FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(910)		1
STATE	STATE DIST.	COUNTY	
TEXAS	WAC	HILL	
CONT.	SECT.	JOB	HIGHWAY NO.
1190	02	018	FM 933

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. F 2021(910)

HILL COUNTY
FM 933

CSJ 1190-02-018

ROADWAY: FT= 32,475.57 MI= 6.150
BRIDGE: FT= 0.00 MI= 0.000
TOTAL: FT= 32,475.57 MI= 6.150

LIMITS: FROM SH 22 TO FM 310

FOR THE CONSTRUCTION OF REHABILITATION OF EXISTING ROAD CONSISTING OF REHAB AND WIDEN ROADWAY

INDEX OF SHEETS

DESIGN SPEED = 40 MPH

TRAFFIC DATA

PRESENT ADT (2022): 3,200
DESIGN ADT (2042): 4,400

BEGIN PROJECT
CSJ 1190-02-018
FM 933
STA 477+55.57
REF MRK 324+1.424

END PROJECT
CSJ 1190-02-018
FM 933
STA 152+80.00
REF MRK 330+1.406

VICINITY MAP

EXCEPTIONS: NONE
RAILROAD CROSSING: NONE
EQUATIONS: NONE

0 5,000 10,000
SCALE: 1" = 10,000'

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, MAY 2012).

SUBMITTED FOR LETTING: 05/24/2021
M. CHAD CRISWELL, P.E.

Texas Department of Transportation

RECOMMENDED FOR LETTING: 5/26/2021
DocuSigned by: Josh Voiles, P.E.
AC8604F84EC2483... AREA ENGINEER

RECOMMENDED FOR LETTING: 05/27/2021
Victor Vasbel, P.E.
DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 5/27/2021
DocuSigned by: Stanley Swiatek, P.E.
B69BD796DD564C9... DISTRICT ENGINEER

MODEL: TITLE
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_MISC\FM933_TTL.dgn
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdr-v\TxDOT_pdf_grayscale.plt
05/24/2021 10:35:10 emahlmann
...\01_CADD\163_MISC\FM933_TTL.dgn

SHEET NO.		DESCRIPTION
		GENERAL
1		TITLE SHEET
2		INDEX OF SHEETS
3 - 6		TYPICAL SECTIONS
7, 7A-7E		GENERAL NOTES
8,8A		ESTIMATE & QUANTITIES
9 - 14		SUMMARY OF QUANTITIES
		TRAFFIC CONTROL PLAN
15		SEQUENCE OF CONSTRUCTION
16		TCP TYPICAL SECTIONS
17 - 28	*	BC(1)-14 THRU BC(12)-14
29	*	TCP(1-1)-18
30	*	TCP(1-2)-18
31	*	TCP(2-2)-18
32	*	TCP(3-1)-13
33	*	TCP(7-1)-13
34	*	WZ(STPM)-13
35	*	WZ(RS)-16
		ROADWAY DETAILS
36 - 43		SURVEY CONTROL INDEX SHEET
44		HORIZONTAL & VERTICAL CONTROL SHEET
45		HORIZONTAL ALIGNMENT DATA
46		EXISTING VERTICAL ALIGNMENT DATA
47 - 60		PLAN LAYOUT
61 - 63		INTERSECTION LAYOUT
64		DRIVEWAY DETAILS
65		MAILBOX DETAILS
66		MISCELLANEOUS ROADWAY DETAILS
67 - 70	*	MB-15(1)
		TRAFFIC DETAILS
71 - 84		SIGNING & PAVEMENT MARKING LAYOUT
85		INTERSECTION PAVEMENT MARKING DETAIL AT SH 22
86 - 94		SOSS
95 - 97		GUIDE SIGN DETAILS
98	**	SMD(GEN)-08
99 - 101	**	SMD(SLIP-1)-08 THRU SMD(SLIP-3)-08
102	**	SMD(2-1)-08
103 - 105	**	TSR(3)-13 THRU TSR(5)-13
106 - 110	**	D&OM(1)-20 THRU D&OM(5)-20
111 - 113	**	PM(1)-20 THRU PM(3)-20
114 - 115	**	RS(3)-13 THRU RS(4)-13
		ENVIRONMENTAL ISSUES
116		EPIC
117		SW3P
118 - 131		SW3P LAYOUT
132 - 141	**	TA-BMP (WACO DISTRICT STANDARD)
142 - 144	**	EC(1)-16 THRU EC(3)-16

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

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

M. CHAD CRISWELL (NO. 90114), PE — 05/25/2021 DATE

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

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

JAVED I. MAHOMMED (NO 107521), PE — 05/25/2021 DATE

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

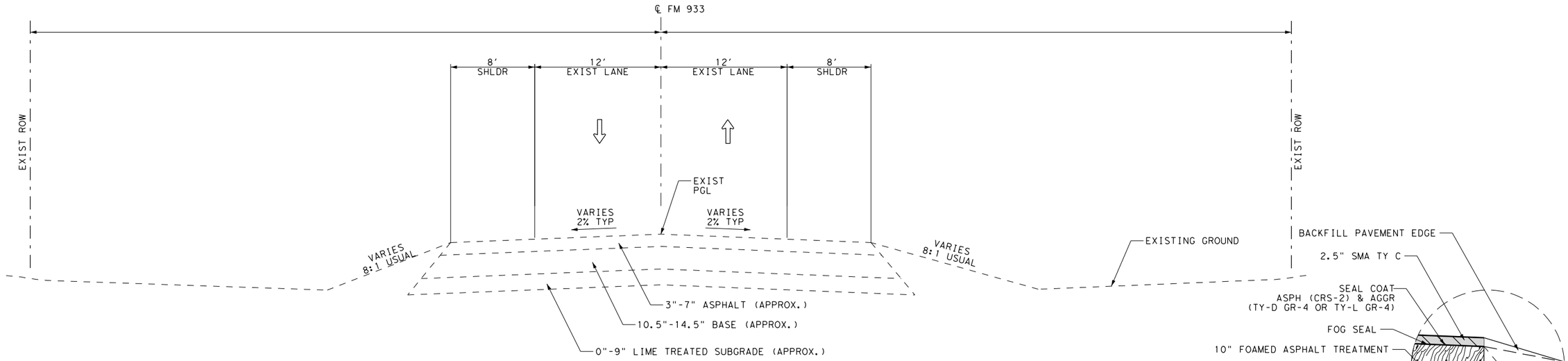
FM 933

INDEX OF SHEETS

SHEET 1 OF 1

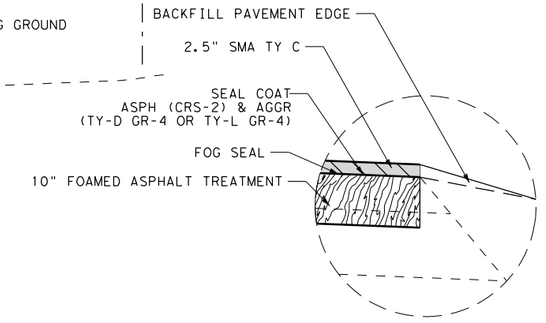
FED RD DIV NO	PROJECT NO		SHEET NO
6			2
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

MODEL: Default
FILE: D:\cfa\v2019\1024.FM.933\USTN\project\Dgn\Sheets\General\933_INDEX.dgn 5/25/2021 8:51:03 AM MJalajel
PEN TABLE: $PENTBL$
PLOT DRIVER: D:\Share\TxDOT_Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
$FILEABBREV$

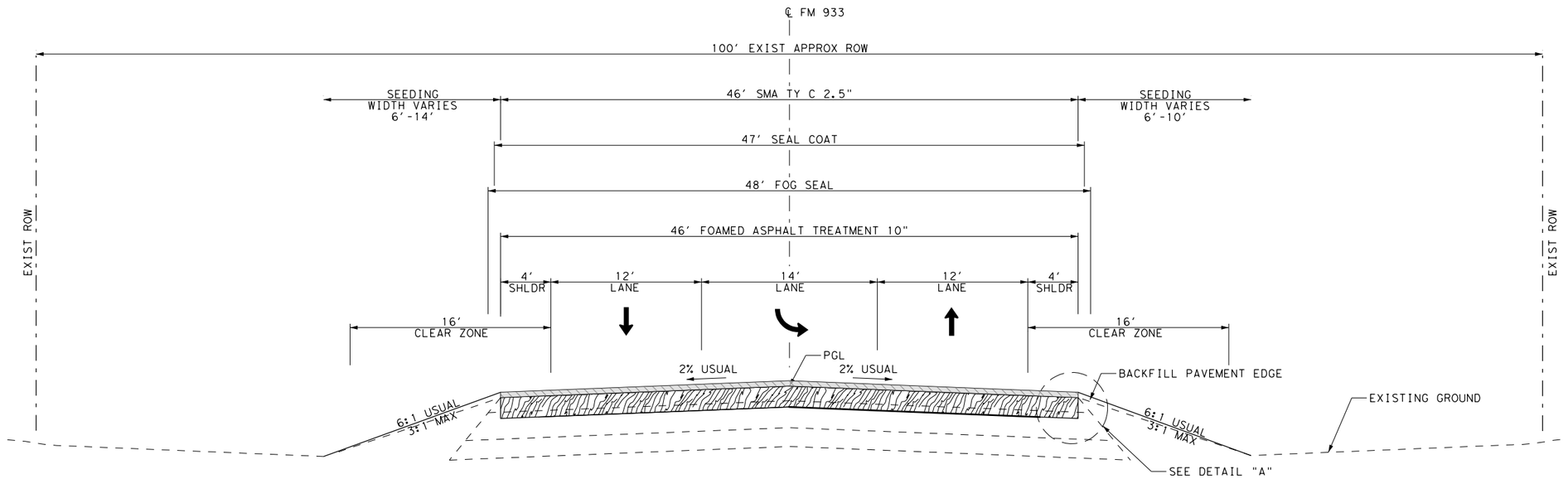


EXISTING TYPICAL SECTION

STA 152+80.00 TO STA 477+55.57



DETAIL "A"
(TO BE APPLIED LT AND RT)



SB LEFT-TURN LANE
PROPOSED TYPICAL SECTION

STA 157+95.00 TO STA 163+10.00

NOTES:

1. PAVEMENT EDGE TO BE BACKFILLED USING ITEM 134, EXCEPT FOR SUPERELEVATED AREAS WHERE ITEM 132: EMBANKMENT SHALL BE USED. REFER TO PLAN LAYOUT FOR LIMITS OF SUPERELEVATION.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 2.5 5 10

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

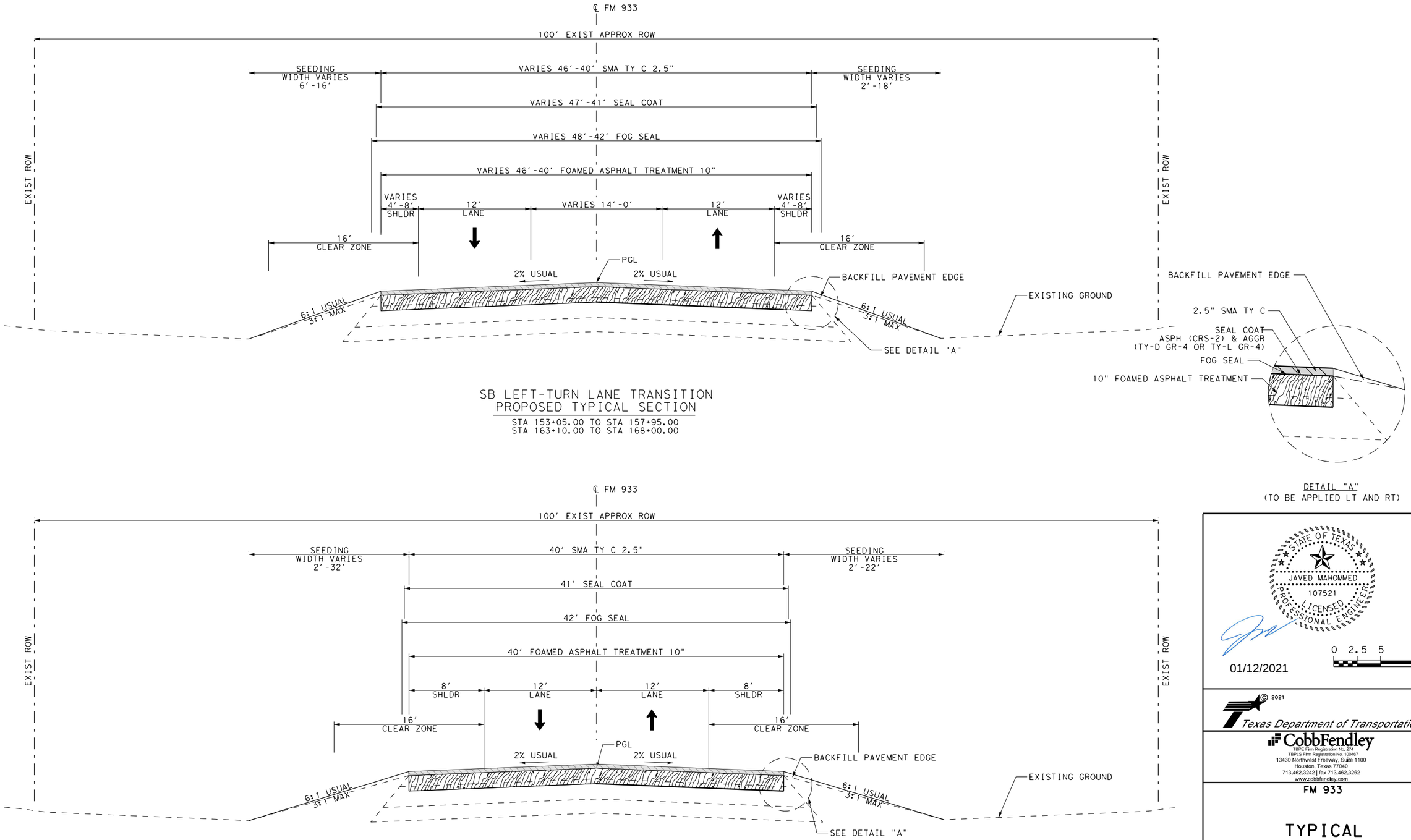
FM 933

TYPICAL SECTIONS

SHEET 1 OF 4

FED RD DIV NO	PROJECT NO		SHEET NO
6			3
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:30:27 PM MJalajel
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_TYP01.dgn



SB LEFT-TURN LANE TRANSITION
PROPOSED TYPICAL SECTION

STA 153+05.00 TO STA 157+95.00
STA 163+10.00 TO STA 168+00.00

DETAIL "A"
(TO BE APPLIED LT AND RT)

PROPOSED TYPICAL SECTION

STA 168+00.00 TO STA 472+00.00

NOTES:

1. PAVEMENT EDGE TO BE BACKFILLED USING ITEM 134, EXCEPT FOR SUPERELEVATED AREAS WHERE ITEM 132: EMBANKMENT SHALL BE USED. REFER TO PLAN LAYOUT FOR LIMITS OF SUPERELEVATION.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 2.5 5 10

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

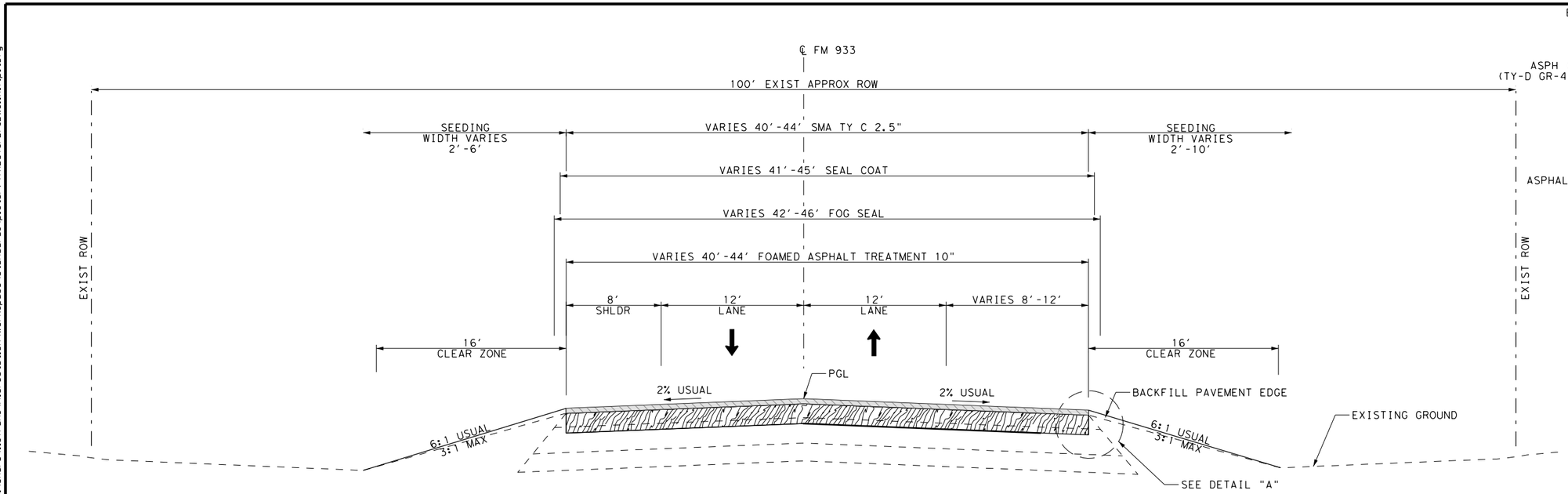
FM 933

TYPICAL SECTIONS

SHEET 2 OF 4

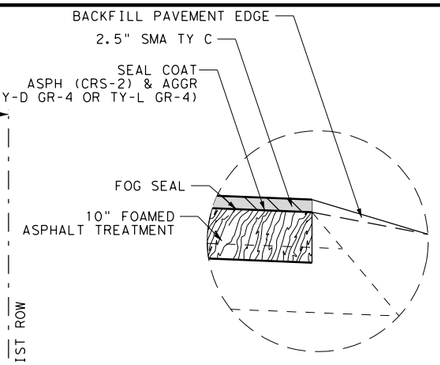
FED RD DIV NO	PROJECT NO		SHEET NO
6			4
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJolejol 1/12/2021 4:30:34 PM
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_TYP02.dgn



NB RIGHT-TURN LANE TRANSITION
PROPOSED TYPICAL SECTION

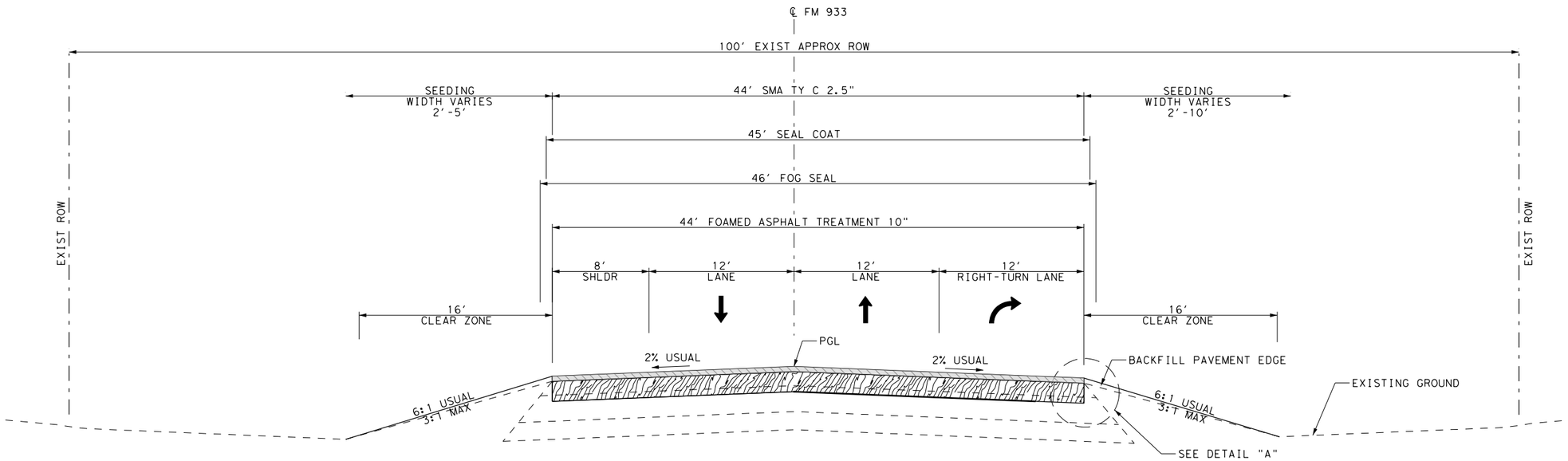
STA 472+00.00 TO STA 473+00.00



DETAIL "A"
(TO BE APPLIED LT AND RT)

NOTES:

1. PAVEMENT EDGE TO BE BACKFILLED USING ITEM 134, EXCEPT FOR SUPERELEVATED AREAS WHERE ITEM 132: EMBANKMENT SHALL BE USED. REFER TO PLAN LAYOUT FOR LIMITS OF SUPERELEVATION.



NB RIGHT-TURN LANE
PROPOSED TYPICAL SECTION

STA 473+00.00 TO STA 473+28.96

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 2.5 5 10

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

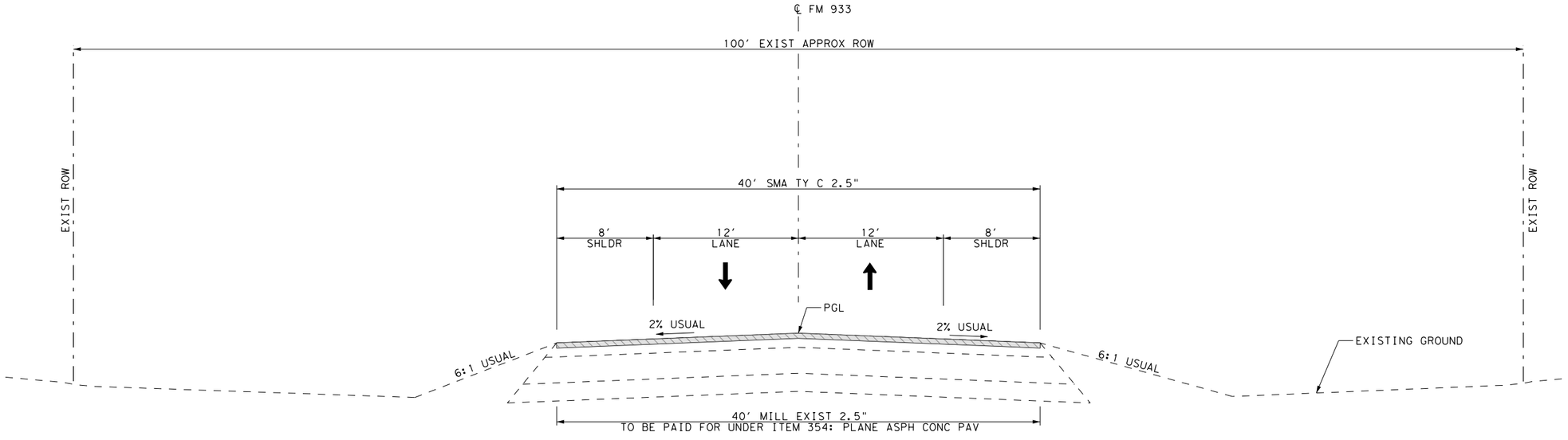
FM 933

TYPICAL SECTIONS

SHEET 3 OF 4

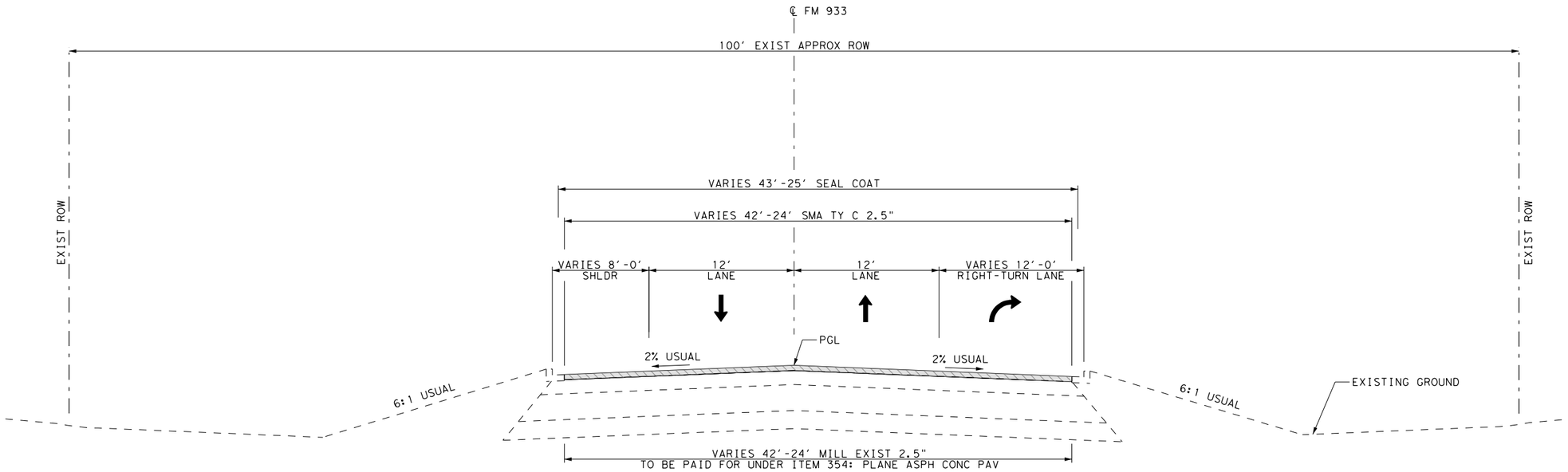
FED RD DIV NO	PROJECT NO		SHEET NO
6			5
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL1$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:30:36 PM Mjolejol
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_TYP03.dgn



PROPOSED TYPICAL SECTION - MILL AND OVERLAY

STA 152+80.00 TO STA 153+05.00



PROPOSED TYPICAL SECTION - MILL AND OVERLAY

STA 473+28.96 TO STA 477+55.57

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED PROFESSIONAL ENGINEER

01/12/2021

0 2.5 5 10

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

TYPICAL SECTIONS

SHEET 4 OF 4

FED RD DIV NO	PROJECT NO		SHEET NO
6			6
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\Sheets\Roadway\933_TYP04.dgn

BASIS OF ESTIMATE TABLES

Table 1: Basis of Estimate for Erosion Control Items

Item	Description	Rate	Basis	Quantities
*166	FERTILIZER			
	FERTILIZER (20-10-10) (PERMANENT)	300 LBS / AC	23.2 AC	3.5 TON
	FERTILIZER (20-10-10) (TEMPORARY)	300 LBS / AC	23.2 AC	3.5 TON
168	VEGETATIVE WATERING			
	(3 APPLICATIONS - PERM)	13,100 GAL/AC/APP	23.2 AC	912 MG
	(3 APPLICATIONS - TEMP)	13,100 GAL/AC/APP	23.2 AC	912 MG

* FOR CONTRACTOR'S INFORMATION ONLY

Table 2: Basis of Estimate for Base Work

Item	Description	Rate	Basis	Quantities
*216	PROOF ROLLING			
	PROOF ROLLING	8HR /ROADBED-MILE	6.0 HR ROADBED-MILE	48 HR
315	FOG SEAL (SS-1)	0.10 GAL / SY	150280 SY	15,028 GAL

* FOR CONTRACTOR'S INFORMATION ONLY

Table 3: Basis of Estimate for Foamed Asphalt Treatment

Item	Description	Rate	Basis	Quantities
3088	**FULL DEPTH RECLAMATION USING ASPHALT EMULSION (ROAD-MIXED)**			
	CEMENT	.9 LB / SY / IN	145,100 SY	695 TON
	ASPHALT BINDER	2.25 LB / SY / IN	145,100 SY	1634 TON

Table 4: Basis of Estimate for Seal Coats

Item	Description	Rate	Basis	Quantities
316	**SEAL COAT**			
	ASPH (CRS-2)	0.45 GAL / SY	83,742 SY	37,684 GAL
	AGGR (TY-D GR-4 OR TY-L GR-4)	1 CY / 135 SY	XX,XXX SY	1,007CY

Table 5: Basis of Estimate for Asphalt Pavements

Item	Description	Rate	Basis	Quantities
346	**STONE-MATRIX ASPHALT (SMA)**			
	STONE-MTRX-ASPH SMA-C SAC-B PG76-22	275 LB / SY	147,236 SY	20,245TON

GENERAL

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

The disturbed area for this project, as shown on the plans is 23.2 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

There is a high probability that an environmentally sensitive area could be encountered on the contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 "Project-Specific Locations", provides a listing of regulatory agencies that may need to be contacted regarding this project.

Contractor questions on this project are to be emailed to the Waco District at the following address:

Bill Compton - Wacoprebid@txdot.gov, 254-867-2707, 100 S. Loop Dr., Waco, TX
Carmen Chau - Wacoprebid@txdot.gov, 254-867-2794, 100 S. Loop Dr., Waco, TX

Or Via phone or in person to the following individual(s):
Area Engineer's: Josh Voiles, P.E., (254)582-5432, 1400 S. Abbott Ave., Hillsboro, TX
Assistant Area Engineer's: Anel Rivera, P.E., (254 313-8730, 1400 S. Abbott Ave., Hillsboro, TX

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

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

Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

GENERAL NOTES

ITEM 5: CONTROL OF THE WORK

Submit all fabrication and shop drawings per TxDOT's online shop drawing submittal system and copy the Area Engineer on the email submittal, unless otherwise directed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (254)867-2808 for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (254)867-2726 for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

ITEM 6: CONTROL OF MATERIALS

References to manufacturer's trade name or catalog numbers are for the purpose of identification only and the contractor will be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

If utilizing private property for waste disposal sites, field office sites, equipment storage sites or for any other purpose involved with this project, provide to the Engineer written proof of the property owner's approval of the use of this property. This proof may be in the form of a letter or agreement signed by the property owner or other documents acceptable to the Engineer.

Personal vehicles of the contractor's employees will not be parked within the right of way at any time including any section closed to public traffic, unless the vehicle is being utilized for construction procedures. However, the contractor's employees may park on the right of way at the sites where the contractor has his office, equipment and materials storage yard.

The contractor is alerted to the possible presence of swallows under the existing bridges or culverts. Because the migratory bird treaty act prohibits harm to swallows, their eggs or their nestlings, the contractor will not begin potentially disturbing activities on or near the bridge until the birds have abandoned any occupied nests (approximately September 1). Active nests may not be removed regardless of the date.

Prior to the swallows returning to the nests (approximately March 1), abandoned nests will be removed from the bridge. The contractor will prevent the establishment of new nests on any portion of the structure. Methods for preventing the establishment of new nests must be approved by the project Engineer. Examples of acceptable nest prevention methods are bird-deterrent netting and bird-repelling sprays and/or gels to be applied to the structure. This work will not be paid for directly, but will be subsidiary to the various bid items.

The Contractor will submit detailed site-specific plans for work in each "water of the United States" designated on the EPIC sheet. These plans must be approved by the TxDOT Engineer prior to starting any work in these areas. The plans must also describe facilities and work activities adjacent the Ordinary High-Water Marks. The plan must show actual dimensions and materials for:

- Proposed construction roads and work areas leading to or in close proximity to the Ordinary High-Water Marks
- Temporary material or equipment storage areas in close proximity to the Ordinary High-Water Marks
- Locations of proposed sediment and erosion control devices
- Identification of construction equipment and construction techniques to accomplish the work

Once this drawing and supporting information is reviewed and approved by TxDOT, all construction workers should be made aware of the limits designated on the drawings by the Contractor's supervision. Work in all waters of the US will be limited to the minimum necessary required to construct the bridge, culvert or roadway fills. Work will also include all activities needed for bridge and culvert demolitions. Working or disturbing soil in the stream channel outside the limits of the work plan will not be allowed. Orange fencing will be provided and maintained to establish the TxDOT approved boundaries in which work may be conducted between the Ordinary High-Water Marks. Orange fencing will not be paid for but will be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling".

ITEM 8: PROSECUTION AND PROGRESS

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

Nighttime work is allowed in accordance with Article 8.3.3.

Meet bi-weekly or at intervals as agreed upon with the engineer to notify him or her of planned work for the upcoming 3-week period.

For this project, provide a Bar Chart progress schedule.

ITEM 110: EXCAVATION

In a cut section, when soils are encountered at subgrade depths that are unstable and are deemed unsuitable by the Engineer, undercut this material for a minimum depth of one (1.0) foot below the maximum depth as determined and replace with a material having a plasticity index less than 25 and a liquid limit of less than 50.

ITEMS 110 & 132: EXCAVATION & EMBANKMENT

Excavation and embankment for driveways, sleeper slabs, alleys and intersections will not be paid for directly, but will be considered subsidiary to these items.

In those cases where fixed features require, the governing slopes indicated herein and on the cross sections may be varied between the limits and to the extent determined.

ITEM 132: EMBANKMENT

Perform Tex-106-E (Plasticity Index) by an approved laboratory on excavated soils from sources outside right of way when used in roadway embankment. Provide the test results at no expense to the department. The engineer will sample and test soils produced by the construction project for specification requirements or material sources specified in the plans.

ITEM 134: BACKFILLING PAVEMENT EDGES

Start backfilling pavement edges as soon as possible after the surface course is started.

Use Type “A” or “B” material to backfill pavement edges as shown in plans. Type “A” or “B” material shall consist of suitable material that when compacted will support the pavement edge. Rap is considered suitable Type “A” or “B” material.

Blade the existing vegetation into a neat wind-row prior to overlay. After placing Ty A or Ty B backfill and seeding, the material from the wind-row shall be replaced on the completed slopes.

Emulsion shall be placed at a 50/50 solution of water to emulsion over disturbed area. Emulsion rate=0.15 Gal/SY residual. This work, materials and equipment shall be subsidiary to Item 134.

ITEM 164: SEEDING FOR EROSION CONTROL

Temporary seeding mixtures (cool and warm) will also include three (3) lbs of Bermuda grass seed per acre, with all seeds being planted concurrently.

Contractor will mow or disc wheat and or oats in spring prior to vegetation going to seed.

Permanent seed mixes for both urban and rural projects including sand or clay soils in the Waco District will be bid and installed to include a minimum of one & one-half (1.5) pounds per acre Green Sprangletop seed and four (4) pounds per acre Bermudagrass seed, with other seed types also being included and quantities remaining unchanged.

ITEM 316: SEAL COAT

All trucks hauling materials to be paid for by truck measurement will be “struck off” prior to delivery to the project.

Unless otherwise approved, seal coat will not be exposed to traffic for more than seven(7) calendar day before application of HMAC..

Utilize an asphalt distributor capable of providing a transversely varied asphalt rate. The Engineer will select the pavements where the transversely varied asphalt rate is required.
When a transversely varied rate is required, the asphalt rate outside of the wheel paths will be between 22 and 32% higher than the asphalt rate applied in the wheel paths. Provide calibration documents to the Engineer that include a description of the spray bar(s) and nozzles that will be used and the percentage difference in asphalt rate achieved by each tested spray bar and nozzle arrangement. The nozzles proposed for use shall be clearly stamped or marked from the factory identifying the manufacturer.

ITEM 320: EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV’s remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

ITEM 346: STONE-MATRIX ASPHALT

RAP from Contractor owned sources may be used if the RAP is fractionated.

Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class C.

Maximum stripping of 0% is required.

No Recycled Asphalt Shingles (RAS) will be allowed.

ITEMS 354: PLANING AND TEXTURING PAVEMENT

Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly, but is subsidiary to this item.

Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at Contractor's expense.

Remove the loose material from the roadway before opening to traffic.

Patch pavement cut to excessive depth by equipment failure with an approved epoxy material. Re-plane patched area to an acceptable approved ride quality. Payment for these corrections is subsidiary to this item

ITEM 400: EXCAVATION AND BACKFILL OF STRUCTURES

Aggregate for cement stabilized backfill will be coarse aggregates, GRADE 3, 4 or 5 and fine aggregate, as shown in Item 421, "Hydraulic Cement Concrete". The ratio of course aggregate to sand should not contain more than sixty percent (60%) sand unless otherwise approved.

CLASS B bedding is required if rock is encountered.

ITEM 421: HYDRAULIC CEMENT CONCRETE

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

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

ITEM 464: REINFORCED CONCRETE PIPE

The concrete collars and the connections of pipes to existing or proposed concrete boxes or pipe will not be paid for directly but will be considered subsidiary to the various bid items.

ITEM 500: MOBILIZATION

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

ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING

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

Install traffic marking signs prior to sealcoat application and remove within three days after placement of traffic markings.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

A meeting between the contractor and Engineer to discuss upcoming changes in construction phasing and traffic switches is required at least fourteen (14) days prior to the phase change. Items to be discussed at this meeting include temporary signing, traffic control, pavement markings, the processes necessary for the phase change and subcontractor scheduling.

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

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

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

The Contractor Responsible Person(s) (CRP) for Work Zone Traffic Controls will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Any misaligned or damaged traffic control devices will be repaired as soon as practical after deficiency is discovered.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee(s) available to respond on the project for emergencies and for taking corrective measures within One (1) Hour.

Traffic Control Plans with Lane Closures causing backups of 20 minutes or greater in duration will be modified by the Engineer.

ITEM 504: FIELD OFFICE

Furnish one Asphalt Mix Control Laboratory (Type D) for this project.

ITEM 506: TEMPROARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS

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

If temporary construction stream crossings are allowed under a Nationwide Permit, submit in writing for approval the type and location of each temporary stream crossing. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for temporary stream crossings. A temporary culvert crossing will consist of storm sewer pipes and 4- to 8-inch nominal size rock. Temporary stream crossings must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality. Remove the temporary stream crossings in their entirety and return the affected areas to their pre-existing elevation. All work and materials use for temporary construction stream crossings will not be paid for directly but are subsidiary to pertinent Items.

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

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

No soil disturbing activities will begin on any section of TxDOT ROW without adequate sedimentation controls first being installed and functioning at adjacent drainage outfalls. Begin and continuously prosecute the repairs, additions and maintenance of erosion and sedimentation control devices within seven days after the Contractor receives each Form 2118, Field Inspection and Maintenance Report, from the Engineer. Failure of the Contractor to fulfill either of the above requirements places TxDOT in potential non-compliance with permit requirements and may result in withholding estimates or stopping work or both until all environmental permit requirements are fulfilled.

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

Cleaning and sweeping of open roadways due to material spillage or loss from Contractor equipment or tires will be the responsibility of the Contractor at no cost to TxDOT. This work will not be charged as Item 738, "Cleaning and Sweeping Highways". Cleaning and sweeping of roadways will be completed as directed, including multiple times per day if necessary, to maintain acceptable roadways for the traveling public and to meet environmental regulations. Construction activities will cease when material deposited on the roadway is not properly removed or when equipment is not available as needed. Adequate construction exits will be planned, constructed and maintained by the Contractor per Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls".

ITEM 560: MAILBOX ASSEMBLIES

Mail boxes will be kept in a position accessible to the carrier's vehicle along the travel way except when performance of grading operations necessitates the moving of mail boxes. When grading operations necessitate the moving of mail boxes, the contractor will place them at a nearby location which will be accessible to the carrier's vehicle. Mail boxes will be returned to a position accessible to the carrier's vehicle along the travel way when grading operations are not in progress. This work will not be paid for directly, but will be subsidiary to Item 560, "Mailbox Assemblies".

ITEM 585: RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule __3_ on the travel lanes.

The contractor will ensure satisfactory profile results in the intermediate paving layers (mixture) to eliminate corrective action for excessive deviations in the final surface layers.

Milling will not be allowed as a corrective action for excessive deviations in the surface layer.

ITEM 644: SMALL ROADSIDE SIGN ASSEMBLIES

Bolt Clamp type will be used on Texas Triangular Slip Base System.

As practical with new construction, leave the existing sign assemblies in place until the proposed foundation, post and sign are in installed, and then remove the old sign assemblies.

Do not leave any sign foundation holes open overnight. Ensure all holes drilled are at least the minimum required depth with no loose material remaining in the hole.

Stake proposed sign locations and receive approval before installation of sign foundations.

Existing Mile Markers Signs are to be relocated to their original location(s) as they were prior to the beginning of the project.

Expanded foam foundations are not permitted.

Cut the bottom of all posts square.

For sign types which design details are not shown on these plans, fabricate according to the "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS".

Removed material that is deemed salvageable (signs and posts) will be the property of TxDOT. Deliver salvageable material to the TxDOT Maintenance Office. Remove unsalvageable material.

The Contractor will relocate the existing double sided street name signs and furnish the post mounted brackets for the street name signs to be paid for as part of the proposed Stop Signs (R1-1). Existing street name signs will be mounted above Stop signs. If damaged while being relocated, the Contractor will furnish new double sided street name sign at their own expense.

ITEM 658: DELINEATOR AND OBJECT MARKER ASSEMBLIES

All flexible and GF2 delineators will have a tubular body.

ITEM 662: WORK ZONE PAVEMENT MARKINGS

Paint and beads may be used for non-removable pavement markings.

ITEM 666: RETROREFLECTORIZED PAVEMENT MARKINGS

The Contractor will layout the proposed striping in accordance with TxDOT Traffic Control Plan Standards and latest version Texas Manual on Uniform Traffic Control Devices (TMUTCD) and project striping layout sheets. The Engineer will verify proposed striping layout prior to the beginning of striping operations.

The Contractor will locate the beginning and ending points of No Pass Zones.

ITEM 668: PREFABRICATED PAVEMENT MARKINGS

Use Type C prefabricated pavement markings.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

This project will require "full matrix" type portable changeable message signs.

Ensure that the Contractor's Responsible Person for traffic control can revise messages within thirty (30) minutes of notification.

Furnish 2 portable changeable message signs. The portable changeable message sign(s) will be used for all lane closures and freeway closures as shown on the traffic control plan standard sheets.

Supply portable changeable message sign(s) in accordance with the Traffic Control Plan standard sheets and Article 6f.55 of the Texas Manual on Uniform Traffic Control Devices for Streets and Highways Part VI.

ITEM 6185: TRUCK MOUNTED ATTENUATORS

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

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

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

TCP 3 Series	Scenario	Required TMA
(3-1)-13	All	2

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

Mobile operations will be paid for by the hour, per specifications. For mobile operations, payment will be made only while the TMA is in use.

For mobile operations requiring multiple TMA's, judgement may be applied in lower speed, urban / in town traffic environments to reduce the numbers of TMA in use where the added TMA may pose a hazard for traffic entering and exiting driveways, side streets, etc.

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

QUANTITY SHEET

CONTROLLING PROJECT ID 1190-02-018 **DISTRICT** Waco **COUNTY** Hill
HIGHWAY FM 933

			CONTROL SECTION JOB		**1190-02-018**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00131207**		
			COUNTY		**Hill**		
			HIGHWAY		**FM 933**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	110-6001	EXCAVATION (ROADWAY)	CY	69.000		69.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY	787.000		787.000	
	134-6001	BACKFILL (TY A)	STA	258.000		258.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	112,201.000		112,201.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	56,101.000		56,101.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY	56,101.000		56,101.000	
	168-6001	VEGETATIVE WATERING	MG	1,823.000		1,823.000	
	315-6001	FOG SEAL (SS-1)	GAL	15,028.000		15,028.000	
	316-6022	ASPH (CRS-2)	GAL	67,815.000		67,815.000	
	316-6397	AGGR(TY-D GR-4 OR TY-L GR-4)	CY	1,118.000		1,118.000	
	346-6006	STONE-MTRX-ASPH SMA-C SAC-B PG76-22	TON	20,245.000		20,245.000	
	354-6069	PLANE ASPH CONC PAV (0"- 2 1/2")	SY	4,294.000		4,294.000	
	400-6006	CUT & RESTORING PAV	SY	111.000		111.000	
	403-6001	TEMPORARY SPL SHORING	SF	135.000		135.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	554.000		554.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	312.000		312.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	33.000		33.000	
	467-6394	SET (TY II) (24 IN) (RCP) (6: 1) (C)	EA	6.000		6.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	11.000		11.000	
	467-6580	SET (REMOV & REINSTALL)	EA	1.000		1.000	
	496-6007	REMOV STR (PIPE)	LF	695.000		695.000	
	500-6001	MOBILIZATION	LS	100.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	7.000		7.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	3,955.000		3,955.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	3,955.000		3,955.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	5,094.000		5,094.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	5,094.000		5,094.000	
	530-6002	INTERSECTIONS (ACP)	SY	1,814.000		1,814.000	
	530-6005	DRIVEWAYS (ACP)	SY	7,605.000		7,605.000	
	533-6001	RUMBLE STRIPS (SHOULDER)	LF	64,442.000		64,442.000	
	533-6002	RUMBLE STRIPS (CENTERLINE)	LF	30,157.000		30,157.000	
	560-6006	MAILBOX INSTALL-M (TWG-POST) TY 2	EA	2.000		2.000	
	560-6007	MAILBOX INSTALL-S (WC-POST) TY 3	EA	48.000		48.000	
	560-6008	MAILBOX INSTALL-D (WC-POST) TY 3	EA	3.000		3.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	35.000		35.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	21.000		21.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	7.000		7.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 1190-02-018 **DISTRICT** Waco **COUNTY** Hill
HIGHWAY FM 933

			CONTROL SECTION JOB		**1190-02-018**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00131207**		
			COUNTY		**Hill**		
			HIGHWAY		**FM 933**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	5.000		5.000	
	644-6050	IN SM RD SN SUP&AM TYS80(2)SA(P)	EA	1.000		1.000	
	644-6051	IN SM RD SN SUP&AM TYS80(2)SA(P-EXAL)	EA	1.000		1.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	91.000		91.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	46.000		46.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	63,076.000		63,076.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	63,076.000		63,076.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	3,156.000		3,156.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	749.000		749.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	261.000		261.000	
	666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	165.000		165.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	64,442.000		64,442.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	5,320.000		5,320.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	30,683.000		30,683.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	5.000		5.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	5.000		5.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA	26.000		26.000	
	672-6007	REFL PAV MRKR TY I-C	EA	36.000		36.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	737.000		737.000	
	3088-6001	CEMENT	TON	695.000		695.000	
	3088-6002	ASPHALT BINDER (PG 64-22)	TON	1,634.000		1,634.000	
	3088-6005	FOAMED ASPHALT TREAT (10")(DC)	SY	145,100.000		145,100.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	140.000		140.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	416.000		416.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

SUMMARY OF TRAFFIC CONTROL QUANTITIES									
ITEM NO.		* 400	403	662			6001	6185	
DESC. CODE		6006	6001	6004	6034	6111	6002	6002	6003
DESCRIPTION		CUT & RESTORING PAV	TEMPORARY SPL SHORING	WK ZN PAV MRK NON-REMOV (W) 4" (SLD)	WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		SY	SF	LF	LF	EA	EA	DAY	HR
UNIT									
CSJ 1190-02-018									
PHASE									
PHASE 1	STEP 1	111	135	31,538	31,538		2	57	
PHASE 1	STEP 2			31,538	31,538			57	
PHASE 2						3,156		26	416
CSJ TOTALS		111	135	63,076	63,076	3,156	2	140	416

* CUTTING AND RESTORING QUANTITY IS FOR PLACEMENT OF CULVERTS AT FM 310 AND FM 1534.
THIS WORK IS TO TAKE PLACE PRIOR TO PAVEMENT REHAB. FOR ADDITIONAL DETAILS, REFER TO SEQUENCE OF CONSTRUCTION SHEET.

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

SUMMARY OF QUANTITIES

SHEET 1 OF 6

FED RD DIV NO	PROJECT NO		SHEET NO
6			9
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

SUMMARY OF ROADWAY QUANTITIES

ITEM NO.	BEGIN STATION	END STATION	110	132	134	315	316		346	354	560			3088		
DESC. CODE			6001	6004	6001	6001	6022	6397	6006	6069	6006	6007	6008	6001	6002	6005
DESCRIPTION			EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY B)	BACKFILL (TY A)	FOG SEAL (SS-1)	ASPH (CRS-2)	AGGR (TY-D GR-4 OR TY-L GR-4)	STONE-MTRX-ASPH SMA-C SAC-B PG76-22	PLANE ASPH CONC PAV (0" - 2 1/2")	MAILBOX INSTALL-M (TWG-POST) TY 2	MAILBOX INSTALL-S (WC-POST) TY 3	MAILBOX INSTALL-D (WC-POST) TY 3	CEMENT	ASPHALT BINDER (PG64-22)	FOAMED ASPHALT TREAT (10") (DC)
UNIT			CY	CY	STA	GAL	GAL	CY	TON	SY	EA	EA	EA	TON	TON	SY
CSJ 1190-02-018																
LOCATION																
SHEET 1 OF 14	152+80.00	180+00.00	12	154	15	1,337	5,849	97	1,755	112		1		60	144	12,759
SHEET 2 OF 14	180+00.00	204+00.00	1	112	11	1,120	4,920	81	1,467			1		51	120	10,667
SHEET 3 OF 14	204+00.00	228+00.00			24	1,120	4,920	81	1,467			4		51	120	10,667
SHEET 4 OF 14	228+00.00	252+00.00	7	163	16	1,120	4,920	81	1,467			2		51	120	10,667
SHEET 5 OF 14	252+00.00	276+00.00	23	145	16	1,120	4,920	81	1,467			3		51	120	10,667
SHEET 6 OF 14	276+00.00	300+00.00			24	1,120	4,920	81	1,467			6	1	51	120	10,667
SHEET 7 OF 14	300+00.00	324+00.00			24	1,120	4,920	81	1,467			5		51	120	10,667
SHEET 8 OF 14	324+00.00	348+00.00	3	6	23	1,120	4,920	81	1,467			3		51	120	10,667
SHEET 9 OF 14	348+00.00	372+00.00	6	82	12	1,120	4,920	81	1,467			5		51	120	10,667
SHEET 10 OF 14	372+00.00	396+00.00			24	1,120	4,920	81	1,467		1	3		51	120	10,667
SHEET 11 OF 14	396+00.00	420+00.00			24	1,120	4,920	81	1,467			5		51	120	10,667
SHEET 12 OF 14	420+00.00	444+00.00			24	1,120	4,920	81	1,467			2	1	51	120	10,667
SHEET 13 OF 14	444+00.00	468+00.00	17	125	11	1,120	4,920	81	1,467			6		51	120	10,667
SHEET 14 OF 14	468+00.00	477+55.57			10	251	2,926	49	886	4,182	1	2	1	12	27	2,384
CSJ TOTALS			69	787	258	15,028	67,815	1,118	20,245	4,294	2	48	3	684	1,611	143,147

SUMMARY OF INTERSECTION QUANTITIES

LOCATION/STATION (LT/RT)			EXIST INTERSECTION TYPE	* 247	* 310	* 346	464		467			496	530
							6003	6005	6363	6394	6395	6580	# 6007	6002
				FL BS (RDWY DEL) (TYD GR1-2) (FNAL POS)	PRIME COAT (AE-P OR MC-30)	STONE-MTRX-ASPH SMA-C SAC-B PG76-22	RC PIPE (CL III) (18 IN)	RC PIPE (CL III) (24 IN)	SET (TY II) (18 IN) (RCP) (6:1) (P)	SET (TY II) (24 IN) (RCP) (6:1) (C)	SET (TY II) (24 IN) (RCP) (6:1) (P)	SET (REMOV & REINSTALL)	REMOV STR (PIPE)	INTERSECTIONS (ACP)
UNIT				CY	GAL	TON	LF	LF	EA	EA	EA	EA	LF	SY
CSJ 1190-02-018														
FM 310	158+54.71	RT	ASPHALT			149		66		2			65	
HCR 2126	177+03.69	RT	ASPHALT	68	122	84		44			2		41	608
CR 2121	217+14.44	LT	GRAVEL	15	27	19	54		2				42	135
CR 2122E	252+66.63	RT	ASPHALT	13	24	17								117
CR 2122W	252+95.71	LT	ASPHALT	16	28	19	14					1		136
FM 1534	320+85.98	RT	ASPHALT			120		84		4			82	
HCR 2115	320+92.47	LT	GRAVEL	15	27	19								132
HCR 2124 LP	350+86.25	RT	GRAVEL	17	30	21	44		2				42	146
HCR 2124 LP	351+00.47	LT	GRAVEL	13	23	16								115
HCR 2124 LP	388+17.45	LT	GRAVEL	19	33	23								163
HCR 2124 LP	388+93.51	RT	GRAVEL	14	25	17		44			2		42	122
HCR 2134	467+46.77	LT	ASPHALT	16	28	20	44		2				41	140
CSJ TOTALS				206	367	524	156	238	6	6	4	1	355	1,814

* FOR CONTRACTORS INFORMATION ONLY. TO BE USED FOR DETERMINING THE MATERIAL REQUIRED FOR INTERSECTIONS.
# SET REMOVAL IS SUBSIDIARY TO ITEM 496-6007 REMOV STR (PIPE).

SUMMARY OF INTERSECTION QUANTITIES

LOCATION/STATION (LT/RT)			EXIST INTERSECTION TYPE	3088		
				6001	6002	6005
				CEMENT	ASPHALT BINDER (PG64-22)	FOAMED ASPHALT TREAT (10") (DC)
UNIT				TON	TON	SY
CSJ 1190-02-018						
FM 310	158+54.71	RT	ASPHALT	6	13	1,080
HCR 2126	177+03.69	RT	ASPHALT			
CR 2121	217+14.44	LT	GRAVEL			
CR 2122E	252+66.63	RT	ASPHALT			
CR 2122W	252+95.71	LT	ASPHALT			
FM 1534	320+85.98	RT	ASPHALT	5	10	873
HCR 2115	320+92.47	LT	GRAVEL			
HCR 2124 LP	350+86.25	RT	GRAVEL			
HCR 2124 LP	351+00.47	LT	GRAVEL			
HCR 2124 LP	388+17.45	LT	GRAVEL			
HCR 2124 LP	388+93.51	RT	GRAVEL			
HCR 2134	467+46.77	LT	ASPHALT			
CSJ TOTALS				11	23	1,953

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

SUMMARY OF QUANTITIES

SHEET 2 OF 6

FED RD DIV NO	PROJECT NO		SHEET NO
6			10
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL1$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MODEL: Default
FILE: D:\cfa\2019\11024.FM_933\USTN\project\Dgn\Sheets\General\933_SUMRDWY01.dgn 5/25/2021 8:49:44 AM MJolejol
$FILEABBREV$

SUMMARY OF DRIVEWAY QUANTITIES

LOCATION/STATION (LT/RT)			EXIST DRWY TYPE	ITEM DESC. CODE: LENGTH	EXIST WIDTH	PROP WIDTH	R1	R2	D	✳ 247 FL BS (RDWY DEL) (TYD GR1-2) (FNAL POS)	✳ 310 PRIME COAT (AE-P OR MC-30)	✳ 340 D-GR HMA(SQ) TY-C PG76-22	464 6003 RC PIPE (CL III) (18 IN)	464 6005 RC PIPE (CL III) (24 IN)	467 6363 SET (TY II) (18 IN) (RCP) (6:1) (P)	467 6395 SET (TY II) (24 IN) (RCP) (6:1) (P)	# 496 6007 REMOV STR (PIPE)	530 6005 DRIVEWAYS (ACP)
UNIT				FT	FT	FT	FT	FT	FT	CY	GAL	TON	LF	LF	EA	EA	LF	SY
CSJ 1190-02-018																		
1	158+35.13	LT	GRAVEL	17.0	36.5	39.1	25	25	33.7	11	20	9	56		2		44	98
2	166+72.49	LT	GRAVEL	21.5	34.2		25	25				9						110
3	181+91.54	LT	GRAVEL	30.5	9.5	16.0	25	25	32.7	10	18	8	32		2		23	86
4	187+85.05	RT	GRAVEL	60.9	19.0		70	25				17						217
5	189+91.23	LT	GRAVEL	30.5	10.9	16.0	25	25	36.8	10	18	8		28		2	22	86
6	199+61.21	LT	GRAVEL	30.2	7.9	16.0	25	25		10	17	8						84
6A	200+67.57	RT	GRASS	30.0	16.0	16.0	15	15	40.8	8	14	6	48		4		40	68
7	201+71.01	LT	DIRT	35.3	11.4	16.0	50	15		10	18	8						86
8	205+05.00	RT	GRAVEL	30.0	16.5		25	25				7						85
9	211+75.43	RT	GRAVEL	30.0	18.5		20	20				7						81
9A	212+08.90	LT	GRASS	30.0	30.0	30.0	25	25	33.4	15	26	12		46		2		130
10	213+13.91	RT	GRAVEL	30.0	19.0		25	25				8						94
11	216+74.96	RT	GRAVEL	30.0	16.0		15	15				5						65
12	224+04.47	RT	DIRT	30.0	15.0	16.0	25	25	35.1	10	17	8	56		4		44	84
13	227+56.02	RT	GRAVEL	30.0	10.9	16.0	15	15	34.7	8	13	6	60		4		44	65
14	240+01.39	RT	DIRT	30.0	9.9	16.0	25	25	32.8	10	17	8	30		2		22	84
15	261+86.99	RT	ASPHALT	30.8	16.0		25	20				6						78
16	265+78.71	LT	GRAVEL	30.0	16.0		15	15				5						65
17	265+97.69	RT	ASPHALT	30.9	13.3	16.0	15	15		8	14	6				1		66
18	268+93.93	RT	GRAVEL	30.0	16.0		15	15				5						65
19	277+12.76	RT	DIRT	30.0	14.1	16.0	15	15		8	13	6						65
20	278+06.08	RT	GRAVEL	30.0	16.9		15	15				6						67
21	278+73.50	LT	GRAVEL	30.0	12.5	16.0	25	25		10	17	8						84
22	280+58.71	LT	GRAVEL	30.0	20.1		15	15				6						78
23	281+73.97	RT	ASPHALT	30.0	16.0		15	15				5						65
24	284+12.80	RT	DIRT	30.0	16.3		15	15				5						66
25	291+77.79	RT	ASPHALT	30.0	12.5	16.0	15	15		8	13	6						65
26	292+11.94	LT	ASPHALT	30.1	13.5	16.0	15	15		8	13	6						65
27	293+76.82	RT	GRAVEL	31.6	9.9	16.0	15	15		8	14	6						67
28	295+74.24	RT	GRAVEL	30.0	22.5		15	15				7						86
29	297+48.86	RT	GRAVEL	30.8	10.9	16.0	15	15		8	14	6			2			66
30	300+85.29	RT	GRAVEL	30.7	12.1	16.0	15	15		8	14	6						66
31	302+23.30	RT	GRAVEL	30.0	9.9	16.0	15	15		8	13	6						65
32	303+48.03	RT	GRAVEL	30.0	25.0		15	15				8						95
33	305+53.16	RT	GRAVEL	30.0	22.9		15	15				7						88
34	306+32.56	RT	GRAVEL	30.0	23.4		15	15				7						89
35	307+78.87	RT	GRAVEL	30.0	11.3	16.0	15	15		8	13	6						65
36	309+34.74	RT	GRAVEL	30.1	15.8	16.0	15	15		8	13	6				2		65
37	312+21.02	RT	GRAVEL	30.0	10.2	16.0	15	15		8	13	6						65
38	313+75.91	RT	GRAVEL	30.1	13.1	16.0	15	15		8	13	6						65
39	333+40.23	LT	GRAVEL	30.0	16.0		15	15				5						65
40	334+65.07	RT	GRAVEL	30.1	16.0		15	15				5						65
41	334+73.31	LT	GRAVEL	30.0	16.0		15	15				5						65
42	337+64.32	LT	GRAVEL	30.1	16.0		15	15				5						65
43	347+43.34	RT	DIRT	30.2	14.5	16.0	25	25		10	17	8						85
44	352+03.72	RT	GRAVEL	51.9	15.0	16.0	25	25		10	17	8						83
45	352+40.24	LT	ASPHALT	20.3	15.5	16.0	15	11.8		6	10	5						46
46	353+02.74	LT	ASPHALT	21.2	12.9	16.0	10.1	15		6	10	5						47
SHEET SUBTOTALS										240	409	327	282	74	20	7	239	3,755

✳ FOR CONTRACTORS INFORMATION ONLY. TO BE USED FOR DETERMINING THE MATERIAL REQUIRED FOR DRIVEWAYS.
SET REMOVAL IS SUBSIDIARY TO ITEM 496-6007 REMOV STR (PIPE).

NOTE:

1. REFER TO "DRIVEWAY DETAILS" SHEET FOR DRIVEWAY PAVEMENT AND OTHER DRIVEWAY INFORMATION.

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

SUMMARY OF QUANTITIES

SHEET 3 OF 6

FED RD DIV NO	PROJECT NO		SHEET NO
6			11
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

SUMMARY OF DRIVEWAY QUANTITIES

LOCATION/STATION (LT/RT)			EXIST DRWY TYPE	ITEM DESC. CODE LENGTH	EXIST WIDTH	PROP WIDTH	R1	R2	D	* 247 FL BS (RDWY DEL) (TYD GR1-2) (FNAL POS)	* 310 PRIME COAT (AE-P OR MC-30)	* 340 D-GR HMA(SQ) TY-C PG76-22	464 6003 RC PIPE (CL III) (18 IN)	464 6005 RC PIPE (CL III) (24 IN)	467 6363 SET (TY II) (18 IN) (RCP) (6:1) (P)	467 6395 SET (TY II) (24 IN) (RCP) (6:1) (P)	# 496 6007 REMOV STR (PIPE)	530 6005 DRIVEWAYS (ACP)
UNIT				FT	FT	FT	FT	FT	FT	CY	GAL	TON	LF	LF	EA	EA	LF	SY
CSJ 1190-02-018																		
47	353+73.93	RT	GRAVEL	61.3	15.0	16.0	30	25		20	36	16						176
48	358+42.37	LT	GRAVEL	31.2	16.0		15	15				6						67
49	361+83.46	RT	GRAVEL	30.2	16.0	16.0	15	15	33.1	8	13	6	34		2		34	65
50	363+62.19	RT	CONCRETE	30.0	43.0		20	20				5						69
51	364+94.71	RT	GRAVEL	30.0	16.0		15	15				5						65
52	365+91.51	RT	DIRT	30.0	22.6		15	15				7						87
53	366+26.92	LT	DIRT	30.1	30.1	30.1	20	20	32.4	14	24	11	46		2		34	119
54	368+31.70	RT	GRAVEL	35.7	14.4	16.0	15	50		10	18	8						86
55	377+97.32	LT	GRAVEL	30.0	44.0		20	20				13						166
56	381+67.93	LT	GRAVEL	30.0	20.1		20	20				7						86
57	382+36.35	RT	ASPHALT	30.0	18.4		15	15				6						73
58	384+07.15	RT	GRAVEL	30.0	23.5		15	15				7						90
59	387+93.41	RT	DIRT	30.0	17.0		15	15				6						68
60	391+89.17	LT	DIRT	30.0	15.2	16.0	25	20		9	16	7						78
61	392+48.98	LT	GRAVEL	30.1	10.5	16.0	20	25		9	16	7						79
62	399+11.59	LT	GRAVEL	30.7	16.1		20	20				6						75
63	407+29.10	LT	GRAVEL	30.1	19.6		15	15				6						77
64	409+64.90	LT	DIRT	30.0	25.8		15	15				8						97
65	411+57.66	RT	GRAVEL	30.0	16.0		15	15				5						65
66	412+98.03	RT	GRAVEL	30.4	19.1		15	15				6						76
67	413+60.28	LT	DIRT	30.0	22.5		15	15				7						86
68	414+77.57	LT	GRAVEL	30.0	16.0		15	15				5						65
69	415+73.26	LT	GRAVEL	30.0	16.0		15	15				5						65
70	417+75.89	RT	GRAVEL	30.8	16.0		15	15				5						66
71	418+38.88	LT	DIRT	30.0	15.1	16.0	25	25		10	17	8						84
72	429+85.92	RT	GRAVEL	30.0	11.6	16.0	25	11.41		11	19	9						92
73	430+04.99	LT	GRAVEL	30.0	12.0	16.0	25	25		10	17	8						84
74	430+24.75	RT	GRAVEL	30.0	10.2	16.0	11.41	25		11	19	8						91
75	435+66.46	LT	GRAVEL	25.6	16.9		15	15				5						59
76	436+83.56	LT	GRAVEL	31.8	11.8	16.0	20	25		9	17	8						81
77	437+05.18	RT	GRAVEL	30.5	16.0		15	15				5						65
78	444+54.54	RT	GRAVEL	30.0	10.5	16.0	25	20		9	16	7						78
79	450+42.24	LT	DIRT	30.1	22.0		25	25				8						102
80	451+37.61	RT	GRAVEL	30.0	10.4	16.0	25	25		8	13	6						65
80A	453+09.22	RT	GRAVEL	30.0	27.1		15	15				8						102
81	454+24.15	RT	ASPHALT	30.0	12.7	16.0	25	25		8	14	7						69
82	455+08.80	LT	GRAVEL	30.4	16.0		15	15				5						65
83	456+70.19	LT	ASPHALT	30.5	16.0	16.0	15	15	31.5	8	13	6	36		2		33	65
84	460+92.88	LT	GRAVEL	30.1	20.0		15	15				6			1			79
85	462+06.09	LT	GRAVEL	31.5	18.0		15	30				6						75
86	462+35.97	RT	GRAVEL	30.0	16.0		30	25				5						65
87	468+88.42	RT	ASPHALT	30.0	16.0		25	25				5						65
88	470+59.53	LT	CONCRETE	30.0	35.9		25	25				5						63
89	471+13.71	RT	ASPHALT	30.2	27.5		40	20				10						132
90	472+70.76	LT	GRAVEL	30.1	38.8		20	25				12						154
91	472+87.16	RT	GRAVEL	26.9	16.4		25	25				6						69
SHEET SUBTOTALS										154	268	323	116	0	7	0	101	3,850
CSJ TOTALS										**394**	**677**	**650**	**398**	**74**	**27**	**7**	**340**	**7,605**

* FOR CONTRACTORS INFORMATION ONLY. TO BE USED FOR DETERMINING THE MATERIAL REQUIRED FOR DRIVEWAYS.
# SET REMOVAL IS SUBSIDIARY TO ITEM 496-6007 REMOV STR (PIPE).

NOTE:

1. REFER TO "DRIVEWAY DETAILS" SHEET FOR DRIVEWAY PAVEMENT AND OTHER DRIVEWAY INFORMATION.

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

SUMMARY OF QUANTITIES

SHEET 4 OF 6

FED RD DIV NO	PROJECT NO		SHEET NO
6			12
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

SUMMARY OF SIGNING & PAVEMENT MARKING QUANTITIES CSJ 1190-02-018

SHEET	533 6001	533 6002	644 6001	644 6004	644 6007	644 6033	644 6050	644 6051	644 6076	658 6099	666 6036	666 6048
	RUMBLE STRIPS (SHOULDER)	RUMBLE STRIPS (CENTERLINE)	IN SM RD SN SUP & AM TY 10 BWG (1) SA (P)	IN SM RD SN SUP & AM TY 10 BWG (1) SA (T)	IN SM RD SN SUP & AM TY 10 BWG (1) SA (U)	IN SM RD SN SUP & AM TY S80 (1) SA (U)	IN SM RD SN SUP & AM TY S80 (2) SA (P)	IN SM RD SN SUP & AM TY S80 (2) SA (P-EXAL)	REMOVE SM RD SN SUP & AM	INSTL OM ASSM (OM-2Z) (WFLX) GND	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF
SPM LAYOUT (SHEET 1 OF 14)	5872	1,256	5	2	2	2		1			340	53
SPM LAYOUT (SHEET 2 OF 14)	4800	2,400	1							2		
SPM LAYOUT (SHEET 3 OF 14)	4725	2,400	2	1						10		13
SPM LAYOUT (SHEET 4 OF 14)	4800	2,400	2							2		
SPM LAYOUT (SHEET 5 OF 14)	4653	2,293	1	2						2		22
SPM LAYOUT (SHEET 6 OF 14)	4800	2,400										
SPM LAYOUT (SHEET 7 OF 14)	4655	2,400	7	2	1					6		26
SPM LAYOUT (SHEET 8 OF 14)	4800	2,400	5	1	1					2		
SPM LAYOUT (SHEET 9 OF 14)	4633	2,325		3						4		22
SPM LAYOUT (SHEET 10 OF 14)	4648	2,400		4	2					6		23
SPM LAYOUT (SHEET 11 OF 14)	4800	2,400								3		
SPM LAYOUT (SHEET 12 OF 14)	4800	2,400	1							5		
SPM LAYOUT (SHEET 13 OF 14)	4730	2,333	8	2	1					4		16
SPM LAYOUT (SHEET 14 OF 14)	1726	350	3	4		3	1				409	86
TOTAL	64,442	30,157	35	21	7	5	1	1	91	46	749	261

SUMMARY OF SIGNING & PAVEMENT MARKING QUANTITIES CSJ 1190-02-018 (CONT.)

SHEET	666 6147	666 6303	666 6312	666 6315	668 6077	668 6085	668 6092	672 6007	672 6009
	REFL PAV MRK TY I (Y) 24" (SLD) (100MIL)	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (BRK) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W) (36") (YLD TRI)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
	LF	LF	LF	LF	EA	EA	EA	EA	EA
SPM LAYOUT (SHEET 1 OF 14)	165	5,872		7,847	1	1		15	137
SPM LAYOUT (SHEET 2 OF 14)		4,800	280	2,534					47
SPM LAYOUT (SHEET 3 OF 14)		4,725	600	30					31
SPM LAYOUT (SHEET 4 OF 14)		4,800	360	3,380					60
SPM LAYOUT (SHEET 5 OF 14)		4,653	430	1,966					46
SPM LAYOUT (SHEET 6 OF 14)		4,800	600	1,115					44
SPM LAYOUT (SHEET 7 OF 14)		4,655	580	288					34
SPM LAYOUT (SHEET 8 OF 14)		4,800	600						30
SPM LAYOUT (SHEET 9 OF 14)		4,633	340	1,932					42
SPM LAYOUT (SHEET 10 OF 14)		4,648	560						28
SPM LAYOUT (SHEET 11 OF 14)		4,800	600	1,485					49
SPM LAYOUT (SHEET 12 OF 14)		4,800	370	3,335					60
SPM LAYOUT (SHEET 13 OF 14)		4,730		4,666					58
SPM LAYOUT (SHEET 14 OF 14)		1,726		2,105	4	4	26	21	71
TOTAL	165	64,442	5,320	30,683	5	5	26	36	737

05/27/2021

Texas Department of Transportation®

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SUMMARY OF QUANTITIES

SHEET 5 OF 6

FED RD DIV NO	PROJECT NO		SHEET NO
6			13
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

MODEL: SUMMARY OF QUANTITIES
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_MISC\FM933_QUANT_01.dgn
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
05/27/2021 08:00:06 emahlmann
...\163_MISC\FM933_QUANT_01.dgn

SUMMARY OF SW3P QUANTITIES CSJ 1190-02-018

SHEET	164 6035	164 6041	164 6043	168 6001	506 6002	506 6011	506 6038	506 6039
	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	DRILL SEEDING (TEMP) (COOL)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	MG	LF	LF	LF	LF
SW3P LAYOUT (SHEET 1 OF 14)	7749	3875	3875	126	315	315	1,072	1,072
SW3P LAYOUT (SHEET 2 OF 14)	8931	4466	4466	145	210	210	70	70
SW3P LAYOUT (SHEET 3 OF 14)	8964	4482	4482	146	420	420	480	480
SW3P LAYOUT (SHEET 4 OF 14)	8730	4365	4365	142	210	210	621	621
SW3P LAYOUT (SHEET 5 OF 14)	9138	4569	4569	148	280	280	1,138	1,138
SW3P LAYOUT (SHEET 6 OF 14)	8734	4367	4367	142	420	420	210	210
SW3P LAYOUT (SHEET 7 OF 14)	9250	4625	4625	150	420	420	430	430
SW3P LAYOUT (SHEET 8 OF 14)	8642	4321	4321	140	140	140	70	70
SW3P LAYOUT (SHEET 9 OF 14)	8409	4205	4205	137	280	280	140	140
SW3P LAYOUT (SHEET 10 OF 14)	8122	4061	4061	132	280	280	210	210
SW3P LAYOUT (SHEET 11 OF 14)	8517	4259	4259	138	245	245	140	140
SW3P LAYOUT (SHEET 12 OF 14)	8263	4131	4131	134	315	315	140	140
SW3P LAYOUT (SHEET 13 OF 14)	8580	4290	4290	139	350	350	373	373
SW3P LAYOUT (SHEET 14 OF 14)	170	85	85	3	70	70		
TOTAL	112,201	56,101	56,101	1,823	3,955	3,955	5,094	5,094

01/12/2021

Texas Department of Transportation®

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

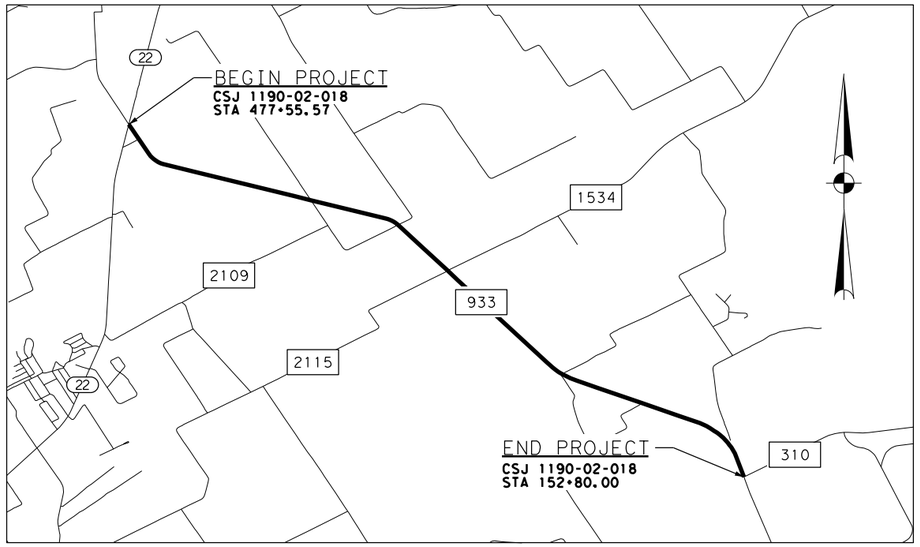
FM 933

SUMMARY OF QUANTITIES

SHEET 6 OF 6

FED RD DIV NO	PROJECT NO		SHEET NO
6			14
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

MODEL: SUMMARY OF QUANTITIES
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_MISC\FM933_QUANT_02.dgn
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
01/12/2021 19:34:19 emahlmann
...\163_MISC\FM933_QUANT_02.dgn



VICINITY MAP
NTS

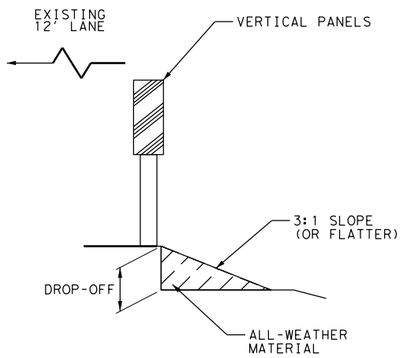
ADVANCED SIGNING

G20-5T	48X24	BEGIN ROAD WORK NEXT X MILES
G20-6T	48X30	NAME, ADDRESS, CITY, STATE, CONTRACTOR
G20-9TP	36X30	BEGIN WORK ZONE
G20-2bT	36X18	END WORK ZONE
R20-3T	48X42	OBEY WARNING SIGNS STATE LAW
G20-1aT	72X36	ROAD WORK NEXT X MILES
CW20-1D	48X48	ROAD WORK AHEAD
R20-5T	36X36	TRAFFIC FINES DOUBLE
R20-5aTP	36X18	WHEN WORKERS ARE PRESENT
G20-2	48X24	END ROAD WORK
G20-10T	60X48	STAY ALERT TALK OR TEXT LATER
R2-1	30X36	SPEED LIMIT XX

1. SIGNS G20-5T, G20-6T, G20-2, G20-2bT, CW20-1D, R20-3T, R20-5T, G20-9TP, R2-1, R20-5T,AND R20-5aTP WILL BE REQUIRED AT PROJECT LIMITS.
2. CW20-1D AND G20-2 WILL BE REQUIRED AT ALL CROSSROADS.
3. G20-1aT WILL BE REQUIRED AT ALL MAJOR CROSSROADS.

NOTES

1. ALL TRAFFIC CONTROL DEVICES WILL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (TMUTCD), AND WILL BE MAINTAINED. ADDITIONAL GUIDELINES FOR TRAFFIC CONTROL DEVICES MAY BE FOUND IN THE TMUTCD.
2. FOR CHANNELING DEVICE PLACEMENT AND SPACING FOR ALL PHASES, REFER TO THE TCP STANDARDS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ACCESS AND SIGNING FOR SIDE STREETS AND DRIVEWAYS.



PAV EDGE DROP-OFF DETAIL

1. LESS THAN 2 INCHES: CW8-11 SIGNS ARE REQUIRED.
2. GREATER THAN 2 INCHES: VERTICAL PANELS AND EITHER CW8-9a OR CW8-11 SIGNS ARE REQUIRED.
3. THE SAFETY SLOPE WILL BE CONSTRUCTED WITH AN ALL-WEATHER MATERIAL SUCH AS RAP, WHICH IS CLEAN AND FREE OF DEBRIS AND LARGE ROCKS.
4. PROVIDE VERTICAL PANELS AND TWO-WAY TRAFFIC SIGNS UNTIL PAVEMENT MARKINGS ARE INSTALLED.

DETOURS, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC", OF THE STANDARD SPECIFICATIONS. IN ADDITION TO THESE REQUIREMENTS, THE FOLLOWING PROVISIONS SHALL ALSO GOVERN ON THIS CONTRACT:

GENERAL

1. INSTALL ALL SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE STANDARD BC SHEETS AND AS DIRECTED.
2. ADDITIONAL SIGNS, BARRICADES, OR 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 OF TRAFFIC CONTROL DEVICES WILL BE CONSIDERED SUBSIDIARY TO THE ITEM "BARRICADES, SIGNS AND TRAFFIC HANDLING."
3. WORK SITES SHOULD BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN AND IN GOOD REPAIR.
4. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.
5. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN ON THE TCP SEQUENCE OF OPERATION BELOW.
6. COMPLETE ALL WORK ON PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.
7. ANY REQUEST TO ALTER THE SEQUENCE OF OPERATION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR THEIR WRITTEN APPROVAL.
8. VERTICAL LONGITUDINAL TAPERS BETWEEN THE WORK AREA AND NON-WORK AREA WILL BE PROVIDED AT ALL TIMES FOR VEHICULAR SAFETY. TAPERS WILL HAVE A RATE OF 1" VERTICAL:50' HORIZONTAL. ALL WORK AND MATERIAL IS SUBSIDIARY TO ITEM 502.
9. EXISTING SIGNS ARE TO REMAIN IN PLACE AS LONG AS CONSTRUCTION HAS NOT BEGUN IN THAT AREA.
10. THE LENGTH OF SECTIONS OF ROADWAY TO BE CONSTRUCTED MUST BE NO MORE THAN 2 MILES OR AS APPROVED BY THE AREA ENGINEER. CONSTRUCT ONE SIDE OF THE ROAD IN SECTIONS THEN MOVE TO THE OTHER SIDE OF THE ROAD. COMPLETE THE WORK UP THROUGH THE FOG SEAL.

SEQUENCE OF CONSTRUCTION

A. SCHEDULE PROPOSED WORK THAT CAN BE COMPLETED IN ONE DAY WITH DAYTIME LANE CLOSURES TO OPEN ROADWAY TO TWO LANE TRAFFIC AT NIGHT.

B. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE AREA ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION, WHICH GENERALLY CONFORMS TO THE FOLLOWING SEQUENCE:

1. INSTALL PROJECT LIMIT SIGNING AND BARRICADES PRIOR TO ANY OTHER WORK.
2. INSTALL CULVERTS AT FM 310 AND FM 1534. CUT AND RESTORE EXISTING PAVEMENT WITH CEMENT STABILIZED BACKFILL. FOR ADDITIONAL DETAILS, REFER TO MISCELLANEOUS ROADWAY DETAILS SHEET.
3. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED BY ENGINEER.
4. CLOSE ONE LANE USING DAYTIME ONE LANE TWO WAY TRAFFIC CONTROL WITH FLAGGERS, AND PILOT CAR USING TCP(2- 2b). OBLITERATE HALF OF EXISTING ROADWAY. RECONSTRUCT HALF OF ROADWAY WITH CEMENT FOAMED ASPHALT PAVEMENT AND FOG SEAL DAILY. SEAL COAT TWICE A WEEK. REOPEN ROADWAY TO TWO LANES AT THE END OF THE WORK DAY.
5. PLACE WORK ZONE MARKINGS ON RECONSTRUCTED PAVEMENT.
6. REPEAT PROCESS FOR ENTIRETY OF PROJECT. PLACE 2.5" SMA OVERLAY OVER FULL WIDTH OF ROADWAY. PLACE WK ZN TABS PRIOR TO REOPENING ROADWAY.
7. PLACE PERMANENT PAVEMENT MARKINGS.
8. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.
9. CLEAN UP PROJECT, REMOVE TEMPORARY EROSION CONTROL DEVICES AND PROJECT BARRICADES.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

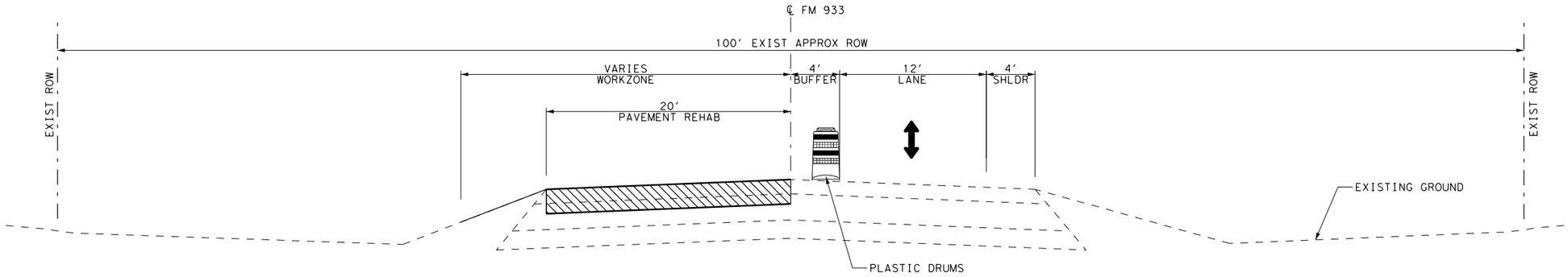
FM 933

SEQUENCE OF CONSTRUCTION

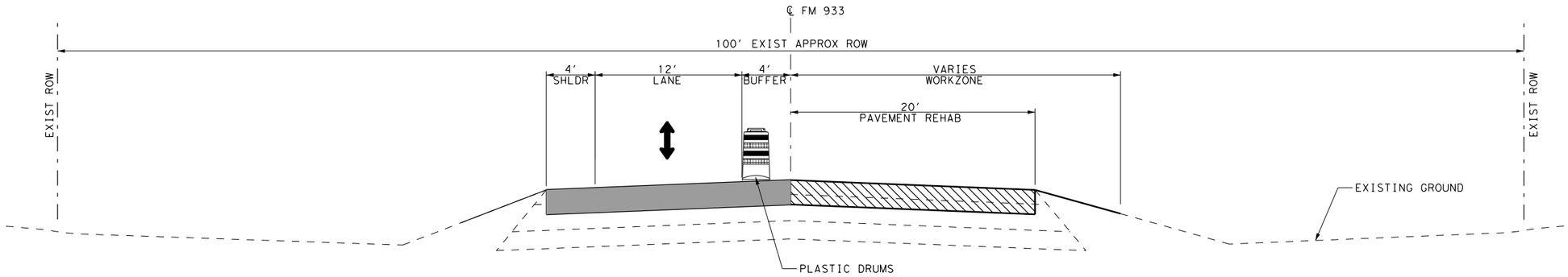
SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			15
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

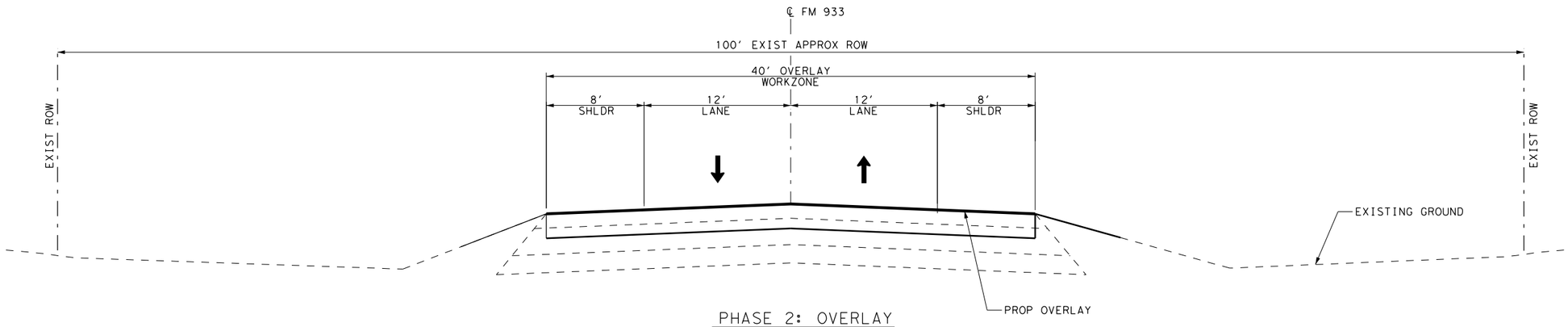
PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:31:28 PM MJolejol
MODEL: Default
FILE: $FILE$
...\Dgn\Sheets\TCP\933_SOC.dgn



PHASE 1-STEP 1: EASTBOUND PAVEMENT REHAB



PHASE 1-STEP 2: WESTBOUND PAVEMENT REHAB



PHASE 2: OVERLAY

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 2.5 5 10

© 2021
Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

TCP TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			16
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJalajel
1/12/2021 4:31:30 PM
MODEL: Default
FILE: $FILE$
...\Sheets\TCP\933_TCP_TYP01.dgn

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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

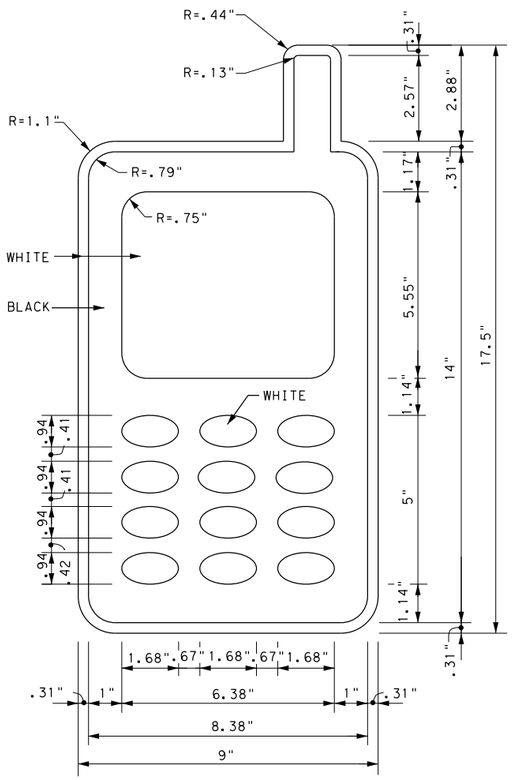
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

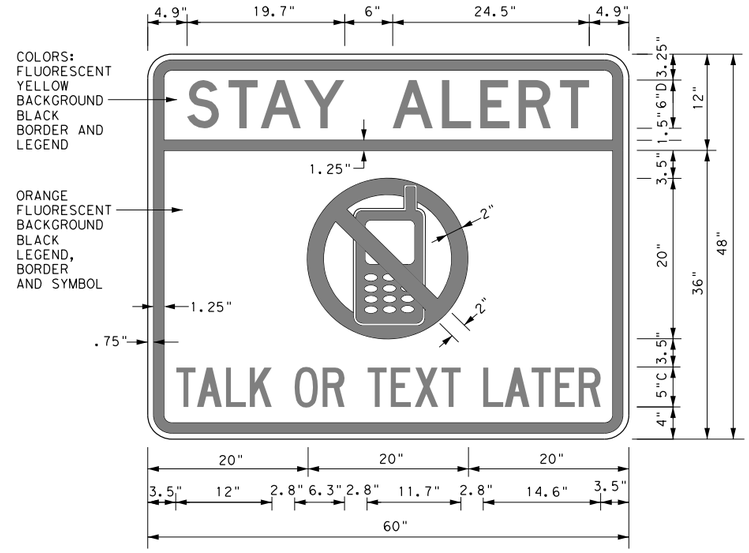
12. The Engineer has the final decision on the location of all traffic control devices.

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 APPAREL 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.





3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

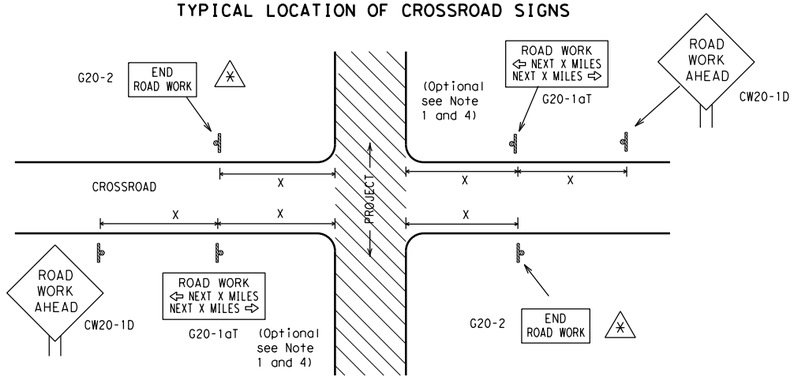
BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	WAC	HILL		17

DATE:
FILE:

DATE:
FILE:

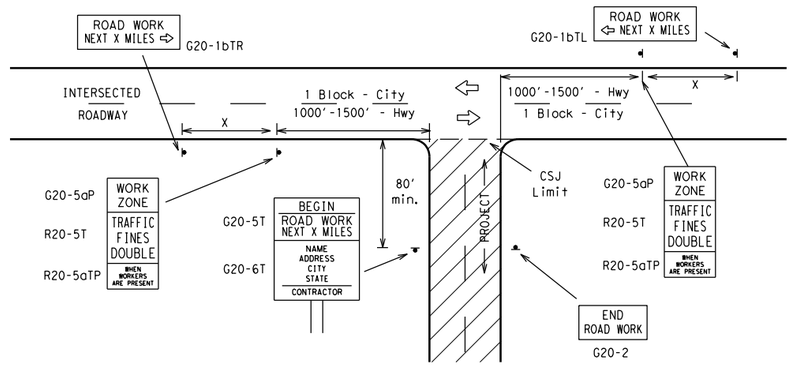
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. 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]

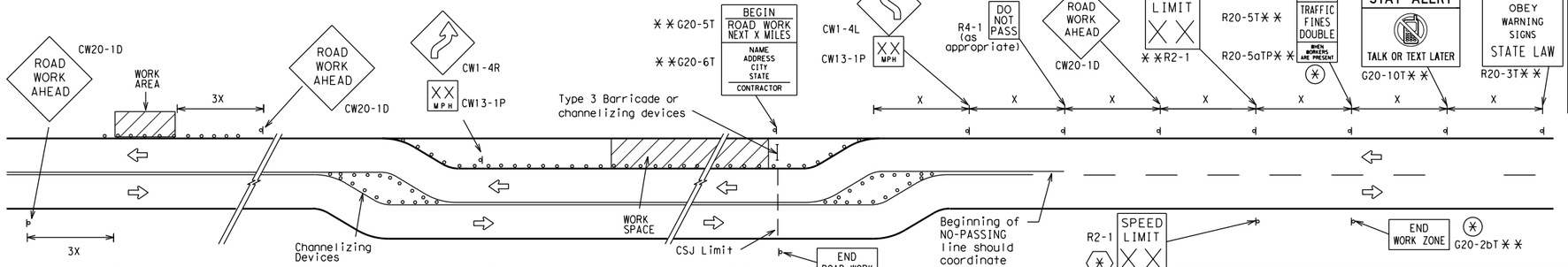
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

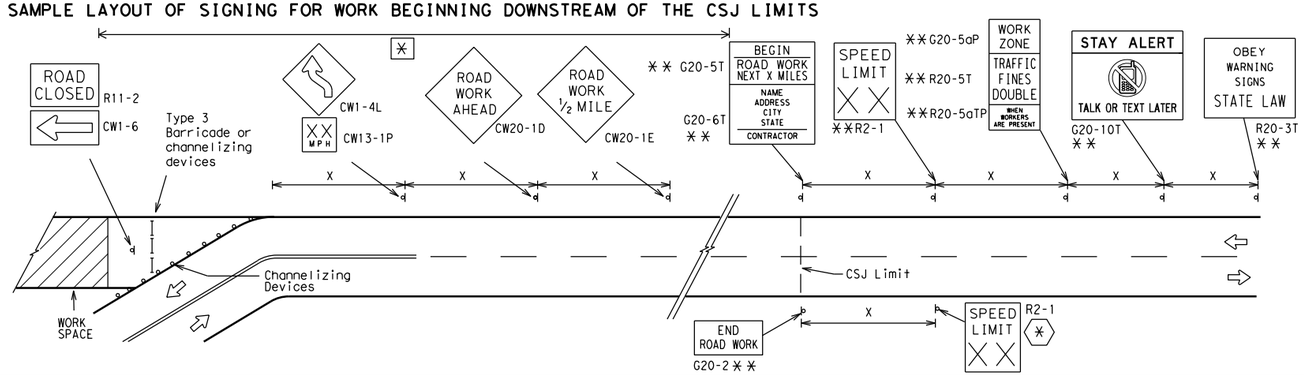
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

✱✱ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

[✱] 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

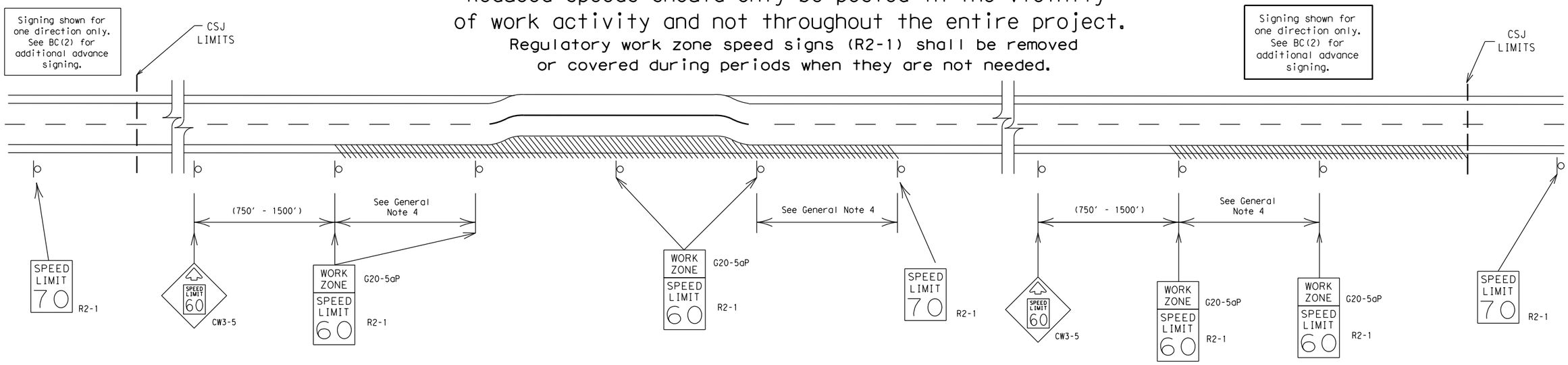
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WAC	HILL		18

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 travelled way.

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

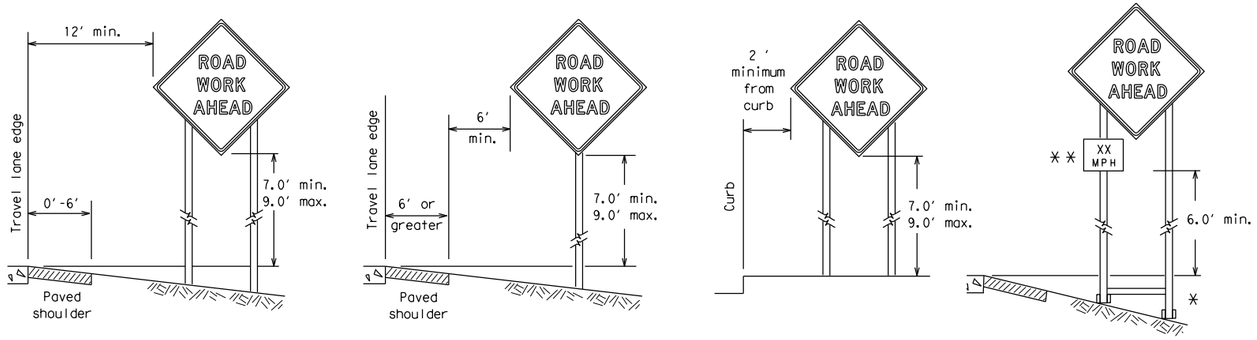
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		19

DATE:
FILE:

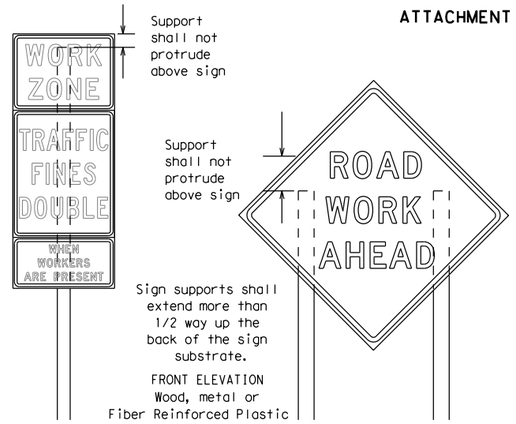
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

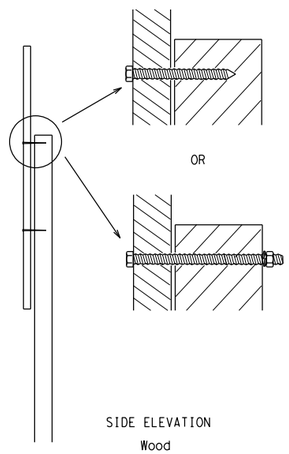
⁎⁎ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or Fiber Reinforced Plastic

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.



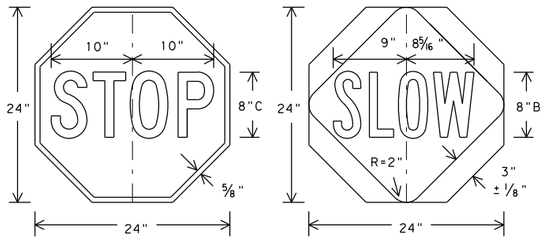
SIDE ELEVATION
Wood

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

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

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" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6′ to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). 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 Operations Division Standard

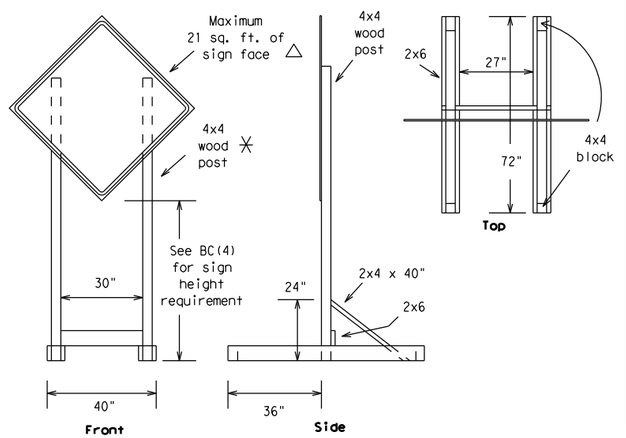
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

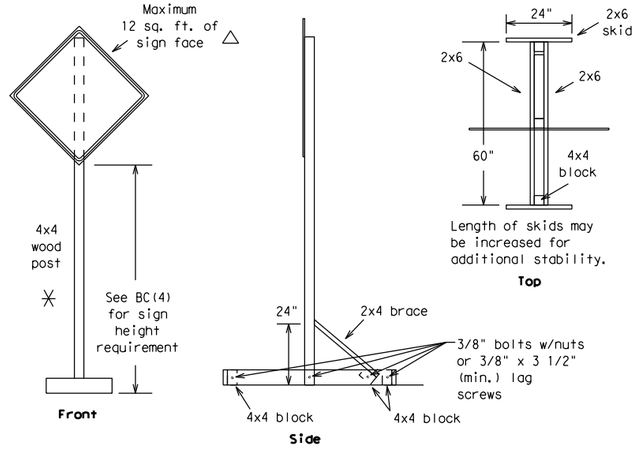
BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WAC	HILL		20

DATE:
FILE:

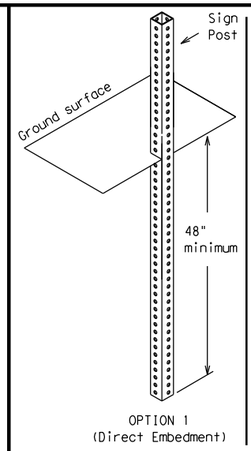
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

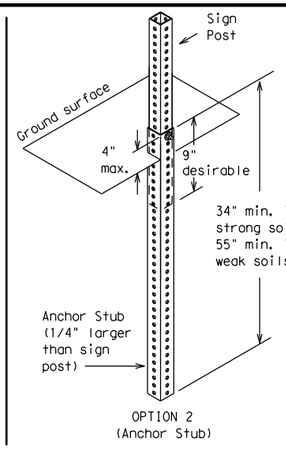


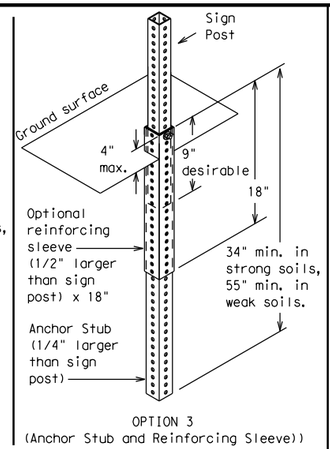


SKID MOUNTED WOOD SIGN SUPPORTS

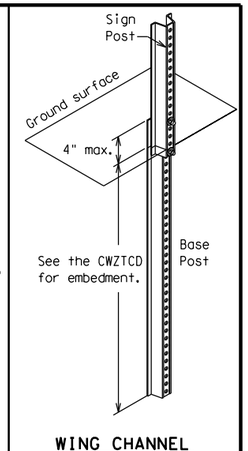
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □







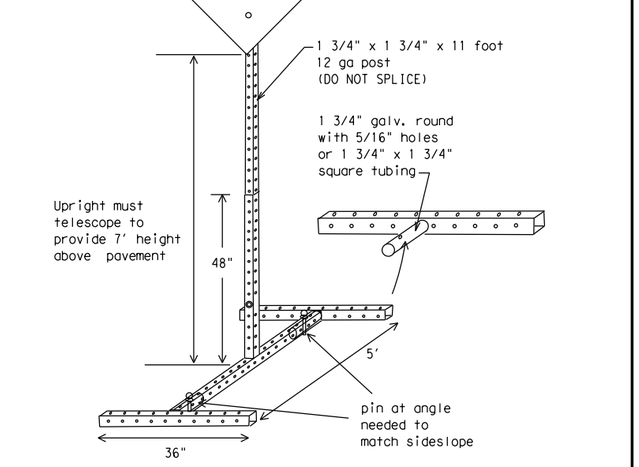
PERFORATED SQUARE METAL TUBING

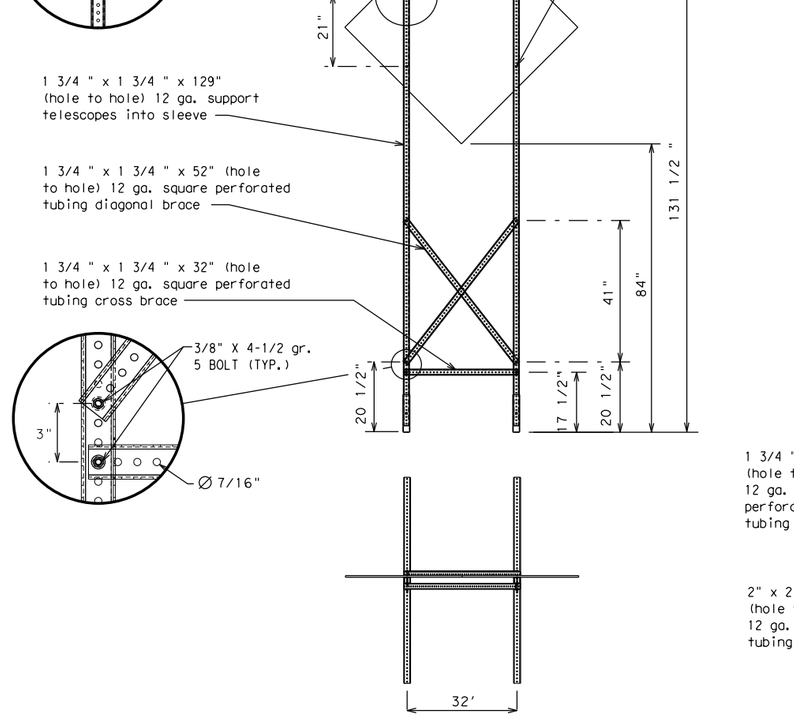


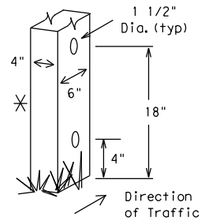
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

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

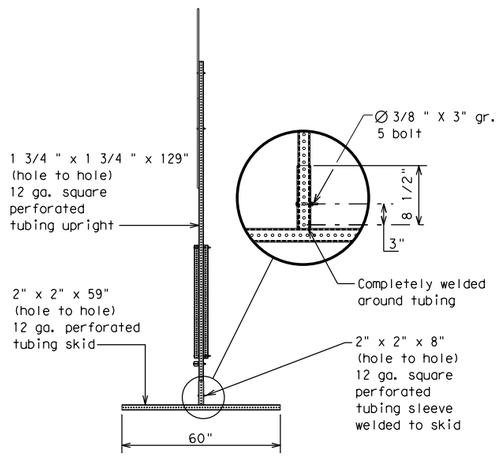






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

DATE:
FILE:

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WAC	HILL		21

99

DATE:
FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

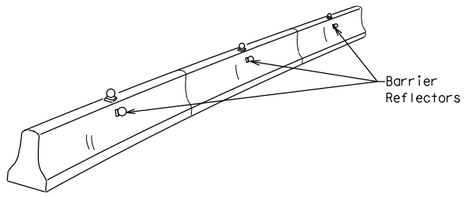
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WAC	HILL		22

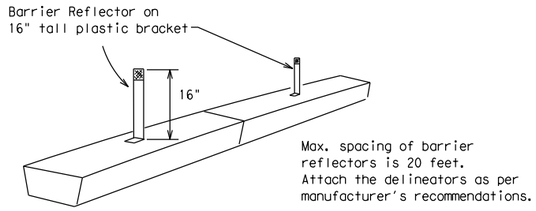
DATE:
FILE:

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.

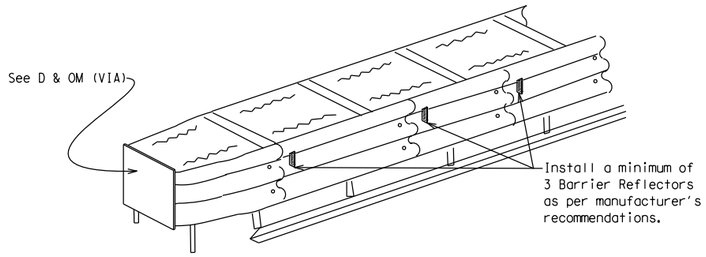


CONCRETE TRAFFIC BARRIER (CTB)

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.



LOW PROFILE CONCRETE BARRIER (LPCB)

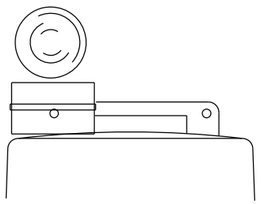


DELINEATION OF END TREATMENTS

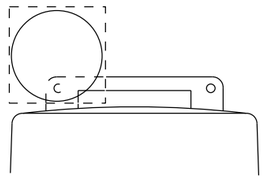
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. 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

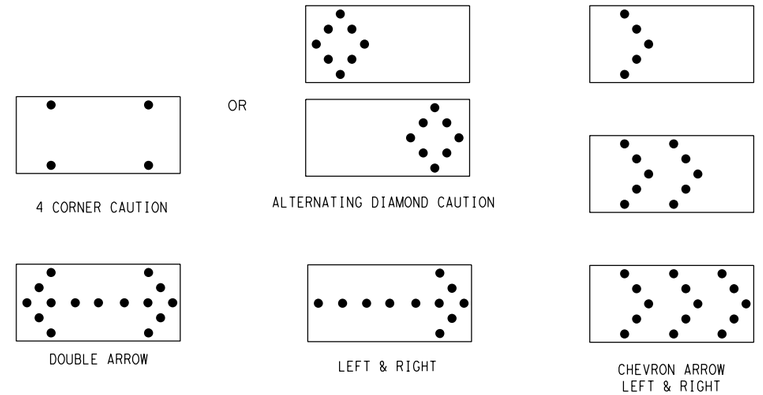
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WAC	HILL		23

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:

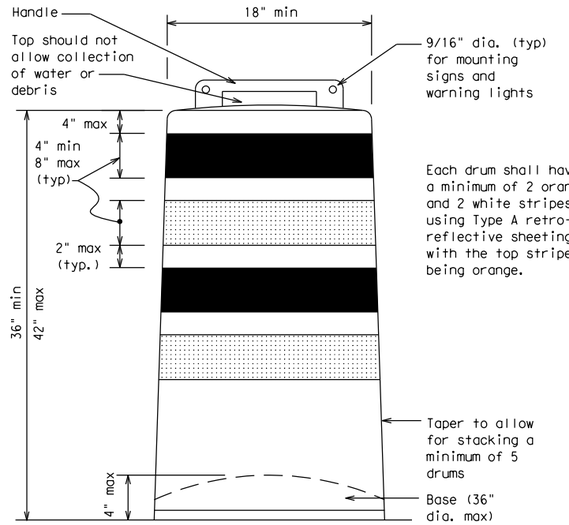
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

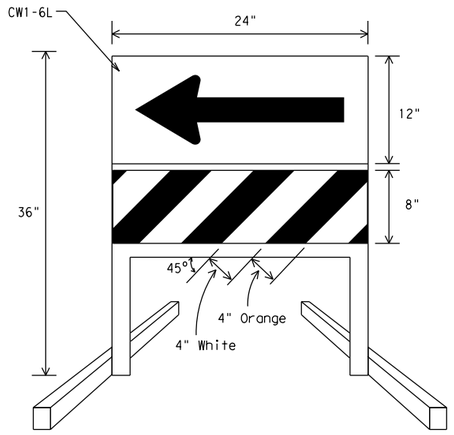
RETROREFLECTIVE SHEETING

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 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.

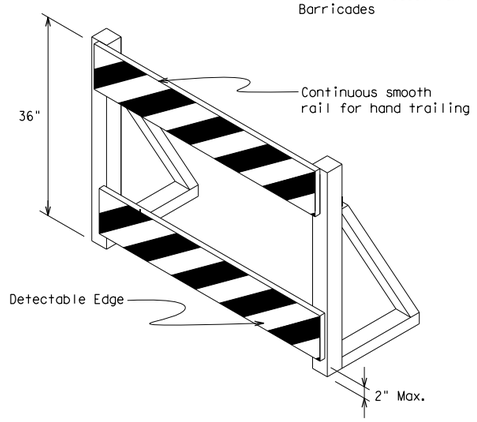




DIRECTION INDICATOR BARRICADE

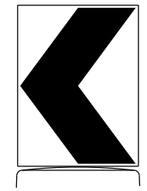
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

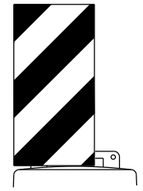


DETECTABLE PEDESTRIAN BARRICADES

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.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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 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

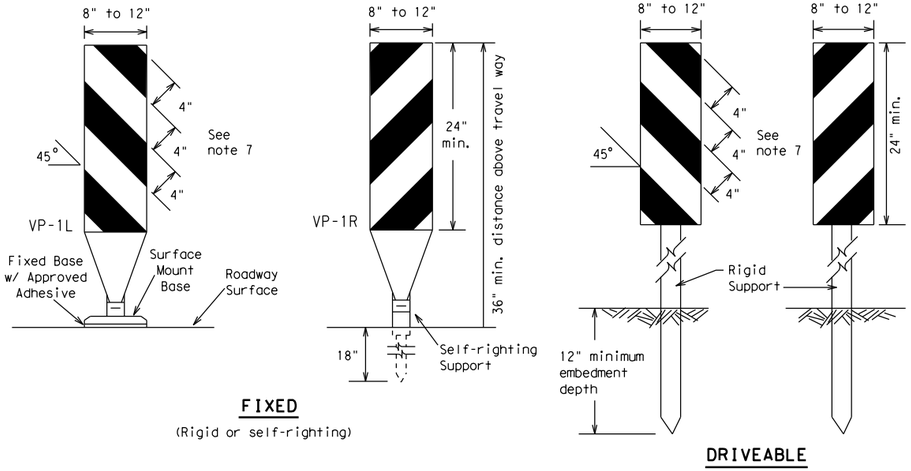
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

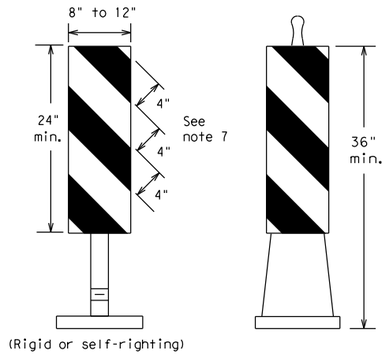
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	WAC	HILL		24

DATE:
FILE:



FIXED
(Rigid or self-righting)

DRIVEABLE

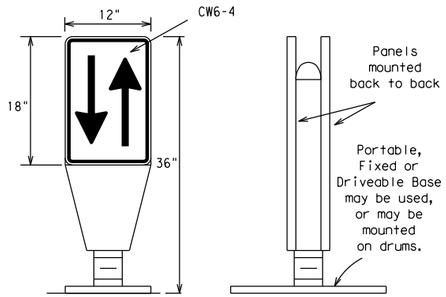


(Rigid or self-righting)

PORTABLE

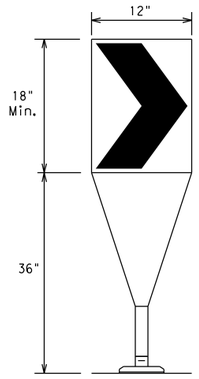
VERTICAL PANELS (VPs)

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 Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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 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.



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

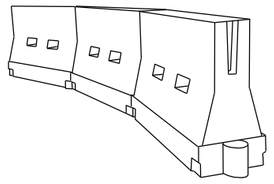
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

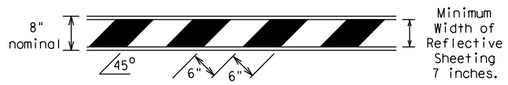
BC(9)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WAC	HILL		25

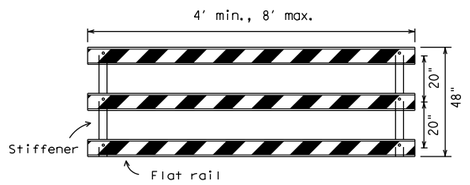
TYPE 3 BARRICADES

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 conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



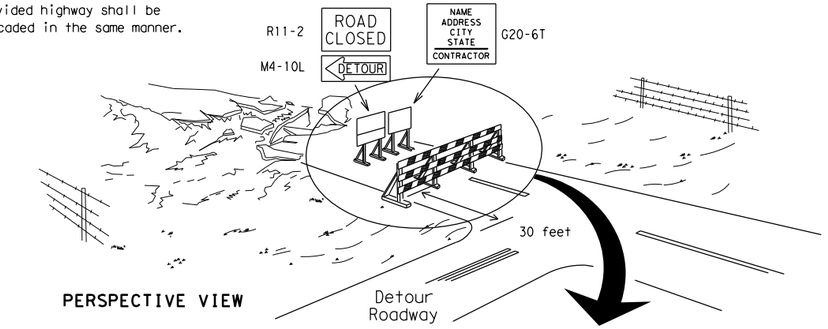
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

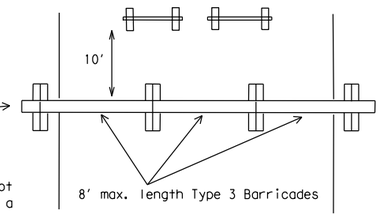
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

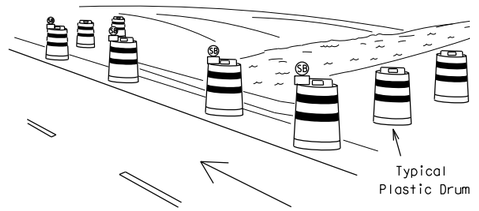
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

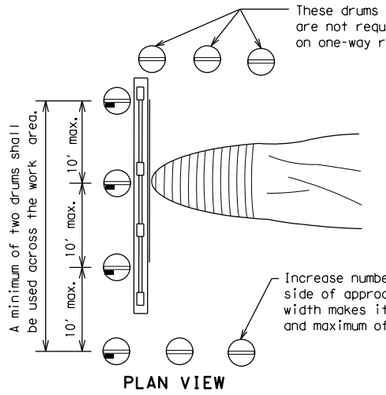
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

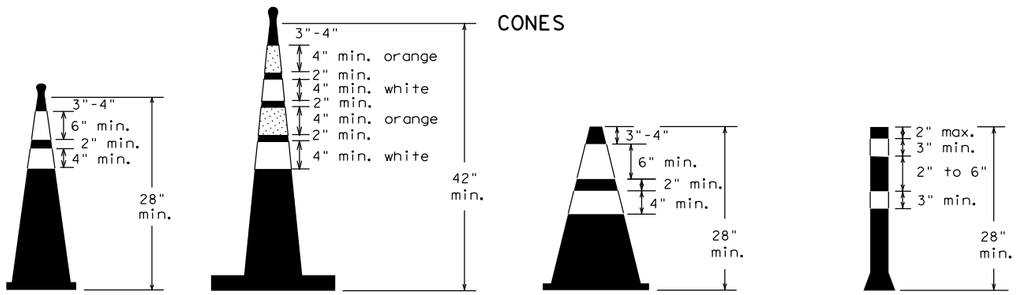
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

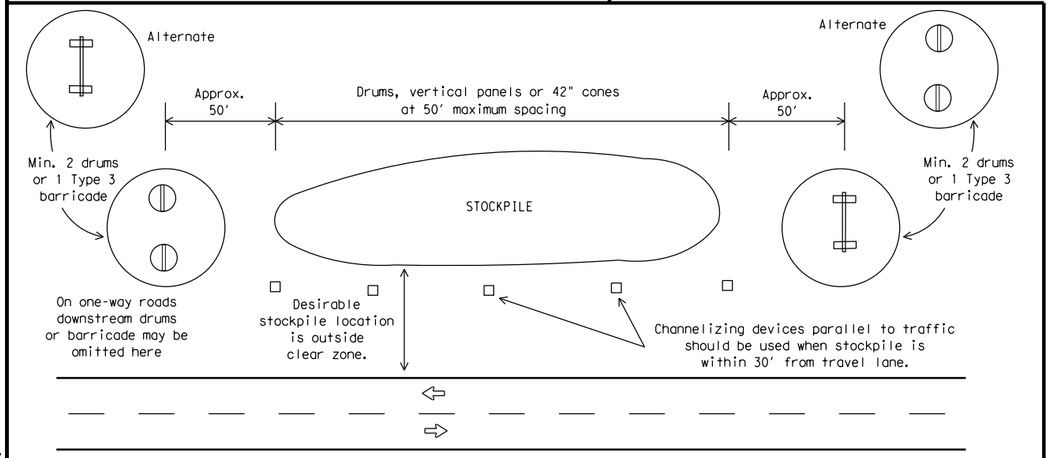
One-Piece cones

Tubular Marker

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

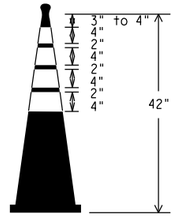
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		26

DATE:
FILE:

DATE:
FILE:

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

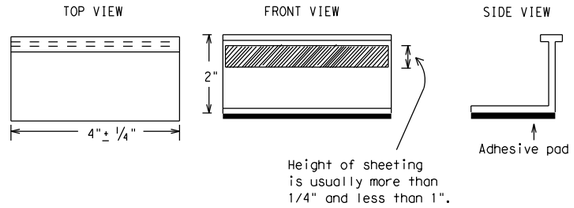
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

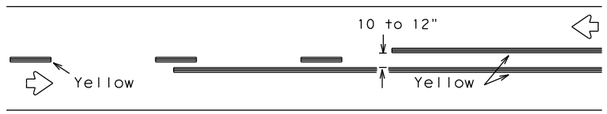
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

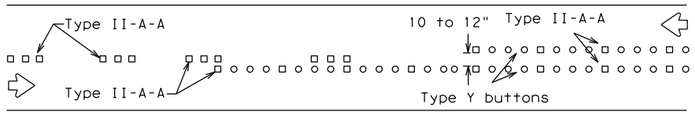
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13	WAC	HILL		27
11-02 8-14				

DATE:
FILE:

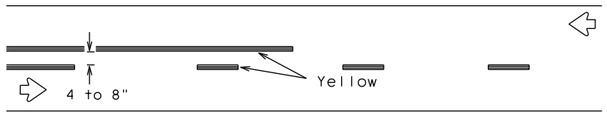
PAVEMENT MARKING PATTERNS



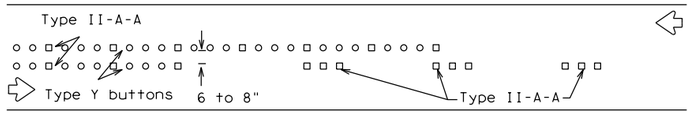
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



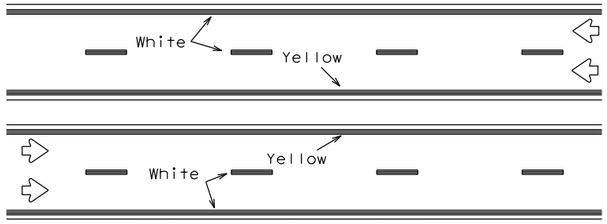
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



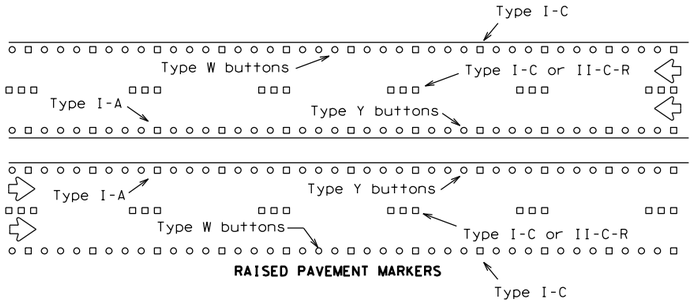
RAISED PAVEMENT MARKERS - PATTERN B

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



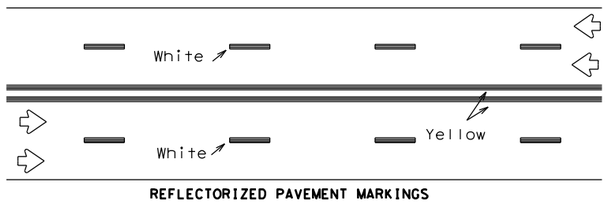
REFLECTORIZED PAVEMENT MARKINGS



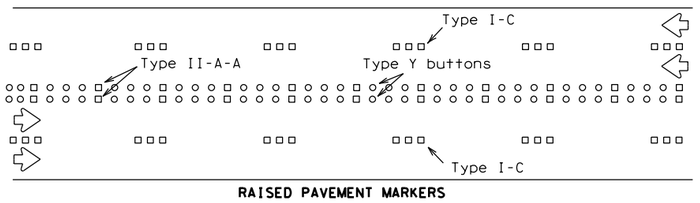
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



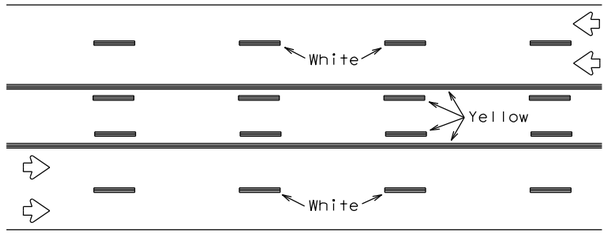
REFLECTORIZED PAVEMENT MARKINGS



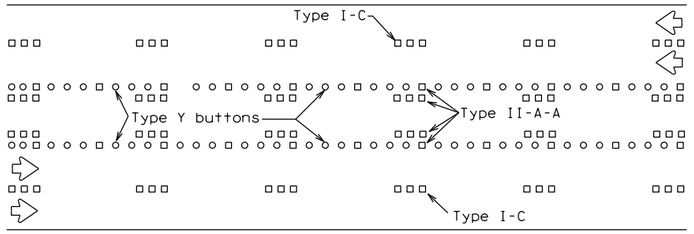
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

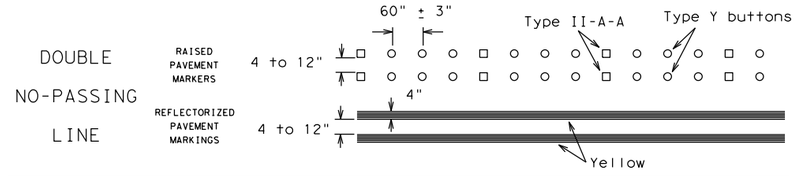
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

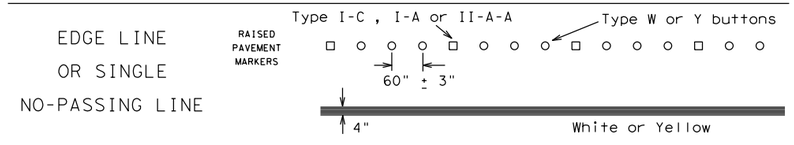
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

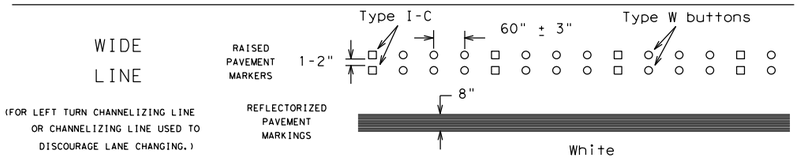


EDGE LINE OR SINGLE NO-PASSING LINE



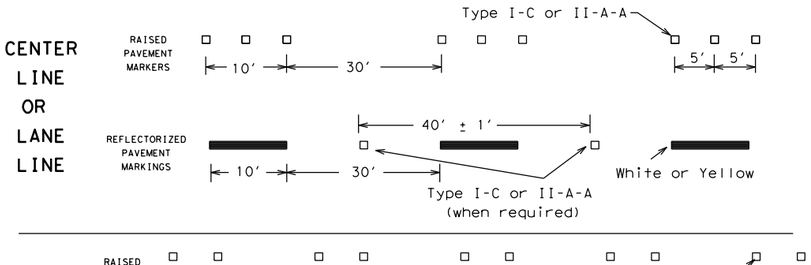
WIDE LINE

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

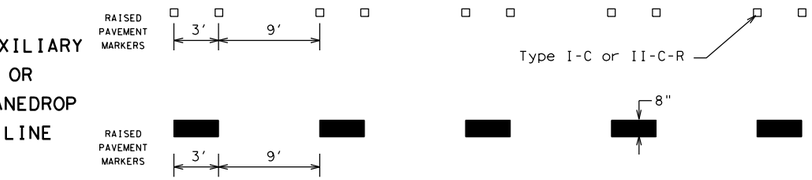


BROKEN LINES

CENTER LINE OR LANE LINE

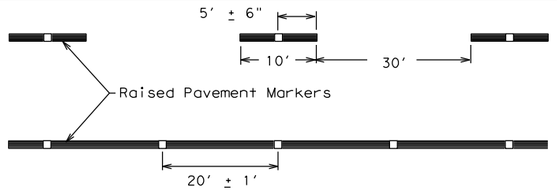


AUXILIARY OR LANEDROP LINE



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."

Texas Department of Transportation

Traffic Operations Division Standard

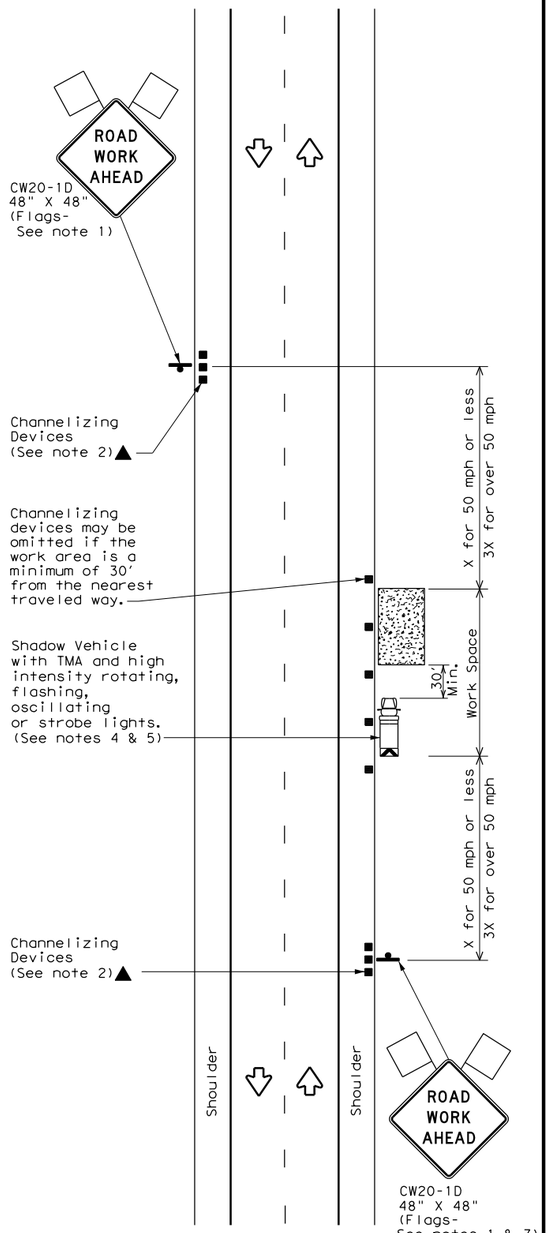
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	WAC	HILL		28
11-02 8-14				

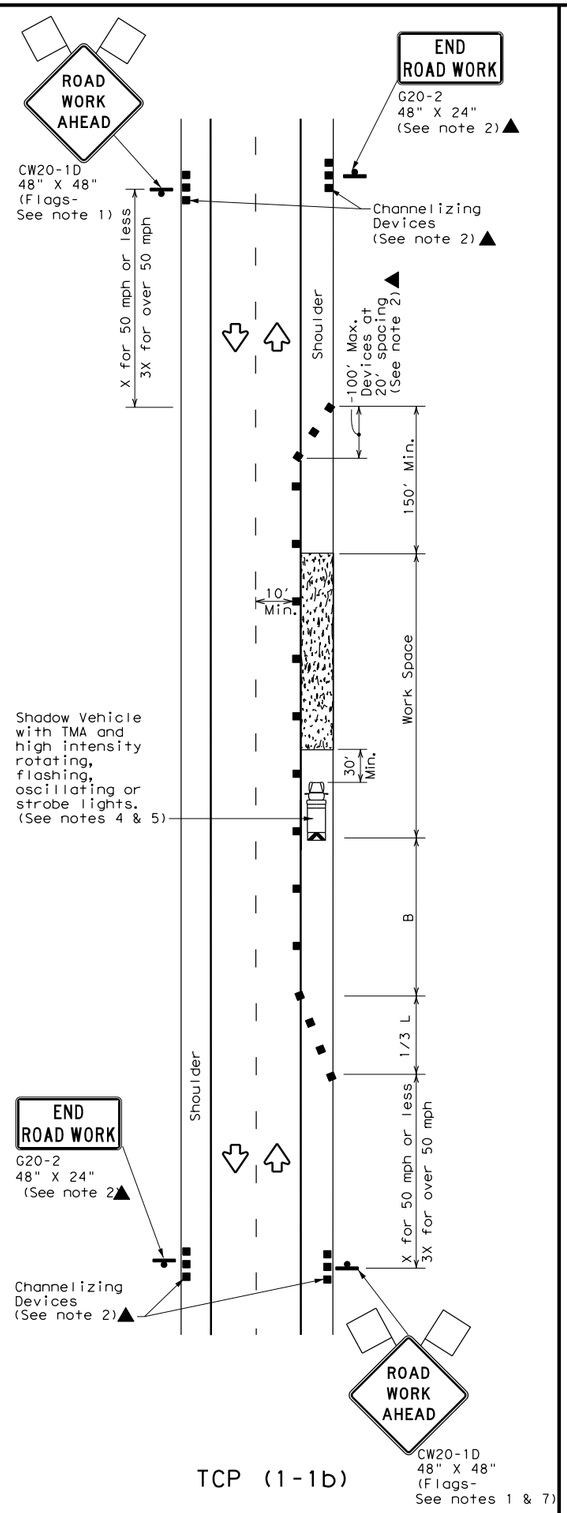
106

DATE:
FILE:



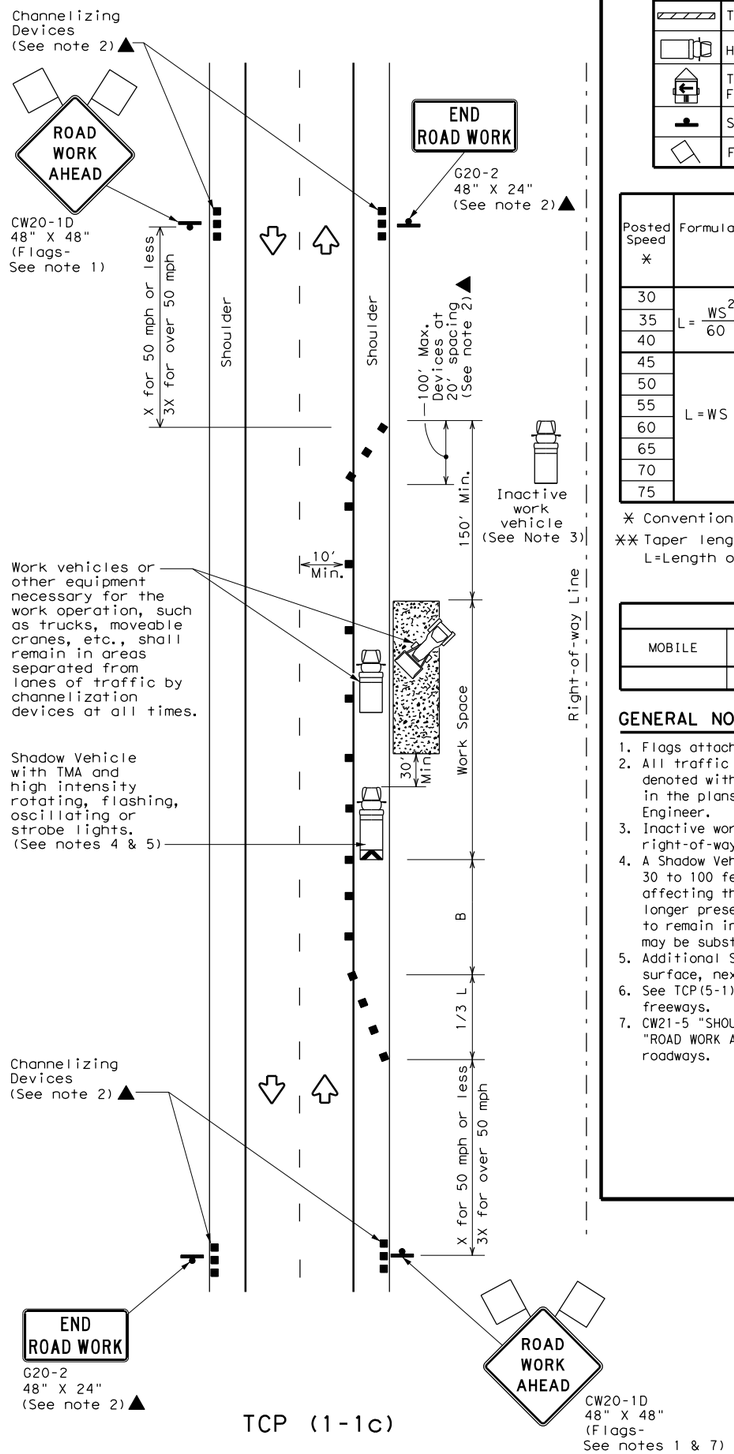
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

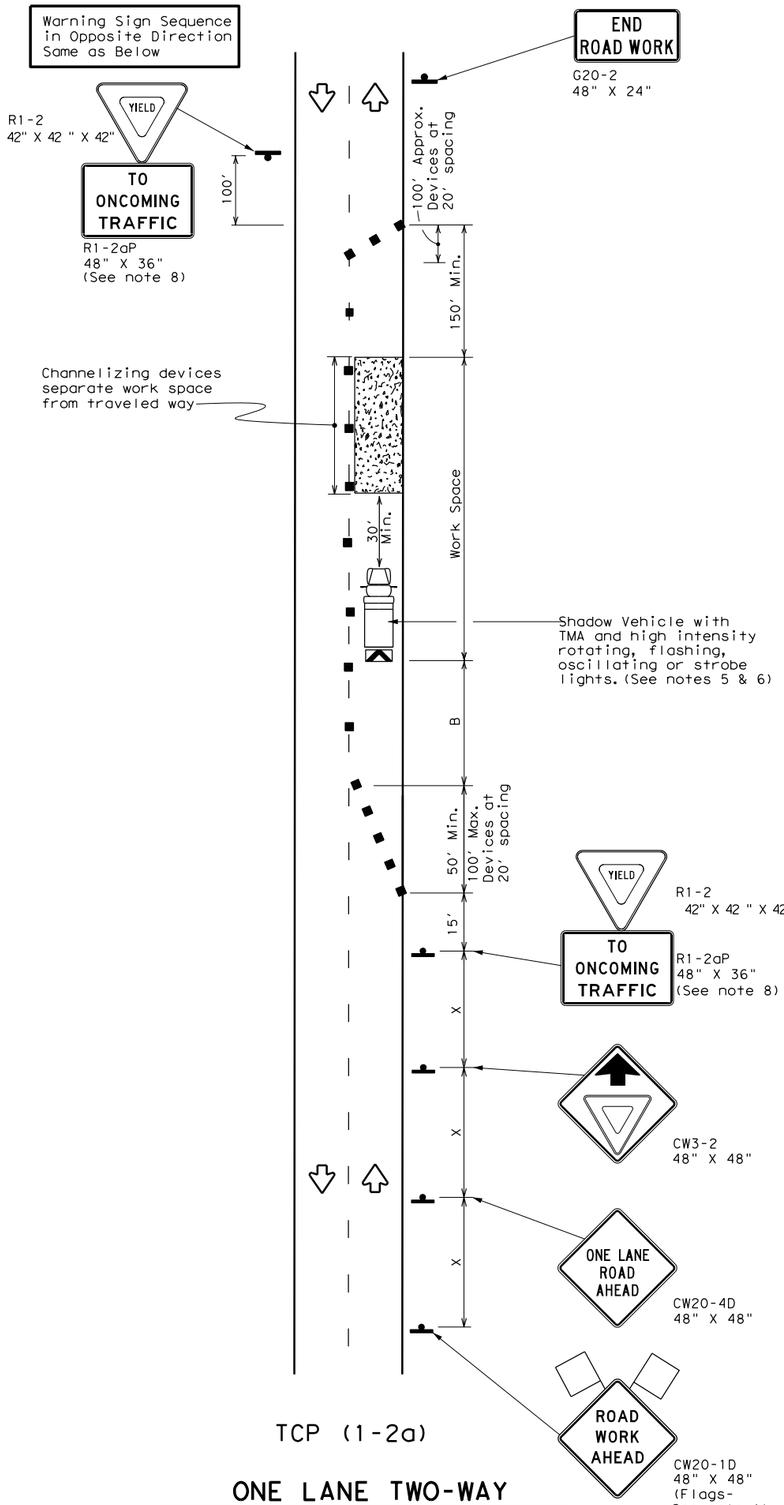
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

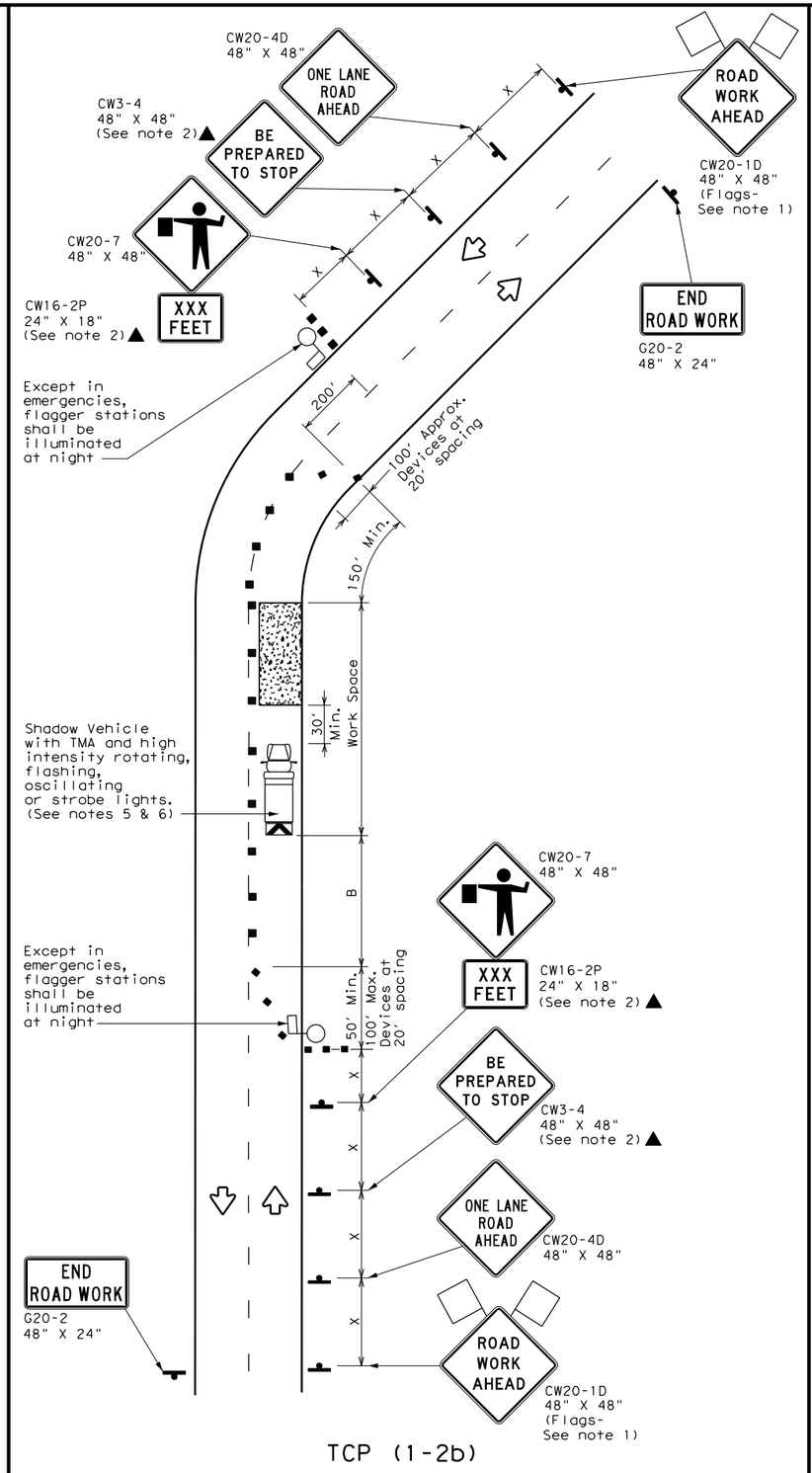
FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WAC	HILL		29
1-97 2-18				

DATE:
FILE:



TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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"	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. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

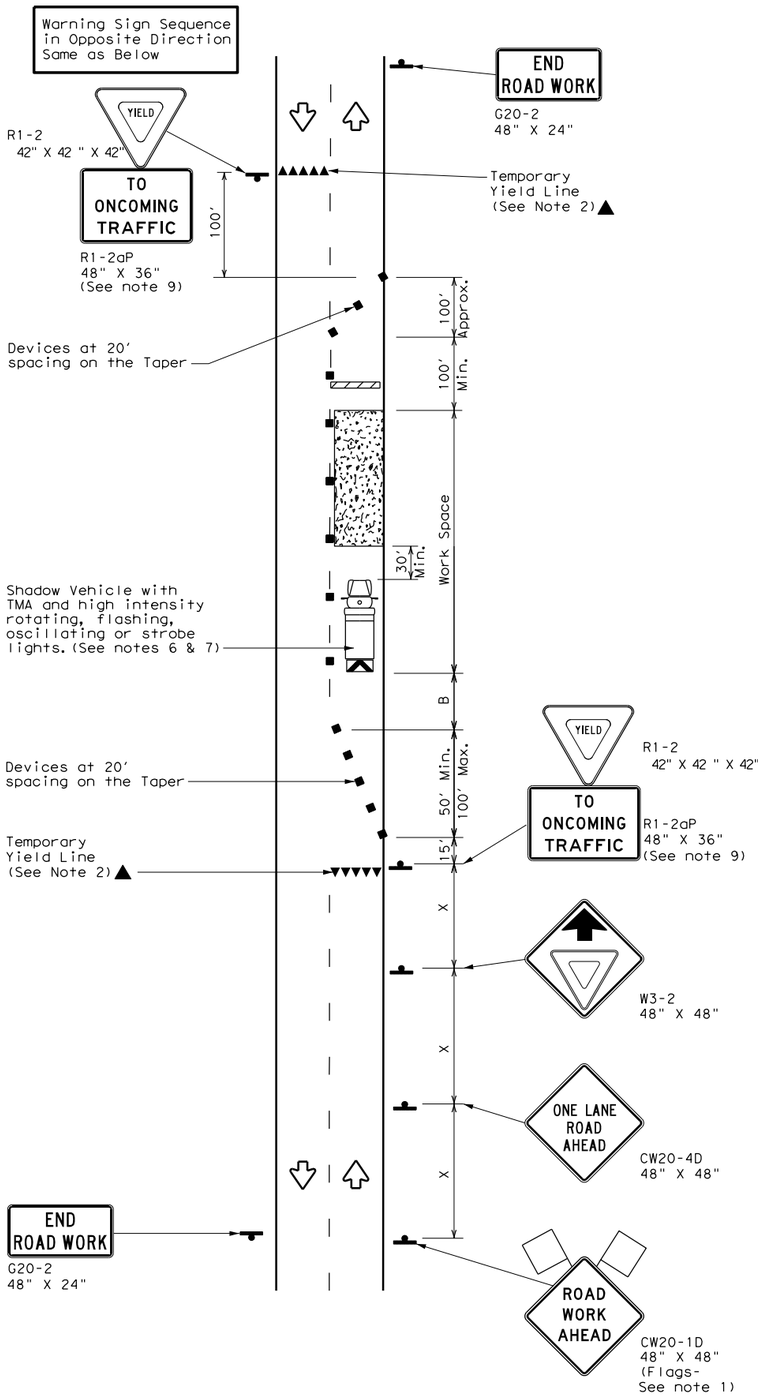
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

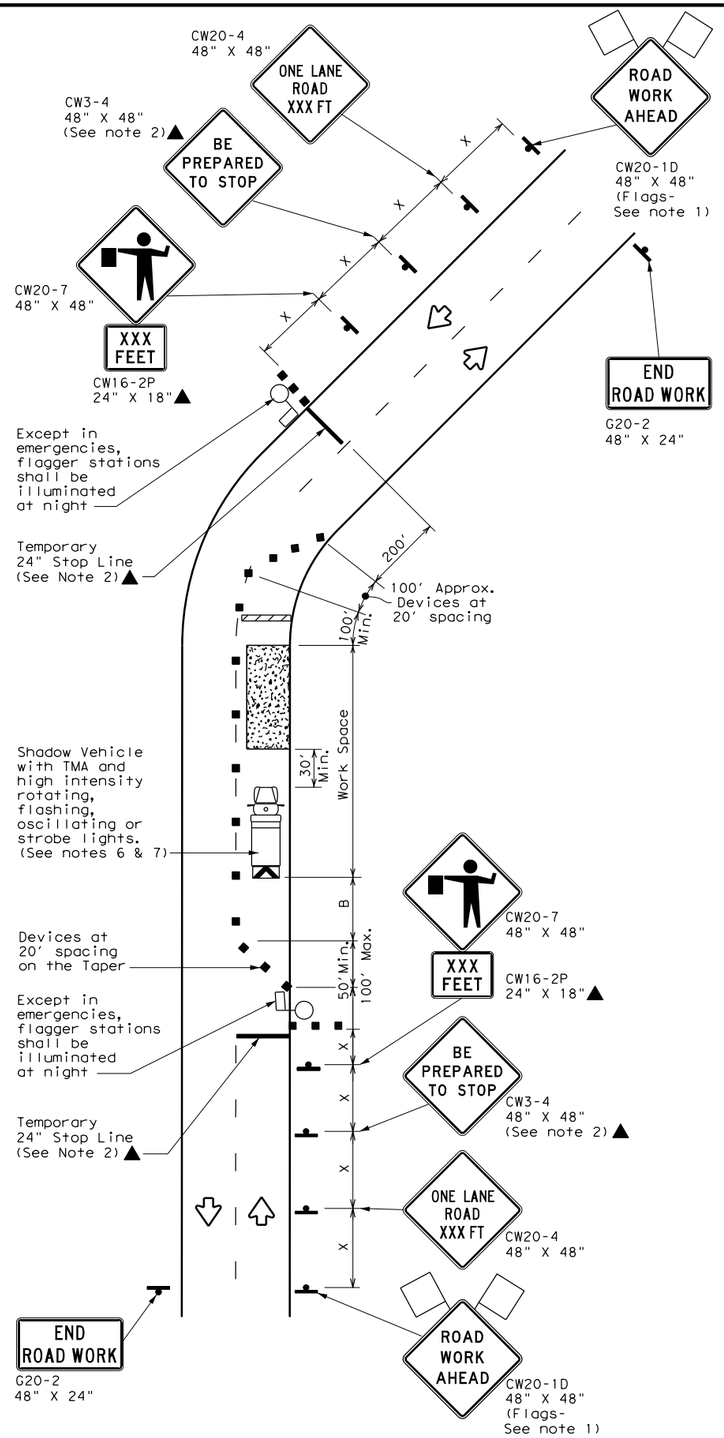
TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98	1190	02	018	FM 933
2-94 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	WAC	HILL		30

DATE:
FILE:



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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"	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. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
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 a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

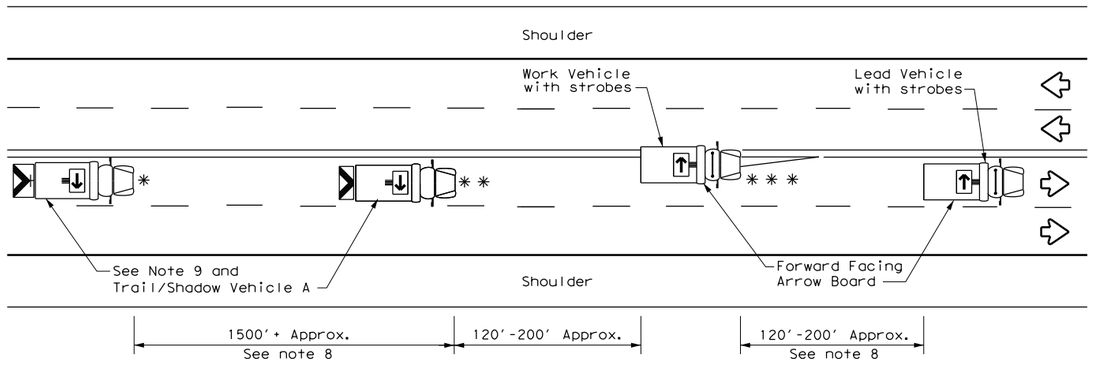
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

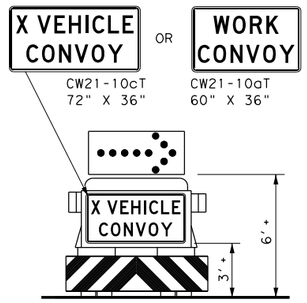
FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1190	02	018	FM 933
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	WAC	HILL		31

DATE:
FILE:



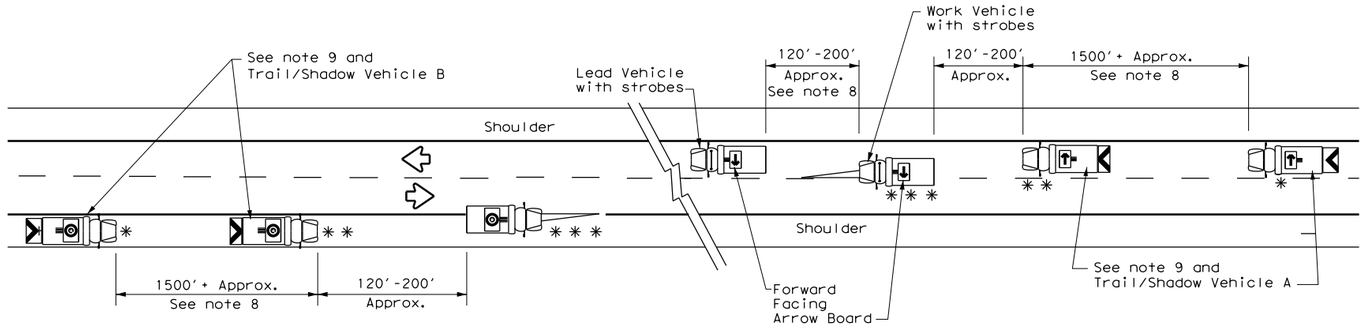
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

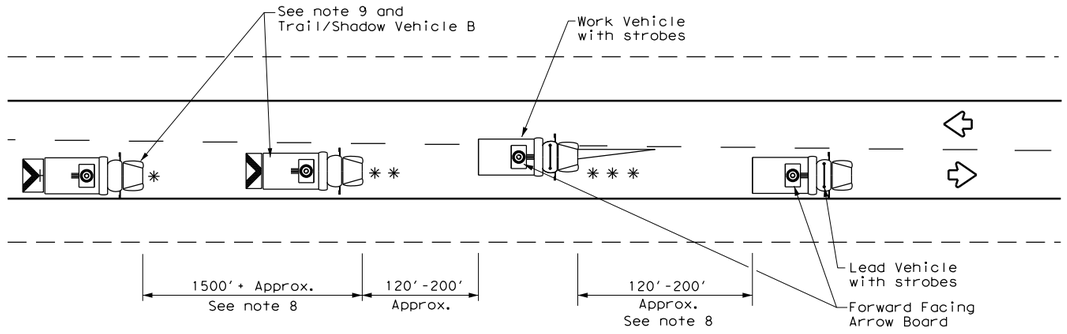


WORK ON SHOULDER

WORK ON TRAVEL LANE

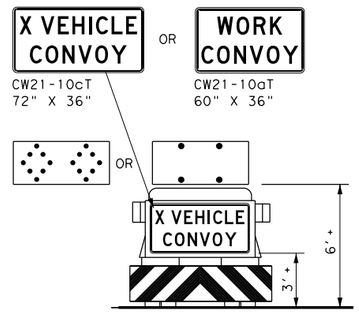
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

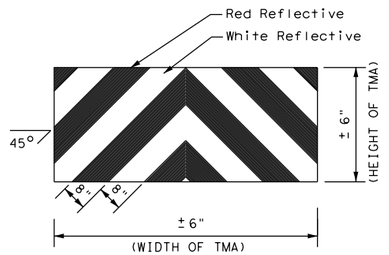
with Flashing Arrow Board in CAUTION display

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

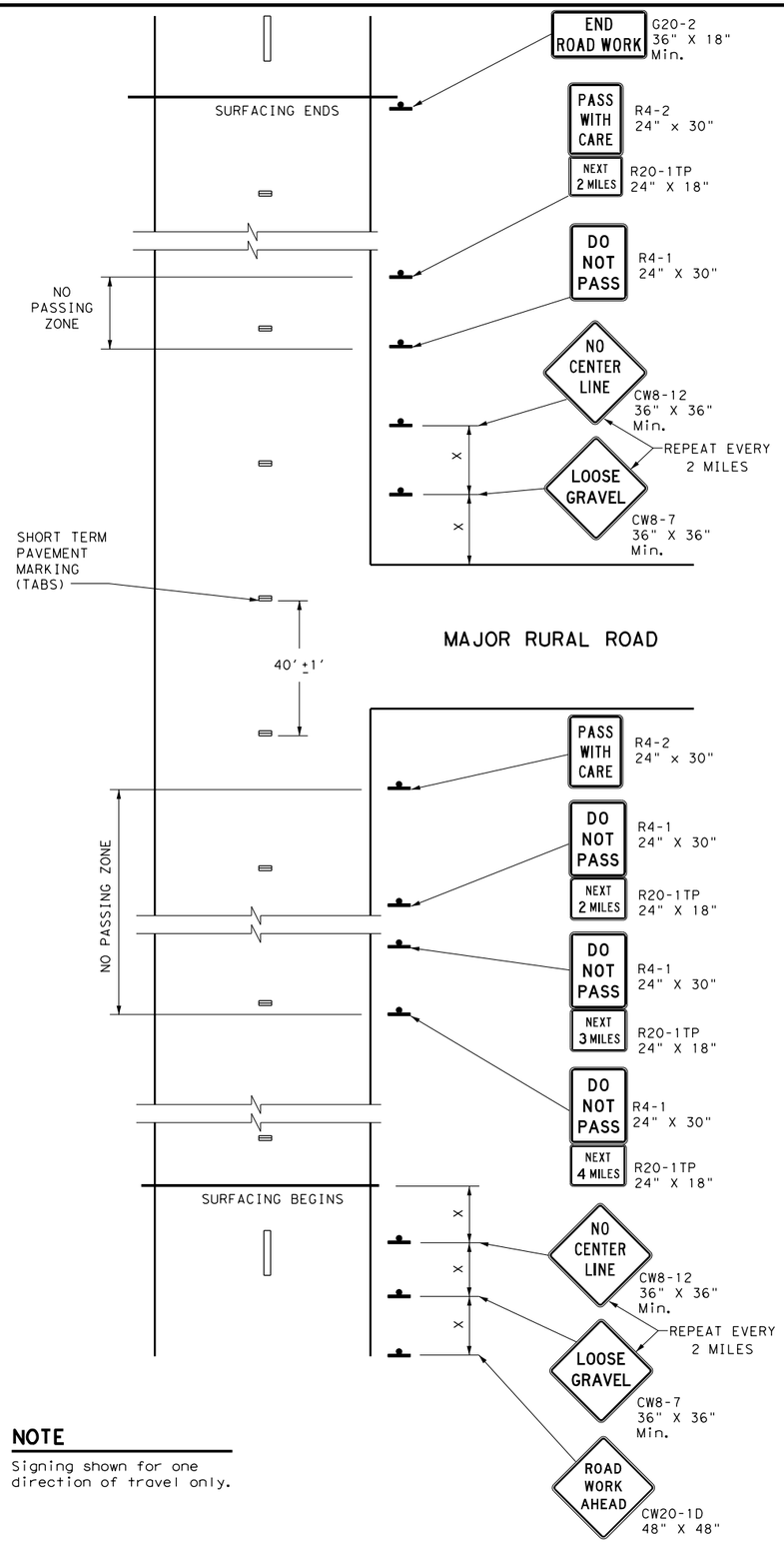
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

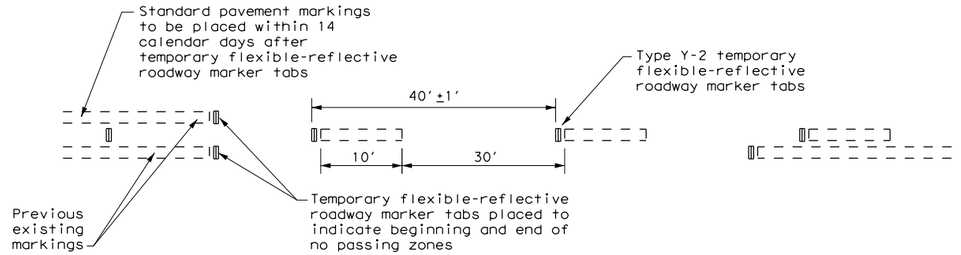
FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		32



NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

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

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	WAC	HILL		33

DATE:
FILE:

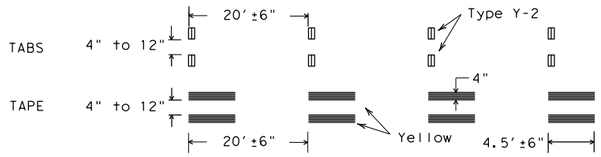
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

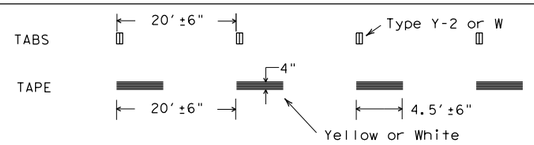
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

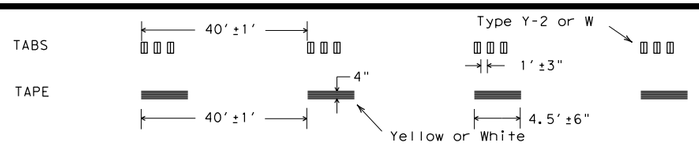


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



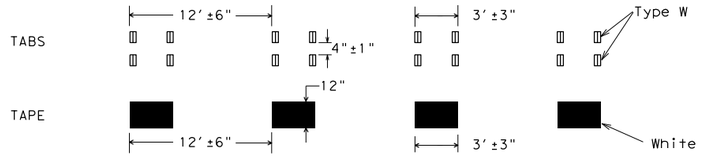
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

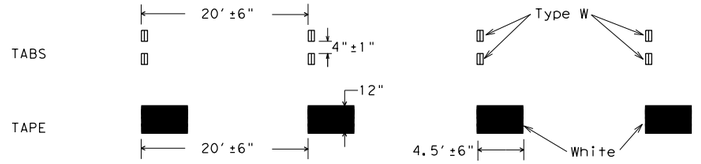


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



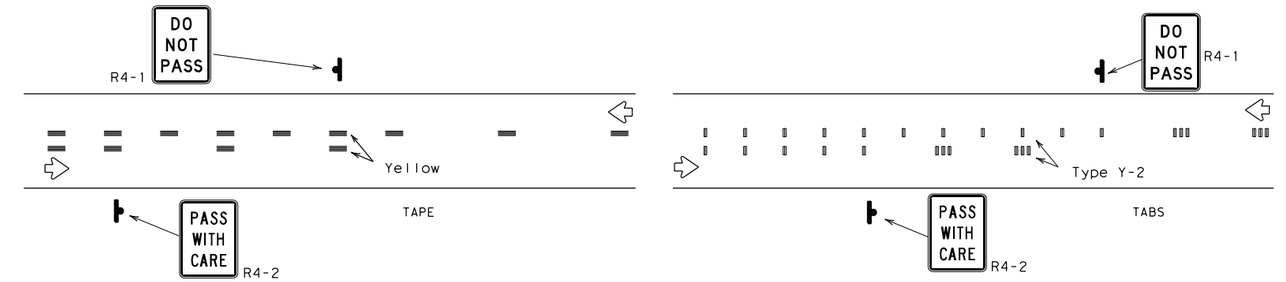
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

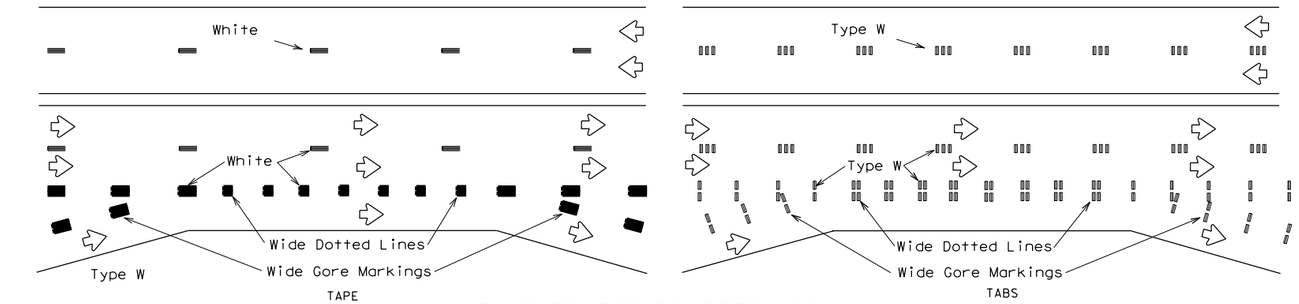
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

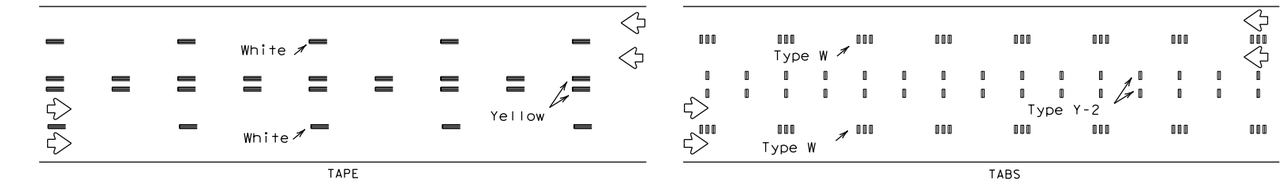
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



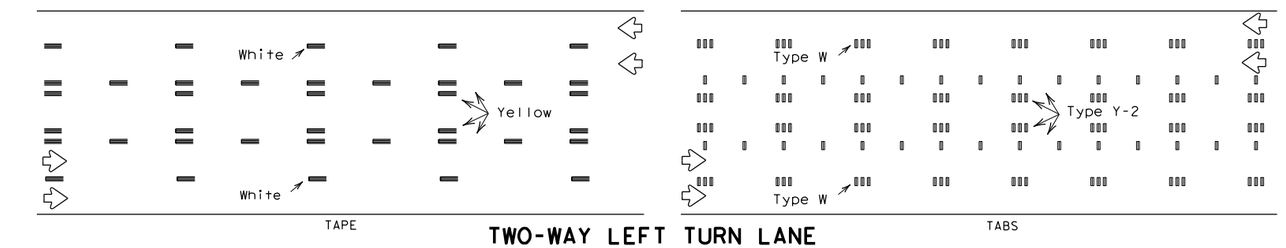
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



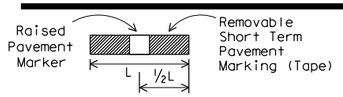
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

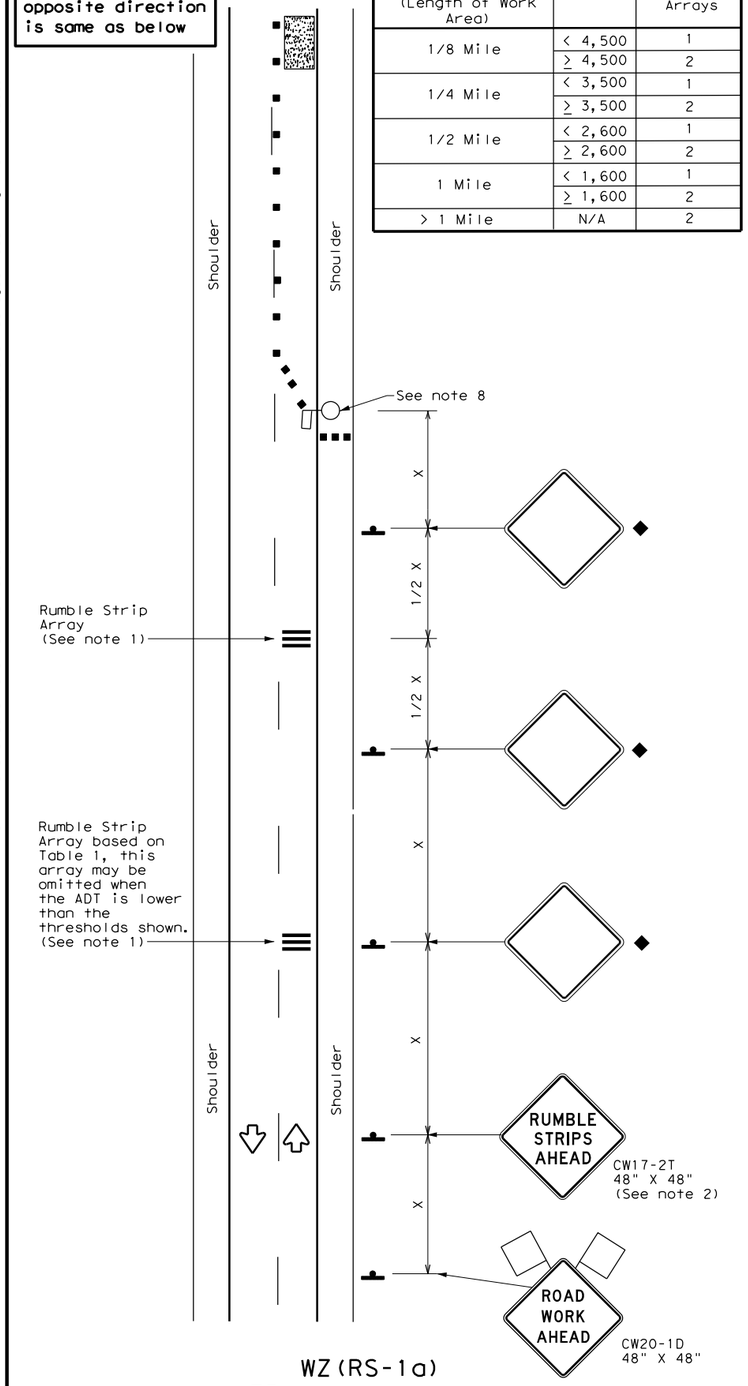
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		1190	02	018	FM 933
1-97		DIST	COUNTY		SHEET NO.
3-03		WAC	HILL		34
7-13					

111

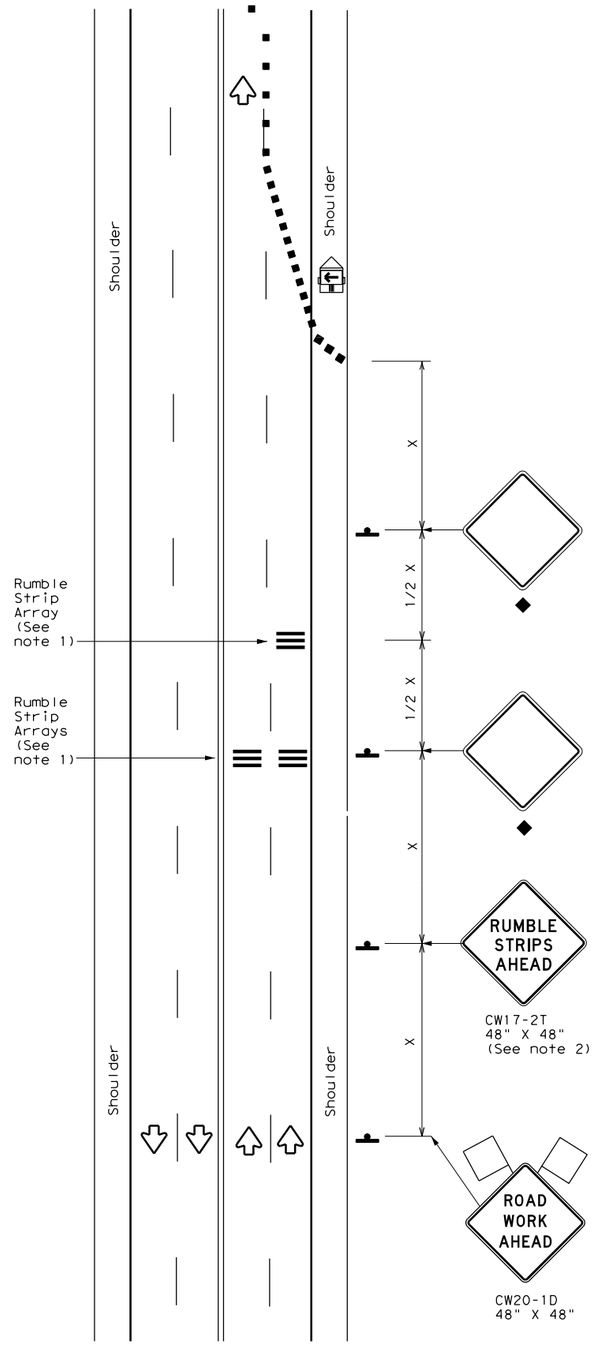
Warning sign and rumble strip sequence in opposite direction is same as below



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION

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



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

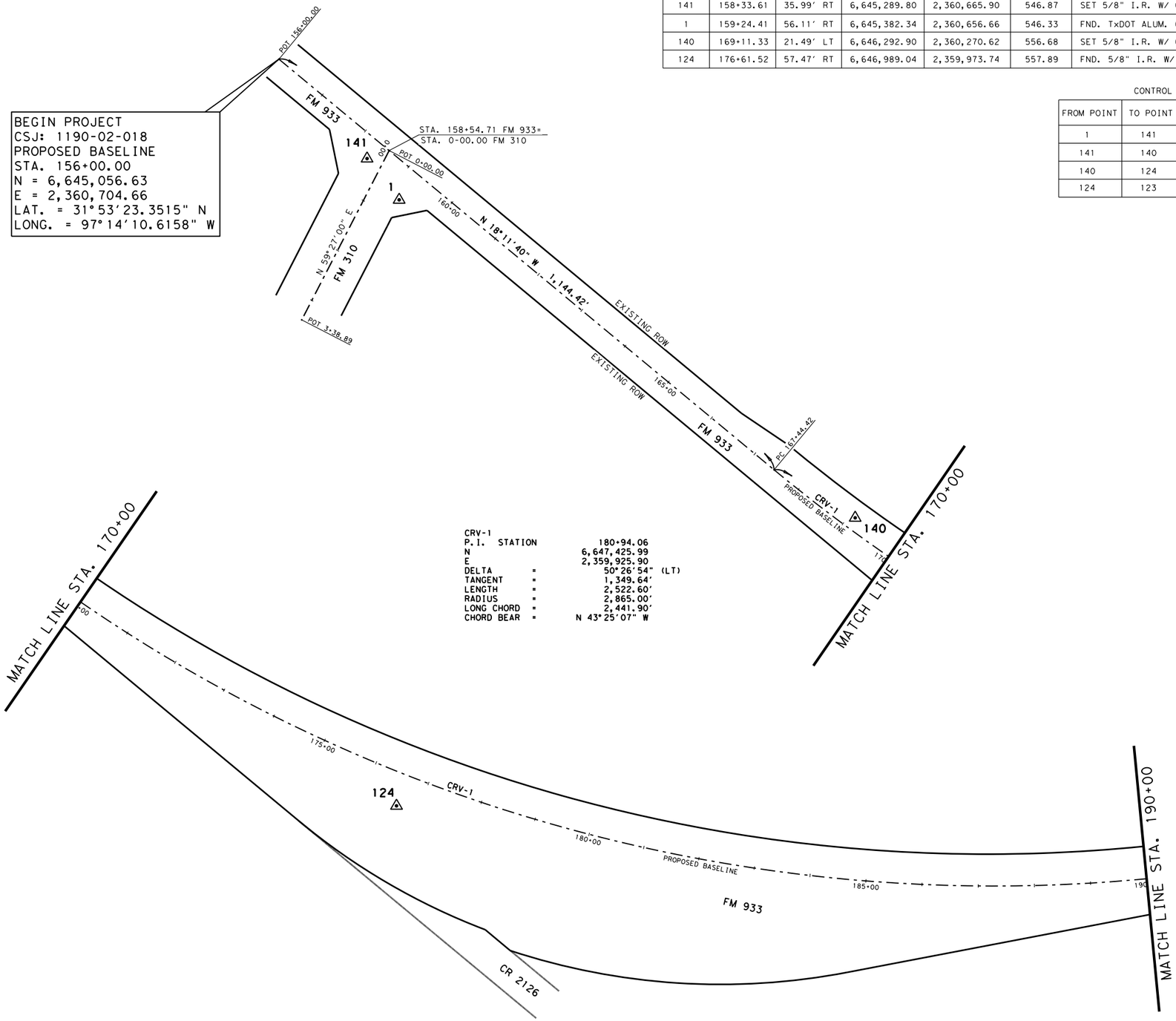
Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
2-14	DIST	COUNTY		SHEET NO.
4-16	WAC	HILL		35

DATE:
FILE:



CRV-1

P.I. STATION		180+94.06
N		6,647,425.99
E		2,359,925.90
DELTA	=	50°26'54" (LT)
TANGENT	=	1,349.64'
LENGTH	=	2,522.60'
RADIUS	=	2,865.00'
LONG CHORD	=	2,441.90'
CHORD BEAR	=	N 43°25'07" W

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
141	158+33.61	35.99' RT	6,645,289.80	2,360,665.90	546.87	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
1	159+24.41	56.11' RT	6,645,382.34	2,360,656.66	546.33	FND. TxDOT ALUM. CAP IN CONC. STAMPED "CP-1"
140	169+11.33	21.49' LT	6,646,292.90	2,360,270.62	556.68	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
124	176+61.52	57.47' RT	6,646,989.04	2,359,973.74	557.89	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"

CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
1	141	S 05°42'06" E	92.99'
141	140	N 21°30'26" W	1,078.17'
140	124	N 23°05'49" W	756.81'
124	123	N 50°01'40" W	1,364.74'

0 100 200

SCALE: 1"=100' (22" x 34" SHEET)
SCALE: 1"=200' (11" x 17" SHEET)

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
EDWARD J. SOUKUP, II
5455
PROFESSIONAL
LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

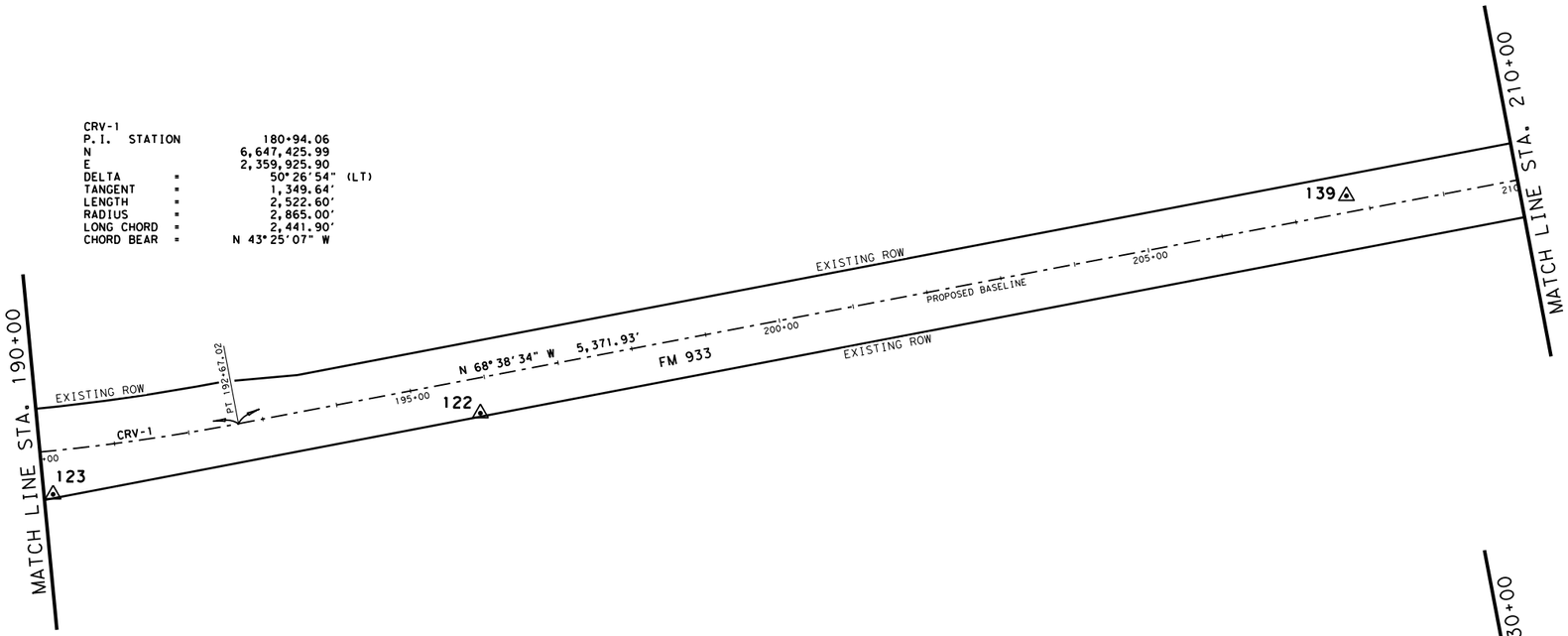
Texas Department of Transportation

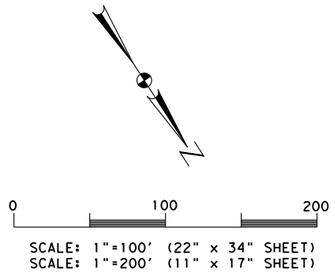
FM 933

SURVEY CONTROL INDEX SHEET

FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	

PEN TABLE: $PENTBL$
PLOT DRIVER: $PLTDRVL$
4/30/2020 2:24:54 PM
MODEL: $MODELNAME$
FILE: S:\2019\1920178\CADD SCM\FM933_SURVEY CONTROL INDEX_S01.dgn
...\FM933_SURVEY CONTROL INDEX_S01.dgn





NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
124	123	N 50°01'40" W	1,364.74'
123	122	N 68°36'15" W	578.94'
122	139	N 71°56'08" W	1,188.36'
139	121	N 60°04'36" W	456.68'
121	138	N 77°56'52" W	528.77'
138	2	N 55°19'43" W	360.06'
2	120	N 71°52'15" W	1,681.50'

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
123	190+11.84	57.70' RT	6,647,865.78	2,358,927.86	559.10	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
122	195+85.98	46.51' RT	6,648,076.98	2,358,388.82	556.15	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
139	207+72.38	21.75' LT	6,648,445.48	2,357,259.03	558.85	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
121	212+23.97	46.28' RT	6,648,673.29	2,356,863.23	558.53	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
138	217+45.78	39.22' LT	6,648,783.70	2,356,346.12	568.34	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
2	220+96.16	43.70' RT	6,648,988.52	2,356,050.00	568.03	FND. TxDOT ALUM. CAP IN CONC. STAMPED "CP-2"

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS REGISTERED EDWARD J. SOUKUP, II 5455 PROFESSIONAL LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

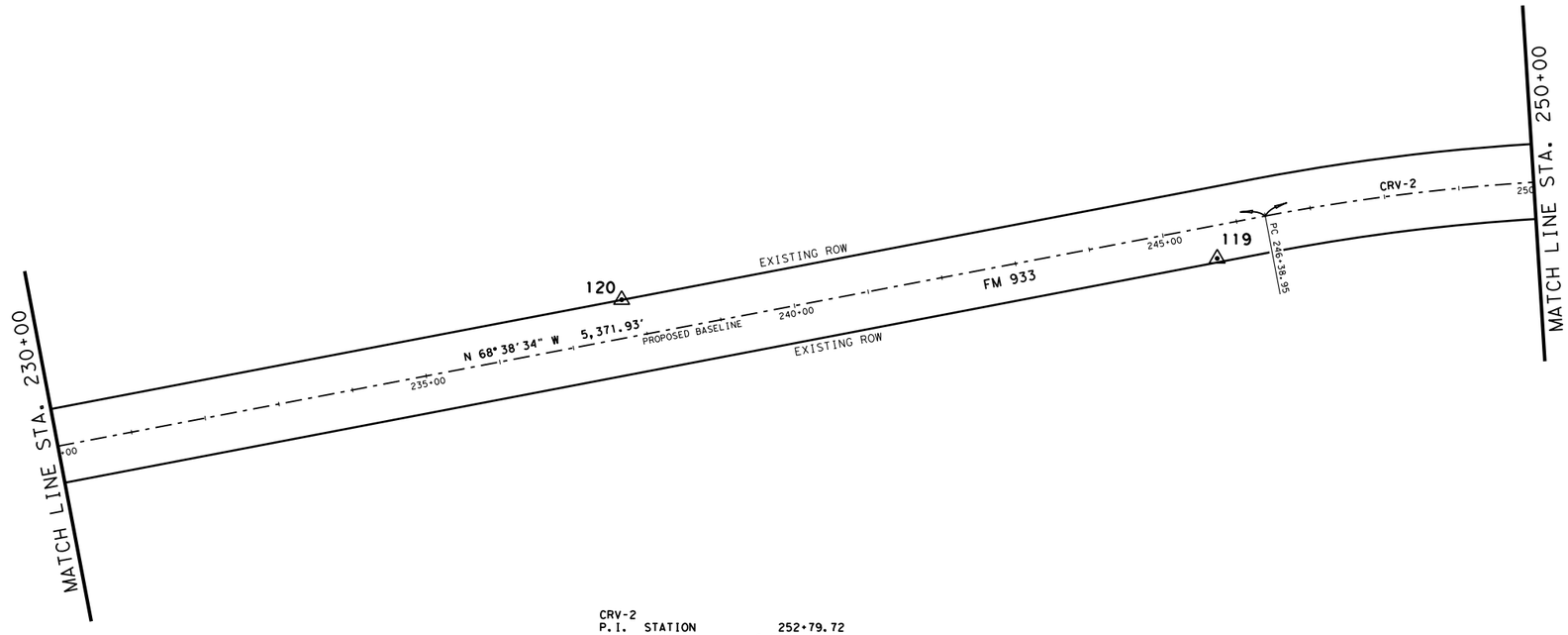
LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

Texas Department of Transportation

FM 933
SURVEY CONTROL INDEX SHEET

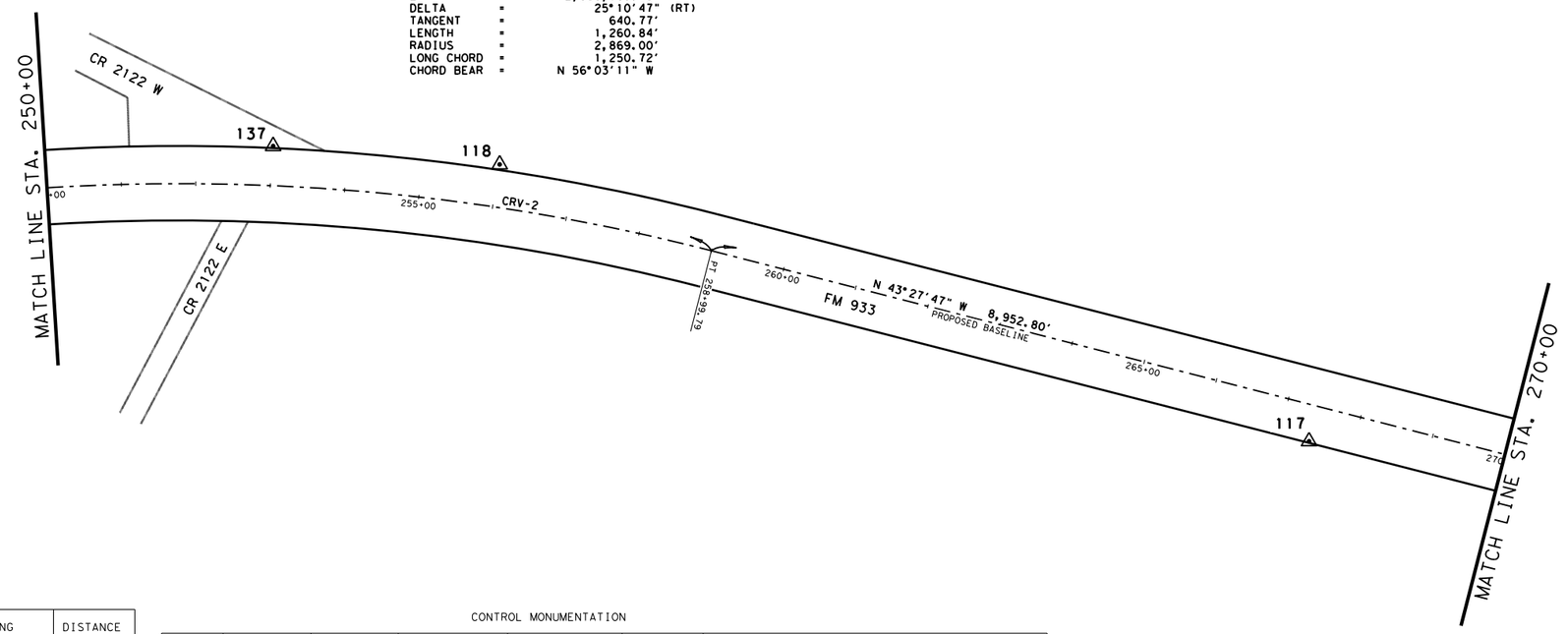
FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	

PEN TABLE: $PENTBL$
PLOT DRIVER: $PLTDRVL$
4/30/2020 8:21:42 AM
MODEL: $MODELNAME$
FILE: S:\2019\1920178\CADD SCM\FM933_SURVEY CONTROL INDEX_S02.dgn
...\FM933_SURVEY CONTROL INDEX_S02.dgn



CRV-2

P.I. STATION		252+79.72
N		6,650,107.21
E		2,353,069.15
DELTA	=	25° 10' 47" (RT)
TANGENT	=	640.77'
LENGTH	=	1,260.84'
RADIUS	=	2,869.00'
LONG CHORD	=	1,250.72'
CHORD BEAR	=	N 56° 03' 11" W



CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
2	120	N 71°52'15" W	1,681.50'
120	119	N 61°49'41" W	796.07'
119	137	N 70°06'50" W	742.65'
137	118	N 53°13'16" W	305.18'
118	117	N 38°58'16" W	1,148.74'
117	136	N 49°09'37" W	725.70'

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
120	237+74.99	50.98' LT	6,649,511.74	2,354,451.97	595.96	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
119	245+65.44	43.48' RT	6,649,887.58	2,353,750.21	596.13	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
137	253+01.55	53.17' LT	6,650,140.19	2,353,051.84	600.17	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
118	256+01.06	57.45' LT	6,650,322.92	2,352,807.41	589.77	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
117	267+40.84	48.37' RT	6,651,216.02	2,352,084.93	593.29	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"

0 100 200

SCALE: 1"=100' (22" x 34" SHEET)
SCALE: 1"=200' (11" x 17" SHEET)

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS REGISTERED EDWARD J. SOUKUP, II 5455 PROFESSIONAL LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

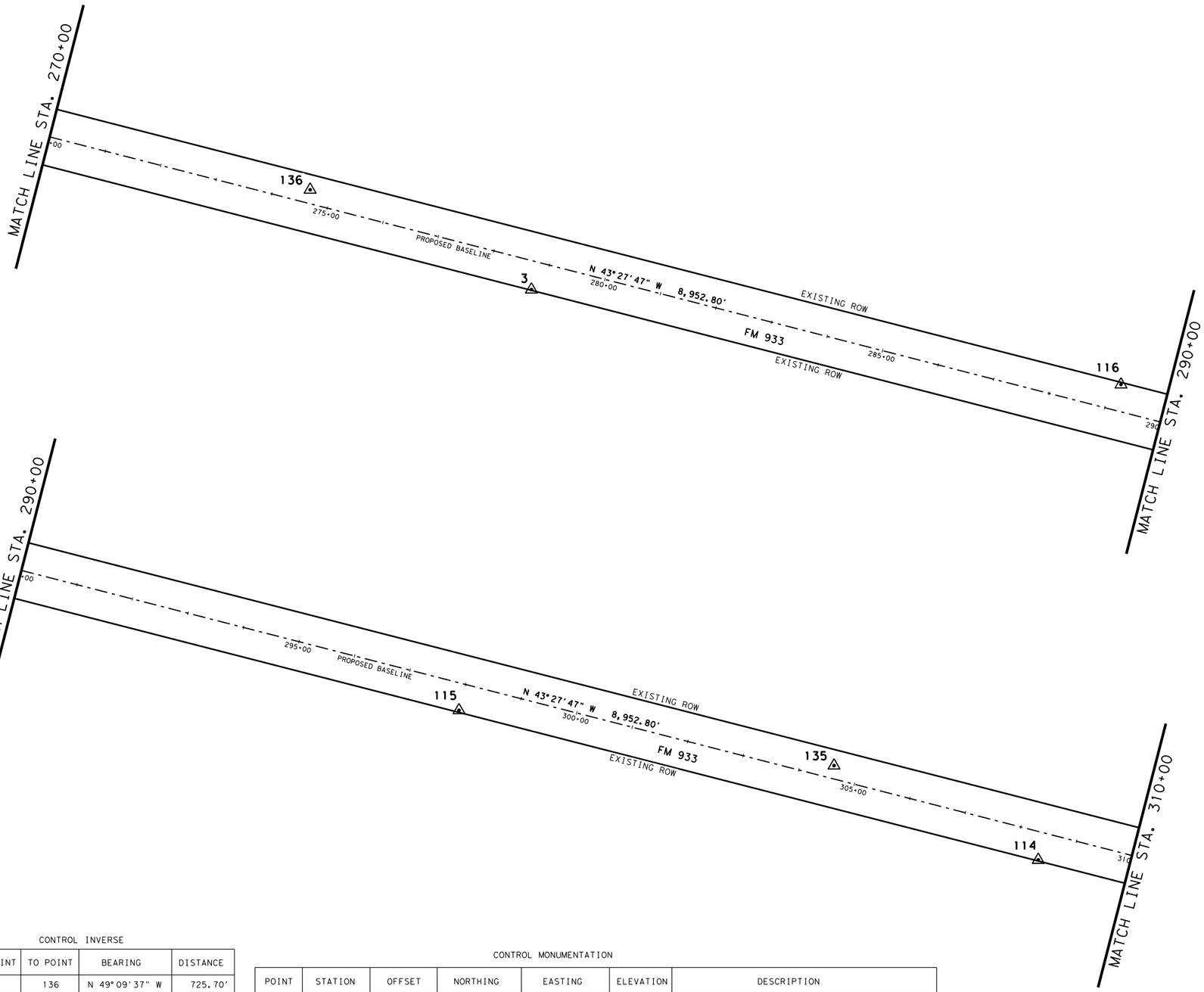
LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

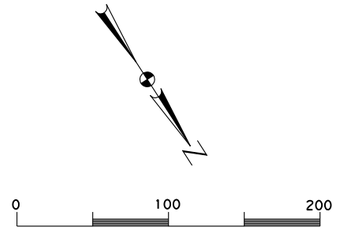
Texas Department of Transportation

FM 933

SURVEY CONTROL INDEX SHEET

FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	





NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
117	136	N 49°09'37" W	725.70'
136	3	N 33°34'31" W	423.52'
3	116	N 48°42'36" W	1,041.64'
116	115	N 37°28'00" W	887.43'
115	135	N 49°28'14" W	661.24'
135	114	N 33°03'51" W	392.36'
114	134	N 50°08'16" W	607.17'

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
136	274+62.95	23.67' LT	6,651,690.58	2,351,535.91	606.40	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
3	278+80.19	49.06' RT	6,652,043.45	2,351,301.69	612.22	FND. TxDOT ALUM. CAP IN CONC. STAMPED "CP-3"
116	289+17.46	46.20' LT	6,652,730.79	2,350,519.02	593.04	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
115	298+00.04	46.50' RT	6,653,435.15	2,349,979.20	591.46	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
135	304+57.64	22.70' LT	6,653,864.85	2,349,476.61	581.90	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
114	308+43.56	48.12' RT	6,654,193.67	2,349,262.54	583.09	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
EDWARD J. SOUKUP, II
5455
PROFESSIONAL
LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

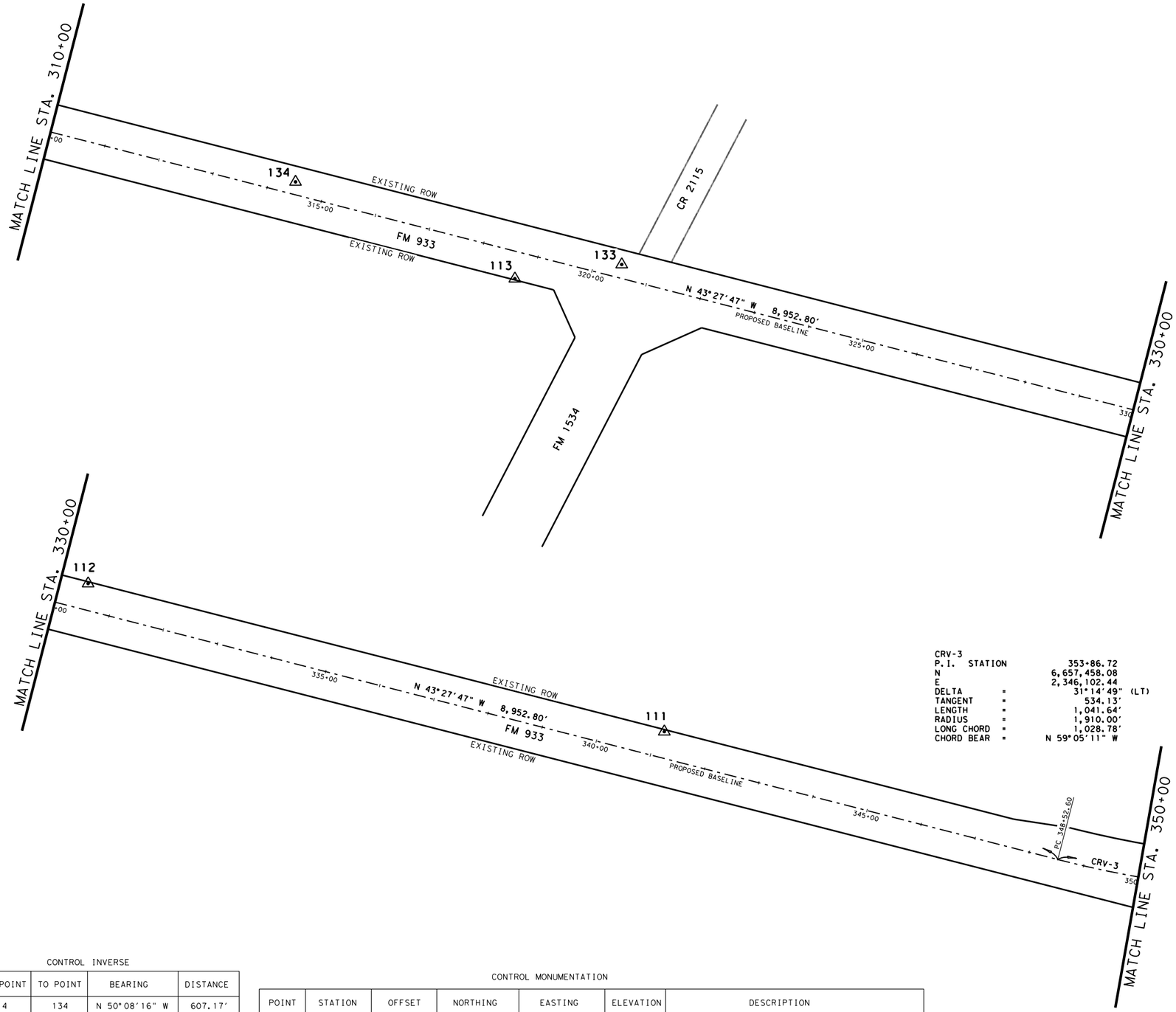
Texas Department of Transportation

FM 933

SURVEY CONTROL INDEX SHEET

FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	

PEN TABLE: $PENTBL$
PLOT DRIVER: $PLTDRVL$
4/30/2020 8:26:14 AM
MODEL: $MODELNAME$
FILE: S:\2019\1920178\CADD SCM\FM933_SURVEY CONTROL INDEX_S04.dgn
...FM933_SURVEY CONTROL INDEX_S04.dgn



CRV-3

P.I. STATION		353+86.72
N		6,657,458.08
E		2,346,102.44
DELTA	=	31°14'49" (LT)
TANGENT	=	534.13'
LENGTH	=	1,041.64'
RADIUS	=	1,910.00'
LONG CHORD	=	1,028.78'
CHORD BEAR	=	N 59°05'11" W

CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
114	134	N 50°08'16" W	607.17'
134	113	N 34°02'50" W	428.95'
113	133	N 65°25'03" W	192.89'
133	112	N 44°45'49" W	1,000.67'
112	111	N 43°26'26" W	1,064.51'
111	4	N 44°58'10" W	949.11'

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
134	314+46.62	22.45' LT	6,654,582.84	2,348,796.48	584.20	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
113	318+69.80	47.72' RT	6,654,938.26	2,348,556.32	586.54	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
133	320+48.70	24.39' LT	6,655,018.50	2,348,380.92	591.96	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
112	330+49.11	47.11' LT	6,655,729.00	2,347,676.26	610.74	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
111	341+13.62	46.69' LT	6,656,501.93	2,346,944.30	620.67	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"

0 100 200

SCALE: 1"=100' (22" x 34" SHEET)
SCALE: 1"=200' (11" x 17" SHEET)

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
EDWARD J. SOUKUP, II
5455
PROFESSIONAL
LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

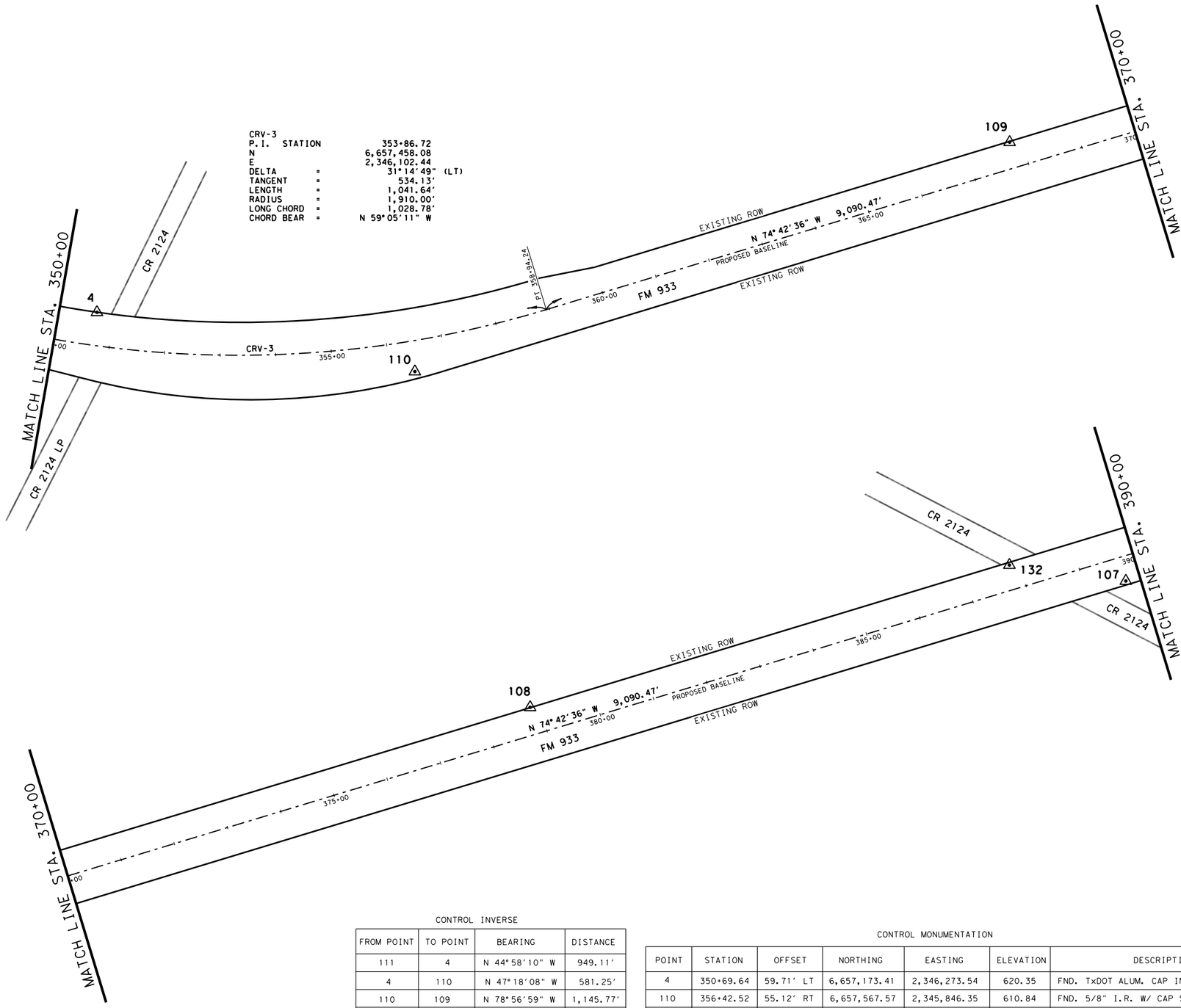
Texas Department of Transportation

FM 933

SURVEY CONTROL INDEX SHEET

FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	

PEN TABLE: $PENTBL$
PLOT DRIVER: $PLTDRVL$
5/1/2020 8:03:06 AM
MODEL: $MODELNAME$
FILE: S:\2019\192018\CADD SCM\FM933_SURVEY CONTROL INDEX_S05.dgn
...\FM933_SURVEY CONTROL INDEX_S05.dgn



SCALE: 1"=100' (22" x 34" SHEET)
SCALE: 1"=200' (11" x 17" SHEET)

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
111	4	N 44°58'10" W	949.11'
4	110	N 47°18'08" W	581.25'
110	109	N 78°56'59" W	1,145.77'
109	108	N 74°50'30" W	1,104.50'
108	132	N 74°23'37" W	898.64'
132	107	N 50°04'37" W	211.26'
107	131	N 76°49'42" W	556.92'

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
4	350+69.64	59.71' LT	6,657,173.41	2,346,273.54	620.35	FND. TxDOT ALUM. CAP IN CONC. STAMPED "CP-4"
110	356+42.52	55.12' RT	6,657,567.57	2,345,846.35	610.84	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
109	367+78.64	46.63' LT	6,657,787.17	2,344,721.83	603.86	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
108	378+83.14	49.17' LT	6,658,075.99	2,343,655.76	597.26	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
132	387+81.76	44.20' LT	6,658,317.75	2,342,790.25	594.96	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
107	389+73.79	43.85' RT	6,658,453.33	2,342,628.23	592.02	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS REGISTERED EDWARD J. SOUKUP, II 5455 PROFESSIONAL LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

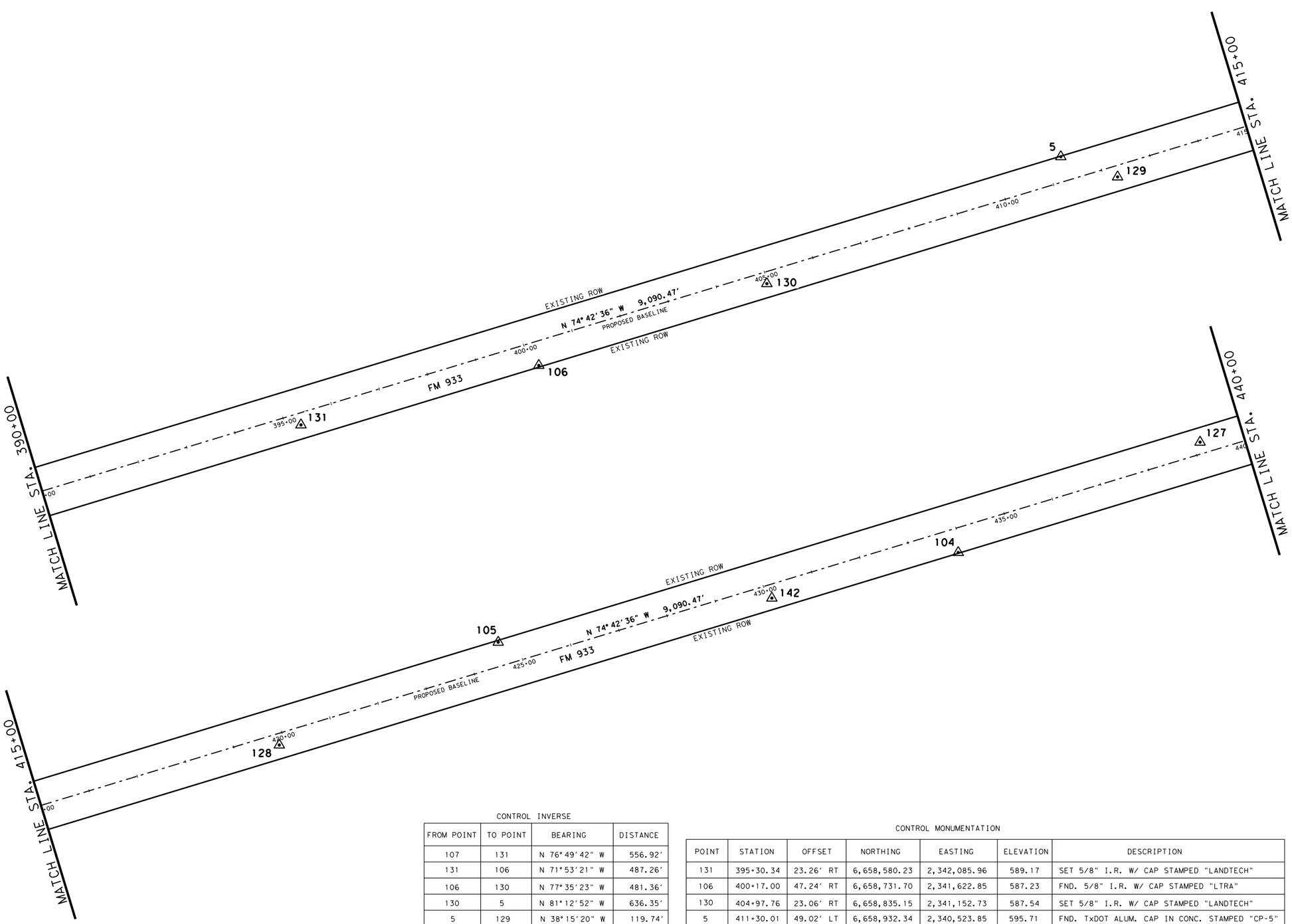
LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

Texas Department of Transportation

FM 933

SURVEY CONTROL INDEX SHEET

FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	



0 100 200

SCALE: 1"=100' (22" x 34" SHEET)
SCALE: 1"=200' (11" x 17" SHEET)

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS REGISTERED EDWARD J. SOUKUP, II 5455 PROFESSIONAL LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
107	131	N 76°49'42" W	556.92'
131	106	N 71°53'21" W	487.26'
106	130	N 77°35'23" W	481.36'
130	5	N 81°12'52" W	636.35'
5	129	N 38°15'20" W	119.74'
129	128	N 74°40'59" W	761.68'
128	105	N 83°00'12" W	480.66'
105	142	N 67°00'55" W	550.77'
142	104	N 71°36'40" W	381.33'
104	127	N 82°23'07" W	528.24'
127	103	N 76°34'39" W	772.85'

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
131	395+30.34	23.26' RT	6,658,580.23	2,342,085.96	589.17	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
106	400+17.00	47.24' RT	6,658,731.70	2,341,622.85	587.23	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
130	404+97.76	23.06' RT	6,658,835.15	2,341,152.73	587.54	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
5	411+30.01	49.02' LT	6,658,932.34	2,340,523.85	595.71	FND. TxDOT ALUM. CAP IN CONC. STAMPED "CP-5"
129	412+26.32	22.12' RT	6,659,026.37	2,340,449.71	597.93	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
128	419+88.00	22.48' RT	6,659,227.58	2,339,715.09	595.14	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
105	424+63.64	46.85' LT	6,659,286.13	2,339,238.00	595.29	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
142	430+09.44	26.90' RT	6,659,501.19	2,338,730.96	600.78	SET COTTON SPINDLE
104	433+90.22	47.51' RT	6,659,621.49	2,338,369.10	594.74	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
127	439+13.73	23.04' LT	6,659,691.49	2,337,845.51	593.02	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"

LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

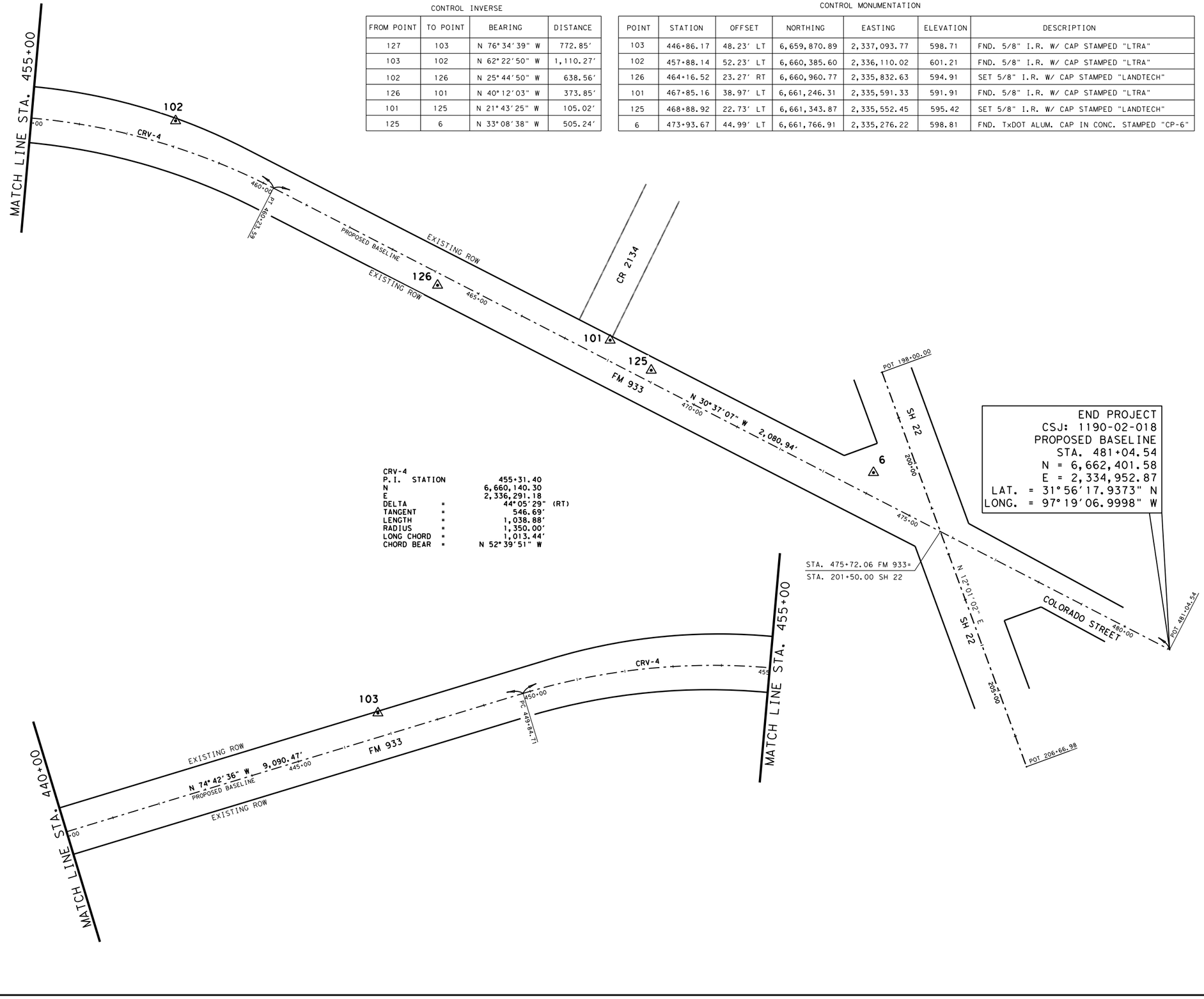
Texas Department of Transportation

FM 933

SURVEY CONTROL INDEX SHEET

FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	

PEN TABLE: $PENTBL$
PLOT DRIVER: $PLTDRVL$
4/30/2020 2:29:52 PM
MODEL: $MODELNAME$
FILE: S:\2019\1920178\CADD SCM\FM933_SURVEY CONTROL INDEX_507.dgn
...\FM933_SURVEY CONTROL INDEX_507.dgn

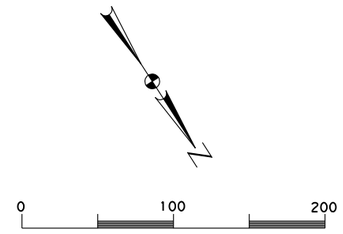


CONTROL INVERSE

FROM POINT	TO POINT	BEARING	DISTANCE
127	103	N 76°34'39" W	772.85'
103	102	N 62°22'50" W	1,110.27'
102	126	N 25°44'50" W	638.56'
126	101	N 40°12'03" W	373.85'
101	125	N 21°43'25" W	105.02'
125	6	N 33°08'38" W	505.24'

CONTROL MONUMENTATION

POINT	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
103	446+86.17	48.23' LT	6,659,870.89	2,337,093.77	598.71	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
102	457+88.14	52.23' LT	6,660,385.60	2,336,110.02	601.21	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
126	464+16.52	23.27' RT	6,660,960.77	2,335,832.63	594.91	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
101	467+85.16	38.97' LT	6,661,246.31	2,335,591.33	591.91	FND. 5/8" I.R. W/ CAP STAMPED "LTRA"
125	468+88.92	22.73' LT	6,661,343.87	2,335,552.45	595.42	SET 5/8" I.R. W/ CAP STAMPED "LANDTECH"
6	473+93.67	44.99' LT	6,661,766.91	2,335,276.22	598.81	FND. TxDOT ALUM. CAP IN CONC. STAMPED "CP-6"



SCALE: 1"=100' (22" x 34" SHEET)
SCALE: 1"=200' (11" x 17" SHEET)

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

END PROJECT
CSJ: 1190-02-018
PROPOSED BASELINE
STA. 481+04.54
N = 6,662,401.58
E = 2,334,952.87
LAT. = 31°56'17.9373" N
LONG. = 97°19'06.9998" W

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
EDWARD J. SOUKUP, II
5455
PROFESSIONAL
LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

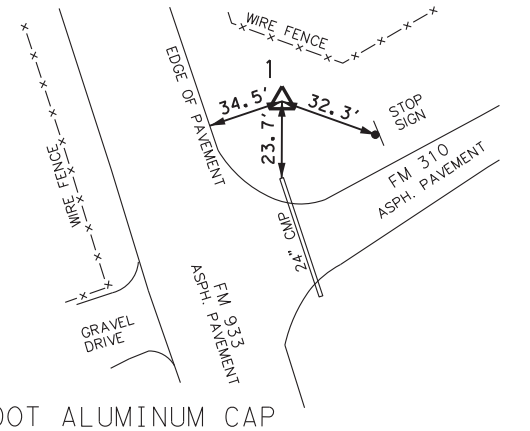
Texas Department of Transportation

FM 933

SURVEY CONTROL INDEX SHEET

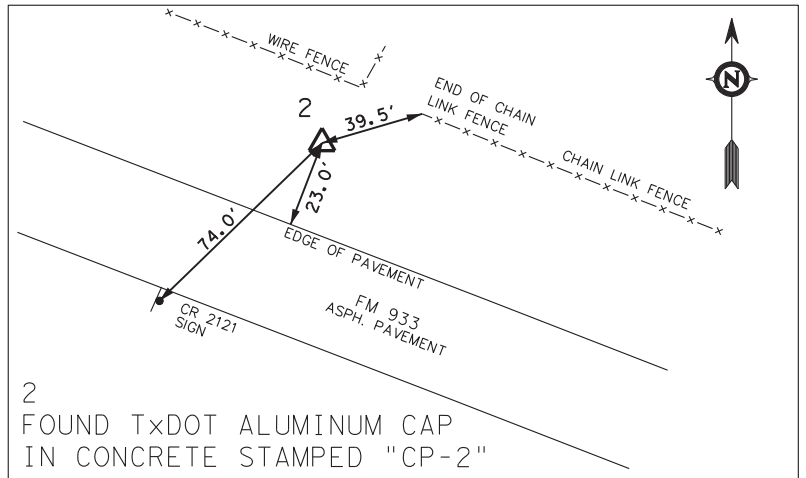
FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	
1190	02	018	

PEN TABLE: $PENTBL$
PLOT DRIVER: $PLTDRVL$
4/30/2020 2:31:13 PM
MODEL: $MODELNAME$
FILE: S:\2019\192018\CADD SCM\FM933_SURVEY CONTROL INDEX_S08.dgn
...\FM933_SURVEY CONTROL INDEX_S08.dgn



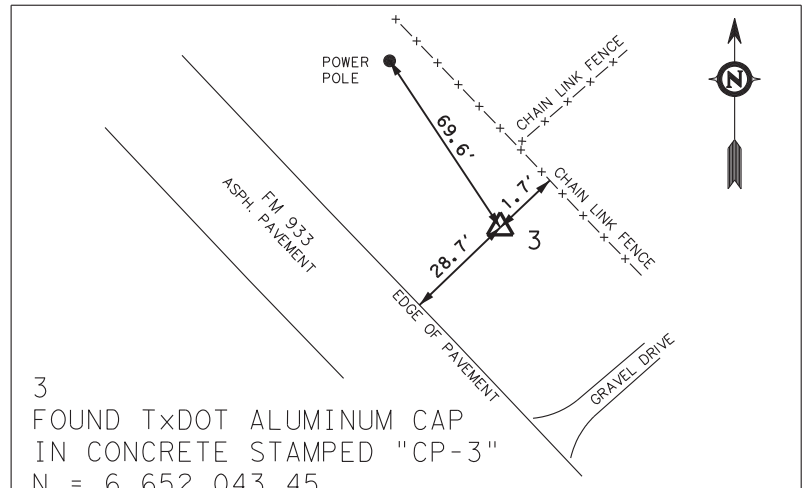
1
FOUND TxDOT ALUMINUM CAP
IN CONCRETE STAMPED "CP-1"
N = 6,645,382.34
E = 2,360,656.66
ELEV = 546.33 N.T.S.

1: LOCATED AT THE NORTHEAST CORNER OF THE INTERSECTION OF FM 933 AND FM 310



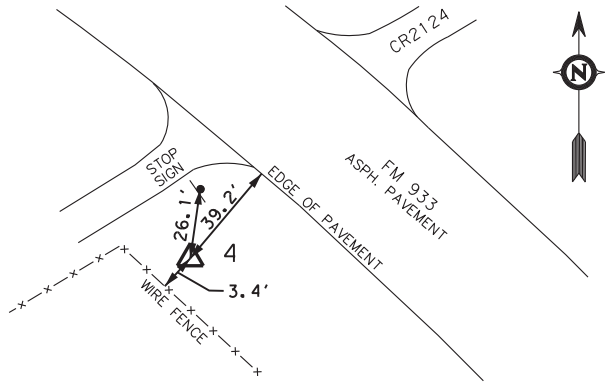
2
FOUND TxDOT ALUMINUM CAP
IN CONCRETE STAMPED "CP-2"
N = 6,648,988.52
E = 2,356,050.00
ELEV = 568.03 N.T.S.

2: FROM THE INTERSECTION OF FM 933 AND FM 310, TRAVEL NORTHWESTERLY ON FM 933 FOR 1.2 MILES, MONUMENT IS LOCATED ON THE NORTHEAST SIDE OF FM 933.



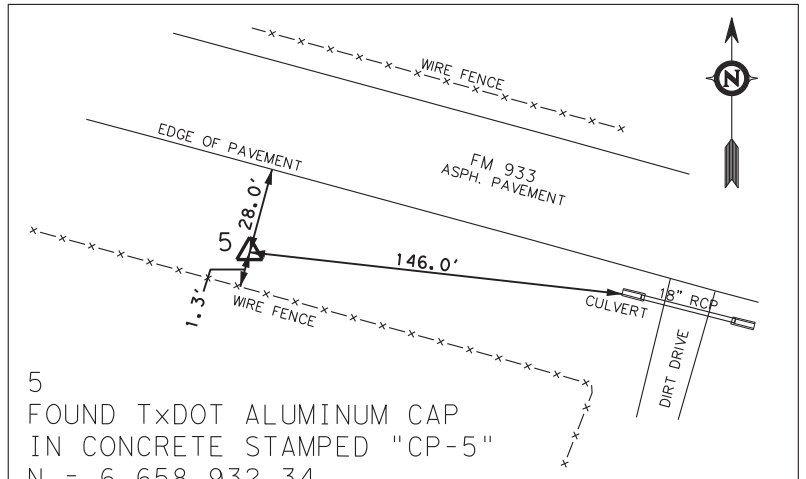
3
FOUND TxDOT ALUMINUM CAP
IN CONCRETE STAMPED "CP-3"
N = 6,652,043.45
E = 2,351,301.69
ELEV = 612.22 N.T.S.

3: FROM THE INTERSECTION OF FM 933 AND FM 310, TRAVEL NORTHWESTERLY ON FM 933 FOR 2.3 MILES, MONUMENT IS LOCATED ON THE NORTHEAST SIDE OF FM 933.



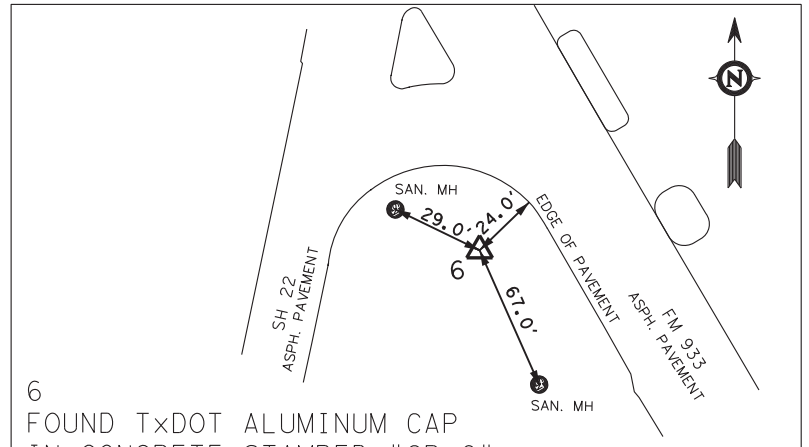
4
FOUND TxDOT ALUMINUM CAP
IN CONCRETE STAMPED "CP-4"
N = 6,657,173.41
E = 2,346,273.54
ELEV = 620.35 N.T.S.

4: FROM THE INTERSECTION OF FM 933 AND SH 22, TRAVEL SOUTHEASTERLY ON FM 933 FOR 2.4 MILES, MONUMENT IS LOCATED ON THE SOUTHWEST SIDE OF FM 933.



5
FOUND TxDOT ALUMINUM CAP
IN CONCRETE STAMPED "CP-5"
N = 6,658,932.34
E = 2,340,523.85
ELEV = 595.71 N.T.S.

5: FROM THE INTERSECTION OF FM 933 AND SH 22, TRAVEL SOUTHEASTERLY ON FM 933 FOR 1.2 MILES, MONUMENT IS LOCATED ON THE SOUTHWEST SIDE OF FM 933.



6
FOUND TxDOT ALUMINUM CAP
IN CONCRETE STAMPED "CP-6"
N = 6,661,766.91
E = 2,335,276.22
ELEV = 598.81 N.T.S.

6: LOCATED AT THE SOUTH CORNER OF THE INTERSECTION OF FM 933 AND SH 22.

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE IN SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.999976. UNIT OF MEASURE: U.S. SURVEY FEET.

2. TXDOT VRS STATION HILLSBORO WAS HELD FOR HORIZONTAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. HORIZONTAL SURVEY METHOD: GPS OBS (RTN).

3. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12A.

4. TXDOT VRS STATION HILLSBORO WAS HELD FOR VERTICAL CONTROL AS PUBLISHED BY LINA T. RAMEY & ASSOCIATES, INC. IN APRIL, 2019 AND VERIFIED BY LANDTECH, INC. IN DECEMBER, 2019. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
EDWARD J. SOUKUP, II
5455
PROFESSIONAL
LAND SURVEYOR

Edward J Soukup II

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION. THIS SURVEY ALSO REPRESENTS AN UPDATE TO SURVEY CONTROL PREVIOUSLY ESTABLISHED BY LINA T. RAMEY & ASSOCIATES, INC.

4/30/2020

LANDTECH
2525 North Loop West, Suite 300
Houston, Texas 77008
Tel: 713-861-7068 Fax: 713-861-4131
TBPLS FIRM No. 10019100

Texas Department of Transportation

FM 933

HORIZONTAL & VERTICAL CONTROL SHEET

PAGE 1 OF 1

FED RD DIV NO	PROJECT NO		HIGHWAY NO
6			FM 933
STATE	DIST	COUNTY	SHEET NO
TEXAS	WACO	HILL	
CONT	SECT	JOB	44
1190	02	018	

...\FM933_HORIZONTAL & VERTICAL CONTROL-1.dgn

S:\2019\1920178\CADD SCM\FM933*HORIZONTAL & VERTICAL CONTROL-1.dgn

FM 933 CENTERLINE

Beginning chain FM933 description

Point FM93301 N 6,644,486.63 E 2,360,892.00 Sta 150+00.00

Course from FM93301 to PC FM9331 N 18° 11′ 40.32" W Dist 1,744.42

		Curve Data				
Curve FM9331						
P.I. Station		180+94.06	N	6,647,425.99	E	2,359,925.90
Delta	=	50° 26′ 53.95"	(LT)			
Degree	=	1° 59′ 59.47"				
Tangent	=	1,349.64				
Length	=	2,522.60				
Radius	=	2,865.00				
External	=	301.98				
Long Chord	=	2,441.90				
Mid. Ord.	=	273.19				
P.C. Station		167+44.42	N	6,646,143.83	E	2,360,347.32
P.T. Station		192+67.02	N	6,647,917.51	E	2,358,668.94
C.C.			N	6,645,249.25	E	2,357,625.56
Back	= N	18° 11′ 40.32" W				
Ahead	= N	68° 38′ 34.27" W				
Chord Bear	= N	43° 25′ 07.30" W				

Course from PT FM9331 to PC FM9332 N 68° 38′ 34.27" W Dist 5,371.93

		Curve Data				
Curve FM9332						
P.I. Station		252+79.72	N	6,650,107.21	E	2,353,069.15
Delta	=	25° 10′ 47.37"	(RT)			
Degree	=	1° 59′ 49.43"				
Tangent	=	640.77				
Length	=	1,260.84				
Radius	=	2,869.00				
External	=	70.68				
Long Chord	=	1,250.72				
Mid. Ord.	=	68.98				
P.C. Station		246+38.95	N	6,649,873.86	E	2,353,665.91
P.T. Station		258+99.79	N	6,650,572.29	E	2,352,628.37
C.C.			N	6,652,545.84	E	2,354,710.74
Back	= N	68° 38′ 34.27" W				
Ahead	= N	43° 27′ 46.90" W				
Chord Bear	= N	56° 03′ 10.58" W				

Course from PT FM9332 to PC FM9333 N 43° 27′ 46.90" W Dist 8,952.80

		Curve Data				
Curve FM9333						
P.I. Station		353+86.72	N	6,657,458.08	E	2,346,102.44
Delta	=	31° 14′ 49.08"	(LT)			
Degree	=	2° 59′ 59.20"				
Tangent	=	534.13				
Length	=	1,041.64				
Radius	=	1,910.00				
External	=	73.28				
Long Chord	=	1,028.78				
Mid. Ord.	=	70.57				
P.C. Station		348+52.60	N	6,657,070.40	E	2,346,469.86
P.T. Station		358+94.24	N	6,657,598.93	E	2,345,587.22
C.C.			N	6,655,756.54	E	2,345,083.54
Back	= N	43° 27′ 46.90" W				
Ahead	= N	74° 42′ 35.98" W				
Chord Bear	= N	59° 05′ 11.44" W				

Course from PT FM9333 to PC FM9334 N 74° 42′ 35.98" W Dist 9,090.47

		Curve Data				
Curve FM9334						
P.I. Station		455+31.40	N	6,660,140.30	E	2,336,291.18
Delta	=	44° 05′ 29.33"	(RT)			
Degree	=	4° 14′ 38.87"				
Tangent	=	546.69				
Length	=	1,038.88				
Radius	=	1,350.00				
External	=	106.49				
Long Chord	=	1,013.44				
Mid. Ord.	=	98.71				
P.C. Station		449+84.71	N	6,659,996.14	E	2,336,818.52
P.T. Station		460+23.59	N	6,660,610.77	E	2,336,012.74
C.C.			N	6,661,298.35	E	2,337,174.52
Back	= N	74° 42′ 35.98" W				
Ahead	= N	30° 37′ 06.65" W				
Chord Bear	= N	52° 39′ 51.32" W				

Course from PT FM9334 to FM93302 N 30° 37′ 06.65" W Dist 2,080.94

Point FM93302 N 6,662,401.58 E 2,334,952.87 Sta 481+04.54

Ending chain FM933 description

SH 22 CENTERLINE

Beginning chain SH22 description

Point SH2201 N 6,661,601.01 E 2,335,151.20 Sta 198+00.00

Course from SH2201 to SH2202 N 12° 01′ 02.04" E Dist 866.98

Point SH2202 N 6,662,448.99 E 2,335,331.72 Sta 206+66.98

Ending chain SH22 description

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			45
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

Beginning profile E_FM933P description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	157+40.00	547.67				
VPI	2	160+55.00	549.10	0.45			
VPC		164+39.10	552.75	0.95	K = 282.4		
VPI	3	165+14.10	553.47		150.00	75.00	75.00
VPT		165+89.10	554.58	1.48			
VPC		167+34.33	556.73	1.48	K = 146.2	SSD = 671.1	
VPI	4	168+86.32	558.99		303.98	151.99	151.99
High Point		169+51.25	558.34				
VPT		170+38.31	558.08	-0.60			
VPC		171+54.16	557.39	-0.60	K = 266.7		
Low Point		173+12.96	556.92				
VPI	5	173+27.71	556.36		347.10	173.55	173.55
VPT		175+01.26	557.59	0.71			
VPC		175+95.87	558.25	0.71	K = 170.6	SSD = 1302.4	
VPI	6	176+70.87	558.78		150.00	75.00	75.00
High Point		177+16.32	558.68				
VPT		177+45.87	558.65	-0.17			
VPC		177+47.07	558.65	-0.17	K = 248.4		
Low Point		177+90.09	558.61				
VPI	7	178+42.07	558.49		190.00	95.00	95.00
VPT		179+37.07	559.05	0.59			
VPC		179+77.08	559.29	0.59	K = 449.7	SSD = 2785.5	
VPI	8	180+67.08	559.82		180.00	90.00	90.00
VPT		181+57.08	559.99	0.19			
VPI	9	182+20.00	560.11	0.19			
VPI	10	183+65.00	560.26	0.11			
VPC		184+07.24	560.48	0.50	K = 255.8	SSD = 1075.4	
High Point		185+35.92	560.80				
VPI	11	185+56.22	561.23		297.96	148.98	148.98
VPT		187+05.20	560.24	-0.66			
VPI	12	187+60.00	559.88	-0.66			
VPI	13	188+50.00	559.68	-0.21			
VPI	14	192+45.00	560.40	0.18			
VPI	15	202+00.00	559.32	-0.11			
VPI	16	210+20.00	559.83	0.06			
VPC		211+80.22	560.24	0.25	K = 197.3		
VPI	17	214+05.22	560.81		450.00	225.00	225.00
VPT		216+30.22	566.51	2.53			
VPC		216+72.04	567.57	2.53	K = 122.4	SSD = 518.5	
VPI	18	218+97.04	573.27		450.00	225.00	225.00
High Point		219+82.22	571.50				
VPT		221+22.04	570.70	-1.14			
VPC		221+27.37	570.64	-1.14	K = 140.5		
VPI	19	222+02.37	569.78		150.00	75.00	75.00
VPT		222+77.37	569.73	-0.07			
VPI	20	223+30.00	569.69	-0.07			
VPC		224+59.28	569.84	0.12	K = 128.8		
VPI	21	226+59.28	570.07		400.00	200.00	200.00
VPT		228+59.28	576.52	3.22			
VPI	22	229+50.00	579.44	3.22			
VPC		235+18.46	593.98	2.56	K = 189.7	SSD = 639.8	
VPI	23	238+68.46	602.94		700.00	350.00	350.00
High Point		240+03.77	600.19				
VPT		242+18.46	598.98	-1.13			
VPC		242+22.64	598.93	-1.13	K = 107.4		
Low Point		243+44.21	598.24				
VPI	24	243+97.64	596.95		350.00	175.00	175.00
VPT		245+72.64	600.67	2.13			
VPC		246+08.44	601.43	2.13	K = 148.2	SSD = 565.5	
High Point		249+23.59	604.78				
VPI	25	249+58.44	608.87		700.00	350.00	350.00
VPT		253+08.44	599.78	-2.60			
VPC		254+83.84	595.23	-2.60	K = 176.8		
VPI	26	257+83.84	587.44		600.00	300.00	300.00
Low Point		259+42.97	589.27				
VPT		260+83.84	589.83	0.80			
VPC		265+57.92	593.61	0.80	K = 629.4		
VPI	27	269+07.92	596.40		700.00	350.00	350.00
VPT		272+57.92	603.08	1.91			
VPC		275+82.17	609.27	1.91	K = 145.1	SSD = 559.7	
High Point		278+59.24	611.91				
VPI	28	279+07.17	615.47		650.00	325.00	325.00
VPT		282+32.17	607.12	-2.57			
VPC		284+09.62	602.56	-2.57	K = 164.2		
VPI	29	286+09.62	597.42		400.00	200.00	200.00
VPT		288+09.62	597.15	-0.13			
VPC		290+94.94	596.77	-0.13	K = 620.3	SSD = 1162.4	
VPI	30	296+19.94	596.07		1,050.00	525.00	525.00
VPT		301+44.94	586.48	-1.83			
VPC		301+86.75	585.72	-1.83	K = 169.6		
VPI	31	303+36.75	582.98		300.00	150.00	150.00
VPT		304+86.75	582.89	-0.06			
VPI	32	307+05.00	582.76	-0.06			
VPC		314+74.91	585.28	0.33	K = 302.4		
VPI	33	317+24.91	586.10		500.00	250.00	250.00
VPT		319+74.91	591.05	1.98			
VPI	34	322+70.00	596.89	1.98			
VPC		325+08.38	600.53	1.53	K = 323.4		
VPI	35	326+58.39	602.83		300.02	150.01	150.01
VPT		328+08.40	606.51	2.46			
VPC		330+07.24	611.40	2.46	K = 186.6	SSD = 821.3	
VPI	36	331+57.24	615.08		300.00	150.00	150.00
VPT		333+07.24	616.36	0.85			
VPI	37	336+10.00	618.93	0.85			
VPC		337+49.74	620.51	1.14	K = 162.5	SSD = 1244.0	
VPI	38	338+24.74	621.37		150.00	75.00	75.00
VPT		338+99.74	621.53	0.21			
VPC		347+68.28	623.38	0.21	K = 175.2	SSD = 645.2	
High Point		348+05.66	623.42				
VPI	39	349+93.28	623.86		450.00	225.00	225.00
VPT		352+18.28	618.56	-2.35			
VPC		352+28.10	618.33	-2.35	K = 378.6		
VPI	40	356+03.10	609.50		750.00	375.00	375.00
VPT		359+78.10	608.10	-0.37			
VPI	41	360+65.00	607.77	-0.37			
VPC		363+20.47	607.69	-0.03	K = 471.6	SSD = 1076.9	
VPI	42	366+70.47	607.57		700.00	350.00	350.00
VPT		370+20.47	602.26	-1.52			
VPC		370+23.95	602.20	-1.52	K = 395.3		
VPI	43	373+73.95	596.89		700.00	350.00	350.00
Low Point		376+24.00	597.65				
VPT		377+23.95	597.78	0.25			
VPC		380+87.29	598.70	0.25	K = 461.0	SSD = 1060.5	
High Point		382+03.85	598.84				
VPI	44	384+37.29	599.58		700.00	350.00	350.00
VPT		387+87.29	595.15	-1.27			
VPC		390+62.01	591.67	-1.27	K = 222.0		
VPI	45	391+87.01	590.09		250.00	125.00	125.00
VPT		393+12.01	589.92	-0.14			
VPC		405+18.64	588.23	-0.14	K = 194.3		
Low Point		405+45.76	588.21				
VPI	46	407+43.64	587.92		450.00	225.00	225.00
VPT		409+68.64	592.82	2.18			
VPC		411+73.83	597.28	2.18	K = 150.8	SSD = 570.8	
VPI	47	414+48.83	603.27		550.00	275.00	275.00
High Point		415+02.01	600.85				
VPT		417+23.83	599.22	-1.47			
VPC		418+43.84	597.45	-1.47	K = 205.5		
VPI	48	421+18.84	593.41		550.00	275.00	275.00
Low Point		421+46.18	595.23				
VPT		423+93.84	596.72	1.20			
VPC		427+52.40	601.04	1.20	K = 133.9	SSD = 561.2	
High Point		429+13.76	602.02				
VPI	49	429+52.40	603.45		400.00	200.00	200.00
VPT		431+52.40	599.89	-1.78			
VPC		433+25.04	596.81	-1.78	K = 225.3		
VPI	50	436+25.04	591.47		600.00	300.00	300.00
Low Point		437+26.51	593.24				
VPT		439+25.04	594.11	0.88			
VPI	51	440+85.00	595.52	0.88			
VPC		443+84.61	599.77	1.42	K = 207.9	SSD = 1022.5	
VPI	52	445+09.61	601.54		250.00	125.00	125.00
VPT		446+34.60	601.81	0.22			
VPI	53	450+58.18	602.73	0.22			
VPC		458+96.89	600.97	-0.21	K = 136.8	SSD = 838.3	
VPI	54	459+96.89	600.76		200.00	100.00	100.00
VPT		460+96.89	599.09	-1.67			
VPC		460+98.59	599.06	-1.67	K = 290.2		
VPI	55	464+18.59	593.71		640.00	320.00	320.00
Low Point		465+83.79	595.00				
VPT		467+38.59	595.41	0.53			
VPC		472+62.80	598.21	0.53	K = 192.8		
VPI	56	473+62.80	598.74		199.99	100.00	100.00
VPT		474+62.80	600.31	1.57			
VPC		474+88.62	600.72	1.57	K = 152.2	SSD = 1243.0	
VPI	57	475+58.62	601.82		140.00	70.00	70.00
VPT		476+28.62	602.28	0.65			
VPI	58	479+43.87	604.33	0.65			

Ending profile E_FM933P description

NOTES:

1. THE EXISTING VERTICAL ALIGNMENT DATA IS FOR INFORMATION PURPOSES ONLY.
2. EXISTING VERTICAL ALIGNMENT DATA DISPLAYED IS FOR A BEST-FIT CENTERLINE PROFILE OF FM 933. THE PROFILE WAS CREATED USING NATURAL GROUND DATA AT THE CENTERLINE PROVIDED BY THE SURVEY.
3. THE BEST-FIT PROFILE IS INTENDED TO VERIFY THAT THE VERTICAL ALIGNMENT MEETS THE 3R DESIGN CITERIA FOR 40 MPH DESIGN SPEED.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED PROFESSIONAL ENGINEER

01/12/2021

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

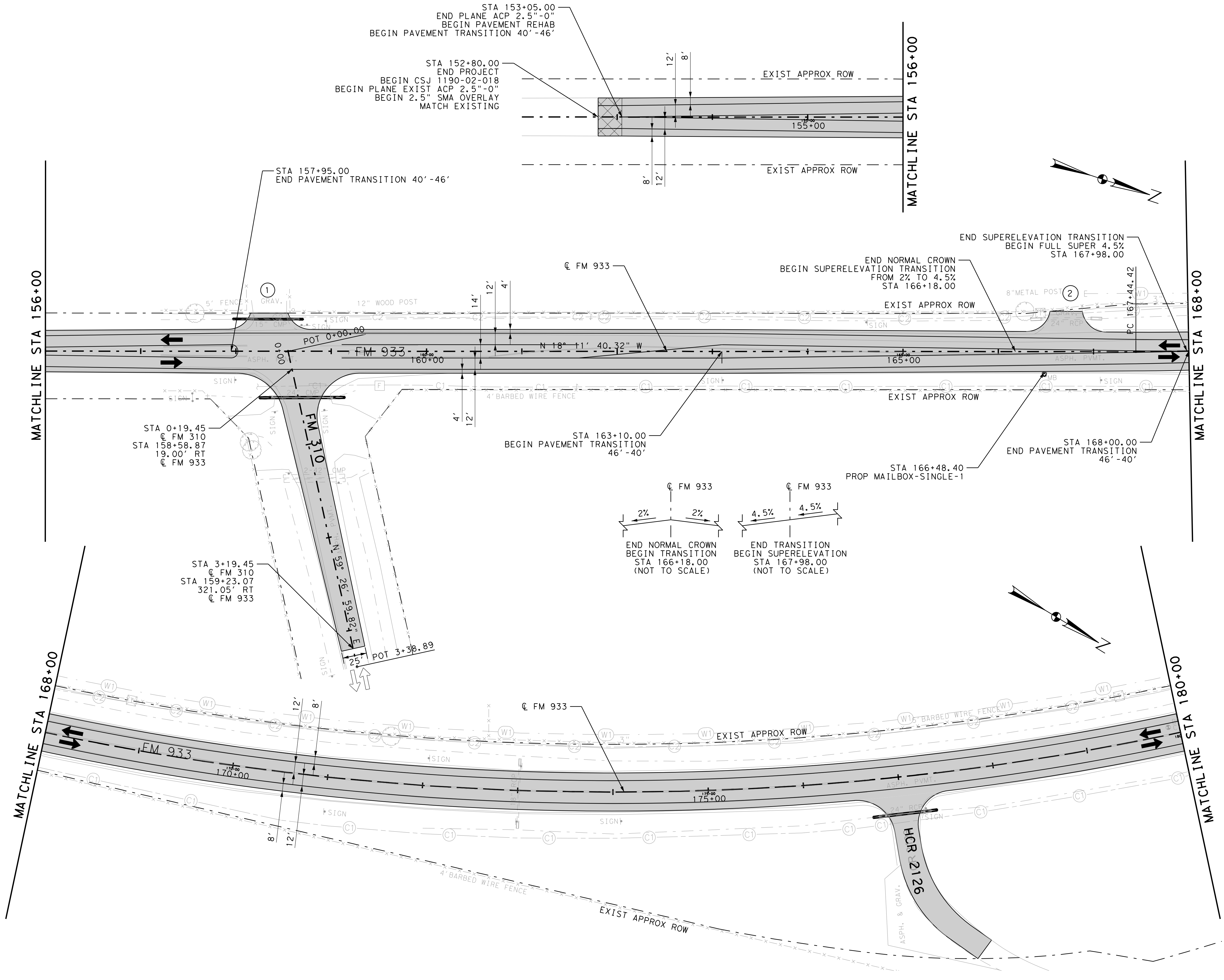
FM 933

EXISTING VERTICAL ALIGNMENT DATA

SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			46
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\Sheets\Roadway\933_YA001.dgn



LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

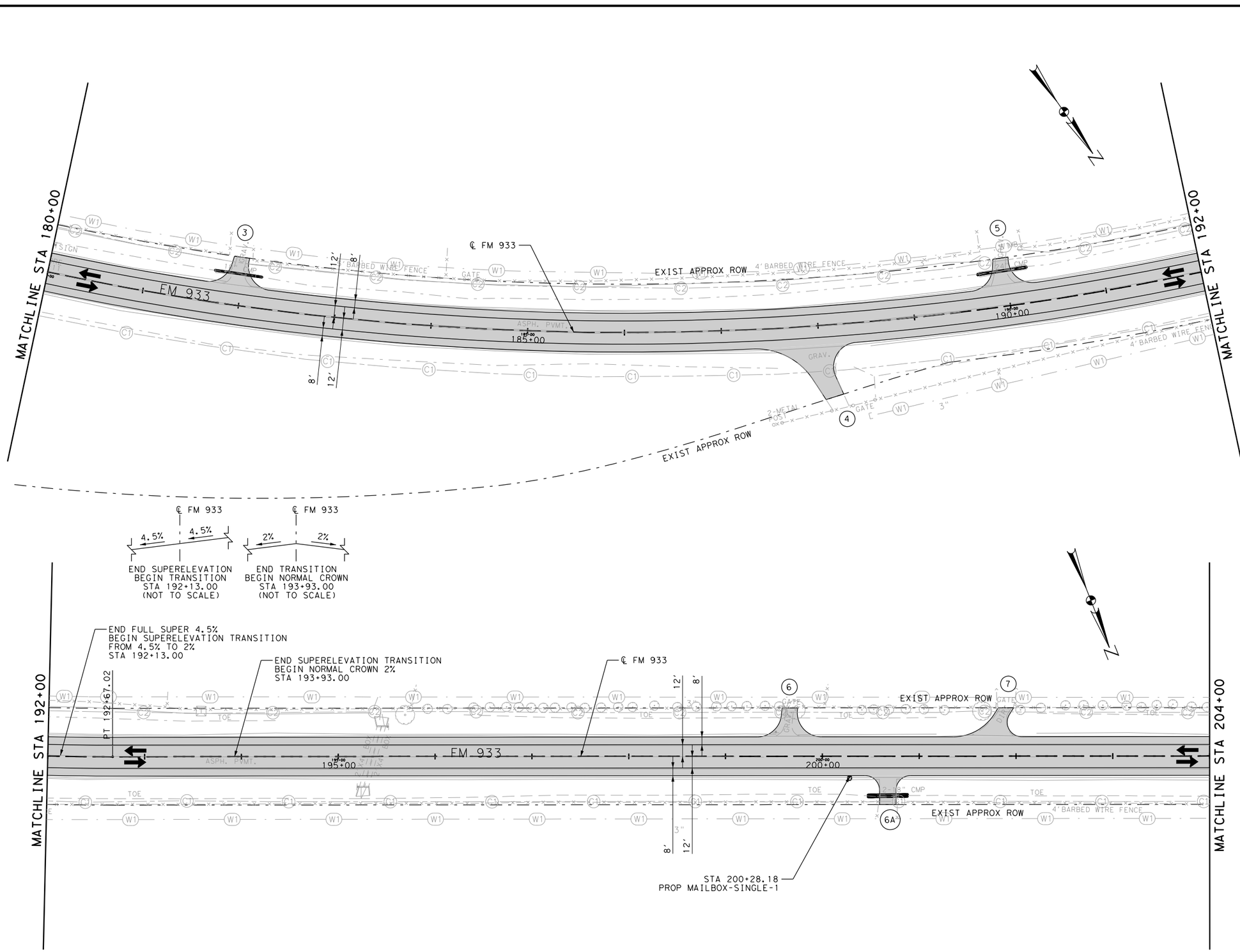
PLAN LAYOUT

BEGIN PROJECT TO STA 180+00

SHEET 1 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			47
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBLL$
PLOT DRIVER: D:\Share\11_Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJalajel 4:33:05 PM 1/12/2021
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL01.dgn



LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

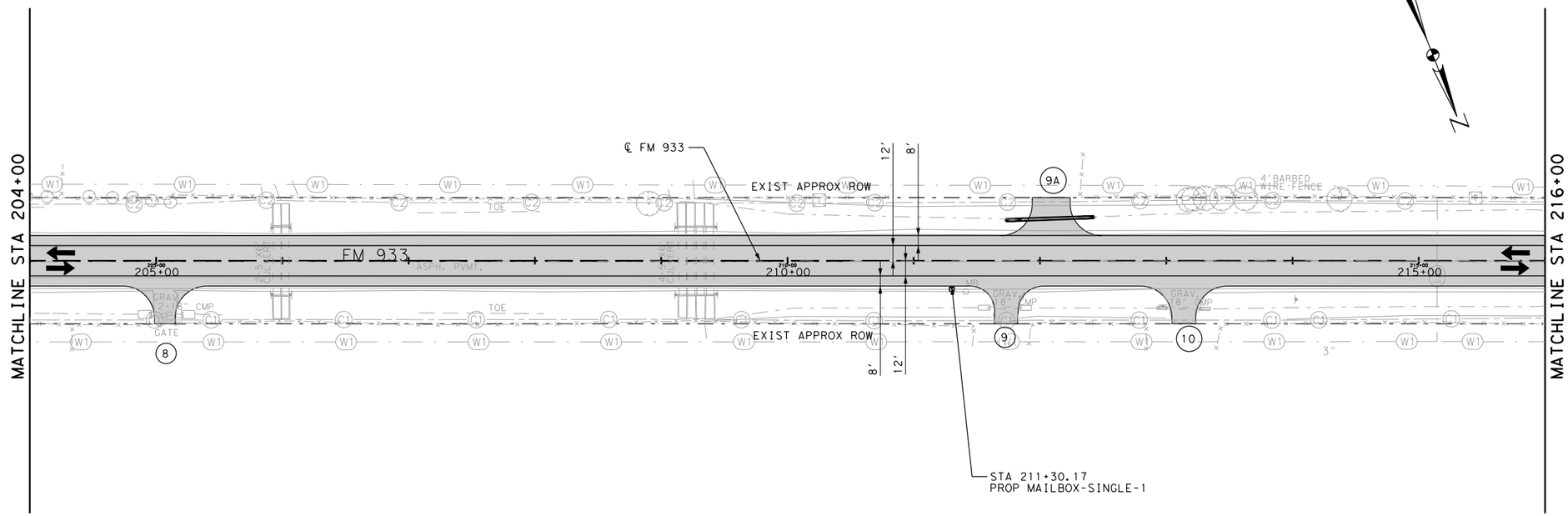
PLAN LAYOUT

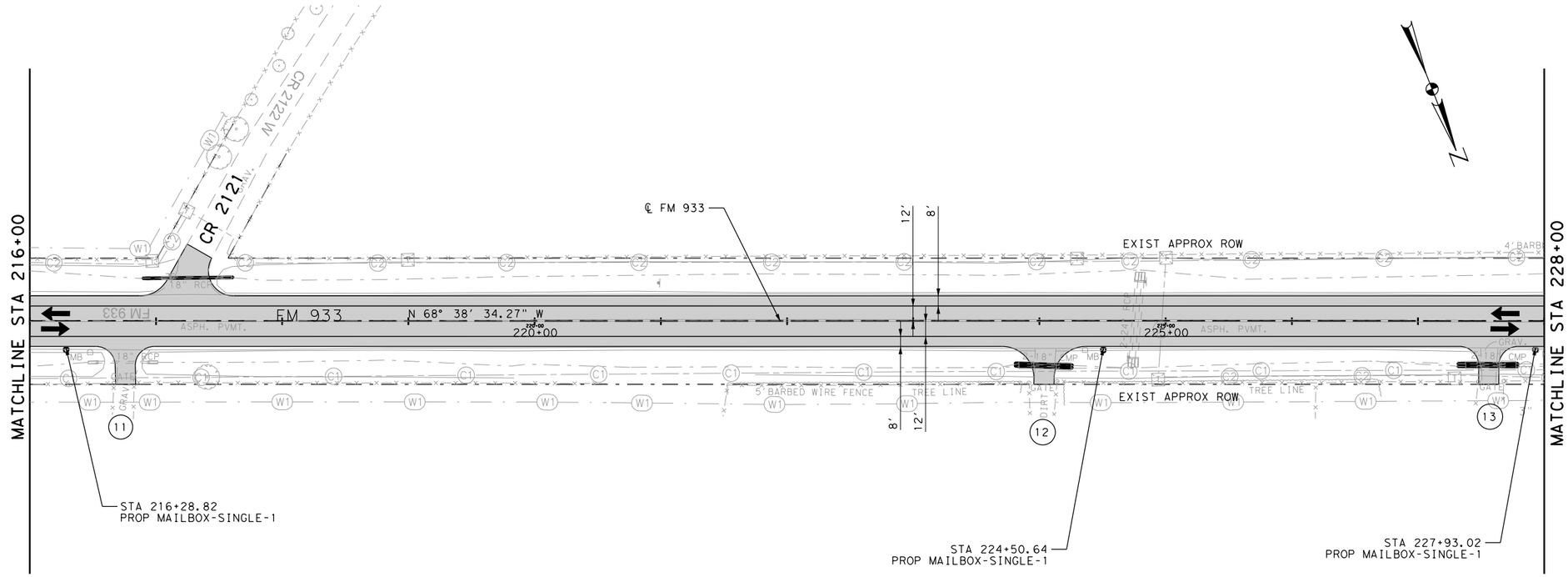
STA 180+00 TO STA 204+00

SHEET 2 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			48
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:33:06 PM Mdalojal
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL02.dgn





LEGEND

- EXIST APPROX ROW
- (#) DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

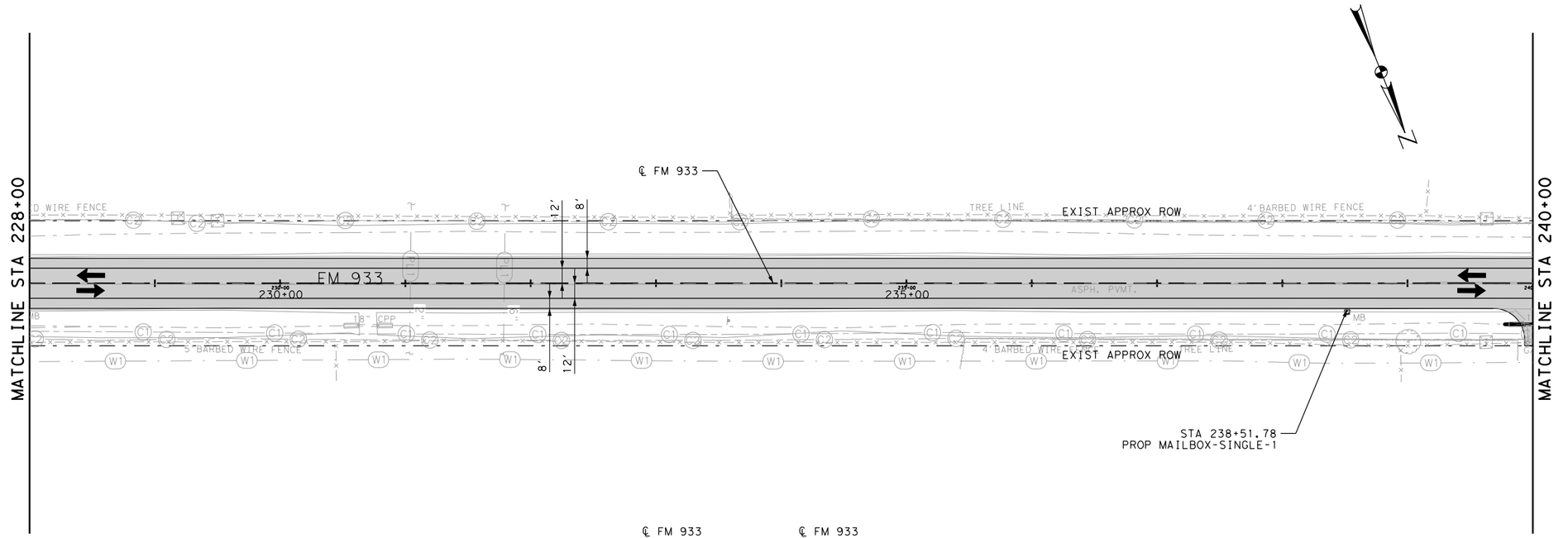
FM 933

PLAN LAYOUT

STA 204+00 TO STA 228+00

FED RD DIV NO	PROJECT NO		SHEET NO
6			49
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\Sheets\Roadway\933_RPL03.dgn

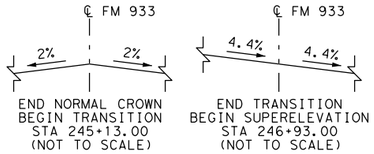


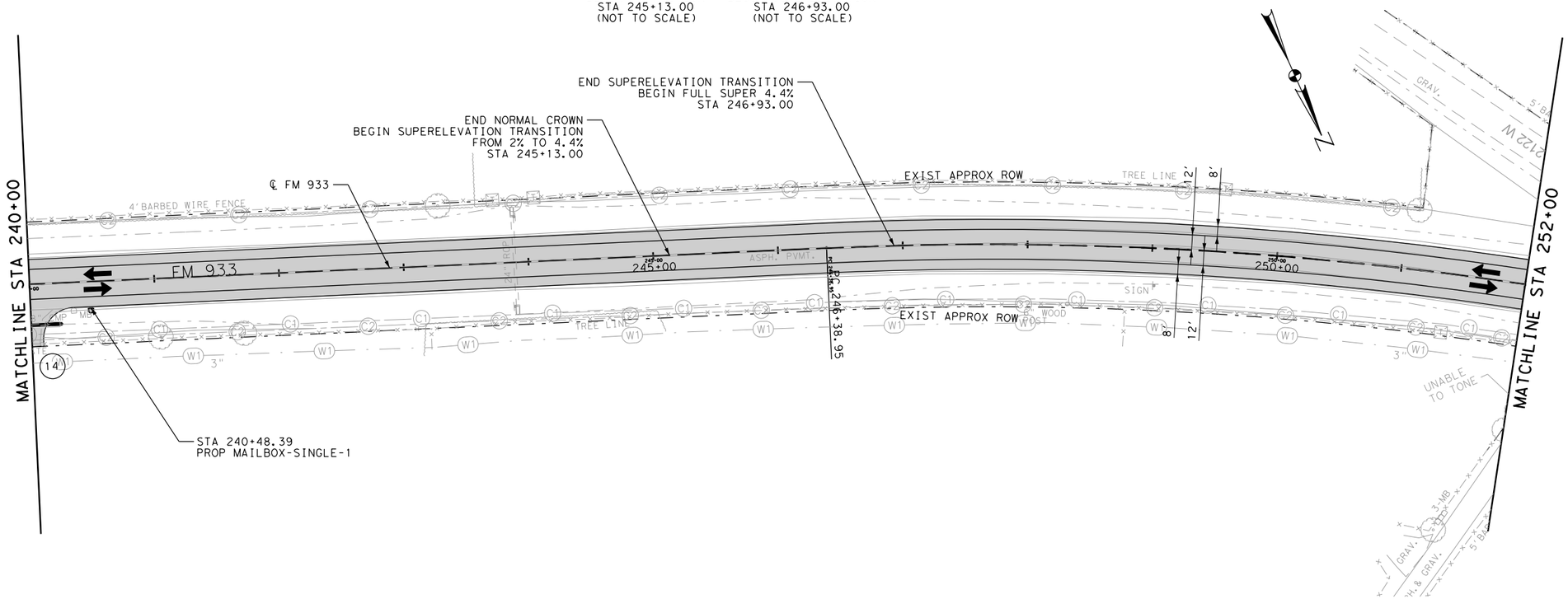
LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.





STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

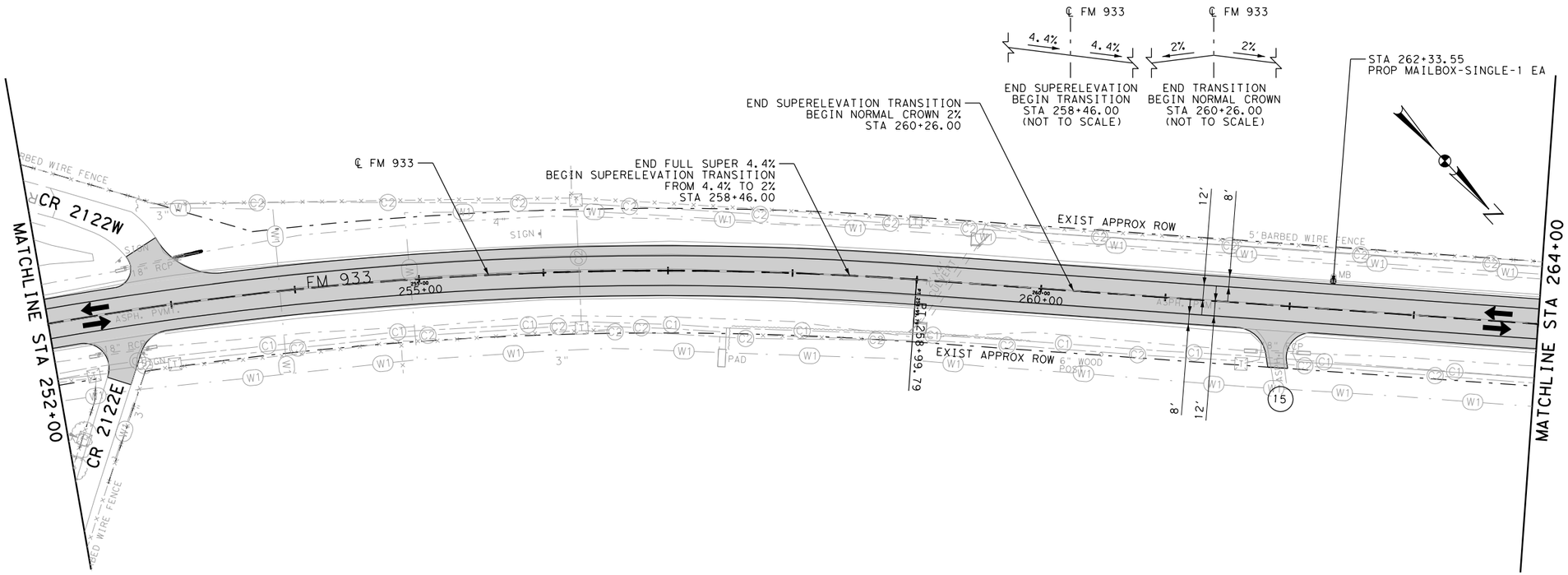
FM 933

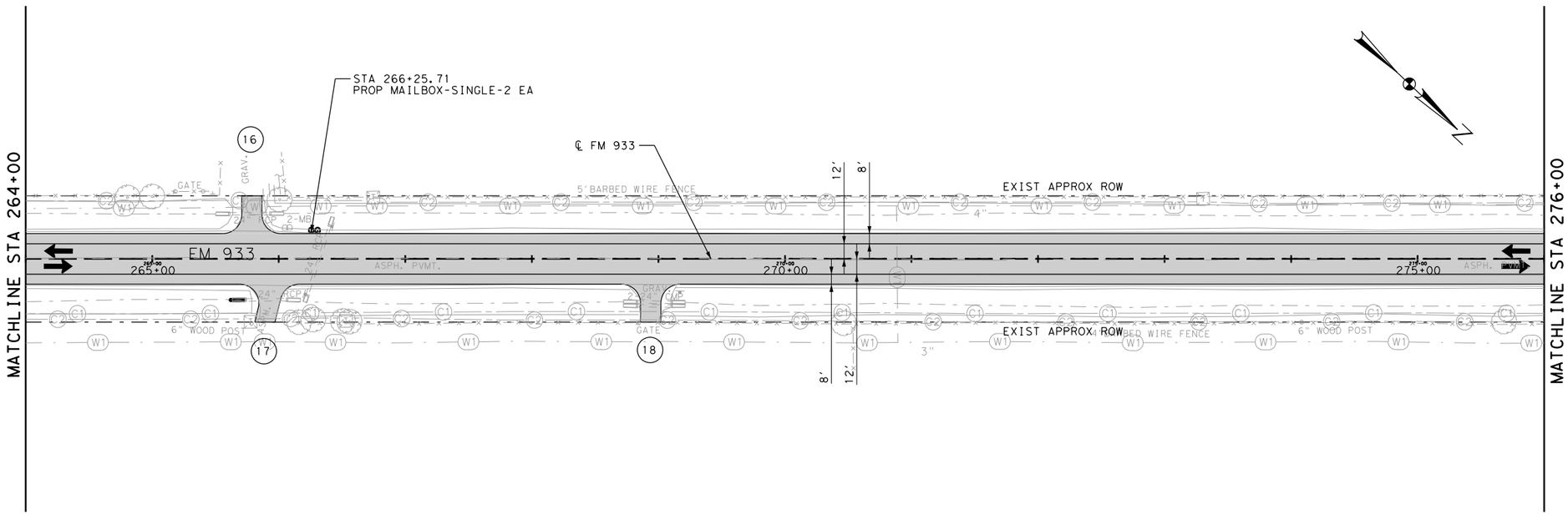
PLAN LAYOUT

STA 228+00 TO STA 252+00

SHEET 4 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			50
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933





LEGEND

- EXIST APPROX ROW
- (#) DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

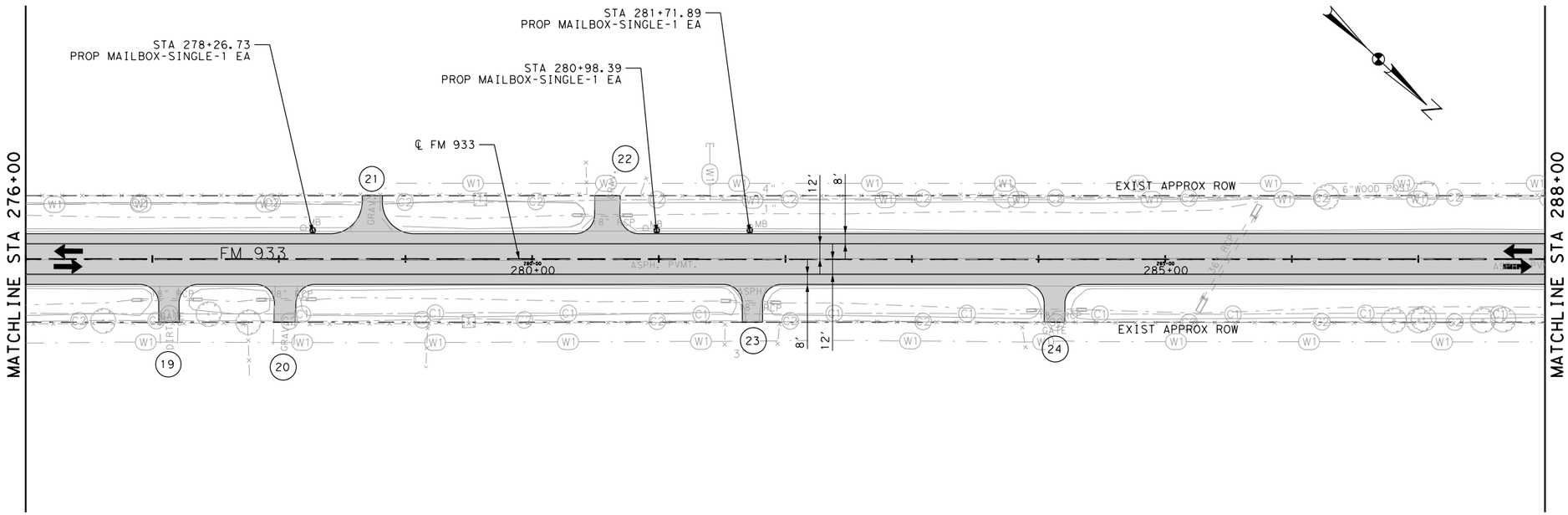
PLAN LAYOUT

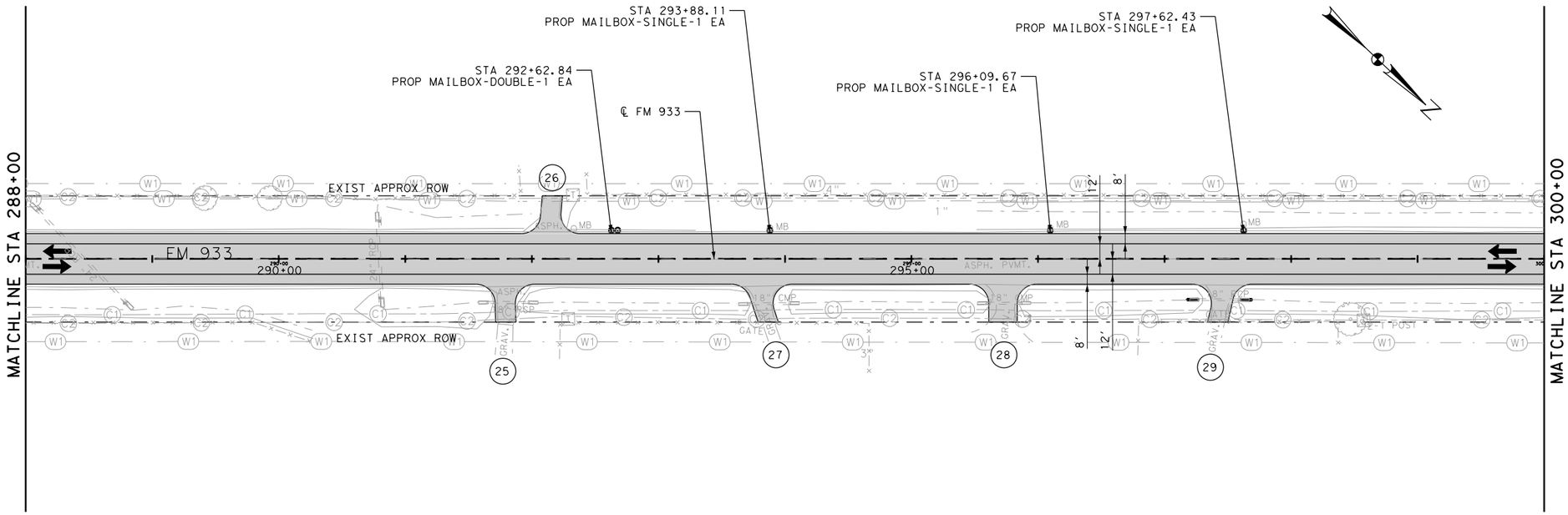
STA 252+00 TO STA 276+00

SHEET 5 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			51
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJolejol 1/12/2021 4:33:11 PM
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL05.dgn





LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

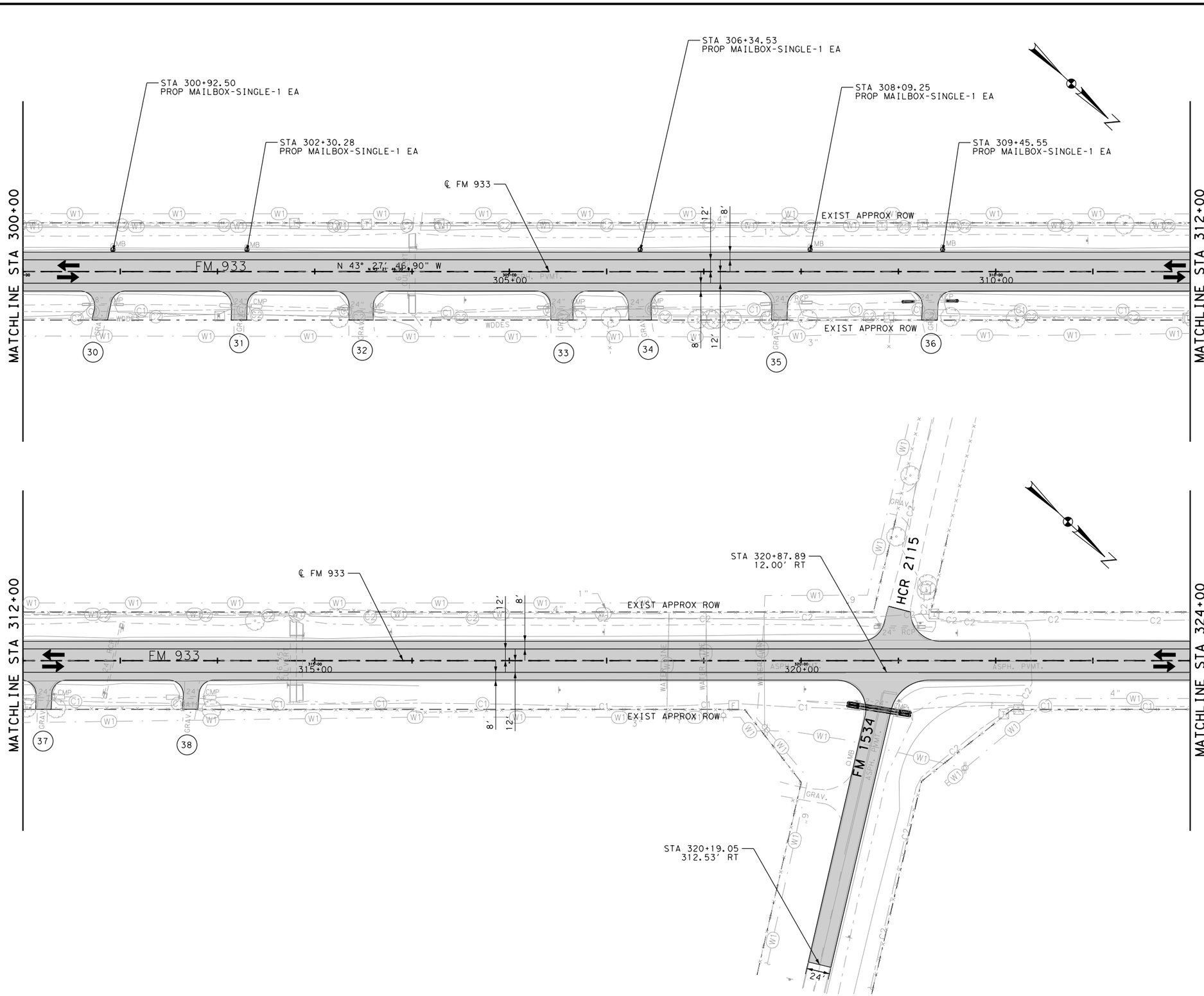
FM 933

PLAN LAYOUT

STA 276+00 TO STA 300+00

FED RD DIV NO	PROJECT NO		SHEET NO
6			52
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJolejol 4:33:12 PM 1/12/2021
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL06.dgn



LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

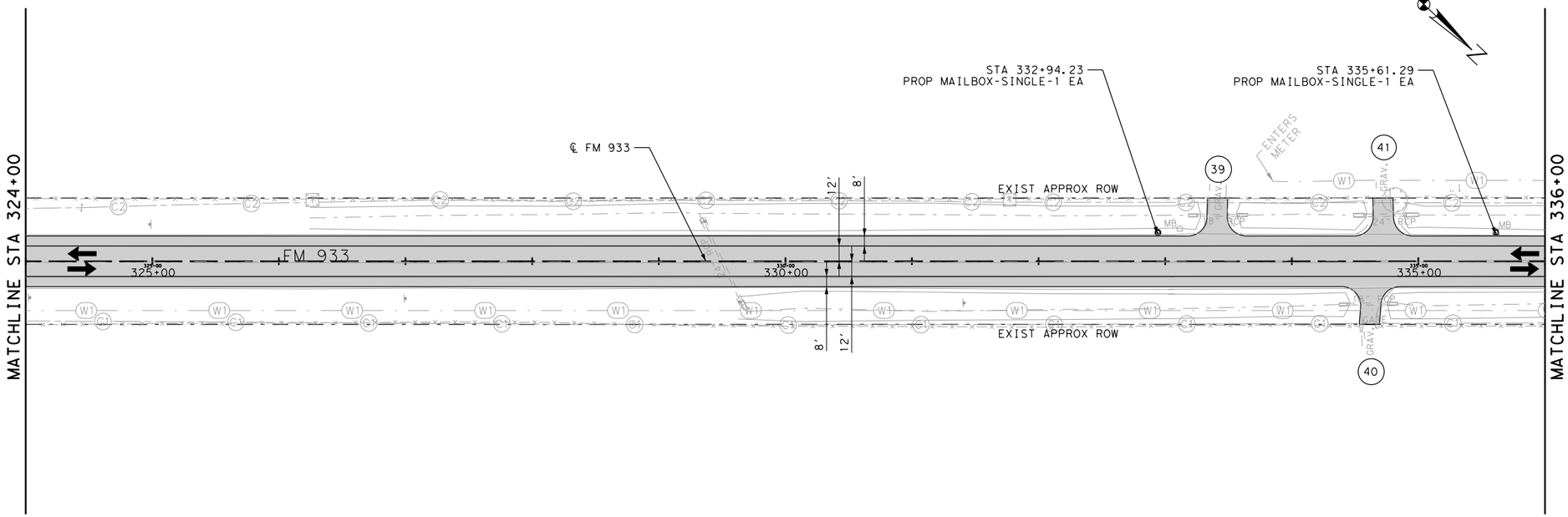
FM 933

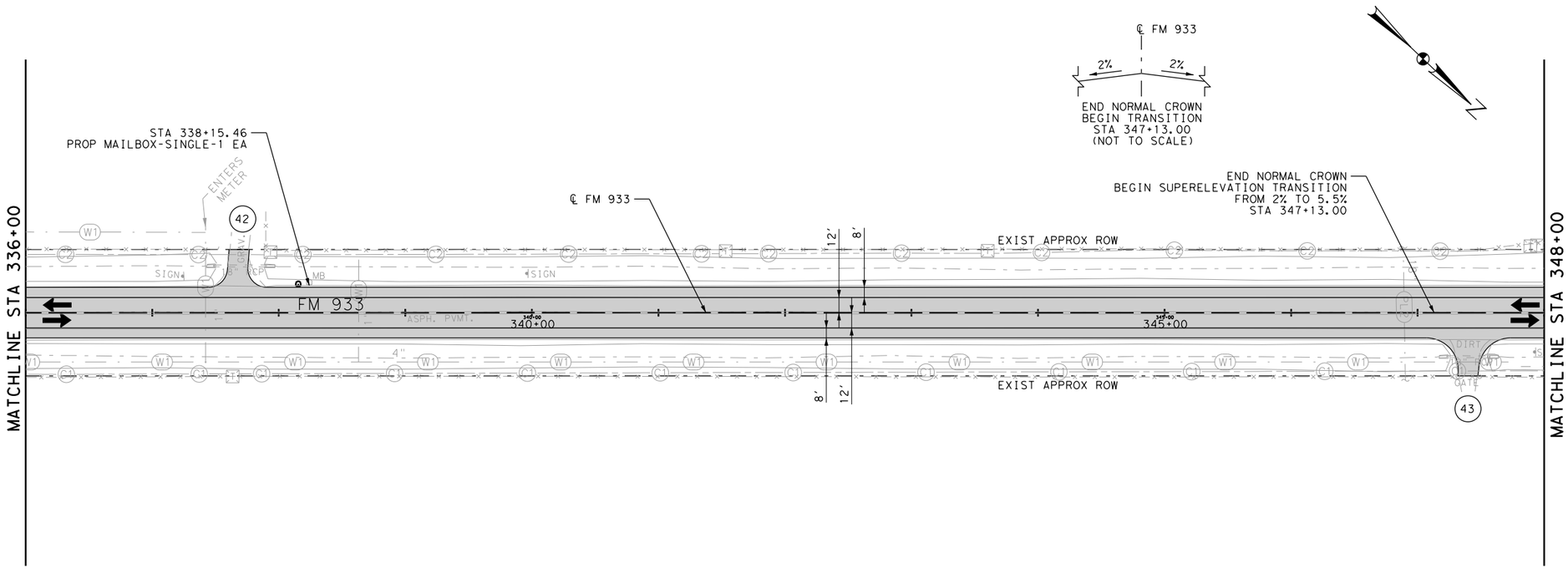
PLAN LAYOUT

STA 300+00 TO STA 324+00

FED RD DIV NO	PROJECT NO		SHEET NO
6			53
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\Sheets\Roadway\933_RPL07.dgn





LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

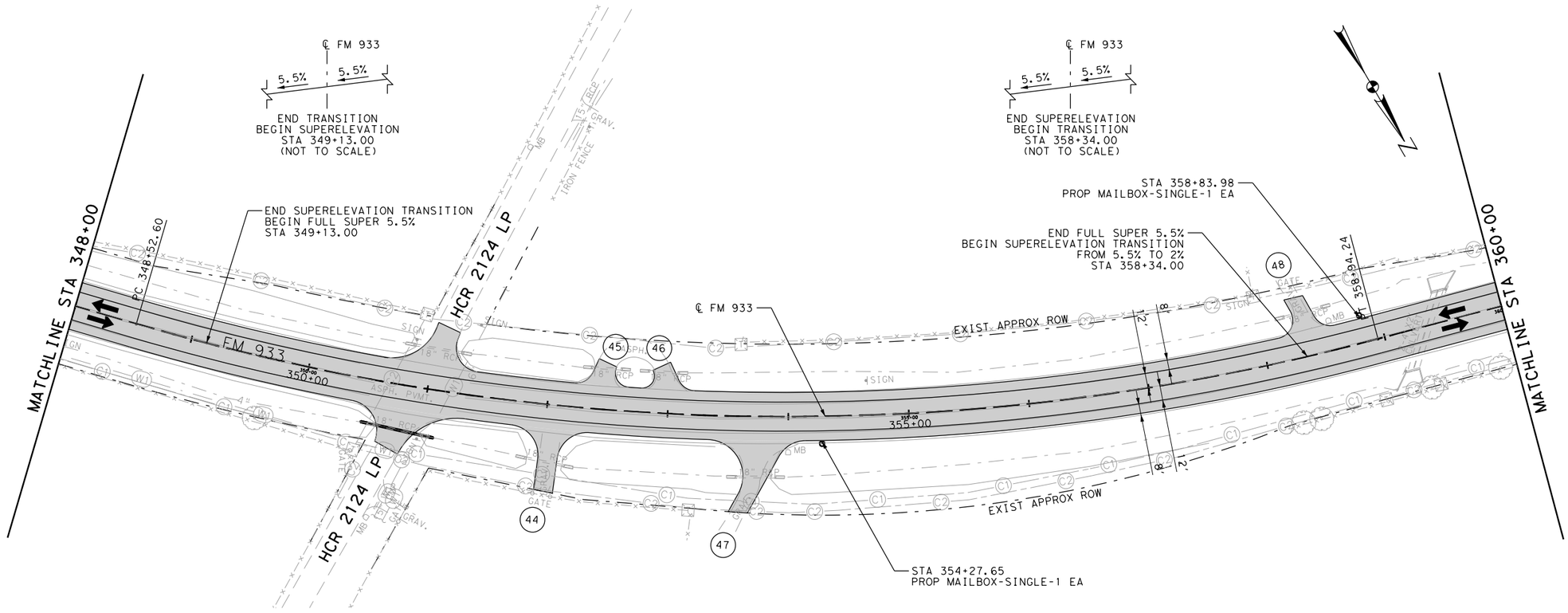
PLAN LAYOUT

STA 324+00 TO STA 348+00

SHEET 8 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			54
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJalajel 4:33:16 PM 1/12/2021
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL08.dgn



LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

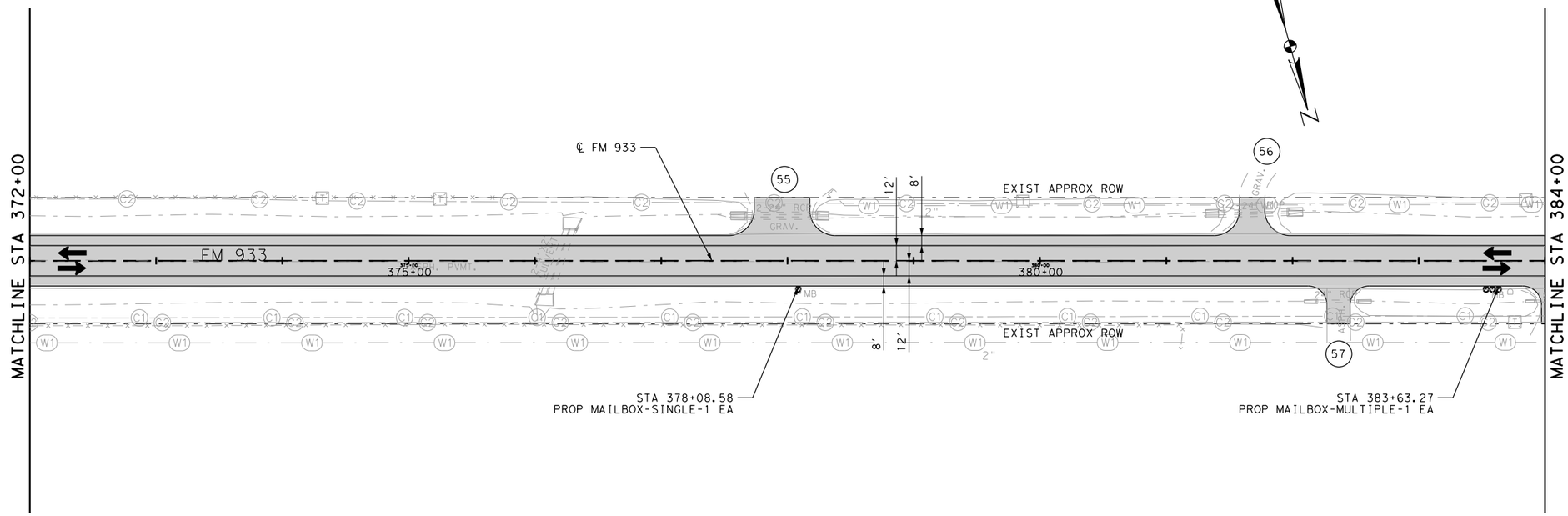
PLAN LAYOUT

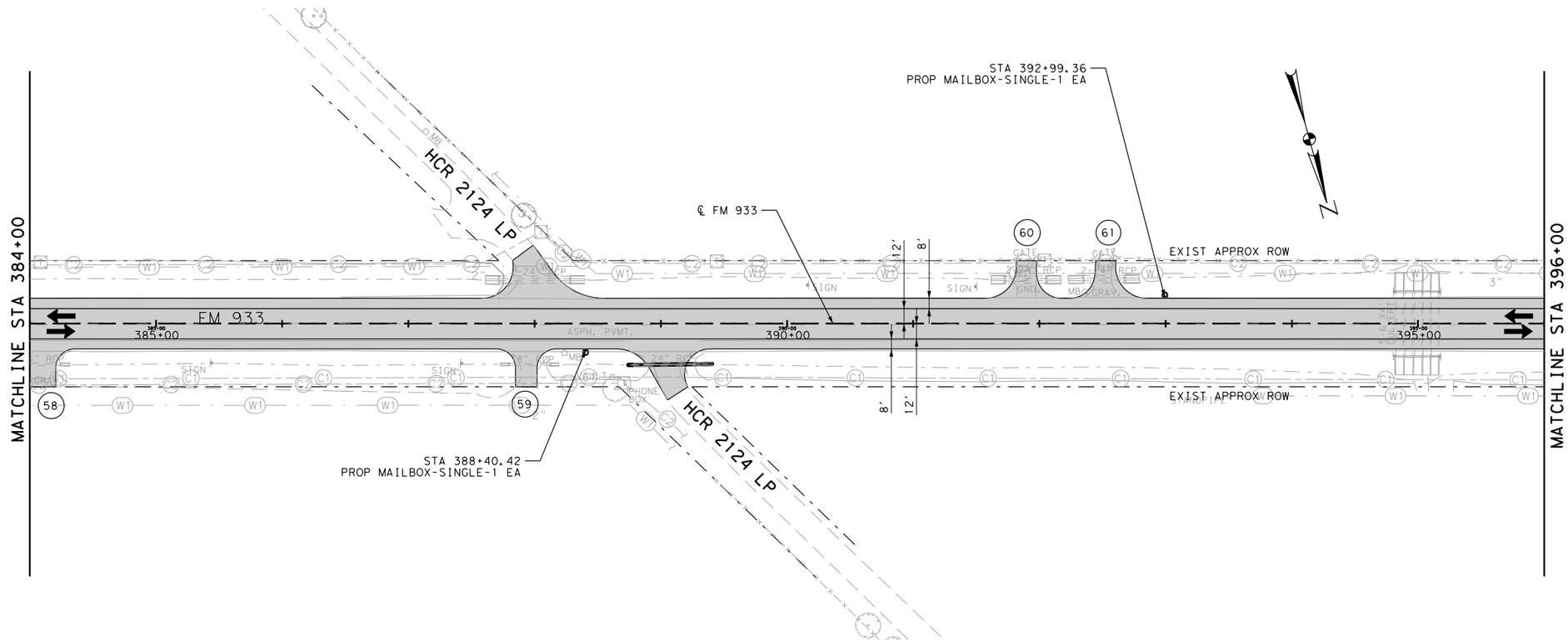
STA 348+00 TO STA 372+00

SHEET 9 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			55
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\Sheets\Roadway\933_RPL09.dgn





LEGEND

- EXIST APPROX ROW
- (#) DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

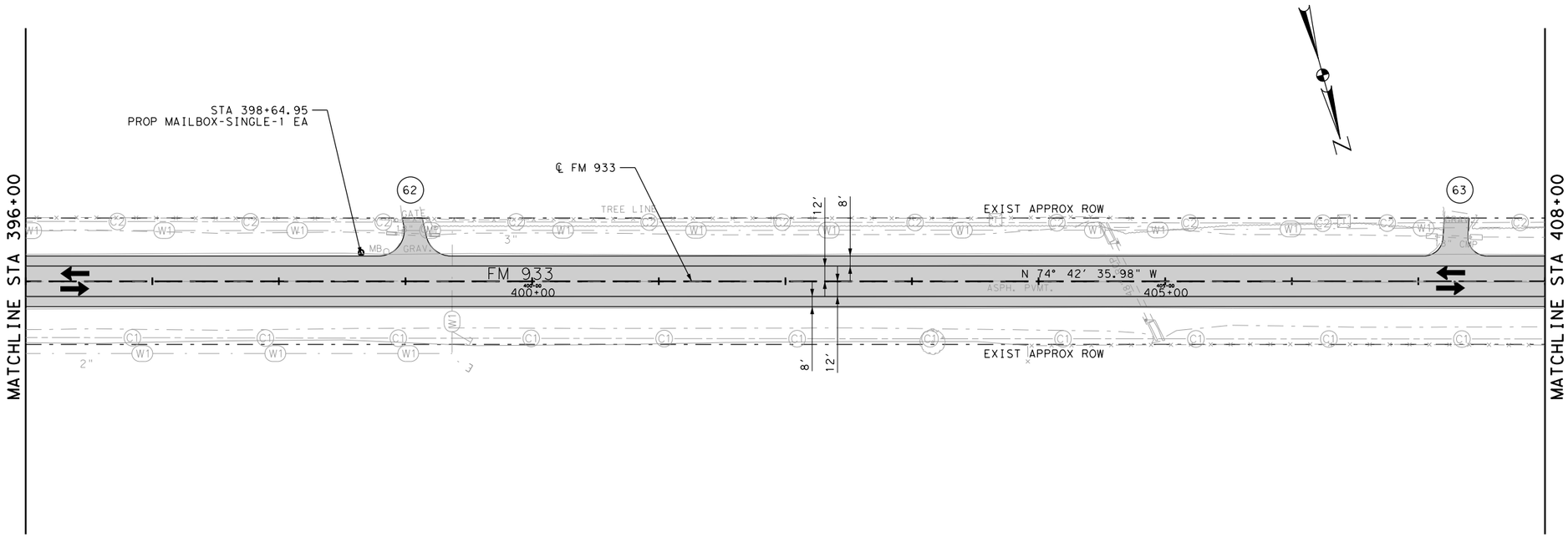
PLAN LAYOUT

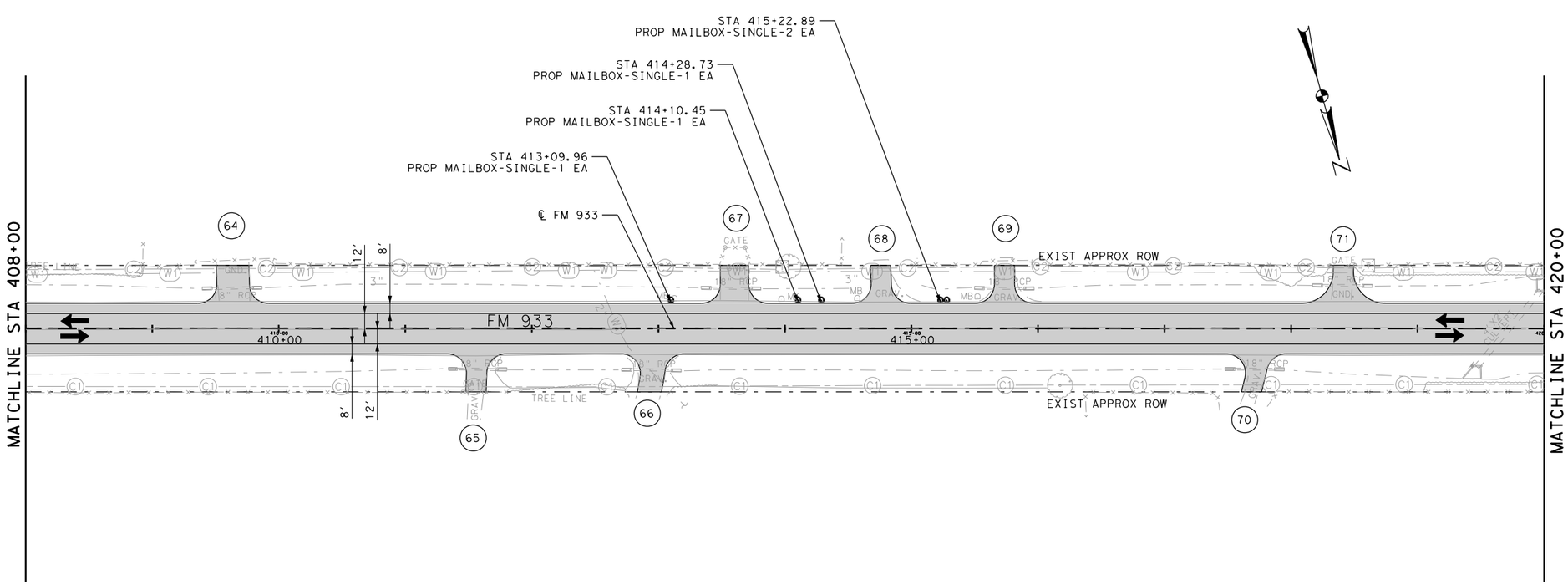
STA 372+00 TO STA 396+00

SHEET 10 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			56
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:33:20 PM MJalajel
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL10.dgn





LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

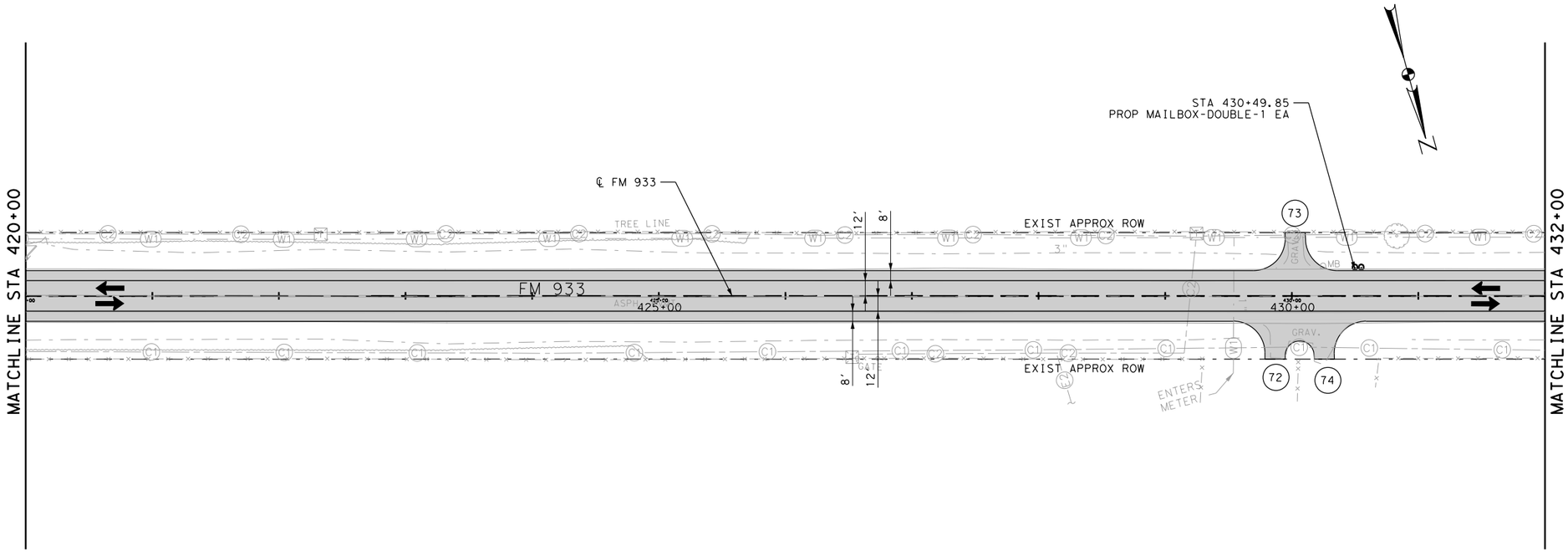
PLAN LAYOUT

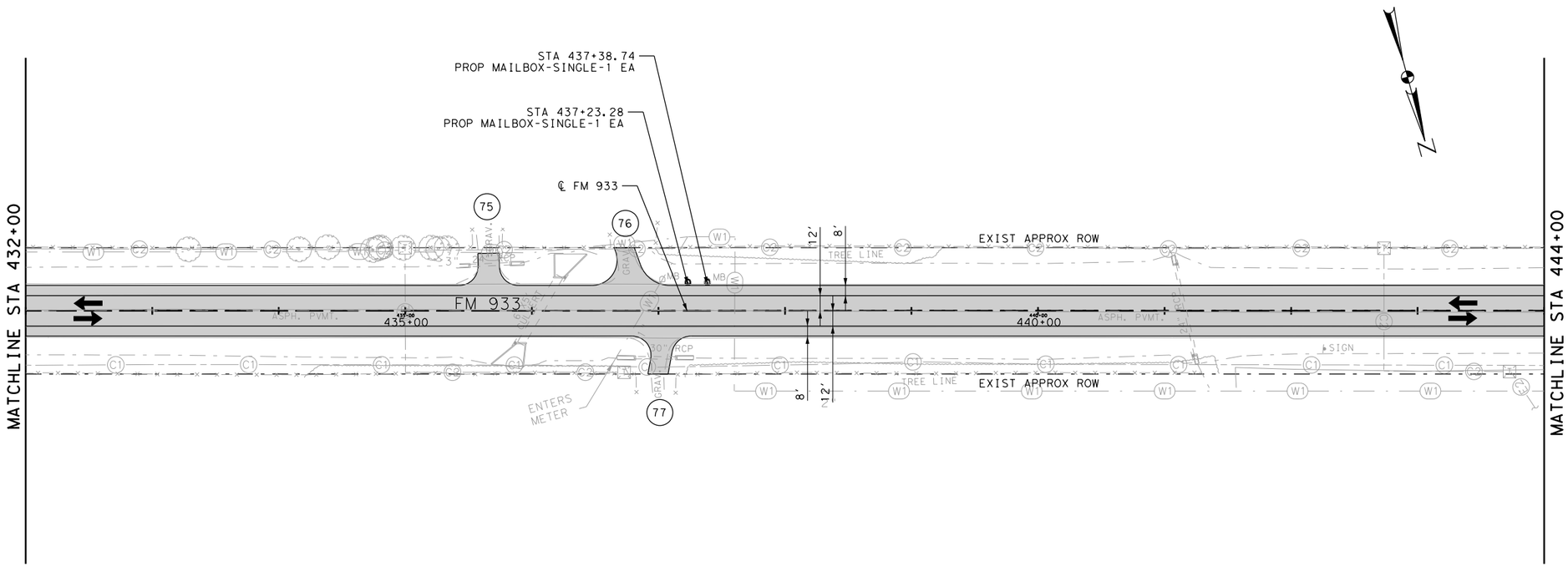
STA 396+00 TO STA 420+00

SHEET 11 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			57
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TxDOT_Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:33:21 PM MJalajel
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPLL1.dgn





LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

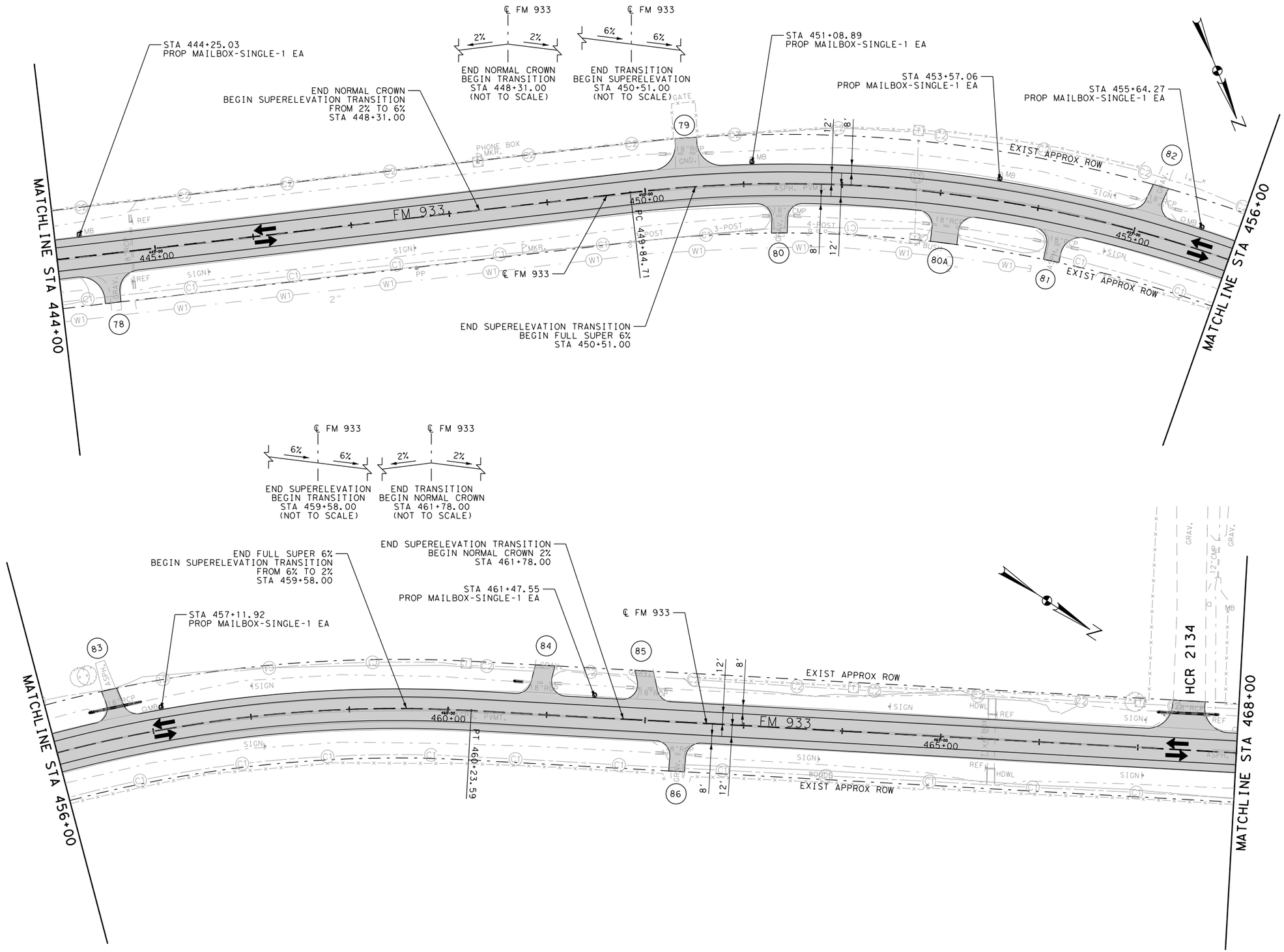
PLAN LAYOUT

STA 420+00 TO STA 444+00

SHEET 12 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			58
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJalajel 4:33:23 PM 1/12/2021
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL12.dgn



LEGEND

- EXIST APPROX ROW
- (#) DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

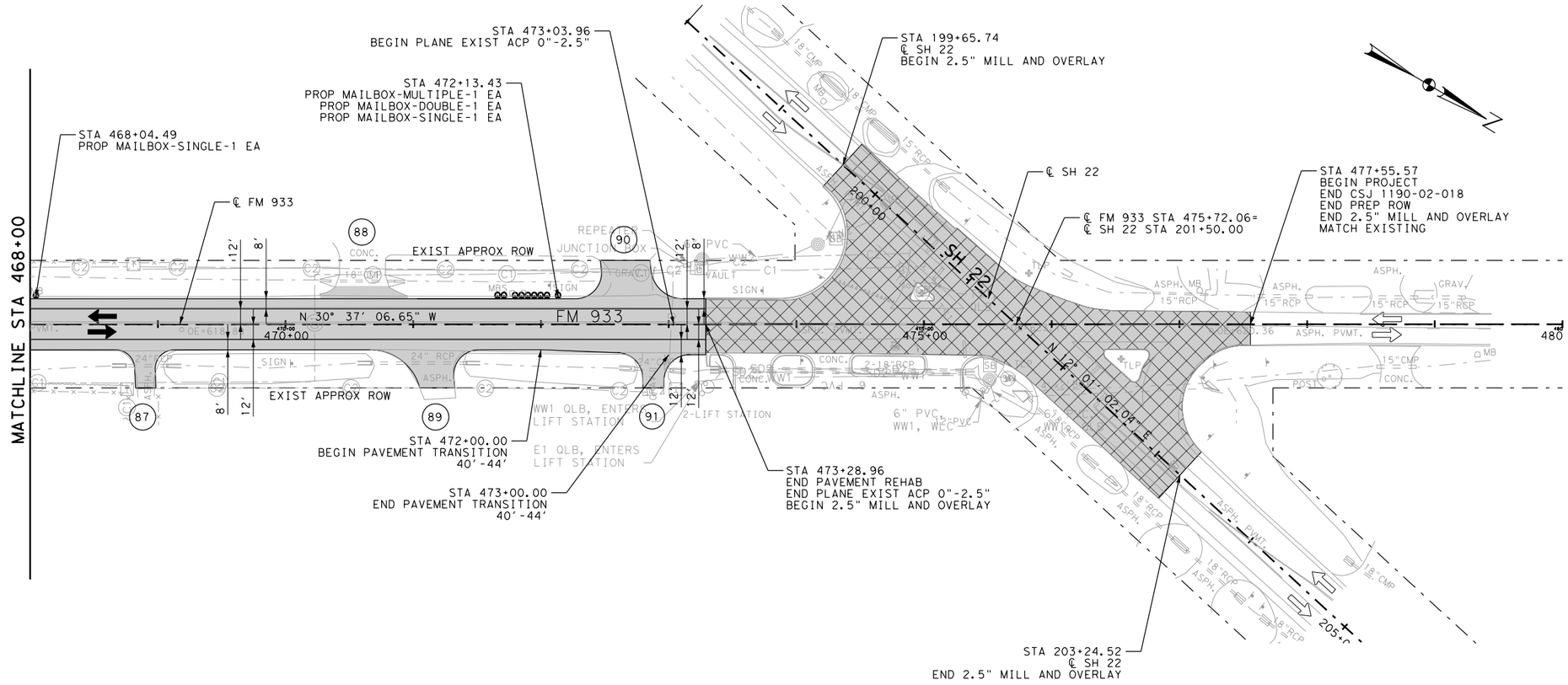
PLAN LAYOUT

STA 444+00 TO STA 468+00

SHEET 13 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			59
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL_Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:33:24 PM MJalajel
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL13.dgn



LEGEND

- EXIST APPROX ROW
- (#) DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. EXISTING ROW SHOWN IS APPROXIMATE BASED ON EXISTING ROW MAPS. CONTRACTOR TO VERIFY EXACT ROW LOCATION PRIOR TO CONSTRUCTION.
2. ALL STATION AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.
3. FOR CROSS-STREET DETAILS, REFER TO "INTERSECTION LAYOUT" SHEETS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 25 50 100
1" = 100'

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

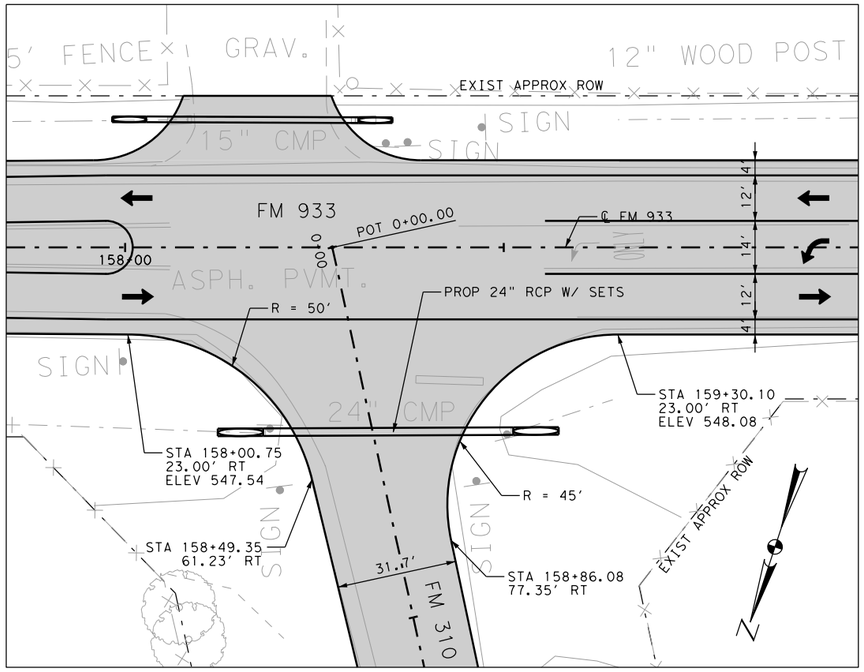
PLAN LAYOUT

STA 468+00 TO END PROJECT

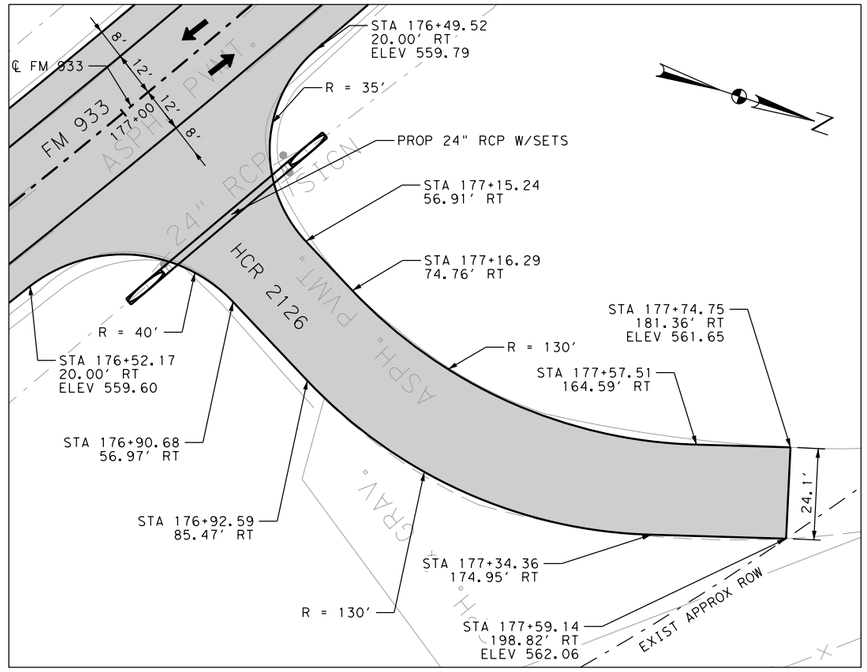
SHEET 14 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			60
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

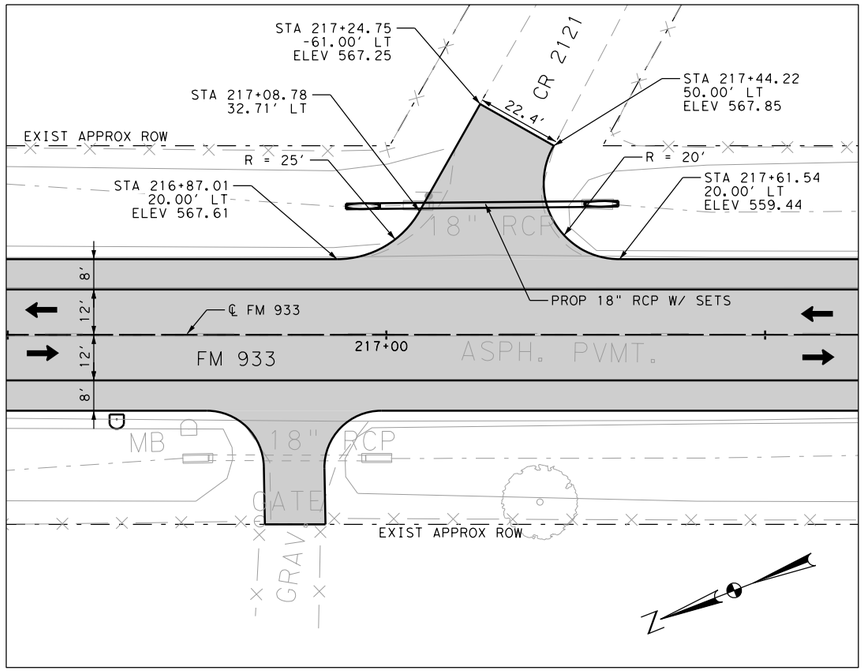
PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJalajel 1/12/2021 4:33:26 PM
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_RPL14.dgn



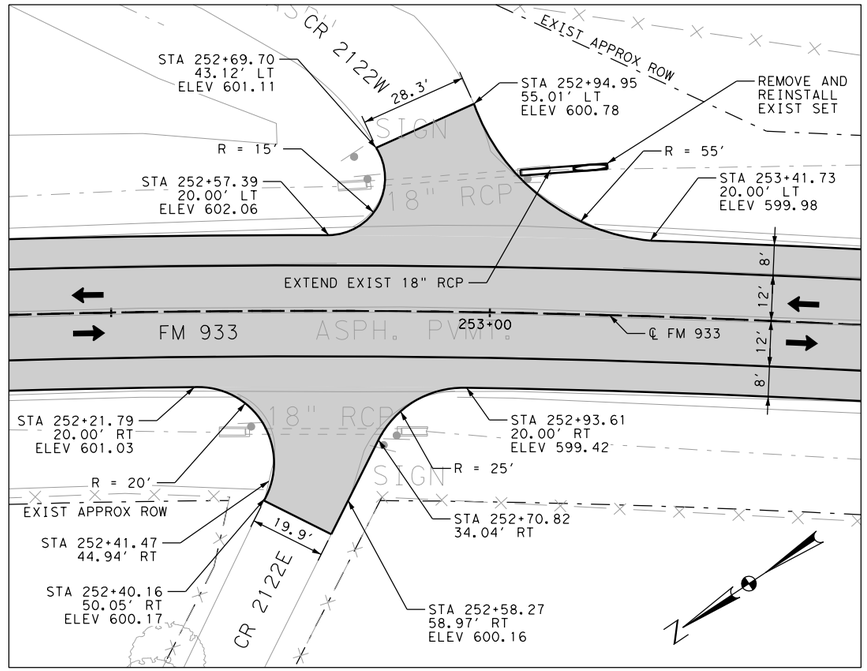
FM 310 - STA 158+54.71
SEE NOTE 6



HCR 2126 - STA 177+03.69



CR 2121 - STA 217+14.44



CR 2122E - STA 252+66.63
CR 2122W - STA 252+95.71

LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. ALL STATIONS AND OFFSETS ARE FROM FM 933 CENTERLINE.
2. SAWCUT JOINT AT LIMIT OF PAY LINE ON INTERSECTION WITH AN EXISTING ASPHALT SURFACE.
3. SEE PLAN LAYOUTS AND INTERSECTION QUANTITIES FOR ADDITIONAL DETAILS.
4. 2.5" SMA-C SAC-B PG76-22 FOR INTERSECTION WILL BE CONSTRUCTED WITH FINAL ROADWAY SURFACE. ALL WORK WILL BE PAID FOR UNDER ITEM 530.
5. INTERSECTIONS WILL CONSIST OF: BLADING AND RESHAPING THE SUBGRADE, WORKING DITCH SLOPES UPSTREAM AND DOWNSTREAM TO ALLOW POSITIVE DRAINAGE OF ADJACENT DITCHES, PROVIDING ADDITIONAL EMBANKMENT NECESSARY TO ACHIEVE PROPER SUBGRADE WIDTH, PLACEMENT OF 4" FLEX BASE, PRIME, AND 2.5" OF SMA-C SAC-B PG76-22 ACP. ALL WORK IS SUBSIDIARY TO ITEM 530.
6. REFER TO PLAN LAYOUTS FOR EXTENT OF LIMITS OF CONSTRUCTION FOR FM 310.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 10 20 40
1" = 40'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

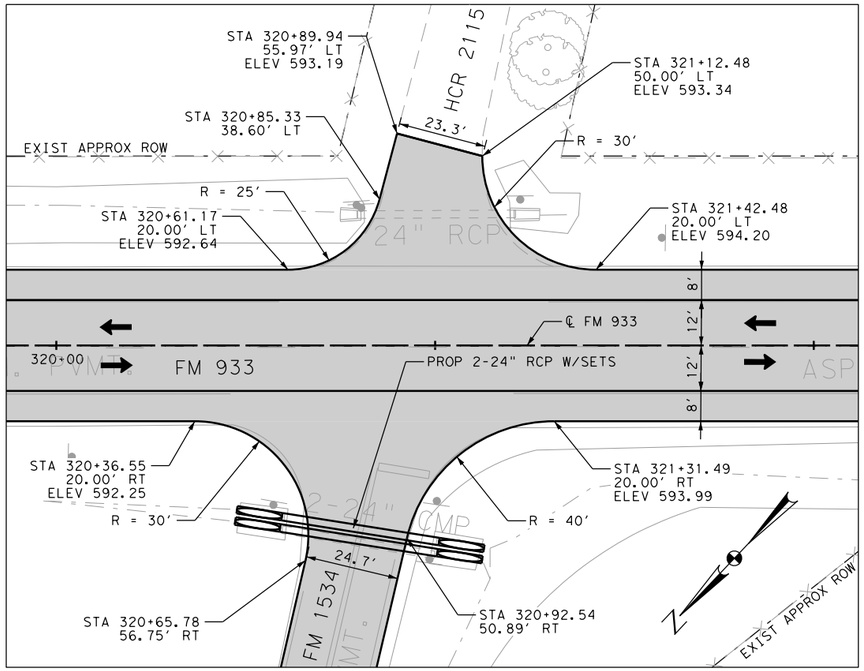
FM 933

INTERSECTION LAYOUT

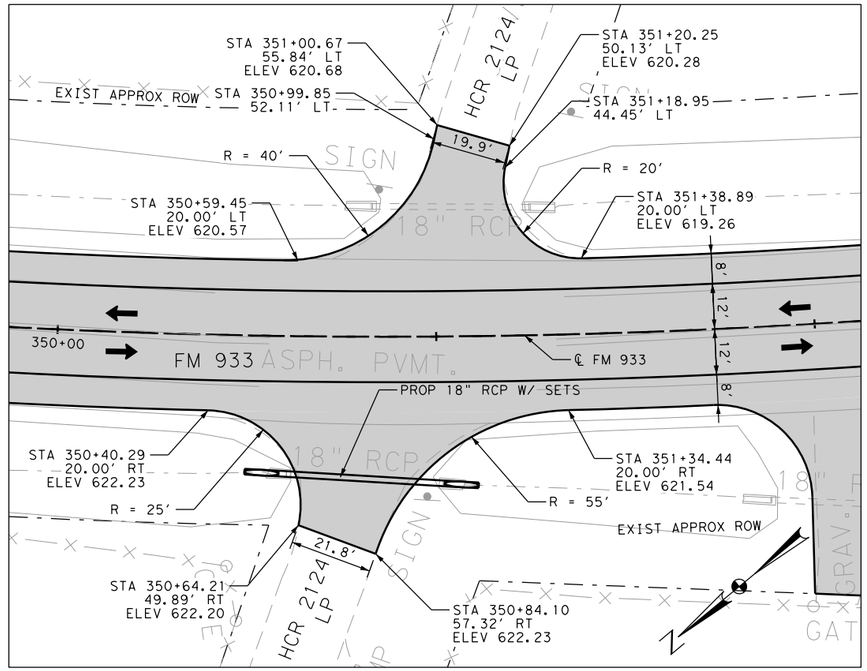
SHEET 1 OF 3

FED RD DIV NO	PROJECT NO		SHEET NO
6			61
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

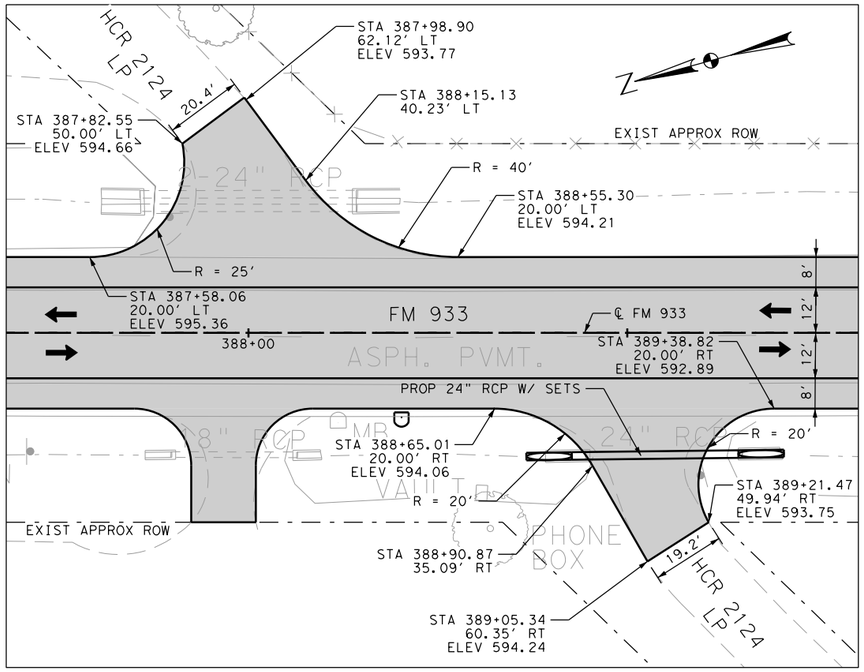
PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\11_Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJolejol 1/12/2021 4:33:29 PM
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_IN101.dgn



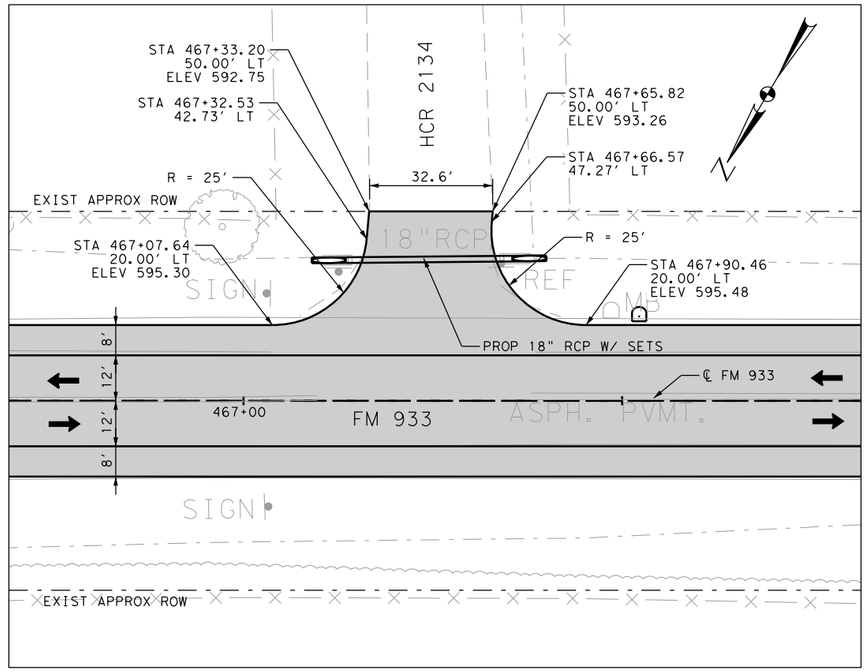
FM 1534 - STA 320+87.89
HCR 2115 - STA 320+92.47
SEE NOTE 6



HCR 2124 LP - STA 350+86.25
HCR 2124 LP - STA 351+00.47



HCR 2124 LP - STA 388+10.10
HCR 2124 LP - STA 389+12.89



HCR 2134 - STA 467+46.77

LEGEND

- EXIST APPROX ROW
- (#) DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. ALL STATIONS AND OFFSETS ARE FROM FM 933 CENTERLINE.
2. SAWCUT JOINT AT LIMIT OF PAY LINE ON INTERSECTION WITH AN EXISTING ASPHALT SURFACE.
3. SEE PLAN LAYOUTS AND INTERSECTION QUANTITIES FOR ADDITIONAL DETAILS.
4. 2.5" SMA-C SAC-B PG76-22 FOR INTERSECTION WILL BE CONSTRUCTED WITH FINAL ROADWAY SURFACE. ALL WORK WILL BE PAID FOR UNDER ITEM 530.
5. INTERSECTIONS WILL CONSIST OF: BLADING AND RESHAPING THE SUBGRADE, WORKING DITCH SLOPES UPSTREAM AND DOWNSTREAM TO ALLOW POSITIVE DRAINAGE OF ADJACENT DITCHES, PROVIDING ADDITIONAL EMBANKMENT NECESSARY TO ACHIEVE PROPER SUBGRADE WIDTH, PLACEMENT OF 4" FLEX BASE, PRIME, AND 2.5" OF SMA-C SAC-B PG76-22 ACP. ALL WORK IS SUBSIDIARY TO ITEM 530.
6. REFER TO PLAN LAYOUTS FOR EXTENT OF LIMITS OF CONSTRUCTION FOR FM 1534.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

0 10 20 40
1" = 40'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

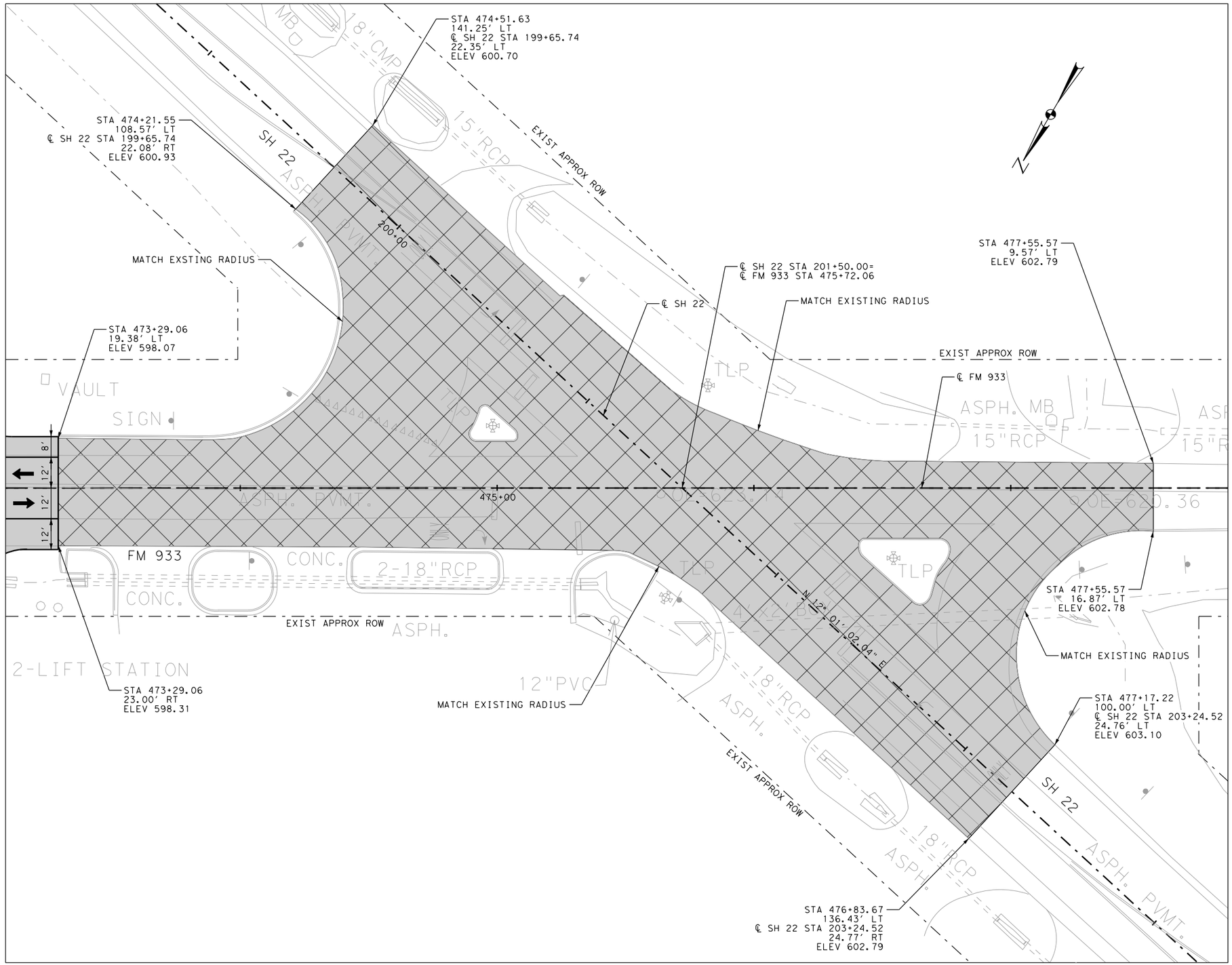
FM 933

INTERSECTION LAYOUT

SHEET 2 OF 3

FED RD DIV NO	PROJECT NO		SHEET NO
6			62
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
MJolejol 4:33:31 PM 1/12/2021
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_IN102.dgn



SH 22 - STA 475+72.06

LEGEND

- EXIST APPROX ROW
- DRIVEWAY NUMBER
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PAVEMENT REHAB
- MILL AND OVERLAY ONLY

NOTES:

1. ALL STATIONS AND OFFSETS ARE FROM FM 933 CENTERLINE UNLESS OTHERWISE NOTED.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED PROFESSIONAL ENGINEER

01/12/2021

0 10 20 40
1" = 40'

Texas Department of Transportation

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

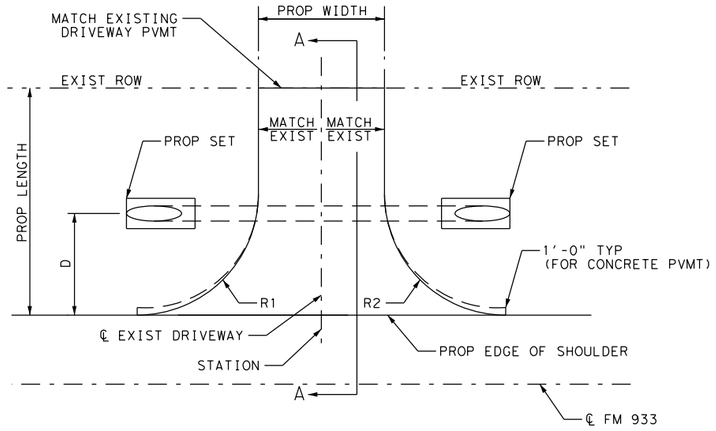
FM 933

INTERSECTION LAYOUT

SHEET 3 OF 3

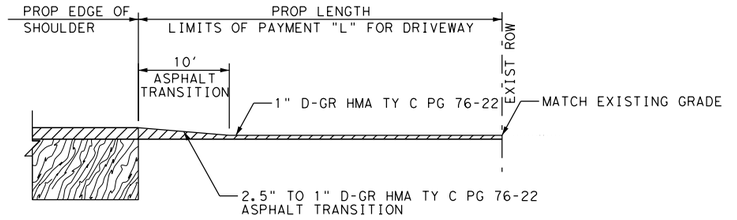
FED RD DIV NO	PROJECT NO		SHEET NO
6			63
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\Sheets\Roadway\933_IN103.dgn

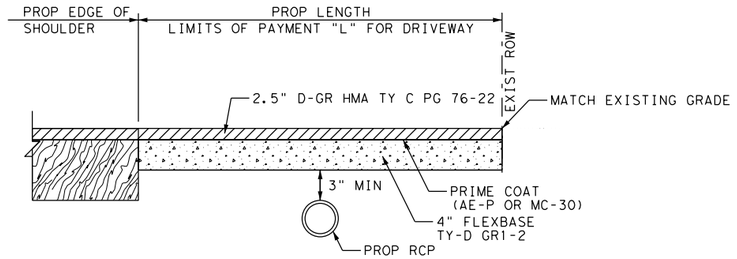


TYPICAL DRIVEWAY
PLAN VIEW

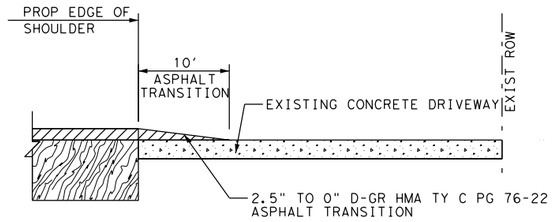
DRIVEWAYS WILL CONSIST OF: BLADING AND RESHAPING THE SUBGRADE, WORKING DITCH SLOPES UPSTREAM AND DOWNSTREAM TO ALLOW POSITIVE DRAINAGE OF ADJACENT DITCHES, PROVIDING ADDITIONAL EMBANKMENT NECESSARY TO ACHIEVE PROPER SUBGRADE WIDTH, PLACEMENT OF 4" FLEX BASE, PRIME, AND 2.5" TY C ACP OR EMBANKMENT (TY B) AND 6" CL "A" CONCRETE. SEE SECTION A-A FOR DETAILS. ALL WORK IS CONSIDERED SUBSIDIARY TO ITEM 530.



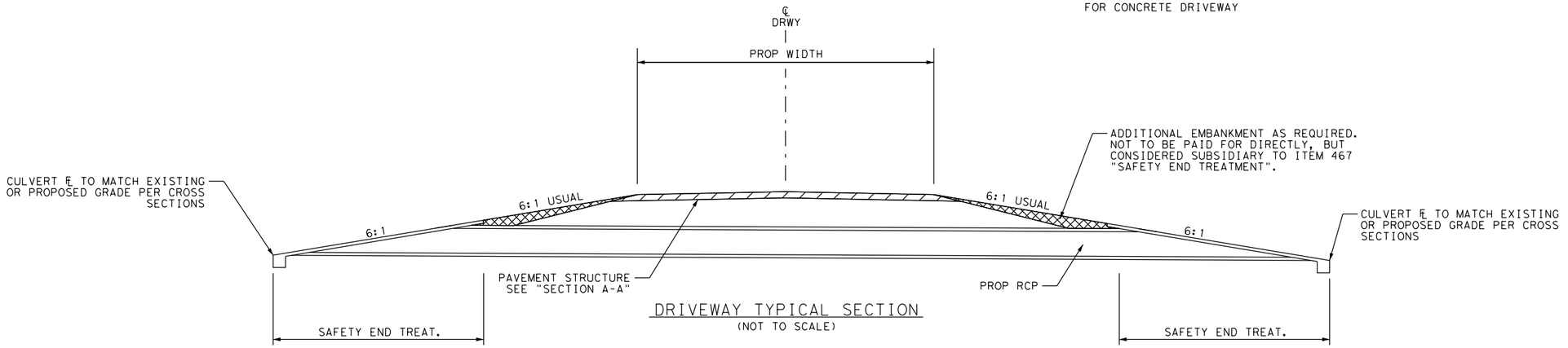
SECTION A-A
FOR ASPHALT DRIVEWAY - OVERLAY ONLY



SECTION A-A
FOR ASPHALT DRIVEWAY - FULL DEPTH



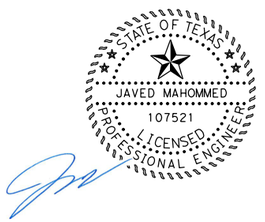
SECTION A-A
FOR CONCRETE DRIVEWAY



DRIVEWAY TYPICAL SECTION
(NOT TO SCALE)

NOTES:

1. SAW CUT JOINT AT LIMIT OF ROW LINE ON DRIVEWAYS WITH AN EXISTING CONCRETE OR ASPHALT SURFACE.
2. SEE PLANS LAYOUTS AND SUMMARY OF DRIVEWAY, INTERSECTION, AND MAILBOX QUANTITIES FOR ADDITIONAL DETAILS & DIMENSIONS.
3. MINIMUM DRIVEWAY WIDTH IS 16' FOR DRIVEWAY RECONSTRUCTION.
4. ASPHALT OVERLAY OR ASPHALT TRANSITION FOR DRIVEWAY WILL BE CONSTRUCTED WITH FINAL ROADWAY SURFACE. ALL WORK WILL BE PAID UNDER ITEM 530.
5. ADDITIONAL GRADING OF DITCHES ADJACENT TO DRIVEWAY PIPE MAY BE REQUIRED TO PLACE PIPE AT PROPER DEPTH BELOW PROPOSED DRIVEWAY AND MAINTAIN POSITIVE DRAINAGE.
6. REMOVAL OF EXISTING ASPHALT DRIVEWAY IS SUBSIDIARY TO ITEM 530.



01/12/2021

SCALE: NTS

Texas Department of Transportation®

CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

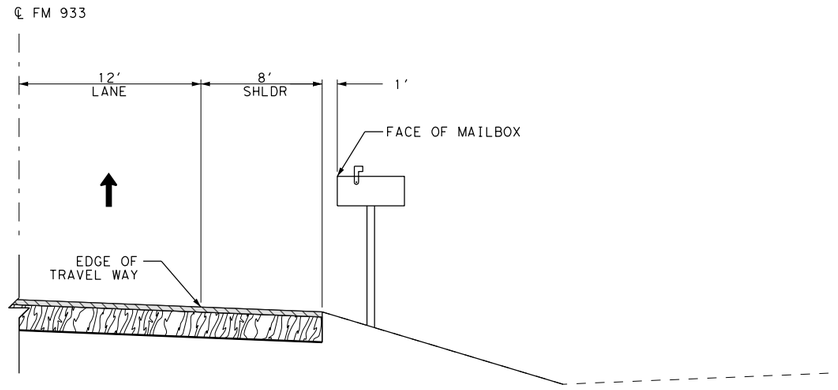
FM 933

DRIVEWAY DETAILS

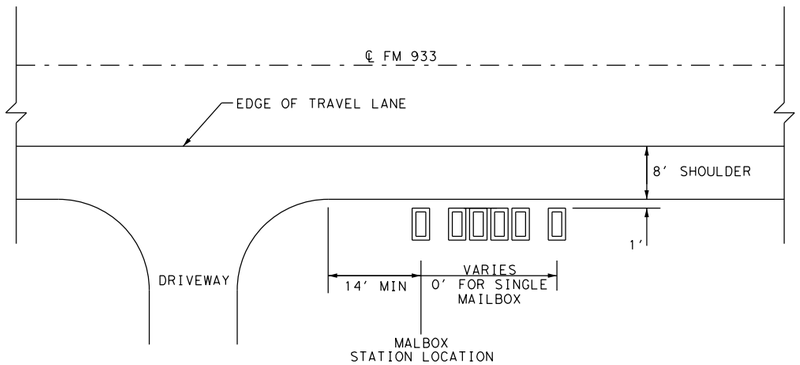
SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			64
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: $PENTBL$
PLOT DRIVER:D:\Share\TL-Trans\MicroStation\Workspace\Standards\plotdrv\TXDOT_PDF_BW_11X17.pltcfg
1/12/2021 4:33:36 PM MJalajel
MODEL: Default
FILE: $FILE$
...\Sheets\Roadway\933_DRWY01.dgn



MAILBOX TYPICAL SECTION



MAILBOX PLAN VIEW DETAIL

NOTES:

1. REFER TO PROPOSED TYPICAL SECTION FOR PAVEMENT STRUCTURE DETAILS.
2. REFER TO MB-15(1) STANDARD FOR ADDITIONAL MAILBOX INFO AND DETAILS.
3. REFER TO PLAN AND PROFILE SHEETS FOR MAILBOX LOCATIONS.

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

SCALE: NTS

Texas Department of Transportation®

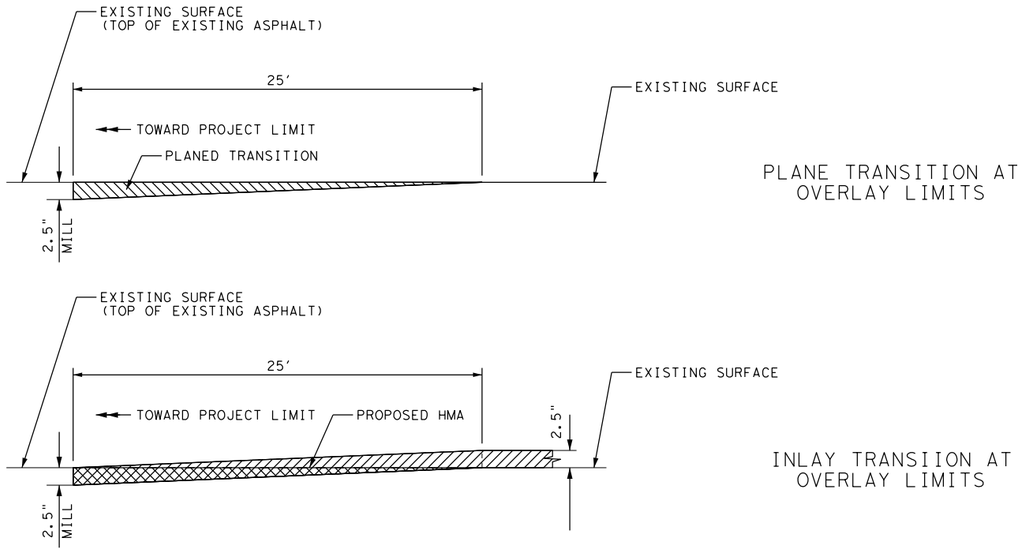
CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

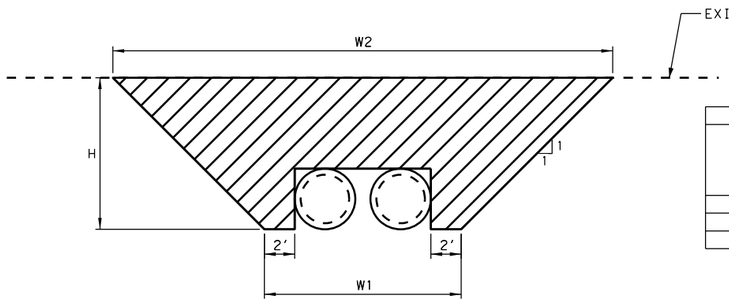
MAILBOX DETAILS

SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			65
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933



PLANE TRANSITION DETAIL
(PLANE PAV 0-2.5")



TYPICAL SHORING DETAIL (PIPE)
NTS

NOTE:

1. CUTTING AND RESTORING EXISTING PAVEMENT TO TAKE PLACE FOR INSTALLATION OF CULVERTS AT FM 310 AND FM 1534 USING ITEM 400-6006. TEMPORARILY INCLUDE CEMENT STABILIZED BACKFILL TO THE TOP OF EXISTING ROADWAY SURFACE. ALL WORK SUBSIDIARY TO ITEM 400.

TEMPORARY SPECIAL SHORING					
CULVERT	STRUCTURE	W1	W2	H	403 6001 TEMPORARY SPL SHORING
		FT	FT	FT	SF
FM 310	1-24" RCP	6.5	12.5	3	57
FM 1534	2-24" RCP	10	16	3	78
CSJ TOTALS					135

STATE OF TEXAS
JAVED MAHOMMED
107521
LICENSED
PROFESSIONAL ENGINEER

01/12/2021

SCALE: NTS

Texas Department of Transportation®

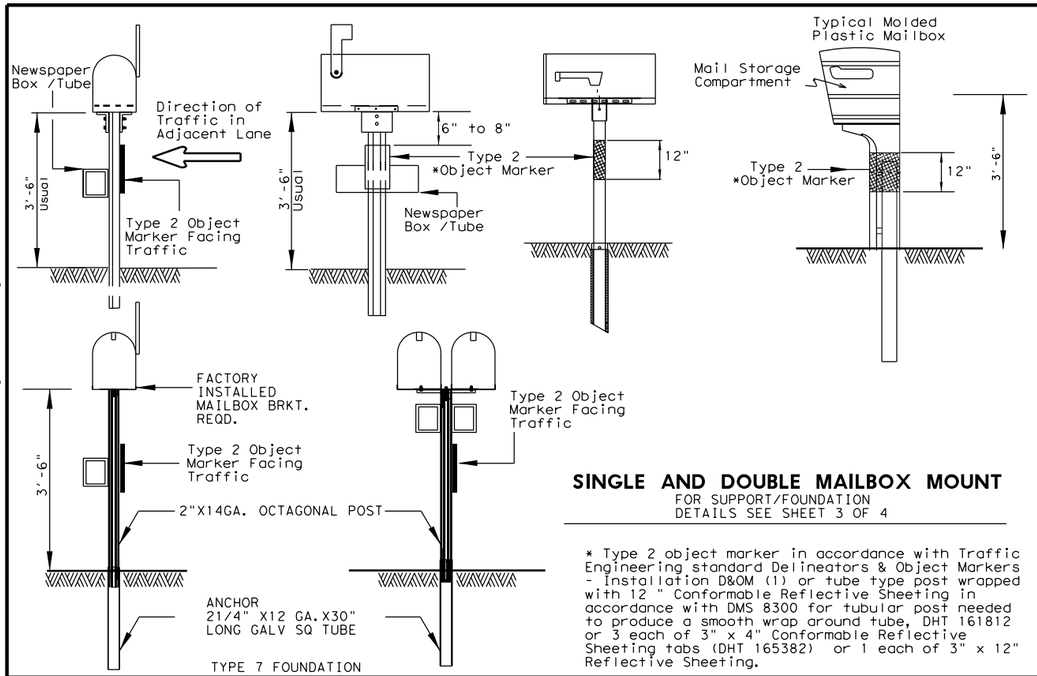
CobbFendley
TBPE Firm Registration No. 274
TBPLS Firm Registration No. 100467
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3242 | fax 713.462.3262
www.cobbfendley.com

FM 933

MISCELLANEOUS ROADWAY DETAILS

SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			66
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933



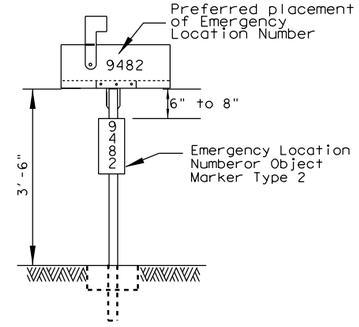
SINGLE AND DOUBLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12 " Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED- 12 , PED-13,etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black. or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved , may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

TYPICAL MAILBOX SIZE				LIGHT WEIGHT MATERIAL	
				SHEET METAL	**PLASTIC
SIZE	LENGTH	WIDTH	HEIGHT	MAXIMUM WEIGHT	
	INCHES			POUNDS	
SMALL	19 1/2	6	7	5	5
MEDIUM	22 1/2	8	11 1/2	7	7
LARGE	23 1/2*	11 1/2*	13 1/2*	10	10

* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

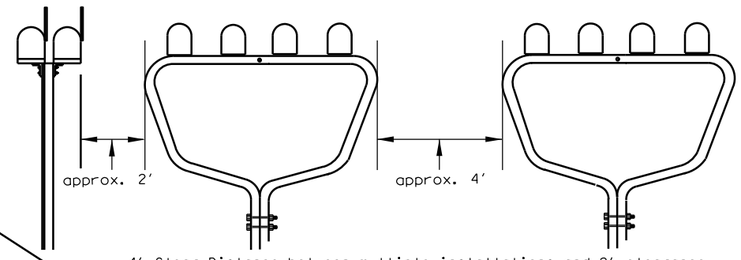
LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)					
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT
SIDE	18	15	18.3	15	(POUNDS)
BACK	11 1/2	11 1/2		15	22.4

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

MAILBOX SIZES

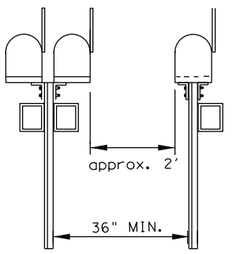
Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



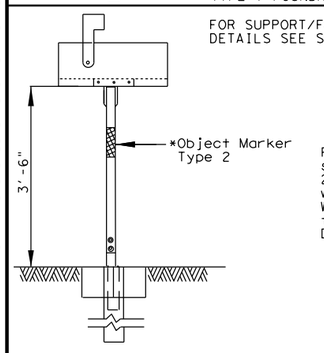
4' Clear Distance between multiple installations and 2' clearance between double or single installations and the multiple installation. DHT #'s 164116 or 149339.

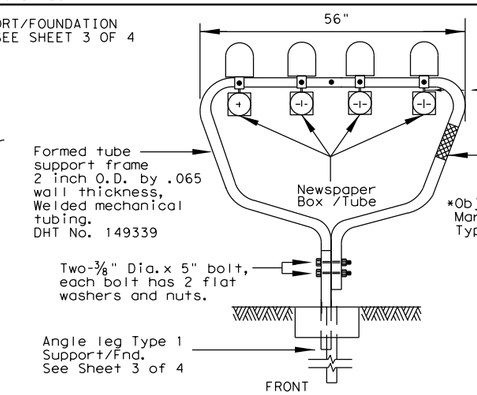
MULTIPLE MAILBOX PLACEMENT

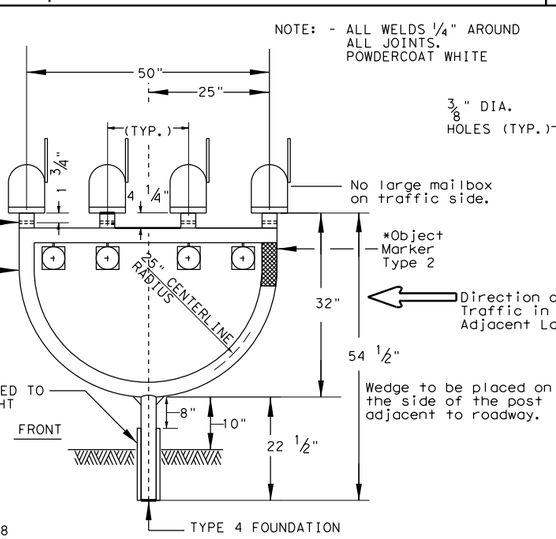


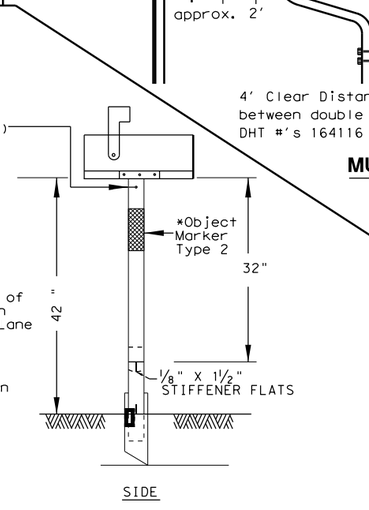
Clear Distance between single or double mounted posts. (Normally when 3 or more mailboxes are in one location, a multiple support is used).

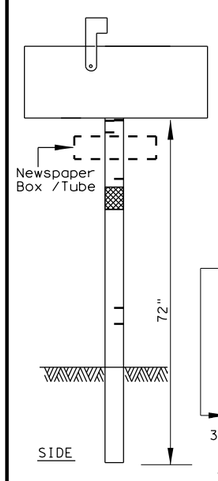
SINGLE & DOUBLE MAILBOX PLACEMENT

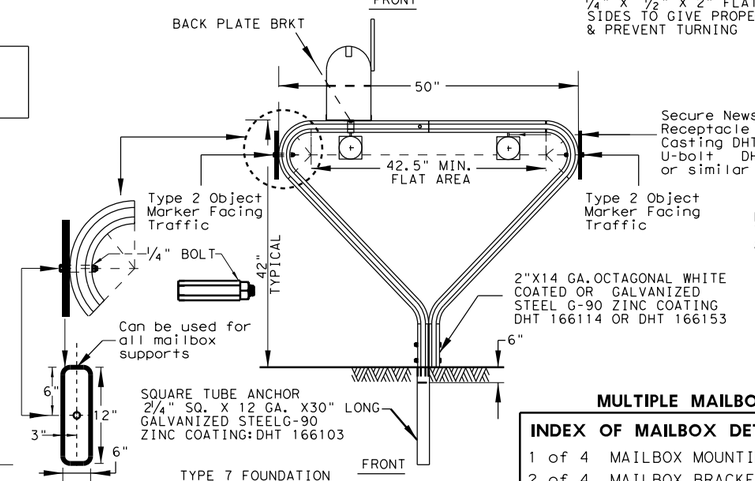












DOUBLE AND MULTIPLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4
FOR DHT NUMBERS SEE SHEET 4 OF 4

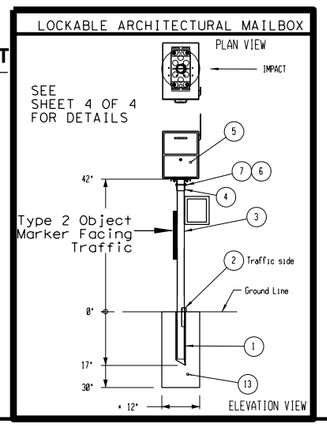
MULTIPLE MAILBOX MOUNT

INDEX OF MAILBOX DETAIL SHEETS

NEWSPAPER RECEPTACLE

A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.



SHEET 1 OF 4

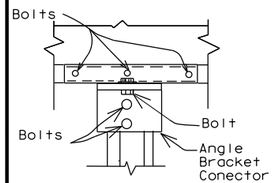
Texas Department of Transportation

Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

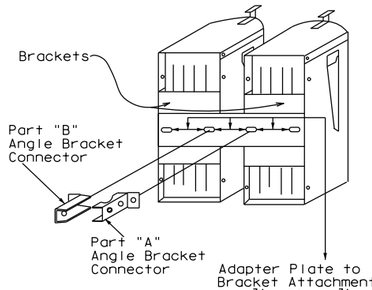
MB-15(1)

FILE: MB14(1).DGN	DN: JEO		CK: JEO	DW:	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB		HIGHWAY
REVISIONS: Added additional newspaper receptacle for double mailbox support	1190	02	018		FM 933
	DIST	COUNTY			SHEET NO.
	WAC	HILL			67



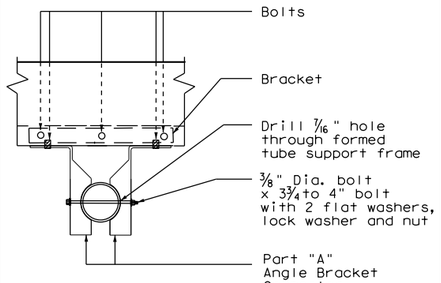
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

SINGLE MAILBOX

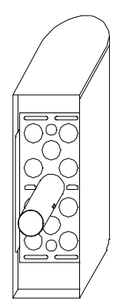


(Not permitted for Large Mailboxes)

DOUBLE MAILBOX

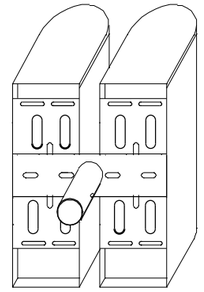


MULTIPLE MAILBOX



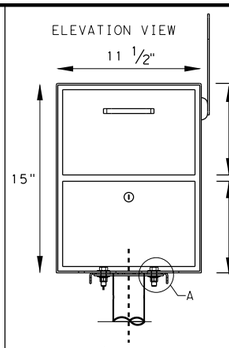
To be used with 2 3/8" OD RR or thinwall Steel posts.

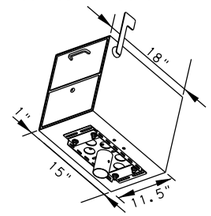
WELDED SINGLE MAILBOXBRACKET

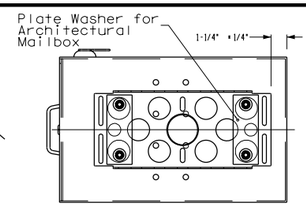


To be used with thinwall Steel posts. Not to be used with RR posts.

WELDED DOUBLE MAILBOX BRACKET WITHADAPTER PLATE

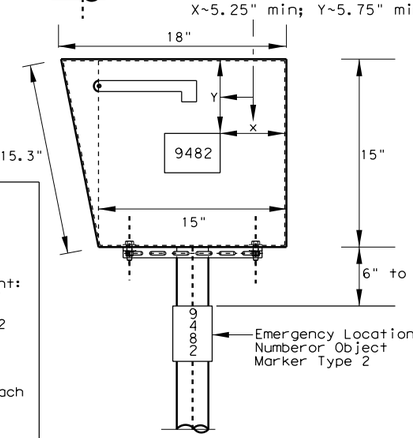






Preferred placement of Emergency Location Number

X~5.25" min; Y~5.75" min



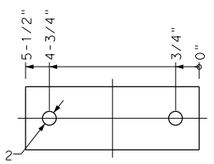
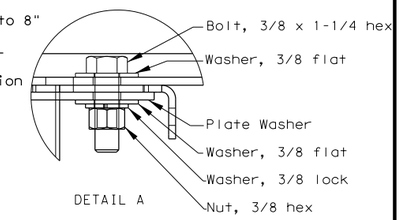
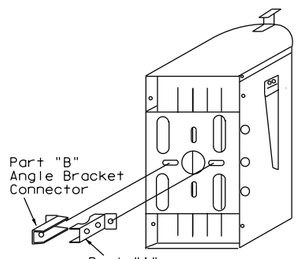
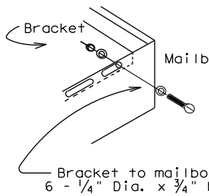


Plate Washer for Architectural Mailbox Plate, 2" x 1/8" ASTM A36 Steel



LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



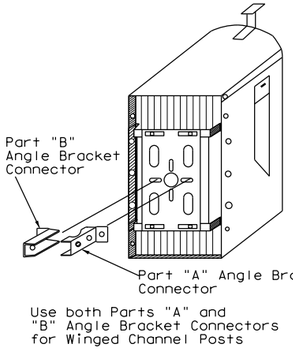


Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/ 2 flat washers and nut per each bolt.

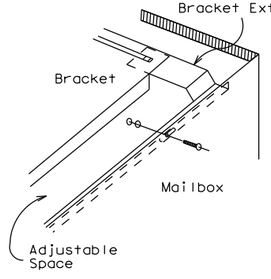
Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt with 2 flat washers, lock washer and nut per each bolt.

Angle to 2 - 3/8" Dia. x 2 1/2" bolt with 2 flat washers, lock washer and nut per each bolt.

SMALL MAILBOX



Use both Parts "A" and "B" Angle Bracket Connectors for Winged Channel Posts



Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/2 flat washers and nut per each bolt.

Bracket to bracket extension attachment: 2 - 1/4" Dia. x 3/4" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).

Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt w/2 flat washers, lock washer and nut per each bolt.

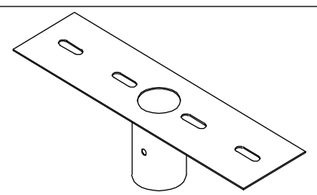
Angle to mailbox support attachment: 2 - 3/8" Dia. x 2 1/2" bolt w/2 flat washers, lock washer, and nut per each bolt.

Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

MEDIUM AND LARGE MAILBOXES

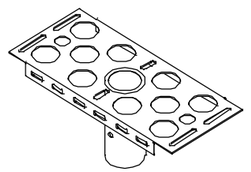
GENERAL NOTES

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



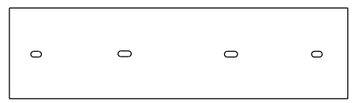
DHT 162323

For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.



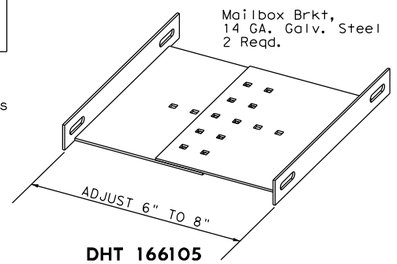
DHT 161443

For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.

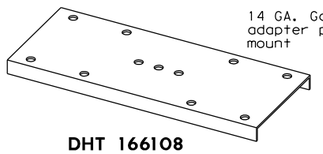


DHT #3789

Used for mounting two Mailboxes on the same post.

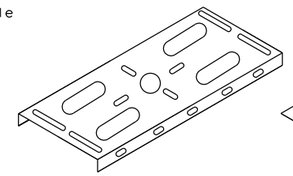


DHT 166105



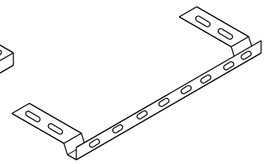
14 GA. Galv. Steel adapter plate for double mount

DHT 166108



DHT 148939

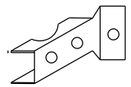
Mailbox Bracket



DHT 148938

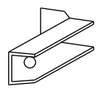
Used for extending 6" wide bracket to attach larger mailboxes.

Bracket Extension



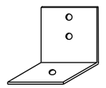
DHT 159489

Part "A" Angle Bracket Connector



DHT 159490

Part "B" Angle Bracket Connector



DHT 2917

Angle Bracket For Temporary Mailbox

HARDWARE AT TXDOT REGIONAL WAREHOUSES

Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

Texas Department of Transportation

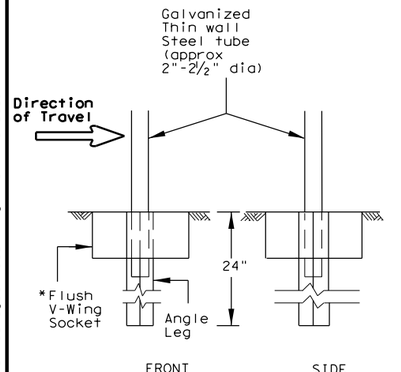
Maintenance Division Standard

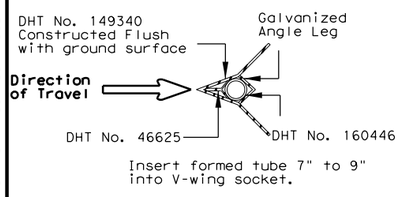
MAILBOX BRACKET CONNECTING DETAILS

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS ADDED DHT 163730	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		68

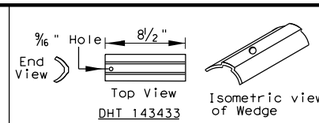
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.





TYPE 1 SUPPORT/FOUNDATION

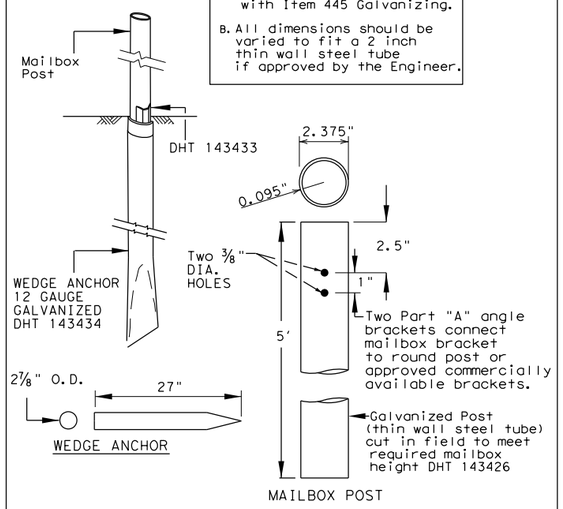
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



NOTES FOR TYPE 2 SUPPORT/FOUNDATION

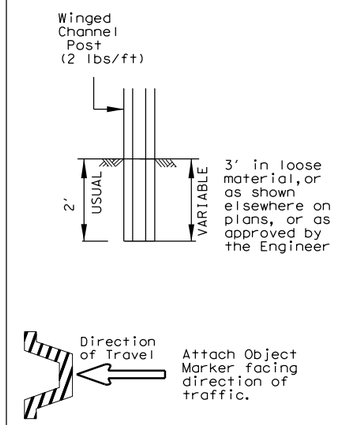
A. Galvanize steel support foundation in accordance with Item 445 Galvanizing.

B. All dimensions should be varied to fit a 2 inch thin wall steel tube if approved by the Engineer.



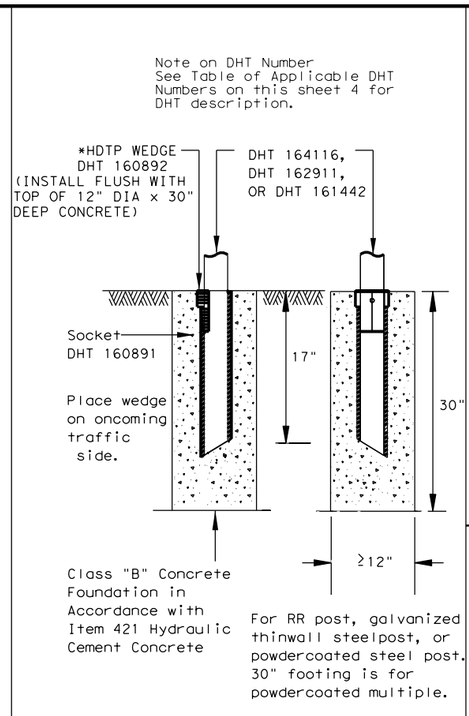
TYPE 2 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



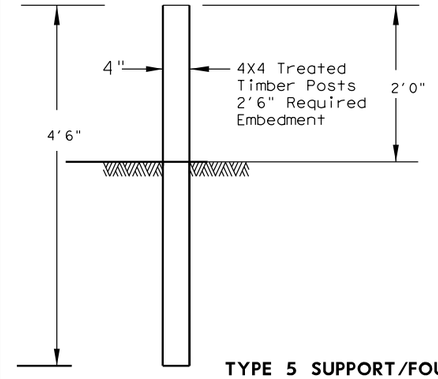
TYPE 3 SUPPORT/FOUNDATION

WINGED CHANNEL POST



TYPE 4 SUPPORT/FOUNDATION

FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

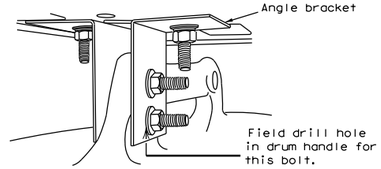


TYPE 5 SUPPORT/FOUNDATION

FOR ONE PIECE MOLDED PLASTIC MAILBOX

ONE PIECE MOLDED PLASTIC MAILBOXES

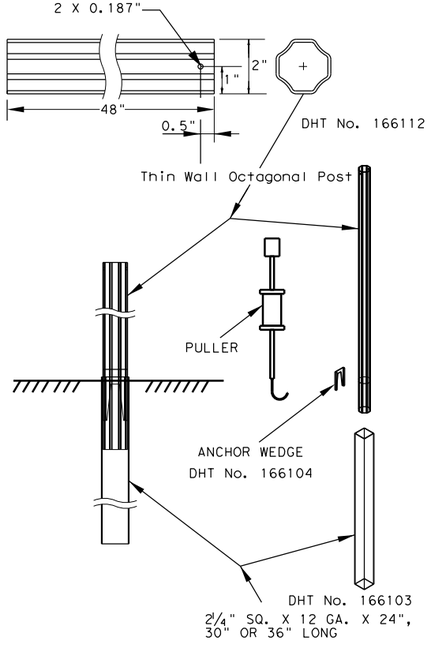
Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.



Placed on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

TYPE 6 TEMPORARY MAILBOX SUPPORT

CONNECTION DETAIL



TYPE 7 MAILBOX SUPPORT/FOUNDATION

CONNECTION DETAIL

MB-(X) ASSM TY (XXX) (X) (XX) (OPTIONAL)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- SP = Single Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post
- Ty 7 = Wedge Anchor

Type of Bracket
- AB = Angle Bracket.
- TB = 2.375" Tube Bracket

GENERAL NOTES

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
4. The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
5. The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
6. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition.

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDTP: High density thermoplastic polyesters

SHEET 3 OF 4

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		69

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

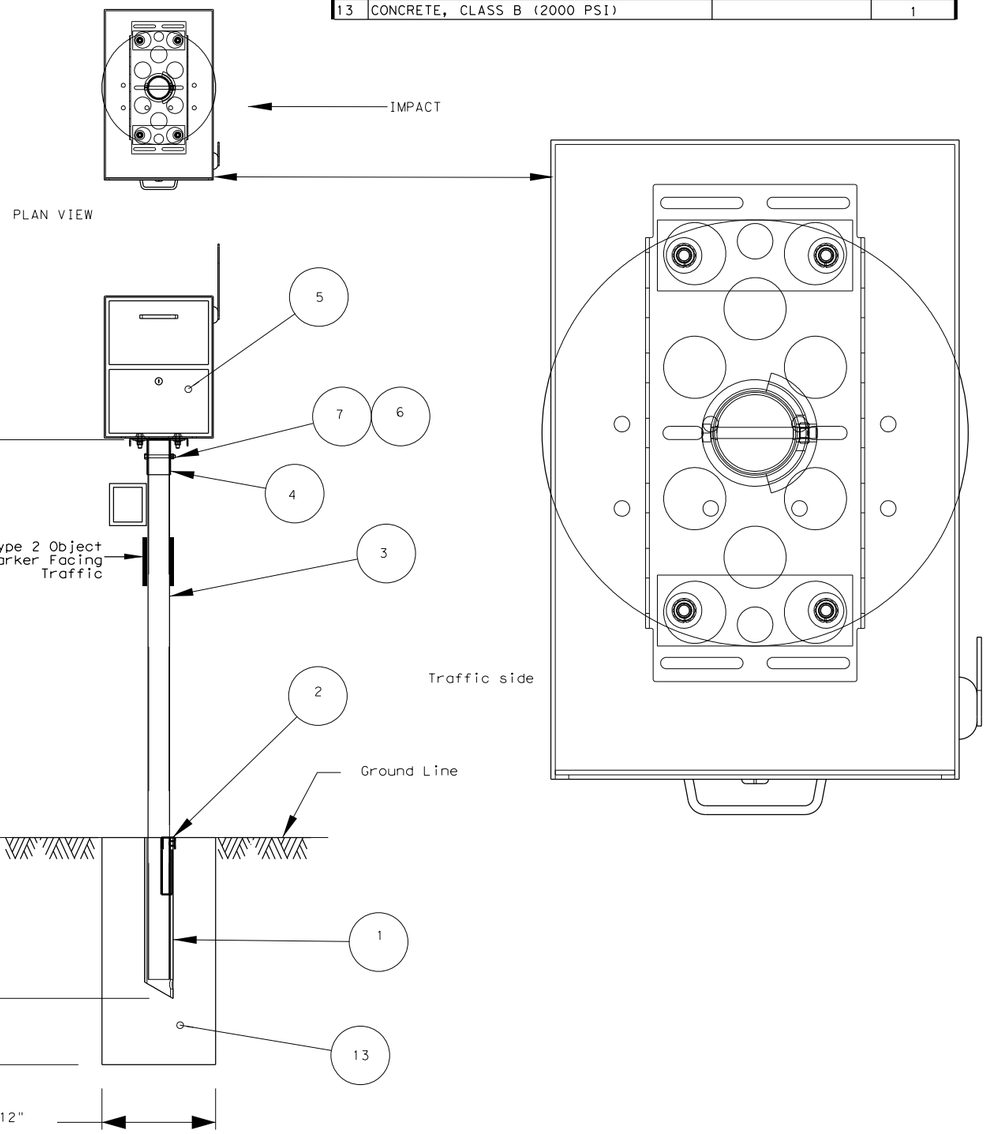


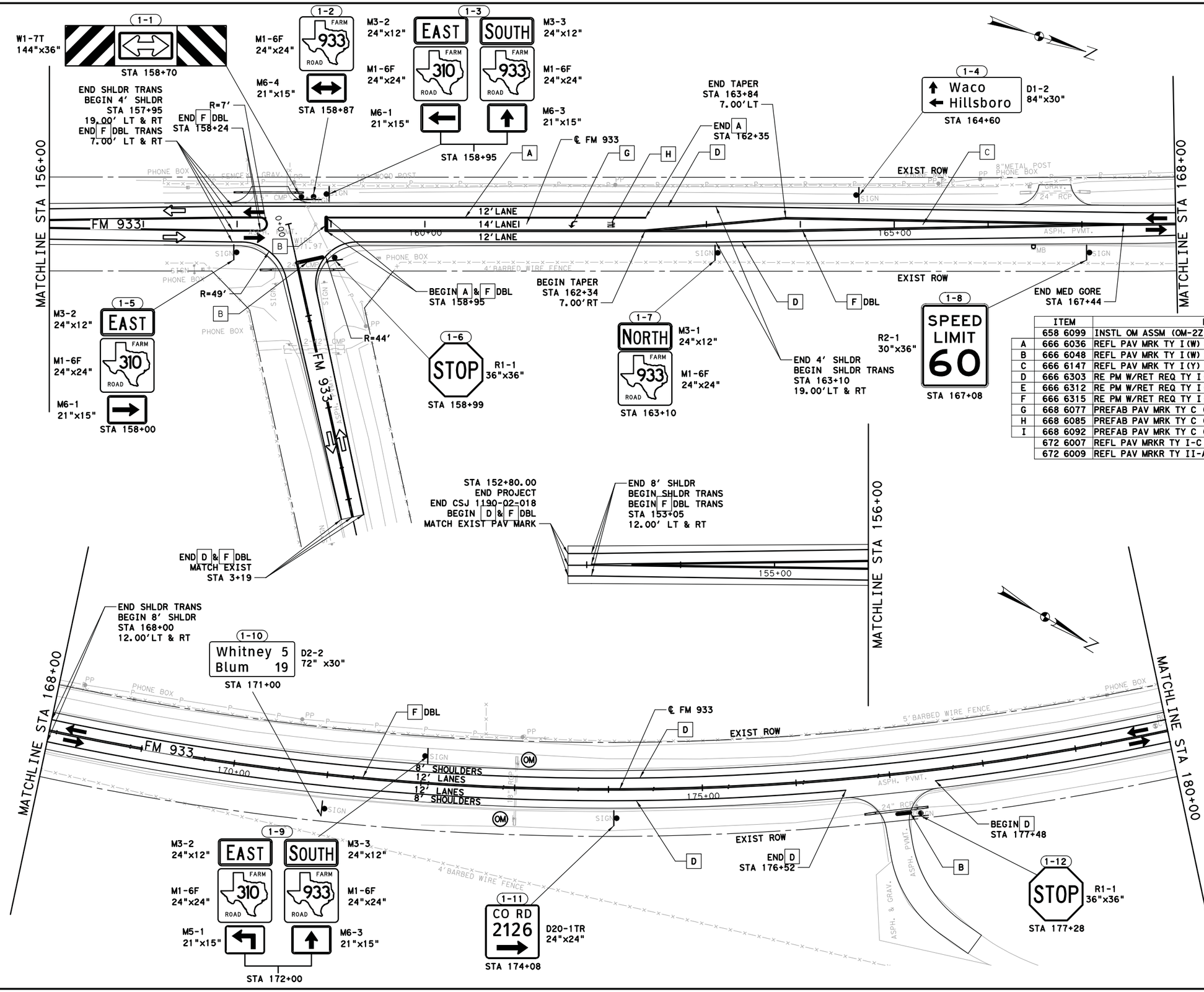
TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
	FOUNDATIONS
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
	POSTS
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
166152	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED 2" OCTAGONAL
166112	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED 2" OCTAGONAL
	REFLECTIVE SHEETING
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
	CONNECTING HARDWARE
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
162323	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL STEEL POST, GALVANIZED OR POWDERCOATED.
161443	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT;HEX HEAD, GALV;3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT;HEX HEAD, GALV;3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT;HEX HEAD, GALV;3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT;HEX HEAD, GALV;3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT;HEX HEAD, GALV;3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT;HEX HEAD, GALV;3/8"DIA X 4"L HD, W/2-FLAT WASHERS

Texas Department of Transportation — Maintenance Division Standard

DHT NUMBERS TABLE

MB-15(1)

FILE:MB14(1).DGN	DN:	CK:	DW:	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		70



LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	
A	666 6036	REFL PAV MRK TY I(W) 8" (SLD) (100MIL)	LF	340
B	666 6048	REFL PAV MRK TY I(W) 24" (SLD) (100MIL)	LF	53
C	666 6147	REFL PAV MRK TY I(Y) 24" (SLD) (100MIL)	LF	165
D	666 6303	RE PM W/RET REQ TY I(W)4" (SLD) (100MIL)	LF	5872
E	666 6312	RE PM W/RET REQ TY I(Y)4" (BRK) (100MIL)	LF	
F	666 6315	RE PM W/RET REQ TY I(Y)4" (SLD) (100MIL)	LF	7847
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	1
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	1
I	668 6092	PREFAB PAV MRK TY C (W)36" (YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	15
	672 6009	REFL PAV MRKR TY II-A-A	EA	137

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

Texas Department of Transportation®

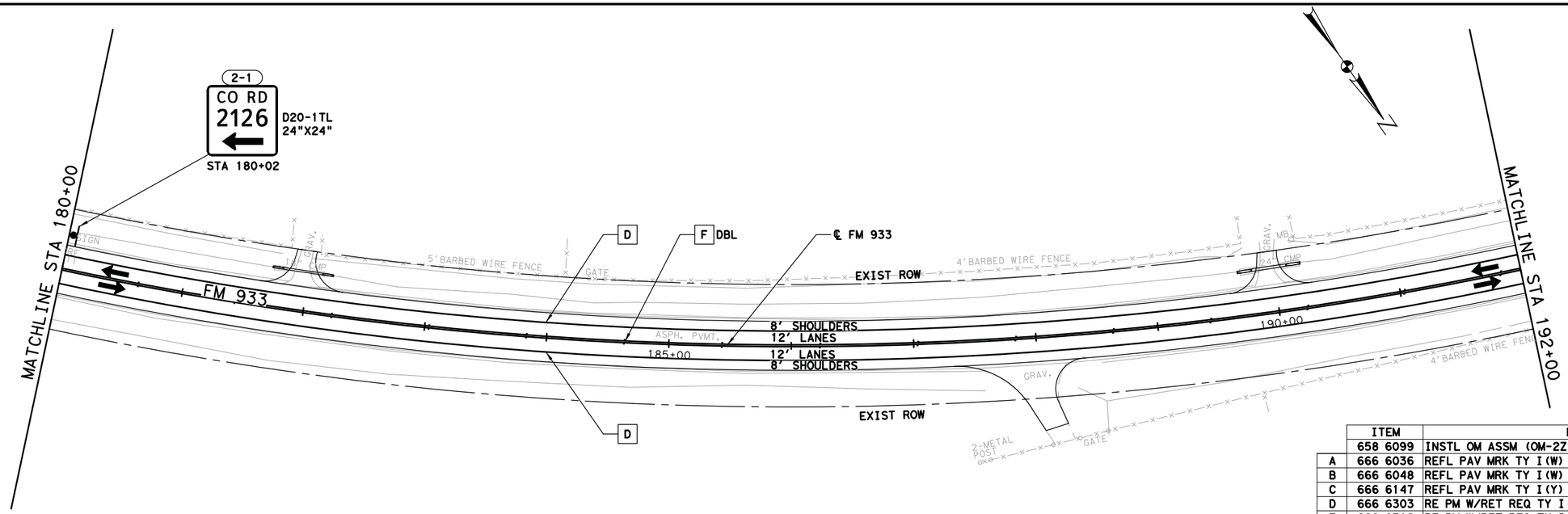
BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 1 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			71
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933



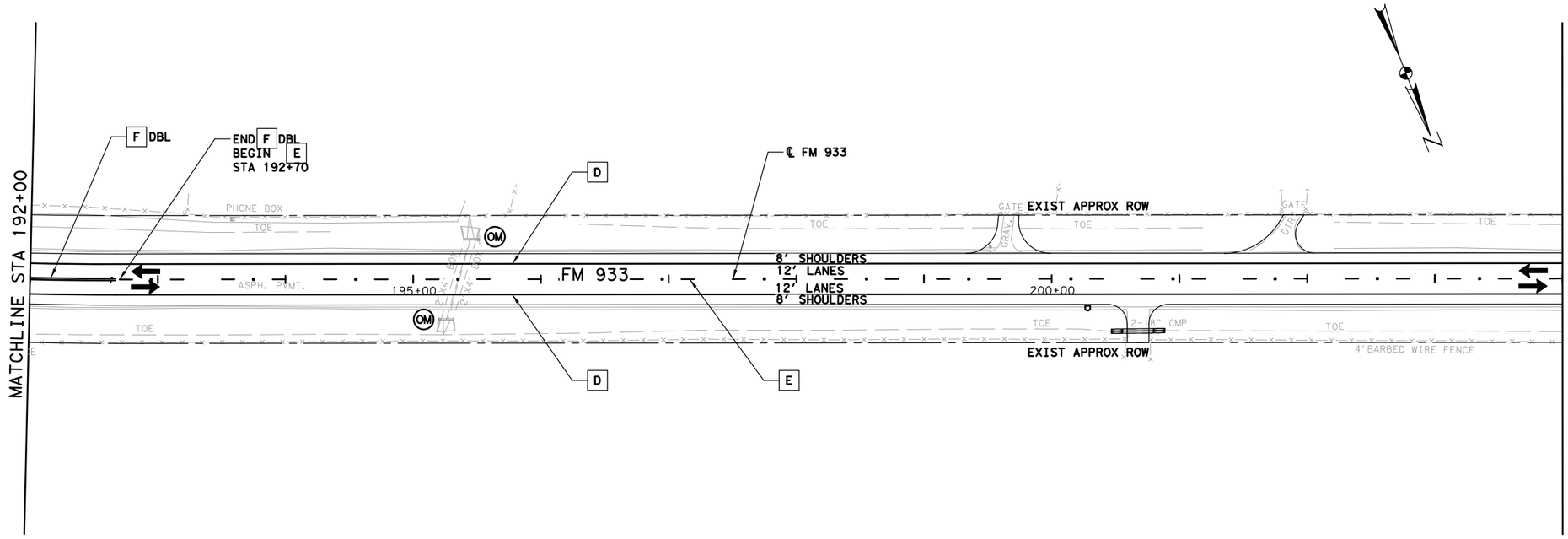
LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	2
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4800
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	280
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	2534
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	47

0 50 100
SCALE: 1" = 100'



STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

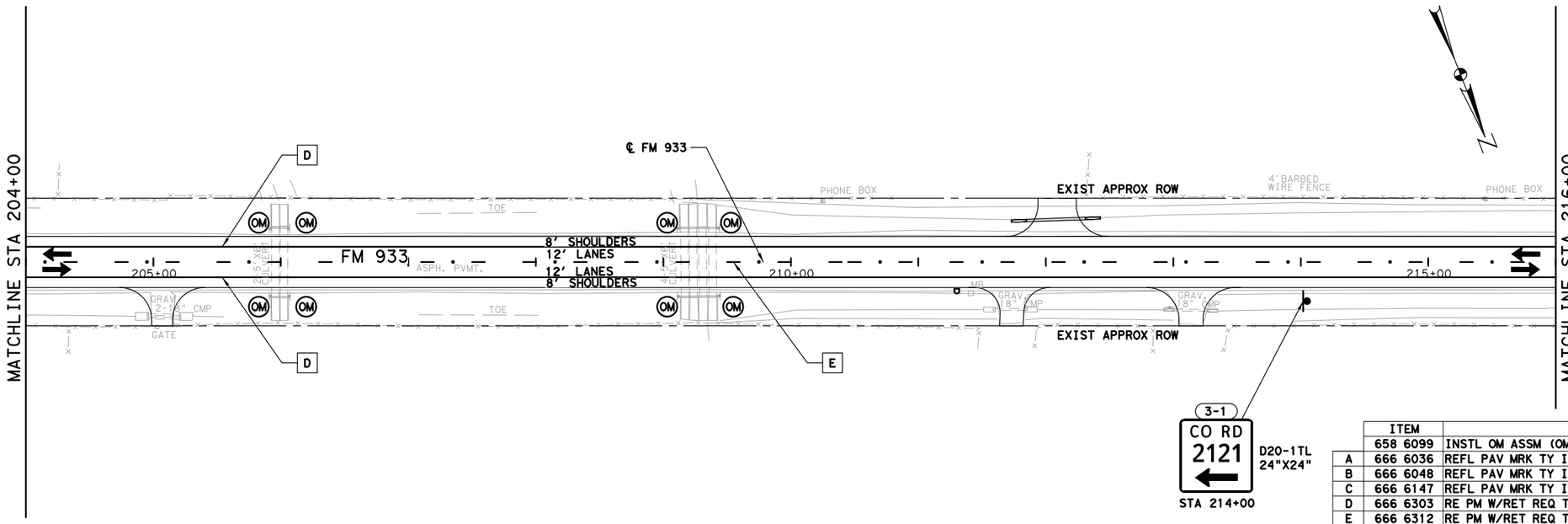
FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 2 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			72
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
05/27/2021 08:00:10 emahlmann
MODEL: SIGNING 0 PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_02.dgn
...\162_SMS\FM933_SPM_02.dgn

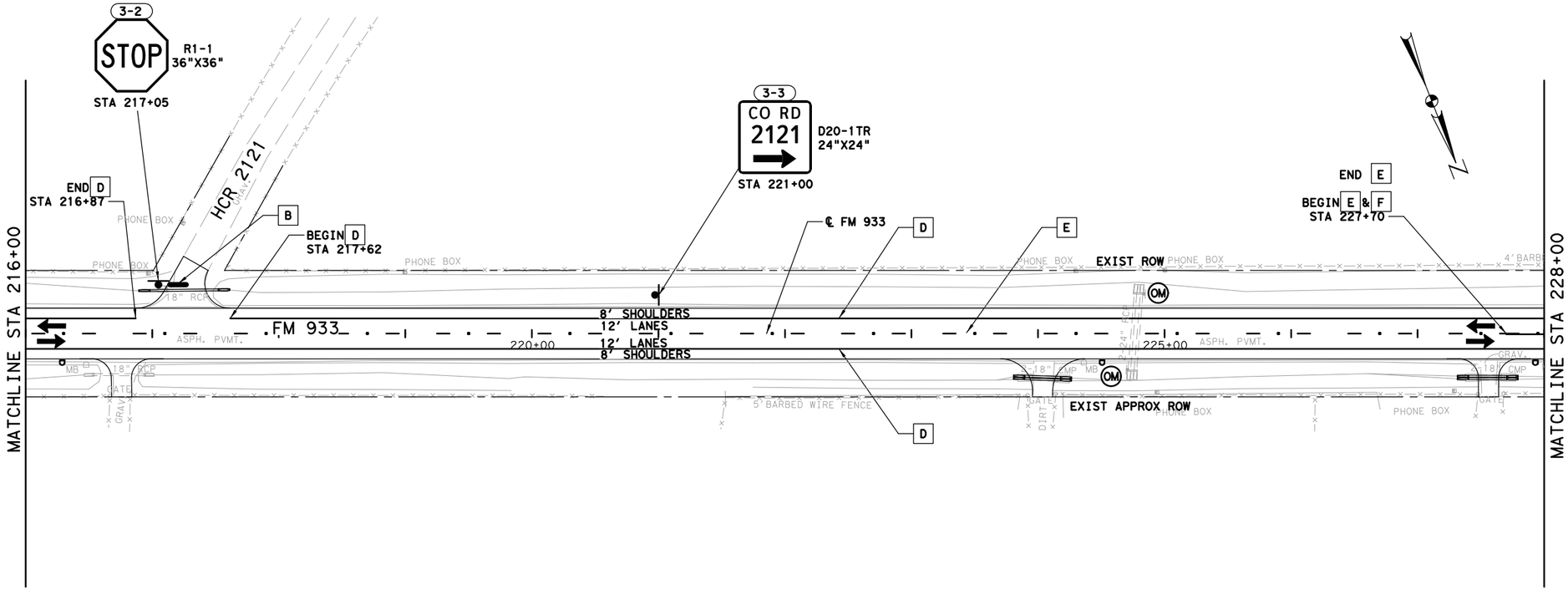


LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- (OM) OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	10
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	13
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4725
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	600
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	30
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	31



0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

Texas Department of Transportation®

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

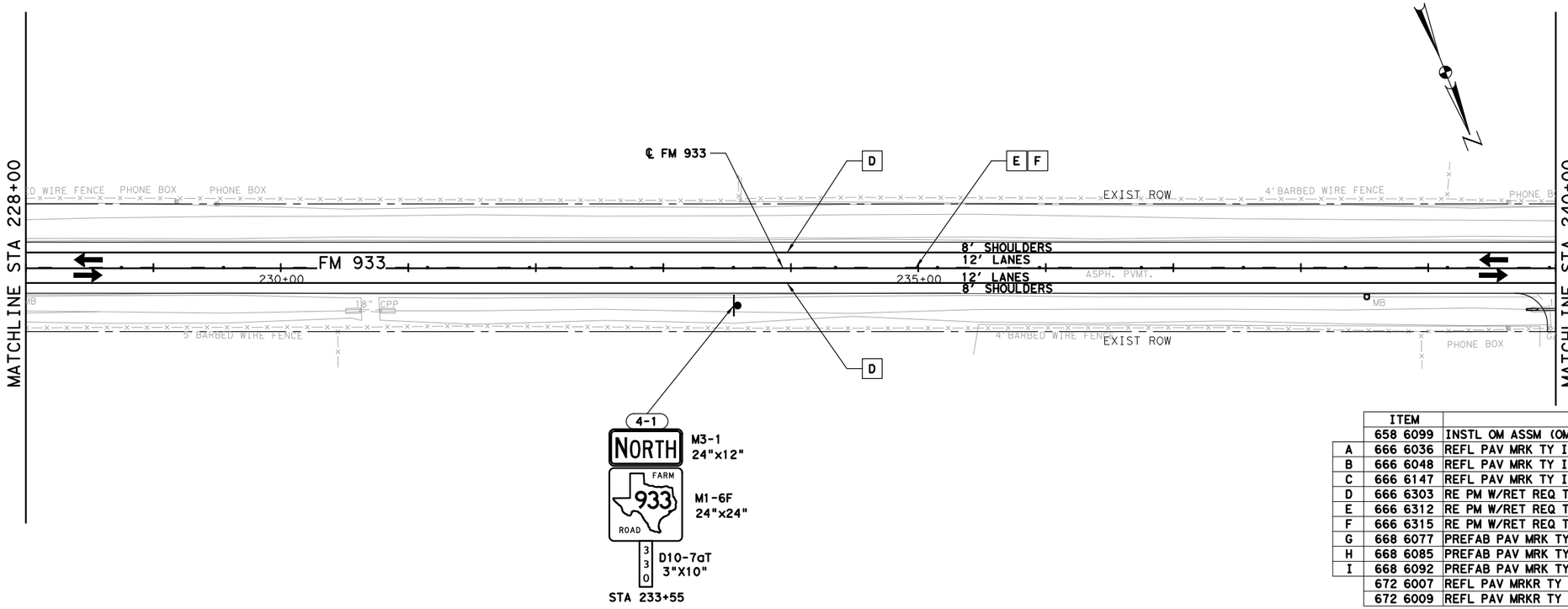
FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 3 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			73
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
05/27/2021 08:08:11 emahlmann
MODEL: SIGNING () PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_03.dgn
...\162_SMS\FM933_SPM_03.dgn



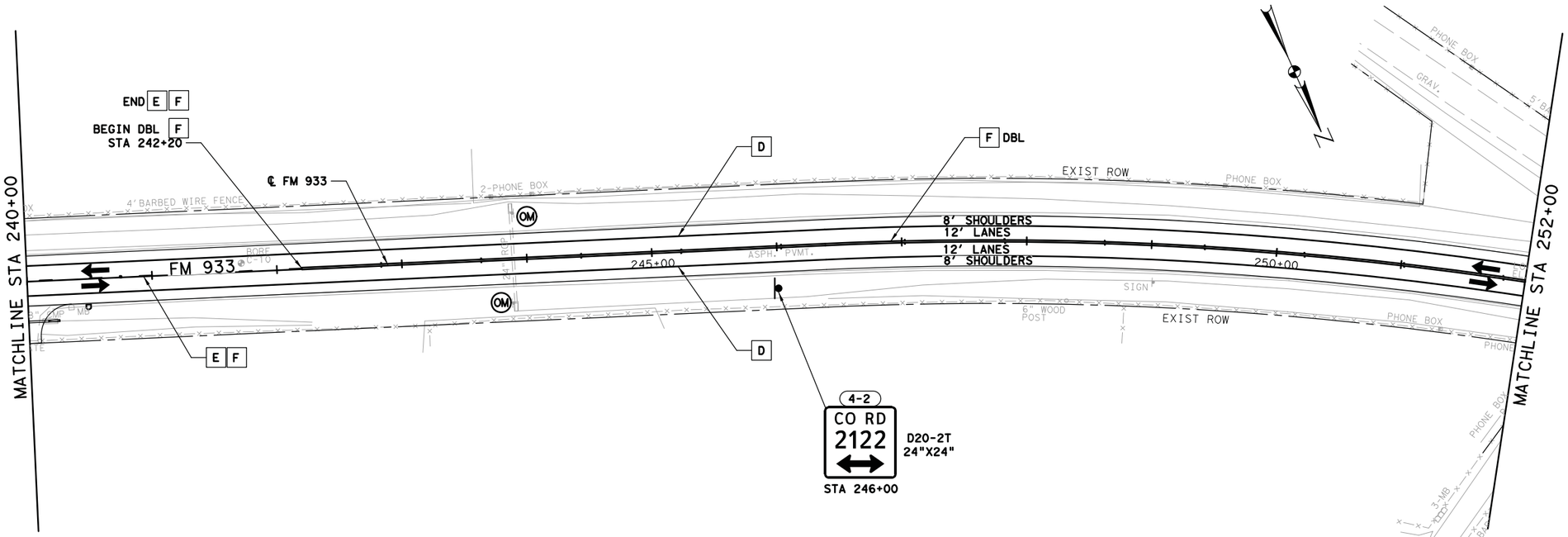
LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT | RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	2
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4800
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	360
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	3380
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	60

0 50 100
SCALE: 1" = 100'



BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

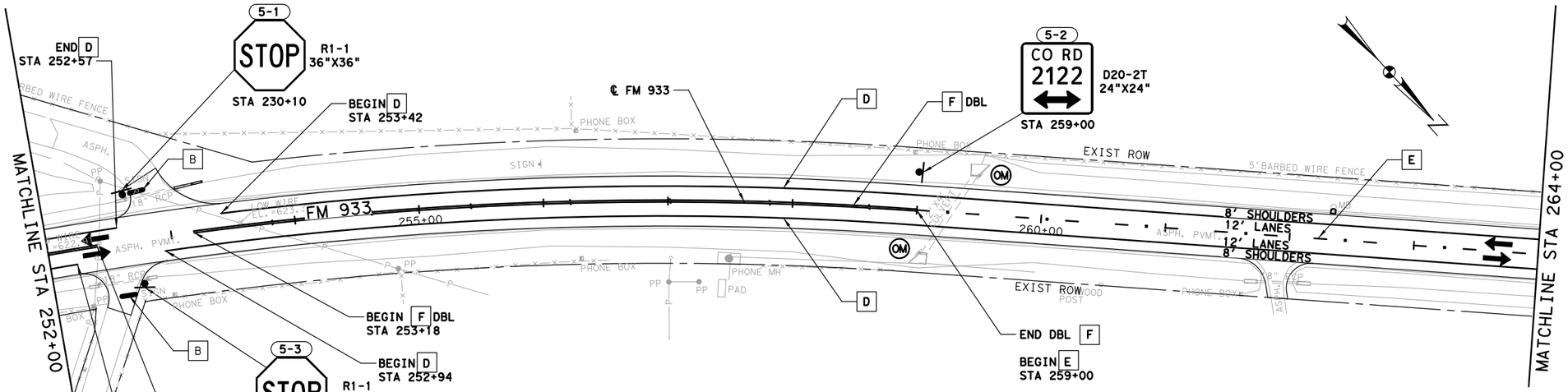
FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 4 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			74
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
05/27/2021 08:08:12 emahlmann
MODEL: SIGNING 0 PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_04.dgn
...\162_SMS\FM933_SPM_04.dgn



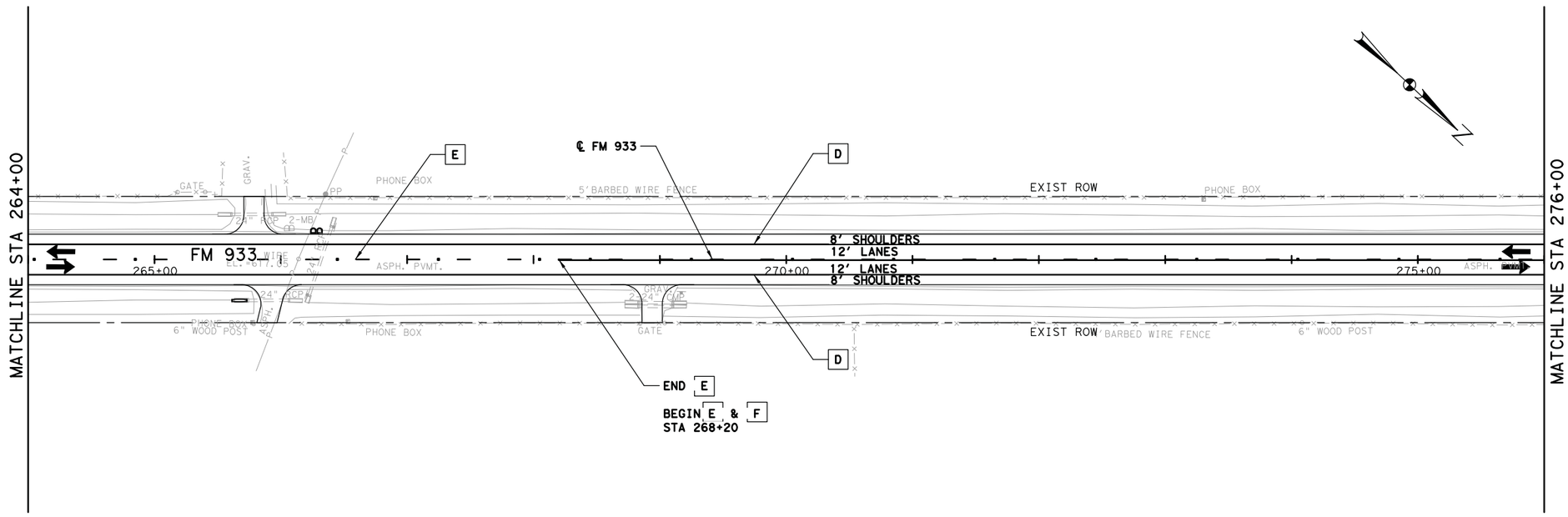
LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	2
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	22
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4653
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	430
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	1966
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	46

0 50 100
SCALE: 1" = 100'



STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

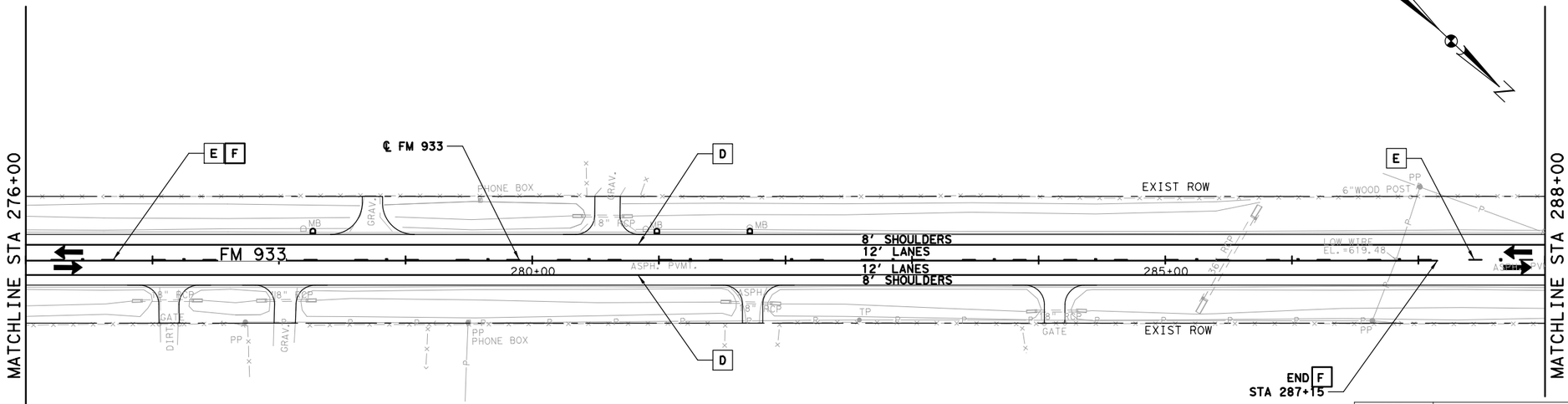
SIGNING & PAVEMENT MARKING LAYOUT

SHEET 5 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			75
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
MODEL: SIGNING & PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_05.dgn
...\162_SMS\FM933_SPM_05.dgn

emahlmann 08:00:13 05/27/2021



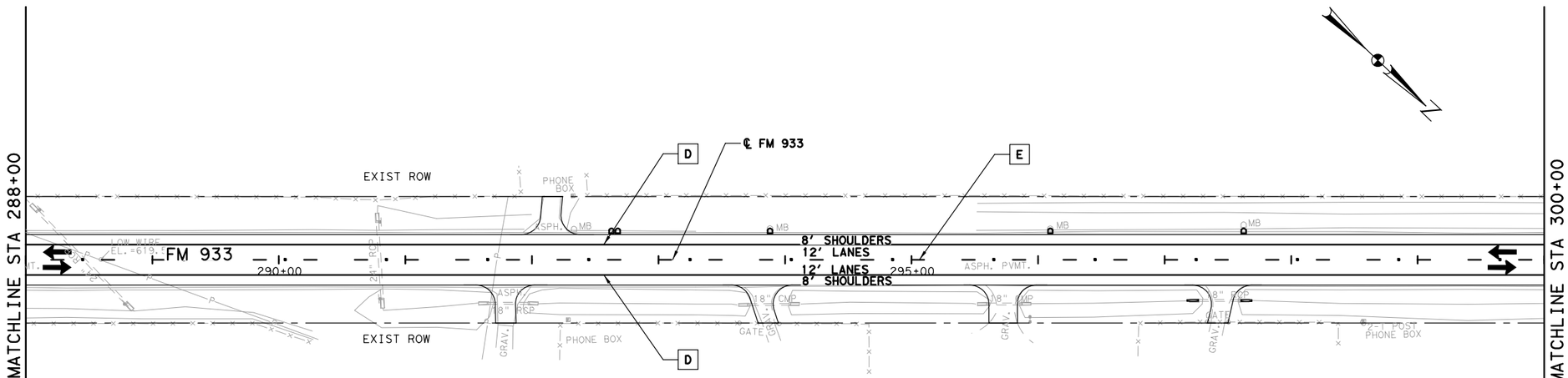
LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4800
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	600
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	1115
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	44

0 50 100
SCALE: 1" = 100'



M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

05/27/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

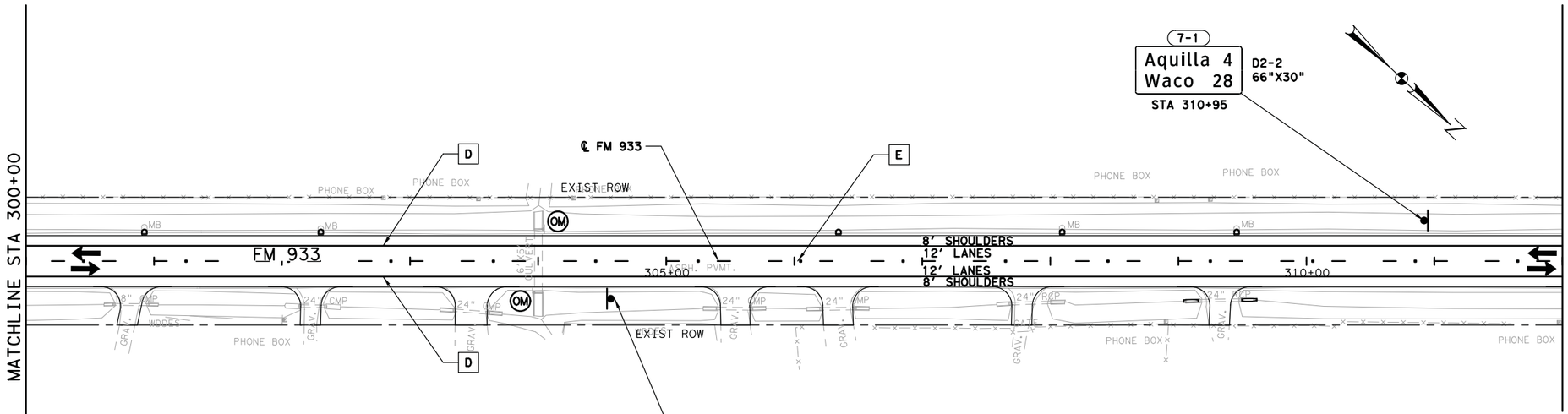
FM 933

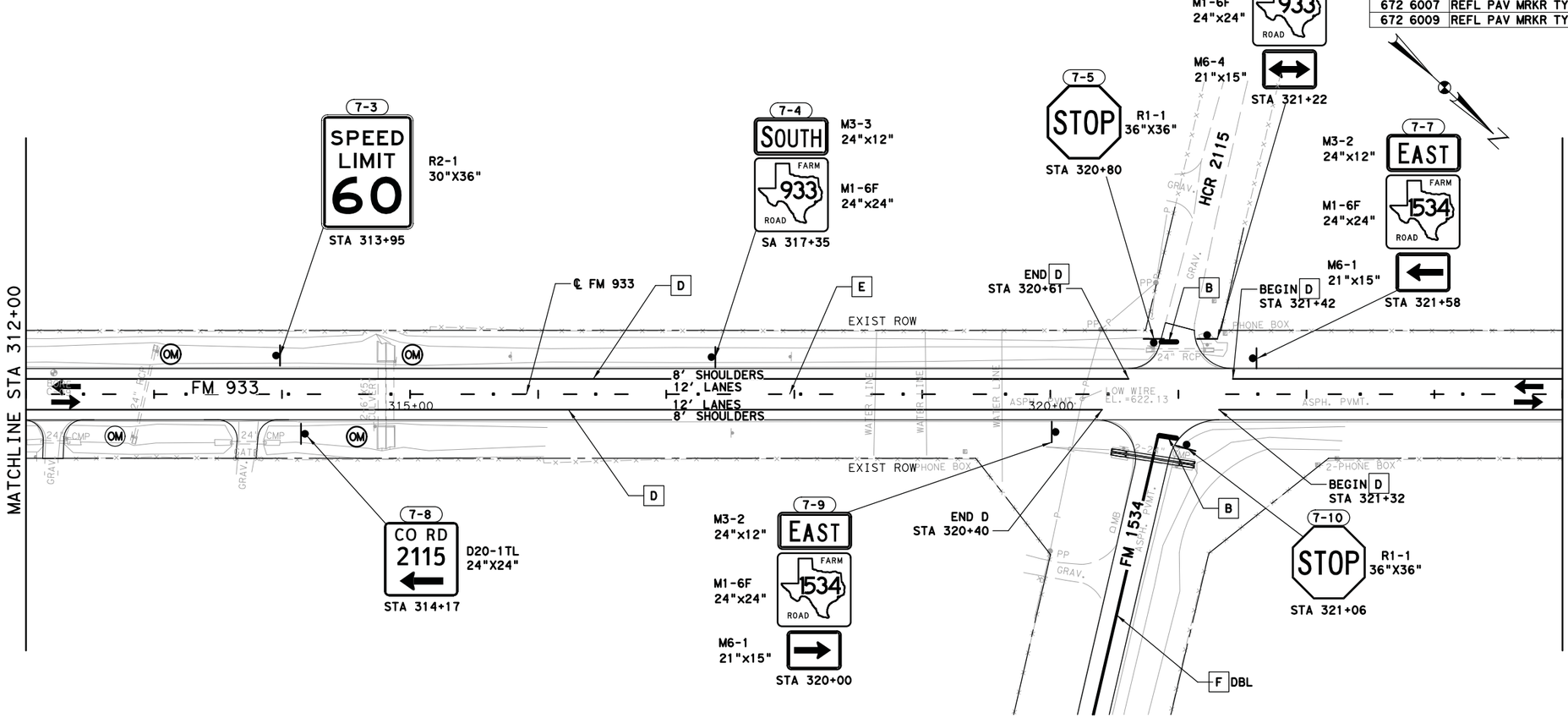
SIGNING & PAVEMENT MARKING LAYOUT

SHEET 6 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			76
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: tx\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
05/27/2021 08:00:13 emahlmann
MODEL: SIGNING 0 PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_06.dgn
...\162_SMS\FM933_SPM_06.dgn





LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	6
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	26
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4655
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	580
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	288
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	34

0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER
05/27/2021

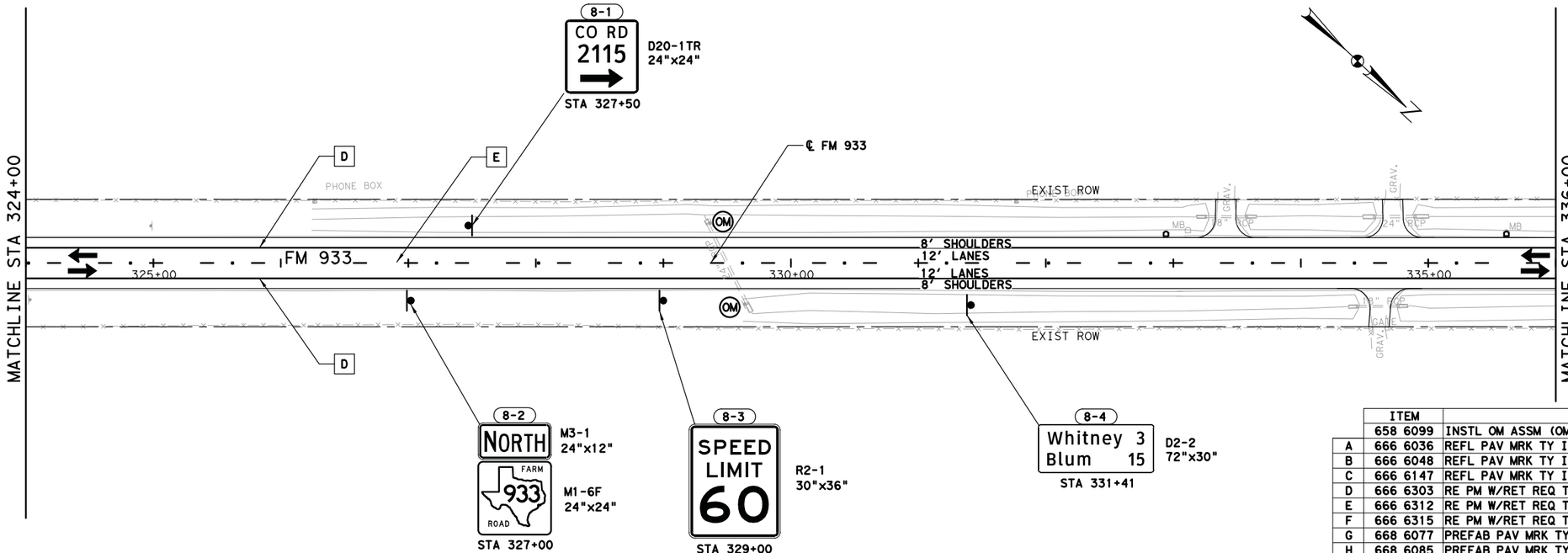
BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

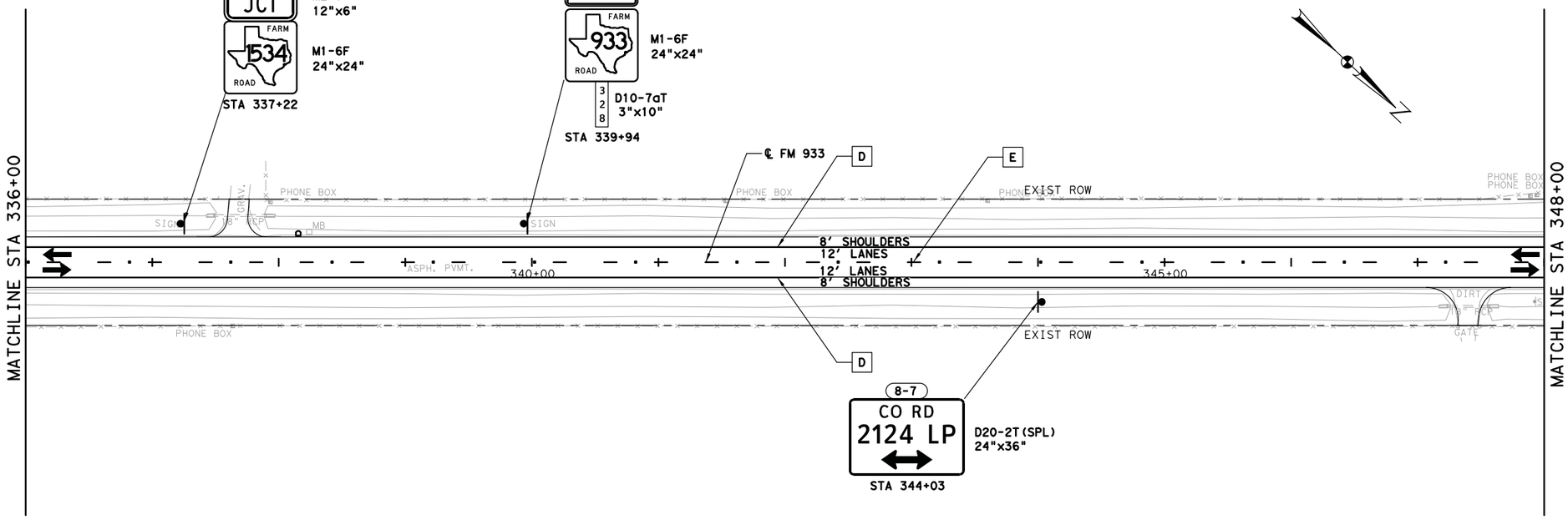
FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 7 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			77
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933





LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT | RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	2
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4800
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	600
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	30

0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

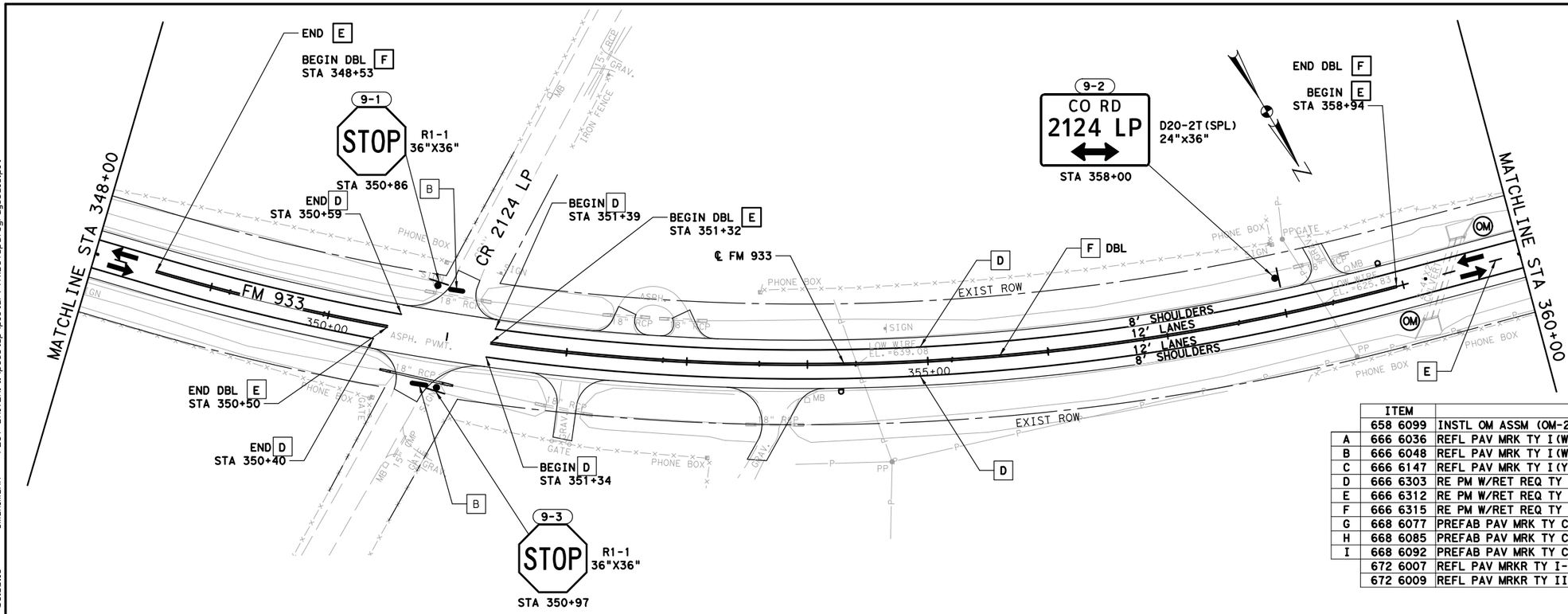
FM 933

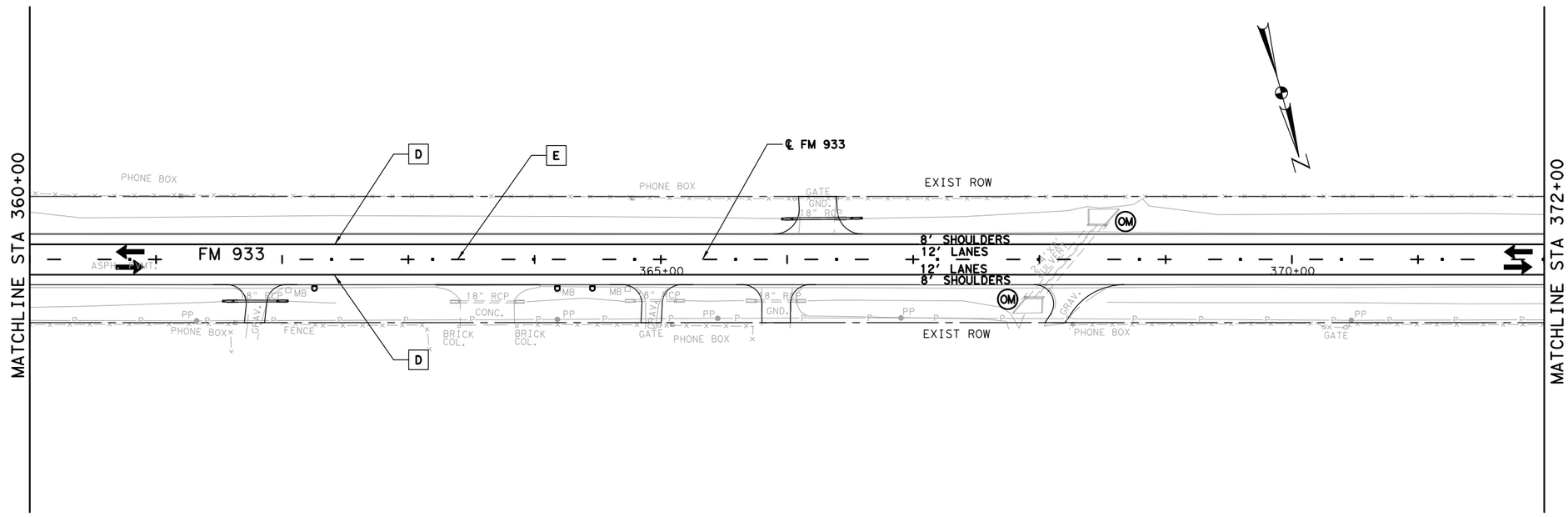
SIGNING & PAVEMENT MARKING LAYOUT

SHEET 8 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			78
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
05/27/2021 08:00:15 emahlmann
MODEL: SIGNING 0 PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\0L_CADD\162_SMS\FM933_SPM_08.dgn
...\162_SMS\FM933_SPM_08.dgn





LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- (OM) OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	4
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	22
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4633
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	340
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	1932
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	42

0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

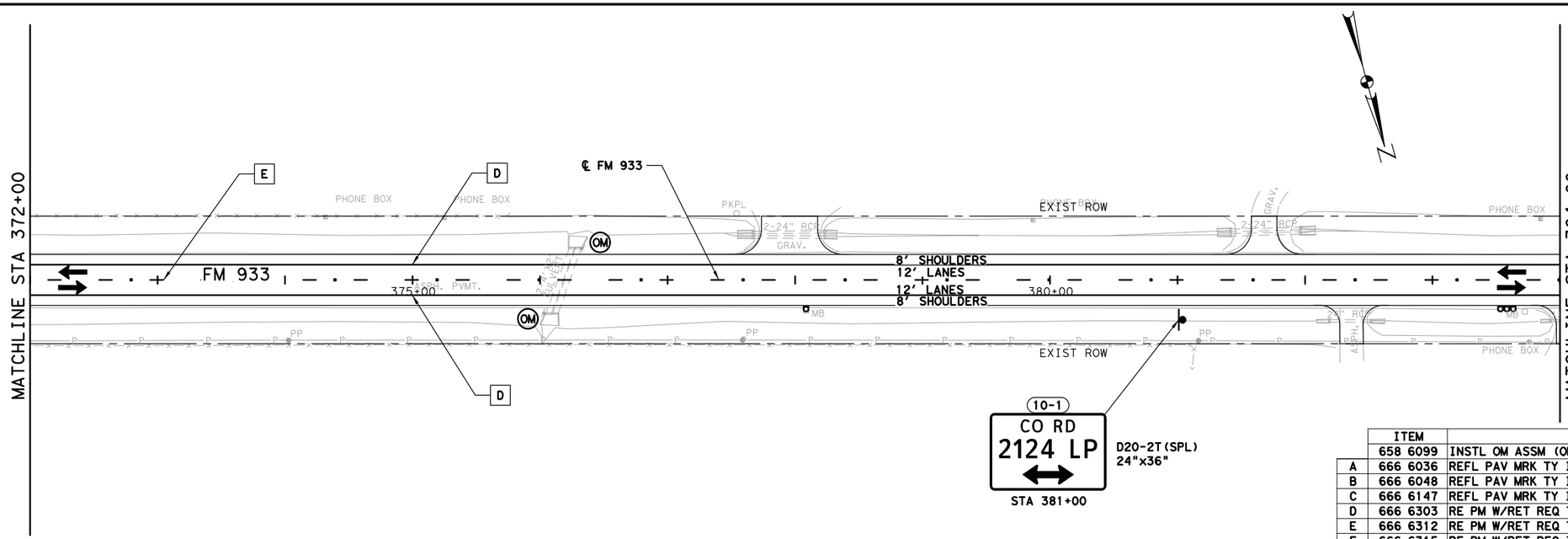
FM 933

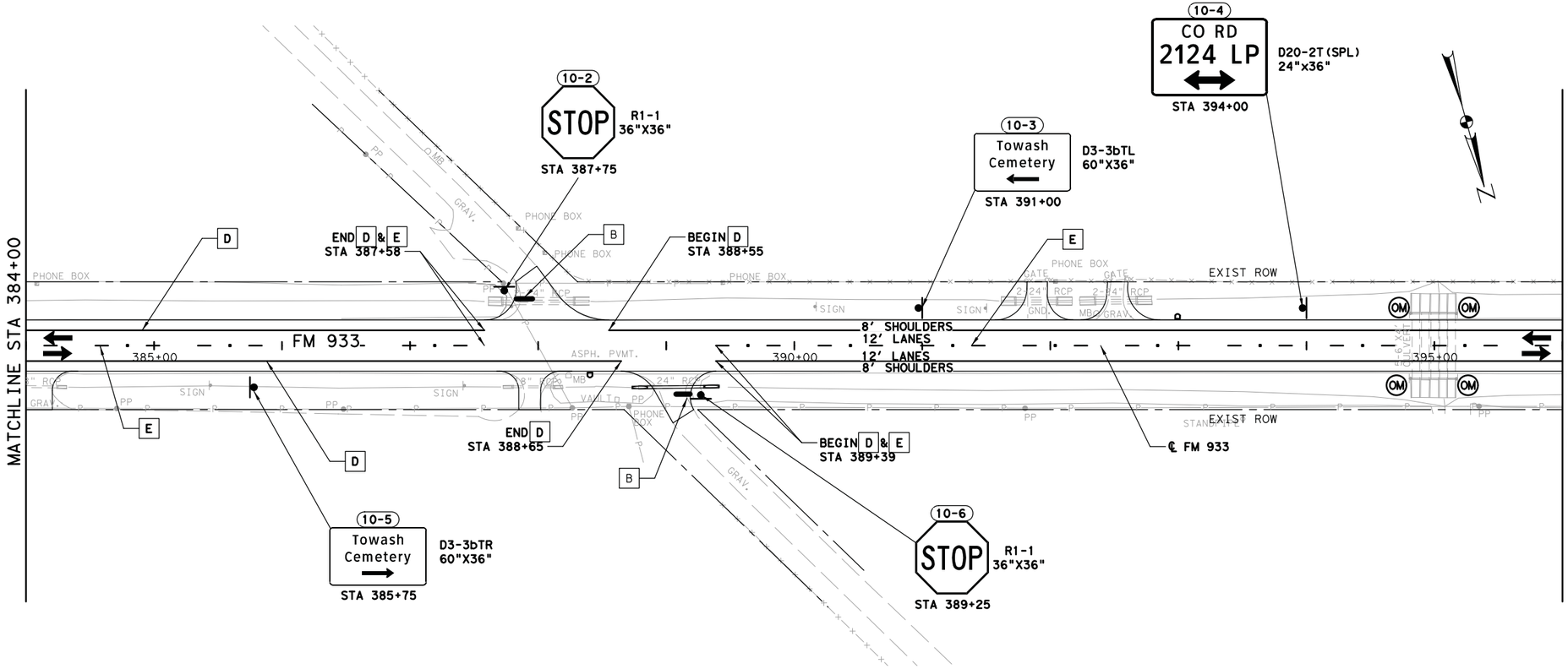
SIGNING & PAVEMENT MARKING LAYOUT

SHEET 9 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			79
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
05/27/2021 08:00:16 emahlmann
MODEL: SIGNING 0 PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_09.dgn
...\162_SMS\FM933_SPM_09.dgn





LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- (OM) OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	6
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	23
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4648
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	560
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	28

0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER
05/27/2021

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

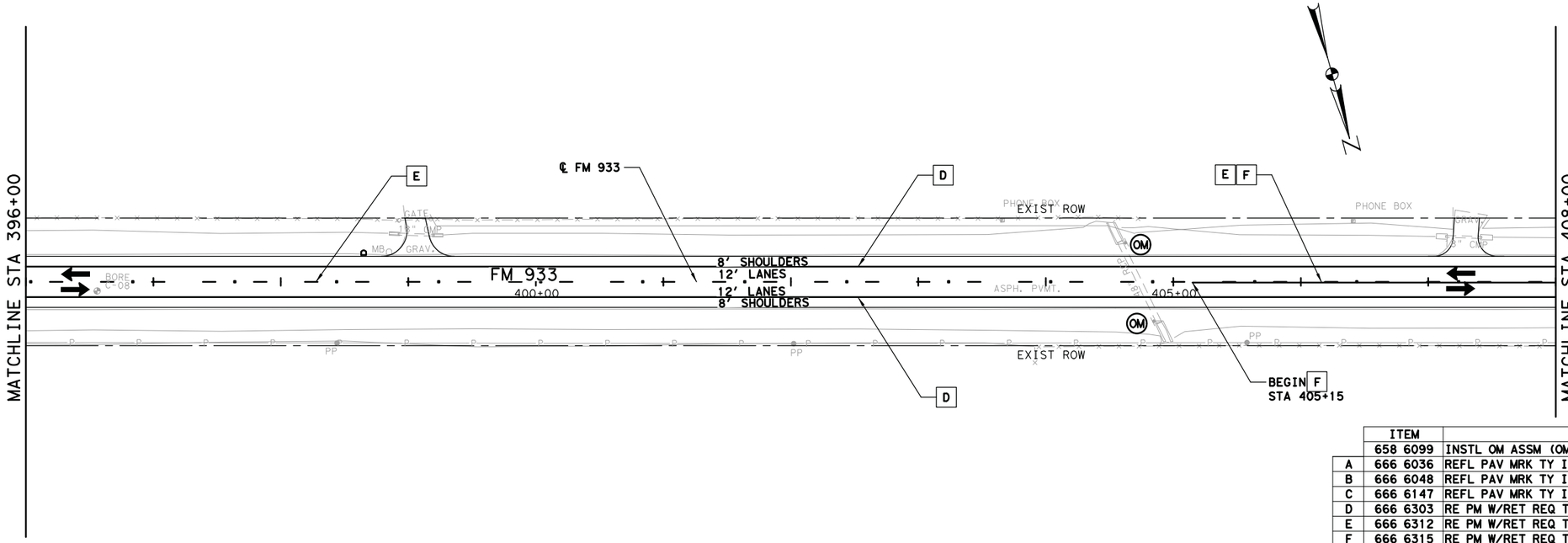
FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 10 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			80
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\162_SMS\FM933_SPM_10.dgn



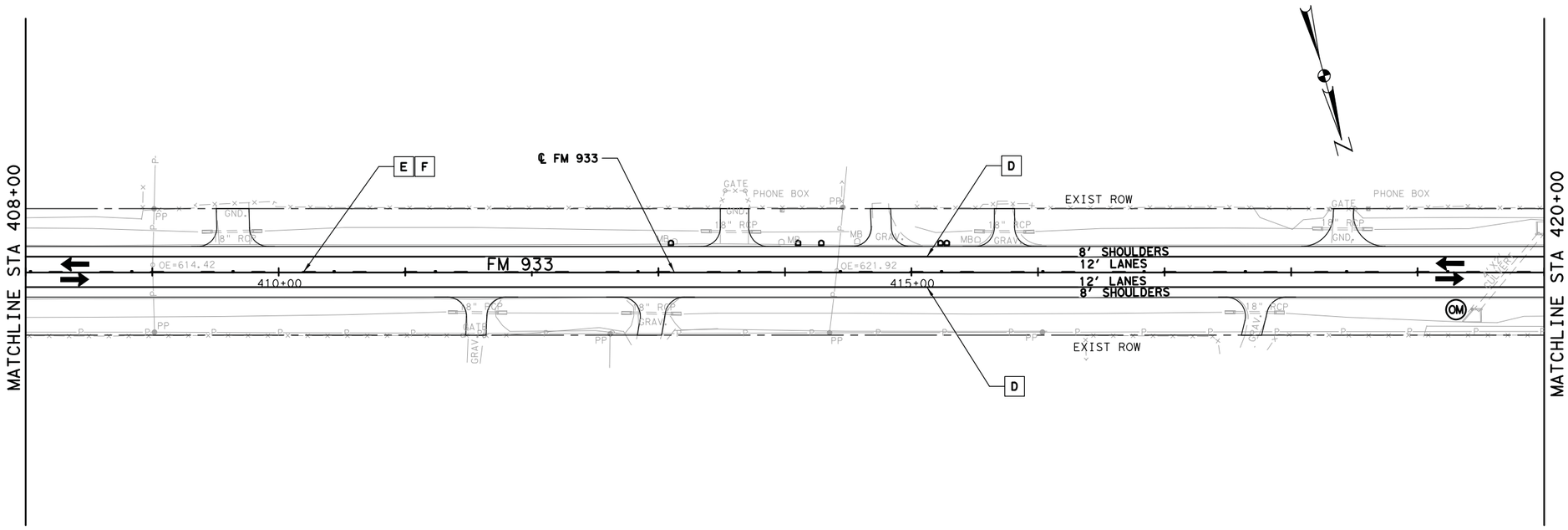
LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	3
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4800
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	600
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	1485
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	49

0 50 100
SCALE: 1" = 100'



M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

05/27/2021

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

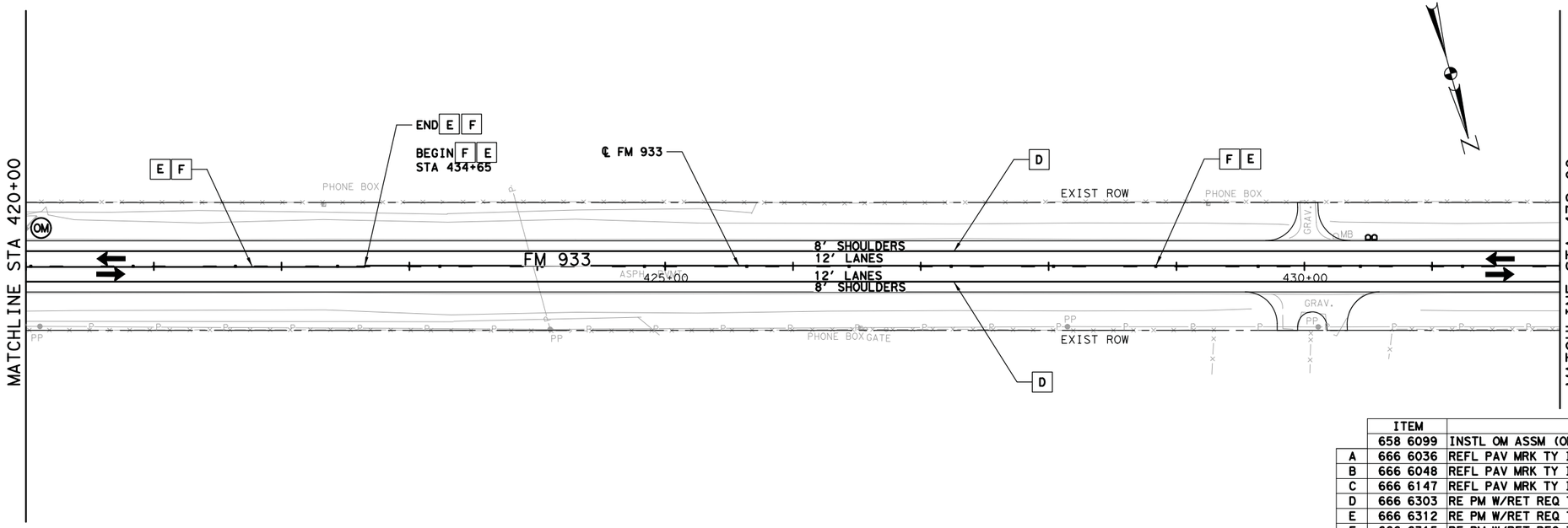
FM 933

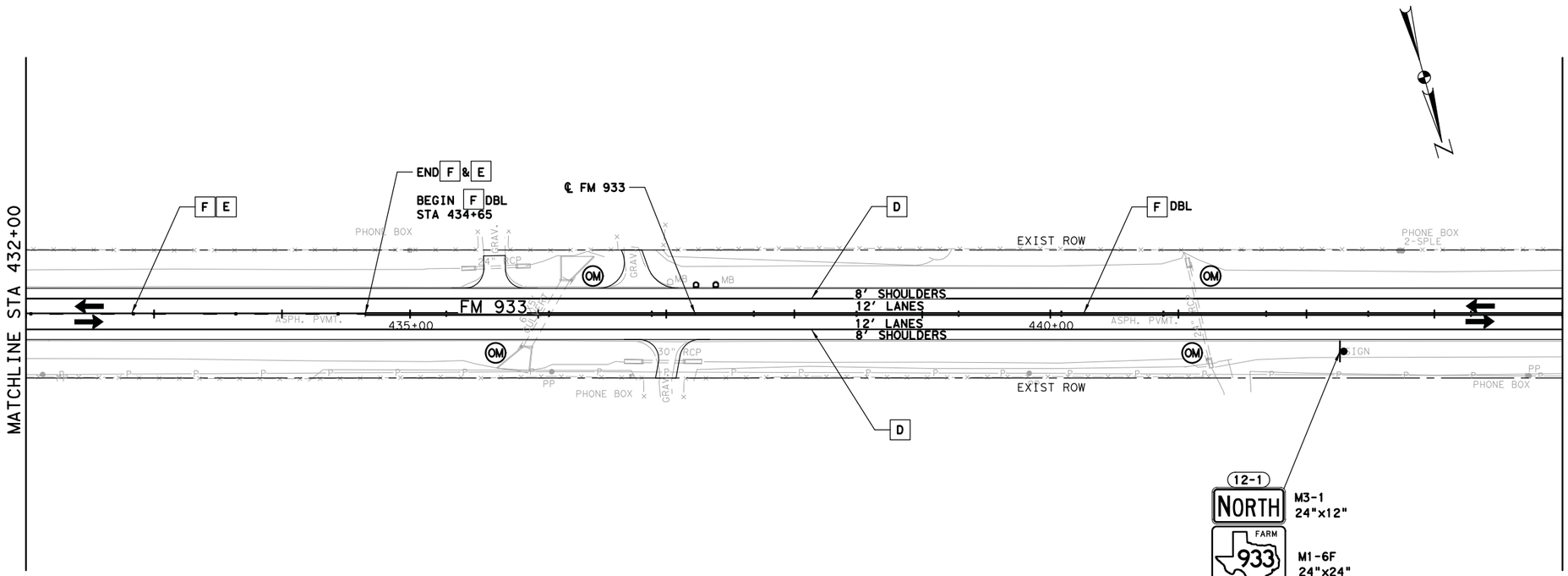
SIGNING & PAVEMENT MARKING LAYOUT

SHEET 11 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			81
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
05/27/2021 08:08:17 emahlmann
MODEL: SIGNING 0 PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\0L_CADD\162_SMS\FM933_SPM_11.dgn
...\162_SMS\FM933_SPM_11.dgn





LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- (OM) OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	5
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4800
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	370
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	3335
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	60

0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

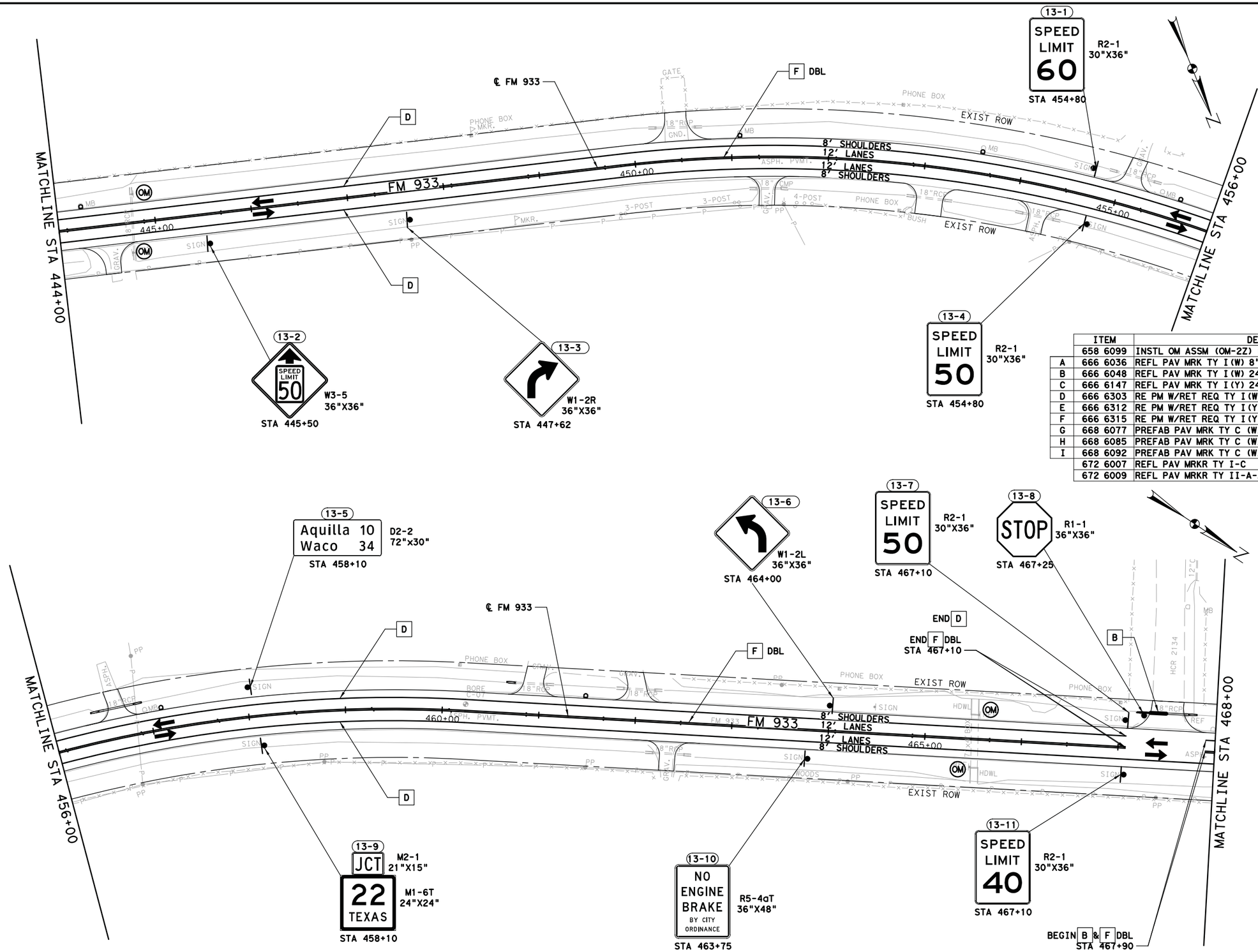
FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 12 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			82
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
05/27/2021 08:00:18 emahlmann
MODEL: SIGNING & PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_12.dgn
...\162_SMS\FM933_SPM_12.dgn



LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- (OM) OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	4
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	16
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	4730
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	4666
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	
	672 6007	REFL PAV MRKR TY I-C	EA	
	672 6009	REFL PAV MRKR TY II-A-A	EA	58

0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER
05/27/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 13 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			83
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

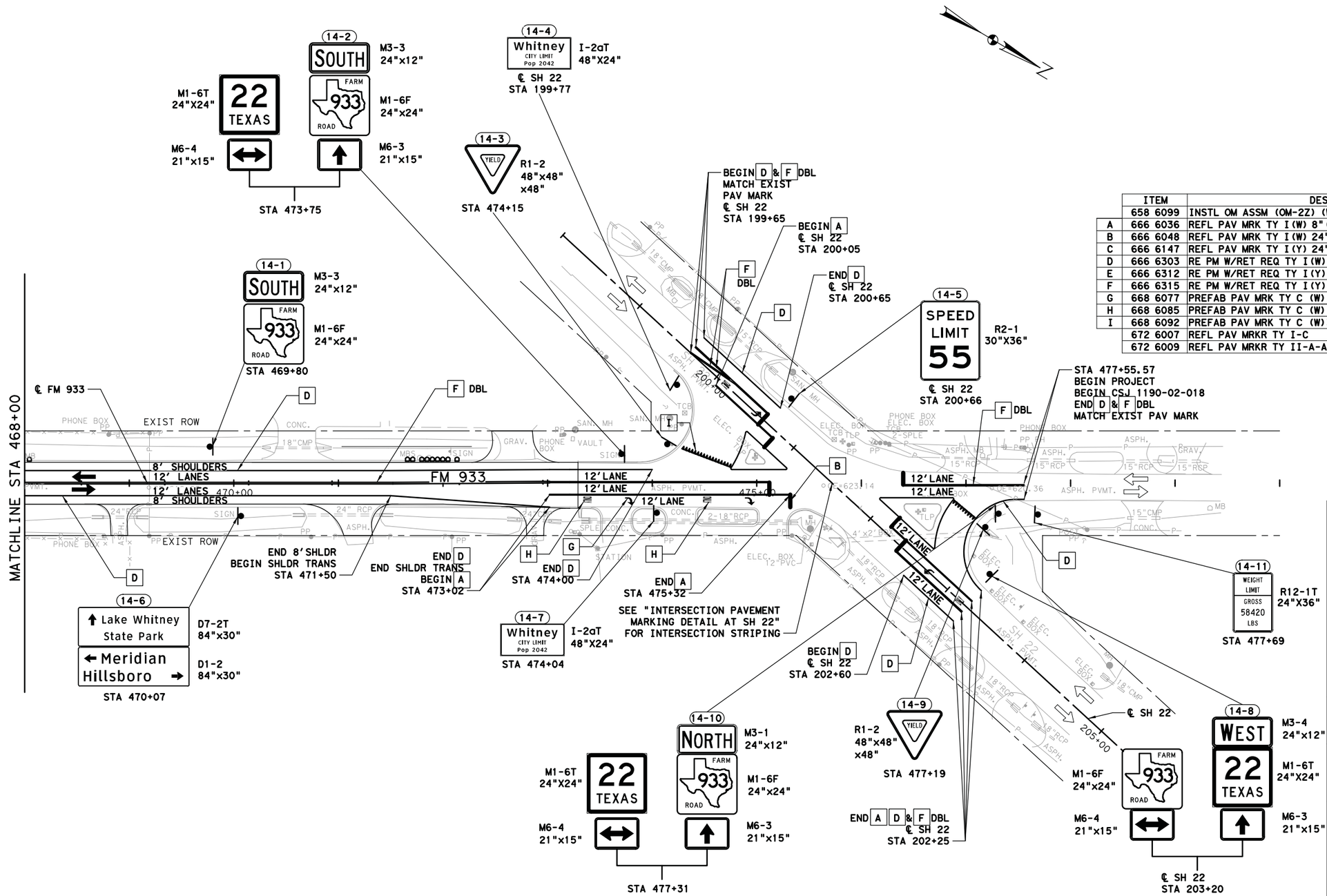
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
05/27/2021 08:00:18
emahlmann
MODEL: SIGNING & PAVEMENT MARKING LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM_13.dgn
...\162_SMS\FM933_SPM_13.dgn

LEGEND

- PROP TRAFFIC ARROW
- NEW SIGN
- OM — OBJECT MARKER (OM-2Z)
- DELINEATOR (D-SW) SZ 1
- LT RT — PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

	ITEM	DESCRIPTION	UNIT	QUANTITY
	658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	
A	666 6036	REFL PAV MRK TY I(W) 8"(SLD)(100MIL)	LF	409
B	666 6048	REFL PAV MRK TY I(W) 24"(SLD)(100MIL)	LF	86
C	666 6147	REFL PAV MRK TY I(Y) 24"(SLD)(100MIL)	LF	
D	666 6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	1726
E	666 6312	RE PM W/RET REQ TY I(Y)4"(BRK)(100MIL)	LF	
F	666 6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	2105
G	668 6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	4
H	668 6085	PREFAB PAV MRK TY C (W) (WORD)	EA	4
I	668 6092	PREFAB PAV MRK TY C (W)36"(YLD TRI)	EA	26
	672 6007	REFL PAV MRKR TY I-C	EA	21
	672 6009	REFL PAV MRKR TY II-A-A	EA	71



0 50 100
SCALE: 1" = 100'

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/27/2021

Texas Department of Transportation®

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

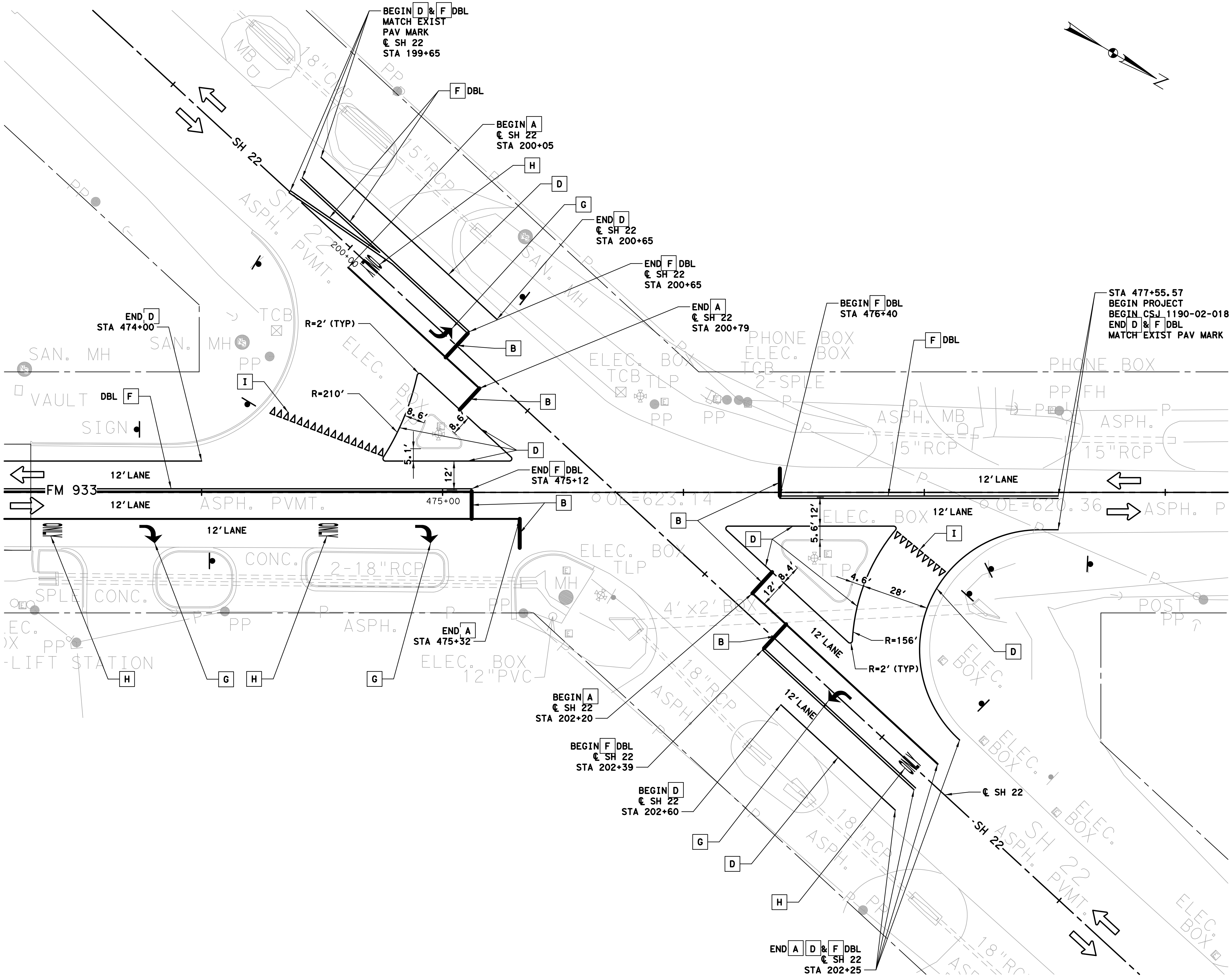
FM 933

SIGNING & PAVEMENT MARKING LAYOUT

SHEET 14 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			84
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\162_SMS\FM933_SPM_14.dgn



LEGEND

PROP TRAFFIC ARROW
NEW SIGN
OBJECT MARKER (OM-2Z)
DELINEATOR (D-SW) SZ 1
LT RT PAV MARK LT & RT OF ℄

NOTES:
1. REMOVE ALL EXISTING SIGNS.
2. REFER TO STANDARDS FOR STRIPING, SIGNING, RUMBLE STRIPS, DELINEATOR AND OBJECT MARKER REQUIREMENTS.
3. SEE SUMMARY OF SMALL SIGNS FOR ADDITIONAL SIGN INFORMATION.
4. RUMBLE STRIPS FOR CENTERLINE AND SHOULDERS SHALL BE OPTION 1.

0 20 40
SCALE: 1" = 40'

01/12/2021

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

INTERSECTION PAVEMENT MARKING DETAIL

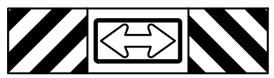
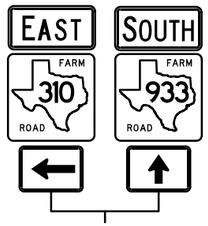
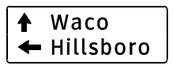
AT SH 22

SHEET 1 OF 1

FED RD DIV NO	PROJECT NO		SHEET NO
6			85
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

MODEL: INTERSECTION PAVEMENT MARKING DETAIL
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SPM-DET_01.dgn
01/12/2021 19:34:31 emahlmann
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
...\162_SMS\FM933_SPM-DET_01.dgn

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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
	1-1	W1-7T		144"x36"	X		S80	2	SA	P	EXAL		
		M1-6F		24"x24"									
	1-2	M6-4		21"x15"	X		10 BWG	1	SA	P			
		M3-2		24"x12"									
		M1-6F		24"x24"									
	1-3	M6-1		21"x15"	X		S80	1	SA	U			
		M3-3		24"x12"									
		M1-6F		24"x24"									
		M6-3		21"x15"									
1	1-4	D1-2		84"x30"	X		10 BWG	1	SA	U			
		M3-2		24"x12"									
	1-5	M1-6F		24"x24"	X		10 BWG	1	SA	P			
		M6-1		21"x15"									
	1-6	R1-1		36"x36"	X		10 BWG	1	SA	T			
		M3-1		24"x12"									
	1-7	M1-6F		24"x24"	X		10 BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

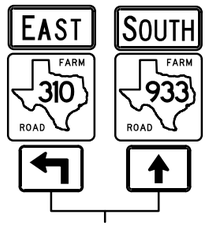
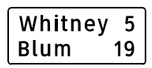
SOSS SHEET 1 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		86

18

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:32 emahlmann
MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\62_SMS\FM933_SOSS.dgn
...\01_CADD\62_SMS\FM933_SOSS.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
										PREFABRICATED	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TYPE N	TYPE S
							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"			
1	1-8	R2-1		30"x36"	X		10 BWG	1	SA	P			
	M3-2			24"x12"									
	M1-6F			24"x24"									
	1-9	M5-1		21"x15"	X		S80	1	SA	U			
	M3-3			24"x12"									
	M1-6F			24"x24"									
	M6-3			21"x15"									
	1-10	D2-2		72"x30"	X		10 BWG	1	SA	U			
	1-11	D20-1TR		24"x24"	X		10 BWG	1	SA	P			
	1-12	R1-1		36"x36"	X		10 BWG	1	SA	T			
2	2-1	D20-1TL		24"x24"	X		10 BWG	1	SA	P			
3	3-1	D20-1TL		24"x24"	X		10 BWG	1	SA	P			
	3-2	R1-1		36"x36"	X		10 BWG	1	SA	T			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

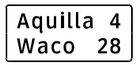
SHEET 2 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		87

18

MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SOSS.dgn
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
emahlmann
19:34:33
01/12/2021
...\01_CADD\162_SMS\FM933_SOSS.dgn

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	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POSTS: 1 or 2	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) MOUNTING DESIGNATION: PREFABRICATED P = "Plain", T = "T", U = "U"	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) 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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
3	3-3	D20-1TR		24"x24"	X		10 BWG	1	SA	P			
4		M3-1		24"x12"									
	4-1	M1-6F		24"x24"	X		10 BWG	1	SA	P			
		D-10-7aT		3"x10"									
	4-2	D20-2T		24"x24"	X		10 BWG	1	SA	P			
5	5-1	R1-1		36"x36"	X		10 BWG	1	SA	T			
	5-2	D20-2T		24"x24"	X		10 BWG	1	SA	P			
	5-3	R1-1		36"x36"	X		10 BWG	1	SA	T			
7	7-1	D2-2		66"x30"	X		10 BWG	1	SA	U			
		M2-1		12"x6"									
	7-2	M1-6F		24"x24"	X		10 BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation | Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS SHEET 3 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		88

01/12/2021 19:34:33 emahlmann
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXHVP-ojects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SOSS.dgn
...\01_CADD\162_SMS\FM933_SOSS.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE 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"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels		
7	7-3	R2-1		30"x36"	X		10 BWG	1	SA	P			
	M3-3			24"x12"									
	7-4	M1-6F		24"x24"	X		10 BWG	1	SA	P			
	7-5	R1-1		36"x36"	X		10 BWG	1	SA	T			
	M1-6F			24"x24"									
	7-6	M6-4		21"x15"	X		10 BWG	1	SA	P			
	M3-2			24"x12"									
	7-7	M1-6F		24"x24"	X		10 BWG	1	SA	P			
	M6-1			21"x15"									
	7-8	D20-1TL		24"x24"	X		10 BWG	1	SA	P			
	M3-2			24"x12"									
	7-9	M1-6F		24"x24"	X		10 BWG	1	SA	P			
	M6-1			21"x15"									

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

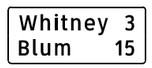
SOSS

SHEET 4 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		89

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:33 emahlmann
MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXHVProjects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SOSS.dgn
...\01_CADD\162_SMS\FM933_SOSS.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE 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"			
7	7-10	R1-1		36"x36"	X		10 BWG	1	SA	T			
8	8-1	D20-1TR		24"x24"	X		10 BWG	1	SA	P			
		M3-1		24"x12"									
	8-2	M1-6F		24"x24"	X		10 BWG	1	SA	P			
	8-3	R2-1		30"x36"	X		10 BWG	1	SA	P			
	8-4	D2-2		72"x30"	X		10 BWG	1	SA	U			
		M2-1		12"x6"									
	8-5	M1-6F		24"x24"	X		10 BWG	1	SA	P			
		M3-3		24"x12"									
	8-6	M1-6F		24"x24"	X		10 BWG	1	SA	P			
		D10-7aT		3"x10"									
	8-7	D20-2T(SPL)		36"x24"	X		10 BWG	1	SA	T			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 5 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		90

18

MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\62_SMS\FM933_SOSS.dgn
01/12/2021 19:34:34 emahlmann
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
...\01_CADD\62_SMS\FM933_SOSS.dgn

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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
9	9-1	R1-1	STOP	36"x36"	X		10 BWG	1	SA	T		
	9-2	D20-2T(SPL)	CO RD 2124 LP ↔	36"x24"	X		10 BWG	1	SA	T		
	9-3	R1-1	STOP	36"x36"	X		10 BWG	1	SA	T		
10	10-1	D20-2T(SPL)	CO RD 2124 LP ↔	36"x24"	X		10 BWG	1	SA	T		
	10-2	R1-1	STOP	36"x36"	X		10 BWG	1	SA	T		
	10-3	D3-3bTL	Towash Cemetery ←	60"x36"	X		10 BWG	1	SA	U		
	10-4	D20-2T(SPL)	CO RD 2124 LP ↔	36"x24"	X		10 BWG	1	SA	T		
	10-5	D3-3bTR	Towash Cemetery →	60"x36"	X		10 BWG	1	SA	U		
	10-6	R1-1	STOP	36"x36"	X		10 BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 6 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		91

MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SOSS.dgn
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
emahlmann
01/12/2021 19:34:34
...\01_CADD\162_SMS\FM933_SOSS.dgn

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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
12		M3-1		24"x12"								
	12-1	M1-6F	NORTH / FARM 933 ROAD / 3 2 6	24"x24"	X		10 BWG	1	SA	P		
		D10-7aT		3"x10"								
13	13-1	R2-1	SPEED LIMIT 60	30"x36"	X		10 BWG	1	SA	P		
	13-2	W3-5	SPEED LIMIT 50	36"x36"	X		10 BWG	1	SA	P		
	13-3	W1-2R		36"x36"	X		10 BWG	1	SA	P		
	13-4	R2-1	SPEED LIMIT 50	30"x36"	X		10 BWG	1	SA	P		
	13-5	D2-2	Aquilla 10 Waco 34	72"x30"	X		10 BWG	1	SA	U		
	13-6	W1-2L		36"x36"	X		10 BWG	1	SA	P		
	13-7	R2-1	SPEED LIMIT 50	30"x36"	X		10 BWG	1	SA	P		
	13-8	R1-1	STOP	36"x36"	X		10 BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 7 OF 9

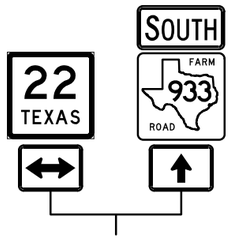
FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		92

18

01/12/2021 19:34:34 emahlmann
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: tx\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXHVP-ojects\TxDOT\5335-05A_FM933\TSV0L_CADD\162_SMS\FM933_SOSS.dgn
...\0L_CADD\162_SMS\FM933_SOSS.dgn

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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
13		M2-1		21"x15"								
	13-9	M1-6T		24"x24"	X		10 BWG	1	SA	P		
	13-10	R5-4aT		36"x48"	X		10 BWG	1	SA	T		
	13-11	R2-1		30"x36"	X		10 BWG	1	SA	P		
14		M3-3		24"x12"								
	14-1	M1-6F		24"x24"	X		10 BWG	1	SA	P		
		M1-6T		24"x24"								
		M6-4		21"x15"								
		M3-3		24"x12"								
	14-2				X		S80	1	SA	U		
		M1-6F		24"x24"								
		M6-3		21"x15"								
	14-3	R1-2		48"x48"x48"	X		10 BWG	1	SA	T		
	14-4	I-2aT		48"x24"	X		10 BWG	1	SA	T		
	14-5	R2-1		30"x36"	X		10 BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 8 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		93

MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SOSS.dgn
01/12/2021 19:34:34 emahlmann
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
...\01_CADD\162_SMS\FM933_SOSS.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE 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"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels		
		D7-2T	Lake Whitney / State Park / ← Meridian / Hillsboro →	84"x30"									
	14-6	D1-2		84"x30"	X		S80	2	SA	P			
	14-7	I-2aT	Whitney CITY LIMIT Pop 2042	48"x24"	X		10 BWG	1	SA	T			
		M1-6F		24"x24"									
		M6-4	FARM 933 ROAD	21"x15"									
	14-8	M3-4	WEST 22 TEXAS	24"x12"	X		S80	1	SA	U			
		M1-6T		24"x24"									
14		M6-3		21"x15"									
	14-9	R1-2	YIELD	48"x48"x48"	X		10 BWG	1	SA	T			
		M1-6T		24"x24"									
		M6-4	NORTH / 22 TEXAS / FARM 933 ROAD	21"x15"									
		M3-2		24"x12"									
	14-10				X		S80	1	SA	U			
		M1-6F		24"x24"									
		M6-3		21"x15"									
	14-11	R12-1T	WEIGHT LIMIT / GROSS 58420 LBS	24"x36"	X		10 BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

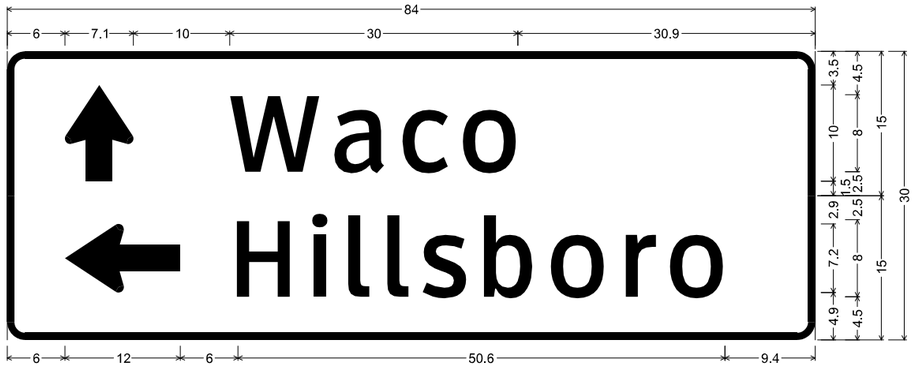
SOSS

SHEET 9 OF 9

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		94

18

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:35 emahlmann
MODEL: SUMMARY OF SMALL SIGNS
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SOSS.dgn
...\01_CADD\162_SMS\FM933_SOSS.dgn

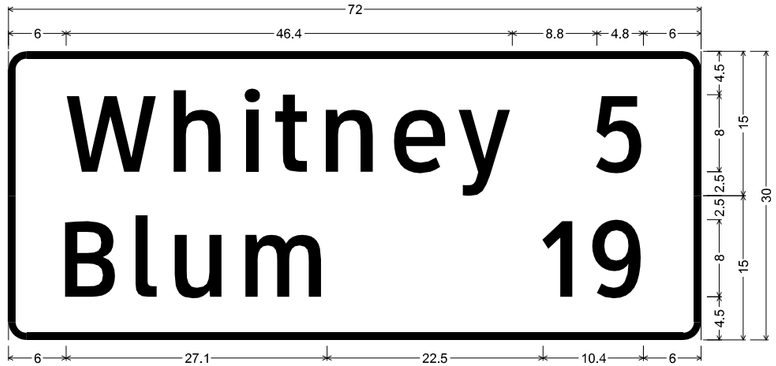


(SIGN 1-4) D1-2 8in UP-LT;

1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 10.0" X 7.1" 90'; "Waco", ClearviewHwy-3-W;

1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180'; "Hillsboro", ClearviewHwy-3-W;

(SHEET 1 OF 14)

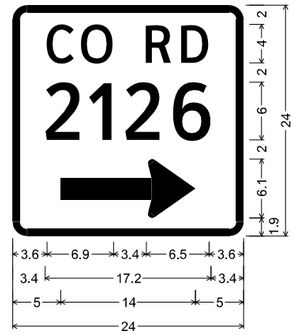


(SIGN 1-10) D2-2 8in;

1.9" Radius, 0.8" Border, White on, Green;
"Whitney", ClearviewHwy-3-W; "5", ClearviewHwy-3-W;

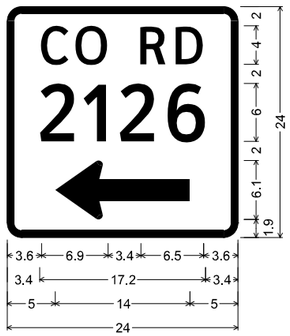
1.9" Radius, 0.8" Border, White on, Green;
"Blum", ClearviewHwy-3-W; "19", ClearviewHwy-3-W;

(SHEET 1 OF 14)



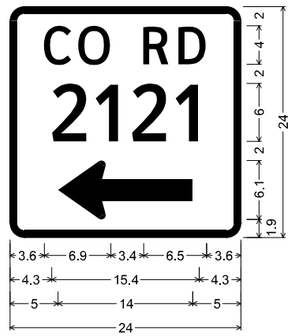
(SIGN 1-11) D20-1TR;
1.5" Radius, 0.8" Border, White on, Green;
"CO RD", ClearviewHwy-3-W;
"2126", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0';

(SHEET 1 OF 14)



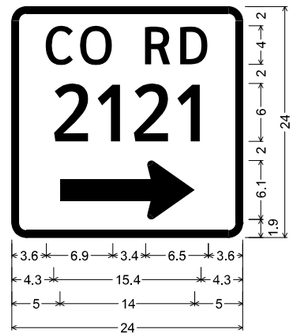
(SIGN 2-1) D20-1TL;
1.5" Radius, 0.8" Border, White on, Green;
"CO RD", ClearviewHwy-3-W;
"2126", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180';

(SHEET 2 OF 14)



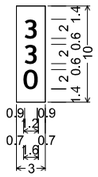
(SIGN 3-1) D20-1TL;
1.5" Radius, 0.8" Border, White on, Green;
"CO RD", ClearviewHwy-3-W;
"2121", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180';

(SHEET 2 OF 14)



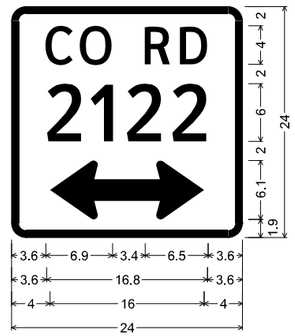
(SIGN 3-3) D20-1TR;
1.5" Radius, 0.8" Border, White on, Green;
"CO RD", ClearviewHwy-3-W;
"2121", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0';

(SHEET 3 OF 14)



(SIGN 4-1) D10-7aT 3in;
No border, White on, Green;
"3", ClearviewHwy-4-W;
"3", ClearviewHwy-4-W;
"0", ClearviewHwy-4-W;

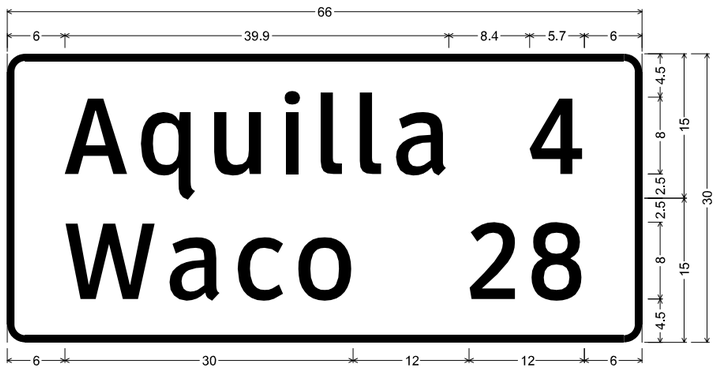
(SHEET 4 OF 14)



(SIGN 4-2 & 5-2) D20-2T;
1.5" Radius, 0.8" Border, White on, Green;
"CO RD", ClearviewHwy-3-W;
"2122", ClearviewHwy-3-W;

(SHEET 4 OF 14 & SHEET 5 OF 14)

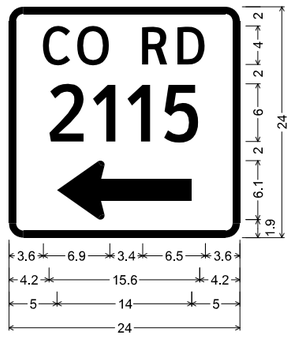
NTS



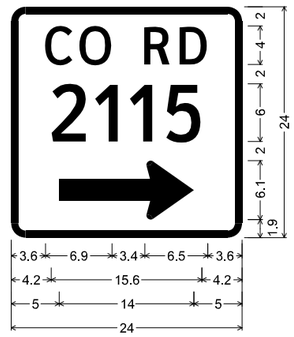
(SIGN 7-1) D2-2 8in;

1.9" Radius, 0.8" Border, White on, Green;
"Aquilla", ClearviewHwy-3-W; "4", ClearviewHwy-3-W;

1.9" Radius, 0.8" Border, White on, Green;
"Waco", ClearviewHwy-3-W; "28", ClearviewHwy-3-W; (SHEET 7 OF 14)



(SIGN 7-8) D20-1TL;
1.5" Radius, 0.8" Border, White on, Green;
"CO RD", ClearviewHwy-3-W;
"2115", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180'; (SHEET 7 OF 14)



(SIGN 8-1) D20-1TR;
1.5" Radius, 0.8" Border, White on, Green;
"CO RD", ClearviewHwy-3-W;
"2115", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0'; (SHEET 8 OF 14)

01/12/2021

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

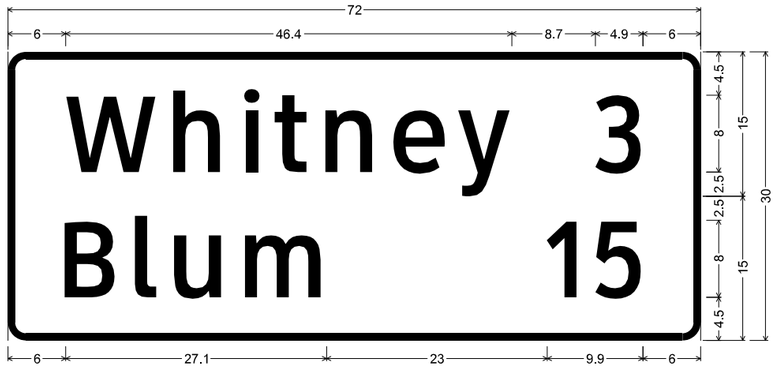
FM 933

GUIDE SIGN DETAILS

SHEET 1 OF 3

FED RD DIV NO	PROJECT NO		SHEET NO
6			95
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

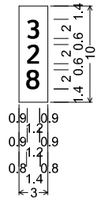
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
01/12/2021 19:34:35 emahlmann
MODEL: GUIDE SIGN DETAILS
FILE: G:\TXHV\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SGNDTL_01.dgn
...\162_SMS\FM933_SGNDTL_01.dgn



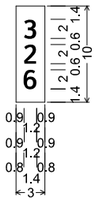
(SIGN 8-4) D2-2;

1.9" Radius, 0.8" Border, White on, Green;
"Whitney", ClearviewHwy-3-W; "3", ClearviewHwy-3-W;

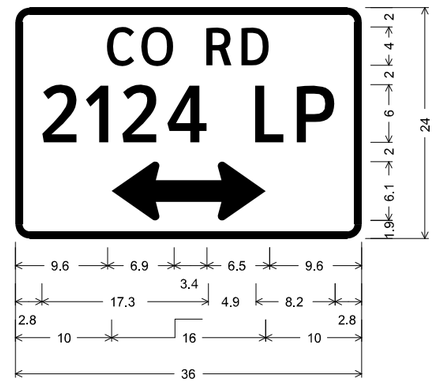
1.9" Radius, 0.8" Border, White on, Green;
"Blum", ClearviewHwy-3-W; "15", ClearviewHwy-3-W;
(SHEET 8 OF 14)



(SIGN 8-6) D10-7aT;
No border, White on, Green;
"3", ClearviewHwy-4-W;
"2", ClearviewHwy-4-W;
"8", ClearviewHwy-4-W;
(SHEET 8 OF 14)



(SIGN 12-1) D10-7aT;
No border, White on, Green;
"3", ClearviewHwy-4-W;
"2", ClearviewHwy-4-W;
"6", ClearviewHwy-4-W;
(SHEET 10 OF 14)

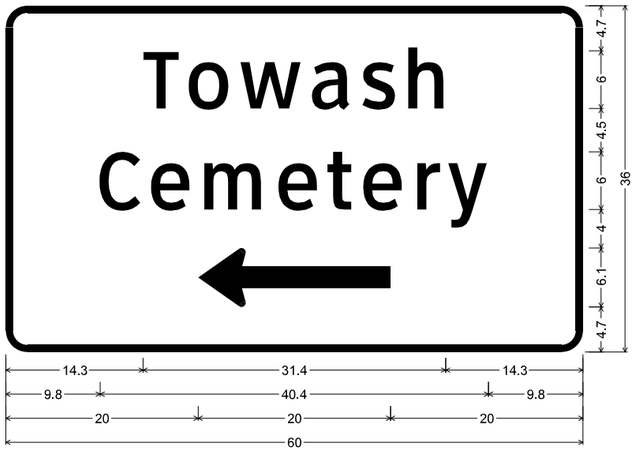


(SIGN 8-7, 9-2, 10-1 & 10-4) D20-2T(SPL);

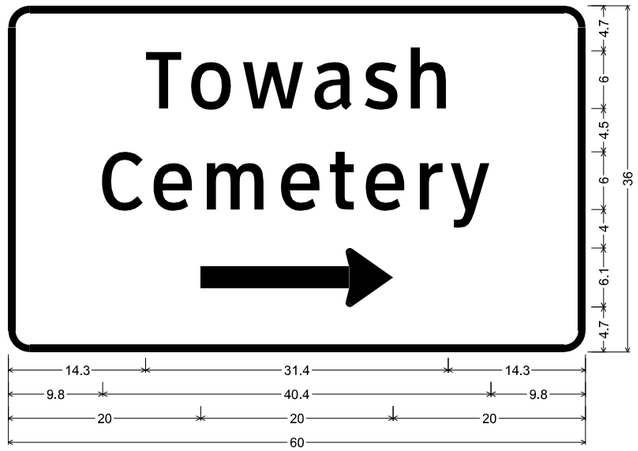
1.5" Radius, 0.8" Border, White on, Green;

"CO RD", ClearviewHwy-3-W;

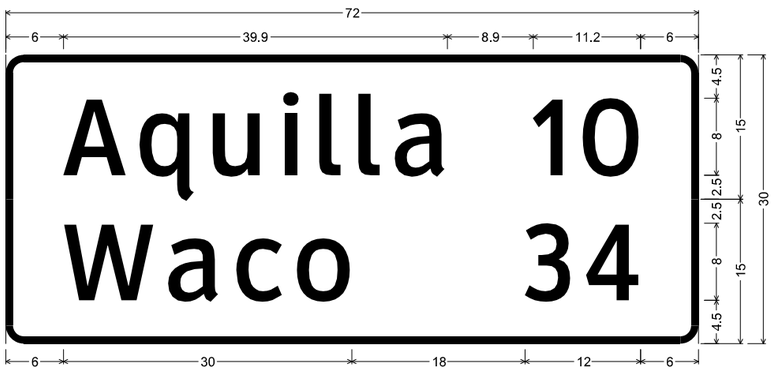
"2124 LP", ClearviewHwy-3-W;
(SHEET 8, 9 & 10 OF 14)



(SIGN 10-3) D3-3bTL;
2.3" Radius, 0.8" Border, White on, Green;
"Towash", ClearviewHwy-3-W; "Cemetery", ClearviewHwy-3-W;
Standard Arrow Custom 20.0" X 6.1" 180';
(SHEET 10 OF 14)



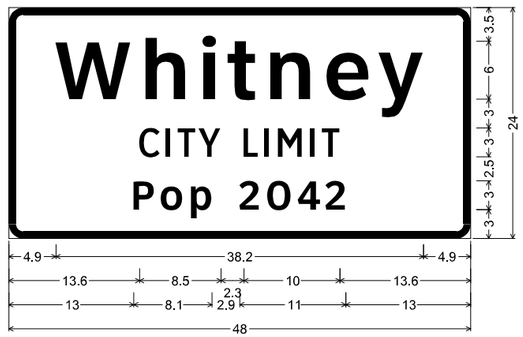
(SIGN 10-5) D3-3bTR;
2.3" Radius, 0.8" Border, White on, Green;
"Towash", ClearviewHwy-3-W; "Cemetery", ClearviewHwy-3-W;
Standard Arrow Custom 20.0" X 6.1" 0';
(SHEET 10 OF 14)



(SIGN 13-5) D2-2;

1.9" Radius, 0.8" Border, White on, Green;
"Aquilla", ClearviewHwy-3-W; "10", ClearviewHwy-3-W;

1.9" Radius, 0.8" Border, White on, Green;
"Waco", ClearviewHwy-3-W; "34", ClearviewHwy-3-W; (SHEET 13 OF 14)



(SIGN 14-4 & 14-7) I-2aT;
1.5" Radius, 0.8" Border, White on, Green;
"Whitney", ClearviewHwy-5-W-R; "CITY LIMIT", ClearviewHwy-3-W;
"Pop 2042", ClearviewHwy-5-W-R;
(SHEET 14 OF 14)

NTS

01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

GUIDE SIGN DETAILS

SHEET 2 OF 3

FED RD DIV NO	PROJECT NO		SHEET NO
6			96
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

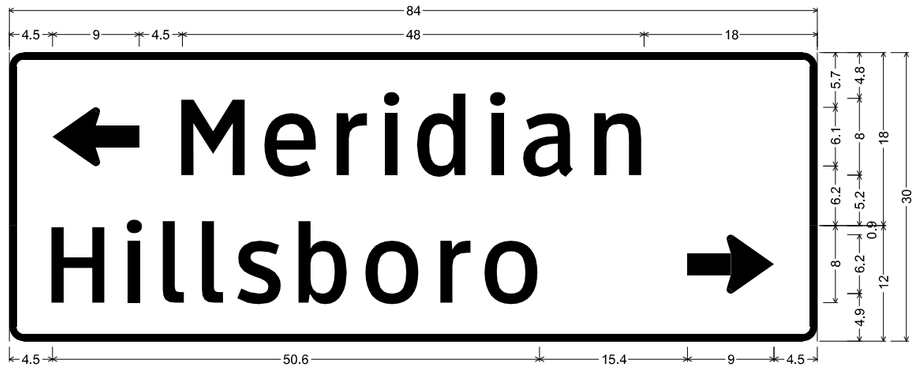
MODEL: GUIDE SIGN DETAILS
FILE: G:\TXHV\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SGNDTL_02.dgn
PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
01/12/2021 19:34:36 emahlmann
...\162_SMS\FM933_SGNDTL_02.dgn

(SIGN 14-6) D7-2T;

1.5" Radius, 0.8" Border, White on, Brown;
Standard Arrow Custom 9.0" X 6.1" 90'; "Lake Whitney", ClearviewHwy-3-W;

1.5" Radius, 0.8" Border, White on, Brown;
"State Park", ClearviewHwy-3-W;

(SHEET 14 OF 14)



(SIGN 14-6) D1-2 LT-RT;

1.5" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 9.0" X 6.1" 180'; "Meridian", ClearviewHwy-3-W;

1.5" Radius, 0.8" Border, White on, Green;
"Hillsboro", ClearviewHwy-3-W; Standard Arrow Custom 9.0" X 6.1" 0';

(SHEET 14 OF 14)

NTS

01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

GUIDE SIGN DETAILS

SHEET 3 OF 3

FED RD DIV NO	PROJECT NO		SHEET NO
6			97
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
emahlmann 19:34:37 01/12/2021
MODEL: GUIDE SIGN DETAILS
FILE: G:\TYXN\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\FM933_SGNDTL_03.dgn
...\162_SMS\FM933_SGNDTL_03.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

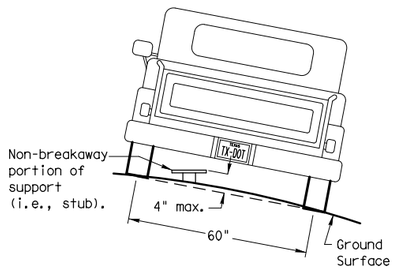
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

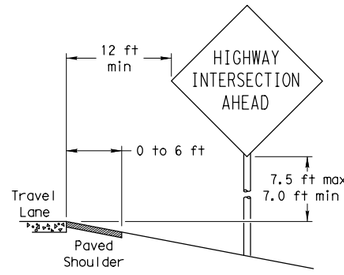
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

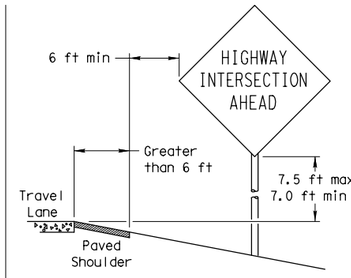
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

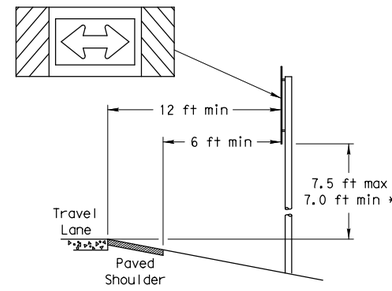
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



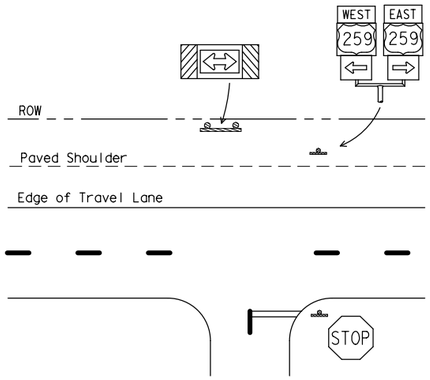
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

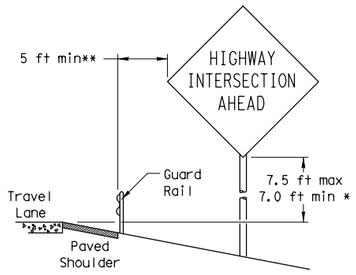
T-INTERSECTION



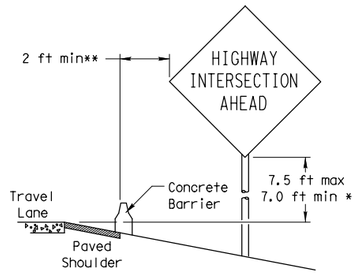
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



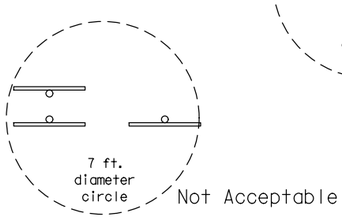
BEHIND GUARDRAIL

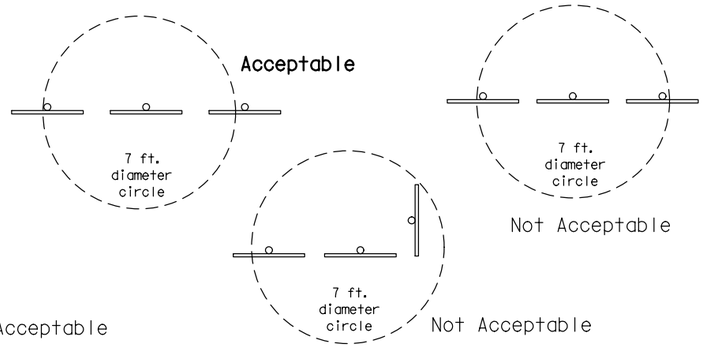


BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

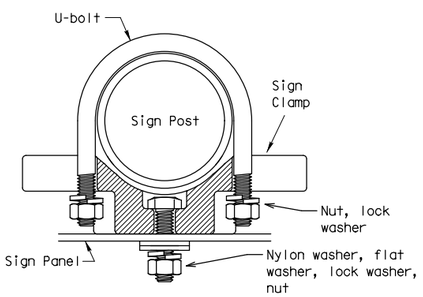
No more than 2 sign posts should be located within a 7 ft. circle.





TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

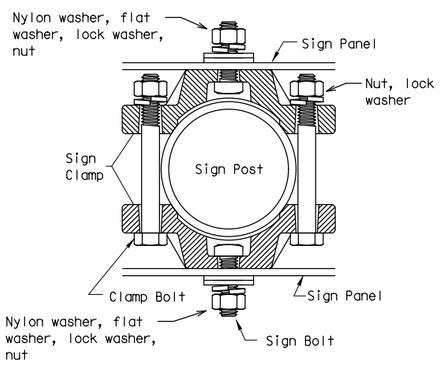


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

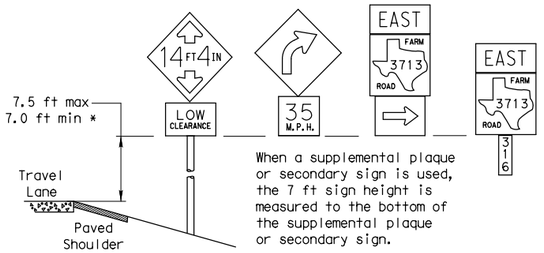
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



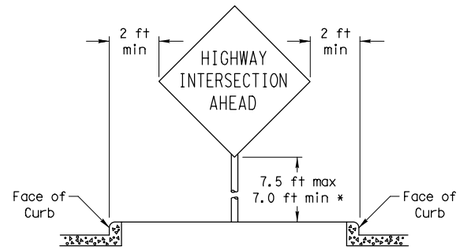
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



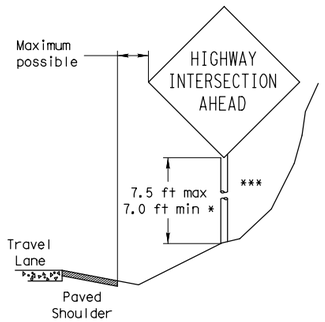
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

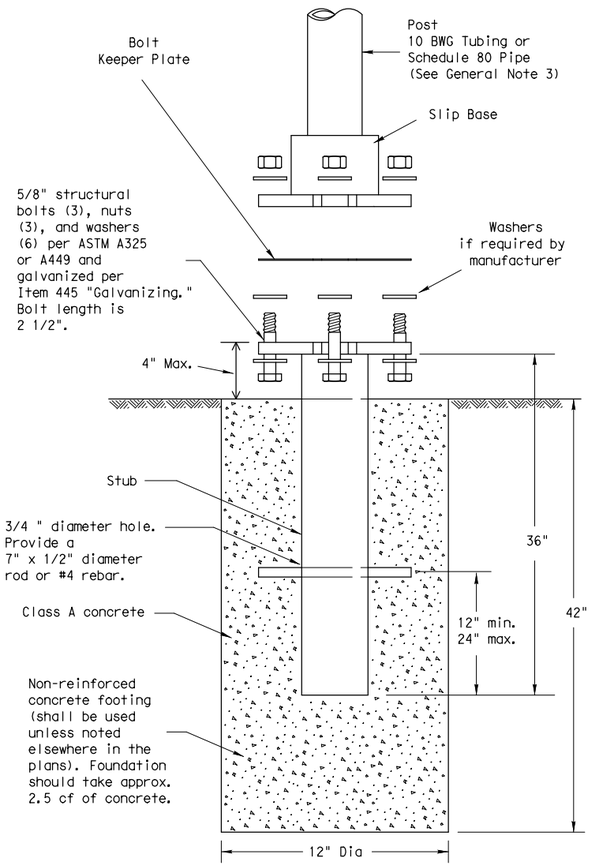
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		98

DATE: 01/12/2021 18:32:17
FILE: G:\TXHYProjects\TxDOT\5335-05A*FM933\TS\01*CADD\162*SMS\Standards\smdgen.dgn

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:

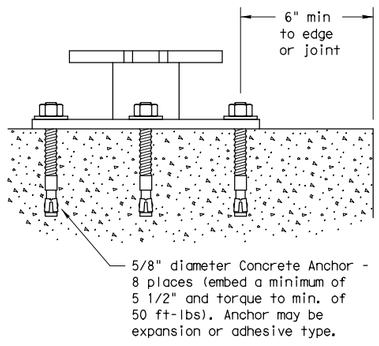
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   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

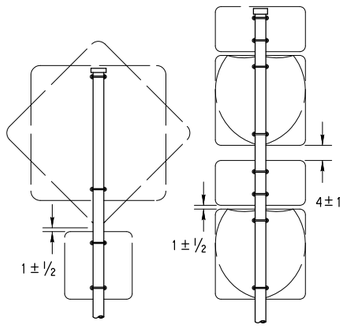
SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

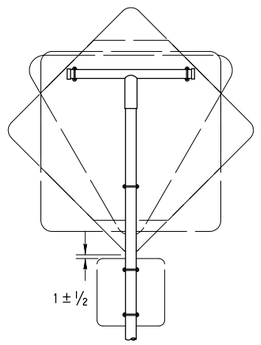
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
1190	02	018	FM 933
DIST	COUNTY		SHEET NO.
WAC	HILL		99

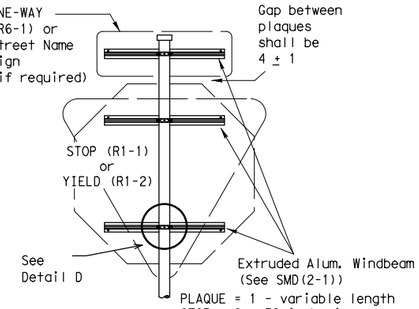
DATE: 01/12/2021 18:32:17
FILE: G:\TXHN\Projects\TxDOT\5335-05A*FM933\TS\01*CADD\162*SMS\Standards\smds1.dgn



SM RD SGN ASSM TY XXXXX(1)XX(P)

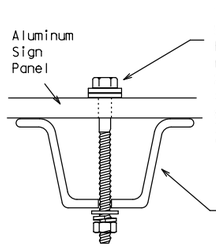


SM RD SGN ASSM TY XXXXX(1)XX(T)



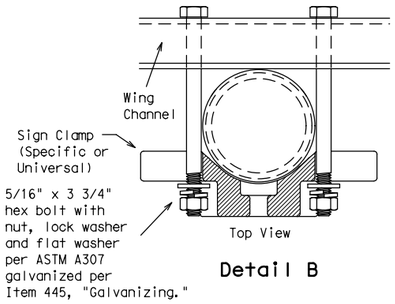
PLAQUE = 1 - variable length
STOP = 2 - 32 inch pieces
YIELD = 1 - 8 inch piece
& 1 - 32 inch piece

SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Top View

Detail A



Top View

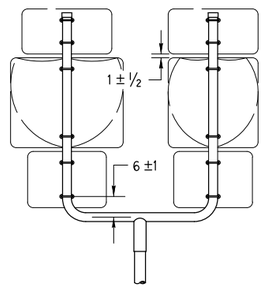
Detail B

GENERAL NOTES:

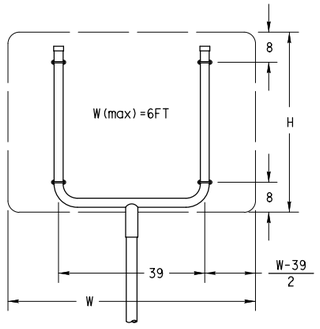
1.

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

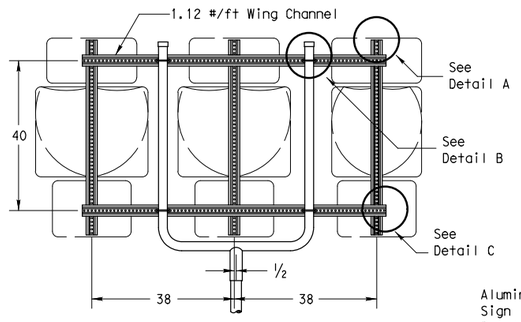
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material 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.



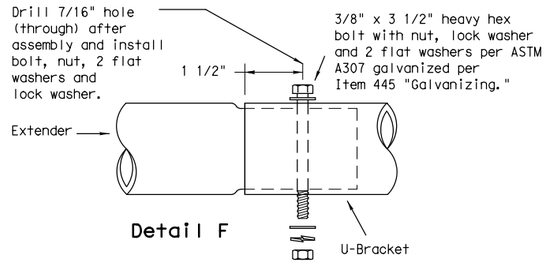
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

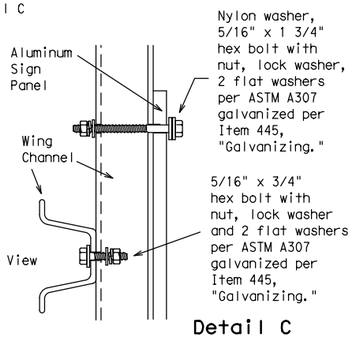


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

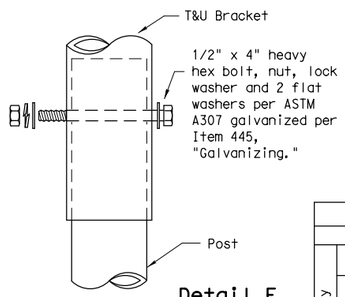


Detail F

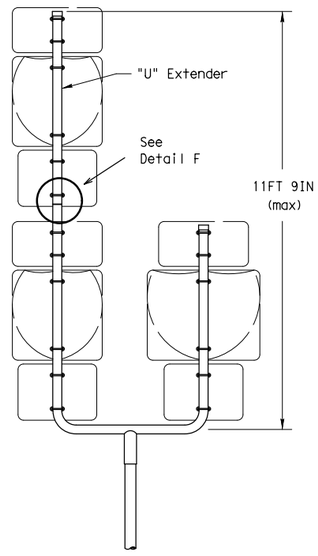
Splices shall only be allowed behind the sign substrate.



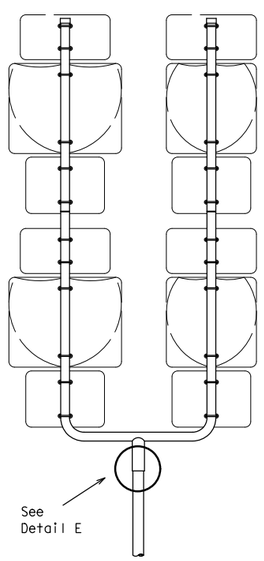
Detail C



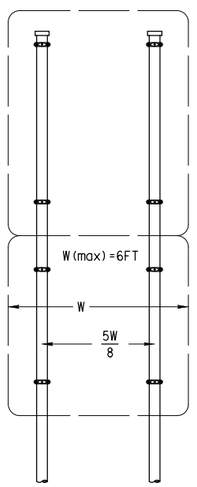
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

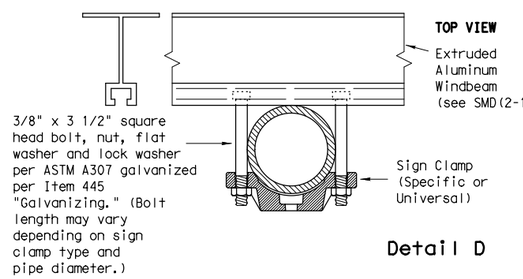


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

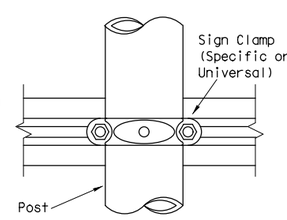


SM RD SGN ASSYM TY XXXXX(2)XX(P)

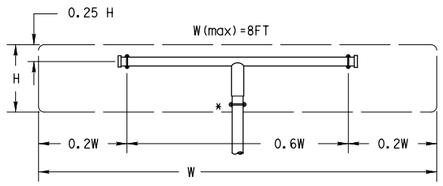
SIDE VIEW



Detail D



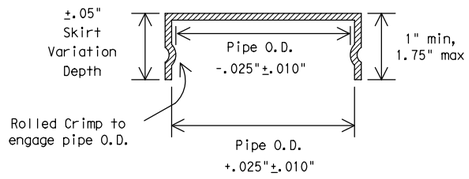
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	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)



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

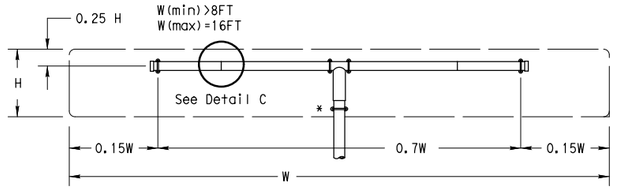
SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		100

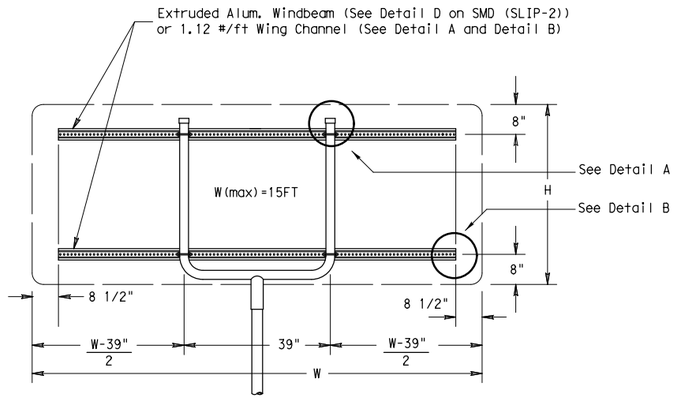
26C

DATE: 01/12/2021 18:32:17
FILE: G:\TXH\Projects\TxDOT\5335-05A*FM933\TS\01*CADD\162*SMS\Standards\smds2.dgn

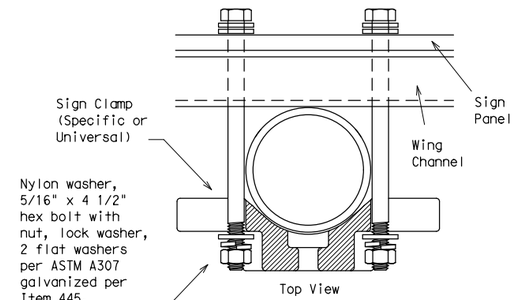


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

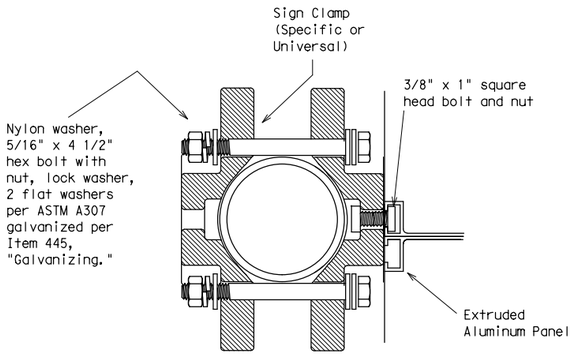
(* - See Note 12)



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

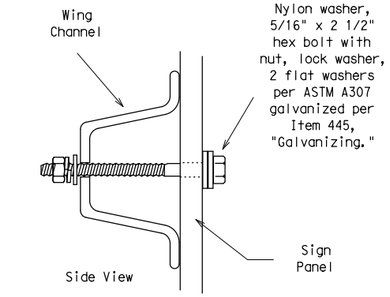


Detail A

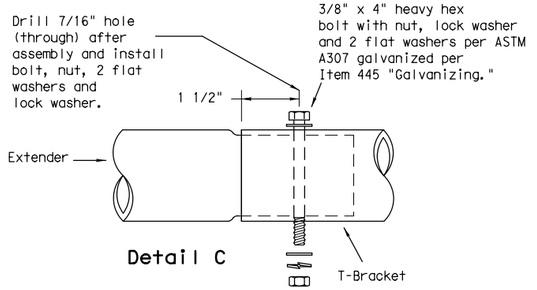


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

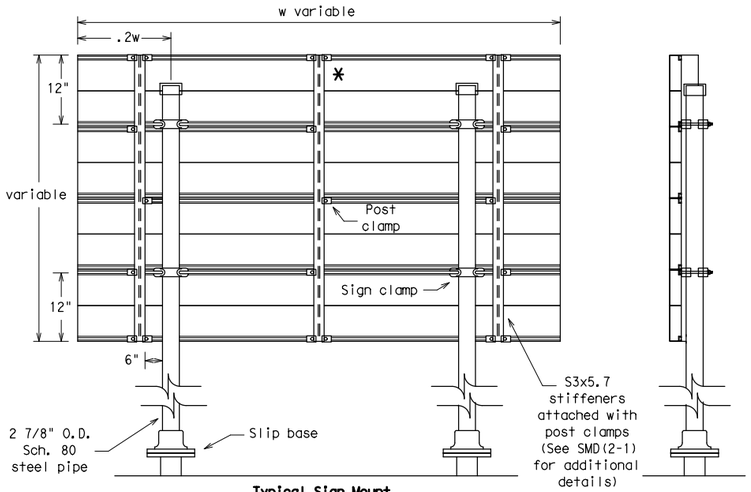


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

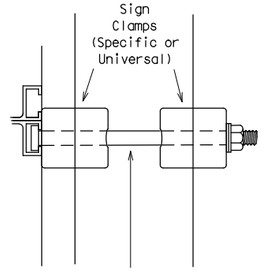


Typical Sign Mount

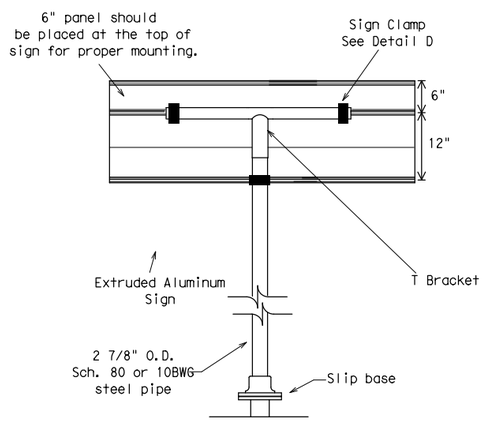
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

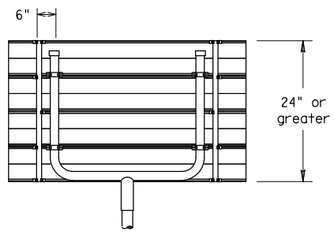
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. 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.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. 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.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. 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.
6. 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.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. 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."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. 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.
11. 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

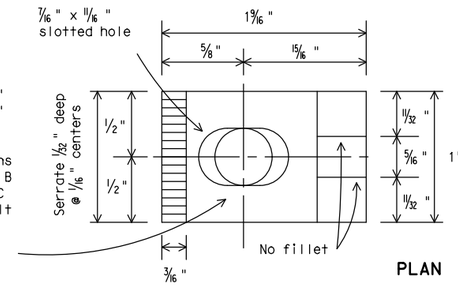
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
1190	02	018	FM 933
DIST	COUNTY		SHEET NO.
WAC	HILL		101

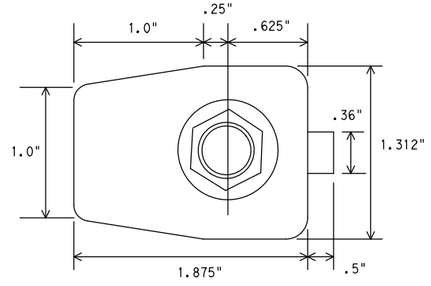
DATE: 01/12/2021 18:32:18
FILE: G:\TXHVProjects\TxDOT\5335-05A*FM933\TS\01*CADD\162*SMS\Standards\smds3.dgn

DATE: 01/12/2021 18:32:18
FILE: G:\TXH\Projects\TxDOT\5335-05A*FM933\TS\01*CADD\162*SMS\Standards\smd21-08.dgn



NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.

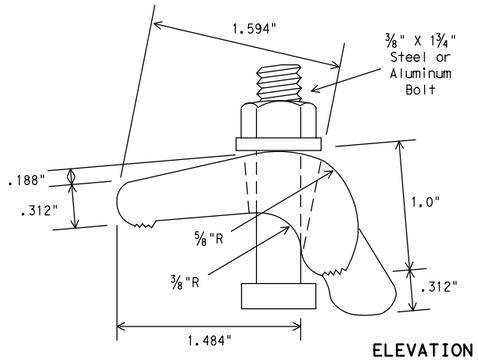
PLAN



ELEVATION

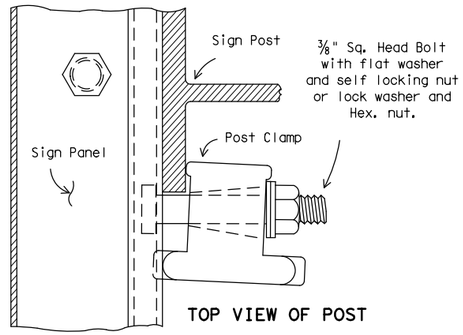
POST CLAMP DETAIL

PLAN

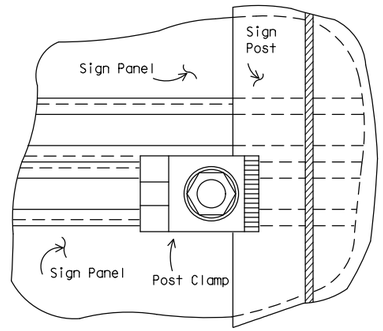


ELEVATION

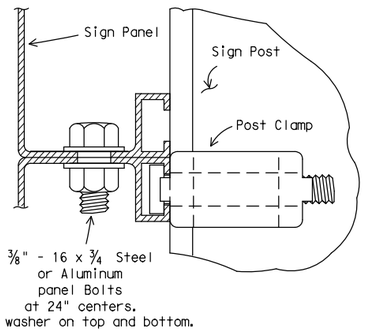
ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST



TOP VIEW OF CLAMP



SIDE VIEW OF PANELS

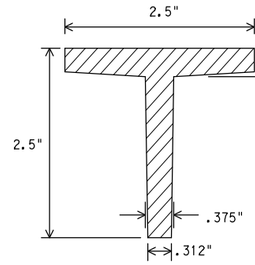
CONNECTION DETAILS

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE — DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

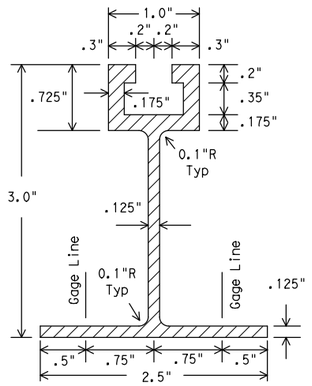


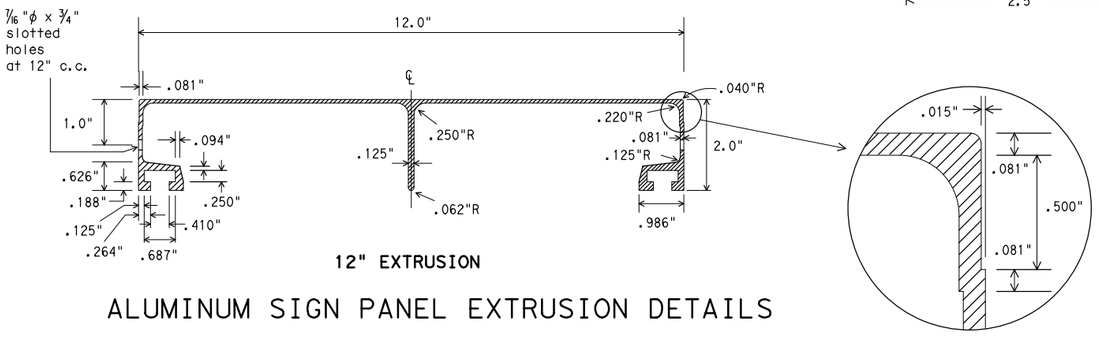
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

WINDBEAM CROSS SECTION

Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative





12" EXTRUSION

ALUMINUM SIGN PANEL EXTRUSION DETAILS

6" EXTRUSION

POST CLAMP BOLT DETAIL

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

SMD(2-1)-08

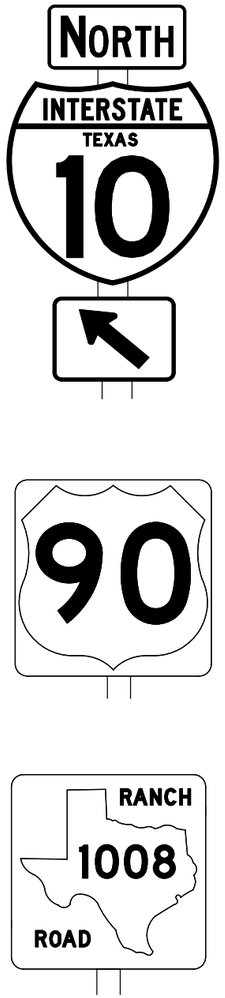
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		102

DATE: 01/12/2021 18:32:19
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

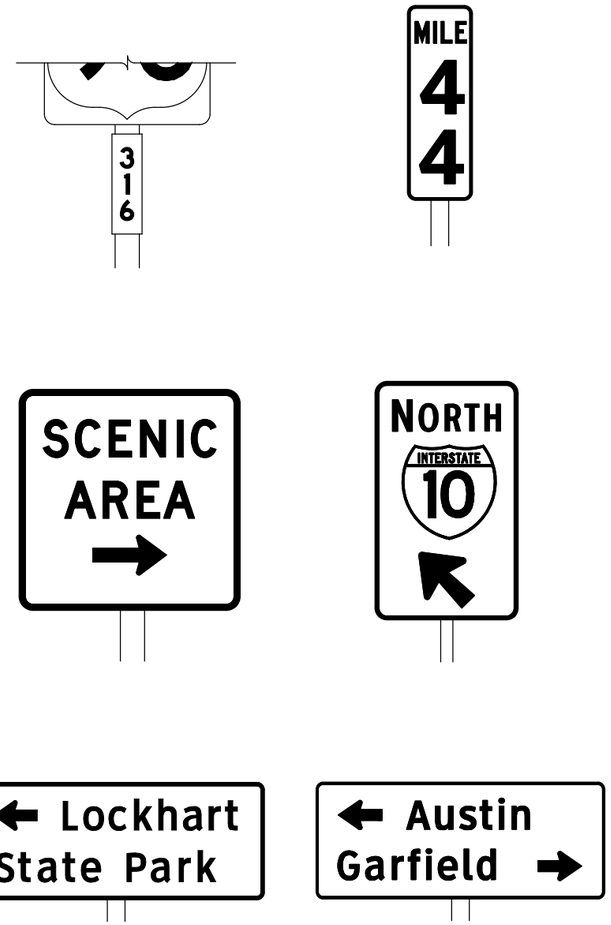
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

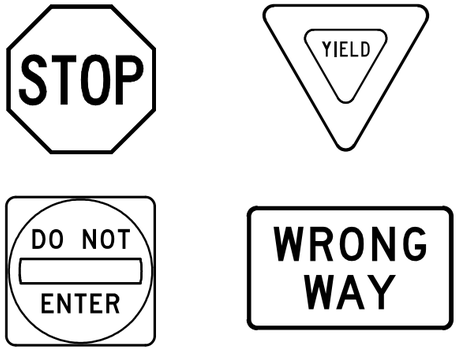
TSR(3)-13

FILE:	tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS		1190	02	018	FM 933
12-03 7-13		DIST	COUNTY		SHEET NO.
9-08		WAC	HILL		103

DATE: 01/12/2021 18:32:19
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\tsr4-13.dgn

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

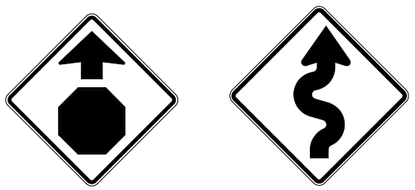
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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

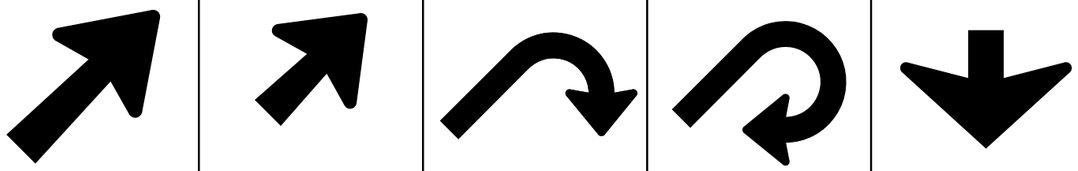
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	WAC	HILL		104

DATE: 01/12/2021 18:32:19
FILE: G:\TXHVProjects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\tsr5-13.dgn

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

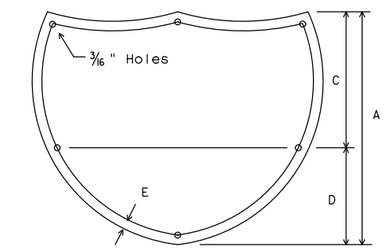
NOTE

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.

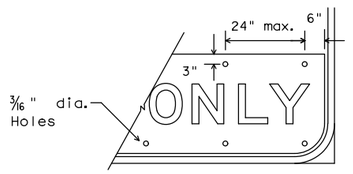
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

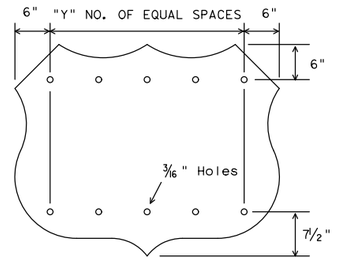


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

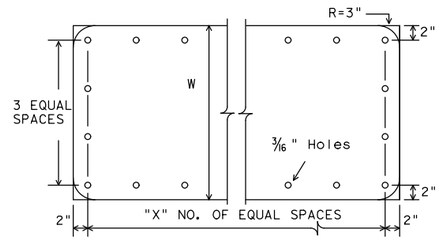


EXIT ONLY PANEL



U.S. ROUTE MARKERS

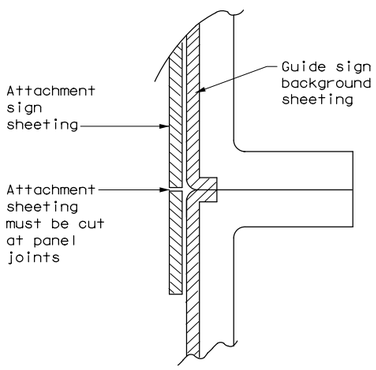
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

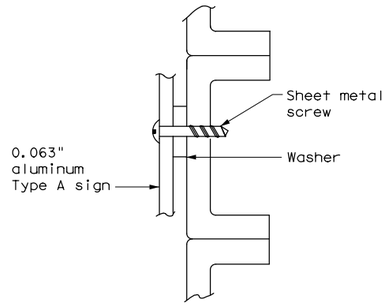
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



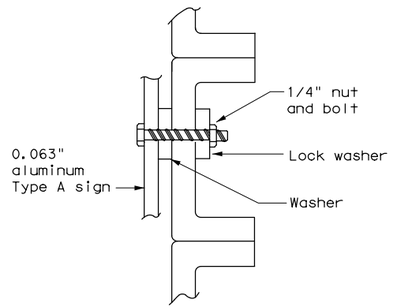
DIRECT APPLIED ATTACHMENT

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



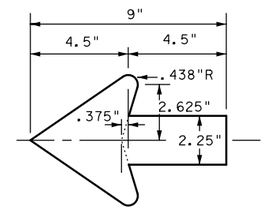
NUT/BOLT ATTACHMENT

NOTE:

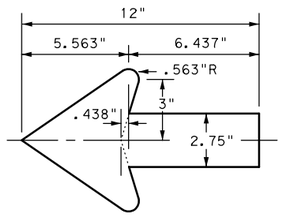
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

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

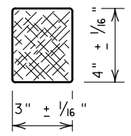
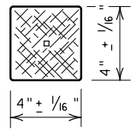
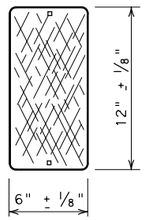
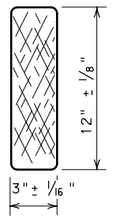
TYPICAL SIGN REQUIREMENTS

TSR(5)-13

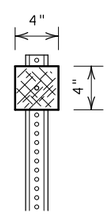
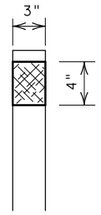
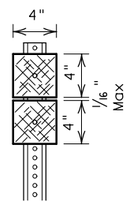
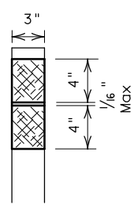
FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	WAC	HILL		105

DATE: 01/12/2021 18:32:20
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\dom1-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

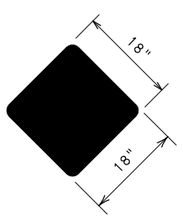
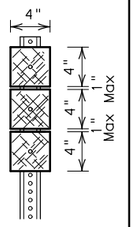
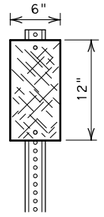
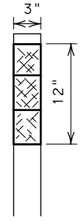
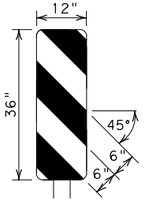
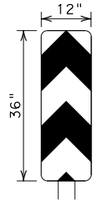
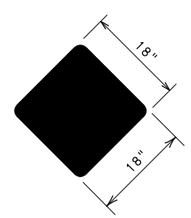
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

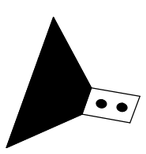
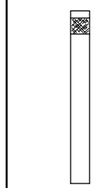
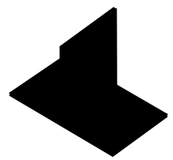
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

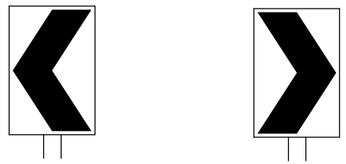
	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING: Yellow, White, Red

NOTE: 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

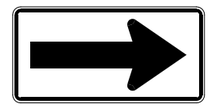
CHEVRONS

DEVICE:  W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE:
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE:  W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WAC	HILL		106

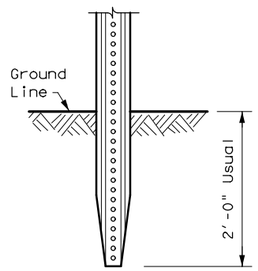
20A

DATE: 01/12/2021 18:32:20
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

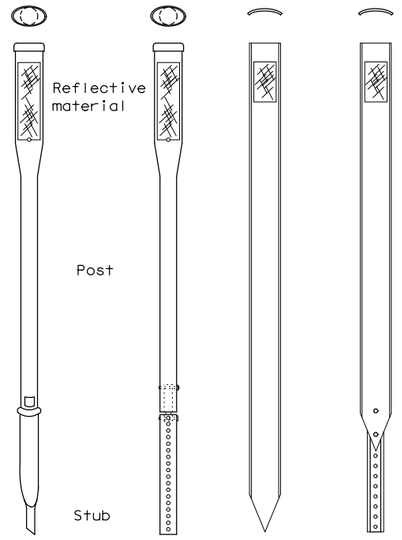


NOTES

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.

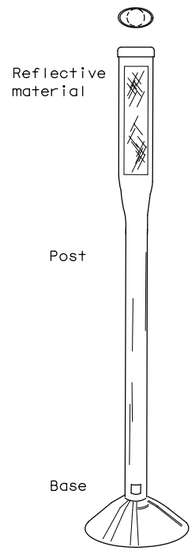
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



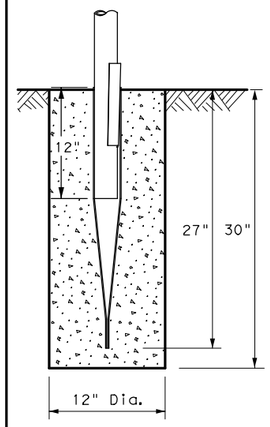
SURFACE MOUNT

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.

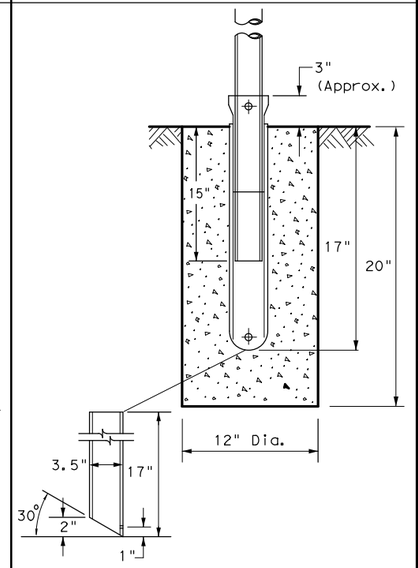
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

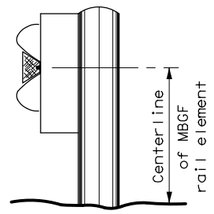
NOTE

1. Install per manufacturer's recommendations.

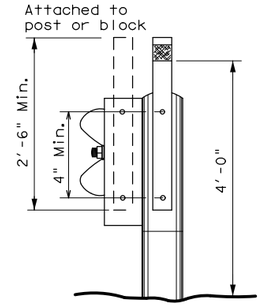
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

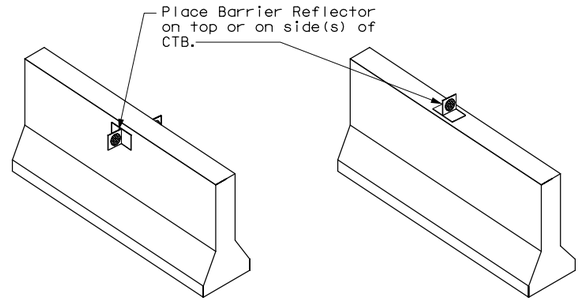
GF1



GF2



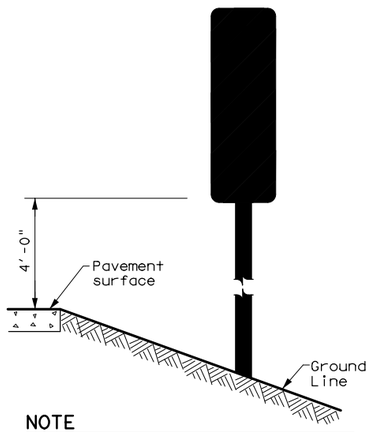
CONCRETE TRAFFIC BARRIER (CTB)



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.

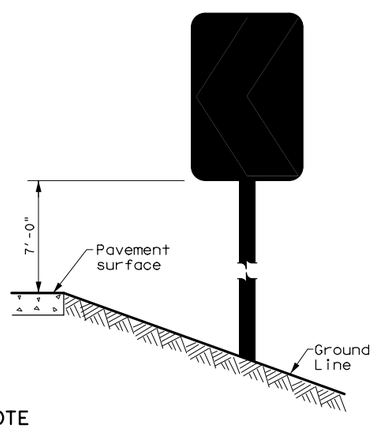
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

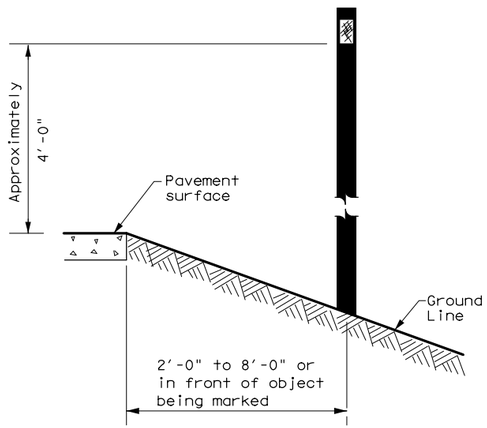
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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	1190	02	018	FM 933
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WAC	HILL		107

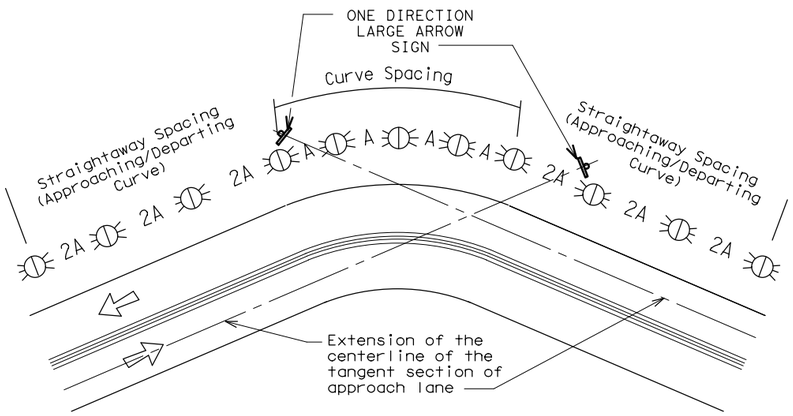
20B

DATE: 01/12/2021 18:32:25
FILE: G:\TXHN\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\dom3-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

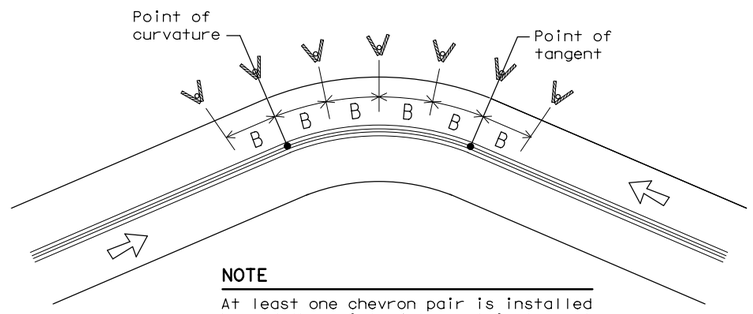
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

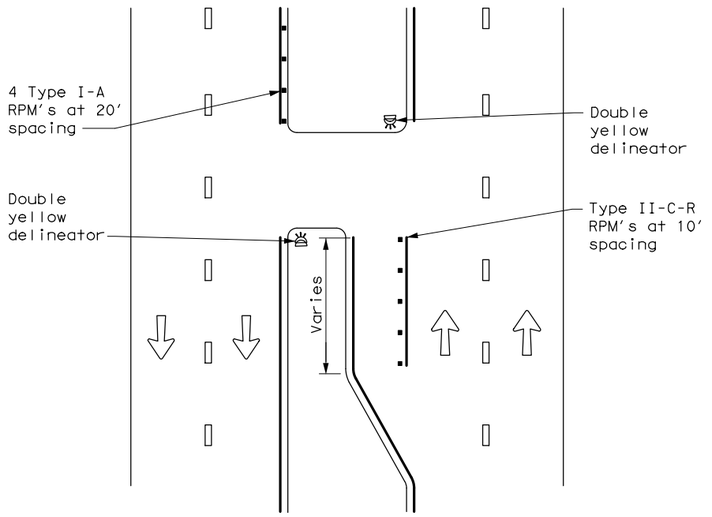
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	WAC	HILL		108

20C

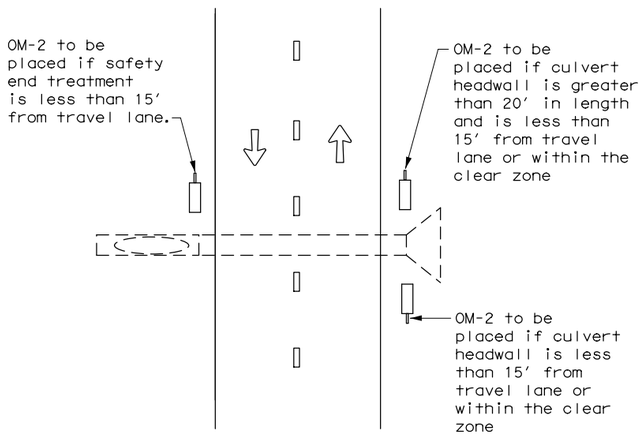
DATE: 01/12/2021 18:32:25
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\dom4-20.dgn

CROSSOVERS



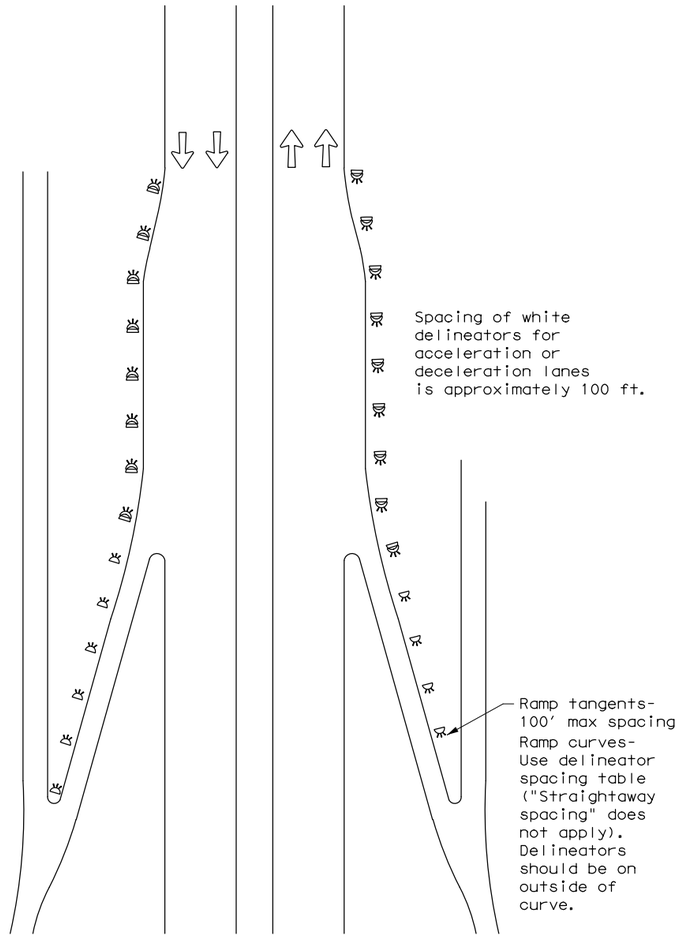
DETAIL 1

FOR CULVERTS WITH MBGF



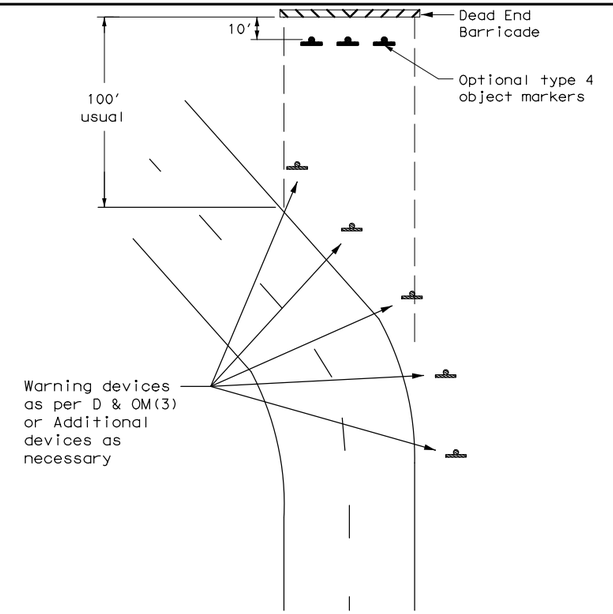
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



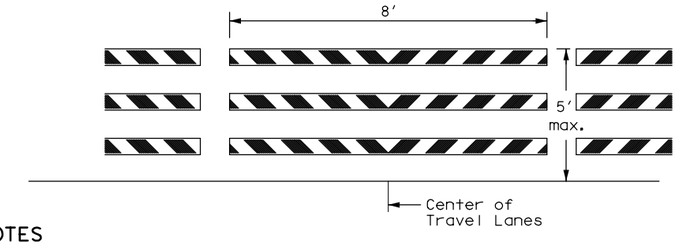
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

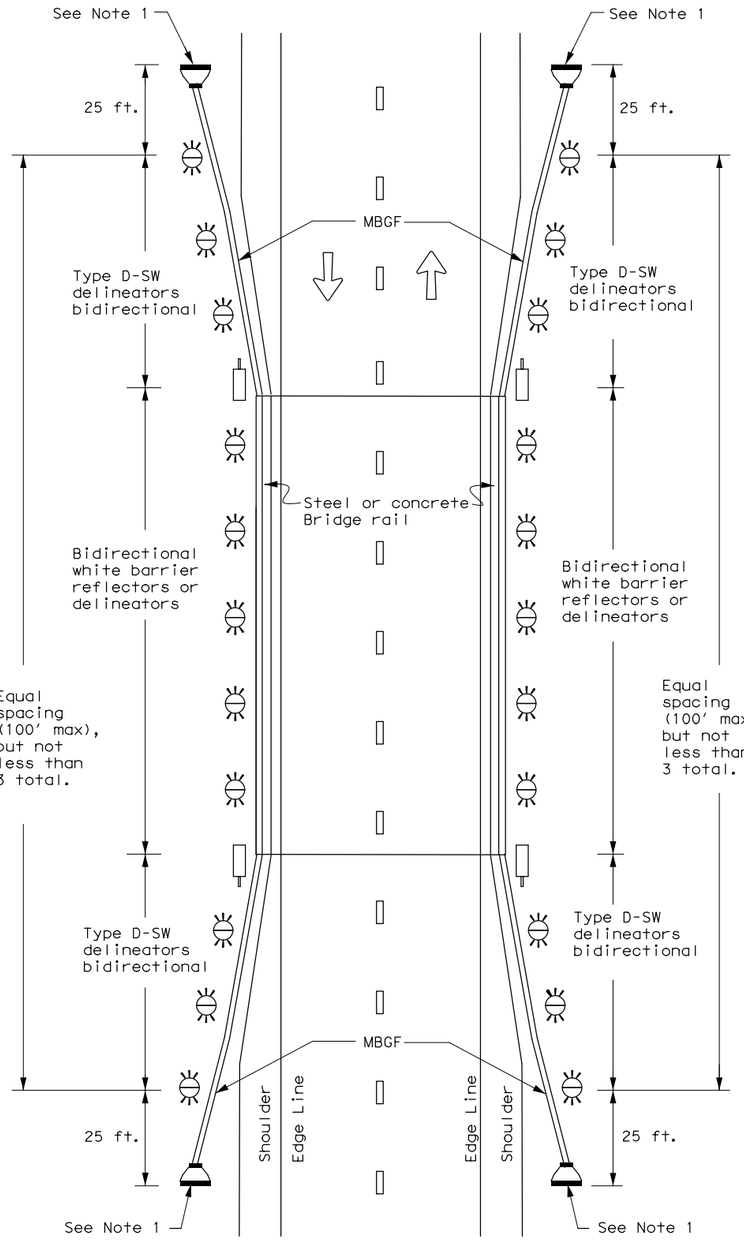
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
3-15 7-20	DIST	COUNTY		SHEET NO.
	WAC	HILL		109

20D

DATE: 01/12/2021 18:32:26
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\dom5-20.dgn

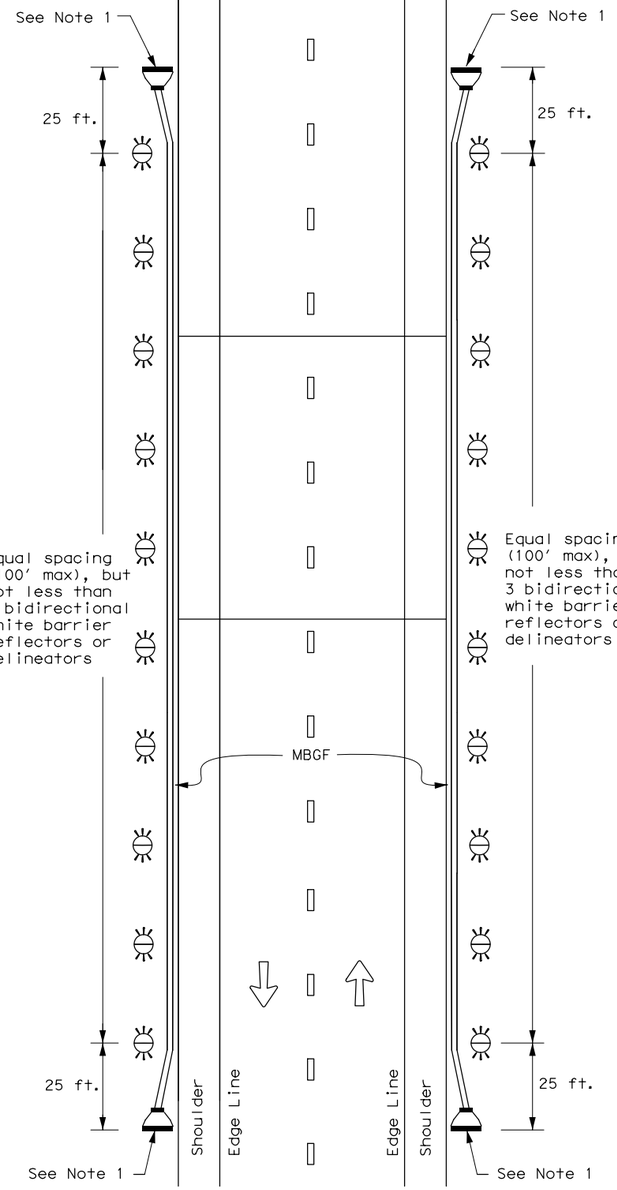
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

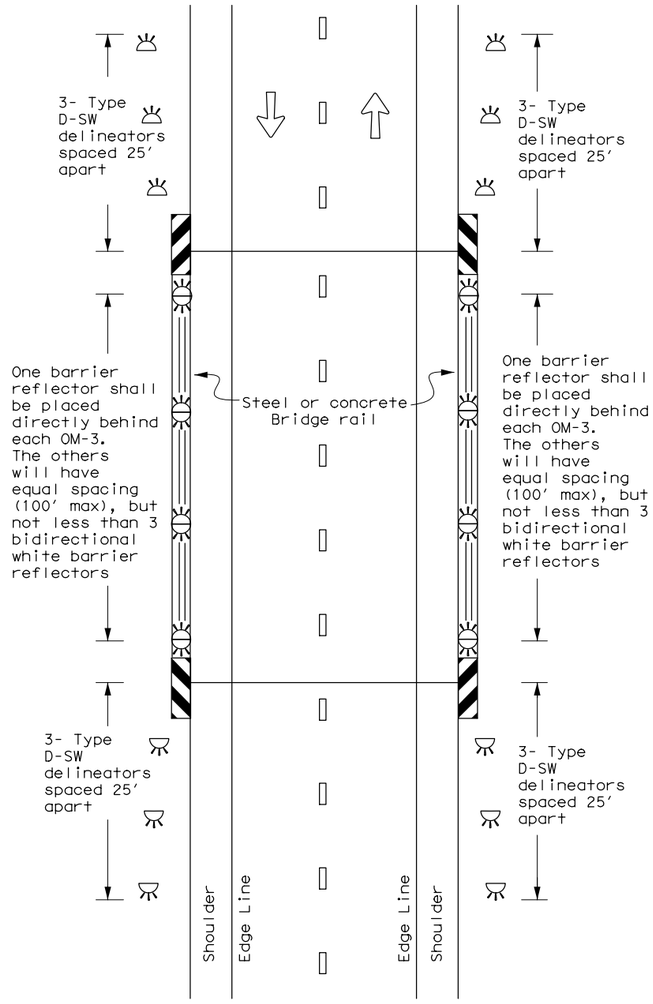
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

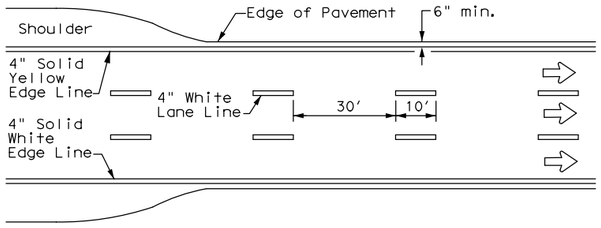
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

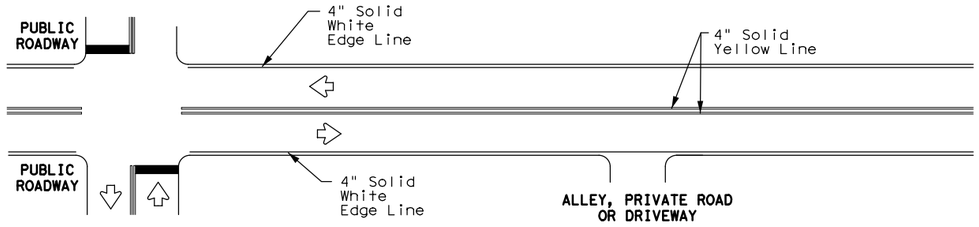
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
7-20	DIST	COUNTY		SHEET NO.
	WAC	HILL		110

20E

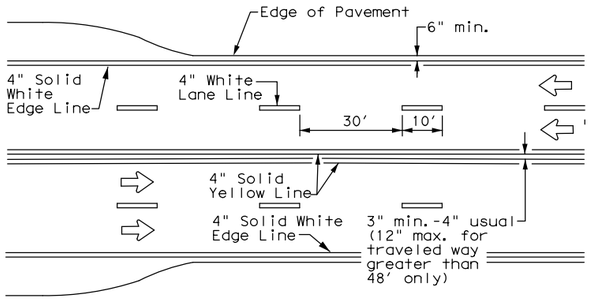
DATE: 01/12/2021 18:32:26
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\pm2-20.dgn



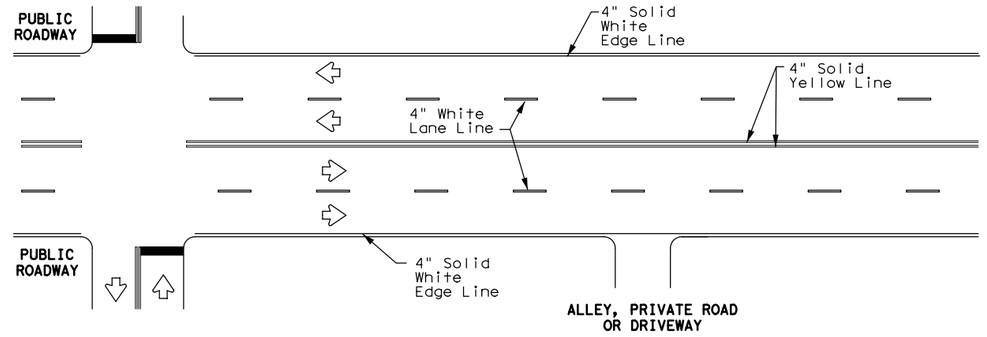
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



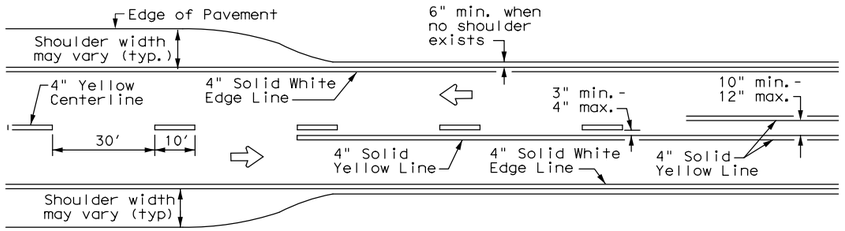
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



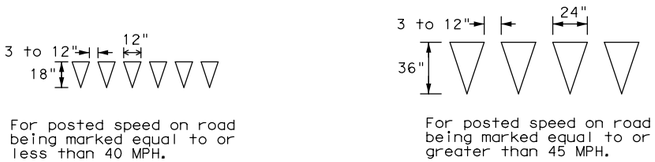
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



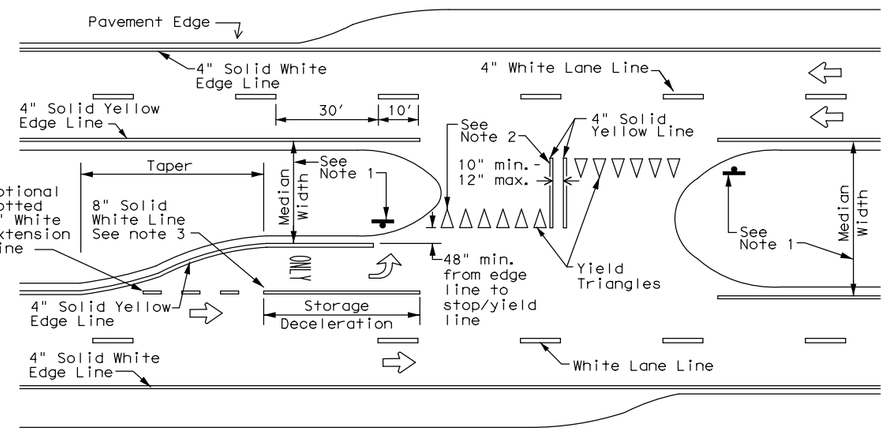
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

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

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

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

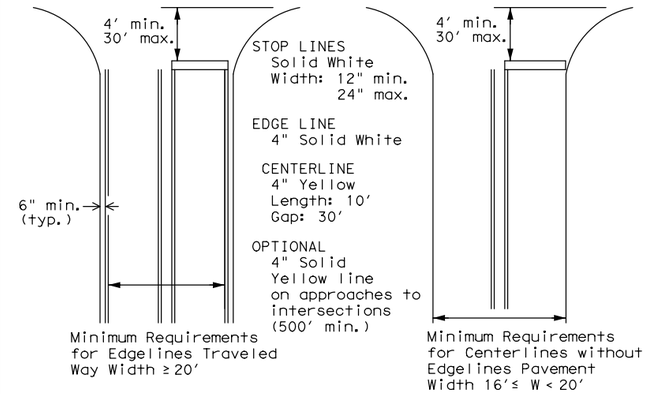
GENERAL NOTES

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

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

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

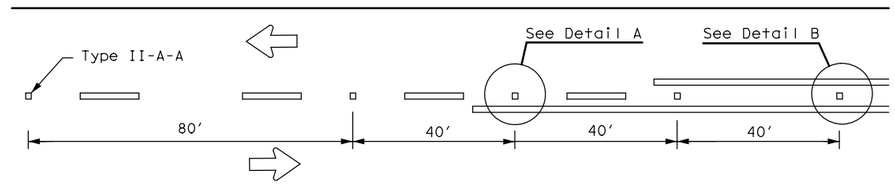
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

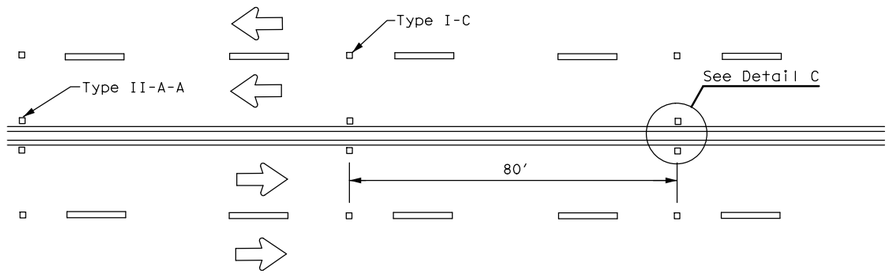
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1190	02	018	FM 933
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	WAC	HILL		111

22B

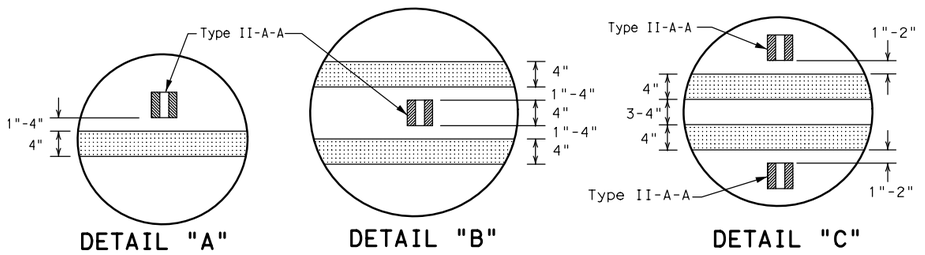
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



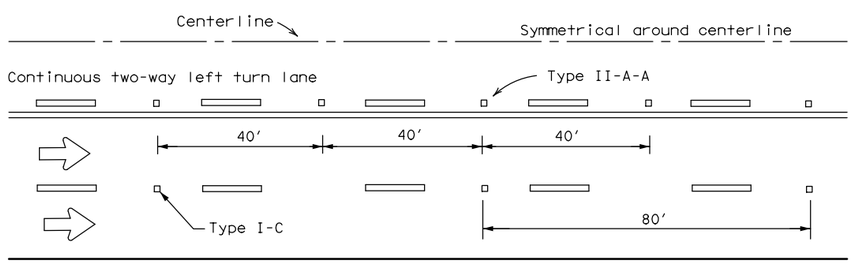
CENTERLINE FOR ALL TWO LANE ROADWAYS



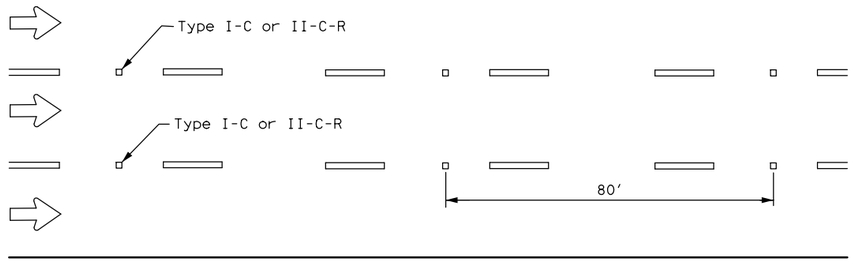
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



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

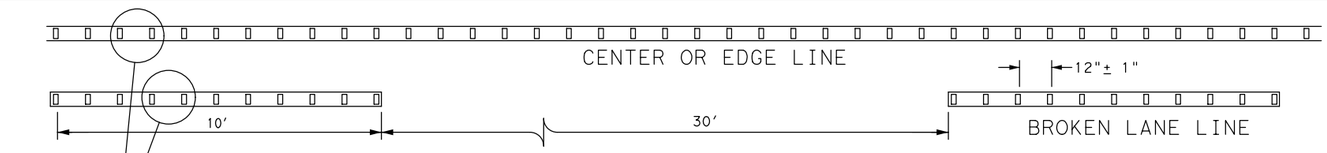


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



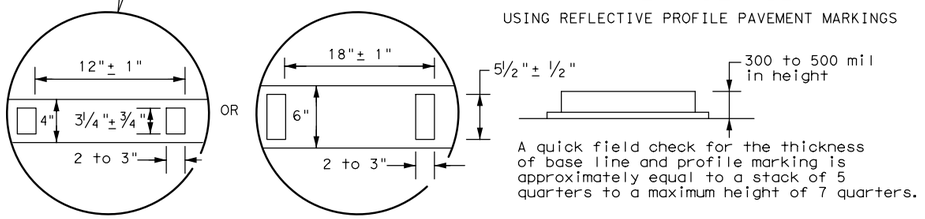
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

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.

NOTE

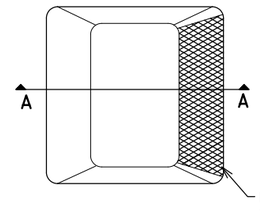
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

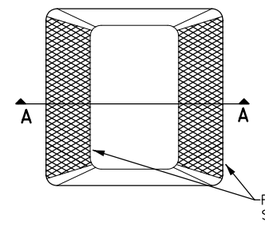
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

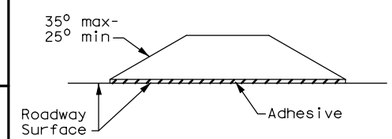
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

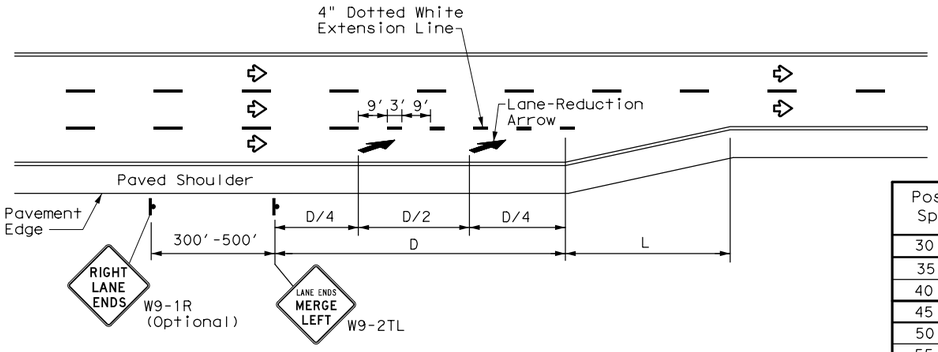
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	1190	02	018	FM 933
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	WAC	HILL		112

22B

DATE: 01/12/2021 18:32:27
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\pm2-20.dgn

DATE: 01/12/2021 18:32:27
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\pm3-20.dgn

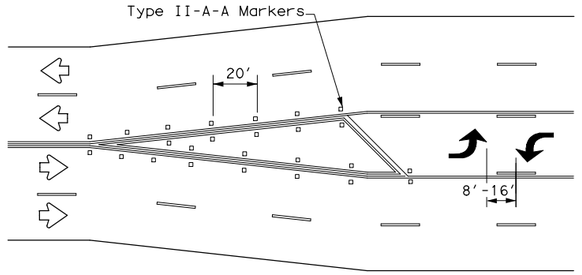


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



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

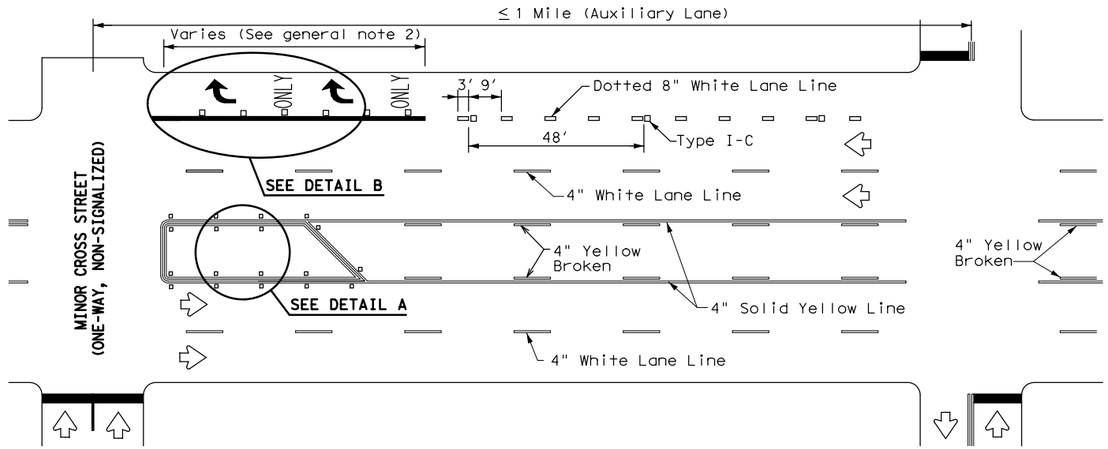
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

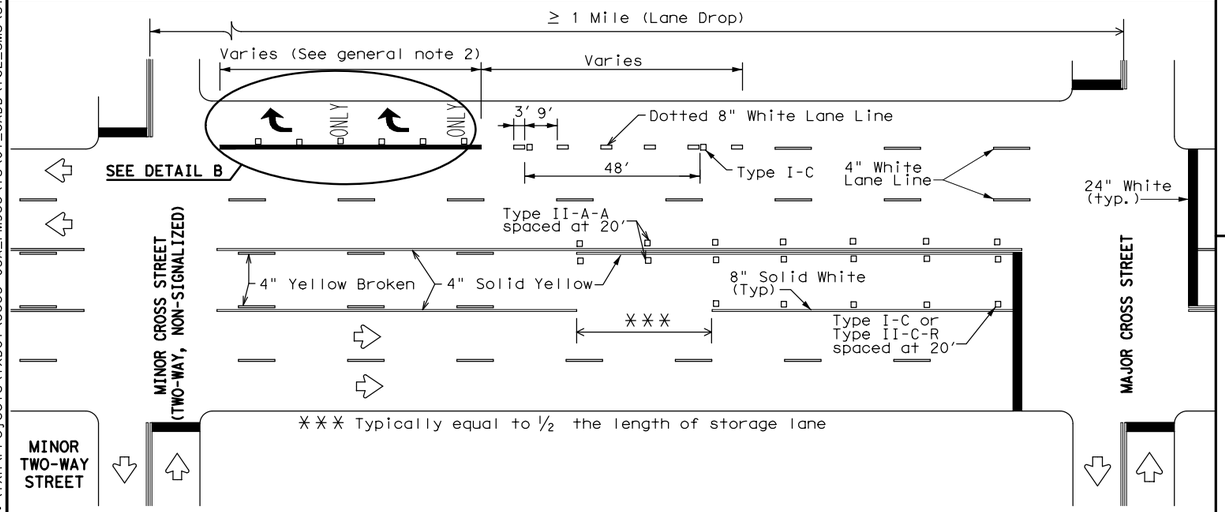
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

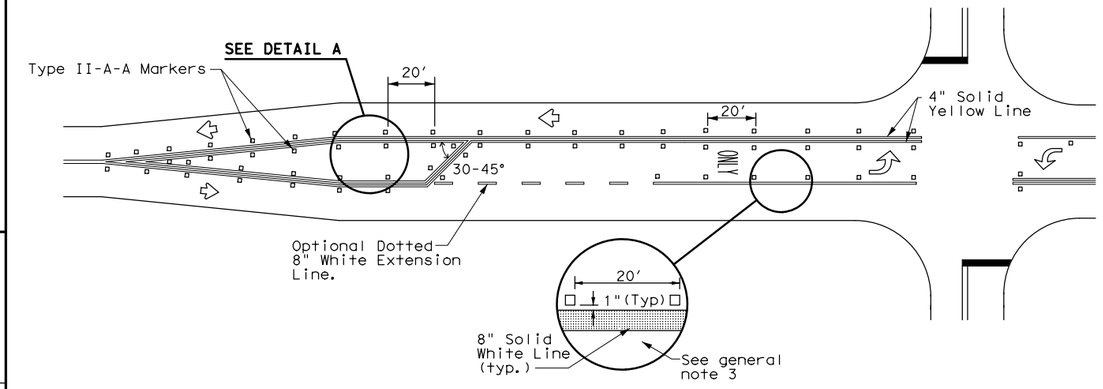
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



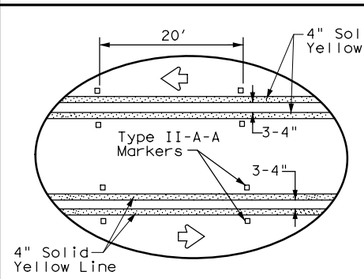
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



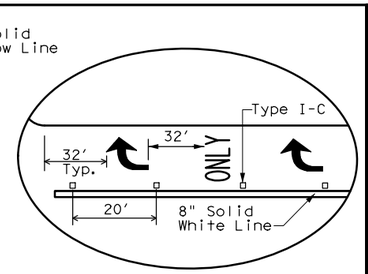
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

Texas Department of Transportation

Traffic Safety Division Standard

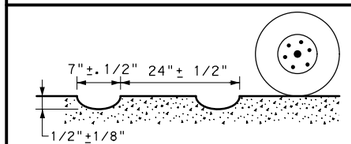
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	WAC	HILL		113
3-03 6-20				

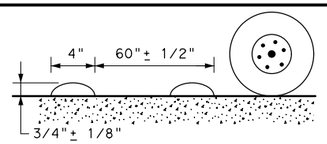
22D

DATE: 01/12/2021 18:32:27
FILE: G:\TXHVProjects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\rs(3)-13.dgn

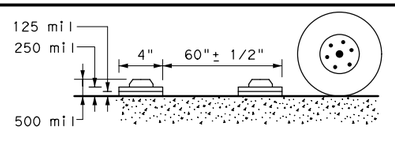
CENTERLINE RUMBLE STRIPS



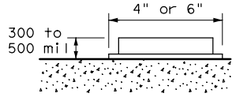
MILLED RUMBLE STRIPS



RAISED TRAFFIC BUTTONS

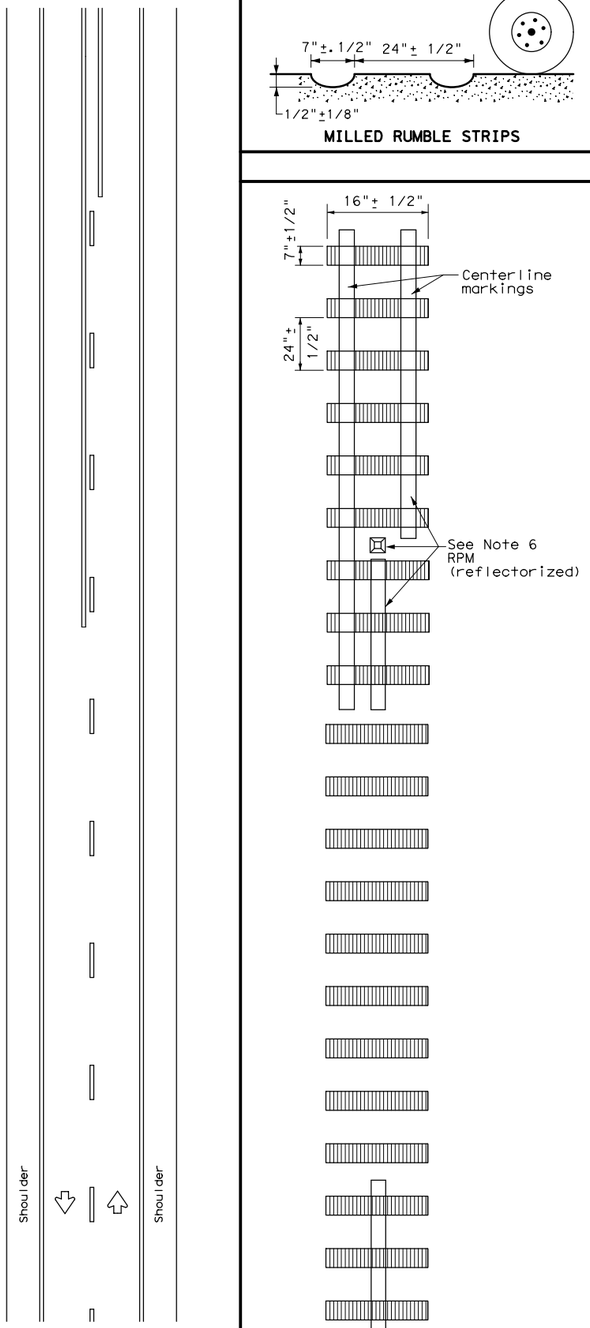


PREFORMED THERMOPLASTIC STRIPS



PROFILE MARKINGS

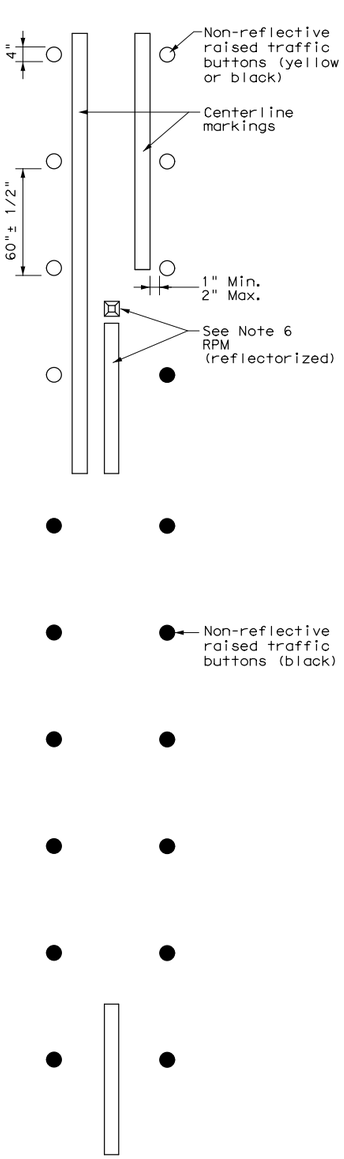
PROFILE VIEW



TWO LANE TWO-WAY ROADWAYS

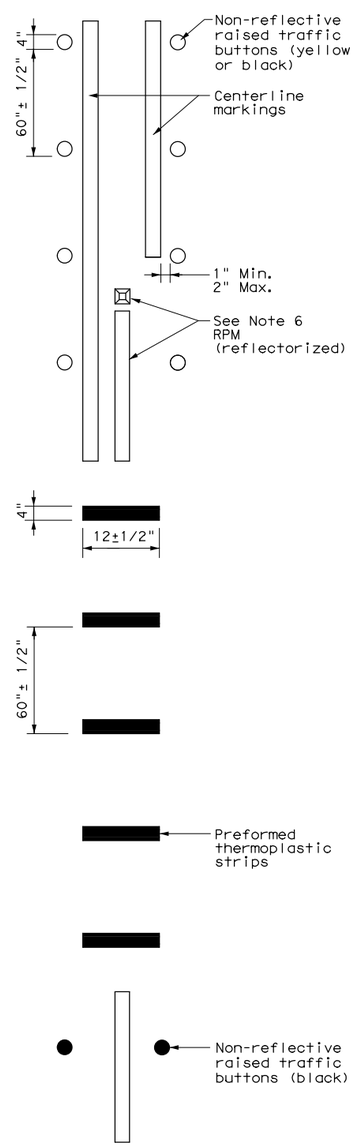
PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS



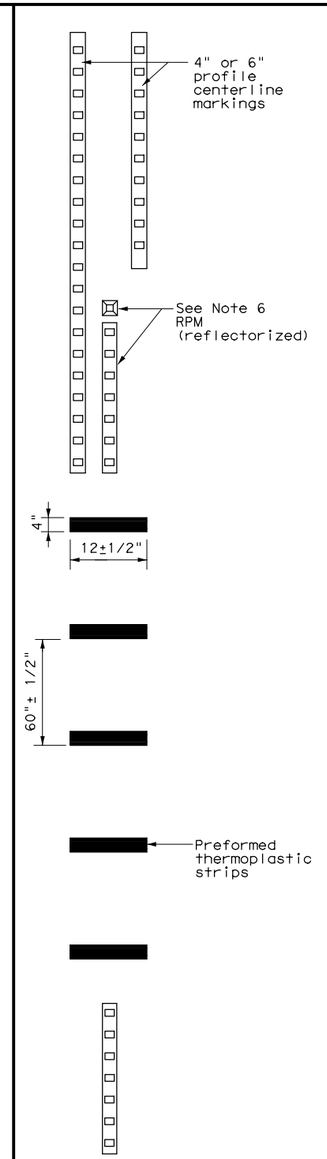
PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS



PLAN VIEW
OPTION 3

RAISED CENTERLINE RUMBLE STRIPS AND PREFORMED THERMOPLASTIC STRIPS



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC 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 edgeline 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 Operations 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 and driveways with high usage of large trucks.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of 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.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

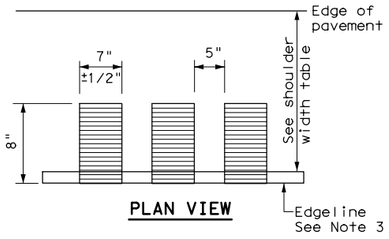
12. See standard sheet RS(4).

Texas Department of Transportation®
Traffic Operations Division Standard

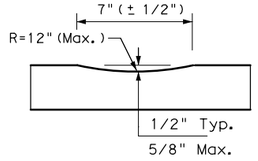
CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS

RS(3)-13

FILE: rs(3)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		114

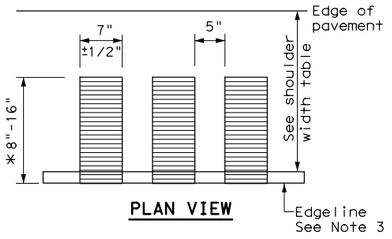


PLAN VIEW

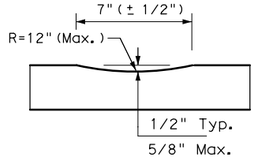


PROFILE VIEW
OPTION 1

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



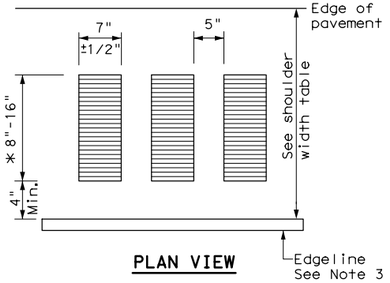
PLAN VIEW



* This distance may vary based on width of shoulder

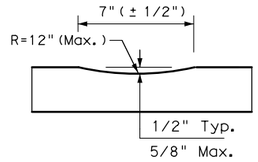
PROFILE VIEW
OPTION 2

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



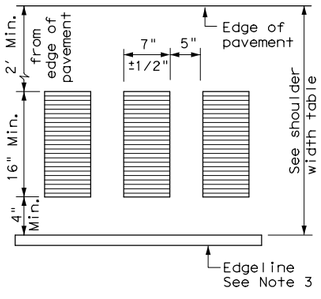
PLAN VIEW

* This distance may vary based on width of shoulder

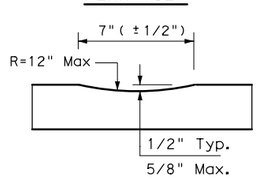


PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

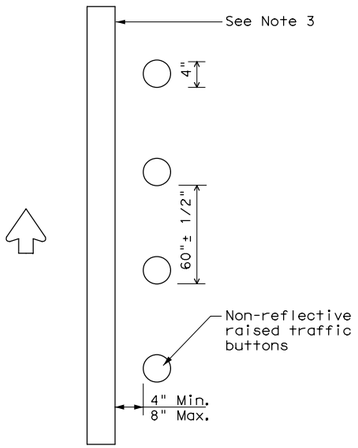


PLAN VIEW



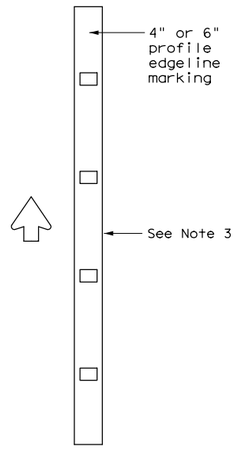
PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

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 OR 6	Option 1, 2, 3 5 OR 6	Option 2, 4, 5 OR 6

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) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

WHEN INSTALLING RAISED OR PROFILE EDGELINE 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 edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline 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. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.

Texas Department of Transportation

Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(4)-13

FILE: rs(4)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		115

DATE: 01/12/2021 18:32:28
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\162_SMS\Standards\rs(4)-13.dgn

DATE: 01/12/2021
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\Standards\EPIC.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☒ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

Obtain and keep on-site 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 Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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 is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1190	02	018	FM 933	
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.	
05-07-14 ADDED NOTE SECTION IV.	WAC	HILL		116	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.					

SITE DESCRIPTION

PROJECT LIMITS:

CSJ 1190-02-018: FM 933 from SH 22 to FM 310, HILL CO.

LOCATION MAPS:

Refer to title sheet for project location map.

PROJECT DESCRIPTION:

CSJ 1190-02-018:

Construction of Rehabilitation of Existing Road
Consisting of Rehab and Widen Roadway

MAJOR SOIL DISTURBING ACTIVITIES:

The major soil disturbing activities for this project will consist of excavation, embankment, grading and construction of proposed driveway and cross street culverts and roadway.

TOTAL PROJECT AREA:	72.58 AC
TOTAL AREA TO BE DISTURBED:	23.20 AC

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

CSJ 1190-02-018:
The predominate soil type is Normangee Clay Loam.
Vegetative cover is in good condition with 90-95% coverage.

NAME OF RECEIVING WATERS:

CSJ 1190-02-018:
There are three creeks that receive runoff within the project limits:

1. Dead Horse Creek drains to Aquilla Creek and ultimately into the Brazos River within stream segment 1257.
2. White Rock Creek drains into the Brazos River within stream segment 1257.
3. Towash Creek drains to Whitney Lake and ultimately into the Brazos River within stream segment 1257.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [ ] MULCHING
- [ ] SOIL RETENTION BLANKET
- [X] NATURAL BARRIERS OR BUFFER ZONES
- [X] PRESERVATION OF NATURAL RESOURCES

OTHER: TXR 150000, Part III, Section G, 2 Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Temporary stabilization must be completed no more than 14 calendar days after initiation of soil stabilization measures, and final stabilization must be achieved prior to termination of permit coverage.

STRUCTURAL PRACTICES:

- [I] SILT FENCES
- [ ] HAY BALES
- [I] SANDBAG OR ROCK BERMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [I] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER:

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

The order of activities will be as follows:

1. Preserve existing vegetative cover as much as possible.
2. Install temporary sediment control fencing, rock berms and other items as shown on plans prior to any soil disturbing activities.
3. Remove existing roadway, construct proposed driveways, and driveway culverts and perform any necessary excavation, embankment and grading.
4. Place soil temporary/permanent seeding as shown in the plans and as directed.

STORM WATER MANAGEMENT:

An integral part of the SWPPP for this project includes the EPIC Sheet, Item 506, Waco District Waters of the US Notes, Waco District Typical Applications for Best Management Practices, Form 2118 TxDOT inspection forms, Contractor daily inspection forms, miscellaneous general notes on environmental requirements, TxDOT EC Standards, 2014 Standard Specifications, TxDOT roadway design drawings, SWPPP design and working BMP drawings, Site Manager Data Base, EMS Stage Gate Inspections and the Waco District environmental folders. The requirements of the TxDOT EMS will be fully implemented including training requirements for Contractors and TxDOT staff.

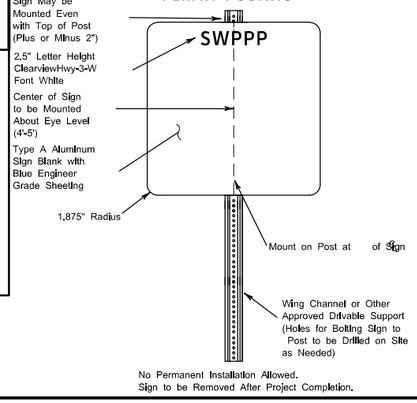
BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

STATE OF TEXAS
M. CHAD CRISWELL
90114
LICENSED
PROFESSIONAL ENGINEER

05/21/2021

Texas Department of Transportation
Waco District Office
Advanced Project Development
100 South Loop Drive
Waco Texas, 76704-2858

STORM WATER POLLUTION PREVENTION PLAN PERMIT POSTING



OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: All erosion and sediment best management practices (BMPs) will be maintained in good working order per the environmental notes, details and standards included as part of the project plans and contract documents. BMP repairs will be made at the earliest possible date, but no later than seven calendar days after the inspection report has been completed and immediately after the ground has dried sufficiently to allow equipment access. BMPs damaged by the Contractor will be repaired or replaced immediately. The installation and repair of BMPs at creeks and outfalls will be given priority.

INSPECTION: TxDOT Form 2118 inspections to support TXR150000 and 404 permits will be conducted on a seven day interval on the same day of the week, until permits are terminated. The Contractor will provide daily BMP inspection reports on work days. Stage Gate Inspections and other BMP inspections will be conducted by the District and Area Office Staff based on requirements of the TxDOT Environmental Management System (EMS).

WASTE MATERIALS:
Any waste materials generated during construction will be disposed of in accordance with existing federal, state, and local laws.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING):

At a minimum, any products in the following categories are considered to be hazardous: Fuels, Lubricating products, Asphalt products, or Concrete curing compounds and any additives. In the event of a spill which may be hazardous, clean-up will be done in accordance with federal, state, and local regulations. The Contractor will maintain a list of all chemicals and wastes required for the project; including chemicals used by sub-contractors, and will implement written spill prevention and clean-up plans.

SANITARY WASTE:
Sanitary waste from portable units will be collected by a licensed sanitary waste management contractor.

OFF SITE VEHICLE TRACKING:

- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [X] STABILIZED CONSTRUCTION ENTRANCE

REMARKS:

Disposal areas, stockpiles, and haul roads will be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas will not be located in any wetland, waterbody or streambed. Construction staging area and vehicle maintenance area will be constructed by the contractor in a manner to minimize the runoff pollutants.

Furnish one SW3P permit posting sign and sign support as detailed on the SW3P Sheet. Install this sign in a location selected by the Engineer. The sign and support should be removed upon completion of the project and is the property of the Contractor. The purchase of the sign and support, installation, relocation(s) if determined necessary by the Engineer and removal at project end will be subsidiary to Item 506.

Sedimentation Basins - Since the area disturbed is less than 10 acres, per outfall location, a sedimentation basin is not required.

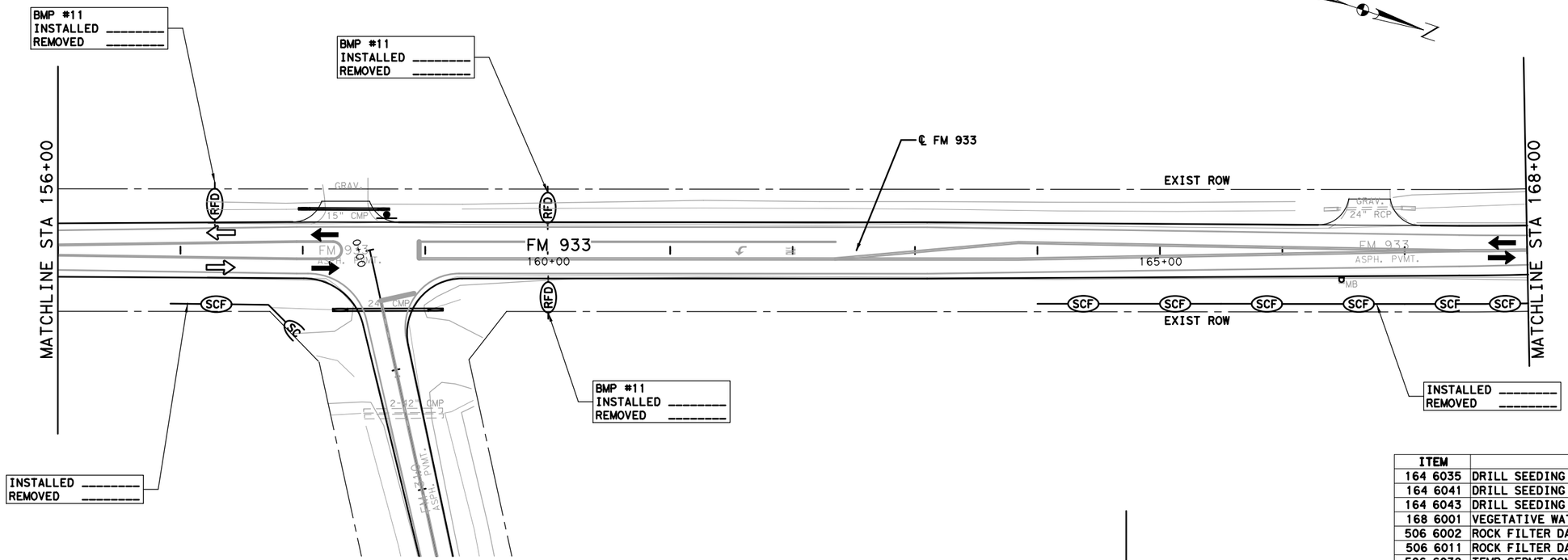
WACO DISTRICT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			117
STATE	DIST.	COUNTY	
TEXAS	WACO	HILL	
CONT.	SECT.	JOB	HIGHWAY NO.
1190	02	018	FM 933

G:\TXH\Projects\TxDOT\5335-05A*FM933\TS\01*CADD\163*SW3P\Standards\SW3P.dgn

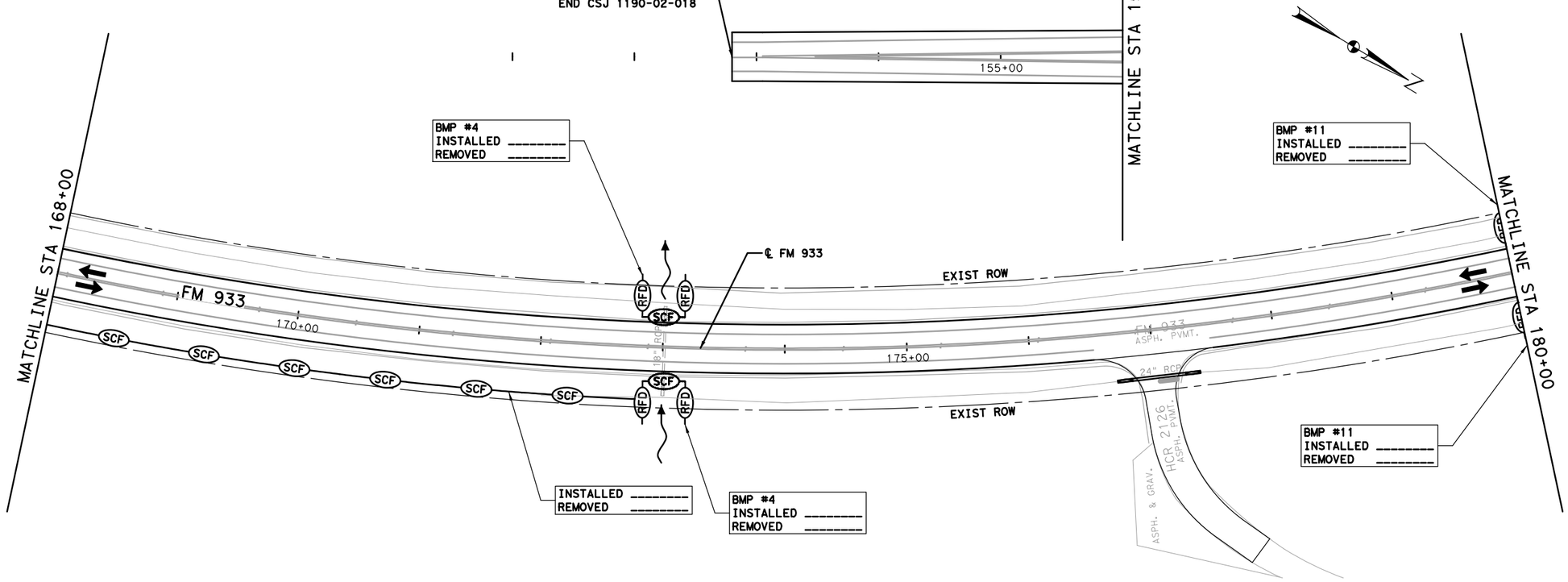
LEGEND

SCF — TEMPORARY SEDIMENT CONTROL FENCE
RFD — TYPE 2 ROCK FILTER DAM
DIRECTION OF FLOW



ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	7749
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	3875
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	3875
168 6001	VEGETATIVE WATERING	MG	126
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	315
506 6011	ROCK FILTER DAMS (REMOVE)	LF	315
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1072
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1072

0 50 100
SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation®

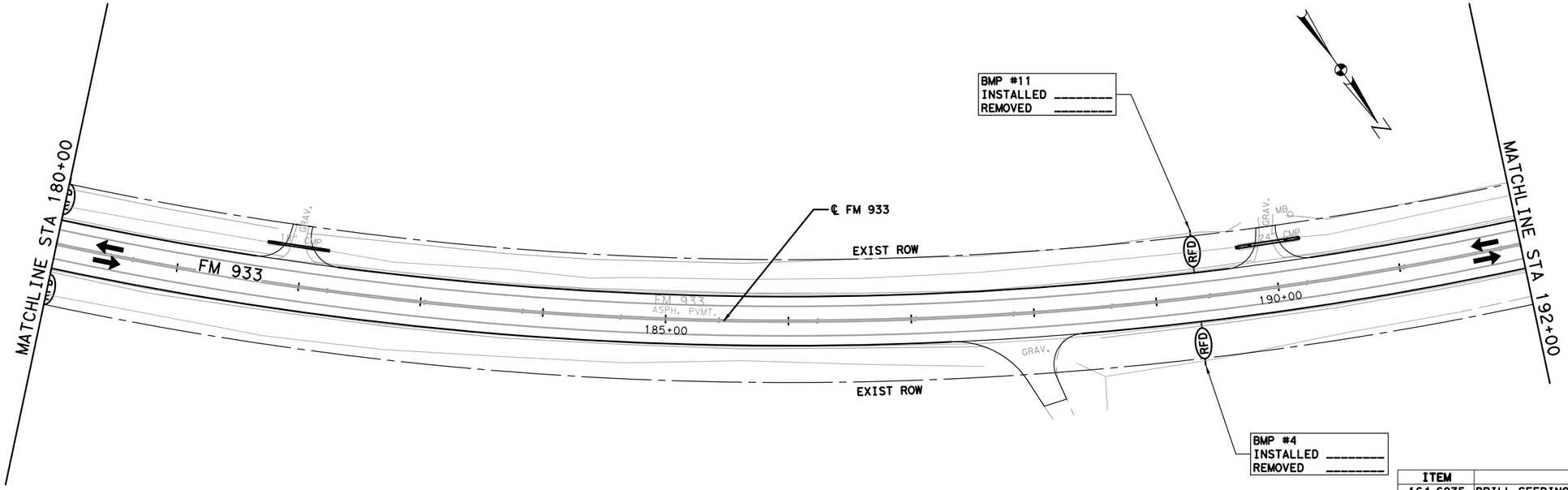
BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SW3P LAYOUT

SHEET 1 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			118
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933



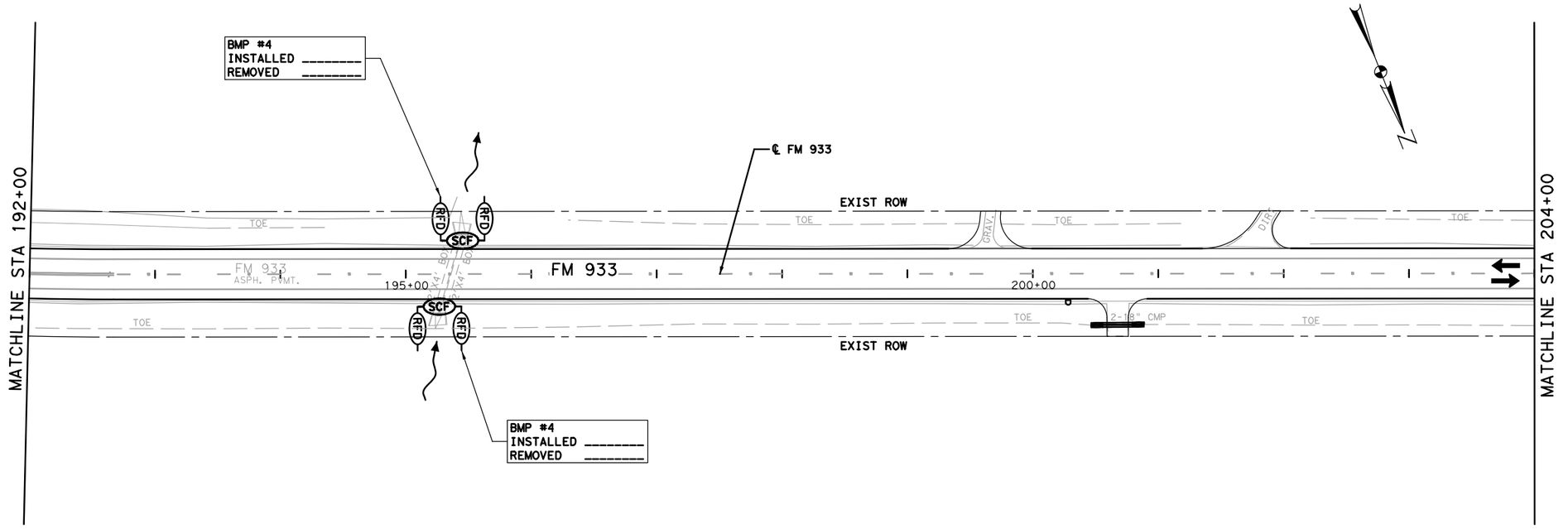
LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8931
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4466
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4466
168 6001	VEGETATIVE WATERING	MG	145
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	210
506 6011	ROCK FILTER DAMS (REMOVE)	LF	210
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	70
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	70

0 50 100

SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

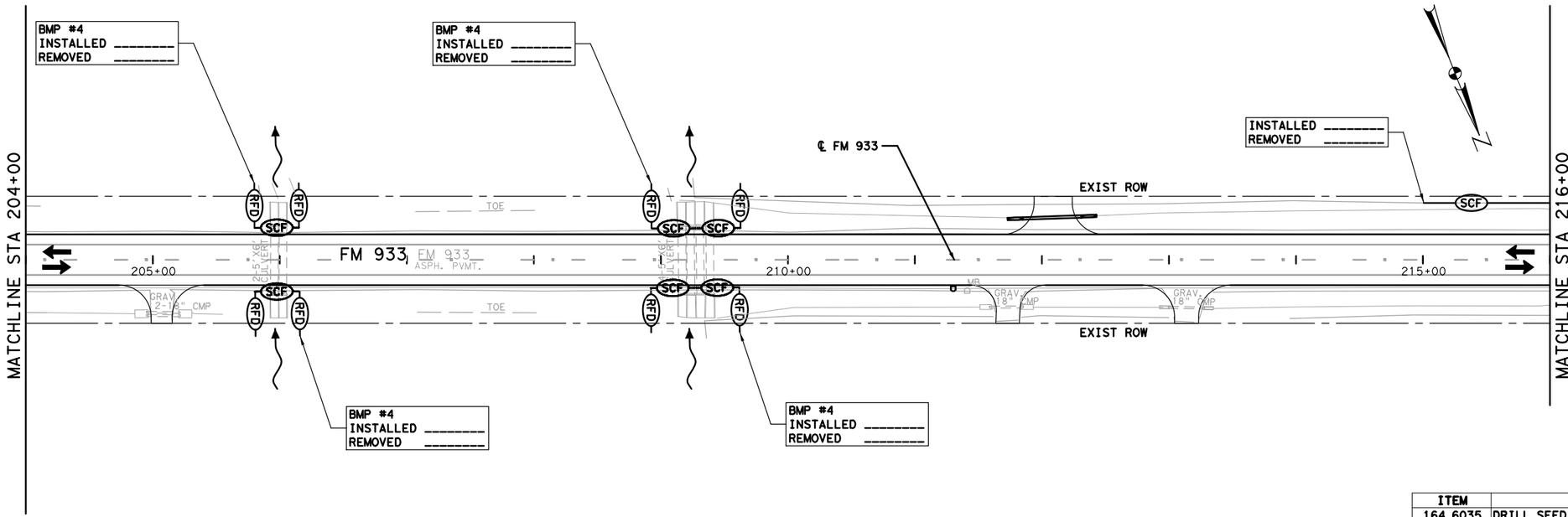
FM 933

SW3P LAYOUT

SHEET 2 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			119
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
emahlmann
01/12/2021 19:34:41
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_02.dgn
...\163_SW3P\FM933_SW3P_02.dgn

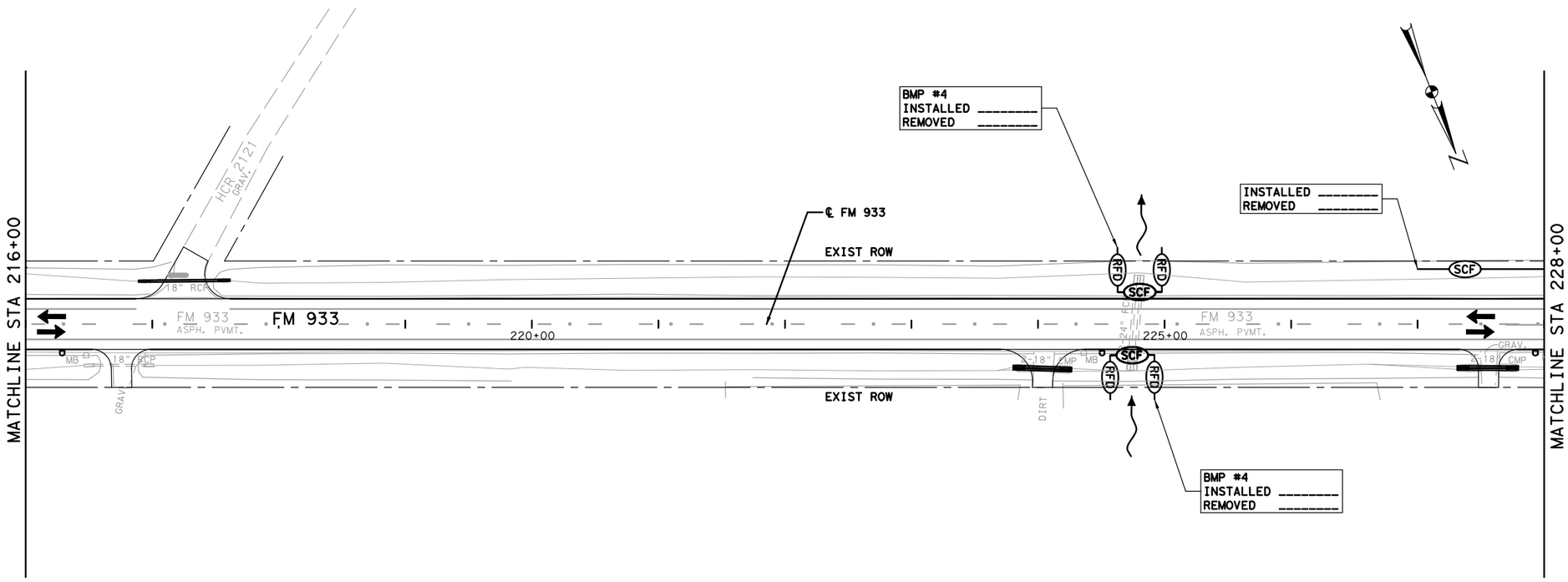


LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8964
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4482
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4482
168 6001	VEGETATIVE WATERING	MG	146
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	420
506 6011	ROCK FILTER DAMS (REMOVE)	LF	480
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	480
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	480

0 50 100
SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

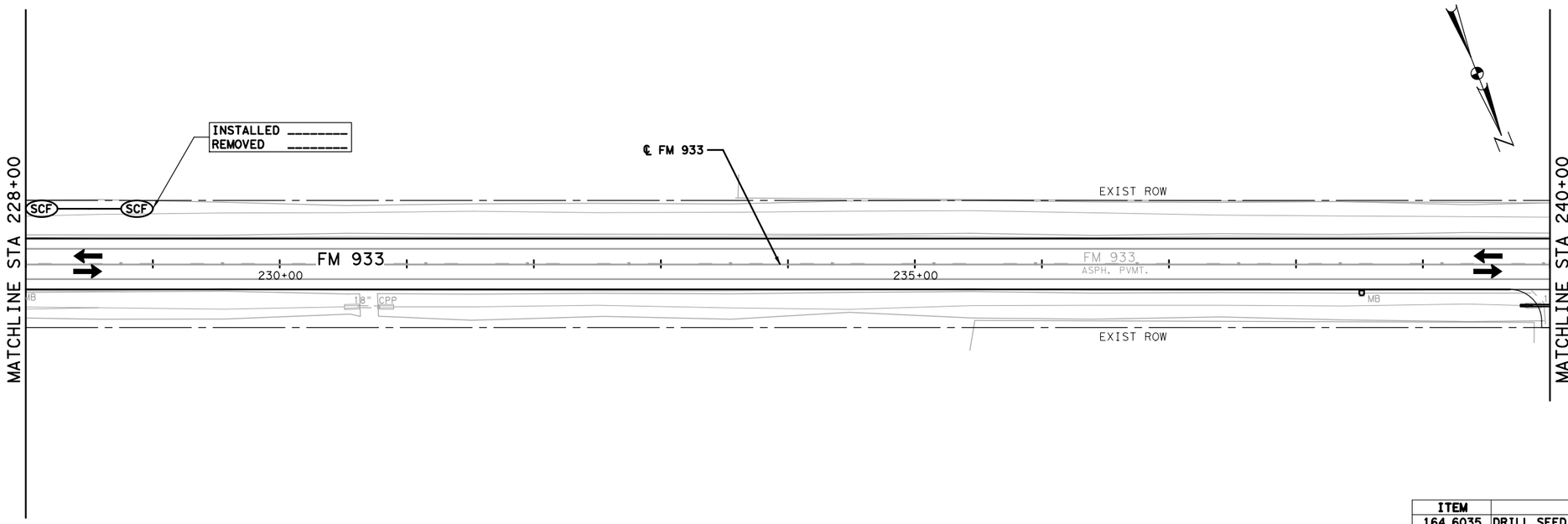
FM 933

SW3P LAYOUT

SHEET 3 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			120
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
01/12/2021 19:34:41 emahlmann
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_03.dgn
...\163_SW3P\FM933_SW3P_03.dgn

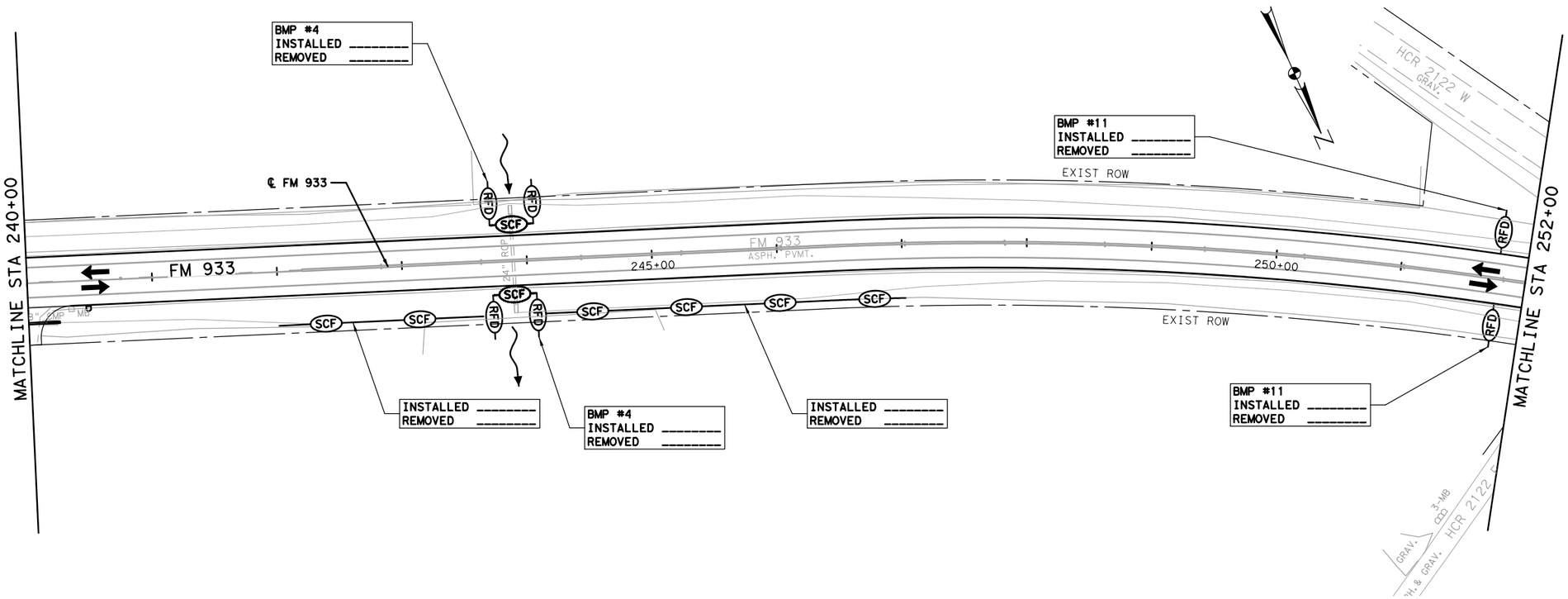


LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8730
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4365
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4365
168 6001	VEGETATIVE WATERING	MG	142
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	210
506 6011	ROCK FILTER DAMS (REMOVE)	LF	210
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	621
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	621

0 50 100
SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

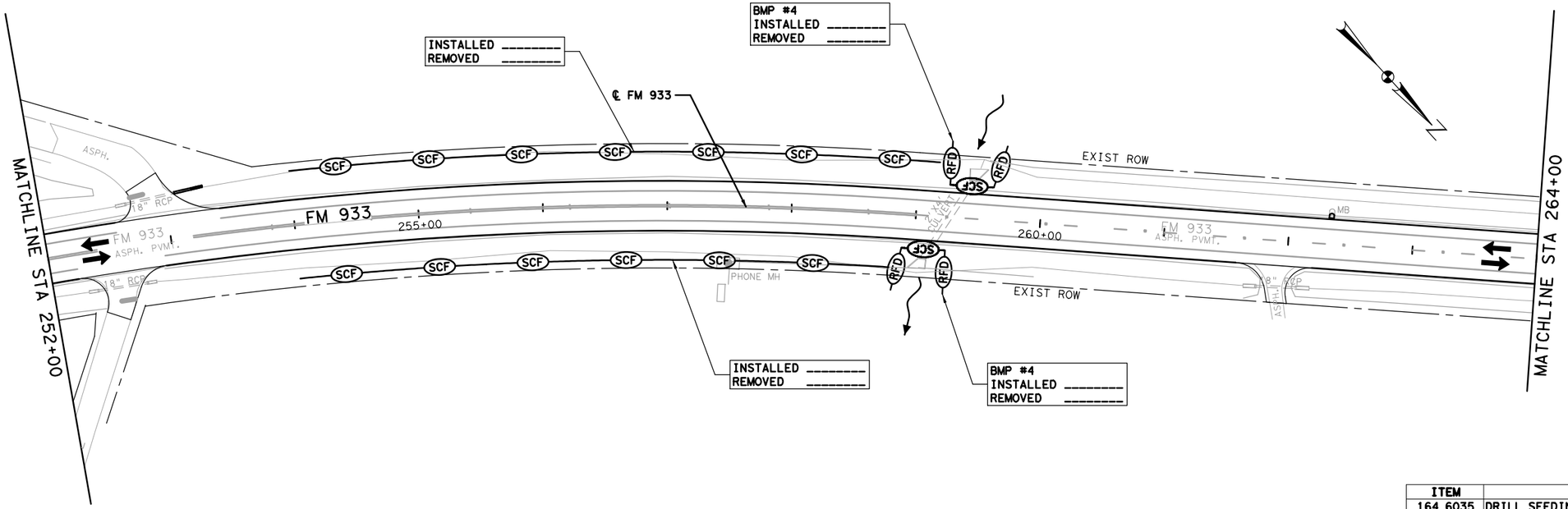
BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SW3P LAYOUT

SHEET 4 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			121
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

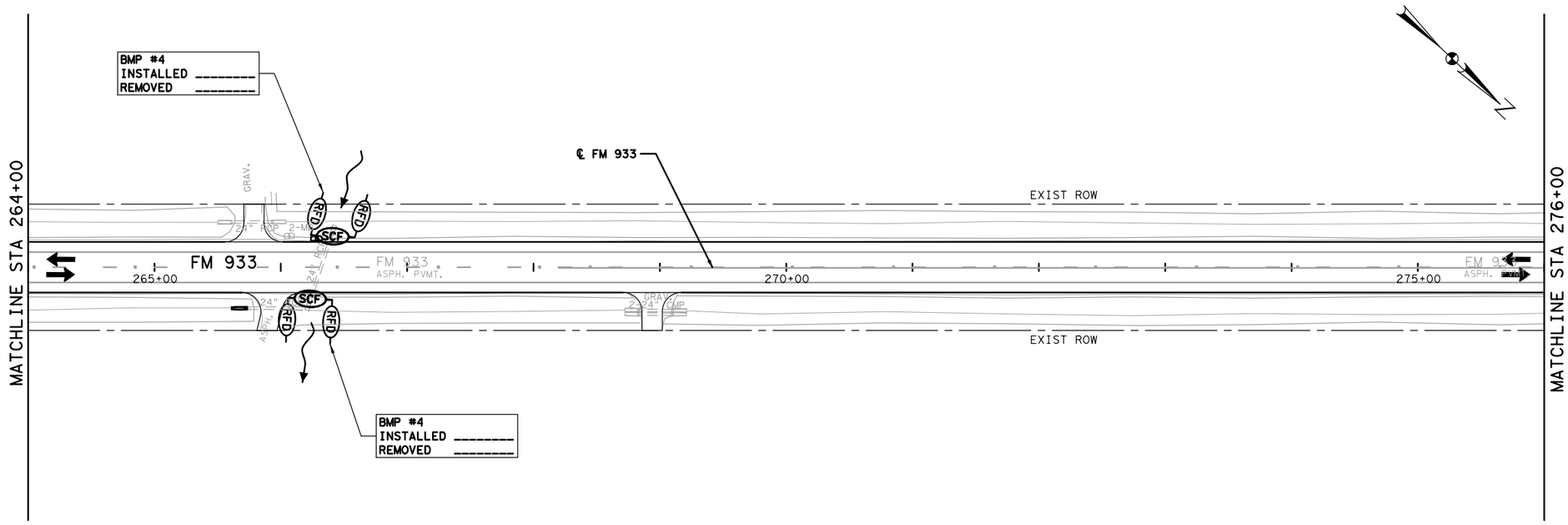


LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	9138
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4569
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4569
168 6001	VEGETATIVE WATERING	MG	148
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	280
506 6011	ROCK FILTER DAMS (REMOVE)	LF	280
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1138
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1138

0 50 100
SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

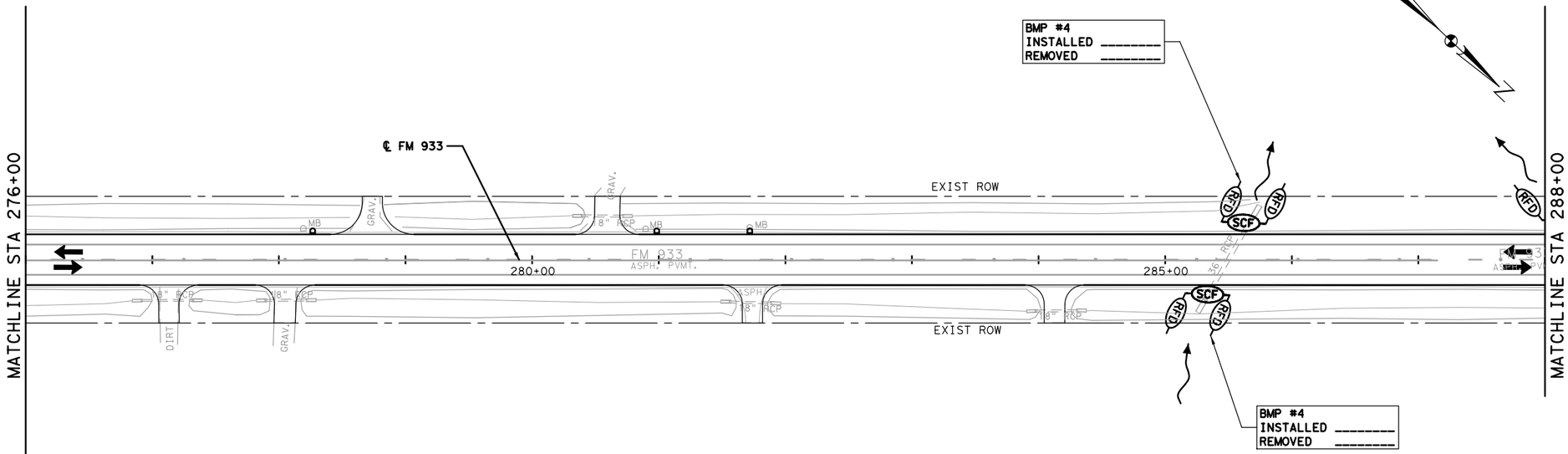
BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SW3P LAYOUT

FED RD DIV NO	PROJECT NO		SHEET NO
6			122
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:42 emahlmann
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_05.dgn
...\163_SW3P\FM933_SW3P_05.dgn



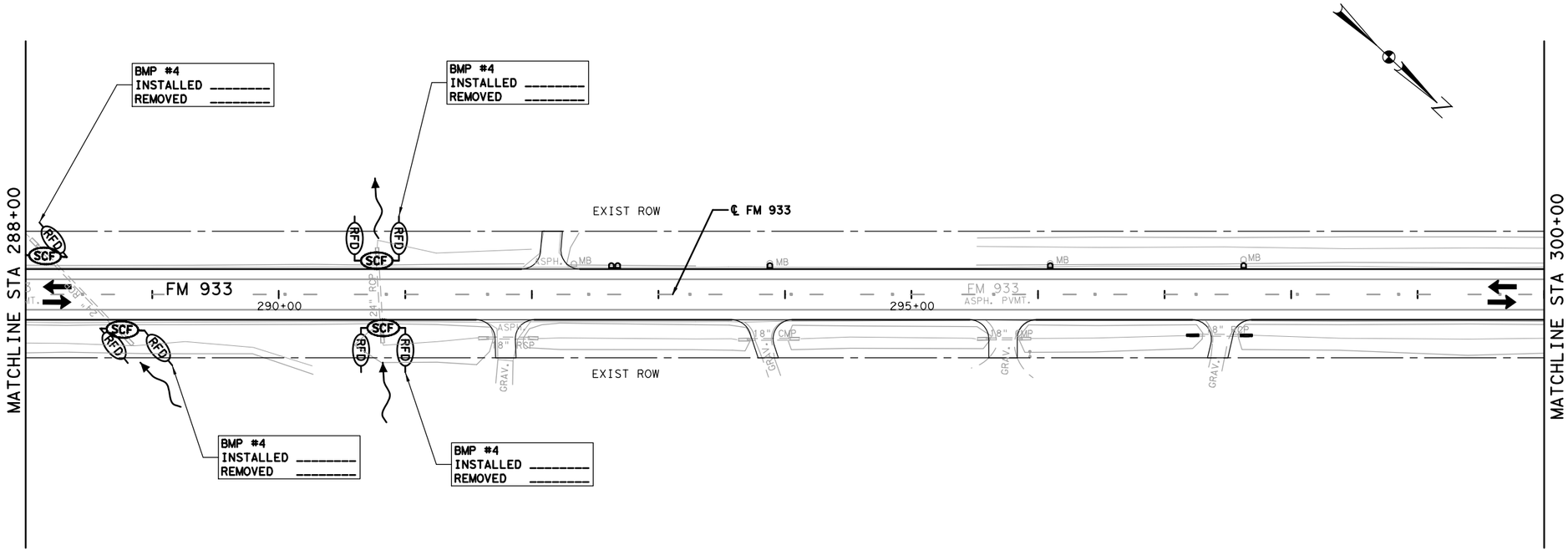
LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD — TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8734
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4367
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4367
168 6001	VEGETATIVE WATERING	MG	142
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	420
506 6011	ROCK FILTER DAMS (REMOVE)	LF	420
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	210
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	210

0 50 100

SCALE: 1" = 100'



01/12/2021

© 2021 Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

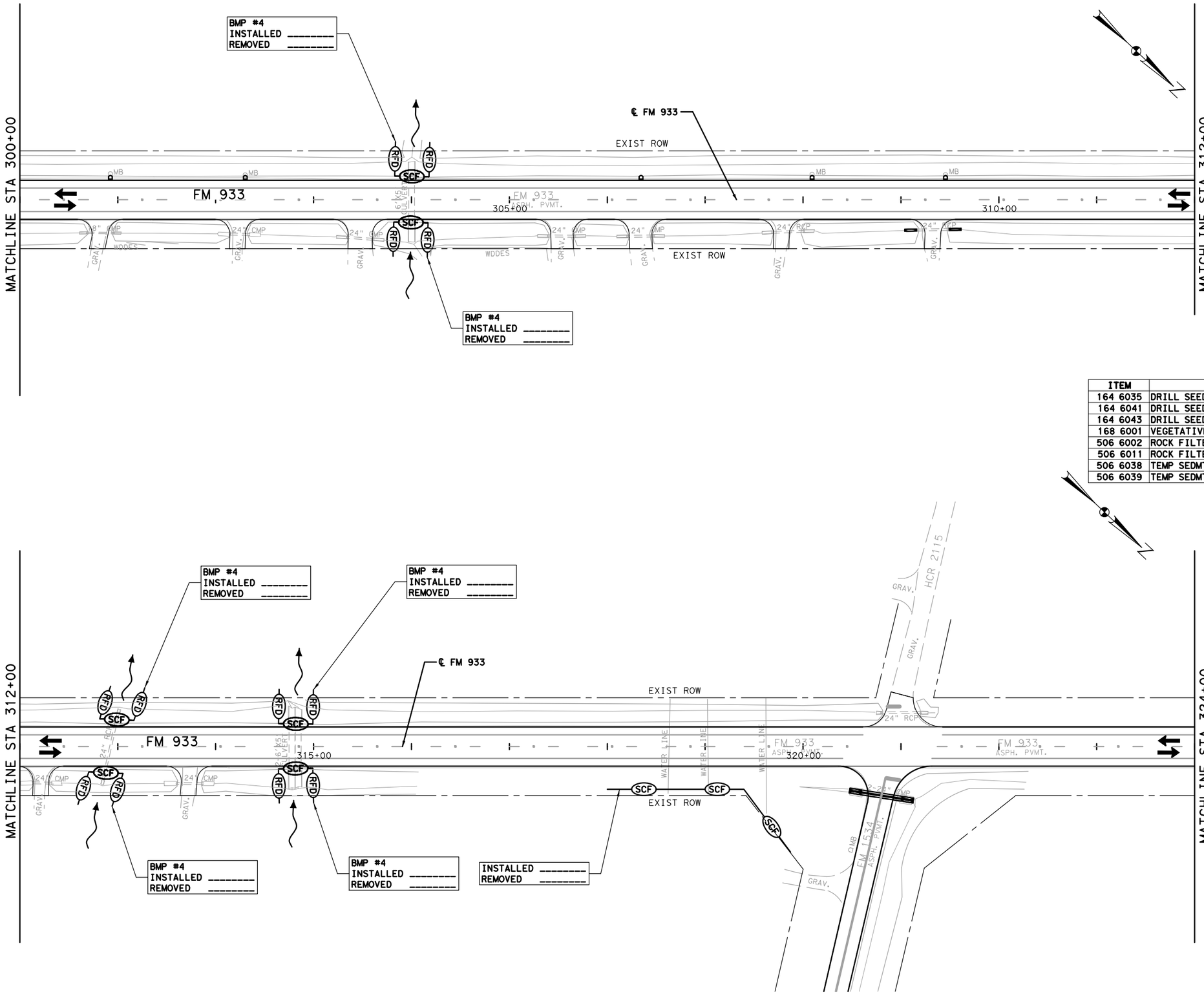
FM 933

SW3P LAYOUT

SHEET 6 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			123
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:43 emahlmann
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_06.dgn
...\163_SW3P\FM933_SW3P_06.dgn



LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	9250
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4625
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4625
168 6001	VEGETATIVE WATERING	MG	150
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	420
506 6011	ROCK FILTER DAMS (REMOVE)	LF	420
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	430
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	430

0 50 100

SCALE: 1" = 100'

01/12/2021

Texas Department of Transportation®

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

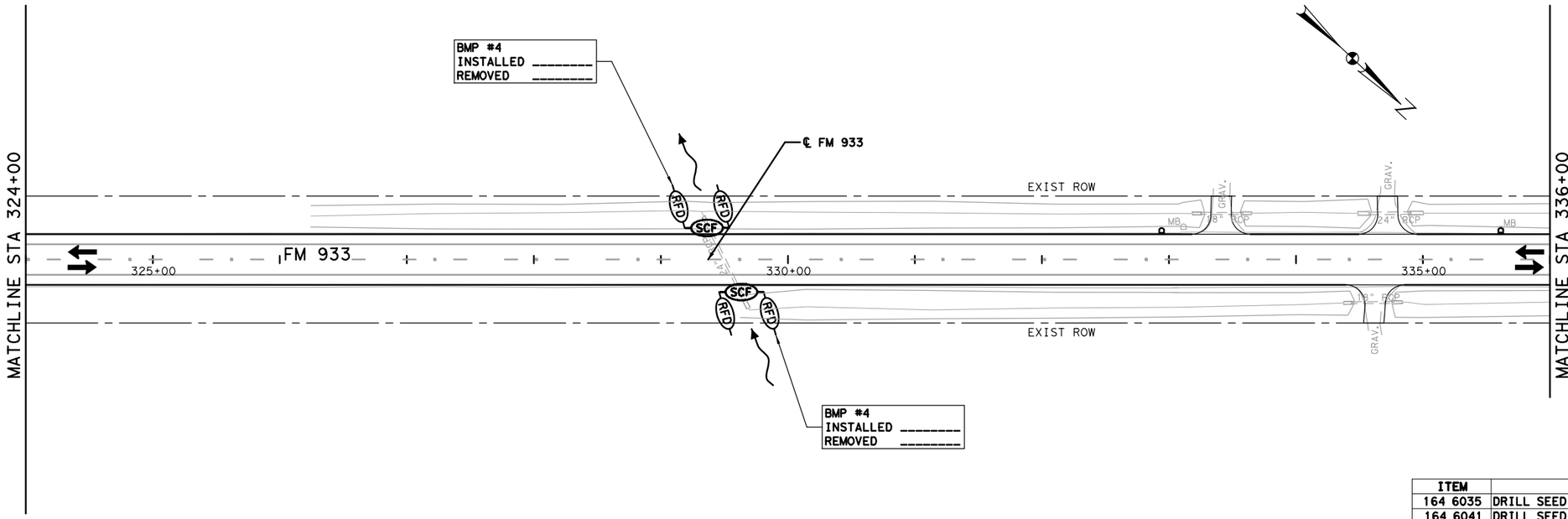
FM 933

SW3P LAYOUT

SHEET 7 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			124
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:44 emahlmann
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\0L_CADD\163_SW3P\FM933_SW3P_07.dgn
...\163_SW3P\FM933_SW3P_07.dgn



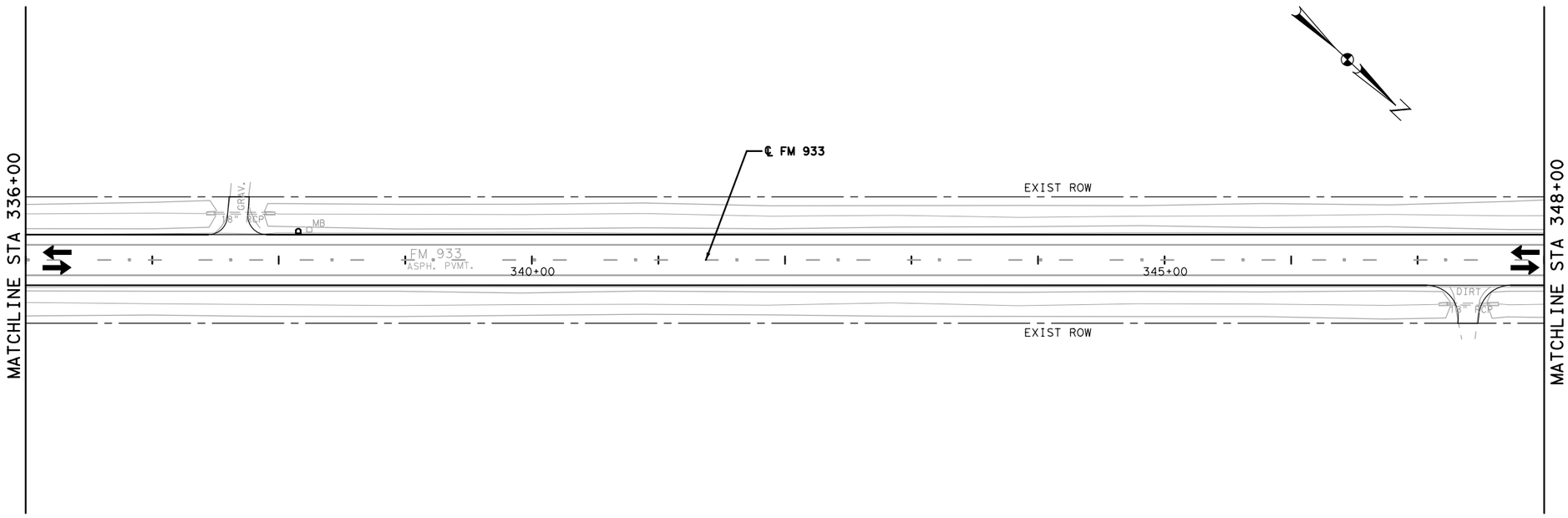
LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8642
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4321
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4321
168 6001	VEGETATIVE WATERING	MG	140
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	140
506 6011	ROCK FILTER DAMS (REMOVE)	LF	140
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	70
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	70

0 50 100

SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

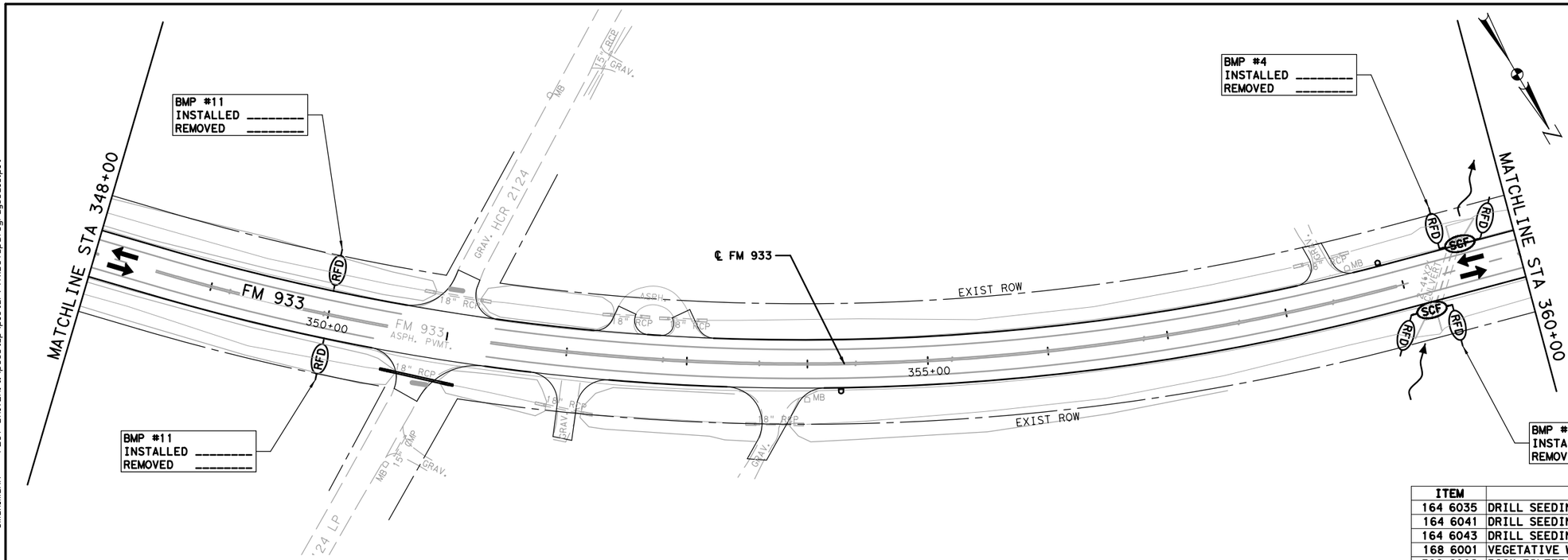
FM 933

SW3P LAYOUT

SHEET 8 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			125
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:45 emahlmann
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_08.dgn
...\163_SW3P\FM933_SW3P_08.dgn



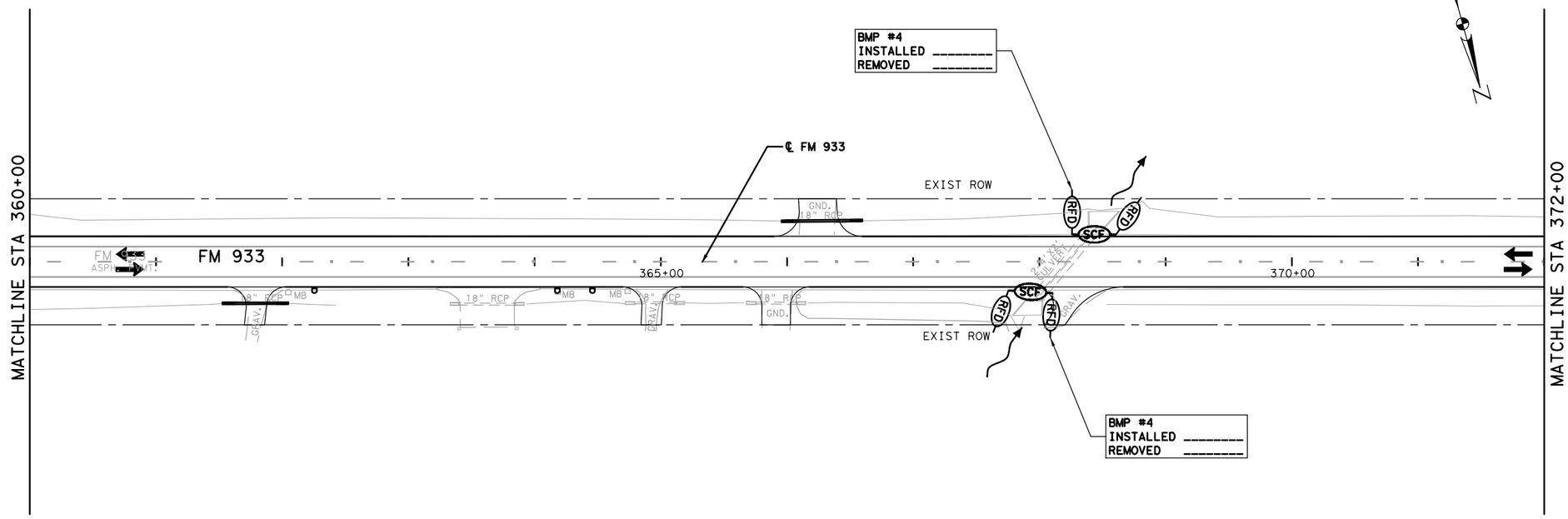
LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8409
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4205
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4205
168 6001	VEGETATIVE WATERING	MG	137
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	280
506 6011	ROCK FILTER DAMS (REMOVE)	LF	280
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	140
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	140

0 50 100

SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

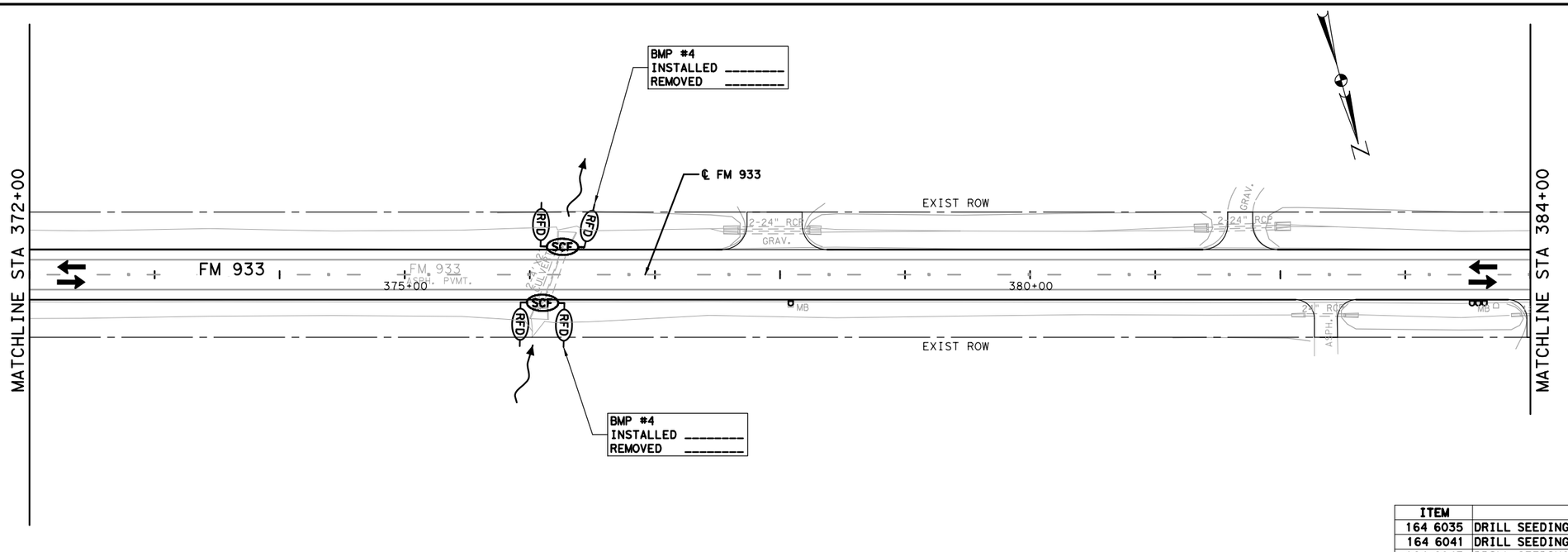
FM 933

SW3P LAYOUT

SHEET 9 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			126
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
emahlmann
01/12/2021 19:34:45
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\0L_CADD\163_SW3P\FM933_SW3P_09.dgn
...\163_SW3P\FM933_SW3P_09.dgn



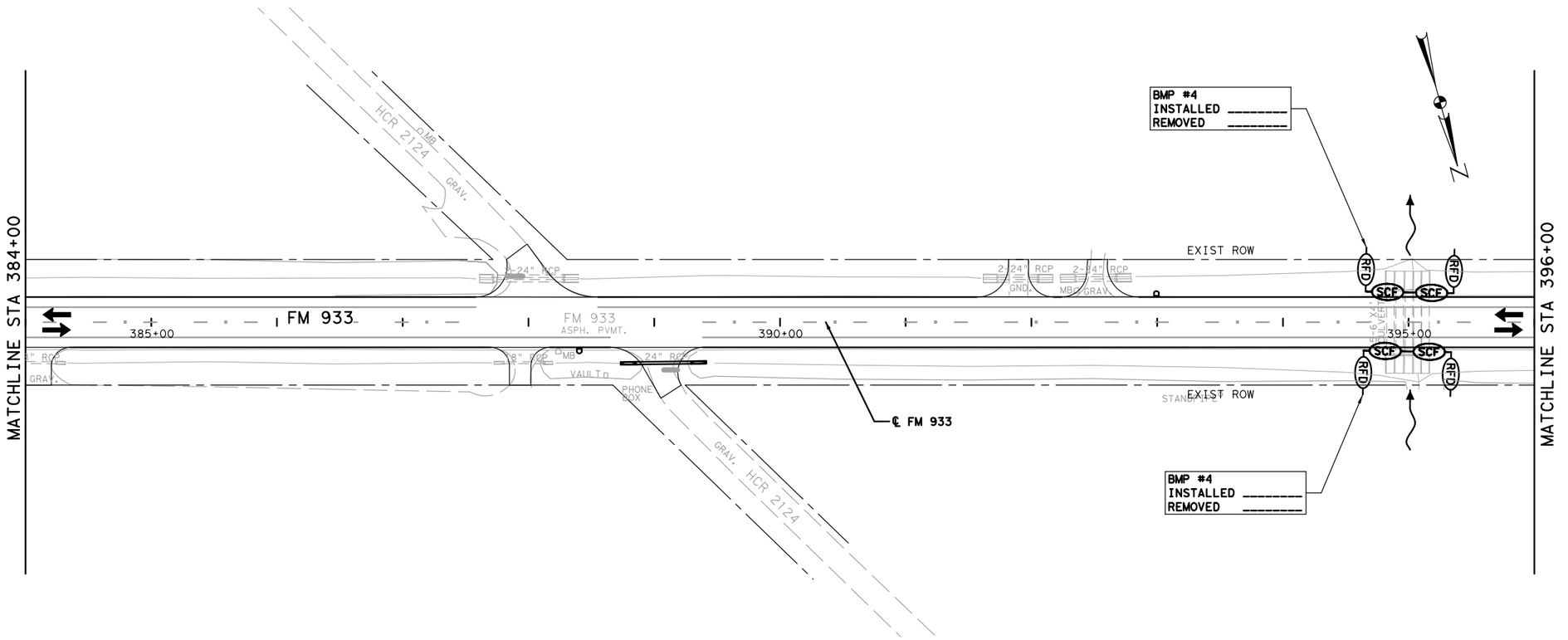
LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8122
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4061
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4061
168 6001	VEGETATIVE WATERING	MG	132
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	280
506 6011	ROCK FILTER DAMS (REMOVE)	LF	280
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	210
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	210

0 50 100

SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

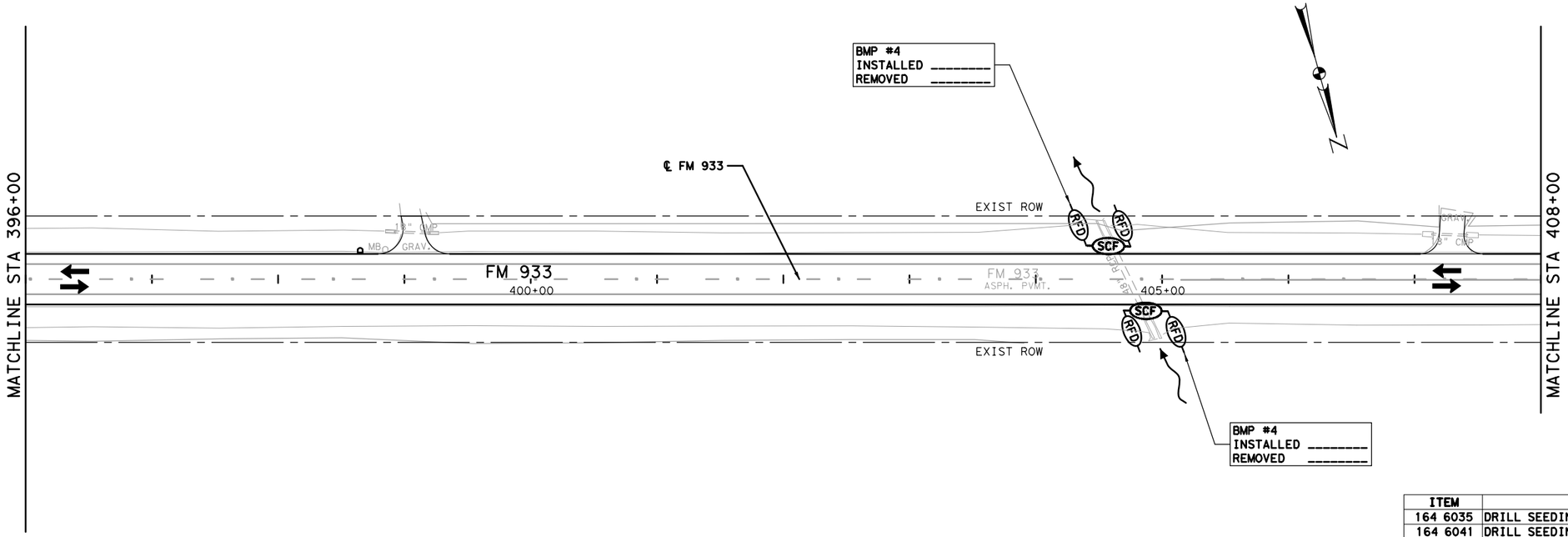
FM 933

SW3P LAYOUT

SHEET 10 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			127
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:46 emahlmann
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_10.dgn
...\163_SW3P\FM933_SW3P_10.dgn



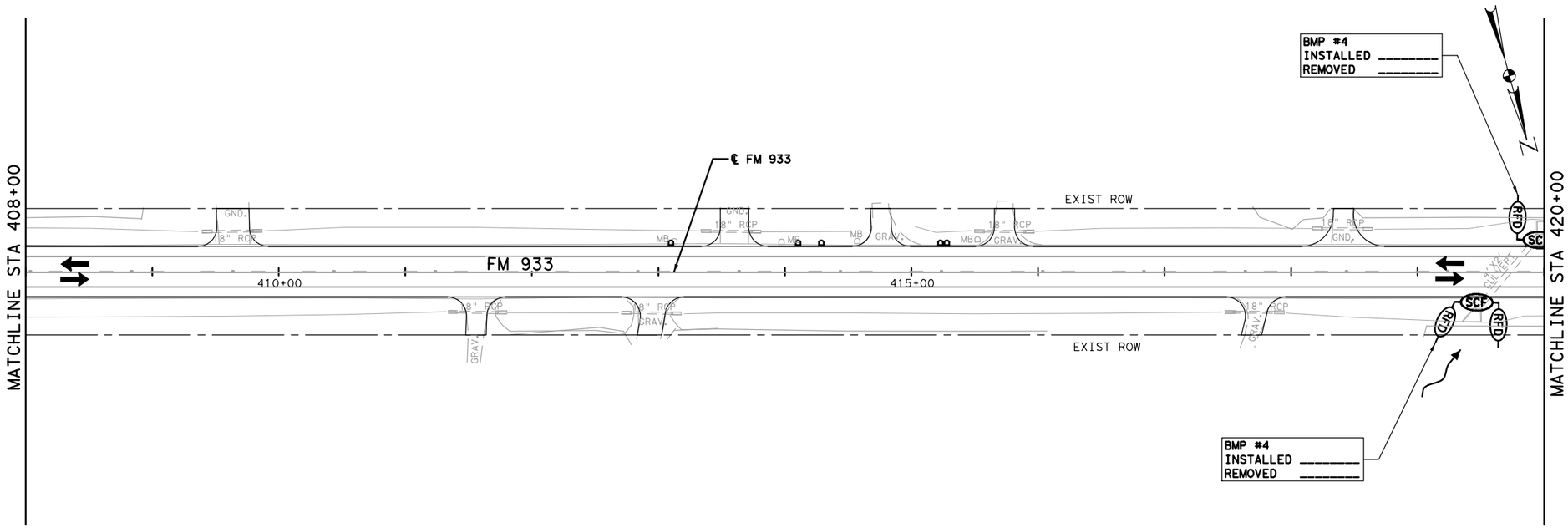
LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD — TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8517
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4259
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4259
168 6001	VEGETATIVE WATERING	MG	138
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	245
506 6011	ROCK FILTER DAMS (REMOVE)	LF	245
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	140
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	140

0 50 100

SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

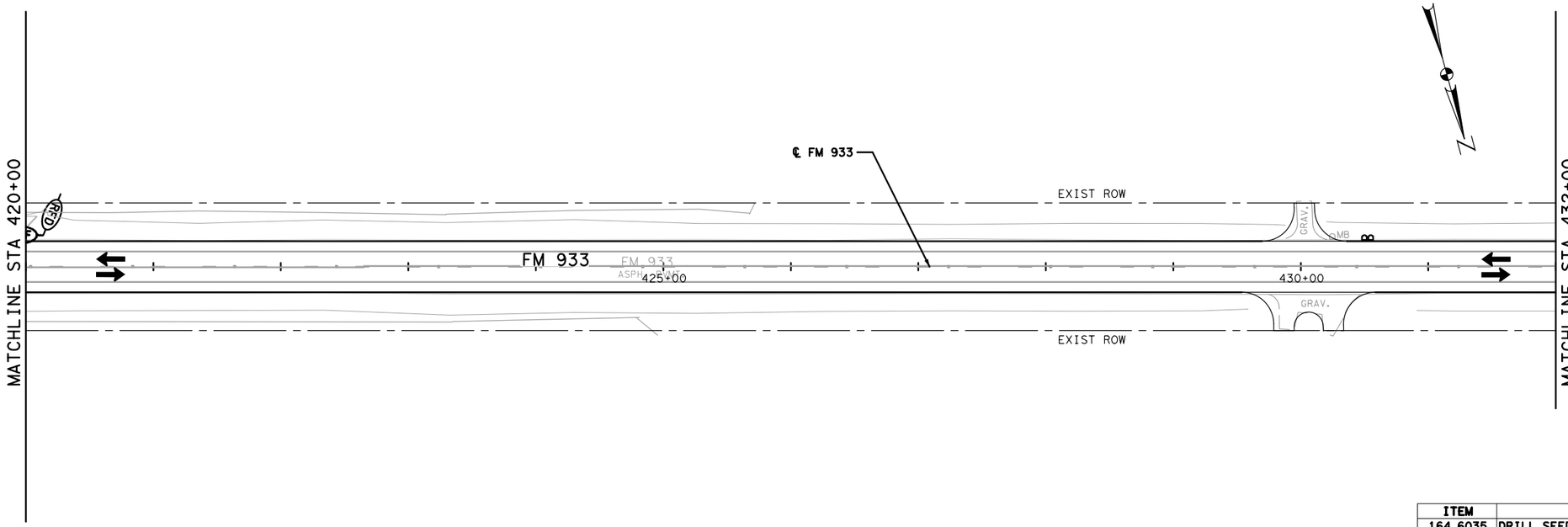
FM 933

SW3P LAYOUT

SHEET 11 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			128
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_grayscale.plt
01/12/2021 19:34:46 emahlmann
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_11.dgn
...\163_SW3P\FM933_SW3P_11.dgn

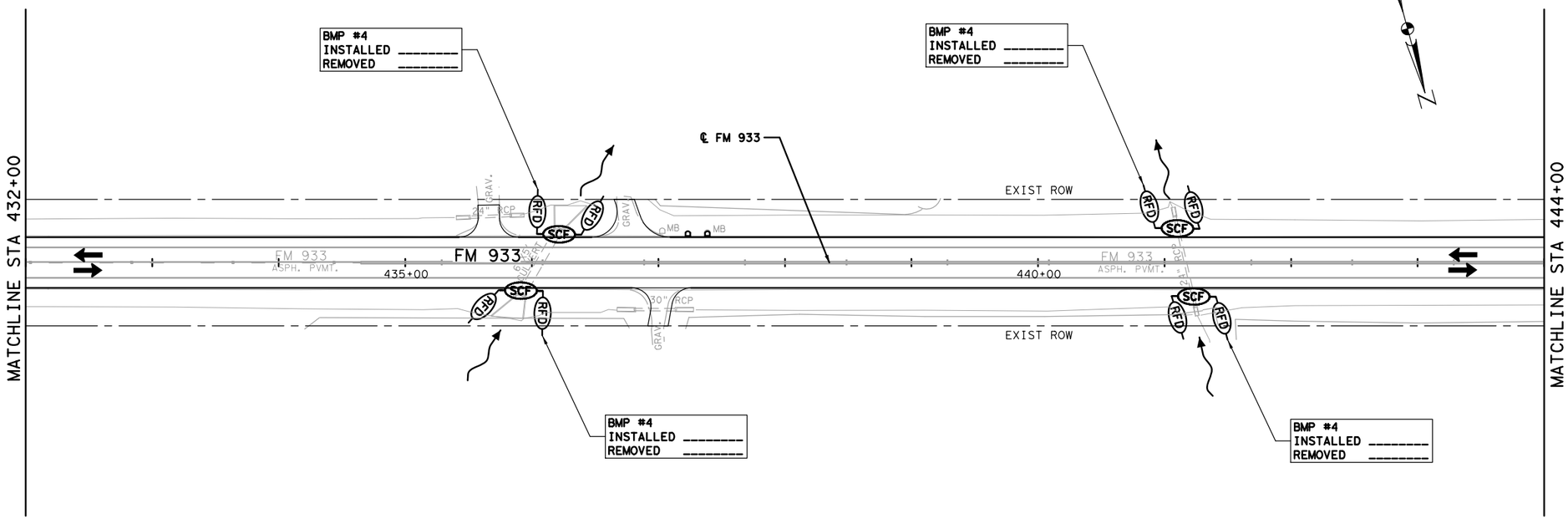


LEGEND

- (SCF) TEMPORARY SEDIMENT CONTROL FENCE
- (RFD) TYPE 2 ROCK FILTER DAM
- DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8263
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4131
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4131
168 6001	VEGETATIVE WATERING	MG	134
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	315
506 6011	ROCK FILTER DAMS (REMOVE)	LF	315
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	140
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	140

0 50 100
SCALE: 1" = 100'



01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

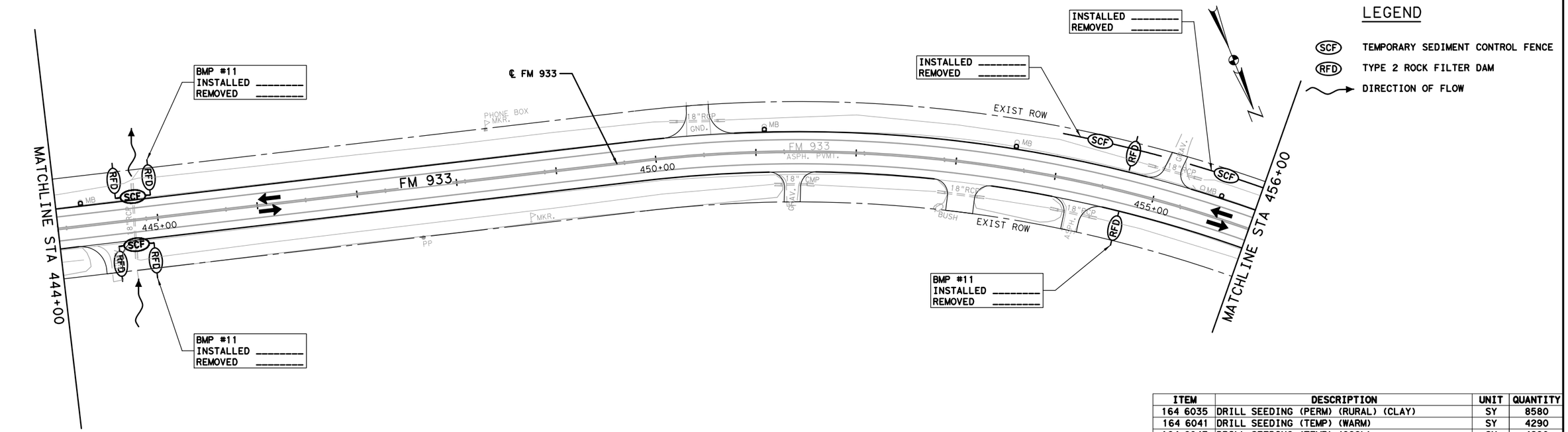
FM 933

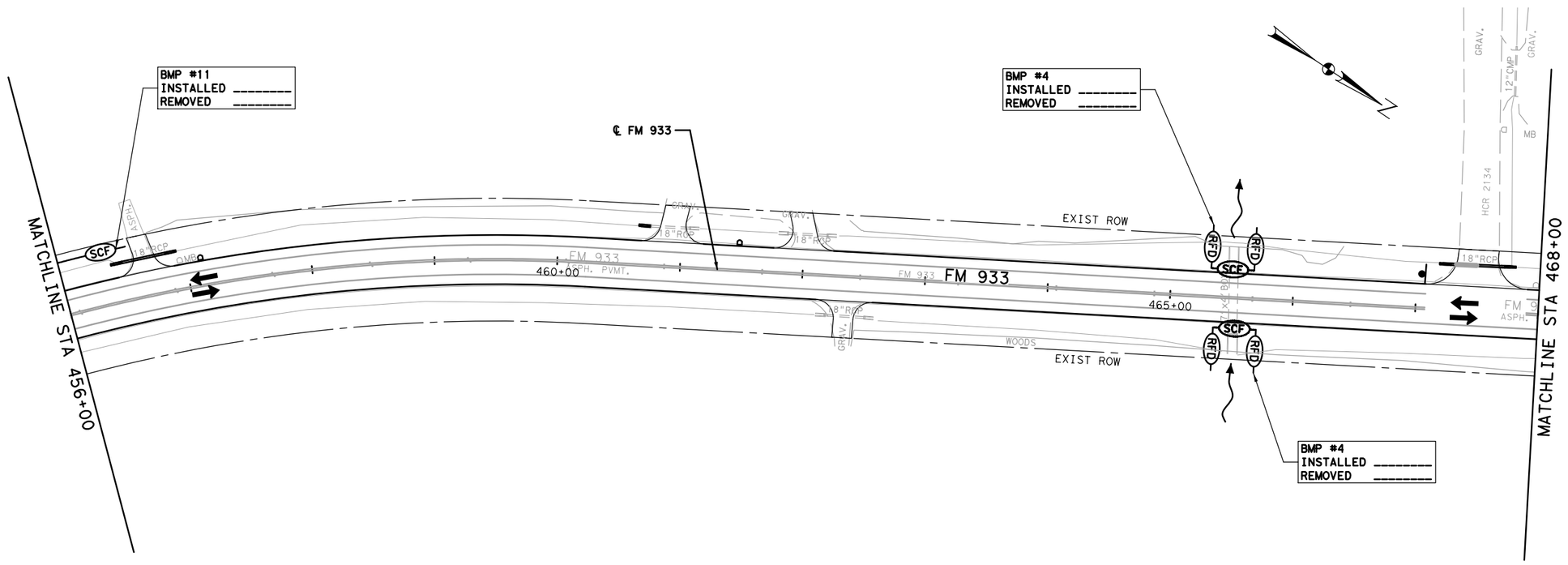
SW3P LAYOUT

SHEET 12 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			129
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

...\163_SW3P\FM933_SW3P_12.dgn





ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	8580
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	4290
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	4290
168 6001	VEGETATIVE WATERING	MG	139
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	350
506 6011	ROCK FILTER DAMS (REMOVE)	LF	350
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	373
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	373

0 50 100

SCALE: 1" = 100'

01/12/2021

Texas Department of Transportation

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SW3P LAYOUT

SHEET 13 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			130
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

PEN TABLE: T:\PCSETUP\Tables\TXDOT.TBL
PLOT DRIVER: t:\pcsetup\plotdrv\TxDOT_pdf_greyscale.plt
emahlmann
01/12/2021 19:34:48
MODEL: SW3P LAYOUT
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\FM933_SW3P_13.dgn
...\163_SW3P\FM933_SW3P_13.dgn

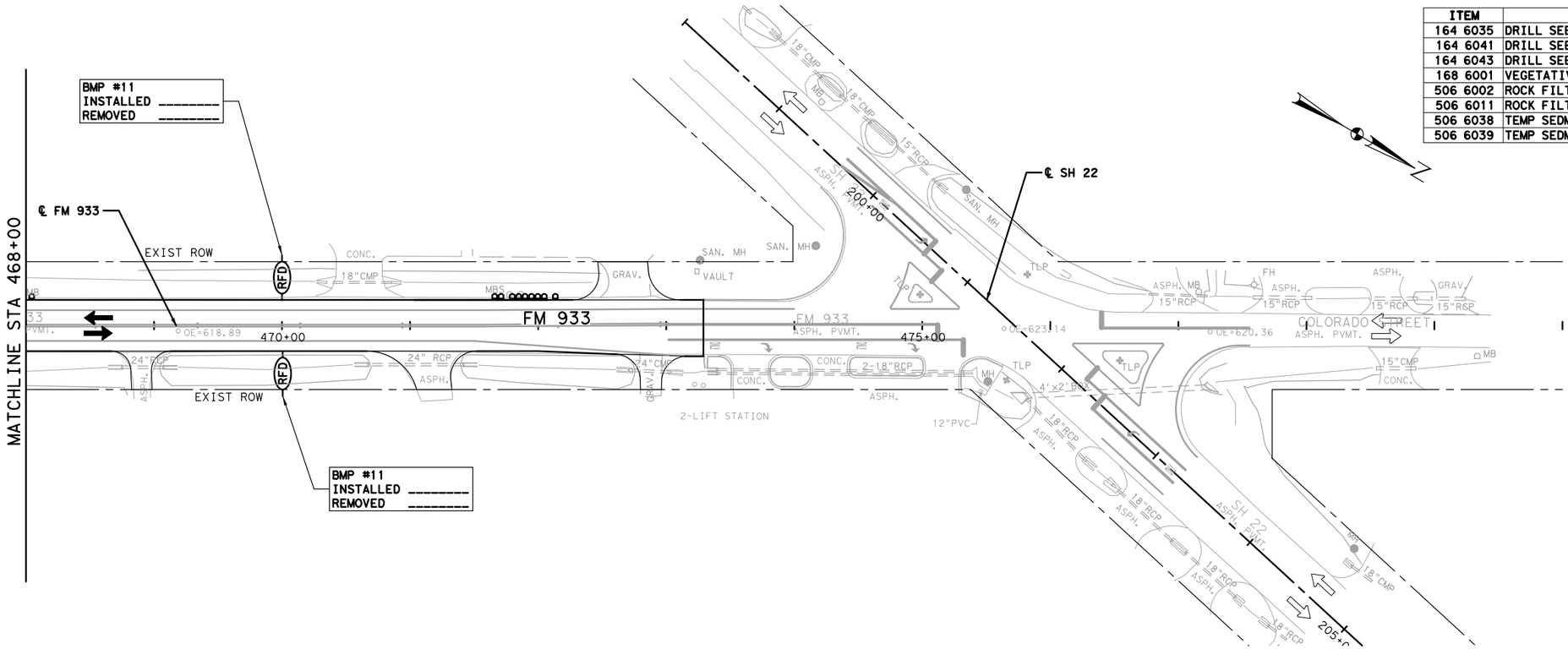
LEGEND

(SCF) TEMPORARY SEDIMENT CONTROL FENCE

(RFD) TYPE 2 ROCK FILTER DAM

DIRECTION OF FLOW

ITEM	DESCRIPTION	UNIT	QUANTITY
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	170
164 6041	DRILL SEEDING (TEMP) (WARM)	SY	85
164 6043	DRILL SEEDING (TEMP) (COOL)	SY	85
168 6001	VEGETATIVE WATERING	MG	3
506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	70
506 6011	ROCK FILTER DAMS (REMOVE)	LF	70
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	



0 50 100

SCALE: 1" = 100'

01/12/2021

Texas Department of Transportation®

BGE, Inc.
10777 Westheimer, Suite 400, Houston, TX 77042
Tel: 281-558-8700 • www.bgeinc.com
TBPE Registration No. F-1046

FM 933

SW3P LAYOUT

SHEET 14 OF 14

FED RD DIV NO	PROJECT NO		SHEET NO
6			131
STATE	DIST	COUNTY	
TEXAS	WAC	HILL	
CONT	SECT	JOB	HIGHWAY NO
1190	02	018	FM 933

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:

   - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.

   - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.

   - Post the TxDOT storm water permit and any Contractor permits, per permit requirements.

   - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.

   - Provide scale drawings of off ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses.

   - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.

   - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration.

   - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day. The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.

   - Provide documentation required for Waters of the US, Note #3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.

   - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.

   - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring cutting or torching of steel, coated with lead containing paints.

2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.

3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEQ, EPA, DSHS and Corps of Engineers regarding activities on this project.

4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).

5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.

6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.

7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.

8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

SCALE = NTS SHEET 1 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

FILE: BMPLAYOUTS.dgn	DN:	CK:	DW:	CK:
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
DEC 2013	DIST	COUNTY		SHEET NO.
FEB 2015	WAC	HILL		132

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance.

10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.

11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.

12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.

13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.

14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).

    The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.

15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.

16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.

17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.

18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.

19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.

20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.

21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.

22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L - hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.

23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.

24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.

25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

FILE: BMPLAYOUTS.dgn	DN:	CK:	DW:	CK:
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
DEC 2013	DIST	COUNTY		SHEET NO.
FEB 2015	WAC	HILL		133

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.

27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls; on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.

28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.

29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.

30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.

31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.

32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.

33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.

34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.

35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.

36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.

37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.

38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.

39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.

40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.

41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.

42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.

43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

FILE: BMPLAYOUTS.dgn	DN:	CK:	DW:	CK:
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS DEC 2013 FEB 2015	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		134

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.

45. Rock riprap for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.

46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to Item 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.

47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.

48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.

49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.

50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.

51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

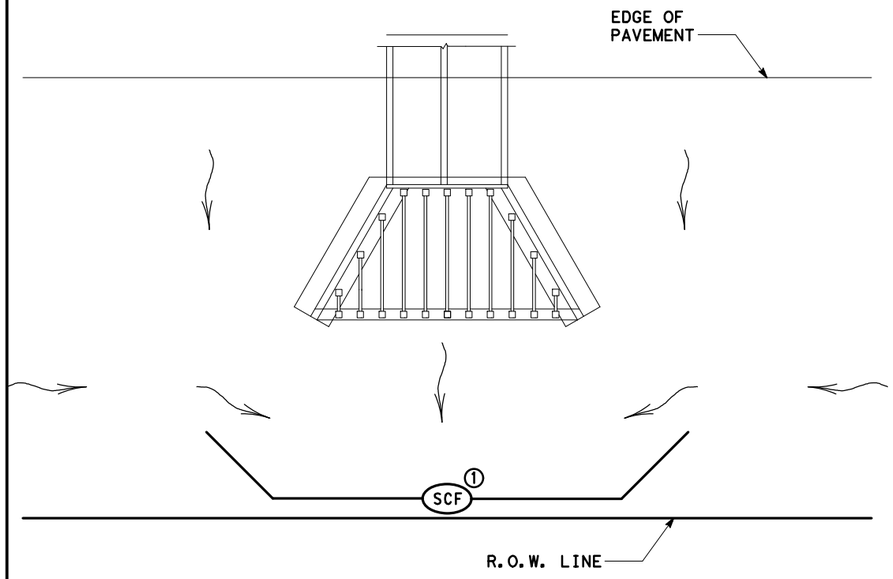
SCALE = NTS SHEET 4 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

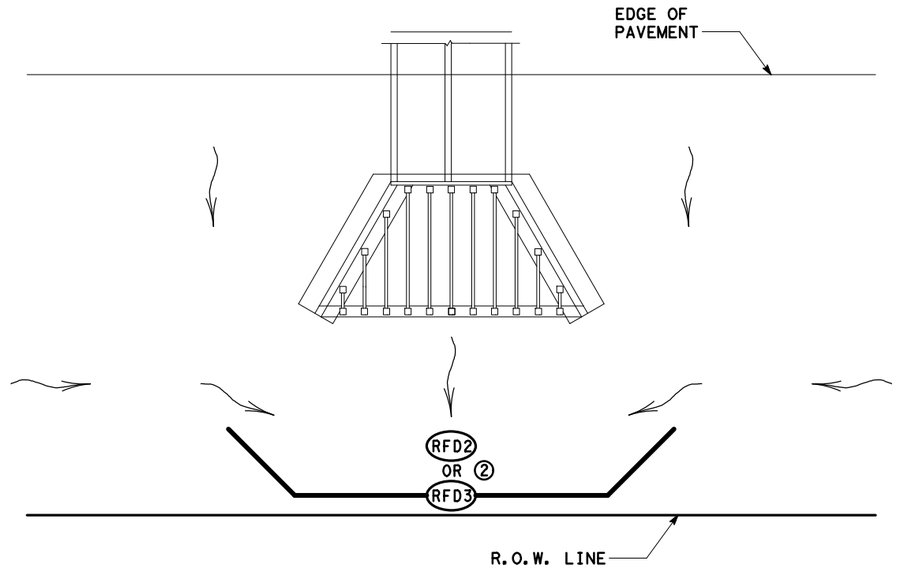
TA-BMP

FILE: BMPLAYOUTS.dgn	DN:	CK:	DW:	CK:
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
DEC 2013 FEB 2015	DIST	COUNTY		SHEET NO.
	WAC	HILL		135



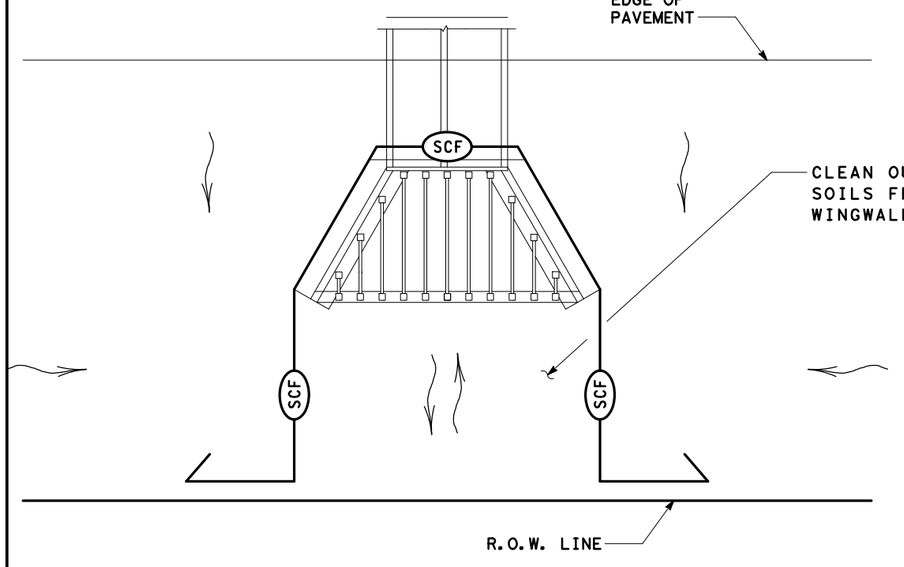
BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



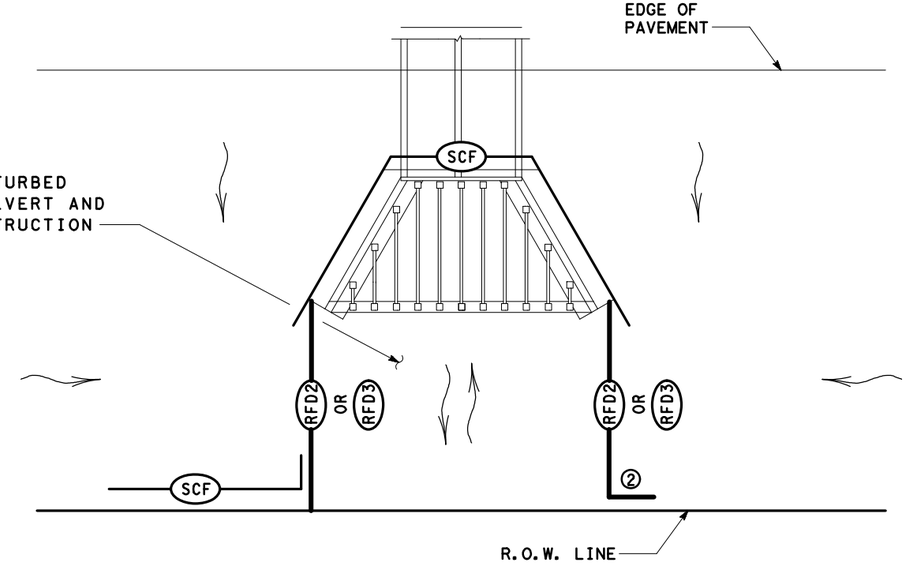
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

1. EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
2. EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

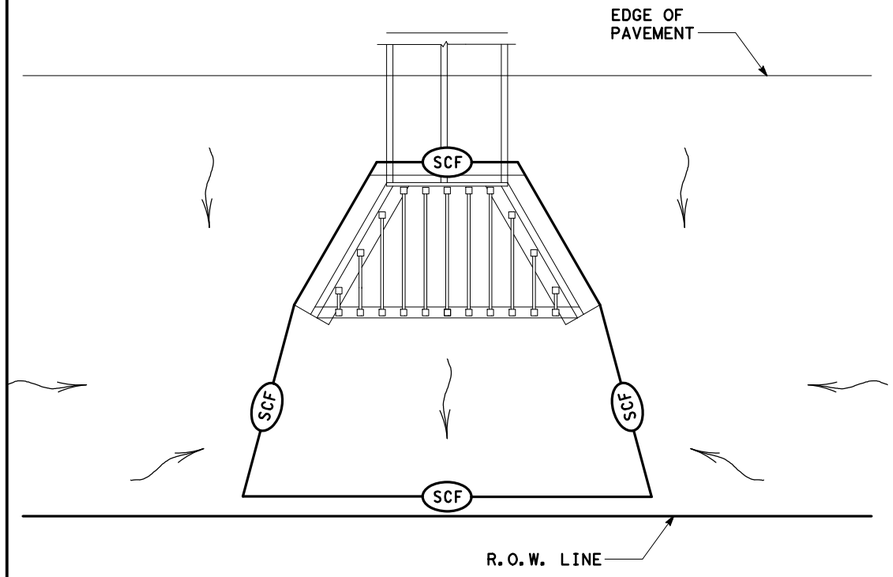
SCALE = NTS SHEET 5 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

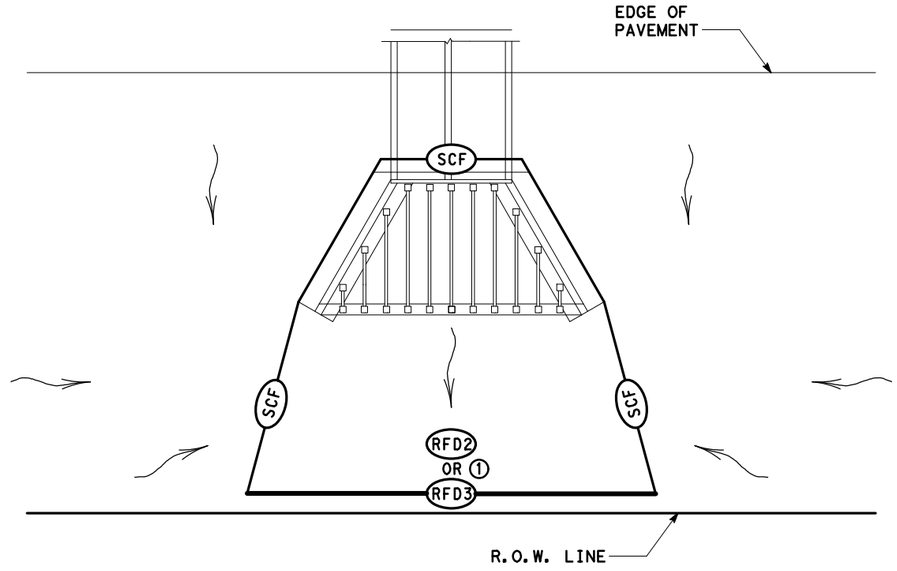
TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	
		CONT	SECT	JOB	HIGHWAY	
REVISIONS		1190	02	018	FM 933	
DEC 2013		DIST	COUNTY			SHEET NO.
FEB 2015		WAC	HILL			136



BEST MANAGEMENT PRACTICE (BMP) #5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #6

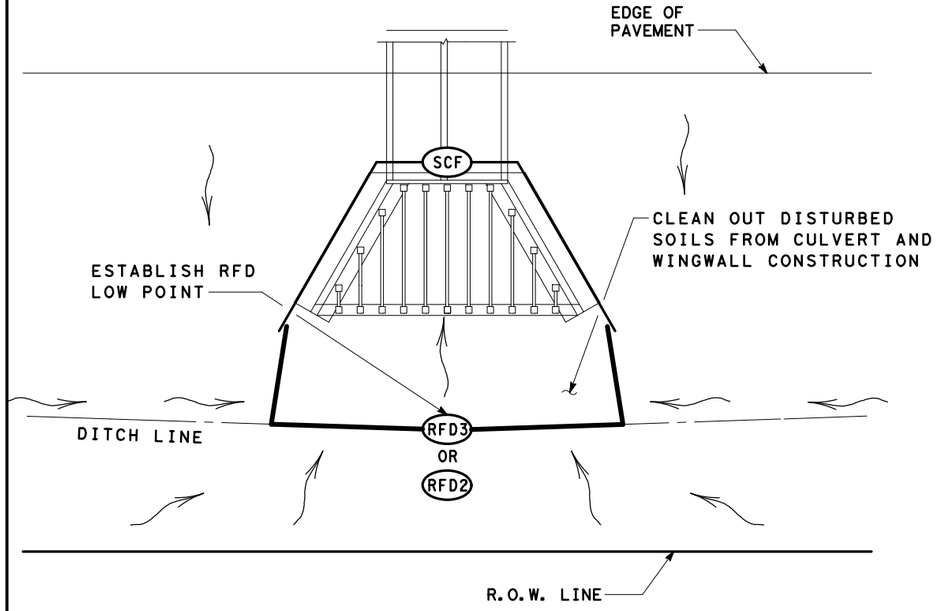
FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

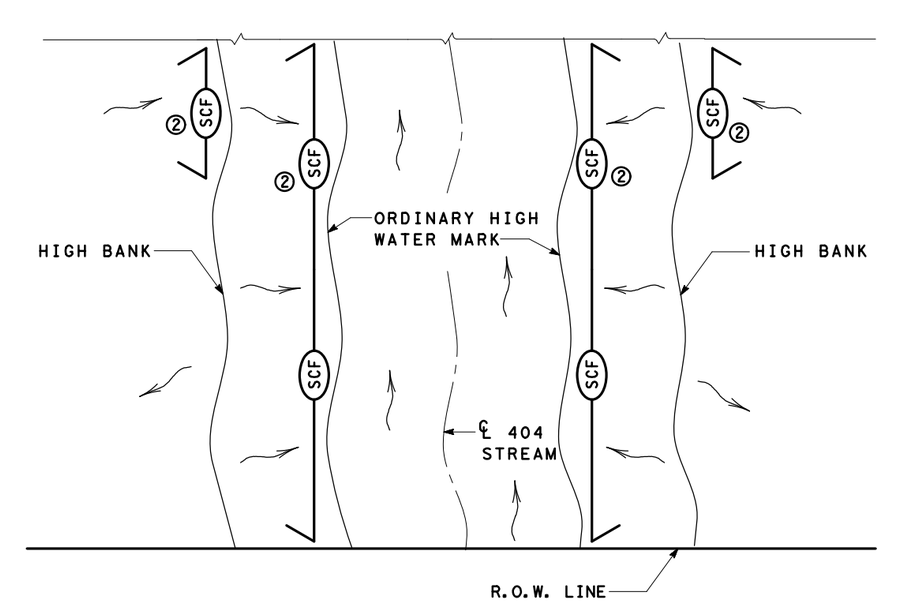
① PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.

② USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT



BEST MANAGEMENT PRACTICE (BMP) #7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #8

FOR 404 STREAMS ~ SEDIMENT CONTROL DURING PROJECT CLEARING AND GRUBBING

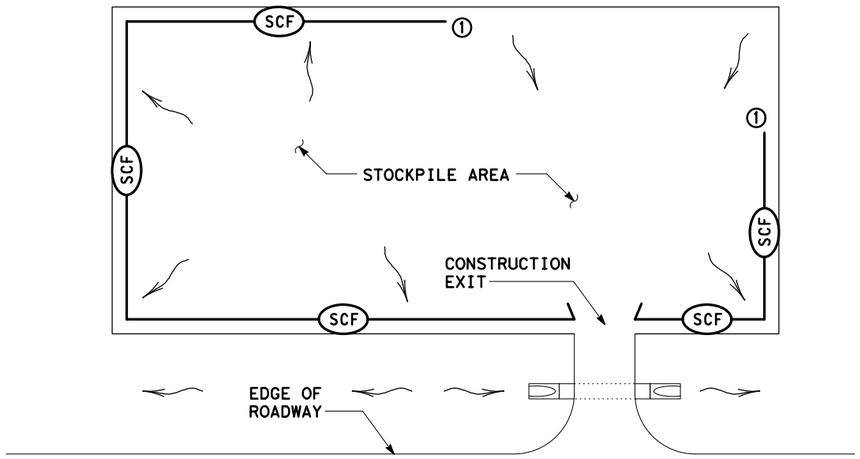
SCALE = NTS SHEET 6 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

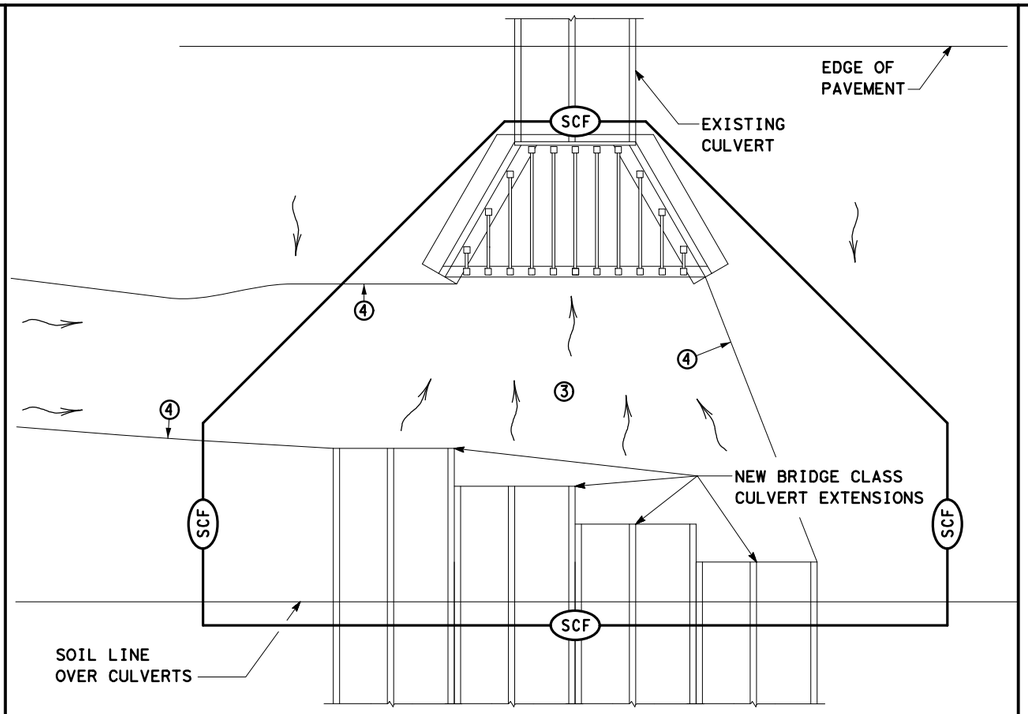
TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT		CK: TXDOT	DW: TXDOT		CK: TXDOT
©TxDOT 2009		CONT	SECT	JOB		HIGHWAY	
REVISIONS		1190	02	018		FM 933	
DEC 2013		DIST	COUNTY				SHEET NO.
FEB 2015		WAC	HILL				137



BEST MANAGEMENT PRACTICE (BMP) #9

STOCKPILE SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #10

FOR 404 OR NON-404 STREAMS ONLY ~
SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

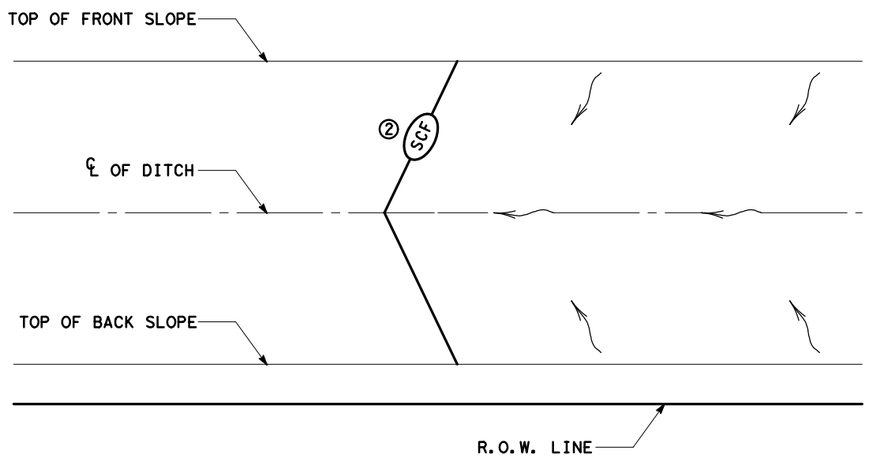
NOTES:

① START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED

② ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.

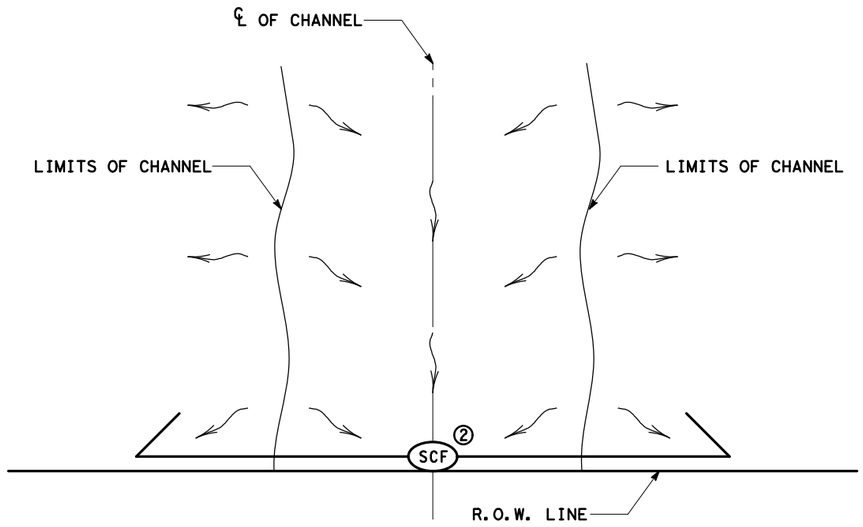
③ PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.

④ PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES; AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE, IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TXDOT.



BEST MANAGEMENT PRACTICE (BMP) #11

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE



BEST MANAGEMENT PRACTICE (BMP) #12

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

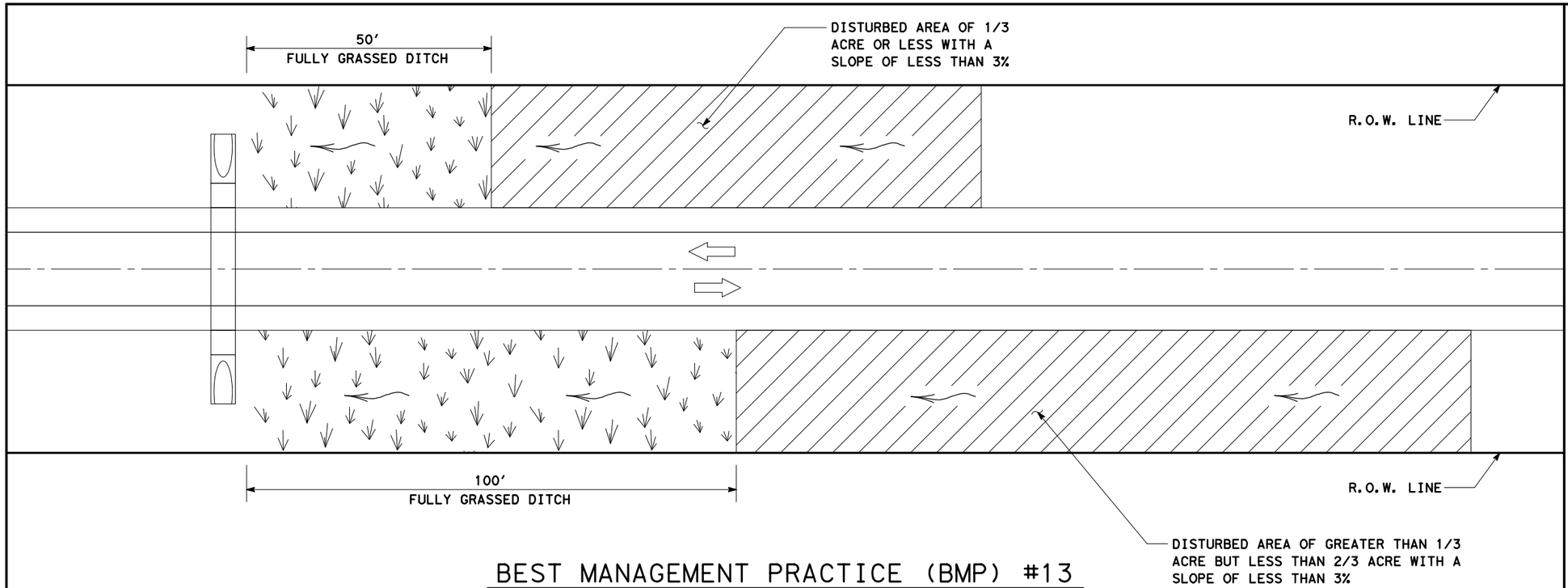
SCALE = NTS SHEET 7 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

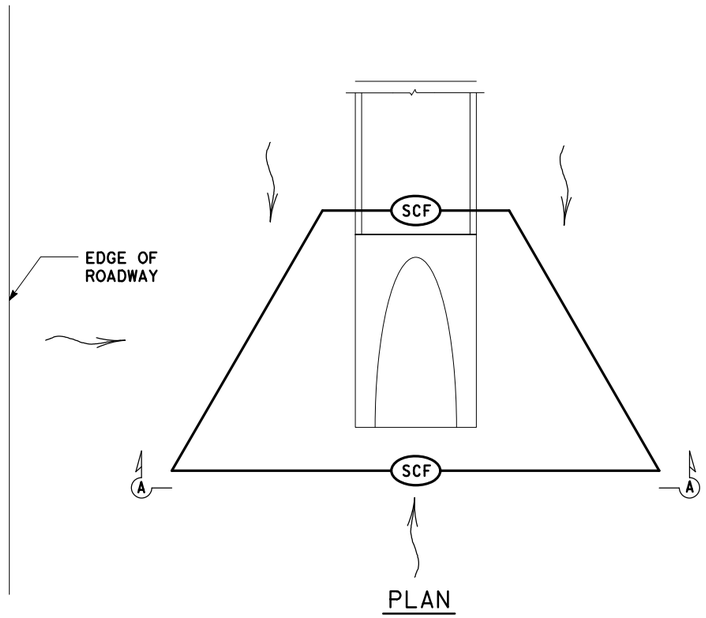
TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT		CK: TXDOT	DW: TXDOT		CK: TXDOT
© TxDOT 2009		CONT	SECT	JOB		HIGHWAY	
REVISIONS		1190	02	018		FM 933	
DEC 2013		DIST	COUNTY				SHEET NO.
FEB 2015		WAC	HILL				138

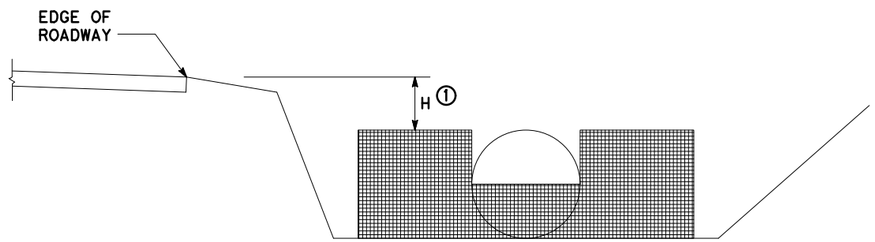


BEST MANAGEMENT PRACTICE (BMP) #13

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS



PLAN



VIEW A-A

BEST MANAGEMENT PRACTICE (BMP) #14

NON-404 STREAMS AND DITCHES ONLY ~ SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE ②

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE

① FOR H DIMENSIONS LESS THAN 1.5' SILT FENCE MAY NEED TO BE NOTCHED AS SHOWN IN VIEW A-A. ADD EXTRA POSTS AT NOTCH.

② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.

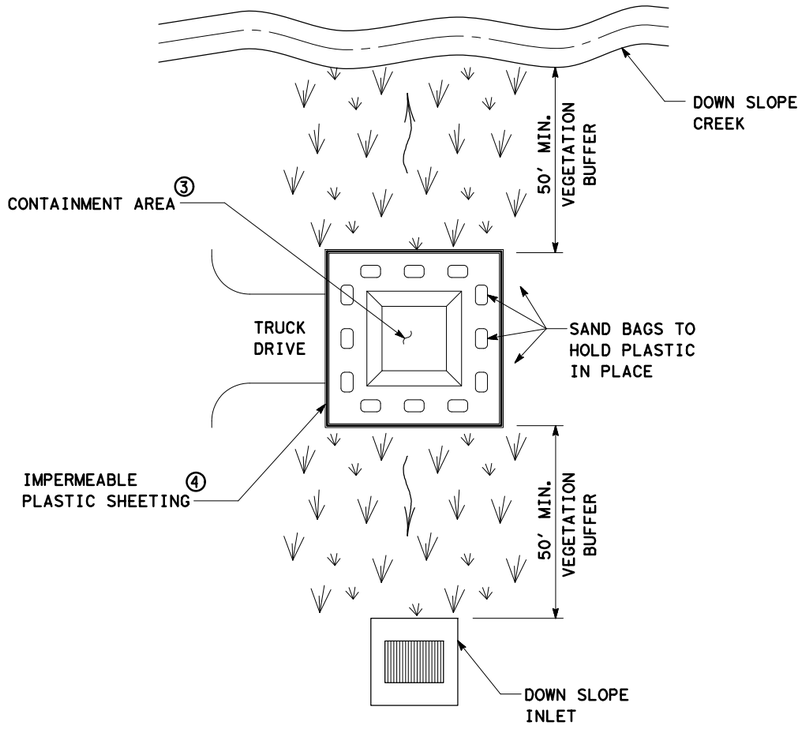
SCALE = NTS SHEET 8 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

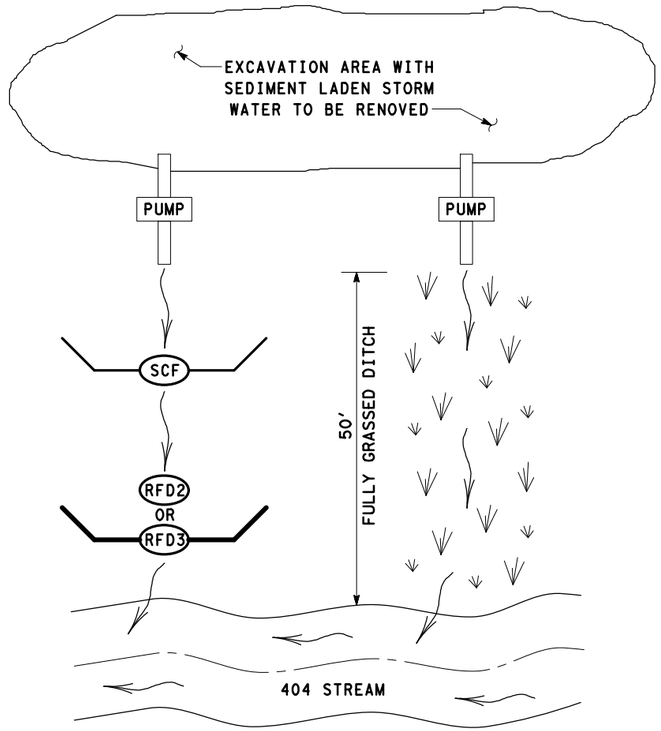
TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT		CK: TXDOT	DW: TXDOT		CK: TXDOT
©TxDOT 2009		CONT	SECT	JOB		HIGHWAY	
REVISIONS		1190	02	018		FM 933	
DEC 2013		DIST		COUNTY			SHEET NO.
FEB 2015		WAC		HILL			139



BEST MANAGEMENT PRACTICE (BMP) #15

CONCRETE TRUCK WASHOUT AREA



BEST MANAGEMENT PRACTICE (BMP) #16

PUMPED STORM WATER SEDIMENT CONTROLS ①

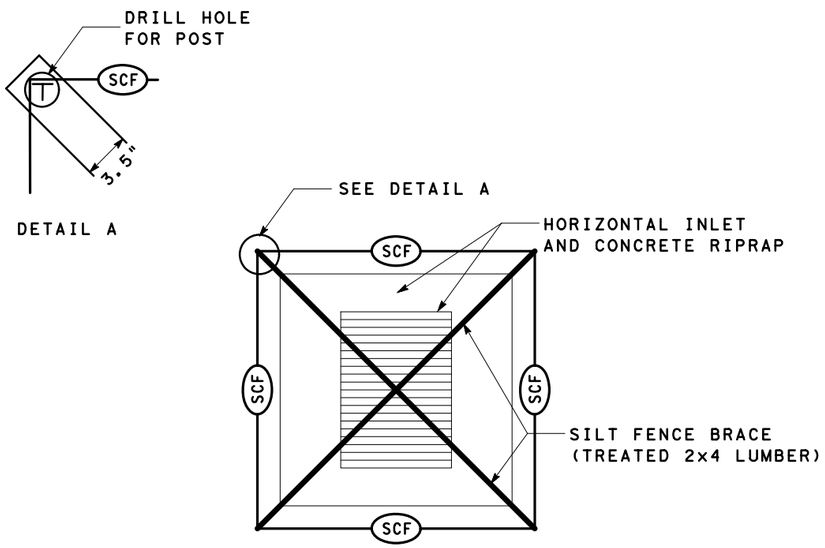
	FULLY GRASSED DITCH
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

① PUMPED STROM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.

② FOR LANDOWNER STOCKPONDS WITHIN 50' OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.

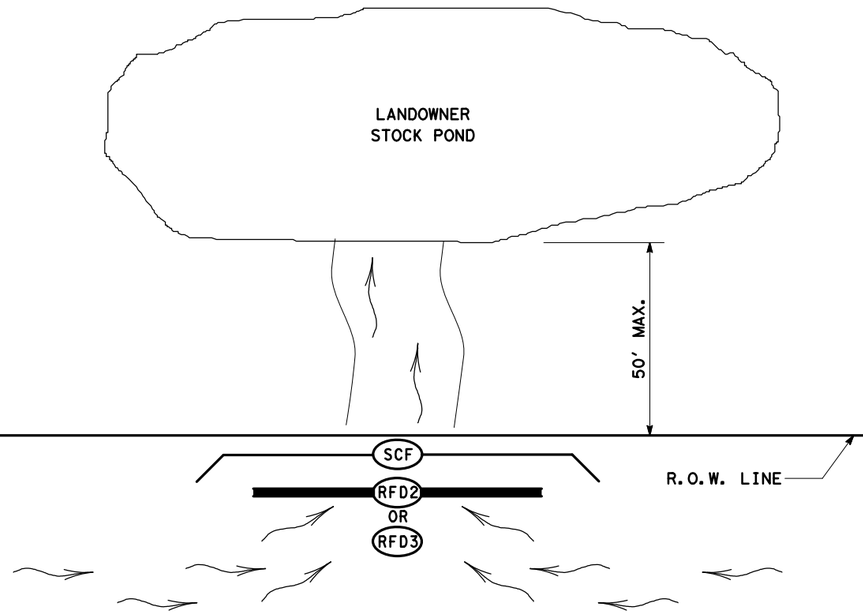
③ WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.

④ EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.



BEST MANAGEMENT PRACTICE (BMP) #17

HORIZONTAL INLET SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #18

LANDOWNER STOCKPOND SEDIMENT CONTROL ②

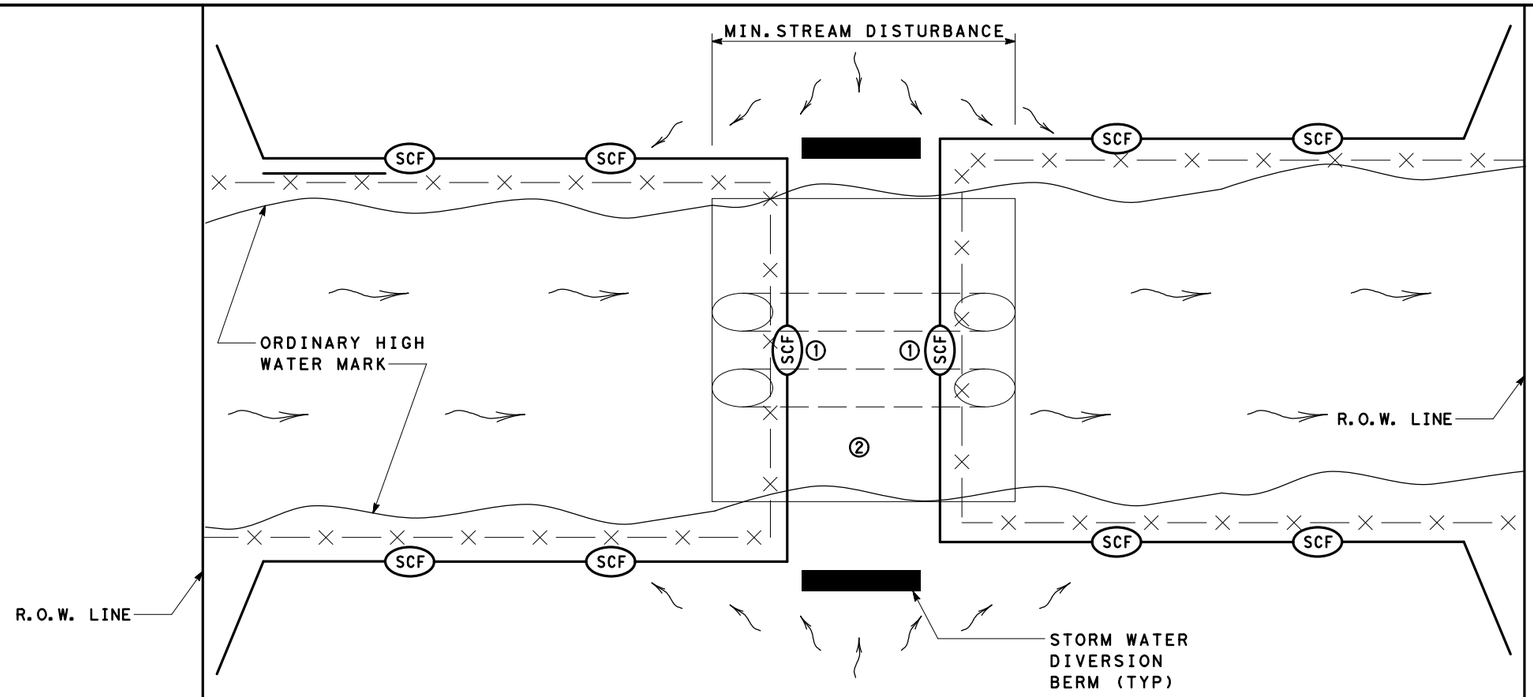
SCALE = NTS SHEET 9 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT		CK: TXDOT	DW: TXDOT		CK: TXDOT
©TxDOT 2009		CONT	SECT	JOB		HIGHWAY	
REVISIONS		1190	02	018		FM 933	
DEC 2013		DIST	COUNTY				SHEET NO.
FEB 2015		WAC	HILL				140



BEST MANAGEMENT PRACTICE (BMP) #19

TYPICAL 404 STREAM CROSSING (SEDIMENT CONTROL AT CROSSING)

	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD	ROCK FILTER DAM
× — ×	SECURITY FENCING

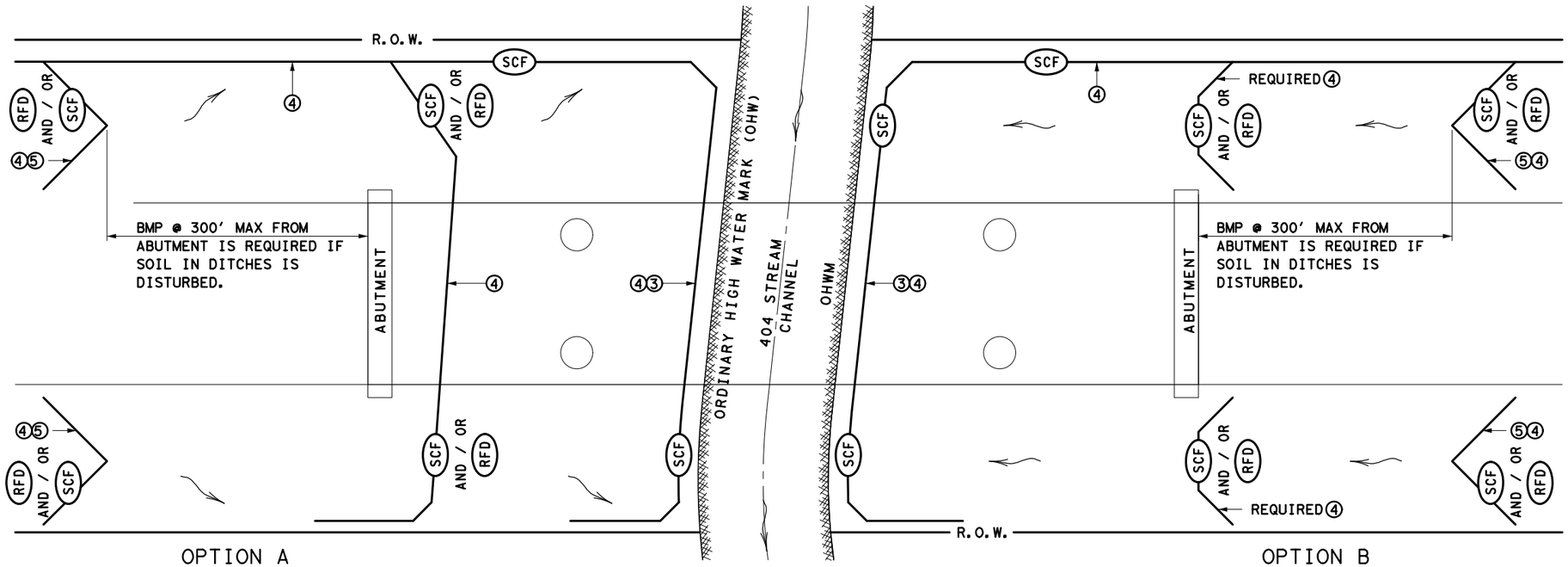
① HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.

② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.

③ INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.

④ USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT

⑤ INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



BEST MANAGEMENT PRACTICE (BMP) #20

FOR 404 STREAMS ~ BMP'S AT BRIDGES

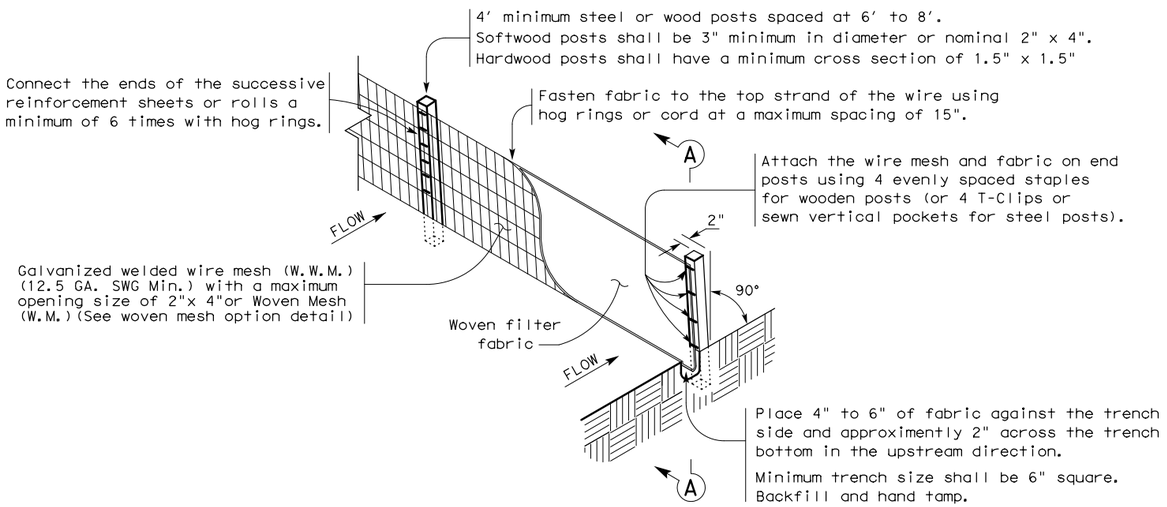
SCALE = NTS SHEET 10 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

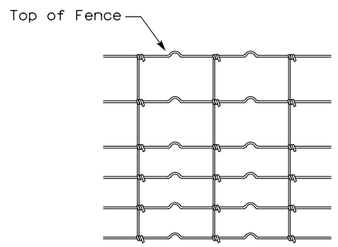
TA-BMP

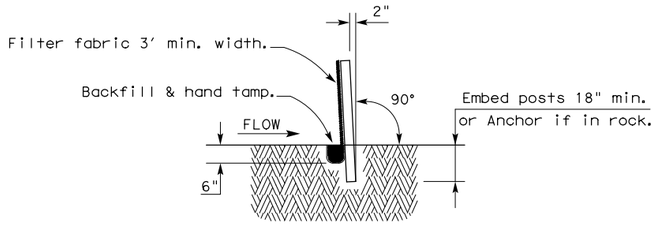
FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS DEC 2013 FEB 2015	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		141



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.

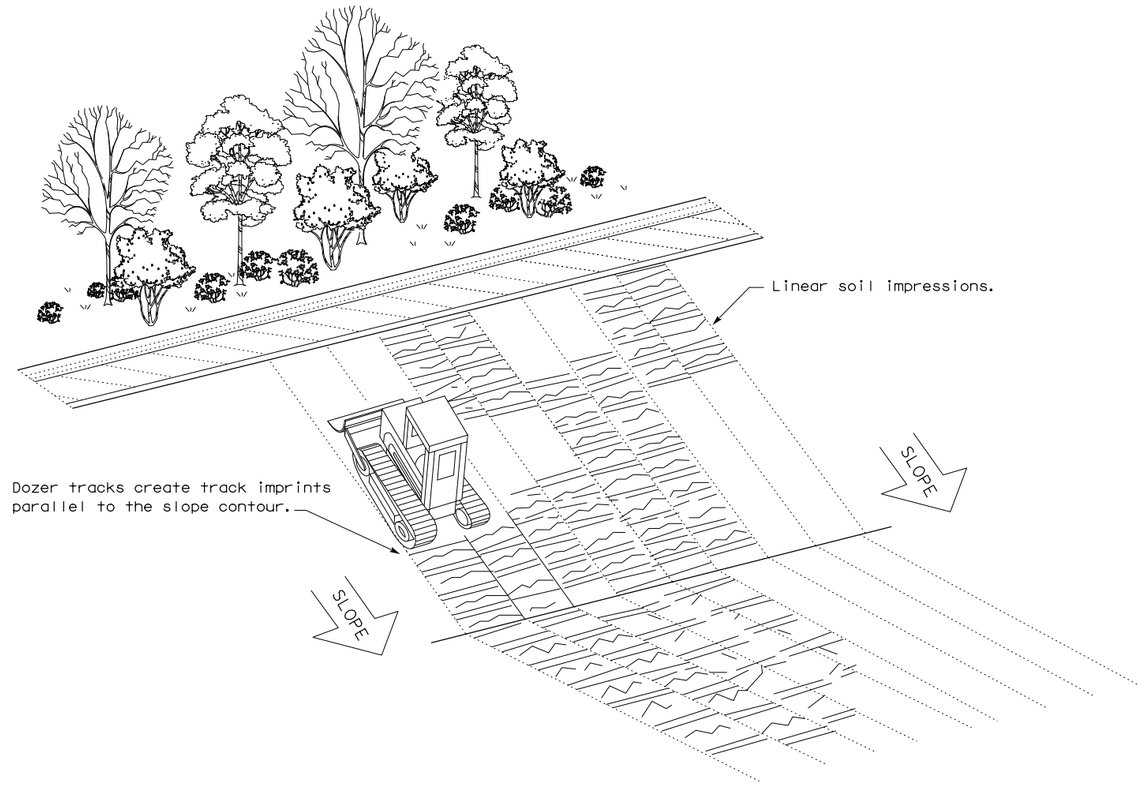
LEGEND

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

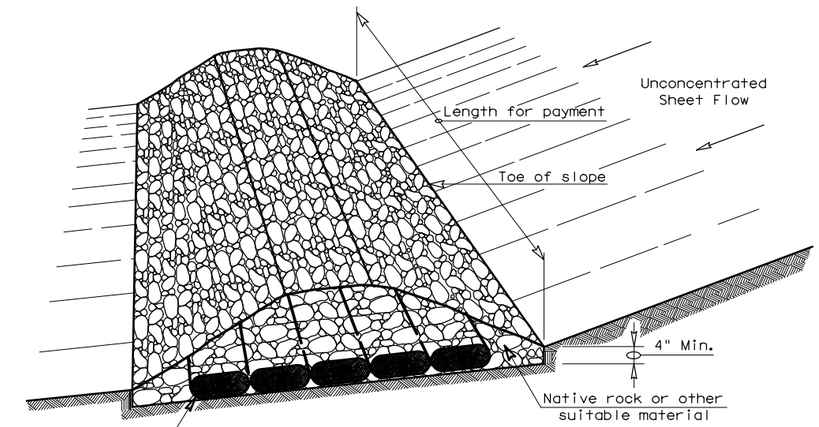
FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	1190	02	018		FM 933		
	DIST	COUNTY				SHEET NO.	
	WAC	HILL				142	

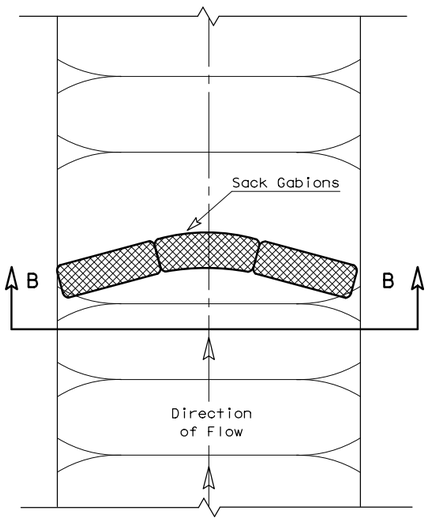
ODATE/2021
GFILE:H:\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SWP\Standards\ec116.dgn

DATE: 01/12/2021
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\Standards\ec216.dgn

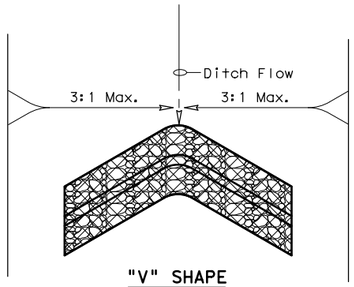


FILTER DAM AT TOE OF SLOPE

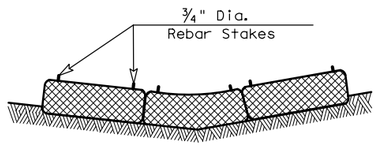
RFD1



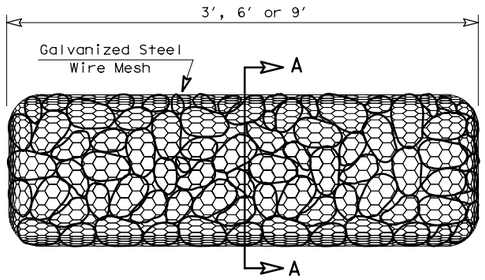
PLAN VIEW



"V" SHAPE PLAN VIEW

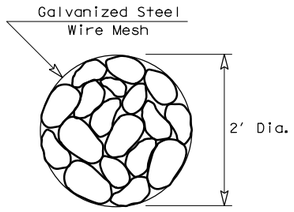


SECTION B-B

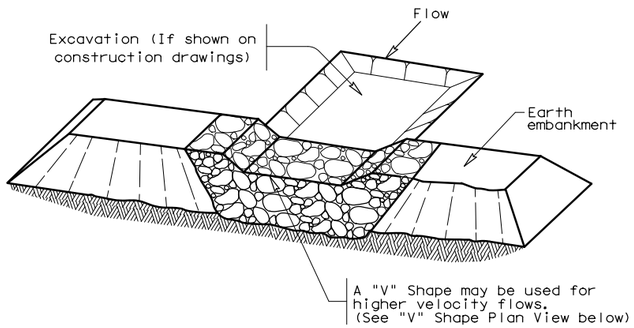


TYPE 4 (SACK GABIONS)

RFD4

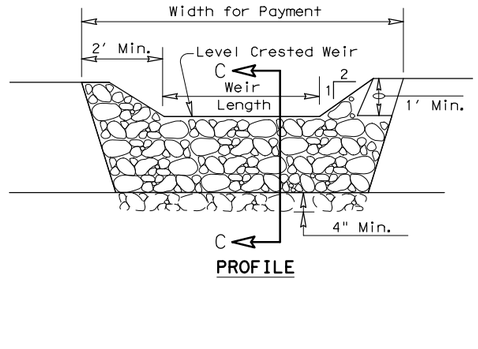


SECTION A-A

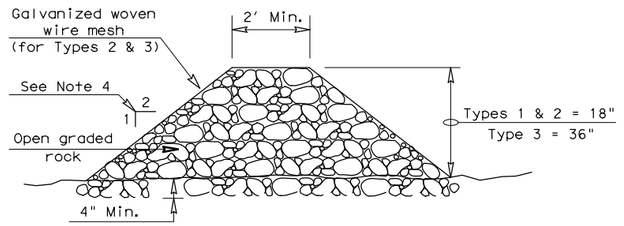


FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

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

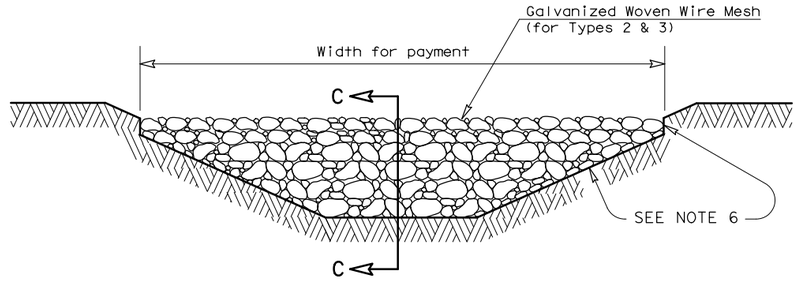
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity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

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

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

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

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



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

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

Texas Department of Transportation

Design Division Standard

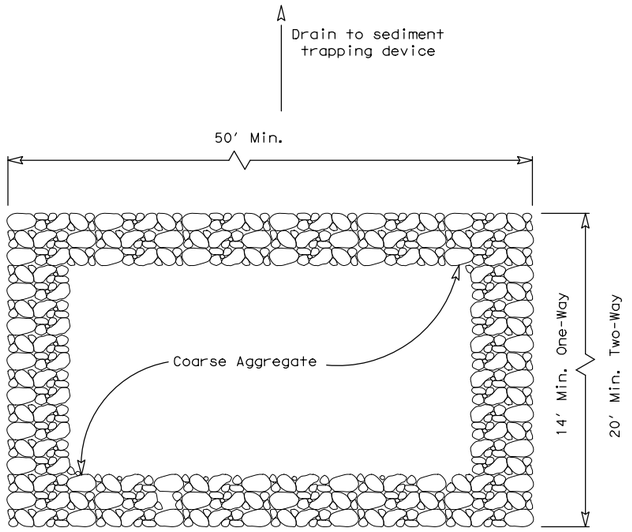
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

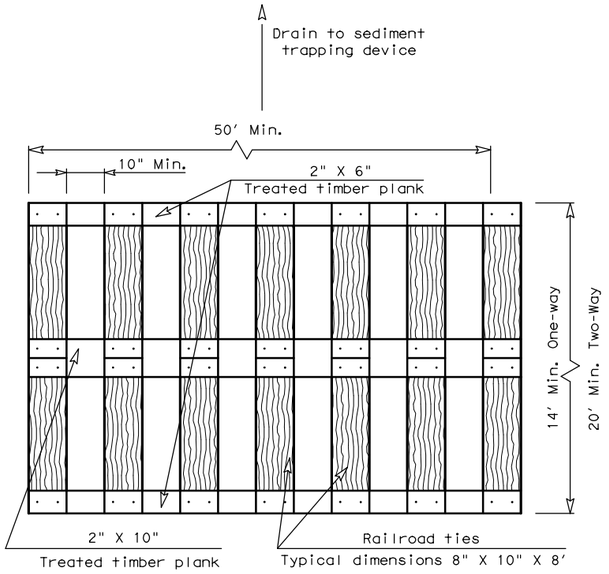
EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		143

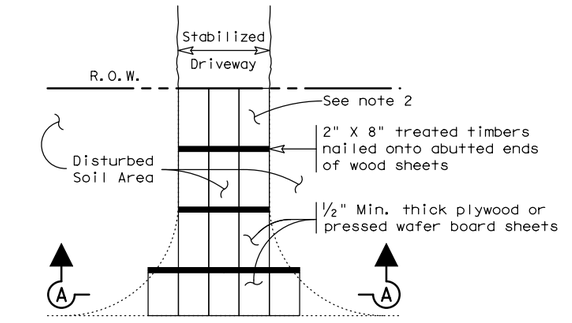
DATE: 01/12/2021
FILE: G:\TXH\Projects\TxDOT\5335-05A_FM933\TS\01_CADD\163_SW3P\Standards\ec316.dgn



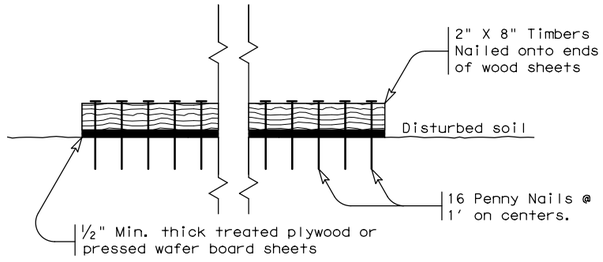
PLAN VIEW



PLAN VIEW



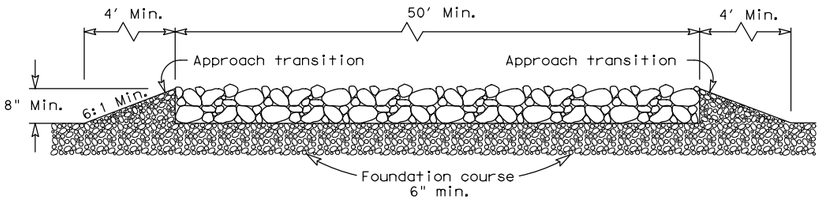
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

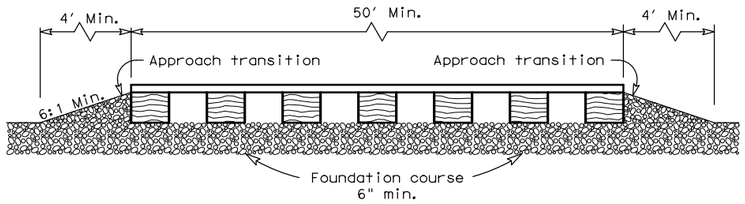
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50′.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1190	02	018	FM 933
	DIST	COUNTY		SHEET NO.
	WAC	HILL		144