FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
6	C 17-6-86			1
STATE	STATE DIST.	COUNTY		
TEXAS	SAT	FRIO		
CONT.	SECT.	JOB	HIGHWAY NO.	
0017	06	086	IH 35	

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE AID PROJECT
PROJECT NO. C 17-6-86
CSJ: 0017-06-086

FRIO COUNTY
IH 35

LIMITS FROM: US 57
TO: FRIO/MEDINA COUNTY LINE

NET LENGTH OF ROADWAY = 35,922.89 FT = 6.804 MI
NET LENGTH OF BRIDGE = 678.07 FT = 0.128 MI
NET LENGTH OF PROJECT = 36,600.96 FT = 6.932 MI

FOR WORK CONSISTING OF BASE REPAIR, MILL, INLAY & PAVEMENT MARKINGS

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

DESIGN SPEED
MAINLANES = N/A

AREA OF DISTURBED SOIL = 0.42ac
ADT: IH 35 34,203 (2025)
47,885 (2045)

ACCESSIBILITY STANDARDS = PROWAG

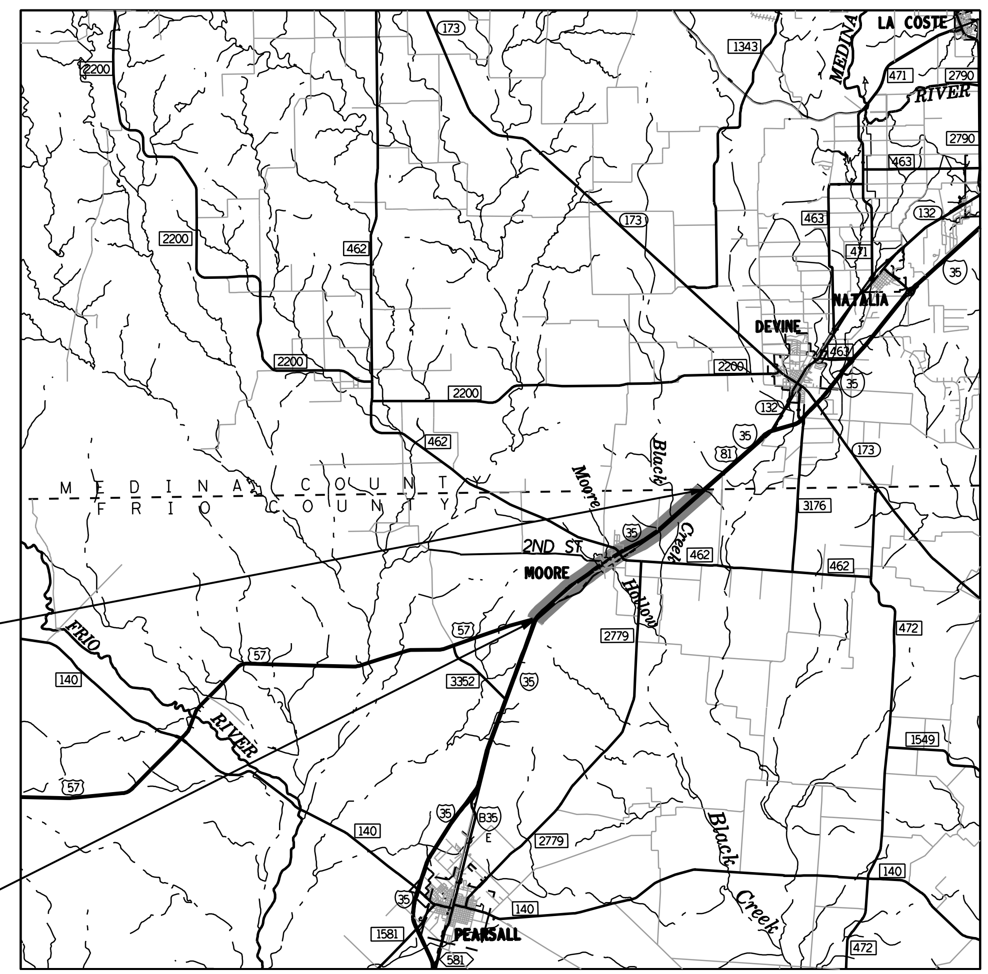
REGISTERED ACCESSIBILITY SPECIALIST INSPECTION REQUIRED
TDLR NO.

THE ABOVE IS REQUIRED IF ANY ONE OF THE FOLLOWING CONDITIONS ARE MET:

1. PEDESTRIAN ELEMENTS GREATER THAN $50,000
2. HIKE AND BIKE TRAIL PROJECTS
3. BUILDING PROJECTS

N.T.S.

N



END PROJECT
CSJ: 0017-06-086
STA 2008+06.83
REF MKR: 118+0.249
MILE PT: 35.64

BEGIN PROJECT
CSJ: 0017-06-086
STA. 1642+00
REF MKR: 111+0.233
MILE PT: 28.708

FINAL PLANS

LETTING DATE: ____________

DATE CONTRACTOR BEGAN WORK: ____________

DATE WORK WAS ACCEPTED: ____________

FINAL CONTRACT COST: $ ____________

CONTRACTOR: ____________

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED
IN ACCORDANCE WITH THE PLANS.

____________ P.E. ____________
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 11/2/2023
Malcolm Gonzalez, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 10/31/2023
DocuSigned by:
Clayton Ripps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS(000--008)

REVIEWED FOR LETTING 10/31/2023
DocuSigned by:
DERogorio, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING 11/1/2023
DocuSigned by:
Gina E. Gallegos, P.E.
DISTRICT ENGINEER

FILE LOCATION AND NAME
T:\Engdata\Standards\Design\TITLESHEET-2014Specs.DGN

LEVELS DISPLAYED

COUNTY ____ PROJ. NO. ____
HWY. NO. ____ LETTING DATE ____
DATE ACCEPTED ____

GENERAL

1	TITLE SHEET
2	INDEX OF SHEETS
3-6	PROJECT LAYOUT
7-8	TYPICAL SECTIONS
9, 9A -9F	GENERAL NOTES
10, 10A	ESTIMATE & QUANTITY
11	TCP SUMMARY
12	GRADING SUMMARY
13	PAVEMENT MARKING AND DELINEATION SUMMARY
14	SW3P SUMMARY

TRAFFIC CONTROL PLAN

15	TCP SCHEDULE OF TRAFFIC CONTROL AND WARNING DEVICES
16	TCP SEQUENCE OF WORK
17	TCP TYPICAL SECTION
18	TMA & TA SUMMARY

TRAFFIC CONTROL PLAN STANDARDS

@ 19-30 *	BC(1)-21 THRU BC(12)-21
@ 31 *	TCP(1-5)-18
@ 32 *	TCP(2-2)-18
@ 33 *	TCP(2-6)-18
@ 34-35 *	TCP (3-1)-13 THRU TCP(3-2)-13
@ 36 *	TCP(3-3)-14
@ 37 *	TCP(5-1)-18
@ 38-42 *	TCP(6-1)-12 THRU TCP(6-5)-12
@ 43 *	TCP(6-8)-14
@ 44 *	WZ(STPM)-23
@ 45 *	WZ(UL)-13
@ 46 *	WZ(BRK)-13

ROADWAY DETAILS

47-63	PLAN LAYOUTS
64	MISCELLANEOUS ROADWAY DETAILS
65	PAVEMENT REPAIR DETAIL

ROADWAY STANDARDS

@ 66 *	GF(31)-19
@ 67 *	GF(31)DAT-19
@ 68 *	GF(31)MS-19
@ 69-70 *	GF(31)TRTL3-20
@ 71 *	SGT(11S)31-18
@ 72 *	SGT(12S)31-18

BRIDGE DETAILS

73-75	CLEANING AND SEALING EXISTING BRIDGE JOINTS
76	T2/T201TR

PAVEMENT MARKING AND DELINEATION

77-92	PAVEMENT MARKING LAYOUT

PAVEMENT MARKING AND DELINEATION STANDARDS

# 93-98 *	D & OM(1)-20 THRU D & OM(6)-20
# 99-100 *	PM(1)-22 THRU PM(2)-22
# 101 *	FPM(1)-22
# 102 *	FPM(2)-22
# 103 *	FPM(5)-22
## 104-106 **	TPMD(1)-18 THRU TPMD(3)-18 (SAN ANTONIO DISTRICT STANDARD)
# 107 *	RS(1)-23

ENVIRONMENTAL ISSUES

@ 108-109 *	STORMWATER POLLUTION PREVENTION PLAN (SW3P)
@@ 110 **	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
111-126	SW3P LAYOUT
127	SW3P TYPICAL AT MBGF

ENVIRONMENTAL ISSUES STANDARDS

* 128-130	EC (1)-16 THRU EC (3)-16
* 131-133	EC (9)-16

NOTE:
1: (**) INDICATES SAN ANTONIO DISTRICT STANDARDS
2: (*) INDICATES STATE STANDARDS

STATE OF TEXAS
JAMES SAKAI
144653
LICENSED PROFESSIONAL ENGINEER

10/30/2023
JAMES SAKAI, P.E. DATE

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

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

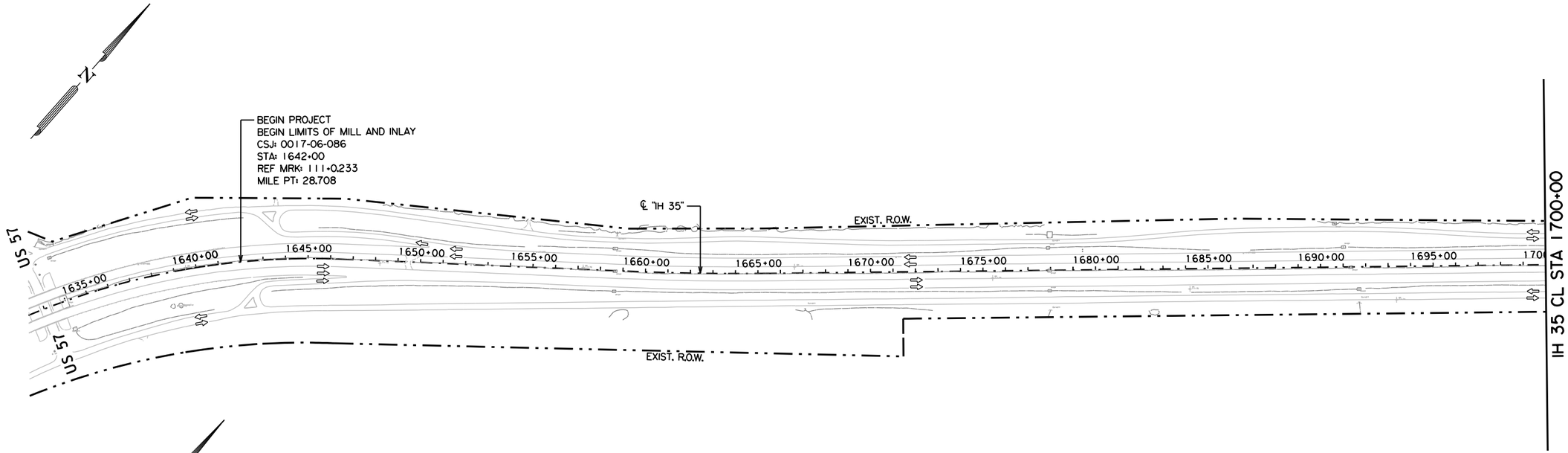
10/30/2023
RENE ALVARADO III, P.E. DATE

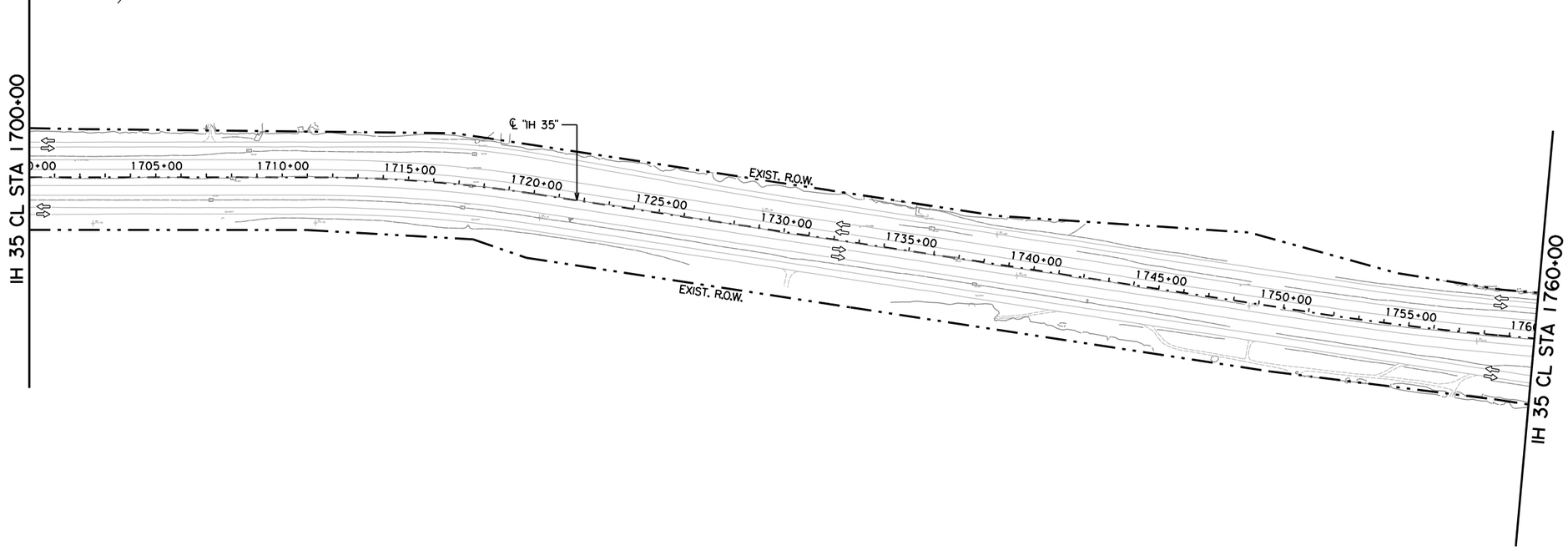
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE (@,@@) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

IH 35
INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		2
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





NOTES

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.

FPA NOTIFICATION FOR FRIO COUNTY WAS SUBMITTED IN WRITING ON SEPTEMBER, 28, 2023 AND RECEIVED SEPTEMBER 29, 2023.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. — DATE 10/30/2023

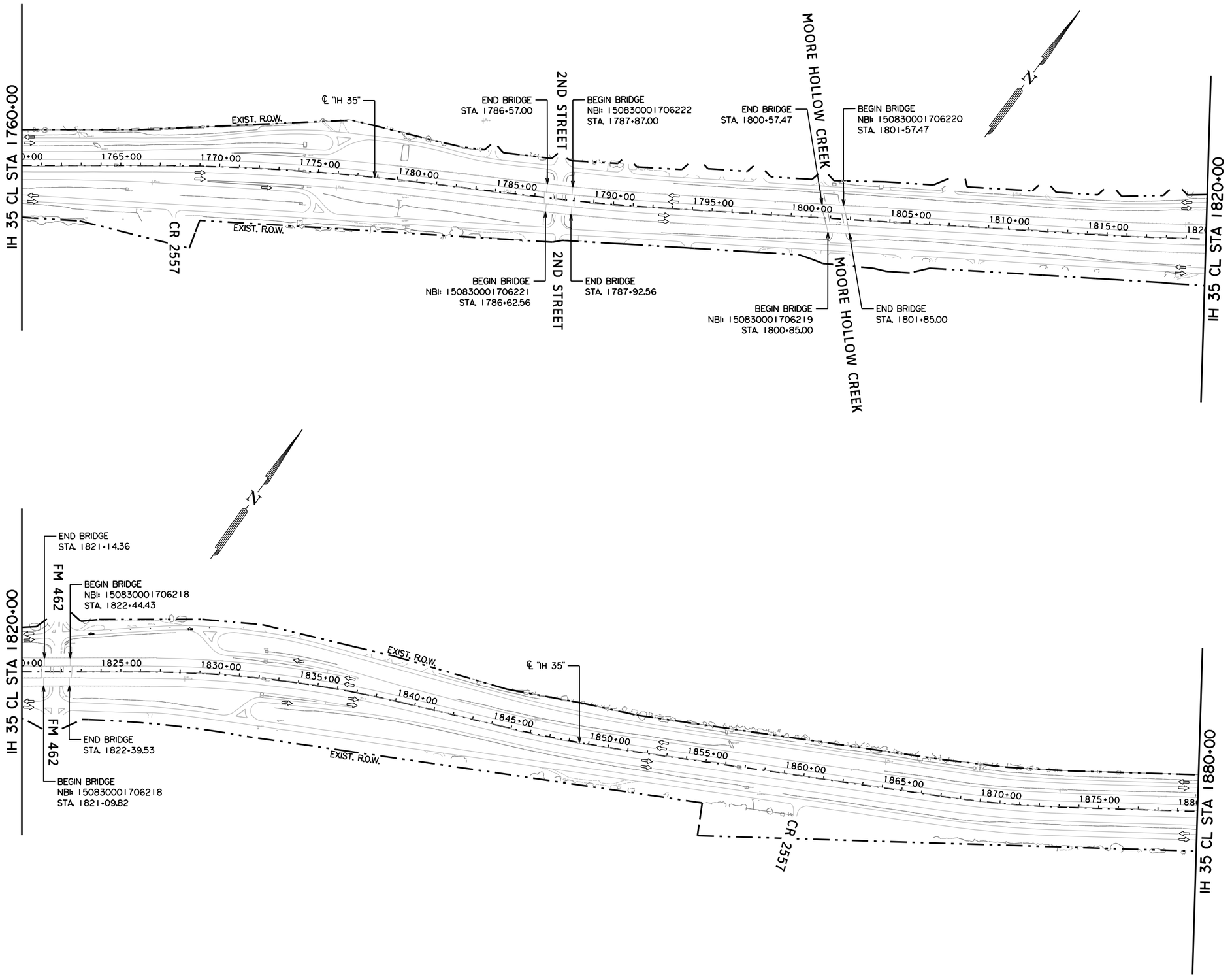
SCALE
HORIZONTAL: 1" = 500'
VERTICAL: N/A

Texas Department of Transportation

IH 35
PROJECT LAYOUT

SHEET 1 OF 4

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		3
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



NOTES

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FPA NOTIFICATION FOR FRIO COUNTY WAS SUBMITTED IN WRITING ON SEPTEMBER, 28, 2023 AND RECEIVED SEPTEMBER 29, 2023.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

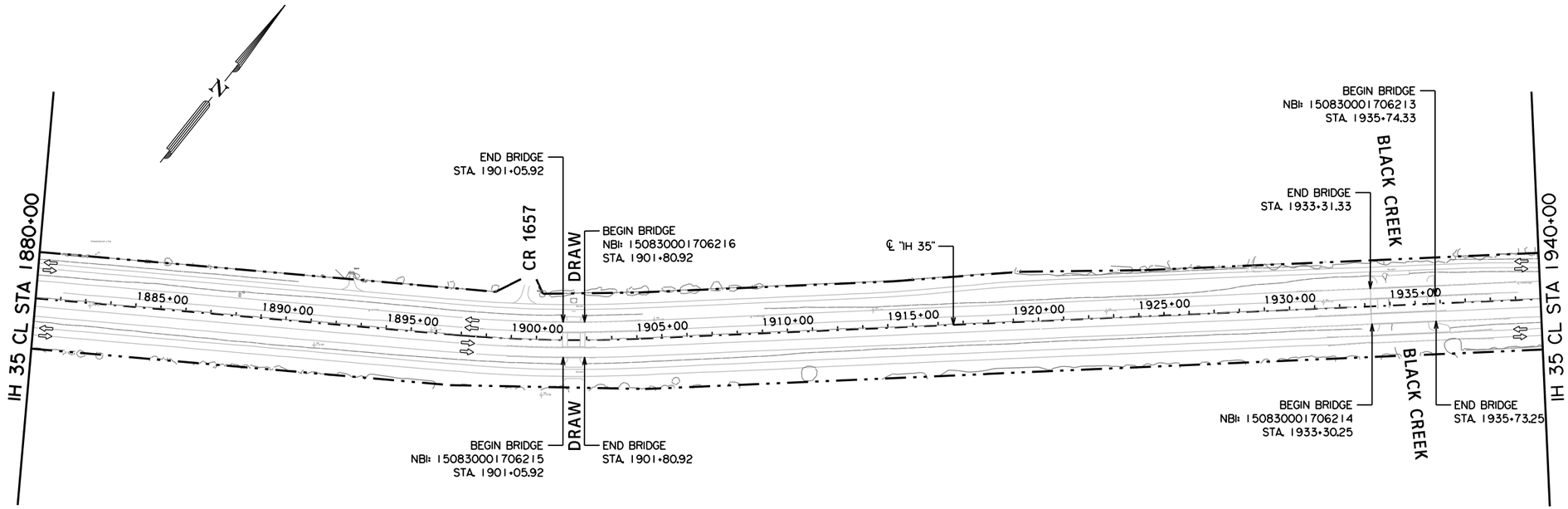
SCALE
HORIZONTAL: 1" = 500'
VERTICAL: N/A

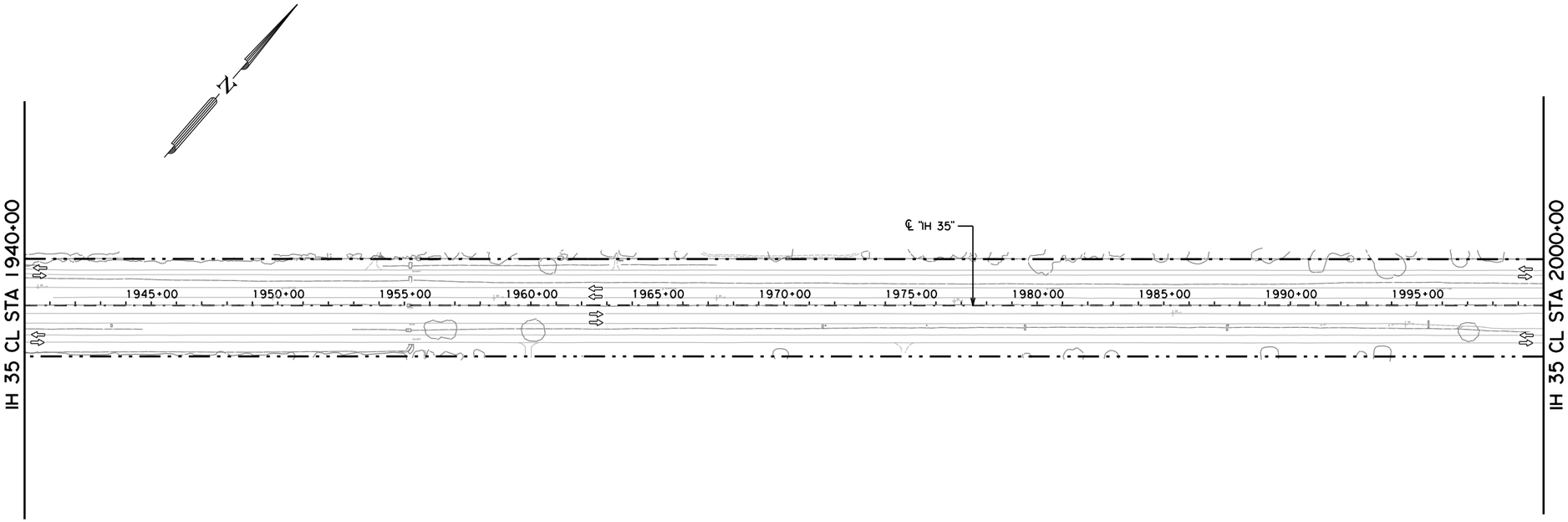
Texas Department of Transportation

IH 35
PROJECT LAYOUT

SHEET 2 OF 4

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		4
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





NOTES

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STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

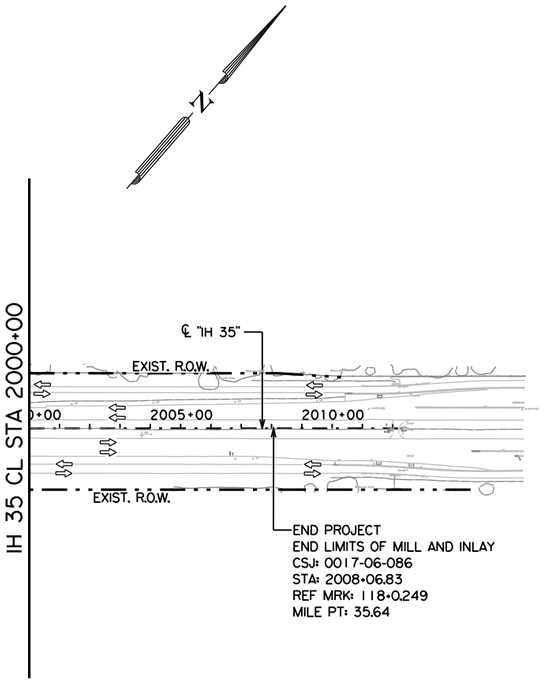
SCALE
HORIZONTAL: 1" = 500'
VERTICAL: N/A

Texas Department of Transportation

IH 35
PROJECT LAYOUT

SHEET 3 OF 4

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		5
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



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FPA NOTIFICATION FOR FRIO COUNTY WAS SUBMITTED IN WRITING ON SEPTEMBER, 28, 2023 AND RECEIVED SEPTEMBER 29, 2023.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

10/30/2023
RENE ALVARADO III, P.E. DATE

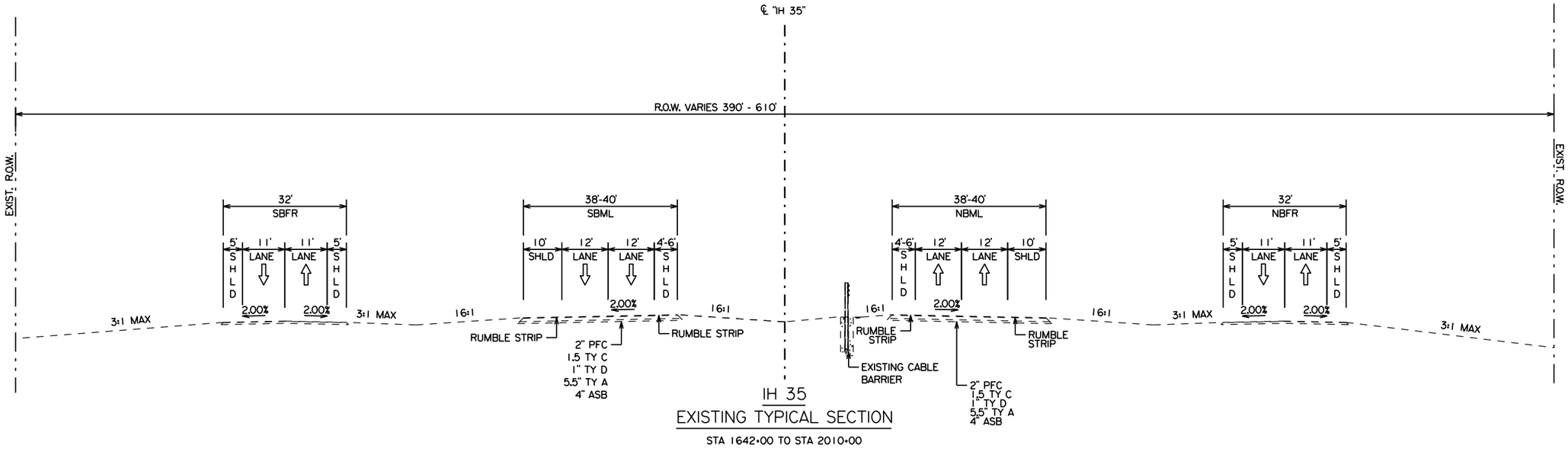
SCALE
HORIZONTAL: 1" = 500'
VERTICAL: N/A

Texas Department of Transportation

IH 35
PROJECT LAYOUT

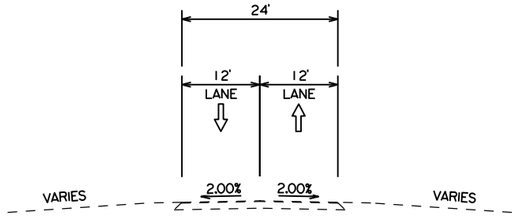
SHEET 4 OF 4

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		6
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



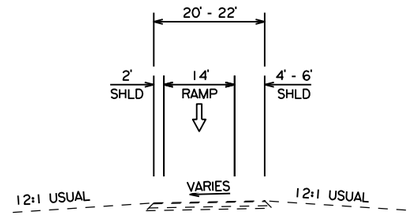
IH 35
EXISTING TYPICAL SECTION

STA 1642+00 TO STA 2010+00



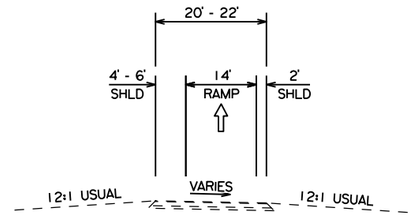
IH 35 EXISTING SB FRONTAGE ROAD
TYPICAL SECTION

STA 1823+50 TO 1828+28
IH-35 SBFR @ FM 462



IH 35 EXISTING SB RAMPS
TYPICAL SECTION

2ND STREET
FM 462



IH 35 EXISTING NB RAMPS
TYPICAL SECTION

2ND STREET
FM 462

STATE OF TEXAS
JAMES O. SAKAI
144653
LICENSED PROFESSIONAL ENGINEER

10/30/2023
JAMES O. SAKAI, P.E. DATE

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

10/30/2023
RENE ALVARADO III, P.E. DATE

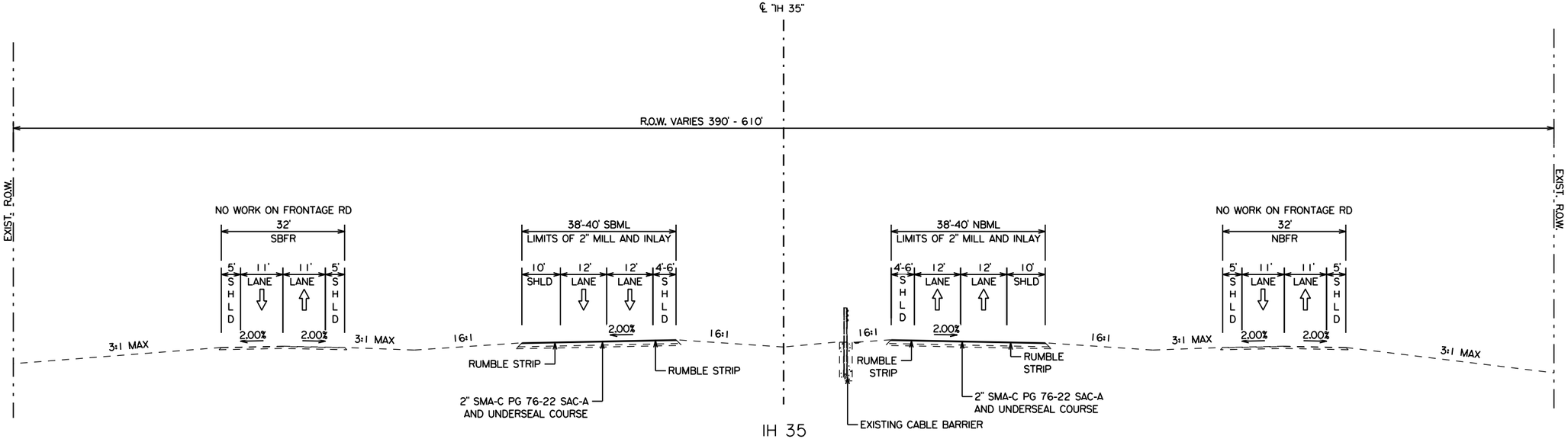
SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

IH 35
TYPICAL SECTIONS
EXISTING

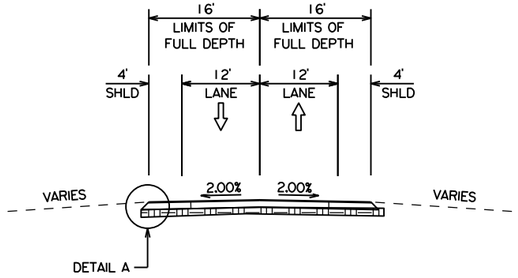
SHEET 1 OF 2

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		7
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



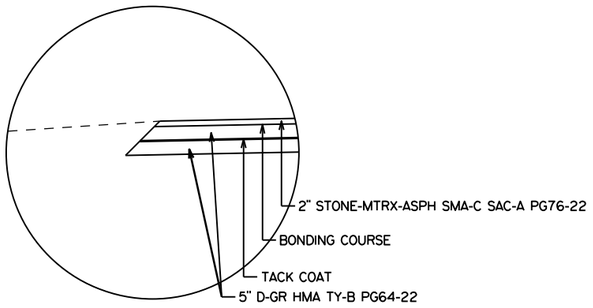
IH 35
PROPOSED TYPICAL SECTION

STA 1642+00 TO STA 2010+00

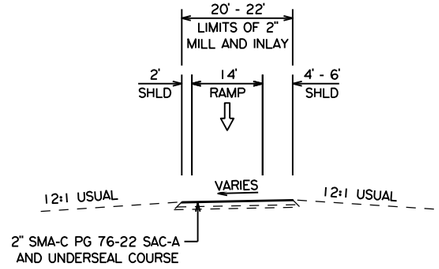


IH 35 PROPOSED SB FRONTAGE ROAD
TYPICAL SECTION

STA 1823+50 TO 1828+28
IH-35 SBFR @ FM 462

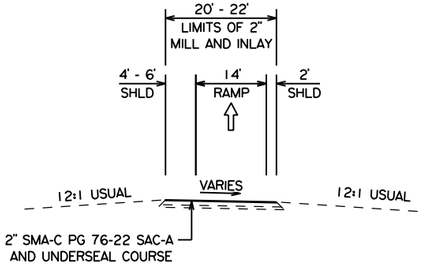


DETAIL A



IH 35 PROPOSED SB RAMPS
TYPICAL SECTION

2ND STREET
FM 462



IH 35 PROPOSED NB RAMPS
TYPICAL SECTION

2ND STREET
FM 462

JAMES O. SAKAI
144653
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/30/2023
JAMES O. SAKAI, P.E. DATE

RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/30/2023
RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

IH 35
TYPICAL SECTIONS
PROPOSED

SHEET 2 OF 2

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		8
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

***********GENERAL NOTES***********

2014 Specification Book (Revised September 25, 2023)

========== Basis of Estimate ==========

Item	Description	Area	Rate	Quant-Unit
168 6001	Vegetative Watering	13,772 SY	16.7 gal/sy	233 MG

Item	Description	Rate/Area	Quant-Unit
354 6021	Plane Asph Conc Pav (0 to 2")	300,067 SY	300,067 SY
354 6024	Plane Asph Conc Pav (2" to 4")	23,778 SY	23,779 SY

========== Asphalt Concrete Pavement ==========

Item	Type	Location	Depth	Area	Rate/Area	Quant-Tons
3080 6007	SMA PG76-22	MLs	2"	324,272 SY	115 lbs/sy-in	37,291
3076 6001	HMA PG64-22	MLs	10"	427 SY	115 lbs/sy-in	246

========== Surface Treatment Data ==========

Item	Description	Depth	Area	Rate	Quantity-Gal
3076 6066	Tack Coat	N/A	52,560 SY	0.2 gal/sy	10,512
3076 6066	Underseal Course	N/A	318,015 SY	0.2 gal/sy	63,603
3076 6001	Bonding Course	N/A	427 SY	0.12 gal/sy	51

========== Flexible Pavement Structure Repair==========

(FOR CONTRACTORS INFOMRATION ONLY)

3076-6001 D-GR HMA TY-B PG 64-22 (for flexible pavement structure repair)

351	Flexible Pav. Struc. Repair(10")	110 lbs Rate/	46,104 SY Area	25,357 TON

Control: 0017-06-086

County: Frio & Medina

Highway: IH-35

--General--
The following State, District, Local and/or Utility Standards have been modified: N/A.

Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Locate and reference all manholes and valves within the construction area with station and offset or GPS. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stockpiles, etc. cannot be placed over these valves or covers.

The Contractor has the option to adjust or construct all manholes and valves to final pavement elevations prior to the final mat of HMA or after final mat of HMA. If between the final elevation adjustment and the final mat of HMA, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the HMA work.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

The Contractor should be aware that the "City Public Service" (CPS) will be consulted by the Engineer in matters concerning the execution of the work, materials and testing related to the CPS work. As such, a CPS employee may be observing the construction and related operations as they progress.
Submit locate request for SAWS water and sewer to TXDOTlocates@saws.org.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
Frances Merecka, Hondo Area Engineer, frances.merecka@txdot.gov
TBD, Hondo Assistant Area Engineer, TBD

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the

controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and back feed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

Excavation within 5 feet of an existing CPS Energy pole will require pole bracing. Contact CPS Energy utility coordination to request pole bracing (Customer Engineering 210-353-4050). The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

Steel Wrapped or Asbestos Utility Lines:

Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

--Item 7--
The total disturbed area within the project is anticipated at less than one (1) acre. Due to this type of construction, the project qualifies for exclusion under the Construction General Permit (CGP) issued by the Texas Commission on Environmental Quality (TCEQ). However, should the sum of the Engineer's anticipated disturbances and the Contractor's (On ROW and off ROW) PSL's equal or exceed the one (1) acre threshold; both TxDOT and the Contractor have project

responsibilities under the CGP that reverts to non-exclusion status. Obtain approval for all non-depicted areas of disturbance that increases the initial soil and vegetation disturbed area estimates before work starts at these locations.

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

Roadway closures during the following key dates and/or special event are prohibited.
See the general notes under Item 502 for these dates.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4 -Standard Workweek.

A Special Provision to Item 8 for a delayed authorized date to begin work has been included in the contract. The reason for including the Special Provision is for material processing or contractor mobilization.

Create and maintain a Bar Chart schedule.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

Repair existing cable barrier system of the type __Trinity Cable Safety System CAS(TL4)-14_ when directed by the Engineer. This work will be paid by force account method.

--Item 161--
Approximately __765__ CY of existing topsoil may be salvaged and windrowed or stockpiled (as approved) for later use as Compost Manufactured Topsoil (CMT). Place erosion control measures for the stockpile and/or windrow.

--Item 164--
Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during “Broadcast Seeding” operations, provided each component is applied at the specified rate.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 302--
Previously tested aggregates found to contain excessive quantities of dust (more than 0.5 percent passing the No. 40 sieve) during precoating, stockpiling or hauling operations, may be rejected. Use Test Method Tex-200-F, Part I for testing.

Precoated Aggregate Type PE shall consist of crushed slag, crushed stone or natural limestone rock asphalt.

--Item 316--
Asphalt season will be year-round but meet temperature limitations specified in the standard specifications for Item 316.

Ensure that the asphalt for precoating the aggregate and the asphalt used for the surface treatment will not result in a reaction that may adversely affect the bonding of the aggregate and asphalt during the surface treatment operation.

Do not add bag house fines in the production of precoated material.

Clean all concrete curbs, islands, medians, etc. that get coated with asphalt.
--Item 320--

Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

When placing Item 346 mixtures, 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 354--

8,000 CY of planed material shall be delivered and stockpiled at the southwest corner of IH 35 and SH 132 in Medina County (between the IH 35 northbound main lanes and the IH 35 frontage road).

8,000 CY of planed material shall be delivered and stockpiled at the northwest corner of IH 35 and BI 35E in Frio County (between the IH 35 northbound main lanes and the IH 35 frontage road).

All additional planed material shall be retained.

Take precaution to avoid damage to existing bridge decks and armor joints. Repair any damage to the bridge decks and/or armor joints as approved. This work will not be paid directly but will be performed at the Contractor’s expense.

--Item 420--
Mass concrete will be measured in place.

Pier and Bent Concrete will be paid for as “Plans Quantity”.

--Item 421--
Use an automated ticket that contains the same information as shown in the standard specification. Submit the ticket for approval prior to use. The concrete producer will contact the District Laboratory or the Engineer’s Office (outside the San Antonio area) to inform TxDOT of scheduled structural concrete batching. The Engineer may suspend concrete operations if ticket information is incomplete/incorrect.

Entrained air is allowed for Class P and Class HES concrete only. Air content testing is waived for all classes of concrete.

Poly-fiber reinforced concrete may be used as an option, with the approval by the Engineer, for riprap, sidewalk, curb/gutter, and mow strip. Use a TxDOT approved manufacturer or producer for the poly-fiber. The poly-fibers shall be combined with the concrete in proportions as recommended by the manufacturer. A concrete mix design must be approved by the Engineer.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

Avoid placing stockpiles, equipment, and other construction materials within the roadway’s horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

Control: 0017-06-086

County: Frio & Medina

Highway: IH-35

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Cover permanent signs if not used. This is subsidiary to Item 502.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

At no time shall two consecutive intersecting roadways be closed at one time during construction.

At no time shall two consecutive ramps be closed at one time during construction or overlay operations.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions:

Nighttime: *Monday-Friday 9PM-5AM as approved by Area Engineer*
(With uniformed off duty law enforcement officers)

Weekend closures when approved by the Engineer: Friday 9PM through Monday 5AM as approved by Area Engineer

No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Fiesta Week and Sales Tax Holidays (Bexar County Only)
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
During major events at the AT&T Center (Spurs home games, Rodeo, concerts, etc.)
Alamodome, and/or Convention Center (Bexar County Only)
Sunday March 31st, 2024; April 20th, 2025

Traffic Signals

Always keep the signals in operation except when necessary for specific installation operations, including any modifications to existing signal heads to always maintain clear visibility. Adjustment of any signal head will be subsidiary to Item 502. When it is necessary for a signal to be turned off, or when left-turn lanes are closed, hire off duty police officers to control the traffic until the signals are back in satisfactory condition.

Moving or adjustment of traffic signal heads, VIVDS, and radar detection for the purpose of alignment with the shifting of lanes in conjunction with the traffic control plan will be subsidiary to various bid items.

Coordinate with the appropriate entity (City of San Antonio, City of New Braunfels, etc.) or TxDOT when left-turn lanes are closed and/or for signal timing revisions as necessary.

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 533--
Use Option 3 and a width of 8 inches for Edgeline Continuous Milled Rumble Strips as shown on the RS standard sheets for edgelines.

--Item 540--
Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) leave-out in the concrete as shown in the state standard for MBGF Mow Strip. After the posts are installed, fill the leave-outs with a Grout mixture as shown in the state standard for MBGF Mow Strip.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding ½" from the edge of the hole.

--Item 585--
Use Surface Test Type B, pay adjustment schedule _____1_____ to evaluate ride quality of travel lanes.

--Item 666--

Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 3076, 3077, 3079, 3080, 3081, & 3082 --

1. Table 10 in Item 3076 and Table 11in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.

2. Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

3. Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided

4. Hold a pre-paving meeting one month prior to the placement of the hot mix. The date and time of pre-paving meeting should be coordinated with the Engineer prior to scheduling.

5. Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.

6. No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed, and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

--Item 3084 & 3085 --
The minimum application rates are listed in Table UC/BC. The Engineer may adjust the application rates taking into consideration the existing pavement surface conditions.

Table UC/BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Hot Asphalt	0.15
Spray Applied Underseal Membrane	0.20
Seal Coat – Emulsion (CHFRS-2P, CRS-2P)	0.25
Seal Coat – Asphalt (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	0.23
Aggregate for Seal Coat Options TY PB GR 4(AC) or TY B GR 4(Emulsion)	1 CY:120 SY

--Item 6185--
3 shadow vehicles with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. 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's needed for the project. See TMA and TA Summary sheet in the plans.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0017-06-086 **DISTRICT** San Antonio **COUNTY** Frio
HIGHWAY IH 35

			CONTROL SECTION JOB		**0017-06-086**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00063836**		
			COUNTY		**Frio**		
			HIGHWAY		**IH 35**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	175.000		175.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	721.000		721.000	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	13,772.000		13,772.000	
	164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	13,772.000		13,772.000	
	168-6001	VEGETATIVE WATERING	MG	233.000		233.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	13,772.000		13,772.000	
	351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	46,104.000		46,104.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	300,067.000		300,067.000	
	354-6024	PLANE ASPH CONC PAV(2" TO 4")	SY	23,778.000		23,778.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	626.000		626.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	1,478.750		1,478.750	
	454-6008	HEADER TYPE EXPANSION JOINT	CF	56.000		56.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	10.000		10.000	
	506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	1,298.000		1,298.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	1,298.000		1,298.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	10,116.000		10,116.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	10,116.000		10,116.000	
	510-6001	ONE-WAY TRAF CONT (FLAGGER CONT)	HR	32.000		32.000	
	530-6004	DRIVEWAYS (CONC)	SY	156.000		156.000	
	533-6001	RUMBLE STRIPS (SHOULDER)	LF	132,803.000		132,803.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	10,870.000		10,870.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	40.000		40.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	21.000		21.000	
	540-6037	MTL BM GD FEN TRANS (ANCHOR PLATE)	EA	40.000		40.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	13,582.000		13,582.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	21.000		21.000	
	542-6004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA	40.000		40.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	21.000		21.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	21.000		21.000	
	658-6063	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BR)	EA	100.000		100.000	
	658-6065	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2(BR)	EA	64.000		64.000	
	658-6069	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BR)	EA	30.000		30.000	
	658-6070	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BR)	EA	30.000		30.000	
	662-6064	WK ZN PAV MRK REMOV (W)6"(BRK)	LF	18,400.000		18,400.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	78,160.000		78,160.000	
	662-6082	WK ZN PAV MRK REMOV (W)(ENTR GORE)	EA	4.000		4.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0017-06-086 **DISTRICT** San Antonio **COUNTY** Frio
HIGHWAY IH 35

			CONTROL SECTION JOB		**0017-06-086**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00063836**		
			COUNTY		**Frio**		
			HIGHWAY		**IH 35**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	662-6083	WK ZN PAV MRK REMOV (W)(EXIT GORE)	EA	4.000		4.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	77,652.000		77,652.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	5,861.000		5,861.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	18.000		18.000	
	666-6075	REFL PAV MRK TY I (W)(NUMBER)(100MIL)	EA	3.000		3.000	
	666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	4.000		4.000	
	666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	4.000		4.000	
	666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA	14.000		14.000	
	666-6225	PAVEMENT SEALER 6"	LF	173,705.000		173,705.000	
	666-6239	PAVEMENT SEALER (ENTR GORE)	EA	4.000		4.000	
	666-6240	PAVEMENT SEALER (EXIT GORE)	EA	4.000		4.000	
	666-6243	PAVEMENT SEALER (YLD TRI)	EA	14.000		14.000	
	666-6248	PAVEMENT SEALER (NUMBER)	EA	3.000		3.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	18,400.000		18,400.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	78,160.000		78,160.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	77,652.000		77,652.000	
	672-6008	REFL PAV MRKR TY I-R	EA	84.000		84.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	1,227.000		1,227.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON	246.000		246.000	
	3076-6066	TACK COAT	GAL	10,512.000		10,512.000	
	3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	37,291.000		37,291.000	
	3084-6001	BONDING COURSE	GAL	51.000		51.000	
	3085-6001	UNDERSEAL COURSE	GAL	63,603.000		63,603.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	154.000		154.000	
	6185-6002	TMA (STATIONARY)	DAY	154.000		154.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	21.000		21.000	
	08	CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	

ITEM NO.	0502-6001	0510-6001	0662-6064	0662-6067	0662-6082	0662-6083	0662-6098	0662-6109	0662-6111	6001-6001	6185-6002	6185-6005
SHEET NO.	BARRICADES, SIGNS AND TRAFFIC HANDLING	ONE-WAY TRAF CONT (FLAGGER CONT)	WK ZN PAV MRK REMOV (W16"BRK)	WK ZN PAV MRK REMOV (W16"SLD)	WK ZN PAV MRK REMOV (W) (ENTR GORE)	WK ZN PAV MRK REMOV (W) (EXIT GORE)	WK ZN PAV MRK REMOV (Y16"SLD)	WK ZN PAV MRK SHT TERM (TAB) TY W	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
CSJ 0017-06-086	MO	HR	LF	LF	EA	EA	LF	EA	EA	DAY	DAY	DAY
IH 35 PROJECT TOTAL	10	32	18,400	78,160	4	4	77,652	5,861	18	154	154	21

SCALE
HORIZONTAL: N/A
VERTICAL: N/A

Texas Department of Transportation

IH 35
TRAFFIC CONTROL PLAN SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		11
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

ITEM NO.		0104-6017	0132-6003	0351-6006	0354-6021	0354-6024	0432-6045	0438-6004	0530-6004	0454-6008	0540-6001	0540-6006	0540-6016	0540-6037	0542-6001	0542-6002	0542-6004	0544-6001
SHEET NO.	STATION TO STATION	REMOVING CONC (DRIVEWAYS)	EMBANKMENT (FINAL)(ORD COMP) (TY B)	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	PLANE ASPH CONC PAVI(0" TO 2")	PLANE ASPH CONC PAVI(2" TO 4")	RIPRAP (MOW STRIP) (4 IN)	CLEANING AND SEALING EXIST JOINTS(CL7)	DRIVEWAYS (CONC)	HEADER TYPE EXPANSION JOINT	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	DOWNSTREAM ANCHOR TERMINAL SECTION	MTL BEAM GD FEN TRANS (ANCHOR PLATE)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)
IH 35		SY	CY	SY	SY	SY	CY	LF	SY	CF	LF	EA	EA	EA	LF	EA	EA	EA
	CSJ 0017-06-086																	
47	STA 1632+00 TO STA 1656+00	0	0	0	12,269	0	0	0	0	0	0	0	0	0	0	0	0	0
48	STA 1656+00 TO STA 1680+00	0	0	2,199	20,783	0	0	0	0	0	0	0	0	0	0	0	0	0
49	STA 1680+00 TO STA 1704+00	0	0	3,775	20,636	0	0	0	0	0	0	0	0	0	0	0	0	0
50	STA 1704+00 TO STA 1728+00	0	0	2,340	20,706	0	0	0	0	0	0	0	0	0	0	0	0	0
51	STA 1728+00 TO STA 1752+00	0	0	4,163	20,994	0	0	0	0	0	0	0	0	0	0	0	0	0
52	STA 1752+00 TO STA 1776+00	0	0	4,011	26,496	0	0	0	0	0	0	0	0	0	0	0	0	0
53	STA 1776+00 TO STA 1800+00	0	283	5,458	15,386	5,864	213	169	0	28	4,050	12	6	12	4,570	6	12	6
54	STA 1800+00 TO STA 1824+00	0	330	4,363	13,634	7,806	222	464.75	0	28	3,850	12	6	12	4,770	6	12	6
55	STA 1824+00 TO STA 1848+00	0	0	1,034	30,131	377	0	0	0	0	0	0	0	0	0	0	0	0
56	STA 1848+00 TO STA 1872+00	0	0	5,058	21,245	0	0	0	0	0	0	0	0	0	0	0	0	0
57	STA 1872+00 TO STA 1896+00	0	0	5,839	21,092	0	0	0	0	0	0	0	0	0	0	0	0	0
58	STA 1896+00 TO STA 1920+00	0	39	3,027	16,557	4,130	61	253.5	0	0	1,045	8	4	8	1,345	4	8	4
59	STA 1920+00 TO STA 1944+00	0	39	3,557	15,143	5,601	107	591.5	0	0	1,550	8	4	8	2,522	4	8	4
60	STA 1944+00 TO STA 1968+00	0	0	0	12,278	0	0	0	0	0	0	0	0	0	0	0	0	0
61	STA 1968+00 TO STA 1992+00	0	0	0	15,464	0	0	0	0	0	0	0	0	0	0	0	0	0
62	STA 1992+00 TO STA 2016+00	0	0	0	17,253	0	23	0	0	0	375	0	1	0	375	1	0	1
63	SBFR PAVEMENT REPAIR	175	30	1,280	0	0	0	0	156	0	0	0	0	0	0	0	0	0
	IH 35 TOTALS	175	721	46,104	300,067	23,778	626	1,478.75	156	56	10,870	40	21	40	13,582	21	40	21

ITEM NO.		0544-6003	3076-6001	3076-6066	3080-6001	3084-6001	3085-6001
SHEET NO.	STATION TO STATION	GUARDRAIL END TREATMENT (REMOVE)	D-GR HMA TY-B PG64-22	TACK COAT	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	BONDING COURSE	UNDERSEAL COURSE
IH 35		EA	TON	GAL	TON	GAL	GAL
	CSJ 0017-06-086						
47	STA 1632+00 TO STA 1656+00	0		0	1,411	0	2,454
48	STA 1656+00 TO STA 1680+00	0	0	440	2,390	0	4,157
49	STA 1680+00 TO STA 1704+00	0	0	755	2,373	0	4,127
50	STA 1704+00 TO STA 1728+00	0	0	468	2,381	0	4,141
51	STA 1728+00 TO STA 1752+00	0	0	833	2,414	0	4,199
52	STA 1752+00 TO STA 1776+00	0	0	802	3,047	0	5,299
53	STA 1776+00 TO STA 1800+00	6	0	1,327	2,444	0	4,014
54	STA 1800+00 TO STA 1824+00	6	0	1,305	2,466	0	3,817
55	STA 1824+00 TO STA 1848+00	0	0	207	3,508	0	6,061
56	STA 1848+00 TO STA 1872+00	0	0	1,012	2,443	0	4,249
57	STA 1872+00 TO STA 1896+00	0	0	1,168	2,426	0	4,218
58	STA 1896+00 TO STA 1920+00	4	0	732	2,379	0	4,074
59	STA 1920+00 TO STA 1944+00	4	0	1,122	2,386	0	3,793
60	STA 1944+00 TO STA 1968+00	0	0	0	1,412	0	2,456
61	STA 1968+00 TO STA 1992+00	0	0	0	1,778	0	3,093
62	STA 1992+00 TO STA 2016+00	1	0	0	1,984	0	3,451
63	SBFR PAVEMENT REPAIR	0	246	341	49	51	0
	IH 35 TOTALS	21	246	10,512	37,291	51	63,603

SCALE
HORIZONTAL: N/A
VERTICAL: N/A

IH 35
GRADING SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		12
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

ITEM NO.	0533-6001	0658-6063	0658-6065	0658-6069	0658-6070	0666-6042	0666-6075	0666-6081	0666-6084	0666-6102	0666-6225
SHEET NO.	RUMBLE STRIPS (SHOULDER)	INSTL DEL ASSM (D-SW\SZ 1(BRF)GF2(BR)	INSTL DEL ASSM (D-SY\SZ 1(BRF)GF2(BR)	INSTL DEL ASSM (D-SW\SZ (BRF)CTB (BR)	INSTL DEL ASSM (D-SY\SZ (BRF)CTB (BR)	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	REFL PAV MRK TY I (W)(NUMBER)(100MIL)	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	PAVEMENT SEALER 6"
CSJ: 0017-06-086	LF	EA	EA	EA	EA	LF	EA	EA	EA	EA	LF
77	4,143						1	1	1		5,790
78	9,386										10,802
79	9,600										10,802
80	9,599										10,799
81	9,600										10,802
82	6,680						1	1	1	7	12,673
83	8,683	36	16	6	6						10,989
84	7,842	34	19	12	12						11,006
85	7,451	6	1				1	1	1	7	15,137
86	9,600										10,799
87	9,600										10,802
88	9,600	9	15	6	6						10,802
89	8,169	15	13	6	6						10,804
90	9,600										10,800
91	9,200										10,800
92	4,050							1	1		10,098
PROJECT TOTAL	132,803	100	64	30	30	0	3	4	4	14	173,705

ITEM NO.	0666-6240	0666-6248	0666-6306	0666-6343	0666-6347	0668-6092	0672-6008	0672-6010
SHEET NO.	PAVEMENT SEALER (EXIT GORE)	PAVEMENT SEALER (NUMBER)	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	REFL PAV MRKR TY I-R	REFL PAV MRKR TY II-C-R
CSJ: 0017-06-086	EA	EA	LF	LF	LF		EA	EA
77	1	1	700	2,291	2,799		14	75
78			1,200	4,802	4,800			60
79			1,200	4,801	4,801			60
80			1,200	4,800	4,799			60
81			1,200	4,802	4,800			60
82	1	1	1,200	5,708	5,660	1	28	184
83			1,200	4,857	4,800			60
84			1,200	4,904	4,902			60
85	1	1	1,200	7,787	6,894	1	28	146
86			1,200	4,800	4,799			60
87			1,200	4,803	4,799			60
88			1,200	4,802	4,800			60
89			1,200	4,804	4,800			60
90			1,200	4,800	4,800			60
91			1,200	4,800	4,800			60
92	1		900	4,599	4,599		14	102
PROJECT TOTAL	4	3	18,400	78,160	77,652	2	84	1,227

SCALE
HORIZONTAL: N/A
VERTICAL: N/A

Texas Department of Transportation

IH 35
PAVEMENT MARKING AND DELINEATION SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	13

STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

ITEM NO.		0161-6017	0164-6033	0168-6001	0169-6001	0506-6004	0506-6011	0506-6038	0506-6039
SHEET NO.	STATION TO STATION	COMPOST MANUF TOPSOIL (4")	DRILL SEEDING (PERM) (RURAL) (SANDY)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY A)	ROCK FILTER DAMS (INSTALL) (TY 4)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	IH 35	SY	SY	MG	SY	LF	LF	LF	LF
	CSJ 0017-06-086								
111	STA 1632+00 TO STA 1656+00	0	0	0	0	0	0	0	0
112	STA 1656+00 TO STA 1680+00	0	0	0	0	0	0	0	0
113	STA 1680+00 TO STA 1704+00	0	0	0	0	0	0	0	0
114	STA 1704+00 TO STA 1728+00	0	0	0	0	0	0	0	0
115	STA 1728+00 TO STA 1752+00	0	0	0	0	0	0	0	0
116	STA 1752+00 TO STA 1776+00	0	0	0	0	0	0	0	0
117	STA 1776+00 TO STA 1800+00	5322	5322	87	5322	364	364	4791	4791
118	STA 1800+00 TO STA 1824+00	4860	4860	82	4860	413	413	4551	4551
119	STA 1824+00 TO STA 1848+00	804	804	13	804	56	56	774	774
120	STA 1848+00 TO STA 1872+00	0	0	0	0	0	0	0	0
121	STA 1872+00 TO STA 1896+00	0	0	0	0	0	0	0	0
122	STA 1896+00 TO STA 1920+00	1067	1067	20	1067	213	213	0	0
123	STA 1920+00 TO STA 1944+00	1422	1422	26	1422	225	225	0	0
124	STA 1944+00 TO STA 1968+00	0	0	0	0	0	0	0	0
125	STA 1968+00 TO STA 1992+00	0	0	0	0	0	0	0	0
126	STA 1992+00 TO STA 2016+00	297	297	5	297	27	27	0	0
	IH 35 TOTALS	13772	13772	233	13772	1298	1298	10116	10116

SCALE
HORIZONTAL: N/A
VERTICAL: N/A

Texas Department of Transportation

IH 35
SW3P SUMMARY

SHEET 1 OF 1

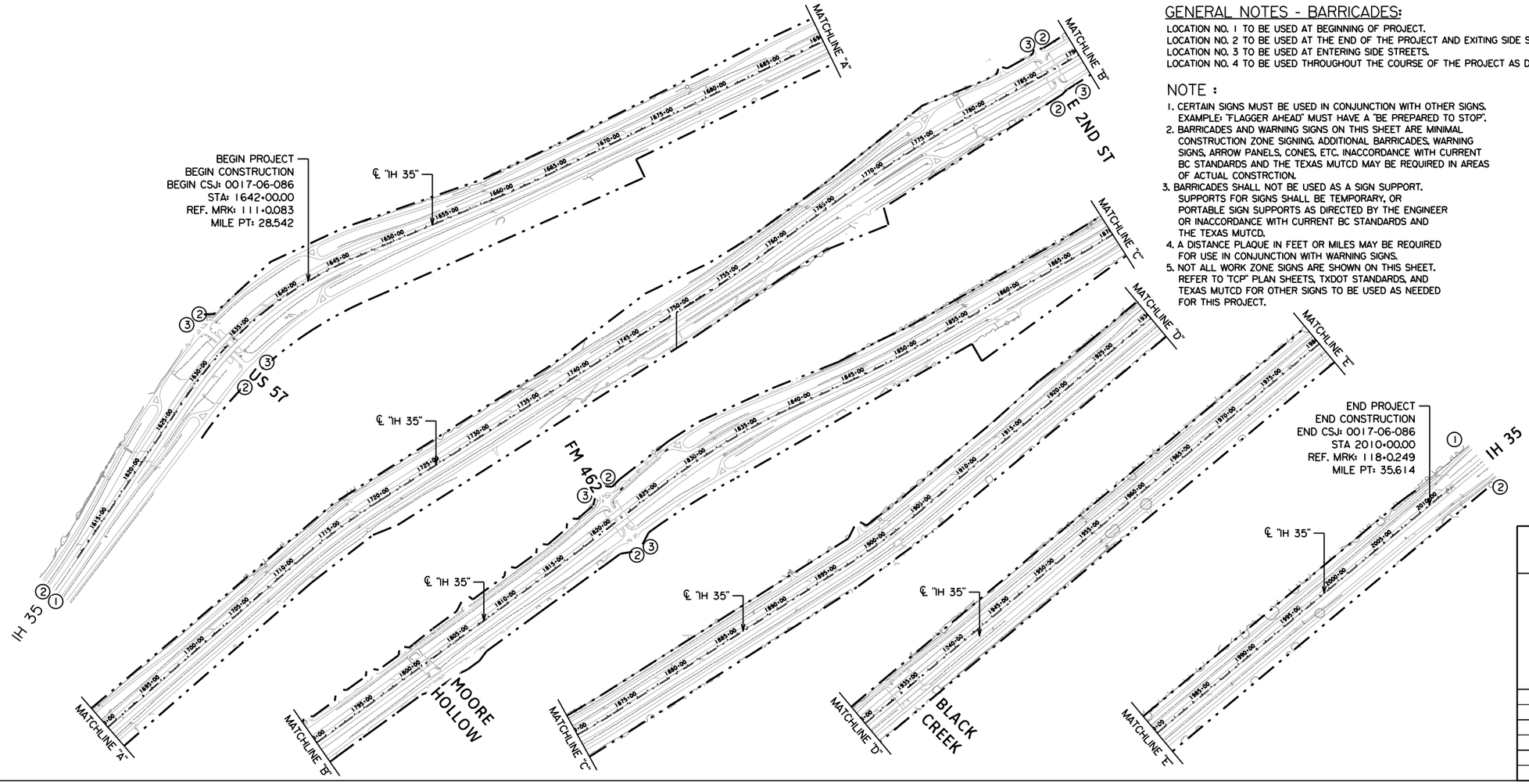
FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		14
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

TRAFFIC CONTROL DEVICES

LOCATION	CW21-1T	G20-2	G20-6T	G20-1bT L/R	G20-1aT	G20-5aP	R20-3T	G20-9TP	R20-5T	G20-5T	R20-5aTP PLAQUE	G20-2bT	R2-1	CW20-1D	CW13-1P	G20-10T	CW8-7	CW8-4	CW8-11	CW8-12	CW8-8	CW8-9aT	VP(F)IR, L	CW16-2P	CW20-7	VP	TRAILER MAUNTED FLASHING ARROW PANEL	PORT CHNGBLE MESSAGE SIGN	CW21-5	TYPE 3 BARRICADE	CW1-8 L/R	CW3-4	CW20-8T	BARRELS	CW1-6aT
1	X		X				X	X	X	X	X			X		X																			
2		X										X																							
3				X	X																														
4						X							X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TRAFFIC CONTROL DEVICES CONT.

LOCATION	CW1-4 L/R	CW3-5	R6-1R/L	CW1-3 L/R	CW3-3	CW4-3R L/R	CW3-2a	CW6-3	R10-6 L/R	R3-1	R3-2	R9-9	R9-10R, L	R9-11	R9-11A	R11-4	R11-3A	CW4-4P	M4-8	M4-8A	R4-1	CW20-4D	W1-7T	CW8-23	EM-6a L/R	PLAQUE	D9-2	D70A	D70	R1-1	R9-3	R5-10b	M4-9 L/R
1																																	
2																																	
3																																	
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X



GENERAL NOTES - BARRICADES:

LOCATION NO. 1 TO BE USED AT BEGINNING OF PROJECT.
LOCATION NO. 2 TO BE USED AT THE END OF THE PROJECT AND EXITING SIDE STREETS.
LOCATION NO. 3 TO BE USED AT ENTERING SIDE STREETS.
LOCATION NO. 4 TO BE USED THROUGHOUT THE COURSE OF THE PROJECT AS DIRECTED BY THE ENGINEER.

NOTE :

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".
2. BARRICADES AND WARNING SIGNS ON THIS SHEET ARE MINIMAL CONSTRUCTION ZONE SIGNING. ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. INACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRCTION.
3. BARRICADES SHALL NOT BE USED AS A SIGN SUPPORT. SUPPORTS FOR SIGNS SHALL BE TEMPORARY, OR PORTABLE SIGN SUPPORTS AS DIRECTED BY THE ENGINEER OR INACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD.
4. A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.
5. NOT ALL WORK ZONE SIGNS ARE SHOWN ON THIS SHEET. REFER TO 'TCP' PLAN SHEETS, TXDOT STANDARDS, AND TEXAS MUTCD FOR OTHER SIGNS TO BE USED AS NEEDED FOR THIS PROJECT.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. — 10/30/2023 DATE

SCALE
HORIZONTAL: N/A
VERTICAL: N/A

IH 35
SCHEDULE OF TRAFFIC CONTROL AND WARNING DEVICES

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		15
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN (3) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.

(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.

(3) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.

(4) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES

(5) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1 - IH 35

THE INTENT OF THIS PHASE IS TO PERFORM FLEXIBLE PAVEMENT STRUCTURE REPAIRS AND SMALL WIDENING ON SBFR.

(1) PRIOR TO COMMENCING ANY PROPOSED CONSTRUCTION INSTALL - PROJECT LIMIT SIGNS, ADVANCE WARNING SIGNS AND CROSS ROAD BARRICADE / SIGNS IN ACCORDANCE WITH THE SCHEDULE OF BARRICADES AND LATEST TMUTCD; AND ANY SW3P BEST MANAGEMNET PRACTICES REQUIRED OR AS DIRECTED BY THE ENGINEER.

(2) THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE IN A ONE DAILY LANE CLOSURE. THE LIMITS OF OPERATIONS MUST BE COMPLETED BY THE SPECIFIED TIME ESTABLISHED BY THE ENGINEER. DIRECTION AND LOCATIONS TO BE ESTABLISHED BY PROJECT ENGINEER AS WELL. LAPSE TIME BETWEEN THE PLACEMENT OF THE FLEXIBLE PAVEMENT REPAIR AND THE FINAL SURFACE MAY NOT BE MORE THAN 1 MONTH.

- (A) BASE REPAIRS TO BE DONE IN THIS PHASE USING TCP (6-1)-12 FOR FREEWAY LANE CLOSURES OR ANY OTHER TCP STANDARDS DEEMED NECESSARY BY ENGINEER. IF BASE REPAIRS RESULT IN REMOVAL OF PAVEMENT MARKINGS USE TY II WORKZONE PAVEMENT MARKINGS TO ESTABLISH TRAVEL LANES.
- (B) BASE REPAIR, WIDENING AND PROPOSED DRIVEWAY TO BE DONE IN THIS PHASE FOR SOUTHBOUND FRONTAGE ROAD USING TCP (2-2)A OR ANY OTHER TCP STANDARDS DEEMED NECESSARY BY ENGINEER. IF BASE REPAIRS RESULT IN REMOVAL OF PAVEMENT MARKINGS USE TY II WORKZONE PAVEMENT MARKINGS TO ESTABLISH TRAVEL LANES.

PHASE 2 - IH 35 RAMPS

THE INTENT OF THIS PHASE IS TO MILL AND INLAY THE ROADWAY SURFACE OF RAMPS AND SBFR.

(1) INSTALL TRAFFIC CONTROL WARNING DEVICES AND / OR SIGNS IN ACCORDANCE WITH THE SCHEDULE OF BARRICADES AND LATEST TMUTCD PRIOR TO COMMENCING ANY PROPOSED CONSTRUCTION.

(2) THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE IN A ONE DAILY LANE CLOSURE. THE LIMITS OF OPERATIONS MUST BE COMPLETED BY THE SPECIFIED TIME ESTABLISHED BY PROJECT ENGINEER. DIRECTION AND LOCATIONS TO BE ESTABLISHED BY PROJECT ENGINEER AS WELL.

- (A) MILL 2" ACP.
- (B) PLACE 2" SMA AS SHOWN IN PROPOSED TYPICAL SECTIONS.
- (C) USE TCP (6-1)-12 STANDARD FOR LANE CLOSURES DURING THIS PHASE.
- (D) INSTALL WORK ZONE PAVEMENT MARKINGS, CONTRACTOR IS RESPONSIBLE FOR SURVEYING, VERIFYING, AND RESTABLISHING EXISTING PAVEMENT MARKINGS IN THE FIELD.
- (E) OPEN ALL LANES OF TRAFFIC AT THE END OF EACH WORKDAY.

PHASE 3 - IH 35 MAIN LANES

THE INTENT OF THIS PHASE IS TO MILL AND INLAY THE ROADWAY SURFACE OF MAINLANES TO THE SUPERPAVE LAYER, REPAIR AND REPLACE METAL BEAM GUARD FENCE, INSTALL FINAL PAVEMENT MARKINGS AND CLEAN / SEAL BRIDGE JOINTS.

(1) INSTALL TRAFFIC CONTROL WARNING DEVICES AND / OR SIGNS IN ACCORDANCE WITH THE SCHEDULE OF BARRICADES AND LATEST TMUTCD PRIOR TO COMMENCING ANY PROPOSED CONSTRUCTION.

(2) THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE IN A ONE DAILY LANE CLOSURE. THE LIMITS OF OPERATIONS MUST BE COMPLETED BY THE SPECIFIED TIME ESTABLISHED BY PROJECT ENGINEER. DIRECTION AND LOCATIONS TO BE ESTABLISHED BY PROJECT ENGINEER AS WELL.

- (A) MILL 2" ACP TO WIDTH SHOWN IN TCP TYPICAL SECTION.
- (B) PLACE 2" SMA AS SHOWN IN TYPICAL SECTIONS.
- (C) USE TCP (6-1)-12 STANDARD FOR LANE CLOSURES DURING THIS PHASE.
- (D) INSTALL WORK ZONE PAVEMENT MARKINGS, CONTRACTOR IS RESPONSIBLE FOR SURVEYING, VERIFYING, AND RESTABLISHING EXISTING PAVEMENT MARKINGS IN THE FIELD.
- (E) OPEN ALL LANES OF TRAFFIC AT THE END OF EACH WORKDAY.

(3) INSTALL MBGF USING TCP (5-1)-18 AND TCP (6-1)-12 FOR TRAFFIC CONTROL DURING THESE OPERATIONS.

(4) CLEAN AND REPLACE BRIDGE JOINTS, UTILIZING APPLICABLE TCP STANDARDS AND DAILY LANE CLOSURES.

(5) INSTALL FINAL PAVEMENT MARKINGS.

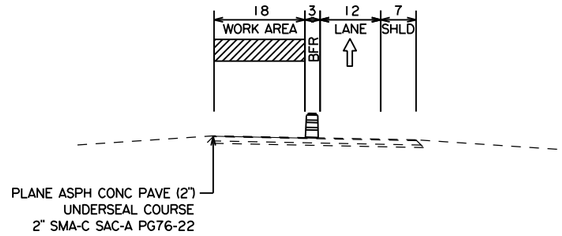
STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

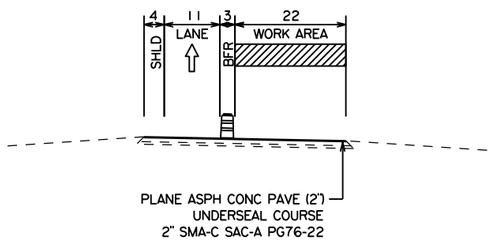
IH 35
TRAFFIC CONTROL PLAN SEQUENCE OF WORK

SHEET 1 OF 2

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		16
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



IH 35
(INSIDE LANE AND SHOULDERS)



IH 35
OUTSIDE LANES AND SHOULDERS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

IH 35
TCP TYPICAL SECTION

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		17
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET					6185 6002	6185 6005
			FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		SHEET NUMBER	EA	EA	EA	DAYS PER TMA/TA USE	DAY	DAY
N/A	1	TCP(6-1) THRU TCP(6-5) (PAVEMENT REPAIR LANE CLOSURES)	1		1	26	26	
N/A	2	TCP(6-2) THRU TCP(6-4) AND TCP(6-8) (PLANE/INLAY RAMP CLOSURE)		1	1	5	5	
N/A	3	TCP(6-1) THRU TCP(6-5) (PLANE/INLAY SINGLE LANE CLOSURE)		1	1	69	69	
N/A	3	TCP(6-1) (CLEAN AND REPLACE BRIDGE JOINTS)		1	1	14	14	
N/A	3	TCP(3-2) AND TCP(3-3) (PAVEMENT MARKING OPERATIONS)	2	1	3	4		12
N/A	3	TCP(3-2) (RUMBLE STRIP OPERATIONS)		3	3	2		9
N/A	3	TCP(6-1) (MBGF REPLACEMENT LANE CLOSURE)		1	1	40	40	
TOTALS			3	8	11	160	154	21

NOTE.
FURNISH TMA/TA - THE NUMBER OF ATTENUATORS BEING FURNISHED FOR THE SPECIFIC TCP.
RELOCATE/REUSE TMA/TA - THE NUMBER OF ATTENUATORS BEING REUSED FROM A PREVIOUS TCP FOR THE SPECIFIC TCP.
TOTAL TMA/TA PER SET UP = (FURNISH TMA/TA) + (RELOCATE/REUSE TMA/TA)
DURATION OF TMA/TA SET UP - THE NUMBER OF DAYS THE ATTENTUATORS WILL BE USED FOR THE SPECIFIC TCP.
TMA/TA (STATIONARY) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)
TMA/TA (MOBILE OPERATION) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)

TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET

FILE: tma.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2018	0017	06	086	IH 35
	DIST	COUNTY		
	SAT	FRIO		
	STATE AID PROJECT			SHEET NO.
	SEE TITLE SHEET			18

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0017	06	086	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	SAT	FRIO		19

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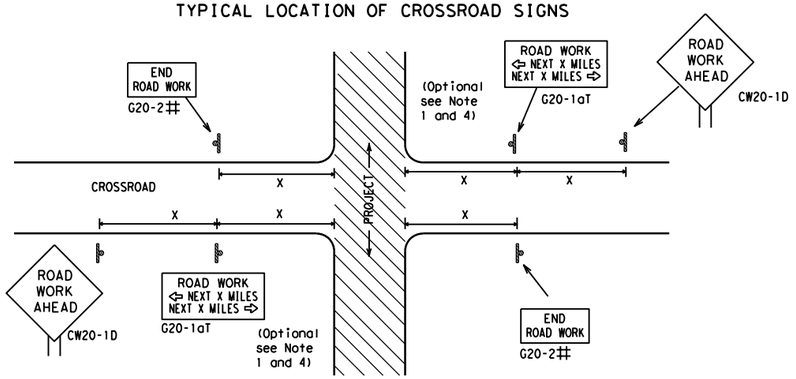
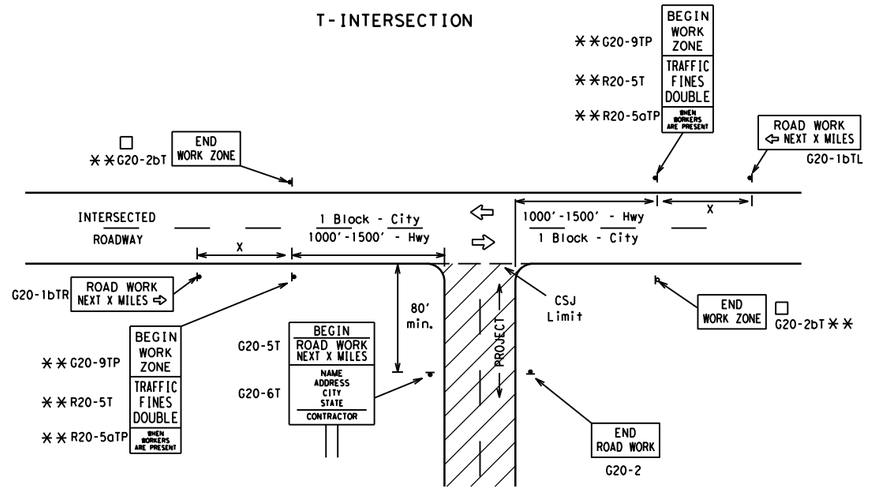
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

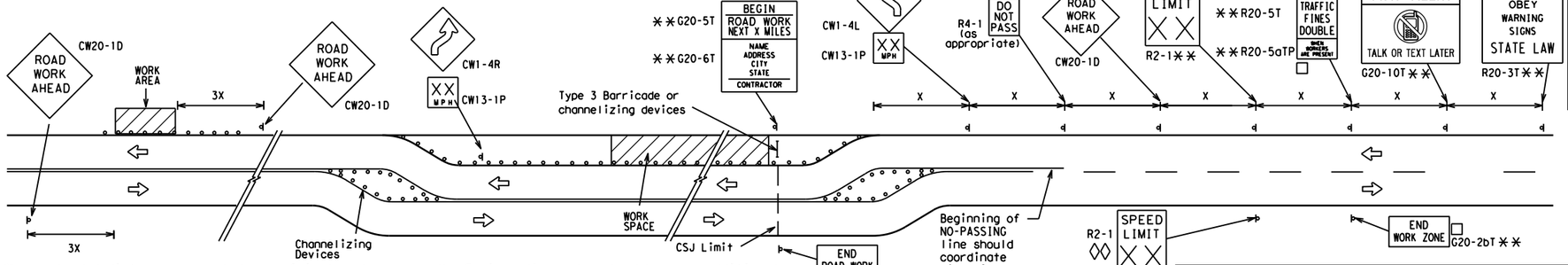
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

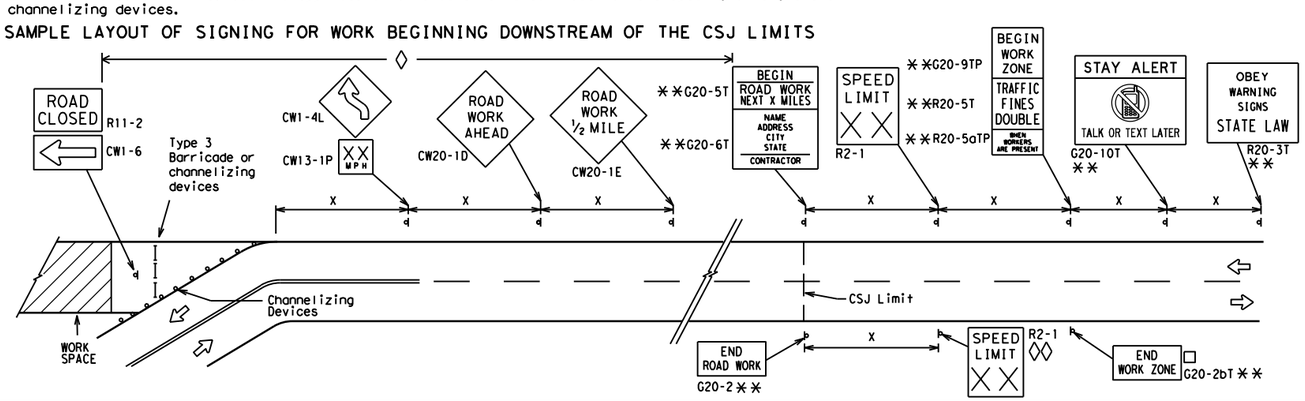
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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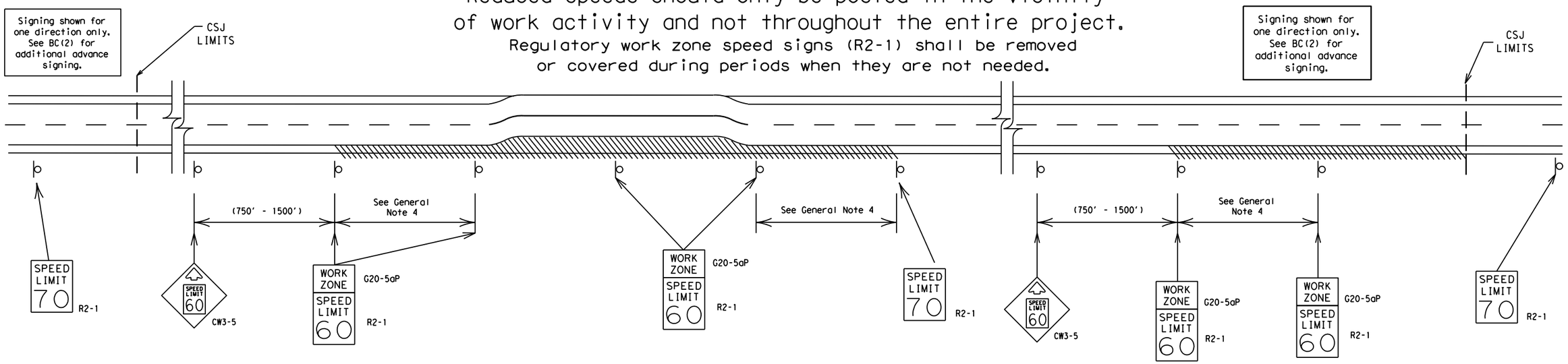
REVISIONS	0017	06	086	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	FRIO		20

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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REVISIONS	0017	06	086	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
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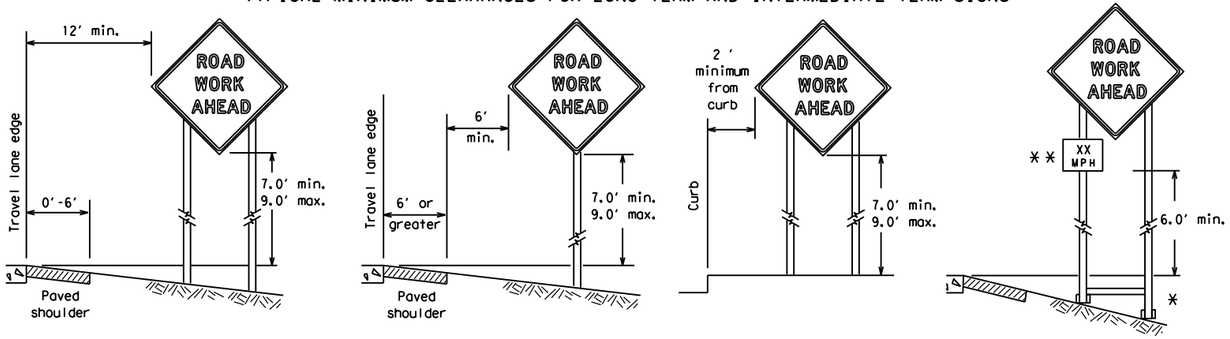
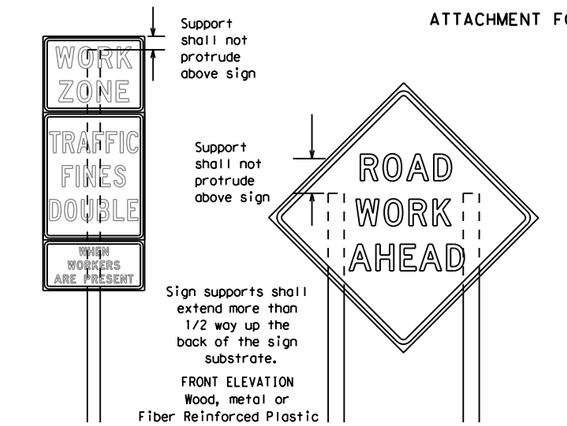
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

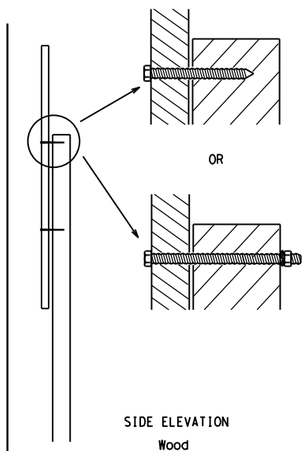


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





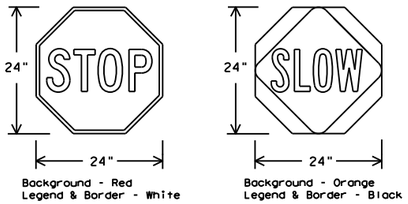
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	FRIO		22

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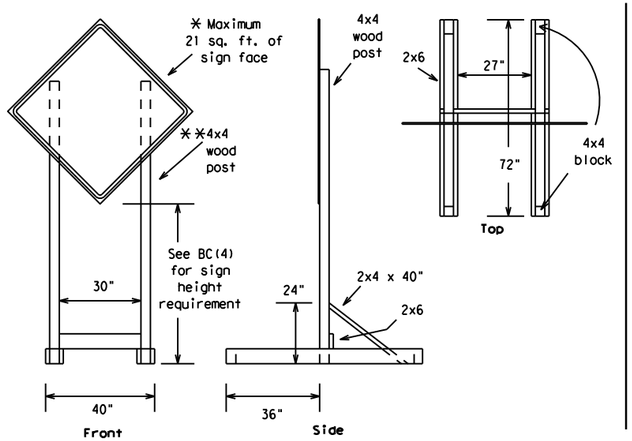
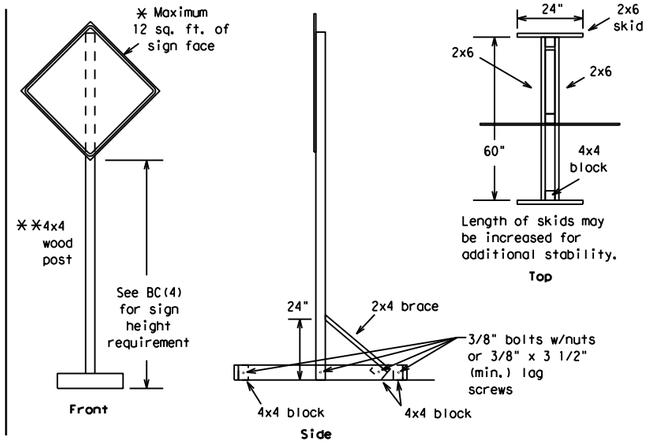
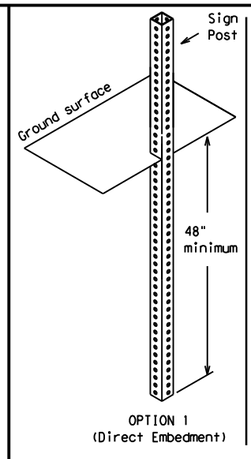
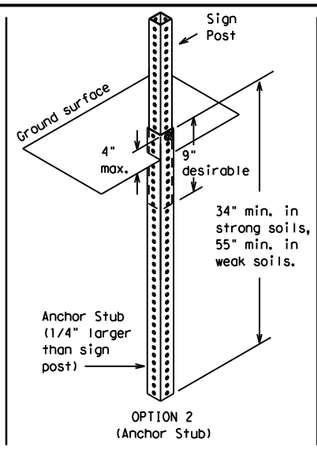


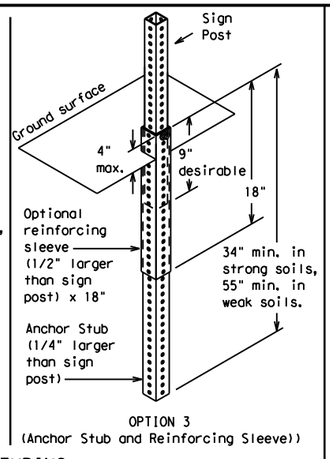


SKID MOUNTED WOOD SIGN SUPPORTS

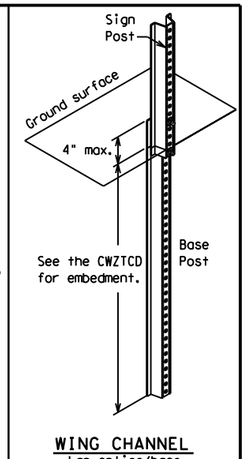
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







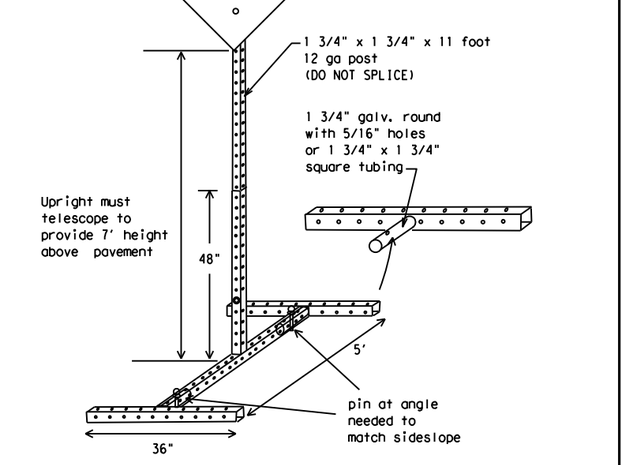
PERFORATED SQUARE METAL TUBING

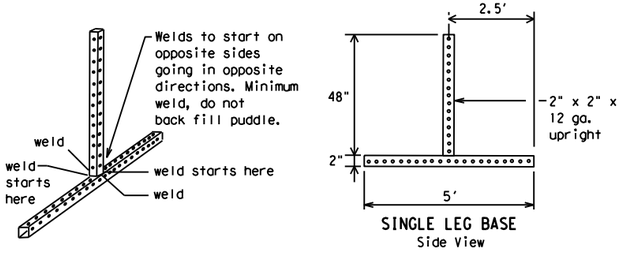


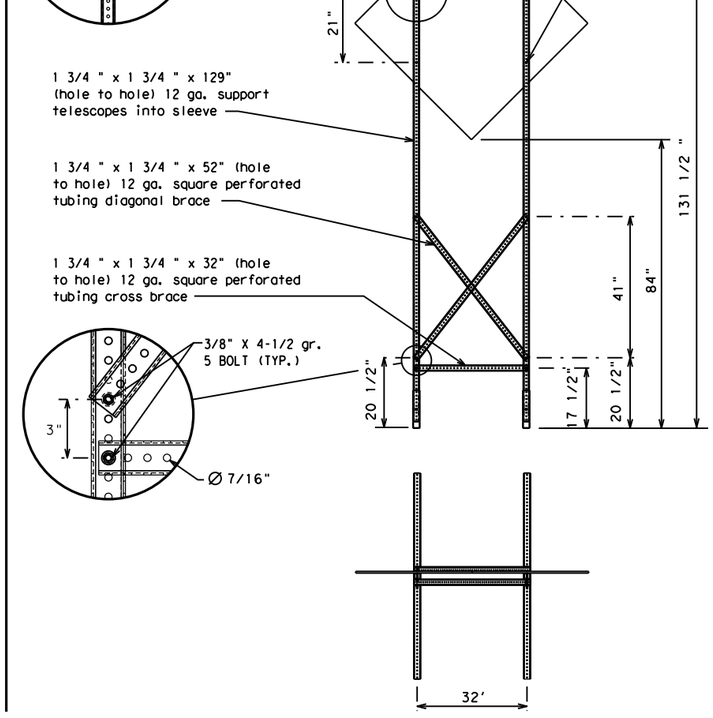
WING CHANNEL
Lap-splice/base bolted anchor

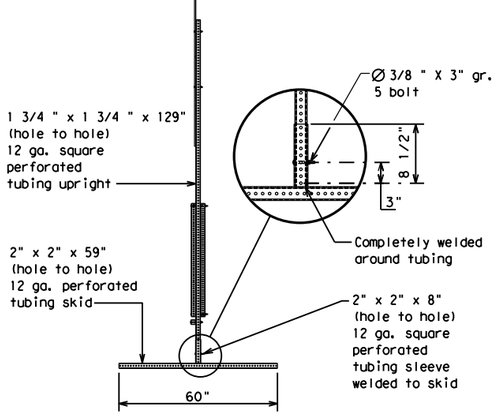
GROUND MOUNTED SIGN SUPPORTS

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









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	FRIO		23

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	**Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

* 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 Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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7-13 5-21	SAT	FRIO		24

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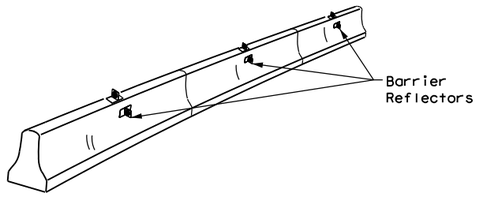
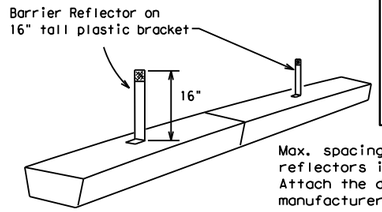
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

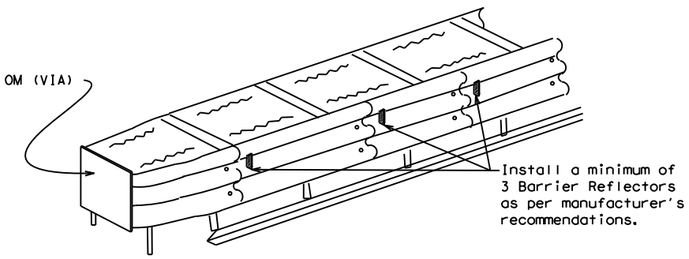


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

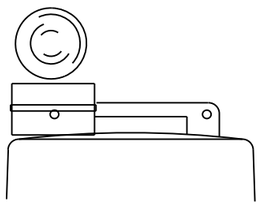


DELINEATION OF END TREATMENTS

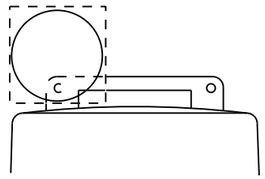
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

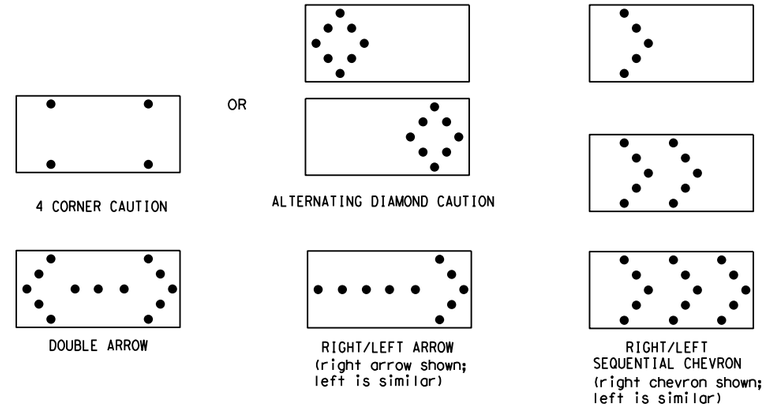
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	FRIO		25

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

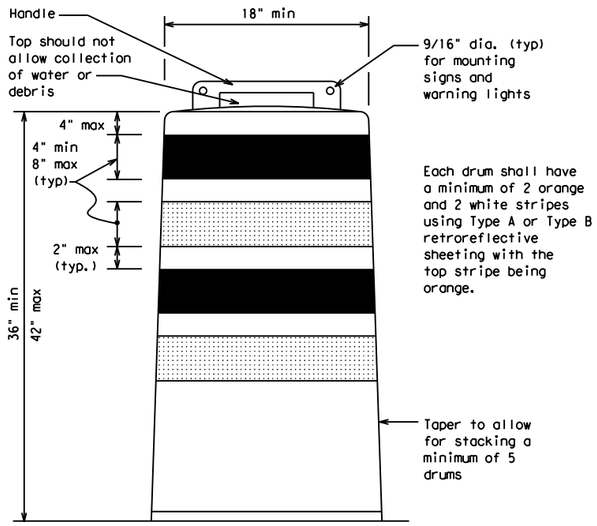
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

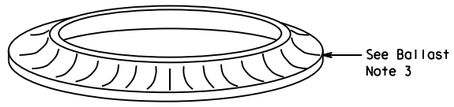
RETROREFLECTIVE SHEETING

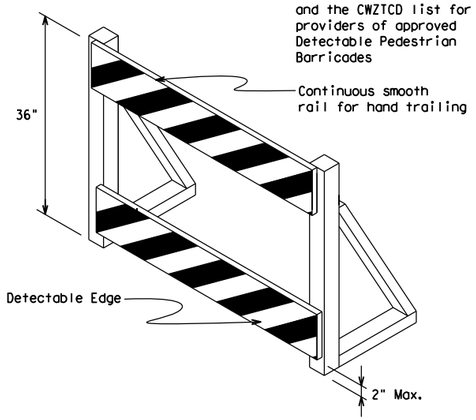
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

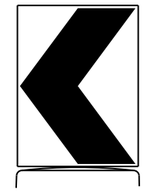




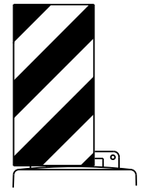


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	SAT	FRIO		26
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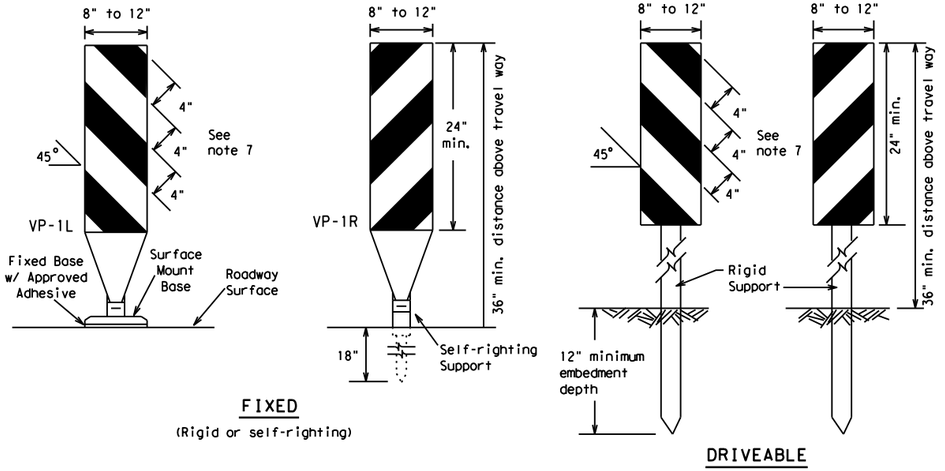
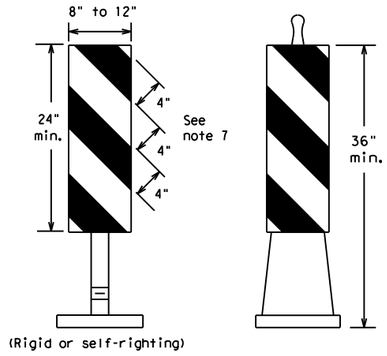


FIXED
(Rigid or self-righting)

DRIVEABLE

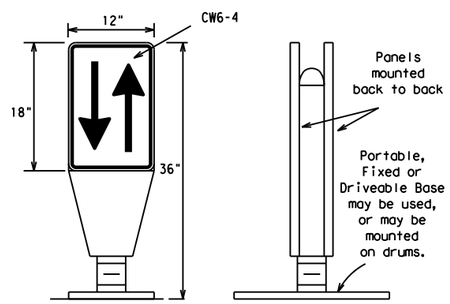


(Rigid or self-righting)

PORTABLE

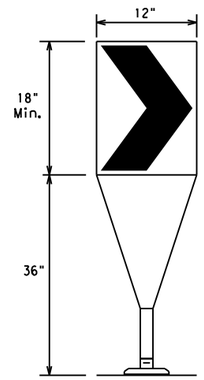
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



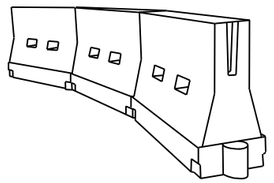
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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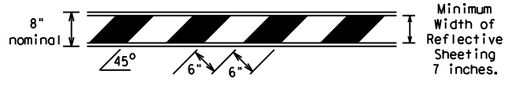
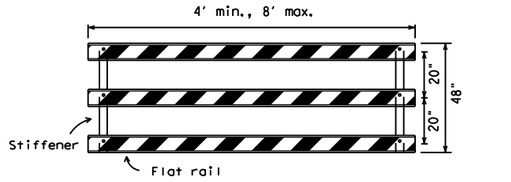
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



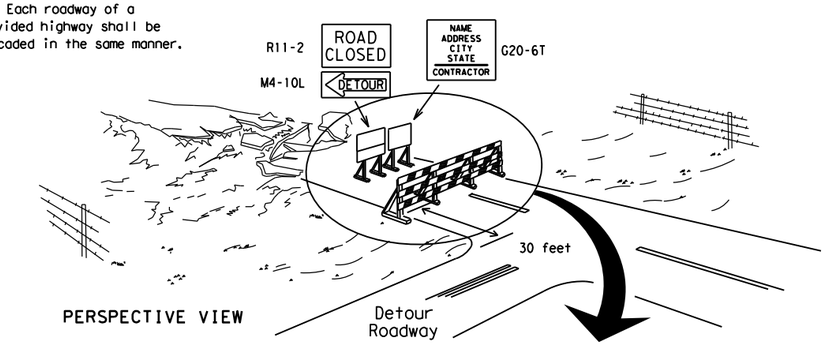
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

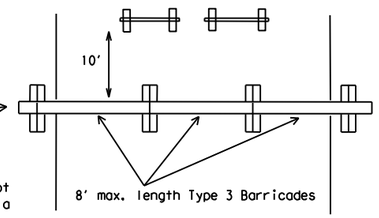
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

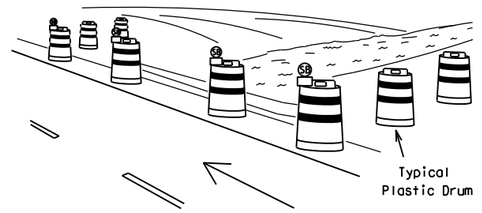
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

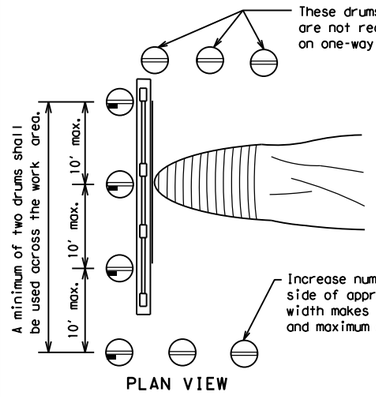
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

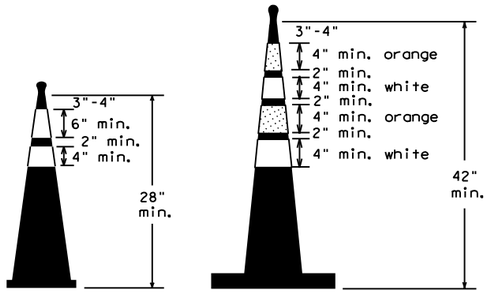
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



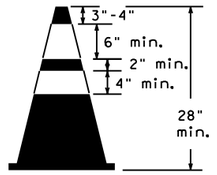
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

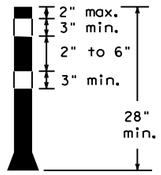
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

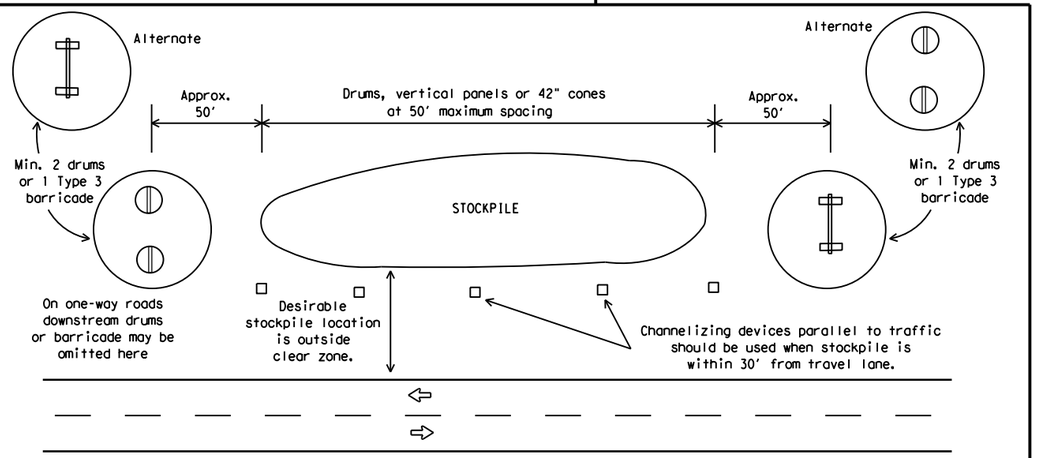


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	FRIO		28

104

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

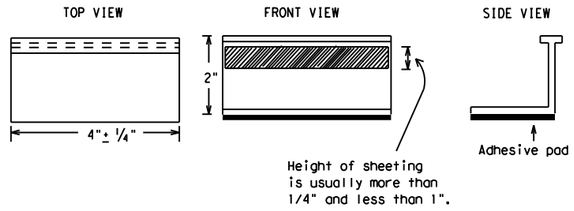
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	SAT	FRIO		29
11-02 8-14				

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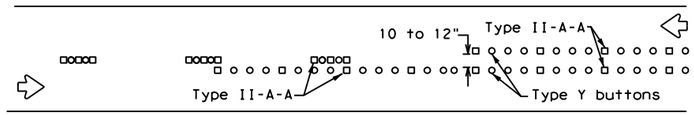
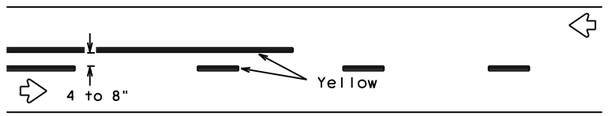
PAVEMENT MARKING PATTERNS

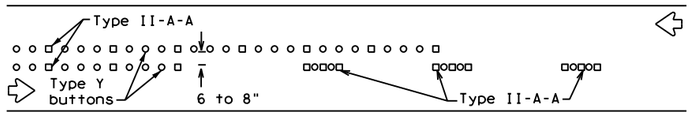
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



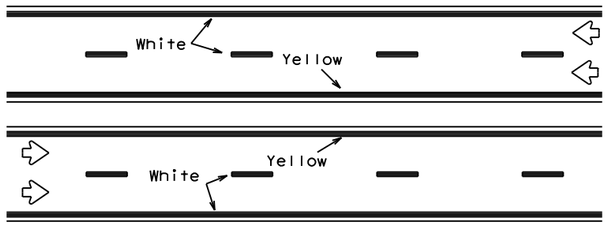
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



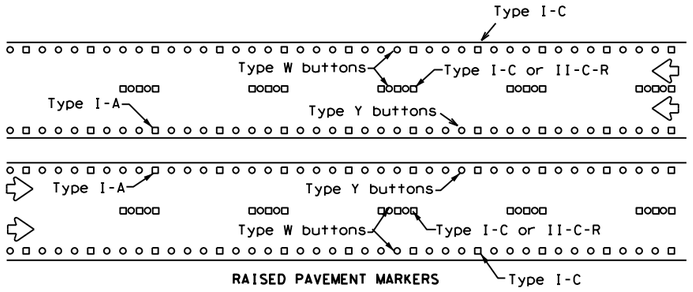
RAISED PAVEMENT MARKERS - PATTERN B

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

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



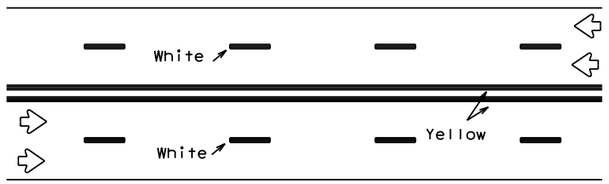
REFLECTORIZED PAVEMENT MARKINGS



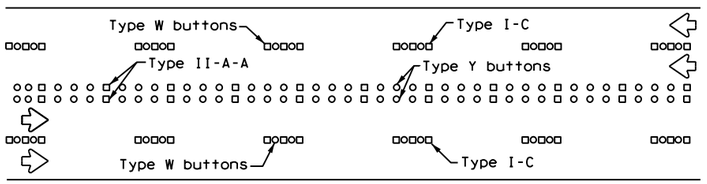
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



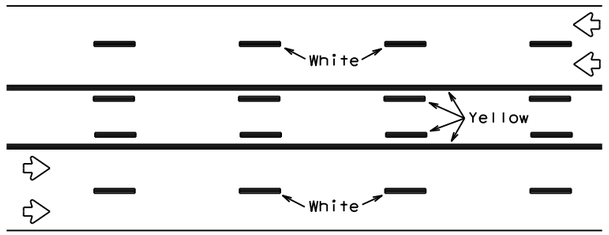
REFLECTORIZED PAVEMENT MARKINGS



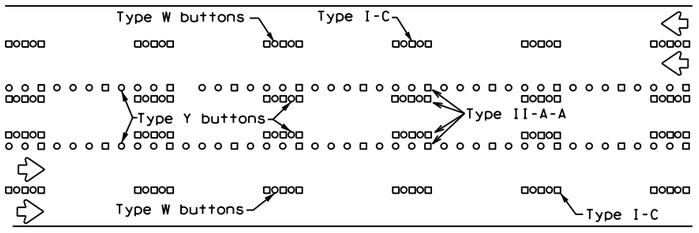
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

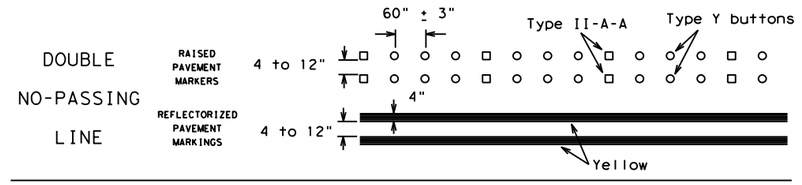
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

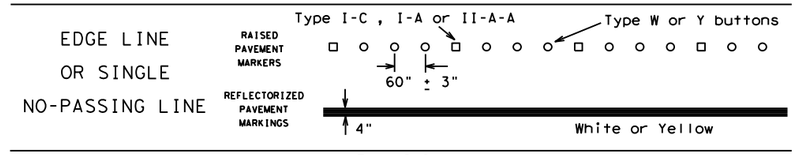
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

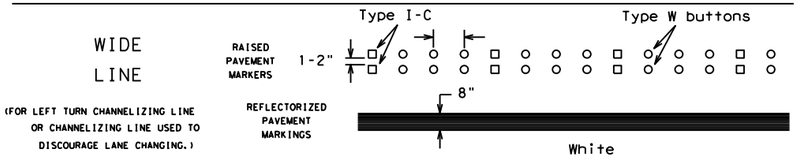


EDGE LINE OR SINGLE NO-PASSING LINE



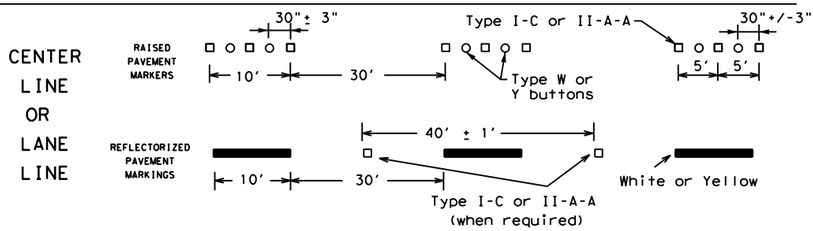
WIDE LINE

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

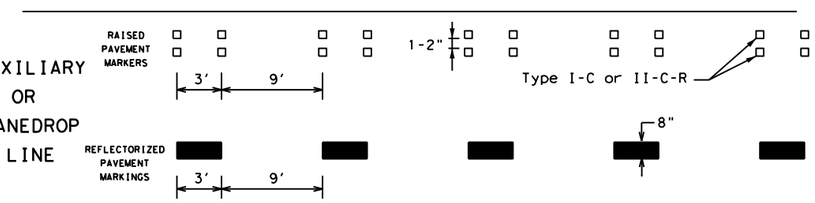


BROKEN LINES

CENTER LINE OR LANE LINE

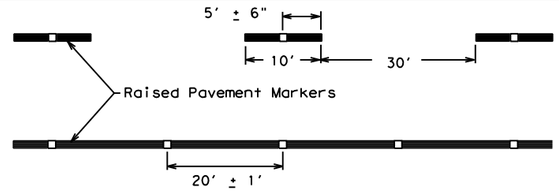


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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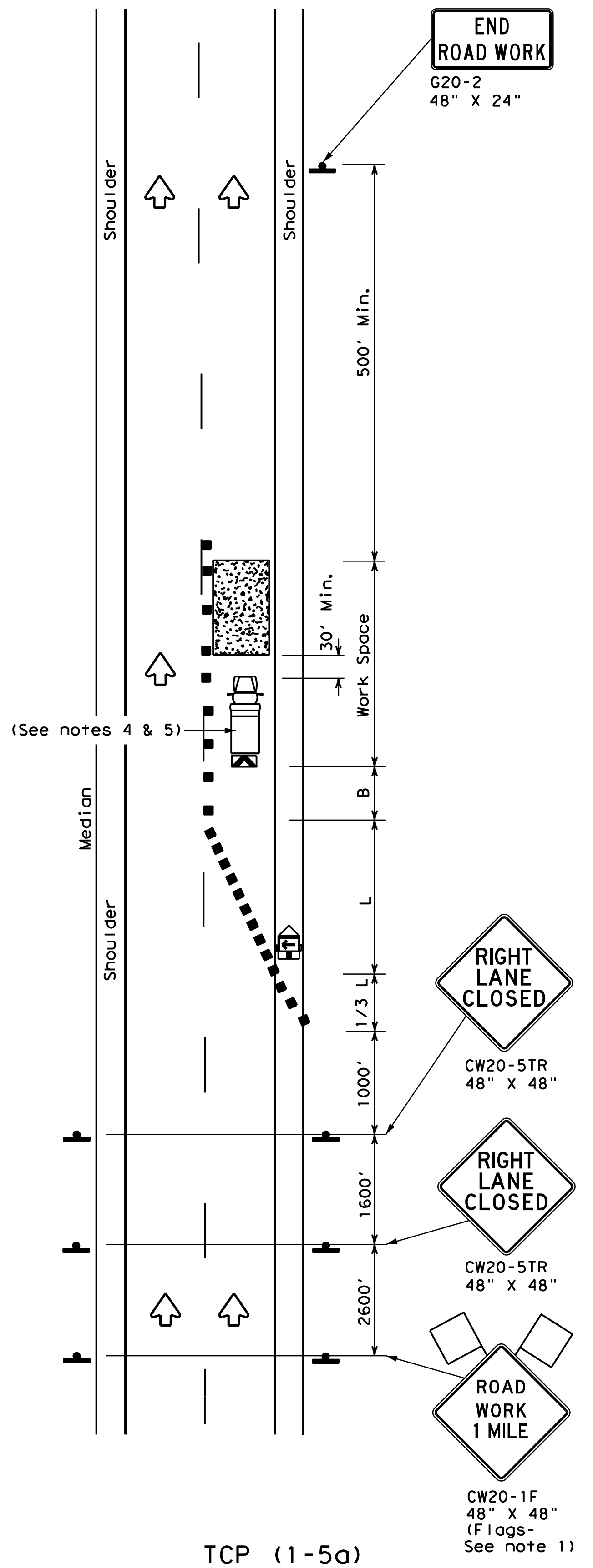
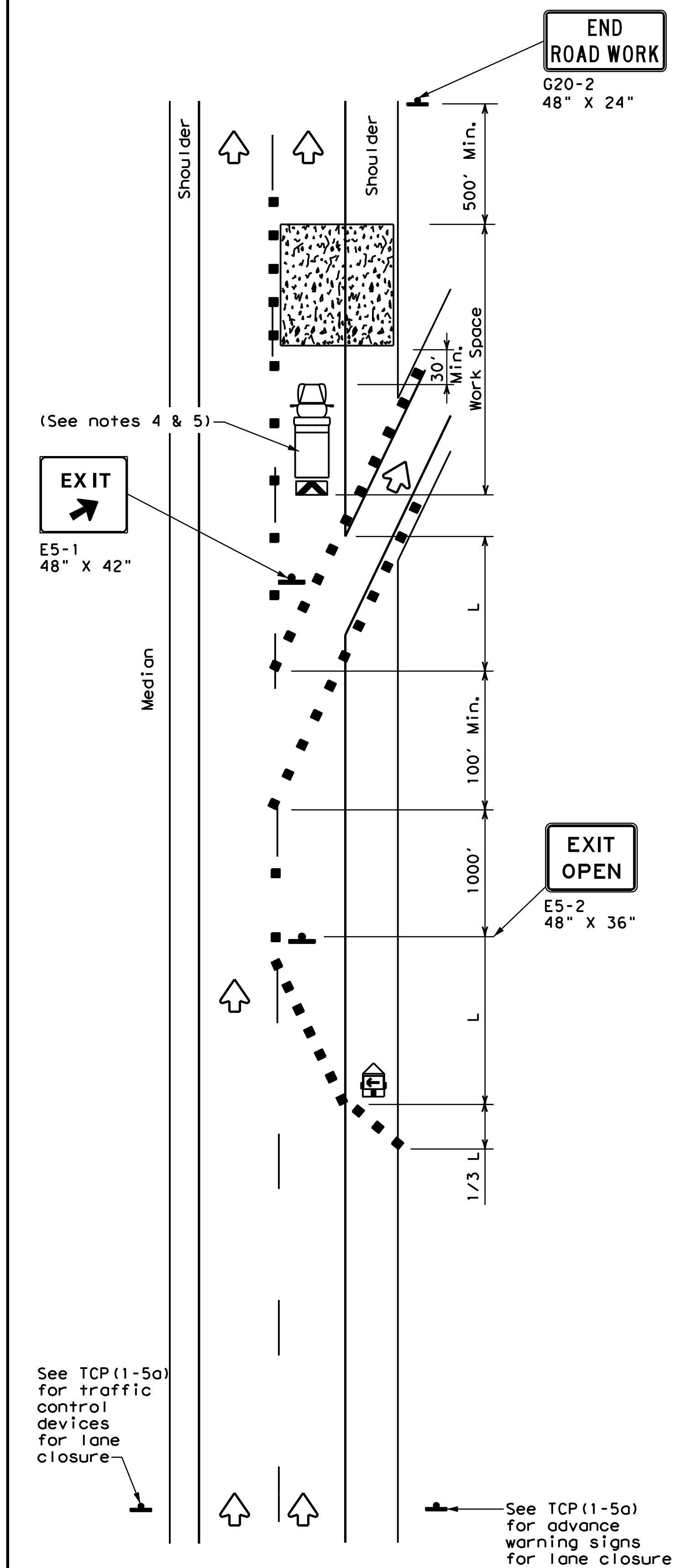


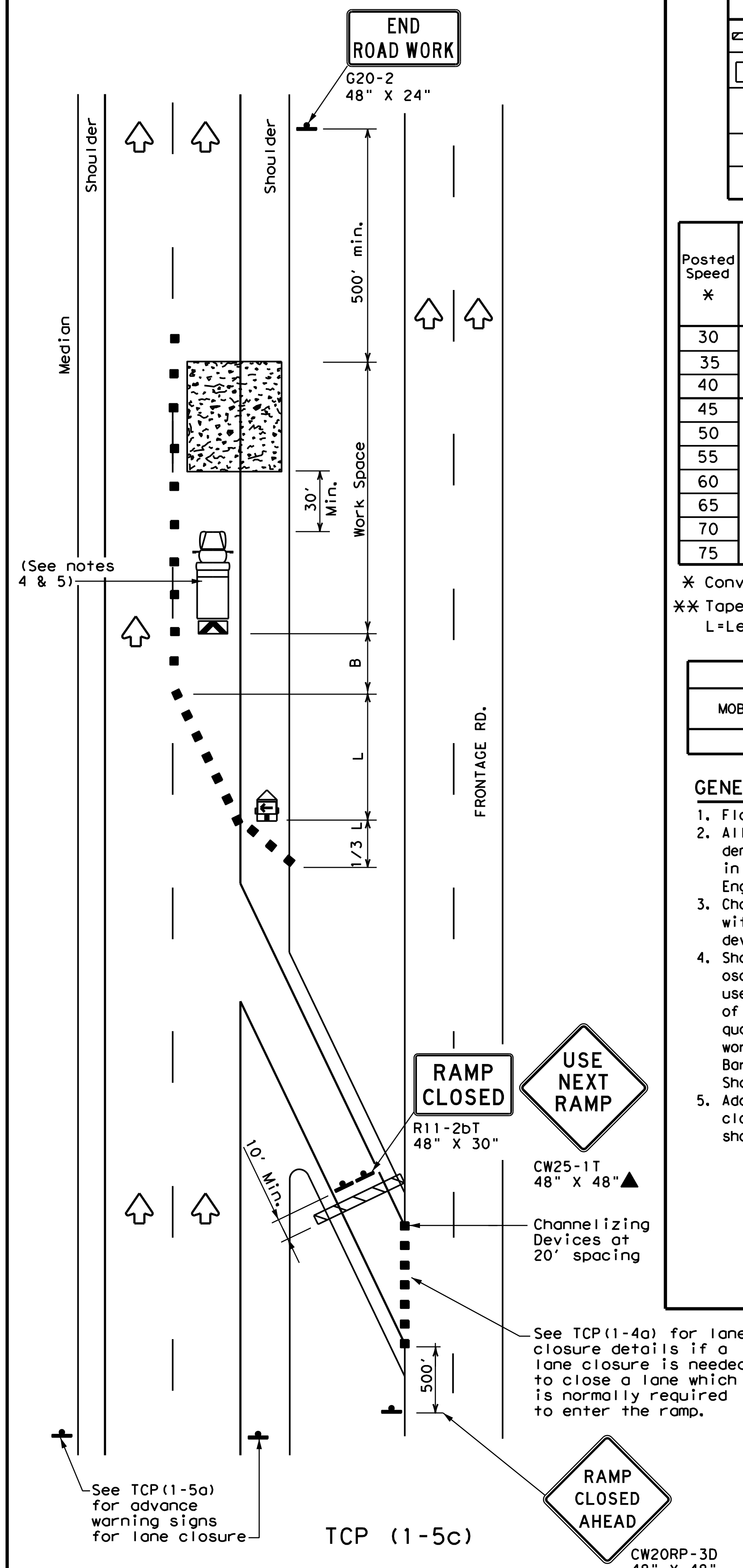
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

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©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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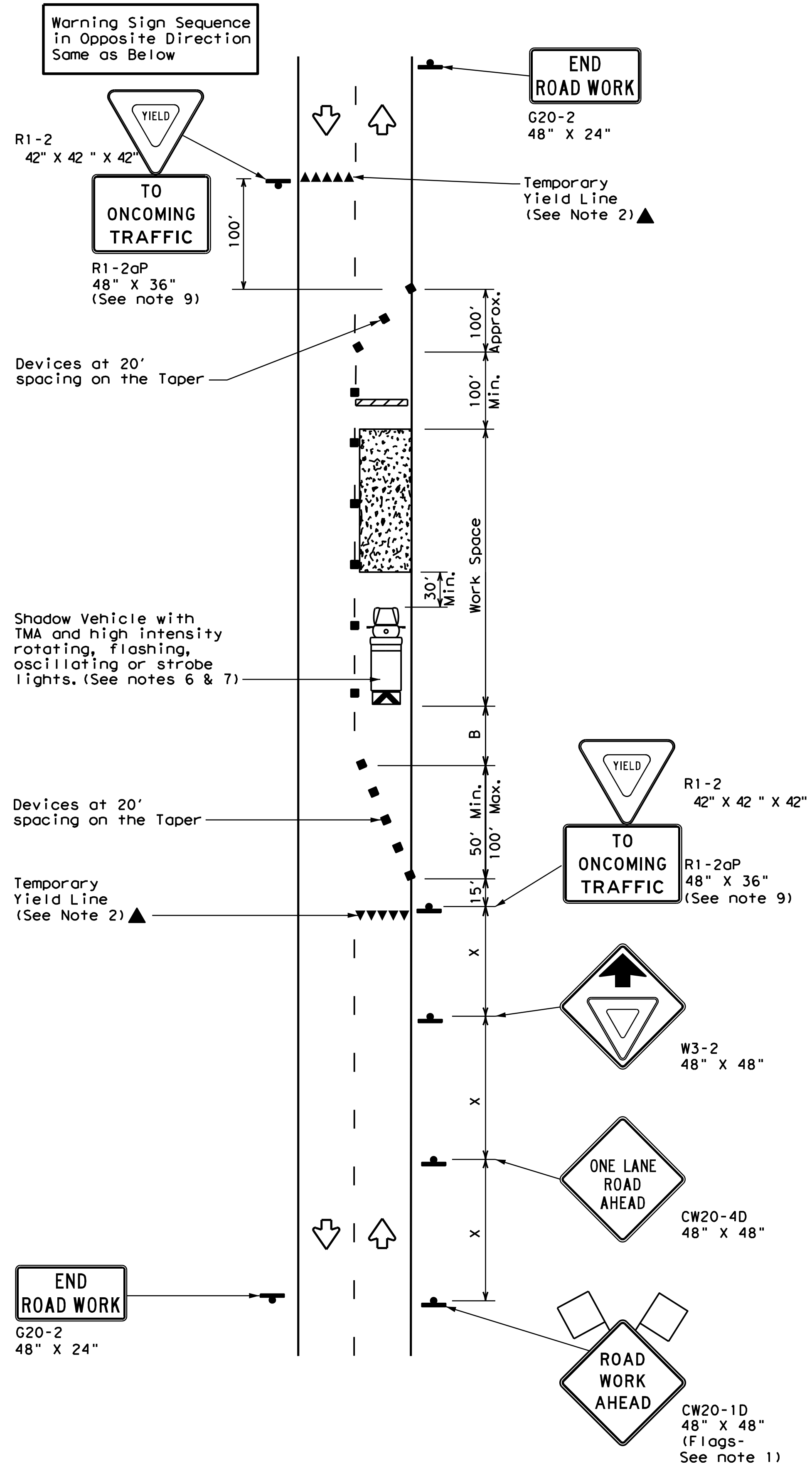


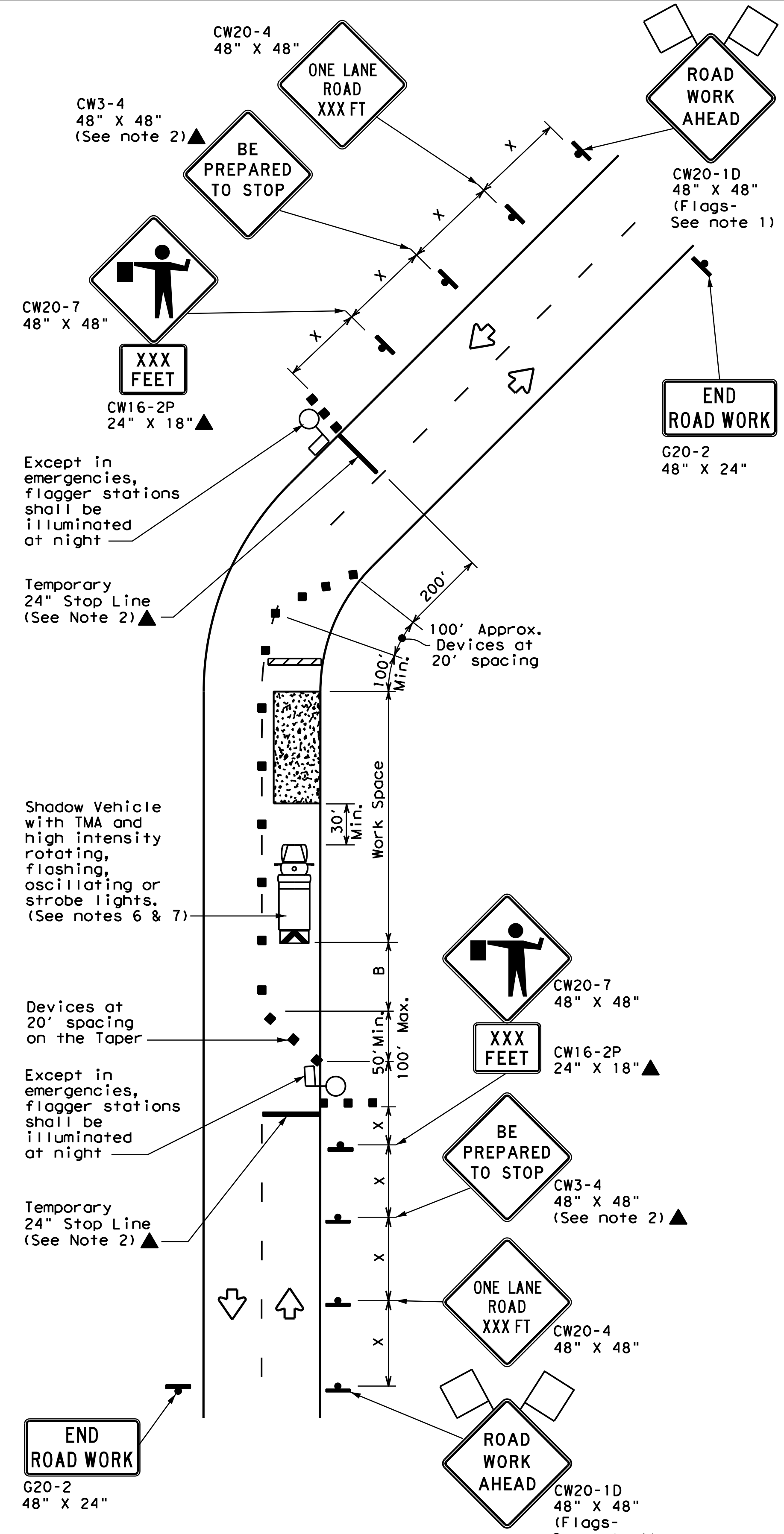
TCP (2-2a)

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

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
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 1-97 2-12 4-98 2-18	0017	06	086	IH 35
	DIST		COUNTY	SHEET NO.
	SAT		FRIO	32

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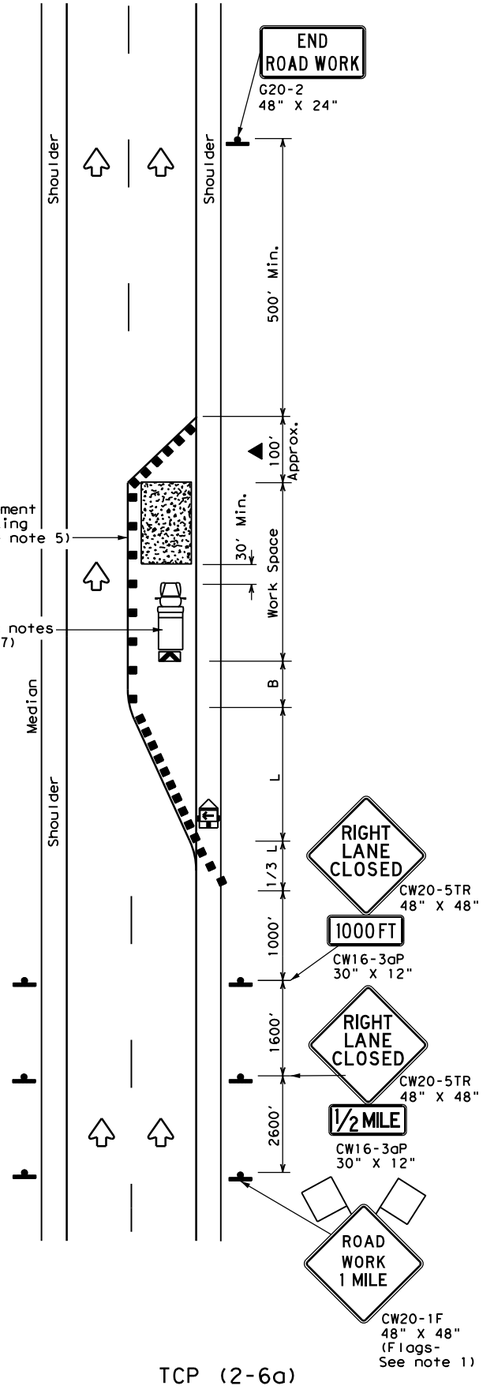
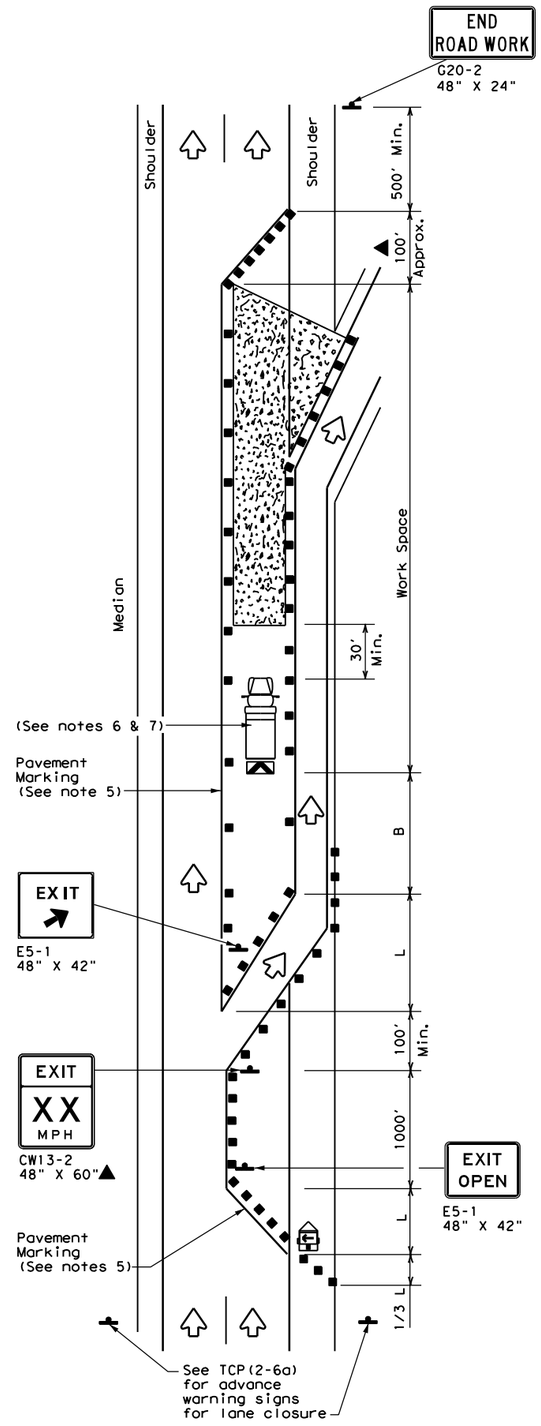


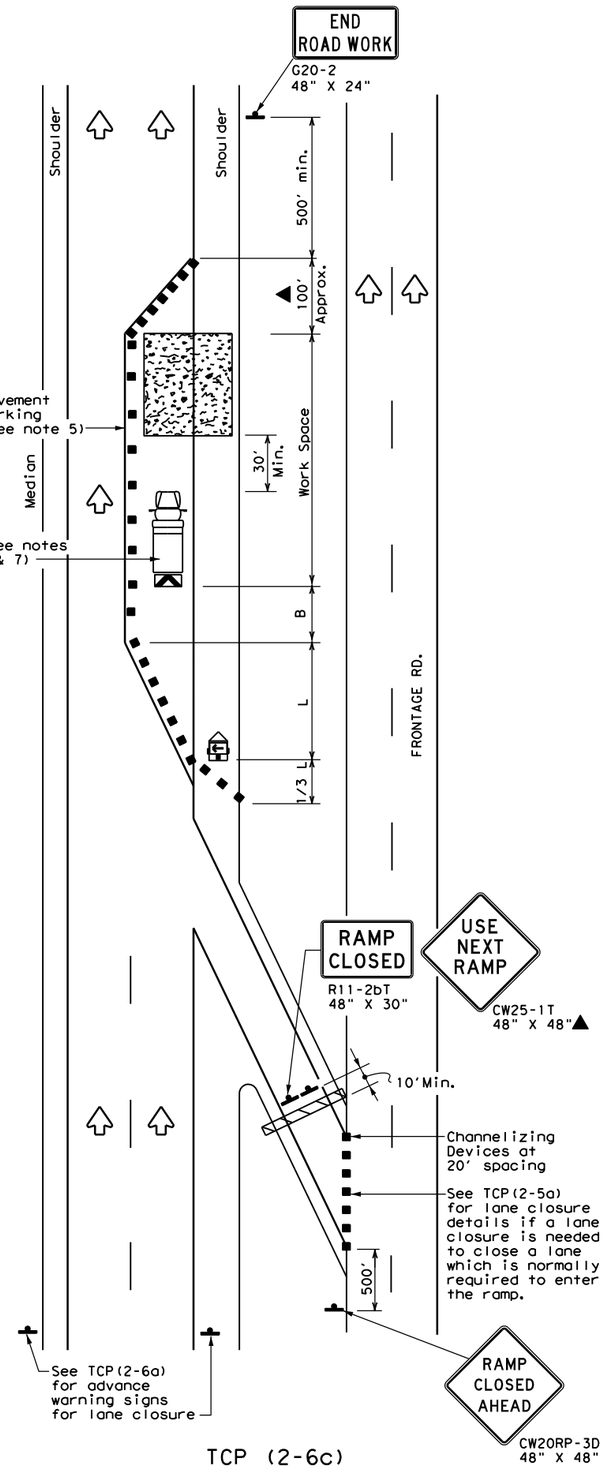
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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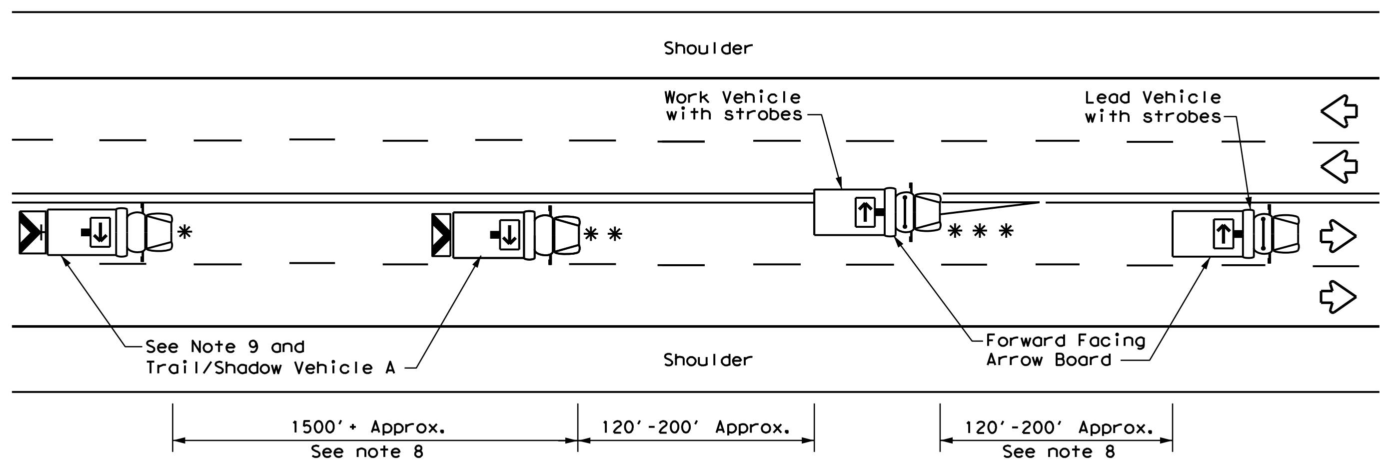
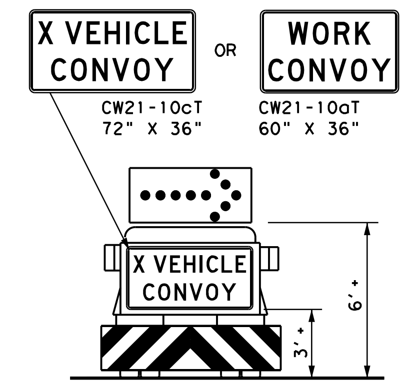
	SAT	FRIO		33



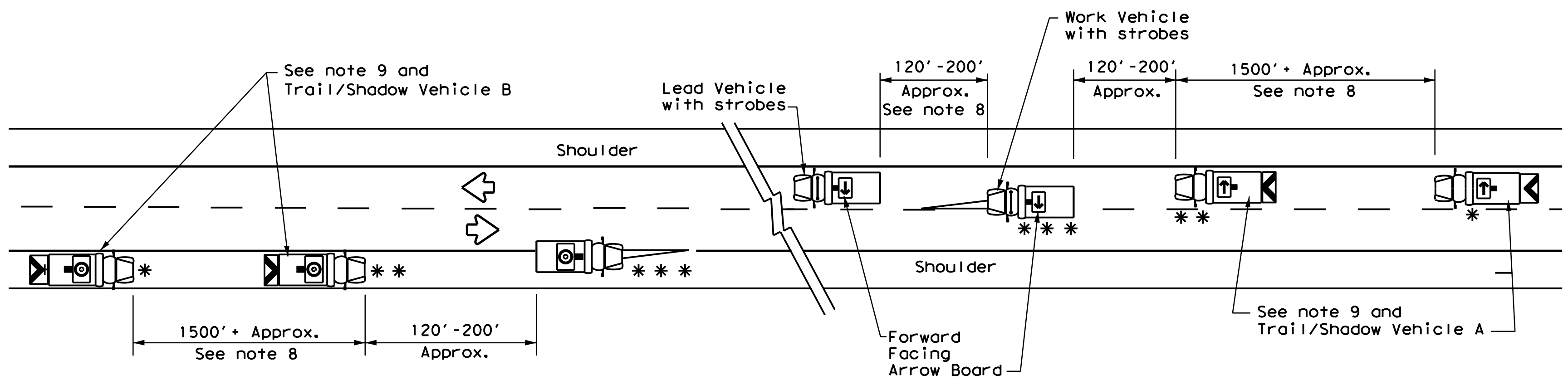
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

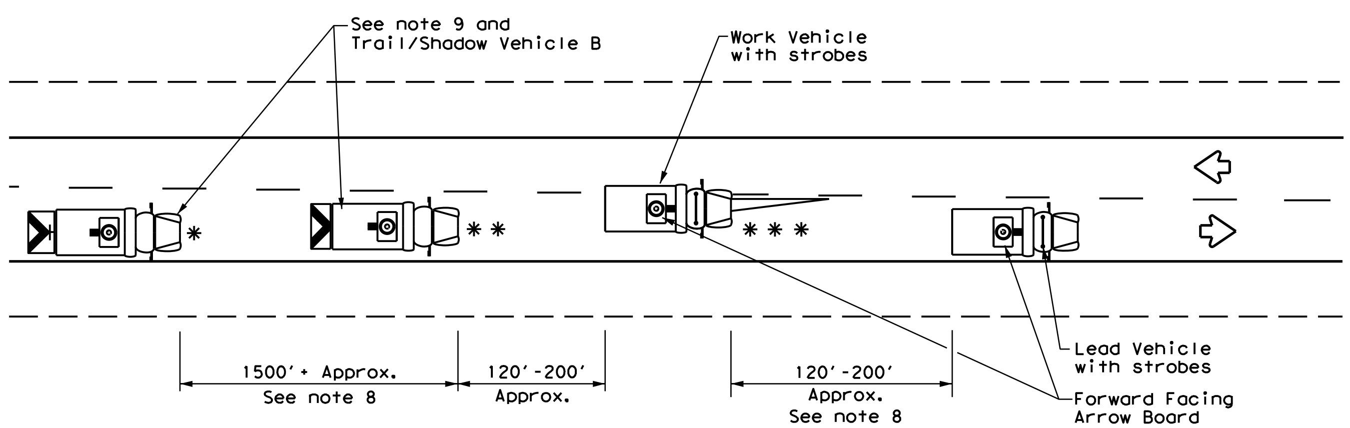


WORK ON SHOULDER

WORK ON TRAVEL LANE

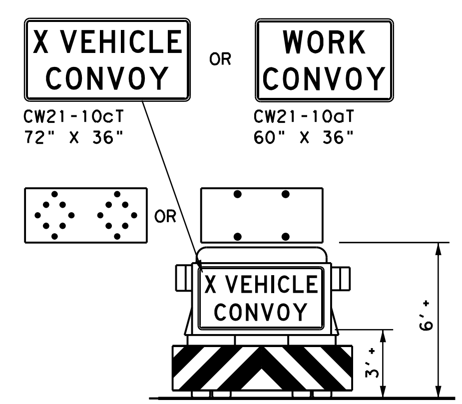
TCP (3-1b)

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

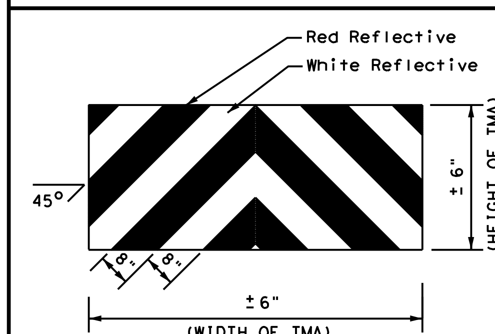
LEGEND

			ARROW BOARD DISPLAY
*	Trail Vehicle		
**	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

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0017	06	086	IH 35
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	SAT		FRIO	34

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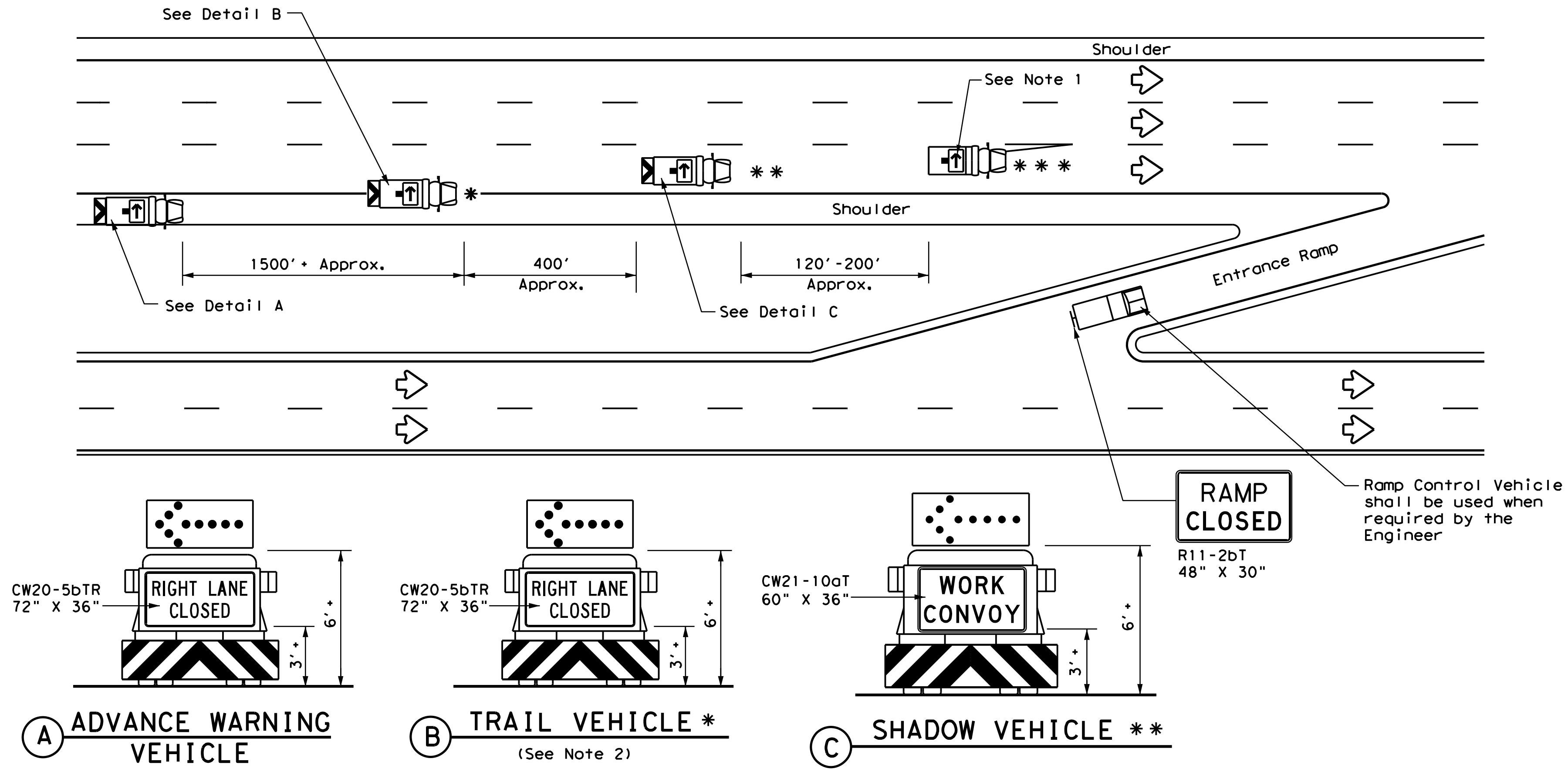
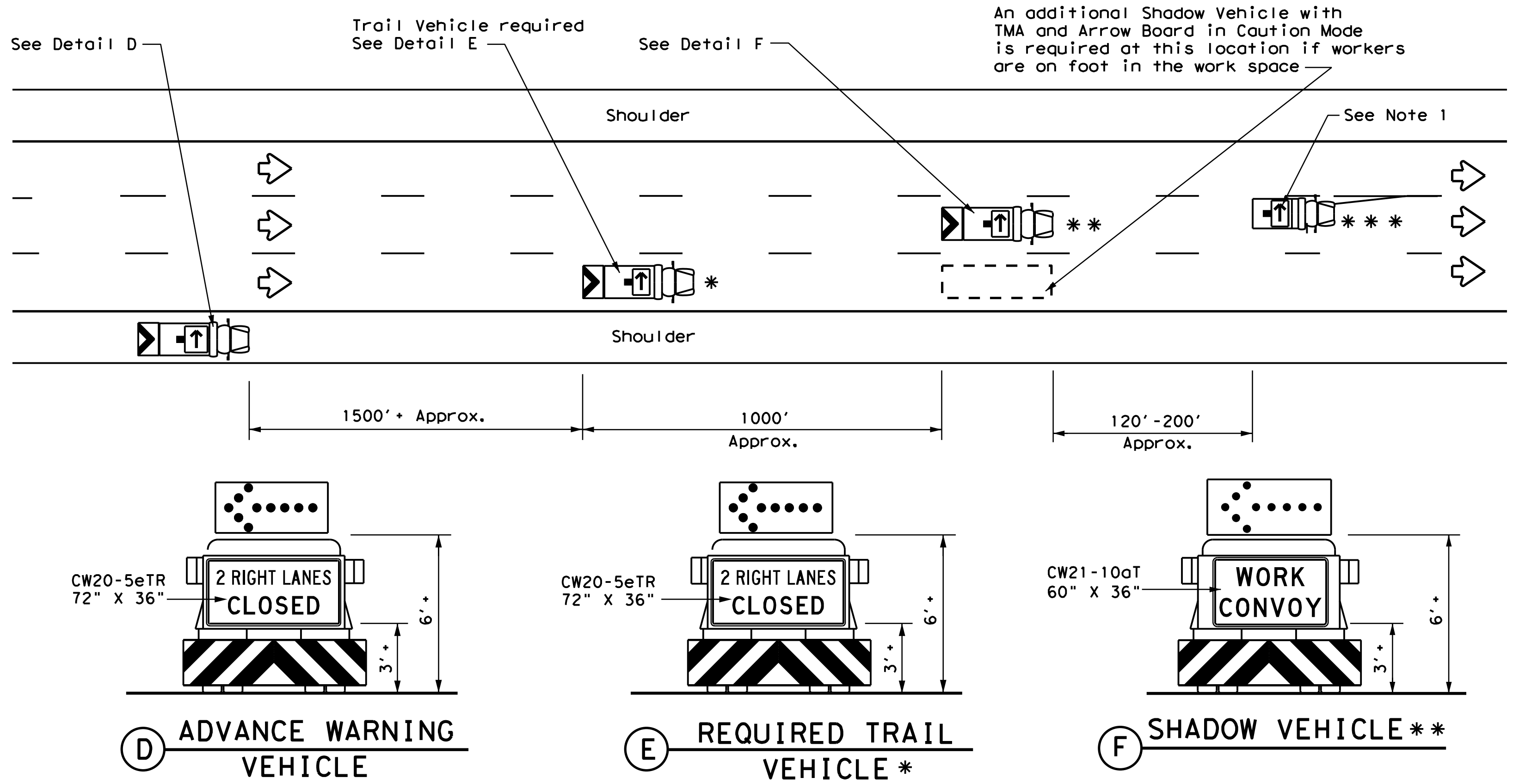


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP (3-2a)



INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP (3-2b)

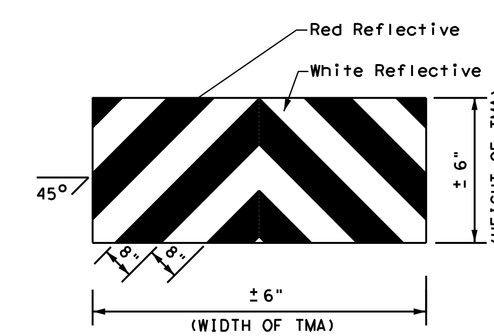
LEGEND

*	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. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. 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.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
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 may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP (3-2) -13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY	
REVISIONS 2-94 4-98 8-95 7-13 1-97	0017	06	086	IH 35	
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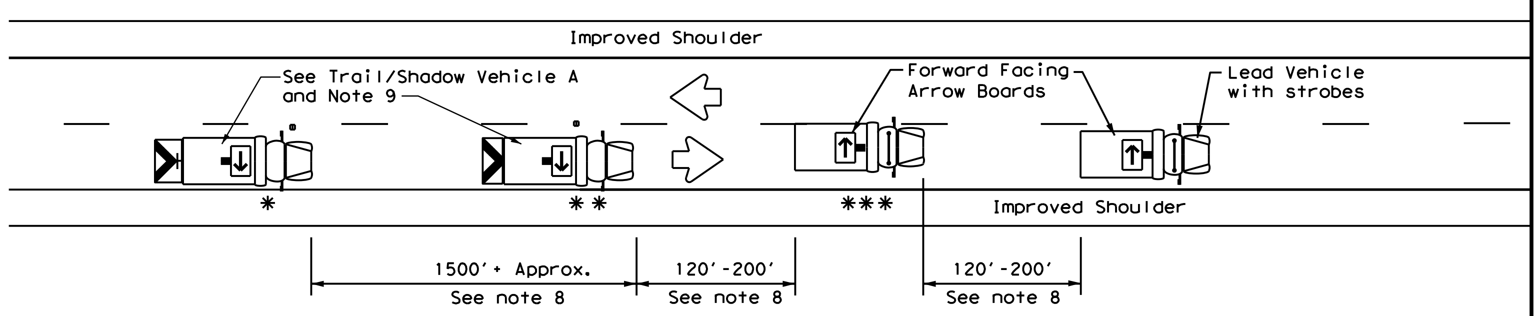
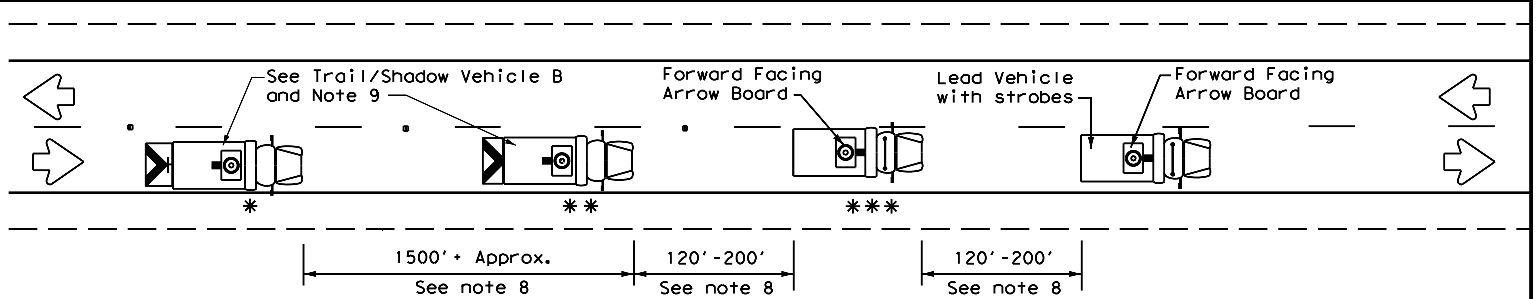


TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS

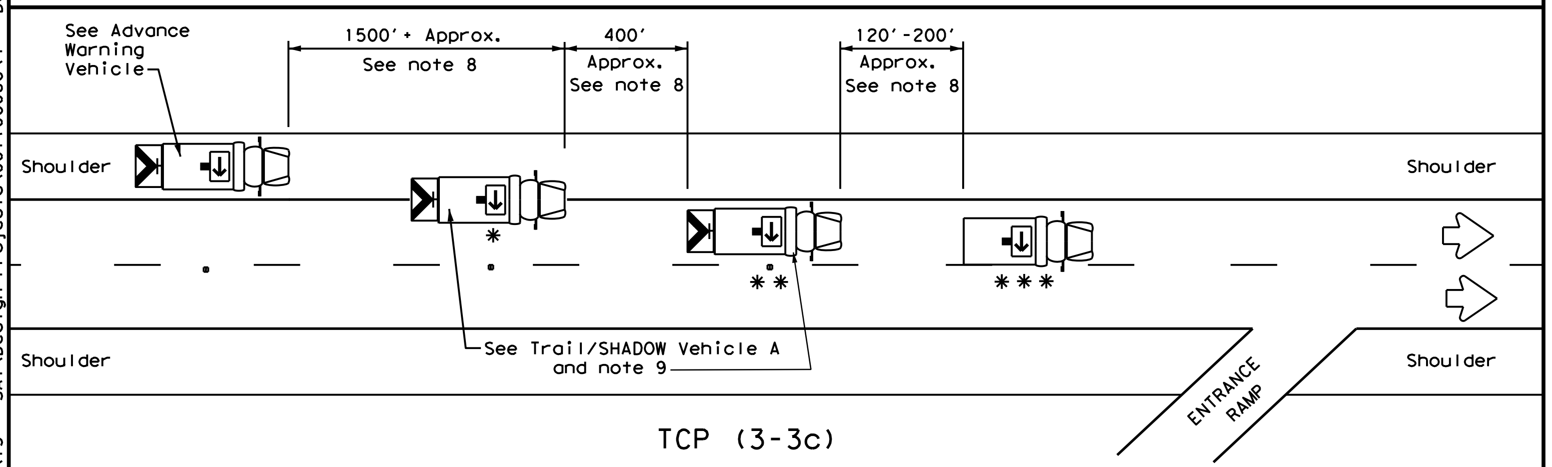
(WORK ON TRAVEL LANE)



TCP (3-3b)

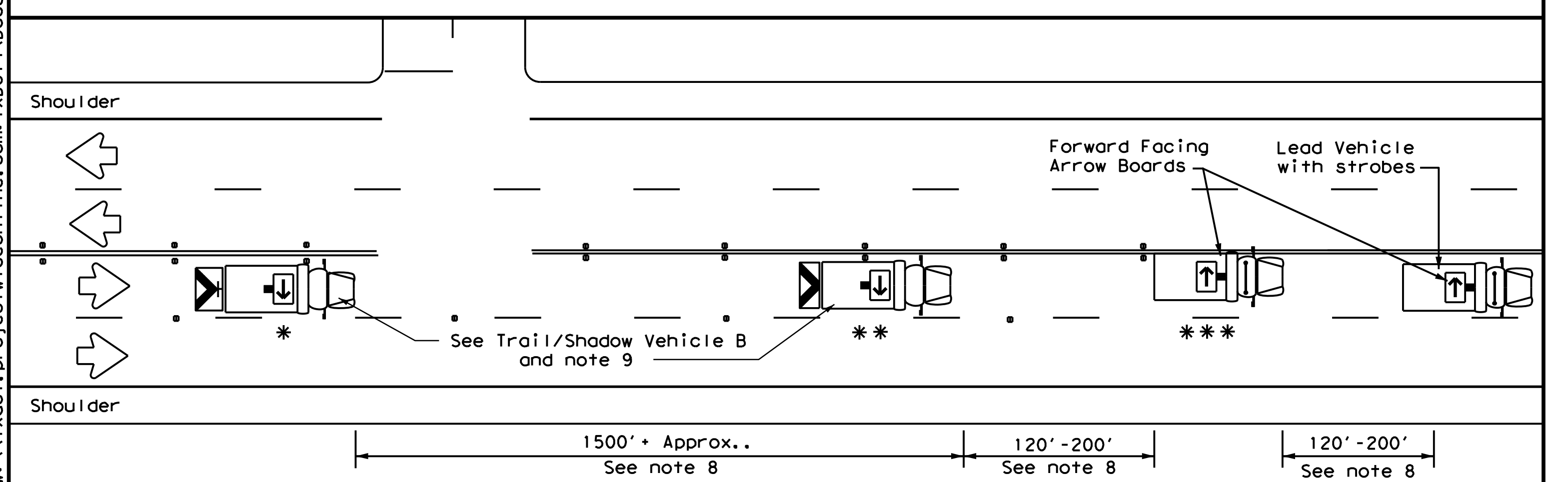
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS

(WORK ON TRAVEL LANE)



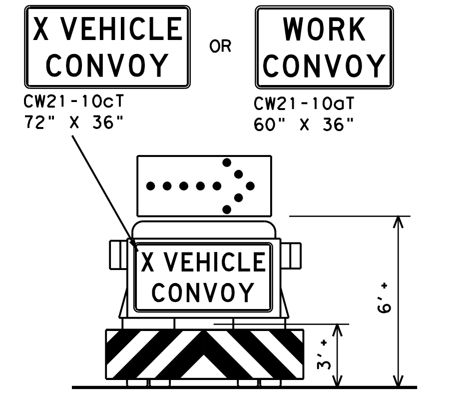
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



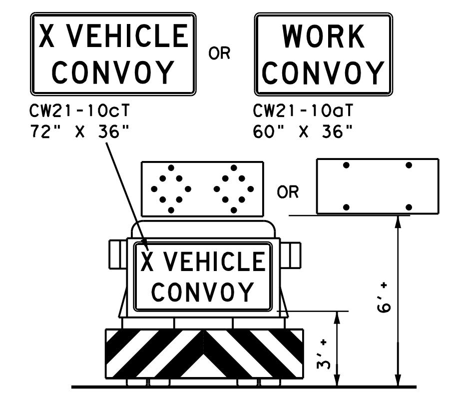
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



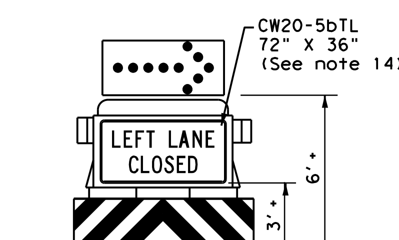
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

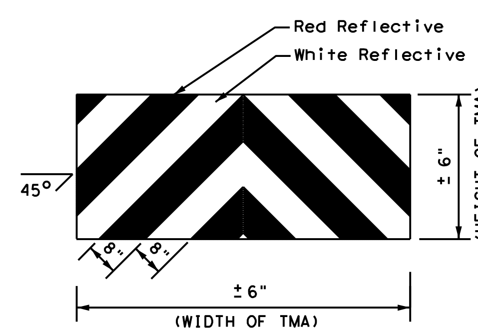


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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2-94 4-98 / 8-95 7-13 / 1-97 7-14	DIST		COUNTY	SHEET NO.
	SAT		FRIO	36

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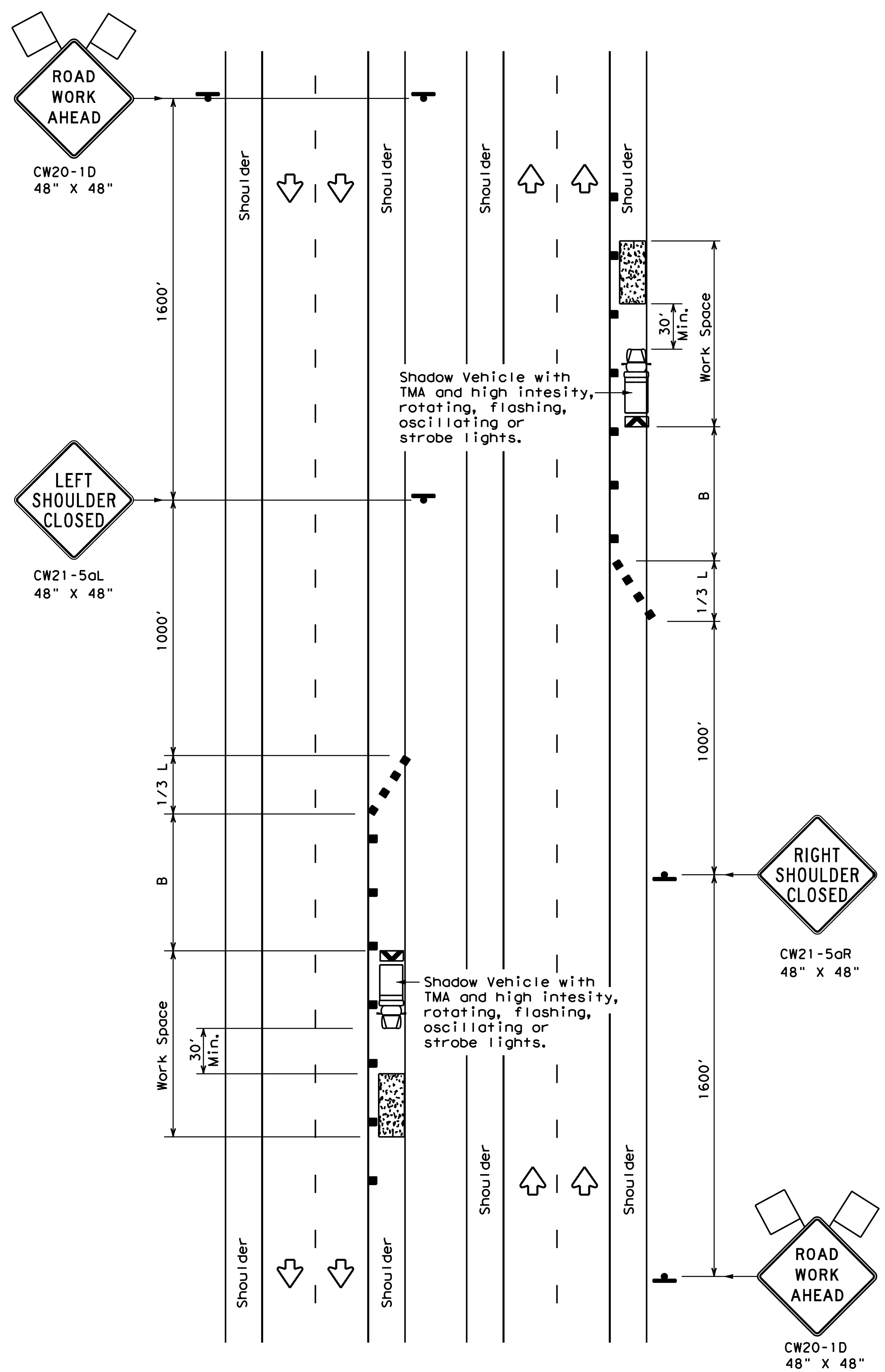
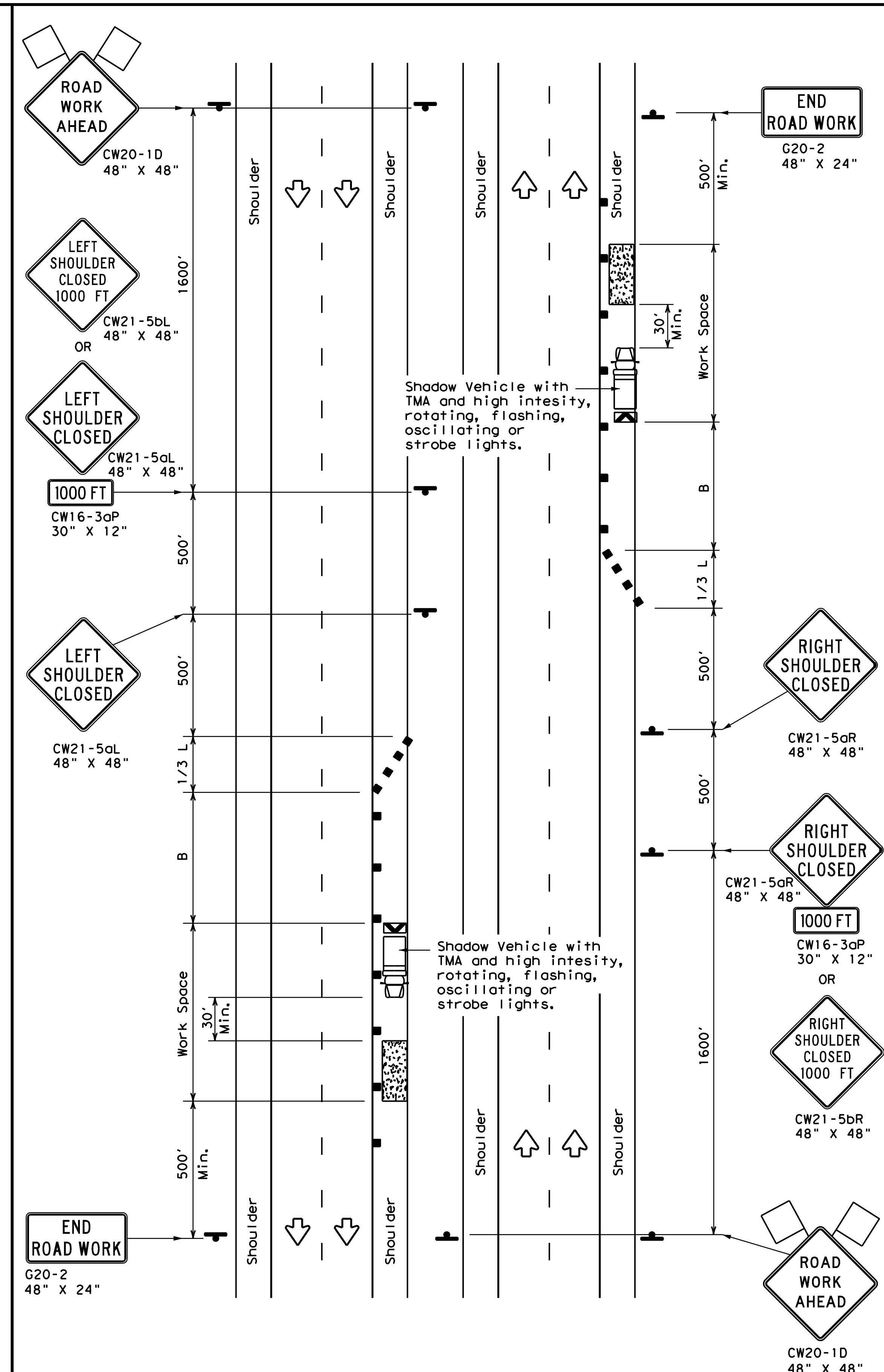


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	$L = WS$	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.

2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
2-18	DIST		COUNTY	SHEET NO.
	SAT		FRIO	37

DATE: 10/30/2023 11:28:00 AM
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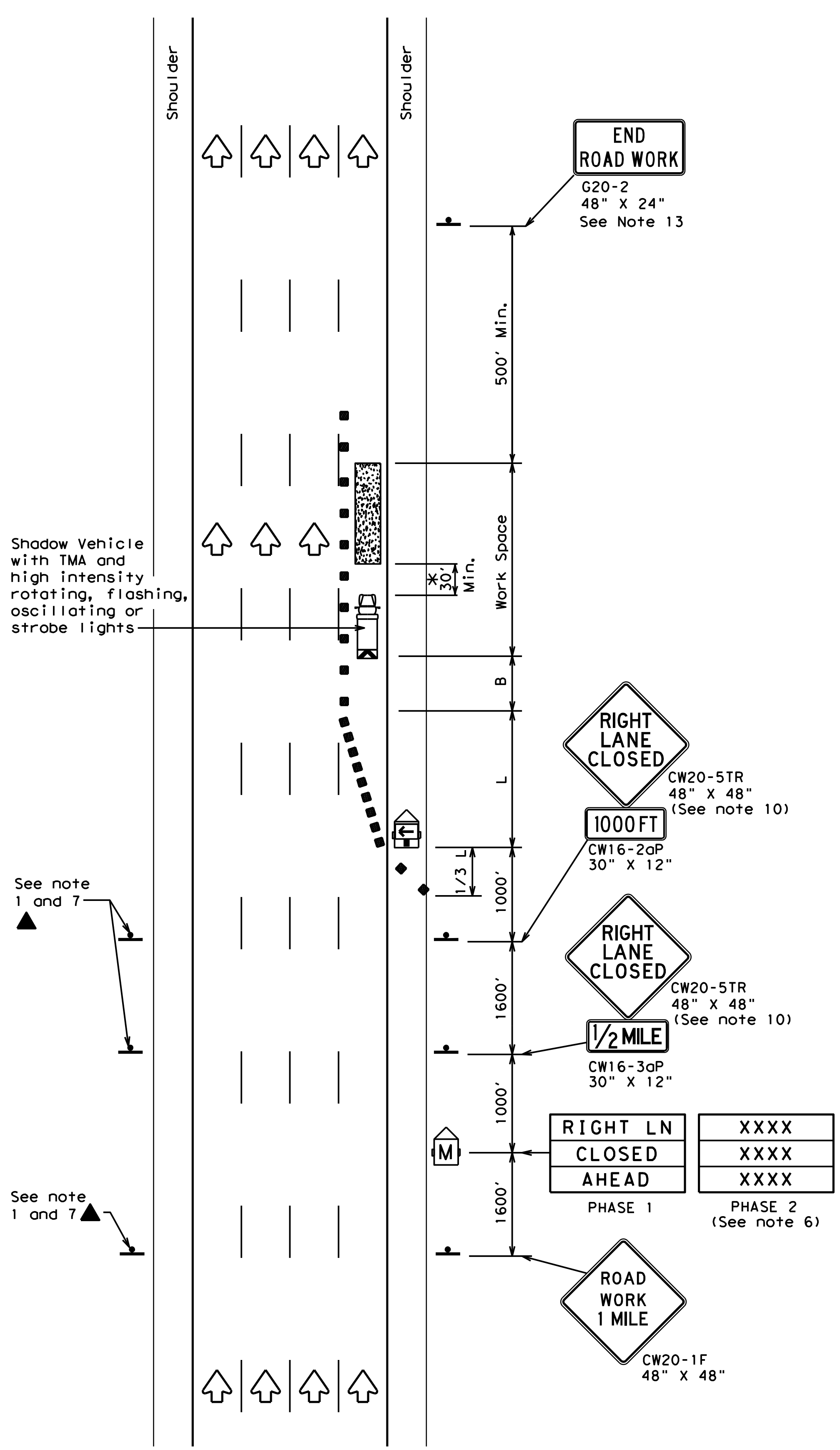
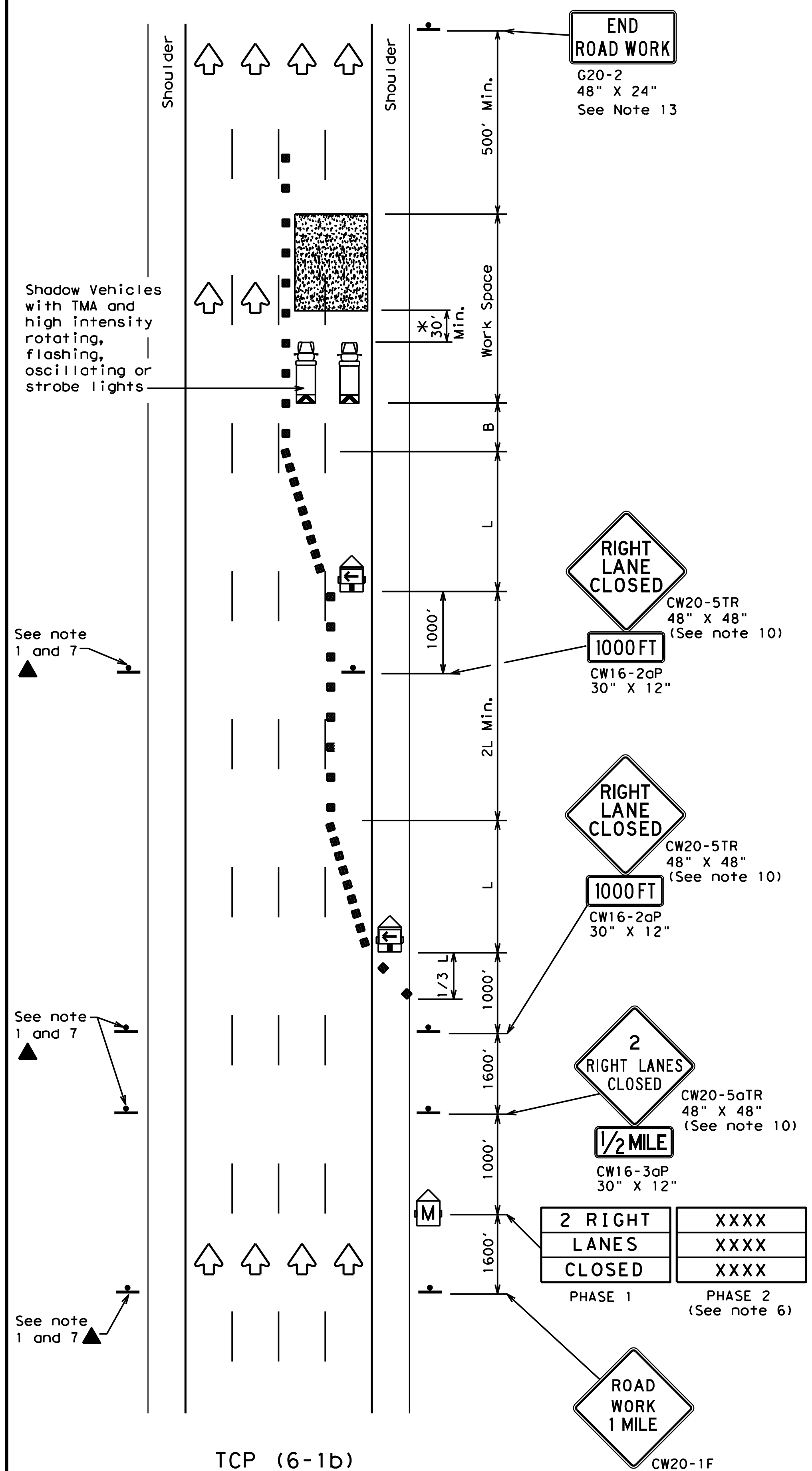


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L = WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		38

201

DATE: 10/30/2023 11:28:06 AM
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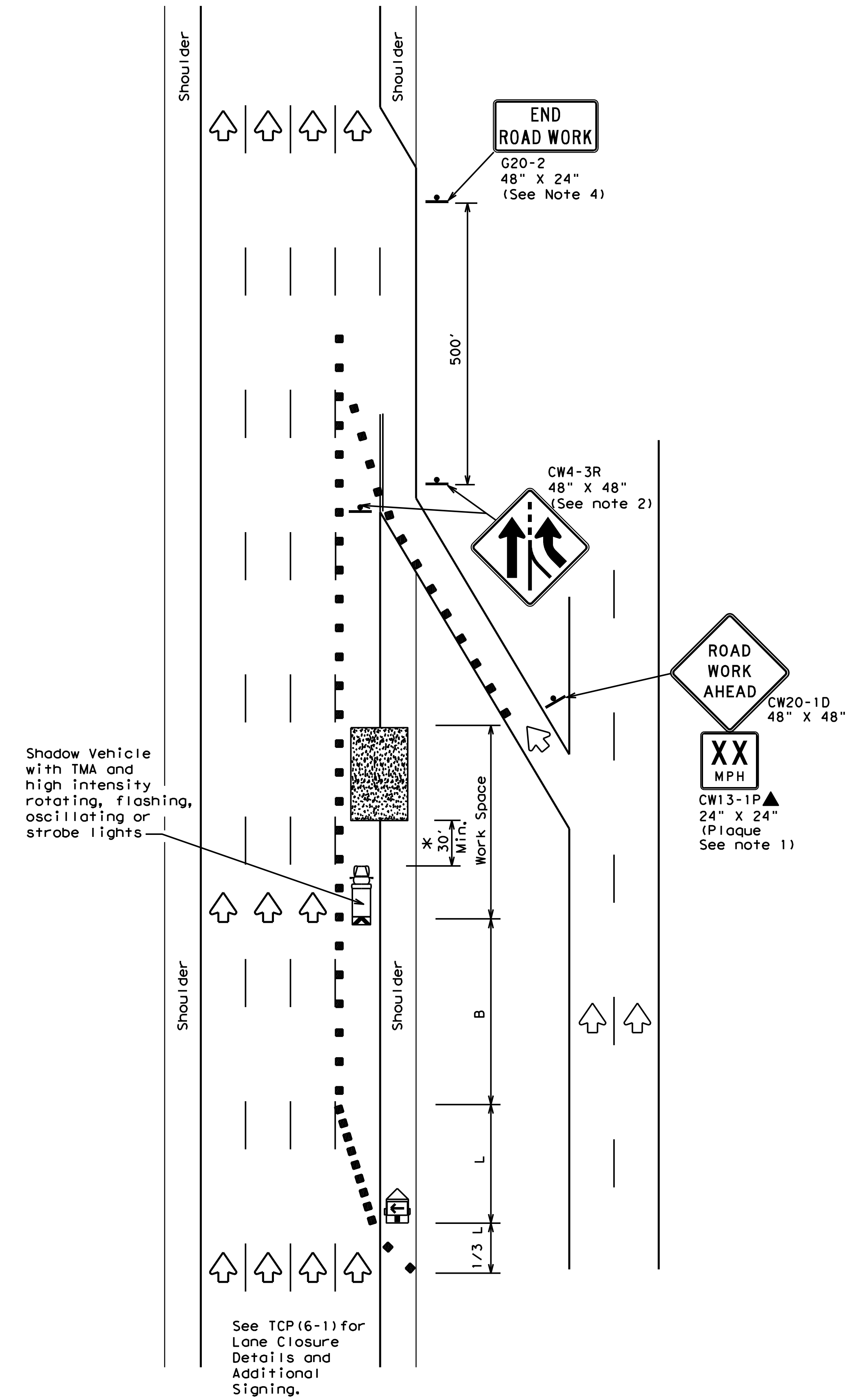
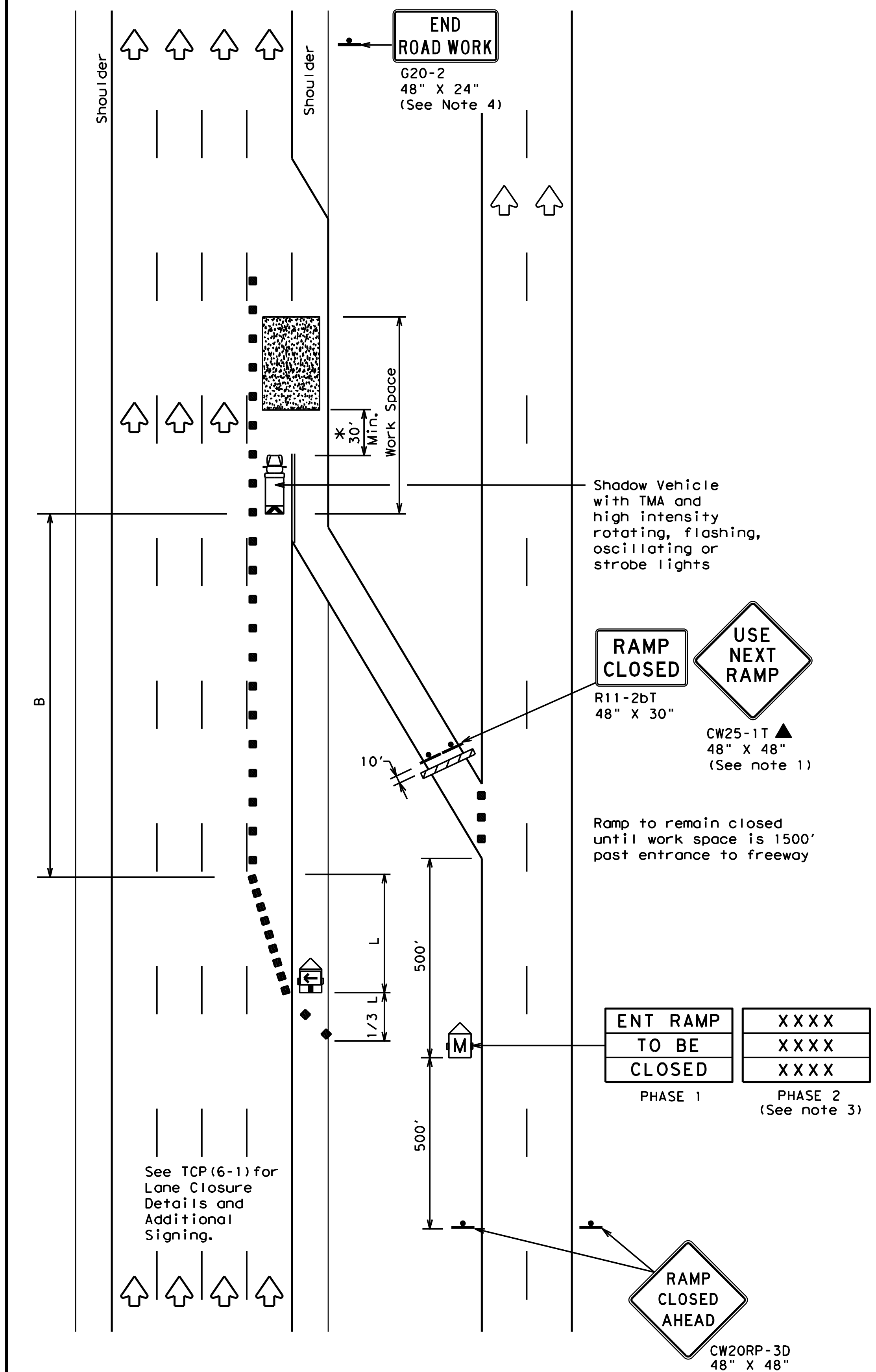


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
1-97 8-98	DIST		COUNTY	SHEET NO.
4-98 8-12	SAT		FRIO	39

202

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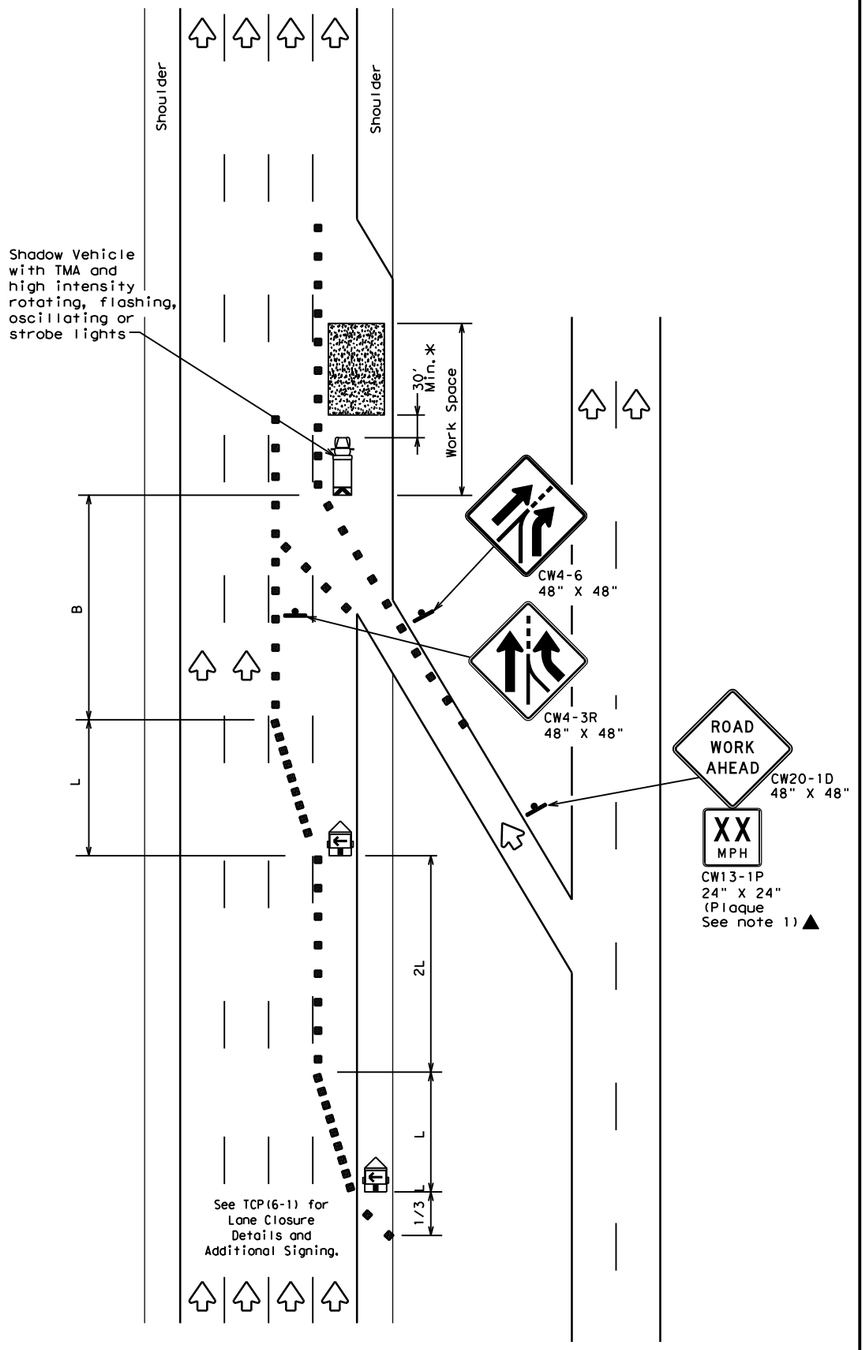
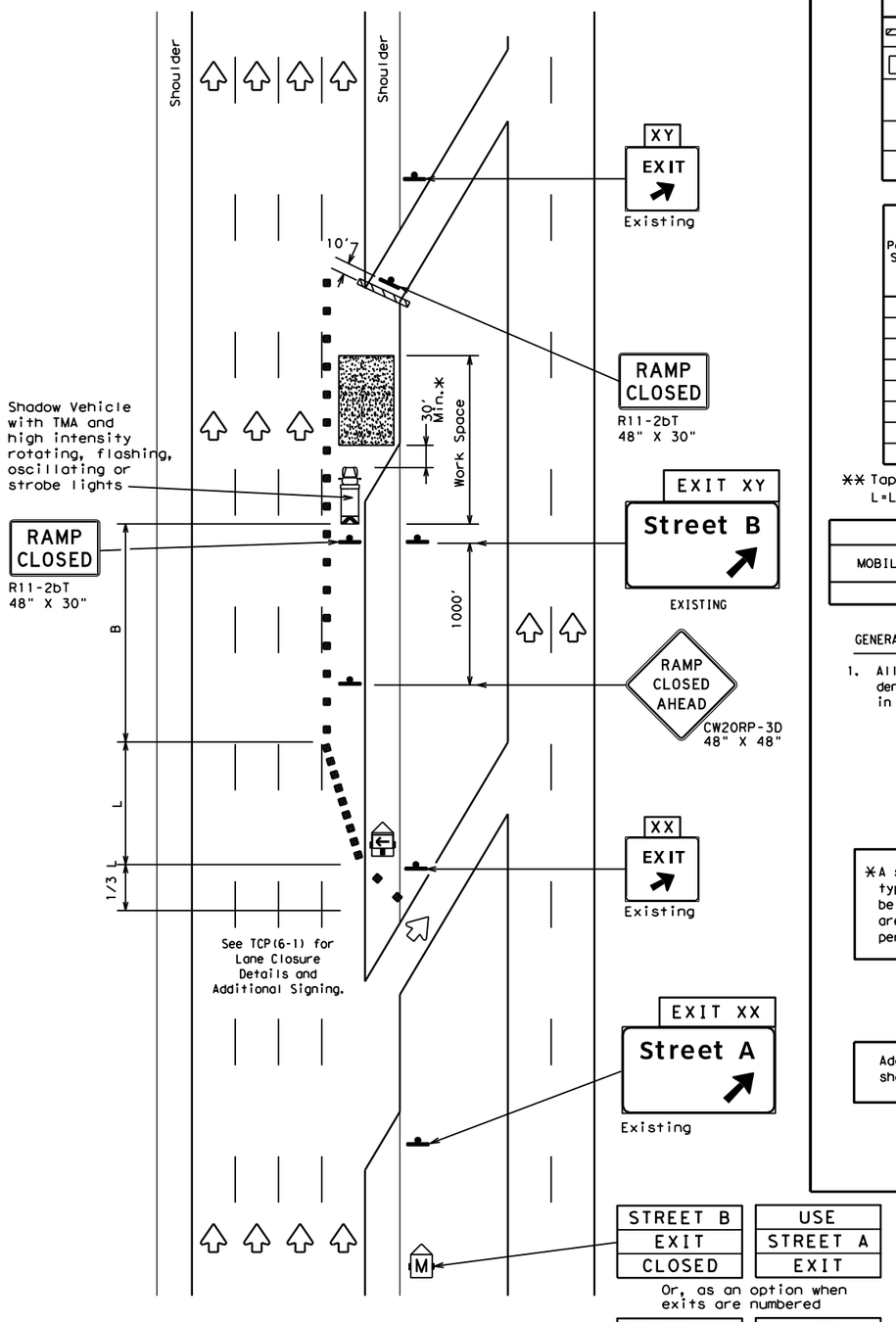


TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES:

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
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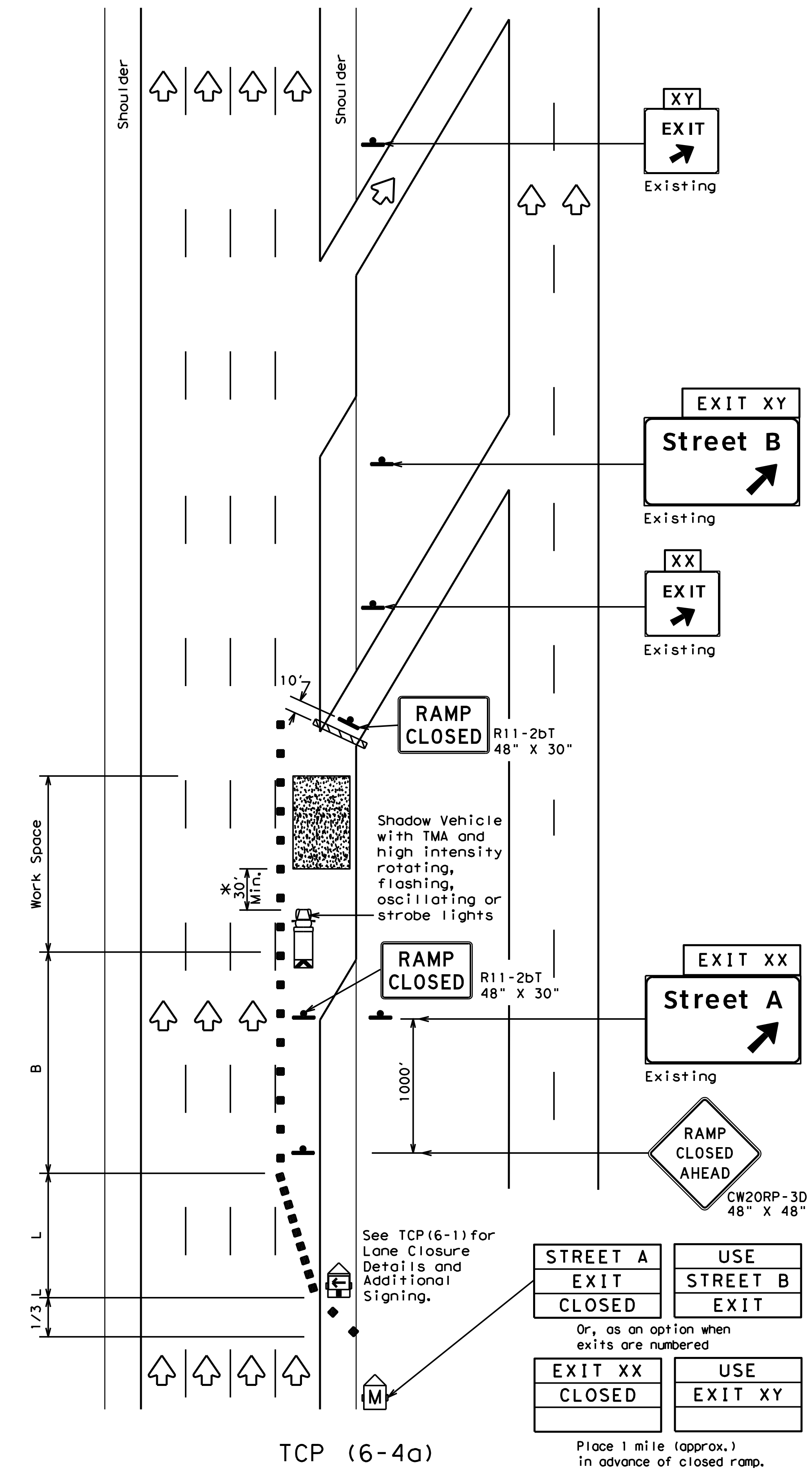
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	FRIO		40

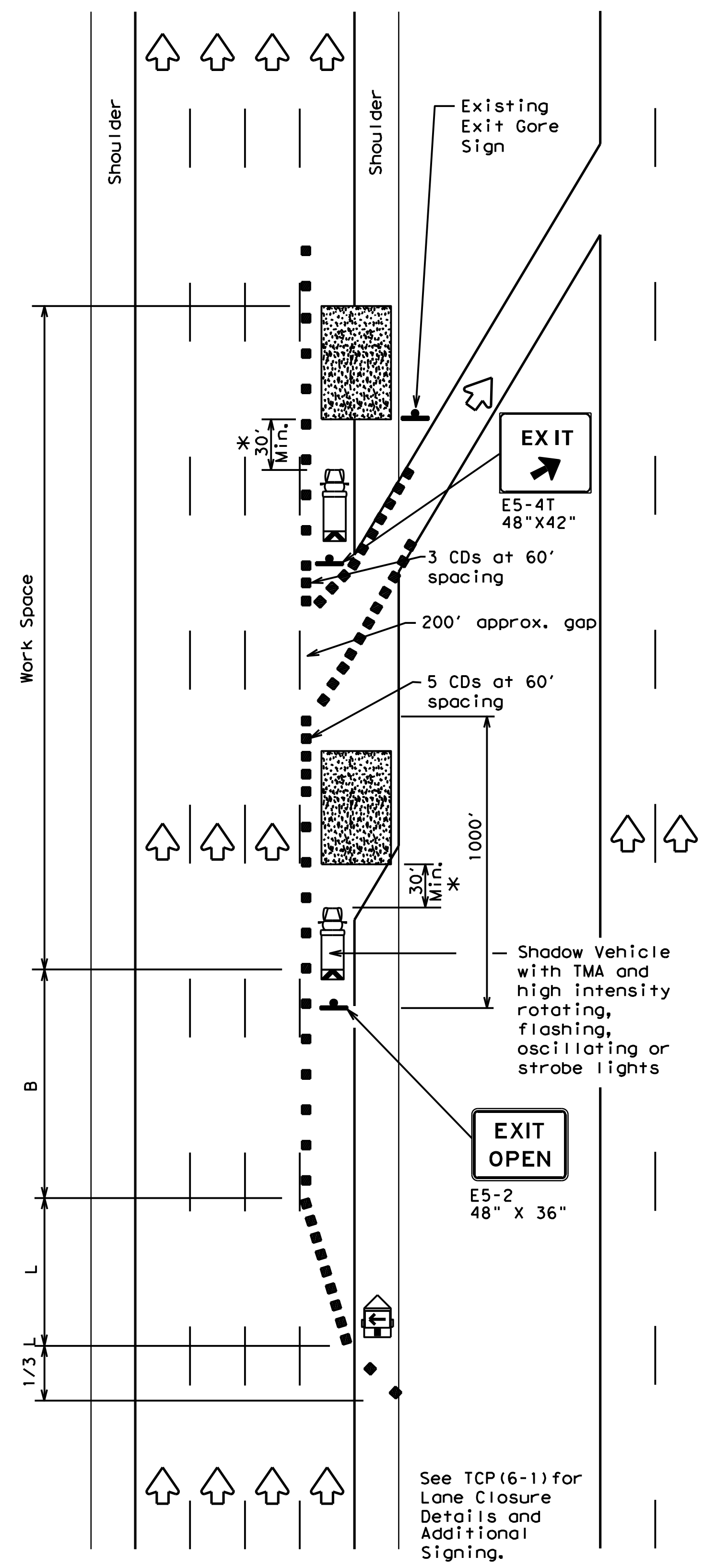
203



TCP (6-4a)

EXIT RAMP CLOSED

TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

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

2. See BC Standards for sign details.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN WORK AREA AT EXIT RAMP

TCP(6-4)-12

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©TxDOT February 1994	CONT 0017	SECT 06	JOB 086	HIGHWAY IH 35
REVISIONS 1-97 8-98 4-98 8-12	DIST SAT		COUNTY FRIO	SHEET NO. 41

204

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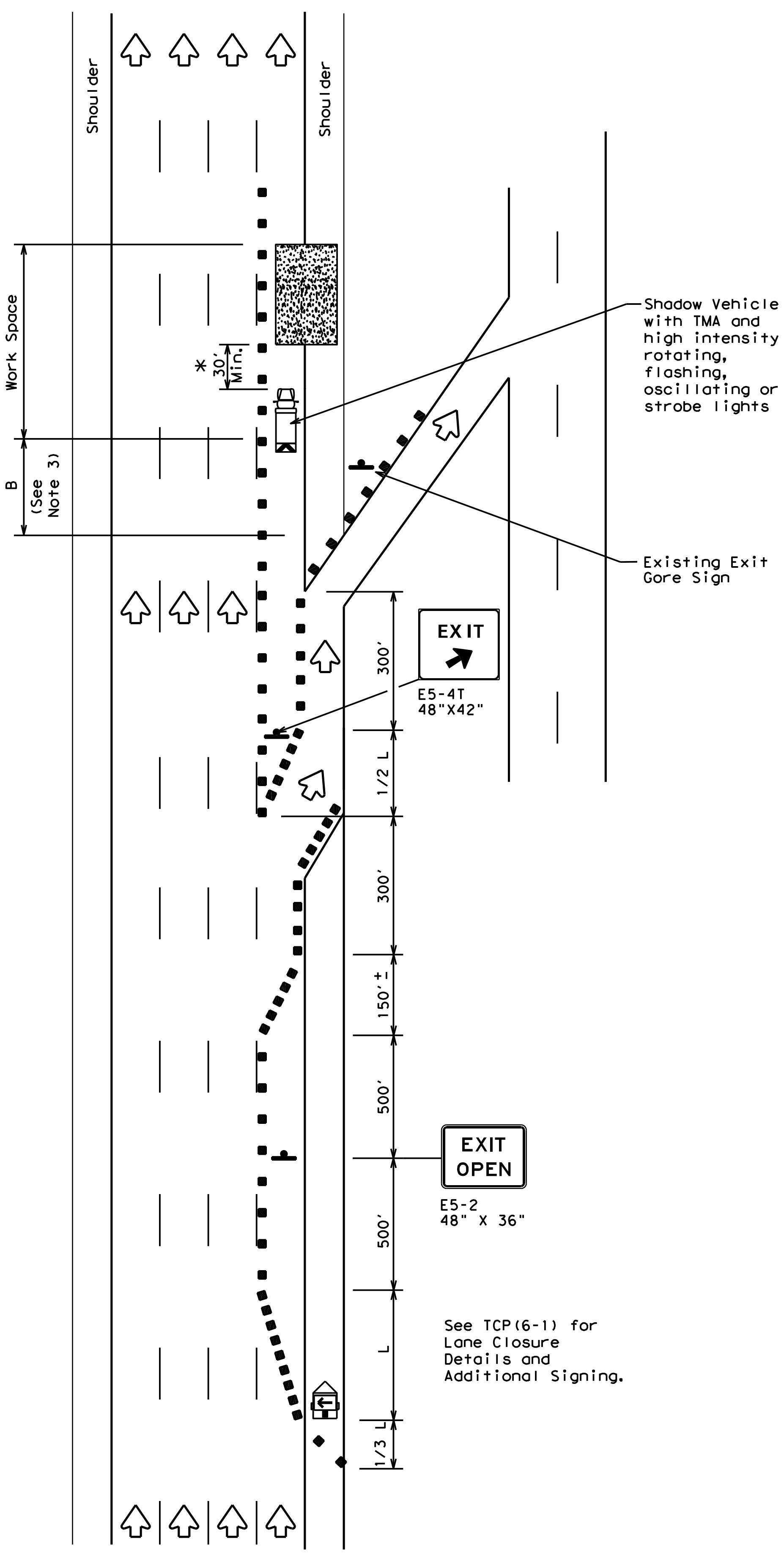
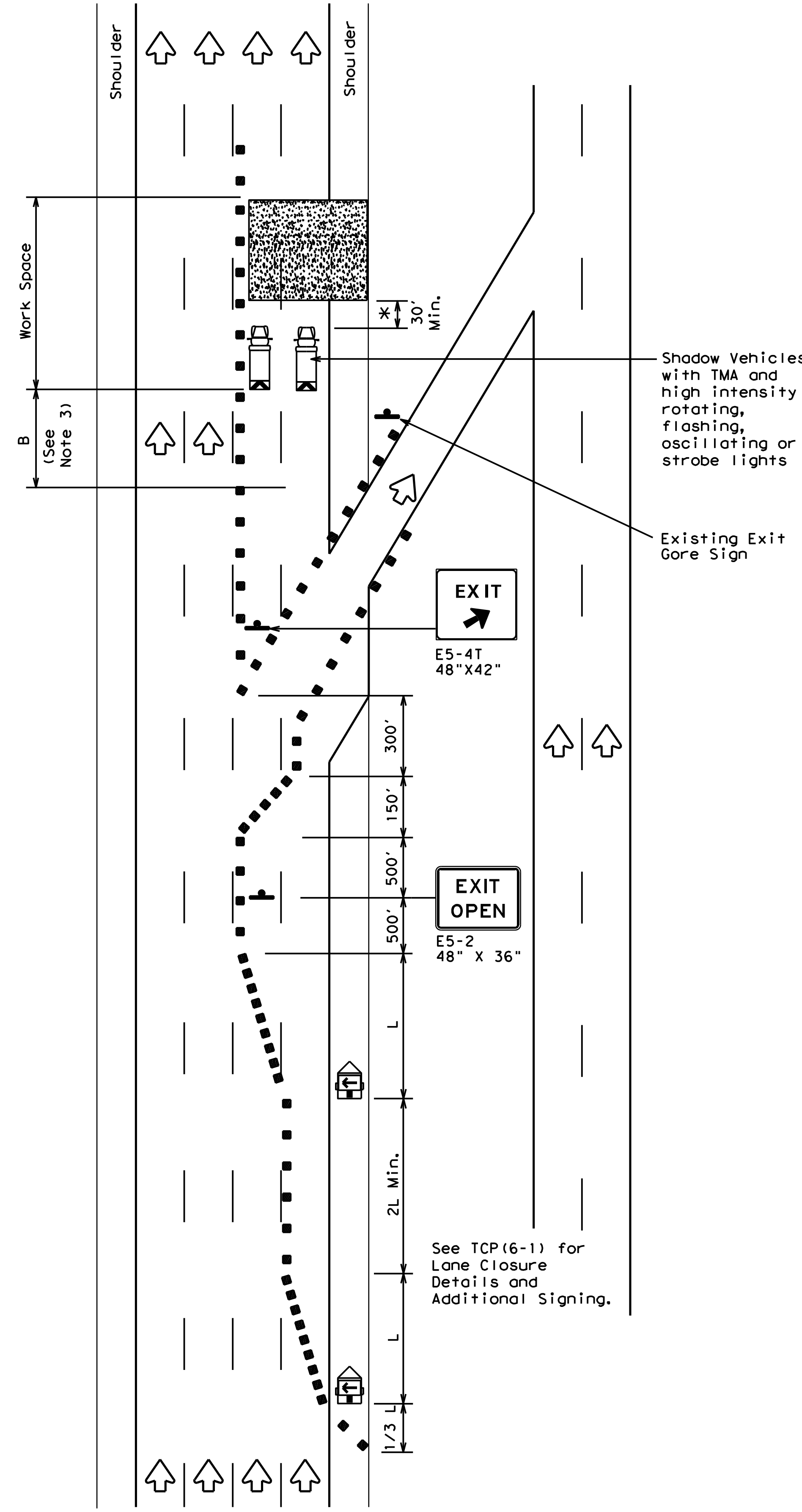


TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

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

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

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

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

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

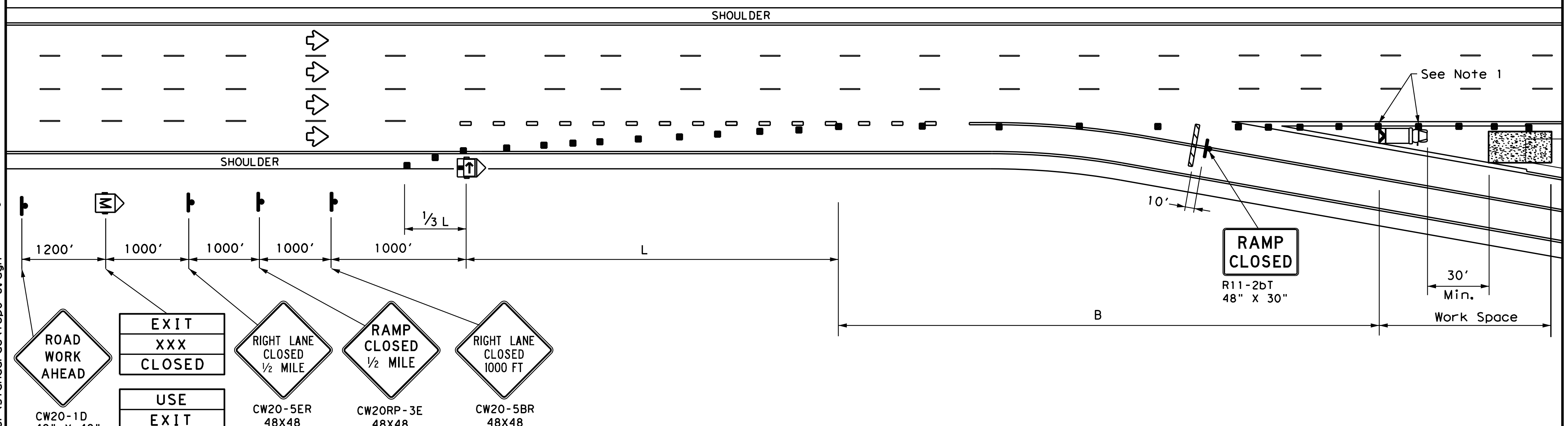
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

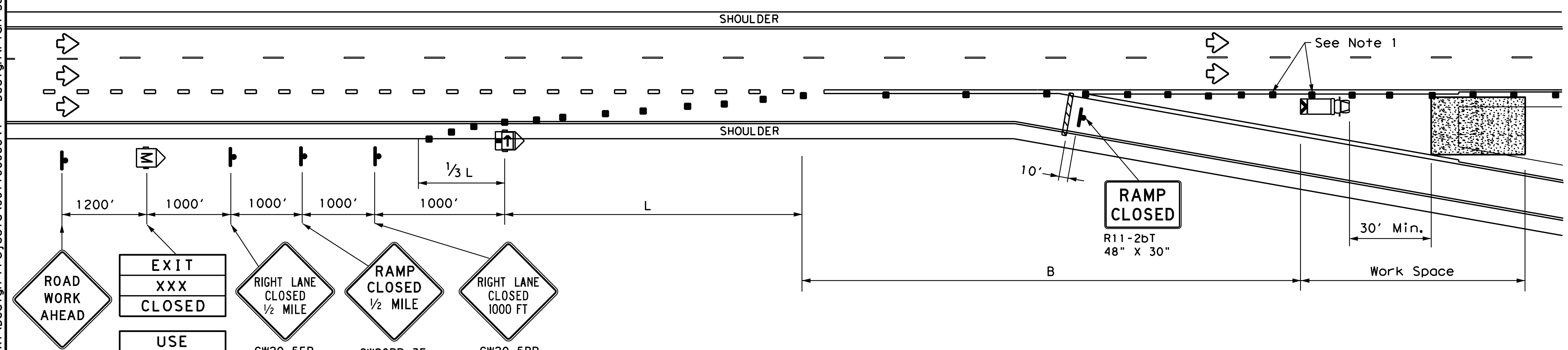
TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT 0017	SECT 06	JOB 086	HIGHWAY IH 35
REVISIONS 1-97 8-98 4-98 8-12	DIST SAT		COUNTY FRIO	SHEET NO. 42

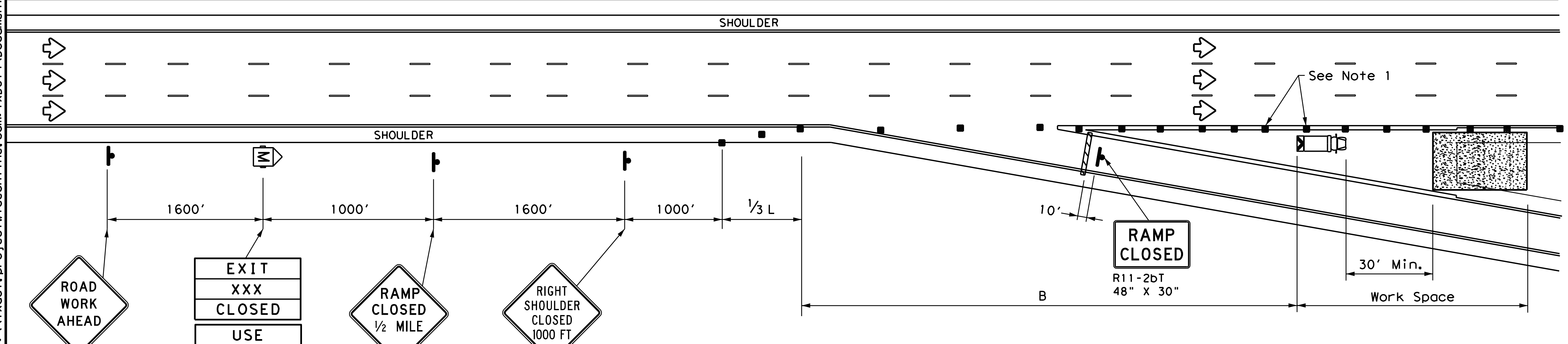
205



TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
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	DIST		COUNTY	SHEET NO.
	SAT		FRIO	43

208

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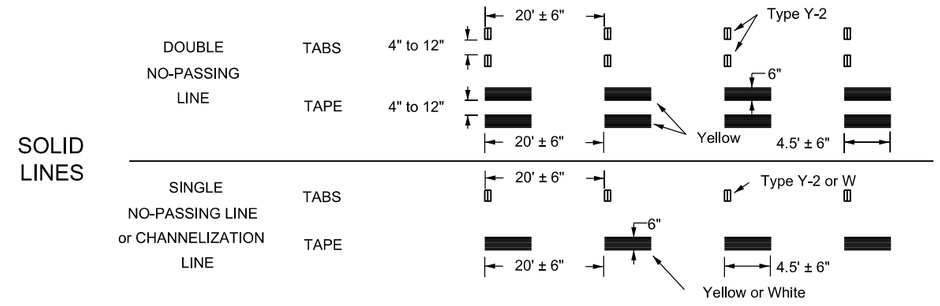
FILE: pw:\\txdot.projectwiseonline.com:TxDOT4\Documents\15 - SAT\Design Projects\0017060804 - Design\Plan Set\2. TCP\Standards\wzstpm-23.dgn

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



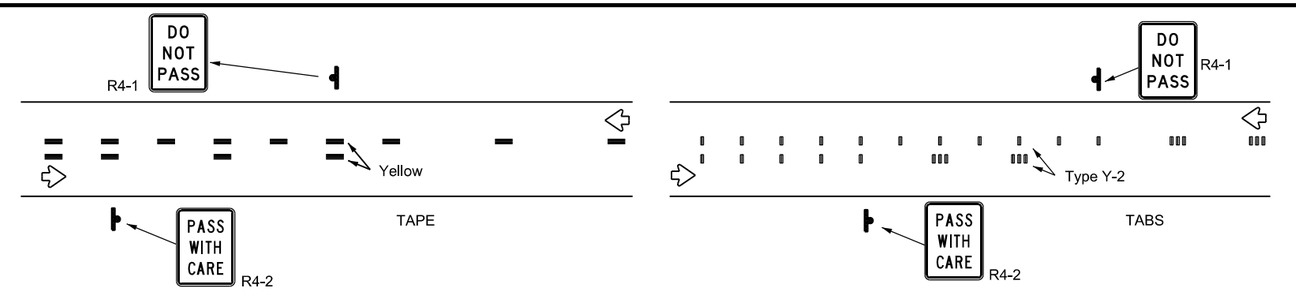
NOTES:

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.

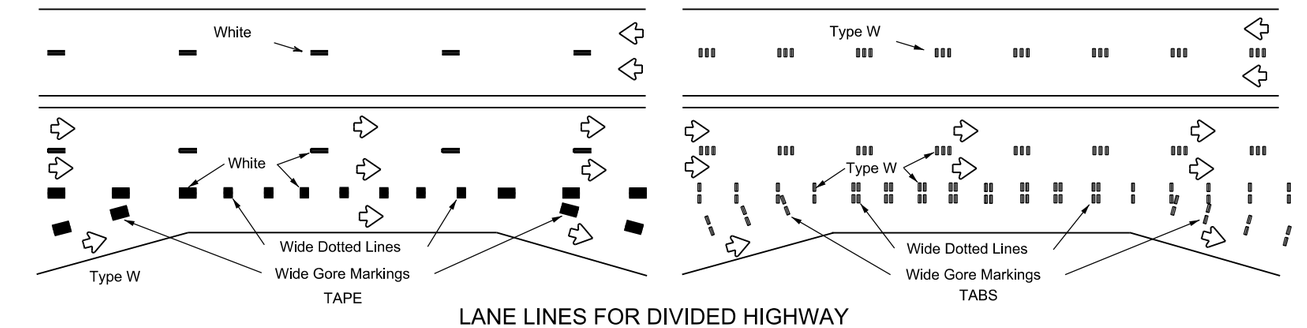
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

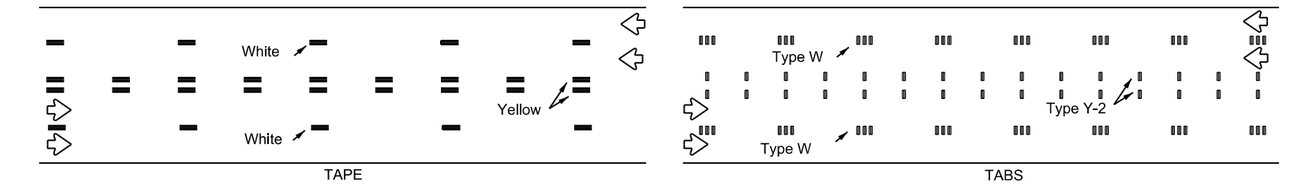
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



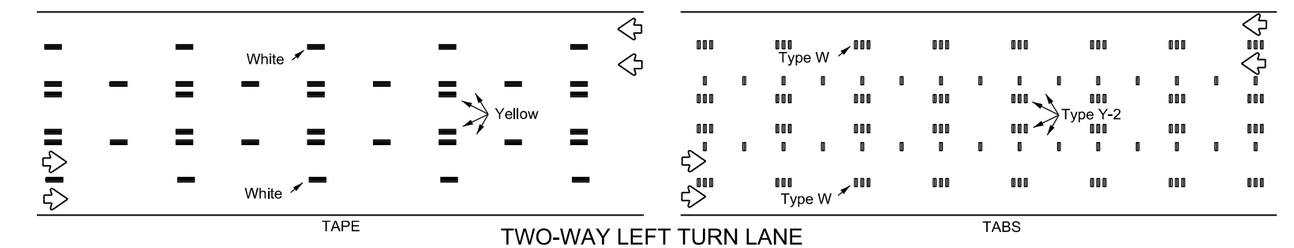
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



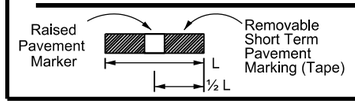
LANE LINES FOR DIVIDED HIGHWAY



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 Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	SAT	FRIO		44

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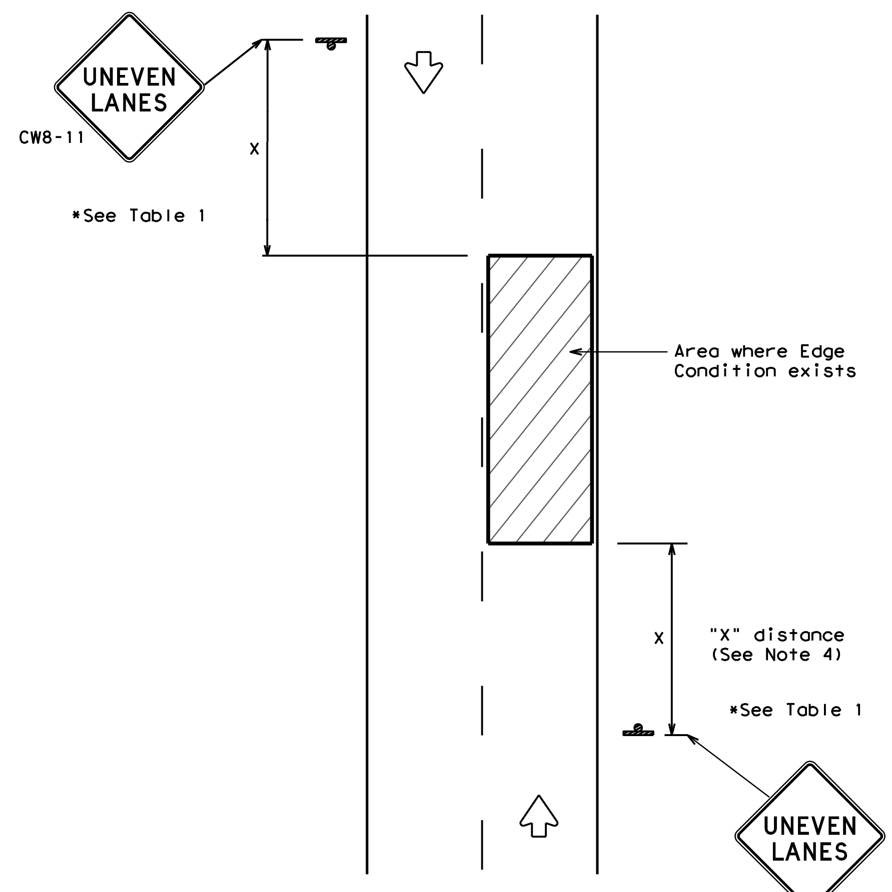
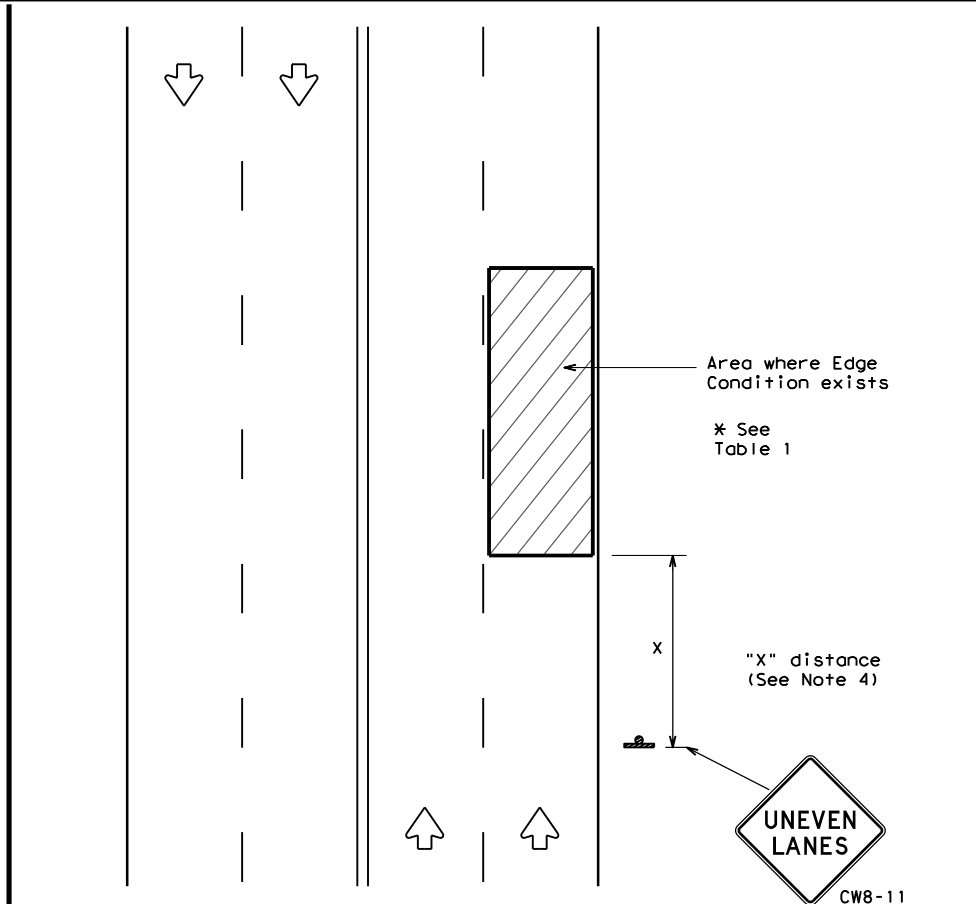
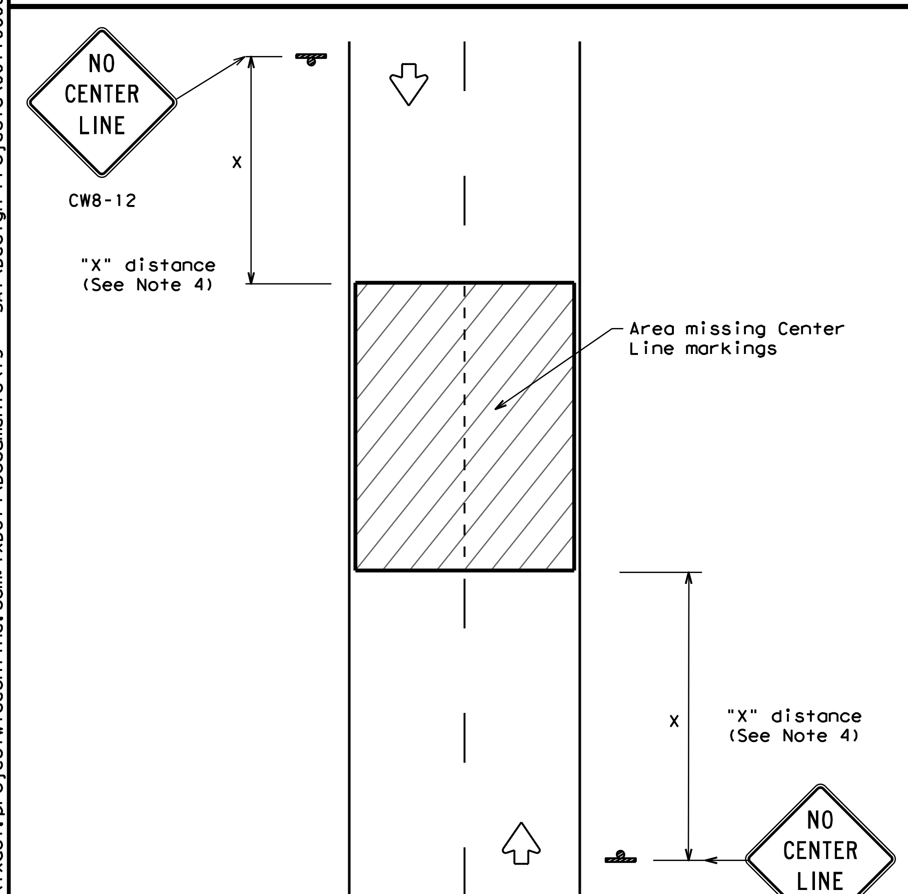


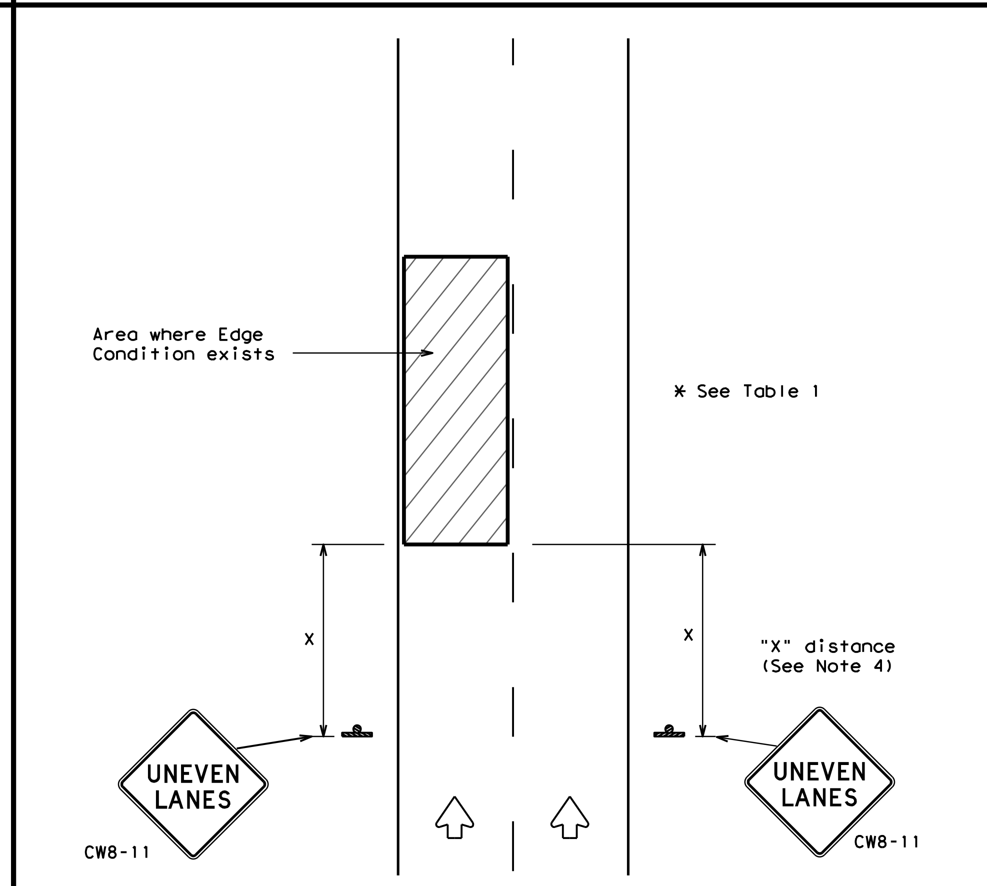
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① (D)	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② (>3, 1, D)	Less than or equal to 3"	Sign: CW8-11
③ (0" to 3/4", D, 12") Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation
Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
8-95 2-98 7-13 1-97 3-03	DIST		COUNTY	SHEET NO.
	SAT		FRIO	45

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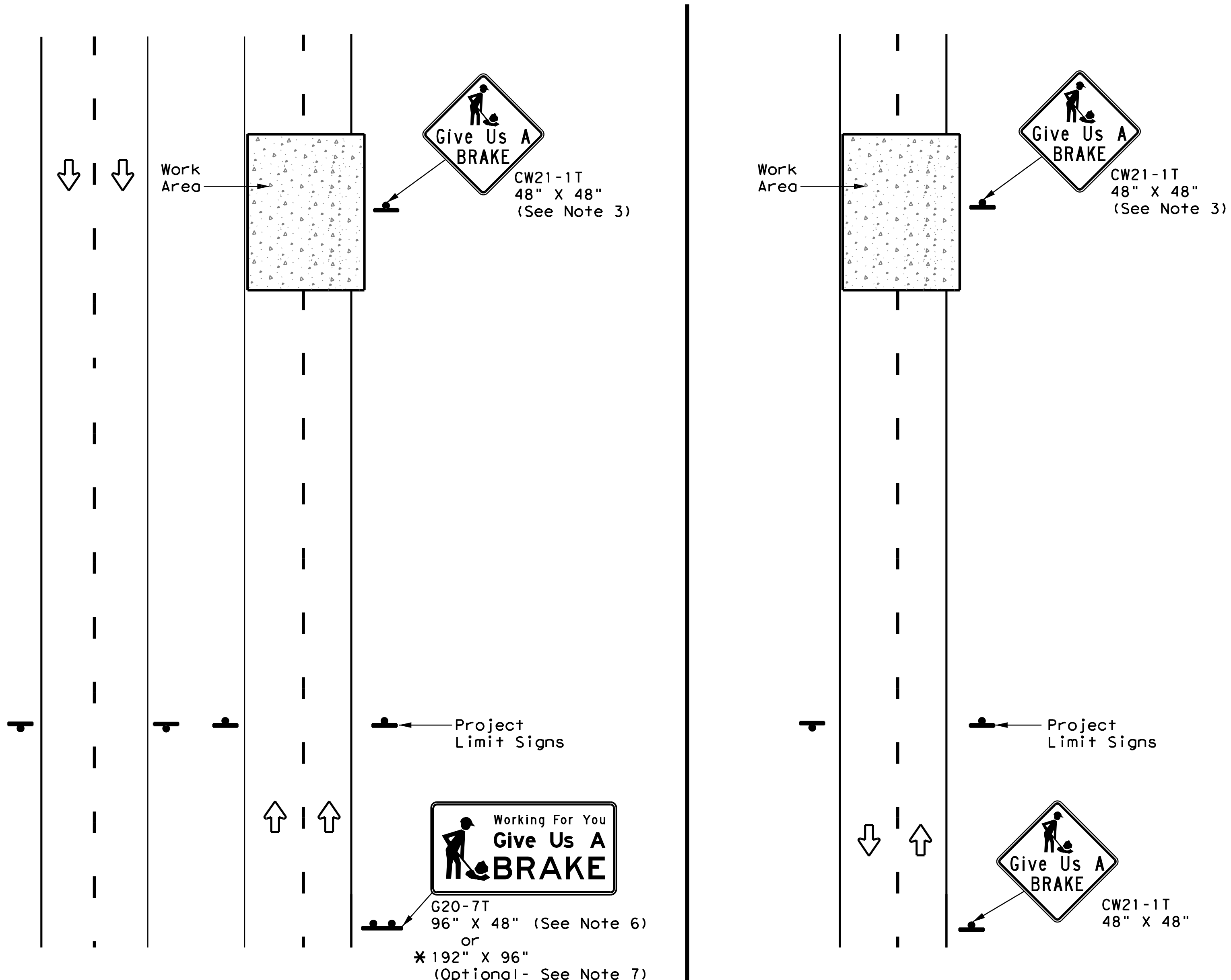

DIVIDED HIGHWAY

UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

LEGEND	
(symbol)	Sign
(symbol)	Large Sign
(symbol)	Traffic Flow

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT 0017	SECT 06	JOB 086	HIGHWAY IH 35
REVISIONS 6-96 5-98 7-13 8-96 3-03	DIST SAT		COUNTY FRIO	SHEET NO. 46

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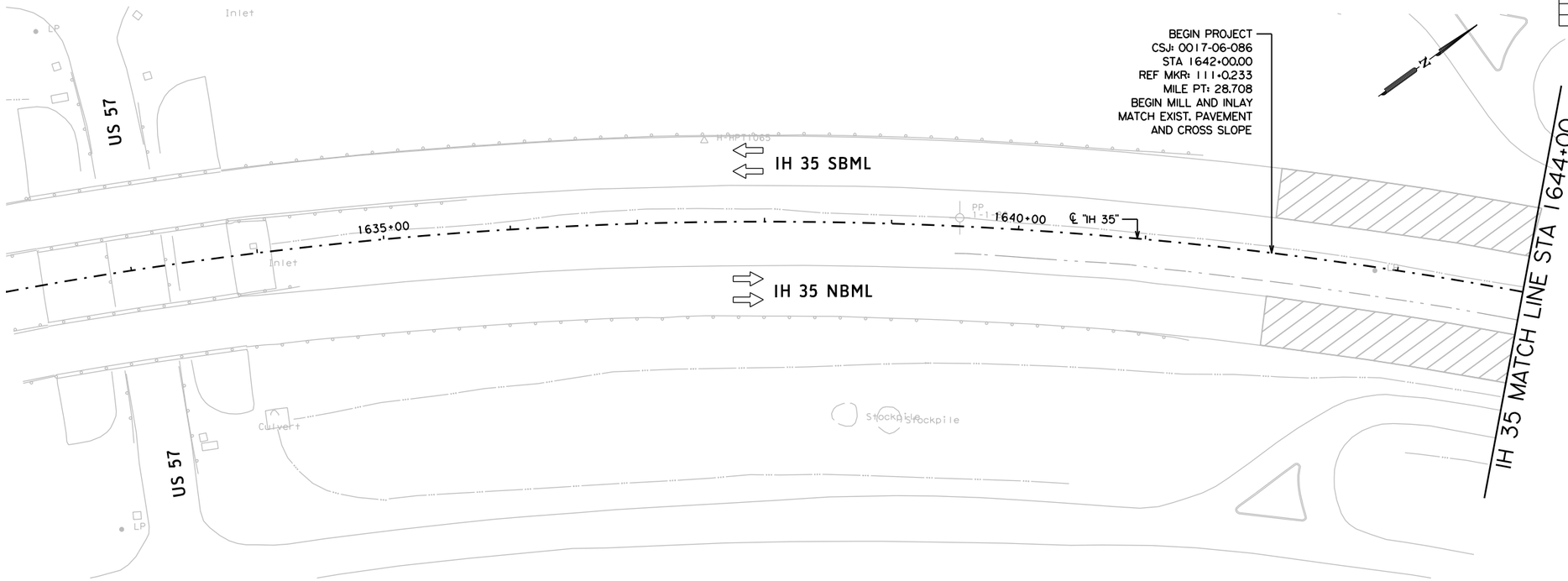
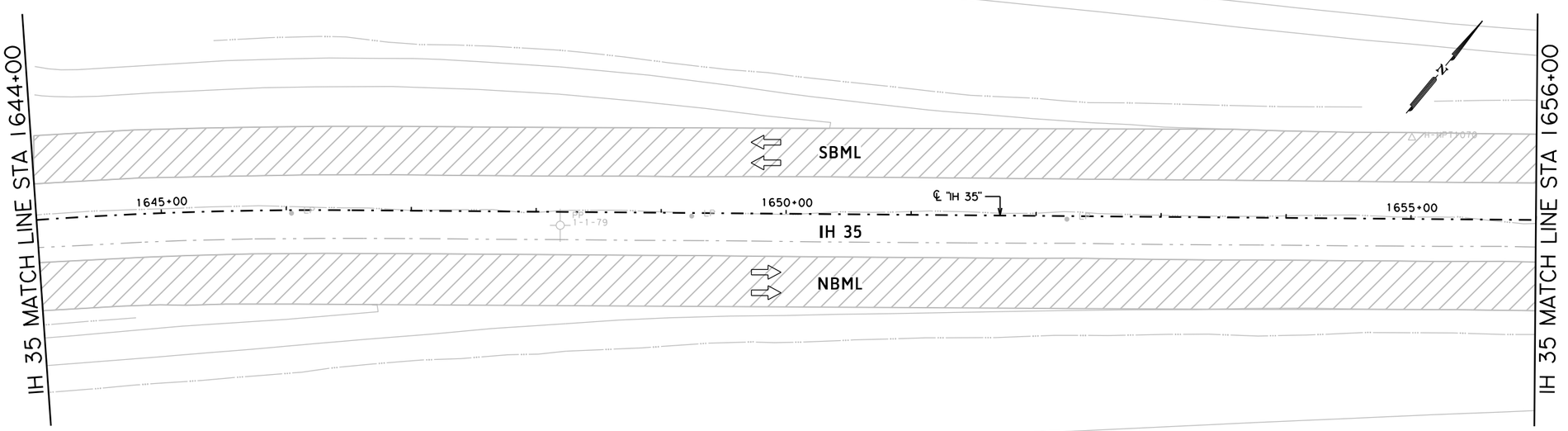
QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	12269
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	1411
3085-6001	UNDERSEAL COURSE	GAL	2454





PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 1 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		47
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TEXAS	SAT	FRIO	
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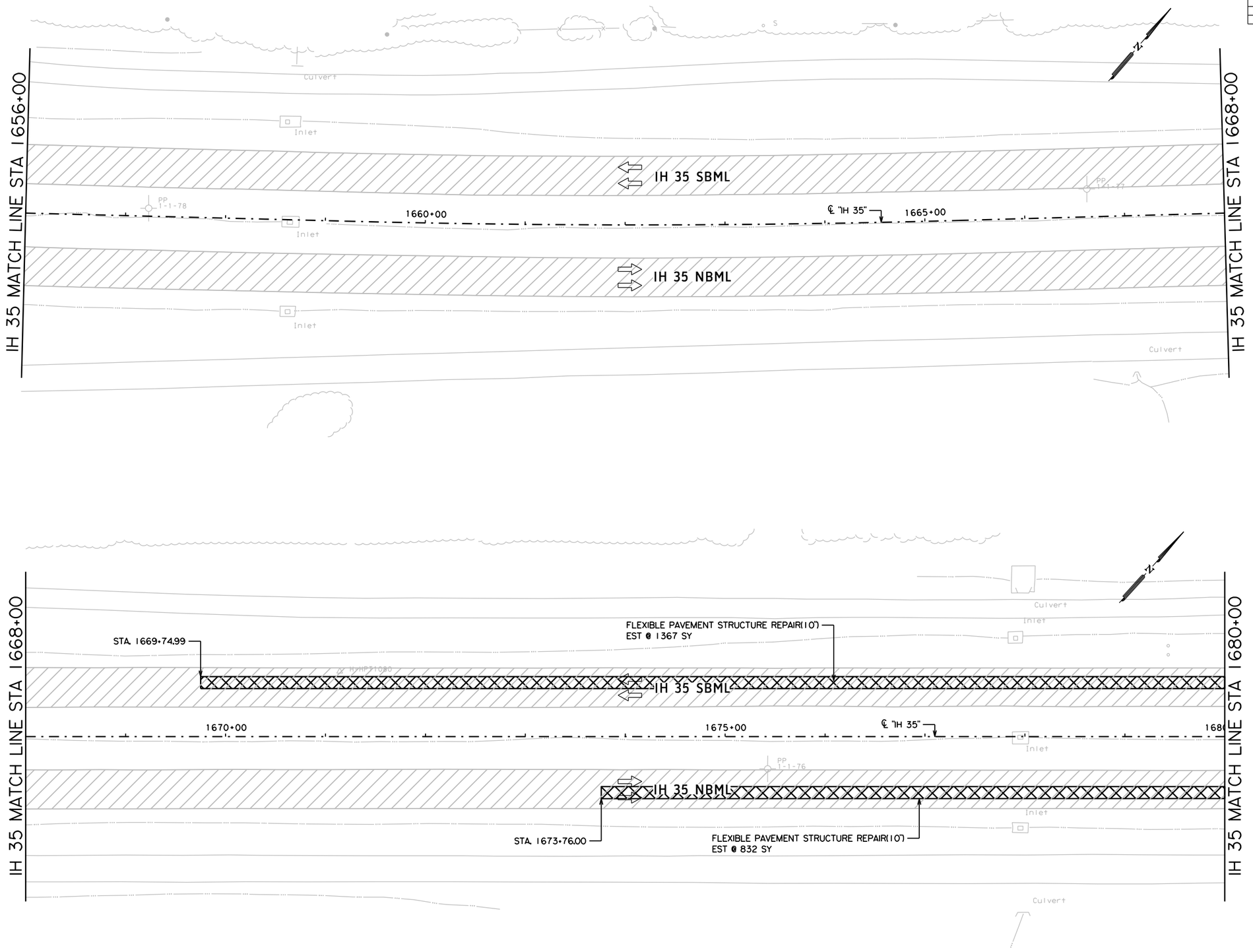
0017	06	086	IH 35

QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	2199
354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	20783
3076-6066	TACK COAT	GAL	440
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	2390
3085-6001	UNDERSEAL COURSE	GAL	4157



PLAN LEGEND

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STATE OF TEXAS
RENE ALVARADO III
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Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

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Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 2 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		48
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
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354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	20636
3076-6066	TACK COAT	GAL	755
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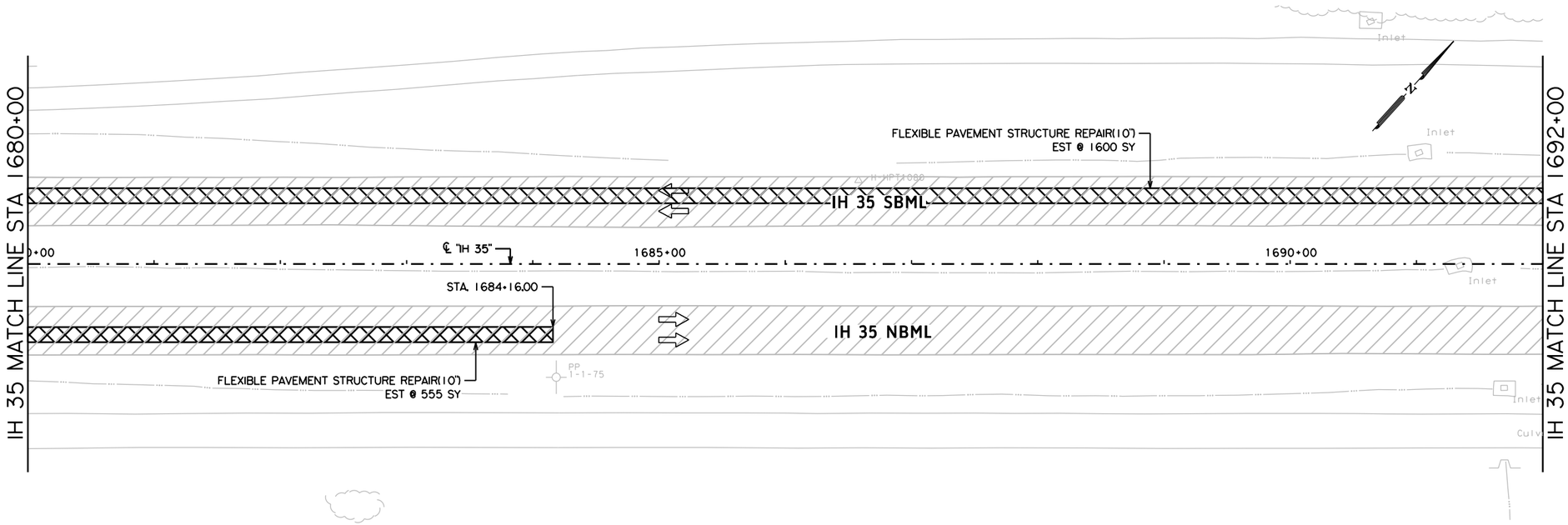
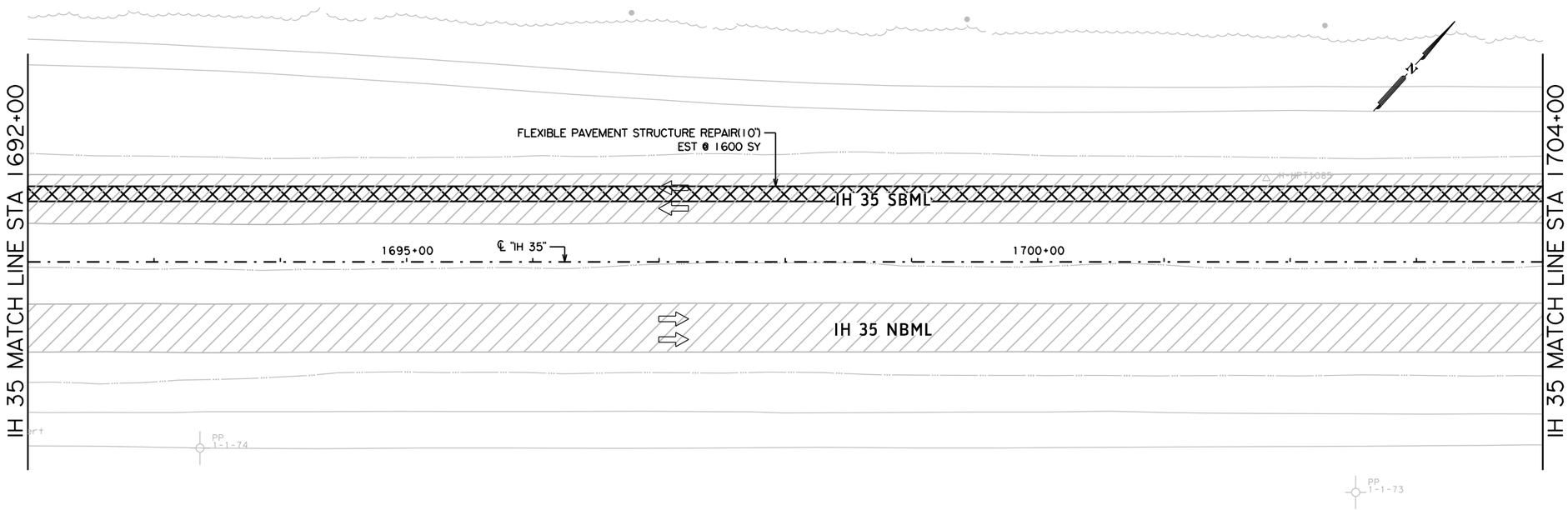
3085-6001	UNDERSEAL COURSE	GAL	4127





PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
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STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

SCALE
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Texas Department of Transportation

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PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 3 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		49
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
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	QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT	QUANTITY
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3076-6066	TACK COAT	GAL	468
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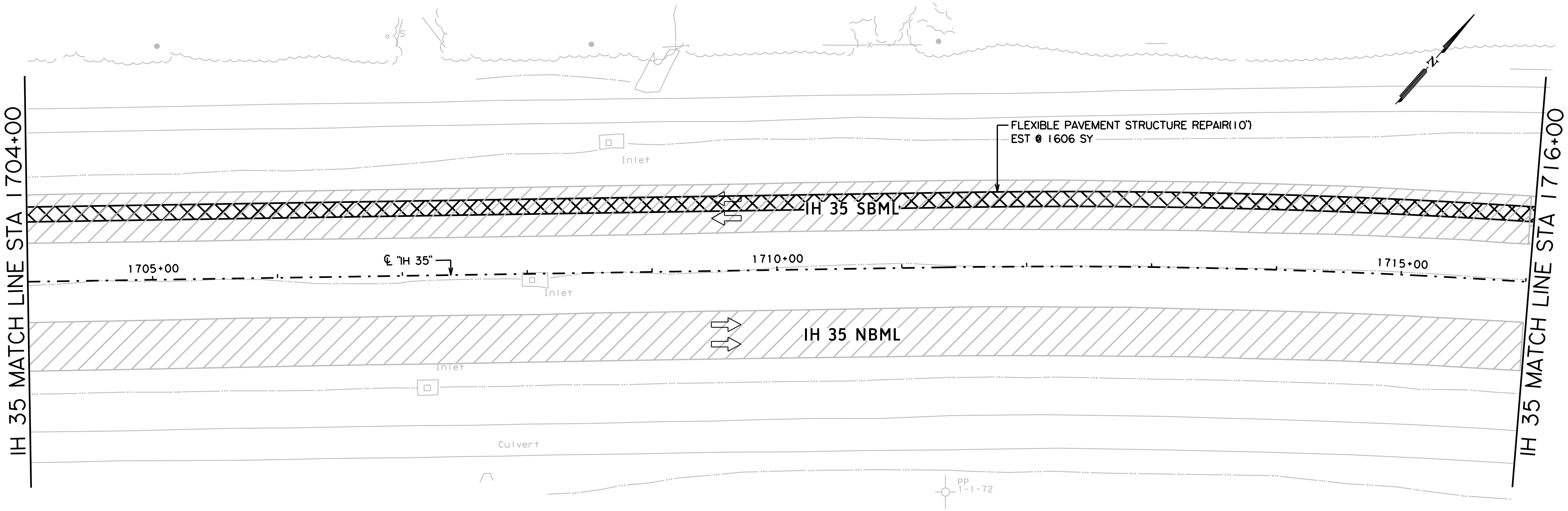
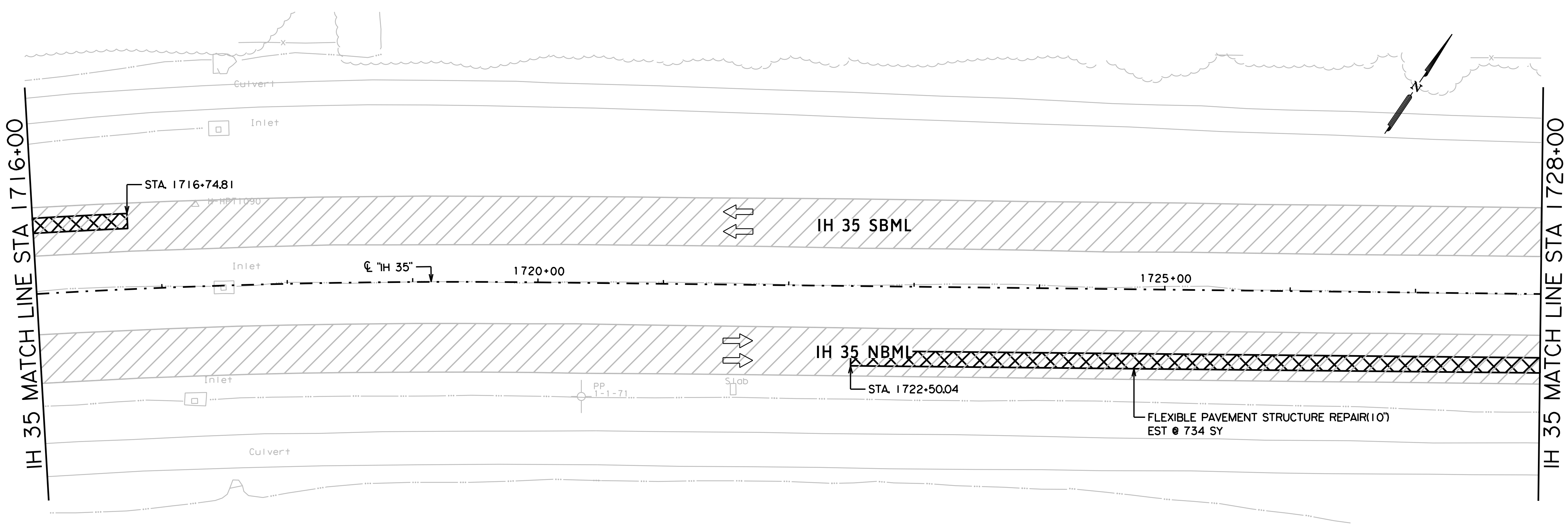
3085-6001	UNDERSEAL COURSE	GAL	4141





PLAN LEGEND

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STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

SCALE
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Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 4 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		50
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
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354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	20994
3076-6066	TACK COAT	GAL	833
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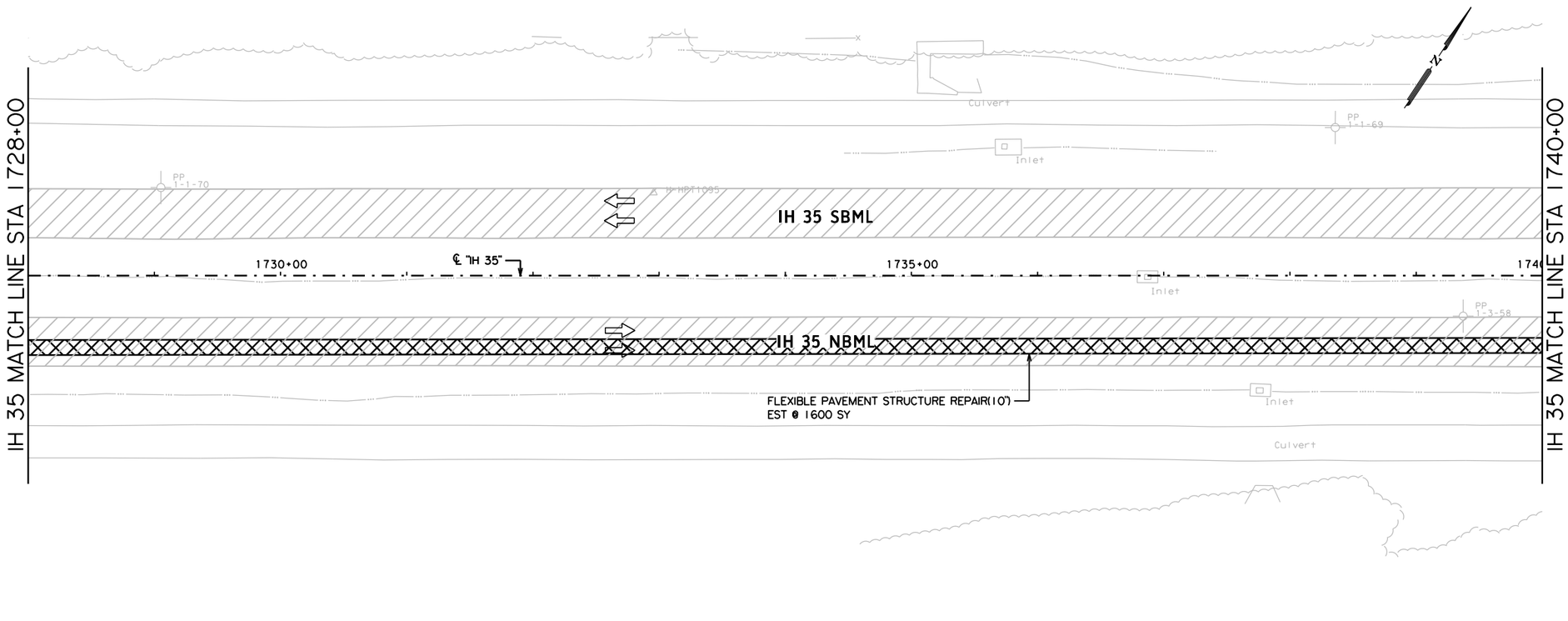

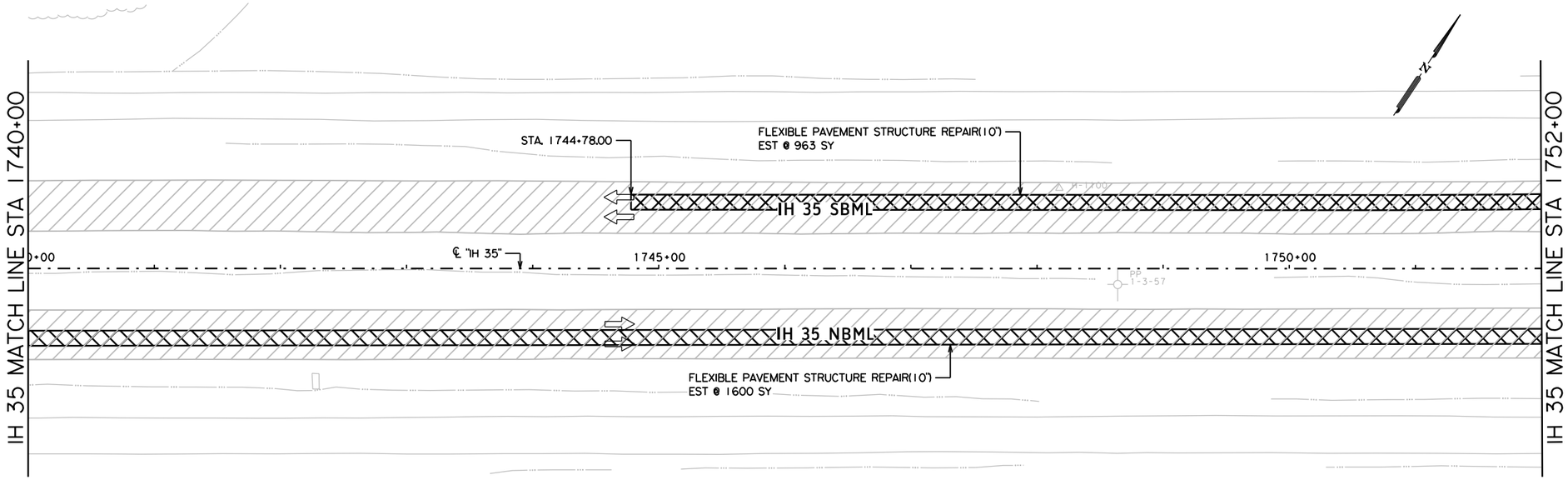

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STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
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Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 5 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		51
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
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354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	26496
3076-6066	TACK COAT	GAL	802
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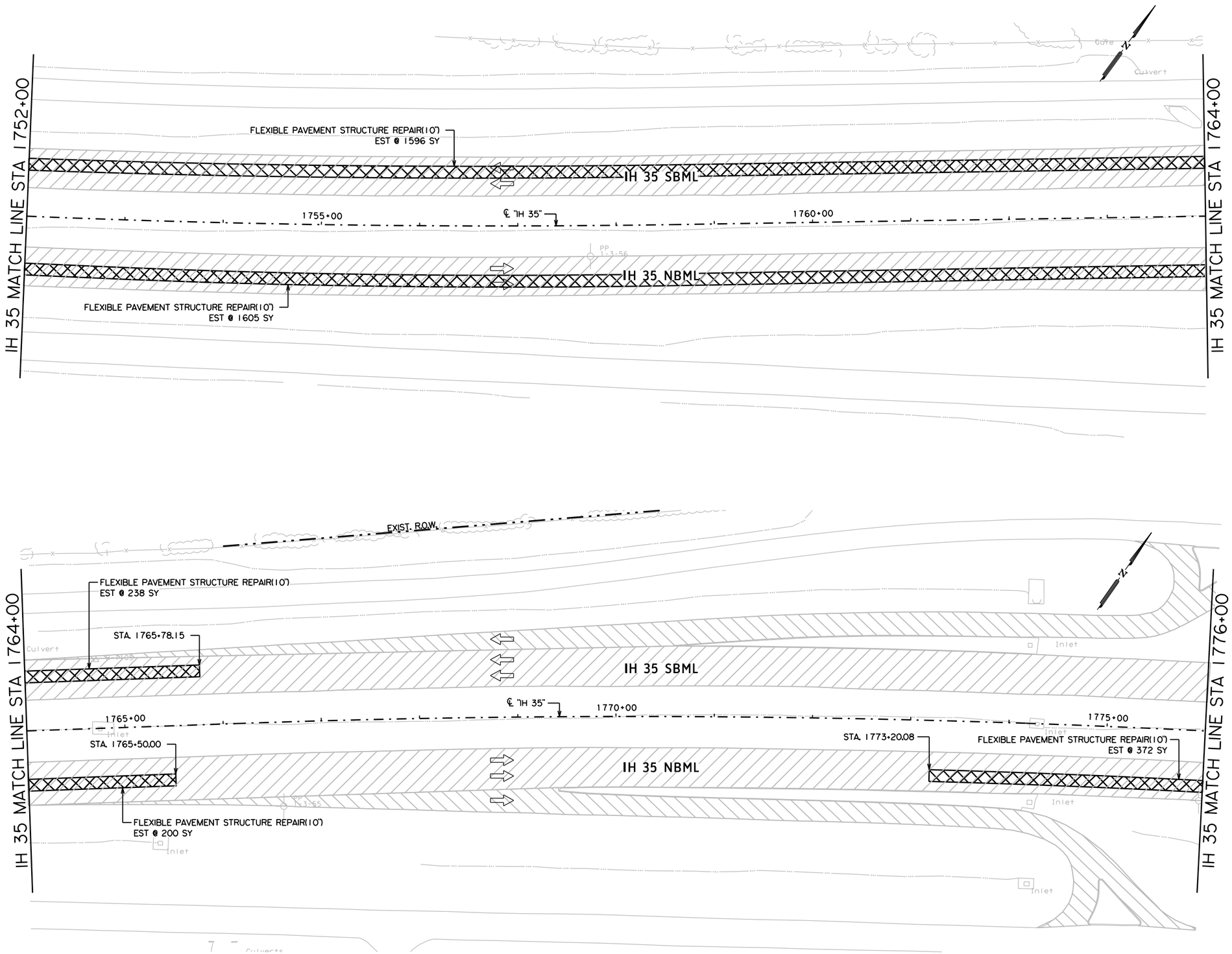
3085-6001	UNDERSEAL COURSE	GAL	5299



PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
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- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

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IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 6 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		52
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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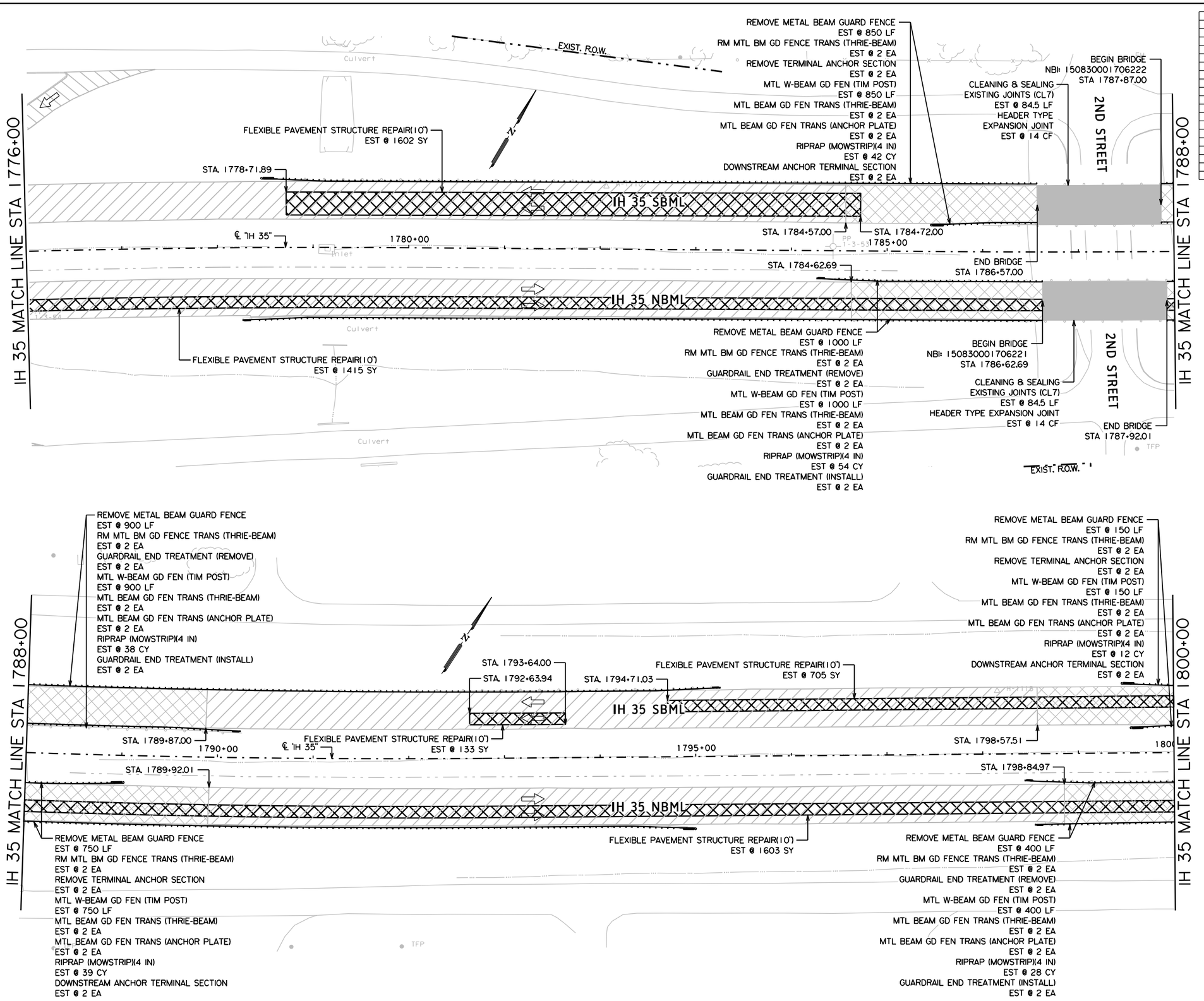

QUANTITY SUMMARY CSJ: 0017-06-086

ITEM NO.	ITEM	UNIT	QUANTITY
132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	283
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	5458
354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	15386
354-6024	PLANE ASPH CONC PAV(2" TO 4")	SY	5864
432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	213
438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	169
454-6008	HEADER TYPE EXPANSION JOINT	CF	28
540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	4050
540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	12
540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	6
540-6037	MTL BEAM GD FEN TRANS (ANCHOR PLATE)	EA	12
542-6001	REMOVE METAL BEAM GUARD FENCE	LF	4570
542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	6
542-6004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA	12
544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	6
544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	6
3076-6066	TACK COAT	GAL	1327
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	2444
3085-6001	UNDERSEAL COURSE	GAL	4014

PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. — 10/30/2023 DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

Texas Department of Transportation
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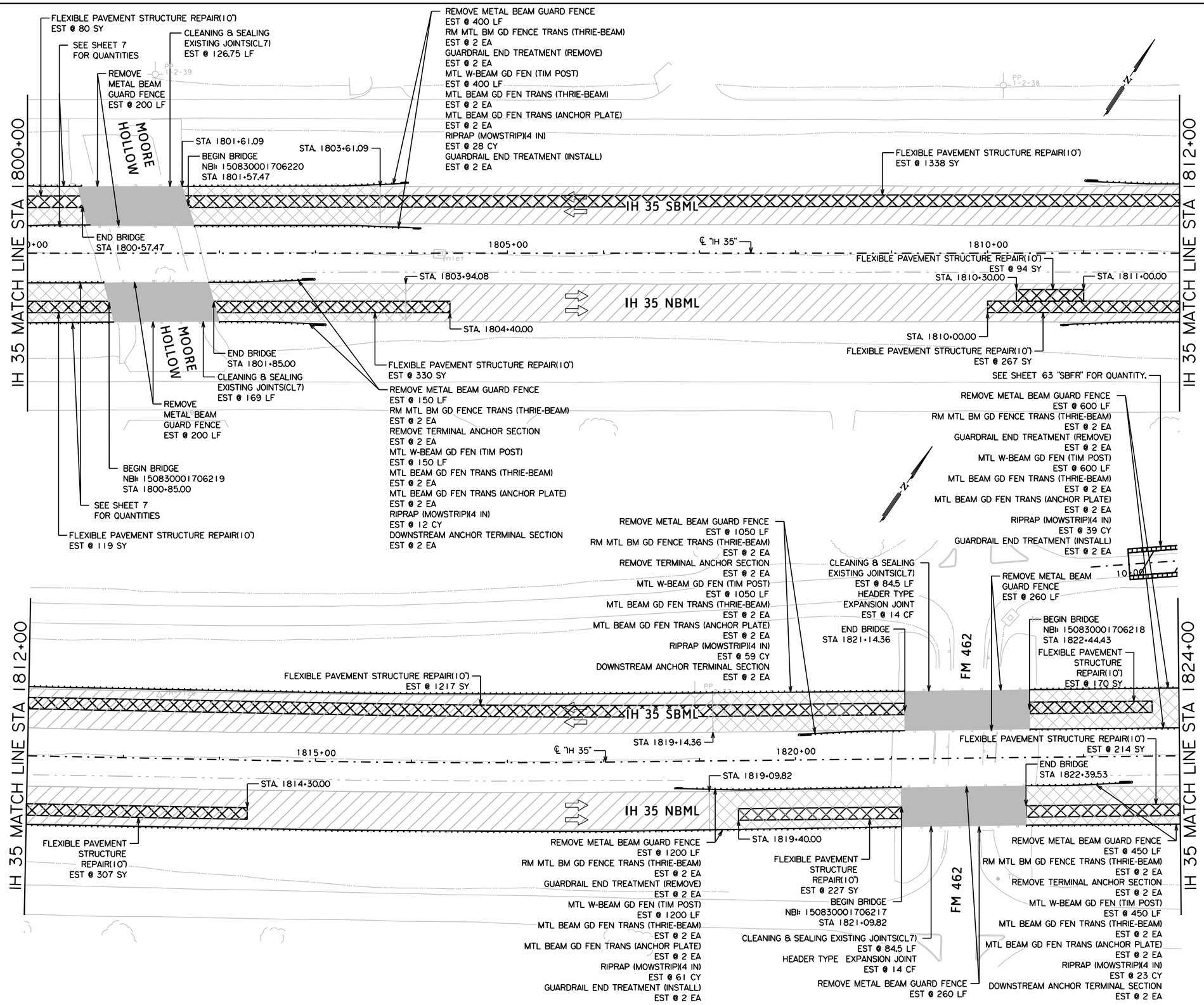
IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 7 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		53
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	330
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	4363
354-6021	PLANE ASPH CONC PAVI(0" TO 2")	SY	13634
354-6024	PLANE ASPH CONC PAVI(2" TO 4")	SY	7806
432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	222
438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	464.75
454-6008	HEADER TYPE EXPANSION JOINT	CF	28
540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	3850
540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	12
540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	6
540-6037	MTL BEAM GD FEN TRANS (ANCHOR PLATE)	EA	12
542-6001	REMOVE METAL BEAM GUARD FENCE	LF	4770
542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	6
542-6004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA	12
544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	6
544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	6
3076-6066	TACK COAT	GAL	1305
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	2466
3085-6001	UNDERSEAL COURSE	GAL	3817

PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

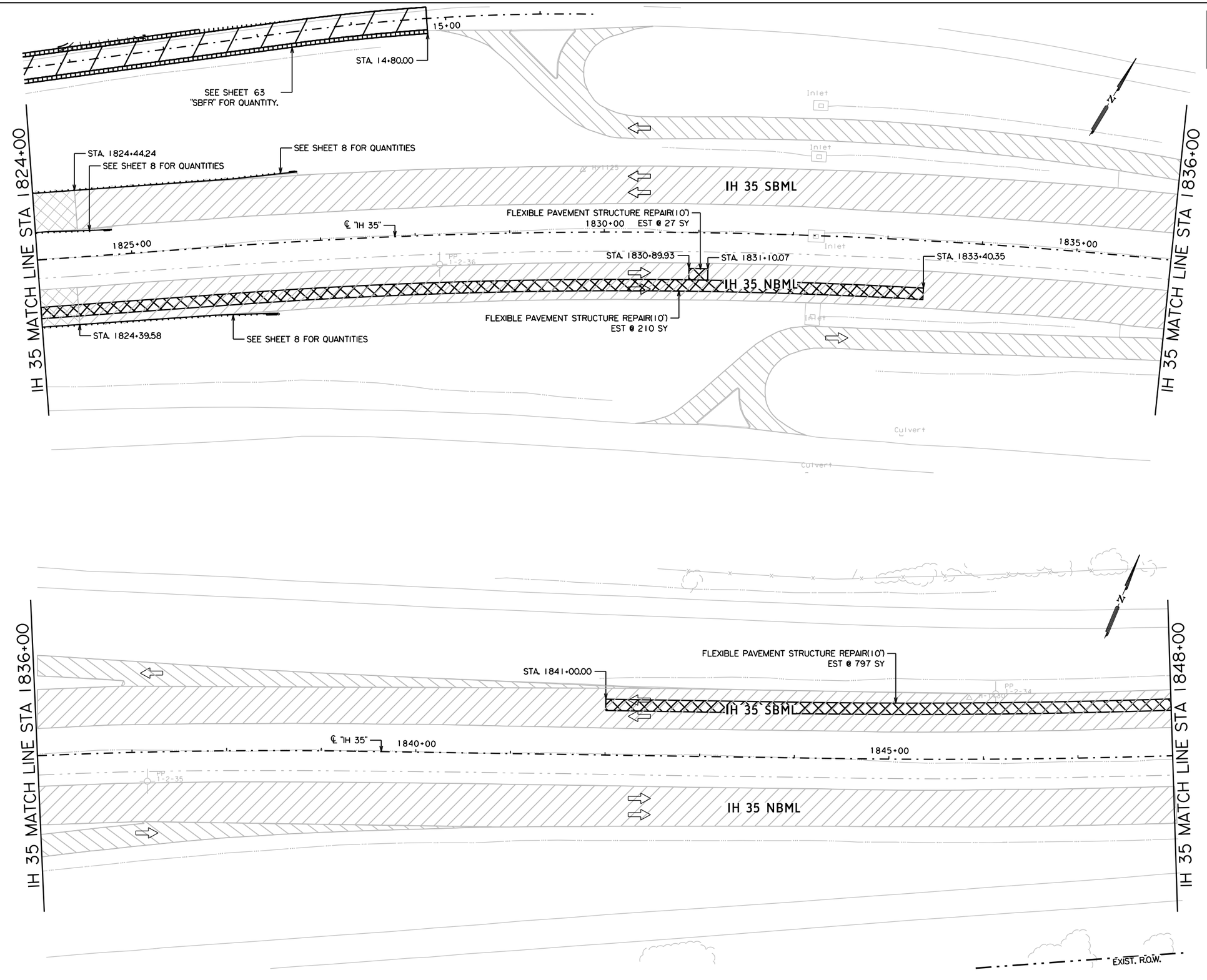
SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 8 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		54
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10')	SY	1034
354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	30131
354-6024	PLANE ASPH CONC PAV(2" TO 4")	SY	377
3076-6066	TACK COAT	GAL	207
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	3508
3085-6001	UNDERSEAL COURSE	GAL	6061

PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

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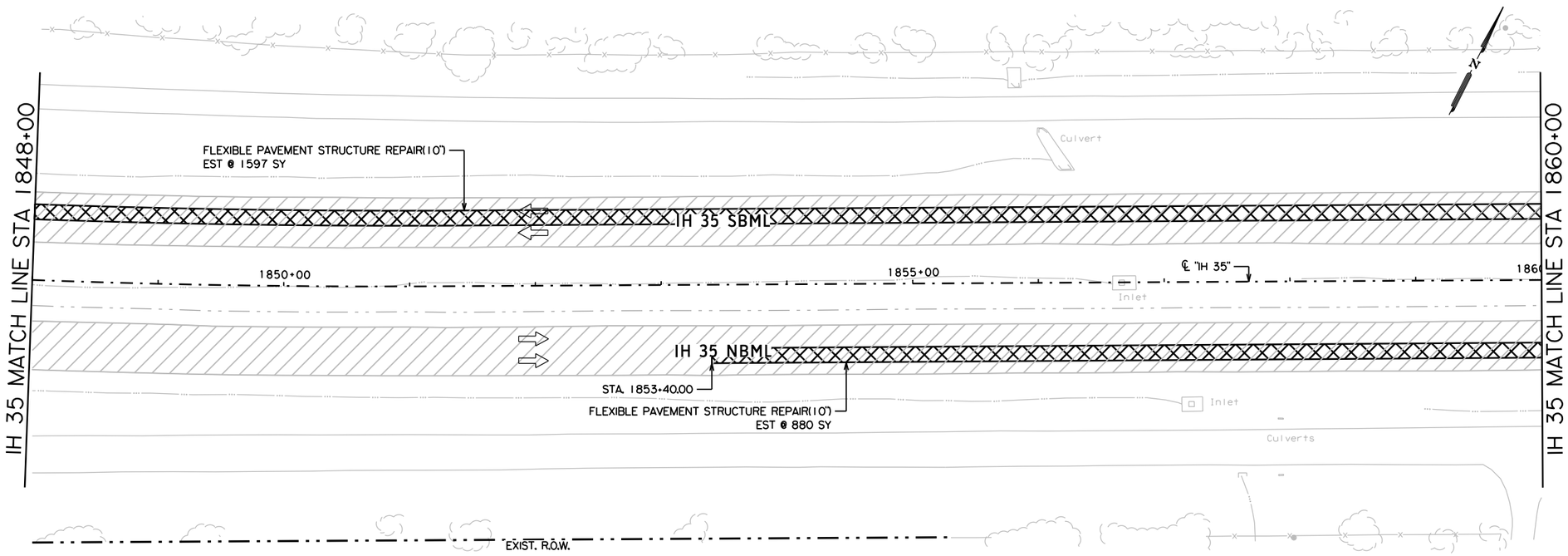
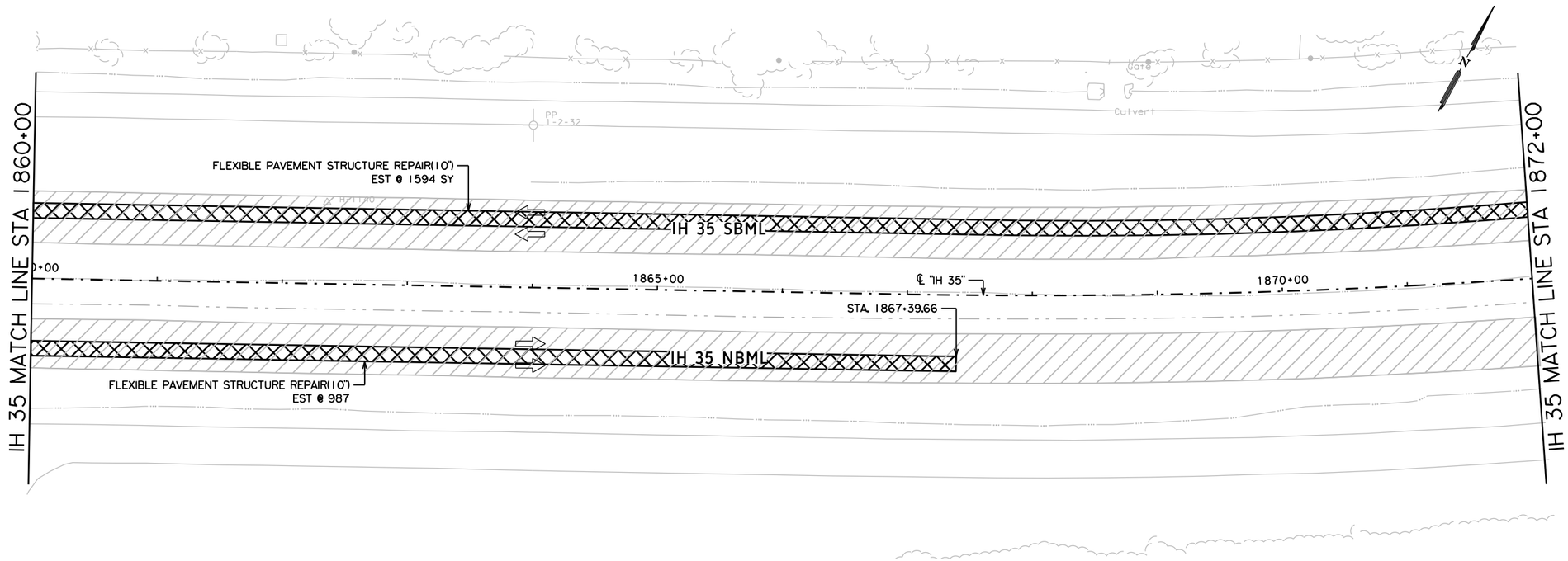
IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 9 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		55
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ#: 0017-06-086

ITEM NO.	ITEM	UNIT	QUANTITY
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10')	SY	5058
354-6021	PLANE ASPH CONC PAVI(0" TO 2")	SY	21245
3076-6066	TACK COAT	GAL	1012
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	2443
3085-6001	UNDERSEAL COURSE	GAL	4249

PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

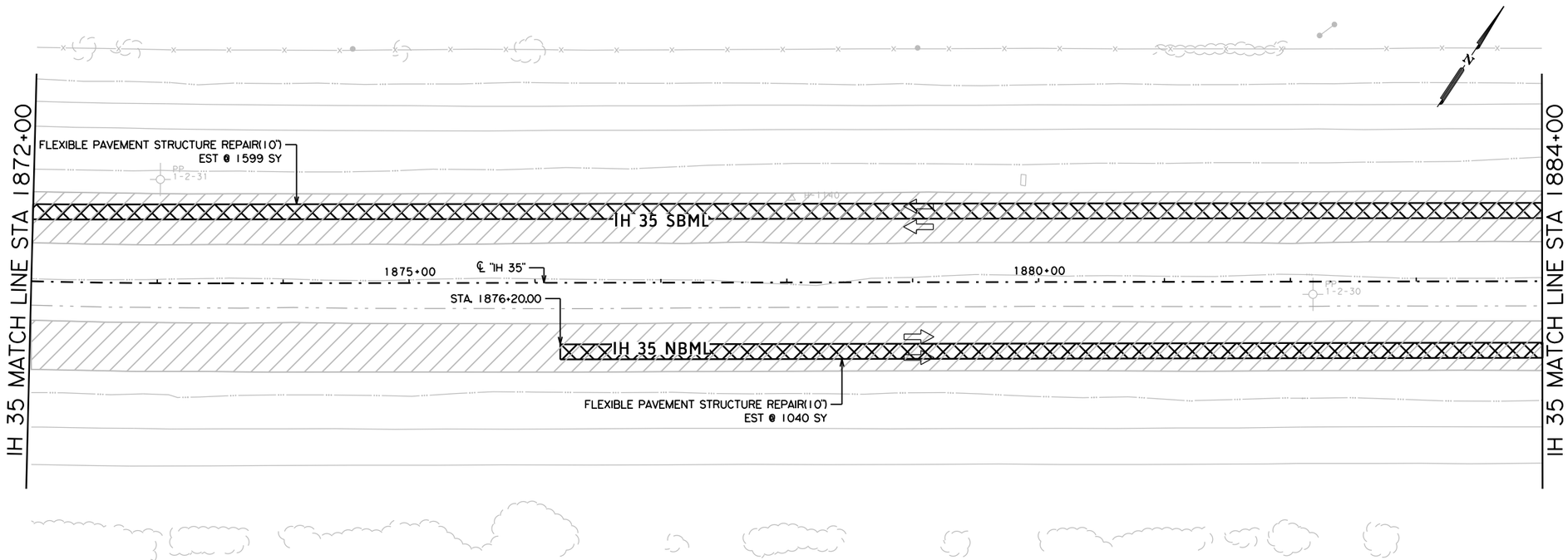
Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 10 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		56
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	5839
354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	21092
3076-6066	TACK COAT	GAL	1168
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	2426
3085-6001	UNDERSEAL COURSE	GAL	4218



PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

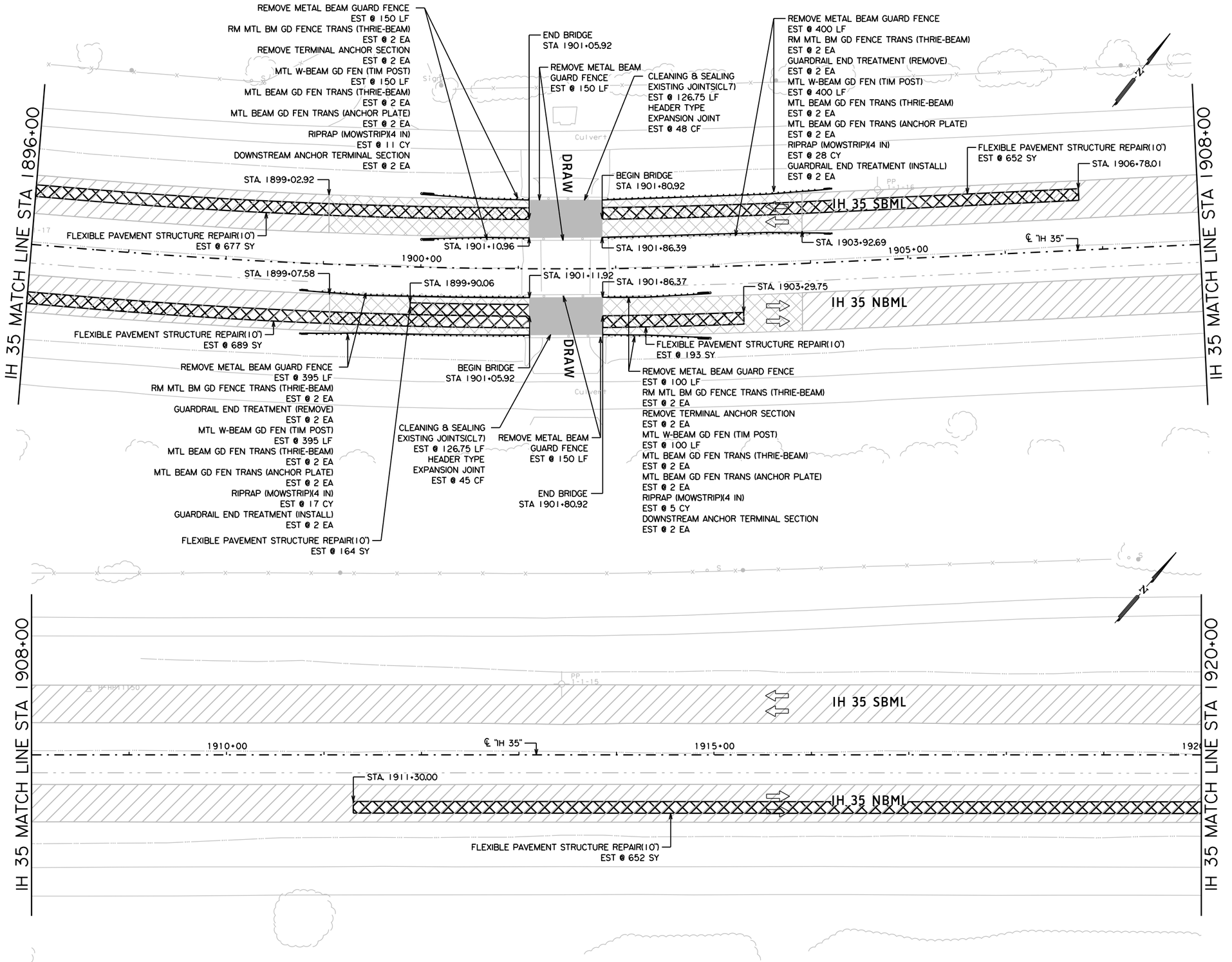
SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 11 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		57
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	39
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10')	SY	3027
354-6021	PLANE ASPH CONC PAVI(0" TO 2")	SY	16557
354-6024	PLANE ASPH CONC PAVI(2" TO 4")	SY	4130
432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	61
438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	2535
540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1045
540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8
540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	4
540-6037	MTL BEAM GD FEN TRANS (ANCHOR PLATE)	EA	8
542-6001	REMOVE METAL BEAM GUARD FENCE	LF	1345
542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	4
542-6004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA	8
544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4
544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4
3076-6066	TACK COAT	GAL	732
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	2379
3085-6001	UNDERSEAL COURSE	GAL	4074

PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

Texas Department of Transportation
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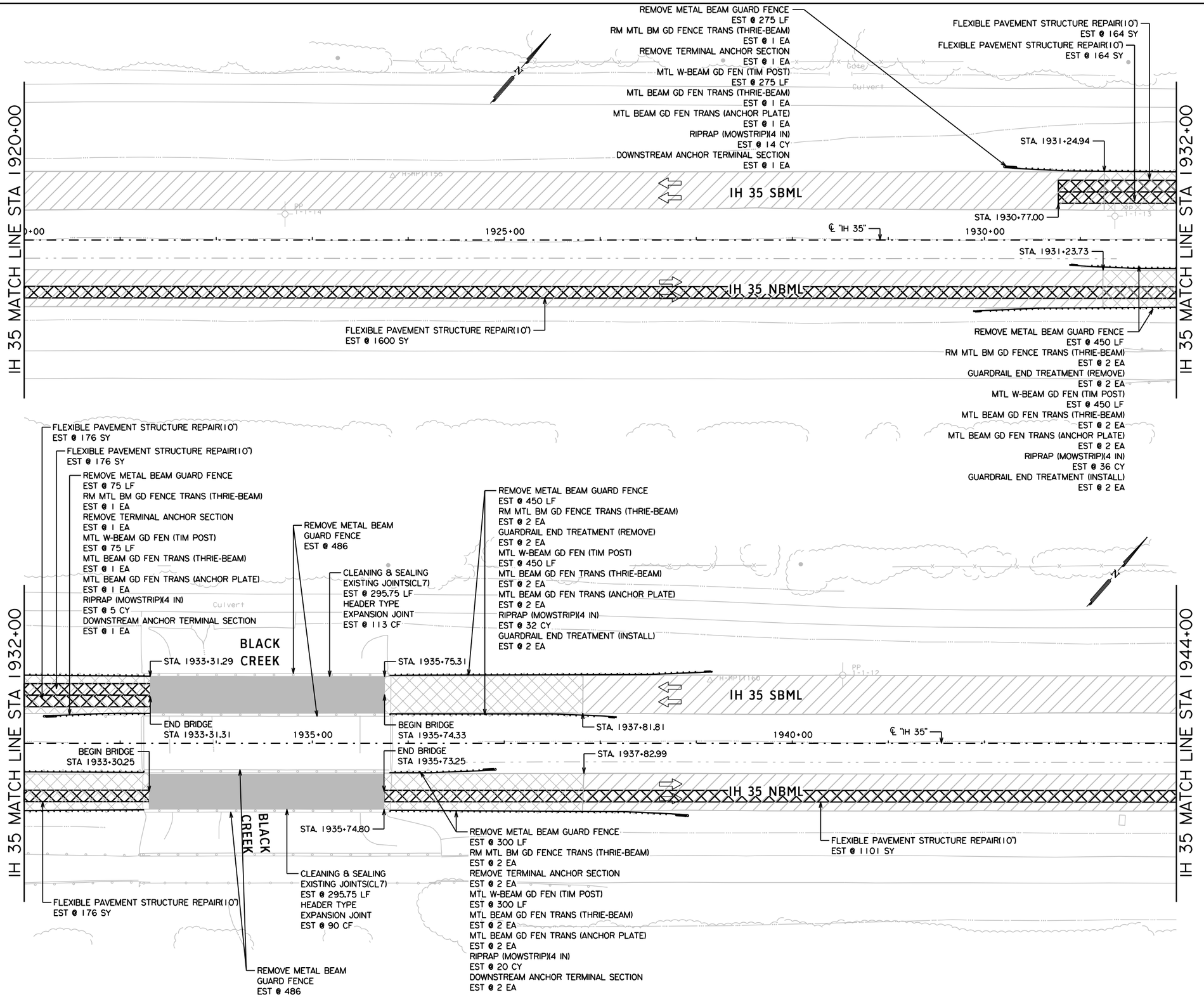
IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 12 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	58

STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



QUANTITY SUMMARY CSJ: 0017-06-086

ITEM NO.	ITEM	UNIT	QUANTITY
132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	39
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	3557
354-6021	PLANE ASPH CONC PAVI(0" TO 2")	SY	15143
354-6024	PLANE ASPH CONC PAVI(2" TO 4")	SY	5601
432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	107
438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	591.5
540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1550
540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8
540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	4
540-6037	MTL BEAM GD FEN TRANS (ANCHOR PLATE)	EA	8
542-6001	REMOVE METAL BEAM GUARD FENCE	LF	2522
542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	4
542-6004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA	8
544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4
544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4
3076-6066	TACK COAT	GAL	1122
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	2386
3085-6001	UNDERSEAL COURSE	GAL	3793

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. — 10/30/2023 DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

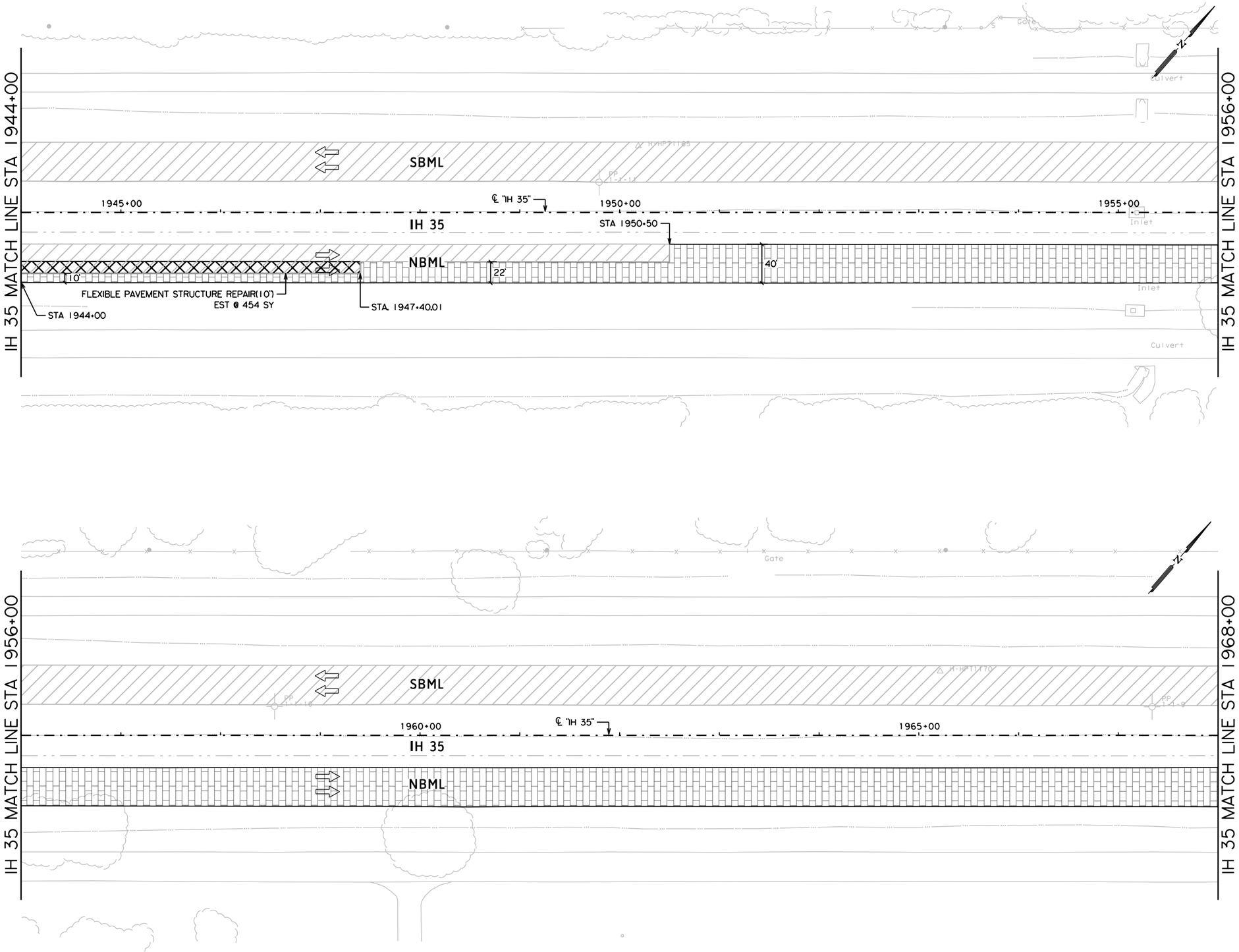
Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 13 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		59
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
354-6021	PLANE ASPH CONC PAVIO" TO 2")	SY	12278
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	1412
3085-6001	UNDERSEAL COURSE	GAL	2456



NOTE: LOCATOIN OF IN PAVEMENT LOOPS APPROXIMATE, TO BE FIELD VERIFIED BY CONTRACTOR.

PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

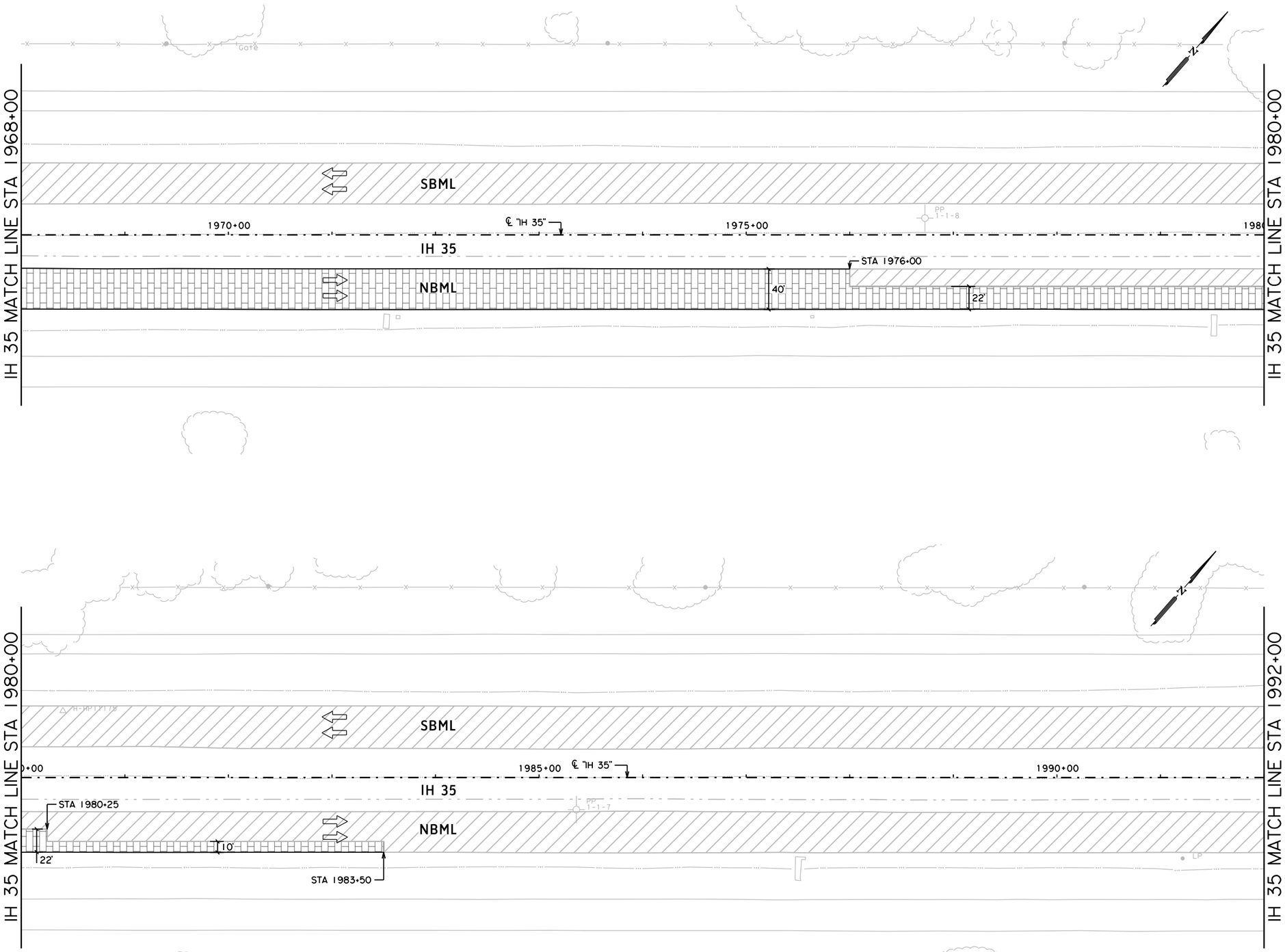
Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 14 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		60
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
354-6021	PLANE ASPH CONC PAVIO" TO 2")	SY	15464
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	1778
3085-6001	UNDERSEAL COURSE	GAL	3093



NOTE: LOCATOIN OF IN PAVEMENT LOOPS APPROXIMATE, TO BE FIELD VERIFIED BY CONTRACTOR.

PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
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STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

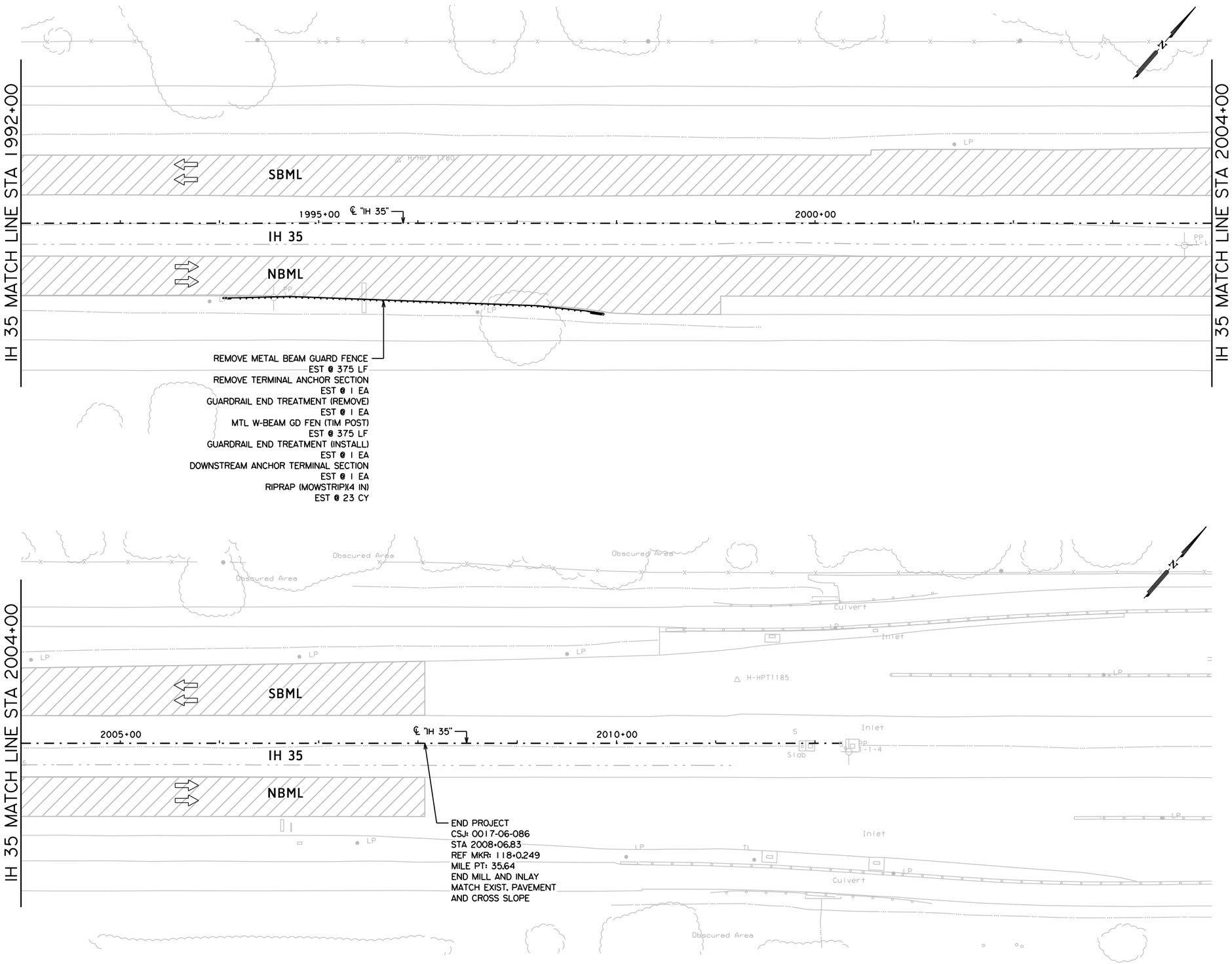
Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 15 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		61
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
354-6021	PLANE ASPH CONC PAVIO" TO 2")	SY	17253
432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	23
540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	375
540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
542-6001	REMOVE METAL BEAM GUARD FENCE	LF	375
542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	1
544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	1
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	1984
3085-6001	UNDERSEAL COURSE	GAL	3451



PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- IN PAVEMENT LOOPS

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

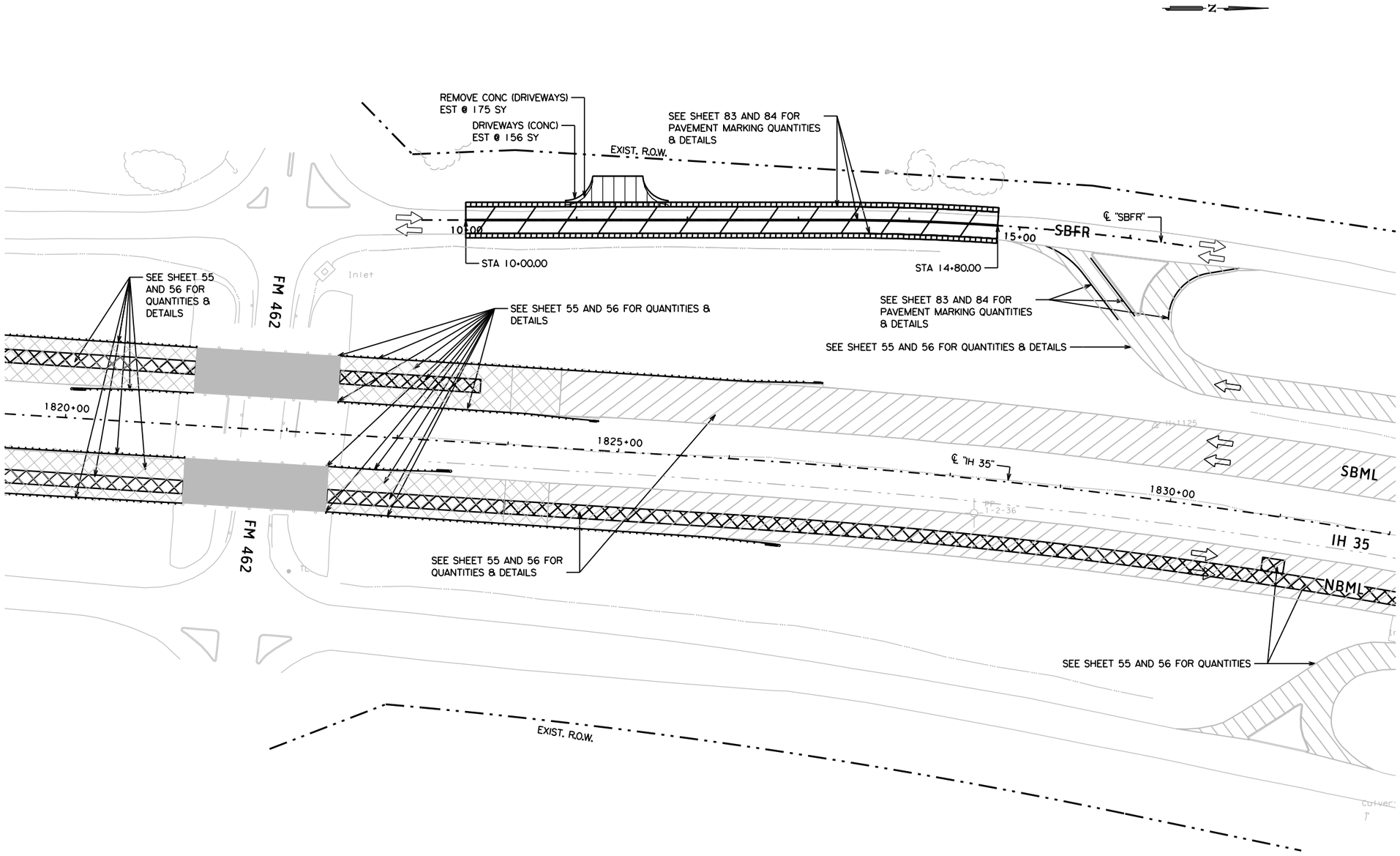
Texas Department of Transportation

IH 35
PLAN LAYOUT
MAINLANES AND RAMPS

SHEET 16 OF 17

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		62
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ#: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
104-6017	REMOVING CONC (DRIVEWAYS)	SY	175
132-6003	EMBANKMENT (FINAL)(ORD COMPCTY B)	CY	30
351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	1280
530-6004	DRIVEWAYS (CONC)	SY	156
3076-6001	D-GR HMA TY-B PG64-22	TON	246
3076-6066	TACK COAT	GAL	341
3080-6001	STONE-MTRX-ASPH SMA-C SAC-A PG76-22	TON	49
3084-6001	BONDING COURSE	GAL	51



PLAN LEGEND

- 2" MILLING AND ASPHALT MAIN LANE
- BRIDGE MILLING AND ASPHALT
- TRANSITION MILLING AND ASPHALT
- 2" MILL AND ASPHALT RAMP
- PAVEMENT STRUCTURE REPAIR
- PAVEMENT STRUCTURE REPAIR SBFR
- PAVEMENT WIDENING SBFR

STATE OF TEXAS
JAMES O. SAKAI
144653
LICENSED PROFESSIONAL ENGINEER

10/30/2023
JAMES O. SAKAI, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N.T.S.

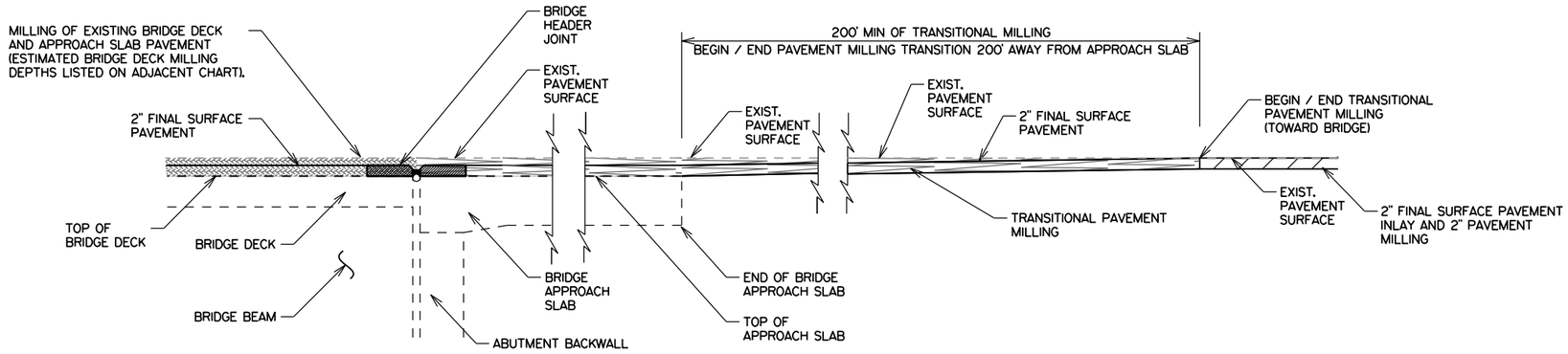
IH 35
PLAN LAYOUT
SBFR

SHEET 17 OF 17

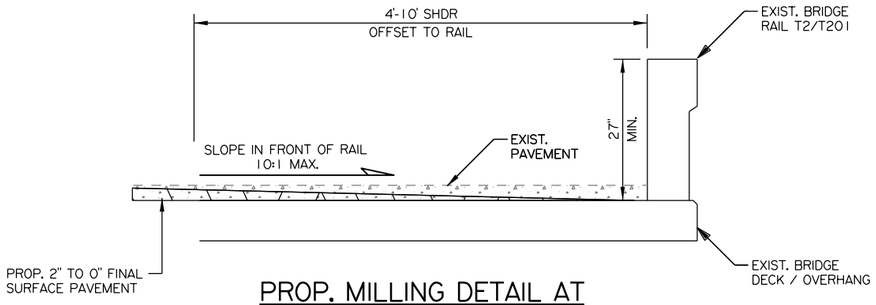
FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		63
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

ESTIMATED BRIDGE DECK MILLING DEPTHS

LOCATION	ESTIMATED DECK AREA (SY)	ESTIMATED DEPTH OF ACP (IN)
2ND STREET (NBML & SBML)	1180	3.5
HOLLOW MORE (NBML)	494	3.0
HOLLOW MORE (SBML)	496	3.625
FM 462 (NBML & SBML)	1174.5	3.75
DRAW (NBML)	317	3.375
DRAW (SBML)	317	3.625
BLACK CREEK (NBML)	1011	3.0
BLACK CREEK (SBML)	1041	3.75



PROP. MILLING AND OVERLAY TRANSITION TO EXIST. BRIDGE



PROP. MILLING DETAIL AT THE BRIDGE BARRIER TYPE T2/T201

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

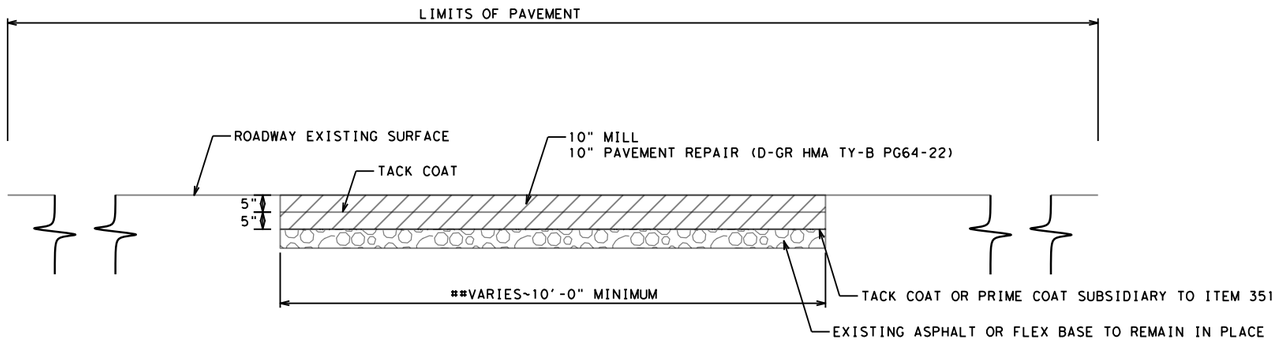
SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S

Texas Department of Transportation

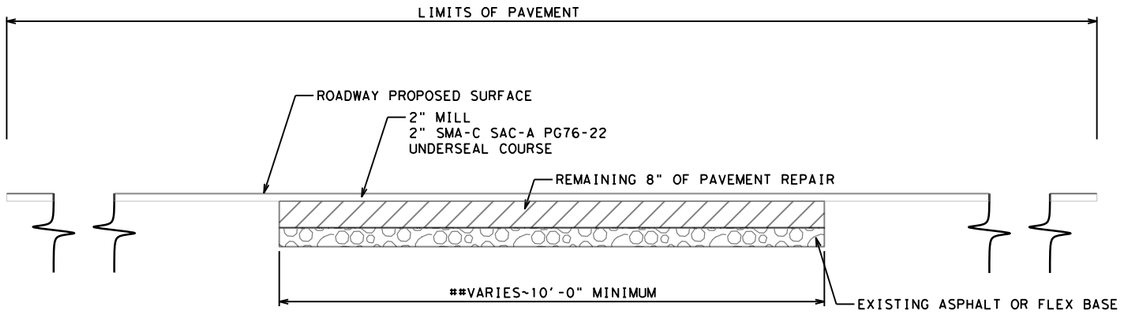
IH 35
MISCELLANEOUS ROADWAY DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		64
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



INTERIM FLEXIBLE PAVEMENT STRUCTURE
REPAIR PRIOR TO FINAL SURFACE
TYPICAL SECTION



PROPOSED FINAL SURFACE
OVER PAVEMENT REPAIR
TYPICAL SECTION

NOTES:

THE TYPICAL REPAIR DIMENSION SHALL BE A MINIMUM WIDTH OF 10 FT AND A MINIMUM LENGTH OF 20 FT. THESE DIMENSIONS MAY DIFFER BASED UPON THE AREA THAT IS IN NEED OF REPAIR.

THE USE OF A ROTOMILL WILL BE USED FOR THE REMOVAL OF THE EXISTING PAVEMENT STRUCTURE, AND SHALL BE SUBSIDIARY TO ITEM 351, "FLEXIBLE PAVEMENT STRUCTURE REPAIR."

ACP (TY B) (BASE) SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 351.

THE REPAIR LOCATIONS AND THE SIZE OF EACH LOCATION IS SUBJECT TO CHANGE AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

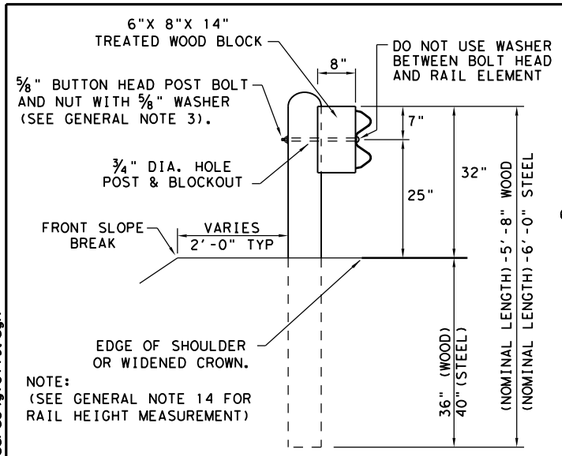
SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S

IH 35
PAVEMENT REPAIR DETAIL

SHEET 1 OF 1

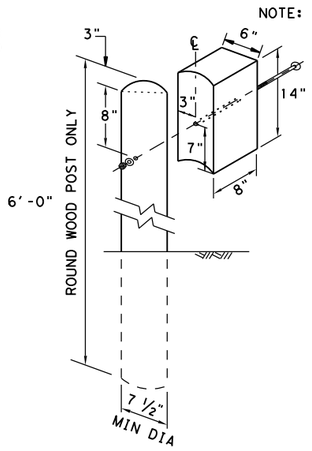
FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		65
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

DATE: 10/30/2023
FILE: pw:\\txdot.projectwiseonline.com:TxDOT4\Documents\15 - SAT\Design Projects\00170686\4 - Design\Plan Set\3. Roadway\Standards\gf3119.dgn



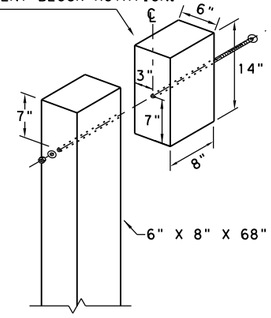
NOTE:
(SEE GENERAL NOTE 14 FOR
RAIL HEIGHT MEASUREMENT)

TYPICAL POST PLACEMENT

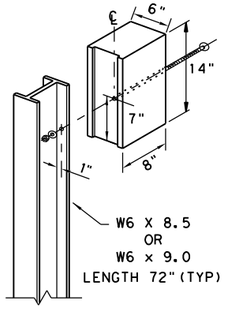


WOOD BLOCK TO
ROUND WOOD POST

NOTE: TOENAIL WITH ONE 16D GALV. NAIL
TO PREVENT BLOCK ROTATION.

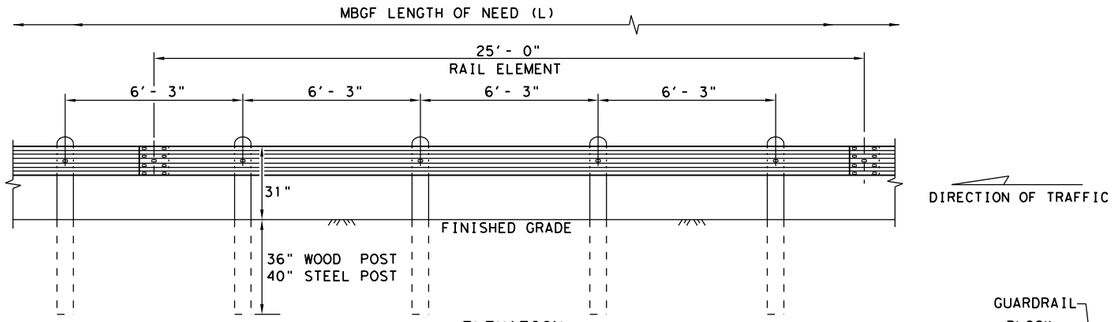


WOOD BLOCK TO
RECTANGULAR WOOD POST



ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

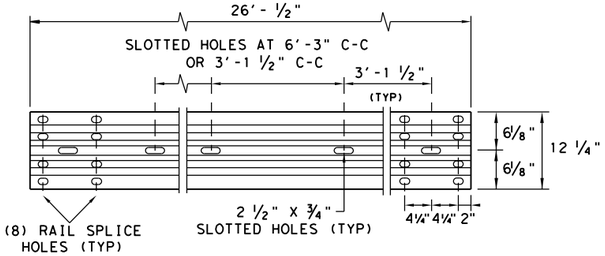
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



DIRECTION OF TRAFFIC

ELEVATION
MID-SPAN RAIL SPLICE

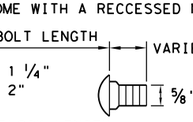
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

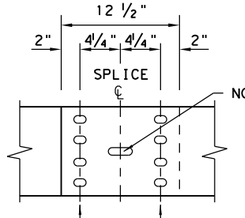
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



BUTTON HEAD BOLT

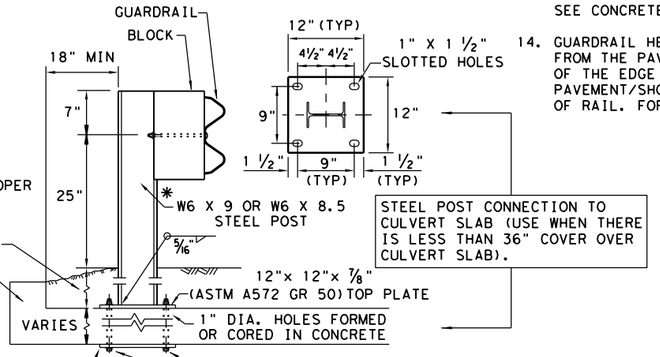
NOTE: SEE GENERAL NOTE 3 FOR
SPLICE & POST BOLT DETAILS.



DIRECTION OF TRAFFIC

MID-SPAN
RAIL SPLICE DETAIL

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



* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		66

DATE: 10/30/2023
FILE: pw:\\txdot.projectwiseonline.com:TxDOT4\Documents\15 - SAT\Design Projects\0017060864 - Design\Plan Set\3. Roadway\Standards\gf31dat19.dgn

BREAKAWAY CABLE TERMINAL (BCT) CABLE ANCHOR ASSEMBLY WITH CABLE BRACKET, BEARING PLATE AND STANDARD HARDWARE.

C3 X 5 X 80" (3) GROUND STRUTS

7 1/4" x 5 1/4" x 46" (2) DAT TERMINAL POST

NON-SYMMETRICAL TRANSITION RAIL SECTION (SEE APPLICABLE TRANSITION STANDARD)

(11) (15) (17)

(5) SHELF ANGLE BRACKET (SEE NOTE 2)

(8) (14) (17) (11)

PLAN VIEW

END PAYMENT FOR DAT SYSTEM (EA.)

BEGIN PAYMENT FOR METAL BEAM GUARD FENCE (SEE GF(31)STANDARD)

DIRECTION OF TRAFFIC

(4) 9'- 4 1/2" Rail Section (SEE GENERAL NOTE 2)

12'-6" (Min.) MBGF

PAYMENT FOR NON-SYMMETRICAL TRANSITION RAIL (EA)

(9) (ROUNDED) W-BEAM END SECTION

6'- 3" | 3'-1 1/2" | 3'-1 1/2" | BEGIN LENGTH OF NEED (LON)

(11) (12)

(7) BCT POST SLEEVE 2" x 5 1/2" (SCH 40 GALV. PIPE)

(11) (13) (17)

31"

*

(11) (16) (17)

To properly install and maintain the anchor system, a 3 1/4" (±) 1/2" tube projection is required above the finished grade.

FINISHED GRADE

FINISHED GRADE

ELEVATION VIEW

(SEE NOTE 1)

* 68 1/4" (MIN.) TUBE EMBEDMENT

(10) (8)

BCT CABLE ANCHOR AND ANCHOR BRACKET WITH HARDWARE

(1) STEEL FOUNDATION TUBES WITH HARDWARE (1)

DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

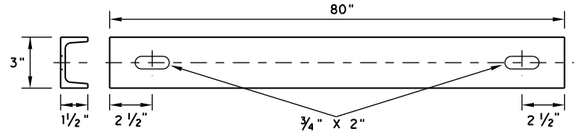
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

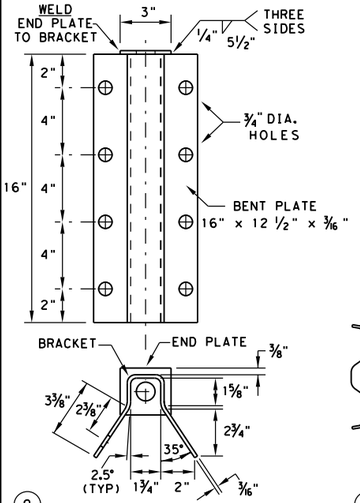
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

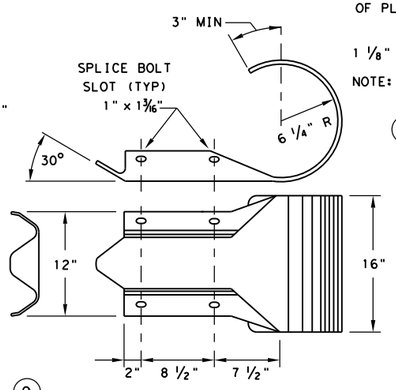
(4) TERMINAL RAIL ELEMENT FOR DAT



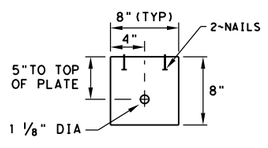
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

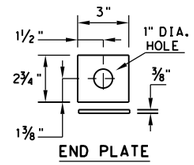


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

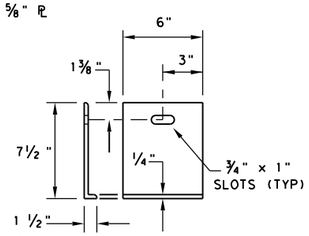


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

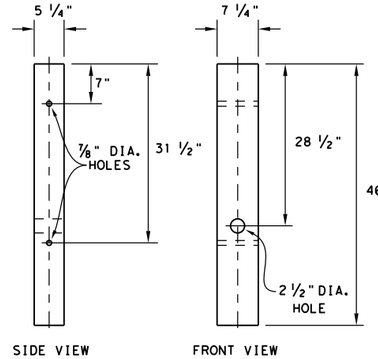
(6) BEARING PLATE
8"x 8"x 5/8" PL



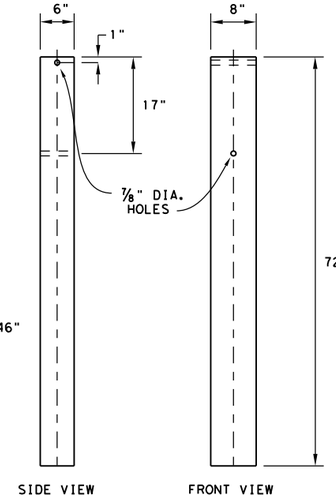
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation

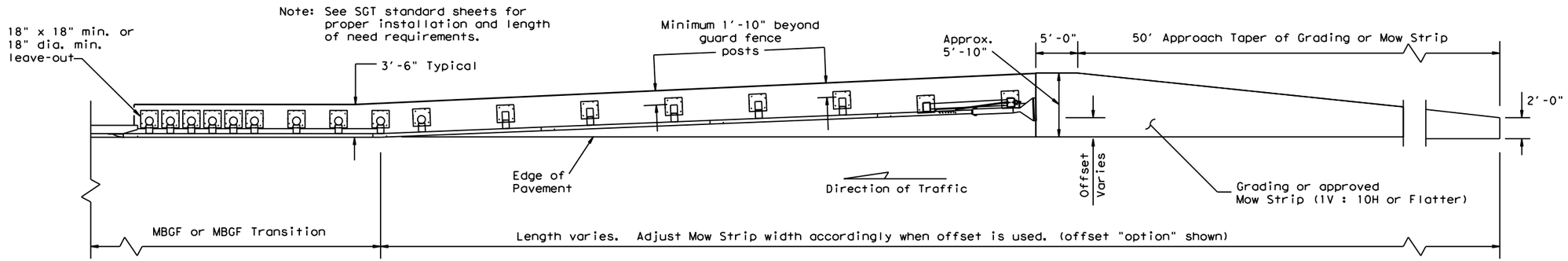
Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

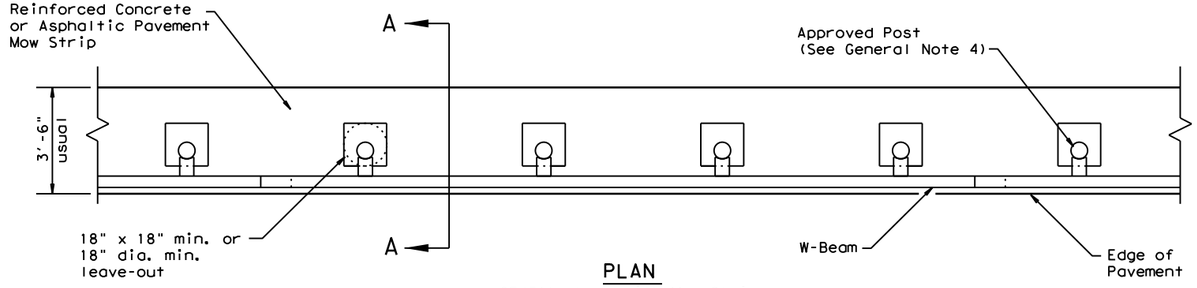
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		67

DATE: 10/30/2023
FILE: pw:\\txdot.projectwiseonline.com:TxDOT4\Documents\15 - SAT\Design Projects\0017060864 - Design\Plan Set\3. Roadway\Standards\gf31ms19.dgn

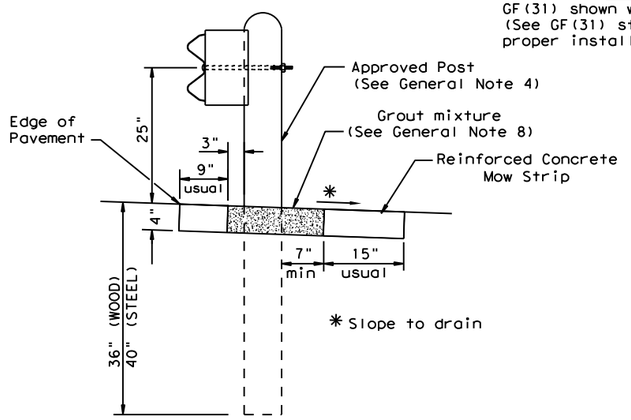


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



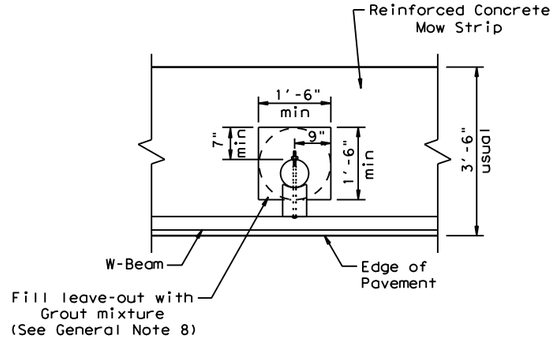
PLAN

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



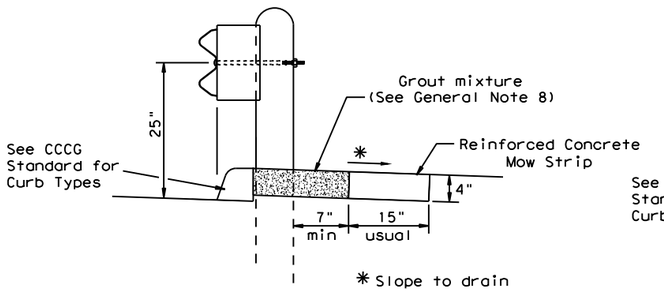
SECTION A-A

Typical



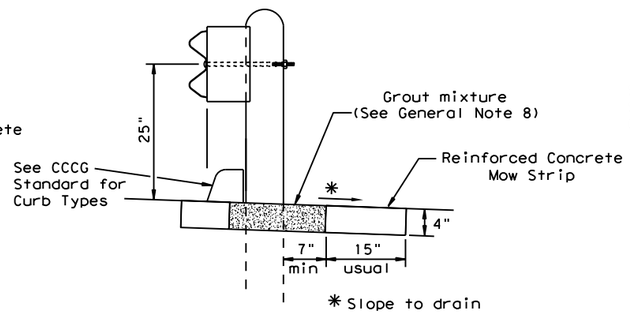
MOW STRIP DETAIL

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



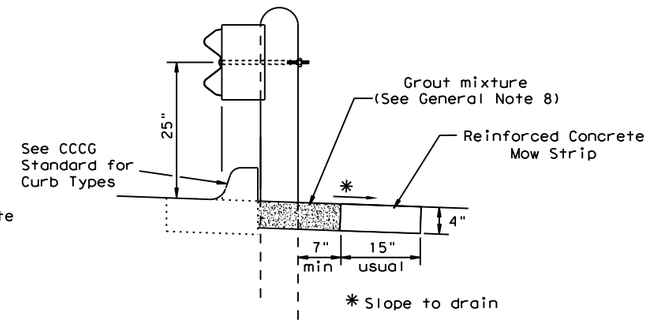
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
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	DIST	COUNTY			SHEET NO.	
	SAT	FRIO			68	

DATE:
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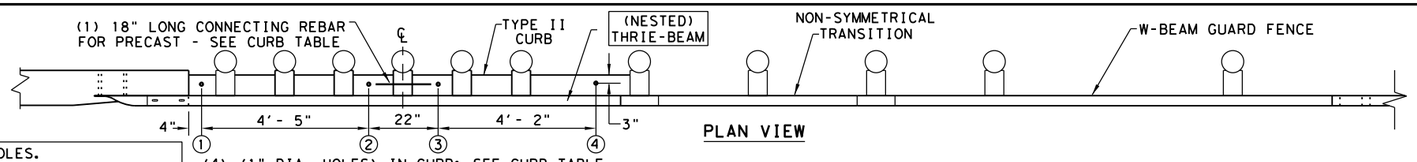
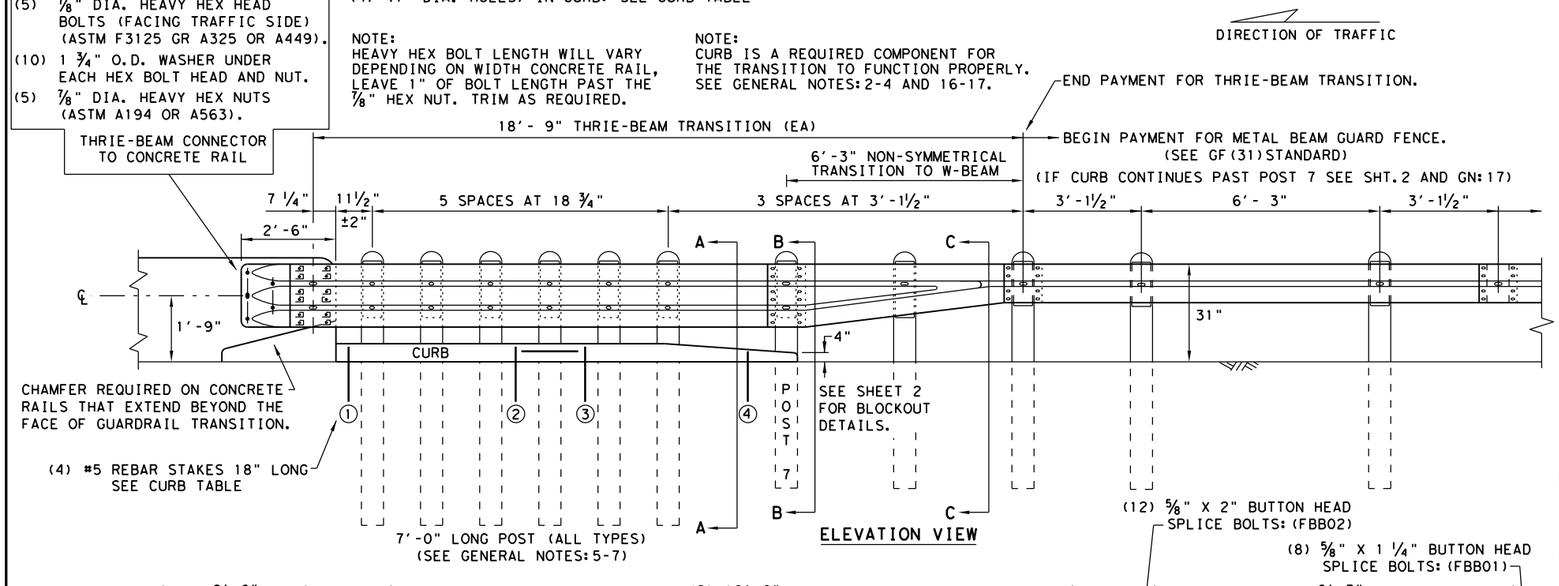


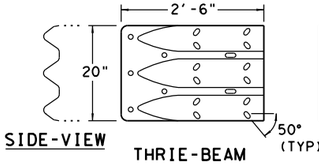
(5) 1" DIA. HOLES.
(5) ⅞" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
(10) 1 ¾" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
(5) ⅞" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE ⅞" HEX NUT. TRIM AS REQUIRED.

NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.

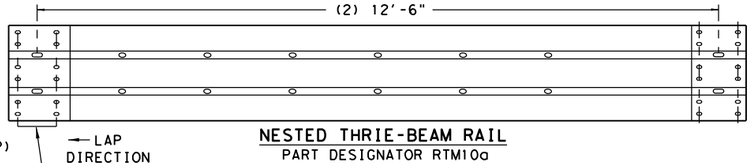
DIRECTION OF TRAFFIC





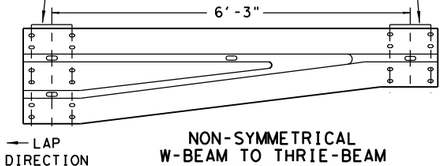
SIDE-VIEW

THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01b
NOTE: SEE GENERAL NOTE: 9



NESTED THRIE-BEAM RAIL
PART DESIGNATOR RTM10a

(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)



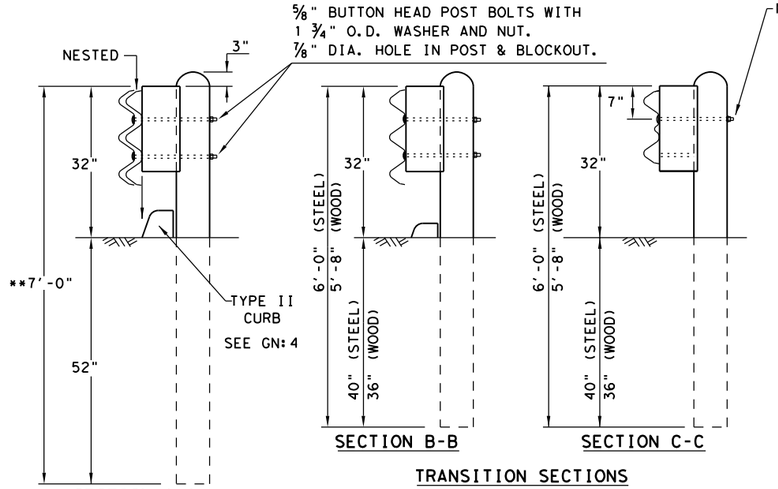
NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION 10GA.
PART DESIGNATOR RWT02a OR RWT02b

PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.

⅝" BUTTON HEAD POST BOLTS WITH 1 ¾" O.D. WASHER AND NUT.
⅞" DIA. HOLE IN POST & BLOCKOUT.

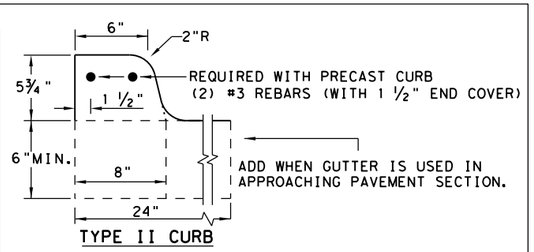
NOTE: ONLY (1) ⅝" BOLT REQUIRED AT THIS POST LOCATION.



SECTION A-A
SECTION B-B
SECTION C-C
TRANSITION SECTIONS
NOTE: ALL POST TYPES, SEE GENERAL NOTE: 5 & 6

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

THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

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

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

TYPE II CURB DETAILS

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

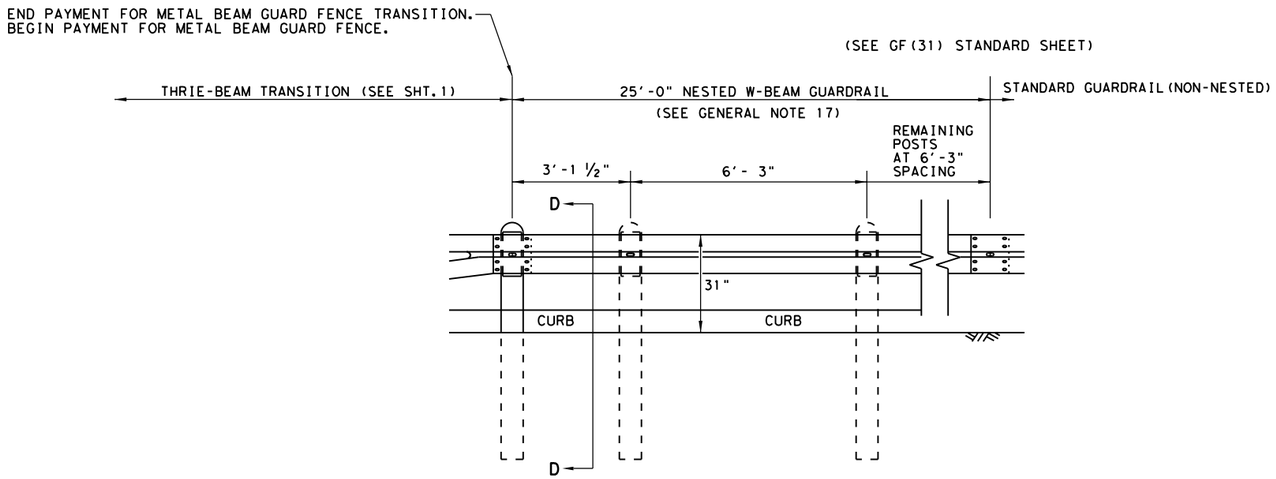
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

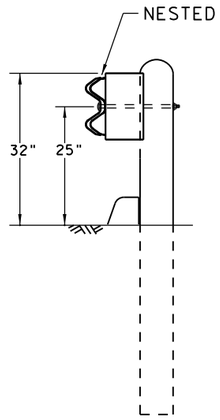
FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	001706	086		IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		69

DATE:
FILE:

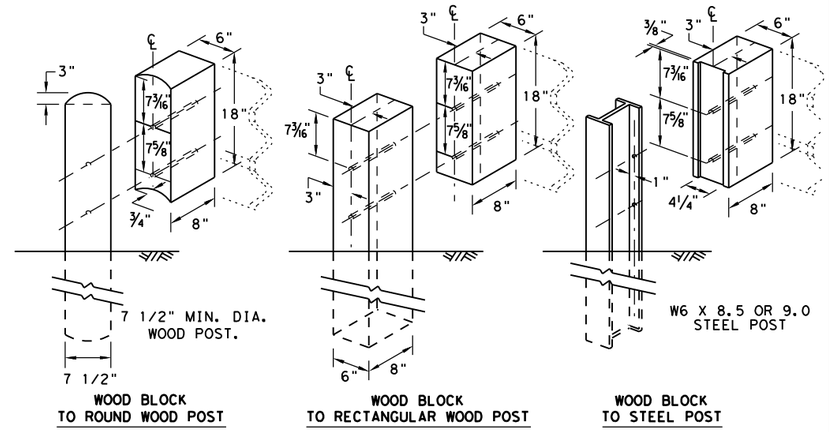
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

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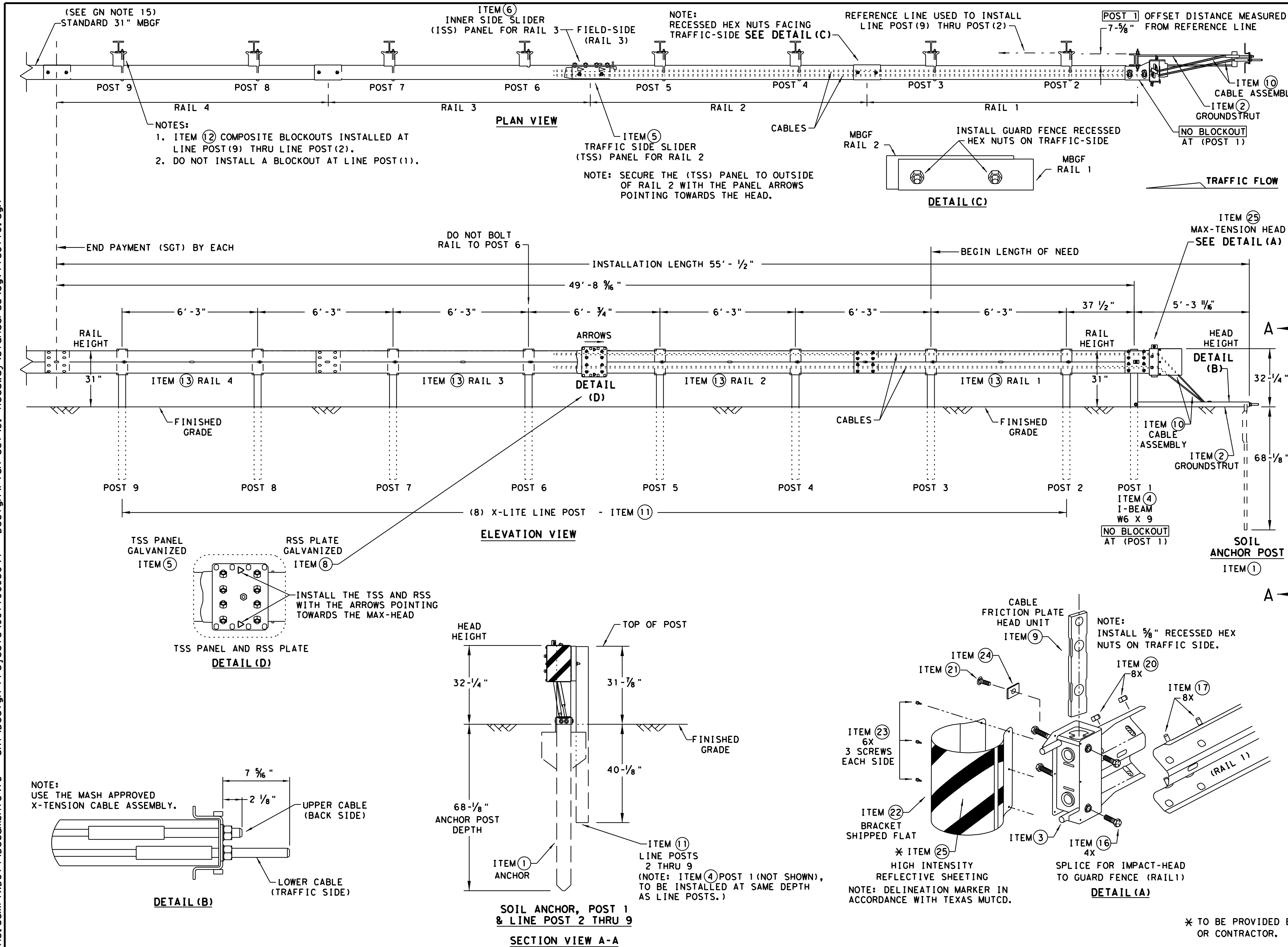
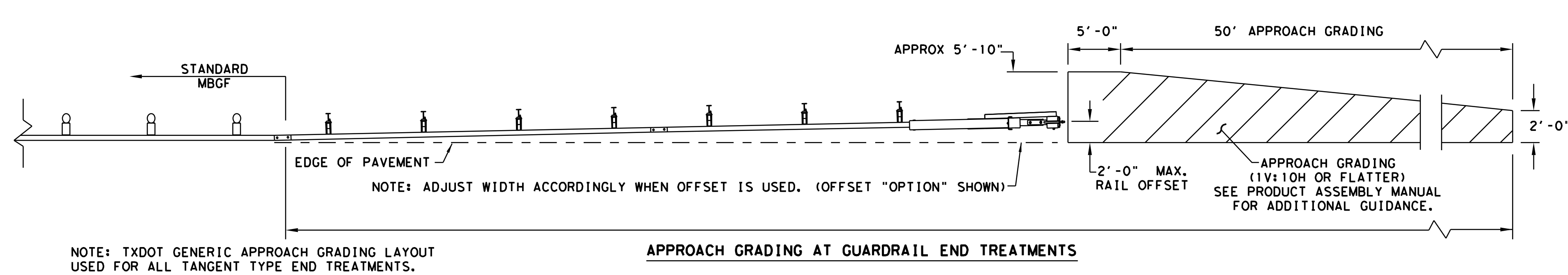




GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

	ITEM#	PART NUMBER	DESCRIPTION	QTY
	1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
	2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
	3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
	4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
	5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
	6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
	7	BSI-1610066-00	TOOTH - GEOMET	1
	8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
	9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
	10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
	11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
	12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
	13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
	14	BSI-1102027-00	X-LITE SQUARE WASHER	1
	15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
	16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
	17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
	18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
	19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
	20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
	21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
	22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
	23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
	24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
*	25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
**	26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
**	27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
	28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN. ITEM(26) 8" WOOD-BLOCKOUTS ITEM(27) 25' GUARD FENCE PANELS

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

Texas Department of Transportation | Design Division Standard

MAX-TENSION END TERMINAL MASH - TL-3

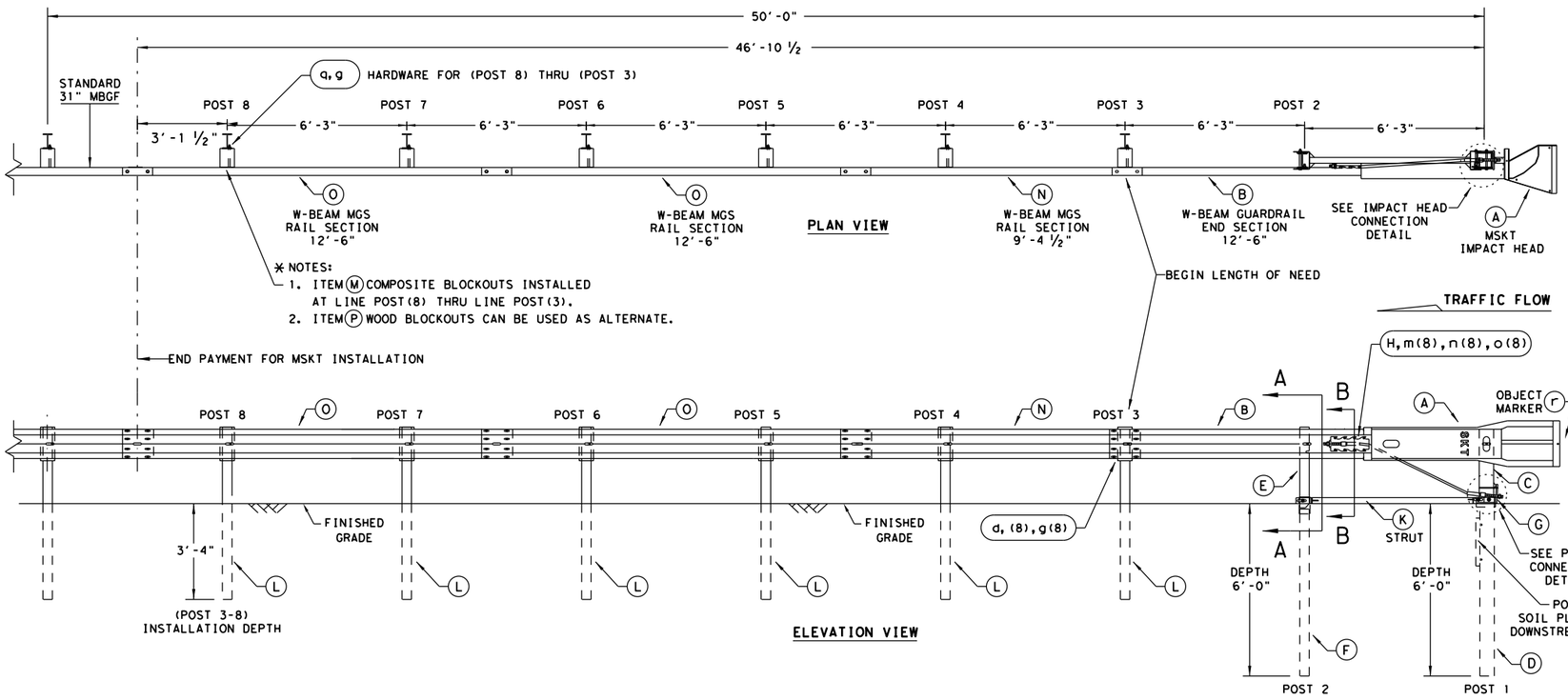
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
	DIST		COUNTY	SHEET NO.
	SAT		FRIO	71

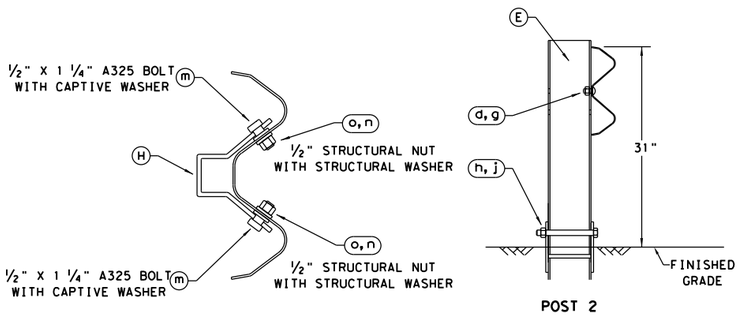
DATE: 10/30/2023
FILE: pw:\\txdot.projectwiseonline.com:TxDOT4\Documents\15 - SAT\Design Projects\0017-06-086

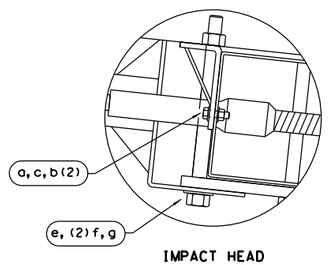
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSIONOF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

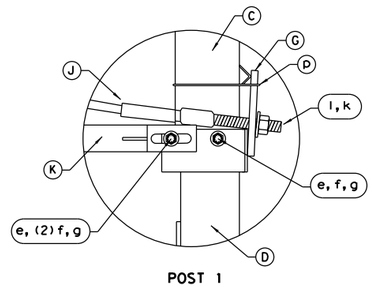
DATE:
FILE:

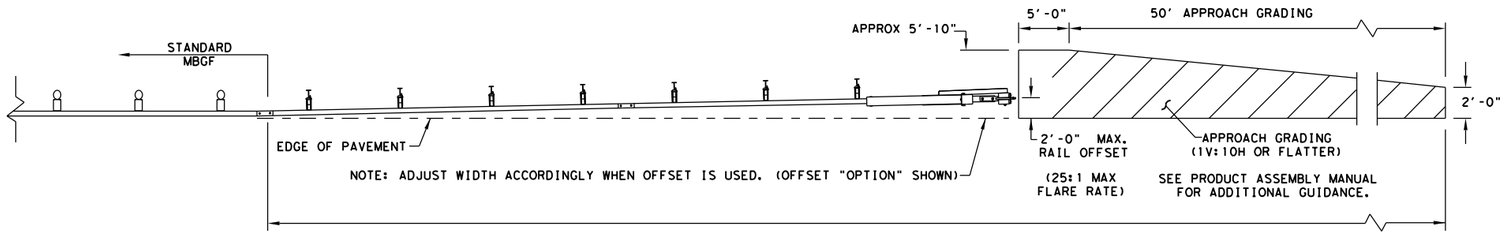


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

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

SEE NOTES: *

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0017	06	086	IH 35	
	DIST	COUNTY		SHEET NO.	
	SAT	FRIO		72	

DATE:
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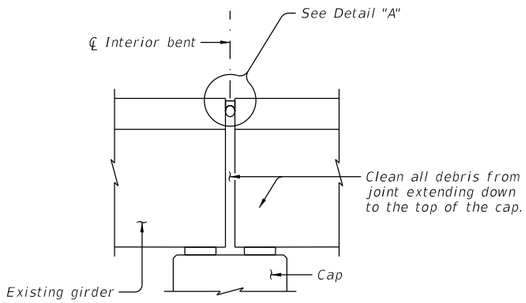
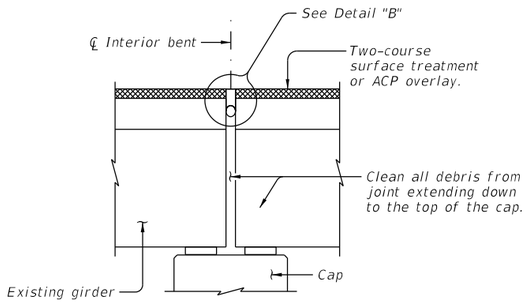


JOINT WITH SILICONE SEAL

(Used without ACP overlay)



JOINT W/ HOT-POURED RUBBER SEAL

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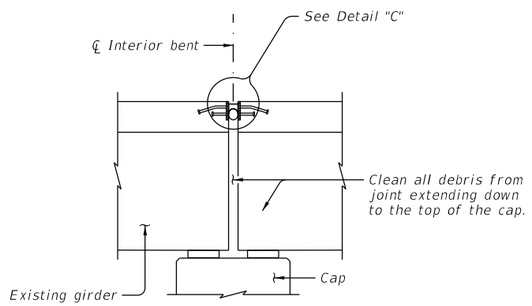

ARMOR JOINT

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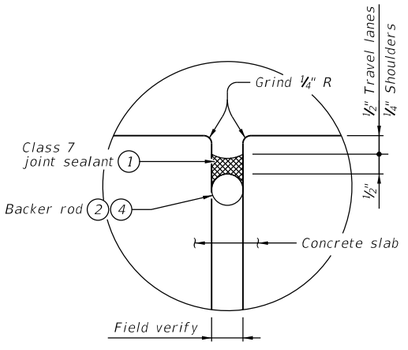

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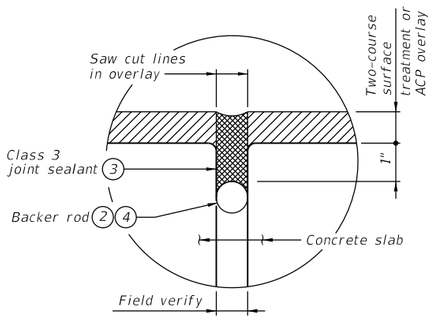

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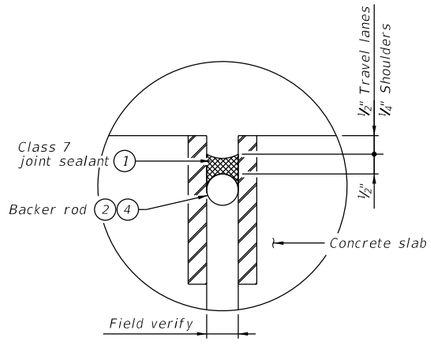

DETAIL "C"

(Stud anchors not shown for clarity.)

1. Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
2. Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
3. Use Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
4. Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH SILICONE SEAL:

1) Clean joint opening of all existing expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
4) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of concrete in travel lanes and ¼" below top of concrete in shoulders.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH HOT-POURED RUBBER SEAL:

1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
4) Seal the joint opening with a Class 3 joint sealant. Seal flush to the top of the asphaltic concrete pavement.

PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS:

1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
2) Abrasive blast clean existing steel surface where silicone seal is to be placed.
3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
4) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
5) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of concrete in travel lanes and ¼" below top of concrete in shoulders.

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LICENSED PROFESSIONAL ENGINEER
10/26/2023

GENERAL NOTES:

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting asphalt overlay, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the linear foot.

Obtain approval for all tools, equipment, materials and techniques proposed to clean and seal the joint.

Provide Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay.

Provide Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete.

Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 joint sealant cannot be effectively placed in the vertical position, a Class 4 joint sealant compatible with the Class 7 joint sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with Manufacturer's specifications.

Texas Department of Transportation | Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

NBI: VARIOUS

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REVISIONS	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		73

DATE:
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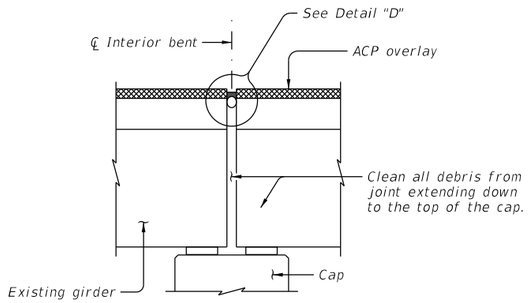
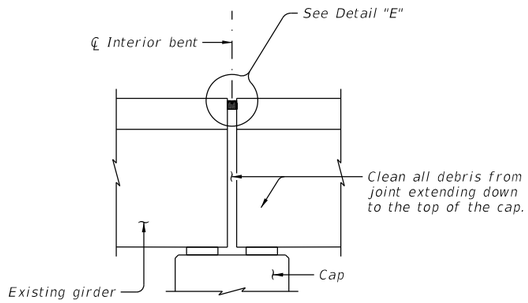


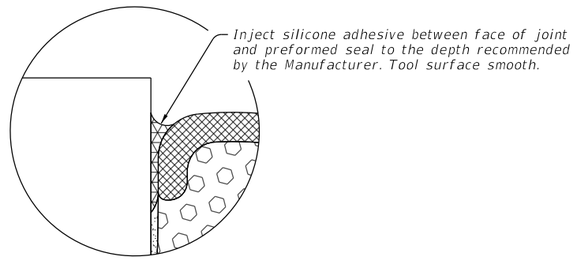
HEADER JOINT WITH SILICONE SEAL

(used with ACP overlay with joints more than 100 ft apart)

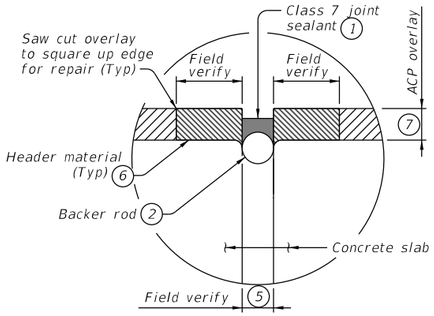


JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL

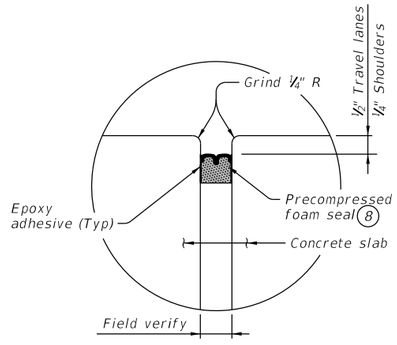
(used without ACP overlay)



SILICONE INJECTION



DETAIL "D"



DETAIL "E"

PROCEDURE FOR CLEANING AND SEALING HEADER JOINT WITH SILICONE SEAL AND HEADER JOINT REPAIR

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Saw cut and remove damaged portions of existing header material to neat lines. Repair deck joint spalls greater than 2" deep in accordance with Item 785, "Bridge Joint Repair or Replacement." Shallower spalls may be filled with header material.

3) Clean the voided region of all materials that could inhibit the bond between header material and concrete or steel.

4) Form the joint opening to the required width and place header material to fill voided region. Repair header material in accordance with Item 785, "Bridge Joint Repair or Replacement."

5) Place backer rod into joint opening 1" below the top of header material. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.

6) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of header in travel lanes and ¼" below top of header in shoulders.

PROCEDURE FOR CLEANING AND SEALING JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." When sealing joints for slab spans, slab beam spans, pan girder spans, or box beam spans, fill void below proposed seal with extruded polystyrene foam.

2) Correctly size joint seal based on field measurement and in accordance with Manufacturer's specifications. Multiple seal widths may be required. Ensure proper seal is selected for each joint.

3) Abrasive blast clean existing joint surfaces where seal is to be applied.

4) Wipe down joint surfaces to remove contaminants.

5) Mask areas adjacent to joint opening sufficiently to keep epoxy off deck surface.

6) Apply epoxy to joint opening side surfaces.

7) While epoxy is still tacky, remove shrink wrap from seal and install in joint opening.

8) Recess top of joint seal ½" in travel lanes and ¼" in shoulders.

9) Inject silicone adhesive along top interface of seal with joint side surface according to Manufacturer's recommendations. Tool to spread adhesive as necessary. See Silicone Injection detail.

(1) Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

(2) Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(5) Match existing joint opening or set at a minimum:
- a. 1" at 70°F when the distance between joints is 150 ft or less
- b. 2" at 70°F when the distance between joints is greater than 150 ft.
- c. As directed by the Engineer.

(6) Cleaning and sealing existing header joints does not necessitate replacement of existing header material. If replacement of header material is necessary, as determined by the Engineer, use header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems." Match the thickness of the header material with the thickness of the overlay as shown in the plans, but do not exceed 4". Place header material flush with roadway surface. Do not cantilever header material over the joint opening. Repair of header material will be paid for in accordance with Item 785-6006, "Bridge Joint Repair (Header)."

(7) Maximum thickness is 4".

(8) See table of Approved Precompressed Foam Seal Manufacturers on Sheet 3 of 3.

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Texas Department of Transportation | Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

NBI: VARIOUS

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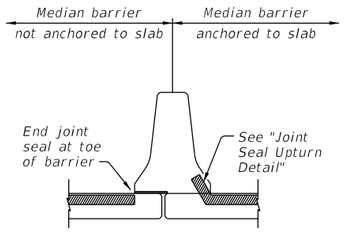
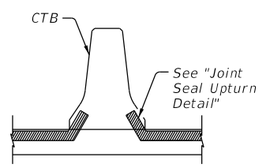
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		74

DATE:
FILE:

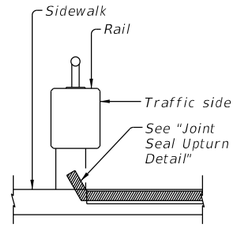
TABLE OF ESTIMATED QUANTITIES						
STRUCTURE NUMBER (FEATURE CROSSED)	JOINT TYPE	ITEM	DESCRIPTION	NUMBER OF JOINTS	UNIT	QUANTITY
150830001706221 (2ND STREET) (NB)	ARMOR JOINT	0454 6008	HEADER TYPE EXPANSION JOINT	2	CF	14
		0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)		LF	84.5
150830001706222 (2ND STREET) (SB)	ARMOR JOINT	0454 6008	HEADER TYPE EXPANSION JOINT	2	CF	14
		0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)		LF	84.5
150830001706219 (MOORE HOLLOW) (NB)	1/2" PREMOLDED EXP. JOINT	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	4	LF	84.5
150830001706220 (MOORE HOLLOW) (SB)	1/2" PREMOLDED EXP. JOINT	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	3	LF	84.5
150830001706217 (FM462) (NB)	ARMOR JOINT	0454 6008	HEADER TYPE EXPANSION JOINT	2	CF	14
		0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)		LF	84.5
150830001706218 (FM462) (SB)	ARMOR JOINT	0454 6008	HEADER TYPE EXPANSION JOINT	2	CF	14
		0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)		LF	84.5
150830001706215 (DRAW) (NB)	1/2" PREMOLDED EXP. JOINT	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	3	LF	84.5
150830001706216 (DRAW) (SB)	1/2" PREMOLDED EXP. JOINT	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	3	LF	84.5
150830001706214 (BLACK CREEK) (SB)	3/8x4" PREMOLDED EXP. JOINT	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	7	LF	84.5
150830001706213 (BLACK CREEK) (NB)	3/8x4" PREMOLDED EXP. JOINT	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	7	LF	84.5



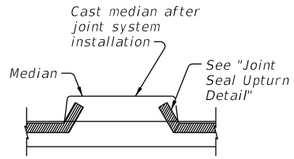
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



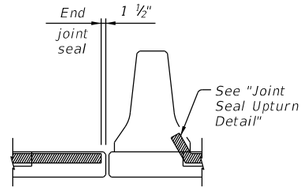
AT CONCRETE TRAFFIC BARRIER



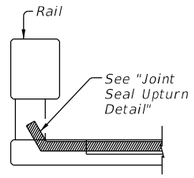
AT SIDEWALK BEHIND BRIDGE RAIL



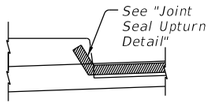
AT RAISED MEDIAN



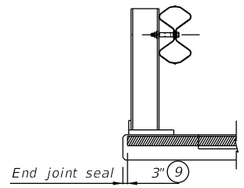
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



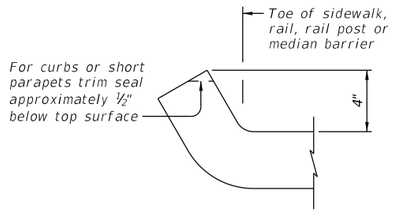
AT SIDEWALK



AT STEEL POST BRIDGE RAIL

JOINT SEALANT TERMINATION DETAILS

(9) 1 ½" for precompressed foam and silicone seal



JOINT SEAL UPTURN DETAIL

APPROVED PRECOMPRESSED FOAM SEAL MANUFACTURERS	
MANUFACTURER	SEAL TYPE
Watson Bowman Acme	Wabo FS
SSI	Silspec SES
Sealtite	Sealtite 50N
EMSEAL	BEJS

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
11/27/2023

SHEET 3 OF 3

Texas Department of Transportation | Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

NBI: VARIOUS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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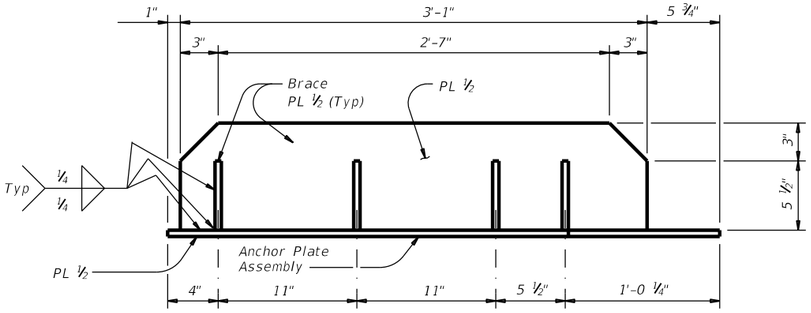
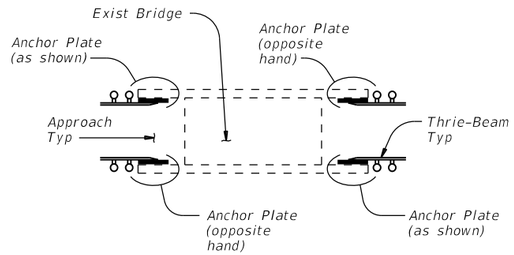
	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		75

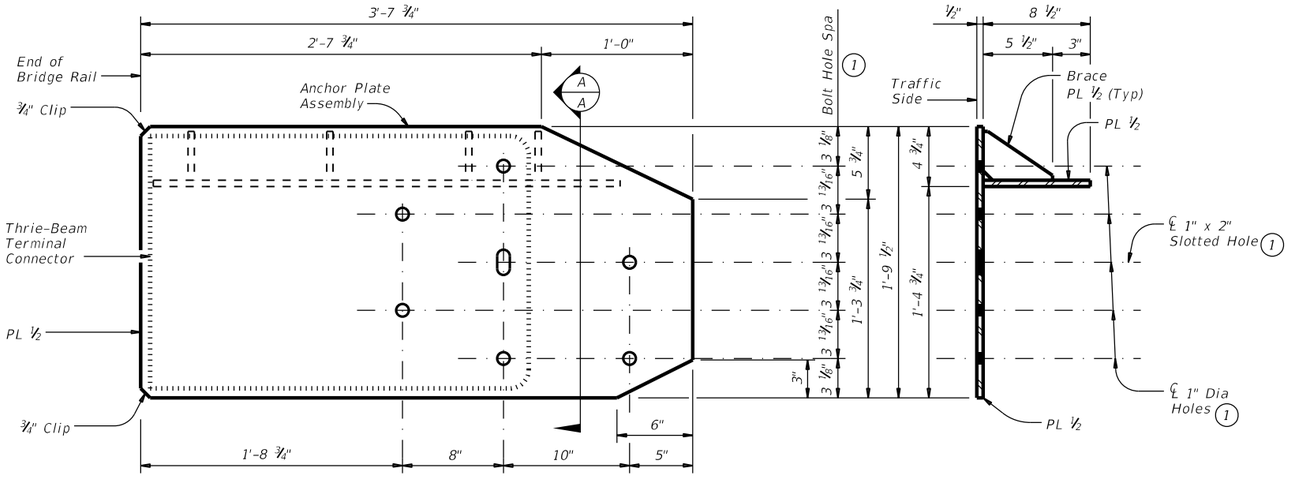
DATE:
FILE:



PLAN



LOCATION DETAILS

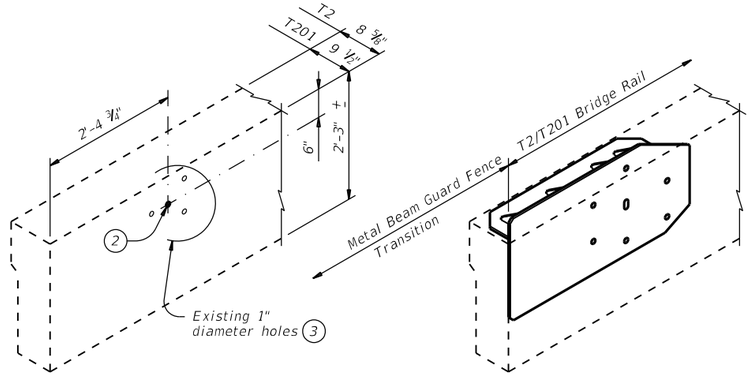


ROADSIDE ELEVATION

SECTION A-A

ANCHOR PLATE DETAILS

Anchor Plate shown is detailed for one end of one side of rail only. For other side, Anchor Plate must be built opposite hand.

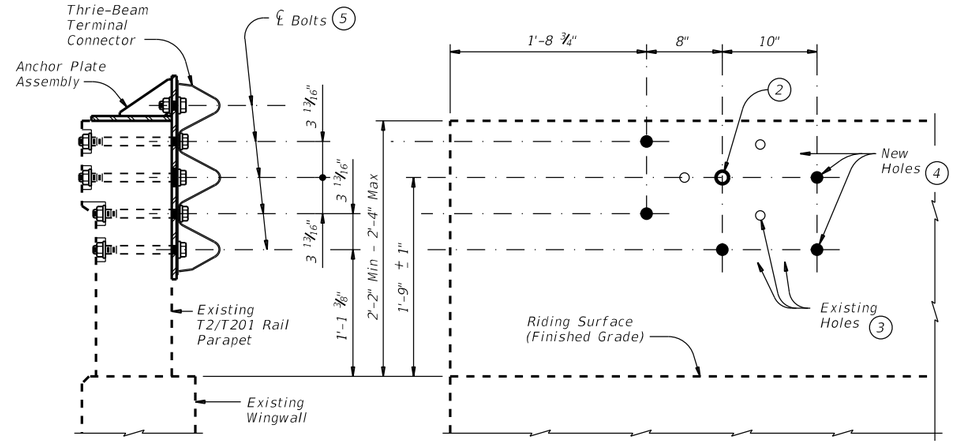


EXISTING PARAPET

Shown after removal of existing MBGF Transition connector and prior to coring new bolt holes

ANCHOR PLATE PLACEMENT

INSTALLATION DETAILS



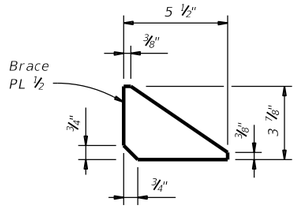
SECTION

Showing completed installation

ROADSIDE ELEVATION

Anchor Plate assembly and Thrie-Beam Terminal Connector not shown for clarity

THRIE-BEAM TERMINAL CONNECTION DETAILS 1



BRACE PLATE DETAIL

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

On T2/T201 rail remove any MBGF (W-beam) and attachment hardware, from the face of rail if present, prior to installation of new MBGF Transition. Dispose of these materials as directed by the Engineer. Plugging of newly exposed existing bolt holes is not necessary except as stated here in or otherwise indicated on the plans. This work is considered subsidiary to the pertinent bid items.

Attach the MBGF Transition to the existing parapet using the Anchor Plate assembly and the Thrie-Beam Terminal Connector. Splice the Thrie-Beam Terminal Connector and Thrie-Beam with the normal 12 connection bolts. Refer to Metal Beam Guard Fence Transition and Metal Beam Guard Fence detail sheets for additional details and information not shown herein.

MATERIAL NOTES:

Fabricate Anchor Plate assembly with steel conforming to either ASTM A36 or A572 Gr 50. Anchor Plate assembly must be free of burrs, sharp edges and weld splatter. Grind edges and corners to a 1/16" flat or radius. Hot-dip galvanize Anchor Plate assembly in accordance with Item 445, "Galvanizing". Anchor bolts, nuts, and washers must conform to Item 449, "Anchor Bolts".

GENERAL NOTES:

These details are for retrofitting existing rails only, not new construction, with a Thrie-Beam Terminal Connector.

Shop drawings are not required for this installation.

Payment for materials, fabrication, and installation of this assembly are to be included in unit price bid in accordance with Item 540 "Mtl Bm Gd Fen Trans (Anchor Plate)".

Estimated weight of a single Anchor Plate assembly, including bolts, nuts, and washers, but not including the Thrie-Beam Terminal Connector = 190 Lbs.

1. *The Contractor must verify that locations of bolt holes match those in the Thrie-Beam Terminal Connector to be installed in that location prior to fabrication of Anchor Plate assembly and prior to coring bolt holes in the existing T2/T201 parapet.*
2. *If the existing holes are aligned as expected, use the indicated existing 1" diameter hole in the installation of the Anchor Plate assembly and the Thrie-Beam Terminal Connector.*
3. *If the existing holes are not aligned as expected, holes that cannot be utilized in the installation and are within 3" of a new bolt hole must be filled with epoxy grout prior to coring new holes.*
4. *Drill new 1" diameter holes, each with a 2 ½" diameter x 1" deep recess, through existing railing parapet. Note that recesses are only required when pedestrian sidewalks are adjacent to back of rail unless directed otherwise by the Engineer. Holes should be perpendicular to the roadside face of the parapet. Drill holes and recesses with coring type equipment. Percussion drilling is not allowed. Patch spalls, when directed by the Engineer, in accordance with Item 429, "Concrete Structure Repair", at the Contractor's expense.*
5. *7 ~ ⅞" diameter ASTM F3125 Gr A325 Hex Head Anchor Bolts each with 2 ~ 1 ¾" O.D. washers. Place washer under each head and nut. Provide bolts of sufficient length to extend a minimum of ½" beyond nut. Cut excess bolt length and paint cut surface with zinc-rich paint if directed by the Engineer.*

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Texas Department of Transportation

Bridge Division Standard

T2/T201 TRANSITION RETROFIT GUIDE

T2/T201TR (MOD)

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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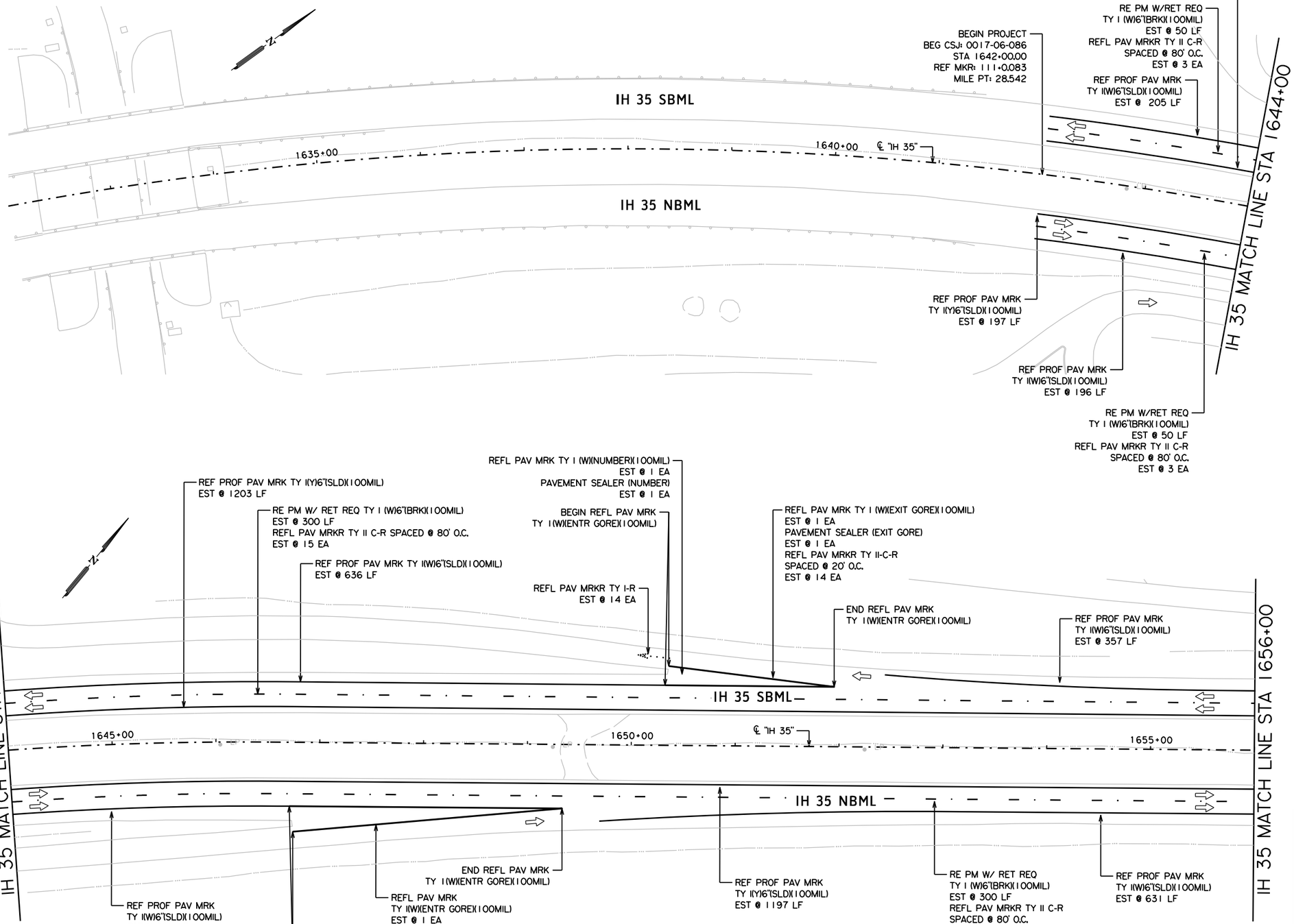
REVISIONS	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		76



	QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	4143
666-6075	REFL PAV MRK TY I (W)(NUMBER)(100MIL)	EA	1
666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	1
666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	1
666-6225	PAVEMENT SEALER 6"	LF	5790
666-6239	PAVEMENT SEALER (ENTR GORE)	EA	1
666-6240	PAVEMENT SEALER (EXIT GORE)	EA	1
666-6248	PAVEMENT SEALER (NUMBER)	EA	1
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	700
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	2291
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	2799
672-6008	REFL PAV MRKR TY I-R	EA	14
672-6010	REFL PAV MRKR TY II-C-R	EA	75

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144653
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10/30/2023
JAMES O. SAKAI, P.E. DATE

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IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 1 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		77
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9386
666-6225	PAVEMENT SEALER 6"	LF	10802
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	4802
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4800
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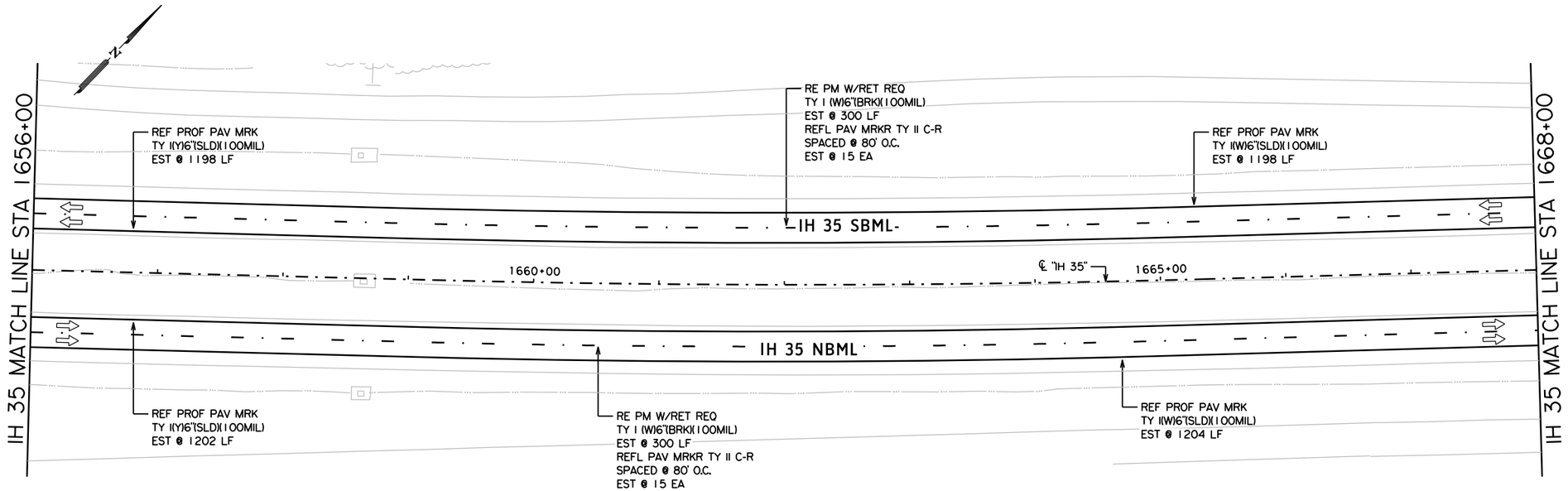

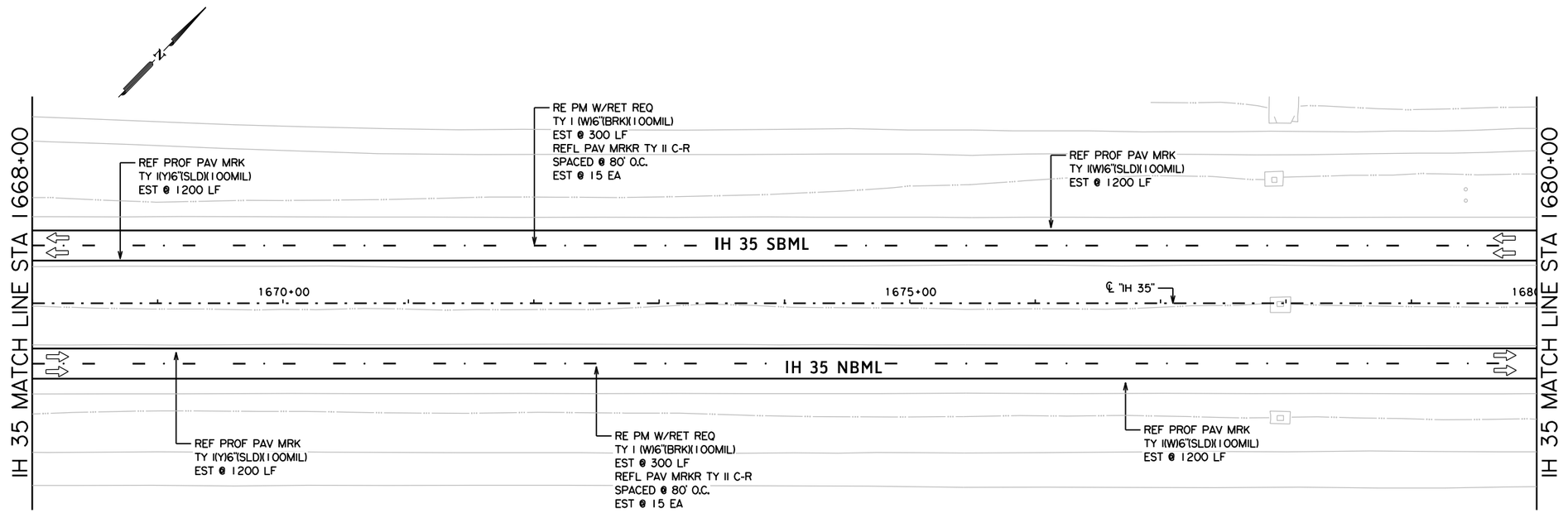

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JAMES O. SAKAI, P.E. DATE

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Texas Department of Transportation

IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 2 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		78
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

	QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9600
666-6225	PAVEMENT SEALER 6"	LF	10802
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	4801
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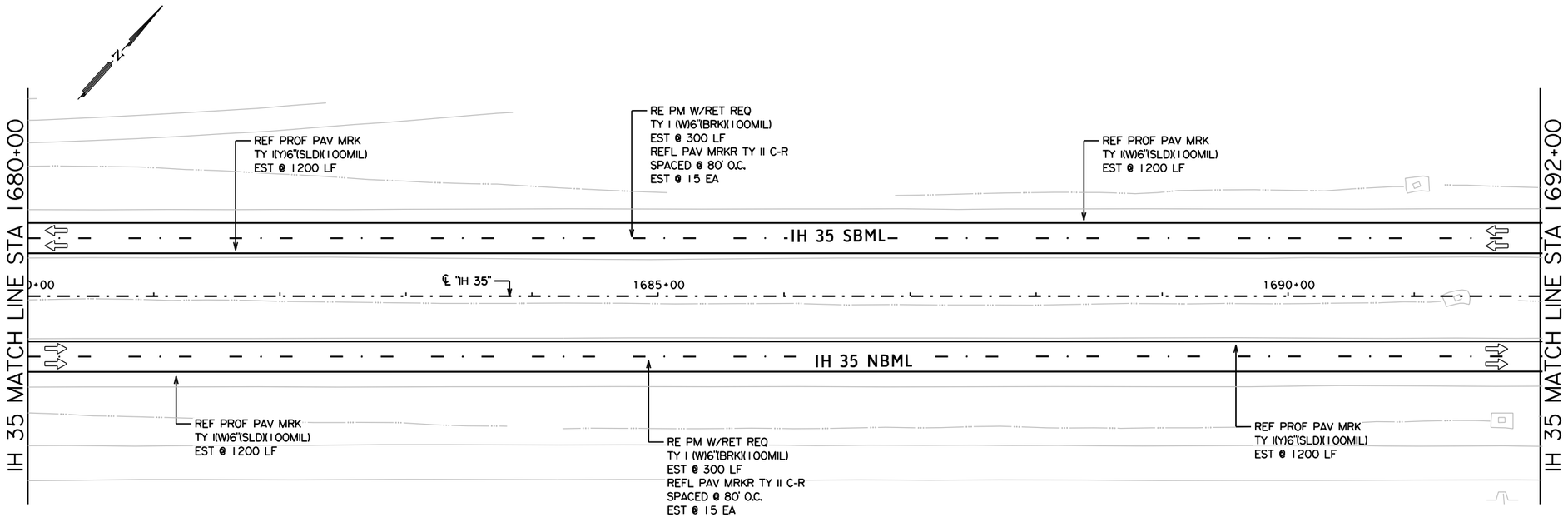

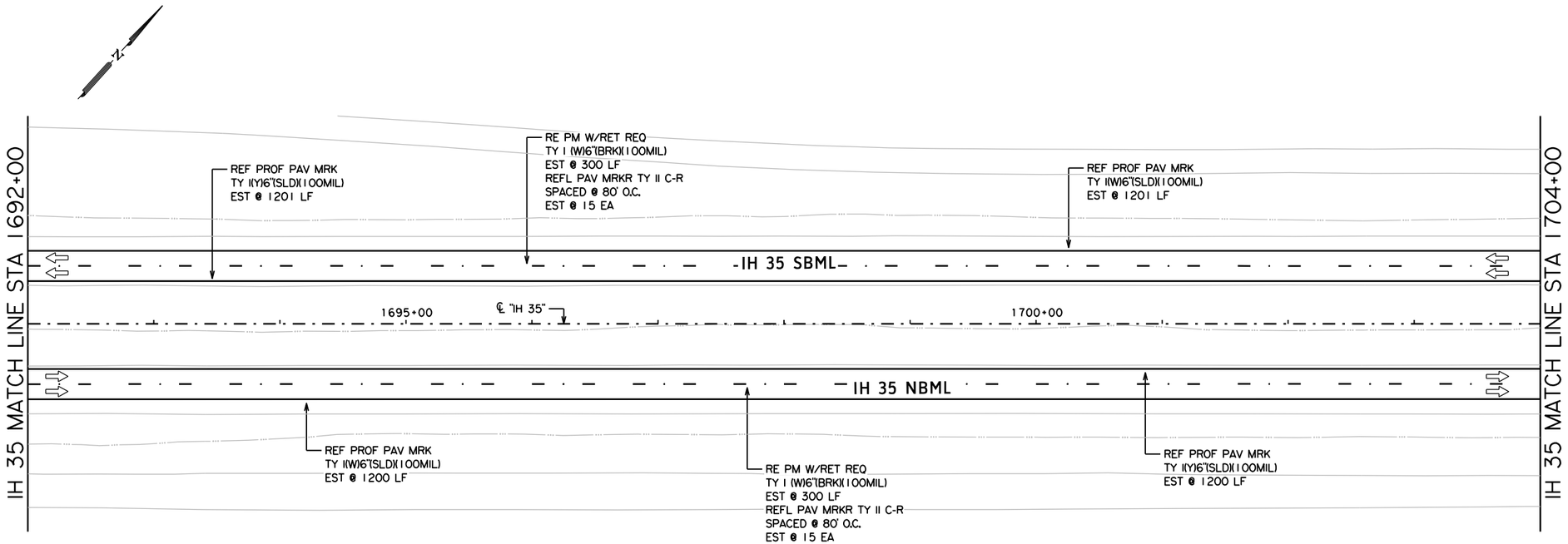

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JAMES O. SAKAI, P.E. DATE

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Texas Department of Transportation

IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 3 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		79
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9599
666-6225	PAVEMENT SEALER 6"	LF	10799
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY II(W)6"(SLD)(100MIL)	LF	4800
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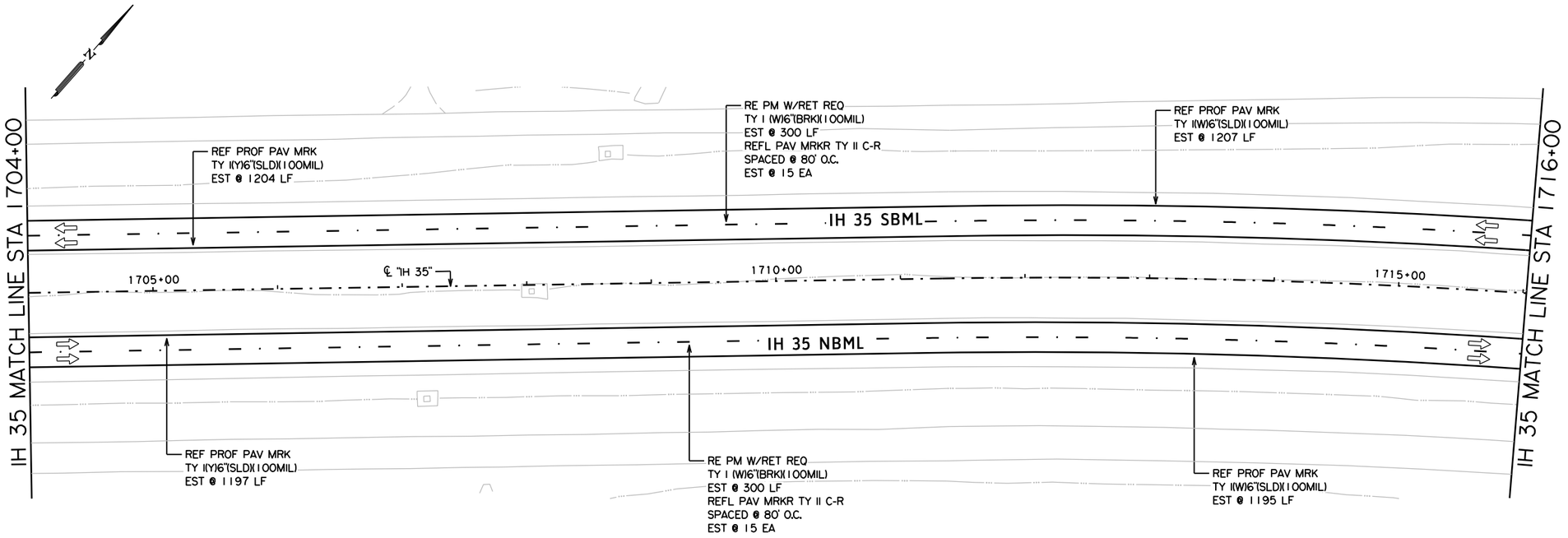

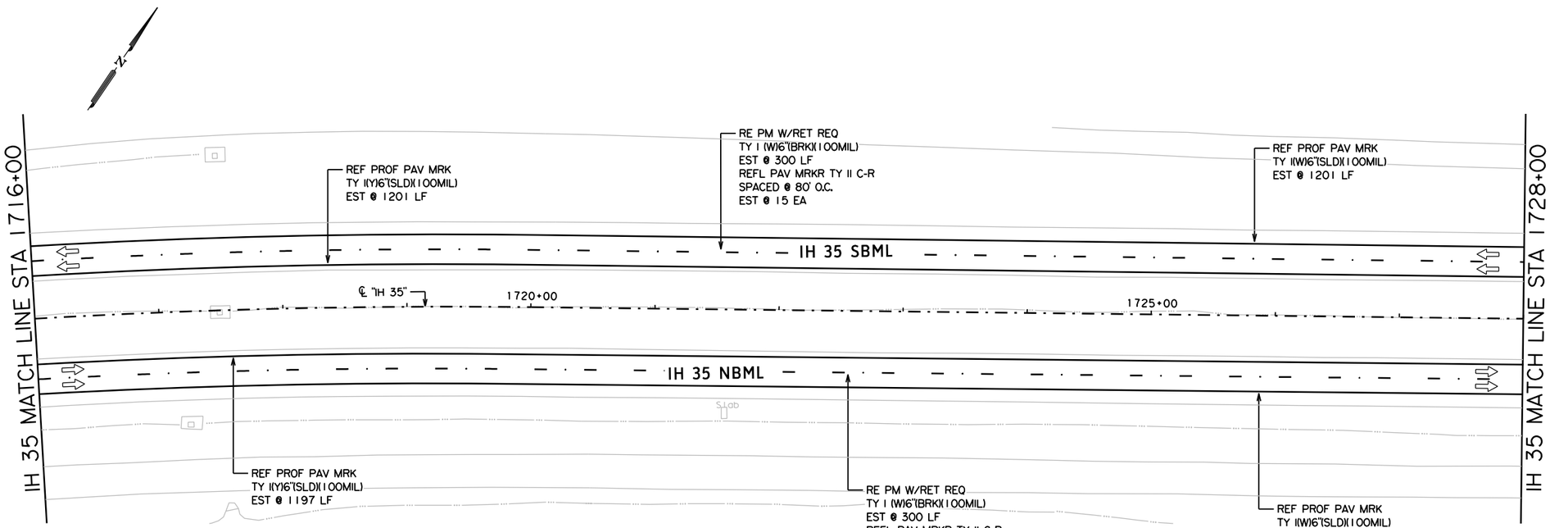

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JAMES O. SAKAI, P.E. DATE

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IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 4 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		80
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9600
666-6225	PAVEMENT SEALER 6"	LF	10802
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	4802
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4800
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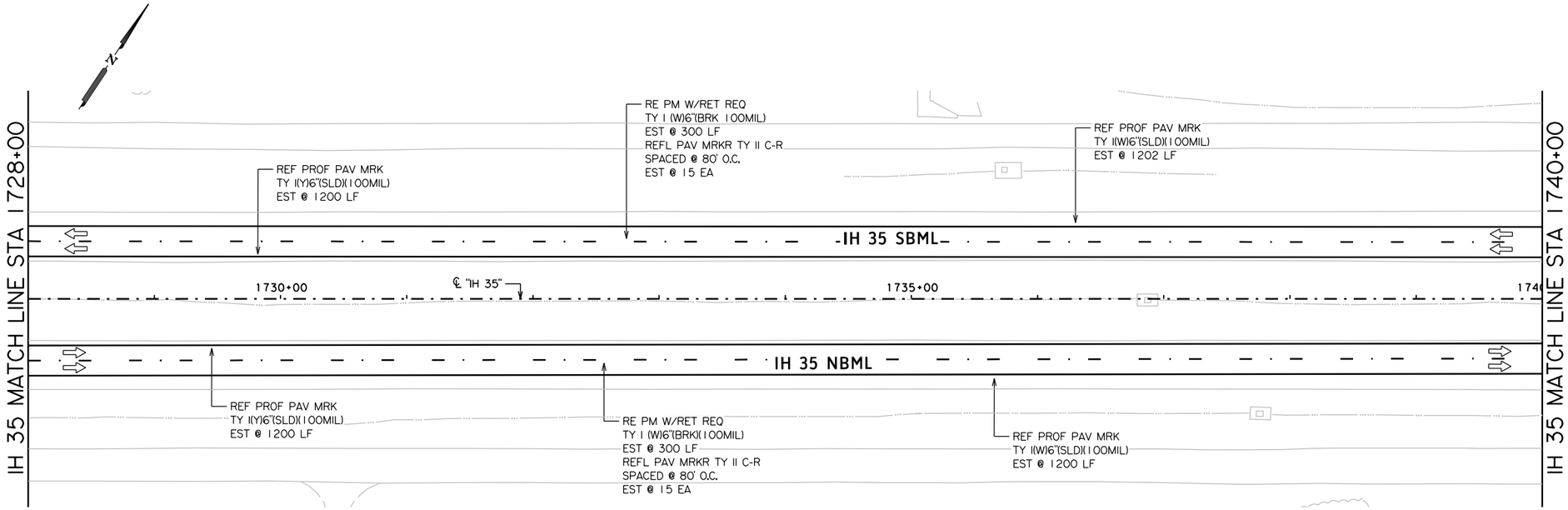

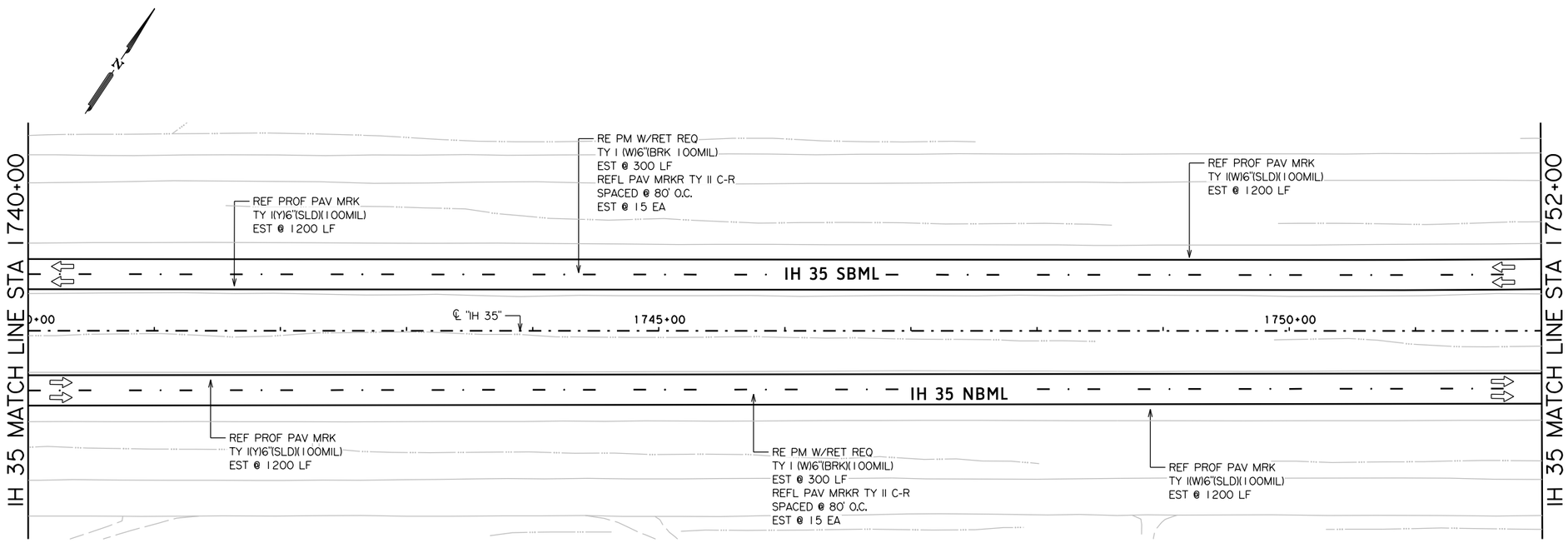

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SHEET 5 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		81
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	6680
666-6075	REFL PAV MRK TY I (W)(NUMBER)(100MIL)	EA	1
666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	1
666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	1
666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA	7
666-6225	PAVEMENT SEALER 6"	LF	12673
666-6239	PAVEMENT SEALER (ENTR GORE)	EA	1
666-6240	PAVEMENT SEALER (EXIT GORE)	EA	1
666-6243	PAVEMENT SEALER (YLD TRI)	EA	7
666-6248	PAVEMENT SEALER (NUMBER)	EA	1
666-6306	RE PM W/RET REQ TY I (W)16"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)16"(SLD)(100MIL)	LF	5708
666-6347	REF PROF PAV MRK TY I(Y)16"(SLD)(100MIL)	LF	5660
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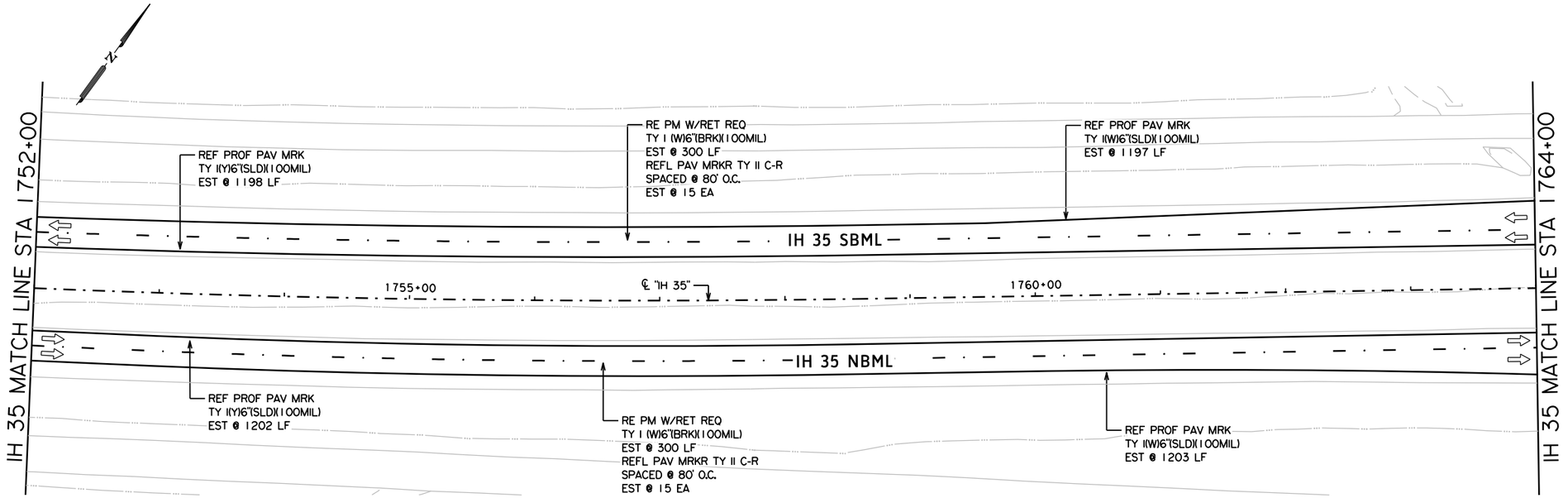

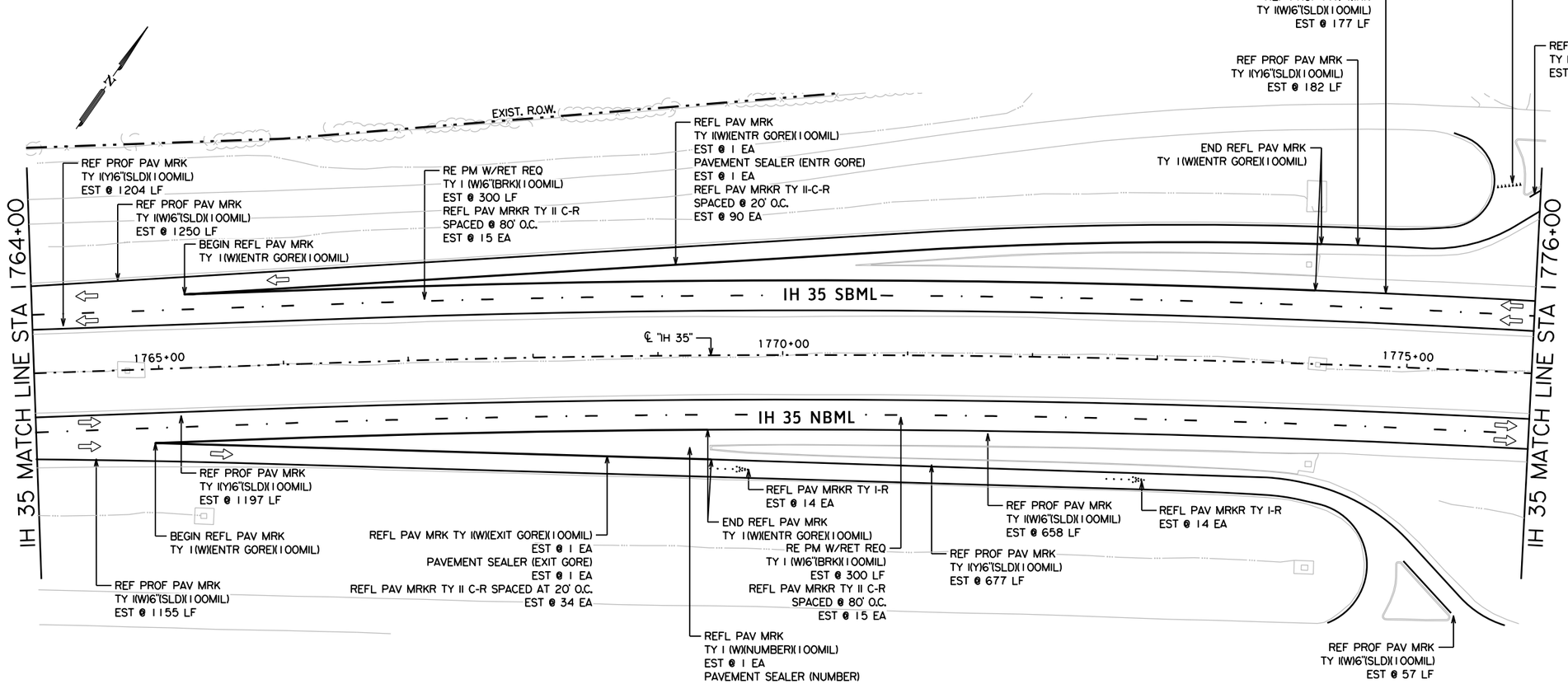

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SHEET 6 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		82
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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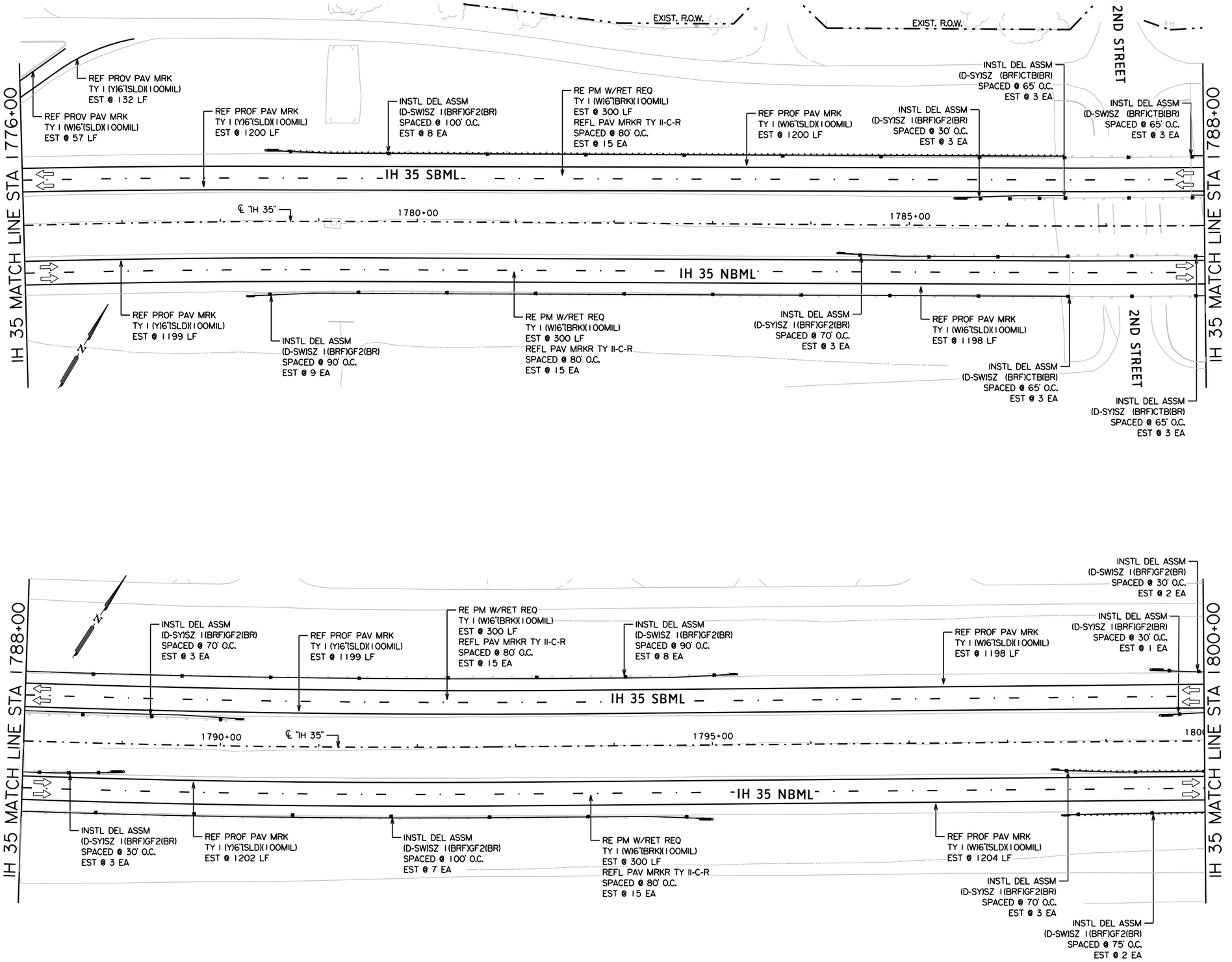

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	8683
658-6063	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BR)	EA	36
658-6065	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2(BR)	EA	16
658-6069	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BR)	EA	6
658-6070	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BR)	EA	6
666-6225	PAVEMENT SEALER 6"	LF	10989
666-6306	RE PM W/RET REQ TY I (W)16"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)16"(SLD)(100MIL)	LF	4857
666-6347	REF PROF PAV MRK TY I(Y)16"(SLD)(100MIL)	LF	4800
672-6010	REFL PAV MRKR TY II-C-R	EA	60

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JAMES O. SAKAI, P.E. DATE

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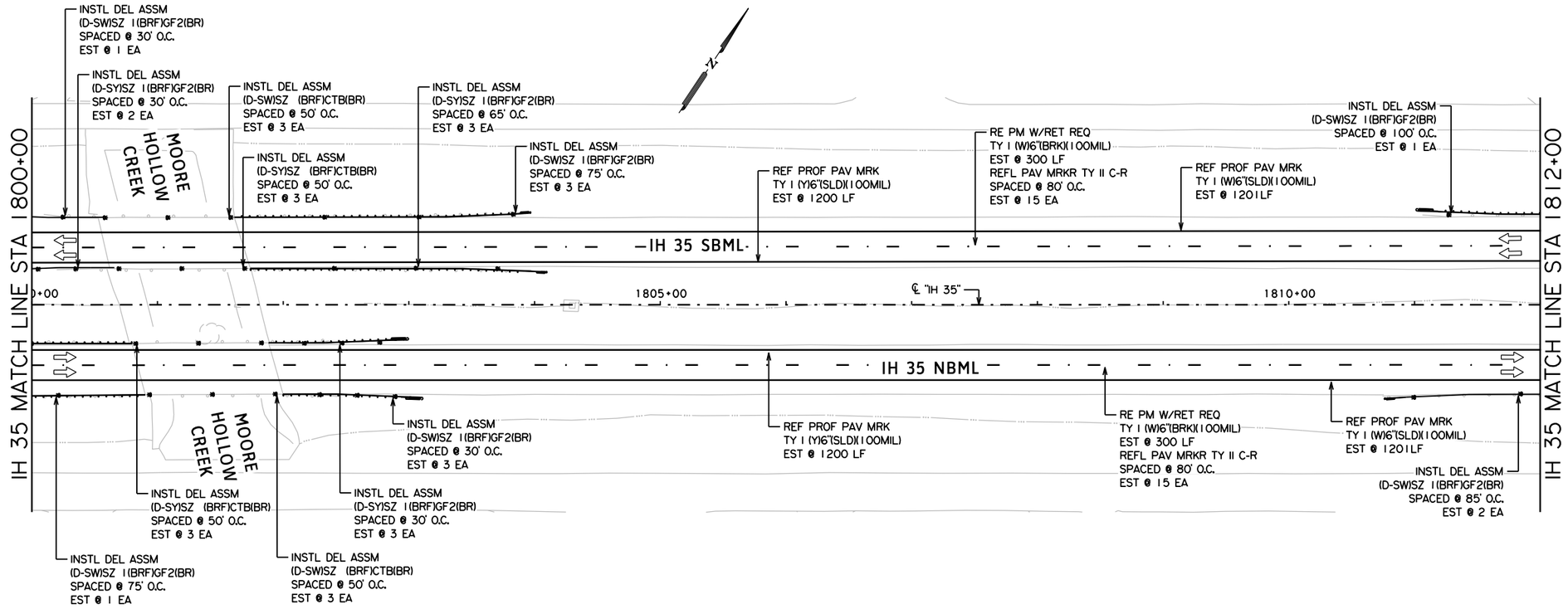
Texas Department of Transportation

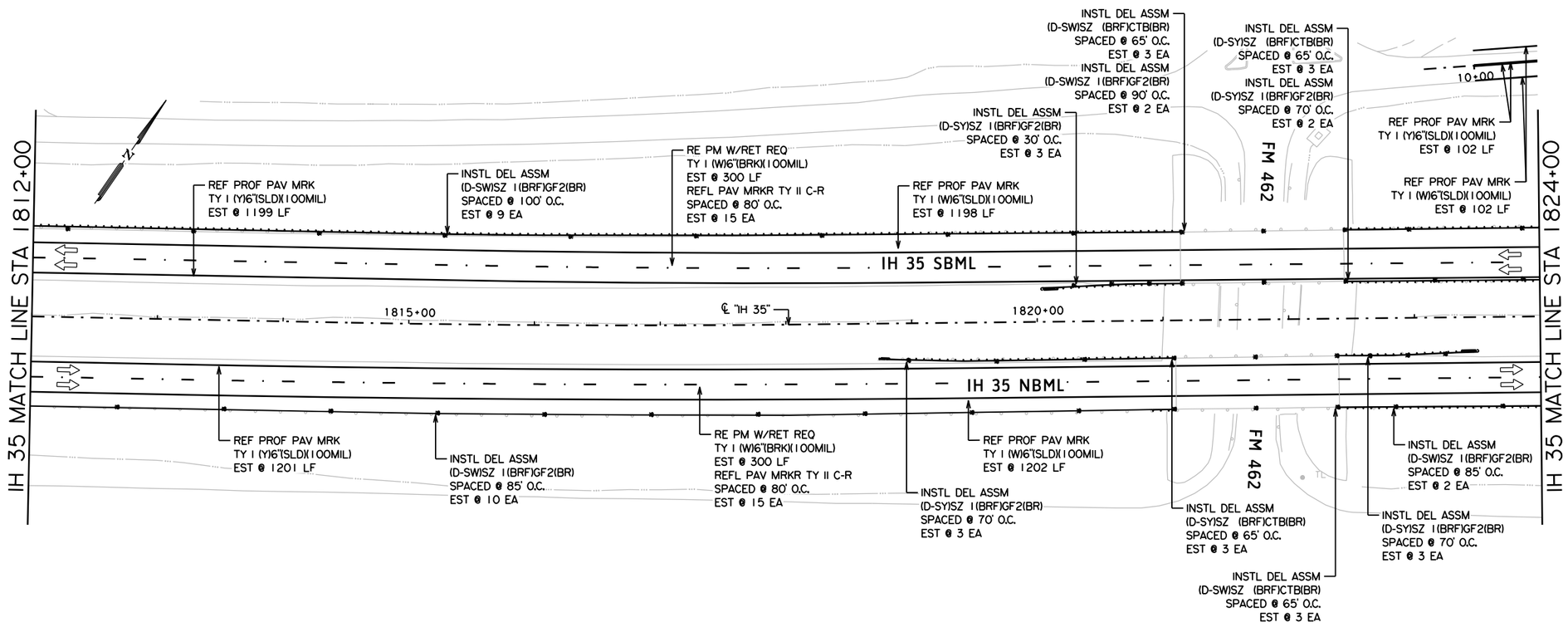
IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 7 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	83

STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





	QUANTITY SUMMARY CSJ: 0017-06-086		
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658-6065	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2(BR)	EA	19
658-6069	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BR)	EA	12
658-6070	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BR)	EA	12
666-6225	PAVEMENT SEALER 6"	LF	11006
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	4904
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4902
672-6010	REFL PAV MRKR TY II-C-R	EA	60

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PAVEMENT MARKINGS LAYOUT

SHEET 8 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	84

STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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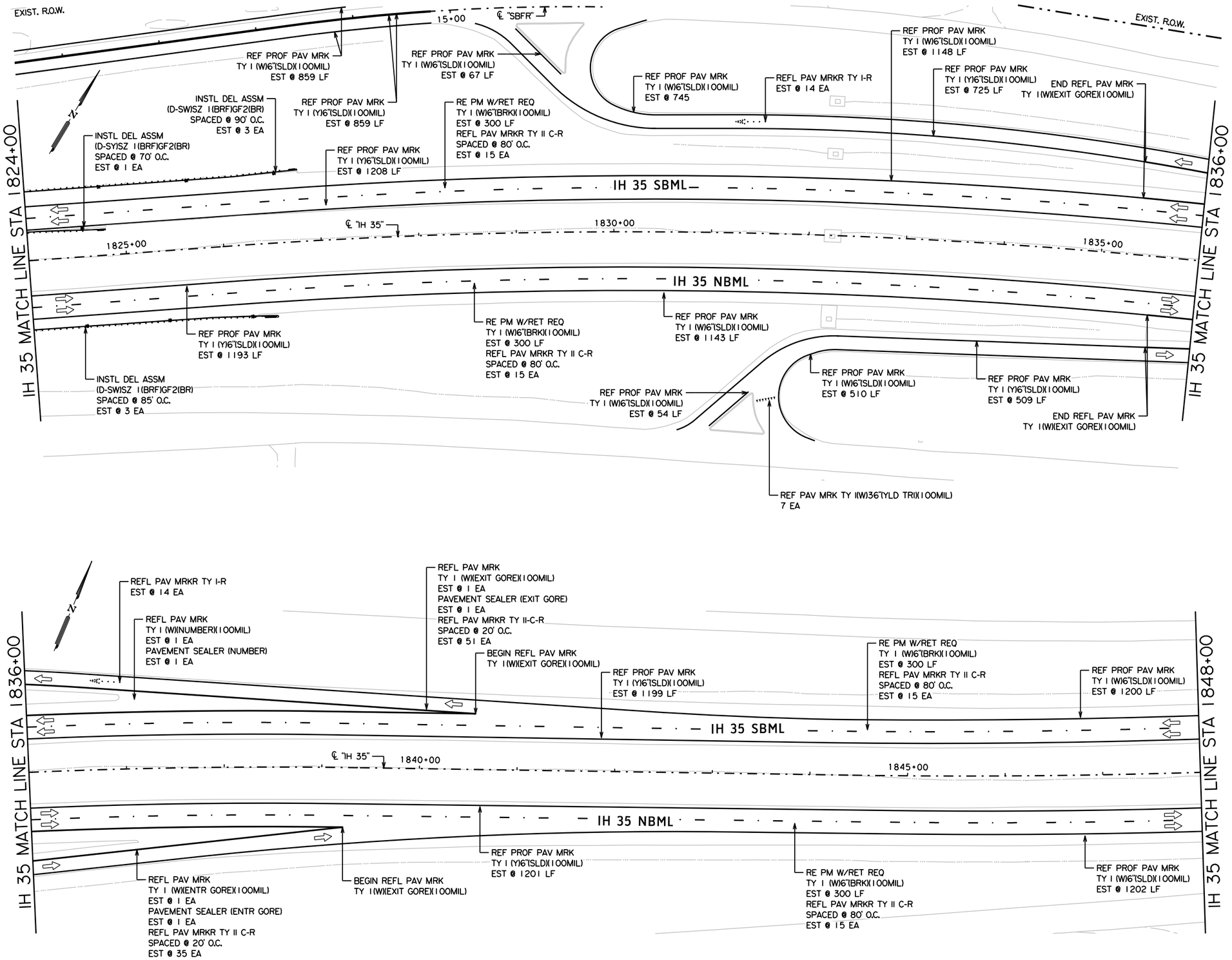

	QUANTITY SUMMARY CSJ: 0017-06-086		
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666-6075	REFL PAV MRK TY I (W)(NUMBER)(100MIL)	EA	1
666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	1
666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	1
666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA	7
666-6225	PAVEMENT SEALER 6"	LF	15137
666-6239	PAVEMENT SEALER (ENTR GORE)	EA	1
666-6240	PAVEMENT SEALER (EXIT GORE)	EA	1
666-6243	PAVEMENT SEALER (YLD TRI)	EA	7
666-6248	PAVEMENT SEALER (NUMBER)	EA	1
666-6306	RE PM W/RET REQ TY I (W)16"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)16"(SLD)(100MIL)	LF	7787
666-6347	REF PROF PAV MRK TY I(Y)16"(SLD)(100MIL)	LF	6894
672-6008	REFL PAV MRKR TY I-R	EA	28
672-6010	REFL PAV MRKR TY II-C-R	EA	146

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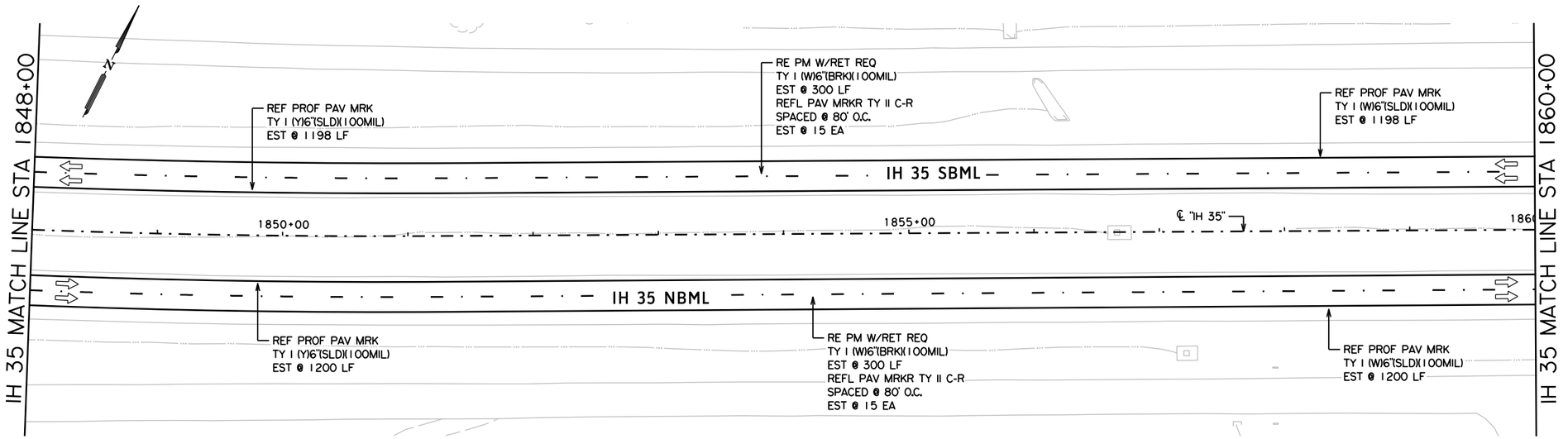
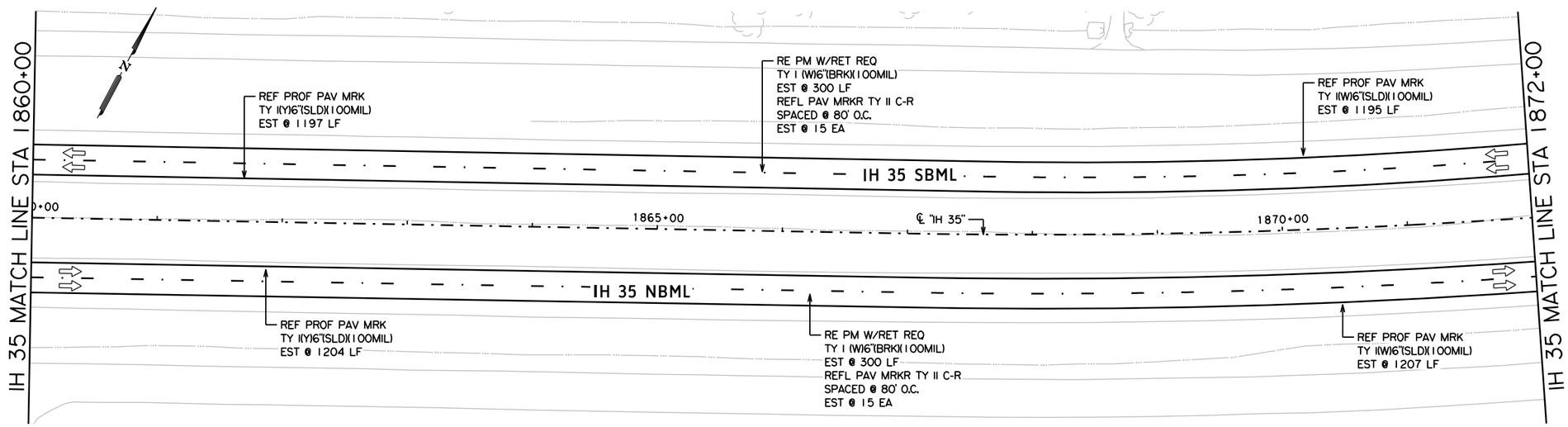
SHEET 9 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		85
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

	QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9600
666-6225	PAVEMENT SEALER 6"	LF	10799
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY II(W)6"(SLD)(100MIL)	LF	4800
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4799
672-6010	REFL PAV MRKR TY II-C-R	EA	60





STATE OF TEXAS
JAMES O. SAKAI
144653
LICENSED
PROFESSIONAL ENGINEER

10/30/2023
JAMES O. SAKAI, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N/A

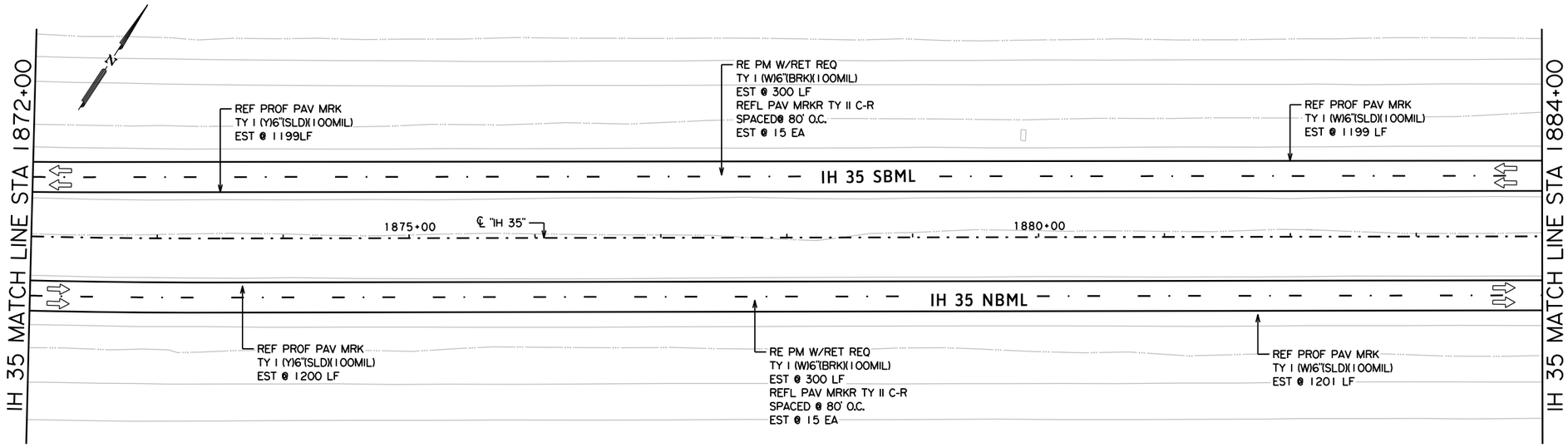
Texas Department of Transportation

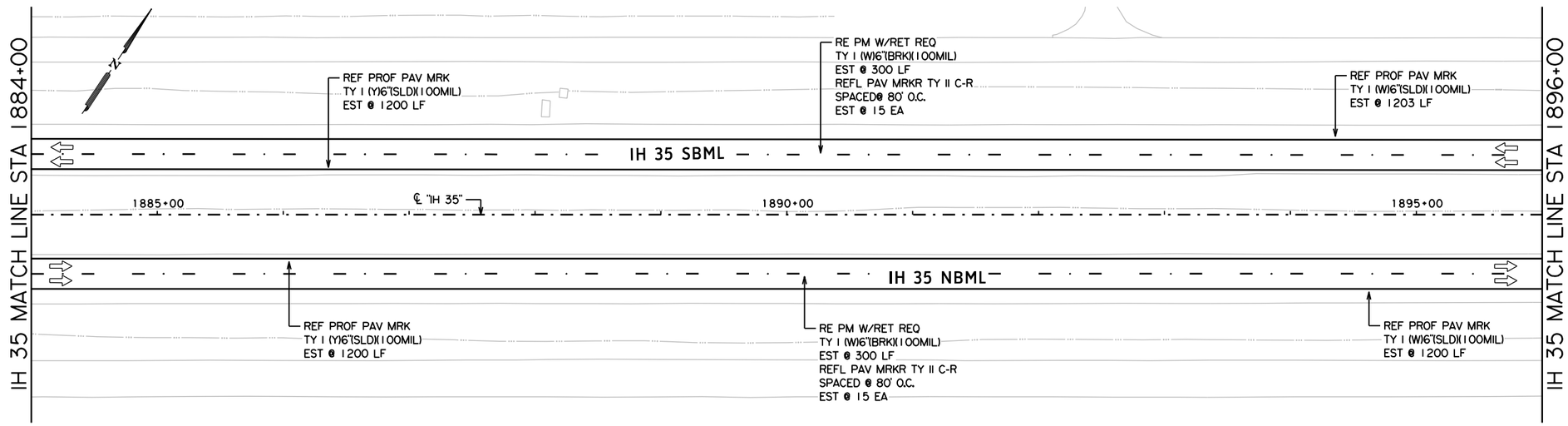
IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 10 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		86
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9600
666-6225	PAVEMENT SEALER 6"	LF	10802
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY II(W)6"(SLD)(100MIL)	LF	4803
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4799
672-6010	REFL PAV MRKR TY II-C-R	EA	60





STATE OF TEXAS
JAMES O. SAKAI
144653
LICENSED
PROFESSIONAL ENGINEER

10/30/2023
JAMES O. SAKAI, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N/A

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IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 11 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		87
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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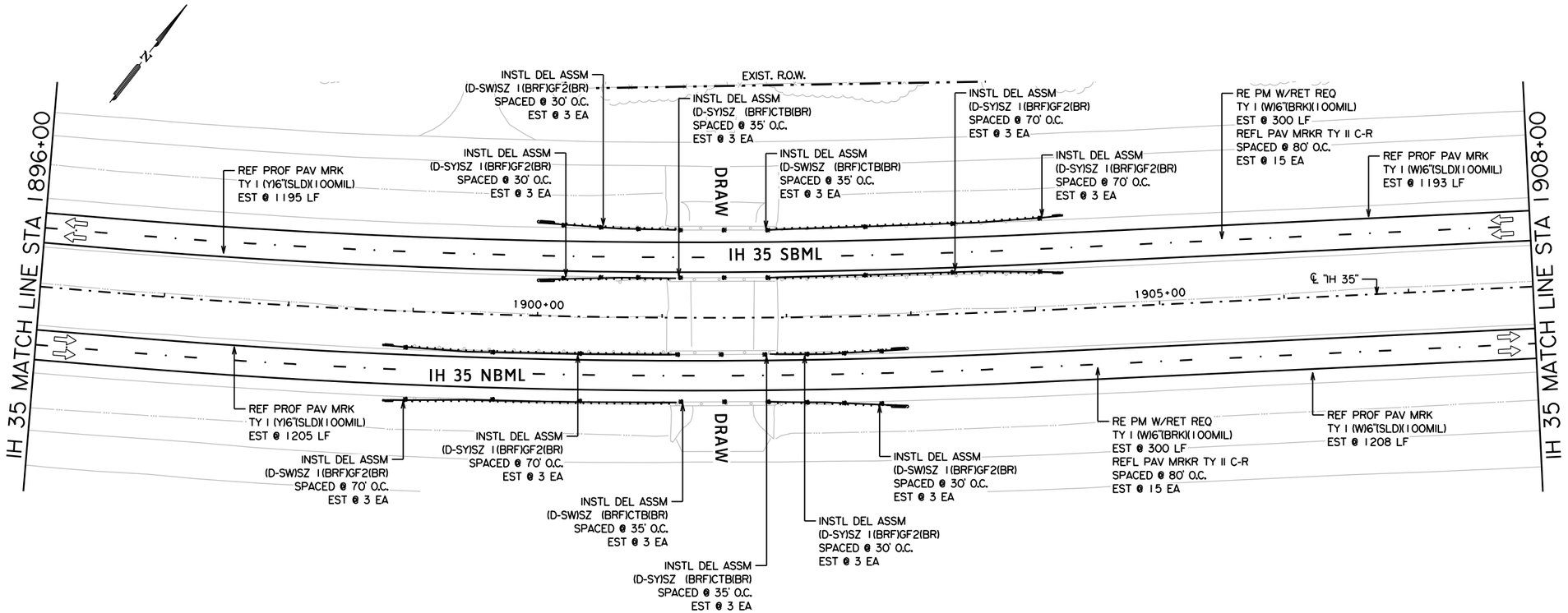
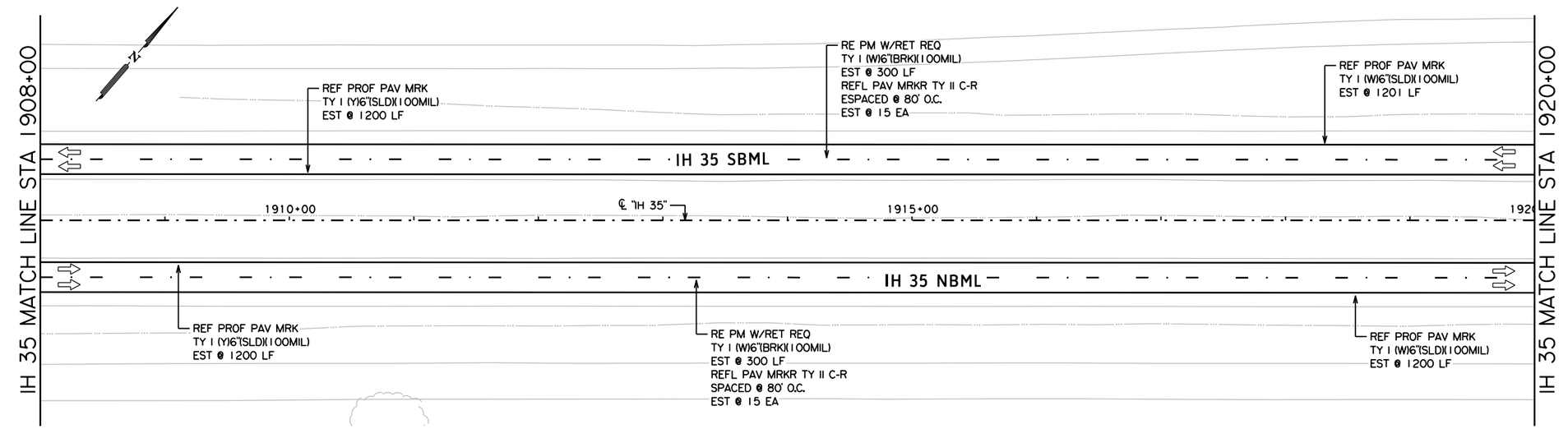
QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9600
658-6063	INSTL DEL ASSM (D-SW)SZ I(BRF)GF2(BR)	EA	9
658-6065	INSTL DEL ASSM (D-SY)SZ I(BRF)GF2(BR)	EA	15
658-6069	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BR)	EA	6
658-6070	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BR)	EA	6
666-6225	PAVEMENT SEALER 6"	LF	10802
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	4802
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4800
672-6010	REFL PAV MRKR TY II-C-R	EA	60





STATE OF TEXAS
JAMES O. SAKAI
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PROFESSIONAL ENGINEER

10/30/2023
JAMES O. SAKAI, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N/A

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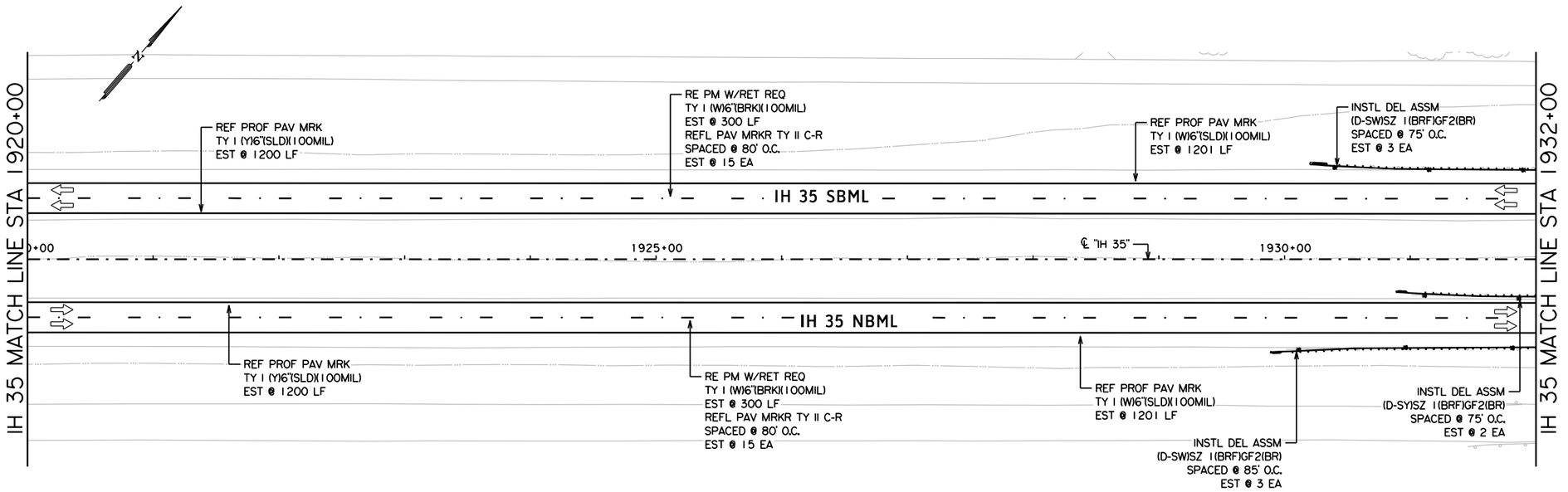
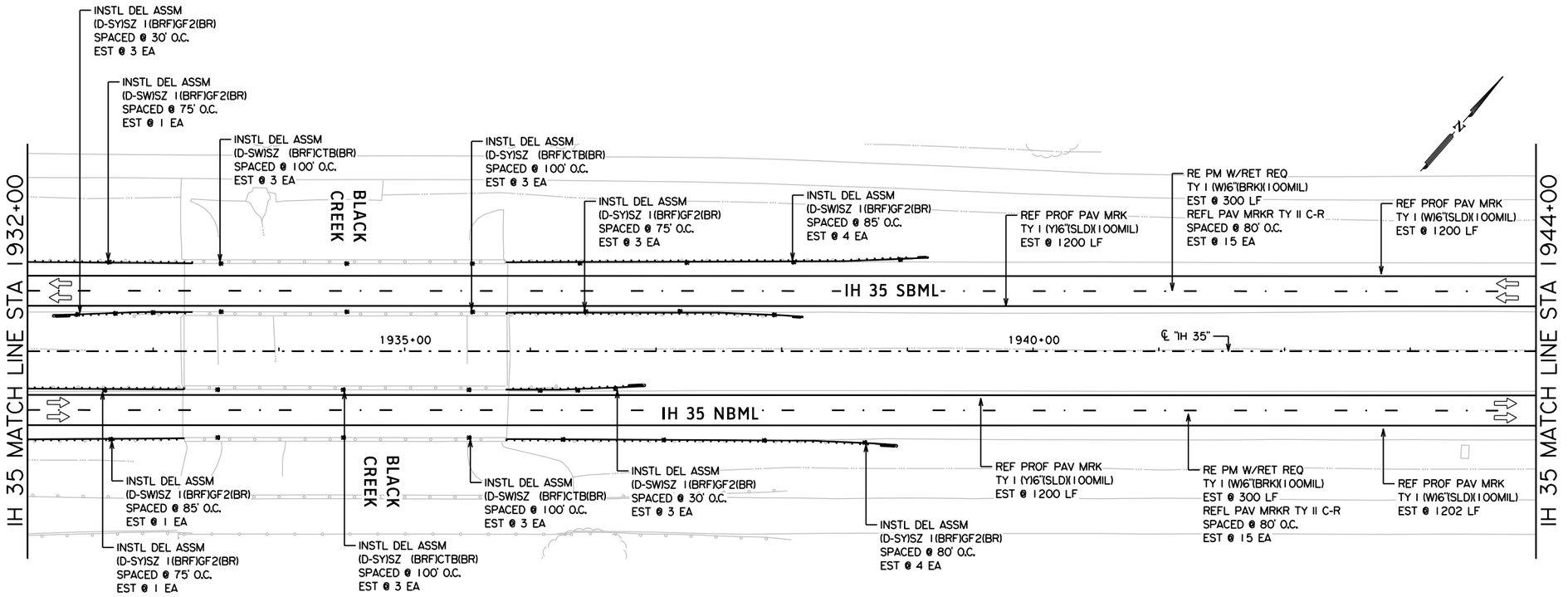
IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 12 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		88
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	8169
658-6063	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BR)	EA	15
658-6065	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2(BR)	EA	13
658-6069	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BR)	EA	6
658-6070	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BR)	EA	6
666-6225	PAVEMENT SEALER 6"	LF	10804
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	4804
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4800
672-6010	REFL PAV MRKR TY II-C-R	EA	60





STATE OF TEXAS
JAMES O. SAKAI
144653
LICENSED
PROFESSIONAL ENGINEER

JAMES O. SAKAI, P.E. — 10/30/2023 DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N/A

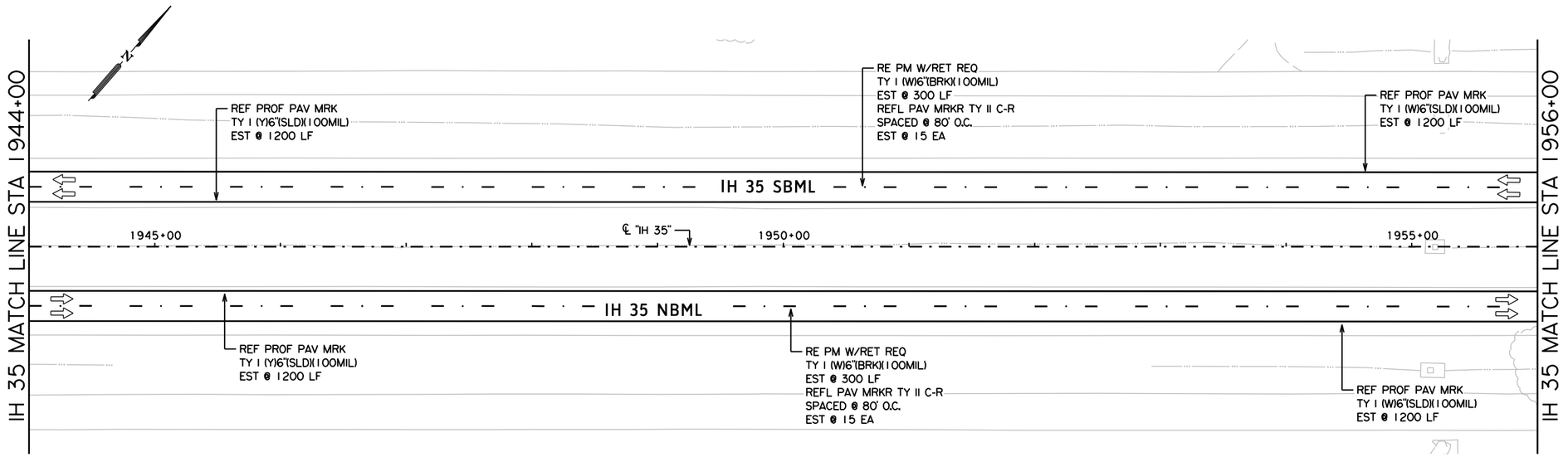
Texas Department of Transportation

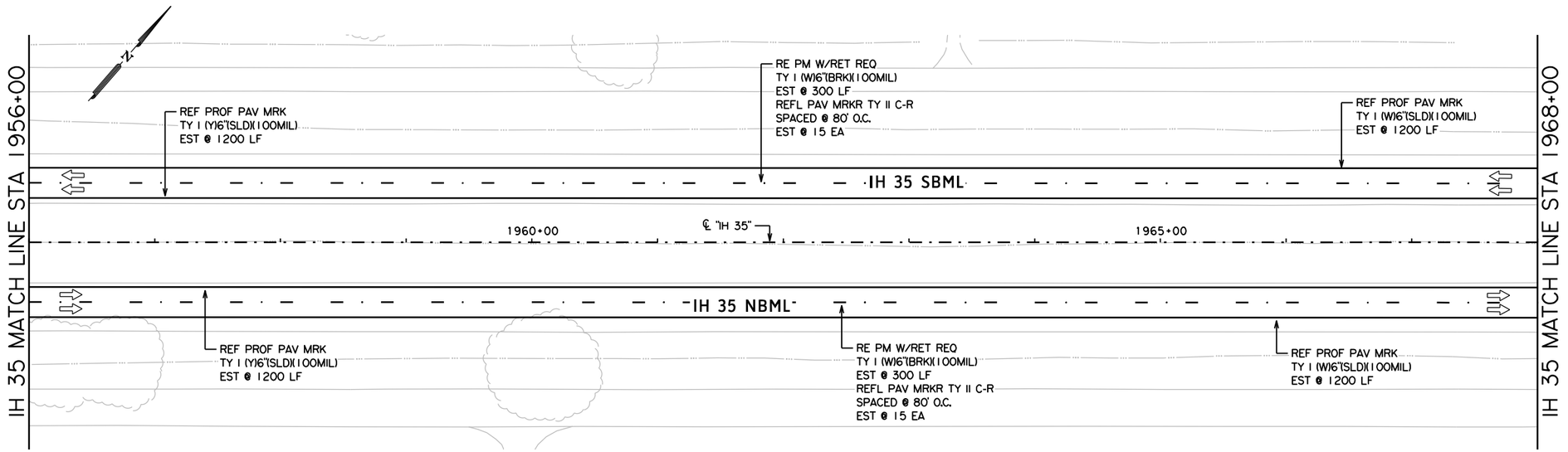
IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 13 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		89
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9600
666-6225	PAVEMENT SEALER 6"	LF	10800
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY II(W)6"(SLD)(100MIL)	LF	4800
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4800
672-6010	REFL PAV MRKR TY II-C-R	EA	60





STATE OF TEXAS
JAMES O. SAKAI
144653
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PROFESSIONAL ENGINEER

10/30/2023
JAMES O. SAKAI, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N/A

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IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 14 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		90
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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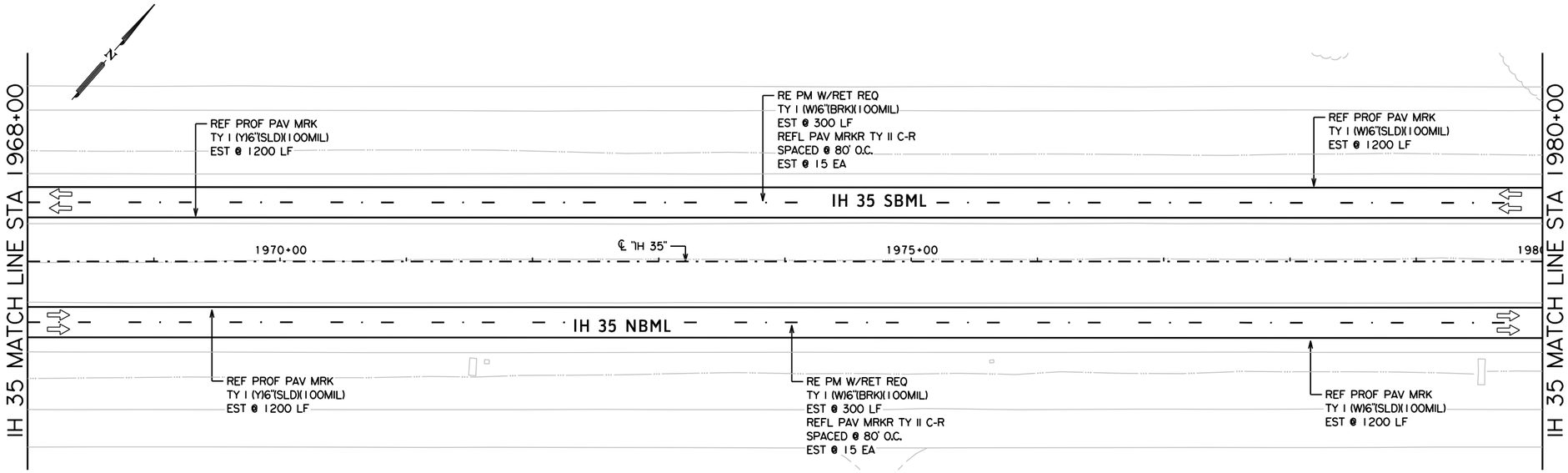
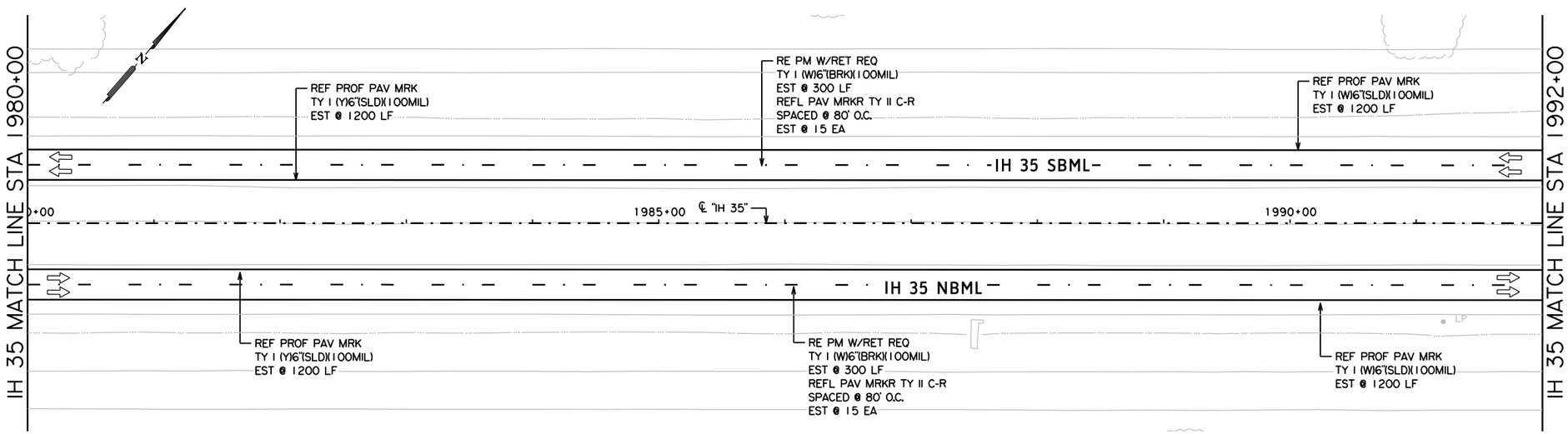
QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	9200
666-6225	PAVEMENT SEALER 6"	LF	10800
666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1200
666-6343	REF PROF PAV MRK TY II(W)6"(SLD)(100MIL)	LF	4800
666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4800
672-6010	REFL PAV MRKR TY II-C-R	EA	60





STATE OF TEXAS
JAMES O. SAKAI
144653
LICENSED
PROFESSIONAL ENGINEER

10/30/2023
JAMES O. SAKAI, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N/A

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IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 15 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		91
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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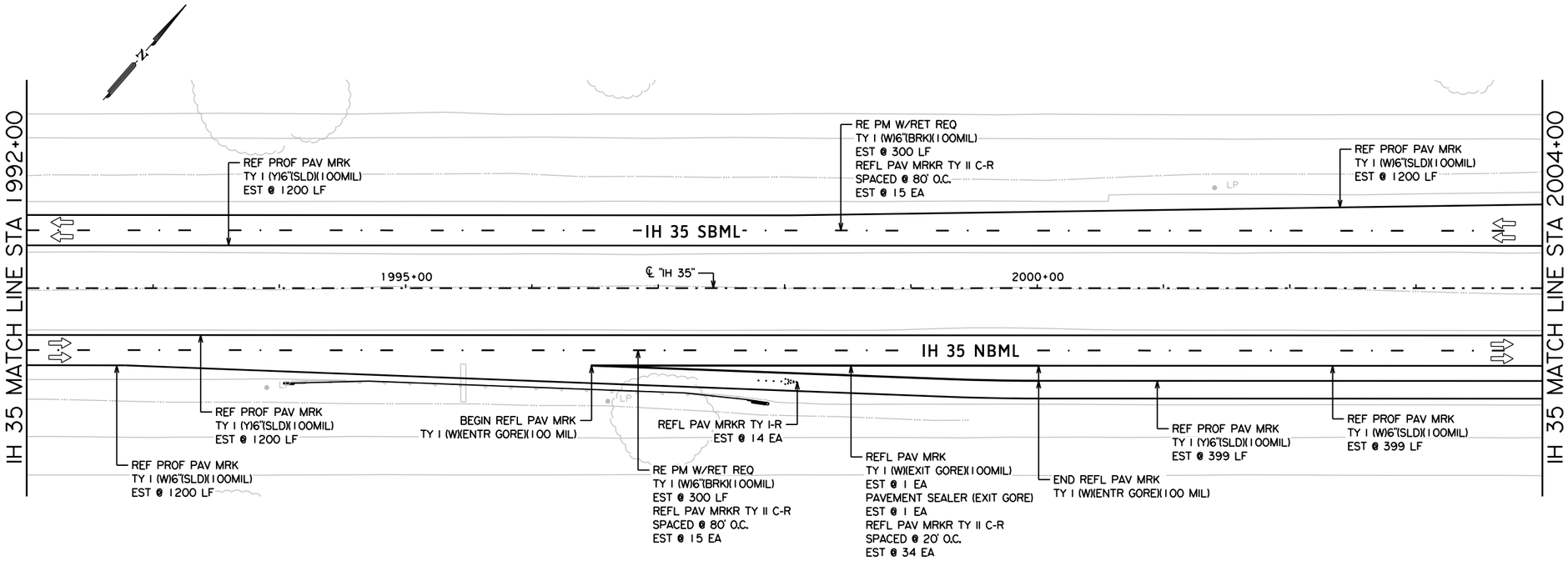
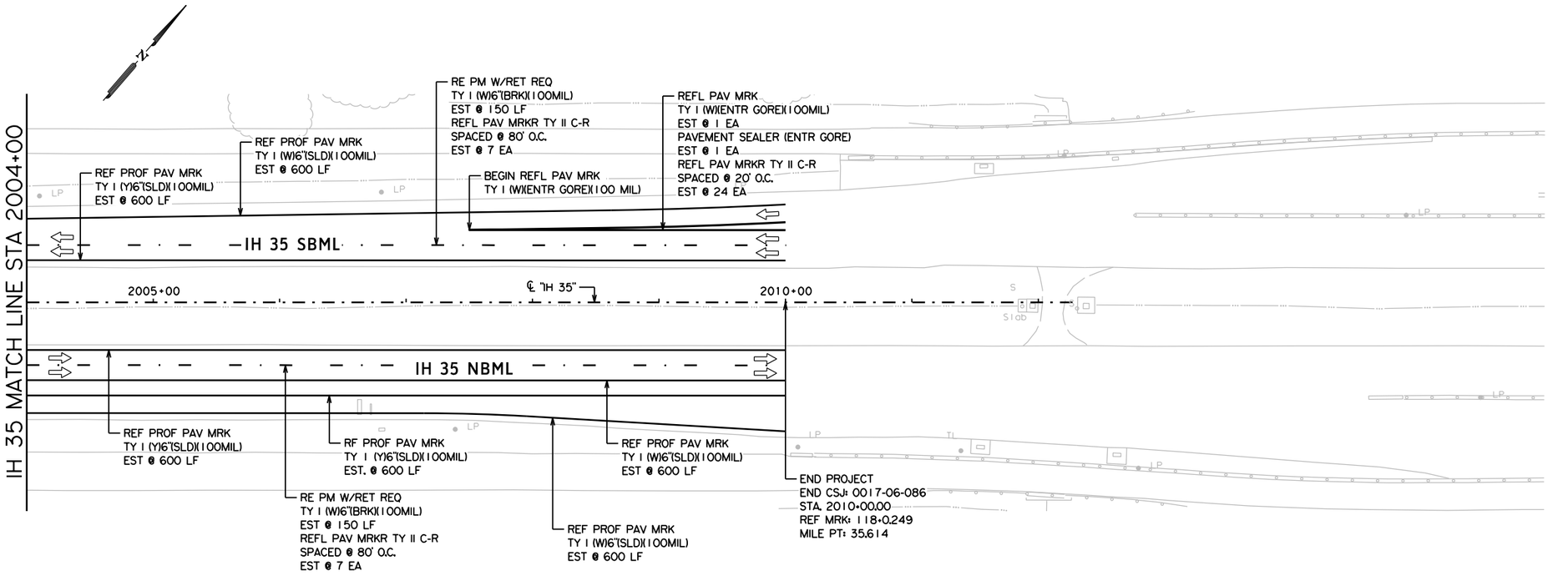
QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNI	QUANTITY
533-6001	RUMBLE STRIPS (SHOULDER)	LF	4050
666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	1
666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	1
666-6225	PAVEMENT SEALER 6"	LF	10098
666-6239	PAVEMENT SEALER (ENTR GORE)	EA	1
666-6240	PAVEMENT SEALER (EXIT GORE)	EA	1
666-6306	RE PM W/RET REQ TY I (W)16"(BRK)(100MIL)	LF	900
666-6343	REF PROF PAV MRK TY I(W)16"(SLD)(100MIL)	LF	4599
666-6347	REF PROF PAV MRK TY I(Y)16"(SLD)(100MIL)	LF	4599
672-6008	REFL PAV MRKR TY I-R	EA	14
672-6010	REFL PAV MRKR TY II-C-R	EA	102





JAMES O. SAKAI
144653
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/30/2023
JAMES O. SAKAI, P.E. DATE

SCALE
HORIZONTAL: 1"=100'
VERTICAL: N/A

Texas Department of Transportation

IH 35
PAVEMENT MARKINGS LAYOUT

SHEET 16 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		92
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

DATE: 10/30/2023 11:26:23 AM
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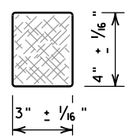
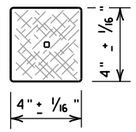
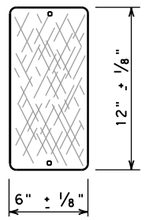
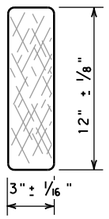
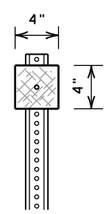
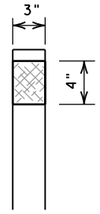
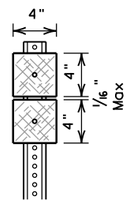
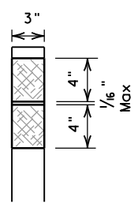
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE	 1-Size 2 reflector unit	 1-Size 1 reflector unit	 2-Size 2 reflector units	 2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

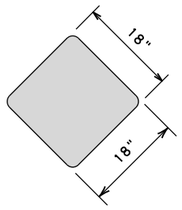
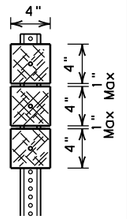
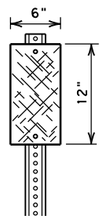
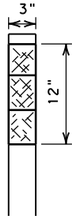
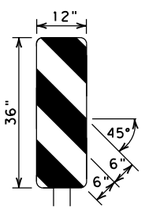
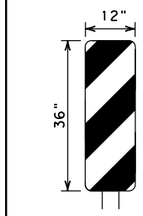
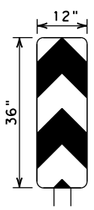
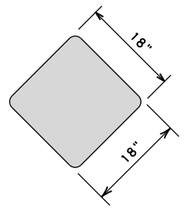
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

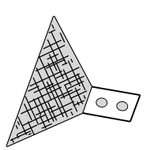
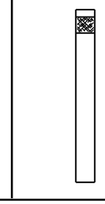
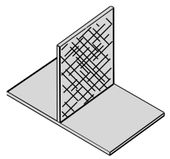
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

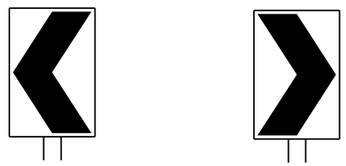
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		 3-Size 2 reflector units	 1-Size 3 reflector unit	 3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

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

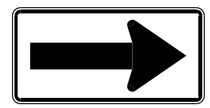


SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

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



SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dam1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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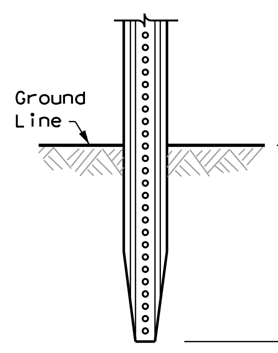
REVISIONS	0017	06	086	IH 35
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	FRIO		93

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

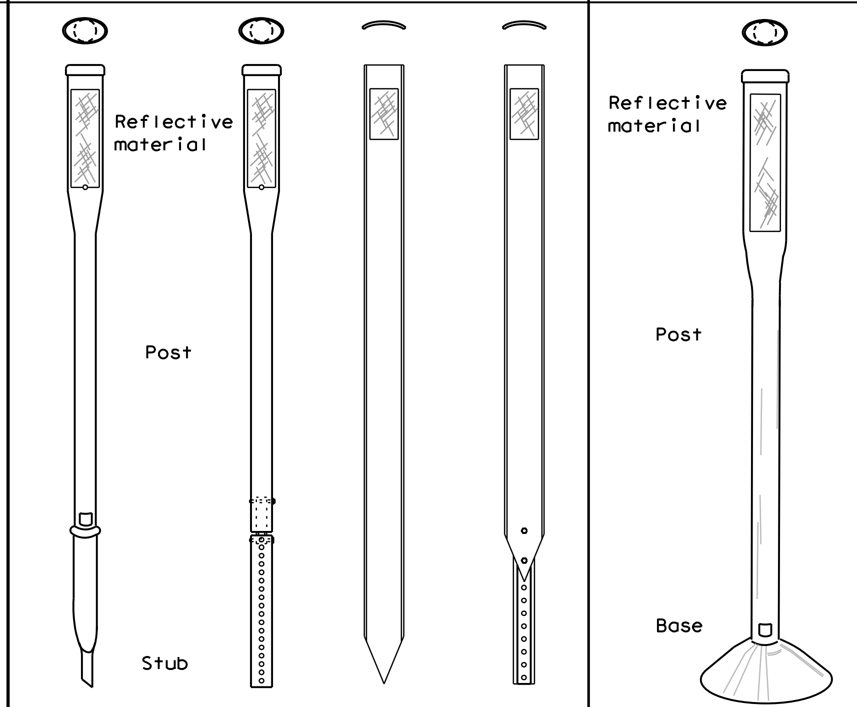


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND | SRF



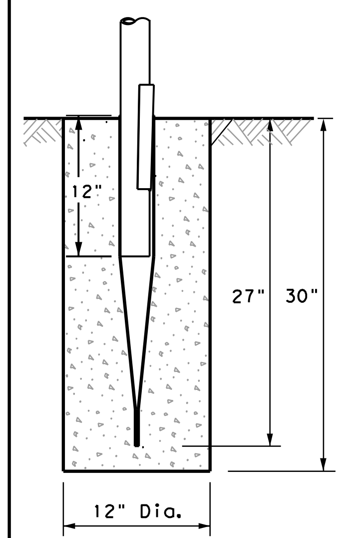
EMBEDDED | SURFACE MOUNT

NOTES

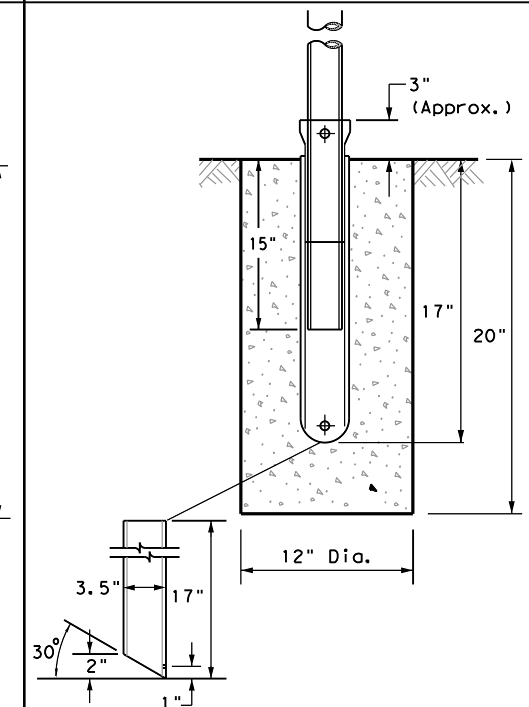
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL | PLASTIC

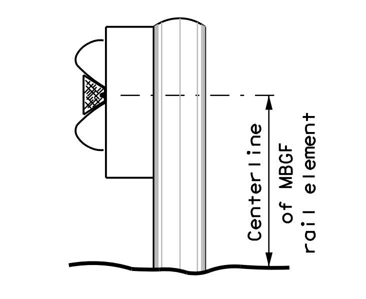
NOTE

1. Install per manufacturer's recommendations.

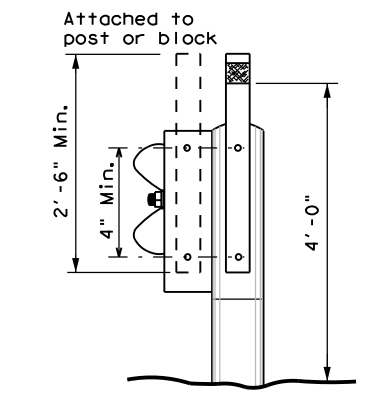
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

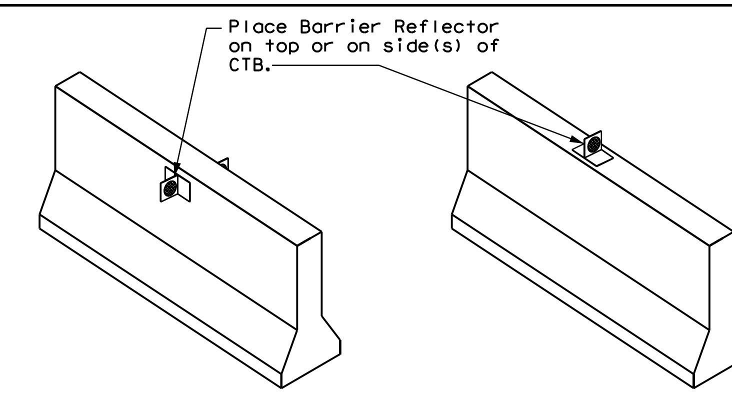
GF1



GF2



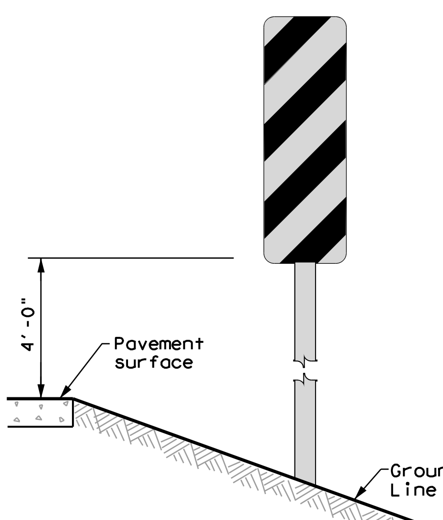
CONCRETE TRAFFIC BARRIER (CTB)



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.

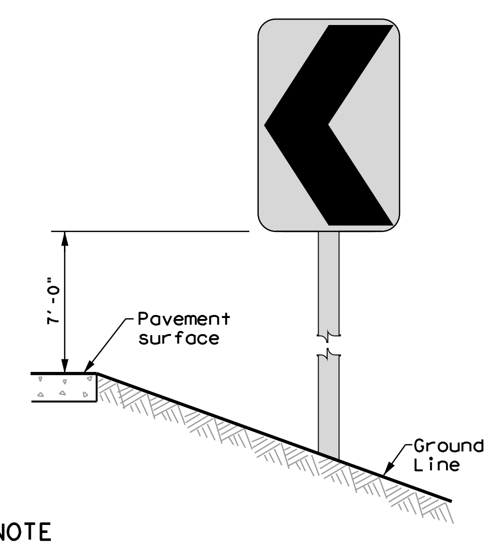
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

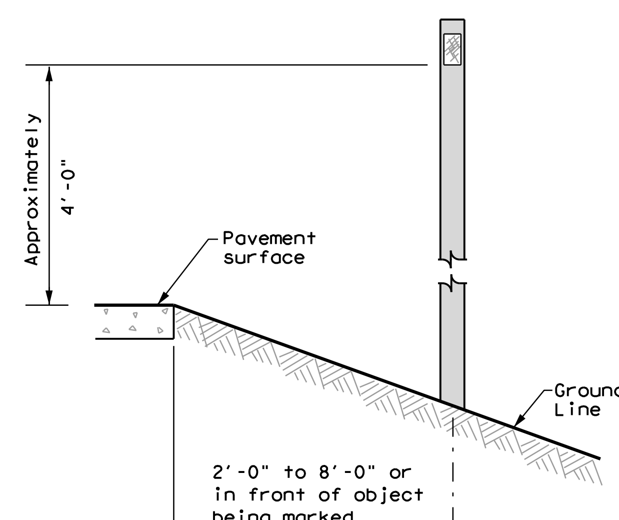
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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.

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DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	0017	06	086	IH 35
10-09 3-15	DIST		COUNTY	SHEET NO.
4-10 7-20	SAT		FRIO	94

20B

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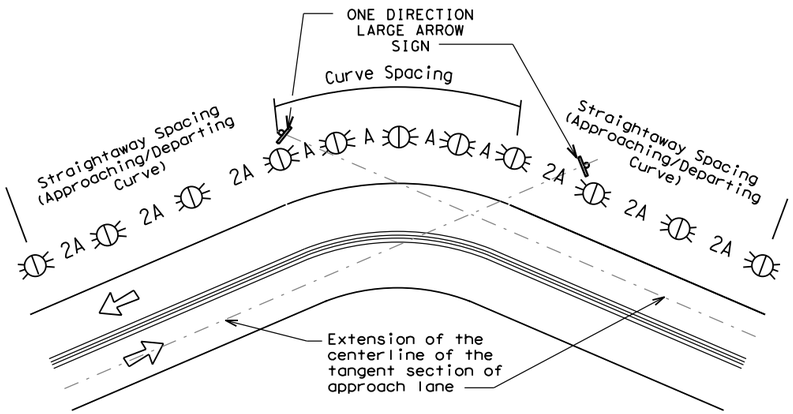
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

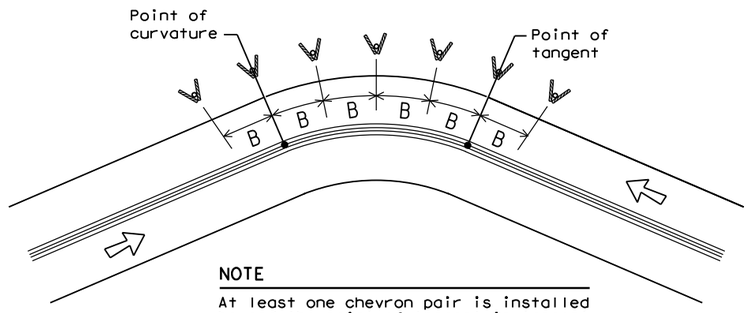
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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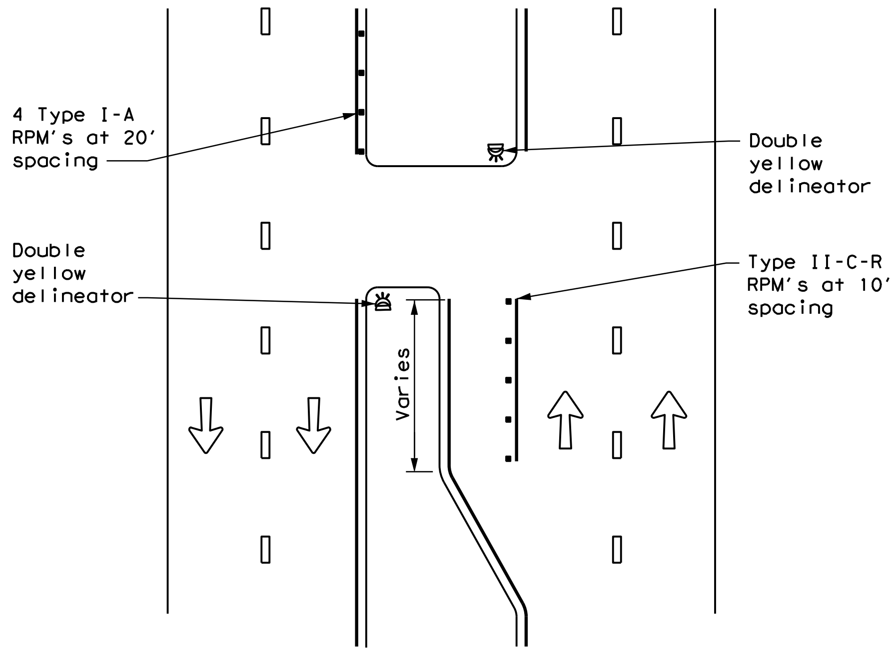
REVISIONS	0017	06	086	IH 35
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	SAT	FRIO		95

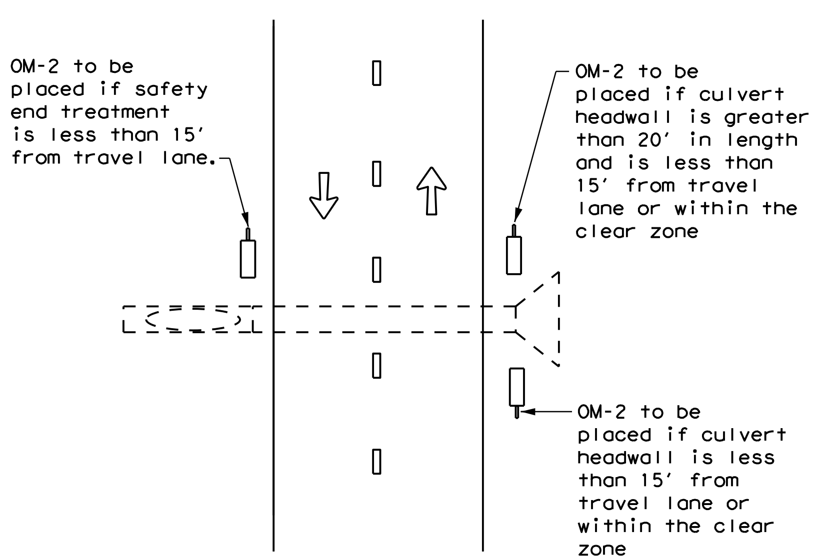
20C

CROSSOVERS



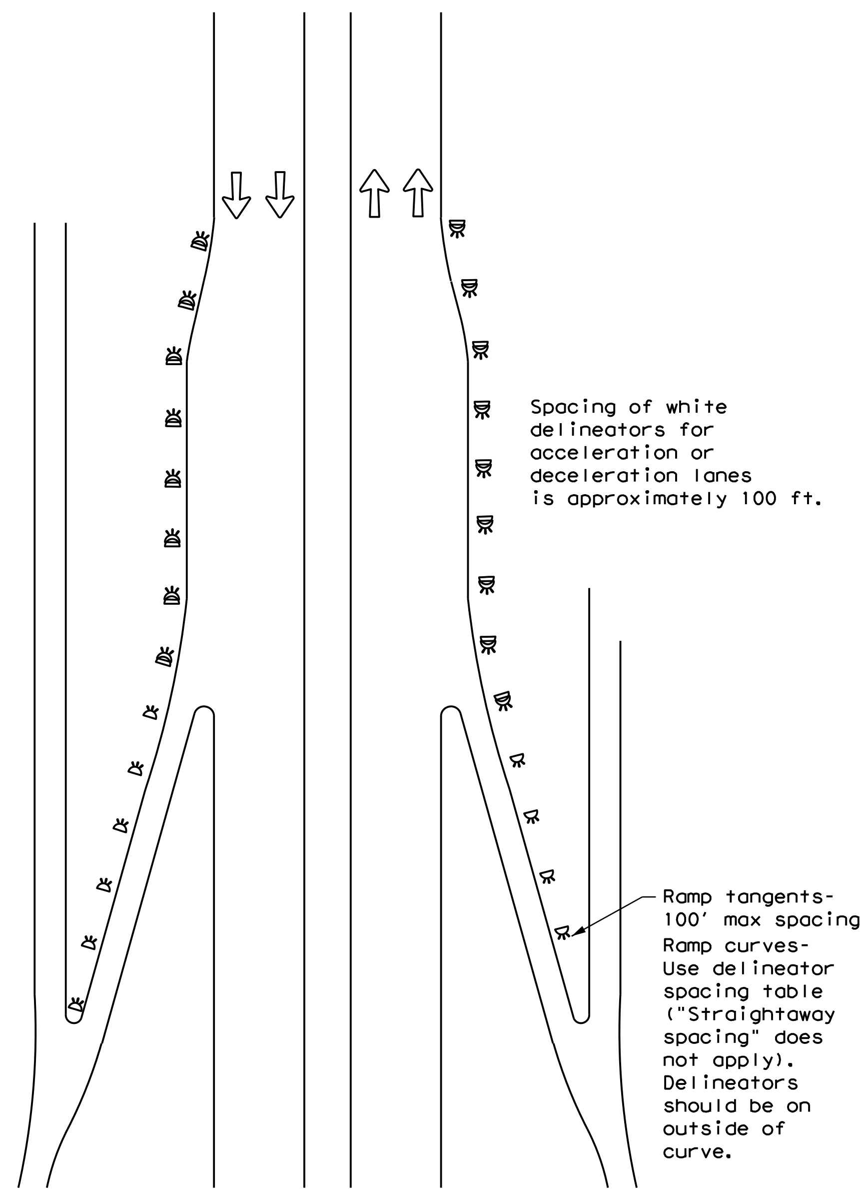
DETAIL 1

FOR CULVERTS WITHOUT MBGF



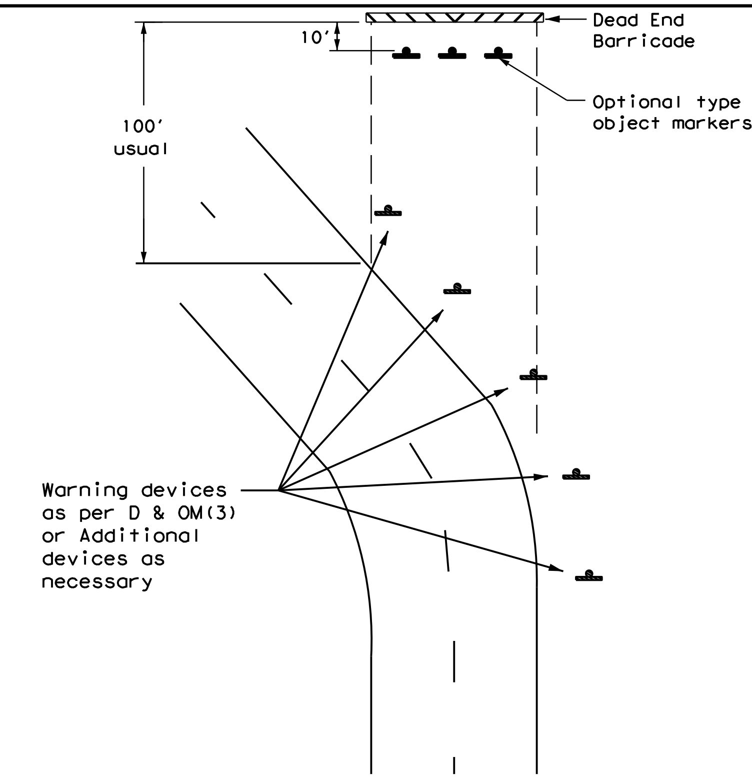
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



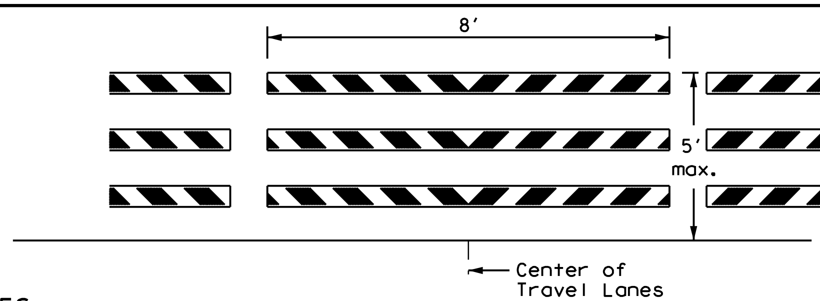
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND

(symbol)	Bidirectional Delineator
(symbol)	Delineator
(symbol)	OM-3
(symbol)	Barricade
(symbol)	Sign
(symbol)	OM-2
(symbol)	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS 3-15 7-20	0017	06	086		IH 35
	DIST		COUNTY		SHEET NO.
	SAT		FRIO		96

20D

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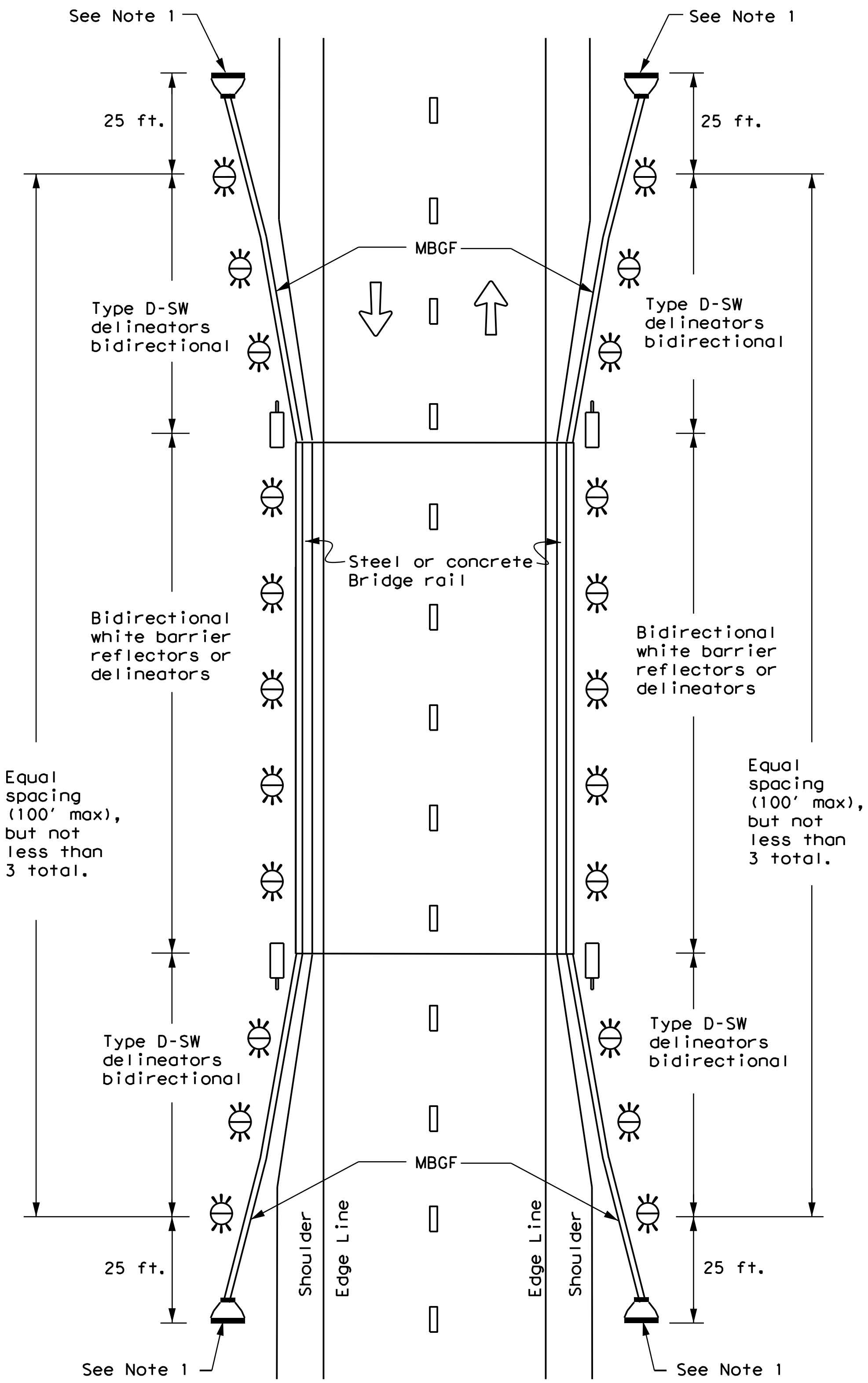
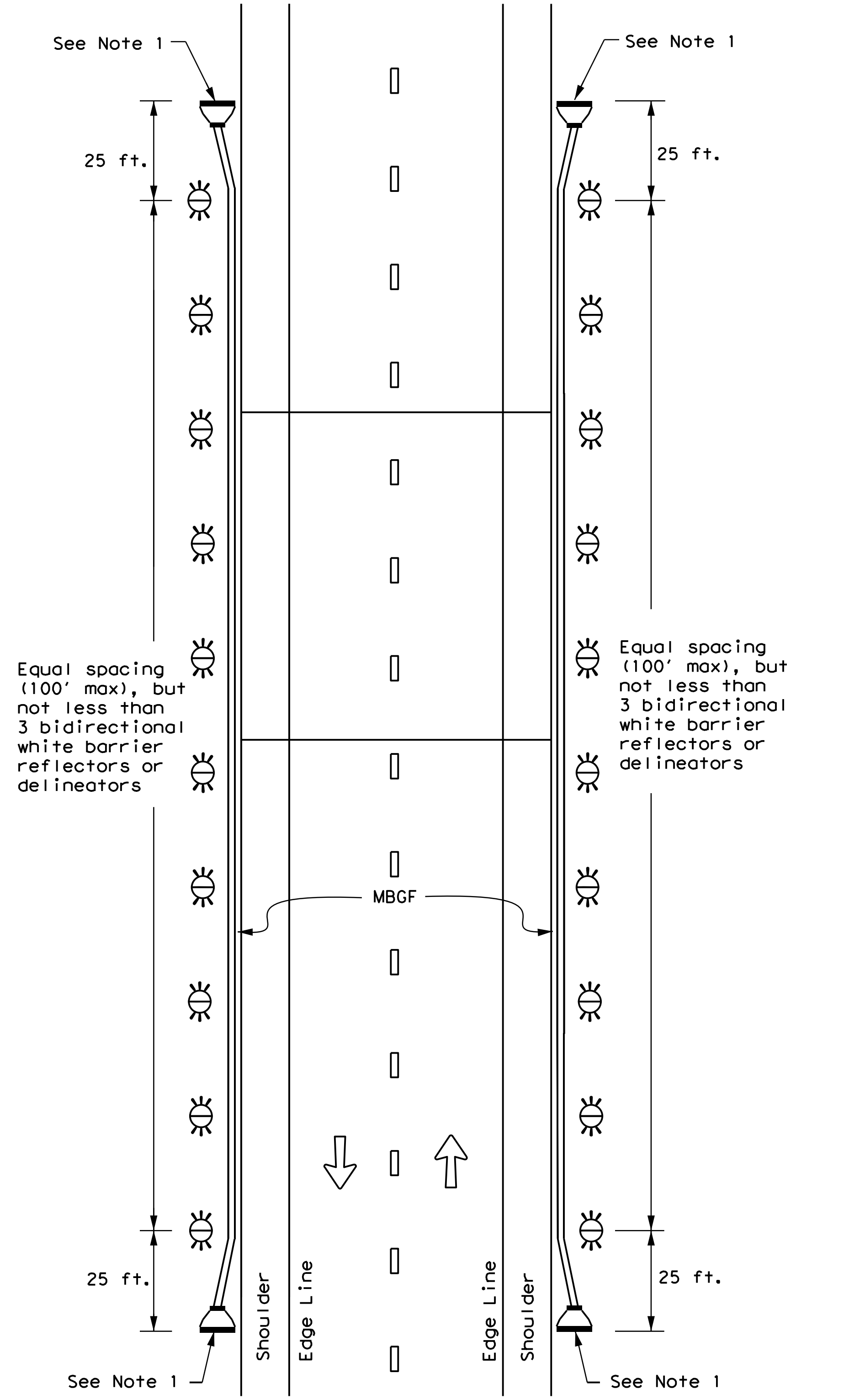
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

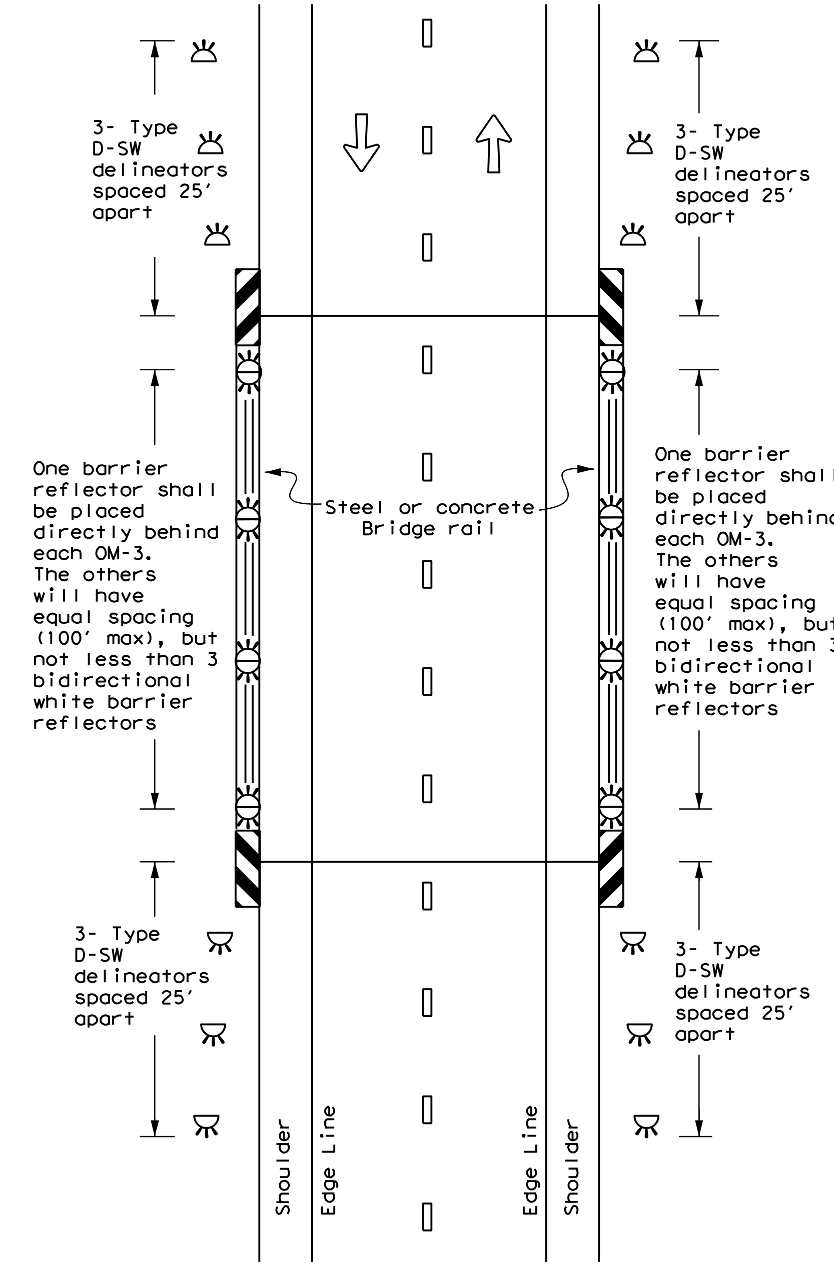
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

(symbol)	Bidirectional Delineator
(symbol)	Delineator
(symbol)	OM-3
(symbol)	OM-2
(symbol)	Terminal End
(symbol)	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
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REVISIONS		0017	06	086	IH 35
7-20		DIST		COUNTY	SHEET NO.
		SAT		FRIO	97

20E

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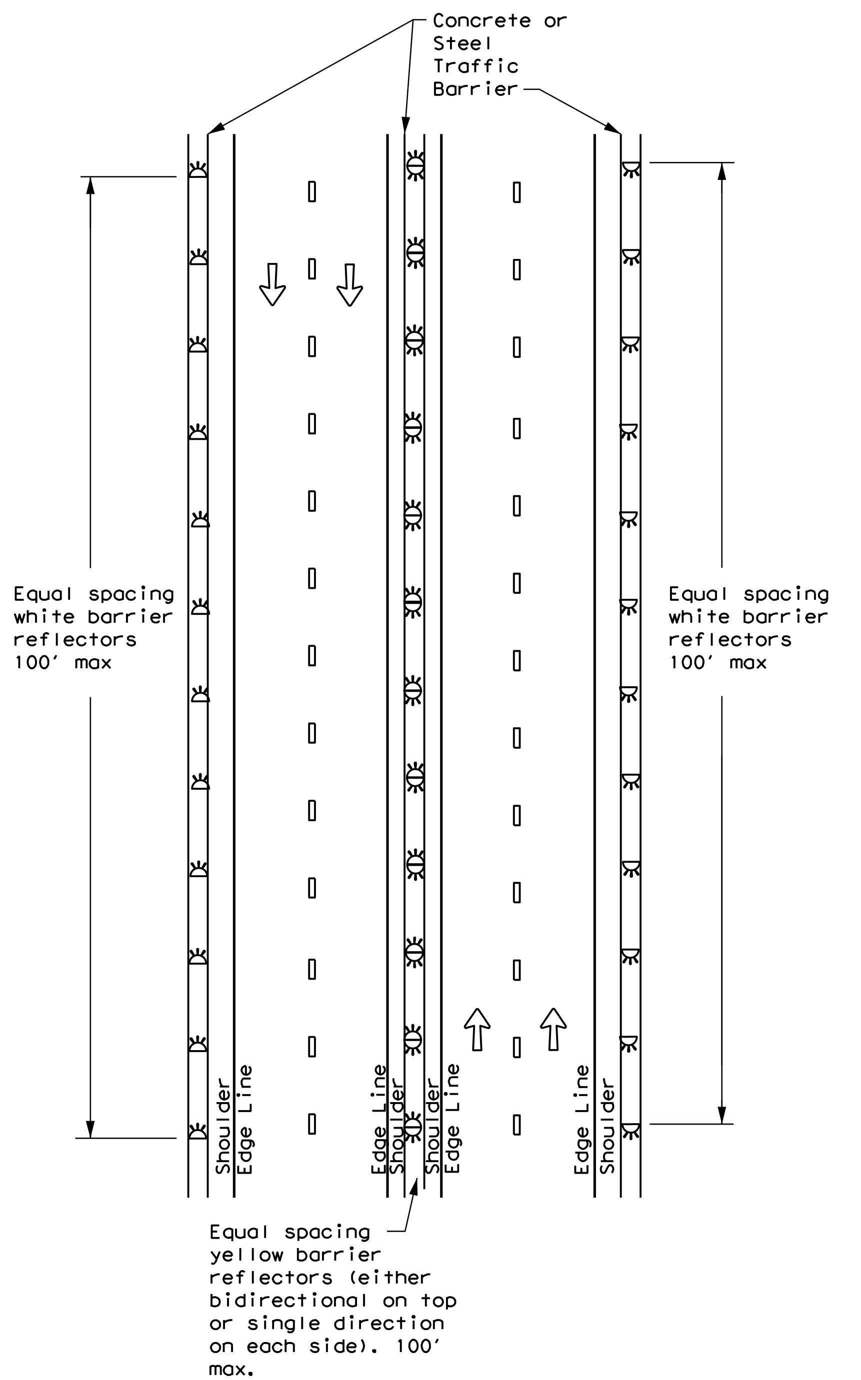
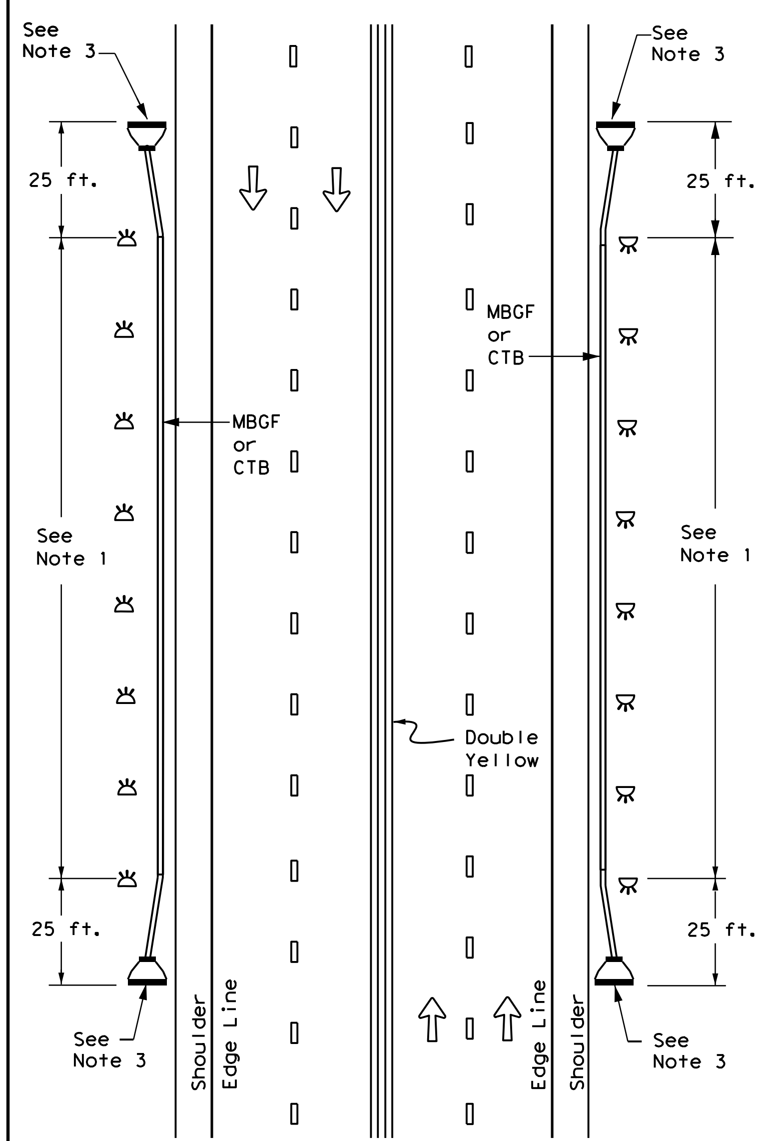
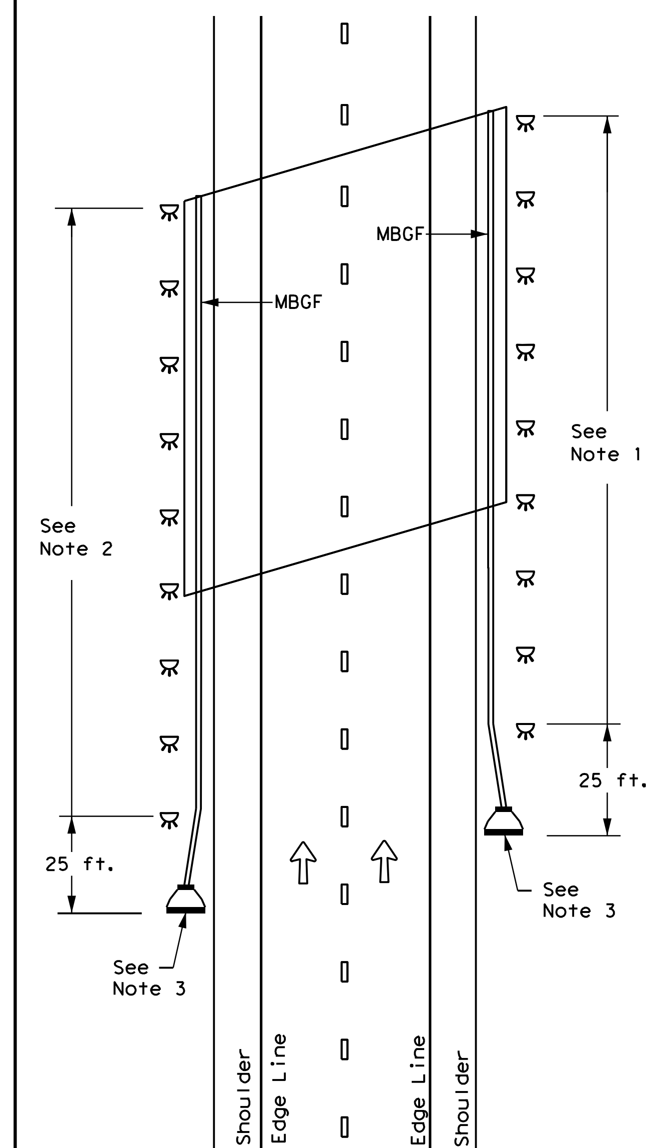
CONTINUOUS CONCRETE OR STEEL BARRIER



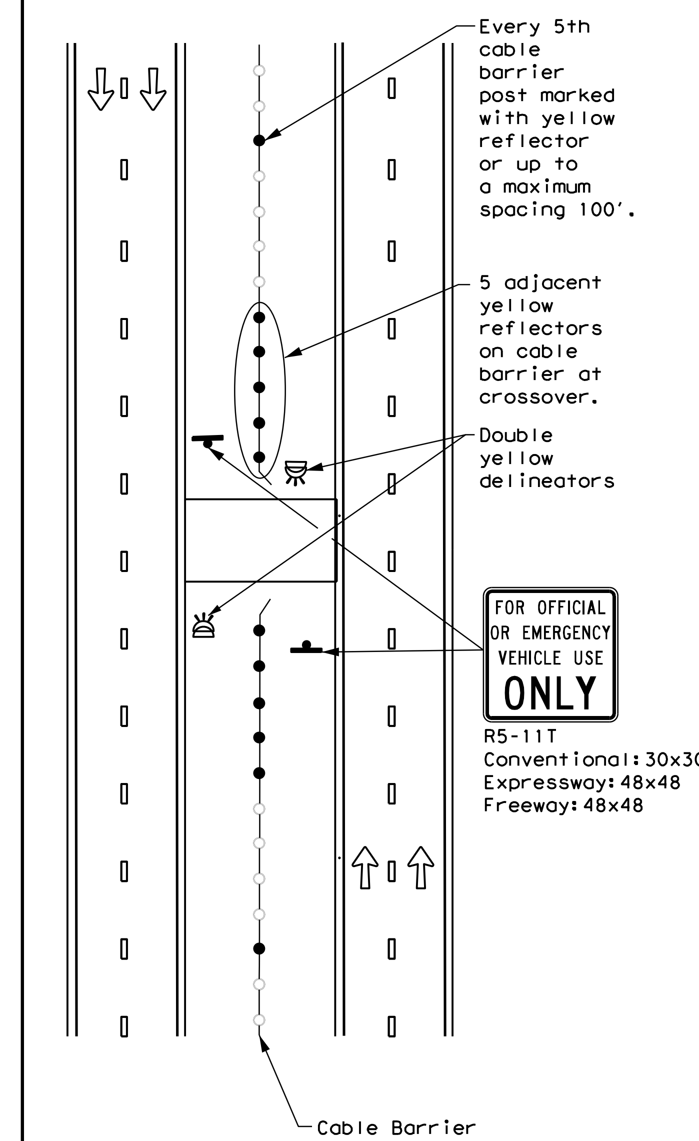
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

LEGEND

Symbol	Description
	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0017	06	086	IH 35
7-20	DIST		COUNTY	SHEET NO.
	SAT		FRIO	98

20F

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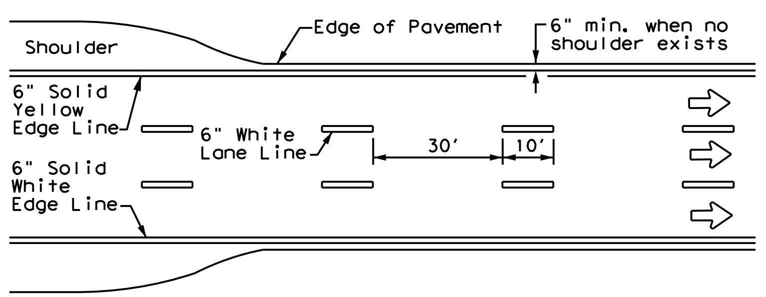
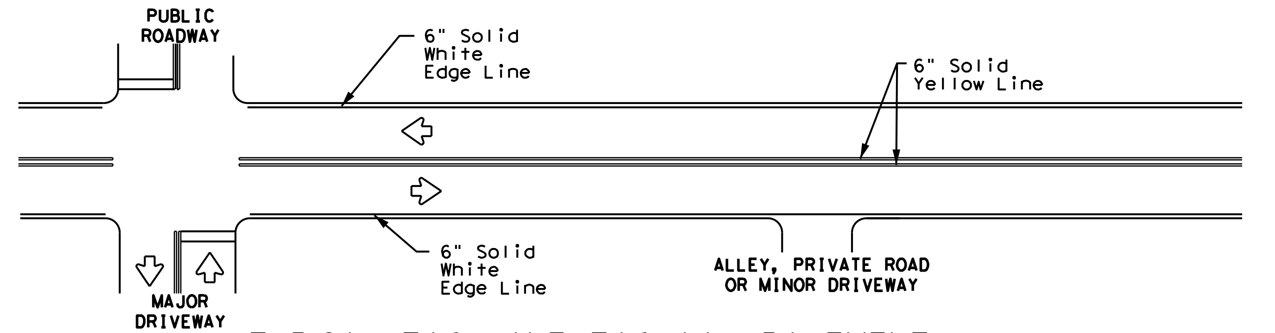


EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS

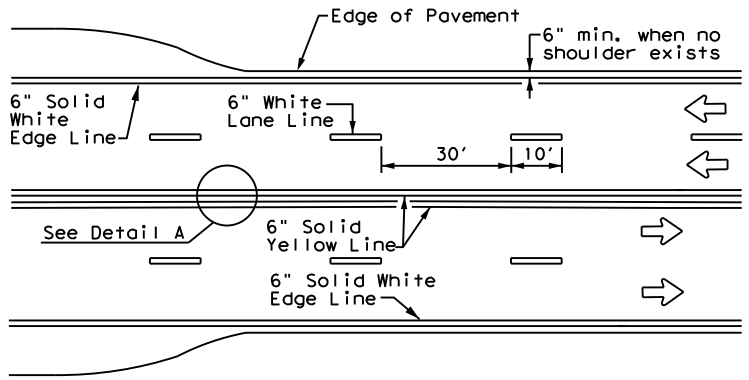
GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.

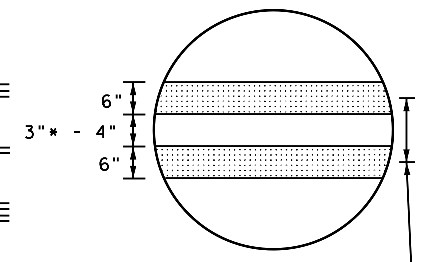
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

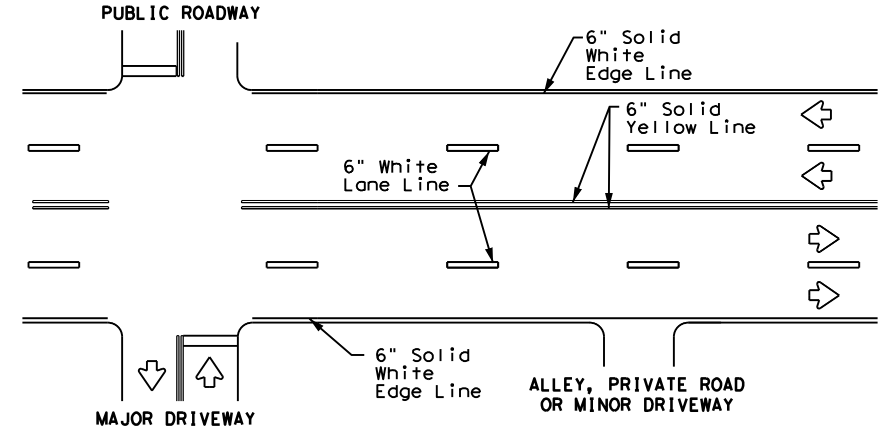


DETAIL "A"

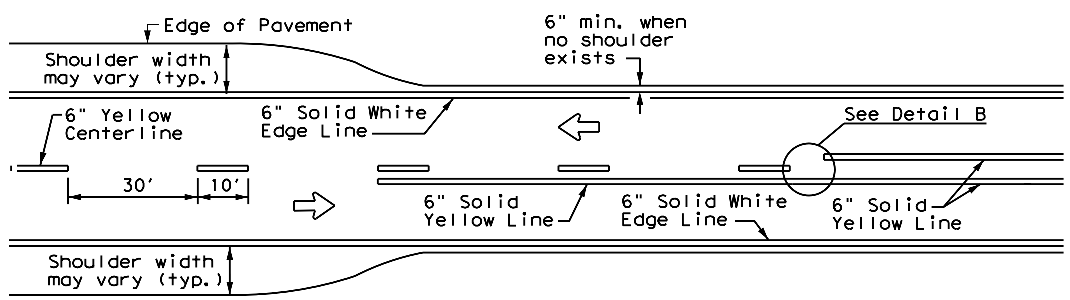
9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

* 2" minimum for restripe projects when approved by the Engineer.

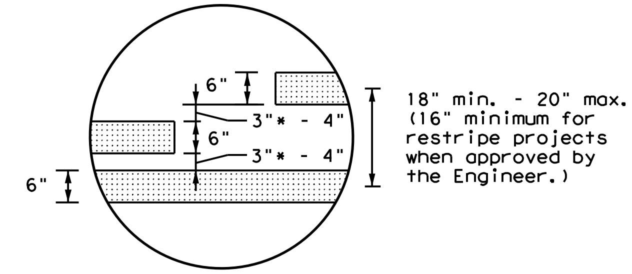
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS

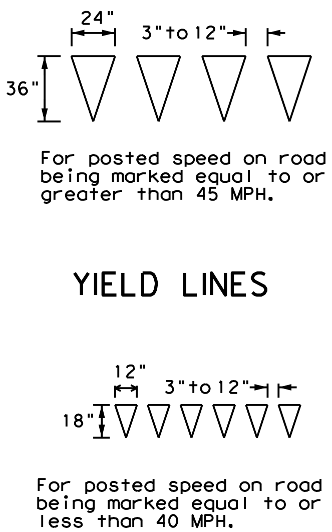


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

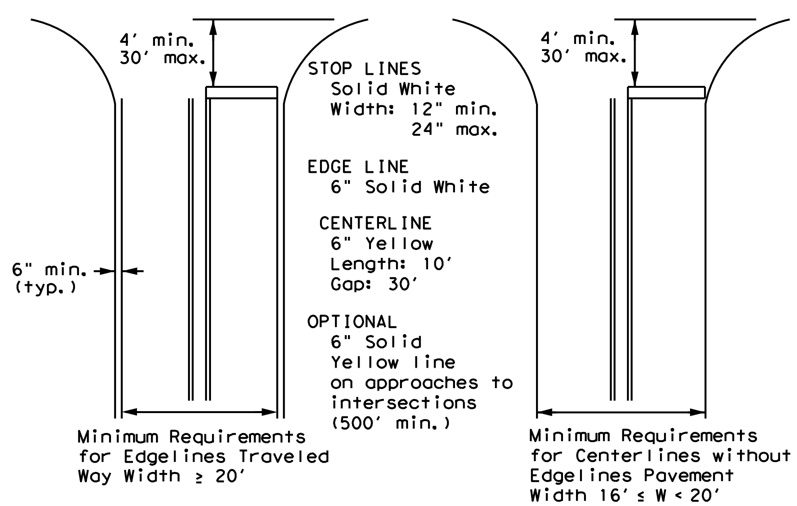


DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.



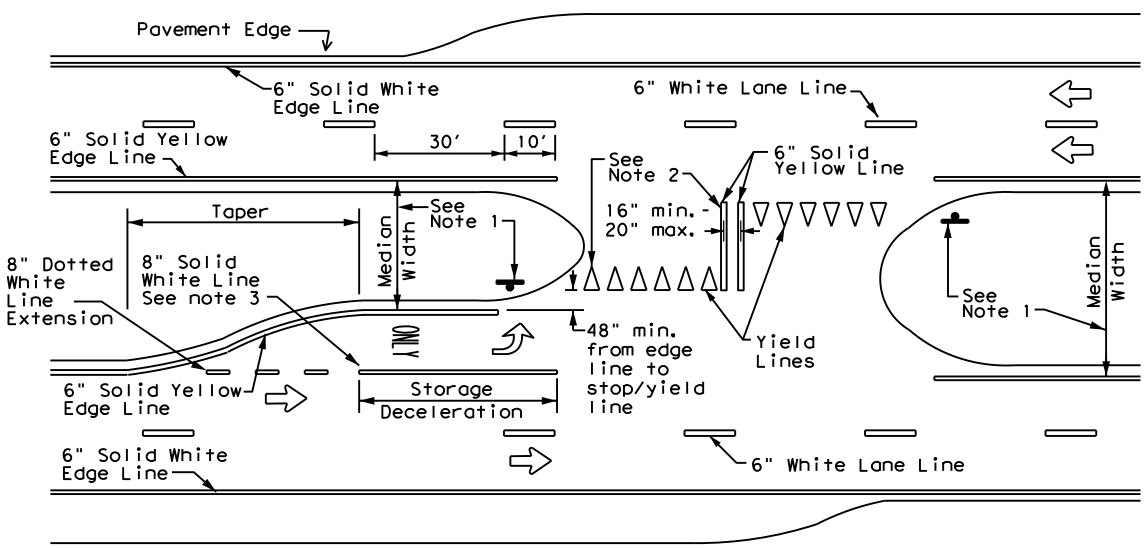
YIELD LINES



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	0017	06	086	IH 35
	DIST		COUNTY	SHEET NO.
	SAT		FRIO	99

22A

DATE: 10/30/2023 11:26:51 AM
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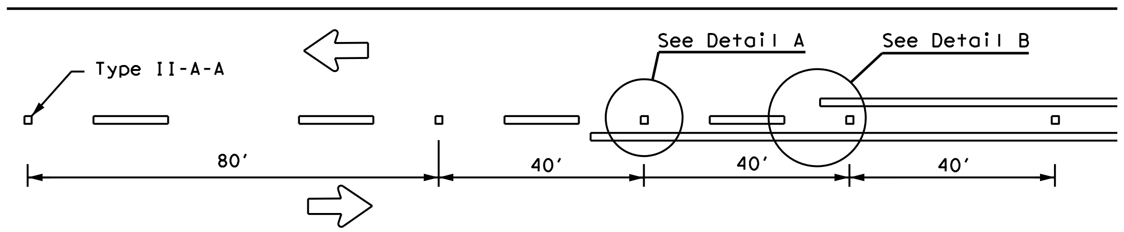
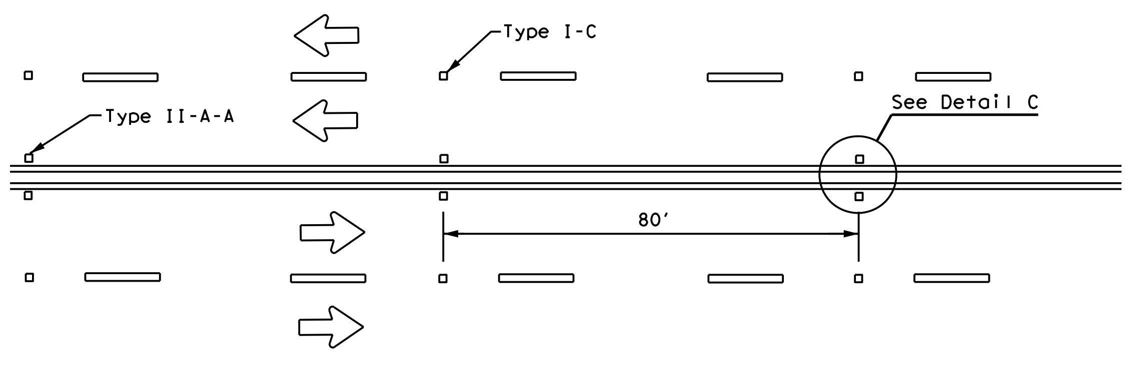
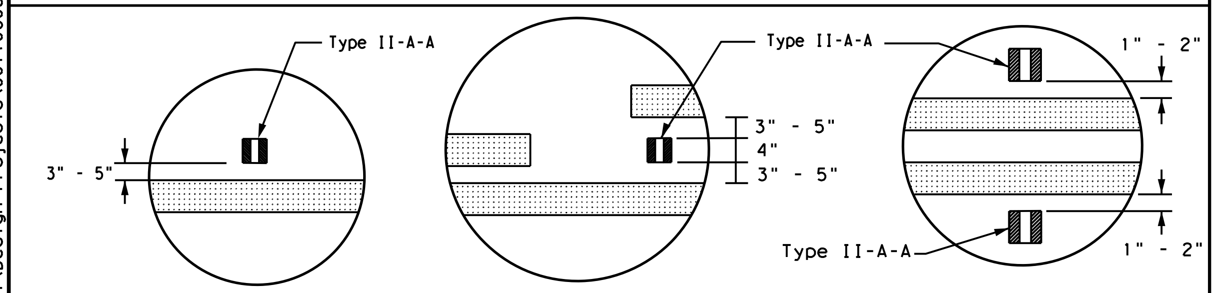
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

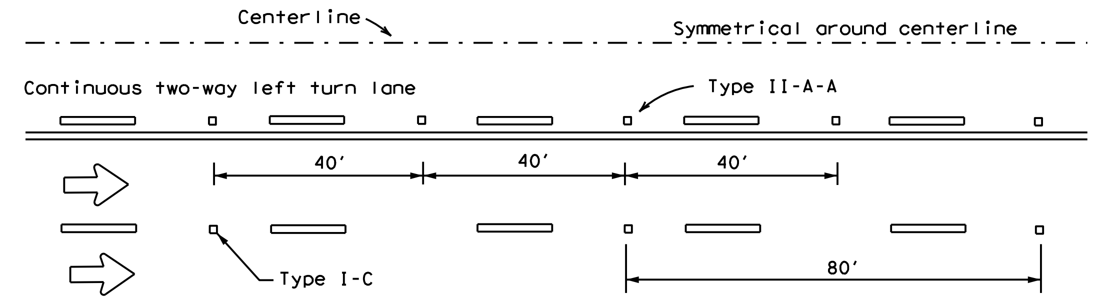


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

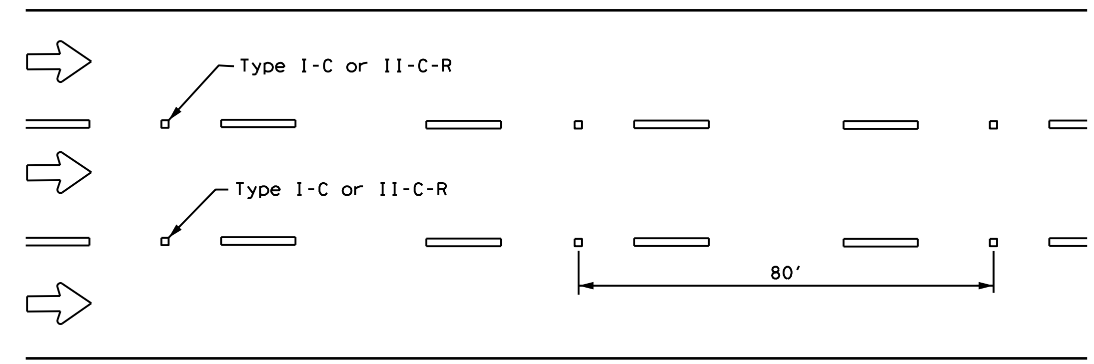


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



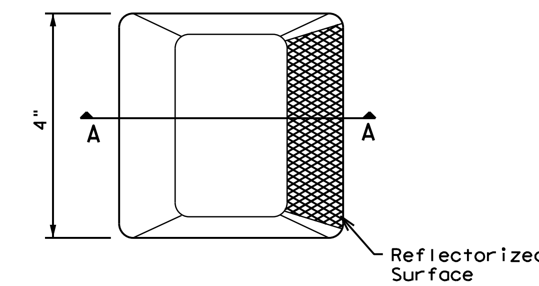
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

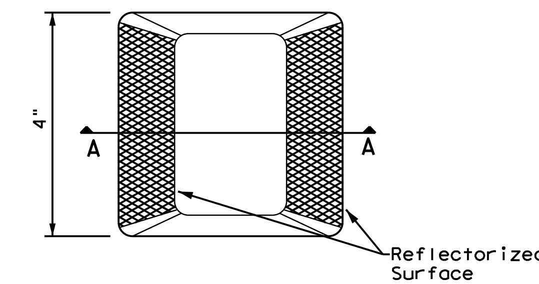
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

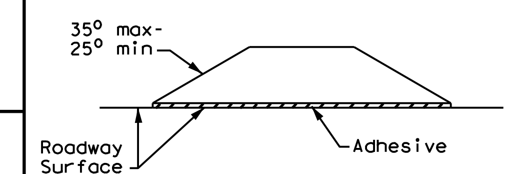
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

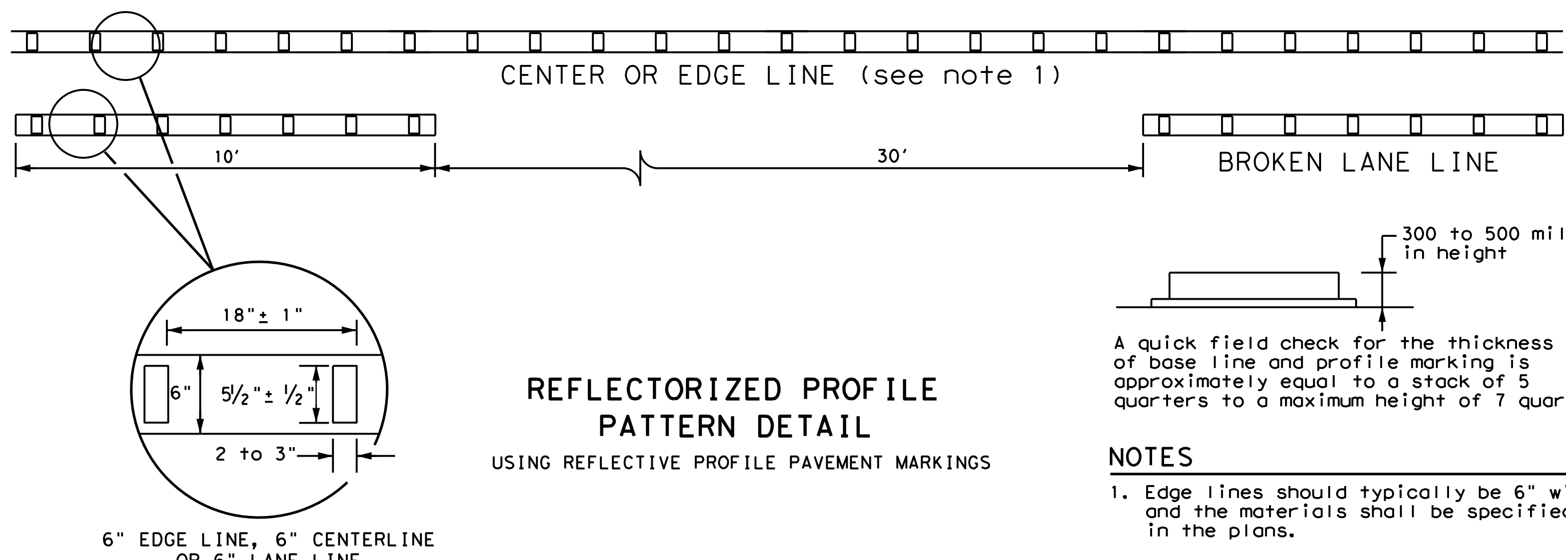


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation — Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS

PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20; 4-92 2-10 12-22; 5-00 2-12	0017	06	086	IH 35
	DIST		COUNTY	SHEET NO.
	SAT		FRIO	100

22B

DATE: 10/30/2023 11:26:55 AM
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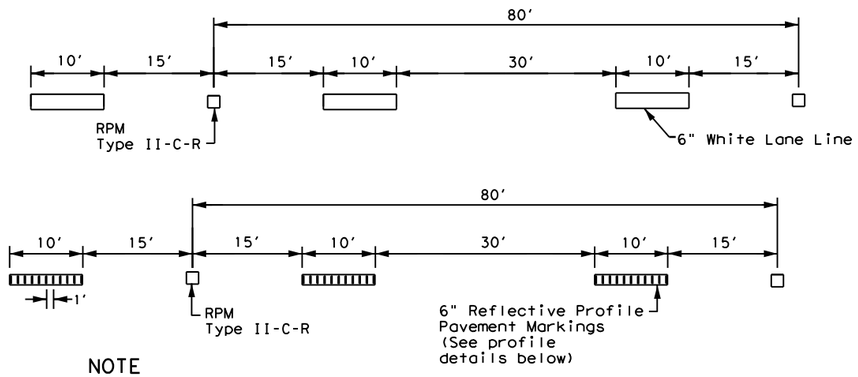
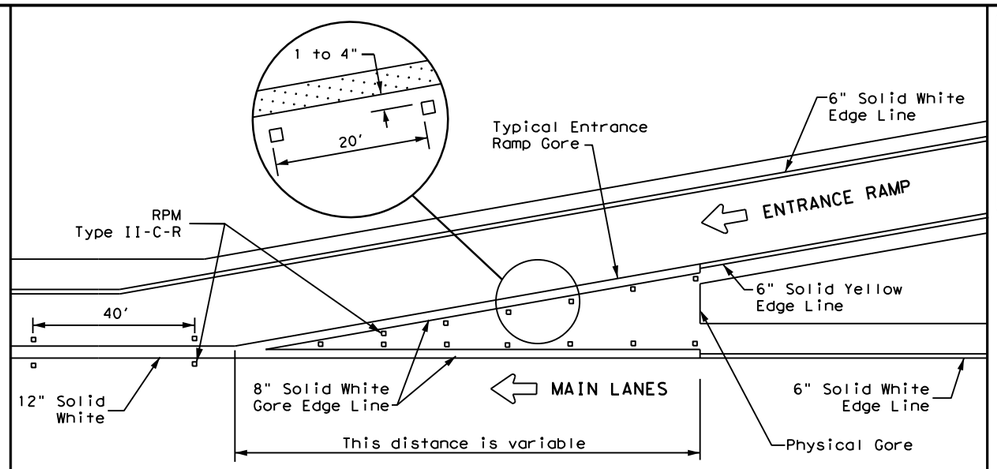


NOTE

Reflectorized raised pavement markers Type II-C-R shall be spaced on 80' centers with the clear face toward normal traffic and the red face toward wrong way traffic. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.

TRAFFIC LANE LINES PAVEMENT MARKING



TYPICAL ENTRANCE RAMP GORE MARKING

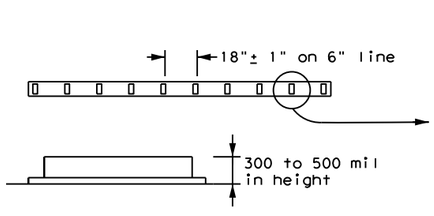
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

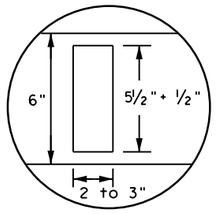
LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R

GENERAL NOTE

On concrete pavements the raised pavement markers shall be placed to one side of the longitudinal joints.



Reflective Profile Pavement Markings

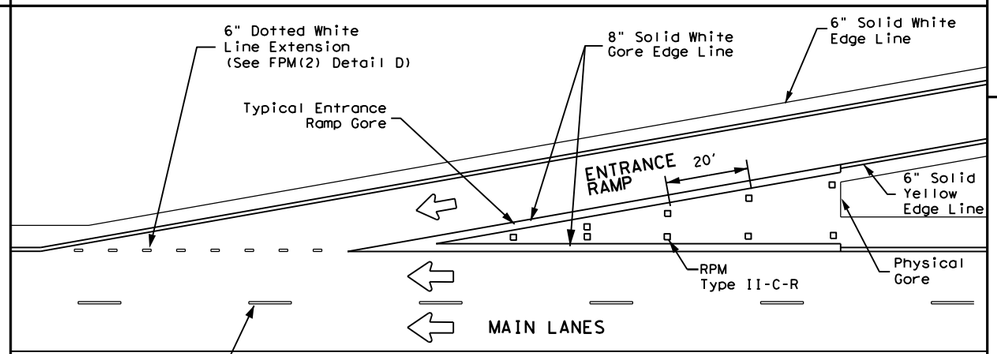


Standard 6" Profile Detail

NOTE

Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

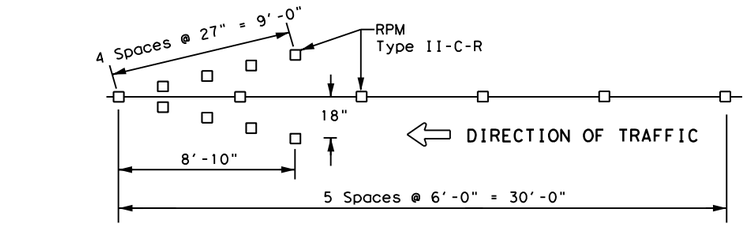
EDGE LINE PAVEMENT MARKINGS



NOTE

See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

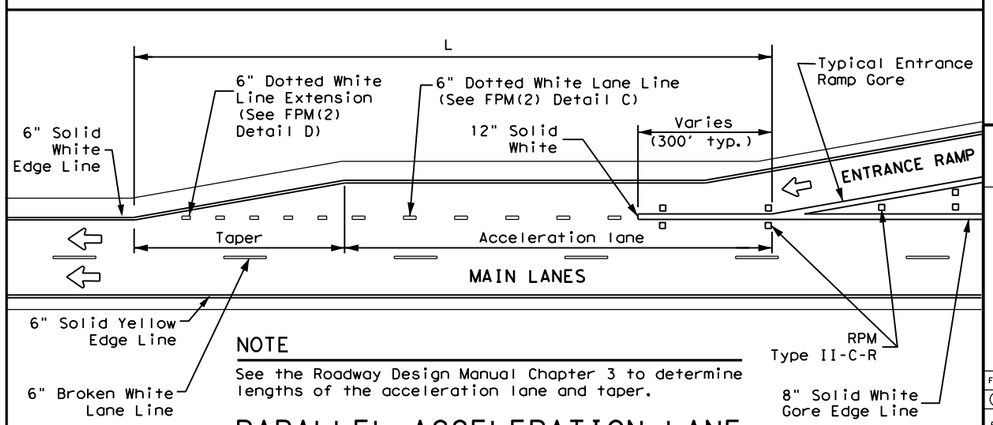
TAPERED ACCELERATION LANE



NOTES

1. Reflectorized raised pavement markers Type-II-C-R in the wrong way arrow shall have the clear face toward normal traffic and the red face toward the wrong way traffic.
2. Red reflectorized wrong way arrows, not to exceed two, may be placed on exit ramps. Locations of the arrows shall be as shown in the plans or as directed by the engineer.

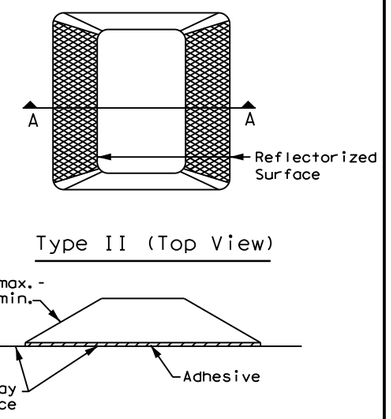
WRONG WAY ARROW



NOTE

See the Roadway Design Manual Chapter 3 to determine lengths of the acceleration lane and taper.

PARALLEL ACCELERATION LANE



SECTION A

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

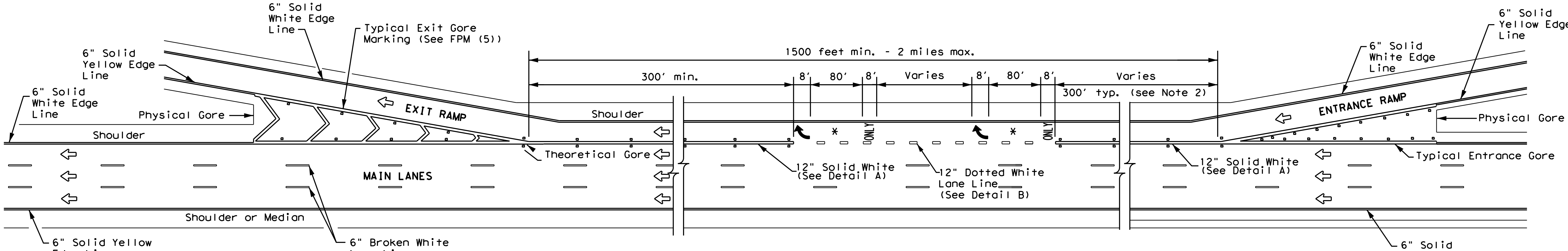
Texas Department of Transportation — Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

FPM(1)-22

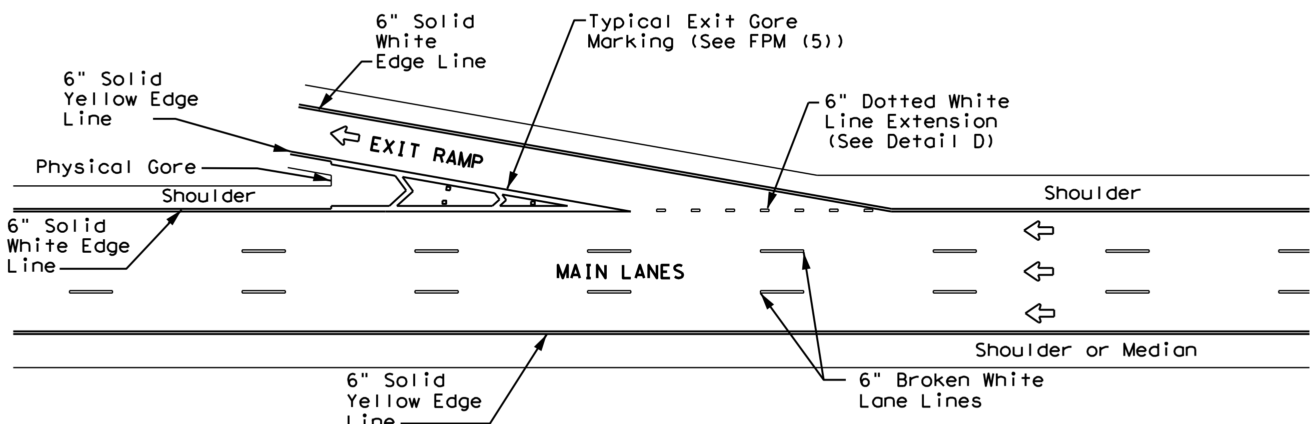
FILE: fpm(1)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
5-74 8-00 2-12	DIST	COUNTY		SHEET NO.
4-92 2-08 10-22	SAT	FRIO		101
5-00 2-10				

23A



SINGLE LANE EXIT WITH AUXILIARY LANE

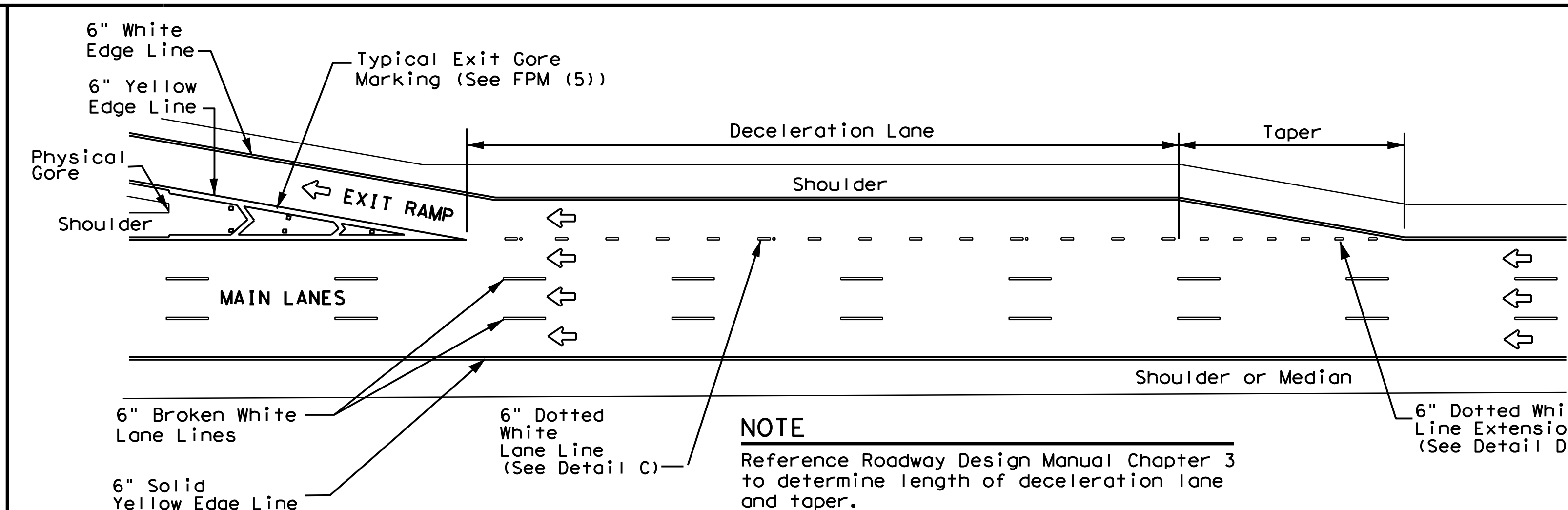
(See Note 2)



NOTE

Reference Roadway Design Manual Chapter 3 to determine if tapered deceleration lane may be used.

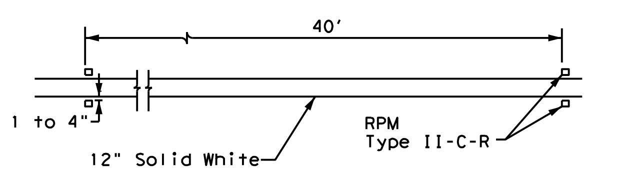
TAPERED DECELERATION LANE



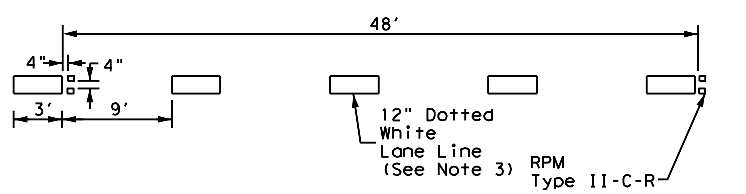
NOTE

Reference Roadway Design Manual Chapter 3 to determine length of deceleration lane and taper.

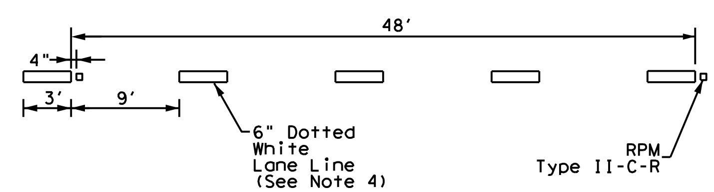
PARALLEL DECELERATION LANE



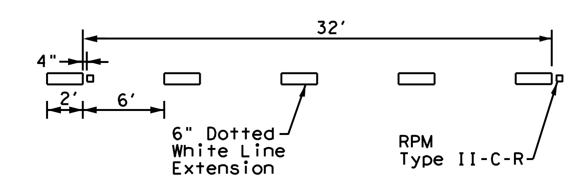
DETAIL A



DETAIL B



DETAIL C



DETAIL D

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Normal (6") dotted lane line (see Detail C) is used at parallel acceleration and deceleration lanes.
5. See FPM(1) for traffic lane line pavement marking details.

LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

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.

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-22

FILE: fpm(2)-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-77 5-00 2-12 / 4-92 8-00 10-22 / 8-95 2-10	0017	06	086	IH 35
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	SAT		FRIO	102

23B

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DATE: 10/30/2023 11:27:09 AM
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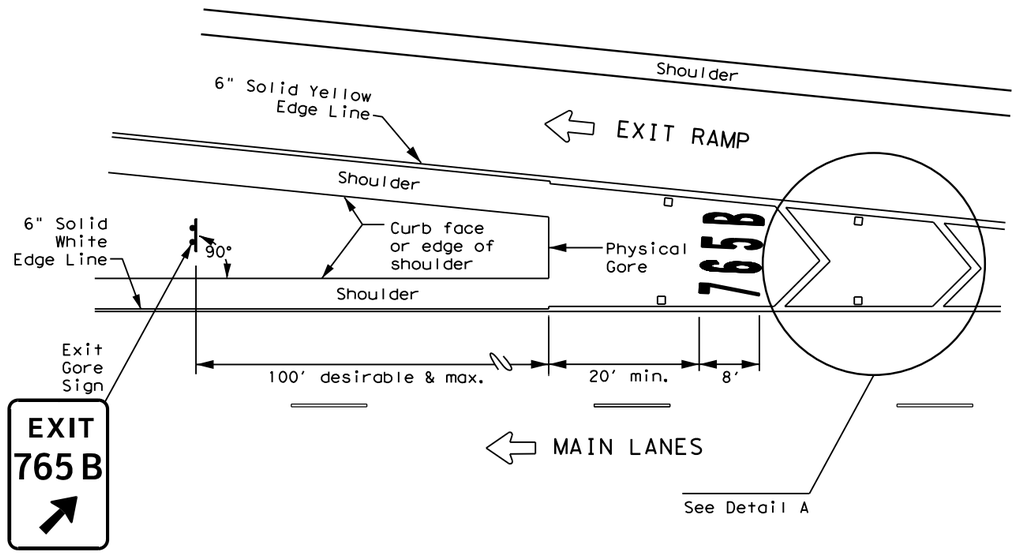
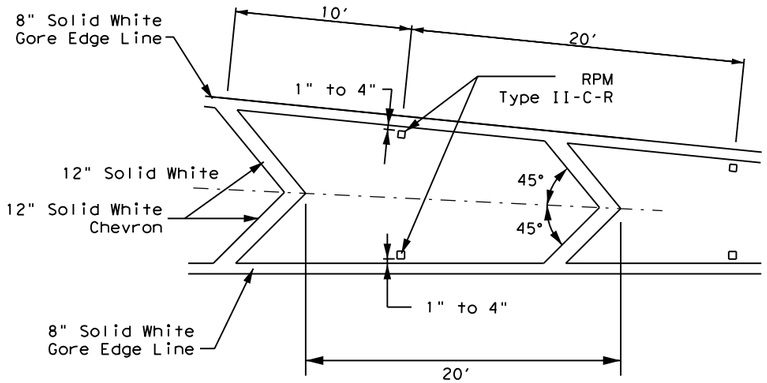
EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white exit number pavement markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Section 12 at http://www.txdot.gov



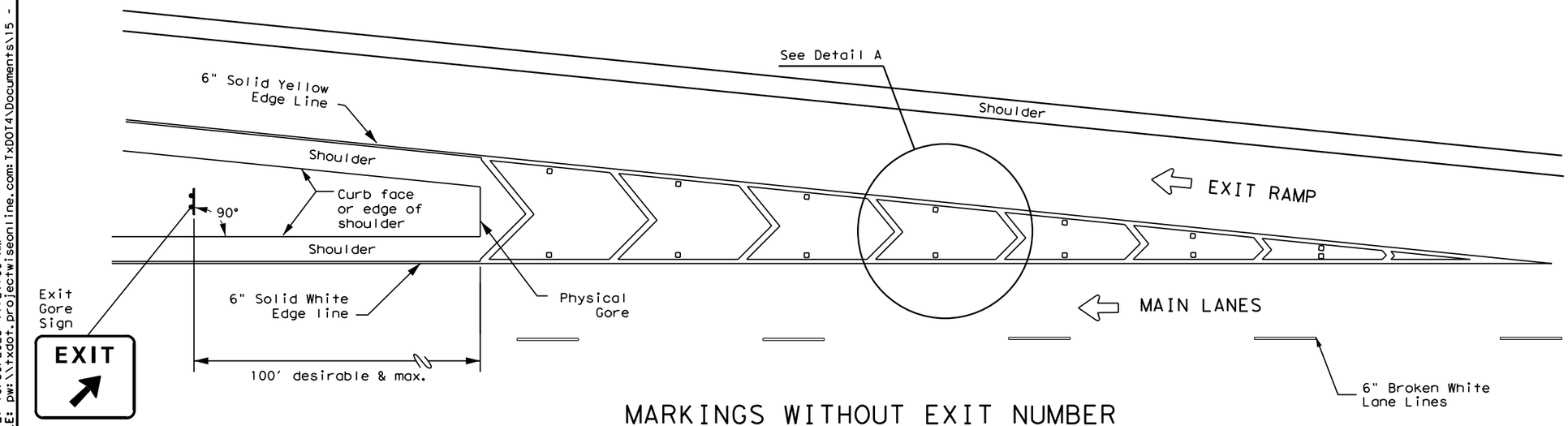
MARKINGS WITH EXIT NUMBER



NOTES

1. Raised pavement markers shall be centered between each chevron or neutral area line.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

DETAIL A

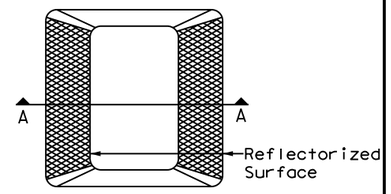


MARKINGS WITHOUT EXIT NUMBER

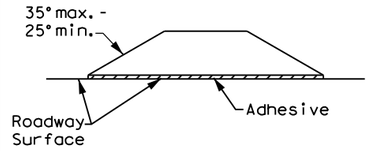
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

LEGEND	
⇦	Traffic flow
▫	Reflectorized Raised Markers (RPM) Type II-C-R



Type II (Top View)



SECTION A

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation | Traffic Safety Division Standard

EXIT GORE PAVEMENT MARKINGS

FPM(5)-22

FILE: fpm(5)-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
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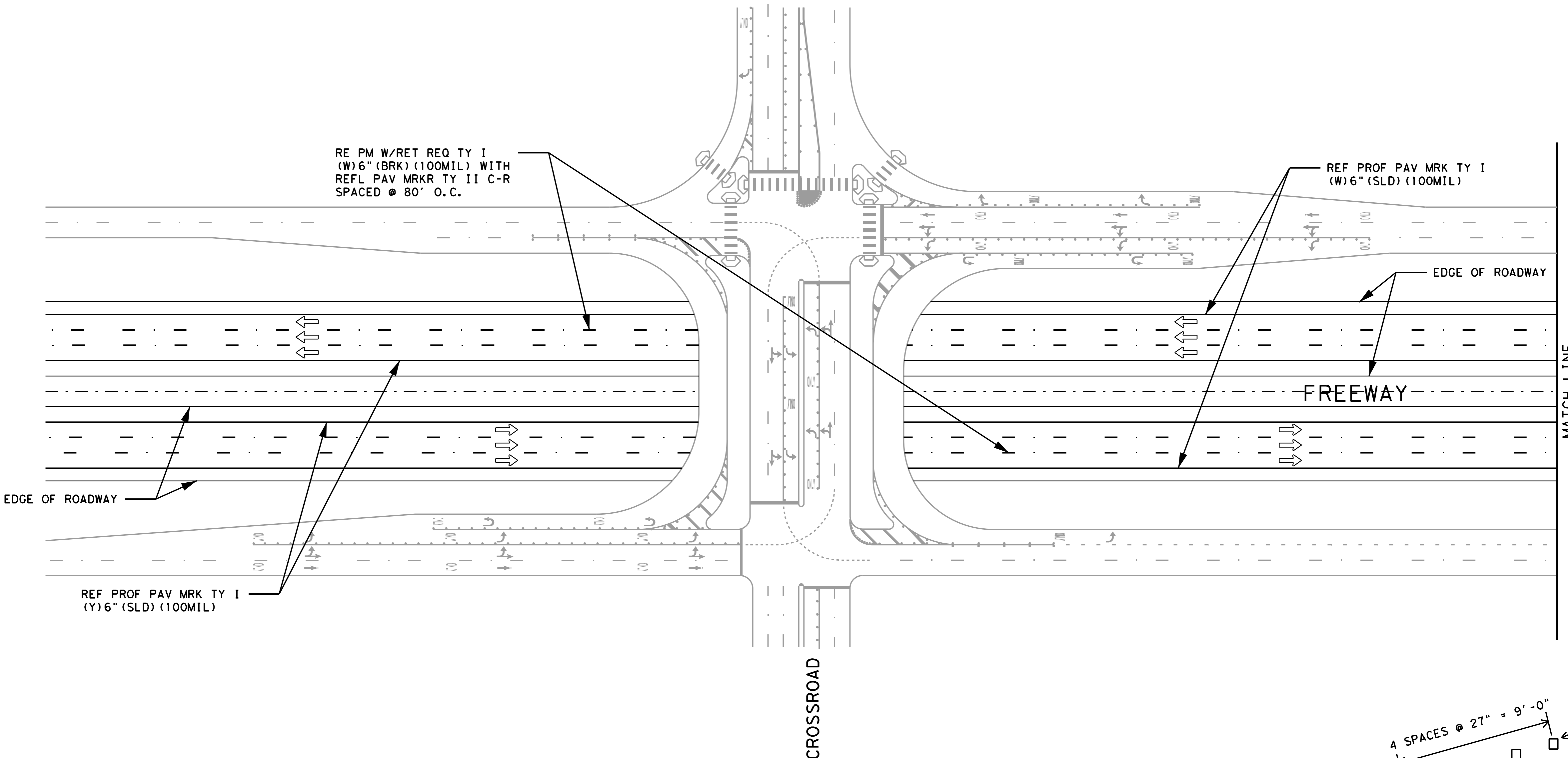
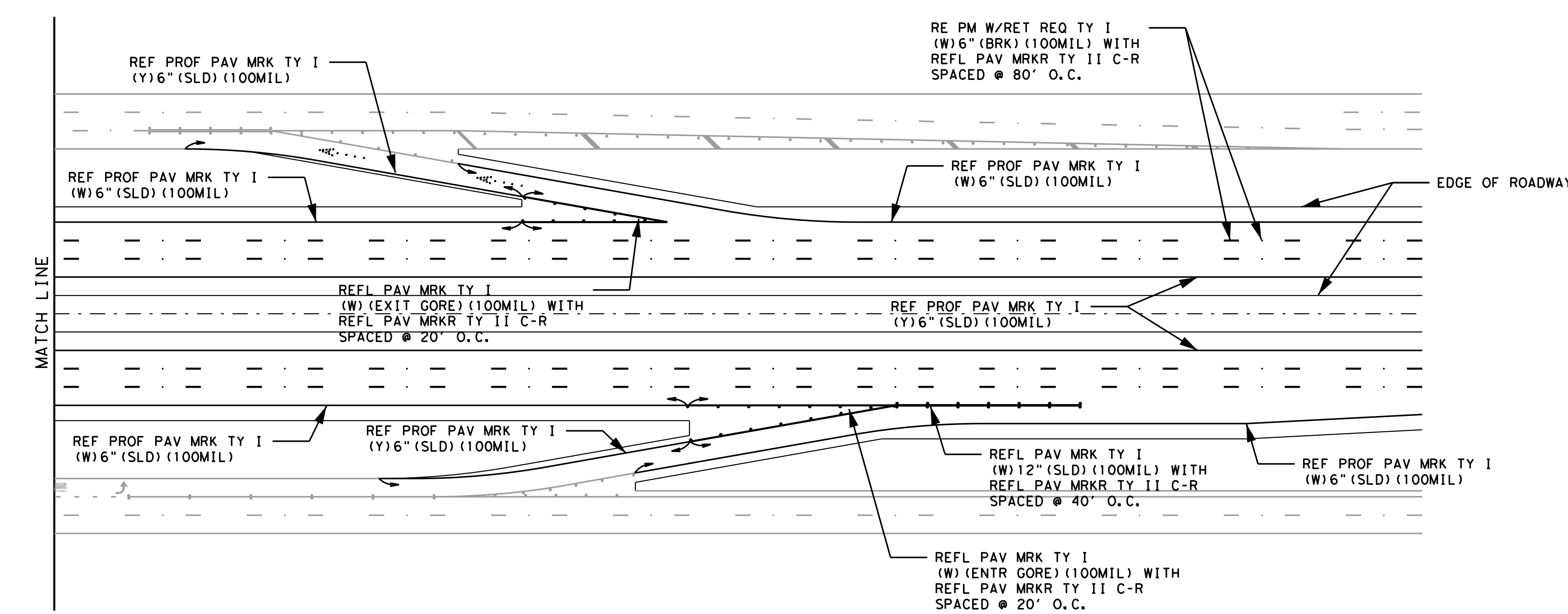
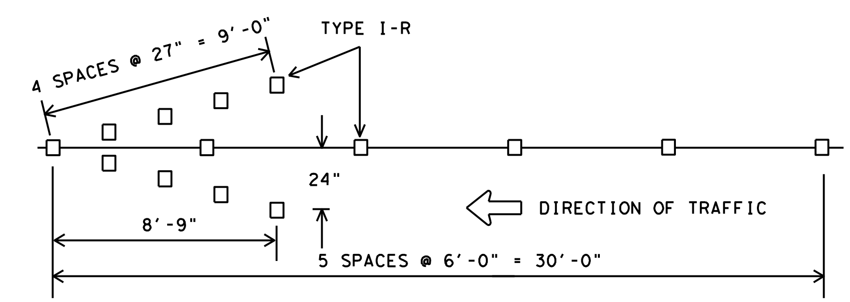
	SAT	FRIO		103

23E







ALL RAISED MARKERS IN THE WRONG WAY ARROW SHALL BE TYPE I-R REFLECTORIZED PAVEMENT MARKERS WITH THE REFLECTORIZED SURFACE FACING THE WRONG WAY TRAFFIC. TYPE II-C-R SHALL NOT BE USED.

REFLECTORIZED WRONG WAY ARROWS, NOT TO EXCEED TWO, MAY BE PLACED ON EXIT RAMPS. LOCATION OF THE ARROWS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

WRONG WAY ARROW DETAIL

Texas Department of Transportation

San Antonio District Standard

TYPICAL PAVEMENT MARKING DETAILS

SCALE: NS

TPMD(1)-18

REVISIONS	FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.		SHEET NO.
MAY 2018		SEE TITLE SHEET		104
	STATE	DIST.	COUNTY	
	TEXAS	SAT	FRIO	
	CONT.	SECT.	JOB	HIGHWAY NO.
	0017	06	086	IH 35

DRAWN BY: TED | REVISED BY: JC03 | CHECKED BY: GG / OMG

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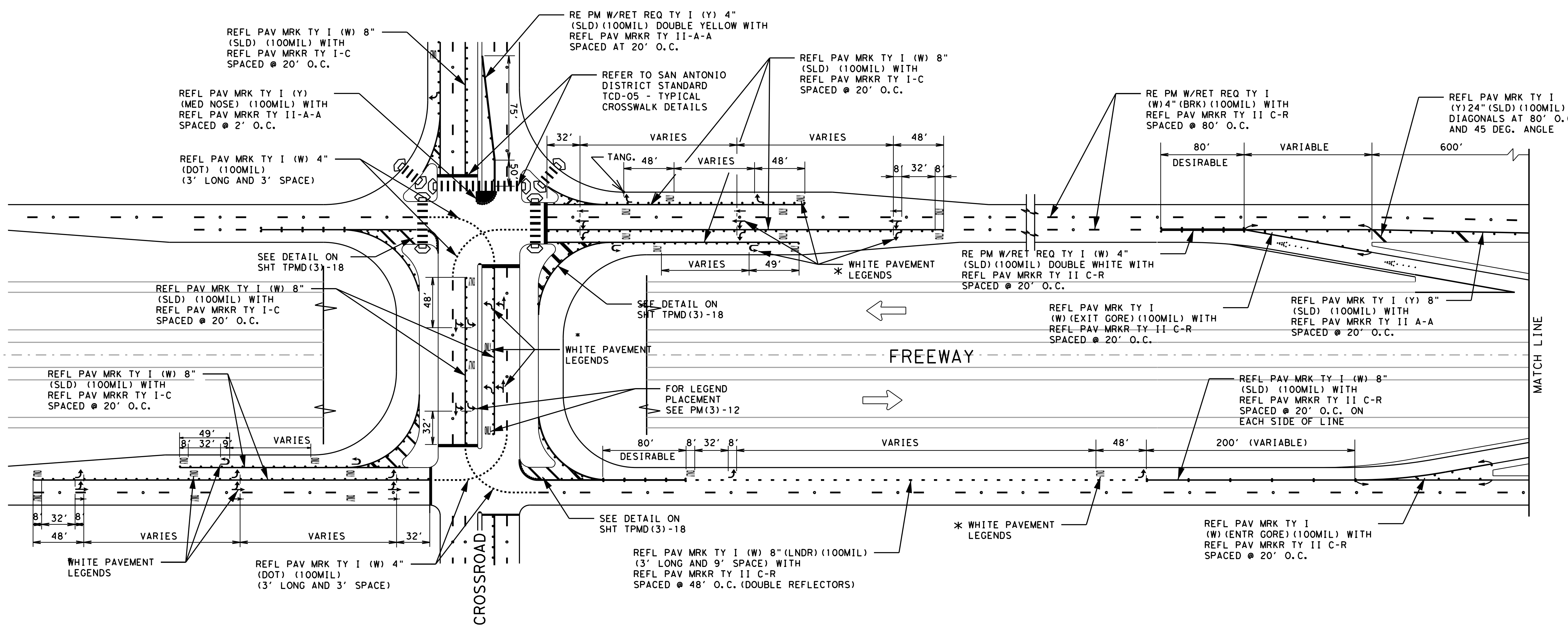
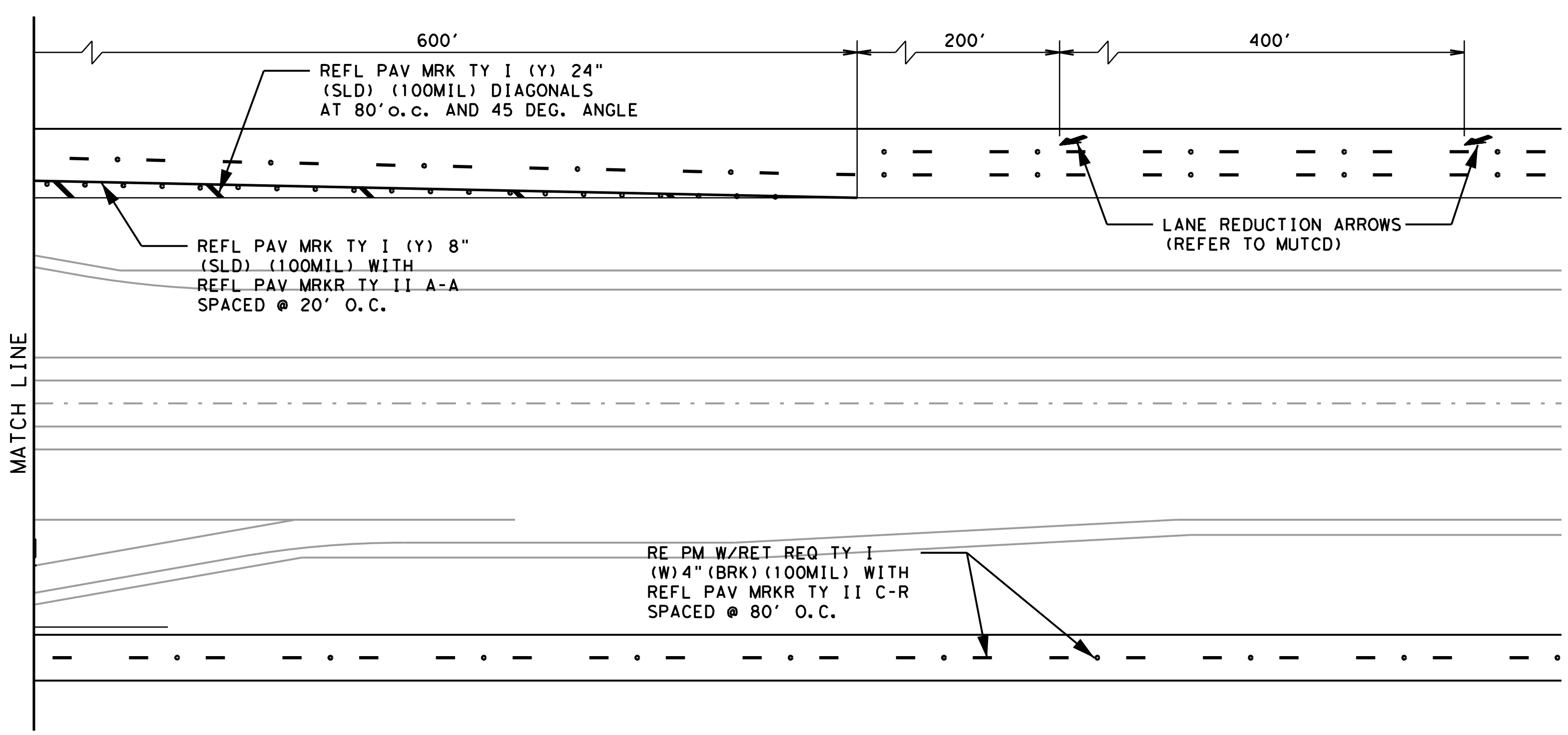




* PROPOSED WHITE LEGENDS TEXT AND ARROW SIZE TO BE IN ACCORDANCE WITH THE TEXAS MUTCD

Texas Department of Transportation © 2018

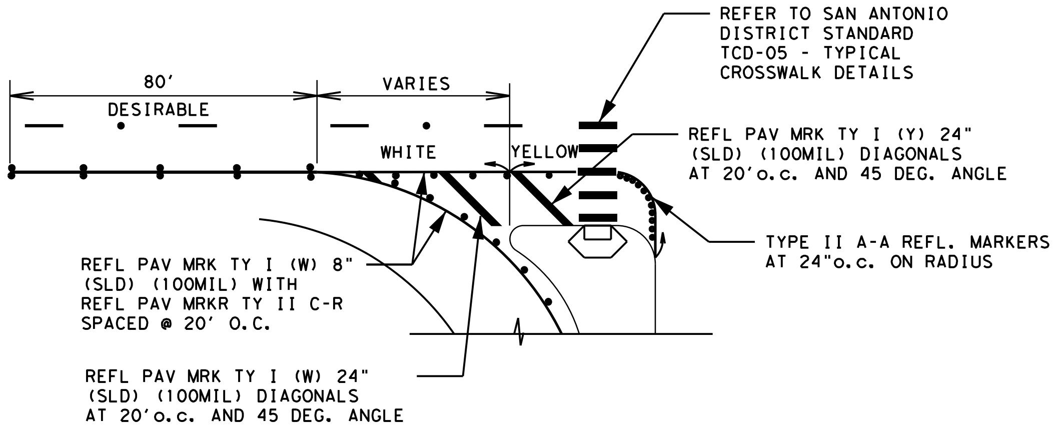
San Antonio District Standard

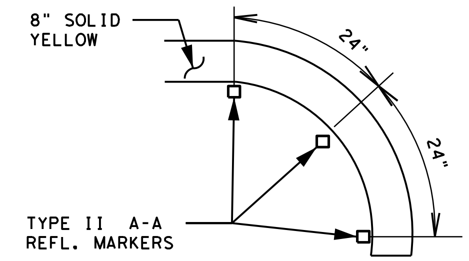
TYPICAL PAVEMENT MARKING DETAILS

SCALE: NS — TPMD(2)-18

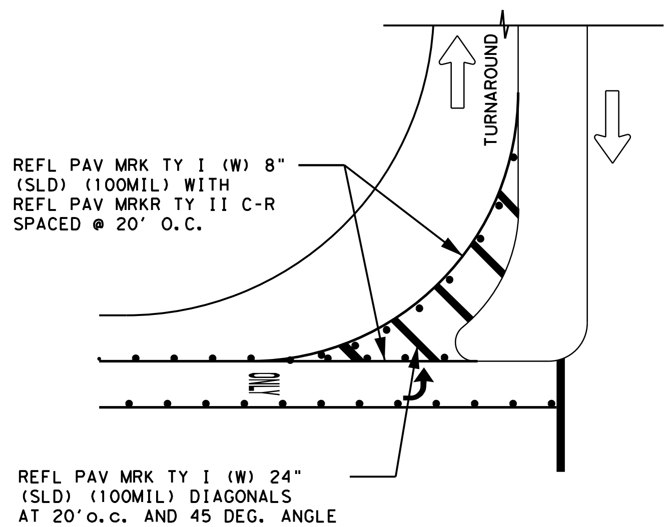
REVISIONS	FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.		SHEET NO.
MAY 2018		SEE TITLE SHEET		105
	STATE	DIST.	COUNTY	
	TEXAS	SAT	FRIO	
	CONT.	SECT.	JOB	HIGHWAY NO.
	0017	06	086	IH 35

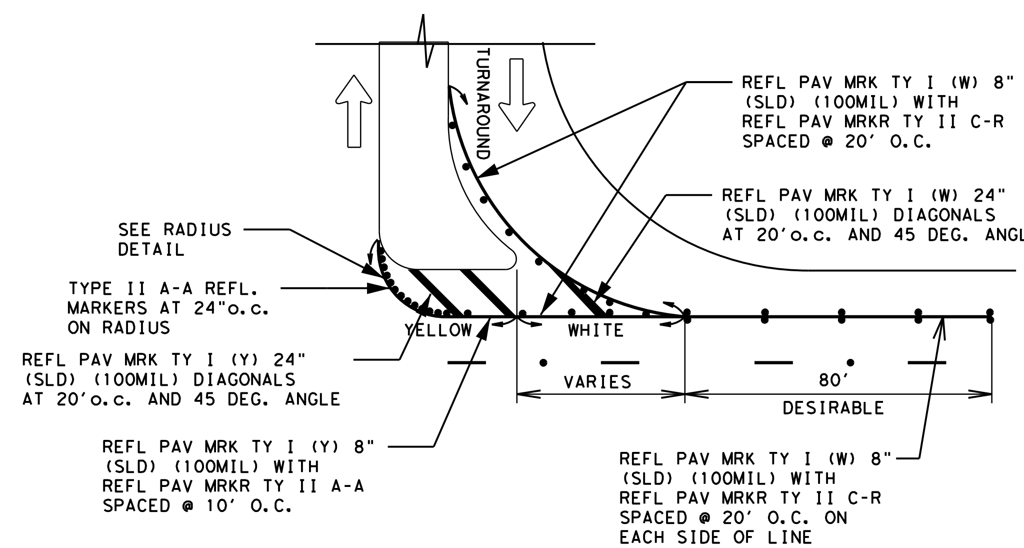
DRAWN BY: TED | REVISED BY: JC03 | CHECKED BY: GG / OMG





RADIUS DETAIL





TYPICAL TURNAROUND PAVEMENT MARKING DETAILS

Texas Department of Transportation

San Antonio District Standard

TYPICAL PAVEMENT MARKING DETAILS

SCALE: NS

TPMD(3)-18

REVISIONS	FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.		SHEET NO.
MAY 2018		SEE TITLE SHEET		106
	STATE	DIST.	COUNTY	
	TEXAS	SAT	FRIO	
	CONT.	SECT.	JOB	HIGHWAY NO.
	0017	06	086	IH 35

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REVISED BY: JC03
CHECKED BY: GG / OMG

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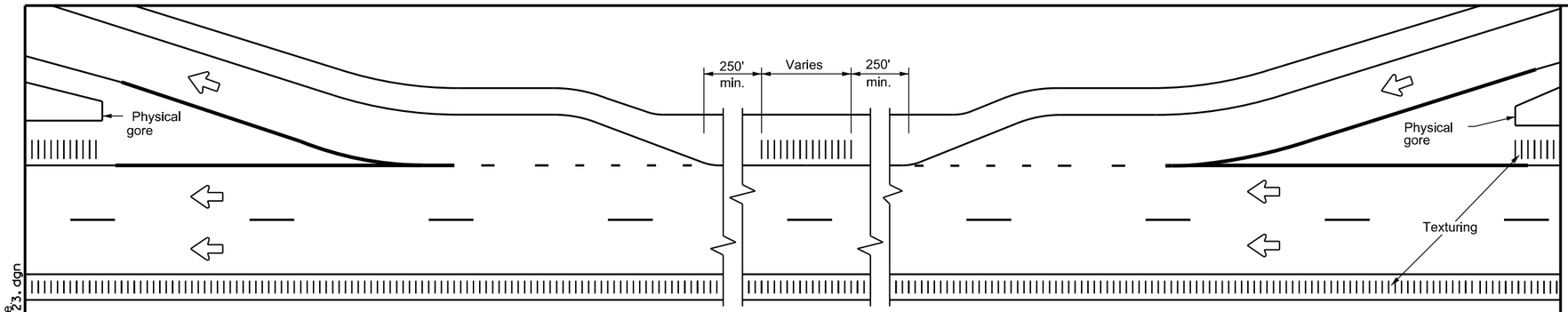
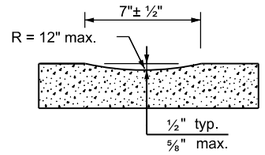
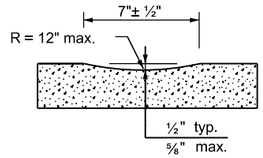


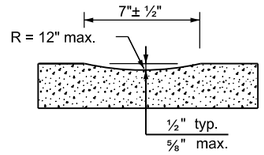
TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS



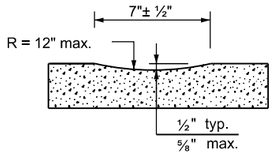
PROFILE VIEW
OPTION 1



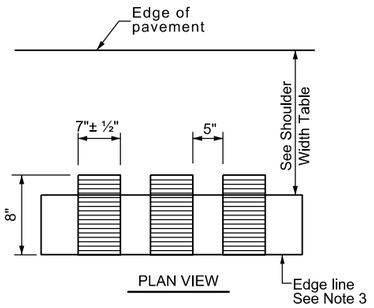
PROFILE VIEW
OPTION 2



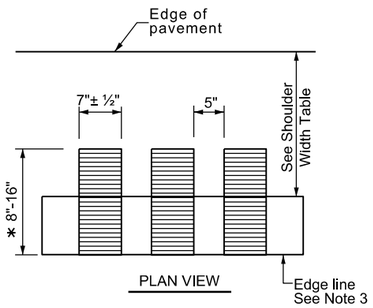
PROFILE VIEW
OPTION 3



PROFILE VIEW
OPTION 4

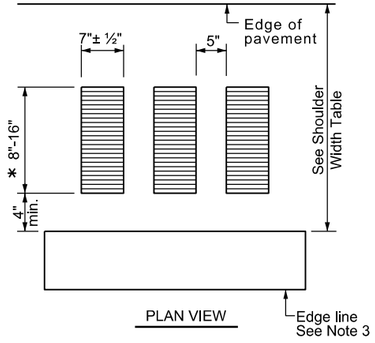


CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



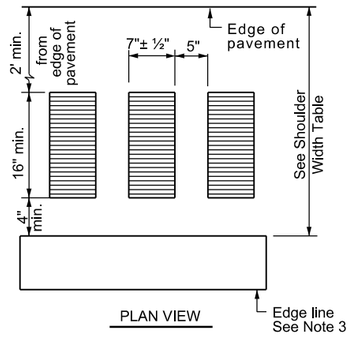
* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

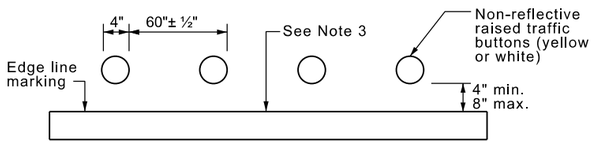


* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

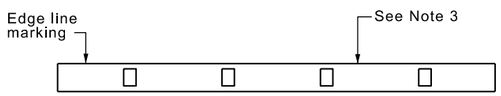


CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGE LINE
(Rumble Strips)



PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS
(Rumble Strips)

SHOULDER WIDTH TABLE

EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, 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 sheets PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edge line rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble stripe.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

Texas Department of Transportation

Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS

RS(1)-23

FILE: rs(1)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
4-06 1-23	DIST	COUNTY		SHEET NO.
2-10	SAT	FRIO		107
10-13				

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0017-06-086

1.2 PROJECT LIMITS:

From: US 57

To: FRIO/MEDINA COUNTY LINE

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 29.0283393 ,(Long) -99.0496850

END: (Lat) 29.0898251 ,(Long) -98.9566007

1.4 TOTAL PROJECT AREA (Acres): 429

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.42

1.6 NATURE OF CONSTRUCTION ACTIVITY:

BASE REPAIR, MILL, INLAY & PAVEMENT MARKINGS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Hindes-Yologo complex, rolling	53% Hindes , 45% Yologo, well drained, high runoff
Antosa-Bobillo complex, gently undulating	48% Antosa, 36% Bobillo, 16% minor components, moderately well drained, low runoff
Duval very fine sandy loam, 1 to 3 percent slopes	85% Duval and similar soils, 15% minor components, well drained, low runoff
Dilley fine sandy loam, 1 to 5 percent slopes	85% Dilley, 15% minor components, well drained, low runoff

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
☐ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☐ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☐ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
☐ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
☐ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. 10/30/2023 DATE

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		108
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☒ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☒ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		109
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

10/30/2023 11:28:34 AM
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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☒ 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 Storm Water Pollution Prevention Plan (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 Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐Yes ☒No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required

☐ Nationwide Permit 14 - PCN Required

☐ 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 (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

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	☐ Sedimentation Chambers
		☐ 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. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

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 immediated area, and contact the Engineer immediately.

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 follwing 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

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

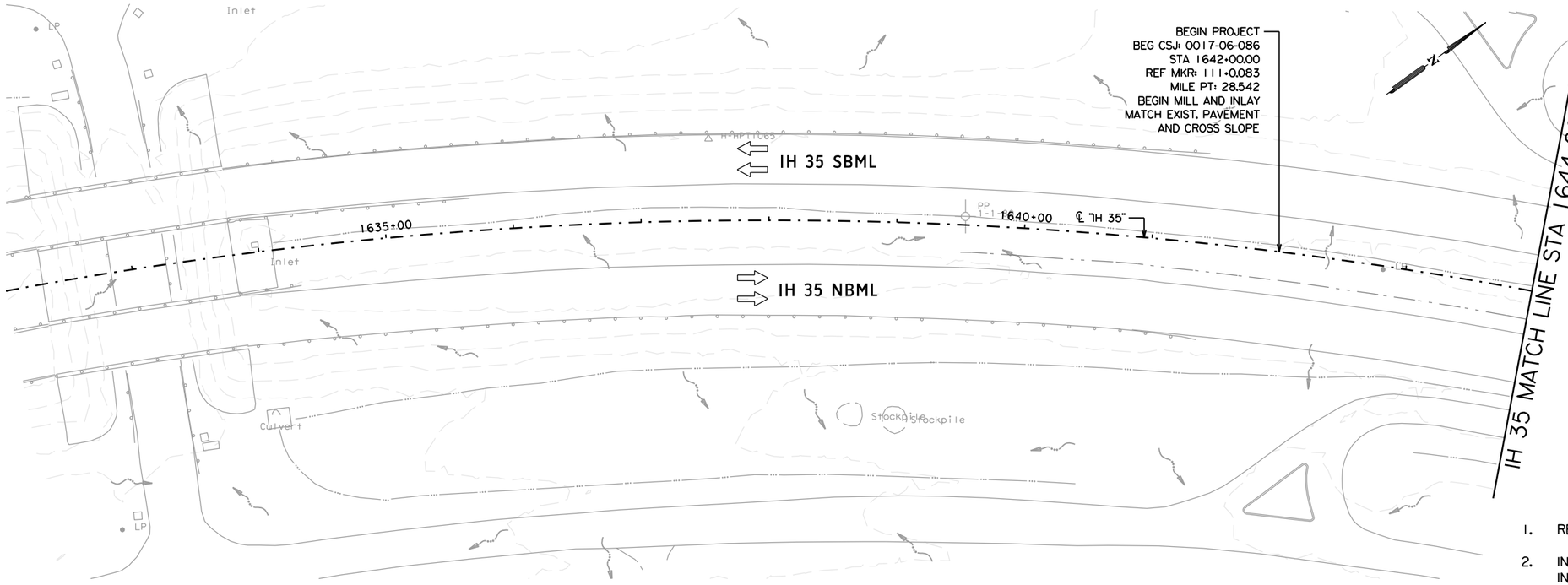
Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

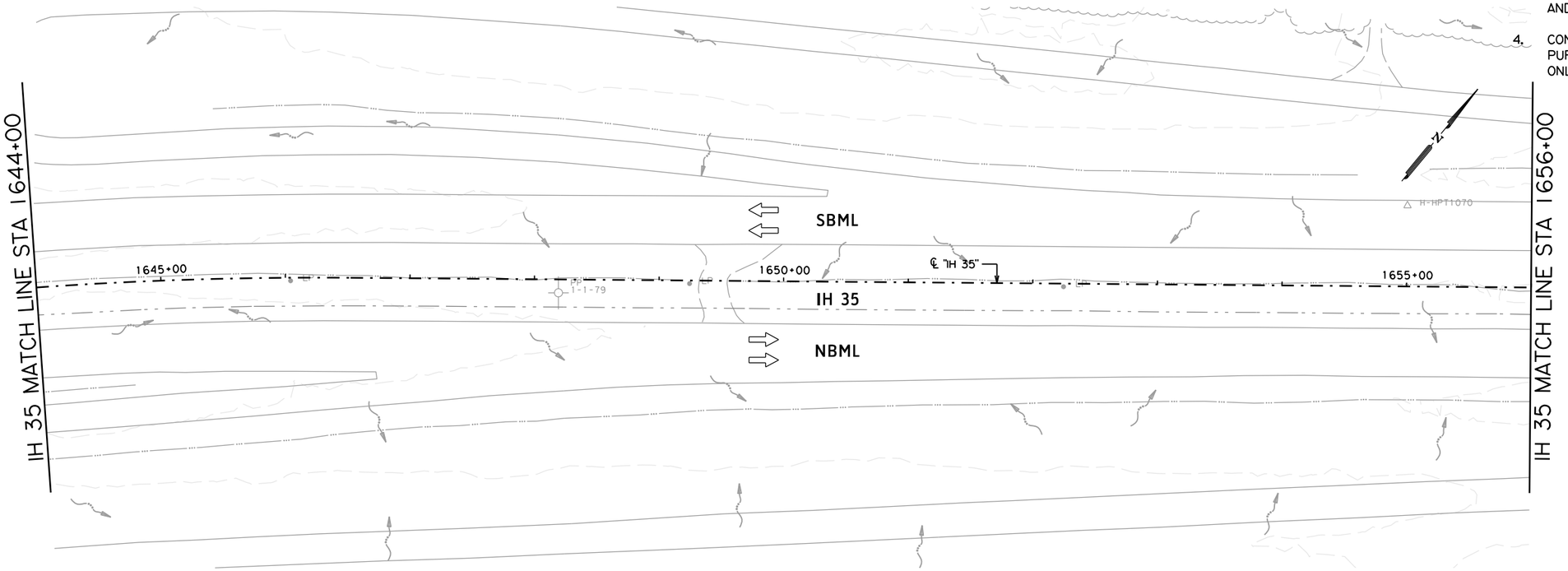
Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
©TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		110





QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT | QUANTITY

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
- COMPOST MANUF TOPOSIL/MULCH/DRILL SEED
- SODDING
- SOIL RETENTION BLANKETS
- CONSTRUCTION EXIT

SW3P GENERAL NOTES

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2. INSTALLED MEASURES SHALL REMAIL IN PLACE AND INSPECTED WEEKLY. ALL ITEMS SHALL BE MAINTAINED AND REPAIRED THROUGHOUT THE DURATION OF USE. MEASURES WILL BE REMOVED WHEN NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER
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STATE OF TEXAS
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140515
LICENSED
PROFESSIONAL ENGINEER

Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

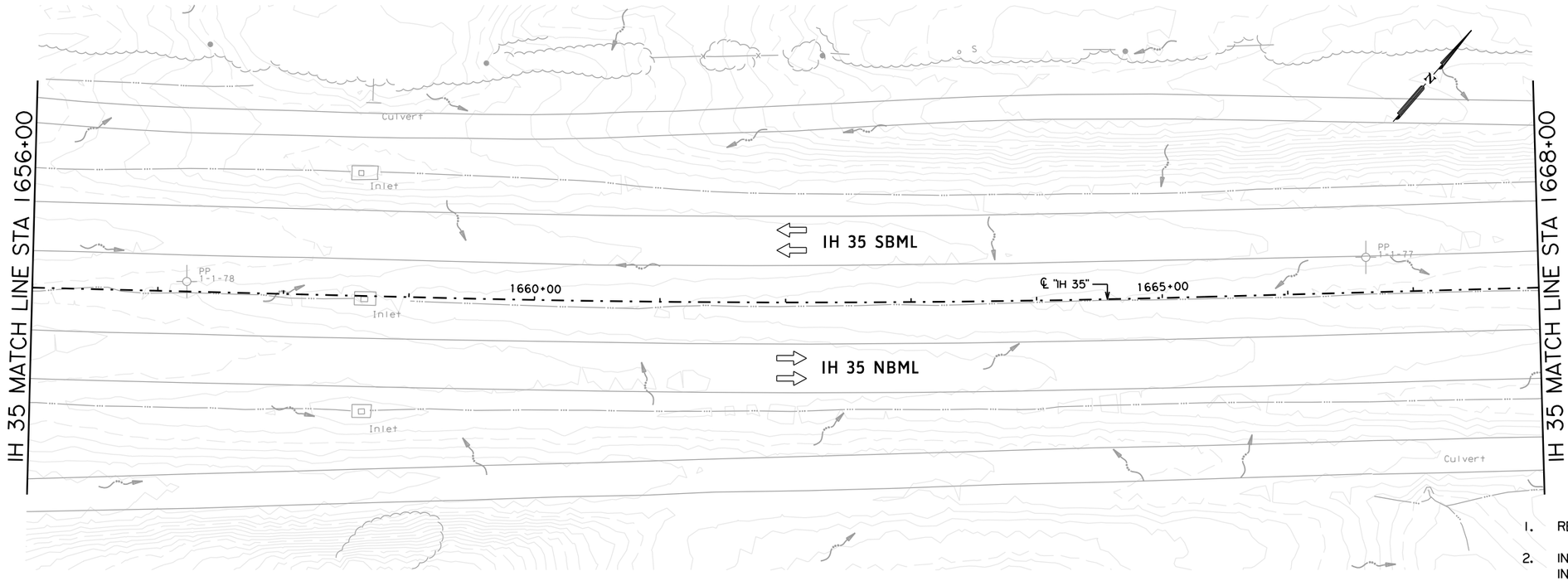
SCALE
HORIZONTAL: 1" = 100'
VERTICAL:

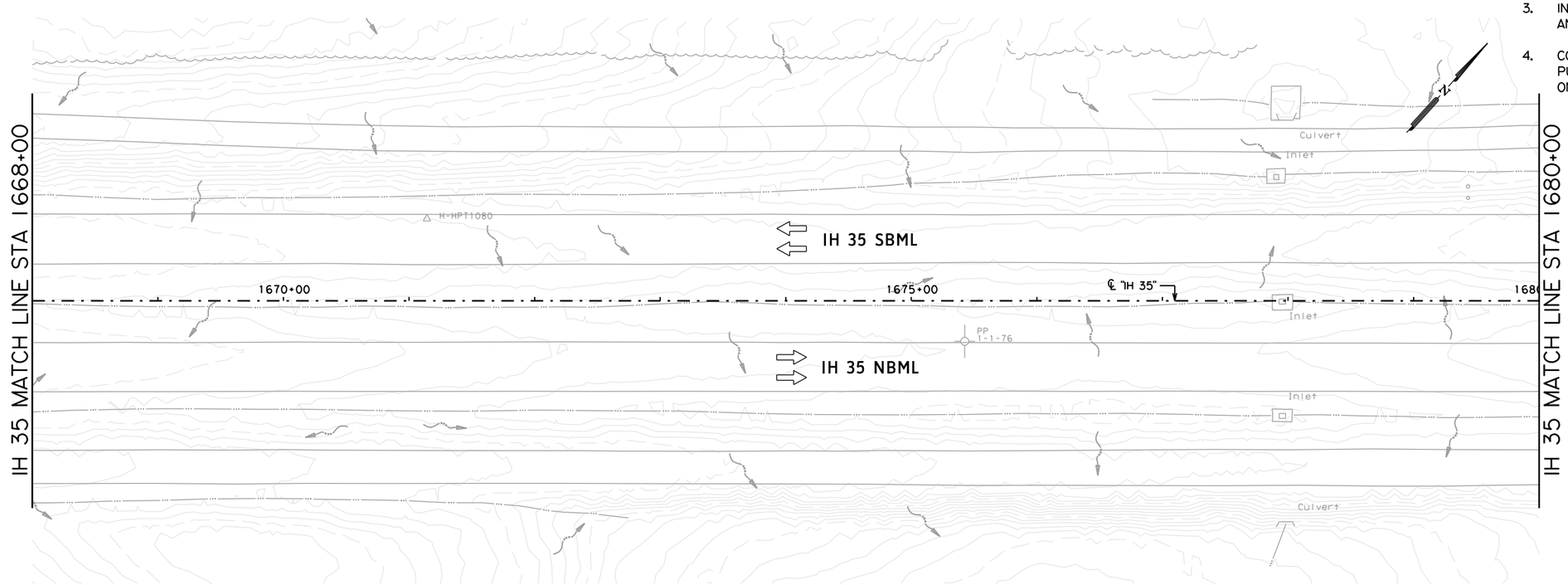
Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 1 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		111
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
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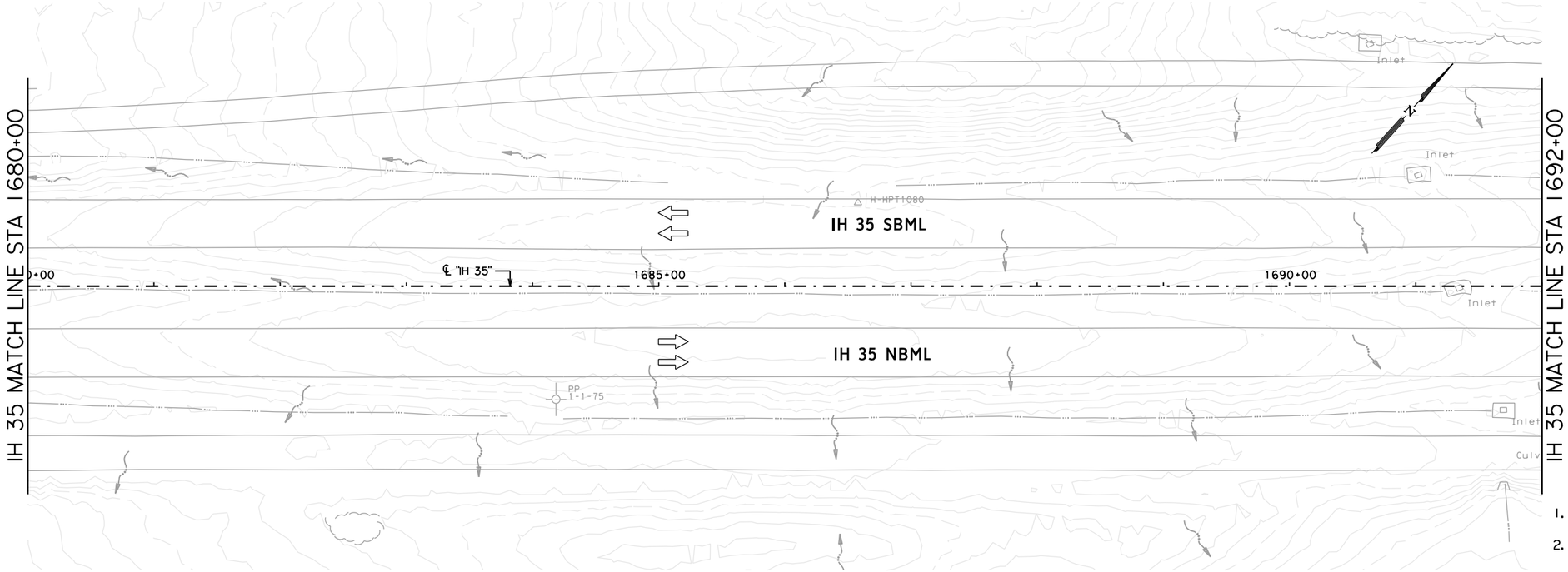
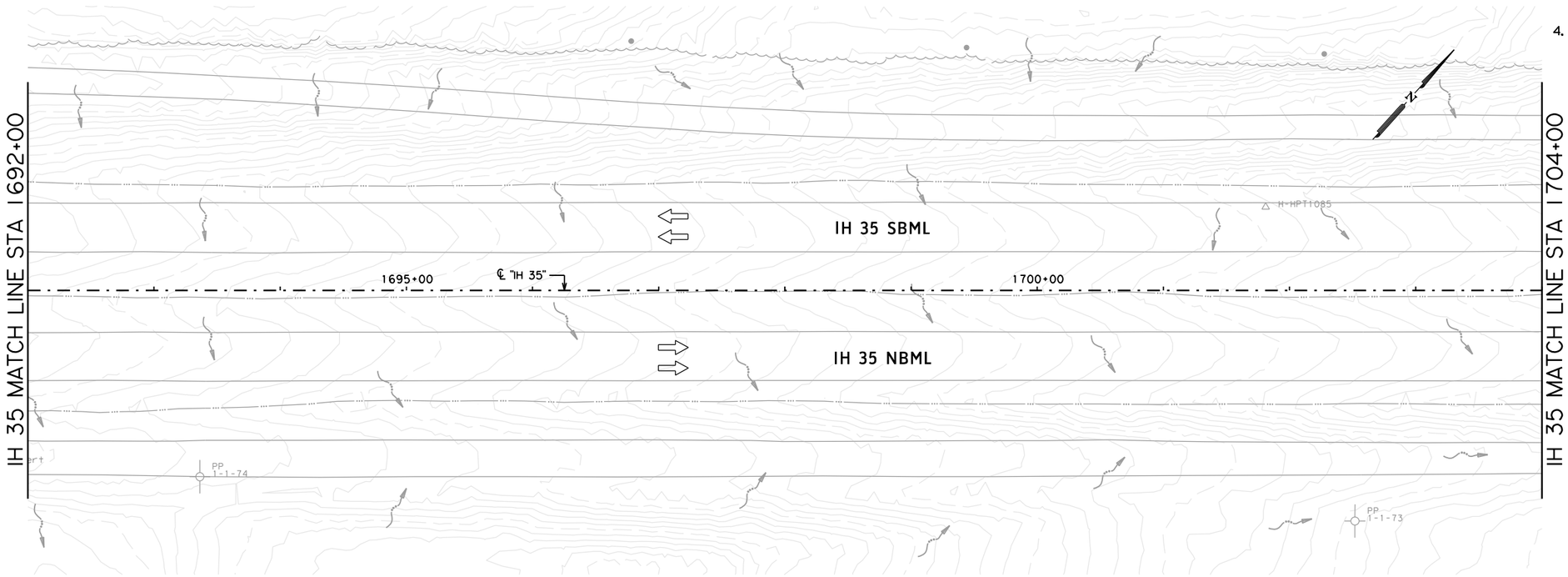
Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 2 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		112
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
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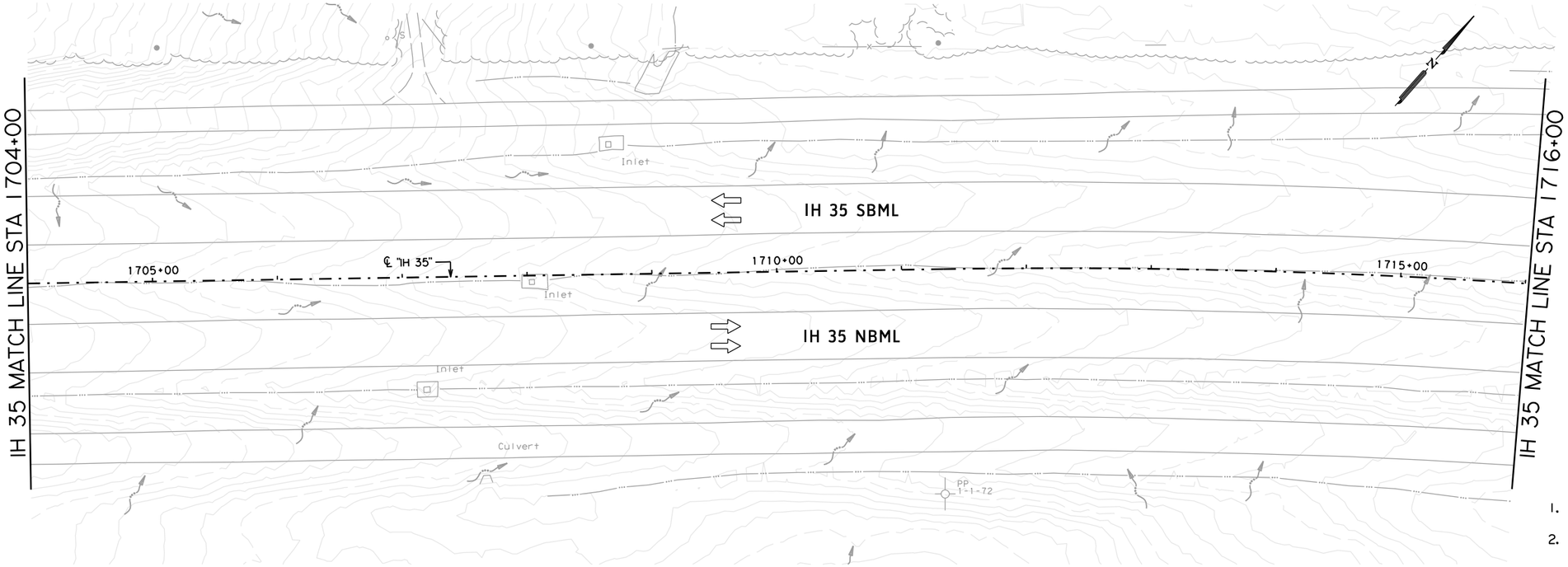
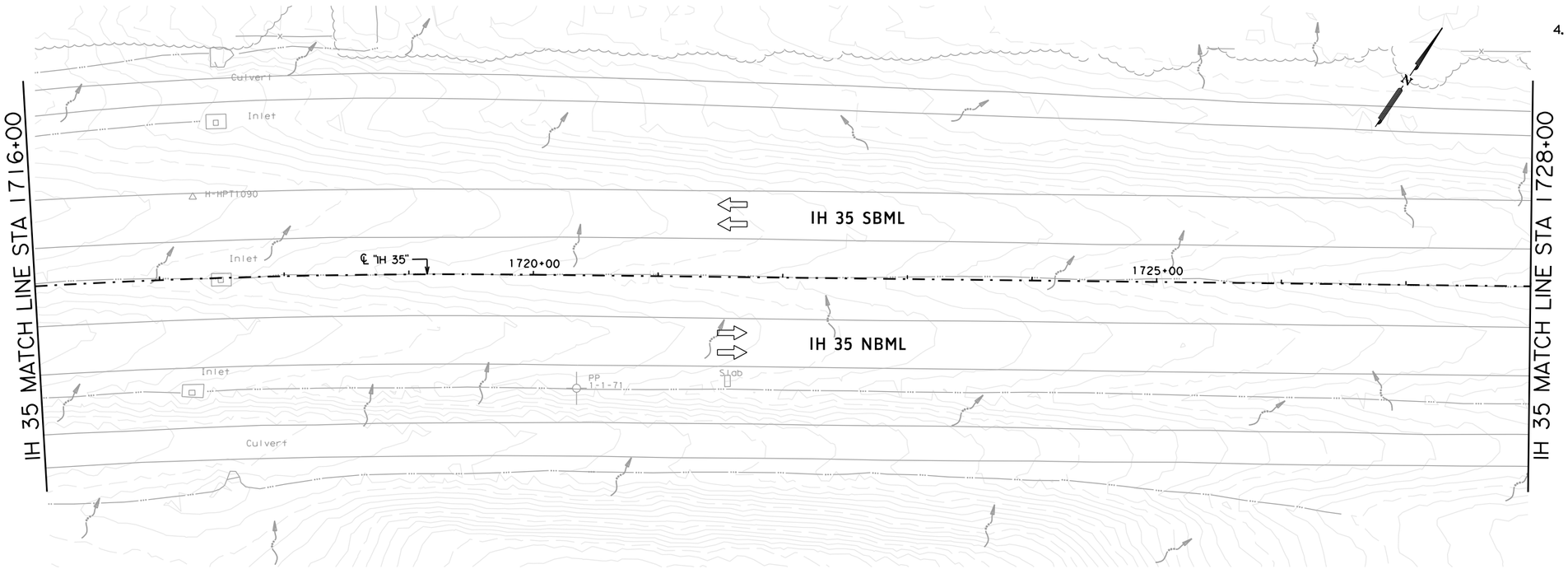
Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 3 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		113
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
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RENE ALVARADO III, P.E. — DATE 10/30/2023

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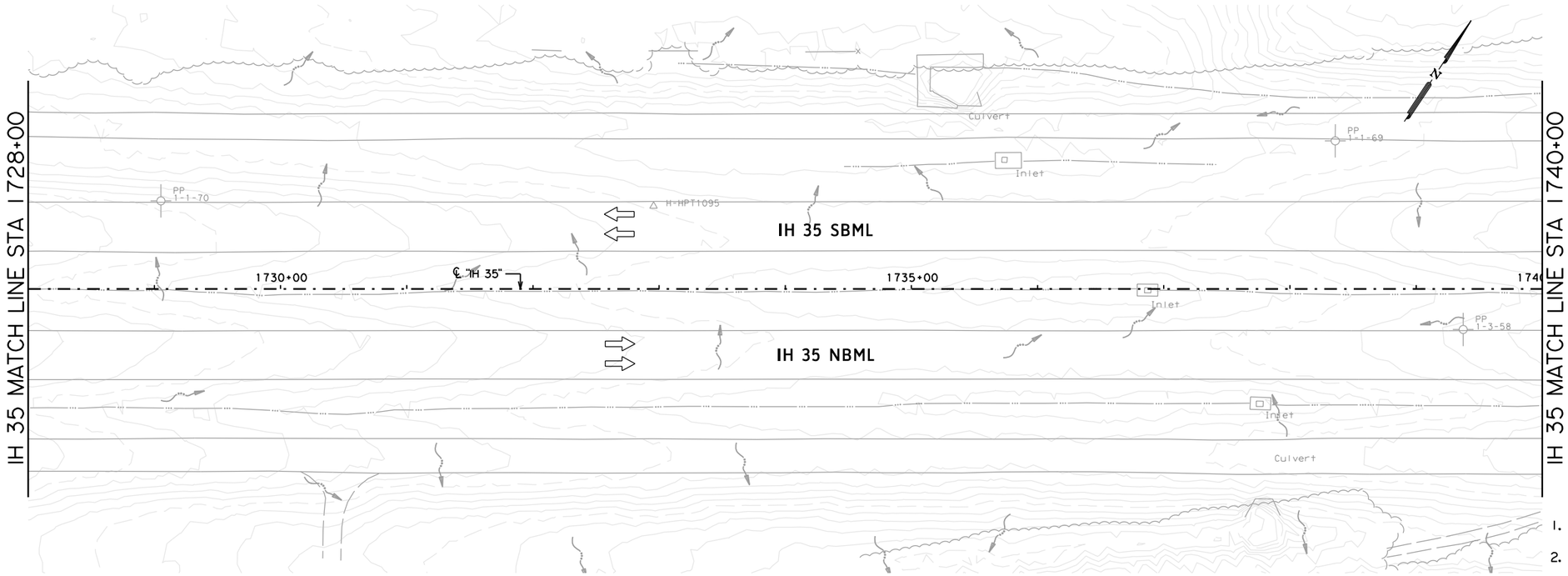
Texas Department of Transportation

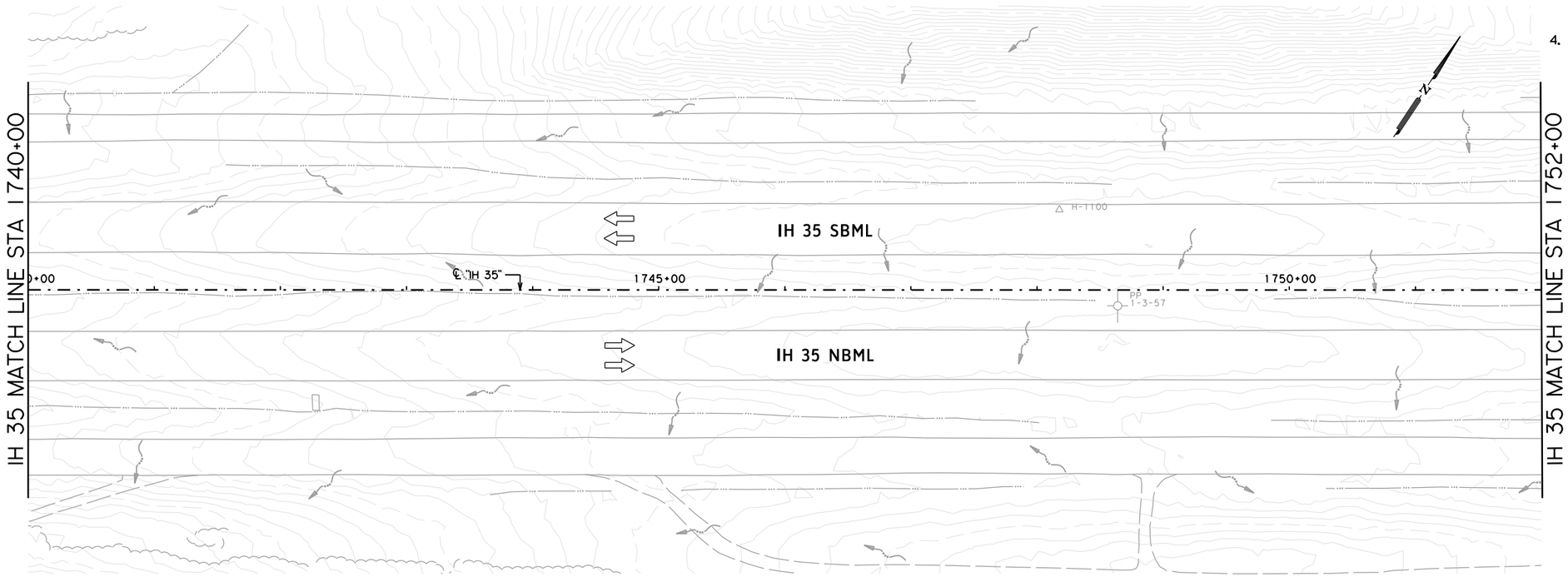
IH 35
SW3P LAYOUT

SHEET 4 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		114
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT | QUANTITY





SW3P LEGEND

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- LIMITS OF OVERLAY
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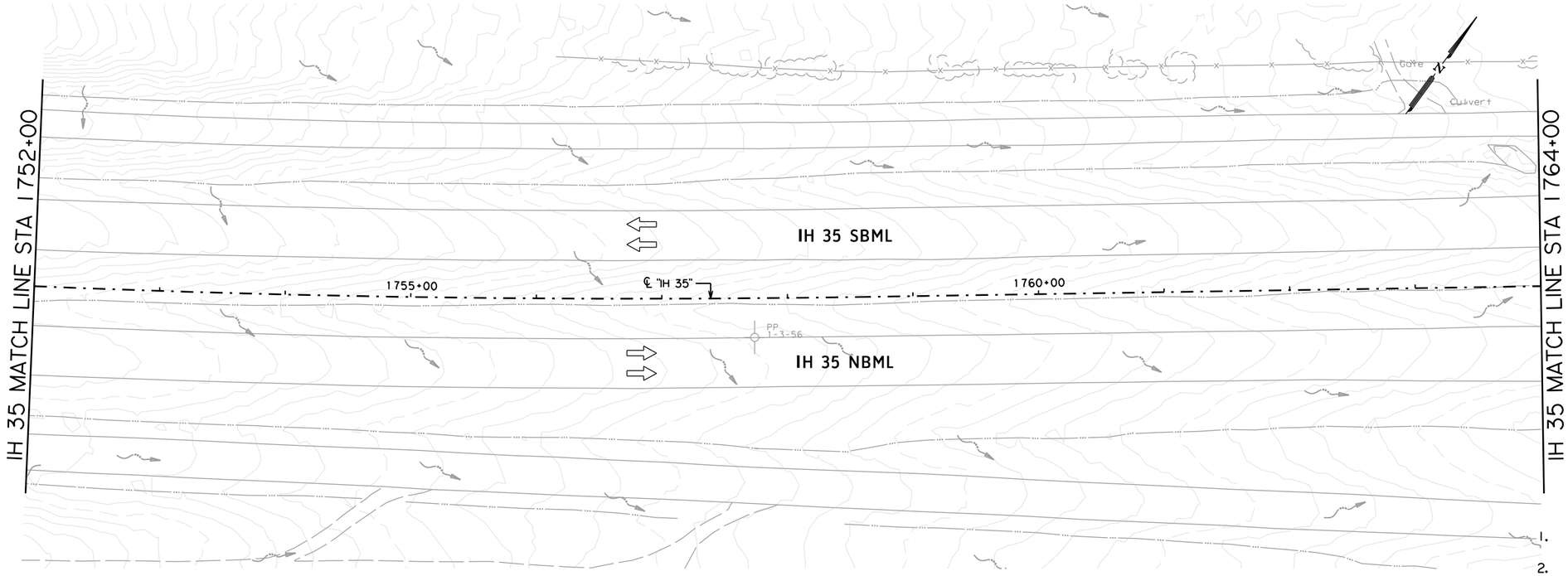
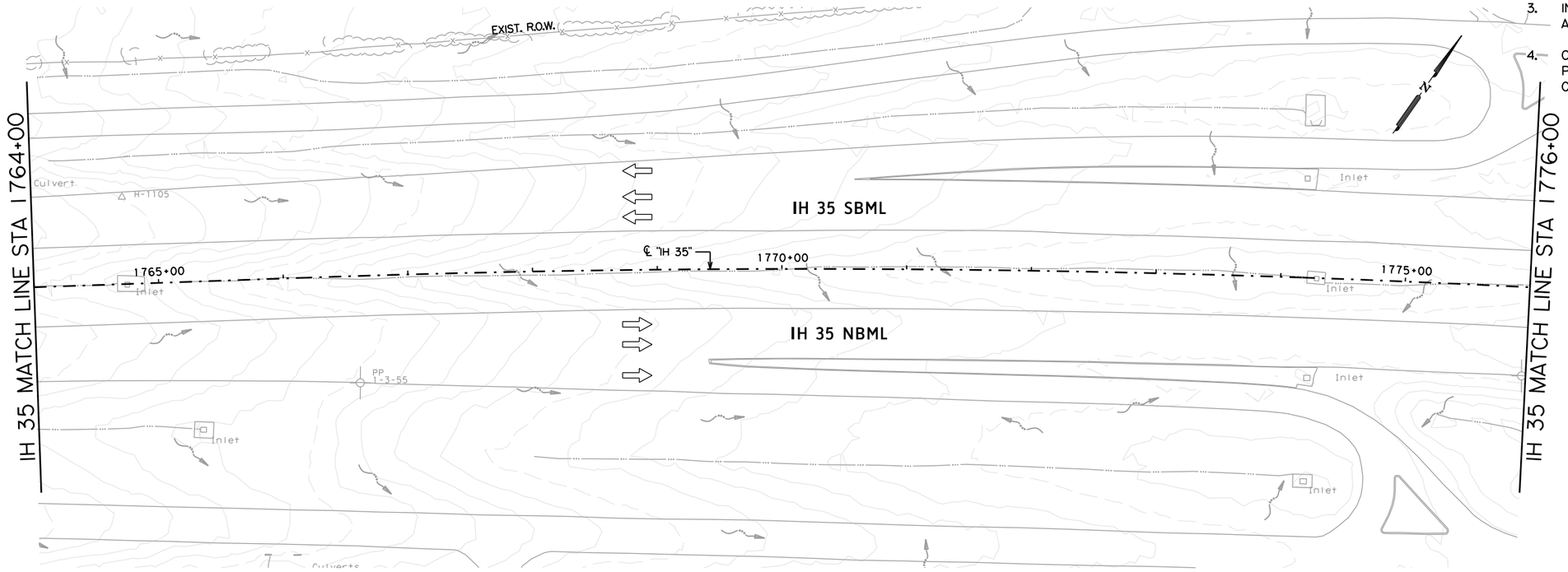
Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 5 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		115
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT | QUANTITY

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
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RENE ALVARADO III, P.E. — DATE 10/30/2023

SCALE
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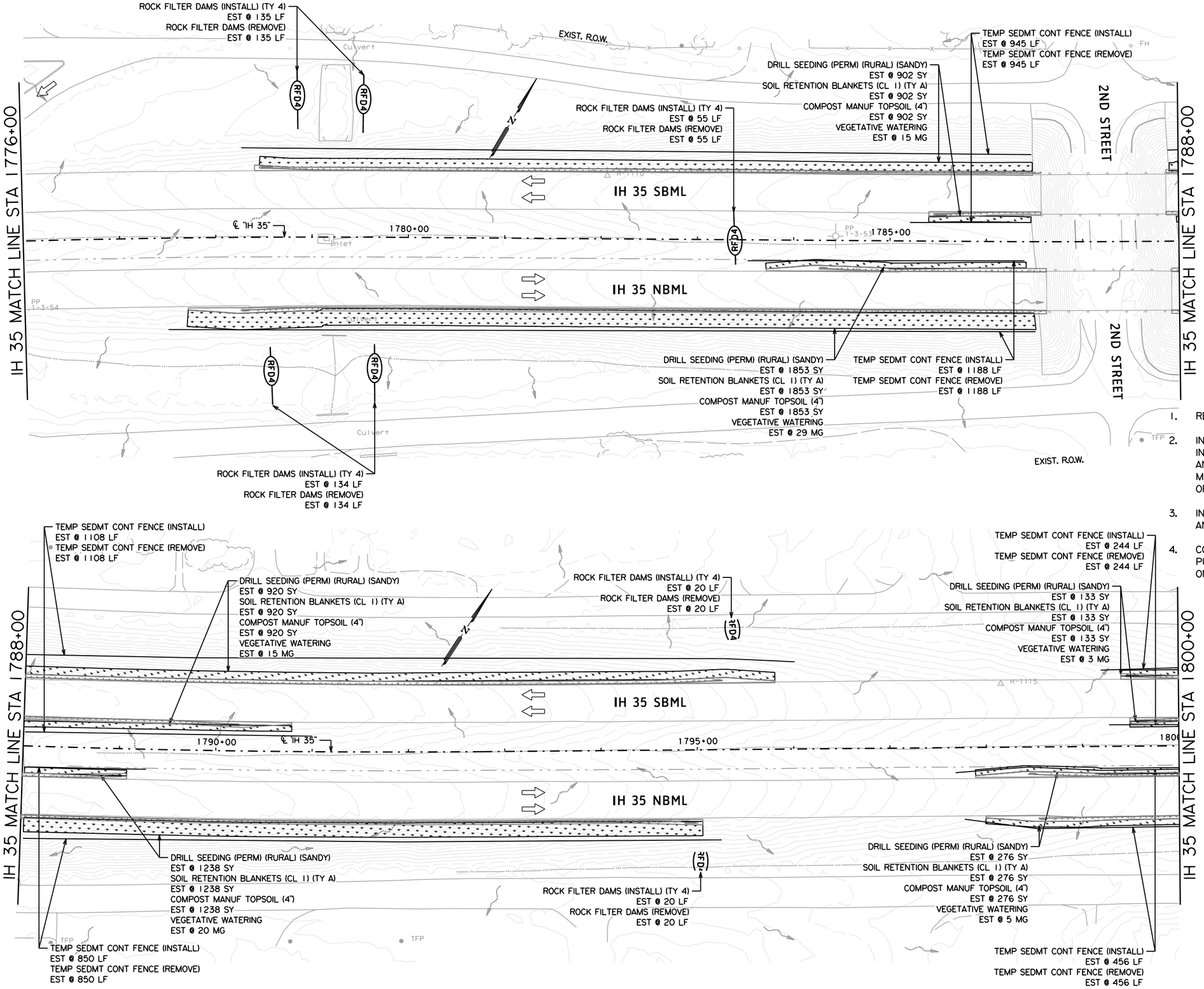
VERTICAL:

Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 6 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		116
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



QUANTITY SUMMARY CSJ: 0017-06-086

ITEM NO.	ITEM	UNIT	QUANTITY
161-6017	COMPOST MANUF TOPSOIL (4")	SY	5322
164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	5322
168-6001	VEGETATIVE WATERING	MG	87
169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	5322
506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	364
506-6011	ROCK FILTER DAMS (REMOVE)	LF	364
506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4791
506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4791

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
- COMPOST MANUF TOPOSIL/MULCH/DRILL SEED
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Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

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HORIZONTAL: 1" = 100'
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Texas Department of Transportation
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IH 35
SW3P LAYOUT

SHEET 7 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		117
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

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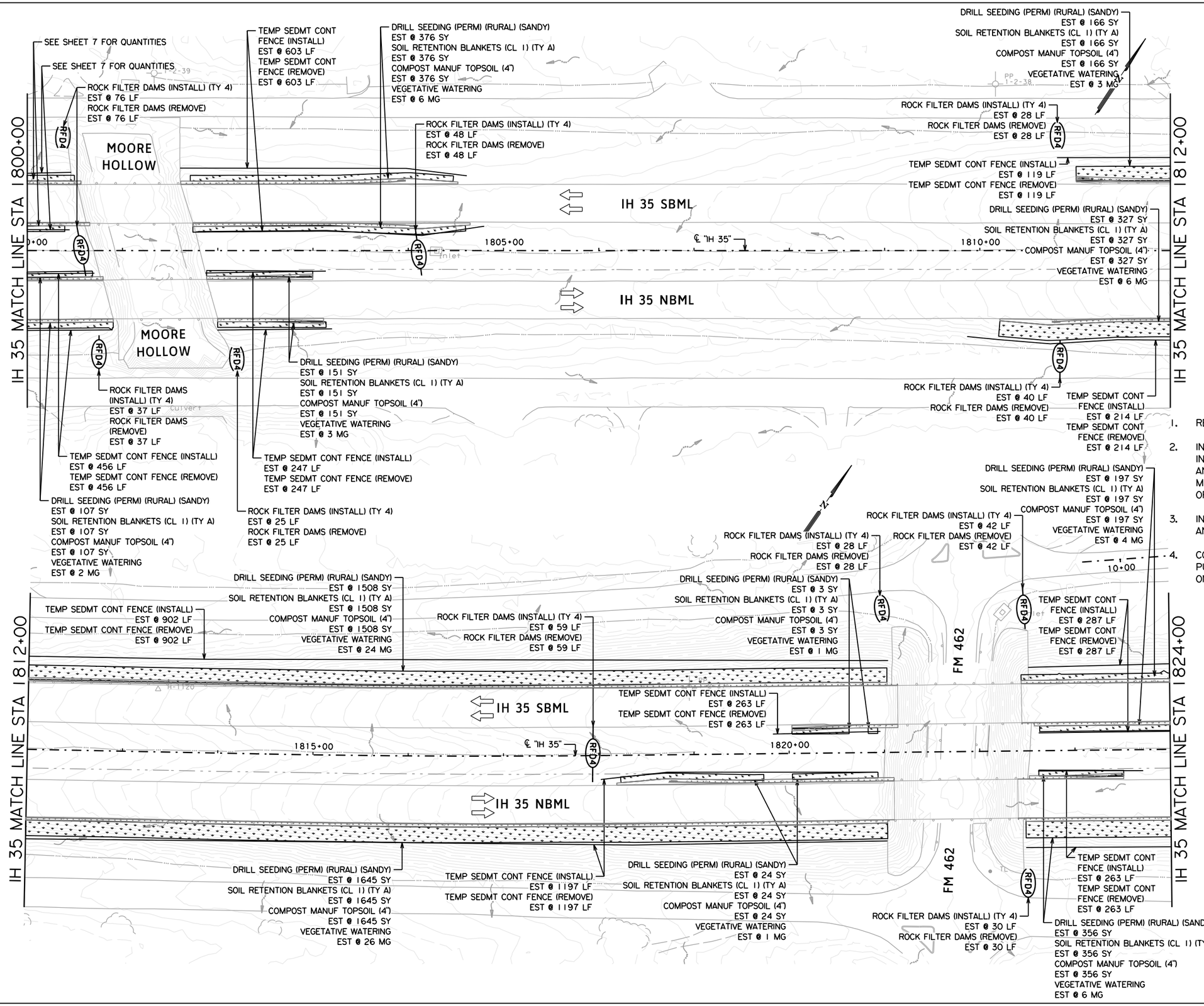

QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
161-6017	COMPOST MANUF TOPSOIL (4")	SY	4860
164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	4860
168-6001	VEGETATIVE WATERING	MG	82
169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	4860
506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	413
506-6011	ROCK FILTER DAMS (REMOVE)	LF	413
506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4551
506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4551

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- (RFD4) ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
- COMPOST MANUF TOPOSIL/MULCH/DRILL SEED
- SODDING
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Rene Alvarado III 10/30/2023

RENE ALVARADO III, P.E. DATE

SCALE
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VERTICAL:

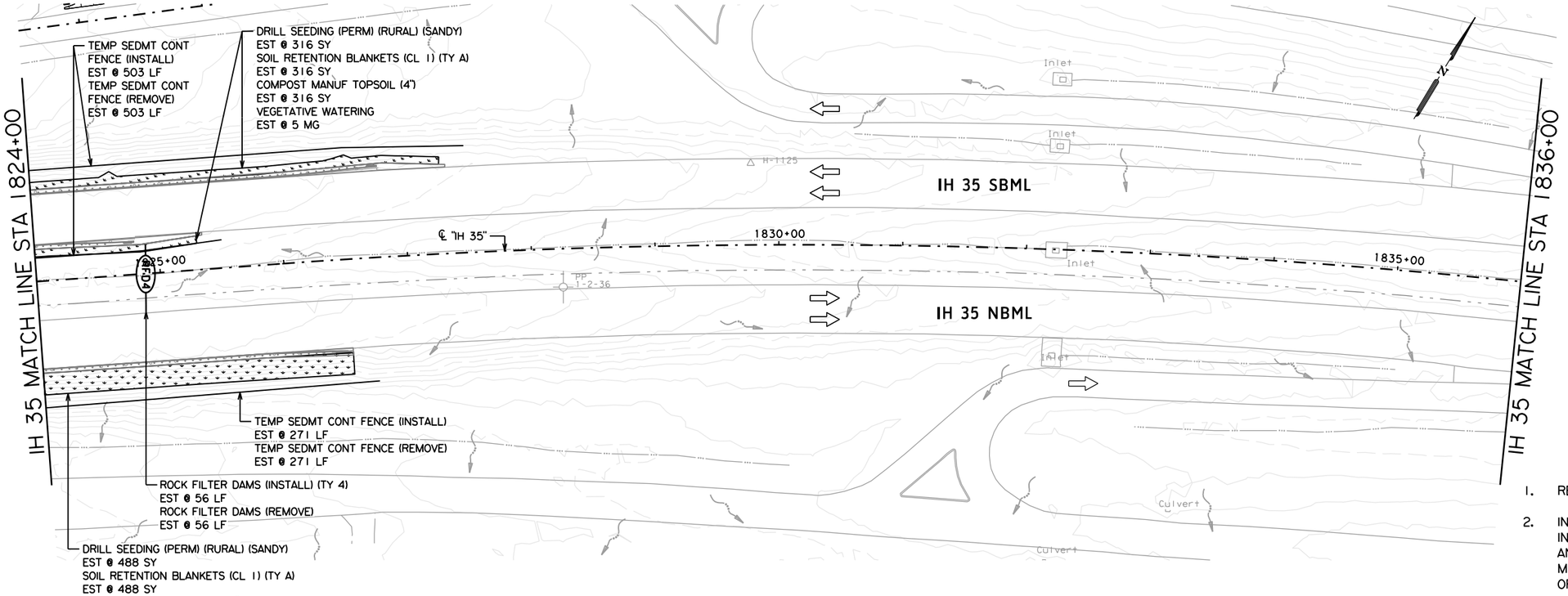
Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 8 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT	SHEET NO.
6	SEE TITLE SHEET	118

STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
161-6017	COMPOST MANUF TOPSOIL (4")	SY	804
164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	804
168-6001	VEGETATIVE WATERING	MG	13
169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	804
506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	56
506-6011	ROCK FILTER DAMS (REMOVE)	LF	56
506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	774
506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	774

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
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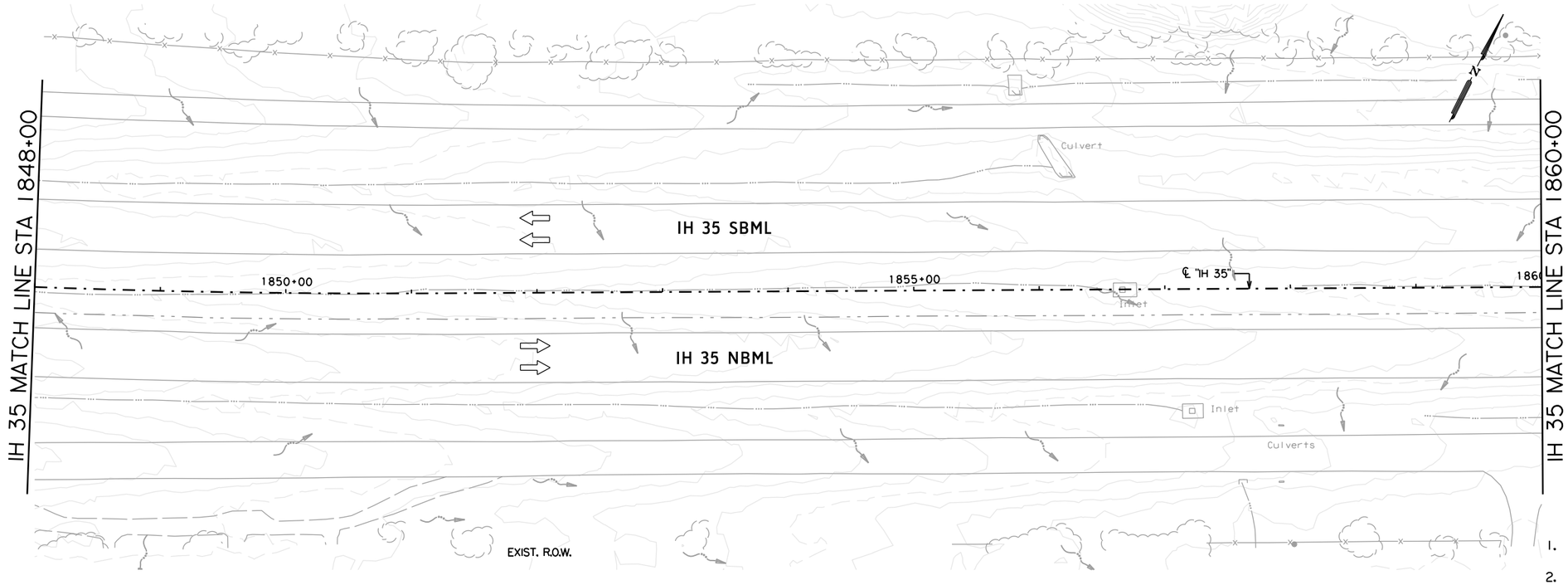
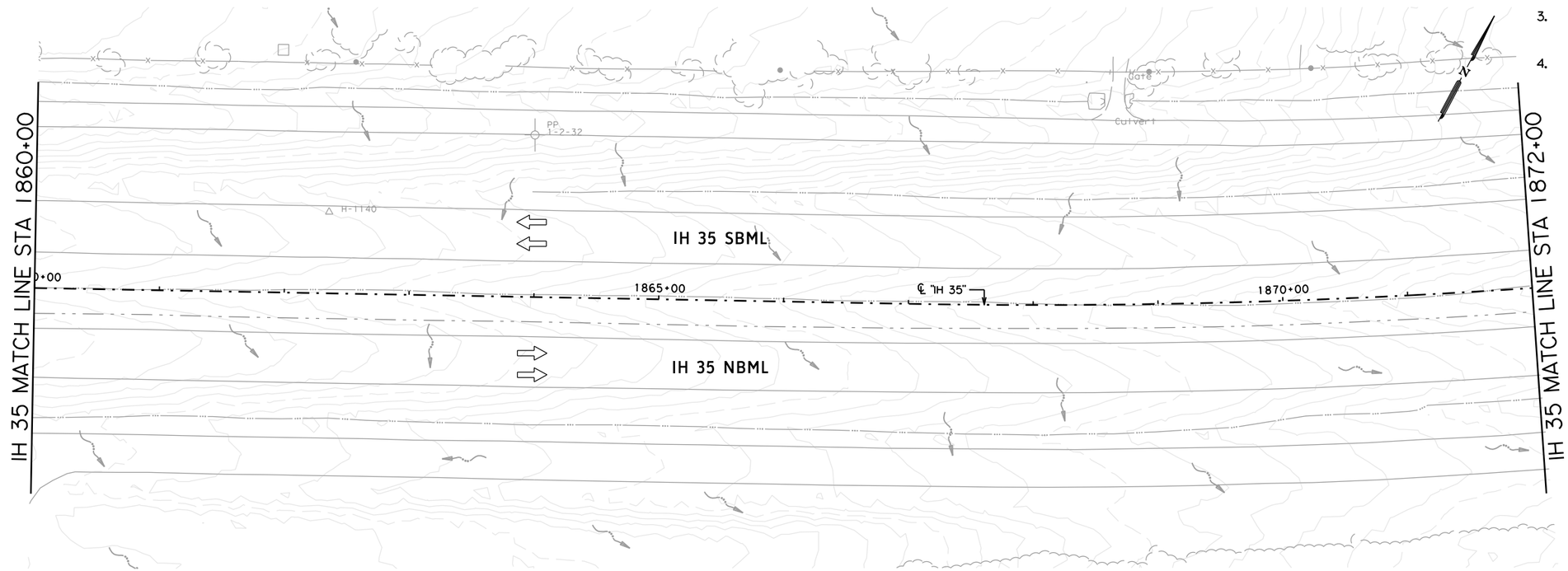
VERTICAL:

IH 35
SW3P LAYOUT

SHEET 9 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		119
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT | QUANTITY

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
- COMPOST MANUF TOPOSIL/MULCH/DRILL SEED
- SODDING
- SOIL RETENTION BLANKETS
- CONSTRUCTION EXIT

SW3P GENERAL NOTES

1. REFER TO SW3P STANDARD SHEETS FOR DETAILS
2. INSTALLED MEASURES SHALL REMAIL IN PLACE AND INSPECTED WEEKLY. ALL ITEMS SHALL BE MAINTAINED AND REPAIRED THROUGHOUT THE DURATION OF USE. MEASURES WILL BE REMOVED WHEN NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER
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STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. — 10/30/2023 DATE

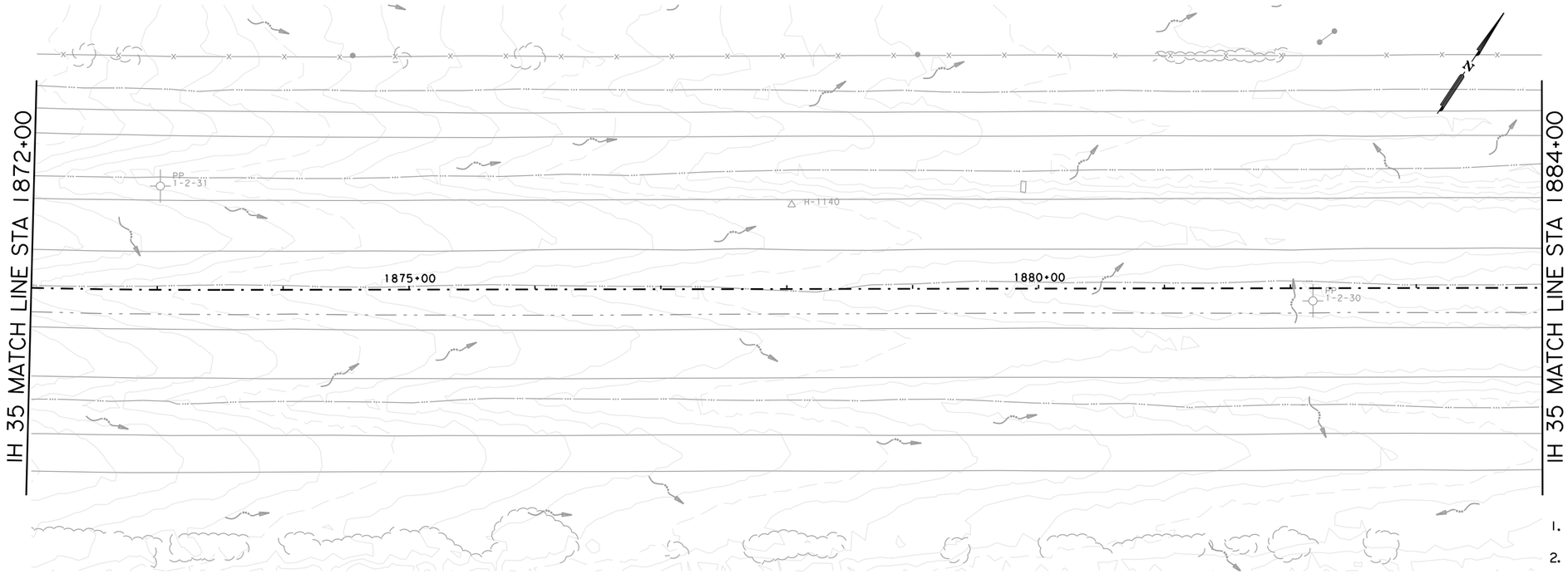
SCALE
HORIZONTAL: 1" = 100'
VERTICAL:

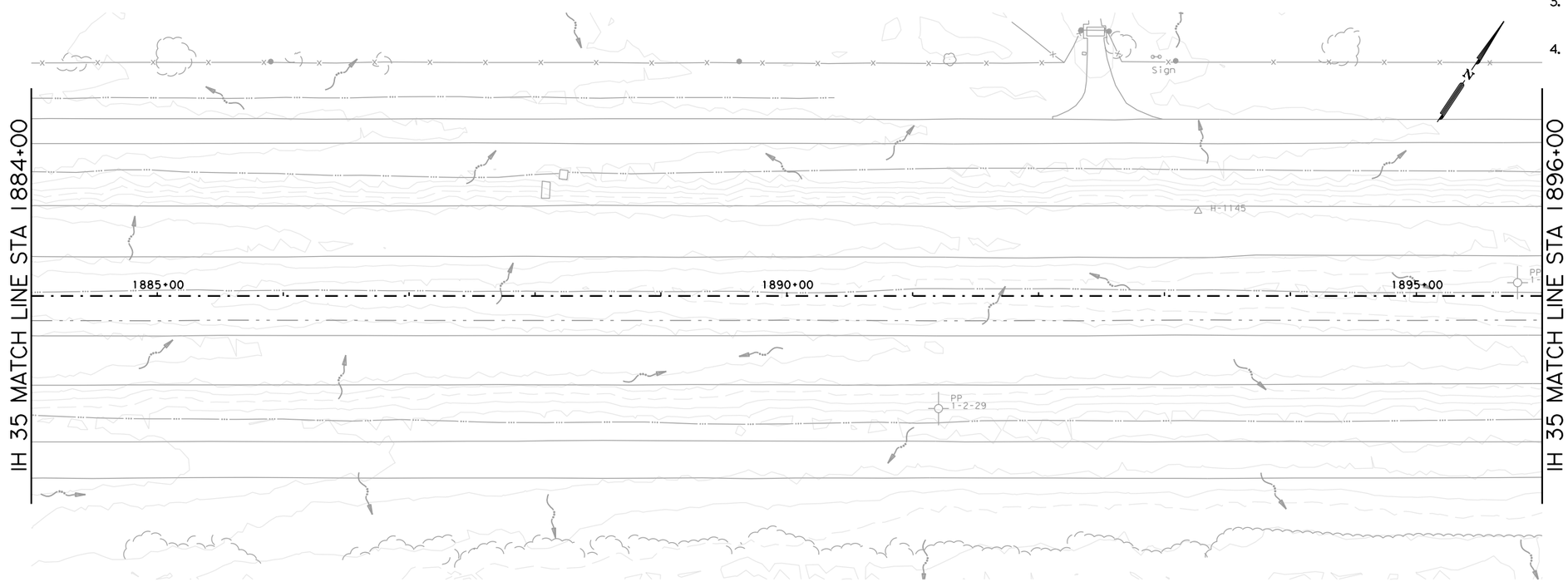
Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 10 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		120
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
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Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

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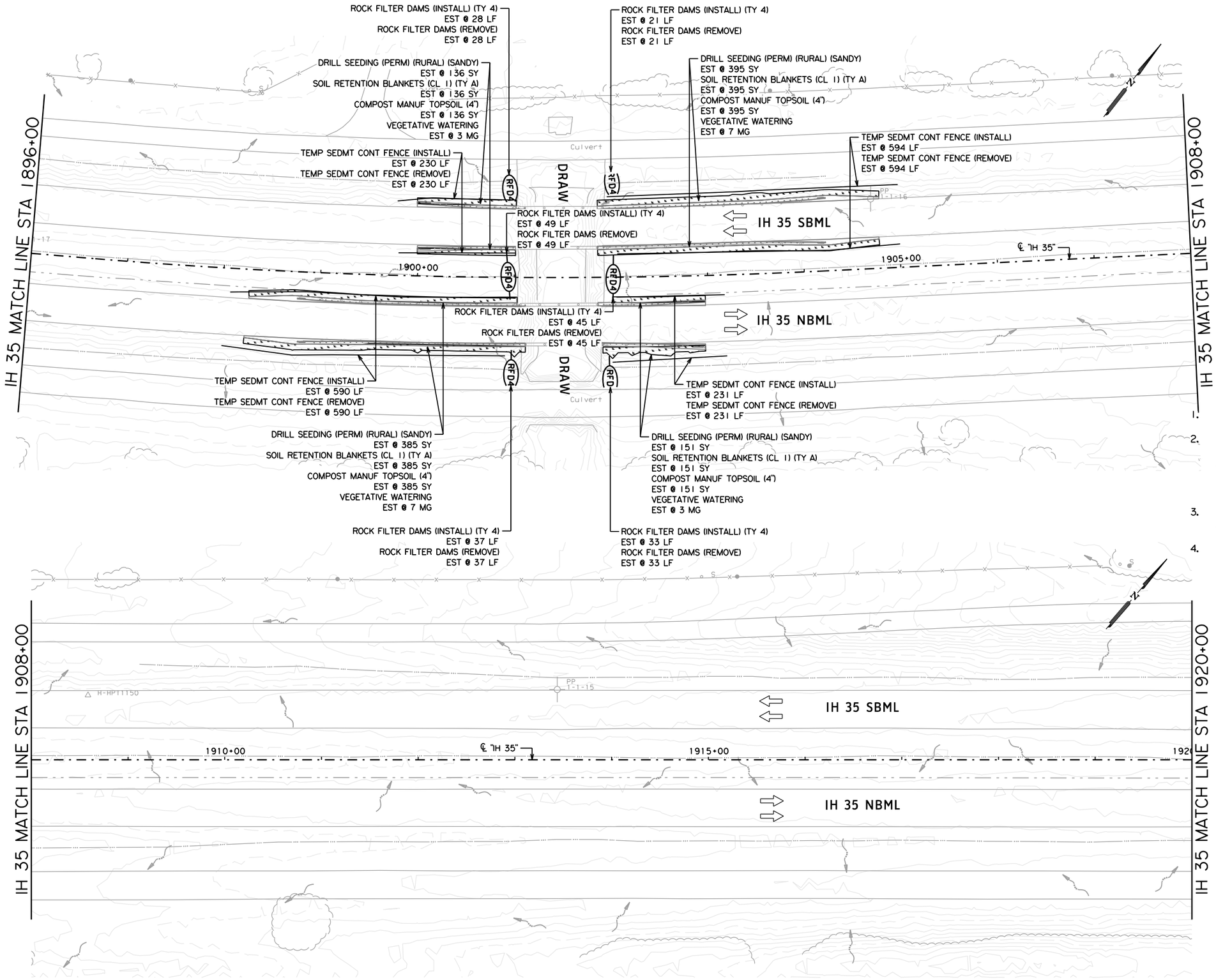
HORIZONTAL: 1" = 100'
VERTICAL:

Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 11 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		121
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
161-6017	COMPOST MANUF TOPSOIL (4")	SY	1067
164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	1067
168-6001	VEGETATIVE WATERING	MG	20
169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1067
506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	213
506-6011	ROCK FILTER DAMS (REMOVE)	LF	213

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
- COMPOST MANUF TOPOSIL/MULCH/DRILL SEED
- SODDING
- SOIL RETENTION BLANKETS
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Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

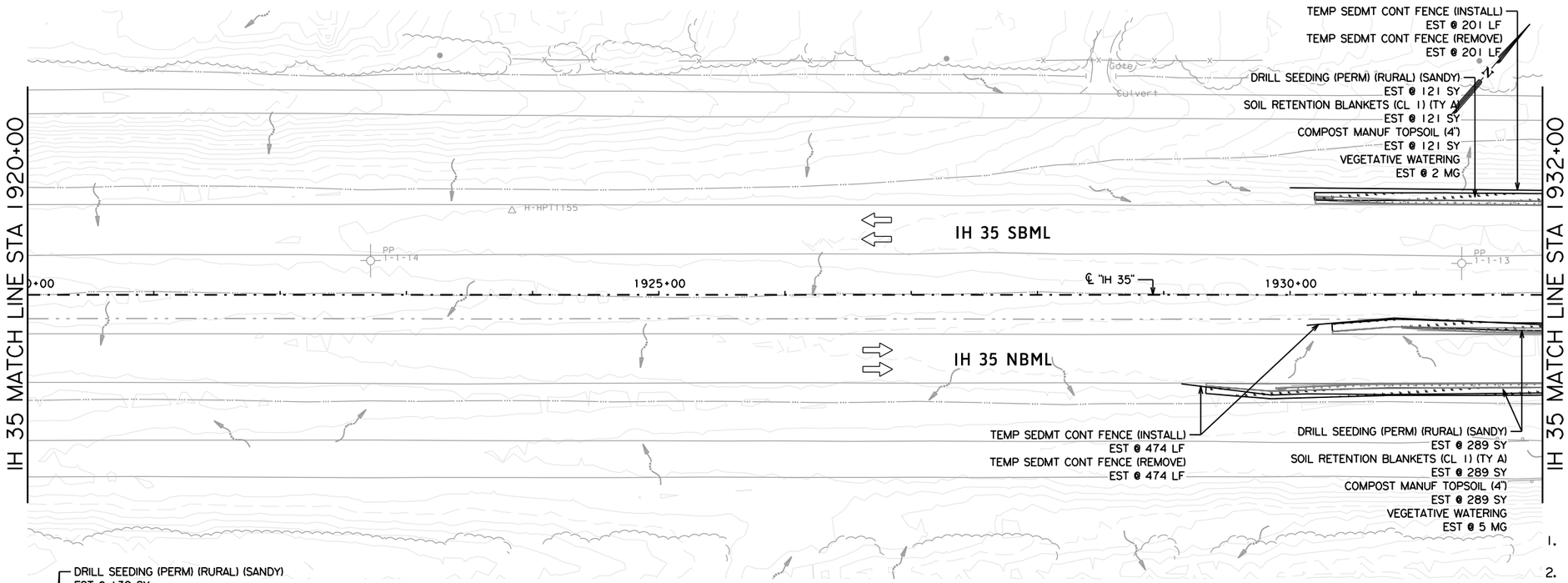
SCALE
HORIZONTAL: 1" = 100'
VERTICAL:

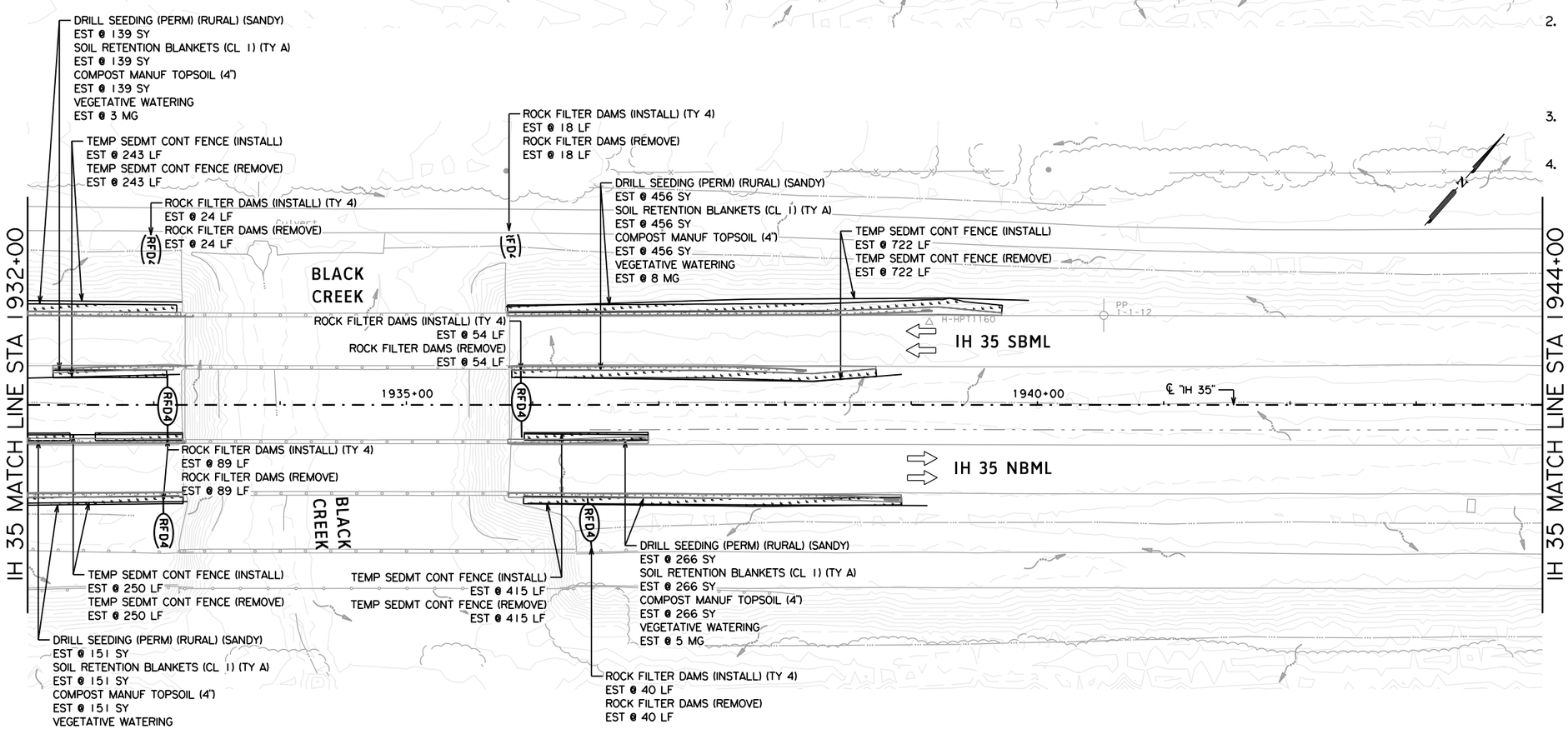
Texas Department of Transportation

IH 35
SW3P LAYOUT

SHEET 12 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		122
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35





QUANTITY SUMMARY CSJ: 0017-06-086			
ITEM NO.	ITEM	UNIT	QUANTITY
161-6017	COMPOST MANUF TOPSOIL (4")	SY	1422
164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	1422
168-6001	VEGETATIVE WATERING	MG	26
169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1422
506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	225
506-6011	ROCK FILTER DAMS (REMOVE)	LF	225

SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
- COMPOST MANUF TOPOSIL/MULCH/DRILL SEED
- SODDING
- SOIL RETENTION BLANKETS
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SCALE
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VERTICAL:

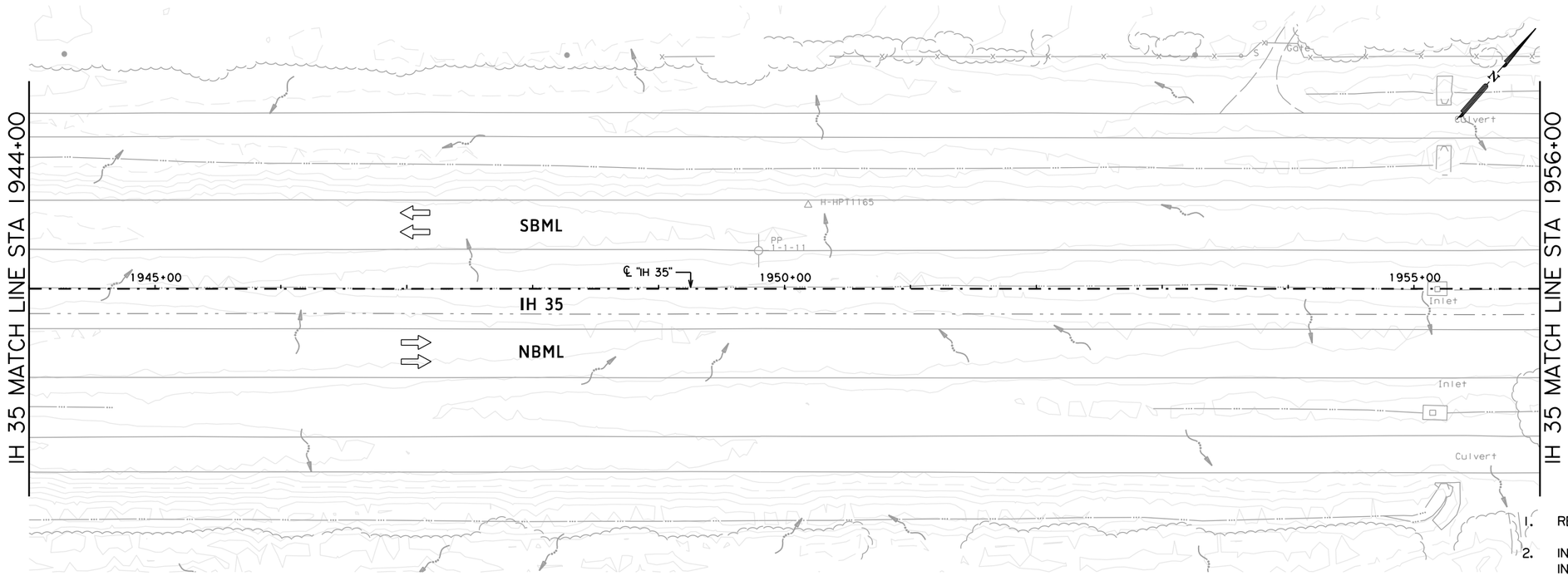
Texas Department of Transportation

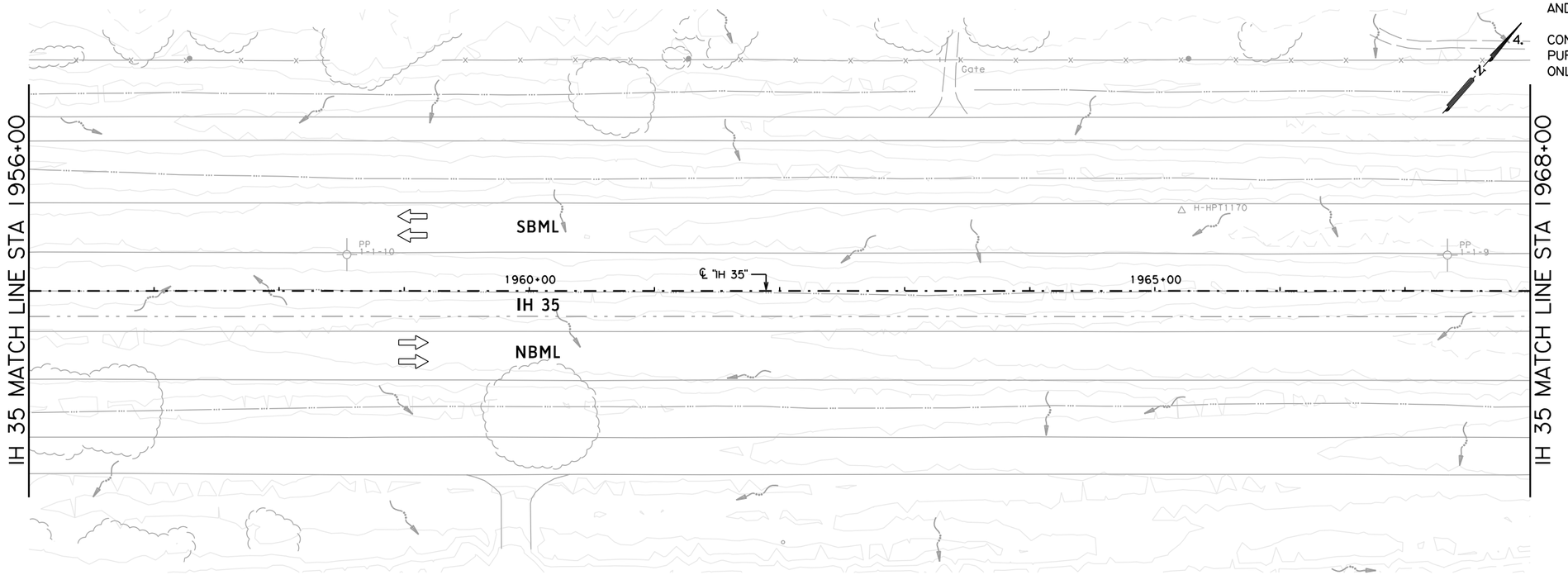
IH 35
SW3P LAYOUT

SHEET 13 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		123
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT | QUANTITY





SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
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RENE ALVARADO III, P.E. — DATE 10/30/2023

SCALE
HORIZONTAL: 1" = 100'
VERTICAL:

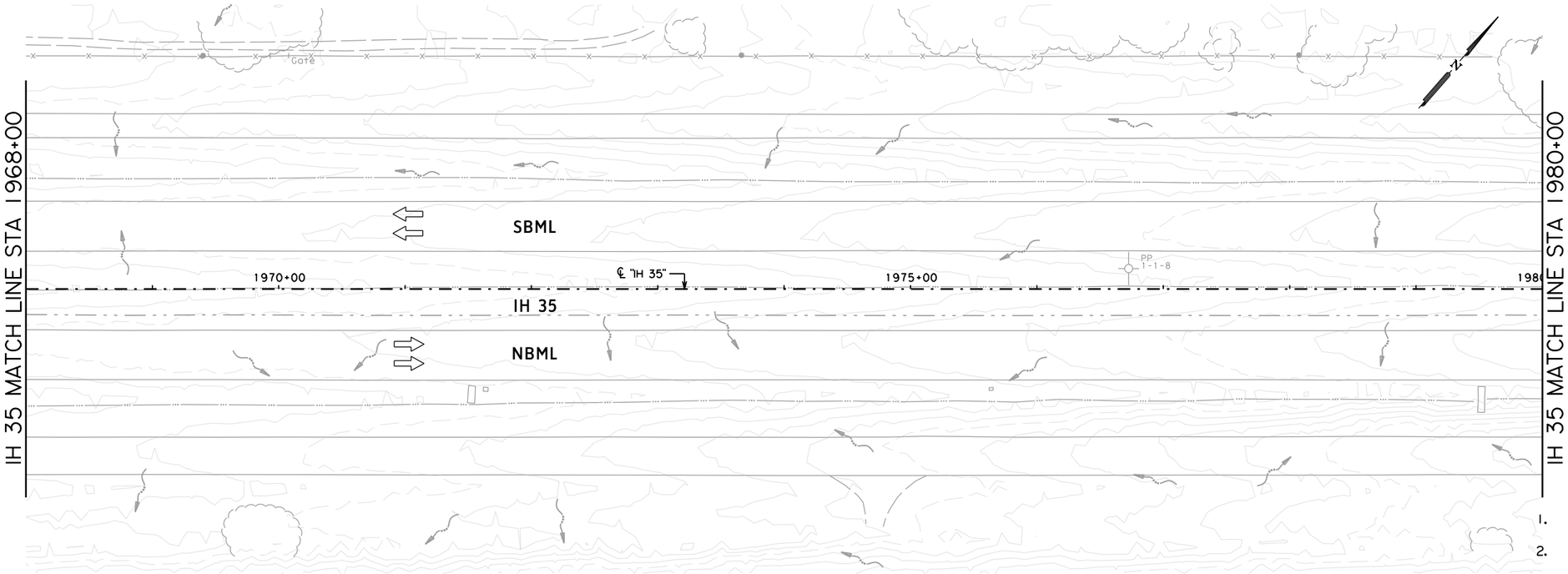
Texas Department of Transportation

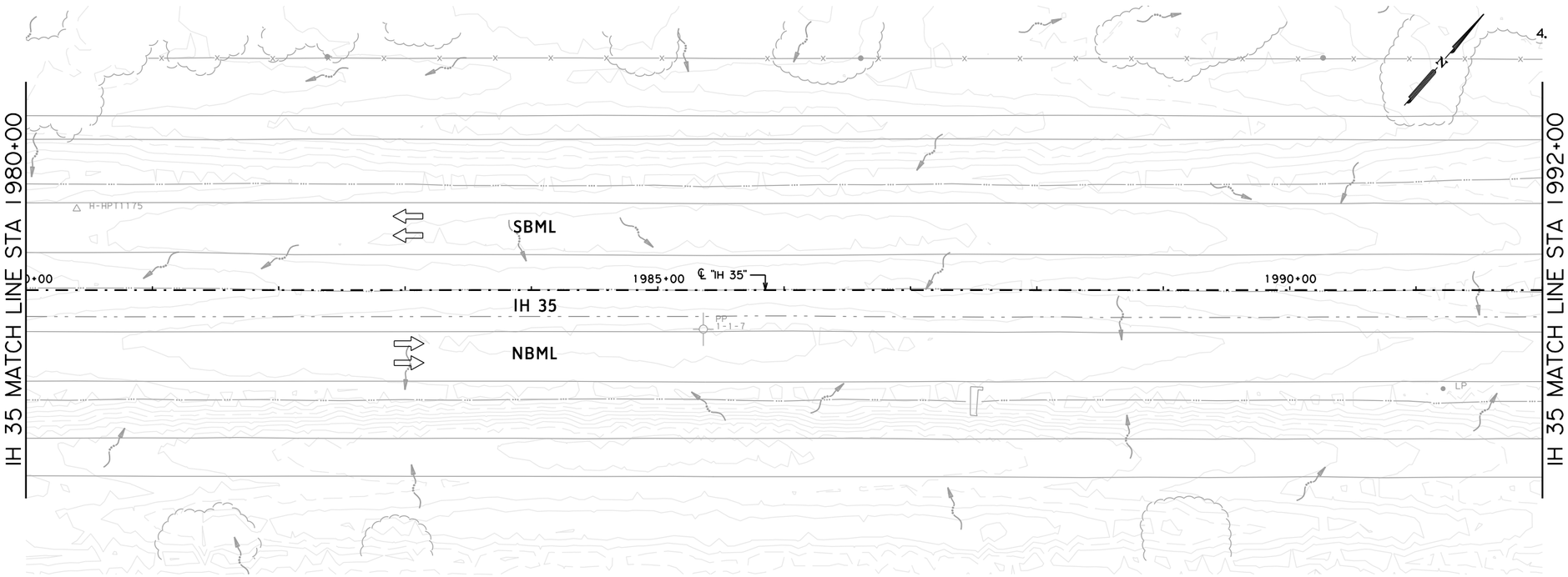
IH 35
SW3P LAYOUT

SHEET 14 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		124
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT | QUANTITY





SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD4 — ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
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Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

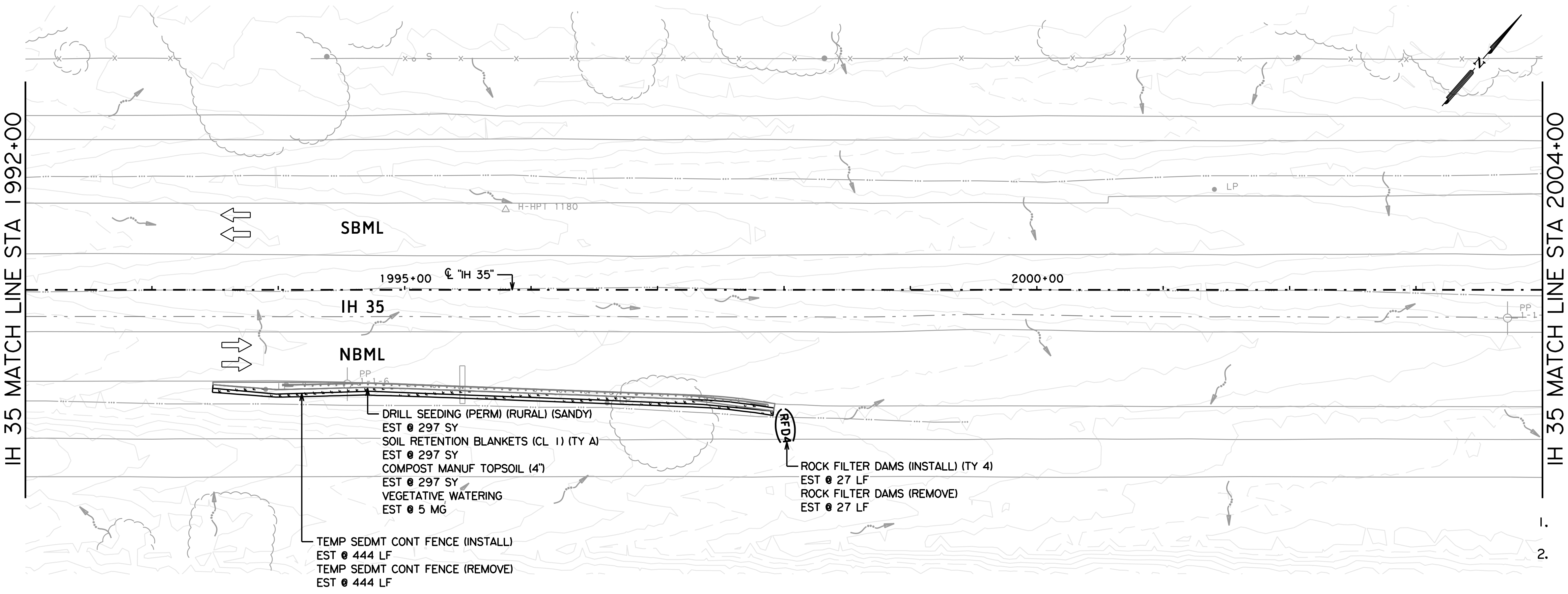
SCALE
HORIZONTAL: 1" = 100'
VERTICAL:

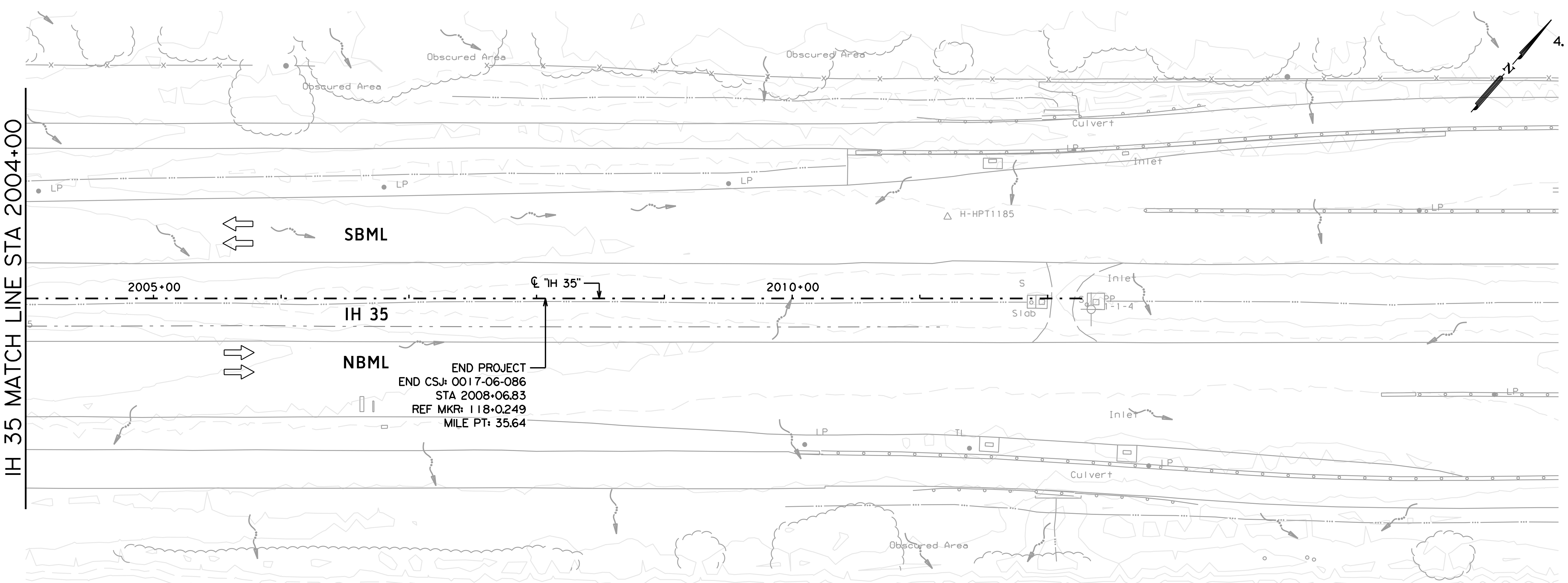
IH 35
SW3P LAYOUT

SHEET 15 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		125
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35

	QUANTITY SUMMARY CSJ: 0017-06-086		
ITEM NO.	ITEM	UNIT	QUANTITY
161-6017	COMPOST MANUF TOPSOIL (4")	SY	297
164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	297
168-6001	VEGETATIVE WATERING	MG	5
169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	297
506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	27
506-6011	ROCK FILTER DAMS (REMOVE)	LF	27





SW3P LEGEND

- LIMITS OF NEW CONSTRUCTION
- LIMITS OF OVERLAY
- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- (RFD4) ROCK FILTER DAM - TYPE 4
- TEMPORARY SEDIMENT CONTROL FENCE
- COMPOST MANUF TOPOSIL/MULCH/DRILL SEED
- SODDING
- SOIL RETENTION BLANKETS
- CONSTRUCTION EXIT

SW3P GENERAL NOTES

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Rene Alvarado III 10/30/2023
RENE ALVARADO III, P.E. DATE

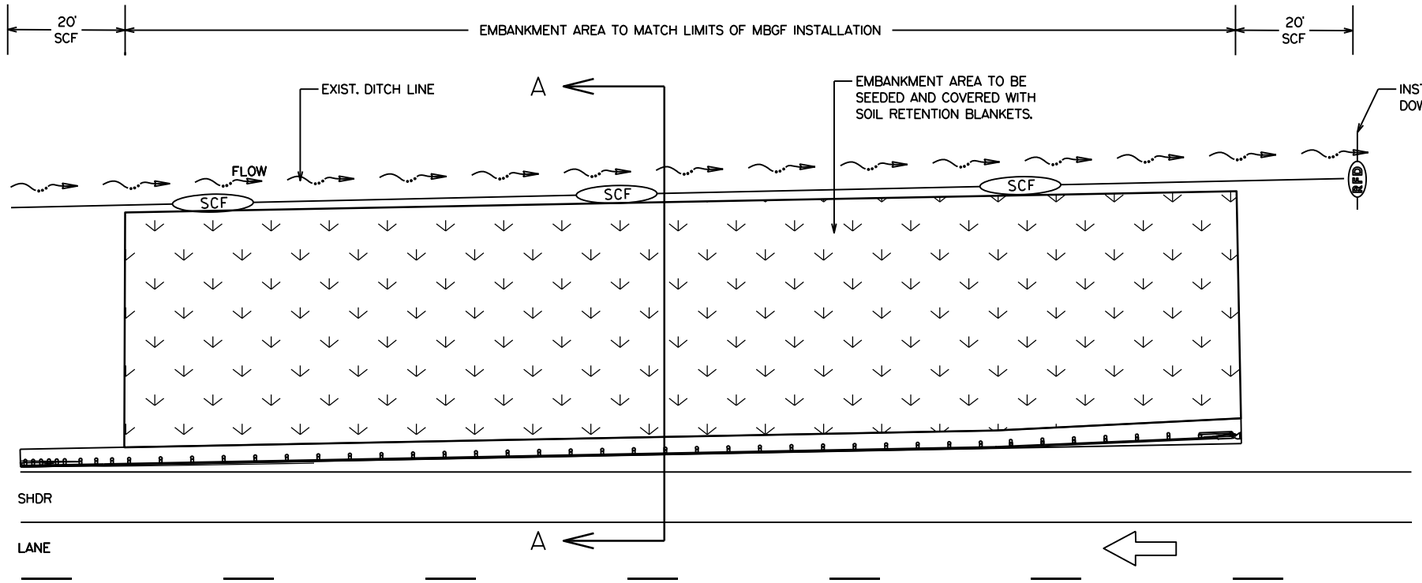
SCALE
HORIZONTAL: 1" = 100'
VERTICAL:

Texas Department of Transportation

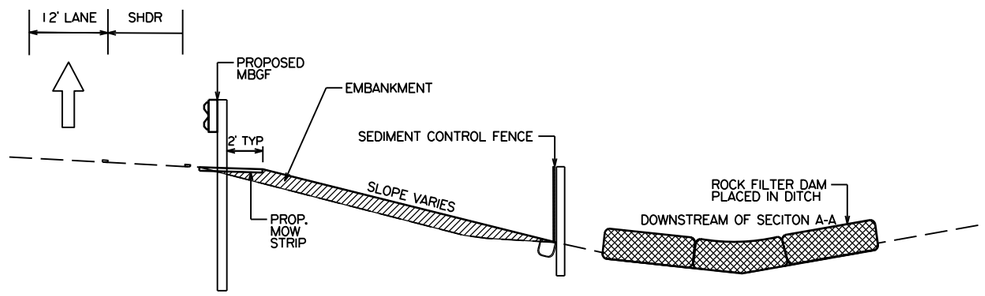
IH 35
SW3P LAYOUT

SHEET 16 OF 16

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		126
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



PLAN



SECTION A-A

SW3P GENERAL NOTES

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SW3P LEGEND

- TRAFFIC FLOW DIRECTIONAL ARROW
- DRAINAGE FLOW ARROW
- RFD — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- EMBANKMENT / SEEDING / SOIL RETENTION BLANKET

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED
PROFESSIONAL ENGINEER

10/30/2023
RENE ALVARADO III. P.E. DATE

Rene Alvarado III

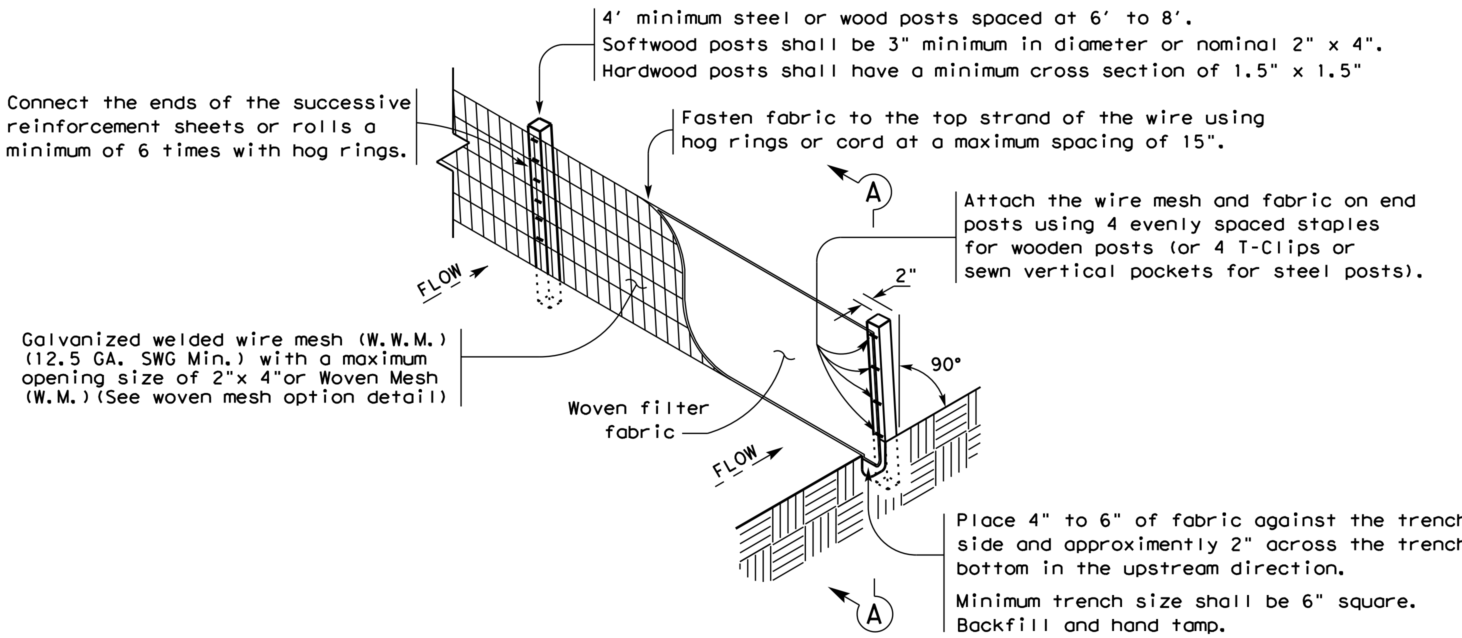
SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

IH 35
SW3P TYPICAL AT MBGF

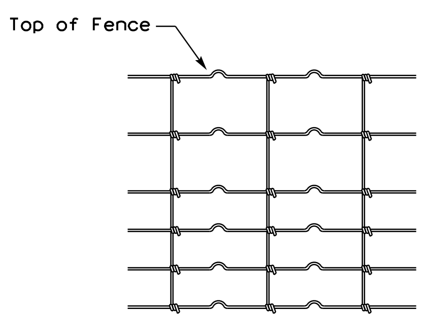
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		127
STATE	DIST.	COUNTY	
TEXAS	SAT	FRIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0017	06	086	IH 35



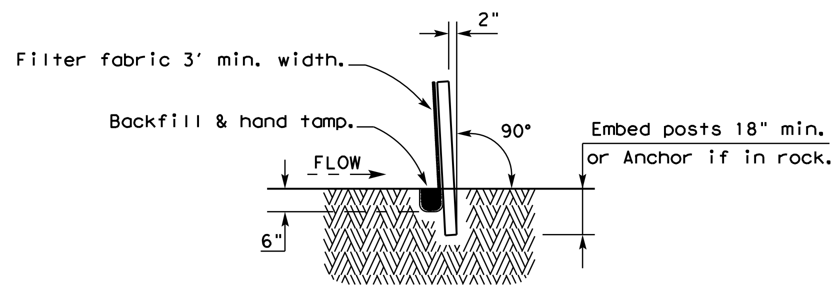
TEMPORARY SEDIMENT CONTROL FENCE

SCF



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.



SECTION A-A

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.

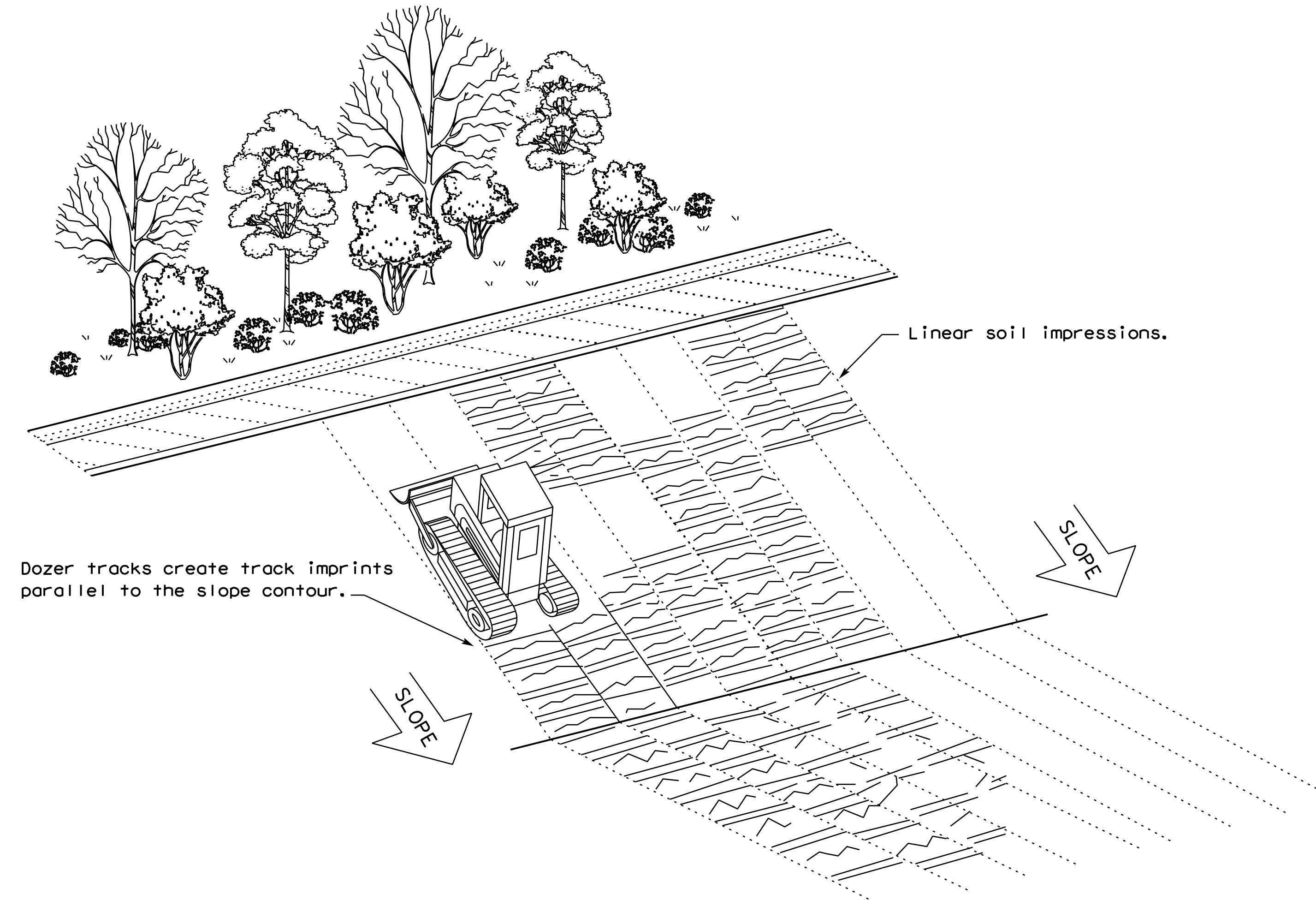
LEGEND

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	0017	06	086	IH 35
	DIST		COUNTY	SHEET NO.
	SAT		FRIO	128

DATE: 10/30/2023
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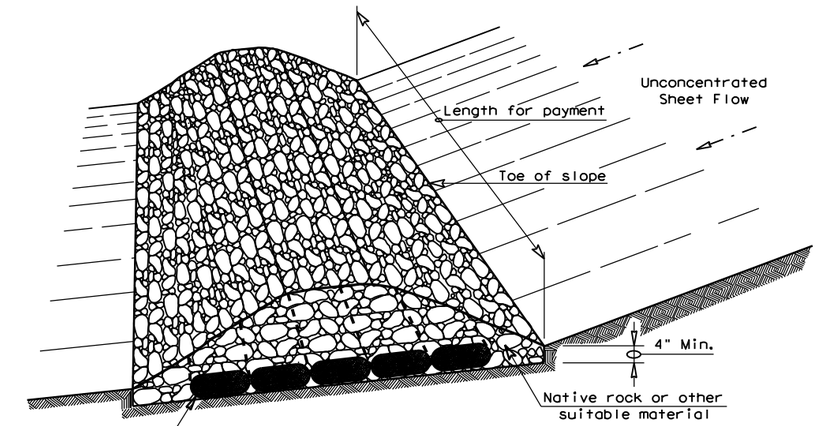
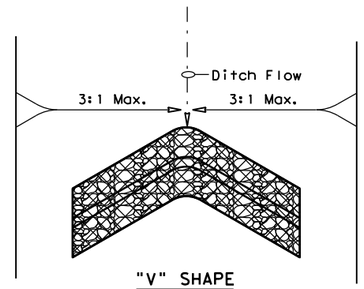
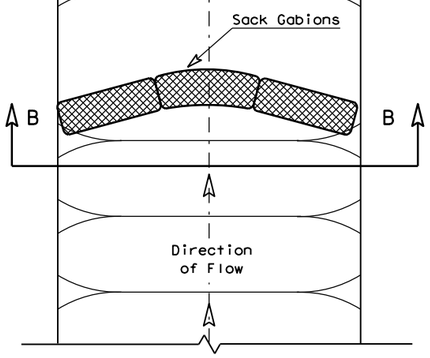


FILTER DAM AT TOE OF SLOPE

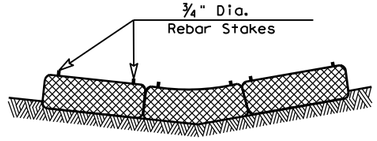
RFD1



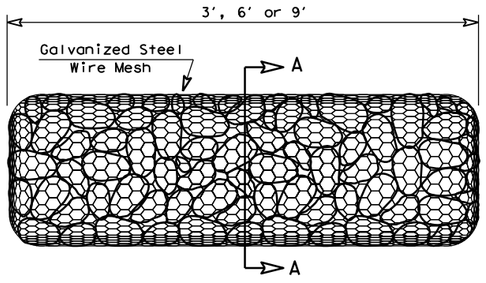
"V" SHAPE
PLAN VIEW



PLAN VIEW

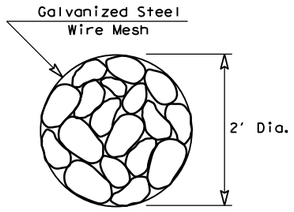


SECTION B-B

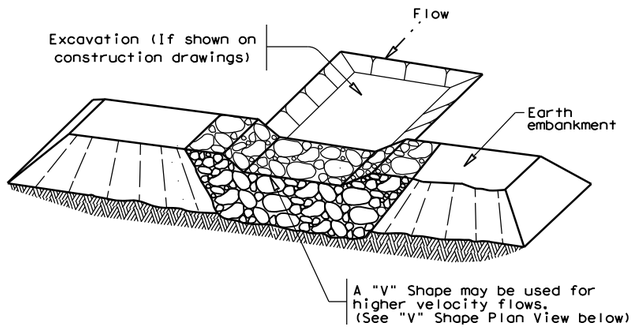


TYPE 4 (SACK GABIONS)

RFD4

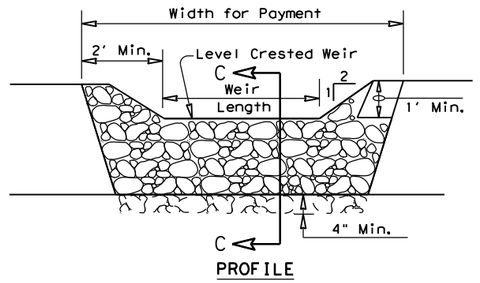


SECTION A-A



FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



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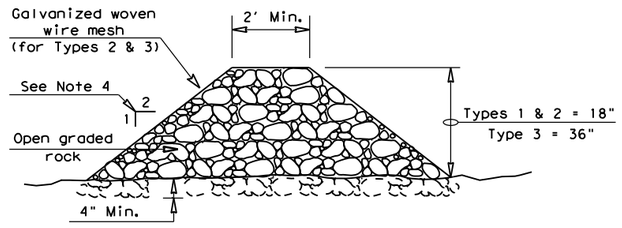
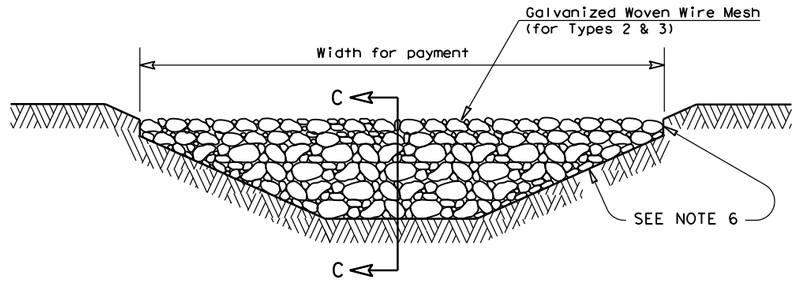


SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

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.

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	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		129

DATE: 10/30/2023
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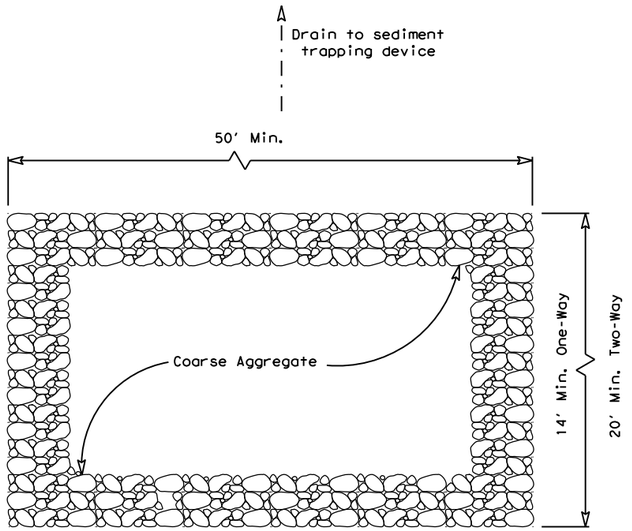
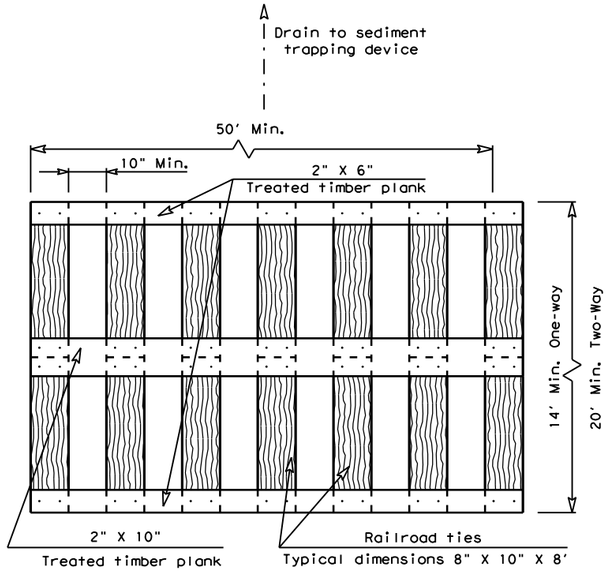


PLAN VIEW



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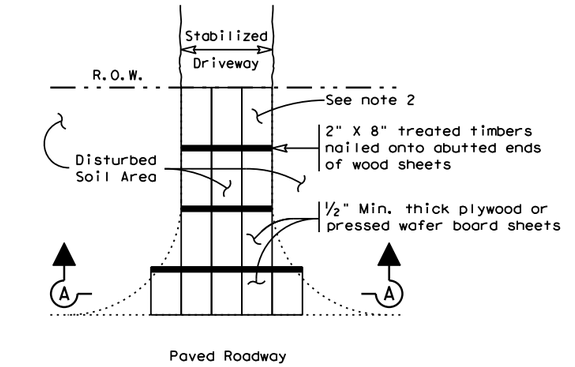
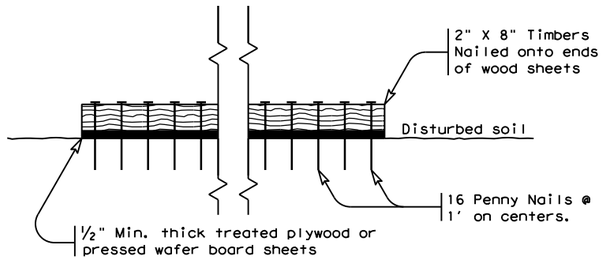


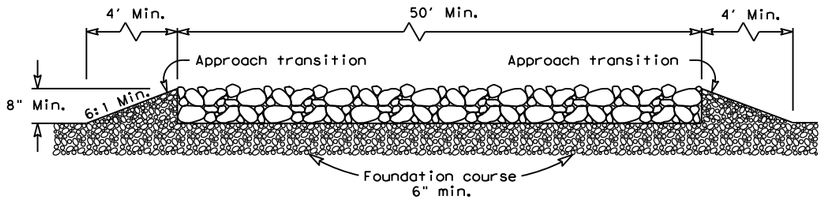
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

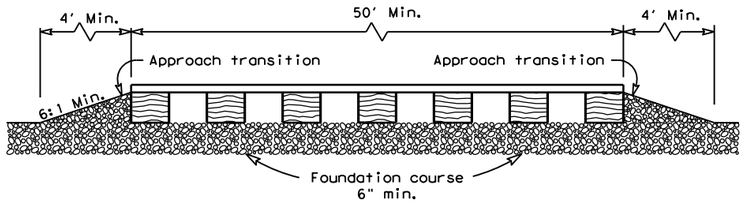
SHORT TERM



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

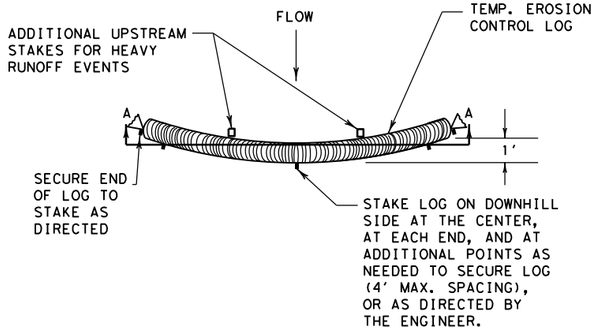
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

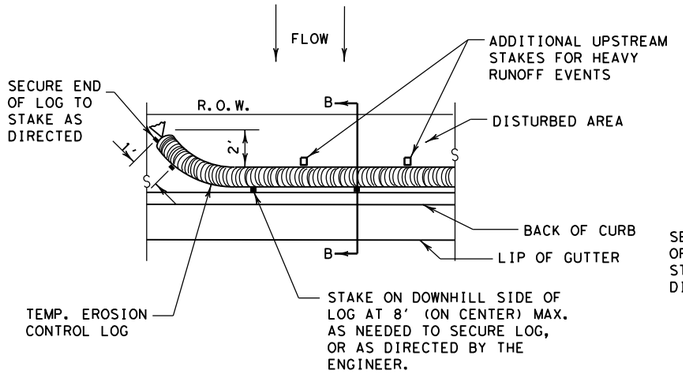
EC(3)-16

FILE: ec316	DN: IxDOI	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0017	06	086	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	FRIO		130

DATE:
FILE:



PLAN VIEW



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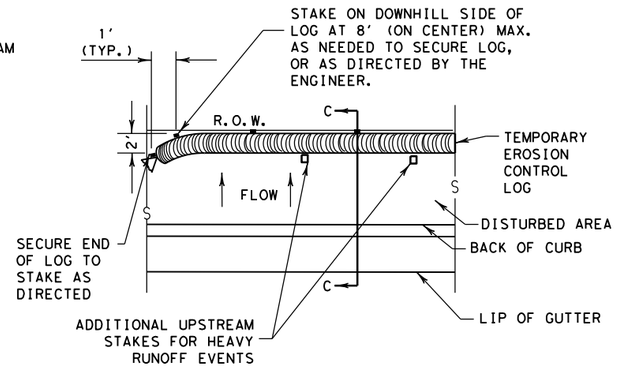
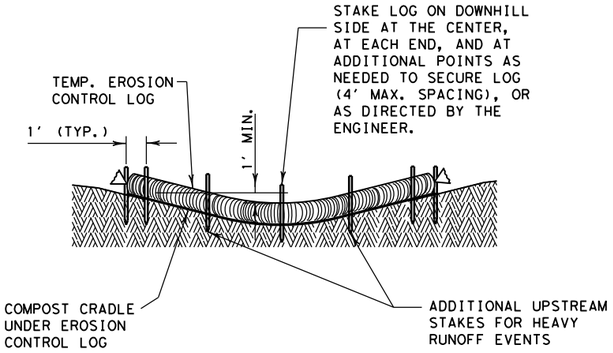


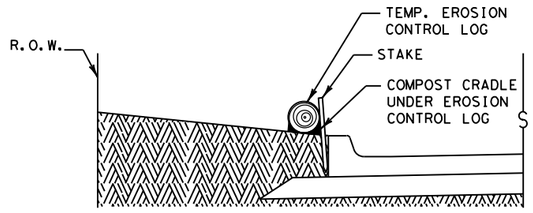
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

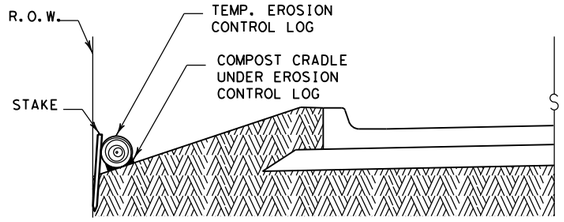
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

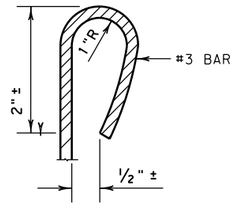
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

GENERAL NOTES:

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

LEGEND

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

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

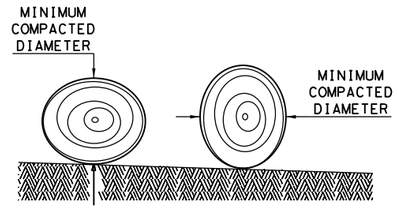
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

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

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

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916		DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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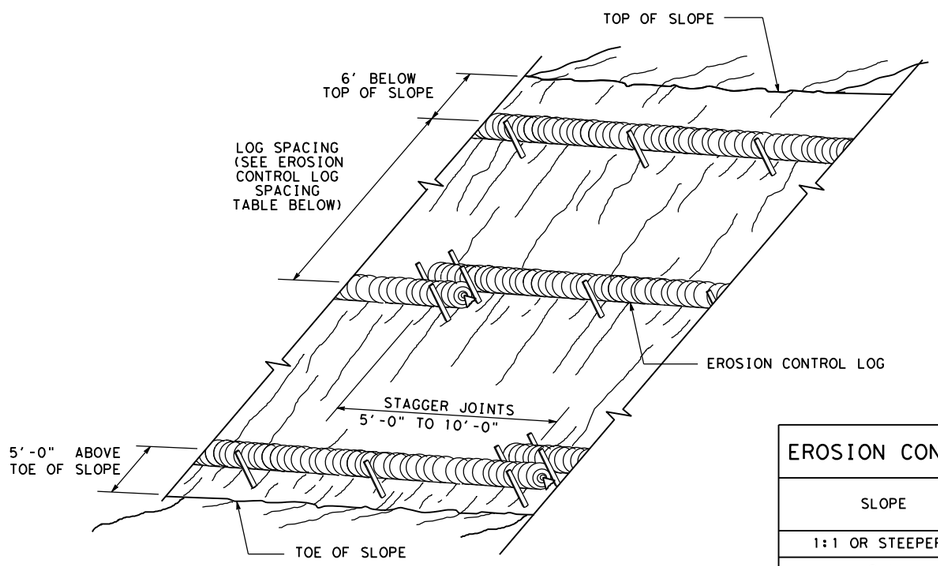
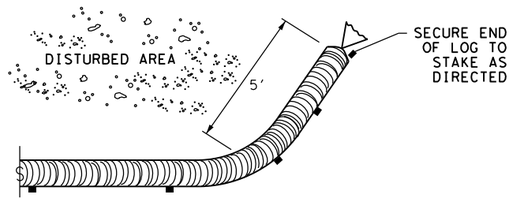


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

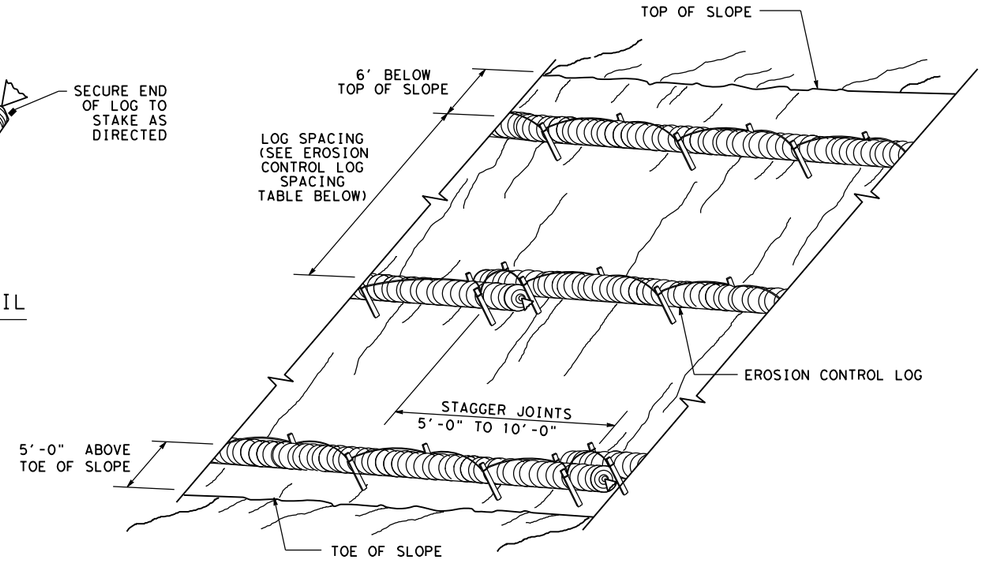
CL-SST



END SECTION RAP DETAIL

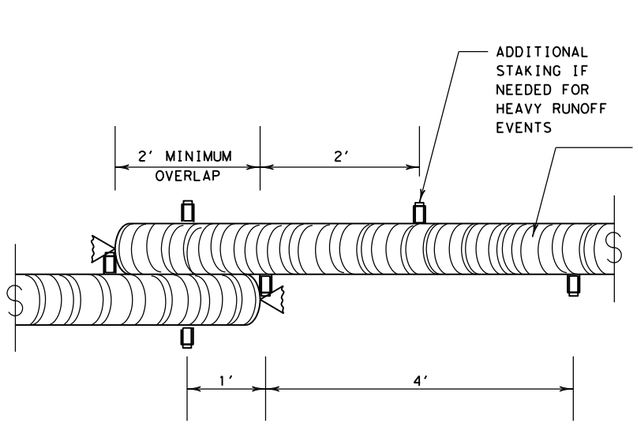
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

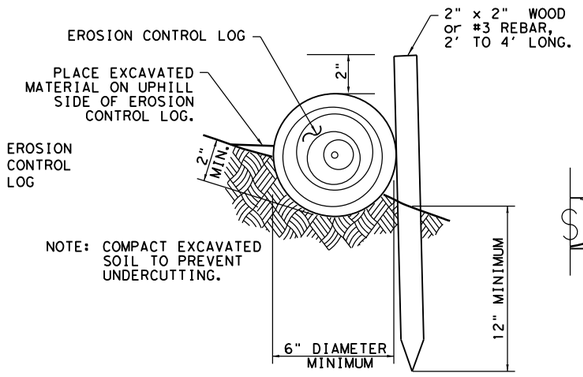
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

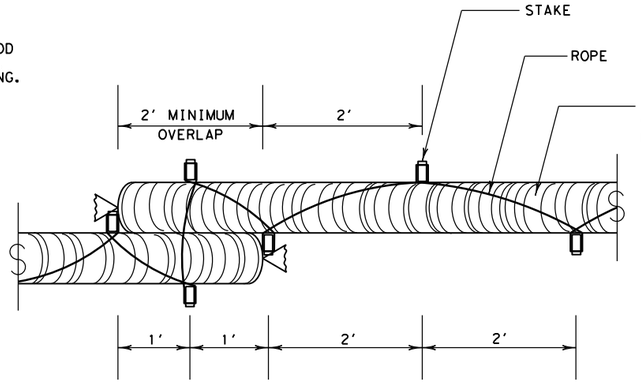


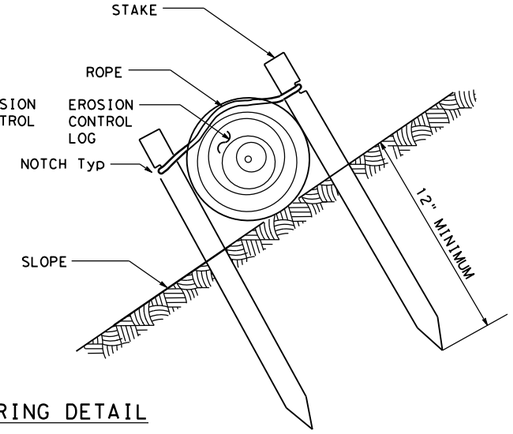


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

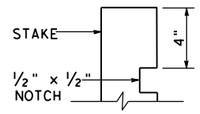
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

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

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
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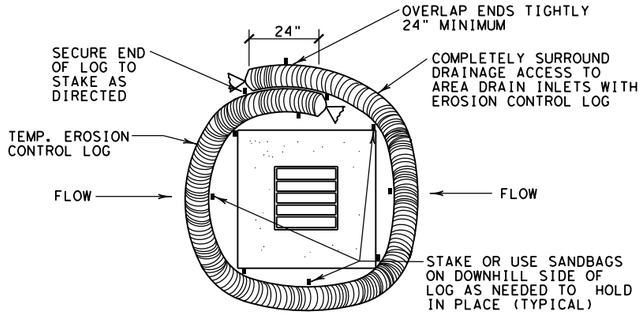
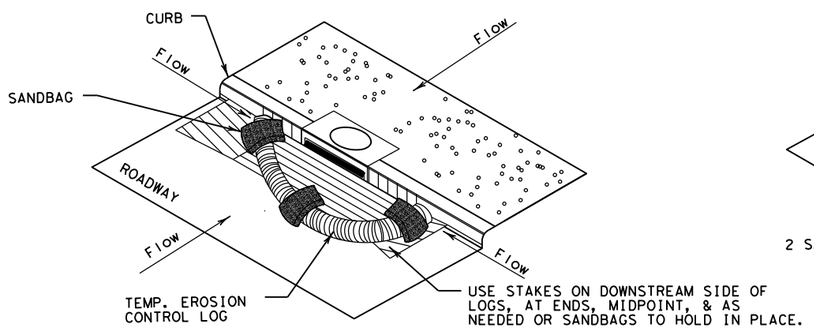


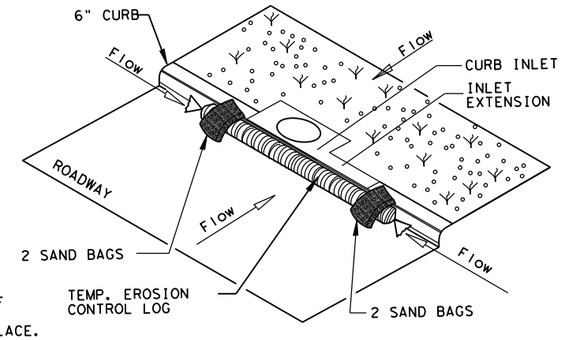
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

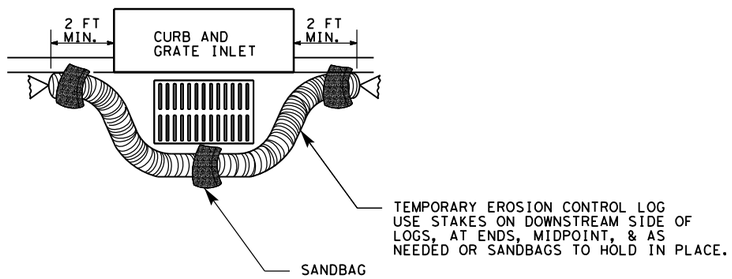
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

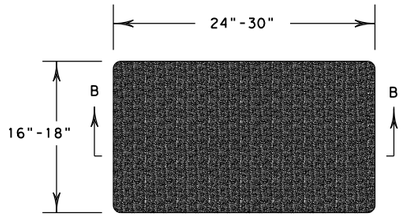
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

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© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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	SAT	FRIO					133