO 149+00									2		2	2	5				
SHEET 13 OF 13 STA 149+00 TO END																	
FM 88 INTERSECTION (SHEET 1 OF 1)								2					1				
FM 1015 INTERSECTION (SHEET 1 OF 1)																	
PROJECT TOTALS	**170**	**77**	**514**	**247**	**194**	**173**	**4**	**14**	**34**	**2**	**8**	**12**	**34**	**81**	**173**	**175**	**85**

BASIS OF ESTIMATE:

1. *260-6002 6% 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. *3077-6065 UNIT WEIGHT OF HMA 110LB/SY/IN*
7. *3077-6075 APPLICATION RATE 0.07 GAL/SY*

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SUMMARY OF QUANTITIES

SHEET 1 OF 5

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		11

DATE: 1/31/2024
FILE: ...\FM490-BMCD-SUM-01.dgn

SUMMARY OF TRAFFIC SIGNAL ITEMS

LOCATION	416 6032 DRILL SHAFT (TRF SIG POLE) (36 IN) LF	620 6007 ELEC CONDR (NO.8) BARE LF	620 6010 ELEC CONDR (NO.6) INSULATED LF	621 6005 TRAY CABLE (4 CONDR) (12 AWG) LF	625 6003 ZINC-COAT STL WIRE STRAND (3/8") LF	628 6301 ELC SRV TY T 120/240 000(NS)GS(L)TS (O) EA	680 6001 INSTALL HWY TRF SIG (FLASH BEACON) EA	682 6005 VEH SIG SEC (12")LED(RED) EA	684 6010 TRF SIG CBL (TY A)(12 AWG)(5 CONDR) LF	686 6020 INS TRF SIG PL AM (S)STR(TY D)LUM EA	690 6018 INSTALL OF SPAN CABLE ASSM LF
CSJ 0860-02-015											
SHEET 1 OF 1 FM 1015 INTERSECTION	30	225	225	189	80	1	1	8	139	2	140
PROJECT TOTALS	**30**	**225**	**225**	**189**	**80**	**1**	**1**	**8**	**139**	**2**	**140**

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6036 REFL PAV MRK TY I (W)8"(SLD)(100 MIL) LF	666 6048 REFL PAV MRK TY I (W)24"(SLD)(100 MIL) LF	666 6141 REFL PAV MRK TY I (Y)12"(SLD)(100 MIL) LF	666 6318 RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL) LF	666 6321 RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) LF	666 6343 REF PROF PAV MRK TY I(W)6"(SLD)(100 MIL) LF	666 6346 REF PROF PAV MRK TY I(Y)6"(BRK)(100 MIL) LF	666 6347 REF PROF PAV MRK TY I(Y)6"(SLD)(100 MIL) LF	668 6077 PREFAB PAV MRK TY C (W) (ARROW) EA	668 6085 PREFAB PAV MRK TY C (W) (WORD) EA	672 6007 REFL PAV MRKR TY I-C EA	672 6009 REFL PAV MRKR TY II-A-A EA	672 6017 TRAFFIC BUTTON TY Y EA	672 6018 TRAFFIC BUTTON TY B EA
CSJ 0860-02-015														
SHEET 1 OF 13 BEGIN TO STA 17+00		42		2,340	1,768	1,134						52	333	763
SHEET 2 OF 13 STA 17+00 TO STA 29+00				1,200	496	2,400						22	93	358
SHEET 3 OF 13 STA 29+00 TO STA 41+00				1,200		2,400						15		450
SHEET 4 OF 13 STA 41+00 TO 53+00				1,200	860	2,400						26	162	289
SHEET 5 OF 13 STA 53+00 TO 65+00				1,200	819	2,400						26	154	297
SHEET 6 OF 13 STA 65+00 TO 77+00		28		1,200		2,232						15		450
SHEET 7 OF 13 STA 77+00 TO 89+00				1,200		2,400						15		450
SHEET 8 OF 13 STA 89+00 TO 101+00		30		1,200		2,232						15		450
SHEET 9 OF 13 STA 101+00 TO 113+00				1,200		2,400						15		450
SHEET 10 OF 13 STA 113+00 TO 125+00		15		1,200		2,317						15		450
SHEET 11 OF 13 STA 125+00 TO 137+00				1,200		2,400						15		450
SHEET 12 OF 13 STA 137+00 TO 149+00		48		1,100	1,033	2,200						55	194	220
SHEET 13 OF 13 STA 149+00 TO END				1,200	3,955	480						65	743	225
FM 88 (SHEET 1 OF 1) BEGIN TO END						8,031	6,690	1,488				233		
FM 1015 (SHEET 1 OF 2) BEGIN TO STA 15+00	258	72	241	360	3,148	3,725			2	2	13	144	96	66
FM 1015 (SHEET 2 OF 2) STA 15+00 TO END			162	370	1,725	2,694						78	68	68
PROJECT TOTALS	**258**	**235**	**403**	**17,370**	**13,804**	**41,845**	**6,690**	**1,488**	**2**	**2**	**13**	**806**	**1,843**	**5,438**

SUMMARY OF SIGNING ITEMS

LOCATION	636 6001 ALUMINUM SIGNS (TY A) SF	644 6027 IN SM RD SN SUP&AM TYS80(1)SA(P) EA	644 6028 IN SM RD SN SUP&AM TYS80(1)SA(P-BM) EA	644 6030 IN SM RD SN SUP&AM TYS80(1)SA(T) EA	644 6033 IN SM RD SN SUP&AM TYS80(1)SA(U) EA	644 6036 IN SM RD SN SUP&AM TYS80(1)SA(U-BM) EA	658 6099 INSTL OM ASSM (OM-2Z)(WFLX)GND EA
CSJ 0860-02-015							
SHEET 1 OF 13 BEGIN TO STA 17+00		3	4				5
SHEET 2 OF 13 STA 17+00 TO STA 29+00	10	2		5			3
SHEET 3 OF 13 STA 29+00 TO STA 41+00		1					2
SHEET 4 OF 13 STA 41+00 TO 53+00		2		2			
SHEET 5 OF 13 STA 53+00 TO 65+00		2					
SHEET 6 OF 13 STA 65+00 TO 77+00		2	2				4
SHEET 7 OF 13 STA 77+00 TO 89+00							
SHEET 8 OF 13 STA 89+00 TO 101+00		2	2				
SHEET 9 OF 13 STA 101+00 TO 113+00							2
SHEET 10 OF 13 STA 113+00 TO 125+00		2	1	1			2
SHEET 11 OF 13 STA 125+00 TO 137+00		1		3			
SHEET 12 OF 13 STA 137+00 TO 149+00	16	6	4		1	1	3
SHEET 13 OF 13 STA 149+00 TO END	16					1	
FM 88 (SHEET 1 OF 1) BEGIN TO END		3					2
FM 1015 (SHEET 1 OF 2) BEGIN TO STA 15+00		3	4				4
FM 1015 (SHEET 2 OF 2) STA 15+00 TO END							
PROJECT TOTALS	**42**	**29**	**17**	**11**	**1**	**2**	**27**

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	160 6003 FURNISHING AND PLACING TOPSOIL (4") SY	164 6023 CELL FBR MLCH SEED(PERM)(RURAL)(CLAY) SY	164 6029 CELL FBR MLCH SEED(TEMP)(WARM) SY	168 6001 VEGETATIVE WATERING MG	506 6038 TEMP SEDMT CONT FENCE (INSTALL) LF	506 6039 TEMP SEDMT CONT FENCE (REMOVE) LF	506 6041 BIODEG EROSN CONT LOGS (INSTL) (12") LF	506 6043 BIODEG EROSN CONT LOGS (REMOVE) LF
CSJ 0860-02-015								
SHEET 1 OF 13 BEGIN TO STA 17+00	3,206	3,206	3,206	53	1,203	1,203	214	214
SHEET 2 OF 13 STA 17+00 TO STA 29+00	6,143	6,143	6,143	100	2,326	2,326	167	167
SHEET 3 OF 13 STA 29+00 TO STA 41+00	6,057	6,057	6,057	99	2,280	2,280	102	102
SHEET 4 OF 13 STA 41+00 TO 53+00	6,989	6,989	6,989	114	2,360	2,360		
SHEET 5 OF 13 STA 53+00 TO 65+00	6,350	6,350	6,350	104	2,392	2,392		
SHEET 6 OF 13 STA 65+00 TO 77+00	6,600	6,600	6,600	108	2,562	2,562	200	200
SHEET 7 OF 13 STA 77+00 TO 89+00	6,400	6,400	6,400	104	2,400	2,400		
SHEET 8 OF 13 STA 89+00 TO 101+00	6,830	6,830	6,830	111	2,723	2,723		
SHEET 9 OF 13 STA 101+00 TO 113+00	6,400	6,400	6,400	104	2,400	2,400	99	99
SHEET 10 OF 13 STA 113+00 TO 125+00	6,808	6,808	6,808	111	2,468	2,468	103	103
SHEET 11 OF 13 STA 125+00 TO 137+00	6,457	6,457	6,457	105	2,405	2,405		
SHEET 12 OF 13 STA 137+00 TO 149+00	6,273	6,273	6,273	102	2,293	2,293	112	112
SHEET 13 OF 13 STA 149+00 TO END	1,249	1,249	1,249	21	510	510		
FM 88 (SHEET 1 OF 1) BEGIN TO END	2,132	2,132	2,132	35	1,002	1,002		
FM 1015 (SHEET 1 OF 1) BEGIN TO END	2,627	2,627	2,627	43	1,468	1,468		
PROJECT TOTALS	**80,521**	**80,521**	**80,521**	**1,314**	**30,792**	**30,792**	**997**	**997**

NOTE

1. *CONTRACTOR WILL USE TOP SOIL REMOVED FROM PROJECT FOR TROUBLE SEEDING AREAS WHICH AREAS WILL NOT PICK UP.*
2. *CONTRACTOR WILL NOT PLACE TEMP AND PERMANENT SEED AT THE SAME TIME.*

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SUMMARY OF QUANTITIES

SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		12

DATE: 1/31/2024
FILE: ...\FM490-BMCD-SUM-02.dgn

CK
DW
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SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	508 6001	510 6003	662 6050	662 6075	662 6067	662 6098	677 6001
	CONSTRUCTING DETOURS	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)6"(SLD)	WK ZN PAV MRK REMOV (Y)6"(SLD)	ELIM EXT PAV MRK & MRKS (4")
	SY	MO	EA	LF	LF	LF	LF
CSJ 0860-02-015							
TCP PHASE 1A		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B	1,506			22	119		6,190
SHEET 2 OF 2 MATCHLINE B TO END			202	24	277	8,056	3,431
TCP PHASE 1B		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B	809			11	119		
SHEET 2 OF 2 MATCHLINE B TO END	1,358		5	12	277	200	225
TCP PHASE 1C		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B				22	128		3,118
SHEET 2 OF 2 MATCHLINE B TO END			43	27	569	1,690	925
TCP PHASE 1D		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B				11	128		
SHEET 2 OF 2 MATCHLINE B TO END			10	28	569	400	125
TCP PHASE 2A		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B	2,428			22	125		5,912
SHEET 2 OF 2 MATCHLINE B TO END	143		180	24	550	7,184	5,593
TCP PHASE 2B		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B	508			11	124		
SHEET 2 OF 2 MATCHLINE B TO END	419		10	28	550	400	25
TCP PHASE 2C		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B				22	124		1,820
SHEET 2 OF 2 MATCHLINE B TO END			34	38	555	1,344	1,175
TCP PHASE 2D		2					
SHEET 1 OF 2 BEGIN TO MATCHLINE B				28	124		
SHEET 2 OF 2 MATCHLINE B TO END			5	0	566	200	
TCP PHASE 3A							
SHEET 1 OF 7 BEGIN TO STA 17+00			19	16		730	
SHEET 2 OF 7 STA 17+00 TO STA 29+00					1,070		
SHEET 3 OF 7 STA 29+00 TO STA 41+00					1,200		
SHEET 4 OF 7 STA 41+00 TO STA 53+00			5	12	1,050	194	997
SHEET 5 OF 7 STA 53+00 TO STA 65+00			60			2,400	1,118
SHEET 6 OF 7 STA 65+00 TO STA 77+00			37			1,470	198
SHEET 7 OF 7 STA 77+00 TO STA 83+00							
TCP PHASE 3B							
SHEET 1 OF 10 STA 17+00 TO STA 29+00			11			418	
SHEET 2 OF 10 STA 29+00 TO STA 41+00			60			2,400	
SHEET 3 OF 10 STA 41+00 TO STA 53+00			35	12	350	1,396	
SHEET 4 OF 10 STA 53+00 TO STA 65+00					1,200		
SHEET 5 OF 10 STA 65+00 TO STA 77+00	41				1,200		102
SHEET 6 OF 10 STA 77+00 TO STA 89+00					1,200		300
SHEET 7 OF 10 STA 89+00 TO STA 101+00	42				1,200		300
SHEET 8 OF 10 STA 101+00 TO STA 113+00			53	12	100	2,092	300
SHEET 9 OF 10 STA 113+00 TO STA 125+00			29			1,144	246
SHEET 10 OF 10 STA 125+00 TO STA 131+00							
TCP PHASE 3C							
SHEET 1 OF 8 STA 65+00 TO STA 77+00			58			2,304	
SHEET 2 OF 8 STA 77+00 TO STA 89+00			45	12	100	1,776	
SHEET 3 OF 8 STA 89+00 TO STA 101+00					1,200		
SHEET 4 OF 8 STA 101+00 TO STA 113+00					1,200		
SHEET 5 OF 8 STA 113+00 TO STA 125+00	26				1,200		
SHEET 6 OF 8 STA 125+00 TO STA 137+00					1,200		
SHEET 7 OF 8 STA 137+00 TO STA 149+00			14	16	380	560	
SHEET 8 OF 8 STA 149+00 TO STA 155+00			24			950	

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS (CONTINUED)

LOCATION	508 6001	510 6003	662 6050	662 6075	662 6067	662 6098	677 6001
	CONSTRUCTING DETOURS	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)6"(SLD)	WK ZN PAV MRK REMOV (Y)6"(SLD)	ELIM EXT PAV MRK & MRKS (4")
	SY	MO	EA	LF	LF	LF	LF
TCP PHASE 3D							
SHEET 1 OF 7 STA 71+00 TO STA 83+00							
SHEET 2 OF 7 STA 83+00 TO STA 95+00							
SHEET 3 OF 7 STA 95+00 TO STA 107+00			5	12	700	200	
SHEET 4 OF 7 STA 107+00 TO STA 119+00					1,200		
SHEET 5 OF 7 STA 119+00 TO STA 131+00					1,200		
SHEET 6 OF 7 STA 131+00 TO STA 143+00					980		
SHEET 7 OF 7 STA 143+00 TO STA 155+00			5			200	
TCP PHASE 3E							
SHEET 1 OF 10 STA 17+00 TO STA 29+00							
SHEET 2 OF 10 STA 29+00 TO STA 41+00							
SHEET 3 OF 10 STA 41+00 TO STA 53+00			5	12	360	200	
SHEET 4 OF 10 STA 53+00 TO STA 65+00					1,200		
SHEET 5 OF 10 STA 65+00 TO STA 77+00	33				1,200		
SHEET 6 OF 10 STA 77+00 TO STA 89+00					1,200		
SHEET 7 OF 10 STA 89+00 TO STA 101+00	112				1,200		
SHEET 8 OF 10 STA 101+00 TO STA 113+00			48	16	100	1,896	
SHEET 9 OF 10 STA 113+00 TO STA 125+00			54			2,134	
SHEET 10 OF 10 STA 125+00 TO STA 137+00							
TCP PHASE 3F							
SHEET 1 OF 7 BEGIN TO STA 17+00			15			588	
SHEET 2 OF 7 STA 17+00 TO STA 29+00			5	16	1,060	172	
SHEET 3 OF 7 STA 29+00 TO STA 41+00					1,200		
SHEET 4 OF 7 STA 41+00 TO STA 53+00					1,050		
SHEET 5 OF 7 STA 53+00 TO STA 65+00			60	16		2,394	
SHEET 6 OF 7 STA 65+00 TO STA 77+00			43			1,688	
SHEET 7 OF 7 STA 77+00 TO STA 83+00							
PROJECT TOTALS	**7,425**	**16**	**1,179**	**482**	**31,404**	**46,780**	**32,100**

NOTE:
PHASE 3 TEMPORARY TRAFFIC SIGNALS WILL BE PAID FOR UNDER ITEM 6509 6001.

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SUMMARY OF QUANTITIES

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		13

DATE: 5/1/2024
FILE: ...\FM490-BMCD-SUM-03.dgn

CK
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SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	677 6002	677 6003	677 6005	677 6007	677 6008	677 6012	6185 6002	6509 6001
	ELIM EXT PAV MRK & MRKS (6")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (12")	ELIM EXT PAV MRK & MRKS (24")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	TMA (STATIONARY)	DRIVEWAY ASSISTANCE DEVICE(DAD) SYSTEM
	LF	LF	LF	LF	EA	EA	DAY	MO
CSJ 0860-02-015							374	
TCP PHASE 1A								
SHEET 1 OF 2 BEGIN TO MATCHLINE B				20				
SHEET 2 OF 2 MATCHLINE B TO END								
TCP PHASE 1B								
SHEET 1 OF 2 BEGIN TO MATCHLINE B				11				
SHEET 2 OF 2 MATCHLINE B TO END	100			12				
TCP PHASE 1C								1
SHEET 1 OF 2 BEGIN TO MATCHLINE B	119							
SHEET 2 OF 2 MATCHLINE B TO END	1,267			12				
TCP PHASE 1D								1
SHEET 1 OF 2 BEGIN TO MATCHLINE B				11				
SHEET 2 OF 2 MATCHLINE B TO END	300			24				
TCP PHASE 2A								
SHEET 1 OF 2 BEGIN TO MATCHLINE B		57	239	61	2	2		
SHEET 2 OF 2 MATCHLINE B TO END			161					
TCP PHASE 2B								
SHEET 1 OF 2 BEGIN TO MATCHLINE B		22		11				
SHEET 2 OF 2 MATCHLINE B TO END	300			23				
TCP PHASE 2C								1
SHEET 1 OF 2 BEGIN TO MATCHLINE B				11				
SHEET 2 OF 2 MATCHLINE B TO END	1,896			12				
TCP PHASE 2D								1
SHEET 1 OF 2 BEGIN TO MATCHLINE B				11				
SHEET 2 OF 2 MATCHLINE B TO END	100			16				
TCP PHASE 3A								2
SHEET 1 OF 7 BEGIN TO STA 17+00	355			16				
SHEET 2 OF 7 STA 17+00 TO STA 29+00	1,760							
SHEET 3 OF 7 STA 29+00 TO STA 41+00	2,400							
SHEET 4 OF 7 STA 41+00 TO STA 53+00	382							
SHEET 5 OF 7 STA 53+00 TO STA 65+00								
SHEET 6 OF 7 STA 65+00 TO STA 77+00								
SHEET 7 OF 7 STA 77+00 TO STA 83+00								
TCP PHASE 3B								2
SHEET 1 OF 10 STA 17+00 TO STA 29+00	1,070			16				
SHEET 2 OF 10 STA 29+00 TO STA 41+00	1,200							
SHEET 3 OF 10 STA 41+00 TO STA 53+00	1,144							
SHEET 4 OF 10 STA 53+00 TO STA 65+00	2,400							
SHEET 5 OF 10 STA 65+00 TO STA 77+00	1,470							
SHEET 6 OF 10 STA 77+00 TO STA 89+00								
SHEET 7 OF 10 STA 89+00 TO STA 101+00								
SHEET 8 OF 10 STA 101+00 TO STA 113+00								
SHEET 9 OF 10 STA 113+00 TO STA 125+00								
SHEET 10 OF 10 STA 125+00 TO STA 131+00								
TCP PHASE 3C								2
SHEET 1 OF 8 STA 65+00 TO STA 77+00	2,758							
SHEET 2 OF 8 STA 77+00 TO STA 89+00	1,200							
SHEET 3 OF 8 STA 89+00 TO STA 101+00	1,200							
SHEET 4 OF 8 STA 101+00 TO STA 113+00	2,092							
SHEET 5 OF 8 STA 113+00 TO STA 125+00	2,256							
SHEET 6 OF 8 STA 125+00 TO STA 137+00	2,400							
SHEET 7 OF 8 STA 137+00 TO STA 149+00	1,202							
SHEET 8 OF 8 STA 149+00 TO STA 155+00	342			22				

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS (CONTINUED)

LOCATION	677 6002	677 6003	677 6005	677 6007	677 6008	677 6012	6185 6002	6509 6001
	ELIM EXT PAV MRK & MRKS (6")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (12")	ELIM EXT PAV MRK & MRKS (24")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	TMA (STATIONARY)	DRIVEWAY ASSISTANCE DEVICE(DAD) SYSTEM
	LF	LF	LF	LF	EA	EA	DAY	MO
TCP PHASE 3D								2
SHEET 1 OF 7 STA 71+00 TO STA 83+00								
SHEET 2 OF 7 STA 83+00 TO STA 95+00								
SHEET 3 OF 7 STA 95+00 TO STA 107+00	100			12				
SHEET 4 OF 7 STA 107+00 TO STA 119+00								
SHEET 5 OF 7 STA 119+00 TO STA 131+00								
SHEET 6 OF 7 STA 131+00 TO STA 143+00	100							
SHEET 7 OF 7 STA 143+00 TO STA 155+00								
TCP PHASE 3E								2
SHEET 1 OF 10 STA 17+00 TO STA 29+00								
SHEET 2 OF 10 STA 29+00 TO STA 41+00								
SHEET 3 OF 10 STA 41+00 TO STA 53+00								
SHEET 4 OF 10 STA 53+00 TO STA 65+00								
SHEET 5 OF 10 STA 65+00 TO STA 77+00								
SHEET 6 OF 10 STA 77+00 TO STA 89+00								
SHEET 7 OF 10 STA 89+00 TO STA 101+00								
SHEET 8 OF 10 STA 101+00 TO STA 113+00	1,200							
SHEET 9 OF 10 STA 113+00 TO STA 125+00	1,200							
SHEET 10 OF 10 STA 125+00 TO STA 137+00	1,587							
TCP PHASE 3F								2
SHEET 1 OF 7 BEGIN TO STA 17+00								
SHEET 2 OF 7 STA 17+00 TO STA 29+00								
SHEET 3 OF 7 STA 29+00 TO STA 41+00								
SHEET 4 OF 7 STA 41+00 TO STA 53+00	250							
SHEET 5 OF 7 STA 53+00 TO STA 65+00	850							
SHEET 6 OF 7 STA 65+00 TO STA 77+00	1,200							
SHEET 7 OF 7 STA 77+00 TO STA 83+00	2,507							
PROJECT TOTALS	**38,707**	**79**	**400**	**301**	**2**	**2**	**374**	**16**

NOTE:
TWO TRUCK MOUNTED ATTENUATORS TO BE KEPT ON SITE FOR DURATION OF CONTRACTED TIME.

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SUMMARY OF QUANTITIES

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490

DIST	COUNTY	SHEET NO.
PHR	WILLACY	14

DATE: 5/1/2024
FILE: ...\FM490-BMCD-SUM-04.dgn

CK
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SUMMARY OF EARTHWORK QUANTITIES (CSJ 0860-02-015)

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
10+00	11+00	0	0
11+00	12+00	28	5
12+00	13+00	38	14
13+00	14+00	30	28
14+00	15+00	91	32
15+00	16+00	97	21
16+00	17+00	49	19
17+00	18+00	28	112
18+00	19+00	37	117
19+00	20+00	83	61
20+00	21+00	122	80
21+00	22+00	159	35
22+00	23+00	173	2
23+00	24+00	170	14
24+00	25+00	175	17
25+00	26+00	178	9
26+00	27+00	167	8
27+00	28+00	152	10
28+00	29+00	150	14
29+00	30+00	164	16
30+00	31+00	194	8
31+00	32+00	198	6
32+00	33+00	173	12
33+00	34+00	150	15
34+00	35+00	131	18
35+00	36+00	105	25
36+00	37+00	107	32
37+00	38+00	96	38
38+00	39+00	79	38
39+00	40+00	94	21
40+00	41+00	96	13
41+00	42+00	84	19
42+00	43+00	84	15
43+00	44+00	120	6
44+00	45+00	177	3
45+00	46+00	189	2
46+00	47+00	159	4
47+00	48+00	134	12
48+00	49+00	123	16
49+00	50+00	131	13
50+00	51+00	133	9
51+00	52+00	133	14
52+00	53+00	140	16
53+00	54+00	148	9
54+00	55+00	148	6
55+00	56+00	142	7
56+00	57+00	143	14
57+00	58+00	146	17
58+00	59+00	138	16
59+00	60+00	132	13
60+00	61+00	133	13
61+00	62+00	143	12
62+00	63+00	153	9
63+00	64+00	151	10

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
64+00	65+00	150	13
65+00	66+00	130	21
66+00	67+00	122	15
67+00	68+00	127	14
68+00	69+00	131	19
69+00	70+00	145	13
70+00	71+00	145	13
71+00	72+00	139	14
72+00	73+00	139	14
73+00	74+00	135	13
74+00	75+00	128	16
75+00	76+00	134	16
76+00	77+00	151	10
77+00	78+00	170	4
78+00	79+00	182	1
79+00	80+00	193	4
80+00	81+00	177	9
81+00	82+00	176	6
82+00	83+00	188	4
83+00	84+00	173	9
84+00	85+00	167	11
85+00	86+00	162	10
86+00	87+00	150	9
87+00	88+00	134	10
88+00	89+00	124	12
89+00	90+00	134	8
90+00	91+00	161	2
91+00	92+00	175	1
92+00	93+00	189	1
93+00	94+00	197	0
94+00	95+00	187	1
95+00	96+00	174	3
96+00	97+00	155	8
97+00	98+00	147	10
98+00	99+00	149	10
99+00	100+00	145	11
100+00	101+00	141	13
101+00	102+00	142	11
102+00	103+00	111	15
103+00	104+00	120	13
104+00	105+00	166	6
105+00	106+00	163	5
106+00	107+00	144	8
107+00	108+00	139	8
108+00	109+00	150	7
109+00	110+00	150	9
110+00	111+00	143	11
111+00	112+00	98	24
112+00	113+00	81	29
113+00	114+00	108	22
114+00	115+00	111	22
115+00	116+00	117	19
116+00	117+00	128	11
117+00	118+00	136	8

STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)
		CY	CY
118+00	119+00	135	14
119+00	120+00	117	66
120+00	121+00	115	64
121+00	122+00	131	9
122+00	123+00	137	7
123+00	124+00	145	6
124+00	125+00	143	6
125+00	126+00	135	6
126+00	127+00	110	20
127+00	128+00	102	26
128+00	129+00	112	18
129+00	130+00	101	22
130+00	131+00	83	33
131+00	132+00	72	36
132+00	133+00	72	25
133+00	134+00	85	19
134+00	135+00	125	13
135+00	136+00	155	7
136+00	137+00	163	6
137+00	138+00	171	3
138+00	139+00	153	5
139+00	140+00	130	13
140+00	141+00	96	18
141+00	142+00	61	25
142+00	143+00	57	31
143+00	144+00	62	28
144+00	145+00	62	15
145+00	146+00	44	15
146+00	147+00	19	63
147+00	148+00	35	51
148+00	149+00	55	8
149+00	150+00	68	9
150+00	151+00	93	4
151+00	152+00	172	7
TOTAL		**18273**	**2375**

DATE: 1/31/2024
FILE: ...\FM490-BMCD-SUM-05.dgn

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SUMMARY OF QUANTITIES

SHEET 5 OF 5

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		15

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0860-02-015 **DISTRICT** Pharr **COUNTY** Willacy
HIGHWAY FM 490

			CONTROL SECTION JOB		**0860-02-015**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00183623**		
			COUNTY		**Willacy**		
			HIGHWAY		**FM 490**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	147.000		147.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	97.000		97.000	
	105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	SY	1,746.000		1,746.000	
	105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	SY	41,500.000		41,500.000	
	110-6001	EXCAVATION (ROADWAY)	CY	18,273.000		18,273.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	2,375.000		2,375.000	
	134-6002	BACKFILL (TY B)	STA	147.000		147.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	80,521.000		80,521.000	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	SY	80,521.000		80,521.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY	80,521.000		80,521.000	
	168-6001	VEGETATIVE WATERING	MG	1,314.000		1,314.000	
	216-6001	PROOF ROLLING	HR	8.000		8.000	
	247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	CY	17,173.000		17,173.000	
	260-6002	LIME (HYDRATED LIME (SLURRY))	TON	1,195.000		1,195.000	
	260-6011	LIME TRT (EXST MATL) (12")	SY	45,098.000		45,098.000	
	275-6001	CEMENT	TON	624.000		624.000	
	275-6031	CEMENT TREAT (NEW BASE) (10")	SY	5,011.000		5,011.000	
	275-6076	CEMENT TREAT(NEW BASE)(15")	SY	11,153.000		11,153.000	
	310-6009	PRIME COAT (MC-30)	GAL	10,712.000		10,712.000	
	316-6005	ASPH (TIER II)	GAL	16,075.000		16,075.000	
	316-6531	AGGR (TY-B GR-4P SAC-B)	CY	448.000		448.000	
	400-6005	CEM STABIL BKFL	CY	170.000		170.000	
	400-6008	CUT & RESTORE ASPH PAVING	SY	78.000		78.000	
	400-6010	STRUCT EXCAV (SPECIAL)	CY	77.000		77.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	514.000		514.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	30.000		30.000	
	464-6038	RC PIPE (CL III)(18 IN)(SPL)	LF	247.000		247.000	
	464-6039	RC PIPE (CL III)(24 IN)(SPL)	LF	194.000		194.000	
	464-6040	RC PIPE (CL III)(30 IN)(SPL)	LF	173.000		173.000	
	467-6326	SET (TY II) (12 IN) (RCP) (6: 1) (P)	EA	4.000		4.000	
	467-6356	SET (TY II) (18 IN) (RCP) (3: 1) (C)	EA	14.000		14.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	34.000		34.000	
	467-6374	SET (TY II) (21 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	467-6388	SET (TY II) (24 IN) (RCP) (3: 1) (C)	EA	8.000		8.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	12.000		12.000	
	480-6001	CLEAN EXIST CULVERTS	EA	34.000		34.000	
	496-6004	REMOV STR (SET)	EA	9.000		9.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0860-02-015 **DISTRICT** Pharr **COUNTY** Willacy
HIGHWAY FM 490

			CONTROL SECTION JOB		**0860-02-015**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00183623**		
			COUNTY		**Willacy**		
			HIGHWAY		**FM 490**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	496-6005	REMOV STR (WINGWALL)	EA	4.000		4.000	
	496-6007	REMOV STR (PIPE)	LF	606.000		606.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	11.000		11.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	30,792.000		30,792.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	30,792.000		30,792.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	997.000		997.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	997.000		997.000	
	508-6001	CONSTRUCTING DETOURS	SY	7,425.000		7,425.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO	16.000		16.000	
	530-6004	DRIVEWAYS (CONC)	SY	95.000		95.000	
	530-6005	DRIVEWAYS (ACP)	SY	1,965.000		1,965.000	
	530-6016	DRIVEWAYS (BASE)	SY	2,467.000		2,467.000	
	560-6025	RELOCATE EXISTING MAILBOX	EA	4.000		4.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	225.000		225.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	225.000		225.000	
	621-6005	TRAY CABLE (4 CONDR) (12 AWG)	LF	189.000		189.000	
	625-6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	80.000		80.000	
	628-6301	ELC SRV TY T 120/240 000(NS)GS(L)TS(O)	EA	1.000		1.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	42.000		42.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	29.000		29.000	
	644-6028	IN SM RD SN SUP&AM TYS80(1)SA(P-BM)	EA	17.000		17.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	11.000		11.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	1.000		1.000	
	644-6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	EA	2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	58.000		58.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	25.000		25.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	27.000		27.000	
	662-6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	1,179.000		1,179.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	31,404.000		31,404.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF	482.000		482.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	46,780.000		46,780.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	258.000		258.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	235.000		235.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	403.000		403.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	17,370.000		17,370.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	13,804.000		13,804.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0860-02-015 **DISTRICT** Pharr **COUNTY** Willacy
HIGHWAY FM 490

			CONTROL SECTION JOB		**0860-02-015**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00183623**		
			COUNTY		**Willacy**		
			HIGHWAY		**FM 490**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	41,845.000		41,845.000	
	666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF	6,690.000		6,690.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	1,488.000		1,488.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	2.000		2.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	2.000		2.000	
	672-6007	REFL PAV MRKR TY I-C	EA	13.000		13.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	806.000		806.000	
	672-6017	TRAFFIC BUTTON TY Y	EA	1,843.000		1,843.000	
	672-6018	TRAFFIC BUTTON TY B	EA	5,438.000		5,438.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	32,100.000		32,100.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	38,707.000		38,707.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	79.000		79.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	400.000		400.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	301.000		301.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	2.000		2.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	2.000		2.000	
	680-6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	1.000		1.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA	1.000		1.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	8.000		8.000	
	684-6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	139.000		139.000	
	686-6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA	2.000		2.000	
	690-6018	INSTALL OF SPAN CABLE ASSM	LF	140.000		140.000	
	1008-6001	PRSSR IRRIG PVC PIPE (18")	LF	81.000		81.000	
	1008-6002	PRSSR IRRIG PVC PIPE (24")	LF	173.000		173.000	
	1008-6003	PRSSR IRRIG PVC PIPE (12")	LF	175.000		175.000	
	1008-6006	PRSSR IRRIGATION PVC PIPE (15")	LF	85.000		85.000	
	3077-6065	SP MIXES SP-D SAC-A PG76-22	TON	5,277.000		5,277.000	
	3077-6075	TACK COAT	GAL	722.000		722.000	
	6185-6002	TMA (STATIONARY)	DAY	374.000		374.000	
	6509-6001	DRIVEWAY ASSISTANCE DEVICE(DAD) SYSTEM	MO	16.000		16.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

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.

	Asphalt Rubber (A-R)	Asphalt Cement (A-C)
Type	☐ A-R Only	☐ 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-1w ☐ 3 1w ☐ 4S ☐ 4P ☐ SP 302-013	☐ 3S ☐ 4S ☐ 5 ☐ 3non-1w ☐ 4P ☐ 5S ☐ 3 1w ☐ 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

	Asphalt Cement (A-C)	Asphalt Emulsion
Type	☒ A-C Only	☐ 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-1w ☒ 4P ☐ 5S ☐ 3 1w ☒ SP 302-008	☐ 3S ☐ 4S ☐ 5S ☐ 3non-1w ☐ 4P ☐ 5 ☐ 3 1w ☐ 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

	Asphalt Cement (A-C)	Asphalt Emulsion
Type	☐ A-C Only	☐ 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-1w ☐ 4P ☐ 5S ☐ 3 1w ☐ SP 302-013	☐ 3S ☐ 4S ☐ ☐ 3non-1w ☐ 4P ☐ 5 ☐ 3 1w ☐ 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 September 2020	DIST	FEDERAL AID PROJECT				SHEET
REVISIONS	PHR					17
September 2020	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	WILLACY		0860	02	015	FM 490

FILE: $FILE$ $DATE$ 4:30:34 PM
DATE:

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.

ALWAYS COMPLETE THE PROPOSED DRIVEWAYS DURING THEIR TCP PHASE BEFORE SWITCHING TRAFFIC TO A NEW PHASE UNLESS DIRECTED BY THE ENGINEER.

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.

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				18
DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
PHR	WILLACY	0860	02	015	FM 490

CK
DW
CK
DW

TRAFFIC CONTROL PLAN

1. INSTALL ALL SIGNS AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE TRAFFIC CONTROL PLAN AND STANDARD BC SHEETS AS DIRECTED.
2. 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".
3. CAREFULLY MONITOR WORK SITES TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN, AND IN GOOD REPAIR.
4. 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.
5. COMPLETE ALL WORK ON THE PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.
6. ANY REQUEST TO ALTER THE SEQUENCE OF CONSTRUCTION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR WRITTEN APPROVAL PRIOR TO IMPLEMENTATION.
7. CONTRACTOR TO MONITOR DRIVEWAY ASSISTANCE DEVICES (DADS) EFFECTIVENESS. CONTRACTOR TO COORDINATE WITH TXDOT SAN BENITO AREA OFFICE FOR FIELD ADJUSTMENTS AS NEEDED.

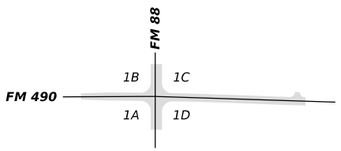
GENERAL SEQUENCE OF CONSTRUCTION

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST THREE WORKING DAYS PRIOR TO LANE CLOSURES.

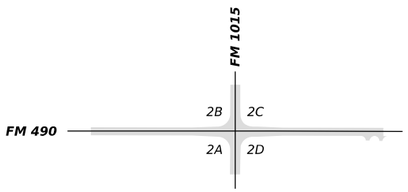
1. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED.
2. CLOSE LANE TO TRAFFIC. REFER TO TCP(2-8)-23 FOR THE MINIMUM SIGNING REQUIRED FOR CLOSURE.
3. RECONSTRUCT ROADWAY.
4. FOLLOWING COMPLETION OF ALL PERMANENT PAVEMENT, APPLY PERMANENT PAVEMENT MARKINGS. USE OF MOBILE OPERATION OR NIGHT TIME DETOURS TO BE COORDINATED WITH TxDOT AREA OFFICE.
5. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.
6. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES AND PROJECT BARRICADES.

NOTES:

1. FM 88 AND FM 1015 SHALL HAVE PHASED CONSTRUCTION.
2. CONSTRUCTION OF BOTH INTERSECTIONS SHALL OCCUR SIMULTANEOUSLY.



PHASE 1
SEQUENCE OF CONSTRUCTION DIAGRAM



PHASE 2
SEQUENCE OF CONSTRUCTION DIAGRAM

TCP PHASE	NUMBER OF PTSS UNITS NEEDED FOR SETUP	NUMBER OF DAD UNITS NEEDED FOR SETUP
PHASE 1C	2	2
PHASE 1D	2	2
PHASE 2C	2	1
PHASE 2D	2	1
PHASE 3A	2	12
PHASE 3B	2	6
PHASE 3C	2	1
PHASE 3D	2	1
PHASE 3E	2	6
PHASE 3F	2	12

PHASE 1 - FM 88 INTERSECTION SEQUENCE OF CONSTRUCTION

CONTRACTOR SHALL RECONSTRUCT FM 88 INTERSECTION IN THE FOLLOWING ORDER AND AS SHOWN IN PHASE 1 SEQUENCE OF CONSTRUCTION DIAGRAM:

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST THREE WORKING DAYS PRIOR TO LANE CLOSURES.

1. SET ADVANCED WARNING SIGNAGE IN ACCORDANCE TO THE TRAFFIC CONTROL PLAN, BC SHEETS, AND TCP (1-3) AND TCP(2-8).
2. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED.
3. INSTALL TEMPORARY STOP SIGNALS, AS SHOWN ON FM 88 INTERSECTION TCP LAYOUT.
4. PHASE 1A: RECONSTRUCT SOUTHWEST QUADRANT OF FM 88. RECONSTRUCTION WILL INCLUDE EASTBOUND FM 490 FROM BEGINNING OF PROJECT TO FM 88. CONSTRUCT TEMPORARY PAVEMENT UPON COMPLETION OF PERMANENT PAVEMENT.

   TRAFFIC IS TWO-WAY ON FM 88 AND SHIFTED ONTO THE EASTERN SHOULDER. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
5. PHASE 1B: RECONSTRUCT NORTHWEST QUADRANT OF FM 88. RECONSTRUCTION WILL INCLUDE WESTBOUND FM 490 FROM BEGINNING OF PROJECT TO FM 88. CONSTRUCT TEMPORARY PAVEMENT UPON COMPLETION OF PERMANENT PAVEMENT.

   TRAFFIC IS TWO-WAY ON FM 88 AND REMAINS SHIFTED ONTO THE EASTERN SHOULDER. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
6. PHASE 1C: RECONSTRUCT NORTHEAST QUADRANT OF FM 88. RECONSTRUCTION WILL INCLUDE A PORTION OF WESTBOUND FM 490 EAST OF FM 88.

   TRAFFIC IS TWO-WAY ON FM 88 AND SHIFTED ONTO THE WESTERN TEMPORARY PAVEMENT. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
7. PHASE 1D: RECONSTRUCT SOUTHEAST QUADRANT OF FM 88. RECONSTRUCTION WILL INCLUDE A PORTION OF EASTBOUND FM 490 EAST OF FM 88.

   TRAFFIC IS TWO-WAY ON FM 88 AND REMAINS SHIFTED ONTO THE WESTERN TEMPORARY PAVEMENT. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
8. CLEAN UP PROJECT AND REMOVE TEMPORARY PAVEMENT AND EROSION CONTROL DEVICES AND WORKZONE SIGNAGE.

PHASE 2 - FM 1015 INTERSECTION SEQUENCE OF CONSTRUCTION

CONTRACTOR SHALL RECONSTRUCT FM 1015 INTERSECTION IN THE FOLLOWING ORDER AND AS SHOWN IN PHASE 2 SEQUENCE OF CONSTRUCTION DIAGRAM:

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST THREE WORKING DAYS PRIOR TO LANE CLOSURES.

1. SET ADVANCED WARNING SIGNAGE IN ACCORDANCE TO THE TRAFFIC CONTROL PLAN, BC SHEETS, AND TCP (1-3) AND TCP(2-8).
2. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED.
3. CONSTRUCT AND COMPLETE TEMPORARY PAVEMENT AND PRIOR TO BEGINNING PERMANENT PAVEMENT RECONSTRUCTION.
4. RECONSTRUCT PROPOSED SAFETY END TREATMENTS.
5. INSTALL TEMPORARY STOP SIGNALS, AS SHOWN ON FM 1015 INTERSECTION TCP LAYOUT.
6. PHASE 1A: CONSTRUCT TEMPORARY PAVEMENT ON EAST SIDE OF FM 1015 PRIOR TO TRAFFIC SHIFT. RECONSTRUCT SOUTHWEST QUADRANT OF FM 1015. RECONSTRUCTION WILL INCLUDE A PORTION OF EASTBOUND FM 490 WEST FM 1015. CONSTRUCT TEMPORARY PAVEMENT ON WEST SIDE OF FM 1015 UPON COMPLETION OF PERMANENT PAVEMENT.

   TRAFFIC IS TWO-WAY ON FM 1015 AND SHIFTED TO EASTERN HALF OF FM 1015. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
7. PHASE 1B: RECONSTRUCT NORTHWEST QUADRANT OF FM 1015. RECONSTRUCTION WILL INCLUDE A PORTION OF WESTBOUND FM 490 WEST FM 1015. CONSTRUCT TEMPORARY PAVEMENT ON WEST SIDE OF FM 1015 UPON COMPLETION OF PERMANENT PAVEMENT.

   TRAFFIC IS TWO-WAY ON FM 1015 AND REMAINS SHIFTED. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
8. PHASE 1C: RECONSTRUCT NORTHEAST QUADRANT OF FM 1015. RECONSTRUCTION WILL INCLUDE WESTBOUND FM 490 FROM FM 1015 TO END OF PROJECT.

   TRAFFIC IS TWO-WAY ON FM 1015 AND SHIFTED TO WESTERN HALF OF FM 1015. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
9. PHASE 1D: RECONSTRUCT SOUTHEAST QUADRANT OF FM 1015. RECONSTRUCTION WILL INCLUDE EASTBOUND FM 490 FROM FM 1015 TO END OF PROJECT.

   TRAFFIC IS TWO-WAY ON FM 1015 AND REMAINS SHIFTED. TRAFFIC ALONG FM 490 WILL BE ONE-LANE, TWO WAY ALONG THE WORKZONE.
10. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES AND WORKZONE SIGNAGE.

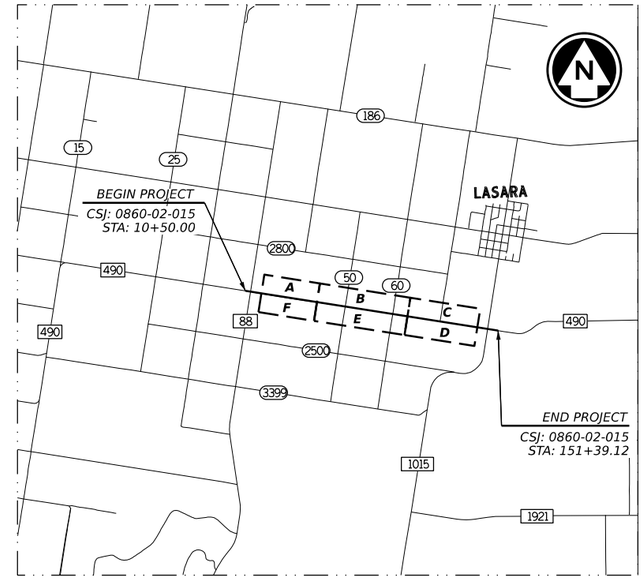
PHASE 3 - FM 490 (FM 88 TO FM 1015) SEQUENCE OF CONSTRUCTION

CONTRACTOR SHALL RECONSTRUCT FM 490 IN THE FOLLOWING ORDER AND AS SHOWN IN PHASE 3 SEQUENCE OF CONSTRUCTION DIAGRAM:

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST THREE WORKING DAYS PRIOR TO LANE CLOSURES.

1. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT, GENERAL MANAGER TROY ALLEN, (956) 262-2101.
2. THE CONTRACTOR SHALL COORDINATE DAYTIME IRRIGATION CROSSING INSTALLATIONS, LANE CLOSURES, AND FLAGGING OPERATIONS WITH THE TXDOT AREA OFFICE. IRRIGATION CROSSINGS SHALL BE COMPLETED INDIVIDUALLY AND PRIOR TO ANY PERMANENT ROADWAY CONSTRUCTION.
3. IF POSSIBLE, INSTALLATION OF IRRIGATION CROSSINGS SHALL OCCUR FROM MIDDLE OF AUGUST TO BEGINNING OF OCTOBER.
4. PHASE 3A-C: RECONSTRUCT WESTBOUND FM 490 BY SEGMENT IDENTIFIED IN THE LOCATION MAP.
5. PHASE 3D-F: RECONSTRUCT EASTBOUND FM 490 BY SEGMENT IDENTIFIED IN THE LOCATION MAP.
6. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES AND PROJECT BARRICADES.

6509-6001 DRIVEWAY ASSISTANCE DEVICE (DAD) SYSTEM					
DRWY NO	STATION	SIDE	WIDTH (FT)	TCP PHASE	PHASE DURATION
1	19+07.40	RT	19.00	Phase 1C	1 MONTH
2	20+13.64	RT	14.00		
1	18+81.80	LT	19.00	Phase 1D	1 MONTH
2	19+98.01	LT	14.00		
14	151+03.79	RT	13.43	Phase 2C	1 MONTH
15			12.50		
14	151+03.79	LT	13.43	Phase 2D	1 MONTH
15			12.50		
1	19+07.40	RT	19.00	Phase 3A	2 MONTHS
2	20+13.64	RT	14.00		
3	23+13.25	RT	9.50		
4	27+42.10	RT	12.00		
5	29+66.15	RT	13.50		
6	30+78.60	RT	10.50		
7	34+68.55	RT	13.00		
8	35+93.09	RT	21.50		
9	38+44.43	RT	9.00		
10	39+54.11	RT	12.50		
11	46+38.64	RT	19.00		
12	51+16.85	RT	17.50		
12	51+16.85	RT	17.50	Phase 3B	2 MONTHS
13	53+64.15	RT	13.50		
CR 50	66+12.06	RT	14.00		
CR 50	66+54.03	RT	14.00		
CR 60	92+53.07	RT	12.00		
CR 60	92+95.04	RT	14.00		
CEM. RD	118+85.72	RT	17.00	Phase 3C	2 MONTHS
CEM. RD	118+87.20	LT	17.00	Phase 3D	2 MONTHS
12	50+96.48	LT	17.50	Phase 3E	2 MONTHS
13	53+44.52	LT	13.50		
CR 50	66+01.11	LT	14.00		
CR 50	66+54.68	LT	14.00		
CR 60	92+37.74	LT	12.00		
CR 60	92+92.45	LT	14.00		
1	19+07.40	RT	19.00	Phase 3F	2 MONTHS
2	19+92.43	LT	14.00		
3	22+92.39	LT	9.50		
4	27+25.01	LT	12.00		
5	29+43.5	LT	13.50		
6	30+56.64	LT	10.50		
7	34+45.91	LT	13.00		
8	35+77.81	LT	21.50		
9	38+22.77	LT	9.00		
10	39+41.95	LT	12.50		
11	46+13.02	LT	19.00		
12	51+16.85	RT	17.50		



PHASE 3
SEQUENCE OF CONSTRUCTION DIAGRAM

PHASE 3 SEGMENT

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
5/1/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

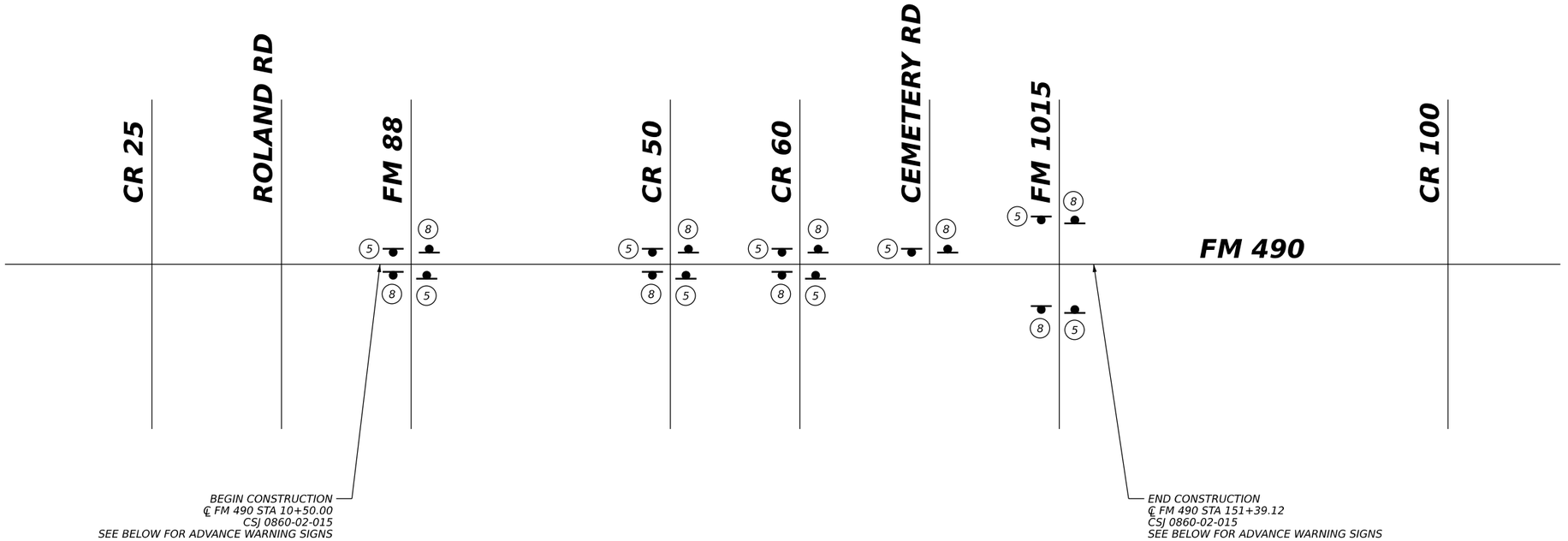
FM 490

TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

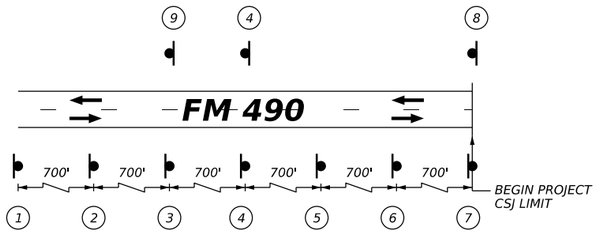
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		19

DATE: 5/1/2024
FILE: ...\FM490-BMCD-TCPNAR.dgn

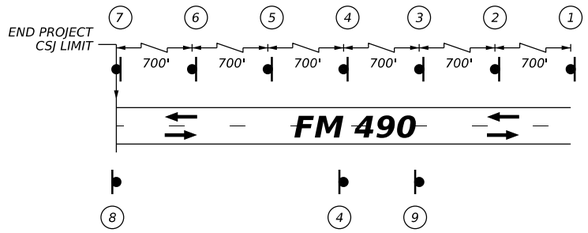


NOTES

1. FIELD CONDITIONS MAY DICTATE ADJUSTMENT OF SIGN LOCATION. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION OF ANY SIGNS.
2. REFER TO PHASING LAYOUT SHEETS FOR OTHER REGULATORY AND WARNING SIGNS.
3. CONTRACTOR SHALL ADHERE AT ALL TIMES TO TXDOT STANDARDS BC (1)-21 THROUGH BC (12)-21, SHEETS AND TMUTCD FOR SIGN DETAILS, DIMENSIONS AND PLACEMENT.
4. ADDITIONAL TRAFFIC CONTROL DEVICES MAY BE ADDED BY THE ENGINEER. ANY SUCH DEVICES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
5. CONTRACTOR SHALL LOCATE SIGNS, BARRICADES & CHANNELIZING DEVICES AS APPROVED BY THE ENGINEER TO MEET FIELD CONDITIONS TO AVOID BLOCKING DRIVEWAYS OR ACCESS TO PROPERTIES.
6. WHEN CONSTRUCTION WORK IS COMPLETED AND THE FACILITY IS READY TO BE OPENED TO TRAFFIC, CONTRACTOR SHALL REQUEST APPROVAL FROM THE ENGINEER PRIOR TO ERECTING PERMANENT SPEED LIMIT SIGNS.
7. N.T.S.

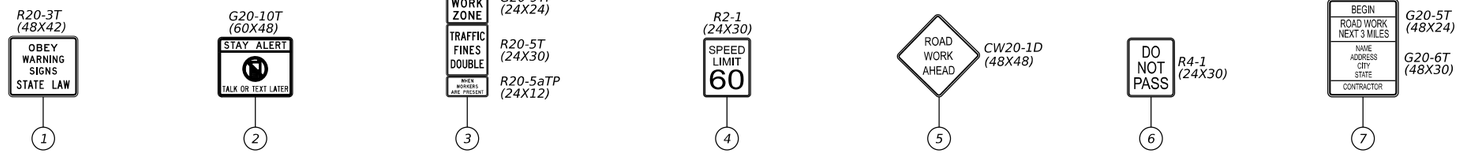


TYPICAL APPROACH SIGN PLACEMENT WEST PROJECT LIMIT



TYPICAL APPROACH SIGN PLACEMENT EAST PROJECT LIMIT

FM 490 POSTED SPEED LIMIT: 60 MPH
FM 88 POSTED SPEED LIMIT: 65 MPH
FM 1015 POSTED SPEED LIMIT: 55 MPH



STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

ADVANCE WARNING SIGNS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		20

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP_ADV.dgn

R20-3T (48X42)

1

G20-10T (60X48)

2

G20-9TP (24X24)

R20-5T (24X30)

R20-5aTP (24X12)

3

R2-1 (24X30)

4

CW20-1D (48X48)

5

R4-1 (24X30)

6

G20-5T (48X24)

G20-6T (48X30)

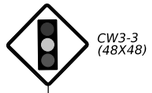
7

G20-2 (48X24)

8

G20-2bT (48X24)

9



CW3-3 (48X48)

10

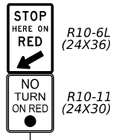
CW1-4R (36X36)

CW13-1P (24X24)

11

CW1-6aT (36X36)

12



R10-6L (24X36)

R10-11 (24X30)

13

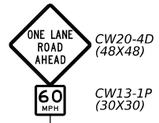
CW1-4L (36X36)

CW13-1P (24X24)

14

R4-2 (24X30)

15



CW20-4D (48X48)

CW13-1P (30X30)

16

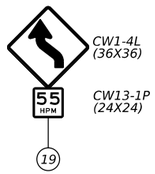
R10-6L (24X36)

17

CW1-4R (36X36)

CW13-1P (24X24)

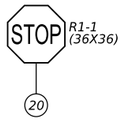
18



CW1-4L (36X36)

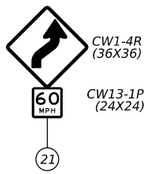
CW13-1P (24X24)

19



R1-1 (36X36)

20



CW1-4R (36X36)

CW13-1P (24X24)

21

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-SIGN-INV.dgn

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

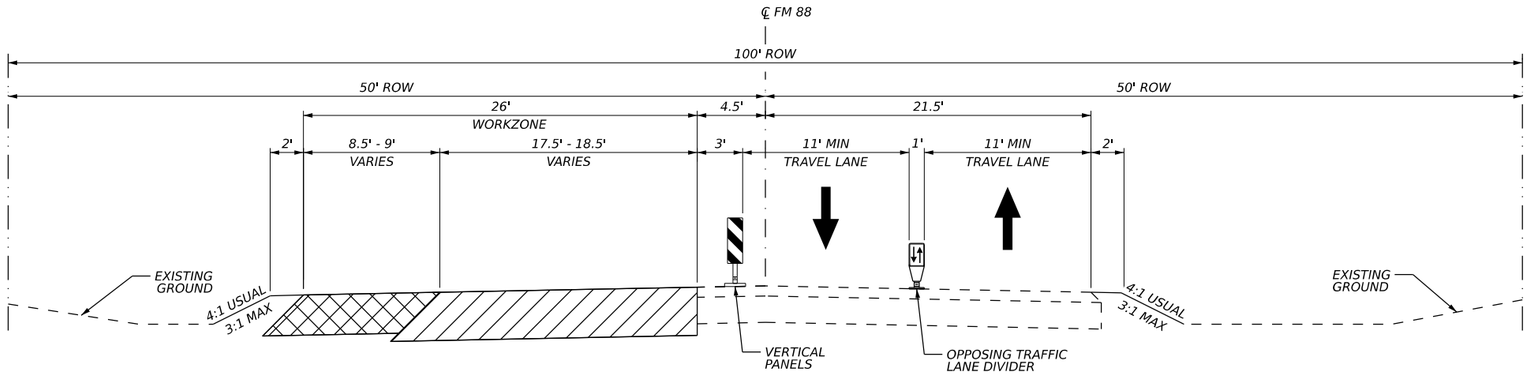
Texas Department of Transportation

FM 490

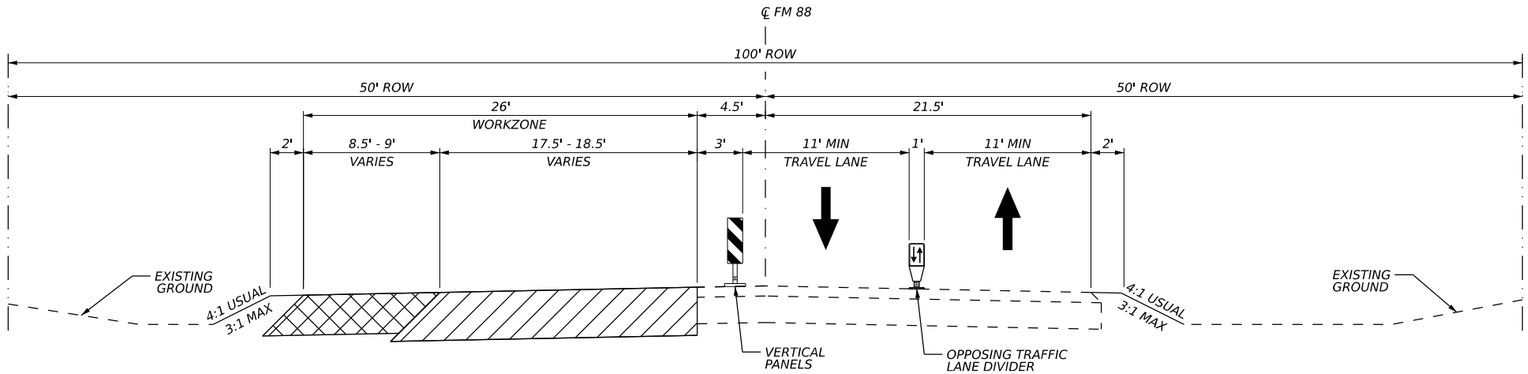
TRAFFIC CONTROL PLAN
SIGN INVENTORY

SHEET 1 OF 1

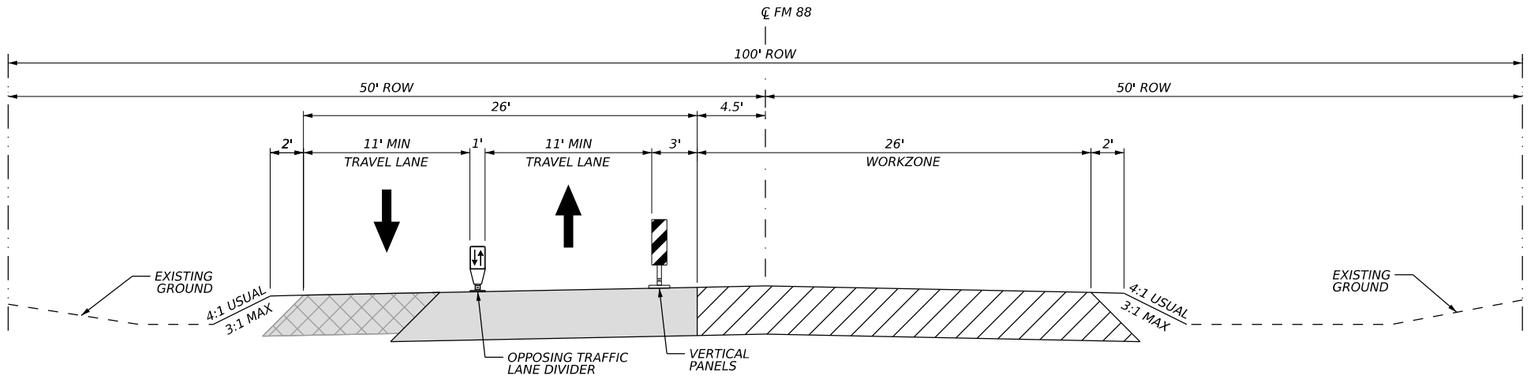
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		21



PHASE 1A



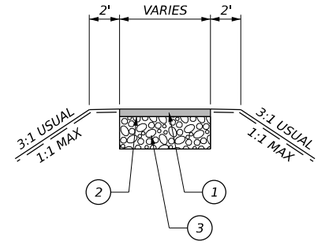
PHASE 1B



PHASE 1C - 1D

LEGEND

- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- (1) 1.5" HMA-D PG 64-22 SAC B
- (2) PRIME COAT
- (3) 12.0" TY E GR-4 BASE W/ 1% LIME (BY WT.) - PROOF ROLL SUBGRADE



CONSTRUCTION DETOUR

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
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Texas Department of Transportation

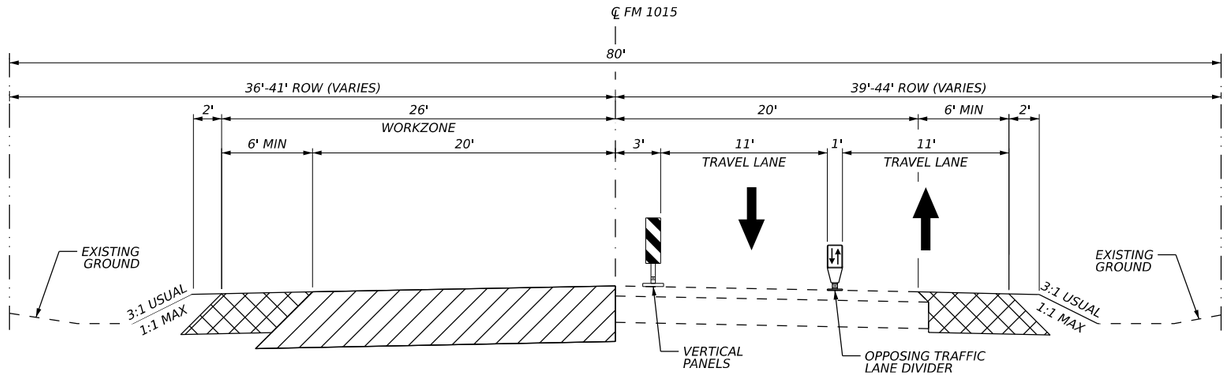
FM 490

TRAFFIC CONTROL TYPICAL SECTIONS PHASE 1

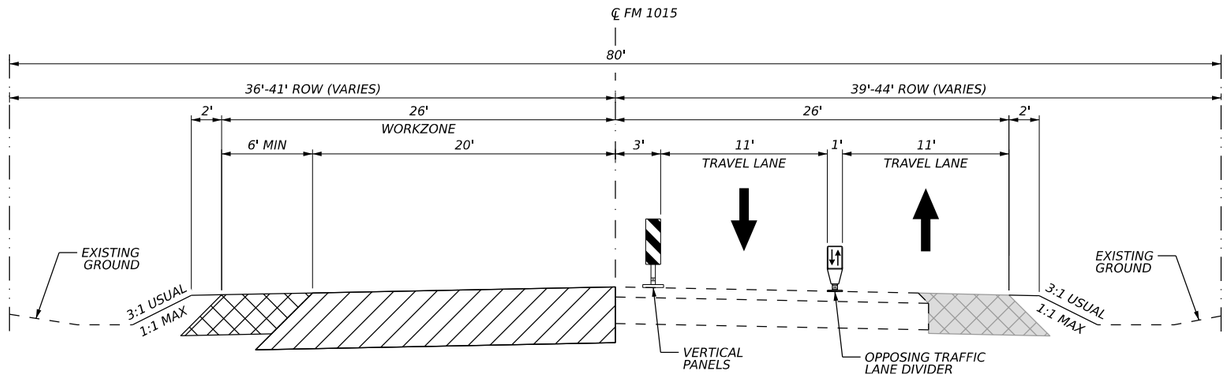
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		22

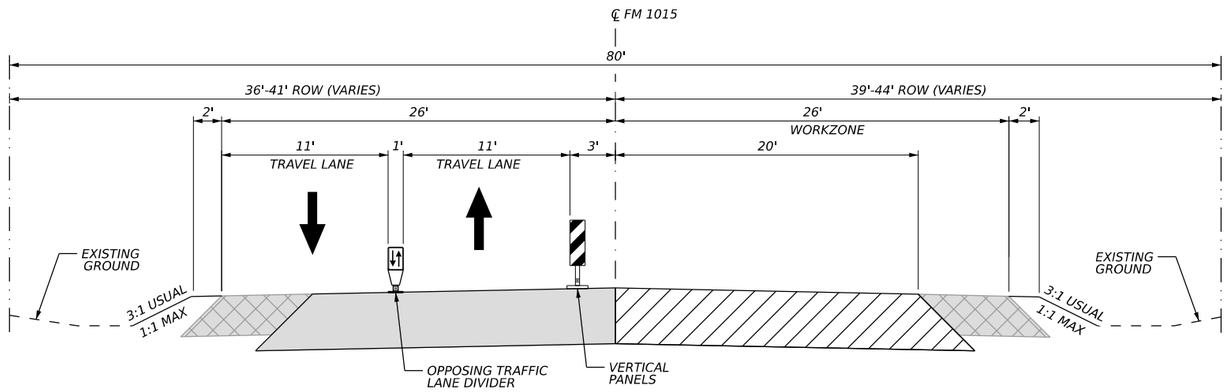
DATE: 1/31/2024
FILE: 22



PHASE 2A



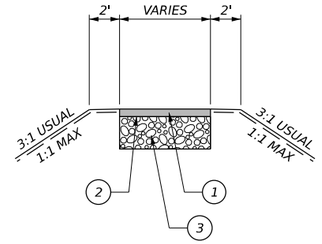
PHASE 2B



PHASE 2C - 2D

LEGEND

- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- (1) 1.5" HMA-D PG 64-22 SAC B
- (2) PRIME COAT
- (3) 12.0" TY E GR-4 BASE W/ 1% LIME (BY WT.) - PROOF ROLL SUBGRADE



CONSTRUCTION DETOUR

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

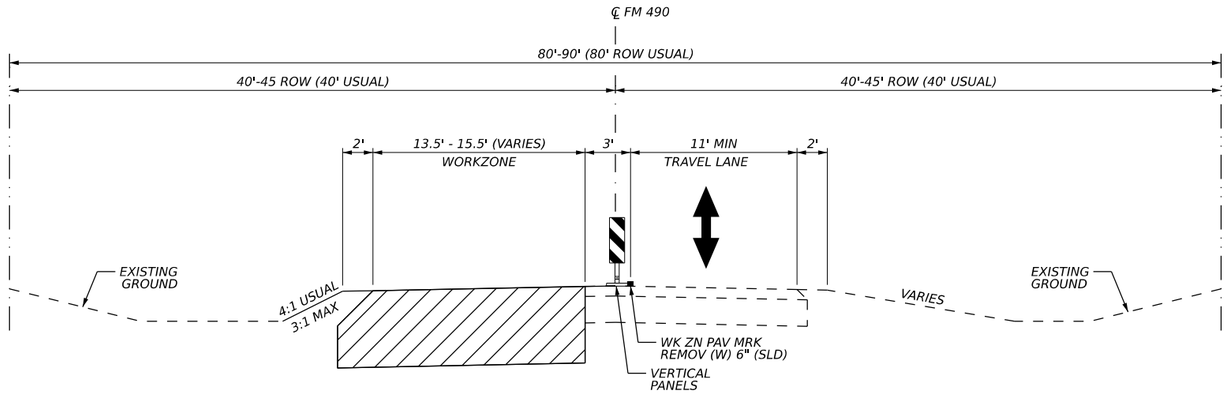
FM 490

TRAFFIC CONTROL TYPICAL SECTIONS PHASE 2

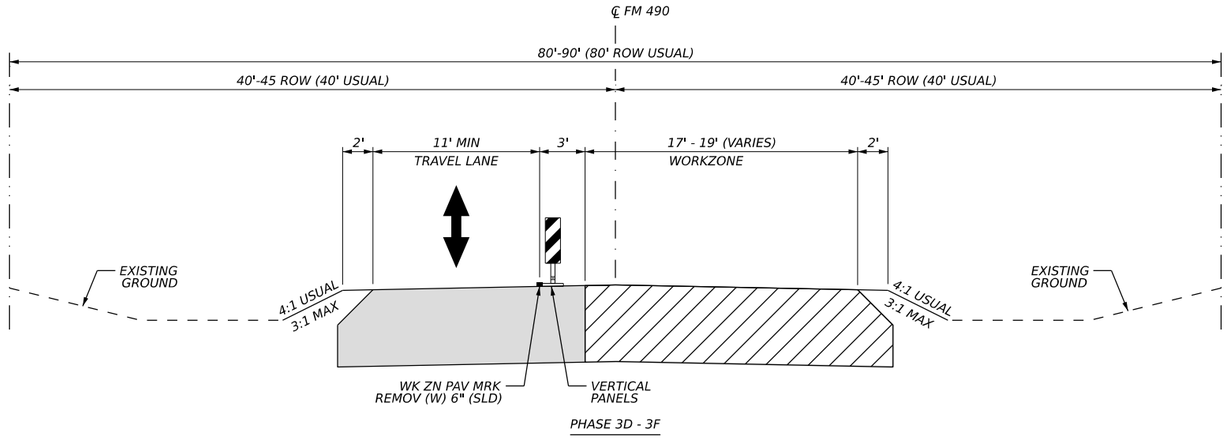
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		23

DATE: 1/31/2024
FILE: 23



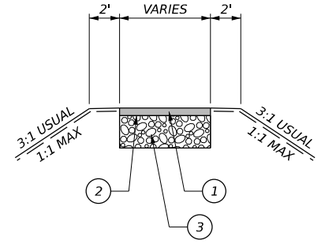
PHASE 3A - 3C



PHASE 3D - 3F

LEGEND

- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- (1) 1.5" HMA-D PG 64-22 SAC B
- (2) PRIME COAT
- (3) 12.0" TY E GR-4 BASE W/ 1% LIME (BY WT.) - PROOF ROLL SUBGRADE



CONSTRUCTION DETOUR

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

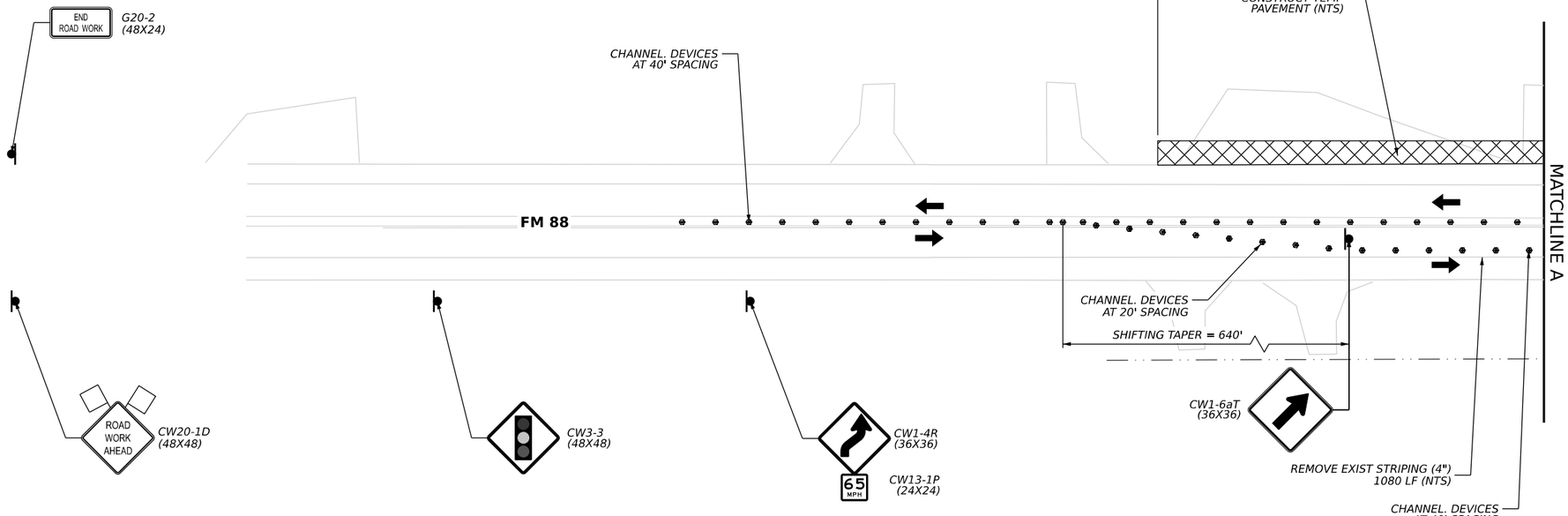
TRAFFIC CONTROL TYPICAL SECTIONS PHASE 3

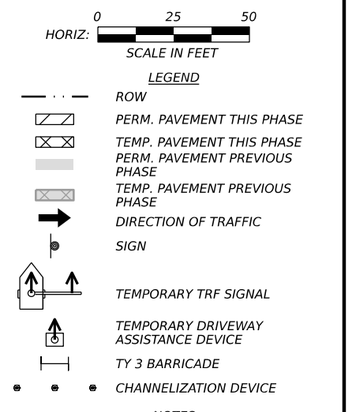
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		24

DATE: 1/31/2024
FILE: 24

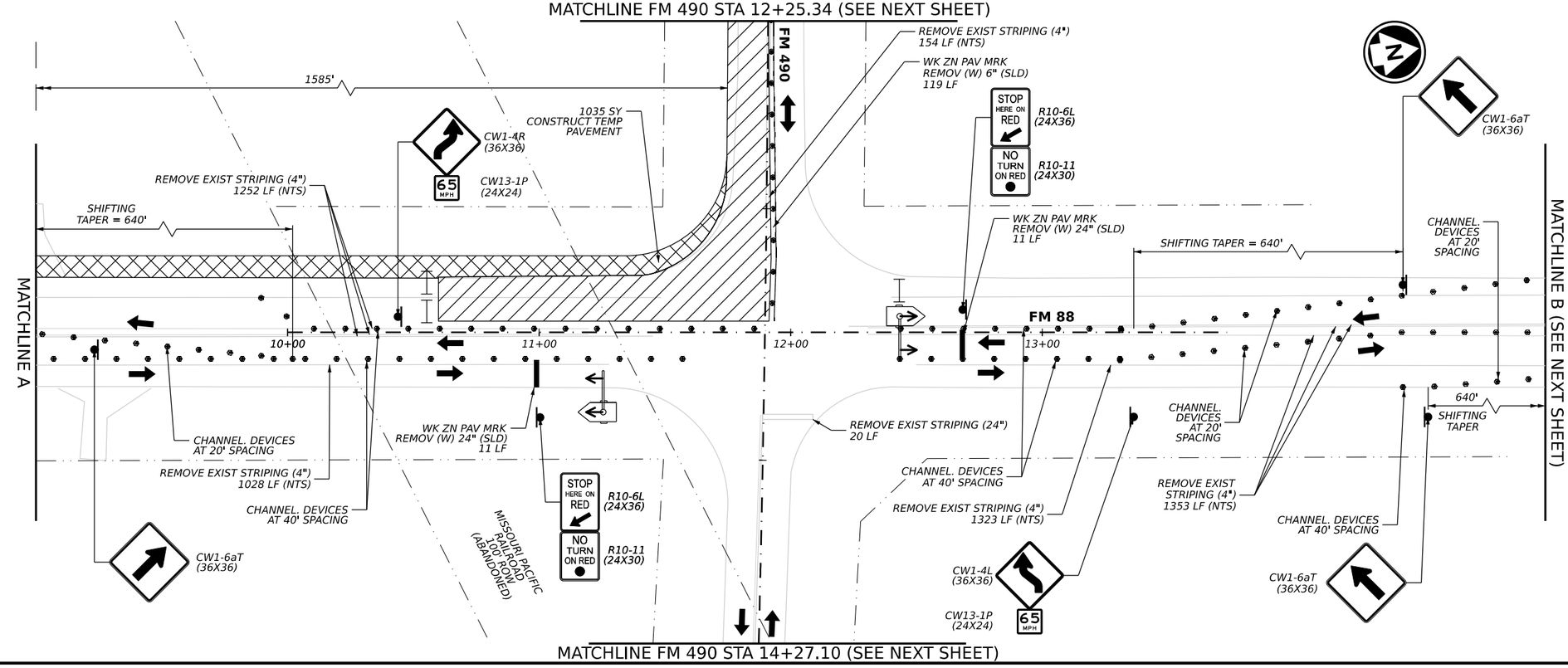
CK:
DW:
CK:
DW:





NOTES

1. ALL SIGNS, DEVICES, LOCATIONS, AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS, AS A MINIMUM.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) AND TCP (1-3A) FOR MORE DETAILS ON MINIMUM REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. TIMING OF DRIVEWAY ASSISTANCE DEVICES SHOULD BE COORDINATED WITH THE TXDOT AREA OFFICE.
5. TEMPORARY PAVEMENT, AND SIGN AND CHANNELIZING DEVICE SPACING IS N.T.S.
6. FOR LANE CLOSURES, A MINIMUM 14' SHOULD REMAIN OPEN TO TRAFFIC TO ALLOW FOR CHANNELIZING DEVICES.



NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

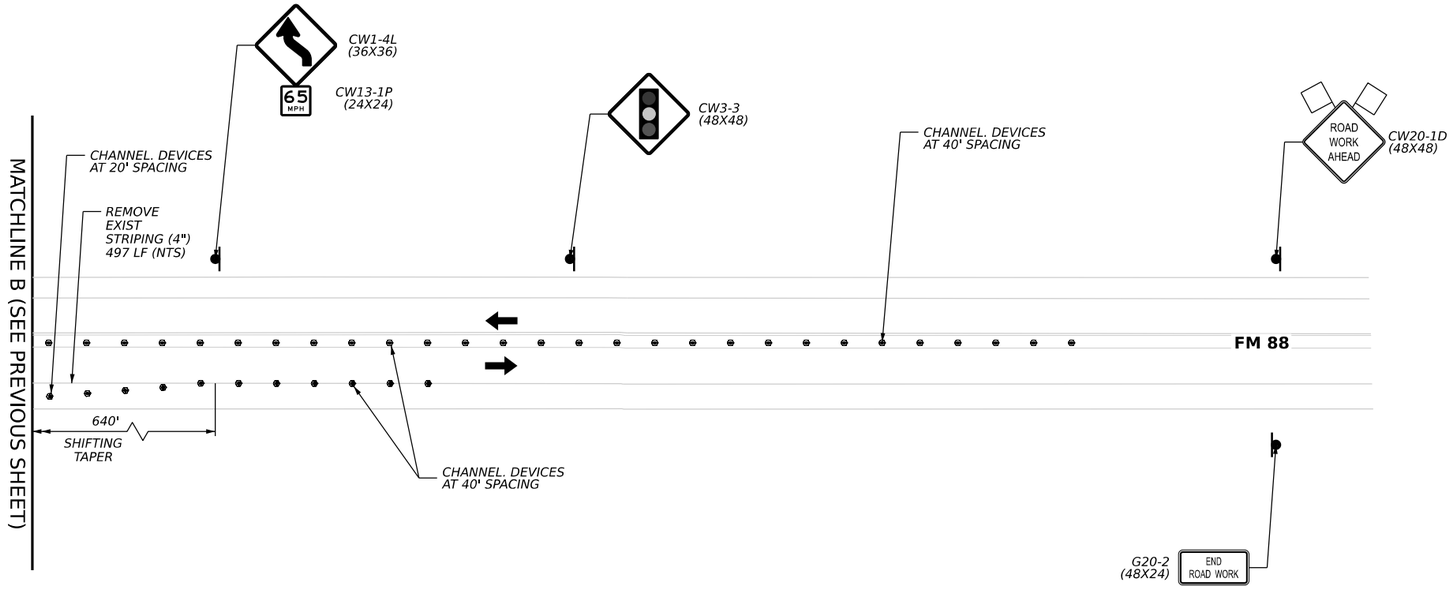
FM 88

TRAFFIC CONTROL PLAN PHASE 1A BEGIN TO MATCHLINE B

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		25

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-1A-01.dgn



LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

NOTES

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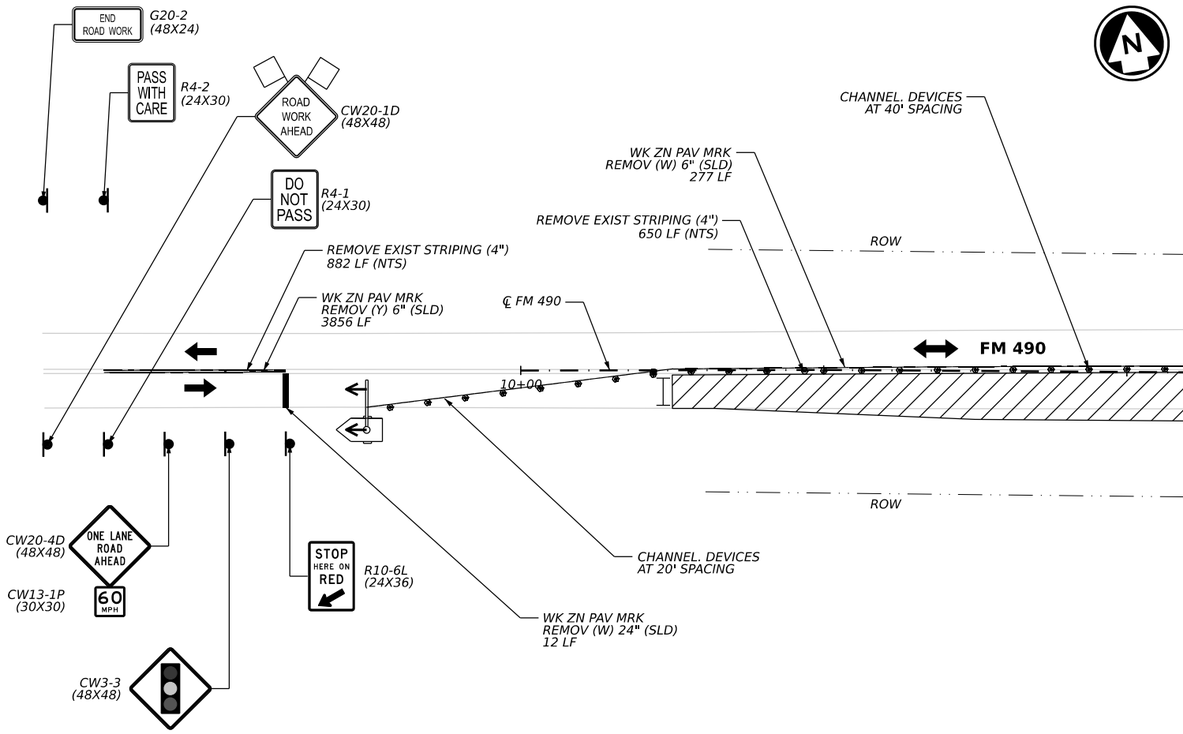

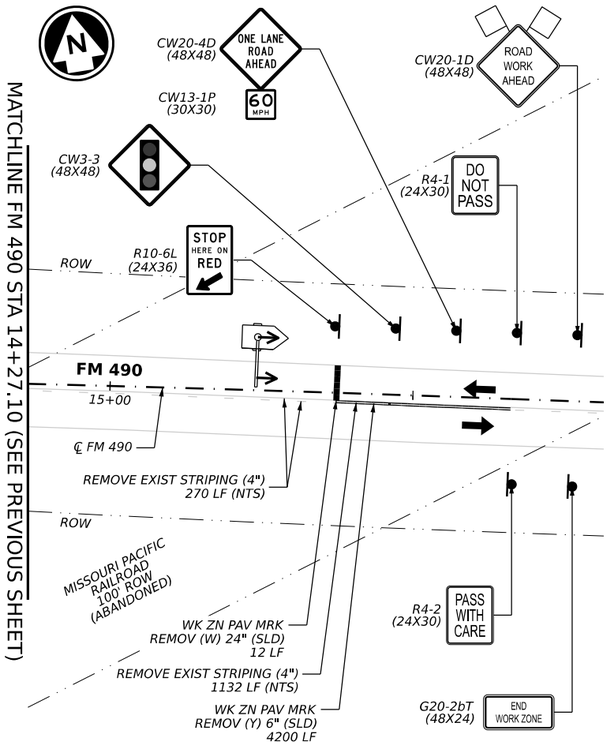

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 88

TRAFFIC CONTROL PLAN
PHASE 1A
MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		26

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-1A-02.dgn

CK: DW: CK: DW:

CK:
DW:
CK:
DW:

END ROAD WORK
G20-2 (48X24)

CHANNEL. DEVICES AT 40' SPACING

FM 88

MATCHLINE A

CHANNEL. DEVICES AT 20' SPACING

SHIFTING TAPER = 640'

ROAD WORK AHEAD
CW20-1D (48X48)

CW3-3 (48X48)

CW1-4R (36X36)

CW13-1P (24X24)
65 MPH

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

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MATCHLINE FM 490 12+25.36

CW1-4R (36X36)
CW13-1P (24X24)
65 MPH

WK ZN PAV MRK REMOV (W) 6" (SLD) 119 LF

CHANNEL. DEVICES AT 40' SPACING

CHANNEL. DEVICES AT 40' SPACING

SHIFTING TAPER = 640'

CHANNEL. DEVICES AT 20' SPACING

MATCHLINE A

FM 88

10+00 11+00 12+00 13+00

1829'

809 SY CONSTRUCT TEMP PAVEMENT

REMOVE PREVIOUS PHASE STRIPING (24") 11 LF

STOP HERE ON RED
R10-6L (24X36)

NO TURN ON RED
R10-11 (24X30)

WK ZN PAV MRK REMOV (W) 24" (SLD) 11 LF

640' SHIFTING TAPER

MATCHLINE B

CHANNEL. DEVICES AT 40' SPACING

WK ZN PAV MRK REMOV (W) 24" (SLD) FROM PREVIOUS PHASE

CW1-6aT (36X36)

CW1-6aT (36X36)

STOP HERE ON RED
R10-6L (24X36)

NO TURN ON RED
R10-11 (24X30)

FM 490

CW1-4L (36X36)

CW13-1P (24X24)
65 MPH

CHANNEL. DEVICES AT 40' SPACING

CHANNEL. DEVICES AT 20' SPACING

MATCHLINE FM 490 14+72.90

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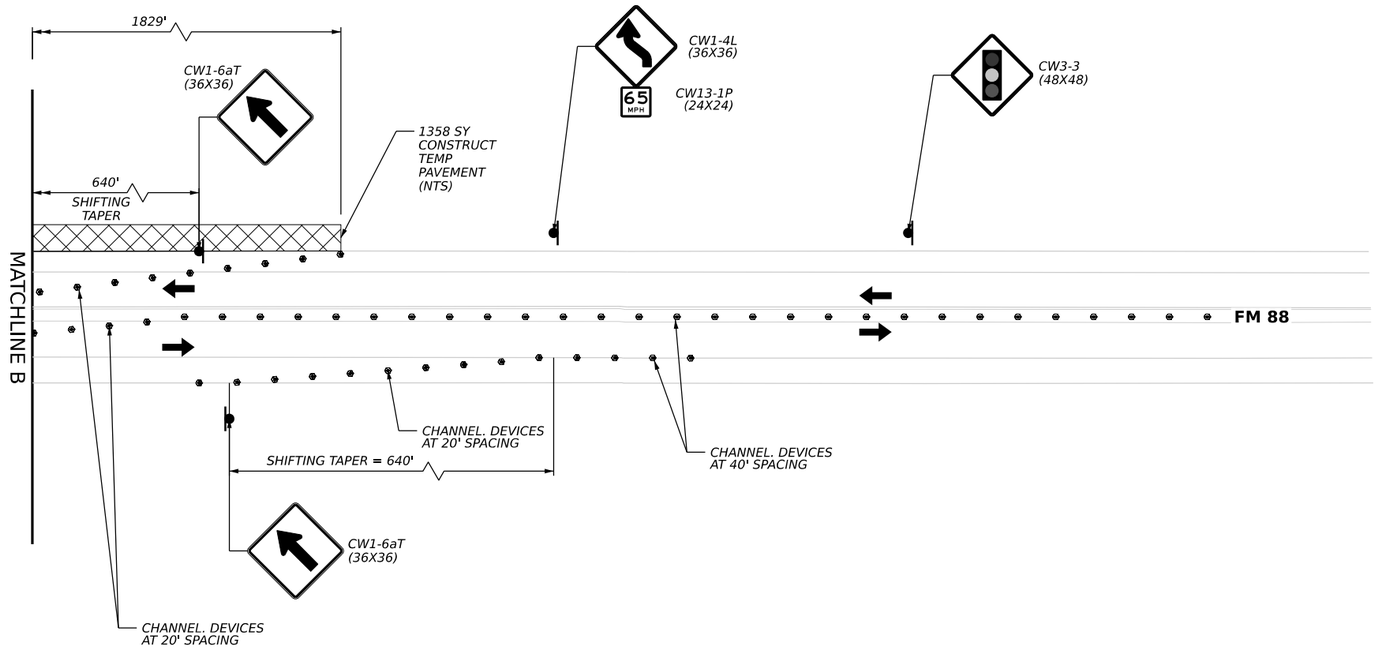
FM 88

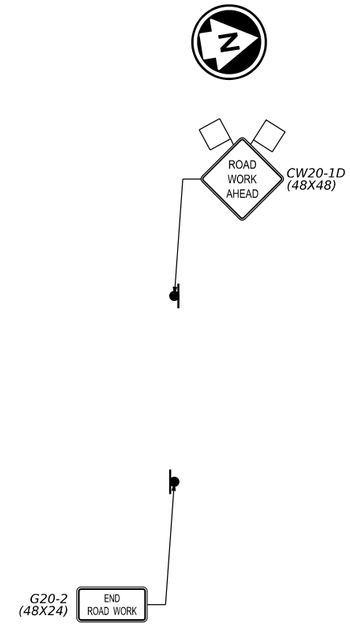
TRAFFIC CONTROL PLAN PHASE 1B BEGIN TO MATCHLINE B

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		27

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-1B-01.dgn





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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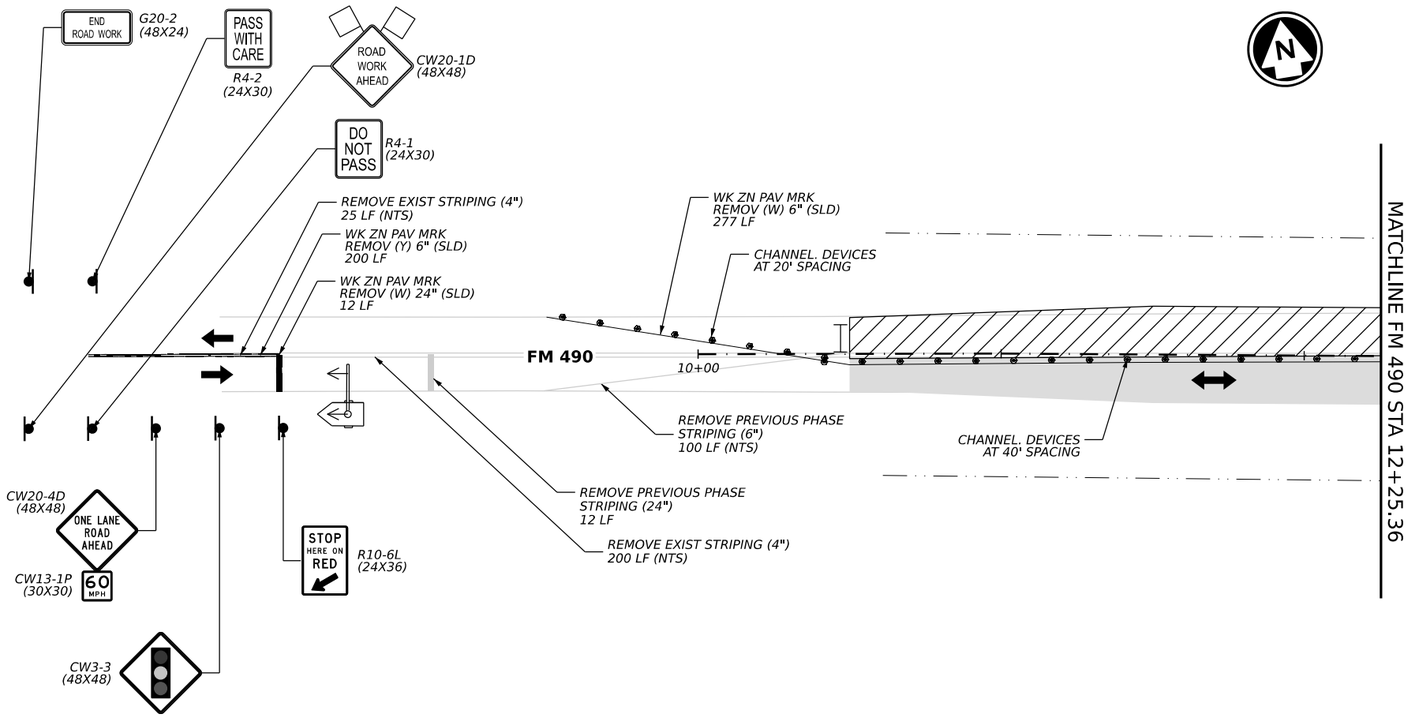

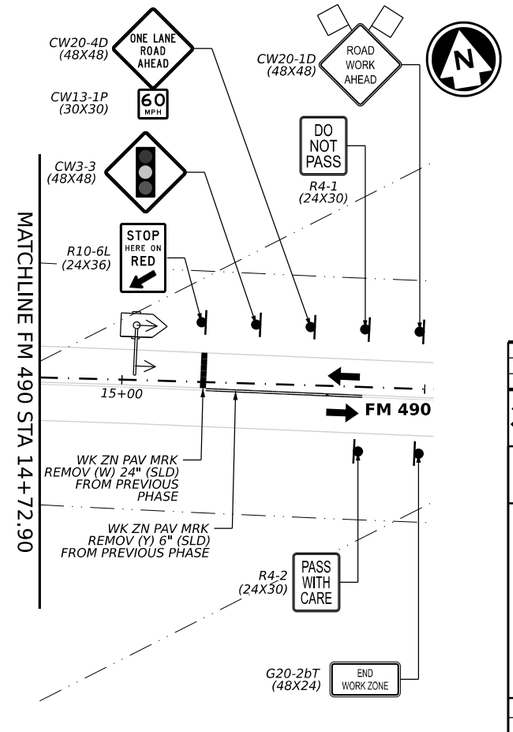

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Texas Department of Transportation

FM 88

TRAFFIC CONTROL PLAN PHASE 1B MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		28

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-1B-02.dgn

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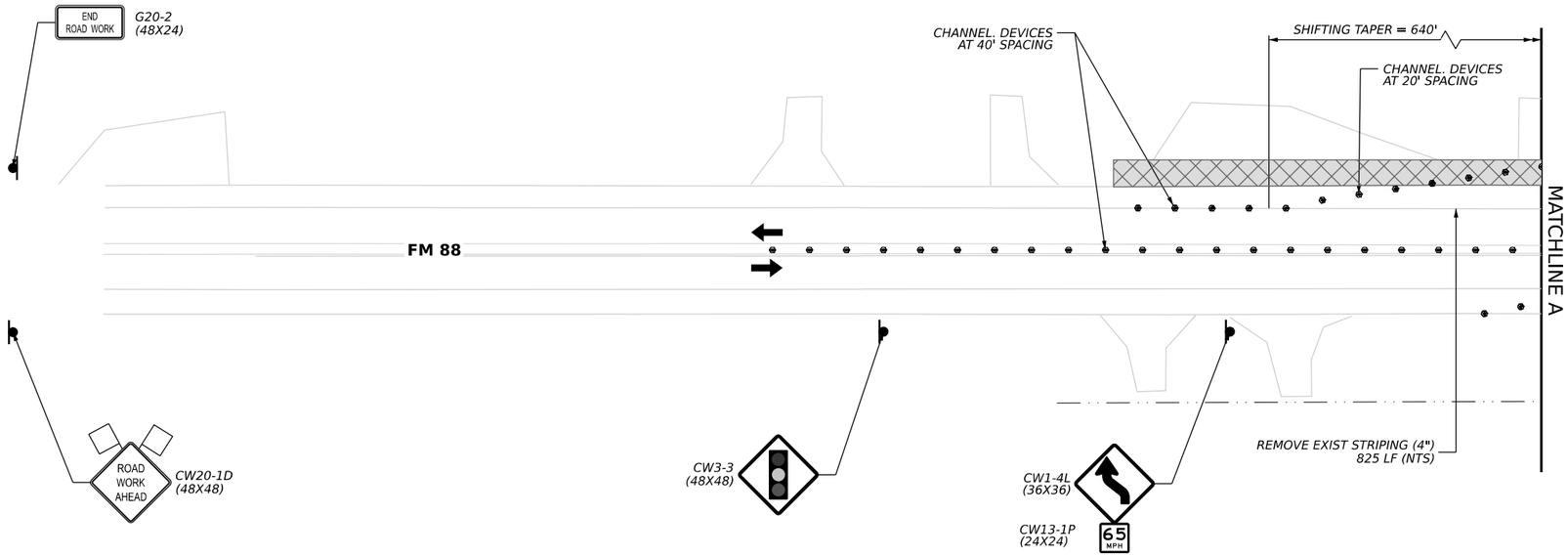

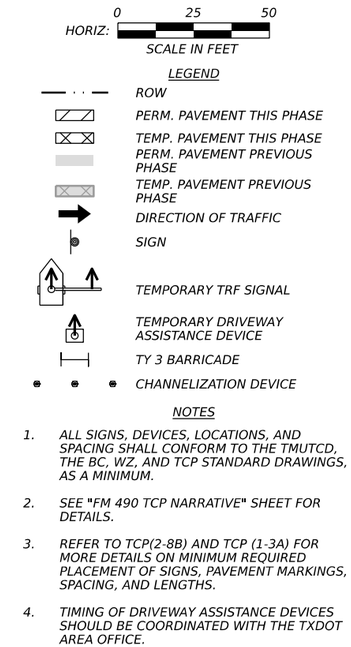

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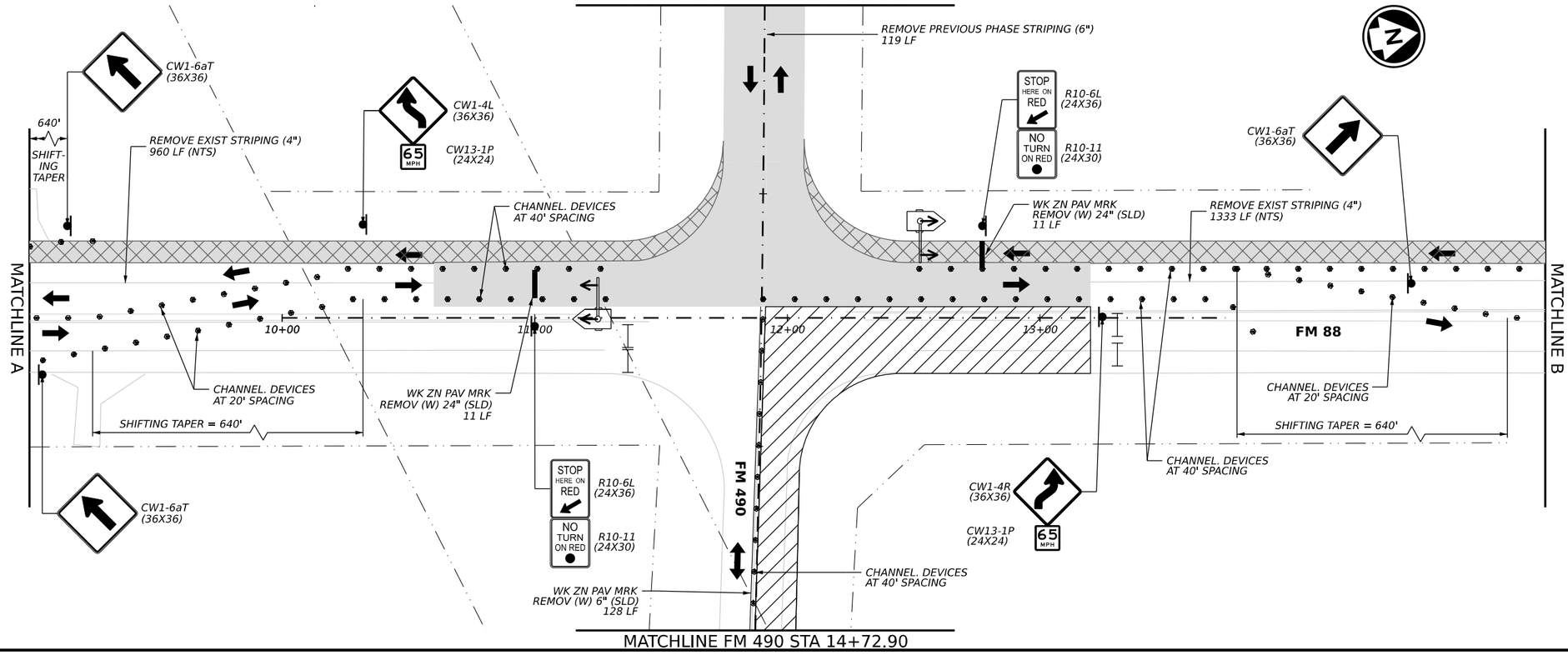

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FM 88

TRAFFIC CONTROL PLAN PHASE 1C BEGIN TO MATCHLINE B

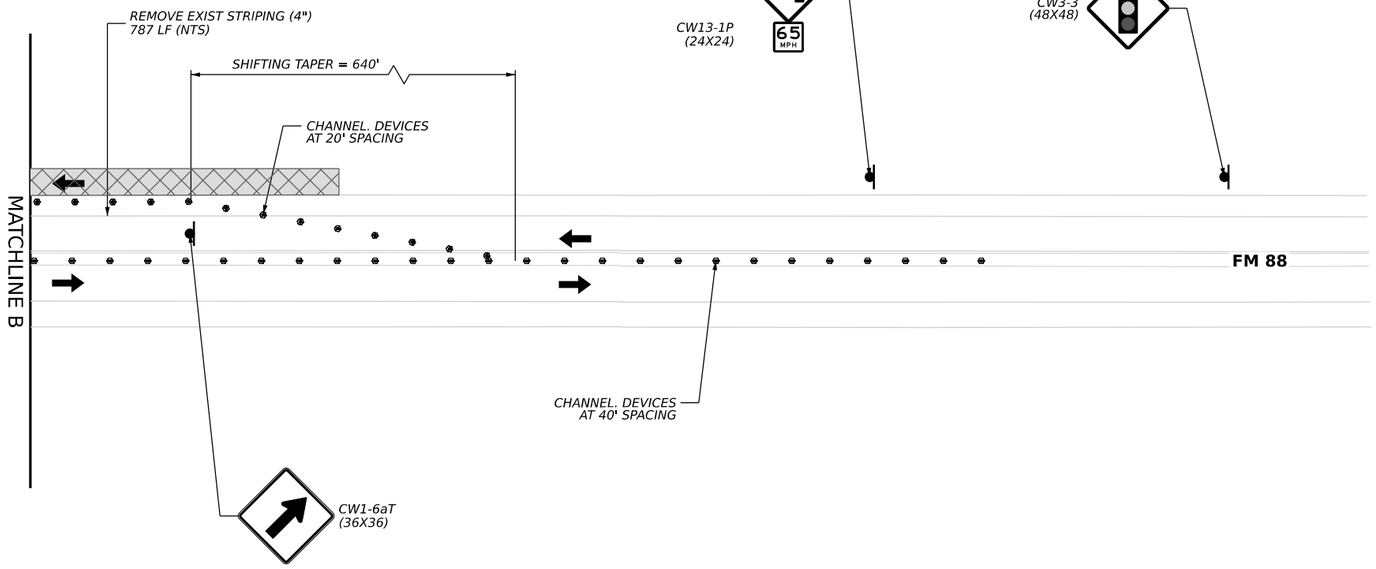
SHEET 1 OF 2

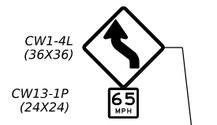
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		29

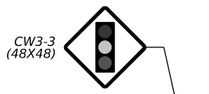
DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-1C-01.dgn

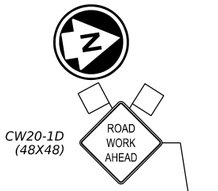
CK:
DW:
CK:
DW:

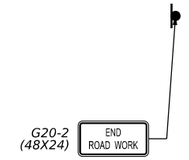
CK:
DW:
CK:
DW:











HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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- DIRECTION OF TRAFFIC
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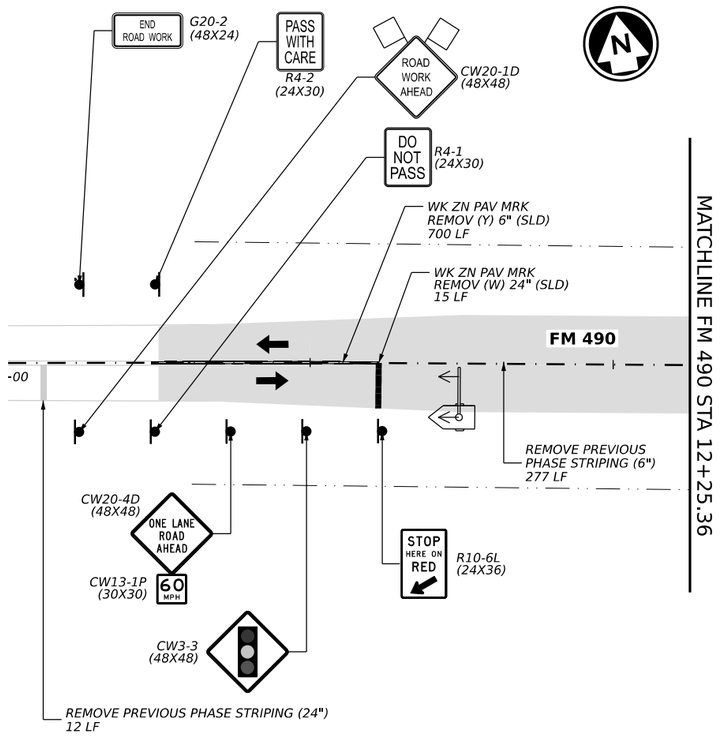
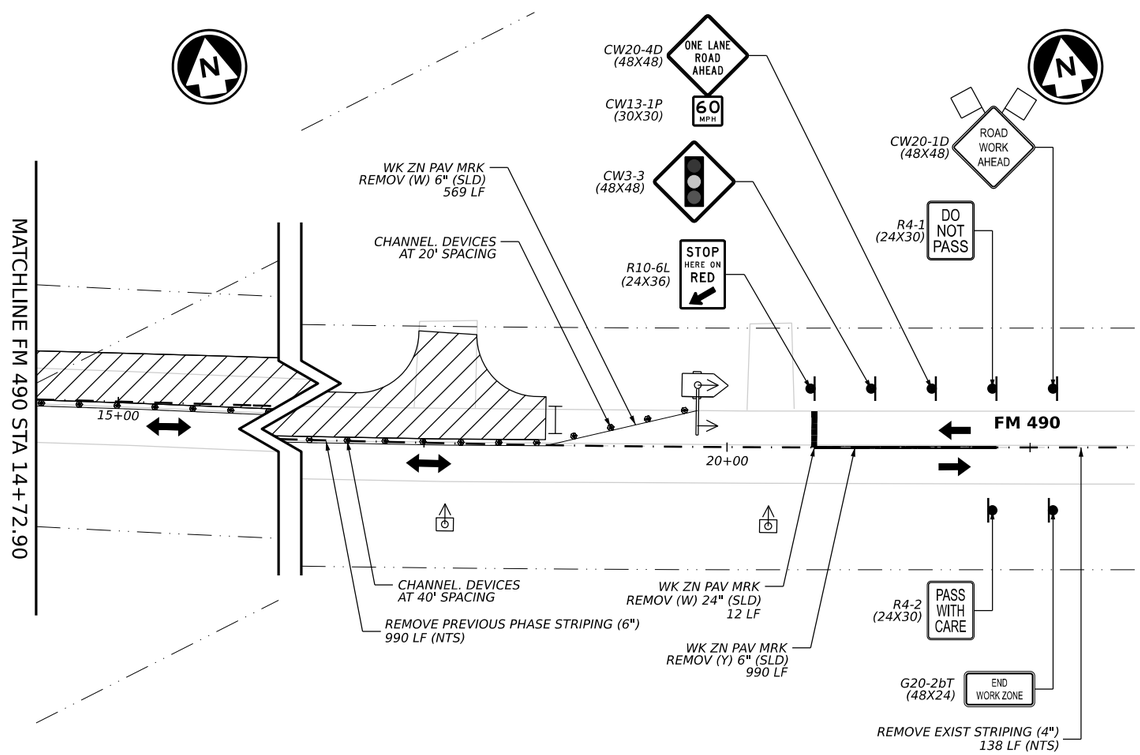




STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
5/1/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

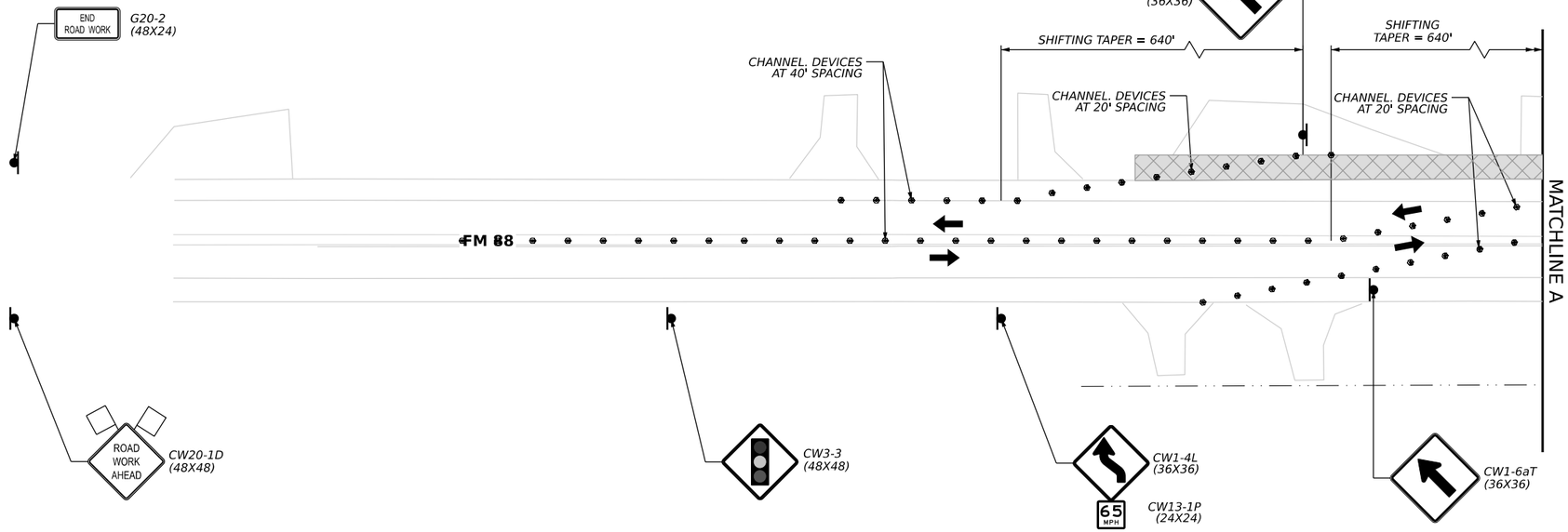
FM 88

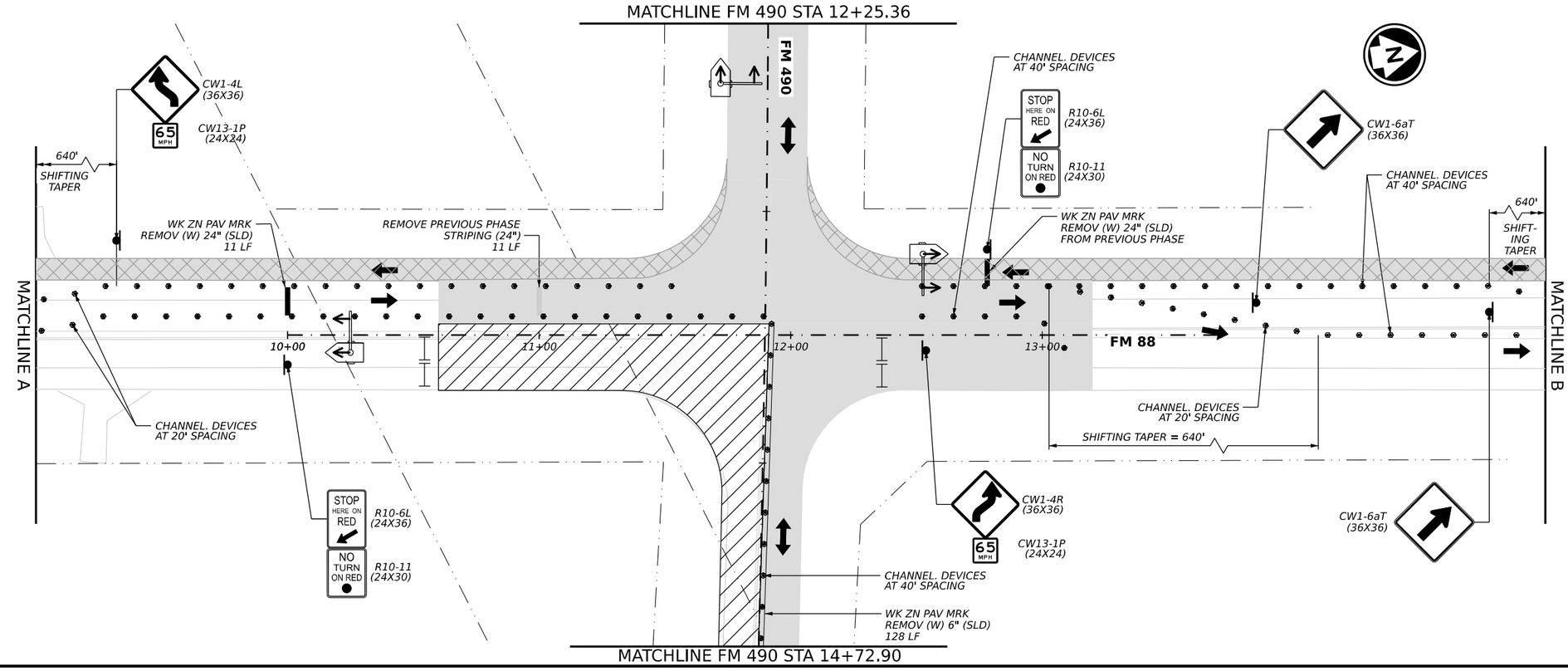
TRAFFIC CONTROL PLAN
PHASE 1C
MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		30

DATE: 5/1/2024
FILE: ...\FM490-BMCD-TCP-1C-02.dgn





LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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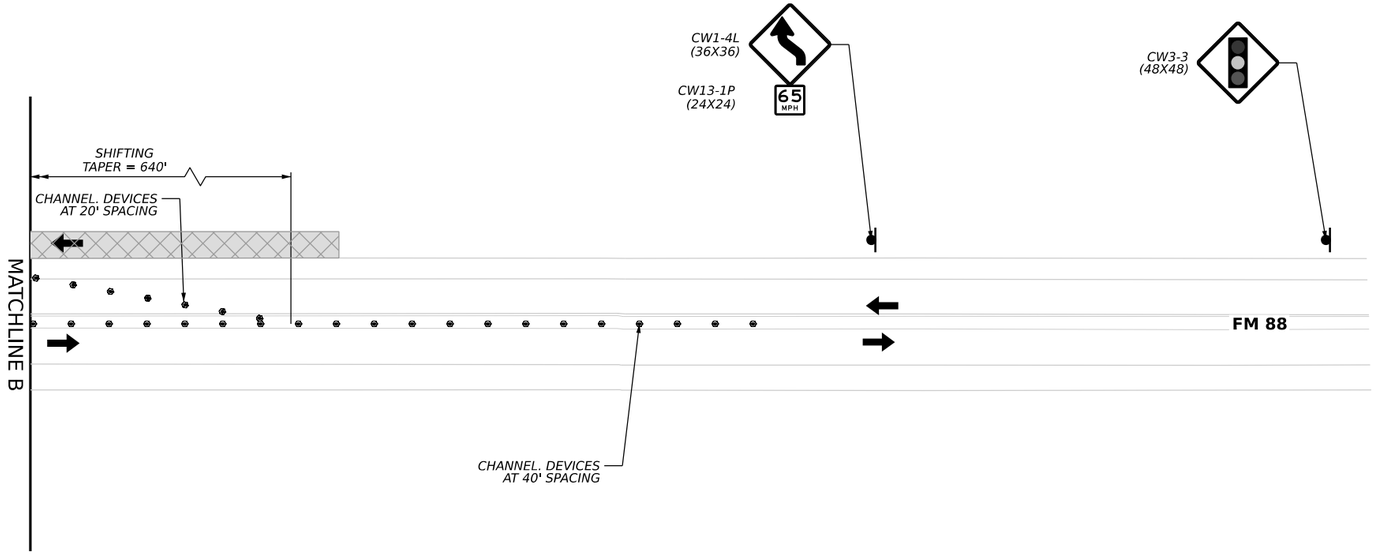
TRAFFIC CONTROL PLAN PHASE 1D BEGIN TO MATCHLINE B

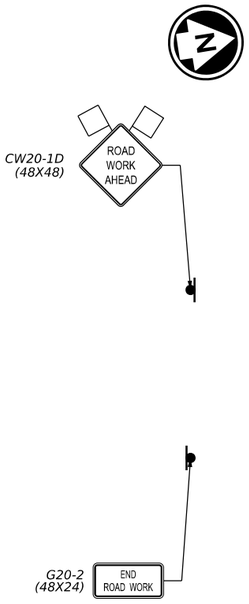
SHEET 1 OF 2

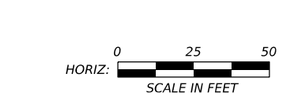
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		31

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-1D-01.dgn

CK:
DW:
CK:
DW:







LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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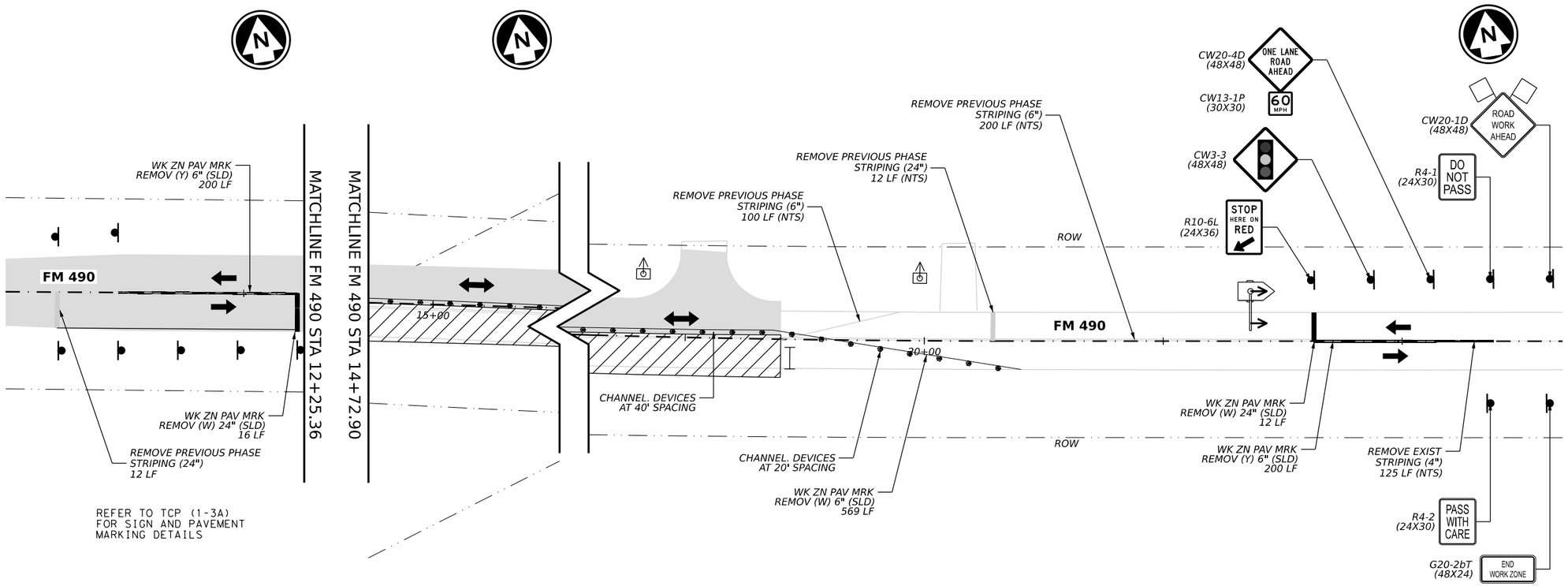

STATE OF TEXAS
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13737 NOEL RD.
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DALLAS, TX. 75240
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Texas Department of Transportation

FM 88

TRAFFIC CONTROL PLAN
PHASE 1D
MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		32

DATE: 5/1/2024
FILE: ...\FM490-BMCD-TCP-1D-02.dgn

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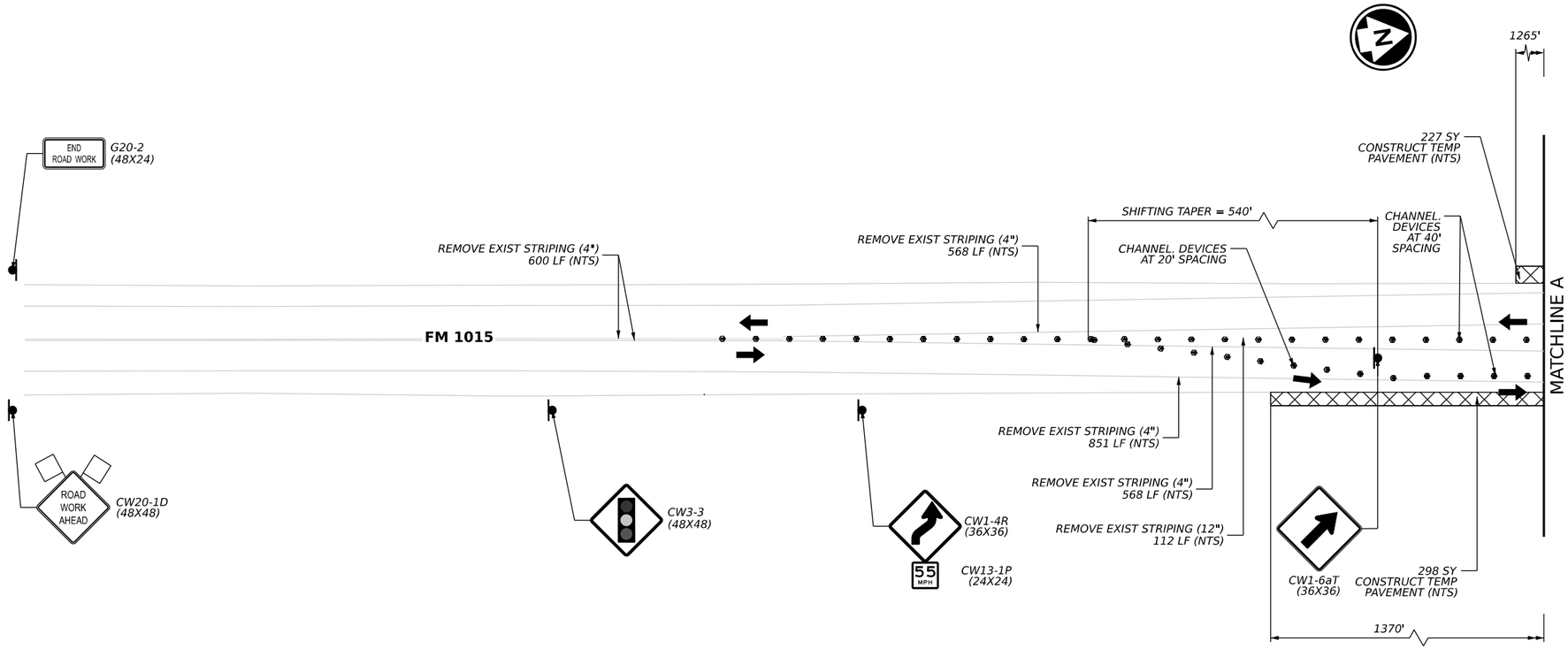
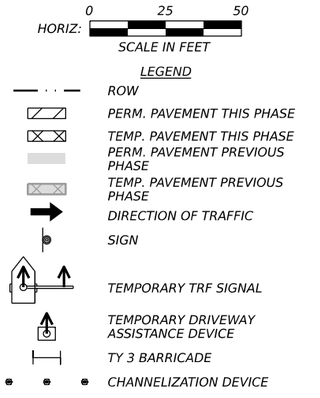
DW:
CK:
DW:





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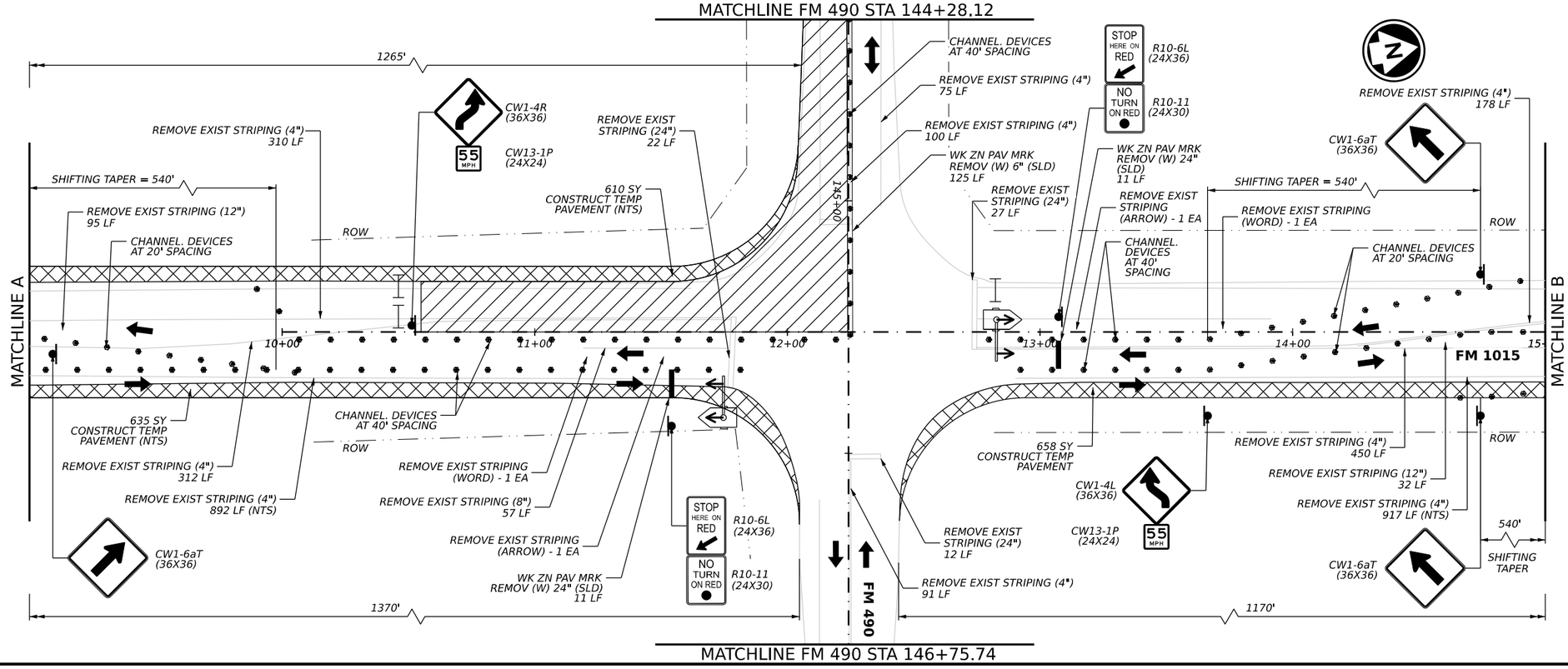

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BURNS McDONNELL
13737 NOEL RD.
SUITE 700
DALLAS, TX. 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

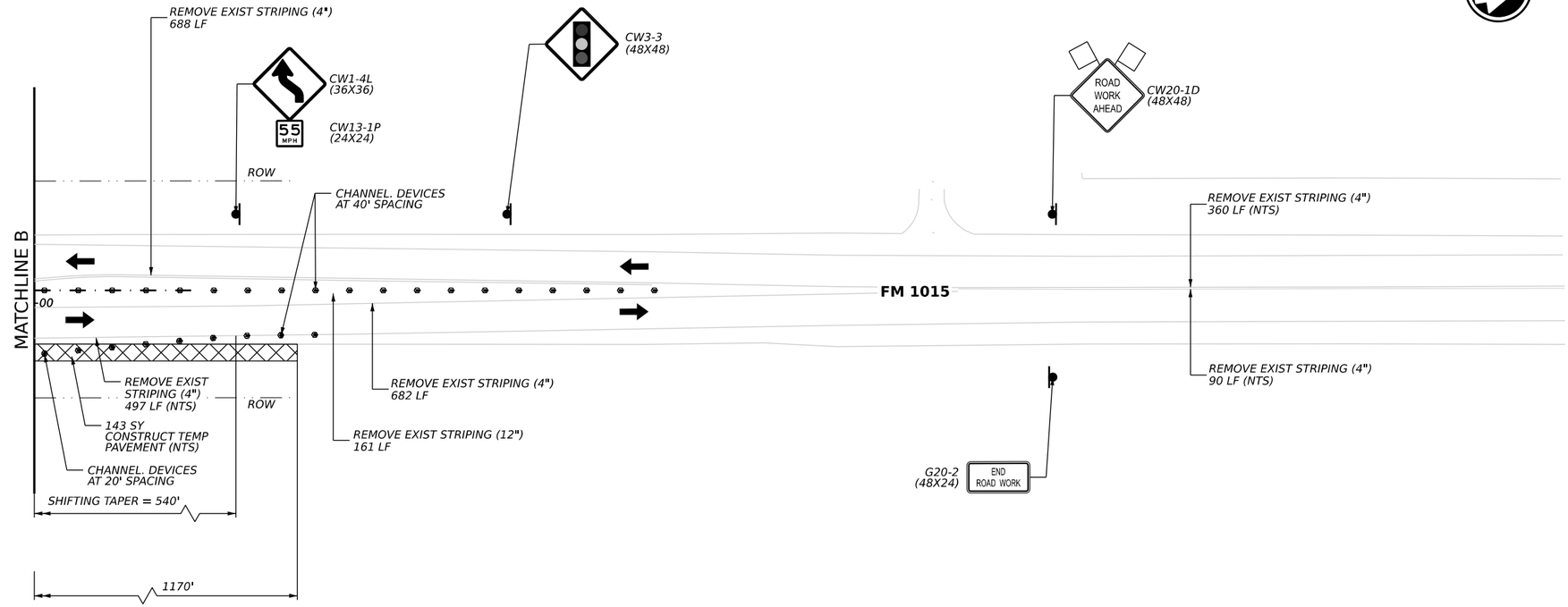
FM 1015

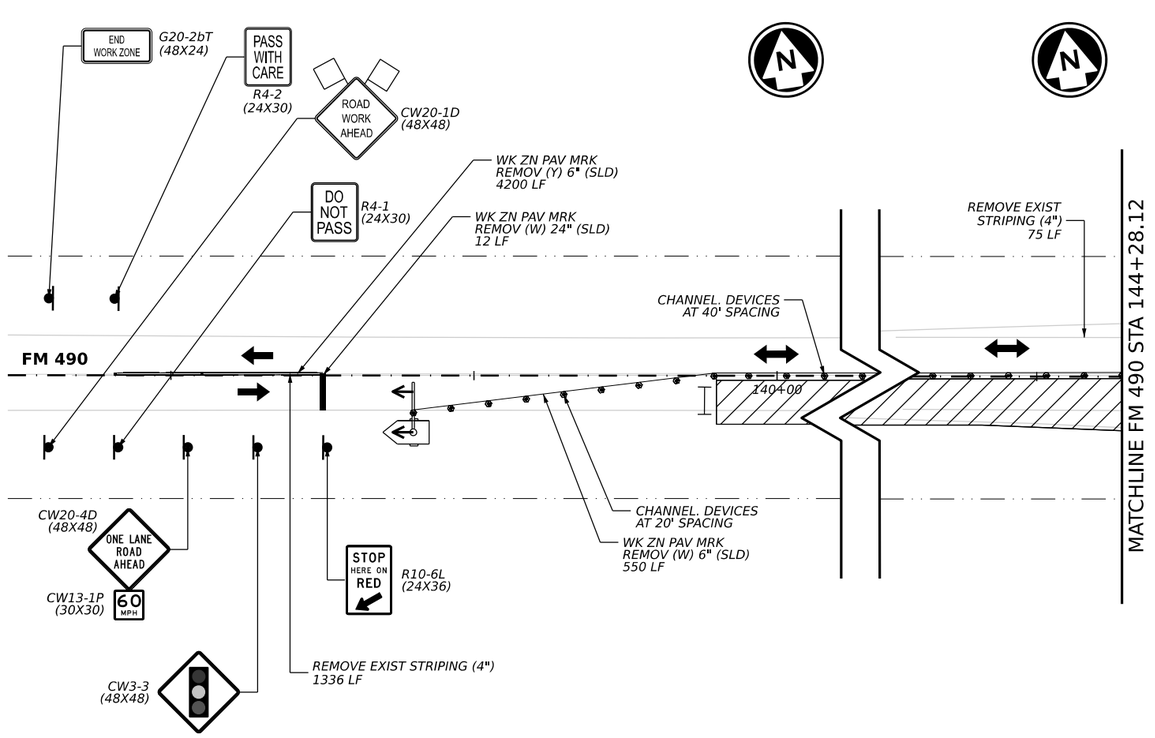
TRAFFIC CONTROL PLAN PHASE 2A BEGIN TO MATCHLINE B

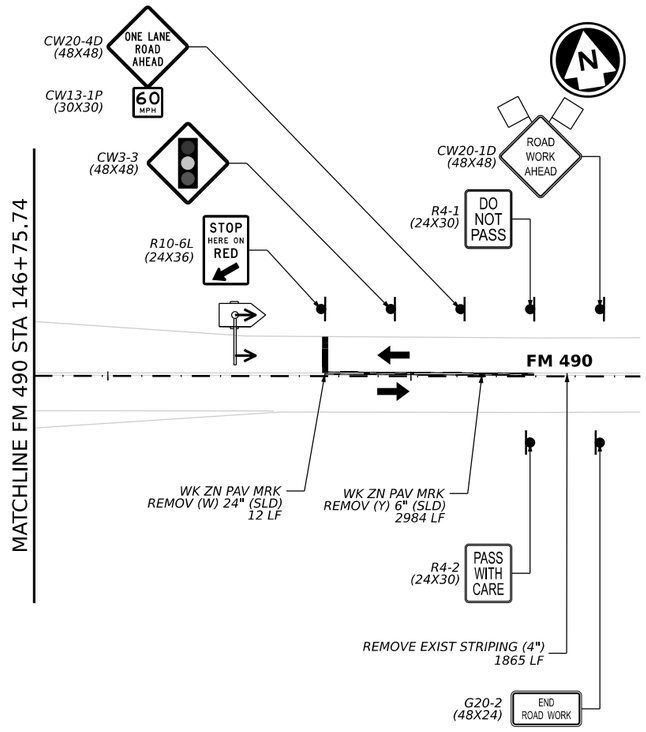
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		33

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2A-01.dgn







LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

NOTES

1. ALL SIGNS, DEVICES, LOCATIONS, AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS, AS A MINIMUM.
2. SEE "FM 490 TCP NARRATIVE" SHEET FOR DETAILS.
3. REFER TO TCP(2-8B) AND TCP (1-3A) FOR MORE DETAILS ON MINIMUM REQUIRED PLACEMENT OF SIGNS, PAVEMENT MARKINGS, SPACING, AND LENGTHS.
4. TIMING OF DRIVEWAY ASSISTANCE DEVICES SHOULD BE COORDINATED WITH THE TXDOT AREA OFFICE.
5. TEMPORARY PAVEMENT, AND SIGN AND CHANNELIZING DEVICE SPACING IS N.T.S.
6. FOR LANE CLOSURES, A MINIMUM 14' SHOULD REMAIN OPEN TO TRAFFIC TO ALLOW FOR CHANNELIZING DEVICES.

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
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Texas Department of Transportation

FM 1015

TRAFFIC CONTROL PLAN
PHASE 2A
MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		34

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2A-02.dgn

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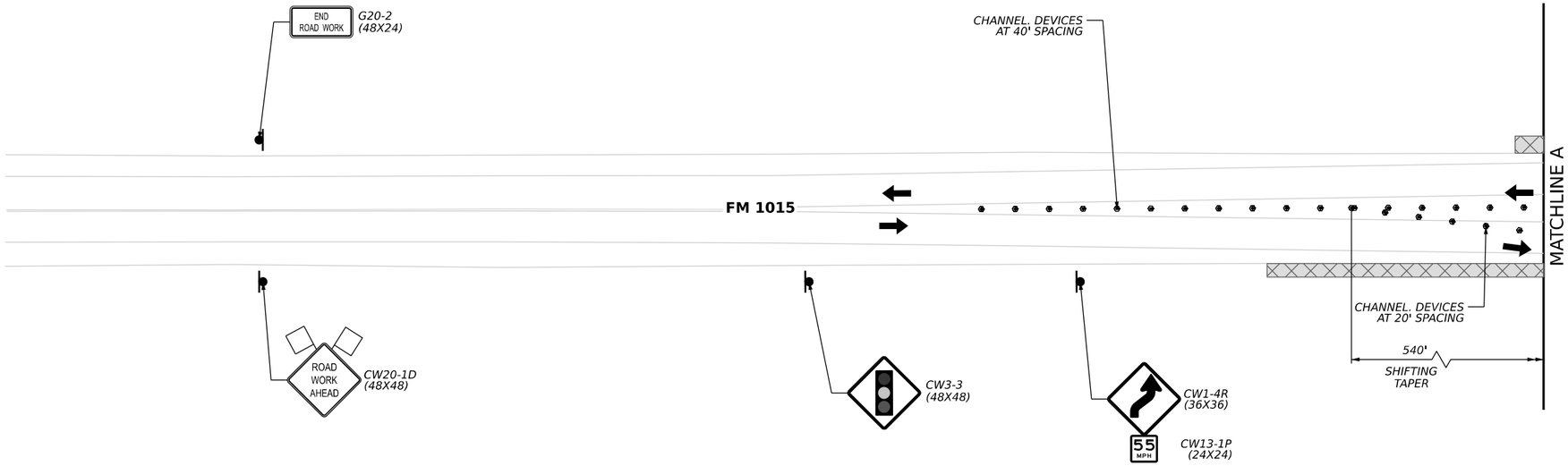
DW:
CK:
DW:



LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

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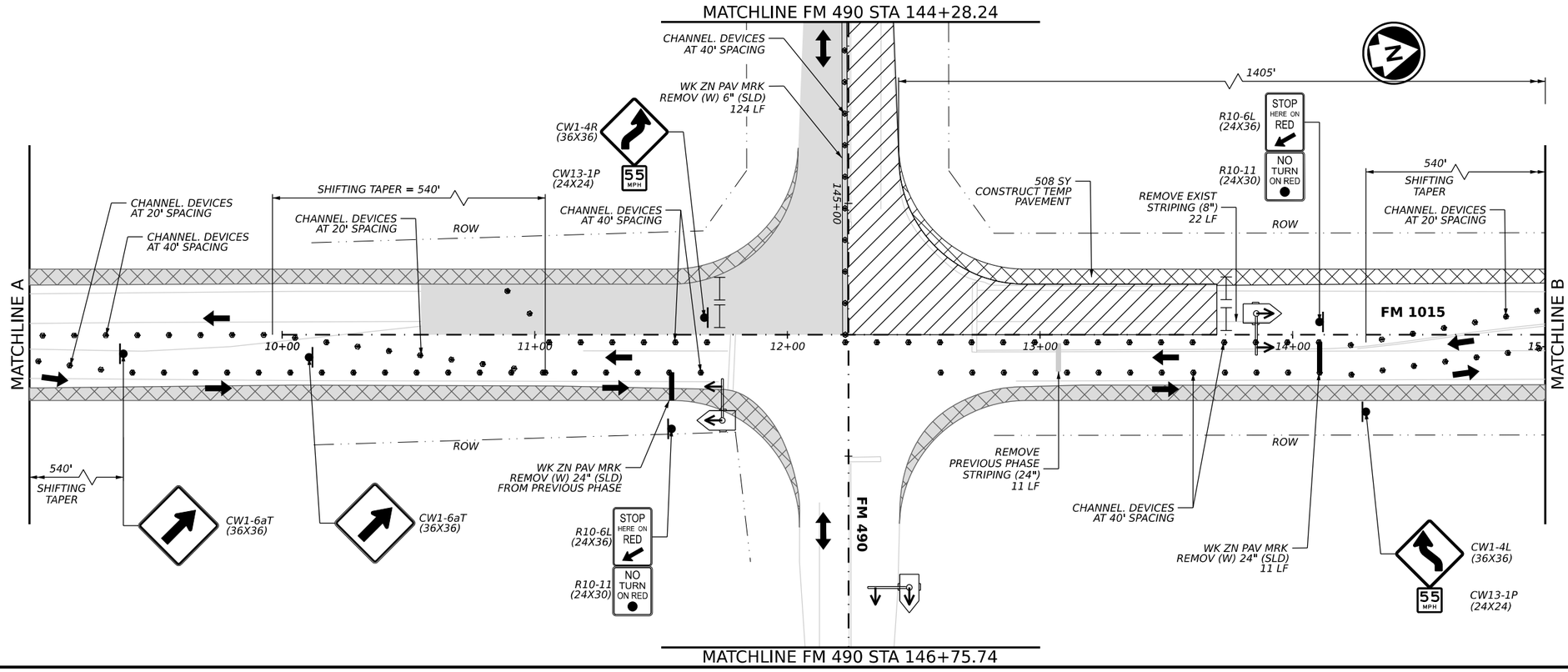

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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Texas Department of Transportation

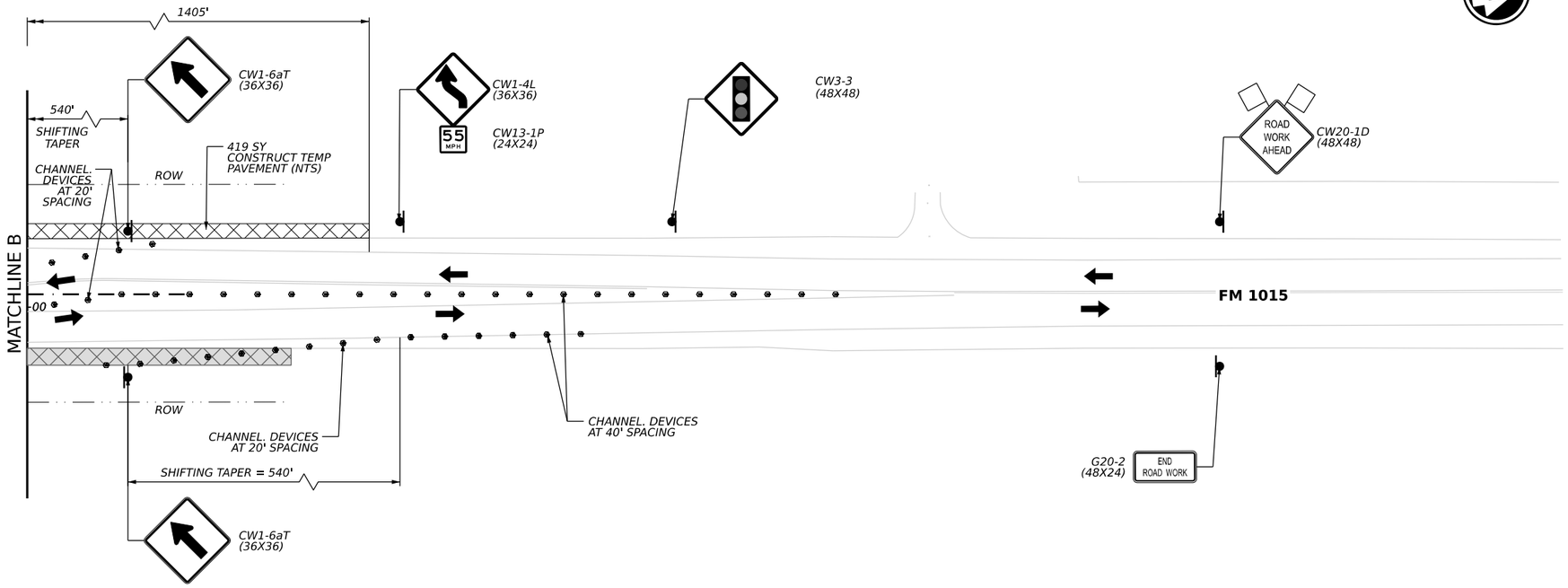
FM 1015

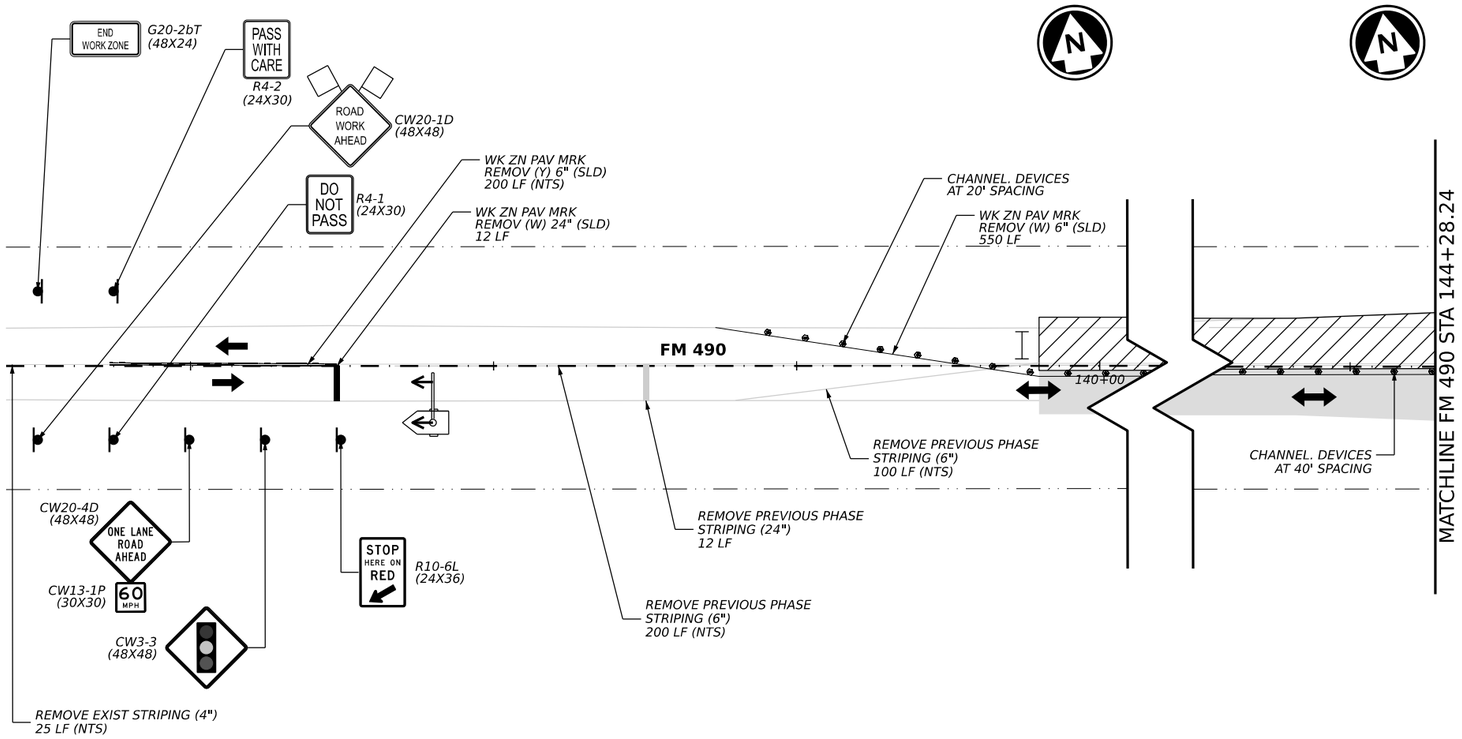
TRAFFIC CONTROL PLAN
PHASE 2B
BEGIN TO MATCHLINE B

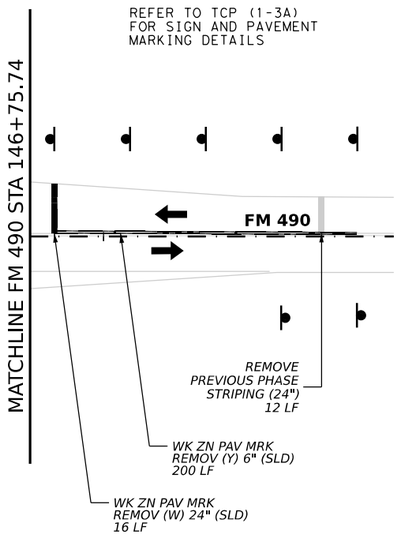
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		35

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2B-01.dgn







HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

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13737 NOEL RD.
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Texas Department of Transportation

FM 1015

TRAFFIC CONTROL PLAN PHASE 2B MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		36

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2B-02.dgn

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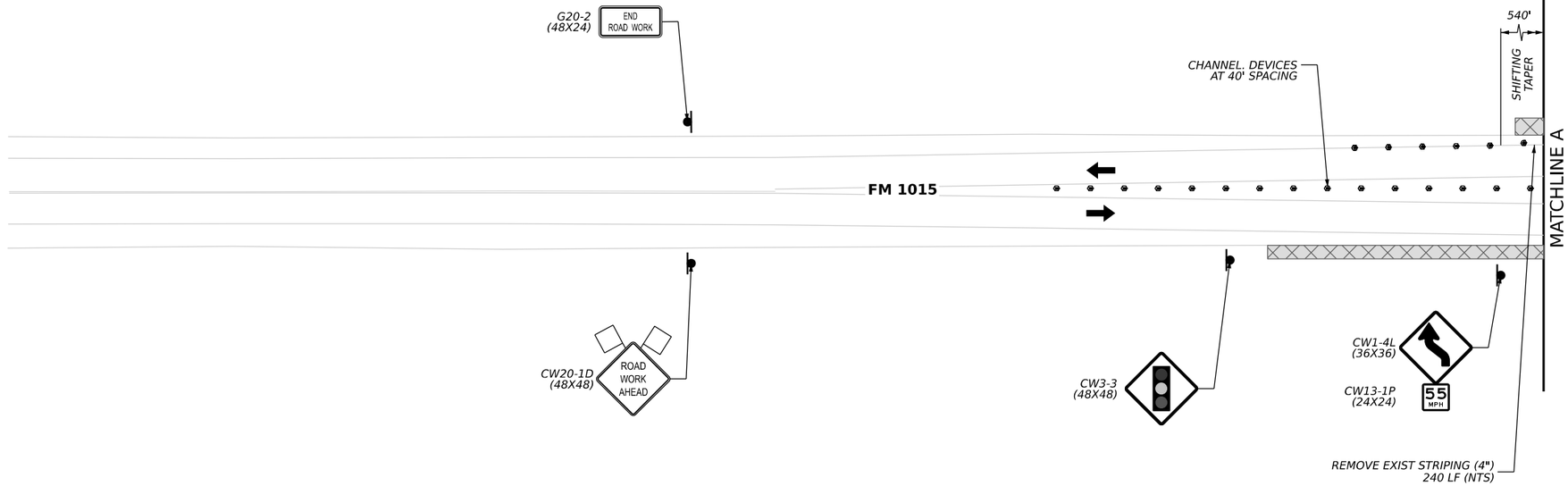
CK:
DW:
CK:
DW:



LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
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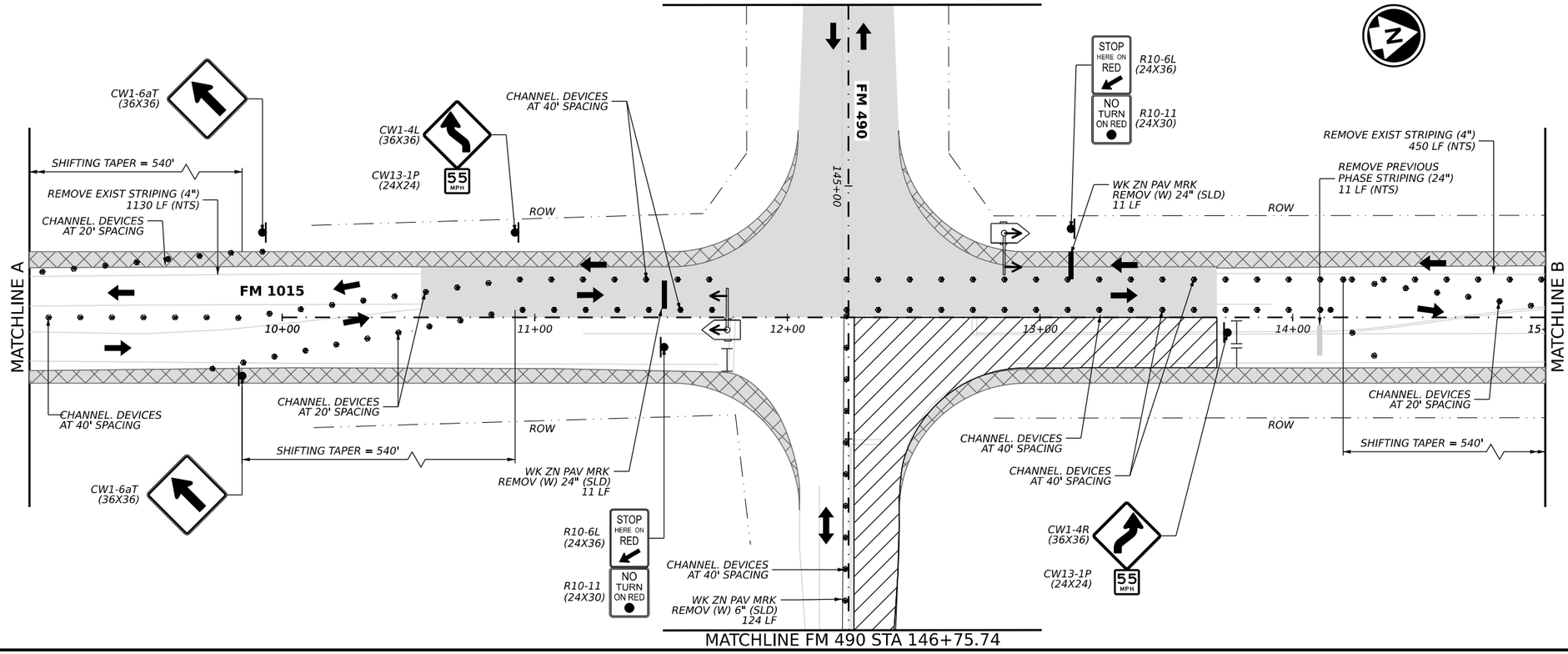

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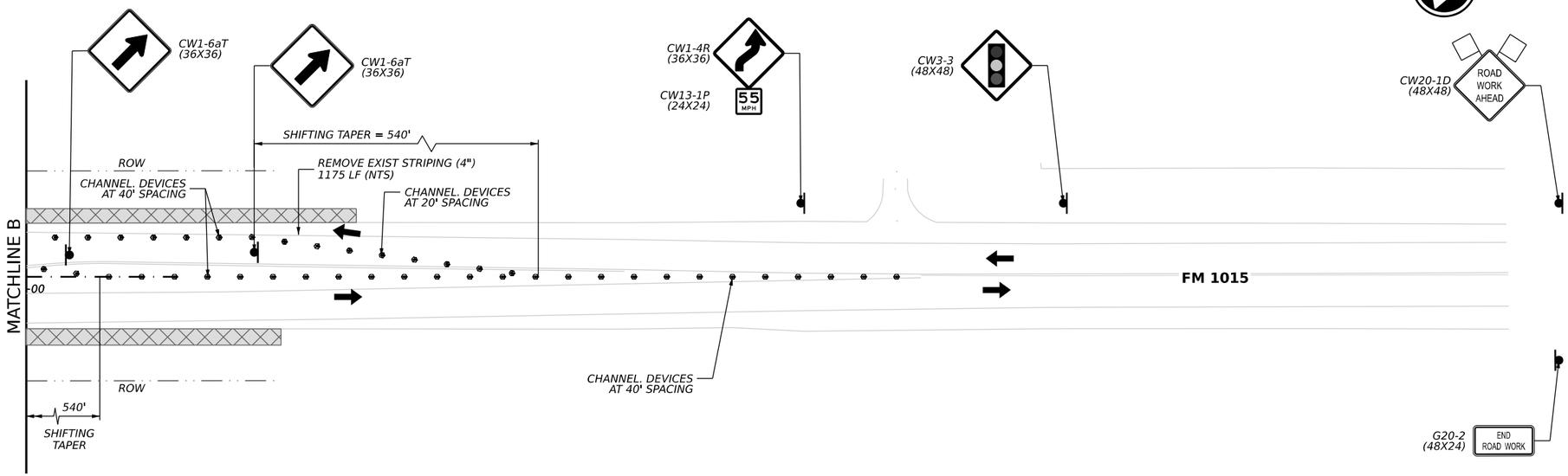
FM 1015

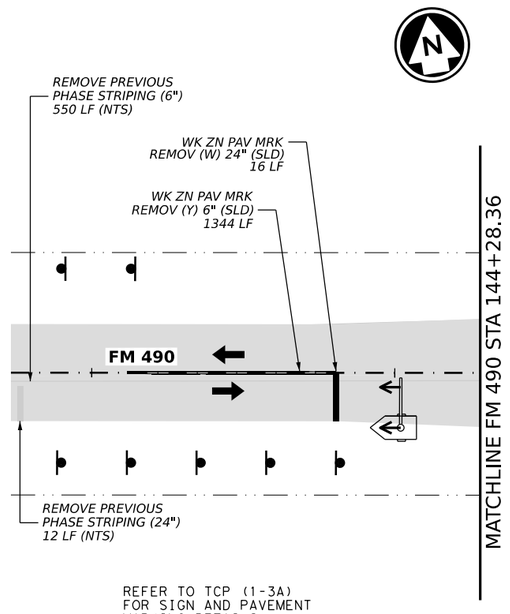
TRAFFIC CONTROL PLAN
PHASE 2C
BEGIN TO MATCHLINE B

SHEET 1 OF 2

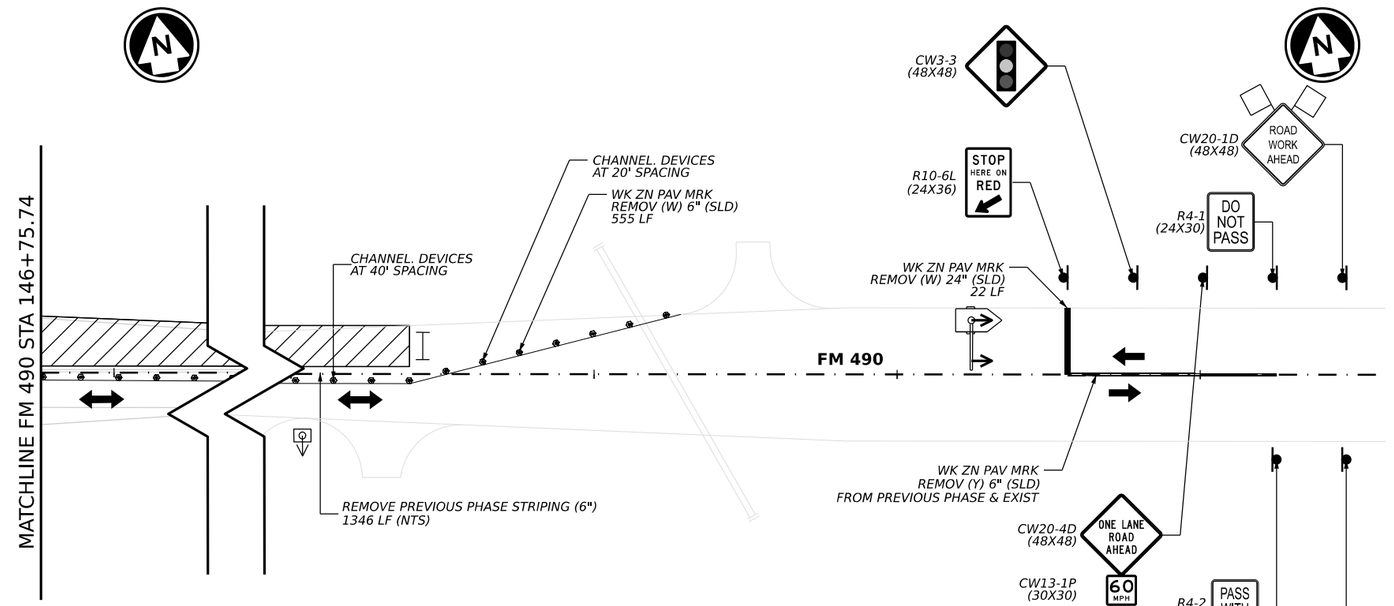
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		37

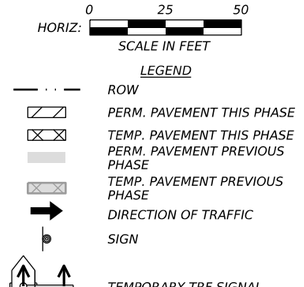
DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2C-01.dgn





REFER TO TCP (1-3A)
FOR SIGN AND PAVEMENT
MARKING DETAILS





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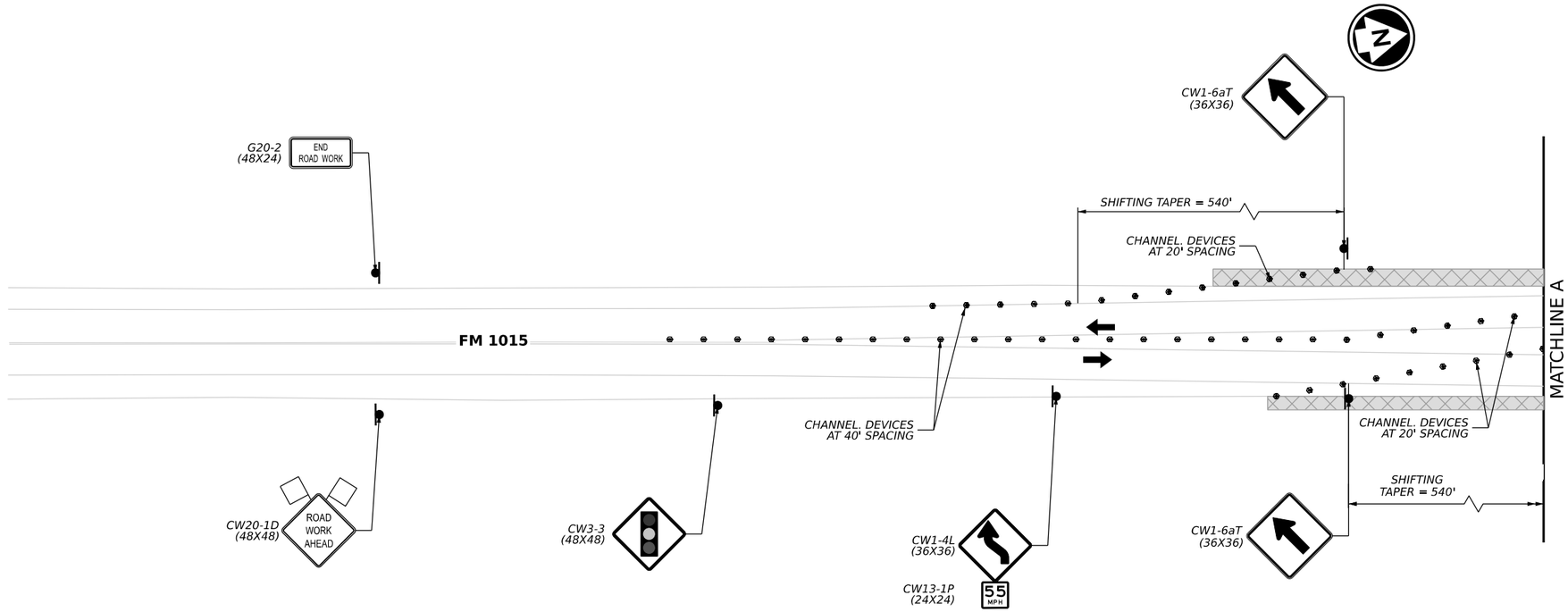
FM 1015

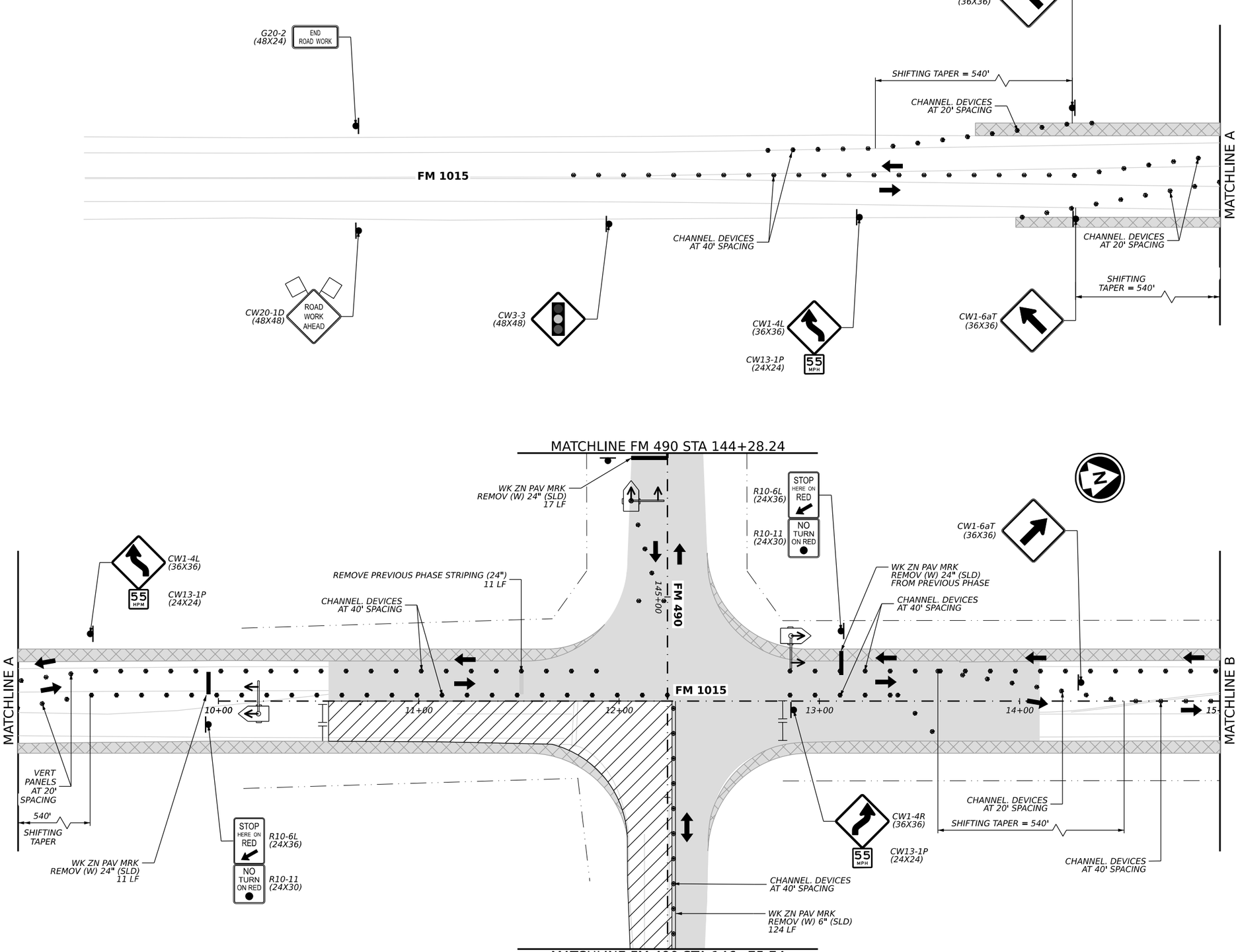
TRAFFIC CONTROL PLAN
PHASE 2C
MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		38

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2C-02.dgn





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
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- TY 3 BARRICADE
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STATE OF TEXAS
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FM 1015

TRAFFIC CONTROL PLAN PHASE 2D BEGIN TO MATCHLINE B

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		39

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2D-01.dgn

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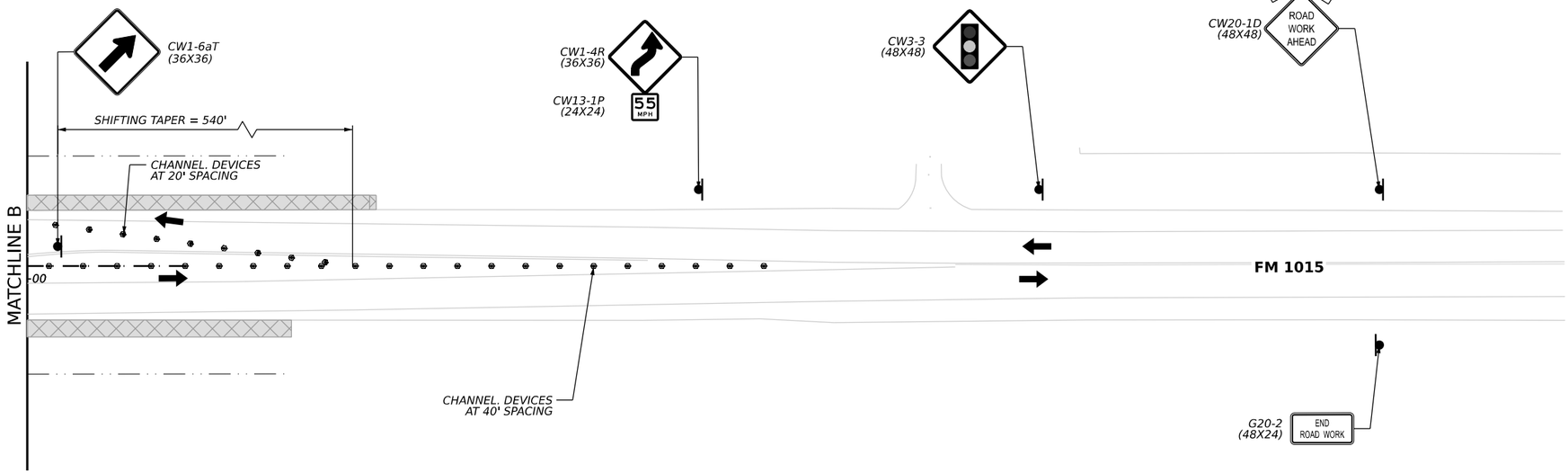

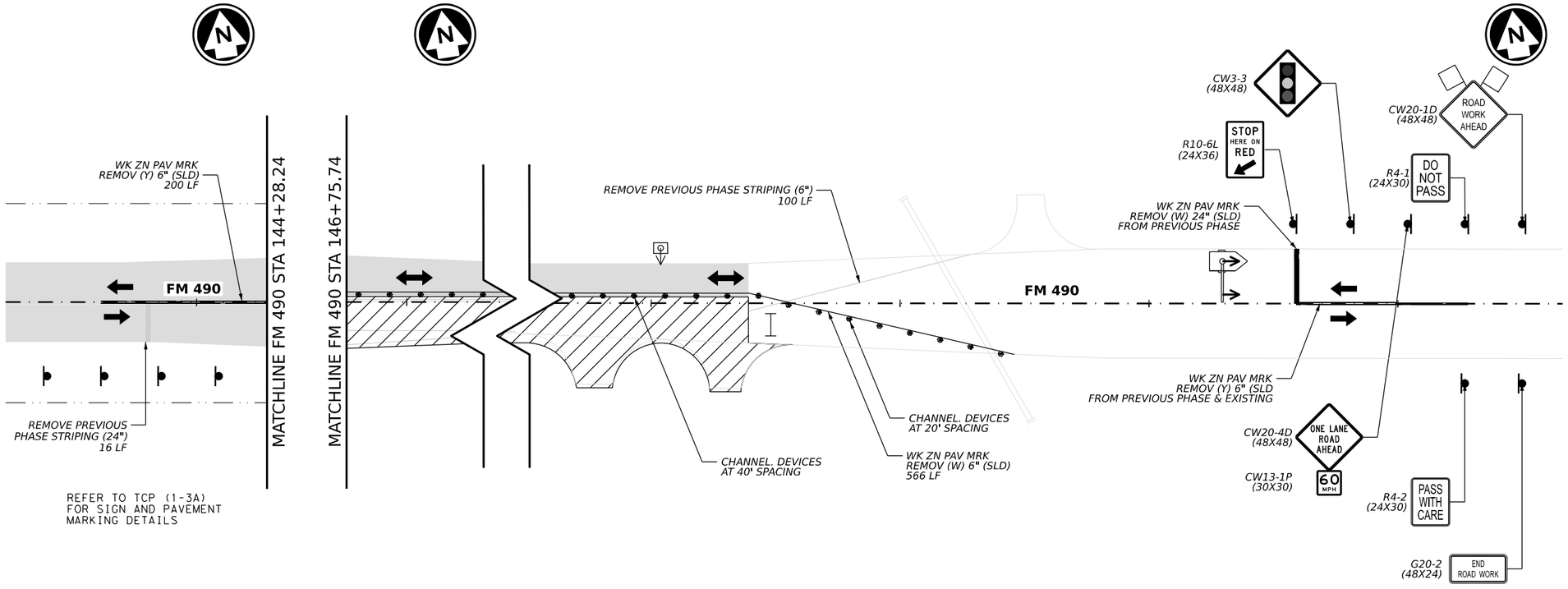

REFER TO TCP (1-3A)
FOR SIGN AND PAVEMENT
MARKING DETAILS

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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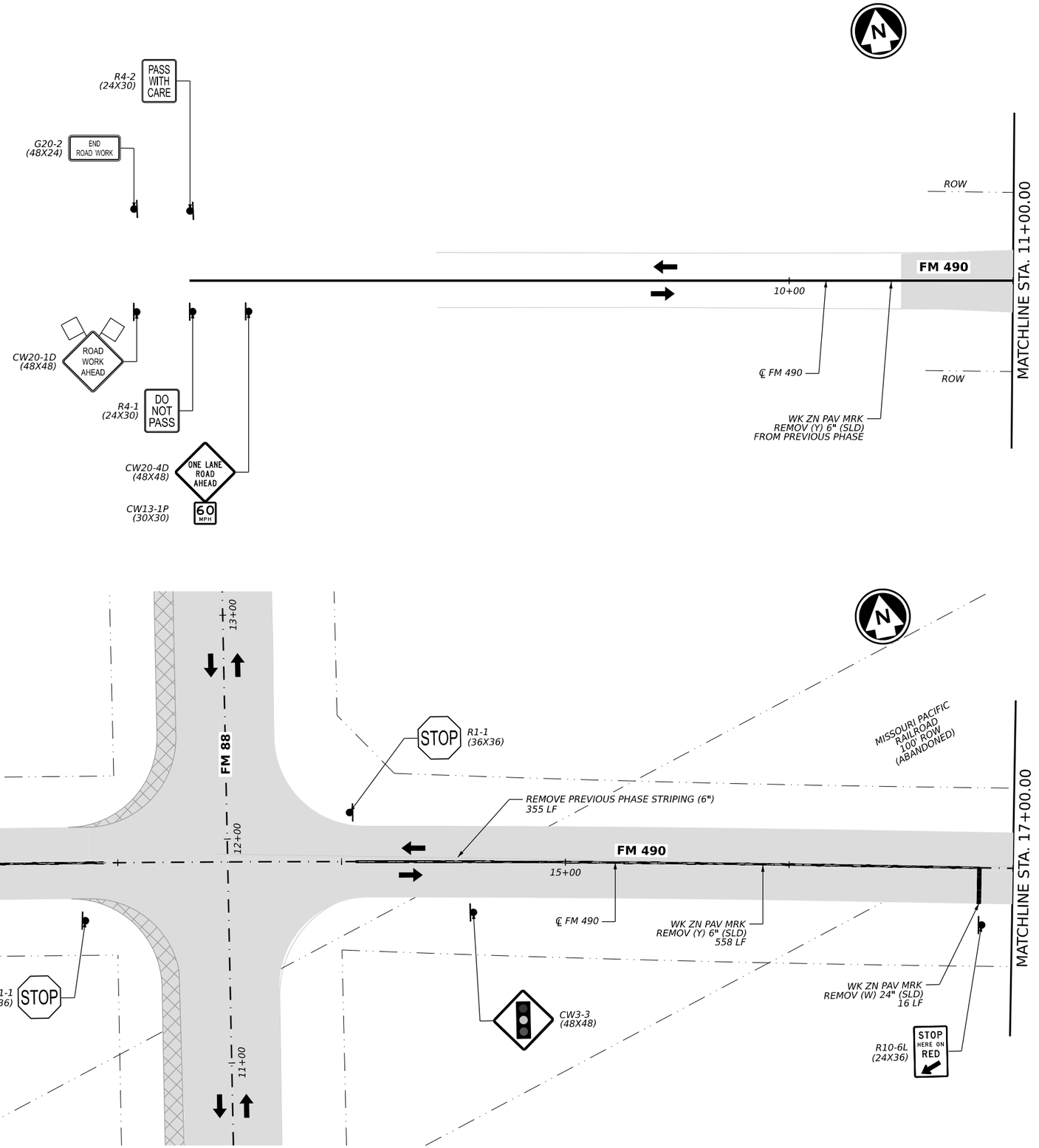
FM 1015

TRAFFIC CONTROL PLAN
PHASE 2D
MATCHLINE B TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		40

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-2D-02.dgn



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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FM 490

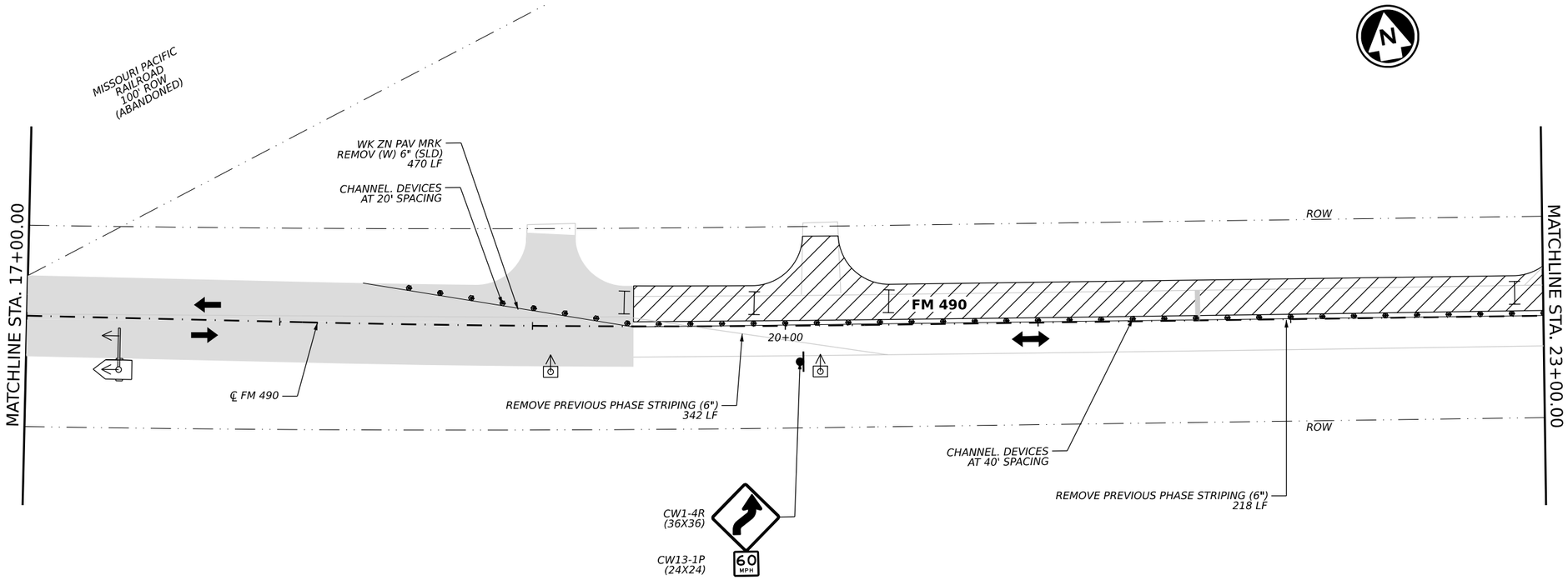
TRAFFIC CONTROL PLAN
PHASE 3A
BEGIN TO STA 17+00

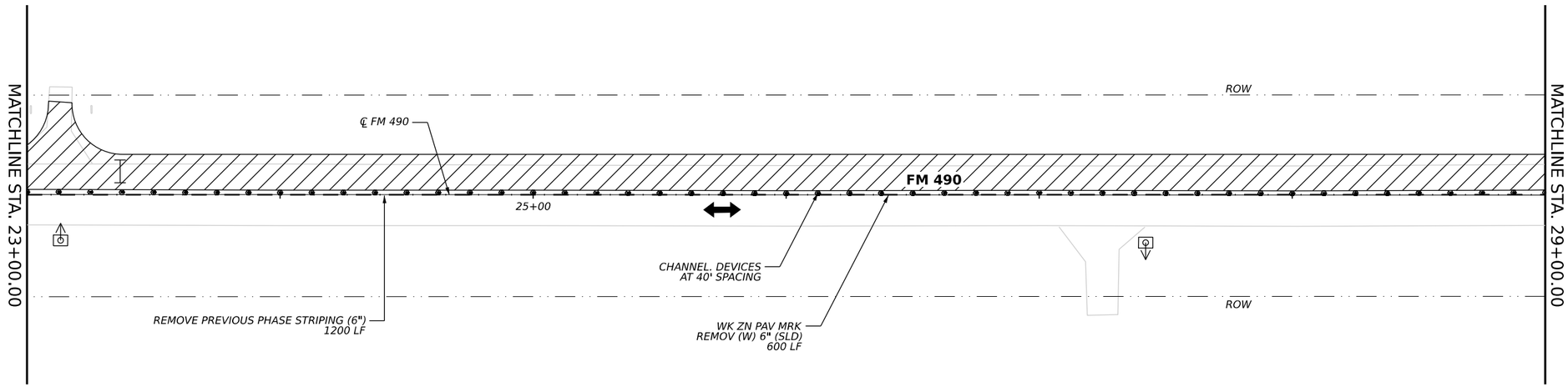
SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		41

CK:
DW:
CK:
DW:

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3A-01.dgn





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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FM 490

TRAFFIC CONTROL PLAN PHASE 3A STA 17+00 TO STA 29+00

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		42

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3A-02.dgn

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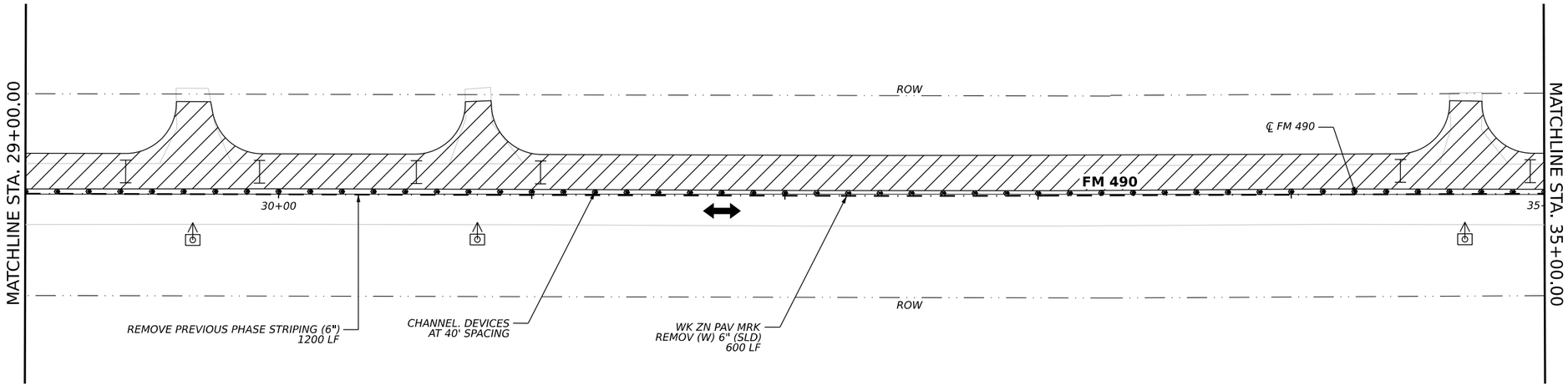

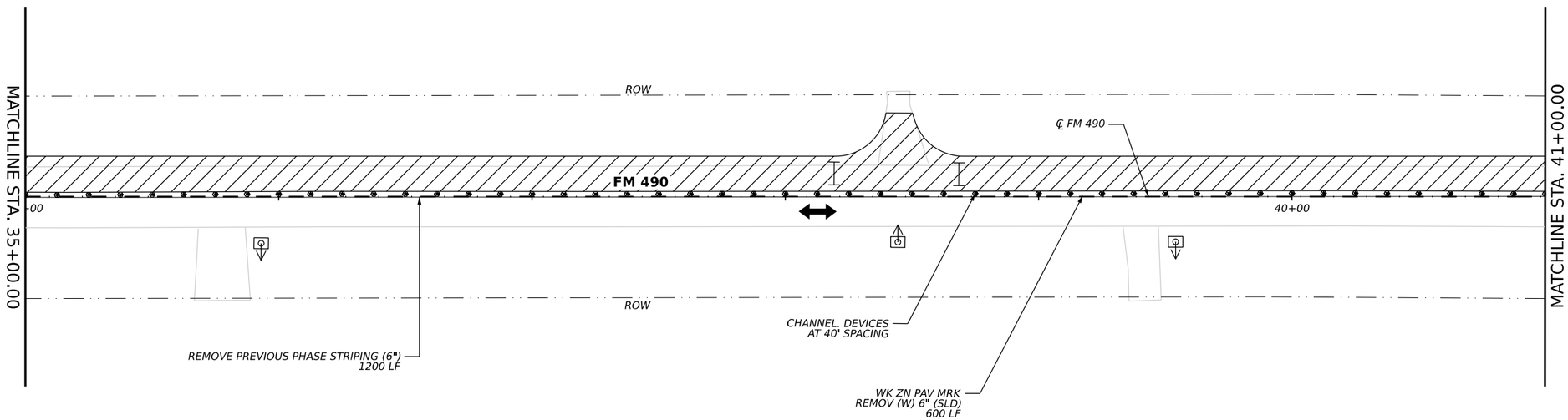

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

NOTES

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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3A
STA 29+00 TO STA 41+00

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		43

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3A-03.dgn

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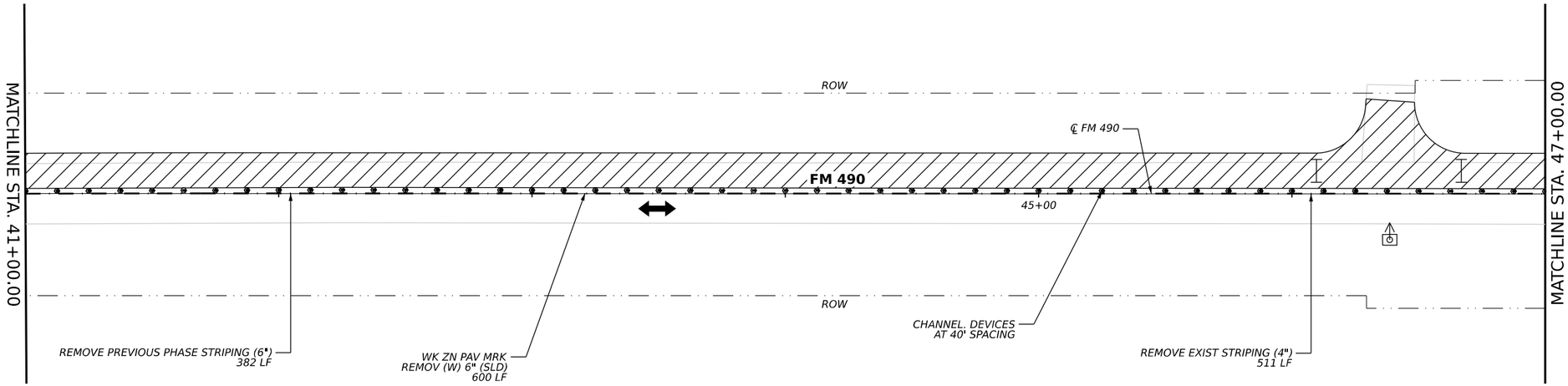

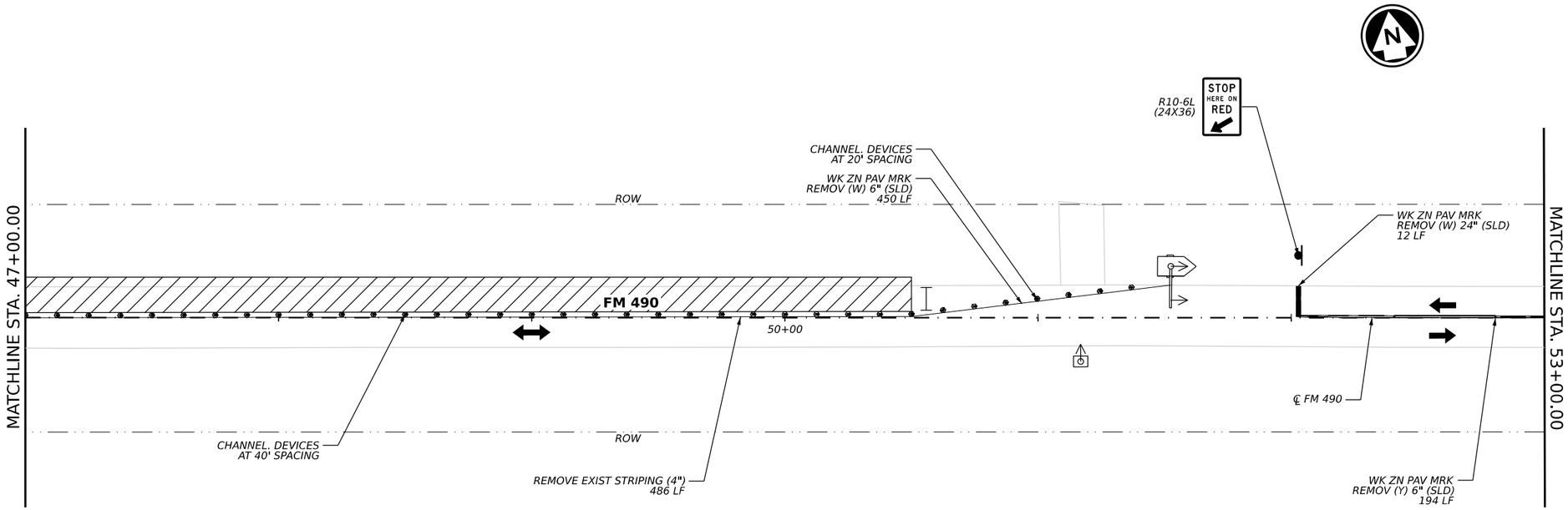

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3A
STA 41+00 TO STA 53+00

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		44

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3A-04.dgn

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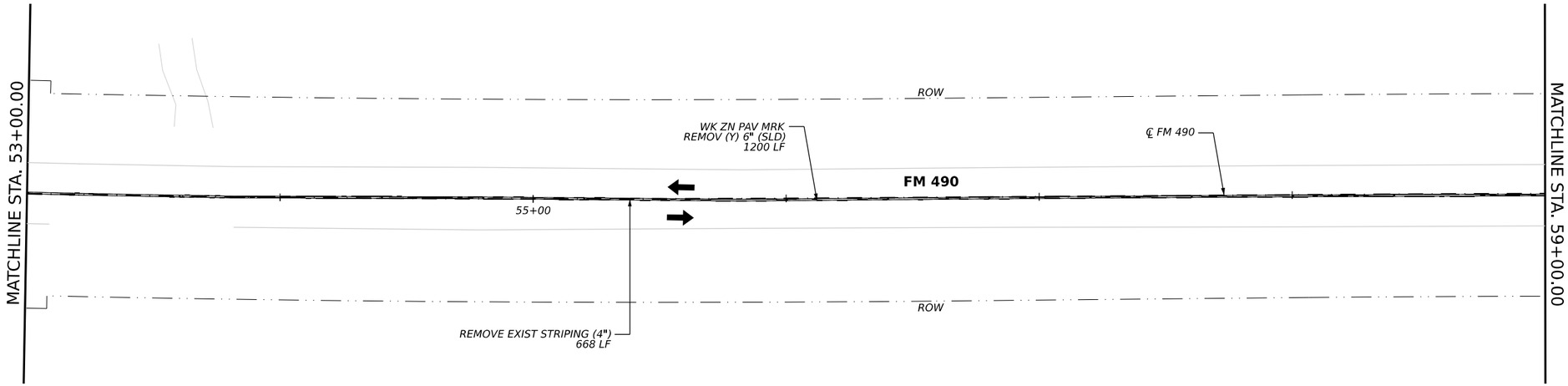

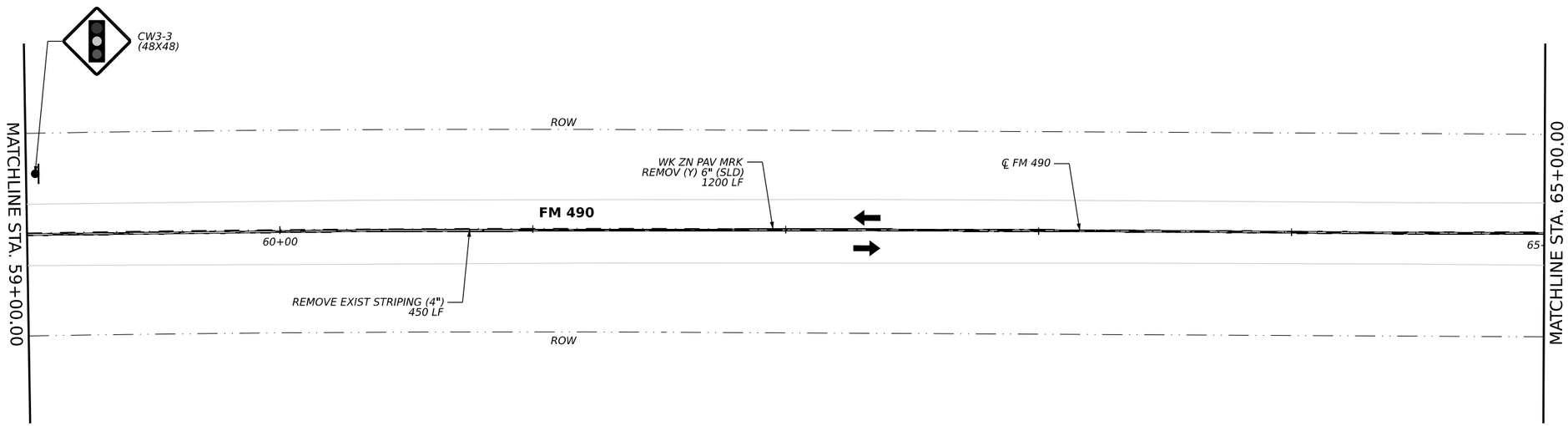

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3A
STA 53+00 TO STA 65+00

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		45

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3A-05.dgn

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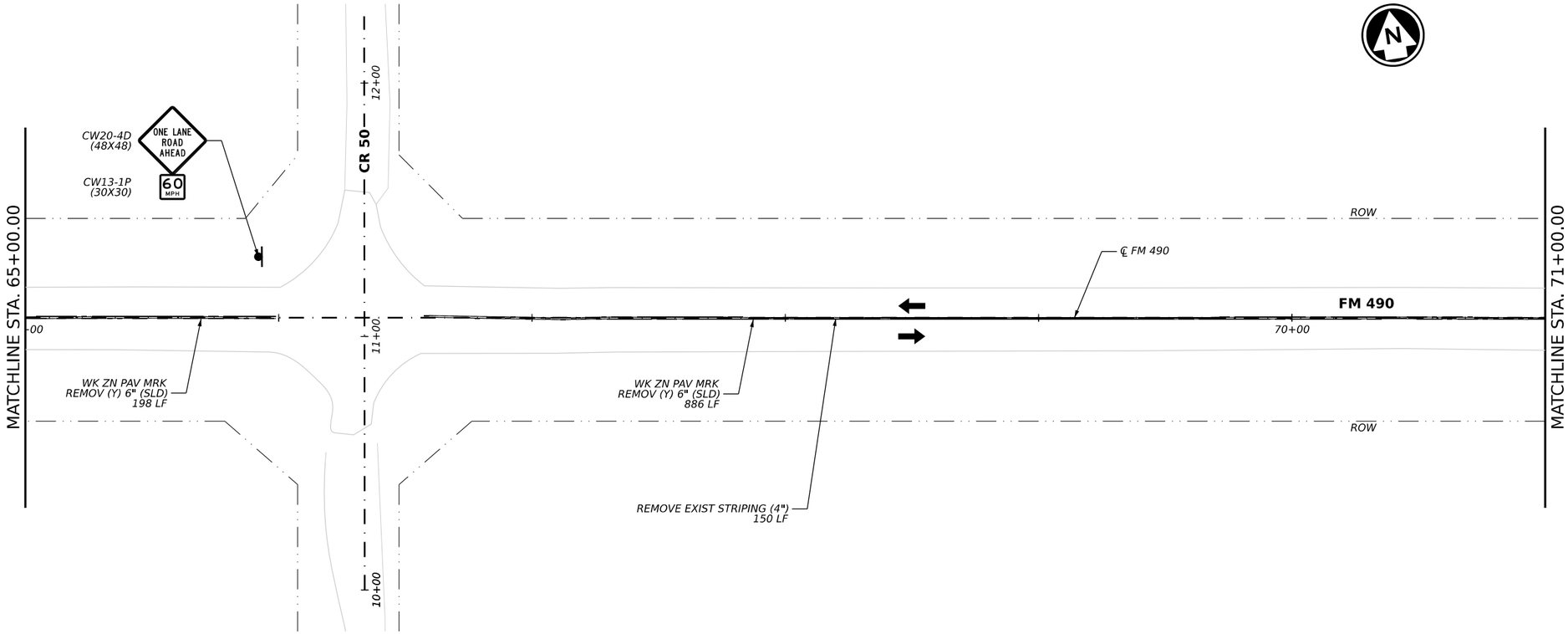

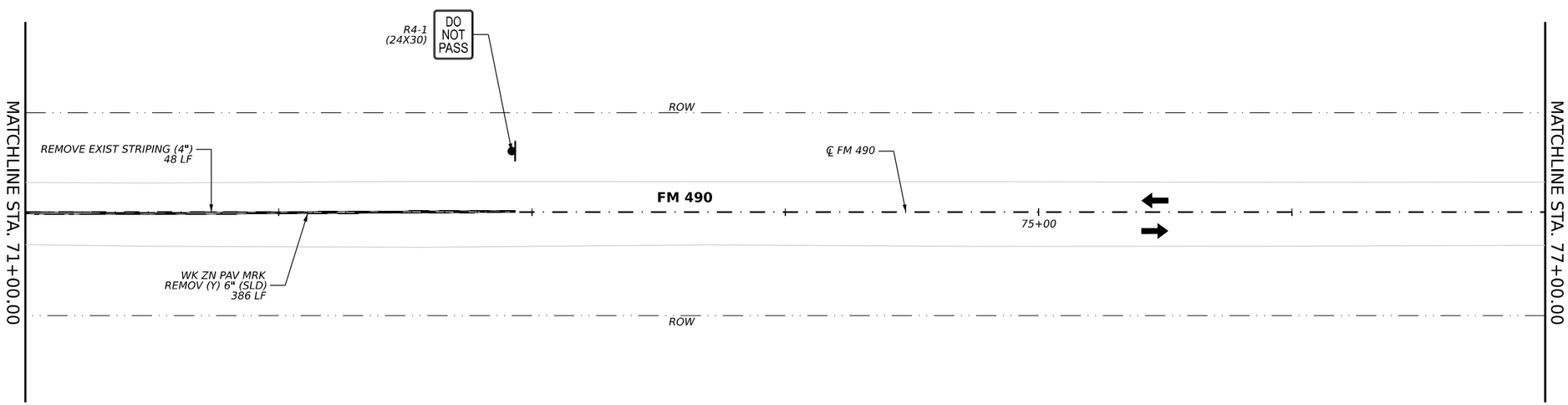

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3A
STA 65+00 TO STA 77+00

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		46

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3A-06.dgn

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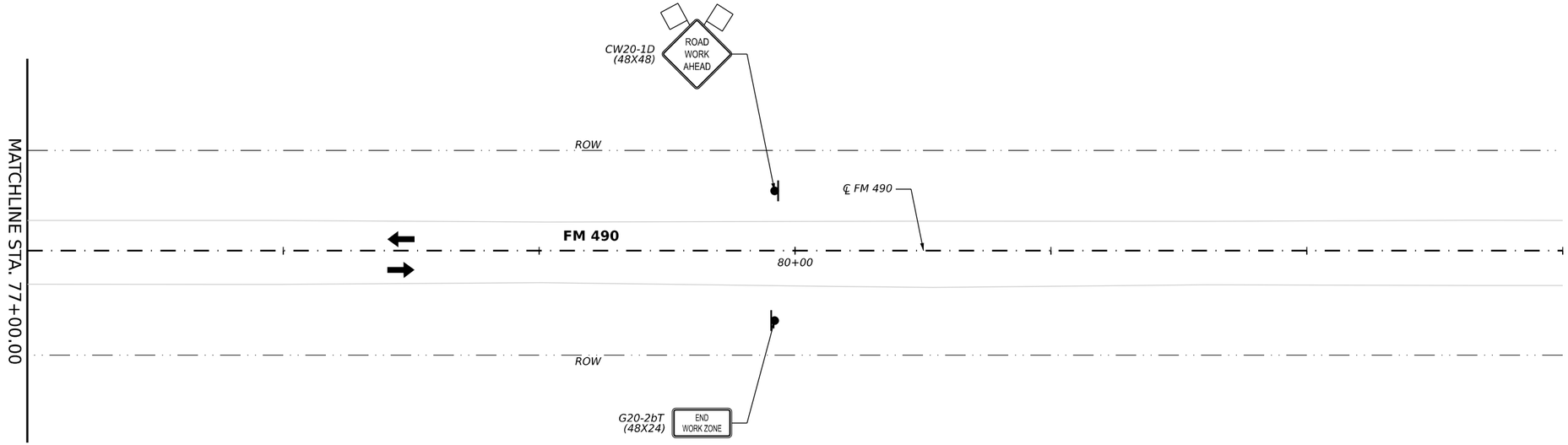

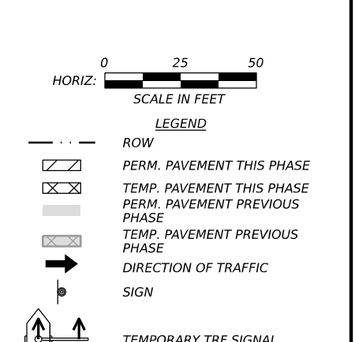

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FM 490

TRAFFIC CONTROL PLAN
PHASE 3A
STA 77+00 TO STA 83+00

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		47

DATE: 1/31/2024
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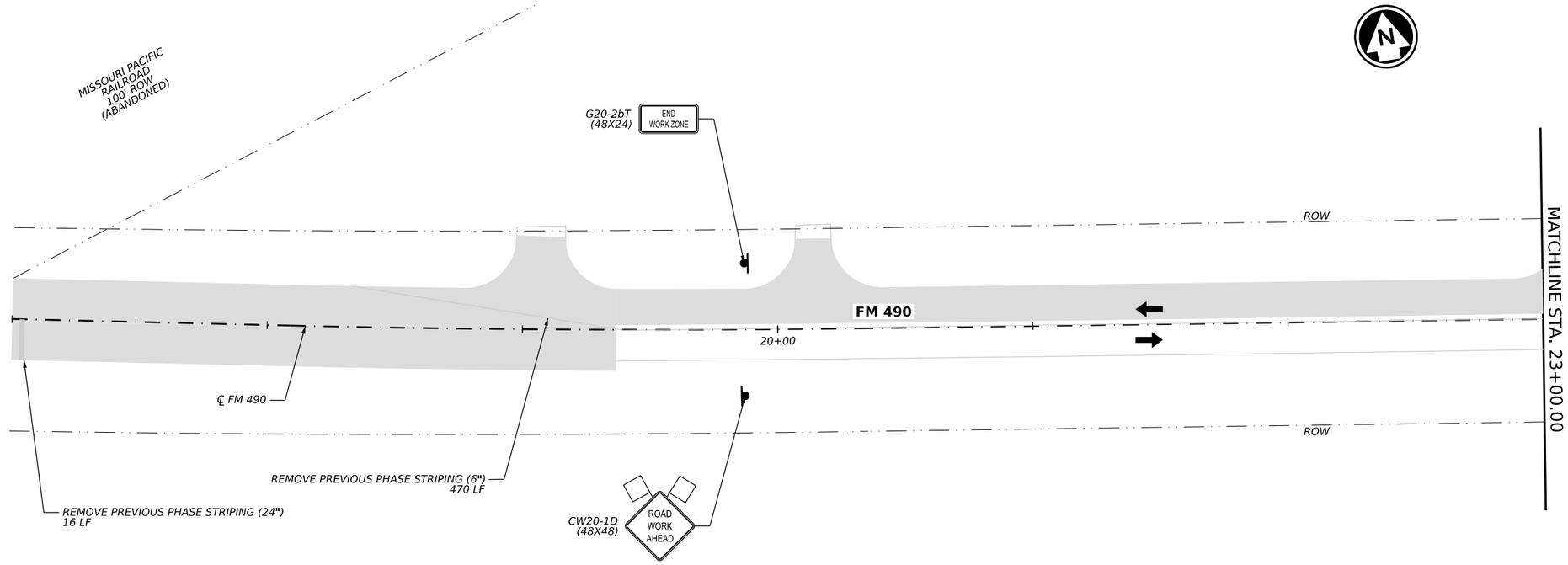

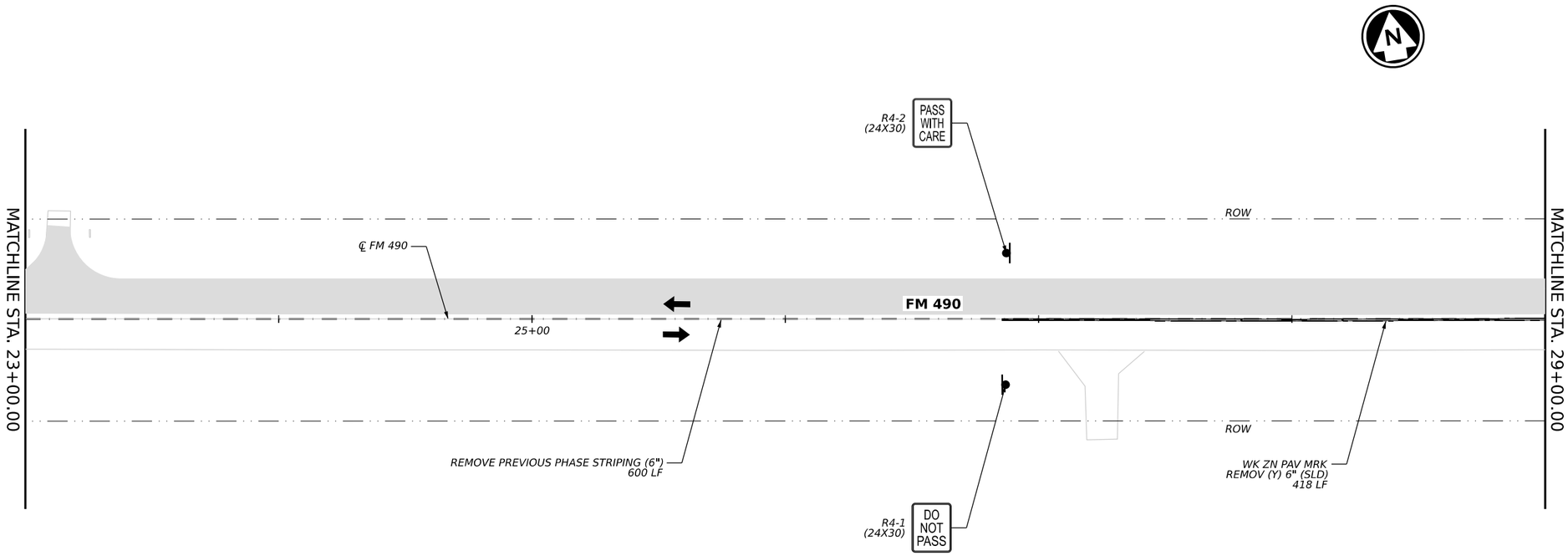

0 25 50

HORIZ:

SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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STATE OF TEXAS
KRISTEN E. HARPER
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LICENSED PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN PHASE 3B STA 17+00 TO STA 29+00

SHEET 1 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		48

DATE: 1/31/2024
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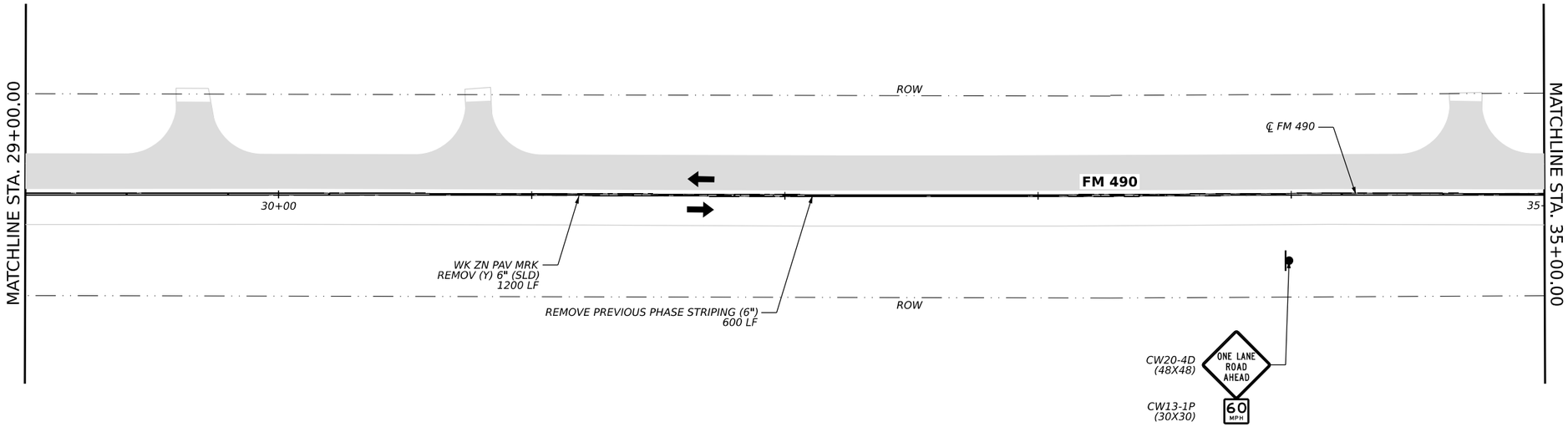

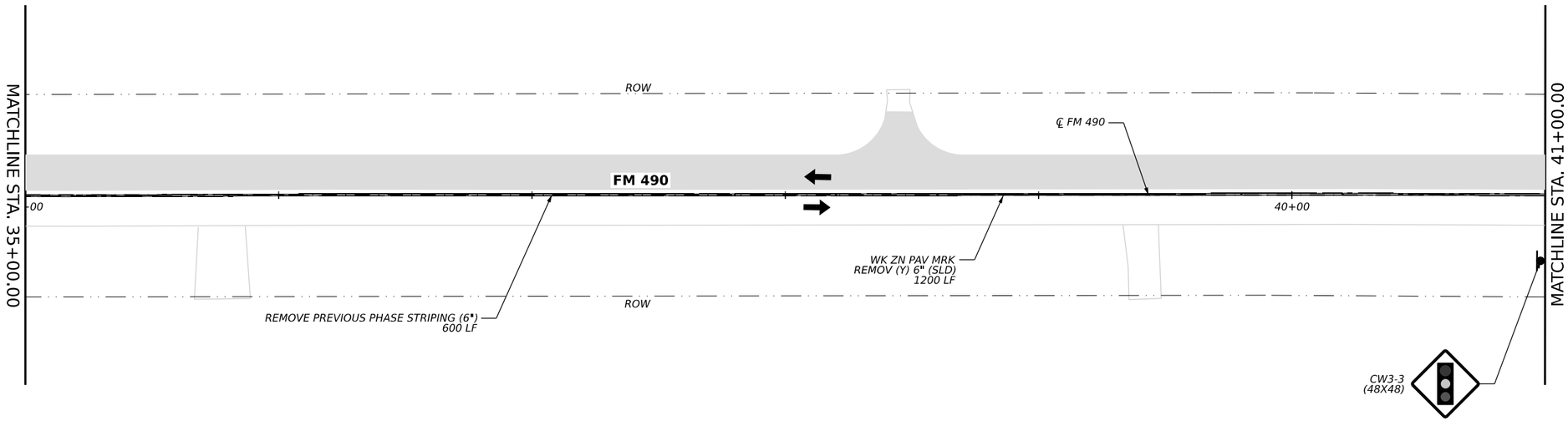

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HORIZ:

SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 29+00 TO STA 41+00

SHEET 2 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		49

DATE: 1/31/2024
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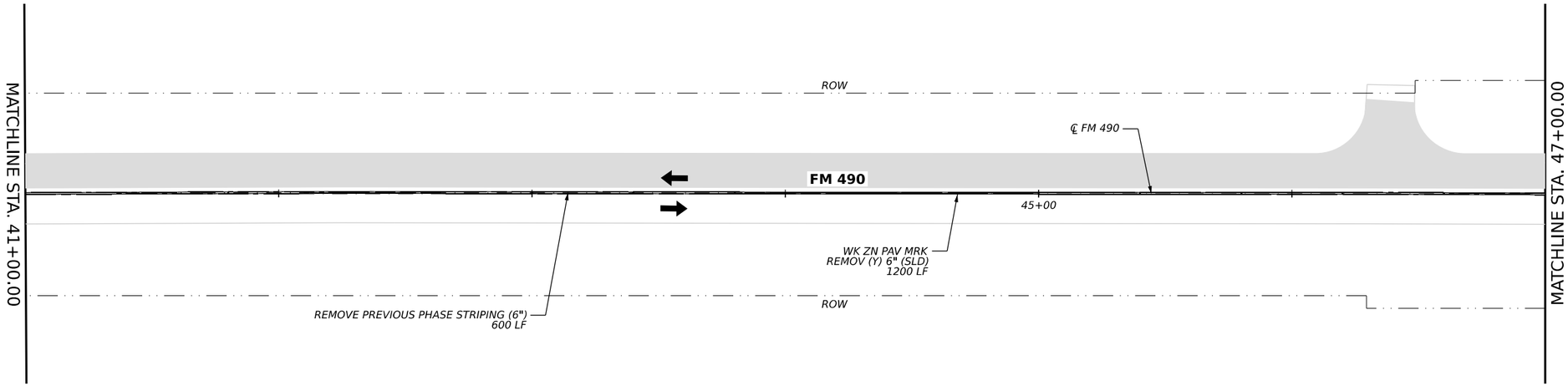

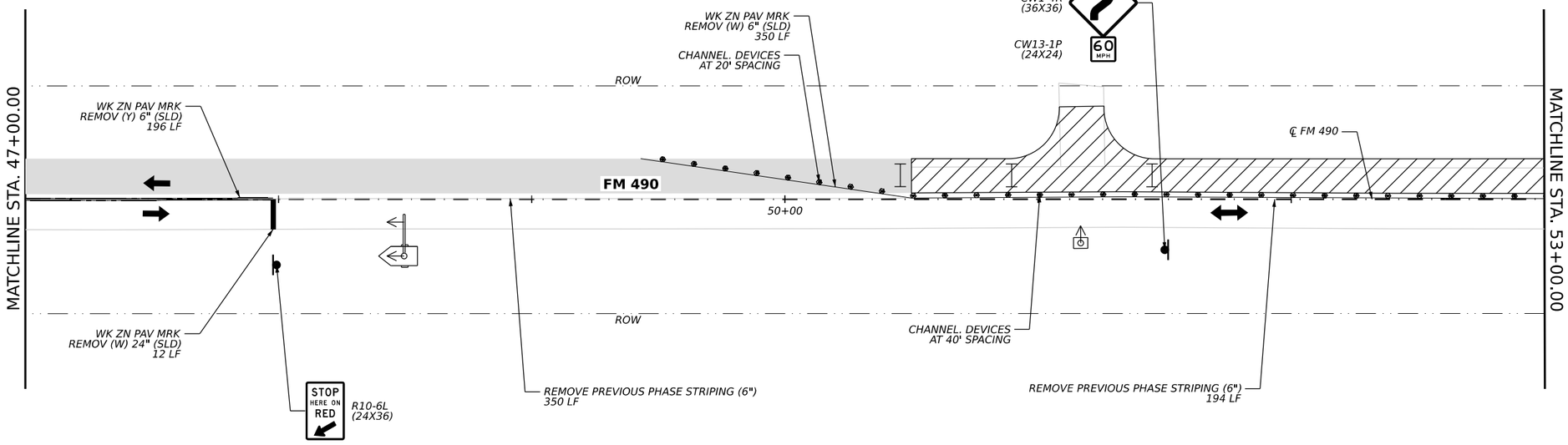

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 41+00 TO STA 53+00

SHEET 3 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		50

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3B-03.dgn

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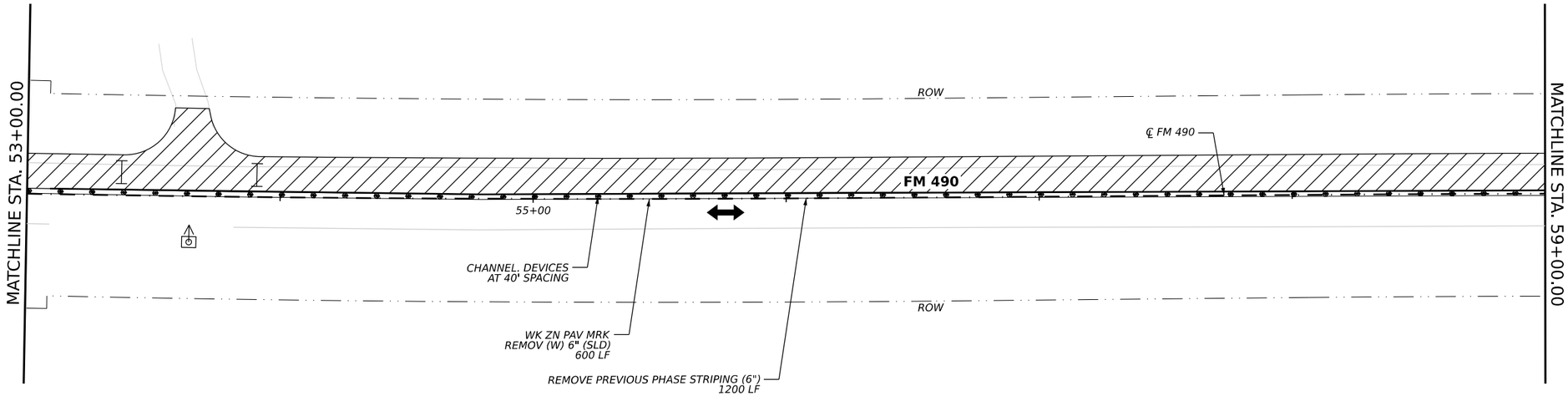

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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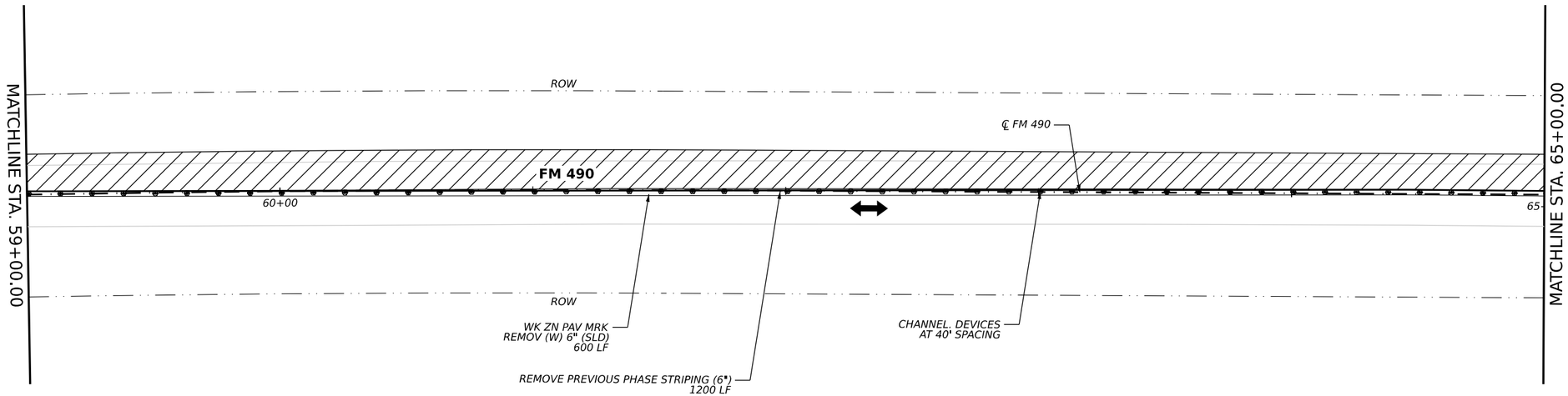

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FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 53+00 TO STA 65+00

SHEET 4 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		51

DATE: 1/31/2024
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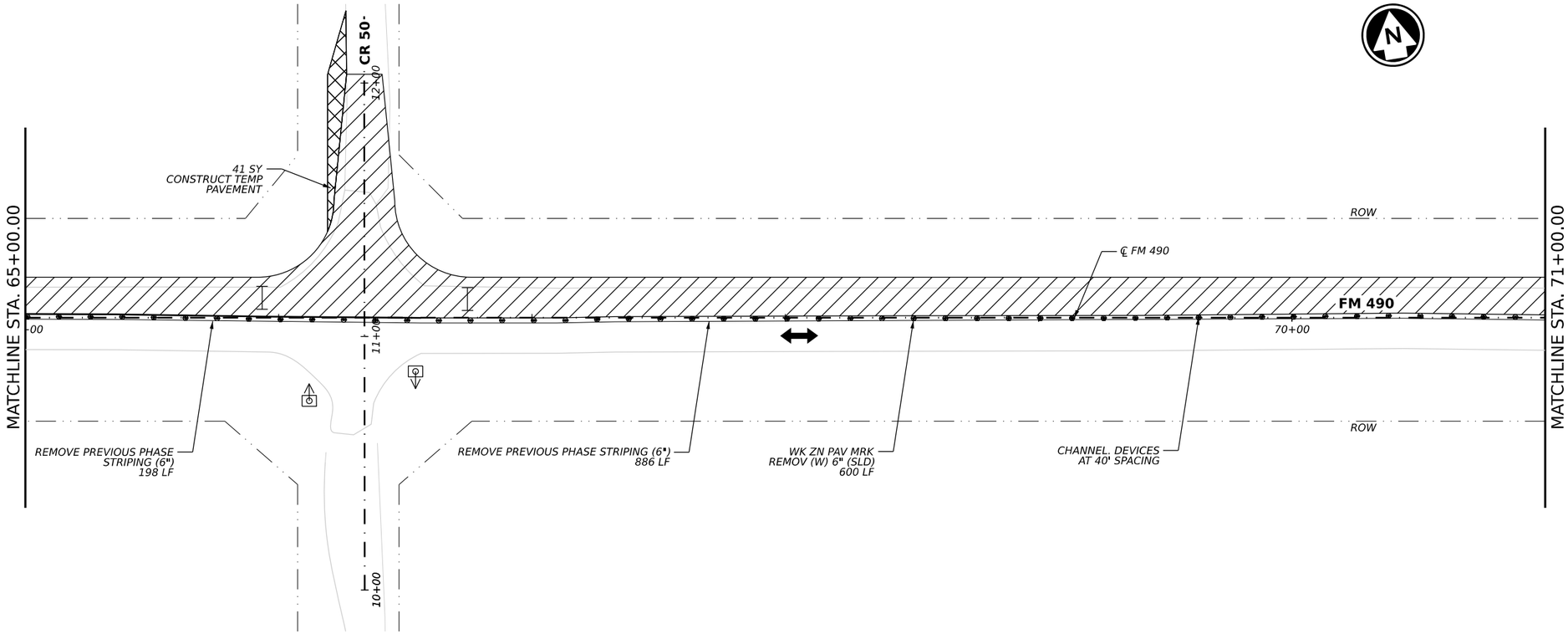

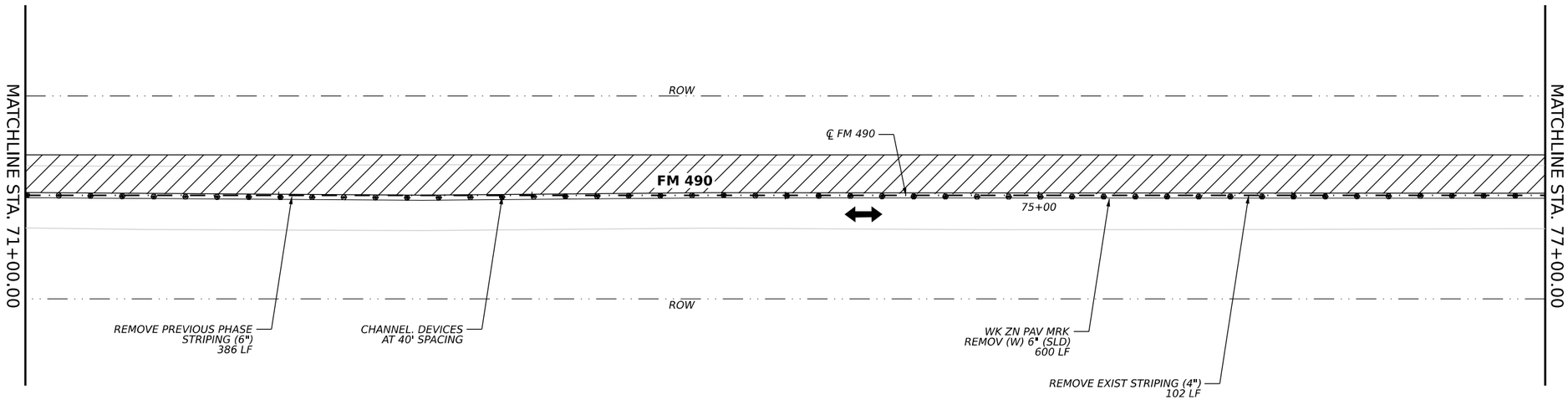

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 65+00 TO STA 77+00

SHEET 5 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		52

DATE: 1/31/2024
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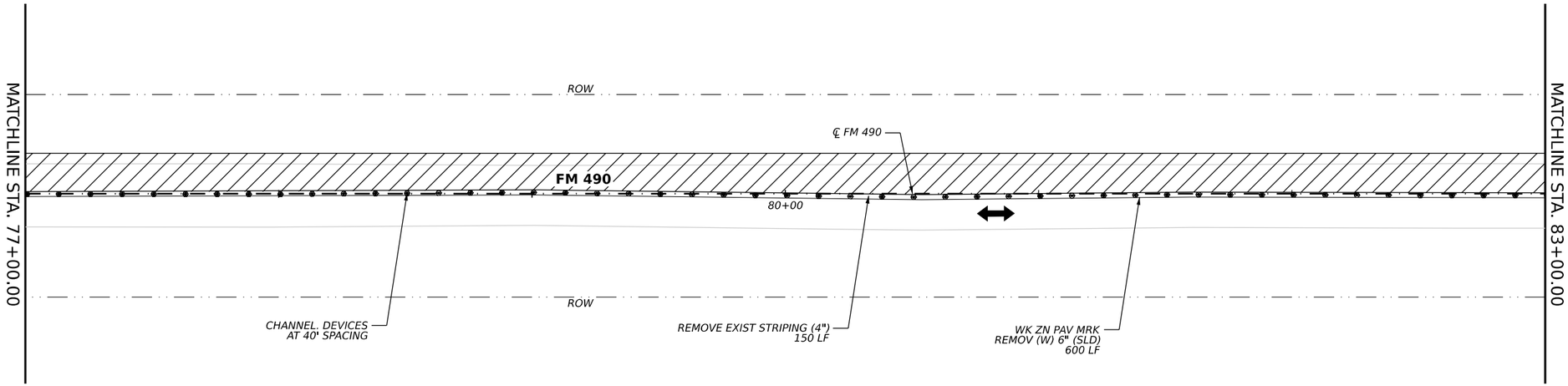

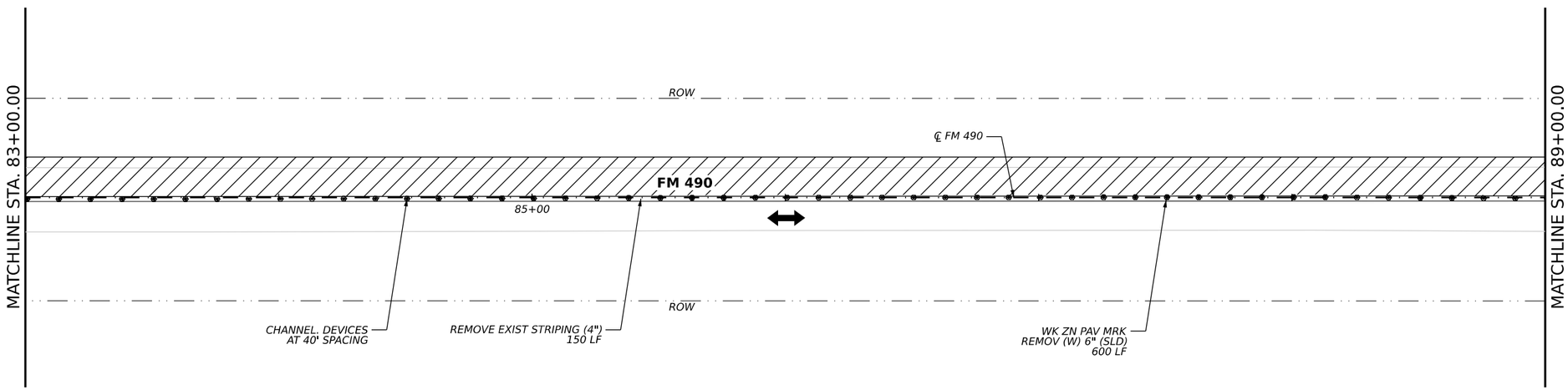

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

NOTES

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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 77+00 TO STA 89+00

SHEET 6 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		53

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3B-06.dgn

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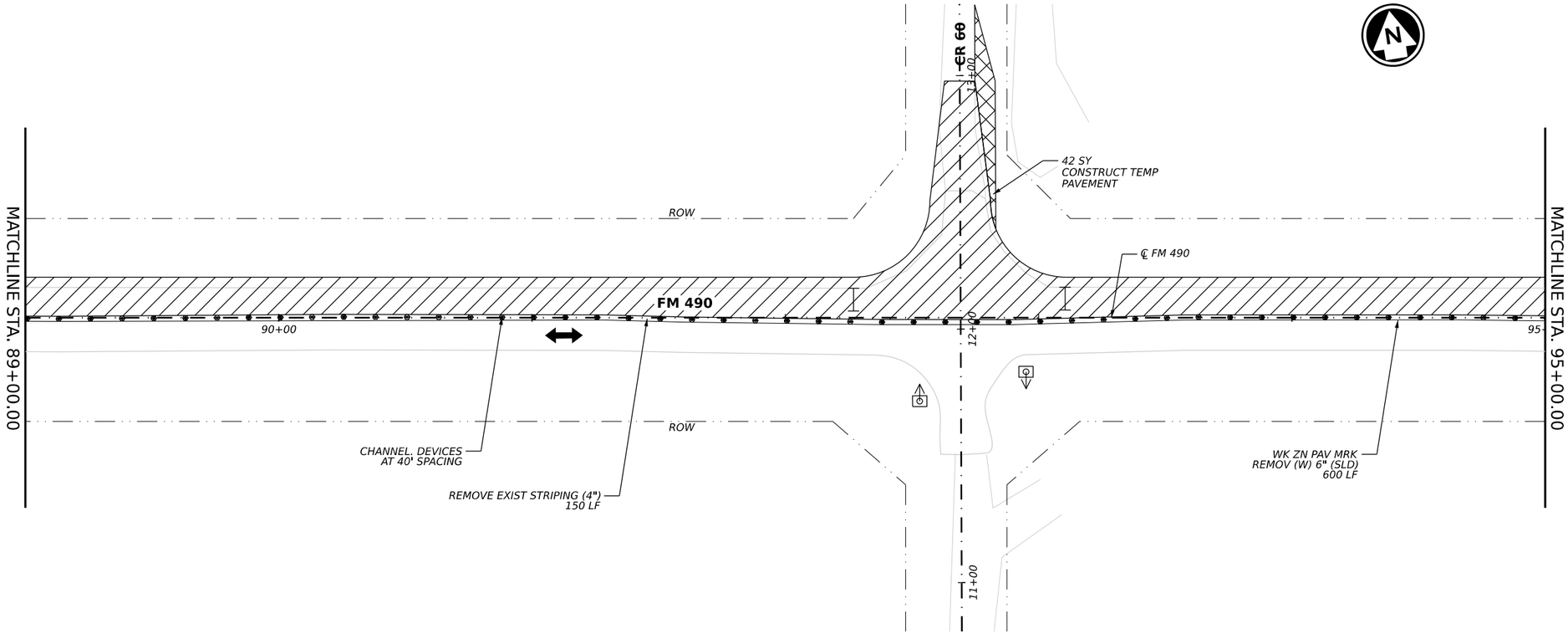

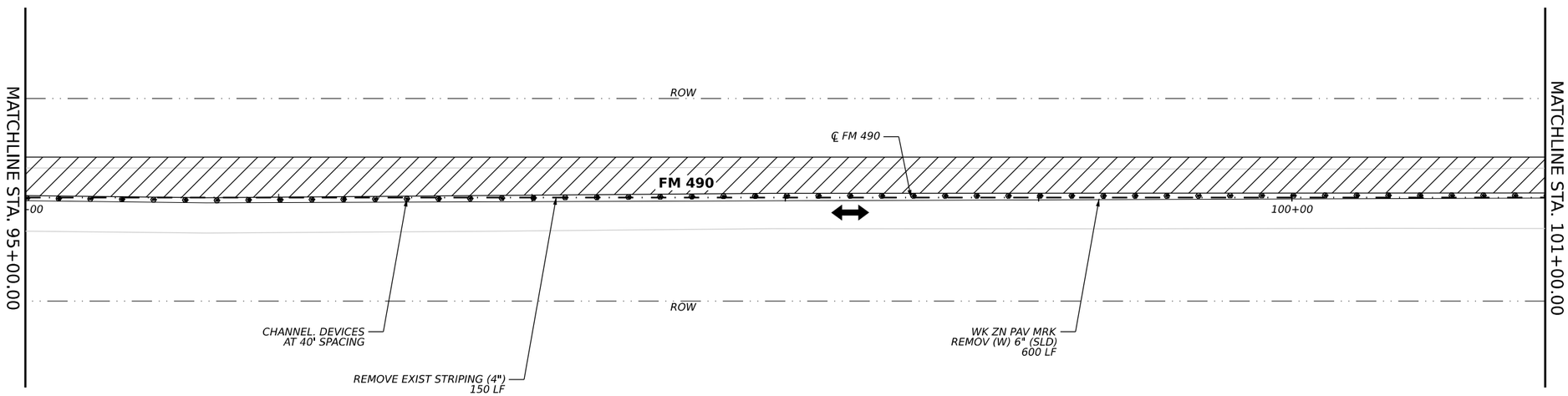

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 89+00 TO STA 101+00

SHEET 7 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		54

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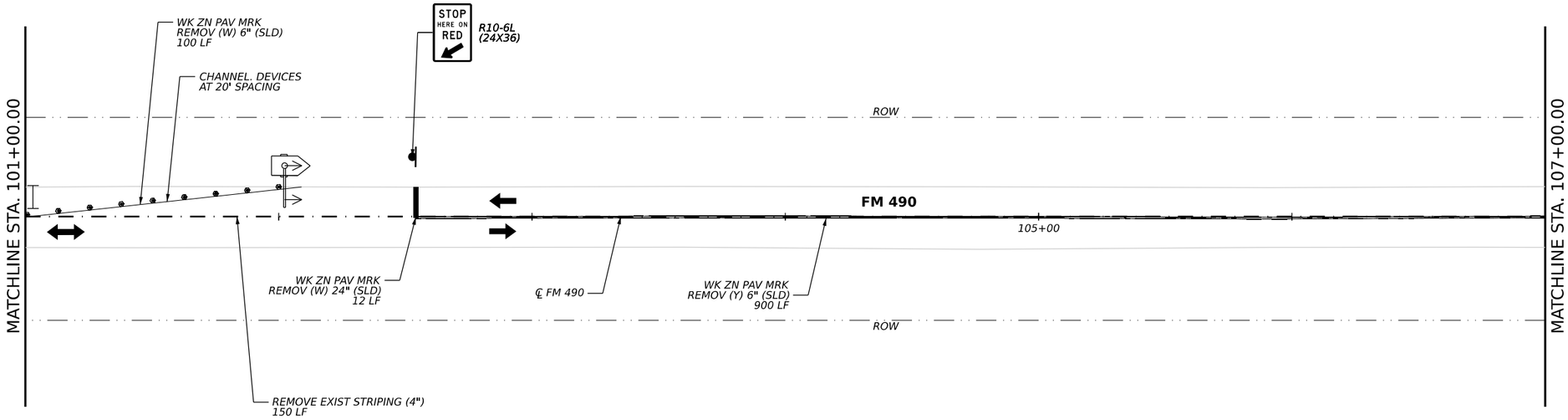

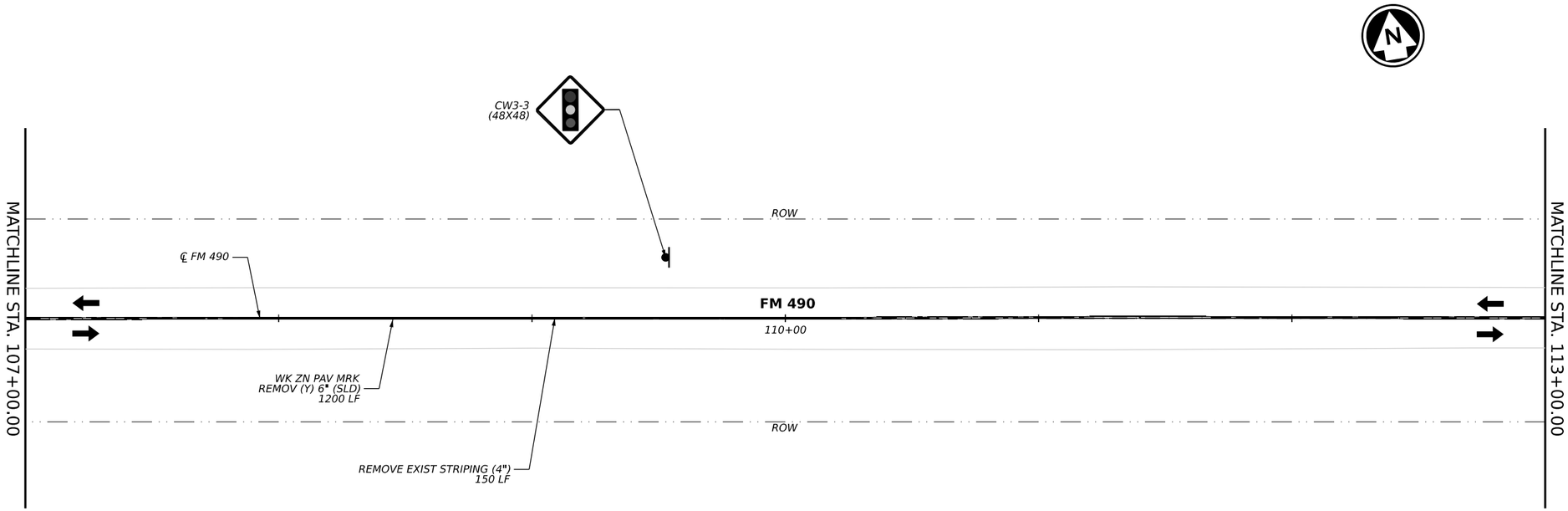

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 101+00 TO STA 113+00

SHEET 8 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		55

DATE: 1/31/2024
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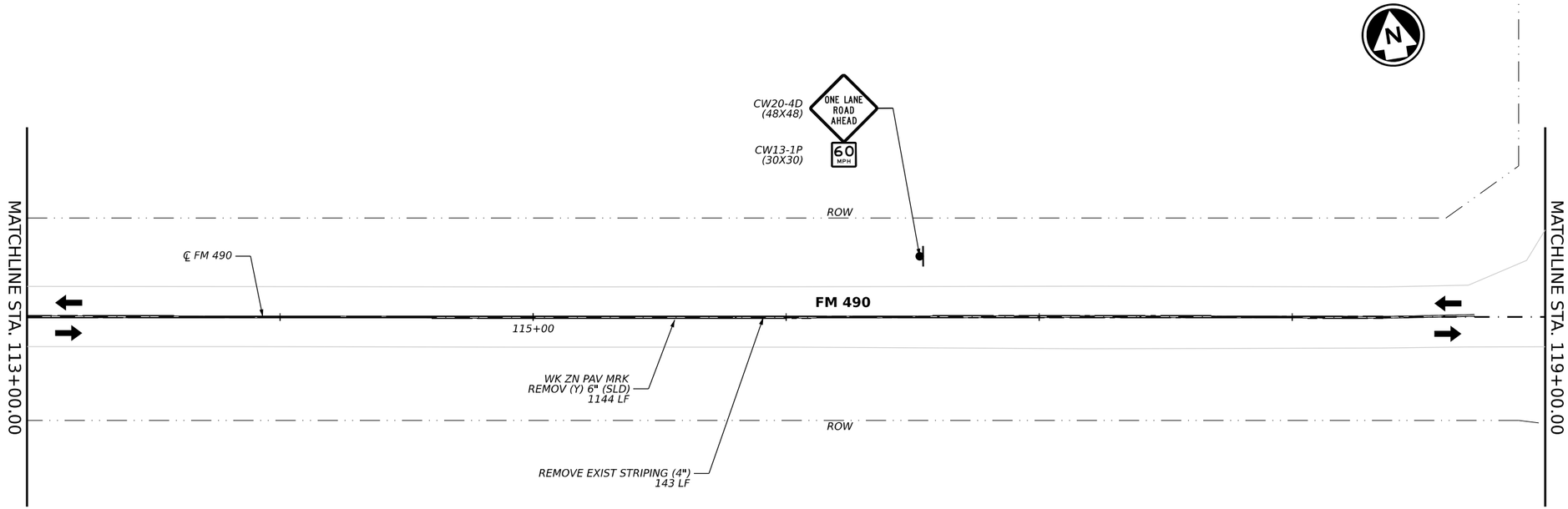

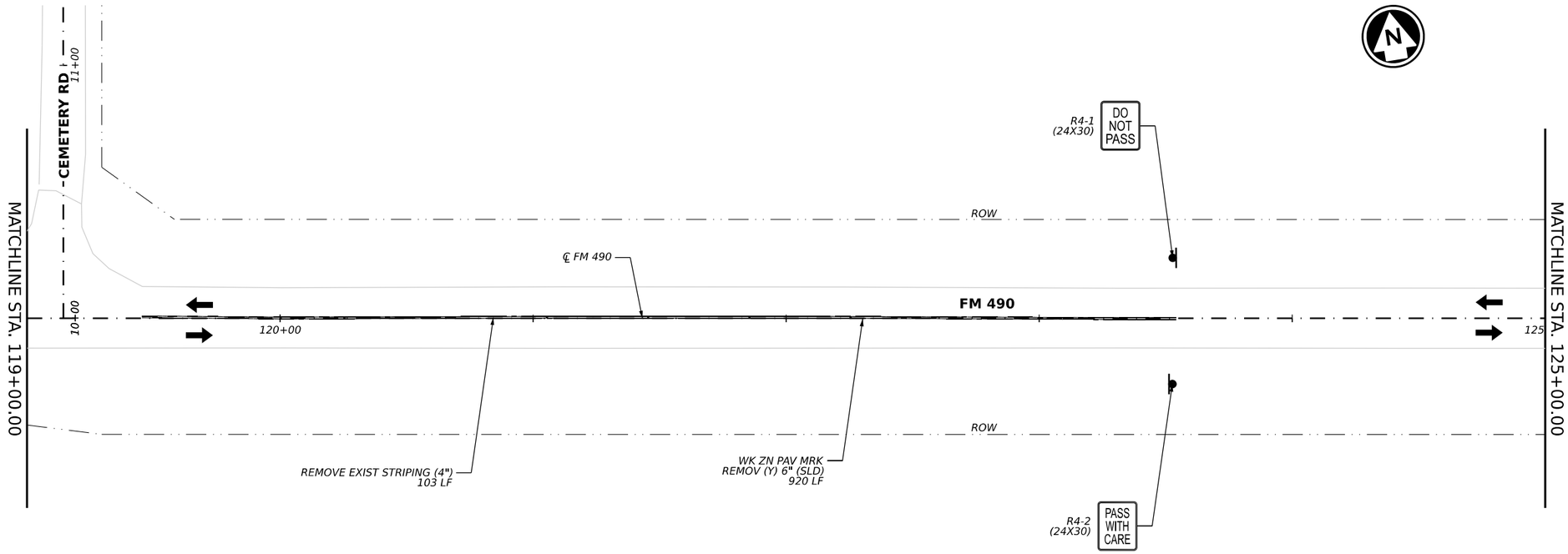

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 113+00 TO STA 125+00

SHEET 9 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		56

DATE: 1/31/2024
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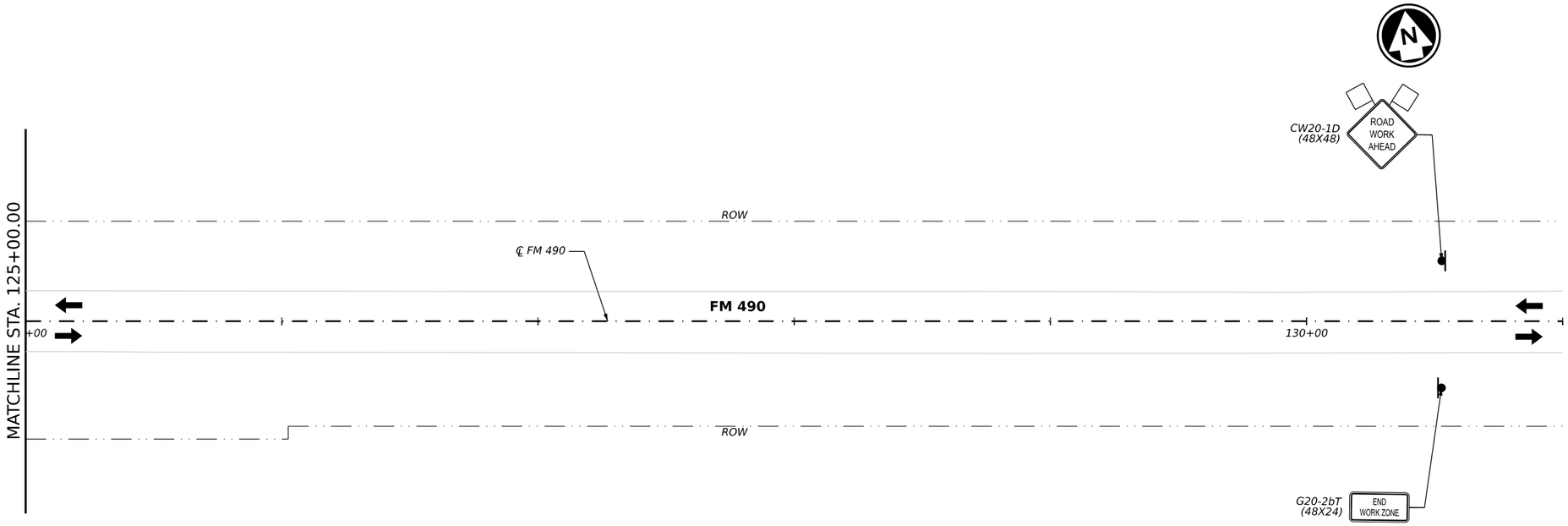

HORIZ: 0 25 50

SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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STATE OF TEXAS
KRISTEN E. HARPER
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Kristen Harper
1/31/2024

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FM 490

TRAFFIC CONTROL PLAN
PHASE 3B
STA 125+00 TO STA 131+00

SHEET10 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		57

DATE: 1/31/2024
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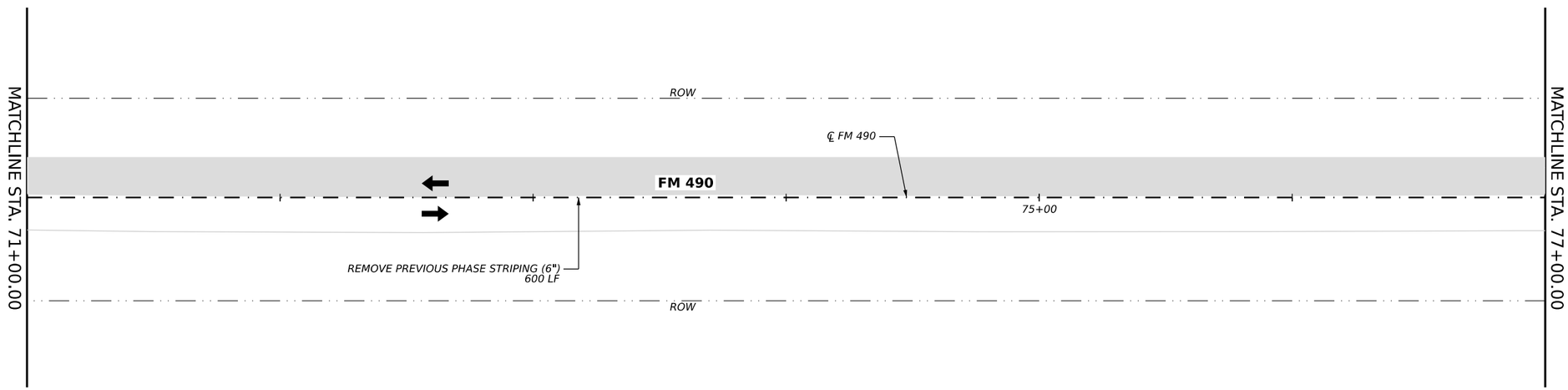

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3C
STA 65+00 TO STA 77+00

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		58

DATE: 1/31/2024
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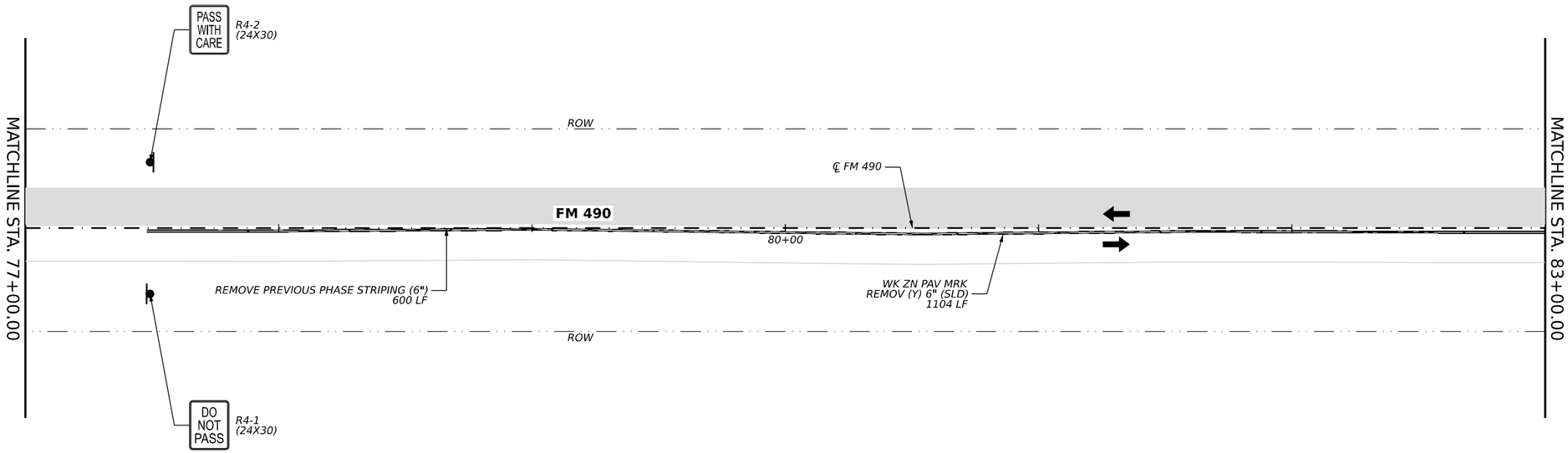

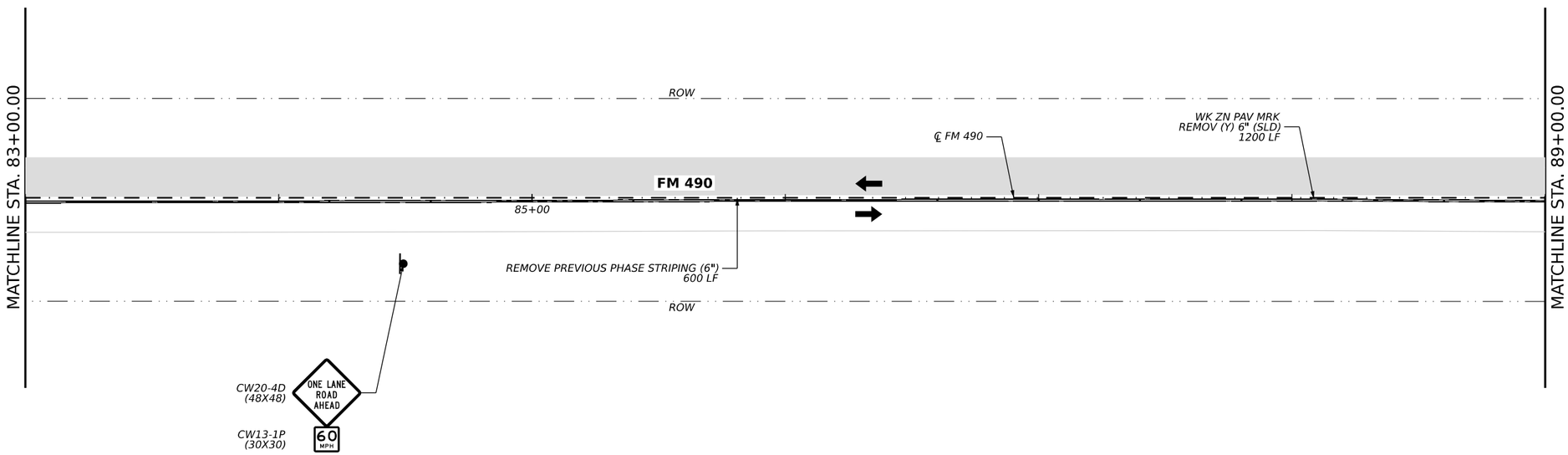

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- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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NO.	DATE	REVISION	APPROVED

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN PHASE 3C STA 77+00 TO STA 89+00

SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		59

DATE: 1/31/2024
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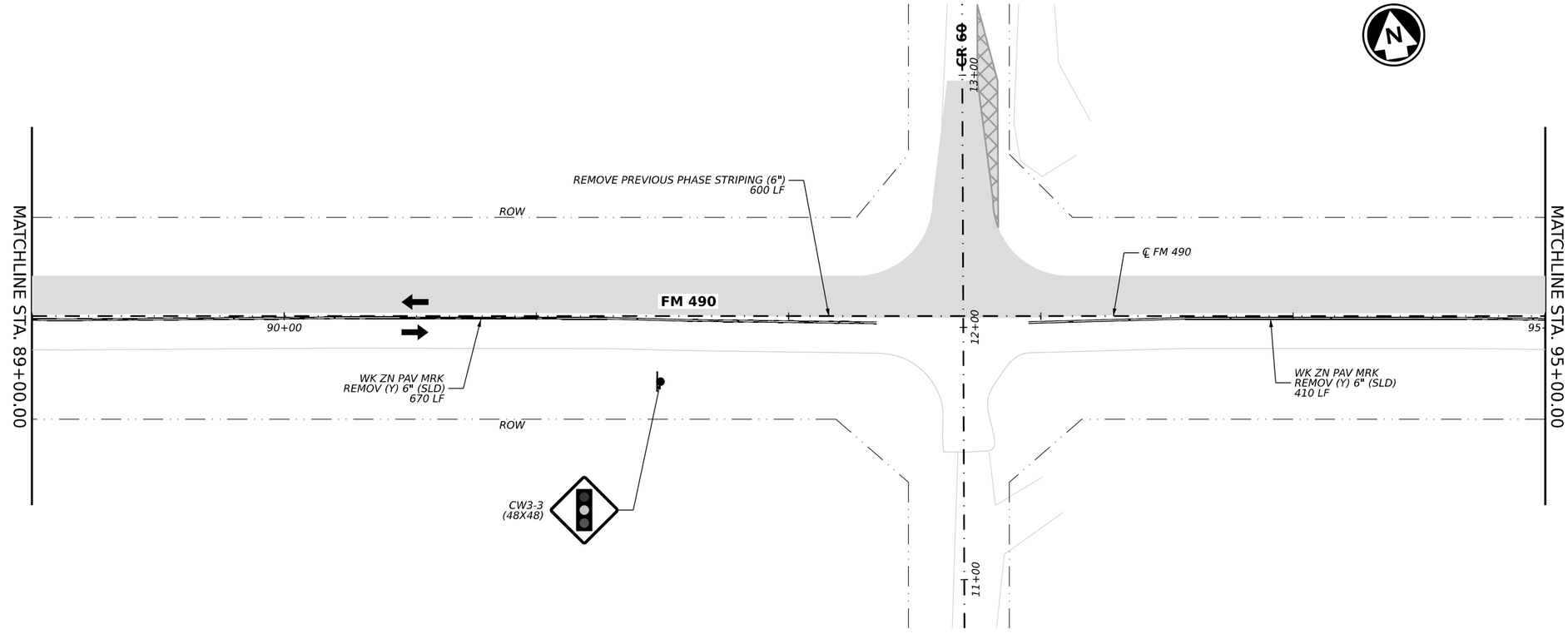

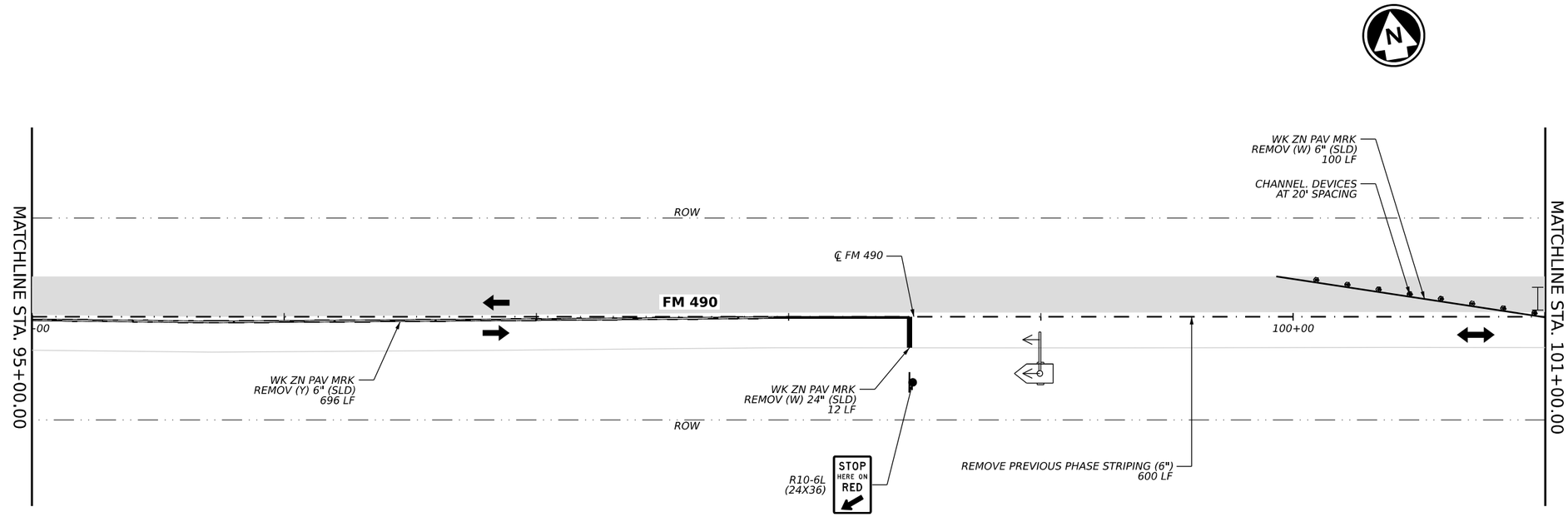

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3C
STA 89+00 TO STA 101+00

SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
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DATE: 1/31/2024
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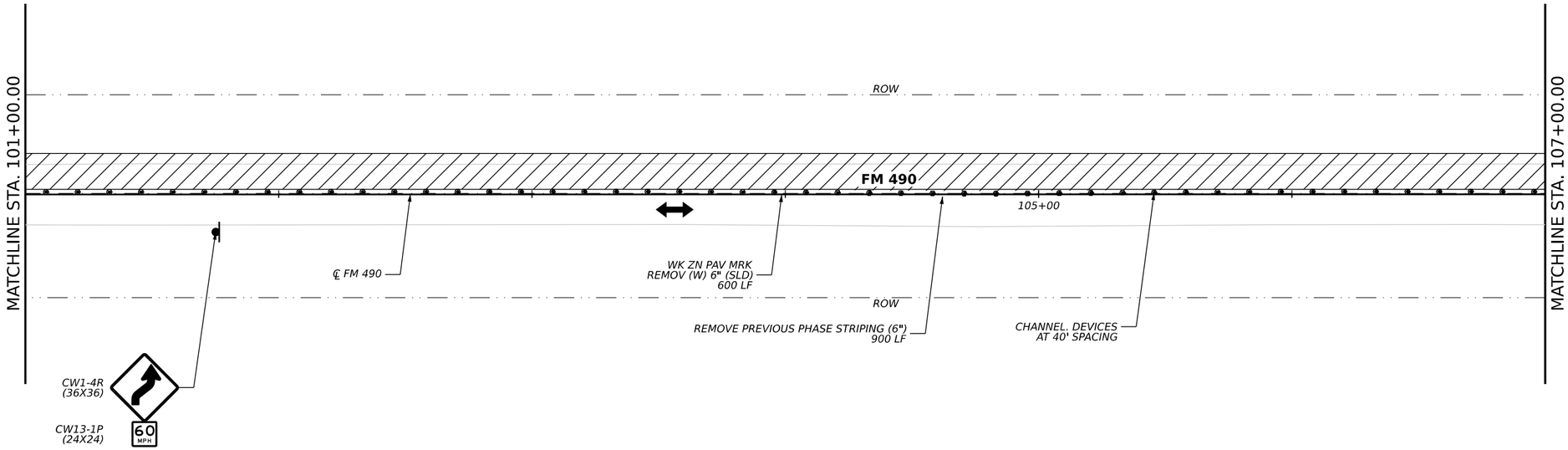

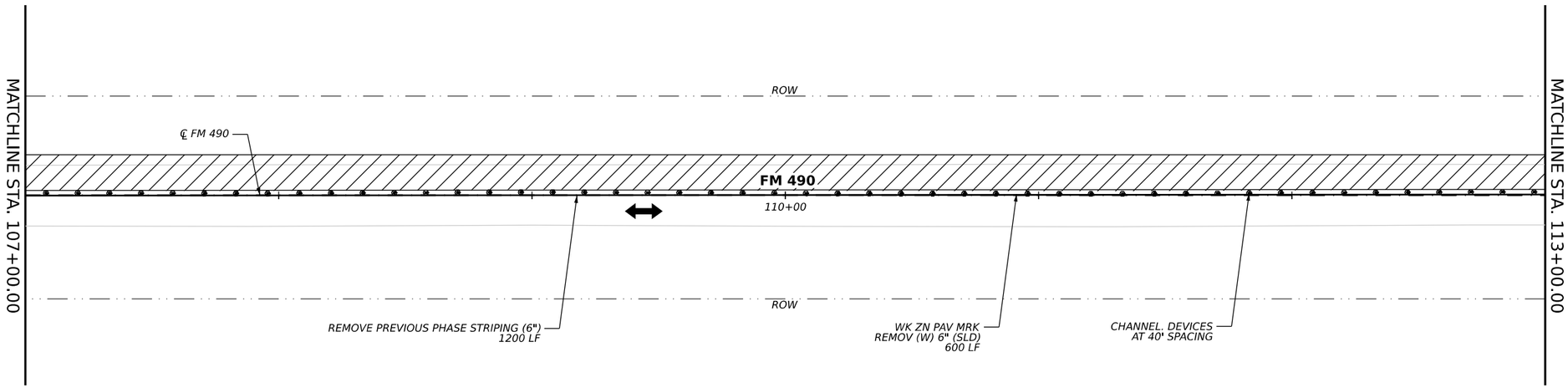

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
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- TEMP. PAVEMENT PREVIOUS PHASE
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3C
STA 101+00 TO STA 113+00

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		61

DATE: 1/31/2024
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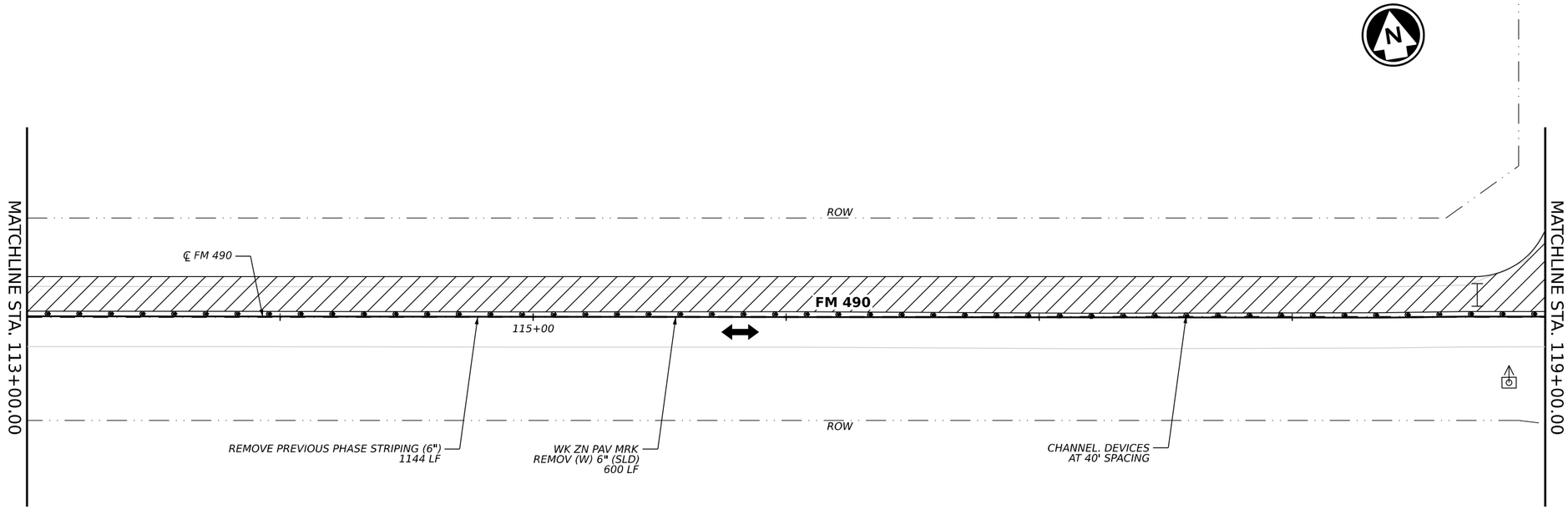

0 25 50
HORIZ:
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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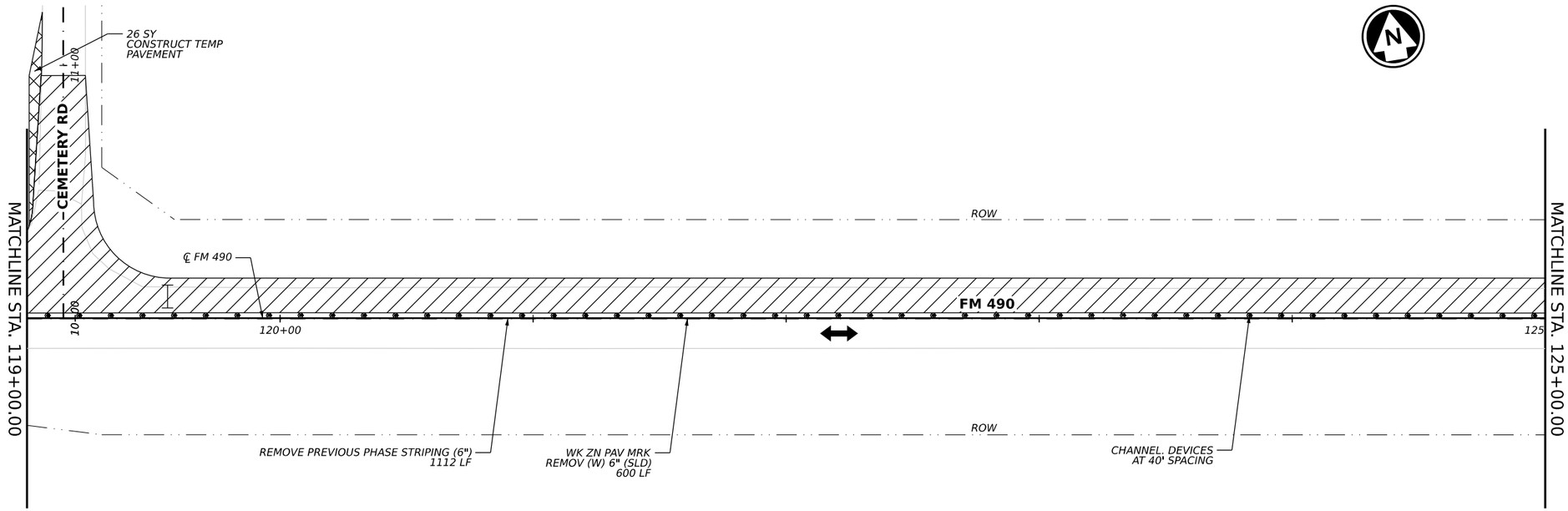

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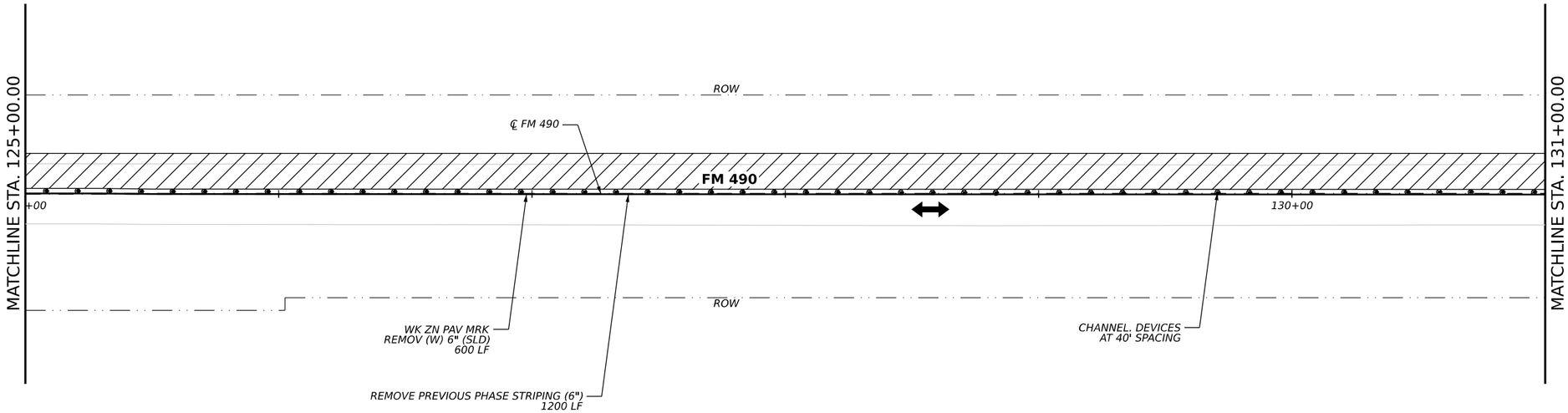
FM 490

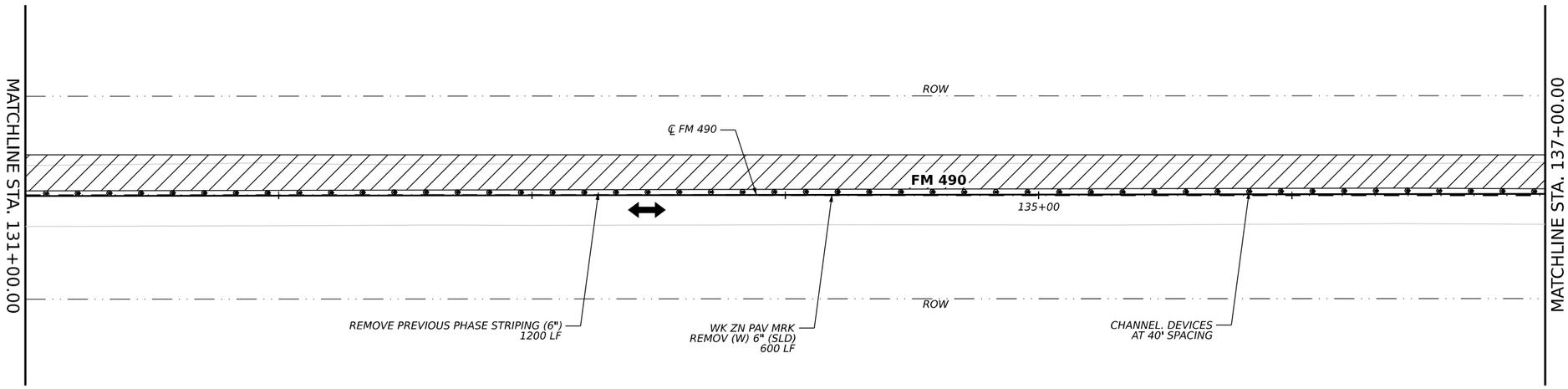
TRAFFIC CONTROL PLAN
PHASE 3C
STA 113+00 TO STA 125+00

SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		62

DATE: 5/1/2024
FILE: ...\FM490-BMCD-TCP-3C-05.dgn





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

NOTES

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4. TIMING OF DRIVEWAY ASSISTANCE DEVICES SHOULD BE COORDINATED WITH THE TXDOT AREA OFFICE.
5. TEMPORARY PAVEMENT, AND SIGN AND CHANNELIZING DEVICE SPACING IS N.T.S.
6. FOR LANE CLOSURES, A MINIMUM 14' SHOULD REMAIN OPEN TO TRAFFIC TO ALLOW FOR CHANNELIZING DEVICES.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3C
STA 125+00 TO STA 137+00

SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		63

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3C-06.dgn

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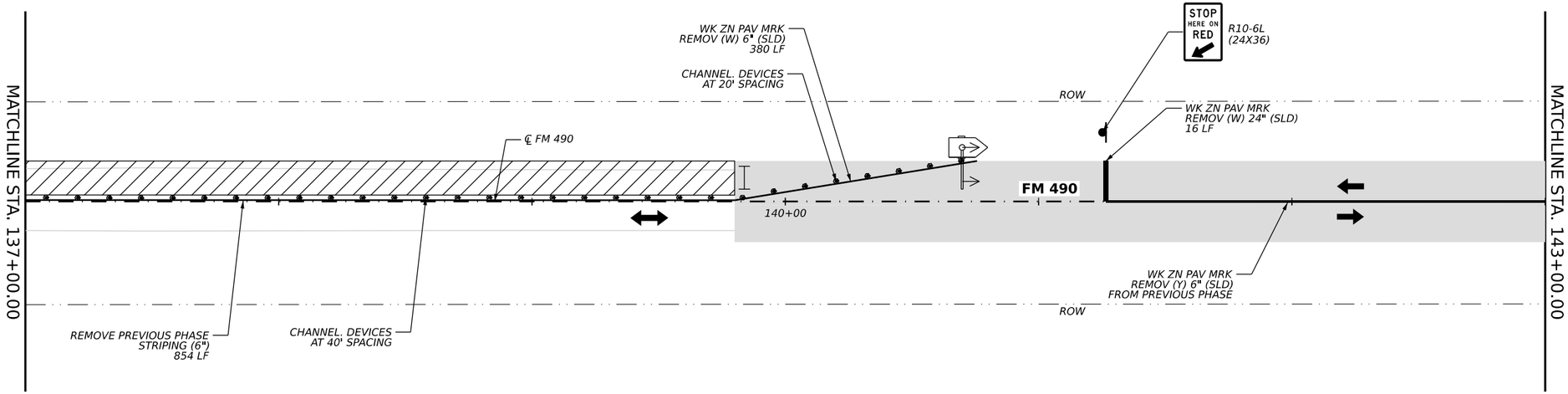

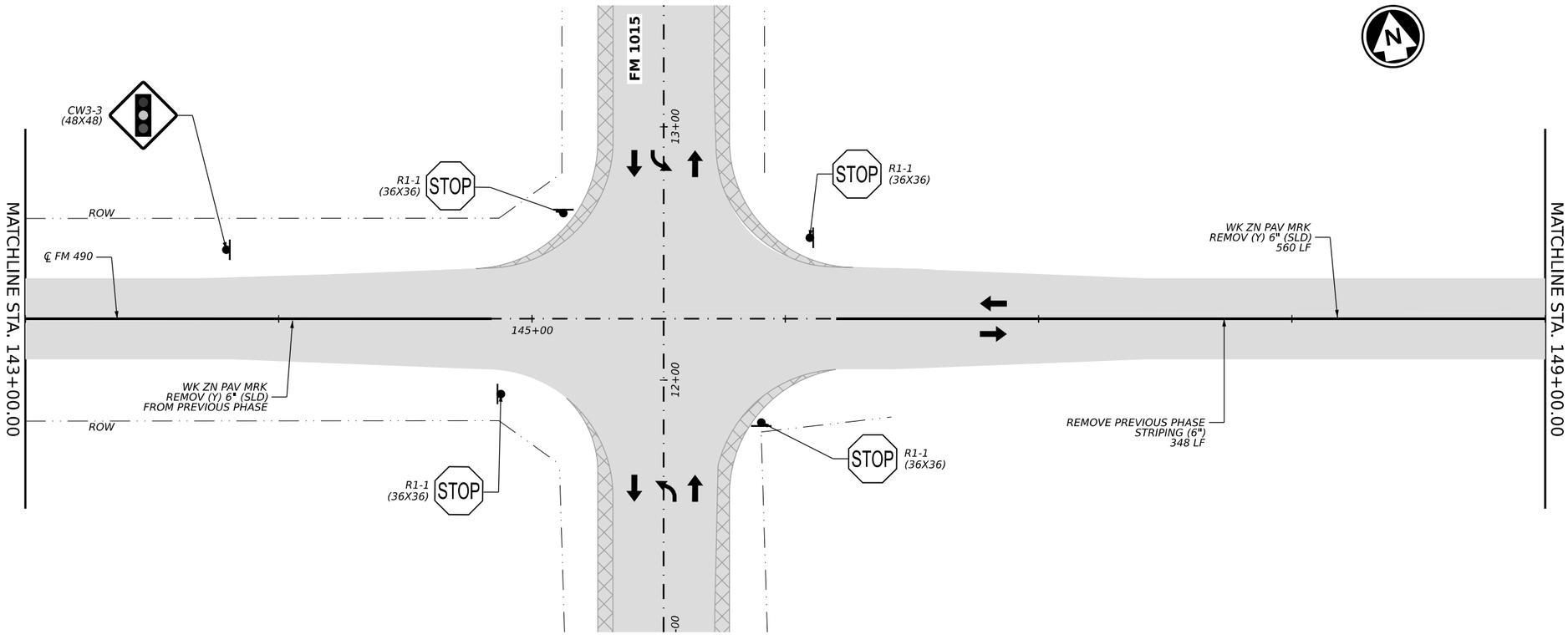

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
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- TY 3 BARRICADE
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3C
STA 137+00 TO STA 149+00

SHEET 7 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		64

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3C-07.dgn

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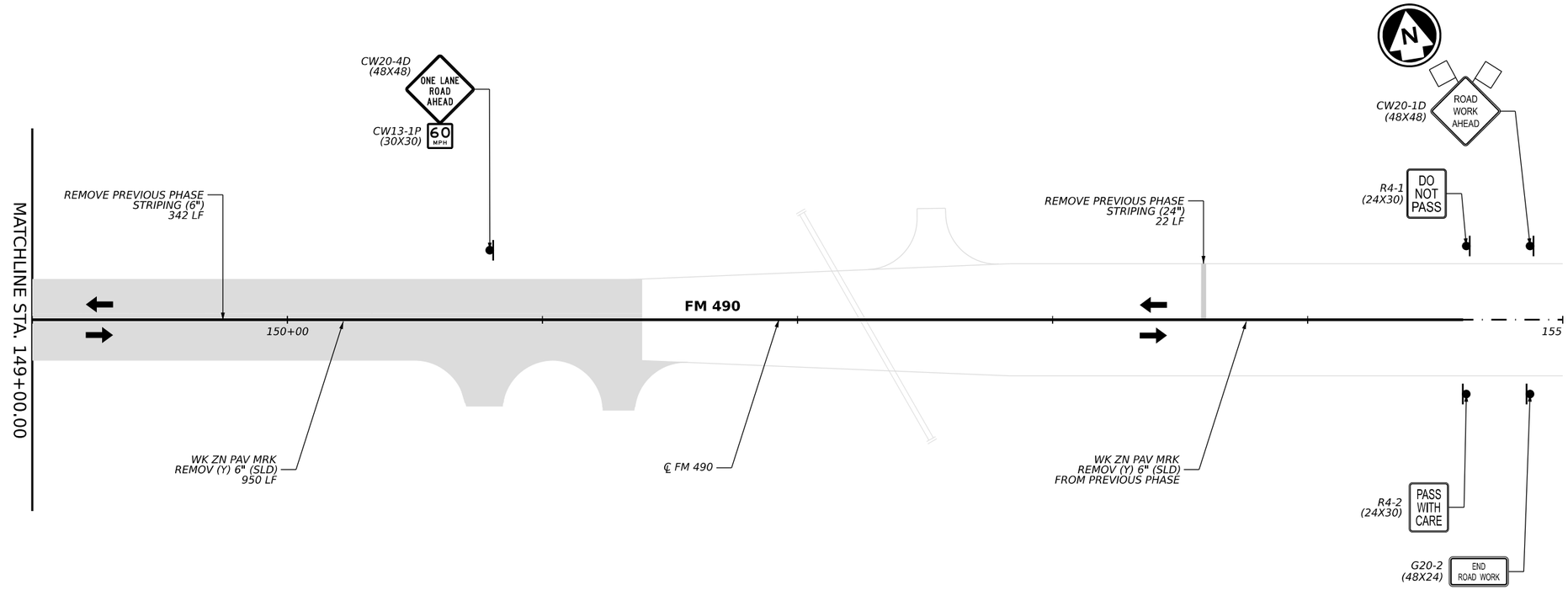

HORIZ: 0 25 50

SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3C
STA 149+00 TO STA 155+00

SHEET 8 OF 8

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		65

DATE: 1/31/2024
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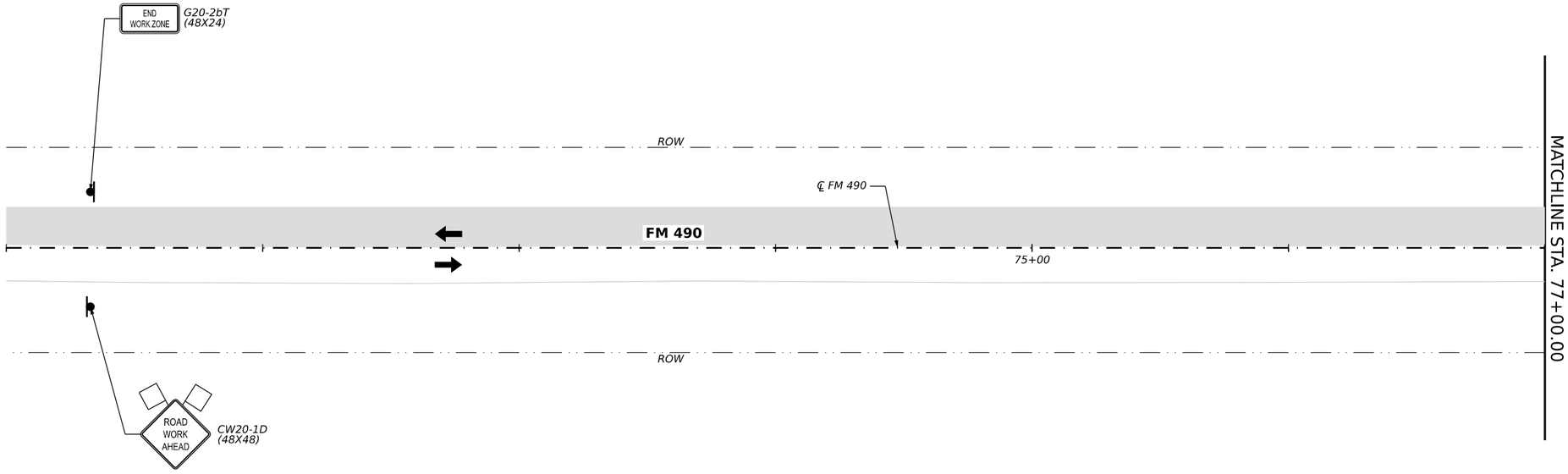

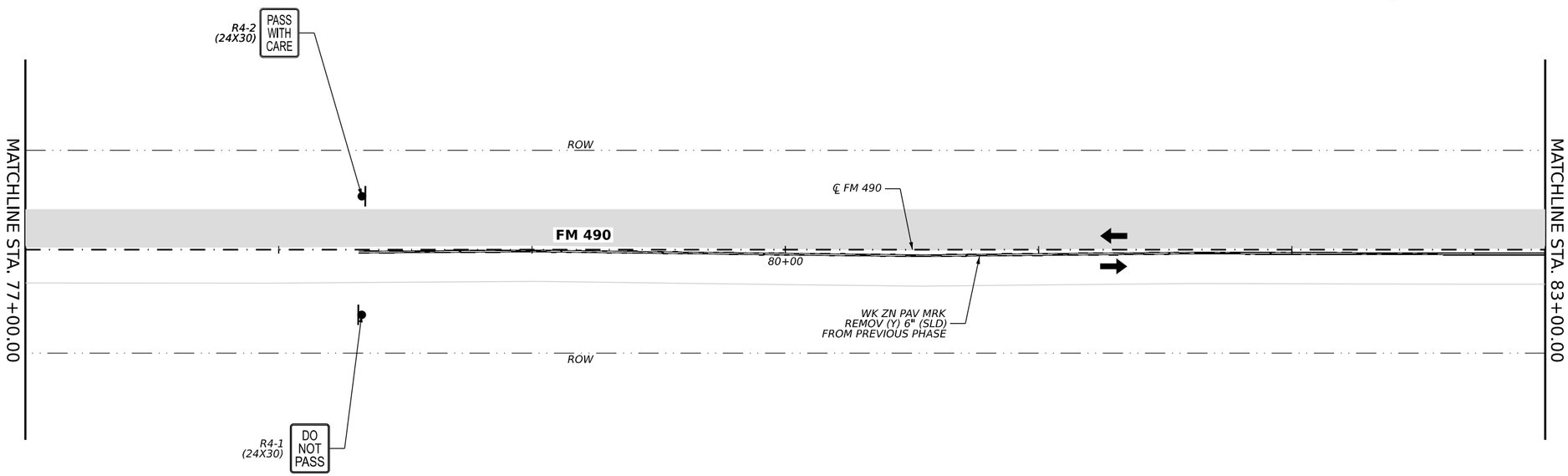

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3D
STA 71+00 TO STA 83+00

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		66

DATE: 1/31/2024
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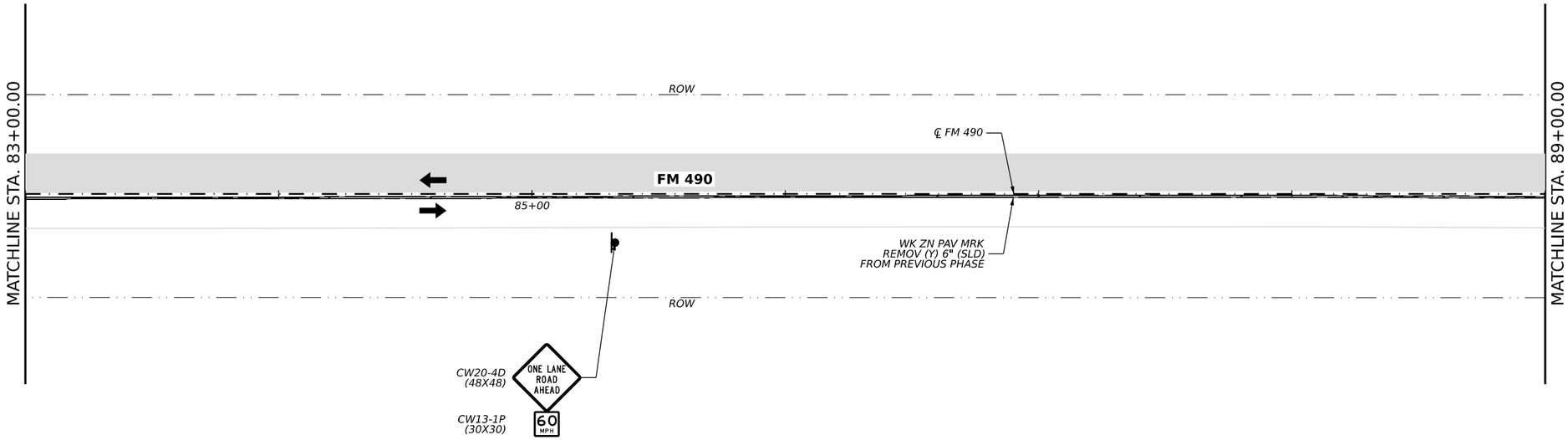

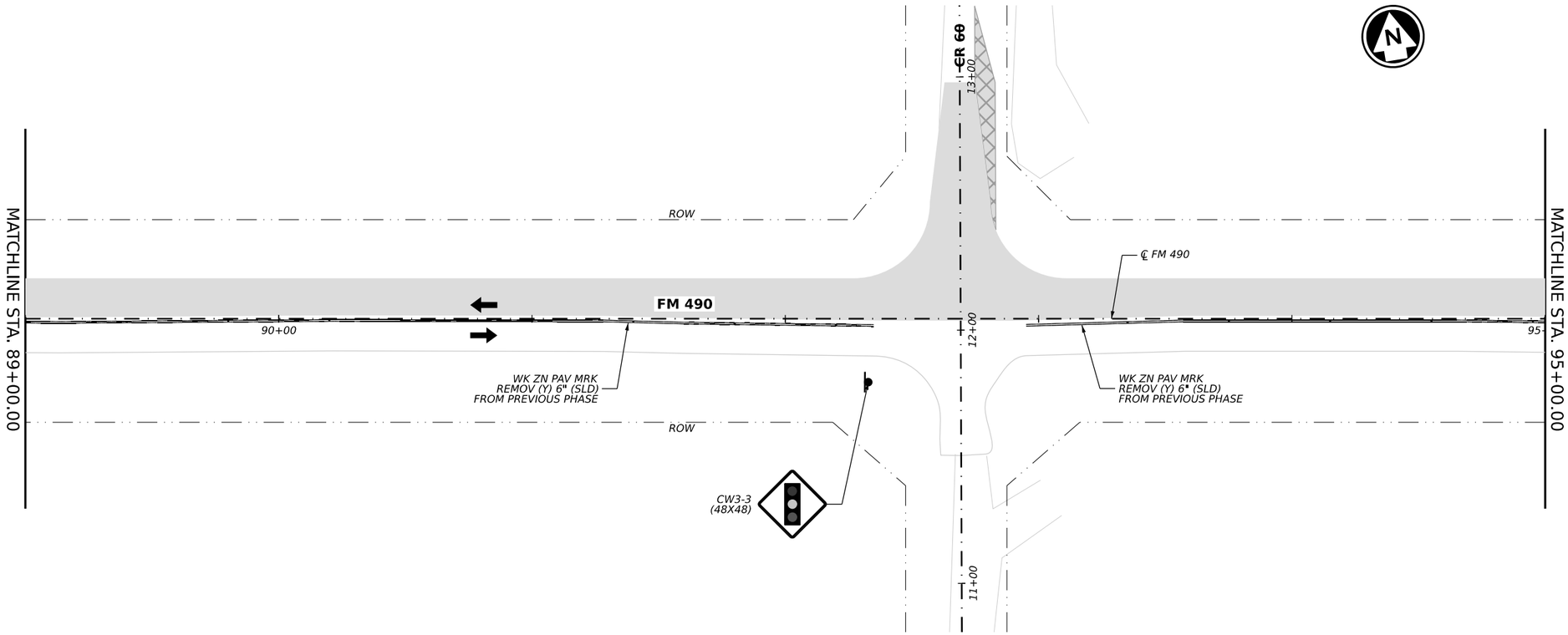

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3D
STA 83+00 TO STA 95+00

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		67

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3D-02.dgn

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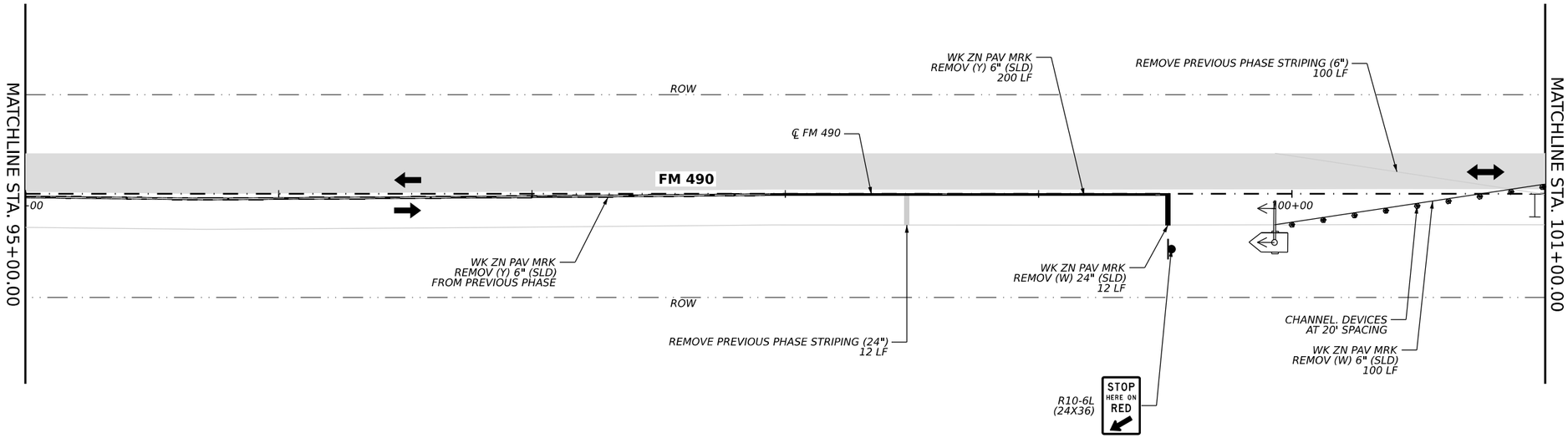

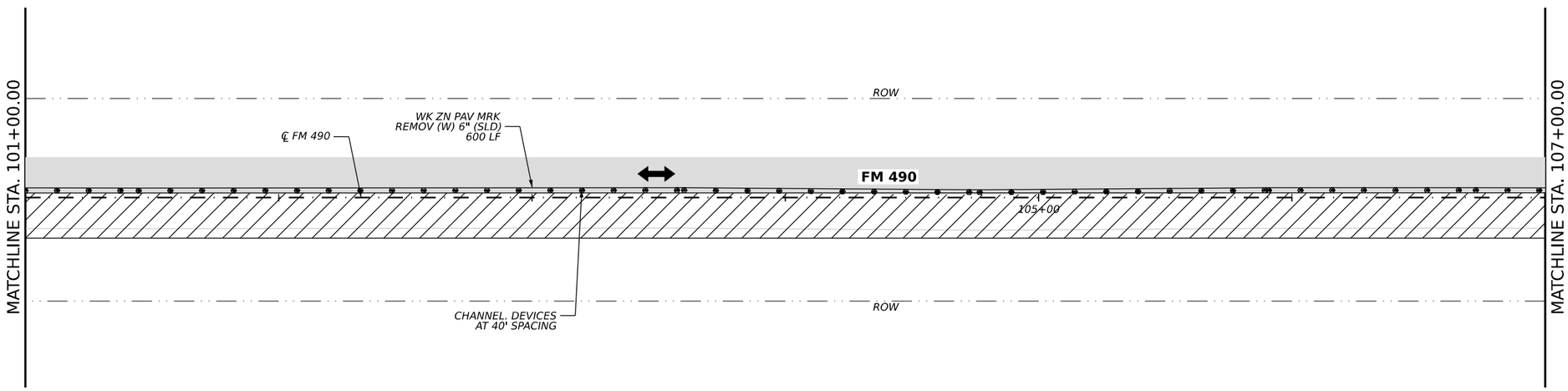

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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- TEMPORARY TRF SIGNAL
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- CHANNELIZATION DEVICE

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NO.	DATE	REVISION	APPROVED

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3D
STA 95+00 TO STA 107+00

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		68

DATE: 1/31/2024
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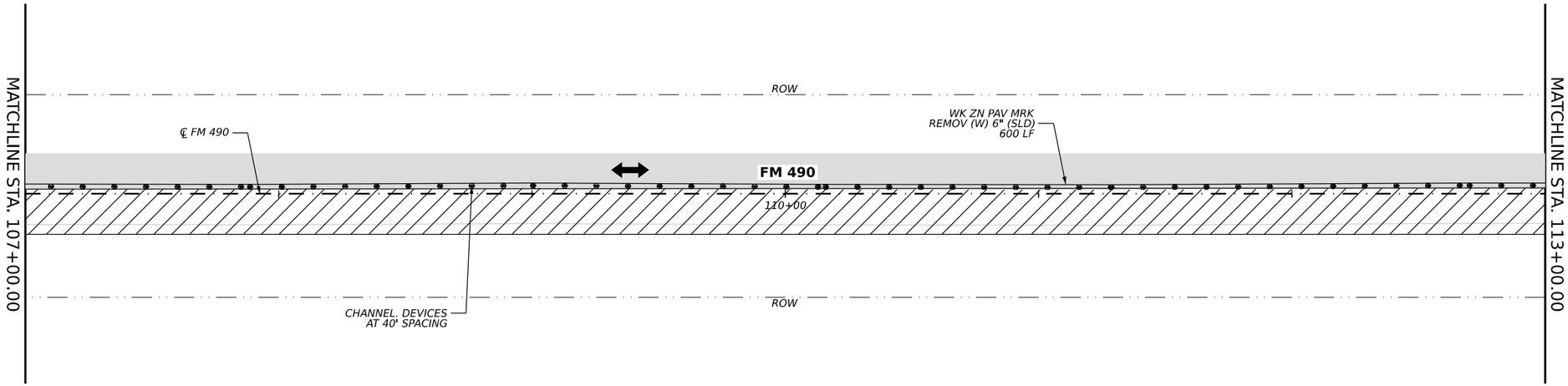

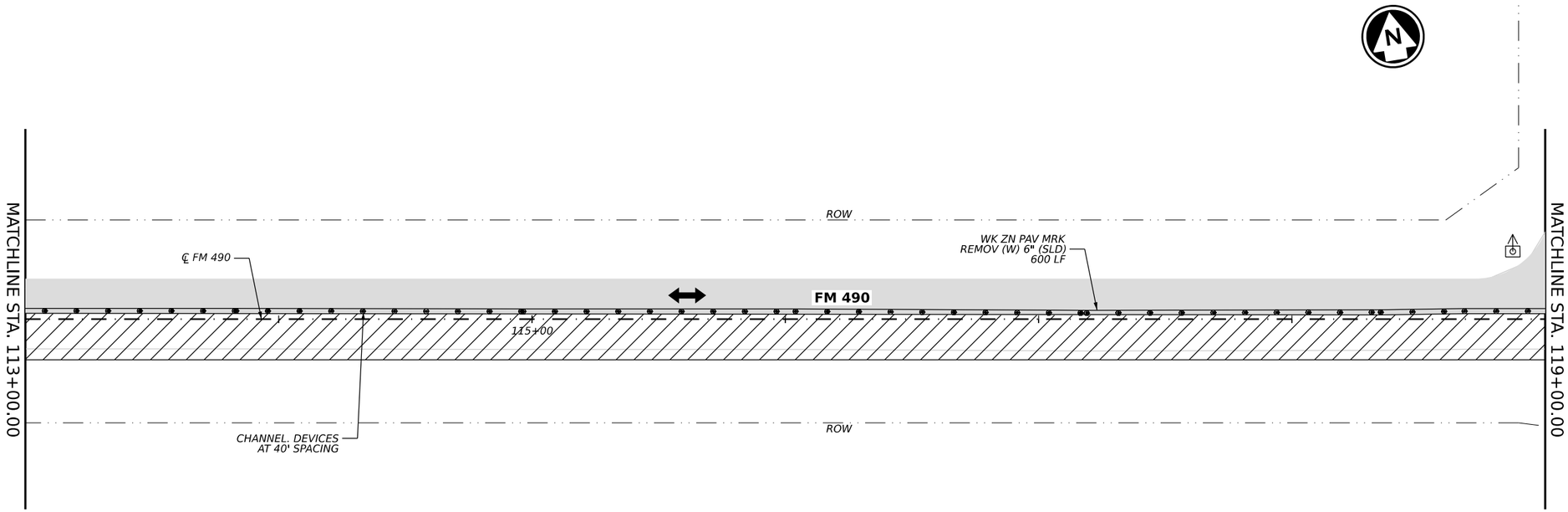

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3D
STA 107+00 TO STA 119+00

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		69

DATE: 1/31/2024
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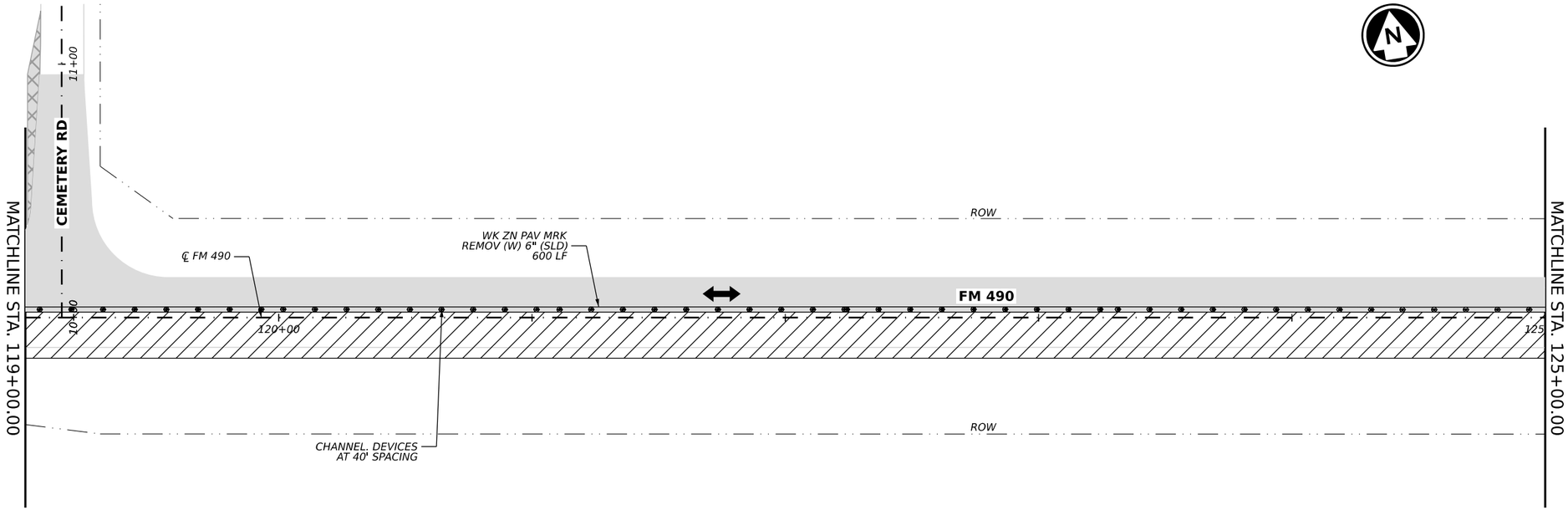

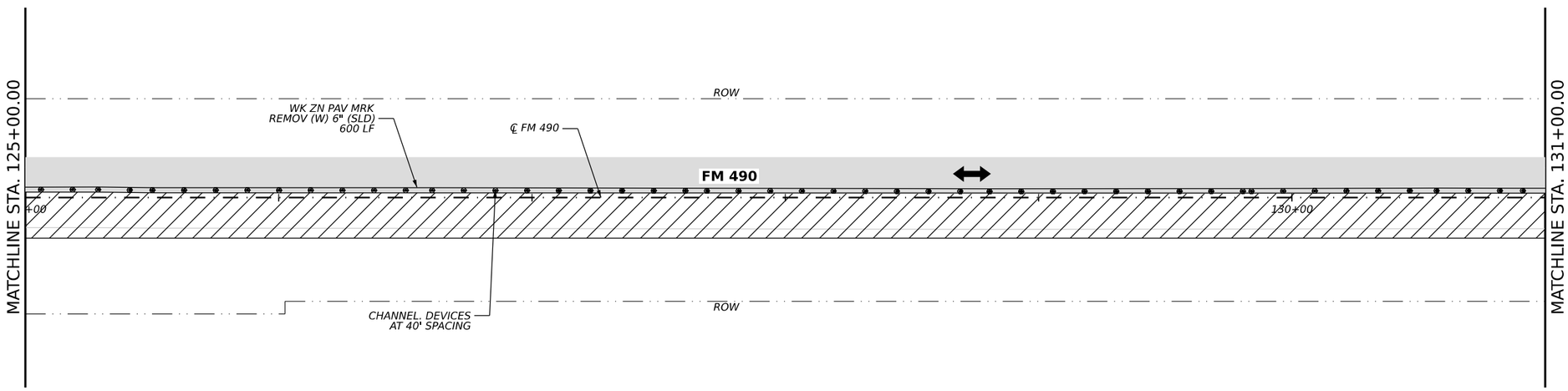

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3D
STA 119+00 TO STA 131+00

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		70

DATE: 1/31/2024
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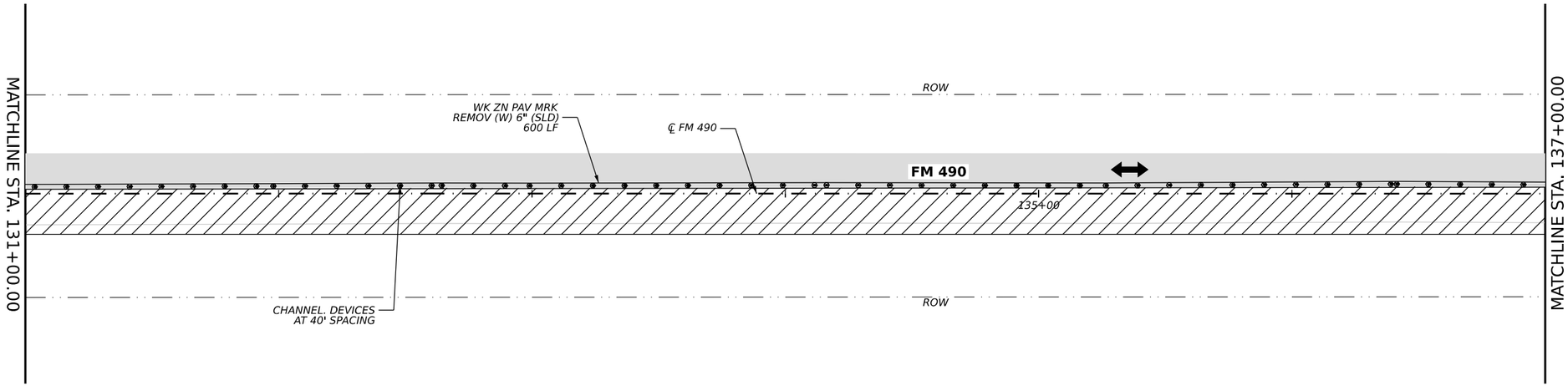

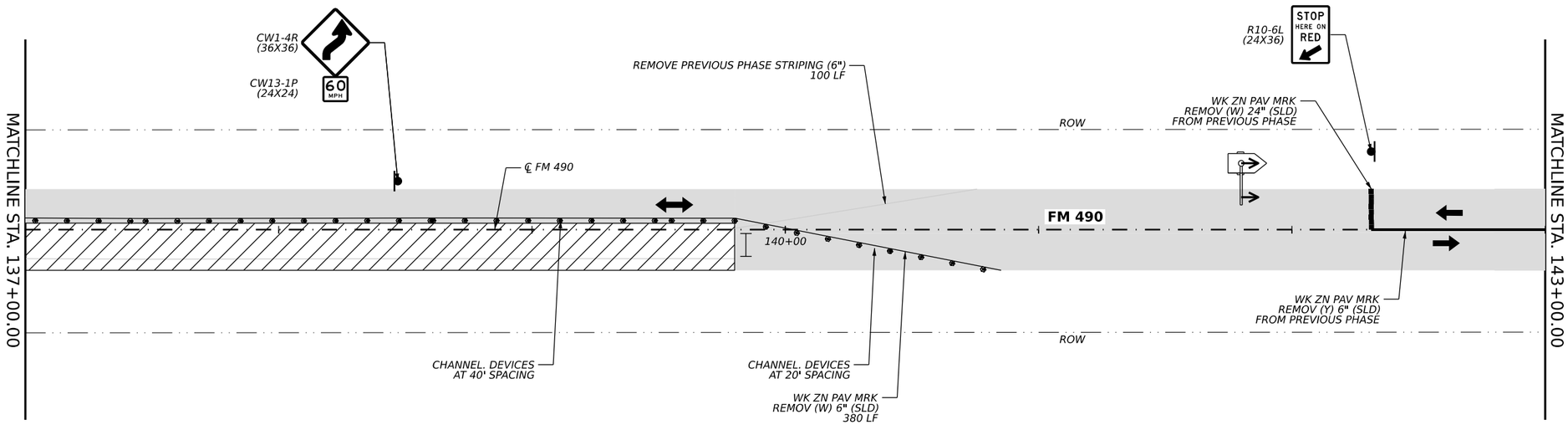

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3D
STA 131+00 TO STA 143+00

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		71

DATE: 1/31/2024
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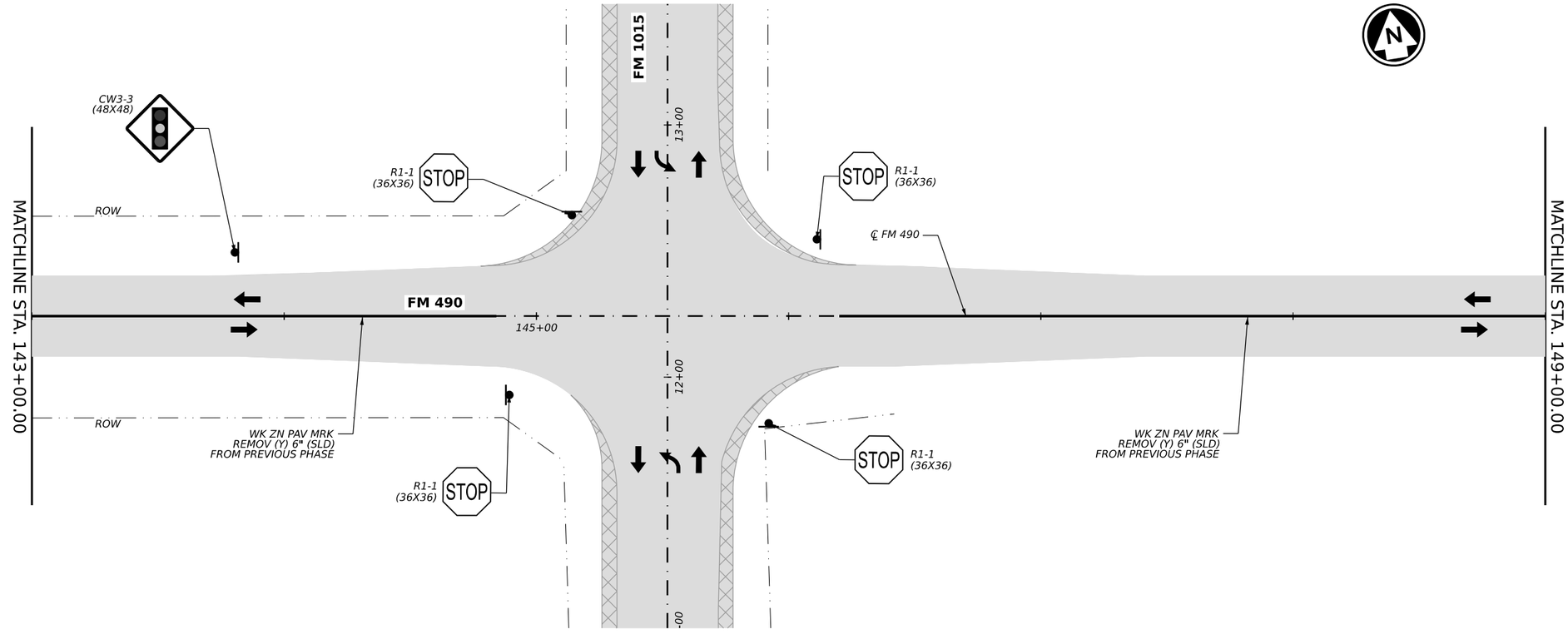

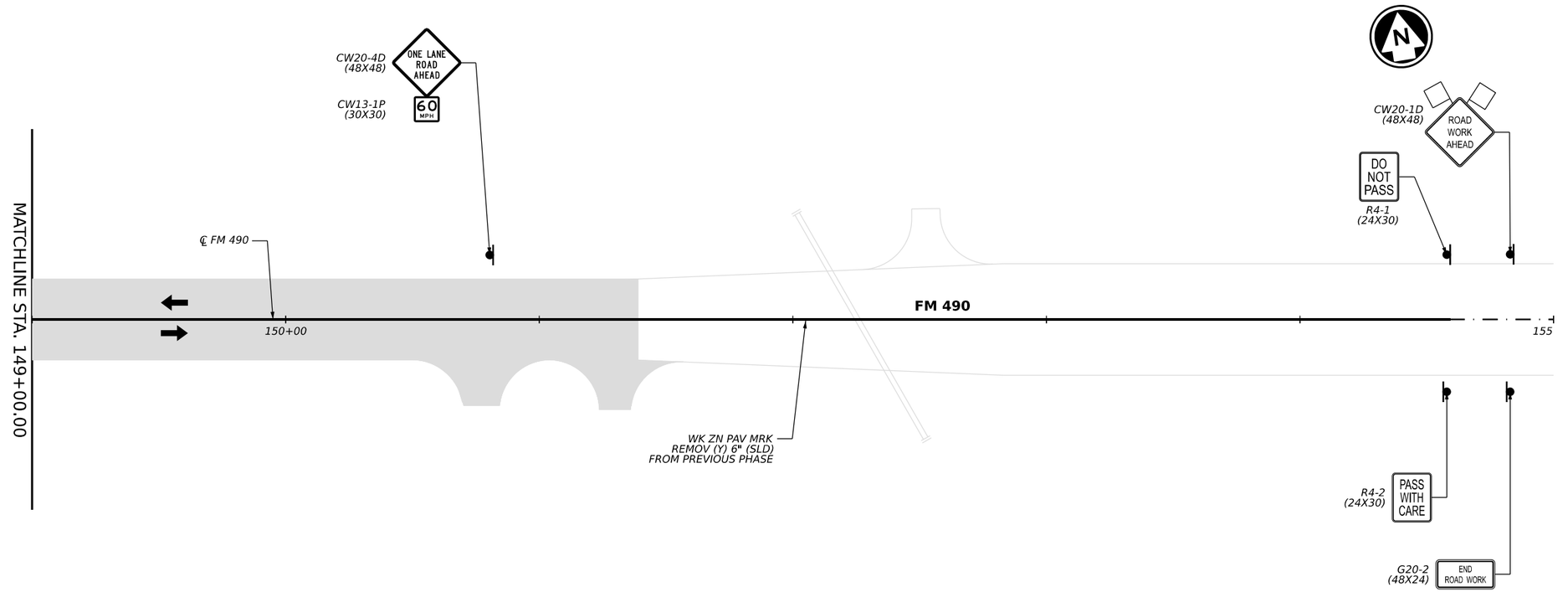

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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5. TEMPORARY PAVEMENT, AND SIGN AND CHANNELIZING DEVICE SPACING IS N.T.S.
6. FOR LANE CLOSURES, A MINIMUM 14' SHOULD REMAIN OPEN TO TRAFFIC TO ALLOW FOR CHANNELIZING DEVICES.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3D
STA 143+00 TO STA 155+00

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		72

DATE: 1/31/2024
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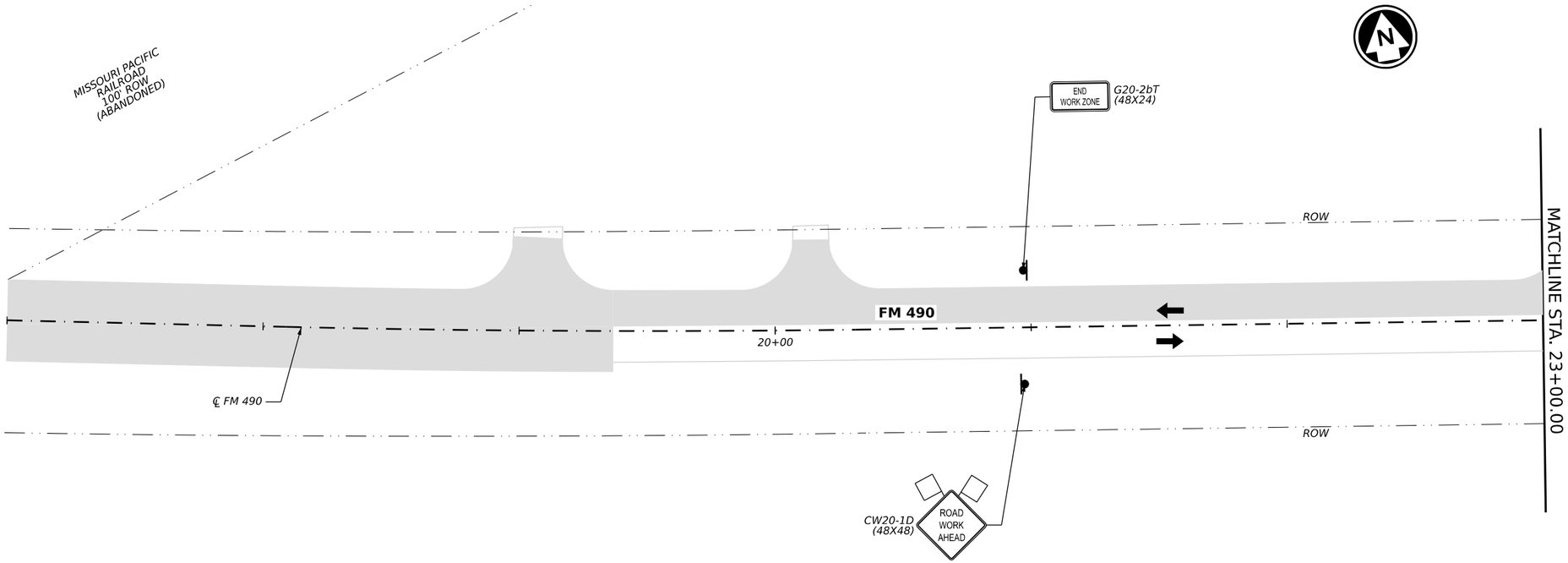

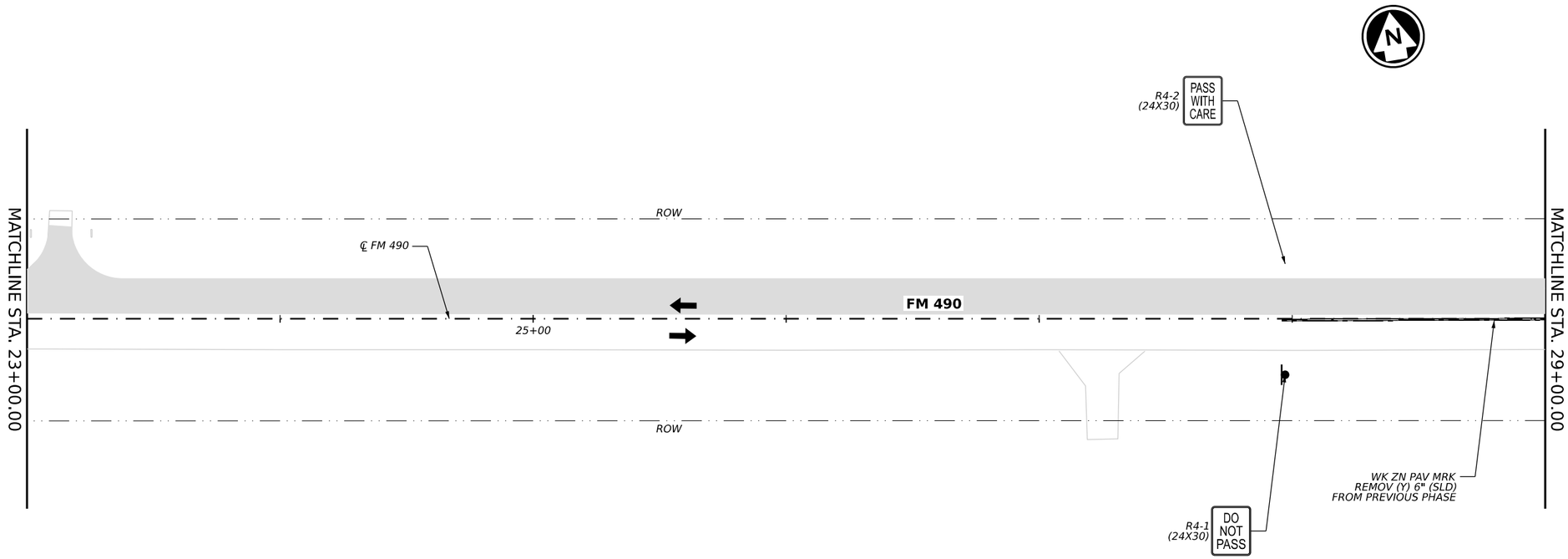

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN PHASE 3E STA 17+00 TO STA 29+00

SHEET 1 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		73

DATE: 1/31/2024
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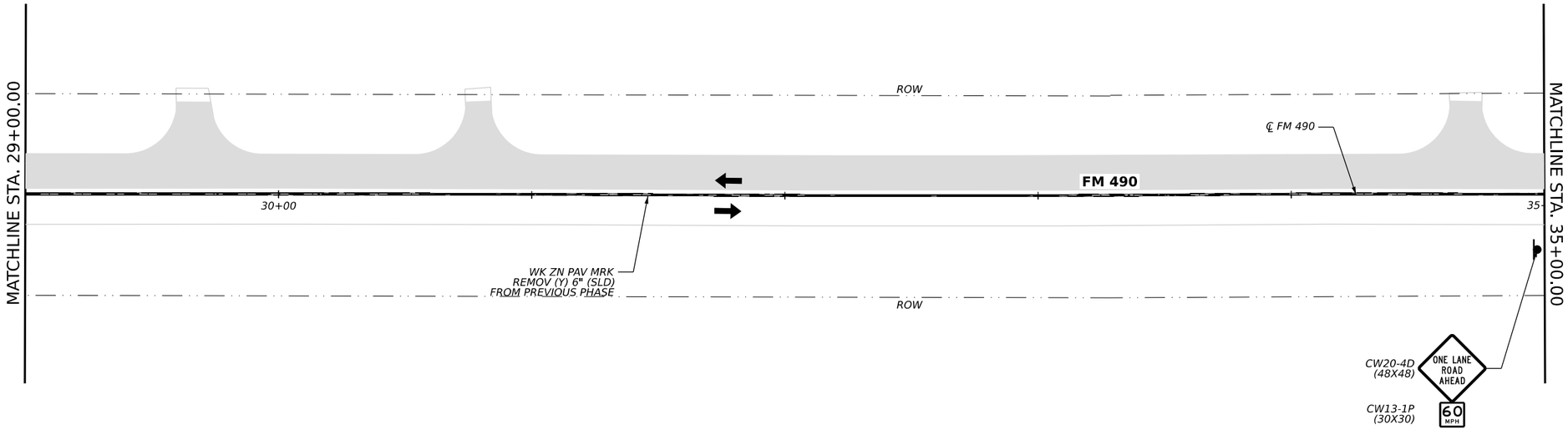

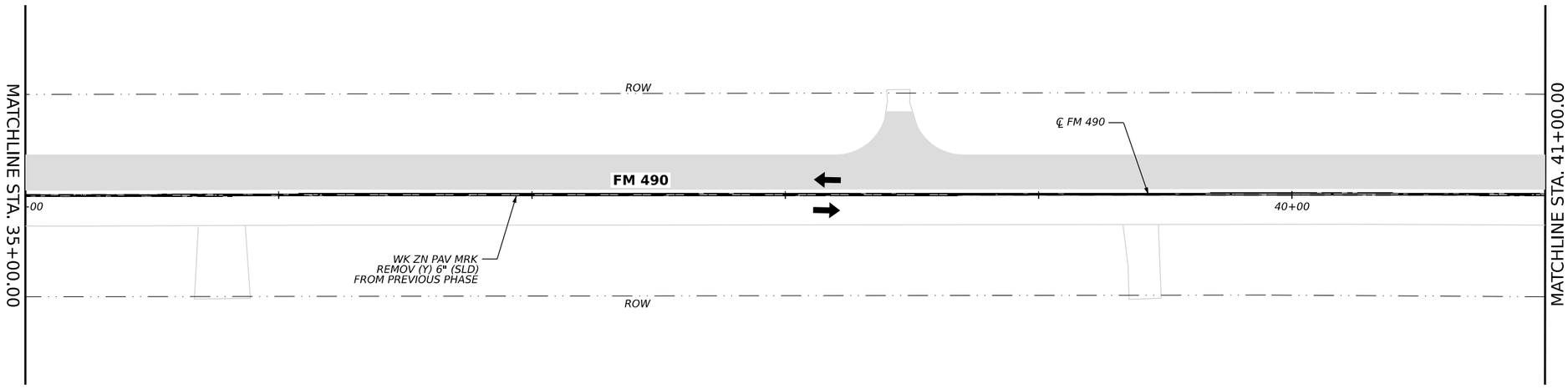

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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Texas Department of Transportation

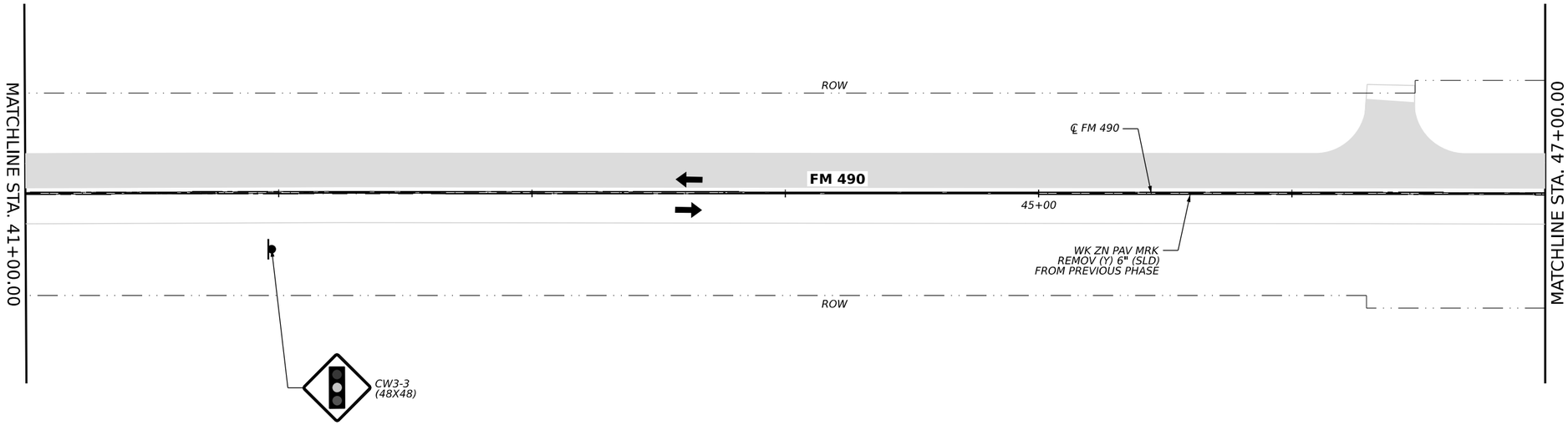
FM 490

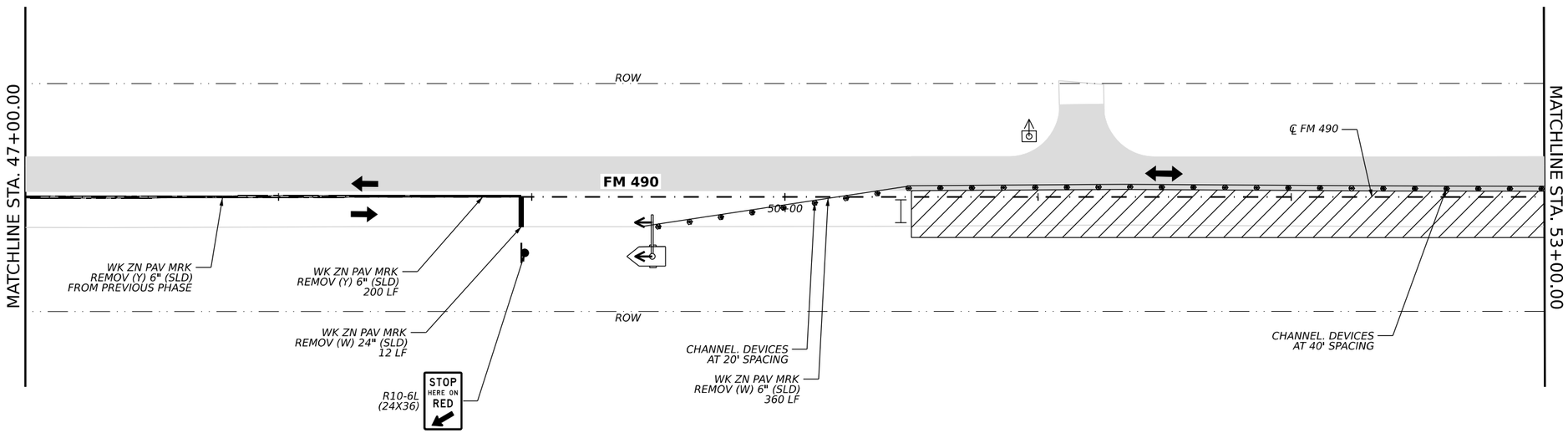
TRAFFIC CONTROL PLAN
PHASE 3E
STA 29+00 TO STA 41+00

SHEET 2 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		74

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3E-02.dgn





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 41+00 TO STA 53+00

SHEET 3 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		75

DATE: 1/31/2024
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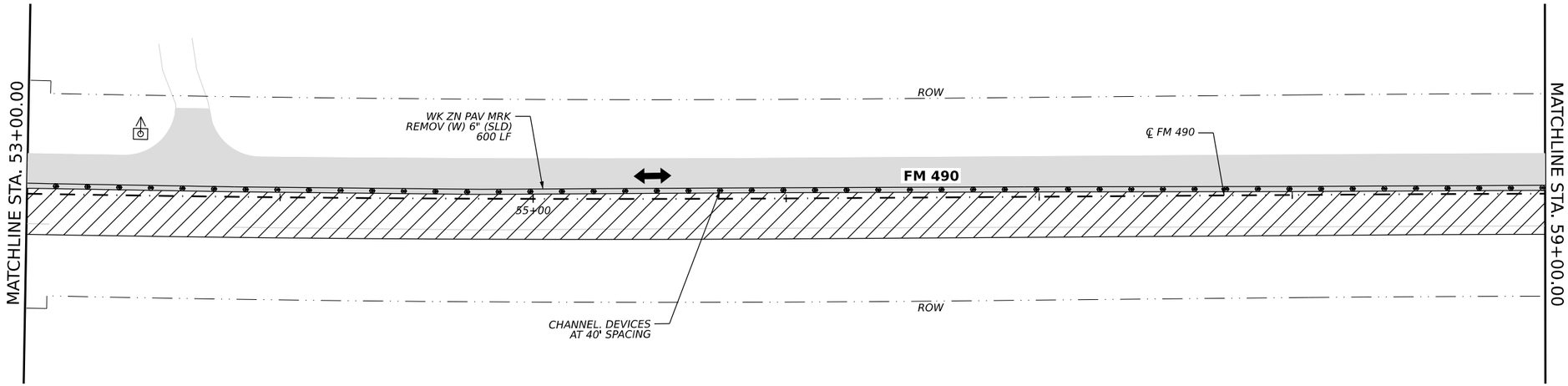

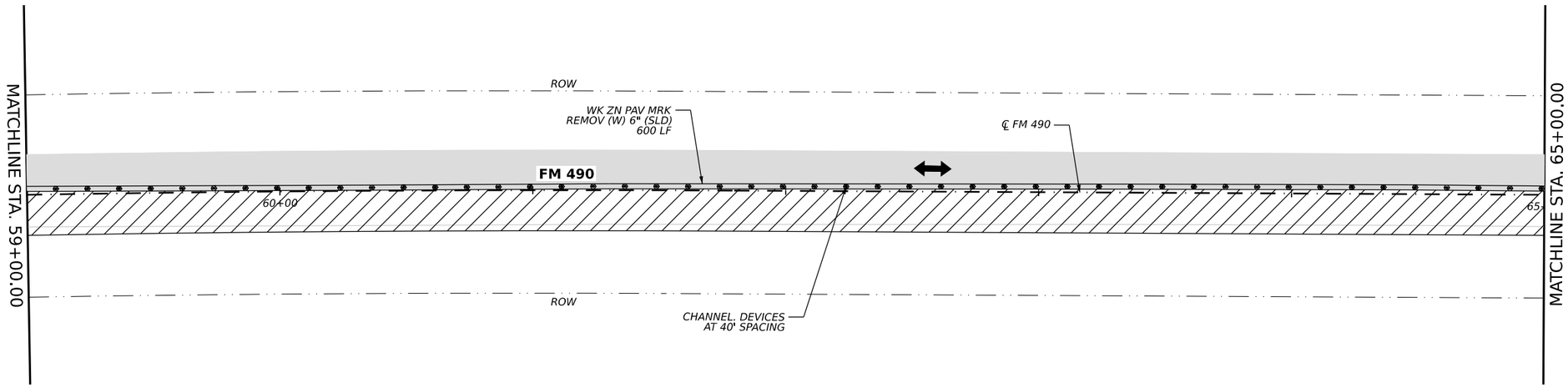

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
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FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 53+00 TO STA 65+00

SHEET 4 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		76

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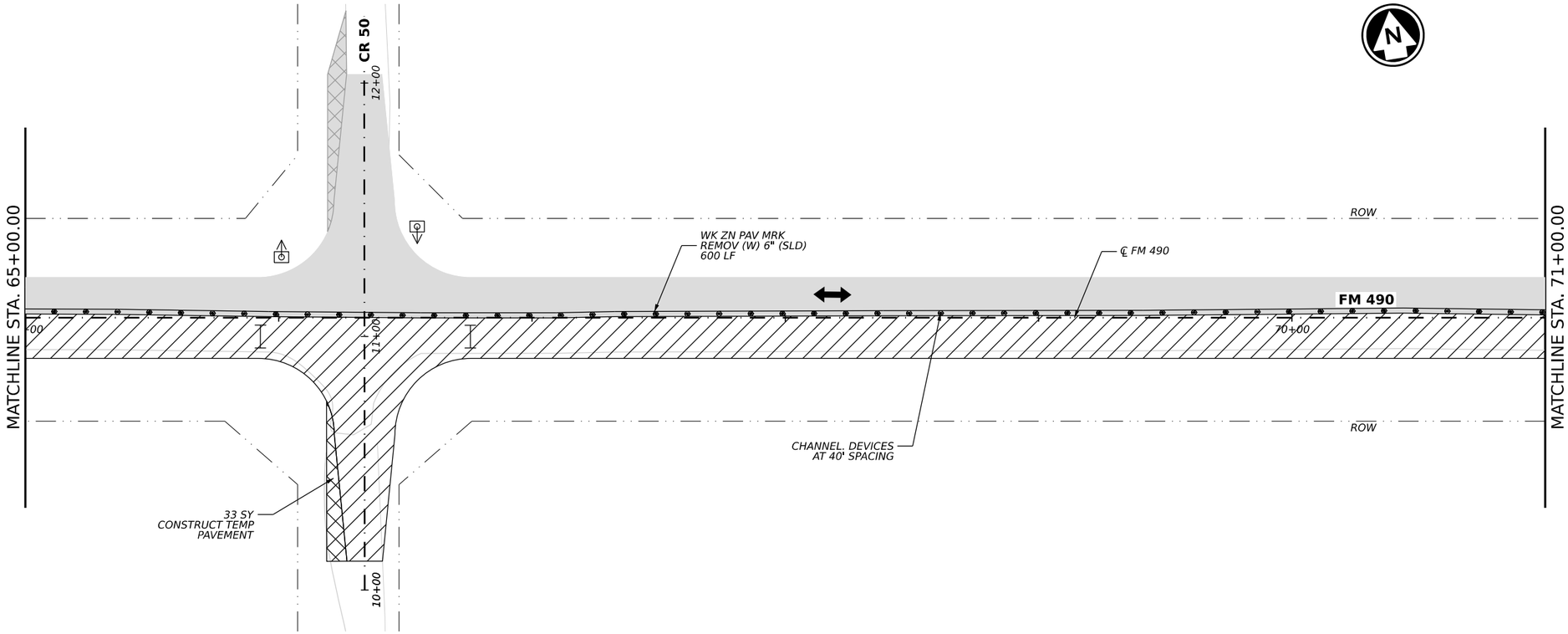

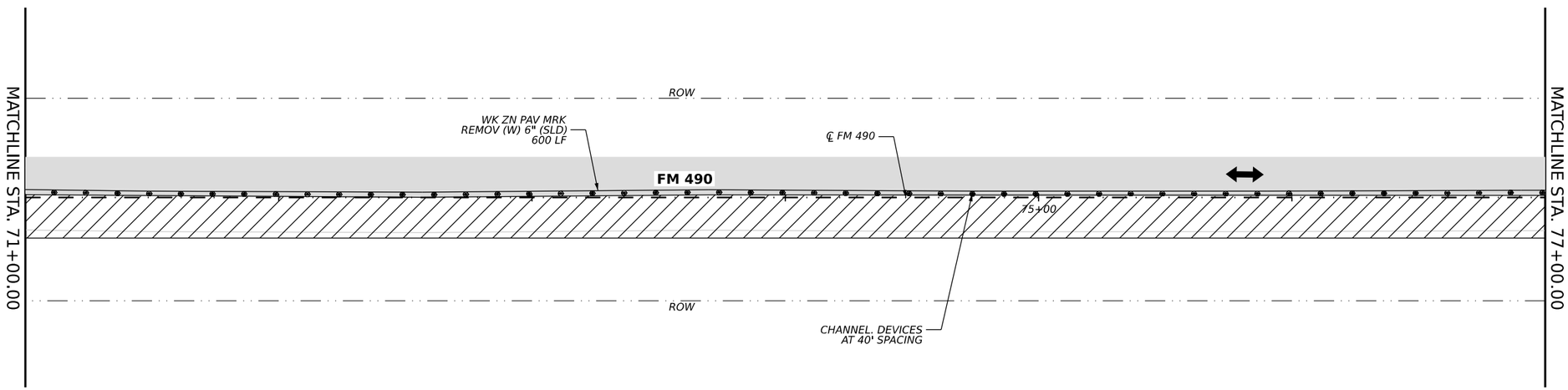

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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1/31/2024

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 65+00 TO STA 77+00

SHEET 5 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		77

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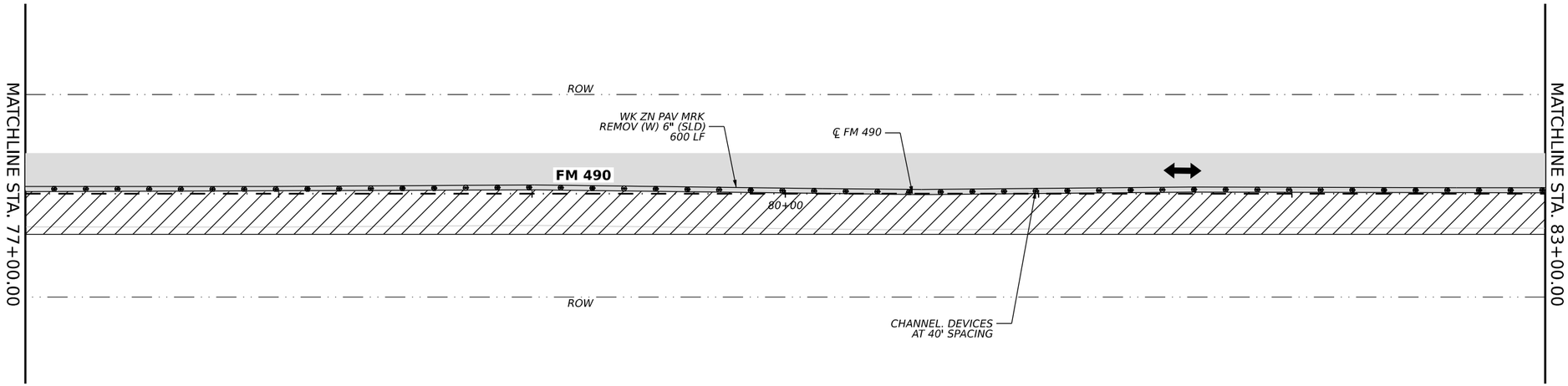

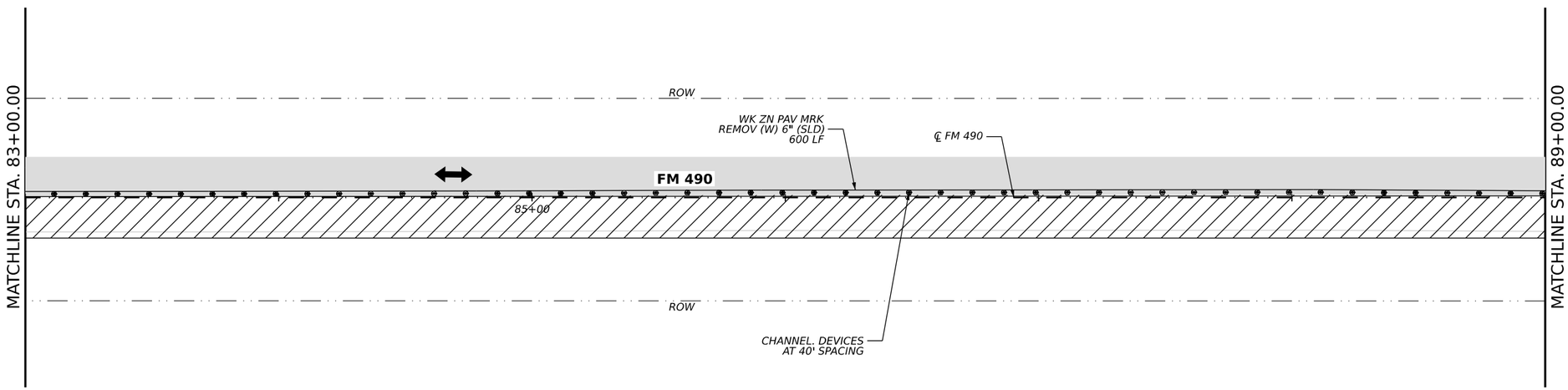

HORIZ: 0 25 50
SCALE IN FEET

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- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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BURNS McDONNELL
13737 NOEL RD.
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 77+00 TO STA 89+00

SHEET 6 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		78

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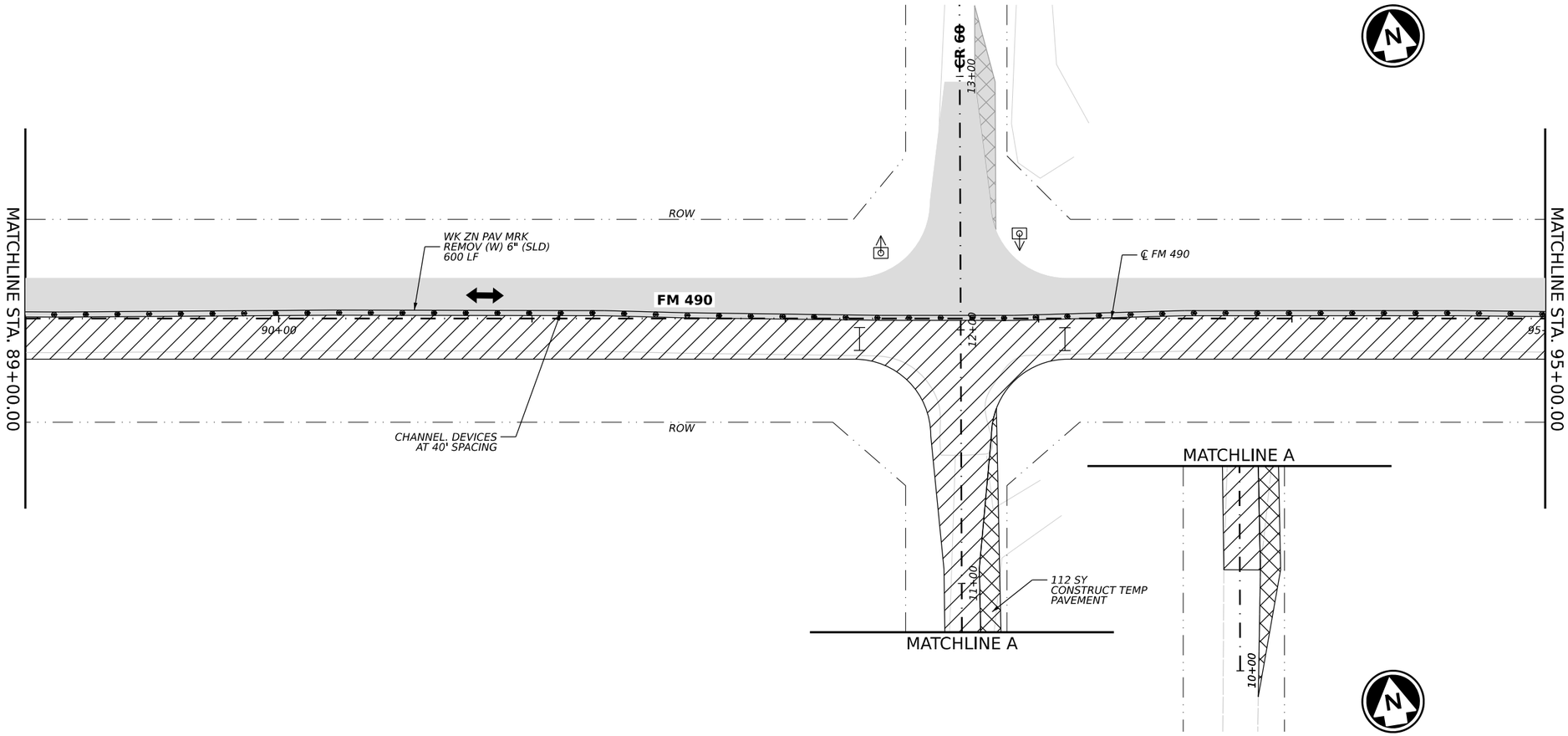

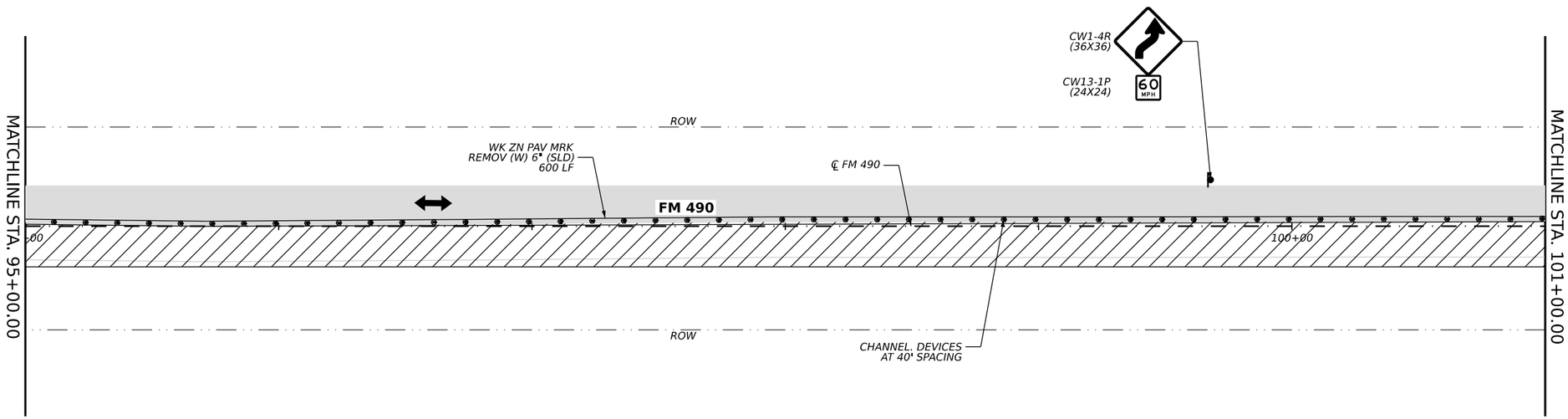

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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KRISTEN E. HARPER
143166
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11/31/2024

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 89+00 TO STA 101+00

SHEET 7 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		79

DATE: 1/31/2024
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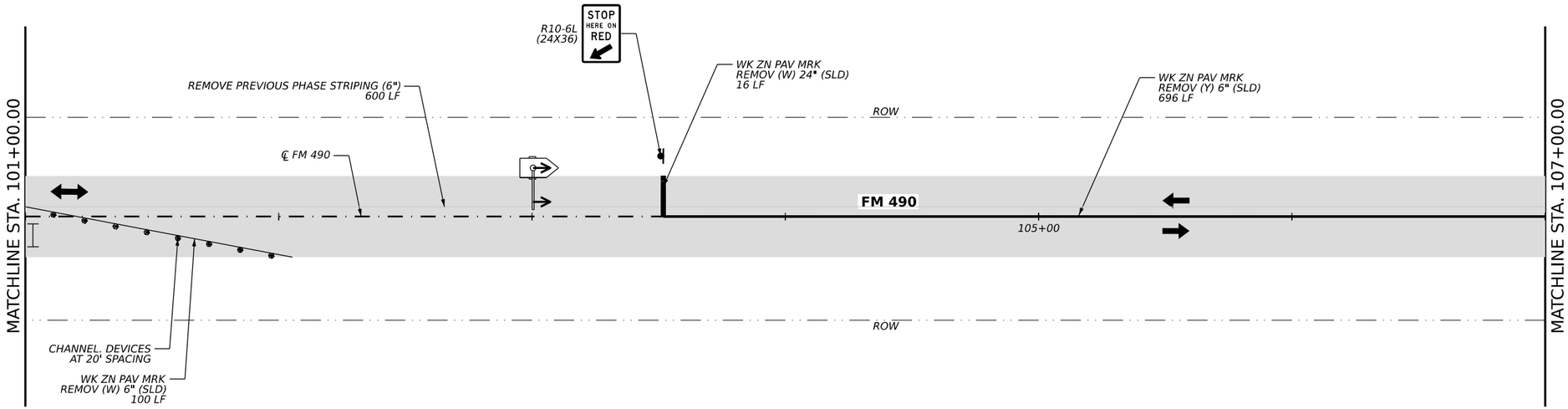

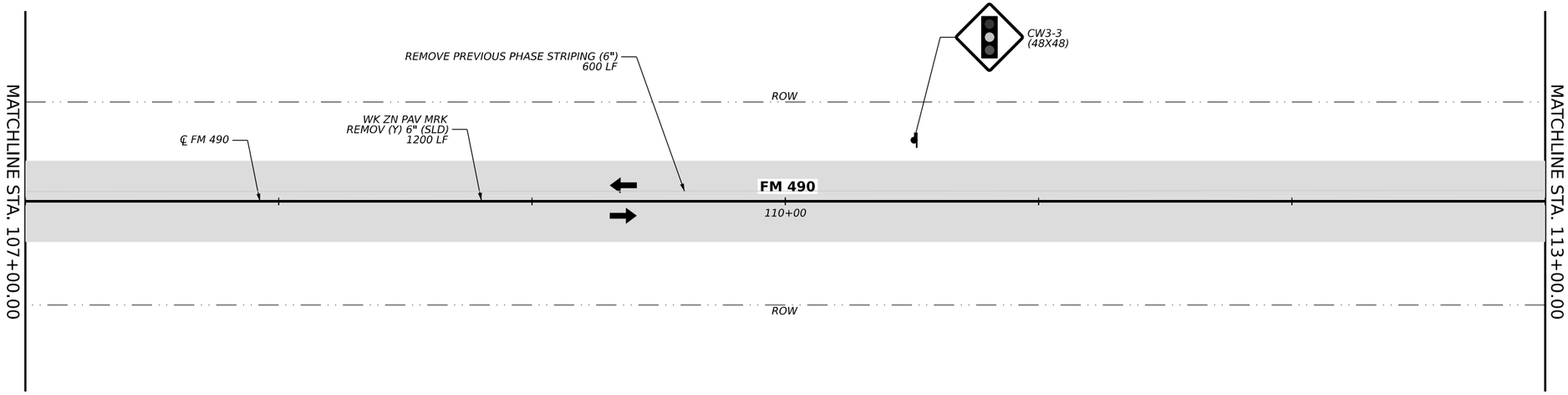

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 101+00 TO STA 113+00

SHEET 8 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		80

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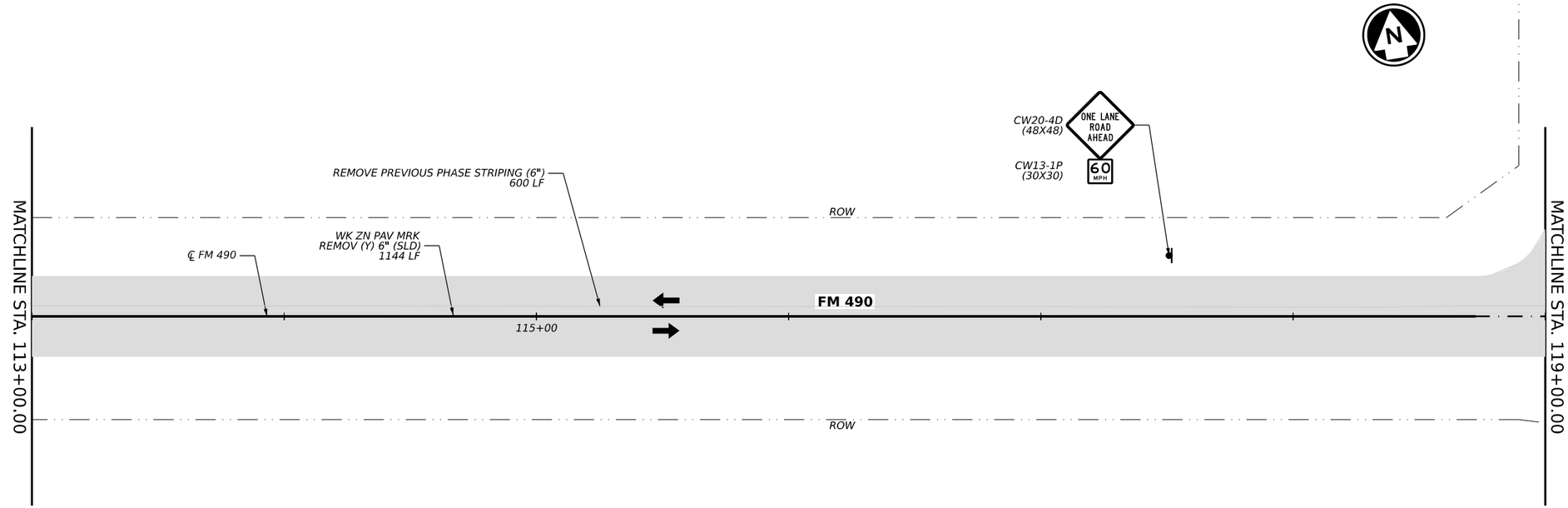

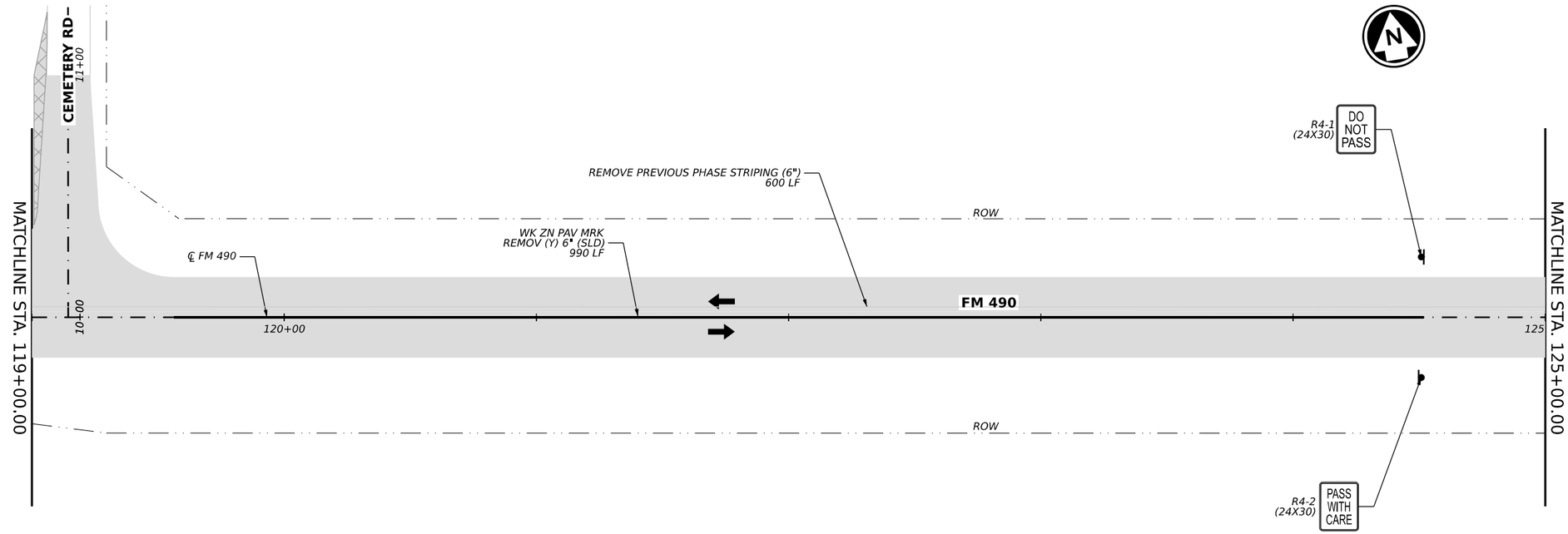

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 113+00 TO STA 125+00

SHEET 9 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		81

DATE: 1/31/2024
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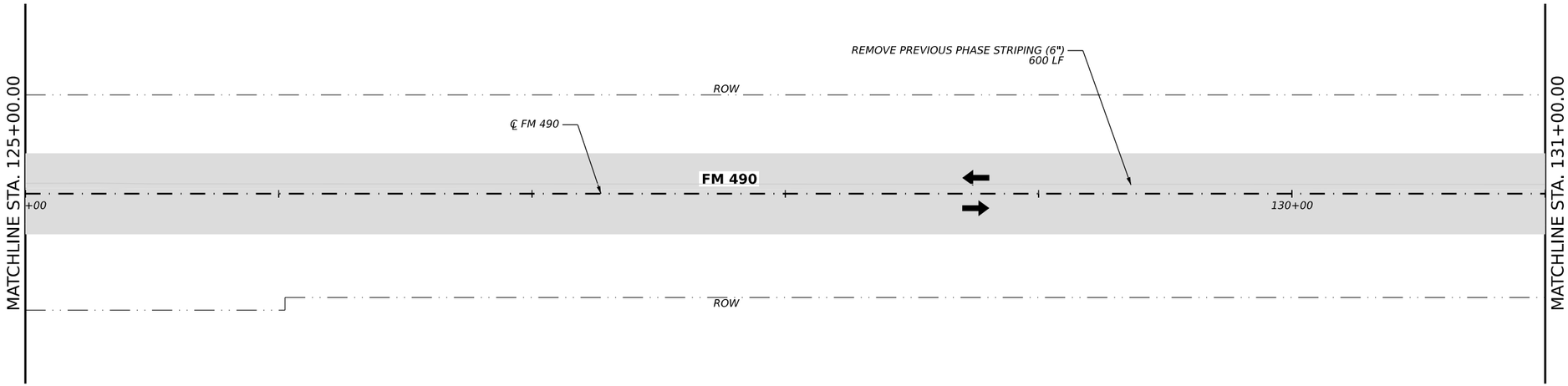

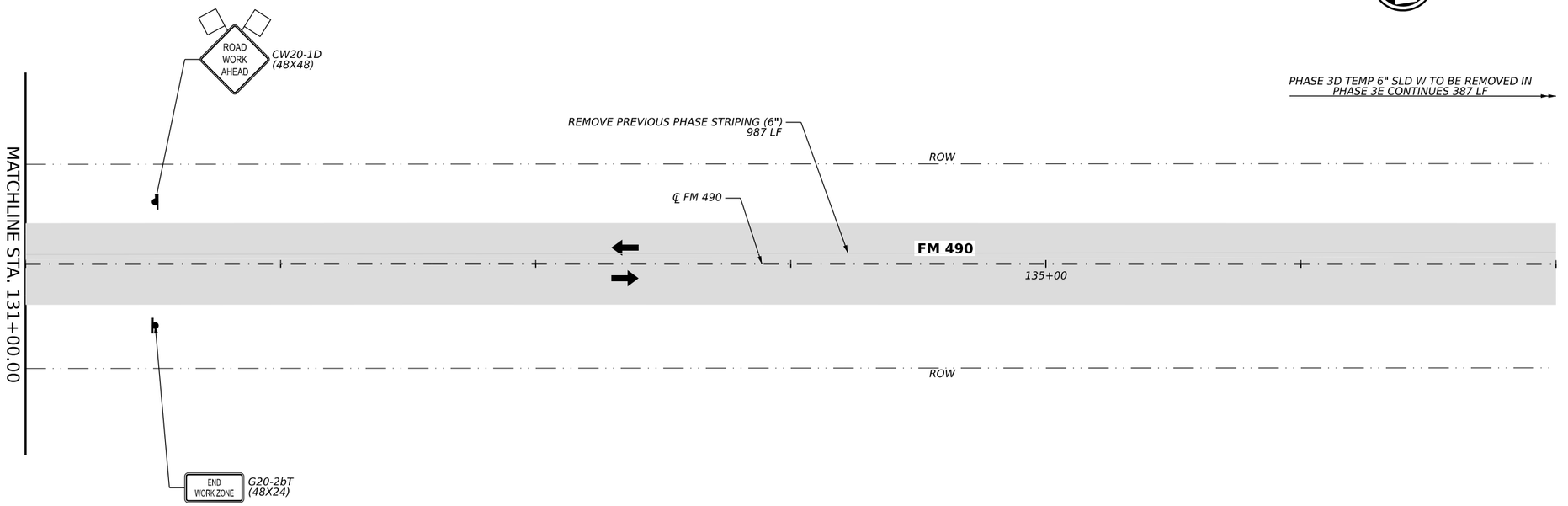

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
- DIRECTION OF TRAFFIC
- SIGN
- TEMPORARY TRF SIGNAL
- TEMPORARY DRIVEWAY ASSISTANCE DEVICE
- TY 3 BARRICADE
- CHANNELIZATION DEVICE

NOTES

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STATE OF TEXAS
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143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3E
STA 125+00 TO STA 137+00

SHEET10 OF 10

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		82

DATE: 1/31/2024
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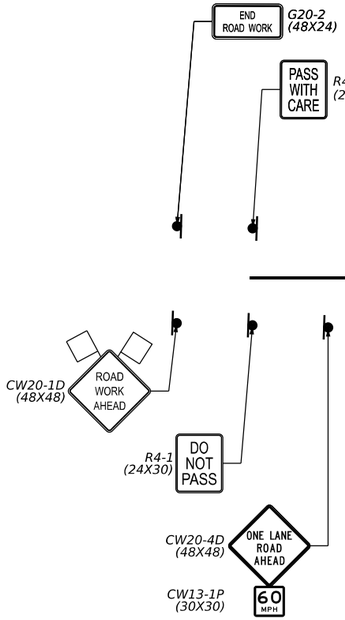

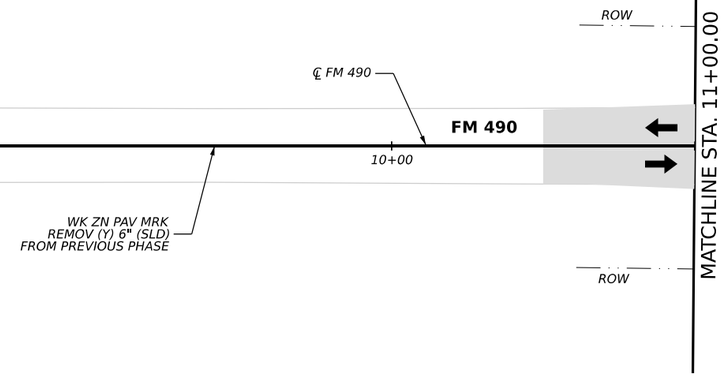

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
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- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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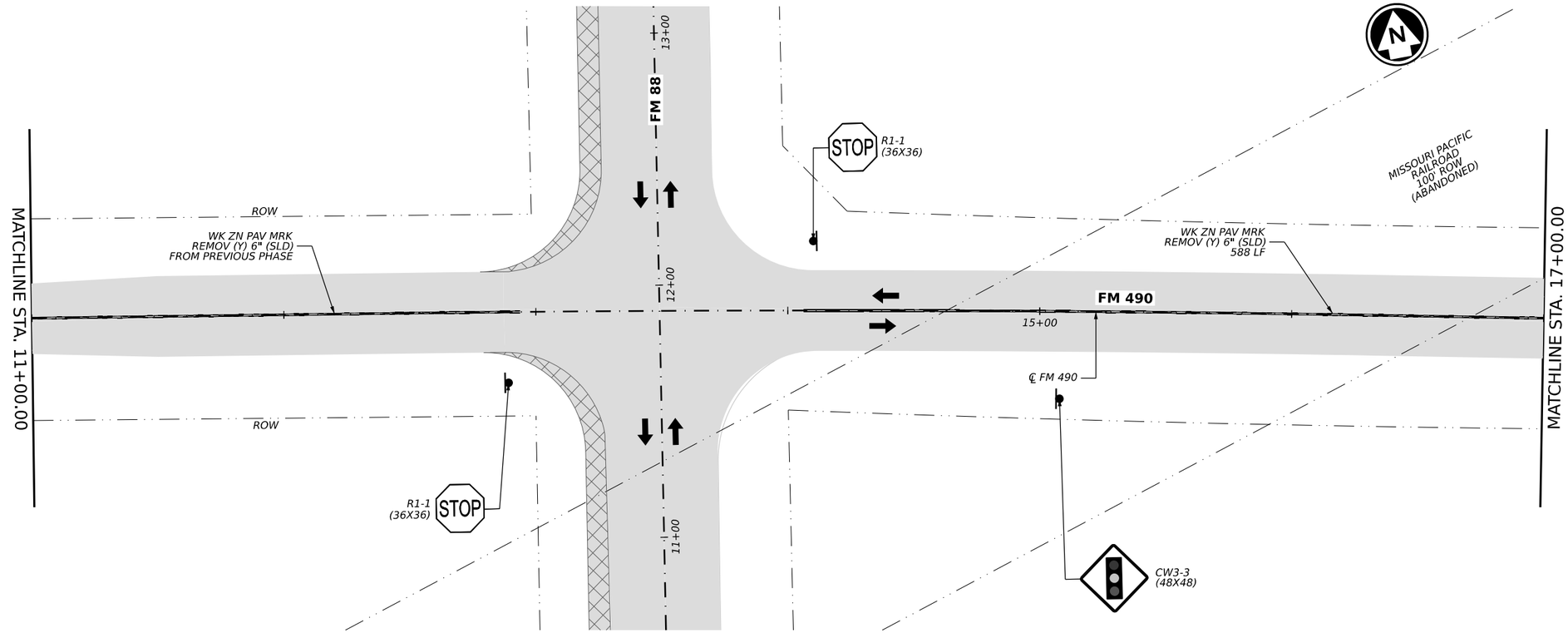

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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN PHASE 3F BEGIN TO STA 17+00.00

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		83

DATE: 1/31/2024
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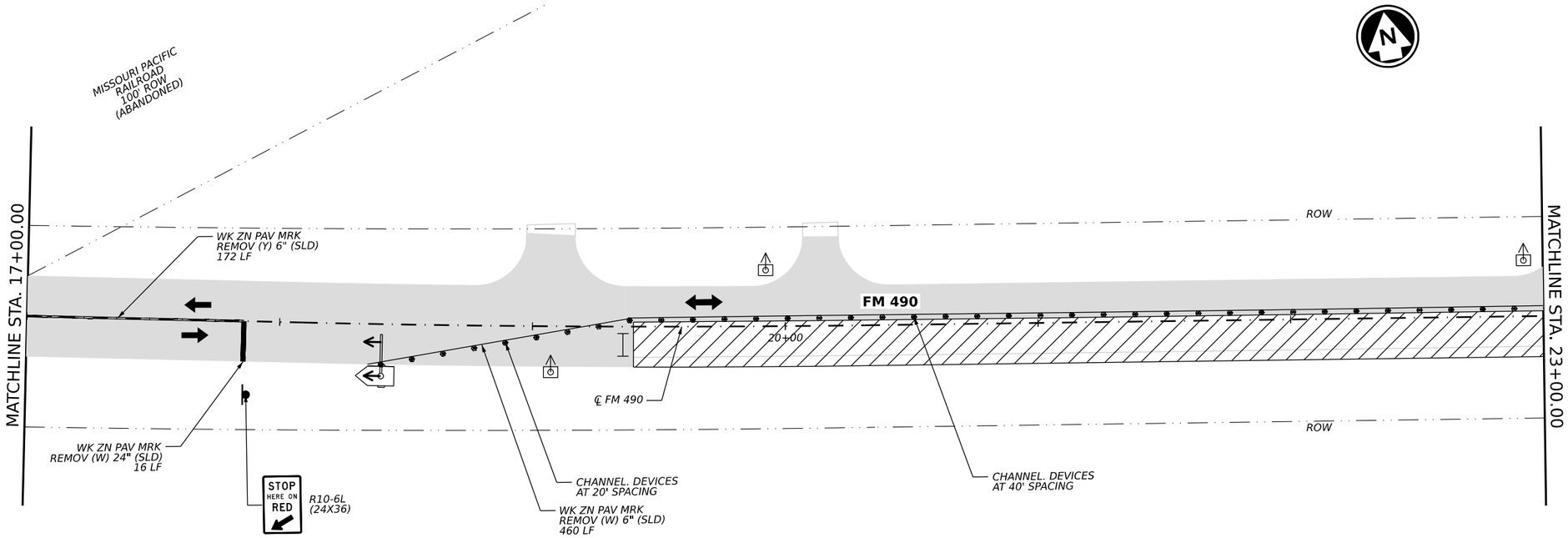

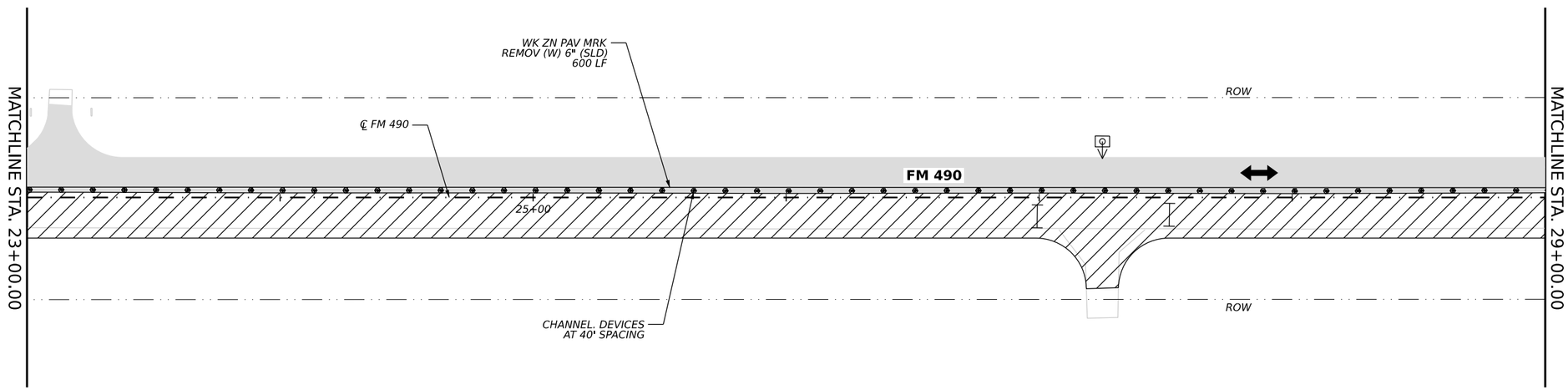

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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STATE OF TEXAS
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN PHASE 3F STA 17+00 TO STA 29+00

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		84

DATE: 1/31/2024
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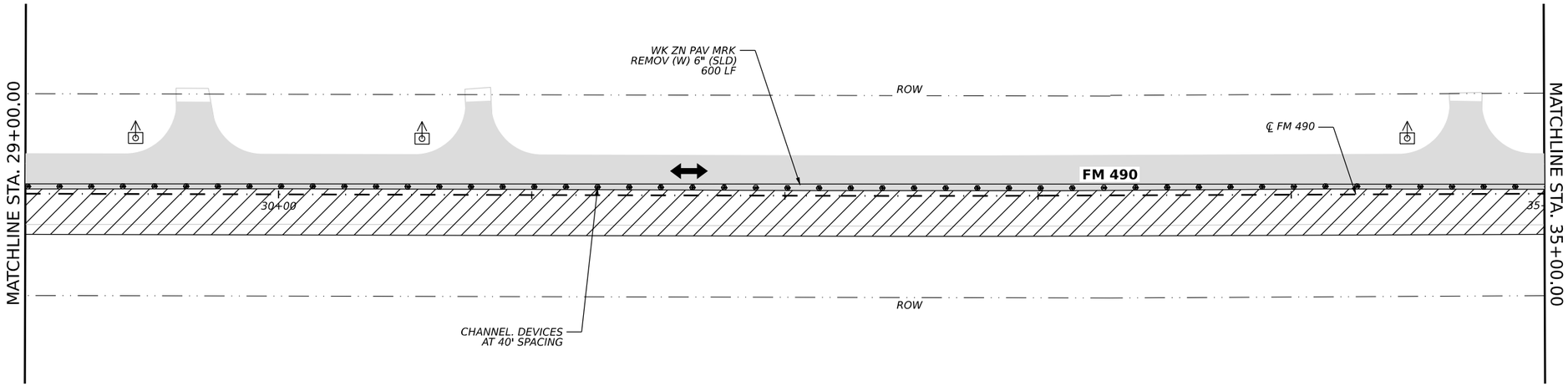

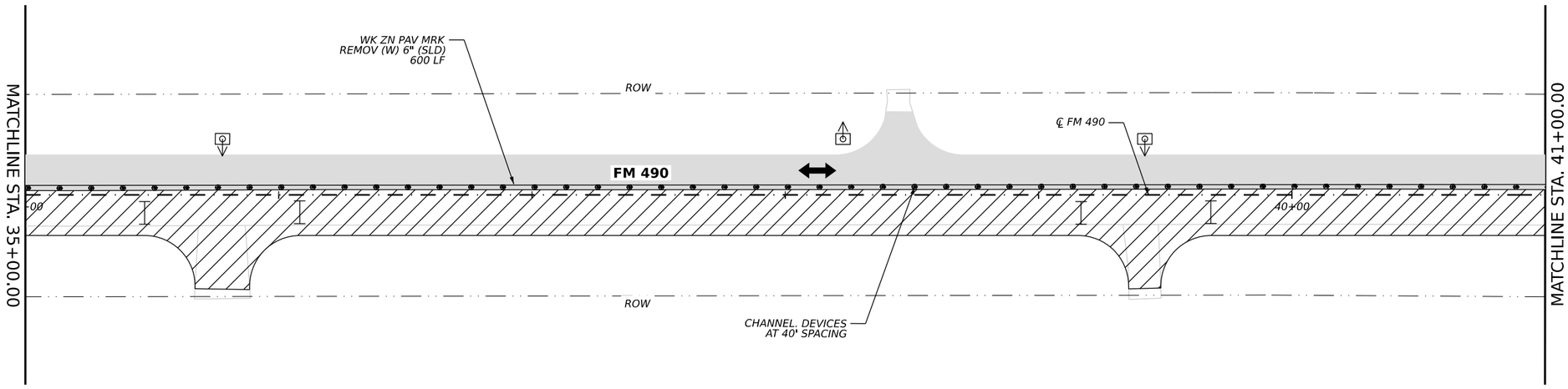

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LEGEND

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- PERM. PAVEMENT THIS PHASE
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- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3F
STA 29+00 TO STA 41+00

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		85

DATE: 1/31/2024
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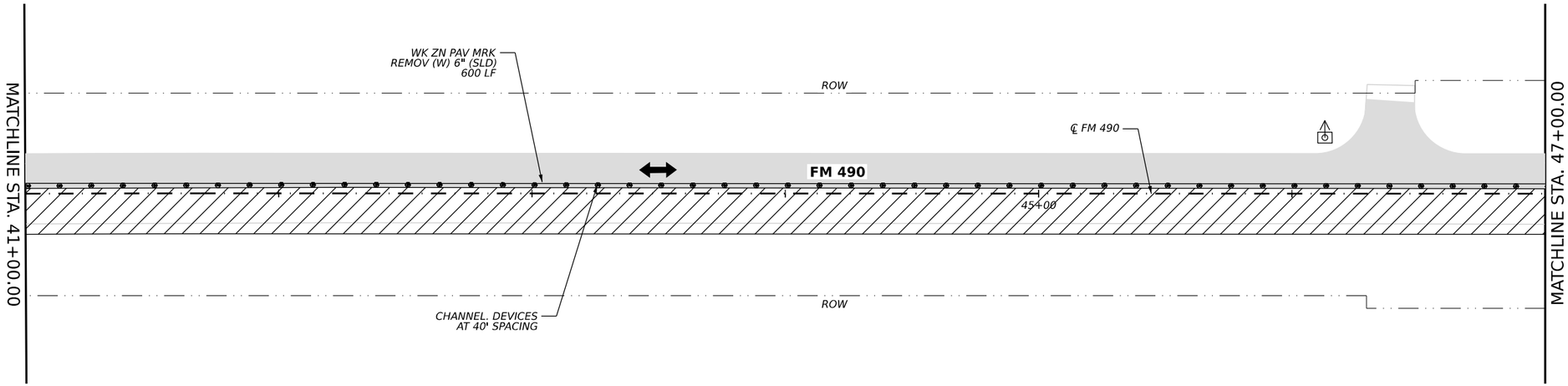

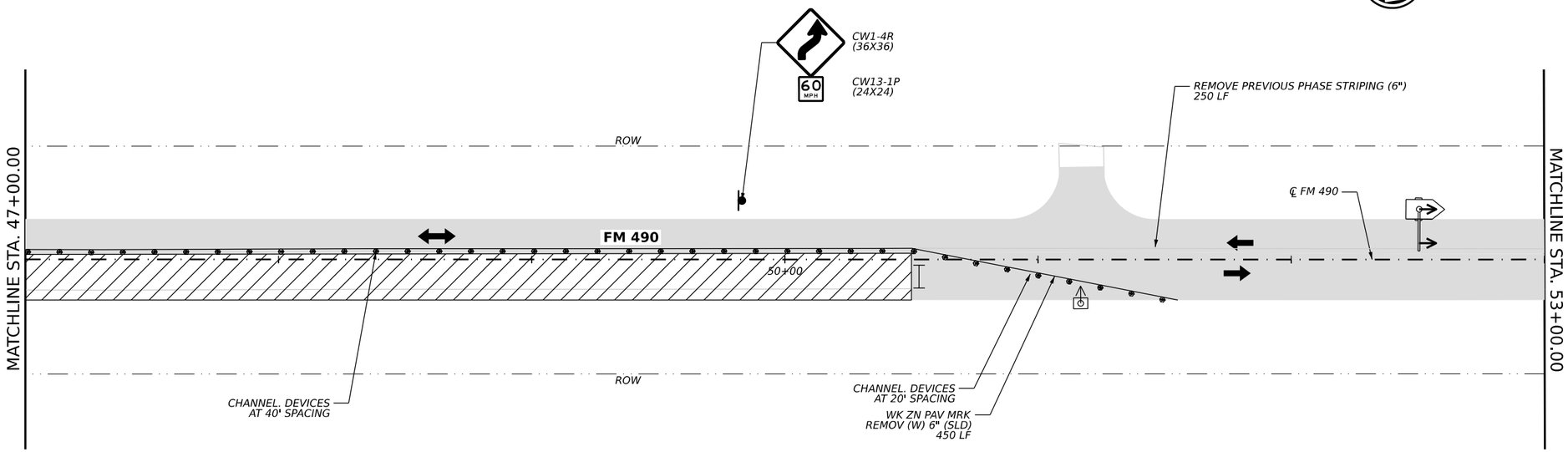

HORIZ: 0 25 50
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LEGEND

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- TEMP. PAVEMENT THIS PHASE
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- TEMP. PAVEMENT PREVIOUS PHASE
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3F
STA 41+00 TO STA 53+00

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		86

DATE: 1/31/2024
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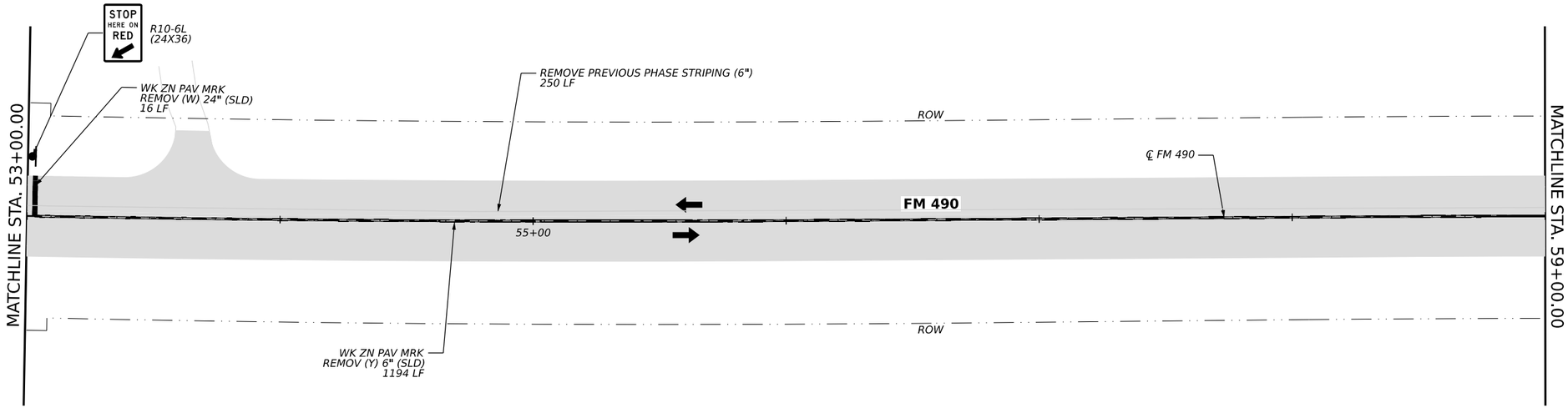

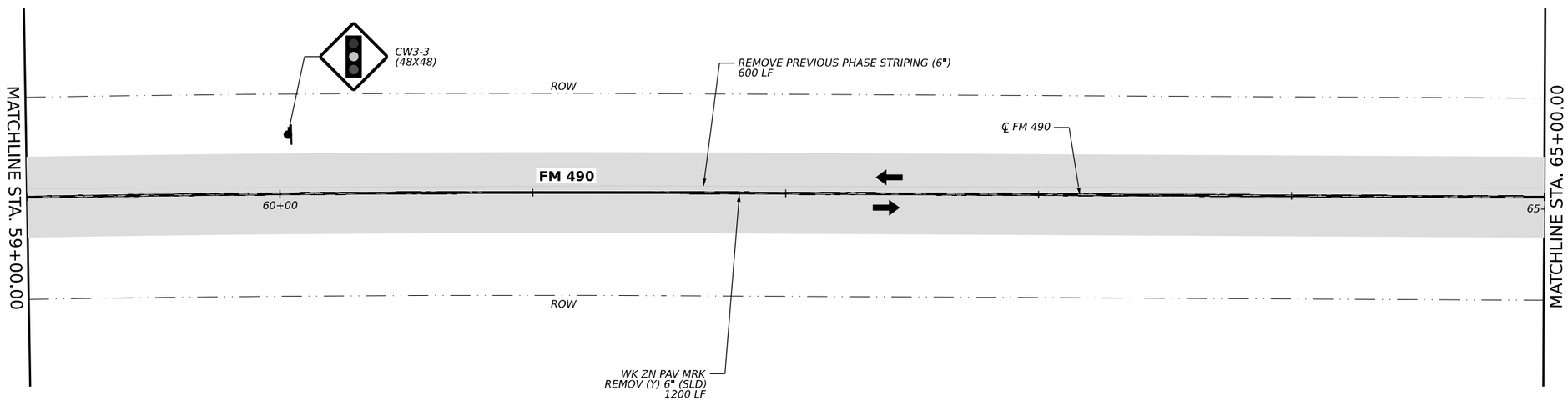

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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- PERM. PAVEMENT THIS PHASE
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- PERM. PAVEMENT PREVIOUS PHASE
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ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3F
STA 53+00 TO STA 65+00

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		87

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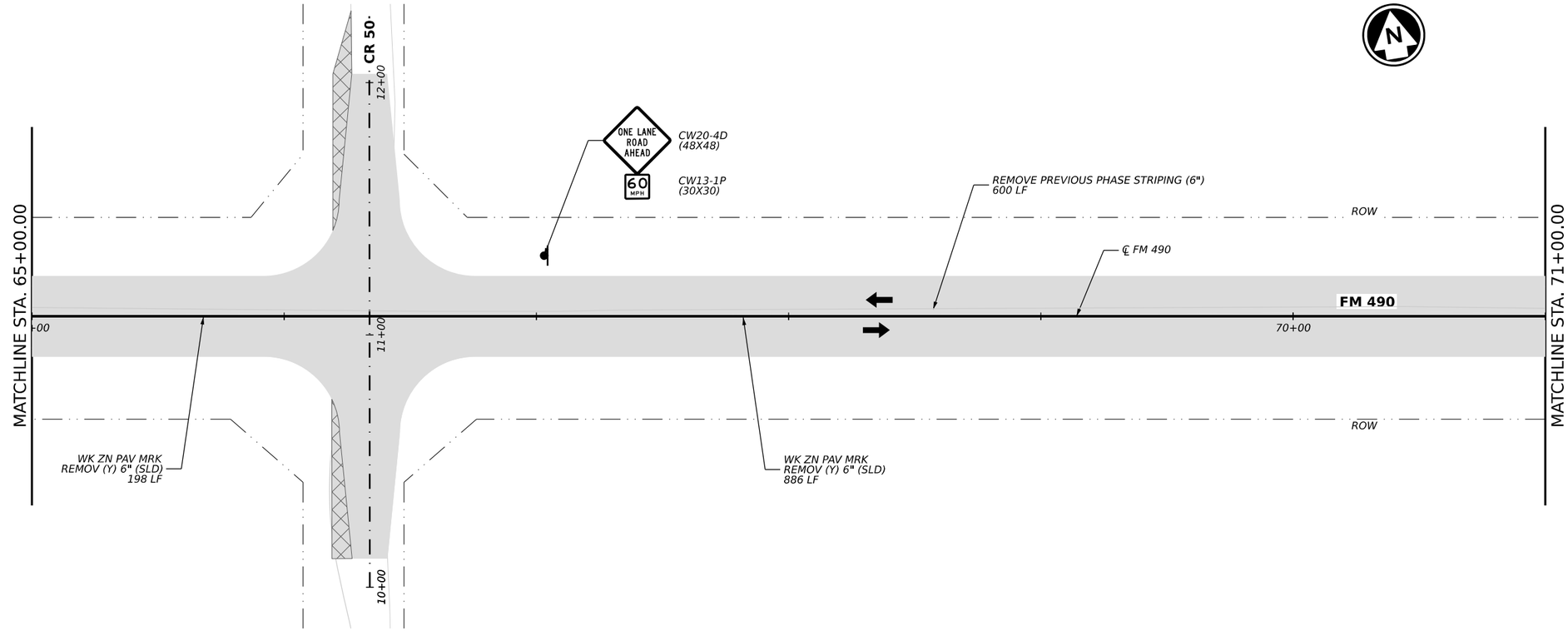

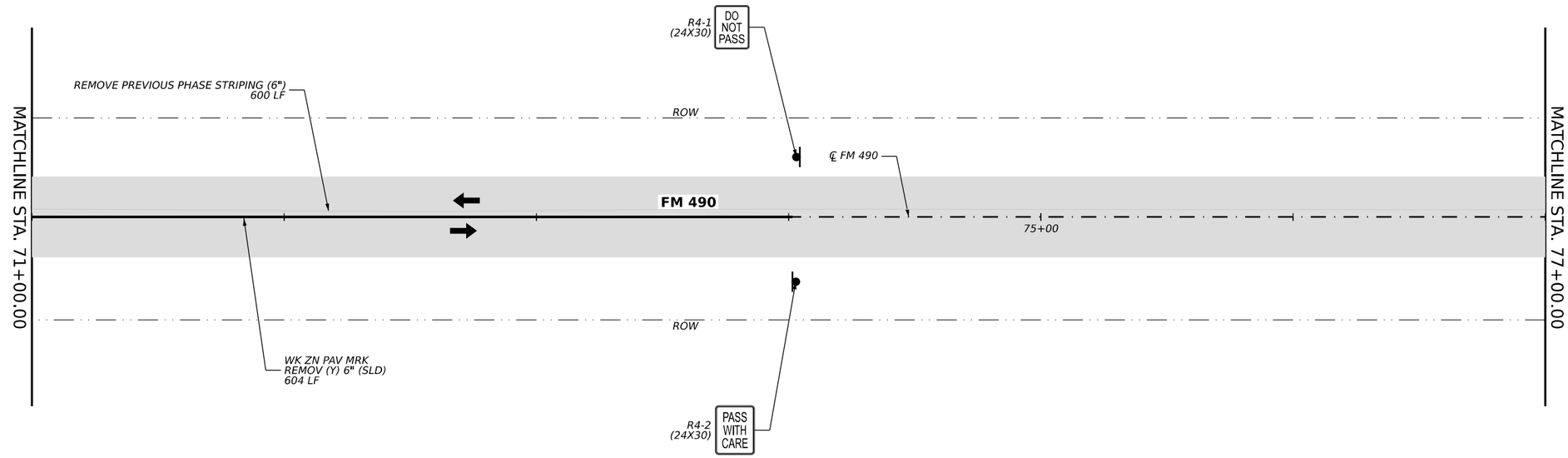

HORIZ: 0 25 50
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LEGEND

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- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
- TEMP. PAVEMENT PREVIOUS PHASE
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN PHASE 3F STA 65+00 TO STA 77+00

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
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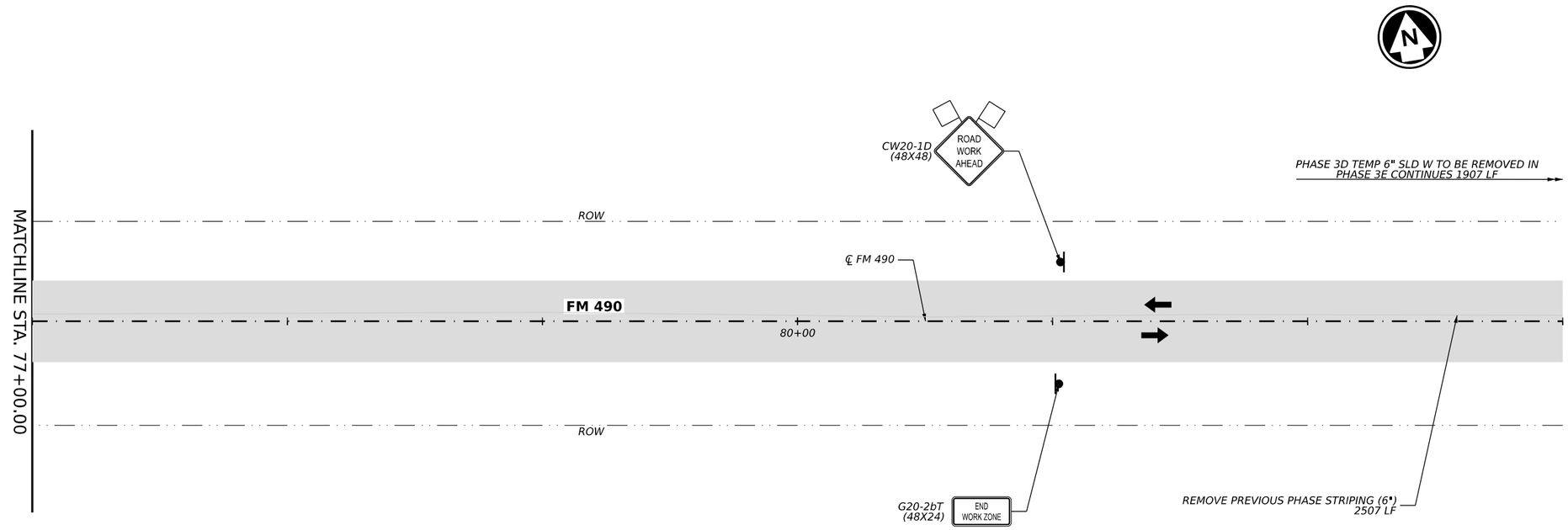

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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- PERM. PAVEMENT THIS PHASE
- TEMP. PAVEMENT THIS PHASE
- PERM. PAVEMENT PREVIOUS PHASE
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Texas Department of Transportation

FM 490

TRAFFIC CONTROL PLAN
PHASE 3F
STA 77+00 TO STA 83+00

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		89

DATE: 1/31/2024
FILE: ...\FM490-BMCD-TCP-3F-07.dgn

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

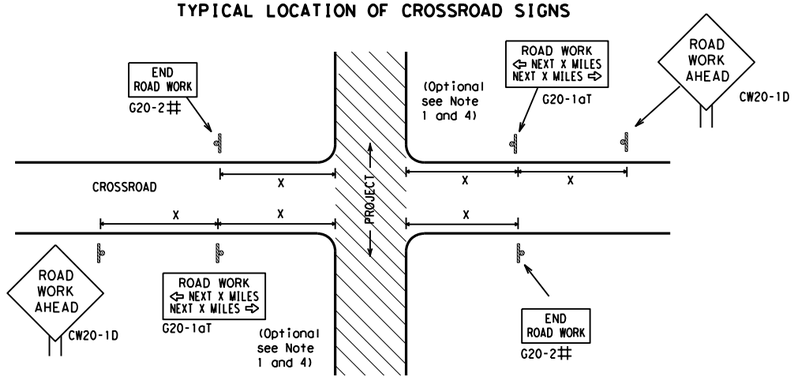
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	PHR	WILLACY		90
5-10 5-21				

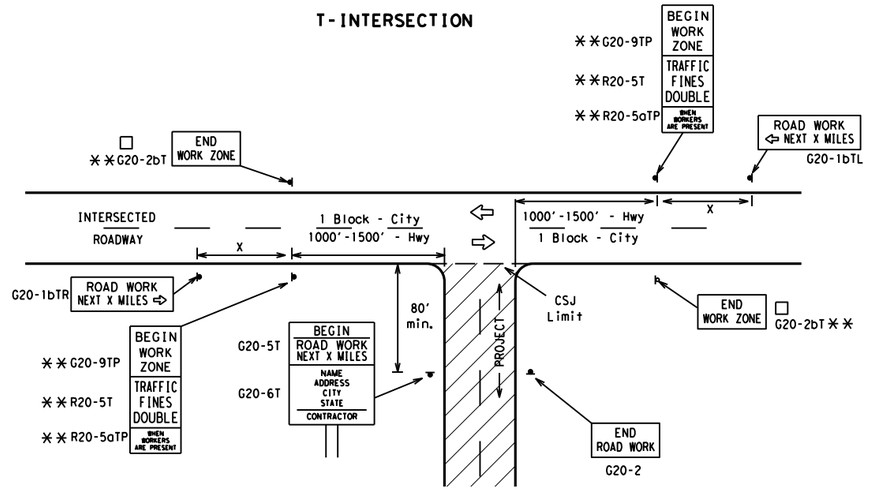
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

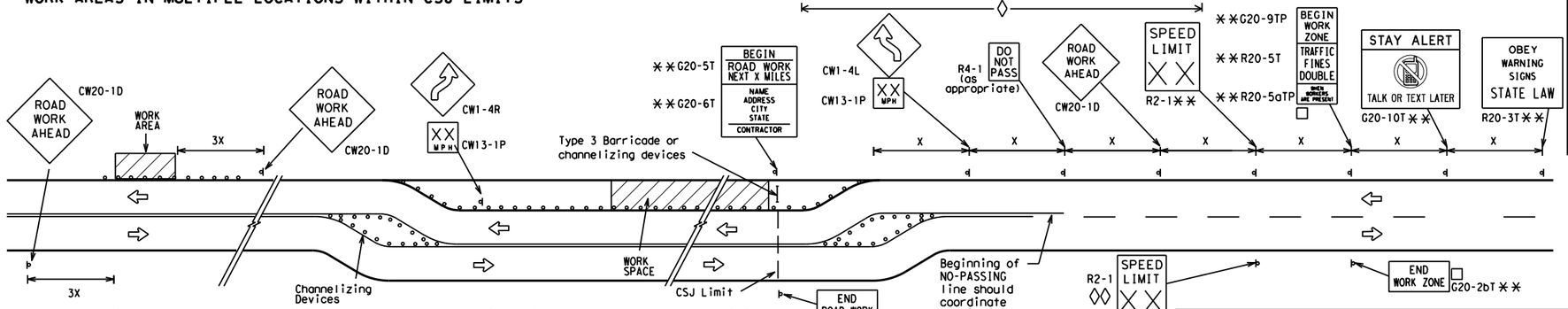
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

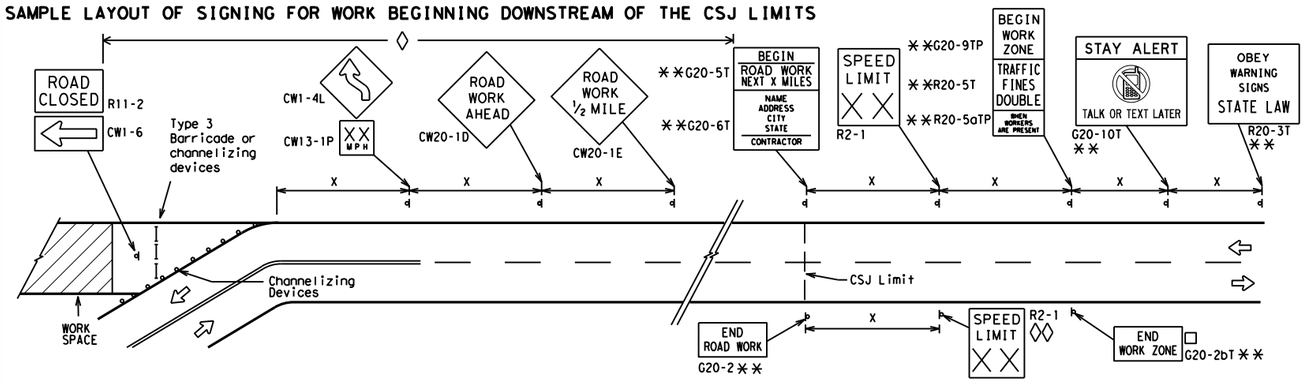
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



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.

SHEET 2 OF 12

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	0860	02	015	FM490
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	WILLACY		91

DATE:
FILE:

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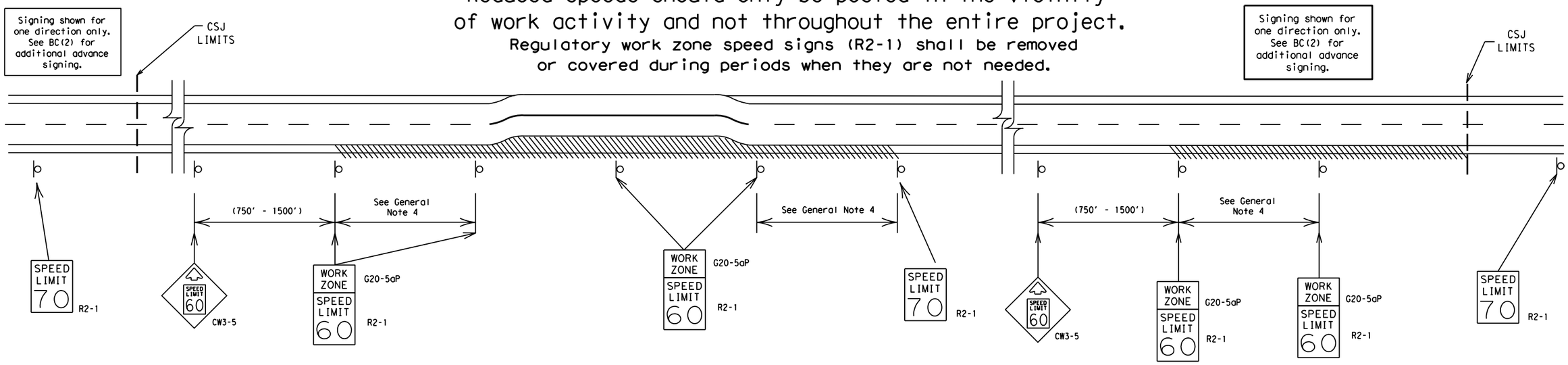
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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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	0860	02	015	FM490
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	WILLACY		92

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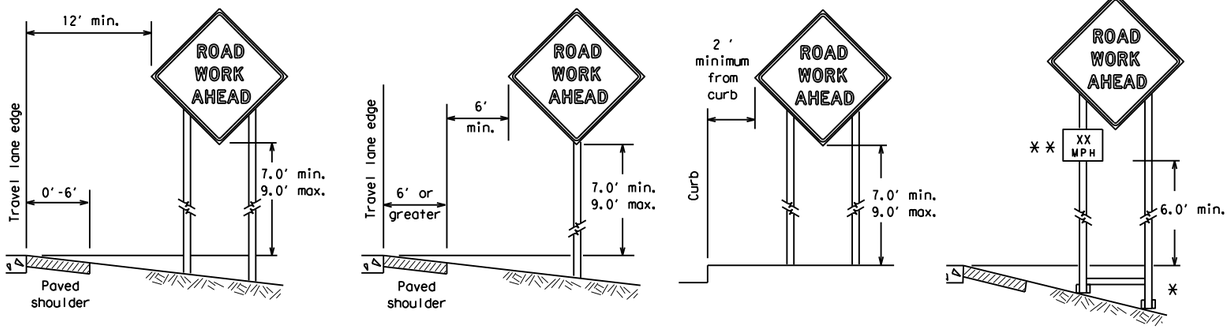
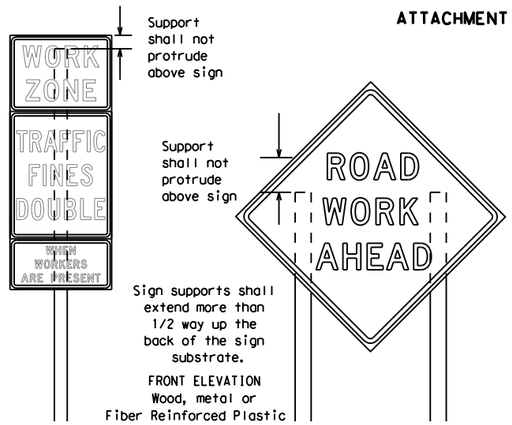
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

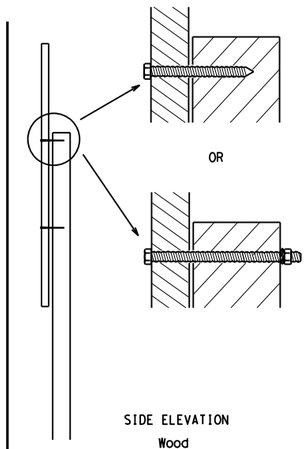


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





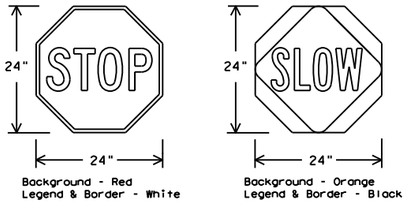
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	WILLACY		93

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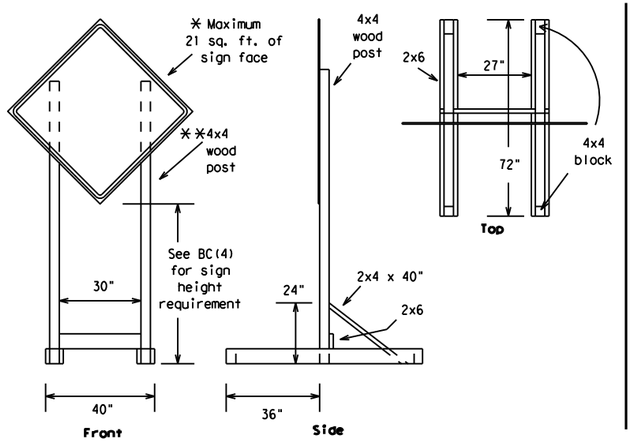
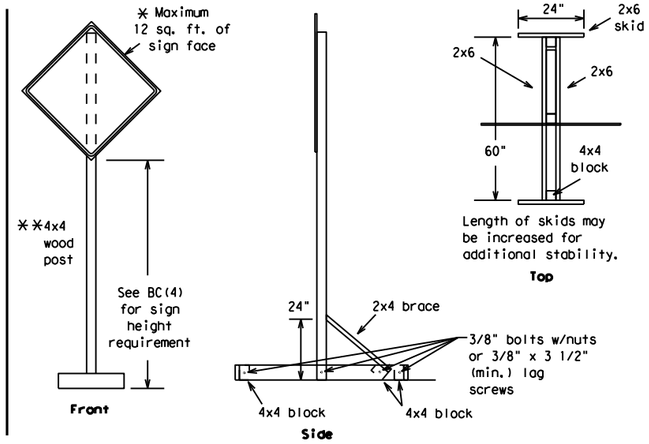
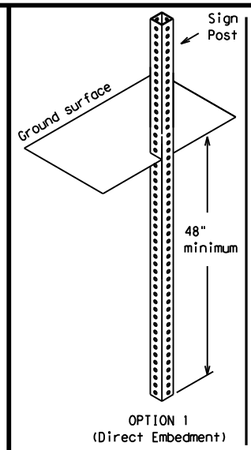
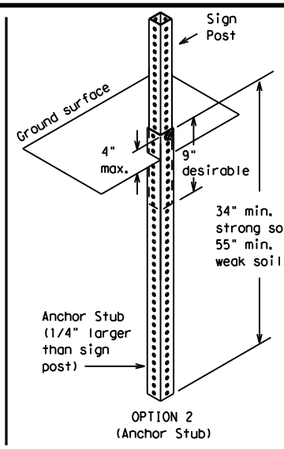


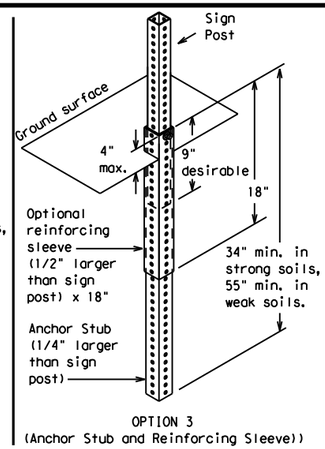


SKID MOUNTED WOOD SIGN SUPPORTS

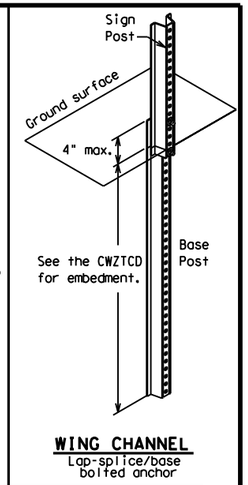
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS





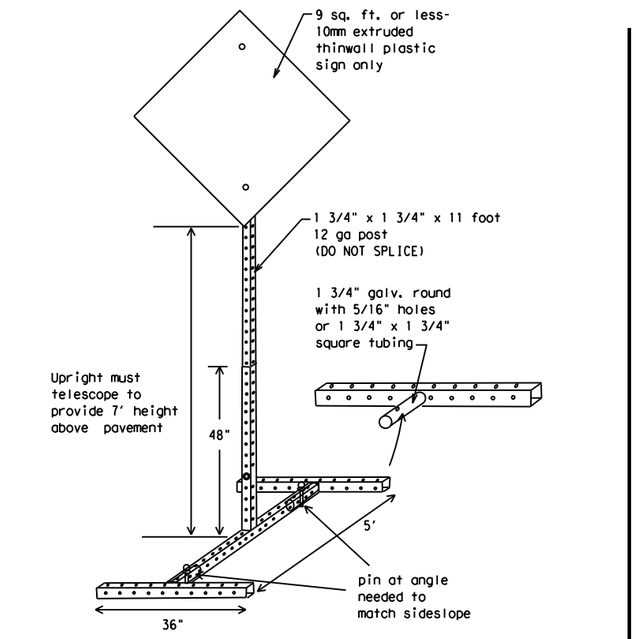


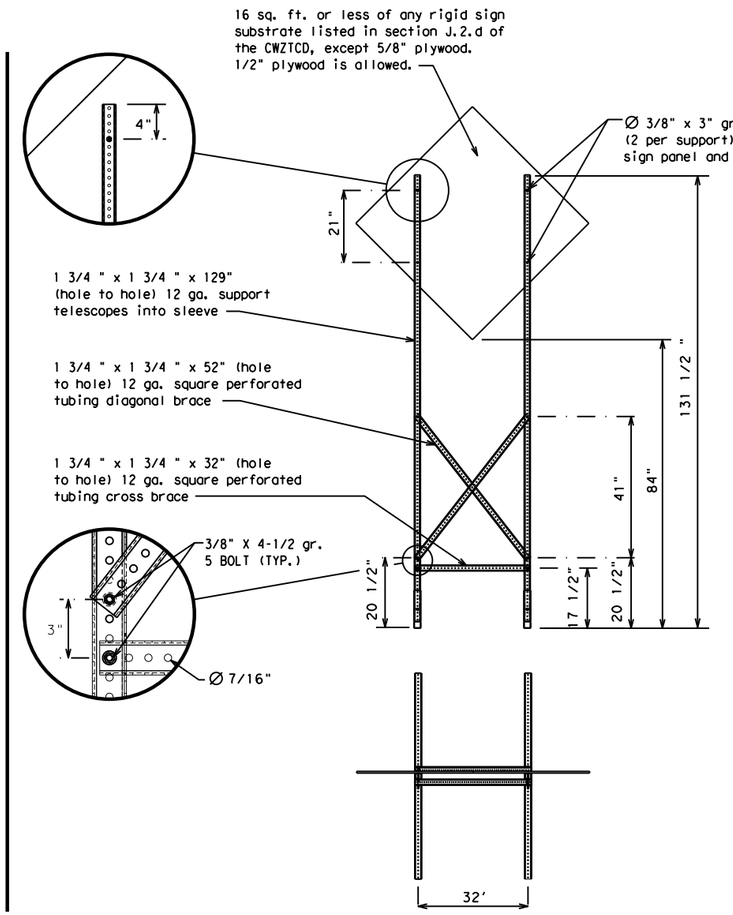
PERFORATED SQUARE METAL TUBING

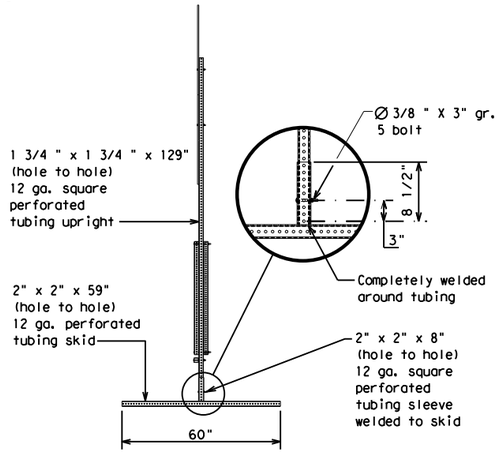


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
9-07 8-14	DIST	COUNTY		SHEET NO.
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
9-07 8-14	DIST	COUNTY		SHEET NO.
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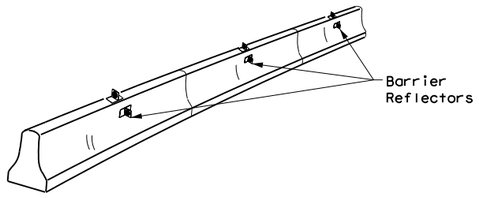
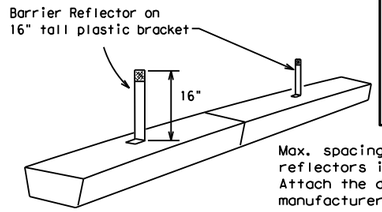
DATE:
FILE:

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



CONCRETE TRAFFIC BARRIER (CTB)

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

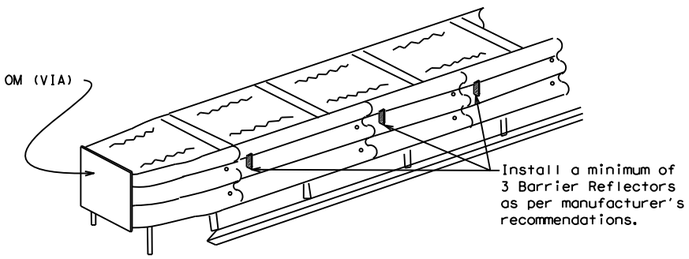


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

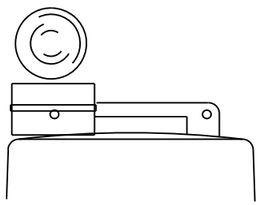


DELINEATION OF END TREATMENTS

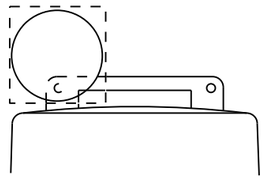
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

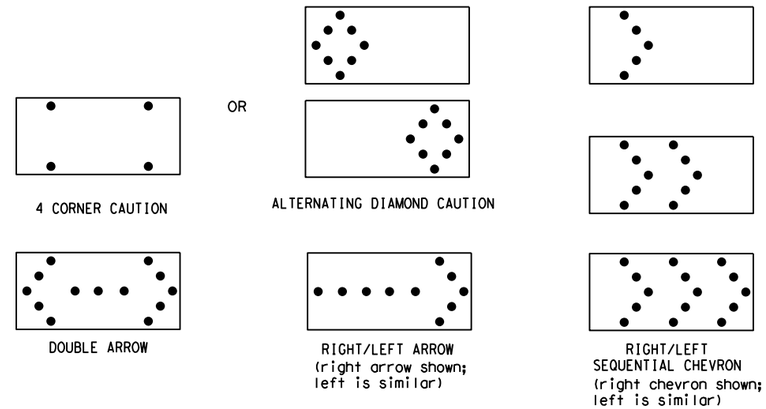
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

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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	0860	02	015	FM490
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	WILLACY		96

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:

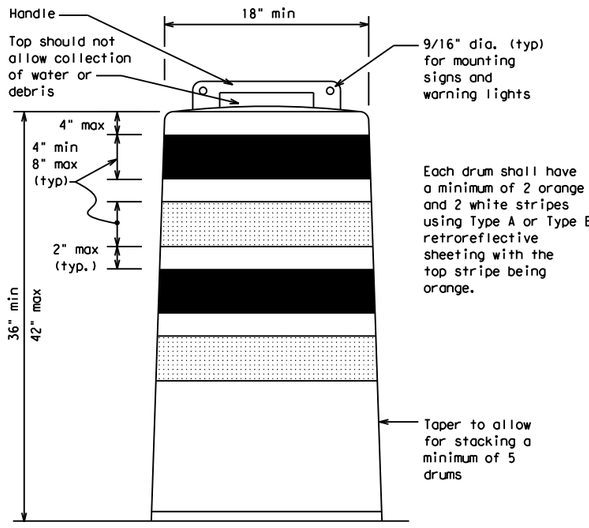
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

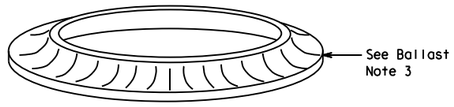
RETROREFLECTIVE SHEETING

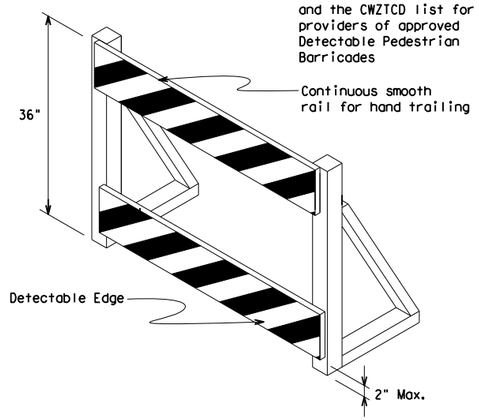
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

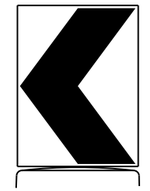




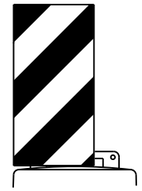


DETECTABLE PEDESTRIAN BARRICADES

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
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9-07 5-21	PHR	WILLACY		97
7-13				

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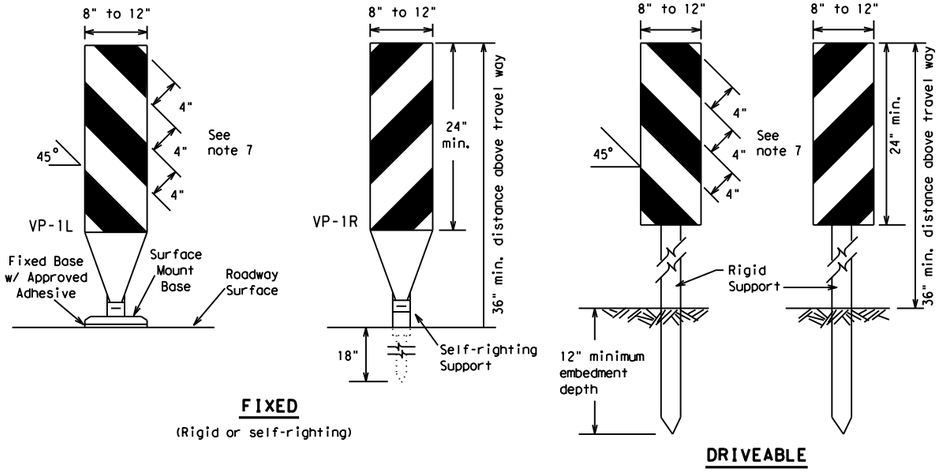
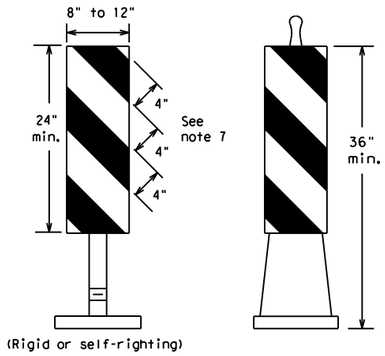


FIXED
(Rigid or self-righting)

DRIVEABLE

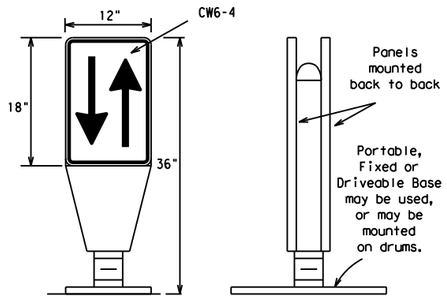


(Rigid or self-righting)

PORTABLE

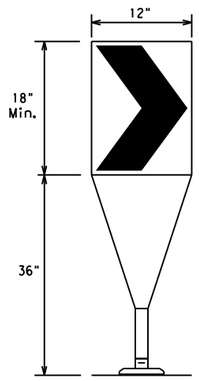
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



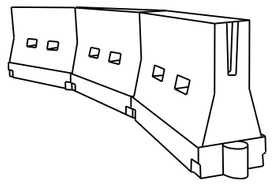
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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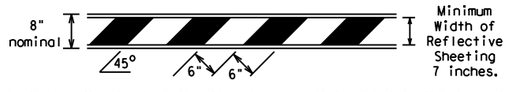
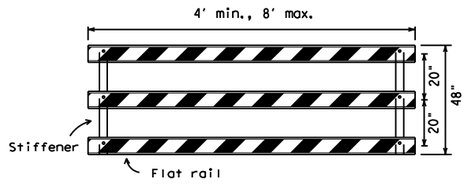
TYPE 3 BARRICADES

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.



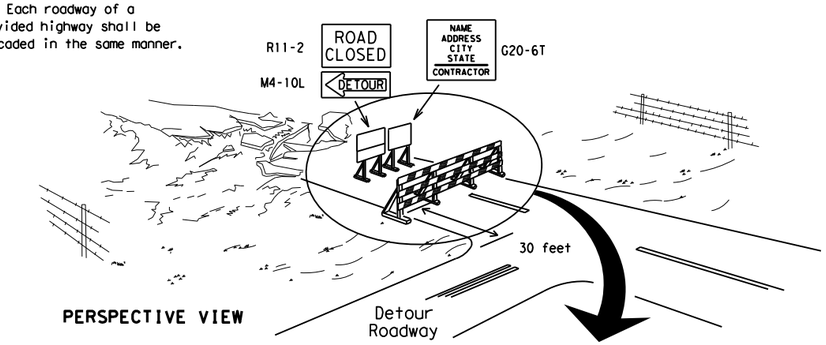
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

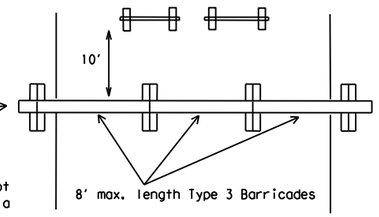
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

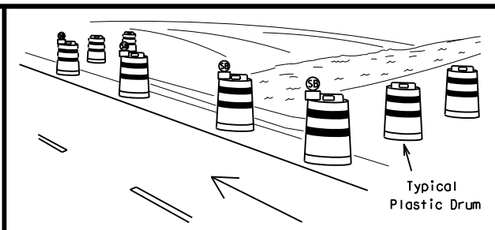
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

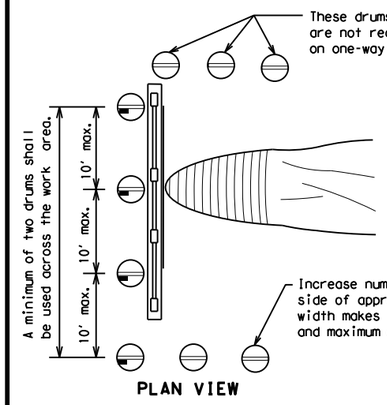
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

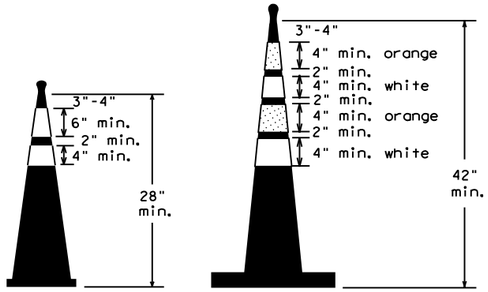
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

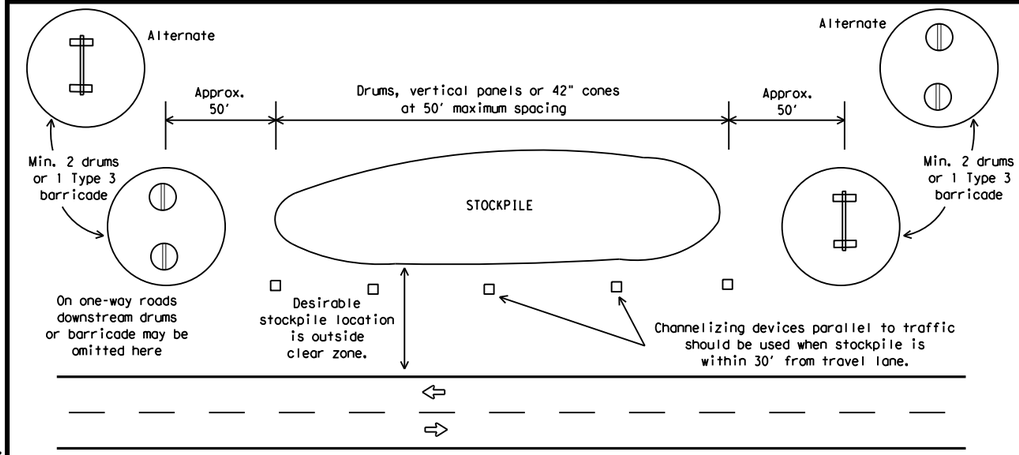
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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7-13 5-21	PHR	WILLACY		99

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

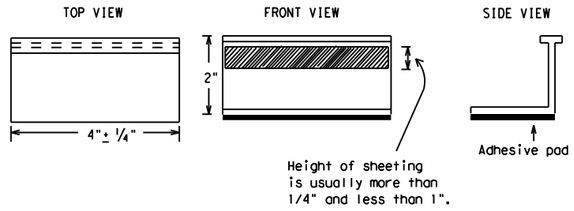
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

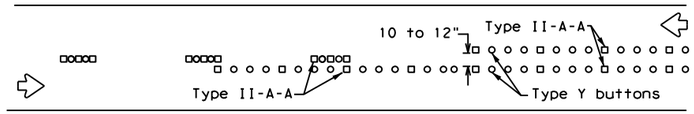
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	PHR	WILLACY		100
11-02 8-14				

105

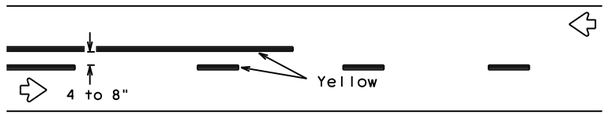
DATE:
FILE:

PAVEMENT MARKING PATTERNS

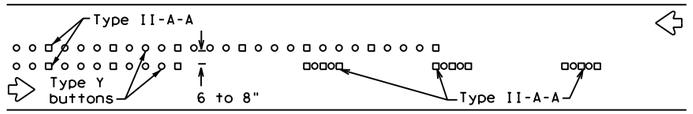
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



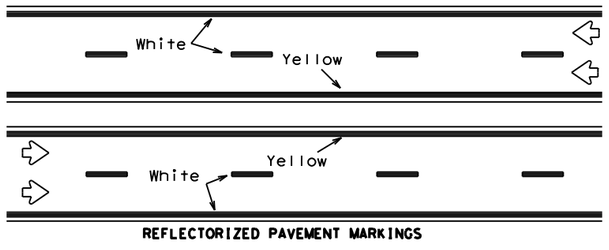
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



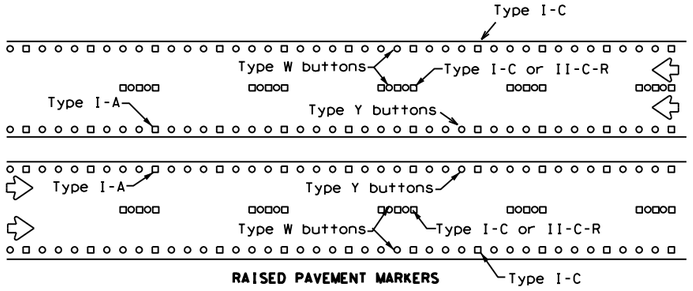
RAISED PAVEMENT MARKERS - PATTERN B

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

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



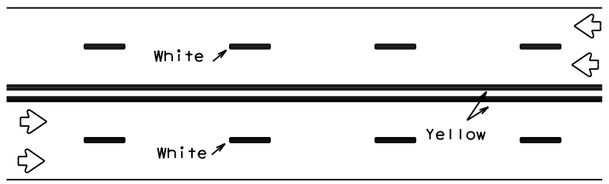
REFLECTORIZED PAVEMENT MARKINGS



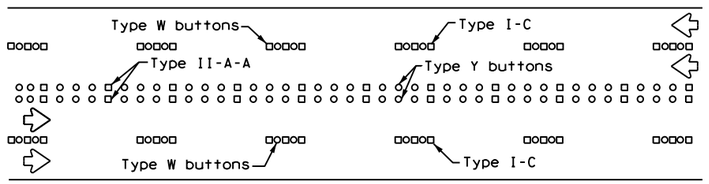
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



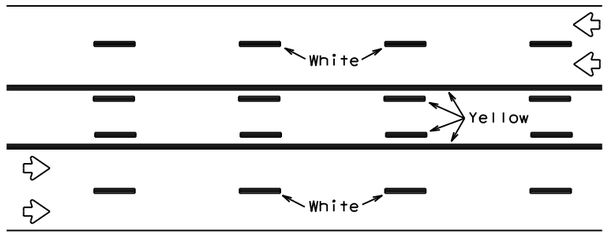
REFLECTORIZED PAVEMENT MARKINGS



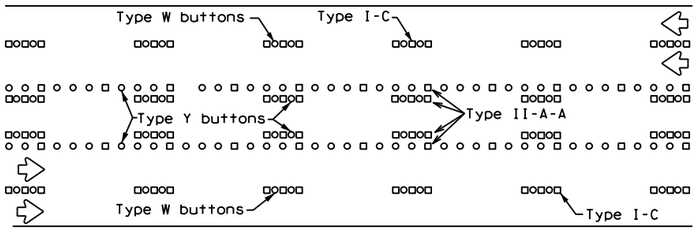
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

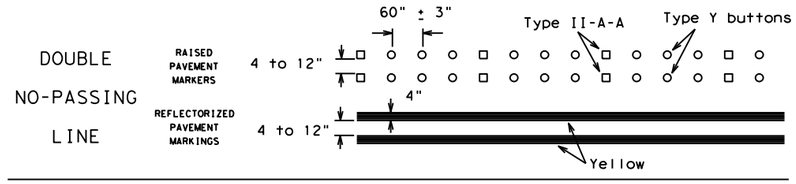
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

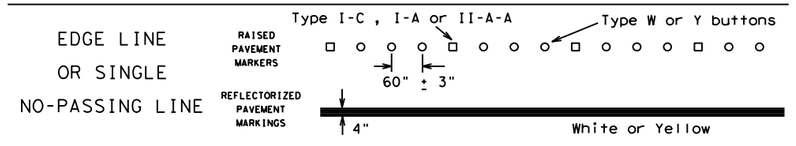
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

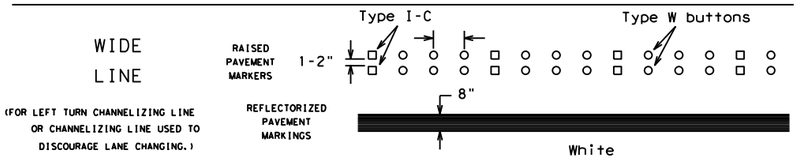


EDGE LINE OR SINGLE NO-PASSING LINE



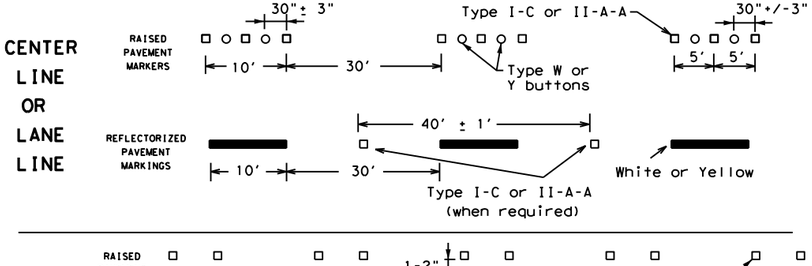
WIDE LINE

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

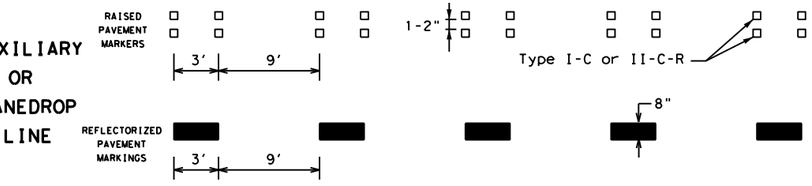


BROKEN LINES

CENTER LINE OR LANE LINE

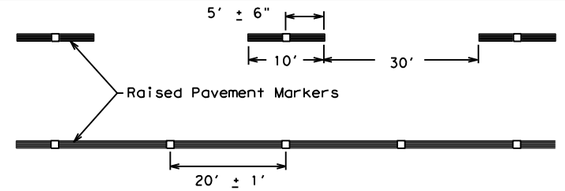


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

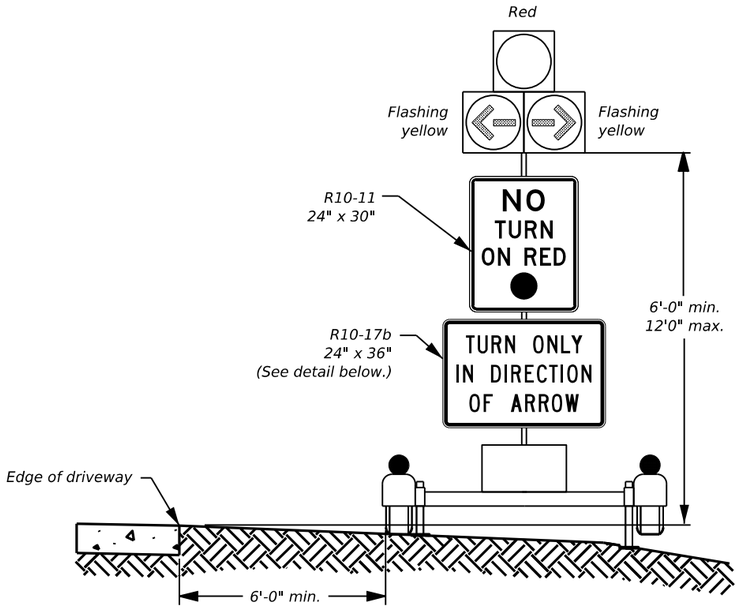
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0860	02	015	FM490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		101

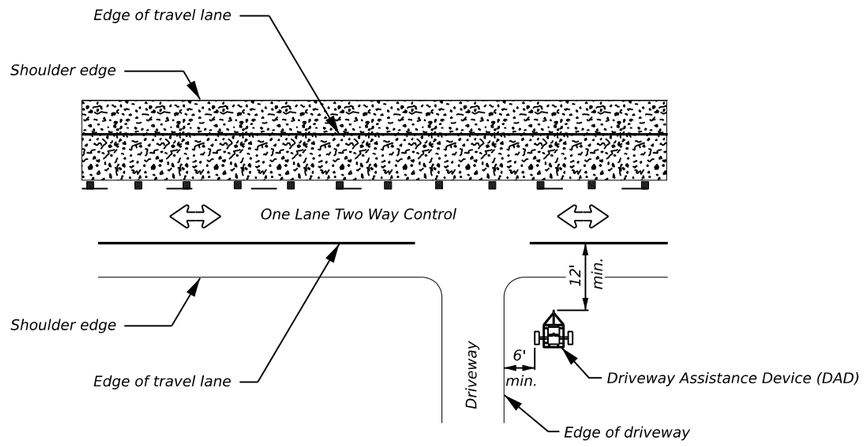
106

ELEVATION VIEW



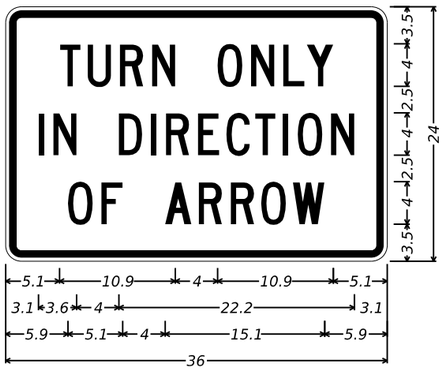
PLAN VIEW

TYPICAL DAD INSTALLATION



SIGN DETAILS

R10-17b



R10-17b_24x36;
1.5" Radius, 0.6" Border, 0.4" Indent, Black on White;
"TURN ONLY", C; "IN DIRECTION", C;
"OF ARROW", C;

GENERAL NOTES

1. Each DAD must have one signal head consisting of three LED indications as follows; one 12 in. diameter steady red ball indication centered over one 12 in. diameter yellow flashing left arrow and one 12 in. diameter yellow flashing right arrow.
2. See Special Specification 6509 for details.

LEGEND	
⇨	Traffic flow
■	Channelizing device

Texas Department of Transportation

DRIVEWAY ASSISTANCE DEVICES DETAIL

FILE: DADs_Detail -2023-09-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT September 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
6-22	DIST	COUNTY		SHEET NO.
8-23	PHR	WILLACY		101A
9-23				

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DATE:
FILE:

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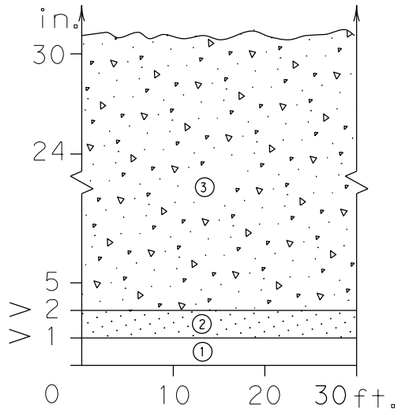
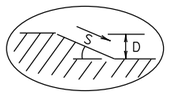
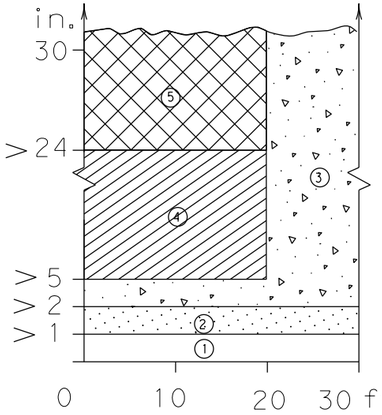
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

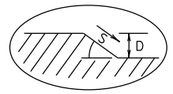


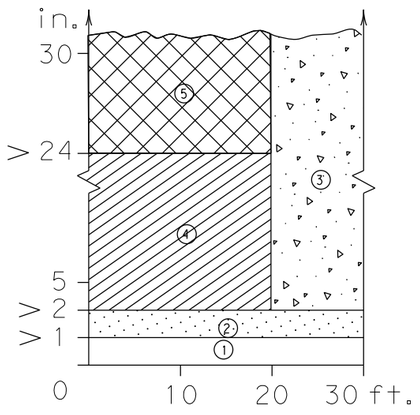
Edge Condition I
S = (3:1) (or flatter)



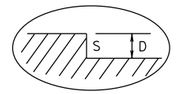


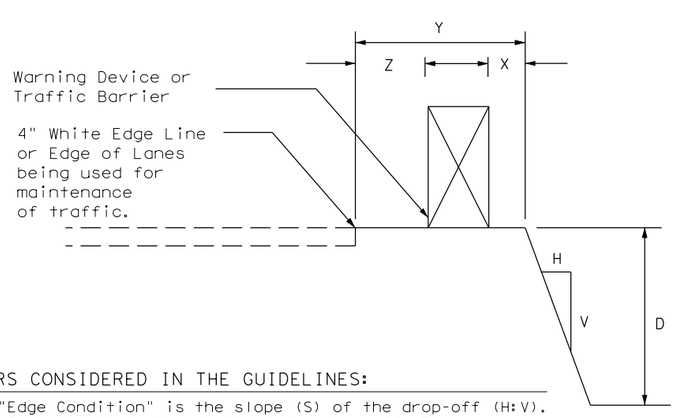
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

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

Edge Condition Notes:

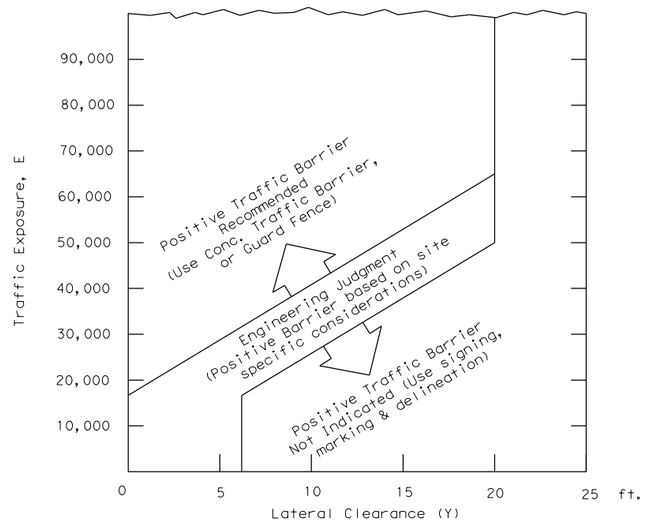
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

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



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

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

Engineer's Seal

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Date 1/31/2024

Kristen Harper

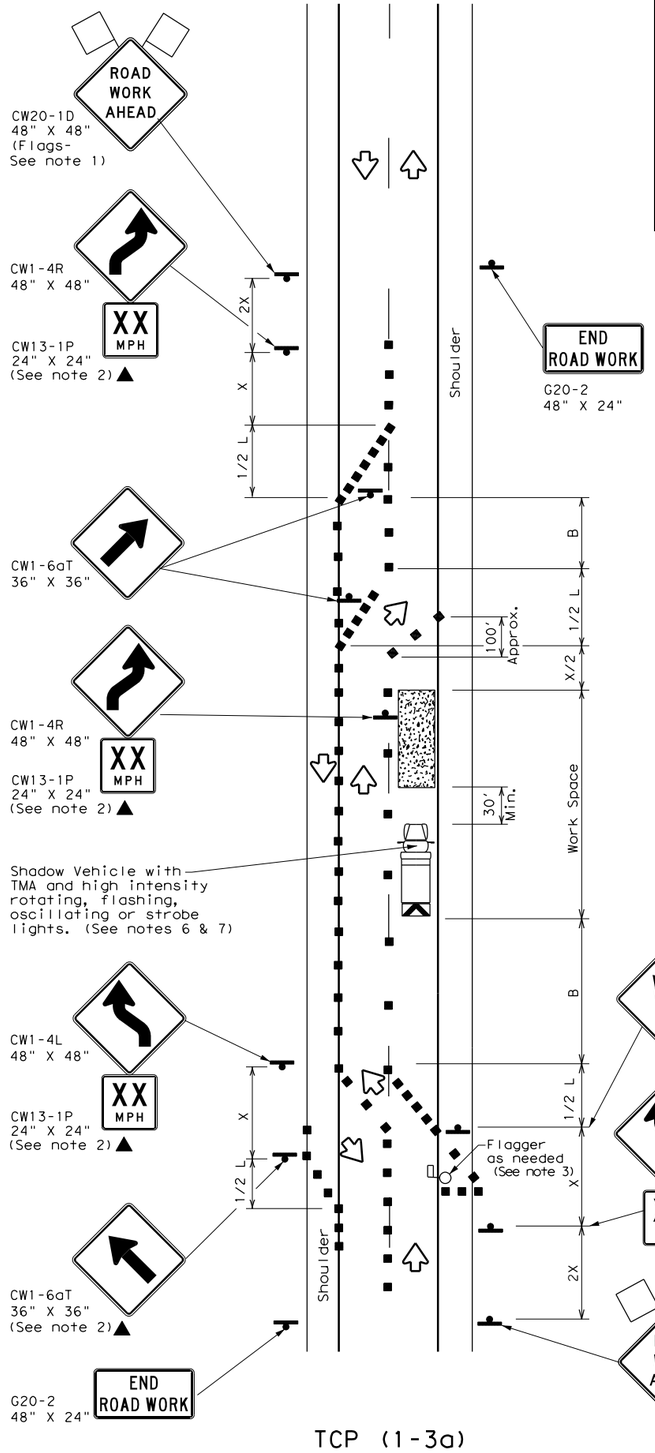
Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM 490
03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		102

DATE:
FILE:

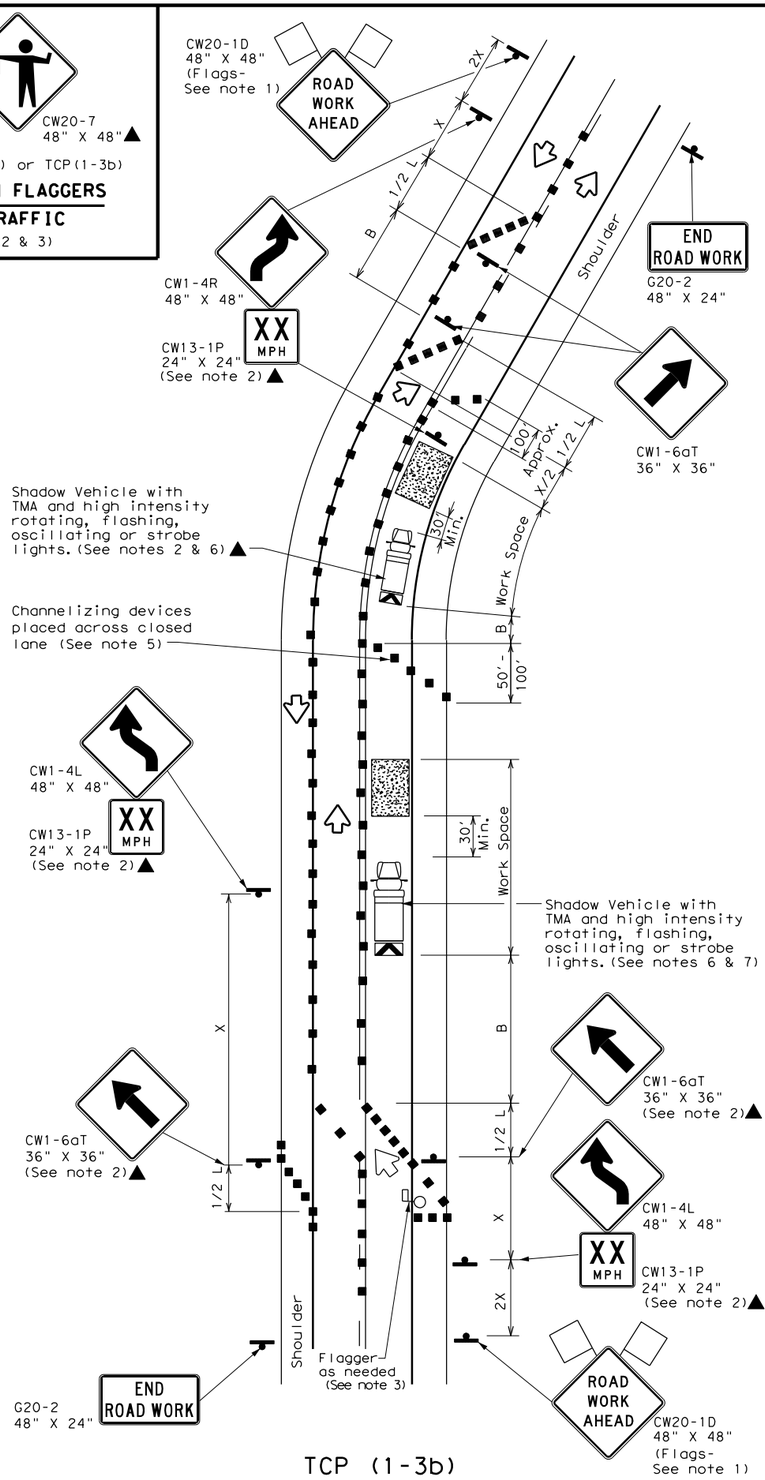


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP
CW3-4 48" X 48"
CW20-7 48" X 48"
For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
(See Notes 2 & 3)



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

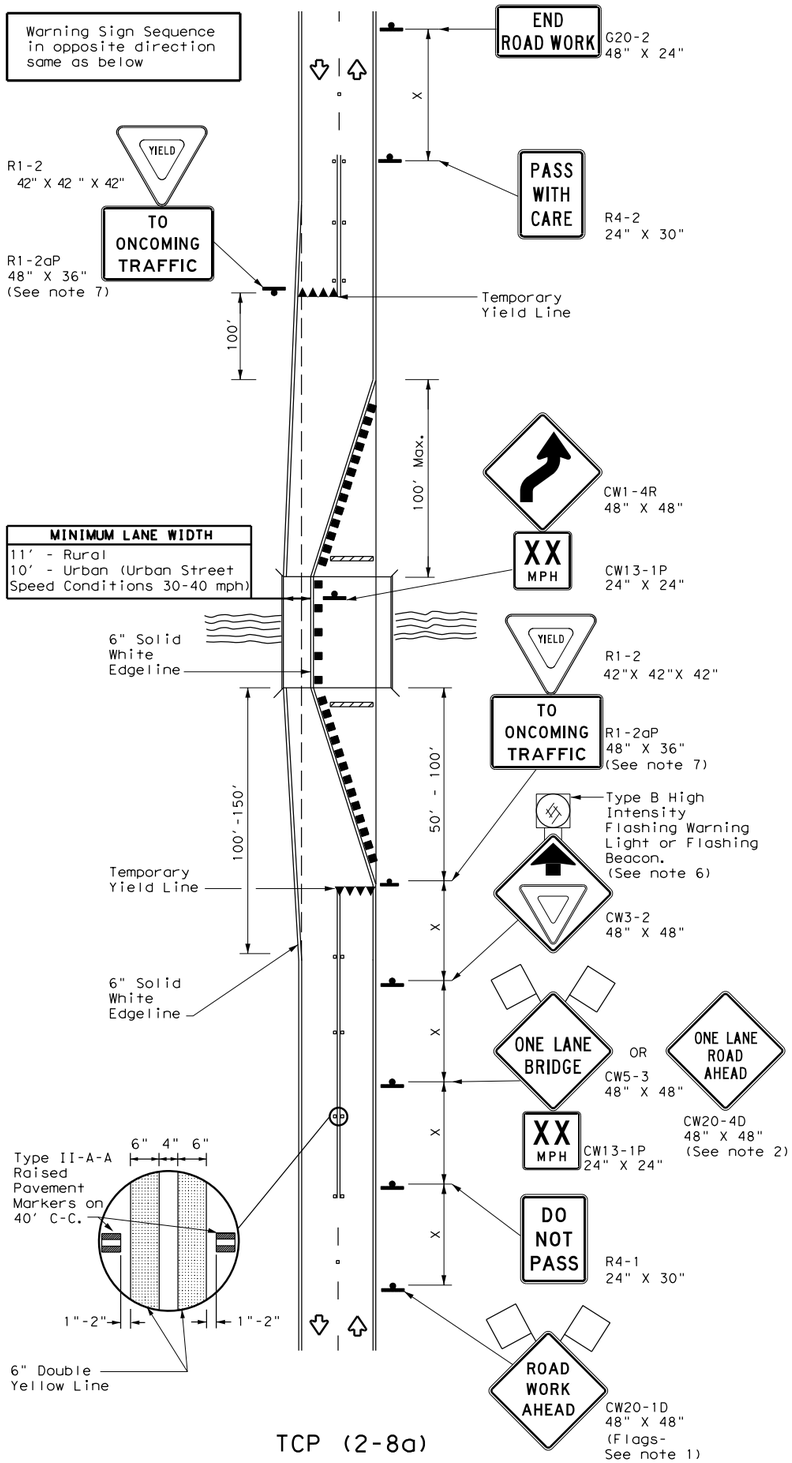
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

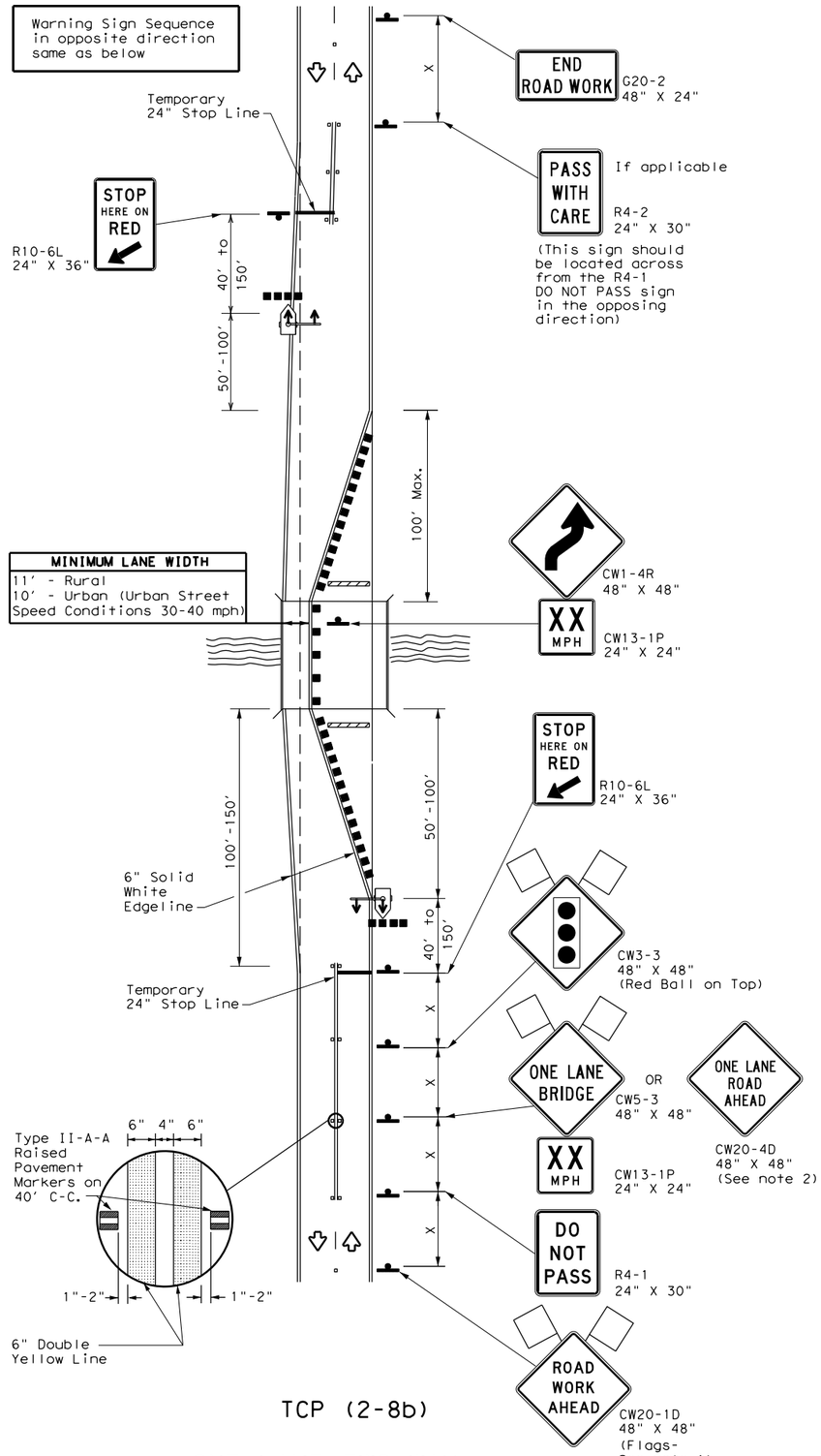
FILE: 103	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	WILLACY		103
1-97 2-18				

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).

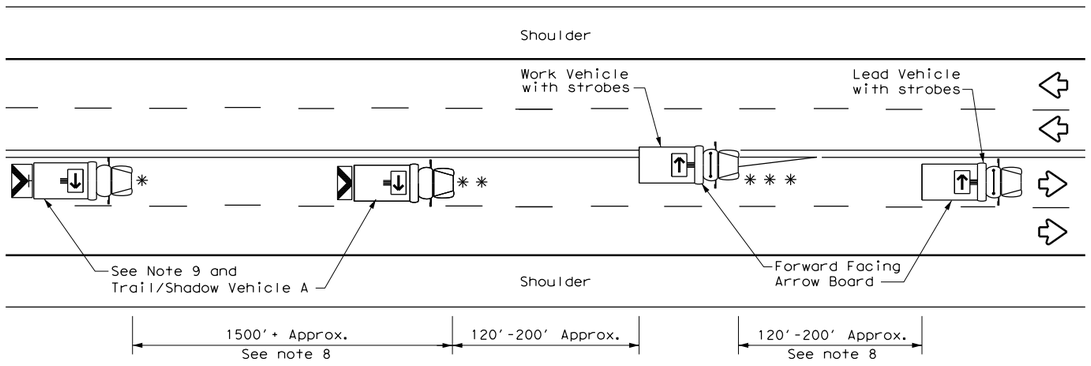
Texas Department of Transportation

Traffic Safety Division Standard

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

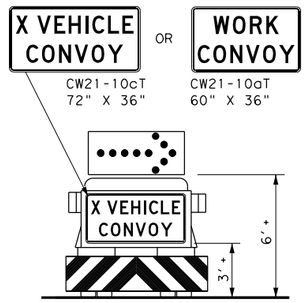
TCP(2-8)-23

FILE: 104	DN:	CK:	DW:	CK:
©TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	0860	02	015	FM490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		104



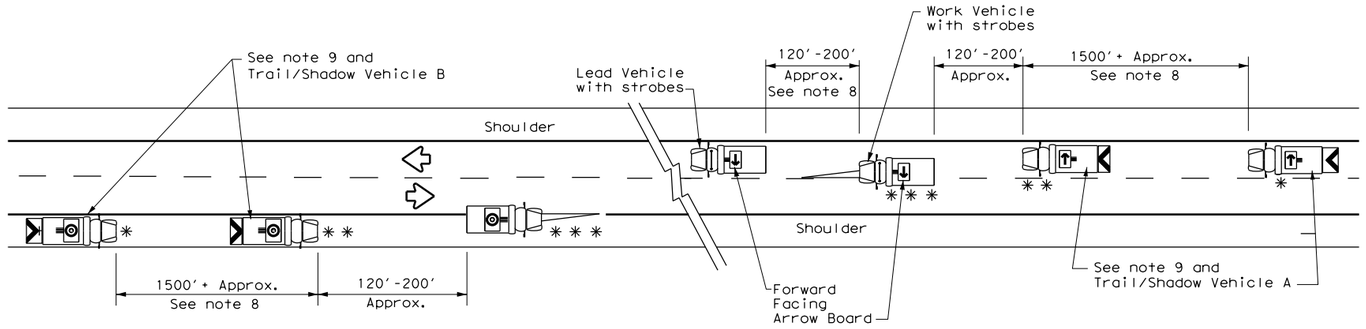
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

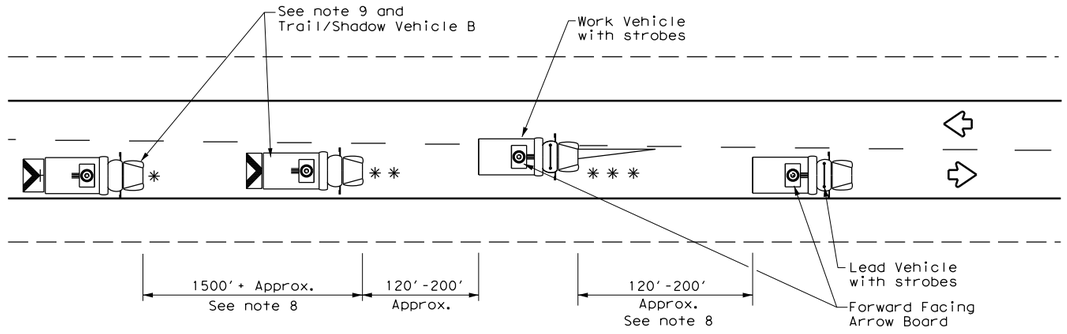


WORK ON SHOULDER

WORK ON TRAVEL LANE

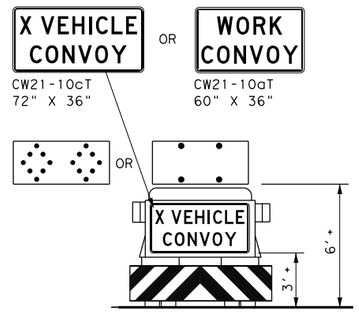
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

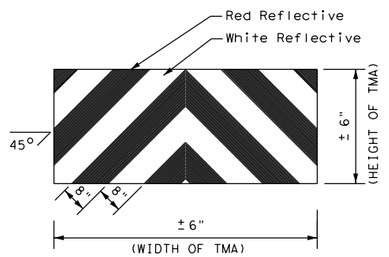
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

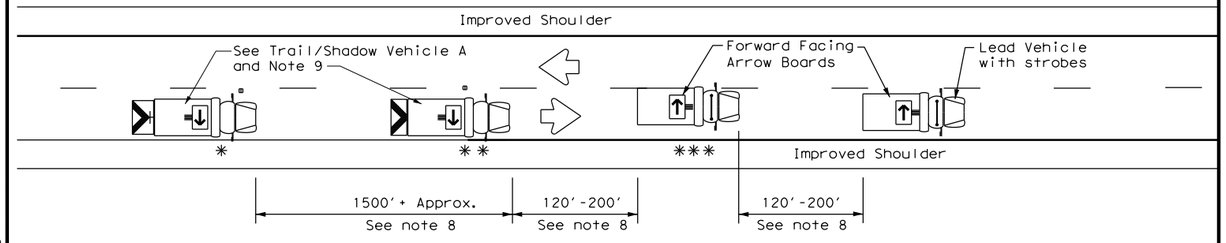
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

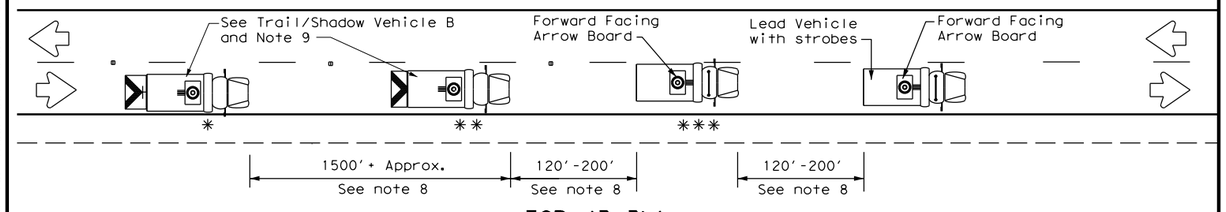
FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM 490
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	PHR	WILLACY		105
1-97				

DATE:
FILE:



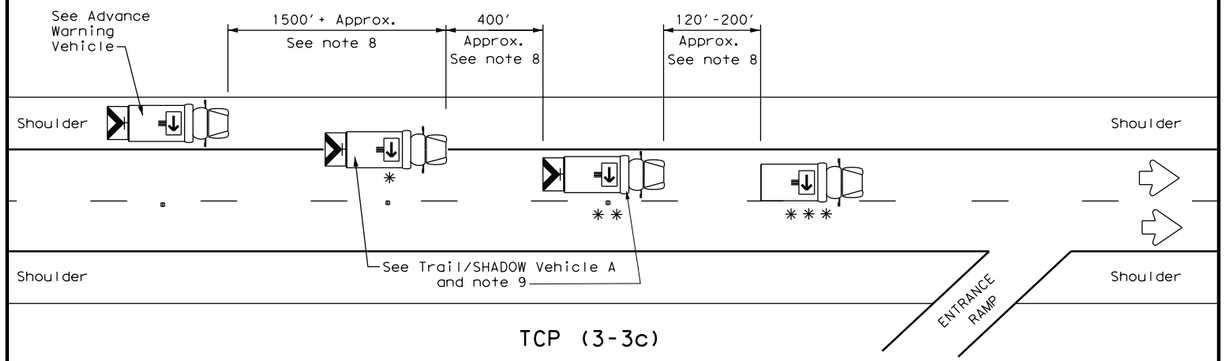
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



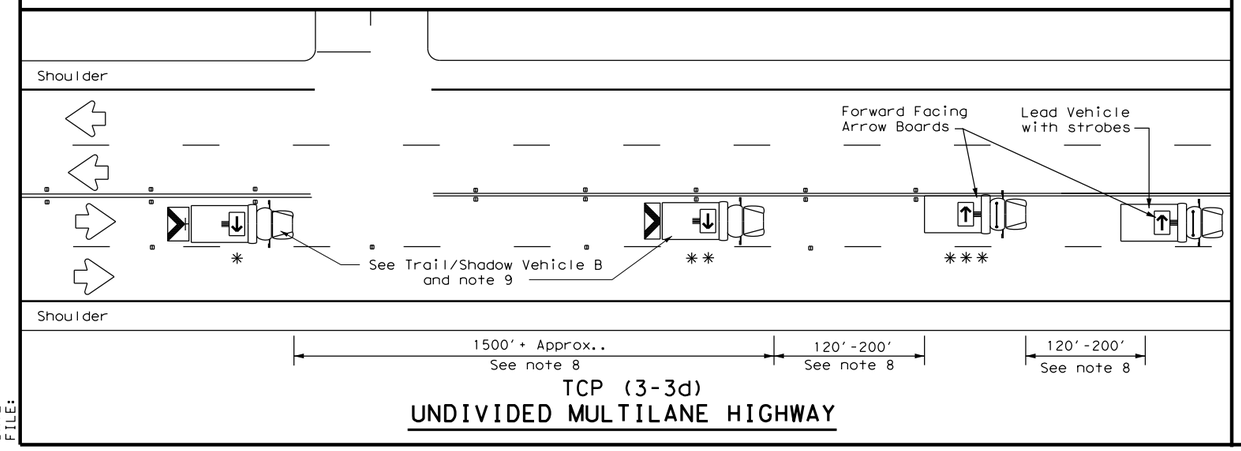
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



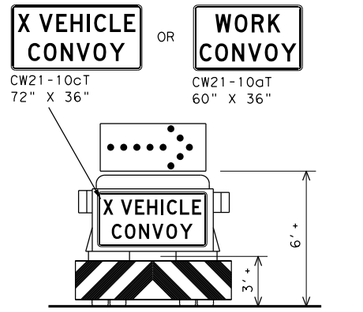
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



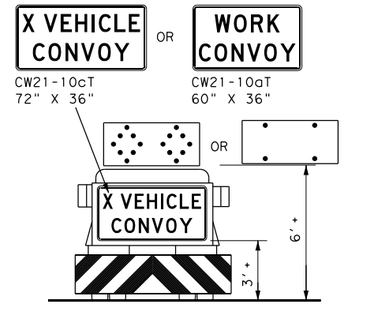
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



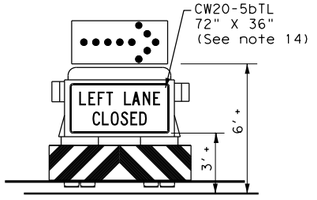
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

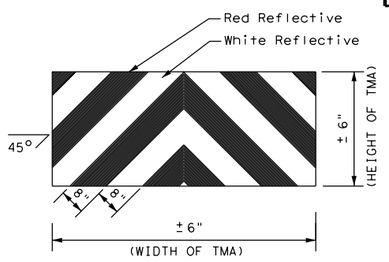


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

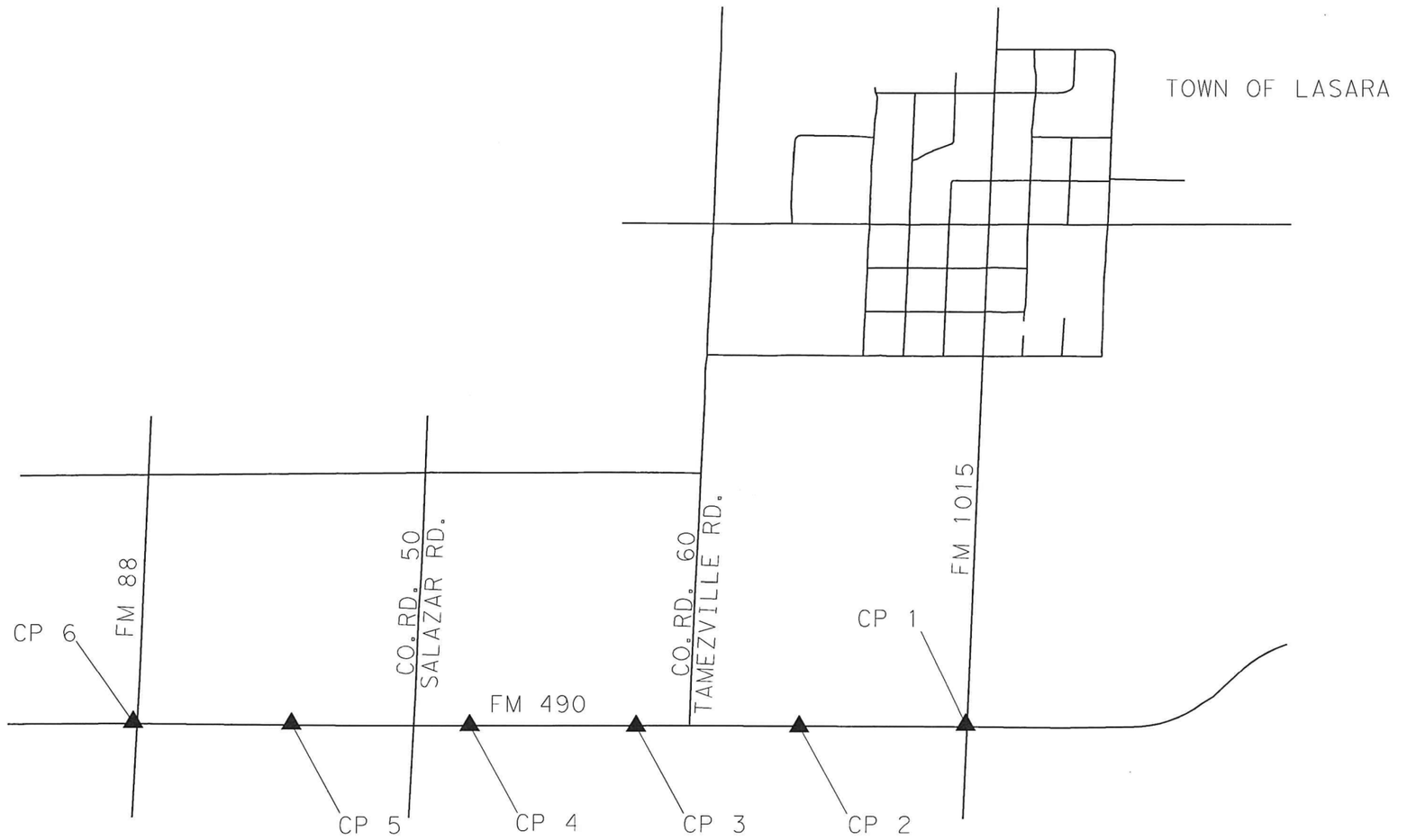
TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM 490
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	PHR	WILLACY		106
1-97 7-14				

DATE:
FILE:

NOT TO SCALE



POINT	SURFACE COORDINATES		GRID COORDINATES		LATITUDE	LONGITUDE	ELEVATION	DESCRIPTION
	NORTHING	EASTING	NORTHING	EASTING				
1	16690209.040	1175970.008	16689541.43	1175922.969	26.45053	-97.91418	44.78	5/8" Iron Rod with TNP Random Cap
2	16690560.836	1173369.358	16689893.21	1173322.424	26.45153	-97.92212	43.75	5/8" Iron Rod with TNP Random Cap
3	16690960.524	1170813.584	16690292.89	1170766.751	26.45266	-97.92993	46.11	5/8" Iron Rod with TNP Random Cap
4	16691370.302	1168204.993	16690702.65	1168158.265	26.45382	-97.93789	43.16	5/8" Iron Rod with TNP Random Cap
5	16691793.423	1165413.024	16691125.75	1165366.407	26.45502	-97.94642	45.65	5/8" Iron Rod with TNP Random Cap
6	16692257.418	1162917.582	16691589.73	1162871.065	26.45633	-97.95404	47.46	5/8" Iron Rod with TNP Random Cap

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

STATE OF TEXAS
REGISTERED
TIMOTHY A. FROST
5316
PROFESSIONAL
LAND SURVEYOR

TIMOTHY A. FROST,
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., MARCH 2023

TBPELS FIRM No. 10016-00
tnp teague nall & perkins

Texas Department of Transportation

FM 490

HORIZONTAL & VERTICAL SURVEY CONTROL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		107

DATE: $DATE$ 10:35:14 AM
FILE: $FILE$

FM 490 CENTERLINE

Beginning chain CL_FM490 description
==========

	STATION	NORTHING	EASTING
POINT FM49001	10+00.00	16692277.894	1162620.664

Course from FM49001 to FM49002 S81°09'40.89"E Dist 100.00'

Course from FM49002 to PC FM490-1 S80°39'40.89"E Dist 145.76'

Curve FM490-1
PC Station 12+45.76 R1 16692238.876 1162863.308
PI Station 14+39.10 R1 16692207.504 1163054.078
CC Station 16679805.870 1160818.715
PT Station 16+32.40 R1 16692170.294 1163243.796
Radius: 12600.00
Delta: 1.76°Right
Degree: 00°27'17.02"
Length: 386.63
Tangent: 193.33
Chord: 386.62
Middle Ordinate: 1.48
External: 1.48
Tangent Direction: S80°39'40.89"E
Radial Direction: S09°20'19.11"W
Chord Direction: S79°46'56.25"E
Radial Direction: S11°05'48.39"W
Tangent Direction: S78°54'11.61"E

Course from PT FM490-1 to PC FM490-2 S78°54'11.61"E Dist 176.68'

Curve FM490-2
PC Station 18+09.08 R1 16692136.289 1163417.173
PI Station 19+20.29 R1 16692114.884 1163526.307
CC Station 16698024.110 1164571.974
PT Station 20+31.48 R1 16692097.538 1163636.159
Radius: 6000.00
Delta: 2.12°Left
Degree: 00°57'17.75"
Length: 222.40
Tangent: 111.21
Chord: 222.39
Middle Ordinate: 1.03
External: 1.03
Tangent Direction: S78°54'11.61"E
Radial Direction: S11°05'48.39"W
Chord Direction: S79°57'54.39"E
Radial Direction: S08°58'22.84"W
Tangent Direction: S81°01'37.16"E

Course from PT FM490-2 to PC FM490-3 S81°01'37.16"E Dist 1190.66'

Curve FM490-3
PC Station 32+22.14 R1 16691911.833 1164812.245
PI Station 32+62.20 R1 16691905.584 1164851.817
CC Station 16704357.633 1166777.456
PT Station 33+02.26 R1 16691899.587 1164891.428
Radius: 12600.00
Delta: 0.36°Left
Degree: 00°27'17.02"
Length: 80.13
Tangent: 40.06
Chord: 80.12
Middle Ordinate: 0.06
External: 0.06
Tangent Direction: S81°01'37.16"E
Radial Direction: S08°58'22.84"W
Chord Direction: S81°12'33.00"E
Radial Direction: S08°36'31.17"W
Tangent Direction: S81°23'28.83"E

Course from PT FM490-3 to PC FM490-4 S81°23'28.83"E Dist 786.51'

Curve FM490-4
PC Station 40+88.77 R1 16691781.859 1165669.073
PI Station 41+28.94 R1 16691775.846 1165708.793
CC Station 16679323.814 1163783.045
PT Station 41+69.11 R1 16691769.580 1165748.473
Radius: 12600.00
Delta: 0.37°Right
Degree: 00°27'17.02"
Length: 80.34
Tangent: 40.17
Chord: 80.34
Middle Ordinate: 0.06
External: 0.06
Tangent Direction: S81°23'28.83"E
Radial Direction: S08°36'31.17"W
Chord Direction: S81°12'31.20"E
Radial Direction: S08°58'26.43"W
Tangent Direction: S81°01'33.57"E

Course from PT FM490-4 to PC FM490-5 S81°01'33.57"E Dist 1091.69'

	STATION	NORTHING	EASTING

Curve FM490-5
PC Station 52+60.80 R1 16691599.291 1166826.802
PI Station 54+35.94 R1 16691571.972 1166999.796
CC Station 16704045.057 1168792.230
PT Station 56+11.06 R1 16691549.471 1167173.482
Radius: 12600.00
Delta: 1.59°Left
Degree: 00°27'17.02"
Length: 350.25
Tangent: 175.14
Chord: 350.24
Middle Ordinate: 1.22
External: 1.22
Tangent Direction: S81°01'33.57"E
Radial Direction: S08°58'26.43"W
Chord Direction: S81°49'20.43"E
Radial Direction: S07°22'52.70"W
Tangent Direction: S82°37'07.30"E

Course from PT FM490-5 to PC FM490-6 S82°37'07.30"E Dist 221.72'

Curve FM490-6
PC Station 58+32.77 R1 16691520.987 1167393.361
PI Station 60+06.23 R1 16691498.703 1167565.379
CC Station 16679025.402 1165774.613
PT Station 61+79.66 R1 16691471.692 1167736.718
Radius: 12600.00
Delta: 1.58°Right
Degree: 00°27'17.02"
Length: 346.89
Tangent: 173.46
Chord: 346.88
Middle Ordinate: 1.19
External: 1.19
Tangent Direction: S82°37'07.30"E
Radial Direction: S07°22'52.70"W
Chord Direction: S81°49'47.97"E
Radial Direction: S08°57'31.35"W
Tangent Direction: S81°02'28.65"E

Course from PT FM490-6 to FM49003 S81°02'28.65"E Dist 7079.71'

Course from FM49003 to FM49004 S81°00'36.00"E Dist 2240.75'

POINT FM49004	155+00.12	16690019.08	1176943.28

==========
Ending chain CL_FM490 description

FM 88 CENTERLINE

Beginning chain CL_FM88 description
==========

	STATION	NORTHING	EASTING
POINT FM8801	10+00.00	16692034.22	1162935.71

Course from FM8801 to FM8802 N08°56'49.43"E Dist 373.46'

POINT FM8802	13+73.46	16692403.13	1162993.79

==========
Ending chain CL_FM88 description

CR 50 CENTERLINE

Beginning chain CL_CR50 description
==========

	STATION	NORTHING	EASTING
POINT CR5001	10+00.00	16691294.82	1168168.77

Course from CR5001 to CR5002 N08°54'03.04"E Dist 226.36'

POINT CR5002	12+26.36	16691518.45	1168203.79

==========
Ending chain CL_CR50 description

CR 60 CENTERLINE

Beginning chain CL_CR60 description
==========

	STATION	NORTHING	EASTING
POINT CR6001	10+00.00	16690788.43	1170757.54

Course from CR6001 to CR6002 N08°44'15.16"E Dist 347.10'

POINT CR6002	13+47.10	16691131.50	1170810.26

==========
Ending chain CL_CR60 description

CEMETERY RD CENTERLINE

Beginning chain CL_CEM description
==========

	STATION	NORTHING	EASTING
POINT CEM01	10+00.00	16690578.67	1173401.48

Course from CEM01 to CEM02 N08°55'34.19"E Dist 144.48'

POINT CEM02	11+44.48	16690721.39	1173423.90

==========
Ending chain CL_CEM description

FM 1015 CENTERLINE

Beginning chain CL_FM1015 description
==========

	STATION	NORTHING	EASTING
POINT FM101501	10+00.00	16689945.81	1175971.72

Course from FM101501 to FM101502 N09°00'13.59"E Dist 557.82'

POINT FM101502	15+57.82	16690496.76	1176059.02

==========
Ending chain CL_FM1015 description

STATE OF TEXAS
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Texas Department of Transportation

FM 490

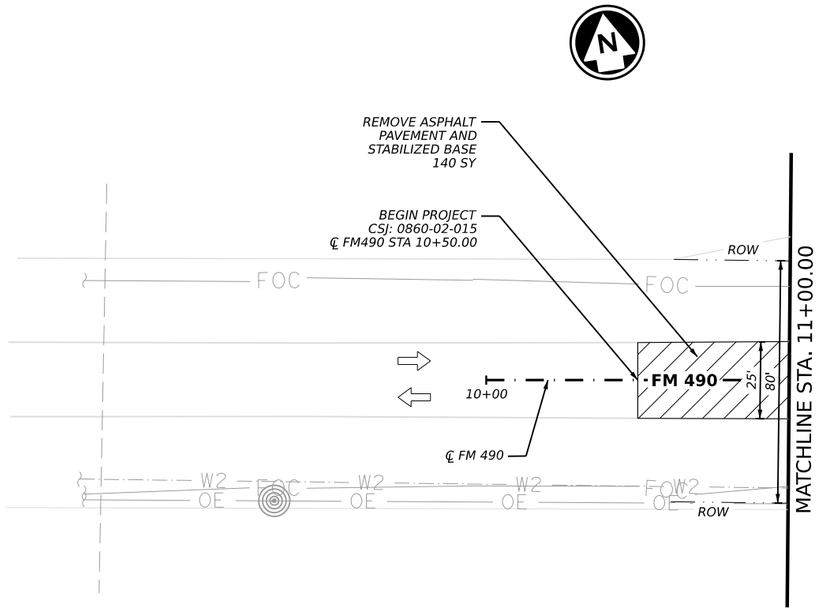
HORIZONTAL ALIGNMENT DATA

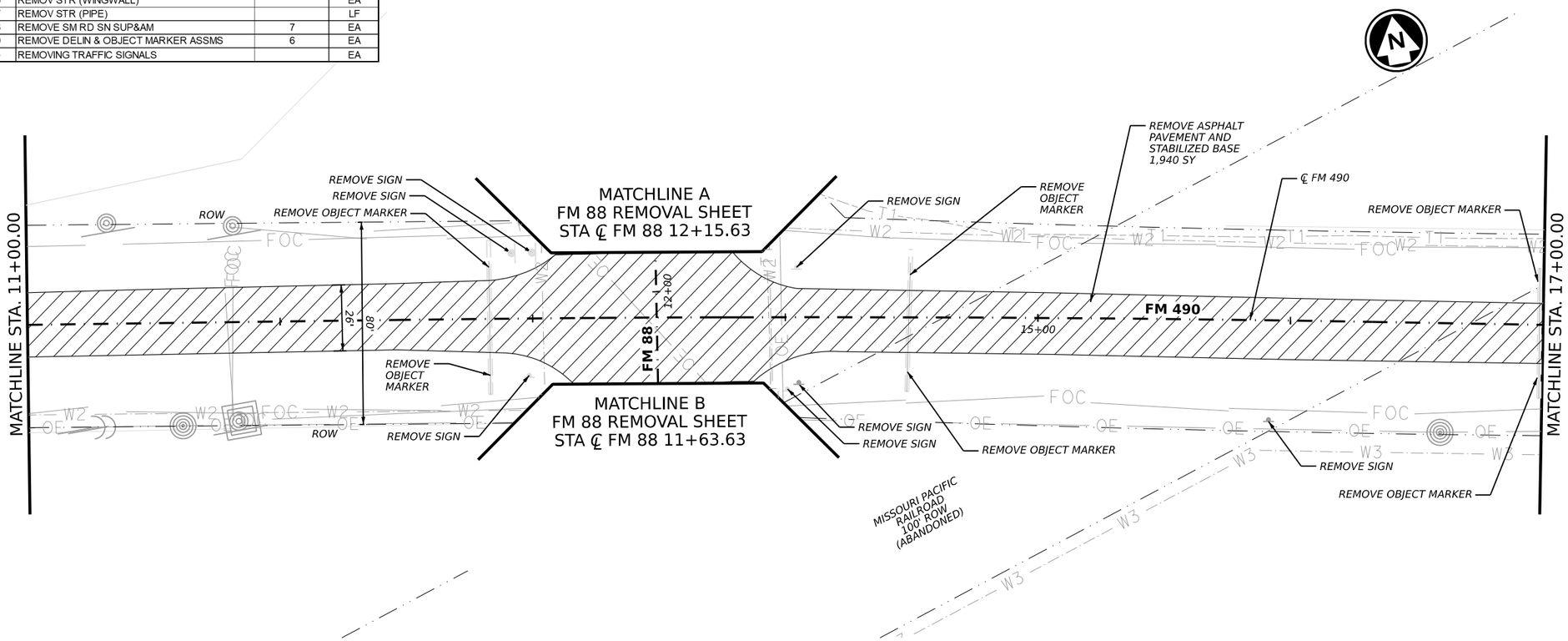
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		108

DATE: 1/25/2024
FILE: ...\Roadway\FM490-BMCD-HAD-01.dgn

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	2080	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)		LF
644-6076	REMOVE SM RD SN SUP&AM	7	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	6	EA
680-6004	REMOVING TRAFFIC SIGNALS		EA





HORIZ: 0 25 50
SCALE IN FEET

LEGEND
- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

NOTES
1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

STATE OF TEXAS
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Texas Department of Transportation

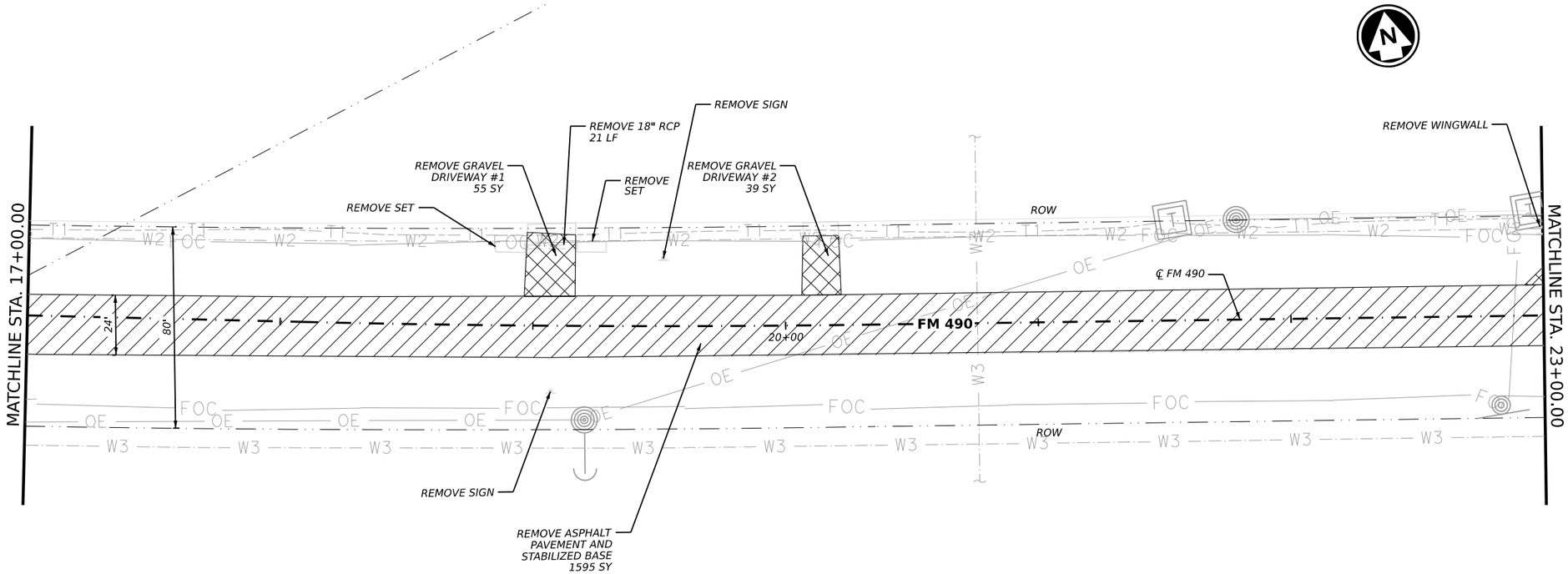
FM 490

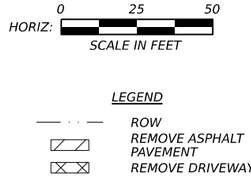
REMOVAL PLAN
BEGIN TO STA 17+00

SHEET 1 OF 13

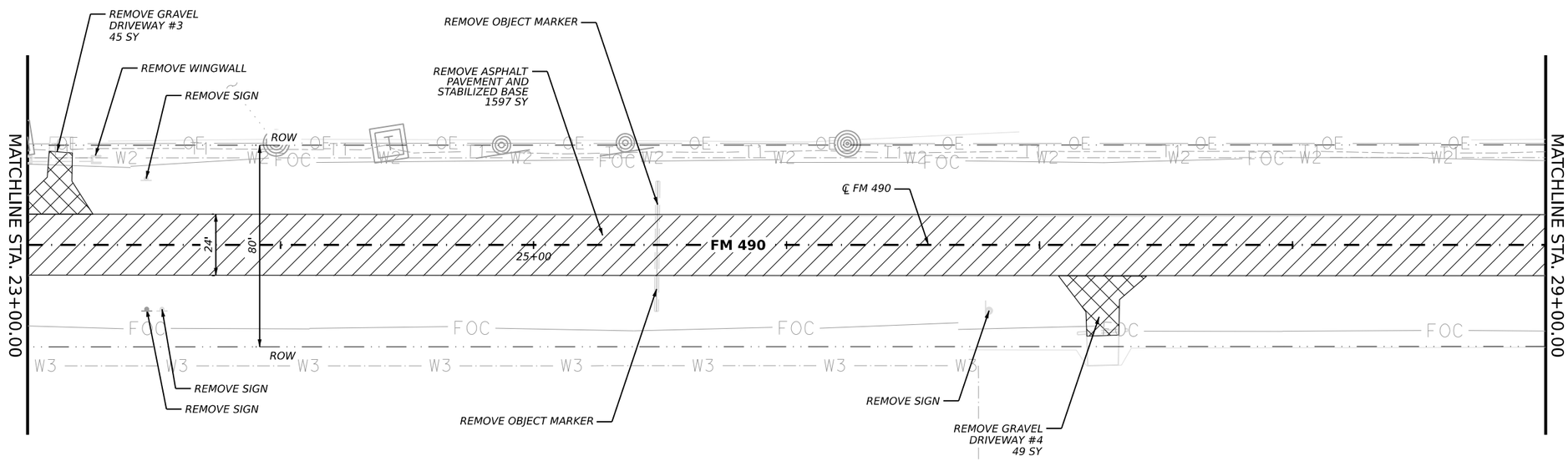
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		109

DATE: DATE TIME
FILE: DOCUMENT NAME





BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	188	SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3192	SY
496-6004	REMOV STR (SET)	2	EA
496-6005	REMOV STR (WINGWALL)	2	EA
496-6007	REMOV STR (PIPE)	21	LF
644-6076	REMOVE SM RD SN SUP&AM	6	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	2	EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

STATE OF TEXAS
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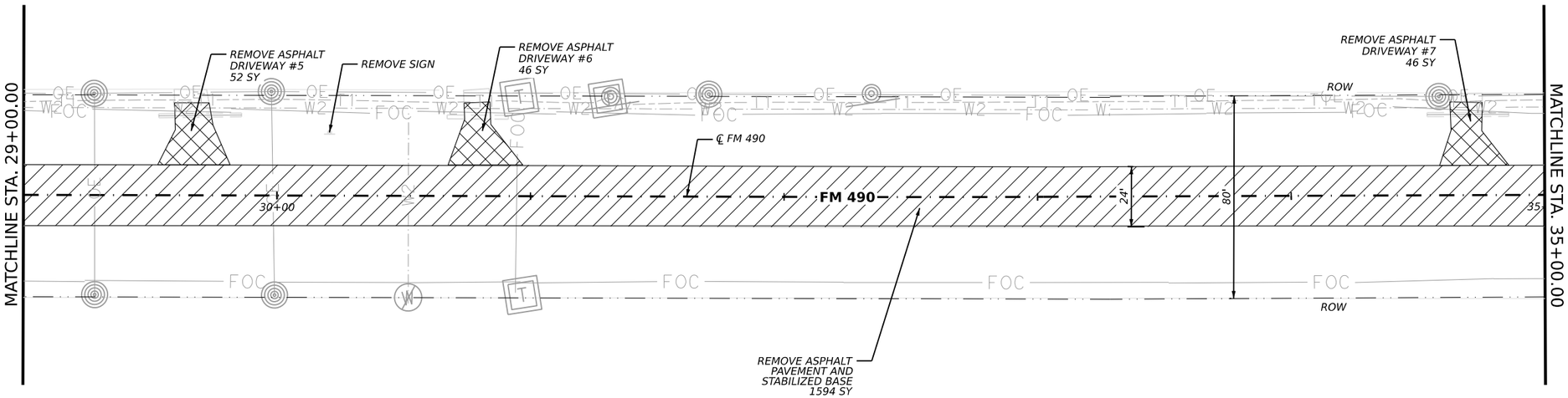
FM 490

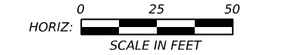
REMOVAL PLAN
STA 17+00 TO STA 29+00

SHEET 2 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		110

DATE: DATE TIME
FILE: DOCUMENT NAME





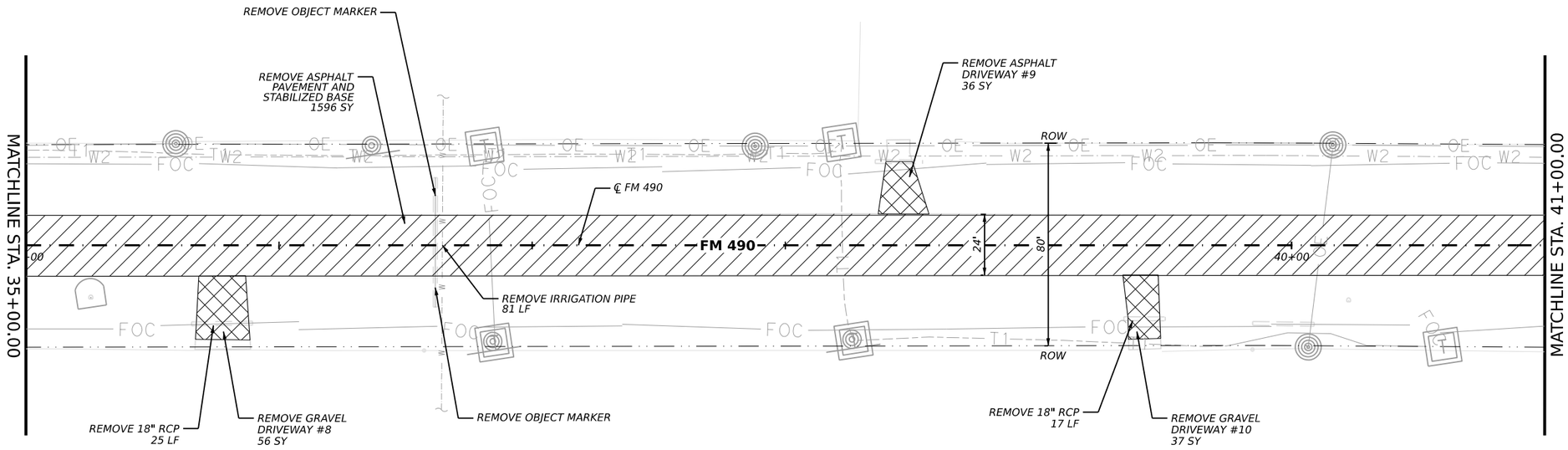
LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	273	SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3190	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)	123	LF
644-6076	REMOVE SM RD SN SUP&AM	1	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	2	EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



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Texas Department of Transportation

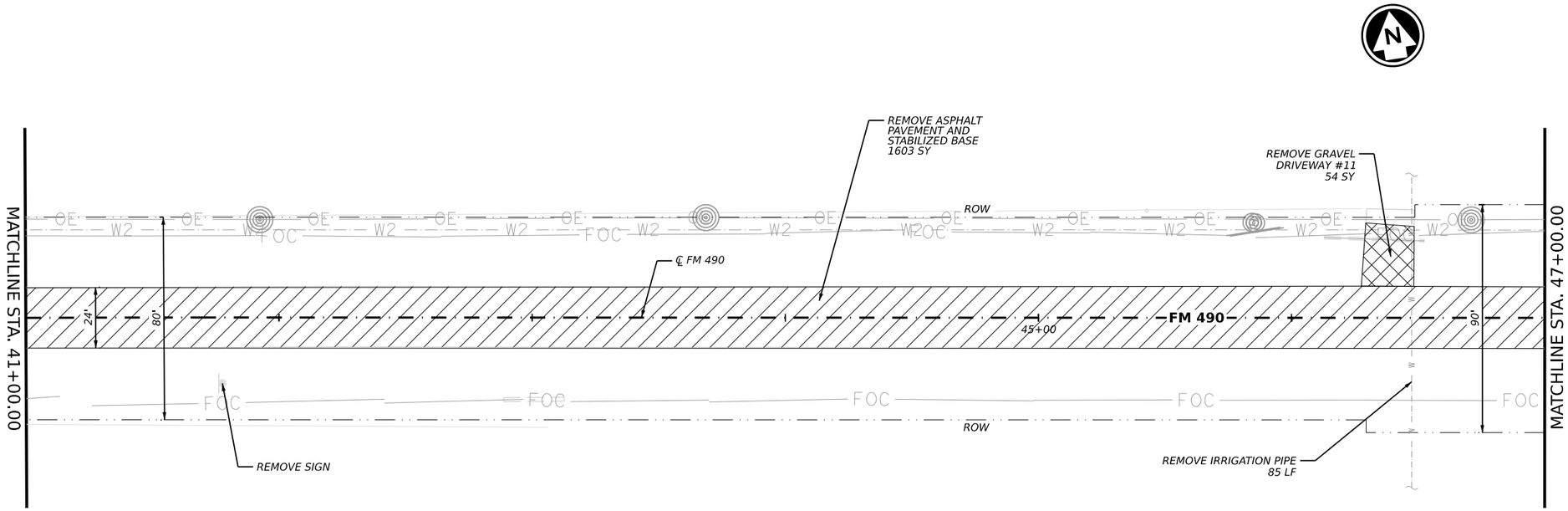
FM 490

REMOVAL PLAN
STA 29+00 TO STA 41+00

SHEET 3 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		111

DATE:
FILE:



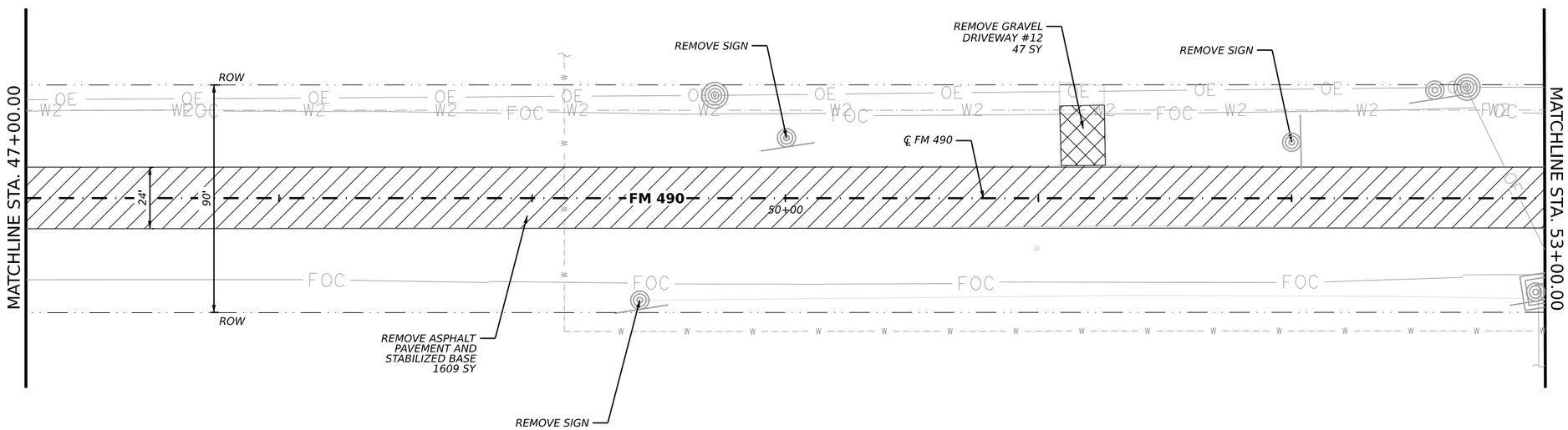
LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	101	SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3212	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)	85	LF
644-6076	REMOVE SM RD SN SUP&AM	4	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



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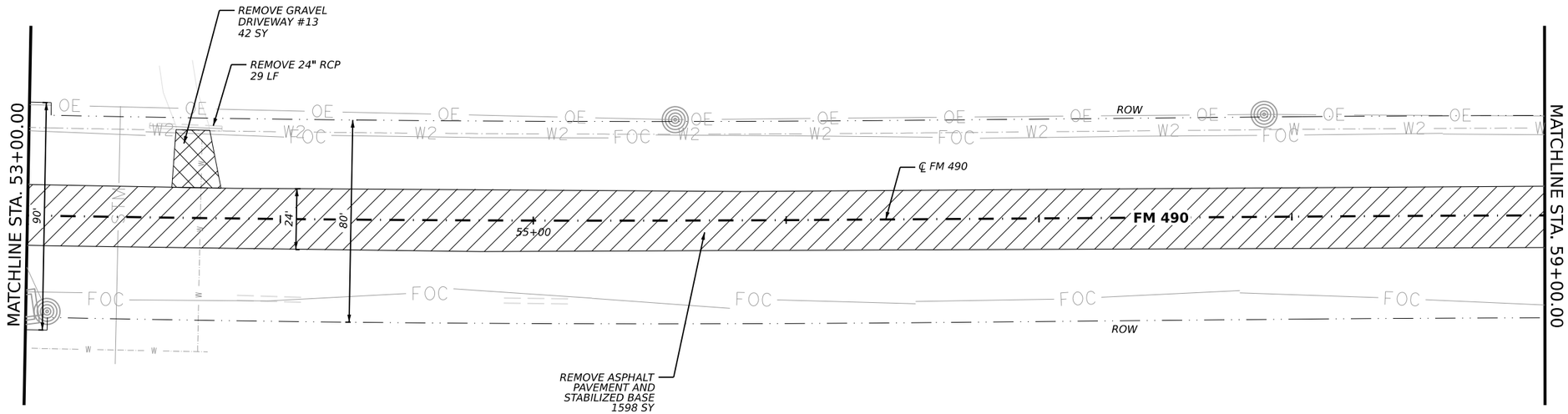
FM 490

REMOVAL PLAN
STA 41+00 TO STA 53+00

SHEET 4 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		112

DATE: DATE TIME
FILE: DOCUMENT NAME



HORIZ: 0 25 50
SCALE IN FEET

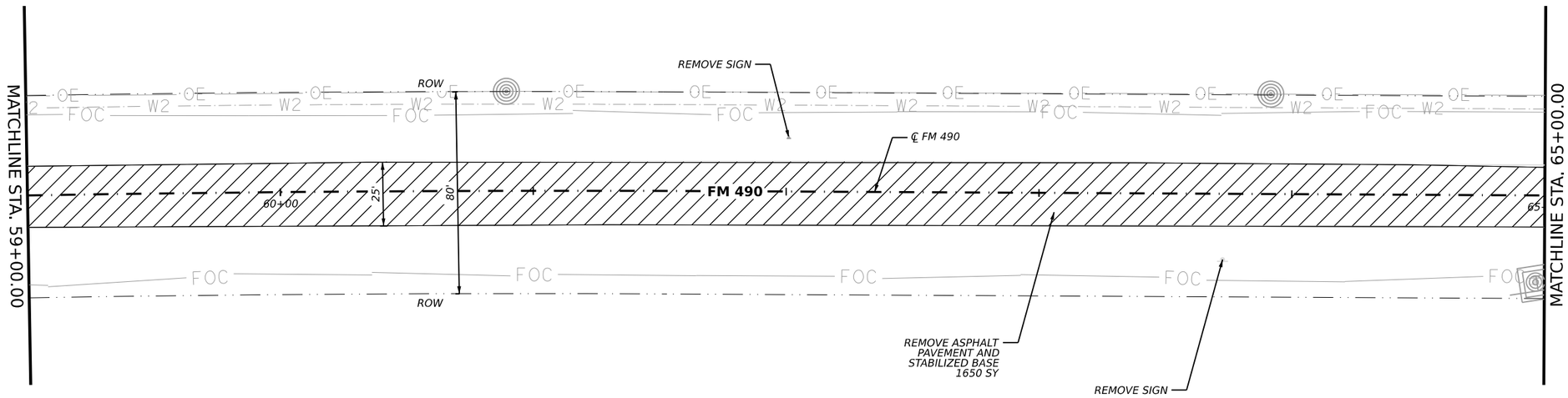
LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	42	SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3248	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)	29	LF
644-6076	REMOVE SM RD SN SUP&AM	2	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA
680-6004	REMOVING TRAFFIC SIGNALS		EA

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.



STATE OF TEXAS
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Kristen Harper
11/31/2024

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Texas Department of Transportation

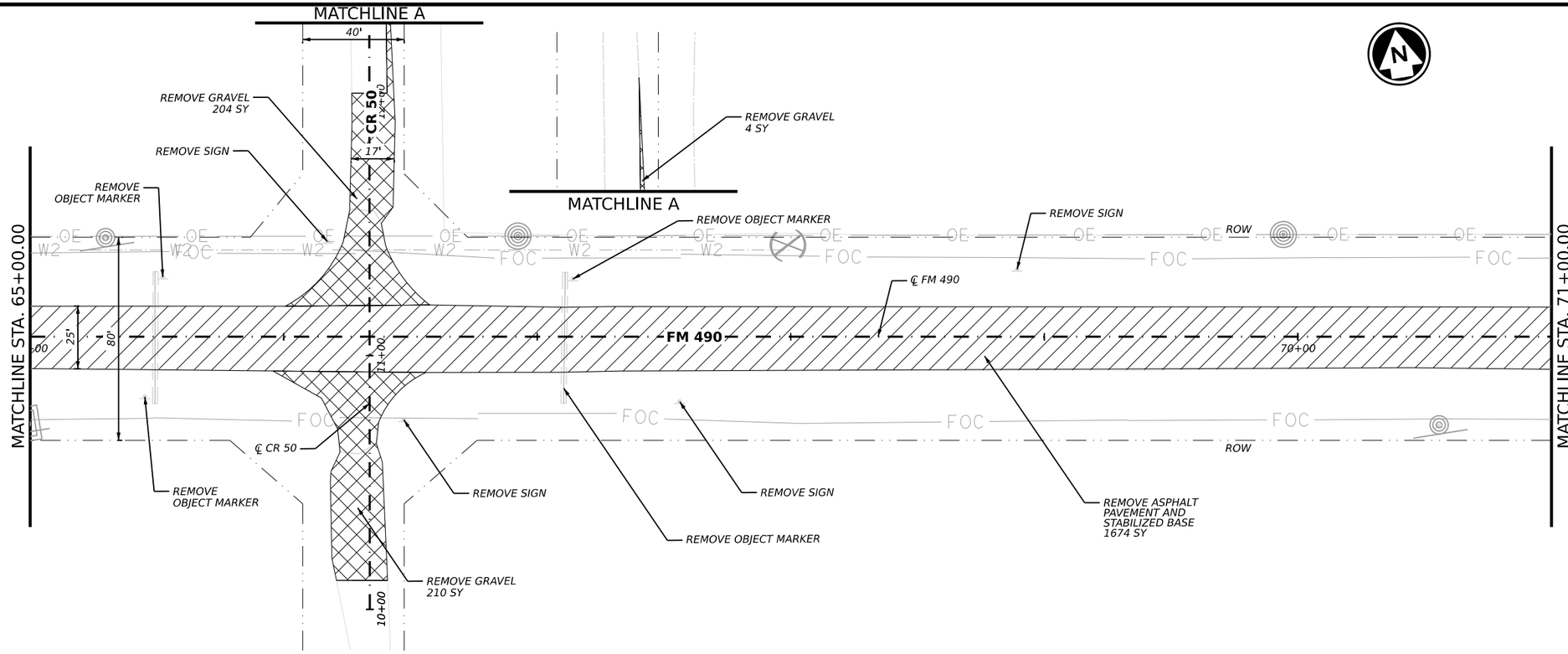
FM 490

REMOVAL PLAN
STA 53+00 TO STA 65+00

SHEET 5 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		113

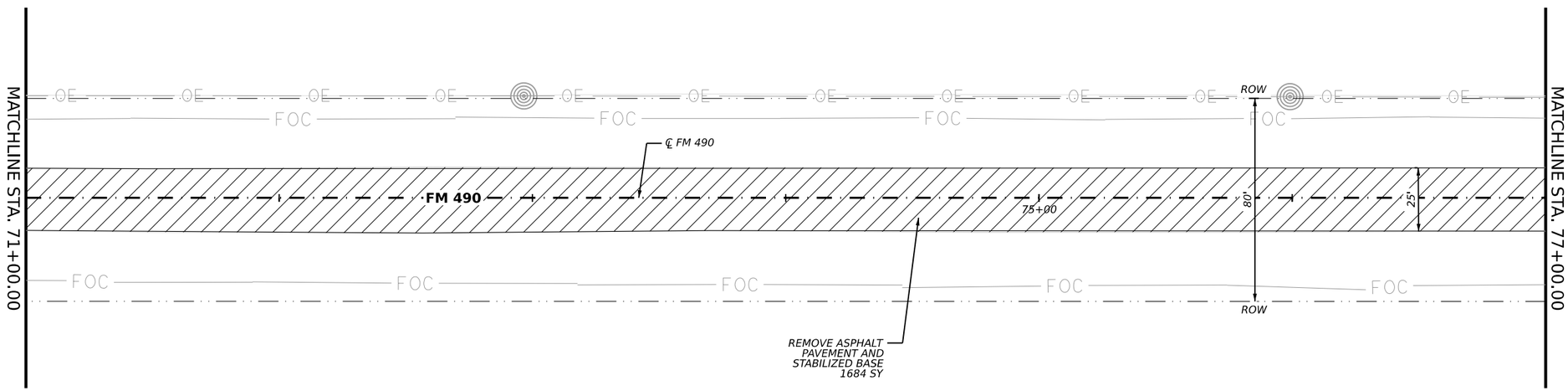
DATE: DATE TIME
FILE: DOCUMENT NAME



LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	418	SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3358	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)		LF
644-6076	REMOVE SM RD SN SUP&AM	4	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	4	EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

STATE OF TEXAS
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Texas Department of Transportation

FM 490

REMOVAL PLAN
STA 65+00 TO STA 77+00

SHEET 6 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
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PHR	WILLACY		114

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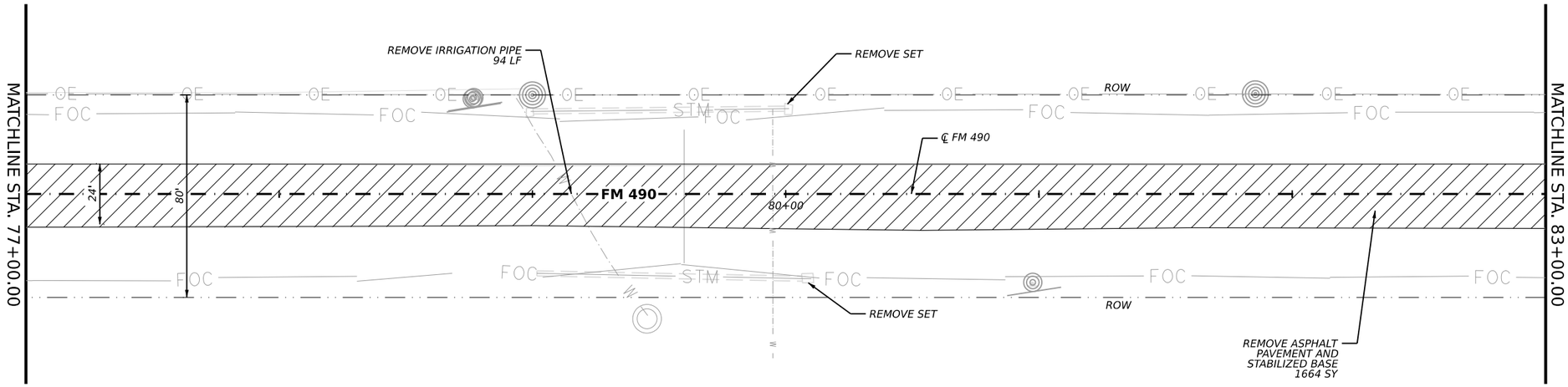
DATE TIME
DOCUMENT NAME



HORIZ: 0 25 50
SCALE IN FEET

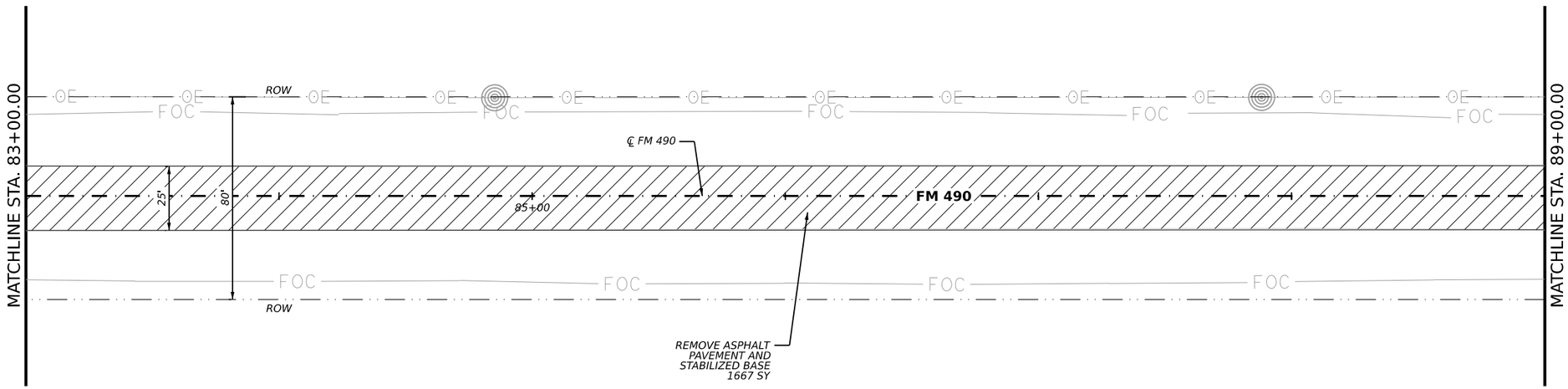
LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3331	SY
496-6004	REMOV STR (SET)	2	EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)	94	LF
644-6076	REMOVE SM RD SN SUP&AM		EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



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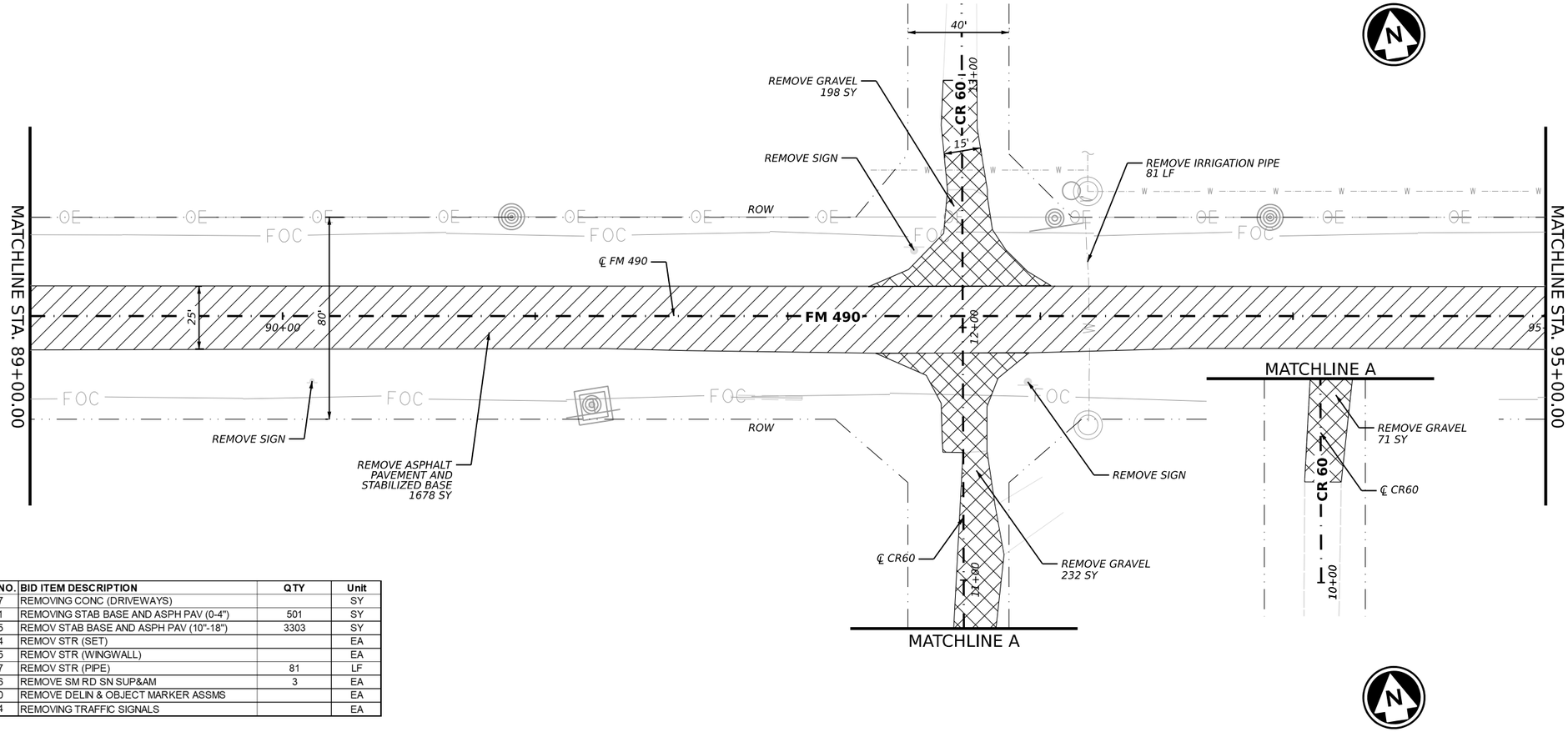
FM 490

REMOVAL PLAN
STA 77+00 TO STA 89+00

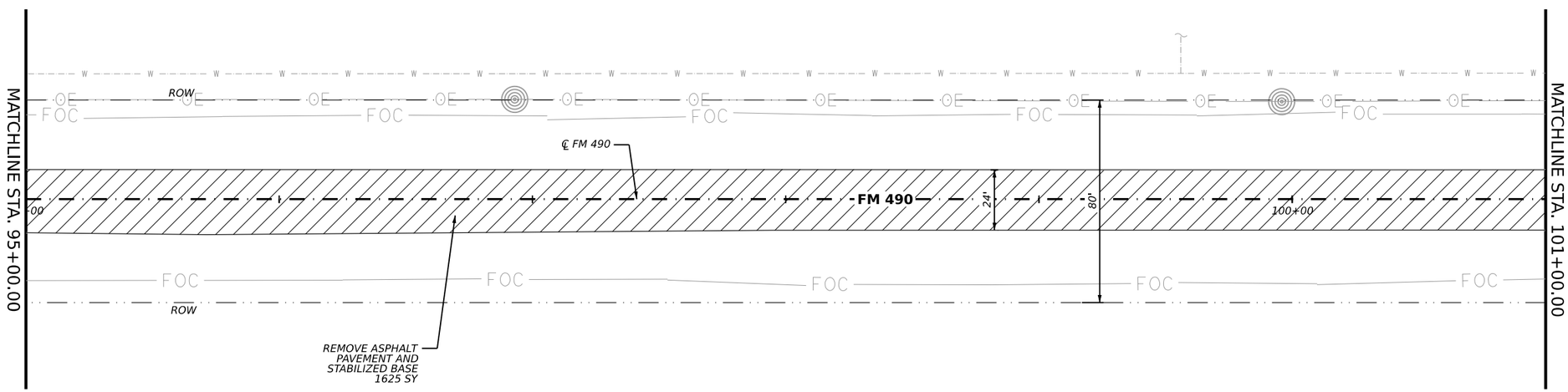
SHEET 7 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		115

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	501	SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3303	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)	81	LF
644-6076	REMOVE SM RD SN SUP&AM	3	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

ROW
REMOVE ASPHALT PAVEMENT
REMOVE DRIVEWAY

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

STATE OF TEXAS
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Texas Department of Transportation

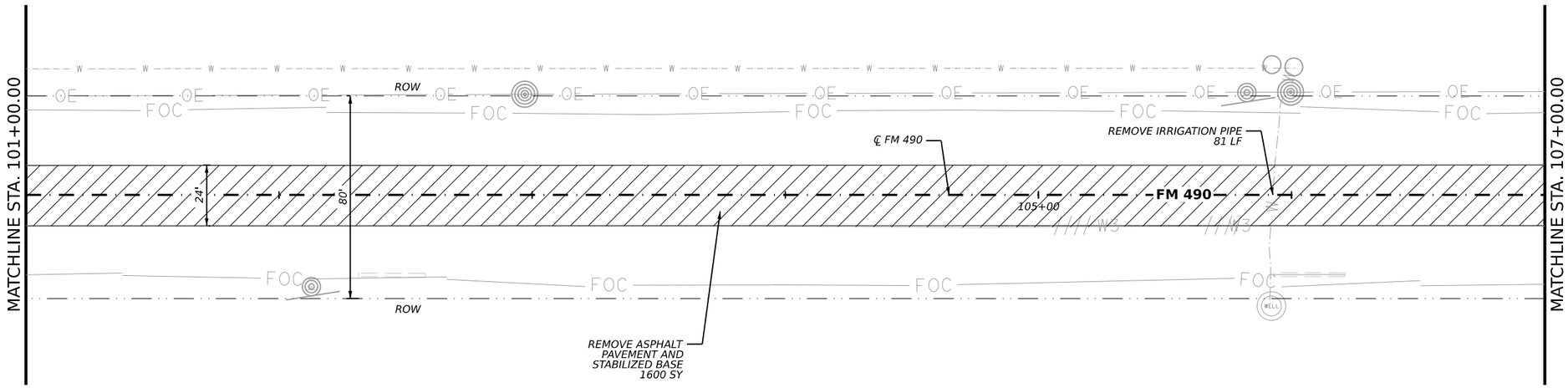
FM 490

REMOVAL PLAN
STA 89+00 TO STA 101+00

SHEET 8 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		116

DATE: DATE TIME
FILE: DOCUMENT NAME



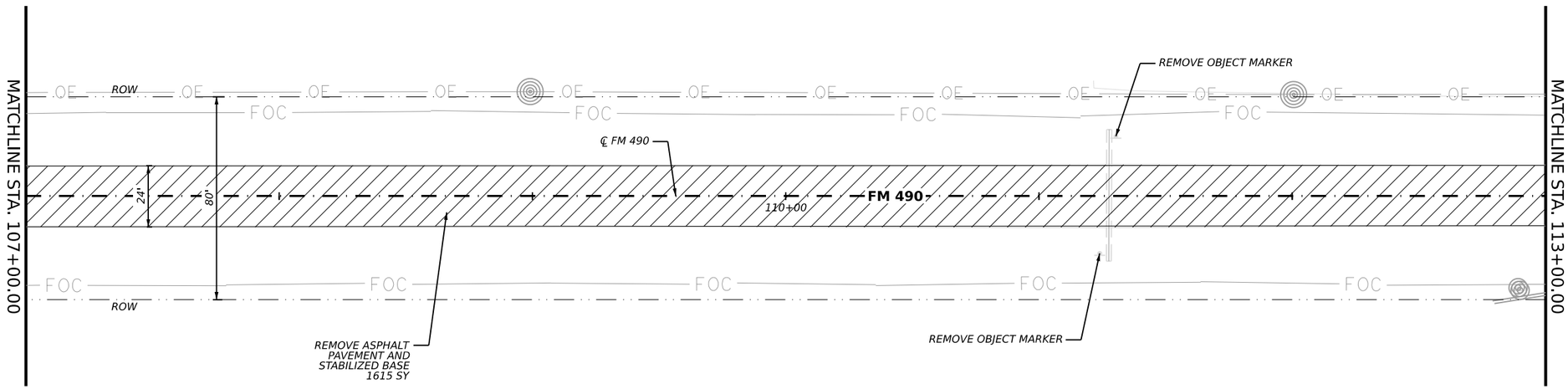
LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3215	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)	81	LF
644-6076	REMOVE SM RD SN SUP&AM		EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	2	EA
680-6004	REMOVING TRAFFIC SIGNALS		EA

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.



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Texas Department of Transportation

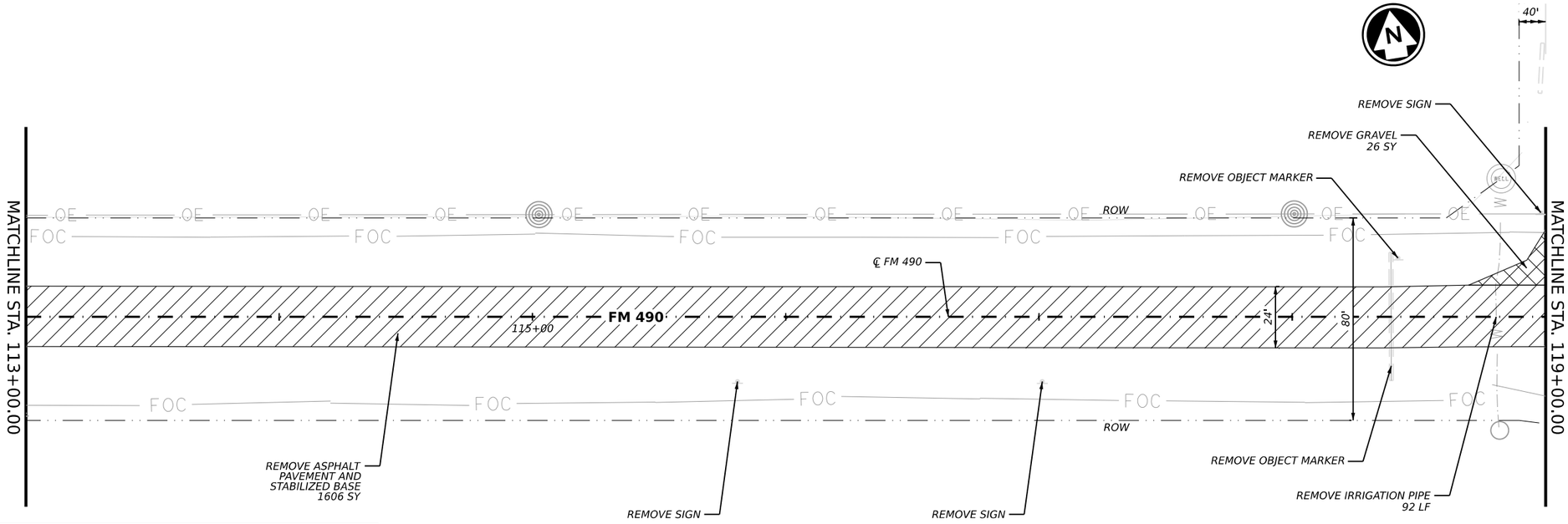
FM 490

REMOVAL PLAN
STA 101+00 TO STA 113+00

SHEET 9 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		117

DATE: DATE TIME
FILE: DOCUMENT NAME

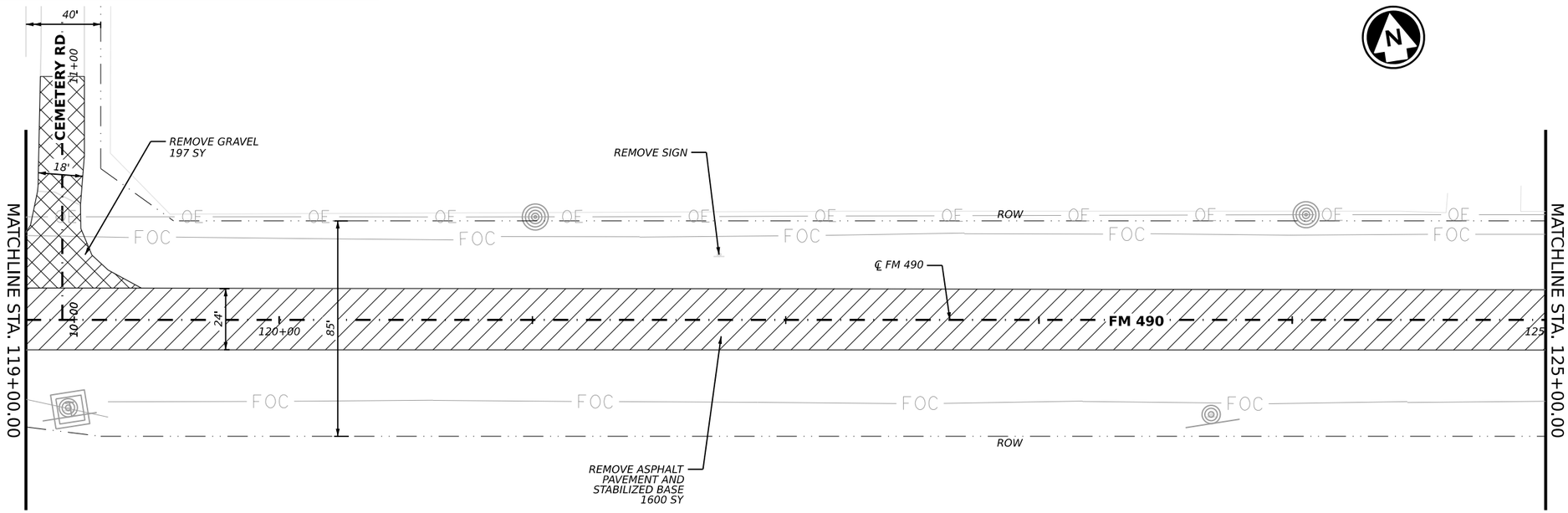


HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	223	SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3206	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)	92	LF
644-6076	REMOVE SM RD SN SUP&AM	4	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	2	EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

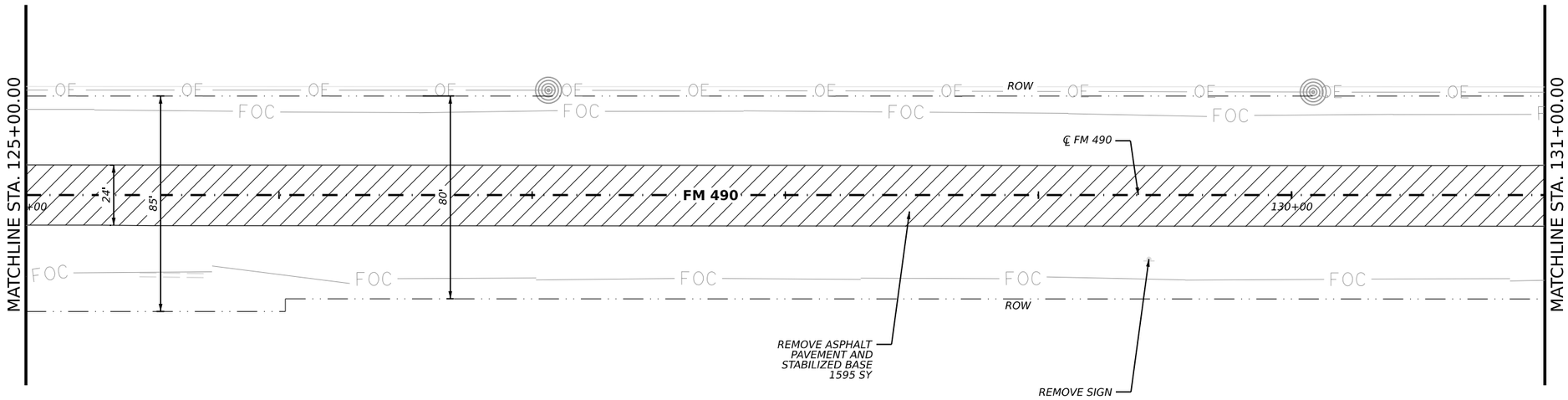
FM 490

REMOVAL PLAN
STA 113+00 TO STA 125+00

SHEET 10 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		118

DATE:
FILE:
DATE TIME
DOCUMENT NAME



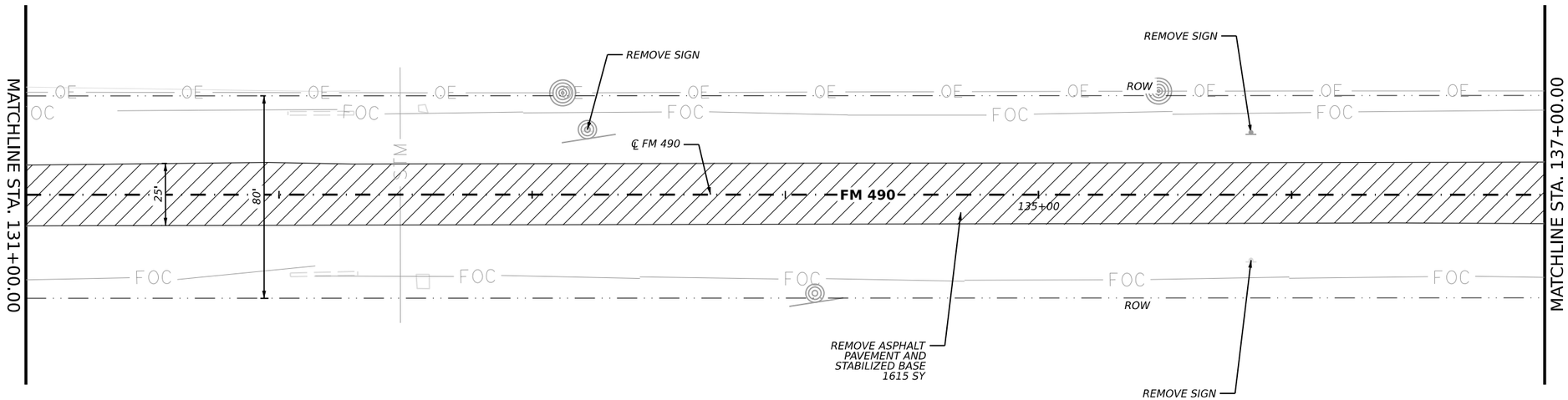
LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	3210	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)		LF
644-6076	REMOVE SM RD SN SUP&AM	4	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA
680-6004	REMOVING TRAFFIC SIGNALS		EA

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.



NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

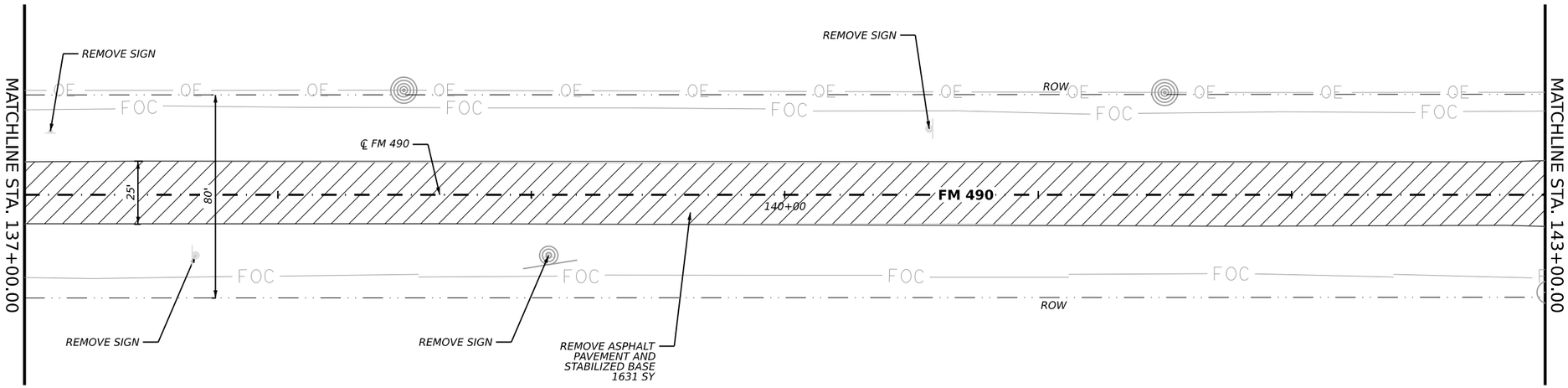
FM 490

REMOVAL PLAN
STA 125+00 TO STA 137+00

SHEET 11 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		119

DATE: DATE TIME
FILE: DOCUMENT NAME



HORIZ: 0 25 50
SCALE IN FEET

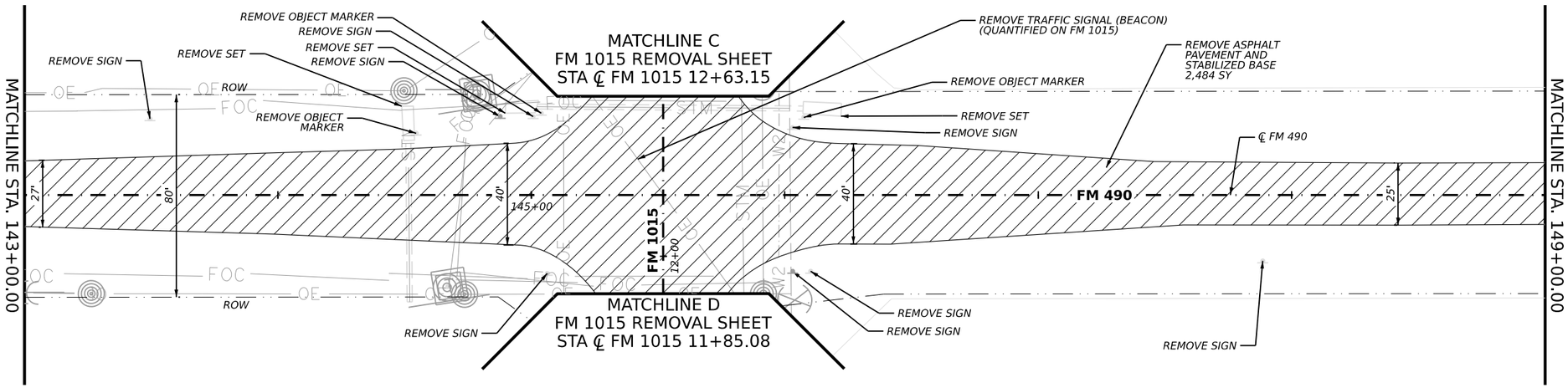
LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	4115	SY
496-6004	REMOV STR (SET)	3	EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)		LF
644-6076	REMOVE SM RD SN SUP&AM	12	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	3	EA
680-6004	REMOVING TRAFFIC SIGNALS		EA



STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

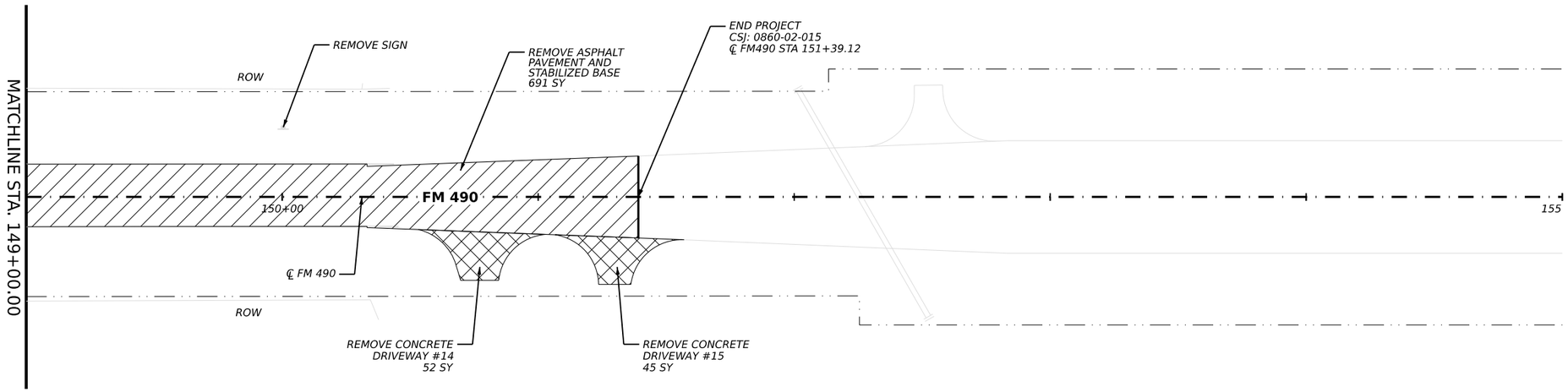
FM 490

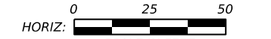
REMOVAL PLAN
STA 137+00 TO STA 149+00

SHEET 12 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		120

DATE: DATE TIME
FILE: DOCUMENT NAME





LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)	97	SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	691	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)		LF
644-6076	REMOVE SM RD SN SUP&AM	1	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA
680-6004	REMOVING TRAFFIC SIGNALS		EA

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

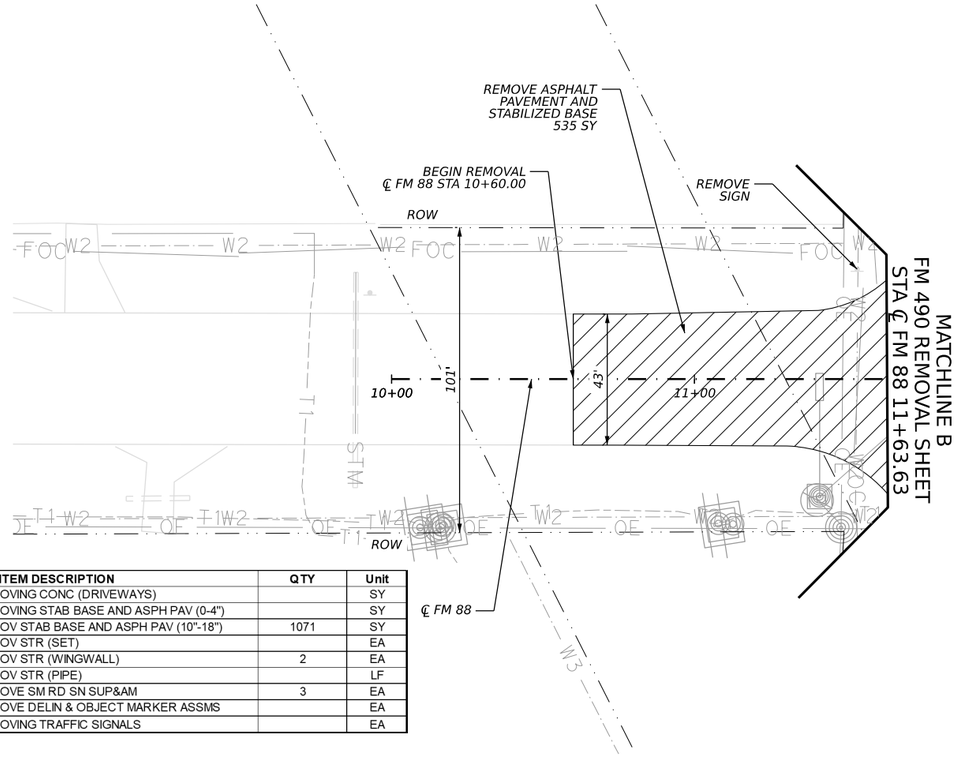
FM 490

REMOVAL PLAN
STA 149+00 TO END

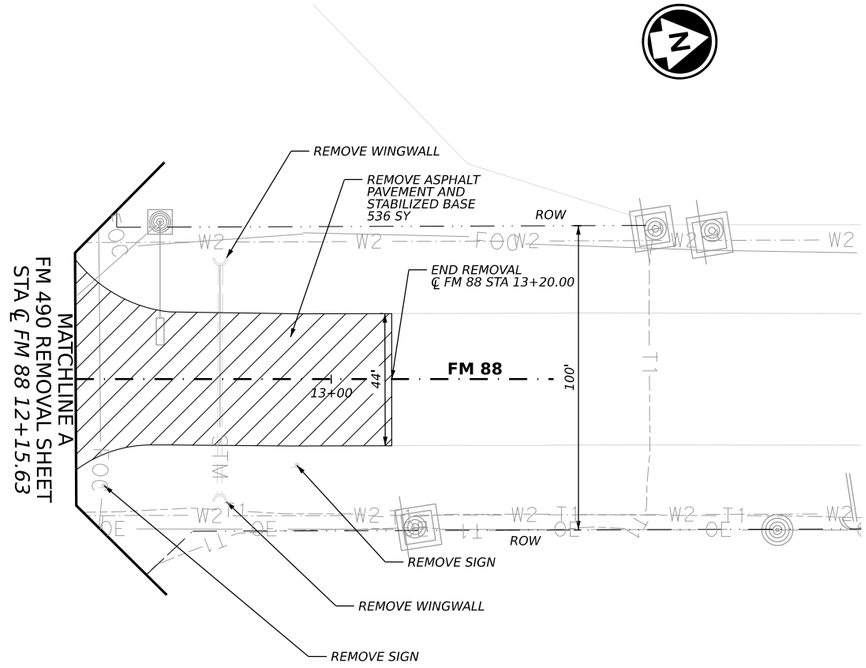
SHEET 13 OF 13

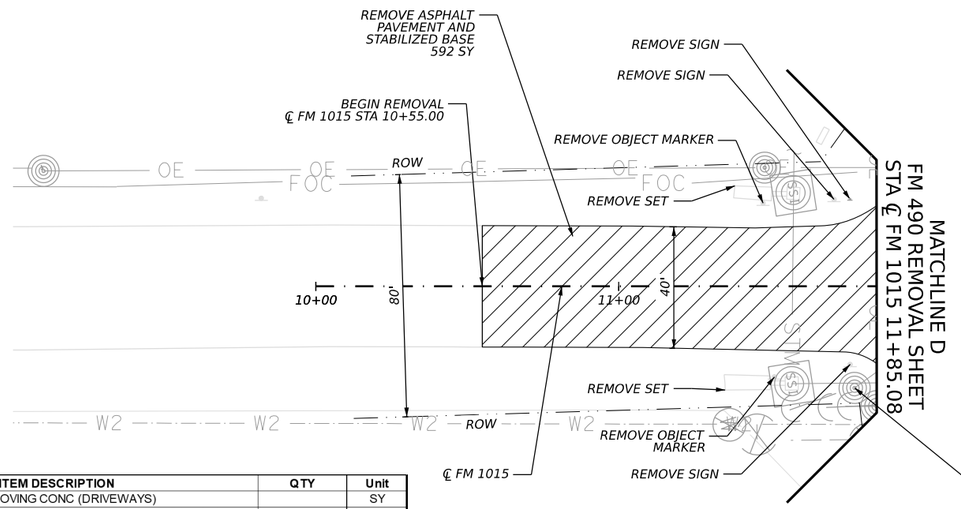
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		121

DATE: DATE TIME
FILE: DOCUMENT NAME

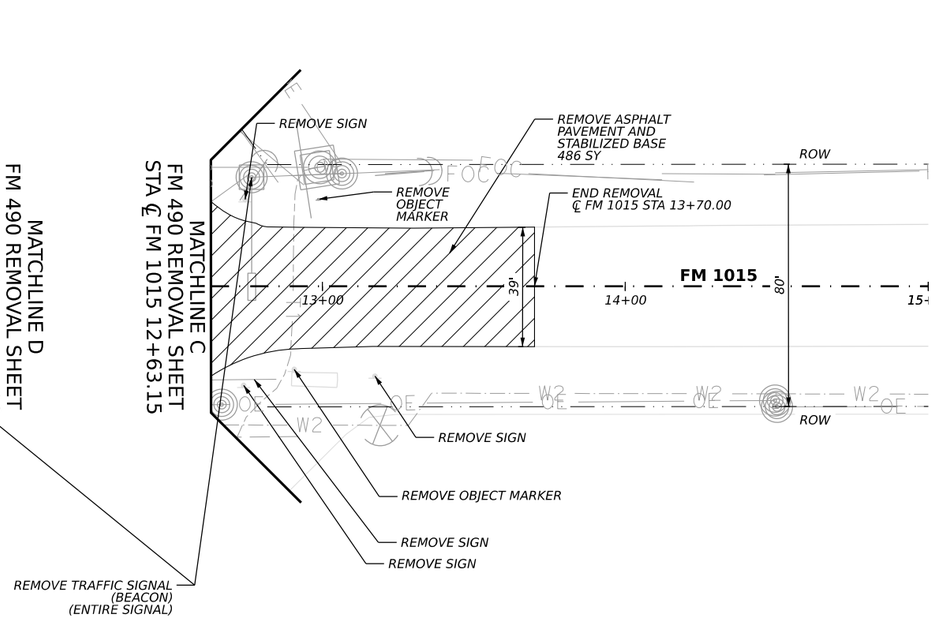


BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	1071	SY
496-6004	REMOV STR (SET)		EA
496-6005	REMOV STR (WINGWALL)	2	EA
496-6007	REMOV STR (PIPE)		LF
644-6076	REMOVE SM RD SN SUP&AM	3	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA
680-6004	REMOVING TRAFFIC SIGNALS		EA





BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
104-6017	REMOVING CONC (DRIVEWAYS)		SY
105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")		SY
105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	1078	SY
496-6004	REMOV STR (SET)	2	EA
496-6005	REMOV STR (WINGWALL)		EA
496-6007	REMOV STR (PIPE)		LF
644-6076	REMOVE SM RD SN SUP&AM	7	EA
658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	4	EA
680-6004	REMOVING TRAFFIC SIGNALS	1	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- REMOVE ASPHALT PAVEMENT
- REMOVE DRIVEWAY

NOTES

1. GRAVEL DRIVEWAY REMOVAL WILL BE PAID FOR UNDER ITEM 105 6021.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 88 & FM 1015

REMOVAL PLAN BEGIN TO END

SHEET 1 OF 1

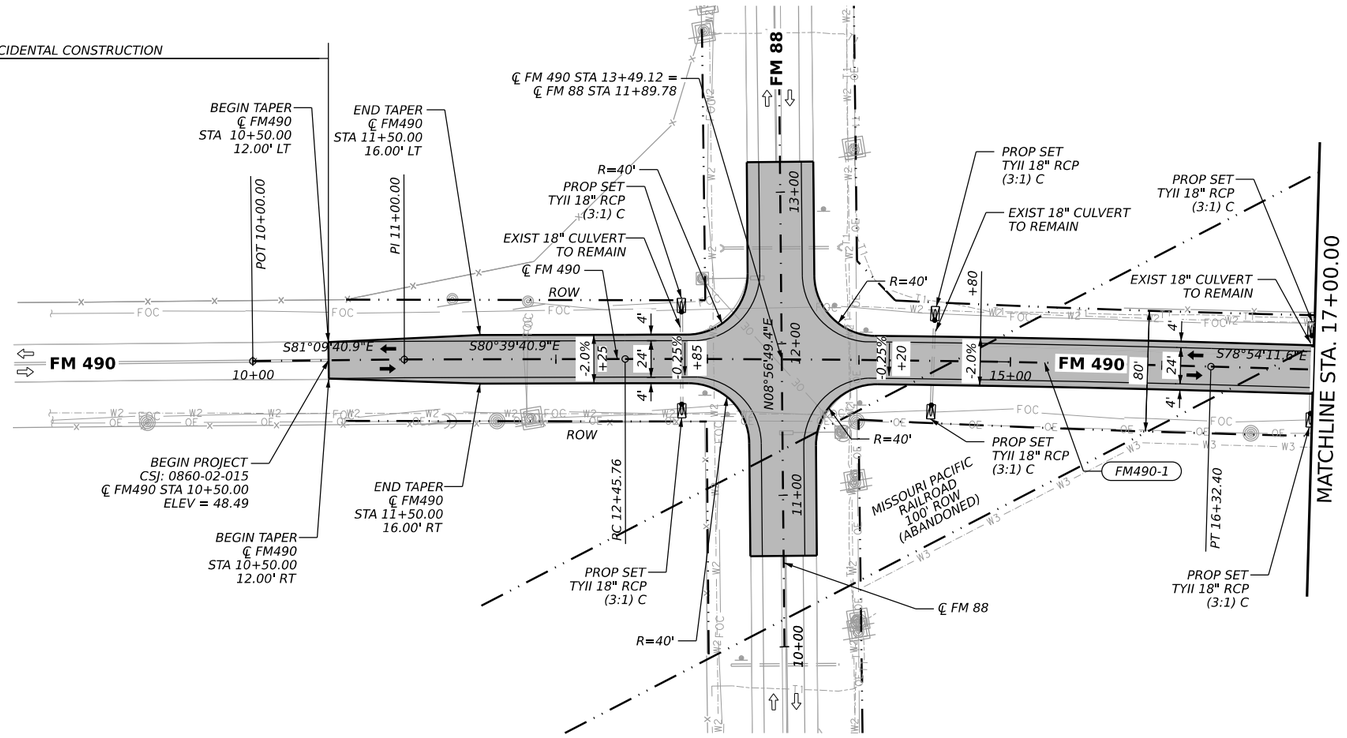
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		122

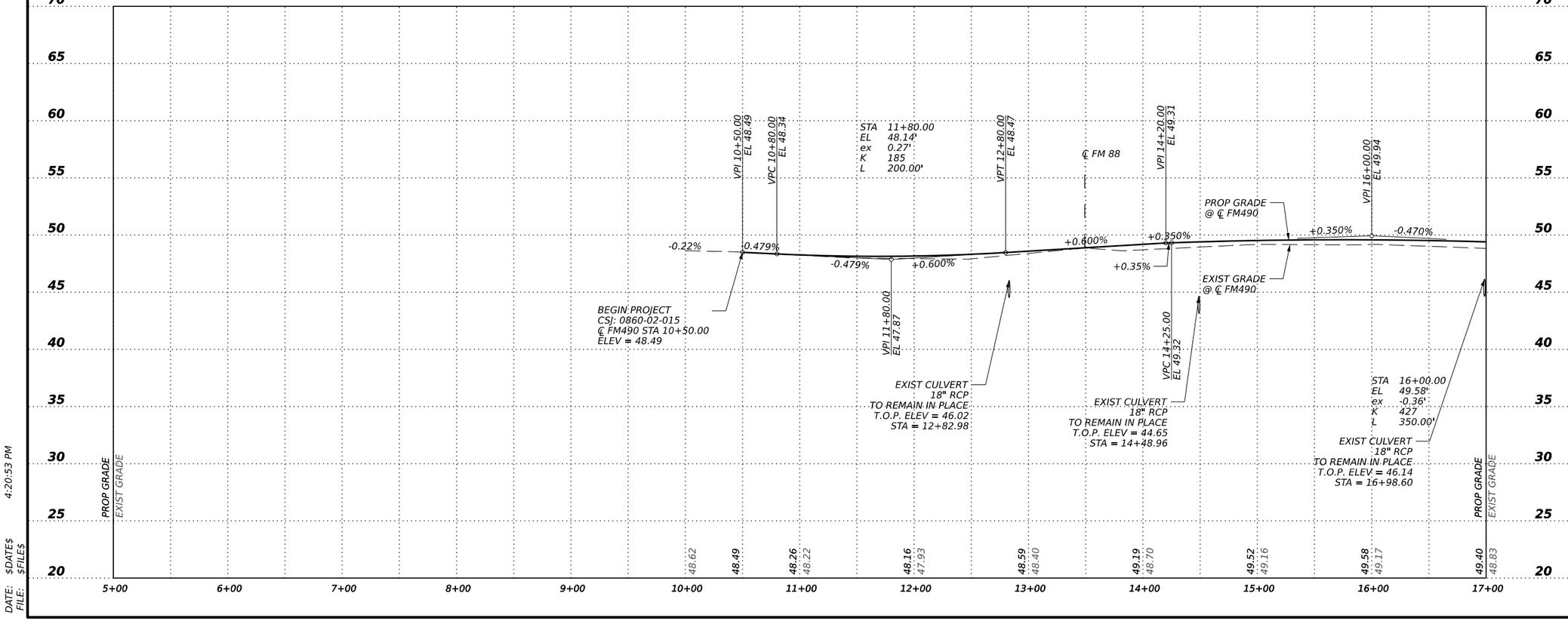
DATE: 1/31/2024
FILE: ...\Roadway\FM490-BMCD-RMV-14.dgn

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	7	STA
134-6002	BACKFILL (TY B)	7	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1259	CY
260-6002	LIME (HYDRATED LIME (SLURRY))		TON
260-6011	LIME TRT (EXST MATL) (12")		SY
275-6001	CEMENT	46	TON
275-6031	CEMENT TREAT (NEW BASE) (10")		SY
275-6076	CEMENT TREAT (NEW BASE) (15")	3023	SY
310-6009	PRIME COAT (MC-30)	568	GAL
316-6005	ASPH (TIER II)	853	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	24	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	469	TON
3077-6075	TACK COAT	197	GAL

STATION	SUPERELEVATION RATE (%)
12+25.00	-2.0
12+85.00	-0.25
14+20.00	-0.25
14+80.00	-2.0

℄ / PGL





HORIZ: 0 50 100 SCALE IN FEET

VERT: 0 2 4 6 8 10 SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR MORE INFORMATION.
2. DESIGN SPEED
   A. FM 490: 65 MPH
   B. FM 88: 65 MPH
   C. FM 1015: 55 MPH
3. FM 490 A.D.T.
   (2021) = 1,263
   (2041) = 1,768
4. SEE DRIVEWAY DETAIL AND STANDARDS FOR CONSTRUCTION DETAILS.
5. MATCH DITCH GRADE LINE FOR PROPOSED DRIVEWAY CULVERTS AND END TREATMENTS.
6. COUNTY ROAD DRIVEWAY PROFILES TO MATCH EXISTING GROUND.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/11/2024

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

Texas Department of Transportation

FM 490

PLAN & PROFILE BEGIN TO STA 17+00

SHEET 1 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		123

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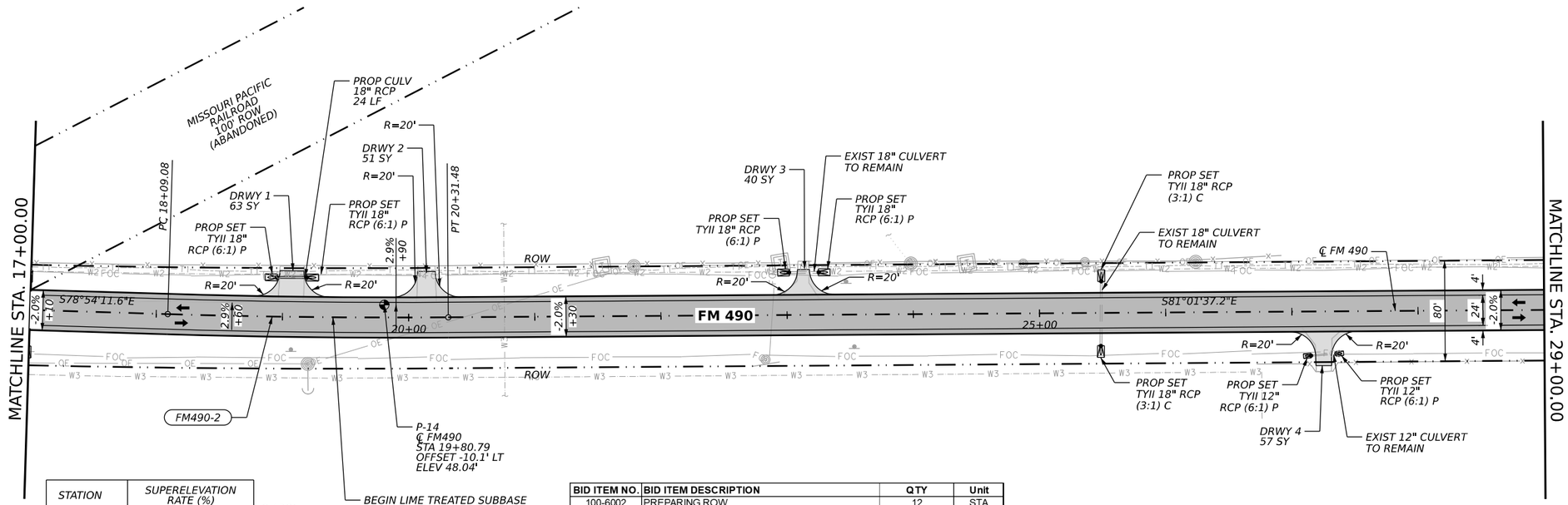


STATION	SUPERELEVATION RATE (%)
17+10.00	-2.0
18+60.00	+2.9
19+90.00	+2.9
21+30.00	-2.0

℄ / PGL

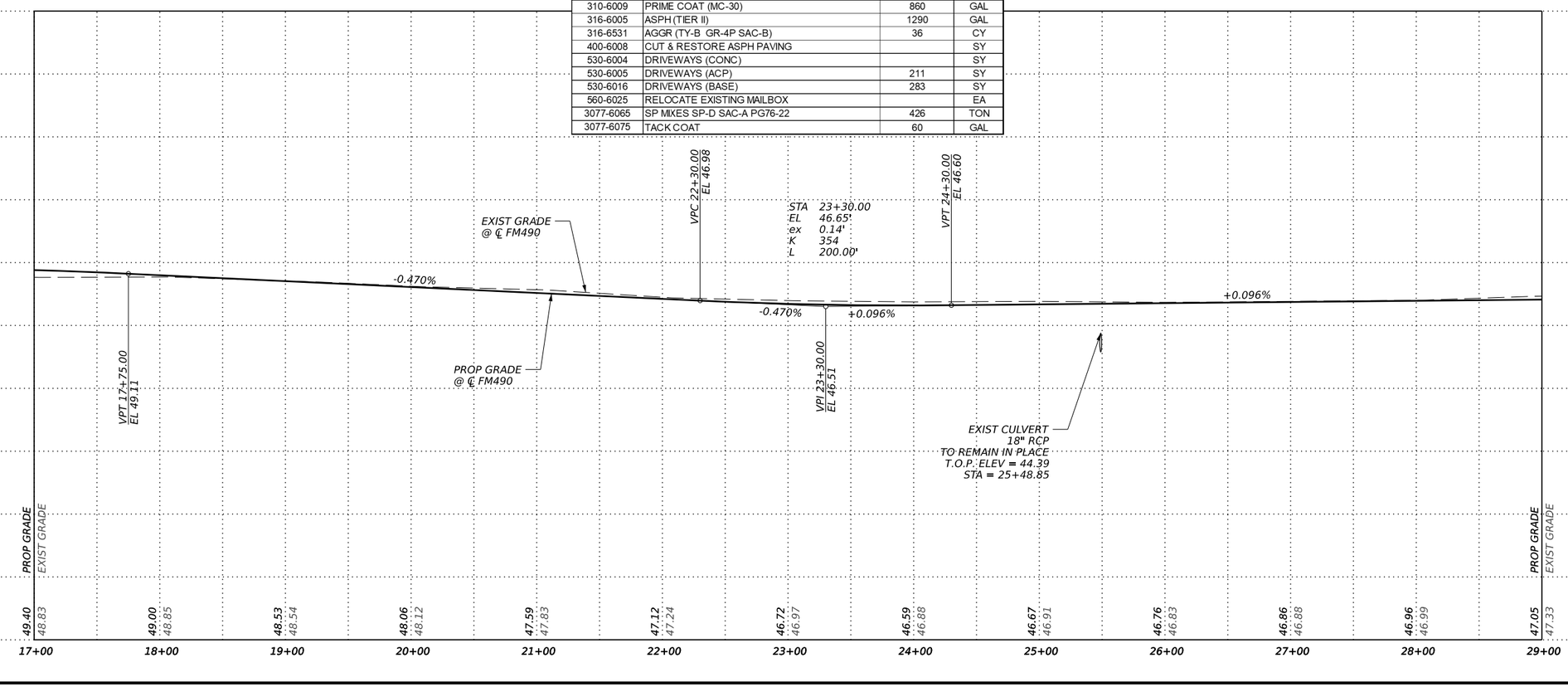
BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1386	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	95	TON
260-6011	LIME TRT (EXST MATL) (12")	3592	SY
275-6001	CEMENT	51	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	399	SY
275-6076	CEMENT TREAT (NEW BASE) (15")	932	SY
310-6009	PRIME COAT (MC-30)	860	GAL
316-6005	ASPH (TIER II)	1290	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)	211	SY
530-6016	DRIVEWAYS (BASE)	283	SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	426	TON
3077-6075	TACK COAT	60	GAL

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR MORE INFORMATION.
2. DESIGN SPEED
   A. FM 490: 65 MPH
   B. FM 88: 65 MPH
   C. FM 1015: 55 MPH
3. FM 490 A.D.T.
   (2021) = 1,263
   (2041) = 1,768
4. SEE DRIVEWAY DETAIL AND STANDARDS FOR CONSTRUCTION DETAILS.
5. MATCH DITCH GRADE LINE FOR PROPOSED DRIVEWAY CULVERTS AND END TREATMENTS.
6. COUNTY ROAD DRIVEWAY PROFILES TO MATCH EXISTING GROUND.



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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

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

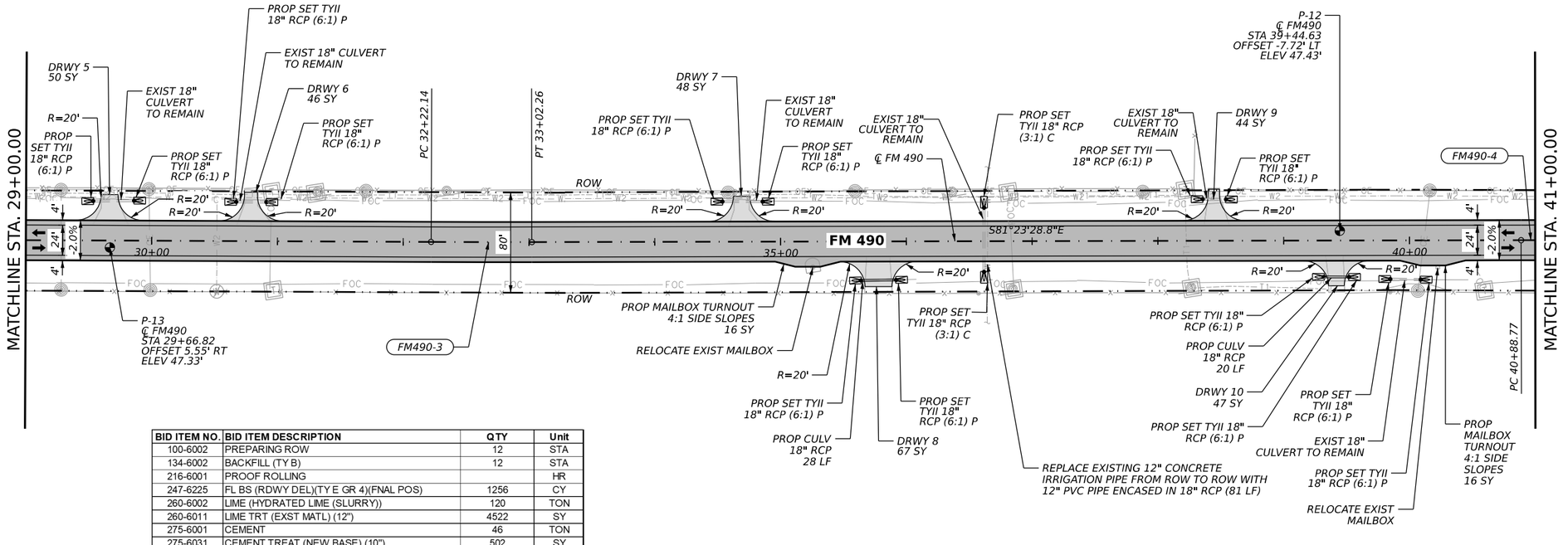
Texas Department of Transportation

FM 490

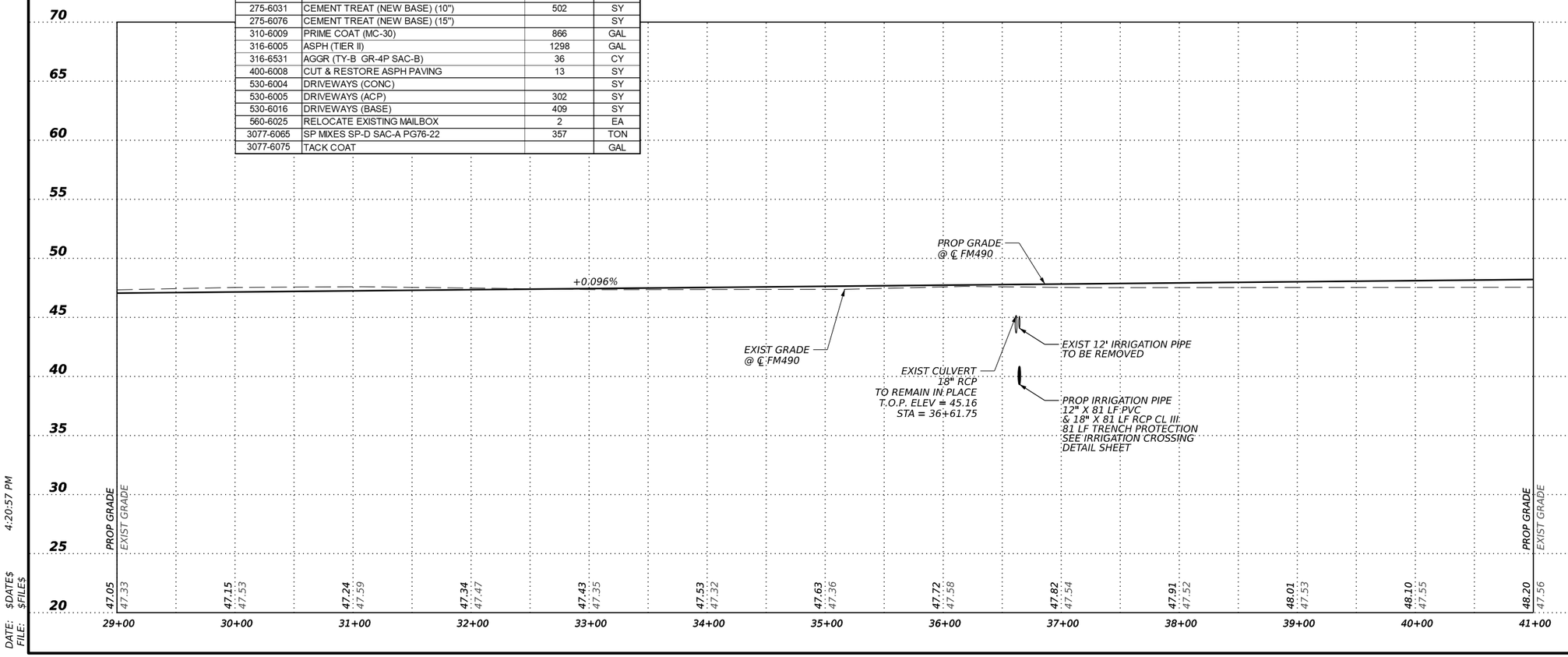
PLAN & PROFILE
STA 17+00 TO STA 29+00

SHEET 2 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		124



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1256	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	120	TON
260-6011	LIME TRT (EXST MATL) (12")	4522	SY
275-6001	CEMENT	46	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	502	SY
275-6076	CEMENT TREAT (NEW BASE) (15")		SY
310-6009	PRIME COAT (MC-30)	866	GAL
316-6005	ASPH (TIER II)	1298	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING	13	SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)	302	SY
530-6016	DRIVEWAYS (BASE)	409	SY
560-6025	RELOCATE EXISTING MAILBOX	2	EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	357	TON
3077-6075	TACK COAT		GAL



HORIZ: 0 50 100 SCALE IN FEET

VERT: 0 2 4 6 8 10 SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR MORE INFORMATION.
2. DESIGN SPEED
   A. FM 490: 65 MPH
   B. FM 88: 65 MPH
   C. FM 1015: 55 MPH
3. FM 490 A.D.T.
   (2021) = 1,263
   (2041) = 1,768
4. SEE DRIVEWAY DETAIL AND STANDARDS FOR CONSTRUCTION DETAILS.
5. MATCH DITCH GRADE LINE FOR PROPOSED DRIVEWAY CULVERTS AND END TREATMENTS.
6. COUNTY ROAD DRIVEWAY PROFILES TO MATCH EXISTING GROUND.

STATE OF TEXAS
KRISTEN E. HARPER
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Kristen Harper
11/31/2024

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13737 NOEL RD.
SUITE 700
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ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 29+00 TO STA 41+00

SHEET 3 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		125

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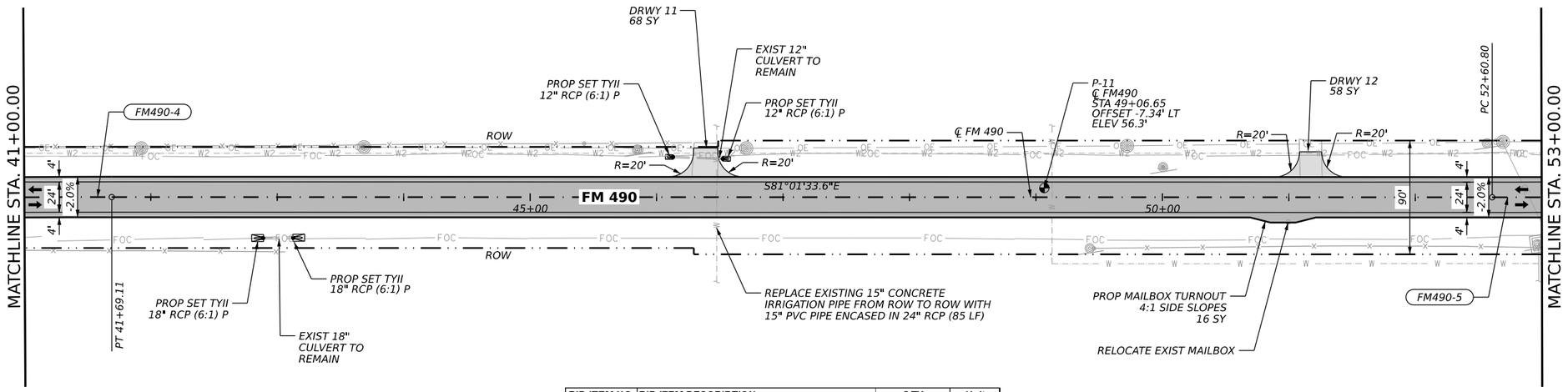
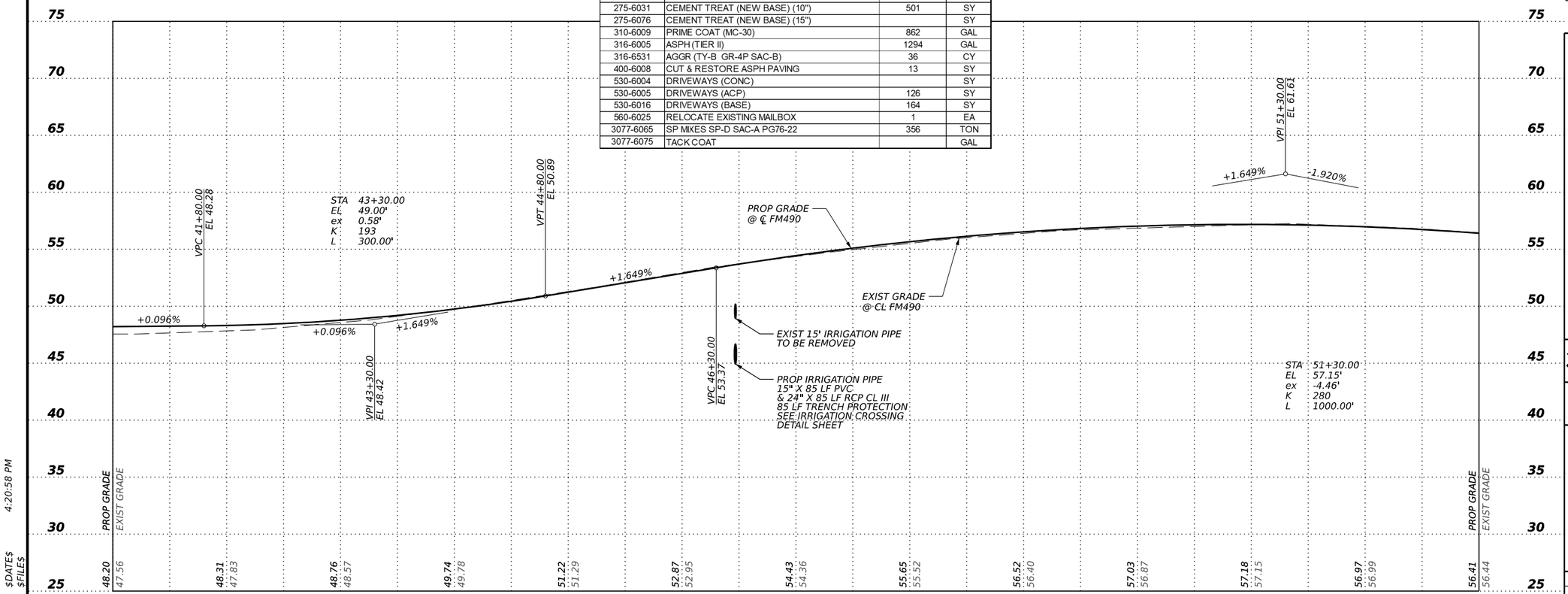


BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1252	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
260-6011	LIME "RT (EXST MATL) (12")	4506	SY
275-6001	CEMENT	46	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	501	SY
275-6076	CEMENT TREAT (NEW BASE) (15")		SY
310-6009	PRIME COAT (MC-30)	862	GAL
316-6005	ASPH (TIER II)	1294	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING	13	SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)	126	SY
530-6016	DRIVEWAYS (BASE)	164	SY
560-6025	RELOCATE EXISTING MAILBOX	1	EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	356	TON
3077-6075	TACK COAT		GAL



LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR MORE INFORMATION.
2. DESIGN SPEED
   A. FM 490: 65 MPH
   B. FM 88: 65 MPH
   C. FM 1015: 55 MPH
3. FM 490 A.D.T.
   (2021) = 1,263
   (2041) = 1,768
4. SEE DRIVEWAY DETAIL AND STANDARDS FOR CONSTRUCTION DETAILS.
5. MATCH DITCH GRADE LINE FOR PROPOSED DRIVEWAY CULVERTS AND END TREATMENTS.
6. COUNTY ROAD DRIVEWAY PROFILES TO MATCH EXISTING GROUND.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

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

Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 41+00 TO STA 53+00

SHEET 4 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		126

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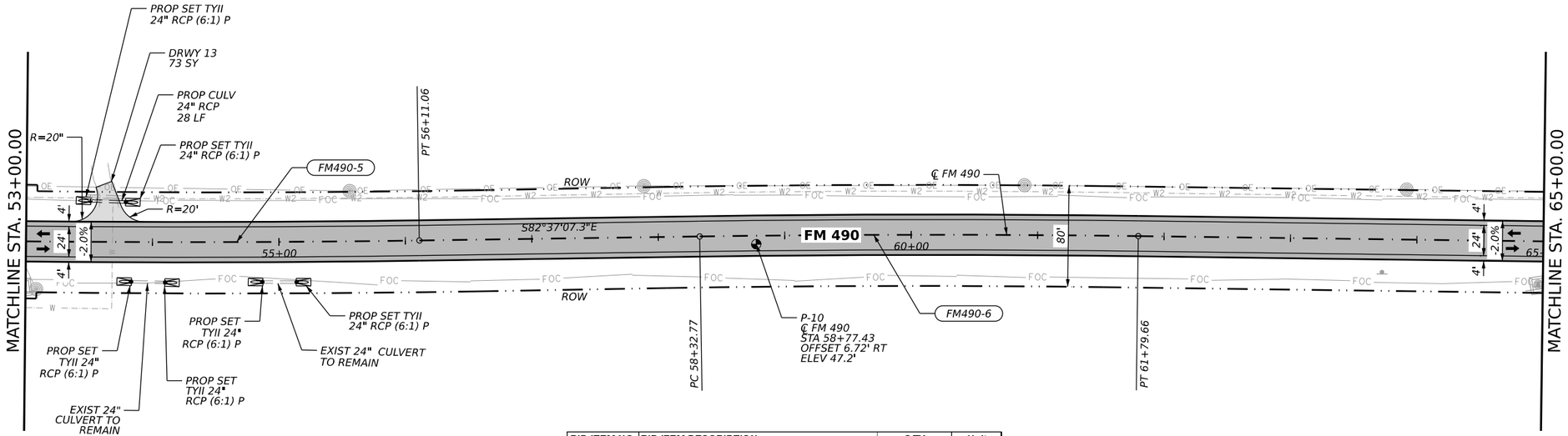
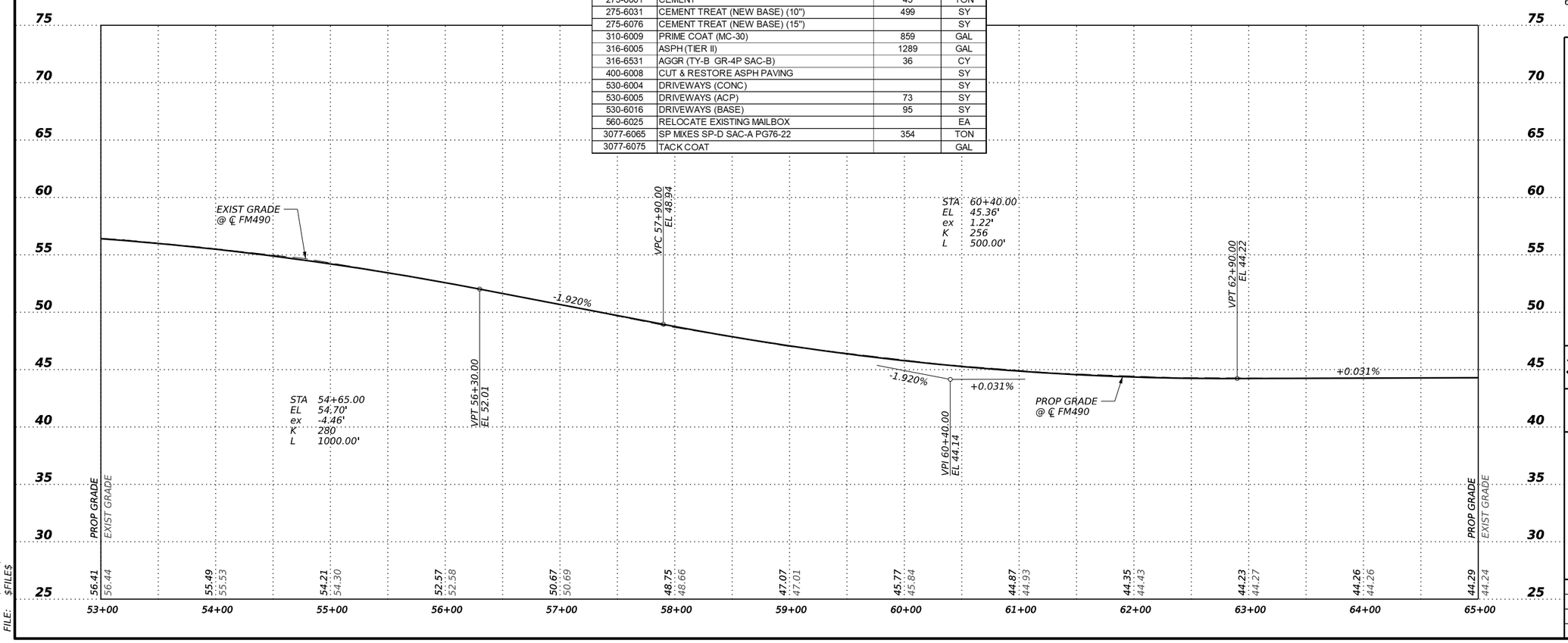
DW:
CK:



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1247	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
260-6011	LIME "RT (EXST MATL) (12")	4490	SY
275-6001	CEMENT	45	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	499	SY
275-6076	CEMENT TREAT (NEW BASE) (15")		SY
310-6009	PRIME COAT (MC-30)	859	GAL
316-6005	ASPH (TIER II)	1289	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)	73	SY
530-6016	DRIVEWAYS (BASE)	95	SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	354	TON
3077-6075	TACK COAT		GAL



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HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

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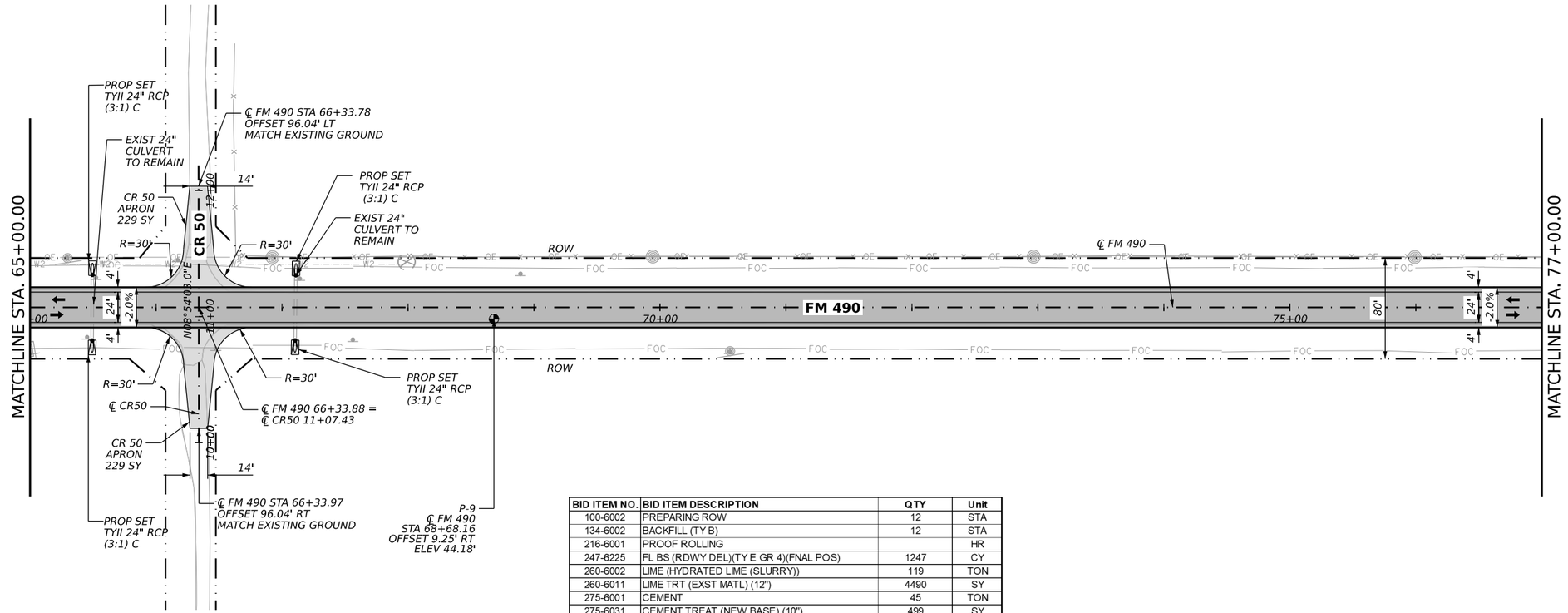
Texas Department of Transportation

FM 490

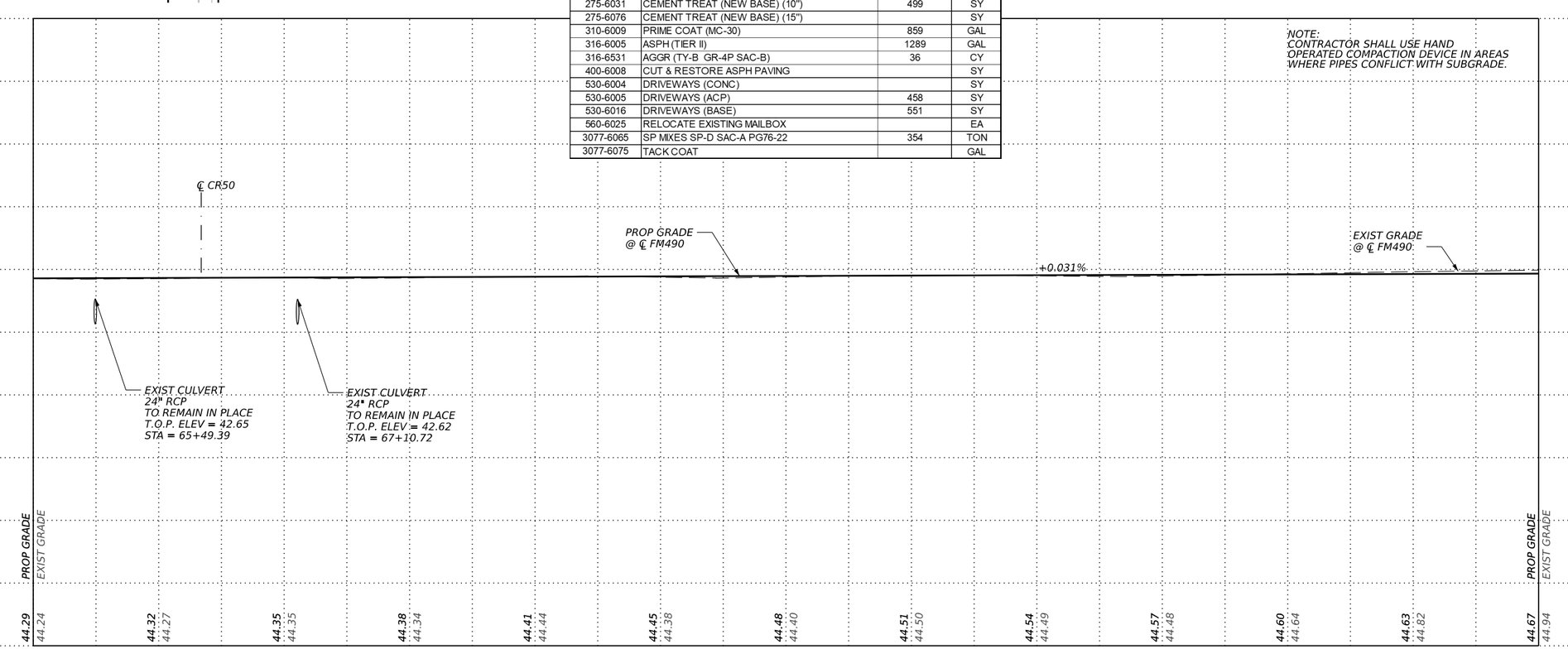
PLAN & PROFILE
STA 53+00 TO STA 65+00

SHEET 5 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		127



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1247	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
260-6011	LIME "RT (EXST MATL) (12")	4490	SY
275-6001	CEMENT	45	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	499	SY
275-6076	CEMENT TREAT (NEW BASE) (15")		SY
310-6009	PRIME COAT (MC-30)	859	GAL
316-6005	ASPH (TIER II)	1289	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)	458	SY
530-6016	DRIVEWAYS (BASE)	551	SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	354	TON
3077-6075	TACK COAT		GAL



NOTE:
CONTRACTOR SHALL USE HAND OPERATED COMPACTION DEVICE IN AREAS WHERE PIPES CONFLICT WITH SUBGRADE.

HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

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FM 490

PLAN & PROFILE
STA 65+00 TO STA 77+00

SHEET 6 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		128

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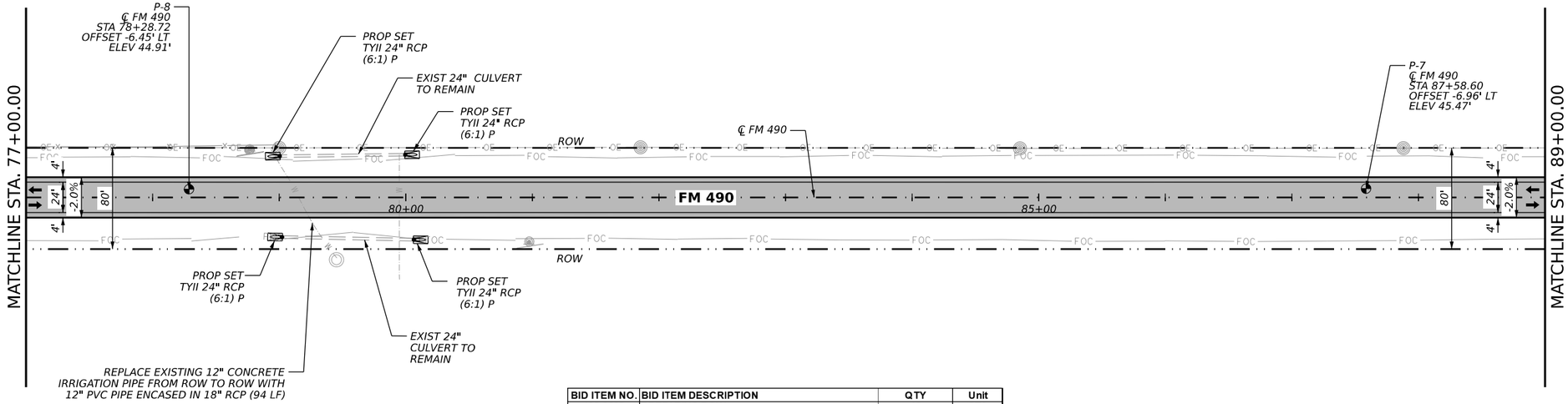
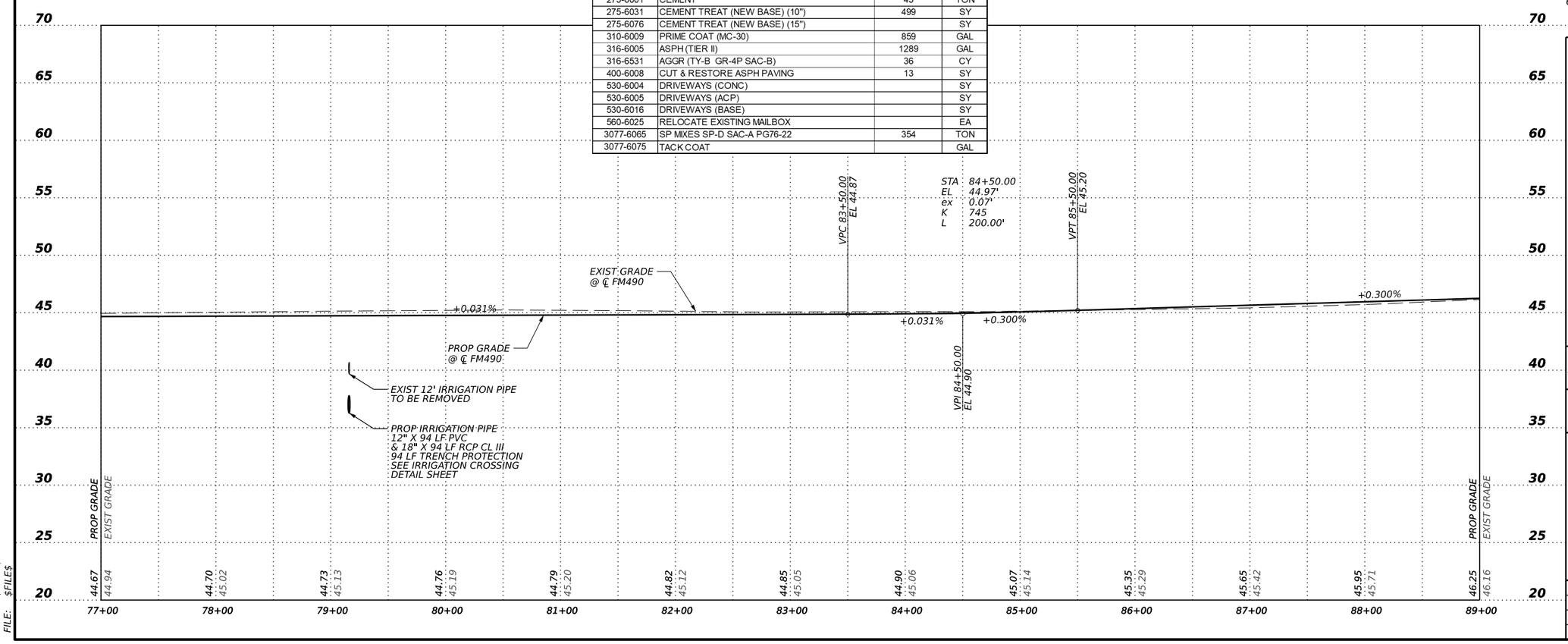


BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1247	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
260-6011	LIME "RT (EXST MATL) (12")	4490	SY
275-6001	CEMENT	45	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	499	SY
275-6076	CEMENT TREAT (NEW BASE) (15")		SY
310-6009	PRIME COAT (MC-30)	859	GAL
316-6005	ASPH (TIER II)	1289	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING	13	SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	354	TON
3077-6075	TACK COAT		GAL



HORIZ: 0 50 100 SCALE IN FEET

VERT: 0 2 4 6 8 10 SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

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Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 77+00 TO STA 89+00

SHEET 7 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		129

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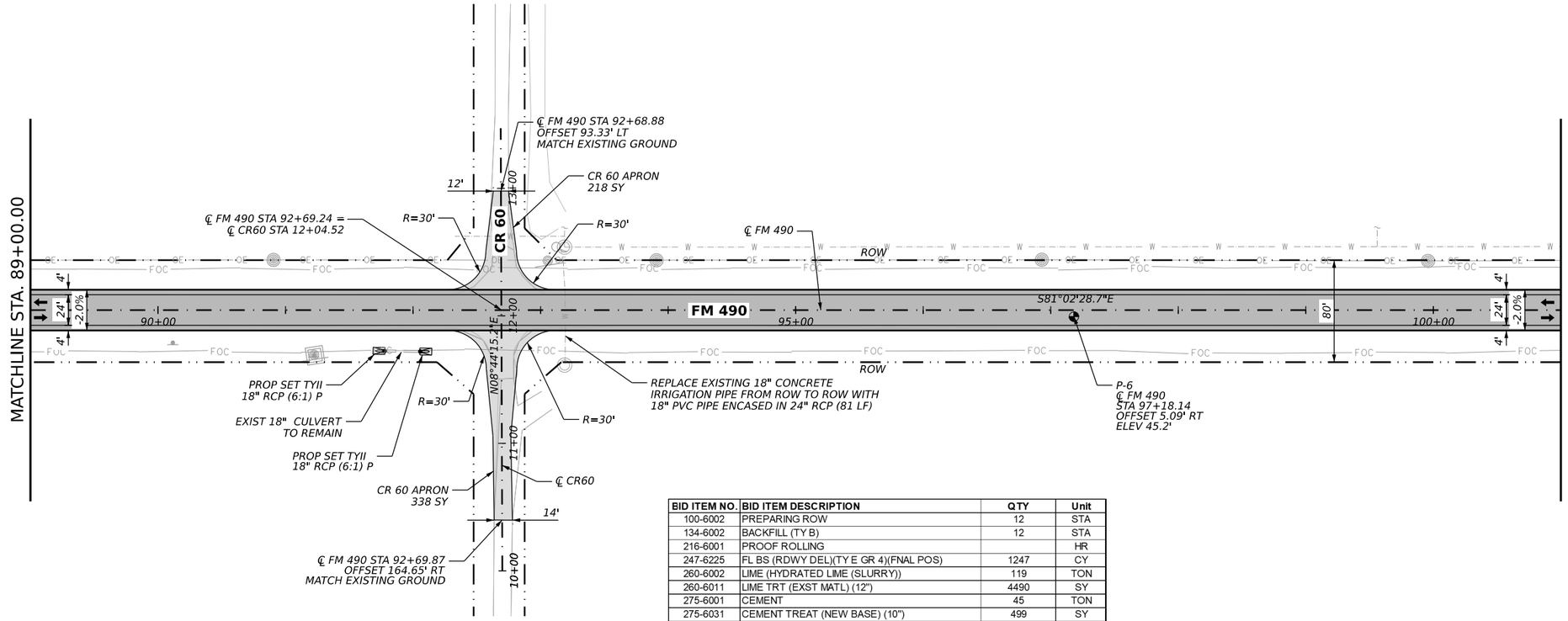
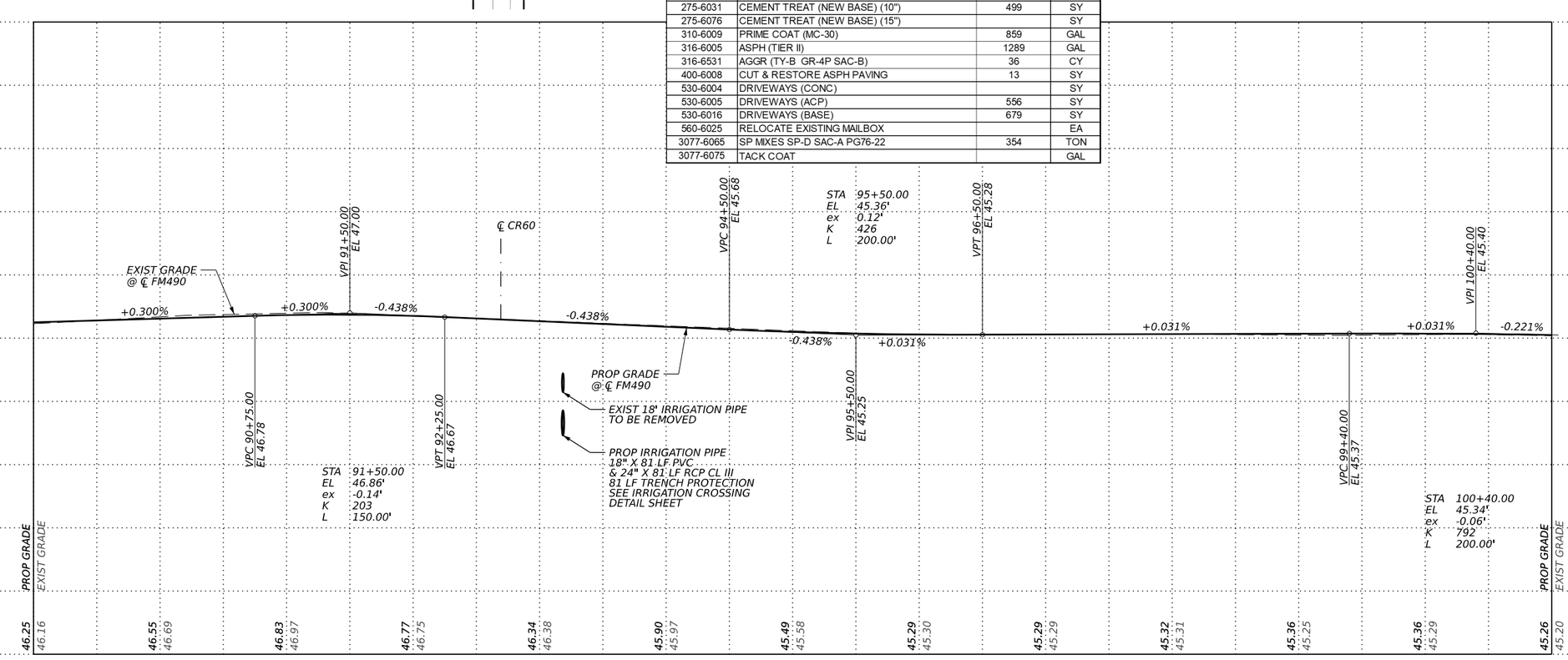


BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1247	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
260-6011	LIME TRT (EXST MATL) (12")	4490	SY
275-6001	CEMENT	45	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	499	SY
275-6076	CEMENT TREAT (NEW BASE) (15")		SY
310-6009	PRIME COAT (MC-30)	859	GAL
316-6005	ASPH (TIER II)	1289	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING	13	SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)	556	SY
530-6016	DRIVEWAYS (BASE)	679	SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	354	TON
3077-6075	TACK COAT		GAL



HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

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Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 89+00 TO STA 101+00

SHEET 8 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		130

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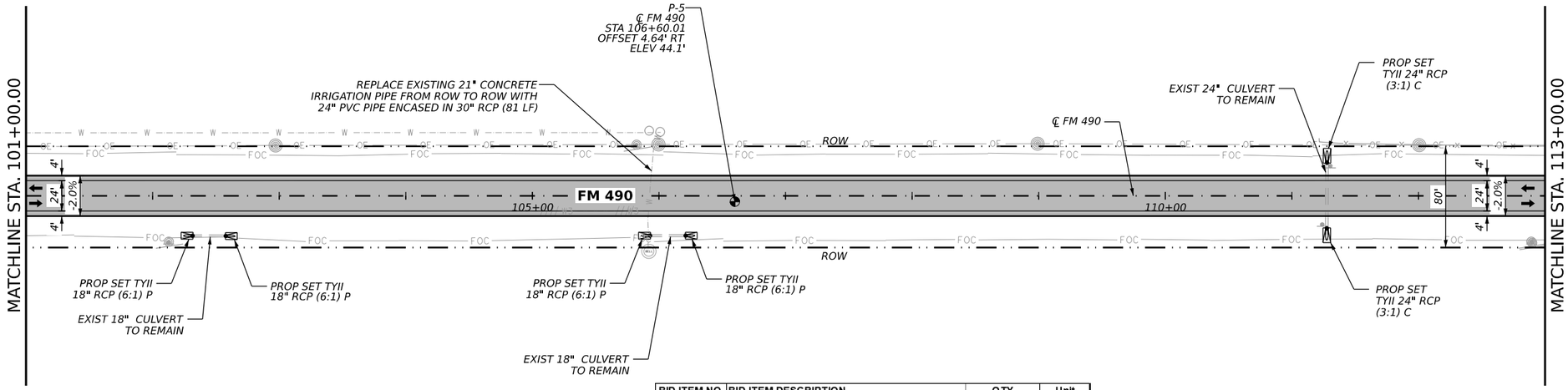

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1247	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
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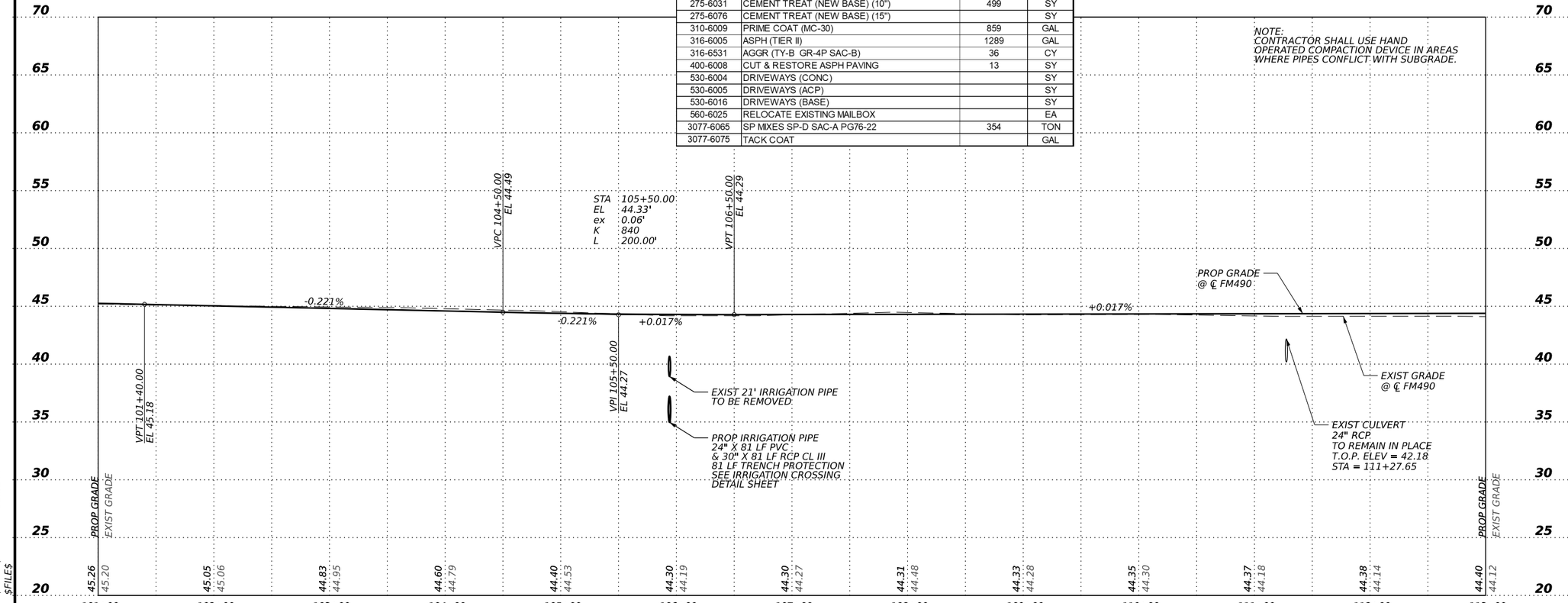
310-6009	PRIME COAT (MC-30)	859	GAL
316-6005	ASPH (TIER II)	1289	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING	13	SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	354	TON
3077-6075	TACK COAT		GAL



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HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
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Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 101+00 TO STA 113+00

SHEET 9 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		131

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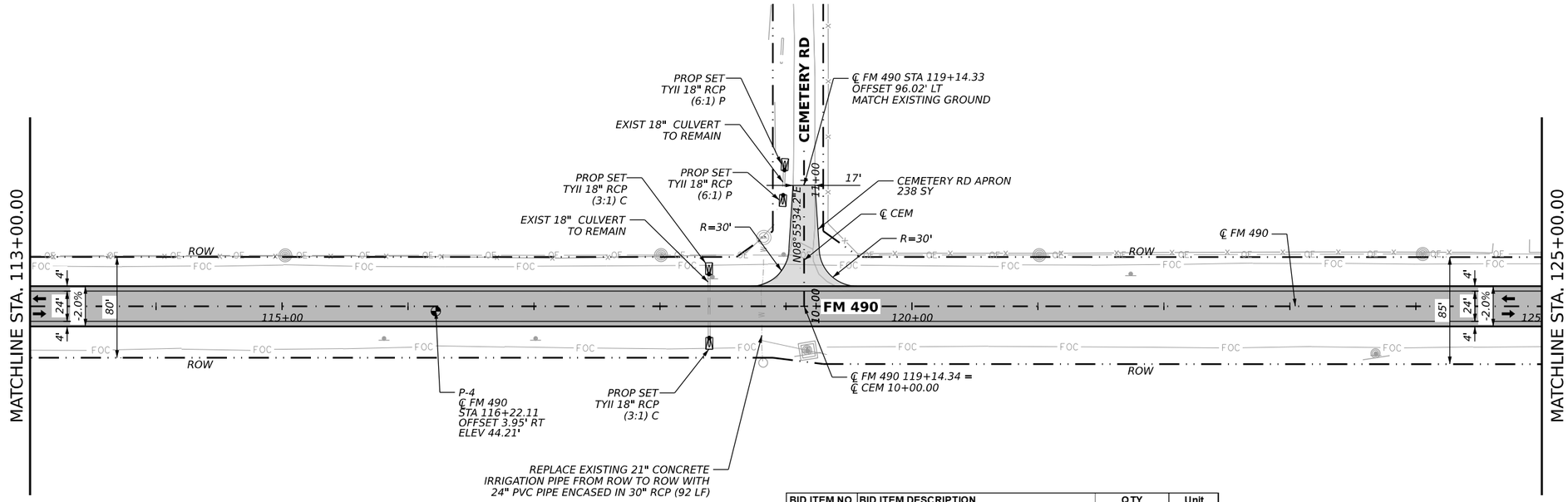

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1247	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
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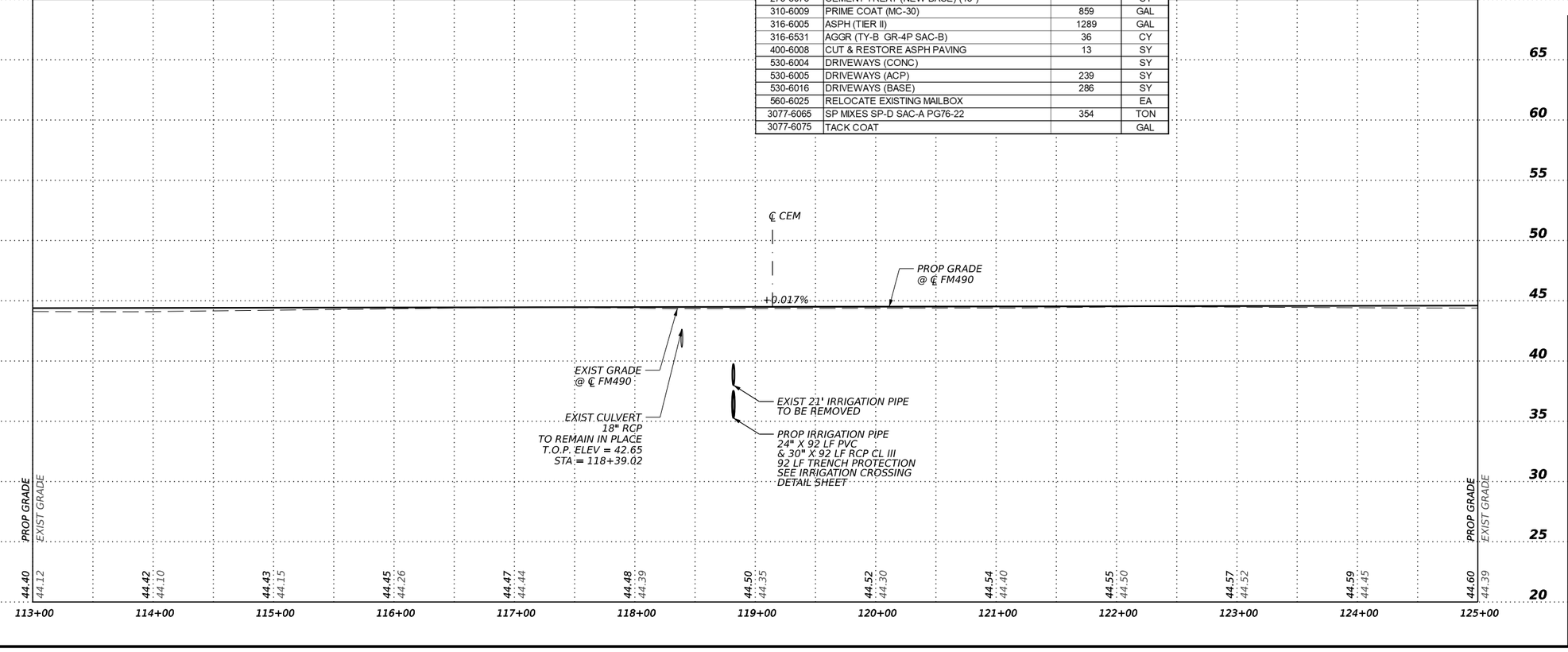
310-6009	PRIME COAT (MC-30)	859	GAL
316-6005	ASPH (TIER II)	1289	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING	13	SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)	239	SY
530-6016	DRIVEWAYS (BASE)	286	SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	354	TON
3077-6075	TACK COAT		GAL



DATE: $DATE$ 4:21:03 PM
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HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

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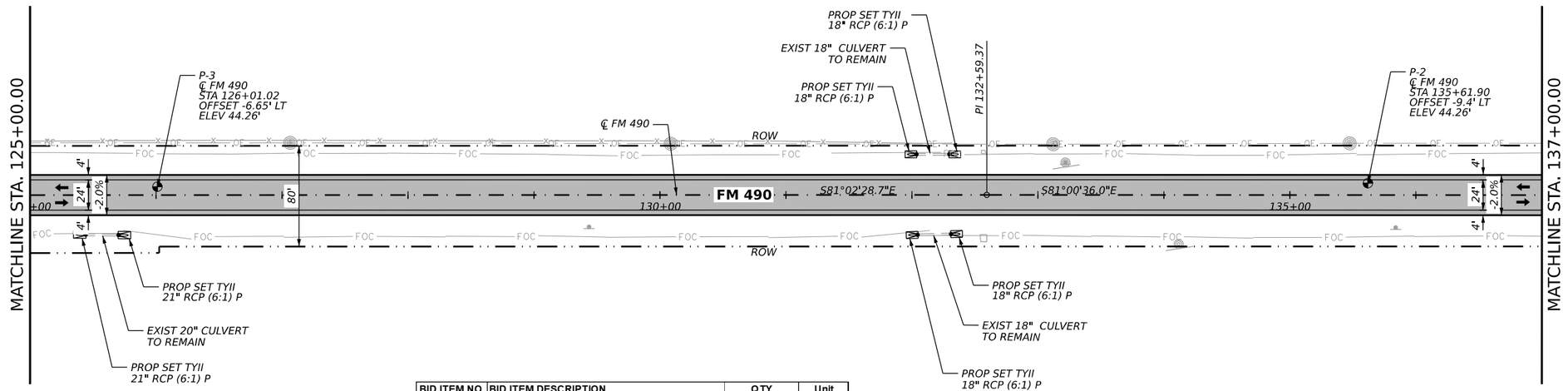
Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 113+00 TO STA 125+00

SHEET 10 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		132



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	1247	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	119	TON
260-6011	LIME TRT (EXST MATL) (12")	4490	SY
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275-6031	CEMENT TREAT (NEW BASE) (10")	499	SY
275-6076	CEMENT TREAT (NEW BASE) (15")		SY
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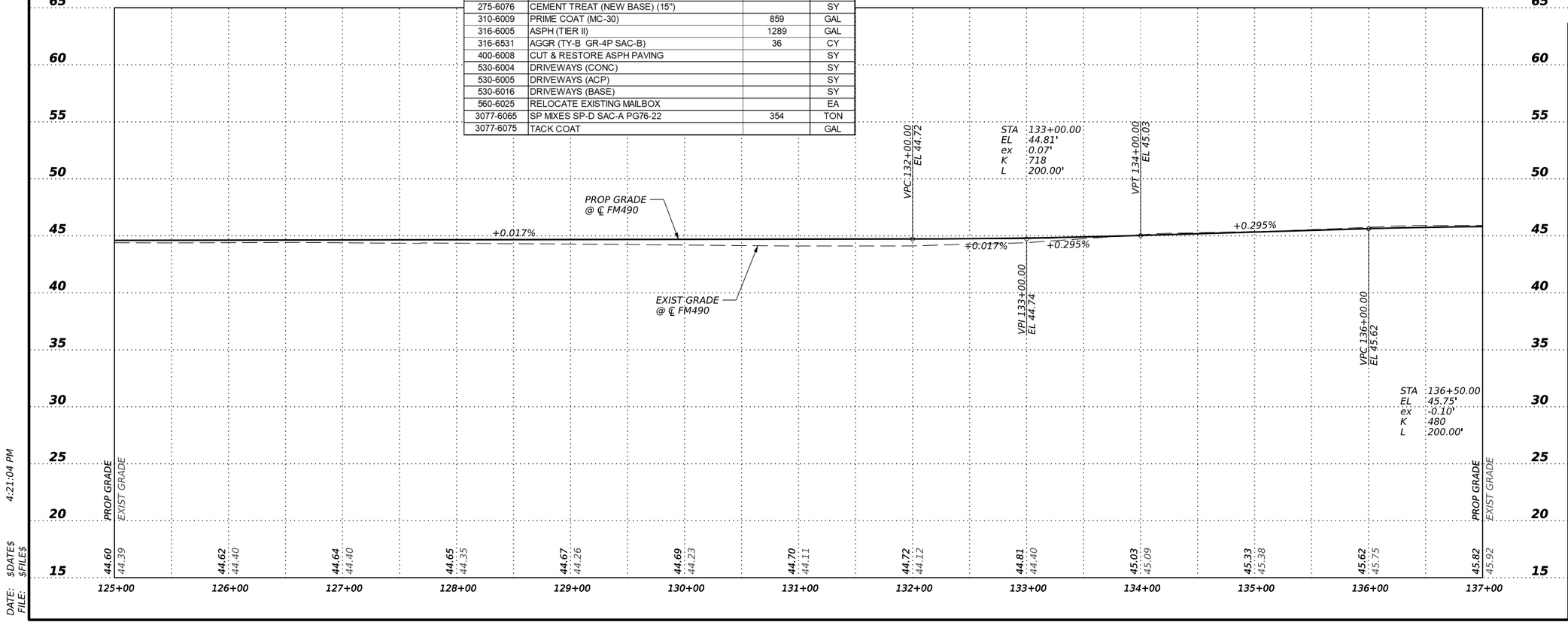
316-6005	ASPH (TIER II)	1289	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	36	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	354	TON
3077-6075	TACK COAT		GAL



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HORIZ: 0 50 100 SCALE IN FEET

VERT: 0 2 4 6 8 10 SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- FM490-# HORIZONTAL ALIGNMENT CURVE

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR MORE INFORMATION.
2. DESIGN SPEED
   A. FM 490: 65 MPH
   B. FM 88: 65 MPH
   C. FM 1015: 55 MPH
3. FM 490 A.D.T.
   (2021) = 1,263
   (2041) = 1,768
4. SEE DRIVEWAY DETAIL AND STANDARDS FOR CONSTRUCTION DETAILS.
5. MATCH DITCH GRADE LINE FOR PROPOSED DRIVEWAY CULVERTS AND END TREATMENTS.
6. COUNTY ROAD DRIVEWAY PROFILES TO MATCH EXISTING GROUND.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/11/2024

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

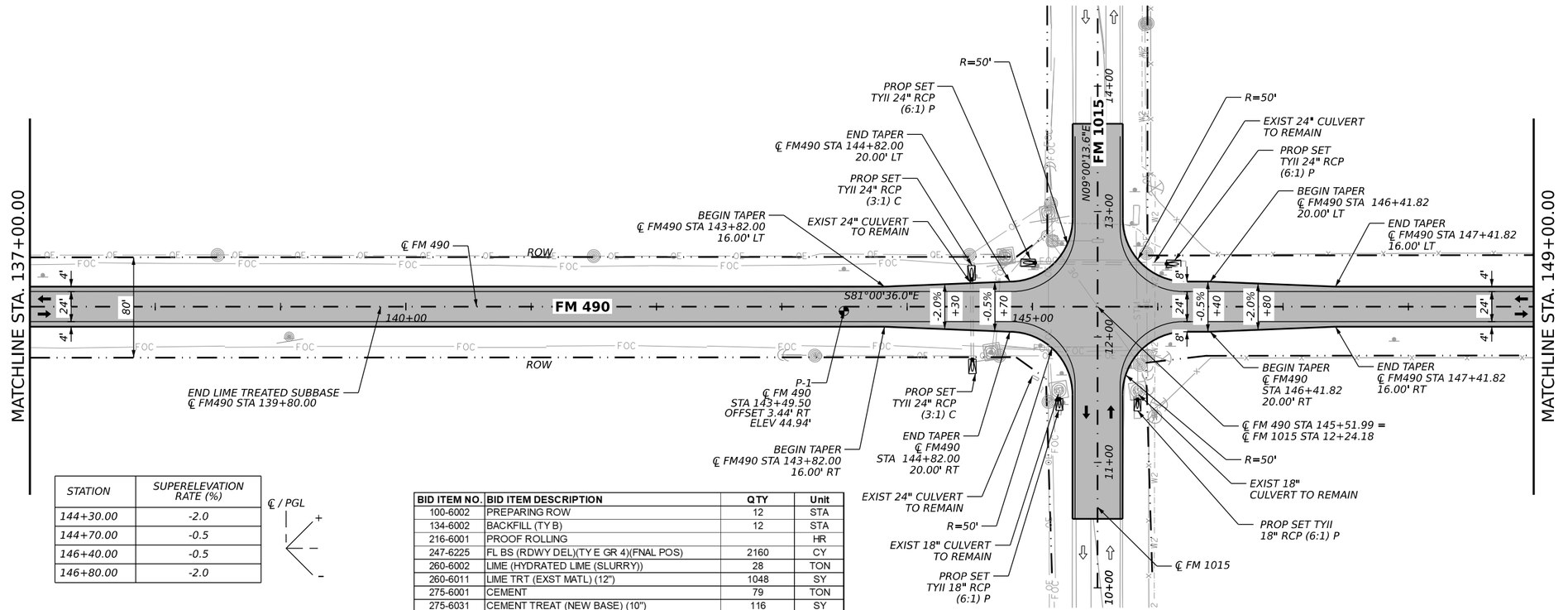
Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 125+00 TO STA 137+00

SHEET 11 OF 13

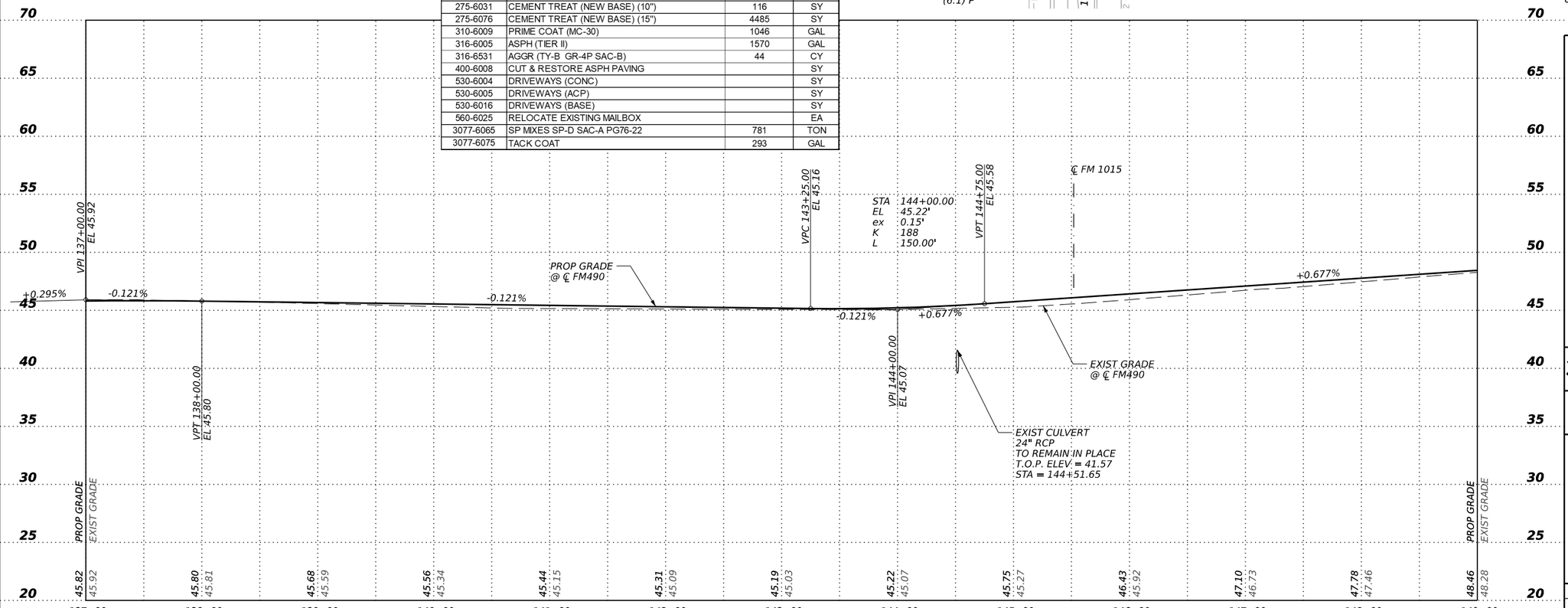
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		133



STATION	SUPERELEVATION RATE (%)
144+30.00	-2.0
144+70.00	-0.5
146+40.00	-0.5
146+80.00	-2.0

℄ / PGL

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	12	STA
134-6002	BACKFILL (TY B)	12	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	2160	CY
260-6002	LIME (HYDRATED LIME (SLURRY))	28	TON
260-6011	LIME TRT (EXST MATL) (12")	1048	SY
275-6001	CEMENT	79	TON
275-6031	CEMENT TREAT (NEW BASE) (10")	116	SY
275-6076	CEMENT TREAT (NEW BASE) (15")	4485	SY
310-6009	PRIME COAT (MC-30)	1046	GAL
316-6005	ASPH (TIER II)	1570	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	44	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	781	TON
3077-6075	TACK COAT	293	GAL



HORIZ: 0 50 100 SCALE IN FEET

VERT: 0 2 4 6 8 10 SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
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Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 137+00 TO STA 149+00

SHEET 12 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		134

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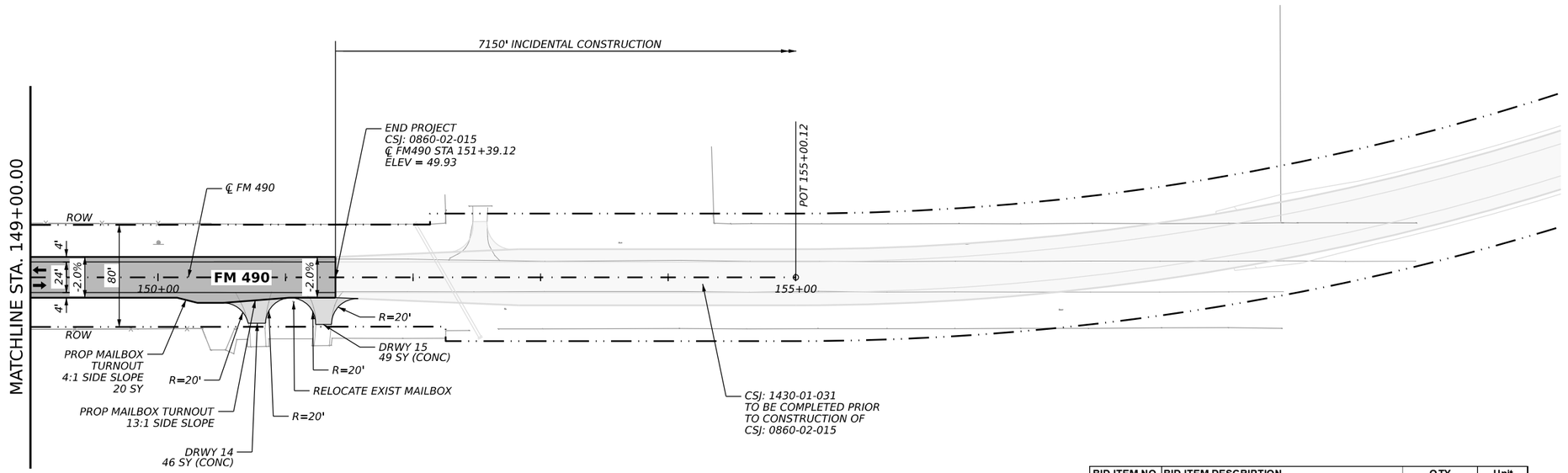

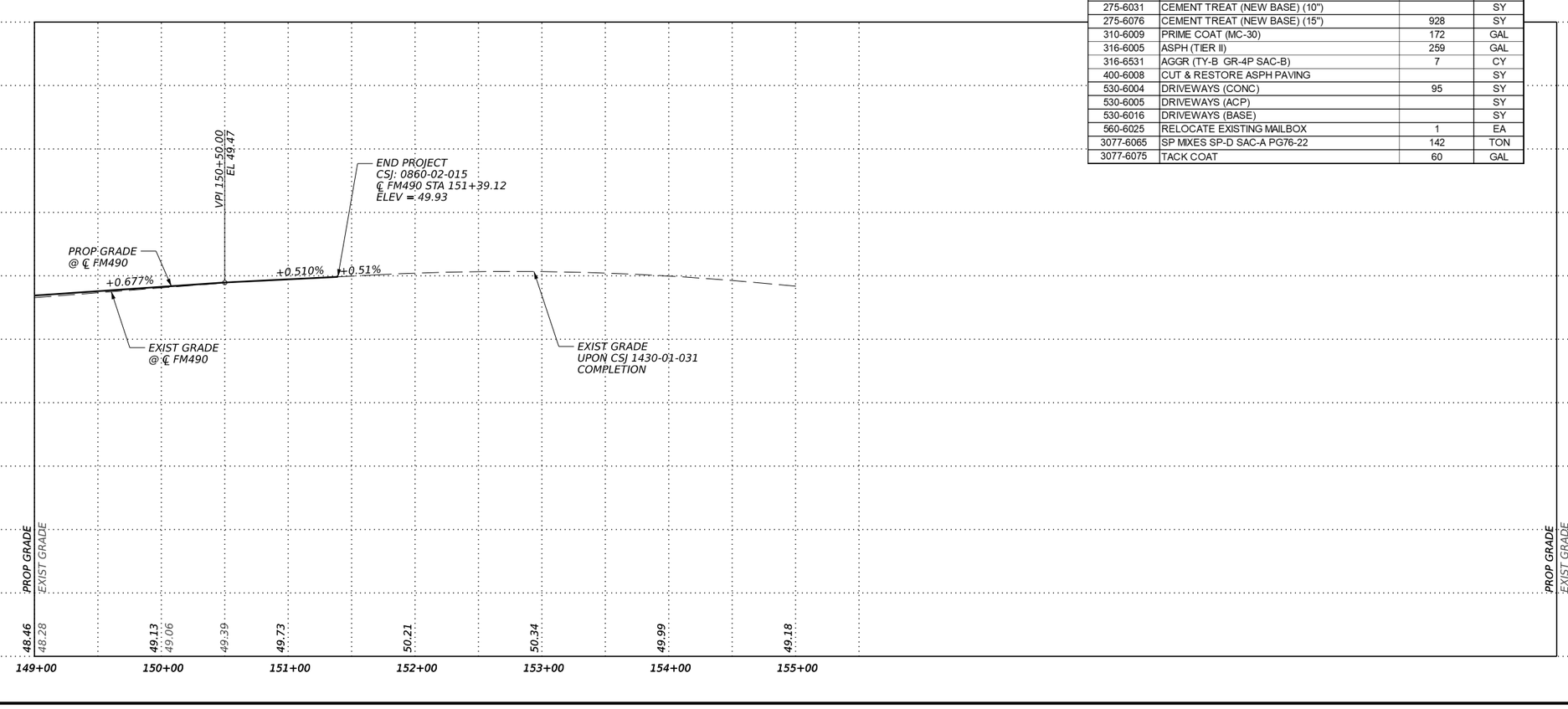

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	2	STA
134-6002	BACKFILL (TY B)	2	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	387	CY
260-6002	LIME (HYDRATED LIME (SLURRY))		TON
260-6011	LIME TRT (EXST MATL) (12")		SY
275-6001	CEMENT	14	TON
275-6031	CEMENT TREAT (NEW BASE) (10")		SY
275-6076	CEMENT TREAT (NEW BASE) (15")	928	SY
310-6009	PRIME COAT (MC-30)	172	GAL
316-6005	ASPH (TIER II)	259	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	7	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)	95	SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX	1	EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	142	TON
3077-6075	TACK COAT	60	GAL

HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
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Texas Department of Transportation

FM 490

PLAN & PROFILE
STA 149+00 TO END

SHEET 13 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		135

DATE: $DATE$ 4:21:05 PM
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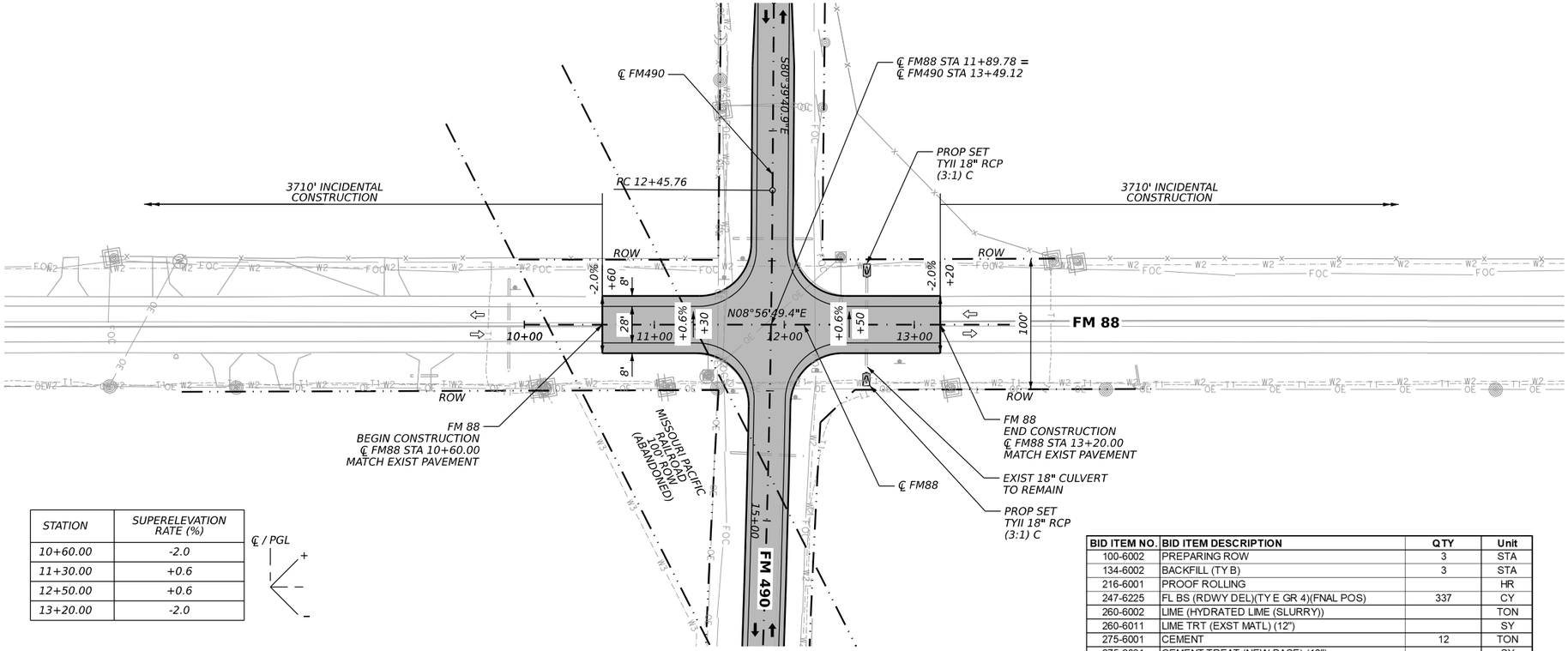

STATION	SUPERELEVATION RATE (%)
10+60.00	-2.0
11+30.00	+0.6
12+50.00	+0.6
13+20.00	-2.0

℄ / PGL

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	3	STA
134-6002	BACKFILL (TY B)	3	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	337	CY
260-6002	LIME (HYDRATED LIME (SLURRY))		TON
260-6011	LIME TRT (EXST MATL) (12")		SY
275-6001	CEMENT	12	TON
275-6031	CEMENT TREAT (NEW BASE) (10")		SY
275-6076	CEMENT TREAT (NEW BASE) (15")	808	SY
310-6009	PRIME COAT (MC-30)	147	GAL
316-6005	ASPH (TIER II)	221	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	6	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	121	TON
3077-6075	TACK COAT	51	GAL

HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
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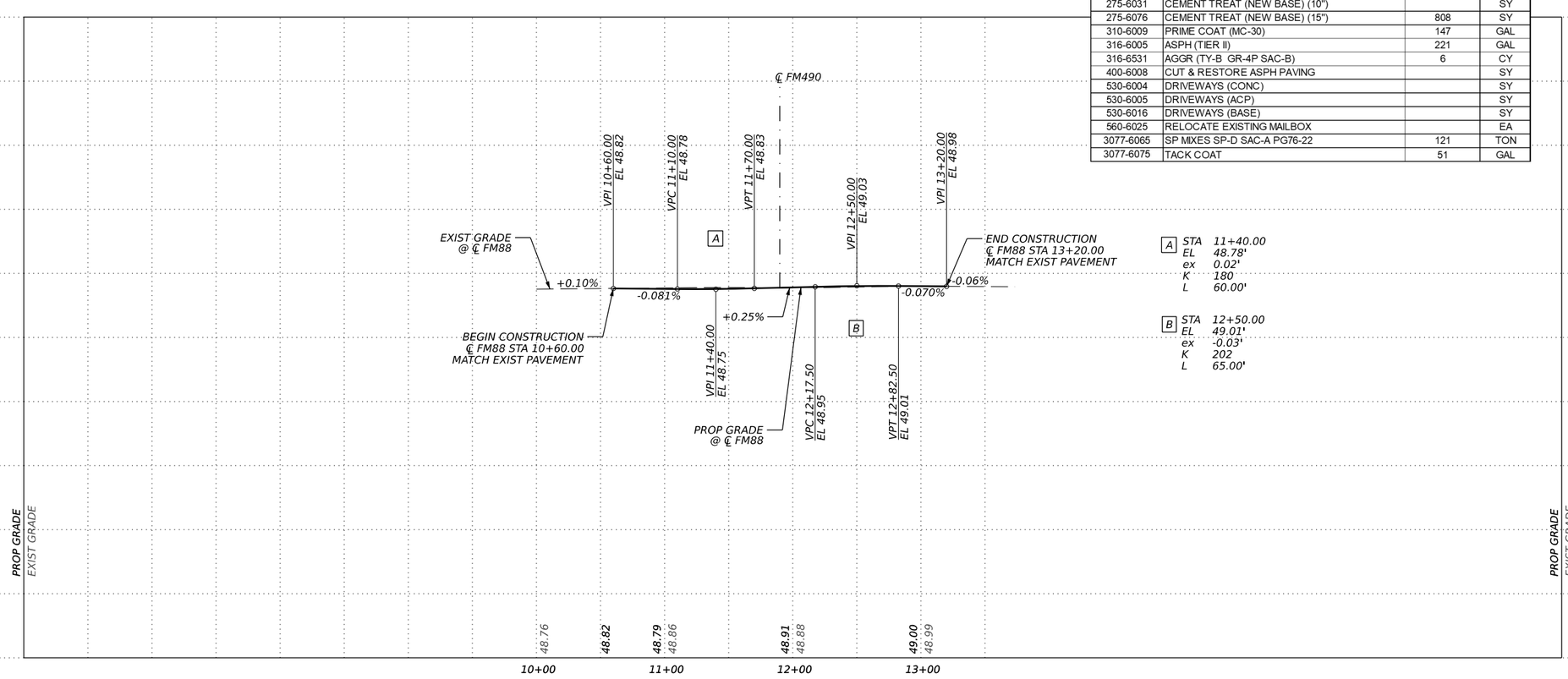

STATE OF TEXAS
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Texas Department of Transportation

FM 88

PLAN & PROFILE BEGIN TO END

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		136

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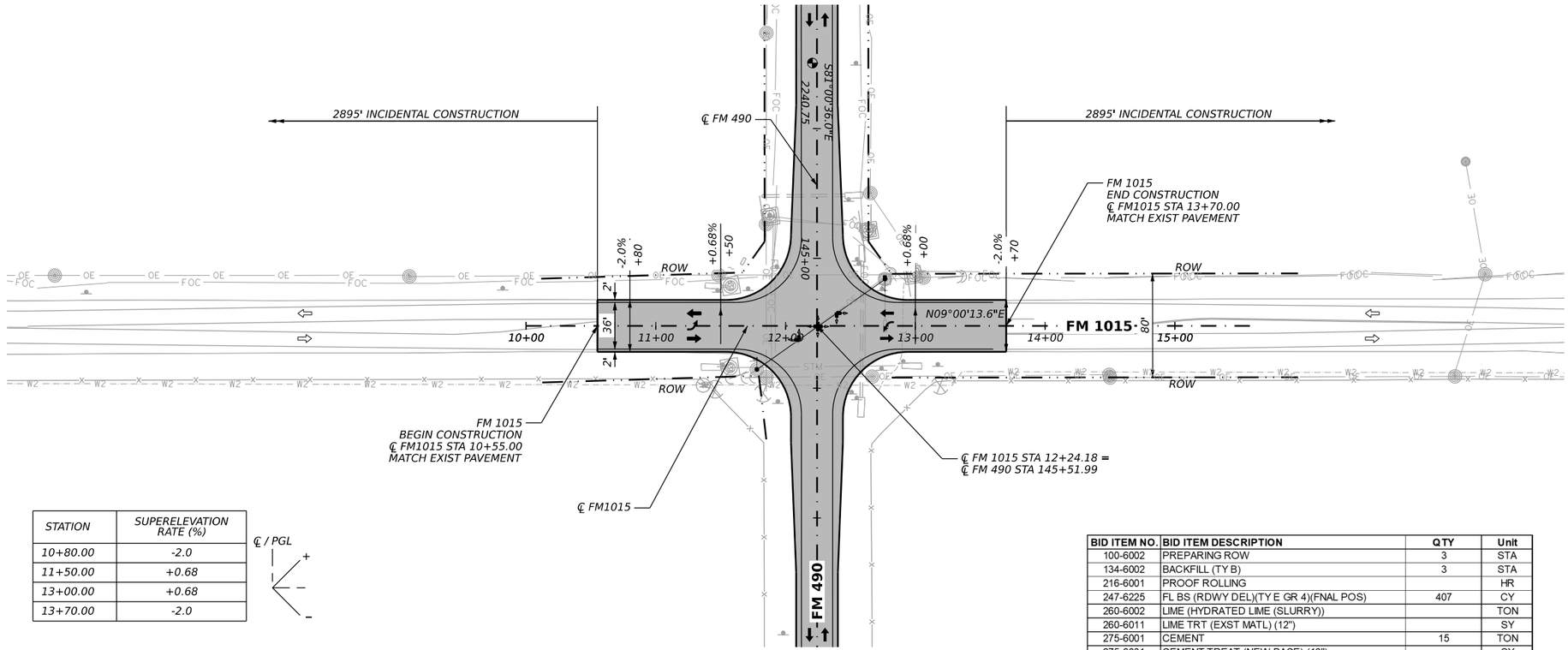
CK:
DW:
CK:



STATION	SUPERELEVATION RATE (%)
10+80.00	-2.0
11+50.00	+0.68
13+00.00	+0.68
13+70.00	-2.0

℄ / PGL

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
100-6002	PREPARING ROW	3	STA
134-6002	BACKFILL (TY B)	3	STA
216-6001	PROOF ROLLING		HR
247-6225	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS)	407	CY
260-6002	LIME (HYDRATED LIME (SLURRY))		TON
260-6011	LIME TRT (EXST MATL) (12")		SY
275-6001	CEMENT	15	TON
275-6031	CEMENT TREAT (NEW BASE) (10")		SY
275-6076	CEMENT TREAT (NEW BASE) (15")	977	SY
310-6009	PRIME COAT (MC-30)	178	GAL
316-6005	ASPH (TIER II)	267	GAL
316-6531	AGGR (TY-B GR-4P SAC-B)	7	CY
400-6008	CUT & RESTORE ASPH PAVING		SY
530-6004	DRIVEWAYS (CONC)		SY
530-6005	DRIVEWAYS (ACP)		SY
530-6016	DRIVEWAYS (BASE)		SY
560-6025	RELOCATE EXISTING MAILBOX		EA
3077-6065	SP MIXES SP-D SAC-A PG76-22	147	TON
3077-6075	TACK COAT	61	GAL

HORIZ: 0 50 100
SCALE IN FEET

VERT: 0 2 4 6 8 10
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
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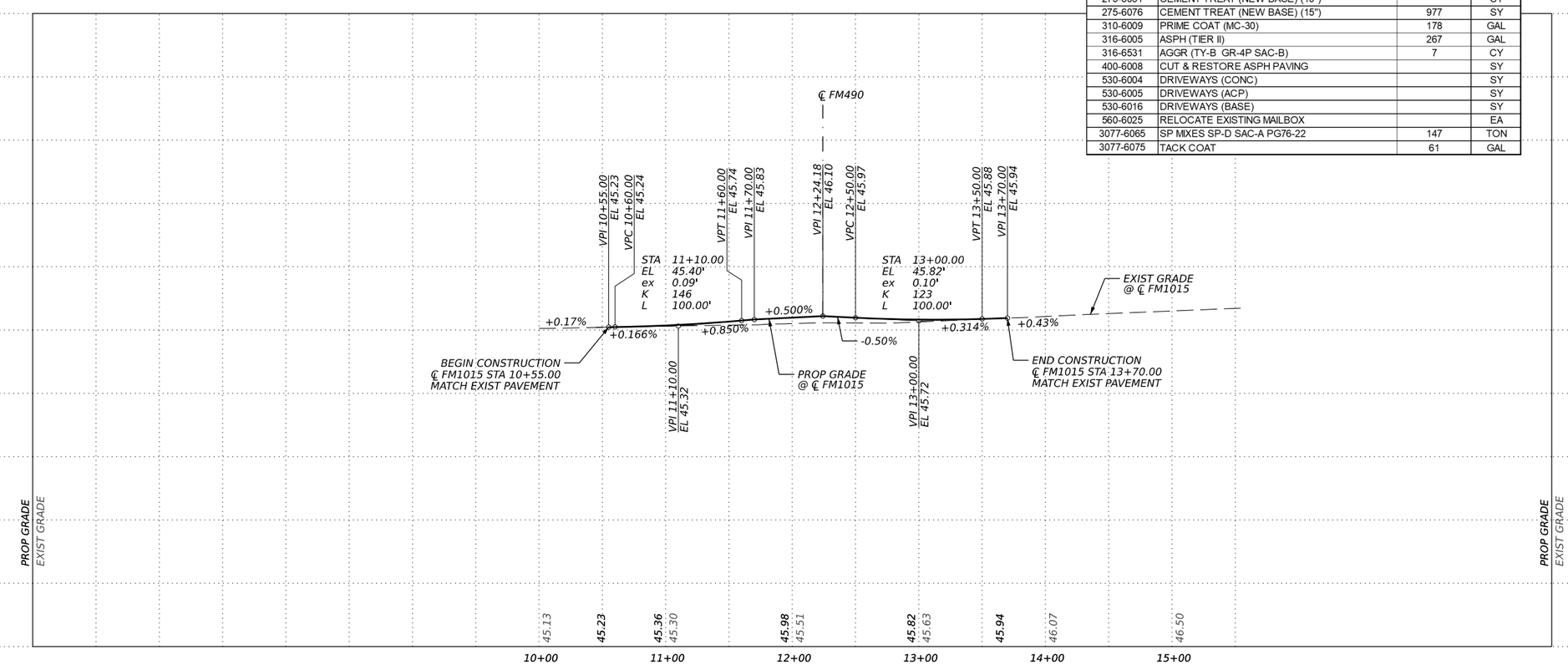

STATE OF TEXAS
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13737 NOEL RD,
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ENGINEERING FIRM F-845

Texas Department of Transportation

FM 1015

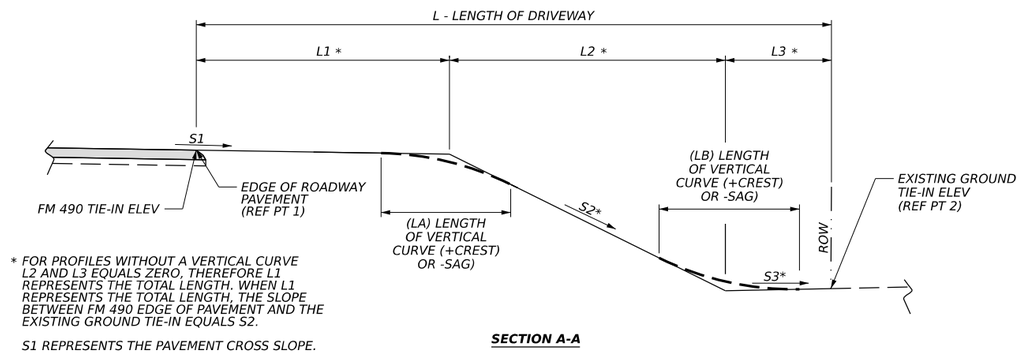
PLAN & PROFILE BEGIN TO END

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		137

DATE: $DATE$ 4:21:29 PM
FILE: $FILE$

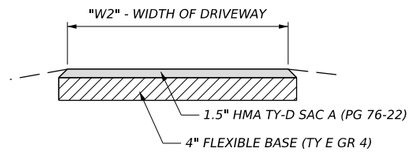
SUMMARY OF DRIVEWAYS																									
CSJ: 0860-02-015																									
DRIVEWAY NAME	FM 490 TIE-IN STATION	FM 490 TIE-IN OFFSET	DIMENSION																						
			FM 490 OFFSET LT/RT	FM 490 TIE-IN ELEV	R1	R2	D	W1	W2	L1	(LA)	L2	(LB)	L3	(LC)	L4	FM 490 CROSS SLOPE/ S1	SLOPE S2	SLOPE CHANGE	SLOPE S3	SLOPE CHANGE	SLOPE S4	SLOPE CHANGE	EXISTING GROUND TIE-IN ELEV	EXISTING GROUND TIE-IN OFFSET
					FT	FT	DEG	FT	FT	FT	FT	FT	FT	FT	FT	FT									
DRWY_1	19+07.10	16.00	LT	48.03	20	20	90.0	59.20	19.00	5.00	(-) 8.0	10.50	(+) 6.0	5.00	-	-	-2.90%	0.54%	3.44%	-8.20%	-8.74%	-	-	47.53	35.50
DRWY_2	20+14.30	16.00	LT	47.55	20	20	90.0	54.15	14.00	5.00	(-) 8.0	9.50	(+) 5.0	6.00	-	-	-2.74%	5.02%	7.76%	-0.41%	-5.43%	-	-	47.87	35.50
DRWY_3	23+13.16	16.00	LT	46.36	20	20	90.0	49.50	9.50	5.00	(-) 7.0	12.00	(+) 5.0	3.00	-	-	-2.00%	1.67%	3.67%	-0.33%	-2.00%	-	-	46.45	35.00
DRWY_4	27+24.99	16.00	RT	46.57	20	20	90.0	52.50	12.00	5.04	(+) 5.0	18.00	(-) 7.0	4.00	-	-	-2.00%	-7.77%	-5.77%	-1.24%	6.53%	-	-	45.02	43.00
DRWY_5	29+66.34	16.00	LT	46.80	20	20	90.0	53.50	13.50	14.17	(-) 5.0	6.50	-	-	-	-	-2.00%	-1.99%	0.01%	-	-	-	-	46.39	35.50
DRWY_6	30+78.79	16.00	LT	47.28	20	20	90.0	50.50	10.50	5.00	(-) 4.0	14.00	(+) 5.0	4.00	-	-	-2.00%	0.03%	2.03%	-4.46%	-4.49%	-	-	46.63	39.00
DRWY_7	34+69.08	16.00	LT	47.28	20	20	90.0	53.00	13.00	5.00	(+) 5.0	12.00	(-) 5.0	3.00	-	-	-2.00%	-2.07%	-0.07%	-0.58%	1.49%	-	-	46.91	35.00
DRWY_8	35+77.77	16.00	RT	47.38	20	20	90.0	61.50	21.50	15.50	(-) 5.0	4.50	-	-	-	-	-2.00%	-1.21%	0.79%	-	-	-	-	47.02	35.00
DRWY_9	38+44.97	16.00	LT	47.64	20	20	90.0	49.00	9.00	4.00	(+) 6.0	16.00	(-) 8.0	5.00	-	-	-2.00%	-7.96%	-5.96%	1.52%	9.48%	-	-	46.36	41.00
DRWY_10	39+41.92	16.00	RT	47.73	20	20	90.0	52.50	12.50	4.10	(+) 6.0	11.00	(-) 8.0	5.00	-	-	-2.00%	-6.52%	-4.52%	0.43%	6.95%	-	-	46.95	35.00
DRWY_11	46+38.84	16.00	LT	53.19	20	20	90.0	59.00	19.00	5.00	(-) 9.0	14.54	(+) 6.0	3.48	-	-	-2.00%	4.35%	6.35%	1.44%	-2.91%	-	-	53.77	39.00
DRWY_12	51+17.20	16.00	LT	56.85	20	20	90.0	57.50	17.50	3.00	(+) 5.0	10.00	(-) 5.0	7.00	-	-	-2.00%	-4.43%	-2.43%	-1.81%	2.62%	-	-	56.22	35.00
DRWY_13	53+64.94	16.00	LT	55.53	20	20	90.0	57.35	13.50	3.94	(+) 5.0	14.00	(-) 12.0	8.00	(-) 3.0	4.29	-2.00%	-3.69%	-1.69%	6.19%	9.88%	9.12%	3.78%	55.82	45.22
DRWY_14	150+77.28	16.00	RT	49.37	20	20	90.0	54.11	13.43	9.00	(-) 15.0	15.00	-	-	-	-	-2.00%	7.72%	9.72%	-	-	-	-	50.35	35.00
DRWY_15	151+29.83	16.00	RT	49.64	20	20	90.0	52.96	12.50	10.25	(-) 18.00	14.82	-	-	-	-	-2.00%	9.24%	11.24%	-	-	-	-	50.81	37.00



* FOR PROFILES WITHOUT A VERTICAL CURVE L2 AND L3 EQUALS ZERO, THEREFORE L1 REPRESENTS THE TOTAL LENGTH, WHEN L1 REPRESENTS THE TOTAL LENGTH, THE SLOPE BETWEEN FM 490 EDGE OF PAVEMENT AND THE EXISTING GROUND TIE-IN EQUALS S2.

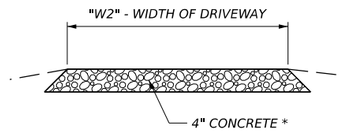
S1 REPRESENTS THE PAVEMENT CROSS SLOPE.

SECTION A-A



ASPHALT DRIVEWAYS

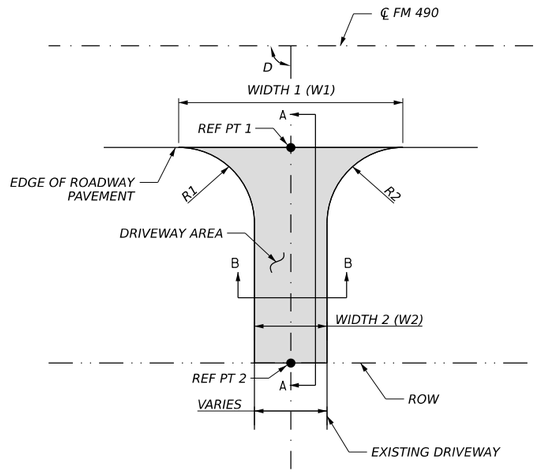
SECTION B-B



* SEE PHARR DISTRICT STANDARD DRIVEWAY DETAIL FOR REINFORCEMENT INFORMATION

CONCRETE DRIVEWAYS

SECTION B-B



TYPICAL DRIVEWAY DETAIL

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

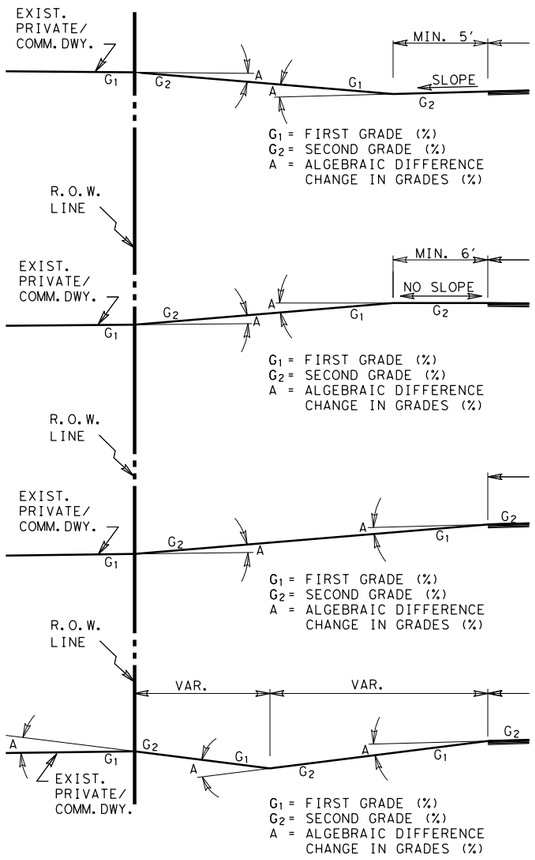
FM 490

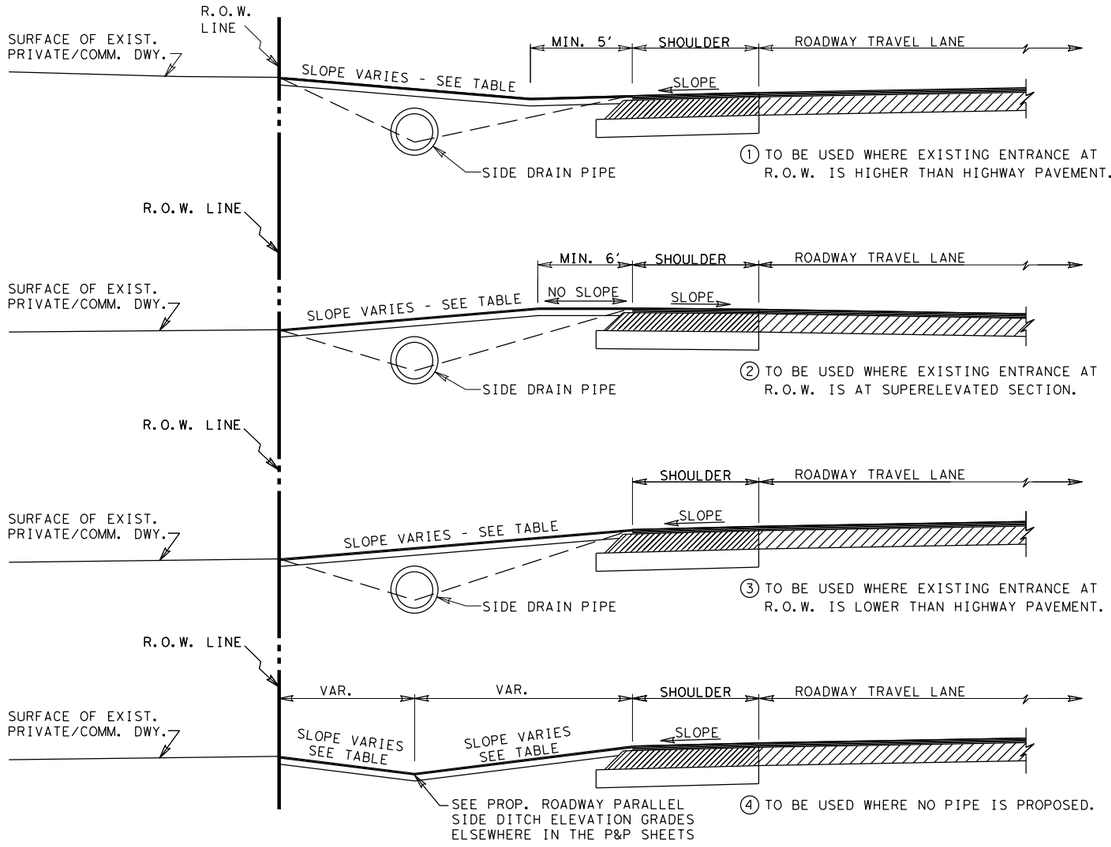
DRIVEWAY DETAILS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		138

DATE: 1/31/2024
FILE: ...\Roadway\FM490-BMCD-DRWY.dgn





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.

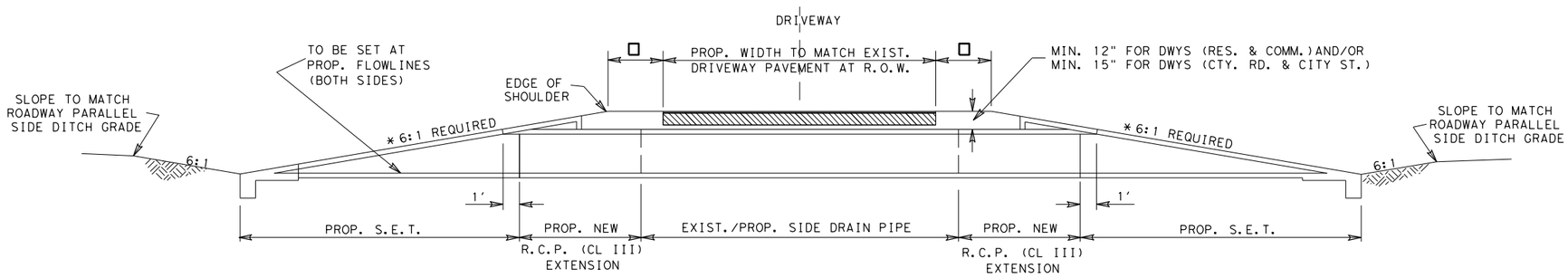
THE RATE OF PRIME COAT SHALL BE 0.10 GAL/SY FOR PRIVATE AND/OR COMMERCIAL DRIVEWAYS AND 0.20 GAL/SY FOR PUBLIC DRIVEWAYS (COUNTY ROADS AND/OR CITY STREETS).

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.

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

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

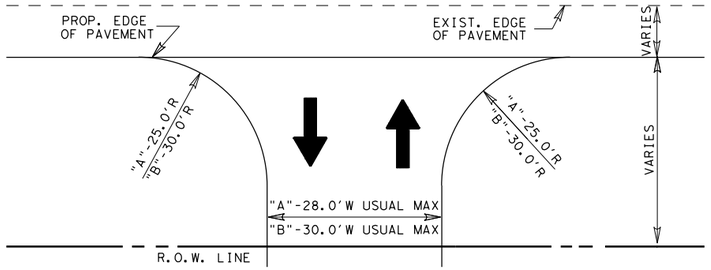
DRIVEWAY PROFILE DETAILS

REV. 3/2020

DRIVEWAY1.DGN

FED. RD. DIV. NO.	STATE AID PROJECT NO.		FILE NO.			SHEET NO.
6						139
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	0860	02	015	FM 490

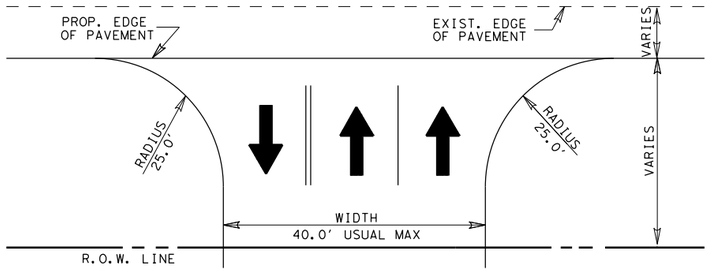
DESIGNS FOR TWO-WAY COMMERCIAL DRIVEWAYS



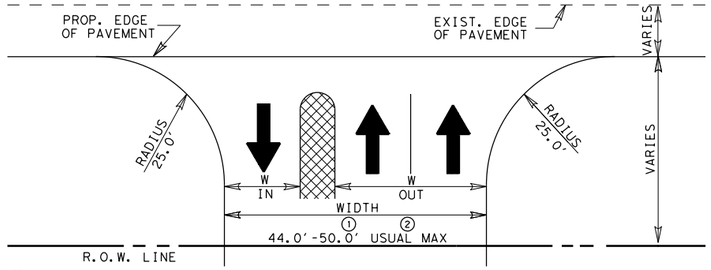
"A"- ONE ENTRY LANE AND ONE EXIT LANE, FEWER THAN 4 LARGE VEHICLES PER HOUR

"B"- ONE ENTRY LANE AND ONE EXIT LANE, 4 OR MORE SINGLE UNIT VEHICLES① PER HOUR

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

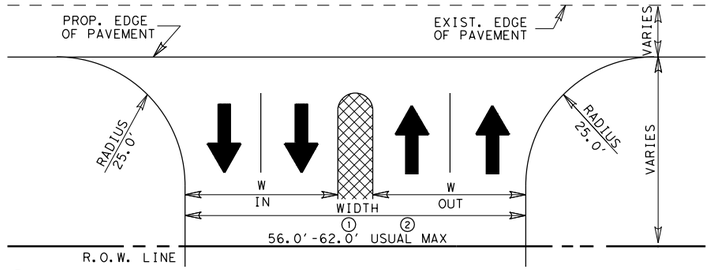


ONE ENTRY LANE AND TWO EXIT LANES (WITHOUT DIVIDERS)



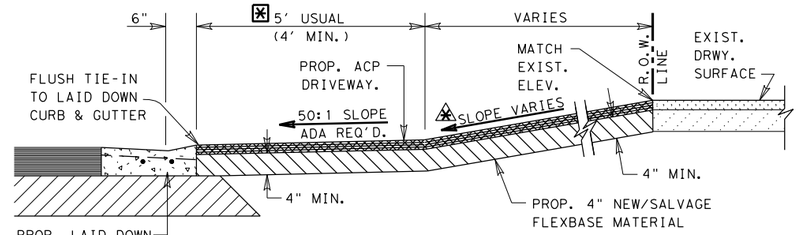
① - *4.0' WIDE DIVIDER, FACE-TO-FACE CURBS*
② - *10.0' WIDE DIVIDER, FACE-TO-FACE-CURBS*

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



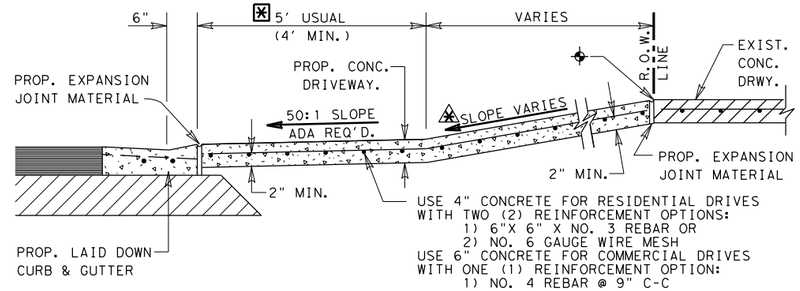
① - *4.0' WIDE DIVIDER, FACE-TO-FACE CURBS*
② - *10.0' WIDE DIVIDER, FACE-TO-FACE-CURBS*

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.

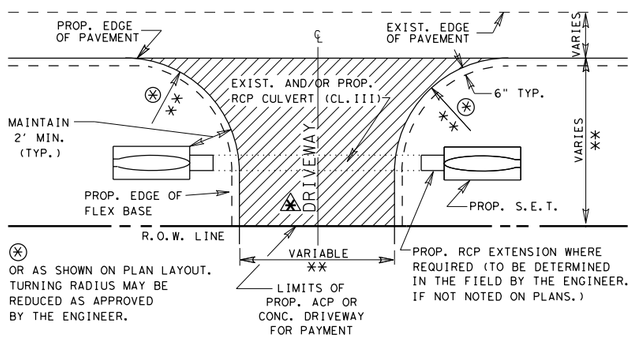
☒ PROP./FUTURE SIDEWALK CROSSING LOCATION UNLESS SHOWN ELSEWHERE ON P&P SHEETS. SEE P&P SHEETS FOR PROP. SIDEWALK LOCATION IF SIDEWALKS ARE INCLUDED AS PART OF PROJECT. REFER TO STATE STANDARDS - PEDESTRIAN FACILITIES - FOR ADDITIONAL REQUIREMENTS.

⁂ 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

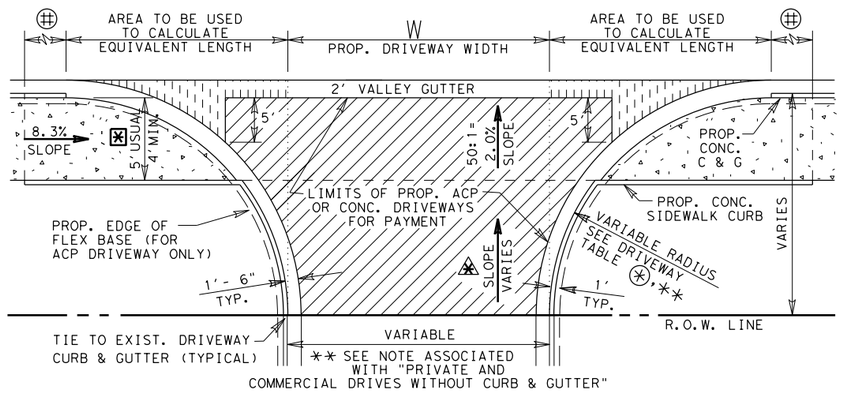


PLAN OF PRIVATE AND COMMERCIAL DRIVES

** 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

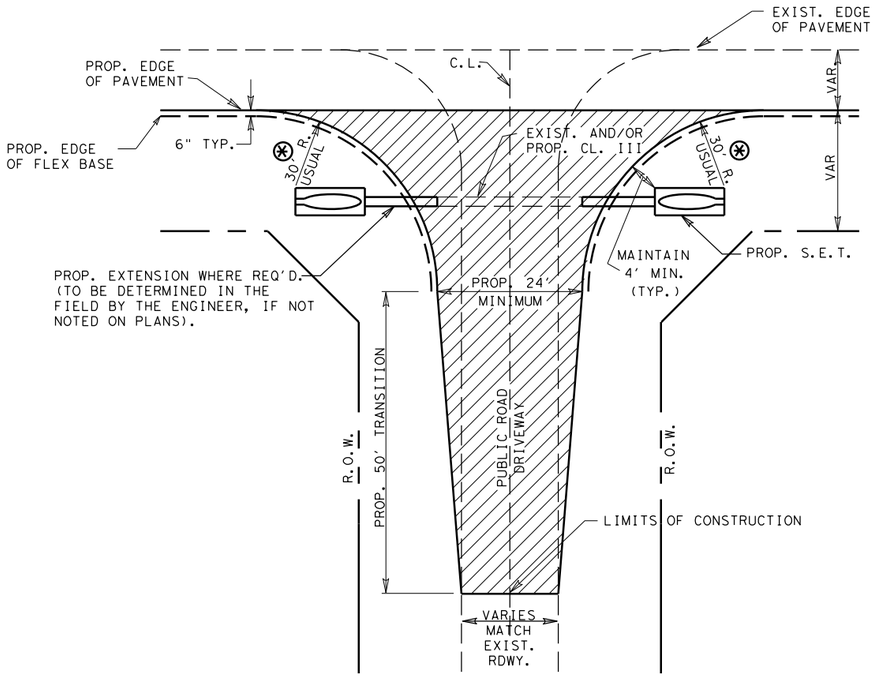
TEXAS DEPARTMENT OF TRANSPORTATION

DRIVEWAY DETAILS PRIVATE (RESIDENTIAL-COMMERCIAL)

REV. 08/22

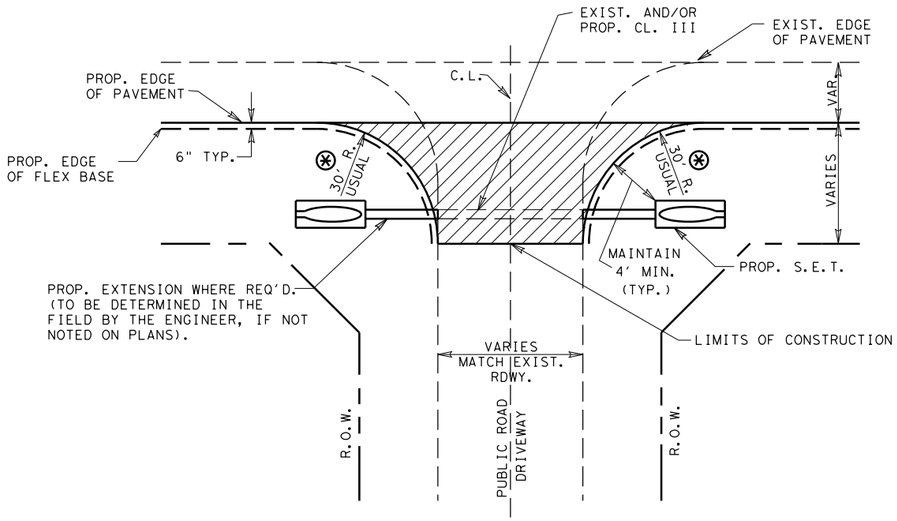
DRIVEWAY2.DGN

FED. RD. DIV. NO.	PROJECT NO.		FILE NO.			SHEET NO.
6						140
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	0860	02	015	FM490



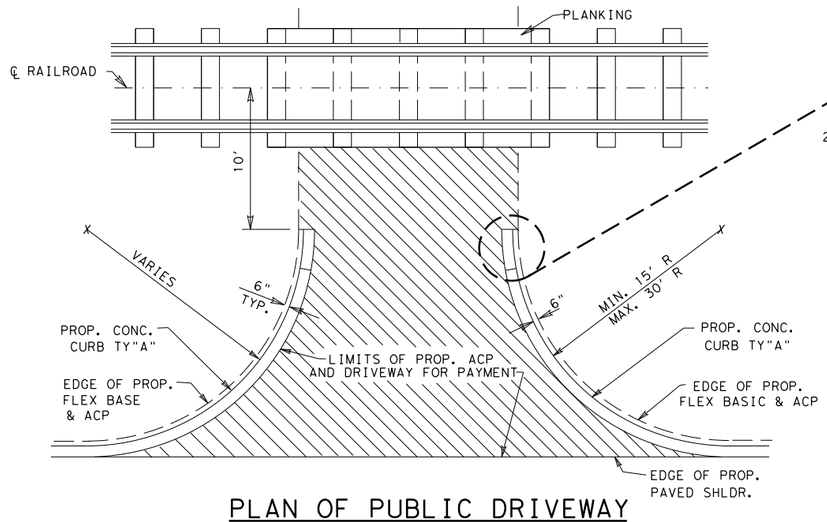
TYPICAL DETAIL

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

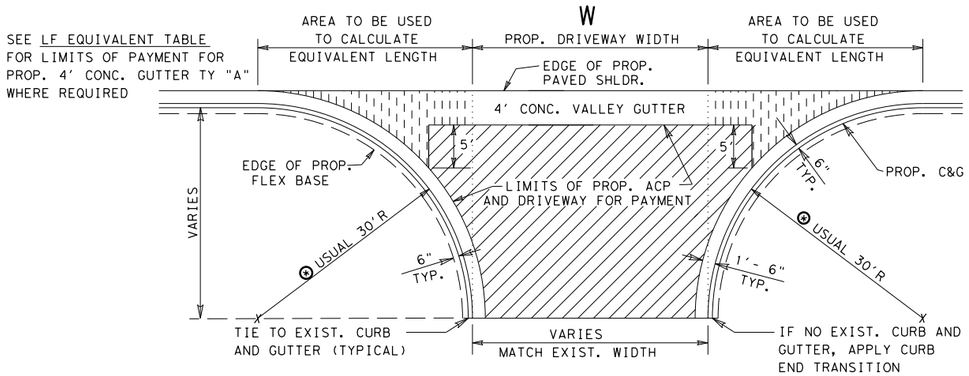


TYPICAL DETAIL

(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

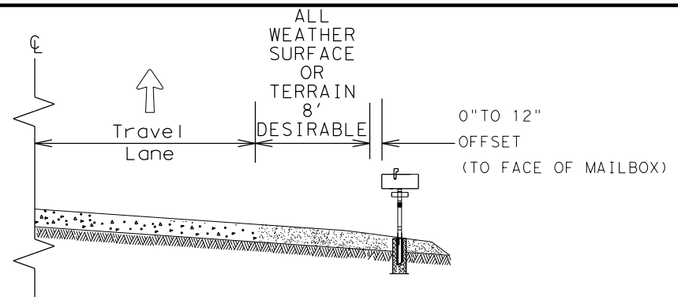
DRIVEWAY DETAILS PUBLIC (COUNTY ROAD-CITY STREET)

REV. 8/22

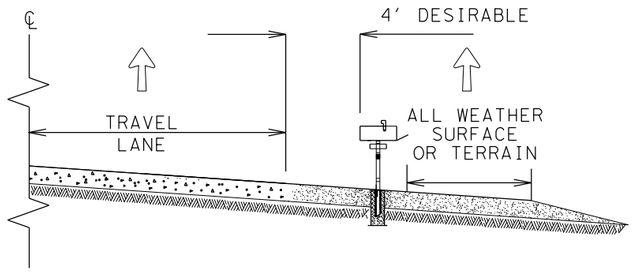
DRIVEWAY3.DGN

FED. RD. DIV. NO.	STATE AID PROJECT NO.	FILE NO.	SHEET NO.
6			141

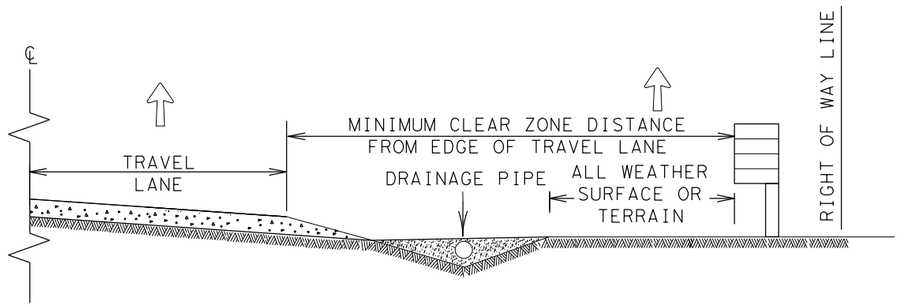
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	0860	02	015	FM 490



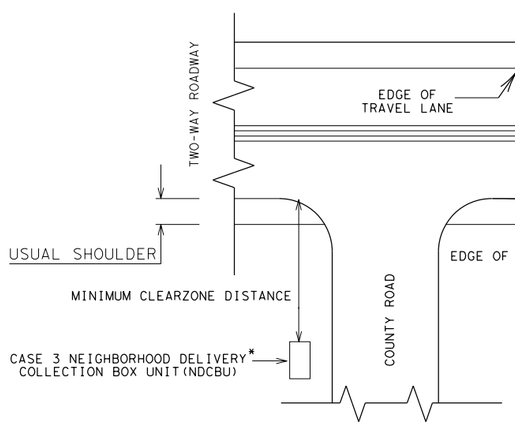
CASE 1. OFF TRAVEL WAY DELIVERY

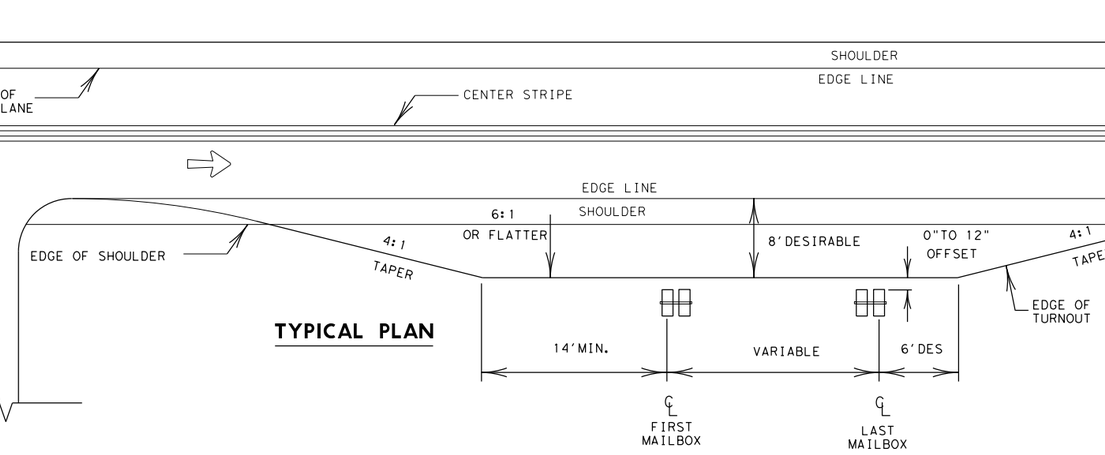


CASE 2. BACK SIDE DELIVERY

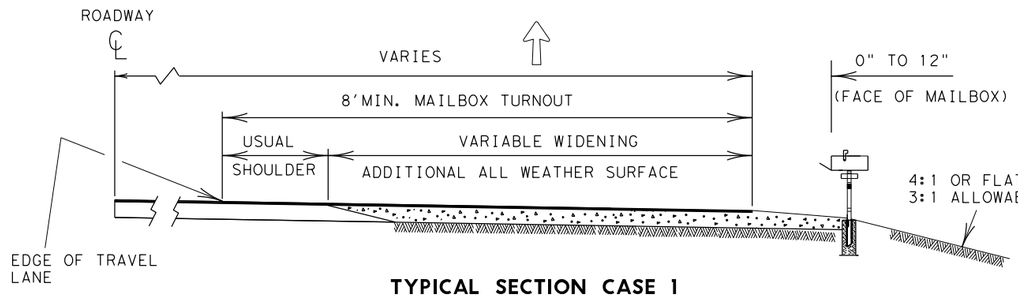


CASE 3. DELIVERY NEAR RIGHT OF WAY LINE





TYPICAL PLAN



TYPICAL SECTION CASE 1

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. WHEN 3 OR MORE MULTI-RACKS ARE ANTICIPATED, THE USE OF AN NDCBU IS RECOMMENDED. ONLY RURAL PATRONS LOCATED ON STATE MAINTAINED HIGHWAYS MAY HAVE A MAILBOX OR NDCBU SLOT ON TXDOT RIGHT OF WAY.

* NDCBU MAY BE INSTALLED ON COUNTY ROAD ROW WITH APPROVAL OF COUNTY.

MAIL DELIVERY VEHICLE TRAVEL DIRECTION

Texas Department of Transportation | Maintenance Division Standard

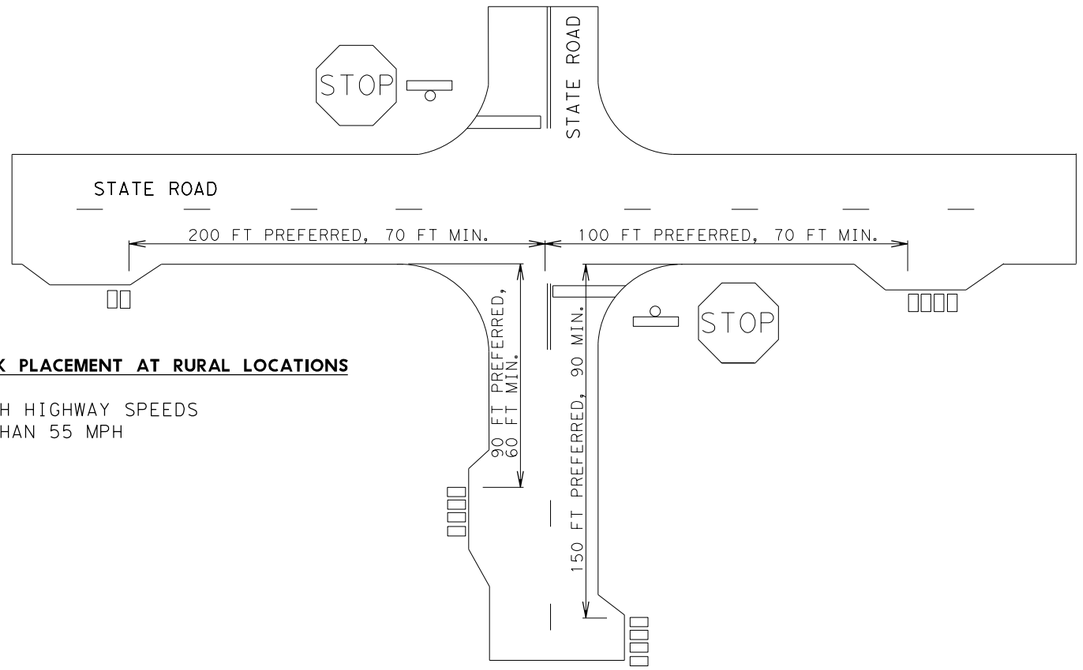
MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS

MBP(1)-22

FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/2012 5/2014	0860	02	015	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		142

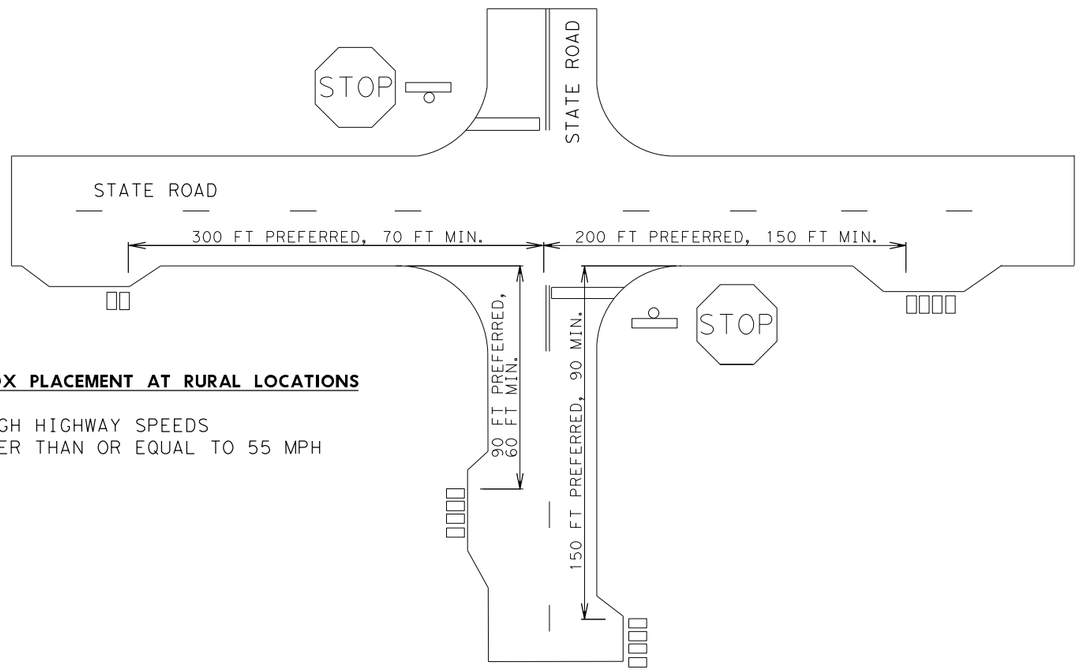
DATE:
FILE:

DATE:
FILE:



MAILBOX PLACEMENT AT RURAL LOCATIONS

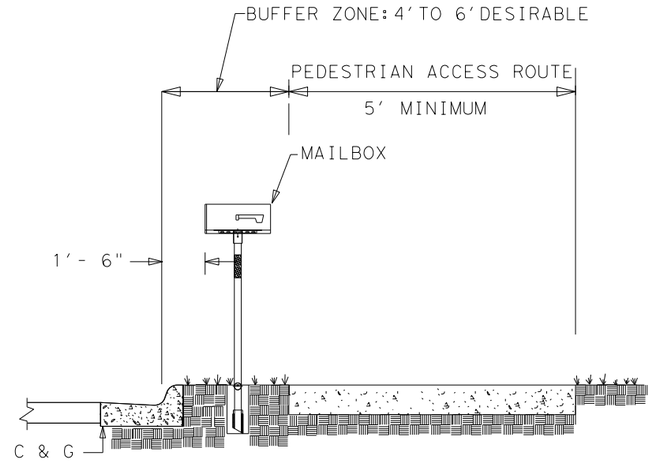
THROUGH HIGHWAY SPEEDS
LESS THAN 55 MPH



MAILBOX PLACEMENT AT RURAL LOCATIONS

THROUGH HIGHWAY SPEEDS
GREATER THAN OR EQUAL TO 55 MPH

CURB AND GUTTER MAILBOX INSTALLATION



NOTES:
1. A NON-TRAVERSABLE SURFACE MUST BE INSTALLED NEAR THE MAILBOX (NATURAL VEGETATION OR OTHER) IN THE BUFFER ZONE. ALTERNATIVELY, A BASE WITH A MINIMUM HEIGHT OF 2.5 INCHES MAY BE INSTALLED SO THAT THE EDGE OF THE MAILBOX DOES NOT EXTEND OUT MORE THAN 4 INCHES HORIZONTALLY BEYOND THE BASE.

2. THE SIDEWALK WIDTH MAY BE REDUCED TO 4 FOOT FOR SHORT DISTANCES AROUND THE MAILBOX IF NEEDED.

3. MAINTAIN A MINIMUM OF 5 FEET BETWEEN OBSTRUCTIONS IN THE PEDESTRIAN ACCESS ROUTE.

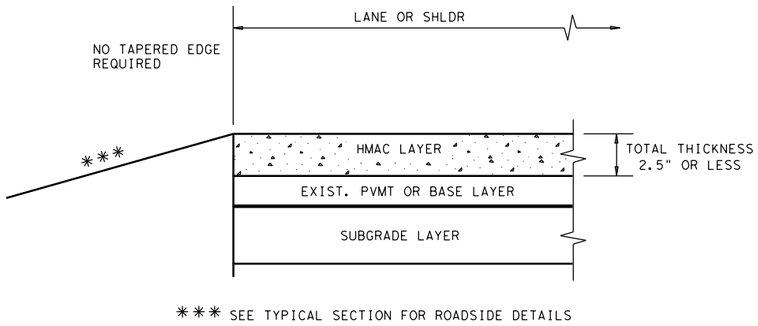
Texas Department of Transportation | Maintenance Division Standard

MAILBOX PLACEMENT CURBS & INTERSECTIONS

MBP(2)-22

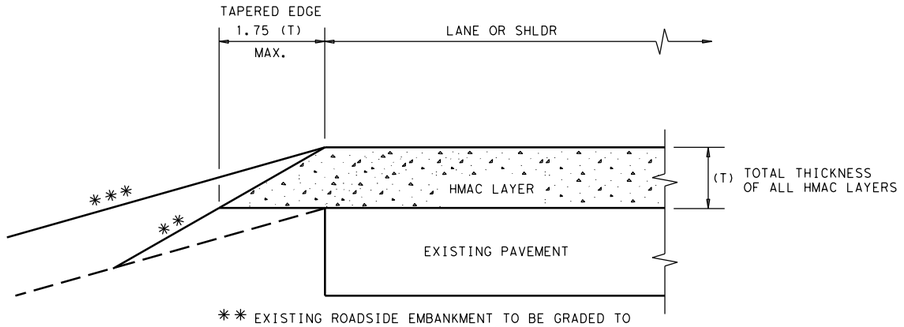
FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/2012 5/2014	0860	02	015	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		143

DATE:
FILE:



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



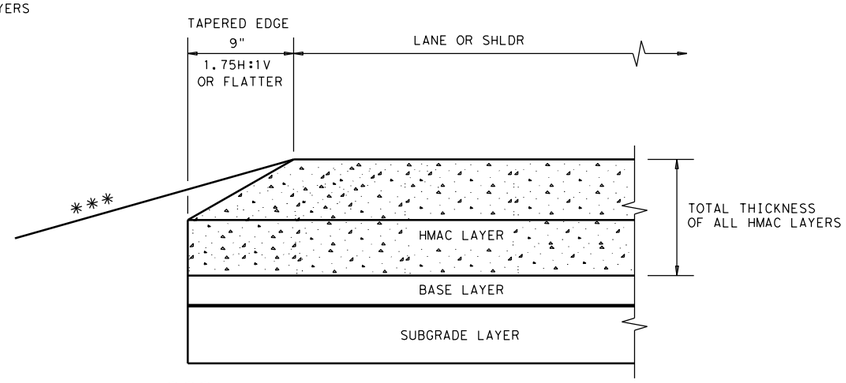
** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

*** 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: 144		DN: TxDOT	CK: RL	DW: KB		CK:	
©TxDOT January 2011		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0860	02	015		FM490	
		DIST	COUNTY			SHEET NO.	
		PHR	WILLACY			144	

CK
DW
CK
DW

NOTES:

1. *CALCULATIONS ARE BASED ON TxDOT HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019) PROCEDURES FOR THE RATIONAL METHOD WITH Tc DETERMINED BY THE NRCS METHOD.*

Coeff.	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR
e	0.8307	0.8113	0.7995	0.7852	0.7741	0.7635
b (in.)	64.7290	80.9170	92.4311	106.4069	115.4019	124.3950
d (mln)	12.6888	12.6941	12.6314	12.4838	12.2128	12.1456

				2-YEAR		5-YEAR		10-YEAR		25-YEAR		50-YEAR		100-YEAR	
DA I.D.	C	A (acres)	T_c (mln)	I_2 (In/hr)	Q_2 (cfs)	I_5 (In/hr)	Q_5 (cfs)	I_{10} (In/hr)	Q_{10} (cfs)	I_{25} (In/hr)	Q_{25} (cfs)	I_{50} (In/hr)	Q_{50} (cfs)	I_{100} (In/hr)	Q_{100} (cfs)
N-1	0.42	0.15	10.00	4.84	0.31	6.43	0.41	7.63	0.49	9.24	0.59	10.47	0.67	11.69	0.75
N-2	0.59	0.44	10.00	4.84	1.26	6.43	1.67	7.63	1.99	9.24	2.40	10.47	2.72	11.69	3.04
N-3	0.64	0.33	10.00	4.84	1.01	6.43	1.33	7.63	1.59	9.24	1.92	10.47	2.17	11.69	2.43
N-4	0.58	0.24	10.00	4.84	0.66	6.43	0.88	7.63	1.04	9.24	1.26	10.47	1.43	11.69	1.60
N-5	0.50	0.60	18.11	3.75	1.12	5.02	1.50	5.98	1.79	7.25	2.17	8.23	2.46	9.21	2.75
N-6	0.53	0.27	14.90	4.11	0.60	5.48	0.80	6.53	0.95	7.91	1.15	8.97	1.31	10.03	1.46
N-7	0.43	0.92	16.19	3.96	1.58	5.28	2.10	6.29	2.51	7.63	3.04	8.65	3.45	9.68	3.85
N-8	0.52	0.30	15.38	4.06	0.64	5.41	0.85	6.44	1.02	7.80	1.23	8.85	1.40	9.90	1.56
N-9	0.59	0.41	10.00	4.84	1.16	6.43	1.54	7.63	1.83	9.24	2.21	10.47	2.51	11.69	2.80
N-10	0.62	0.11	10.00	4.84	0.34	6.43	0.45	7.63	0.54	9.24	0.65	10.47	0.74	11.69	0.82
N-11	0.61	0.35	10.00	4.84	1.05	6.43	1.39	7.63	1.65	9.24	2.00	10.47	2.27	11.69	2.53
N-12	0.62	0.13	10.00	4.84	0.40	6.43	0.53	7.63	0.63	9.24	0.76	10.47	0.86	11.69	0.96
N-13	0.60	0.05	10.00	4.84	0.13	6.43	0.17	7.63	0.21	9.24	0.25	10.47	0.28	11.69	0.32
N-14	0.61	0.15	10.00	4.84	0.45	6.43	0.59	7.63	0.70	9.24	0.85	10.47	0.96	11.69	1.08
N-15	0.60	0.72	10.00	4.84	2.09	6.43	2.78	7.63	3.30	9.24	4.00	10.47	4.53	11.69	5.06
N-16	0.61	0.45	10.00	4.84	1.32	6.43	1.75	7.63	2.08	9.24	2.51	10.47	2.85	11.69	3.18
N-17	0.60	0.25	10.00	4.84	0.73	6.43	0.98	7.63	1.16	9.24	1.40	10.47	1.59	11.69	1.77
N-18	0.59	1.23	10.00	4.84	3.50	6.43	4.64	7.63	5.51	9.24	6.67	10.47	7.56	11.69	8.44
N-19	0.60	1.05	10.11	4.82	3.02	6.40	4.01	7.60	4.77	9.20	5.77	10.43	6.54	11.64	7.30
N-20	0.58	0.15	10.00	4.84	0.42	6.43	0.56	7.63	0.66	9.24	0.80	10.47	0.90	11.69	1.01
N-21	0.58	1.33	10.00	4.84	3.74	6.43	4.97	7.63	5.90	9.24	7.14	10.47	8.09	11.69	9.04
N-22	0.60	0.58	10.00	4.84	1.67	6.43	2.22	7.63	2.64	9.24	3.19	10.47	3.62	11.69	4.04
N-23	0.60	1.72	17.14	3.86	3.97	5.15	5.30	6.13	6.31	7.44	7.66	8.44	8.69	9.44	9.72
N-24	0.63	0.02	10.00	4.84	0.06	6.43	0.07	7.63	0.09	9.24	0.11	10.47	0.12	11.69	0.14
N-25	0.67	0.08	10.00	4.84	0.26	6.43	0.35	7.63	0.41	9.24	0.50	10.47	0.57	11.69	0.63
N-26	0.54	0.05	10.00	4.84	0.14	6.43	0.18	7.63	0.21	9.24	0.26	10.47	0.29	11.69	0.33
N-27	0.60	1.21	16.31	3.95	2.89	5.27	3.85	6.27	4.58	7.61	5.56	8.62	6.30	9.65	7.05
N-28	0.56	0.68	10.00	4.84	1.84	6.43	2.45	7.63	2.91	9.24	3.52	10.47	3.99	11.69	4.45
N-29	0.55	0.76	10.00	4.84	2.03	6.43	2.70	7.63	3.20	9.24	3.87	10.47	4.39	11.69	4.90
N-30	0.80	0.07	10.00	4.84	0.27	6.43	0.35	7.63	0.42	9.24	0.51	10.47	0.58	11.69	0.64
N-31	0.61	0.54	10.00	4.84	1.58	6.43	2.10	7.63	2.50	9.24	3.02	10.47	3.42	11.69	3.82

				2-YEAR		5-YEAR		10-YEAR		25-YEAR		50-YEAR		100-YEAR	
DA I.D.	C	A (acres)	T_c (mln)	I_2 (In/hr)	Q_2 (cfs)	I_5 (In/hr)	Q_5 (cfs)	I_{10} (In/hr)	Q_{10} (cfs)	I_{25} (In/hr)	Q_{25} (cfs)	I_{50} (In/hr)	Q_{50} (cfs)	I_{100} (In/hr)	Q_{100} (cfs)
S-1	0.53	0.73	10.00	4.84	1.89	6.43	2.51	7.63	2.98	9.24	3.61	10.47	4.09	11.69	4.56
S-2	0.54	0.88	10.00	4.84	2.30	6.43	3.05	7.63	3.63	9.24	4.39	10.47	4.97	11.69	5.55
S-3	0.49	0.79	21.66	3.43	1.31	4.59	1.76	5.48	2.10	6.65	2.55	7.55	2.89	8.46	3.24
S-4	0.53	0.63	12.35	4.46	1.50	5.93	2.00	7.05	2.38	8.54	2.88	9.68	3.26	10.82	3.65
S-5	0.47	0.52	12.50	4.44	1.07	5.90	1.42	7.02	1.69	8.50	2.05	9.64	2.32	10.77	2.60
S-6	0.62	0.05	10.00	4.84	0.14	6.43	0.19	7.63	0.23	9.24	0.28	10.47	0.31	11.69	0.35
S-7	0.33	2.69	29.31	2.90	2.54	3.90	3.41	4.66	4.08	5.68	4.97	6.45	5.64	7.24	6.33
S-8	0.51	1.29	28.02	2.98	1.96	4.00	2.63	4.78	3.14	5.82	3.82	6.61	4.34	7.42	4.88
S-9	0.51	0.30	10.00	4.84	0.73	6.43	0.97	7.63	1.16	9.24	1.40	10.47	1.59	11.69	1.77
S-10	0.51	0.16	32.15	2.75	0.23	3.70	0.31	4.42	0.37	5.39	0.45	6.13	0.51	6.88	0.57
S-11	0.31	4.65	29.53	2.89	4.20	3.88	5.65	4.64	6.75	5.65	8.22	6.42	9.34	7.21	10.49
S-12	0.61	0.73	10.00	4.84	2.15	6.43	2.86	7.63	3.39	9.24	4.10	10.47	4.65	11.69	5.19
S-13	0.60	0.22	10.00	4.84	0.65	6.43	0.87	7.63	1.03	9.24	1.25	10.47	1.41	11.69	1.58
S-14	0.61	0.97	10.00	4.84	2.85	6.43	3.78	7.63	4.49	9.24	5.43	10.47	6.16	11.69	6.88
S-15	0.59	0.12	10.00	4.84	0.33	6.43	0.44	7.63	0.53	9.24	0.64	10.47	0.72	11.69	0.80
S-16	0.56	0.08	10.00	4.84	0.21	6.43	0.27	7.63	0.33	9.24	0.39	10.47	0.45	11.69	0.50
S-17	0.59	0.96	10.00	4.84	2.74	6.43	3.64	7.63	4.32	9.24	5.23	10.47	5.92	11.69	6.61
S-18	0.36	2.45	49.67	2.09	1.83	2.83	2.48	3.40	2.98	4.16	3.65	4.74	4.16	5.34	4.68
S-19	0.63	0.17	10.00	4.84	0.54	6.43	0.71	7.63	0.84	9.24	1.02	10.47	1.16	11.69	1.29
S-20	0.32	8.34	39.83	2.41	6.35	3.25	8.57	3.90	10.26	4.76	12.53	5.41	14.26	6.09	16.04
S-21	0.32	7.76	51.11	2.05	5.05	2.78	6.84	3.34	8.21	4.08	10.05	4.65	11.45	5.24	12.91
S-22	0.32	2.20	62.54	1.79	1.27	2.43	1.73	2.92	2.08	3.59	2.55	4.09	2.91	4.62	3.28
S-23	0.55	0.75	10.00	4.84	2.02	6.43	2.68	7.63	3.18	9.24	3.85	10.47	4.36	11.69	4.87
S-24	0.52	0.70	10.00	4.84	1.77	6.43	2.35	7.63	2.79	9.24	3.38	10.47	3.83	11.69	4.28
S-25	0.49	1.65	48.40	2.13	1.72	2.88	2.33	3.45	2.79	4.22	3.42	4.81	3.89	5.42	4.39
S-26	0.76	0.04	10.00	4.84	0.16	6.43	0.21	7.63	0.25	9.24	0.30	10.47	0.34	11.69	0.38
S-27	0.31	13.66	24.66	3.20	13.74	4.29	18.43	5.12	22.00	6.23	26.75	7.07	30.37	7.93	34.07
S-28	0.55	0.86	23.30	3.30	1.55	4.42	2.08	5.27	2.48	6.41	3.01	7.28	3.42	8.16	3.83

PIPE I.D.	PIPE STATION	PIPE BARREL NO.	ROAD CROWN ELEV (FT)	PIPE DIA. (IN)	PIPE LENGTH (FT)	PIPE UPSTREAM INVERT ELEV (FT)	PIPE DOWNSTREAM INVERT ELEV (FT)	PIPE SLOPE (FT/FT)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)	HEADWATER ELEVATION (FT)				TAILWATER ELEVATION (FT)				TAILWATER VELOCITY (FT/S)			
													Q5	Q10	Q25	Q100	Q5	Q10	Q25	Q100	Q5	Q10	Q25	Q100
X-1	12+83.04	1	48.69	18	60.9	44.39	44.24	0.0025	6.60	7.85	9.50	12.04	45.96	46.17	46.54	47.20	44.73	44.76	44.80	44.85	5.50	5.75	6.03	6.39
X-2	14+48.96	1	49.68	18	56.1	43.03	42.94	0.0016	3.05	3.63	4.39	5.55	44.03	44.13	44.26	44.45	43.53	43.57	43.62	43.68	1.55	1.62	1.70	1.80
X-3	16+98.58	1	50.67	18	51.4	44.77	44.43	0.0066	2.30	2.74	3.32	4.22	45.56	45.65	45.75	45.90	44.95	44.98	45.02	45.08	1.28	1.34	1.41	1.50
X-4	25+48.88	1	46.59	18	51.6	43.08	42.68	0.0078	4.95	5.89	7.13	9.04	44.31	44.45	44.63	44.94	43.34	43.39	43.44	43.51	1.69	1.76	1.85	1.96
X-5	36+61.76	1	47.66	18	51.1	43.77	43.45	0.0063	5.12	6.08	7.36	9.31	45.03	45.16	45.35	45.35	43.68	43.70	43.72	43.74	1.87	1.95	2.04	2.17
X-6	65+49.45	1	44.18	24	52.0	40.78	40.40	0.0073	5.62	6.67	8.07	10.21	41.95	42.07	42.22	42.43	40.86	40.89	40.93	40.98	5.59	5.85	6.15	6.53
X-7	67+10.70	1	44.23	24	51.7	40.42	40.37	0.0010	5.65	6.75	8.22	10.49	41.68	41.81	41.97	42.21	40.93	40.96	41.01	41.07	4.52	4.78	5.10	5.55
X-8	111+27.69	1	44.25	24	51.9	40.01	39.93	0.0015	9.28	11.11	13.55	17.33	41.74	41.95	42.21	42.64	40.77	40.83	40.90	41.00	5.31	5.67	6.13	6.86
X-9	118+39.04	1	43.87	18	50.6	41.19	40.94	0.0049	5.37	6.40	7.77	9.86	42.53	42.68	42.88	43.23	41.23	41.25	41.27	41.30	4.90	5.24	5.71	6.45
X-10	144+51.65	1	46.30	24	63.8	40.34	39.32	0.0160	0.35	0.42	0.51	0.64	40.61	40.63	40.67	40.71	39.61	39.63	39.65	39.68	3.31	3.50	3.72	3.96

NOTES:

1. *DESIGN CRITERIA WAS ESTABLISHED IN ACCORDANCE WITH TXDOT'S HYDRAULIC DESIGN MANUAL, DATED SEPTEMBER 2019.*
2. *THE 25 YEAR DESIGN STORM REQUENCY WAS BASED ON A MINOR ROADWAY CLASSIFICATION. THE 100 YEAR STORM FREQUENCY WAS USED AS A CHECK STORM.*
3. *RAINFALL INTENSITIES WERE DERIVED FROM TXDOTS'S "EBDKLUP-2019-Vo6.2.10.XLSM" SPREADSHEET*
4. *THE TIME OF CONCENTRATION WAS DETERMINED USING THE NRCS METHOD.*
5. *THE MINIMUM TIME OF CONCENTRATION IS 10 MINUTES.*
6. *TOPOGRAPHY WAS DETERMINED UTILIZING THE FOLLOWING RESOURCES:*
   - *A. 1-FT CONTOURS: NCTCOG, DATED 2023*
   - *B. 2-FT CONTOURS: TNRIS, DATED 2023*

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER

01/31/2024

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 INPUT AND HYDRAULIC DATA

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		145

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FILE: $FILE$
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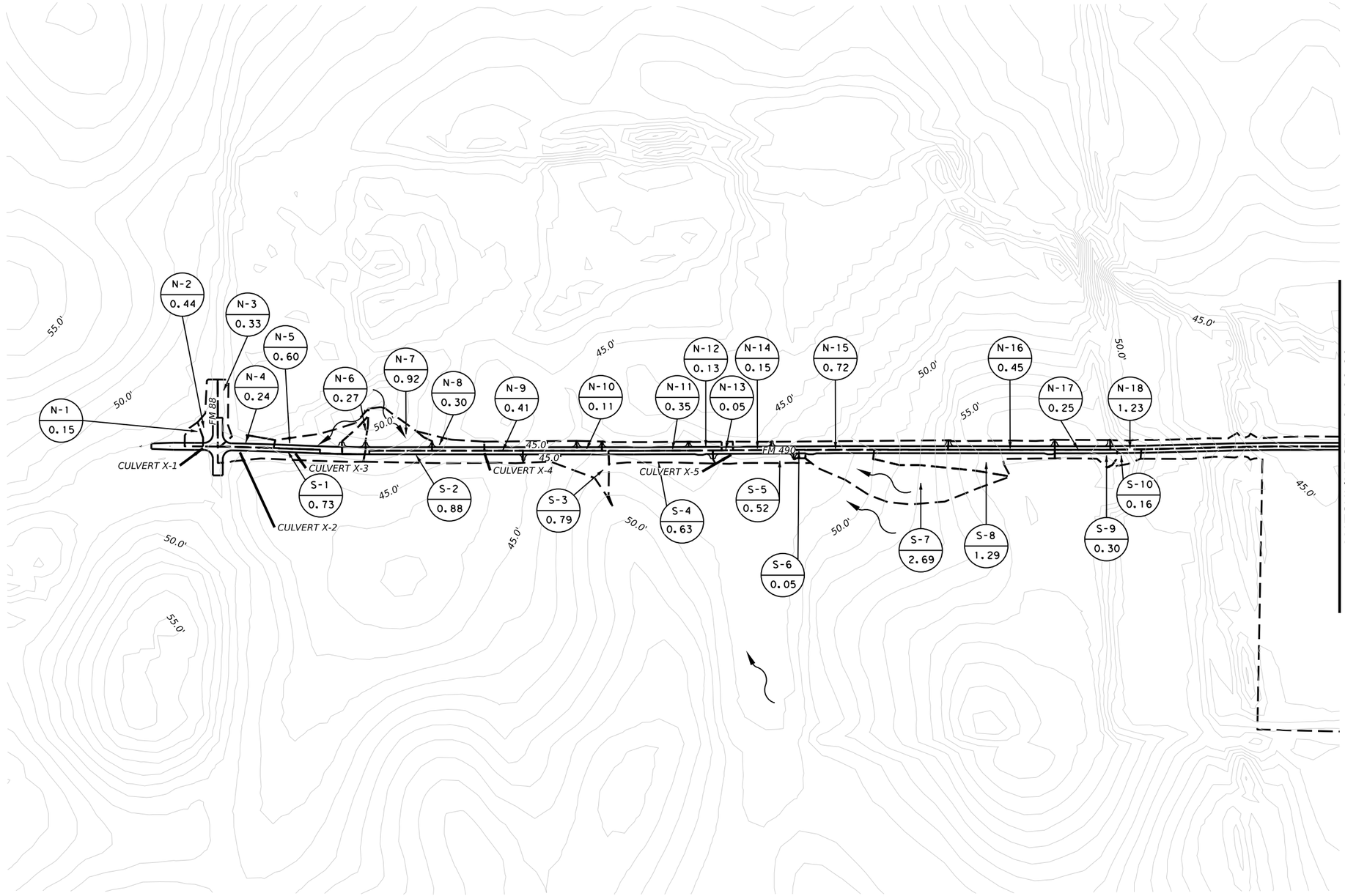
DW:
CK:
DN:



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HORIZ: 0 250 500
SCALE IN FEET

LEGEND

- XXX / X.XX — AREA IDENTIFIER / AREA (ACRES)
- MINOR DRAINAGE AREA BOUNDARY
- DRAINAGE FLOW
- CULVERT FLOW

STATE OF TEXAS
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BURNS McDONNELL
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DALLAS, TX. 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

FM 490

DRAINAGE AREA MAPS

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		146

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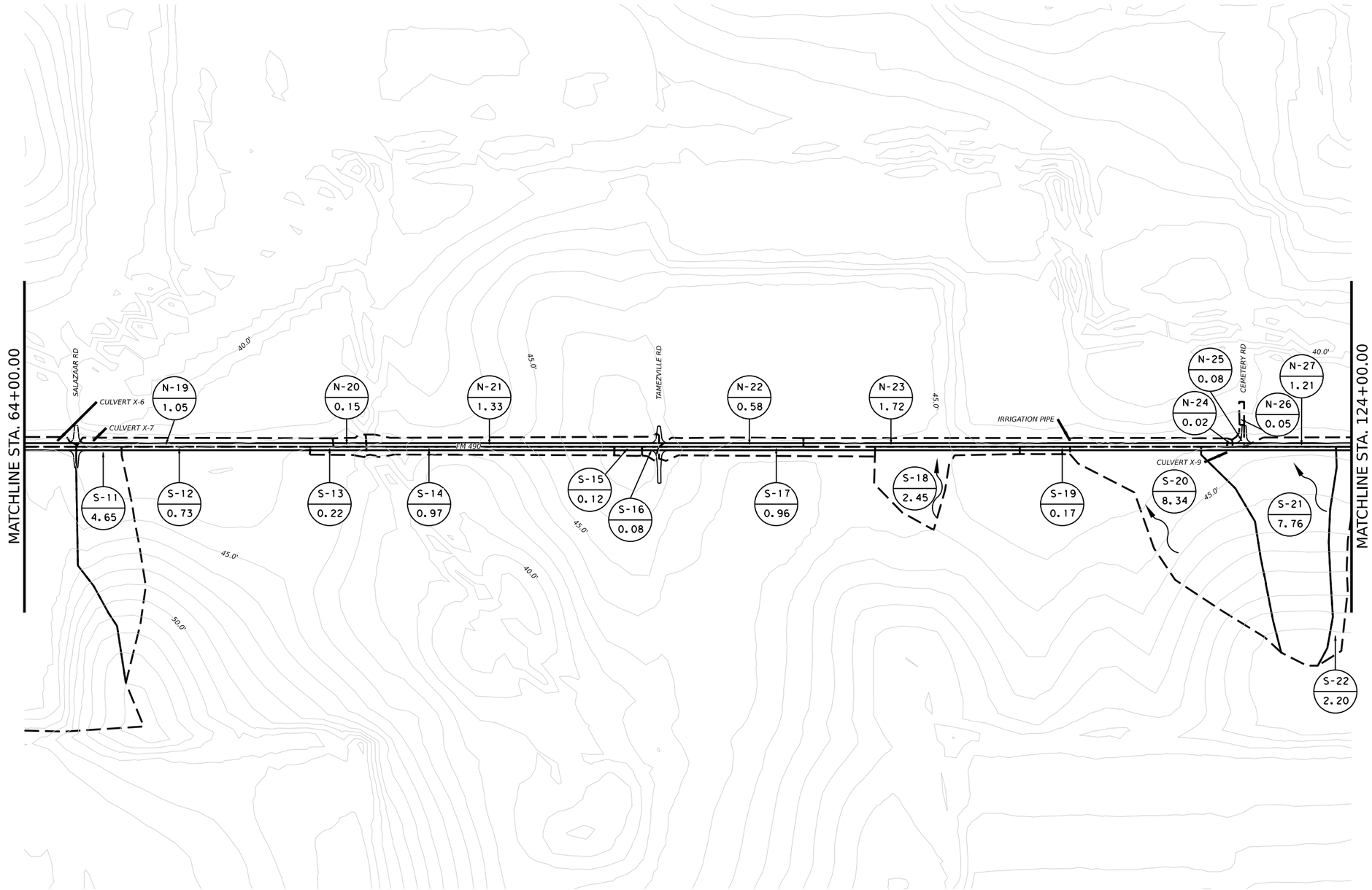

0 250 500
HORIZ:
SCALE IN FEET

LEGEND

XXX / X.XX — AREA IDENTIFIER / AREA (ACRES)

MINOR DRAINAGE AREA BOUNDARY

DRAINAGE FLOW

CULVERT FLOW

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DALLAS, TX. 75240
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Texas Department of Transportation

FM 490

DRAINAGE AREA MAPS

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		147

DATE:
FILE:
DATE TIME
DOCUMENT NAME

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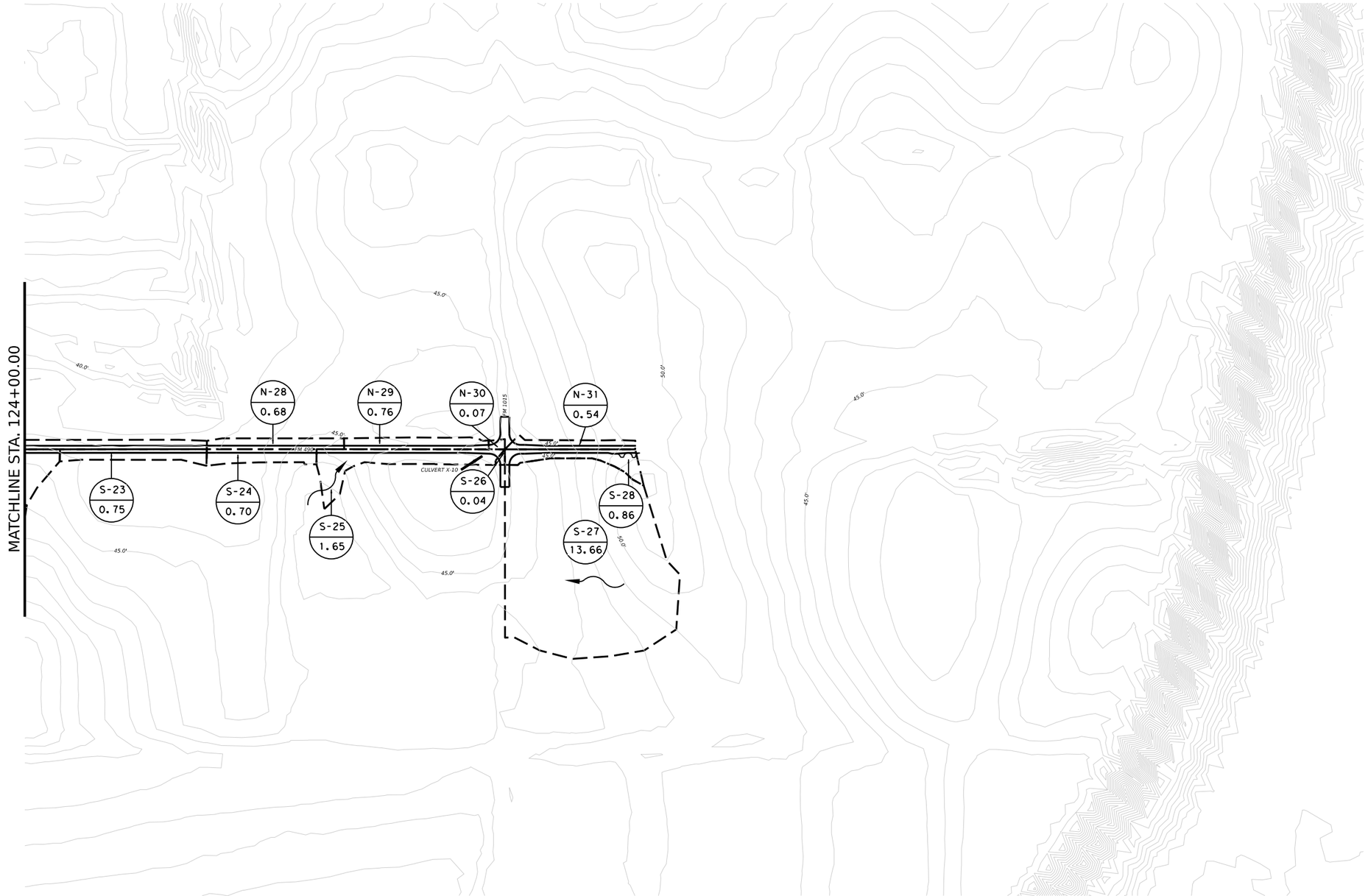
DW:
CK:
DW:



HORIZ: 0 250 500
SCALE IN FEET

LEGEND

XXX / X.XX — AREA IDENTIFIER / AREA (ACRES)

MINOR DRAINAGE AREA BOUNDARY

DRAINAGE FLOW

CULVERT FLOW

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Texas Department of Transportation

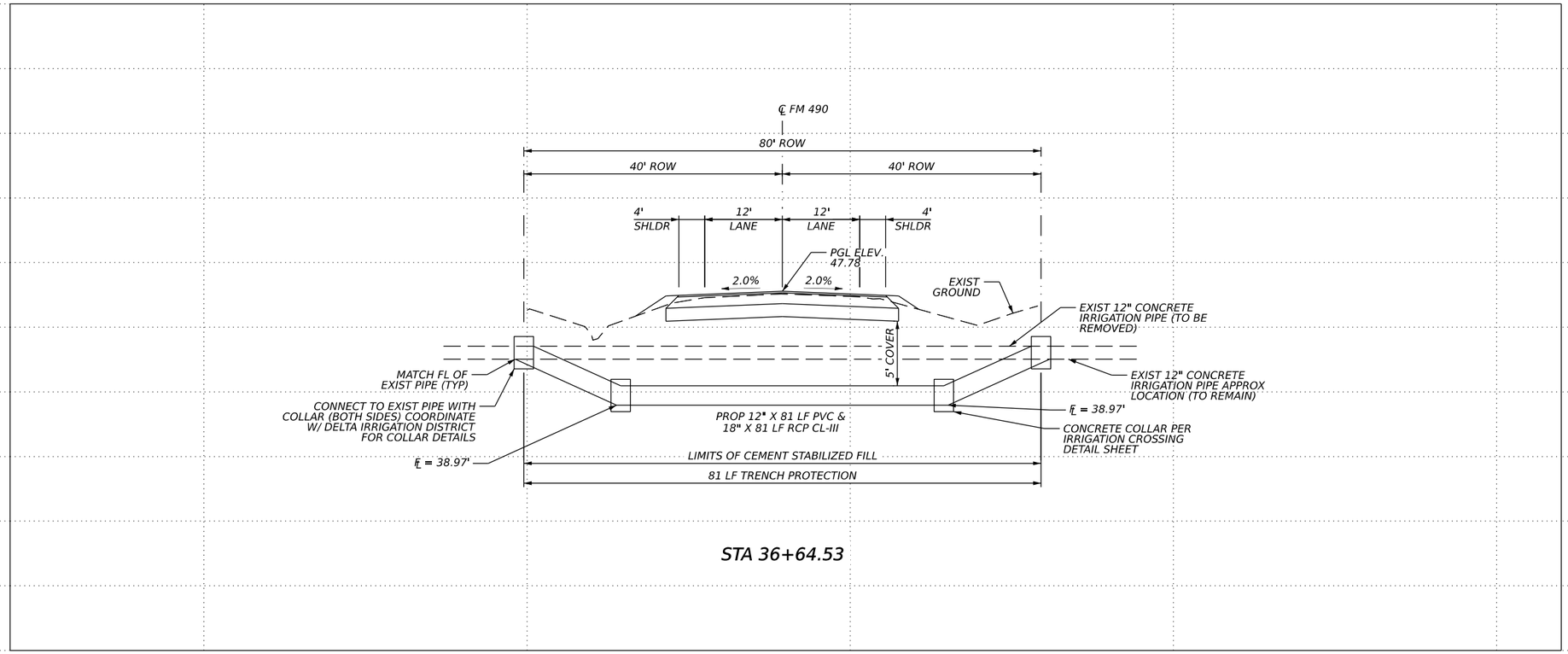
FM 490

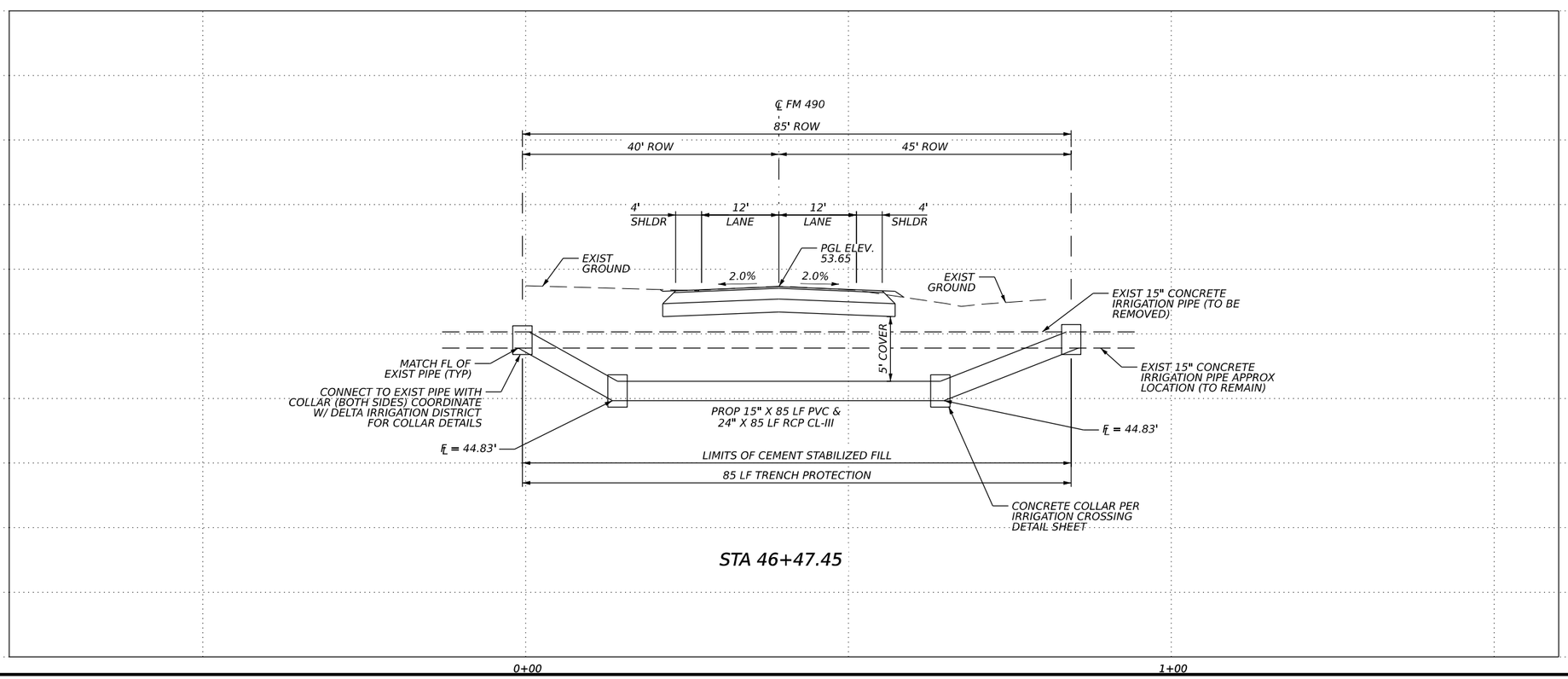
DRAINAGE AREA MAPS

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		148

DATE:
FILE:
DATE TIME
DOCUMENT NAME





IRRIGATION PIPE REPLACEMENT NOTES:

1. *COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT PRIOR TO PIPE SHUTDOWN. VERIFY ALIGNMENT AND ELEVATIONS OF EXISTING AND PROPOSED IRRIGATION PIPE PRIOR TO INSTALLATION.*
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.*
7. *IRRIGATION PIPE TIE IN LOCATION MAY BE ADJUSTED TO AVOID NEARBY UTILITIES. COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT.*
8. *N.T.S.*

STATE OF TEXAS
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01/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

IRRIGATION CROSSINGS

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		149

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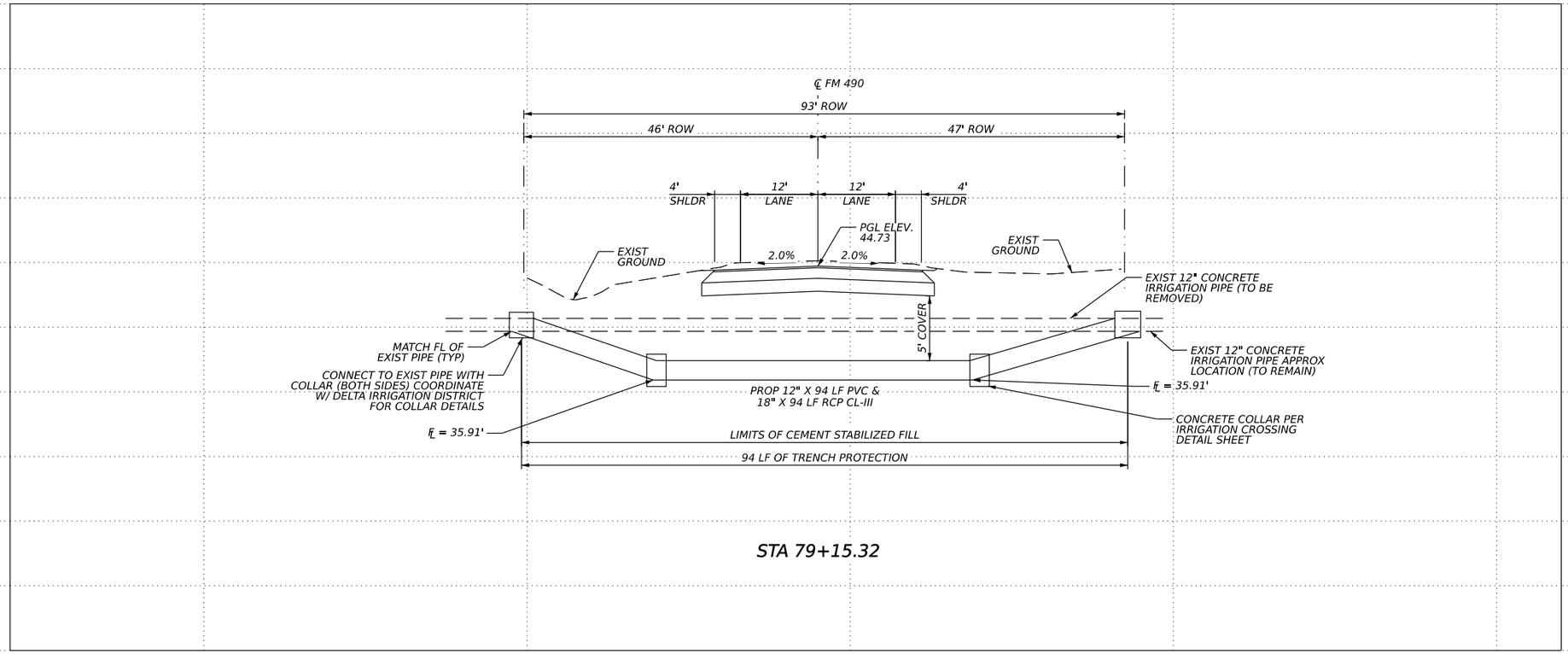

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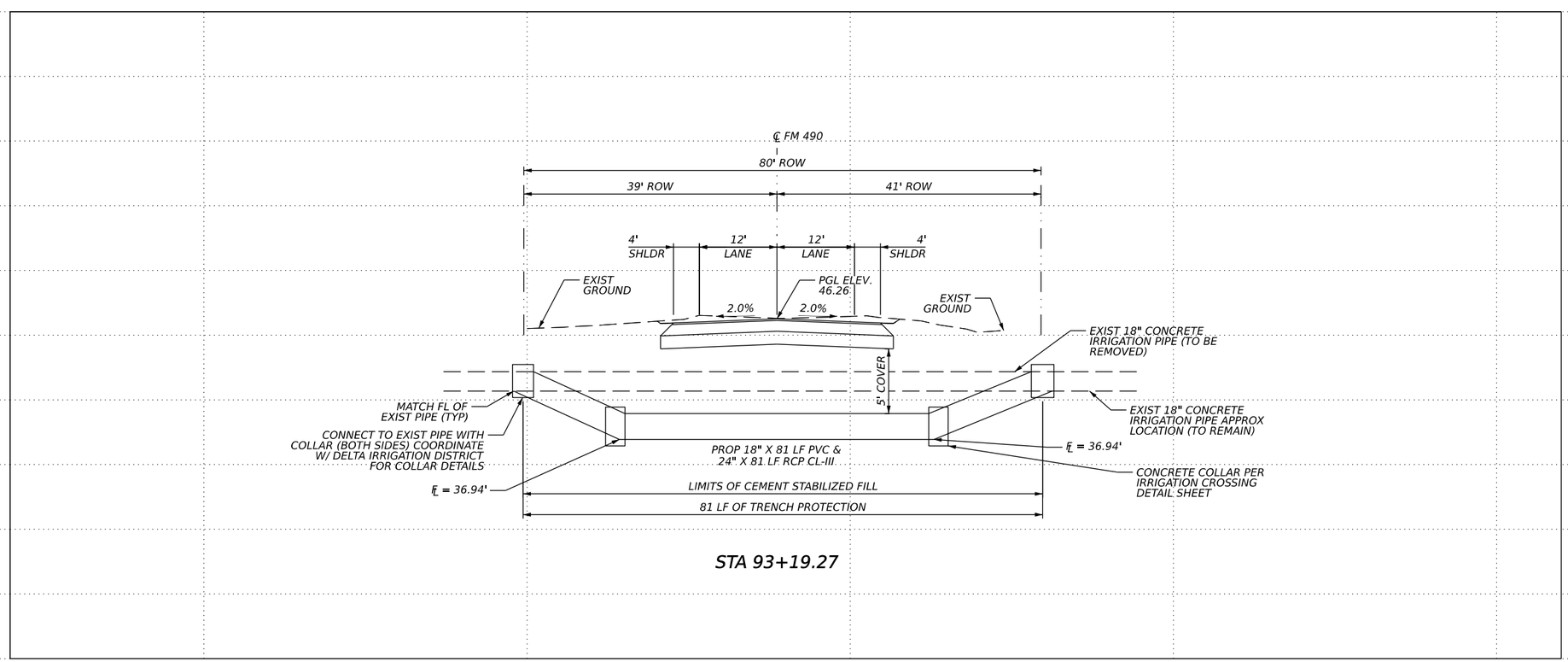


STA 93+19.27

IRRIGATION PIPE REPLACEMENT NOTES:

1. *COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT PRIOR TO PIPE SHUTDOWN. VERIFY ALIGNMENT AND ELEVATIONS OF EXISTING AND PROPOSED IRRIGATION PIPE PRIOR TO INSTALLATION.*
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.*
7. *IRRIGATION PIPE TIE IN LOCATION MAY BE ADJUSTED TO AVOID NEARBY UTILITIES. COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT.*
8. *N.T.S.*

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
01/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

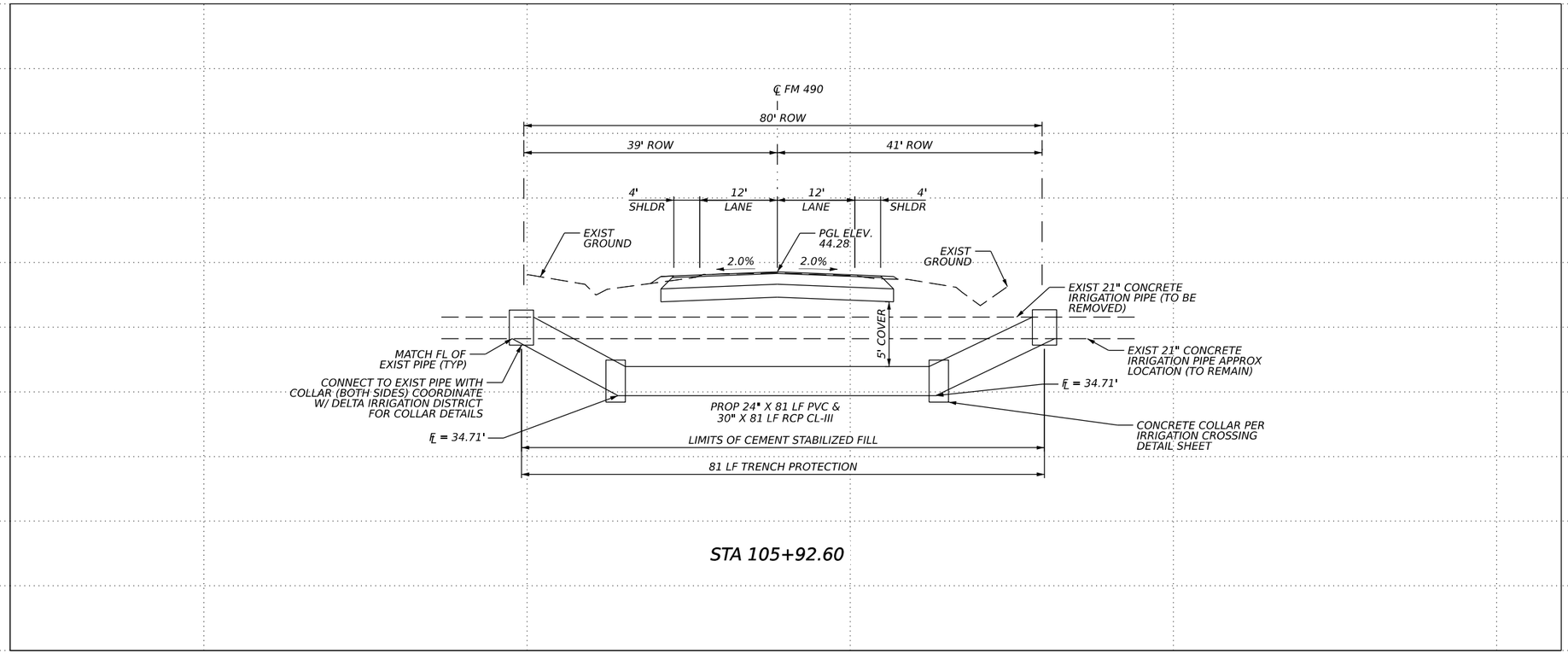
FM 490

IRRIGATION CROSSINGS

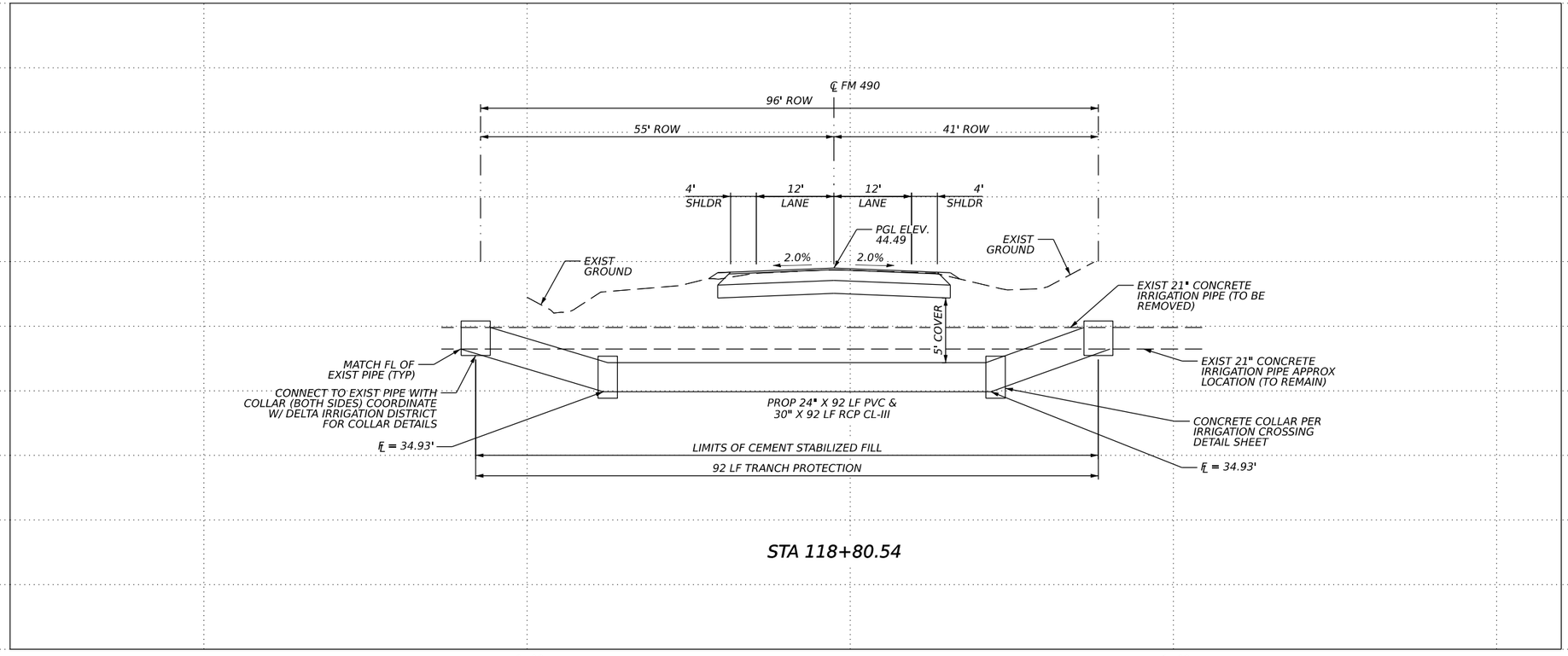
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		150

DATE: 1/31/2024
FILE: ...\Drainage\FM490-BMCD-IRR-02.dgn



STA 105+92.60



STA 118+80.54

IRRIGATION PIPE REPLACEMENT NOTES:

1. *COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT PRIOR TO PIPE SHUTDOWN. VERIFY ALIGNMENT AND ELEVATIONS OF EXISTING AND PROPOSED IRRIGATION PIPE PRIOR TO INSTALLATION.*
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.*
7. *IRRIGATION PIPE TIE IN LOCATION MAY BE ADJUSTED TO AVOID NEARBY UTILITIES. COORDINATE WITH DELTA LAKE IRRIGATION DISTRICT.*
8. *N.T.S.*

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
01/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

IRRIGATION CROSSINGS

SHEET 3 OF 3

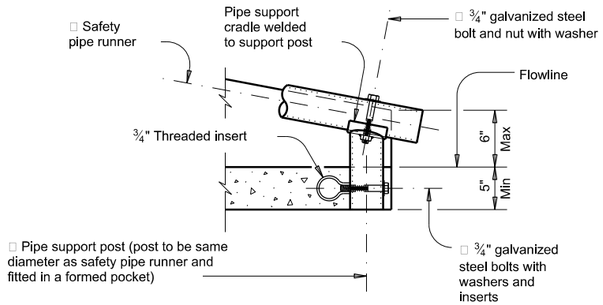
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		151

DATE: 1/31/2024
FILE: ...\Drainage\FM490-BMCD-IRR-03.dgn

DATE:
FILE:

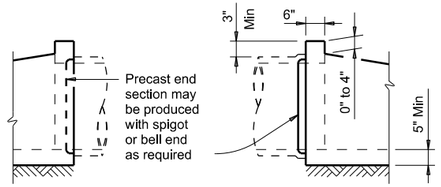
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe		Multiple Pipes	
						Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' - 11"	≤ 45°	No	≤ 45°	No
				4:1	3' - 6"				
				6:1	4' - 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
				4:1	4' - 7"				
				6:1	6' - 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' - 6"	≤ 45°	No	≤ 45°	No
				4:1	5' - 8"				
				6:1	8' - 0"				
24"	3"	1.95"	31.00"	3:1	6' - 2"	≤ 45°	No	= 30°	No
				4:1	7' - 10"			> 30°	Yes
				6:1	11' - 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' - 10"	= 15°	No	= 15°	No
				4:1	10' - 1"	> 15°	Yes	> 15°	Yes
				6:1	14' - 8"				
36"	4"	2.75"	45.50"	3:1	9' - 5"	= 0°	No	≥ 0°	Yes
				4:1	12' - 3"	> 0°	Yes		
				6:1	17' - 11"				
42"	4 ½"	2.7"	52.50"	3:1	11' - 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' - 5"				
				6:1	21' - 2"				



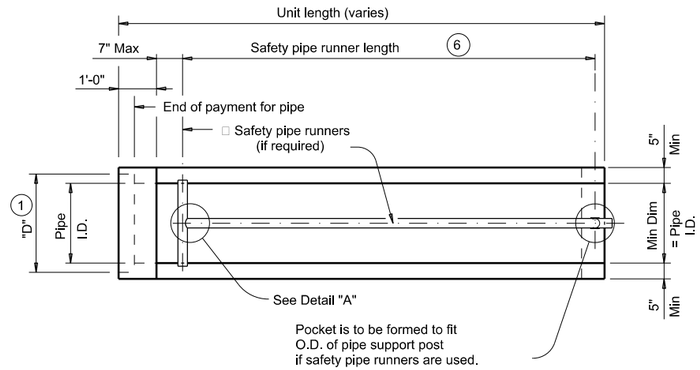
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



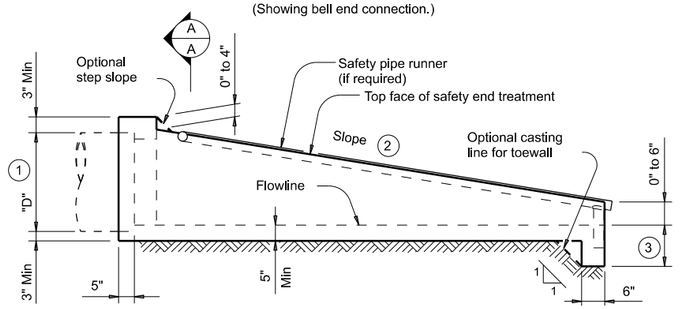
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



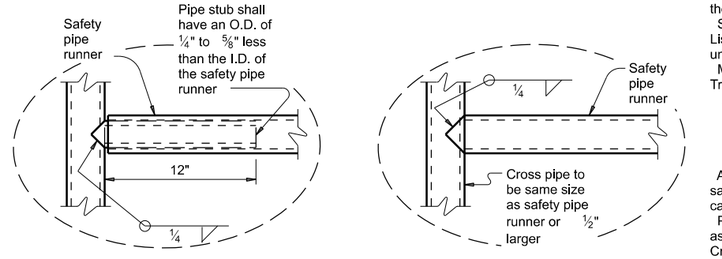
PLAN

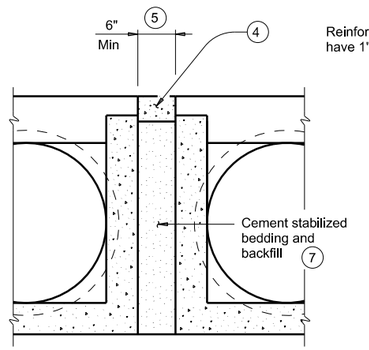
(Showing bell end connection.)



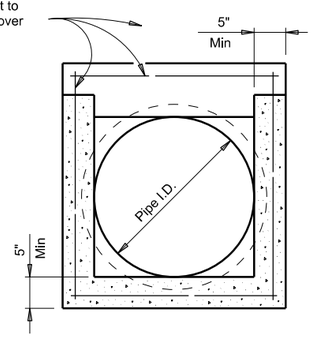
LONGITUDINAL ELEVATION

(Showing bell end connection.)

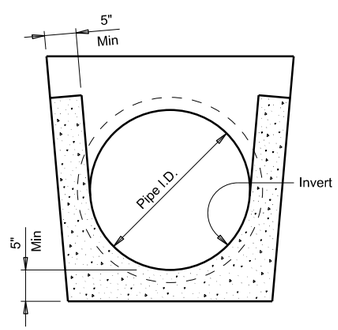




MULTIPLE PIPE INSTALLATION

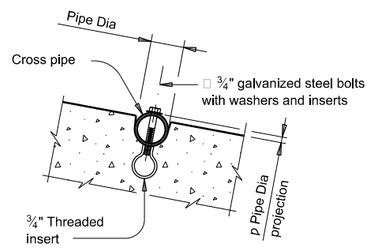


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 ½" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment."

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Measured along slope.

(7) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures." Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment." When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(8) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment."

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor, the next larger size of safety end treatment may be furnished as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe." Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

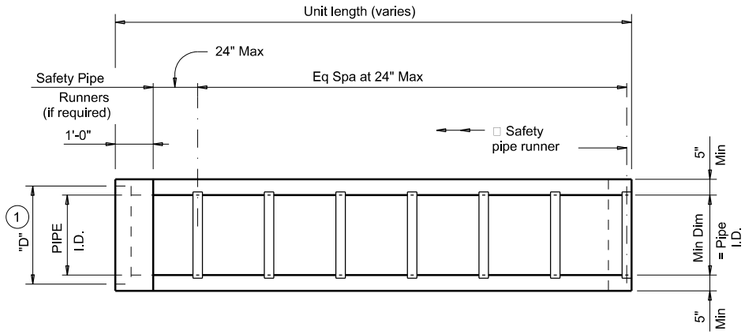
PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

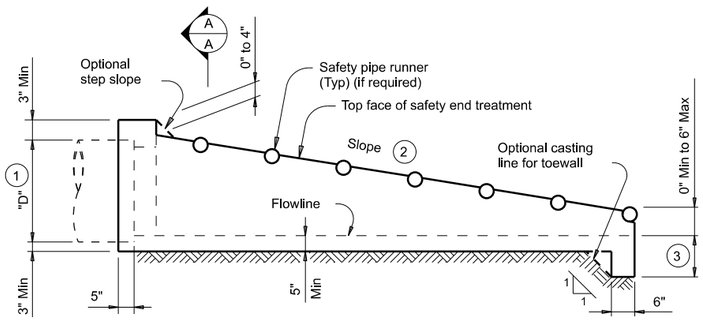
FILE:	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0860	02	015	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		152

DATE:
FILE:



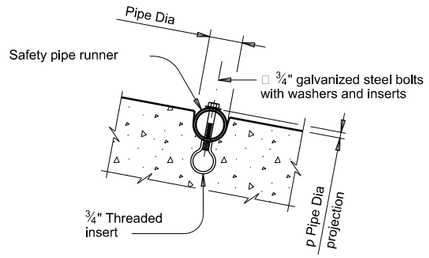
PLAN

(Showing bell end connection.)



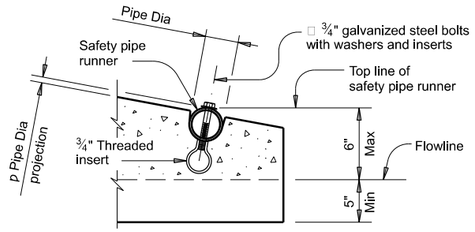
LONGITUDINAL ELEVATION

(Showing bell end connection.)

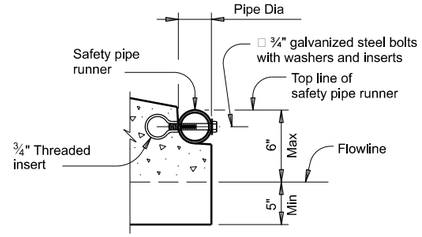


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



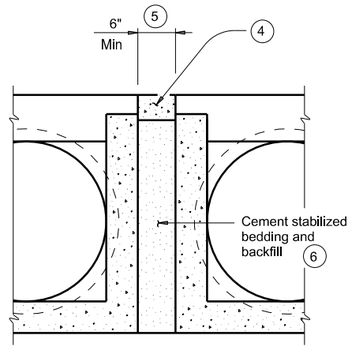
OPTION A



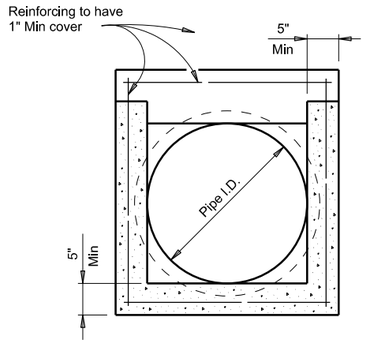
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

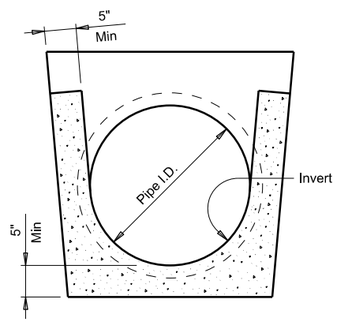
(If required)



MULTIPLE PIPE INSTALLATION

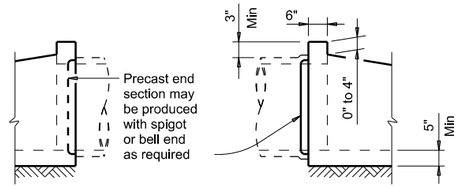


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (7)	"D" (1)	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' - 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	1.30"	20.50"	6:1	6' - 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	1.60"	24.00"	6:1	8' - 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' - 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	2.65"	38.50"	6:1	14' - 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' - 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	2.7"	52.50"	6:1	21' - 2"	Yes	Yes	4" STD	4.500"	4.026"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment."

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures." Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment." When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(7) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment."

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe." Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

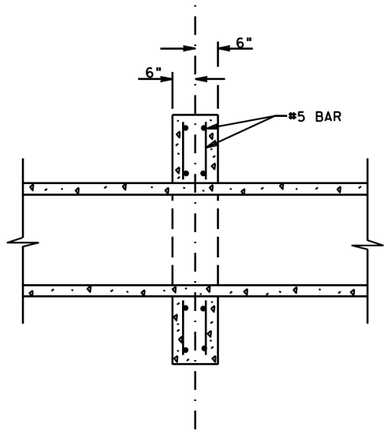
Bridge Division Standard

PRECAST SAFETY END TREATMENT

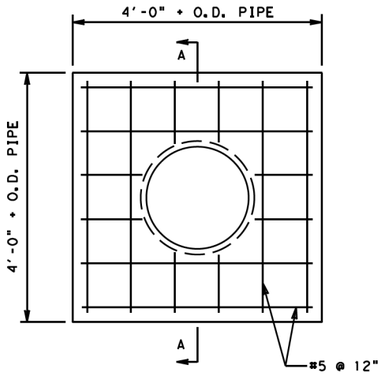
TYPE II ~ PARALLEL DRAINAGE

PSET-SP

FILE:	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0860	02	015	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		153

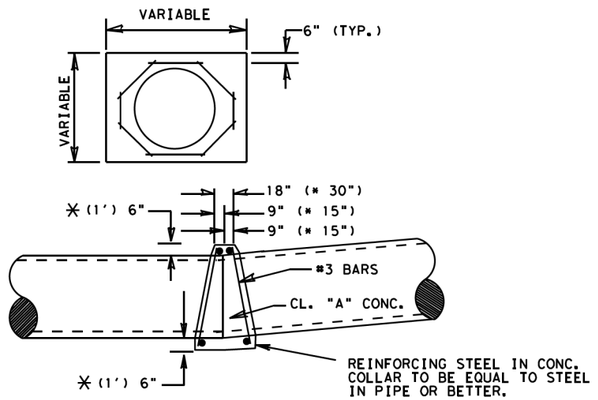


SECTION A-A



FRONT ELEVATION

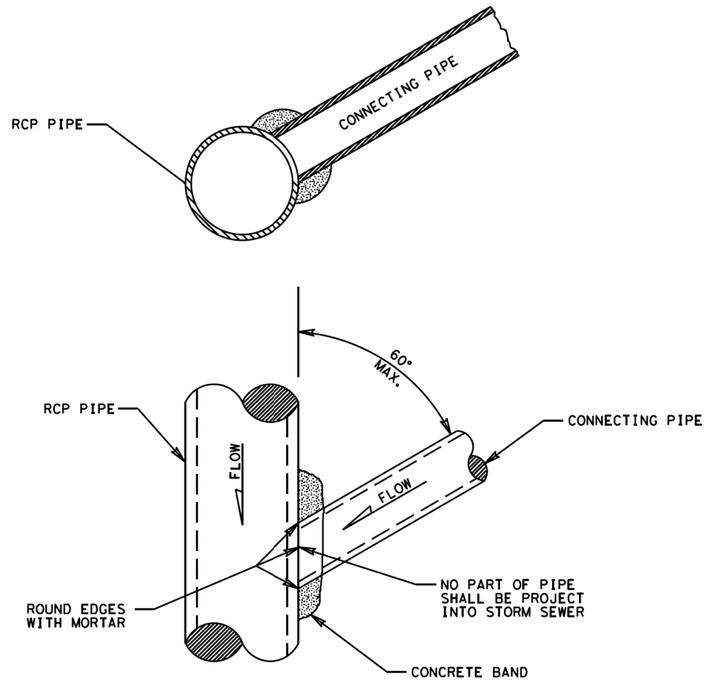
CONCRETE PIPE COLLAR



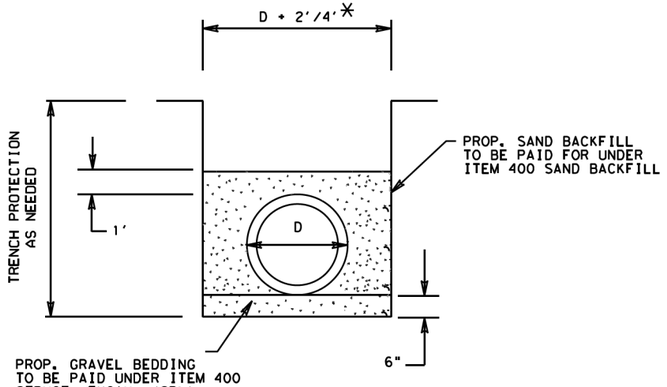
DETAIL FOR CONC. COLLARS DRAINAGE STRUCTURES AND PIPE SIPHONS (HORIZ. & VERT. BENDS)

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

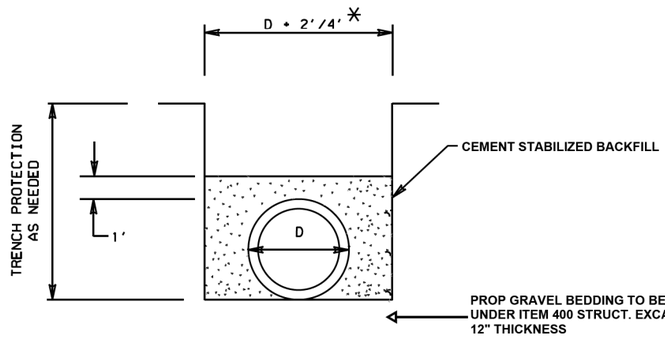


TYPICAL REINFORCED CONC. PIPE CONNECTION WITHOUT MANHOLE



* FOR PIPE 42" DIAMETER OR LESS PLACE 1'OF FILL ON EACH SIDE OF THE PIPE.
FOR PIPE LARGER THAN 42" DIAMETER PLACE 2' OF FILL ON EACH SIDE OF THE PIPE.

SPIRAL RIB CMP
TYPICAL BACKFILL DETAIL GRAVEL & SAND



* FOR PIPE 42" DIAMETER OR LESS PLACE 1'OF FILL ON EACH SIDE OF THE PIPE.
FOR PIPE LARGER THAN 42" DIAMETER PLACE 2' OF FILL ON EACH SIDE OF THE PIPE.

REINFORCED CONCRETE PIPE
TYPICAL BACKFILL DETAIL-SAND

STATE OF TEXAS
SEAN CLARY
122134
LICENSED
PROFESSIONAL ENGINEER
01/31/2024

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS PIPE DETAILS

REV. 8/14

COLLAR.DGN

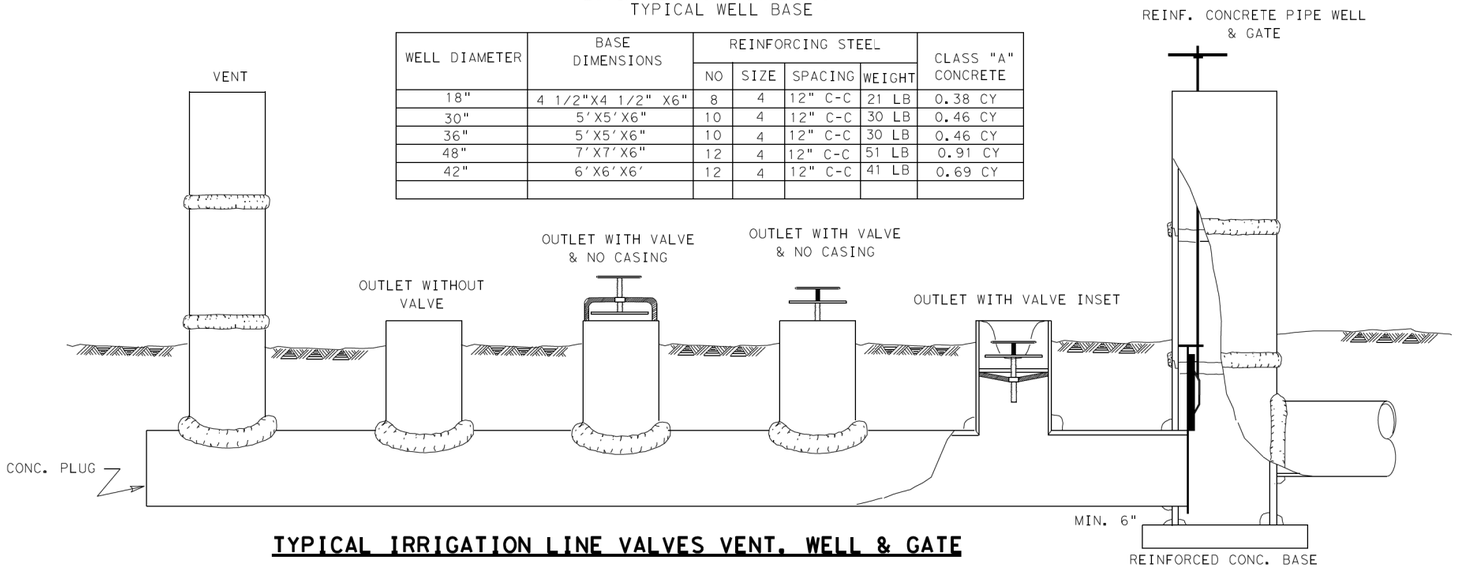
FED. ROAD DIV. NO.	FEDERAL AID PROJECT NO.	FILE NO.	SHEET NO.
6			154

STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	WILLACY	0860	02	015	FM 490

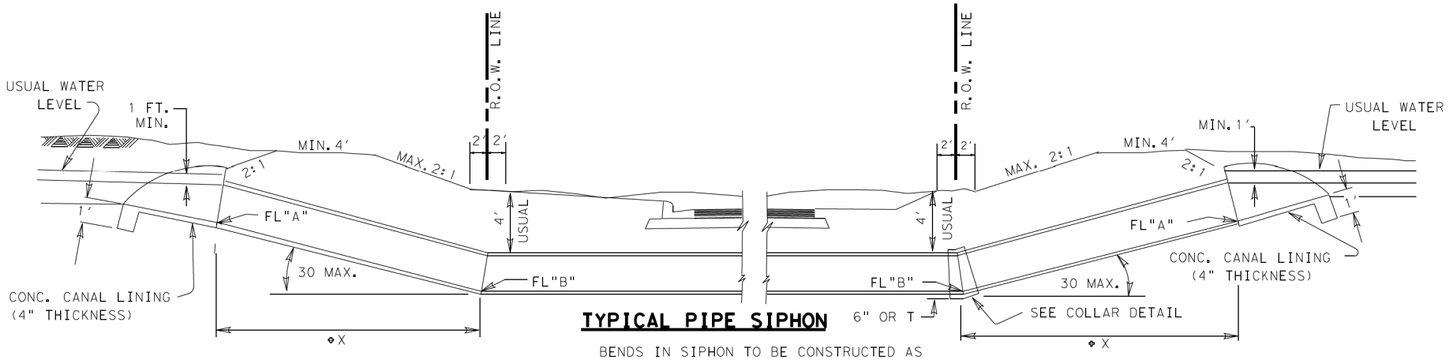
FILE: $FILE$ DATE: $DATE$ $TIME$

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



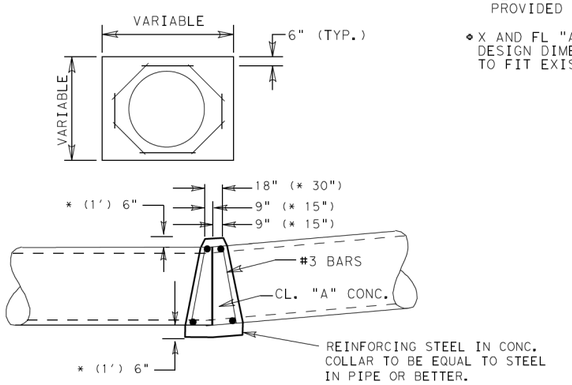
TYPICAL IRRIGATION LINE VALVES VENT, WELL & GATE



TYPICAL 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)

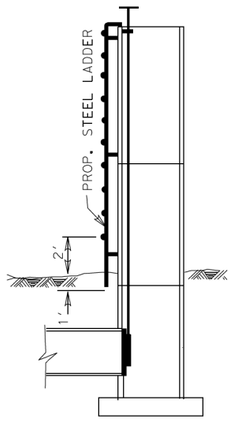
NOTE: PROP. CONC. COLLAR WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE BIDS ITEMS INVOLVED.

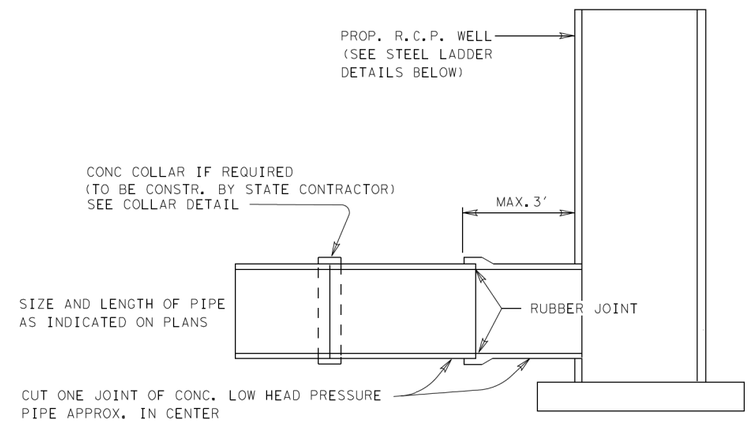
* FOR 42" AND LARGER PIPE

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.





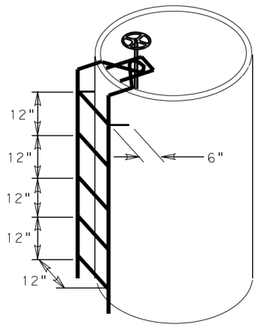
TYPICAL CONC. PIPE WELL DETAILS FOR CONNECTING CONC. LOW HEAD PRESSURE PIPE

GENERAL NOTES

HEIGHT OF RELOCATED WELLS AND VENTS TO BE EQUIVALENT TO THAT OF EXISTING STRUCTURES OR AS REQUIREDFOR PROPER OPERATION.

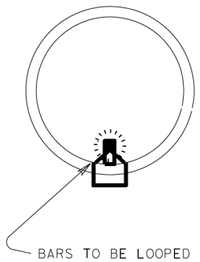
CONCRETE REQUIRED FOR BASE, PLUGS, OR CAPS WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED AS SUB-SIDIARY TO THE VARIOUS BID ITEMS OF THIS CONTRACT.

IN GENERAL THE PARTICULAR TYPE OR DESIGN OF THE EXISTING FACILITY TO BE EXTENDED OR RELOCATED SHALL BE DUPLICATED.



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

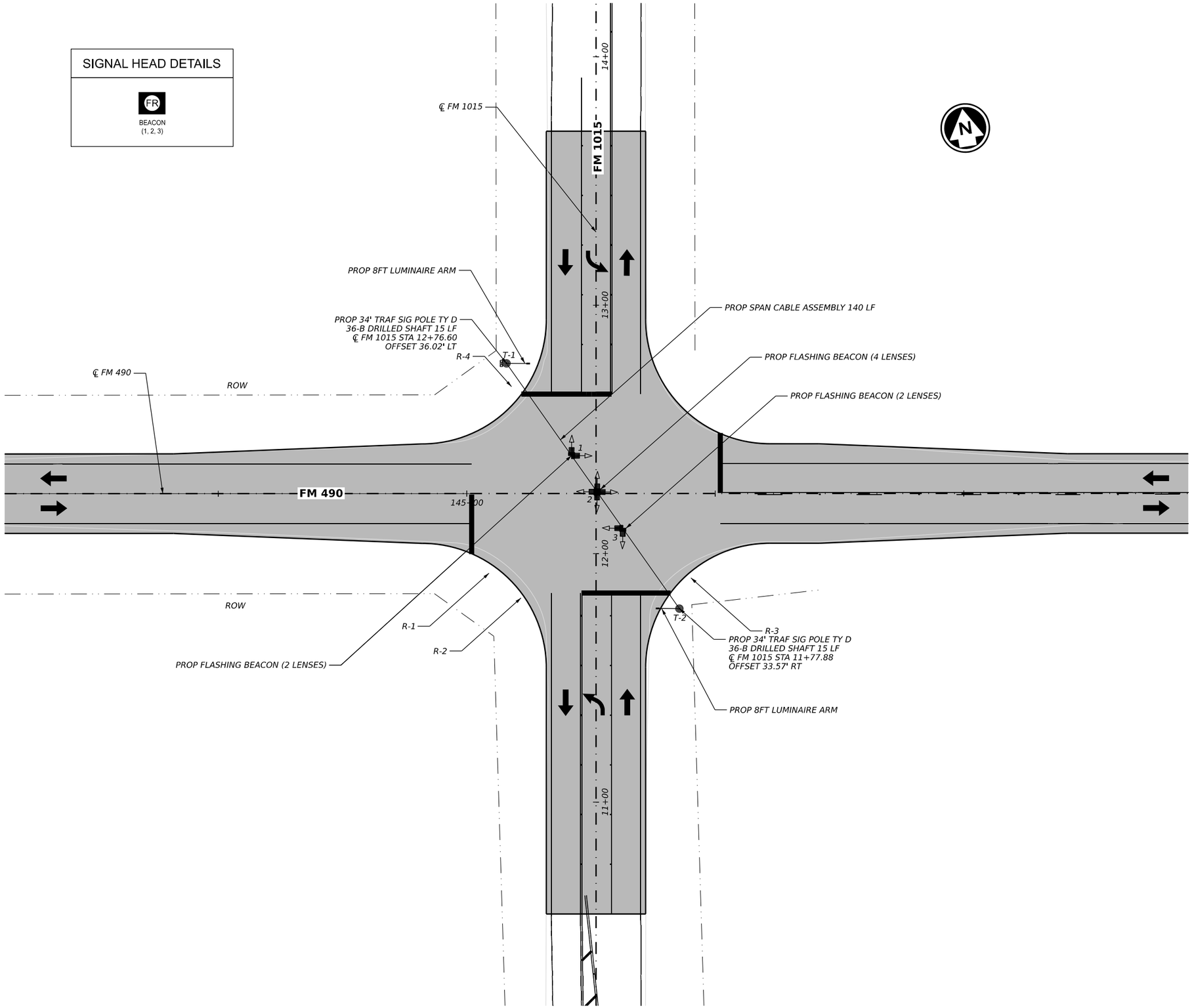
REV. 4/15 IRRIG1.DGN

FED.RD DIV.NO.	FEDERAL AID PROJECT NO.			FILE NO.			SHEET NO.
6							155
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.	
TEXAS	21	WILLACY	0860	02	015	FM 490	

CK
DW
CK
DW

SIGNAL HEAD DETAILS

FR
BEACON
(1, 2, 3)



HORIZ: 0 20 40
SCALE IN FEET

LEGEND

- ROW
- LUMINAIRE ARM
- SIGNAL POLE
- DIRECTION OF TRAFFIC
- POLE MOUNTED CONTROLLER

NOTES

1. POWER SOURCE TO BE LOCATED IN THE NORTHEASTERN QUADRANT OF THIS INTERSECTION.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SIGNAL PLAN

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		156

DATE: 1/31/2024
FILE: ...\FM490-BMCD-SIG-DET-01.dgn

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DW
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SUMMARY OF QUANTITIES				
TxDOT SPECIFICATION NUMBER	DESCRIPTION CODE	DESCRIPTION	UNIT OF MEASURE	TOTAL QUANTITY
416	6032	DRILL SHAFT (TRF SIGNAL POLE) (36 IN)	LF	30
620	6007	ELEC CONDR. (NO. 8) BARE	LF	225
620	6010	ELEC CONDR (NO.6) INSULATED	LF	225
621	6005	TRAY CABLE (4 CONDR) (12 AWG)	LF	189
625	6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	80
628	6301	ELEC SRV TY T 120/240 000(NS)GS(L)TS(O)	EA	1
680	6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	1
682	6005	VEH SIG SEC (12")LED(RED)	EA	8
684	6010	TRF SIG CBL (TY A)(12 AWG)(5CONDR)	LF	139
686	6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA	2
690	6018	INSTALL OF SPAN CABLE ASSM	LF	140

DATE: 1/31/2024
FILE: ...\FM490-BMCD-SIG-DET-02.dgn

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SIGNAL DETAILS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
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PHR	WILLACY		157

CK
DW
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SIGNAL POLE, POLE WIRING, AND SPAN WIRE INFORMATION																							
SIGNAL HEAD AND POLE PLACEMENT												SIGNAL POLE FOUNDATIONS			CABLE INSIDE POLES/ON SPAN WIRE (FT)								
POLE NO.	DIMENSION (FT)							COMPONENTS				FDN. TYPE WIND ZONE 80 MPH	DIMENSIONS (FT)		NO. 6 INSULATED CONDR	NO.8 BARE CONDR	SIGNAL HEAD		PED HEAD	APS	ADDITIONAL WIRING			
	A	B	C	D	E	F	G	# OF SIGNAL HEADS	# OF PED HEADS	ILSN?	LUM?		DRILLED SHAFT DIA. (FT)	DRILLED SHAFT LENGTH (FT)			5C#12 AWG (TY-A)	7C#12 AWG (TY-A)	5C#14 AWG (TY-A)	2C#12 AWG (TY-C)	OPTICOM PRE-EMPTION CABLE	PRESENCE RADAR CABLE	ADVANCE RADAR CABLE	TRAY CABLE (4C#12)
1	6	---	---	---	---	---	30	---	---	---	1	36-B	3	15	40	40	39	---	---	---	---	---	---	39
2	11	---	---	---	---	---	30	---	---	---	1	36-B	3	15	40	40	---	---	---	---	---	---	---	---
SPAN WIRE	---	---	---	---	---	---	---	8	---	---	---	---	---	---	145	145	100	---	---	---	---	---	---	150

CABLE TERMINATION TABLE		
COND. NO.	CONDUCTOR COLOR	CABLE 1 POLE 1 TO CNTRL 20 CNDR
1	BLACK	SPARE
2	WHITE	COMMON
3	RED	SH 1 FR
4	GREEN	SH 2 FR
5	ORANGE	SH 3 FR

SIGNAL HEADS											
LOCATION		12" SIGNAL INDICATION									LED COUNTDOWN PED SIGNAL
POLE NO.	SIGNAL HEAD NO.	TYPE	BACK PLATE		RED LED	YLW LED	GRN LED	R LED	Y LED	G LED	
			3-SEC	5-SEC							
SPAN WIRE	1	BEACON	---	---	2	---	---	---	---	---	---
	2	BEACON	---	---	4	---	---	---	---	---	---
	3	BEACON	---	---	2	---	---	---	---	---	---

POLE NO.	BASELINE STATION	OFFSET	FDN TYPE	DESCRIPTION	VEHICLE SIGNAL	PED SIGNAL HEADS	PUSH BUTTONS
T-1	12+76.60	36.02' LT	36-A	TY B 30' STRAIN POLE W/LUMINAIRE	-	-	-
T-2	11+77.88	33.57' RT	36-A	TY B 30' STRAIN POLE W/LUMINAIRE	-	-	-
SPAN WIRE	N/A	N/A	N/A	SPAN WIRE	1, 2, 3	-	-

ELECTRICAL SERVICE INFORMATION											
EXISTING ELECTRIC SERVICE NO.	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CIRCUIT BREAKER POLE/AMP	TWO-POLE CONTACTOR AMPS	PANEL BD. / LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CIRCUIT BREAKER POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
1	ELEC SRV TY T 120/240 000(NS)GS(L)TS(O)	1 1/4	3/#4 PROVIDED BY UTILITY COMPANY	N/A	N/A	N/A	100	FB ILL	1P/20 1P/20	12.0 6.0	<2.2

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 490

SIGNAL DETAILS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		158

DATE: 1/31/2024
FILE: ...\FM490-BMCD-SIG-DET-03.dgn

DATE:
FILE:

GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

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

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	146	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
October 2014		CONT	SECT	JOB	HIGHWAY
REVISIONS		0860	02	015	FM 490
		DIST	COUNTY		SHEET NO.
		PHR	WILLACY		159

71A

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.
12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

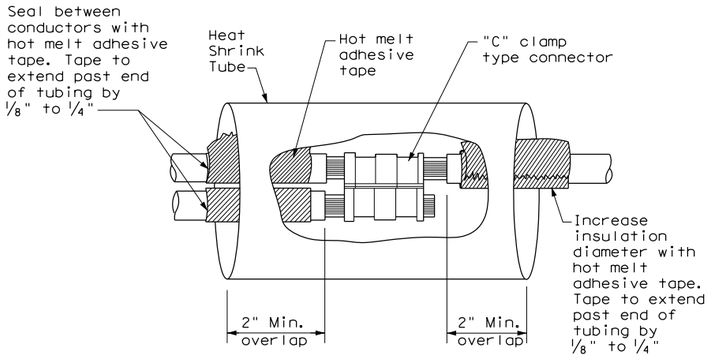
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

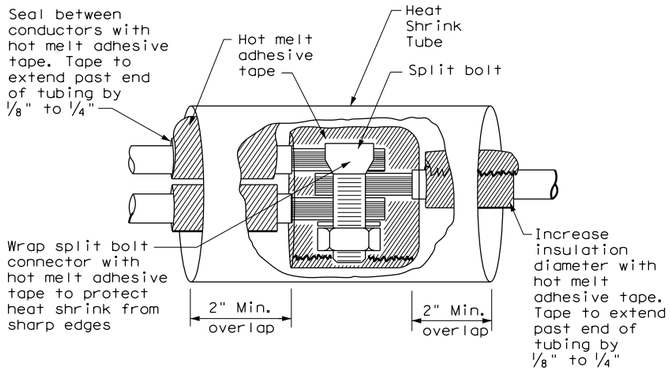
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in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

B. CONSTRUCTION METHODS

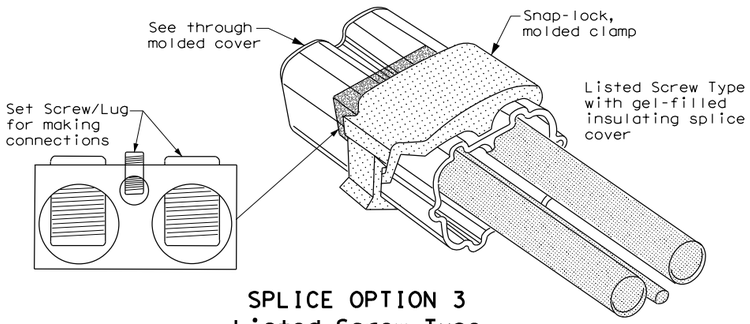
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

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Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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ELECTRICAL SERVICES NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SERVICE ASSEMBLY ENCLOSURE

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

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

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

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

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

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

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

PHOTOELECTRIC CONTROL

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

* ELECTRICAL SERVICE DATA

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

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

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

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

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

Schematic Type

Service Voltage V / V

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

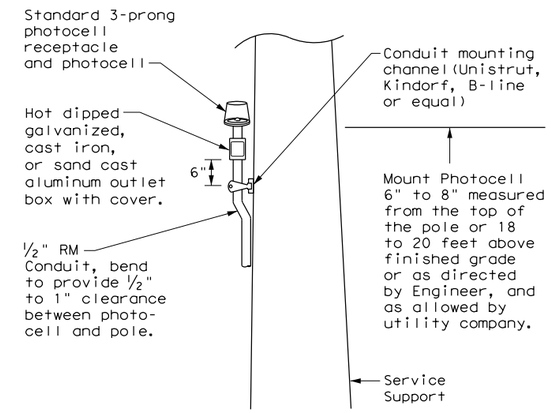
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

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

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

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



TOP MOUNTED PHOTOCELL

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

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ELECTRICAL DETAILS SERVICE NOTES & DATA

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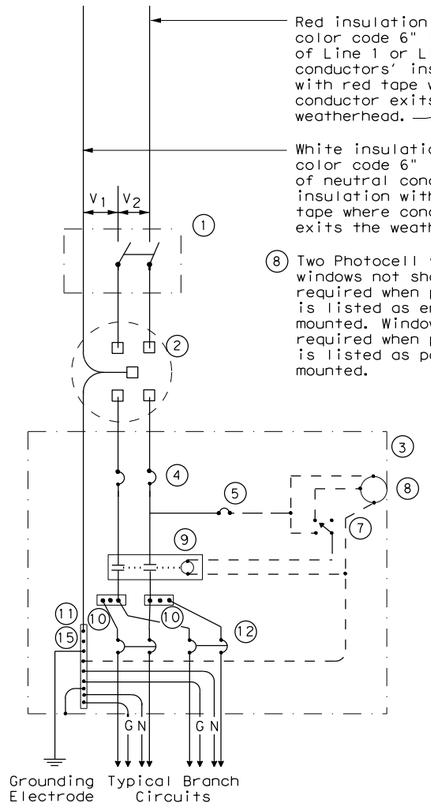
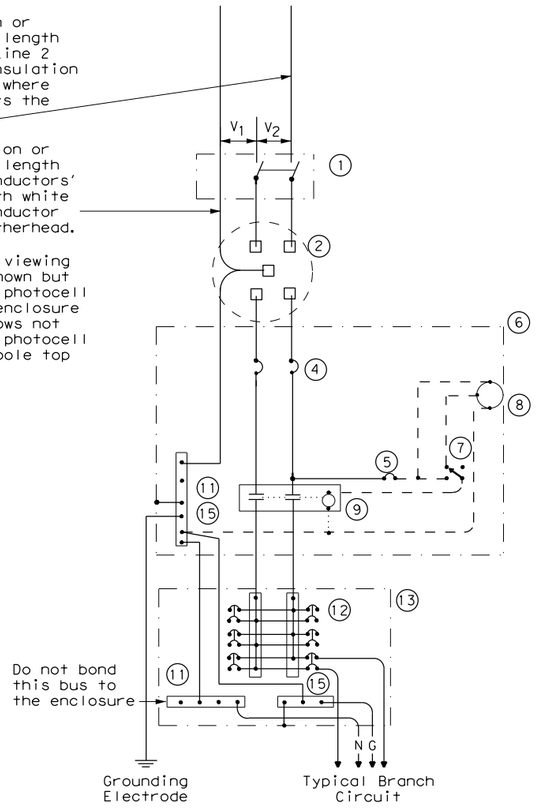
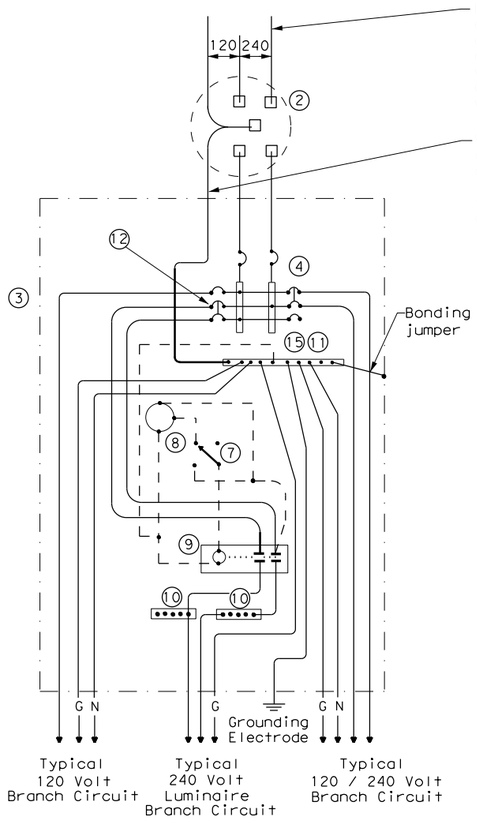


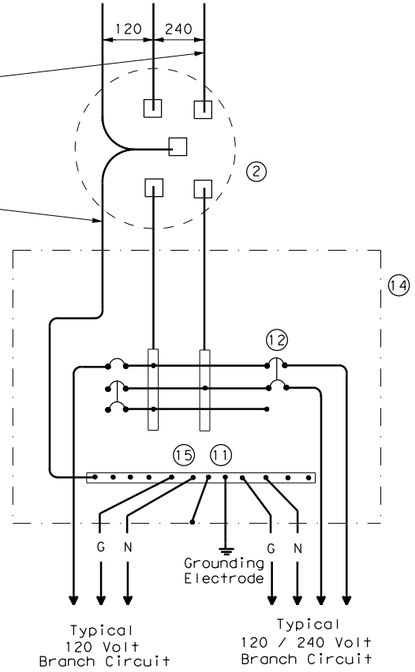
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

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

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

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

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ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

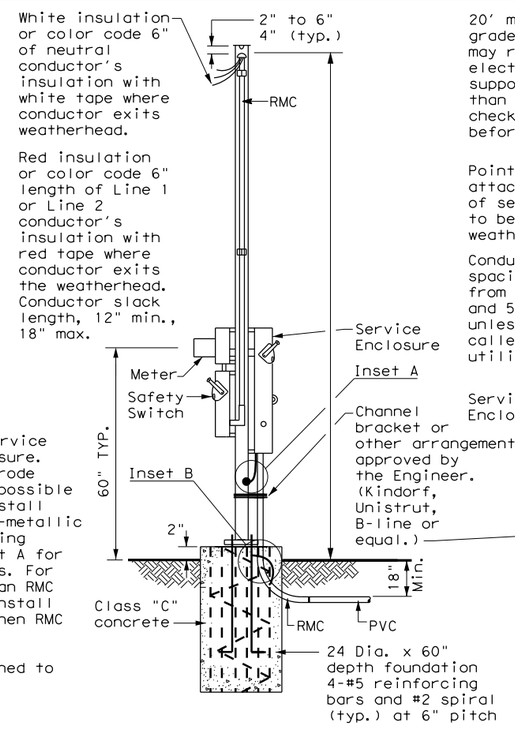
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

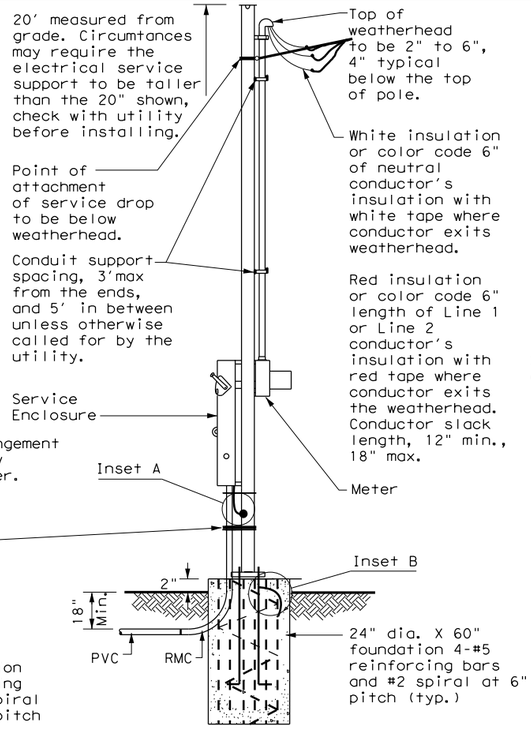
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

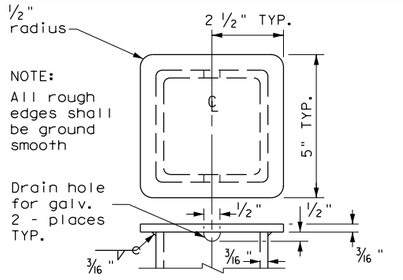


WITH SAFETY SWITCH

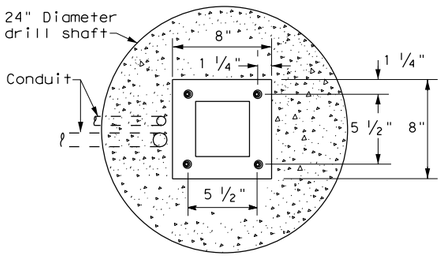


WITHOUT SAFETY SWITCH

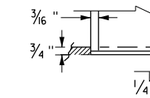
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

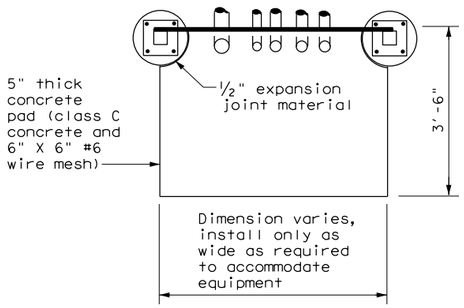


BASE PLATE DETAIL



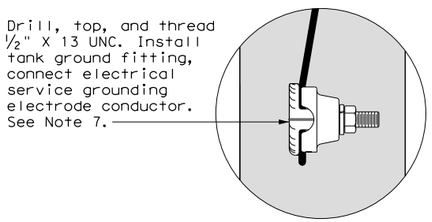
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



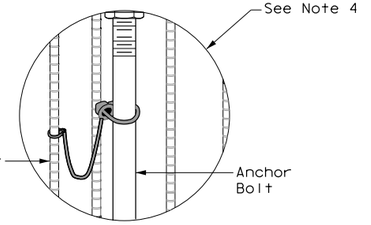
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

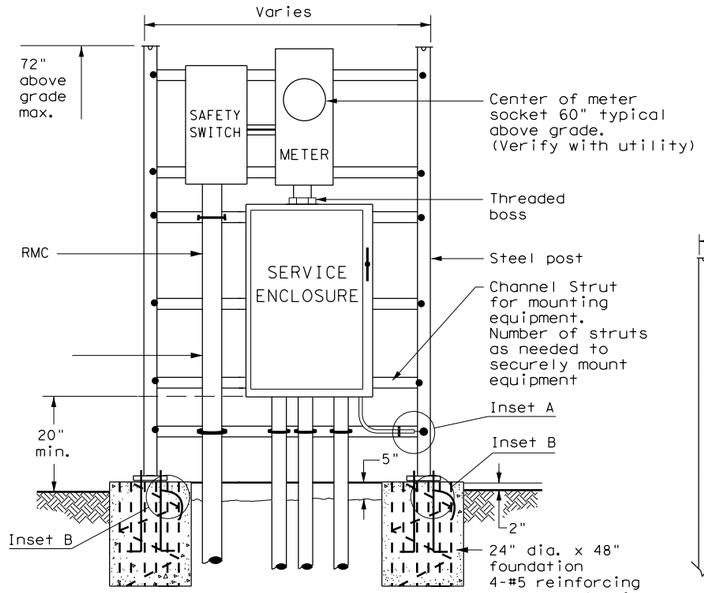


FRONT VIEW

INSET A

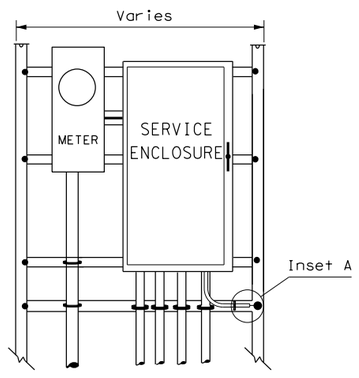


INSET B



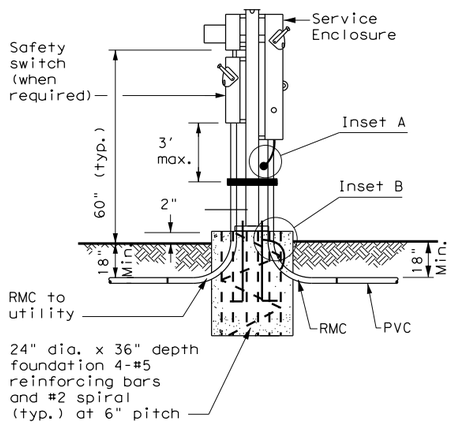
WITH SAFETY SWITCH

FRONT VIEW

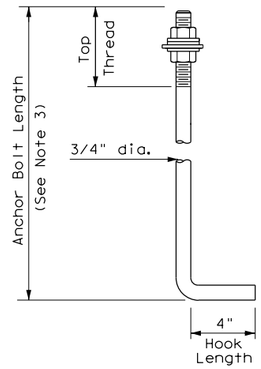


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

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ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

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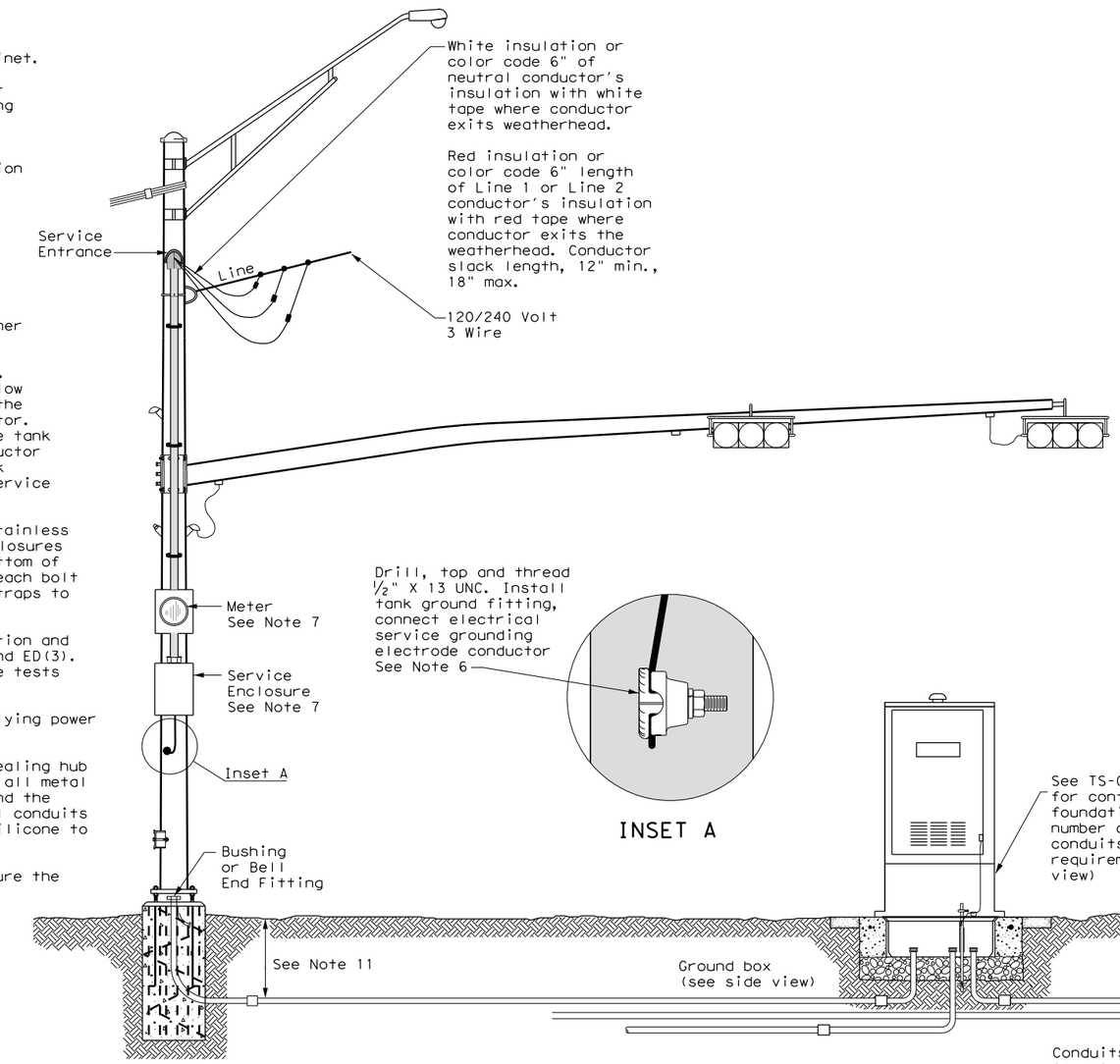
TRAFFIC SIGNAL NOTES

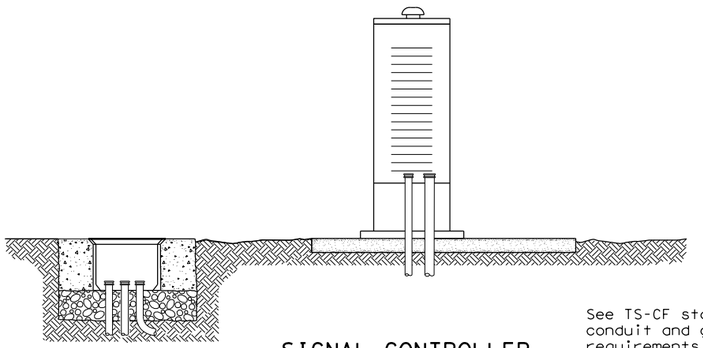
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

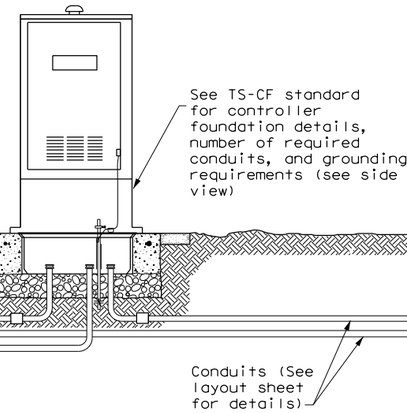
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A

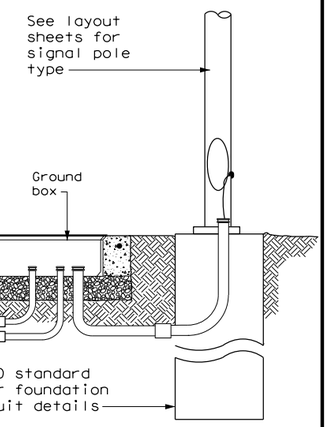


SIGNAL CONTROLLER SIDE VIEW

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



SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

FILE: 151	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
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FILE:

TIMBER POLE (TP) SERVICE SUPPORT NOTES

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

(1) Class 5 pole, height as required

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

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

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

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

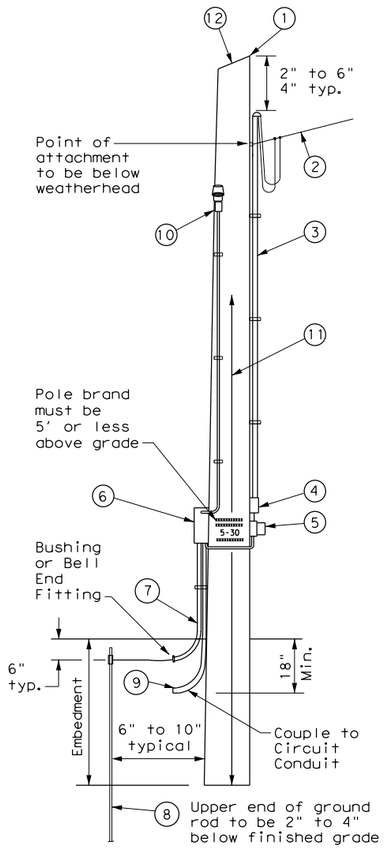
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

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

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

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

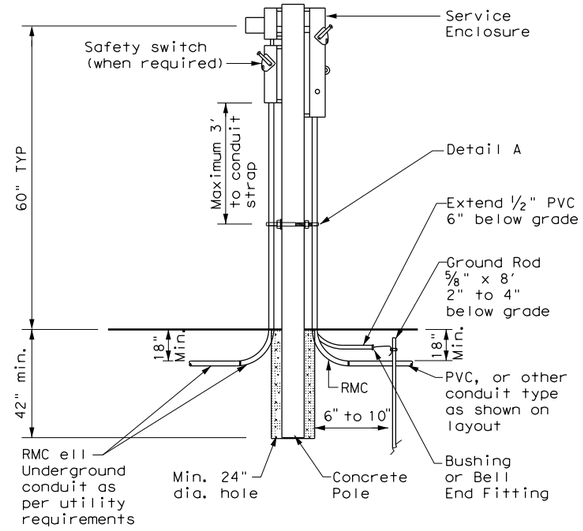


SERVICE SUPPORT TYPE TP (O)

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

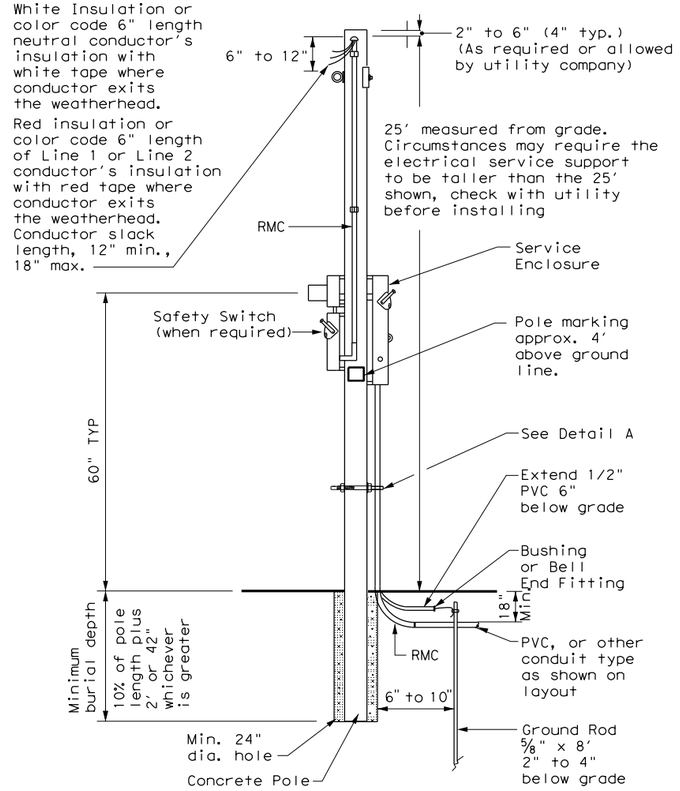
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

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



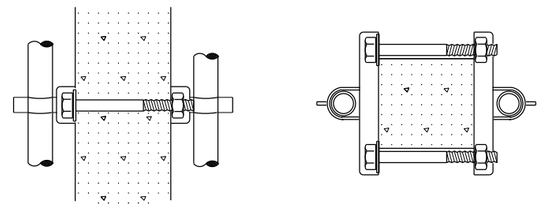
CONCRETE SERVICE SUPPORT

Underground (U)



CONCRETE SERVICE SUPPORT

Overhead (O)



DETAIL A

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

FILE: 152	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM 490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		165

71K

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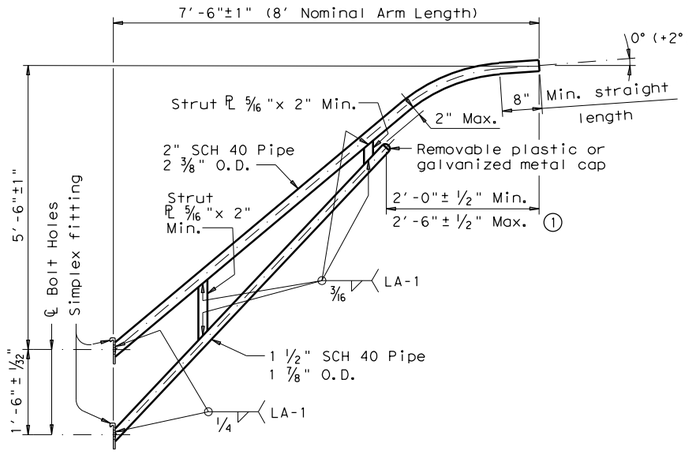
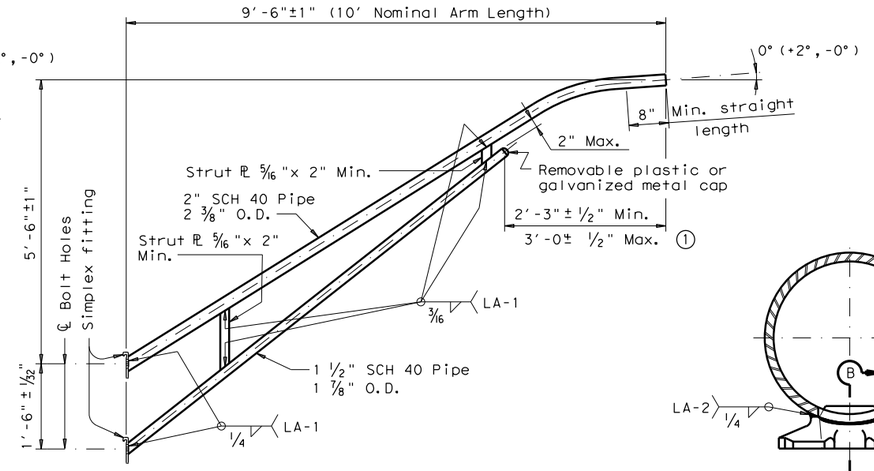
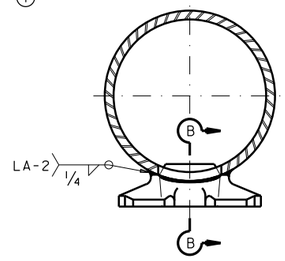
DATE:
FILE:



8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

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

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

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

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

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

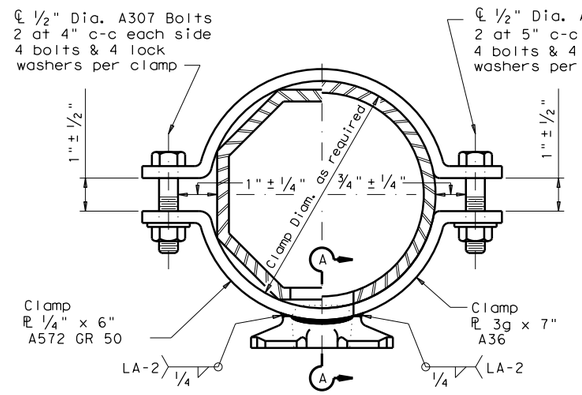
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

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

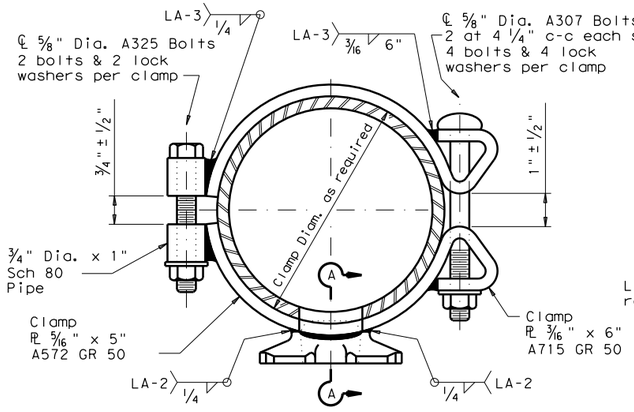
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



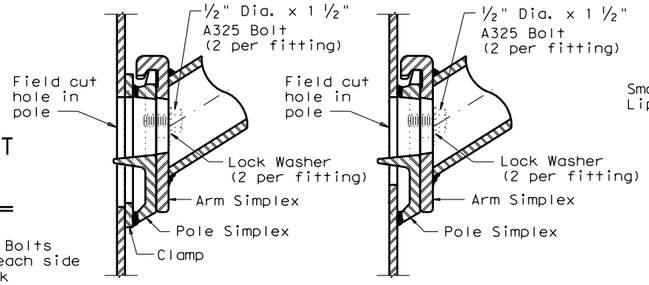
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



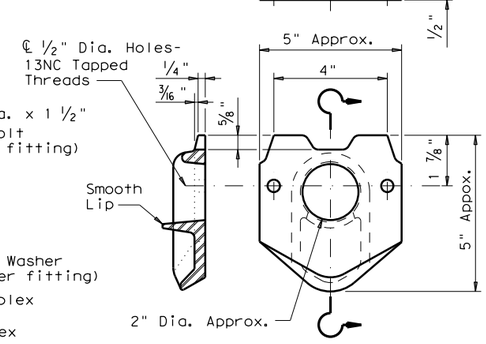
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)

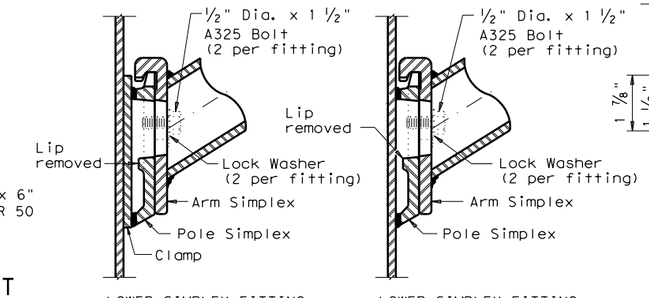


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

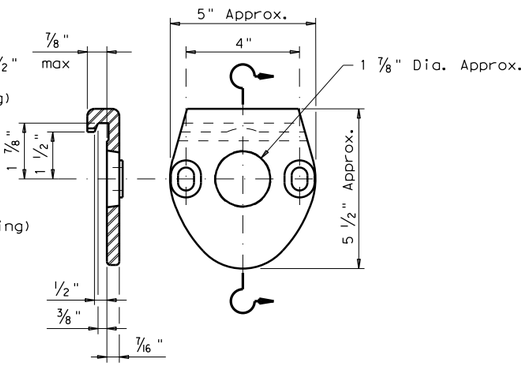


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

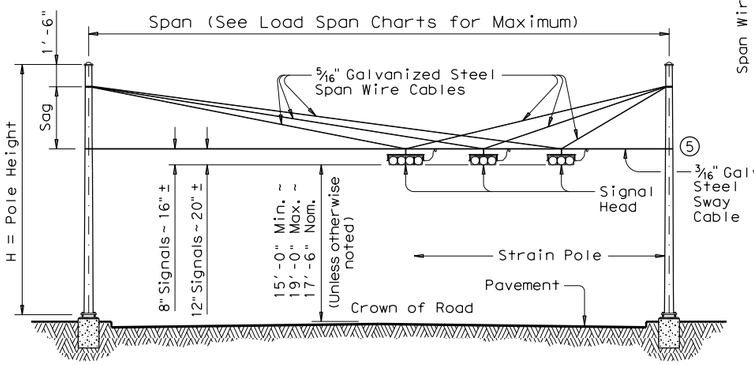
DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

REVISIONS
5-96
1-99
1-12

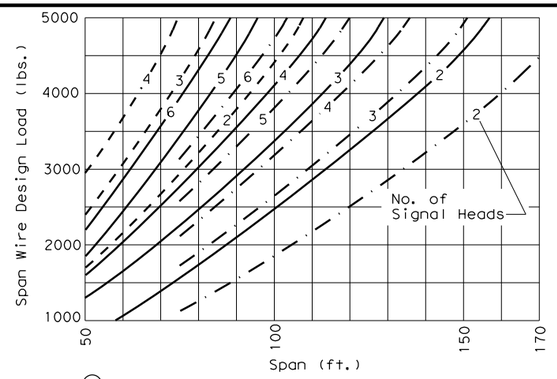
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		166

STRAIN POLE DESCRIPTION	Pole Type	Found-ation Type	Maximum Permissible Span Wire Load (lbs.)
26′ Pole	A	36-A	4900
30′ Pole	B	36-A	4300
30′ Pole with Lum.	B	36-A	4000
30′ Pole with 20′ Mast Arm	C	36-B	4400
30′ Pole with 24′ Mast Arm	C	36-B	4000
30′ Pole with 28′ Mast Arm	C	36-B	3600
30′ Pole with 32′ Mast Arm	C	36-B	3300
30′ Pole with 36′ Mast Arm	C	36-B	2900
30′ Pole with 20′ Mast Arm & Lum.	C	36-B	4100
30′ Pole with 24′ Mast Arm & Lum.	C	36-B	3800
30′ Pole with 28′ Mast Arm & Lum.	C	36-B	3400
30′ Pole with 32′ Mast Arm & Lum.	C	36-B	3000
30′ Pole with 36′ Mast Arm & Lum.	C	36-B	2500
34′ Pole	D	36-B	5200
34′ Pole with Lum.	D	36-B	4900

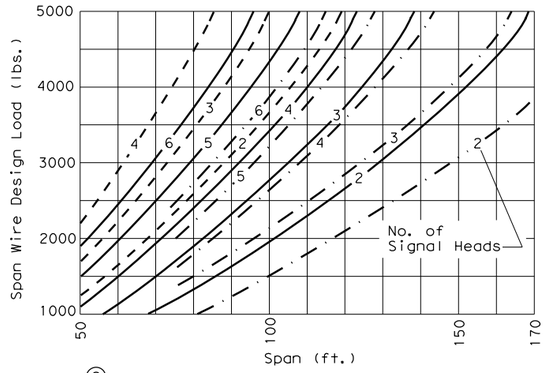
② Numbers on Load Span Charts indicate the number of signal heads on the span. The total span wire design load is based on one 5-section head and one or more additional 3-section head(s). Design wind pressures on cables are assumed as 1.6 lb/ft. Weight of span wire cables (one per signal head) is assumed as 0.65 lb/ft which includes an allowance for conductor cables and miscellaneous hardware. The effect of the sway cable on load distribution is ignored as it is assumed to break at design wind conditions. When a pole supports 2 spans, the span wire design loads for both spans should be added vectorially to determine the design load for that pole.



STRAIN POLE ELEVATIONS HORIZONTAL SIGNALS



② SIGNALS WITH 12-INCH LENS

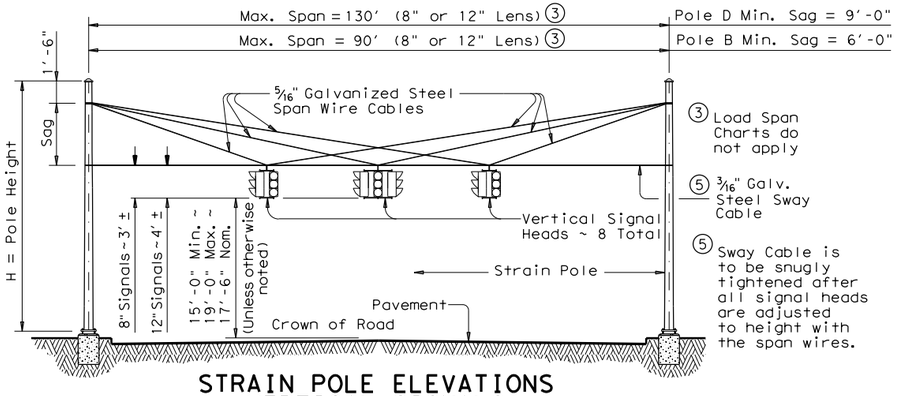


② SIGNALS WITH 8-INCH LENS

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

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

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



STRAIN POLE ELEVATIONS VERTICAL SIGNALS

(Mast arms are not used with vertical signals)

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

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

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

SHIPPING PARTS LIST

Poles (Without Traffic Signal Arm)

Pole Type	Strain poles with Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap, 2 clamp-on simplex and 1 pipe plug.			Strain poles without Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap and 1 pipe plug.		
	Description	Designation	Quantity	Description	Designation	Quantity
A				26′ Strain Pole	SP 26 A-100	
B	30′ Strain Pole	SPL 30 B-100		30′ Strain Pole	SP 30 B-100	
D	34′ Strain Pole	SPL 34 D-100	2	34′ Strain Pole	SP 34 D-100	

Poles (With Traffic Signal Arm)

Pole Type	Strain poles with Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap, clamp-on simplex and 3 pipe plugs.			Strain poles without Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap and 3 pipe plugs.		
	Description	Designation	Quantity	Description	Designation	Quantity
C	30′ SPw/TS Arm	SPL 30 C-100		30′ SPw/TS Arm	SP 30 C-100	

Traffic Signal Arms (For Type C poles)

Nominal Arm Length	Type I Arm (1 Signal): Ship each Type I Arm with the following hardware attached: 2 CGB Connectors, 1 clamp with bolts and washers		Type II Arm (2 Signals): Ship each Type II Arm with the following hardware attached: ① 1 Bracket Assembly, 3 CGB Connectors and 1 clamp with bolts and washers		Type III Arm (3 Signals): Ship each Type III Arm with the following hardware attached: ① 2 Bracket Assemblies, 4 CGB Connectors and 1 clamp with bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24 II-100			
28	28I-100		28 II-100			
32			32 II-100		32 III-100	
36			36 II-100		36 III-100	

Anchor Bolt Assemblies (1 per pole)

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

Each Anchor Bolt Assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Luminaire Arms

Nominal Arm Length	Quantity
8′ Arm	2

① See Sheet "DMA-100"

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES STRAIN POLE ASSEMBLIES

(100 MPH WIND ZONE)

SP-100(1)-12

DN: MS	CK: JSY	DW: BR	CK: JSY

REVISIONS
6-96
1-12

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		167

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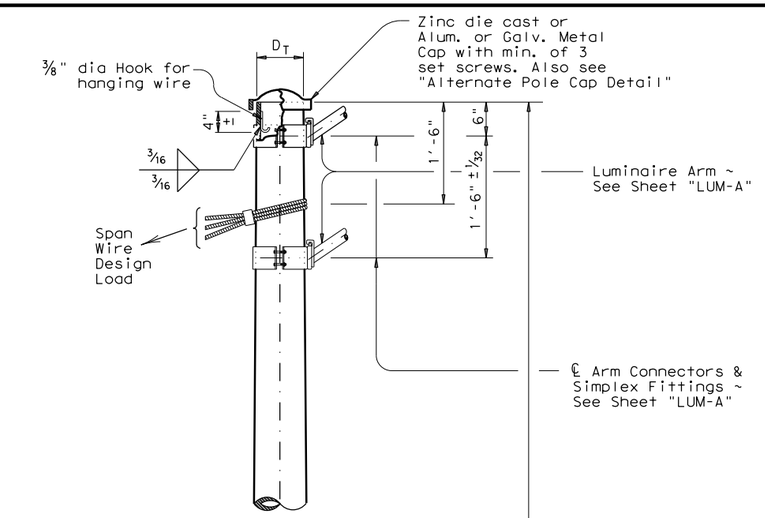
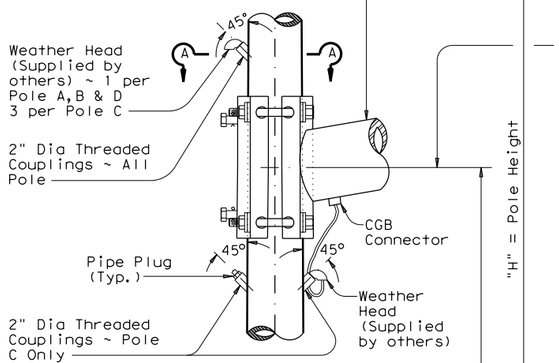
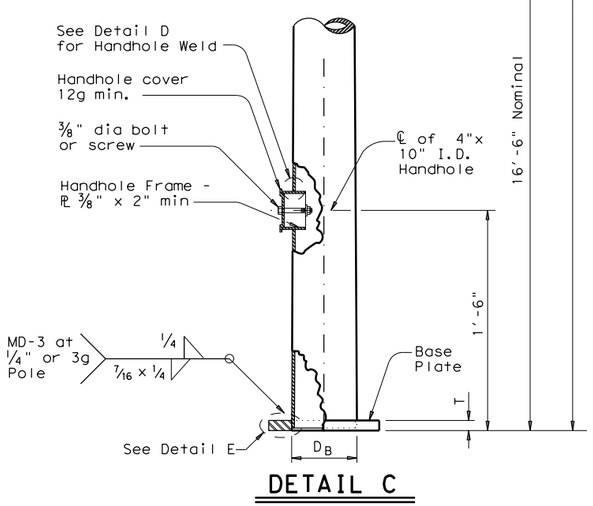


DETAIL A

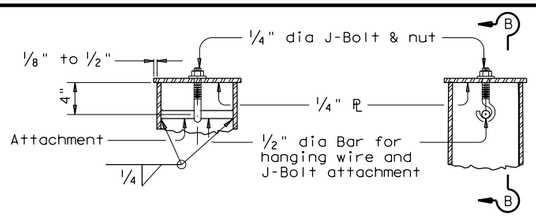


DETAIL B



DETAIL C

POLE ELEVATION



SECTION B-B

ALTERNATE POLE CAP DETAIL

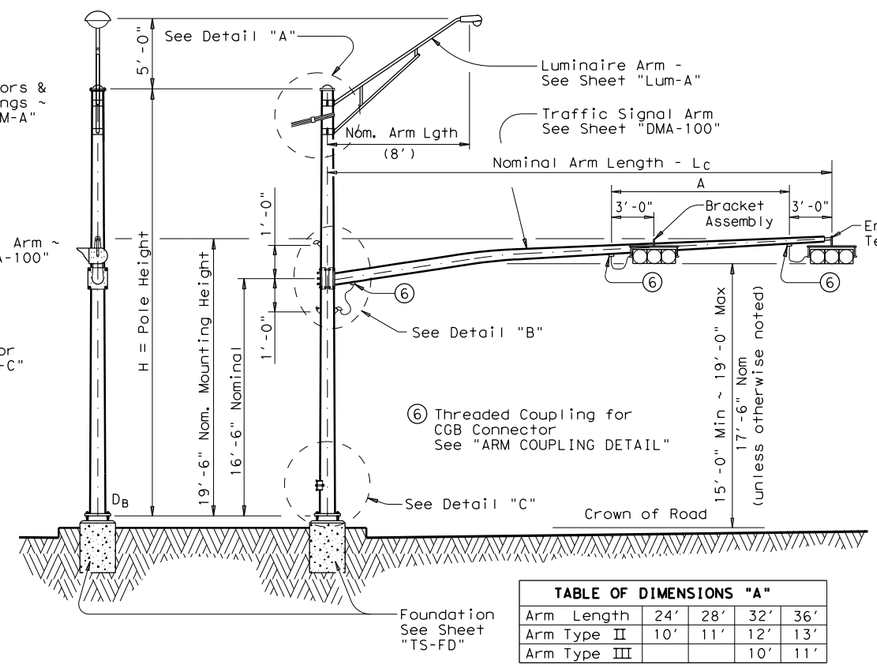
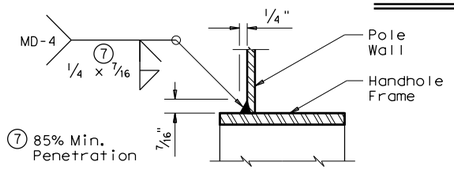
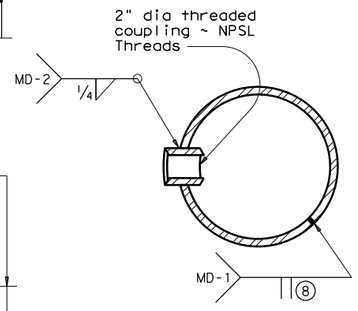


TABLE OF DIMENSIONS "A"				
Arm Length	24'	28'	32'	36'
Arm Type II	10'	11'	12'	13'
Arm Type III			10'	11'

STRUCTURE ASSEMBLY

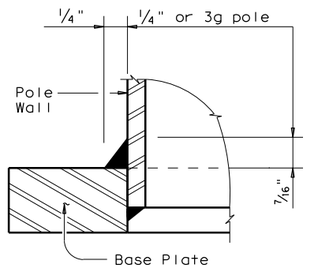


DETAIL D



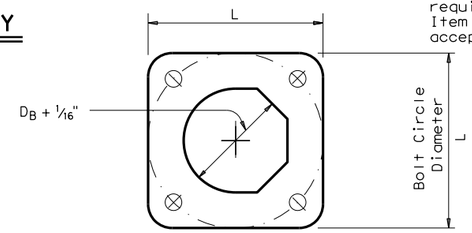
SECTION A-A

(Pole Coupling and Seam Weld Details)

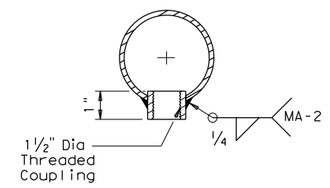


DETAIL E

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



BASE PLATE PLAN



ARM COUPLING DETAIL

MATERIALS	
Round Shafts or Polygonal Shafts ⑨	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ⑩
Plates ⑨	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 except where noted
Pin Bolts	ASTM A325
Pipe ⑨	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Steel Cable	ASTM A475, 7 Wire Utilities Grade
Misc. Hardware	Galvanized steel or stainless steel or as noted

⑨ ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

⑩ ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 100 mph plus a 1.3 gust factor. The maximum permissible span wire design loads tabulated are calculated at a stress load of 1.4 times the basic allowable stress. A simultaneous wind on the pole, mast arm, and luminaire is also included.

See standard sheet "DMA-100" for details of clamp-on traffic signal arms, sheet "MA-C" for traffic signal arm connection details, sheet "LUM-A" for luminaire arm and connection details, and sheet "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES STRAIN POLE ASSEMBLIES

(100 MPH WIND ZONE)

SP-100(2)-12

DN: MS	CK: JSY	DW: BR	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
6-96	0860	02	015	FM 490
1-12	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		168

DATE:
FILE:

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DATE:
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FOUNDATION DESIGN TABLE

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

NOTES:

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

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

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

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

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

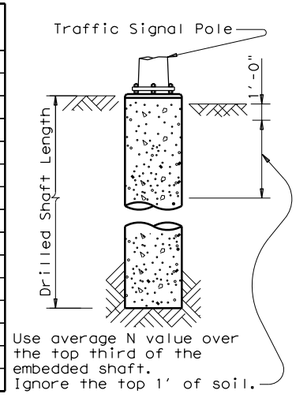
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
T-1	15	36-B	1				15	
T-2	15	36-B	1				15	
TOTAL DRILLED SHAFT LENGTHS						30		

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

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

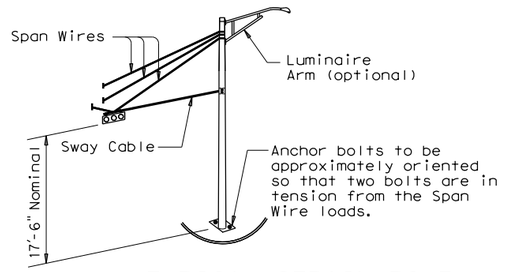


ANCHOR BOLT & TEMPLATE SIZES

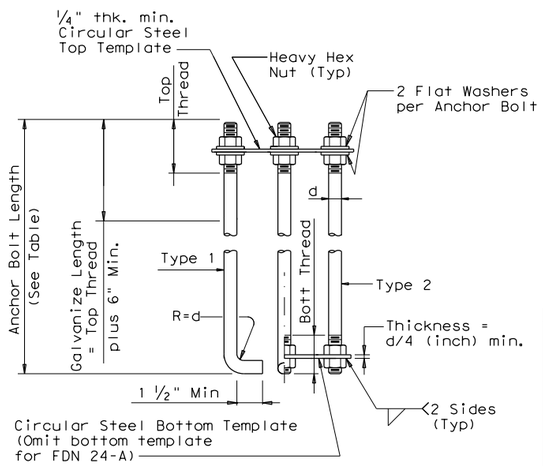
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

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



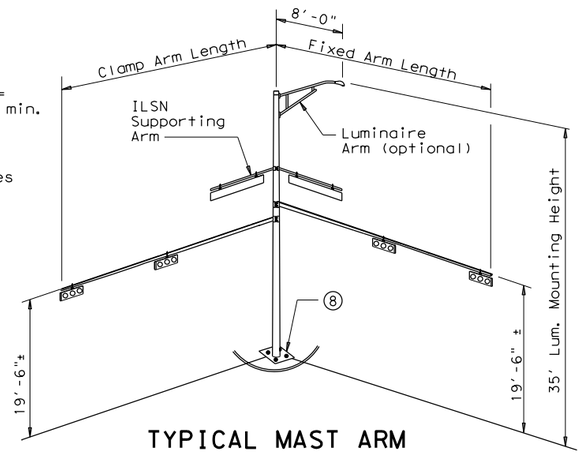
TYPICAL STRAIN POLE ASSEMBLY



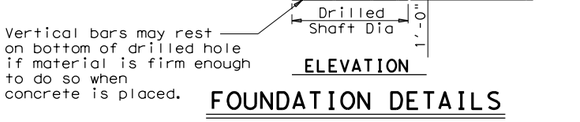
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

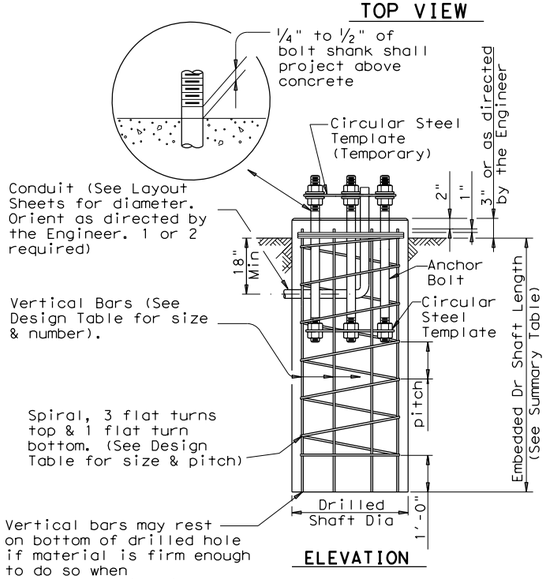
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

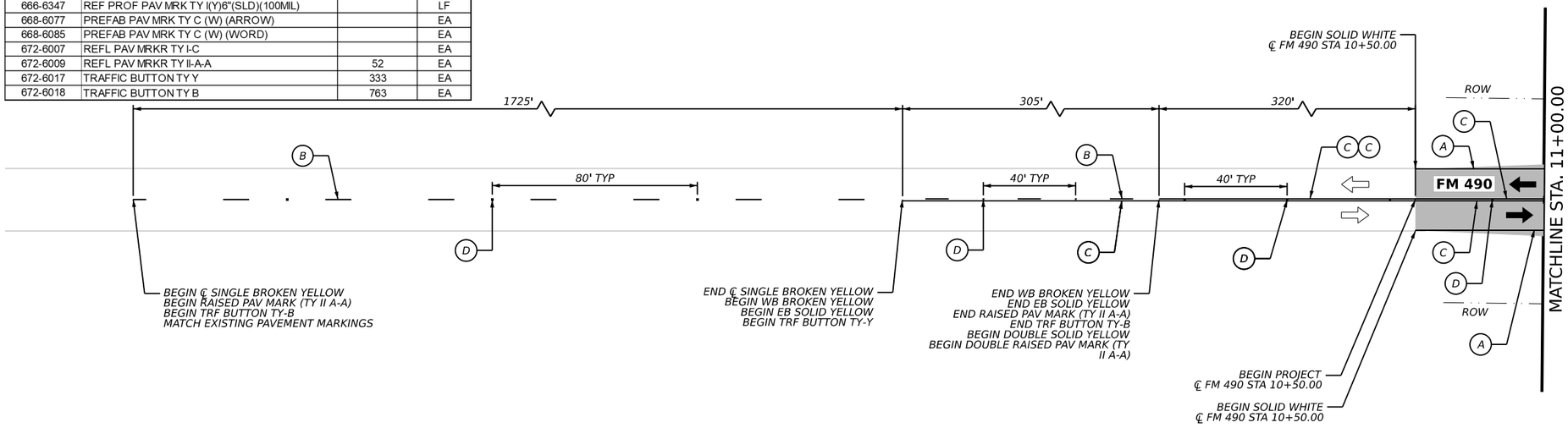
TS-FD-12

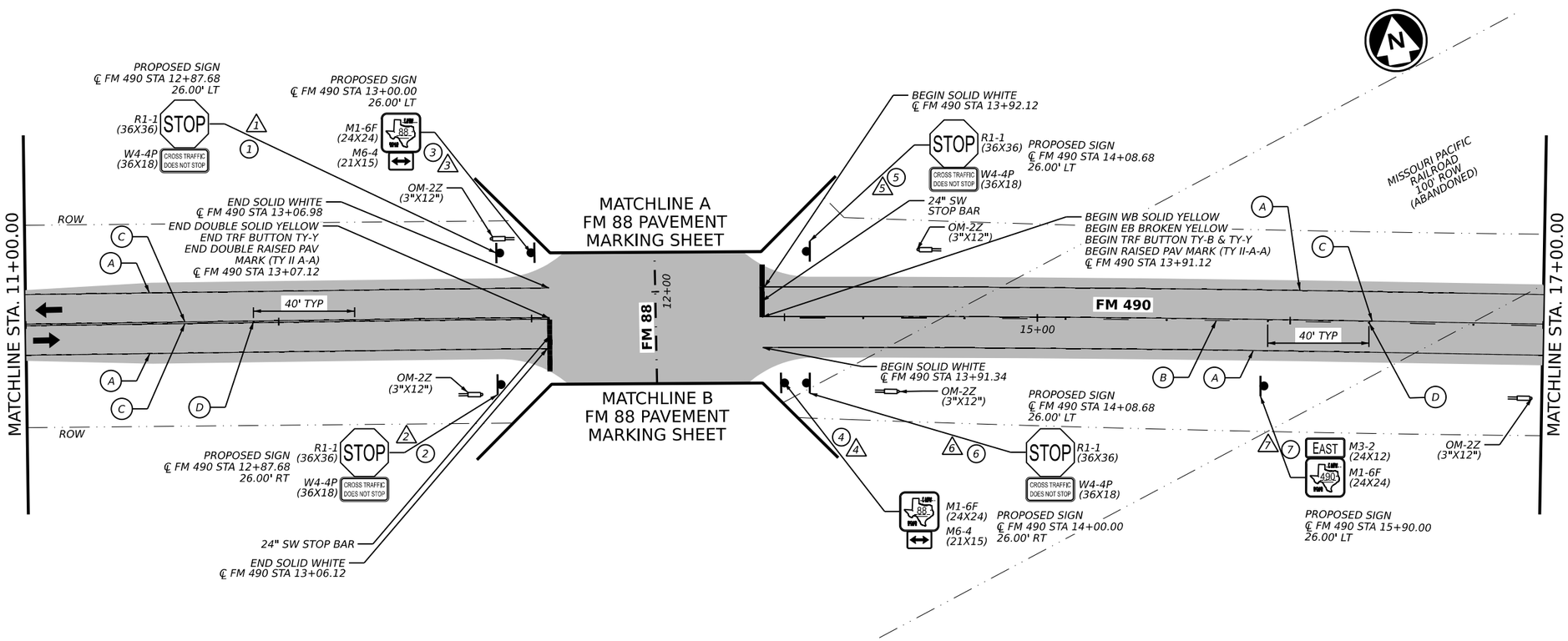
REVISIONS
5-96
11-99
1-12

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

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		169

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	42	LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	2340	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	1768	LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	1134	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	52	EA
672-6017	TRAFFIC BUTTON TY Y	333	EA
672-6018	TRAFFIC BUTTON TY B	763	EA





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

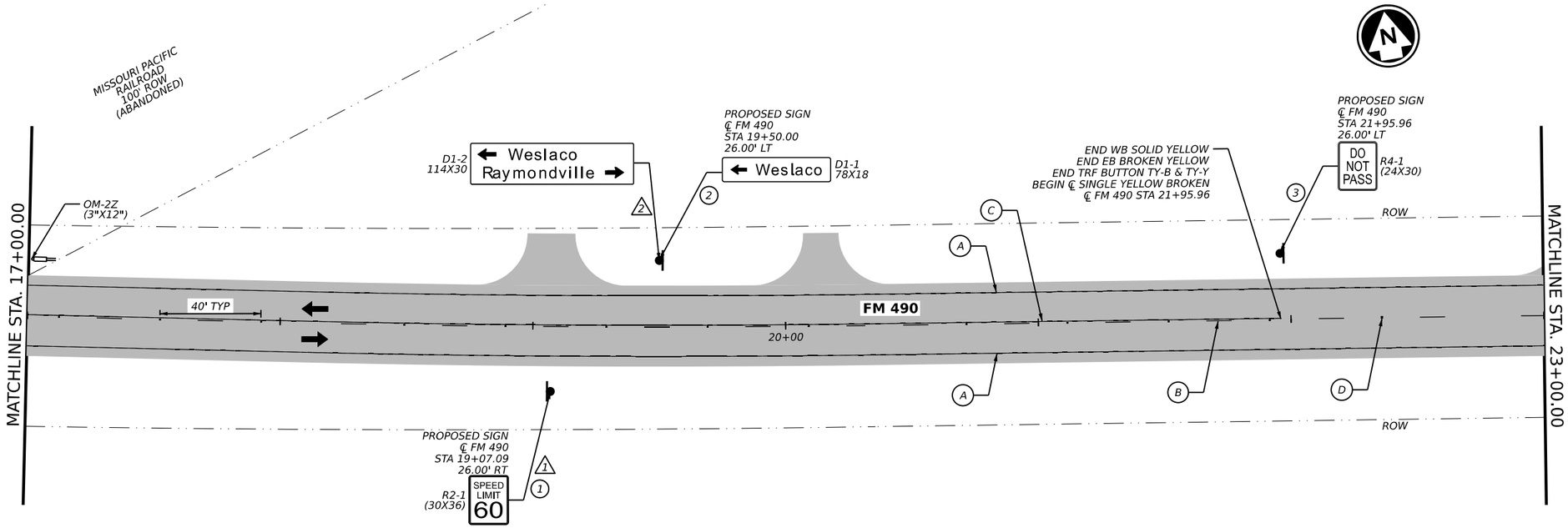
FM 490

PAVEMENT MARKING AND SIGNING PLAN BEGIN TO STA 17+00

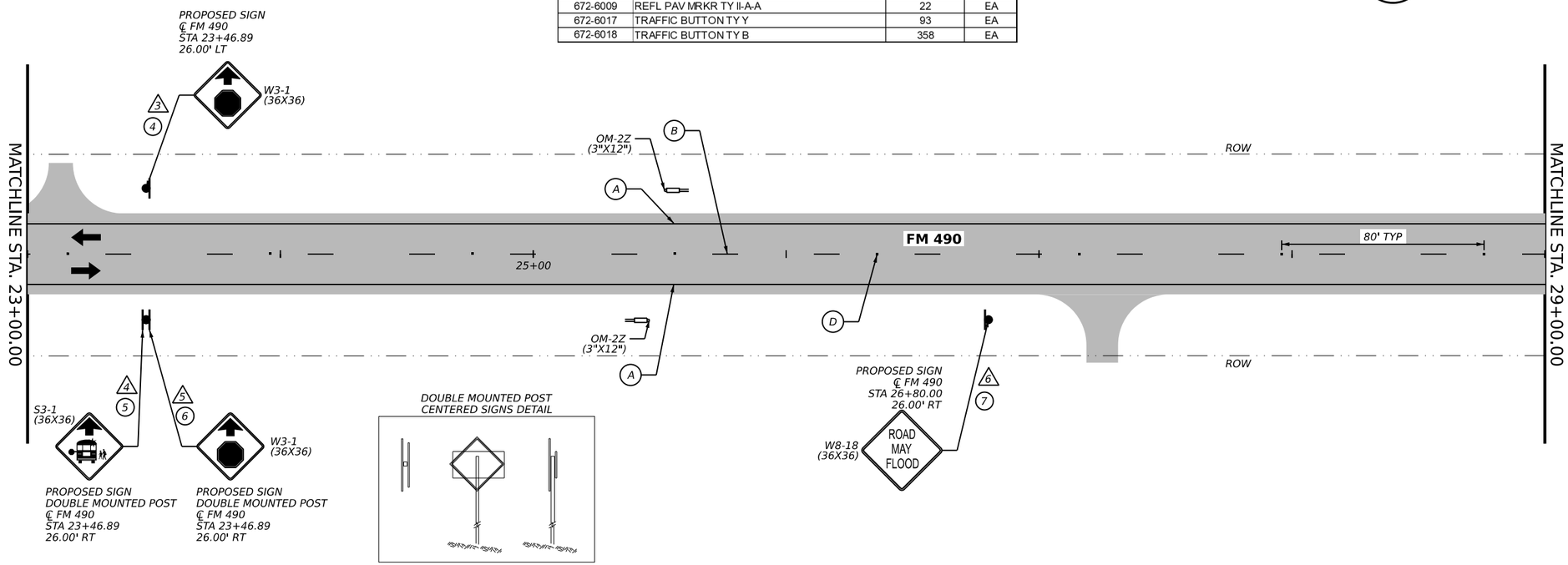
SHEET 1 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		170

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	496	LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2400	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	22	EA
672-6017	TRAFFIC BUTTON TY Y	93	EA
672-6018	TRAFFIC BUTTON TY B	358	EA



LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

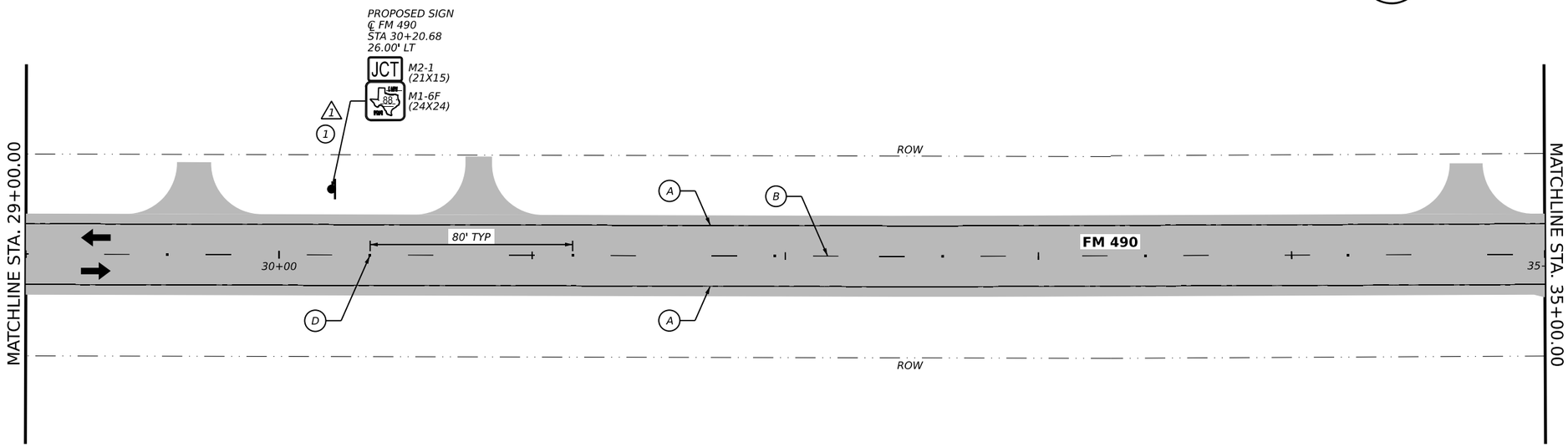
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 17+00 TO STA 29+00

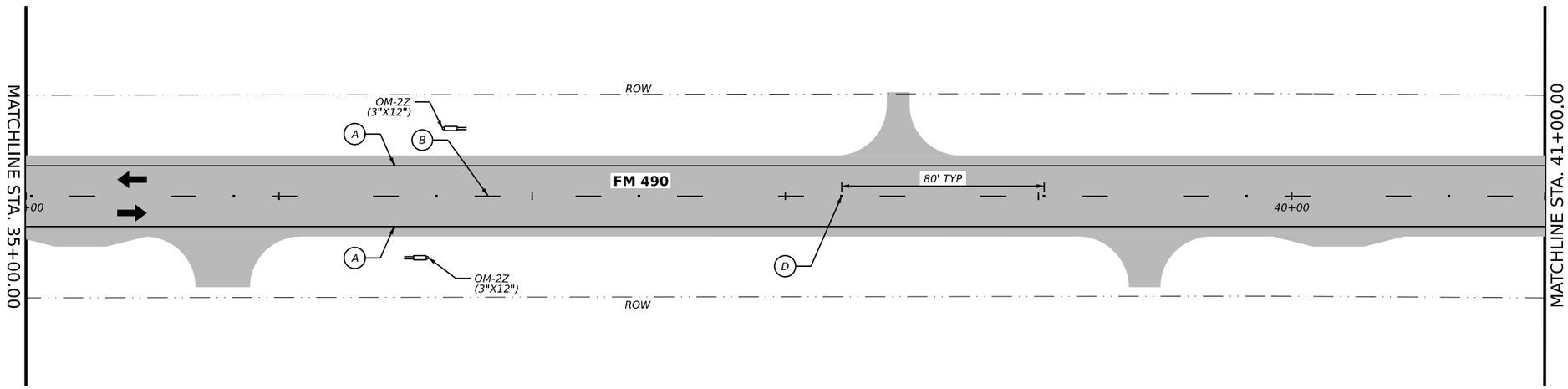
SHEET 2 OF 13

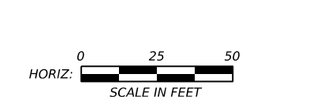
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		171

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2400	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	15	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B	450	EA





LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

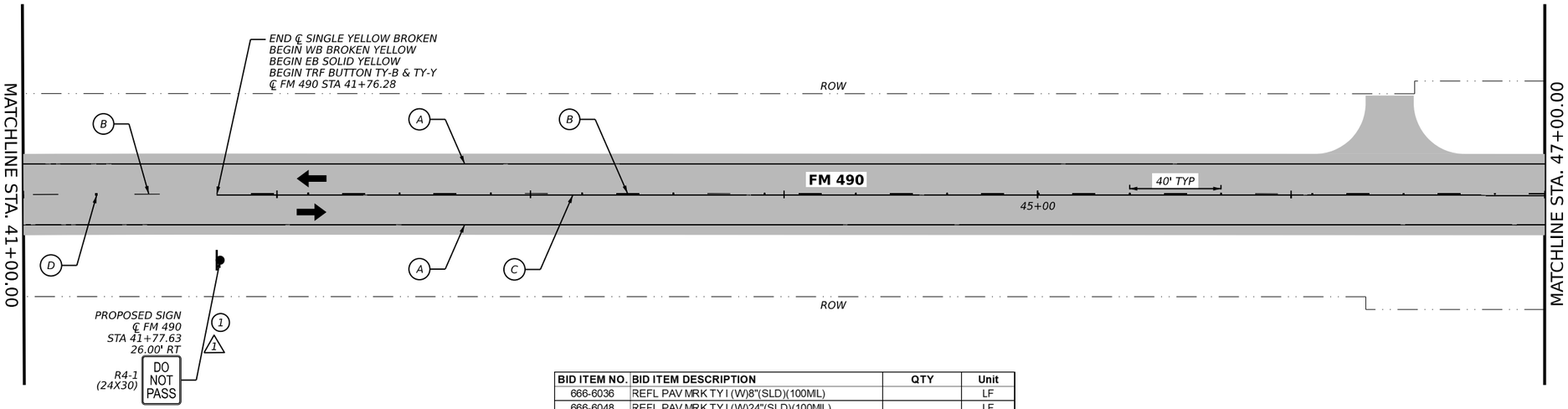
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 29+00 TO STA 41+00

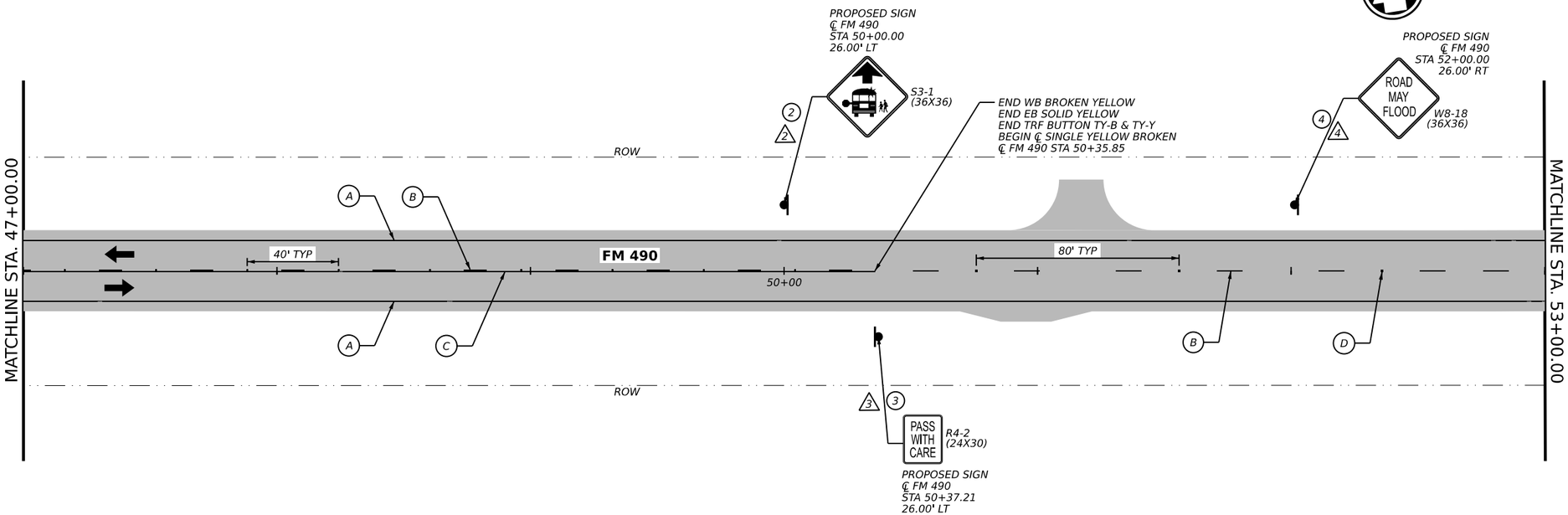
SHEET 3 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		172

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	860	LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2400	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	26	EA
672-6017	TRAFFIC BUTTON TY Y	162	EA
672-6018	TRAFFIC BUTTON TY B	289	EA



LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- 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)
- E RAISED PAV MARK (TY I-C)
- F REFL PAV MRK TY 1 W 8" (SLD)
- G RE PM W/ RET REQ TY I Y 12" (SLD)
- H REF PROF PAV MRK TY I Y 6" (BRK)
- I REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

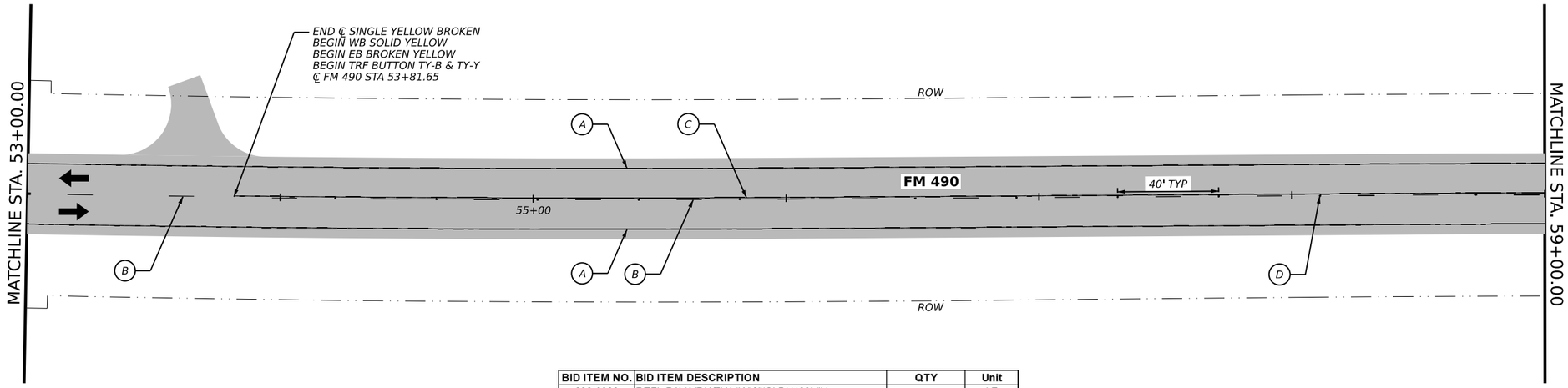
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 41+00 TO STA 53+00

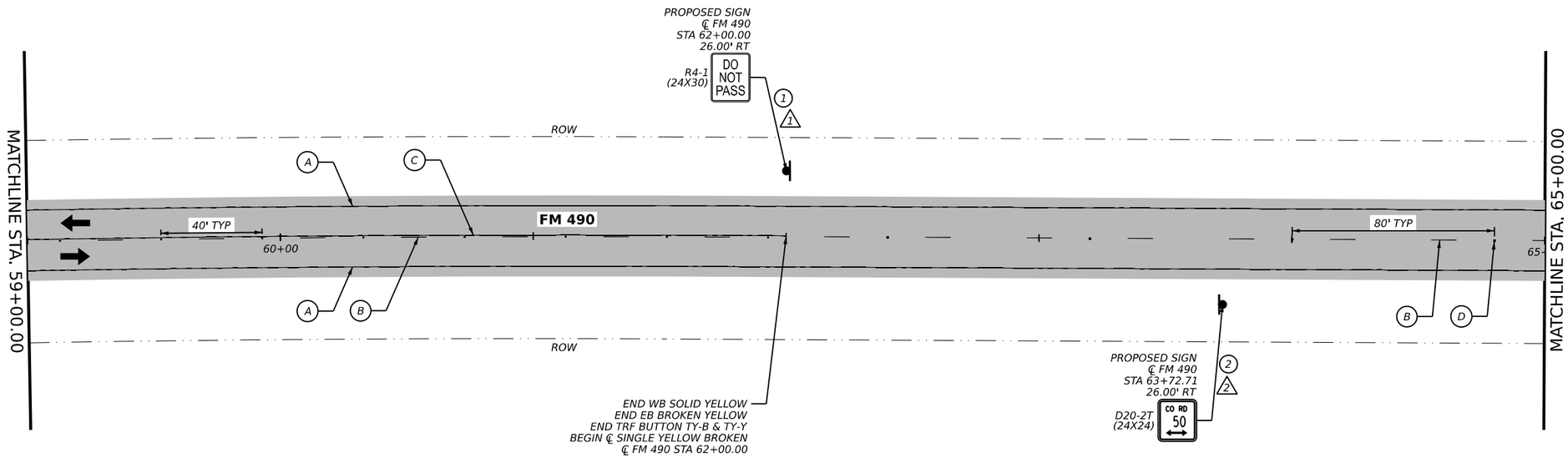
SHEET 4 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		173

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	819	LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2400	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	26	EA
672-6017	TRAFFIC BUTTON TY Y	154	EA
672-6018	TRAFFIC BUTTON TY B	297	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/11/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

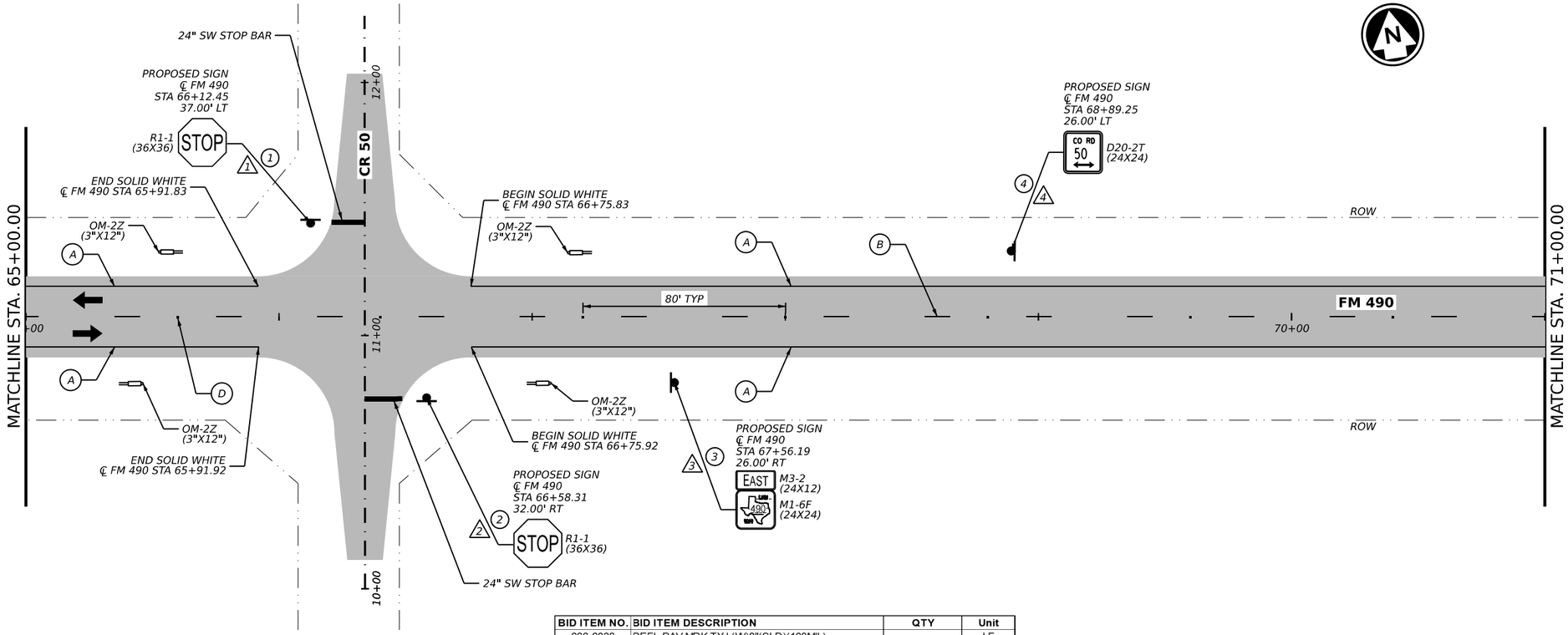
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 53+00 TO STA 65+00

SHEET 5 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		174

DATE:
FILE:
DATE TIME
DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	28	LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2232	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	15	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B	450	EA

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- 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)
- E RAISED PAV MARK (TY I-C)
- F REFL PAV MRK TY 1 W 8" (SLD)
- G RE PM W/ RET REQ TY I Y 12" (SLD)
- H REF PROF PAV MRK TY I Y 6" (BRK)
- I REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- # REMOVE SIGN
- # ADD SIGN

NOTES

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2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

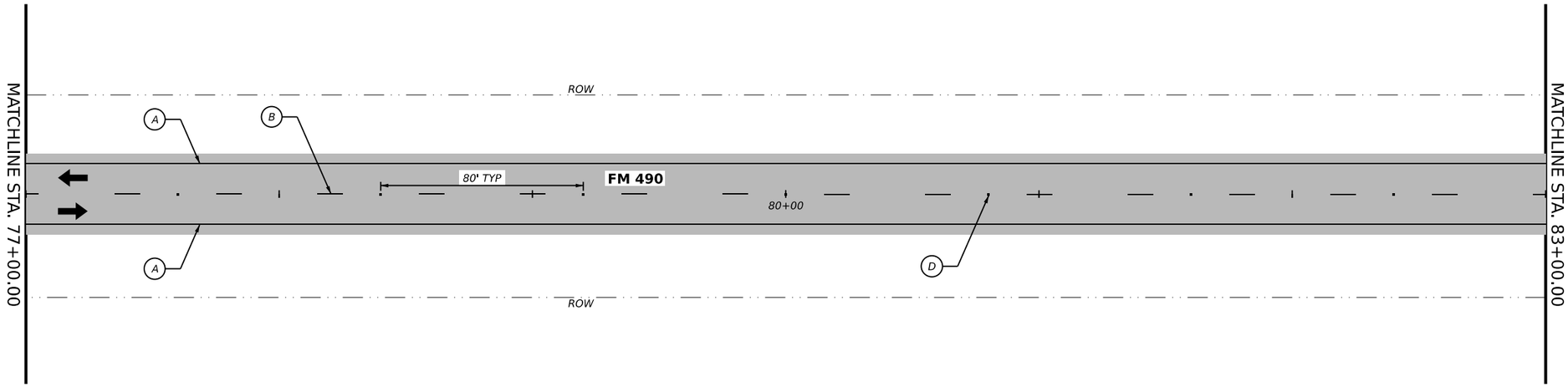
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 65+00 TO STA 77+00

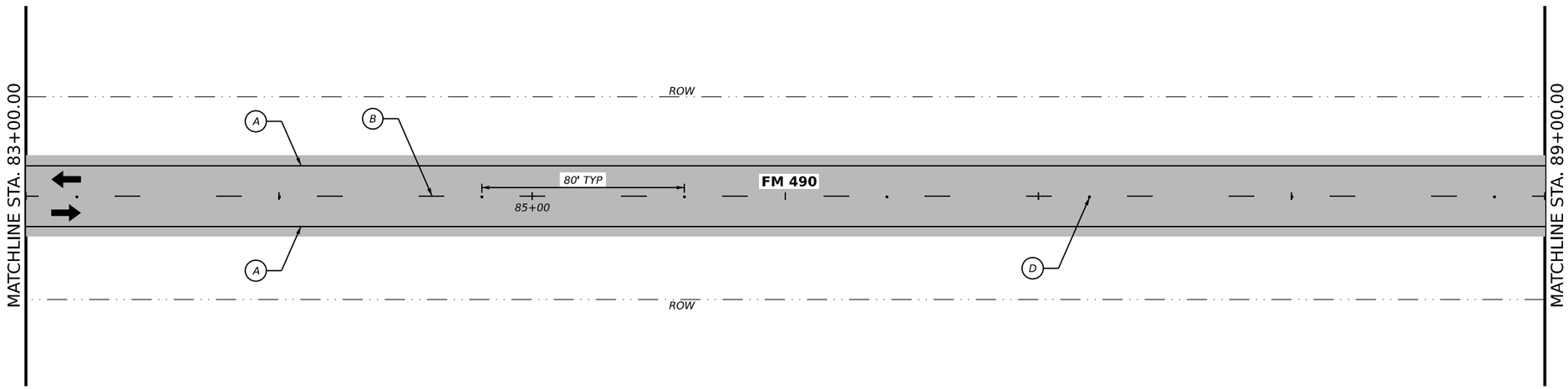
SHEET 6 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		175

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2400	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	15	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B	450	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR MORE INFORMATION.
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
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4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

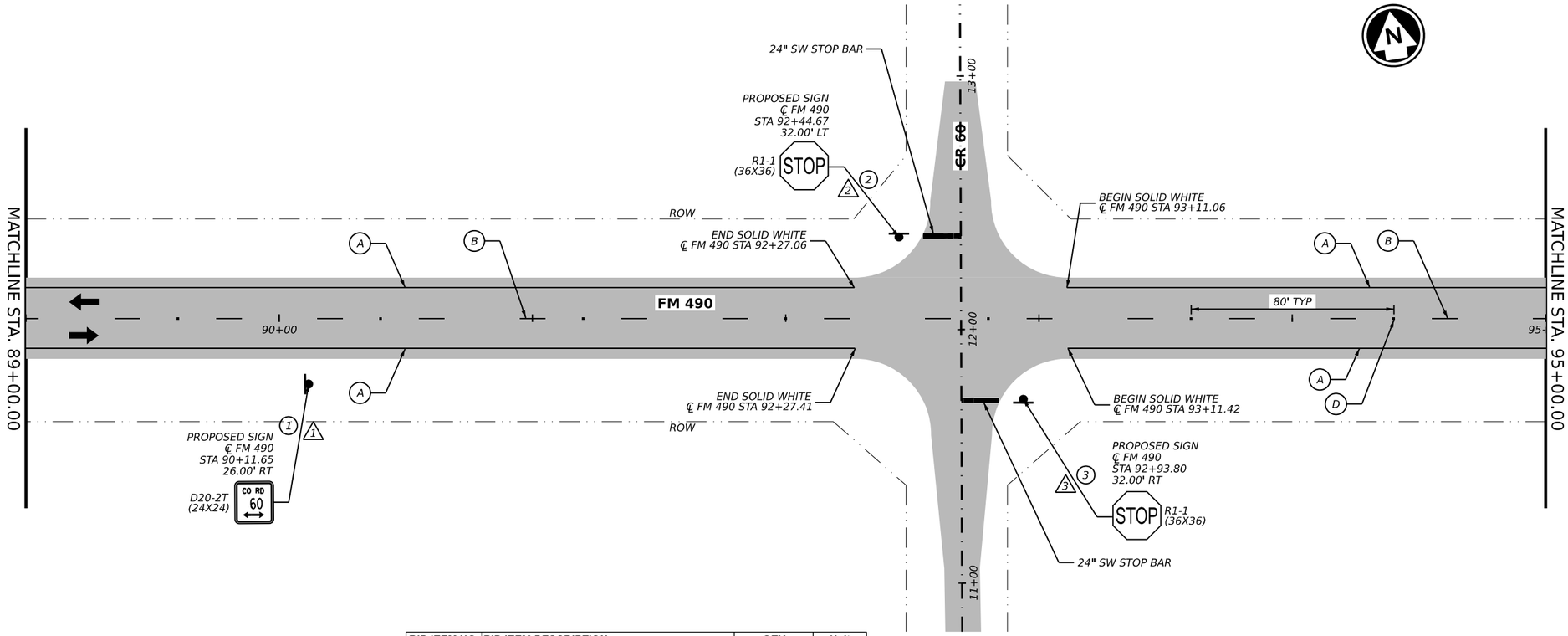
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 77+00 TO STA 89+00

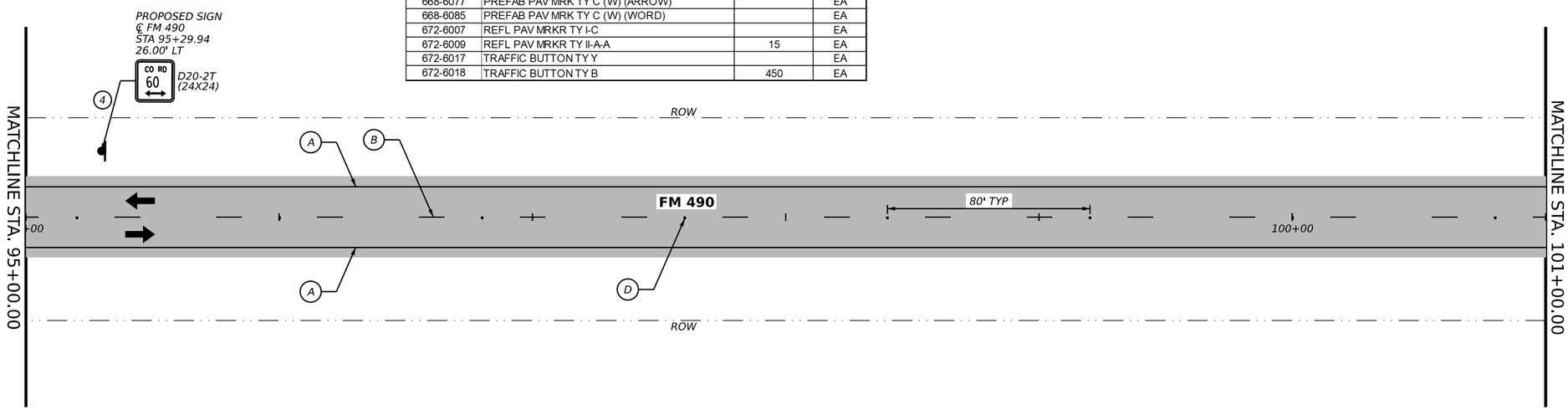
SHEET 7 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		176

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	30	LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2232	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	15	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B	450	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR MORE INFORMATION.
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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

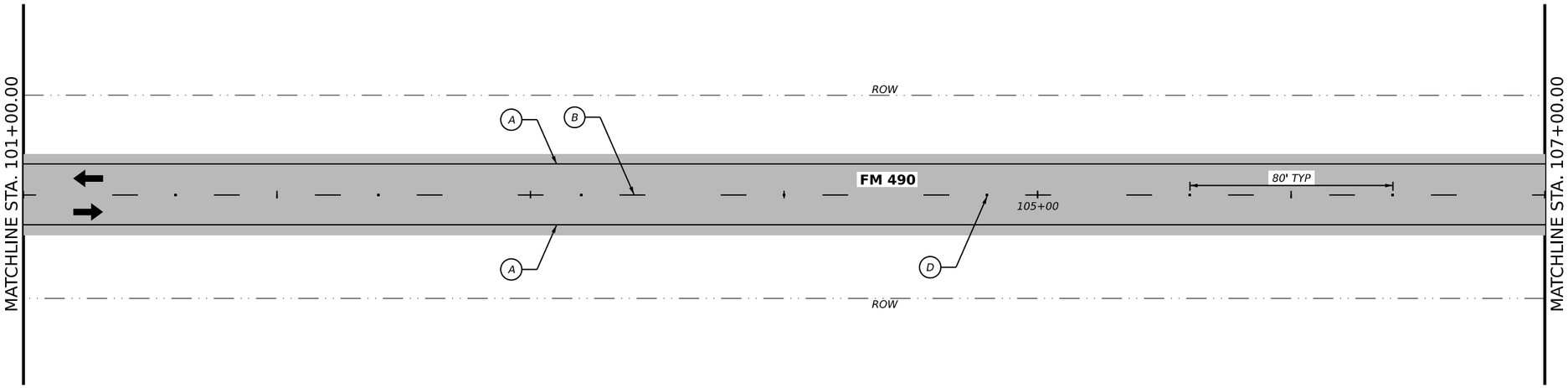
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 89+00 TO STA 101+00

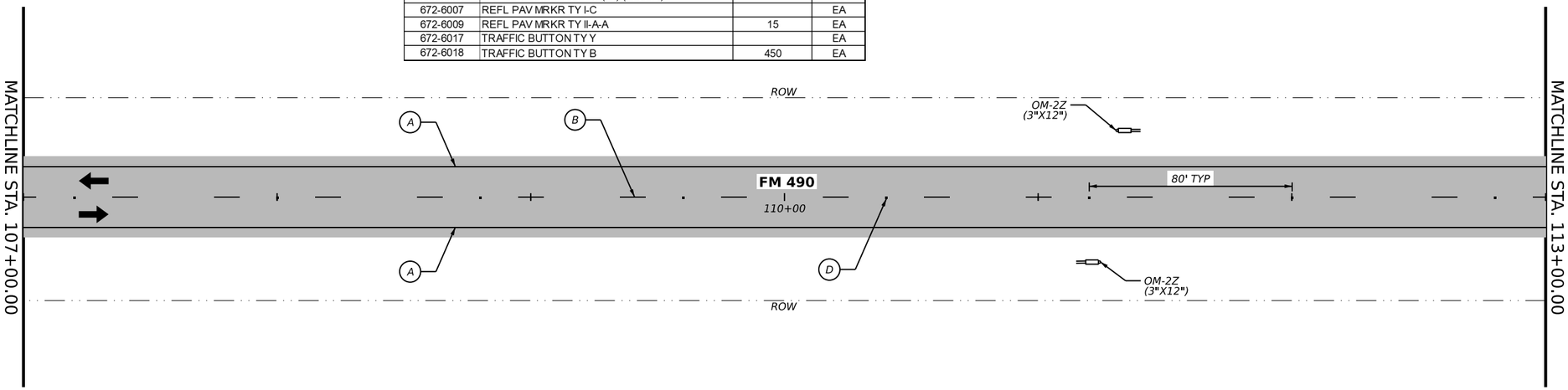
SHEET 8 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		177

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2400	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	15	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B	450	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

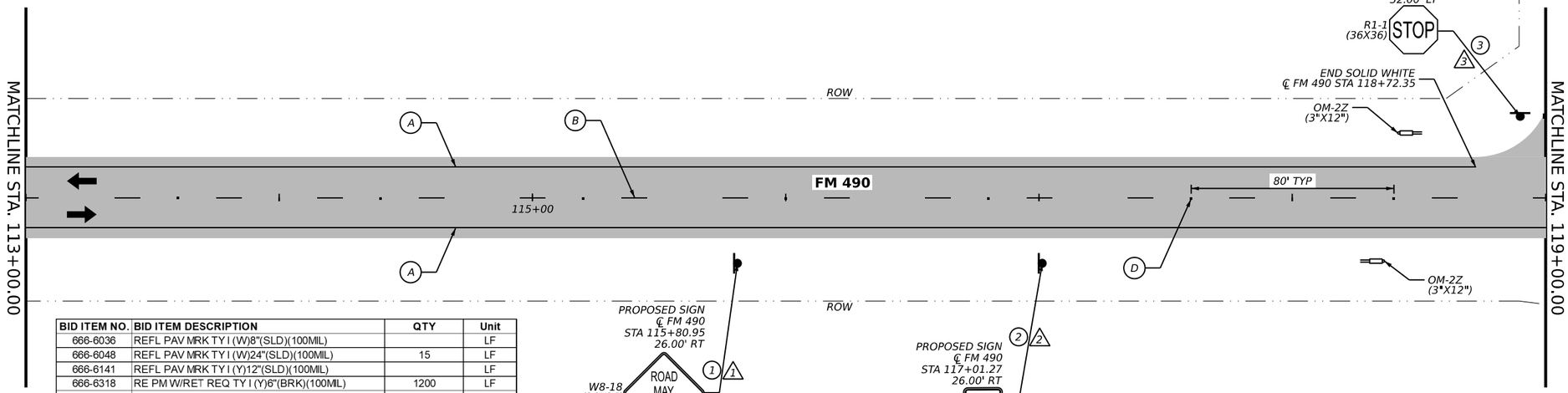
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 101+00 TO STA 113+00

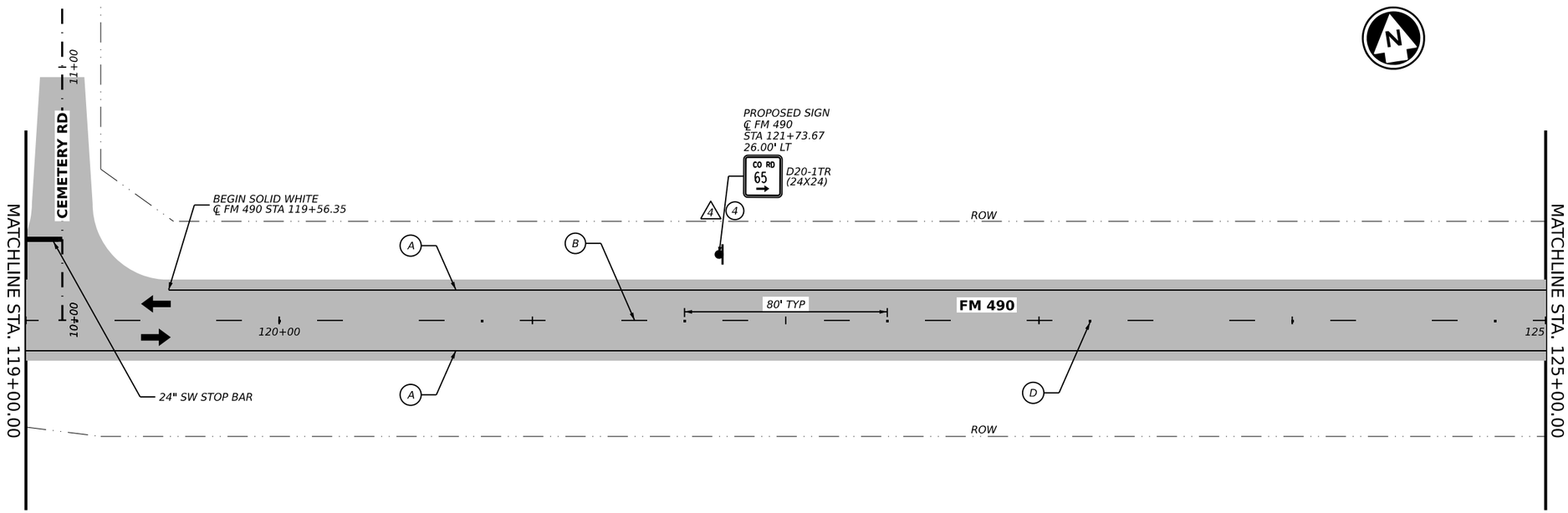
SHEET 9 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		178

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	15	LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2317	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	15	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B	450	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

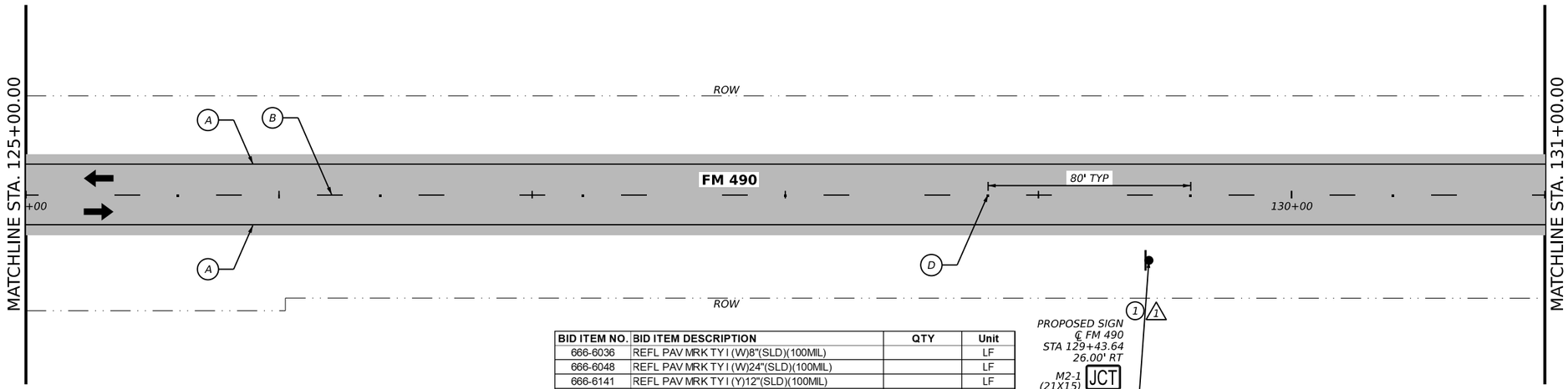
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 113+00 TO STA 125+00

SHEET 10 OF 13

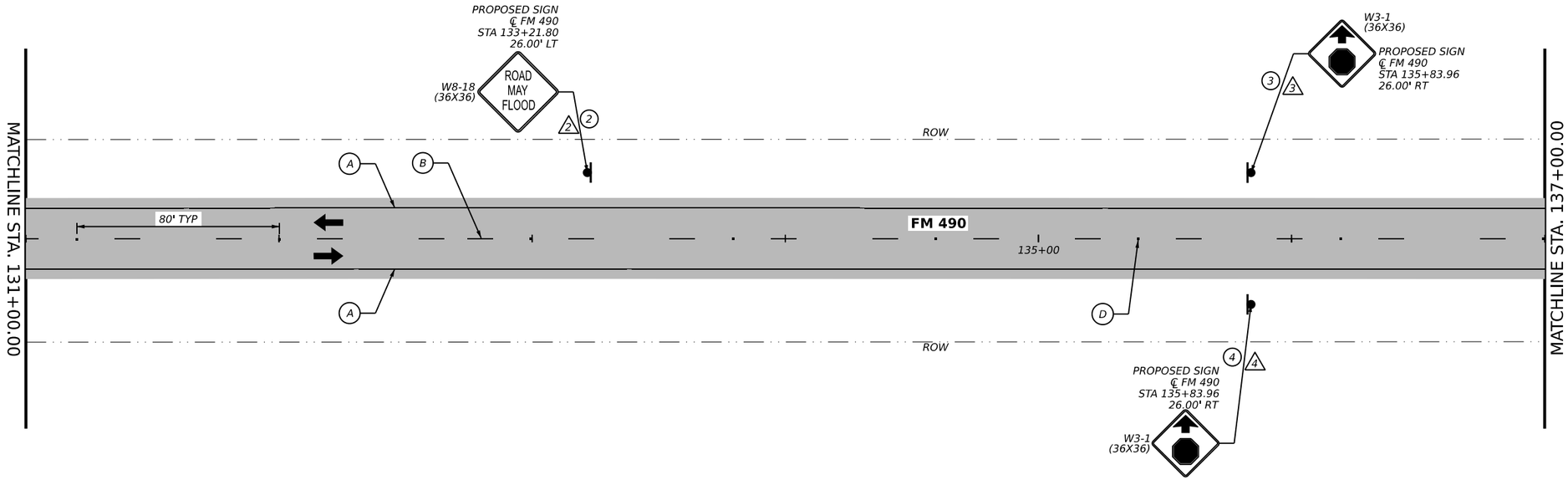
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		179

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2400	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	15	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B	450	EA

PROPOSED SIGN
℄ FM 490
STA 129+43.64
26.00' RT
M2-1
(21X15)
JCT
M1-6F
(24X24)
1016
1
1



0 25 50
HORIZ:
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- 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)
- E RAISED PAV MARK (TY I-C)
- F REFL PAV MRK TY 1 W 8" (SLD)
- G RE PM W/ RET REQ TY I Y 12" (SLD)
- H REF PROF PAV MRK TY I Y 6" (BRK)
- I REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- REMOVE SIGN
- ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

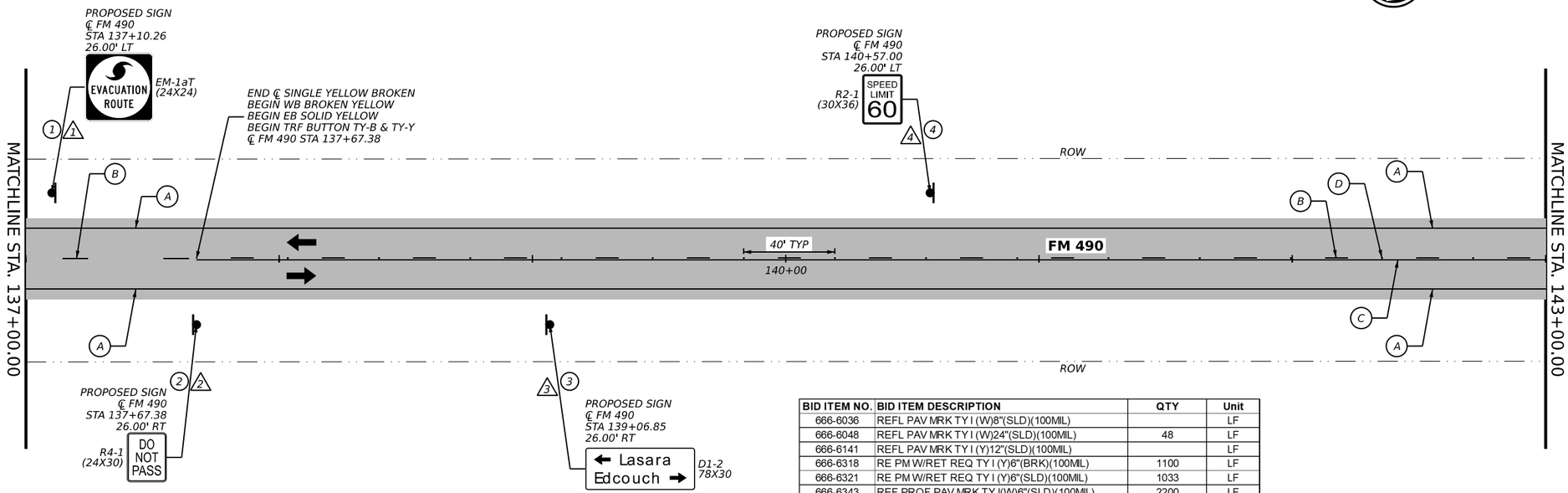
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 125+00 TO STA 137+00

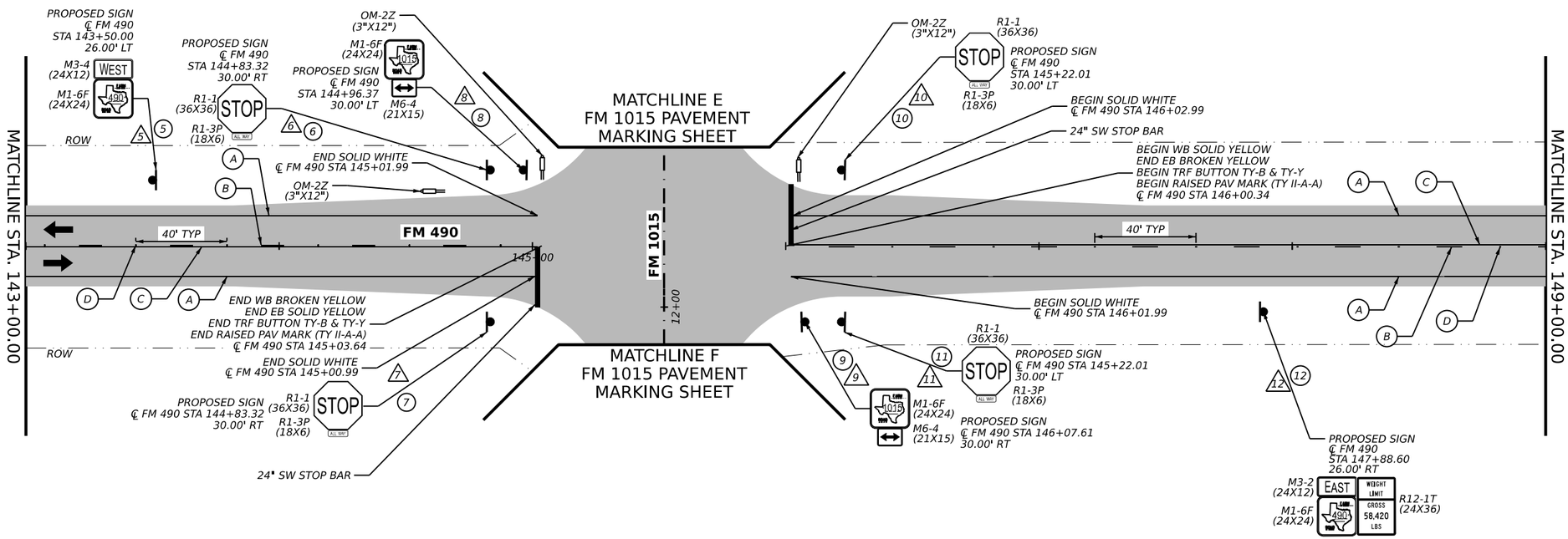
SHEET 11 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		180

DATE: DATE TIME
FILE: DOCUMENT NAME



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	48	LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1100	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	1033	LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2200	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	55	EA
672-6017	TRAFFIC BUTTON TY Y	194	EA
672-6018	TRAFFIC BUTTON TY B	220	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- 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)
- E RAISED PAV MARK (TY I-C)
- F REFL PAV MRK TY 1 W 8" (SLD)
- G RE PM W/ RET REQ TY I Y 12" (SLD)
- H REF PROF PAV MRK TY I Y 6" (BRK)
- I REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- # REMOVE SIGN
- # ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
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Kristen Harper
11/31/2024

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ENGINEERING FIRM F-845

Texas Department of Transportation

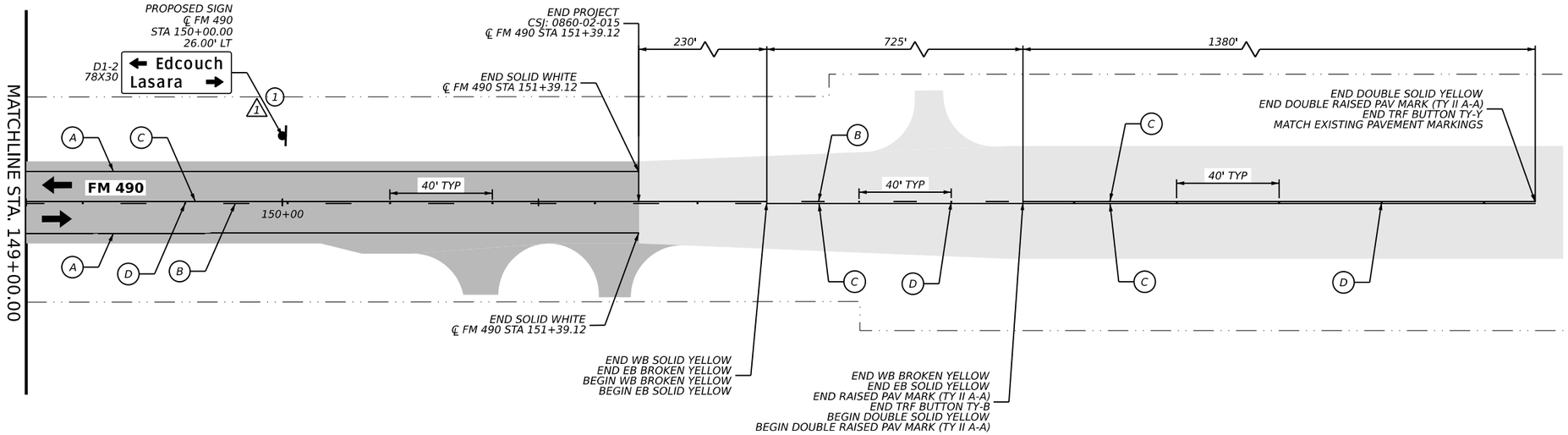
FM 490

PAVEMENT MARKING AND SIGNING PLAN STA 137+00 TO STA 149+00

SHEET 12 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		181

DATE: DATE TIME
FILE: DOCUMENT NAME



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	1200	LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	3955	LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	480	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)		LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)		LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	65	EA
672-6017	TRAFFIC BUTTON TY Y	743	EA
672-6018	TRAFFIC BUTTON TY B	225	EA

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
1/31/2024

NO.	DATE	REVISION	APPROVED

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13737 NOEL RD,
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DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

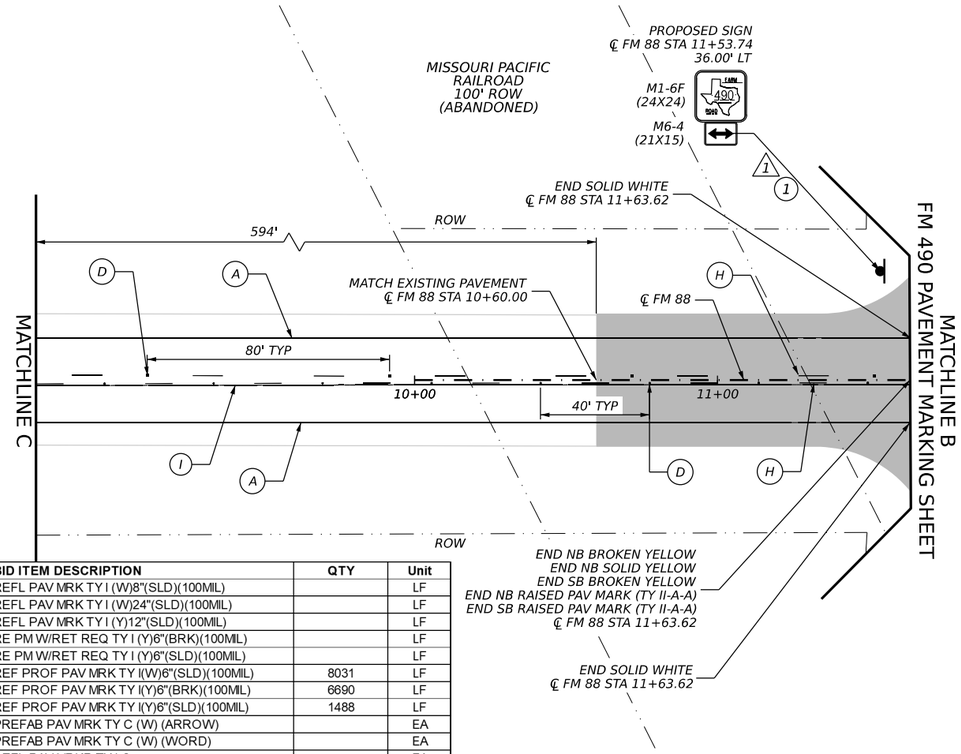
FM 490

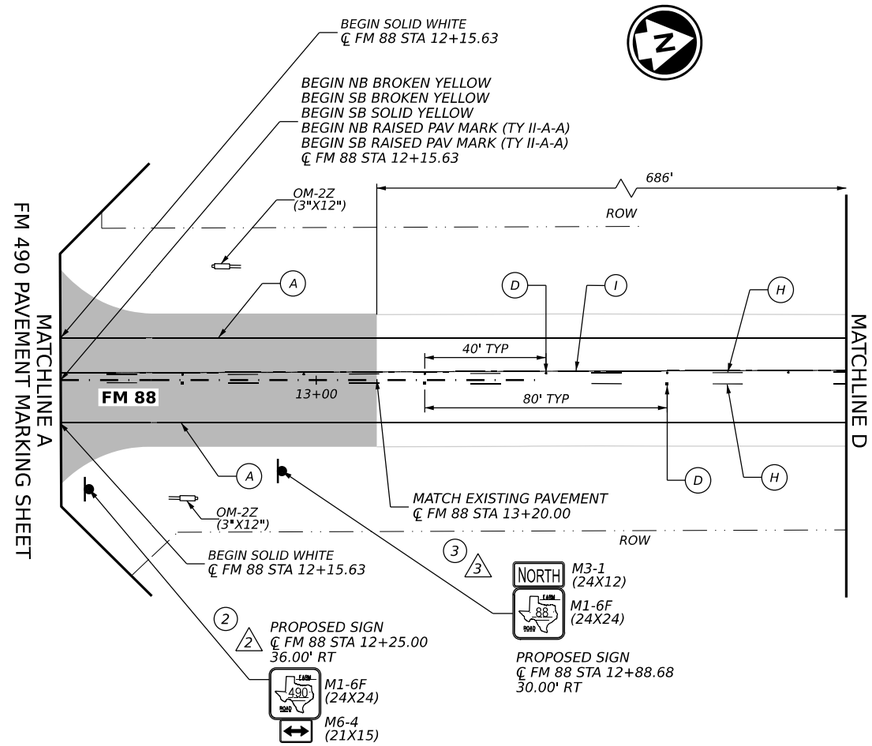
PAVEMENT MARKING AND SIGNING PLAN STA 149+00 TO END

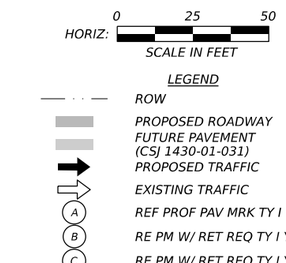
SHEET 13 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		182

DATE: DATE TIME
FILE: DOCUMENT NAME







BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)		LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)		LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	8031	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	6690	LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	1488	LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	233	EA
672-6017	TRAFFIC BUTTON TY Y		EA
672-6018	TRAFFIC BUTTON TY B		EA

NOTES

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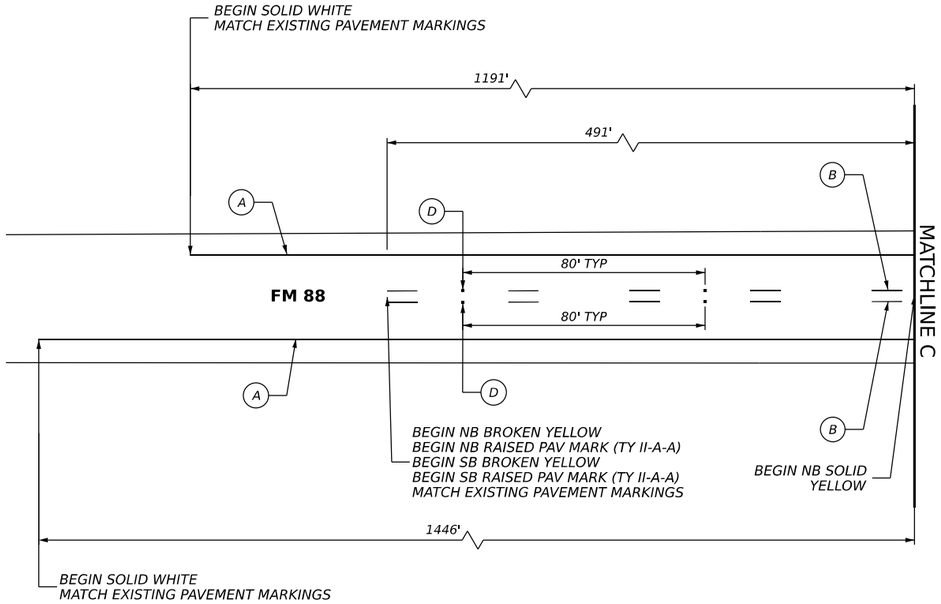
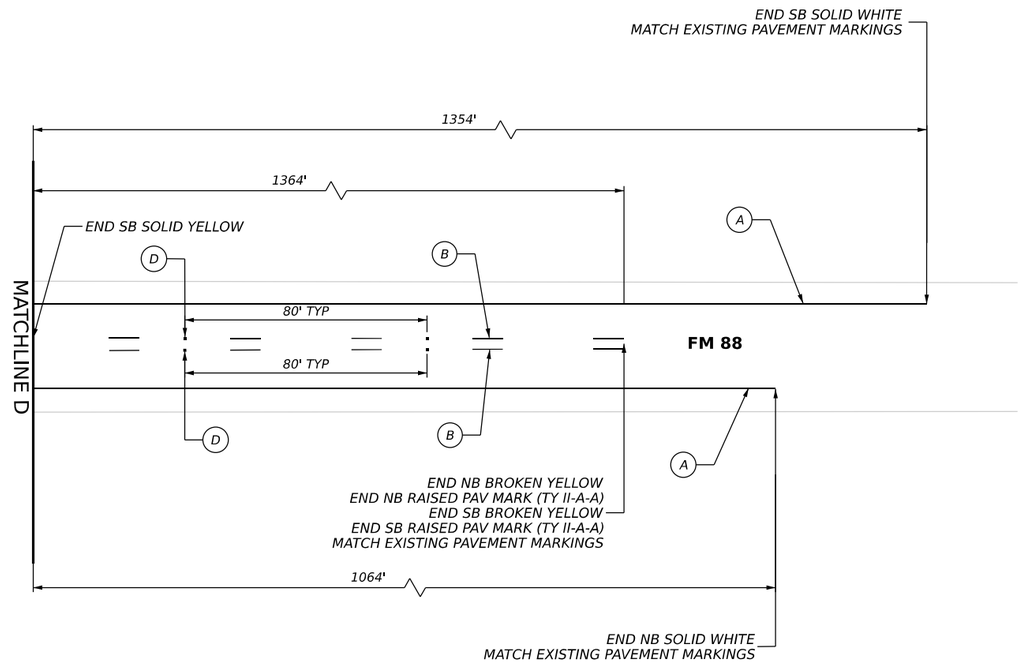
2. SEE TRAFFIC STANDARDS FOR MORE INFORMATION AND DETAILS.
3. TRAFFIC BUTTONS SHALL BE PLACED IN COMPLIANCE WITH TXDOT AND PHARR DISTRICT STANDARDS.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.





STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

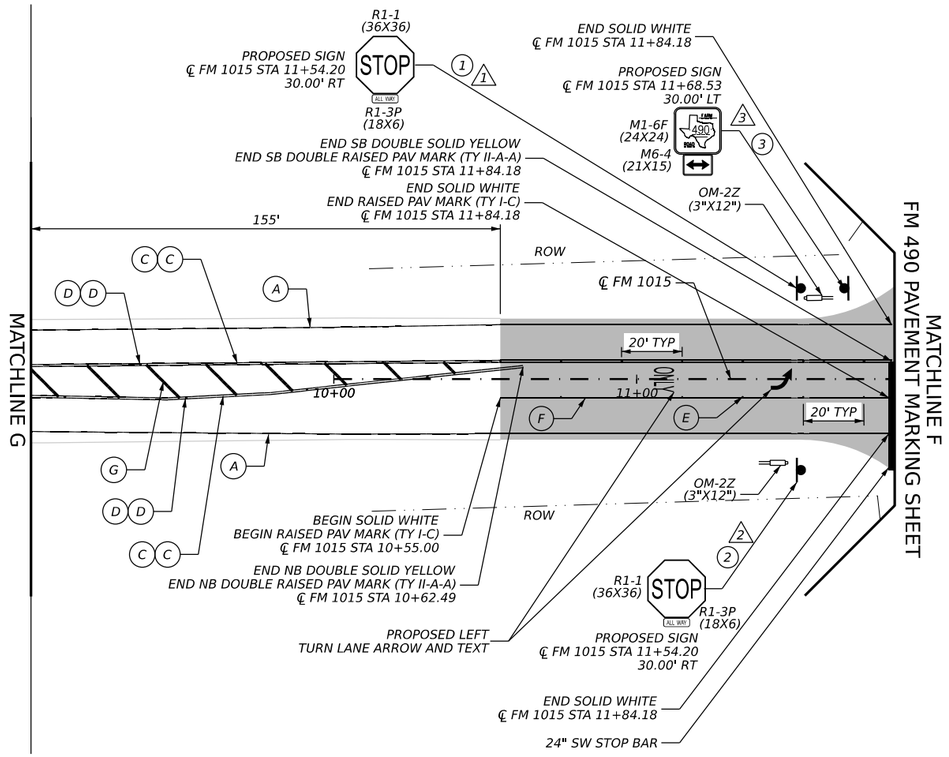
FM 88

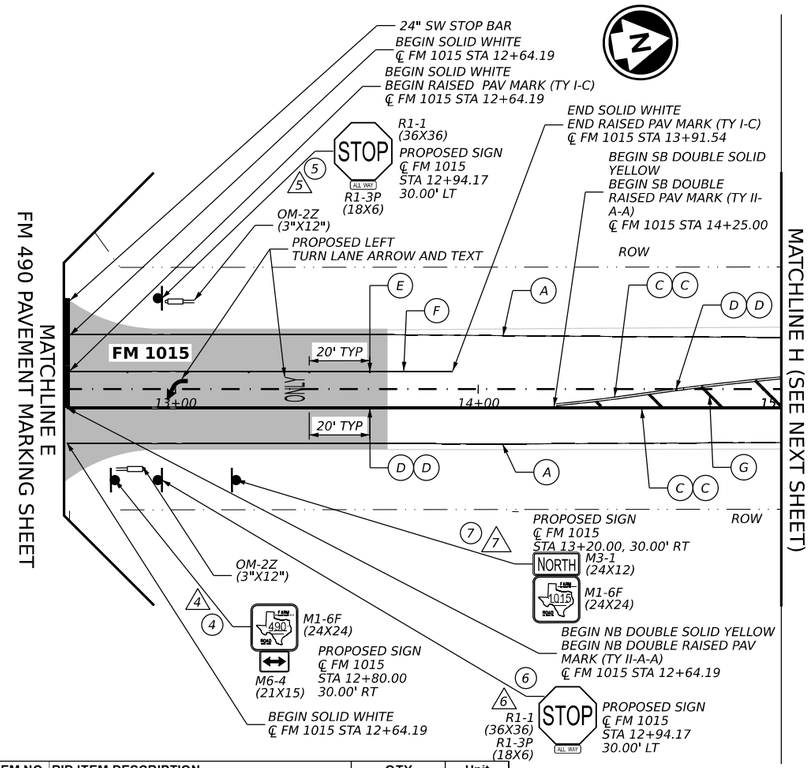
PAVEMENT MARKING AND SIGNING PLAN BEGIN TO END

SHEET 1 OF 1

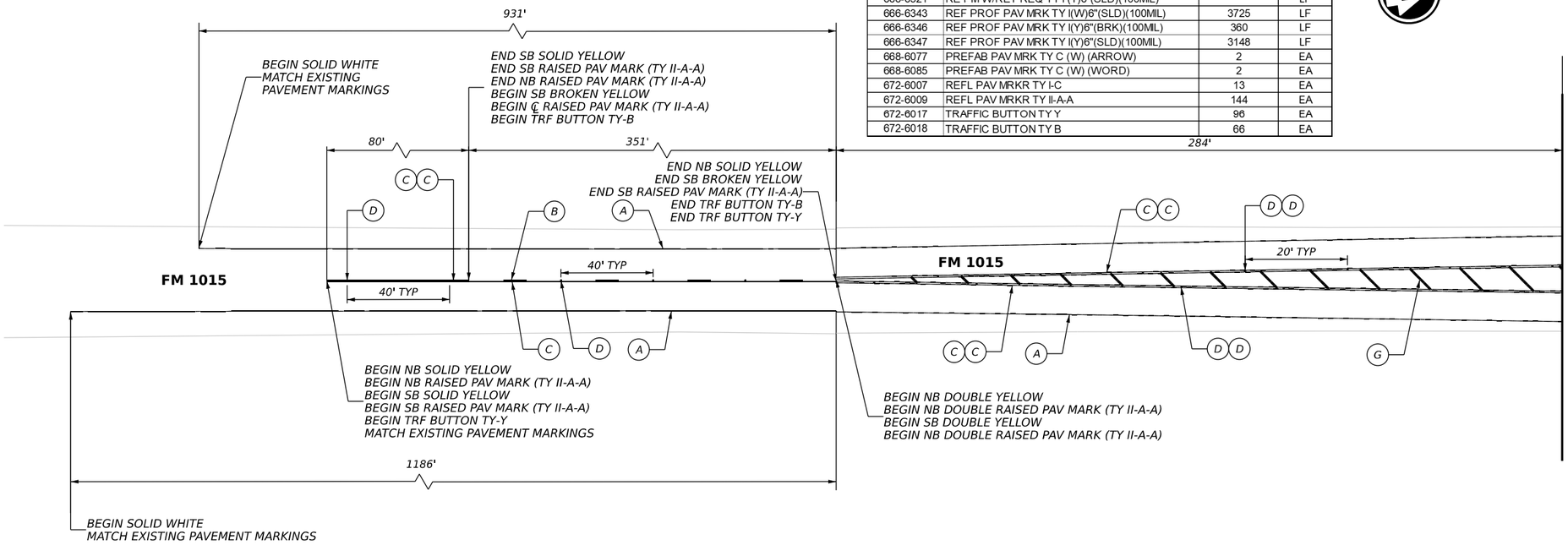
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		183

DATE: 1/31/2024
FILE: ...\FM490-BMCD_PMRK-14.dgn





BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	258	LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	72	LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	241	LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)		LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	3725	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	360	LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	3148	LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)	2	EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)	2	EA
672-6007	REFL PAV MRKR TY I-C	13	EA
672-6009	REFL PAV MRKR TY II-A-A	144	EA
672-6017	TRAFFIC BUTTON TY Y	96	EA
672-6018	TRAFFIC BUTTON TY B	66	EA



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

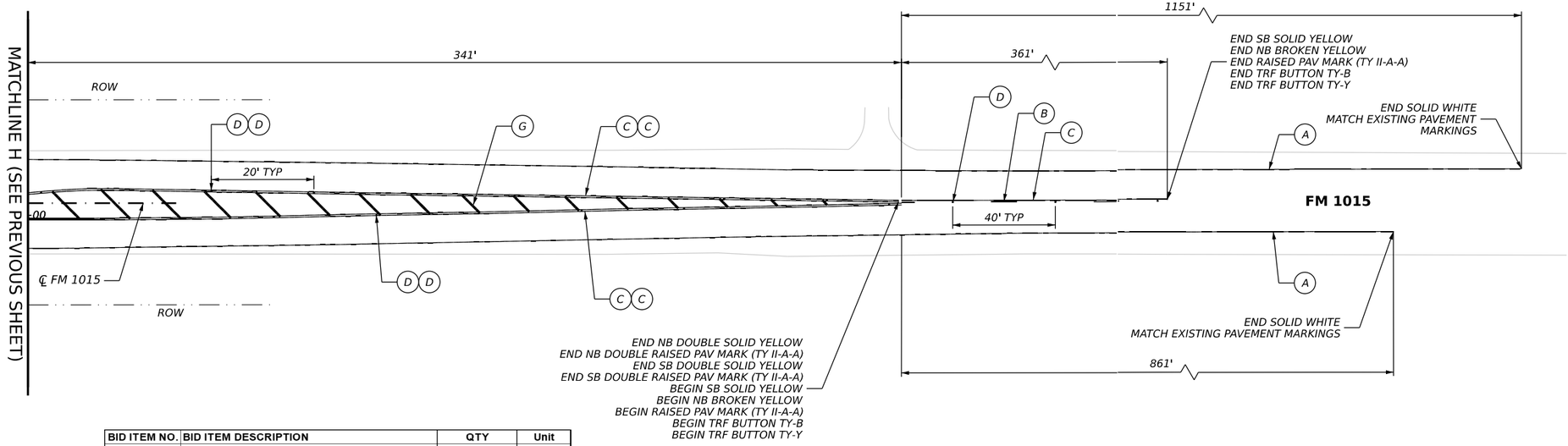
FM 1015

PAVEMENT MARKING AND SIGNING PLAN BEGIN TO STA 15+00

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		184

DATE: 1/31/2024
FILE: ...\FM490-BMCD_PMRK-15.dgn



BID ITEM NO.	BID ITEM DESCRIPTION	QTY	Unit
666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF
666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF
666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	162	LF
666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)		LF
666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	2694	LF
666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	370	LF
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	1725	LF
668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA
668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA
672-6007	REFL PAV MRKR TY I-C		EA
672-6009	REFL PAV MRKR TY II-A-A	78	EA
672-6017	TRAFFIC BUTTON TY Y	68	EA
672-6018	TRAFFIC BUTTON TY B	68	EA

HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED ROADWAY
- FUTURE PAVEMENT (CSJ 1430-01-031)
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (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)
- (E) RAISED PAV MARK (TY I-C)
- (F) REFL PAV MRK TY 1 W 8" (SLD)
- (G) RE PM W/ RET REQ TY I Y 12" (SLD)
- (H) REF PROF PAV MRK TY I Y 6" (BRK)
- (I) REF PROF PAV MRK TY I Y 6" (SLD)
- INSTL DEL ASSM (BI-DIRECTIONAL)
- ROAD SIGN
- OM-2Z CULVERT MARKER
- (#) REMOVE SIGN
- (#) ADD SIGN

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 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.
4. PAVEMENT MARKINGS REMOVED FOR TCP SHOULD BE REPLACED TO EXISTING CONDITION. REFER TO STANDARDS AND TMUTCD FOR DETAILS. DIAGONAL YELLOW LINES PER TMUTCD 3B.24 WITH SPACING TO FOLLOW REFLECTOR GUIDANCE.

STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/31/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

FM 1015

PAVEMENT MARKING AND SIGNING PLAN STA 15+00 TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
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DATE: 1/31/2024
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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE 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
1	1	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
		W4-4P	CROSS TRAFFIC DOES NOT STOP	36X18	A							
1	2	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
		W4-4P	CROSS TRAFFIC DOES NOT STOP	36X18	A							
1	3	M1-6F	FARM 88 ROAD	24X24	A		S80	1	SA	P		
		M6-4	↔	21X15	A							
1	4	M1-6F	FARM 88 ROAD	24X24	A		S80	1	SA	P		
		M6-4	↔	21X15	A							
1	5	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
		W4-4P	CROSS TRAFFIC DOES NOT STOP	36X18	A							
1	6	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
		W4-4P	CROSS TRAFFIC DOES NOT STOP	36X18	A							
1	7	M3-2	EAST	24X12	A		S80	1	SA	P		
		M1-6F	FARM 490 ROAD	24X24	A							
2	1	R2-1	SPEED LIMIT 60	30X36	A		S80	1	SA	P		
2	2	D1-1	← Weslaco	78X18	A		S80	1	SA	T		
2	3	R4-1	DO NOT PASS	24X30	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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Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0860	02	015	FM490
4-16 8-16	DIST	COUNTY		SHEET NO.
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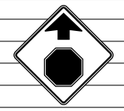
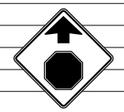
SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
2	4	W3-1		36X36	A		S80	1	SA	T		
2	5	S3-1		36X36	A		S80	1	SA	T		
2	6	W3-1		36X36	A		S80	1	SA	T		
2	7	W8-18		36X36	A		S80	1	SA	T		
3	1	M2-1		21X15	A		S80	1	SA	P		
		M1-6F		24X24	A							
4	1	R4-1		24X30	A		S80	1	SA	P		
4	2	S3-1		36X36	A		S80	1	SA	T		
4	3	R4-2		24X30	A		S80	1	SA	P		
4	4	W8-18		36X36	A		S80	1	SA	T		
5	1	R4-1		24X30	A		S80	1	SA	P		
5	2	D20-2T		24X24	A		S80	1	SA	P		

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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)					BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		TY = TYPE
										PREFABRICATED	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY N TY S
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		
6	1	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
6	2	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
6	3	M3-2	EAST	24X12	A		S80	1	SA	P		
		M1-6F	FARM 490 ROAD	24X24	A							
6	4	D20-2T	CO RD 50	24X24	A		S80	1	SA	P		
8	1	D20-2T	CO RD 60	24X24	A		S80	1	SA	P		
8	2	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
8	3	R1-1	STOP	36X36	A		S80	1	SA	P	BM	
8	4	D20-2T	CO RD 60	24X24	A		S80	1	SA	P		
10	1	W8-18	ROAD MAY FLOOD	36X36	A		S80	1	SA	T		
10	2	D20-1TL	CO RD 65	24X24	A		S80	1	SA	P		
10	3	R1-1	STOP	36X36	A		S80	1	SA	P	BM	

DATE:
FILE:

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

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Traffic Operations Division Standard

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4-16		DIST	COUNTY		SHEET NO.
8-16		PHR	WILLACY		188

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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
10	4	D20-1TR	CO RD 65 ➡	24X24	A		S80	1	SA	P		
11	1	M2-1	JCT	21X15	A		S80	1	SA	P		
		M1-6F	FARM 1015 ROAD	24X24	A							
11	2	W8-18	ROAD MAY FLOOD	36X36	A		S80	1	SA	T		
11	3	W3-1		36X36	A		S80	1	SA	T		
11	4	W3-1		36X36	A		S80	1	SA	T		
12	1	EM-1aT	EVACUATION ROUTE	24X24	A		S80	1	SA	P		
12	2	R4-1	DO NOT PASS	24X30	A		S80	1	SA	P		
12	3	D1-2	← Lasara Edcouch →	78X30	A		S80	1	SA	U	BM	
12	4	R2-1	SPEED LIMIT 60	30X36	A		S80	1	SA	P		
12	5	M3-4	WEST	24X12	A		S80	1	SA	P		
		M1-6F	FARM 490 ROAD	24X24	A							

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

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Traffic Operations Division Standard

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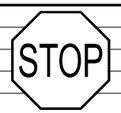
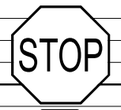
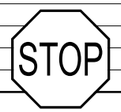
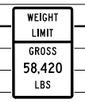
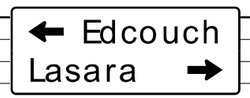
4-16 8-16	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		189

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: 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
12	6	R1-1		36X36	A		S80	1	SA	P	BM	
		R1-3P		18X6	A							
12	7	R1-1		36X36	A		S80	1	SA	P	BM	
		R1-3P		18X6	A							
12	8	M1-6F		24X24	A		S80	1	SA	P		
		M6-4		21X15	A							
12	9	M1-6F		24X24	A		S80	1	SA	P		
		M6-4		21X15	A							
12	10	R1-1		36X36	A		S80	1	SA	P	BM	
		R1-3P		18X6	A							
12	11	R1-1		36X36	A		S80	1	SA	P	BM	
		R1-3P		18X6	A							
12	12	M3-2		24X12	A		S80	1	SA	U		
		M1-6F		24X24	A							
		R12-1T		24X36	A							
13	1	D1-2		78X30	A		S80	1	SA	U	BM	
1	1	M1-6F		24X24	A		S80	1	SA	P		
FM88												
		M6-4		21X15	A							

ALUMINUM SIGN BLANKS THICKNESS	
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8-16		PHR	WILLACY		190

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DATE:
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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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	2	M1-6F	FARM 490 ROAD	24X24	A		S80	1	SA	P		
FM88												
		M6-4	↔	21X15	A							
1	3	M3-1	NORTH	24X12	A		S80	1	SA	P		
FM88			FARM 88 ROAD									
		M1-6F		24X24	A							
1	1	R1-1	STOP ALL WAY	36X36	A		S80	1	SA	P	BM	
FM1015												
		R1-3P		18X6	A							
1	2	R1-1	STOP ALL WAY	36X36	A		S80	1	SA	P	BM	
FM1015												
		R1-3P		18X6	A							
1	3	M1-6F	FARM 490 ROAD	24X24	A		S80	1	SA	P		
FM1015			↔									
		M6-4		21X15	A							
1	4	M1-6F	FARM 490 ROAD	24X24	A		S80	1	SA	P		
FM1015			↔									
		M6-4		21X15	A							
1	5	R1-1	STOP ALL WAY	36X36	A		S80	1	SA	P	BM	
FM1015												
		R1-3P		18X6	A							
1	6	R1-1	STOP ALL WAY	36X36	A		S80	1	SA	P	BM	
FM1015												
		R1-3P		18X6	A							
1	7	M3-1	NORTH	24X12	A		S80	1	SA	P		
FM1015			FARM 1015 ROAD									
		M1-6F		24X24	A							

ALUMINUM SIGN BLANKS THICKNESS	
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© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
4-16 8-16	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		191

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	R1-1	STOP SIGN	1	
		W4-4P	CROSS TRAFFIC DOESN'T STOP		
	2	R1-1	STOP SIGN	1	
		W4-4P	CROSS TRAFFIC DOESN'T STOP		
	3	M1-6F	TEXAS FARM ROAD 88 ROUTE MARKER	1	
		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	4	M1-6F	TEXAS FARM ROAD 88 ROUTE MARKER	1	
		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	5	R1-1	STOP SIGN	1	
		W4-4P	CROSS TRAFFIC DOESN'T STOP		
	6	R1-1	STOP SIGN	1	
		W4-4P	CROSS TRAFFIC DOESN'T STOP		
	7	M3-2	EAST	1	
		M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER		7
2	1	R2-1	SPEED LIMIT 60	1	
	2	D1-2	WESLACO/RAYMONDVILLE GUIDE SIGN	1	
	3	W3-1	STOP SIGN AHEAD	1	
	4	S3-1	SCHOOL BUS STOP AHEAD	1	
	5	W3-1	STOP SIGN AHEAD	1	
	6	W8-18	ROAD MAY FLOOD	1	6
3	1	M2-1	JCT	1	
		M1-6F	TEXAS FARM ROAD 88 ROUTE MARKER		1
4	1	R4-1	DO NOT PASS	1	
	2	S3-1	SCHOOL BUS STOP AHEAD	1	
	3	R4-2	PASS WITH CARE	1	
	4	W8-18	ROAD MAY FLOOD	1	4
5	1	R4-1	DO NOT PASS	1	
	2	D20-2T	CO RD 50 DOUBLE HEAD DIRECTIONAL ARROW	1	2
6	1	R1-1	STOP SIGN	1	
	2	R1-1	STOP SIGN	1	
	3	M3-2	EAST	1	
		M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER		
	4	D20-2T	CO RD 50 DOUBLE HEAD DIRECTIONAL ARROW	1	4
8	1	D20-2T	CO RD 60 DOUBLE HEAD DIRECTIONAL ARROW	1	
	2	R1-1	STOP SIGN	1	
	3	R1-1	STOP SIGN	1	3
10	1	W8-18	ROAD MAY FLOOD	1	
	2	D20-1TL	CO RD 65 LEFT DIRECTIONAL ARROW	1	
	3	R1-1	STOP SIGN	1	
	4	D20-1TR	CO RD 65 RIGHT DIRECTIONAL ARROW	1	4
11	1	M2-1	JCT	1	
		M1-6F	TEXAS FARM ROAD 1015 ROUTE MARKER		
	2	W8-18	ROAD MAY FLOOD	1	
	3	W3-1	STOP AHEAD	1	
	4	W3-1	STOP AHEAD	1	4
12	1	EM-1aT	EVACUATION ROUTE	1	
	2	R4-1	DO NOT PASS	1	
	3	D1-2	LASARA/EDCOUCH GUIDE SIGN	1	
	4	R2-1	SPEED LIMIT 60	1	
	5	M3-4	WEST	1	
		M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER		
	6	R1-1	STOP SIGN	1	
		R1-3P	ALL WAY		
	7	R1-1	STOP SIGN	1	
		R1-3P	ALL WAY		
	8	M1-6F	TEXAS FARM ROAD 1015 ROUTE MARKER	1	
		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	9	M1-6F	TEXAS FARM ROAD 1015 ROUTE MARKER	1	
		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		

SUMMARY OF SIGN REMOVAL

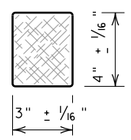
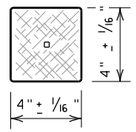
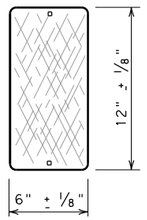
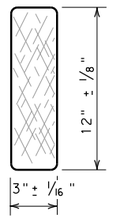
PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	644 6078 REMOVE SM RD SN SUP & AM (EA)	SHEET TOTAL
	10	R1-1	STOP SIGN	1	
		R1-3P	ALL WAY		
	11	R1-1	STOP SIGN	1	
		R1-3P	ALL WAY		
	12	M3-2	EAST	1	
		M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER		
		R12-1T	WEIGHT LIMIT 58,420 LBS		12
13	1	D1-2	EDCOUCH/LASARA GUIDE SIGN	1	1
1	1	M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER	1	
FM88		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	2	M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER	1	
		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	3	M3-1	NORTH	1	
		M1-6F	TEXAS FARM ROAD 88 ROUTE MARKER		3
1	1	R1-1	STOP SIGN	1	
FM1015		R1-3P	ALL WAY		
	2	R1-1	STOP SIGN	1	
		R1-3P	ALL WAY		
	3	M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER	1	
		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	4	M1-6F	TEXAS FARM ROAD 490 ROUTE MARKER	1	
		M6-4	DOUBLE HEAD DIRECTIONAL ARROW		
	5	R1-1	STOP SIGN	1	
		R1-3P	ALL WAY		
	6	R1-1	STOP SIGN	1	
		R1-3P	ALL WAY		
	7	M3-1	NORTH	1	
		M1-6F	TEXAS FARM ROAD 1015 ROUTE MARKER		7
				TOTAL	58

Texas Department of Transportation

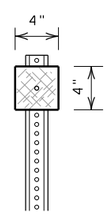
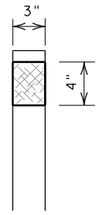
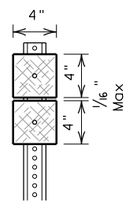
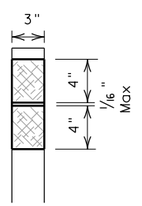
SUMMARY TABLE OF SMALL SIGNS TO BE REMOVED

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		192

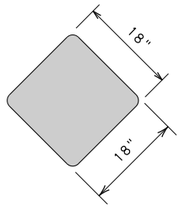
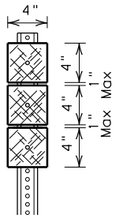
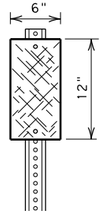
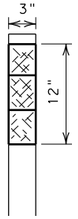
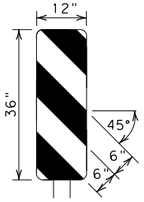
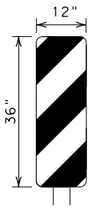
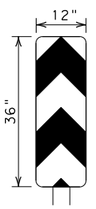
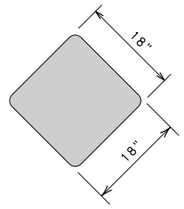
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	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.			

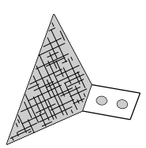
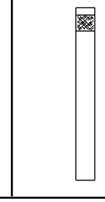
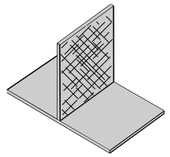
DELINEATORS

	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

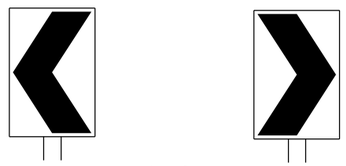
OBJECT MARKERS

	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

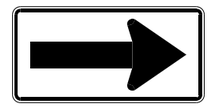
BARRIER REFLECTORS (BRF)

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

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

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

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

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	0860	02	015	FM490
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHR	WILLACY		193

20A

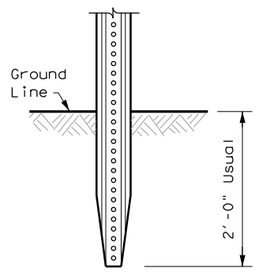
DATE:
FILE:

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

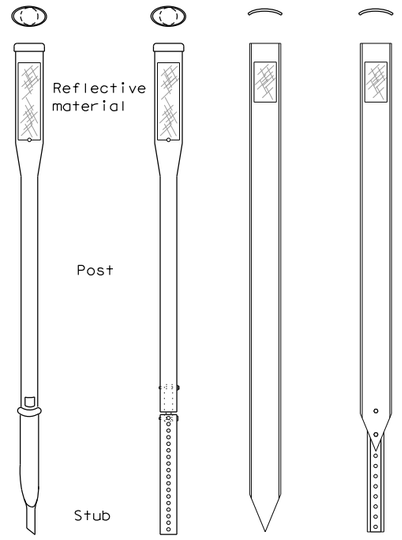


NOTES

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

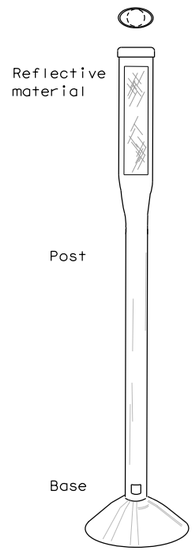
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



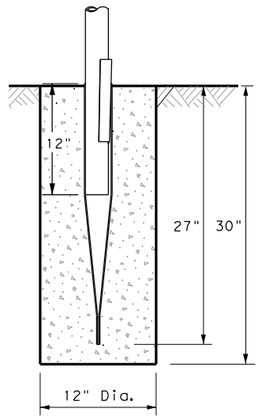
SURFACE MOUNT

NOTES

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

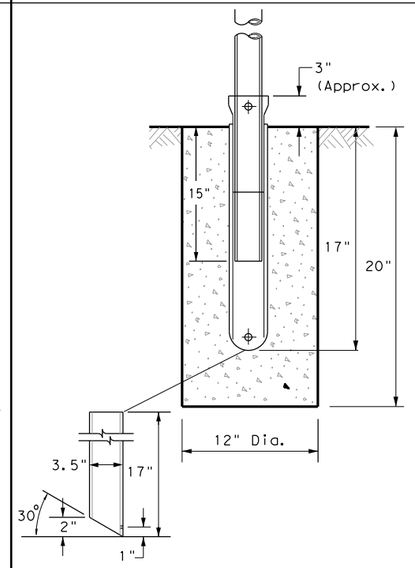
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

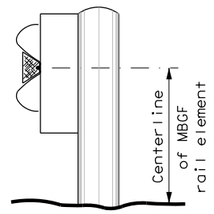
NOTE

1. Install per manufacturer's recommendations.

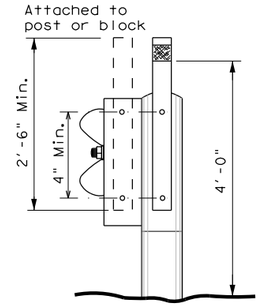
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

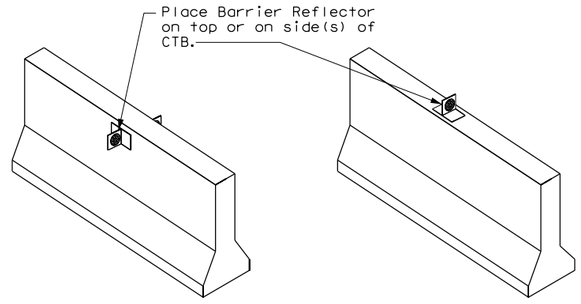
GF1



GF2



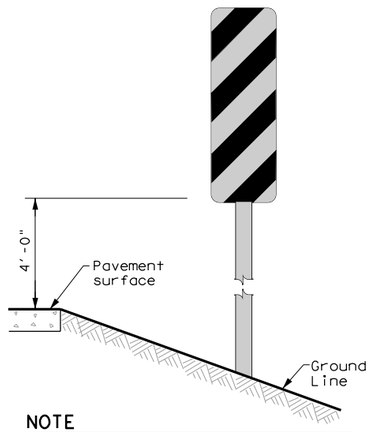
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

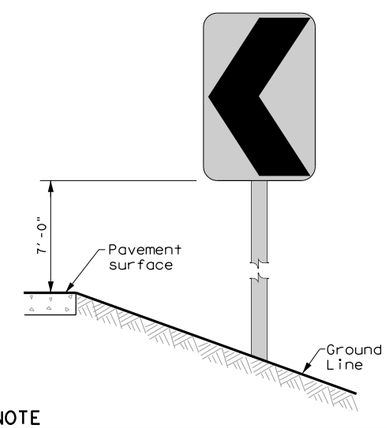
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

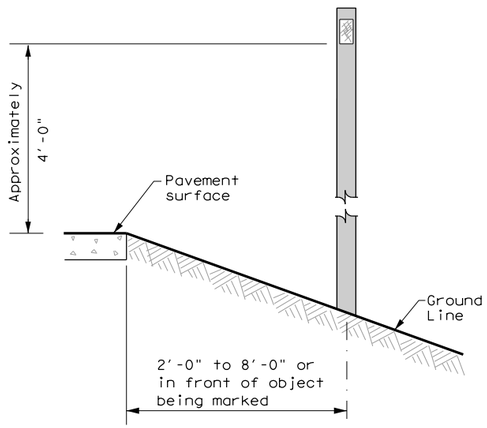
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHR	WILLACY		194

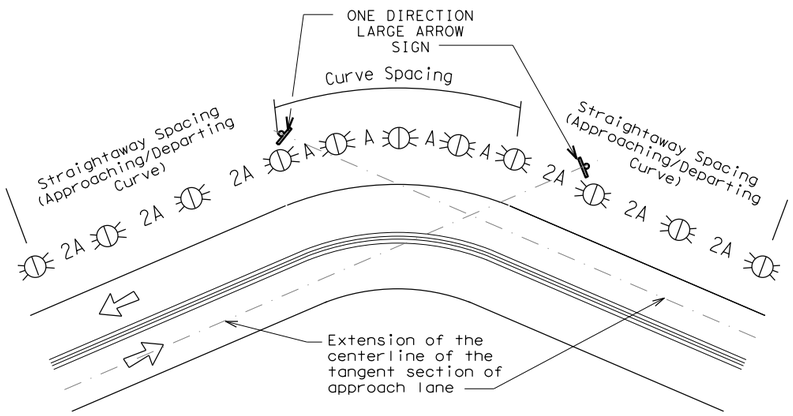
20B

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

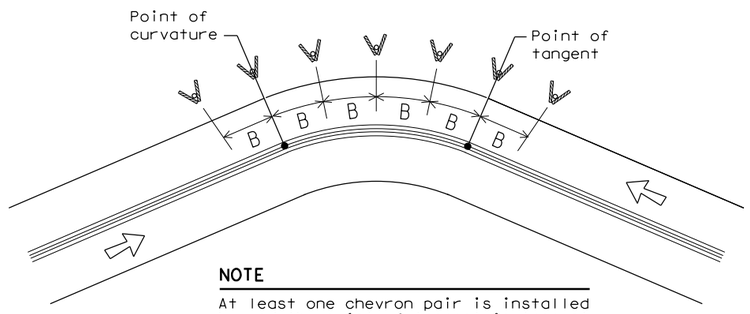
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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
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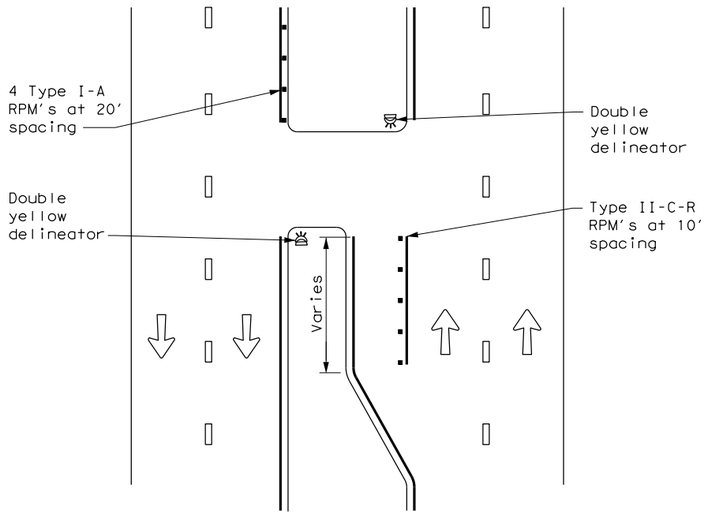
REVISIONS	0860	02	015	FM490
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	PHR	WILLACY		195

20C

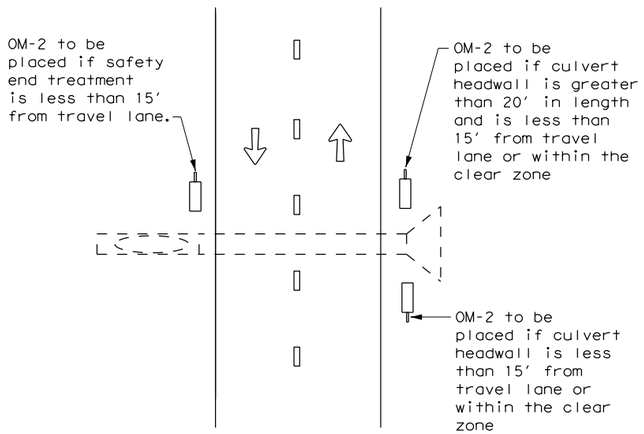
DATE:
FILE:

CROSSOVERS



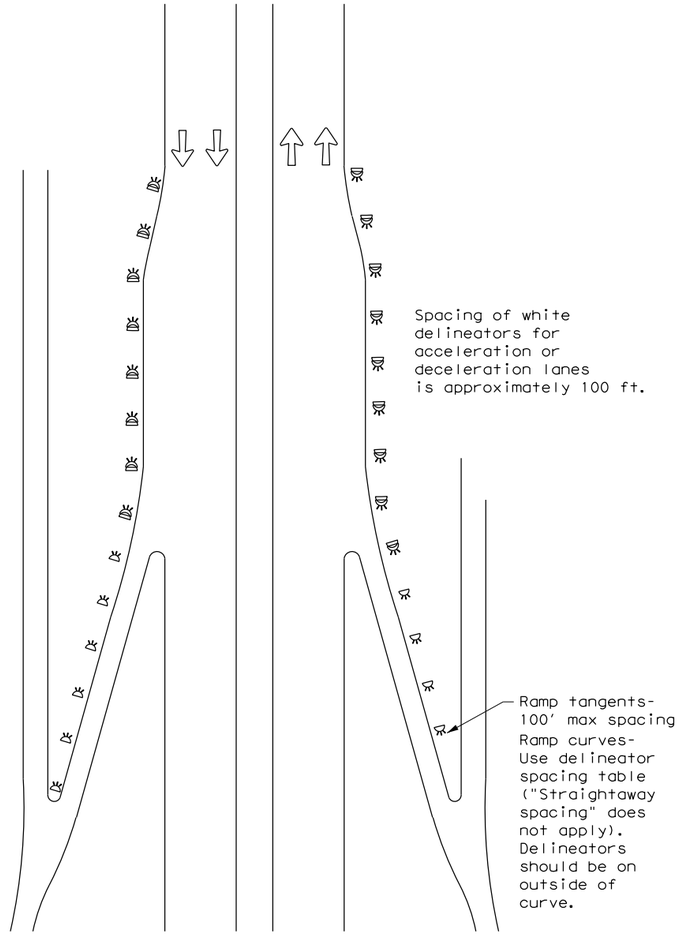
DETAIL 1

FOR CULVERTS WITHOUT MBGF



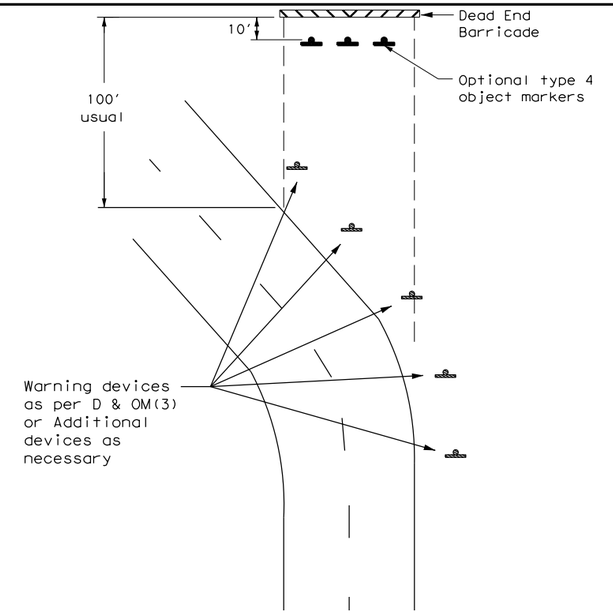
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



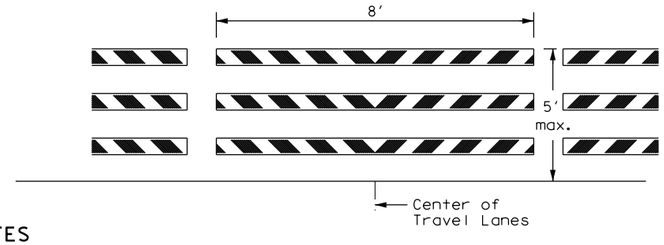
DETAIL 3

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
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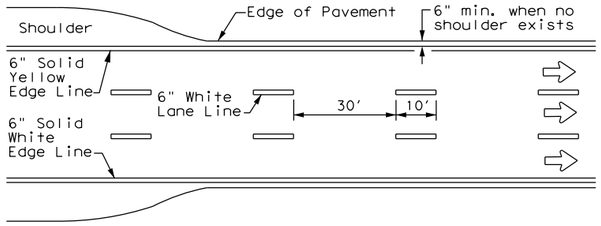
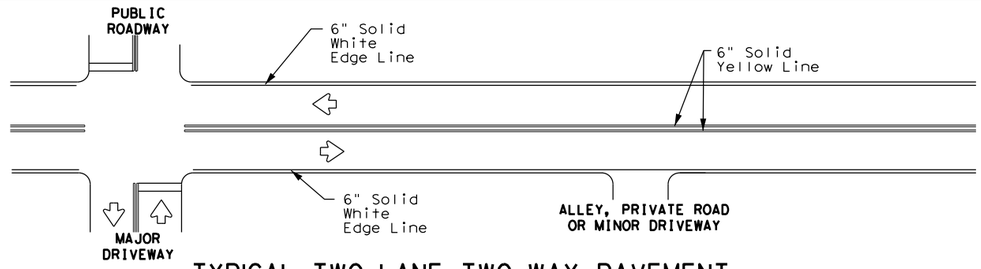
REVISIONS	0860	02	015	FM490
3-15	DIST	COUNTY		SHEET NO.
7-20	PHR	WILLACY		196

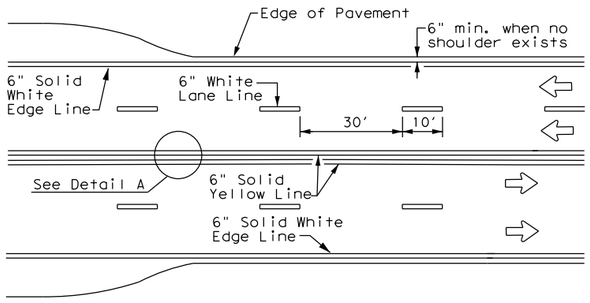
20D

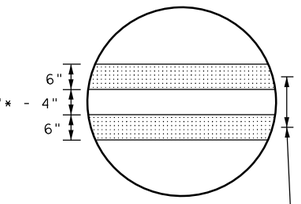


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





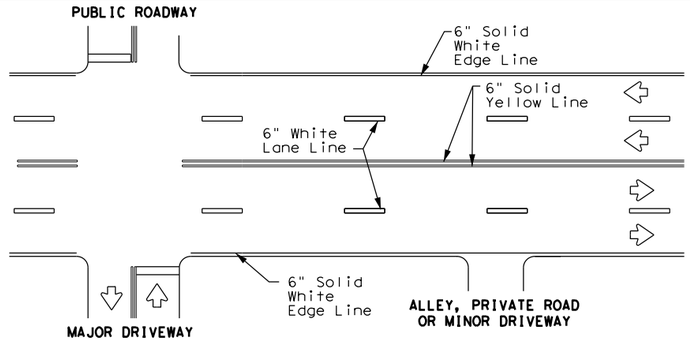
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

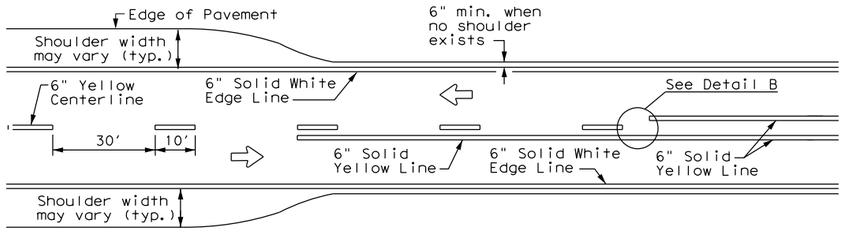
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

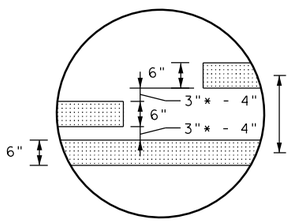
** 8" minimum for restripe projects when approved by the Engineer.



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

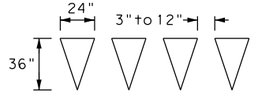


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



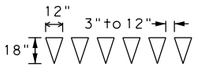
DETAIL "B"

* 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



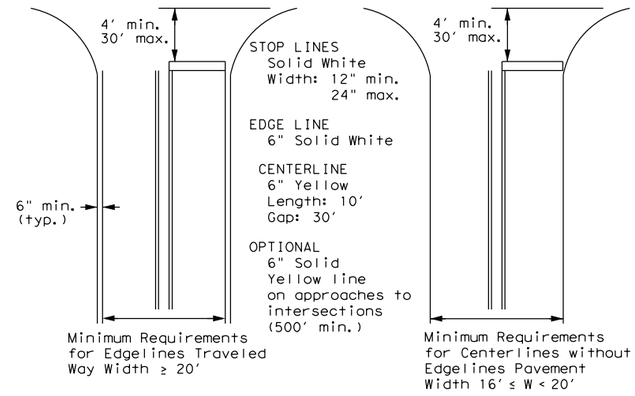
For posted speed on road being marked equal to or less than 40 MPH.

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

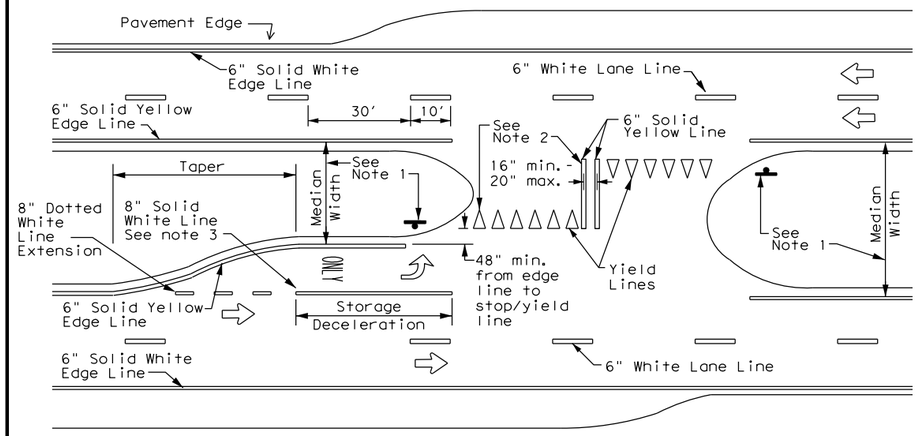
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



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



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.

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TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
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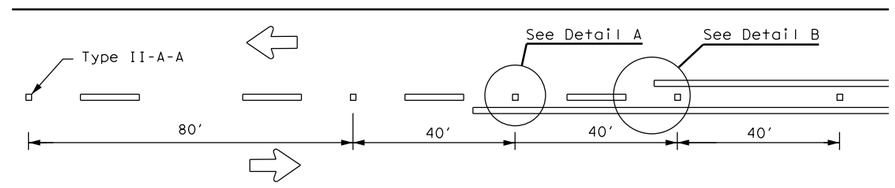
REVISIONS 11-78 8-00 6-20	0860	02	015	FM490
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	PHR	WILLACY		197

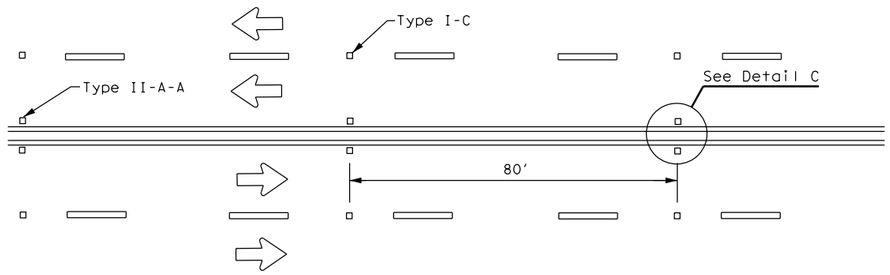
DATE:
FILE:

22A

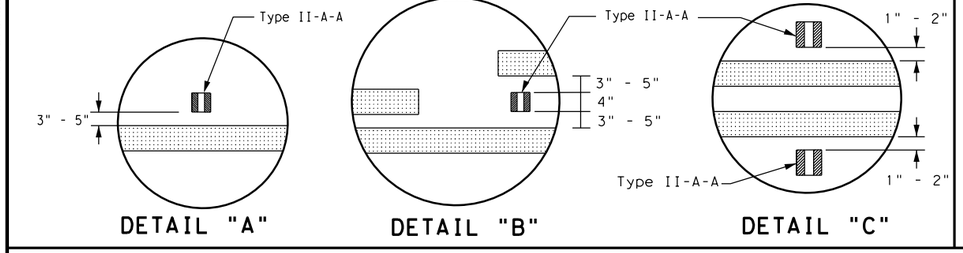
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

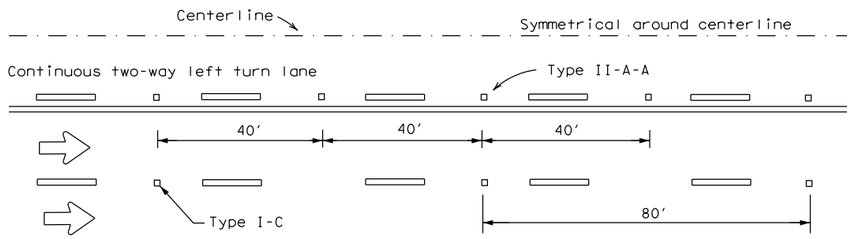


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

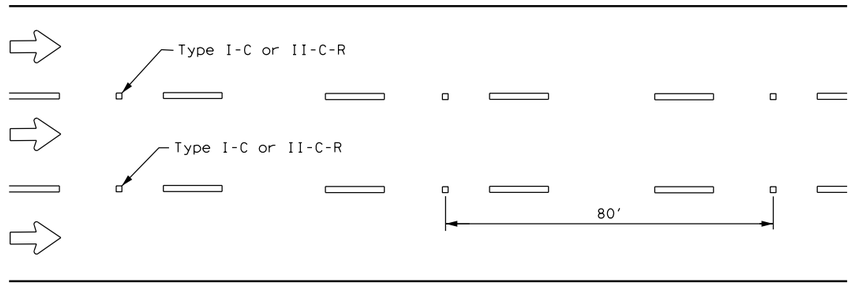


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



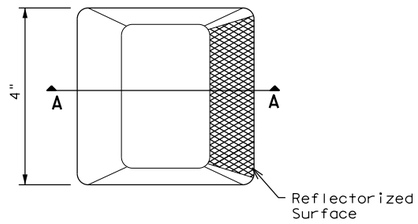
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

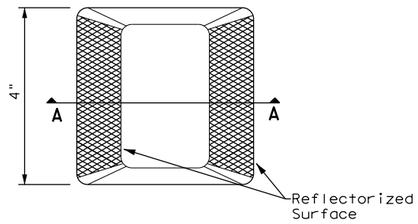
See Note 3.

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

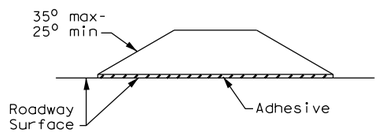
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

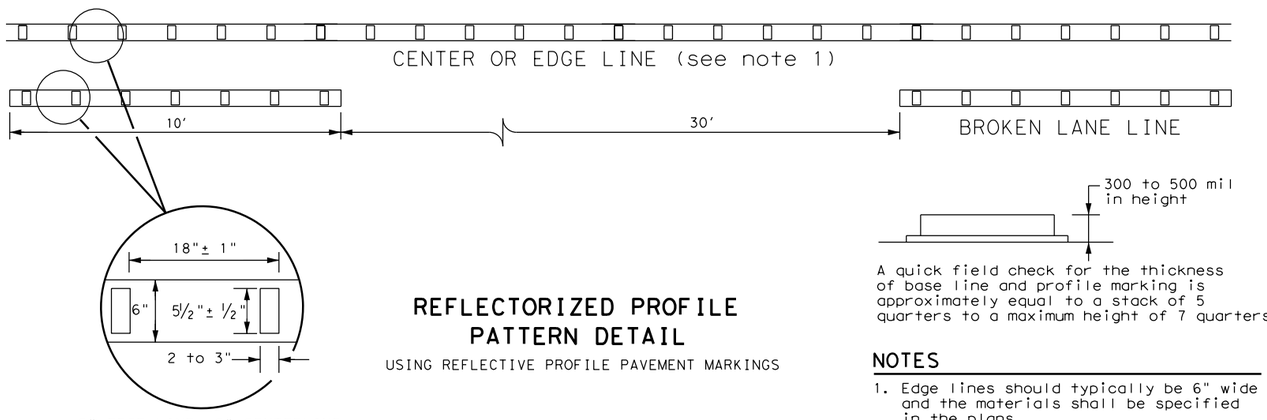


Type II (Top View)



SECTION A

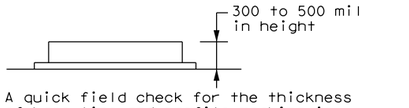
RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
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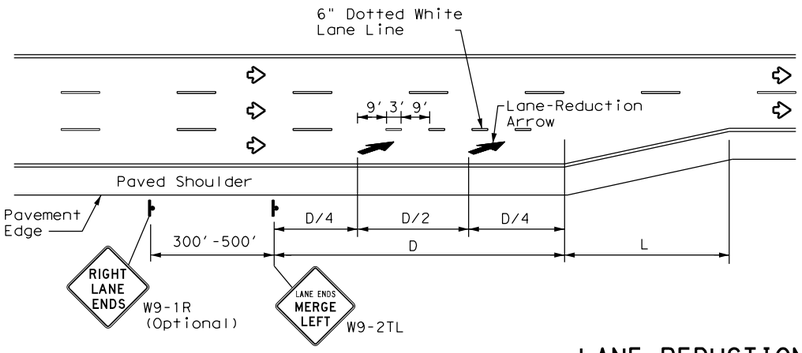
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0860	02	015	FM490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		198

22B

DATE:
FILE:



LANE REDUCTION

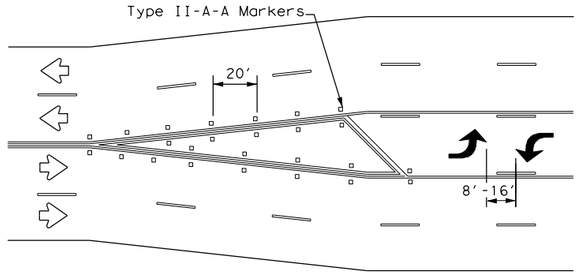
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

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

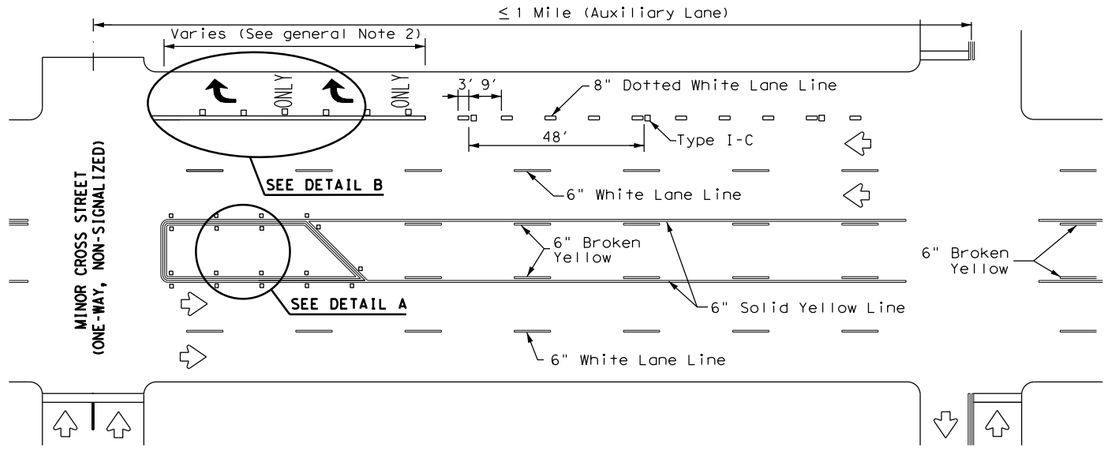


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

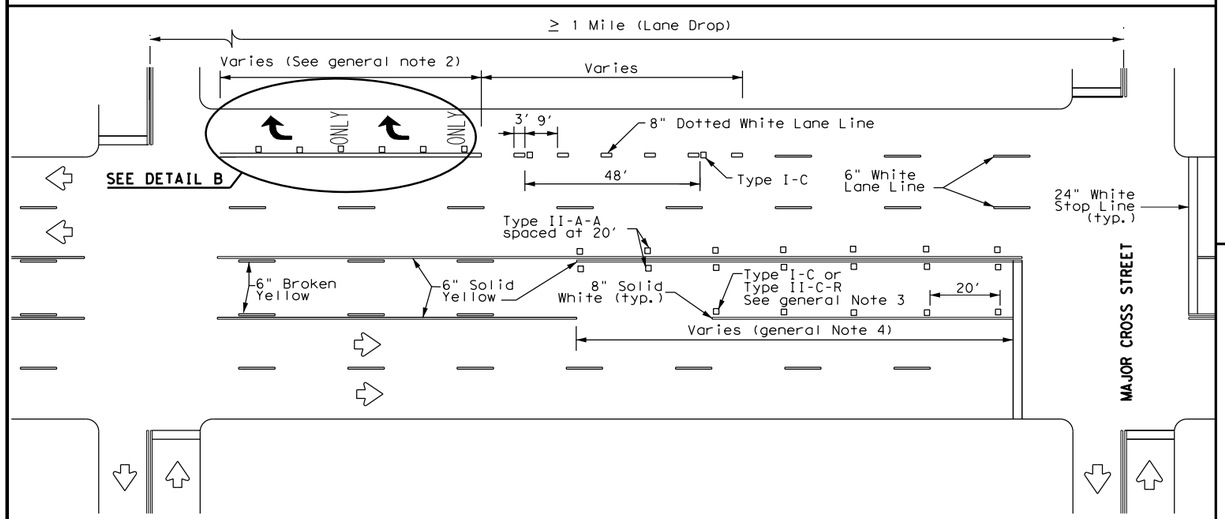
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

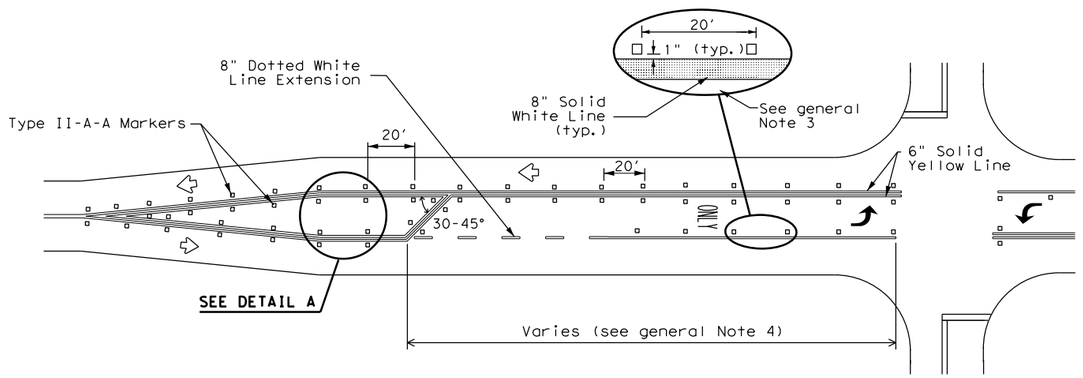
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



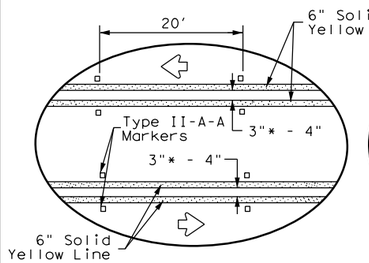
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



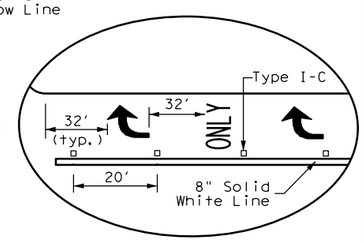
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

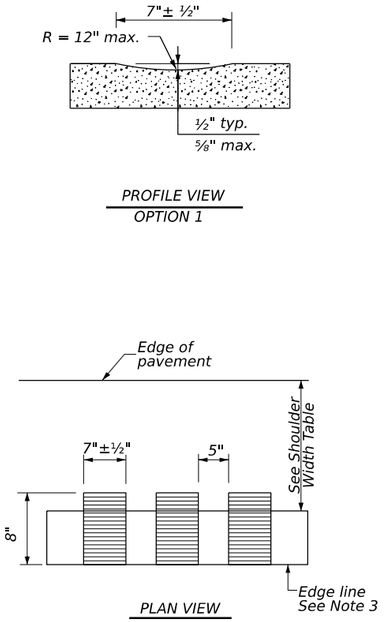
PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20	0860	02	015	FM 490
5-00 2-10 12-22	DIST	COUNTY		SHEET NO.
8-00 2-12	PHR	WILLACY		199

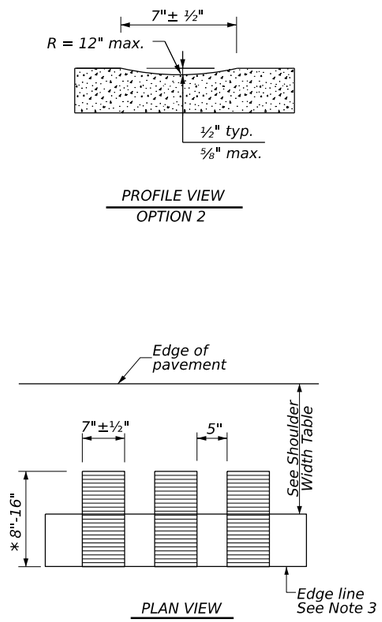
22C

DATE:
FILE:

DATE:
FILE:

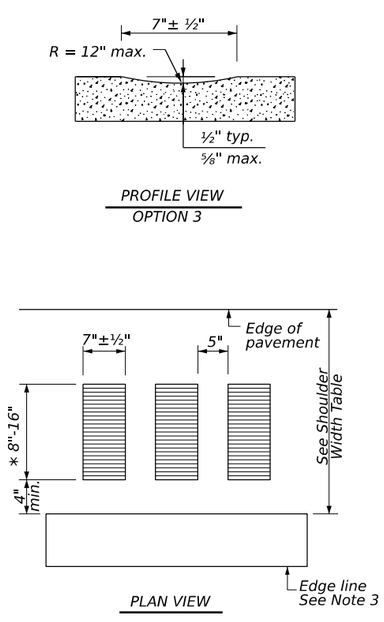


CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



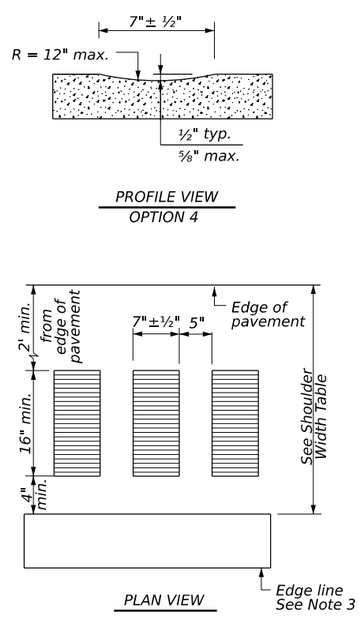
∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

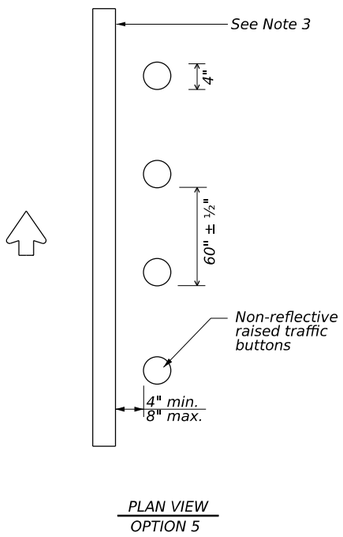


∗ This distance may vary based on width of shoulder

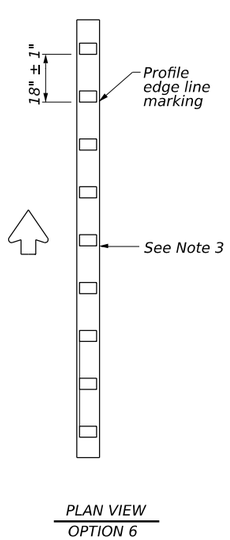
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



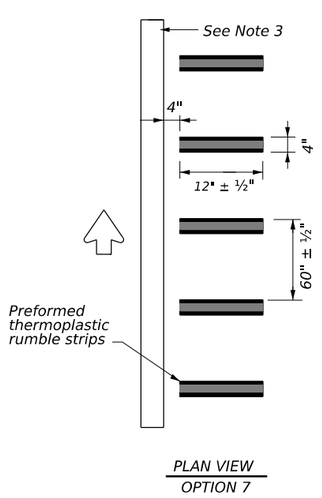
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



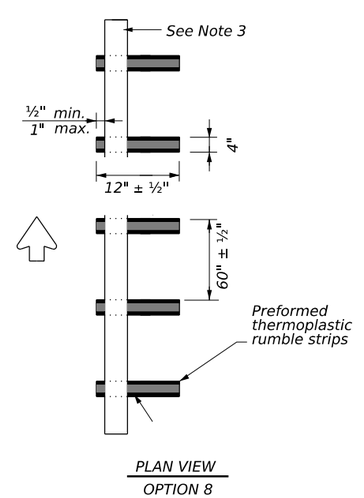
RAISED EDGE LINE (Rumble Strips)



PROFILE EDGE LINE MARKINGS (Rumble Strips)



PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)



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: 184	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
10-13	DIST	COUNTY		SHEET NO.
1-23	PHR	WILLACY		200

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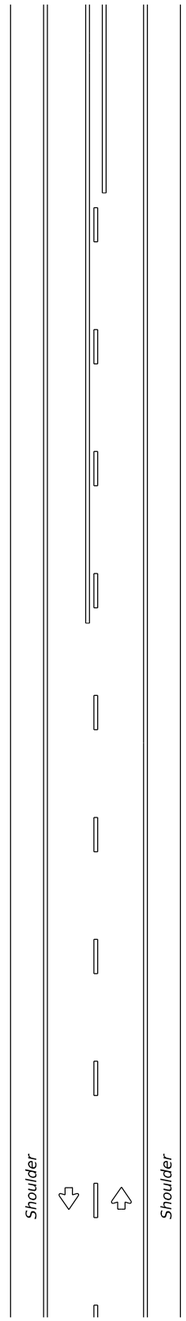
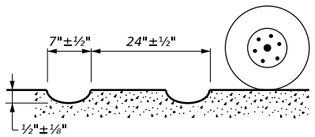
DATE:
FILE:

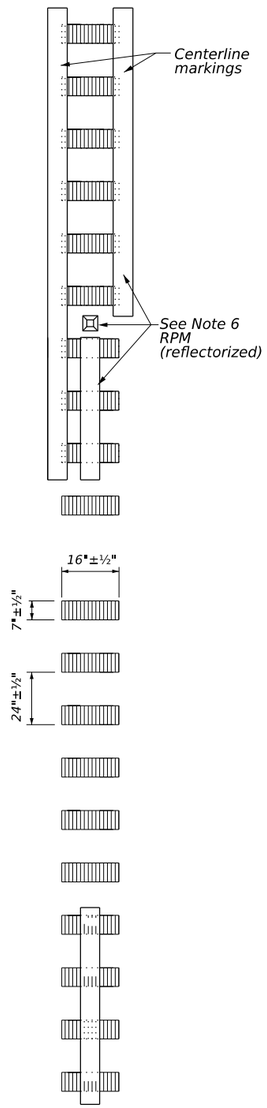
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

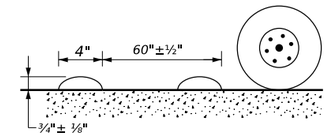


PROFILE VIEW

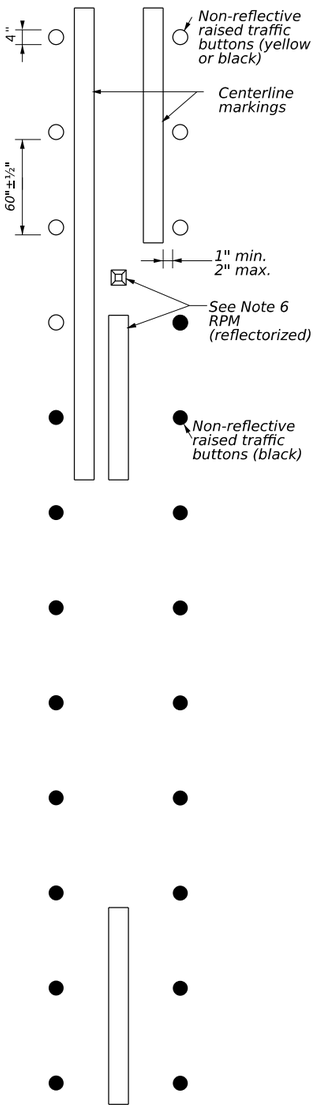


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

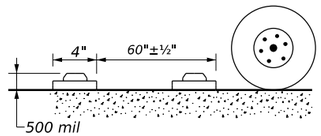


PROFILE VIEW

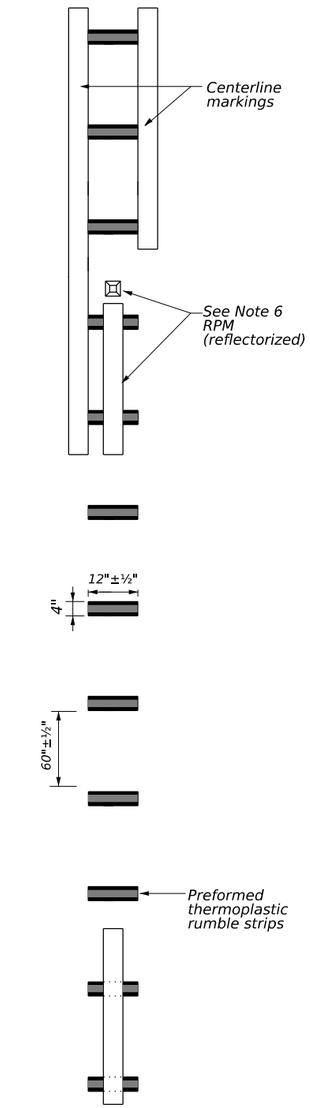


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

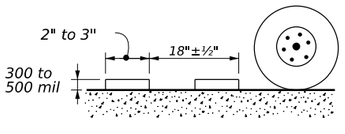


PROFILE VIEW

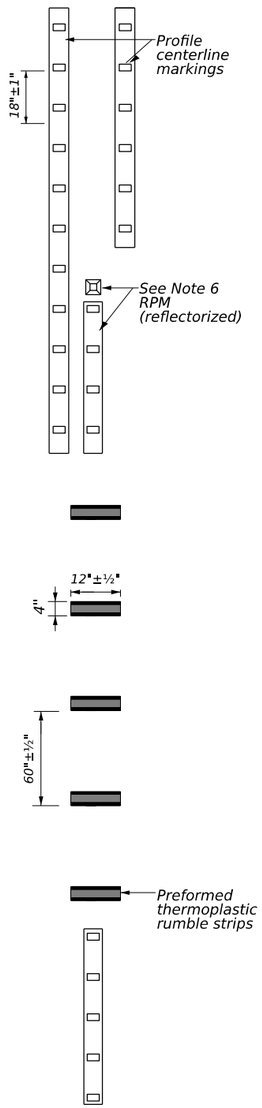


PLAN VIEW
OPTION 3

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: 185	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
10-13 1-23	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		201

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

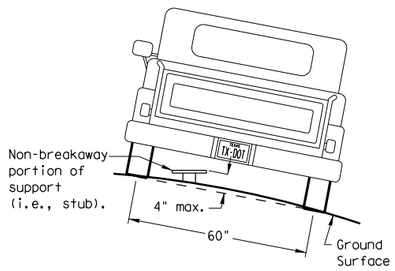
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

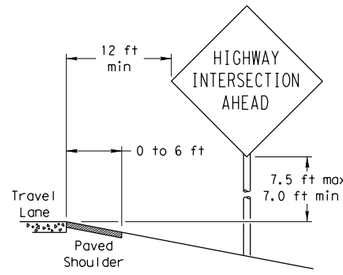
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

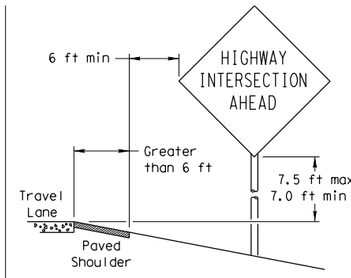
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

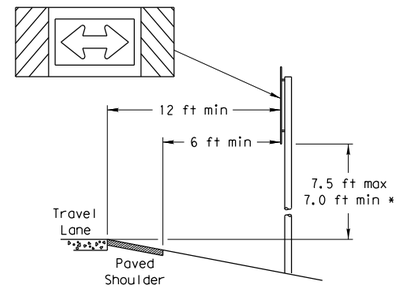
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



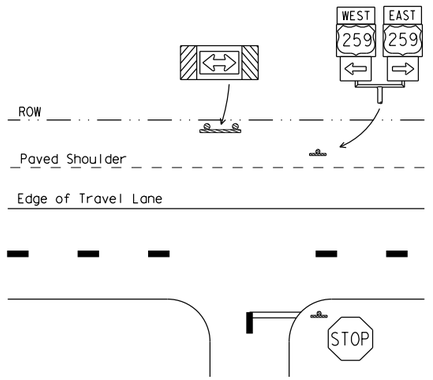
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

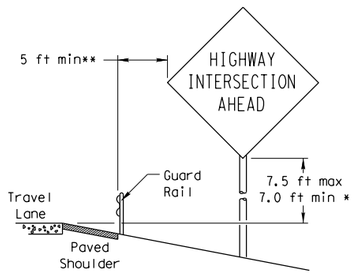
T-INTERSECTION



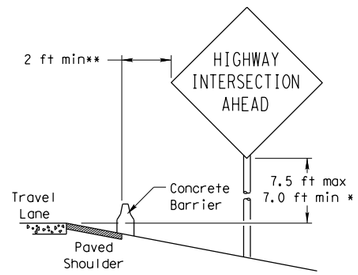
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* 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

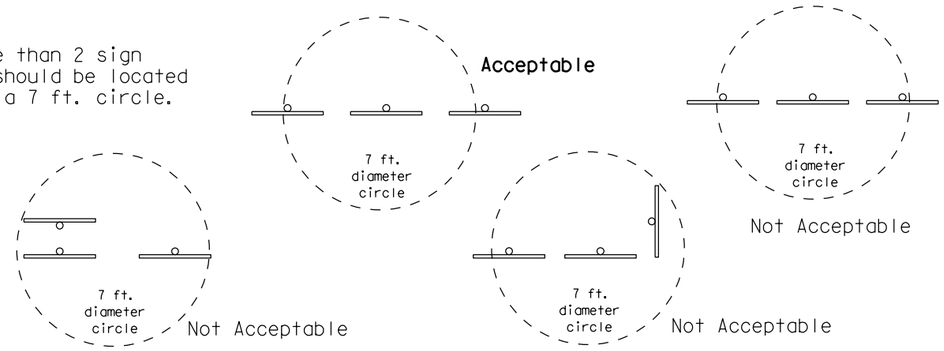
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

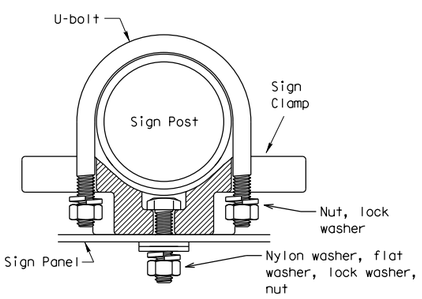
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

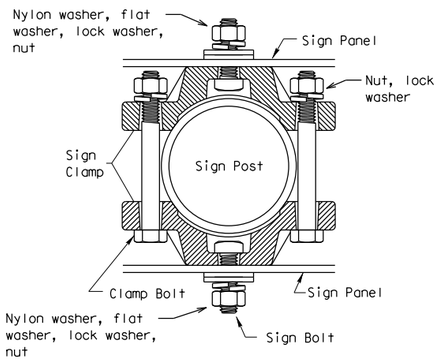


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

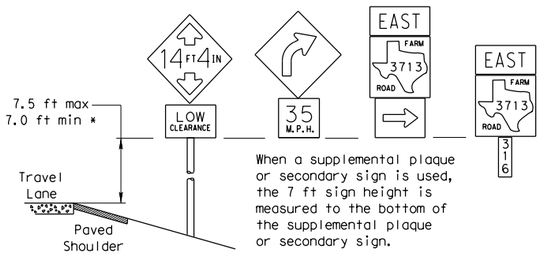
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



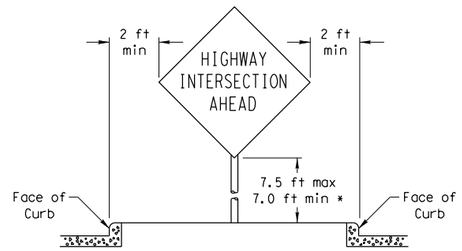
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



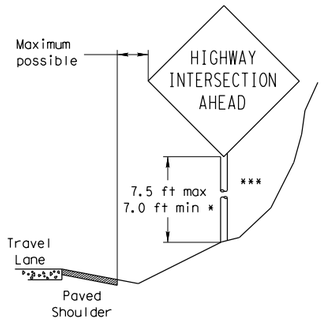
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

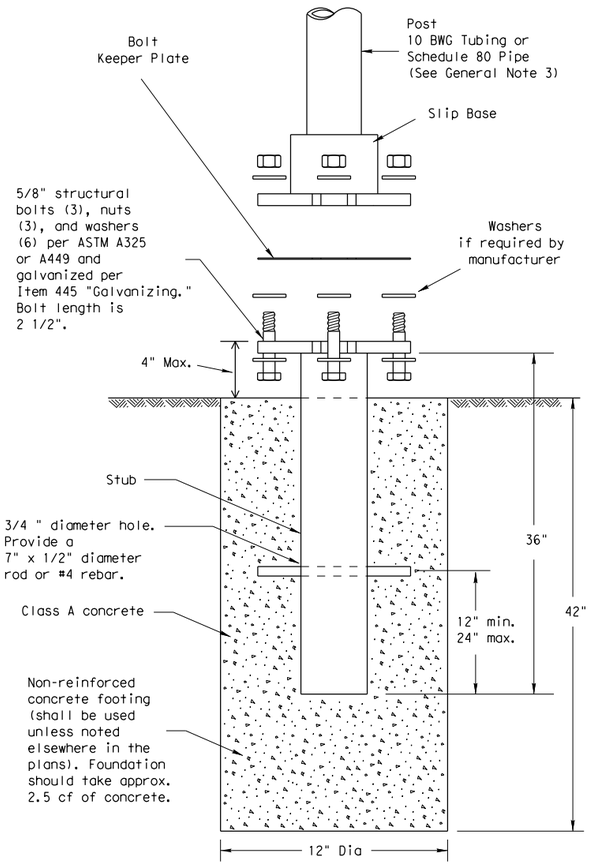
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		202

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

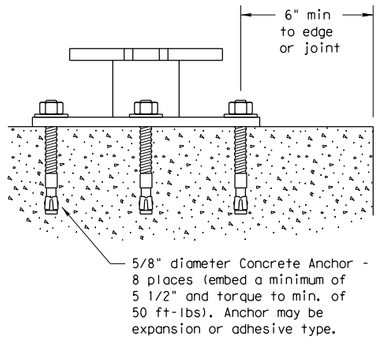
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

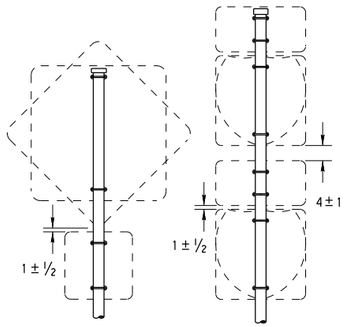
SMD(SLIP-1)-08

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

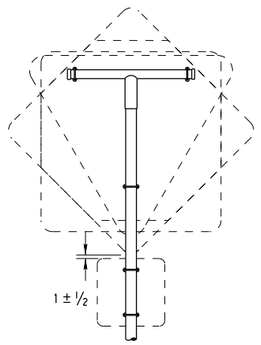
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		203

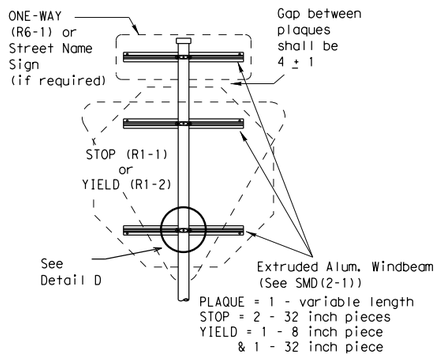
DATE:
FILE:



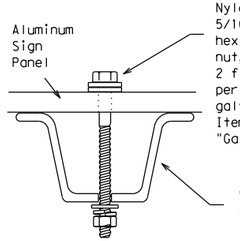
SM RD SGN ASSM TY XXXXX(1)XX(P)



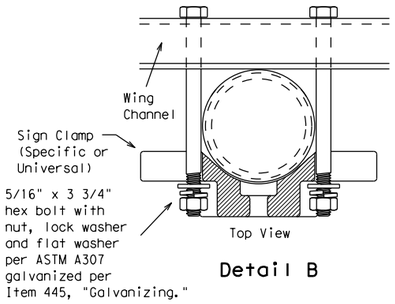
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



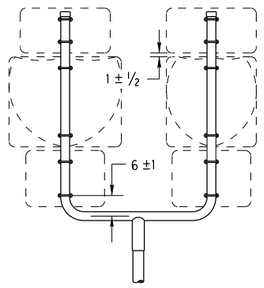
Detail B

GENERAL NOTES:

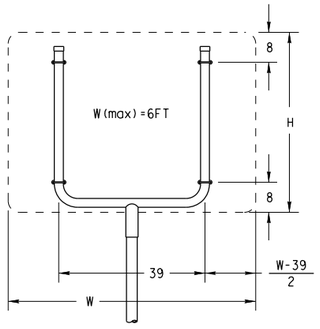
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

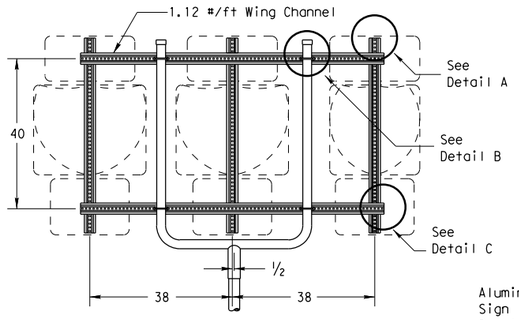
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



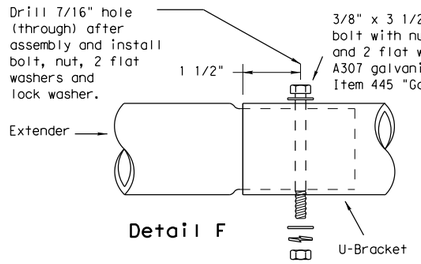
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

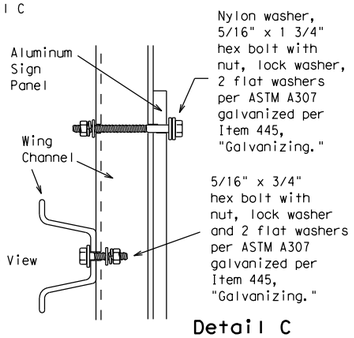


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

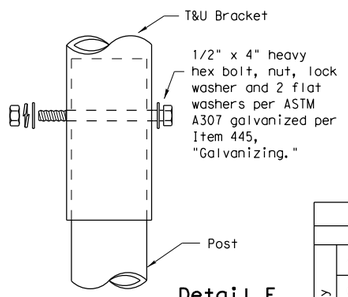


Detail F

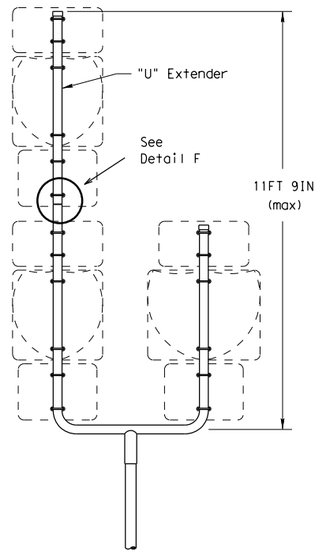
Splices shall only be allowed behind the sign substrate.



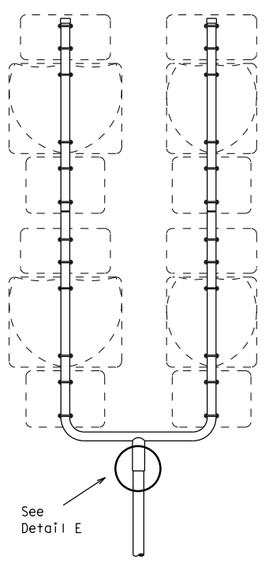
Detail C



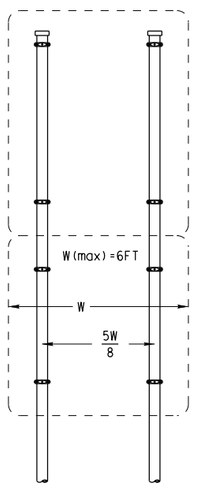
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

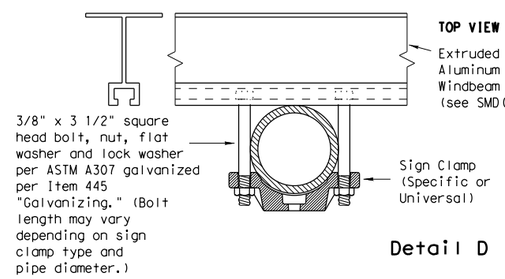


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

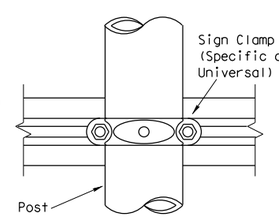


SM RD SGN ASSYM TY XXXXX(2)XX(P)

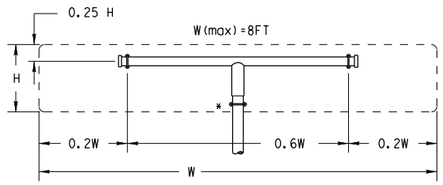
SIDE VIEW



Detail D



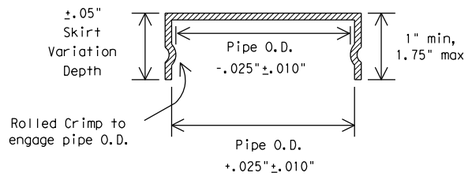
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

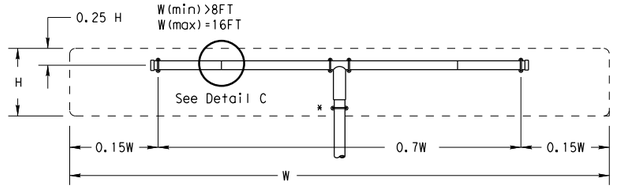
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM490

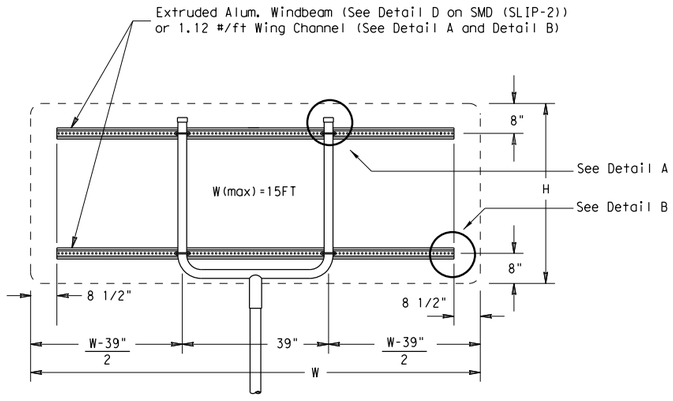
DIST	COUNTY	SHEET NO.
PHR	WILLACY	204

9-08 REVISIONS

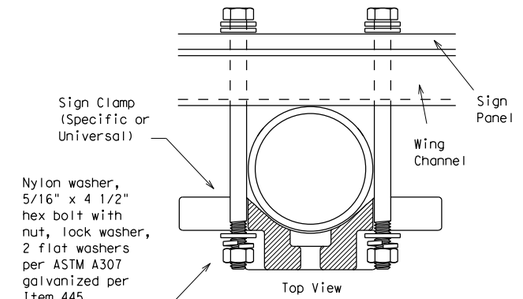
DATE:
FILE:



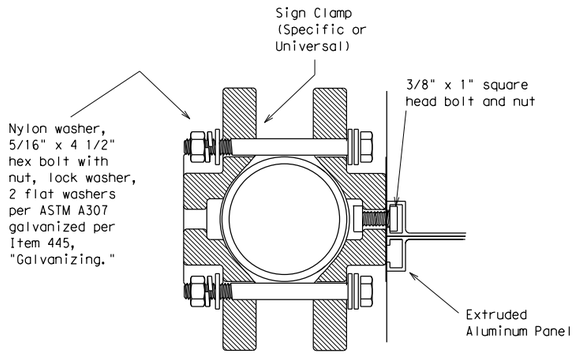
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



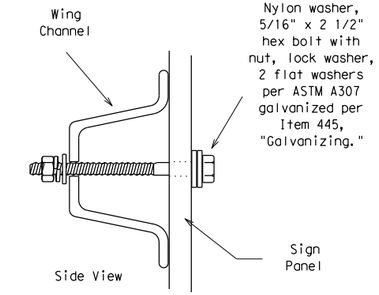
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



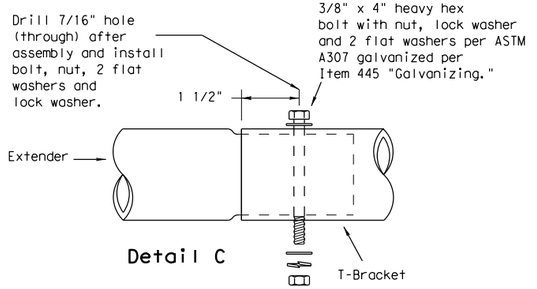
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

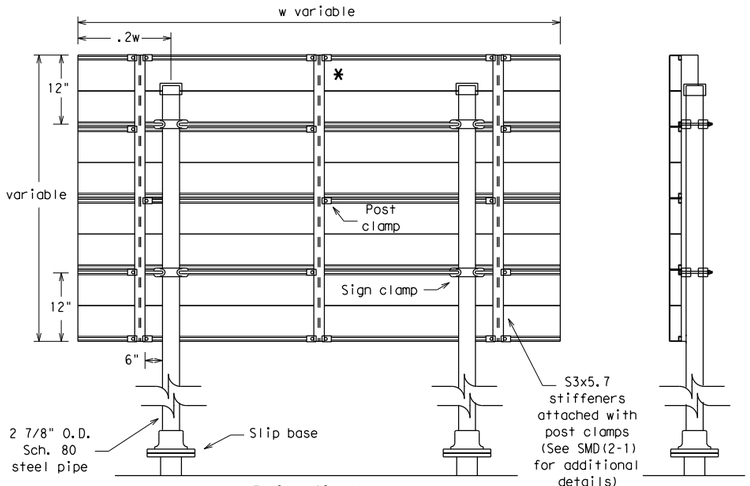


Detail B



Detail C

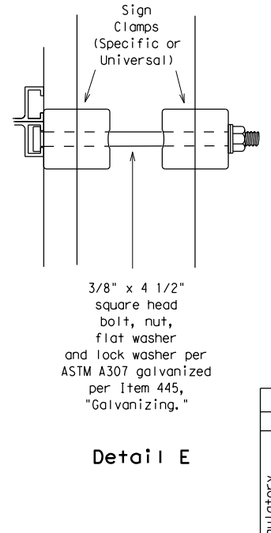
Splices shall only be allowed behind the sign substrate.



Typical Sign Mount

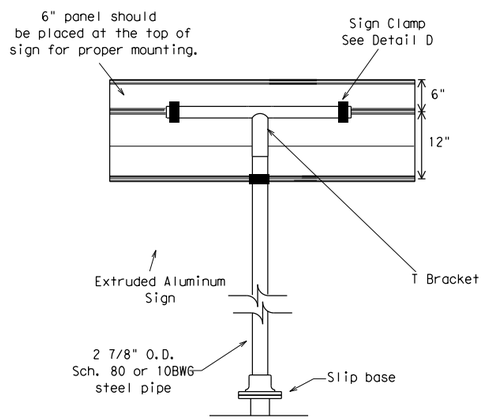
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

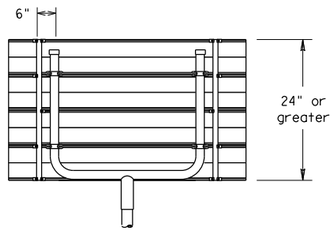


Detail E

See Detail E
for clamp installation



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

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

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

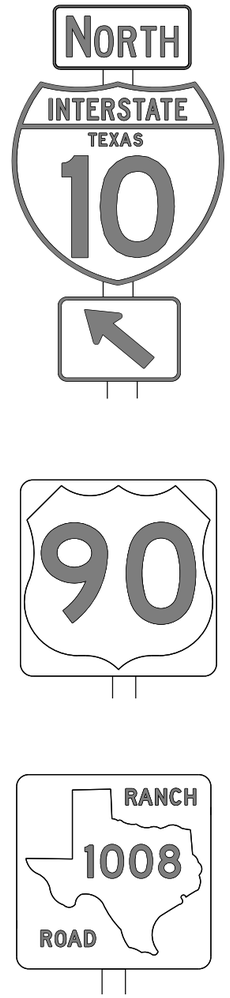
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0860	02	015	FM490
	DIST	COUNTY		SHEET NO.
	PHR	WILLACY		205

DATE:
FILE:

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

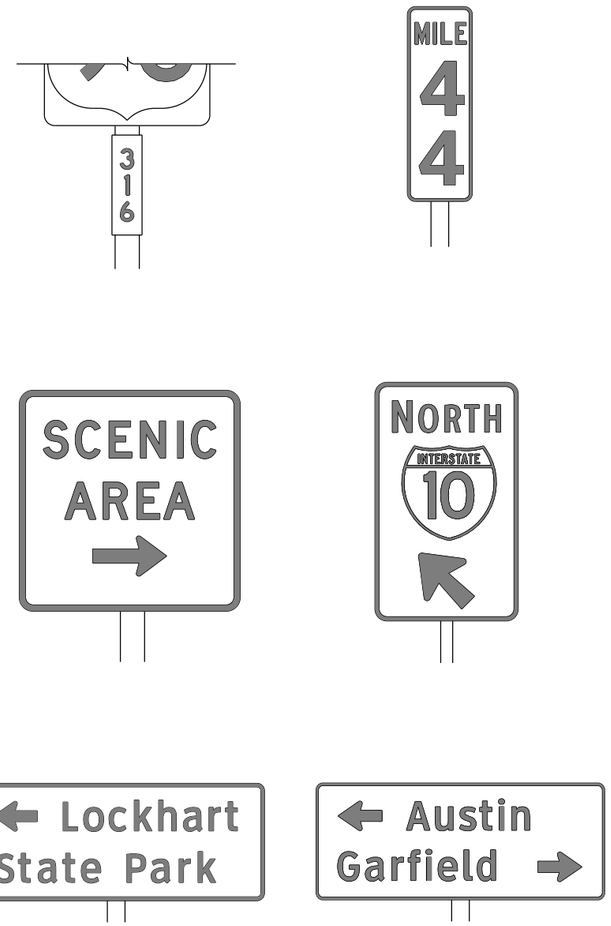
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

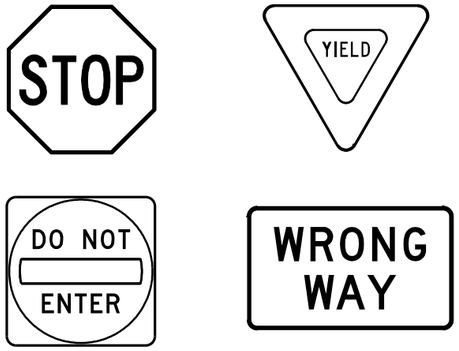
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHR	WILLACY		206

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

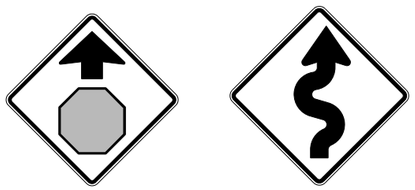
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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

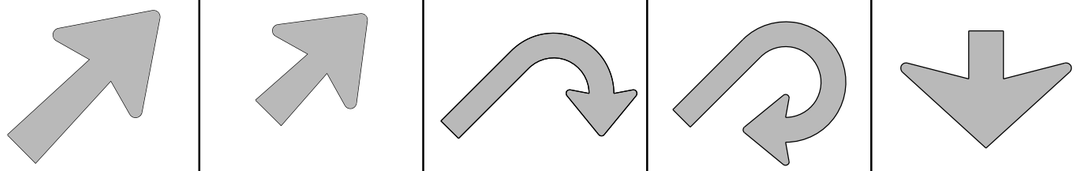
TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0860	02	015	FM490
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHR	WILLACY		207

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



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

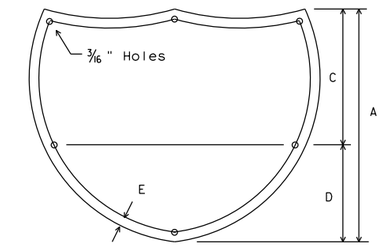
NOTE

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.

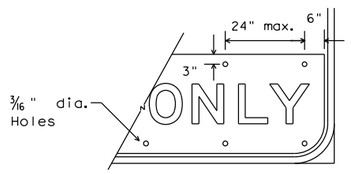
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

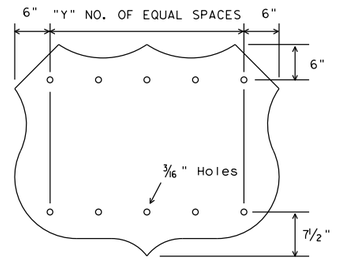


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	11/2
48	28	20	13/4

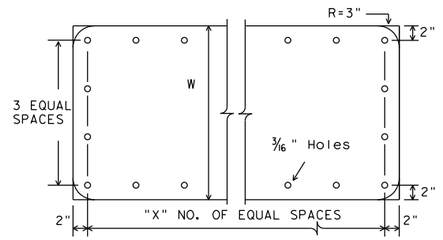


EXIT ONLY PANEL



U.S. ROUTE MARKERS

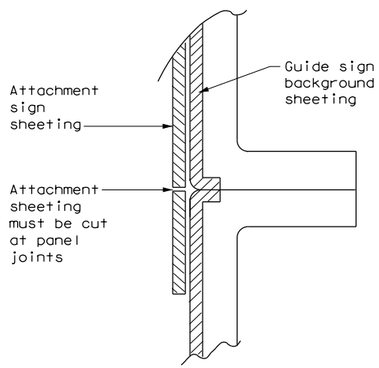
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



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

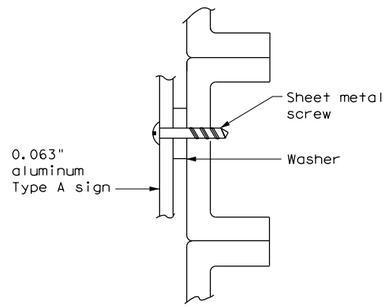
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



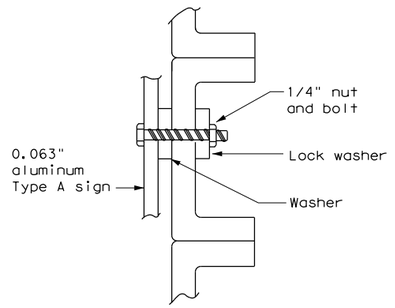
DIRECT APPLIED ATTACHMENT

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".



SCREW ATTACHMENT



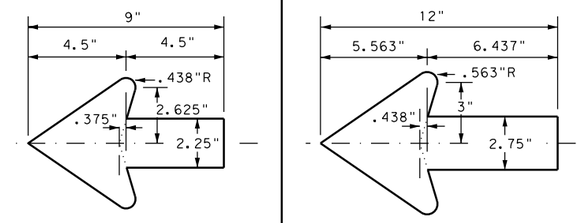
NUT/BOLT ATTACHMENT

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		0860	02	015	FM490
12-03 7-13		DIST	COUNTY		SHEET NO.
9-08		PHR	WILLACY		208

DATE:
FILE:

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		FM490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	
CONTROL	SECTION	JOB	SHEET NO.
0860	02	015	209

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	(Notophtholmusmerid onalis)
Mexican Burrowing Toad	(Rhinophrynus dorsalis)
Mexican Tree frog	(Smilisco boudinii)
Sheep Frog	(Hypopachus voriolosus)
South Texas Siren	(Siren sp.)
White-Lipped Frog	(Leptodoctylus frogilis)
Mexican Goby	(Ctenogobius claytonii)
Texas Horned Lizard	(Phrynosomo cornutum)
Reddish Egret	(Egretta rufescens)
White faced Ibis	(Plegadis chihi)
Reddish Egret	(Egretta rufescens)
Wood Stork	(Mycteria americana)
Monarch Butterfly	(Danaus plexippus)

   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.

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)

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	SHEET NO.
CONTROL	SECTION	JOB	
0860	02	015	210

Date Printed: X-X-XX

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.

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):
0860-02-015

1.2 PROJECT LIMITS:
From: FM 88

To: 0.10 MI E OF FM 1015

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 97°57'17.27" ,(Long) 26°27'22.92"

END: (Lat) 97°54'44.26" ,(Long) 26°27'00.56"

1.4 TOTAL PROJECT AREA (Acres): 27.3

1.5 TOTAL AREA TO BE DISTURBED (Acres): 15.3

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 TO HIGH WATER TRANSMISSION
RACOMBES SANDY CLAY LOAM	MOD WELL DRAINED, MOD TO HIGH WATER TRANSMISSION
HARGILL FINE SANDY LOAM	WELL DRAINED, MOD TO HIGH WATER TRANSMISSION

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
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143166
LICENSED
PROFESSIONAL ENGINEER

Kristen Harper
11/31/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			211
STATE	STATE DIST.	COUNTY	
TEXAS	PHR	WILLACY	
CONT.	SECT.	JOB	HIGHWAY NO.
0860	02	015	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
- ☒ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☒ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

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

T / P

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

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

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

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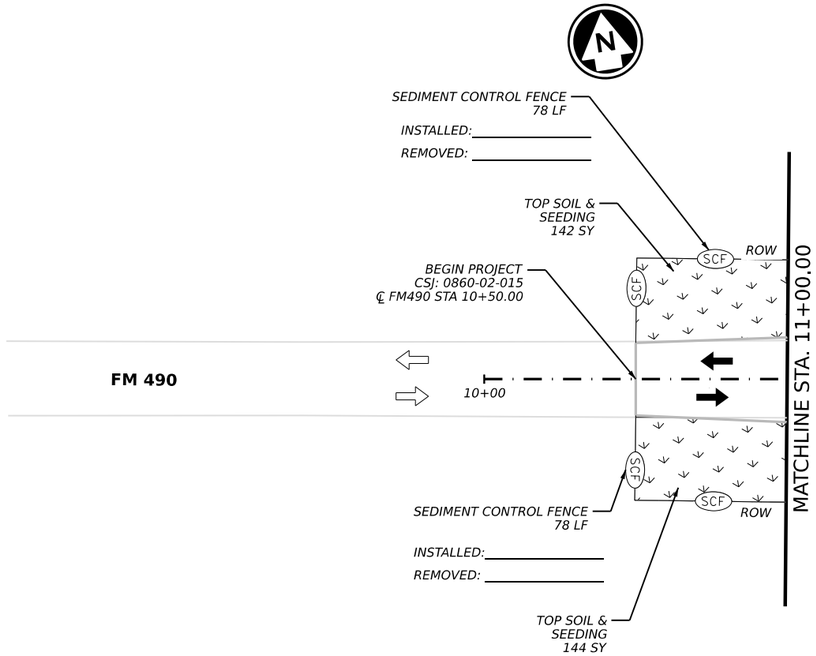
11/1/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			212
STATE	STATE DIST.	COUNTY	
TEXAS	PHR	WILLACY	
CONT.	SECT.	JOB	HIGHWAY NO.
0860	02	015	FM 490

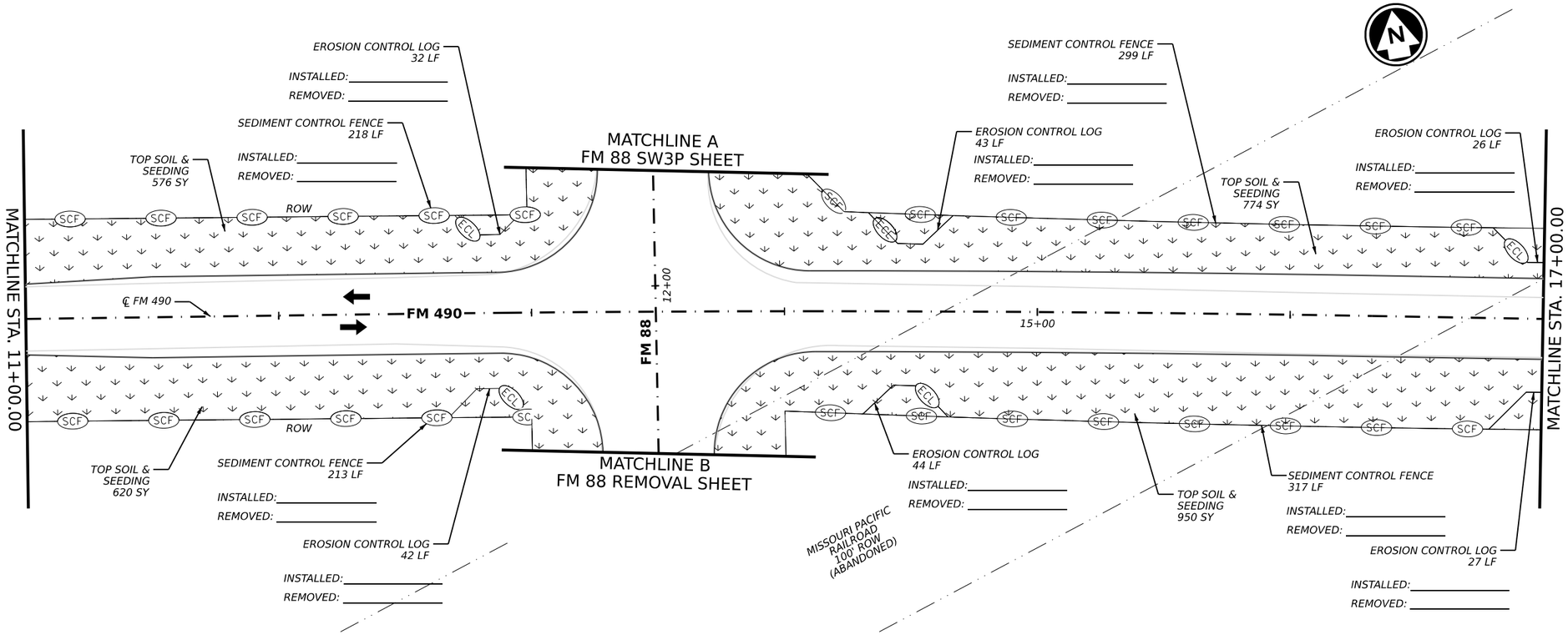


LEGEND

- ROW
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- 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 THE 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.
6. DO NOT PLACE TEMPORARY AND PERMANENT SEEDING AT THE SAME TIME. WATER EARLY IN THE DAY.



NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

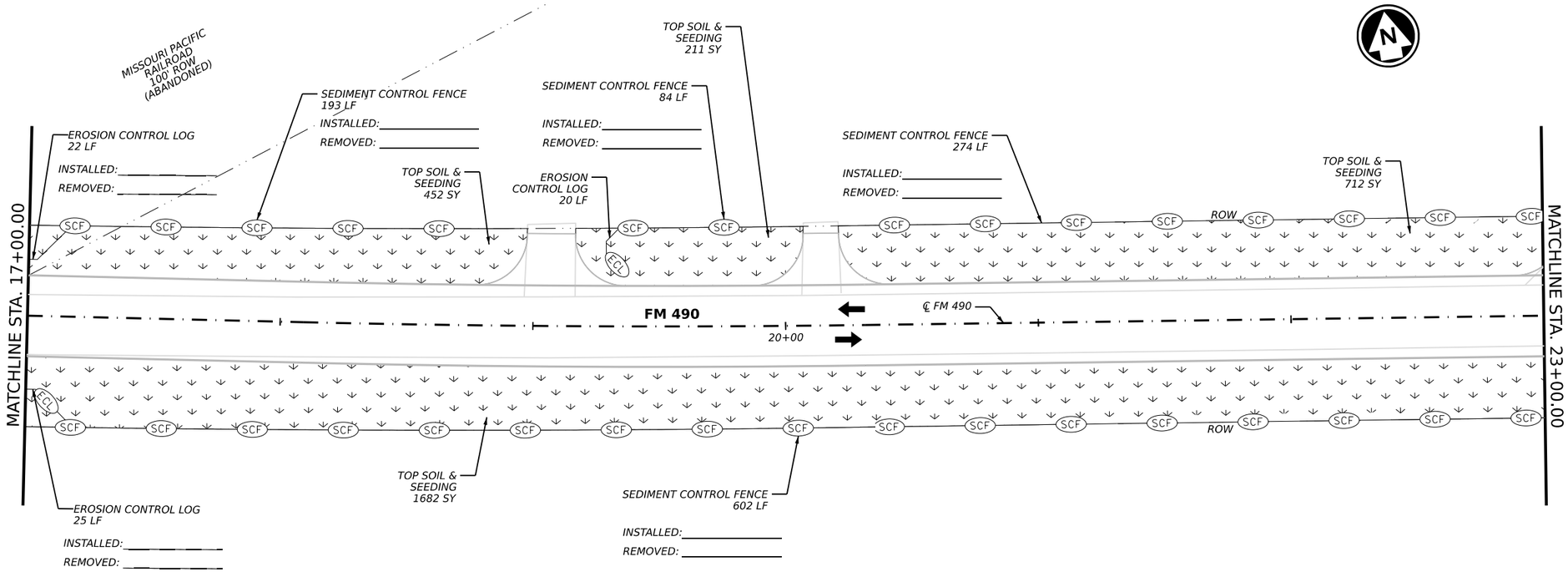
FM 490

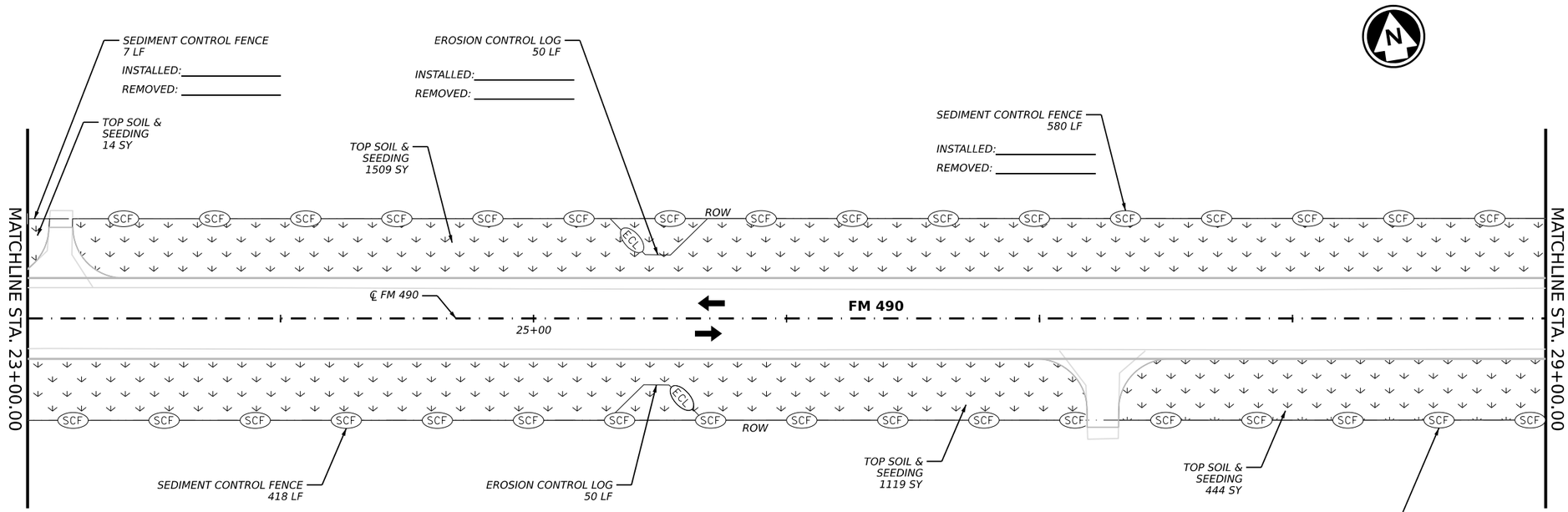
SW3P PLAN
BEGIN TO STA 17+00

SHEET 1 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		213

DATE: DATE TIME
FILE: DOCUMENT NAME





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SCALE IN FEET

LEGEND

- ROW
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11/11/2024

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Texas Department of Transportation

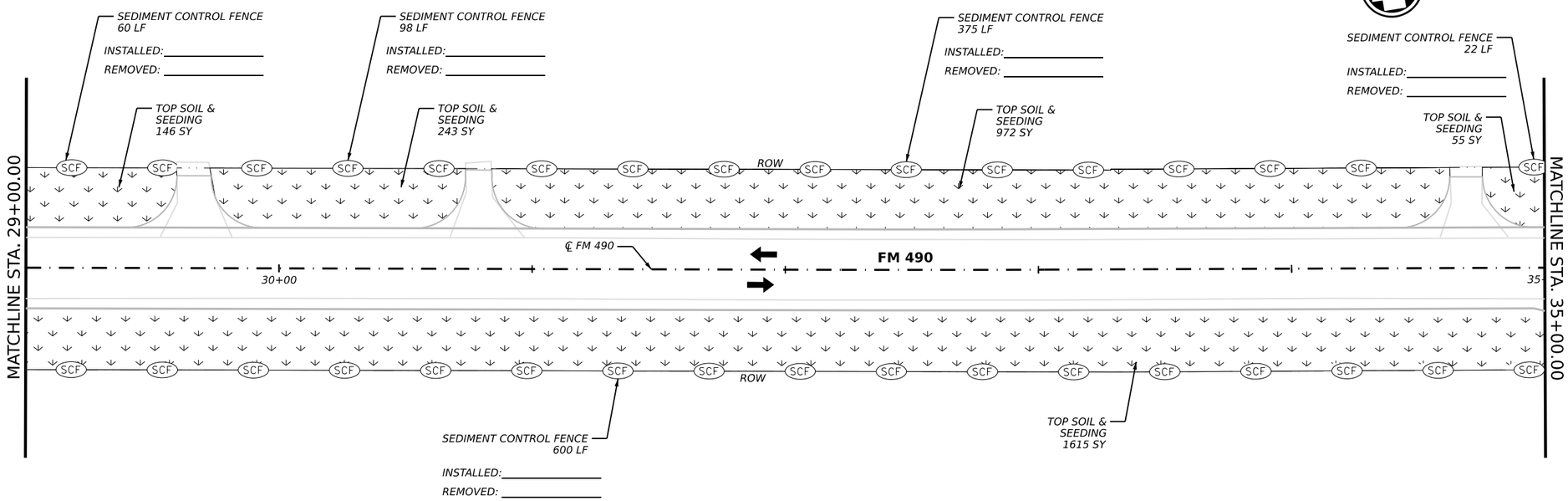
FM 490

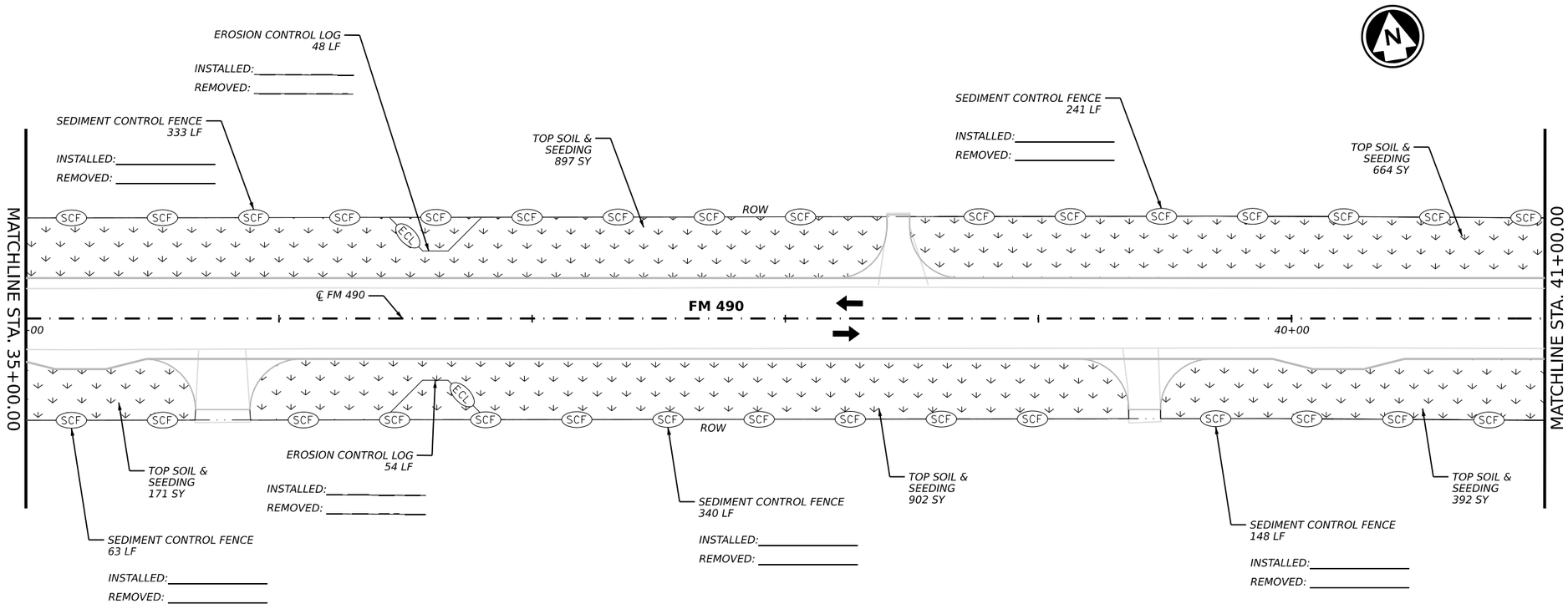
SW3P PLAN
STA 17+00 TO STA 29+00

SHEET 2 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		214

DATE: DATE TIME
FILE: DOCUMENT NAME





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NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

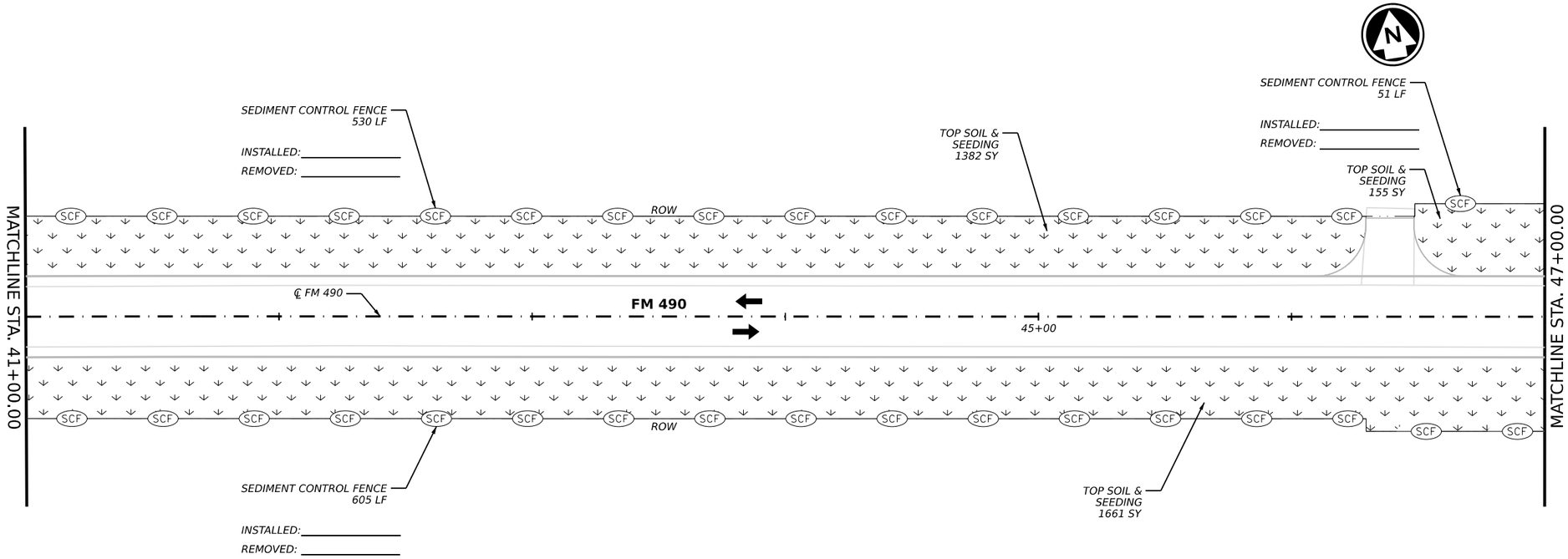
FM 490

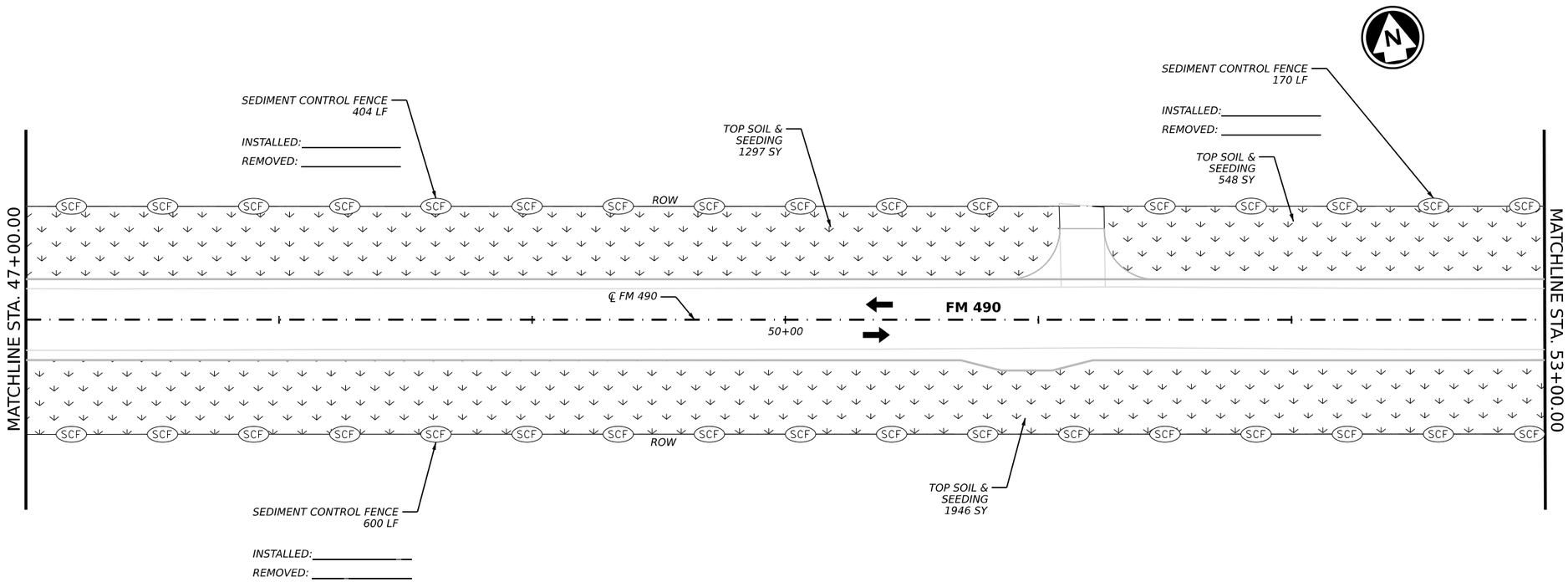
SW3P PLAN
STA 29+00 TO STA 41+00

SHEET 3 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		215

DATE: DATE TIME
FILE: DOCUMENT NAME





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
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STATE OF TEXAS
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PROFESSIONAL ENGINEER
Kristen Harper
11/11/2024

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Texas Department of Transportation

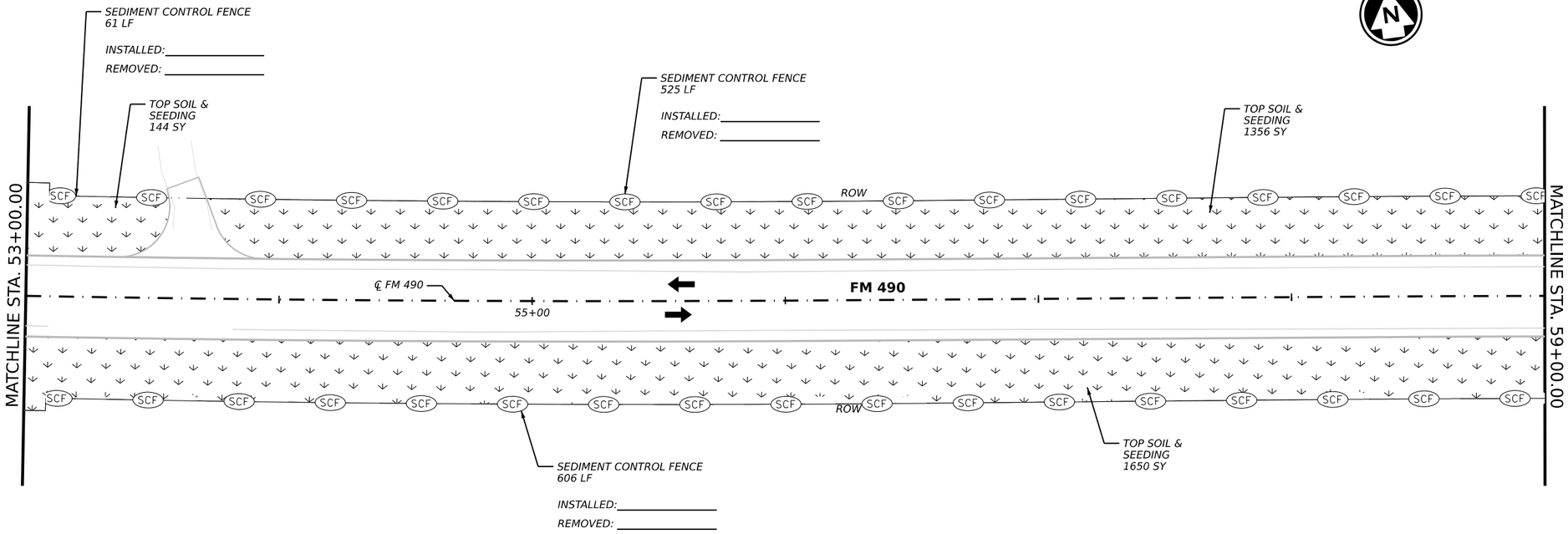
FM 490

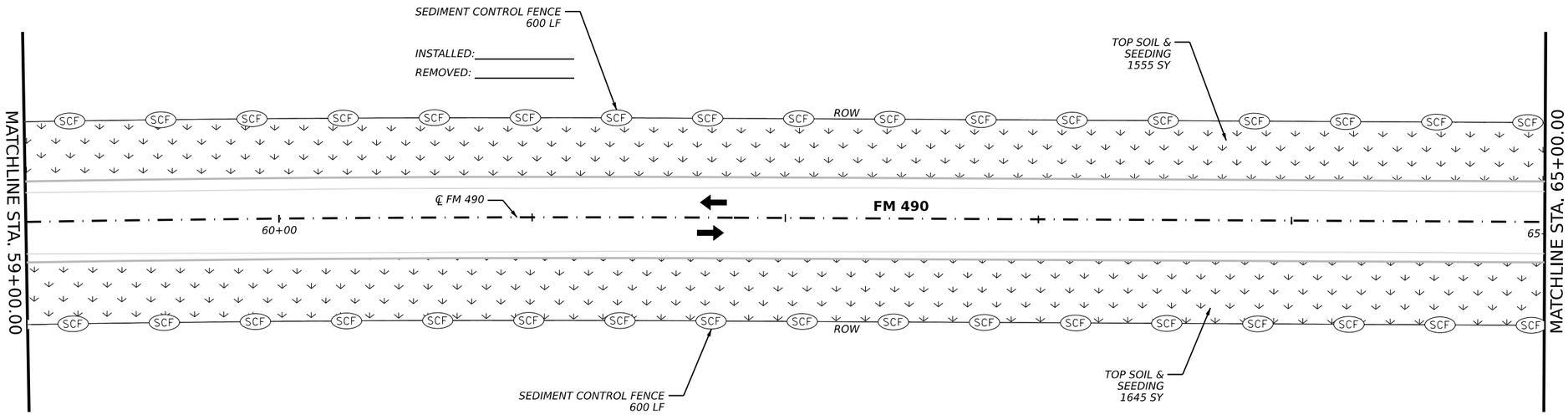
SW3P PLAN
STA 41+00 TO STA 53+00

SHEET 4 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		216

DATE:
FILE:
DATE TIME
DOCUMENT NAME





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SCALE IN FEET

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Texas Department of Transportation

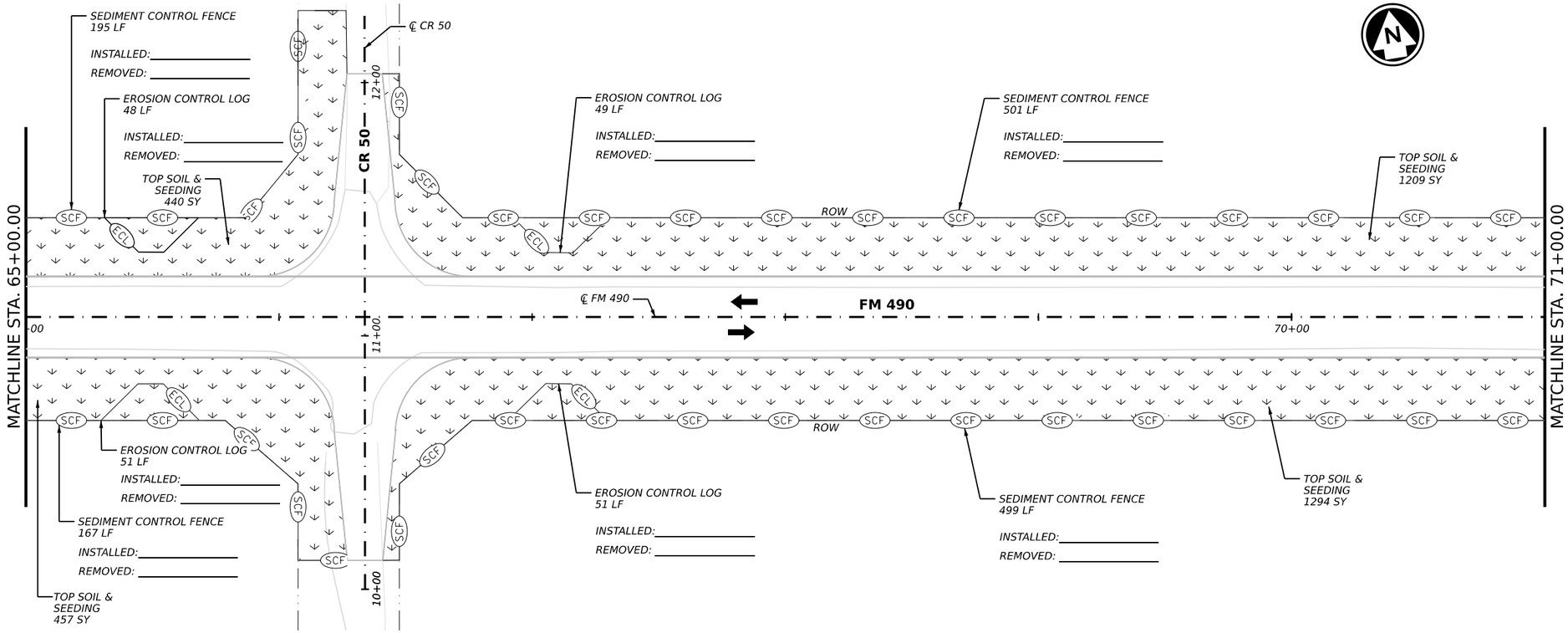
FM 490

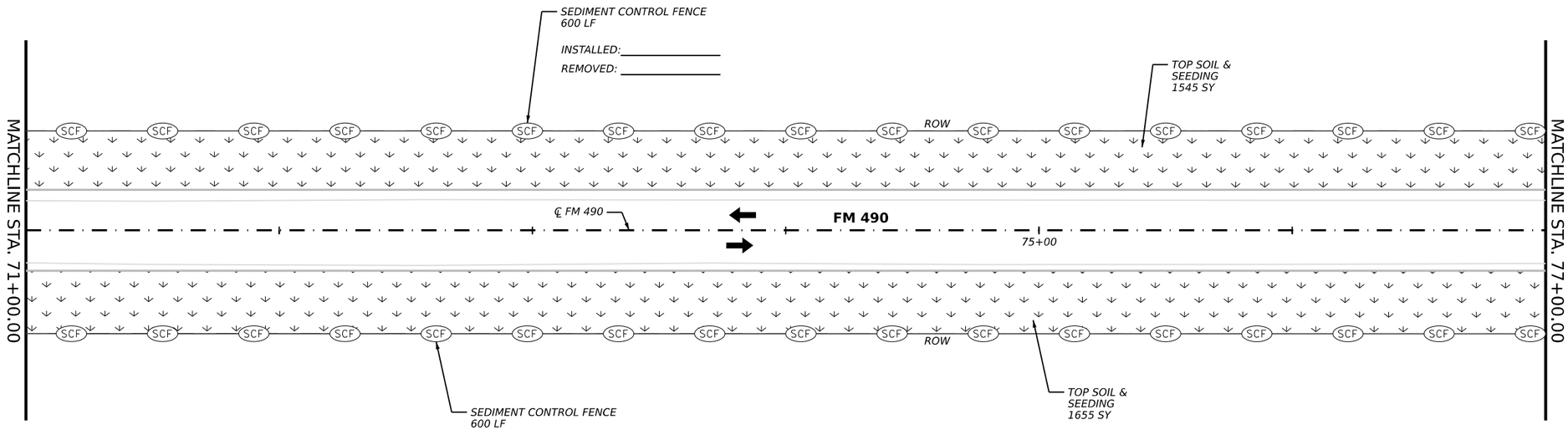
SW3P PLAN
STA 53+00 TO STA 65+00

SHEET 5 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		217

DATE: DATE TIME
FILE: DOCUMENT NAME





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

- ROW
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- SCF — SEDIMENT CONTROL FENCE
- ECL — EROSION CONTROL LOG
- SEEDING (PERM, TEMP)

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STATE OF TEXAS
KRISTEN E. HARPER
143166
LICENSED
PROFESSIONAL ENGINEER
Kristen Harper
11/11/2024

NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

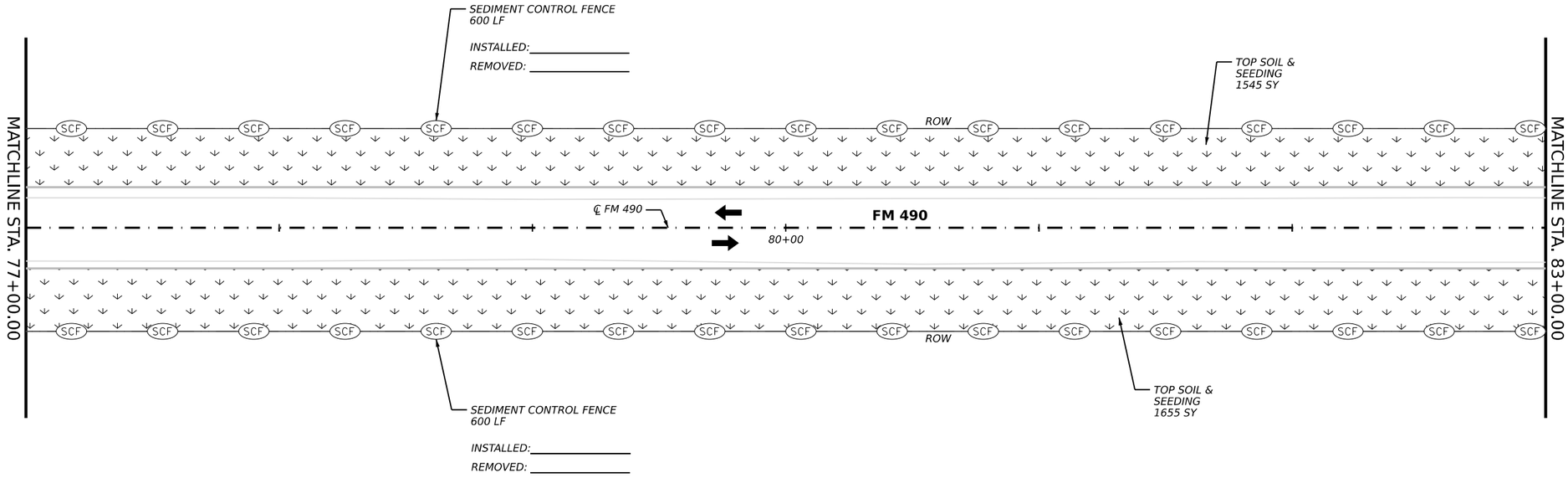
FM 490

SW3P PLAN
STA 65+00 TO STA 77+00

SHEET 6 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		218

DATE: DATE TIME
FILE: DOCUMENT NAME



LEGEND

- ROW
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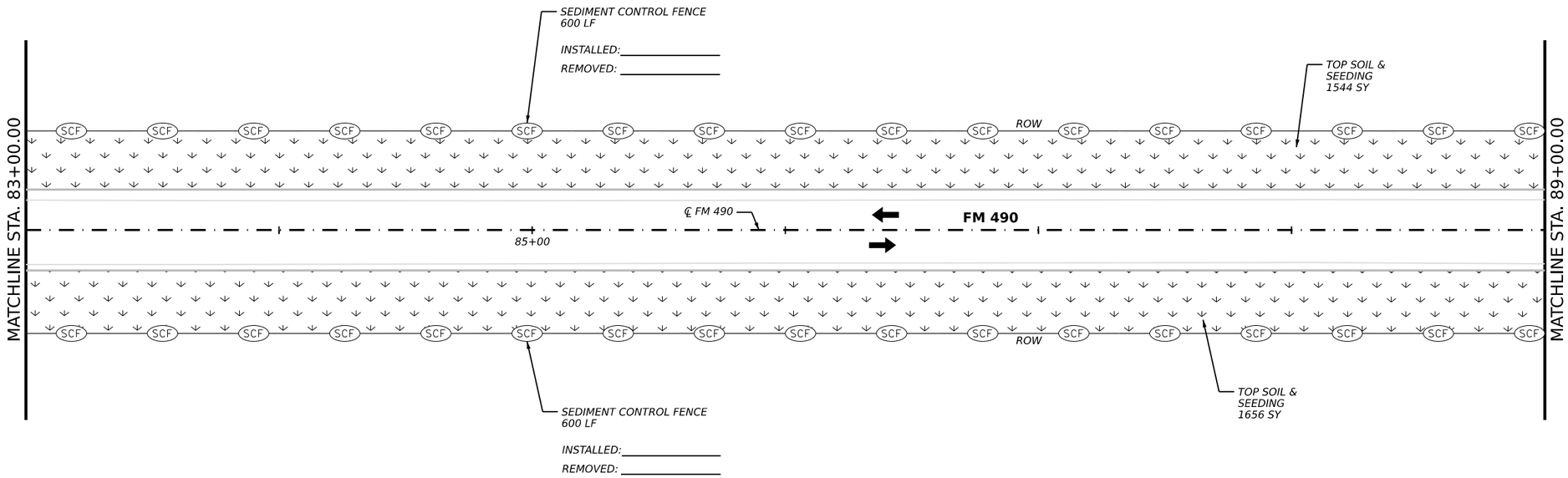

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13737 NOEL RD,
SUITE 700
DALLAS, TX. 75240
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Texas Department of Transportation

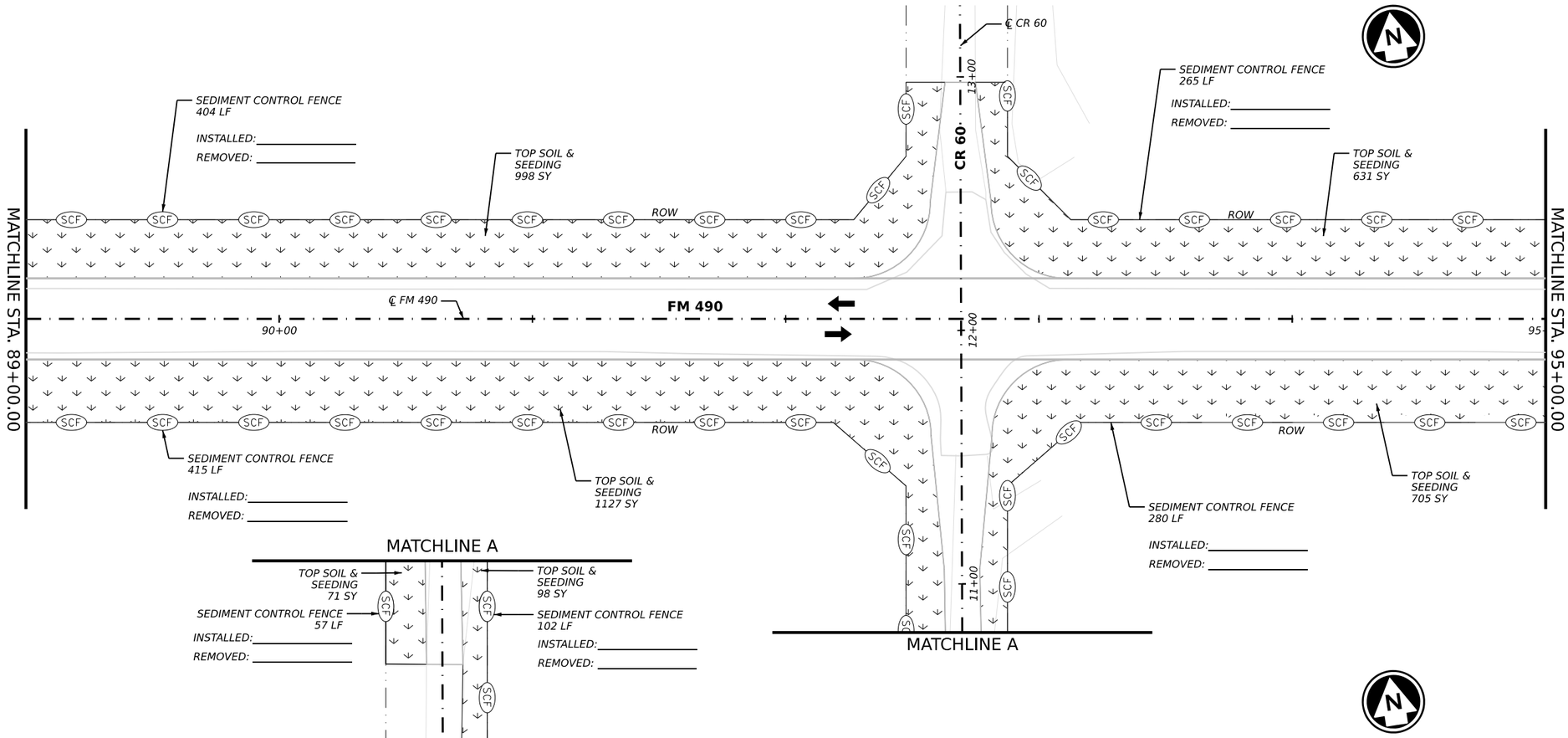
FM 490

SW3P PLAN
STA 77+00 TO STA 89+00

SHEET 7 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		219

DATE: DATE TIME
FILE: DOCUMENT NAME



HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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STATE OF TEXAS
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1/31/2024

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Texas Department of Transportation

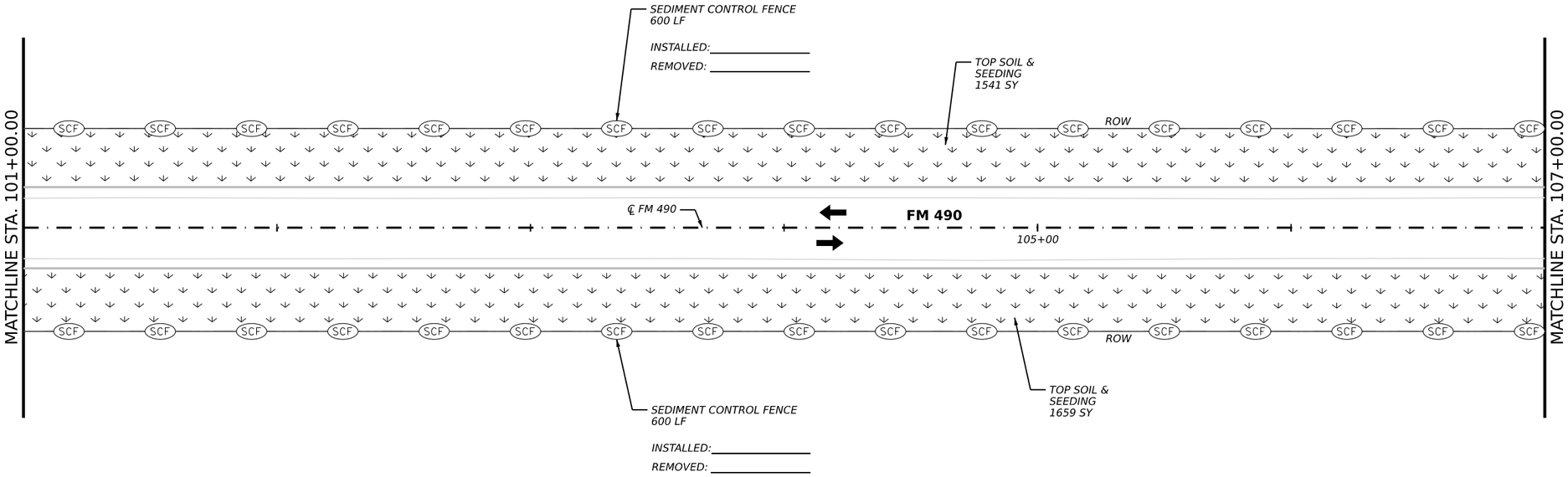
FM 490

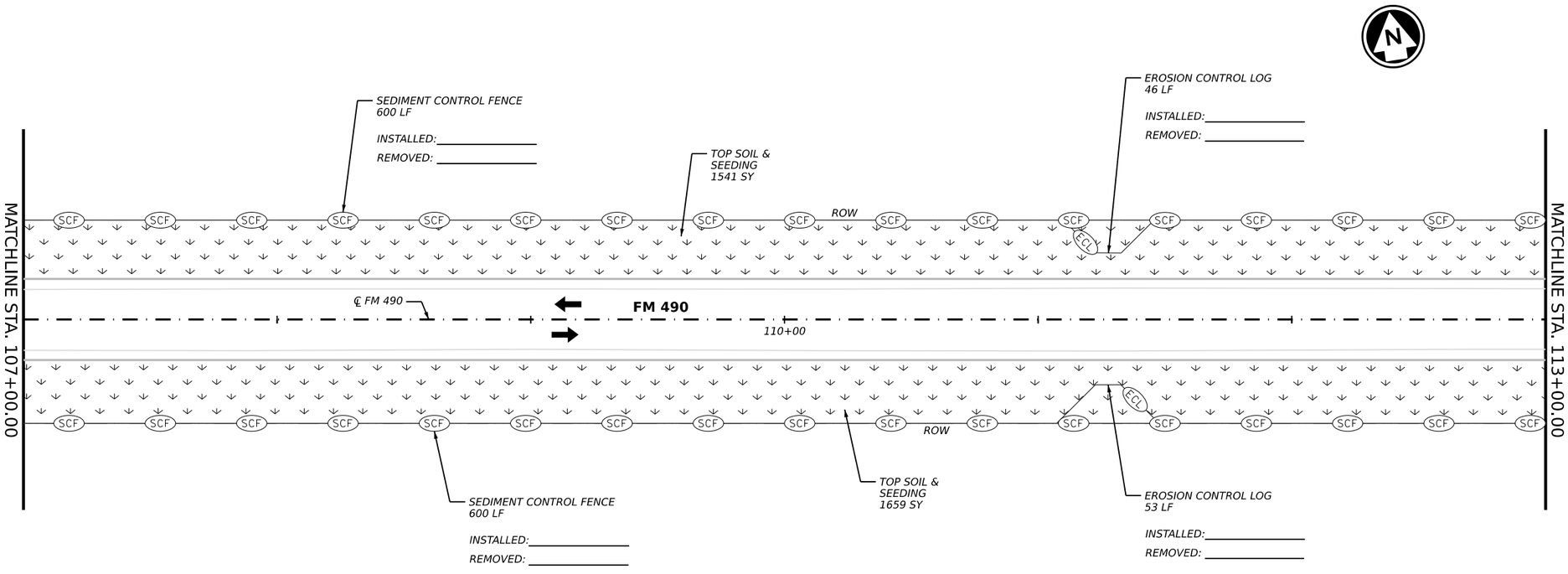
SW3P PLAN
STA 89+00 TO STA 101+00

SHEET 8 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		220

DATE TIME
DOCUMENT NAME
DATE:
FILE:





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SCALE IN FEET

LEGEND

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Texas Department of Transportation

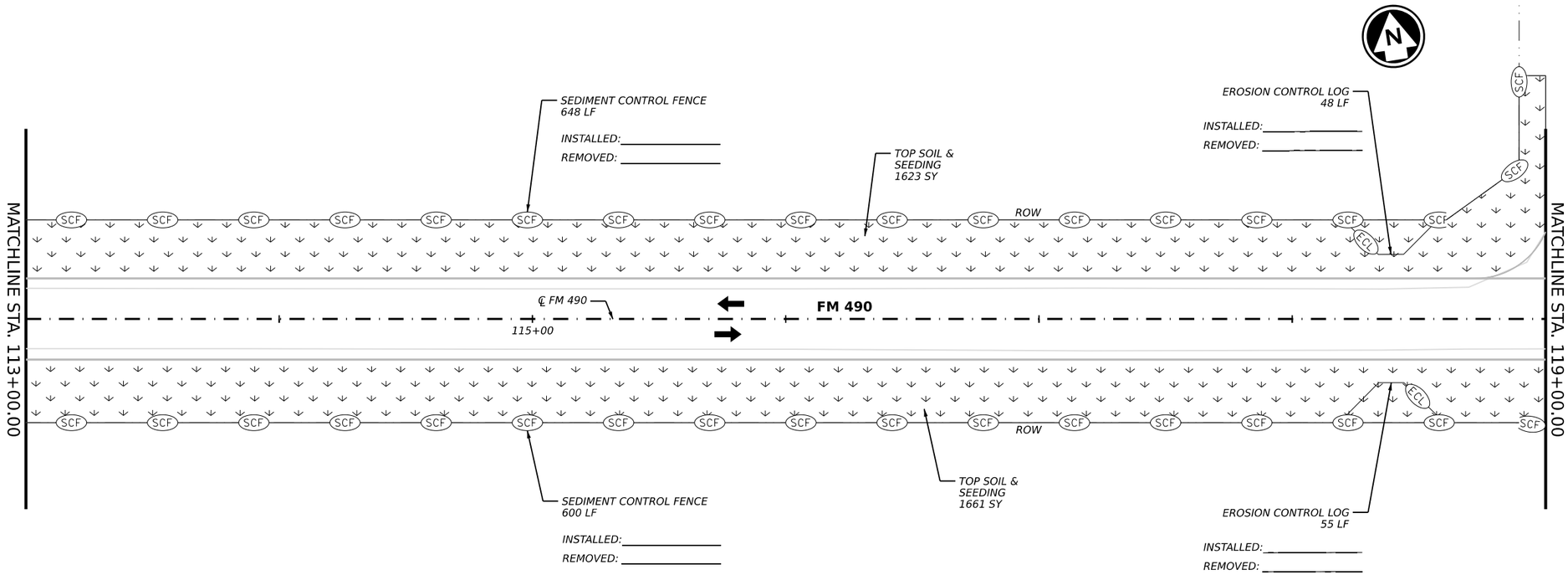
FM 490

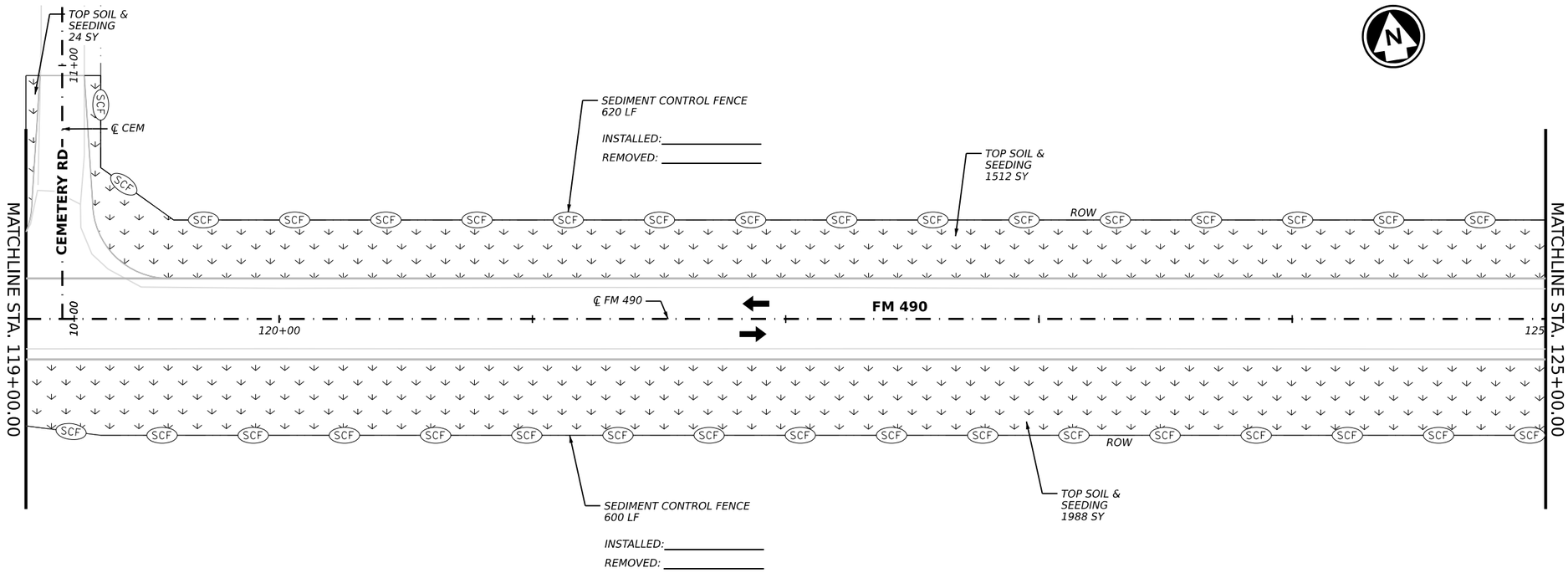
SW3P PLAN
STA 101+00 TO STA 113+00

SHEET 9 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		221

DATE: DATE TIME
FILE: DOCUMENT NAME





HORIZ: 0 25 50
SCALE IN FEET

LEGEND

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Texas Department of Transportation

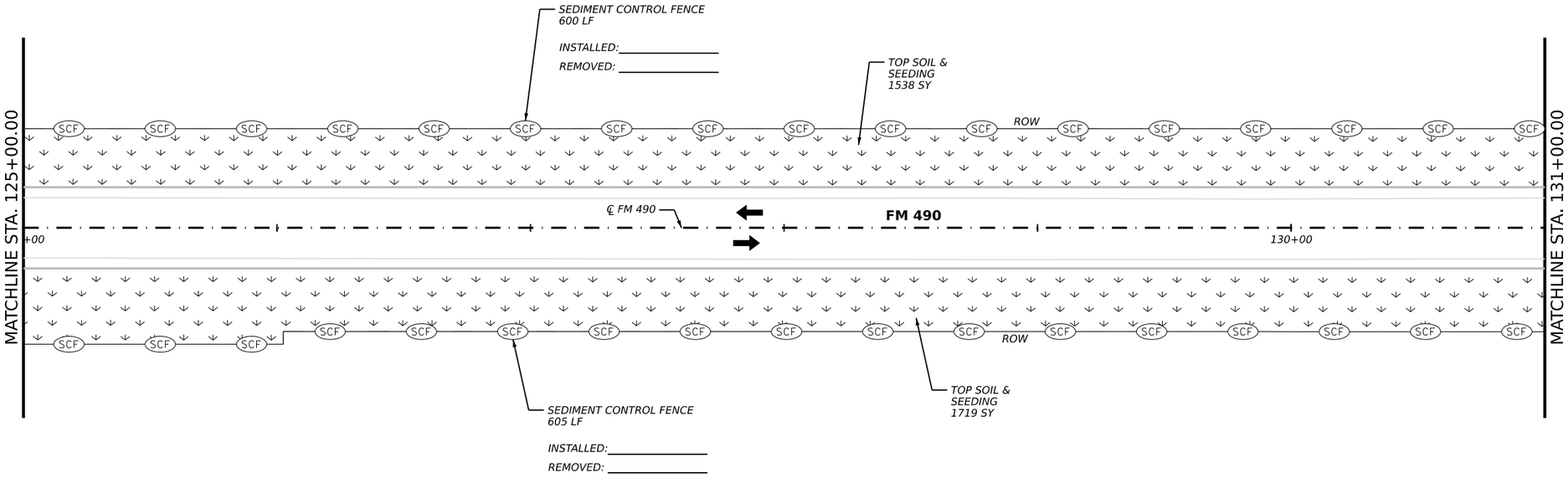
FM 490

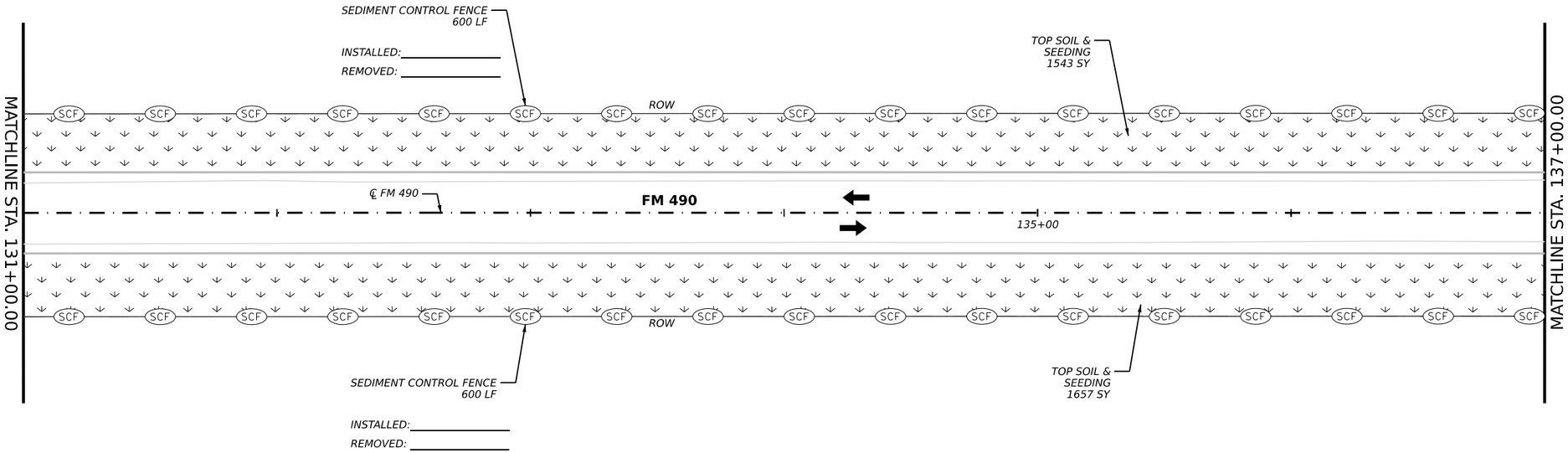
SW3P PLAN
STA 113+00 TO STA 125+00

SHEET 10 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		222

DATE:
FILE:
DATE TIME
DOCUMENT NAME





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ENGINEERING FIRM F-845

Texas Department of Transportation

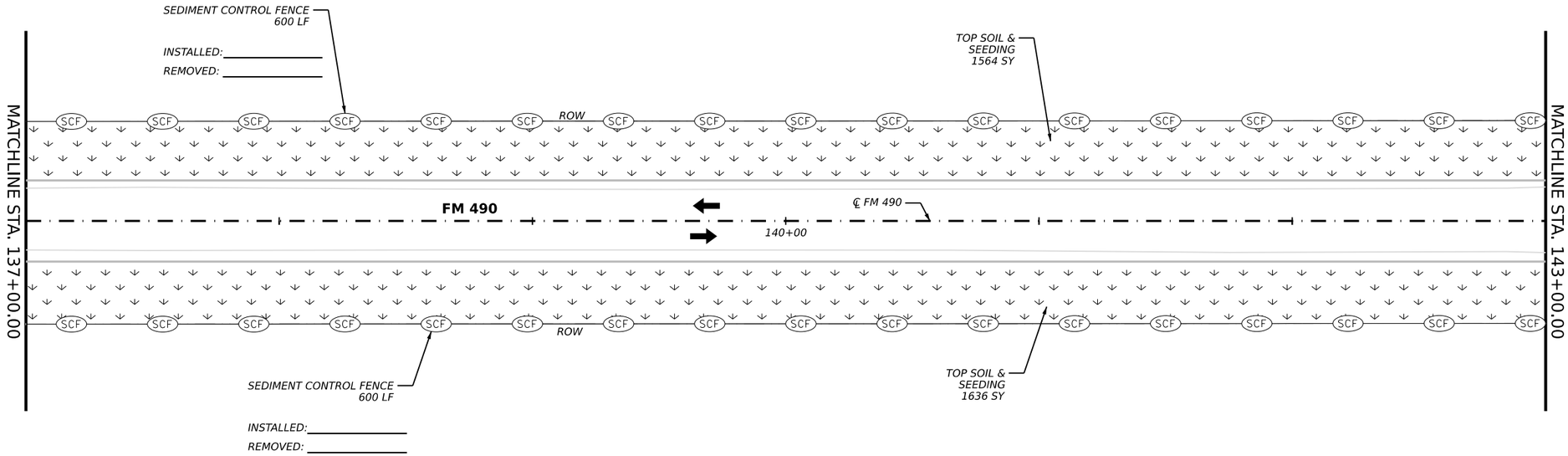
FM 490

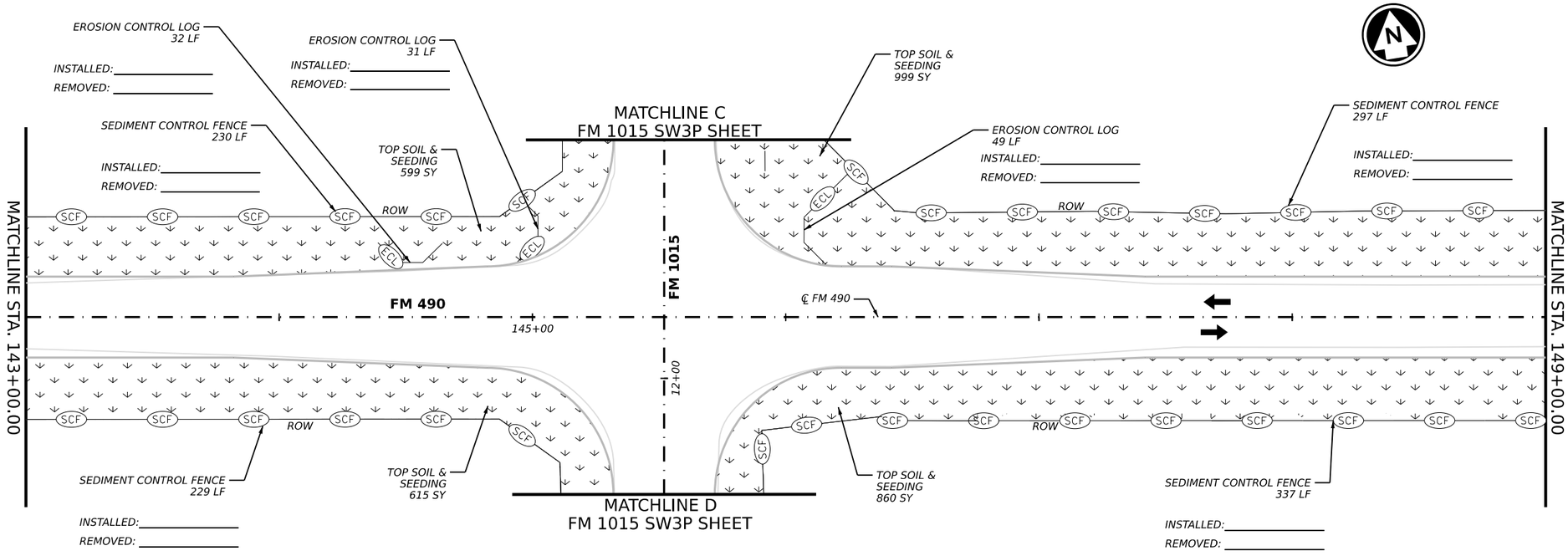
SW3P PLAN
STA 125+00 TO STA 137+00

SHEET 11 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		223

DATE: DATE TIME
FILE: DOCUMENT NAME





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NO.	DATE	REVISION	APPROVED

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

Texas Department of Transportation

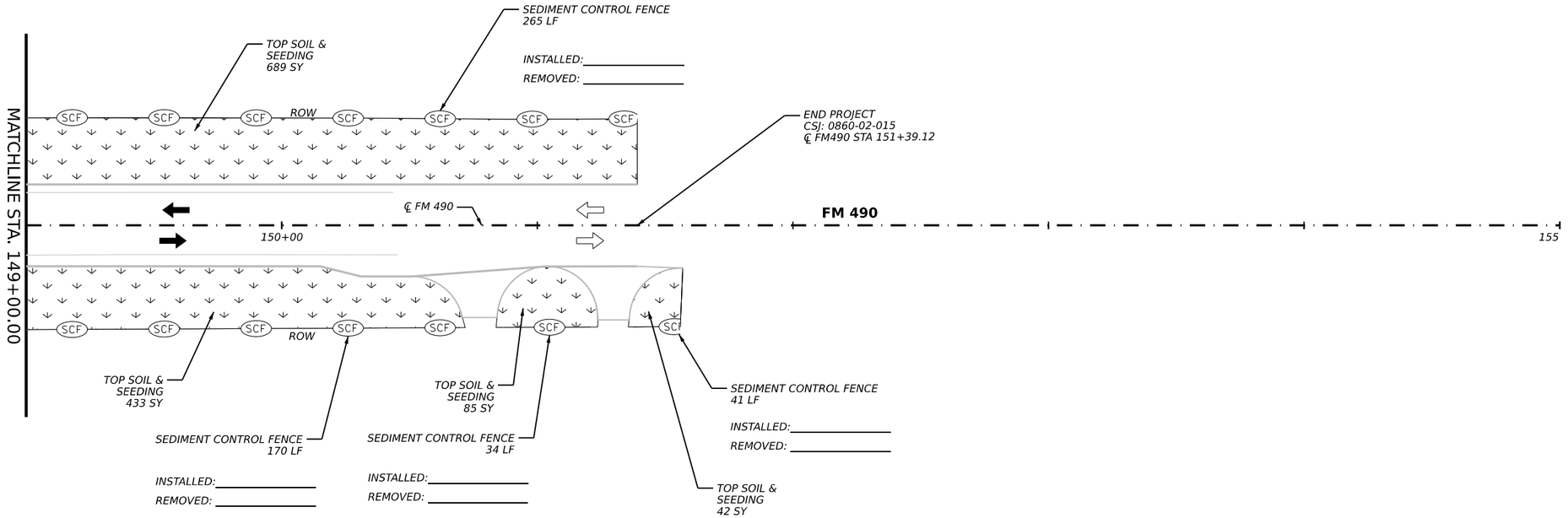
FM 490

SW3P PLAN
STA 137+00 TO STA 149+00

SHEET 12 OF 13

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		224

DATE: DATE TIME
FILE: DOCUMENT NAME



HORIZ: 0 25 50

SCALE IN FEET

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BURNS McDONNELL
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Texas Department of Transportation

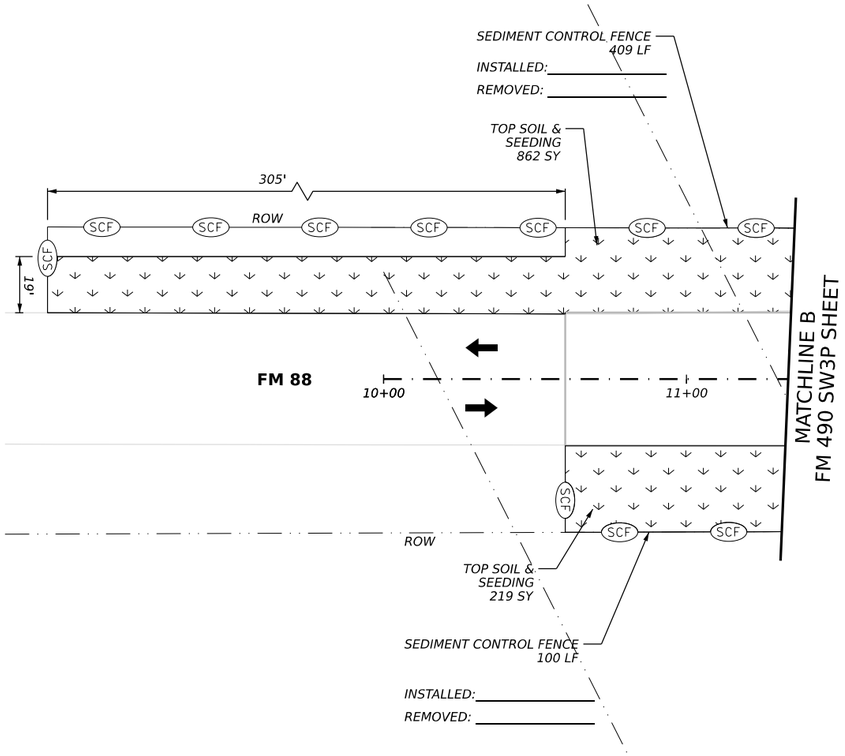
FM 490

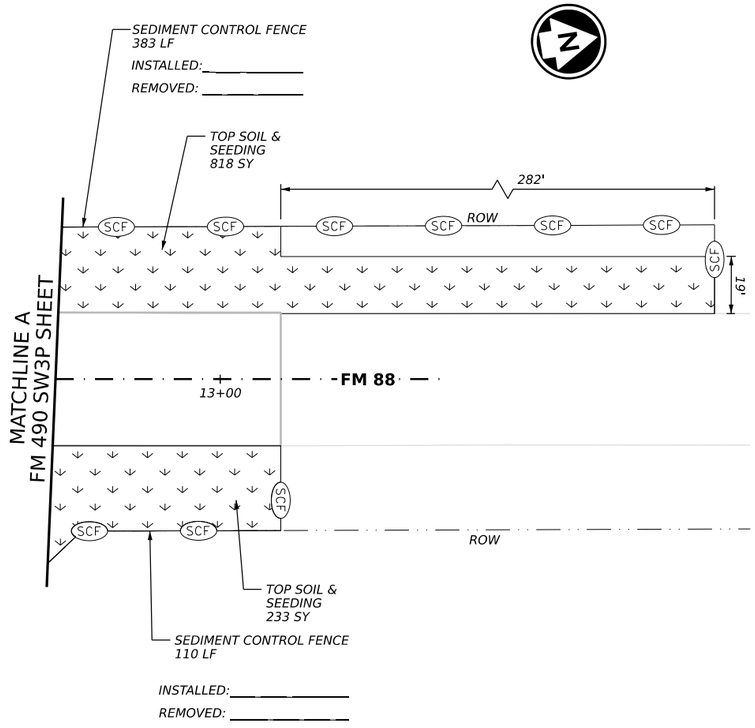
SW3P PLAN
STA 149+00 TO END

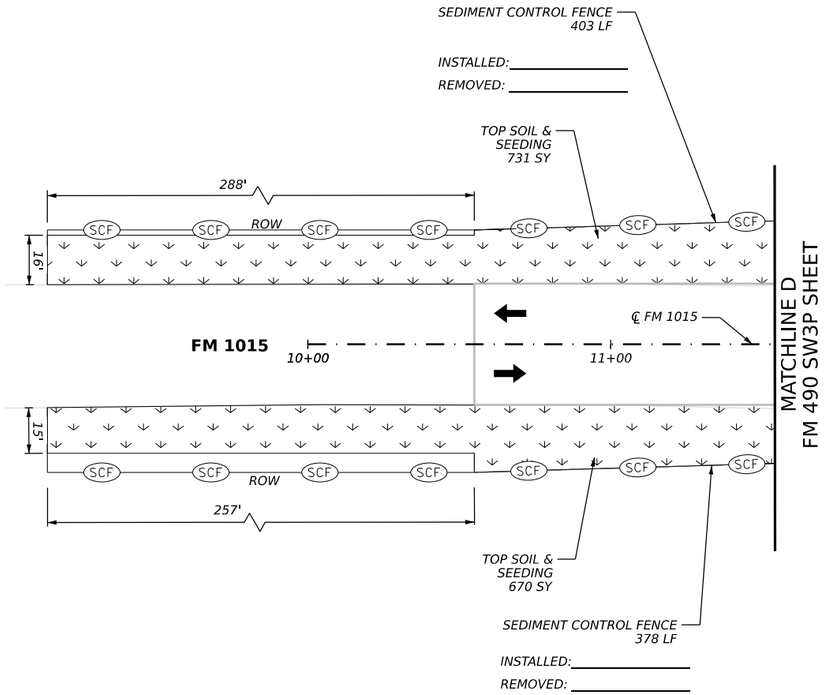
SHEET 13 OF 13

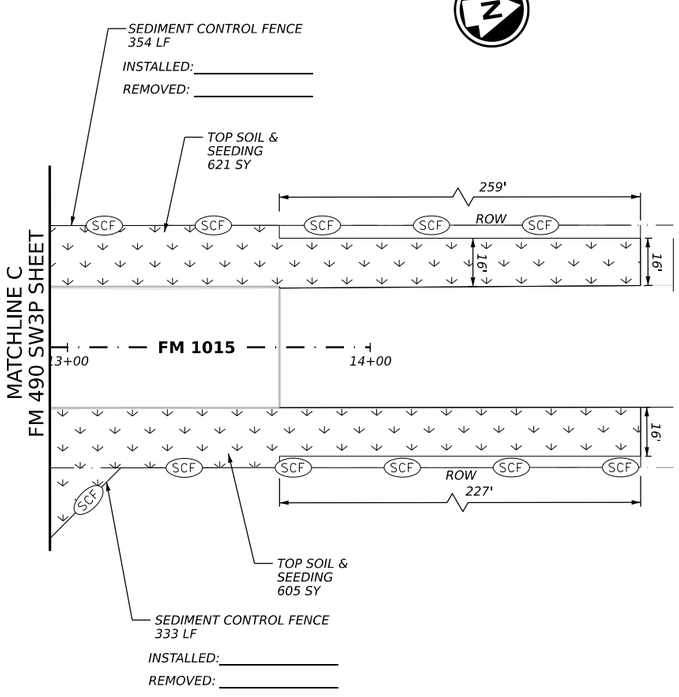
CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		225

DATE: DATE TIME
FILE: DOCUMENT NAME









HORIZ: 0 25 50
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Texas Department of Transportation

FM 88 & FM 1015

SW3P PLAN
BEGIN TO END

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0860	02	015	FM 490
DIST	COUNTY		SHEET NO.
PHR	WILLACY		226

DATE: 1/31/2024
FILE: ...\Erosion\FM490-BMCD-SW3P-14.dgn

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 5/32 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).

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☐ 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

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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		FM490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	
CONTROL	SECTION	JOB	SHEET NO.
0860	02	015	227

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.

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☐ 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		FM490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	
CONTROL	SECTION	JOB	SHEET NO.
0860	02	015	228

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

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Texas Department of Transportation

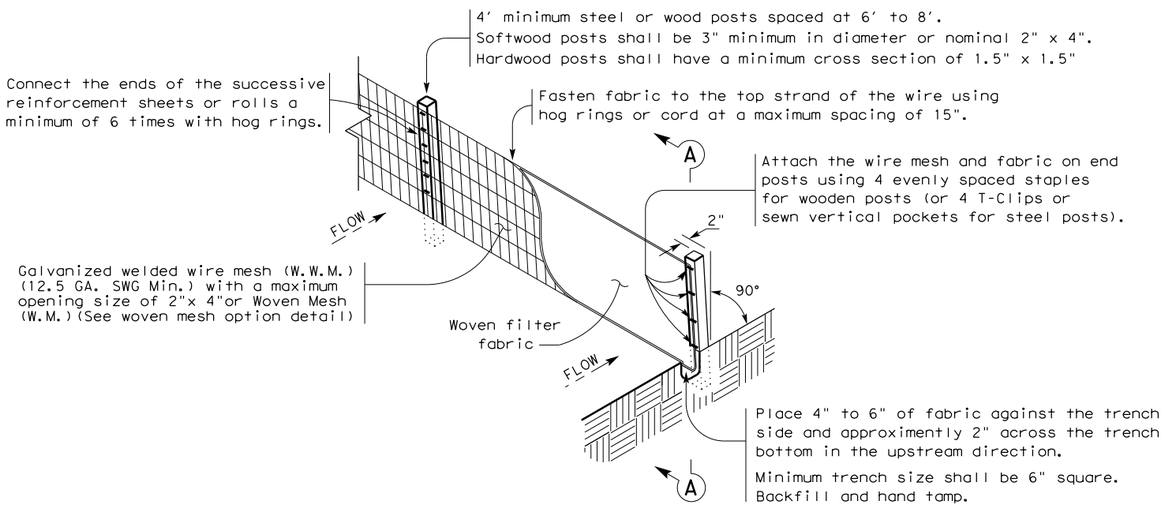
PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

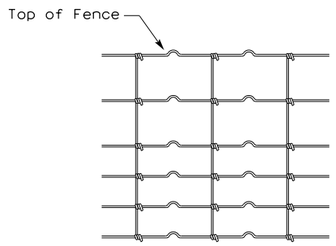
FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM490
STATE	DISTRICT	COUNTY	
TEXAS	PHR	WILLACY	SHEET NO.
CONTROL	SECTION	JOB	
0860	02	015	229

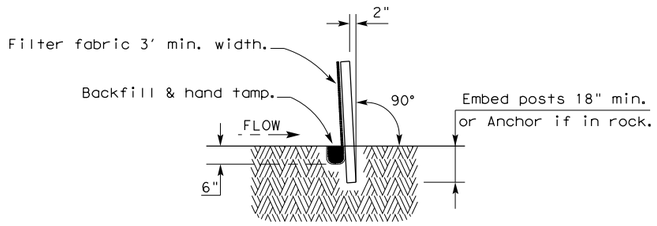
Date Printed: $DATE$



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.

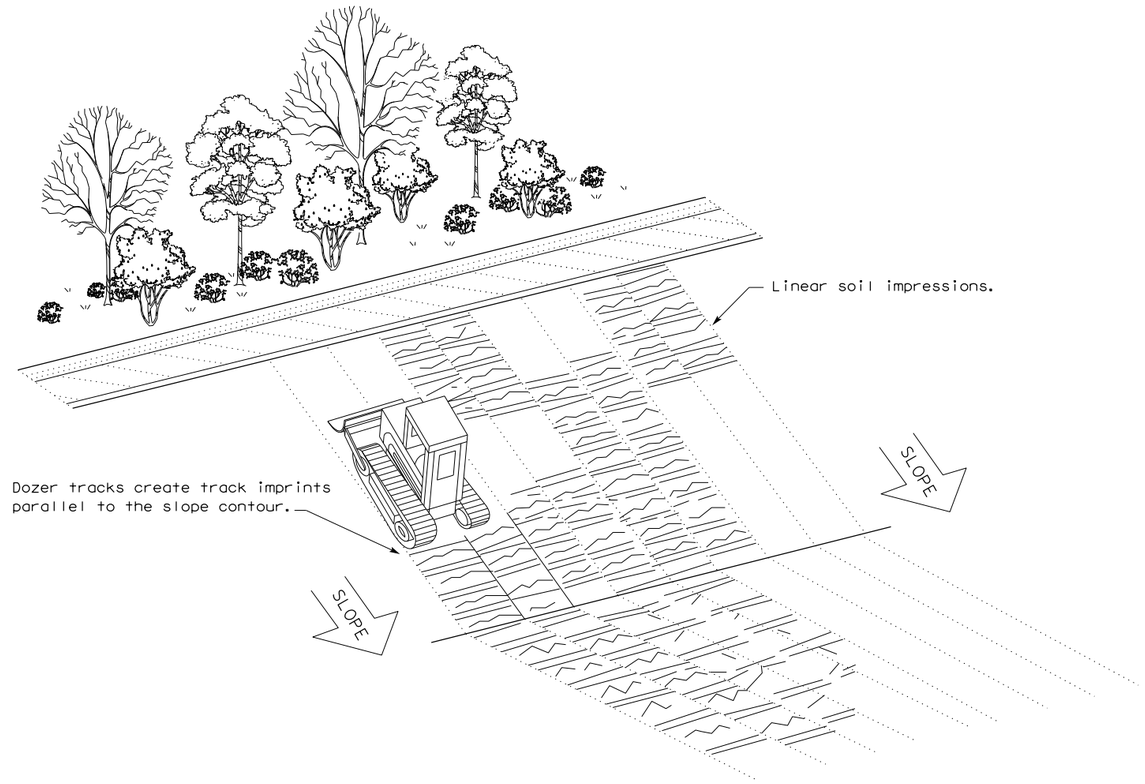
LEGEND

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	0860	02	015		FM490	
	DIST	COUNTY			SHEET NO.	
	PHR	WILLACY			230	

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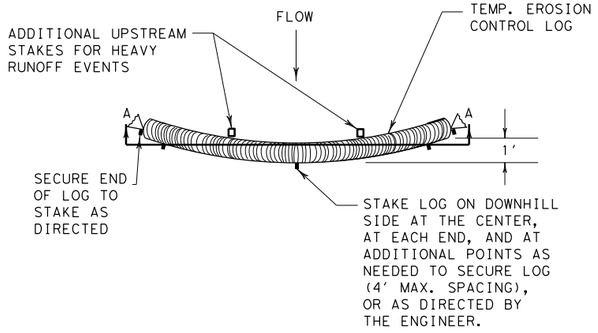
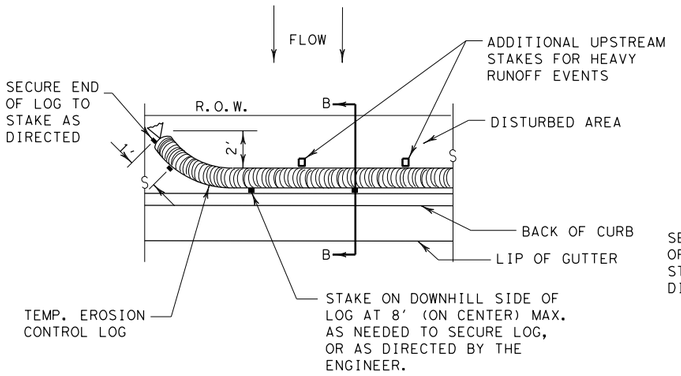
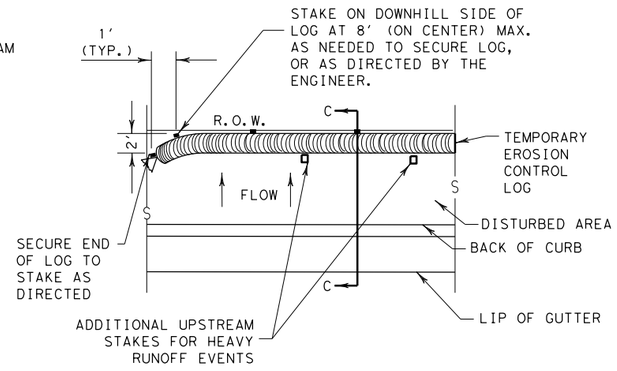


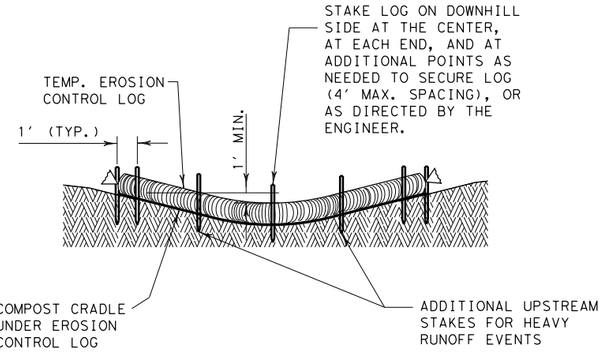
PLAN VIEW



PLAN VIEW



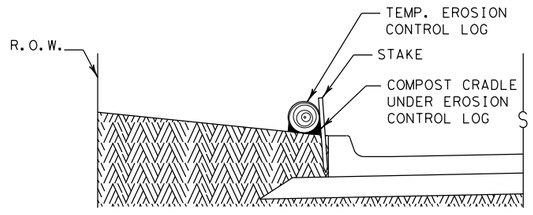
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

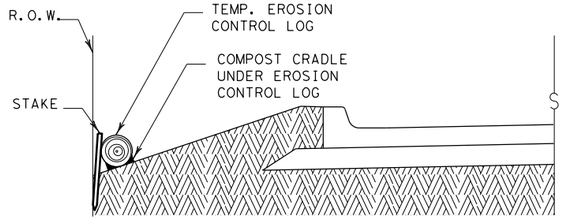
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

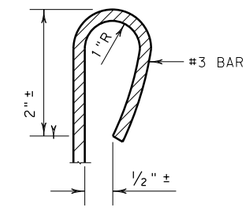
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



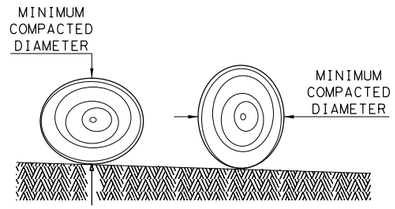
REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

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

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

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916		DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0860	02	015		FM 490		
	DIST	COUNTY					SHEET NO.
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DATE:
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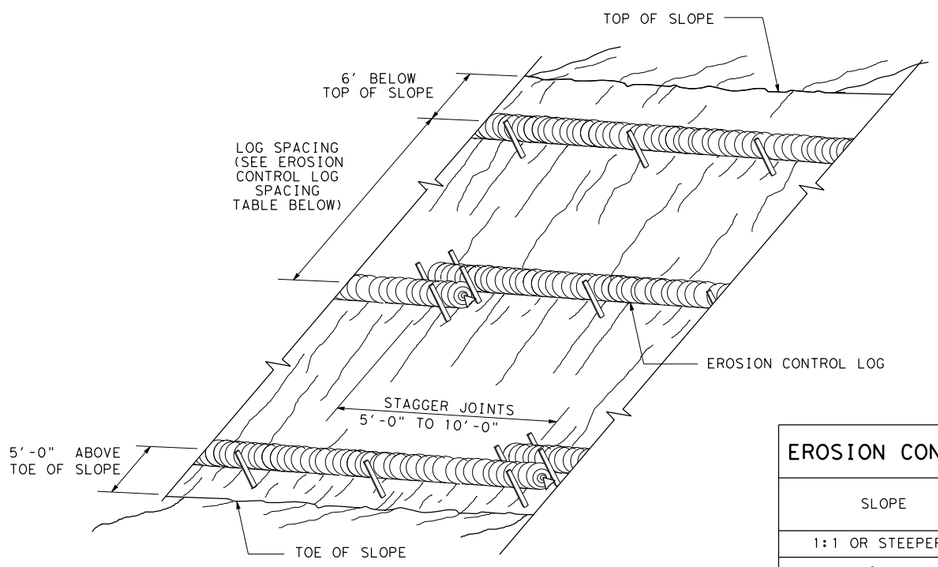
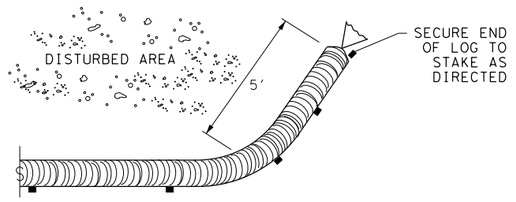


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

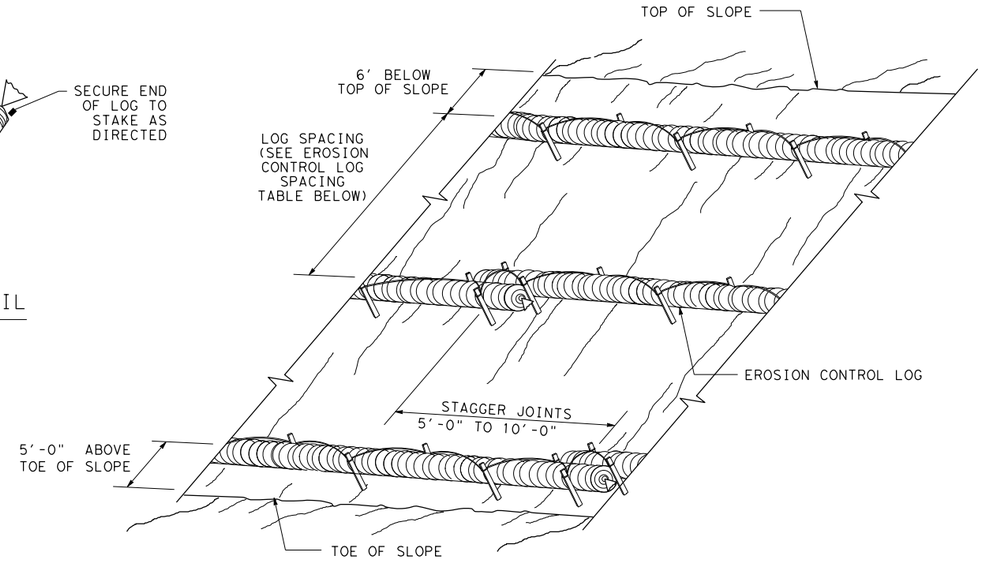
CL-SST



END SECTION RAP DETAIL

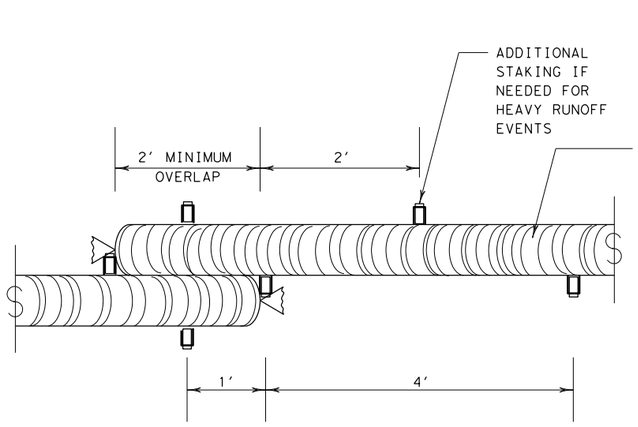
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

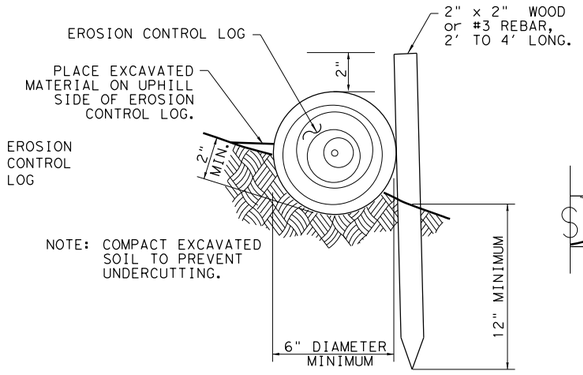
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

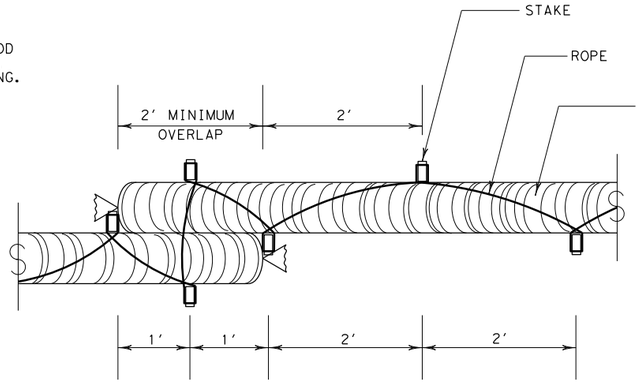


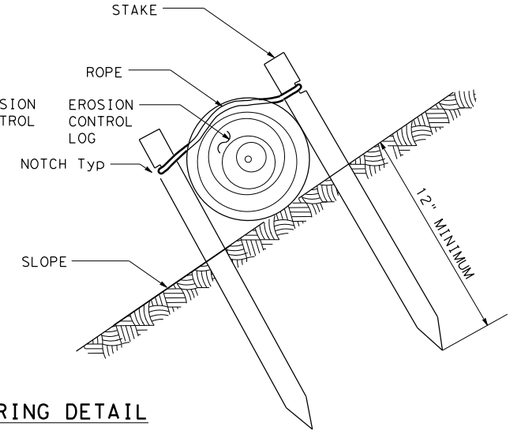


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

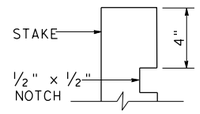
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

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

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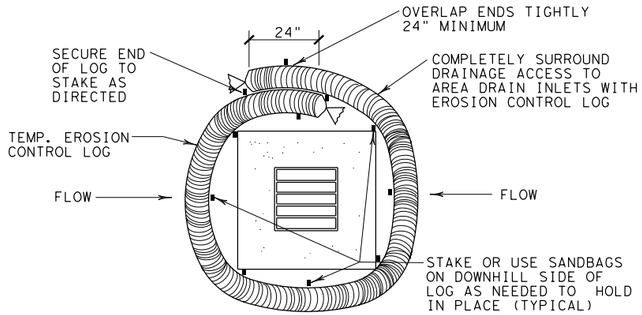
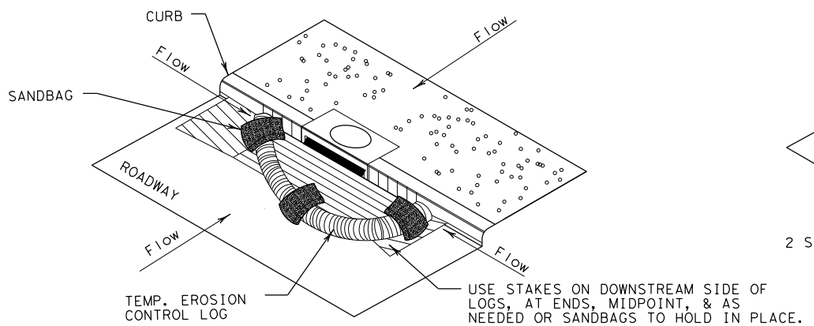
	PHR	WILLACY			232	

DATE:
FILE:



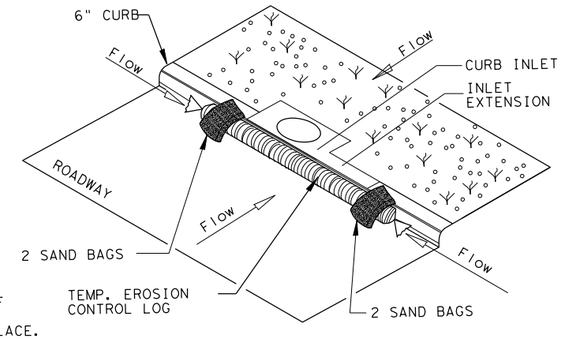
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

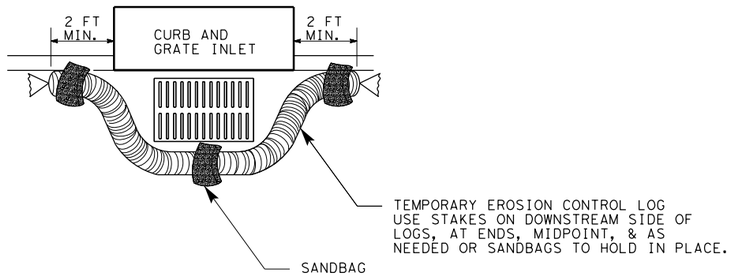
CL-CI



EROSION CONTROL LOG AT CURB INLET

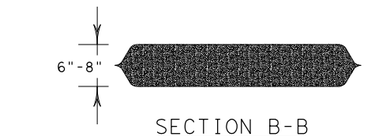
CL-CI

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

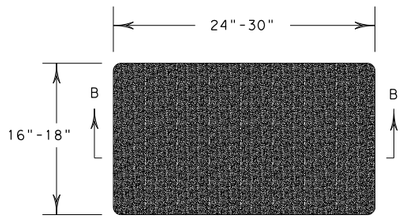


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

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