DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
KP	6	BR 2B24(289)		IH 35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JS	TEXAS	DALLAS	DENTON	1
CHECK SY	CONTROL	SECTION	JOB	
CHECK CV	0195	03	088, ETC	

FINAL PLANS

NAME OF CONTRACTOR: ______________________

DATE OF LETTING: ______________________

DATE WORK BEGAN: ______________________

DATE WORK COMPLETED: ______________________

DATE WORK ACCEPTED: ______________________

SUMMARY OF CHANGE ORDERS:

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
BR 2B24(289)
CCSJ: 0195-03-088, ETC

IH 35E

DENTON COUNTY

IH 35E NORTHBOUND FRONTAGE ROAD
DESIGN SPEED = 45 MPH
ADT 17,600 (2023)
ADT 23,800 (2043)
FUNCTIONAL CLASS: INTERSTATE

IH 35E SOUTHBOUND FRONTAGE ROAD
DESIGN SPEED = 45 MPH
ADT 18,400 (2023)
ADT 24,900 (2043)
FUNCTIONAL CLASS: INTERSTATE

LIMITS: IH 35E NBFR AT UPRR
CSJ: 0195-03-088

IH 35E SBFR AT UPRR
CSJ: 0195-03-089

TOTAL LENGTH OF PROJECT =

	IH 35E NBFR (CSJ 0195-03-088)		IH 35E SBFR (CSJ 0195-03-089)	
ROADWAY	=1428.17 FT.	= 0.270 MI.	=1849.15 FT.	= 0.350 MI.
BRIDGE	= 260.00 FT.	= 0.049 MI.	= 260.00 FT.	= 0.049 MI.
TOTAL	=1688.17 FT.	= 0.319 MI.	=2109.15 FT.	= 0.399 MI.

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT
CONSISTING OF: REPLACE BRIDGES AND APPROACHES

NOTE:

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023)

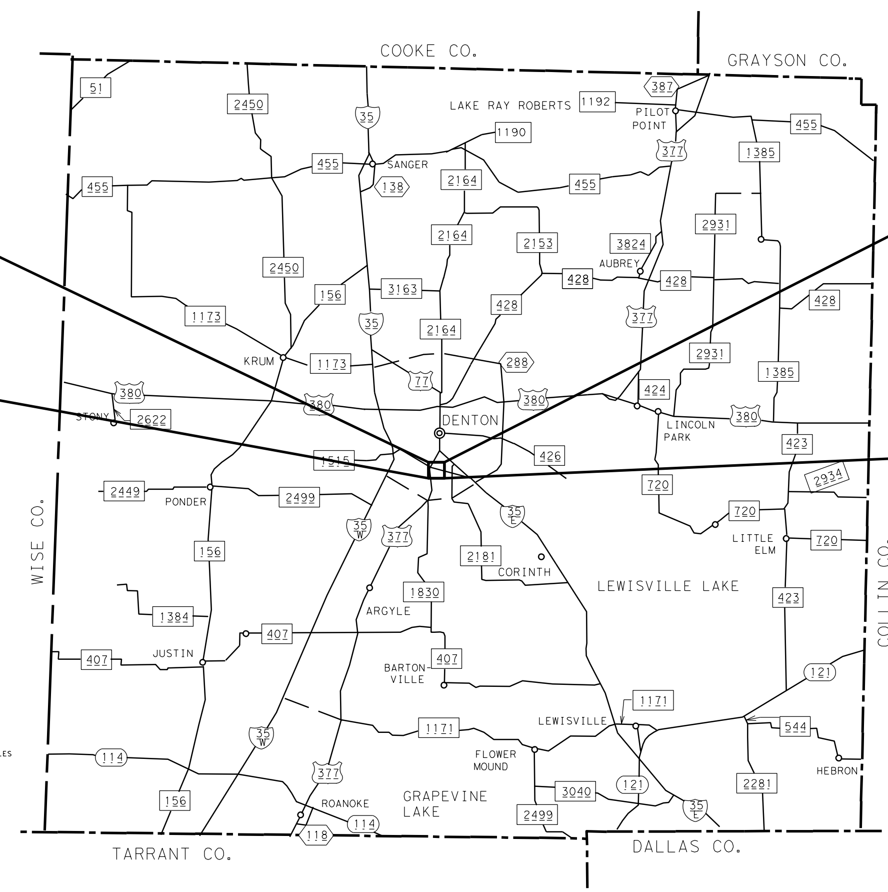
REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED
TDLR PROJECT NO. 2022026703

END PROJECT
CSJ 0195-03-088
STA 2937+28.17
TRM 465+0.909

BEGIN PROJECT
CSJ 0195-03-088
STA 2920+40.00
TRM 465+0.590

END PROJECT
CSJ 0195-03-089
STA 3936+50.00
TRM 465+0.934

BEGIN PROJECT
CSJ 0195-03-089
STA 3915+40.85
TRM 465+0.535



DENTON COUNTY
DALLAS DISTRICT

AECOM 13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

SUBMITTED FOR LETTING 05/30/2024
______________, P.E.
CONSULTANT PROJECT MANAGER

TEXAS DEPARTMENT OF TRANSPORTATION

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: UPRR AT: ℄ PNBFR STA 2929+67.29 (0195-03-088)
℄ PSBFR STA 3928+03.75 (0195-03-089)

RECOMMENDED FOR LETTING: 5/31/2024
DocuSigned by: James P. Campbell, P.E.
9867C1C109B6A4C3
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED FOR LETTING: 5/31/2024
DocuSigned by: Amanda Miller, P.E.
01F881A42A4A49C...
AREA ENGINEER

APPROVED FOR LETTING: 5/31/2024
DocuSigned by: Ceason Clemens, P.E.
A879E0D...
DISTRICT ENGINEER

WORK WAS COMPLETED ACCORDING
TO THE PLANS AND CONTRACT.

______________, P.E.
Signature of Registrant & Date

DES: AECOM CK1: AECOM DW: AECOM CK2: AECOM irene.alanis

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8, 8A-8C	ESTIMATE AND QUANTITY SHEETS
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10	SUMMARY OF QUANTITIES - ROADWAY
11	SUMMARY OF QUANTITIES - EARTHWORK
12	SUMMARY OF QUANTITIES - REMOVAL
13	SUMMARY OF QUANTITIES - RETAINING WALL
14	SUMMARY OF QUANTITIES - SIGNING AND PAVEMENT MARKING
15	SUMMARY OF QUANTITIES - DRAINAGE
16	SUMMARY OF QUANTITIES - BRIDGE
17	SUMMARY OF QUANTITIES - BRIDGE REPAIR
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IH 35E NBFR OVER UPRR

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IH 35E SBFR OVER UPRR

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> 218-219	IGMS (DAL)
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> 228	SEJ-M
> 229-231	TYPE C221
> 232-233	TYPE T221

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

Rajasegaram Ranjith , P.E. 5/28/2024
Rajasegaram Ranjith & Date

STATE OF TEXAS · RAJASEGARAM RANJITH · 138052 · LICENSED PROFESSIONAL ENGINEER

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SIGNING AND PAVEMENT MARKING STANDARDS

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STATE OF TEXAS · SEAN K. YOUNG · 96504 · LICENSED PROFESSIONAL ENGINEER

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

Sean Young , P.E. 5/28/2024
Sean Young & Date

STATE OF TEXAS · IRENE ALANIS · 116808 · LICENSED PROFESSIONAL ENGINEER

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

Irene Alanis , P.E. 5/28/2024
Irene Alanis & Date

STATE OF TEXAS · DION R. ALLICOCK · 92529 · LICENSED PROFESSIONAL ENGINEER

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

Dion Allicock , P.E. 5/28/2024
Dion Allicock & Date

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E

INDEX OF SHEETS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	2
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				
AEC				

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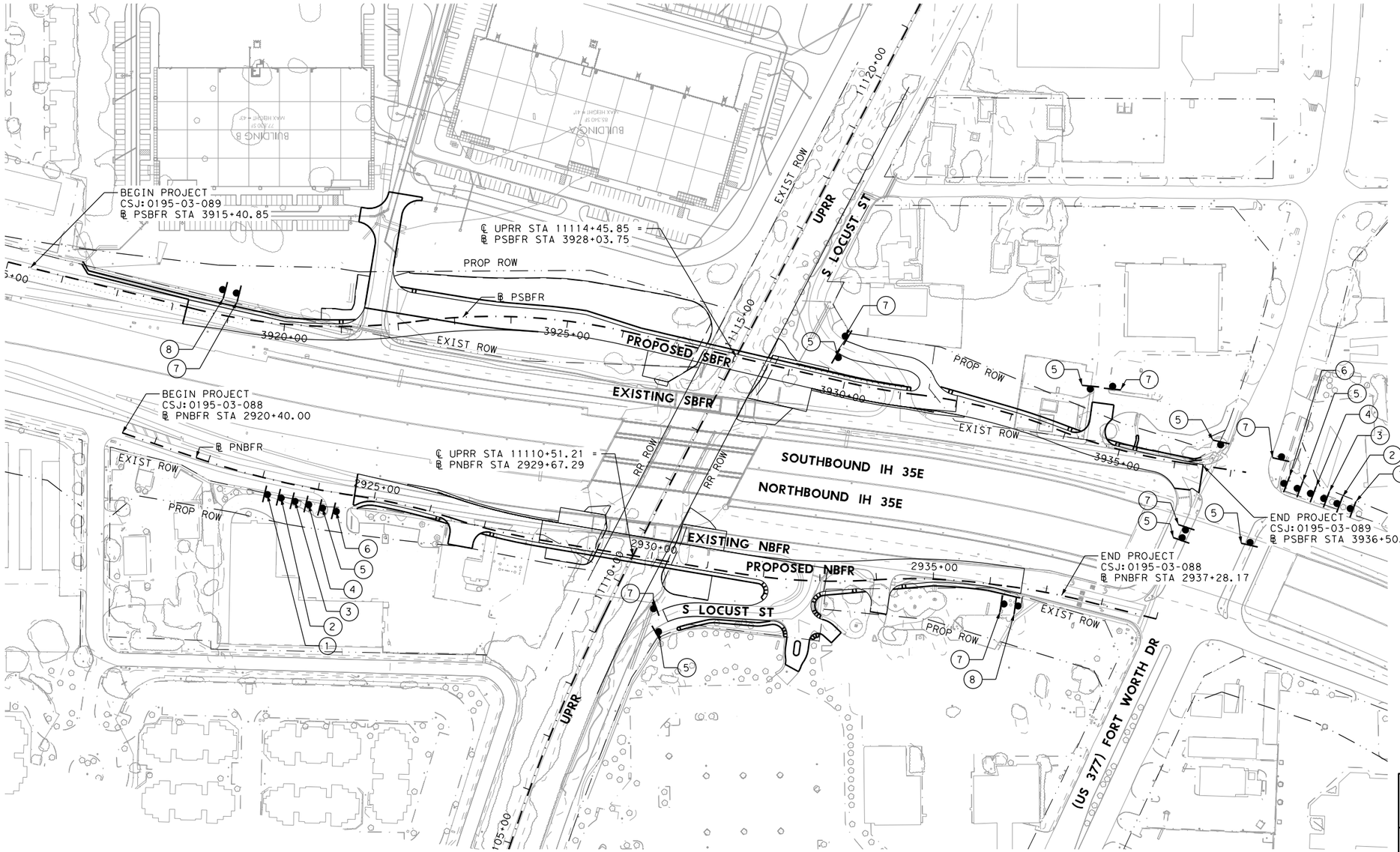

N

0′ 100′ 200′
SCALE IN FEET

NOTES:

1. ADVANCE WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
2. REFER TO BC STANDARDS FOR SPACING OF ADVANCE WARNING SIGNS
3. SEE BC(3)-21 FOR SPACING WORK ZONE SPEED LIMIT SIGNS

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
6/18/2024

OBEY WARNING SIGNS STATE LAW
R20-3T ①

STAY ALERT
TALK OR TEXT LATER
G20-10T ②

BEGIN WORK ZONE — G20-9TP
TRAFFIC FINES DOUBLE — R20-5T
WHEN WORKERS ARE PRESENT — R20-5aTP
③

SPEED LIMIT XX
R2-1 ④

ROAD WORK AHEAD
CW20-1D ⑤

BEGIN ROAD WORK NEXT X MILES — G20-5T
NAME ADDRESS CITY STATE — G20-6T
CONTRACTOR
⑥

END ROAD WORK
G20-2 ⑦

END WORK ZONE
G20-2bT ⑧

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IH 35E

PROJECT LAYOUT AND ADVANCE WARNING SIGNS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	3
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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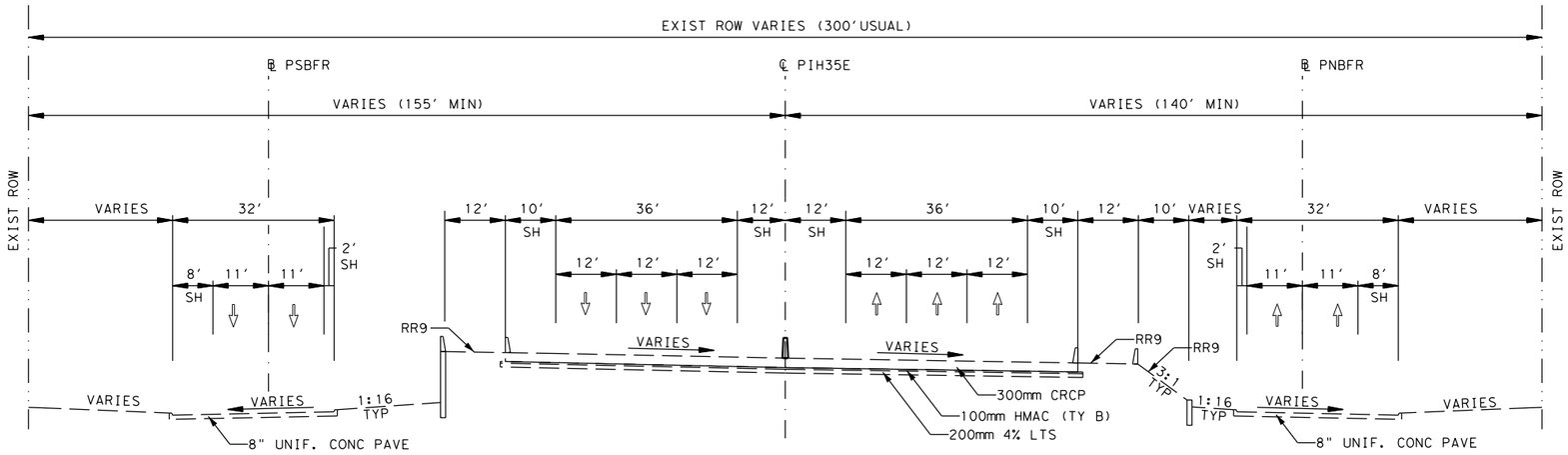
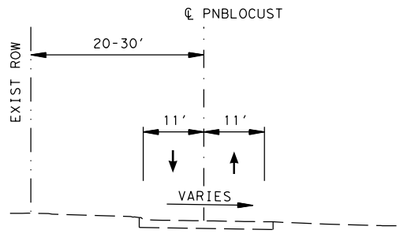
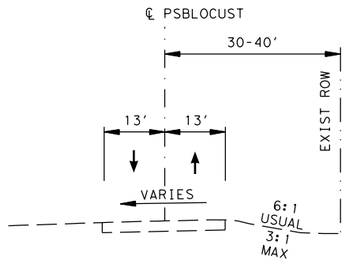


EXIST IH 35E SOUTHBOUND FRONTAGE ROAD
℄ PSBFR STA 3915+40.85 TO STA 3936+50.00

EXIST IH 35E NORTHBOUND FRONTAGE ROAD
℄ PNBFR STA 2920+40.00 TO STA 2937+28.17



EXIST S LOCUST
℄ PNBLOCUST STA 10+00.00 TO STA 12+61.40



EXIST S LOCUST
℄ PSBLOCUST STA 10+00.00 TO STA 12+00.00

10/2/2023

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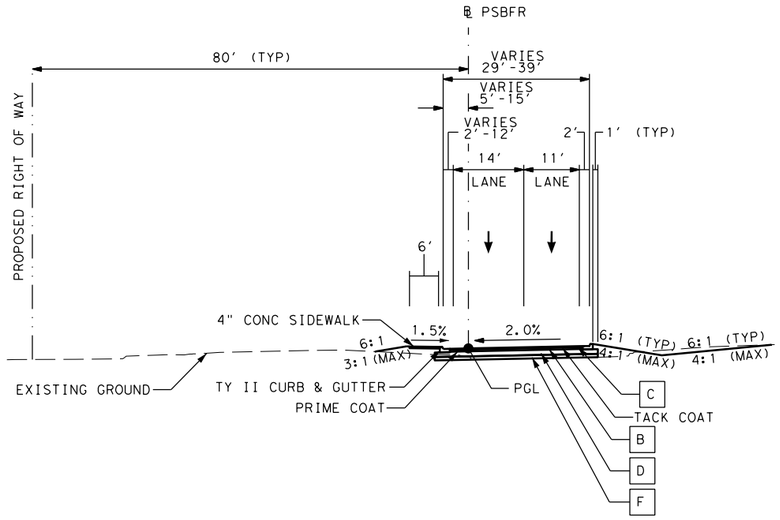
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
EXISTING TYPICAL SECTIONS

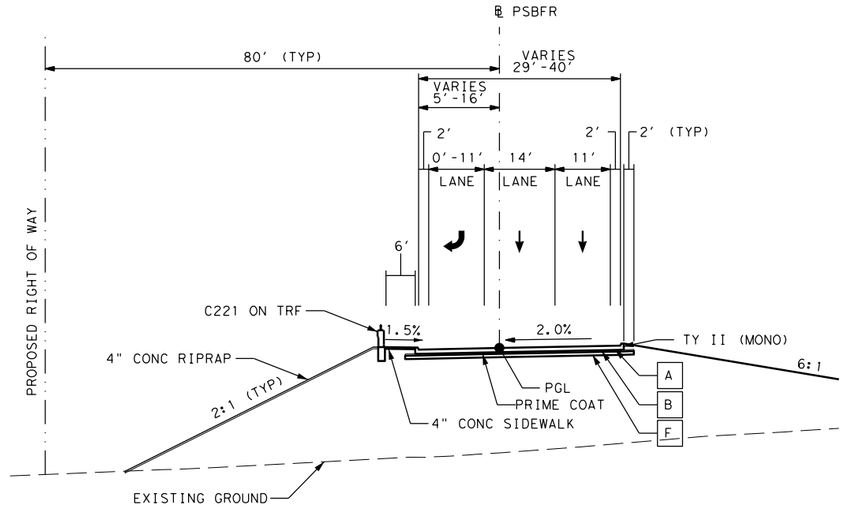
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	4
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	



SOUTHBOUND IH 35E FRONTAGE ROAD INTERIM PAVE

STA 3918+25.00 TO STA 3921+02.97
STA 3932+00.64 TO STA 3936+50.00
NOT TO SCALE

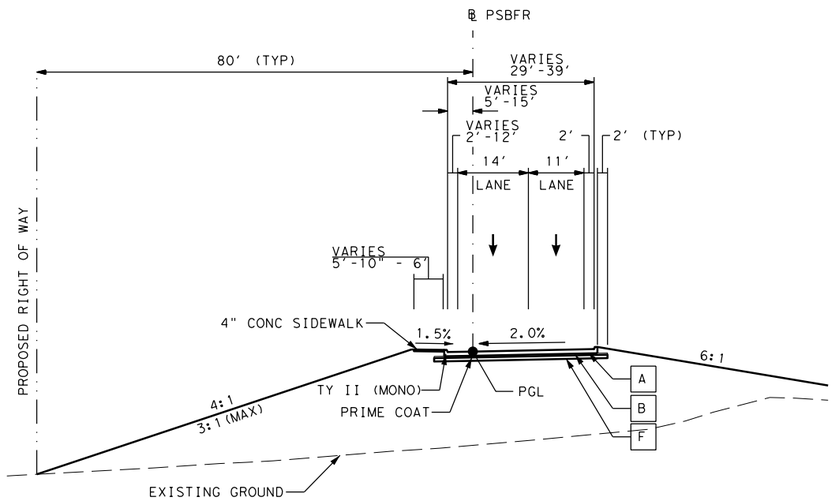


SOUTHBOUND IH 35E FRONTAGE ROAD PERM PAVE

STA 3921+02.97 TO STA 3926+30.00
NOT TO SCALE

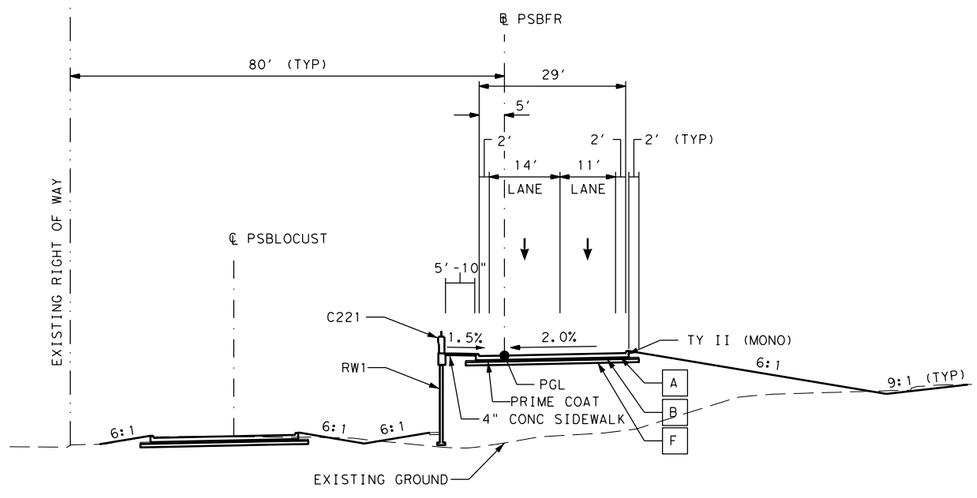
LEGEND

A	10" CONCRETE PAVEMENT (CRCP)
B	4" SP-B PG (64-22)
C	3" SP-C SAC(B) PG (64-22)
D	12" FL BS (CMP IN PLC)(TY D GR1-2)
E	8" CEMENT TREATED SUBGRADE (2%) (EXIST MAT'L)
F	8" LIME TREATED SUBGRADE (5%) (EXIST MAT'L)



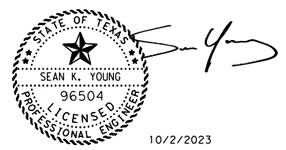
SOUTHBOUND IH 35E FRONTAGE ROAD PERM PAVE

STA 3926+30.00 TO STA 3926+74.00
STA 3931+05.45 TO STA 3932+00.64
NOT TO SCALE



SOUTHBOUND IH 35E FRONTAGE ROAD PERM PAVE

STA 3929+34.00 TO STA 3931+05.45
NOT TO SCALE



10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
PROPOSED TYPICAL SECTIONS

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	5
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088, ETC	
CHECK				
AEC				

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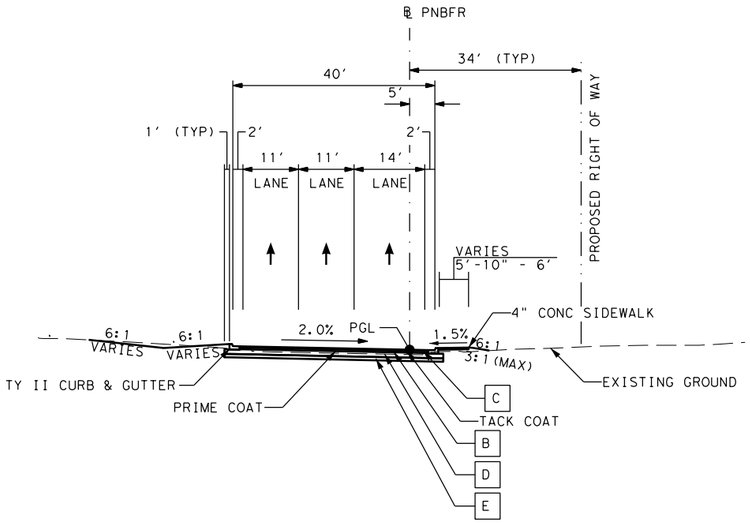
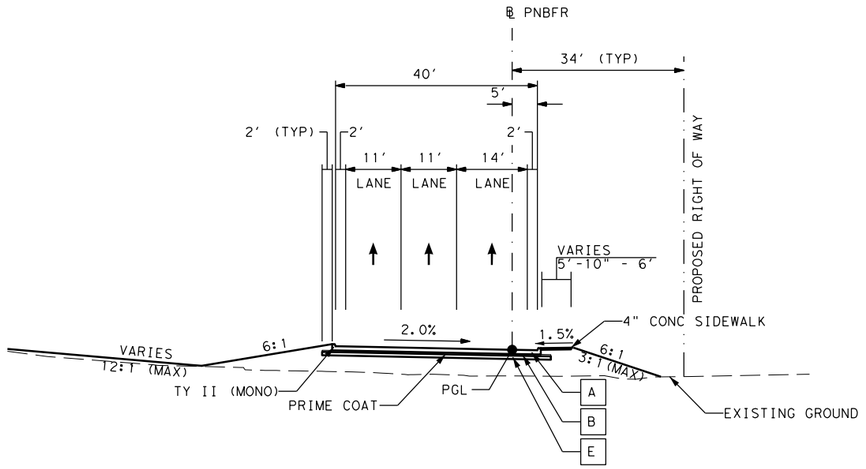


NORTHBOUND IH 35E FRONTAGE ROAD INTERIM PAVE

STA 2924+65.00 TO STA 2928+00.00
STA 2933+10.26 TO STA 2936+56.52
NOT TO SCALE

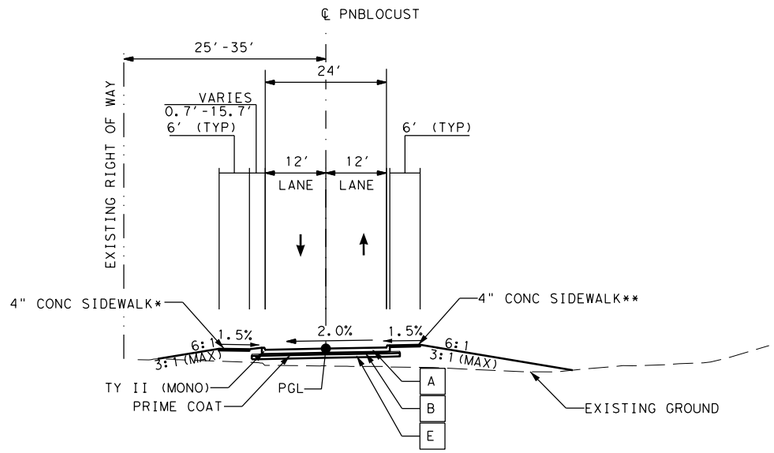


NORTHBOUND IH 35E FRONTAGE ROAD PERM PAVE

STA 2928+00.00 TO STA 2928+36.00
STA 2930+96.00 TO STA 2933+10.26
NOT TO SCALE

LEGEND

A	10" CONCRETE PAVEMENT (CRCP)
B	4" SP-B PG (64-22)
C	3" SP-C SAC(B) PG (64-22)
D	12" FL BS (CMP IN PLC)(TY D GR1-2)
E	8" CEMENT TREATED SUBGRADE (2%) (EXIST MAT'L)
F	8" LIME TREATED SUBGRADE (5%) (EXIST MAT'L)

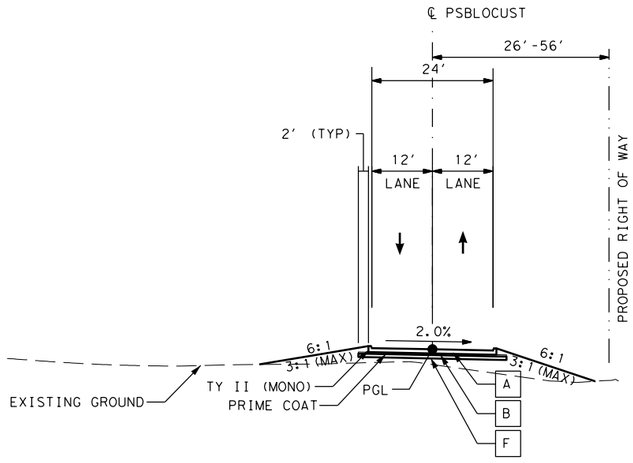


*SIDEWALK (LT LIMITS)
℄ PNBLOCUST STA 10+22.56 TO STA 10+28.83
℄ PNBLOCUST STA 10+67.99 TO STA 12+47.52

**SIDEWALK (RT LIMITS)
℄ PNBLOCUST STA 10+75.21 TO STA 10+88.11

NORTH SOUTH LOCUST STREET

STA 10+00.00 TO STA 12+61.40
NOT TO SCALE



SOUTH SOUTH LOCUST STREET

STA 10+00.00 TO STA 12+00.00
NOT TO SCALE

SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
6/17/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
PROPOSED TYPICAL SECTIONS

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	6
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				

DATE: 6/17/2024 7:00:35 PM
FILE: c:\pwworking\aecom_dsi6_no\diana.cabrer@aecom.com\d0373441\I35_AEC_GN_TY_03.dgn

SPECIFICATION DATA

Table 1: Soil Constants Requirements				
Item	Description	Plasticity Index		Note
		Max	Min	
132	Embankment (Final) (DC) (Ty C1)	40	8	1
132	Embankment (Final) (DC) (Ty C2)	25	8	2

Note 1: Material excavated from the project must meet the PI requirements when used in the top 10 feet of embankment that supports the pavement structure or other locations shown in the plans. Do not use shale and obtain approval to incorporate shaley clay produced by the construction project.

Note 2: Use as a non-select embankment backfill as defined under Item 423.2.4.1. Use as an embankment to backfill behind abutments to the extent of the approach slab or to backfill areas enclosed by an abutment and / or retaining walls or other locations as shown in the plans.

Table 2: Basis of Estimate for Permanent Construction					
Item	Description	Thickness	Rate		Quantity
162	Block Sod	N/A	See Specifications		11,875 SY
164	Drill Seed (Perm) (U) (C)	N/A	See Specifications		17,044 SY
166*	Fertilizer (12-6-6)	N/A	500	Lbs./Ac	1.49 Ton
168	Vegetative Watering (Warm)**	N/A	12	MG/Ac/Day	4,302.1 MG
260	Hydrated Lime (slurry)	8”		5% by Wt.	130 Ton
275	Cement	8”		2% by Wt.	38 Ton
310	Prime Coat	N/A	0.20	Gal/SY	2,673 Gal
3077	SP-B PG 64-22	4”	110	Lbs./SY/In	2,710 Ton
3077	SP-C SAC SAC-B PG 64-22	3”	110	Lbs./SY/In	1060 Ton
3077	Tack Coat (Undiluted Application Rate)	New HMA	0.06	Gal/SY	387 Gal
*For Contractor’s information only. **Use summer rate for calculation, adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Plan Sheet for estimated daily rates.					
Note: (1) Base material weight based on 1.50 Ton/CY (dry-compacted) (2) Asphalt weight based on 110 Lbs./SY/In (3) Subgrade weight based on 1.48 Ton/CY (dry-compacted)					

Table 3: Basis of Estimate for Temporary Erosion Control Items				
Item	Description	Rate		Quantity
164	Drill Seeding (Temp) (Warm or Cool)	See Specifications		28,919 SY
166*	Fertilizer (12-6-6)	500	Lb/Ac	1.49 Ton
168	Vegetative Watering (Warm)**	12	MG/Ac/Day	4,302.2 MG
*For Contractor’s information only. **Use summer rate for calculation, adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Sheet for estimated daily rates.				

Table 4: Basis of Estimate for Finish Colors (Items 427 & 446) [1]		
Element	Color	Specification Number [2]
CTB	Cream	27886
Columns	Warm Gray / Ochre	24201 / 13275
Bent Caps	Warm Gray	24201
Striated Retaining Wall Surfaces	Warm Gray	24201
Retaining Wall Coping and Other Components Except Striated Surfaces.	Cream	27886
Abutments (All Parts)	Ochre Pear	13275
Prestressed Concrete Girders And Structural Steel	Warm Gray	24201
Bottom of Slab Overhang and Slab Edge	Warm Gray	24201
Concrete Rail Parts Except Outside Lower 18"	Cream	27886
Lower Outside 18" ff Concrete Rails	Cream	27886

1. Unless otherwise noted, it is the intent of these plans that all exposed surfaces (concrete or steel) of bridges, retaining walls, concrete traffic railing and concrete traffic barrier be given a tinted coating as shown or as directed. Such coating shall meet the applicable provisions of Item 427 or Item 446. Provide test panels of the color approved by the Engineer prior to painting.

2. Federal Standard 595 colors.

GENERAL

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

The disturbed area for this project, as shown on the plans is 8.9 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The Contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project ROW according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the Engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

This project required formal consultation and permitting with environmental resources agencies as outlined in the plan set Environmental Permits,Issues and Commitments (EPIC) Sheet. There is a high probability that an environmentally sensitive area could be encountered on the Contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 “Project-Specific Locations”, provides a listing of regulatory agencies that may need to be contacted regarding this project.

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

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following address: https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors or Contractor questions on this project are to be addressed to the following individual(s):

Amanda Miller, P.E. Amanda.Moser@txdot.gov
Christopher Rocha, P.E. Christopher.Rocha@txdot.gov

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

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.

Cross sections may be requested by posting a question to the above Letting Pre-Bid Q&A web page. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

Item 5:
Place survey monuments, provided by the department, at points indicated and as detailed in the plans or as directed. Furnish surface coordinates and the elevation of the set monument and an azimuth from the monument to some prominent physical feature, preferably another survey monument on the project. This work will not be paid for directly, but will be considered subsidiary to the various bid items.

Underground utilities owned by the Texas Department of Transportation may be present within the right-of-way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (214-320-6682) for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (214-320-6205) for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor’s negligence including, but not limited to, repair or replacement at the Contractor’s expense.

For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

Place construction stakes/station markings at intervals of no more than 100 feet or as directed by the Engineer. Place stakes and markings so as not to interfere with normal construction operations.

Submit all shop drawings, working drawings, or other documents which require review sufficiently in advance of scheduled construction to allow no less than thirty (30) calendar days for review and response.

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

Item 6:
This project has structures with surface coatings which contain hazardous constituents which are Asbestos Containing Materials (ACM) at 10% Chrysotile on the grey expansion joints approximately 20 LF and Lead Based Paint (LBP) in the olive and grey paint on the metal

guardrails at 109,000 ppm at IH 35E NBFR at UPRR location and ACM at 10% Chrysotile on the grey expansion joints approximately 20 LF and LBP in the olive and grey paint on the metal guardrails at 119,000 ppm at IH 35E SBFR at UPRR location. The Contractor is responsible for the health and safety of his employees and compliance with all OSHA standards and regulations.

Paint containing hazardous materials will be removed by a third party, 10.1.1

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the Contractor must submit an original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

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

The Buy America Material Classification Sheet is located at the below link. https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

Item 7:
Repair or replace any structures and utilities that might have been damaged by negligence or a failure to have utility locates performed.

Holiday restrictions – The Engineer may decide that no lane closures or construction operations shall be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No additional compensation will be allowed for these closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

- New Year's Eve and Day (5 am on December 31 thru 10:00 pm January 1)
- Easter Holiday weekend (5 am on Friday thru 10:00 pm Sunday)
- Memorial Day weekend (5 am on Friday thru 10:00pm Monday)
- Independence Day (5 am on July 3 thru 10:00 pm on July 5)
- Labor Day weekend (5 am on Friday thru 10:00 pm Monday)
- Thanksgiving Holiday (5 am on Wednesday thru 10:00 pm Sunday)
- Christmas Holiday (5 am on December 23 thru 10:00 pm December 26)

No significant traffic generator events identified.

Item 8:
This Project will be a Six-Day Workweek in accordance with Article 8.3.1.2.

Nighttime work is allowed in accordance with Article 8.3.3.

Meet weekly with the Engineer to notify him or her of planned work for the upcoming week.

Provide the Engineer with a daily work schedule of planned work.

Critical Path Method (CPM) schedule in P6 format will be required for this project. Submit baseline schedule and obtain approval prior to beginning construction. The Estimate will be held if monthly schedule update is not submitted.

This project will have SP 008-056: 90-Day delay start for materials fabrication.

Item 100:
Remove the existing roadway small signs, delineators and object markers as shown on the plans, or as directed, during construction within the right-of-way. Small sign, delineator and object marker removals are subsidiary to this Item.

The limits of preparing right-of-way will be measured from Sta. 2920+40.00 to Sta. 2937+28.17 along the centerline of construction at IH 35E NBFR and from Sta. 3915+40.85 to Sta. 3936+50.00 along the centerline of construction at IH 35E SBFR.

Areas not delineated within the removal boundaries of tree trimming and brush removal will be subsidiary to this item.

Item 104:
In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planing or grinding is considered an acceptable method at these locations. Measurement and payment is in accordance with this item.

Sawing of concrete is not paid for directly, but is considered subsidiary to this item.

Items 105:
Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly, but is subsidiary to this item.

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

Properly dispose of unsalvageable material at your own expense.

Item 110:
Excavated shale is not an acceptable material for embankment.

Items 110 and 132:
Scarify and loosen the excavated areas, unpaved surface areas, except rock, to a depth of at least 8 inches and compact in accordance with the specifications.

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

Item 132:
Excavated material from the project site has not been determined to be suitable for embankment. The bidder assumes all risk for the use of excavated materials for embankment and is expected to meet all material requirements for embankment regardless of the source.

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

Earth embankments Type C1 and C2, are mainly composed of material other than shale. Furnish material that is free from vegetation or other objectionable material and that conforms to the requirements of Table 1 (Sheet A). If necessary, treat material with lime slurry in accordance with Item 260, "Lime Treatment (Road-Mixed)" in order to meet these requirements. Use Tex-121-E, figure 1, page 4 to calculate the amount of lime required. When lime treated subgrade is specified, 3000 PPM is the maximum allowed sulfate content in the top 3 feet when material comes from borrow source. Follow recommendations of 260.4.4 for mixing and mellowing. The Engineer will test material placed or excavated to a depth of one foot below and laterally to one foot outside the proposed treatment limit. Lime treatment of this material will not be paid for directly, but will be considered subsidiary to this item.

Do not use shaley clays in embankment unless approved in writing.

Use embankment material Type C2 described in Table 1 "Soil Constants Requirements" for embankments behind bridge abutments to the extent of the bridge approach slabs, and other embankments enclosed by an abutment and / or retaining walls.

Item 160:
Sequence construction operations to salvage topsoil from one location and spread on areas ready to receive topsoil. Keep stockpiling of topsoil to a minimum.

Use fertile clay or loam from the project site not more than six inches below natural grade as topsoil.

Item 161:
Provide tickets representing quantity of compost delivered to site.

Item 247:
Construct uniform layer thickness of 12 inches, or less with the required density and moisture content. Minimum PI is equal to three (3) for all grades.

Item 260:
Furnish and distribute MS-2 smoothly and evenly at the rate of 0.20 gallons per square yard to cure lime, as directed.

Provide Hydrated Lime Slurry and apply lime by slurry placement method.

Item 301:
Provide liquid antistripping agents unless otherwise directed. Add the minimum dosage determined by the manufacturer or higher dosage determined by design requirement and try subsequent trials at 0.25% increments.

Item 320:
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.

The use of windrow pick-up equipment is allowed except on the first course of roadway material placed over the subgrade.

Item 360:
Use of multiple piece tiebars will be required. Provide chairs for multiple piece tiebars, threaded connectors or other adequate devices, used in concrete paving, or tie them to the pavement reinforcing steel. If approved by the Engineer for specific areas, in lieu of multiple piece tiebars, drill holes into the pavement and grout straight tiebars in place with epoxy. Use a non-impact, rotary core drill to prevent damage to the pavement unless otherwise directed. Clean the drill holes and then completely fill with epoxy before inserting the tiebar. Do not bend the tiebars or insert them into plastic concrete without the approval of the Engineer.

Provide curbs monolithically constructed with the concrete pavement. If continuous monolithic curb has to be temporarily omitted for any reason, provide dowelled curbs in the proposed areas, as detailed in the plans, and apply an approved epoxy resin to the pavement to receive the curb as directed. This work and materials will not be paid for directly, but is considered subsidiary to this item.

If asphalt curing is used, cure the concrete pavement with MS-2.

Stockpile the concrete aggregates at the plant site.

Provide pavement widening joints, as detailed in the plans, at all locations where concrete pavement is placed adjacent to existing concrete pavement. Installation of these joints is not paid for directly, but is considered subsidiary to this item.

Payment for furnishing and installing the pre-molded expansion joint material between the retaining walls and concrete pavement is not paid for directly, but is considered subsidiary to this item.

Provide a curing machine equipped with rubber tires, or other acceptable arrangement, so that the machine will span the pavement and monolithic curb.

Curb transition is paid for as Type II curb.

The installation of curb openings is not paid for directly, but is considered subsidiary to this item.

Place construction, sawed and contraction joints in accordance with the pavement detail sheet and as directed. Joint locations, other than as shown on the plans, are subject to approval.

Pavement leave outs are required on this project as necessary to provide for traffic at driveways and side streets as shown in the plans or as directed. The cost of providing these leaveouts, including the construction of a suitable crossover connection at each site, is not paid for directly but is considered subsidiary to this item.

If a traveling form paver is used, provide one equipped with an electronically operated horizontal control device.

Use "mechanical steel placing equipment" at the discretion of the Engineer.

Provide Class HES concrete at the locations shown on the plans. Design Class HES to meet the requirements of Class P and a minimum average flexural strength of 450 psi or minimum average compressive strength of 3,200 psi in 24 hr.

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

If more than 30% of an area in any 1000-ft section of roadway requires grinding, action will be taken by the Contractor to make that 1000-ft full width section uniform without changing ride quality, compromising quality of pavement and decreasing skid resistance. Approved blasting method or other method approved by the Engineer will be performed at the Contractor's expense.

Item 400:
Structural Excavation is not paid for directly but is considered subsidiary to pertinent Items.

When placing concrete storm drain pipe on slopes of greater than 10 percent, provide cement stabilized backfill to a depth shown on the plans.

Item 416:
Provide a minimum of one core per bent, regardless of placement method.

Item 420:
Apply an ordinary surface finish to all concrete surfaces within 30 days after form removal.

Form columns to a point a minimum of one foot below the proposed future or existing bottom of channel elevation indicated on the bridge layouts by an acceptable method. This form work is not paid for directly, but is considered subsidiary to this item.

BENT NUMBERING:

For bridges with four or more spans, number every third bent (counting the abutments) on the up-station and down-station faces of the outside column(s) at approximately the mid height of the column. For structures with three columns or less per bent, place numbers on column A. Where there are four or more columns per bent, place numbers on both outside columns. Bent numbers shall be as shown on the bridge layout.

All materials, labor and incidentals associated with placing bent numbers are subsidiary to the various bid items.

For bridges with aesthetic treatments, the numbering will be incorporated into the aesthetics package.

NATIONAL BRIDGE INVENTORY NUMBERS:

Provide National Bridge Inventory (NBI) numbers on all bridge structures and bridge class culverts.

Where beam types allow access to the face of abutment backwall, place NBI numbers on the face of each abutment backwall using 3" block numbers. Locate NBI numbers between the outside beams at opposite corners of the bridge.

Where beam types do not allow access to the face of abutment backwall, place NBI numbers on the face of each abutment cap using 3" block numbers. Locate NBI numbers below the outside beams at opposite corners of the bridge.

Where a bridge begins, ends or contains a bent common to multiple structures, place NBI numbers on both faces near both ends of the common bent cap. The number placed at each of the four locations will correspond to the NBI number assigned to the bridge immediately above the number. Locate NBI numbers below the outside beam. Place using 3" Block Numbers.

For Bent Numbering and NBI Numbering, furnish materials that conform to the pertinent requirements of the following items:

- Stencil ink, black 11 oz., spray can (lead, CFC, and CFHC free). Black spray will be waterproof, weather resistance and dry instantly on all surfaces, without smearing, smudging or rippling and
- Die cut stencils or
- Brass stencil, 3 in., numbers and letters, adjustable interlocking stencil, set content 92 piece numbers and letters, legend height 3 in., symbol height 3 in. Stencils must be industrial grade and interlocking.

All materials, labor and incidentals associated with placing NBI numbers are subsidiary to the various bid items.

Item 421:
Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.

Provide High Performance Concrete (HPC) of the class specified for the following bridge components: approach slabs, abutments, bents, columns, slabs, sidewalks and medians. Provide High Performance Concrete (HPC) of the class specified for all railing and permanent concrete traffic barrier placed on bridges or approach slabs. HPC concrete is not required for portions of rail or concrete traffic barrier not located on a bridge.

Provide sulfate resistant concrete for box culverts and all drilled shafts.

Strength evaluation using maturity testing, Tex-426-A, may be used for all concrete elements except drilled shafts and mass concrete pours.

Provide a digital hydraulic compression testing Machine and accessories. The machine shall have a minimum testing range of 2,500 pounds force to 250,000 pounds force with a hydraulic switching valve to allow for rapid advancing, hold, controlled advancing and rapid retracting. The machine shall have a load cell to measure compressive forces within the testing range and shall be calibrated and verified in accordance with ASTM latest version. The Machine can meet or exceed the following when approved by the Engineer:

ELE International ACCU-TEK250 Digital Compression Tester including accessories or Forney F-250EX Standard Compression Machine including accessories or TxDOT approved equal.

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

Item 423:
For Mechanically Stabilized Earth (MSE) walls, provide a system from one of the following approved suppliers:

Name	Manufacturer	Phone
Reinforced Earth Walls	The Reinforced Earth Company 1331 Airport Freeway, Suite 302 Euless, TX 76040-4150	(817) 283-5503
Vist-A-Wall Precast MSE Walls (Grid-Strip, Wide Mesh)	Contech Engineered Solutions LLC 650 Justice Lane Mansfield, TX 76063	(800) 338-1122
Strengthened Soil Walls	ROSCH Earth Technologies 18390 Wings Corporate Drive Chesterfield, MO 63005	(636) 519-7770

Structural Embankment MSE Walls	Structural Embankment, LLC P.O. Box 2200 Weatherford, TX 76086	(817) 599-5700
Tricon Retained Soil Walls	Tricon Precast, Ltd. 15055 Henry Road Houston, TX 77060	(281) 931-9832
VP Wall System	Valley Prestress Products, Inc. 1520 Calhoun Road P.O. Box 309 Eagle Lake, TX 77434	(979) 234-7899
Jobe Wall System	Jobe Materials, L.P. 12123 Dyer Street El Paso, TX 79934	(915) 298-9900

All retaining walls will have a uniform texture and appearance.

Unless otherwise noted in the plans, the top of the leveling pad is located 2 feet below the proposed ground.

Square foot surface area of retaining wall is measured from the top of retaining wall to the top of the leveling pad. Footing adjustments made to accommodate the available optional retaining walls are not measured.

Unless otherwise shown on the plans, provide Type AS backfill as defined under this item for permanent MSE or concrete block (CB) walls not subject to inundation. Unless otherwise shown on the plans, provide type DS backfill as defined under this item for permanent MSE or CB walls subject to inundation.

Supply drainage aggregate meeting the requirements of this item for use as filter material with the retaining wall.

Cement-Stabilized Backfill (CSB) is not permitted.

Unless otherwise noted on the plans, provide flowable backfill meeting the requirements of Item 401 between the back of panels and inlets or drainage pipes where the required compaction can not be achieved. Flowable backfill used for this purpose is subsidiary to this item.

Provide earth reinforcements with a minimum length of 8' or longer as required by RW(MSE)-DD. Earth reinforcement length is measured perpendicular to the wall. Adjust skewed earth reinforcements as necessary of obtain required length.

Submit design calculations supporting the details necessary to incorporate coping, railing, inlets, drainage, electrical conduits and any additional necessary features.

The Contractor has the option of constructing any of the types of retaining walls for which details and specifications are included in the plans. Footing adjustments made to accommodate the

available optional retaining walls are not measured. Regardless of option or options chosen, use the same fascia pattern throughout the entire project, including cast in place full height retaining walls or retaining wall type abutments.

Submit detailed drawings depicting the patterns and matching of precast with cast-in-place for approval.

Unless otherwise shown on the plans, form the map of Texas emblem into a wall panel next to each bridge abutment. Engineer approval of the exact location of each emblem is required. The cost of forming emblems is considered subsidiary to this item. Inset the map of Texas a minimum of ¾ inch into the face of the panel, and provide a smooth finish with an Engineer approved contrasting color.

At Contractor's expense, repair all damage to the precast units (such as chips) as required to match the fascia pattern.

Use Embankment Type C2 as non-select embankment backfill as defined under Item 423.2.4.1. For non-select embankment fill behind retaining walls provide and install fill in accordance with Item 132, Type C2.

For cut walls, the backfill between the select fill zone and the existing ground shall be either select material as required for the select fill zone or backfill meeting or exceeding the requirements of Item 132, type C2. Place material in accordance with Item 132, Type C2 requirements. If existing ground is laid back (i.e. not vertical), the lay back shall be done as a series of equal height benches so as to prevent the formation of a smooth surface at the material interface.

Avoid distinct vertical joints between select backfill and embankment (Non-Select) backfill as required by Section 423.3.4. This may be conveniently done by providing a zone of material behind the strap zone (1' min width) in which alternating lifts of select and non-select materials are interlaced.

Items 423 and 427:
Unless otherwise noted on the plans, provide a striated finish on all retaining walls and retaining wall type bridge abutments. Supply form liners providing a finish similar to that derived from Lithotex Formliner Pattern T-2150, "Fractured Fin-Grooved", by the l. M. Scofield Company, Pattern P/C 30717, "¾ inch deep Fractured Fin", by Simons, Pattern 373 "Fractured Fin", by Greenstreak, "Adams Rib – Pattern 16950" by Fitzgerald or equal. Maximum depth of the striations is ¾ inch.

For cast in place walls, cast the top two feet smooth.

Retaining wall colors are shown elsewhere in the plans.

Item 425:
Repair "Safety Harness Pole Holes" in beams in accordance with Item 429 prior to placement of the Bridge Slab. This work is considered subsidiary to the various bid items.

Item 427:
Finish concrete structures surface area I with an opaque sealer of the color(s) shown elsewhere in the plans in accordance Item 427.

Apply a 4-SF sample of each color on the project surfaces for approval. Adjust color as required by Engineer to compensate for surroundings and natural lighting conditions on the project site. Provide test panels of the color approved by the Engineer prior to painting.

Ensure that surfaces are free of weak surface material, curing compounds and other surface contaminants prior to coating.

FORM LINER FINISHES: Place architectural concrete treatments as shown. Placement is subsidiary to this item.

Where used, provide fractured fin/ribs/striations that are continuous with no apparent curves or discontinuities. Variations of the fractured ribs from true vertical exceeding ¼" for each 4'-0" of panel height are not acceptable.

Provide form liners that release without leaving pieces of liner material on the concrete and without pulling or breaking concrete from the textured surface. Provide form release agents as recommended by the manufacturer. Replace form liners as directed that have become damaged or worn. Replacement of form liners is considered incidental to the work and no additional compensation is provided.

No horizontal splices in the form liner are permitted. Vertical splices may occur only in valleys between fractured ribs.

Provide sample panels a minimum of ten days in advance of starting construction of the textured concrete surfaces. Construct sample panel(s) in accordance with Item 427.4.3.5 "Form Liner Finish" using each type of approved form liner. Sample panels must meet the requirements of the plans and specifications and be approved before any construction form liners may be ordered, obtained or used. Provide panels having a textured portion at least 5'-0" by 5'-0" with a representative un-textured surrounding surface. If directed, construct and finish additional test panels until a satisfactory concrete surface texture is obtained.

The approved sample panel is the standard of comparison for the production concrete surface texture. If directed, build a new test panel to demonstrate acceptability of any proposed change in construction method.

Tool or replace areas requiring surface treatment that do not match their associated sample panels. Upon completion, tooled or replaced panels must match the associated sample panel. Tooling or replacement is at the Contractor's expense.

For proper placement of the expansion joint behind the rail, omit surface finish from the top of T551 (RW) (DAL) rail to bottom of panel as directed.

Joint reveal details and location may vary slightly from what is shown to match the adjacent MSE walls as directed. No additional compensation will be allowed.

Item 440:
Provide reinforcing steel with epoxy coating meeting the requirements of item 440 for the following bridge components: approach slab, slab, sidewalk, median, concrete traffic barrier, and rail.

Epoxy coated reinforcing is not required for portions of rail or concrete traffic barrier not located on a bridge.

Reinforcing for abutments, bents and columns are not required to be epoxy coated.

R-bars (I-beams, U-beams, X-Beams and TX Girders), Z-bars (boxes), and H-bars (Slab beams) are not required to be epoxy coated**.**

All ties, chairs and other appurtenances used with epoxy coated reinforcing shall be epoxy coated or non-metallic.

Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strip and Rip Rap Items as approved. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved.

Item 442:
Use temperature Zone 1 for CVN testing.

Item 446:
Paint all structural steel using protective “System II" paint in accordance with Item 446. Paint colors are shown elsewhere in the plans.

After all concrete placement has been completed, remove any concrete or other contaminate from the beam by hand cleaning methods so as not to damage the primer and then water blast / wash with a minimum of 2,500 psi pressure.

Item 464:
The concrete collars and the connections of pipes to existing or proposed concrete boxes or pipe will not be paid for directly but will be considered subsidiary to the various bid items.

At locations where storm drains dead-end, plug with a concrete plug of a thickness equal to 1 ½ inches per foot of diameter of pipe with a minimum thickness of 3 inches. The cost of the plugs shall be included in the unit price bid per foot of the various storm drain pipes.

Item 465:
All manholes, junction boxes and inlets will require inverts unless otherwise directed.

Item 471:
Tackweld all inlet grates and manhole covers to the frame with two 1-inch welds. Supply un-painted cast iron inlet grate and frame and/or cast iron manhole frame and cover.

Item 496:
Concrete pavement removed as a result of removing the inlets will not be paid for directly but will be considered as subsidiary to Item 496.

Inlet grates and manhole covers become the property of the Contractor for disposal.

Item 500:
Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

Item 502:
The Contractor Force Account “Safety Contingency” that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor’s Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

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

Provide a person to contact at all times (24 hours/day, 7 days/week) to patrol, monitor, and maintain the traffic control devices and signs. The person must respond within 30 minutes of being contacted. The person must be knowledgeable of TxDOT Guidelines for traffic control devices and signs.

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

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

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.
Do not operate or park any equipment/machinery closer than 30 feet from the traveled roadway after sunset unless authorized by the Engineer.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

As approved by the Engineer, provide uniformed off duty police officers and squad cars during lane or ramp closures, night time work or other situations that indicate a need for additional traffic control to protect the traveling public or the construction workforce. Provide documentation such as payroll, log sheets with signatures and badge number, or invoices from the government entity providing the officers for reimbursement. Complete the weekly tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided. Reimbursement will not be made for coordination fees charged by any party.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

Limit lane closures along IH 35E NBFR and IH 35E SBFR to the hours between 9:00 AM and 3:30 PM. Work in other areas of the project is not restricted to this time frame.

One lane of the frontage roads must always be open during TCP.

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

Work in other areas of the project not restricted to this time frame.

Additional lanes may be closed, started earlier, or extended later with written permission of the Engineer.

Item 504:
Furnish one Field Office (Type C) for this project.

Chain link fencing (6-ft. chain-link fence and a top-mounted 3-strand barbed wire) area dimensioned as directed by the Engineer, will be provided around TxDOT field office/laboratory and parking areas separate from Contractor areas. Keep Contractor and TxDOT parking separate. No Contractor vehicles, equipment, dumpsters, storage, etc. is allowed in TxDOT parking area. A clear parking lot (no building included) is required of 75'X90' and separate entrance and exit gates are also required of 25' each to facilitate pull through maneuvers of the vehicles.

Allow for space to accommodate a minimum of 3 pull through parking spaces.

All field office layouts must be approved by the Engineer prior to installation.

The Engineer reserves the right to modify the layout.

A 10 lb. ABC fire extinguisher with up-to-date inspection tag, working smoke detector, first aid kit and an eye wash station shall be installed in all facilities used by TxDOT personnel. They shall be mounted on a wall that is easily accessible and not blocked by any permanent furniture.

Inspect the fire extinguishers, smoke detectors, eye wash stations and first aid kits every month. Make necessary corrections or updates as needed or as directed within 7 calendar days.

Provide a broadband internet connection with a minimum speed of 50 Mbps download and 50 Mbps upload, unless otherwise approved.

Provide an all in one color printer/scanner/copier that will print, scan and copy 11"x17" and 8.5"X11" sheets with software that is compatible with TxDOT equipment. This is subsidiary to the various bid items.

Item 506:
Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

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

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

Item 508:
Testing of materials used in the construction of a temporary detour may be waived when approved by the Engineer.

Item 512:
The Contractor will furnish pre-cast F Shape Barriers for traffic control, and remove and retain possession of non-permanent barriers at the end of the project. Pre-cast F Shape Barriers must

have drainage slots as detailed on the Concrete Safety Barrier Standards. Submit for approval the type of barrier joint connection proposed for the project.

Item 529:
Provide grooved joints at 10-foot intervals and ¾ inch expansion joint material for doweled curb at the same locations as on the existing pavement.

For Curb and Gutter sections, provide grooved joints at 10-foot intervals and ¾ inch expansion joint material at a maximum of 50-foot centers and at all radius points and inlets.

Curb and Gutter transitions will be paid for by the foot at the unit price for the corresponding curb or curb and gutter section.

Saw joints at the same location as on the existing pavement.

Item 530:
Provide Class "HES" concrete for concrete intersections and driveways listed or shown on the plans.

Item 531:
Joint sealant is required when shown in the plans. This work will not be paid for directly but will be considered subsidiary to this Item.

Item 540:
Furnish one type of post throughout the project except as specifically noted in the plans.

Item 556:
Place bell and spigot type pipe with an open joint of approximately ¾ inch.

The requirements for decantation of filter material are deleted for this project.

Item 585:
Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule 3 on the service roads.

Items 644:
Provide two (2) sets of shop drawings for signs. The shop drawings shall conform to the details shown on the plans. The shop drawings shall show the details of the panels, wind beams, stiffeners, joint backing plates, splices, fasteners, brackets, and sign support connections. The shop drawings shall show letter types and sizes, interline spacing and message arrangements.

Affix a sign identification decal to the back of all signs in accordance with Item 643.

Prior to taking elevations to determine the lengths for fabrication of sign posts, obtain verification of all proposed locations.

All sign mounts shall have a clam base system for all small roadside sign assemblies.

Item 677:
A water blasting method approved by the Engineer will be the only method allowed for the removal of permanent and temporary pavement markings except on a sealcoat surface. A 2-foot wide sealcoat will be required on sealcoat surfaces to eliminate permanent and temporary pavement markings.

Item 730:
At the discretion of the Engineer, mow non-paved areas within the project prior to placement of permanent vegetation. Mow up to three (3) cycles per growing season.

Item 3077:
Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class B.

Superpave Mixtures used as concrete pavement underlayment is deemed as "Exempt Production".

Provide PG binder 64-22 in Type SP-B and SP-C mixture.

Item 6185:
The total number of truck mounted attenuators (TMAs) or trailer attenuators (TAs) required when utilizing the traffic control standards are shown in the tables below.

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

TCP 3 Series	Scenario	Required TMA/TA
(3-2)-13	All	3
(3-3)-14	C	3

TCP 6 Series	Scenario	Required TMA/TA
(6-2)-12 / (6-3)-12	All	1

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

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0195-03-088 **DISTRICT** Dallas **COUNTY** Denton
HIGHWAY IH 35E

			CONTROL SECTION JOB		**0195-03-088**		**0195-03-089**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00064766**		**A00064768**			
			COUNTY		**Denton**		**Denton**			
			HIGHWAY		**IH 35E**		**IH 35E**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	11.920		20.230		32.150	
	104-6001	REMOVING CONC (PAV)	SY	5,580.000		5,975.000		11,555.000	
	104-6009	REMOVING CONC (RIPRAP)	SY	403.000		234.000		637.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	297.000		1,752.000		2,049.000	
	104-6021	REMOVING CONC (CURB)	LF	1,986.000		2,982.000		4,968.000	
	105-6008	REMOVING STAB BASE AND ASPH PAV (6")	SY	443.000		948.000		1,391.000	
	110-6001	EXCAVATION (ROADWAY)	CY	12,782.000		8,812.000		21,594.000	
	132-6025	EMBANKMENT (FINAL) (DENS CONT) (TY C1)	CY	10,325.000		45,167.000		55,492.000	
	132-6026	EMBANKMENT (FINAL) (DENS CONT) (TY C2)	CY	622.000		2,620.000		3,242.000	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	11,124.000		17,795.000		28,919.000	
	162-6002	BLOCK SODDING	SY	4,904.000		6,971.000		11,875.000	
	164-6039	DRILL SEEDING (PERM) (URBAN) (CLAY)	SY	6,220.000		10,824.000		17,044.000	
	164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	11,124.000		17,795.000		28,919.000	
	168-6001	VEGETATIVE WATERING	MG	3,309.800		5,294.500		8,604.300	
	247-6313	FL BS (CMP IN PLC)(TY D GR1-2)(12")	SY	3,584.000		3,878.000		7,462.000	
	260-6002	LIME (HYDRATED LIME (SLURRY))	TON			130.000		130.000	
	260-6027	LIME TRT (EXST MATL)(8")	SY			7,768.000		7,768.000	
	275-6001	CEMENT	TON	38.000				38.000	
	275-6011	CEMENT TREAT(EXIST MATL)(8")	SY	5,584.000				5,584.000	
	310-6009	PRIME COAT (MC-30)	GAL	1,119.000		1,554.000		2,673.000	
	360-6004	CONC PVMT (CONT REINF - CRCP) (10")	SY	1,815.000		3,477.000		5,292.000	
	400-6005	CEM STABIL BKFL	CY	292.000		222.000		514.000	
	400-6007	CUT & RESTORE CONC PAVING	SY			13.000		13.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF			183.000		183.000	
	403-6001	TEMPORARY SPL SHORING	SF	5,477.000		11,251.000		16,728.000	
	416-6001	DRILL SHAFT (18 IN)	LF	68.000		81.000		149.000	
	416-6004	DRILL SHAFT (36 IN)	LF	282.000		282.000		564.000	
	420-6014	CL C CONC (ABUT)(HPC)	CY	76.800		58.000		134.800	
	420-6030	CL C CONC (CAP)(HPC)	CY	44.400		33.300		77.700	
	420-6038	CL C CONC (COLUMN)(HPC)	CY	49.200		32.200		81.400	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY			65.000		65.000	
	422-6002	REINF CONC SLAB (HPC)	SF	12,610.000		9,751.000		22,361.000	
	422-6014	BRIDGE SIDEWALK (HPC)	SF	2,031.000		1,995.000		4,026.000	
	422-6016	APPROACH SLAB (HPC)	CY	110.400		79.600		190.000	
	423-6001	RETAINING WALL (MSE)	SF			2,745.000		2,745.000	
	425-6039	PRESTR CONC GIRDER (TX54)	LF	1,651.090		1,143.830		2,794.920	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	8.000		12.000		20.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0195-03-088 **DISTRICT** Dallas **COUNTY** Denton
HIGHWAY IH 35E

			CONTROL SECTION JOB		**0195-03-088**		**0195-03-089**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00064766**		**A00064768**			
			COUNTY		**Denton**		**Denton**			
			HIGHWAY		**IH 35E**		**IH 35E**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	432-6001	RIPRAP (CONC)(4 IN)		CY	223.000		569.000		792.000	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)		CY	19.000				19.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)		CY	13.000		23.600		36.600	
	438-6001	CLEANING AND SEALING EXISTING JOINTS		LF	16.000		1.000		17.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)		LF	112.000		112.000		224.000	
	438-6016	CLEAN AND SEAL EXIST JTS (STRIP SEAL)		LF	120.000		120.000		240.000	
	442-6007	STR STEEL (MISC NON - BRIDGE)		LB	161.000		161.000		322.000	
	450-6005	RAIL (TY T221)(HPC)		LF	296.000		278.000		574.000	
	450-6031	RAIL (TY C221)(HPC)		LF	296.000		923.000		1,219.000	
	450-6051	RAIL (HANDRAIL)(TY E)		LF			61.000		61.000	
	450-6119	RAIL (CLF-RO)		LF	240.000		220.000		460.000	
	454-6018	SEALED EXPANSION JOINT (4 IN) (SEJ - M)		LF	92.000		71.000		163.000	
	464-6005	RC PIPE (CL III)(24 IN)		LF			620.000		620.000	
	465-6032	INLET (COMPL)(PCU)(3FT)(BOTH)		EA			4.000		4.000	
	465-6071	INLET (COMPL)(PSL)(RC)(4FTX4FT)		EA			1.000		1.000	
	465-6158	INLET(COMPL)(PAZD)(FG)(3FTX3FT-3FTX3FT)		EA			1.000		1.000	
	496-6002	REMOV STR (INLET)		EA			1.000		1.000	
	496-6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)		EA	1.000		1.000		2.000	
	500-6001	MOBILIZATION		LS	0.390		0.610		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	16.000				16.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)		LF	60.000		80.000		140.000	
	506-6011	ROCK FILTER DAMS (REMOVE)		LF	60.000		80.000		140.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY	493.000		493.000		986.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)		SY	493.000		493.000		986.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	1,198.000		1,907.000		3,105.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	1,198.000		1,932.000		3,130.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")		LF			99.000		99.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF			99.000		99.000	
	506-6047	TEMP SDMT CONT FENCE (INLET PROTECTION)		LF			25.000		25.000	
	508-6001	CONSTRUCTING DETOURS		SY	563.000		684.000		1,247.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)		LF	1,830.000		2,520.000		4,350.000	
	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)		LF	35.000				35.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)		LF	1,500.000		2,400.000		3,900.000	
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)		LF	1,830.000		2,520.000		4,350.000	
	512-6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)		LF	35.000				35.000	
	529-6005	CONC CURB (MONO) (TY II)		LF	902.000		1,838.000		2,740.000	
	529-6008	CONC CURB & GUTTER (TY II)		LF	1,326.000		1,792.000		3,118.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0195-03-088 **DISTRICT** Dallas **COUNTY** Denton
HIGHWAY IH 35E

			CONTROL SECTION JOB		**0195-03-088**		**0195-03-089**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00064766**		**A00064768**			
			COUNTY		**Denton**		**Denton**			
			HIGHWAY		**IH 35E**		**IH 35E**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	530-6017	DRIVEWAYS (CONC) (HES)	SY	1,071.000		1,235.000		2,306.000	
	531-6001	CONC SIDEWALKS (4")	SY	548.000		974.000		1,522.000	
	531-6005	CURB RAMPS (TY 2)	EA	5.000				5.000	
	531-6013	CURB RAMPS (TY 10)	EA	4.000		6.000		10.000	
	536-6002	CONC MEDIAN	SY	26.000				26.000	
	538-6001	RIGHT OF WAY MARKERS	EA	11.000		13.000		24.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	150.000		150.000		300.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	1.000		1.000		2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	215.000		559.000		774.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	1.000		1.000		2.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA			2.000		2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1.000		1.000		2.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000		4.000		6.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	1.000		2.000		3.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	2.000		5.000		7.000	
	545-6010	CRASH CUSH ATTEN (INSTL)(L)(W)(TL3)	EA			1.000		1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	2.000		4.000		6.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	6.000		3.000		9.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	5.000		3.000		8.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	1.000				1.000	
	644-6075	RELOCATE SM RD SN SUP&AM(SIGN ONLY)	EA	2.000		2.000		4.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA			3.000		3.000	
	658-6015	INSTL DEL ASSM (D-SW)SZ (BRF)GF1	EA	1.000				1.000	
	658-6028	INSTL DEL ASSM (D-SY)SZ (BRF)GF1	EA	3.000		3.000		6.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	1.000		1.000		2.000	
	662-6064	WK ZN PAV MRK REMOV (W)6"(BRK)	LF	367.000				367.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	2,461.000		5,725.000		8,186.000	
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	879.000		647.000		1,526.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF	16.000				16.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	3,459.000		3,981.000		7,440.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	512.000		1,091.000		1,603.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	274.000		419.000		693.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4.000				4.000	
	666-6225	PAVEMENT SEALER 6"	LF	5,642.000		4,615.000		10,257.000	
	666-6226	PAVEMENT SEALER 8"	LF	512.000		1,091.000		1,603.000	
	666-6230	PAVEMENT SEALER 24"	LF	274.000		419.000		693.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA	4.000				4.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0195-03-088 **DISTRICT** Dallas **COUNTY** Denton
HIGHWAY IH 35E

									TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0195-03-088**		**0195-03-089**				
		PROJECT ID		**A00064766**		**A00064768**				
		COUNTY		**Denton**		**Denton**				
		HIGHWAY		**IH 35E**		**IH 35E**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL			
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1,080.000		704.000			1,784.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	1,900.000		1,827.000			3,727.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2,503.000		2,084.000			4,587.000	
	666-6356	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	LF	159.000					159.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	66.000		72.000			138.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	1,836.000		635.000			2,471.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	635.000		330.000			965.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	415.000					415.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	5,642.000		4,615.000			10,257.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	512.000		1,091.000			1,603.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	274.000		419.000			693.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	4.000					4.000	
	730-6107	FULL - WIDTH MOWING	CYC	3.000					3.000	
	734-6002	LITTER REMOVAL	CYC	3.000					3.000	
	752-6004	TREE TRIMMING / BRUSH REMOVAL(CHANNELS)	AC	0.330		0.330			0.660	
	752-6015	TREE AND BRUSH REMOVAL	AC	0.450		0.800			1.250	
	780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	19.000		12.000			31.000	
	3077-6001	SP MIXES SP-B PG64-22	TON	1,134.000		1,576.000			2,710.000	
	3077-6013	SP MIXES SP-C SAC-B PG64-22	TON	520.000		540.000			1,060.000	
	3077-6075	TACK COAT	GAL	190.000		197.000			387.000	
	5113-6001	WROUGHT IRON FENCE	LF	48.000					48.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000			4.000	
	6185-6002	TMA (STATIONARY)	DAY	37.000		37.000			74.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	8.000		8.000			16.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000					1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000					1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000					1.000	
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000					1.000	

DN: AECOM CK: AECOM DN: AECOM CK: AECOM Jacob.Huffman

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	403 6001	502 6001	508 6001	512 6001	512 6025	512 6049	545 6003	545 6005	545 6010	545 6019	662 6064	662 6067	662 6071	662 6075	662 6098	6001 6002	6185 6002	6185 6005
	TEMPORARY SPL SHORING	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONSTRUCTING DETOURS	PORT CTB (FUR & INST) (SGL SLOPE) (TY1)	PORT CTB (MOVE) (SGL SLP) (TY 1)	PORT CTB (REMOVE) (SGL SLP) (TY 1)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN(INSTL) (L)(W)(TL3)	CRASH CUSH ATTEN(INSTL) (S)(N)(TL3)	WK ZN PAV MRK REMOV (W)6"(BRK)	WK ZN PAV MRK REMOV (W)6"(SLD)	WK ZN PAV MRK REMOV (W)8"(SLD)	WK ZN PAV MRK REMOV (W)24"(SLD)	WK ZN PAV MRK REMOV (Y)6"(SLD)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	SF	MO	SY	LF	LF	LF	EA	EA	EA	EA	LF	LF	LF	LF	LF	EA	DAY	DAY
CSJ: 0195-03-088																2		
PHASE 1 STEP 1																	29	1
SHEET 1 OF 2	1411		349	655						2		657	575		811			
SHEET 2 OF 2	4066		214	845								851			785			
PHASE 1 STEP 2																		1
SHEET 1 OF 2				155	655		1	1			151	206	304		810			
SHEET 2 OF 2				175	845						216	747		16	1053			
PHASE 2																	8	6
SHEET 1 OF 2						810		1										
SHEET 2 OF 2						1020												
CSJ TOTAL	5477		563	1830	1500	1830	1	2	0	2	367	2461	879	16	3459	2	37	8
CSJ: 0195-03-089																2		
PHASE 1 STEP 1																	31	1
SHEET 1 OF 2	3237		85	1170						2		1702	330		1044			
SHEET 2 OF 2	5900		599	750						2		838			967			
PHASE 1 STEP 2																		1
SHEET 1 OF 2					350		1	1				270						
SHEET 2 OF 2	2114			600	130			2	1			1319	127					
PHASE 2																	6	6
SHEET 1 OF 2					900	1170	1					691	190		920			
SHEET 2 OF 2					1020	1350		2				905			1050			
CSJ TOTAL	11251		684	2520	2400	2520	2	5	1	4	0	5725	647	0	3981	2	37	8
PROJECT TOTALS	**16728**	**16**	**1247**	**4350**	**3900**	**4350**	**3**	**7**	**1**	**6**	**367**	**8186**	**1526**	**16**	**7440**	**4**	**74**	**16**

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AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E

SUMMARY OF QUANTITIES

TRAFFIC CONTROL PLAN

SHEET 1 OF 10

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	9
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alanis

SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002	110 6001	132 6025	132 6026	247 6313	260 6002	260 6027	275 6001	275 6011	310 6009	360 6004	420 6066	422 6016	432* 6001
	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)	EMBANKMENT (FINAL) (DENS CONT) (TY C2)	FL BS (CMP IN PLC)(TY D GR1-2)(12")	LIME (HYDRATED LIME (SLURRY))	LIME TRT (EXST MATL)(8")	CEMENT	CEMENT TREAT(EXIST MATL)(8")	PRIME COAT (MC-30)	CONC PVMT (CONT REINF - CRCP) (10")	CL C CONC (RAIL FOUNDATION)	APPROACH SLAB (HPC)	RIPRAP (CONC)(4 IN)
	STA	CY	CY	CY	SY	TON	SY	TON	SY	GAL	SY	CY	CY	CY
CSJ: 0195-03-088	11.92	12782	10325	622										
NBFR SHEET 1 OF 2					1658			14	2081	417	387		110.4	223
NBFR SHEET 2 OF 2					1926			17	2456	492	499			
BRIDGE REPAIR LAYOUT														
NORTH S LOCUST ST SHEET 1 OF 1								7	1047	210	929			
CSJ TOTAL	11.92	12782	10325	622	3584	0	0	38	5584	1119	1815	0	110.4	223
CSJ: 0195-03-089	20.23	8812	45167	2620										
SBFR SHEET 1 OF 2					2099	70	4220			844	1957	57		245
SBFR SHEET 2 OF 2					1779	48	2879			576	949	8	79.6	323
SOUTH S LOCUST ST SHEET 1 OF 1						12	669			134	571			
CSJ TOTAL	20.23	8812	45167	2620	3878	130	7768	0	0	1554	3477	65	79.6	568
PROJECT TOTALS	**32.15**	**21594**	**55492**	**3242**	**7462**	**130**	**7768**	**38**	**5584**	**2673**	**5292**	**65**	**190**	**791**

SUMMARY OF ROADWAY ITEMS

LOCATION	432* 6045	450* 6031	450 6051	512 6005	529 6005	529 6008	530 6017	531 6001	531 6005	531 6013	536 6002	538 6001	540 6001	540 6006	544 6001
	RIPRAP (MOW STRIP)(4 IN)	RAIL (TY C221)(HPC)	RAIL (HANDRAIL)(TY E)	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	CONC CURB (MONO) (TY II)	CONC CURB & GUTTER (TY II)	DRIVEWAYS (CONC) (HES)	CONC SIDEWALKS (4")	CURB RAMPS (TY 2)	CURB RAMPS (TY 10)	CONC MEDIAN	RIGHT OF WAY MARKERS	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)
	CY	LF	LF	LF	LF	LF	SY	SY	EA	EA	SY	EA	LF	EA	EA
CSJ: 0195-03-088															
NBFR SHEET 1 OF 2	13				195	613	215	243		2		7	150	1	1
NBFR SHEET 2 OF 2					97	713	188	179		2		4			
BRIDGE REPAIR LAYOUT				35											
NORTH S LOCUST ST SHEET 1 OF 1			0		610		668	126	5		26				
CSJ TOTAL	13	0	0	35	902	1326	1071	548	5	4	26	11	150	1	1
CSJ: 0195-03-089															
SBFR SHEET 1 OF 2		403	61		931	926	956	561		2		7			
SBFR SHEET 2 OF 2	14	57			537	866	279	413		2		6	150	1	1
SOUTH S LOCUST ST SHEET 1 OF 1					370					2					
CSJ TOTAL	14	460	61	0	1838	1792	1235	974	0	6	0	13	150	1	1
PROJECT TOTALS	**27**	**460**	**61**	**35**	**2740**	**3118**	**2306**	**1522**	**5**	**10**	**26**	**24**	**300**	**2**	**2**

SUMMARY OF ROADWAY ITEMS

LOCATION	730 6107	734 6002	752 6004	752 6015
	FULL - WIDTH MOWING	LITTER REMOVAL	TREE TRIMMING / BRUSH REMOVAL(CHANNELS)	TREE AND BRUSH REMOVAL
	CYC	CYC	AC	AC
CSJ: 0195-03-088				
NBFR SHEET 1 OF 2			0.33	0.45
NBFR SHEET 2 OF 2				
BRIDGE REPAIR LAYOUT				
NORTH S LOCUST ST SHEET 1 OF 1				
CSJ TOTAL	3	3	0.33	0.45
CSJ: 0195-03-089				
SBFR SHEET 1 OF 2			0.33	0.8
SBFR SHEET 2 OF 2				
SOUTH S LOCUST ST SHEET 1 OF 1				
CSJ TOTAL			0.33	0.8
PROJECT TOTALS	**3**	**3**	**0.66**	**1.25**

SUMMARY OF ROADWAY ITEMS

LOCATION	3077 6001	3077 6013	3077 6075	5113 6001
	SP MIXES SP-B PG64-22	SP MIXES SP-C SAC-B PG64-22	TACK COAT	WROUGHT IRON FENCE
	TON	TON	GAL	LF
CSJ: 0195-03-088				
NBFR SHEET 1 OF 2	418	244	89	
NBFR SHEET 2 OF 2	485	276	101	
BRIDGE REPAIR LAYOUT				
NORTH S LOCUST ST SHEET 1 OF 1	231			48
CSJ TOTAL	1134	520	190	48
CSJ: 0195-03-089				
SBFR SHEET 1 OF 2	861	296	108	
SBFR SHEET 2 OF 2	567	244	89	
SOUTH S LOCUST ST SHEET 1 OF 1	148			
CSJ TOTAL	1576	540	197	0
PROJECT TOTALS	**2710**	**1060**	**387**	**48**

* BID ITEM SHOWN IN MULTIPLE SUMMARY BOXES.

AECOM 13355 NOEL RD, STE 400
AECOM Technical Services Inc. DALLAS, TEXAS 75240 214.741.7777 TBPE REG #3580

IH 35E

SUMMARY OF QUANTITIES

ROADWAY

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	10
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				

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SUMMARY OF EARTHWORK ITEMS

BL PNBFR CSJ: 195-03-088

STATION	AREA	EXCAVATION VOLUME (CY)	AREA	EMBANKMENT VOLUME C1 (CY)	AREA	EMBANKMENT VOLUME C2 (CY)
2924+00.00	0.00	0.00	0.00	0.00		
2924+65.00	57.26	68.92	0.00	0.00		
2924+65.81	92.49	2.25	18.12	0.27		
2925+00.00	67.80	101.48	21.94	25.36		
2926+00.00	50.54	219.15	65.45	161.84		
2926+45.25	47.54	82.19	114.13	150.50		
2927+00.00	48.05	96.91	156.93	274.81		
2928+00.00	48.76	179.28	302.49	850.78		
2928+10.00	43.45	17.08	339.97	118.97		
2928+15.00	41.06	7.83	121.82	42.76	218.43	20.22
2928+20.00	38.82	7.40	106.41	21.13	215.18	40.15
2928+30.00	10.88	9.20	67.87	32.27	201.87	77.23
2928+40.00	84.11	17.59	50.81	21.98	59.56	48.41
2928+50.00	304.31	71.93	7.61	10.82		
2928+60.00	674.67	181.29	3.44	2.05		
2928+70.00	1122.75	332.85	0.10	0.66		
2928+80.00	1527.91	490.86	0.00	0.02		
2928+90.00	1523.20	565.02	0.12	0.02		
2929+00.00	1388.55	539.21	0.33	0.08		
2930+00.00	792.94	4039.79	0.00	0.62		
2930+10.00	1191.96	367.57	0.00	0.00		
2930+20.00	1577.82	512.92	0.00	0.00		
2930+30.00	1855.77	635.85	0.01	0.00		
2930+40.00	1734.40	664.85	0.85	0.16		
2930+50.00	1625.86	622.27	2.70	0.66		
2930+60.00	1440.44	567.83	29.63	5.99		
2930+70.00	1063.82	463.75	86.67	21.54		
2930+80.00	678.88	322.72	200.26	53.14		
2930+90.00	313.67	183.81	326.62	97.57		
2931+00.00	39.1	65.33	242.14	105.33	355.63	65.86
2931+10.00	2.25	7.66	347.13	109.12	560.26	169.61
2931+20.00	0.91	0.59	518.31	160.27	523.65	200.72
2931+30.00	30.58	5.83	1144.67	307.96		
2931+40.00	31.06	11.41	1166.62	428.02		
2931+50.00	31.07	11.51	1176.99	434.00		
2932+00.00	41.73	67.41	1256.36	2253.10		
2932+35.00	52.16	60.85	1023.99	1478.00		
2932+65.00	64.93	65.05	778.99	1001.66		
2933+00.00	43.27	70.13	568.27	873.22		
2933+94.33	57.34	175.75	75.08	1123.85		
2934+00.00	53.92	11.68	69.35	15.16		
2935+00.00	97.56	280.52	3.98	135.80		
2935+85.00	112.43	330.54	0.03	6.31		
2935+97.83	110.61	53.00	0.08	0.03		
2936+00.00	110.83	8.90	0.06	0.01		
2936+30.14	116.15	126.69	0.03	0.05		
2936+56.52	0.00	56.74	0.00	0.01		
TOTAL VOLUME		**12782**		**10325**		**622**

SUMMARY OF EARTHWORK ITEMS

BL PSBFR CSJ: 195-03-089

STATION	AREA	EXCAVATION VOLUME (CY)	AREA	EMBANKMENT VOLUME C1 (CY)	AREA	EMBANKMENT VOLUME C2 (CY)
3918+00.00	0.00	0.00	0.00	0.00		
3918+25.00	58.00	26.85	1.05	0.49		
3918+35.04	56.96	21.38	6.07	1.32		
3918+75.00	61.72	87.82	4.10	7.53		
3919+00.00	50.17	51.80	6.65	4.98		
3920+00.00	28.02	144.80	38.13	82.93		
3921+00.00	32.83	112.69	175.07	394.82		
3922+00.00	38.01	131.19	1168.68	2488.43		
3922+05.00	38.41	7.08	1267.59	225.58		
3922+31.11	31.59	33.85	1267.14	1225.82		
3923+00.00	29.04	77.34	1516.29	3550.69		
3924+00.00	33.54	115.89	1930.43	6382.82		
3924+50.00	0.12	31.17	2108.14	3739.42		
3925+00.00	31.05	28.86	2115.06	3910.37		
3925+25.00	30.41	28.45	2092.21	1947.81		
3926+00.00	44.05	103.42	1662.60	5215.01		
3926+06.55	37.84	9.93	1603.49	396.21		
3926+20.00	21.32	14.73	1524.77	779.13		
3926+30.00	9.55	5.72	1472.48	555.05		
3926+40.00	6.29	2.93	1452.29	541.62		
3926+50.00	0.19	1.20	1103.00	473.20		
3926+60.00	2.08	0.42	547.90	305.72	646.30	119.68
3926+70.00	1.08	0.58	438.27	182.62	464.57	205.72
3926+80.00	12.38	2.49	474.92	169.11		
3926+90.00	98.05	20.45	261.78	136.43		
3927+00.00	286.89	71.29	122.99	71.25		
3927+10.00	591.68	162.70	58.21	33.55		
3927+20.00	885.39	273.53	12.84	13.16		
3927+30.00	1142.72	375.58	0.00	2.38		
3927+40.00	1191.96	432.35	0.00	0.00		
3927+50.00	950.09	396.68	0.00	0.00		
3928+00.00	0.00	879.72	0.00	0.00		
3928+60.00	2057.47	2286.07	0.00	0.00		
3928+70.00	1898.60	732.60	0.00	0.00		
3928+80.00	1381.94	607.51	0.00	0.00		
3928+90.00	885.36	419.87	0.00	0.00		
3929+00.00	437.49	244.97	1.03	0.19		
3929+10.00	116.50	102.59	85.87	16.09		
3929+20.00	28.19	26.79	250.73	62.33	59.76	11.07
3929+30.00	5.41	6.22	106.38	66.13	381.66	81.74
3929+40.00	31.79	6.89	143.12	46.20	635.60	188.38
3929+50.00	79.70	20.65	388.02	98.36	483.47	207.23
3929+60.00	81.74	29.90	382.95	142.77	482.57	178.90
3929+70.00	76.57	29.32	396.58	144.36	464.17	175.32
3929+80.00	57.69	24.86	410.06	149.38	452.21	169.70
3929+90.00	56.32	21.11	418.36	153.41	443.80	165.93
3930+00.00	46.02	18.95	424.27	156.04	437.35	163.18
3930+06.55	39.08	10.32	443.33	105.25	416.10	103.53
3930+75.00	5.77	56.85	760.07	1525.40	180.27	755.95
3931+00.00	4.96	4.96	1151.60	885.03	20.69	93.04
3931+23.06	5.17	4.32	1418.08	1097.34		
3931+49.50	5.81	5.38	1345.66	1353.23		
3931+50.50	5.97	0.22	1334.95	49.64		
3932+00.00	7.87	12.69	857.64	2009.87		
3932+70.01	14.35	28.81	607.10	1898.87		
3933+00.00	16.70	17.25	468.62	597.52		
3933+86.21	23.98	64.95	216.90	1094.45		
3934+00.00	25.17	12.55	189.30	103.72		
3935+00.00	39.21	119.22	59.86	461.40		
3936+00.00	36.83	140.81	0.51	111.79		
3936+16.20	55.82	27.80	0.00	0.15		
3936+50.00	61.97	73.71	0.00	0.00		
TOTAL		**8812**		**45167**		**2620**

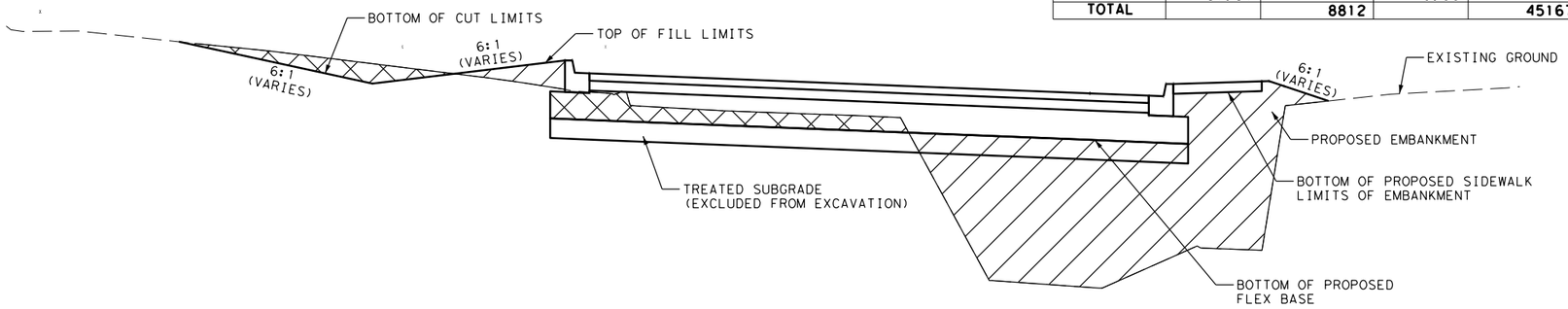
LEGEND

EMBANKMENT

EXCAVATION

NOTES:

1. FOR CONTRACTOR'S INFORMATION ONLY. QUANTITIES ARE ALREADY SHOWN IN THE SUMMARY OF ROADWAY.
2. EXISTING PAVEMENT AND BASE NOT INCLUDED IN EXCAVATION QUANTITIES.



AECOM Technical Services Inc. 13355 NOEL RD, STE 400 DALLAS, TEXAS 75240 214.741.7777 TBPE REG #3580

IH 35E

SUMMARY OF QUANTITIES

EARTHWORK

SHEET 3 OF 10

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	11
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

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SUMMARY OF REMOVAL ITEMS													
LOCATION	104 6001	104* 6009	104** 6015	104 6017	104 6021	105 6008	496 6002	496 6010	512 6053	542 6001	542 6002	542 6003	544 6003
	REMOVING CONC (PAV)	REMOVING CONC (RIPRAP)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (DRIVEWAYS)	REMOVING CONC (CURB)	REMOVING STAB BASE AND ASPH PAV (6")	REMOV STR (INLET)	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	PORT CTB (REMOVE) (F-SHAPE) (TY 1)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE DOWNSTREAM ANCHOR TERMINAL	GUARDRAIL END TREATMENT (REMOVE)
	SY	SY	SY	SY	LF	SY	EA	EA	LF	LF	EA	EA	EA
CSJ: 0195-03-088													
SHEET 1 OF 2	1440		78	103	204	443		1					
SHEET 2 OF 2	4140	403	310	194	1782					215	1		2
BRIDGE REPAIR LAYOUT									35				
CSJ TOTAL	5580	403	388	297	1986	443	0	1	35	215	1	0	2
CSJ: 0195-03-089													
SHEET 1 OF 2	2408		547	1383	1338	280	1	1		131	1		1
SHEET 2 OF 2	3567	232	218	369	1644	668				428		2	3
CSJ TOTAL	5975	232	765	1752	2982	948	1	1	0	559	1	2	4
PROJECT TOTALS	**11555**	**635**	**1153**	**2049**	**4968**	**1391**	**1**	**2**	**35**	**774**	**2**	**2**	**6**

SUMMARY OF REMOVAL ITEMS					
LOCATION	560** 6025	644** 6076	677 6001	677 6003	677 6007
	RELOCATE EXISTING MAILBOX	REMOVE SM RD SN SUP&AM	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (24")
	EA	EA	LF	LF	LF
CSJ: 0195-03-088					
SHEET 1 OF 2	2		1710	635	415
SHEET 2 OF 2		10	126		
BRIDGE REPAIR LAYOUT					
CSJ TOTAL	2	10	1836	635	415
CSJ: 0195-03-089					
SHEET 1 OF 2			635	330	0
SHEET 2 OF 2		2			
CSJ TOTAL	0	2	635	330	0
PROJECT TOTALS	**2**	**12**	**2471**	**965**	**415**

* BID ITEM SHOWN IN MULTIPLE SUMMARY BOXES.
** FOR CONTRACTOR'S INFORMATION ONLY.

AECOM 13355 NOEL RD, STE 400
AECOM Technical Services Inc. DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
SUMMARY OF QUANTITIES
REMOVAL

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	12
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

SUMMARY OF RETAINING WALL ITEMS				
LOCATION	423 6001	432* 6045	450* 6031	556** 6008
	RETAINING WALL (MSE)	RIPRAP (MOW STRIP)(4 IN)	RAIL (TY C221) (HPC)	PIPE UNDERDRAINS (TY 8) (6")
	SF	CY	LF	LF
CSJ: 0195-03-089				
SHEET 1 OF 1	2745	9.6	167	222
PROJECT TOTALS	**2745**	**9.6**	**167**	**222**

* BID ITEM SHOWN IN MULTIPLE SUMMARY BOXES.
** FOR CONTRACTOR'S INFORMATION ONLY.

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
SUMMARY OF QUANTITIES
RETAINING WALL

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	13
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DATE: 5/31/2024 10:36:58 AM
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DN: AECOM | CK: AECOM | DW: AECOM | CK: AECOM
irene.alanis

DN: AECOM CK: AECOM DN: AECOM CK: AECOM diana.cabrera

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001	644 6004	644 6068	644 6075	658 6013	658 6015	658 6028	658 6099
	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM(SIGN ONLY)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	INSTL DEL ASSM (D-SW)SZ (BRF)GF1	INSTL DEL ASSM (D-SY)SZ (BRF)GF1	INSTL OM ASSM (OM-2Z)(WFLX)GND
	EA	EA	EA	EA	EA	EA	EA	EA
CSJ: 0195-03-088								
SHEET 1 OF 2	2	1				1	3	1
SHEET 2 OF 2	4	4	1	2				
CSJ TOTAL	6	5	1	2	0	1	3	1
CSJ: 0195-03-089								
SHEET 1 OF 2	1	1						
SHEET 2 OF 2	2	2	0	2	3		3	1
CSJ TOTAL	3	3	0	2	3	0	3	1
PROJECT TOTALS	**9**	**8**	**1**	**4**	**3**	**1**	**6**	**2**

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6036	666 6048	666 6054	666 6225	666 6226	666 6230	666 6231	666 6306	666 6309	666 6321
	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	REFL PAV MRK TY I (W)(ARROW)(100MIL)	PAVEMENT SEALER 6"	PAVEMENT SEALER 8"	PAVEMENT SEALER 24"	PAVEMENT SEALER (ARROW)	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
	LF	LF	EA	LF	LF	LF	EA	LF	LF	LF
CSJ: 0195-03-088										
SHEET 1 OF 2	512			3057	512			530	1237	1290
SHEET 2 OF 2		274	4	2585		274	4	550	663	1213
CSJ TOTAL	512	274	4	5642	512	274	4	1080	1900	2503
CSJ: 0195-03-089										
SHEET 1 OF 2	1091	404		2355	1091	404		354	942	1059
SHEET 2 OF 2		15		2260		15		350	885	1025
CSJ TOTAL	1091	419	0	4615	1091	419	0	704	1827	2084
PROJECT TOTALS	**1603**	**693**	**4**	**10257**	**1603**	**693**	**4**	**1784**	**3727**	**4587**

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6356	672 6010	678 6002	678 6004	678 6008	678 6009
	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	REFL PAV MRKR TY II-C-R	PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (8")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (ARROW)
	LF	EA	LF	LF	LF	EA
CSJ: 0195-03-088						
SHEET 1 OF 2		45	3057	512		
SHEET 2 OF 2	159	21	2585		274	4
CSJ TOTAL	159	66	5642	512	274	4
CSJ: 0195-03-089						
SHEET 1 OF 2		58	2355	1091	404	
SHEET 2 OF 2		14	2260		15	
CSJ TOTAL	0	72	4615	1091	419	0
PROJECT TOTALS	**159**	**138**	**10257**	**1603**	**693**	**4**

AECOM 13355 NOEL RD, STE 400
AECOM Technical Services Inc. DALLAS, TEXAS 75240 214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E

SUMMARY OF QUANTITIES

SIGNING AND PAVEMENT MARKINGS

SHEET 6 OF 10

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	14
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

DATE: 6/17/2024 10:01:12 PM
FILE: c:\pwworking\aecom_dsf6_na\diana.cabrera@aecom.com\d0373441\I35_AEC_GN_SU_09.dgn

SUMMARY OF DRAINAGE ITEMS						
LOCATION	400 6007	402 6001	464 6005	465 6032	465 6071	465 6158
	CUT & RESTORE CONC PAVING	TRENCH EXCAVATION PROTECTION	RC PIPE (CL III)(24 IN)	INLET (COMPL)(PCU)(3FT) (BOTH)	INLET (COMPL)(PSL)(RC) (4FTX4FT)	INLET(COMPL) (PAZD)(FG)(3FT X3FT-3FTX3FT)
	SY	LF	LF	EA	EA	EA
CSJ: 0195-03-089						
LINE G	13	99	547	3	1	
LAT G4		79	73			1
LINE A1		5		1		
PROJECT TOTALS	**13**	**183**	**620**	**4**	**1**	**1**

AECOM Technical Services Inc. 13355 NOEL RD, STE 400 DALLAS, TEXAS 75240 214.741.7777 TBPE REG #3580

IH 35E

SUMMARY OF QUANTITIES

DRAINAGE

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	15
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DATE: 5/31/2024 10:37:02 AM
FILE: c:\pwworking\aecom_ds16_na\irene.alanis@aecom.com\d0373441\I35_AEC_GN_SU_06.dgn
DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alanis

DN: AECOM CK: AECOM DM: AECOM CK: AECOM irene.alanis

SUMMARY OF BRIDGE ITEMS

CSJ	BRIDGE LOCATION	400-6005 CEM STABIL BKFL	416-6001 DRILL SHAFT (18 IN)	416-6004 DRILL SHAFT (36 IN)	420-6014 CL C CONC (ABUT) (HPC)	420-6030 CL C CONC (CAP) (HPC)	420-6038 CL C CONC (COLUMN) (HPC)	422-6002 REINF CONC SLAB (HPC)	422-6014 BRIDGE SIDEWALK (HPC)	425-6039 PRESTR CONC GIRDER (TX54)	442-6007 STR STEEL (MISC NON-BRIDGE)	450-6005 RAIL (TY T221) (HPC)	450-6031* RAIL (TY C221) (HPC)	450-6119 RAIL (CLF-RO)	454-6018 SEALED EXPANSION JOINT (4 IN) (SEJ-M)
		CY	LF	LF	CY	CY	CY	SF	SF	LF	LB	LF	LF	LF	LF
0195-03-088	IH35E NBFR OVER UPRR	292	68	282	76.8	44.4	49.2	12610	2031	1651.09	161	296.0	296.0	240.0	92
0195-03-089	IH35E SBFR OVER UPRR	222	81	282	58.0	33.3	32.2	9751	1995	1143.83	161	278.0	296.0	220.0	71
	TOTALS	514	149	564	134.8	77.7	81.4	22361	4026	2794.92	322	574.0	592.0	460.0	163

* BID ITEM SHOWN IN MULTIPLE SUMMARY BOXES.

AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
SUMMARY OF QUANTITIES
BRIDGE

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	16
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DATE: 5/3/2024 12:06:56 PM
FILE: c:\pwworking\aecom_ds16_na\irene.alanis@aecom.com\d0373441\I35_AEC_GN_SU_07.dgn

ESTIMATED QUANTITIES

	ITEM NO.	104*	429	432*	432	438	438	438	780
	DESCRIPTION CODE	6009	6007	6001	6031	6001	6004	6016	6002
	ITEM DESCRIPTION	REMOVING CONC (RIPRAP)	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC) (4 IN)	RIPRAP (STONE PROTECTION) (12 IN)	CLEANING AND SEALING EXISTING JOINTS	CLEANING AND SEALING EXIST JOINTS (CL7)	CLEAN AND SEAL EXIST JTS (STRIP SEAL)	CNC CRACK REPAIR (DISCRETE) (INJECT)
	NBI NUMBER	SY	SF	CY	CY	LF	LF	LF	LF
CSJ: 0195-03-088	18-061-0-0195-03-145		8		19	16	112	120	19
CSJ: 0195-03-089	18-061-0-0195-03-144	2	12	1		1	112	120	12
	TOTAL	2	20	1	19	17	224	240	31

* BID ITEM SHOWN IN MULTIPLE SUMMARY BOXES.

Texas Department of Transportation

Dallas District Bridge

IH 35E

SUMMARY OF QUANTITIES BRIDGE REPAIR

IH 35E NBML OVER UPRR AND IH 35E SBML OVER UPRR

SHEET 9 OF 10

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		17

DN: AECOM | CK: AECOM | DW: AECOM | CK: AECOM | diana.cabrera

SUMMARY OF SW3P ITEMS													
LOCATION	161 6017	162 6002	164 6039	164 6051	168 6001	506 6002	506 6011	506 6020	506 6024	506 6038	506 6039	506 6042	506 6043
	COMPOST MANUF TOPSOIL (4")	BLOCK SODDING	DRILL SEEDING (PERM) (URBAN) (CLAY)	DRILL SEED (TEMP) (WARM OR COOL)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (18")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	SY	MG	LF	LF	SY	SY	LF	LF	LF	LF
CSJ: 0195-03-088													
PHASE 1													
SHEET 1 OF 2	1037	1037		1037	308.6			112	112	176	176		
SHEET 2 OF 2	5695	3269	2426	5695	1694.4	20	20	112	112	727	727		
PHASE 2													
SHEET 1 OF 2	2316		2316	2316	689.1	20	20	112	112				
SHEET 2 OF 2	2076	598	1478	2076	617.7	20	20	112	112	186	186		
ADDITIONAL 10%								45	45	109	109		
CSJ TOTAL	11124	4904	6220	11124	3309.8	60	60	493	493	1198	1198	0	0
CSJ: 0195-03-089													
PHASE 1													
SHEET 1 OF 2	2996	2996		2996	891.4			112	112	735	735	18	18
SHEET 2 OF 2	2396	1886	510	2396	712.9	20	20	112	112	998	1005	36	36
PHASE 2													
SHEET 1 OF 2	5977		5977	5977	1778.3	20	20	112	112		16		
SHEET 2 OF 2	6426	2089	4337	6426	1911.9	40	40	112	112			36	36
ADDITIONAL 10%								45	45	174	176	9	9
CSJ TOTAL	17795	6971	10824	17795	5294.5	80	80	493	493	1907	1932	99	99
PROJECT TOTALS	**28919**	**11875**	**17044**	**28919**	**8604.3**	**140**	**140**	**986**	**986**	**3105**	**3130**	**99**	**99**

SUMMARY OF SW3P ITEMS	
LOCATION	506 6047
	TEMP SDMT CONT FENCE (INLET PROTECTION)
	LF
CSJ: 0195-03-088	
PHASE 1	
SHEET 1 OF 2	
SHEET 2 OF 2	
PHASE 2	
SHEET 1 OF 2	
SHEET 2 OF 2	
ADDITIONAL 10%	
CSJ TOTAL	0
CSJ: 0195-03-089	
PHASE 1	
SHEET 1 OF 2	
SHEET 2 OF 2	7
PHASE 2	
SHEET 1 OF 2	16
SHEET 2 OF 2	
ADDITIONAL 10%	2
CSJ TOTAL	25
PROJECT TOTALS	**25**

NOTES:

1. ADDITIONAL QUANTITY OF PERISHABLE BMPs (CE, ECL & SCF) IS PROVIDED TO ALLOW FOR THEIR PERIODIC REPLACEMENT DUE TO NORMAL WEAR AND CHANGING SITE CONDITIONS.

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13355 NOEL RD, STE 400
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IH 35E

SUMMARY OF QUANTITIES

SW3P

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	18
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

DATE: 6/18/2024 11:10:58 AM
FILE: c:\pwworking\aecom_as16_na\diana.cabrera@aecom.com\d0373441\I35_AEC_GN_SU_08.dgn

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	CSJ	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1	0195-03-089	1	R1-1	STOP	36X36	✓		10BWG	1	SA	P		
1		2	R6-1R	ONE WAY	54X18	✓		10BWG	1	SA	T		
1	0195-03-088	3	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36	✓		10BWG	1	SA	P		
1		4	R6-1R	ONE WAY	54X18	✓		10BWG	1	SA	T		
1		5	R2-1	SPEED LIMIT XX	30X36	✓		10BWG	1	SA	P		
2	0195-03-089	1	R1-1	STOP *SEE NOTE 4	36X36	✓		10BWG	1	SA	P	BM	
2		2	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36	✓		10BWG	1	SA	P		
2		3	R6-1R	ONE WAY	54X18	✓		10BWG	1	SA	T		
2		4	R6-1R	ONE WAY	54X18	✓		10BWG	1	SA	T		
2	0195-03-088	5	R6-1R	ONE WAY	54X18	✓		10BWG	1	SA	T		
2		6	W3-3		36X36	✓		10BWG	1	SA	P		
2		7	R6-1R	ONE WAY	54X18	✓		10BWG	1	SA	T		

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS SHEET 1 OF 2

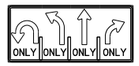
FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
4-16 8-16	DIST	COUNTY		SHEET NO.
	DAL	DENTON		19

TB

DATE: 5/28/2024 4:29:12 AM
FILE: c:\pwworking\aecom_ds16_na\irene.alani@aecom.com\d037351O\I35_AEC_SOSS.dgn

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	CSJ	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
2	0195-03-088	8	R3-8MOD		66X30	✓		10BWG	1	SA	T		
2		9	R1-1	*SEE NOTE 4 	36X36	✓		10BWG	1	SA	P	BM	
2		10	R1-1		36X36	✓		10BWG	1	SA	P		
2		11	R1-1		36X36	✓		10BWG	1	SA	P		
2		12	R3-8MOD		66X30	✓		10BWG	1	SA	T		

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS SHEET 2 OF 2

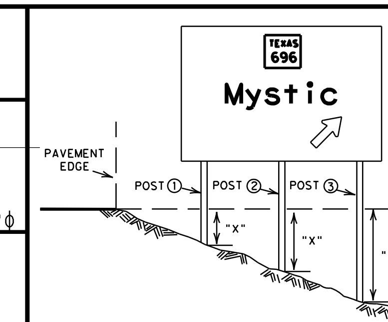
FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
4-16 8-16	DIST	COUNTY		SHEET NO.
	DAL	DENTON		20

TB

DATE: 5/28/2024 4:29:15 AM
FILE: c:\pwworking\aecom_dsi6_na\irene.alanis@aecom.com\d0373510\I35_AEC_SOSS1025.dgn

SUMMARY OF LARGE SIGNS

PLAN SHEET NO.	SIGN NO.	CSJ	SIGN BACK-GROUND COLOR	SIGN TEXT	SIGN DIMENSIONS	PLAQUES, & OTHER ATTACHMENTS: DIRECT APPLY	PLAQUES, & OTHER ATTACHMENTS: * ALUMINUM (TYPE A)	BACKGROUND SUBSTRATE (SQ FT): GROUND MOUNT (TYPE G)	BACKGROUND SUBSTRATE (SQ FT): OVERHEAD (TYPE O)	TYPE OF MOUNT	"X" DIMENSION ◒: post (1)	"X" DIMENSION ◒: post (2)	"X" DIMENSION ◒: post (3)	GALVANIZED STRUCTURAL STEEL: SIZE	GALVANIZED STRUCTURAL STEEL: LINEAR FEET post (1)	GALVANIZED STRUCTURAL STEEL: LINEAR FEET post (2)	GALVANIZED STRUCTURAL STEEL: LINEAR FEET post (3)	GALVANIZED STRUCTURAL STEEL: TOTAL WEIGHT LBS.	DRILLED SHAFT: LINEAR FEET NON-REINF 12"ϕ	DRILLED SHAFT: LINEAR FEET REINFORCED 24"ϕ	DRILLED SHAFT: LINEAR FEET REINFORCED 30"ϕ	DRILLED SHAFT: LINEAR FEET REINFORCED 36"ϕ
P1S2 SHEET 2 OF 2		0195-03-089	ORANGE	CANDY HAVEN AND CAKES KEEP RIGHT ↗	96" X 72"			48		SKID MOUNT												
PAGE TOTALS								48		PAGE TOTALS												



◒ The "X" dimension is the elevation difference at the post between the ground and the edge of pavement or top of curb.

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

The post lengths listed here are approximations, The corrected post lengths will be furnished by the Contractor after the stud posts are placed.

Tower heights shall be verified with the Engineer before fabrication.

* This column is for aluminum Type A and not direct apply. Direct apply is subsidiary to the sign.

SIGN TYPE

SIGN TYPE 1 3 0
- 1 — Wind Design Zone
- 3 — No. of Posts
- 0 — Series No.: 0 Aluminum/Fiberglass, 1 Aluminum, 2 Fiberglass

See sheet SMD(8W1)

TEMPORARY

SUMMARY OF LARGE SIGNS

SOLS

DN.: TxDOT	CK.: TxDOT	DW.: TxDOT	CK.: TxDOT

REVISIONS: 11-93, 8-95, 5-01, 1-04, 9-08

CONT	SECT	JOB	HIGHWAY
0195	03	088, etc.	IH 35E

DIST	COUNTY	SHEET NO.
DAL	DENTON	21

DATE:
FILE:

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC. #	N	W	N	W	N	W
1	1-1	24	NORTHBOUND FRONTAGE ROAD	℄ PNBFR STA 2921+25.32, 3.32' RT	3	UNI	ASPHALT	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"		1								X	
2	1-1	24	NORTHBOUND FRONTAGE ROAD	℄ PNBFR STA 2924+80.48, 10.84' LT	3	UNI	CONCRETE	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"		1								X	
3	1-1	24	SOUTHBOUND FRONTAGE ROAD	℄ PSBFR STA 3921+09.72, 34.48' RT	3	UNI	CONCRETE	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"		1								X	
4	1-1	24	SOUTHBOUND FRONTAGE ROAD	℄ PSBFR STA 3925+77.20, 108.67' RT	3	UNI	CONCRETE	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"		1								X	
5	1-1	25	SOUTHBOUND FRONTAGE ROAD	℄ PSBFR STA 3930+27.16, 63.60' RT	3	UNI	CONCRETE	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"		1								X	
6	1-1	25	SOUTHBOUND FRONTAGE ROAD	℄ PSBFR STA 3936+27.05, 12.96' RT	3	UNI	CONCRETE	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"		1								X	
7	1-2	26	NORTHBOUND FRONTAGE ROAD	℄ PNBFR STA 2920+53.87, 52.34' LT	3	UNI	ASPHALT	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"			1	1	1					X	
8	1-2	26	SOUTHBOUND FRONTAGE ROAD	℄ PSBFR STA 3922+31.34, 240.26' LT	3	UNI	CONCRETE	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"			1	1	3					X	
9	1-2	27	SOUTHBOUND FRONTAGE ROAD	℄ PSBFR STA 3935+07.88, 7.57' RT	3	UNI/BI	ASPHALT	N/A	PORTABLE TRAFFIC BARRIER	10'-0"	3'-6"		1	2				X				
10	2	30	NORTHBOUND FRONTAGE ROAD	℄ PNBFR STA 2920+53.87, 52.34' LT	3	UNI	ASPHALT	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"			1							X	
11	2	31	SOUTHBOUND FRONTAGE ROAD	℄ PSBFR STA 3936+19.72, 6.89' RT	3	UNI	ASPHALT	N/A	PORTABLE TRAFFIC BARRIER	2'-0"	3'-6"			2	1	8					X	
												TOTALS	7	7	3							

LEGEND:

L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyIse.htm

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
5/28/2024

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc	IH 35E
	DIST	COUNTY		
	DAL	DENTON		
	PROJECT NO.			SHEET NO.
	(SEE TITLE SHEET)			22

GENERAL NOTES:

1. THE TRAFFIC CONTROL PLAN SHOWN HEREIN IS A SUGGESTED METHOD FOR ACCOMPLISHING THE WORK. THE CONTRACTOR MAY MODIFY OR DEVIATE FROM THE PLAN IF A REVISED TCP, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER, IS APPROVED BY THE ENGINEER.

2. THE CONTRACTOR SHALL INSTALL AND SPACE ALL TEMPORARY SIGNS IN ACCORDANCE WITH THE CURRENT TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND APPLICABLE TXDOT STANDARDS. TEMPORARY SIGNS SHOULD BE PLACED IN SUCH A MANNER THAT WILL NOT CONFLICT WITH EXISTING PERMANENT SIGNS OR HINDER ANY ACCESS TO ADJACENT PROPERTIES.

3. THE CONTRACTOR SHALL INSTALL ALL DELINEATORS, PAVEMENT MARKINGS, BARRICADES, AND CHANNELIZING DEVICES PER THE TMUTCD. THE CONTRACTOR SHALL MAINTAIN EXISTING DO NOT ENTER, WRONG WAY, AND STOP SIGNS UNTIL PERMANENT SIGNS HAVE BEEN INSTALLED. THE INSTALLATION OF ANY SPECIAL SIGNS SHALL BE COORDINATED THROUGH THE ENGINEER FOR CONFORMANCE AND APPROVAL.

4. THE CONTRACTOR SHALL INSTALL AND MAINTAIN ALL PAVEMENT MARKINGS, SIGNS, BARRICADES, AND CHANNELIZING DEVICES IN EACH PHASE/STAGE AS SHOWN IN THE PLANS OR AS APPROVED BY THE ENGINEER.

5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN DRAINAGE DURING ALL PHASES OF CONSTRUCTION. TEMPORARY DRAINAGE STRUCTURES MAY BE INSTALLED AS SHOWN ON THE PLANS OR AS APPROVED BY THE ENGINEER.

6. PERMANENT SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED AS APPROPRIATE, PRIOR TO THE OPENING OF COMPLETED SECTIONS OF THE ROADWAY. IN ADDITION, CHANNELIZING DEVICES AND BARRICADES SHALL BE INSTALLED AND REMAIN IN PLACE TO ROADWAYS CLOSED TO THRU TRAFFIC, AS SHOWN ON THE PLANS OR AS APPROVED BY THE ENGINEER.

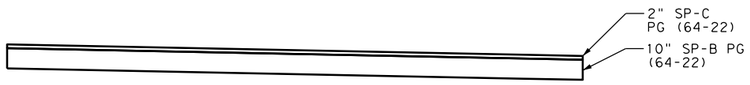
7. WHERE PORTABLE CONCRETE TRAFFIC BARRIER IS CALLED OUT IN THE PLANS, THE ADJACENT ROADWAY SHALL NOT BE OPENED TO TRAFFIC PRIOR TO THE INSTALLATION OF AN APPROPRIATE ATTENUATOR.

8. UNLESS SHOWN OTHERWISE, DRAINAGE CONSTRUCTION SHALL BE CONCURRENT WITH ROADWAY CONSTRUCTION.

9. THE CONTRACTOR SHALL ALWAYS MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION. DRUMS AND SIGNS SHALL BE PLACED IN SUCH A MANNER THAT THEY DO NOT BLOCK THE DRIVEWAY OPERATIONS.

10. IF, AT THE END OF EACH WORK DAY, REQUIRED EXCAVATION NEXT TO A PAVEMENT LANE HAS LEFT A DROP OFF PARALLEL AND ADJACENT TO A LANE USED BY TRAFFIC, THE CONTRACTOR WILL BE REQUIRED TO PLACE SUFFICIENT BACKFILL OF A TYPE ACCEPTABLE TO THE ENGINEER AGAINST THE EDGE OF PAVEMENT TO PROVIDE A USUAL 3:1 SLOPE SUFFICIENT TO ADEQUATELY SUPPORT VEHICULAR TRAFFIC. AT THE BEGINNING OF THE FOLLOWING WORK DAY, THIS BACKFILL SHALL BE CAREFULLY REMOVED AND STOCKPILED BY THE CONTRACTOR AT LOCATIONS APPROVED BY THE ENGINEER FOR USE AT THE END OF THAT WORK DAY. THIS PROCESS SHALL CONTINUE UNTIL IT IS NO LONGER REQUIRED AT WHICH TIME THE BACKFILL SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR. MATERIALS AND LABOR FOR THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."

11. WHEN BARRIER IS TYPICALLY LESS THAN 2' AWAY FROM TRAFFIC AND SPACE PERMITS, A TAPER SHALL BE USED TO MOVE THE CRASH CUSHION AWAY FROM TRAFFIC AND PROVIDE A TRANSITION INTO THE BARRIER SECTION. USE A 90' TAPER AT 45:1 TAPER +30' PARALLEL BARRIER BEFORE THE CRASH CUSHION.



TEMP PAVEMENT SECTION

PHASE 1 - STEP 1

1. INSTALL ADVANCE WARNING SIGNS, BARRICADES, BARRELS, PORTABLE CHANGEABLE MESSAGE SIGNS AND OTHER TRAFFIC CONTROL DEVICES USED FOR TRAFFIC HANDLING AS INDICATED ON THE PLANS AND AS DIRECTED BY THE ENGINEER. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE STANDARD DETAILS FROM THE TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

2. INSTALL AND MAINTAIN THE DEPARTMENT'S STORM WATER POLLUTION PREVENTION PLANS (SW3P) FOR THE PROJECT SITE, AND DISTURBED AREAS, IN ACCORDANCE WITH THE SPECIFIC OR GENERAL STORM WATER PERMIT REQUIREMENTS. PREVENT WATER POLLUTION, FROM STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES, FROM ENTERING ANY SURFACE WATER OR PRIVATE PROPERTY ON OR ADJACENT TO THE PROJECT SITE. LIMIT THE DISTURBANCE TO THE AREA SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

3. INSTALL PORTABLE CONCRETE TRAFFIC BARRIER (PCTB) WITH CRASH CUSHION ATTENUATORS ON THE SOUTHBOUND FRONTAGE ROAD FROM STA 3915+76.39 TO STA 3921+09.72, STA 3921+65.73 TO STA 3925+77.20, STA 3927+30.10 TO STA 3930+27.16 AND STA 3931+74.44 TO STA 3936+27.05 AND ON THE NORTHBOUND FRONTAGE ROAD FROM STA 2921+25.32 TO STA 2923+95.48 AND STA 2924+80.48 TO STA 2937+05.59 AND ON SBDRWY1

4. CONSTRUCT THE RETAINING WALL ALONG THE SOUTHBOUND FRONTAGE ROAD FROM STA 3928+64.82 TO STA 3930+50.00.

5. CONSTRUCT TEMPORARY PAVEMENT ON THE SOUTHBOUND FRONTAGE ROAD FROM STA 3917+66.61 TO STA 3920+97.57, STA 3934+81.63 TO STA 3936+64.83 AND TEMPORARY PAVEMENT FOR DRIVEWAY DETOUR FROM STA 3930+86.97 TO STA 3933+76.00 AS SEEN ON DRIVEWAY DETOUR SHEET. REMOVE AND REPLACE EXISTING CURB AND RELOCATE HANDICAP PARKING SPACE AND SIGN SUBSIDIARY TO DETOUR PAY ITEM. CONSTRUCT TEMPORARY PAVEMENT ON THE NORTHBOUND FRONTAGE ROAD FROM STA 2921+65.23 TO STA 2924+10.77, STA 2924+61.00 TO STA 2926+36.90 AND STA 2934+41.34 TO STA 2936+81.48.

6. CONSTRUCT THE SOUTHBOUND FRONTAGE ROAD BRIDGE AND PORTIONS OF THE SOUTHBOUND FRONTAGE ROAD. CONSTRUCT PORTIONS OF THE NORTHBOUND FRONTAGE ROAD AND NORTHBOUND FRONTAGE ROAD BRIDGE.

PHASE 1 - STEP 2

1. INSTALL PORTABLE CONCRETE TRAFFIC BARRIER (PCTB) WITH CRASH CUSHION ATTENUATORS ON THE SOUTHBOUND FRONTAGE ROAD FROM STA 3921+09.72 TO STA 3921+65.73, STA 3925+77.45 TO STA 3927+30.10 AND STA 3930+27.16 TO 3931+74.44 AND ON THE NORTHBOUND FRONTAGE ROAD FROM STA 2920+53.87 TO STA 2938+84.32 AND ON THE DRIVEWAY DETOUR AND ON SBDRWY1.

2. SHIFT TRAFFIC TO UTILIZE DRIVEWAY DETOUR CONSTRUCTED IN PHASE 1 STAGE 1 TO PROVIDE BUSINESS ACCESS.

3. CONSTRUCT THE RETAINING WALL ALONG THE SOUTHBOUND FRONTAGE ROAD FROM STA 3930+50.00 TO STA 3931+00.00.

4. CONSTRUCT PORTIONS OF THE SOUTHBOUND FRONTAGE ROAD FROM STA 3930+50.00 TO STA 3932+00.64 AND S LOCUST ST ALONG SOUTHBOUND FRONTAGE ROAD.

PHASE 2

1. INSTALL PORTABLE CONCRETE TRAFFIC BARRIER (PCTB) WITH CRASH CUSHION ATTENUATORS ON THE SOUTHBOUND FRONTAGE ROAD FROM STA 3917+03.84 TO STA 3936+19.72.

2. SHIFT SOUTHBOUND TRAFFIC TO PREVIOUSLY CONSTRUCTED SOUTHBOUND FRONTAGE ROAD AND TEMPORARY PAVEMENT ALLOWING ONE-LANE TRAFFIC. SHIFT NORTHBOUND TRAFFIC TO PREVIOUSLY CONSTRUCTED NORTHBOUND FRONTAGE ROAD AND TEMPORARY PAVEMENT ALLOWING TWO-LANES OF TRAFFIC.

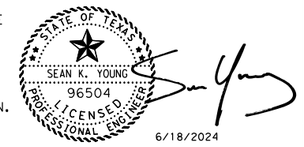
3. REMOVE EXISTING BRIDGES AND PAVEMENT ON NORTHBOUND AND SOUTHBOUND FRONTAGE ROADS.

4. CONSTRUCT REMAINING SOUTHBOUND FRONTAGE ROAD. CONSTRUCT REMAINING NORTHBOUND FRONTAGE ROAD AND NORTHBOUND FRONTAGE ROAD BRIDGE.

5. INSTALL PERMANENT SIGNING AND PAVEMENT MARKINGS.

6. REMOVE TEMPORARY PAVEMENT, INLET CAP AND INSTALL PERMANENT TOP OF INLET AT ℄ PSBFR STA 3936+35.00. INSTALL CURBS, SIDEWALKS AND OTHER MISCELLANEOUS CONSTRUCTION.

7. REMOVE TEMPORARY SW3P CONTROLS ONCE VEGETATIVE ESTABLISHMENT/SOILS STABILIZATION HAS BEEN ACHIEVED IN THEIR CONTROL AREA, AND AS AUTHORIZED BY ENGINEER.



6/18/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E

TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	23
CHECK AEC	CONTROL 0195	SECTION 03	JOB 088,ETC	

END PERM PAVEMENT CONSTRUCTION
℄ SBDRWY1 STA 12+37.14,
10.50′ LT
END 240 LF PCTB
℄ SBDRWY1 STA 12+37.14,
6.00′ RT
BEGIN PERM PAVEMENT CONSTRUCTION
℄ SBDRWY1 STA 10+28.52
BEGIN 240 LF PCTB
℄ PSBFR STA 3921+56.61, 2.98′ RT
END TEMP PAVEMENT CONSTRUCTION
℄ PSBFR STA 3920+97.57, 5.00′ LT
INSTALL CCA
END 540 LF PCTB
℄ PSBFR STA 3921+09.72,
34.48′ RT
BEGIN TEMP PAVEMENT CONSTRUCTION
℄ PSBFR STA 3917+66.61, 10.75′ LT
BEGIN D ℄ PSBFR STA 3915+41.97, 23.72′ RT
BEGIN 540 LF PCTB
℄ PSBFR STA 3915+76.39,
4.85′ LT
BEGIN A ℄ PSBFR STA 3915+76.15,
2.86′ LT
3915+00
3920+00
12+00
11+00
10-00
END A ℄ SBDRWY1 STA 12+37.14,
8.00′ RT
END TEMP SPL
SHORING SBFR-TS11
℄ SBDRWY1 STA 11+59.85
BEGIN TEMP SPL
SHORING SBFR-TS12
℄ PSBFR STA 3922+40.57,
82.70′ LT
BEGIN INTERIM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3922+09.85,
24.00′ RT
BEGIN PERM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3922+65.54
℄ PSBFR-ULT
PROP ROW
PROPOSED SOUTHBOUND
FRONTAGE ROAD
3925+00
℄ PSBFR
END TEMP SPL
SHORING SBFR-TS12
℄ PSBFR STA 3922+35.34,
24.00′ RT
EXIST ROW
BEGIN A ℄ PSBFR STA 3922+01.99,
50.17′ RT
INSTALL CCA
END 390 LF PCTB
℄ PSBFR STA 3925+77.20,
108.67′ RT
TEMPORARY SHORING WALL
BEGIN 390 LF PCTB
℄ PSBFR STA 3921+65.73,
48.77′ RT
BEGIN INTERIM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3918+25.00
BEGIN TEMP SPL
SHORING SBFR-TS11
℄ PSBFR STA 3919+96.56,
11.00′ RT
END D ℄ PSBFR STA 3917+06.60,
20.13′ RT
SOUTHBOUND IH 35E
BEGIN D ℄ PSBFR STA 3915+42.43,
35.69′ RT
BEGIN B ℄ PSBFR STA 3915+43.31,
49.62′ RT
BEGIN PERM BRIDGE CONSTRUCTION
℄ PNBFR STA 2928+12.92
BEGIN PERM PAVEMENT CONSTRUCTION
℄ PNBFR STA 2928+00.00
BEGIN B ℄ PNBFR STA 2920+48.67,
51.48′ LT
END A ℄ PNBFR STA 2923+17.70,
11.83′ LT
BEGIN A ℄ PNBFR STA 2924+80.41,
13.84′ LT
NORTHBOUND IH 35E
BEGIN D ℄ PNBFR STA 2920+48.16,
37.00′ LT
END D ℄ PNBFR STA 2923+36.26,
24.30′ LT
INSTALL CCA
BEGIN 1230 LF PCTB
℄ PNBFR STA 2924+80.48,
10.84′ LT
BEGIN D ℄ PNBFR STA 2920+46.24,
8.55′ LT
BEGIN TEMP SPL
SHORING NBFR-TS1
℄ PNBFR STA 2926+08.29,
15.43′ LT
℄ PNBFR
C
C
PROPOSED NORTHBOUND
FRONTAGE ROAD
EXIST ROW
EXIST ROW
CW4-1L
BEGIN A ℄ PNBFR STA 2920+46.24,
2.45′ RT
INSTALL CCA
BEGIN 270 LF PCTB
℄ PNBFR STA 2921+25.32,
3.32′ RT
YIELD
R1-2
PROP ROW
PROP ROW
END 270 LF PCTB
℄ PNBFR STA 2923+95.48,
3.77′ LT
END TEMP PAVEMENT CONSTRUCTION
℄ PNBFR STA 2926+36.90, 10.82′ RT
R11-2
ROAD
CLOSED
R11-2
BEGIN INTERIM PAVEMENT CONSTRUCTION
℄ PNBFR STA 2924+65.00
BEGIN TEMP PAVEMENT CONSTRUCTION
℄ PNBFR STA 2921+65.23, 3.55′ RT
END TEMP PAVEMENT CONSTRUCTION
℄ PNBFR STA 2924+10.77, 13.98′ RT
BEGIN TEMP PAVEMENT CONSTRUCTION
℄ PNBFR STA 2924+61.00, 22.40′ RT

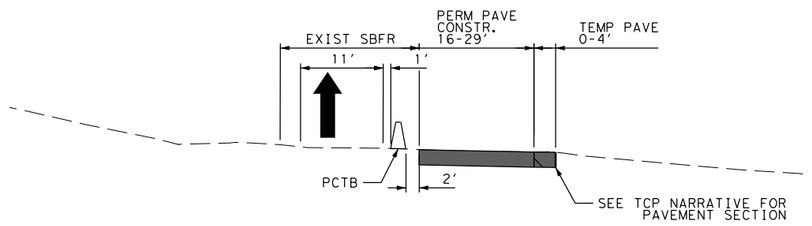
MATCH LINE PSBFR STA 3926+00

N

0′ 50′ 100′
SCALE IN FEET

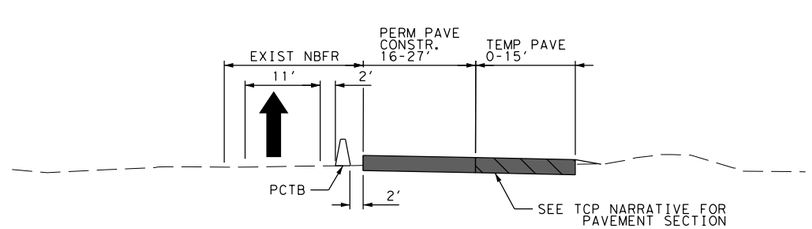
LEGEND

- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW
- TEMP PAVEMENT CONSTRUCTION IN THIS STEP
- PERM PAVEMENT CONSTRUCTION IN THIS STEP
- BRIDGE CONSTRUCTION IN THIS STEP
- TEMP PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- BRIDGE CONSTRUCTION IN PREVIOUS STEP
- CHANNELIZING DRUMS
- TYPE III BARRICADE
- TEMPORARY SIGN
- TEMPORARY DITCH
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- CRASH CUSHION ATTENUATOR (CCA)
- A WRK ZN PAV MRK (REM) (W) (6") (SLD)
- B WRK ZN PAV MRK (REM) (Y) (6") (SLD)
- C WRK ZN PAV MRK (REM) (W) (6") (BRK)
- D WRK ZN PAV MRK (REM) (W) (8") (SLD)
- E WRK ZN PAV MRK (REM) (W) (24") (SLD)



SECTION B-B

NOT TO SCALE



SECTION C-C

NOT TO SCALE

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

5/28/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E

TRAFFIC CONTROL PLAN

PHASE 1 STEP 1

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	24
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

DATE: 5/28/2024 4:37:52 AM
FILE: c:\pwworking\aecom_ds16_na\irene.alanis@aecom.com\d0373451\I35_AEC_TCP_P1_001.dgn

MATCH LINE A

MATCH LINE SBFR STA 3926+00

PROP ROW

BEGIN TEMP PAVEMENT CONSTRUCTION
℄ PSBFR STA 3930+86.97, 89.62' LT

END PERM RW1 CONSTRUCTION
END TEMP SPL SHORING SBFR-TS2
℄ PSBFR STA 3930+50.00, 12.42' LT

END PERM PAVE CONSTRUCTION
℄ PSBFR STA 3930+50.00

BEGIN PERM RW1 CONSTRUCTION
℄ PSBFR STA 3928+64.82, 12.42' LT

PROPOSED SOUTHBOUND FRONTAGE ROAD

3930+00

S LOCUST ST

EXIST ROW

BEGIN TEMP SPL SHORING SBFR-TS2
℄ PSBFR STA 3928+55.34, 25.00' RT

BEGIN INTERIM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3932+00.64

INSTALL CCA
END 300 LF PCTB
℄ PSBFR STA 3930+27.16, 63.60' RT

BEGIN PERM PAVE CONSTRUCTION
℄ PSBFR STA 3929+56.85

END A
℄ PSBFR STA 3930+27.33, 65.59' RT

BEGIN A
℄ PSBFR STA 3927+30.30, 97.14' RT

BEGIN 300 LF PCTB
℄ PSBFR STA 3927+30.10, 95.15' RT

BEGIN PERM BRIDGE CONSTRUCTION
℄ PSBFR STA 3926+48.00

END A
℄ PSBFR STA 3926+44.82, 105.50' RT

SOUTHBOUND IH 35E

NORTHBOUND IH 35E

BEGIN TEMP PAVEMENT CONSTRUCTION
℄ PSBFR STA 3934+81.63, 6.94' LT

END TEMP PAVEMENT CONSTRUCTION
℄ PSBFR STA 3933+76.00, 7.00' LT

CONSTRUCT INLET BOX AND CAP FOR FUTURE USE SUBSIDIARY TO OTHER BID ITEMS

CONSTRUCT PERM DRAINAGE THIS STEP

℄ PSBFR

BEGIN TEMP SPL SHORING SBFR-TS3
℄ PSBFR STA 3931+99.92, 9.37' LT

END TEMP SPL SHORING SBFR-TS3
℄ PSBFR STA 3933+86.22, 24.00' RT

BEGIN 450 LF PCTB
℄ PSBFR STA 3931+74.44, 60.51' RT

BEGIN A
℄ PSBFR STA 3931+74.47, 62.48' RT

END B
℄ PNBFR STA 2936+56.52, 32.65' LT

END TEMP SPL SHORING NBFR-TS1
℄ PNBFR STA 2929+09.42, 22.33' LT

BEGIN TEMP SPL SHORING NBFR-TS2
℄ PNBFR STA 2930+34.57, 22.33' LT

END TEMP SPL SHORING NBFR-TS2
℄ PNBFR STA 2934+41.83, 21.29' LT

END INTERIM PAVEMENT CONSTRUCTION
℄ PNBFR STA 2936+56.52

2935+00

D

EXIST ROW

END A
℄ PNBFR STA 2937+10.68, 12.68' RT

END 1230 LF PCTB
℄ PSBFR STA 2937+05.59, 13.08' RT

END TEMP PAVEMENT CONSTRUCTION
℄ PNBFR STA 2936+81.48, 11.75' RT

2930+00

PROPOSED NORTHBOUND FRONTAGE ROAD

℄ PNBFR

BEGIN PERM PAVEMENT CONSTRUCTION
℄ PNBFR STA 2931+25.38

SEE DETOUR PLAN FOR S LOCUST ST CLOSURE

S LOCUST ST

℄ PNBLOCUST

EXIST ROW

BEGIN TEMP PAVEMENT CONSTRUCTION
℄ PNBFR STA 2934+41.34, 10.80' RT

BEGIN INTERIM PAVEMENT CONSTRUCTION
℄ PNBFR STA 2933+10.26

PROVIDE ALL-WEATHER SURFACE AT ALL TIMES DURING CONSTRUCTION FOR EMERGENCY VEHICLE ACCESS

END TEMP PAVEMENT CONSTRUCTION
℄ PSBFR STA 3936+64.83, 8.75' LT

PROP ROW

DRUMS @ 45' C-C

3935+00

EXIST ROW

R11-2
ROAD CLOSED
R11-2

END INTERIM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3936+50.00

INSTALL CCA
END 450 LF PCTB
℄ PSBFR STA 3936+27.05, 12.96' RT

END A
℄ PSBFR STA 3936+27.01, 14.96' RT

END B
℄ PSBFR STA 3935+64.44, 26.78' RT

EXIST ROW

(US 377) FORT WORTH DR

EXIST ROW

N

0' 50' 100'
SCALE IN FEET

LEGEND

- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW
- TEMP PAVEMENT CONSTRUCTION IN THIS STEP
- PERM PAVEMENT CONSTRUCTION IN THIS STEP
- BRIDGE CONSTRUCTION IN THIS STEP
- TEMP PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- BRIDGE CONSTRUCTION IN PREVIOUS STEP
- CHANNELIZING DRUMS
- TYPE III BARRICADE
- TEMPORARY SIGN
- TEMPORARY DITCH
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- CRASH CUSHION ATTENUATOR (CCA)
- A — WRK ZN PAV MRK (REM) (W) (6") (SLD)
- B — WRK ZN PAV MRK (REM) (Y) (6") (SLD)
- C — WRK ZN PAV MRK (REM) (W) (6") (BRK)
- D — WRK ZN PAV MRK (REM) (W) (8") (SLD)
- E — WRK ZN PAV MRK (REM) (W) (24") (SLD)

MATCH LINE A

320' 320' 320'

DRUMS @ 45' C-C

RIGHT LANE CLOSED
CW20-5TR

RIGHT LANE CLOSED
CW20-5TR

ROAD WORK AHEAD
CW20-1D

EXIST SBFR 11' 1' | PERM PAVE CONSTR. 16-29' | TEMP PAVE 0-6'

PCTB 2'

SEE TCP NARRATIVE FOR PAVEMENT SECTION

SECTION A-A

NOT TO SCALE

EXIST NBFR 11' 2' | PERM PAVE CONSTR. 17-40' | TEMP PAVE 0-13'

PCTB 2'

SEE TCP NARRATIVE FOR PAVEMENT SECTION

SECTION D-D

NOT TO SCALE

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

6/18/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
TRAFFIC CONTROL PLAN

PHASE 1 STEP 1

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	25
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

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DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alanis

END PERM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3922+27.33,
228.44′ LT

INSTALL CCA
END 270 LF PCTB
℄ PSBFR STA 3922+31.34,
240.26′ LT

CONSTRUCT PERM DRAINAGE
THIS STEP

PROP ROW

BEGIN PERM PAVEMENT CONSTRUCTION
℄ SBDRWY1 STA 10+28.52
℄ PSBFR

12+00
11+00
10+00
3920+00
3915+00
3925+00

PROPOSED SOUTHBOUND
FRONTAGE ROAD

EXIST ROW

END INTERIM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3922+09.85,
24.00′ RT

END 60 LF PCTB
℄ PSBFR STA 3921+65.73,
48.77′ RT

BEGIN 150 LF PCTB
℄ PSBFR STA 3925+77.45,
108.66′ RT

BEGIN 60 LF PCTB
℄ PSBFR STA 3921+09.72,
34.48′ RT

BEGIN 270 LF PCTB
℄ PSBFR STA 3921+47.98,
19.06′ RT

BEGIN INTERIM PAVEMENT CONSTRUCTION
℄ PSBFR STA 3921+49.92,
24.00′ RT

MATCH LINE PSBFR STA 3926+00

SOUTHBOUND IH 35E

BEGIN B
℄ PNBFR STA 2920+53.80,
50.34′ LT

NORTHBOUND IH 35E

BEGIN D
℄ PNBFR STA 2920+53.37,
36.65′ LT

INSTALL CCA
BEGIN 1830 LF PCTB
℄ PNBFR STA 2920+53.87,
52.34′ LT

BEGIN C
℄ PNBFR STA 2922+60.80,
8.82′ LT

BEGIN A
℄ PNBFR STA 2928+12.92,
5.00′ RT

℄ PNBFR

CW4-1L

EXIST ROW

2925+00

PROPOSED NORTHBOUND
FRONTAGE ROAD

BEGIN D
℄ PNBFR STA 2921+64.85,
7.71′ LT

PROP ROW

END A
℄ PNBFR STA 2926+22.49,
10.50′ RT

BEGIN A
℄ PNBFR STA 2924+65.01,
17.99′ RT

N

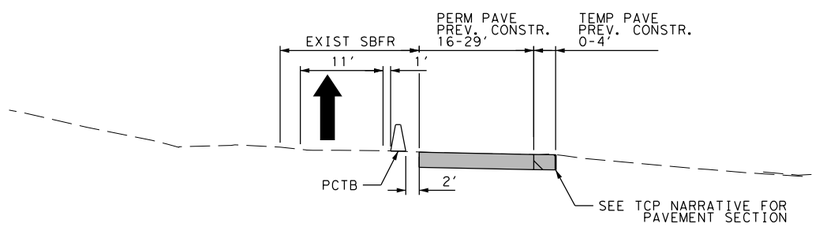
0′ 50′ 100′
SCALE IN FEET

LEGEND

- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW
- TEMP PAVEMENT CONSTRUCTION IN THIS STEP
- PERM PAVEMENT CONSTRUCTION IN THIS STEP
- BRIDGE CONSTRUCTION IN THIS STEP
- TEMP PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- BRIDGE CONSTRUCTION IN PREVIOUS STEP
- CHANNELIZING DRUMS
- TYPE III BARRICADE
- TEMPORARY SIGN
- TEMPORARY DITCH
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- CRASH CUSHION ATTENUATOR (CCA)
- A WRK ZN PAV MRK (REM) (W) (6") (SLD)
- B WRK ZN PAV MRK (REM) (Y) (6") (SLD)
- C WRK ZN PAV MRK (REM) (W) (6") (BRK)
- D WRK ZN PAV MRK (REM) (W) (8") (SLD)
- E WRK ZN PAV MRK (REM) (W) (24") (SLD)

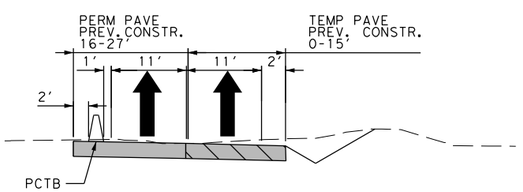
STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

5/28/2024



SECTION B-B

NOT TO SCALE



SECTION C-C

NOT TO SCALE

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
TRAFFIC CONTROL PLAN

PHASE 1 STEP 2

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	26
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				
AEC				

DATE: 5/28/2024 4:37:59 AM
FILE: c:\pwworking\aecom_ds16_na\irene.alanis@aecom.com\d037345\N135_AEC_TCP_P1S2_001.dgn

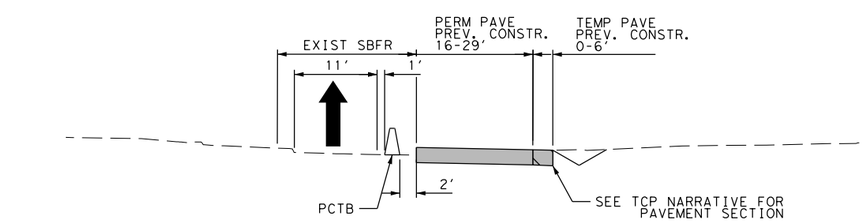
MATCH LINE SBFR STA 3926+00

PROP ROW
EXIST ROW
R11-2 ROAD CLOSED R11-2
S LOCUST ST
PROPOSED SOUTHBOUND FRONTAGE ROAD
PROPOSED NORTHBOUND FRONTAGE ROAD
SOUTHBOUND IH 35E
NORTHBOUND IH 35E
FORT WORTH DR (US 377)
℄ PSBLOCUST
℄ PNBLOCUST
℄ PSBFR
℄ PNBFR
CANDY HAVEN AND CAKES
KEEP RIGHT
SEE TEMPORARY SUMMARY OF LARGE SIGNS

BEGIN A ℄ PSBFR STA 3926+00.00, 109.28′ RT
END A ℄ PSBFR STA 3927+30.30, 97.14′ RT
END 150 LF PCTB ℄ PSBFR STA 3927+30.10, 95.15′ RT
BEGIN A ℄ PSBFR STA 3930+27.33, 65.59′ RT
BEGIN 150 LF PCTB ℄ PSBFR STA 3930+27.16, 63.60′ RT
BEGIN PERM PAVE CONSTRUCTION ℄ PSBFR STA 3930+50.00
BEGIN PERM RW1 CONSTRUCTION ℄ PSBFR STA 3930+50.00, 12.42′ LT
BEGIN TEMP SPL SHORING SBFR-TS4 ℄ PSBFR STA 3930+50.00, 24.00′ RT
CONSTRUCT PERM DRAINAGE THIS STEP
BEGIN A ℄ PSBFR STA 3930+82.72, 96.46′ LT
BEGIN 450 LF PCTB ℄ DRV-CH STA 13+12.33, 2.00′ LT
END PERM PAVEMENT CONSTRUCTION ℄ PSBLOCUST STA 12+00.00
END PERM RW1 CONSTRUCTION ℄ PSBFR STA 3931+00.00, 12.42′ LT
BEGIN A ℄ PSBFR STA 3930+87.08, 106.73′ LT
END PERM PAVEMENT CONSTRUCTION ℄ PSBFR STA 3932+00.64
END TEMP SPL SHORING SBFR-TS4 ℄ PSBFR STA 3932+02.52, 24.00′ RT
END 150 LF PCTB ℄ PSBFR STA 3931+74.44, 60.51′ RT
END A ℄ PSBFR STA 3931+74.47, 62.48′ RT
INSTALL CCA END 450 LF PCTB ℄ PSBFR STA 3935+07.88, 7.57′ RT
BEGIN D ℄ PSBFR STA 3935+70.56, 4.39′ RT
END A ℄ PSBFR STA 3936+54.81, 6.82′ LT
END D ℄ PSBFR STA 3936+28.86, 9.99′ RT
BEGIN D ℄ PSBFR STA 3935+61.27, 15.91′ RT
END B ℄ PNBFR STA 2937+31.16, 19.05′ LT
END 1830 LF PCTB ℄ PNBFR STA 2938+84.32, 21.12′ LT
END C ℄ PNBFR STA 2937+29.48, 6.38′ LT
END A ℄ PNBFR STA 2936+75.10, 10.27′ RT
BEGIN A ℄ PNBFR STA 2934+37.98, 8.52′ RT
END A ℄ PNBFR STA 2933+75.78, 3.00′ RT
BEGIN A ℄ PNBFR STA 2933+12.13, 3.00′ RT
END E ℄ PNBFR STA 2932+81.31 33.37′ RT
END B A ℄ PNBFR STA 2932+59.57 3.00′ RT
END A ℄ PNBFR STA 2931+25.38, 5.00′ RT
BEGIN B A ℄ PNBFR STA 2932+44.31, 3.00′ RT
END B ℄ PNBFR STA 2931+97.76 64.50′ RT
BEGIN E ℄ PNBFR STA 2932+65.91 31.32′ RT

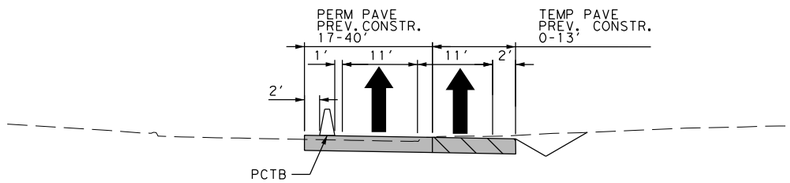
0′ 50′ 100′
SCALE IN FEET

LEGEND
- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW
- TEMP PAVEMENT CONSTRUCTION IN THIS STEP
- PERM PAVEMENT CONSTRUCTION IN THIS STEP
- BRIDGE CONSTRUCTION IN THIS STEP
- TEMP PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- BRIDGE CONSTRUCTION IN PREVIOUS STEP
- CHANNELIZING DRUMS
- TYPE III BARRICADE
- TEMPORARY SIGN
- TEMPORARY DITCH
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- CRASH CUSHION ATTENUATOR (CCA)
- A WRK ZN PAV MRK (REM) (W) (6") (SLD)
- B WRK ZN PAV MRK (REM) (Y) (6") (SLD)
- C WRK ZN PAV MRK (REM) (W) (6") (BRK)
- D WRK ZN PAV MRK (REM) (W) (8") (SLD)
- E WRK ZN PAV MRK (REM) (W) (24") (SLD)



SECTION A-A

NOT TO SCALE



SECTION D-D

NOT TO SCALE

SEAN K. YOUNG 96504 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
6/17/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
TRAFFIC CONTROL PLAN

PHASE 1 STEP 2

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	27
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

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DN: AECOM CK: AECOM DW: AECOM CK: AECOM DN: AECOM CK: diana.cabrera

DN: AECOM CK: AECOM DN: AECOM CK: AECOM irene.alanis

1	ROAD WORK NEXT XX MILES	G20-1 48"X18"	4	S LOCUST ST DETOUR	M4-12T 48"X12" M4-9R 30"X24"	7		R3-1 24"X24"	10	ROAD CLOSED 500 FT	CW20-3C 48"X48"
2	ROAD CLOSED AHEAD	CW20-3D 48"X48"	5	S LOCUST ST DETOUR	M4-12T 48"X12" M4-9R 30"X24"	8	ROAD CLOSED TO THRU TRAFFIC	R11-4 60"X30"	11	ROAD CLOSED	R11-2 48"X30"
3	DETOUR AHEAD	CW20-2D 48"X48"	6	END DETOUR S LOCUST ST	M4-8A 24"X18" M4-12T 48"X12"	9	S LOCUST ST DETOUR	M4-12T 48"X12" M4-9R 30"X24"	12	NAME ADDRESS CITY STATE CONTRACTOR	G20-6T 48"X30"

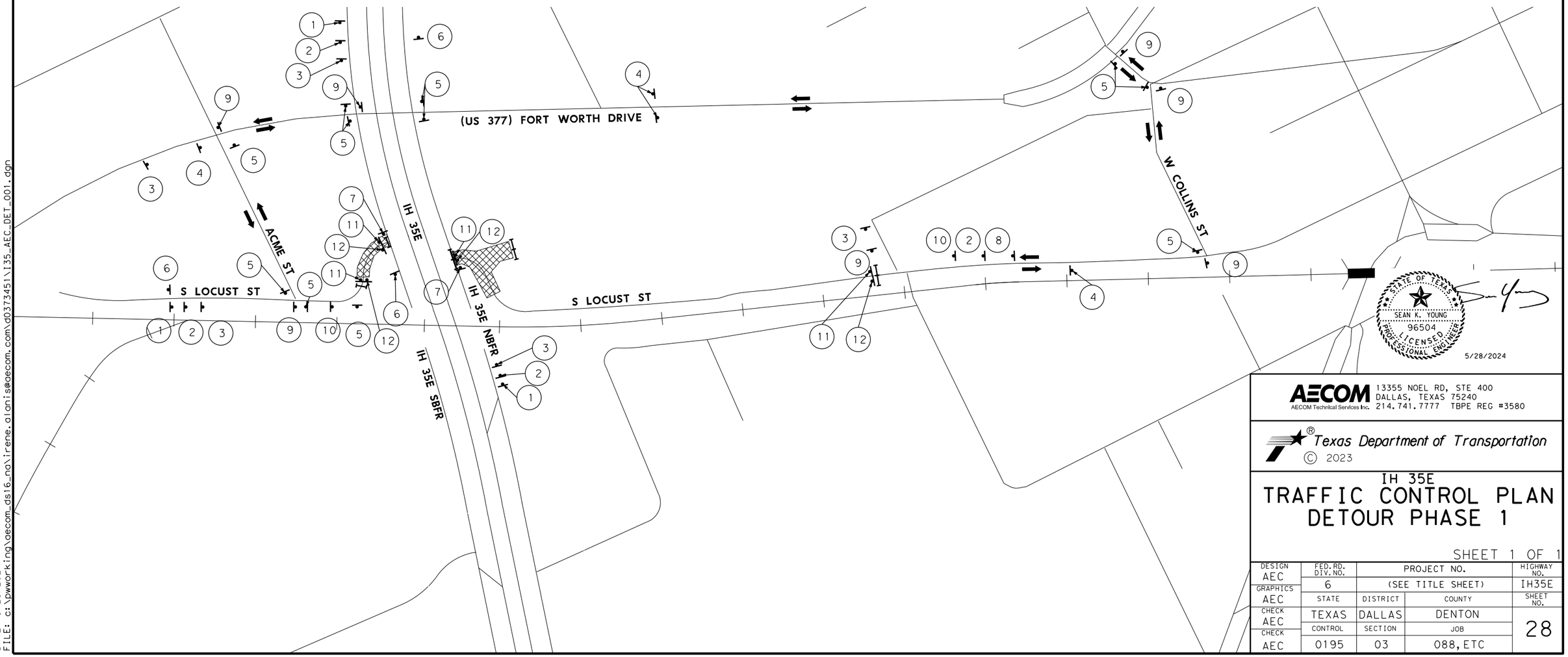
N. T. S.

LEGEND

- WORK ZONE
- TRAFFIC FLOW
- SIGN
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. SIGN SPACING SHALL BE AS PER THE LATEST BC STANDARDS AND AS DIRECTED BY THE FIELD ENGINEER.
2. ADDITIONAL SIGNS AND TRAFFIC HANDLING MAY BE NECESSARY TO COMPLETE THE WORK SHOWN HEREIN AND WILL BE CONSIDERED SUBSIDIARY TO BID ITEM 502, BARRICADES, SIGNS AND TRAFFIC HANDLING (REFER TO CURRENT BC STANDARDS).
3. ALL TRAFFIC CONTROL SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS PART VI & ALL APPLICABLE TXDOT STANDARDS.
4. ALL DRIVEWAYS ARE TO REMAIN OPEN DURING CONSTRUCTION IN ALL PHASES
5. SIGN LOCATIONS ARE SCHEMATICALLY SHOWN.
6. ALL PCMS SHALL BE PLACED AT MINIMUM 7 DAYS IN ADVANCE PRIOR TO STREET CLOSURES.



SEAN K. YOUNG 96504 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

5/28/2024

AECOM Technical Services Inc. 13355 NOEL RD, STE 400 DALLAS, TEXAS 75240 214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
TRAFFIC CONTROL PLAN DETOUR PHASE 1

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	28
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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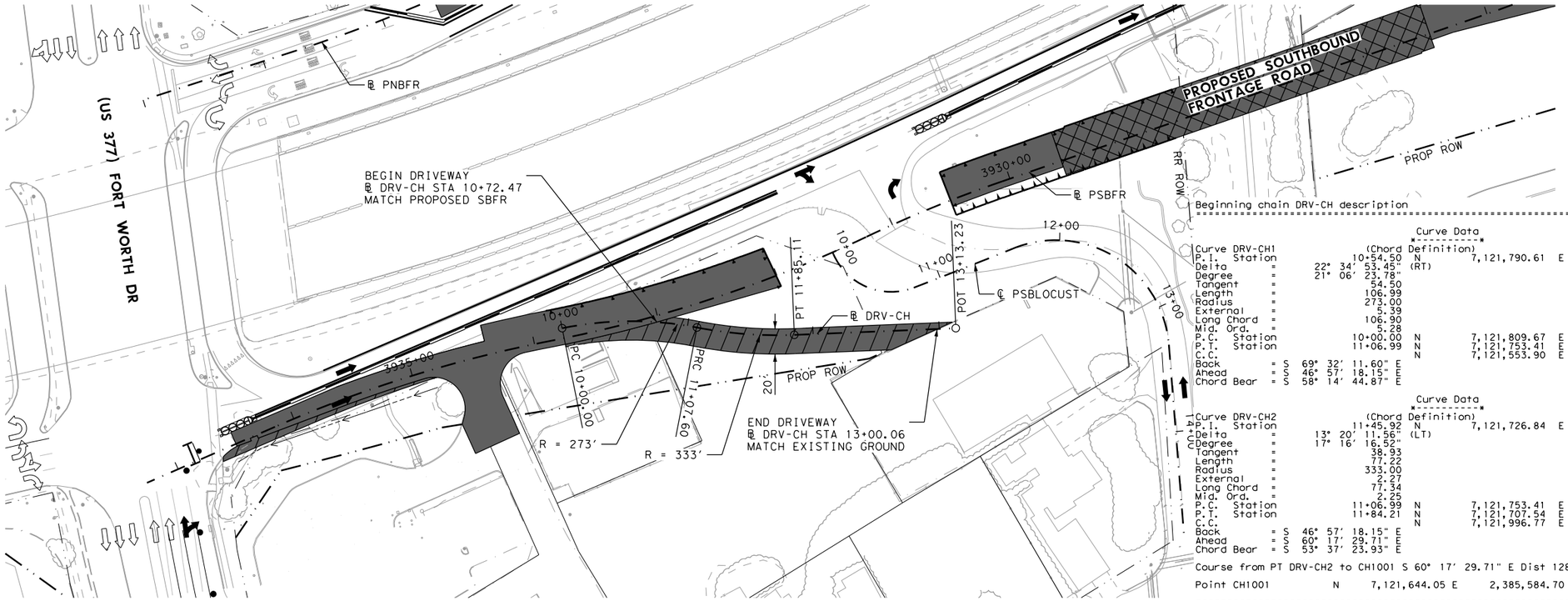


Beginning chain DRV-CH description

Curve Data

Curve DRV-CH1		(Chord Definition)				
P.I. Station		10+54.50	N	7,121,790.61	E	2,385,371.31
Delta	= 22° 34' 53.45"	(RT)				
Degree	= 21° 06' 23.78"					
Tangent	= 54.50					
Length	= 106.99					
Radius	= 273.00					
External	= 5.39					
Long Chord	= 106.90					
Mid. Ord.	= 5.28					
P.C. Station	10+00.00	N	7,121,809.67	E	2,385,320.25	
P.T. Station	11+06.99	N	7,121,753.41	E	2,385,411.15	
C.C.		N	7,121,553.90	E	2,385,224.81	
Back	= S 69° 32' 11.60" E					
Ahead	= S 46° 57' 18.15" E					
Chord Bear	= S 58° 14' 44.87" E					

Curve Data

Curve DRV-CH2		(Chord Definition)				
P.I. Station		11+45.92	N	7,121,726.84	E	2,385,439.60
Delta	= 13° 20' 11.56"	(LT)				
Degree	= 17° 16' 16.52"					
Tangent	= 38.93					
Length	= 77.22					
Radius	= 333.00					
External	= 2.27					
Long Chord	= 77.34					
Mid. Ord.	= 2.25					
P.C. Station	11+06.99	N	7,121,753.41	E	2,385,411.15	
P.T. Station	11+84.21	N	7,121,707.54	E	2,385,473.41	
C.C.		N	7,121,996.77	E	2,385,638.44	
Back	= S 46° 57' 18.15" E					
Ahead	= S 60° 17' 29.71" E					
Chord Bear	= S 53° 37' 23.93" E					

Course from PT DRV-CH2 to CH1001 S 60° 17' 29.71" E Dist 128.13

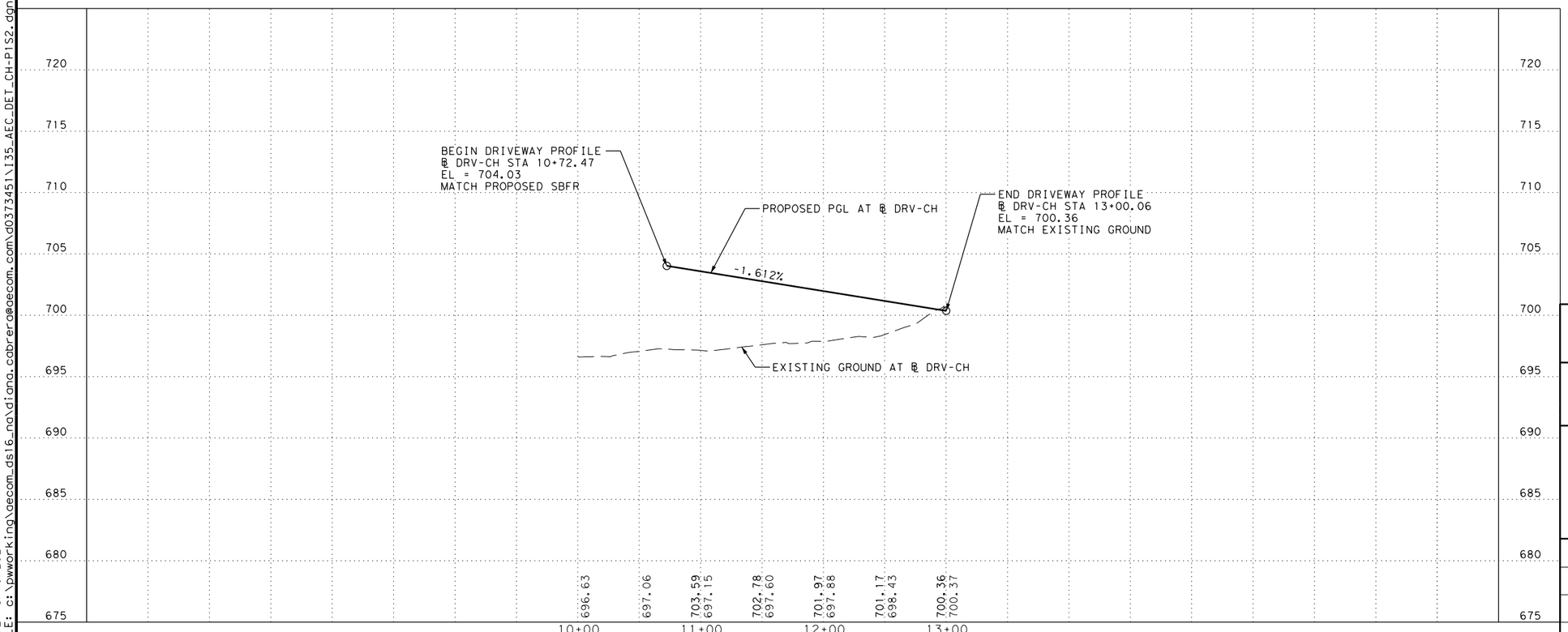
Point CH1001 N 7,121,644.05 E 2,385,584.70 Sta 13+12.33

Ending chain DRV-CH description

HORZ 0' 50' 100'
VERT 0' 5' 10'
SCALE IN FEET

LEGEND

- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW
- TEMP PAVEMENT CONSTRUCTION IN THIS STEP
- PERM PAVEMENT CONSTRUCTION IN THIS STEP
- BRIDGE CONSTRUCTION IN THIS STEP
- TEMP PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- BRIDGE CONSTRUCTION IN PREVIOUS STEP
- CHANNELIZING DRUMS
- TYPE III BARRICADE
- TEMPORARY SIGN
- TEMPORARY DITCH
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- CRASH CUSHION ATTENUATOR (CCA)
- [A] WRK ZN PAV MRK (REM) (W) (6") (SLD)
- [B] WRK ZN PAV MRK (REM) (Y) (6") (SLD)
- [C] WRK ZN PAV MRK (REM) (W) (6") (BRK)
- [D] WRK ZN PAV MRK (REM) (W) (8") (SLD)
- [E] WRK ZN PAV MRK (REM) (W) (24") (SLD)



STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED
PROFESSIONAL ENGINEER
6/10/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
TRAFFIC CONTROL PLAN PHASE 1 STEP 1
DRIVEWAY DETOUR

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	29
CHECK AEC	CONTROL 0195	SECTION 03	JOB 088,ETC	

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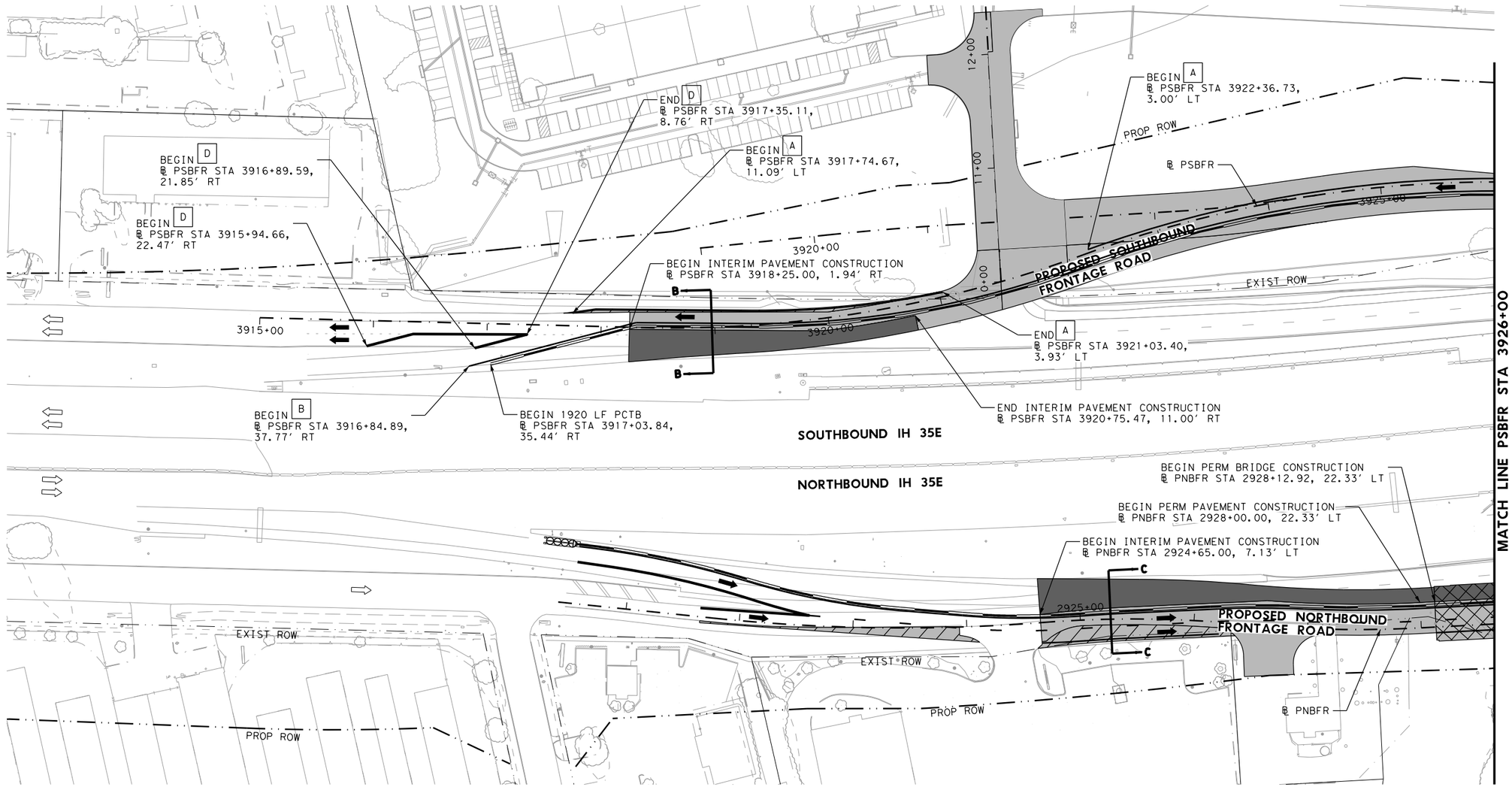
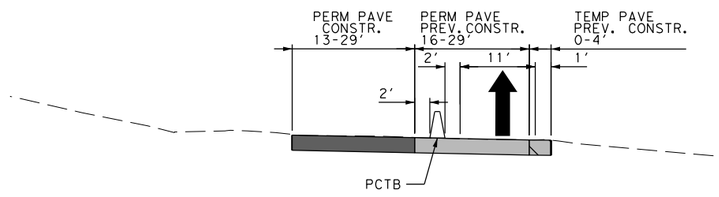


LEGEND

- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW
- TEMP PAVEMENT CONSTRUCTION IN THIS STEP
- PERM PAVEMENT CONSTRUCTION IN THIS STEP
- BRIDGE CONSTRUCTION IN THIS STEP
- TEMP PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- BRIDGE CONSTRUCTION IN PREVIOUS STEP
- CHANNELIZING DRUMS
- TYPE III BARRICADE
- TEMPORARY SIGN
- TEMPORARY DITCH
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- CRASH CUSHION ATTENUATOR (CCA)
- A WRK ZN PAV MRK (REM) (W) (6") (SLD)
- B WRK ZN PAV MRK (REM) (Y) (6") (SLD)
- C WRK ZN PAV MRK (REM) (W) (6") (BRK)
- D WRK ZN PAV MRK (REM) (W) (8") (SLD)
- E WRK ZN PAV MRK (REM) (W) (24") (SLD)

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

4/30/2024



SECTION B-B

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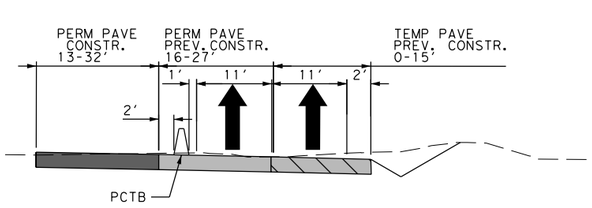

SECTION C-C

NOT TO SCALE

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Texas Department of Transportation

IH 35E
TRAFFIC CONTROL PLAN

PHASE 2

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	30
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

steigerwald
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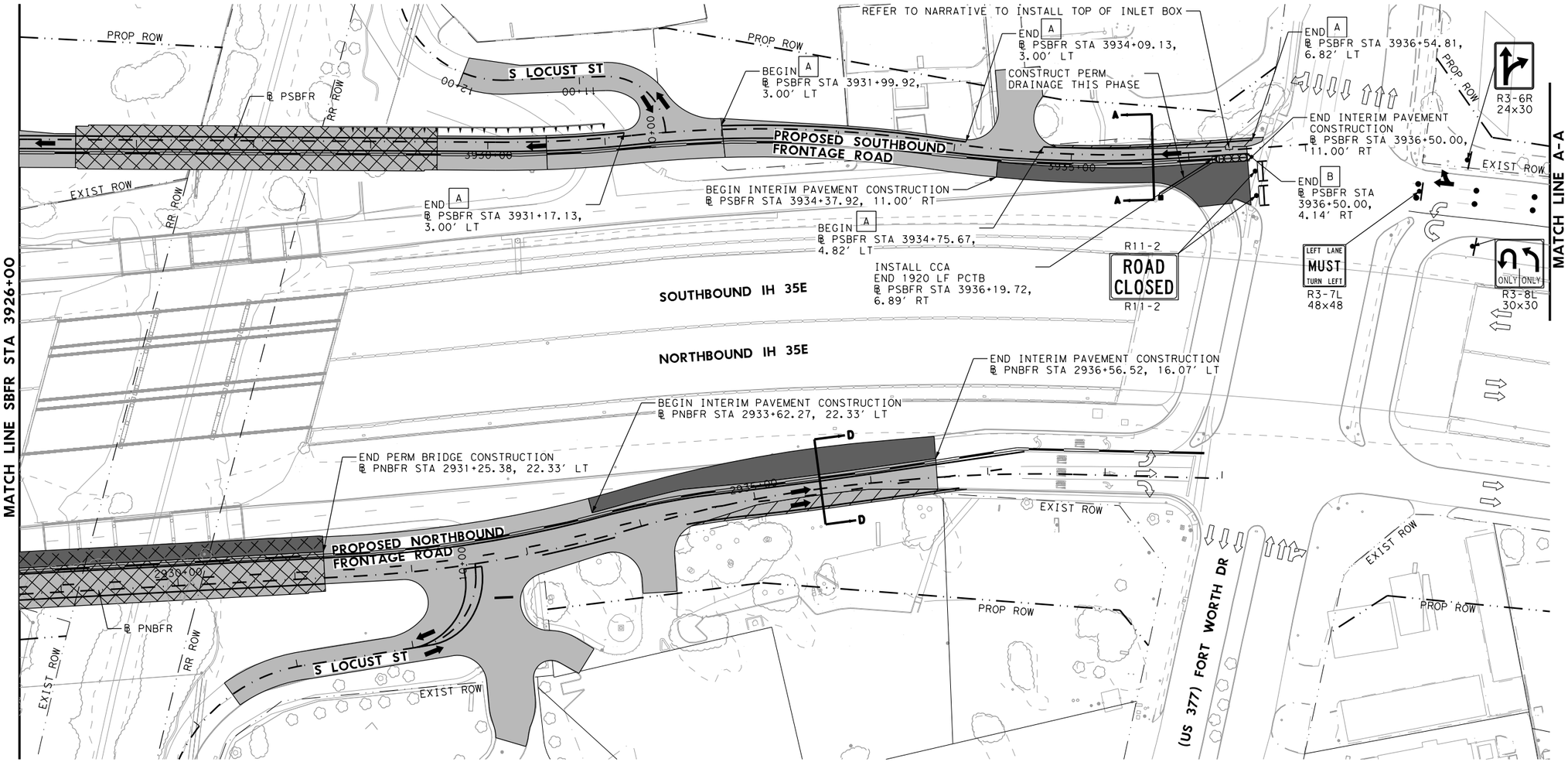

LEGEND

- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW
- TEMP PAVEMENT CONSTRUCTION IN THIS STEP
- PERM PAVEMENT CONSTRUCTION IN THIS STEP
- BRIDGE CONSTRUCTION IN THIS STEP
- TEMP PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS STEP
- BRIDGE CONSTRUCTION IN PREVIOUS STEP
- CHANNELIZING DRUMS
- TYPE III BARRICADE
- TEMPORARY SIGN
- TEMPORARY DITCH
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
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- A WRK ZN PAV MRK (REM) (W) (6") (SLD)
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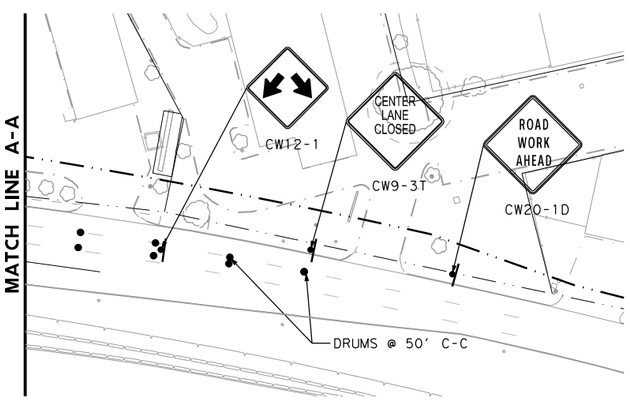
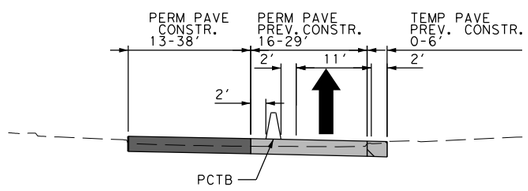
- C WRK ZN PAV MRK (REM) (W) (6") (BRK)
- D WRK ZN PAV MRK (REM) (W) (8") (SLD)
- E WRK ZN PAV MRK (REM) (W) (24") (SLD)





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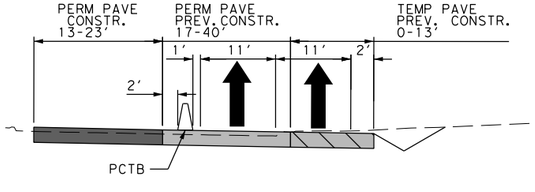

SECTION D-D

NOT TO SCALE

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
6/17/2024

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DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
TRAFFIC CONTROL PLAN

PHASE 2

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	31
CHECK AEC	CONTROL	SECTION	JOB	
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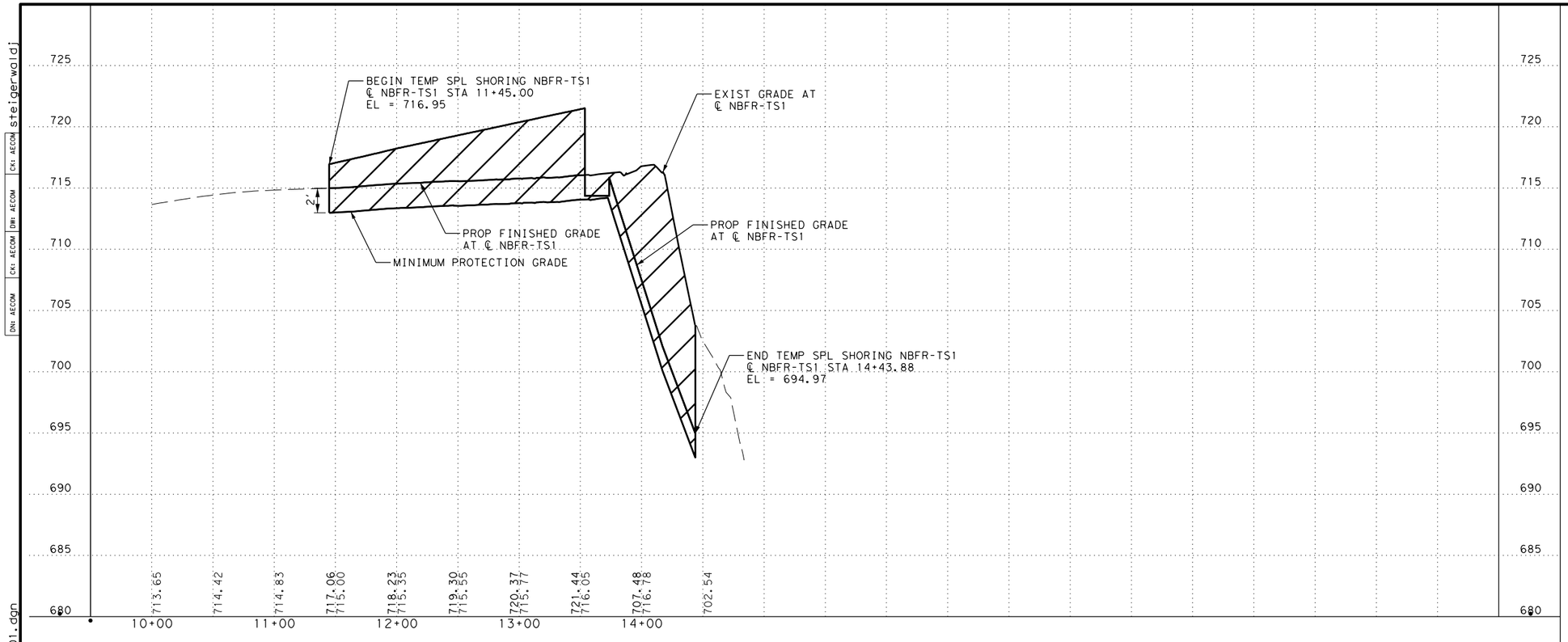

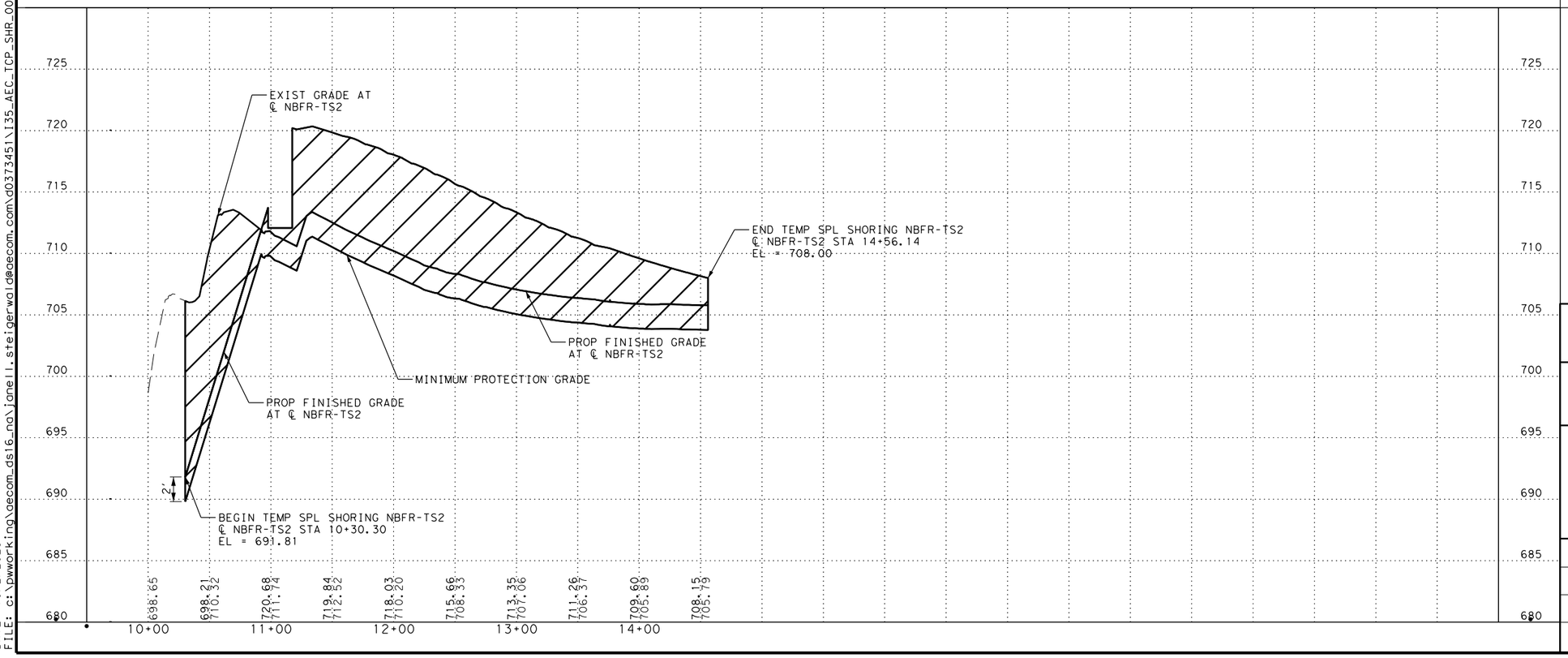

HORZ 0' 50' 100'
VERT 0' 5' 10'
SCALE IN FEET

LEGEND

LIMITS OF TEMPORARY SPECIAL SHORING

NOTES:

1. REFER TO TCP LAYOUT FOR ADDITIONAL LOCATION INFORMATION.

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED
PROFESSIONAL ENGINEER
10/2/2023

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AECOM Technical Services Inc.
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DALLAS, TEXAS 75240
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Texas Department of Transportation

IH 35E

TRAFFIC CONTROL PLAN

TEMPORARY SPECIAL SHORING LAYOUT
NBFR PHASE 1

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	32
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CHECK				
AEC				

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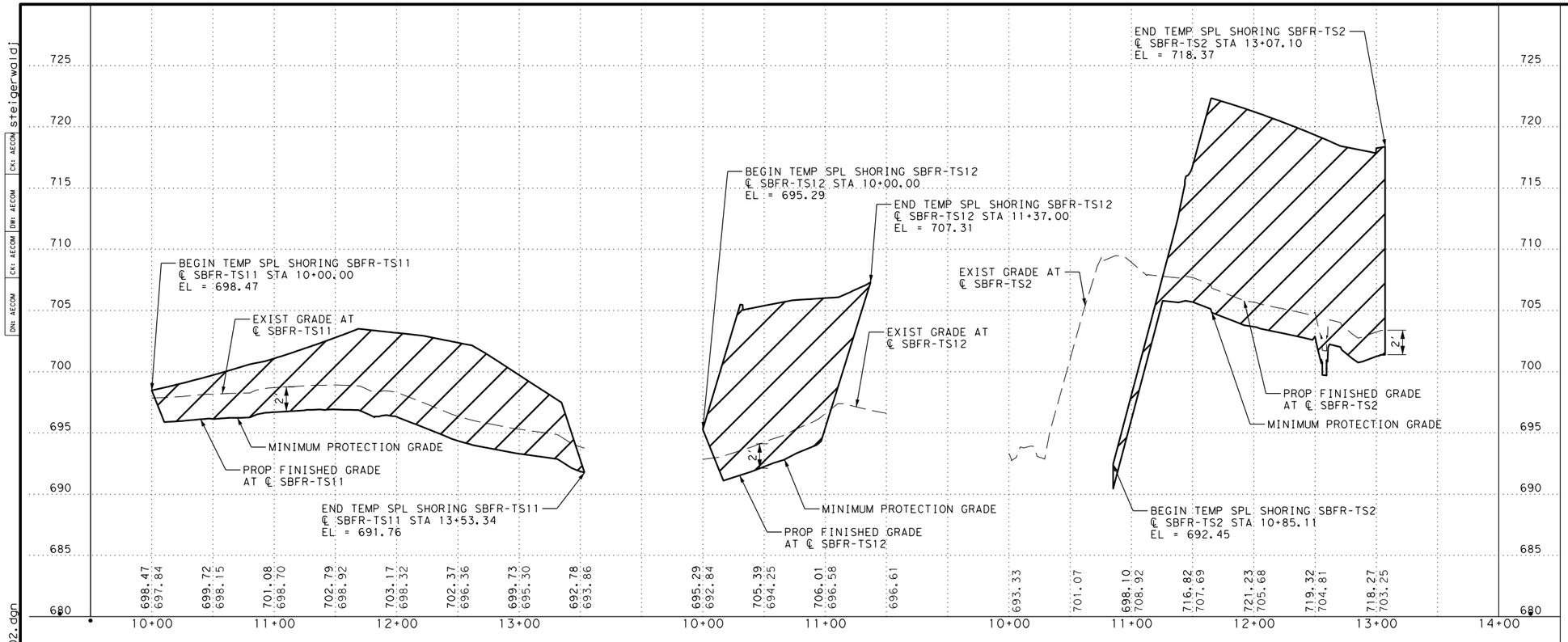

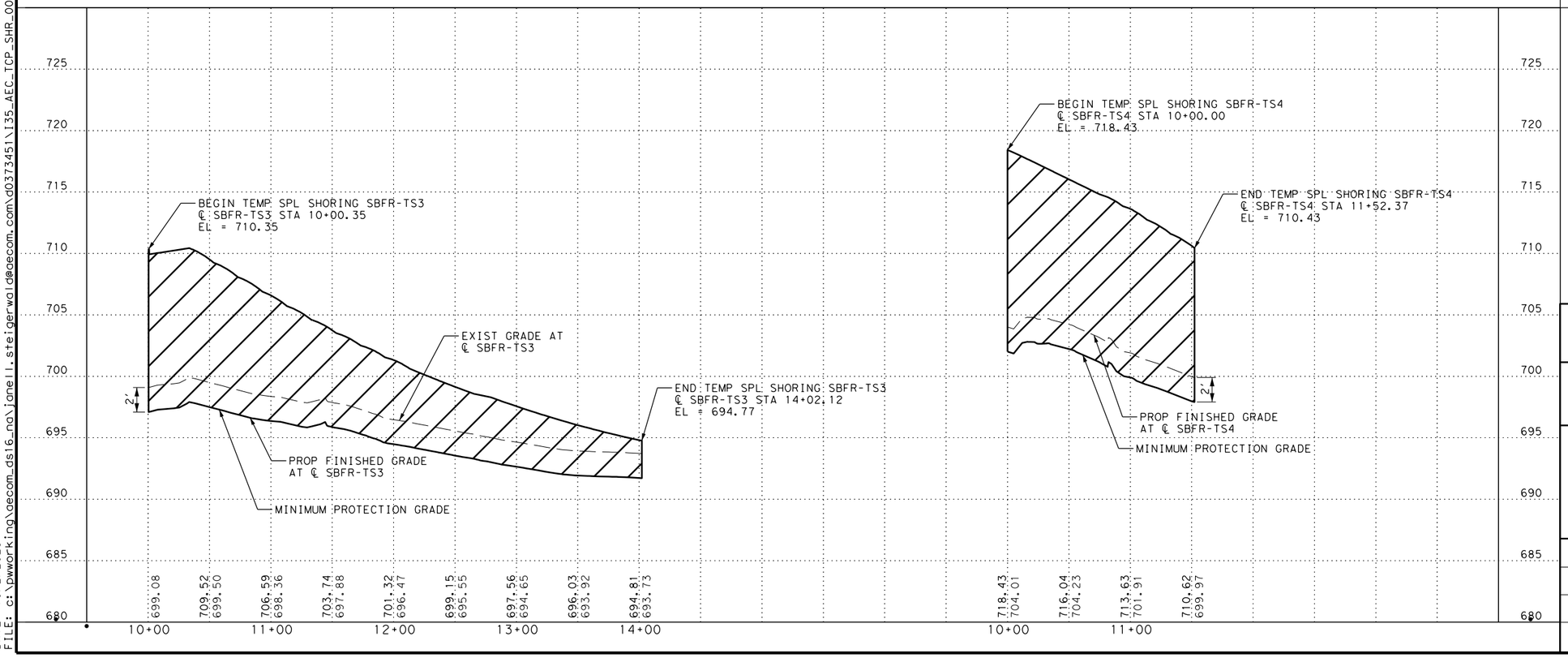

HORZ 0' 50' 100'
VERT 0' 5' 10'
SCALE IN FEET

LEGEND

LIMITS OF TEMPORARY SPECIAL SHORING

NOTES:

1. REFER TO TCP LAYOUT FOR ADDITIONAL LOCATION INFORMATION.

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
10/2/2023

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IH 35E

TRAFFIC CONTROL PLAN

TEMPORARY SPECIAL SHORING LAYOUT SBFR PHASE 1

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	33
CHECK	CONTROL	SECTION	JOB	
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CHECK				
AEC				

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0195	03	088,etc.	IH 35E
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	DAL	DENTON		34

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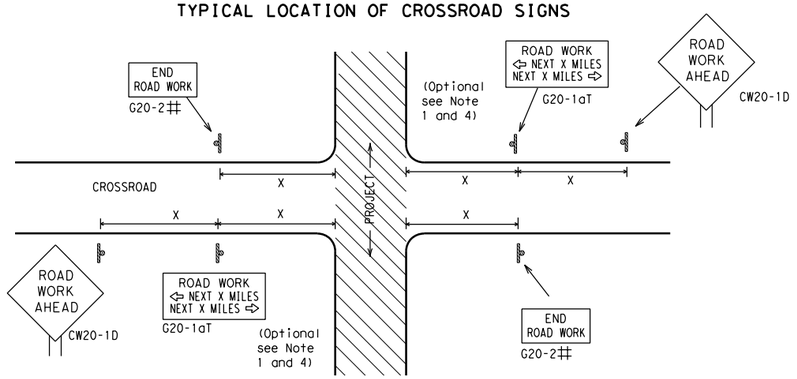
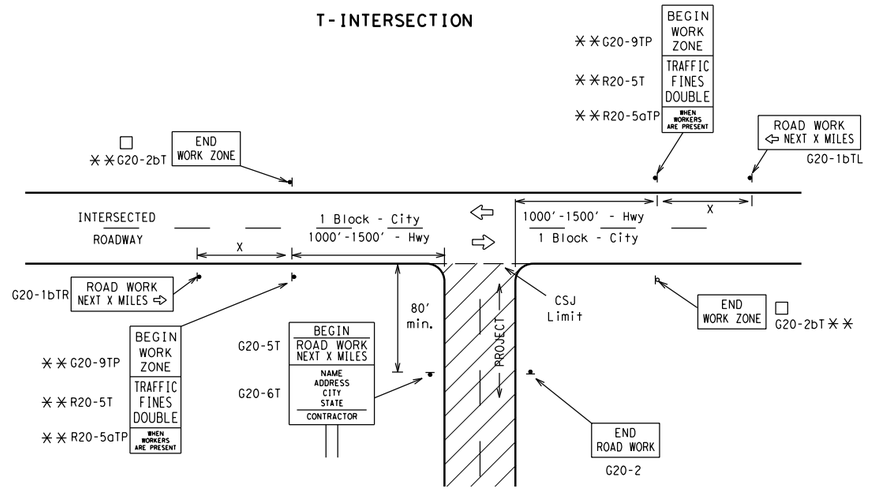
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

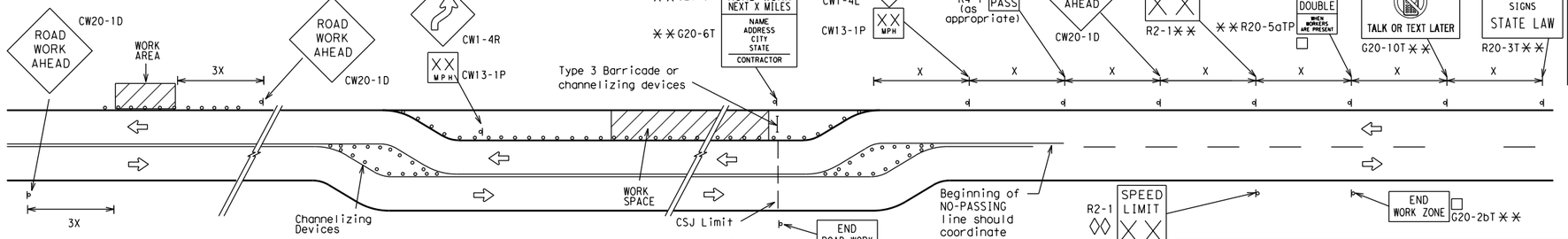
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

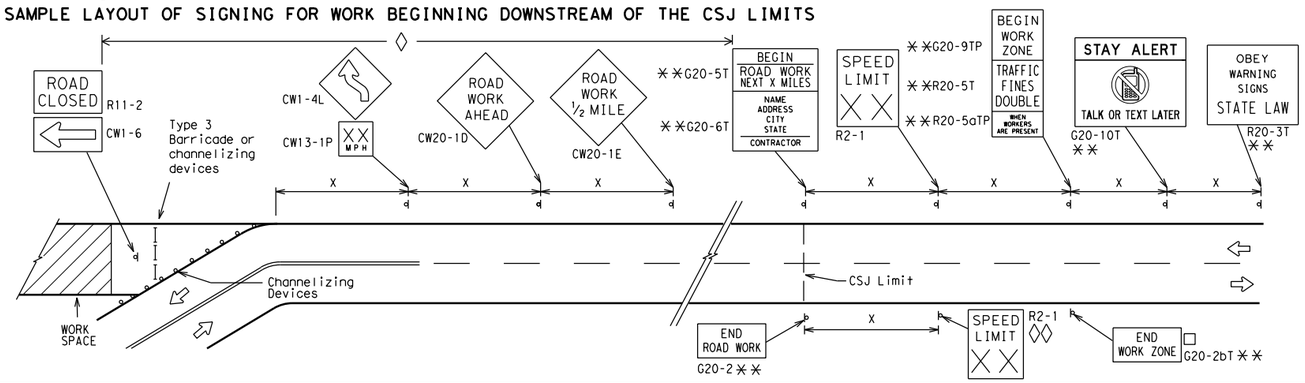
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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.

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		35

DATE: 10/2/2023 10:44:53 PM
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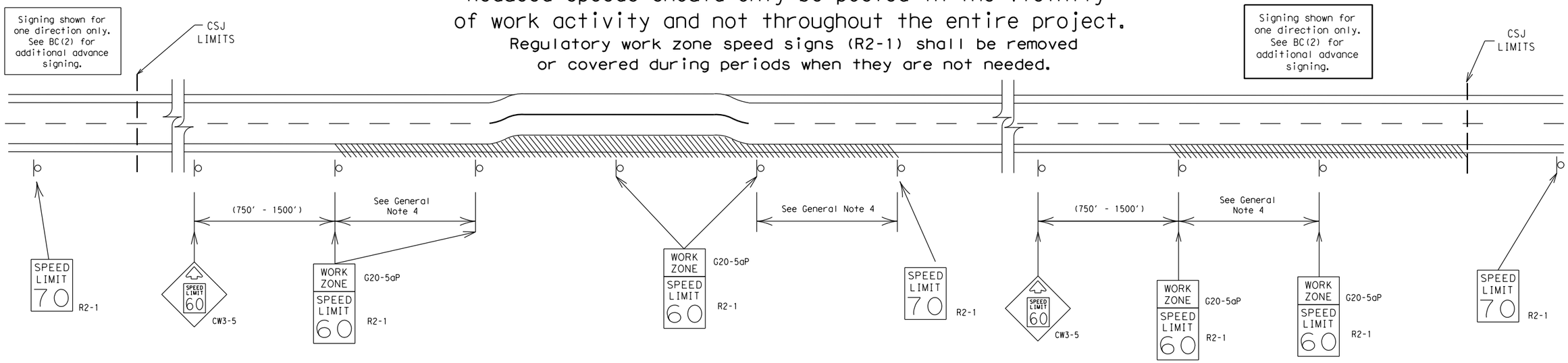
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		36

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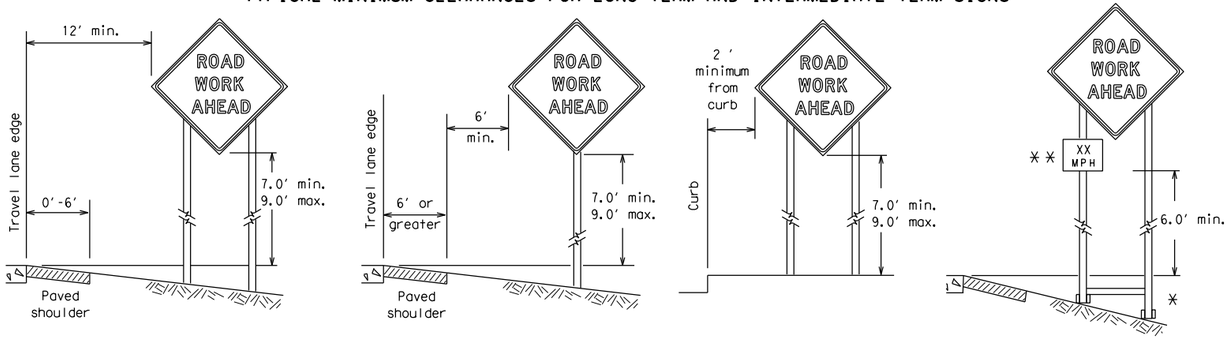
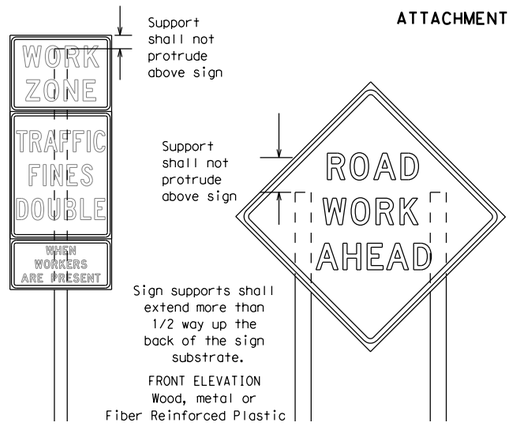
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

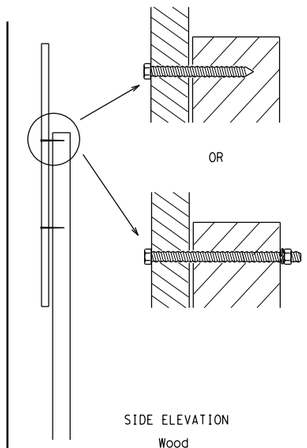


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





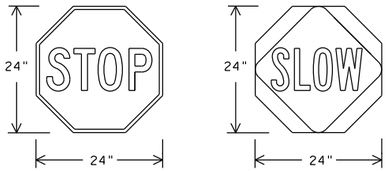
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		37

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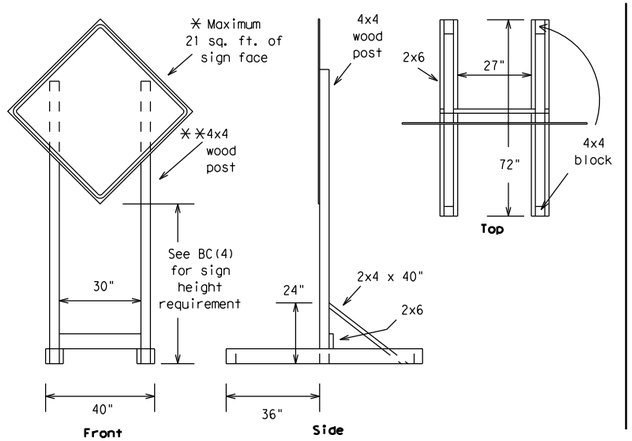
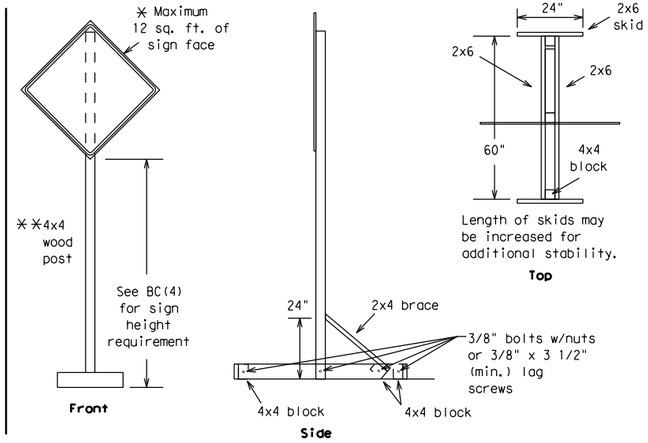
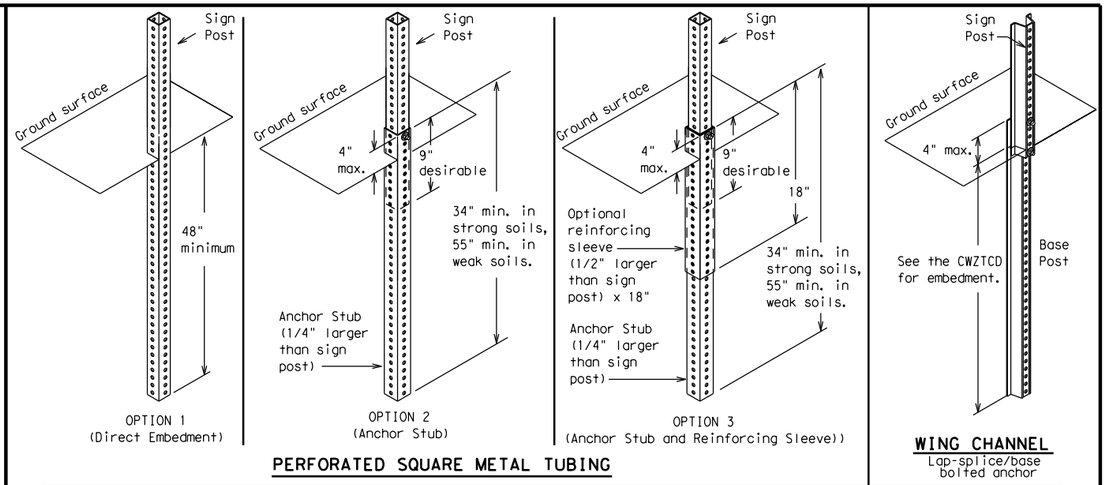




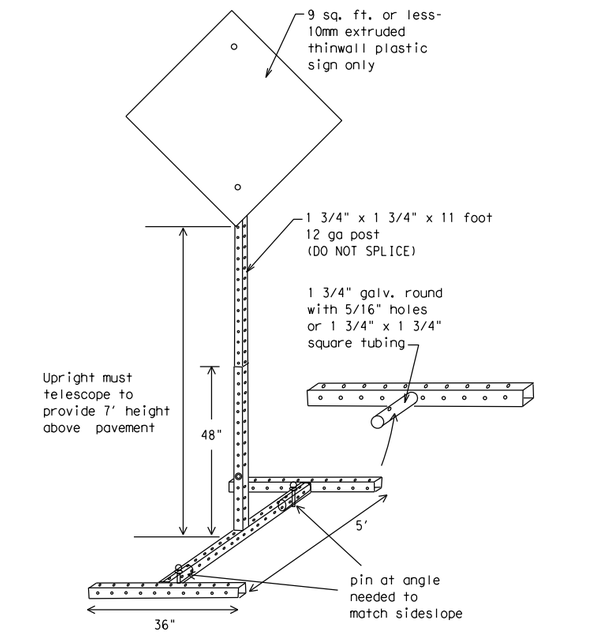
SKID MOUNTED WOOD SIGN SUPPORTS

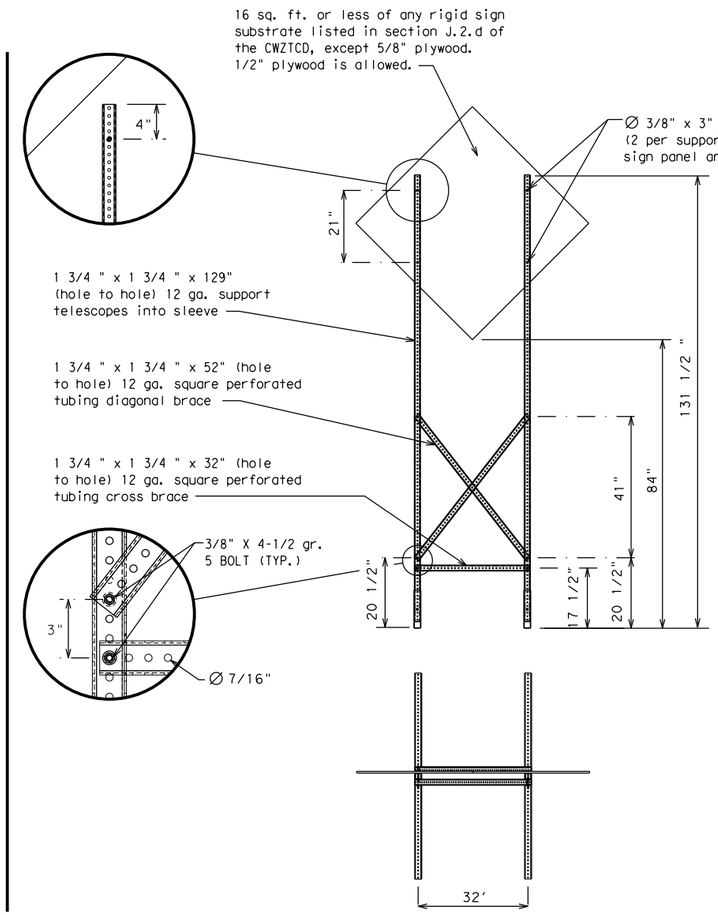
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

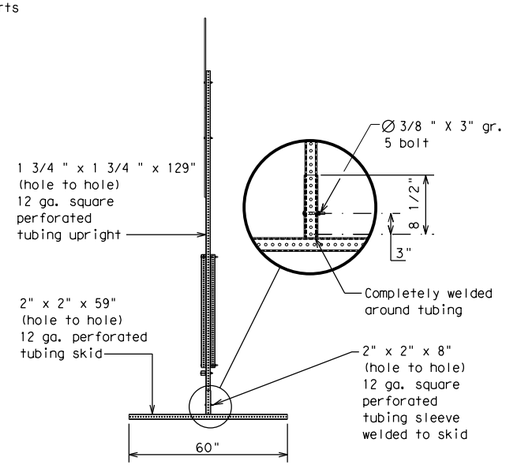


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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7-13 5-21	DAL	DENTON		38

DATE: 10/2/2023 10:45:02 PM
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

* 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

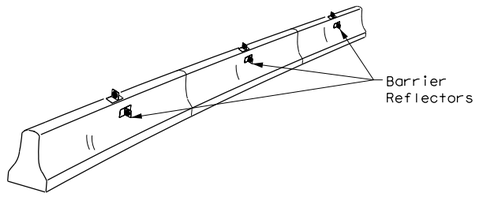
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		39

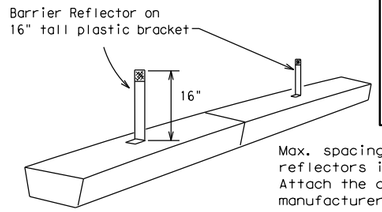
100

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.



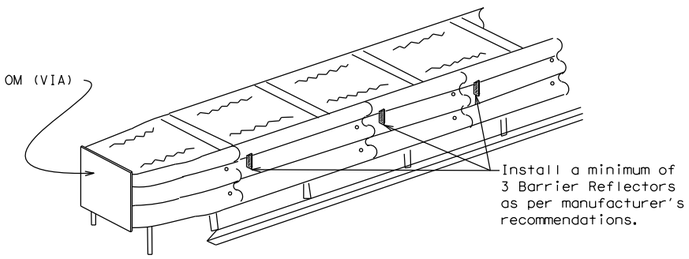
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

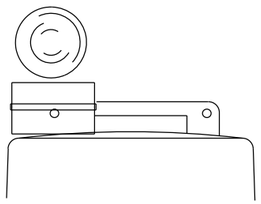
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

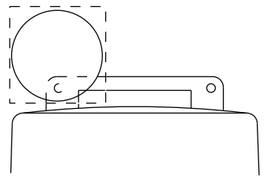
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

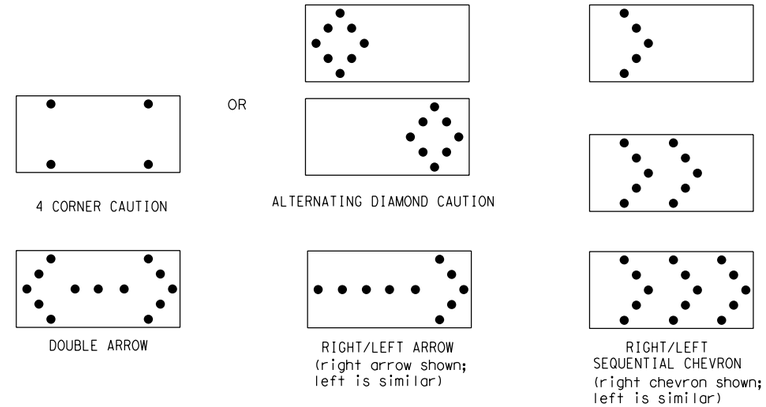
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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:



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW
(right arrow shown;
left is similar)

RIGHT/LEFT
SEQUENTIAL CHEVRON
(right chevron shown;
left is similar)

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.

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	0195	03	088,etc.	IH 35E
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		40

101

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

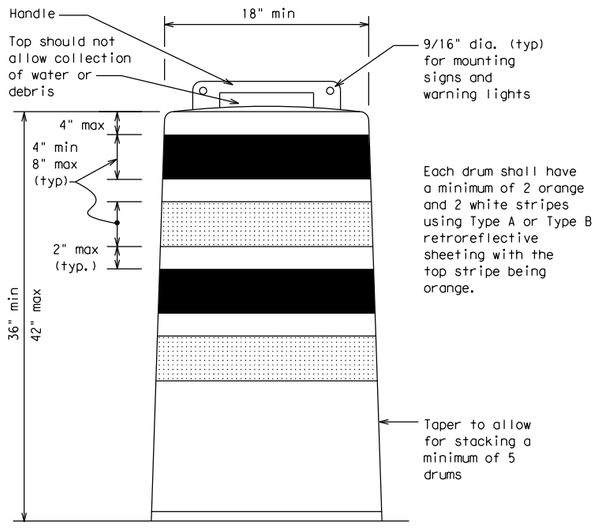
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

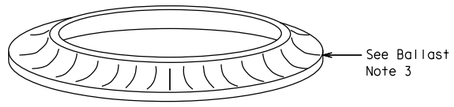
RETROREFLECTIVE SHEETING

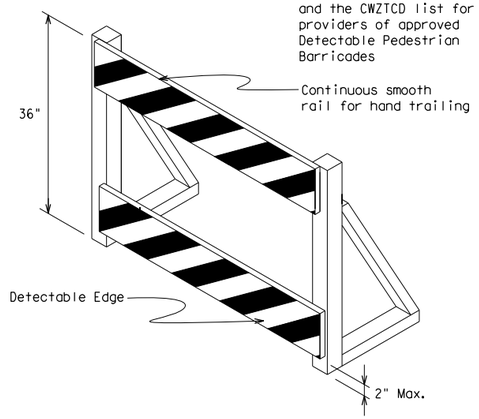
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

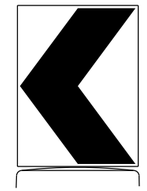




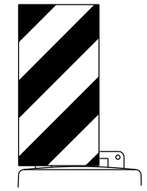


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	DAL	DENTON		41
7-13				

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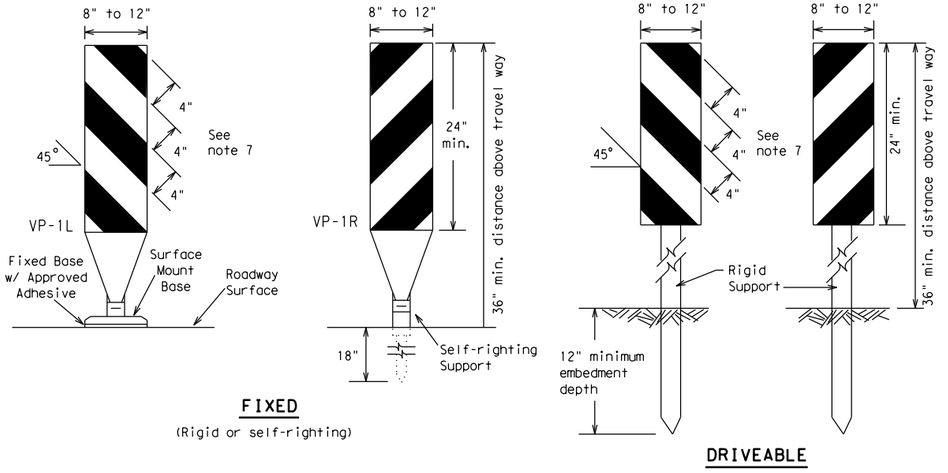
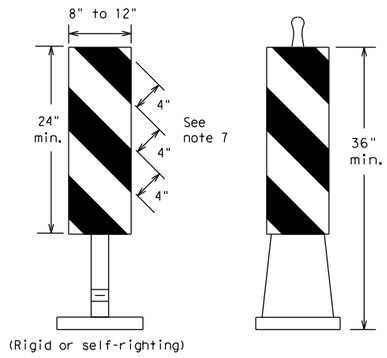


FIXED
(Rigid or self-righting)

DRIVEABLE

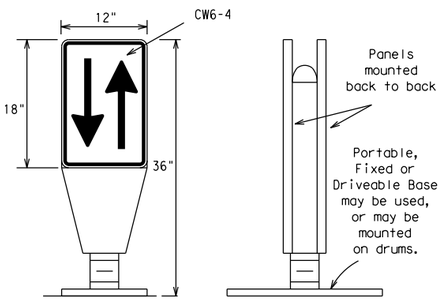


(Rigid or self-righting)

PORTABLE

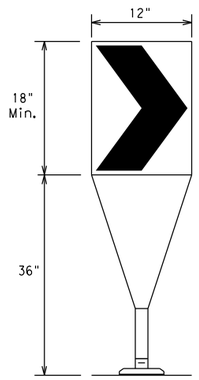
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



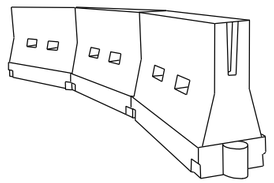
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

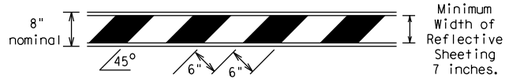
BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		42

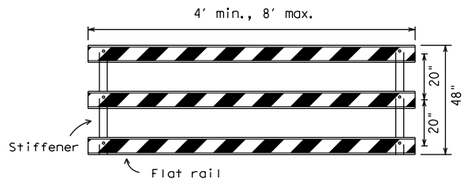
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



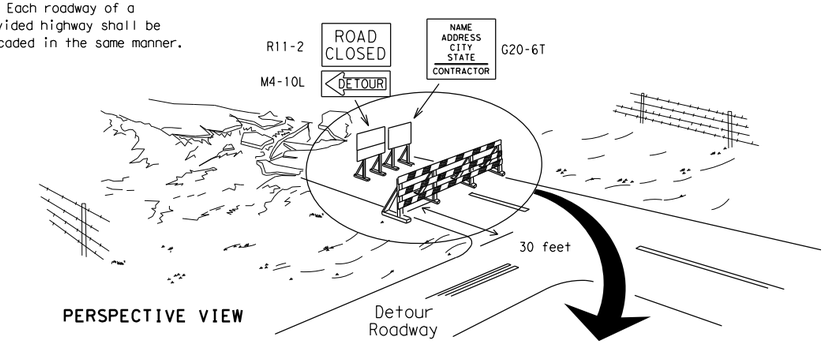
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

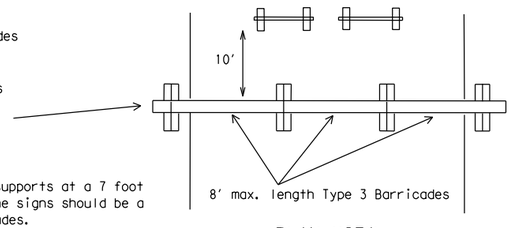
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

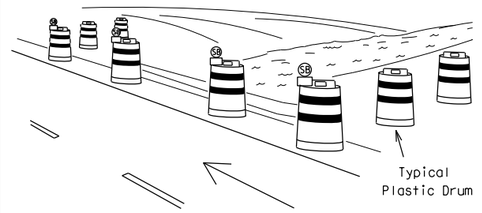
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

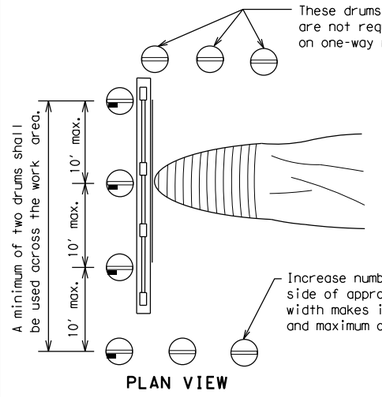
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

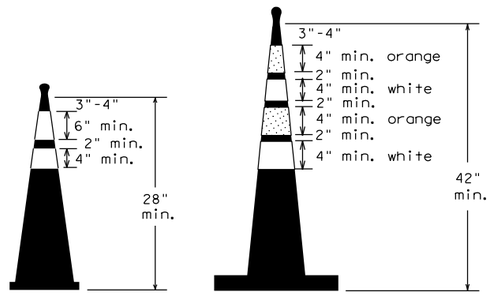
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



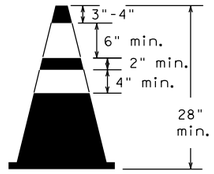
PLAN VIEW

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

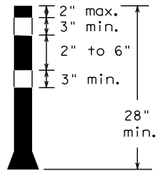
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

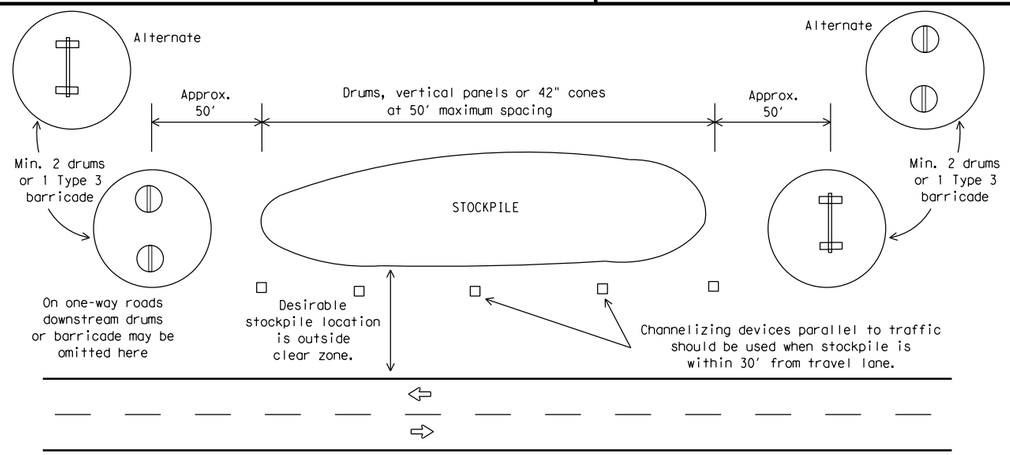


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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
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9-07 8-14	DIST	COUNTY		SHEET NO.
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

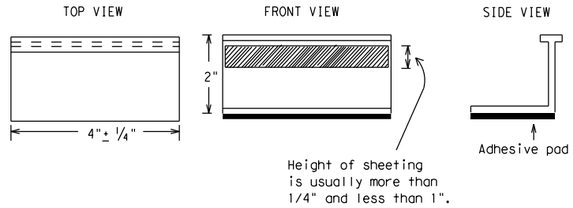
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
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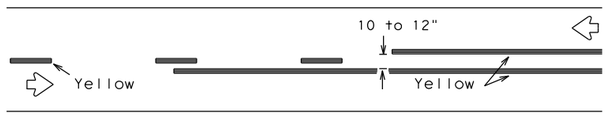
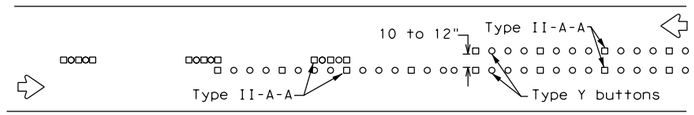
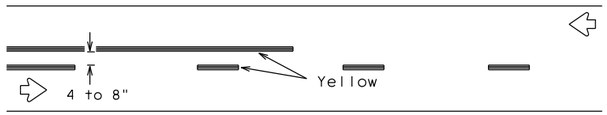
PAVEMENT MARKING PATTERNS



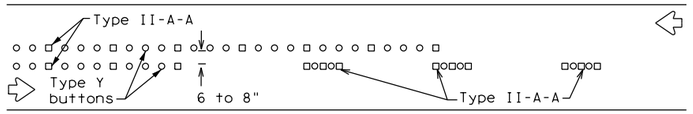
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



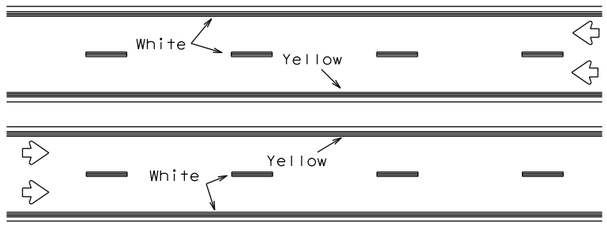
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



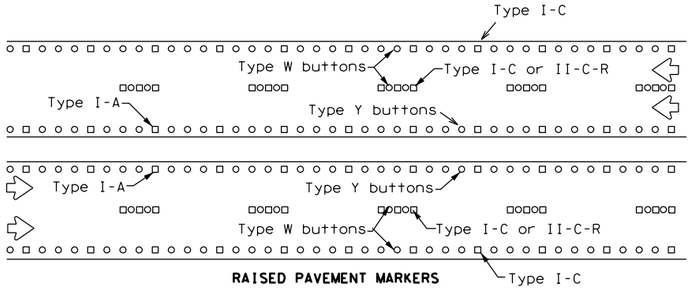
RAISED PAVEMENT MARKERS - PATTERN B

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

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



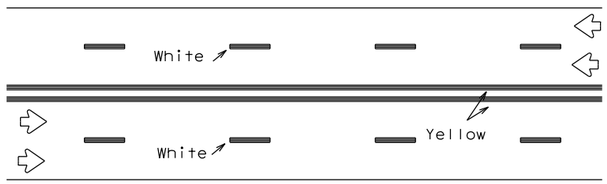
REFLECTORIZED PAVEMENT MARKINGS



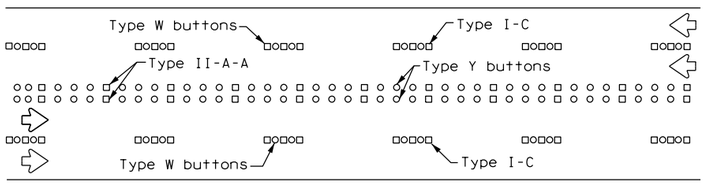
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



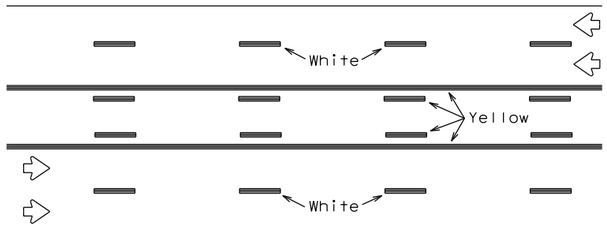
REFLECTORIZED PAVEMENT MARKINGS



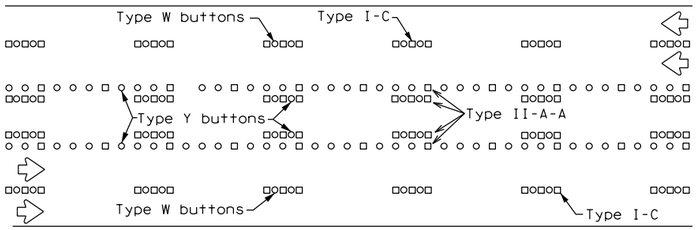
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

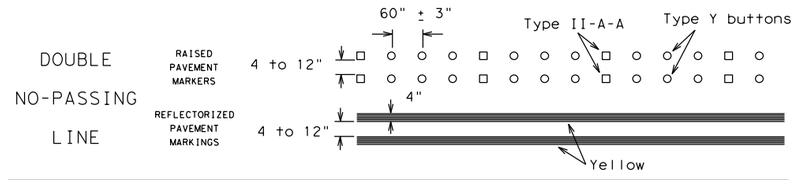
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

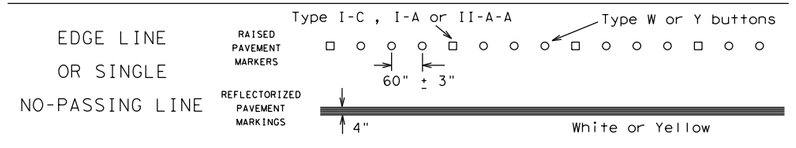
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

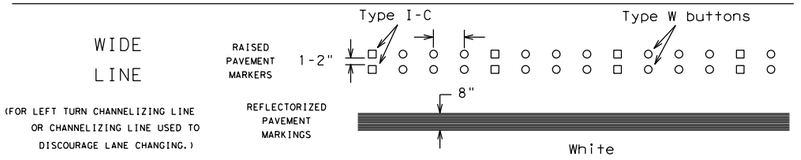


EDGE LINE OR SINGLE NO-PASSING LINE



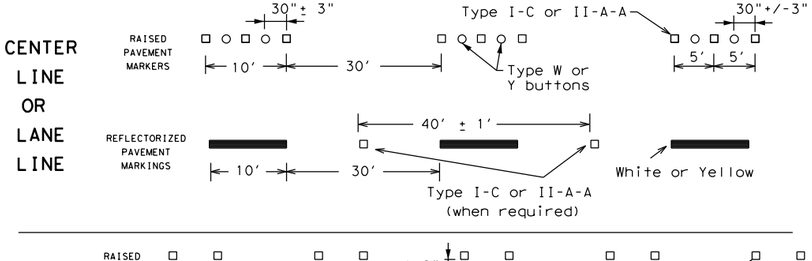
WIDE LINE

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

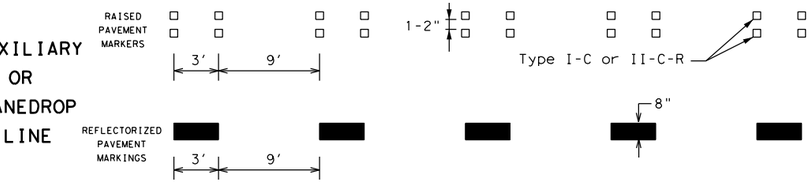


BROKEN LINES

CENTER LINE OR LANE LINE

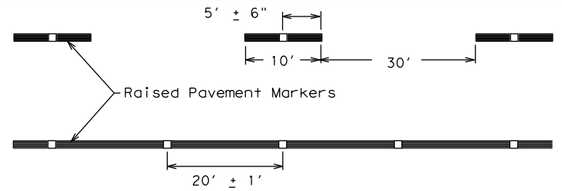


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

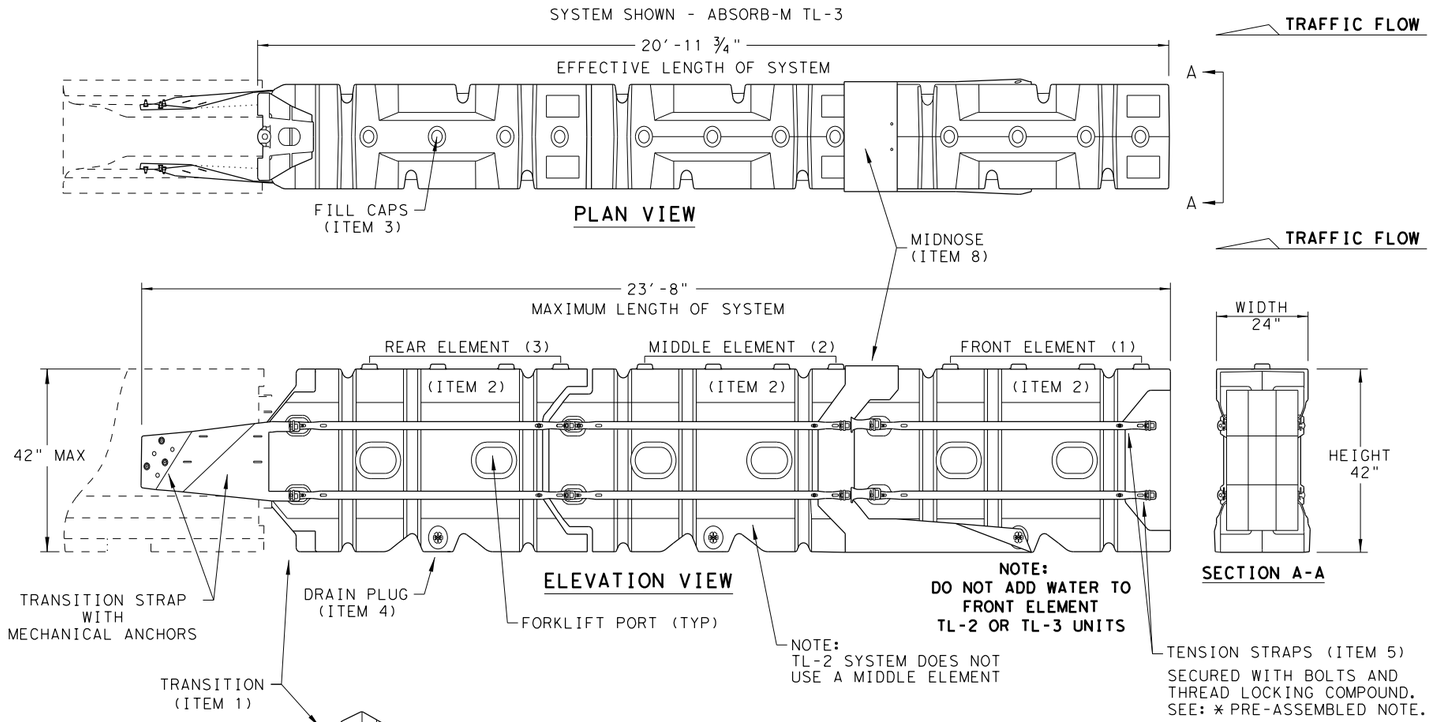
BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
1-97 9-07 5-21	DIST	COUNTY		SHEET NO.
2-98 7-13	DAL	DENTON		45
11-02 8-14				

106

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0555314\absorbm19 (1).dgn

SYSTEM SHOWN - ABSORB-M TL-3



THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

NOTE:
CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.

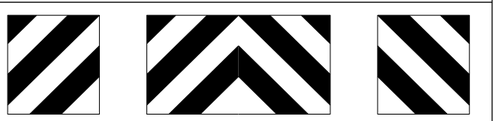
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

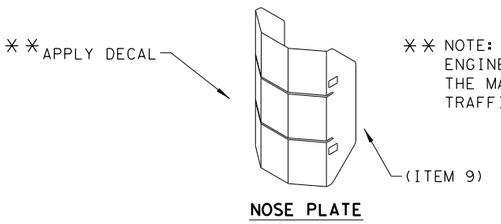
BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
* 6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
* 7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE-(GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE



TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER



NOSE PLATE

** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

Texas Department of Transportation — Design Division Standard

LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		46

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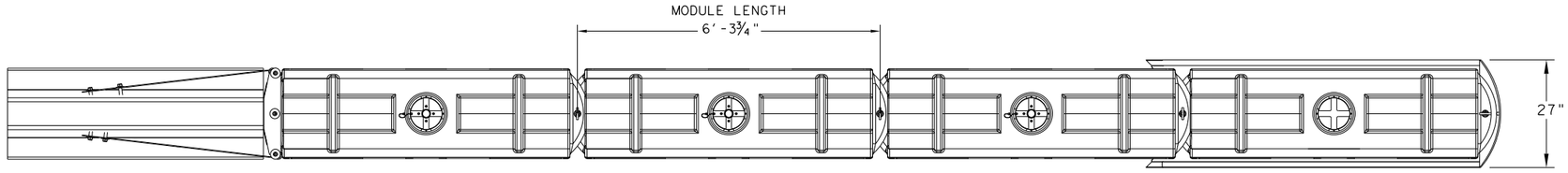
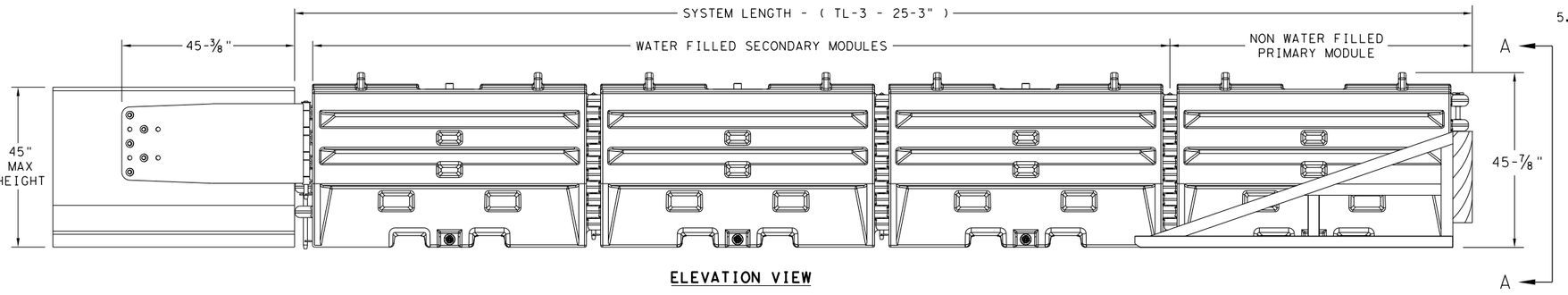


PLAN VIEW



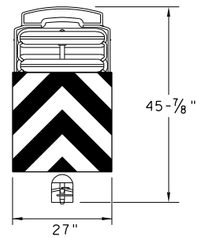
ELEVATION VIEW

GENERAL NOTES

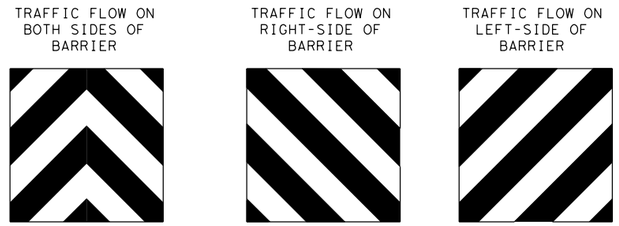
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25′ 3"

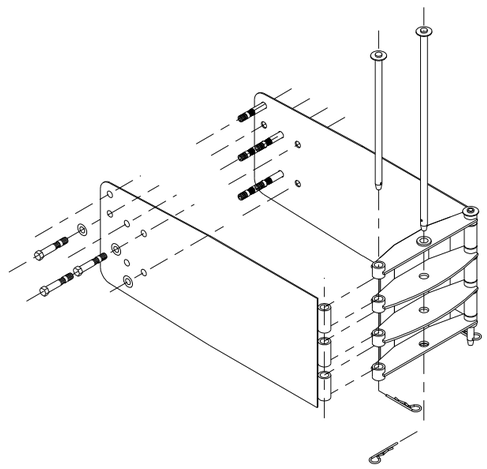


SECTION A-A



NOSE SHEETING PANEL DELINEATION

NOTE:
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

BILL OF MATERIAL

PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1

Texas Department of Transportation

Design Division Standard

SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		47

DATE: 5/28/2024
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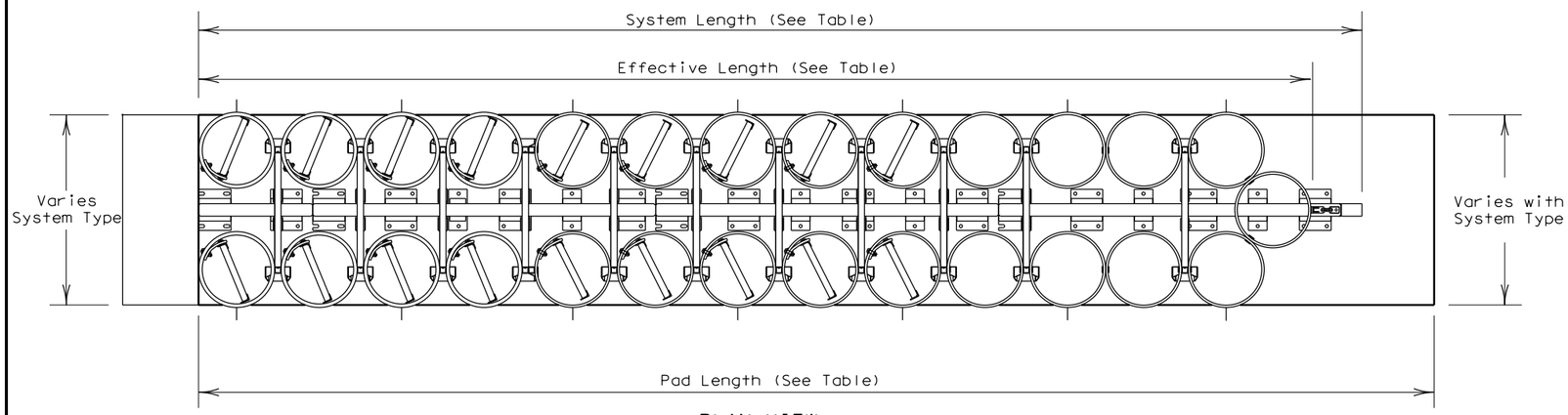
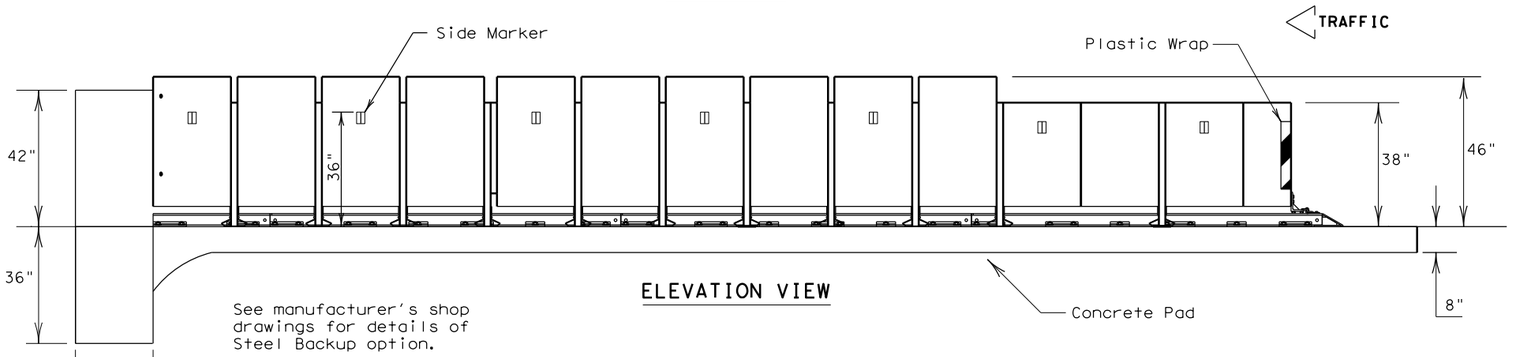
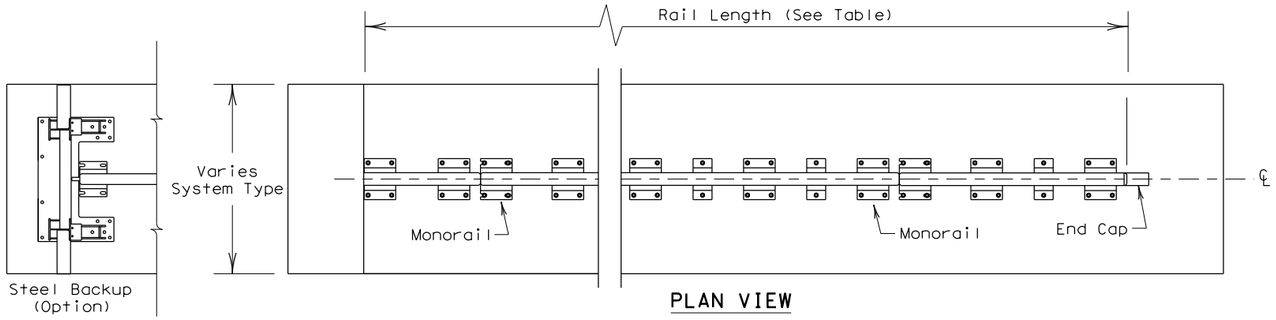


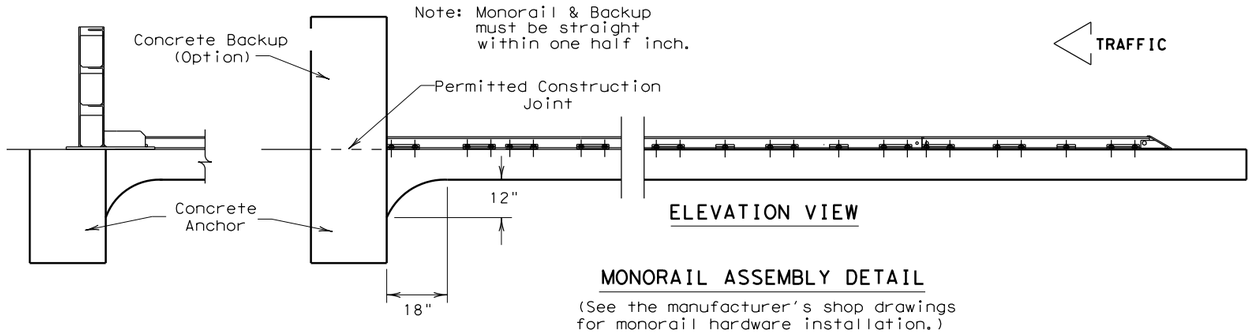
PLAN VIEW



ELEVATION VIEW



PLAN VIEW



ELEVATION VIEW

MONORAIL ASSEMBLY DETAIL

(See the manufacturer's shop drawings for monorail hardware installation.)

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Trinity Highway - Energy Absorption at 1(888)323-6374. 70 W. Madison St. Suite 2350. Chicago, IL 60602
2. The nose of the REACT 350 shall be clad with a plastic wrap with standard delineation adhered to the wrap and shall have a series of side marker reflectors on both sides of the unit. See site plan views for marker and plastic wrap color orientation.
3. For bi-directional traffic, appropriate transition details will be as shown on the manufacturer's shop drawings.
4. Details of components for the REACT(W) and backups and reinforcing details will be shown on the manufacturer's shop drawings furnished to the Engineer.
5. If the cross-slope varies more than 2% over the length of the system, the concrete pad will require leveling. Maximum permissible cross-slope is 8%.
6. The installation area should be free from curbs, elevated objects, or depressions.
7. The REACT(W) system should be approximately parallel with the barrier or ℄ of merging barriers.
8. All steel components to be hot dipped galvanized except stakes, drive spikes, threaded bolts in backup unit, and wedge fittings on cables.

WIDE REACT SYSTEMS					
SYSTEM TYPE	BACKUP WIDTH	TEST LEVEL	SYSTEM LENGTH	EFFECTIVE LENGTH	PAD LENGTH
W60	60"	TL-2 TL-3	18'-10" 30'-10"	16'-3" 29'-3"	19'-6" 32'-6"
W96	96"	TL-2 TL-3	18'-10" 34'-9"	17'-6" 32'-10"	19'-7" 35'-6"
W120	120"	TL-3	33'-10"	32'-2"	35'-6"

(See the manufacturer's shop drawings for additional details.)

ANCHOR SYSTEM TYPE
MP-3® polyester anchoring system with 7.5" studs, 5.5" embedment
FOUNDATION TYPES
Minimum 8" Reinforced concrete pad (Required reinforcing steel for concrete pad shall be shown on the manufacturer's shop drawings. Minimum 8" Non-reinforced concrete roadway (Measuring at least 12' wide by 50' long) Minimum 7" Concrete deck structure, or Minimum 6" Reinforced concrete roadway

LOW MAINTENANCE

Texas Department of Transportation — Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION CRASH CUSHION (REACT 350 WIDE)

REACT(W)-16

FILE: reactw16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: October 2001	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
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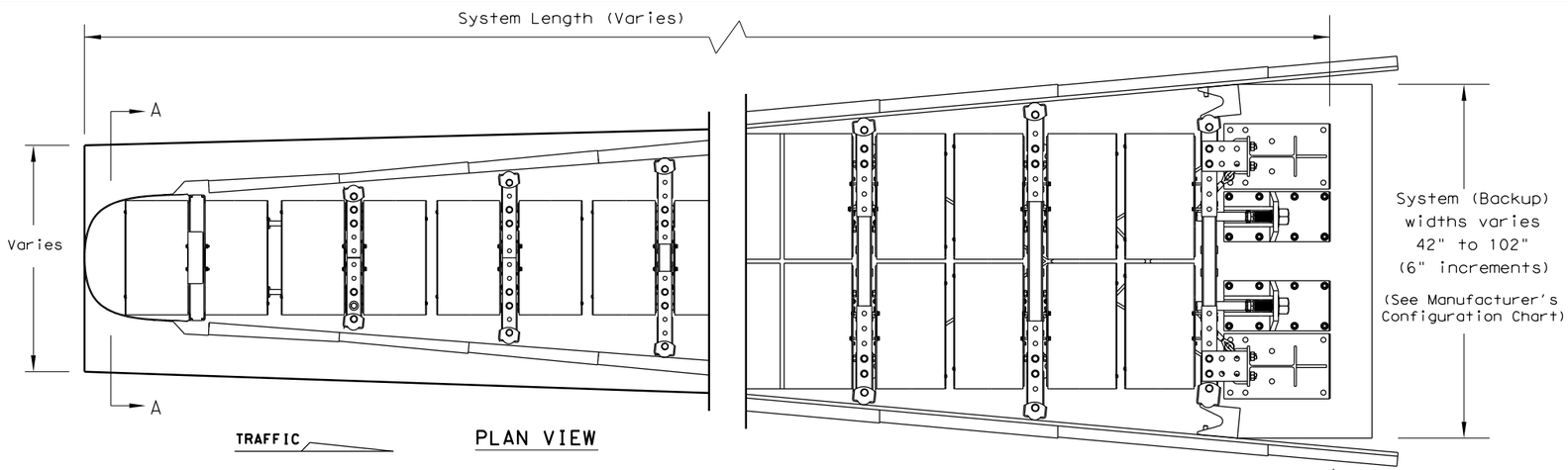
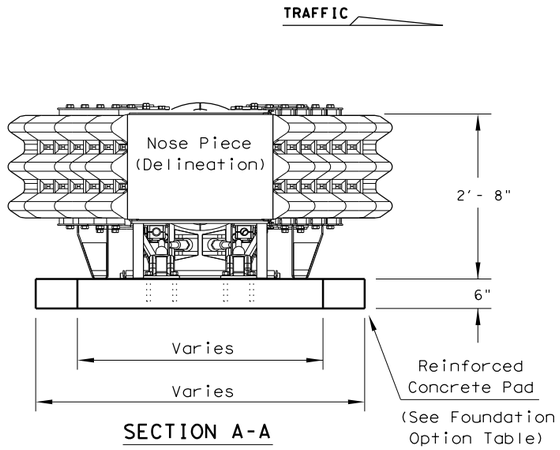




Nose Piece delineation orientation, is shown elsewhere on the plans.

BACKUP SUPPORT OPTIONS
Wide Flange (Stand alone)

Backup and Transition types are shown elsewhere on the plans, (i.e. Attenuator location details or in the general notes).

TAU-II-R (WIDE) SYSTEM LENGTHS			
SYSTEM WIDTH	TL-2	TL-3	70 mph
42"	15'-4"	29'-5"	32'-3"
48"	15'-4"	29'-5"	32'-3"
54"	15'-4"	29'-5"	32'-3"
60"	12'-5"	29'-5"	32'-3"
66"	12'-5"	26'-7"	29'-5"
72"	12'-5"	26'-7"	26'-7"
78"	12'-5"	26'-7"	26'-7"
84"	12'-5"	26'-7"	26'-7"
90"	12'-5"	26'-7"	26'-7"
96"	12'-5"	26'-7"	26'-7"
102"			26'-7"

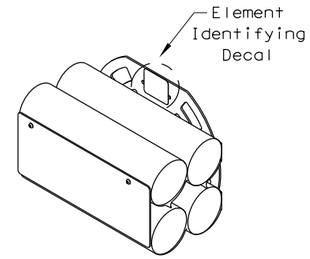
Note: System Lengths are +/-2"

FOUNDATION OPTIONS
6" Reinforced Concrete
8" Unreinforced Concrete
Asphalt over Concrete with Minimum 6" Embedment in Concrete

For steel placement in concrete foundations. (See manufacturer's product manual)

TRANSITION OPTIONS
Vertical Wall
Concrete Traffic Barriers
W-Beam Guardrail
Thrie Beam Guardrail

For bi-directional transition panel and end shoe details. (See manufacturer's product manual)



ENERGY ABSORBING ELEMENTS (EAE)

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Lindsay Transportation Solutions - Barrier Systems, Inc. at (707) 374-6800. 180 River Road, Rio Vista, CA 94571
2. For bi-directional traffic, appropriate transition panels will be required.
3. Additional details for the backup support option, transition option and foundation option will be shown on the manufacturer's shop drawings furnished to the Engineer.
4. Concrete shall be class "S" with a minimum compressive strength of 4,000 psi
5. Maximum permissible cross-slope is 8%.
6. The installation area should be free from curbs, elevated objects, or groud depressions.
7. The TAU-II-R system should be installed approximately parallel with the barrier or center of merging barriers.
8. Refer to Universal TAU-II-R configuration chart for system configuration numbers and location of each type of energy absorbing element.

BILL OF MATERIAL

PRODUCT CODE	QTY	DESCRIPTION
B030704	1	Front Support
B030703	TBD	Mid Support
TBD	TBD	XL Bulkhead
TBD	TBD	XXL Bulkhead
TBD	TBD	XXXL Bulkhead
TBD	1	Backstop Assembly (See Table)
TBD	2	Front Cable Anchor
TBD	1	Nose Assembly
B010202	TBD	Sliding Panel
B010659	2	End Panel
K001003	1	Slider Assembly Kit
BSI-1202006-KT	TBD	TAU-II-R Slider Kit
BSI-1107131-KT	TBD	TAU-II-R EAE Mounting Hw Kit
BSI-1012069-00	TBD	Energy Absorbing Element, Type 1
BSI-1012070-00	TBD	Energy Absorbing Element, Type 2
BSI-1012071-00	TBD	Energy Absorbing Element, Type 3
BSI-1109042-00	TBD	Energy Absorbing Element, Type 1S
BSI-1107116-00	TBD	Energy Absorbing Element, Type 2S
BSI-1110009-00	TBD	Energy Absorbing Element, Type 3N
TBD	TBD	Cable Assembly
K001031	TBD	Lateral Support Kit
K001004	TBD	Cable Guide Kit
K001005	2	Front Support Leg Kit
TBD	1	Anchoring Package

(TBD) = To Be Determined, depending on Backup Type and System Length.
(See manufacturer's product manual for details)

Texas Department of Transportation

Design Division Standard

LTS-BARRIER SYSTEMS CRASH CUSHION (R-WIDE)

TAU-II-R(W)-16

FILE: tauiirw16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL
©TxDOT: January 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
REVISED 06,2013 (VP)	DIST	COUNTY		SHEET NO.
REVISED 02,2016 (VP)	DAL	DENTON		49

LOW MAINTENANCE

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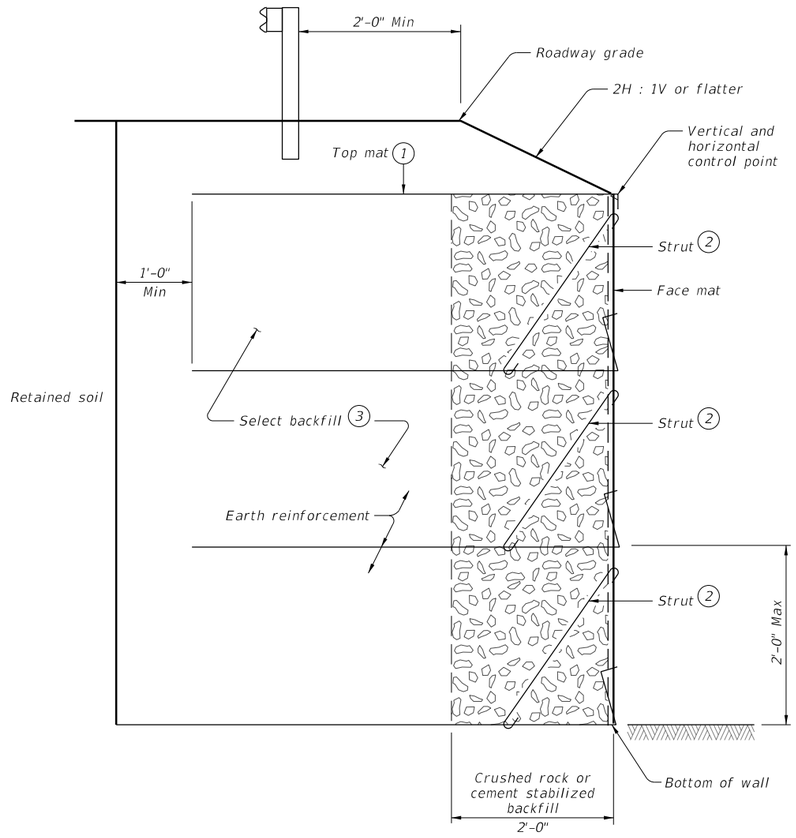
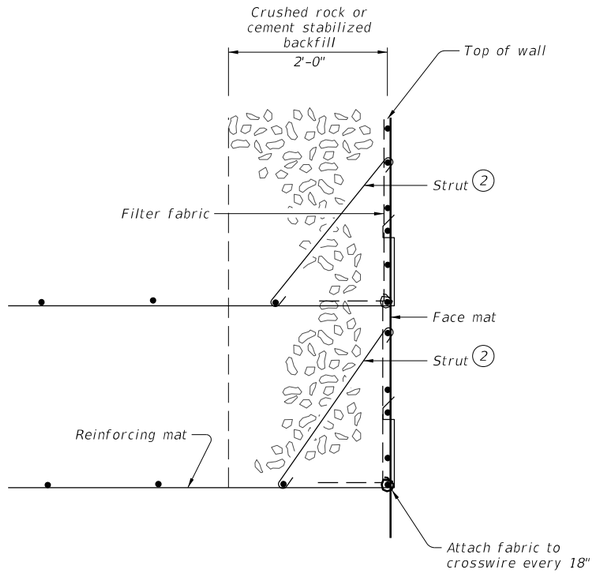


TYPICAL SECTION

(Showing top mat option.)



DETAIL OF WALL FACE

(Showing strut option.)

(1) Provide top mat to stabilize top of wall. Contractor may propose alternate method to stabilize top of wall for review.

(2) Provide intermediate struts to stabilize face. Wall supplier may propose alternate methods of face stabilization for review.

(3) Shop drawings must include drainage provisions and details for backfill composed of:
Cement stabilized sand,
Crushed concrete, or
Type CS fill with a fines content greater than 15%.

SPECIAL NOTE - FACE CONSTRUCTION

When constructing wire faced walls, it is critical that the area immediately behind the face mat be completely filled. Failure to fill and compact this area will result in bulging of the face mats and settlement of the top of wall. The filter fabric shall closely follow the contours of the face unit, with particular attention paid to the lower corner of the basket. Pull the fabric into the corner and attach to the basket with hog rings or tie wire. Extend the coarse rock or cement stabilized backfill in the 2-foot zone behind the face completely to the top of the face mat. Take particular care not to leave a gap or void below the next layer of earth reinforcement.

DESIGN CRITERIA NOTES:

Design Parameters:
Base design of retaining walls on the following design parameters unless stated elsewhere in the plans:

Random Backfill (Embankment or Existing Soils)	Unit Weight = 120 pcf ϕ = 30° C = 0 psf
Select Backfill	Unit Weight = 120 pcf ϕ = 30° C = 0 psf

Limit allowable stresses and pullout of earth reinforcement in accordance with current AASHTO Standard Specifications for Highway Bridges and Interim Specifications.

Stability Criteria:
Base design on the following factors of safety:

Sliding along the base of the structure	Factor of Safety ≥ 1.5
Overturning	Factor of Safety ≥ 2.0
Pullout of Earth Reinforcement	Factor of Safety ≥ 1.5

Design the wall such that the base pressure resultant falls within the middle third of the retaining wall.

EARTH REINFORCEMENT:

Space vertical earth reinforcement at 24 inch maximum.
Provide earth reinforcement lengths adhering to the following:
6-foot minimum for walls 6 feet and shorter
8-foot minimum for walls over 6 feet tall,
or as shown elsewhere in the plans.
Utilize a minimum W4.5 wire size for welded wire earth reinforcement. Space longitudinal wire at maximum of 12 inches and transverse wire at a maximum of 24 inches.
Geogrid earth reinforcement is permissible. If geogrid is to be used, provide a detail showing the connection between the welded wire face basket and the geogrid earth reinforcement.
Provide non-metallic or galvanized reinforcement for any temporary earth wall reinforcement that will be placed in the reinforced volume of a permanent MSE wall.

WALL FACE:

Provide welded wire in facing with a minimum W4.5 wire size. Space wire at 6 inches maximum in both the horizontal and vertical directions. Design the facing to maintain a vertical position during wall backfilling. Utilize wire struts, external bracing, or other means which provide acceptable performance. Stop construction if the face does not remain vertical during wall backfilling until the system is modified to meet this requirement.
Provide angled struts or a top mat to stabilize the top basket face. Space struts at 24 inch maximum.

GENERAL NOTES:

Sections shown are for informational purposes only. Determine specific geometry based on wall layouts and other plan information.
Extend the select backfill specified for use within the temporary earth wall select volume a minimum of 1 foot horizontally beyond the end of the earth reinforcement from the back of the 2-foot backfill zone.

Texas Department of Transportation

Bridge Division Standard

TEMPORARY EARTH RETAINING WALL

RW(TEW)

FILE: RW-TEW-22.dgn		DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE		
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY			
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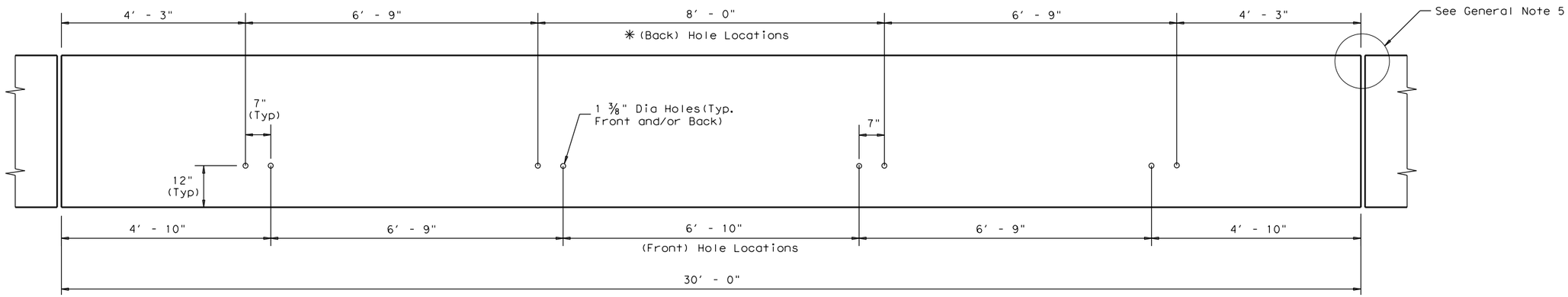
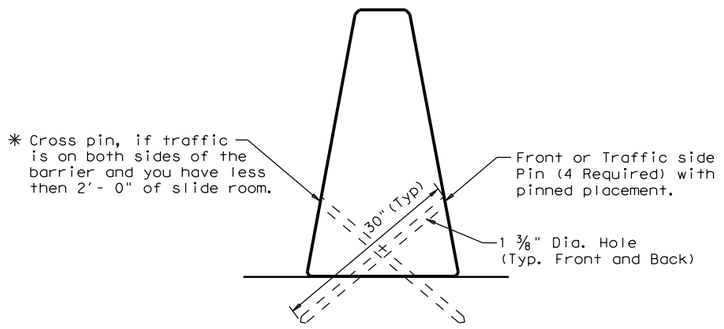


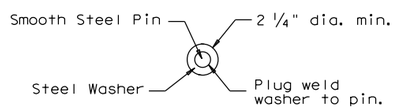
DETAIL 1

Precast SSCB(42")
Showing hole locations

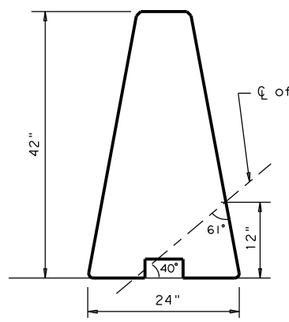


DETAIL 2

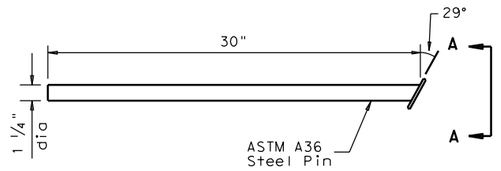
Placement on (ACP)
Asphalt Conc. Pavement
or Treated Base Material
(30" Pin required)



VIEW A-A

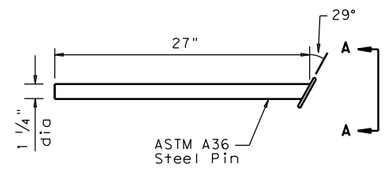


HOLE LOCATION DETAIL



(30") PIN DETAIL

See Detail 2



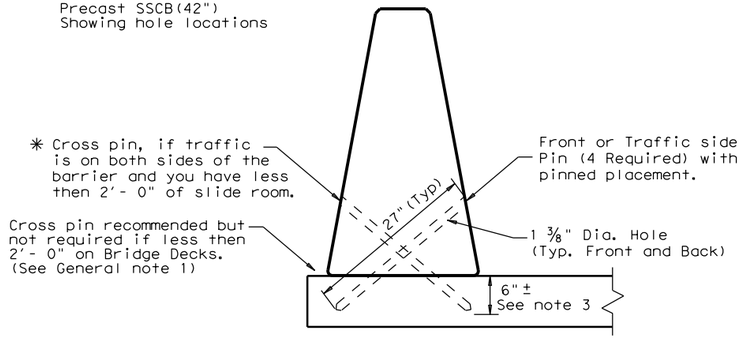
(27") PIN DETAIL

See Detail 3

Note:
Steel washer welded to pin at 29° angle so that the washer is flush with barrier surface. (See View A-A)

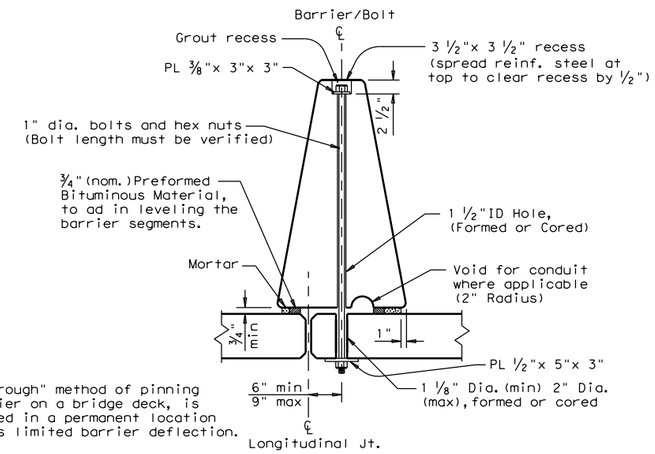
DETAIL 3

Bridge Deck or CRCP
(27" Pin required).



CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding ½" shall be patched.



Note:
The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.

PRECAST SSCB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

GENERAL NOTES

1. These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less then 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
2. Each precast concrete barrier section shall have a minimum of four or total of eight 1 3/8 in. ID holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
3. The drilling of the travel surface is accomplished by placing the pre-drilled barrier section on the travel surface in the desired position. Then the hole is drilled with the bit passing though the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travel surface is drilled to a point which is slightly more than the pin length.
4. Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
5. See SSCB(2) standard sheet for reinforcement requirements and joint connection types.
6. The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 1/4 in. pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
7. The barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
8. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
9. Weight of barrier is approx. 700 lbs per foot.

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)
PINNED PLACEMENT

SSCB(5)-10

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	DAL	DENTON		51

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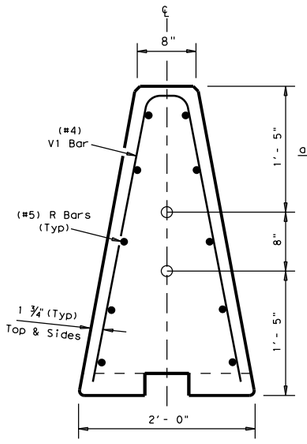
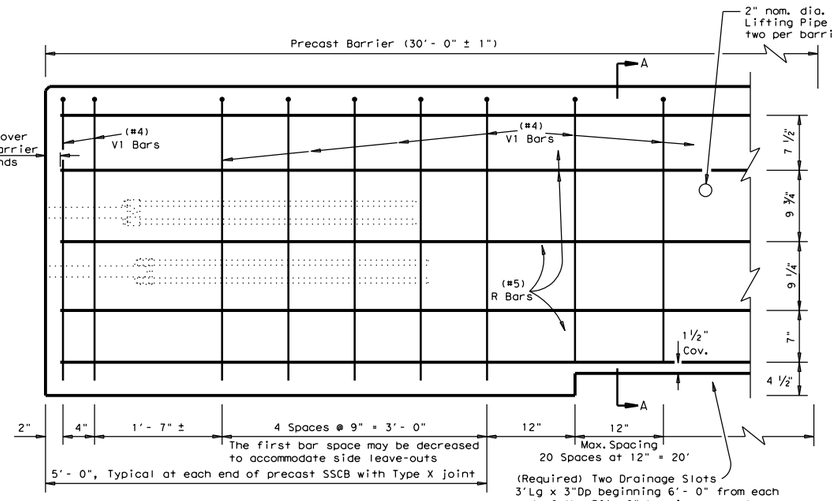


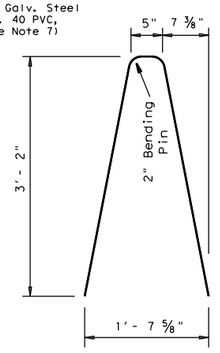
End View
Precast Barrier

Pipe locations for Joint
Type X connection



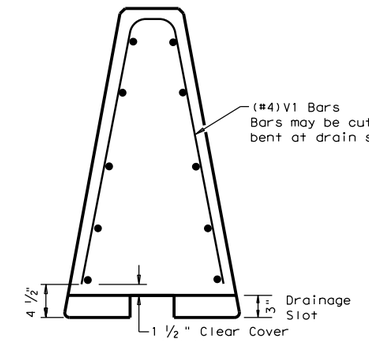
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



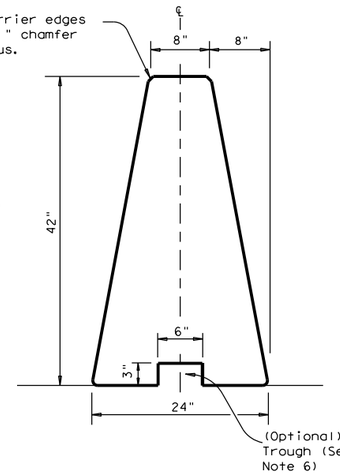
V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.



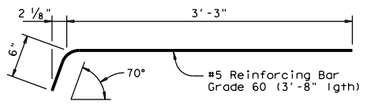
Section A-A
Steel Placement at
(Required) Drainage Slots

All precast barrier edges shall have a ¾" chamfer or tooled radius.



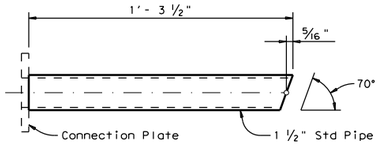
Single Slope Concrete Traffic Barrier

Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



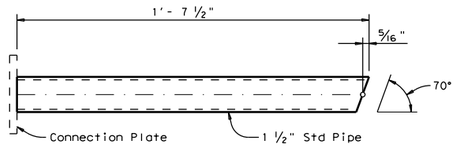
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



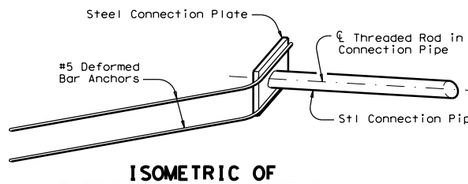
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.

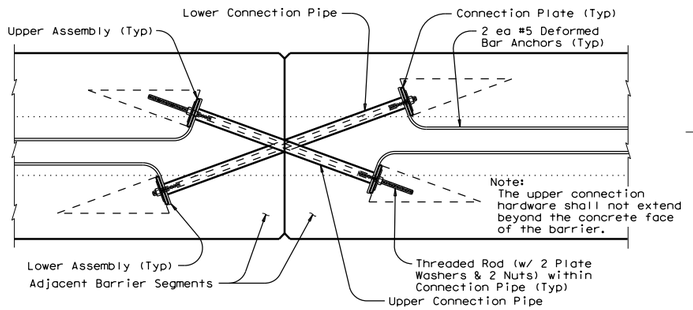


ISOMETRIC OF
TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower]
Assemblies required per Joint.

General Notes

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out
dimensions not shown for clarity.

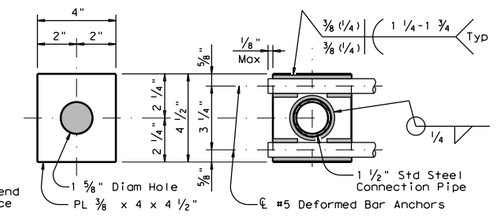
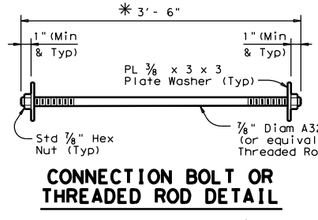


PLATE DIMENSIONS **WELDING DETAILS**

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.

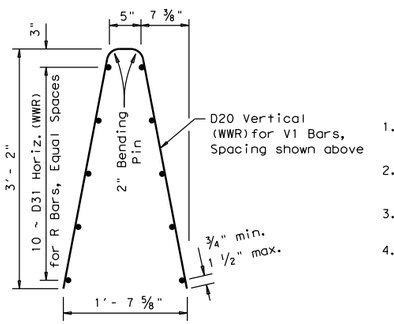


✳ The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

CONNECTION BOLT OR
THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL ⅜ x 3 x 3
Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

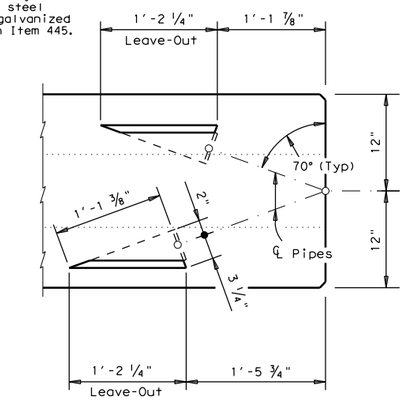
Weight of one precast 30 ft.
(SSCB) segment = Approx. 10.5 Tons
or 717 lbs per ft.



Welded Wire Reinforcement
(WWR) Option for Bars R and V1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



BARRIER PLAN AT JOINT

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

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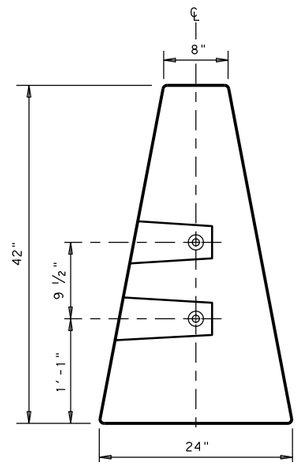
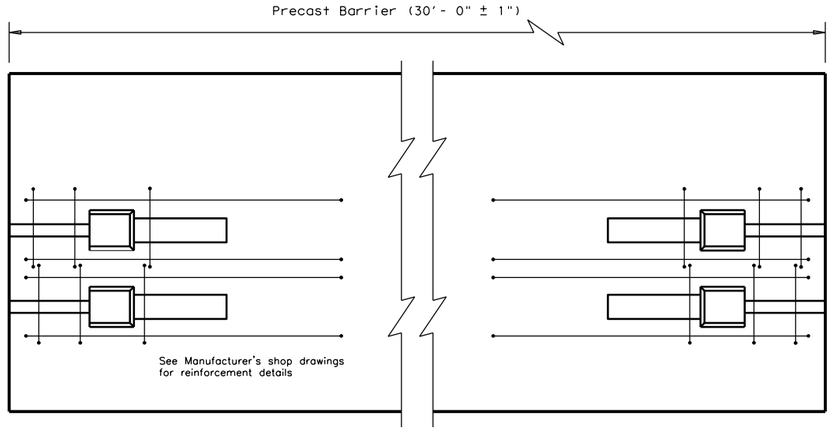
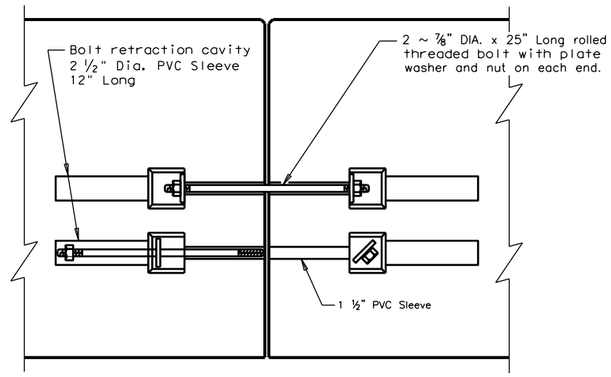


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

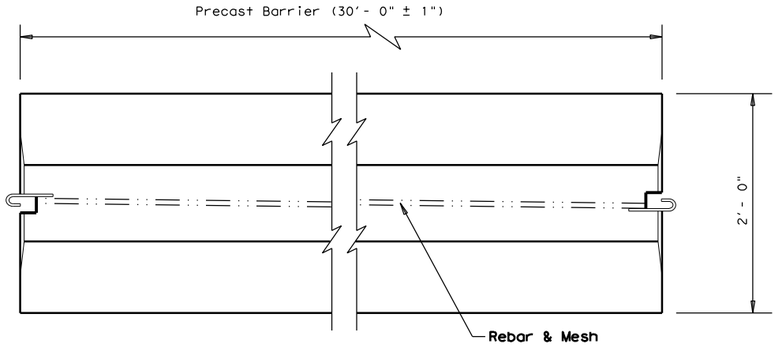


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

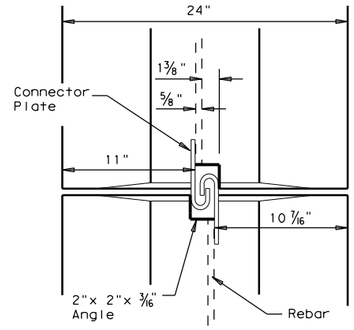


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

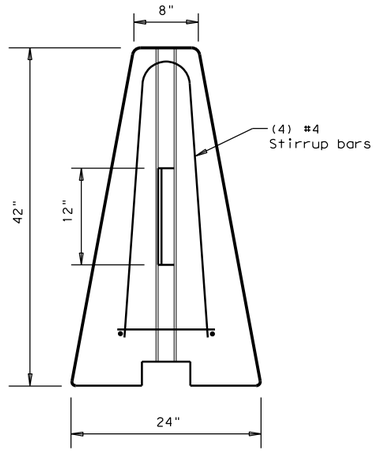
Joint Connection (Type Q)



TOP VIEW
PRECAST (SSCB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION



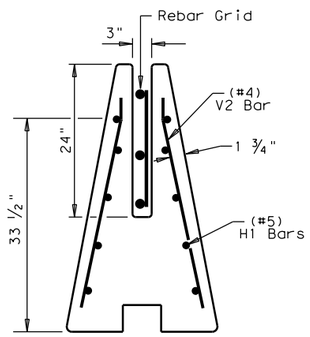
END VIEW

Proprietary Joint Connections (SSCB)

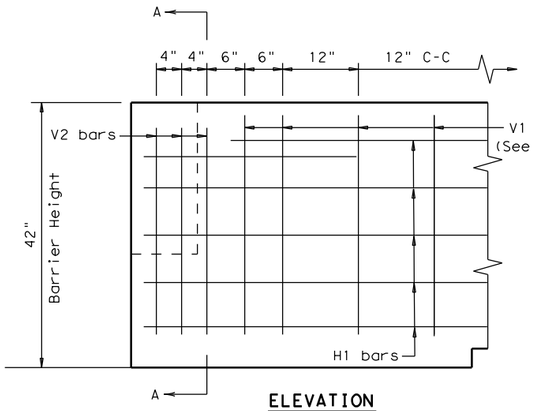
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

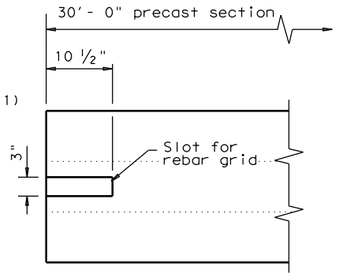
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



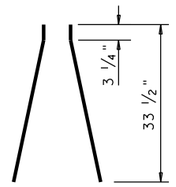
SECTION A-A
Showing (Type R) Rebar Grid



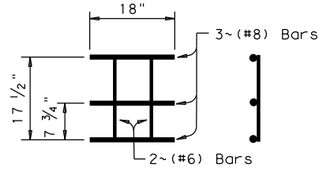
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per barrier segment



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

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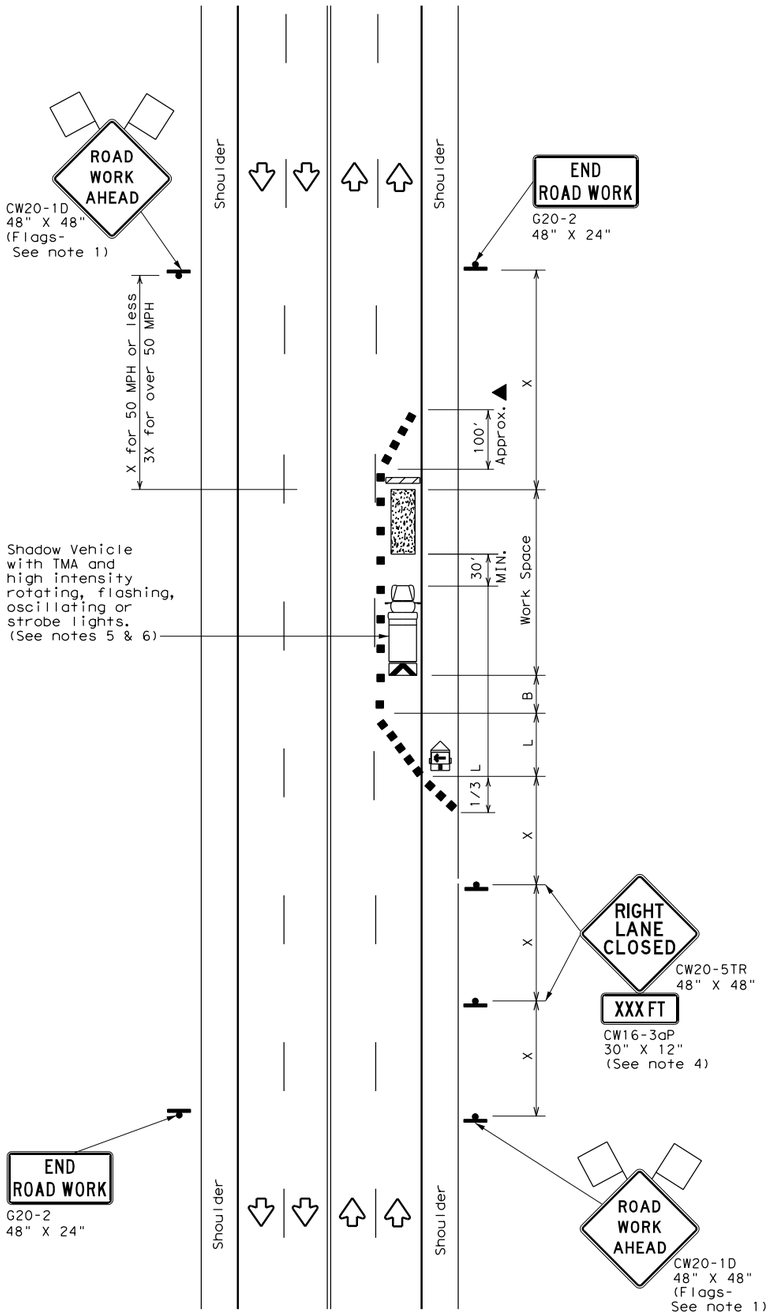
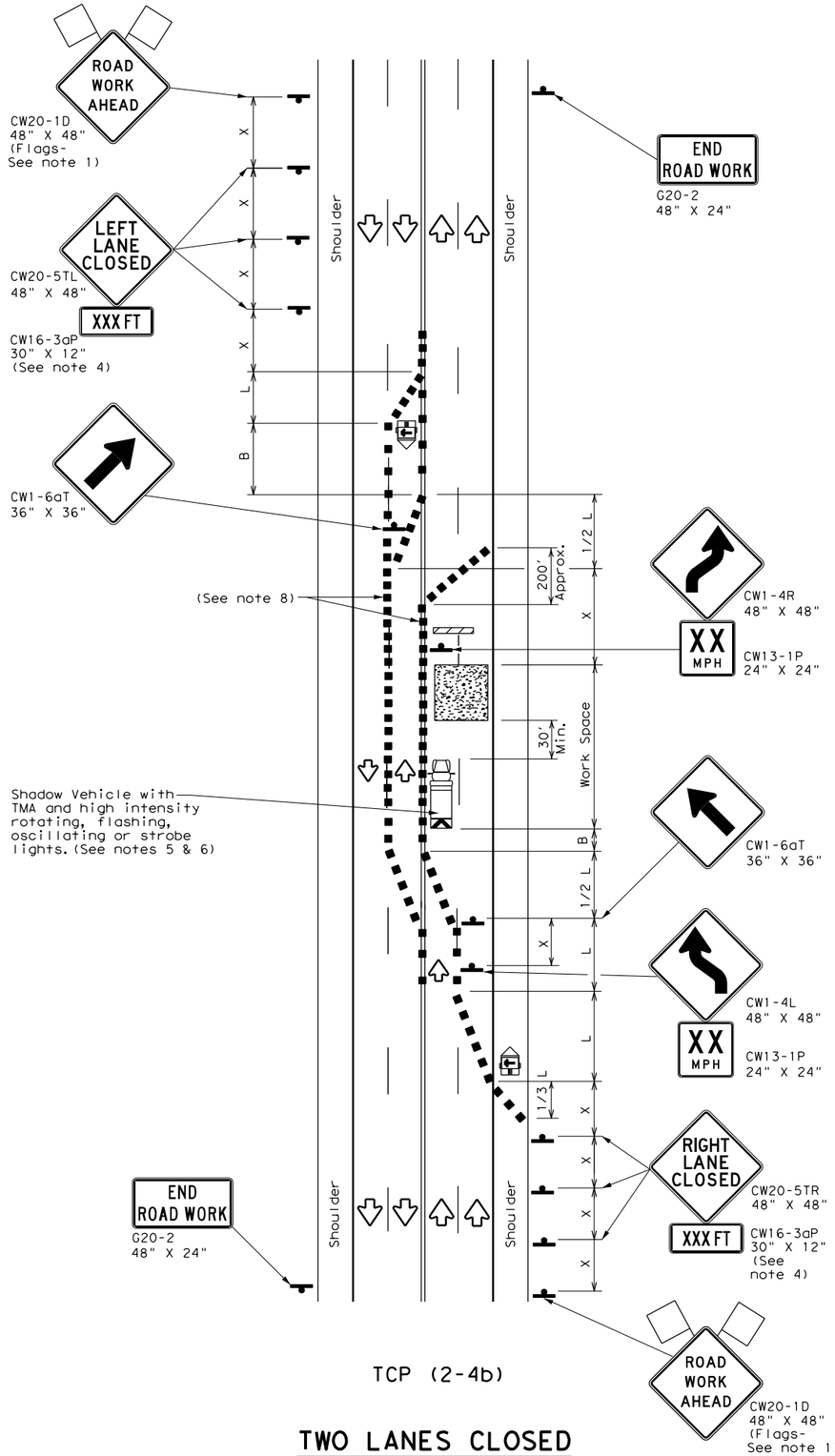


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0195	03	088,etc.	IH 35E
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	DAL	DENTON		54

DATE: 10/2/2023 10:48:02 PM
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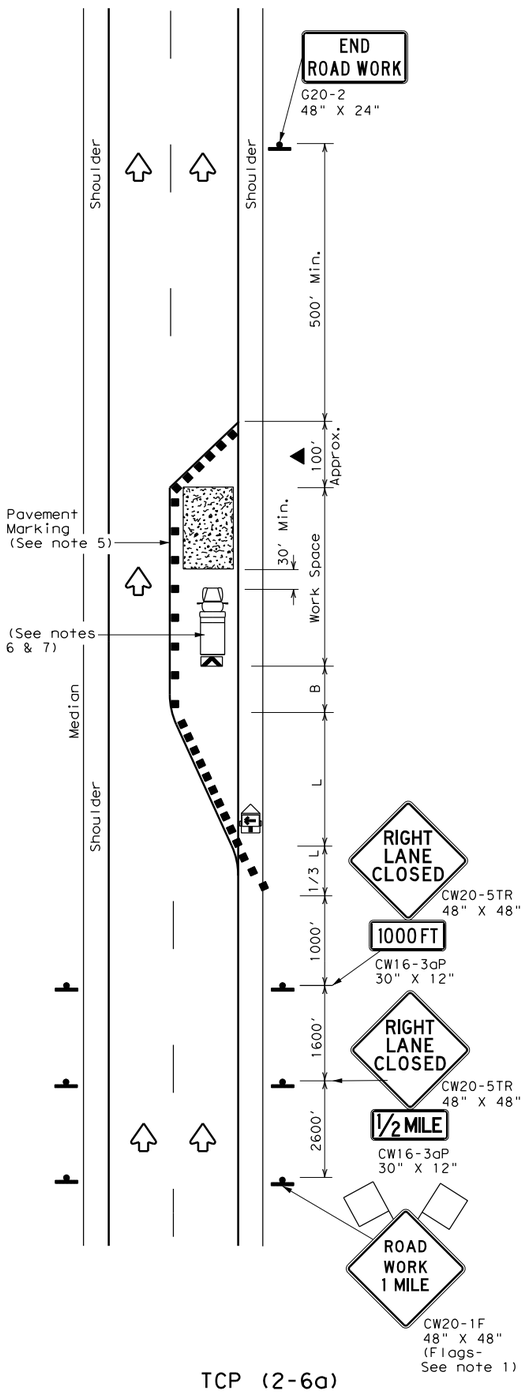
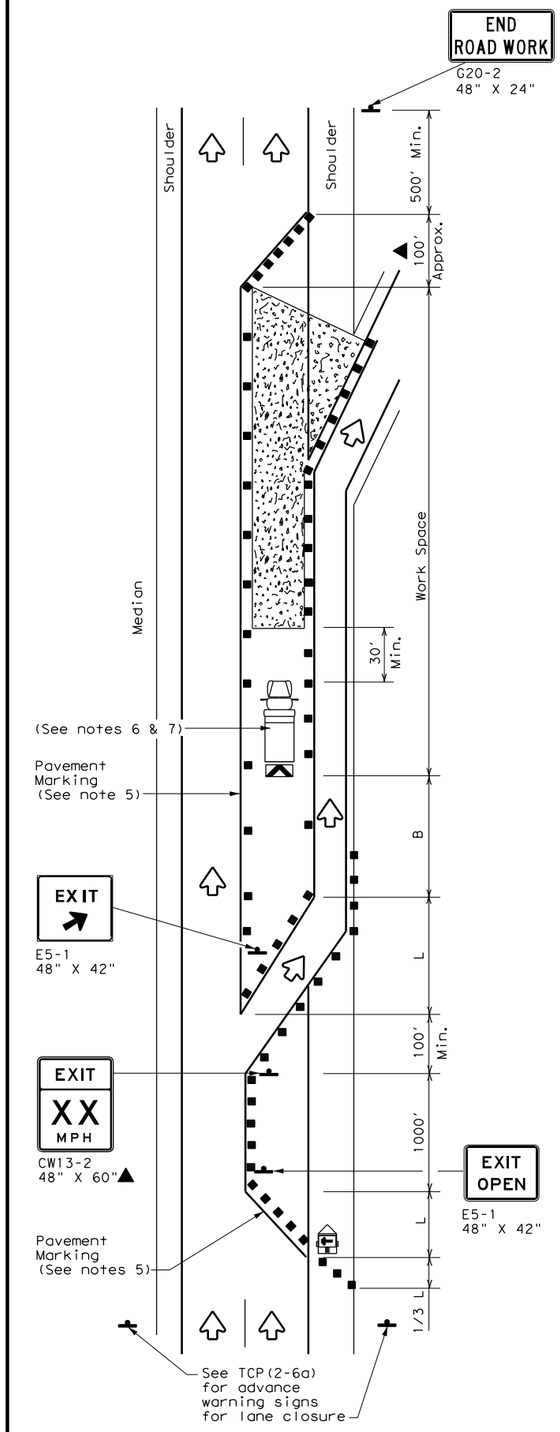


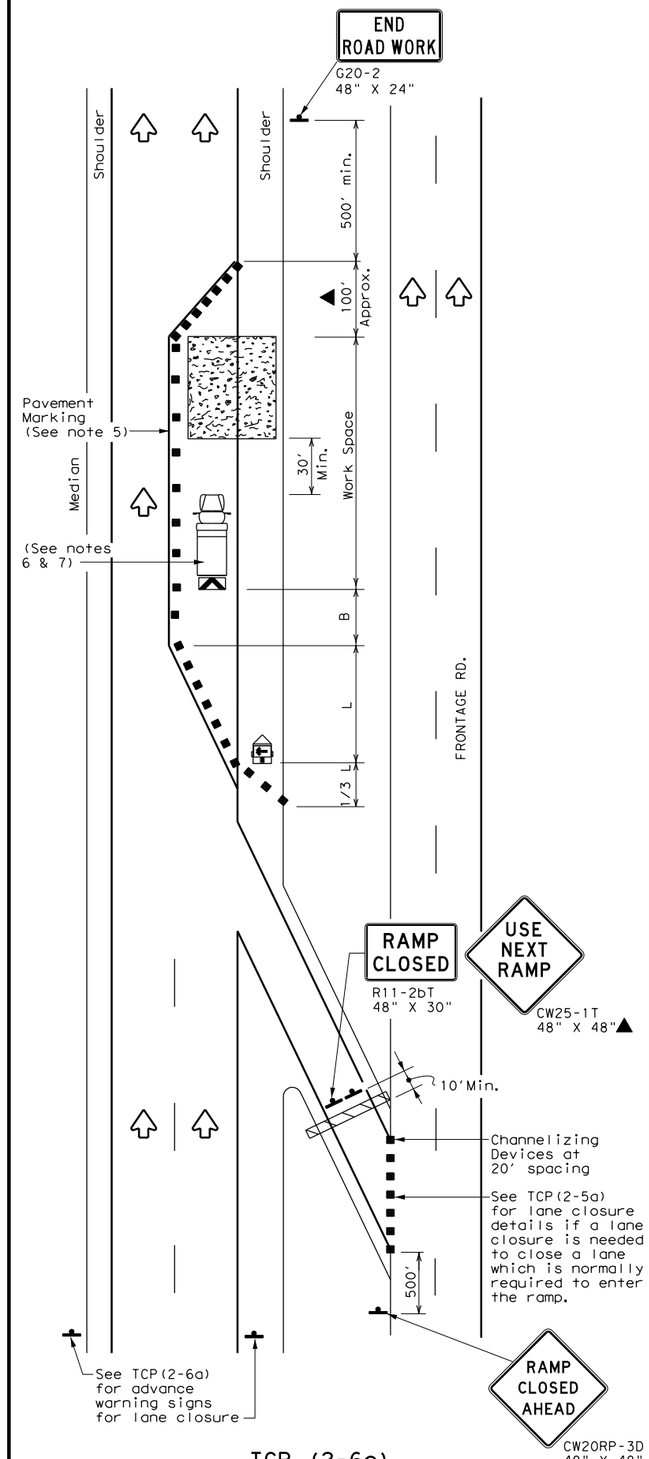
TCP (2-6a)

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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		55

DATE: 10/2/2023 10:48:29 PM
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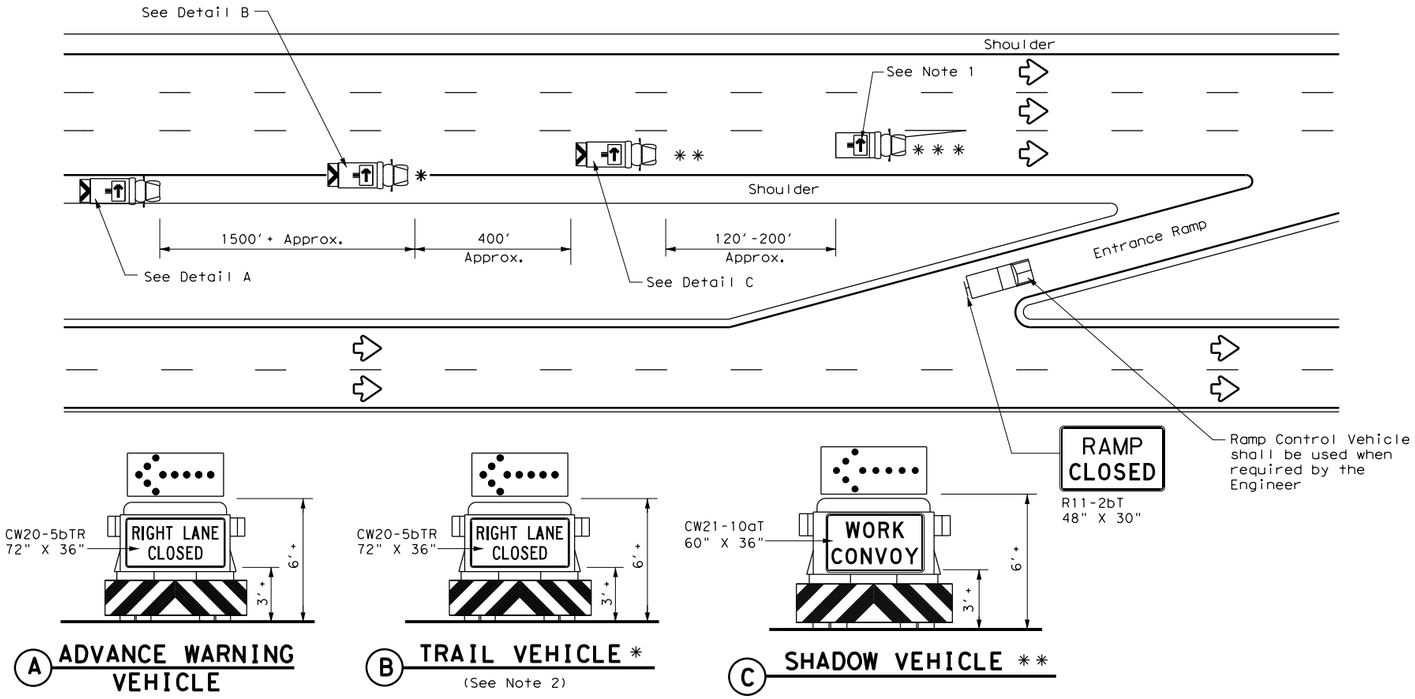
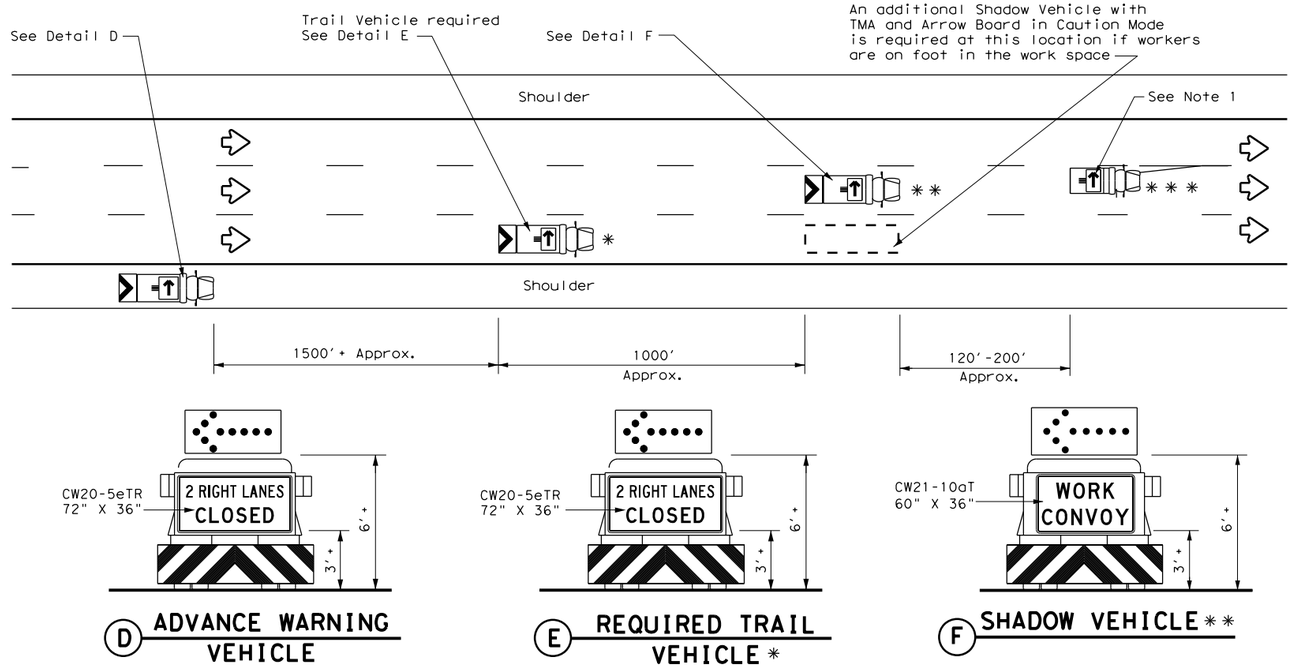


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



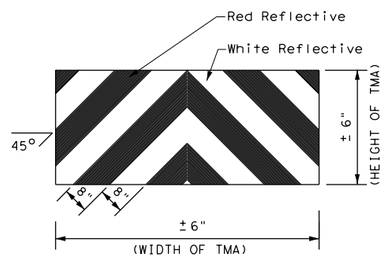
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

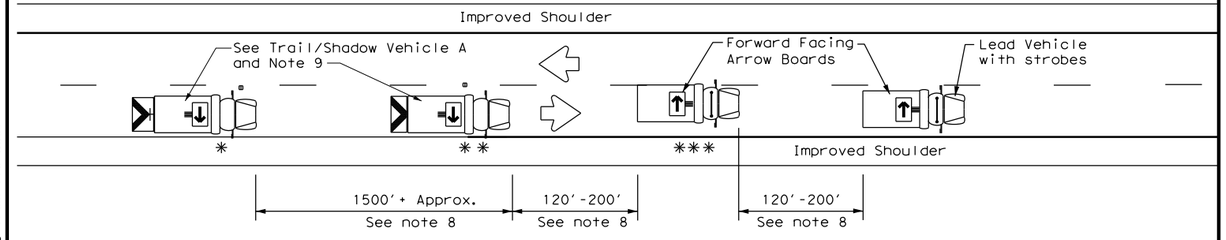
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

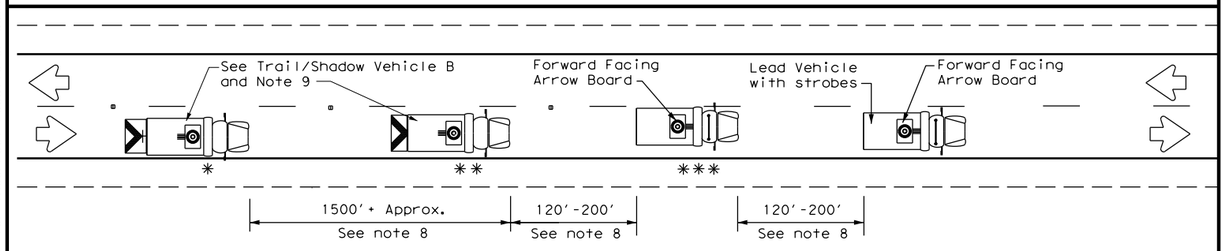
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	DAL	DENTON		56
1-97				

176



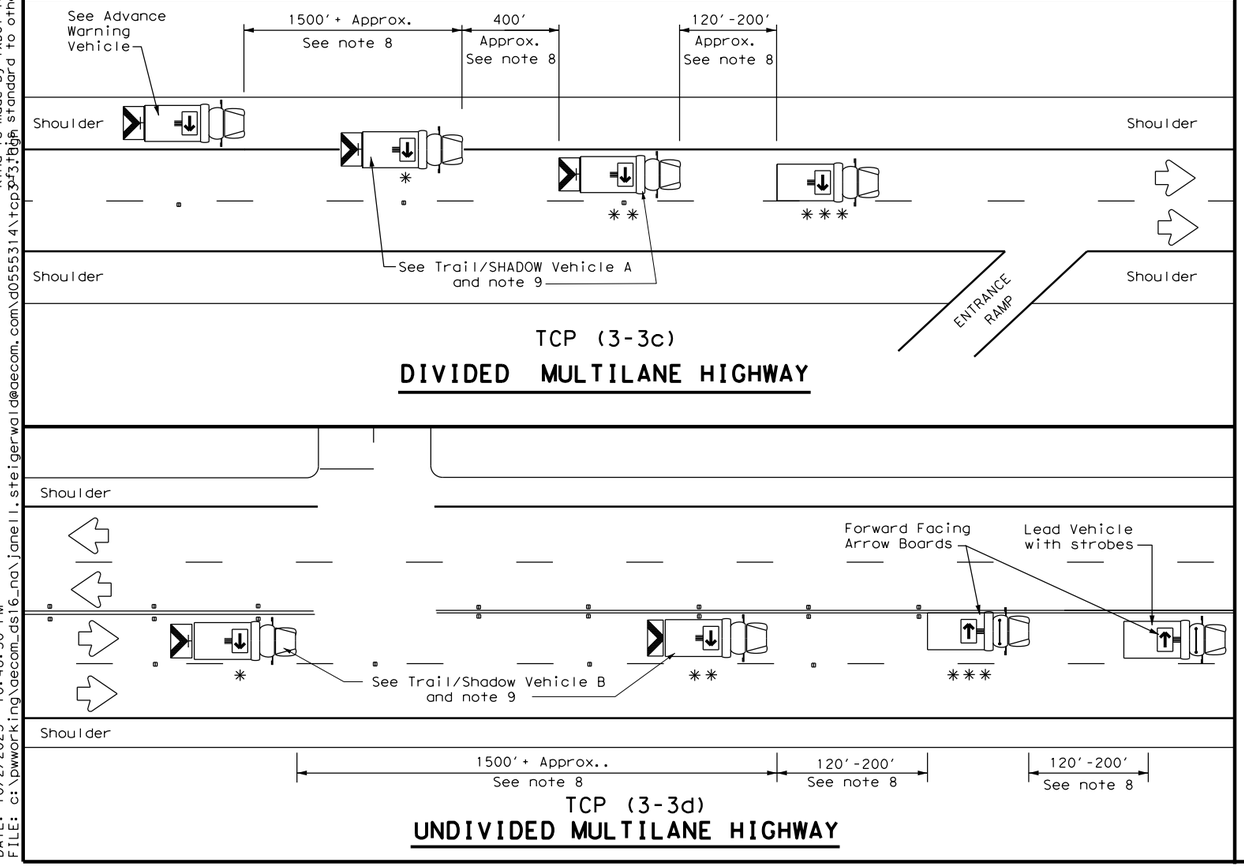
TCP (3-3a)

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



TCP (3-3b)

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

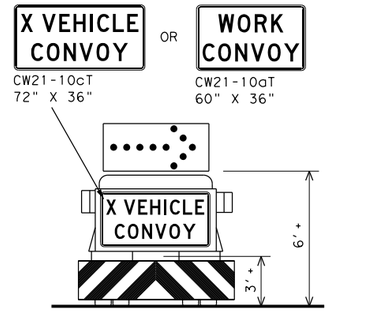


TCP (3-3c)

DIVIDED MULTILANE HIGHWAY

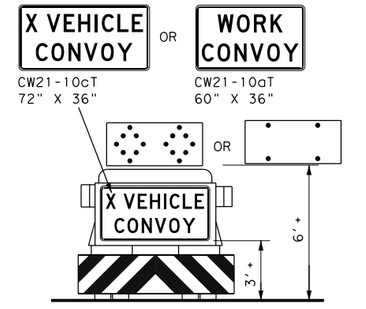
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



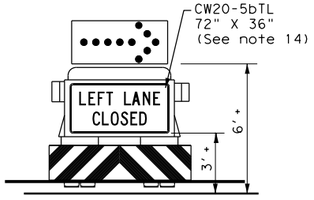
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

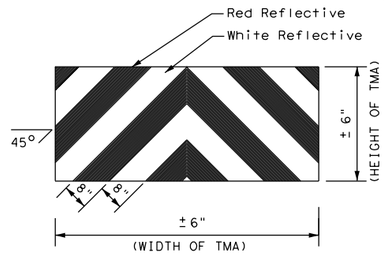


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	DAL	DENTON		57
1-97 7-14				

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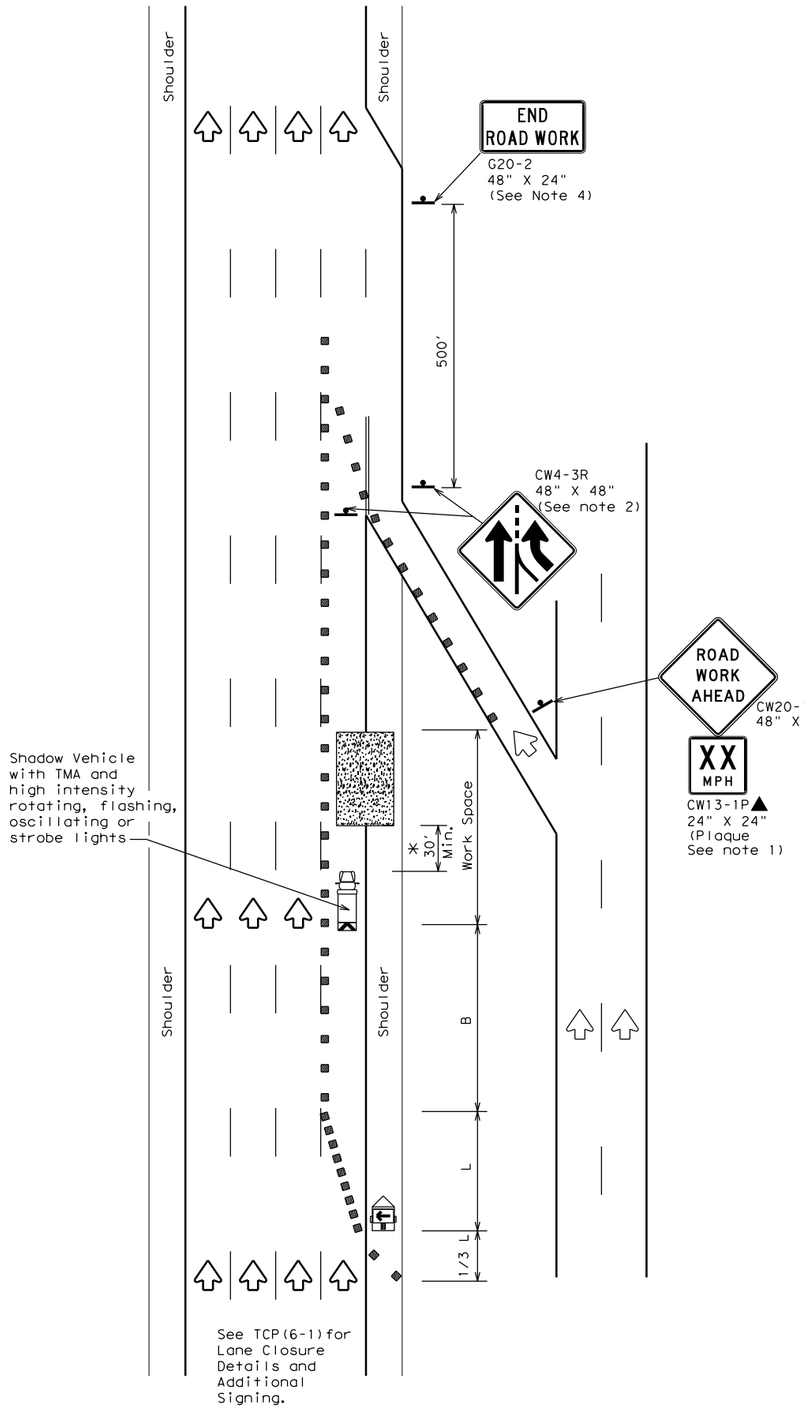
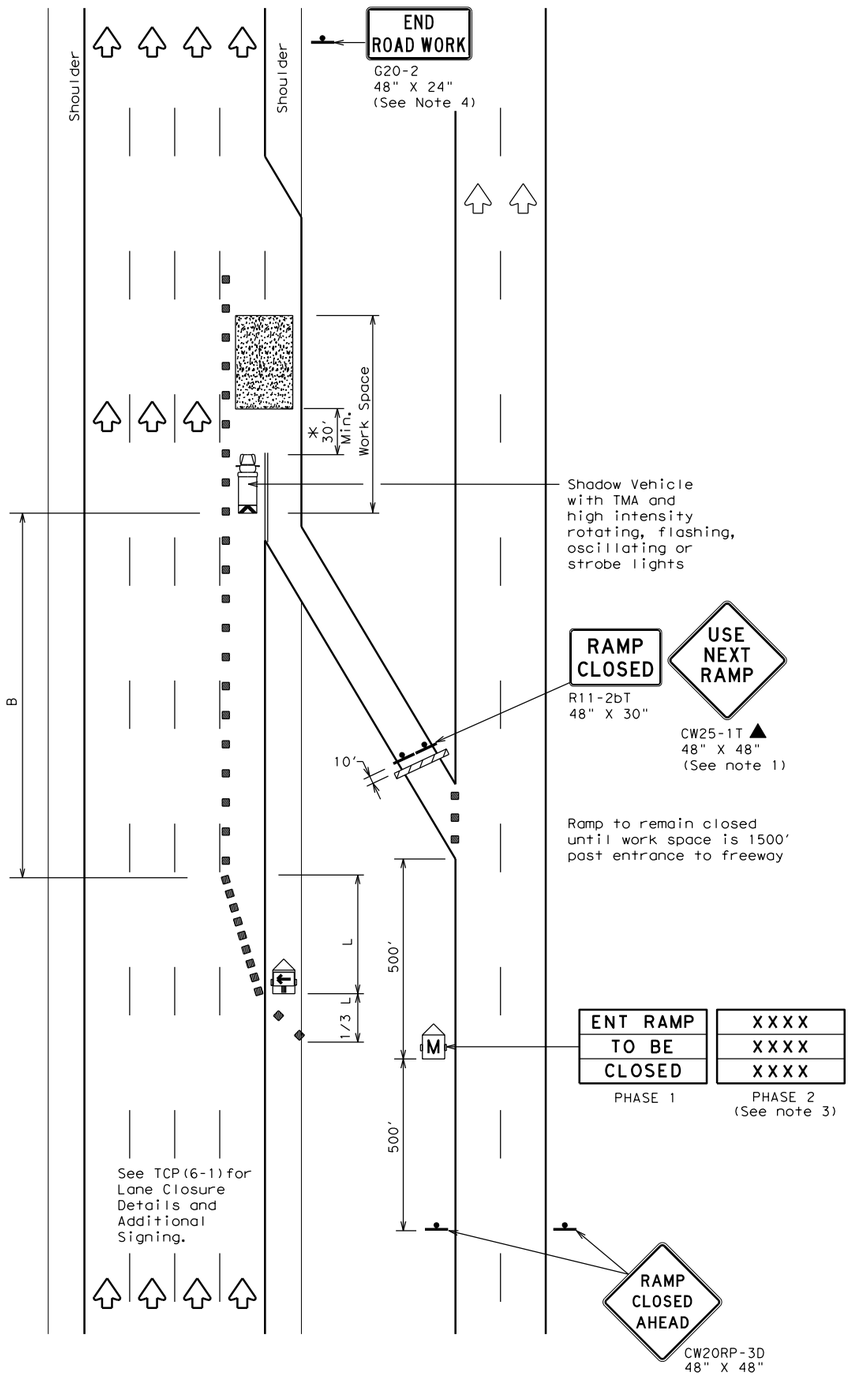


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. 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	0195	03	088,etc.	IH 35E
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	DAL	DENTON		58

202

DATE: 10/2/2023 10:49:14 PM
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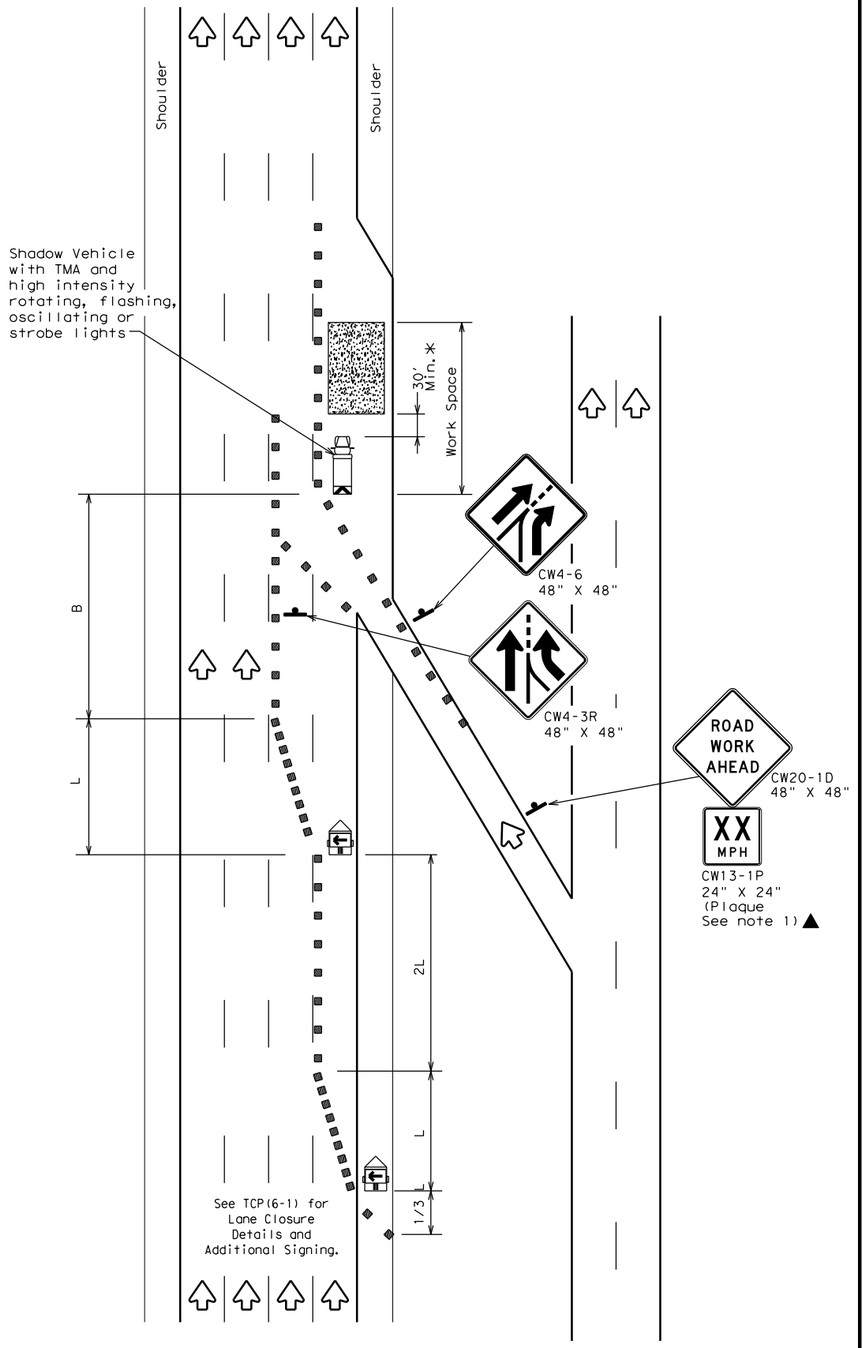
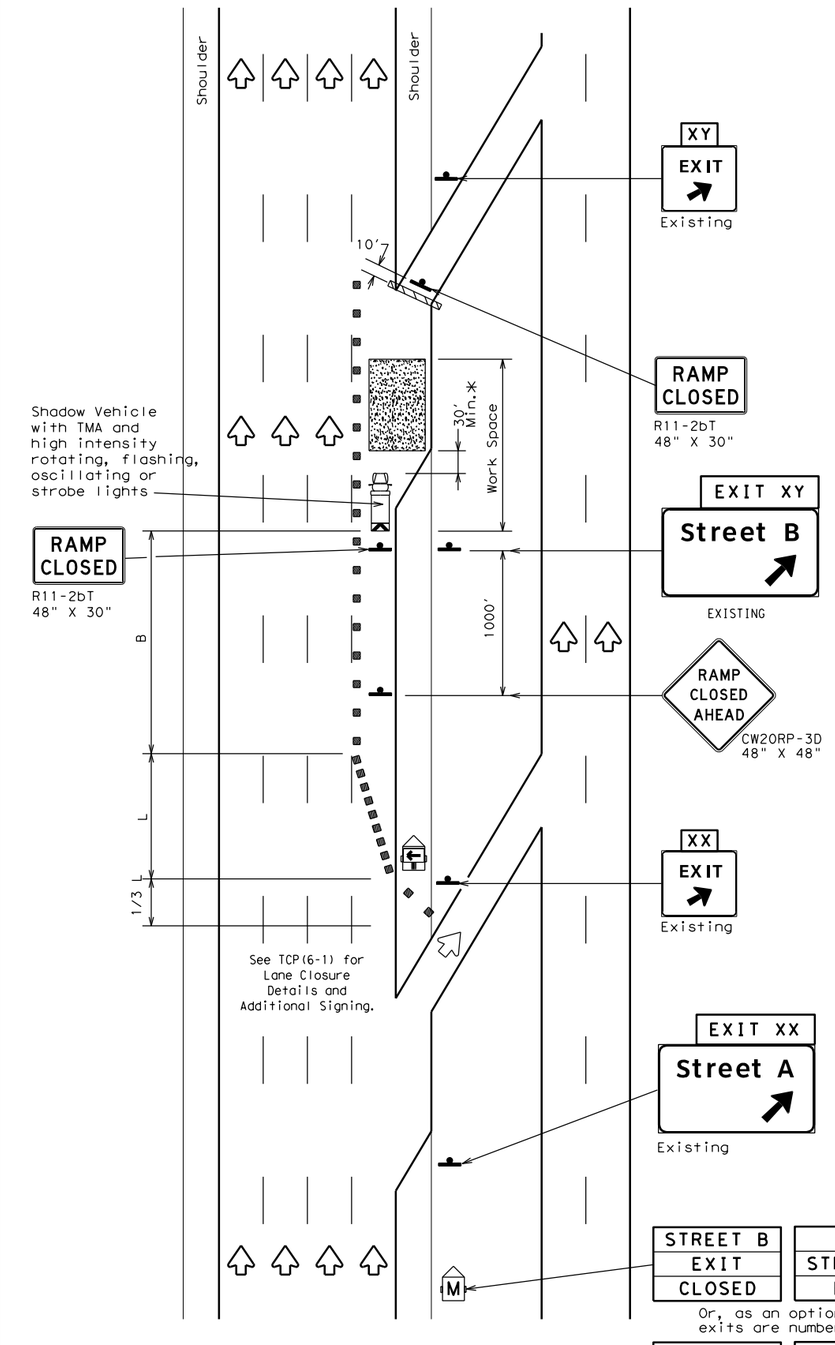


TCP (6-3a)

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" ** 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.

*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
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4-98 8-12	DAL	DENTON		59

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DATE: 10/2/2023 10:49:56 PM
FILE: c:\pwworking\aecom_as16_na\janell.steigerwald@aecom.com\d0555314\tlrs17.dgn

METHOD 1: WOOD EMBEDMENT

STEPS:

Step 1. Determine sign height (Hs), width (Ws), average mounting height from bottom of sign to ground (Hbs), and temporary guide sign wind zone. Temporary guide sign wind zone is determined from Wind Velocity Worksheet. (Page 30A on the Traffic Standards web page) and Table 1.

TABLE 1

Wind Zone on Wind Velocity Worksheet	Temporary Guide Sign Wind Zone
90 mph	70 mph
80 mph	70 mph
70 mph	60 mph

Step 2. Determine number of posts and post size from temporary guide sign wind zone using Hs, Ws, Hbs below (Figure 1: 60 mph and Figure 2: 70 mph). Determine spacing of posts (A) and distance from edge of sign to outside posts (0.5A) from 'Post Spacing and Sign Placement' detail on TLRS(2).

Step 3. Determine minimum post embedment depth from Table 2. For cohesionless soils, another method should be used to determine embedment depth.

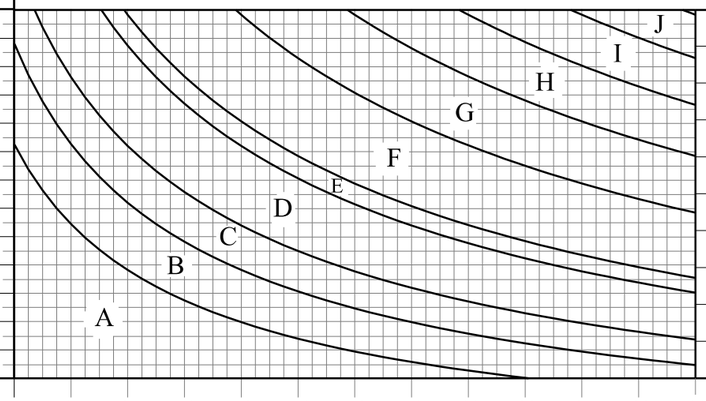
TABLE 2

Wooden Post Size	Embedment Depth (ft)
4x6	3
6x8	4
6x10	5

Step 4. Fabricate posts using 'Wood Post' detail on TLRS(2). Attach sign (plywood or extruded aluminum) using a method on TLRS(3). Wooden parts are not required to be painted.

FIGURE 1

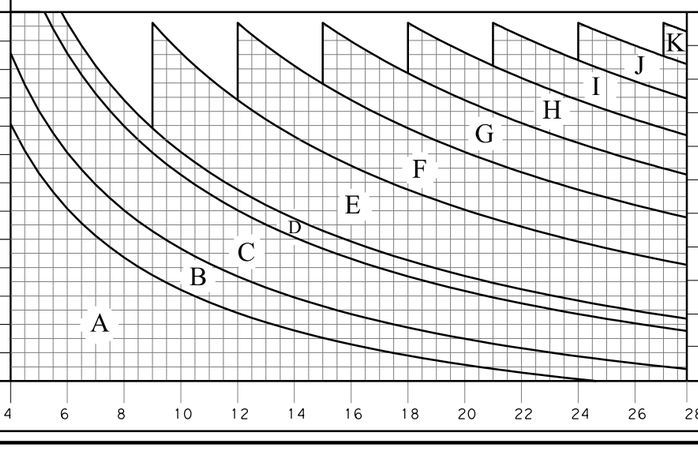
Average Height Above Ground (Hbs)(ft)	13-16	10-13	7-10
Sign Face Height (Hs) (ft)	13	14	15
	12	13	14
	11	12	13
	10	11	12
	9	10	11
	8	9	10
	7	8	9
	6	7	8
	5	6	7
	4	5	6
	3	4	5
	2	3	4
	1	2	3



Post Qty	Post Size
7	6" x 10"
6	6" x 10"
5	6" x 10"
4	6" x 10"
3	6" x 10"
2	6" x 10"
3	6" x 8"
2	6" x 8"
3	4" x 6"
2	4" x 6"

FIGURE 2

Average Height Above Ground (Hbs)(ft)	13-16	10-13	7-10
Sign Face Height (Hs) (ft)	13	14	15
	12	13	14
	11	12	13
	10	11	12
	9	10	11
	8	9	10
	7	8	9
	6	7	8
	5	6	7
	4	5	6
	3	4	5
	2	3	4
	1	2	3



Post Qty	Post Size
9	6" x 10"
8	6" x 10"
7	6" x 10"
6	6" x 10"
5	6" x 10"
4	6" x 10"
3	6" x 10"
2	6" x 10"
3	6" x 8"
2	6" x 8"
3	4" x 6"

GENERAL NOTES

1. See plans for specifications and pay item information. Temporary guide signs required for contractor changes to traffic control plan are subsidiary to item 502.
2. Contractor may use any of the 3 methods (Wood Embedment, Steel Embedment or Wood Skid) as long as sign height requirements are met and approved by the Engineer.
3. See SMD (2-3) for details on attaching panels and plaques to parent signs.
4. Nails are not allowed in temporary sign support structures.

METHOD 2: STEEL EMBEDMENT

STEPS:

Step 1. Determine sign height (Hs), width (Ws), average mounting height from bottom of sign to ground (Hbs), and wind zone from Wind Velocity Worksheet.

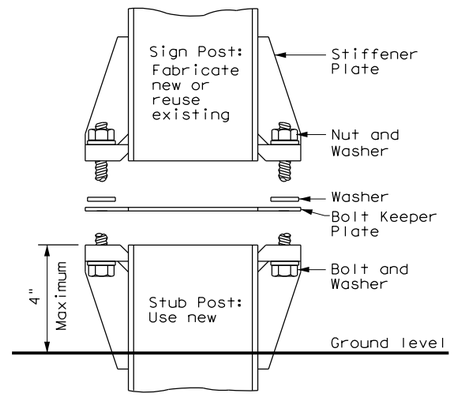
Step 2. Determine number of posts, post size, and post spacing from SMD(2-3) and SMD(8W1). Alternatively, the sign posts from an existing sign may be used if 7' minimum height from pavement to bottom of sign can be maintained at new location. In this case, only a new stub post without concrete foundation is required. See Detail A and SMD(2-2) for more information.

Step 3. Determine minimum stub post embedment depth from Table 3. No concrete foundation is required. For cohesionless soils, another method should be used to determine embedment depth.

TABLE 3

Steel Support Post Size	Embedment Depth (ft)
W6x9	4
W6x12	4.5
W6x15	5
W8x18	6
W8x21	6.5
W10x22	7.5
W10x26	8
W12x26	8.5
S3x5.7	3
S4x7.7	3.5

Step 4. Attach sign using SMD(2-3) for an extruded aluminum sign or using TLRS(3) for a plywood sign.



DETAIL A

SHEET 1 OF 4

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TEMPORARY LARGE ROADSIDE SIGNS

TLRS(1)-17

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	DAL	DENTON		60

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METHOD 3: WOOD SKID

STEPS:

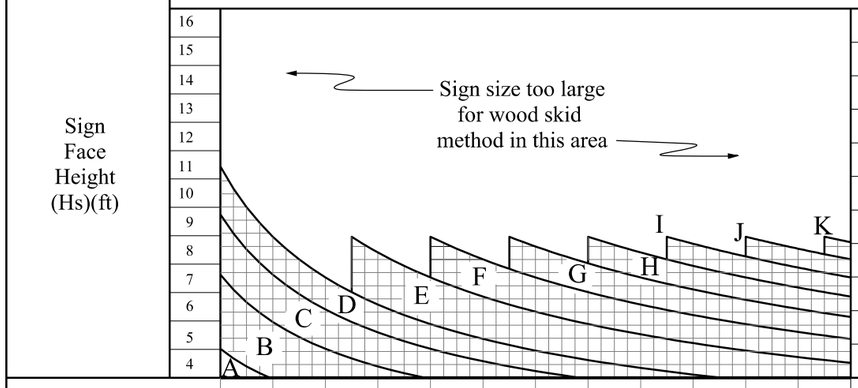
Step 1. Determine sign height (Hs) and width (Ws). Note that the wood skid method is only intended for use on level terrain. The skid height from ground to bottom of sign is 7'6". If this causes the distance from edge of pavement to the bottom of the sign to be less than 7', the wood skid method is not to be used.

Step 2. Determine number of 4"x6" (nominal 3.5"x 5.5") posts from Figure 3 below. Determine spacing of posts (A) and distance from edge of sign to outside posts (0.5A) from 'Post Spacing and Sign Placement' detail.

Step 3. Determine number of 40 pound sandbags from Figure 4.

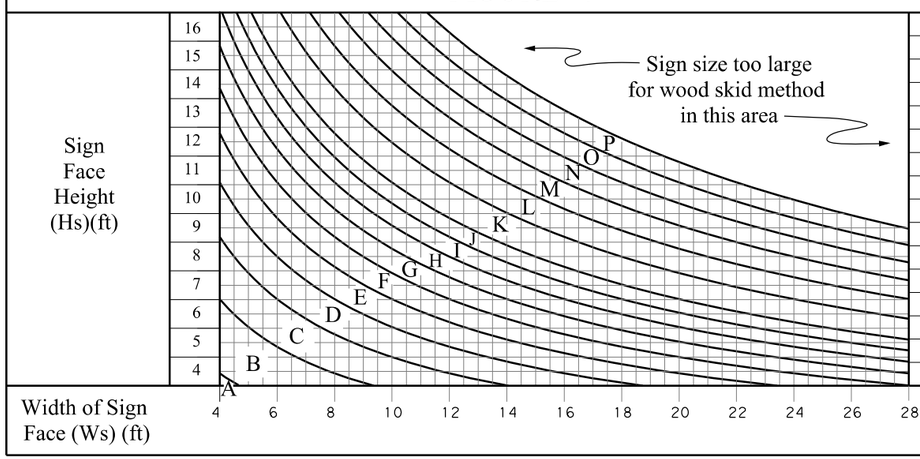
Step 4. Assemble skid as shown on TLRS(4) standard. Attach sign (plywood or extruded aluminum) using a method on TLRS(3). Wooden parts are not required to be painted.

FIGURE 3



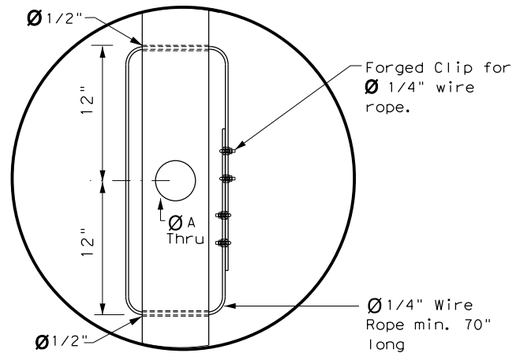
Post Qty	Post Size
K 9	3.5" x 5.5"
J 8	3.5" x 5.5"
I 7	3.5" x 5.5"
H 6	3.5" x 5.5"
G 5	3.5" x 5.5"
F 4	3.5" x 5.5"
E 3	3.5" x 5.5"
D 2	3.5" x 5.5"
C 3	3.5" x 3.5"
B 2	3.5" x 3.5"
A 1	3.5" x 3.5"

FIGURE 4



Bags
P 110
O 100
N 090
M 080
L 070
K 060
J 050
I 045
H 040
G 035
F 030
E 025
D 020
C 015
B 010
A 005

WIRE ROPE BREAKAWAY FEATURE

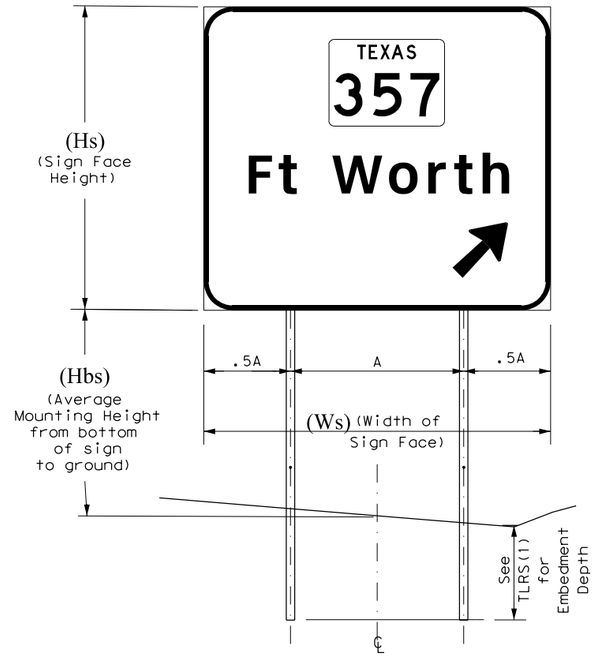


DETAIL B

NOTES:

1. Wire rope breakaway feature required on all wooden posts. This breakaway feature includes the clamped cable with 2 holes to mount the cable, 4 cable clips, and hole A which the cable surrounds.
2. Breakaway feature is designed so wooden post fractures at hole A, with post staying attached to sign structure via the clamped cable.

POST SPACING AND SIGN PLACEMENT



WOODEN POST SPACING NOTES:

1. Spacing between posts: A = Ws / # of posts required
2. Spacing between edge of sign and outside posts: 0.5A

STEEL POST SPACING NOTE:

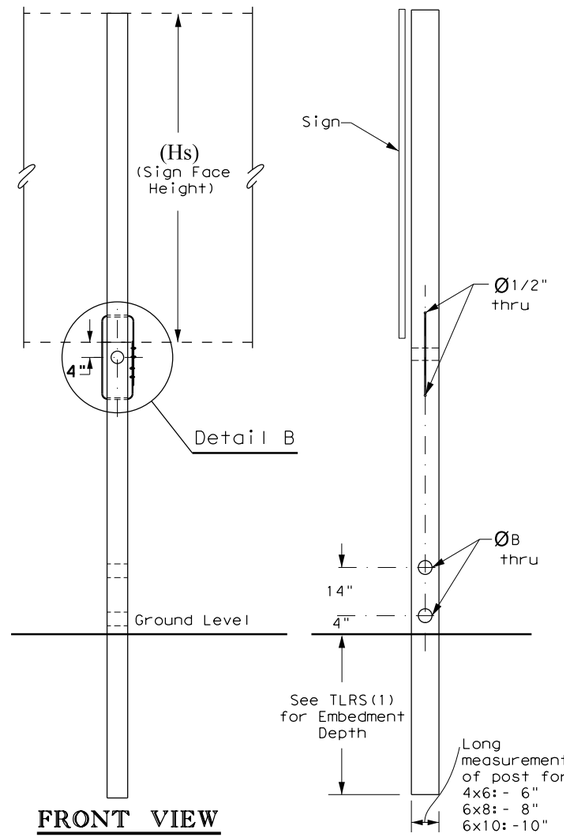
See SMD(2-3) for post spacing unless reusing existing sign posts.

SIGN PLACEMENT NOTE:

See SMD(2-3) for sign placement details.

WOOD POST

TABLE 4		
Support Size	ØA	ØB
4x6	1 1/2"	2"
6x8	3 5/8"	4"
6x10	3 5/8"	4"



FRONT VIEW **SIDE VIEW**

NOTE:

All holes shown here are required for breakaway features to function properly.

Texas Department of Transportation — Traffic Operations Division Standard

TEMPORARY LARGE ROADSIDE SIGNS

TLRS(2)-17

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	DAL	DENTON		61

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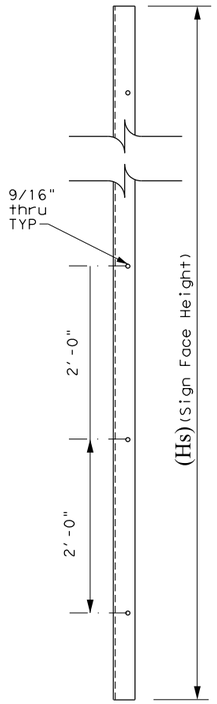
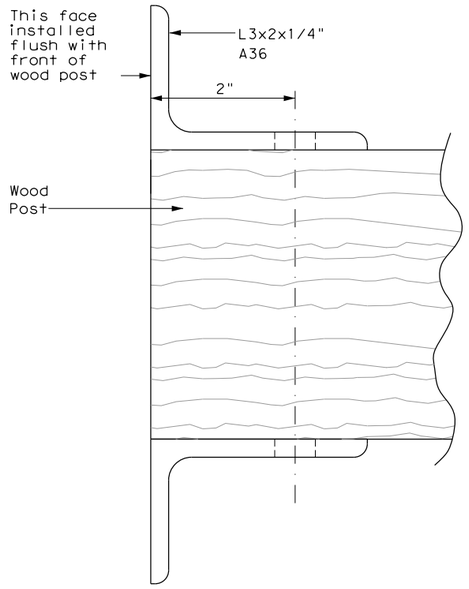
ANGLE STIFFENER METHOD (WOOD POST)



SIDE VIEW

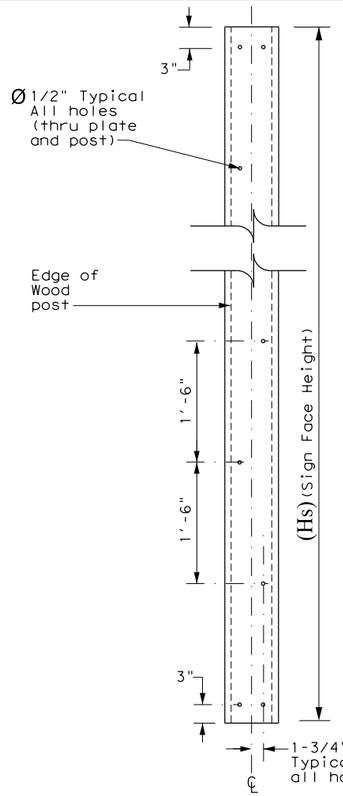


TOP VIEW

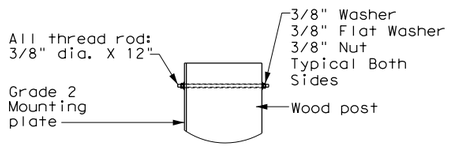
NOTES:

1. Drill holes evenly spaced from each edge of angle stiffener, with 2' between holes.
2. Attach 2 angle stiffeners to each post using A307 1/2" dia. x 2" long lag screws for 4x6 post, or A307 1/2" dia. x 3" long lag screws for 6x8 or 6x10 post.

MOUNTING PLATE METHOD (WOOD POST)



FRONT VIEW

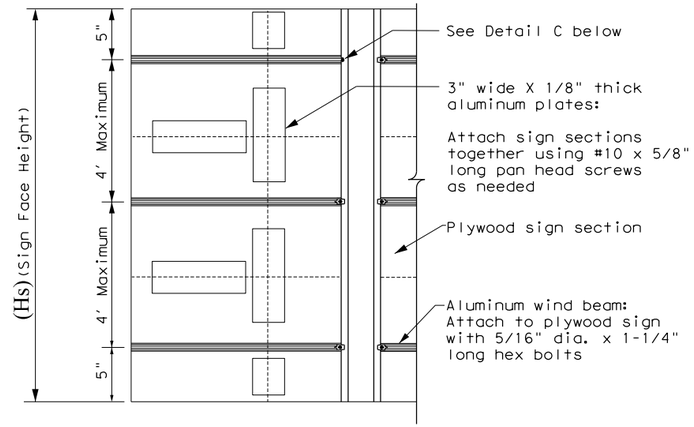


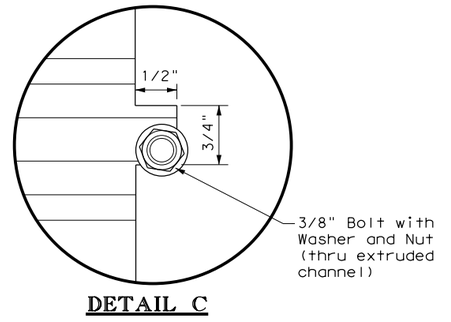
SIDE VIEW

NOTES:

1. Drill holes evenly spaced from each edge of mounting plate, with 1'6" between holes.
2. Two holes drilled 3" from each end of mounting plate.
3. Steel mounting plate 6" wide x 1/4" thick for 4x6 post, or 8" wide x 1/4" thick for 6x8 or 6x10 post.
4. Install mounting plate so plate overhang is the same on both sides of wood post. Drill 1/2" dia. holes thru wood post before attaching mounting plate using 3/8" threaded rod.

MOUNTING A PLYWOOD SIGN



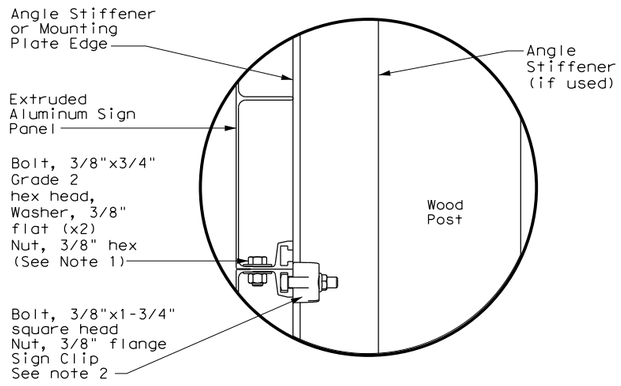


DETAIL C

NOTES:

1. Recommended sign thickness 5/8".
2. Attach an aluminum wind beam approx. 5" from the top and bottom of sign thru the width of the sign and then as needed so there is a maximum 4' spacing between beams.
3. Attach sign sections with aluminum plates as needed.
4. Attach sign to post using bolts with sign clips as shown in 'Mounting Plate and Angle Stiffener Attachment to Extruded Aluminum Sign' detail. On the top bolt, cut out a 1/2" wide x 3/4" tall notch and tighten the bolt in the notch with a nut and washer. A sign clip is not used here. See Detail C.
5. This option works for the angle stiffener or mounting plate methods. Clamp plate method not recommended with aluminum wind beams.
6. Alternatively, contractor may drill holes thru plywood sign and attach to post using angle stiffener, mounting plate, or clamp plate method. Vertical bolt spacing should not be greater than 12" with 3/8" bolts.

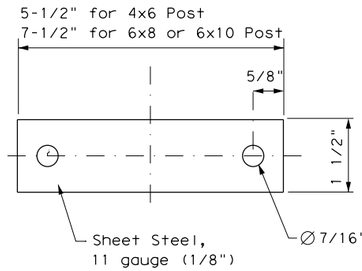
MOUNTING PLATE AND ANGLE STIFFENER ATTACHMENT TO EXTRUDED ALUMINUM SIGN

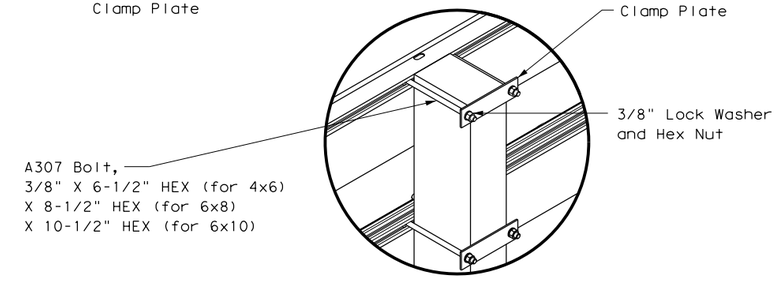


NOTES:

1. Space this hardware at 24" at each joint between panels.
2. Install this hardware on both sides of the wood post for proper attachment.

CLAMP PLATE METHOD (WOOD POST)





SHEET 3 OF 4

Texas Department of Transportation | Traffic Operations Division Standard

TEMPORARY LARGE ROADSIDE SIGNS: MOUNTING DETAILS

TLRS(3)-17

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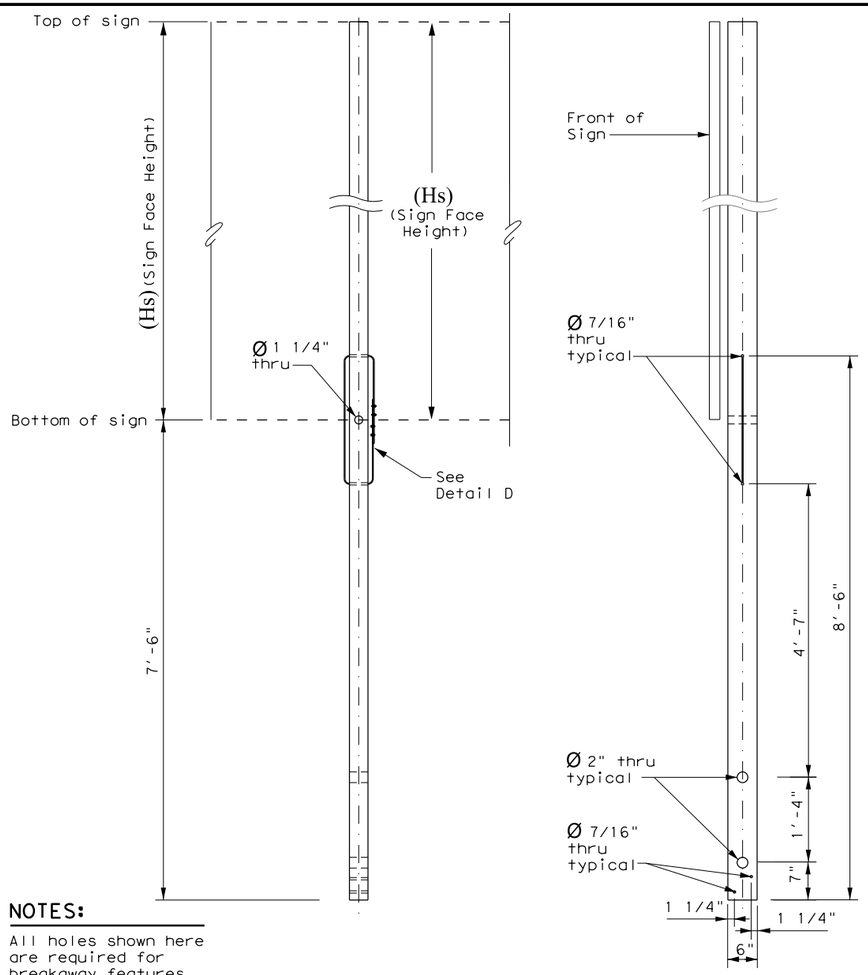
WOOD POST (4 x 6)



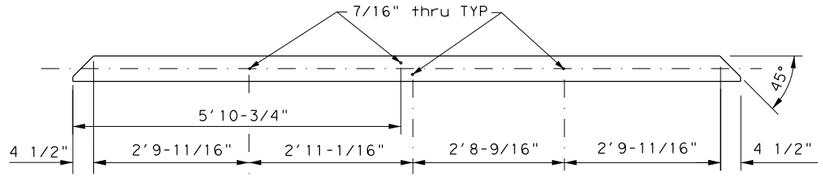
NOTES:

All holes shown here are required for breakaway features to function properly.

FRONT VIEW

SIDE VIEW

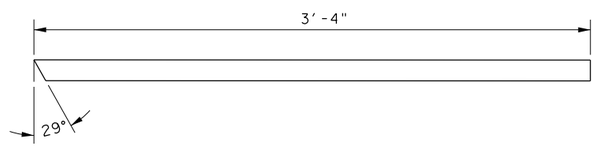
SKID (2 x 6)



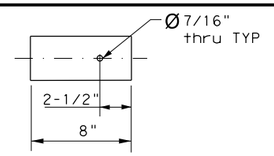
NOTES:

The 2 center holes are drilled 1-1/4" above and below skid centerline for attachment to post.

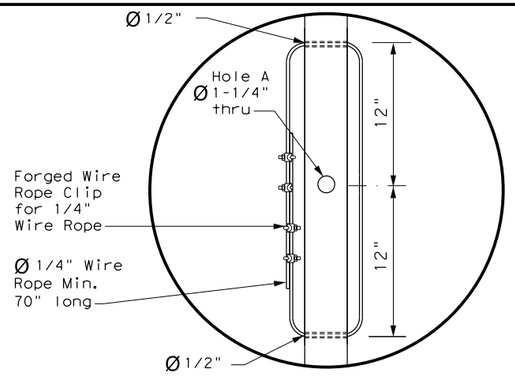
BRACE (2 x 4)



BRACE BLOCK (4 x 4)



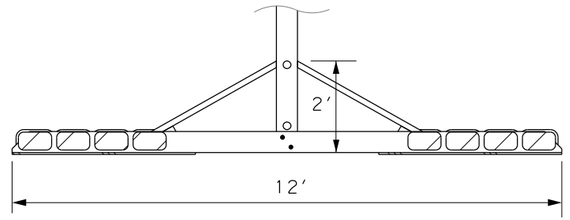
WIRE ROPE BREAKAWAY FEATURE



DETAIL D

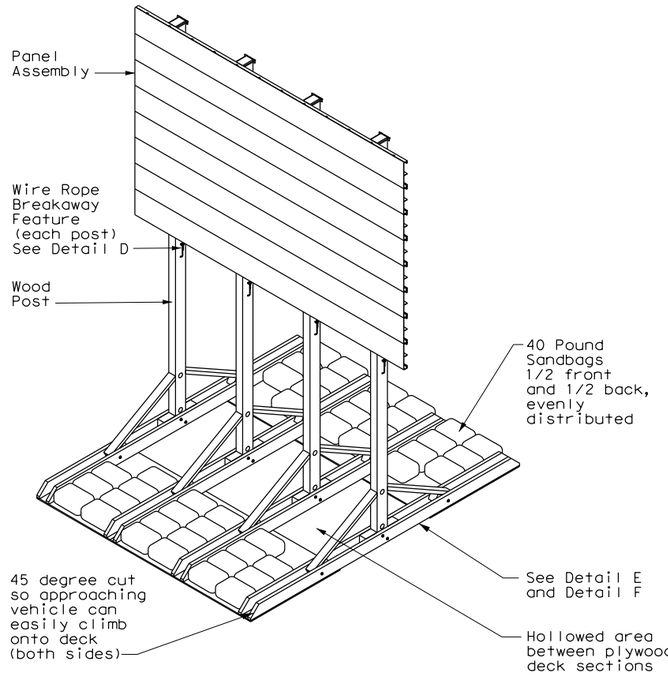
NOTES:

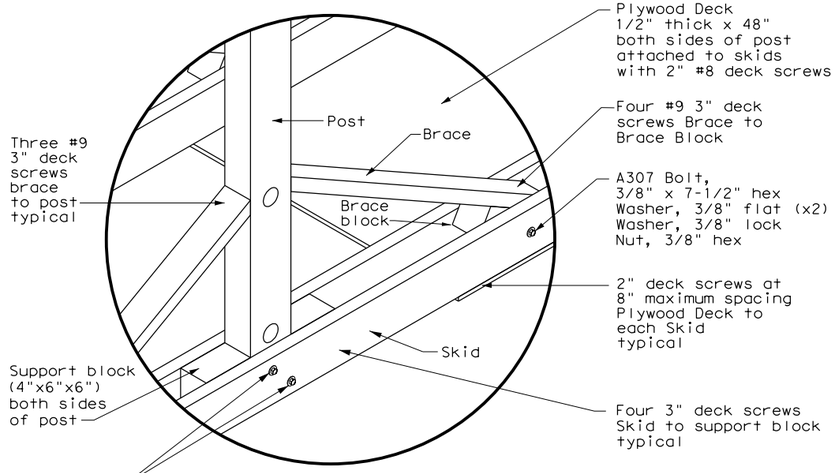
1. Wire rope breakaway feature required on all wooden posts. This breakaway feature includes the clamped cable with 2 holes to mount the cable, 4 cable clips, and hole A which the cable surrounds.
2. Breakaway feature is designed so wood post fractures at hole A, with post staying attached to sign structure via the clamped cable.



DETAIL E

WOOD SKID





DETAIL F

NOTE:

Contractor shall have the option to use another method to support the sandbags, provided the material under the sandbags does not exceed 0.75" in height. Examples include use of marine grade plywood or composite decking. Contractor may drill holes in plywood as needed for drainage.

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Traffic Operations Division Standard

TEMPORARY LARGE ROADSIDE SIGNS: WOOD SKID

TLRS(4)-17

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	DAL	DENTON		63

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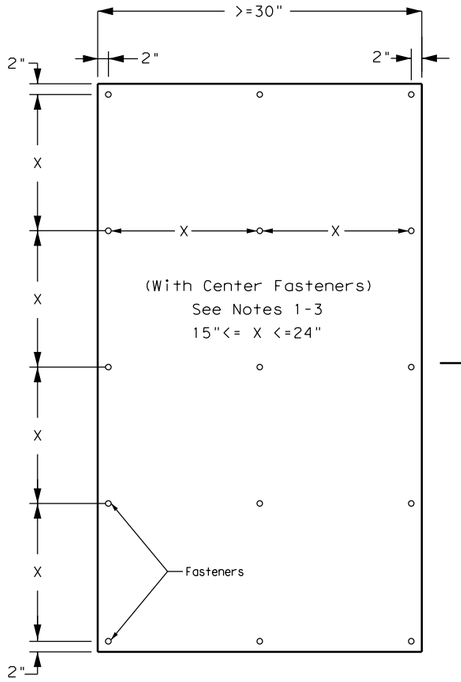
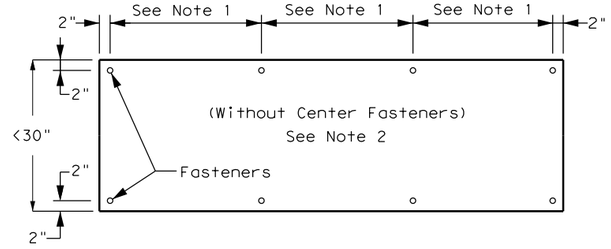
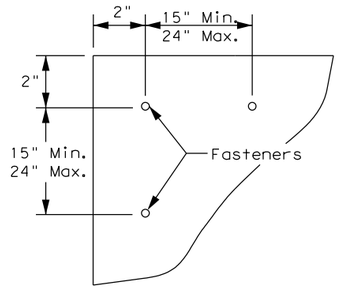
OVERLAY PANEL SPACING DETAIL



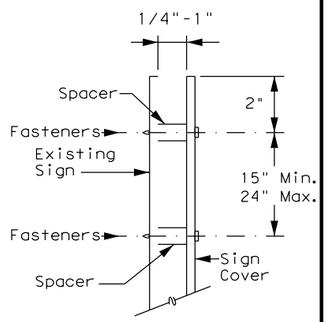




EDGE FASTENER SPACING DETAIL

SPACING NOTES:

1. Edge fasteners should be placed 2" from edges of overlay panel, and be evenly spaced no less than 15" apart and no greater than 24" apart for the length of the panel.
2. For overlay panels measuring less than 30" on any side, only edge fasteners should be used.
3. Center fasteners should only be used for panels measuring 30" or greater on both sides. Center fasteners should be used evenly spaced and aligned with the edge fasteners along the longest side.
4. The CW26-1aT EXIT CLOSED sign panel and the CW26-1bT EXIT CLOSED sign panel may come with pre-drilled holes for installation. If no pre-drilled holes, refer to notes 1 and 2 above.



SIDE VIEW DETAIL

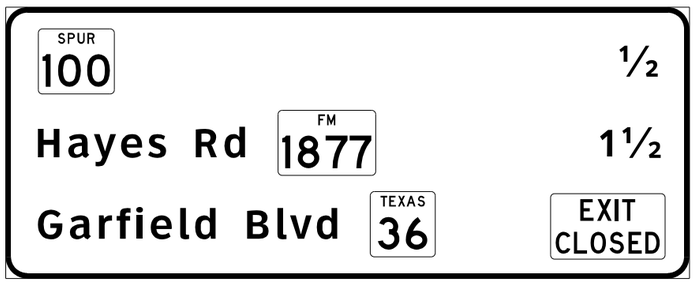
GENERAL NOTES:

1. Permanent large guide signs that are in conflict with work zone conditions should be removed or covered until the message matches the roadway condition.
2. Sign panel overlays should be made of a rigid material (sheet aluminum, corrugated plastic, or other material as approved by the Engineer). The installation should allow adequate air flow between the overlay panel and the existing sign panel by providing a minimum spacer of 1/4" (1" maximum).
3. Spacers should be a material (such as plastic or nylon fiber) that will not harm the sign sheeting face.
4. #12 x 1½" self-drilling screw (fasteners) should be aluminum, galvanized, blue coated, or stainless steel.
5. Sign panel overlays used to cover all or part of a sign should be the same color as the background color of the sign to be covered with the exception of Exit Closed Sign Panels. The sign panel overlays should cover the conflicting or non-applicable sign information. See the Exit Closed Sign Panel detail and notes for sign panel overlay installations for closed exits.
6. Large extruded sign covers in work zones should only be used for long-term stationary work.
7. All covering material, mounting hardware, and spacers should be removed when panel overlay is removed.

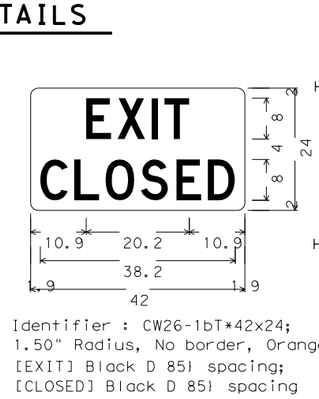
ASSEMBLY NOTES:

1. Apply fasteners to the sheet aluminum overlays in accordance with the hole spacing in the Overlay Panel Spacing Detail.
2. Tape should not be applied to the sign sheeting surface. Pre-mask or application tape should be removed prior to exposure to sunlight.
3. For full sign covering applications, position the overlay panel's bottom edge flush with the bottom of the existing extruded sign panel and then position the overlay panel's lower left edge flush with the lower left edge of the bottom existing extruded panel section. For only covering a specific sign message, position the overlay panel's bottom edge first and then position the overlay panel's lower left edge to completely cover the conflicting or non-applicable message.
4. If additional overlay panels are needed, abut the next overlay panel to the first attached overlay panel and perform the same work as specified in steps above.

EXIT CLOSED SIGN DETAILS

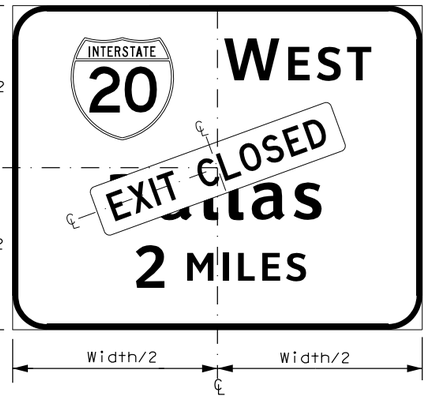


EXIT CLOSED SIGN PANEL
(See detail 1)

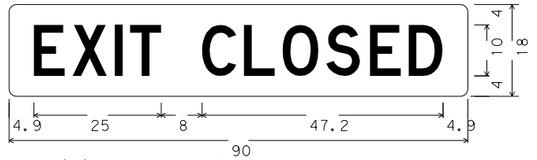


Identifier : CW26-1bT*42x24;
1.50" Radius, No border, Orange;
[EXIT] Black D 85) spacing;
[CLOSED] Black D 85) spacing

DETAIL 1



EXIT CLOSED SIGN PANEL
(See detail 2)



Identifier : CW26-1aT*90x18;
1.5" Radius, No border, Orange;
[EXIT] Black D, [CLOSED] Black D 80) spacing;

DETAIL 2

EXIT CLOSED SIGN PANEL NOTES:

1. When using an EXIT CLOSED (CW26-1bT) sign on an interchange sequence guide sign, place the EXIT CLOSED (CW26-1bT) sign panel horizontal in-line with the information for the closed exit and right-aligned with the distances shown for the other destinations.
2. When using an EXIT CLOSED (CW26-1aT) sign on interchange guide sign(s), place the EXIT CLOSED (CW26-1aT) sign panel diagonally across the interchange guide sign(s) as per TMUTCD 6F.28.
3. The EXIT CLOSED (CW26-1aT & CW26-1bT) signs should have a black legend on an orange background.

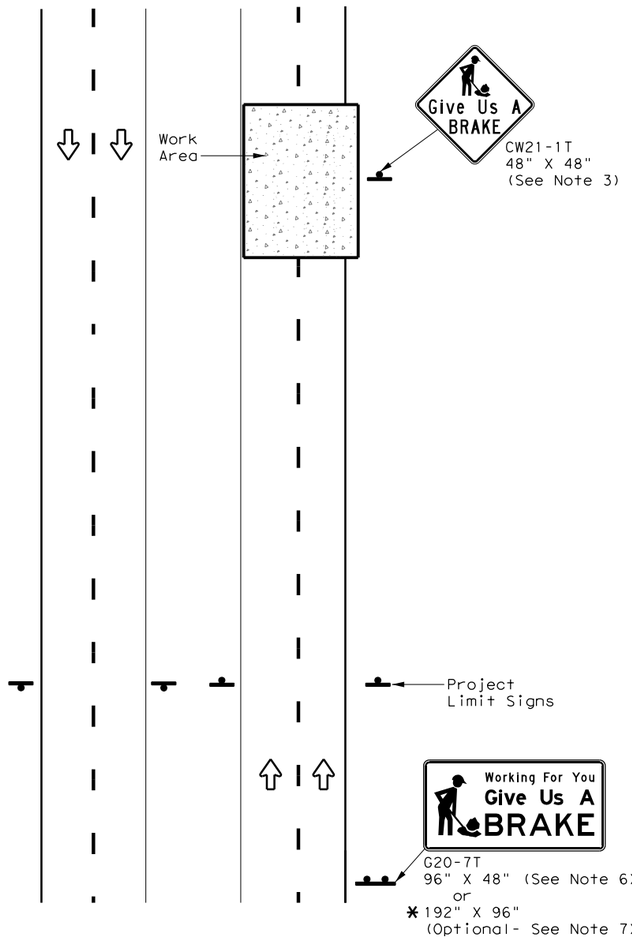
Texas Department of Transportation | Traffic Safety Division Standard

TEMPORARY LARGE SIGN COVERING DETAILS

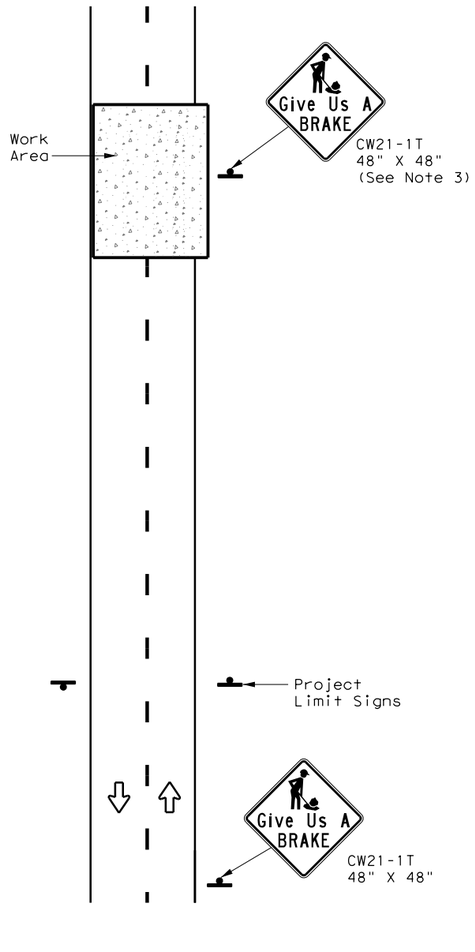
TS-CD-22

FILE: ts-cd-22.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
12-19	DIST	COUNTY		SHEET NO.
10-22	DAL	DENTON		64

117E



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 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	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	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	DAL	DENTON		65

116

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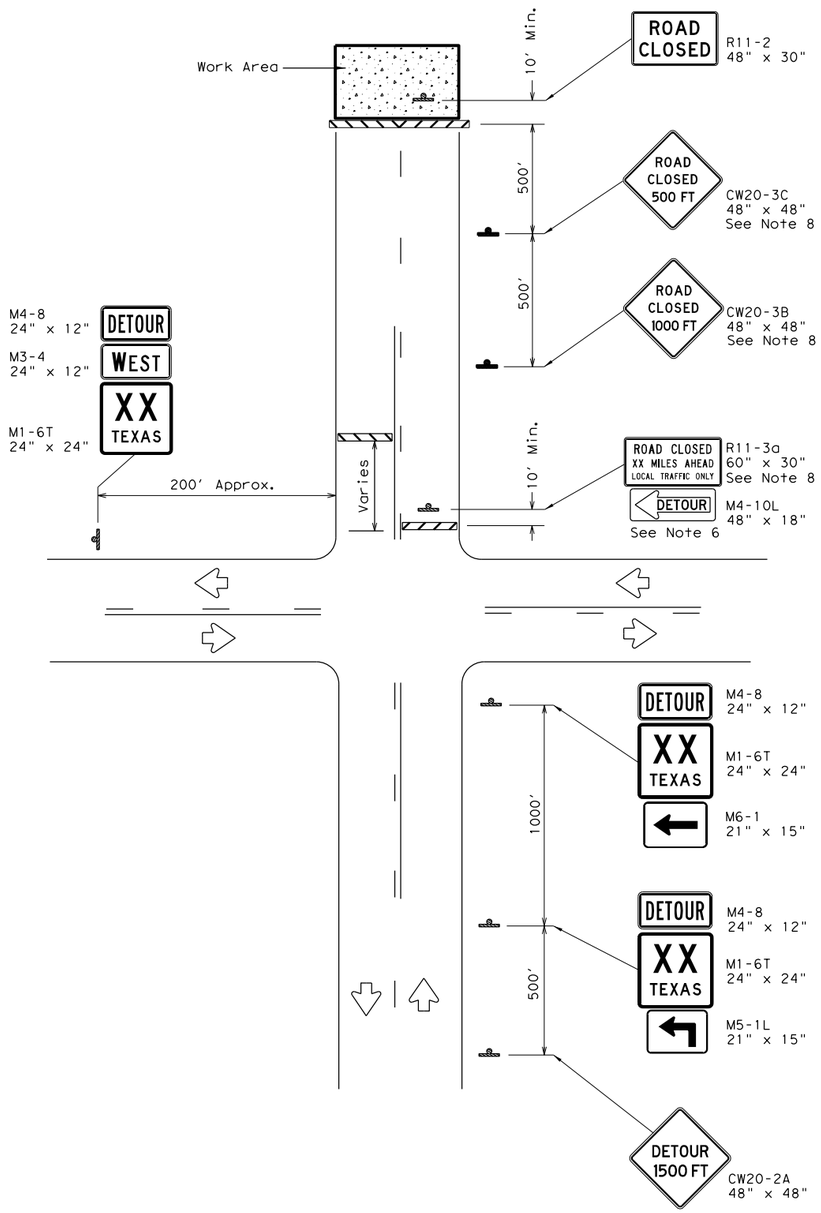
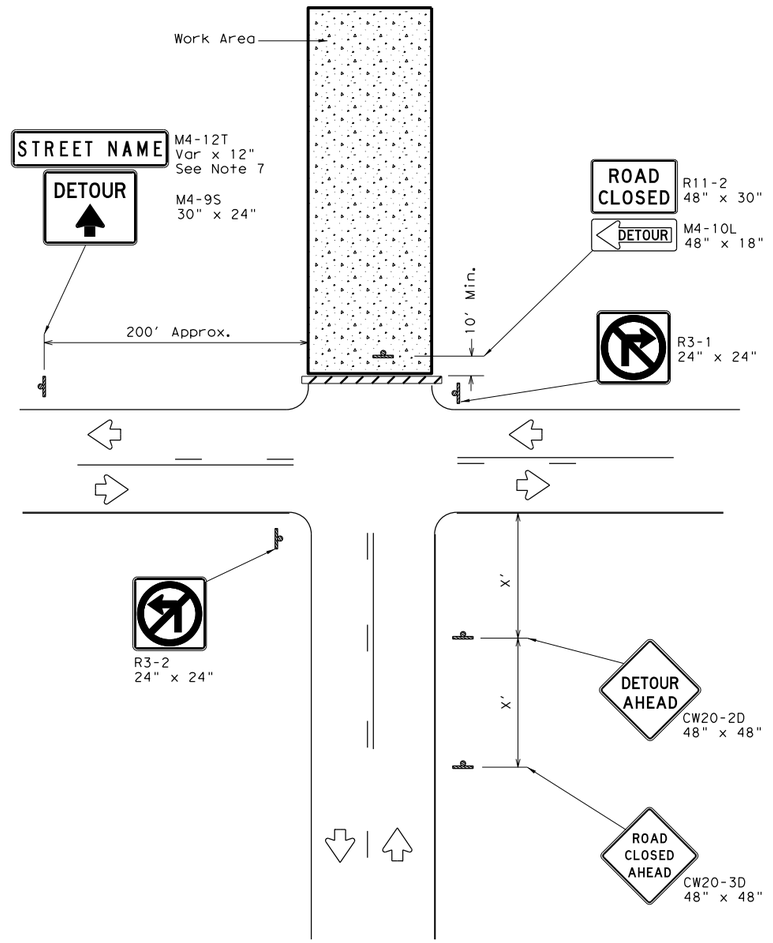


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

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

LEGEND	
	Type 3 Barricade
	Sign

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

* Conventional Roads Only

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	DAL	DENTON		66

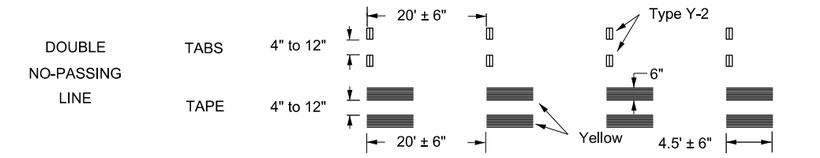
113

DATE: 10/2/2023 10:53:26 PM
FILE: c:\pw\working\aecom_ds16_naijanell.steigerwald@aecom.com\d0555314\wz(stpm)-23.dgn

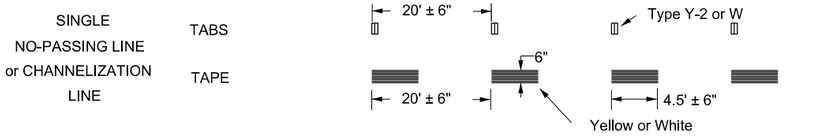
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

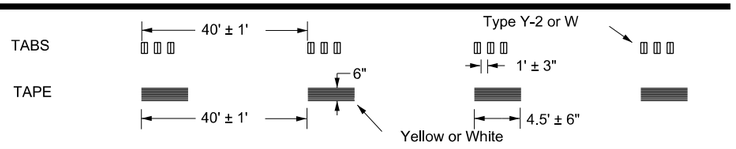


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



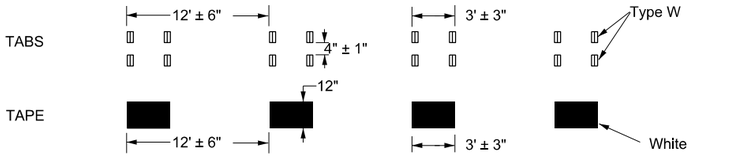
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

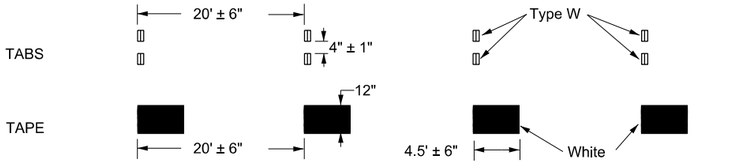


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



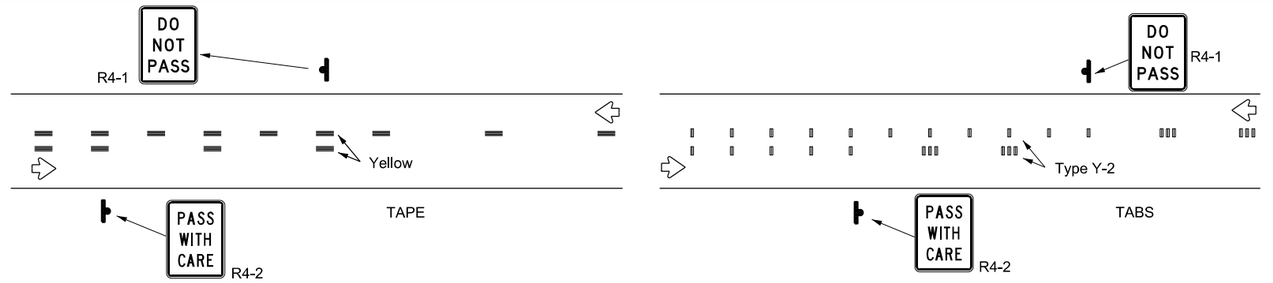
NOTES:

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

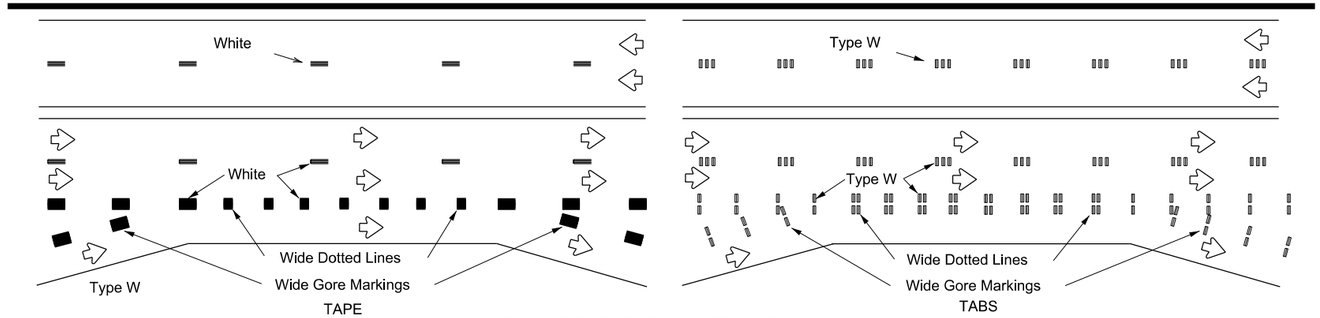
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

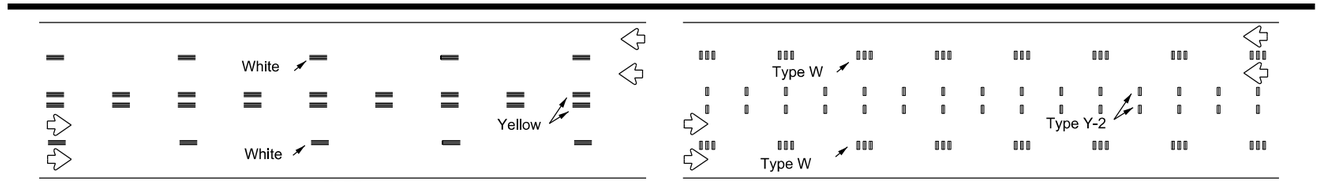
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



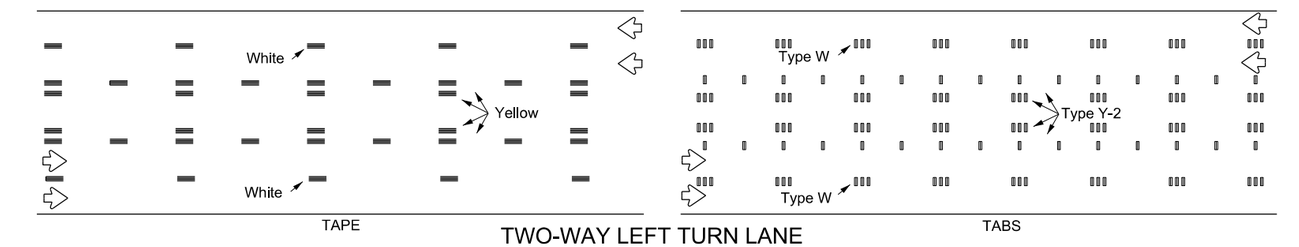
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



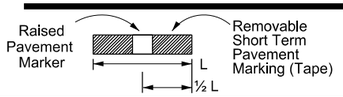
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic 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	0195	03	088,etc.	IH 35E
4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	DAL	DENTON		67

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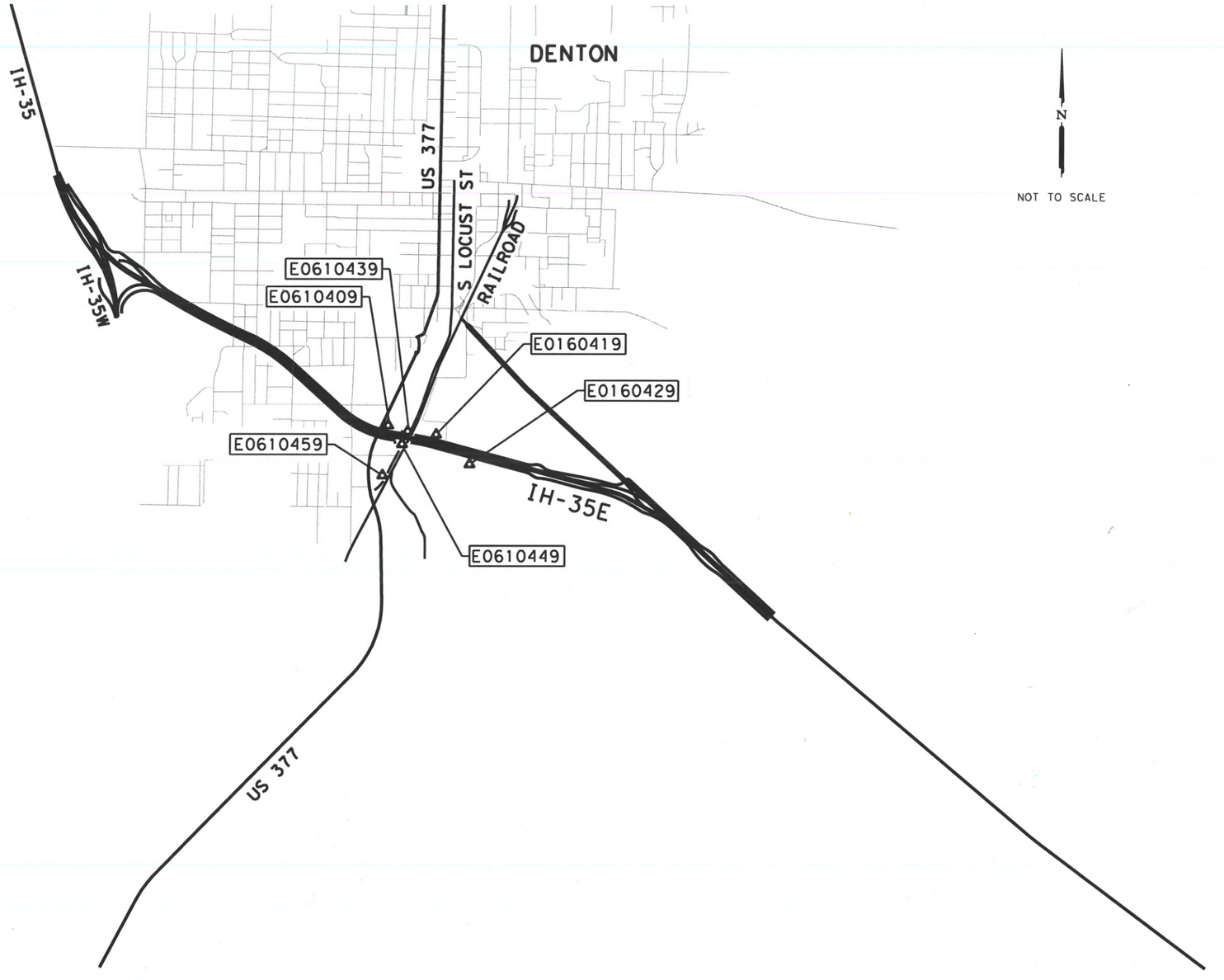
CONTROL POINT	SURFACE COORDINATES		GRID COORDINATES		LATITUDE	LONGITUDE	ELEVATION	DESCRIPTION
	NORTHING	EASTING	NORTHING	EASTING				
E0610409	7,122,077.434	2,385,203.607	7,121,004.797	2,384,844.378	33°11'48.09024"	97°08'19.84127"	704.553	SET TxDOT 3-1/4" ALUMINUM DISK IN CONCRETE
E0610419	7,121,886.517	2,386,501.495	7,120,813.909	2,386,142.070	33°11'46.03496"	97°08'04.59902"	713.663	SET TxDOT 3-1/4" ALUMINUM DISK IN CONCRETE
E0610429	7,121,616.568	2,386,933.165	7,120,544.001	2,386,573.675	33°11'43.30895"	97°07'59.56119"	693.880	SET TxDOT 3-1/4" ALUMINUM DISK IN CONCRETE
E0610439	7,122,064.336	2,385,976.441	7,120,991.701	2,385,617.095	33°11'47.86151"	97°08'10.74981"	705.674	SET TxDOT 3-1/4" ALUMINUM DISK IN CONCRETE
E0610449	7,121,685.871	2,385,778.677	7,120,613.293	2,385,419.361	33°11'44.14292"	97°08'13.13456"	706.903	SET TxDOT 3-1/4" ALUMINUM DISK IN CONCRETE
E0610459	7,120,740.638	2,385,321.891	7,119,668.202	2,384,962.645	33°11'34.85076"	97°08'18.65335"	682.631	SET TxDOT 3-1/4" ALUMINUM DISK IN CONCRETE



N

NOT TO SCALE

NOTES:

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM OF 1983 TEXAS NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83) 2010 ADJUSTMENT, EPOCH 2010 (GEOID 12A). ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.0001506300
2. ALL HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (TXDE DENTON), BASED ON THREE AVERAGED 180 EPOCH OBSERVATIONS
3. UNIT OF MEASURE IS U.S. SURVEY FOOT
4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (TXDE DENTON)
5. FIELD SURVEYS WERE PERFORMED DURING OCTOBER 2019

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY ON THE GROUND UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
CHRISTOPHER R. FREEMAN
5701
PROFESSIONAL
LAND SURVEYOR

12-21-22

CHRISTOPHER R. FREEMAN - R.P.L.S. NO. 5701

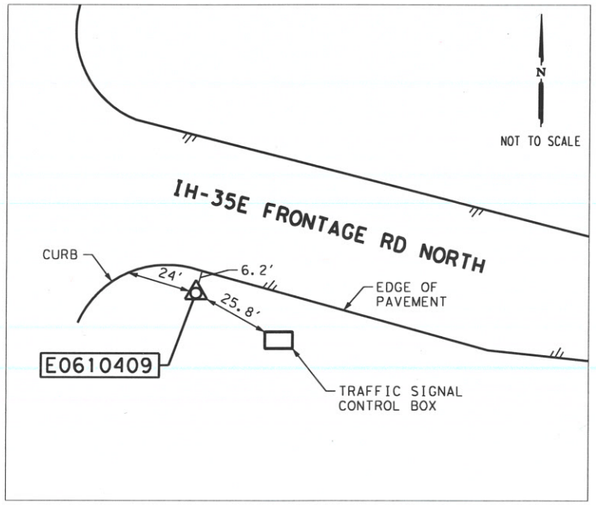
LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPELS REGISTRATION NO. 10140700

IH-35E

SURVEY CONTROL INDEX

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0195	03	088, ETC	68
DIST	COUNTY		HIGHWAY	
DALLAS	DENTON		IH-35E	

12/21/2022 O:*(001) AECOM\19.001.06 Bridge PS&E SH 31 & IH 35E\IH 35 E\Control\IH-35E CONTROL INDEX SHEET 01.dgn

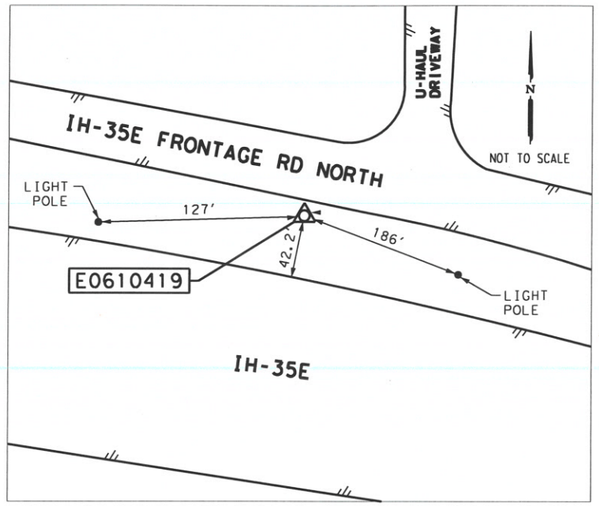


CONTROL POINT: E0610409

CP# E0610409 IS A 3-1/4" TxDOT ALUMINUM DISK SET IN CONCRETE, LOCATED ON THE NORTH SIDE OF IH-35E , +/- 128.1' EAST OF THE INTERSECTION OF IH-35E FRONTAGE RD NORTH AND US 377

LATITUDE: 33°11'48.09024"
LONGITUDE: 97°08'19.84127"

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,122,077.434	NORTHING:	7,121,004.797
EASTING:	2,385,203.607	EASTING:	2,384,844.378
ELEVATION:	704.553	ELEVATION:	704.553

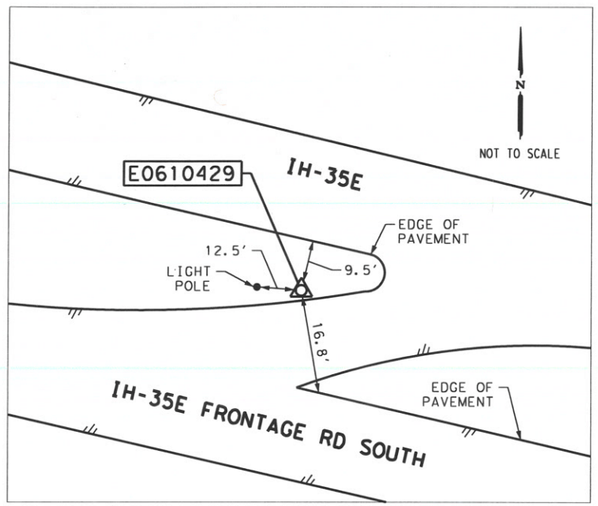


CONTROL POINT: E0610419

CP# E0610419 IS A 3-1/4" TxDOT ALUMINUM DISK SET IN CONCRETE, LOCATED ON THE NORTH SIDE OF IH-35E , +/- 1,429.1' EAST OF THE INTERSECTION OF IH-35E FRONTAGE RD NORTH AND US 377

LATITUDE: 33°11'46.03496"
LONGITUDE: 97°08'04.55902"

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,121,886.517	NORTHING:	7,120,813.909
EASTING:	2,386,501.495	EASTING:	2,386,142.070
ELEVATION:	713.663	ELEVATION:	713.663



CONTROL POINT: E0610429

CP# E0610429 IS A 3-1/4" TxDOT ALUMINUM DISK SET IN CONCRETE, LOCATED ON THE SOUTH SIDE OF IH-35E , +/- 1,371.6' EAST OF THE INTERSECTION OF IH-35E FRONTAGE RD SOUTH AND S LOCUST ST

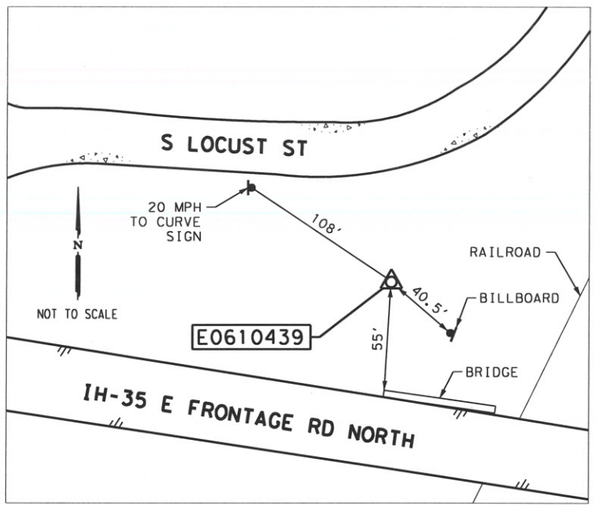
LATITUDE: 33°11'43.30895"
LONGITUDE: 97°07'59.56119"

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,121,616.568	NORTHING:	7,120,544.001
EASTING:	2,386,933.165	EASTING:	2,386,573.675
ELEVATION:	693.880	ELEVATION:	693.880

NOTES:

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM OF 1983 TEXAS NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83) 2011 ADJUSTMENT, EPOCH 2010 (GEOID 12A). ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY ACOMBINED ADJUSTMENT FACTOR OF 1.0001506300
2. ALL HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (TXDE DENTON), BASED ON THREE AVERAGED 180 EPOCH OBSERVATIONS
3. UNIT OF MEASURE IS U.S. SURVEY FOOT
4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (TXDE DENTON)
5. FIELD SURVEYS WERE PERFORMED DURING OCTOBER 2019

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY ON THE GROUND UNDER MY SUPERVISION.

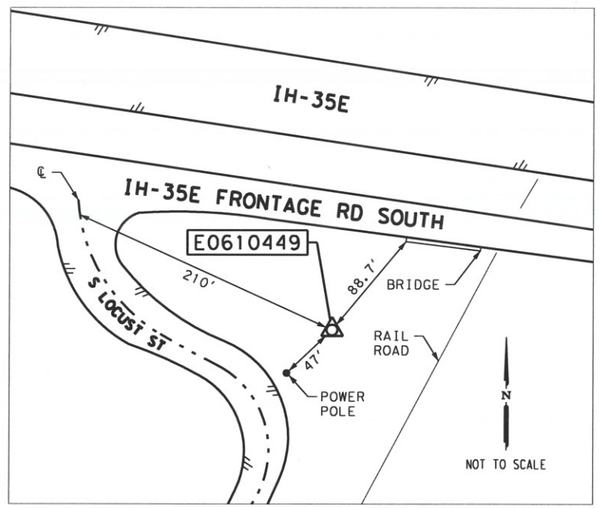


CONTROL POINT: E0610439

CP# E0610439 IS A 3-1/4" TxDOT ALUMINUM DISK SET IN CONCRETE, LOCATED ON THE NORTH SIDE OF IH-35E , +/- 354.' NORTHEAST OF THE INTERSECTION OF IH-35E FRONTAGE RD NORTH AND S LOCUST ST

LATITUDE: 33°11'47.86151"
LONGITUDE: 97°08'10.74981"

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,122,064.336	NORTHING:	7,120,991.701
EASTING:	2,385,976.441	EASTING:	2,385,617.095
ELEVATION:	705.674	ELEVATION:	705.674

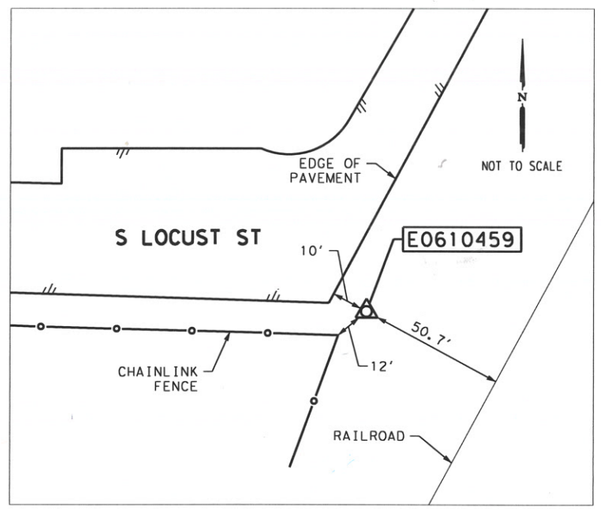


CONTROL POINT: E0610449

CP# E0610449 IS A 3-1/4" TxDOT ALUMINUM DISK SET IN CONCRETE, LOCATED ON THE SOUTH SIDE OF IH-35E , +/- 204.7' SOUTHEAST OF THE INTERSECTION OF IH-35E FRONTAGE RD AND S LOCUST ST

LATITUDE: 33°11'44.14292"
LONGITUDE: 97°08'13.13456"

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,121,685.871	NORTHING:	7,120,613.293
EASTING:	2,385,778.677	EASTING:	2,385,419.361
ELEVATION:	706.903	ELEVATION:	706.903



CONTROL POINT: E0610459

CP# E01610459 IS A 3-1/4" TxDOT ALUMINUM DISK SET IN CONCRETE, LOCATED ON THE EAST SIDE OF S LOCUST ST , +/- 1,216.8' SOUTH OF THE INTERSECTION OF IH-35E FRONTAGE RD SOUTH AND S LOCUST ST

LATITUDE: 33°11'34.85076"
LONGITUDE: 97°08'18.65335"

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,120,740.368	NORTHING:	7,119,668.202
EASTING:	2,385,321.891	EASTING:	2,384,962.645
ELEVATION:	682.631	ELEVATION:	682.631

STATE OF TEXAS REGISTERED CHRISTOPHER R. FREEMAN 5701 PROFESSIONAL LAND SURVEYOR

12-21-22

CHRISTOPHER R. FREEMAN - R.P.L.S. NO. 5701

LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPELS REGISTRATION NO. 10140700

IH-35E

SURVEY CONTROL DATA

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0195	03	088.ETC	69
DIST	COUNTY		HIGHWAY	
DALLAS	DENTON		IH-35E	

12/21/2022 O:_(001) AECOM\19.001.06 Bridge PS&E SH 31 & IH 35E\IH 35E\Control\IH-35E CONTROL DATA SHEET 01.dgn

℄ PNBFR (NORTHBOUND FRONTAGE ROAD)

Beginning chain PNBFR description
Feature: Geom_Centerline

Point PNBFR1000 N 7,121,811.29 E 2,386,957.00 Sta 2920+40.00

Course from PNBFR1 to PC PNBFR_3 N 71° 24′ 32.34" W Dist 137.27

Curve Data

Curve PNBFR1						
P.I. Station	2923+21.93	N	7,121,901.17	E	2,386,689.78	
Delta =	10° 19′ 56.94"	(LT)				
Degree =	3° 34′ 51.55"					
Tangent =	144.66					
Length =	288.54					
Radius =	1,600.00					
External =	6.53					
Long Chord =	288.15					
Mid. Ord. =	6.50					
P.C. Station	2921+77.27	N	7,121,855.05	E	2,386,826.89	
P.T. Station	2924+65.81	N	7,121,921.95	E	2,386,546.62	
C.C.		N	7,120,338.54	E	2,386,316.80	
Back = N	71° 24′ 32.34" W					
Ahead = N	81° 44′ 29.28" W					
Chord Bear = N	76° 34′ 30.81" W					

Curve Data

Curve PNBFR2						
P.I. Station	2925+55.75	N	7,121,934.87	E	2,386,457.61	
Delta =	9° 47′ 30.07"	(RT)				
Degree =	5° 27′ 24.27"					
Tangent =	89.94					
Length =	179.44					
Radius =	1,050.00					
External =	3.84					
Long Chord =	179.22					
Mid. Ord. =	3.83					
P.C. Station	2924+65.81	N	7,121,921.95	E	2,386,546.62	
P.T. Station	2926+45.25	N	7,121,962.74	E	2,386,372.10	
C.C.		N	7,122,961.06	E	2,386,697.44	
Back = N	81° 44′ 29.28" W					
Ahead = N	71° 56′ 59.21" W					
Chord Bear = N	76° 50′ 44.25" W					

Curve Data

Curve PNBFR3						
P.I. Station	2927+22.77	N	7,121,986.75	E	2,386,298.40	
Delta =	8° 26′ 38.93"	(LT)				
Degree =	5° 27′ 24.27"					
Tangent =	77.51					
Length =	154.75					
Radius =	1,050.00					
External =	2.86					
Long Chord =	154.61					
Mid. Ord. =	2.85					
P.C. Station	2926+45.25	N	7,121,962.74	E	2,386,372.10	
P.T. Station	2928+00.00	N	7,121,999.69	E	2,386,221.97	
C.C.		N	7,120,964.41	E	2,386,046.76	
Back = N	71° 56′ 59.21" W					
Ahead = N	80° 23′ 38.14" W					
Chord Bear = N	76° 10′ 18.68" W					

Course from PT PNBFR3 to PC PNBFR4 N 80° 23′ 38.14" W Dist 350.00

Curve Data

Curve PNBFR4						
P.I. Station	2932+72.72	N	7,122,078.57	E	2,385,755.88	
Delta =	13° 19′ 57.05"	(LT)				
Degree =	5° 27′ 24.27"					
Tangent =	122.72					
Length =	244.33					
Radius =	1,050.00					
External =	7.15					
Long Chord =	243.78					
Mid. Ord. =	7.10					
P.C. Station	2931+50.00	N	7,122,058.10	E	2,385,876.88	
P.T. Station	2933+94.33	N	7,122,070.60	E	2,385,633.42	
C.C.		N	7,121,022.82	E	2,385,701.67	
Back = N	80° 23′ 38.14" W					
Ahead = S	86° 16′ 24.81" W					
Chord Bear = N	87° 03′ 36.67" W					

Curve Data

Curve PNBFR5						
P.I. Station	2934+96.40	N	7,122,063.96	E	2,385,531.57	
Delta =	11° 06′ 16.03"	(RT)				
Degree =	5° 27′ 24.27"					
Tangent =	102.07					
Length =	203.50					
Radius =	1,050.00					
External =	4.95					
Long Chord =	203.18					
Mid. Ord. =	4.93					
P.C. Station	2933+94.33	N	7,122,070.60	E	2,385,633.42	
P.T. Station	2935+97.83	N	7,122,077.07	E	2,385,430.34	
C.C.		N	7,123,118.38	E	2,385,565.18	
Back = S	86° 16′ 24.81" W					
Ahead = N	82° 37′ 19.16" W					
Chord Bear = N	88° 10′ 27.18" W					

Course from PT PNBFR5 to PC PNBFR6 N 82° 37′ 19.16" W Dist 32.31

Curve Data

Curve PNBFR6						
P.I. Station	2937+01.56	N	7,122,090.39	E	2,385,327.47	
Delta =	6° 48′ 44.66"	(RT)				
Degree =	4° 46′ 28.73"					
Tangent =	71.42					
Length =	142.68					
Radius =	1,200.00					
External =	2.12					
Long Chord =	142.59					
Mid. Ord. =	2.12					
P.C. Station	2936+30.14	N	7,122,081.22	E	2,385,398.30	
P.T. Station	2937+72.82	N	7,122,107.90	E	2,385,258.23	
C.C.		N	7,123,271.28	E	2,385,552.40	
Back = N	82° 37′ 19.16" W					
Ahead = N	75° 48′ 34.50" W					
Chord Bear = N	79° 12′ 56.83" W					

Course from PT PNBFR6 to PNBFR7 N 75° 48′ 34.50" W Dist 127.18

Point PNBFR7 N 7,122,139.08 E 2,385,134.93 Sta 2939+00.00

Ending chain PNBFR description

10/2/2023

AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
HORIZONTAL ALIGNMENT DATA
NORTHBOUND FRONTAGE ROAD

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	70
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				
AEC				

DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwaldj
DATE: 10/2/2023 10:53:55 PM
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0373462\l35_AEC_RD_HA_01.dgn

℄ PSBFR (SOUTHBOUND FRONTAGE ROAD)

Beginning chain PSBFR description

Point PSBFR1000 N 7,121,510.11 E 2,387,158.15 Sta 3915+00.00

Course from PSBFR1000 to PC PSBFR1 N 75° 51′ 18.68" W Dist 335.04

Curve Data

Curve PSBFR1			
P.I. Station	3920+35.46	N 7,121,640.96	E 2,386,638.92
Delta =	21° 36′ 45.63"	(LT)	
Degree =	5° 27′ 24.27"		
Tangent =	200.42		
Length =	396.07		
Radius =	1,050.00		
External =	18.96		
Long Chord =	393.73		
Mid. Ord. =	18.62		
P.C. Station	3918+35.04	N 7,121,591.98	E 2,386,833.26
P.T. Station	3922+31.11	N 7,121,614.91	E 2,386,440.20
C.C.		N 7,120,573.82	E 2,386,576.67
Back = N	75° 51′ 18.68" W		
Ahead = S	82° 31′ 55.69" W		
Chord Bear = N	86° 39′ 41.50" W		

Curve Data

Curve PSBFR2			
P.I. Station	3924+20.86	N 7,121,590.25	E 2,386,252.07
Delta =	20° 29′ 11.61"	(RT)	
Degree =	5° 27′ 24.27"		
Tangent =	189.74		
Length =	375.44		
Radius =	1,050.00		
External =	17.01		
Long Chord =	373.44		
Mid. Ord. =	16.74		
P.C. Station	3922+31.11	N 7,121,614.91	E 2,386,440.20
P.T. Station	3926+06.55	N 7,121,632.99	E 2,386,067.20
C.C.		N 7,122,656.01	E 2,386,303.73
Back = S	82° 31′ 55.69" W		
Ahead = N	76° 58′ 52.70" W		
Chord Bear = N	87° 13′ 28.51" W		

Course from PT PSBFR2 to PC PSBFR3 N 76° 58′ 52.70" W Dist 400.00

Curve Data

Curve PSBFR3			
P.I. Station	3930+64.87	N 7,121,736.24	E 2,385,620.67
Delta =	6° 21′ 27.34"	(LT)	
Degree =	5° 27′ 24.27"		
Tangent =	58.31		
Length =	116.51		
Radius =	1,050.00		
External =	1.62		
Long Chord =	116.45		
Mid. Ord. =	1.62		
P.C. Station	3930+06.55	N 7,121,723.10	E 2,385,677.48
P.T. Station	3931+23.06	N 7,121,743.00	E 2,385,562.75
C.C.		N 7,120,700.09	E 2,385,440.95
Back = N	76° 58′ 52.70" W		
Ahead = N	83° 20′ 20.05" W		
Chord Bear = N	80° 09′ 36.37" W		

Curve Data

Curve PSBFR4			
P.I. Station	3932+55.33	N 7,121,758.35	E 2,385,431.37
Delta =	14° 21′ 34.34"	(RT)	
Degree =	5° 27′ 24.27"		
Tangent =	132.27		
Length =	263.15		
Radius =	1,050.00		
External =	8.30		
Long Chord =	262.46		
Mid. Ord. =	8.23		
P.C. Station	3931+23.06	N 7,121,743.00	E 2,385,562.75
P.T. Station	3933+86.21	N 7,121,805.79	E 2,385,307.90
C.C.		N 7,122,785.91	E 2,385,684.54
Back = N	83° 20′ 20.05" W		
Ahead = N	68° 58′ 45.71" W		
Chord Bear = N	76° 09′ 32.88" W		

Curve Data

Curve PSBFR5			
P.I. Station	3935+01.67	N 7,121,847.21	E 2,385,200.13
Delta =	12° 32′ 56.10"	(LT)	
Degree =	5° 27′ 22.66"		
Tangent =	115.46		
Length =	229.99		
Radius =	1,050.09		
External =	6.33		
Long Chord =	229.53		
Mid. Ord. =	6.29		
P.C. Station	3933+86.21	N 7,121,805.79	E 2,385,307.90
P.T. Station	3936+16.20	N 7,121,864.21	E 2,385,085.93
C.C.		N 7,120,825.59	E 2,384,931.23
Back = N	68° 58′ 45.71" W		
Ahead = N	81° 31′ 41.81" W		
Chord Bear = N	75° 15′ 13.76" W		

Course from PT PSBFR5 to PSBFR1001 N 81° 31′ 41.81" W Dist 110.77

Point PSBFR1001 N 7,121,880.53 E 2,384,976.37 Sta 3937+26.97

Ending chain PSBFR description

℄ PSBFR-ULT (SOUTHBOUND FRONTAGE ROAD)

Beginning chain PSBFR-ULT description
Feature: Geom_Centerline

Point 19 N 7,121,535.31 E 2,386,767.32 Sta 3918+99.28

Course from 19 to PC PSBFR-ULT1 N 83° 15′ 54.04" W Dist 112.57

Curve Data

Curve PSBFR-ULT1			
P.I. Station	3920+66.48	N 7,121,554.92	E 2,386,601.27
Delta =	2° 30′ 12.47"	(RT)	
Degree =	2° 17′ 30.59"		
Tangent =	54.63		
Length =	109.23		
Radius =	2,500.00		
External =	0.60		
Long Chord =	109.23		
Mid. Ord. =	0.60		
P.C. Station	3920+11.86	N 7,121,548.51	E 2,386,655.52
P.T. Station	3921+21.09	N 7,121,563.69	E 2,386,547.36
C.C.		N 7,124,031.26	E 2,386,948.72
Back = N	83° 15′ 54.04" W		
Ahead = N	80° 45′ 41.57" W		
Chord Bear = N	82° 00′ 47.80" W		

Course from PT PSBFR-ULT1 to PC PSBFR-ULT2 N 80° 45′ 41.57" W Dist 196.88

Curve Data

Curve PSBFR-ULT2			
P.I. Station	3923+61.63	N 7,121,602.31	E 2,386,309.94
Delta =	4° 45′ 44.36"	(LT)	
Degree =	5° 27′ 24.27"		
Tangent =	43.66		
Length =	87.27		
Radius =	1,050.00		
External =	0.91		
Long Chord =	87.25		
Mid. Ord. =	0.91		
P.C. Station	3923+17.97	N 7,121,595.30	E 2,386,353.04
P.T. Station	3924+05.24	N 7,121,605.71	E 2,386,266.41
C.C.		N 7,120,558.92	E 2,386,184.46
Back = N	80° 45′ 41.57" W		
Ahead = N	85° 31′ 25.93" W		
Chord Bear = N	83° 08′ 33.75" W		

Course from PT PSBFR-ULT2 to 20 N 85° 31′ 25.93" W Dist 44.76

Point 20 N 7,121,609.21 E 2,386,221.79 Sta 3924+50.00

Ending chain PSBFR-ULT description

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED
PROFESSIONAL ENGINEER

10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
HORIZONTAL ALIGNMENT DATA
SOUTHBOUND FRONTAGE ROAD

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	71
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DN: AECOM CK: AECOM DN: AECOM CK: AECOM steigerwaldj

℄ PNBLOCUST (NORTHBOUND LOCUST STREET)

Beginning chain PNBLOCUST description

Point PNBLOCUST1000 N 7,122,070.38 E 2,385,773.15 Sta 10+00.00

Course from PNBLOCUST1000 to PC PNBLOCUST1 N 9° 36′ 21.86" E Dist 8.88

		Curve Data				
Curve PNBLOCUST1						
P.I. Station		10+62.84	N	7,122,132.34	E	2,385,783.64
Delta	=	83° 55′ 47.55"	(RT)			
Degree	=	95° 29′ 34.68"				
Tangent	=	53.96				
Length	=	87.89				
Radius	=	60.00				
External	=	20.69				
Long Chord	=	80.24				
Mid. Ord.	=	15.39				
P.C. Station		10+08.88	N	7,122,079.14	E	2,385,774.63
P.T. Station		10+96.77	N	7,122,129.01	E	2,385,837.49
C.C.			N	7,122,069.12	E	2,385,833.79
Back	= N	9° 36′ 21.86" E				
Ahead	= S	86° 27′ 50.59" E				
Chord Bear	= N	51° 34′ 15.63" E				

Course from PT PNBLOCUST1 to PC PNBLOCUST2 S 86° 27′ 50.59" E Dist 99.30

		Curve Data				
Curve PNBLOCUST2						
P.I. Station		12+96.49	N	7,122,116.69	E	2,386,036.83
Delta	=	71° 18′ 17.88"	(LT)			
Degree	=	40° 55′ 32.00"				
Tangent	=	100.42				
Length	=	174.23				
Radius	=	140.00				
External	=	32.29				
Long Chord	=	163.20				
Mid. Ord.	=	26.24				
P.C. Station		11+96.07	N	7,122,122.88	E	2,385,936.60
P.T. Station		13+70.30	N	7,122,209.65	E	2,386,074.83
C.C.			N	7,122,262.62	E	2,385,945.24
Back	= S	86° 27′ 50.59" E				
Ahead	= N	22° 13′ 51.53" E				
Chord Bear	= N	57° 53′ 00.47" E				

Course from PT PNBLOCUST2 to PNBLOCUST1001 N 22° 13′ 51.53" E Dist 150.00

Point PNBLOCUST1001 N 7,122,348.50 E 2,386,131.58 Sta 15+20.30

Ending chain PNBLOCUST description

℄ PSBLOCUST (SOUTHBOUND LOCUST STREET)

Beginning chain PSBLOCUST description
Feature: Geom_Centerline

Point PSBLOCUST1000 N 7,121,746.78 E 2,385,533.85 Sta 10+00.00

Course from PSBLOCUST1000 to PC PSBLOCUST1 S 8° 15′ 04.60" W Dist 1.58

		Curve Data				
Curve PSBLOCUST1						
P.I. Station		10+49.16	N	7,121,698.14	E	2,385,526.80
Delta	=	87° 09′ 06.71"	(LT)			
Degree	=	114° 35′ 29.61"				
Tangent	=	47.57				
Length	=	76.05				
Radius	=	50.00				
External	=	19.02				
Long Chord	=	68.93				
Mid. Ord.	=	13.78				
P.C. Station		10+01.58	N	7,121,745.22	E	2,385,533.62
P.T. Station		10+77.64	N	7,121,688.98	E	2,385,573.48
C.C.			N	7,121,738.04	E	2,385,583.11
Back	= S	8° 15′ 04.61" W				
Ahead	= S	78° 54′ 02.10" E				
Chord Bear	= S	35° 19′ 28.75" E				

		Curve Data				
Curve PSBLOCUST2						
P.I. Station		11+19.91	N	7,121,680.84	E	2,385,614.97
Delta	=	1° 06′ 17.14"	(LT)			
Degree	=	1° 18′ 23.87"				
Tangent	=	42.28				
Length	=	84.55				
Radius	=	4,385.00				
External	=	0.20				
Long Chord	=	84.55				
Mid. Ord.	=	0.20				
P.C. Station		10+77.64	N	7,121,688.98	E	2,385,573.48
P.T. Station		11+62.19	N	7,121,673.50	E	2,385,656.60
C.C.			N	7,125,991.95	E	2,386,417.65
Back	= S	78° 54′ 02.10" E				
Ahead	= S	80° 00′ 19.24" E				
Chord Bear	= S	79° 27′ 10.67" E				

		Curve Data				
Curve PSBLOCUST3						
P.I. Station		12+84.89	N	7,121,652.21	E	2,385,777.44
Delta	=	107° 28′ 53.99"	(RT)			
Degree	=	63° 39′ 43.12"				
Tangent	=	122.70				
Length	=	168.83				
Radius	=	90.00				
External	=	62.17				
Long Chord	=	145.14				
Mid. Ord.	=	36.77				
P.C. Station		11+62.19	N	7,121,673.50	E	2,385,656.60
P.T. Station		13+31.02	N	7,121,543.34	E	2,385,720.83
C.C.			N	7,121,584.87	E	2,385,640.98
Back	= S	80° 00′ 19.24" E				
Ahead	= S	27° 28′ 34.75" W				
Chord Bear	= S	26° 15′ 52.25" E				

Course from PT PSBLOCUST3 to PSBLOCUST1001 S 27° 28′ 34.75" W Dist 150.74

Point PSBLOCUST1001 N 7,121,409.61 E 2,385,651.28 Sta 14+81.76

Ending chain PSBLOCUST description

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

10/2/2023

AECOM
AECOM Technical Services Inc.
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DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
HORIZONTAL ALIGNMENT DATA
NORTHBOUND AND SOUTHBOUND LOCUST STREET

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	72
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

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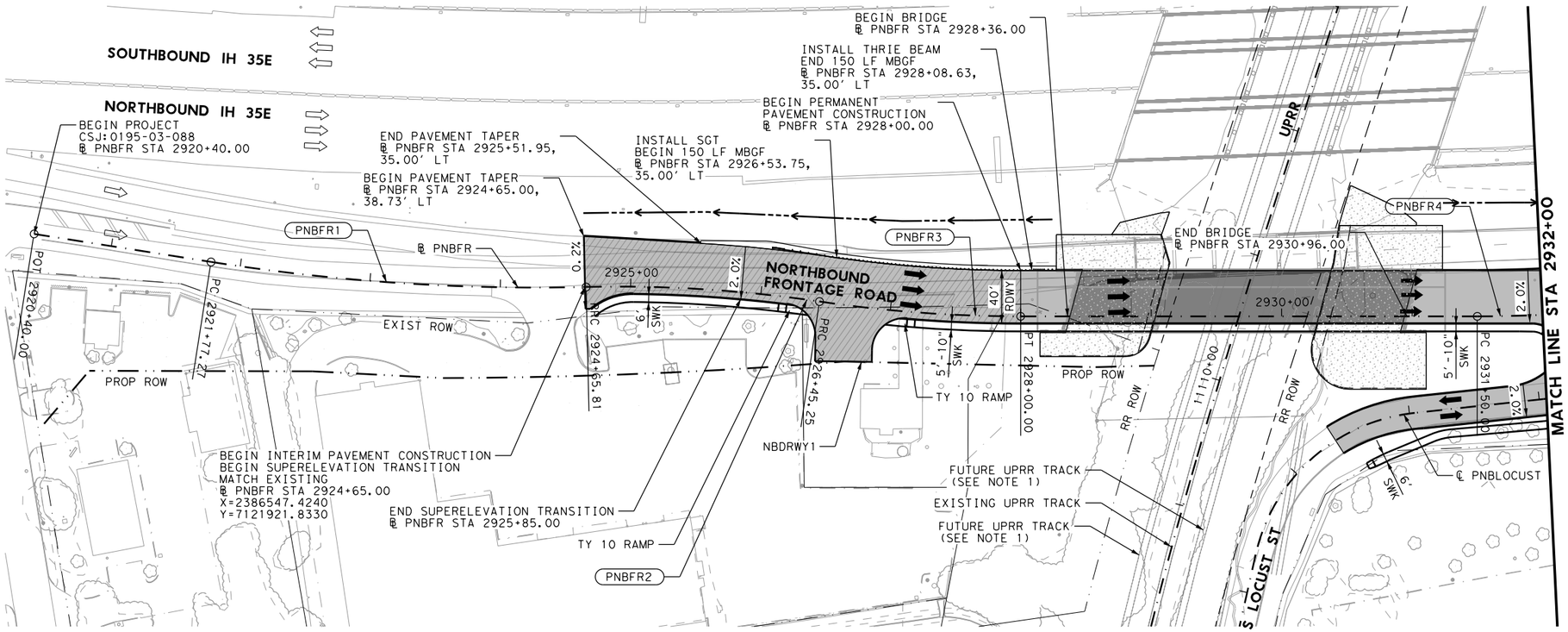

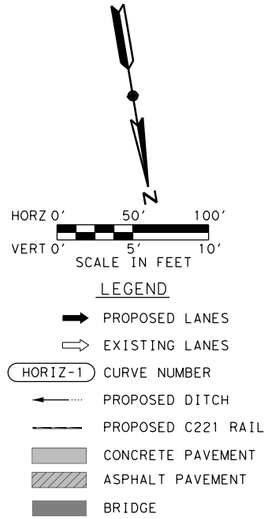

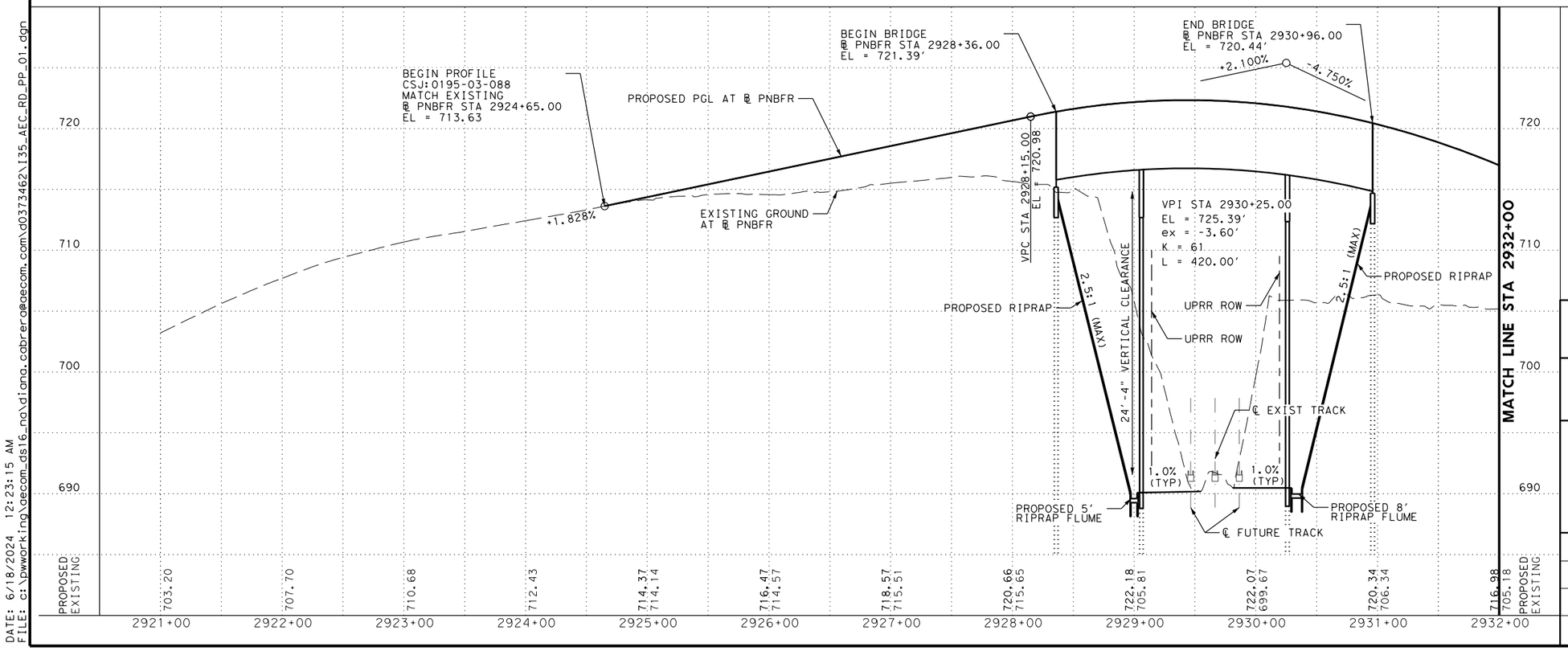

NOTE:

1. GREYSCALE LINES DENOTE FUTURE UPRR TRACK EXPANSION PROJECT AND WILL NOT BE CONSTRUCTED AS PART OF THIS PROJECT

STATE OF TEXAS
SEAN K. YOUNG
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LICENSED
PROFESSIONAL ENGINEER
6/18/2024

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DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
ROADWAY
PLAN AND PROFILE
NORTHBOUND FRONTAGE ROAD

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	73
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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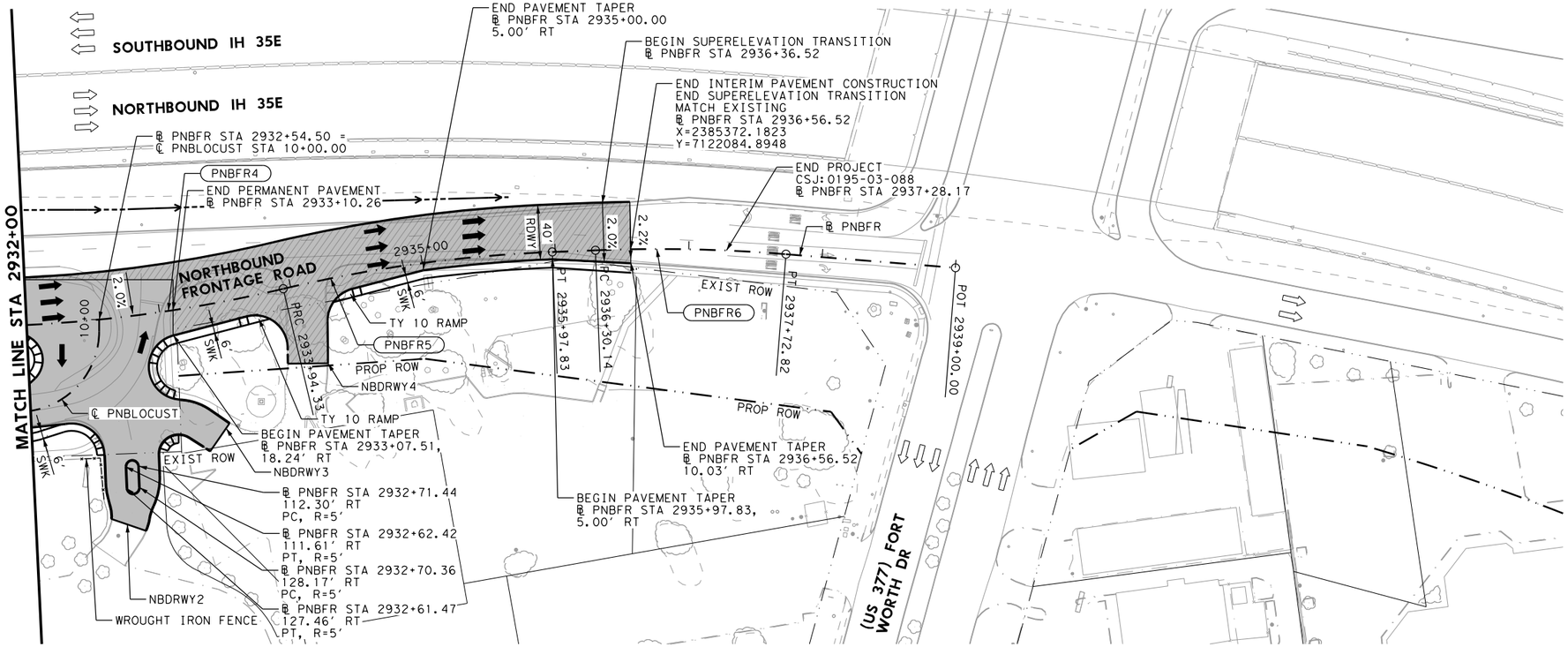

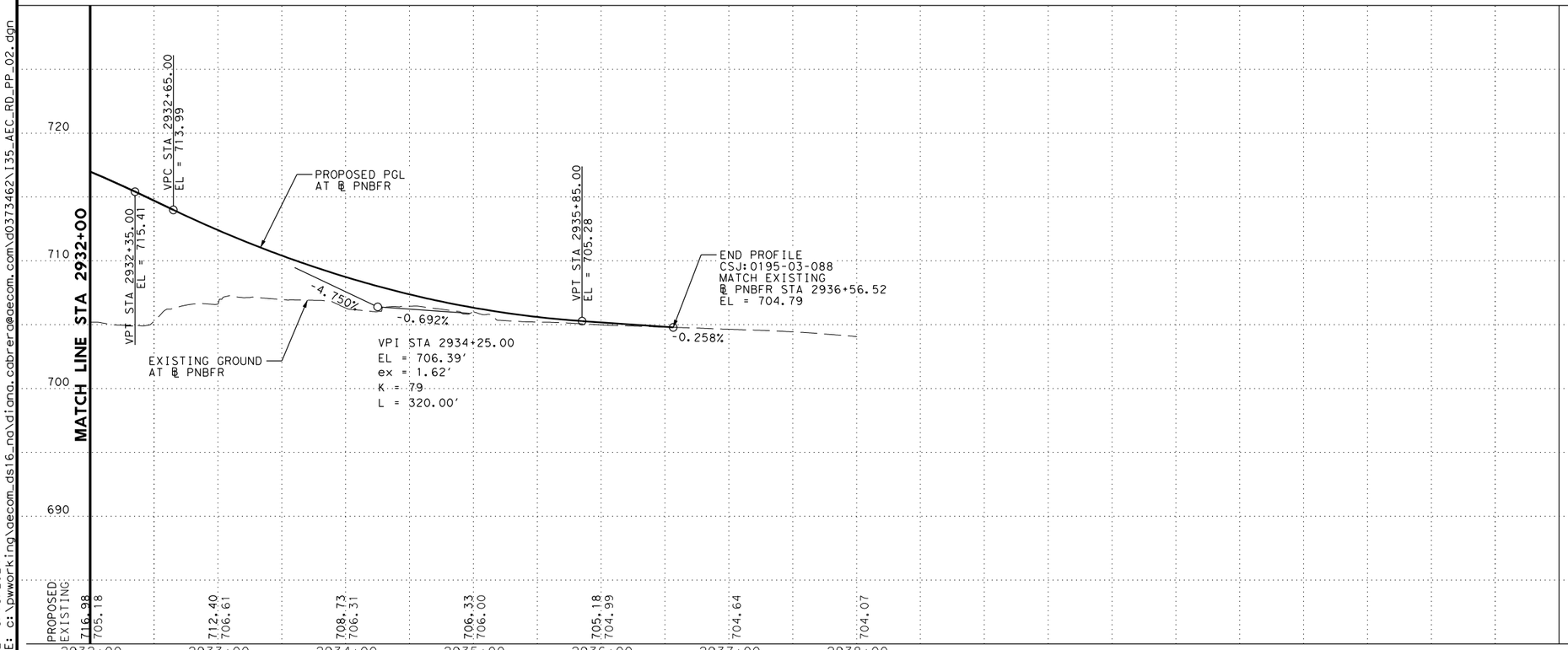

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STATE OF TEXAS
6/18/2024

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214.741.7777 TBPE REG #3580

IH 35E
ROADWAY
PLAN AND PROFILE

NORTHBOUND FRONTAGE ROAD

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	74
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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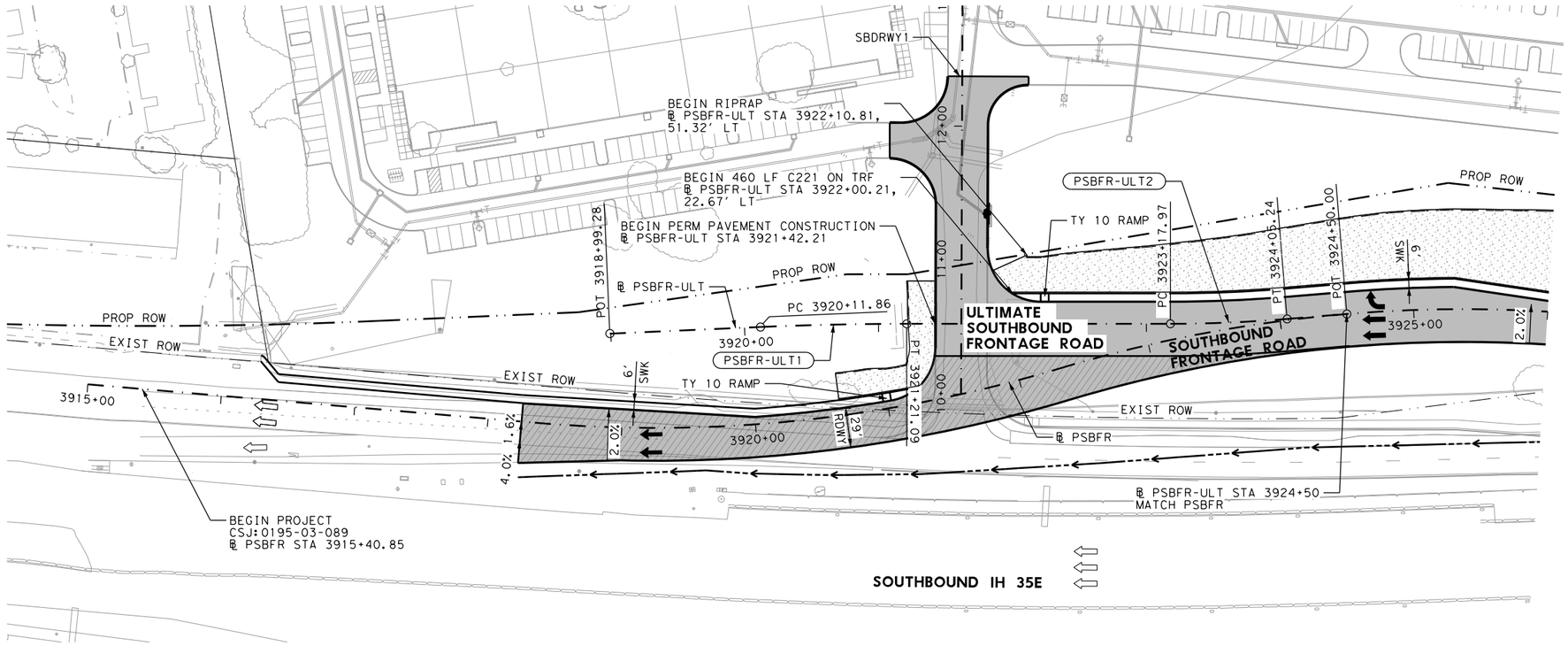

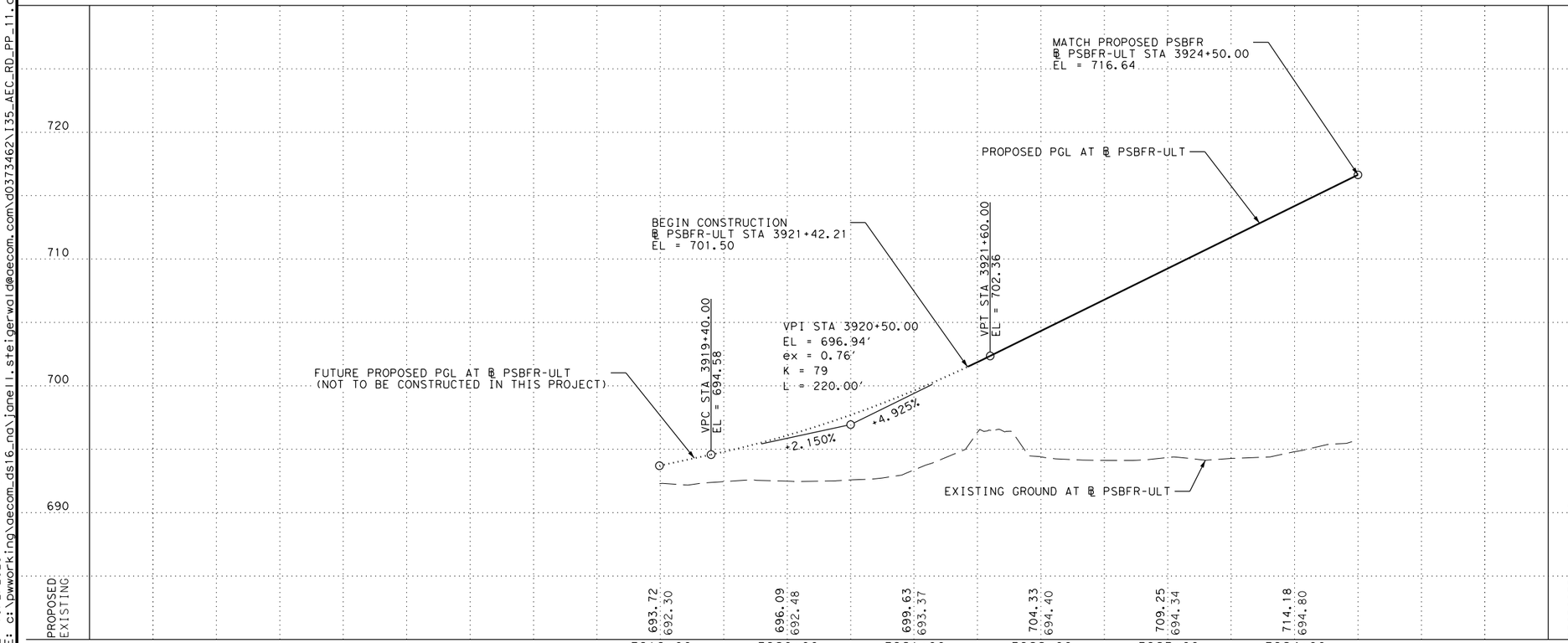

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LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
10/2/2023

AECOM
AECOM Technical Services Inc.
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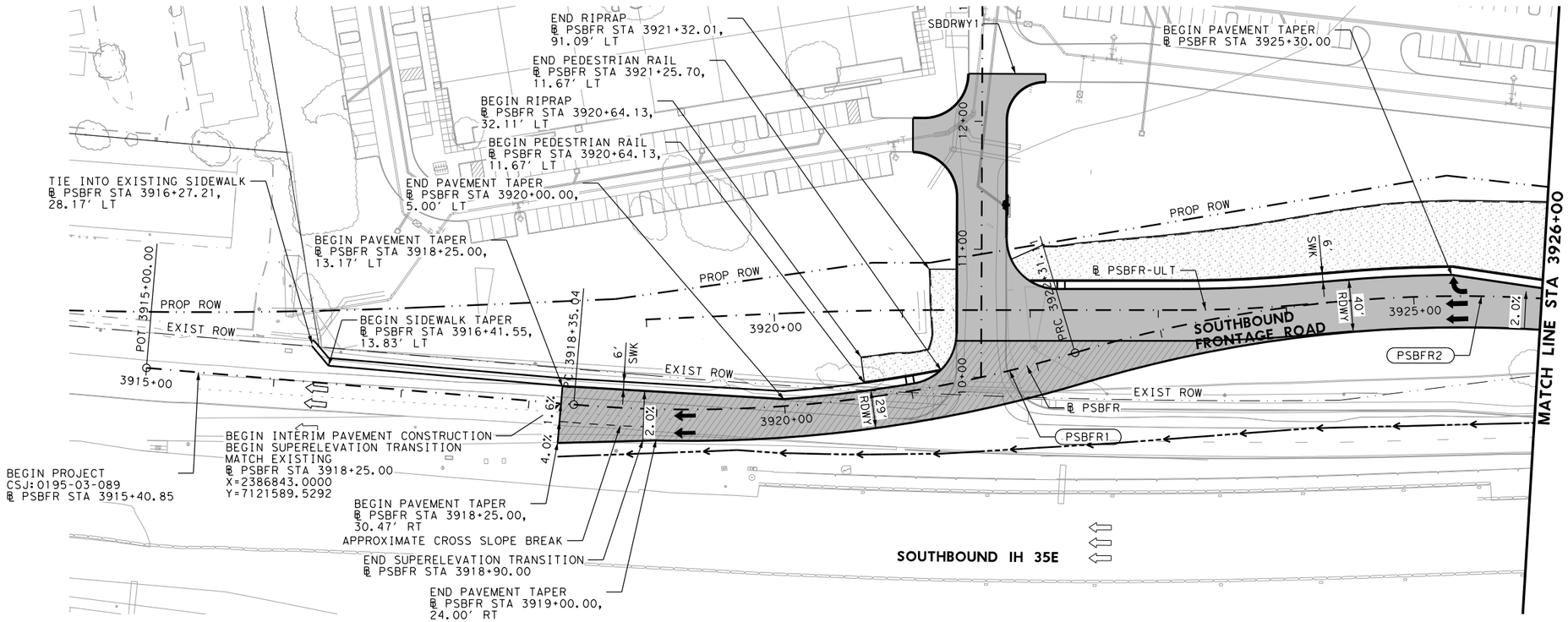
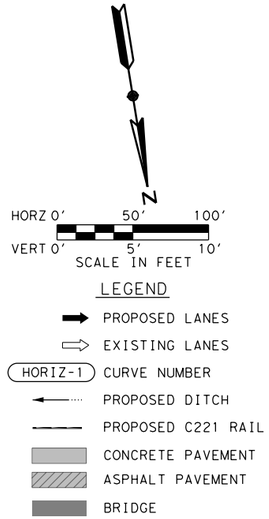
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
ROADWAY
PLAN AND PROFILE
ULTIMATE SOUTHBOUND FRONTAGE ROAD

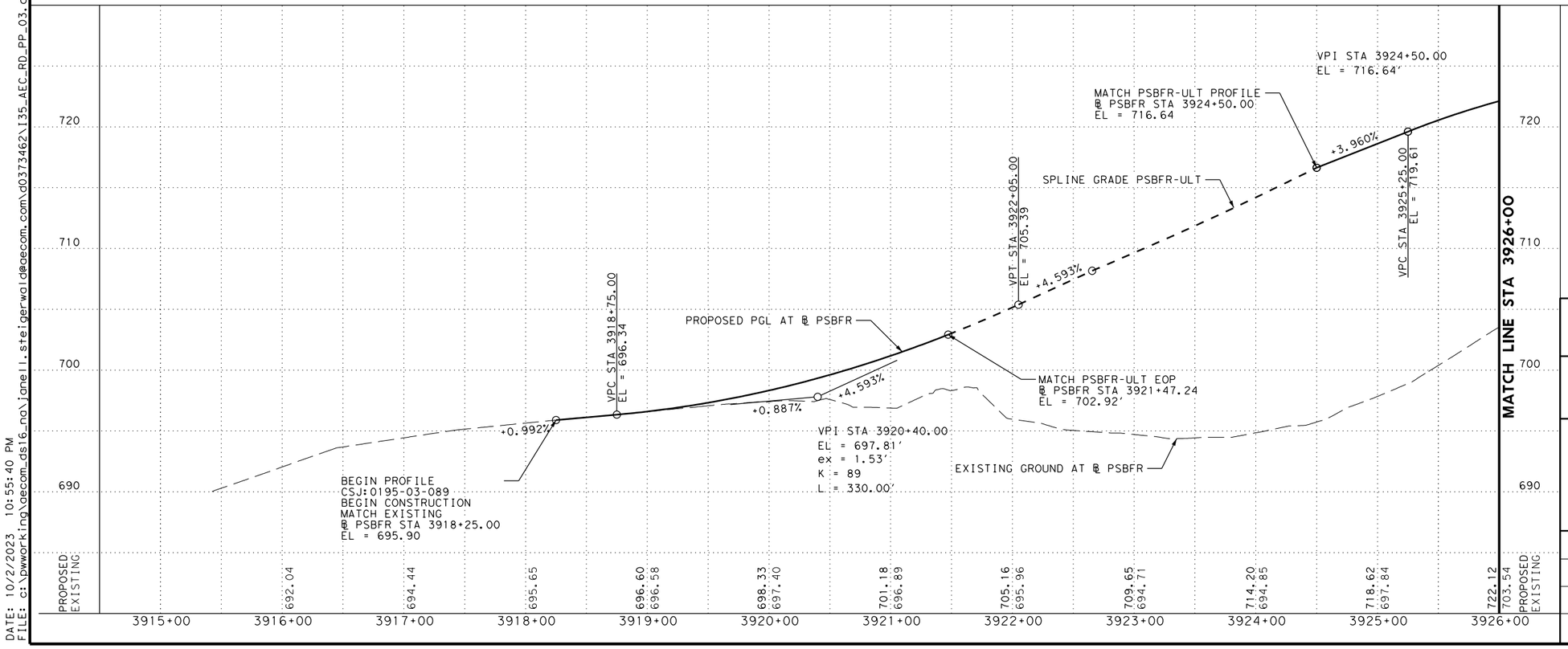
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AESC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	75
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	





NOTE: CONTRACTOR TO VERIFY FIELD CONDITIONS IN ACME DRIVEWAY AREA.



10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
ROADWAY
PLAN AND PROFILE
SOUTHBOUND FRONTAGE ROAD

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AESC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	76
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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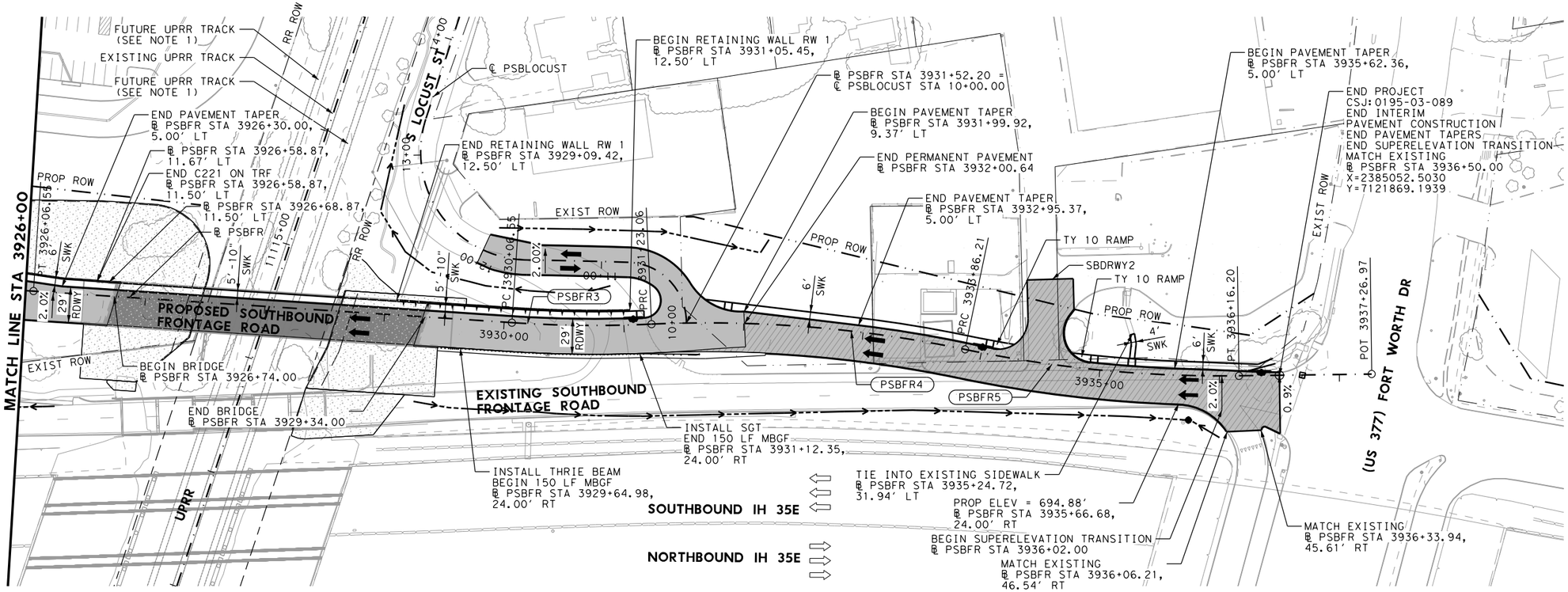

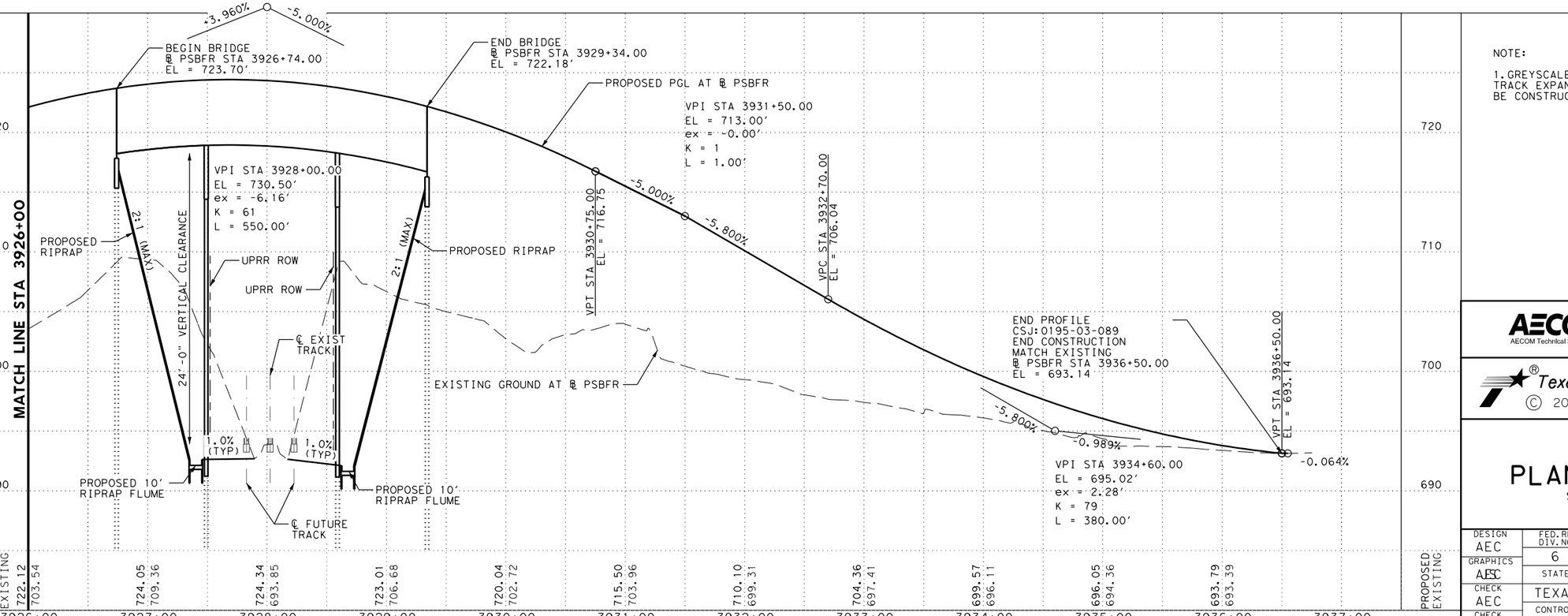

NOTE:

1. GREYSCALE LINES DENOTE FUTURE UPRR TRACK EXPANSION PROJECT AND WILL NOT BE CONSTRUCTED AS PART OF THIS PROJECT

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
ROADWAY
PLAN AND PROFILE
SOUTHBOUND FRONTAGE ROAD

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AECOM	TEXAS	DALLAS	DENTON	77
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088, ETC	
CHECK				
AEC				

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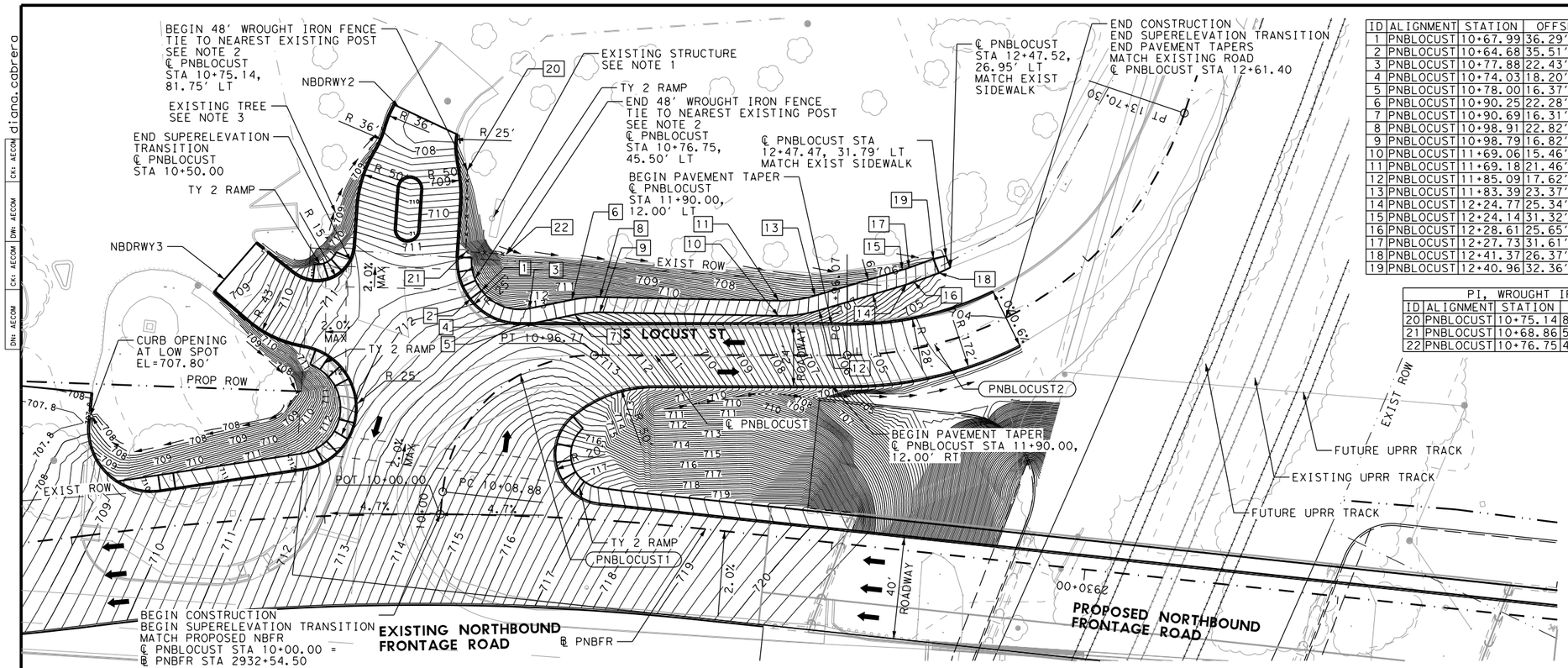


ID	ALIGNMENT	STATION	OFFSET	ELEVATION	NOTES
1	PNBLOCUST	10+67.99	36.29' LT	712.39'	PC, R=19'
2	PNBLOCUST	10+64.68	35.51' LT	712.31'	PC, R=24.3'
3	PNBLOCUST	10+77.88	22.43' LT	713.40'	PT, R=19'
4	PNBLOCUST	10+74.03	18.20' LT	713.43'	PT, R=24.3'
5	PNBLOCUST	10+78.00	16.37' LT	713.45'	N/A
6	PNBLOCUST	10+90.25	22.28' LT	712.65'	PC, R=50'
7	PNBLOCUST	10+90.69	16.31' LT	712.61'	PC, R=44'
8	PNBLOCUST	10+98.91	22.82' LT	712.15'	PT, R=50'
9	PNBLOCUST	10+98.79	16.82' LT	712.06'	PT, R=44'
10	PNBLOCUST	11+69.06	15.46' LT	708.55'	PC, R=53'
11	PNBLOCUST	11+69.18	21.46' LT	708.64'	PC, R=47'
12	PNBLOCUST	11+85.09	17.62' LT	707.78'	PT, R=53'
13	PNBLOCUST	11+83.39	23.37' LT	707.87'	PT, R=47'
14	PNBLOCUST	12+24.77	25.34' LT	705.99'	PC, R=53'
15	PNBLOCUST	12+24.14	31.32' LT	706.08'	PC, R=47'
16	PNBLOCUST	12+28.61	25.65' LT	705.84'	PT, R=53'
17	PNBLOCUST	12+27.73	31.61' LT	705.93'	PT, R=47'
18	PNBLOCUST	12+41.37	26.37' LT	705.32'	N/A
19	PNBLOCUST	12+40.96	32.36' LT	705.42'	N/A

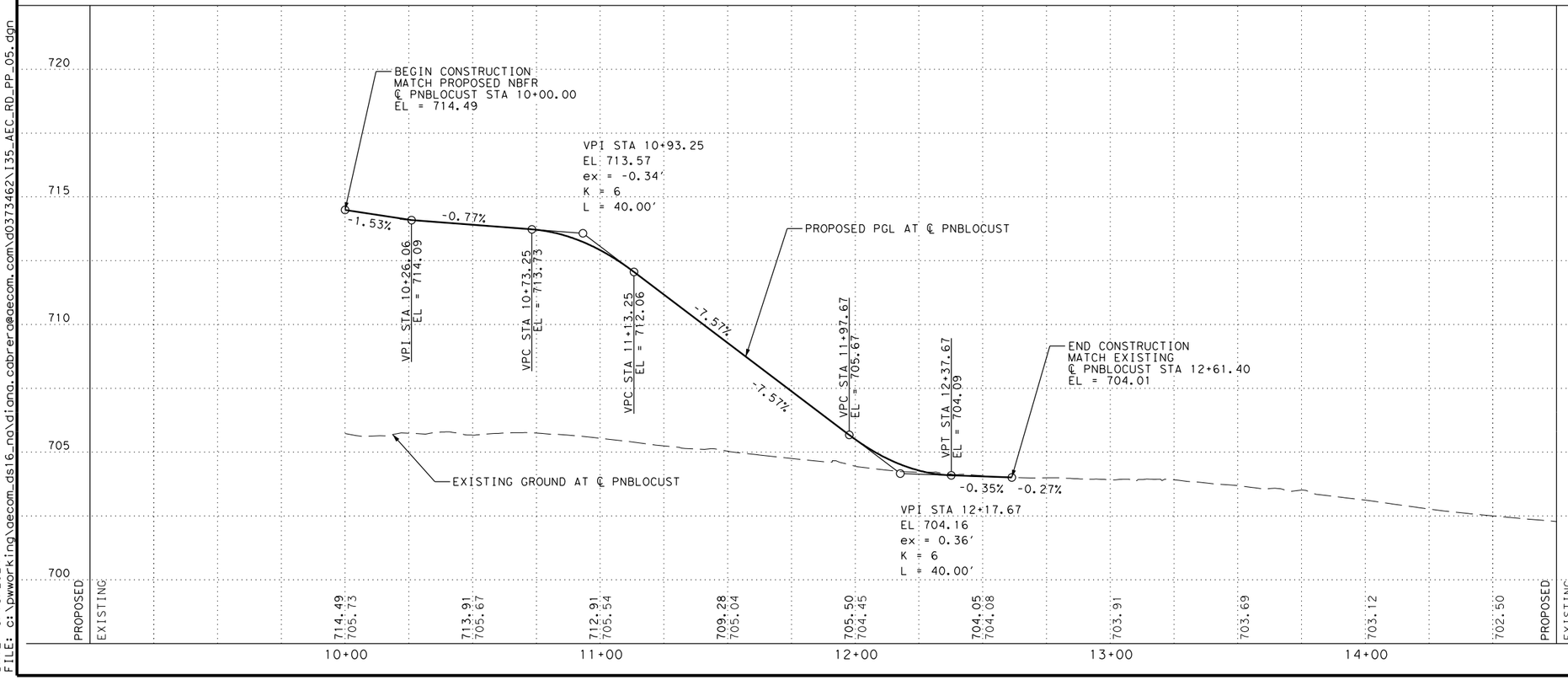
PI, WROUGHT IRON FENCE				
ID	ALIGNMENT	STATION	OFFSET	ELEVATION
20	PNBLOCUST	10+75.14	81.75' LT	708.29'
21	PNBLOCUST	10+68.86	52.61' LT	711.67'
22	PNBLOCUST	10+76.75	45.50' LT	707.56'

LEGEND

- PROPOSED LANES
- EXISTING LANES
- (HORIZ-1) CURVE NUMBER
- PROPOSED DITCH
- PROPOSED C221 RAIL

NOTES:

1. APPROXIMATE LOCATION OF EXISTING STRUCTURE TO REMAIN. LIMITS OF PROPOSED GRADING APPROXIMATELY 3 FT FROM EXISTING STRUCTURE. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING STRUCTURE PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO MATCH EXISTING FENCE MATERIAL, COLOR, STYLE AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3. PROTECT EXISTING TREE IN PLACE. CONTRACTOR TO ADJUST GRADING IN FIELD.



SEAN K. YOUNG 96504 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
6/18/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
ROADWAY
PLAN AND PROFILE
NORTH S LOCUST STREET AT NORTHBOUND FRONTAGE ROAD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	78
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	

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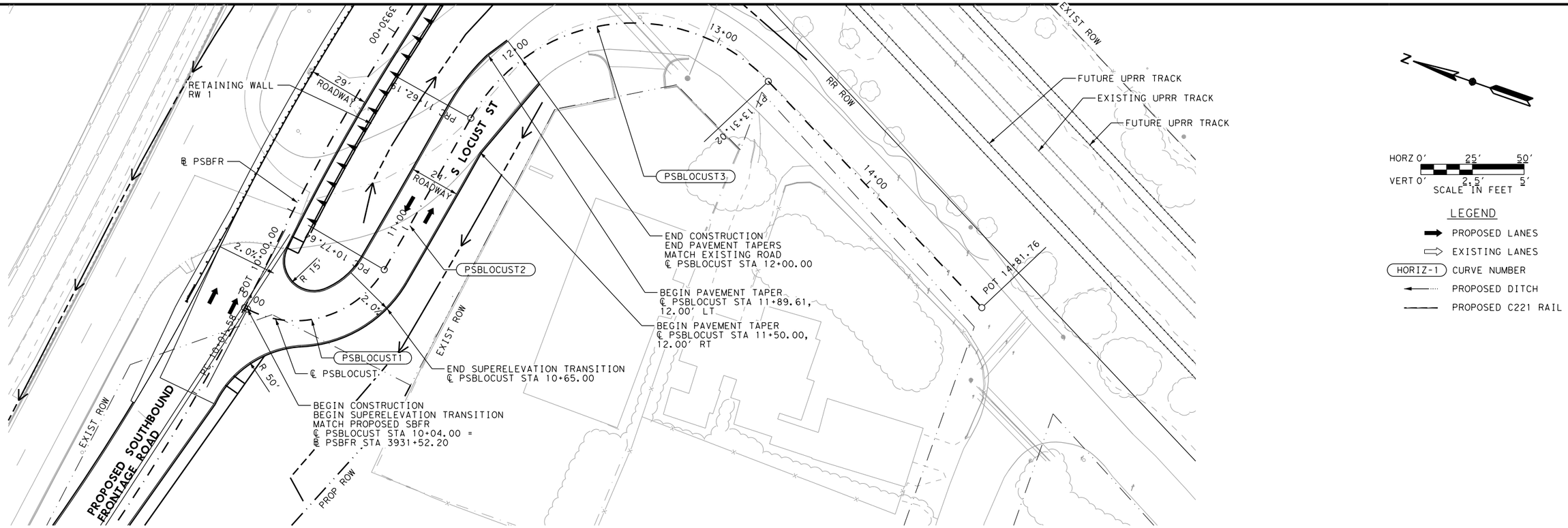

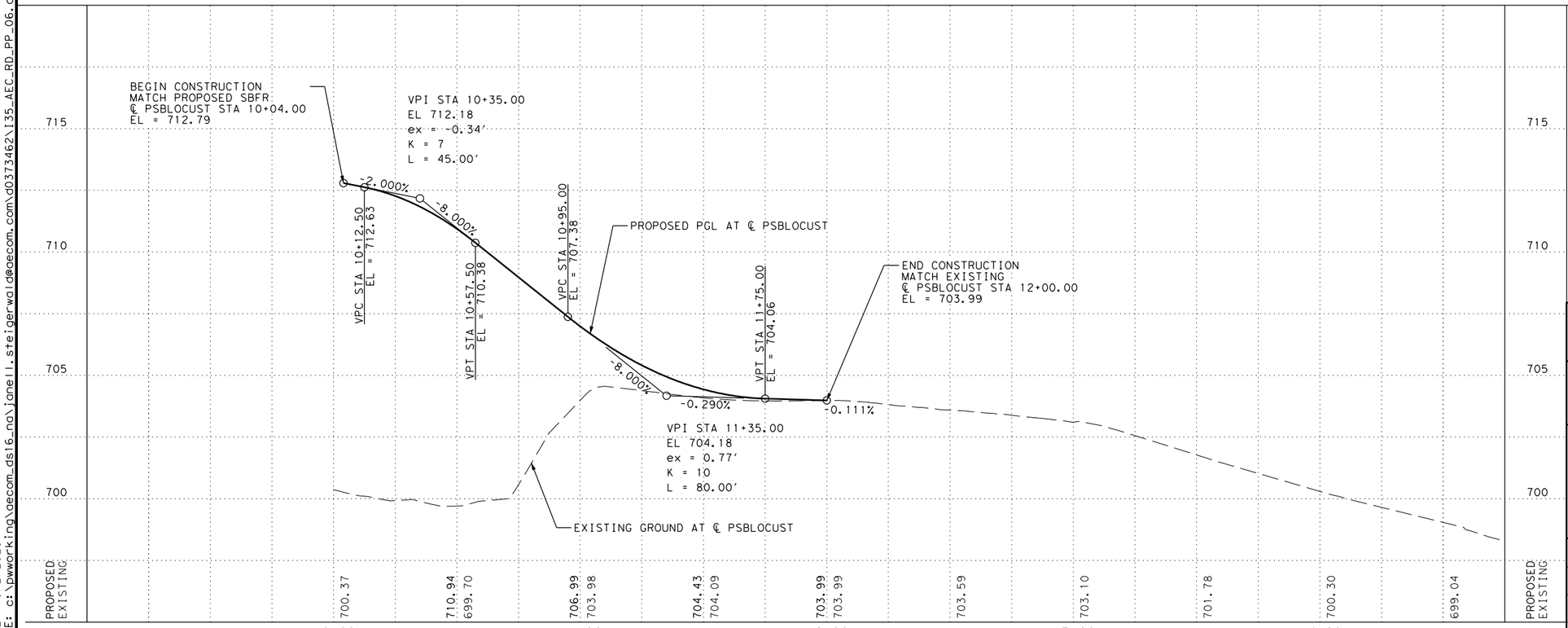

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
ROADWAY PLAN AND PROFILE
SOUTH S LOCUST STREET AT SOUTHBOUND FRONTAGE ROAD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	79
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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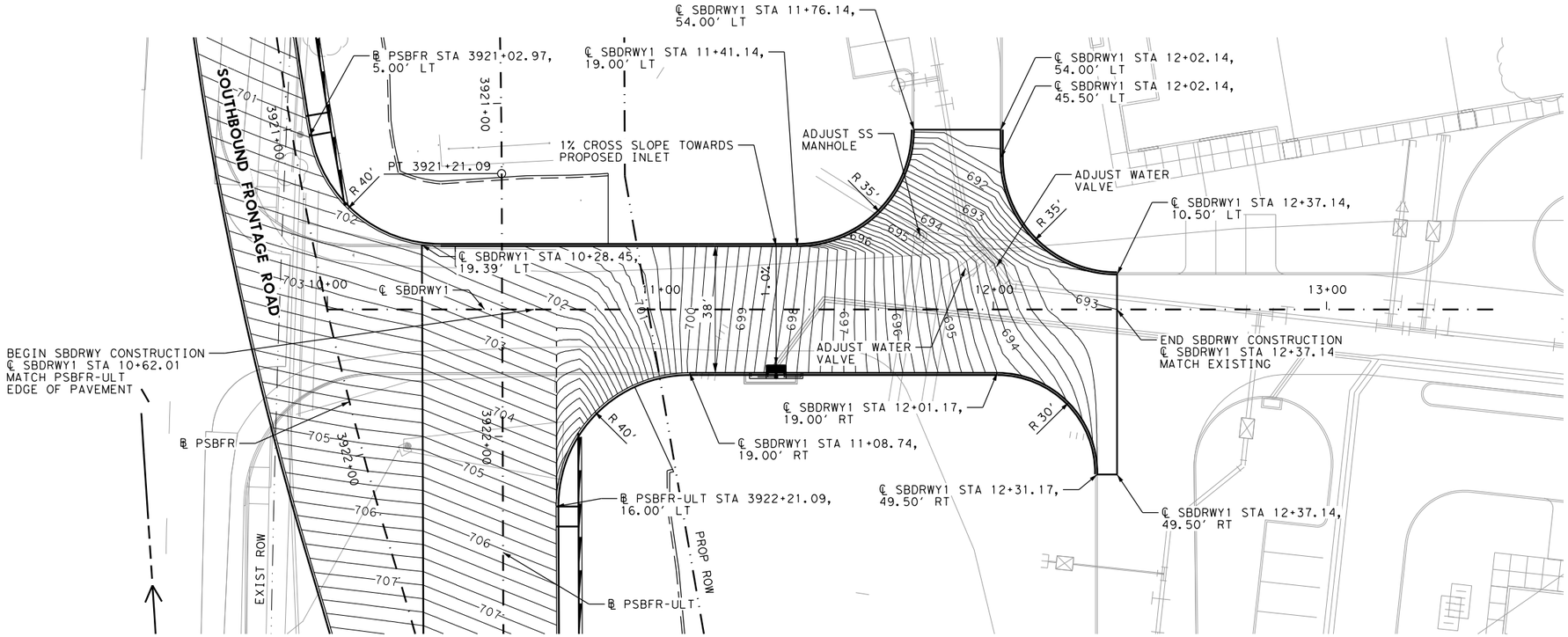

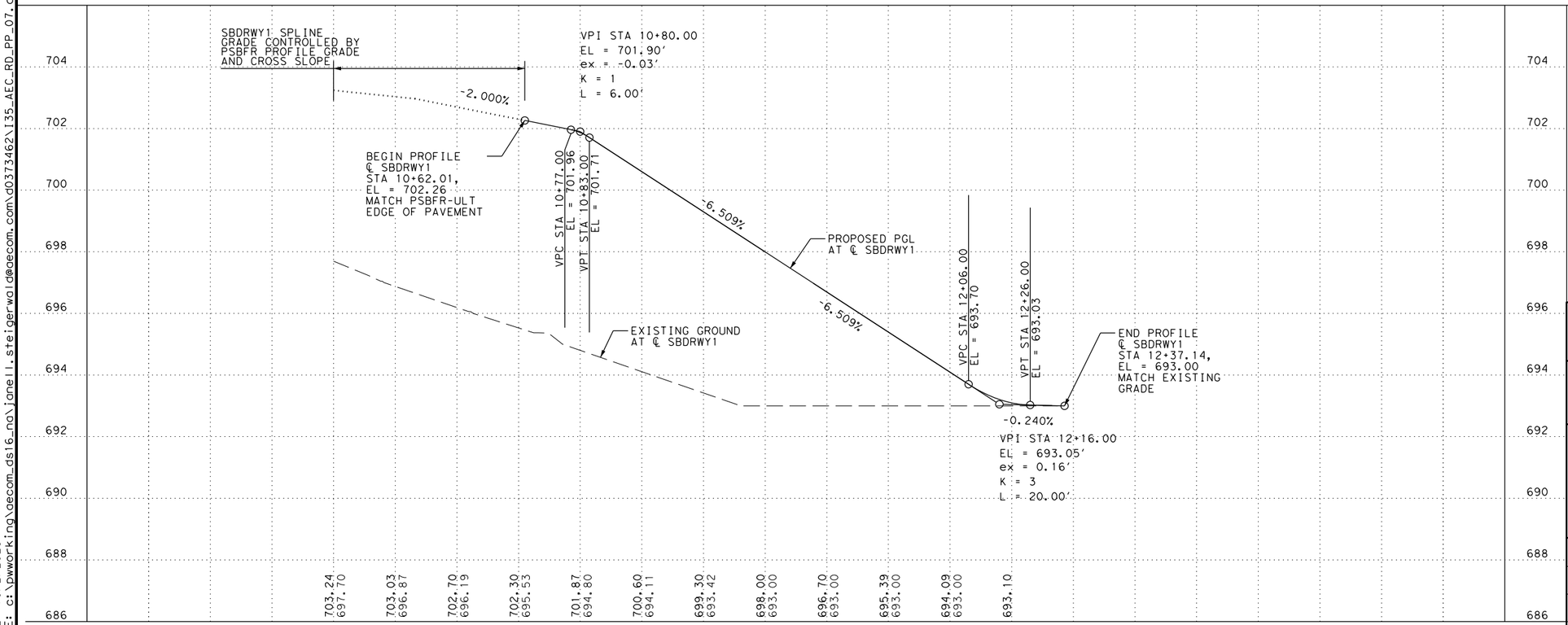

HORZ 0' 20' 40'
VERT 0' 2' 4'
SCALE IN FEET

LEGEND

- PROPOSED LANES
- EXISTING LANES
- HORIZ-1 CURVE NUMBER
- PROPOSED DITCH
- PROPOSED C221 RAIL

NOTES:

1. CONTRACTOR TO FIELD VERIFY TIE-IN ELEVATIONS AND CROSS SLOPES.

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

10/2/2023

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AECOM Technical Services Inc.
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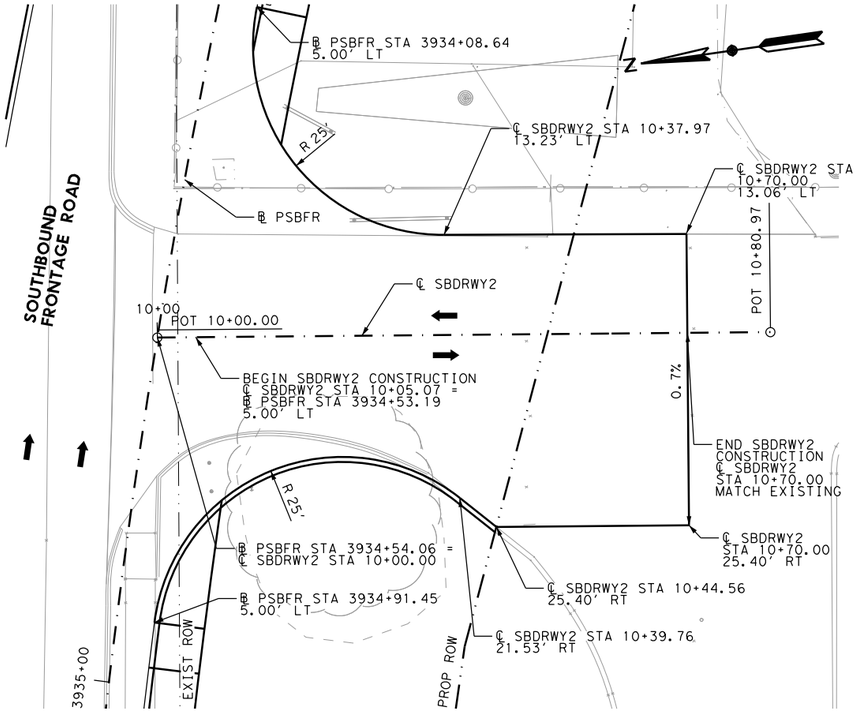
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
ROADWAY
PLAN AND PROFILE
DRIVEWAYS
SBDRWY1

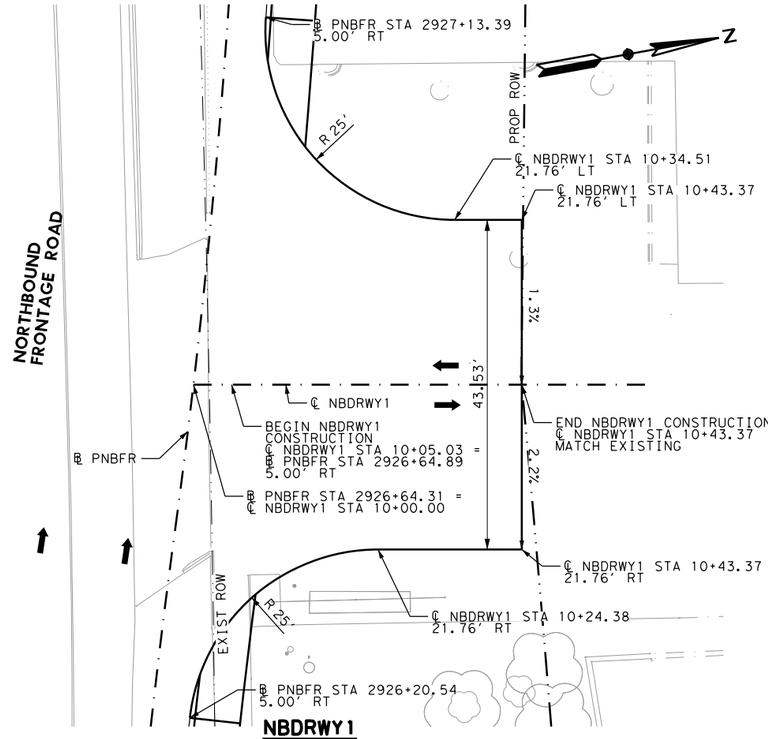
SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	80
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

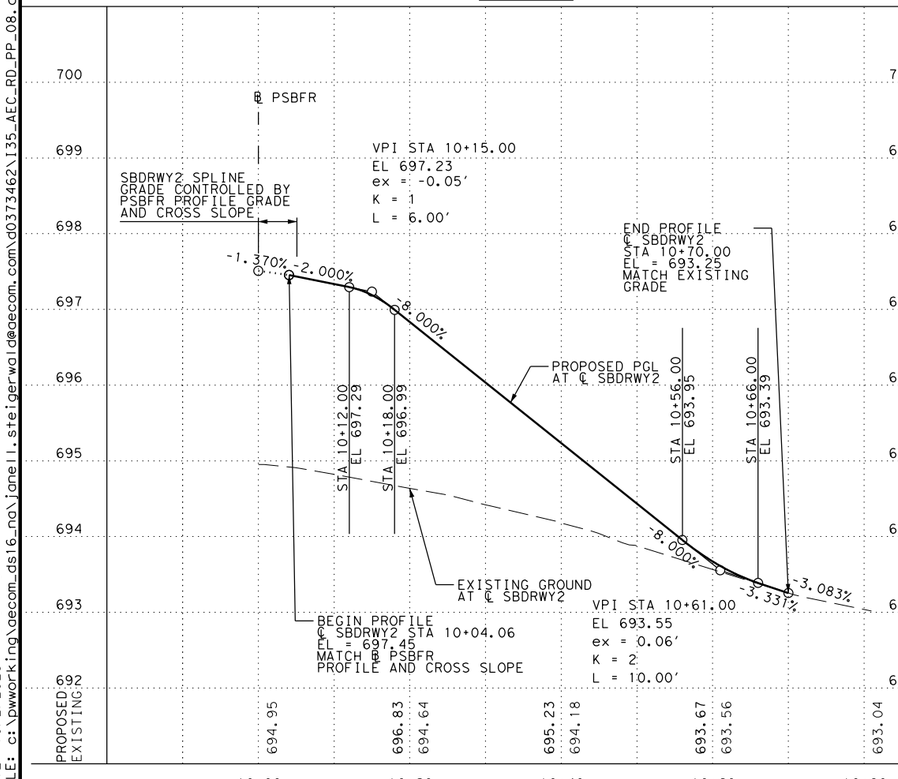
DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwald

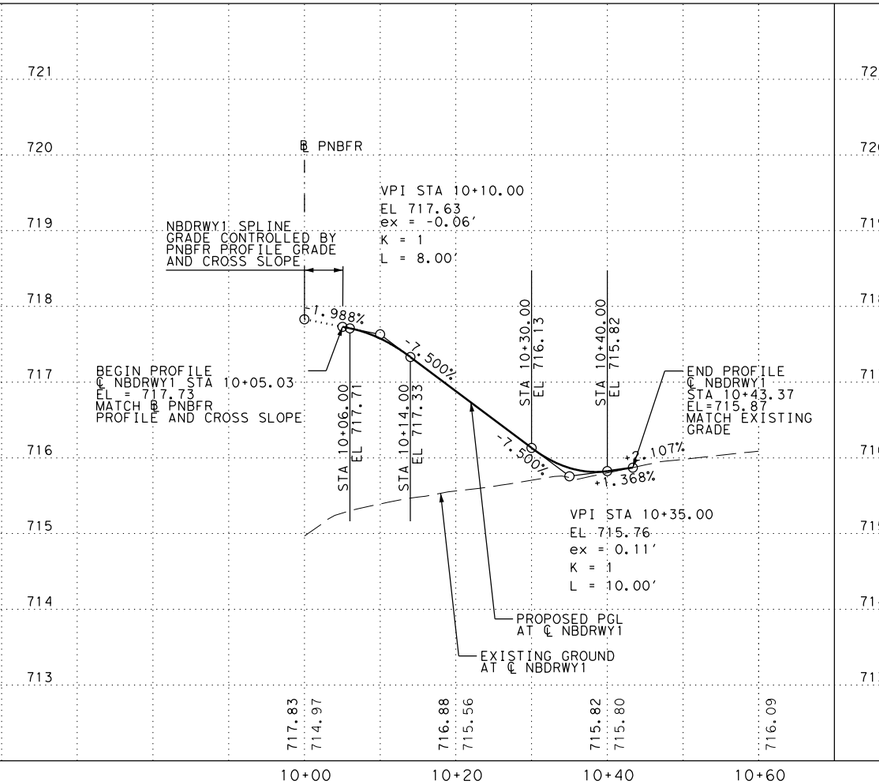


SBDRWY2



NBDRWY1





HORZ 0' 10' 20'
VERT 0' 1' 2'
SCALE IN FEET

LEGEND

- PROPOSED LANES
- EXISTING LANES
- HORIZ-1 CURVE NUMBER
- PROPOSED DITCH
- PROPOSED C221 RAIL

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
10/2/2023

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Texas Department of Transportation

IH 35E
ROADWAY PLAN AND PROFILE
DRIVEWAYS
SBDRWY2 AND NBDRWY1

SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	81
CHECK AEC	CONTROL	SECTION	JOB	
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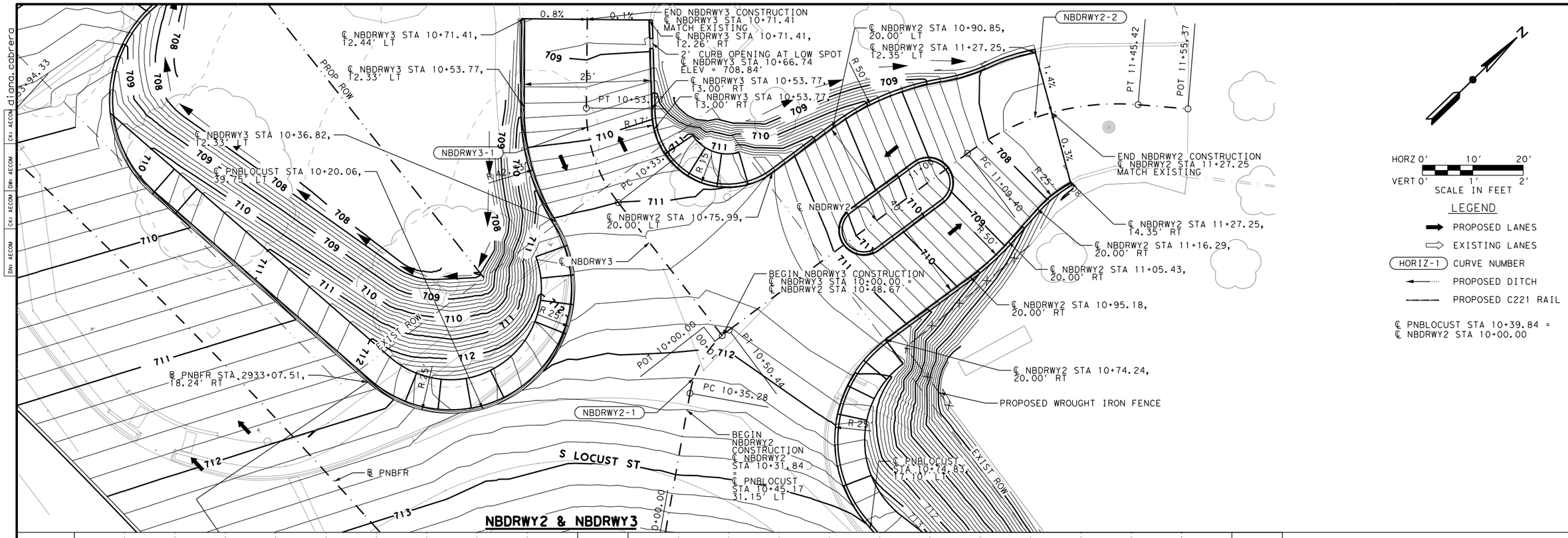

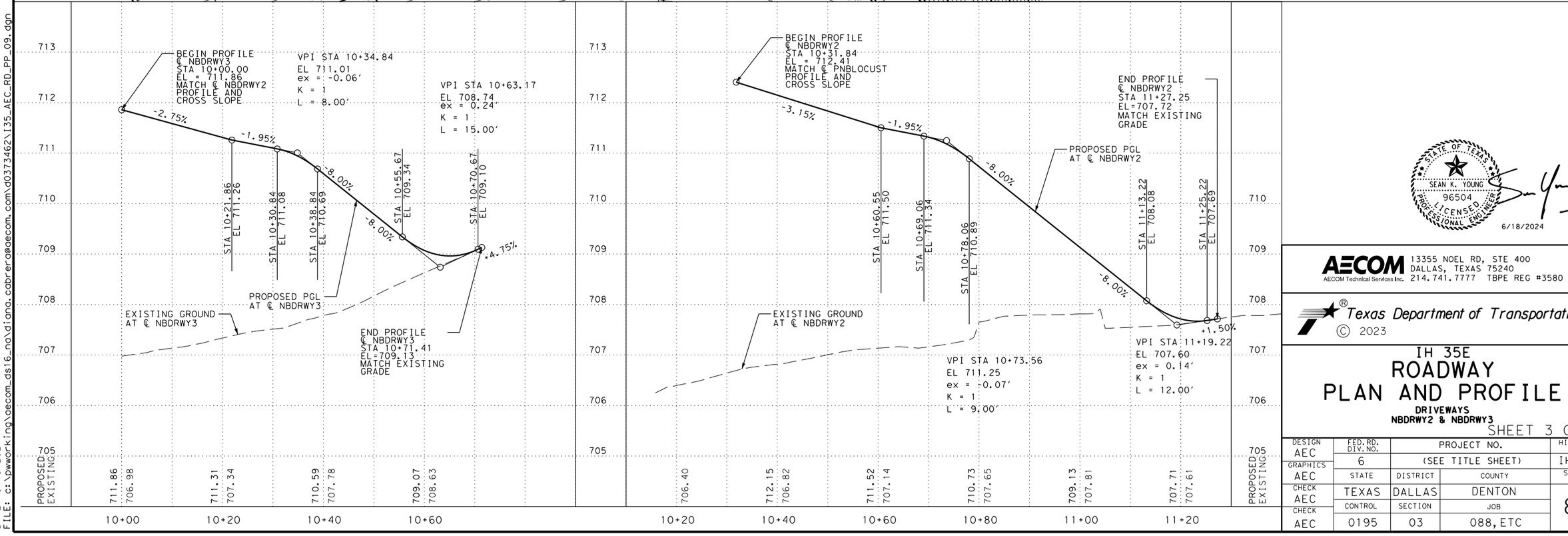

STATE OF TEXAS
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PROFESSIONAL ENGINEER
6/18/2024

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IH 35E
ROADWAY
PLAN AND PROFILE

DRIVEWAYS
NBDRWY2 & NBDRWY3

SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	82
CHECK AEC	CONTROL	SECTION	JOB	
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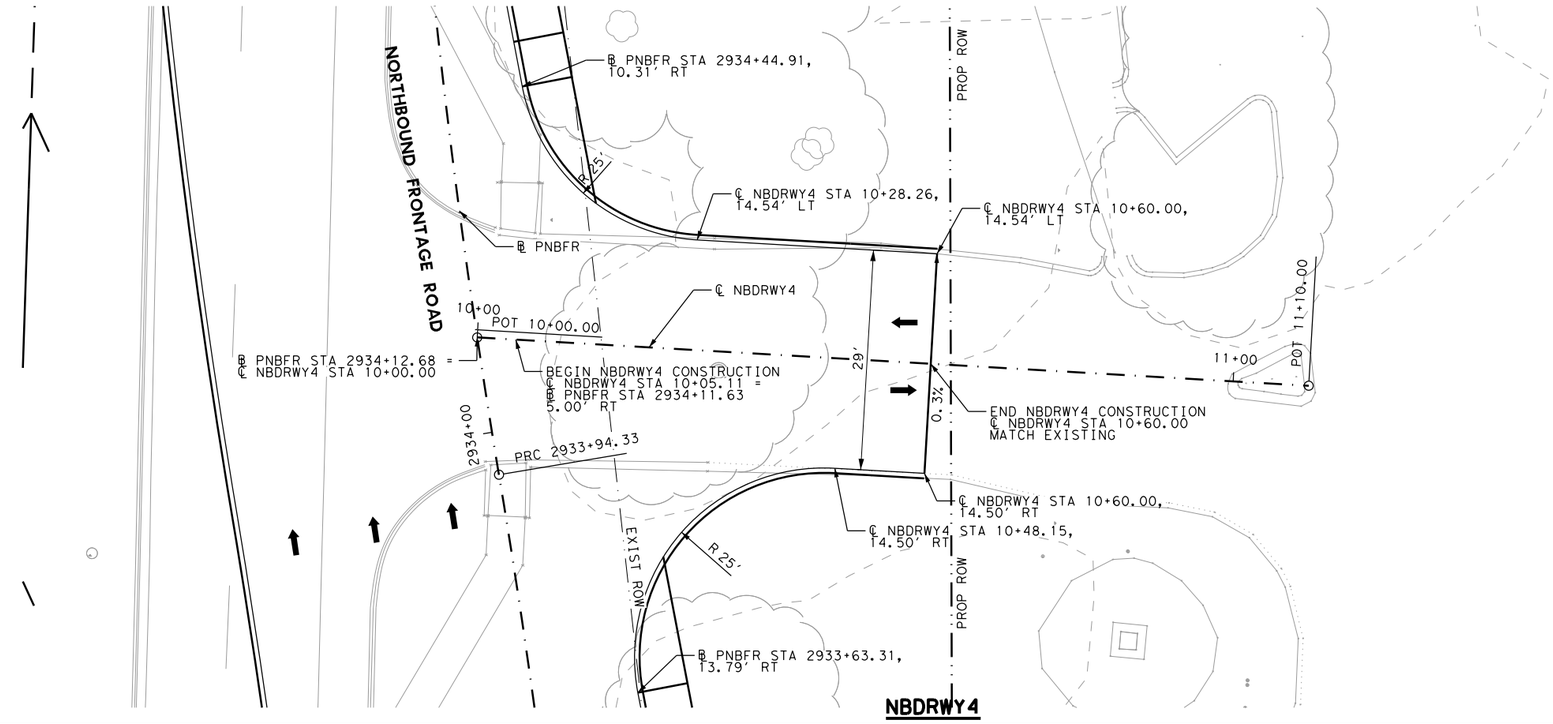
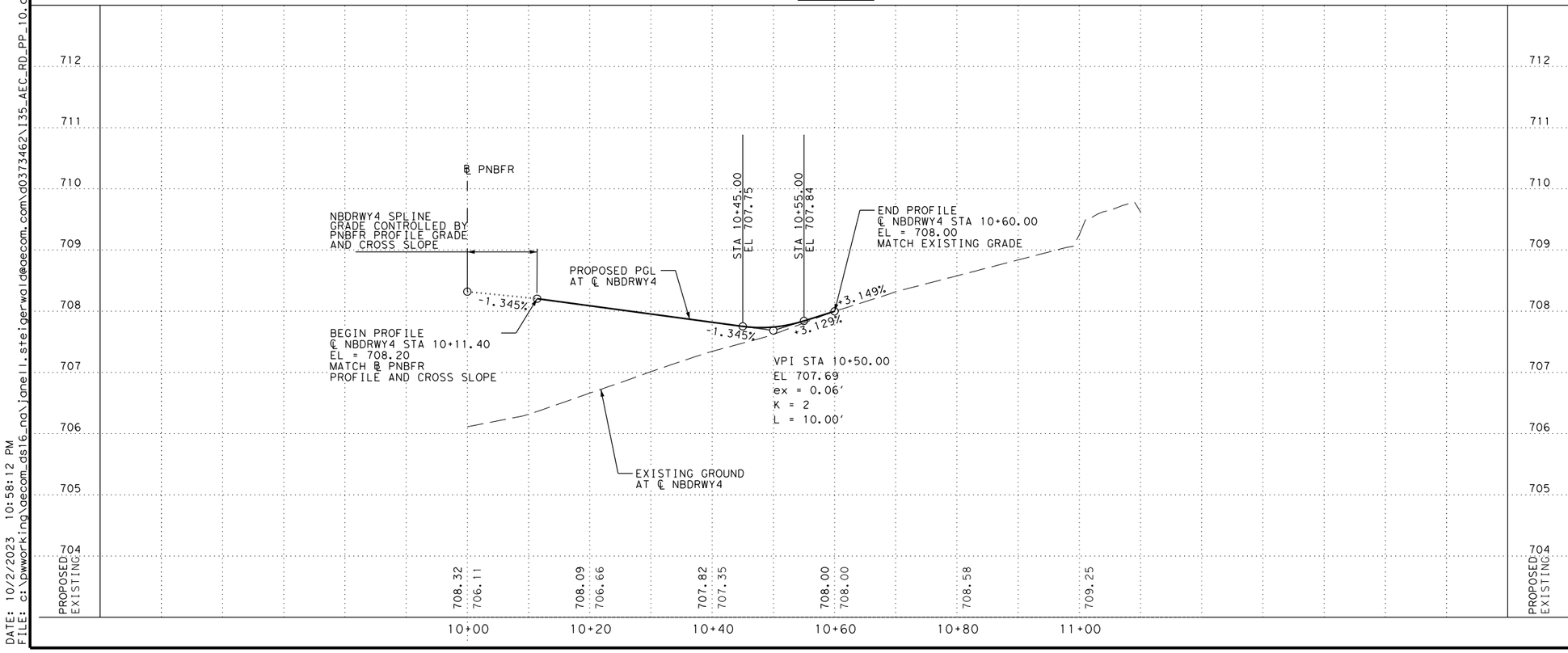
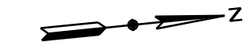
DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwald







LEGEND

- PROPOSED LANES
- EXISTING LANES
- (HORIZ-1) CURVE NUMBER
- PROPOSED DITCH
- PROPOSED C221 RAIL

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

10/2/2023

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IH 35E
ROADWAY
PLAN AND PROFILE

DRIVEWAYS
NBDRWY4

SHEET 4 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	83
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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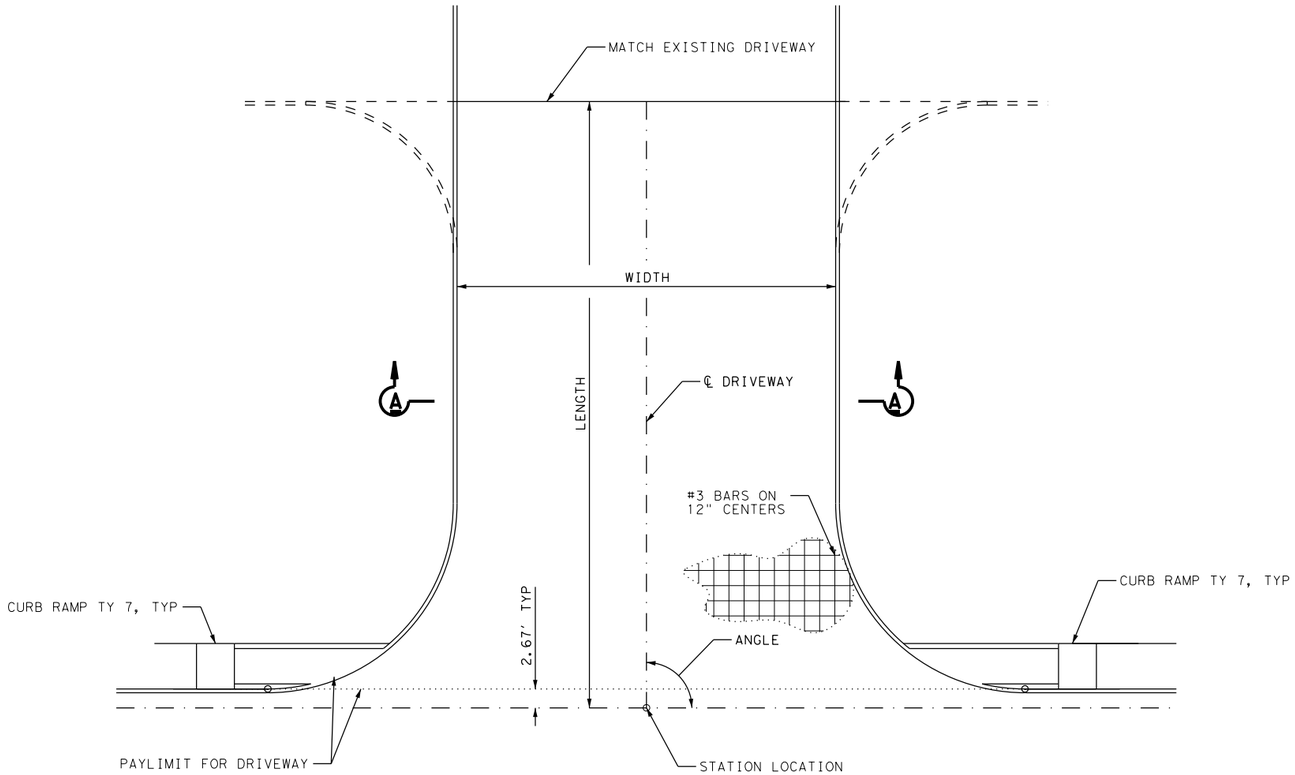
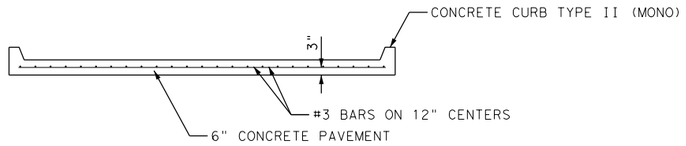


PLAN

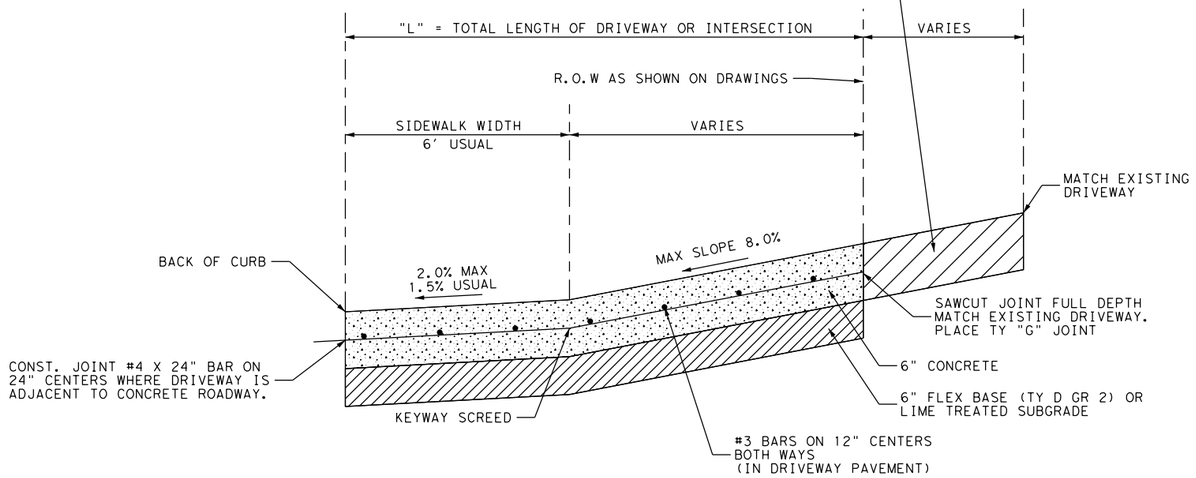


SECTION A-A

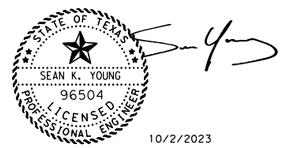
REPLACE EXISTING DRIVEWAY WITH
EQUAL OR BETTER MATERIAL:

IF CONCRETE, PAY FOR AS CONCRETE DRIVEWAY.

IF HOT MIX OR OTHER MATERIAL, PAY
FOR IN ACCORDANCE WITH APPROPRIATE BID ITEMS.



DRIVEWAY SLOPE TO ROADWAY



10/2/2023

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Texas Department of Transportation

IH 35E
DRIVEWAY DETAILS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	84
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				

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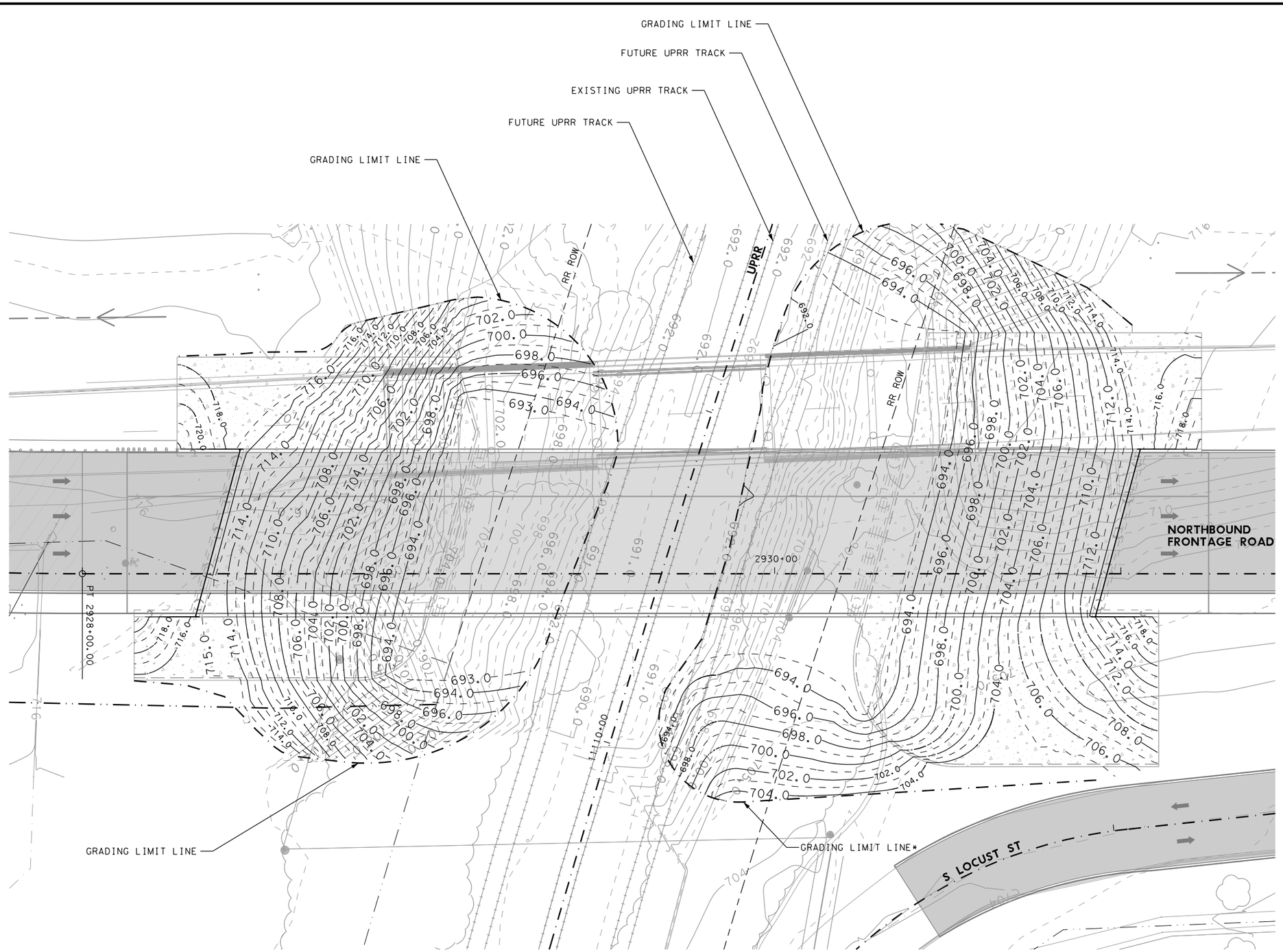
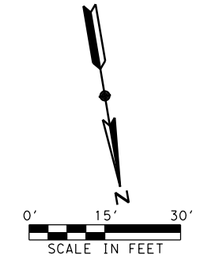
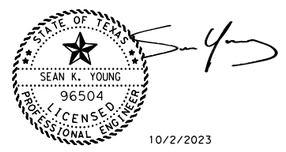




LEGEND

- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT
- BRIDGE
- RIPRAP

* NOTE: VERIFY AND ADJUST THE TOE LIMIT TO MATCH EXISTING GROUND WITH 3:1 MAXIMUM SLOPE.



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IH 35E

GRADING DETAILS

NORTHBOUND FRONTAGE ROAD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	85
CHECK AEC	CONTROL	SECTION	JOB	
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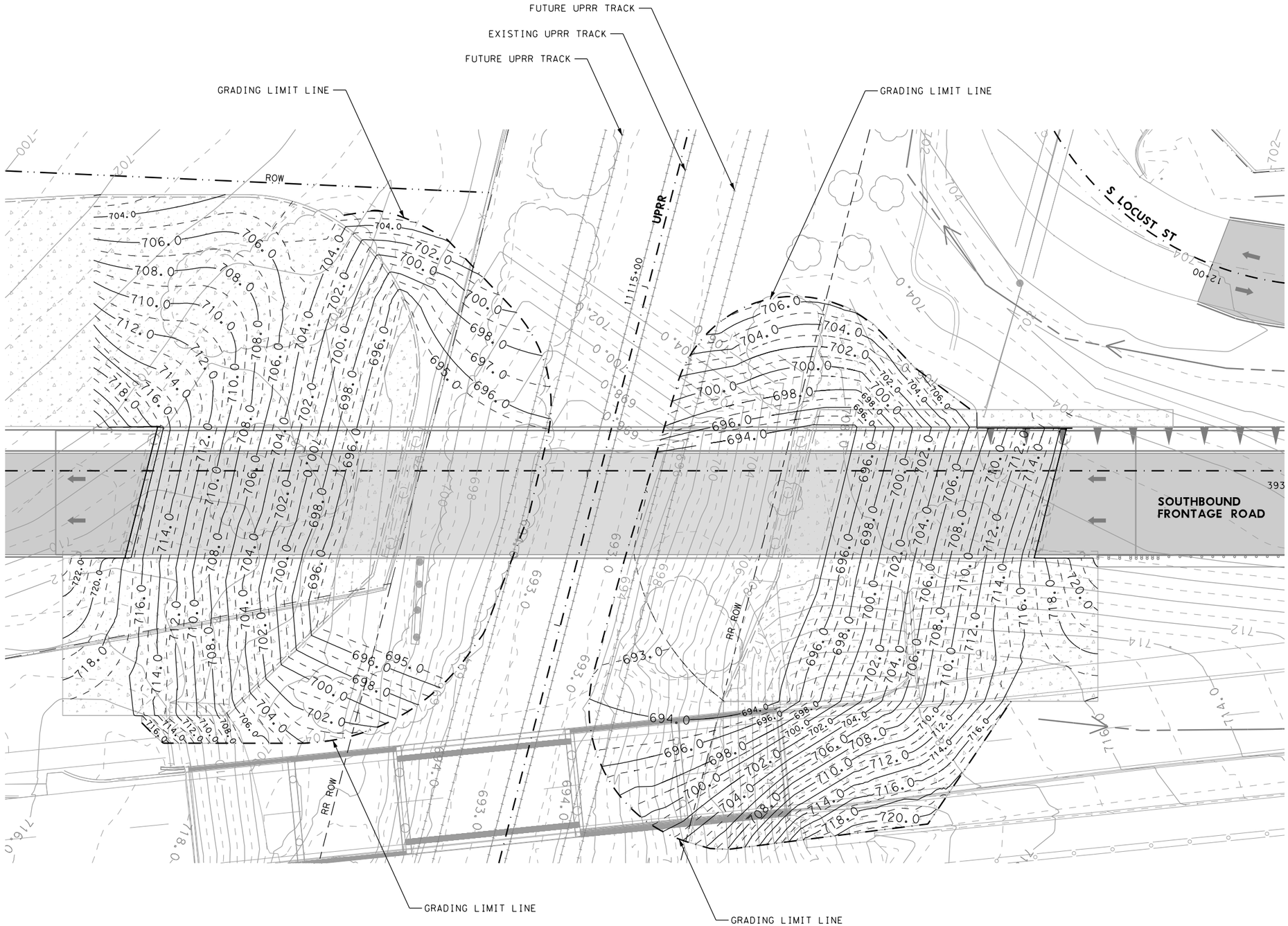
steigerwald



N

0′ 15′ 30′
SCALE IN FEET

LEGEND

- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT
- BRIDGE
- RIPRAP

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED
PROFESSIONAL ENGINEER

10/2/2023

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Texas Department of Transportation

IH 35E

GRADING DETAILS

SOUTHBOUND FRONTAGE ROAD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	86
CHECK AEC	CONTROL	SECTION	JOB	
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	RIGHT OF WAY MARKERS					
	NAME	BASELINE	STATION	OFFSET	EASTING	NORTHING
NORTHEAST	1	PNBFR	2920+70.22	142.37 RT	2386973.753733	7121955.865715
	2	PNBFR	2920+98.09	96.88 RT	2386932.830339	7121921.633604
	3	PNBFR	2922+63.39	72.97 RT	2386764.081171	7121950.615655
	4	PNBFR	2923+59.17	70.85 RT	2386666.392148	7121972.406349
	5	PNBFR	2926+69.65	42.98 RT	2386361.183632	7122011.190381
	6	PNBFR	2928+57.36	38.92 RT	2386171.911243	7122047.634078
	7	PNBFR	2929+02.36	37.77 RT	2386127.356640	7122054.013758
NORTHWEST	1	PNBFR	2933+07.07	49.28 RT	2385721.524163	7122121.914932
	2	PNBFR	2934+92.36	71.27 RT	2385537.464360	7122140.041711
	3	PNBFR	2938+15.83	114.77 RT	2385244.667064	7122229.710129
	4	PNBFR	2938+41.04	144.40 RT	2385227.481065	7122264.617190
SOUTHEAST	1	PSBFR			2387580.987664	7121370.027916
	2	PSBFR			2387440.561027	7121405.367892
	3	PSBFR	3917+12.90	-65.81 LT	2386935.617914	7121498.319230
	4	PSBFR	3918+62.69	-84.67 LT	2386787.846977	7121515.769817
	5	PSBFR	3920+84.54	-103.77 LT	2386585.428492	7121520.011870
	6	PSBFR	3921+33.95	-95.84 LT	2386540.613554	7121527.301175
	7	PSBFR	3925+26.63	-94.16 LT	2386131.498602	7121524.881538
	8	PSBFR	3927+72.84	-79.45 LT	2385887.289156	7121593.049843
SOUTHWEST	1	PSBFR	3931+48.81	-88.68 LT	2385524.768612	7121658.496996
	2	PSBFR	3931+59.08	-88.67 LT	2385513.743169	7121660.125737
	3	PSBFR	3934+89.37	-46.06 LT	2385197.724647	7121793.601115
	4	PSBFR	3936+25.64	-33.66 LT	2385071.635477	7121832.310904
	5	PSBFR	3936+79.88	-68.02 LT	2385012.929015	7121806.318155

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96504
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10/2/2023

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IH 35E

RIGHT OF WAY MARKER

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	87
CHECK AEC	CONTROL	SECTION	JOB	
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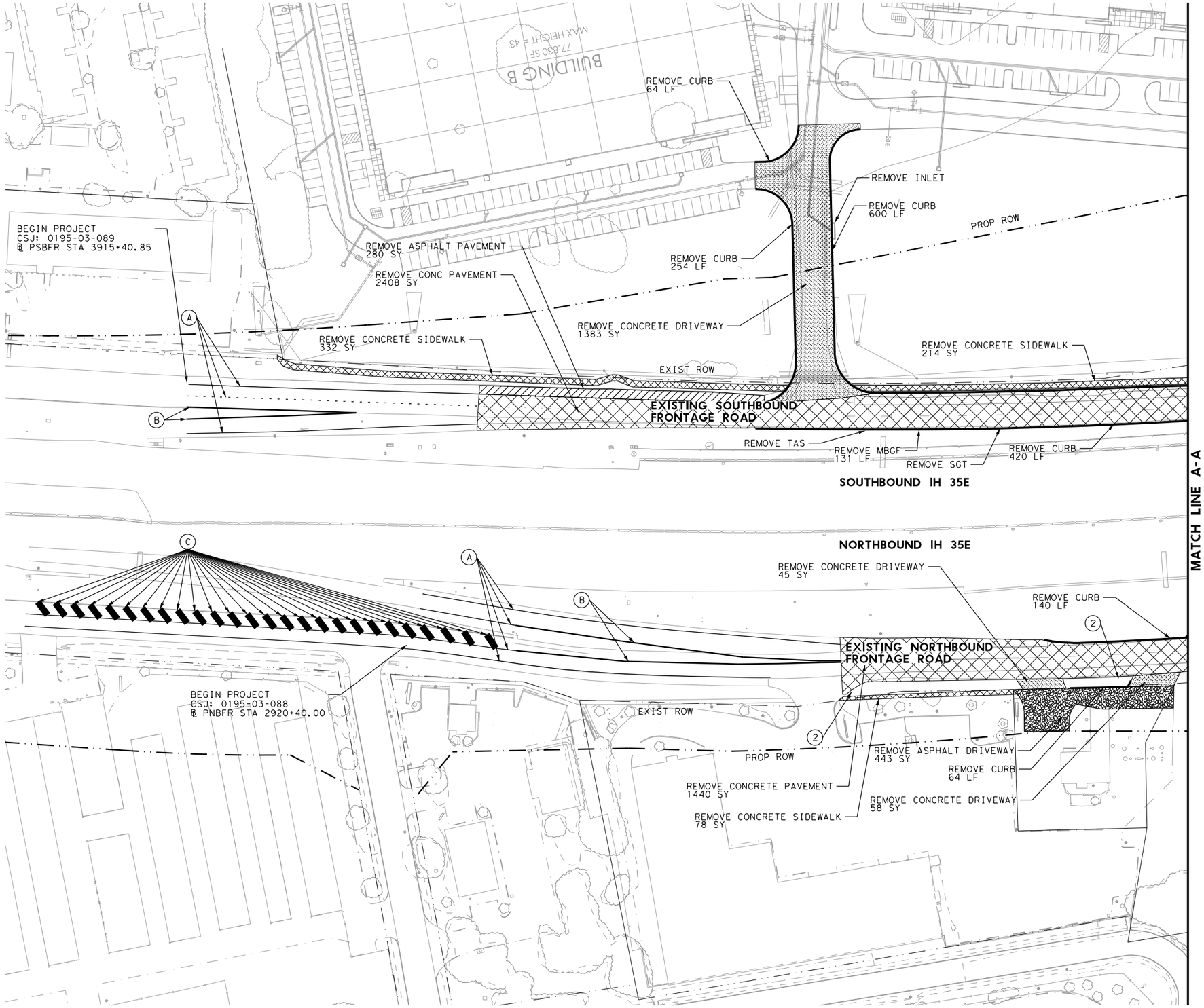

N

0' 50' 100'

SCALE IN FEET

LEGEND

- REMOVE ASPHALT PAVEMENT
- REMOVE CONCRETE PAVEMENT
- REMOVE BRIDGE
- REMOVE CONCRETE RIPRAP
- REMOVE CONCRETE SIDEWALK
- REMOVE ASPHALT DRIVEWAY
- REMOVE CONCRETE DRIVEWAY
- MBGF
- (1) REMOVE SM RD SN SUP & AM
- (2) RELOCATE MAILBOX
- (A) REMOVE EXT PAV MRK & MARKS (4")
- (B) REMOVE EXT PAV MRK & MARKS (8")
- (C) REMOVE EXT PAV MRK & MARKS (24")

NOTES:

1. CONC SIDEWALK REMOVAL QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY. SUBSIDIARY TO ITEM 531.

STATE OF TEXAS
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5/28/2024

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IH 35E

REMOVAL PLAN

BEGIN PROJECT TO A-A

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	88
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088, ETC	
CHECK				
AEC				

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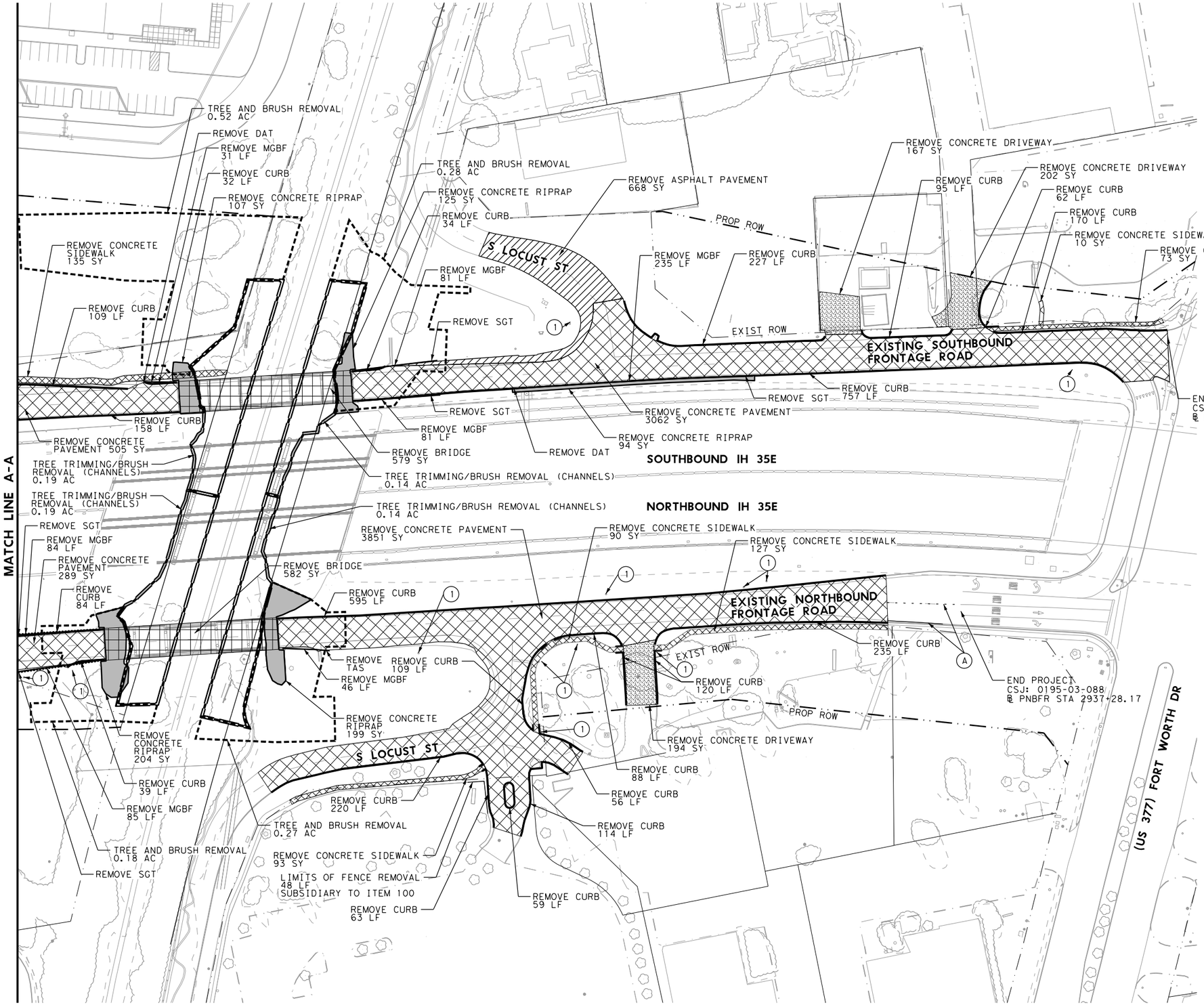

LEGEND

- REMOVE ASPHALT PAVEMENT
- REMOVE CONCRETE PAVEMENT
- REMOVE BRIDGE
- REMOVE CONCRETE RIPRAP
- REMOVE CONCRETE SIDEWALK
- REMOVE ASPHALT DRIVEWAY
- REMOVE CONCRETE DRIVEWAY
- MBGF
- (1) REMOVE SM RD SN SUP & AM
- (2) RELOCATE MAILBOX
- (A) REMOVE EXT PAV MRK & MARKS (4")
- (B) REMOVE EXT PAV MRK & MARKS (8")
- (C) REMOVE EXT PAV MRK & MARKS (24")

NOTES:

1. CONC SIDEWALK REMOVAL QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY. SUBSIDIARY TO ITEM 531.

STATE OF TEXAS
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96504
LICENSED PROFESSIONAL ENGINEER
6/18/2024

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Texas Department of Transportation

IH 35E

REMOVAL PLAN

A-A TO PROJECT END

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	89
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088, ETC	

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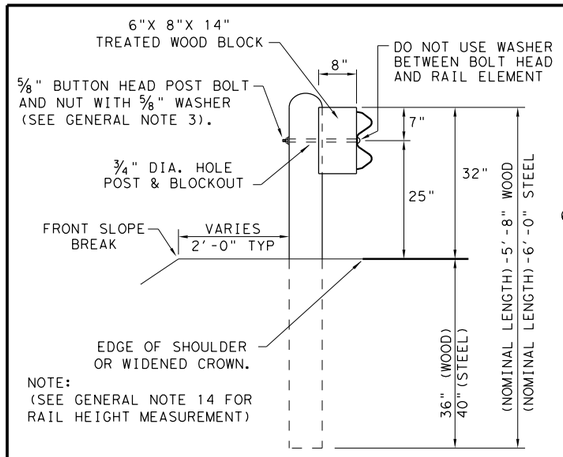
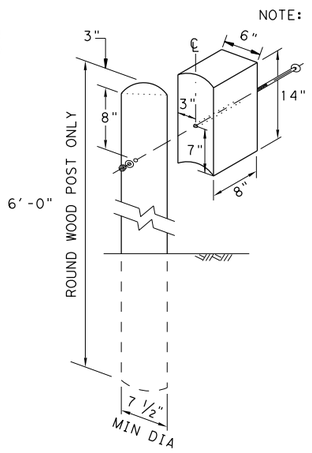
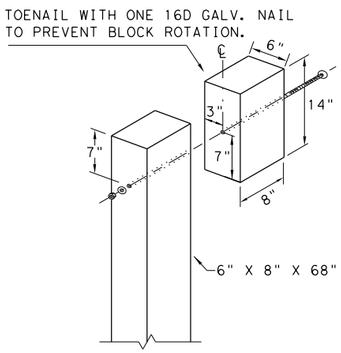


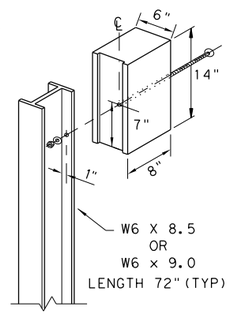
TYPICAL POST PLACEMENT



WOOD BLOCK TO ROUND WOOD POST

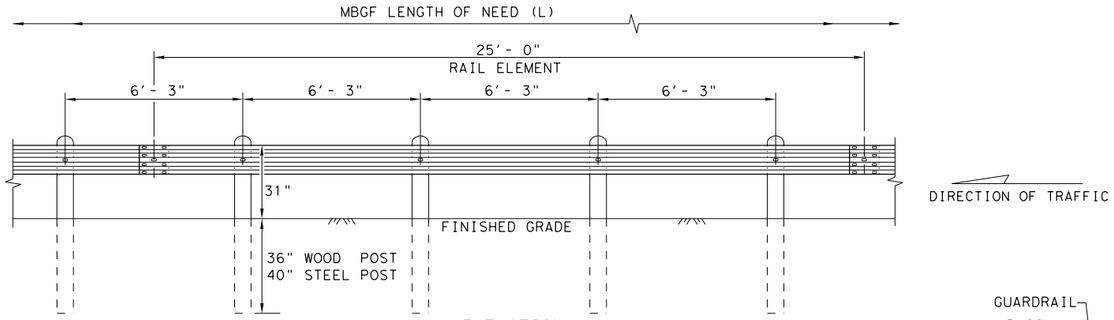


WOOD BLOCK TO RECTANGULAR WOOD POST



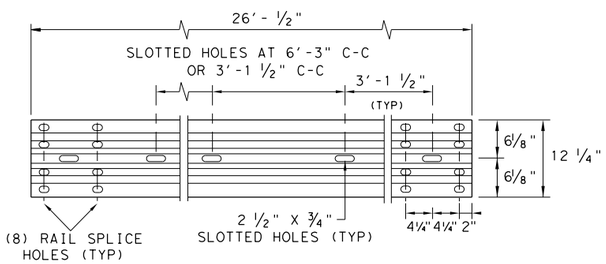
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



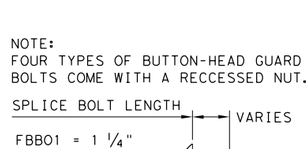
ELEVATION
MID-SPAN RAIL SPLICE

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



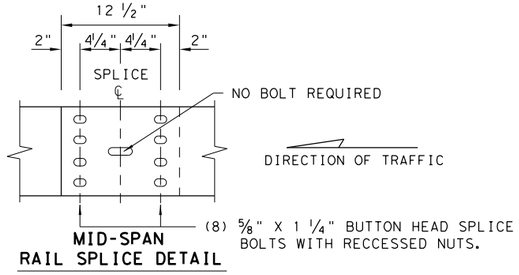
ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

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



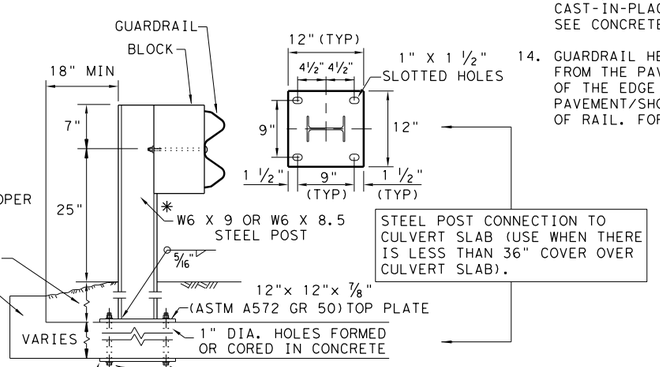
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



* 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
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	DAL	DENTON		90

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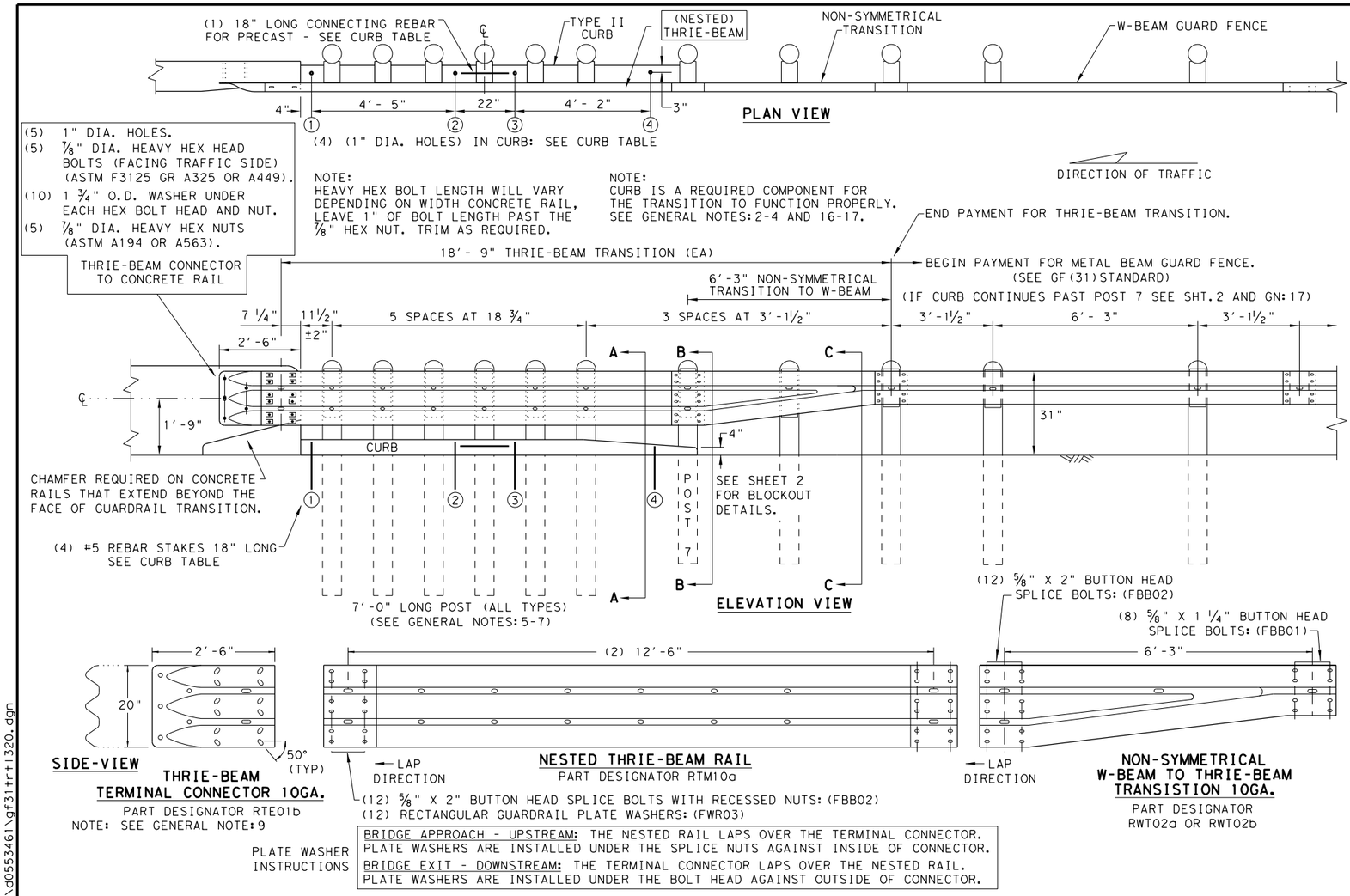


GENERAL NOTES

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

THRIE-BEAM TERMINAL - CURB TABLE

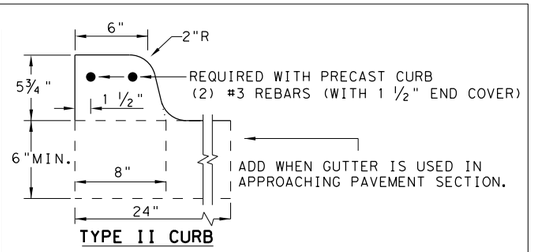
PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

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

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

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

* 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

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

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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	DAL	DENTON		91

DATE: 10/2/2023
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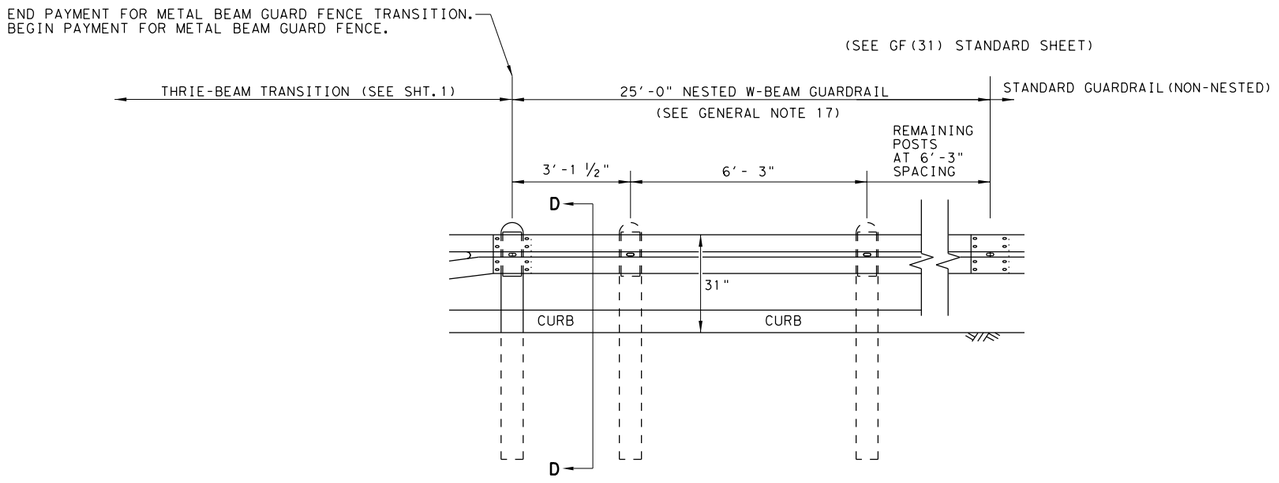
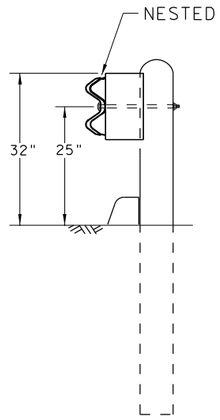
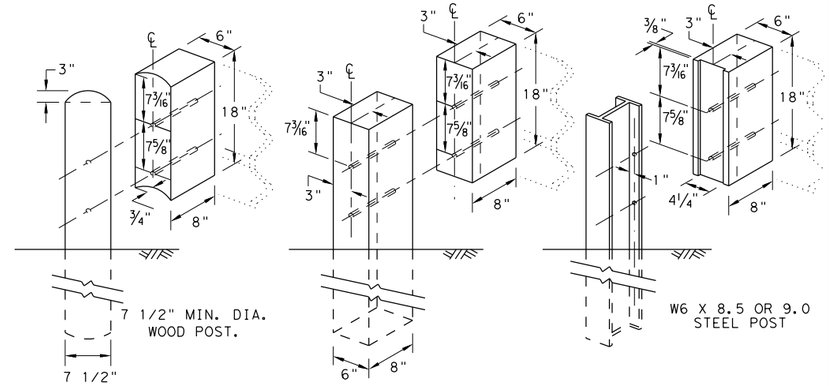
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

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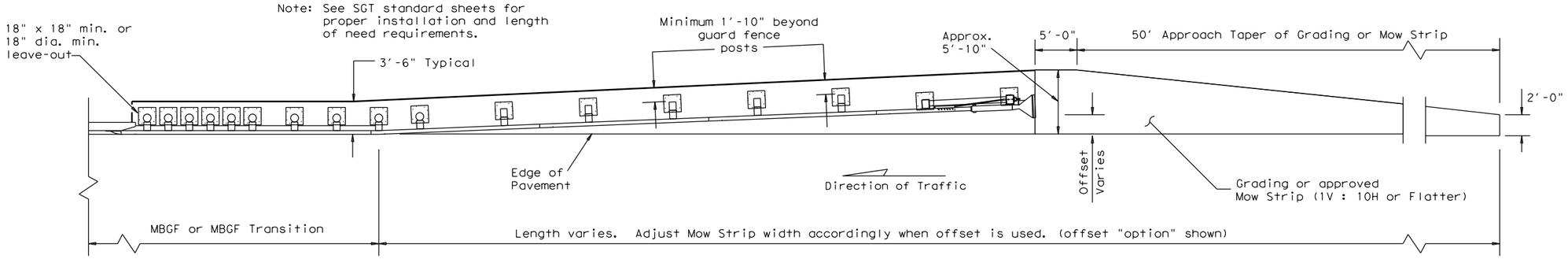
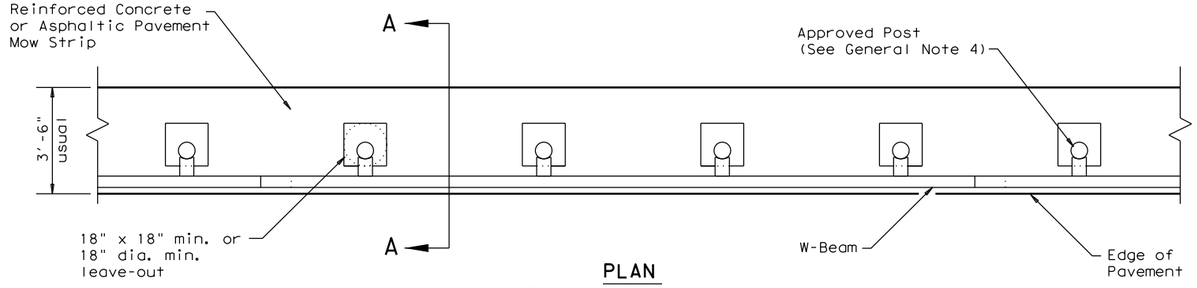
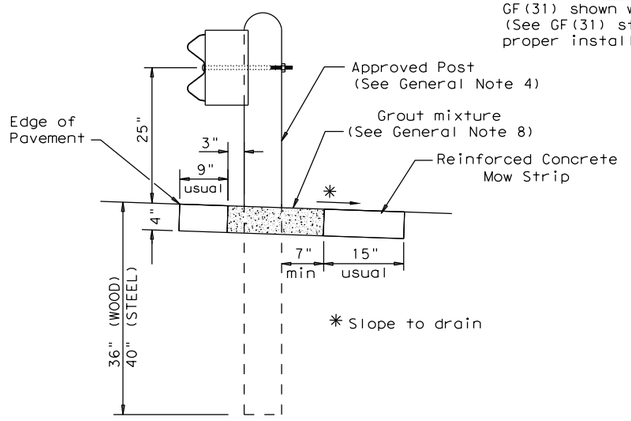


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



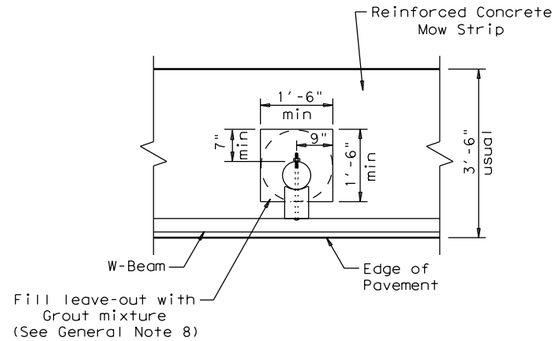
PLAN

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



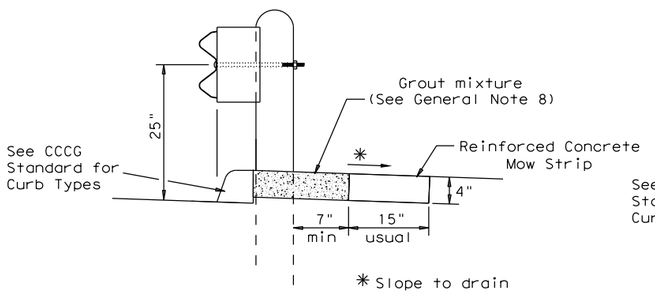
SECTION A-A

Typical



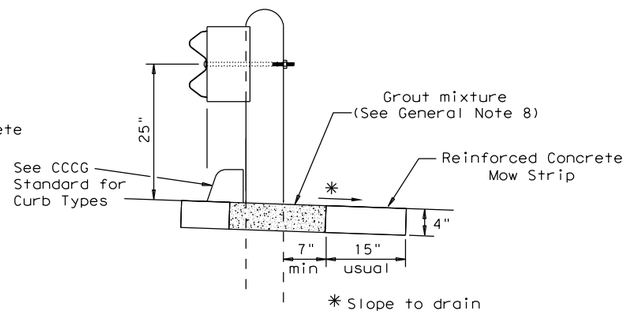
MOW STRIP DETAIL

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



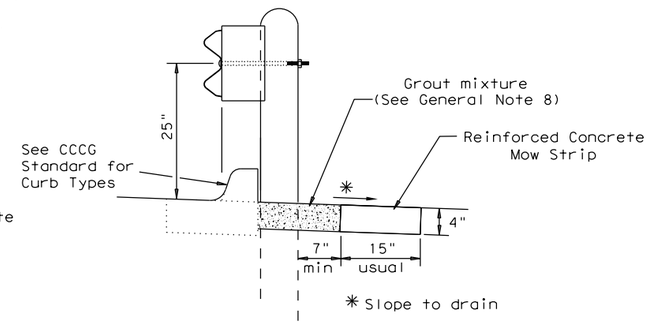
CURB OPTION (1)

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
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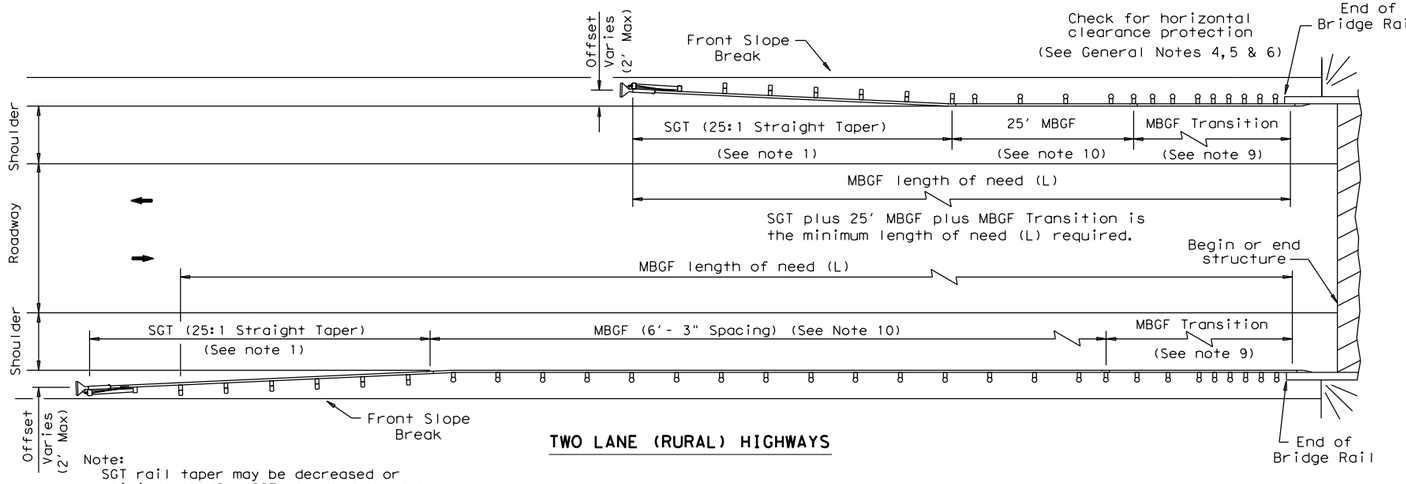
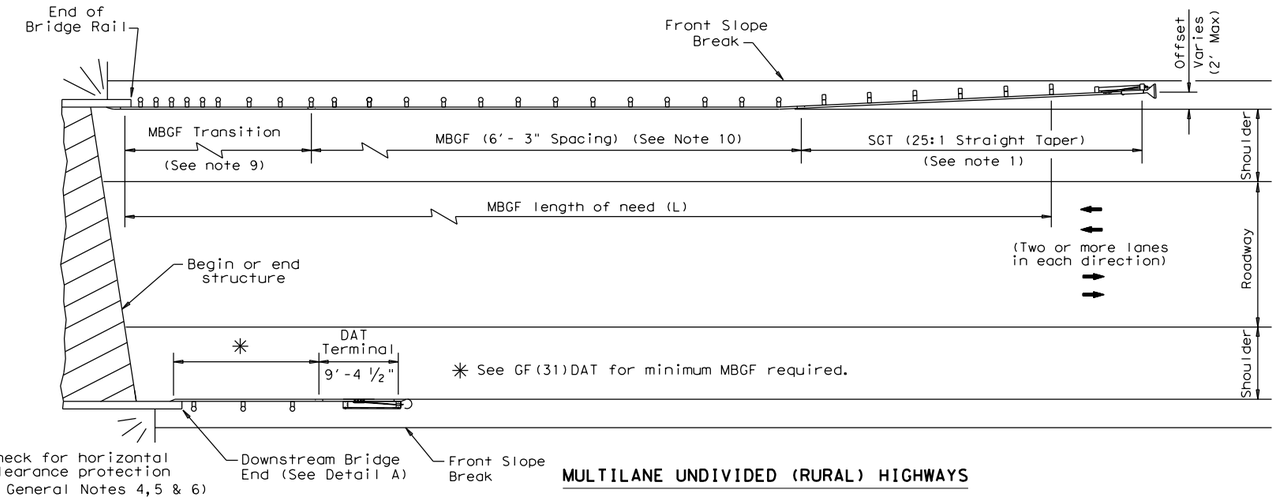
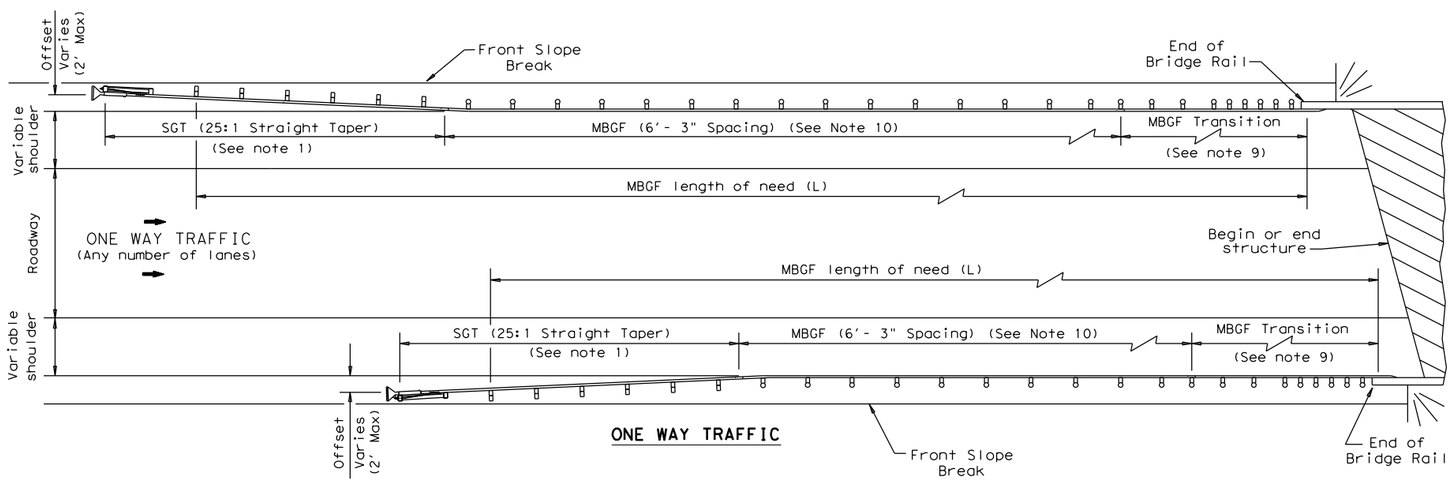


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



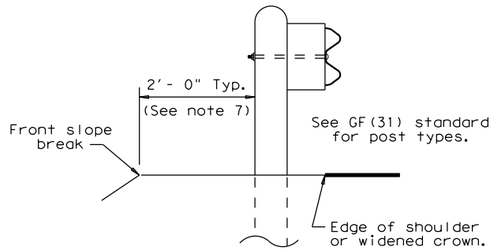
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



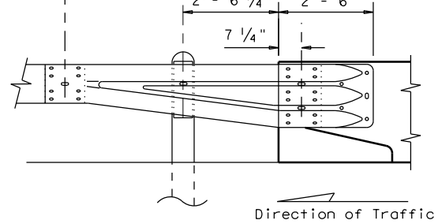
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. <u>For restrictive bridge widths:</u> The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft."maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		94

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\sgt10s3116.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(1) POST(0)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

BEGIN LENGTH OF NEED

TRAFFIC FLOW

PLAN VIEW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2)½" X 6'-9 ⅝"

SoftStop FACE SEE GN(3) & NOTE:B

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

SEE NOTE:C

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: A

POST 32" HEIGHT

31"

RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

31"

RAIL HEIGHT

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

(8) ⅝"× 1- ¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

(8) ⅝"× 1- ¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) 6'-0" (SYTP) PN: 15000G POST(1) 4'-9 ½" SYTP PN: 15203G POST(0) 6'-5 ⅜" PN: 15205A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"× 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1- ½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3 AT POST(0)

6'-5 ⅜" (W6 X 15) I-BEAM POST PN: 15205A

TRAFFIC FLOW

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

SECTION VIEW B-B

6'-0" (W6 X 8.5) I-BEAM POST PN: 533G

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

SECTION VIEW A-A

6'-0" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST 17"- ½" HEIGHT

4'- 9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

2'-0"

STANDARD MBGF

EDGE OF PAVEMENT

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

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
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. A COMPOSITE MATERIAL BLOCKOUT 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.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop 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.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅞")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

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

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		95

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\sgt11s3118.dgn

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE **SEE DETAIL (C)**

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-⅝" FROM REFERENCE LINE

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2

RAIL 4 | RAIL 3 | RAIL 2 | RAIL 1

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

PLAN VIEW

CABLES

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.

MBGF
RAIL 2

INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE

MBGF
RAIL 1

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

INSTALLATION LENGTH 55'- ½"

49'-8 ⅝"

6'-3" | 6'-3" | 6'-3" | 6'- ¾" | 6'-3" | 6'-3" | 6'-3" | 37 ½" | 5'-3 11/16"

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

RAIL
HEIGHT
31"

ITEM (13) RAIL 4 | ITEM (13) RAIL 3 | ITEM (13) RAIL 2 | ITEM (13) RAIL 1

ARROWS

DETAIL (D)

RAIL
HEIGHT
31"

HEAD
HEIGHT

DETAIL (B)

32-¼"

68-⅛"

FINISHED
GRADE

CABLES

FINISHED
GRADE

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2 | POST 1

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

**SOIL
ANCHOR POST**
ITEM (1)

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE

DETAIL (D)

HEAD
HEIGHT
32-¼"

TOP OF POST

31-⅞"

FINISHED
GRADE

40-⅛"

68-⅛"
ANCHOR POST
DEPTH

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN),
TO BE INSTALLED AT SAME DEPTH
AS LINE POSTS.)

**SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9**

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 ⅝"

2 ⅛"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL ⅝" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)

ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

(RAIL 1)

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

✳ ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

✳ TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD
MBGF

2'-0"

EDGE OF PAVEMENT

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

2'-0" MAX.
RAIL OFFSET

APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL
FOR ADDITIONAL GUIDANCE.

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION 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: 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	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" 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

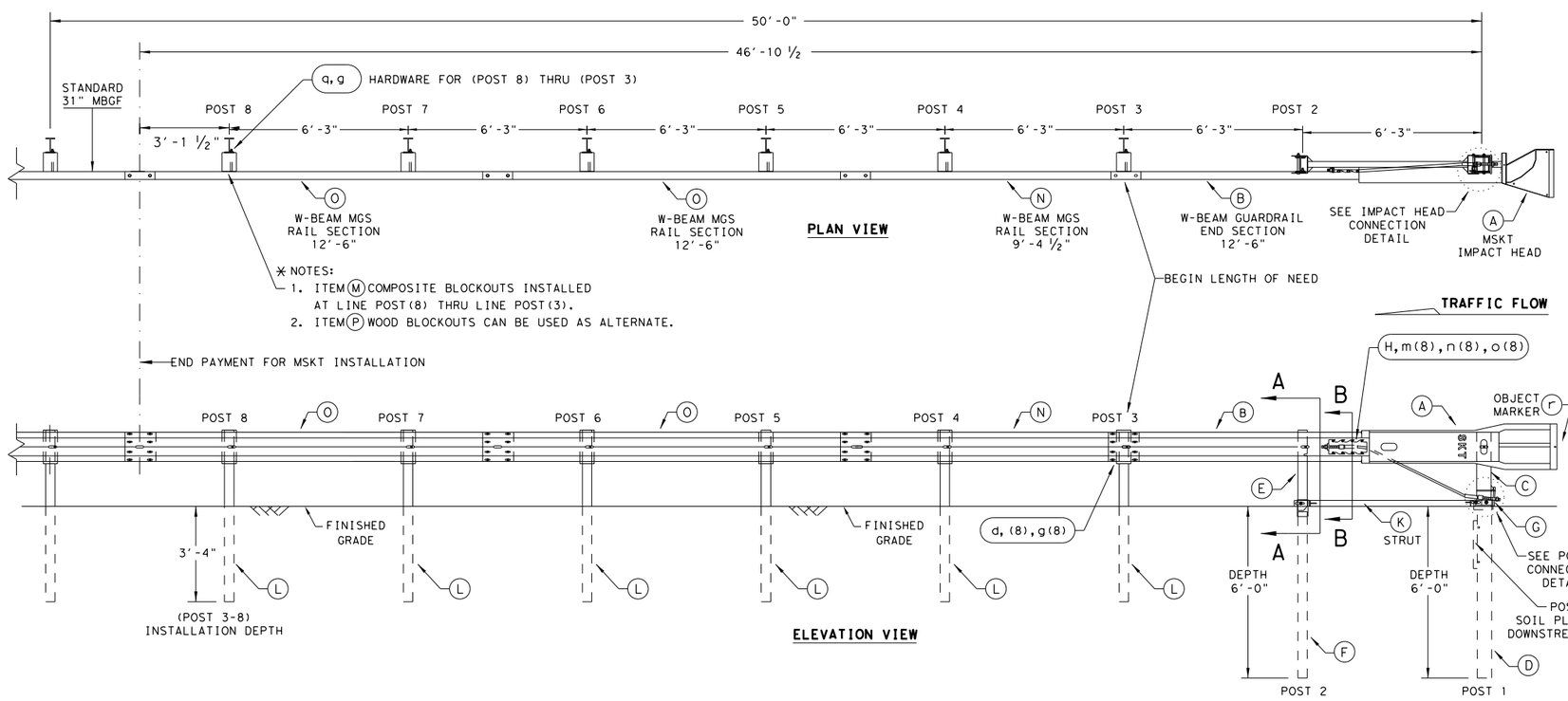
Texas Department of Transportation

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	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		96

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steiger.wald@aecom.com\d0553461\sgt12s3118.dgn



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

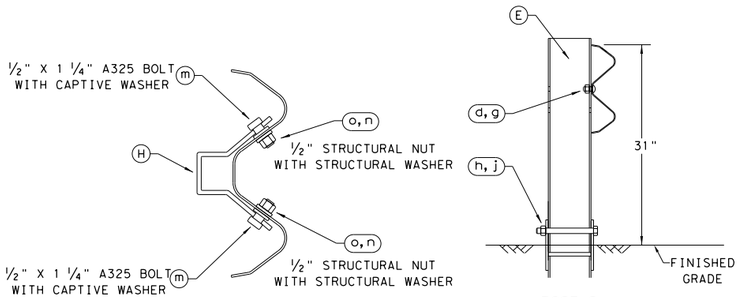
GENERAL NOTES

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" 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 ½")	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	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 ⅛" O.D. x ⅜" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

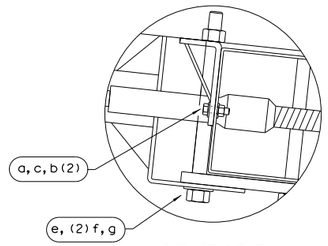
SEE NOTES: ✳

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

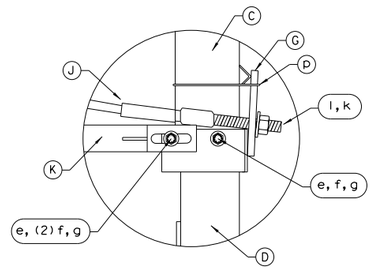


SECTION B-B
ANCHOR BRACKET

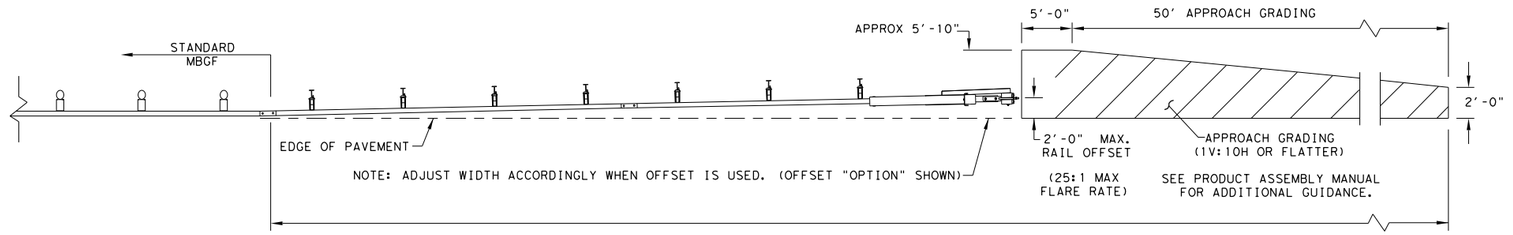
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

TRAFFIC FLOW

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

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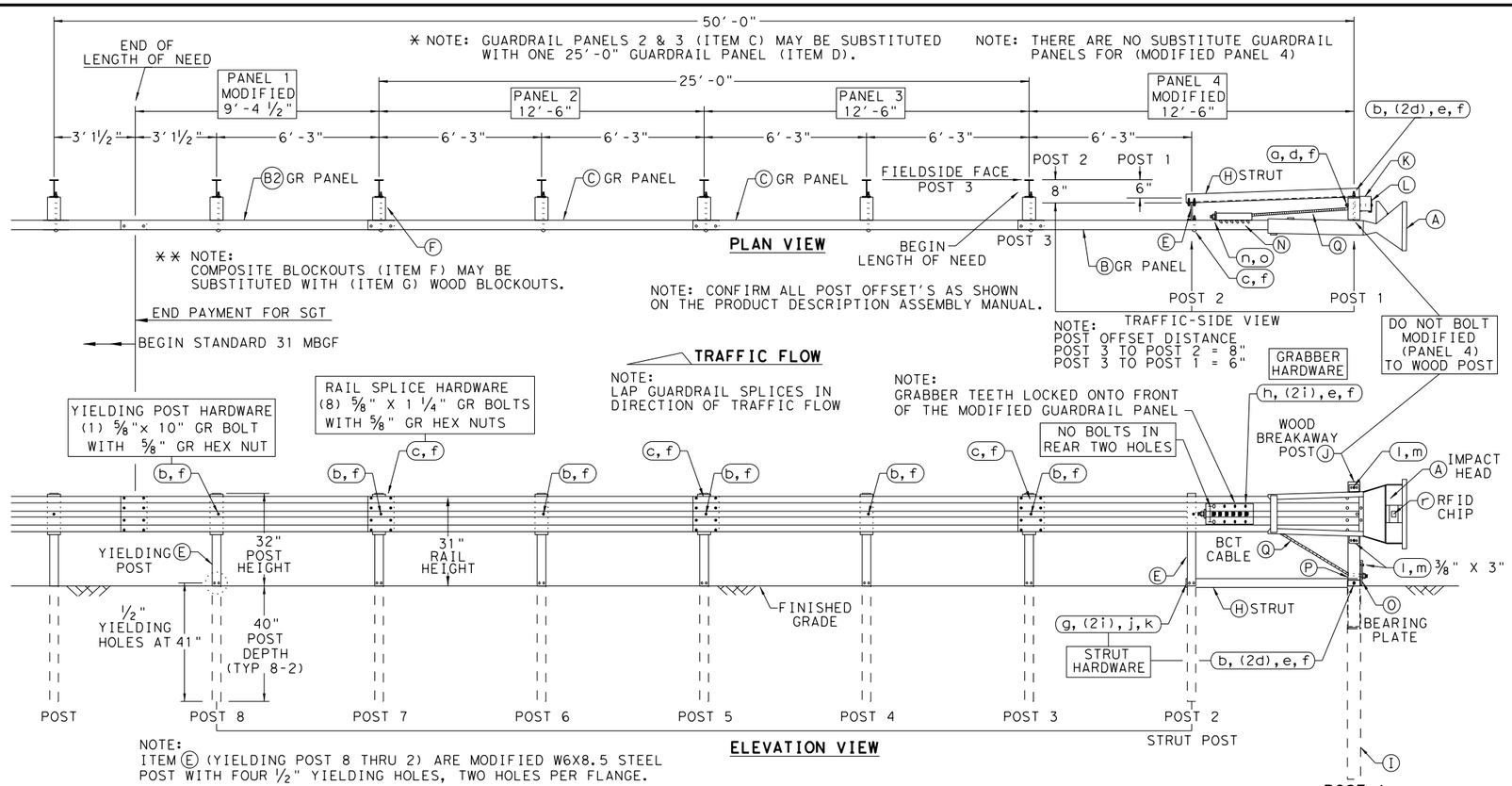
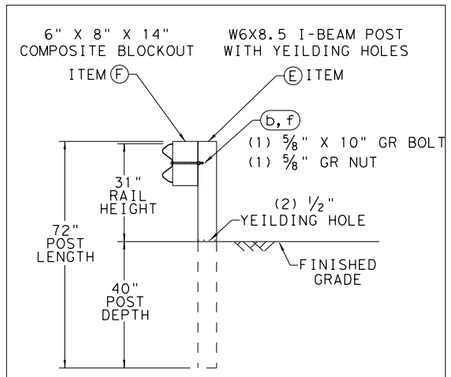


GENERAL NOTES

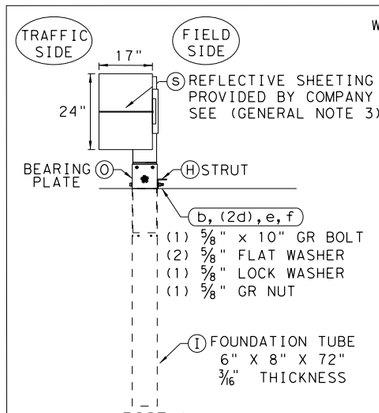
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

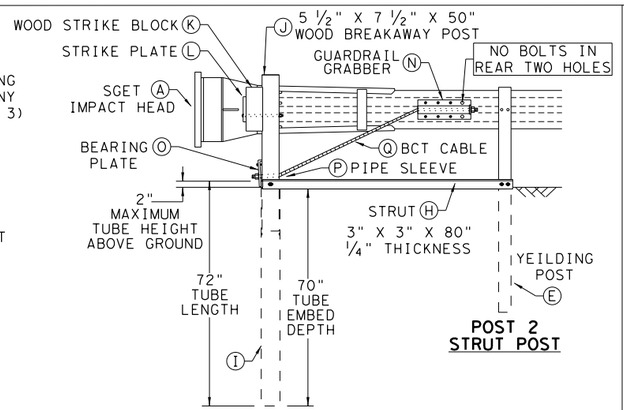
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW
* D
** G



SIDE VIEW
POST 8 - POST 3 (TYP)

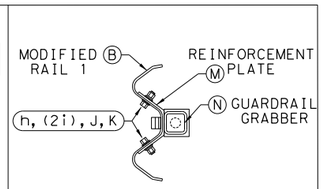


POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW

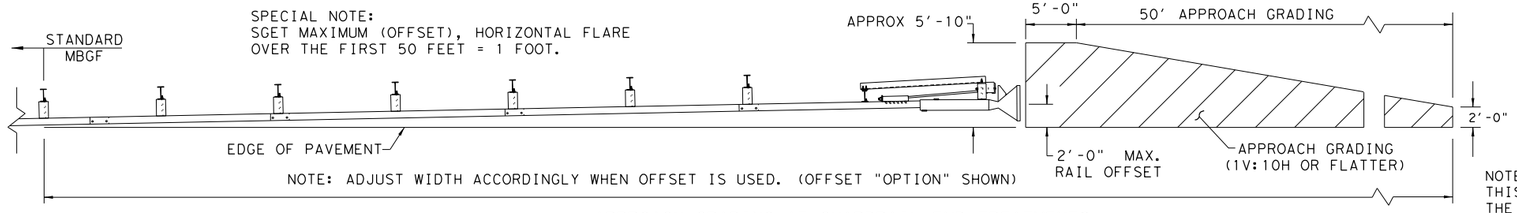
POST 2
STRUT POST



(6h) 1/2" X 1 1/4" BOLTS
(12i) 1/2" FLAT WASHER
(6j) 1/2" LOCK WASHER
(6k) 5/8" HEX NUT

NOTE: TWO FLAT WASHERS PER BOLT, ONE EACH SIDE OF PANEL.

SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

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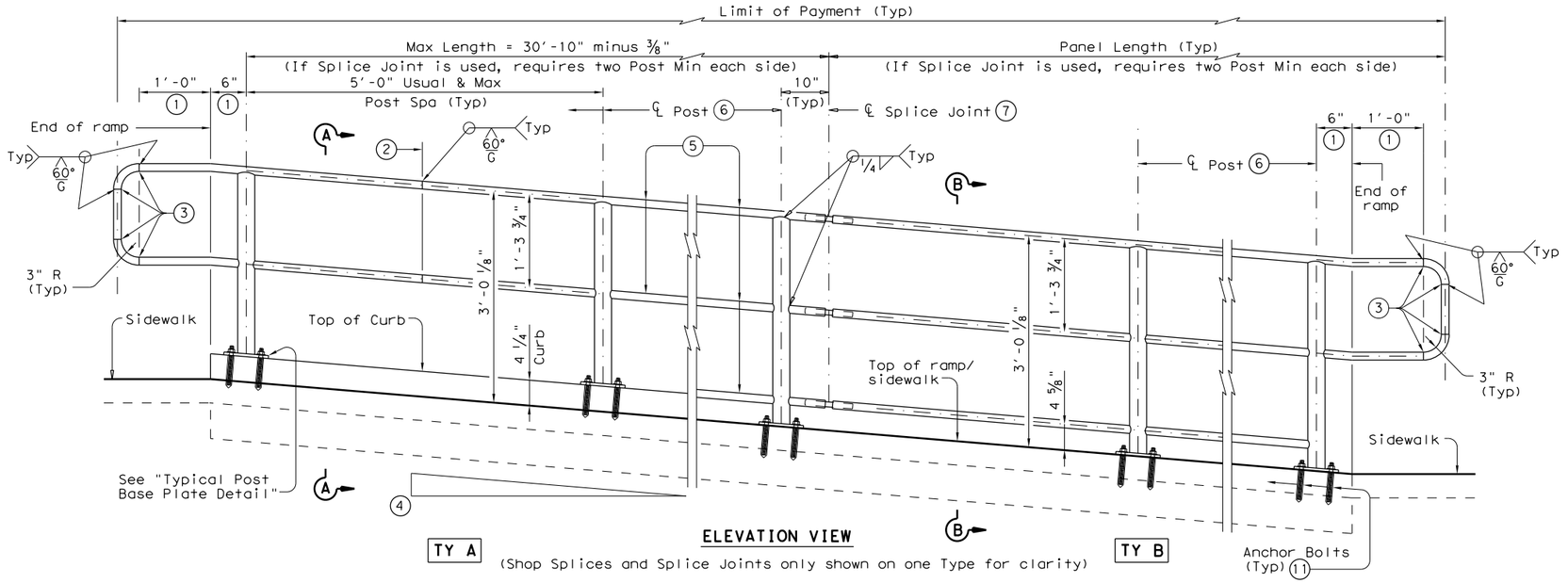
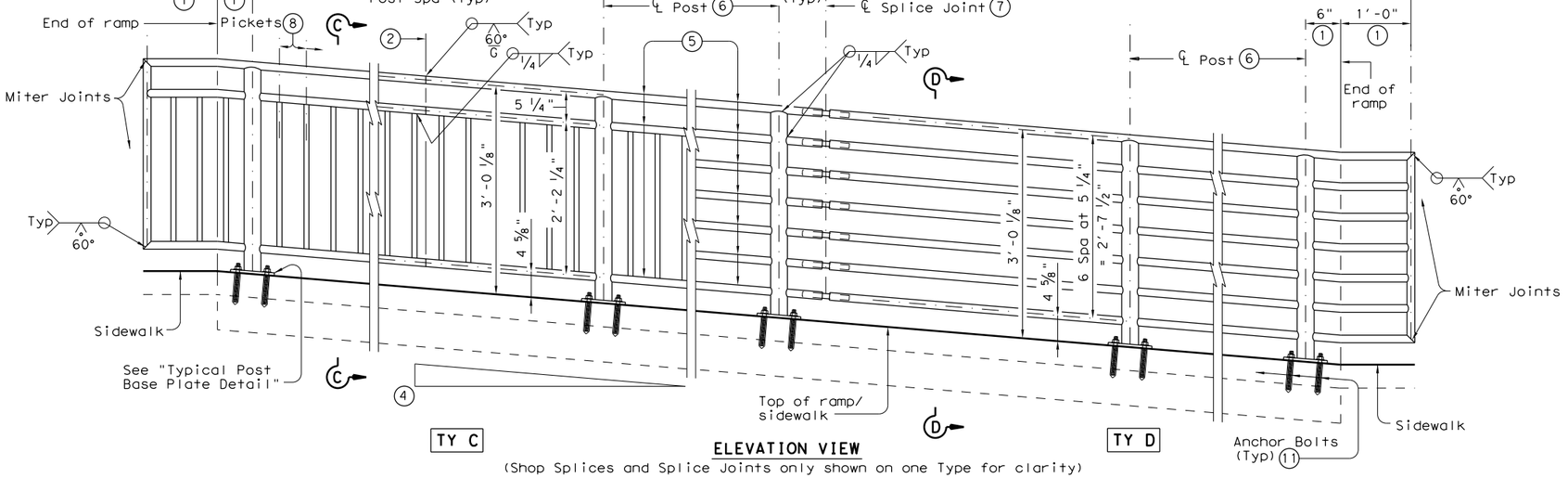


ELEVATION VIEW

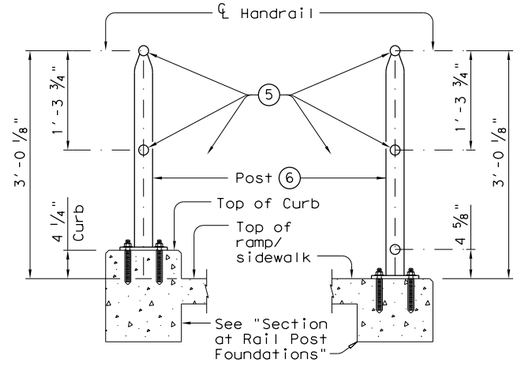
(Shop Splices and Splice Joints only shown on one Type for clarity)



ELEVATION VIEW

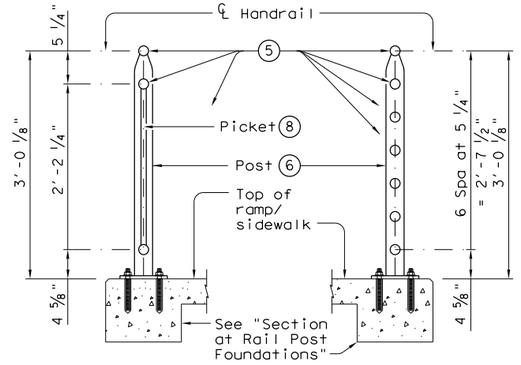
(Shop Splices and Splice Joints only shown on one Type for clarity)

RECOMMENDED USAGE (9) (10)	
Dropoff Height/ Condition	Recommended Rail Options
<30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



SECTION A-A
(Showing Handrail **TY A**)

SECTION B-B
(Showing Handrail **TY B**)



SECTION C-C
(Showing Handrail **TY C**)

SECTION D-D
(Showing Handrail **TY D**)

(1) Parallel to ground.

(2) One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(3) Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(4) See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.

(7) See "Handrail Fabrication Details" for Splice Joints.

(8) ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

(9) When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.

(10) Not to be used on bridges.

(11) See "General Notes" for anchor bolt information.

SHEET 1 OF 3

Texas Department of Transportation — Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT Decmeber 2006	CONT	SECT	JOB	HIGHWAY
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	DAL	DENTON		99

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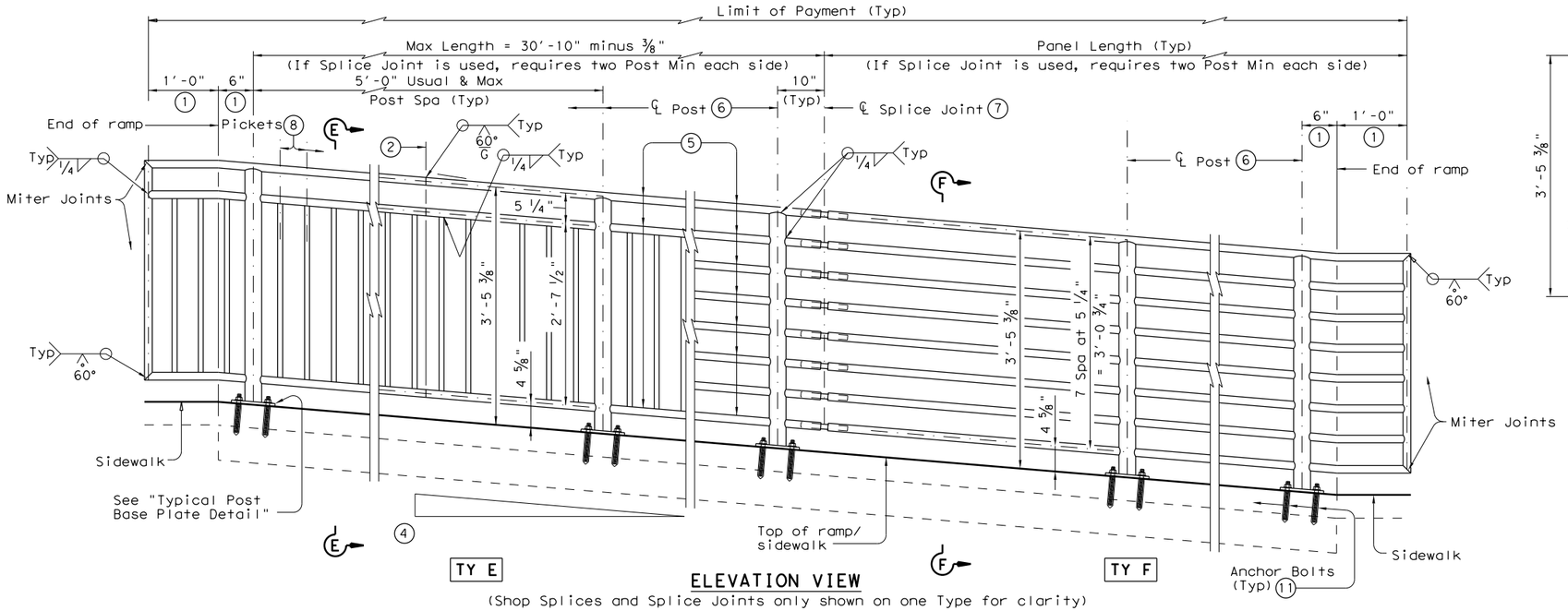
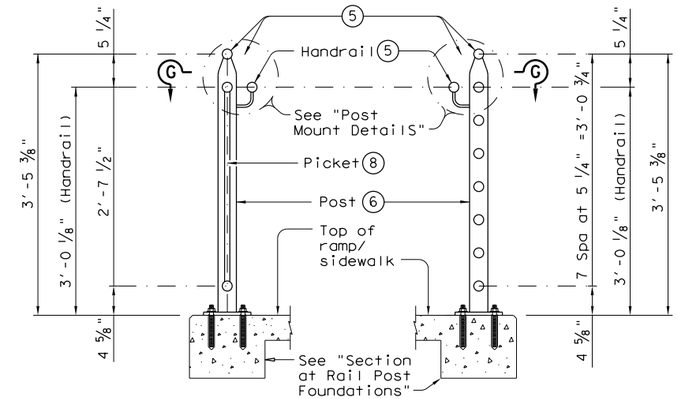


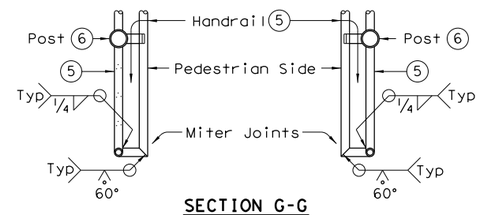
ELEVATION VIEW

(Shop Splices and Splice Joints only shown on one Type for clarity)



SECTION E-E
(Showing Handrail **TY E**)

SECTION F-F
(Showing Handrail **TY F**)



SECTION G-G
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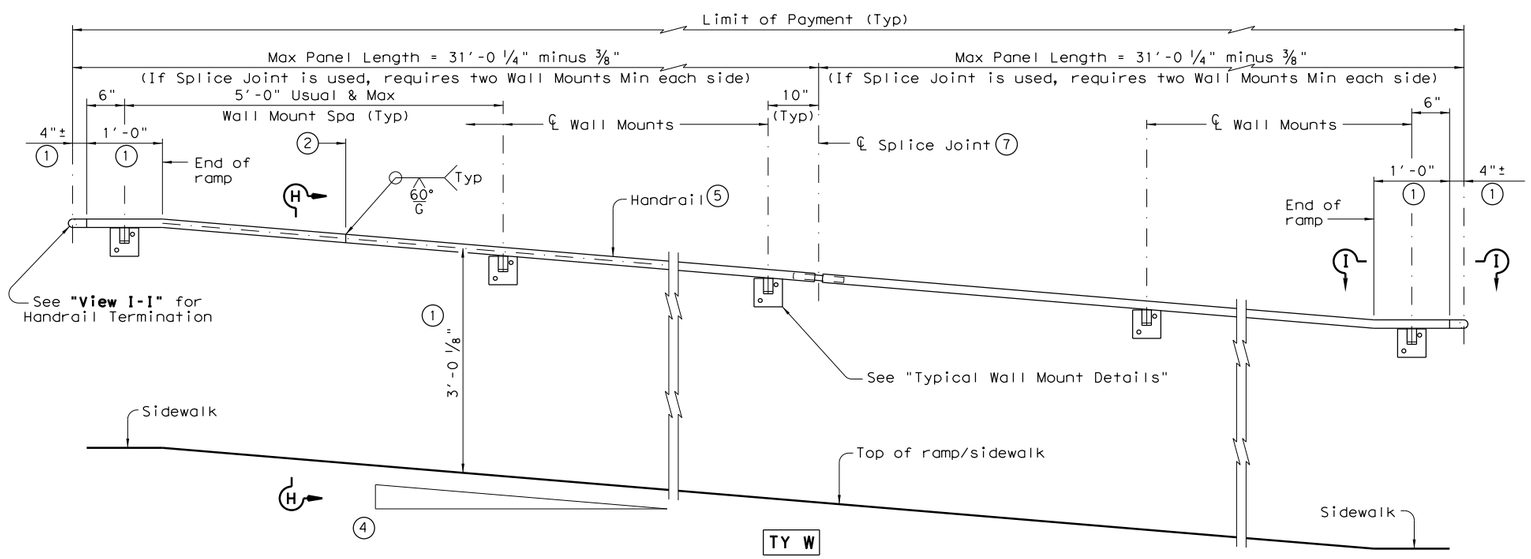
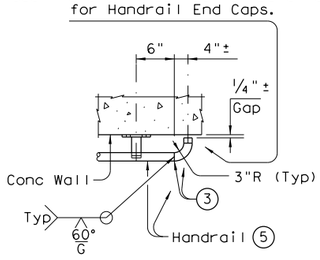
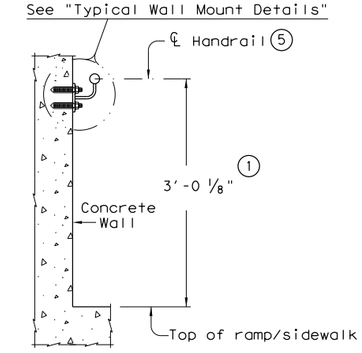


ELEVATION VIEW



VIEW I-I
(Showing Handrail Termination)



SECTION H-H
(Showing Handrail **TY W**)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
11. See "General Notes" for anchor bolt information.

Texas Department of Transportation — Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

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©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
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	DAL	DENTON		100

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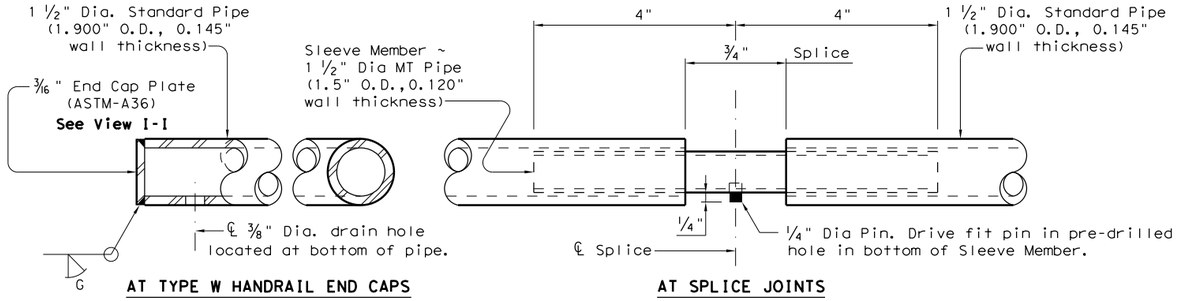
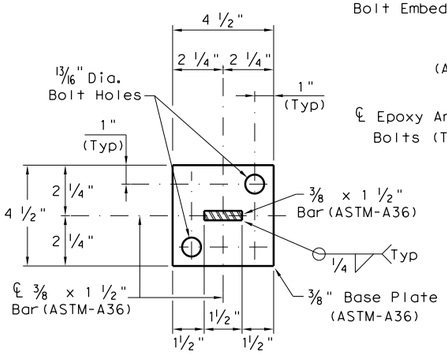


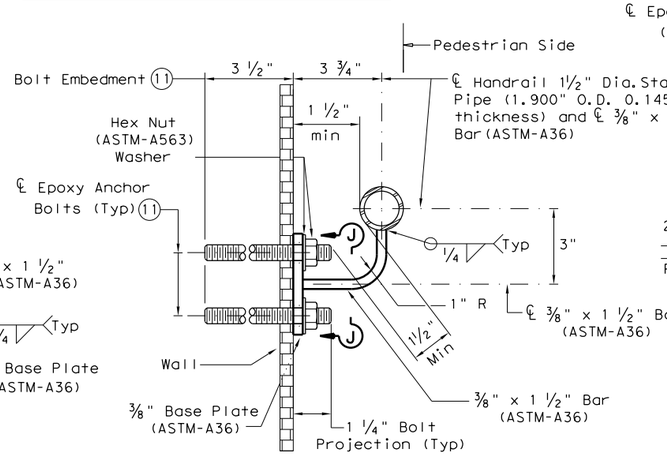
AT TYPE W HANDRAIL END CAPS

AT SPLICE JOINTS

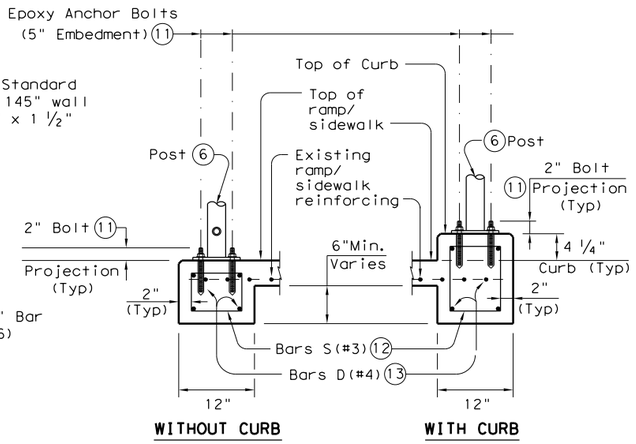
HANDRAIL FABRICATION DETAILS



SECTION J-J
(Anchor Bolts not shown for clarity)

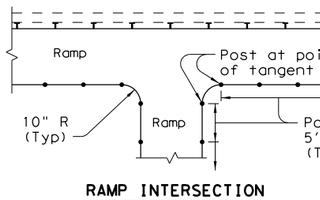


SECTION AT WALL MOUNT

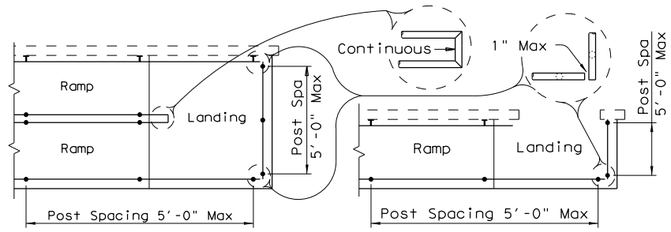


SECTION AT RAIL POST FOUNDATIONS

TYPICAL WALL MOUNT DETAILS



RAMP INTERSECTION



MULTI-LEVEL RAMP

SINGLE-LEVEL RAMP

PLAN SHOWING RAIL AT RAMP CONDITIONS

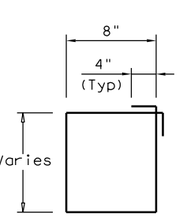
(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diamenter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

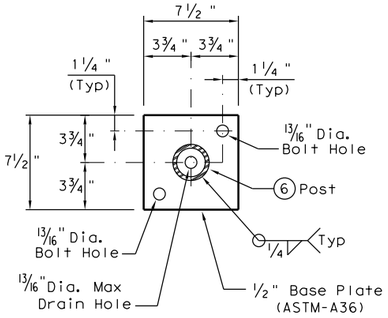
(11) See "General Notes" for anchor bolt information.

(12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

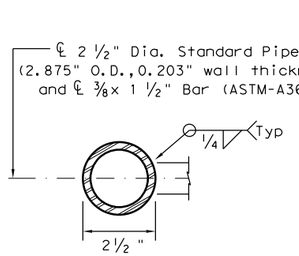
(13) Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



BARS S (#3)

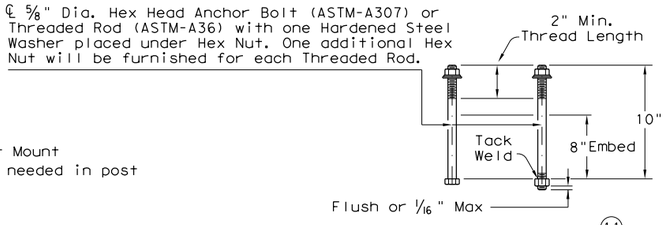


TYPICAL POST BASE PLATE DETAIL

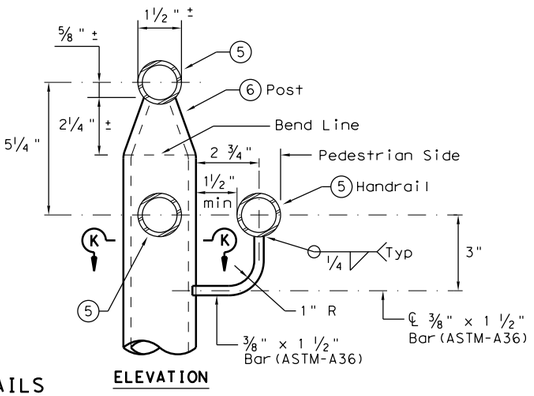


SECTION K-K

POST MOUNT DETAILS



CAST-IN-PLACE ANCHOR BOLT OPTIONS
(Used for Post Base Plate only)



ELEVATION

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be ⅝" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. ⅝" Dia. threaded rod embedment depth for wall mounts is 3 ½" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be ⅝" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately ⅛" by grinding.

Texas Department of Transportation

Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.
	DAL	DENTON		101

DATE: 10/2/2023 11:04:03 PM
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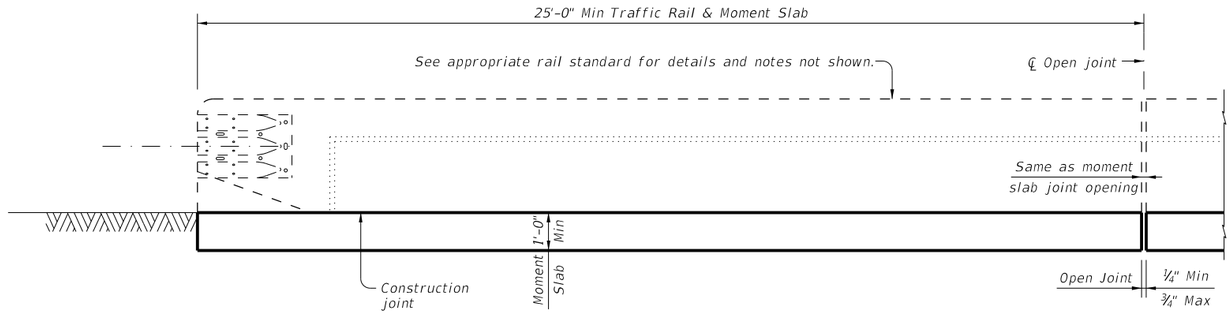
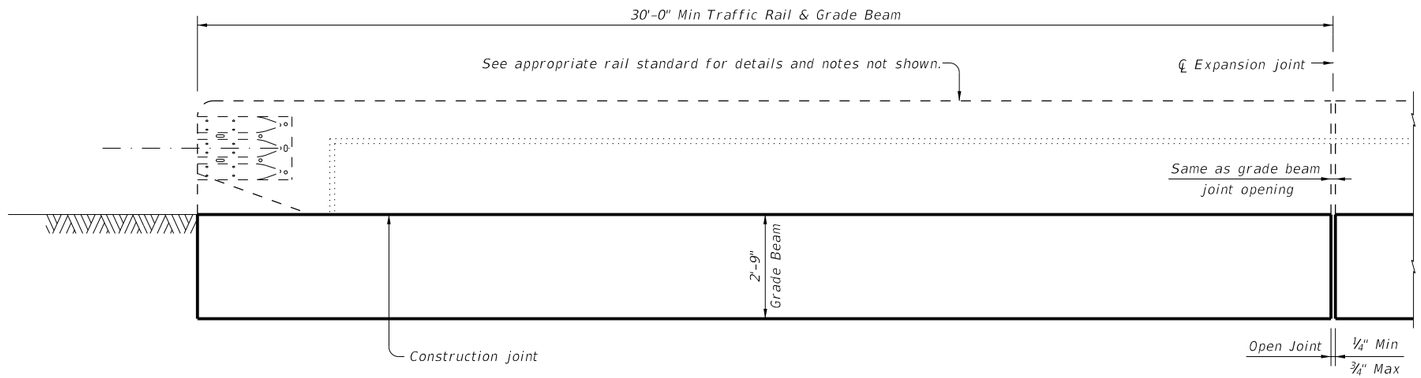


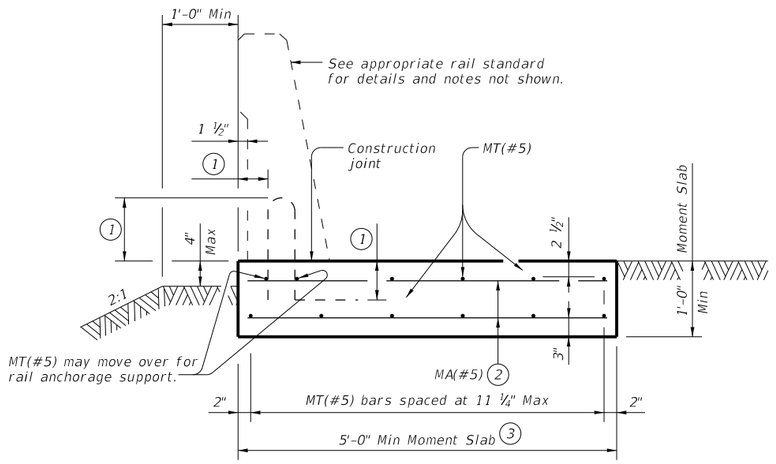
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



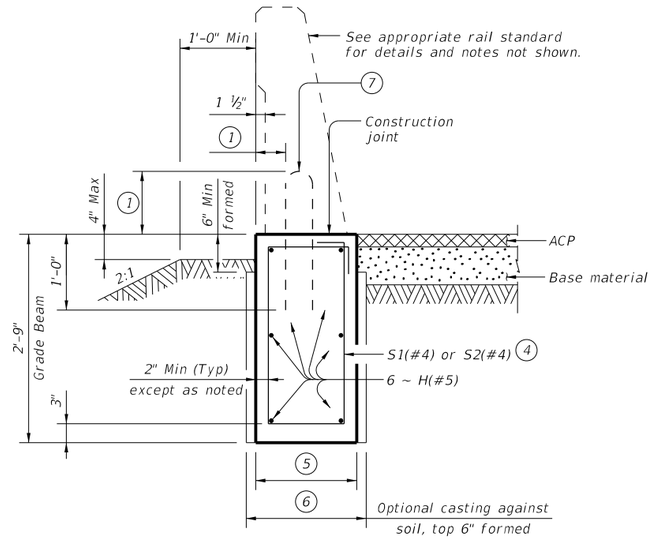
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



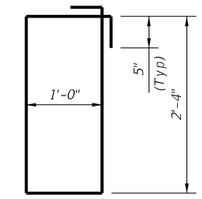
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

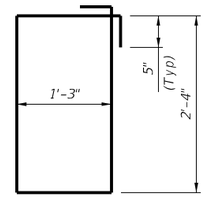
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
   Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66.
   Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

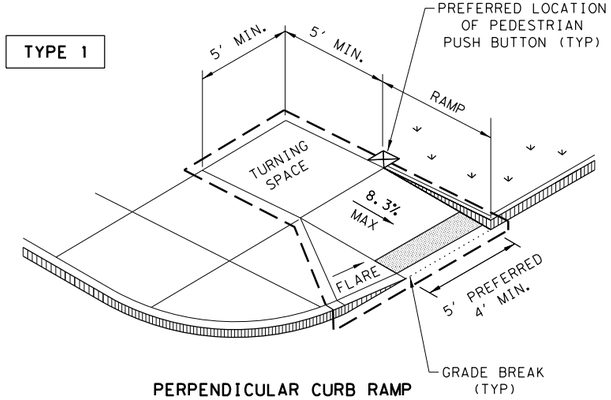
TRAFFIC RAIL FOUNDATIONS
FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
07-20: Added moment slab with rail foundation lengths.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		102

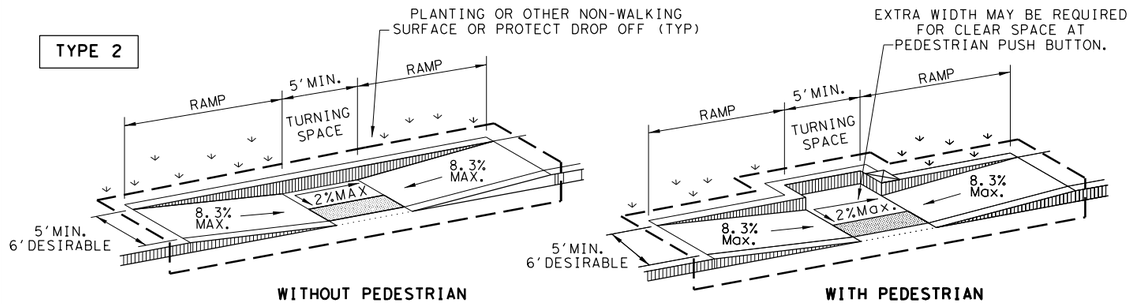
DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.streigerwald@aecom.com\d0553461\ped18.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

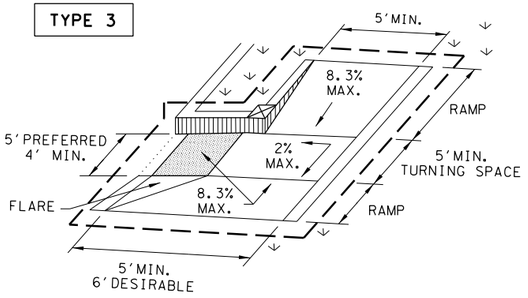


WITHOUT PEDESTRIAN PUSH BUTTON

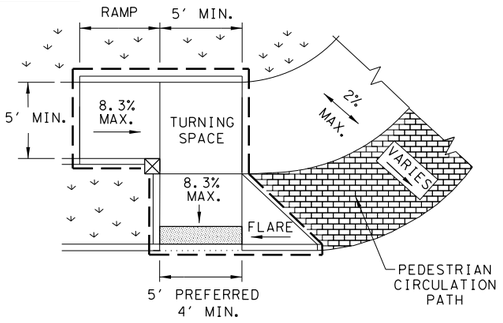
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

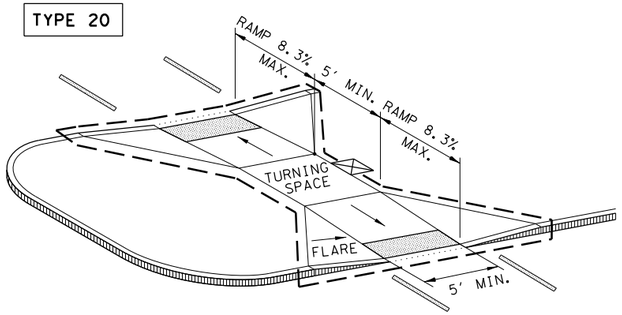


TYPE 6



COMBINATION CURB RAMPS

TYPE 20

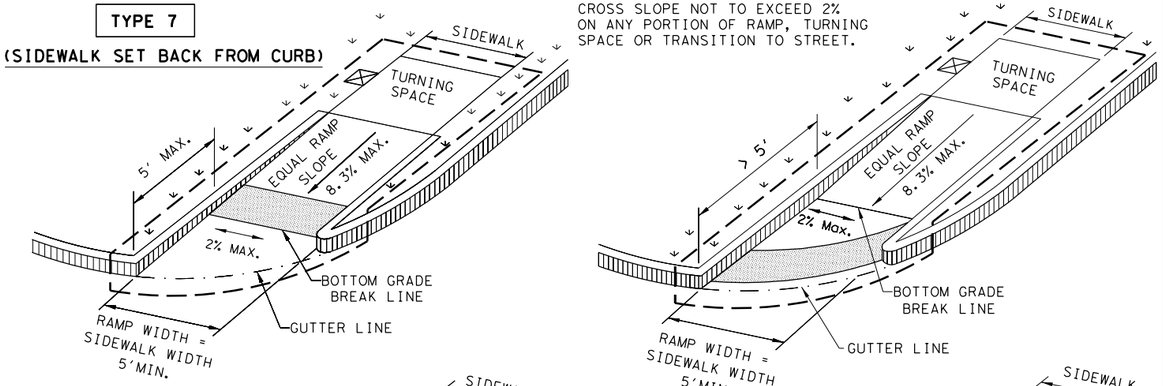


CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

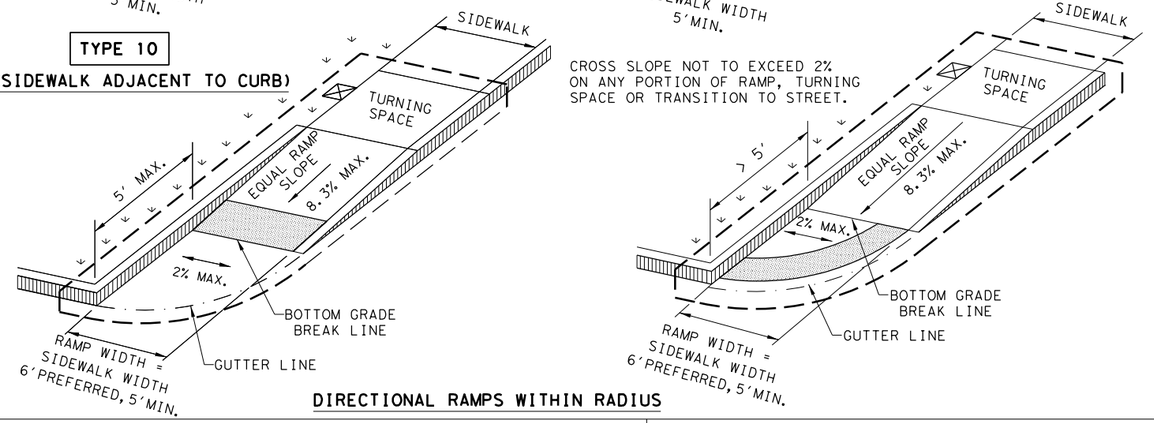
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10

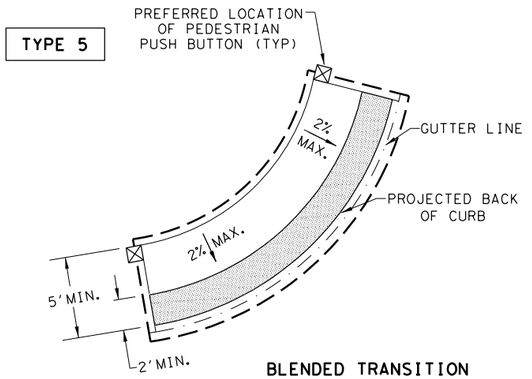
(SIDEWALK ADJACENT TO CURB)

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

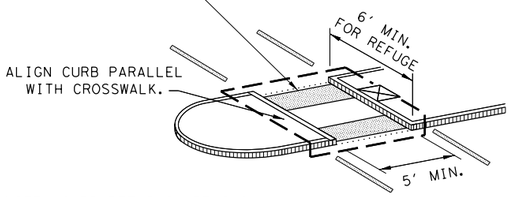
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

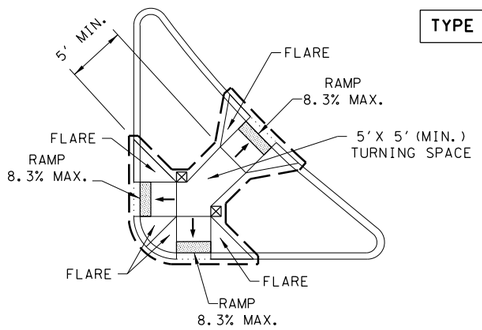
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



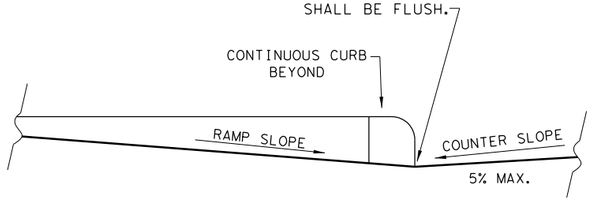
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, etc.	IH 35E
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	DAL	DENTON		103

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\ped18.dgn

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5′. Where the sidewalk is adjacent to the back of curb, a 6′ sidewalk width is desirable. Where a 5′ sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4′ for short distances. 5′x 5′ passing areas at intervals not to exceed 200′ are required.
5. Turning Spaces shall be 5′x 5′ minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4′x 4′ wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6′ wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5′x 5′ landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

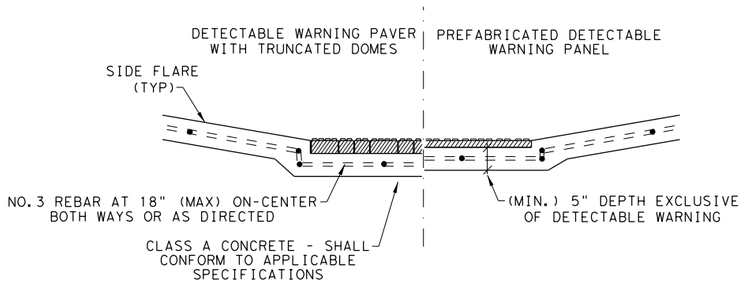
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

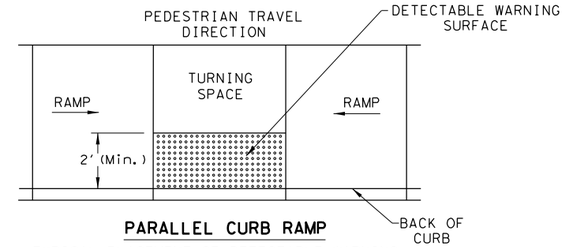
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.



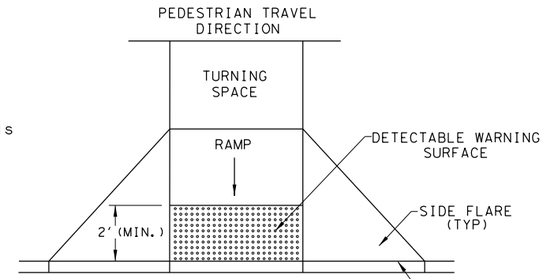
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



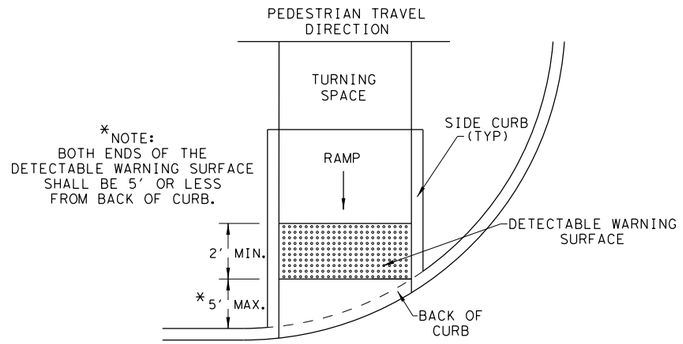
PARALLEL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

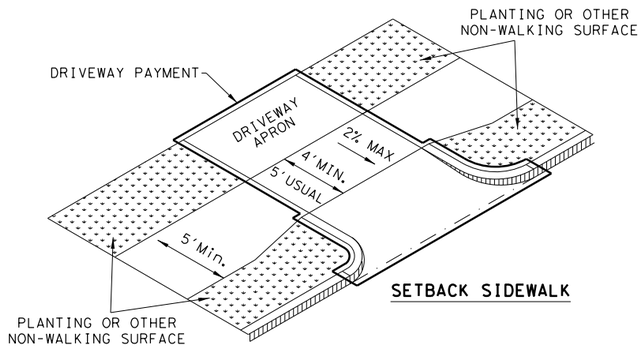
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

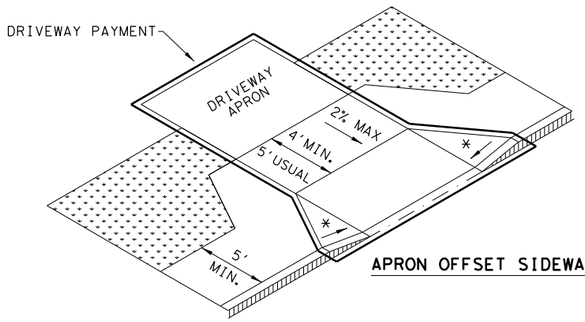
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0195	03	088, etc.		IH 35E
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	DAL	DENTON			104

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\ped18.dgn

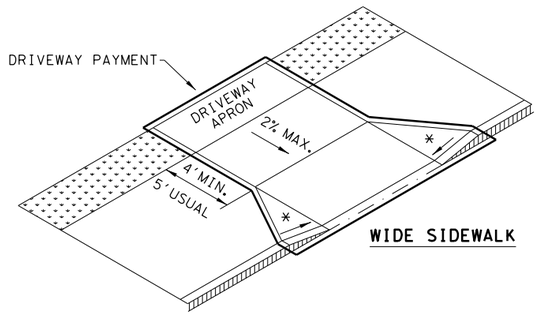
SIDEWALK TREATMENT AT DRIVEWAYS



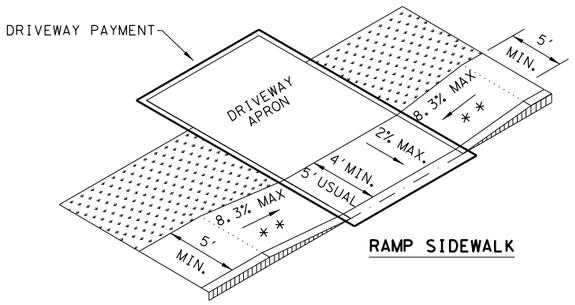
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

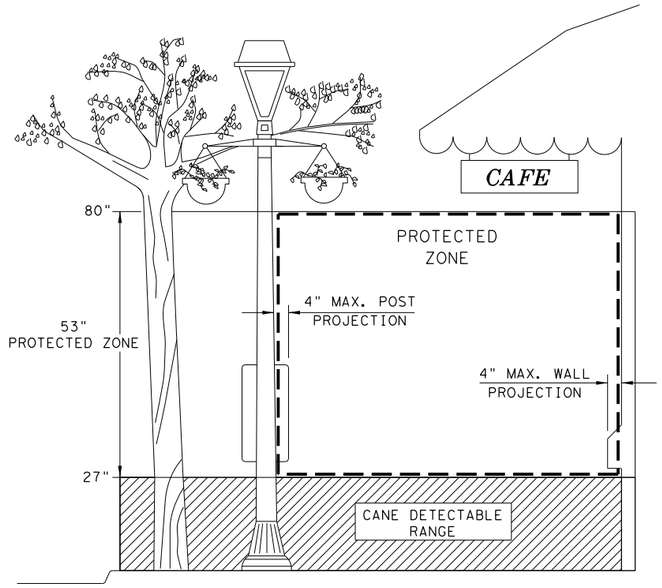


RAMP SIDEWALK

NOTES:

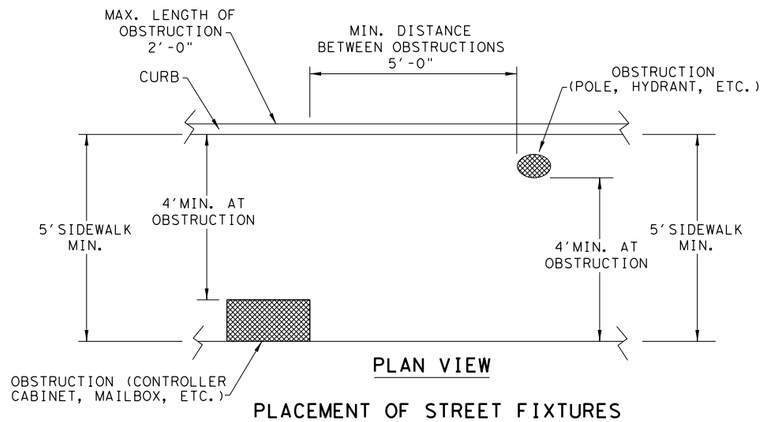
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



PROTECTED ZONE

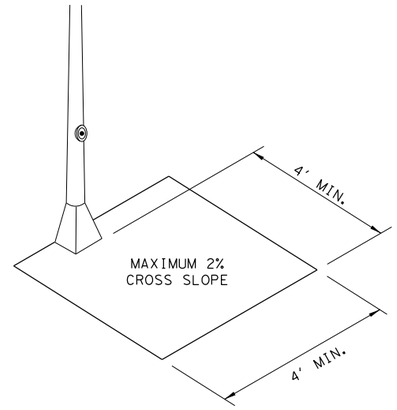
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



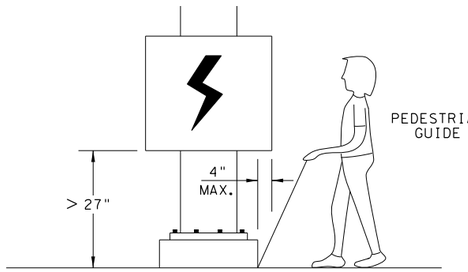
PLAN VIEW

PLACEMENT OF STREET FIXTURES

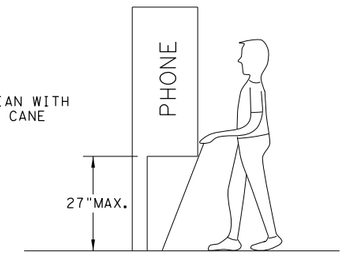
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

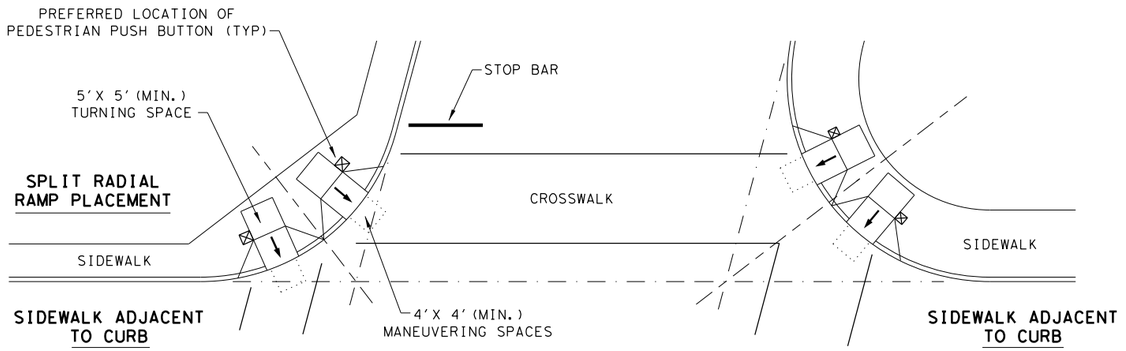
PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0195	03	088, etc.		IH 35E	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.	
	DAL	DENTON			105	

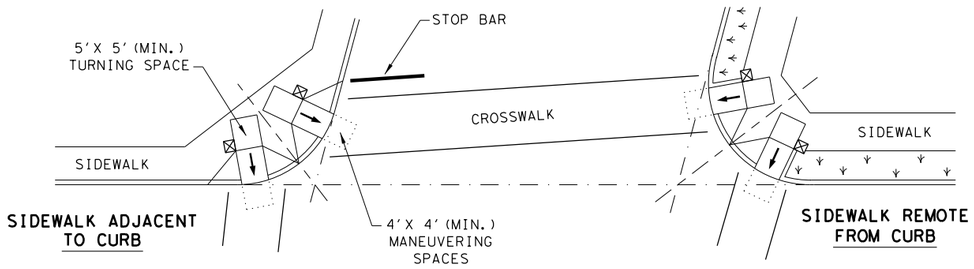
DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\ped18.dgn

TYPICAL CROSSING LAYOUTS

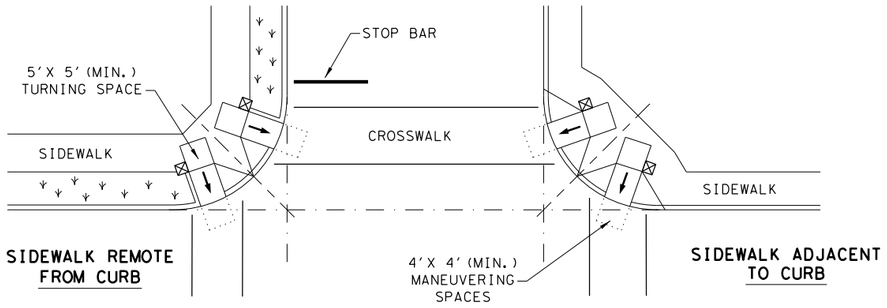
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



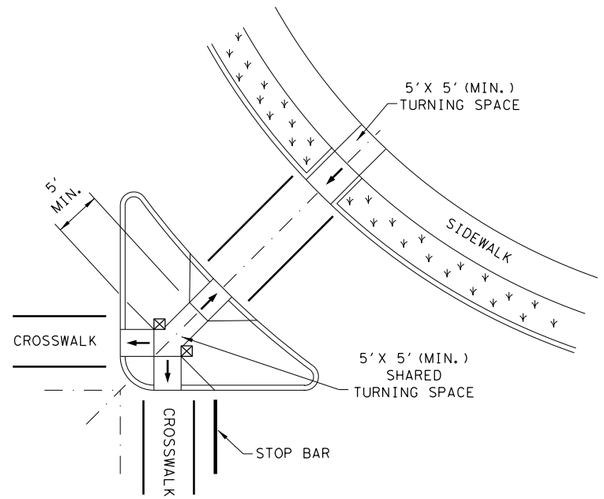
SKEWED INTERSECTION WITH "LARGE" RADIUS



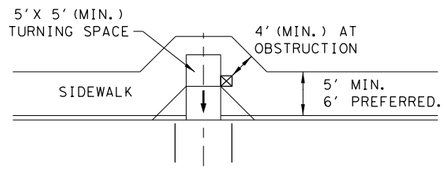
SKEWED INTERSECTION WITH "SMALL" RADIUS



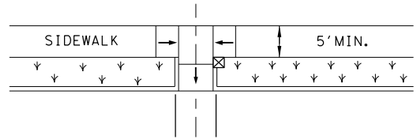
NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



SIDEWALK ADJACENT TO CURB



SIDEWALK REMOTE FROM CURB

MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

SHEET 4 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, etc.	IH 35E
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	DAL	DENTON		106

DATE: 10/2/2023
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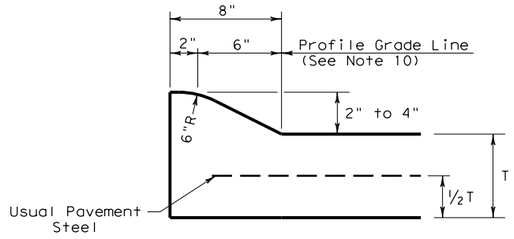
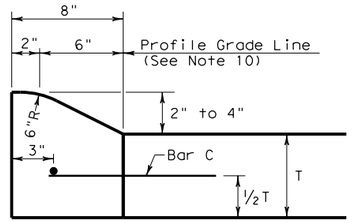
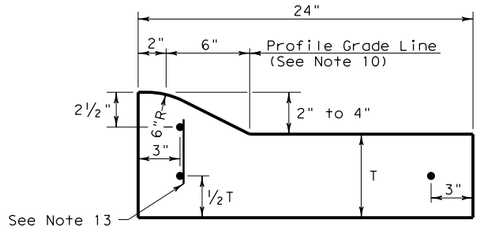


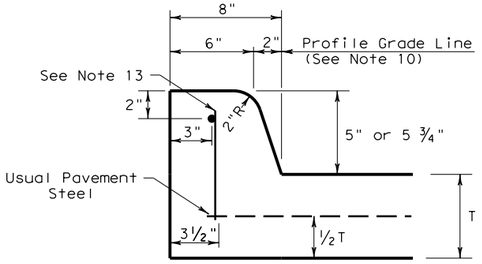
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



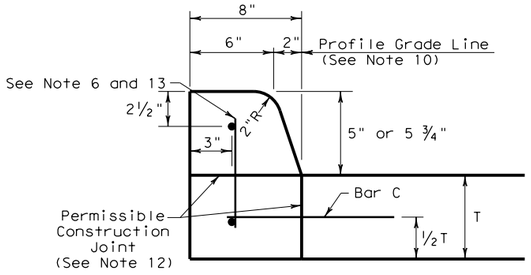
TYPE I CURB
2" - 4" HEIGHT



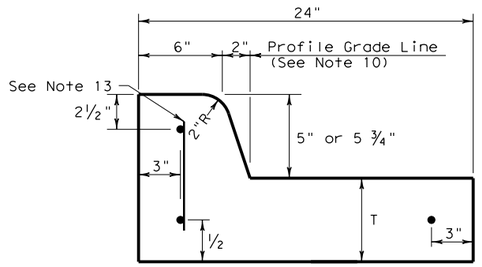
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



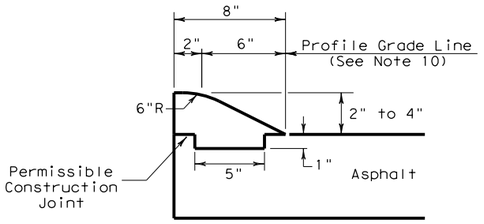
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



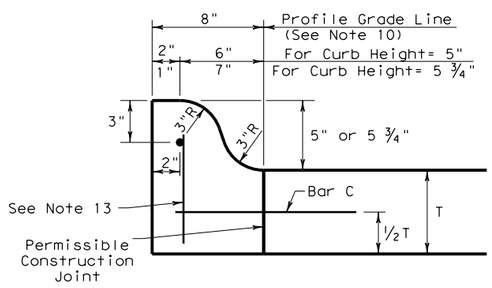
TYPE II CURB
5" - 5 ¾" HEIGHT



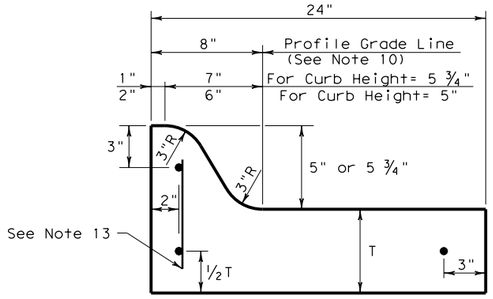
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



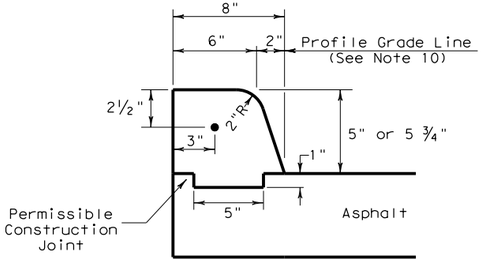
TYPE III CURB (KEYED)
2" - 4" HEIGHT



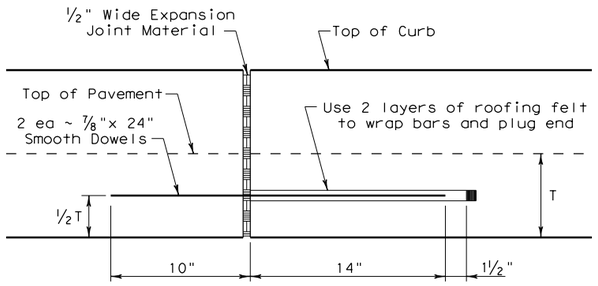
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

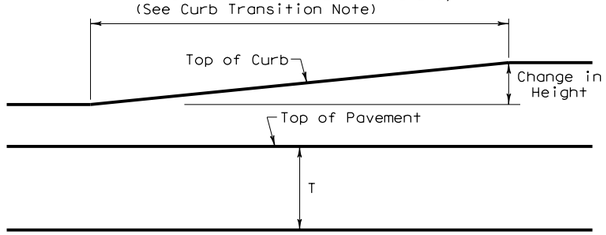


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

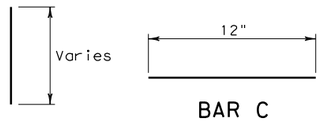
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-22

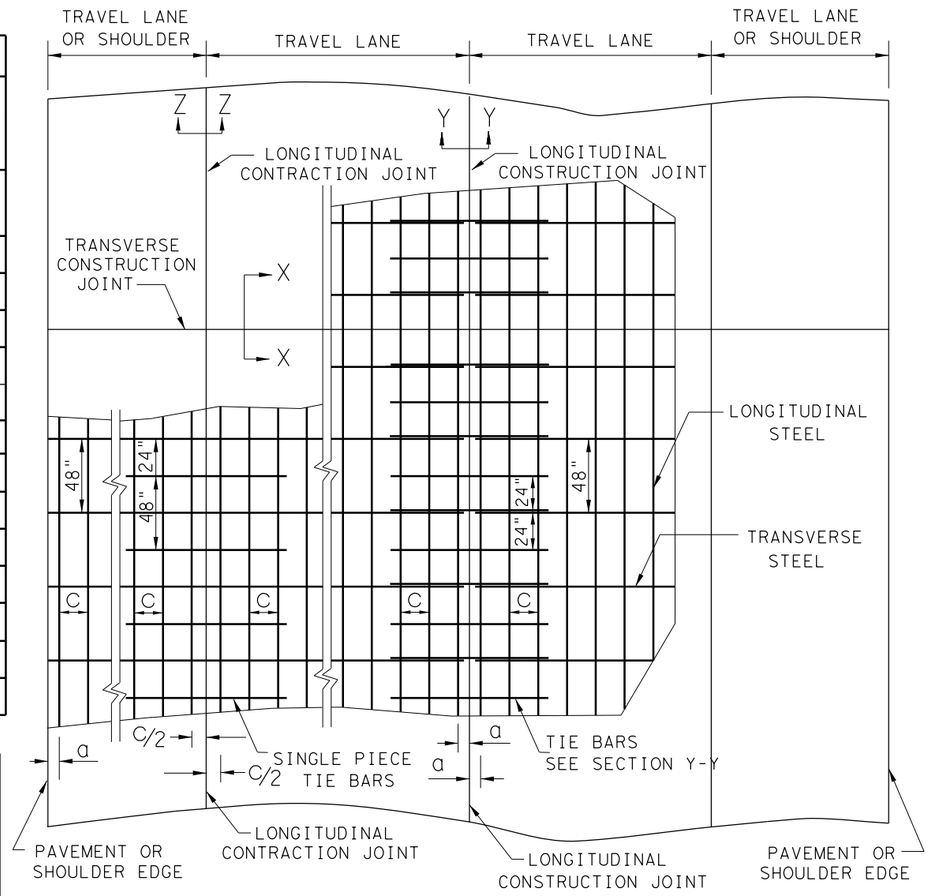
FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		107

DATE: 10/2/2023, 11:05:00 PM
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\crcp123.dgn

TABLE NO. 1 LONGITUDINAL STEEL				
SLAB THICKNESS AND BAR SIZE		LONGITUDINAL STEEL BARS	FIRST SPACING AT EDGE OR JOINT	LONG. STEEL VERTICAL POSITION FROM BOTTOM OF PAVEMENT
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	T1 (IN.)
7.0	#5	6.5	3 TO 4	3.5
7.5	#5	6.0	3 TO 4	3.75
8.0	#6	9.0	3 TO 4	4.0
8.5	#6	8.5	3 TO 4	4.25
9.0	#6	8.0	3 TO 4	4.5
9.5	#6	7.5	3 TO 4	4.75
10.0	#6	7.0	3 TO 4	5.0
10.5	#6	6.75	3 TO 4	5.5
11.0	#6	6.5	3 TO 4	6.0
11.5	#6	6.25	3 TO 4	6.5
12.0	#6	6.0	3 TO 4	7.0
12.5	#6	5.75	3 TO 4	7.5
13.0	#6	5.5	3 TO 4	8.0

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5*	48	#5*	48	#5*	24
8.0 - 13.0	#5*	48	#6	48	#6	24

*CONTRACTOR MAY USE #6 REINFORCING STEEL INSTEAD OF #5 REINFORCING STEEL OR COMBINATION OF EACH SIZE

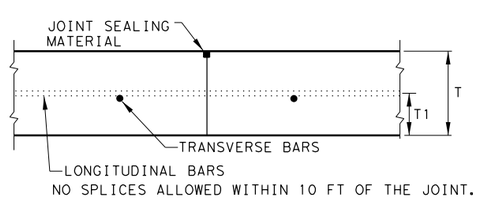


TYPICAL PAVEMENT LAYOUT

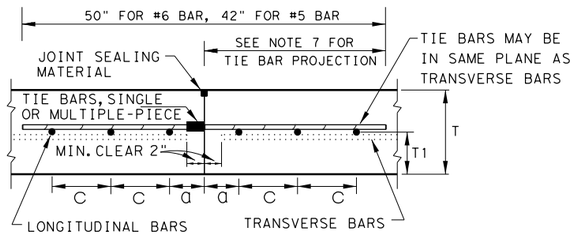
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

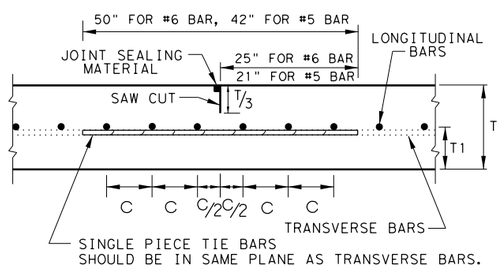
1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. FOR PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT, ADDITIONAL DETAIL MAY BE SHOWN ELSEWHERE IN THE PLANS.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1.
5. ADJUST REINFORCING STEEL VERTICALLY USING SHIMS OR OTHER METHODS, AS APPROVED, TO MEET VERTICAL TOLERANCES PRIOR TO CONCRETE PLACEMENT.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE MINIMUM PROJECTION OF TIE BARS INTO THE ADJACENT PLACEMENT IS 22.5 IN. for #6 BARS AND 18.5 IN. FOR #5 BARS.
8. SEE STANDARD SHEET "CONCRETE CURB AND CURB AND GUTTER," FOR DETAILS WHEN TYING CONCRETE CURB OR CURB GUTTER AT A LONGITUDINAL JOINT.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES

CRCP(1)-23

FILE: crcp123.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
©TxDOT: APRIL 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
APRIL 2023: REVISED LONG. STEEL VERTICAL LOCATION. REMOVED ADDITIONAL TIEBAR AT TRANSVERSE CONSTRUCTION JOINTS	DIST	COUNTY		SHEET NO.
	DAL	DENTON		108

DATE: 10/2/2023 11:05:02 PM
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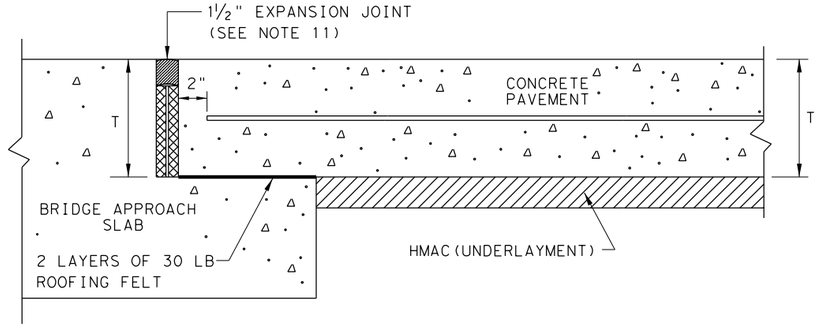
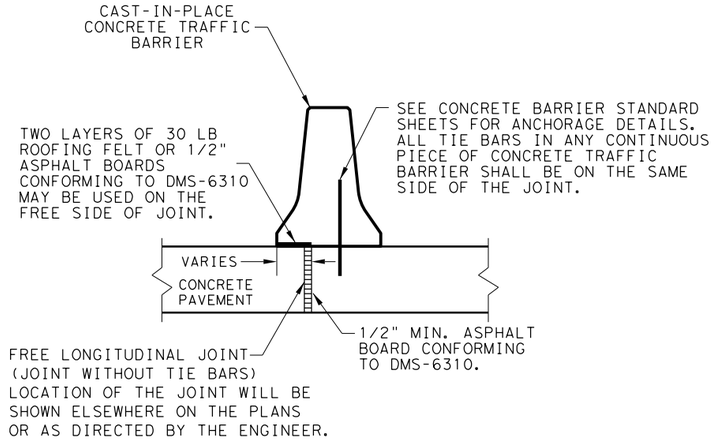
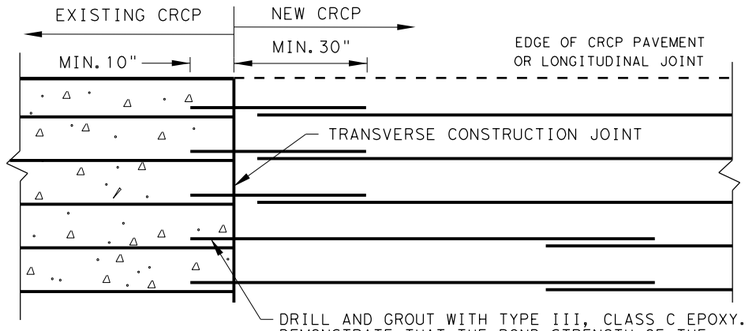


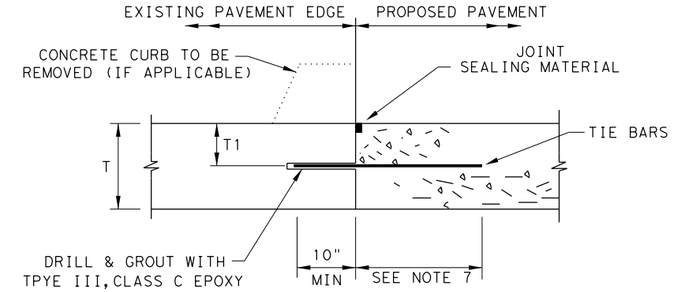
TRANSVERSE EXPANSION JOINT DETAIL AT BRIDGE APPROACH



CENTERLINE FREE LONGITUDINAL JOINT DETAIL

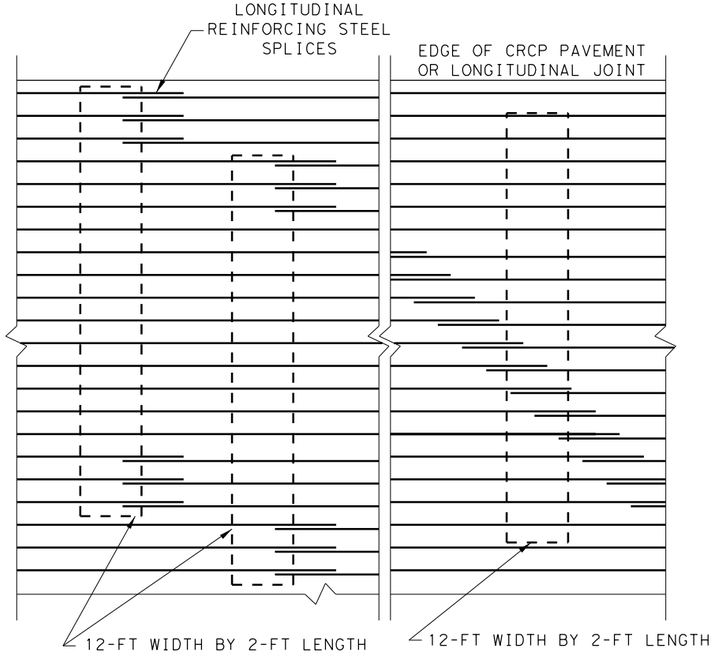


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



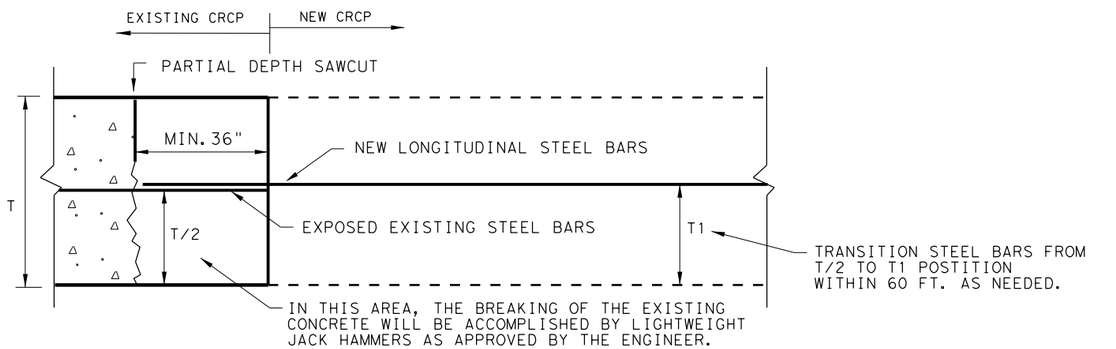
1. BEFORE CONCRETE PLACEMENT, PERFORM PULL-OUT TESTS ON EPOXY-GROUTED TIE BARS IN ACCORDANCE WITH ITEM 360.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER PAVEMENTS, USE #5 TIE BARS FOR LESS THAN 8" THICK PAVEMENTS.

LONGITUDINAL WIDENING JOINT DETAIL



STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
NEW CRCP TO EXISTING CRCP

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

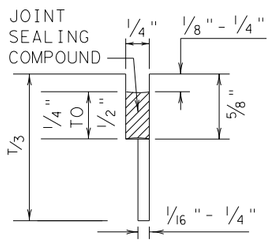
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-23

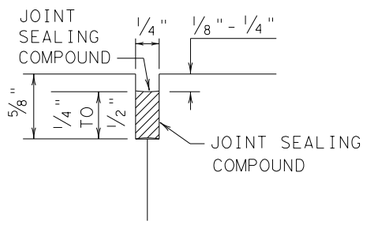
FILE: crcp123.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
©TxDOT: APRIL 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
APRIL 2023: MODIFIED EXPANSION JOINT DETAIL AT BRIDGE APPROACH SLAB	DIST	COUNTY		SHEET NO.
	DAL	DENTON		109

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\js14.dgn

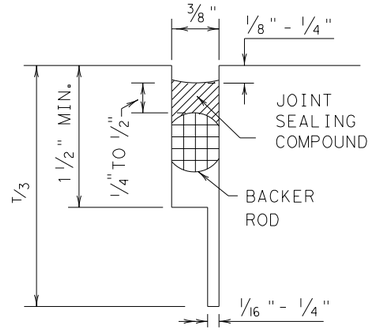
METHOD B: JOINT SEALING COMPOUND



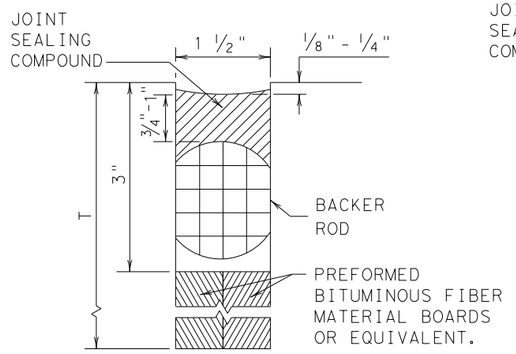
LONGITUDINAL SAWED
CONTRACTION JOINT



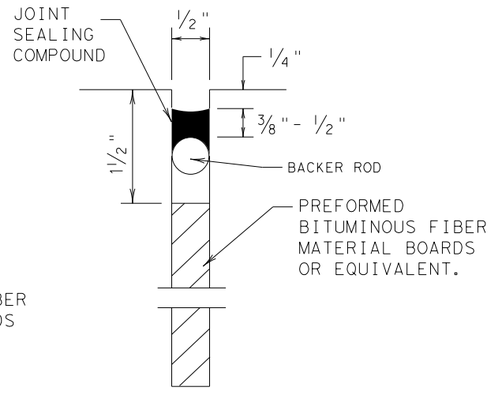
LONGITUDINAL OR TRANSVERSE
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT

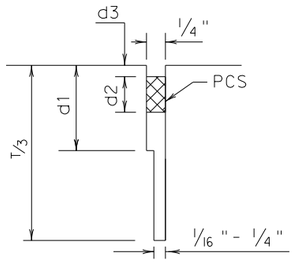


TRANSVERSE FORMED
EXPANSION JOINT

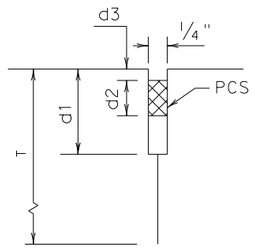


FORMED
ISOLATION JOINT

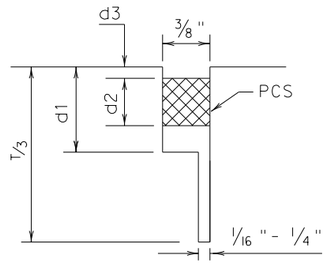
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



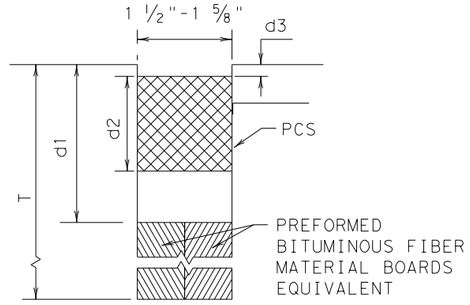
LONGITUDINAL SAWED
CONTRACTION JOINT



LONGITUDINAL
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT



TRANSVERSE FORMED
EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation

Design Division Standard

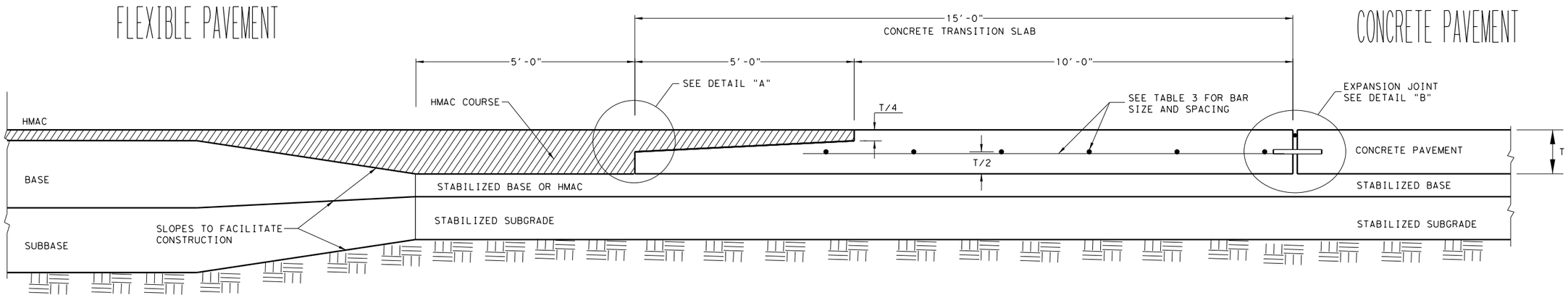
CONCRETE PAVING DETAILS

JOINT SEALS

JS-14

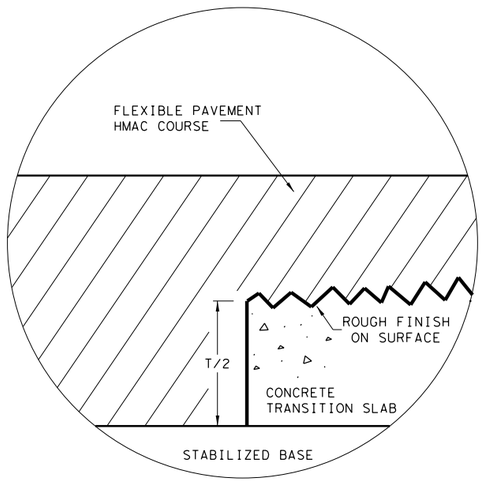
FILE: js14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		110

DATE: 10/2/2023
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0553461\transitslab20.dgn

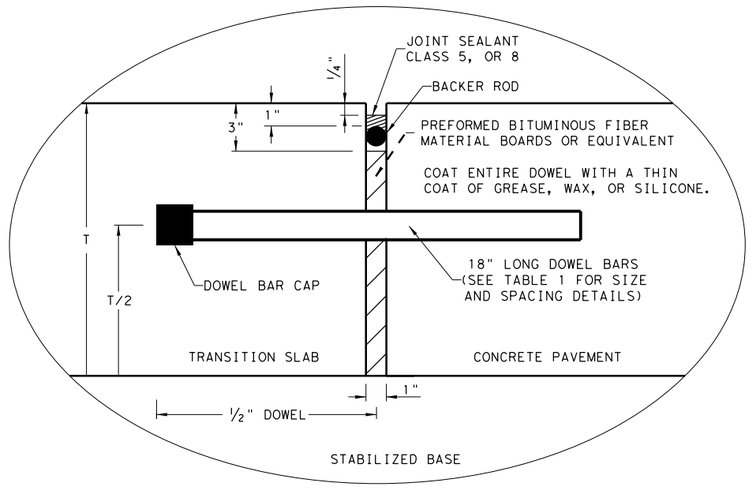


TYPICAL JUNCTION OF CONCRETE PAVEMENT WITH FLEXIBLE PAVEMENT

(NOT TO SCALE)



DETAIL "A"



DETAIL "B"

GENERAL NOTES

1. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "REINFORCING STEEL."
2. DETAILS FOR PAVEMENT WIDTH AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS.
3. MATCH THE LONGITUDINAL JOINTS OF THE CONCRETE TRANSITION SLAB WITH ADJOINING CONCRETE PAVEMENT. PROVIDE EQUIVALENT TIEBARS OR TRANSVERSE BARS AT THESE LONGITUDINAL JOINTS, SEE TABLE NO. 2.
4. REFER TO DMS-6310, "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
5. TRANSITION SLABS WILL BE PAID UNDER ITEM 360, "CONCRETE PAVEMENTS."

TABLE NO.1 DOWELS (SMOOTH BARS)

SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	SPACING (IN.)
7 TO 7.5	1" X 18"	12
8 TO 10	1 1/4" X 18"	12
10 TO 13	1 1/2" X 18"	12

TABLE NO.2 TIE BARS (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.)
7 TO 7.5	#5	24
8 TO 13	#6	24

TABLE NO.3 TRANSITION SLAB STEEL (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.) TRANSVERSE DIRECTION	SPACING (IN.) LONGITUDINAL DIRECTION
7 TO 7.5	#5	24	12
8 TO 13	#6	24	12

ADJUST SPACING OF LONGITUDINAL BARS AS NEEDED TO ACCOMDATE DOWEL BAR SPACING.

Texas Department of Transportation

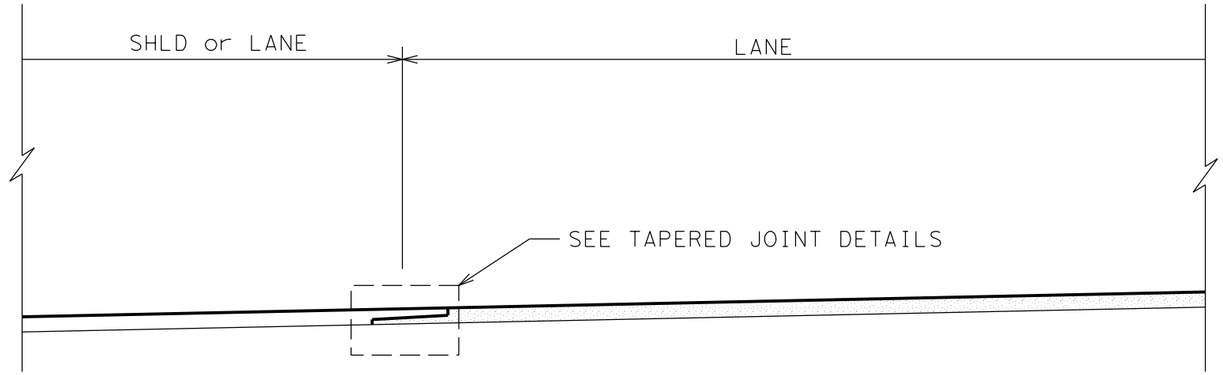
Design Division Standard

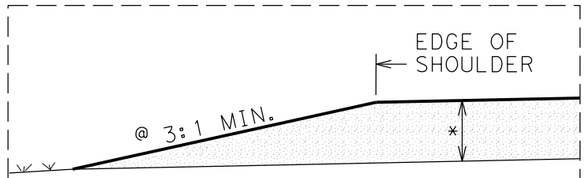
CONCRETE PAVEMENT DETAILS TRANSITION SLAB

T-7 to 13 INCHES

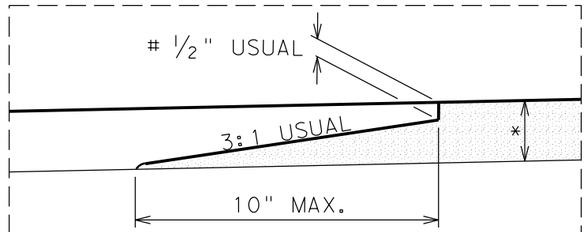
TRANS-20

FILE: transitslab20.dgn	DN: TxDOT	DN: TxDOT	DW: AN	CK: KM
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		111

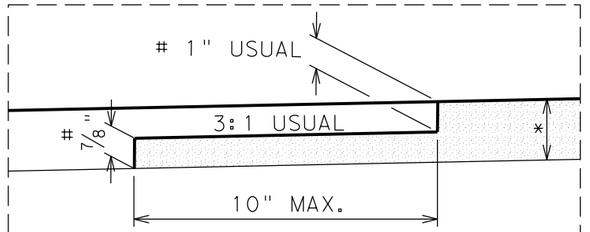




TAPERED OUTSIDE EDGE DETAIL



TAPERED JOINT DETAIL 1.5" TO 4" LIFTS



TAPERED JOINT DETAIL OVER 4" LIFTS

@ IF BACKFILLED SLOPE IS LESS THAN 3:1, COVER WEDGE WITH APPROVED BACKFILL.

* SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA.
# NOTCH DEPTH SHALL NOT BE LESS THAN NOMINAL AGGREGATE SIZE.

NOTES:

1. THE ABOVE DETAILS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH AND BE LAID MONOLITHICALLY WITH ADJOINING MAT. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREED. CLEAN WEDGE PRIOR TO PLACEMENT OF TACK COAT. TACK COAT SHALL BE APPLIED UNIFORMLY TO THE IN-PLACE TAPER WITH A DISTRIBUTOR BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED. COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED AS NEAR TO FINAL DENSITY AS POSSIBLE. ROLL ADJACENT MAT FROM HOT SIDE TO COLD.

2. THE TYPE OF DEVICE TO PRODUCE ABOVE REFERENCED DETAILS SHALL PROVIDE INITIAL COMPACTION EQUIVALENT TO LAYDOWN MACHINE, WITH FINAL DENSITY ADHERING TO NOTE 1, AND BE APPROVED BY THE ENGINEER.

3. HOT MIX MATERIAL AND PLACEMENT SHALL BE PAID FOR UNDER THE PERTINENT ITEM. ANY ADDITIONAL SURFACE PREPARATION, TACK COAT, TACK COAT PLACEMENT, EQUIPMENT, LABOR, TOOLS AND INCIDENTALS TO PRODUCE TAPERED EDGE AND JOINTS AS DESCRIBED ABOVE SHALL BE CONSIDERED SUBSIDIARY TO THE HOT MIX ITEM.

4. THE TAPERED JOINT DETAIL IS NOT INTENDED FOR USE ON 2 WAY 2 LANE ROADBED CENTERLINE WITH LESS THAN 22' OVERALL WIDTH.

5. FULL PAVING OF ALL LANES AND SHOULDRS BY THE END OF EACH DAY PRODUCTION WILL NOT REQUIRE A TAPERED JOINT.

HOT MIX EDGE AND LONGITUDINAL JOINT DETAILS DALLAS DISTRICT STANDARD

LJD(1-1)-07

FED. RD. DIV. NO.	PROJECT NUMBER		SHEET NUMBER
6	(SEE TITLE SHEET)		112
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	DENTON	
CONTROL	SECTION	JOB	HIGHWAY NUMBER
0195	03	088,etc.	IH35E

REVISED ON 9/10/08

DATE: 10/2/2023
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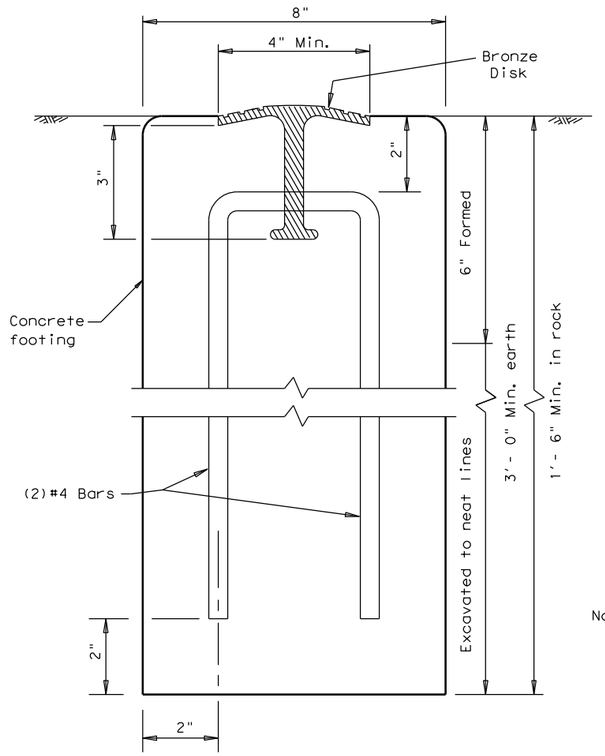
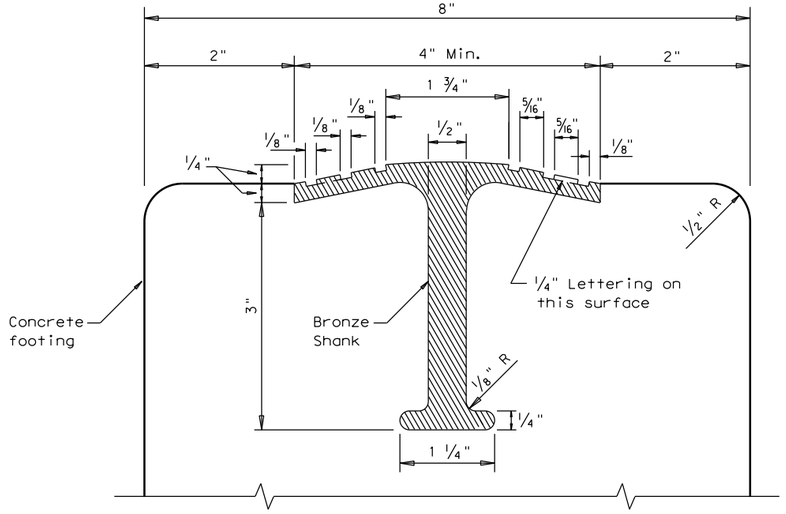
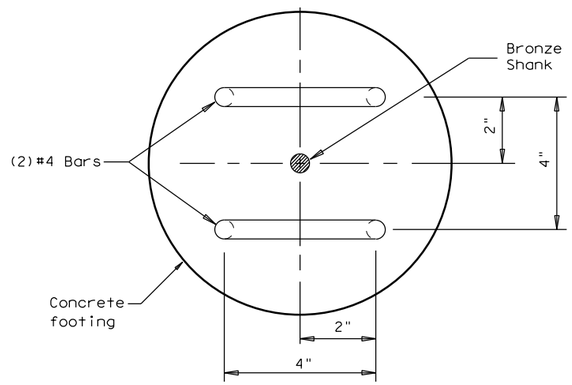


SECTION A-A

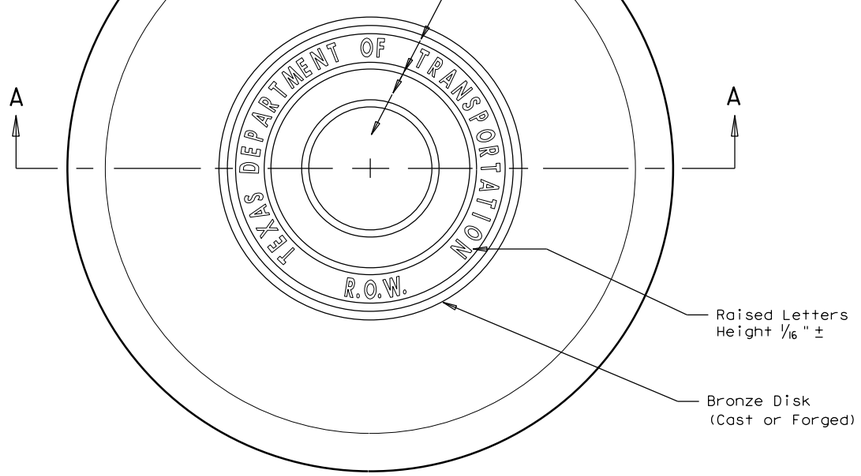


SECTION THRU TOP OF ROW MARKER



CROSS SECTION THRU MARKER

Note:
Measurement of grooves on face of disk may vary slightly. Top surface may be arched.



TOP VIEW OF ROW MARKER

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 538, "Right of way markers."
2. Right-of-Way marker concrete shall be poured in place. The bronze disks shall be set to the correct line and grade, as directed by the Engineer.
3. The bronze disk shall be of architectural bronze with the following composition: Copper 85%, Tin 5%, Lead 5%, Zinc 5%. Excavation of the marker locations shall be made of uniform lines except for the top of 6 inches which shall be formed with removable forms. The top part of the marker around the bronze disk shall receive a trowel finish.
4. Once the concrete has set, the Engineer will stencil the required survey data and, with a chisel or center punch, cut across marker the exact location of the Right-of-Way line in the bronze disk.

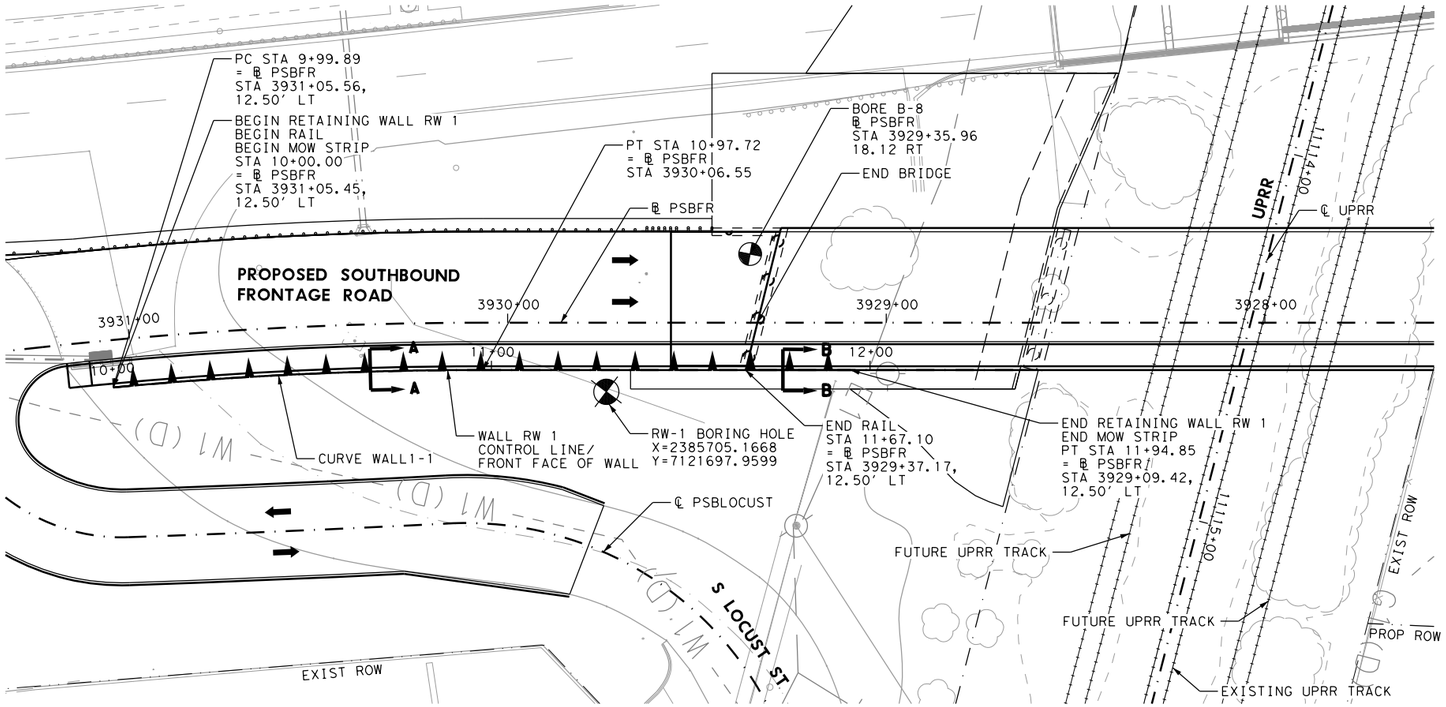
Texas Department of Transportation

Design Division Standard

RIGHT-OF-WAY MARKER

M-10

FILE: m10.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: VP
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		113



N

HORZ 0' 20' 40'
VERT 0' 5' 10'
SCALE IN FEET

LEGEND

RETAINING WALL (PROP)

BORE LOCATION

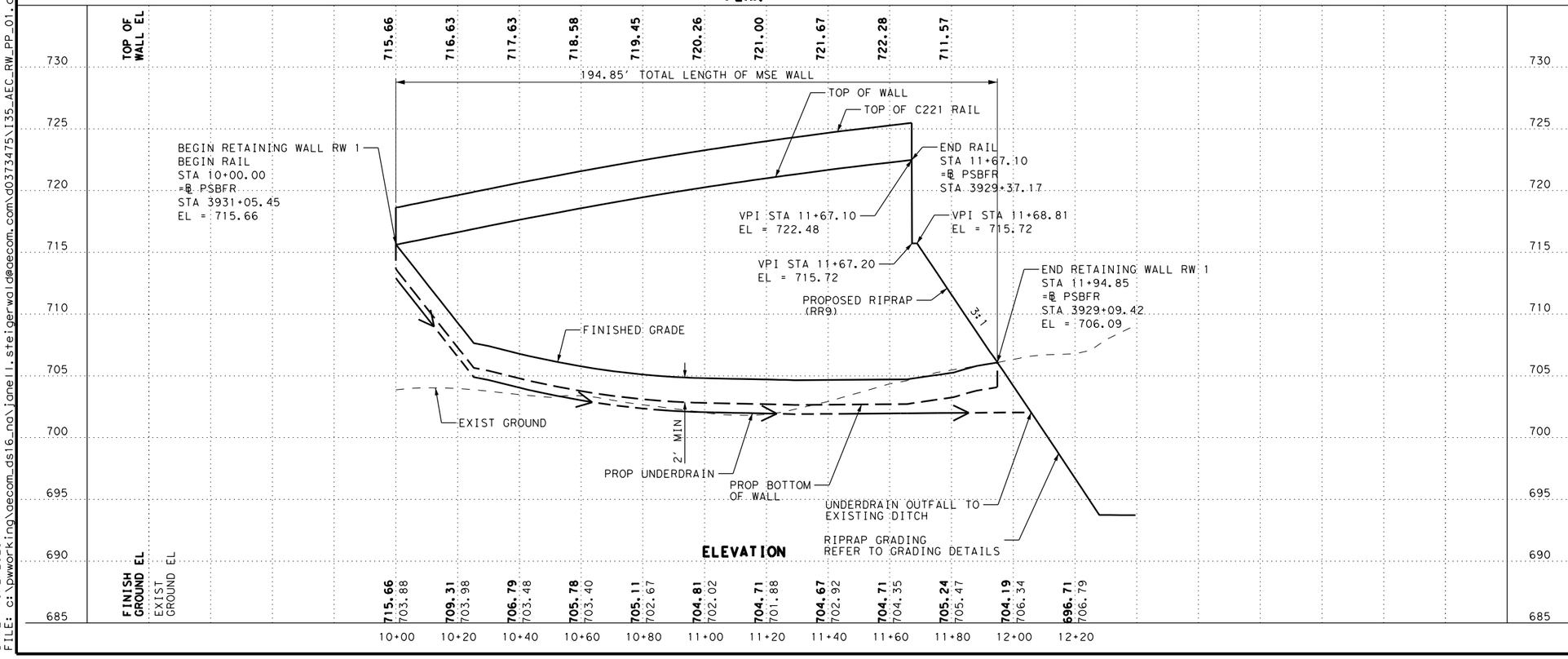
QUANTITIES OF WALL 1				
ITEM		ITEM DESCRIPTION	UNITS	QUANTITY
0423	6001	RETAINING WALL (MSE)	SF	2745
0432	6045	RIPRAP (MOW STRIP)(4 IN)	CY	9.6
0450	6030	RAIL (TY C221)	LF	167
0556	6008	PIPE UNDERDRAINS (TY 8) (6")*	LF	222

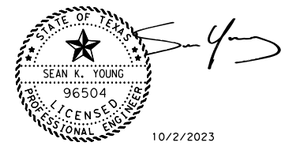
*FOR CONTRACTOR'S INFORMATION ONLY.

CURVE WALL RW 1-1

P.I. STATION = 10+48.84
DELTA = 5° 24' 10.09" (RT)
DEGREE OF CURVE = 5° 31' 20.95"
TANGENT = 48.95
LENGTH = 97.83
RADIUS = 1,037.50
P.C. STATION = 9+99.89
P.T. STATION = 10+97.72

PLAN





10/2/2023

AECOM 13355 NOEL RD, STE 400
AECOM Technical Services Inc. DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E

RETAINING WALL RW 1 - LAYOUT

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	114
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

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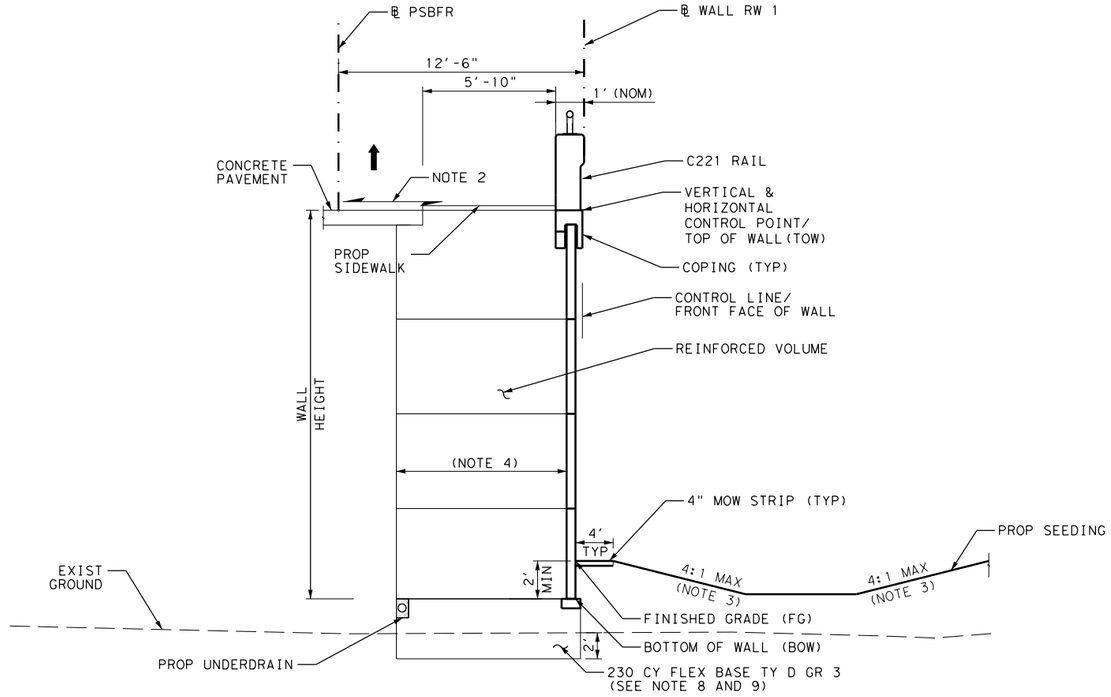
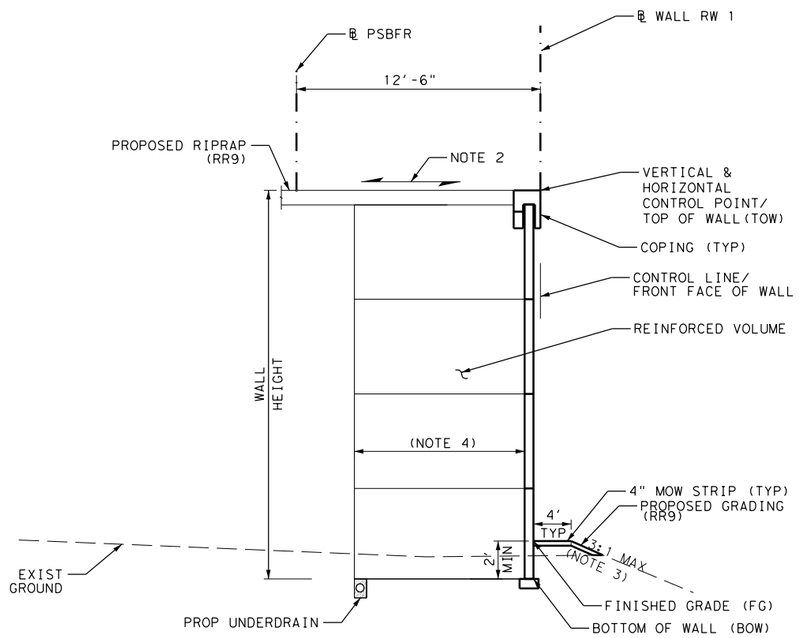


SECTION A-A
RETAINING WALL RW 1



SECTION B-B
RETAINING WALL RW 1

GENERAL NOTES:

UNLESS OTHERWISE NOTED IN THE PLANS, THE TOP OF THE LEVELING PAD IS LOCATED 2 FEET BELOW THE PROPOSED GROUND.

SQUARE FOOT SURFACE AREA OF RETAINING WALL IS MEASURED FROM THE TOP OF RETAINING WALL TO THE TOP OF LEVELING PAD. FOOTING ADJUSTMENTS MADE TO ACCOMMONDATE THE AVAILABLE OPTIONAL RETAINING WALLS ARE NOT MEASURED.

REFER TO TXDOT STANDARDS RW(EM), RW(MSE)DD, RW(MSE) AND RW (TRF) FOR MORE INFORMATION.

CEMENT STABILIZED BACKFILL IS NOT PERMITTED.

RETAINING WALLS ARE NOT SUBJECT TO INUNDATION.

NOTES:

1. REFER TO UTILITY PLANS FOR DETAILS OF EXISTING UTILITIES.
2. REFER TO PAVING PLAN AND TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
3. REFER TO TYPICAL SECTIONS, GRADING PLAN, AND DRAINAGE PLAN FOR DETAILS AND LIMITS.
4. REFER TO TXDOT STANDARDS, DESIGN DATA SHEET, GEOTECHNICAL RECOMMENDATIONS AND REPORTS FOR DETAILED INFORMATION.
5. REFER TO BRIDGE LAYOUT SHEETS FOR DETAILS AND LIMITS OF BRIDGES.
6. REFER TO BORING LOGS FOR BORE HOLE INFORMATION.
7. QUANTITY FOR UNDERDRAINS IS FOR CONTRACTOR INFORMATION ONLY. ALL COSTS ASSOCIATED WITH MATERIALS FOR THE UNDERDRAIN SYSTEM IS SUBSIDIARY TO ITEM 423.
8. FLEX BASE TY D GR 3 TO BE PLACED BETWEEN THE BASE OF THE WALL AND 2' BELOW EXISTING GROUND AS SHOWN.
9. FLEX BASE TY D GR 3 PLUS THE REQUIRED EXCAVATION ARE SUBSIDIARY TO ITEM 423.

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
RETAINING WALL TYPICAL SECTION

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	115
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				
AEC				

DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwoldj

DATE: 10/2/2023 11:07:03 PM
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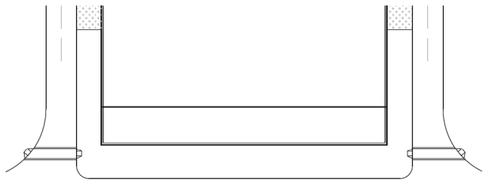
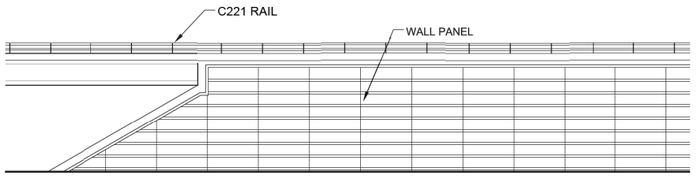
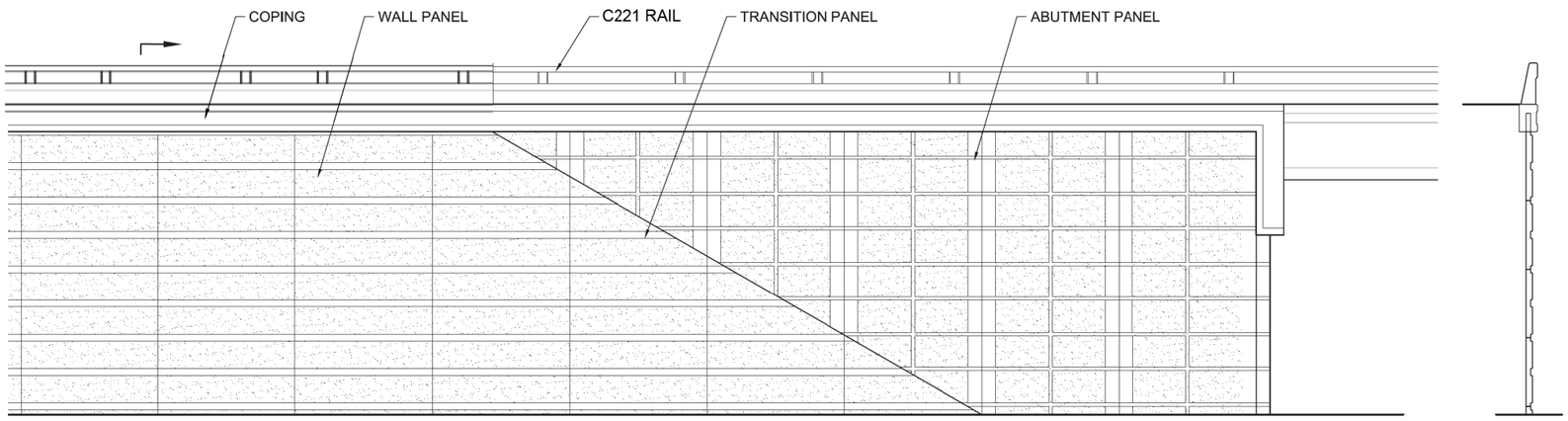


Minor Plan

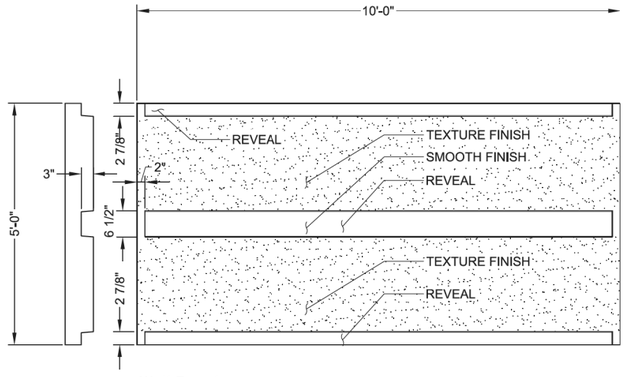


Minor Elevation



Elevation

Section



Wall Panel
Side Section / Elevation

STATE OF TEXAS
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10/2/2023

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IH 35E
RETAINING WALL DETAILS
AESTHETICS

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	116
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DATE: 10/2/2023 11:07:53 PM
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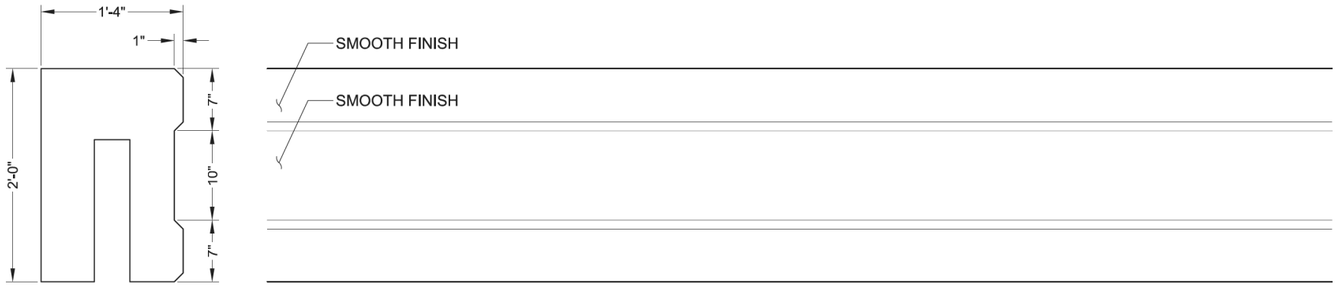
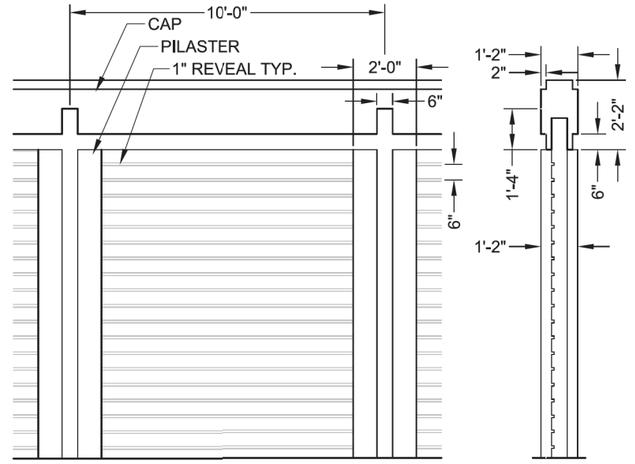
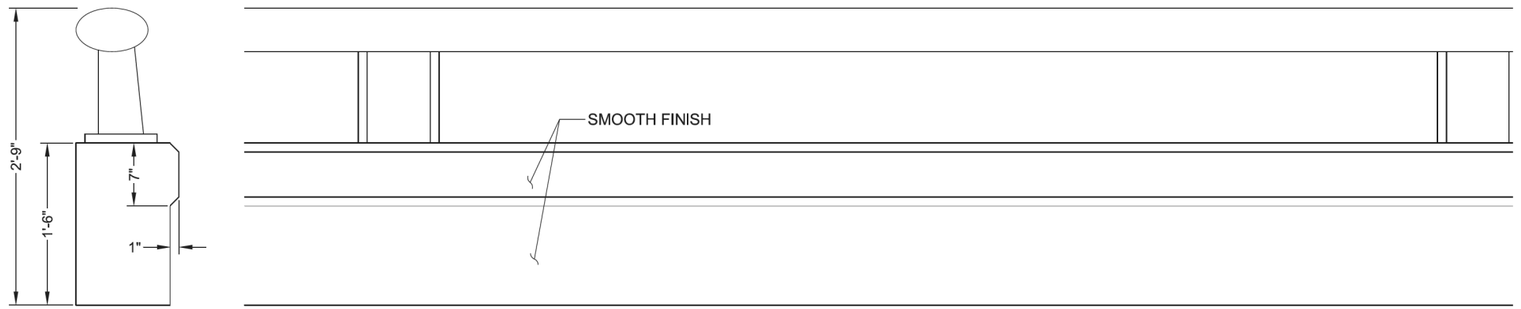


Coping Side Elevation / Elevation



Standard Panel Detail Elevation / Section



C221 Rail
Side Elevation / Elevation

STATE OF TEXAS
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96504
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10/2/2023

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IH 35E

RETAINING WALL DETAILS

AESTHETICS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	117
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

steigerwaldj
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CK: AECOM
DW: AECOM
CK: AECOM
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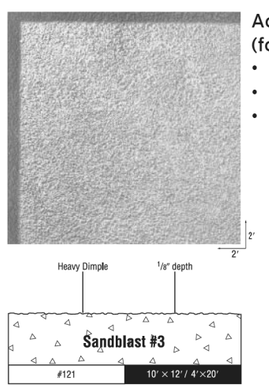
FILE: c:\pwworking\aecom_ds16_na\janell.steigerwald@aecom.com\d0373475\l35_AEC_RW_RT_02.dgn

Notes:
- Final color selection and method of application determined during final design.

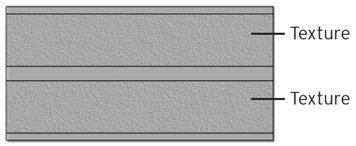
Primary Color (Warm Gray):
Federal Standard 24201
- Walls
- Beams
- Sound Wall Panels

Secondary Color (Ochre):
Federal Standard 13275
- Abutment Walls
- Sound Walls End Panels

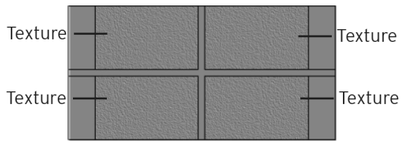
Accent Color (Cream):
Federal Standard 27886
- Traffic Railings
- Coping
- Deck Edges
- Sound Wall Coping



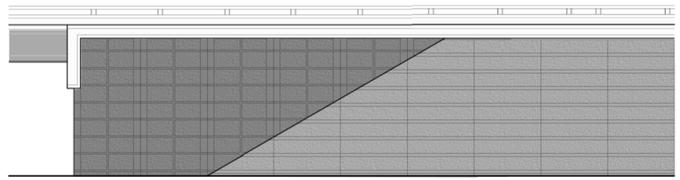
Accent Texture: Heavy Sandblast (formliner finish)
- Walls (select areas)
- Abutment Wall Panel (select areas)
- Sound Wall Panel (select areas)



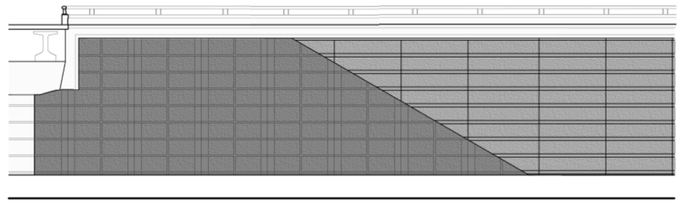
Wall Panel



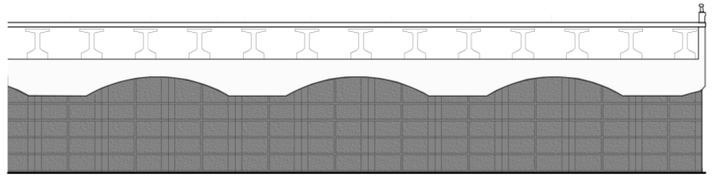
Abutment Panel



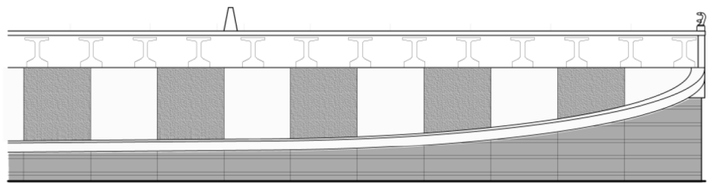
Overpass



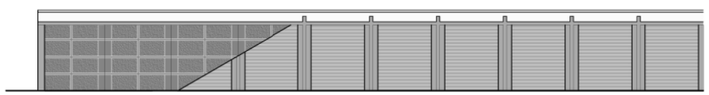
Underpass



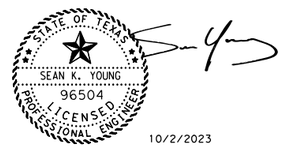
Vertical Abutment



Sloped Abutment



Sound Wall



10/2/2023

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IH 35E
RETAINING WALL DETAILS
AESTHETICS

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	118
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DATE: 10/2/2023 11:10:03 PM
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DN: AECOM CK: AECOM DN: AECOM CK: AECOM steigerwaldj

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW-1	District	Dallas
Highway	IH 35E SBFR	Structure	Retaining Wall	Date	12/1/20
CSJ	0195-03-089	Station	3929+73.92	Grnd. Elev.	701.81 ft
		Offset	18.26' LT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			SAND, Clayey, loose, moist, brown, w/ roots at 0'-2' (SC)			12	60	39		% Passing #200 Sieve: 31.1
		8 (6) 12 (6)								
698.3			CLAY, Sandy Fat, soft to hard, moist, reddish brown and gray (CH)	2.6	67.1	12			131	
5		11 (6) 7 (6)		5.2	16.34	16	50	32	131	% Passing #200 Sieve: 58.3
694.8			CLAY, Lean, very soft to hard, moist, gray and brown (CL)	6.9	24.05	11	39	22	146	% Passing #200 Sieve: 95.9
10		3 (6) 3 (6)		9.5	57.3	9	39	23	139	
689.8			CLAY, Fat, soft, moist, brown and gray (CH)			19	64	39		% Passing #200 Sieve: 98.2
686.3		8 (6) 12 (6)								
15			SAND, Silty, very dense, dry, gray and brown (SM)			5				% Passing #200 Sieve: 19.9
		50 (4) 50 (0.5)								
681.3			SAND, Clayey, dense to very dense, dry, brown and gray (SC)			8	37	25		% Passing #200 Sieve: 25.8
20										
25		50 (2) 50 (0)				11				
671.8		50 (4) 50 (2)								
30										

Remarks: Water level was not encountered below the existing grade during the drilling operations.

The ground water elevation was not determined during the course of this boring.

Driller: GEDCO **Logger:** GO **Organization:** HVJ Associates, Inc.

g:\houston\hou ps\geo\lab info\gint logs\hg1610081.1.2.gpj

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW-2	District	Dallas
Highway	IH 35E SBFR	Structure	Retaining Wall	Date	12/1/20
CSJ	0195-03-089	Station	3931+32.47	Grnd. Elev.	698.85 ft
		Offset	68.64' LT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			SAND, Silty, very loose, moist, dark brown and gray, w/ roots at 0'-2' (SM)			13				% Passing #200 Sieve: 17.8
		4 (6) 4 (6)								
695.4			SAND, Silty Clayey, loose, moist, brown and gray (SC-SM)							
5		6 (6) 10 (6)				13	26	7		% Passing #200 Sieve: 34.5
691.9			CLAY, Lean, soft to stiff, moist, gray and brown (CL)	6.9	26.9	19	48	29	133	% Passing #200 Sieve: 98.4
10		6 (6) 11 (6)					54	30		% Passing #200 Sieve: 94.5
688.4			CLAY, Fat, soft, moist, gray and brown to reddish brown, w/ sand pockets at 10'-14' (CH)	11.3	8.6	16			130	
684.4		50 (3) 50 (2.5)								
15			SAND, Silty, dense to very dense, moist, brown and gray, w/ silt seams at 20'-30' (SM)			17				% Passing #200 Sieve: 24.4
		50 (3) 50 (0.5)								
20										
25		50 (4) 50 (1)				17				% Passing #200 Sieve: 21.0
668.9		50 (4) 50 (3)								
30										

Remarks: Water level was encountered at 15' during the drilling operations; at 13.2' and 12.7' after 5 minutes and 10 minutes, respectively.

The ground water elevation was not determined during the course of this boring.

Driller: GEDCO **Logger:** GO **Organization:** HVJ Associates, Inc.

g:\houston\hou ps\geo\lab info\gint logs\hg1610081.1.2.gpj

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

4/11/2024

AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E

RETAINING WALL BORING LOGS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	119
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				

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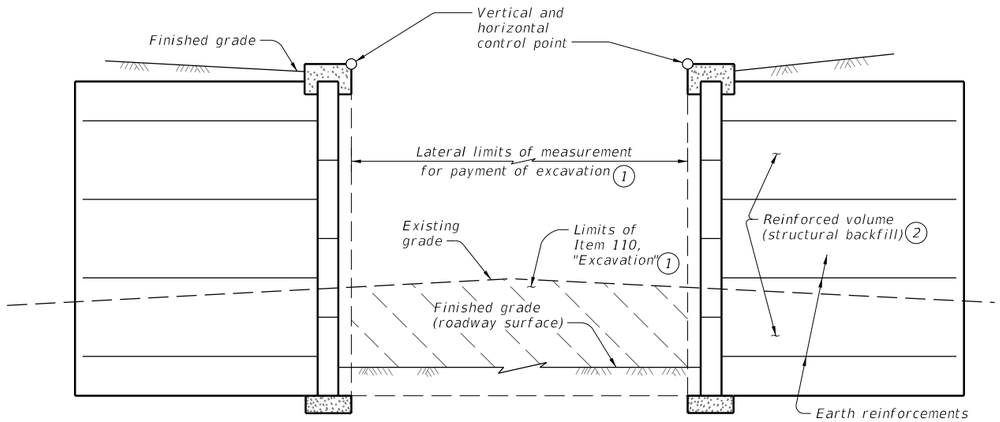
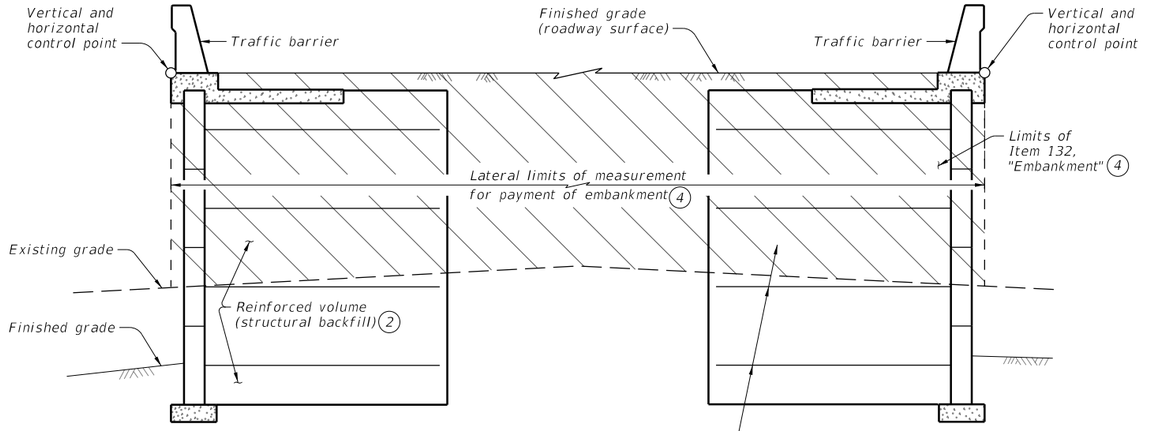


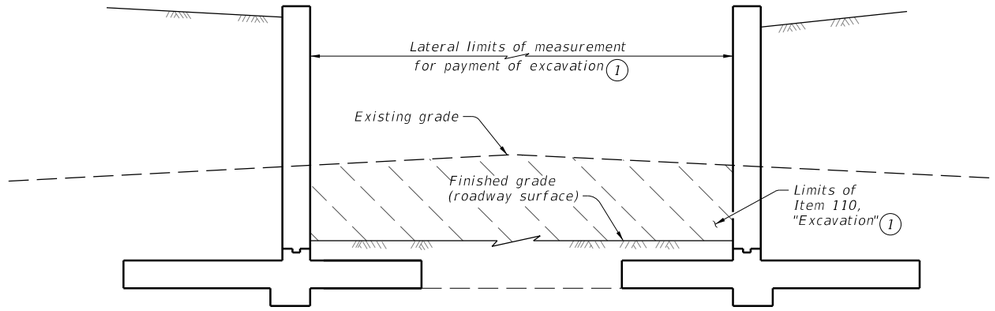
TYPICAL SECTION

(Excavation between MSE retaining walls.) (3)



TYPICAL SECTION

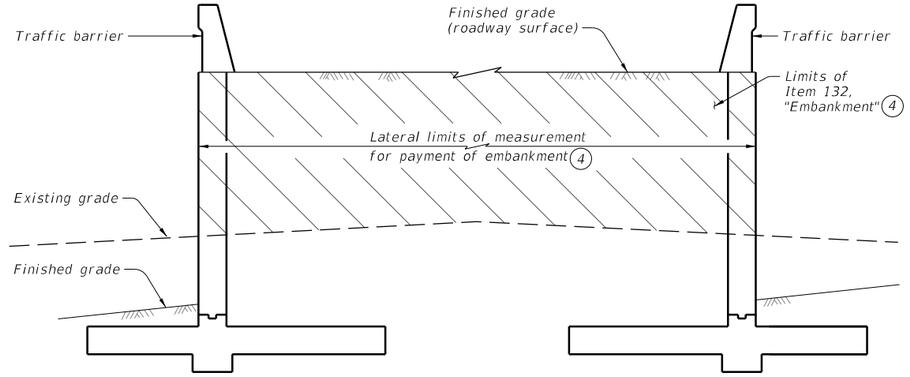
(Embankment between MSE retaining walls.) (3)



TYPICAL SECTION

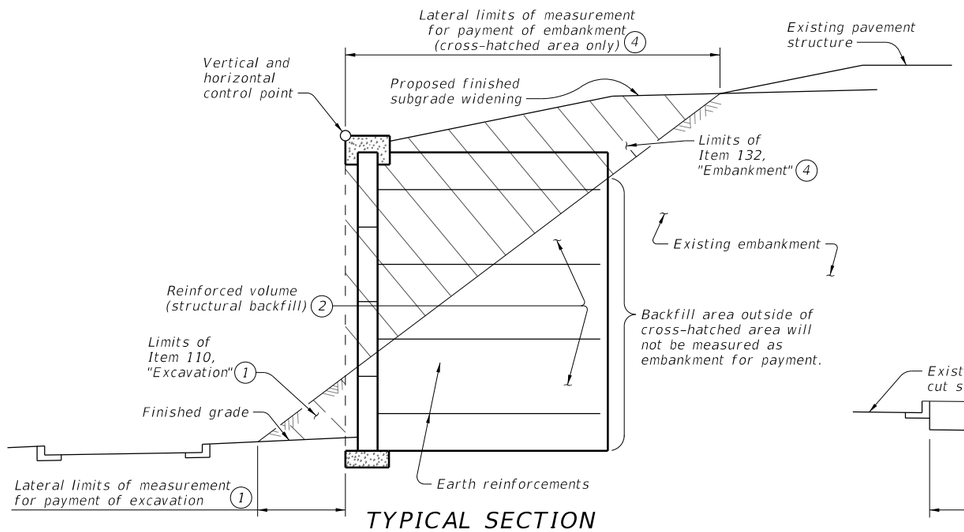
(Excavation between conventional retaining walls.)

1. Only the excavation above the proposed subgrade elevation will be measured for payment.
2. Meeting requirements for Item 423, "Retaining Walls."
3. Earthwork measurement with other retaining wall types will be made to the outside finished face in the same manner.
4. Only the embankment above the existing ground line will be measured for payment.



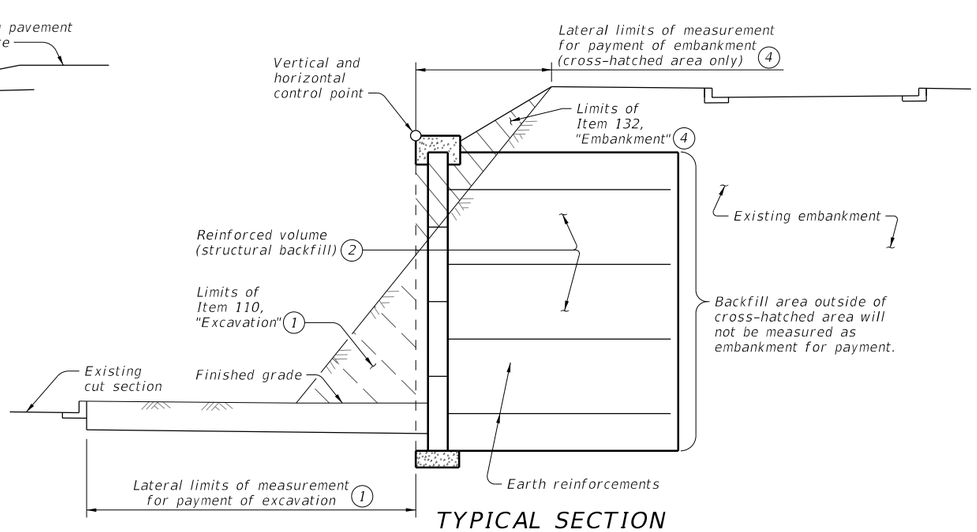
TYPICAL SECTION

(Embankment between conventional retaining walls.)



TYPICAL SECTION

(Widening embankment with MSE retaining walls.) (3)



TYPICAL SECTION

(Widening cut section with MSE retaining walls.) (3)

Texas Department of Transportation

Bridge Division Standard

EARTHWORK MEASUREMENT AT RETAINING WALL

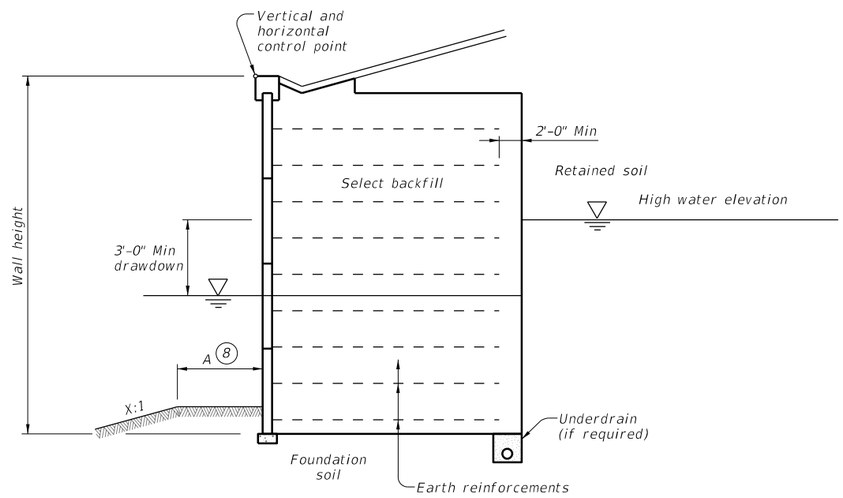
RW(EM)

FILE: RW-EM-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		120

DATE: 10/2/2023, 7:58:40 PM
FILE: c:\pwworking\aecom_ds16_nov\janell.steigerwald@aecom.com\d0555313\RW-MSEDD-22 (1).dgn

WALL SUMMARY

MSE Retaining Wall	Begin Station (1)	End Station (1)	Retained Soil Friction Angle (2)	Foundation Soil Friction Angle (2)	Ground Improvement (3)	Min Earth Reinf. Length (4)	Min Wall Embedment (5)	Underdrain Required (6)	Drawdown Analysis (7)	Bench Width (8)
RW-1	10+00	11+94.85	28°	28°	Not Required	85%	2'	Yes	No	4'



TYPICAL SECTION
(Rapid drawdown condition.)

(1) Indicate limits for which the stated soil design requirements and assumptions are applicable.

(2) Base the listed retained and foundation friction angle on local experience or measured/correlated long term strength values.

(3) Indicate if ground improvement is required or not required. If shown as required, refer to ground improvement detail(s) shown elsewhere in the plans for additional information.

(4) Indicate on table both the minimum length and length ratio required. The minimum default length of earth reinforcements is either 8 feet or 70% of the wall height, whichever is greater. Wall height and design wall height may differ depending on project geometry and loading conditions. Note: Wall height at bridge abutments is equal to the distance between the top of leveling pad and finished grade at the bridge abutment backwall.

(5) Guidance to wall designer of record for determination of minimum wall embedment. Unless noted elsewhere in the plans, provide a minimum embedment from the top of leveling pad to finish grade of
- 1 foot for level ground where there is no potential for erosion or future excavation, or
- 2 feet for sloping ground (4.0H:1.0V or steeper) or where there is potential for removal of soil in front of the wall.

(6) Indicate if underdrain is required or not required.

(7) Indicate if rapid drawdown analysis is required.

(8) Horizontal bench width at base of wall varies. Use the following criteria to establish base width:
A = 2-foot Min for X > 4 or
A = 4-foot Min for X ≤ 4
Applicable to both drawdown and dry condition.

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
10/2/2023

SPECIAL NOTES:
This sheet is to be filled out by the wall designer of record at time of plan preparation to provide soil strength parameters for the design of the specified walls.
The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL DESIGN DATA

RW(MSE)DD

FILE: RW-MSEDD-22.dgn	DN: TxDOT	CK: RLE	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		121

DATE: 10/2/2023 7:58:45 PM
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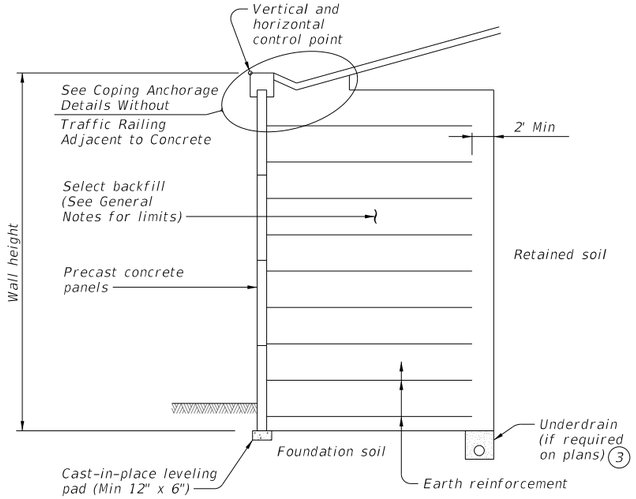
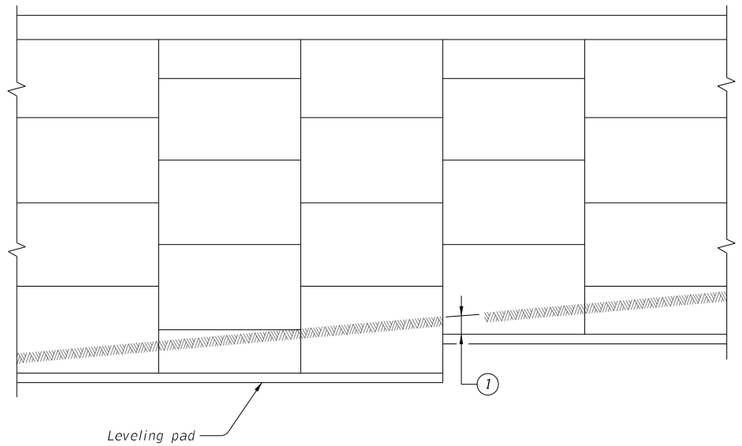


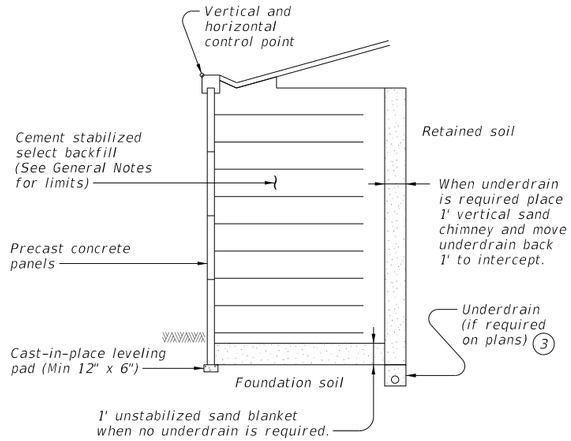
TYPICAL SECTION

(Wall at bottom of slope.)



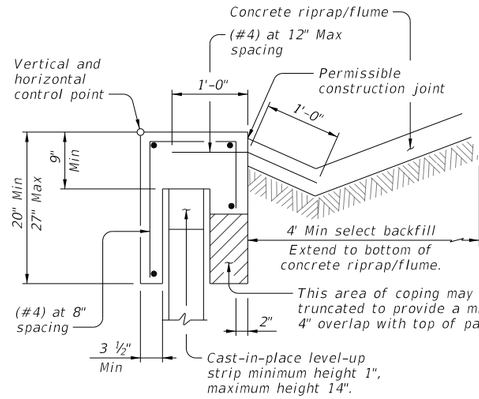
ELEVATION

1. Minimum embedment conforming to values given on the RW(MSE)DD standard.
2. Form map of Texas emblem into a wall panel next to each bridge abutment. Submit the exact location of each emblem to the Engineer for approval. The cost of forming the emblems will not be paid for directly, but is subsidiary to Item 423, "Retaining Walls." Inset the map of Texas a minimum of ¾" into the face of the panel with a smooth finish. Finish the inset area in a contrasting color as approved by the Engineer.
3. Provide underdrain pipe and filter material in accordance with Item 556, "Pipe Underdrains."
4. Anchor precast coping to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Provide details that include coping reinforcement. Concrete flume (if required) is paid for separately from Item 423, "Retaining Walls."



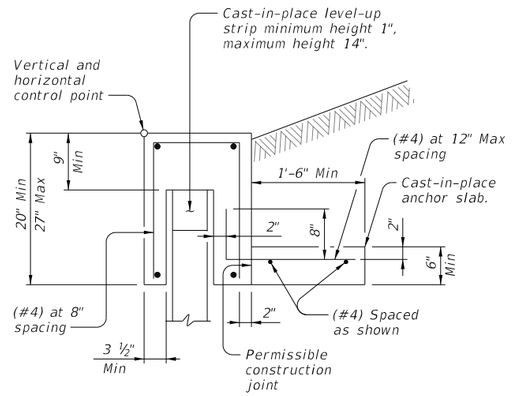
SPECIAL DRAINAGE PROVISIONS

(When cement stabilized backfill is used.)



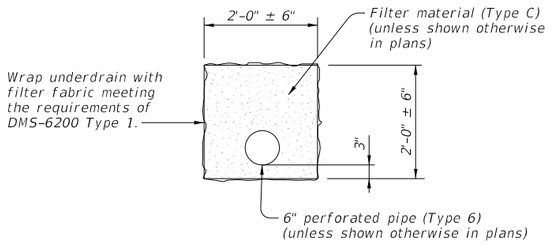
ADJACENT TO CONCRETE

(Excluding concrete pavement)

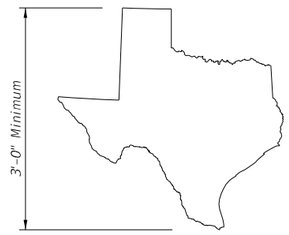


ADJACENT TO SOIL

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING 4



UNDERDRAIN DETAIL 3



MAP OF TEXAS EMBLEM 2

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: RW-MSE-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		122

DATE: 10/2/2023, 7:58:46 PM
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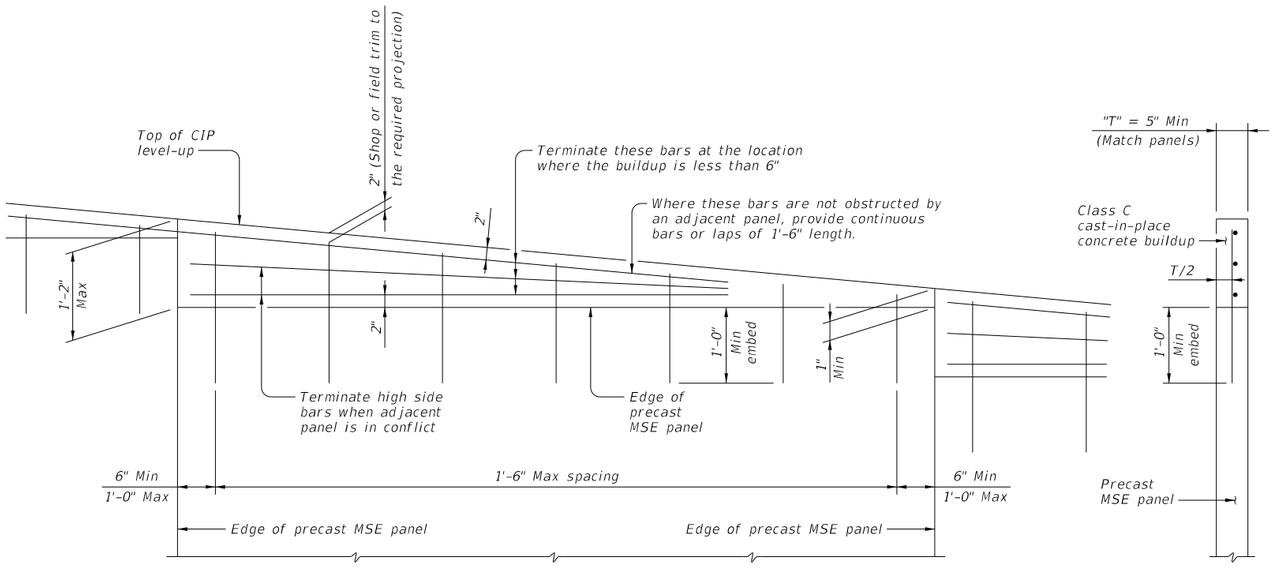

ELEVATION SECTION

LEVEL UP DETAIL (5)

(5) Cast vertical bars into the top of panels. At Contractor's option vertical bars may be embedded 4 inches with a Type III Class C epoxy anchorage system. Follow manufacturer's directions for installing the epoxy vertical bars.

(6) Soil design parameters must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard.

(7)

SELECT BACKFILL UNIT WEIGHT			
Type AS, BS & DS	Unit Weight	Internal Stability	External Stability
	105 PCF	Pullout	Sliding, Overturning, Eccentricity
	125 PCF	Rupture	Bearing

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Provide precast coping in 10-foot minimum lengths (typical.) To optimize coping lengths at radiuses, ends of runs, or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

EARTH REINFORCEMENT:

Place the uppermost earth reinforcement no more than 3 feet below the top of wall.
Place the lowest level of earth reinforcement no more than 2 feet above the top of the leveling pad.
Provide earth reinforcement with a minimum wire size of W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire must be at least 50% of the cross sectional area of the larger wire.
A maximum of four wire mesh configurations (wire sizes) will be allowed on a project. Provide unique transverse bar spacing for each mesh configuration, differing from other configurations by a minimum of 3 inches. Step earth reinforcement lengths in increments no finer than 12 inches.

PANELS:

Fabricate standard precast concrete panels to a maximum height of 6 feet and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel must not exceed 7 ft.-6 in. Provide a minimum panel thickness of 5 inches. Arrange panels to provide offset horizontal joints.
Provide an open joint around the perimeter of the concrete panels. Configure joints such that 1) the filter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between $\frac{3}{8}$" and $\frac{3}{4}$".
Provide a one-piece corner panel for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.

MATERIAL NOTES:

Provide Class C concrete for reinforced concrete and precast coping.
Provide Class H concrete for precast concrete panels.
Provide Class A concrete for unreinforced concrete.
Provide Grade 60 reinforcing steel.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Determine specific geometry based on wall layouts and other plan information.
Extend select backfill specified for use within the mechanically stabilized earth volume horizontally from the back of the panels a minimum 2 feet beyond the end of the earth reinforcement. Extend select backfill vertically to the top of the panels from either the top of the leveling pad, or from 4 inches below the lowest earth reinforcement, whichever is lower.
Provide concrete coping along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall.
Provide details and calculations that establish support for panels that are affected when obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcement in their normal locations. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcement, no adjustment in length is needed for skew angles less than or equal to 10 degrees. Adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall when skew angles are greater than 10 degrees. Provide calculations that justify any alterations made to the soil reinforcement or modifications to their normal placement. Do not use panels without any soil reinforcement connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting soil reinforcement attached to them and as approved by the Engineer.
Coping and anchor slabs are considered subsidiary to the Item 423, "Retaining Walls."
Use these details in conjunction with the retaining wall layout, the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard and other applicable standards.

Cover dimensions are clear dimensions, unless noted otherwise.

DESIGN CRITERIA NOTES:

Design Parameters:
Base design of retaining walls on the following design parameters unless stated elsewhere in the plans:

Retained Soil	Unit Weight = 125 pcf ϕ = (6) C = 0 psf
Foundation Soil	ϕ = (6) C = 0 psf
Select Backfill	Unit Weight = See Table (7) ϕ = 34° C = 0 psf
Cement Stabilized Select Backfill	Unit Weight = 125 pcf ϕ = 45° C = 0 psf

Limit stress in steel and concrete in accordance with current AASHTO Standard Specifications for Highway Bridges and Interim Specifications.
The minimum length of earth reinforcement are as shown on the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard.

Stability Criteria:
Stability criteria applies to both dry and drawdown analysis. Base design on the following factors of safety.

Sliding along the base of the structure	Factor of Safety ≥ 1.5
Overturning	Factor of Safety ≥ 2.0
Pullout of Earth Reinforcement at each level	Factor of Safety ≥ 1.5

Design the wall such that the base pressure resultant falls within the middle third of the retaining wall.
Determine pullout resistance from test data evaluated at $\frac{3}{4}$ inch strain.

Corrosion Criteria:
Design the earth reinforcement elements to have a minimum design life of 75 years, using current AASHTO corrosion rates.
Perform stress calculations (rupture) on the calculated earth reinforcement section remaining after 75 years. Pullout calculations may be based on non-corroded section.

Texas Department of Transportation | Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: RW-MSE-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		123

DATE: 10/2/2023, 7:58:50 PM
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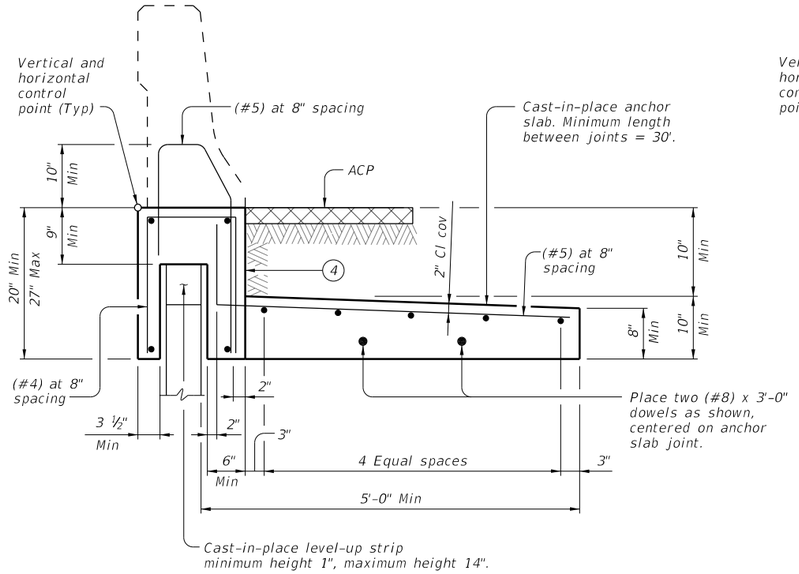
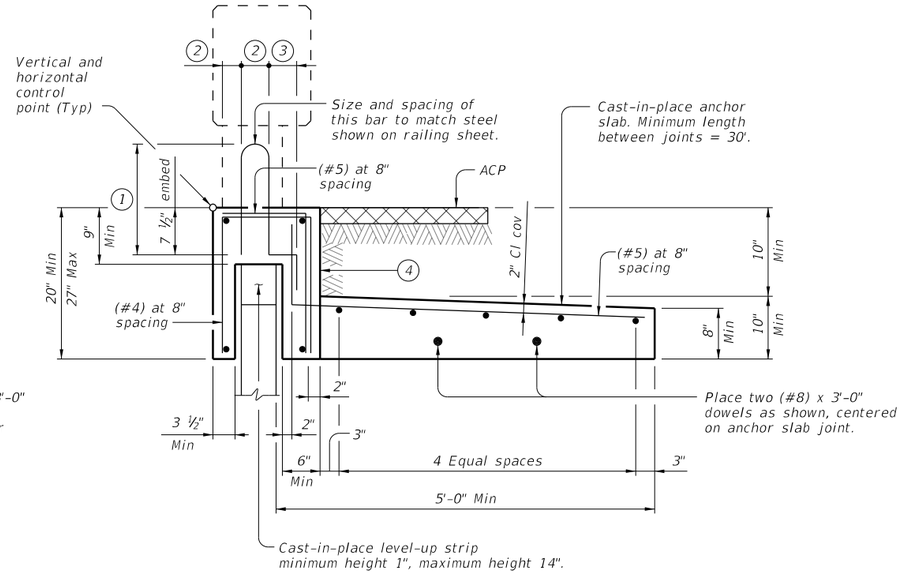


"WIDE BASED" ADJACENT TO ACP

(Showing T551 Rail, other rails listed similar.)



"NARROW BASED" ADJACENT TO ACP

(Showing T223 Rail, other rails listed similar.)

Rail Type	Detail	Precasting Rail with Coping Allowed
T1F/T1W/C1W/T2P/C2P	NARROW	NO
T221/C221/T222	NARROW	YES
T223/C223	NARROW	NO
T402/C402	NARROW	NO
T411/C411	NARROW	NO
T551/T552	WIDE	YES
T66	NARROW	NO
SSTR	WIDE	YES

CAST-IN-PLACE COPINGS:

Provide compressible material to isolate precast panel from cast-in-place coping to prevent cracking. Attach compressible material to both sides of precast panel prior to casting concrete for coping.

When cast-in-place coping is anchored to reinforced concrete pavement, provide a smooth level-up strip on the top of the precast panels. The purpose of the level-up is to allow the pavement and coping to move longitudinally relative to the wall without causing damage.

Align coping and railing joints with precast panel joints. Optional rail joints are allowed as approved by Engineer. Provide railing construction joints or expansion joints at 100-foot maximum spacing.

PRECAST COPINGS:

Provide a smooth level-up strip on top of the precast panels prior to installation of the coping. Shims may be used on top of level-up strips to facilitate alignment. Total shim thickness not to exceed 1 inch.

Provide precast coping in 10-foot minimum lengths.

JOINTED CONCRETE PAVEMENT:

When coping is adjacent to and anchored into jointed concrete pavement, align the coping joints with the pavement joints.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi.)
Provide Grade 60 reinforcing steel.
Provide #4 longitudinal bars, unless otherwise shown.

GENERAL NOTES:

Details on this sheet are to be used in development of specific details for mounting traffic railing on mechanically stabilized earth (MSE) walls.

The specific details proposed must have strengths equivalent to those shown on this sheet and must be submitted for approval. Areas of particular importance are the connection of the coping to the railing, the strength of the vertical coping leg connecting the railing to the anchor slab, and the connection of the coping to the anchor slab or concrete pavement.

Submit shop drawings for the traffic railing foundations to the Engineer in accordance with Item 423, "Retaining Walls." The shop drawings must include bar bending details.

Precasting of railing with the coping will be allowed as noted in the table on this sheet.

The Contractor's attention is directed to the fact that various configurations of precast coping/railing combinations are covered by patent. The Contractor must provide for use of these systems in accordance with Article 7.5.

Coping and anchor slabs are considered subsidiary to Item 423, "Retaining Walls." Payment for traffic railing is per the linear foot for the appropriate railing type.

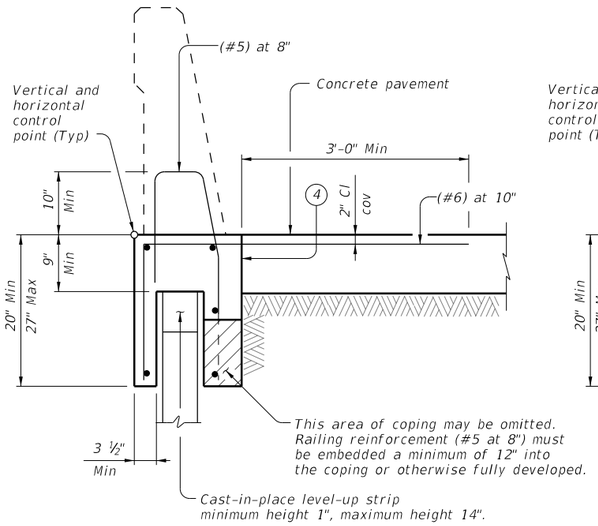
Cover dimensions are clear dimensions, unless noted otherwise.

1 Reinforcement length equal to length shown on the appropriate rail standard plus 1 inch.

2 Match dimension on the appropriate rail standard.

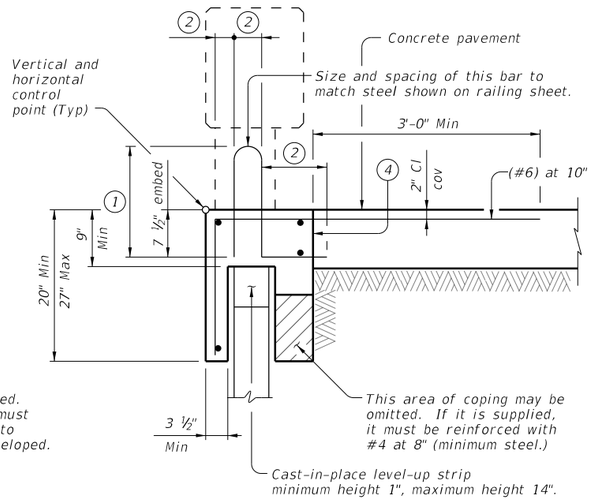
3 Match dimension on the appropriate rail standard. Bend end of rail anchorage reinforcing as shown as required to maintain clear cover.

4 See "Coping Joint Sealer Details."



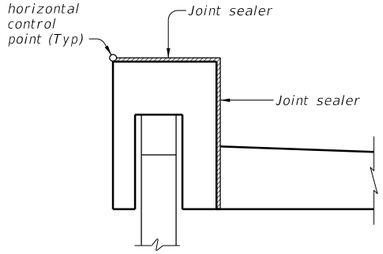
"WIDE BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing SSTR Rail, other rails listed similar.)

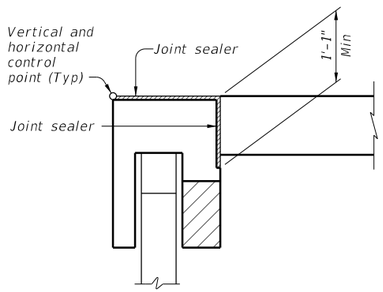


"NARROW BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing T223 Rail, other rails listed similar.)



ADJACENT TO ACP



ADJACENT TO CONCRETE PAVEMENT

COPING JOINT SEALER DETAILS

(Reinforcing steel not shown for clarity.)

Texas Department of Transportation

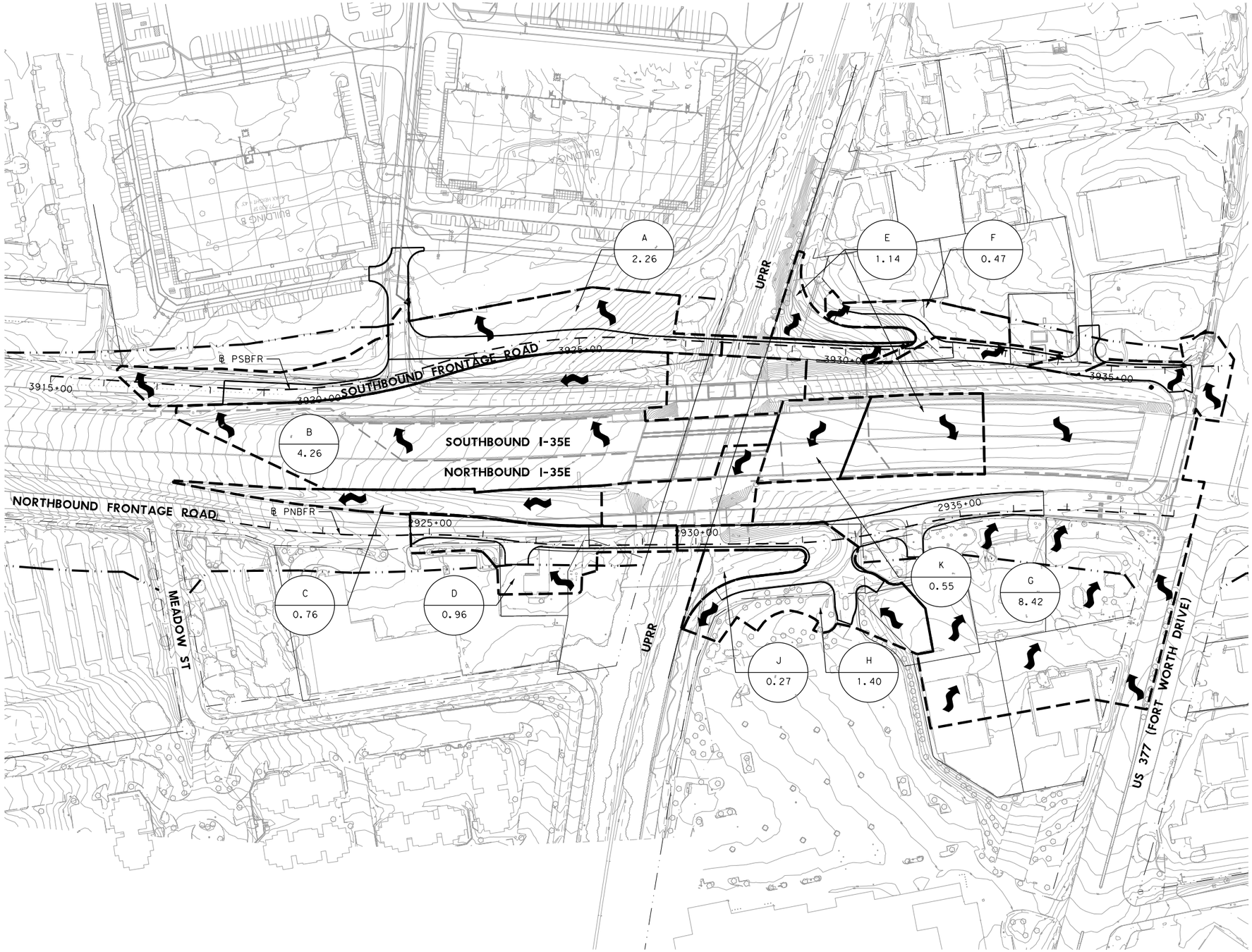
Bridge Division Standard

RETAINING WALL TRAFFIC RAILING FOUNDATIONS

RW(TRF)

FILE: RW-TRF-22.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TAR
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		124

DN: AECOM | CK: AECOM | DN: AECOM | CK: AECOM | steigerwaldj



0′ 100′ 200′
SCALE IN FEET

LEGEND

- DRAINAGE BASIN BOUNDARY AREA
- XXXX / XX.XX — DRAINAGE AREA IDENTIFICATION / DRAINAGE AREA (ACRES)
- EXIST ROW
- PROP ROW
- DRAINAGE FLOW ARROW

STATE OF TEXAS
IRENE ALANIS
116808
LICENSED PROFESSIONAL ENGINEER
10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
OVERALL DRAINAGE AREA MAP

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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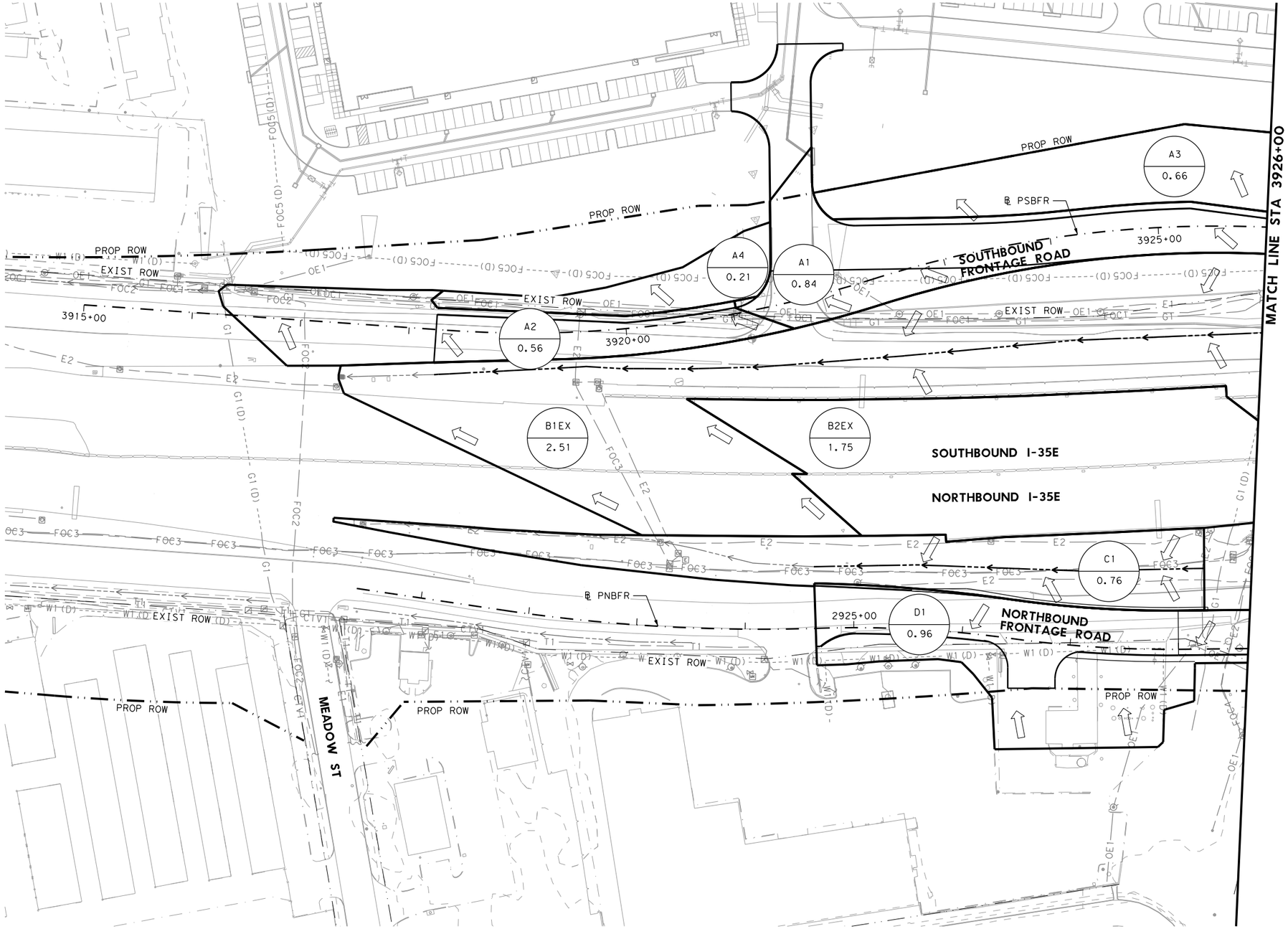

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SCALE IN FEET

LEGEND

- DRAINAGE BASIN BOUNDARY AREA
- XXXX / XX.XX — DRAINAGE AREA IDENTIFICATION / DRAINAGE AREA (ACRES)
- EXISTING DITCH
- PROPOSED DITCH
- DRAINAGE FLOW ARROW

STATE OF TEXAS
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116808
LICENSED PROFESSIONAL ENGINEER

10/2/2023

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IH 35E

DRAINAGE AREA MAP

PSBFR
BEGIN TO STA 3926+00

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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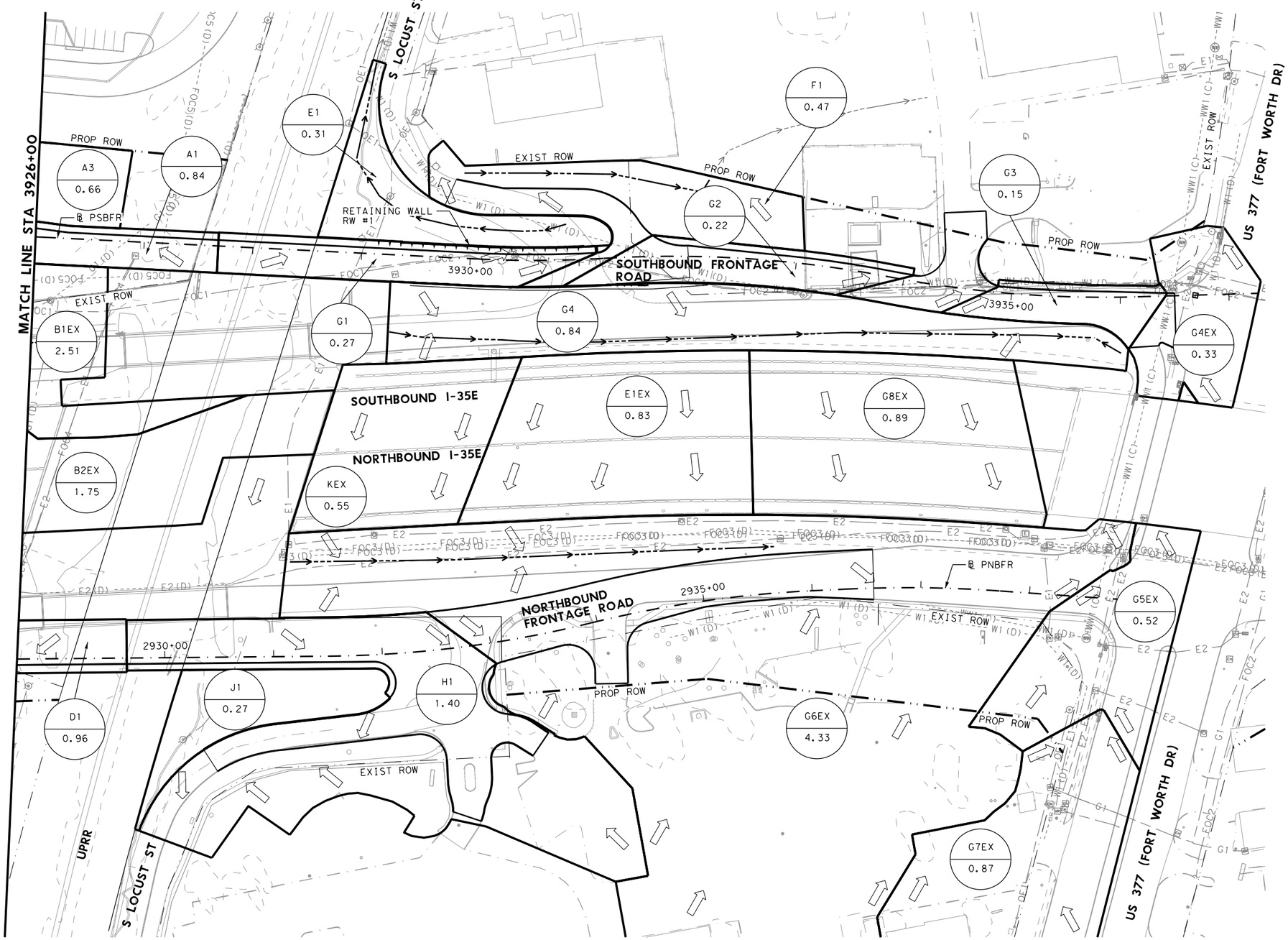

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0′ 50′ 100′

SCALE IN FEET

LEGEND

- DRAINAGE BASIN BOUNDARY AREA
- XXXX / XX.XX — DRAINAGE AREA IDENTIFICATION / DRAINAGE AREA (ACRES)
- EXISTING DITCH
- PROPOSED DITCH
- DRAINAGE FLOW ARROW

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116808
LICENSED PROFESSIONAL ENGINEER
10/2/2023

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DALLAS, TEXAS 75240
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IH 35E
DRAINAGE AREA MAP

PSBFR
STA 3926+00 TO END

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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steigerwoldj

RUNOFF COMPUTATIONS

DRAINAGE AREA	AREA (ACRES)				C_f	T_c (HRS)	USED T_c (MIN)	CALC T_c (MIN)	RAINFALL INTENSITY (IN/HR)				PEAK FLOW (CFS)			
	PVMT	GRASS	COMMERCIAL	TOTAL AREA (AC)					I	I	I	I	Q	Q	Q	Q
	0.93	0.35	0.65						10% AEP	4% AEP	2% AEP	1% AEP	10% AEP	4% AEP	2% AEP	1% AEP
A1	0.84	0.00	0.00	0.84	0.93	0.17	10.00	4.67	6.56	7.79	8.69	9.58	5.12	6.09	6.79	7.48
A2	0.46	0.10	0.00	0.56	0.82	0.17	10.00	3.58	6.56	7.79	8.69	9.58	3.04	3.61	4.03	4.44
A3	0.00	0.65	0.00	0.66	0.35	0.17	10.00	0.71	6.56	7.79	8.69	9.58	1.52	1.81	2.01	2.22
A4	0.00	0.21	0.00	0.21	0.36	0.17	10.00	0.79	6.56	7.79	8.69	9.58	0.50	0.59	0.66	0.73
B1EX	1.04	1.47	0.00	2.51	0.59	0.17	10.00	8.07	6.56	7.79	8.69	9.58	9.72	11.54	12.88	14.19
B2EX	1.75	0.00	0.00	1.75	0.93	0.17	10.00	5.64	6.56	7.79	8.69	9.58	10.68	12.68	14.14	15.59
C1	0.00	0.76	0.00	0.76	0.35	0.17	10.00	5.63	6.56	7.79	8.69	9.58	1.74	2.07	2.31	2.55
D1	0.96	0.00	0.00	0.96	0.93	0.17	10.00	3.70	6.56	7.79	8.69	9.58	5.86	6.95	7.76	8.55
E1	0.06	0.25	0.00	0.31	0.46	0.17	10.00	3.38	6.56	7.79	8.69	9.58	0.94	1.12	1.25	1.37
E1EX	0.83	0.00	0.00	0.83	0.93	0.17	10.00	2.93	6.56	7.79	8.69	9.58	5.06	6.01	6.71	7.39
F1	0.27	0.20	0.00	0.47	0.68	0.17	10.00	2.01	6.56	7.79	8.69	9.58	2.11	2.50	2.79	3.08
G1	0.27	0.00	0.00	0.27	0.93	0.17	10.00	2.57	6.56	7.79	8.69	9.58	1.65	1.96	2.18	2.41
G2	0.22	0.00	0.00	0.22	0.93	0.17	10.00	2.64	6.56	7.79	8.69	9.58	1.34	1.59	1.78	1.96
G3	0.15	0.00	0.00	0.15	0.93	0.17	10.00	2.50	6.56	7.79	8.69	9.58	0.92	1.09	1.21	1.34
G4	0.00	0.84	0.00	0.84	0.35	0.17	10.00	1.74	6.56	7.79	8.69	9.58	1.93	2.29	2.55	2.82
G4EX	0.28	0.04	0.01	0.33	0.85	0.17	10.00	3.70	6.56	7.79	8.69	9.58	1.84	2.19	2.44	2.69
G5EX	0.28	0.24	0.00	0.52	0.66	0.17	10.00	1.74	6.56	7.79	8.69	9.58	2.26	2.68	2.99	3.30
G6EX	0.78	1.77	1.78	4.33	0.58	0.17	10.00	2.30	6.56	7.79	8.69	9.58	16.41	19.49	21.74	23.97
G7EX	0.26	0.28	0.33	0.87	0.64	0.17	10.00	4.59	6.56	7.79	8.69	9.58	3.64	4.32	4.82	5.31
G8EX	0.89	0.00	0.00	0.89	0.93	0.17	10.00	2.63	6.56	7.79	8.69	9.58	5.43	6.45	7.19	7.93
H1	0.74	0.42	0.24	1.40	0.71	0.17	10.00	2.93	6.56	7.79	8.69	9.58	6.50	7.72	8.61	9.50
J1	0.01	0.26	0.00	0.27	0.37	0.17	10.00	2.19	6.56	7.79	8.69	9.58	0.66	0.78	0.87	0.96
KEX	0.55	0.00	0.00	0.55	0.93	0.17	10.00	2.74	6.56	7.79	8.69	9.58	3.36	3.98	4.44	4.90

INLET COMPUTATIONS

INLET NO.	INLET TYPE	STATION/OFFSET				GRATE PERIMETER (FT)	GRATE AREA (SQ FT)	LONGITUDINAL SLOPE (%)	CROSS SLOPE (%)	DISCHARGE (CFS)	BYPASS FLOW (CFS)	BYPASS TO	INLET CAPACITY (CFS)	CURB INLET LENGTH (FT)	ALLOWABLE PONDED WIDTH (FT)	ACTUAL PONDED WIDTH (FT)	PONDED DEPTH (FT)	ALLOWABLE HEAD (FT)	ACTUAL HEAD (FT)	NO. GRATES (EA)	REMARKS
CI-A1	CURB AND GRATE	SBDRWY1	11+34.75	20.25	RT	7.73	3.13	6.5	2.00	5.12	0.48	EXIST INLET	4.64	16.00	14	9.16	0.18	0.50		2	ON-GRADE
CI-G1	CURB AND GRATE	PSBFR	3931+08.00	6.25	LT	7.73	3.13	5.00	2.00	1.62		CI-G2	1.62	16.00	14	6.25	0.12	0.50		2	ON-GRADE
CI-G2	CURB AND GRATE	PSBFR	3934+00.00	6.25	LT	7.73	3.13	4.15	2.00	1.37		CI-G3	1.37	16.00	14	6.07	0.12	0.50		2	ON-GRADE
CI-G3	CURB AND GRATE	PSBFR	3936+35.00	4.00	LT	7.73	3.13	1.18	2.00	0.92		CI-G4EX	0.92	16.00	14	6.62	0.13	0.50		2	ON-GRADE
DI-G4	GRATE	PSBFR	3935+75.00	37.20	RT	12.67	4.54	N/A	8.00	1.95			1.95	N/A	12	2.58		1.00	0.21	1	SAG
CI-G4EX	CURB AND GRATE	PSBFR	3936+94.57	53.54	LT	7.73	3.13	1.19	2.00	2.50		EXIST INLE	2.50	16.00	16	9.64	0.19	0.50		2	EXISTING
CI-G5EX	CURB	PSBFR	3936+54.55	82.23	RT	N/A	N/A	1.50	2.00	3.31	0.69	CI-G4EX	2.62	11.5	16	10.23	0.20	0.50			EXISTING
CI-G6EX	CURB AND GRATE	PSBFR	3936+10.70	91.49	RT	7.73	3.13	1.50	2.00	16.38		CI-G4EX	16.38	11.5	14	18.63	0.37	0.50		1	EXISTING
CI-G7EX	CURB	PSBFR	3935+83.16	382.32	RT	N/A	N/A	2.75	2.00	3.62	1.10	CI-G5EX	2.52	11.5	16	9.45	0.19	0.50			EXISTING
DI-B1EX	GRATE	PSBFR	3917+41.49	49.50	RT	10.83	8.80	N/A	33.33	9.54			9.54	N/A	8.5	4.07		1.00	0.53	1	SAG, EXIST

LINK COMPUTATIONS

	FROM	TO	FREQ. (YRS)	CALCULATED CUMULATIVE TIME OF CONC. (MIN)	USED CUMULATIVE TIME OF CONC. (MIN)	INTENSITY (IN/HR)	CUMULATIVE DISCHARGE (CFS)	CAPACITY (CFS)	LENGTH (FT)	SIZE	UPSTREAM FLOWLINE (FT)	DOWNSTREAM FLOWLINE (FT)	PIPE SLOPE (%)	ACTUAL DOWNSTREAM DEPTH (FT)	HGL UPSTREAM (FT)	HGL DOWNSTREAM (FT)	HGL SLOPE (%)	ACTUAL VELOCITY (FT/S)	NOTES
LINE A1	CI-A1	EX-A	10	3.32	10.00	6.63	4.29	9.96	25.13	15" RCP	685.20	684.76	1.75	0.61	686.53	685.39	4.54	6.87	EXIST SYSTEM
LINE G	CI-G1	CI-G2	10	2.64	10.00	6.56	1.62	61.30	287.20	24" RCP	708.92	693.40	5.41	0.23	709.68	693.63	5.59	7.98	
	CI-G2	CI-G3	10	3.25	10.61	6.42	2.92	39.83	228.71	24" RCP	693.40	688.17	2.28	0.38	694.14	688.55	2.44	7.02	
	CI-G3	SYSTEM OUTFALL	10	3.94	11.16	6.29	5.61	28.56	29.82	24" RCP	688.17	687.82	1.17	0.65	689.68	688.47	4.06	6.33	
LAT G4	DI-G4	CI-G3	10	3.70	10.00	6.56	1.95	31.16	72.75	24" RCP	689.19	688.17	1.40	0.35	689.85	688.53	1.81	5.23	

LEGEND

CI - CURB INLET
DI - DROP INLET

NOTES:

1. COMPUTATIONS FOLLOW TXDOT 2019 HYDRAULIC DESIGN MANUAL.

   RATIONAL METHOD
   Q=CIA

2. INTENSITY VALUES WERE OBTAINED FROM NOAA'S PRECIPITATION FREQUENCY DATA SERVER (PFDS) WEBSITE.

3. DRAINAGE STRUCTURE IDENTIFIED WITH "EX" IS EXISTING DRAINAGE STRUCTURE.

4. CLOGGING FACTOR OF 0.5 WAS UTILIZED AT GRATE INLET LOCATIONS.

5. MANNING'S VALUE OF 0.012 WAS UTILIZED FOR ALL INLET GUTTERS.

6. REFER TO STANDARDS FOR GUTTER DEPRESSION.

STATE OF TEXAS
IRENE ALANIS
116808
LICENSED PROFESSIONAL ENGINEER

10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
HYDRAULIC COMPUTATIONS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	128
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				
AEC				

DATE: 10/2/2023 8:00:54 PM
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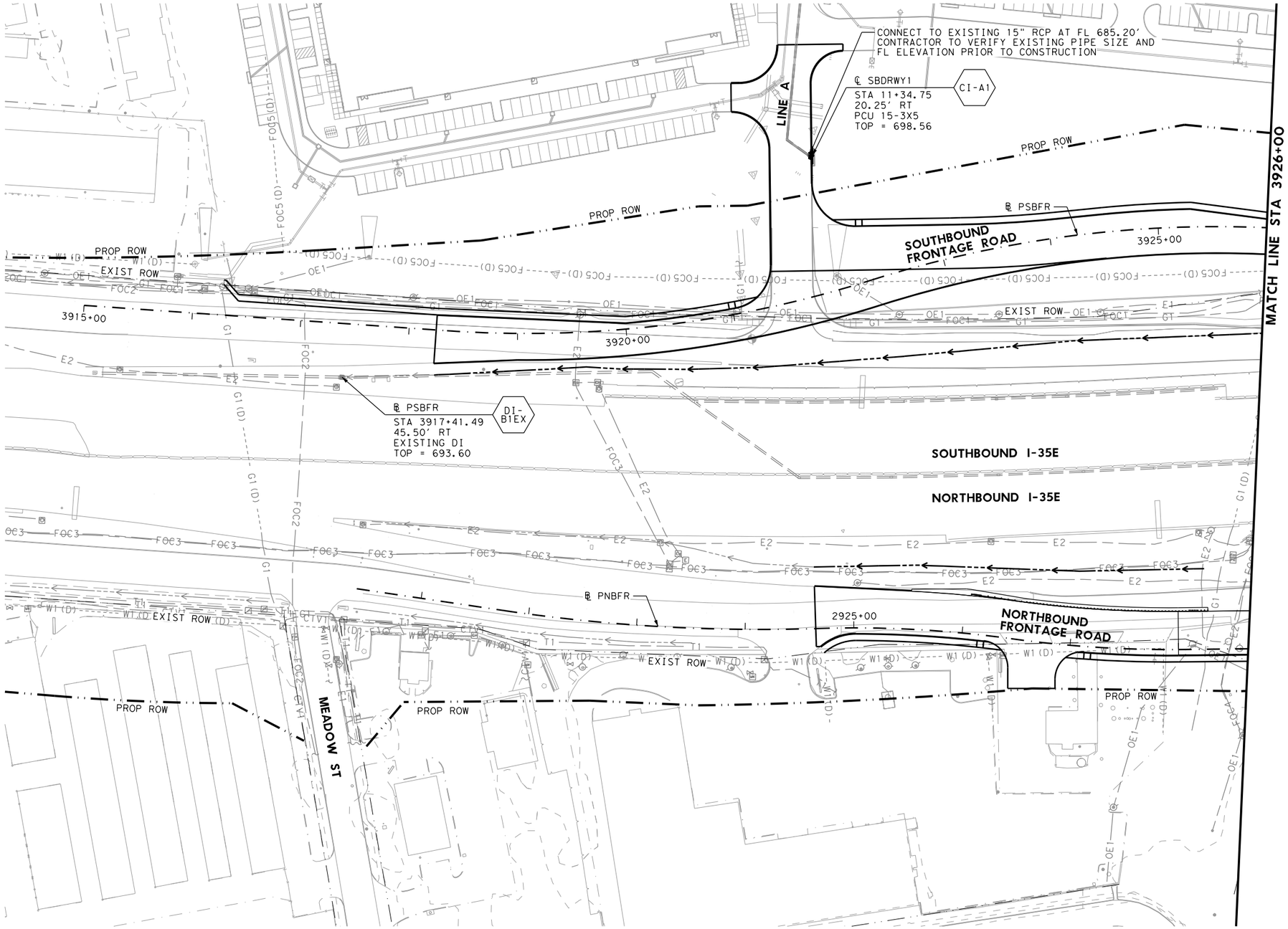

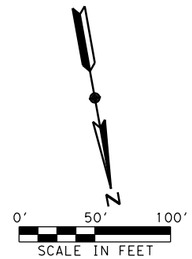

LEGEND

- PCU - PRECAST CURB INLET UNDER ROADWAY
- PAZD- PRECAST AREA ZONE DRAIN
- PSL- PRECAST SLAB LID
- FG- FRAME GRATE
- CI - CURB INLET
- DI - DROP INLET
- XXX — INLET IDENTIFICATION
- EXISTING DITCH
- PROPOSED DITCH
- RETAINING WALL
- CUT AND RESTORE LIMITS

NOTES:

1. DITCH FLOW LINES ARE DICTATED BY ROADWAY CROSS SECTIONS.
2. CONTRACTOR TO DETERMINE/VERIFY LOCATION AND ELEVATION OF UTILITIES.
3. PCU STATION, OFFSET AND TOP ELEVATION PROVIDED ARE ON FINISHED GRADE AT INSIDE BACKWALL OF INLET.

STATE OF TEXAS
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116808
LICENSED
PROFESSIONAL ENGINEER
10/2/2023

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214.741.7777 TBPE REG #3580

IH 35E

DRAINAGE PLAN

PSBFR
BEGIN TO STA 3926+00

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	129
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088, ETC	
CHECK				

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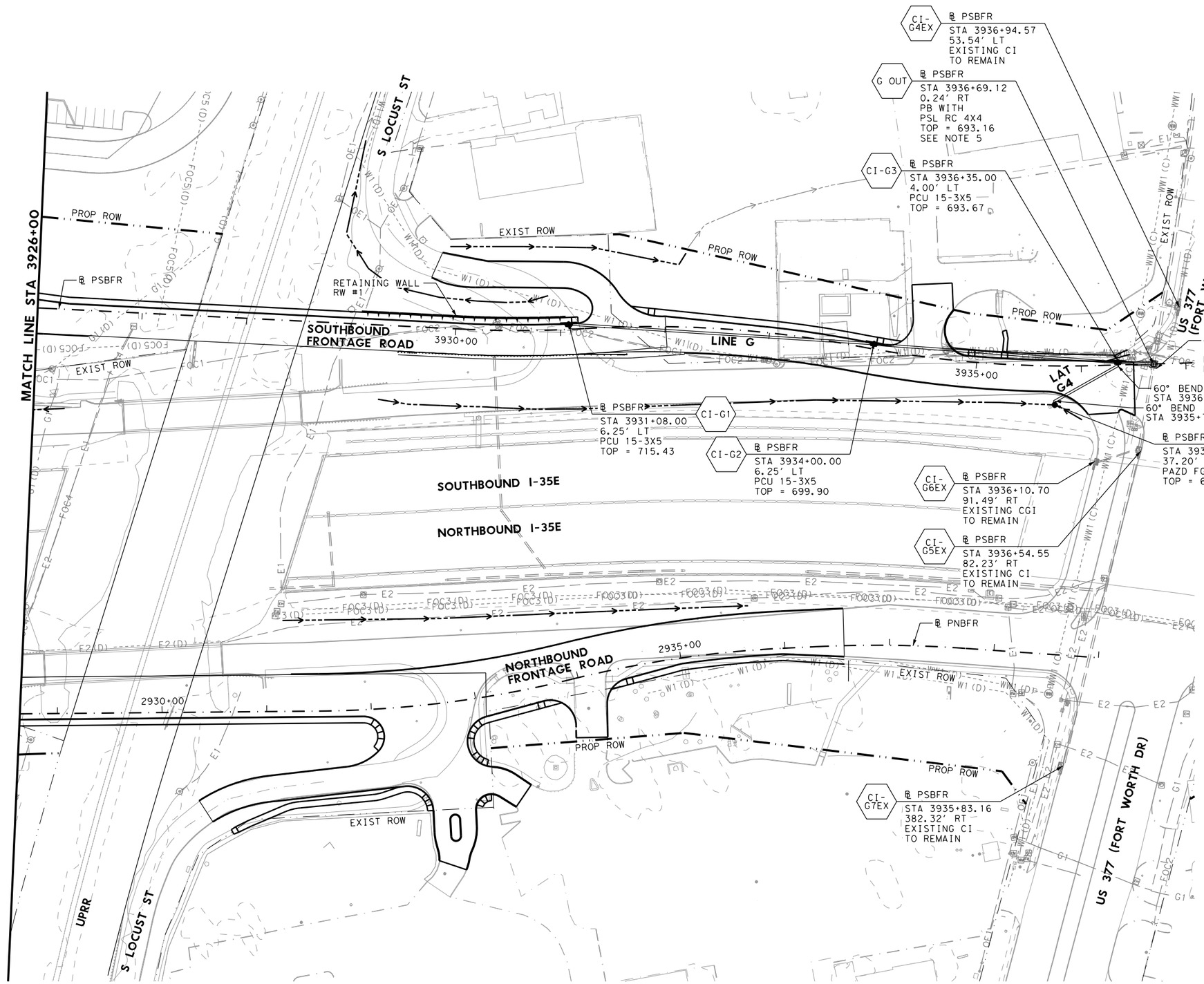

LEGEND

PCU - PRECAST CURB INLET UNDER ROADWAY
PAZD- PRECAST AREA ZONE DRAIN
PSL- PRECAST SLAB LID
FG- FRAME GRATE
CI - CURB INLET
DI - DROP INLET
XXX INLET IDENTIFICATION
EXISTING DITCH
PROPOSED DITCH
RETAINING WALL
CUT AND RESTORE LIMITS

NOTES:

1. DITCH FLOW LINES ARE DICTATED BY ROADWAY CROSS SECTIONS.
2. CONTRACTOR TO DETERMINE/VERIFY LOCATION AND ELEVATION OF UTILITIES.
3. PCU STATION, OFFSET AND TOP ELEVATION PROVIDED ARE ON FINISHED GRADE AT INSIDE BACKWALL OF INLET.
4. PAZD FG STATION, OFFSET AND TOP ELEVATION ARE PROVIDED AT TOP CENTER OF GRATE.
5. CONTRACTOR TO VERIFY EXISTING PIPE SIZE, LOCATION, AND FLOW LINE ELEVATION PRIOR TO PB-PSL CONSTRUCTION.

STATE OF TEXAS
IRENE ALANIS
116808
LICENSED PROFESSIONAL ENGINEER
6/17/2024

AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
DRAINAGE PLAN

PSBFR
STA 3926+00 TO END

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	130
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				

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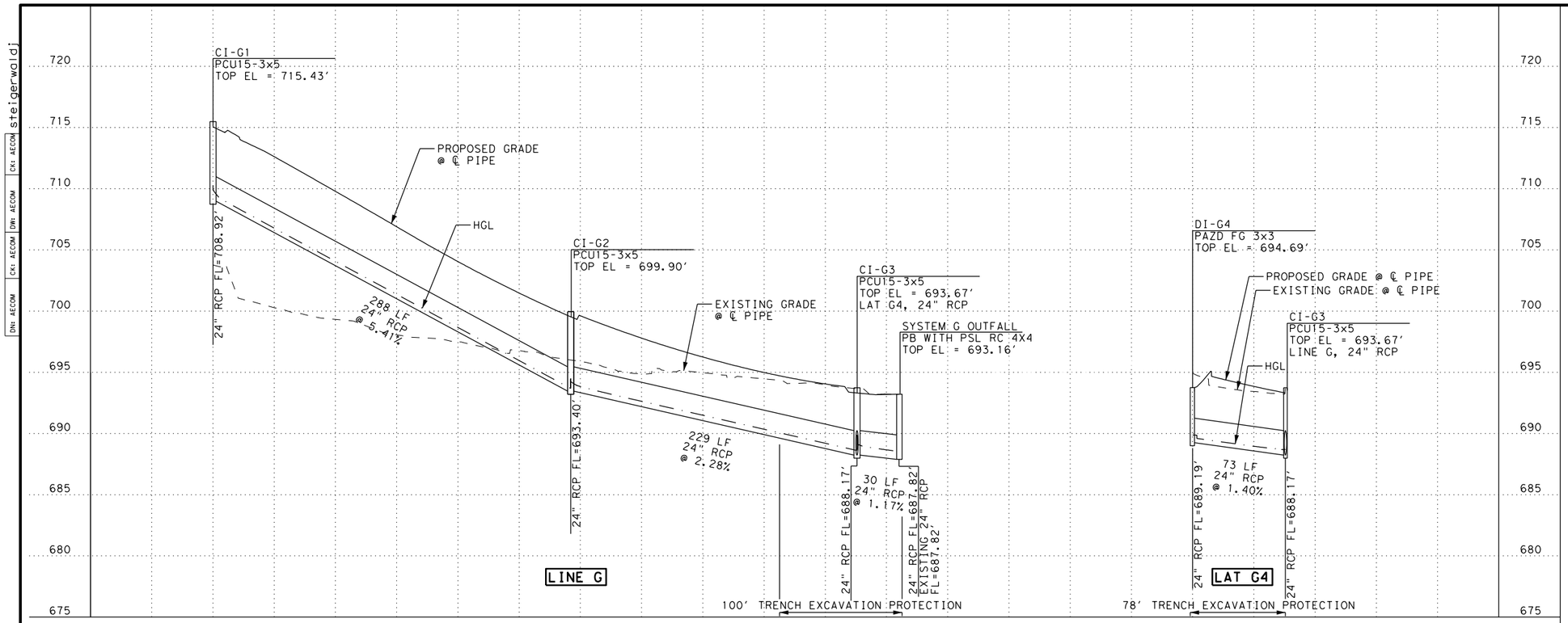

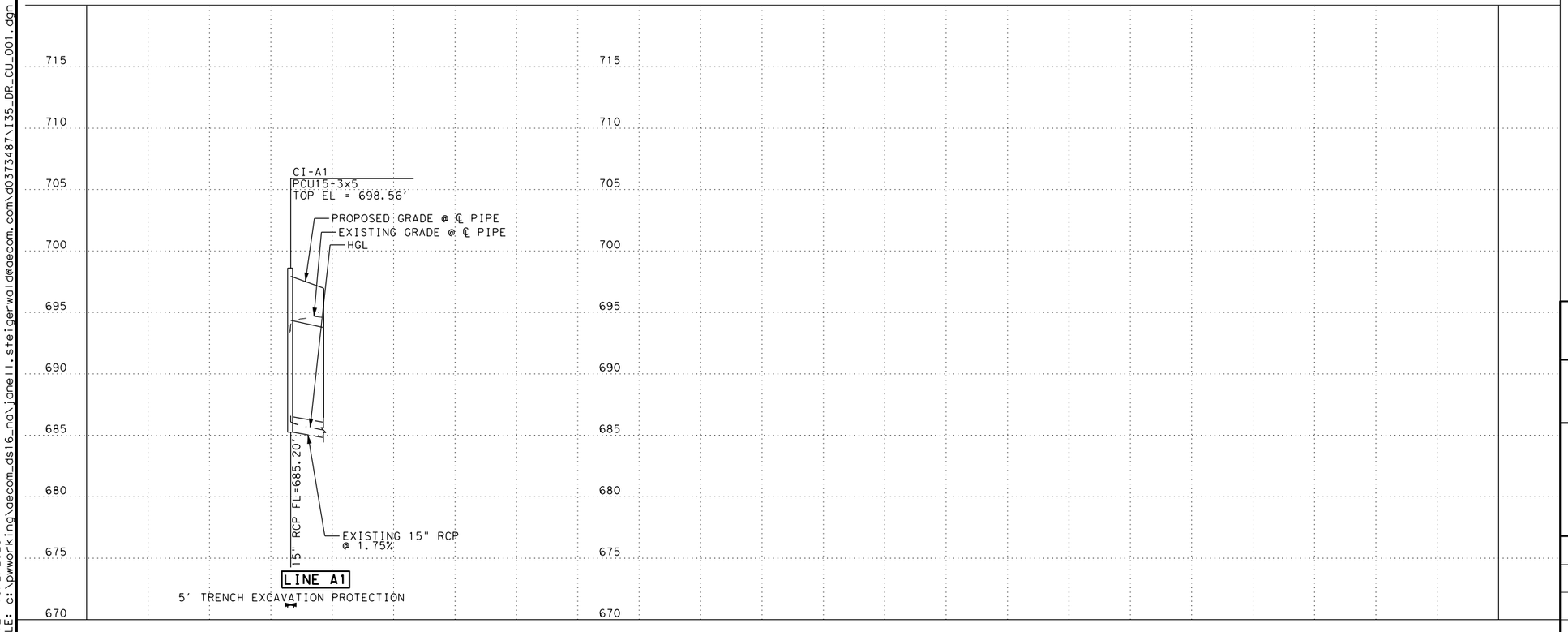

HORZ 0' 50' 100'
VERT 0' 5' 10'
SCALE IN FEET

LEGEND

PCU - PRECAST CURB INLET UNDER ROADWAY
PAZD- PRECAST AREA ZONE DRAIN
PSL- PRECAST SLAB LID
FG- FRAME GRATE
CI - CURB INLET
DI - DROP INLET

NOTES:

1. PIPE LENGTHS SHOWN ARE PAY LENGTHS. PIPE SLOPES ARE BASED ON CENTER-TO-CENTER LENGTHS WHICH ARE SHOWN ON THE COMPUTATION SHEET.
2. PIPES ARE CLASS III, UNLESS NOTED.
3. CONTRACTOR TO DETERMINE/VERIFY LOCATION AND ELEVATION OF UTILITIES.
4. PCU STATION, OFFSET AND TOP ELEVATION PROVIDED ARE ON FINISHED GRADE AT INSIDE BACKWALL OF INLET.
5. PAZD FG STATION, OFFSET AND TOP ELEVATION ARE PROVIDED AT TOP CENTER OF GRATE.

STATE OF TEXAS
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116808
LICENSED
PROFESSIONAL ENGINEER
10/2/2023

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IH 35E
DRAINAGE PROFILES

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	131
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

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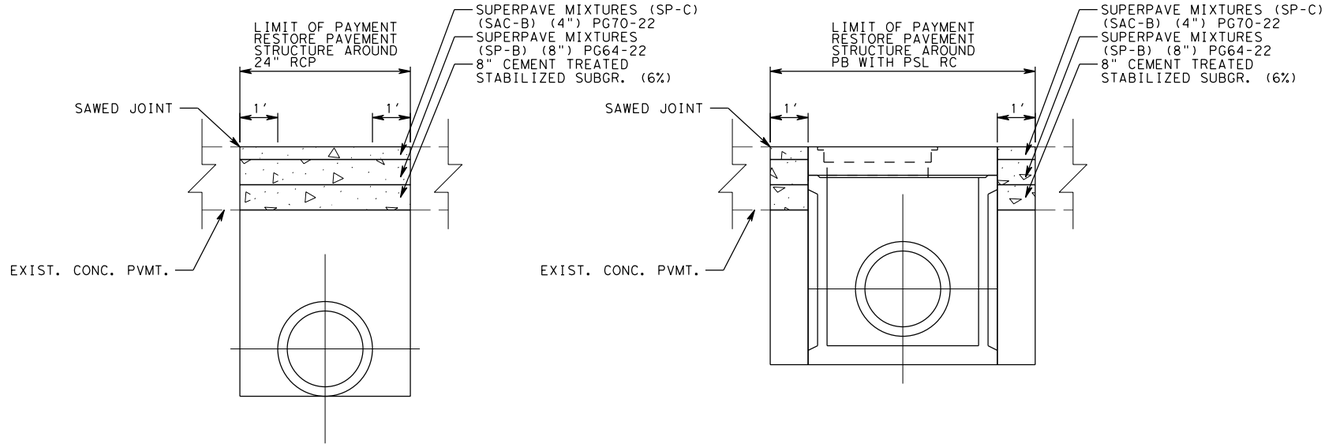

CUT AND RESTORE PAVEMENT DETAILS

N.T.S.

STATE OF TEXAS
IRENE ALANIS
116808
LICENSED
PROFESSIONAL ENGINEER

10/2/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E

DRAINAGE MISCELLANEOUS DETAILS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	132
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

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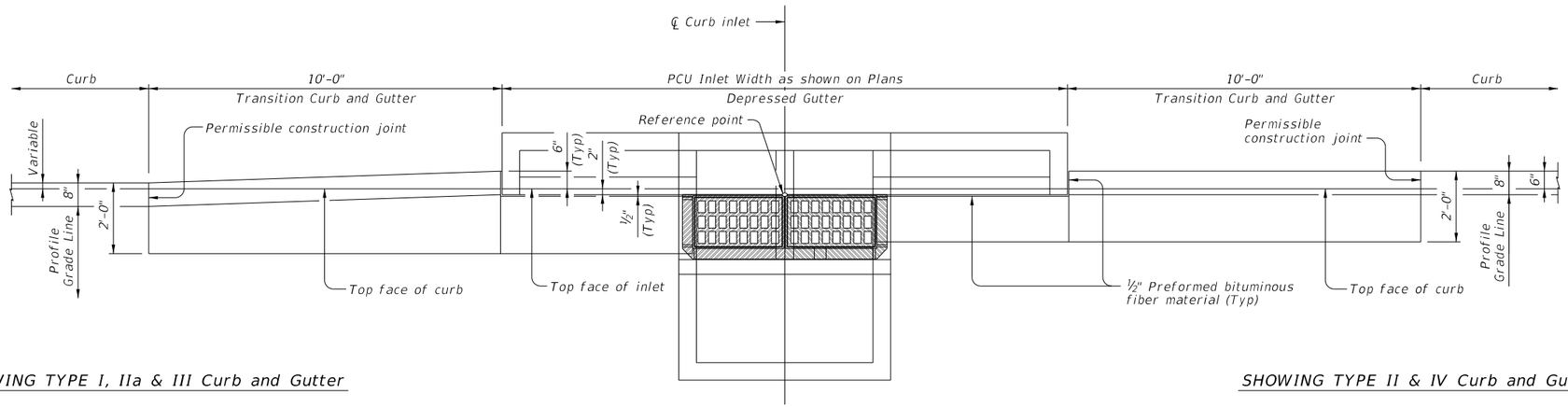
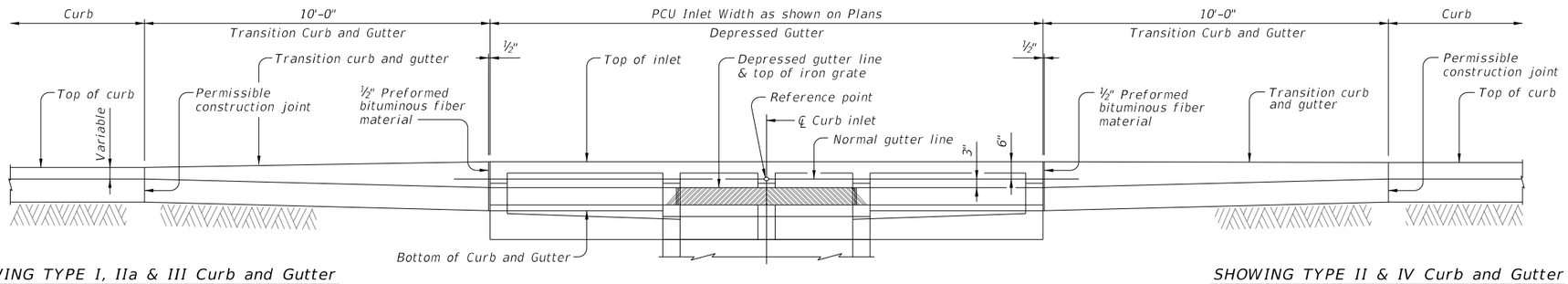


SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

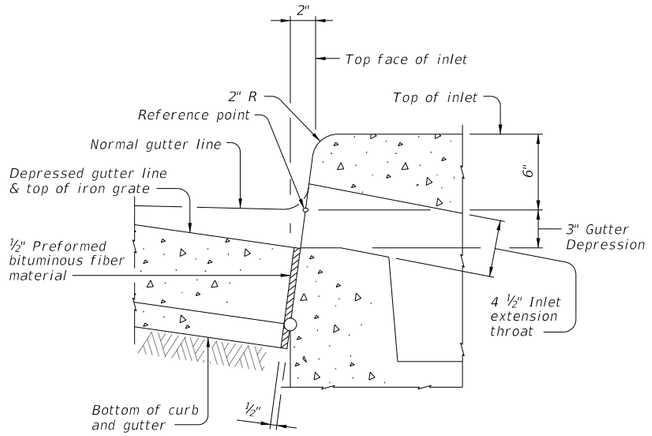
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

(Reinforcing steel not shown for clarity.)

CONSTRUCTION NOTES:

Align top face of curb with PCU Inlet as shown.

MATERIAL NOTES:

Provide ½" Preformed Bituminous Fiber Material.

GENERAL NOTES:

Reference point is located where the ℄ of the main throat intersects the normal gutter line.

See Precast Curb Inlet Under Roadway standard PCU for details and notes not shown.

See Concrete Curb and Curb and Gutter standard CCCG-22 for details and notes not shown.

Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."

Preformed Bituminous Fiber Material is subsidiary to PCU Inlet.

Texas Department of Transportation

Bridge Division Standard

CURB AND GUTTER TRANSITION DETAILS FOR PCU INLET

CGT-PCU

FILE:	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		133

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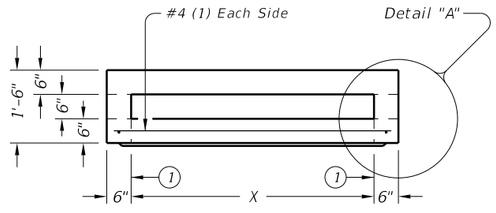
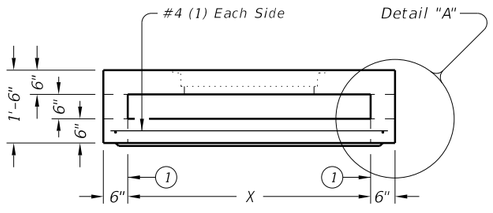
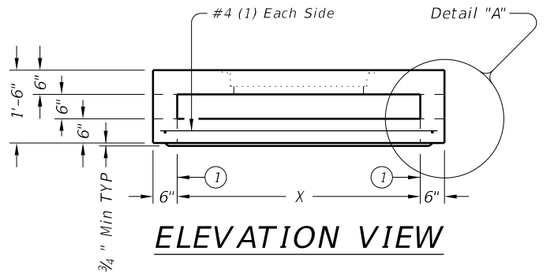


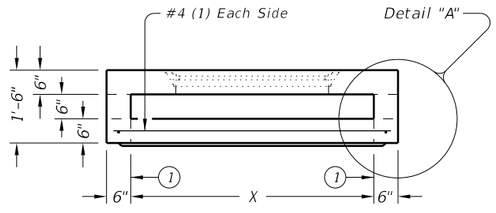
ELEVATION VIEW



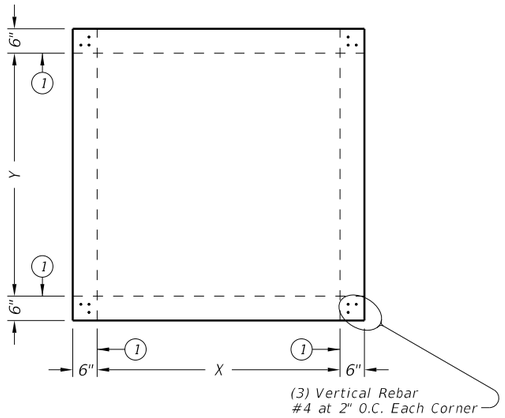
ELEVATION VIEW



ELEVATION VIEW

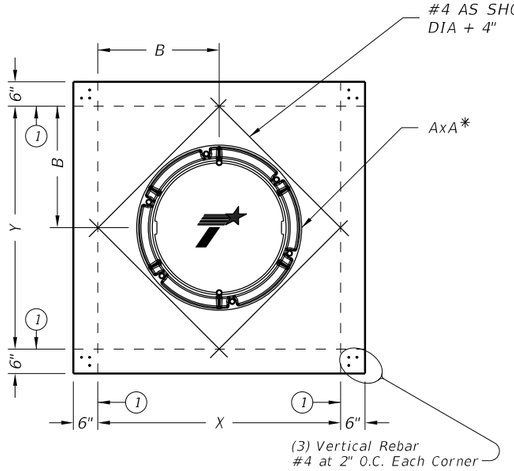


ELEVATION VIEW



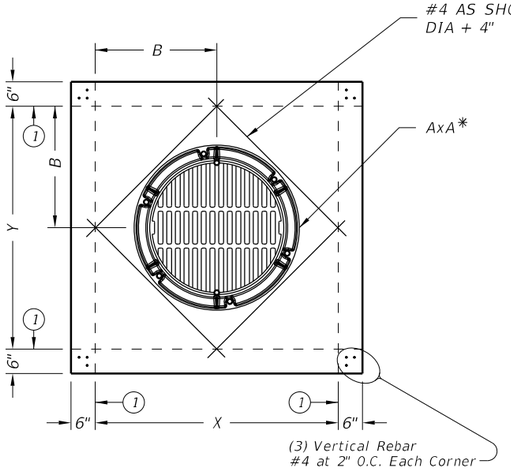
PLAN VIEW
NO OPENINGS

STYLE 'SL'



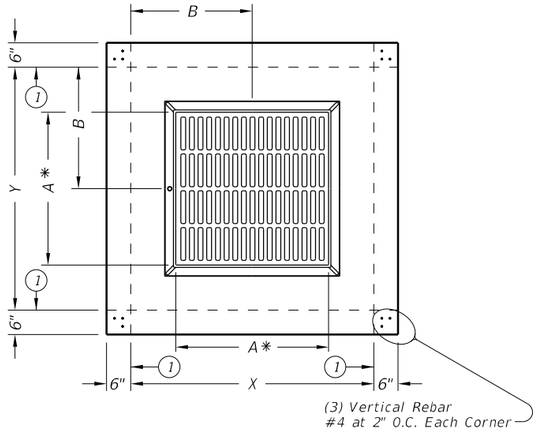
PLAN VIEW
32" DIA CAST-IN RING & COVER

STYLE 'RC'



PLAN VIEW
32" DIA CAST-IN RING & GRATE

STYLE 'RG'



PLAN VIEW
CAST-IN FRAME & GRATE

STYLE 'FG'

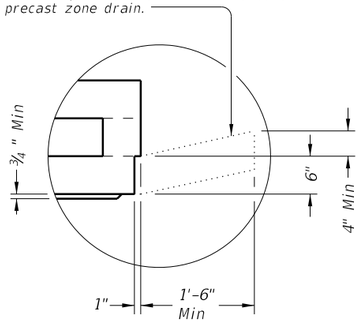
(1) Matches inside face of wall of precast base or riser below inlet.

FABRICATION NOTES:
1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of ¾" to reinforcing from bottom of slab for structural reinforcement. Place short span reinforcing closest to surface.
4. No substitution is allowed for diagonal #4 bars around openings.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:
1. PAZD is for use in ditches and medians outside of the horizontal clearance (clear zone). Precast Area Zone Drain is not intended for direct traffic and may not be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:
1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Construct cast-in-place reinforced concrete apron when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PAZD. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PAZD, use detail above to create an apron ledge on all 4 sides.

Style	Size (X x Y)	A x A*	B x B	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	n/a	n/a	0.37 in²/ft	0.37 in²/ft
RC,RG	3'x3'	32" Dia	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
FG	3'x3'	3'x3'	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
SL	4'x4'	n/a	n/a	0.34 in²/ft	0.34 in²/ft
RC,RG	4'x4'	32" Dia	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	3'x3'	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	4'x4'	2'x2'	0.34 in²/ft	0.34 in²/ft
SL	5'x5'	n/a	n/a	0.43 in²/ft	0.43 in²/ft
RC,RG	5'x5'	32" Dia	2.5'x2.5'	0.68 in²/ft	0.68 in²/ft
FG	5'x5'	3'x3'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft
FG	5'x5'	4'x4'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft

* Nominal frame/grate or ring/cover size.

Texas Department of Transportation

Bridge Division Standard

PRECAST AREA ZONE DRAIN

PAZD

FILE: prestd08-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		134

DATE:
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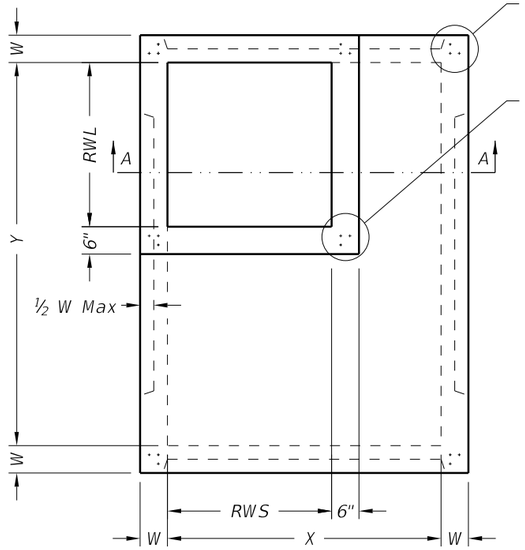
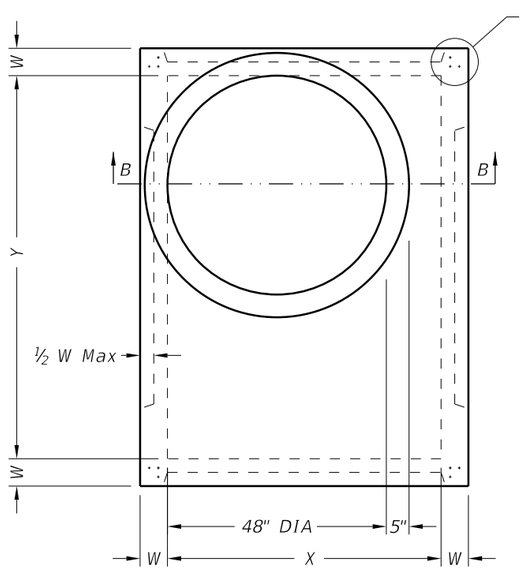


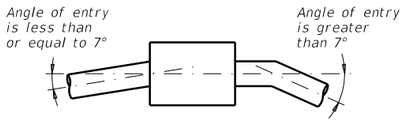
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



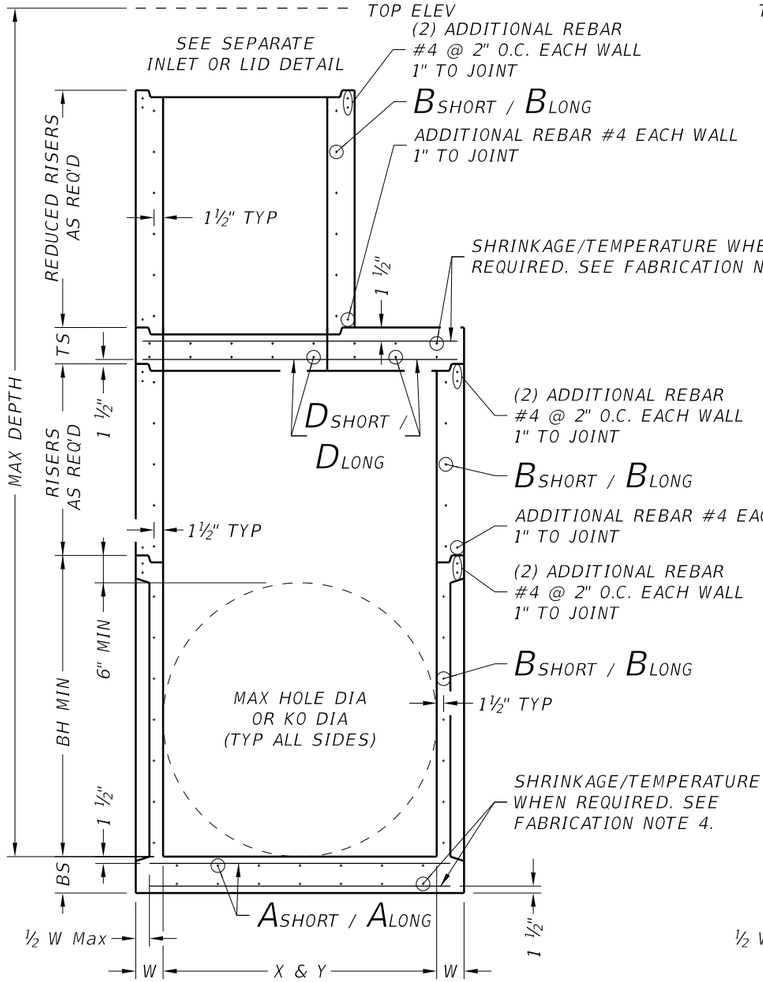
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



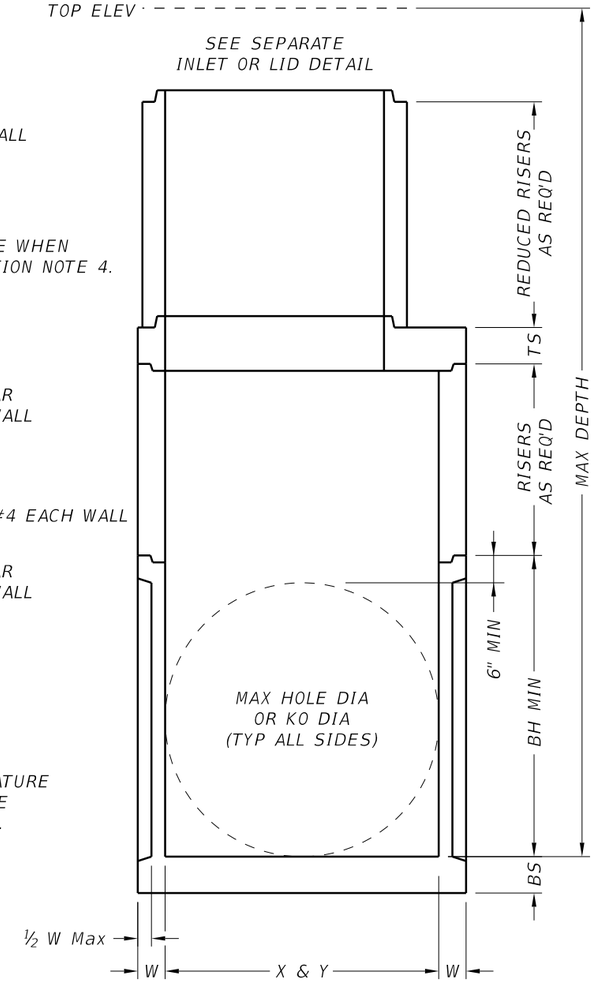
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

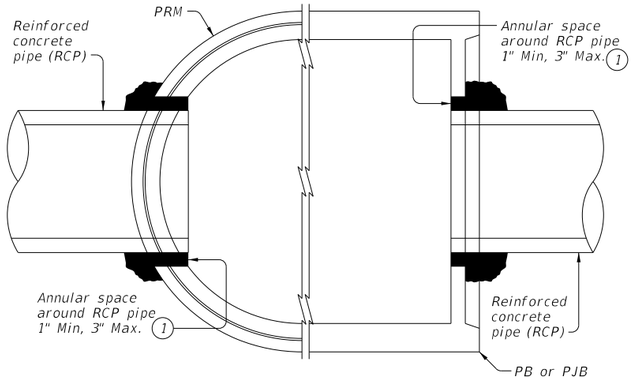
Bridge Division Standard

PRECAST BASE

PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		135

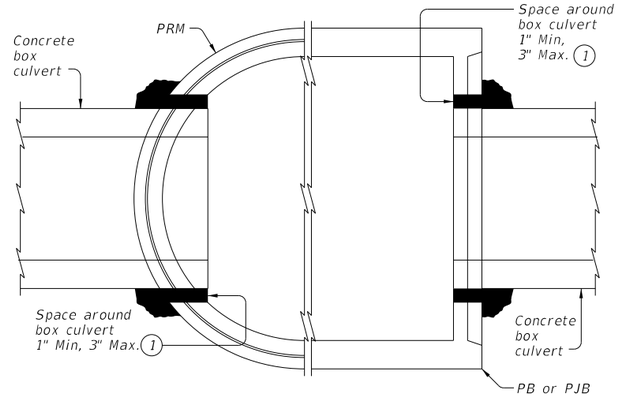
DATE:
FILE:



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

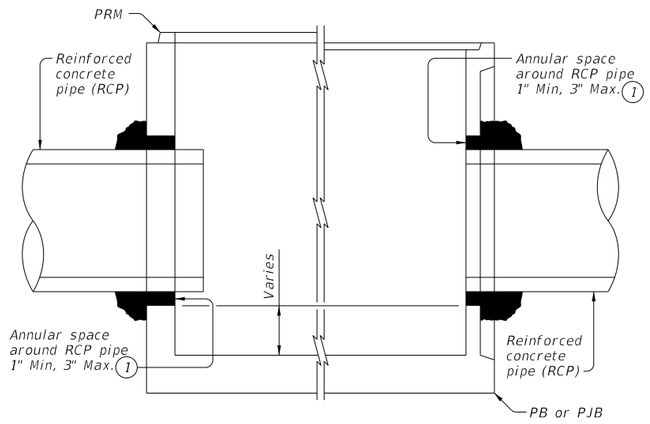
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

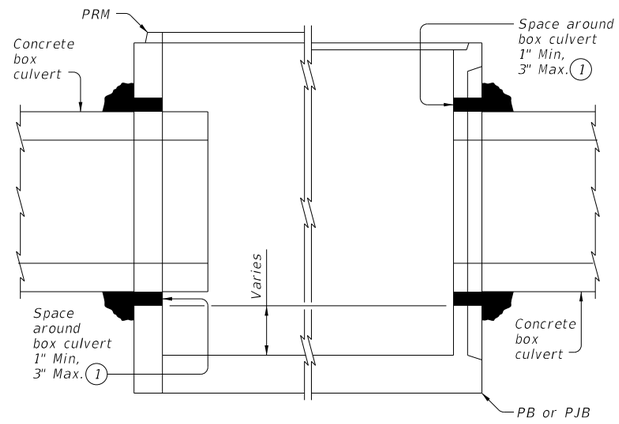
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

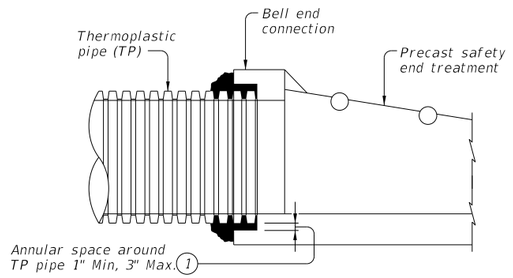
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

FILE: pbgcstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		136

DATE: 10/2/2023 8:01:39 PM
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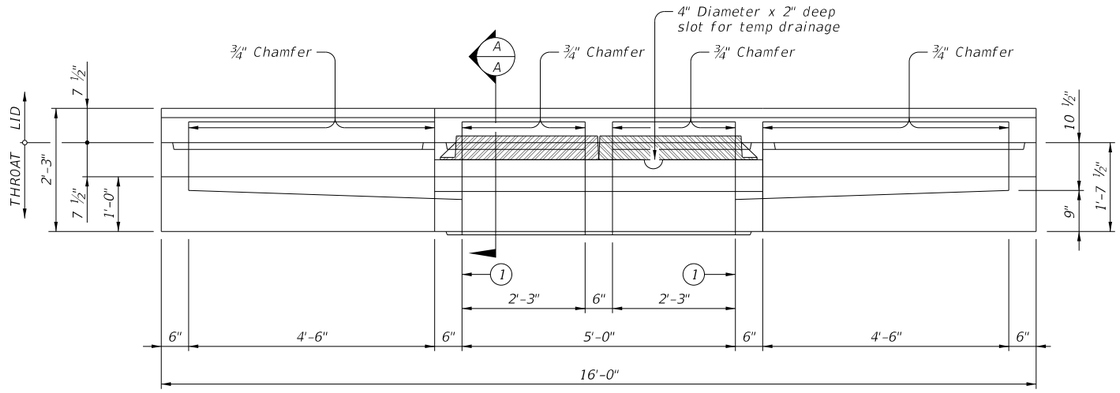
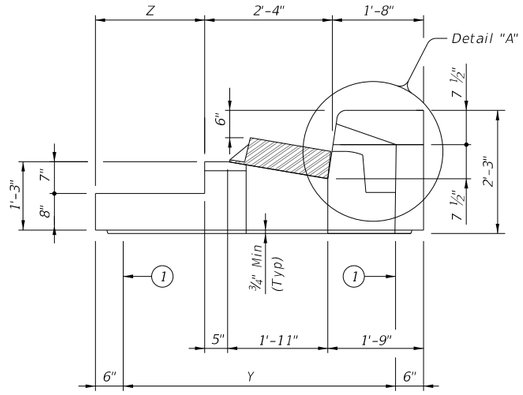
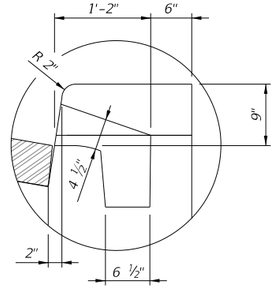


FRONT VIEW

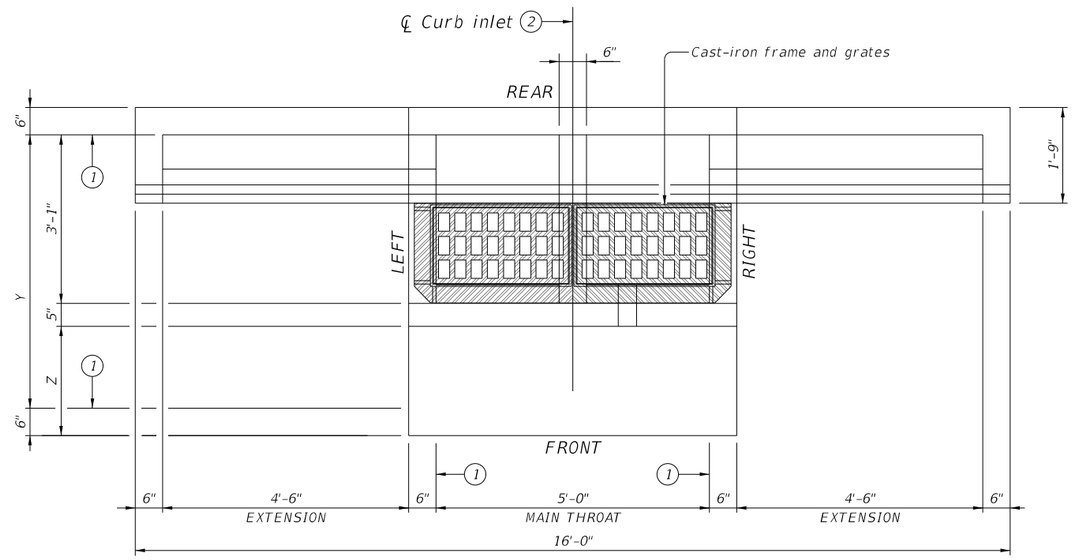
(Showing left and right extensions)



SECTION A-A



DETAIL "A"



PLAN VIEW

(Showing left and right extensions)

TABLE OF VARIABLE DIMENSIONS

Size (Y)	Z
3'	0'
4'	1'
5'	2'
6'	3'

(1) Matches inside face of wall of precast base or riser below inlet.

(2) Reference point is located where the ℄ of the main throat intersects the normal gutter line. See Curb and Gutter Transition Details for PCO Inlet (CGT-PCO) standard for more information.

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

PCU

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		137

DATE: 10/2/2023 8:01:39 PM
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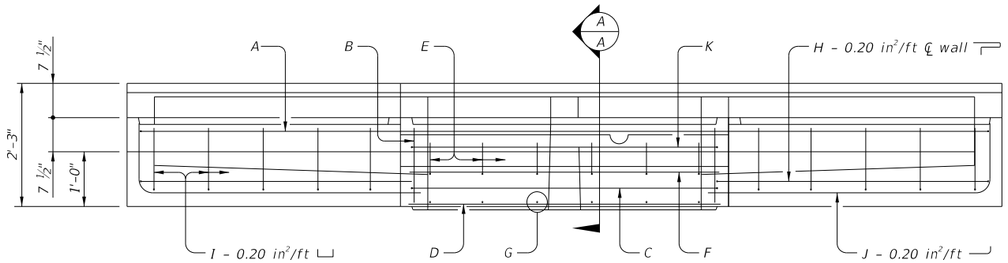
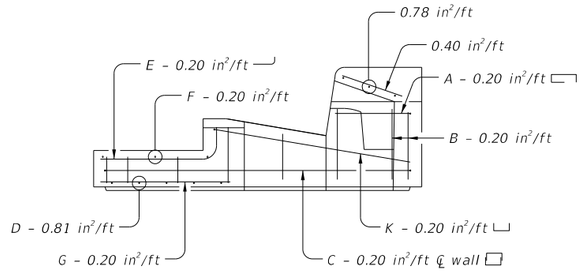
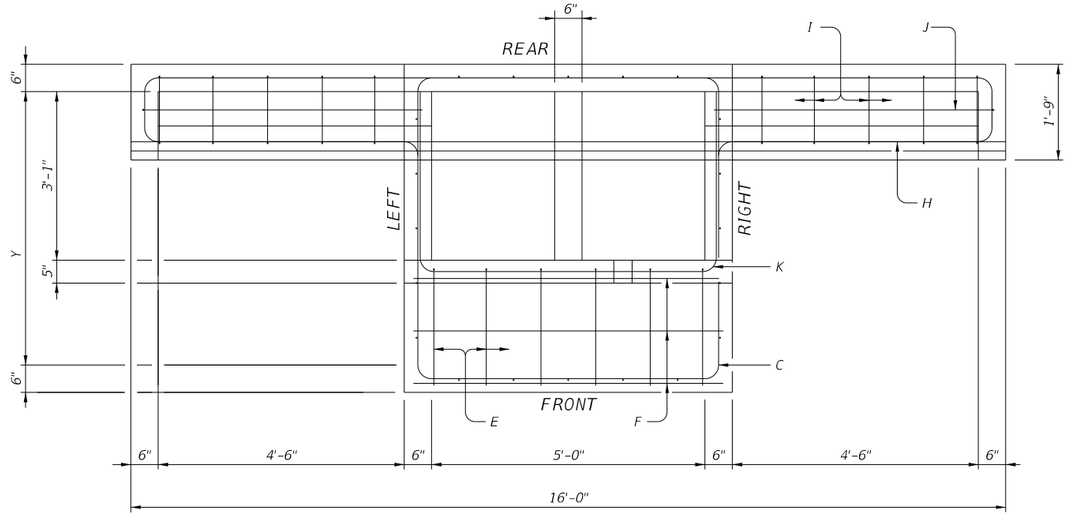


FRONT VIEW

(Showing left and right extensions)



SECTION A-A



PLAN VIEW

(Showing left and right extensions)

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel from surface of concrete or lower outside shoulder.
4. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in plans.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Top slab may employ a butt joint with dowels at the Contractor's option.
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Chamfer vertical edges on inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat is placed under roadway and intended for direct traffic. Inlet lid is not for direct traffic. Do not place Inlet lid in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 324 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes and Inlets" by type, size and extension placement. Extensions are subsidiary to inlet.

HS20 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

PCU

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		138

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

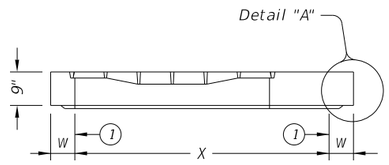
Texas Department of Transportation | Bridge Division Standard

DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

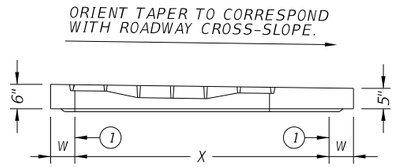
PDD

FILE: prestd10-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		139

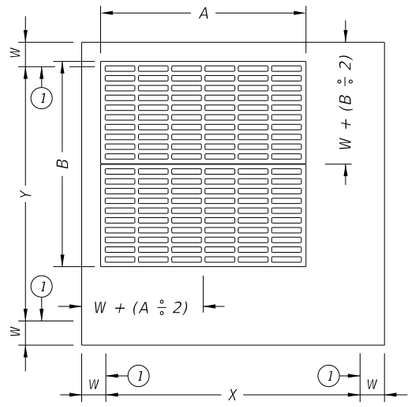
DATE:
FILE:



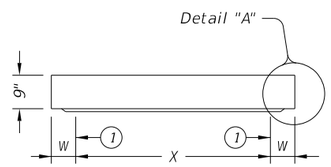
STYLE 'FG'



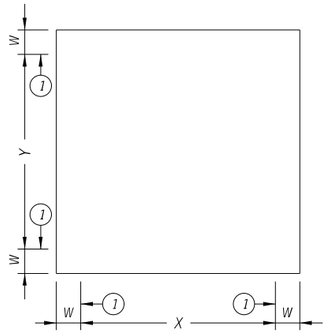
STYLE 'SFG'
ELEVATION VIEW



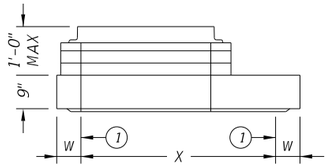
PLAN VIEW
CAST-IN FRAME & GRATE
STYLES 'FG' & 'SFG'



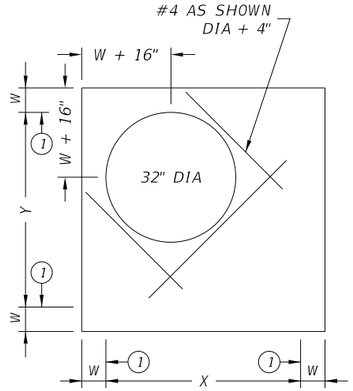
ELEVATION VIEW



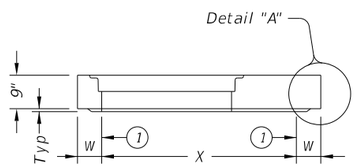
PLAN VIEW
NO OPENINGS
STYLE 'SL'



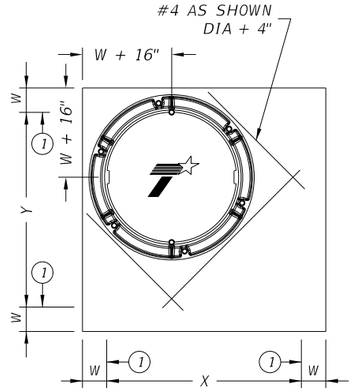
ELEVATION VIEW



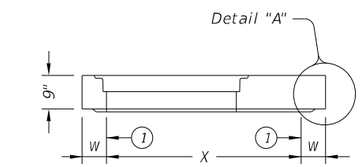
PLAN VIEW
SHIP LOOSE RING & COVER
STYLE 'RH'



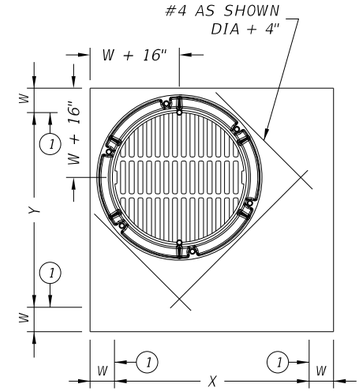
ELEVATION VIEW



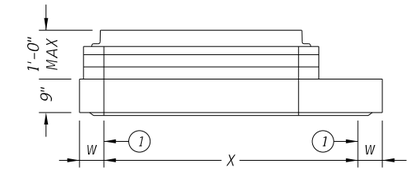
PLAN VIEW
32" DIA CAST-IN RING & COVER
STYLE 'RC'



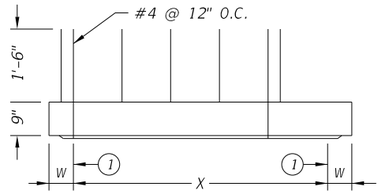
ELEVATION VIEW



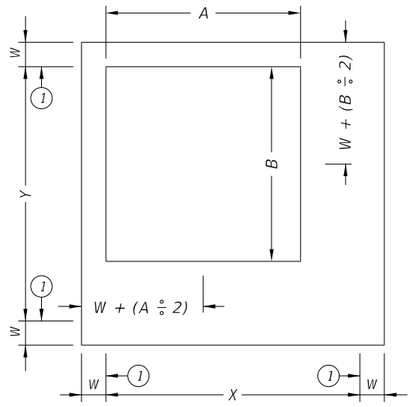
PLAN VIEW
32" DIA CAST-IN RING & GRATE
STYLE 'RG'



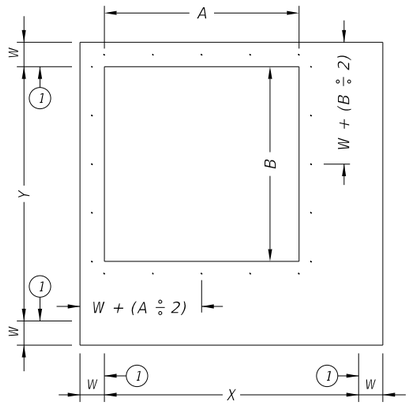
ELEVATION VIEW



ELEVATION VIEW



PLAN VIEW
SHIP LOOSE FRAME & GRATE
STYLE 'SH'



PLAN VIEW
EXPOSED REBAR
STYLE 'S1'

(1) Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		140

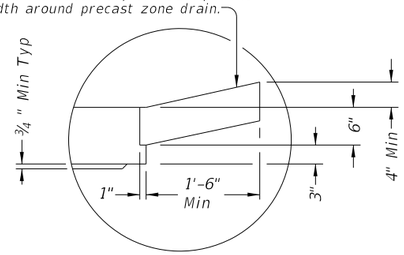
DATE:
FILE:

DATE:
FILE:

Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in²/ft	0.37 in²/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
SFG	3'x3'	6"	3'x3'	0.32 in²/ft	0.32 in²/ft
SL	4'x4'	6"	n/a	0.34 in²/ft	0.34 in²/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in²/ft	0.41 in²/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in²/ft	0.41 in²/ft
SFG	4'x4'	6"	4'x4'	0.32 in²/ft	0.32 in²/ft
SL	3'x5'	6"	n/a	0.39 in²/ft	0.39 in²/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in²/ft	0.48 in²/ft
SFG	3'x5'	6"	3'x5'	0.32 in²/ft	0.32 in²/ft
SL	4'x5'	6"	n/a	0.42 in²/ft	0.42 in²/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in²/ft	0.42 in²/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in²/ft	0.66 in²/ft
SL	5'x5'	6"	n/a	0.36 in²/ft	0.36 in²/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in²/ft	0.63 in²/ft
SL	5'x6'	6"/8"	n/a	0.48 in²/ft	0.48 in²/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in²/ft	0.60 in²/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in²/ft	0.60 in²/ft
SL	6'x6'	6"/8"	n/a	0.43 in²/ft	0.43 in²/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in²/ft	0.59 in²/ft
SL	8'x8'	8"/10"	n/a	0.45 in²/ft	0.45 in²/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in²/ft	0.45 in²/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		141

LEGEND

OVERHEAD ELECTRIC	— — — OE1 — — —	DENTON MUNICIPAL ELECTRIC
ELECTRIC	— — — E1 — — —	DENTON MUNICIPAL ELECTRIC
ELECTRIC	--- E1(D) ------- E1(D) ---	DENTON MUNICIPAL ELECTRIC
ELECTRIC	— — — E2 — — —	TXDOT
ELECTRIC	--- E2(D) ------- E2(D) ---	TXDOT
FIBER OPTIC	— — — FOC1 — — —	CENTURYLINK (PREVIOUSLY LEVEL 3)
FIBER OPTIC	--FOC1(D)-------FOC1(D)--	CENTURYLINK (PREVIOUSLY LEVEL 3)
FIBER OPTIC	— — — FOC2 — — —	ATT
FIBER OPTIC	--FOC2(D)-------FOC2(D)--	ATT
FIBER OPTIC	— — — FOC3 — — —	TXDOT
FIBER OPTIC	--FOC3(D)-------FOC3(D)--	TXDOT
FIBER OPTIC	— — — FOC4 — — —	DENTON MUNICIPAL ELECTRIC
FIBER OPTIC	--FOC4(D)-------FOC4(D)--	DENTON MUNICIPAL ELECTRIC
FIBER OPTIC	— — — FOC5 — — —	DENTON ISD
FIBER OPTIC	--FOC5(D)-------FOC5(D)--	DENTON ISD
TELEPHONE	— — — T1 — — —	FRONTIER(PREVIOUSLY VERIZON)
TELEPHONE	----T1(D)-------T1(D)-----	FRONTIER(PREVIOUSLY VERIZON)
GAS	— — — G1 — — —	ATMOS
GAS	--- G1(D) ------- G1(D) ---	ATMOS
WATER	— — — W1 — — —	CITY OF DENTON
WATER	---- W1(D)------- W1(D)---	CITY OF DENTON
WASTE WATER	— — — WW1 — — —	CITY OF DENTON
WASTE WATER	----WW1(D)-------WW1(D)---	CITY OF DENTON
WASTE WATER	----WW1(C)-------WW1(C)---	CITY OF DENTON

TRANSMISSION TOWER	HYDRANT	WASTE WATER MANHOLE
ELECTRICAL TRANSFORMER BOX	WATER MANHOLE	CLEAN OUT
ELECTRICAL POWER BOX	WATER VALVE	WASTE WATER VAULT
ELECTRIC MANHOLE	WATER METER	STORM SEWER DRAIN
TRAFFIC SIGNAL POWER BOX	WATER VAULT	CULVERT HEADWALL
POWER POLE	TELEPHONE MANHOLE	GAS VENT
LIGHT POLE	TELEPHONE VAULT	GAS METER
FIBER OPTIC VAULT	TELEPHONE PEDESTAL	GAS TRANSFORMER
FIBER OPTIC MANHOLE	TELEPHONE HAND HOLE	OUT OF SCOPE
FIBER OPTIC HANDHOLE		END OF LINE

MATERIAL

AC= ASBESTOS CEMENT
PVC=POLYVINYL CHLORIDE
MW=MILL WRAPPED
DI=DUCTILE IRON
STL=STEEL
PE=POLYETHYLENE

UTILITIES

WW=WASTE WATER
WL=WATER LINE
FOC=FIBER OPTIC
TELE=TELEPHONE
CTV=CABLE TV
GAS=GAS
PL=PIPELINE
ELECT-ELECTRIC

GENERAL

ED-ELECTRONIC DEPTH
TH-TESTHOLE
FL-FLOW LINE
ELEV-ELEVATION
EXIST-EXISTING
PROP-PROPOSED

GENERAL NOTES:

1. UTILITIES ARE DEPICTED ON THESE PLANS IN ACCORDANCE WITH THEIR ACHIEVED QUALITY LEVELS AS DEFINED IN THE AMERICAN SOCIETY OF CIVIL ENGINEER'S DOCUMENT ASCE 38-02, "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

2. THE HORIZONTAL ALIGNMENT OF QUALITY LEVEL B LINES SHOWN WERE ARRIVED AT USING GEOPHYSICAL EQUIPMENT. THE ACCURACY OF THE HORIZONTAL LOCATION CAN BE INFLUENCED BY MOISTURE CONTENT, PROXIMITY OF OTHER UNDERGROUND UTILITIES OR STRUCTURES, DEPTH OF THE UTILITY AND LOCATION OF TRACE WIRE/TAPE IN RELATIONSHIP TO THE TOP OF THE PIPE.

3. GEOPHYSICAL SEARCH AND RECORDS RESEARCH DO NOT GUARANTY ALL UTILITIES WILL BE FOUND.

4. UTILITY INFORMATION LABELED AS LEVELS "C" OR "D" ARE DERIVED FROM FURNISHED RECORDS. SUCH INFORMATION MAY NOT BE ACCURATE OR RELIABLE. LTRA DISCLAIMS RESPONSIBILITY FOR THE ACCURACY OR RELIABILITY OF UTILITY INFORMATION DEPICTED ACCORDING TO RECORDS.

5. THE ROADWAY AND ROW FILES WERE PROVIDED BY OTHERS AND ARE SHOWN FOR REFERENCE PURPOSES ONLY.

6. RELIANCE UPON THESE DATA FOR RISK MANAGEMENT PURPOSES DURING BIDDING DOES NOT RELIEVE THE EXCAVATOR OR UTILITY OWNER FROM FOLLOWING ALL APPLICABLE UTILITY DAMAGE PREVENTION LAWS AND REGULATIONS. THIS INCLUDES BUT IS NOT LIMITED TO GIVING NOTIFICATION TO UTILITY OWNER'S "ONE-CALL" CENTERS BEFORE EXCAVATION.

7. FIELD WORK BEGAN ON 12-04-2019 AND WAS COMPLETED 12-17-2019, LTRA EXPRESSLY DISCLAIMS RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS, MODIFICATIONS OR ADJUSTMENTS TO EXISTING UTILITIES AFTER 3-26-2021 ALONG THE MAIN CORRIDOR.

8. EXISTING ALIGNMENTS FOR IH35E WERE USED THROUGHOUT THE PROJECT.

QUALITY LEVEL "D": INFORMATION DERIVED FROM EXISTING RECORDS AND/OR ORAL RECOLLECTIONS,

QUALITY LEVEL "C": INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE-GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGMENT IN CORRELATING THIS INFORMATION TO QUALITY LEVEL D INFORMATION.

QUALITY LEVEL "B": INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES (AKA DESIGNATING).

QUALITY LEVEL "A": PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES, USUALLY AT A SPECIFIC POINT (AKA LOCATING).

QUALITY LEVEL LEGEND

— — — — — — QUALITY LEVEL "B"
------WW5(D)------ QUALITY LEVEL "D"
------WW5(C)------ QUALITY LEVEL "C"
TYPICAL FOR ALL UTILITIES

Company	Contact Name	Contact Number	Contact Email
AT&T	Ike Butler	(214) 821-5237	ib9705@att.com
ATMOS Energy	Kimberly Winn	(979) 774-2551	kimberly.winn@atmosenergy.com
CenturyLink	Danny States	(214) 837-6675	Danny.States@CenturyLink.com
City of Denton	Teresa McElreath	(940) 349-8935	teresa.mcelreath@cityofdenton.com
Denton ISD	Graham Walden	(940)369-0576	gwalden@dentonisd.org
Denton Municipal Electric	Daniel Howington	(940) 349-7168	daniel.howington@cityofdenton.com
Frontier	Stephanie Allison	(940) 536-9844	stephanie.allison@cyient.com

STATE OF TEXAS
AIMEE R. TRAWICK
126400
LICENSED
PROFESSIONAL ENGINEER

AIMEE R. TRAWICK, PE
DATE: 1/3/2023

LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPLS REGISTRATION NO. 10140700

IH 35E NBFR AT UP RAILROAD AND
IH 35E SBFR AT UP RAILROAD

IH 35E BRIDGES

EXISTING UTILITY LEGEND

SCALE: 1" = 100'

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
LTRA	6	SEE TITLE SHEET		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LTRA	TEXAS	DALLAS	DENTON	142
CHECK	CONTROL	SECTION	JOB	
LTRA	0195	03	088,ETC.	
CHECK				
LTRA				

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1/3/2023
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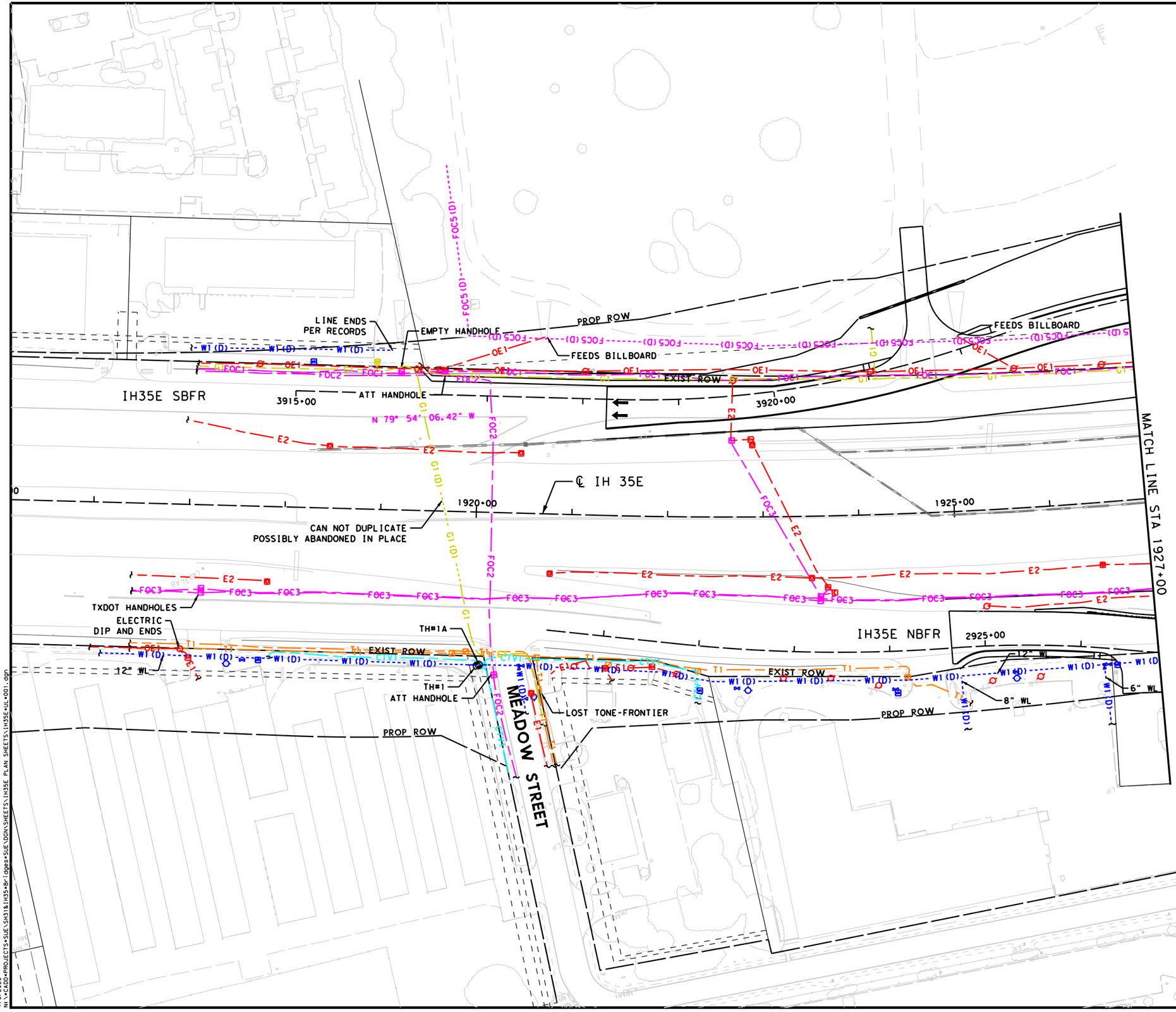

0 50 100
SCALE IN FEET

NOTES:

1. SEE SHEET 1 FOR LEGEND

QUANTITIES:

LEVEL "B"	7,385
LEVEL "D"	1,637
LEVEL "C"	1,253
TOTAL =	10,275

STATE OF TEXAS
AIMEE R. TRAWICK
126400
LICENSED
PROFESSIONAL ENGINEER

AIMEE R. TRAWICK, PE
DATE: 1/3/2023

LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPLS REGISTRATION NO. 10140700

IH 35E NBFR AT UP RAILROAD AND
IH 35E SBFR AT UP RAILROAD

IH 35E BRIDGES

EXISTING UTILITY PLANS

BEGIN PROJECT TO STA 1927+00

SCALE: 1" = 100'

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
LTRA	6	SEE TITLE SHEET		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LTRA	TEXAS	DALLAS	DENTON	143
CHECK	CONTROL	SECTION	JOB	
LTRA	0195	03	088,ETC.	
CHECK				
LTRA				

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1/3/2023
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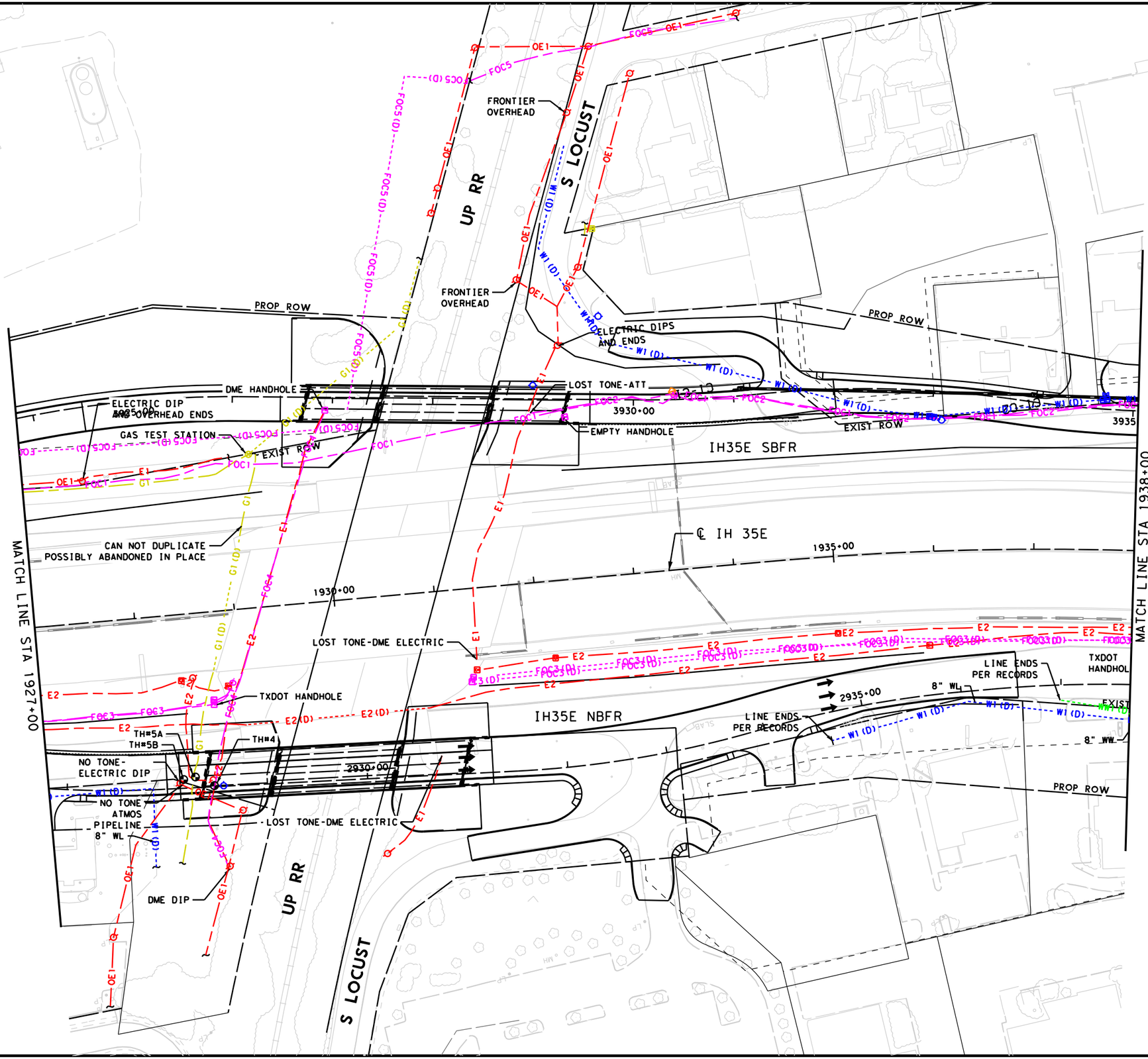

0 50 100
SCALE IN FEET

NOTES:

1. SEE SHEET 1 FOR LEGEND

QUANTITIES:

LEVEL "B"	6,425
LEVEL "D"	2,877
LEVEL "C"	1,526
TOTAL=	10,828

STATE OF TEXAS
AIMEE R. TRAWICK
126400
LICENSED PROFESSIONAL ENGINEER

AIMEE R. TRAWICK, PE
DATE: 1/3/2023

LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPLS REGISTRATION NO. 10140700

Texas Department of Transportation

IH 35E NBFR AT UP RAILROAD AND
IH 35E SBFR AT UP RAILROAD

IH 35E BRIDGES
EXISTING UTILITY PLANS
STA 1927+00 TO STA 1938+00

SCALE: 1" = 100'

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
LTRA	6	SEE TITLE SHEET		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LTRA	TEXAS	DALLAS	DENTON	144
CHECK	CONTROL	SECTION	JOB	
LTRA	0195	03	088,ETC.	
CHECK				
LTRA				

arrowick
5:37:51 PM
1/3/2023
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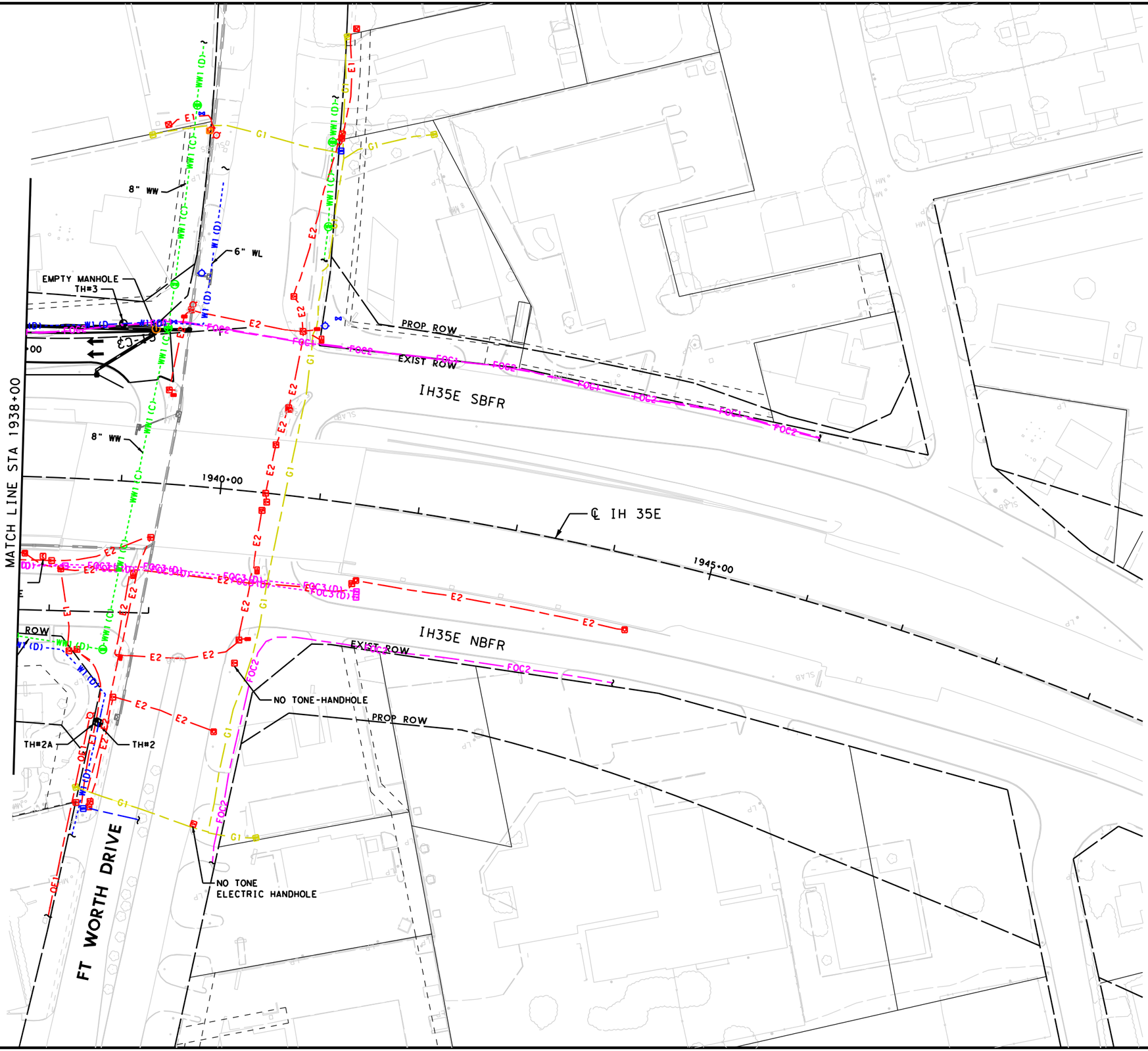

N

0 50 100
SCALE IN FEET

NOTES:

1. SEE SHEET 1 FOR LEGEND

QUANTITIES:

LEVEL "B"	6,126
LEVEL "D"	1,493
LEVEL "C"	849
TOTAL =	7,717

STATE OF TEXAS
AIMEE R. TRAWICK
126400
LICENSED
PROFESSIONAL ENGINEER

AIMEE R. TRAWICK, PE
DATE: 1/3/2023

LTRA
LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPLS REGISTRATION NO. 10140700

Texas Department of Transportation

IH 35E NBFR AT UP RAILROAD AND
IH 35E SBFR AT UP RAILROAD

IH 35E BRIDGES

EXISTING UTILITY PLANS

STA 1938+00 TO END PROJECT

SCALE: 1" = 100'

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
LTRA	6	SEE TITLE SHEET		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LTRA	TEXAS	DALLAS	DENTON	145
CHECK	CONTROL	SECTION	JOB	
LTRA	0195	03	088,ETC.	
CHECK				
LTRA				

atrawick
5:37:53 PM
1/3/2023
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DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwald

SUMMARY OF ESTIMATED QUANTITIES

BID ITEM	400-6005	416-6001	416-6004	420-6014	420-6030	420-6038	422-6002	422-6014	425-6039	442-6007	450-6005	450-6031	450-6119	454-6018
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (18 IN) (1)	DRILL SHAFT (36 IN) (1)	CL C CONC (ABUT) (HPC)	CL C CONC (CAP) (HPC)	CL C CONC (COLUMN) (HPC)	REINF CONC SLAB (HPC)	BRIDGE SIDEWALK (HPC)	PRESTR CONC GIRDER (TX54)	STR STEEL (MISC NON-BRIDGE)	RAIL (TY T221) (HPC)	RAIL (TY C221) (HPC)	RAIL (CLF-R0)	SEALED EXPANSION JOINT (4 IN) (SEJ-M)
	CY	LF	LF	CY	CY	CY	SF	SF	LF	LB	LF	LF	LF	LF
IH35E NBFR OVER UPRR														
2 - ABUTMENTS	292	68	210	76.8										92
2 - INTERIOR BENTS			72		44.4	49.2								
260.00' PRESTRESSED CONCRETE I-GIRDER UNIT (SPANS 1 - 3)							12610	2031	1651.09	161	296.0	296.0	240.0	
IH35E SBFR OVER UPRR														
2 - ABUTMENTS	222	81	228	58.0										71
2 - INTERIOR BENTS			54		33.3	32.2								
260.00' PRESTRESSED CONCRETE I-GIRDER UNIT (SPANS 1 - 3)							9751	1995	1143.83	161	278.0	296.0	220.0	
TOTAL	513	149	564	134.8	77.7	81.4	22361	4026	2794.92	322	574.0	592.0	460.0	163

(1) PROVIDE SULPHATE-RESISTANT CONCRETE

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
4/10/2024

AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

SUMMARY OF BRIDGE QUANTITIES

IH 35E NBFR OVER UPRR AND IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		146

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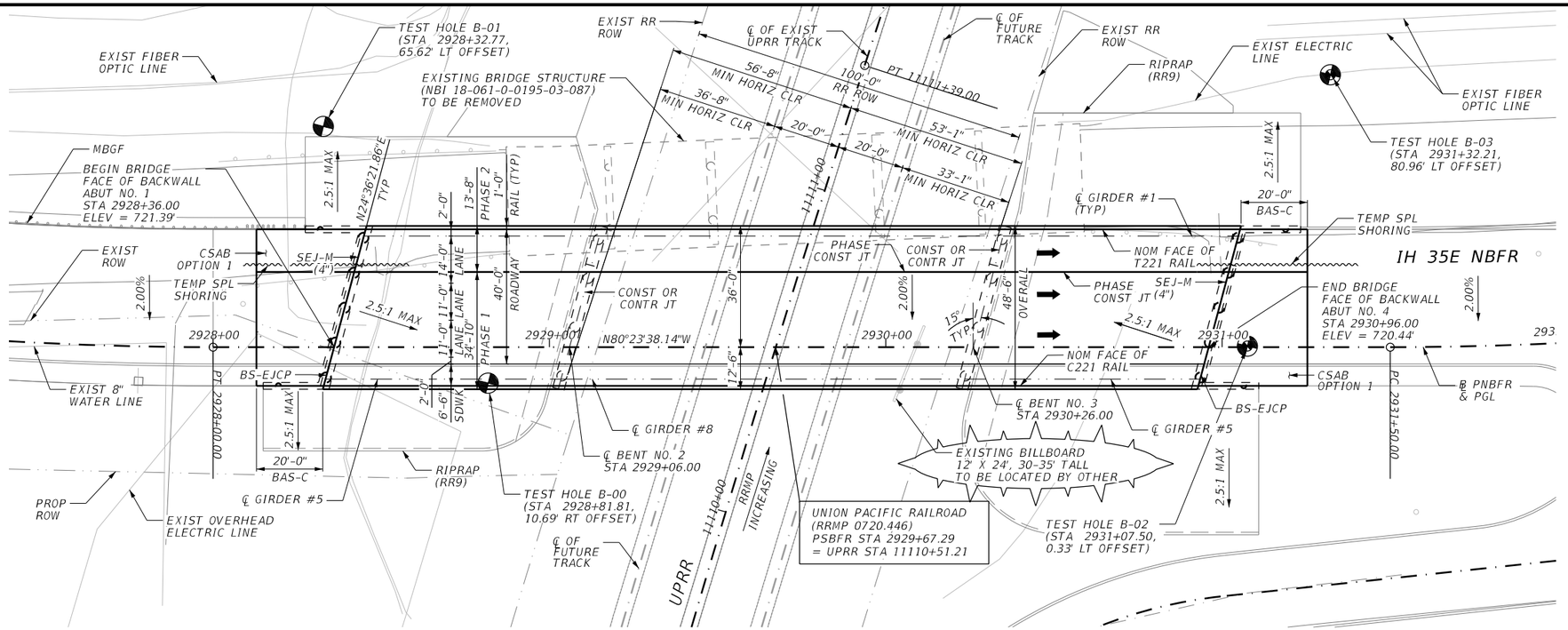


PLAN

NOTE: THE REMOVAL OF EXISTING STRUCTURES SHALL BE COMPLETED IN A SAFE AND CONTROLLED MANNER. SAWCUTTING, PULVERIZING, AND/OR RUBBLIZING THAT RESULTS IN FREE FALL OF DEBRIS TO THE TRACKS IS NOT ALLOWED.

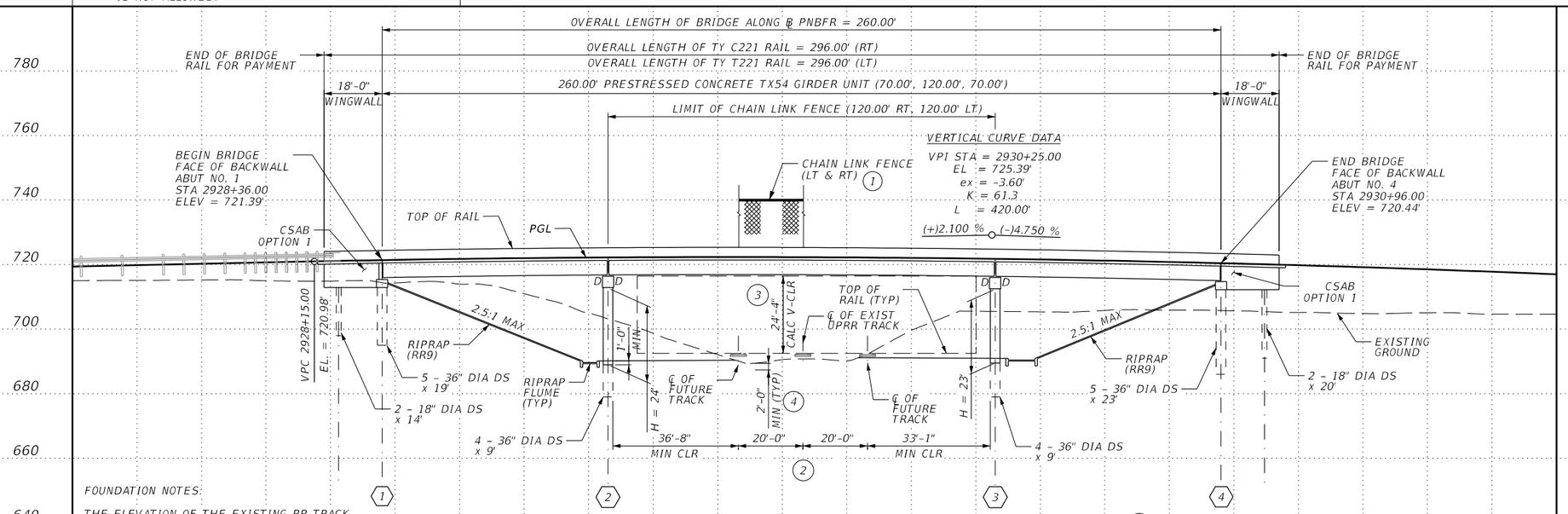
NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
3. "D" DENOTES BENTS WITH DOWELS D AND SLOTTED HOLES AT CONCRETE GIRDERS. SEE BENT SHEET FOR LOCATIONS AND ADD'L INFO.
4. SEE CSAB STANDARD FOR CEMENT STABILIZED BACKFILL LIMITS AND DETAILS.
5. SEE BORING LOGS SHEETS FOR BORING DATA.
6. SAWCUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS REQUIRED.
7. SEE TEMPORARY SPECIAL SHORING SHEET FOR LIMITS AND ADD'L INFO.
8. SEE ROADWAY PLANS FOR FOR RIPRAP LIMITS AND ADD'L INFO.
9. DRILLED SHAFTS WITHIN THE INFLUENCE OF TRACK SURCHARGE SHALL BE CONSTRUCTED WITH PERMANENT CASING DESIGNED FOR LIVE LOADS FROM RAILROAD SURCHARGE.
10. ALL RAIL DRAINAGE SLOTS SHALL BE BLOCKED OVER RR ROW.

EXISTING 5-SIMPLE SPAN (4- CONCRETE PAN GIRDERS AND 1-CONCRETE BEAM SPANS) BRIDGE, CONCRETE DECK TO BE REMOVED.
EXIST BRIDGE LENGTH = 171.33'
EXIST BRIDGE WIDTH = 31.17'

FUNCT. CLASS = URBAN MAJOR COLLECTOR
DESIGN SPEED = 45MPH
EXIST ADT = 6935(2017)
PROP ADT = 17600(2023)
PROP ADT = 23800(2043)

EXIST NBI NO. = 18-061-0-0195-03-087
PROP NBI NO. = 18-061-0-0195-03-310



ELEVATION

FOUNDATION NOTES:

THE ELEVATION OF THE EXISTING RR TRACK TOP-OF-RAIL SHALL BE VERIFIED BEFORE BEGINNING CONSTRUCTION.

FOUND DRILLED SHAFTS AT LENGTHS SHOWN OR EMBED A MINIMUM OF 3 DIAMETERS INTO SANDSTONE WHICHEVER IS GREATER.

REFER TO "RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION" SHEETS FOR SHORING REQUIREMENTS.

(1) SEE CLF-R0 STANDARD FOR CHAIN LINK FENCE DETAILS.

(2) DIMENSIONS TAKEN PERPENDICULAR TO RAILROAD ALIGNMENT

(3) CALCULATED VERTICAL CLEARANCE MEASURED FROM TOP OF EXISTING RAIL TO BOTTOM OF BRIDGE GIRDER AT LOWEST POINT WITHIN UPRR ROW.

(4) EXISTING SUBSTRUCTURE (CONCRETE ABUTMENTS, INTERIOR BENTS AND FOUNDATIONS) TO BE REMOVED TO 2'-0" MIN BELOW PROPOSED GROUND.

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

BRIDGE LAYOUT

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		147

DATE: 10/5/2023 8:27:24 PM
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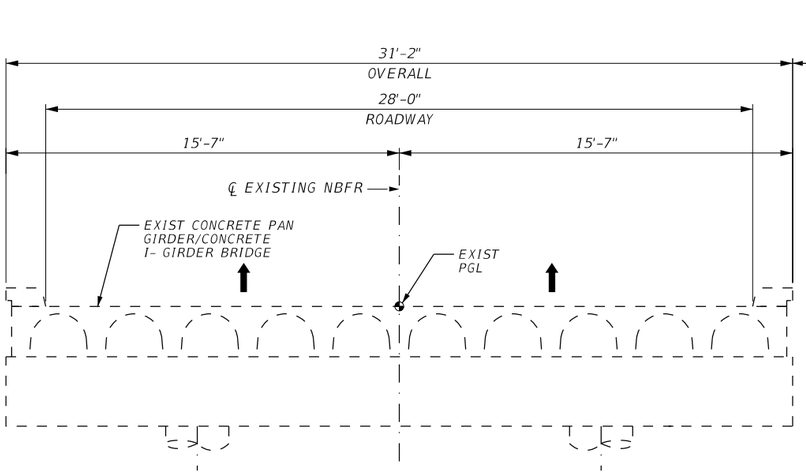
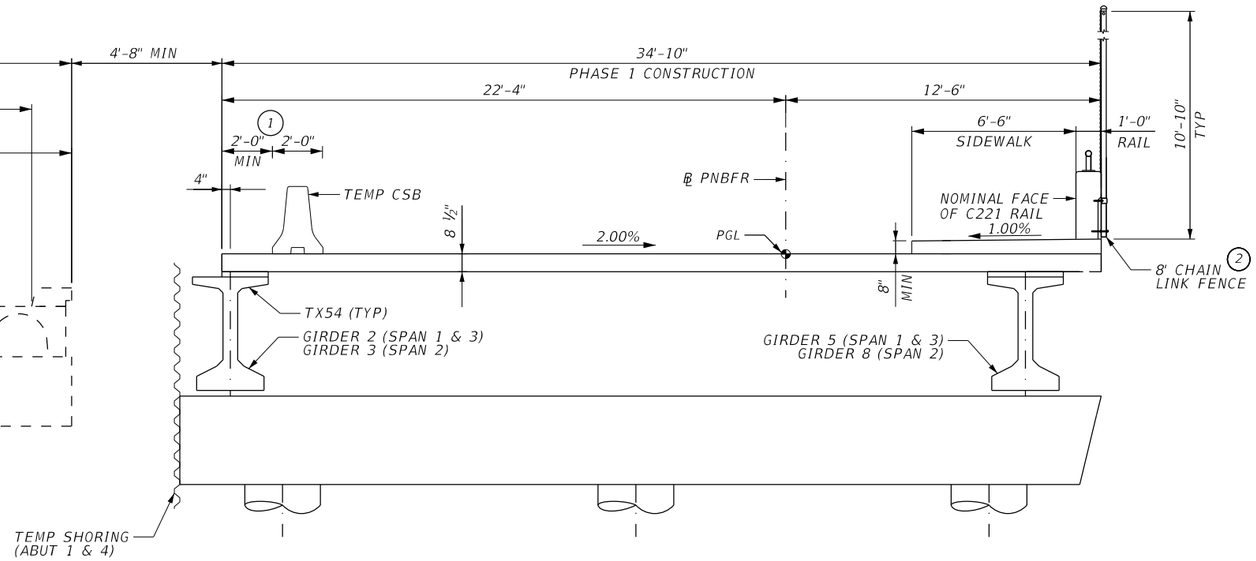
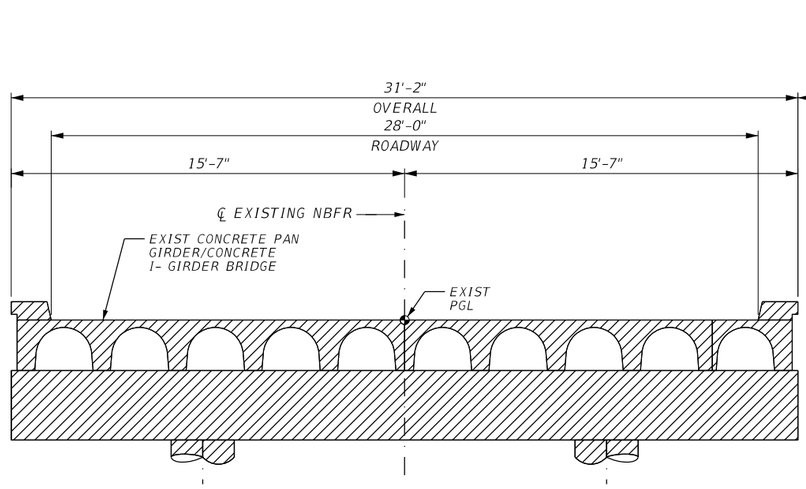


EXISTING TYPICAL SECTION



PHASE 1 CONSTRUCTION TYPICAL SECTION

NTS



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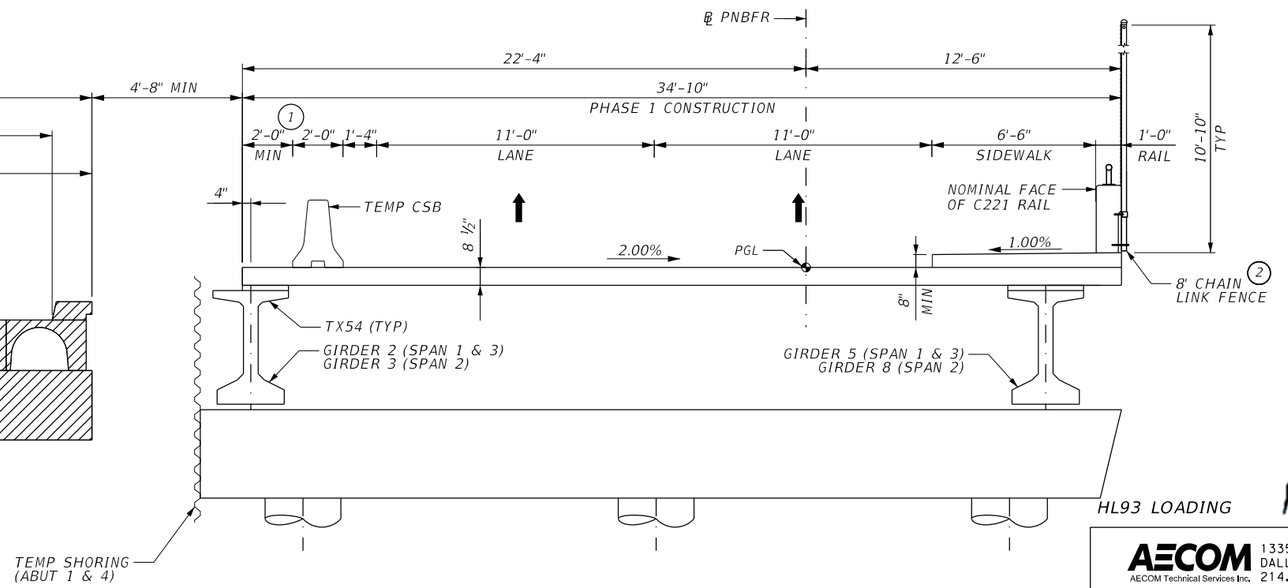

TO BE REMOVED

PHASE 1A REMOVAL TYPICAL SECTION

NTS

1. ANCHORAGE/PINNING OF TEMPORARY RAILS TO BRIDGE DECK NOT PERMITTED. MAINTAIN 2'-0" MIN DISTANCE FROM EDGE OF DECK.
2. 8" CHAIN LINK FENCE ONLY AT SPAN 2. REFER TO CLF-RO STANDARD.

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation
Dallas District Bridge

IH35E

TYPICAL SECTIONS
IH 35E NBFR OVER UPRR

SHEET 1 OF 2

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		148

DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwaldj

DATE: 10/5/2023 8:27:31 PM
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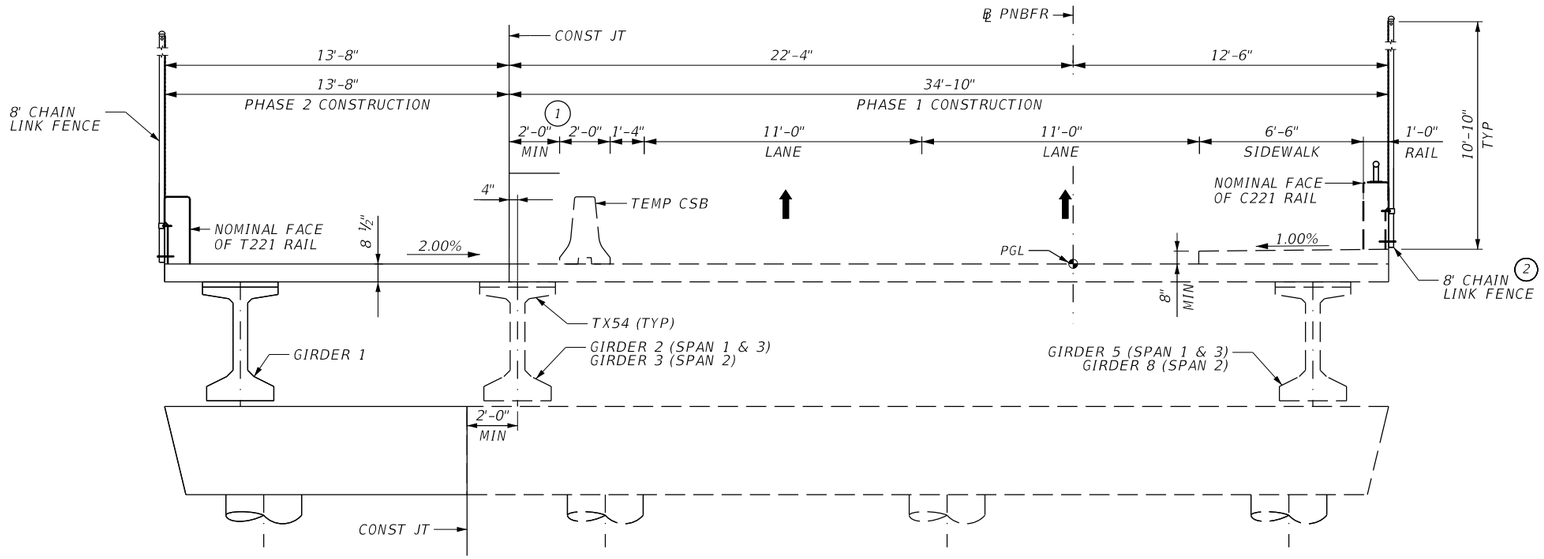
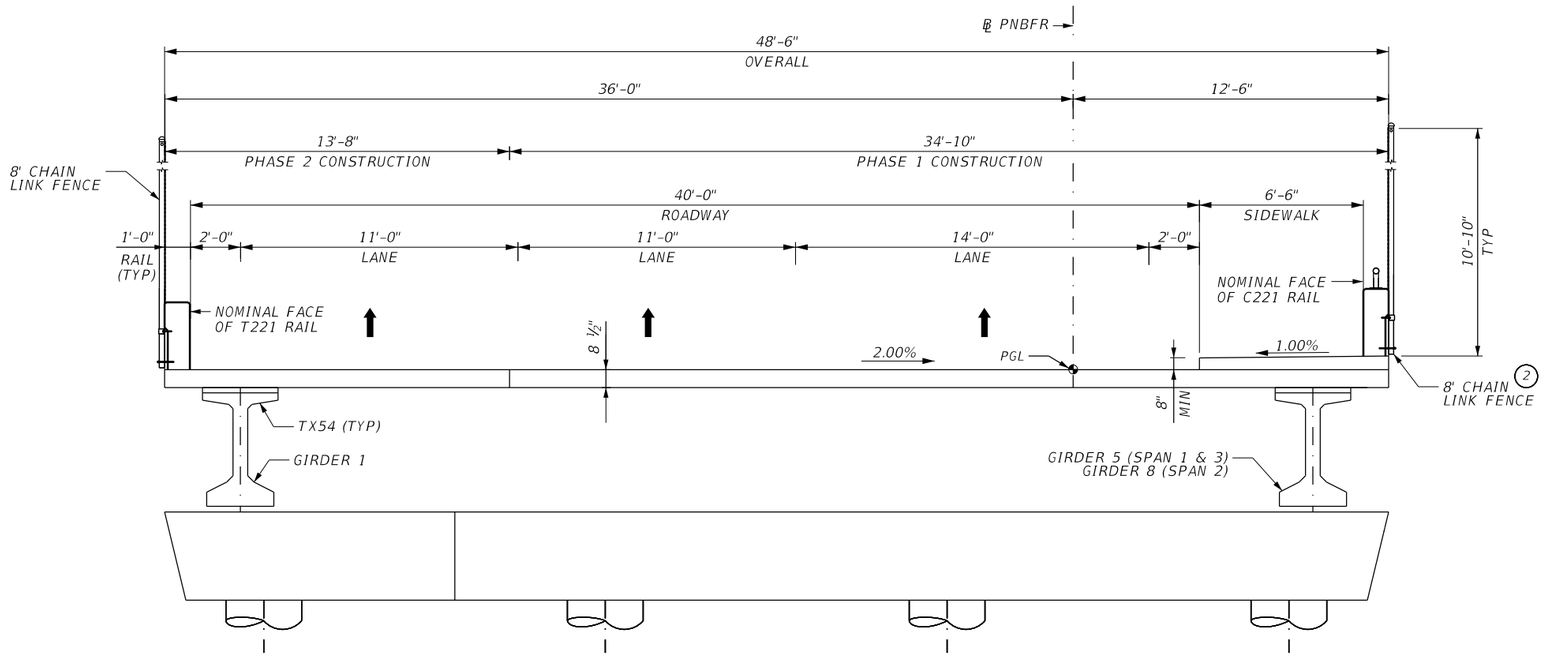


PHASE 2 CONSTRUCTION TYPICAL SECTION

NTS



COMPLETED STRUCTURE TYPICAL SECTION

NTS

1. ANCHORAGE/PINNING OF TEMPORARY RAILS TO BRIDGE DECK NOT PERMITTED. MAINTAIN 2'-0" MIN DISTANCE FROM EDGE OF DECK.
2. 8" CHAIN LINK FENCE ONLY AT SPAN 2. REFER TO CLF-RO STANDARD.

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

TYPICAL SECTIONS
IH 35E NBFR OVER UPRR

SHEET 2 OF 2

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		149

DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwoldj

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DRILLING LOG

WinCore
Version 3.3

County	Denton	Hole	B-0	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/7/19
CSJ	0195-03-088	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	57.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
98.			CLAY, soft, moist, brown, with trace sand, silt and gravels (CH)							PP = 1.5
			CLAY, soft, moist, brown, with trace sand seams, gravels and silt (CL)							Sieve #200 = 90%
										PP = 2.0
5		6 (6) 12 (6)								PP = 1.5
										PP = 4.0
						11	38	24		
10		8 (6) 11 (6)								PP = 1.0
88.			CLAY, silty, very hard, moist, brown, with sand (CL)							
		50 (2.5) 50 (1)								
15										
83.			SAND, very dense, brown, with silt (SP)							
20		50 (1) 50 (2.5)								
25		50 (2) 50 (1)								

Remarks: LATITUDE: 33.196524, LONGITUDE: -97.135786. Initial free water was encountered at 43 feet below existing ground during drilling operations. Water seepage was observed at a depth of 34 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Mario Ybarra **Logger: Paulo Pereira** **Organization: Fugro USA Land, Inc.**

I:\Project Files\Projects-2019\19-1087 FM 2450 Denton County, CSJ 2353-02-026, 0195-03-088 and 0195-03-089\7. Drafting\7.1 Boring Logs\7.1.1 Bridges\B-0.clg

DRILLING LOG

WinCore
Version 3.3

County	Denton	Hole	B-0	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/7/19
CSJ	0195-03-088	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	57.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, very dense, brown, with silt (SP)							
73.			SAND, very dense, moist, tan, with silt (SP)							
30		50 (1.5) 50 (0.5)								
										Sieve #200 = 11%
35		50 (1.5) 50 (1)								
40		50 (1.5) 50 (1)								
45		50 (1.5) 5 (0.5)								
50		50 (1) 50 (0.5)								

Remarks: LATITUDE: 33.196524, LONGITUDE: -97.135786. Initial free water was encountered at 43 feet below existing ground during drilling operations. Water seepage was observed at a depth of 34 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

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Driller: Mario Ybarra **Logger: Paulo Pereira** **Organization: Fugro USA Land, Inc.**

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STATE OF TEXAS
MD FAYSAL
138042
LICENSED
PROFESSIONAL ENGINEER

10/9/23

Fugro USA Land, Inc.
3011 Red Hawk Drive, Grand Prairie, TX 75052
Tel: +1 (972) 484-8301 * www.fugro.com
Texas Engineering Firm F-299

Texas Department of Transportation

Dallas District Bridge

IH35E

BORING LOGS

IH 35E NBFR OVER UPRR

SHEET 1 OF 5

FILE: SEE PATH	DN: RC		CK: RS	DW: RC		CK: RS
©TxDOT 2023	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0195	03	088, ETC.		IH35E	
	DIST	COUNTY			SHEET NO.	
	DAL	DENTON			150	

DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alonis

DATE: 10/8/2023 8:31:44 PM
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DRILLING LOG

WinCore Version 3.3

County	Denton	Hole	B-0	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/7/19
CSJ	0195-03-088	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	57.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SAND, very dense, moist, tan, with silt (SP)							
55		50 (2) 50 (1)								
60		50 (1.5) 50 (1)								
36.5			SHALE, soft, dark gray							
65		50 (3) 50 (2)								
34.			SHALE, hard, dark gray, with limestone seams							66'-70', REC=96%, RQD=69%
70		50 (2) 50 (1)		0	144	15			141	70'-75', REC=100%, RQD=95%
25. 75		50 (1.5) 50 (1)								

Remarks: LATITUDE: 33.196524, LONGITUDE: -97.135786. Initial free water was encountered at 43 feet below existing ground during drilling operations. Water seepage was observed at a depth of 34 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

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Driller: Mario Ybarra **Logger:** Paulo Pereira **Organization:** Fugro USA Land, Inc.

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DRILLING LOG

WinCore Version 3.3

County	Denton	Hole	B-0	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/7/19
CSJ	0195-03-088	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	57.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SAND, very dense, moist, gray, with silt seam (SP)							75'-80', REC=90%, RQD=8%
80		50 (2) 50 (1)								80'-85', REC=100%, RQD=53%
85		50 (1) 50 (0.5)								85'-90', REC=95%, RQD=88%
13.5			SHALE, hard to very hard, gray							
90		50 (0.5) 50 (0.5)								90'-95', REC=85%, RQD=65%
95		50 (0.25) 50 (0.25)								95'-100', REC=100%, RQD=100%
100		50 (0.25) 50 (0.25)								

Remarks: LATITUDE: 33.196524, LONGITUDE: -97.135786. Initial free water was encountered at 43 feet below existing ground during drilling operations. Water seepage was observed at a depth of 34 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Mario Ybarra **Logger:** Paulo Pereira **Organization:** Fugro USA Land, Inc.

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STATE OF TEXAS
MD FAYSAL
138042
LICENSED
PROFESSIONAL ENGINEER

10/9/23

FUGRO
Fugro USA Land, Inc.
3011 Red Hawk Drive, Grand Prairie, TX 75052
Tel: +1 (972) 484-8301 * www.fugro.com
Texas Engineering Firm F-299

Texas Department of Transportation

Dallas District Bridge

IH35E

BORING LOGS

IH 35E NBFR OVER UPRR

SHEET 2 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		151

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DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alanis

DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alanis

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-1	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/26/18
CSJ	0195-03-088	Station		Grnd. Elev.	717.96 ft
		Offset		GW Elev.	669.96 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			CLAY, hard, reddish brown and tan, moist (CL)							HP: 4.50; SPT-N: 28
716.0			SAND, slightly compact, reddish brown and tan, dry (SC)							SPT-N: 19
714.0		18 (6) 18 (6)	CLAY, stiff, reddish brown and tan, with sand (CL)							SPT-N: 19
5										SPT-N: 18
10		7 (6) 6 (6)								
705.0			SAND, slightly compact, brown, moist, poorly cemented (SC)							SPT-N: 50(4")
15		12 (6) 12 (6)								
700.0			SAND, dense, reddish brown and tan, moist, poorly cemented, with sandstone seams (SC)							SPT-N: 50(5.5")
20		50 (1) 50 (0.5)								
25		50 (0.5) 50 (0.5)								SPT-N: 50(4.5")
30		50 (1.5) 50 (1)								SPT-N: 50(4.5")
35		50 (1) 50 (0.8)								SPT-N: 50(3.75")
40		50 (1) 50 (0.5)								SPT-N: 50(4")

Remarks: Groundwater was noted at a depth of 48 feet . Boring depth 70 feet. As surveyed coordinates: E-2386178.716, N-7121940.456

Driller: Cody Logger: RJ Organization: Texplor

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-1	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/26/18
CSJ	0195-03-088	Station		Grnd. Elev.	717.96 ft
		Offset		GW Elev.	669.96 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SAND, dense, reddish brown and tan, moist, poorly cemented, with sandstone seams (SC)							
45		50 (0.5) 50 (0.5)								SPT-N: 50(3")
50		50 (4) 50 (3)								SPT-N: 59
55		50 (1) 50 (0.5)								SPT-N: 50(5.75")
660.0			SAND, dense, light tan, moist, poorly cemented, with sandstone seams (SC)							SPT-N: 50(3")
60		50 (2) 50 (1)								
65		50 (1) 50 (0.8)								SPT-N: 50(4")
648.0		50 (1) 50 (1)								
70										
75										
80										

Remarks: Groundwater was noted at a depth of 48 feet . Boring depth 70 feet. As surveyed coordinates: E-2386178.716, N-7121940.456

Driller: Cody Logger: RJ Organization: Texplor

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

STATE OF TEXAS
AJAY POTTURI VENKATA
107656
LICENSED
PROFESSIONAL ENGINEER

10/19/2023

intertek psi
Registered Engineering Firm
Certification: F-3307

Texas Department of Transportation | Dallas District Bridge

IH35E

BORING LOGS

IH 35E NBFR OVER UPRR

SHEET 3 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		152

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DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-2	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/27/18
CSJ	0195-03-088	Station		Grnd. Elev.	705.71 ft
		Offset		GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SAND, loose, reddish brown and tan, moist (SC)							SPT-N: 5
703.7			SAND, loose to dense, tan, dry, poorly cemented (SC)							
		9 (6) 10 (6)								SPT-N: 9
5										SPT-N: 8
										SPT-N: 50(2")
10		50 (2) 50 (0.3)								SPT-N: 50(1")
694.7			SAND, dense, reddish brown and tan, moist, poorly cemented, with sandstone seams (SC)							
691.7			SAND, dense, light tan, moist, poorly cemented, with sandstone seams (SC)							SPT-N: 50(6")
15		50 (1) 50 (0.5)								
										SPT-N: 50(5")
20		50 (1) 50 (0.3)								
										SPT-N: 50(2")
25		50 (1) 50 (0.3)								
675.7										
30		50 (1.3) 50 (0.3)								
35										
40										

Remarks: Groundwater was not noted during drilling. Boring depth 30 feet. As surveyed coordinates: E-2385918.736, N-7122050.682

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected.

Driller: Jason **Logger:** Jason **Organization:** Kraatz

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-3	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/27/18
CSJ	0195-03-088	Station		Grnd. Elev.	715.34 ft
		Offset		GW Elev.	671.34 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			CLAY, stiff, dark brown, reddish brown and tan, with sand (CL)							HP: 4.50; SPT-N: 31
										SPT-N: 27
		13 (6) 14 (6)								SPT-N: 36
710.3 5			SAND, loose to dense, reddish brown and tan, moist, poorly cemented (SC)							SPT-N: 15
										SPT-N: 5
10		5 (6) 13 (6)								
										HP: 4.00; SPT-N: 50(5.75")
15		50 (3) 50 (2)								
696.3			SAND, dense, light tan, moist, poorly cemented, with sandstone seams (SC)							SPT-N: 50(5")
20		50 (0.8) 50 (0.5)								
691.3			SAND, dense, reddish brown and light tan, moist, poorly cemented, with sandstone seams (SC)							SPT-N: 50(4.5")
25		50 (0.8) 50 (0.5)								
										SPT-N: 50(5.5")
30		50 (3) 50 (2)								
										SPT-N: 50(4.75")
35		50 (1) 50 (1)								
										SPT-N: 18
40		50 (0.8) 50 (0.5)								

Remarks: Groundwater was noted at a depth of 44 feet . Boring depth 40 feet. As surveyed coordinates: E-2385880.917, N-7121975.304

Driller: Cody **Logger:** RJ **Organization:** Texplor

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

STATE OF TEXAS
AJAY POTTURI VENKATA
107656
LICENSED
PROFESSIONAL ENGINEER

10/19/2023

intertek psi Registered Engineering Firm
Certification: F-3307

Texas Department of Transportation

Dallas District Bridge

IH35E

BORING LOGS

IH 35E NBFR OVER UPRR

SHEET 4 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		153

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DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-3	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/27/18
CSJ	0195-03-088	Station		Grnd. Elev.	715.34 ft
		Offset		GW Elev.	671.34 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, dense, reddish brown and light tan, moist, poorly cemented, with sandstone seams (SC)							
45		18 (6) 17 (6)								SPT-N: 50(5")
50		50 (5.5) 50 (3.3)								SPT-N: 50(5")
55		50 (2) 50 (1.3)								SPT-N: 50(4")
655.3 60		50 (1) 50 (0.8)								SPT-N: 61
			SAND, dense, light tan, moist, poorly cemented (SC)							
65		23 (6) 50 (3.5)								SPT-N: 50(5.5")
70		50 (4.5) 50 (3.8)								SPT-N: 50(5")
641.8 75		50 (0.3) 50 (0.3)	SHALE, hard, gray, sandy							SPT-N: 50(5")
80		50 (0.5) 50 (0.5)								SPT-N: 50(5")

Remarks: Groundwater was noted at a depth of 44 feet . Boring depth 40 feet. As surveyed coordinates: E-2385880.917, N-7121975.304

Driller: Cody Logger: RJ Organization: Texplor

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-3	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/27/18
CSJ	0195-03-088	Station		Grnd. Elev.	715.34 ft
		Offset		GW Elev.	671.34 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SHALE, hard, gray, sandy							
85		50 (2) 50 (2)								SPT-N: 50(4")
625.3 90		50 (0.5) 50 (0.3)								
95										
100										
105										
110										
115										
120										

Remarks: Groundwater was noted at a depth of 44 feet . Boring depth 40 feet. As surveyed coordinates: E-2385880.917, N-7121975.304

Driller: Cody Logger: RJ Organization: Texplor

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

STATE OF TEXAS
AJAY POTTURI VENKATA
107656
LICENSED
PROFESSIONAL ENGINEER

10/19/2023

intertek psi Registered Engineering Firm Certification: F-3307

Texas Department of Transportation — Dallas District Bridge

IH35E

BORING LOGS

IH 35E NBFR OVER UPRR

SHEET 5 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		154

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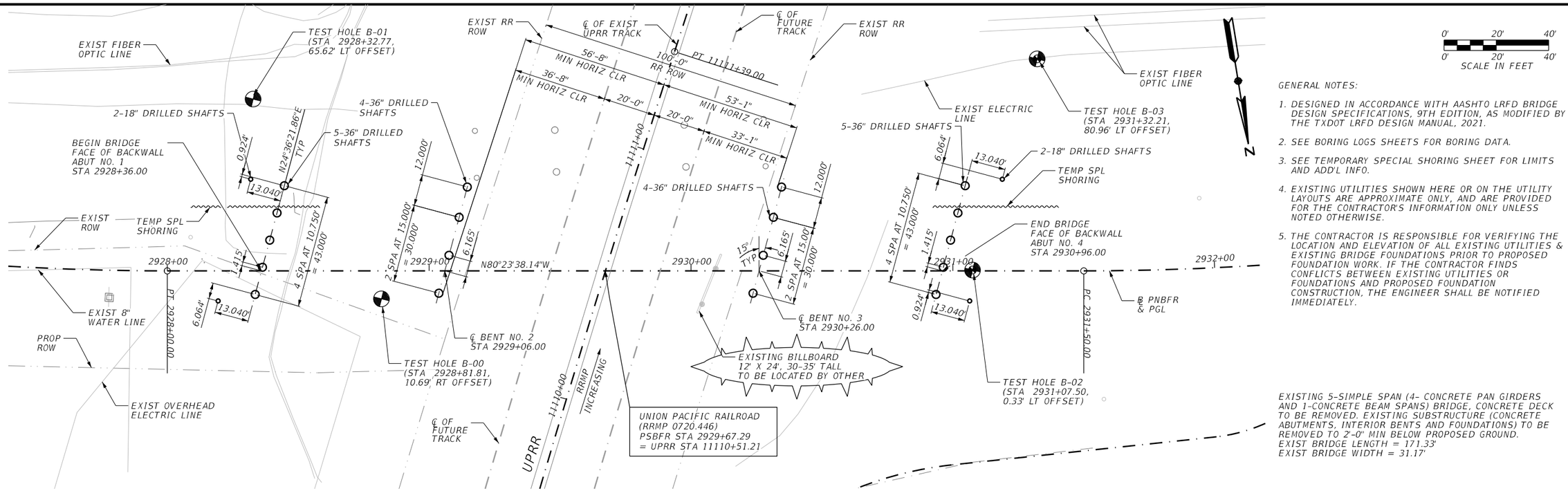

PLAN

NOTE: THE REMOVAL OF EXISTING STRUCTURES SHALL BE COMPLETED IN A SAFE AND CONTROLLED MANNER. SAW CUTTING, PULVERIZING, AND/OR RUBBLIZING THAT RESULTS IN FREE FALL OF DEBRIS TO THE TRACKS IS NOT ALLOWED.

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. SEE BORING LOGS SHEETS FOR BORING DATA.
3. SEE TEMPORARY SPECIAL SHORING SHEET FOR LIMITS AND ADD'L INFO.
4. EXISTING UTILITIES SHOWN HERE OR ON THE UTILITY LAYOUTS ARE APPROXIMATE ONLY, AND ARE PROVIDED FOR THE CONTRACTOR'S INFORMATION ONLY UNLESS NOTED OTHERWISE.
5. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES & EXISTING BRIDGE FOUNDATIONS PRIOR TO PROPOSED FOUNDATION WORK. IF THE CONTRACTOR FINDS CONFLICTS BETWEEN EXISTING UTILITIES OR FOUNDATIONS AND PROPOSED FOUNDATION CONSTRUCTION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

EXISTING 5-SIMPLE SPAN (4- CONCRETE PAN GIRDERS AND 1-CONCRETE BEAM SPANS) BRIDGE, CONCRETE DECK TO BE REMOVED. EXISTING SUBSTRUCTURE (CONCRETE ABUTMENTS, INTERIOR BENTS AND FOUNDATIONS) TO BE REMOVED TO 2'-0" MIN BELOW PROPOSED GROUND.
EXIST BRIDGE LENGTH = 171.33'
EXIST BRIDGE WIDTH = 31.17'

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

FOUNDATION LAYOUT
IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		155

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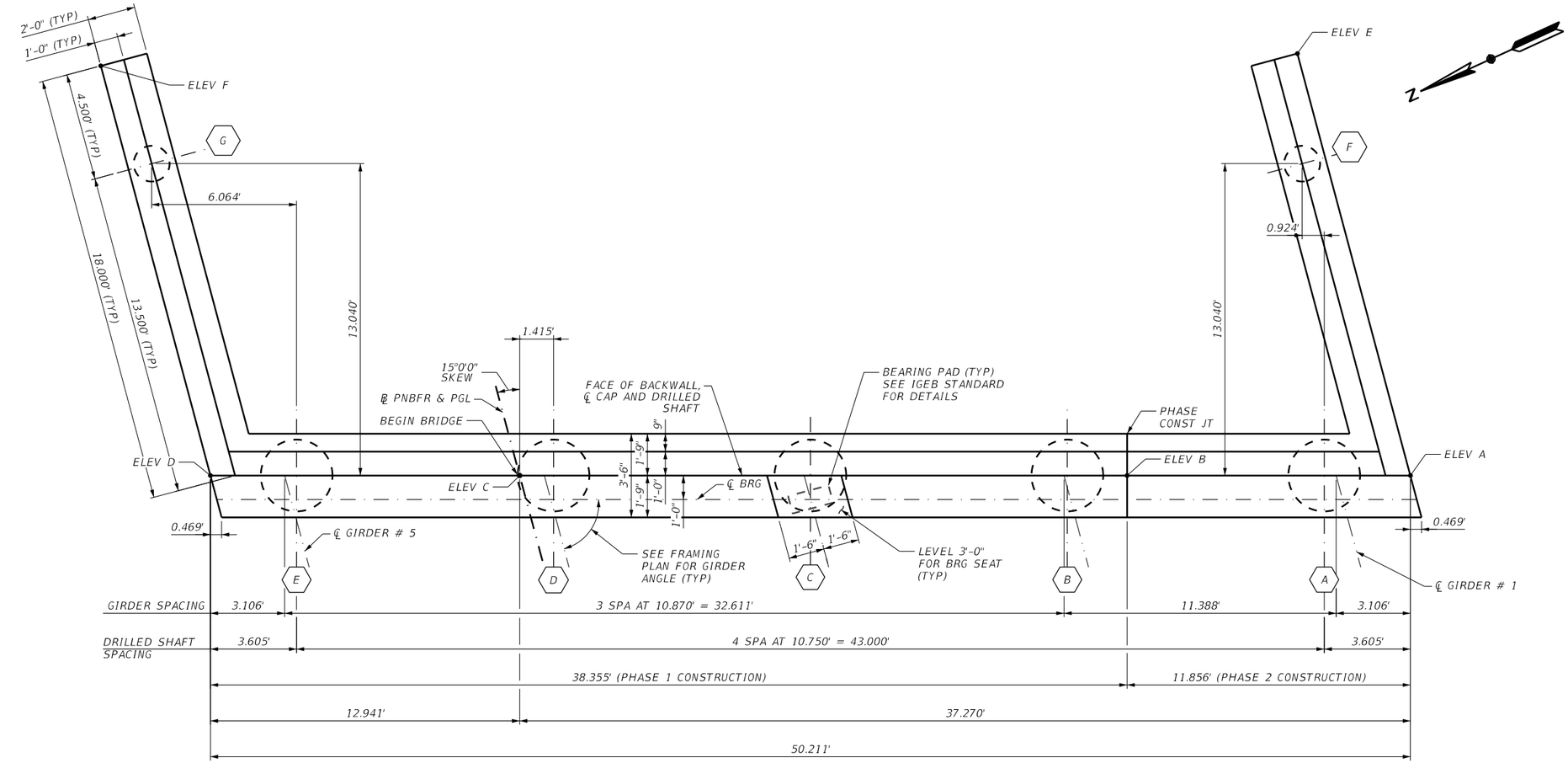
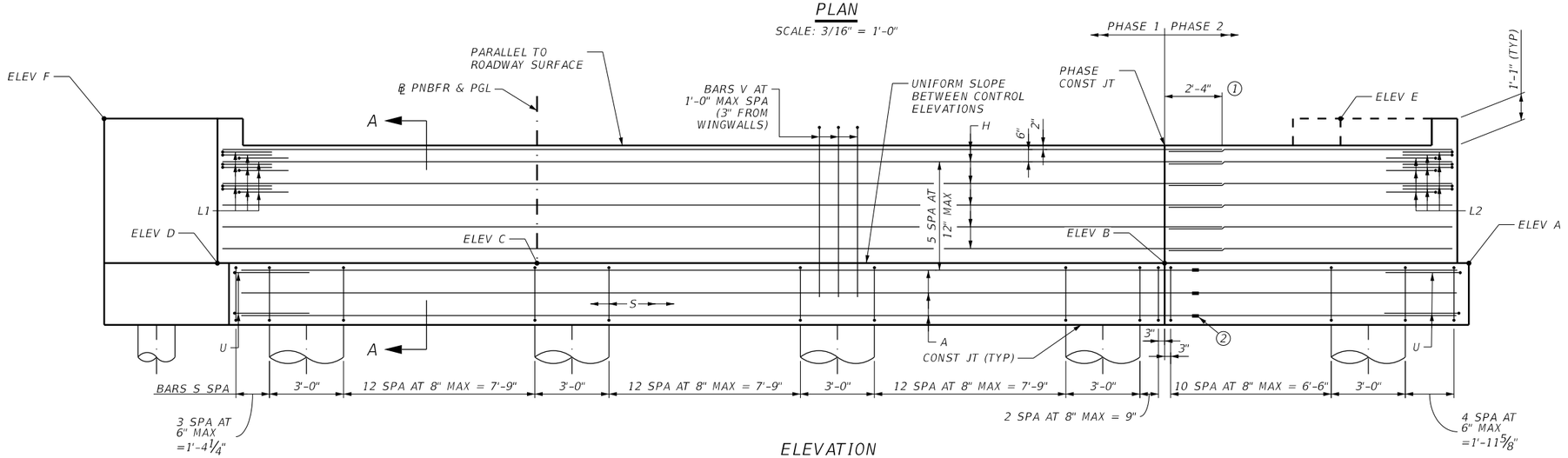


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

BEARING SEATS					TOP OF CAP CONTROL ELEVATIONS						TOP OF DRILLED SHAFT CONTROL ELEVATIONS				
GDR #1	GDR #2	GDR #3	GDR #4	GDR #5	ELEV A	ELEV B	ELEV C	ELEV D	ELEV E	ELEV F	DS A	DS B	DS C	DS D	DS E
716.606	716.338	716.082	715.823	715.564	716.544	716.263	715.662	715.355	721.950	720.730	713.959	713.704	713.450	713.195	712.940

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET, FOR RIPRAP ATTACHMENT DETAILS.
7. DRILLED SHAFT LOADS:
   36" DIA SHAFT = 110 TONS/DS.
   18" DIA SHAFT = 10 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

(1) EXTEND BARS H 2'-4" FROM FACE OF PHASE CONSTRUCTION JOINT TO ACHIEVE MIN 2'-2" LAP.

(2) EXTEND BARS A 1'-0" FROM FACE OF PHASE CONSTRUCTION JOINT. PROVIDE MECHANICAL REINFORCING COUPLERS, IN ACCORDANCE WITH ITEM 440 "MECHANICAL COUPLERS", FOR CONNECTION TO LATER PHASE OF CONSTRUCTION.

(X) DENOTES ℄ D.S.

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation
Dallas District Bridge

IH35E

ABUTMENT 1 DETAILS

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		156

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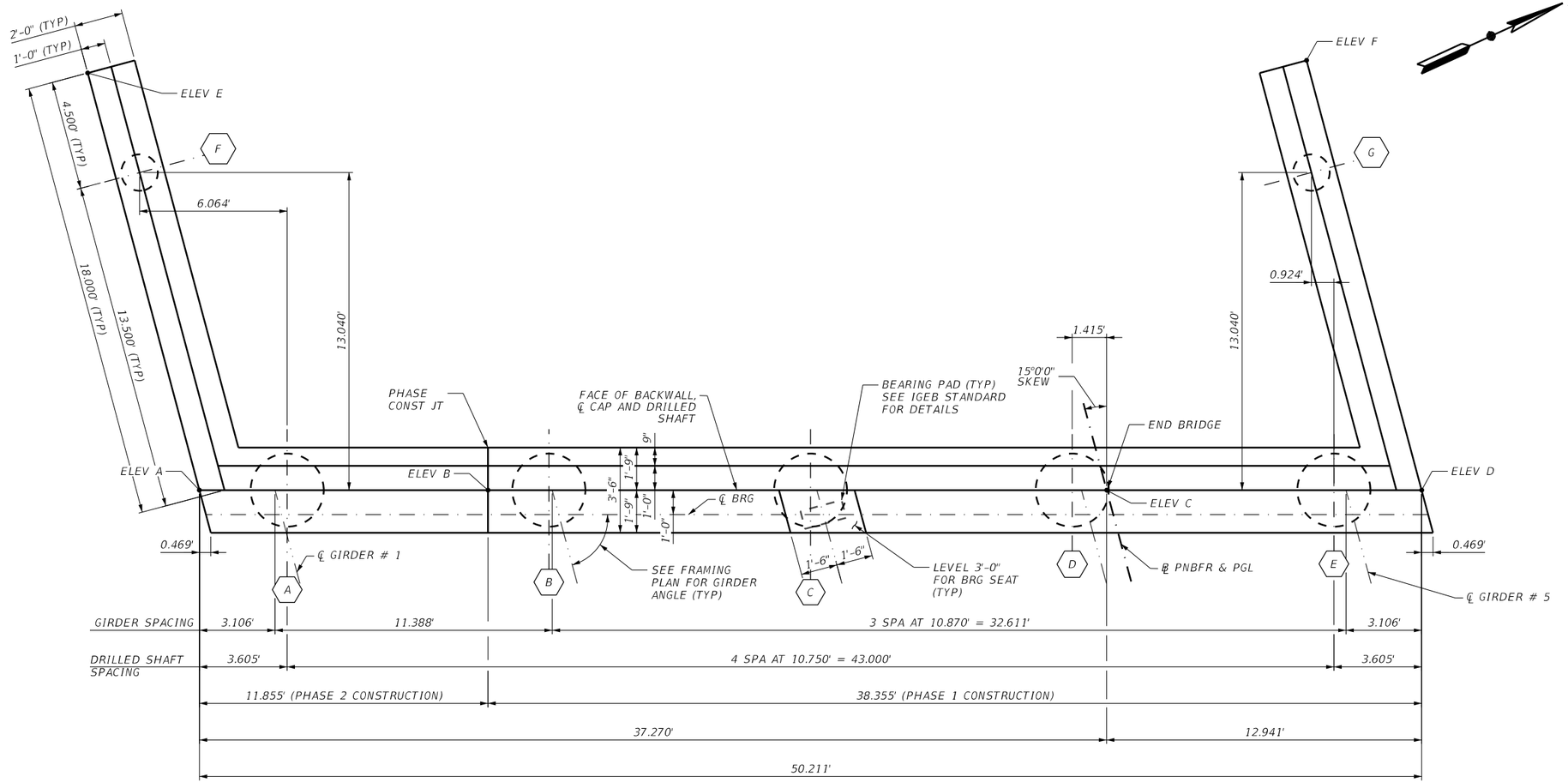
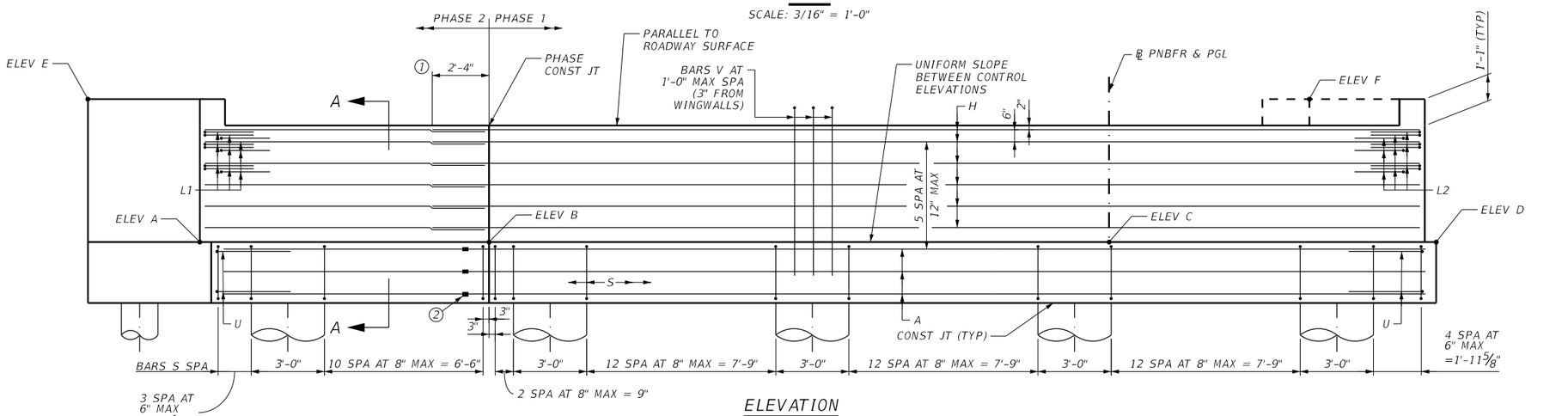


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

BEARING SEATS					TOP OF CAP CONTROL ELEVATIONS						TOP OF DRILLED SHAFT CONTROL ELEVATIONS				
GDR #1	GDR #2	GDR #3	GDR #4	GDR #5	ELEV A	ELEV B	ELEV C	ELEV D	ELEV E	ELEV F	DS A	DS B	DS C	DS D	DS E
715.298	715.154	715.016	714.876	714.735	715.211	715.059	714.734	714.569	720.420	719.800	712.665	712.527	712.390	712.252	712.115

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET, FOR RIPRAP ATTACHMENT DETAILS.
7. DRILLED SHAFT LOADS:
   36" DIA SHAFT = 110 TONS/DS.
   18" DIA SHAFT = 10 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

(1) EXTEND BARS H 2'-4" FROM FACE OF PHASE CONSTRUCTION JOINT TO ACHIEVE MIN 2'-2" LAP.

(2) EXTEND BARS A 1'-0" FROM FACE OF PHASE CONSTRUCTION JOINT. PROVIDE MECHANICAL REINFORCING COUPLERS, IN ACCORDANCE WITH ITEM 440 "MECHANICAL COUPLERS", FOR CONNECTION TO LATER PHASE OF CONSTRUCTION.

(X) DENOTES ℄ D.S.

HL93 LOADING

STATE OF TEXAS · DION R. ALLICOCK · 92529 · LICENSED PROFESSIONAL ENGINEER

10/5/2023

AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

ABUTMENT 4 DETAILS

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE:	SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT	2024	CONT	SECT	JOB	HIGHWAY
REVISIONS		0195	03	088, ETC.	IH35E
		DIST	COUNTY		SHEET NO.
		DAL	DENTON		157

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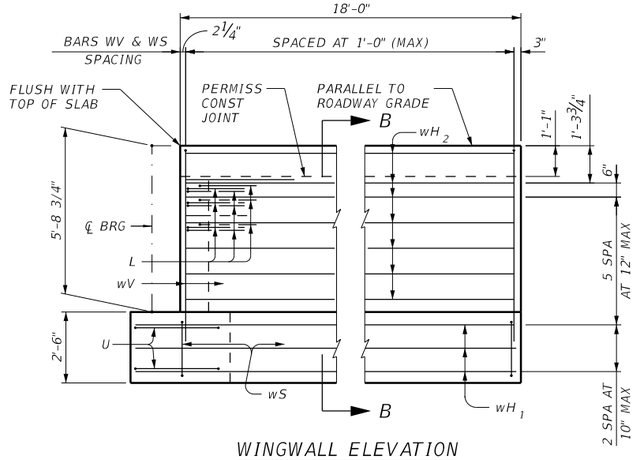
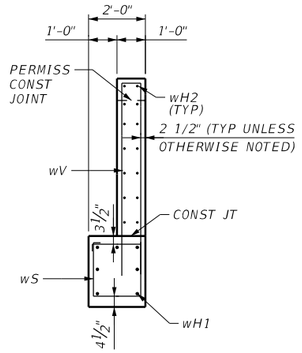


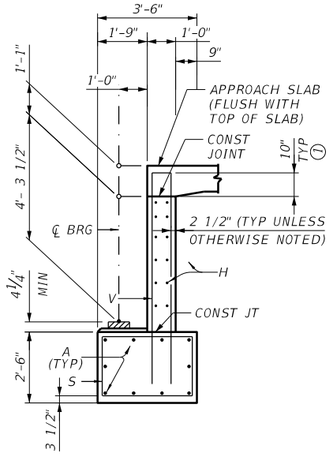
WINGWALL ELEVATION

SCALE: 3/16" = 1'-0"



SECTION B-B

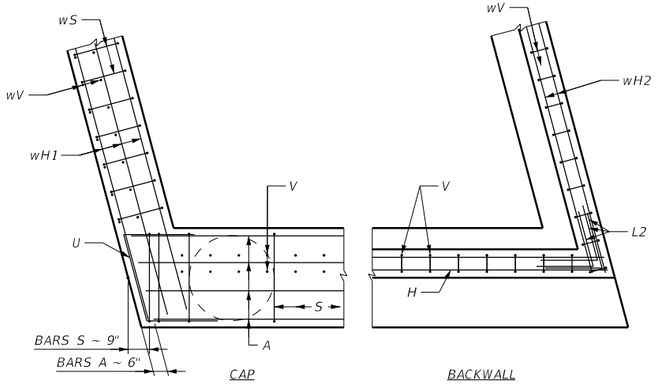
SCALE: 3/16" = 1'-0"



SECTION A-A

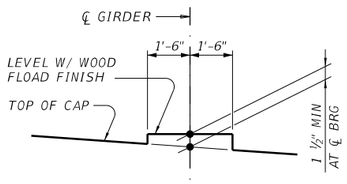
SCALE: 3/16" = 1'-0"

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE



CORNER DETAILS

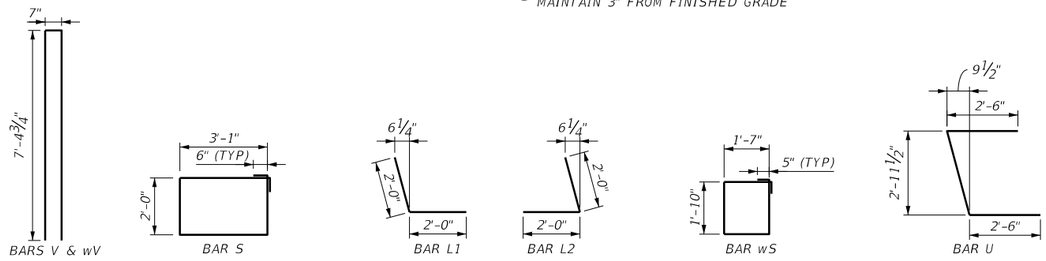
SCALE: 3/16" = 1'-0"



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

SCALE: NTS



ABUTMENT 1 PHASE 1 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	37' - 10"	2,010
H	12	#6	40' - 6"	730
L1	9	#6	4' - 0"	54
L2	0	#6	4' - 0"	0
S	46	#5	11' - 6"	552
U	2	#6	8' - 2"	25
V	38	#5	15' - 7"	618
wH1	7	#6	19' - 6"	205
wH2	14	#6	17' - 7"	370
wS	19	#4	8' - 0"	102
wV	19	#5	15' - 7"	309
(2) REINFORCING STEEL (LB)				4,973
CLASS "C" CONCRETE (CY) (HPC)				25.8

ABUTMENT 1 PHASE 2 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	11' - 4"	602
H	12	#6	14' - 0"	252
L1	0	#6	4' - 0"	0
L2	9	#6	4' - 0"	54
S	15	#5	11' - 6"	180
U	2	#6	8' - 2"	25
V	11	#5	15' - 7"	179
wH1	7	#6	19' - 6"	205
wH2	14	#6	17' - 7"	370
wS	19	#4	8' - 0"	102
wV	19	#5	15' - 7"	309
(2) REINFORCING STEEL (LB)				2,277
CLASS "C" CONCRETE (CY) (HPC)				12.6

ABUTMENT 4 PHASE 1 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	37' - 10"	2,010
H	12	#6	40' - 6"	730
L1	9	#6	4' - 0"	54
L2	0	#6	4' - 0"	0
S	46	#5	11' - 6"	552
U	2	#6	8' - 2"	25
V	38	#5	15' - 7"	618
wH1	7	#6	19' - 6"	205
wH2	14	#6	17' - 7"	370
wS	19	#4	8' - 0"	102
wV	19	#5	15' - 7"	309
(2) REINFORCING STEEL (LB)				4,973
CLASS "C" CONCRETE (CY) (HPC)				25.8

ABUTMENT 4 PHASE 2 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	11' - 4"	602
H	12	#6	14' - 0"	252
L1	0	#6	4' - 0"	0
L2	9	#6	4' - 0"	54
S	15	#5	11' - 6"	180
U	2	#6	8' - 2"	25
V	11	#5	15' - 7"	179
wH1	7	#6	19' - 6"	205
wH2	14	#6	17' - 7"	370
wS	19	#4	8' - 0"	102
wV	19	#5	15' - 7"	309
(2) REINFORCING STEEL (LB)				2,277
CLASS "C" CONCRETE (CY) (HPC)				12.6

(2) FOR CONTRACTOR'S INFORMATION ONLY

STATE OF TEXAS
DION R. ALLICOCK
92529
PROFESSIONAL ENGINEER
LICENSED
10/5/2023

HL93 LOADING

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

ABUTMENT MISC DETAILS

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		158

DATE: 10/5/2023 8:28:04 PM
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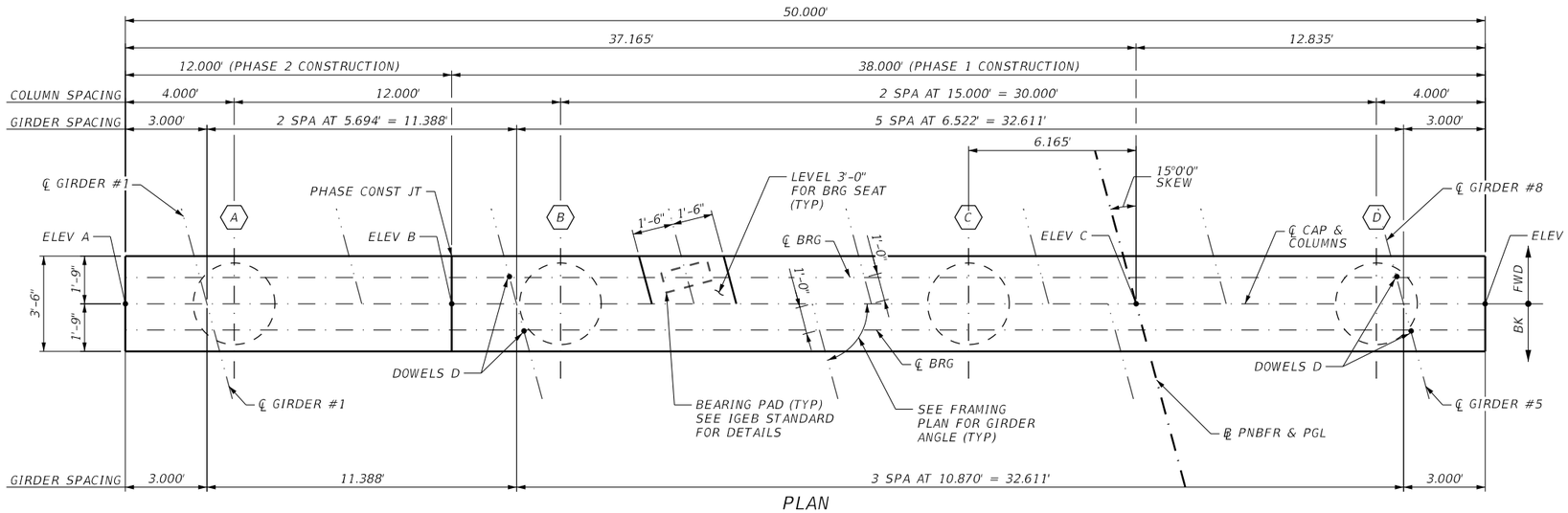
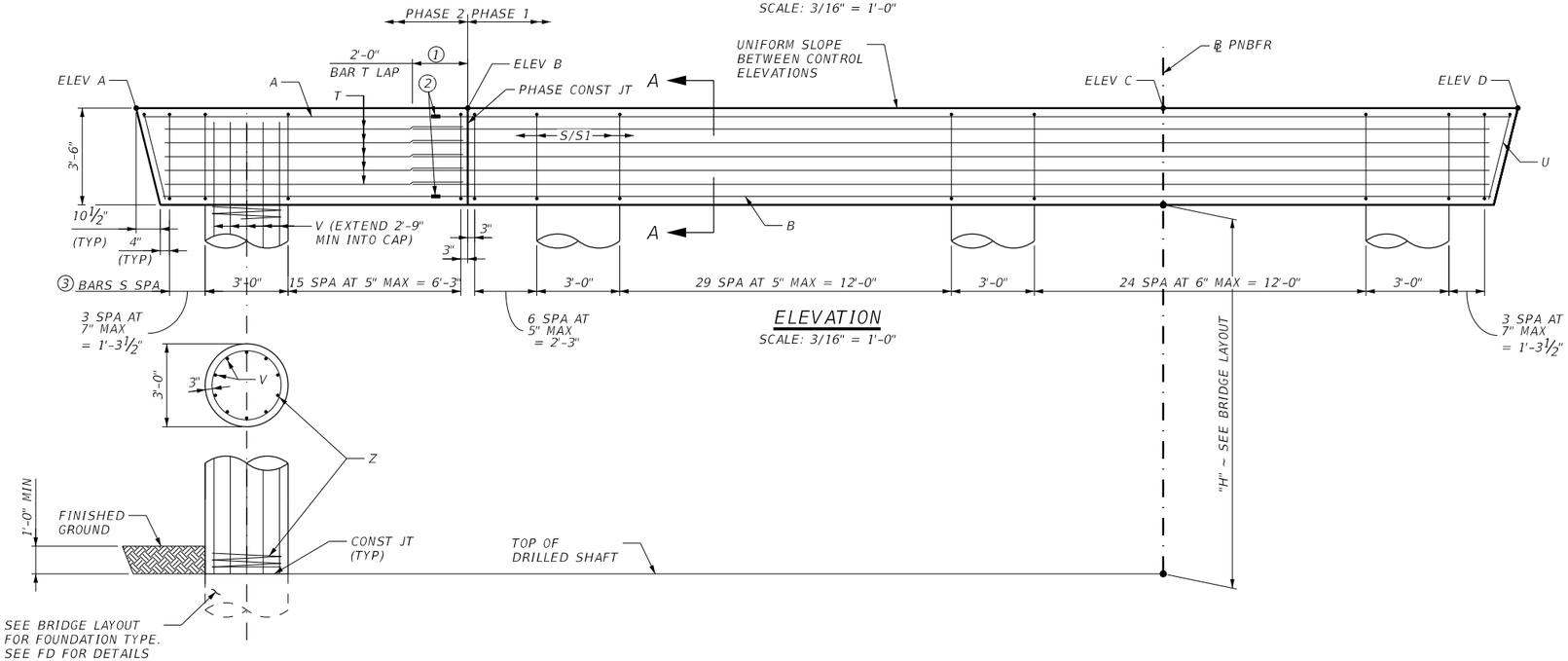


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

BEARING SEATS (FWD)								BEARING SEATS (BACK)				
GDR #1	GDR #2	GDR #3	GDR #4	GDR #5	GDR #6	GDR #7	GDR #8	GDR #1	GDR #2	GDR #3	GDR #4	GDR #5
717.324	717.207	717.089	716.954	716.819	716.683	716.547	716.411	717.315	717.079	716.854	716.627	716.398

TOP OF CAP CONTROL ELEVATIONS				TOP OF COLUMN CONTROL ELEVATIONS			
ELEV A	ELEV B	ELEV C	ELEV D	COL A	COL B	COL C	COL D
717.248	716.998	716.475	716.208	713.665	713.415	713.103	712.791

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR COLUMN HEIGHTS AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. DRILLED SHAFT LOADS: 36" DIA SHAFT = 327 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

① EXTEND BARS T 2'-0" FROM FACE OF PHASE CONSTRUCTION JOINT.

② EXTEND BARS A & B 1'-0" FROM FACE OF PHASE CONSTRUCTION JOINT. PROVIDE MECHANICAL REINFORCING COUPLERS, IN ACCORDANCE WITH ITEM 440 "MECHANICAL COUPLERS", FOR CONNECTION TO LATER PHASE OF CONSTRUCTION.

③ DOUBLE STIRRUPS

(X) DENOTES ℄ COLUMN

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation
Dallas District Bridge

IH35E

BENT 2 DETAILS

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		159

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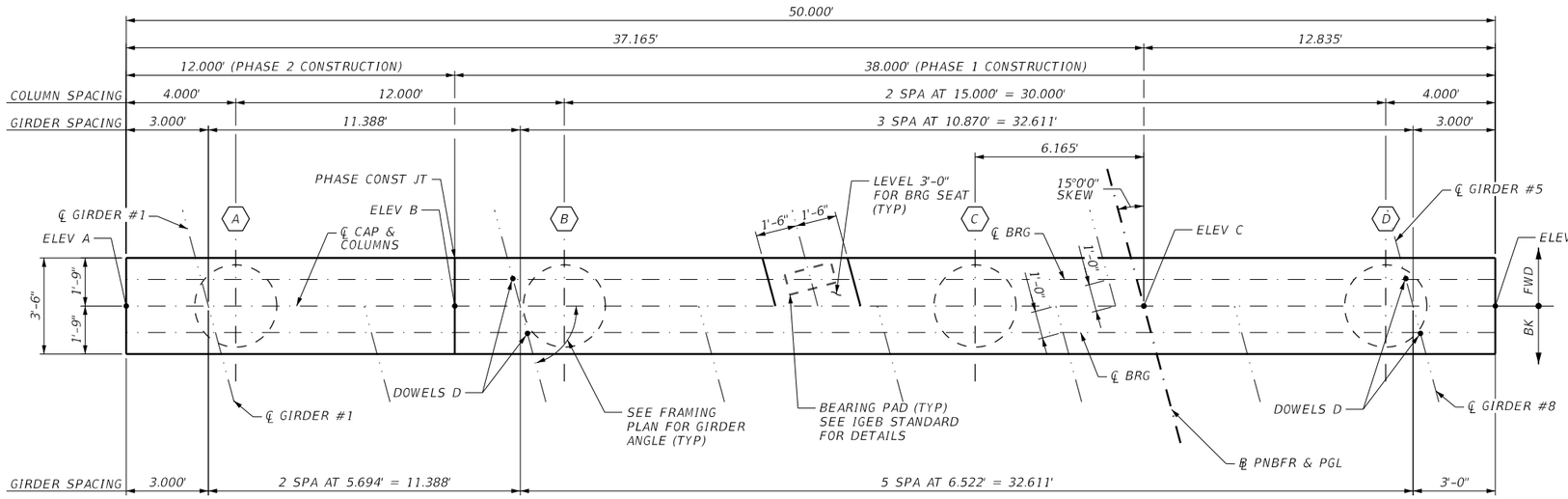
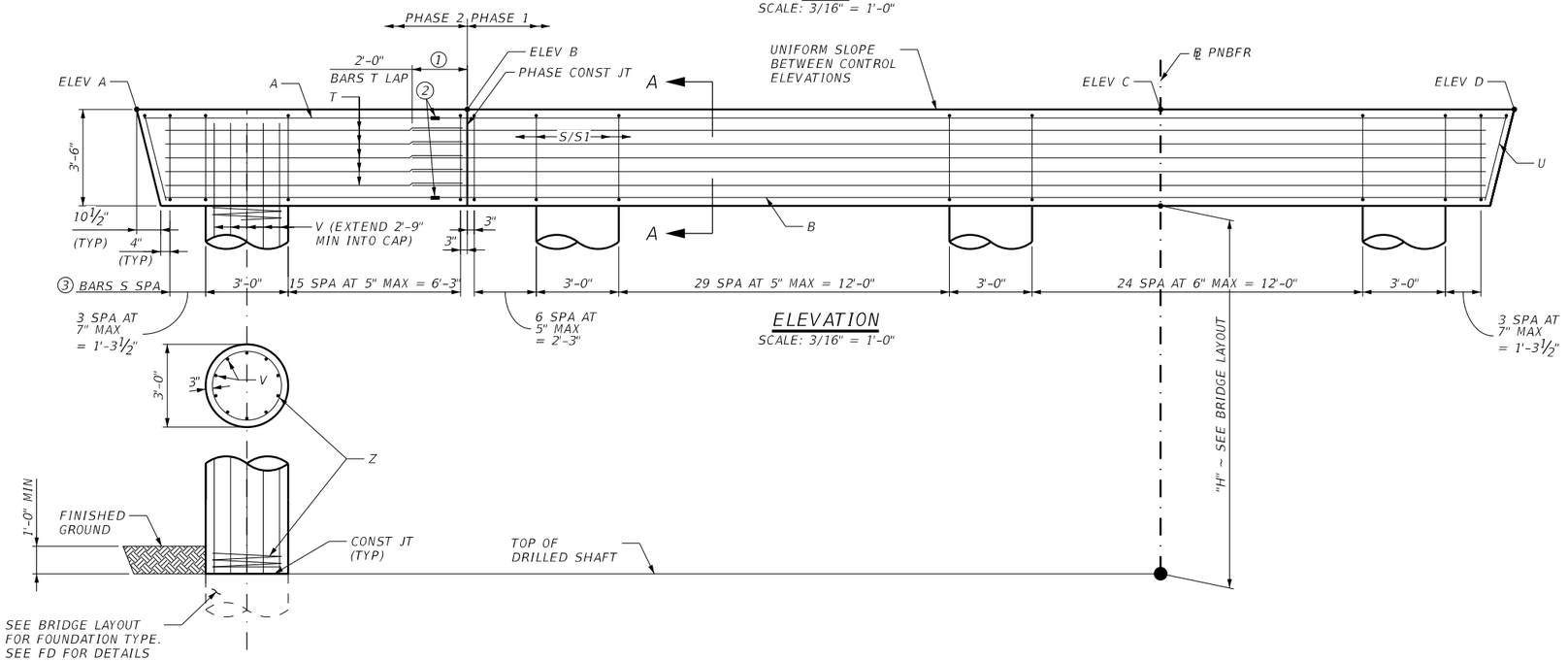


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR COLUMN HEIGHTS AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. DRILLED SHAFT LOADS: 36" DIA SHAFT = 327 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

① EXTEND BARS T 2'-0" FROM FACE OF PHASE CONSTRUCTION JOINT.

② EXTEND BARS A & B 1'-0" FROM FACE OF PHASE CONSTRUCTION JOINT. PROVIDE MECHANICAL REINFORCING COUPLERS, IN ACCORDANCE WITH ITEM 440 "MECHANICAL COUPLERS", FOR CONNECTION TO LATER PHASE OF CONSTRUCTION.

③ DOUBLE STIRRUPS

(X) DENOTES ℄ COLUMN

BEARING SEATS (FWD)					BEARING SEATS (BACK)							
GDR #1	GDR #2	GDR #3	GDR #4	GDR #5	GDR #1	GDR #2	GDR #3	GDR #4	GDR #5	GDR #6	GDR #7	GDR #8
716.695	716.519	716.349	716.178	716.006	716.726	716.637	716.549	716.446	716.344	716.240	716.137	716.033

TOP OF CAP CONTROL ELEVATIONS				TOP OF COLUMN CONTROL ELEVATIONS			
ELEV A	ELEV B	ELEV C	ELEV D	COL A	COL B	COL C	COL D
716.609	716.421	716.025	715.824	713.046	712.858	712.622	712.387

HL93 LOADING

STATE OF TEXAS
DION R. ALLCOCK
92529
PROF. LICENSED
NATIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

BENT 3 DETAILS

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		160

DATE: 10/5/2023 8:28:18 PM
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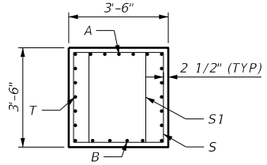

SECTION A-A
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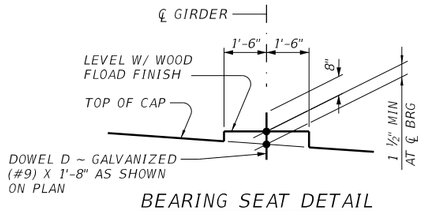
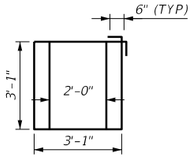
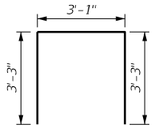


BEARING SEAT DETAIL

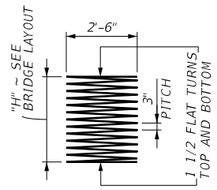
(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)
SCALE: NTS



BAR S/S1



BAR U



BAR Z

BENT 2 PHASE 1 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	7	#11	37' - 10"	1,407
B	6	#11	38' - 1"	1,214
D	4	#9	1' - 8"	23
S	71	#5	13' - 8"	1,012
S1	71	#5	11' - 2"	827
T	10	#5	37' - 0"	386
U	1	#5	9' - 8"	10
V	30	#9	23' - 0"	2,346
(1) Z	3	#4	405' - 0"	812
(1)(2) REINFORCING STEEL (LB)				8,036
CLASS "C" CONCRETE CAP (CY) (HPC)				17.3
(1) CLASS "C" CONCRETE COL (CY) (HPC)				15.7

BENT 2 PHASE 2 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	7	#11	11' - 10"	440
B	6	#11	10' - 0"	319
D	2	#9	1' - 8"	11
S	20	#5	13' - 8"	285
S1	20	#5	11' - 2"	233
T	10	#5	10' - 11"	114
U	1	#5	9' - 8"	10
V	10	#9	23' - 0"	782
(1) Z	1	#4	405' - 0"	271
(1)(2) REINFORCING STEEL (LB)				2,465
CLASS "C" CONCRETE CAP (CY) (HPC)				6.0
(1) CLASS "C" CONCRETE COL (CY) (HPC)				5.5

BENT 3 PHASE 1 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	7	#11	37' - 10"	1,407
B	6	#11	38' - 1"	1,214
D	4	#9	1' - 8"	23
S	71	#5	13' - 8"	1,012
S1	71	#5	11' - 2"	827
T	10	#5	37' - 0"	386
U	1	#5	9' - 8"	10
V	30	#9	23' - 0"	2,346
(1) Z	3	#4	405' - 0"	812
(1)(2) REINFORCING STEEL (LB)				8,036
CLASS "C" CONCRETE CAP (CY) (HPC)				17.3
(1) CLASS "C" CONCRETE COL (CY) (HPC)				15.7

BENT 3 PHASE 2 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	7	#11	11' - 10"	440
B	6	#11	10' - 0"	319
D	2	#9	1' - 8"	11
S	20	#5	13' - 8"	285
S1	20	#5	11' - 2"	233
T	10	#5	10' - 11"	114
U	1	#5	9' - 8"	10
V	10	#9	23' - 0"	782
(1) Z	1	#4	405' - 0"	271
(1)(2) REINFORCING STEEL (LB)				2,465
CLASS "C" CONCRETE CAP (CY) (HPC)				6.0
(1) CLASS "C" CONCRETE COL (CY) (HPC)				5.5

(1) ADJUST SPIRAL Z LENGTH BY 8.1 FT. AND BARS V LENGTH BY 0.5 FT. FOR EACH 0.5 FT. VARIATION IN "H" VALUE.
ADJUST ESTIMATED QUANTITY OF CONCRETE FOR EACH COLUMN BY 0.13 CY FOR EACH 0.5 FT. VARIATION IN "H" VALUE.
ADJUST ESTIMATED QUANTITY OF REINFORCING STEEL FOR EACH COLUMN BY 20.0 LB FOR EACH 0.5 FT. VARIATION IN "H" VALUE.

(2) FOR CONTRACTOR'S INFORMATION ONLY

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

BENT MISC DETAILS

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		161

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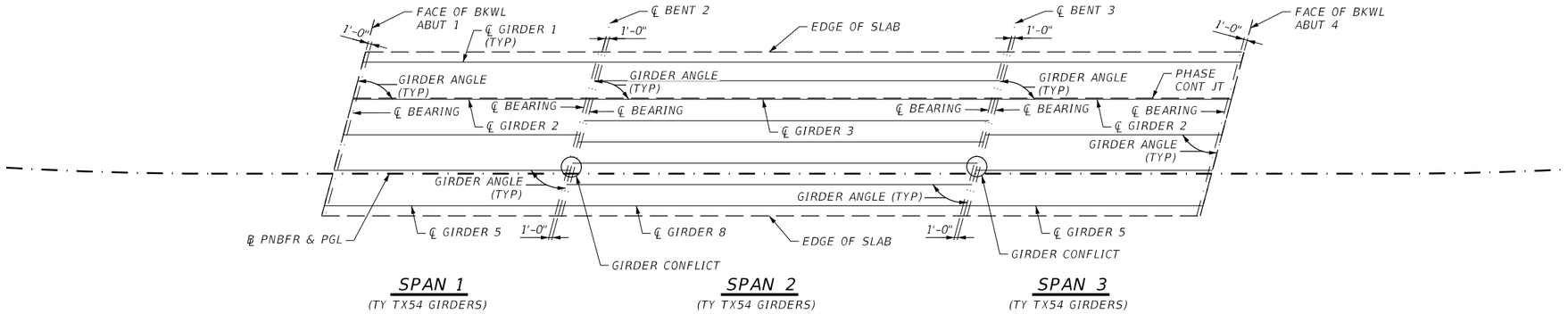
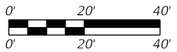


PLAN
SCALE 1" = 40'



GENERAL NOTES:

1. DIMENSIONS ARE IN FEET UNLESS OTHERWISE SHOWN.
2. SEE IGEB STANDARD FOR ORIENTATION OF DIMENSIONS.
3. BEAM LENGTHS SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.

(1) BEAM LENGTHS SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.

BENT REPORT

ABUT NO. 1 (S 24° 36' 21.86" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 34.164 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 1	BEAM 1	0.000	75	0	0
	BEAM 2	11.388	75	0	0
	BEAM 3	10.870	75	0	0
	BEAM 4	10.870	75	0	0
	BEAM 5	10.870	75	0	0
	TOTAL	43.998			

BENT NO. 2 (S 24° 36' 21.86" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 34.164 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 1	BEAM 1	0.000	75	0	0
	BEAM 2	11.388	75	0	0
	BEAM 3	10.870	75	0	0
	BEAM 4	10.870	75	0	0
	BEAM 5	10.870	75	0	0
	TOTAL	43.998			

BENT NO. 2 (S 24° 36' 21.86" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 34.682 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 2	BEAM 1	0.000	75	0	0
	BEAM 2	5.694	75	0	0
	BEAM 3	5.743	75	0	0
	BEAM 4	6.523	75	0	0
	BEAM 5	6.523	75	0	0
	BEAM 6	6.523	75	0	0
	BEAM 7	6.523	75	0	0
	BEAM 8	6.523	75	0	0
	TOTAL	44.052			

BENT NO. 3 (S 24° 36' 21.86" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 34.682 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 2	BEAM 1	0.000	75	0	0
	BEAM 2	5.694	75	0	0
	BEAM 3	5.692	75	0	0
	BEAM 4	6.523	75	0	0
	BEAM 5	6.523	75	0	0
	BEAM 6	6.523	75	0	0
	BEAM 7	6.523	75	0	0
	BEAM 8	6.523	75	0	0
	TOTAL	44.001			

BENT NO. 3 (S 24° 36' 21.86" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 34.164 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 3	BEAM 1	0.000	75	0	0
	BEAM 2	11.388	75	0	0
	BEAM 3	10.870	75	0	0
	BEAM 4	10.870	75	0	0
	BEAM 5	10.870	75	0	0
	TOTAL	43.998			

ABUT NO. 4 (S 24° 36' 21.86" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 34.164 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 3	BEAM 1	0.000	75	0	0
	BEAM 2	11.388	75	0	0
	BEAM 3	10.870	75	0	0
	BEAM 4	10.870	75	0	0
	BEAM 5	10.870	75	0	0
	TOTAL	43.998			

BEAM REPORT

BEAM REPORT, SPAN 1 (1)

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	GIRDER SLOPE
BEAM 1	70.000	67.965	69.495	0.0104
BEAM 2	70.000	67.965	69.495	0.0109
BEAM 3	70.000	67.965	69.496	0.0114
BEAM 4	70.000	67.965	69.496	0.0118
BEAM 5	70.000	67.965	69.496	0.0123

BEAM REPORT, SPAN 2 (1)

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	GIRDER SLOPE
BEAM 1	120.000	118.000	119.502	-0.0051
BEAM 2	120.000	118.000	119.501	-0.0048
BEAM 3	120.000	118.000	119.515	-0.0046
BEAM 4	120.000	118.000	119.515	-0.0043
BEAM 5	120.000	118.000	119.514	-0.0040
BEAM 6	120.000	118.000	119.514	-0.0038
BEAM 7	120.000	118.000	119.514	-0.0035
BEAM 8	120.000	118.000	119.514	-0.0032

BEAM REPORT, SPAN 3 (1)

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	GIRDER SLOPE
BEAM 1	70.000	67.965	69.506	-0.0206
BEAM 2	70.000	67.965	69.505	-0.0201
BEAM 3	70.000	67.965	69.505	-0.0196
BEAM 4	70.000	67.965	69.504	-0.0192
BEAM 5	70.000	67.965	69.503	-0.0187

HL93 LOADING

10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

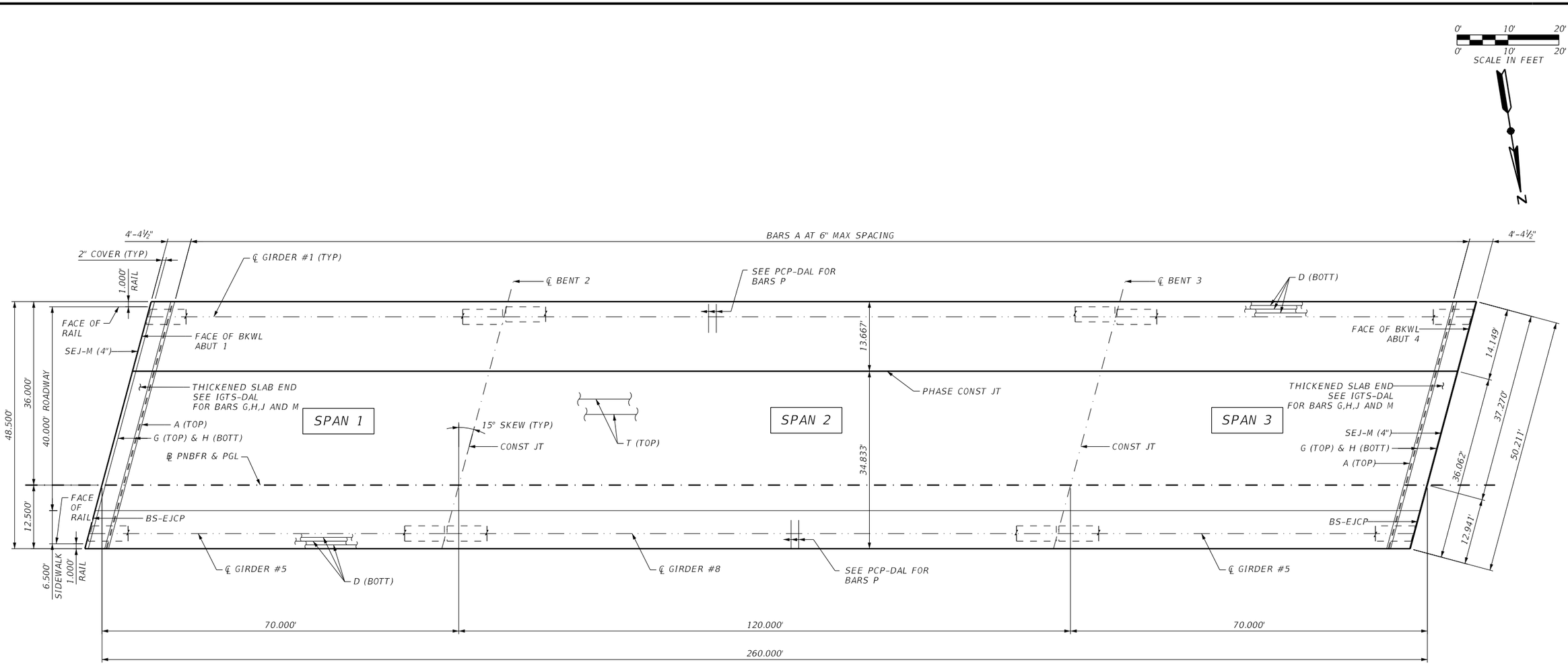
IH35E

FRAMING PLAN

IH 35E NBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		162



PLAN

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. SEE IGTS-DAL STANDARD FOR THICKENED SLAB END DETAILS NOT SHOWN.
3. SEE IGMS-DAL STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.
4. SEE BRSM STANDARD FOR SIDEWALK DETAILS NOT SHOWN.
5. SEE PCP-DAL & PCP-FAB STANDARDS FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
6. CONCRETE SHALL BE CLASS S HPC (F'C = 4,000 PSI)
7. ALL REINFORCING SHALL BE GRADE 60 EPOXY COATED.
8. BAR LAPS, WHERE REQUIRED, SHALL FOLLOW:
   #4 = 2'-5"
   #5 = 3'-0"
9. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED PROFESSIONAL ENGINEER
5/9/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

CONCRETE GIRDER UNIT
IH 35E NBFR OVER UPRR

SHEET 1 OF 2

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		163

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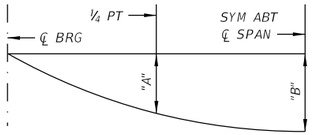


DEAD LOAD DEFLECTION DIAGRAM

CALCULATED DEFLECTIONS SHOWN ARE DUE TO THE CONCRETE SLAB ONLY (EC = 5000 KSI). ADJUST VALUES AS REQUIRED IF OPTIONAL SLAB FORMING IS USED. THESE VALUES MAY REQUIRE FIELD VERIFICATION.

DEAD LOAD DEFLECTION			
SPAN NO.	GIRDER NO.	"A" (FT)	"B" (FT)
1 & 3	1 & 5	-0.017	-0.024
	2	-0.011	-0.016
	3 & 4	-0.021	-0.030
	5	-0.016	-0.023
2	1	-0.104	-0.148
	2	-0.100	-0.142
	3	-0.063	-0.090
	4 - 7	-0.114	-0.162
	8	-0.111	-0.158

TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	"X" AT CL BRG	"Y" AT CL BRG	"Z" AT CL SPAN
1 & 3	1 - 5	10 ½"	5' - 4 ½"	10 ½"
2	1, 3 & 8	10 ½"	5' - 4 ½"	11 ⅞"
	2	10 ½"	5' - 4 ½"	11 ¾"
	4 - 7	10 ½"	5' - 4 ½"	1'-0"

BAR TABLE	
BAR	SIZE
A	#5
D	#5
G	#5
H	#5
J	#5
M	#5
P	#4
T	#4

TABLE OF ESTIMATED QUANTITIES			
SPAN	REINF CONCRETE SLAB (HPC)	PRESTR CONCRETE GIRDERS (TX 54)	REINF STEEL (EPOXY COATED)
NO.	SF	LF (1)	LB (2) (3)
1	3,395	347.48	7,809
2	5,820	956.09	13,386
3	3,395	347.52	7,809
TOTAL	12,610	1651.09	29,003

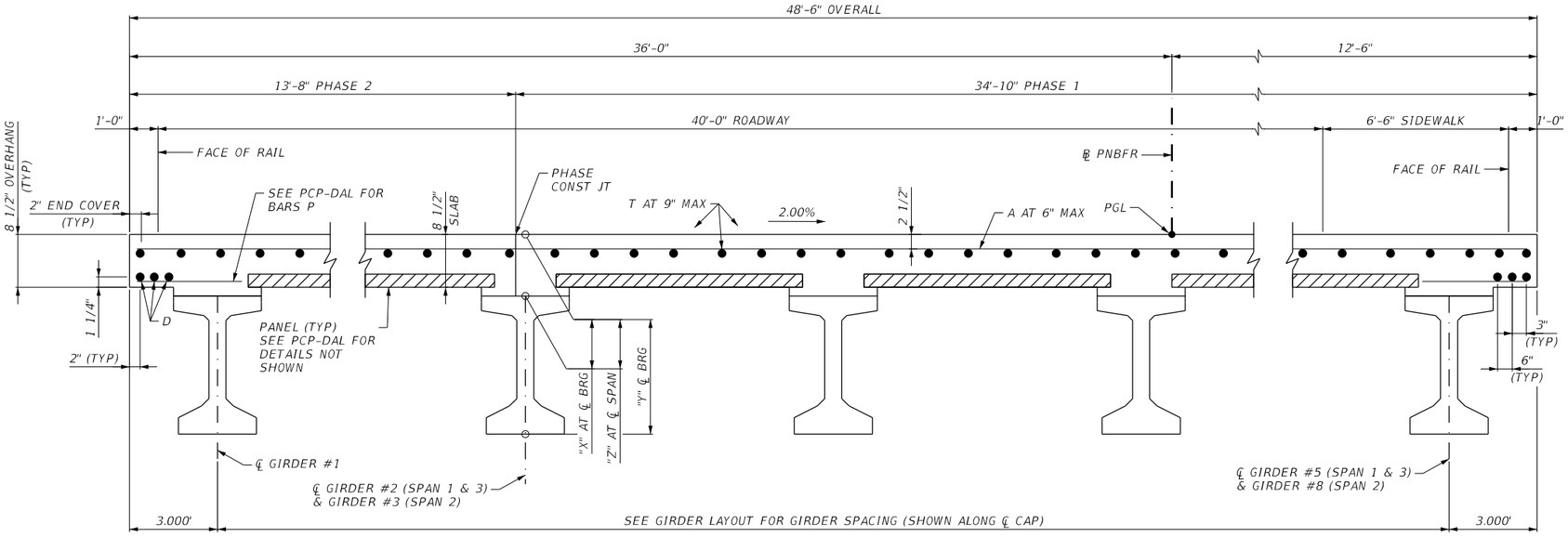
GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. SEE IGTS-DAL STANDARD FOR THICKENED SLAB END DETAILS NOT SHOWN.
3. SEE IGMS-DAL STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.
4. SEE BRSM STANDARD FOR SIDEWALK DETAILS NOT SHOWN.
5. SEE PCP-DAL & PCP-FAB STANDARDS FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
6. CONCRETE SHALL BE CLASS S HPC (F'C = 4,000 PSI)
7. ALL REINFORCING SHALL BE GRADE 60 EPOXY COATED.
8. BAR LAPS, WHERE REQUIRED, SHALL FOLLOW:
   #4 = 2'-5"
   #5 = 3'-0"
9. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

(1) QUANTITIES SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENT MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEET FOR GIRDER LENGTHS.

(2) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 3.4 PSF.

(3) FOR CONTRACTOR'S INFORMATION ONLY.



TYPICAL TRANSVERSE SECTION

NTS

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED PROFESSIONAL ENGINEER

5/9/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

CONCRETE GIRDER UNIT
IH 35E NBFR OVER UPRR

SHEET 2 OF 2

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		164

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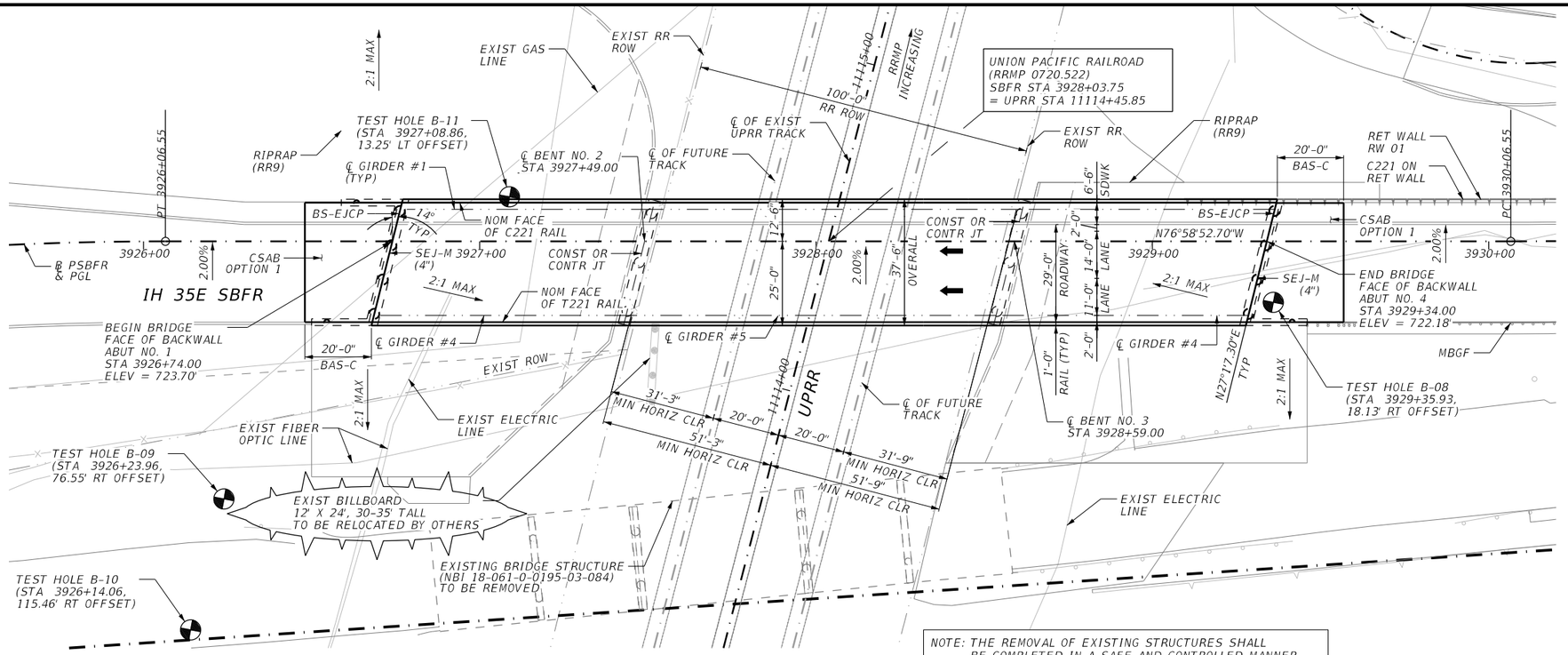


PLAN

NOTE: THE REMOVAL OF EXISTING STRUCTURES SHALL BE COMPLETED IN A SAFE AND CONTROLLED MANNER. SAWCUTTING, PULVERIZING, AND/OR RUBBLIZING THAT RESULTS IN FREE FALL OF DEBRIS TO THE TRACKS IS NOT ALLOWED.

HORZ 0' 20' 40'
VERT 0' 20' 40'
SCALE IN FEET

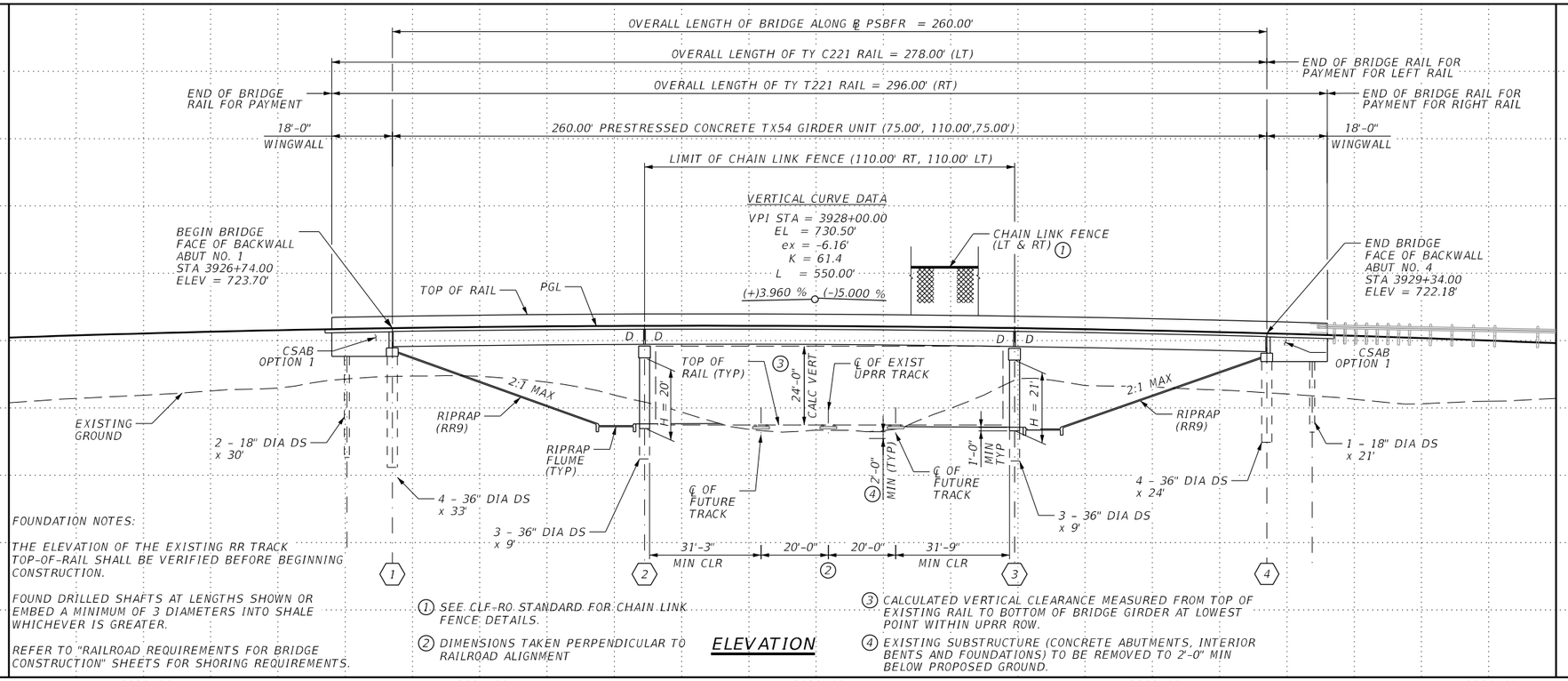
NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
3. "D" DENOTES BENTS WITH DOWELS DAND SLOTTED HOLES AT CONCRETE GIRDERS. SEE BENT SHEET FOR LOCATIONS AND ADD'L INFO.
4. SEE CSAB STANDARD FOR CEMENT STABILIZED BACKFILL LIMITS AND DETAILS.
5. SEE BORING LOGS SHEETS FOR BORING DATA.
6. SAWCUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS REQUIRED.
7. SEE ROADWAY PLANS FOR FOR RIPRAP LIMITS AND ADD'L INFO.
8. DRILLED SHAFTS WITHIN THE INFLUENCE OF TRACK SURCHARGE SHALL BE CONSTRUCTED WITH PERMANENT CASING DESIGNED FOR LIVE LOADS FROM RAILROAD SURCHARGE.
9. ALL RAIL DRAINAGE SLOTS SHALL BE BLOCKED OVER RR ROW.

EXISTING 5-SIMPLE SPAN (4- CONCRETE PAN GIRDERS AND 1-CONCRETE BEAM SPANS) BRIDGE, CONCRETE DECK TO BE REMOVED.
EXIST BRIDGE LENGTH = 171.33'
EXIST BRIDGE WIDTH = 31.17'

FUNCT. CLASS = URBAN MAJOR COLLECTOR
DESIGN SPEED = 45MPH
EXIST ADT = 8780(2017)
PROP ADT = 18400(2023)
PROP ADT = 24900(2043)

EXIST NBI NO. = 18-061-0-0195-03-084
PROP NBI NO. = 18-061-0-0195-03-311



FOUNDATION NOTES:

THE ELEVATION OF THE EXISTING RR TRACK TOP-OF-RAIL SHALL BE VERIFIED BEFORE BEGINNING CONSTRUCTION.

FOUND DRILLED SHAFTS AT LENGTHS SHOWN OR EMBED A MINIMUM OF 3 DIAMETERS INTO SHALE WHICHEVER IS GREATER.

REFER TO "RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION" SHEETS FOR SHORING REQUIREMENTS.

(1) SEE CLF-RO STANDARD FOR CHAIN LINK FENCE DETAILS.

(2) DIMENSIONS TAKEN PERPENDICULAR TO RAILROAD ALIGNMENT

(3) CALCULATED VERTICAL CLEARANCE MEASURED FROM TOP OF EXISTING RAIL TO BOTTOM OF BRIDGE GIRDER AT LOWEST POINT WITHIN UPRR ROW.

(4) EXISTING SUBSTRUCTURE (CONCRETE ABUTMENTS, INTERIOR BENTS AND FOUNDATIONS) TO BE REMOVED TO 2'-0" MIN BELOW PROPOSED GROUND.

ELEVATION

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

BRIDGE LAYOUT

IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		165

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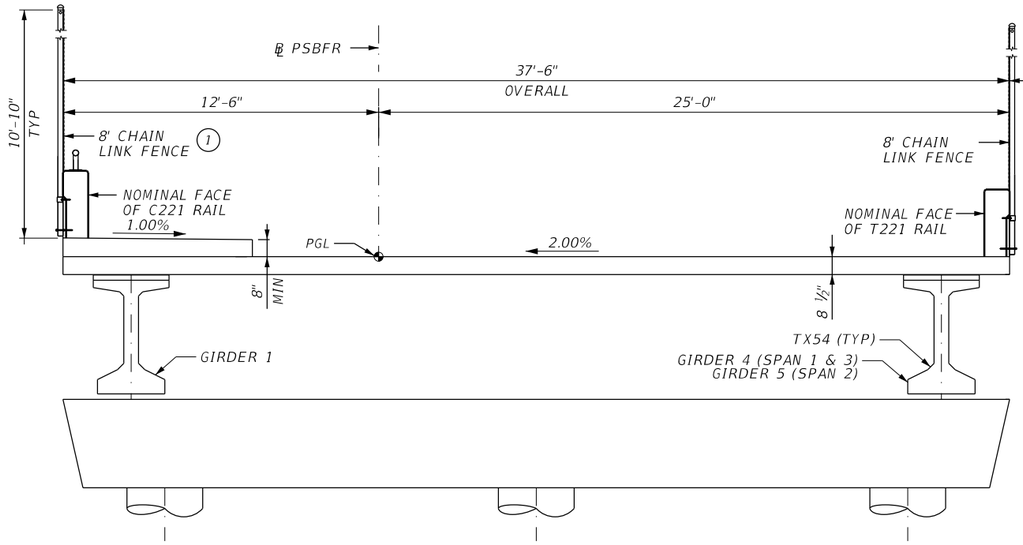
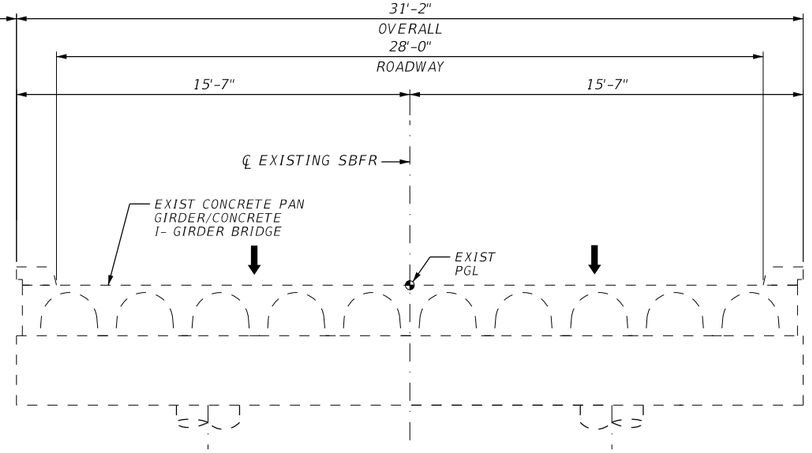
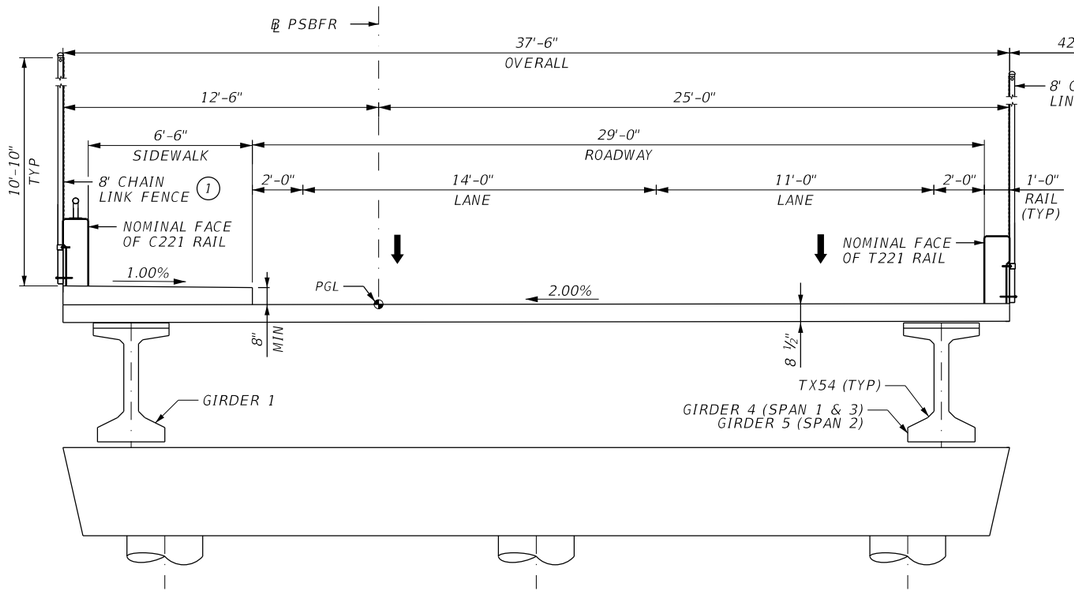


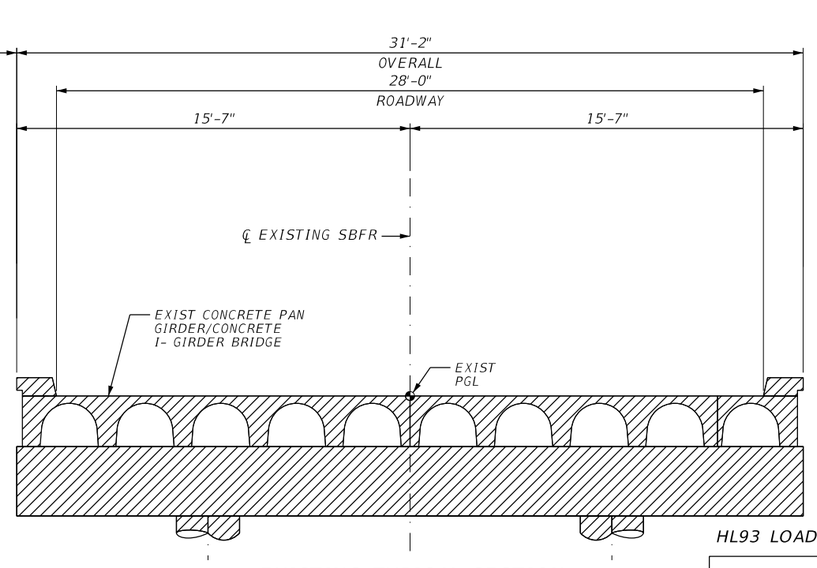


EXISTING TYPICAL SECTION

CONSTRUCTION TYPICAL SECTION

NTS





HL93 LOADING

EXISTING TYPICAL SECTION

REMOVAL TYPICAL SECTION

NTS

1 8" CHAIN LINK FENCE ONLY AT SPAN 2. REFER TO CLF-RO (MOD) STANDARD.

DION R. ALLICOCK
92529
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
10/5/2023

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13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

TYPICAL SECTIONS
IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		166

DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwaldj

DATE: 10/5/2023 8:28:38 PM
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DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alanis

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-8	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/26/18
CSJ	0195-03-089	Station		Grnd. Elev.	705.71 ft
		Offset		GW Elev.	672.21 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SAND, compact, reddish brown and tan, dry (SC)							HP: 4.5+
										HP: 4.5+
										HP: 4.5+
5		31 (6) 22 (6)								
699.7			SAND, compact, gray, dry (SC)							HP: 4.5+
697.7			SAND, dense, reddish brown and tan, dry (SC)							HP: 4.5+
10		50 (2.3) 50 (1.3)								
15		50 (6) 50 (1)								SPT-N: 50(5")
689.7			SAND, dense, light tan, moist, poorly cemented, with sandstone seams (SC)							
20		50 (1.3) 50 (1)								SPT-N: 50(5")
25		50 (1.3) 50 (0.8)								SPT-N: 50(5")
30		50 (1.3) 50 (1.3)								SPT-N: 50(4.5")
670.7 35		50 (1.3) 50 (0.5)								SPT-N: 9
40										

Remarks: Groundwater was noted at a depth of 33.5 feet . Boring depth 90 feet. As surveyed coordinates: E-2385750.371, N-7121724.853

Driller: Jason Logger: Jason Organization: Kraatz

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-9	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/26/18
CSJ	0195-03-089	Station		Grnd. Elev.	713.32 ft
		Offset		GW Elev.	669.82 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SAND, loose, reddish brown and tan, dry (SC)							
5		7 (6) 7 (6)								
706.3			SAND, loose, gray, dry (SC)							
10		6 (6) 6 (6)								
701.3			CLAY, soft to very stiff, tan, with sand (CL)							
15		8 (6) 9 (6)								SPT-N: 5
20		6 (6) 5 (6)								SPT-N: 25
25		27 (6) 26 (6)								SPT-N: 30
30		41 (6) 50 (5)								SPT-N: 50(3")
679.3			SAND, dense, light tan, moist, poorly cemented, with sandstone seams (SC)							SPT-N: 50(6")
35		50 (1.3) 50 (0.8)								
40		50 (1) 50 (0.3)								SPT-N: 50(4.5")

Remarks: Groundwater was noted at a depth of 43.5 feet . Boring depth 50 feet. As surveyed coordinates: E-2386067.484, N-7121711.495

Driller: Jason Logger: Jason Organization: Kraatz

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

STATE OF TEXAS
AJAY POTTURI VENKATA
107656
LICENSED
PROFESSIONAL ENGINEER

10/19/2023

intertek psi Registered Engineering Firm Certification: F-3307

Texas Department of Transportation — Dallas District Bridge

IH35E

BORING LOGS

IH 35E SBFR OVER UPRR

SHEET 1 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS	
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0195	03	088, ETC.	IH35E	
	DIST	COUNTY		SHEET NO.	
	DAL	DENTON		167	

DATE: 10/8/2023 8:32:24 PM
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DN: AECOM CK: AECOM DW: AECOM CK: AECOM irene.alanis

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-9	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/26/18
CSJ	0195-03-089	Station		Grnd. Elev.	713.32 ft
		Offset		GW Elev.	669.82 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
		50 (1.5) 50 (0.5)	SAND, dense, light tan, moist, poorly cemented, with sandstone seams (SC)							SPT-N: 50(2")
663.3		50 (1) 50 (0.5)								

Remarks: Groundwater was noted at a depth of 43.5 feet . Boring depth 50 feet. As surveyed coordinates: E-2386067.484, N-7121711.495

Driller: Jason Logger: Jason Organization: Kraatz

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-10	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/28/18
CSJ	0195-03-089	Station		Grnd. Elev.	714.89 ft
		Offset		GW Elev.	669.89 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			ASPHALT, 8" concrete							
713.9			SAND, loose, reddish brown and tan, dry (SC)							HP: 3.75
		4 (6) 4 (6)								HP: 3.50
										HP: 1.25
										HP: 2.25
		8 (6) 8 (6)								HP: 1.75; SPT-N: 13
		2 (6) 5 (6)								
699.9			SAND, loose, light tan, moist, poorly cemented (SC)							SPT-N: 5
		6 (6) 4 (6)								SPT-N: 26
		4 (6) 6 (6)								
688.9			CLAY, hard, gray and tan (CH)							SPT-N: 50(5")
		46 (6) 50 (3)								HP: 4.5+SPT-N: 50(2.25")
682.9			SAND, dense, light tan, poorly cemented, with sandstone seams (SC)							
		50 (1) 50 (0.5)								
		50 (3.5) 36 (6)								

Remarks: Groundwater was noted at a depth of 45 feet . Boring depth 55 feet. As surveyed coordinates: E-2386085.921, N-7121747.184

Driller: Cody Logger: RJ Organization: Texplor

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

STATE OF TEXAS
AJAY POTTURI VENKATA
107656
LICENSED
PROFESSIONAL ENGINEER

10/19/2023

intertek psi
Registered Engineering Firm
Certification: F-3307

Texas Department of Transportation
Dallas District Bridge

IH35E

BORING LOGS

IH 35E SBFR OVER UPRR

SHEET 2 OF 5

FILE: SEE PATH		DN: RC	CK: RS	DW: RC	CK: RS		
©TxDOT 2023		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0195	03	088, ETC.		IH35E	
		DIST	COUNTY			SHEET NO.	
		DAL	DENTON			168	

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DRILLING LOG

WinCore Version 3.0

County	Denton	Hole	B-10	District	Dallas
Highway	IH 35E	Structure	Bridge	Date	06/28/18
CSJ	0195-03-089	Station		Grnd. Elev.	714.89 ft
		Offset		GW Elev.	669.89 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
		50 (1) 50 (1)	SAND, dense, light tan, poorly cemented, with sandstone seams (SC)							SPT-N: 50(2.5")
45										
		50 (1.8) 50 (1)								SPT-N: 50(5.75")
50										
		50 (1.8) 50 (1)								SPT-N: 50(2")
659.9 55										
60										
65										
70										
75										
80										

Remarks: Groundwater was noted at a depth of 45 feet . Boring depth 55 feet. As surveyed coordinates: E-2386085.921, N-7121747.184

Driller: Cody Logger: RJ Organization: Texplor

\\client\p$\0342 dallas geo\2017 geo projects\03421467 txdot dallas district\wa5\report\wa5 fm1461.gpj

STATE OF TEXAS
AJAY POTTURI VENKATA
107656
LICENSED
PROFESSIONAL ENGINEER

10/19/2023

intertek psi
Registered Engineering Firm
Certification: F-3307

Texas Department of Transportation

Dallas District Bridge

IH35E

BORING LOGS

IH 35E SBFR OVER UPRR

SHEET 3 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		169

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DRILLING LOG

WinCore Version 3.3

County	Denton	Hole	B-11	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/4/19
CSJ	0195-03-089	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	63.50 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, sandy, soft, moist, brown to reddish brown, with fine to medium coarse grained sand (CL)							PP = 1.75
						7	29	16		PP = 4.5 Sieve #200 = 55%
5		9 (6) 9 (6)								PP = 4.5
										PP = 2.0
10		10 (6) 8 (6)								
86.5			SAND, clayey, slightly compact, moist, grayish brown, with gravels (SC)							
15		9 (6) 13 (6)								
81.5			CLAY, very stiff, moist, yellowish brown (CL)							
80. 20		50 (4.5) 50 (5)	SHALE, soft to hard, gray, weathered							shaley at 19.5' to 20'
25		50 (1) 50 (0.5)								

Remarks: LATITUDE: 33.195484, LONGITUDE: -97.136386. Initial free water was encountered at 36.5 feet below existing ground during drilling operations. Water seepage was observed at a depth of 36.5 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Mario Ybarra **Logger:** Sandesh Gautam/Paulo Pereira **Organization:** Fugro USA Land, Inc.

I:\Project Files\Projects-2019\19-1087 FM 2450 Denton County, CSJ 2353-02-026, 0195-03-088 and 0195-03-089\7. Drafting\7.1 Boring Logs\7.1.1 Bridges\B-11.clg

DRILLING LOG

WinCore Version 3.3

County	Denton	Hole	B-11	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/4/19
CSJ	0195-03-089	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	63.50 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SHALE, soft to hard, gray, weathered							
73.			SAND, very dense, moist to wet, light brown and reddish brown, fine to medium coarse grained sand (SP)							
30		50 (1.5) 50 (0.5)								
35		50 (1.5) 50 (0.5)								
40		50 (1.5) 50 (1)								
45		50 (3.5) 5 (1)								
50		38 (6) 50 (3)								

Remarks: LATITUDE: 33.195484, LONGITUDE: -97.136386. Initial free water was encountered at 36.5 feet below existing ground during drilling operations. Water seepage was observed at a depth of 36.5 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Mario Ybarra **Logger:** Sandesh Gautam/Paulo Pereira **Organization:** Fugro USA Land, Inc.

I:\Project Files\Projects-2019\19-1087 FM 2450 Denton County, CSJ 2353-02-026, 0195-03-088 and 0195-03-089\7. Drafting\7.1 Boring Logs\7.1.1 Bridges\B-11.clg

STATE OF TEXAS
MD FAYSAL
138042
LICENSED
PROFESSIONAL ENGINEER

10/9/23

FUGRO
Fugro USA Land, Inc.
3011 Red Hawk Drive, Grand Prairie, TX 75052
Tel: +1 (972) 484-8301 * www.fugro.com
Texas Engineering Firm F-299

Texas Department of Transportation

Dallas District Bridge

IH35E

BORING LOGS

IH 35E SBFR OVER UPRR

SHEET 4 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		170

DRILLING LOG

WinCore Version 3.3

County	Denton	Hole	B-11	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/4/19
CSJ	0195-03-089	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	63.50 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SAND, very dense, moist to wet, light brown and reddish brown, fine to medium coarse grained sand (SP)							
46.5										
		50 (2.5) 50 (0.5)	SAND, clayey, very dense, wet to moist, gray, with silt (SC)							Sieve #200 = 43%
55										
		50 (2) 50 (1.5)								
60										
37.			SHALE, hard, dark gray							
		50 (2) 50 (1)								
65										
										67'-70', REC=61%, RQD=16%
		50 (1.5) 50 (1)								
30. 70			SHALE, hard, gray, with trace sand seam	0	42	13			140	70'-75', REC=100%, RQD=86% sand seam at 70' to 71'
		50 (1) 50 (0.75)								
75										

Remarks: LATITUDE: 33.195484, LONGITUDE: -97.136386. Initial free water was encountered at 36.5 feet below existing ground during drilling operations. Water seepage was observed at a depth of 36.5 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Mario Ybarra **Logger:** Sandesh Gautam/Paulo Pereira **Organization:** Fugro USA Land, Inc.

I:\Project Files\Projects-2019\19-1087 FM 2450 Denton County, CSJ 2353-02-026, 0195-03-088 and 0195-03-089\7. Drafting\7.1 Boring Logs\7.1.1 Bridges\B-11.clg

DRILLING LOG

WinCore Version 3.3

County	Denton	Hole	B-11	District	Dallas
Highway	IH-35E at UPRR	Structure	Bridge	Date	12/4/19
CSJ	0195-03-089	Station		Grnd. Elev.	100.00 ft
		Offset		GW Elev.	63.50 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SHALE, hard, gray, with trace sand seam							75'-80', REC=95%, RQD=95%
80		50 (0.5) 50 (0.5)								80'-85', REC=100%, RQD=73%
85		50 (0.7) 50 (0.5)								85'-90', REC=100%, RQD=100%
10. 90		50 (0.5) 50 (0.25)								
95										
100										

Remarks: LATITUDE: 33.195484, LONGITUDE: -97.136386. Initial free water was encountered at 36.5 feet below existing ground during drilling operations. Water seepage was observed at a depth of 36.5 feet below existing ground at completion. Ground elevation of 100 feet was assumed for reference.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Mario Ybarra **Logger:** Sandesh Gautam/Paulo Pereira **Organization:** Fugro USA Land, Inc.

I:\Project Files\Projects-2019\19-1087 FM 2450 Denton County, CSJ 2353-02-026, 0195-03-088 and 0195-03-089\7. Drafting\7.1 Boring Logs\7.1.1 Bridges\B-11.clg

STATE OF TEXAS
MD FAYSAL
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PROFESSIONAL ENGINEER

10/9/23

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Tel: +1 (972) 484-8301 * www.fugro.com
Texas Engineering Firm F-299

Texas Department of Transportation

Dallas District Bridge

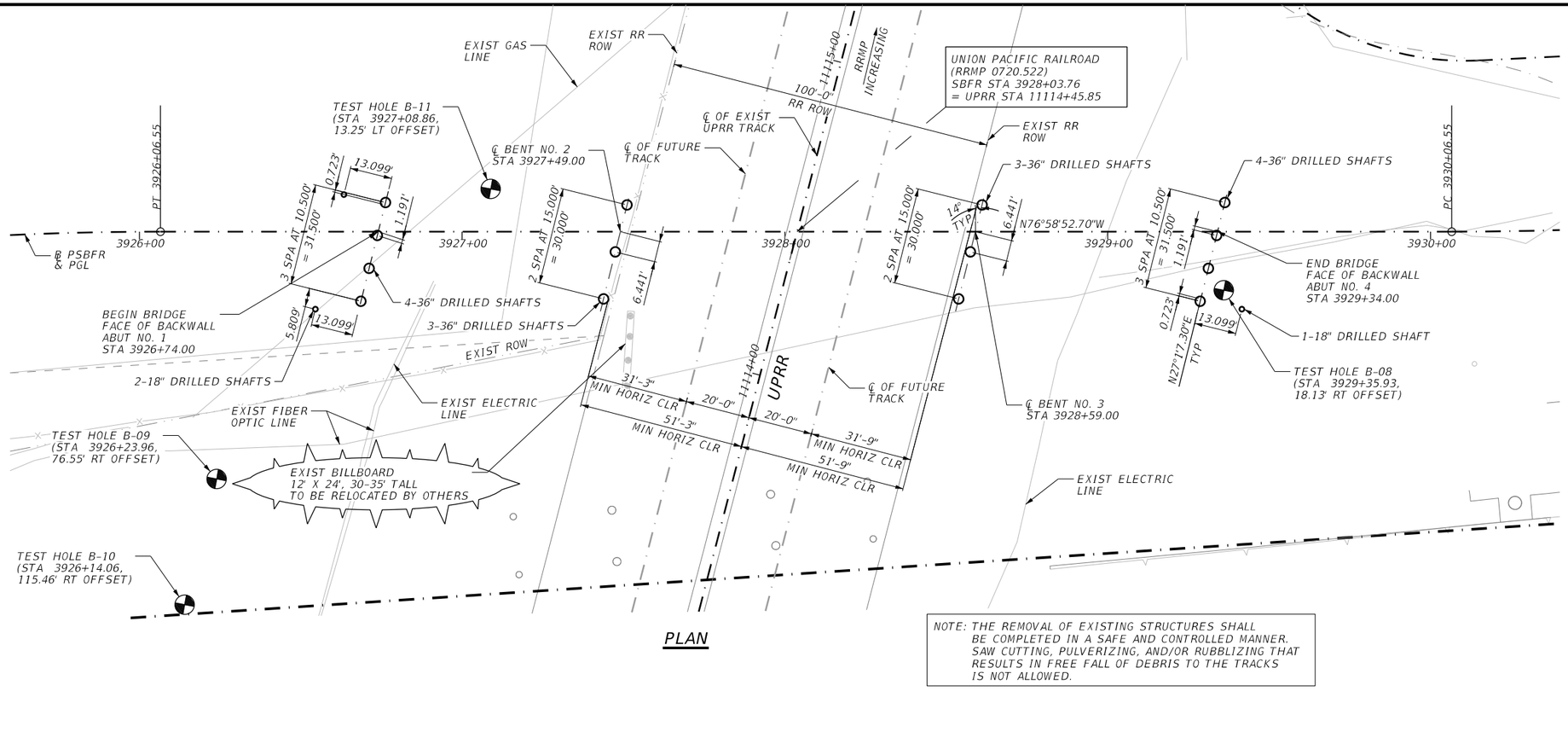
IH35E

BORING LOGS

IH 35E SBFR OVER UPRR

SHEET 5 OF 5

FILE: SEE PATH	DN: RC	CK: RS	DW: RC	CK: RS
©TxDOT 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		171



PLAN

NOTE: THE REMOVAL OF EXISTING STRUCTURES SHALL BE COMPLETED IN A SAFE AND CONTROLLED MANNER. SAW CUTTING, PULVERIZING, AND/OR RUBBLIZING THAT RESULTS IN FREE FALL OF DEBRIS TO THE TRACKS IS NOT ALLOWED.

NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. SEE BORING LOGS SHEETS FOR BORING DATA.
3. EXISTING UTILITIES SHOWN HERE OR ON THE UTILITY LAYOUTS ARE APPROXIMATE ONLY, AND ARE PROVIDED FOR THE CONTRACTOR'S INFORMATION ONLY UNLESS NOTED OTHERWISE.
4. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES & EXISTING BRIDGE FOUNDATIONS PRIOR TO PROPOSED FOUNDATION WORK. IF THE CONTRACTOR FINDS CONFLICTS BETWEEN EXISTING UTILITIES OR FOUNDATIONS AND PROPOSED FOUNDATION CONSTRUCTION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

EXISTING 5-SIMPLE SPAN (4- CONCRETE PAN GIRDERS AND 1-CONCRETE BEAM SPANS) BRIDGE, CONCRETE DECK TO BE REMOVED. EXISTING SUBSTRUCTURE (CONCRETE ABUTMENTS, INTERIOR BENTS AND FOUNDATIONS) TO BE REMOVED TO 2'-0" MIN BELOW PROPOSED GROUND.
EXIST BRIDGE LENGTH = 171.33'
EXIST BRIDGE WIDTH = 31.17'

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

FOUNDATION LAYOUT
IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		172

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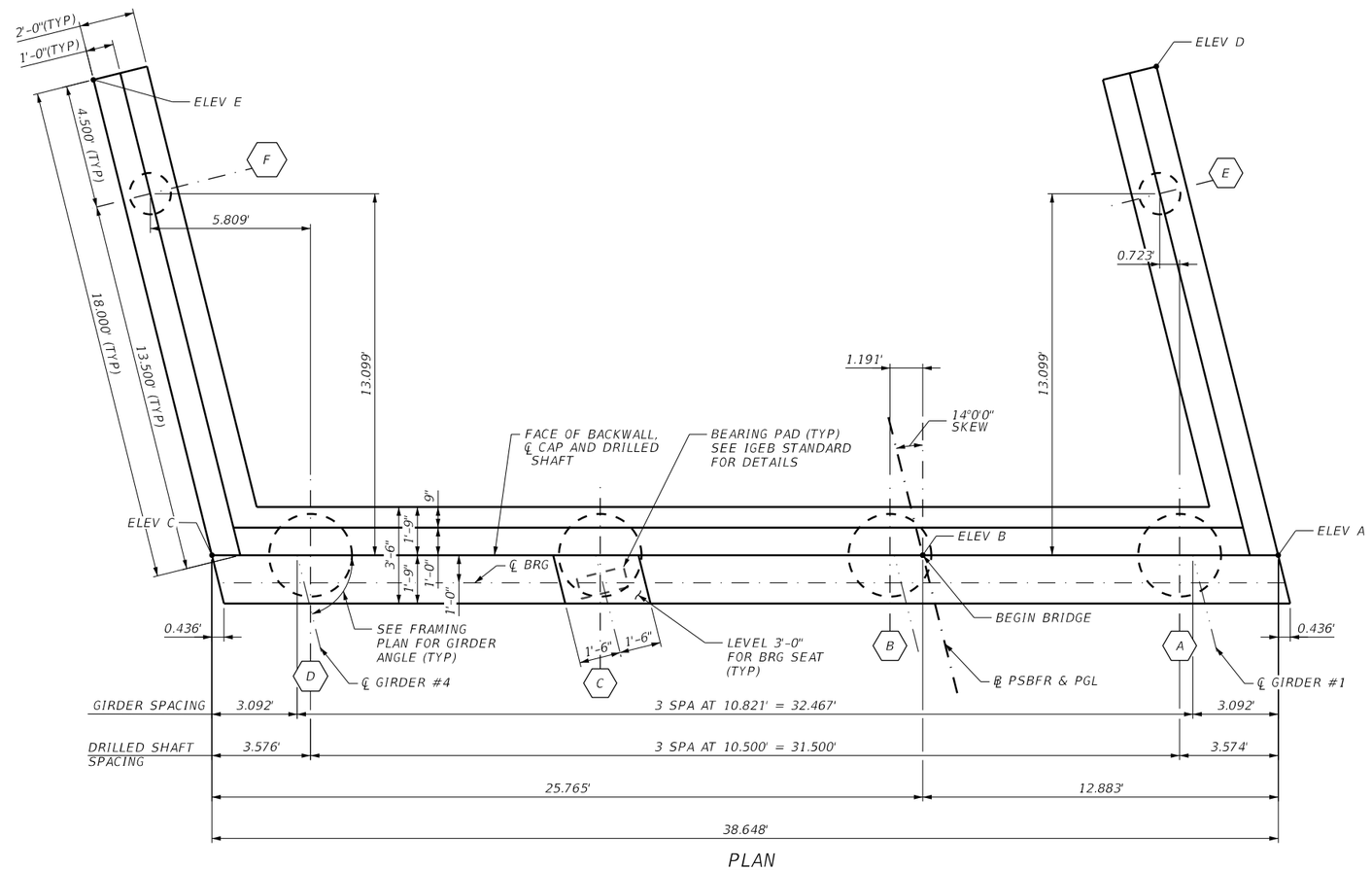
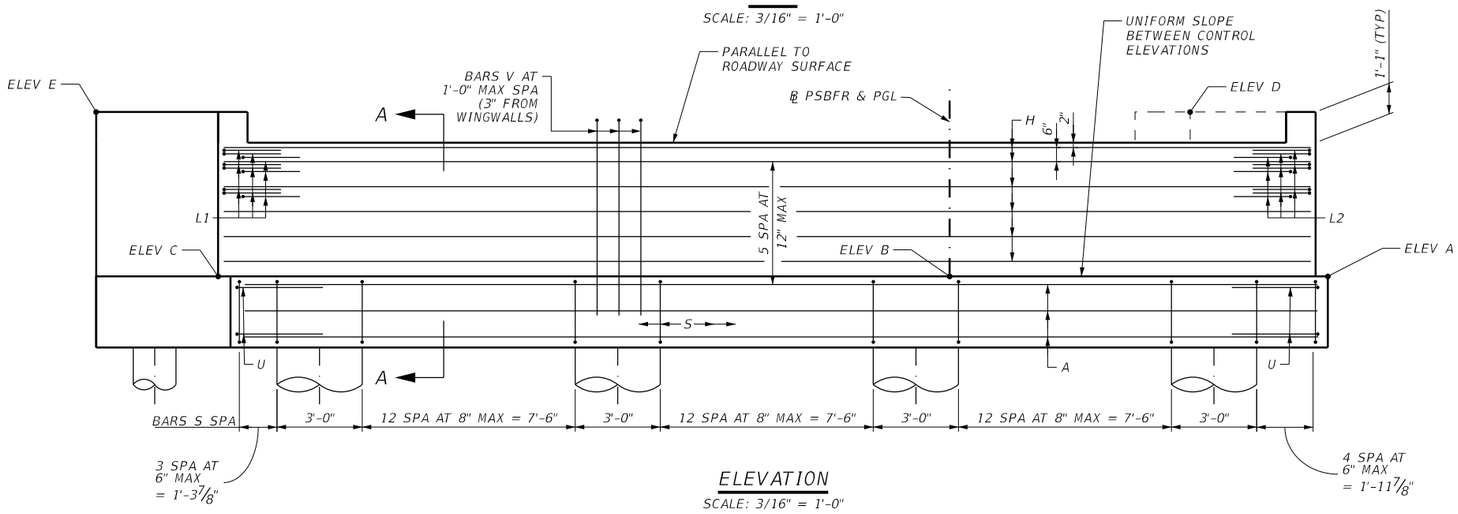


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

BEARING SEATS				TOP OF CAP CONTROL ELEVATIONS					TOP OF DRILLED SHAFT CONTROL ELEVATIONS			
GDR #1	GDR #2	GDR #3	GDR #4	ELEV A	ELEV B	ELEV C	ELEV D	ELEV E	DS A	DS B	DS C	DS D
717.959	718.130	718.299	718.468	717.780	717.982	718.386	723.200	723.790	715.336	715.501	715.666	715.830

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET, FOR RIPRAP ATTACHMENT DETAILS.
7. DRILLED SHAFT LOADS:
   36" DIA SHAFT = 110 TONS/DS.
   18" DIA SHAFT = 10 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

(X) DENOTES ℄ D.S.

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

ABUTMENT 1 DETAILS

IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		173

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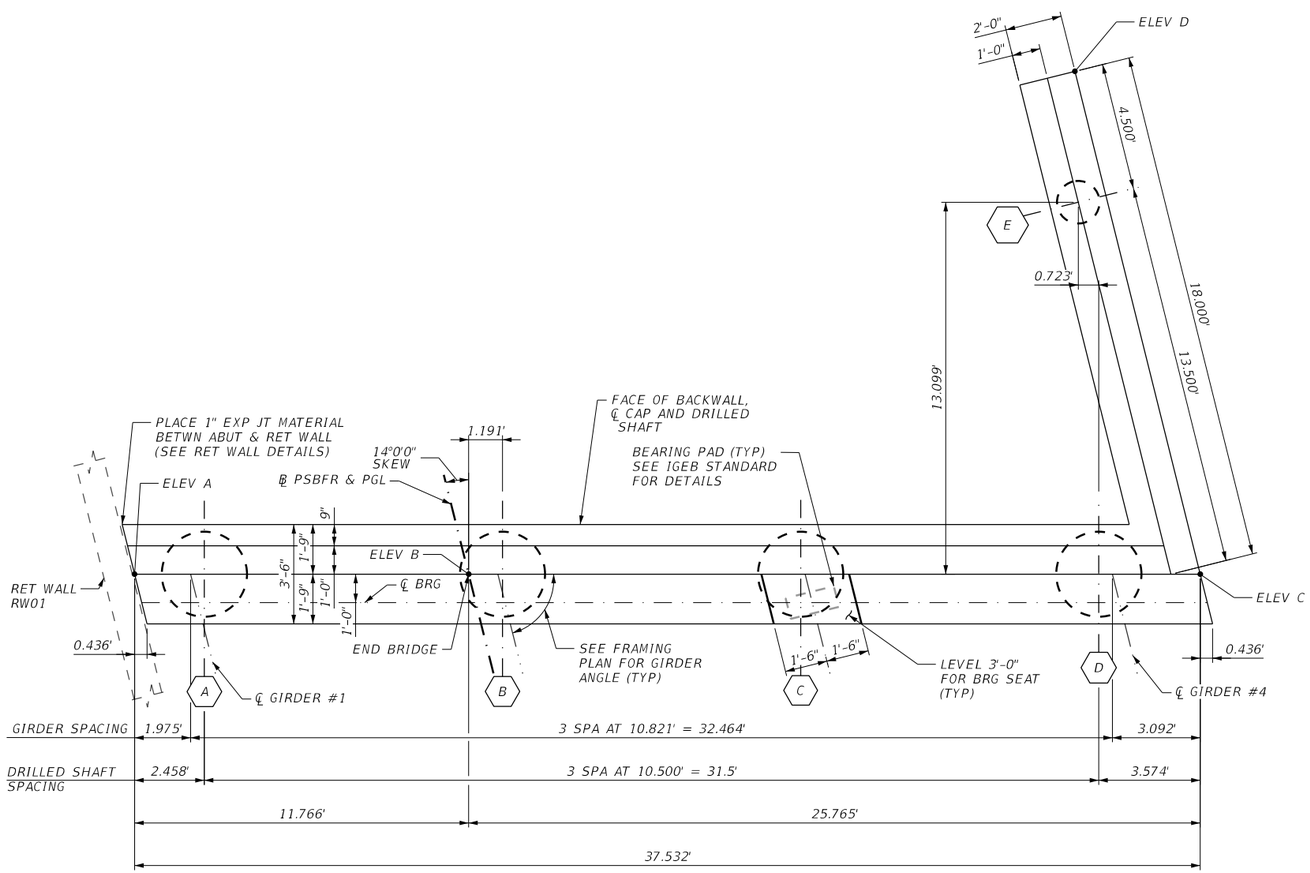
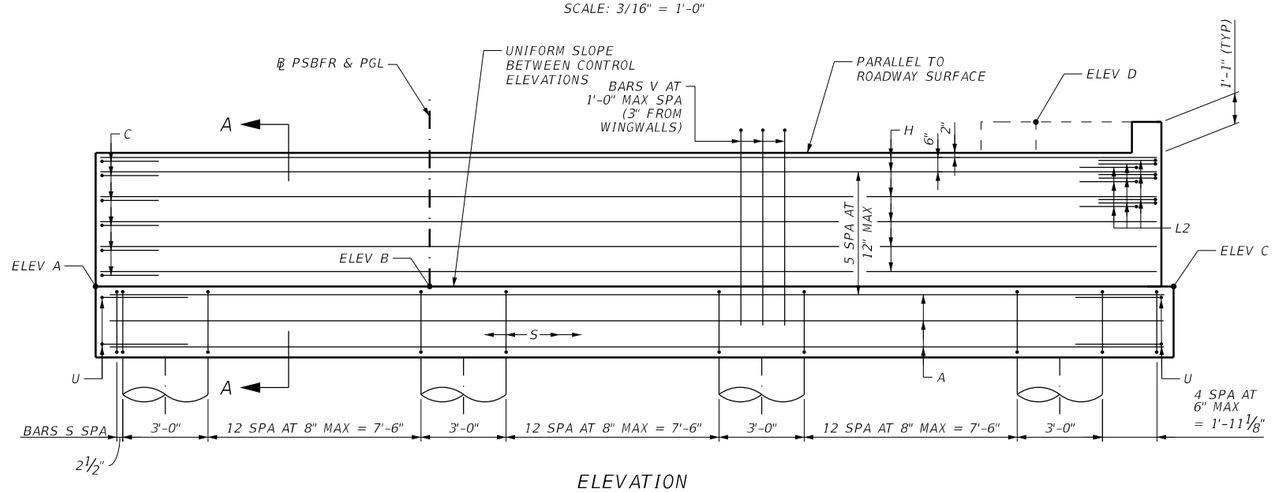


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

BEARING SEATS				TOP OF CAP CONTROL ELEVATIONS				TOP OF DRILLED SHAFT CONTROL ELEVATIONS			
GDR #1	GDR #2	GDR #3	GDR #4	ELEV A	ELEV B	ELEV C	ELEV D	DS A	DS B	DS C	DS D
716.349	716.630	716.910	717.188	716.129	716.462	717.127	722.340	713.709	713.980	714.251	714.523

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET, FOR RIPRAP ATTACHMENT DETAILS.
7. DRILLED SHAFT LOADS:
   36" DIA SHAFT = 110 TONS/DS.
   18" DIA SHAFT = 10 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

(X) DENOTES ℄ D.S.

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

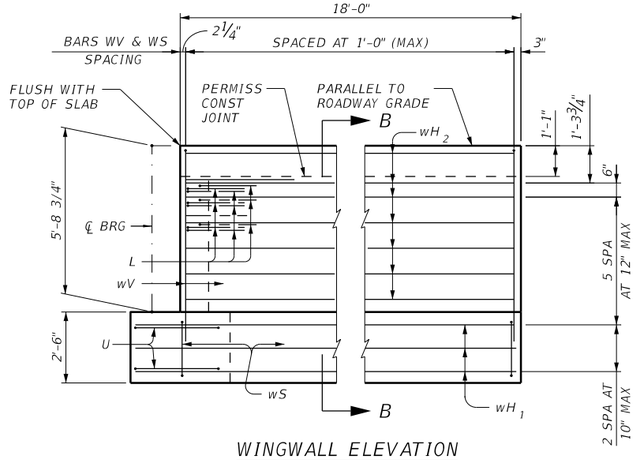
IH35E

ABUTMENT 4 DETAILS

IH 35E SBFR OVER UPRR

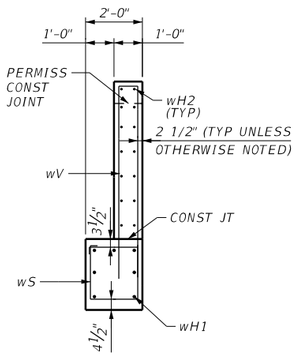
SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		174



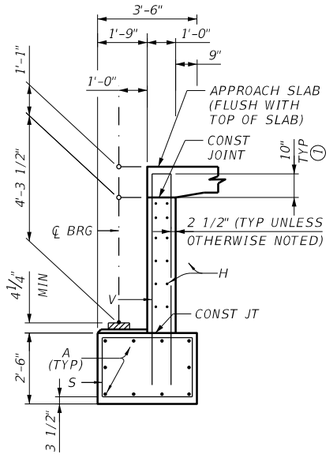
WINGWALL ELEVATION

SCALE: 3/16" = 1'-0"



SECTION B-B

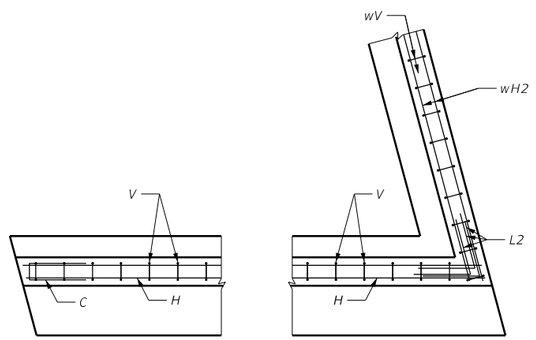
SCALE: 3/16" = 1'-0"



SECTION A-A

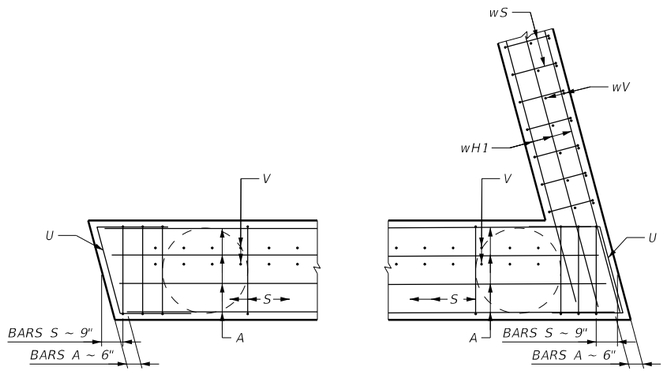
SCALE: 3/16" = 1'-0"

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE



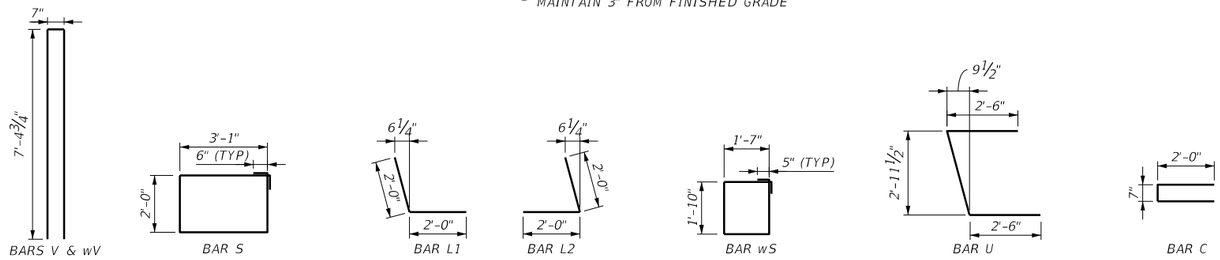
BACKWALL CORNER DETAILS

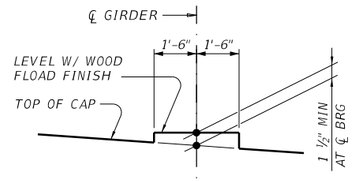
SCALE: 3/16" = 1'-0"



CAP CORNER DETAILS

SCALE: 3/16" = 1'-0"





BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)
SCALE: NTS

ABUTMENT 1 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	37' - 8"	2,001
H	12	#6	38' - 4"	691
L1	9	#6	4' - 0"	54
L2	9	#6	4' - 0"	54
S	48	#5	11' - 6"	576
U	4	#6	8' - 2"	49
V	38	#5	15' - 7"	618
wH1	14	#6	19' - 6"	410
wH2	28	#6	17' - 7"	739
wS	38	#4	8' - 0"	203
wV	38	#5	15' - 7"	618
(2) REINFORCING STEEL (LB)				6,013
CLASS "C" CONCRETE (CY) (HPC)				32.8

ABUTMENT 4 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	36' - 6"	1,939
C	6	#6	5' - 2"	47
H	12	#6	37' - 2"	670
L2	9	#6	4' - 0"	54
S	46	#5	11' - 6"	552
U	2	#6	8' - 2"	25
V	37	#5	15' - 7"	601
wH1	7	#6	19' - 6"	205
wH2	14	#6	17' - 7"	370
wS	19	#4	8' - 0"	102
wV	19	#5	15' - 7"	309
(2) REINFORCING STEEL (LB)				4,873
CLASS "C" CONCRETE (CY) (HPC)				25.5

(2) FOR CONTRACTOR'S INFORMATION ONLY

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
PROFESSIONAL ENGINEER
LICENSED
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

ABUTMENT MISC DETAILS

IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		175

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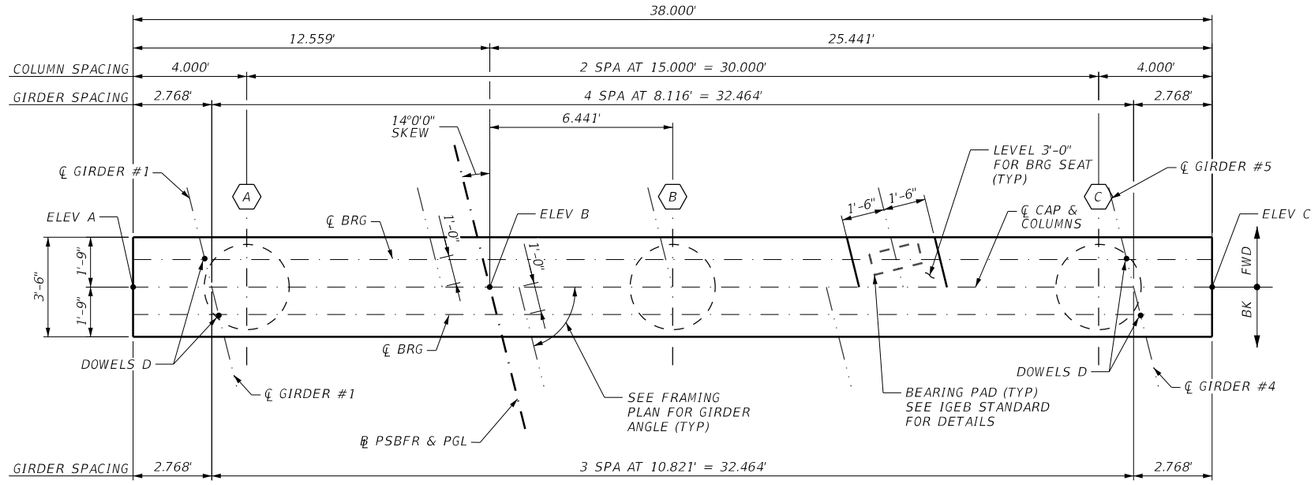
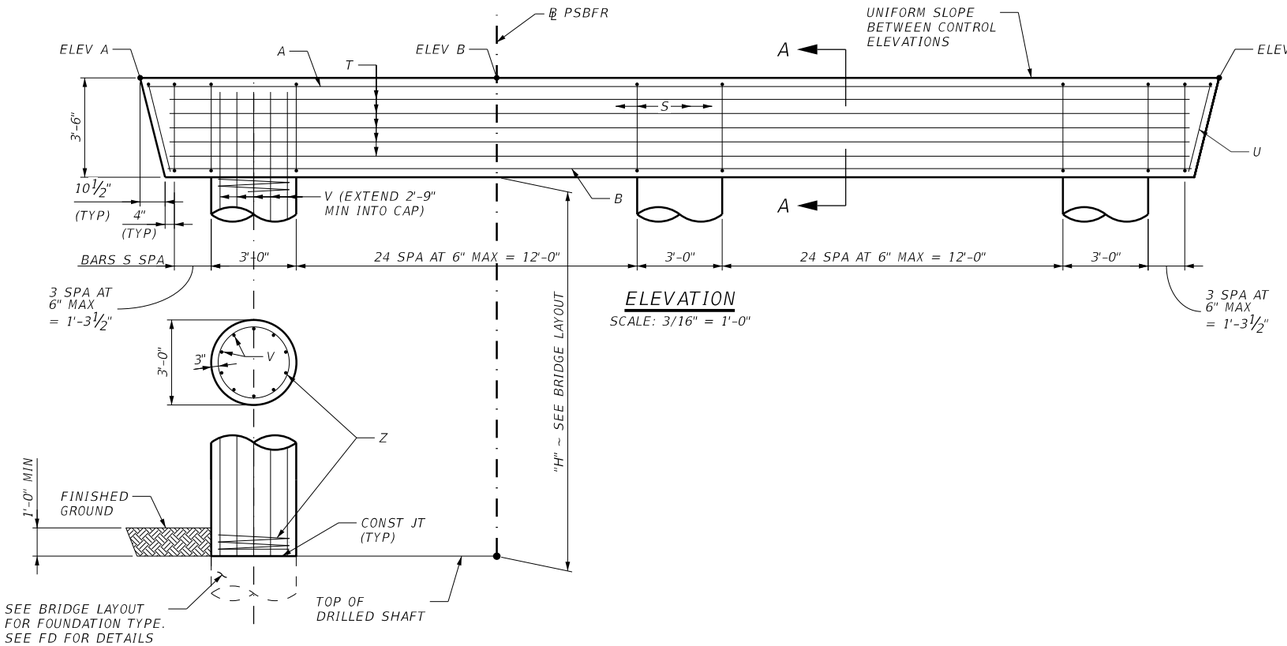


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

BEARING SEATS (FWD)					BEARING SEATS (BACK)				TOP OF CAP CONTROL ELEVATIONS			TOP OF COLUMN CONTROL ELEVS		
GDR #1	GDR #2	GDR #3	GDR #4	GDR #5	GDR #1	GDR #2	GDR #3	GDR #4	ELEV A	ELEV B	ELEV C	COL A	COL B	COL C
718.609	718.761	718.912	719.063	719.214	718.603	718.805	719.006	719.205	718.419	718.652	719.125	714.993	715.272	715.551

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR COLUMN HEIGHTS AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. DRILLED SHAFT LOADS:
   36" DIA SHAFT = 293 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

(X) DENOTES ℄ COLUMN

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

BENT 2 DETAILS

IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		176

DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwald

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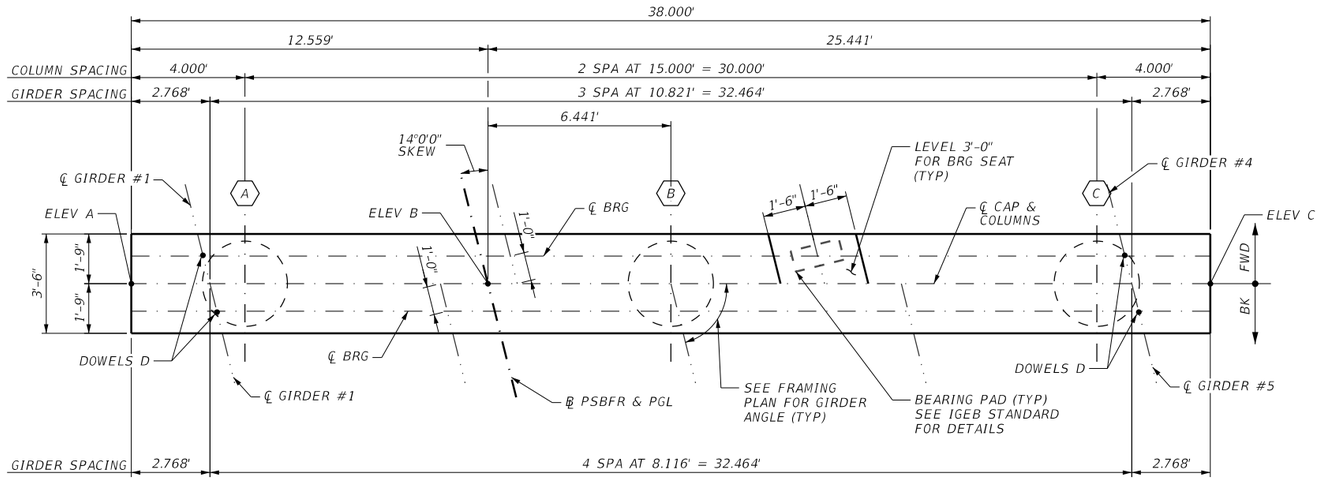
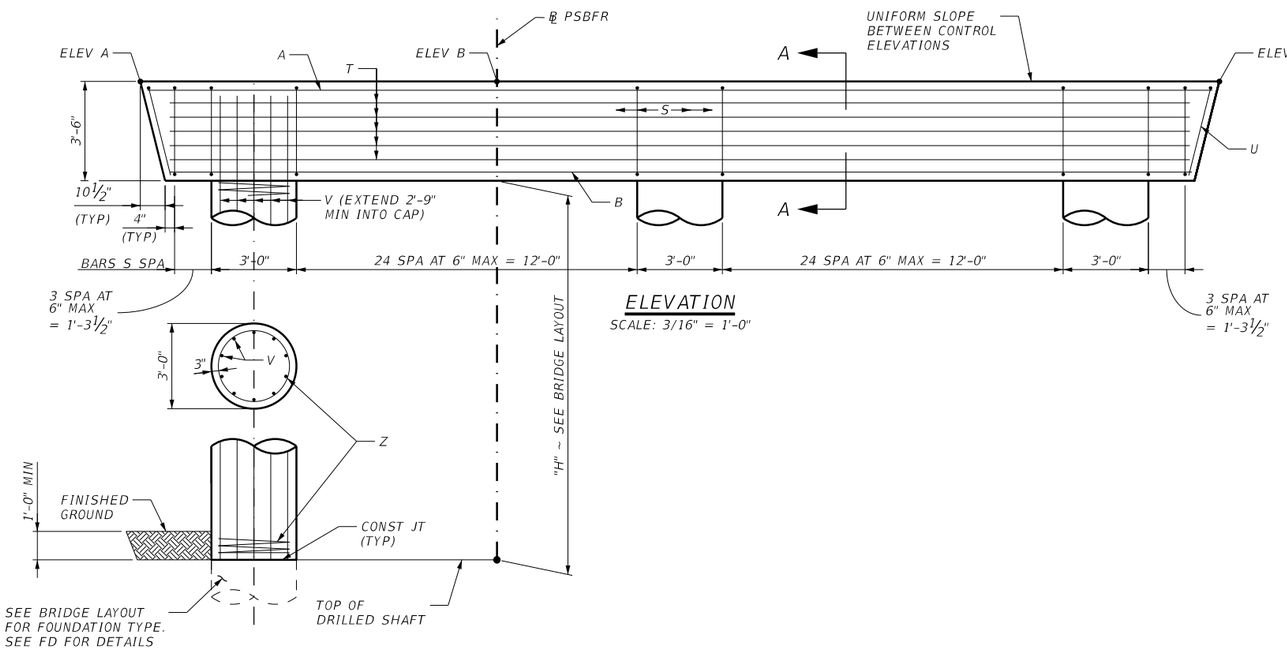


PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

BEARING SEATS (FWD)				BEARING SEATS (BACK)					TOP OF CAP CONTROL ELEVATIONS			TOP OF COLUMN CONTROL ELEVS		
GDR #1	GDR #2	GDR #3	GDR #4	GDR #1	GDR #2	GDR #3	GDR #4	GDR #5	ELEV A	ELEV B	ELEV C	COL A	COL B	COL C
717.904	718.153	718.402	718.649	717.935	718.122	718.308	718.493	718.678	717.717	718.005	718.588	714.309	714.653	714.996

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
3. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
4. SEE BRIDGE LAYOUT FOR COLUMN HEIGHTS AND FOUNDATION TYPE, SIZE AND LENGTH.
5. SEE FOUNDATION DETAIL STANDARD SHEET, FD, FOR ALL FOUNDATION DETAILS AND NOTES.
6. DRILLED SHAFT LOADS:
   36" DIA SHAFT = 235 TONS/DS.

MATERIAL NOTES:

1. CONCRETE SHALL BE CLASS C (HPC) WITH A STRENGTH f'c = 3,600 PSI.
2. ALL CAP AND WALL REINFORCING MUST BE EPOXY COATED GRADE 60 STEEL.

(X) DENOTES ℄ COLUMN

HL93 LOADING

STATE OF TEXAS
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10/5/2023

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214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

BENT 3 DETAILS

IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		177

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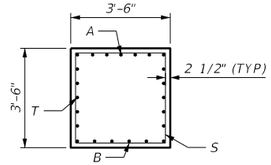
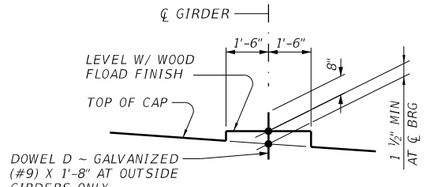
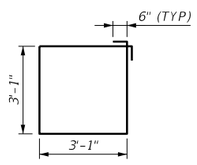


SECTION A-A
SCALE: 3/16" = 1'-0"

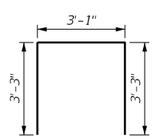


BEARING SEAT DETAIL

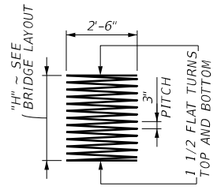
(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)
SCALE: NTS



BAR S



BAR U



BAR Z

BENT 2 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	7	#11	37' - 8"	1,401
B	6	#11	36' - 1"	1,150
D	4	#9	1' - 8"	23
S	55	#5	13' - 8"	784
T	10	#5	35' - 11"	375
U	2	#5	9' - 8"	20
V	30	#9	24' - 0"	2,448
(1) Z	3	#4	425' - 0"	852
(1)(2) REINFORCING STEEL (LB)				7,052
CLASS "C" CONCRETE CAP (CY) (HPC)				16.8
(1) CLASS "C" CONCRETE COL (CY) (HPC)				16.2

BENT 3 TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	7	#11	37' - 8"	1,401
B	6	#11	36' - 1"	1,150
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S	55	#5	13' - 8"	784
T	10	#5	35' - 11"	375
U	2	#5	9' - 8"	20
V	30	#9	24' - 0"	2,448
(1) Z	3	#4	425' - 0"	852
(1)(2) REINFORCING STEEL (LB)				7,052
CLASS "C" CONCRETE CAP (CY) (HPC)				16.8
(1) CLASS "C" CONCRETE COL (CY) (HPC)				16.8

(1) ADJUST SPIRAL Z LENGTH BY 8.1 FT. AND BARS V LENGTH BY 0.5 FT. FOR EACH 0.5 FT. VARIATION IN "H" VALUE.
ADJUST ESTIMATED QUANTITY OF CONCRETE FOR EACH COLUMN BY 0.13 CY FOR EACH 0.5 FT. VARIATION IN "H" VALUE.
ADJUST ESTIMATED QUANTITY OF REINFORCING STEEL FOR EACH COLUMN BY 20.0 LB FOR EACH 0.5 FT. VARIATION IN "H" VALUE.

(2) FOR CONTRACTOR'S INFORMATION ONLY

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
PROFESSIONAL ENGINEER
LICENSED
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

BENT MISC DETAILS

IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		178

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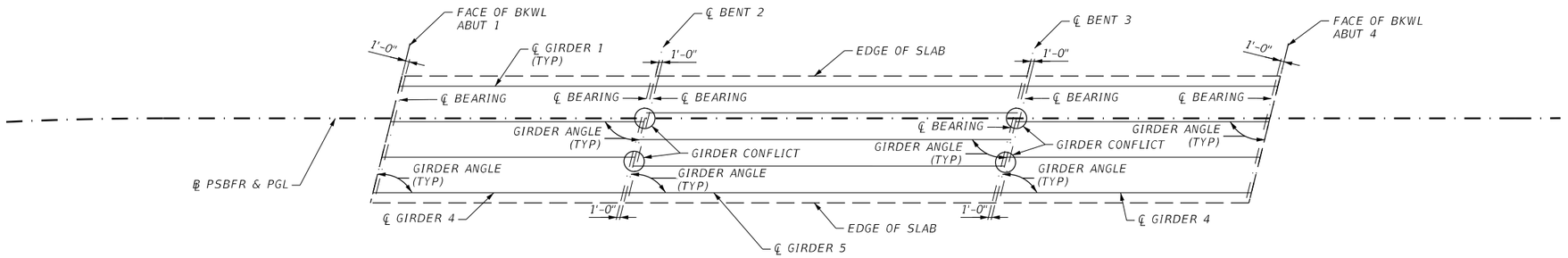
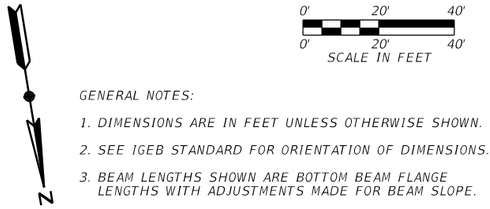


PLAN
SCALE 1" = 40'



GENERAL NOTES:

1. DIMENSIONS ARE IN FEET UNLESS OTHERWISE SHOWN.
2. SEE IGEB STANDARD FOR ORIENTATION OF DIMENSIONS.
3. BEAM LENGTHS SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.

(1) BEAM LENGTHS SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.

BENT REPORT

ABUT NO. 1 (S 27° 01' 07.30" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 9.791 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 1	BEAM 1	0.000	76	0	0
	BEAM 2	10.821	76	0	0
	BEAM 3	10.821	76	0	0
	BEAM 4	10.821	76	0	0
	TOTAL	32.463			

BENT NO. 2 (S 27° 01' 07.30" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 9.791 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 1	BEAM 1	0.000	76	0	0
	BEAM 2	10.821	76	0	0
	BEAM 3	10.821	76	0	0
	BEAM 4	10.821	76	0	0
	TOTAL	32.463			

BENT NO. 2 (S 27° 01' 07.30" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 9.791 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 2	BEAM 1	0.000	76	0	0
	BEAM 2	8.116	76	0	0
	BEAM 3	8.116	76	0	0
	BEAM 4	8.116	76	0	0
	BEAM 5	8.116	76	0	0
	TOTAL	32.464			

BENT NO. 3 (S 27° 01' 07.30" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 9.791 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 2	BEAM 1	0.000	76	0	0
	BEAM 2	8.116	76	0	0
	BEAM 3	8.116	76	0	0
	BEAM 4	8.116	76	0	0
	BEAM 5	8.116	76	0	0
	TOTAL	32.464			

BENT NO. 3 (S 27° 01' 07.30" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 9.791 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 3	BEAM 1	0.000	76	0	0
	BEAM 2	10.821	76	0	0
	BEAM 3	10.821	76	0	0
	BEAM 4	10.821	76	0	0
	TOTAL	32.463			

ABUT NO. 4 (S 27° 01' 07.30" W)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 9.791 L

		BEAM SPAC. (C.L. BENT)	BEAM ANGLE D	M	S
SPAN 3	BEAM 1	0.000	76	0	0
	BEAM 2	10.821	76	0	0
	BEAM 3	10.821	76	0	0
	BEAM 4	10.821	76	0	0
	TOTAL	32.463			

BEAM REPORT

BEAM REPORT, SPAN 1 (1)

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANC BOT. BM. FLG.	GIRDER SLOPE
BEAM 1	75.000	72.969	74.495	0.0088
BEAM 2	75.000	72.969	74.496	0.0093
BEAM 3	75.000	72.969	74.496	0.0097
BEAM 4	75.000	72.969	74.496	0.0101

BEAM REPORT, SPAN 2 (1)

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANC BOT. BM. FLG.	GIRDER SLOPE
BEAM 1	110.000	108.000	109.502	-0.0062
BEAM 2	110.000	108.000	109.502	-0.0059
BEAM 3	110.000	108.000	109.502	-0.0056
BEAM 4	110.000	108.000	109.502	-0.0053
BEAM 5	110.000	108.000	109.501	-0.0050

BEAM REPORT, SPAN 3 (1)

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANC BOT. BM. FLG.	GIRDER SLOPE
BEAM 1	75.000	72.969	74.509	-0.0213
BEAM 2	75.000	72.969	74.509	-0.0209
BEAM 3	75.000	72.969	74.508	-0.0205
BEAM 4	75.000	72.969	74.507	-0.0200

HL93 LOADING

STATE OF TEXAS
DION R. ALLCOCK
92529
LICENSED
PROFESSIONAL ENGINEER
10/5/2023

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation
Dallas District Bridge

IH35E

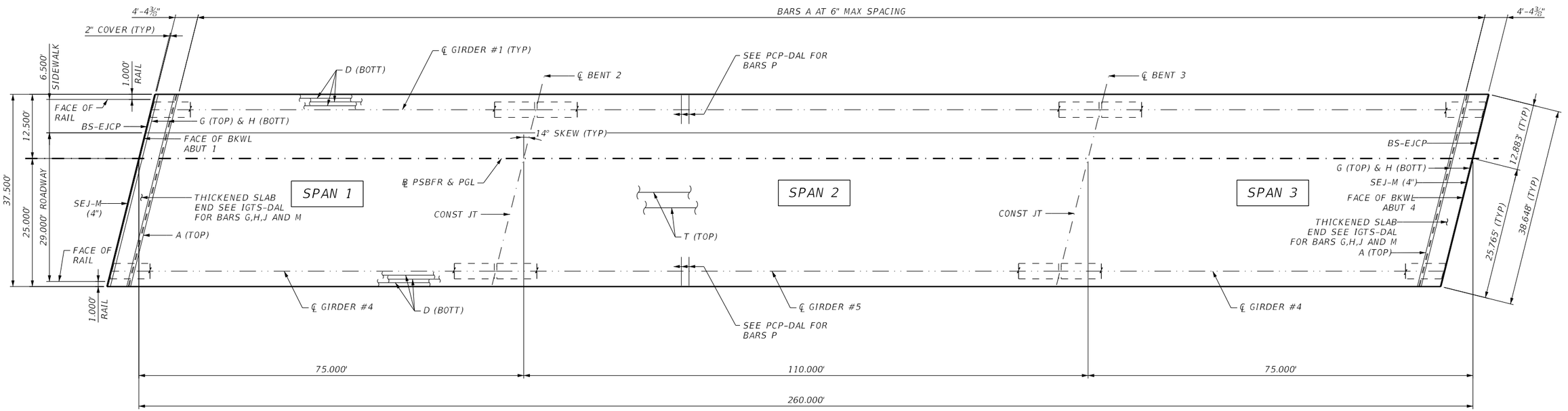
FRAMING PLAN

IH 35E SBFR OVER UPRR

SHEET 1 OF 1

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		179

DN: AECOM CK: AECOM DW: AECOM CK: AECOM steigerwold



PLAN

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. SEE IGTS-DAL STANDARD FOR THICKENED SLAB END DETAILS NOT SHOWN.
3. SEE IGMS-DAL STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.
4. SEE BRSM STANDARD FOR SIDEWALK DETAILS NOT SHOWN.
5. SEE PCP-DAL & PCP-FAB STANDARDS FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
6. CONCRETE SHALL BE CLASS S HPC (F'C = 4,000 PSI)
7. ALL REINFORCING SHALL BE GRADE 60 EPOXY COATED.
8. BAR LAPS, WHERE REQUIRED, SHALL FOLLOW:
   #4 = 2'-5"
   #5 = 3'-0"
9. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER

5/9/2024

HL93 LOADING

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214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

CONCRETE GIRDER UNIT

IH 35E SBFR OVER UPRR

SHEET 1 OF 2

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		180

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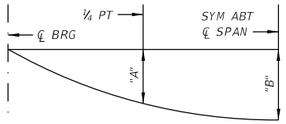

DEAD LOAD DEFLECTION DIAGRAM

CALCULATED DEFLECTIONS SHOWN ARE DUE TO THE CONCRETE SLAB ONLY (EC = 5000 KSI). ADJUST VALUES AS REQUIRED IF OPTIONAL SLAB FORMING IS USED. THESE VALUES MAY REQUIRE FIELD VERIFICATION.

DEAD LOAD DEFLECTION			
SPAN NO.	GIRDER NO.	"A" (FT)	"B" (FT)
1 & 3	1 & 4	-0.022	-0.031
	2 & 3	-0.028	-0.040
2	1 & 5	-0.088	-0.125
	2 - 4	-0.100	-0.142

TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	"X" AT CL BRG	"Y" AT CL BRG	"Z" AT CL SPAN
1 & 3	1 - 4	10 1/2"	5' - 4 1/2"	10 5/8"
2	1 & 5	10 1/2"	5' - 4 1/2"	10 3/4"
	2 - 4	10 1/2"	5' - 4 1/2"	11"

BAR TABLE	
BAR	SIZE
A	#5
D	#5
G	#5
H	#5
J	#5
M	#5
P	#4
T	#4

TABLE OF ESTIMATED QUANTITIES			
SPAN	REINF CONCRETE SLAB (HPC)	PRESTR CONCRETE GIRDERS (TX 54)	REINF STEEL (EPOXY COATED)
NO.	SF	LF (1)	LB (2)(3)
1	2,813	297.98	6,469
2	4,125	547.51	9,488
3	2,813	298.03	6,469
TOTAL	9,750	1143.53	22,425

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AS MODIFIED BY THE TXDOT LRFD DESIGN MANUAL, 2021.
2. SEE IGTS-DAL STANDARD FOR THICKENED SLAB END DETAILS NOT SHOWN.
3. SEE IGMS-DAL STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.
4. SEE BRSM STANDARD FOR SIDEWALK DETAILS NOT SHOWN.
5. SEE PCP-DAL & PCP-FAB STANDARDS FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
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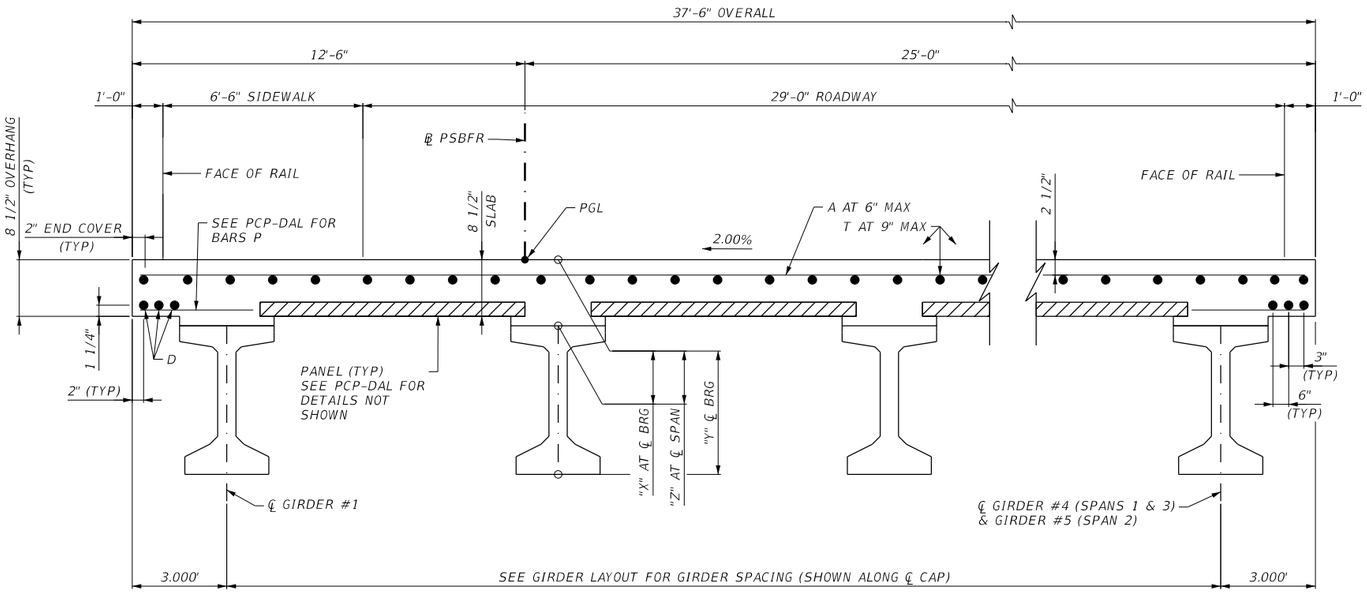
7. ALL REINFORCING SHALL BE GRADE 60 EPOXY COATED.
8. BAR LAPS, WHERE REQUIRED, SHALL FOLLOW:
   #4 = 2'-5"
   #5 = 3'-0"
9. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

(1) QUANTITIES SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENT MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEET FOR GIRDER LENGTHS.

(2) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 3.4 PSF.

(3) FOR CONTRACTOR'S INFORMATION ONLY.



TYPICAL TRANSVERSE SECTION

NTS

HL93 LOADING

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER

5/9/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

Dallas District Bridge

IH35E

CONCRETE GIRDER UNIT
IH 35E SBFR OVER UPRR

SHEET 2 OF 2

FILE: SEE PATH	DN: DRA	CK: DM	DW: CA	CK: DM
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		181

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STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS		
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						NO.	TO END (in)	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)								Moment	Shear	Inv	Opr	Inv
IH 35E NBFR AT UPRR	1 & 3 2	1 - 5 1 - 8	Tx54 Tx54		22 44	0.6 0.6	270 270	20.28 18.83	17.37 11.19	4 8	20.5 50.5	4.0 6.0	5.0 8.5	1.827 4.532	-2.052 -4.406	4623 8182	0.909 0.527	1.059 0.726	1.72 1.88	2.23 2.43	1.75 1.13
IH 35E SBFR AT UPRR	1 & 3 2	1 - 4 1 - 5	Tx54 Tx54		22 44	0.6 0.6	270 270	20.28 18.83	17.37 11.19	4 8	20.5 50.5	4.0 6.0	5.0 8.5	1.968 3.731	-2.230 -3.835	4829 7536	0.861 0.630	1.023 0.840	1.51 1.95	1.96 2.62	1.48 1.61

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications. Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

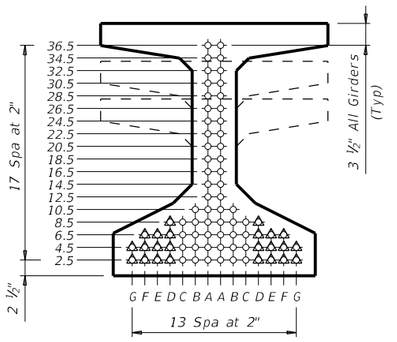
Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

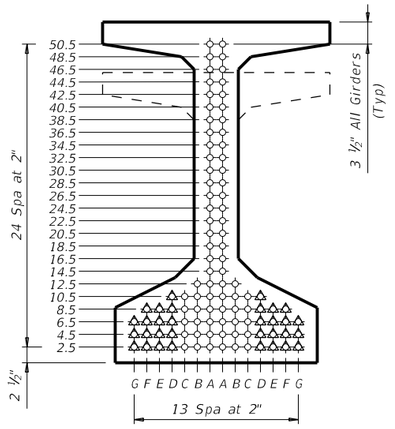
Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

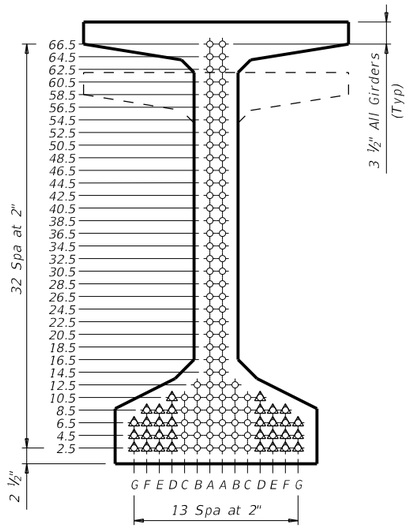
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND

STATE OF TEXAS
DION R. ALLICOCK
92529
LICENSED
PROFESSIONAL ENGINEER

Allicock 05/24/2024

FILE: IG-IGND-22.dgn	DN: TxDOT	CK: TxDOT	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Modified for depressed strands only. 3-22: Added Load Rating.	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		182

ESTIMATED QUANTITIES

ITEM NO.	104	429	432	432	438	438	438	780
DESCRIPTION CODE	6009	6007	6001	6031	6001	6004	6016	6002
ITEM DESCRIPTION	REMOVING CONC (RIPRAP)	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC) (4 IN)	RIPRAP (STONE PROTECTION) (12 IN)	CLEANING AND SEALING EXISTING JOINTS	CLEANING AND SEALING EXIST JOINTS (CL7)	CLEAN AND SEAL EXIST JTS (STRIP SEAL)	CNC CRACK REPAIR (DISCRETE) (INJECT)
NBI NUMBER	SY	SF	CY	CY	LF	LF	LF	LF
18-061-0-0195-03-145		8		19	16	112	120	19
18-061-0-0195-03-144	2	12	1		1	112	120	12
TOTAL	2	20	1	19	17	224	240	31

Texas Department of Transportation

Dallas District Bridge

IH 35E

SUMMARY OF BRIDGE REPAIR QUANTITIES

IH 35E NBML OVER UPRR AND IH 35E SBML OVER UPRR

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		183

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATOR	DETAILS/NOTES
D1	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	56	Clean and re-seal relief joint at abutment 1 approach slab.	See Cleaning and Sealing Existing Bridge Joints detail "A"
D2	0438 6016	CLEAN AND SEAL EXIST JTS (STRIP SEAL)	LF	60	Clean and re-seal expansion joint at abutment 1.	See Cleaning and Sealing Existing Bridge Joints (Strip Seal) detail
D3	0438 6016	CLEAN AND SEAL EXIST JTS (STRIP SEAL)	LF	60	Clean and re-seal expansion joint at abutment 4.	See Cleaning and Sealing Existing Bridge Joints (Strip Seal) detail
D4	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	56	Clean and re-seal relief joint at abutment 4 approach slab.	See Cleaning and Sealing Existing Bridge Joints detail "A"
(1)	R1a	0512 6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	35	Remove damaged portable barrier on approach slab at abutment 1.	See Concrete Barrier Rail as-built standard detail
(1) (2)	R1b	0512 6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF	35	Install in-kind portable barrier on approach slab at abutment1.	See Concrete Barrier Rail as-built standard detail
R2	0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	2	Repair spall on the South face of the North rail located at the joint on abutment 4.	Refer to Concrete & Overhead Repair detail
SB1	0780 6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	14	Repair cracks on the face of abutment 4 backwall on the North end of the abutment.	Refer to the TXDOT Concrete Repair Manual Chapter 3, Section 5
SB2	0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	6	Repair delamination on the face of abutment 4 backwall on the North end of the abutment.	Refer to Concrete & Overhead Repair detail
SB3	0780 6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	5	Repair cracks on abutment 4 wingwall and rail on the North end of the abutment.	Refer to the TXDOT Concrete Repair Manual Chapter 3, Section 5
M1	0438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	8	Clean and re-seal the joint between abutment 1 and retaining wall at North end of the abutment.	See Cleaning and Sealing Existing Bridge Joints detail "B"
M2	0438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	8	Clean and re-seal the joint on the retaining wall at North end of abutment 1.	See Cleaning and Sealing Existing Bridge Joints detail "B"
M3	0432 6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	19	Install stone riprap at the bottom of the abutment 1 concrete riprap between columns 1 and 2 at bent 2.	See Stone Riprap Protection detail

(1) Will be paid as a roadway item

(2) Field measure exact length needed before pre-cast

STATE OF TEXAS
EDUARDO A. RAMIREZ
147778
LICENSED PROFESSIONAL ENGINEER

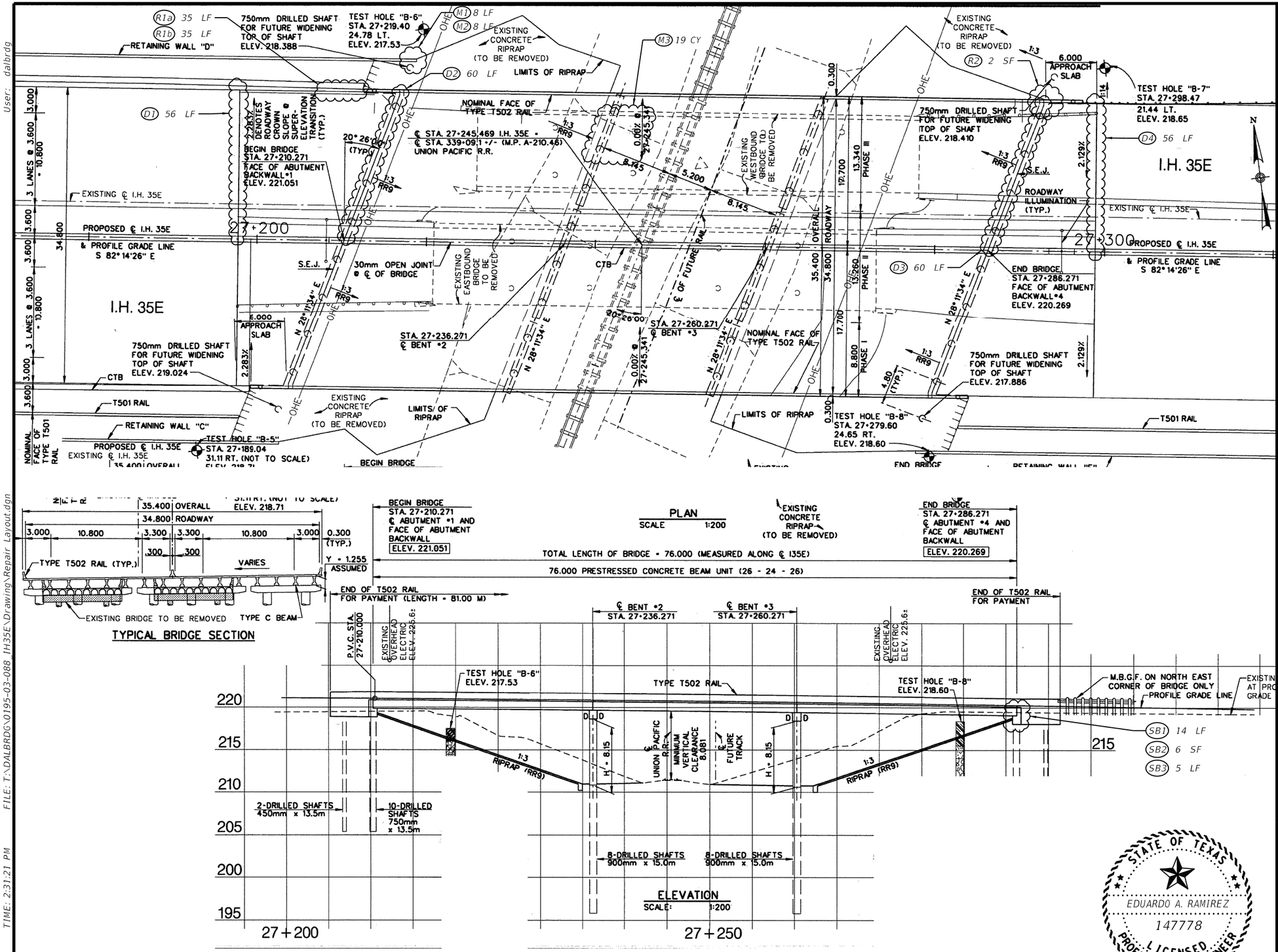
03/28/2024

Texas Department of Transportation

Dallas District Bridge

IH 35E
IH 35E NBML
OVERPASS AT UPRR
TABLE OF REPAIRS
NBI: 18-061-0-0195-03-145

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		184



BRIDGE REPAIR LAYOUT

GENERAL NOTES

1. Layout, stations, and elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (02/2024). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   HS20 (INV)
   HS33.4 (OR)

REPAIR CALL-OUT LEGEND

XX YY ZZ
- XX — Repair number – See "Table of Repairs"
- YY — Estimated repair quantity at each location
- ZZ — Unit of measure

SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

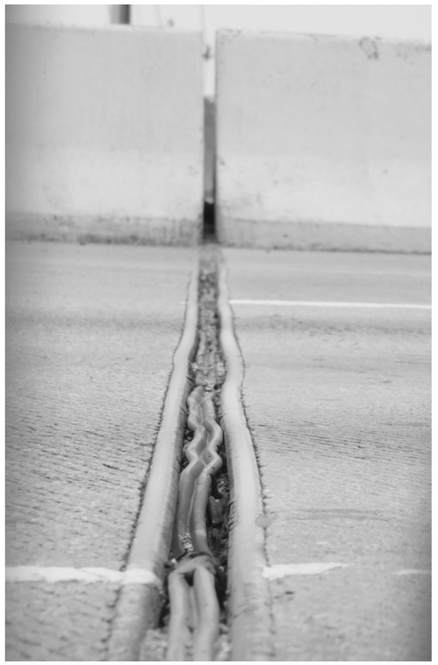
STATE OF TEXAS
EDUARDO A. RAMIREZ
147778
LICENSED PROFESSIONAL ENGINEER
03/28/2024

Texas Department of Transportation
Dallas District Bridge

IH 35E
IH 35E NBML
OVERPASS AT UPRR
BRIDGE REPAIR LAYOUT
NBI: 18-061-0-0195-03-145

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		185

D1 – Relief joint seal failure at abutment 1 approach slab

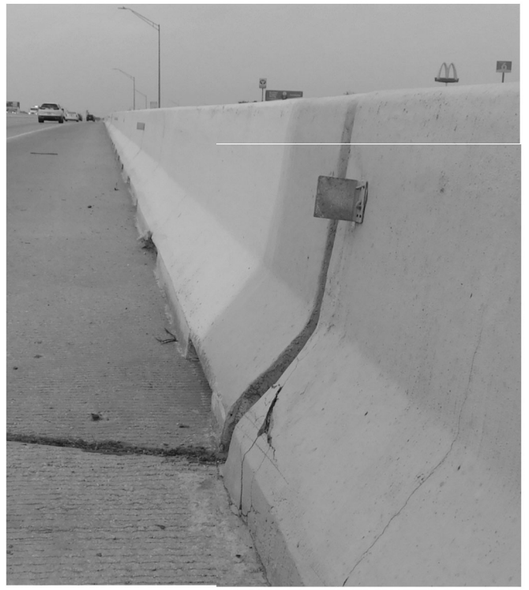


D2 – Expansion joint seal failure at abutment 1

D3 – Expansion joint seal failure at abutment 4

D4 – Relief joint seal failure at abutment 4 approach slab

R1a/R1b – Impact damage on south face of portable CTB sitting on approach slab at abutment 1



R2 – Spalling on South face of North rail at the joint on abutment 4

STATE OF TEXAS
EDUARDO A. RAMIREZ
147778
LICENSED
PROFESSIONAL ENGINEER

03/28/2024

NOTE:
Photographs are provided for contractor's information and are intended to show a generalized idea of the structure condition. Extent of damage may vary from what is shown in photos.

Texas Department of Transportation

Dallas District Bridge

IH 35E
IH 35E NBML
OVERPASS AT UPRR
REPAIR PHOTOS

NBI: 18-061-0-0195-03-145

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		186

SB1/SB2 – Cracking and delamination on the face of abutment 4 backwall at the North end of the abutment

SB3 – Cracking on abutment 4 wingwall and rail at North end of abutment

M1 – Joint seal failure between abutment 1 and retaining wall at North end of abutment

M2 – Joint seal failure on retaining wall at North end of abutment 1

M3 – Erosion caused by drainage outlet at the riprap toewall on riprap at North end of abutment 1

M3 – Erosion caused by drainage outlet on riprap at North end of abutment 1

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EDUARDO A. RAMIREZ
147778
LICENSED
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03/28/2024

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Sheet 2 of 2

Texas Department of Transportation

Dallas District Bridge

IH 35E
IH 35E NBML
OVERPASS AT UPRR
REPAIR PHOTOS

NBI: 18-061-0-0195-03-145

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC	IH 35E
	DIST.	COUNTY		SHEET NO.
	DAL	DENTON		187

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATOR	DETAILS/NOTES
D1	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	56	Clean and re-seal relief joint at abutment 1 approach slab.	See Cleaning and Sealing Existing Bridge Joints detail "A"
D2	0438 6016	CLEAN AND SEAL EXIST JTS (STRIP SEAL)	LF	60	Clean and re-seal expansion joint at abutment 1.	See Cleaning and Sealing Existing Bridge Joints (Strip Seal) detail
D3	0438 6016	CLEAN AND SEAL EXIST JTS (STRIP SEAL)	LF	60	Clean and re-seal expansion joint at abutment 4.	See Cleaning and Sealing Existing Bridge Joints (Strip Seal) detail
D4	0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	56	Clean and re-seal relief joint at abutment 4 approach slab.	See Cleaning and Sealing Existing Bridge Joints detail "A"
SB1	0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	9	Repair spall on the face of abutment 1 backwall on the South end of the abutment.	Refer to Concrete & Overhead Repair detail
SB2	0780 6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	4	Repair cracks on the face of abutment 1 backwall on the South end of the abutment.	Refer to the TXDOT Concrete Repair Manual Chapter 3, Section 5
SB3	0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	3	Repair spall at the bottom of the second column from the South on bent 3.	Refer to Concrete & Overhead Repair detail
SB4	0780 6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	8	Repair cracks on the face of abutment 4 backwall on the South end of the abutment.	Refer to the TXDOT Concrete Repair Manual Chapter 3, Section 5
M1	0104 6009	REMOVING CONC (RIPRAP)	SY	2	Remove damaged riprap at the South end of abutment 4. Avoid damaging exsiting rebar during removal for re-use.	See Concrete Riprap standard
M2	0432 6001	RIPRAP (CONC)(4 IN)	CY	1	Replace with new riprap at the South end of abutment 4. Clean existing rebar before pouring new riprap.	See Concrete Riprap standard
M3	0438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	1	Clean and re-seal damaged joint seal between concrete riprap and abutment 4.	See Concrete Riprap standard

STATE OF TEXAS
EDUARDO A. RAMIREZ
147778
LICENSED PROFESSIONAL ENGINEER

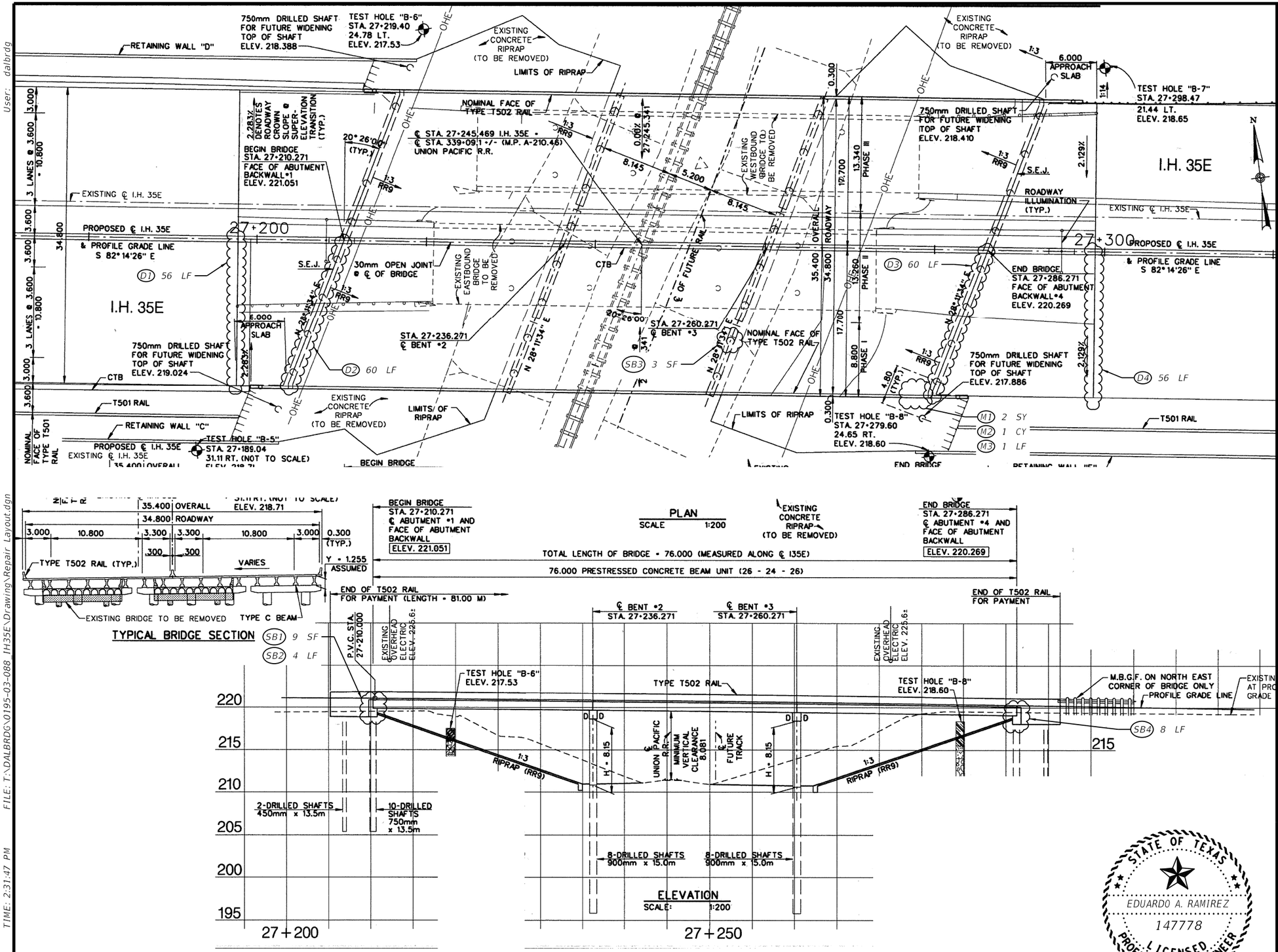
03/28/2024

Texas Department of Transportation

Dallas District Bridge

IH 35E
IH 35E SBML
OVERPASS AT UPRR
TABLE OF REPAIRS
NBI: 18-061-0-0195-03-144

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		188

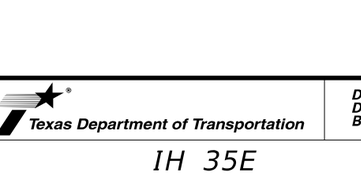


BRIDGE REPAIR LAYOUT

GENERAL NOTES

1. Layout, stations, and elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (02/2024). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   HS20 (INV)
   HS33.4 (OR)

REPAIR CALL-OUT LEGEND



SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

STATE OF TEXAS
EDUARDO A. RAMIREZ
147778
LICENSED PROFESSIONAL ENGINEER
03/28/2024

Texas Department of Transportation

Dallas District Bridge

IH 35E
IH 35E SBML
OVERPASS AT UPRR
BRIDGE REPAIR LAYOUT

NBI: 18-061-0-0195-03-144

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		189

D1 – Relief joint seal failure at abutment 1 approach slab

D2 – Expansion joint seal failure at abutment 1

D3 – Expansion joint seal failure at abutment 4

D4 – Relief joint seal failure at abutment 4 approach slab

STATE OF TEXAS
EDUARDO A. RAMIREZ
147778
LICENSED
PROFESSIONAL ENGINEER

03/28/2024

NOTE:
Photographs are provided for contractor's information and are intended to show a generalized idea of the structure condition. Extent of damage may vary from what is shown in photos.

Sheet 1 of 2

Texas Department of Transportation

Dallas District Bridge

IH 35E
IH 35E SBML
OVERPASS AT UPRR
REPAIR PHOTOS

NBI: 18-061-0-0195-03-144

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
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REVISIONS	0195	03	088, ETC	IH 35E
	DIST.	COUNTY		SHEET NO.
	DAL	DENTON		190

SB1/SB2 – Spall and cracking on the face of abutment 1 backwall at the south end of abutment

SB3 – Spall on the bottom of the second column for the South on bent 3

SB4 – Previous crack repair failing on the southern face of abutment 4

M1/M2/M3 – Riprap spalling at Southern corner of abutment 4, likely caused by seal failure between abutment cap and riprap

STATE OF TEXAS
EDUARDO A. RAMIREZ
147778
LICENSED
PROFESSIONAL ENGINEER

03/28/2024

NOTE:
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Texas Department of Transportation

Dallas District Bridge

IH 35E
IH 35E SBML OVERPASS AT UPRR
REPAIR PHOTOS

NBI: 18-061-0-0195-03-144

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		191

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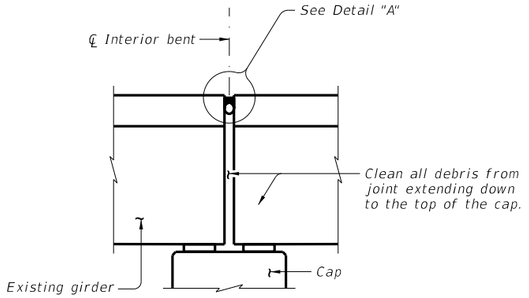
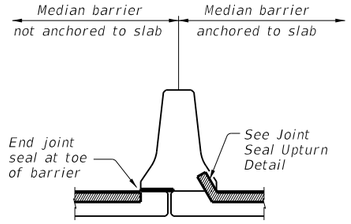
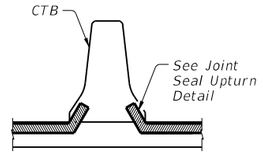


JOINT WITH SILICONE SEAL

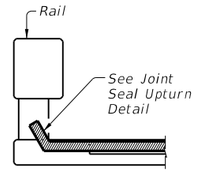
(Used without ACP overlay)



OPEN DECK JOINT BELOW MEDIAN BARRIER



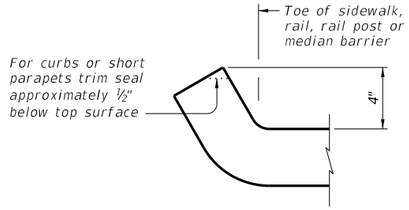
CONCRETE TRAFFIC BARRIER



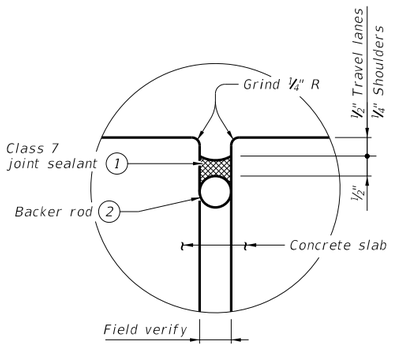
CONCRETE BRIDGE RAIL

JOINT SEALANT TERMINATION DETAILS

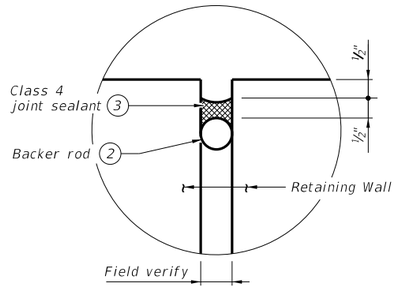
(9) 1 ½" for precompressed foam and silicone seal



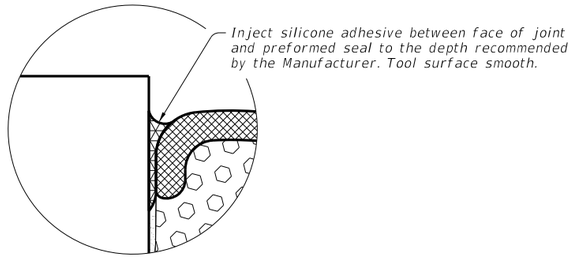
JOINT SEAL UPTURN DETAIL



DETAIL "A"



DETAIL "B"



SILICONE INJECTION

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 RETAINING WALL 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.

4) Seal the joint opening with a Class 4 joint sealant. Recess seal ½" below top of concrete

(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 4 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

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 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.

STATE OF TEXAS
RAJASEGARAM RANJITH
138052
LICENSED PROFESSIONAL ENGINEER
Rajasegaram Ranjith
03/28/2024

Texas Department of Transportation | Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

NBI: 18-061-0-0195-03-144
18-061-0-0195-03-145

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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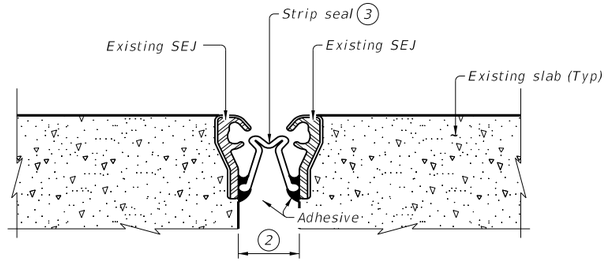
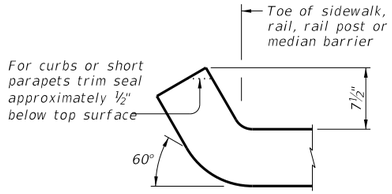
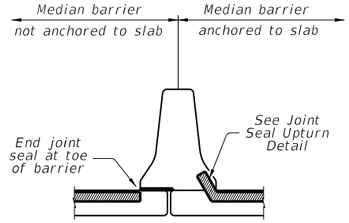


BONDED STRIP SEAL ON SEJ-M

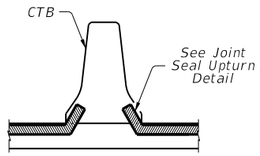
Used to repair failed strip seals. Showing SEJ-M. Other sections similar.



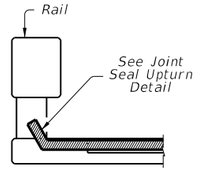
JOINT SEAL UPTURN DETAIL



OPEN DECK JOINT BELOW MEDIAN BARRIER



CONCRETE TRAFFIC BARRIER



CONCRETE BRIDGE RAIL

JOINT SEALANT TERMINATION DETAILS

APPROVED STRIP SEAL SYSTEM MANUFACTURERS

Manufacturer	Strip Seal Seal Type
D.S. Brown	V-400
R.J. Watson	SF-400
SSI	SSS-400
Watson Bowman ACME	SPS-400

(1) The PRE-INSTALLATION CONDITIONS and INSTALLATION PROCEDURE FOR NEW AND EXISTING JOINTS are meant to be general guides. See manufacturer specific procedures and instructions for detailed guidance.

(2) Recommended minimum installation width is 2".

(3) Regardless of seal type shown, any strip seal system from the table above may be used in this application.

PRE-INSTALLATION CONDITIONS (1)
- Ambient and surface temperatures must be at least 40°F.
- Joint surfaces must be completely dry. Do not install strip seal system immediately after a rain event or if precipitation is forecast for the day.
- Prepare joints and install strip seal system on the same day.
- No traffic is allowed to cross over primed and sandblasted joints.
- If necessary, repair existing joint appropriately per TxDOT Item 785, "Bridge Joint Repair or Replacement."
- Ensure that all materials associated with preparation and installation of strip seal are compatible.

INSTALLATION PROCEDURE FOR NEW AND EXISTING JOINTS: (1)
- Abrasive blast the vertical faces of the joint (steel or concrete) then clean with a cloth saturated in denatured alcohol.
- Apply the surface primer to the vertical joint faces. Follow all manufacturer's instructions for preparation and application of surface primer.
- Ready the strip seal next to the joint opening and clean thoroughly with a cloth saturated in denatured alcohol.
- Using a caulking tool, apply an initial bead of adhesive at least ⅜" in diameter to both vertical faces of the joint below the top surface of the joint.
- Place the strip seal into the joint above the initial bead of adhesive. Gradually press the seal downward while maintaining contact between the seal's sides and joint header. Position the strip seal so that seal top is at least ½" below the riding surface.
- Place a second bead of adhesive along each side of the strip seal no higher than the top of the strip seal's serrations. Ensure that this layer of adhesive is in contact with the strip seal and joint faces.
- Tool the second layer of adhesive with a tongue depressor (or other suitable tool) to create a concave face that is completely in contact with the joint faces.
- Cure the strip seal system per manufacturer's recommendations prior to permitting traffic on the bridge.

STATE OF TEXAS
RAJASEGARAM RANJITH
138052
LICENSED PROFESSIONAL ENGINEER
Rajasegaram Ranjith
03/28/2024

Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS
(STRIP SEAL)

NBI: 18-061-0-0195-03-144
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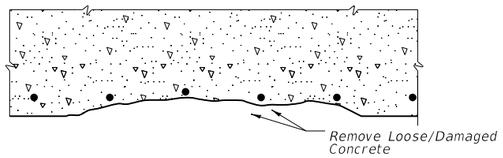
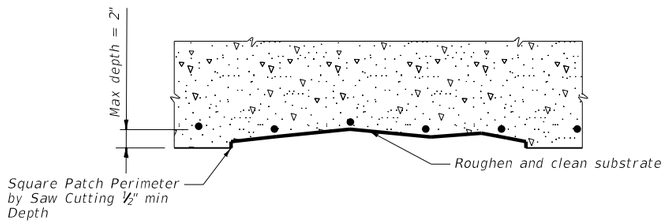


SHOWING DAMAGED CONDITION



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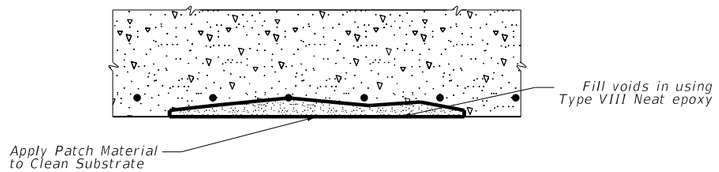

SHOWING PATCHING

MINOR SPALL REPAIR DETAIL

MINOR SPALL REPAIR DETAIL

Condition:

Minor spalls are those with no exposed reinforcement or strands and that are no more than 2" deep

Repair procedure:

1. Remove delaminated, loose, and unsound concrete. Avoid damage to sound concrete that is to remain in place by saw cutting the perimeter of the repair area. Do not damage reinforcement or strands that is to remain in place. Use only hand tools or power-driven chipping hammers (15 lb. max) to remove concrete and to excavate behind reinforcing bars.
2. Some repair areas indicated do not exhibit visible spalling and will need to be identified by sounding the concrete with hammers to determine the location and limits of repairs.
3. Sound all surfaces to identify and mark all delaminated areas for review and approval by the Engineer. Confirm square footage of repair areas prior to commencing removal and notify Engineer of any discrepencies. Provide access to Engineer for verification.
4. Remove rust, oil, and other contaminants from concrete and reinforcing steel surfaces. Prior to patching, blast the area usign a high-pressure air compressor equipped with filters to remove all oils from the compressed air.
5. Treat spalls with exposed reinforcement or strands as intermediate spalls.
6. Roughen and clean substrate to promote bond at patch material.
7. It is not necessary to install dowels or provide other mechanical anchorage in applications less than 2 inch thick.
8. Fill voids using neat Type VIII epoxy (no sand) according to DMS 6100 to help protect against deterioration caused by exposure to the water, chlorides, and other contaminants. Use materials from TxDOT's preapproved list.

See bridge repair layouts for estimated quantities and locations.

VERTICAL & OVERHEAD REPAIR GENERAL NOTES:

1. Submit detailed repair procedures, including proposed proprietary materials, for approval prior to commencing work.
2. See "Concrete Repair Manual" for details not shown.
3. All details shown herein shall be paid under pay item 0429-6007 "CONC STR REPAIR (VERTICAL & OVERHEAD)"

STATE OF TEXAS
RAJASEGARAM RANJITH
138052
LICENSED PROFESSIONAL ENGINEER
Rajasegaram Ranjith
03/28/2024

Texas Department of Transportation

Dallas District Bridge

CONCRETE AND OVERHEAD REPAIR DETAILS

NBI: 18-061-0-0195-03-144
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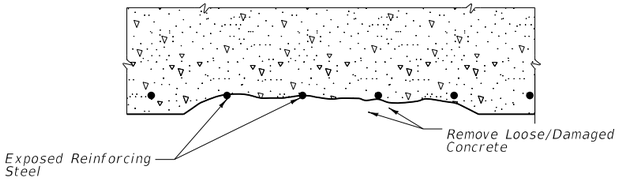

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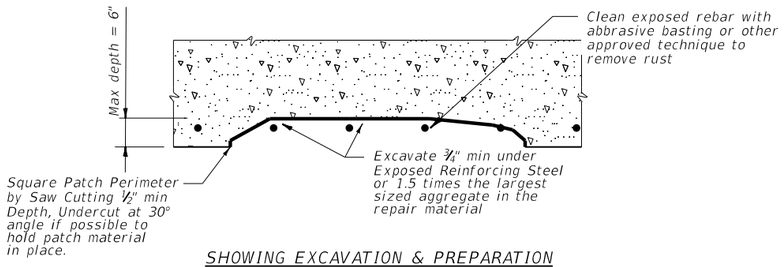

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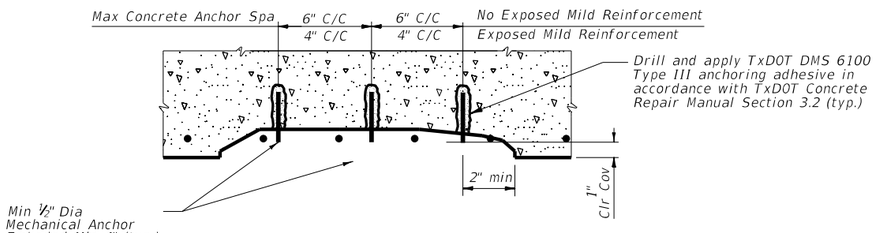
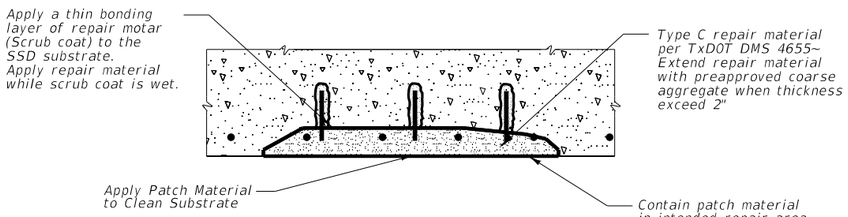


SHOWING CONCRETE ANCHOR INSTALLATION



SHOWING PATCHING

INTERMEDIATE SPALL REPAIR DETAIL

INTERMEDIATE SPALL REPAIR DETAIL

See bridge repair layouts for estimated quantities and locations.

Condition:

1. The damage exposes a reinforcing bar or strand circumference, or the damage is greater than 2" deep.
2. The maximum depth of an intermediate spall is 6 inches.
3. No significant stresses are likely to develope in or immediately around the repair material due to service loads.

Repair procedure:

1. Remove delaminated, loose, and unsound concrete. Avoid damage to sound concrete that is to remain in place by saw cutting the perimeter of the repair area. Do not damage reinforcement or strands that is to remain in place. Use only hand tools or power-driven chipping hammers (15 lb. max) to remove concrete and to excavate behind reinforcing bars.
2. Some repair areas indicated do not exhibit visible spalling and will need to be identified by sounding the concrete with hammers to determine the location and limits of repairs.
3. Sound all surfaces to identify and mark all delaminated areas for review and approval by the Engineer. Confirm square footage of repair areas prior to commencing removal and notify Engineer of any discrepencies. Provide access to Engineer for verification.
4. If any mild reinforcement is exposed or if the exposed bar exhibits significant corrosion, remove the concrete from around the entire bar. Provide ¾ inch clearance or 3 times the largest sized aggregate in the repair material, whichever is greater, between the steel and surrounding concrete to permit adequate flow of the repair material.
5. Do not chip around prestressing strand that is exposed anywhere away from the immediate end of the member. Consult the Engineer when repairing an area in which prestressing strands have been exposed. When repair dictates that chipping occur around exposed strands, the Contractor must avoid striking the strands directly or otherwise causing damage that could lead to wire or strand breaks.
6. Saw-cut the repair perimeters to eliminate feathered edges and to ensure that the repair material will be applied in depths no less than 1/2 inch. Do not damage reinforcement or strands that is to remain in place.
7. Handheld grinders or saws may be used to square the repair perimeters. When practical, undercut the repair perimeter at an approximate angle of 30 degrees such that the profile will help hold the repair material in place.
8. Roughen the substrate to ensure that there will be a mechanical bond between the repair material and the parent concrete. Contractor should attempt to attain a minimum surface roughness profile of 1/8 inch or CSP (Concrete Surface Profile) 6 per ICRI.
9. Embed mechanical tie (1/2" diameter minumum) with Type III anchoring adhesives, meeting the requirements of DMS-6100, "Epoxies and Adhesives". Make the drilled hole deep enough to permit a minimum 4-inch embedment of the dowel. Follow Manufacture's directions for installing the epoxied mechanical tie. Contractor to scan for existing concrete reinforcing before drilling.
10. Notify Engineer once existing concrete is removed and repair areas for each structure elements have been prepared. Provide access to the Engineer for verification of prepared repair areas.
11. Where anchors are installed, ensure that there will be a minimum cover of 1/2 inch for stainless steel and 1 inch for non-stainless steel after the repair material is applied.
12. Substrates must be clean and sound. Remove any contaminants, including laitance, oil, dust, debris, or other foreign particles.
13. just prior to repairing, blast the repair area using a high-pressure air compressor equipped with filters to remove all oil from the compressed air. Use abrasive blasting to remove rust from exposed steel surfaces.
14. Obtain an Saturated Surface Dry (SSD) condition using the following method: Several minutes before repairing, apply pressure water blast to the surface for a brief period (at least 15 minutes depending on the porosity of the concrete). An SSD condition is achieved if the surface remains damp until the repair material is applied. Surface may be damp, but must be free of standing water.
15. Ensure maximum aggregate size is no larger than 1/3 of the clear space between reinforcement or the cover. For small repair area, the largest of the coarse aggregate can be removed using a sieve to allow the material to flow adequately in the confined repair spaces.

STATE OF TEXAS
RAJASEGARAM RANJITH
138052
LICENSED PROFESSIONAL ENGINEER
Rajasegaram Ranjith
03/28/2024

Texas Department of Transportation
Dallas District Bridge

CONCRETE AND OVERHEAD REPAIR DETAILS

NBI: 18-061-0-0195-03-144
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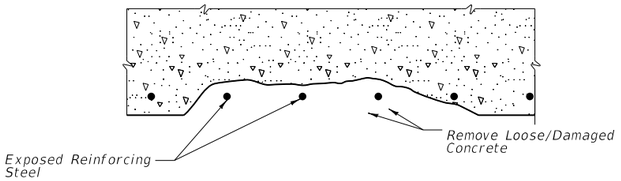

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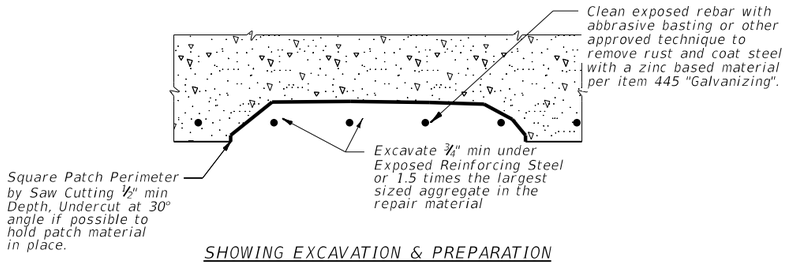

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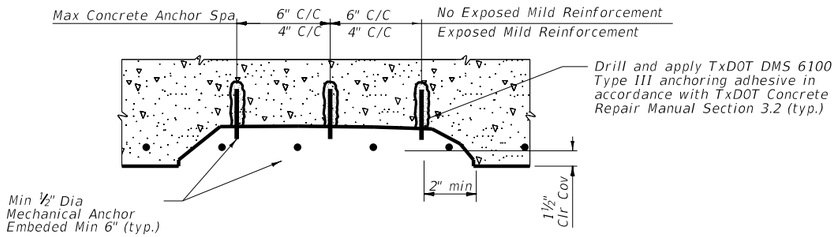

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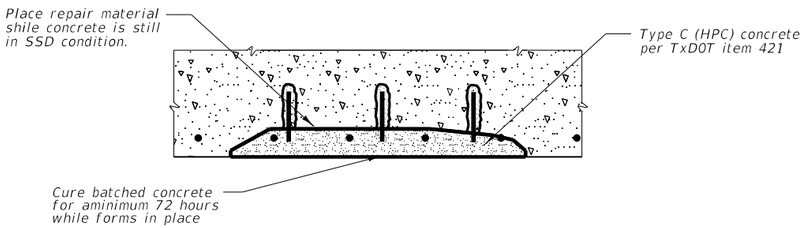

SHOWING PATCHING

MAJOR SPALL REPAIR DETAIL

MAJOR SPALL REPAIR DETAIL

See bridge repair layouts for estimated quantities and locations.

Condition:

1. Damage extend well beyond the outer layer of reinforcement.
2. Significant stresses are likely to develop in or immediately around the repair material due to service loads.

Repair procedure:

1. Remove delaminated, loose, and unsound concrete. Avoid damage to sound concrete that is to remain in place by saw cutting the perimeter of the repair area. Do not damage reinforcement or strands that is to remain in place. Use only hand tools or power-driven chipping hammers (15 lb. max) to remove concrete and to excavate behind reinforcing bars.
2. Some repair areas indicated do not exhibit visible spalling and will need to be identified by sounding the concrete with hammers to determine the location and limits of repairs.
3. Sound all surfaces to identify and mark all delaminated areas for review and approval by the Engineer. Confirm square footage of repair areas prior to commencing removal and notify Engineer of any discrepencies. Provide access to Engineer for verification.
4. If any mild reinforcement is exposed or if the exposed bar exhibits significant corrosion, remove the concrete from around the entire bar. Provide ¾ inch clearance or 3 times the largest sized aggregate in the repair material, whichever is greater, between the steel and surrounding concrete to permit adequate flow of the repair material.
5. Do not chip around prestressing strand that is exposed anywhere away from the immediate end of the member. Consult the Engineer when repairing an area in which prestressing strands have been exposed. When repair dictates that chipping occur around exposed strands, the Contractor must avoid striking the strands directly or otherwise causing damage that could lead to wire or strand breaks.
6. Saw-cut the repair perimeters to eliminate feathered edges and to ensure that the repair material will be applied in depths no less than 1/2 inch. Do not damage reinforcement or strands that is to remain in place.
7. Handheld grinders or saws may be used to square the repair perimeters. When practical, undercut the repair perimeter at an approximate angle of 30 degrees such that the profile will help hold the repair material in place.
8. Roughen the substrate to ensure that there will be a mechanical bond between the repair material and the parent concrete. Contractor should attempt to attain a minimum surface roughness profile of 1/8 inch or CSP (Concrete Surface Profile) 6 per ICRI.
9. Embed mechanical tie (1/2" diameter minumum) with Type III anchoring adhesives, meeting the requirements of DMS-6100, "Epoxies and Adhesives". Make the drilled hole deep enough to permit a minimum 6-inch embedment of the dowel. Follow Manufacture's directions for installing the epoxied mechanical tie. Contractor to scan for existing concrete reinforcing before drilling.
10. Notify Engineer once existing concrete is removed and repair areas for each structure elements have been prepared. Provide access to the Engineer for verification of prepared repair areas.
11. Where anchors are installed, ensure that there will be a minimum cover of 1 inch for stainless steel and 1½ inch for non-stainless steel after the repair material is applied.
12. Substrates must be clean and sound. Remove any contaminants, including laitance, oil, dust, debris, or other foreign particles.
13. just prior to repairing, blast the repair area using a high-pressure air compressor equipped with filters to remove all oil from the compressed air. Use abrasive blasting to remove rust from exposed steel surfaces.
14. Obtain an Saturated Surface Dry (SSD) condition using the following method: Several minutes before repairing, apply pressure water blast to the surface for a brief period (at least 15 minutes depending on the porosity of the concrete). An SSD condition is achieved if the surface remains damp until the repair material is applied. Surface may be damp, but must be free of standing water.
15. Prepare and install the forms prior to mixing the repair material. Ensure that forms are tight enough to prevent grout leakage. Place the repair material in the forms while the concrete substrate is still SSD. If the parent concrete is no longer SSD, remove the forms and re-spray the surface with a high-pressure water blast.
16. Consolidate the material adequately. Do not over-vibrate the mix. Do not vibrate self-consolidating concrete.
17. Cure batched concrete repairs for a minimum of 72 hours. The material should be cured by leaving the forms in place during the entire curing period. Place wet mats on exposed sections and over the openings. Do not allow concrete surfaces to become dry. Ensure that wet mats are kept wet during the entire cycle.
18. Ensure the maximum coarse aggregate does not exceed 1/3 of the smallest dimension, including reinforcement clearance. Remove large aggregate by wet sieving when necessary.

STATE OF TEXAS
RAJASEGARAM RANJITH
138052
LICENSED PROFESSIONAL ENGINEER
Rajasegaram Ranjith
03/28/2024

Texas Department of Transportation
Dallas District Bridge

CONCRETE AND OVERHEAD REPAIR DETAILS

NBI: 18-061-0-0195-03-144
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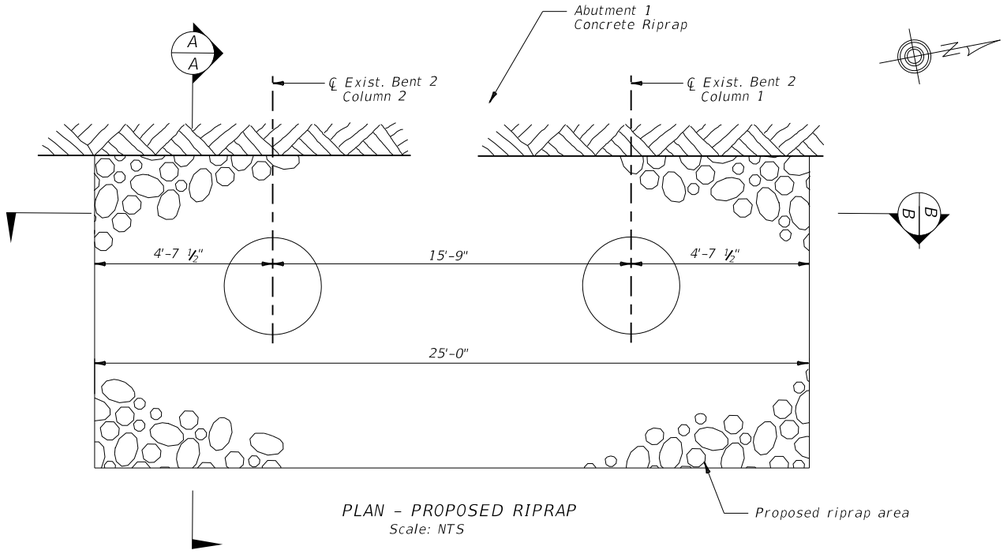
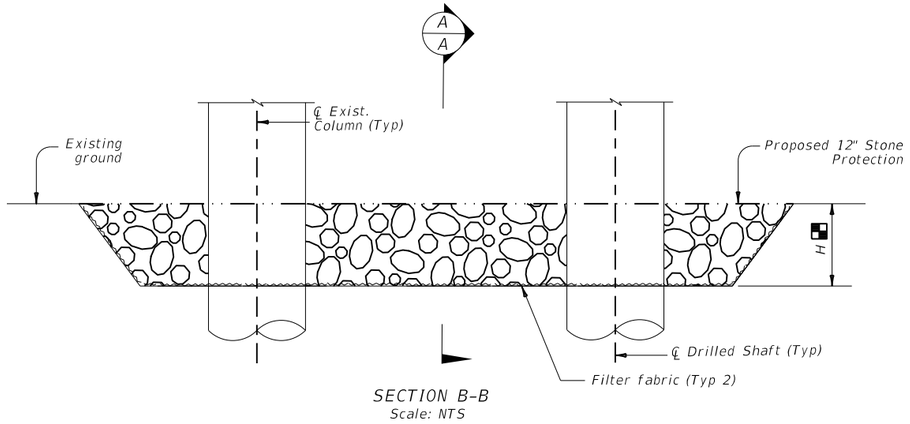
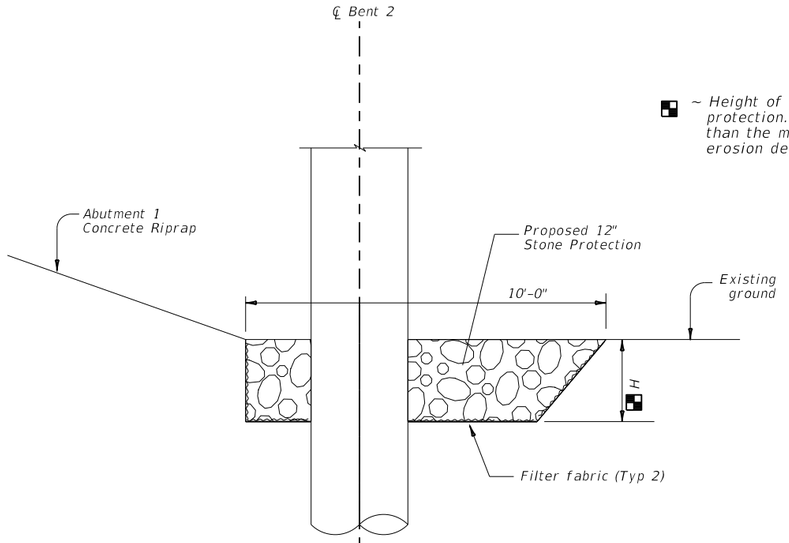


PLAN – PROPOSED RIPRAP
Scale: NTS

PHOTO OF FIELD CONDITION



SECTION B–B
Scale: NTS



■ ~ Height of proposed Stone riprap protection. Height should be more than the maximum of 2 ft and the erosion depth

SECTION A–A
Scale: NTS

GENERAL NOTE:

1. Construct the stone riprap as directed. For details not shown follow standard SRR sheet (Protection Stone Riprap) and item 432, "Riprap".
2. Notify TxDOT if any discrepancies are noted between the plans and actual conditions.

CONSTRUCTION SEQUENCE:

1. Remove debris, and trash from the eroded areas and abutment concrete riprap toe wall.
2. Excavate/deepen the bottom of the eroded areas within the limits shown above.
3. Grade the side walls slope as necessary to achieve a smooth slope.
4. Place filter fabric (Type 2 per DMS-6200) on the excavated ground and the side walls of excavations where stone protections will be placed.
5. Place stone protection (12" stone) as shown on the plan view and typical sections.

STATE OF TEXAS
RAJASEGARAM RANJITH
138052
LICENSED PROFESSIONAL ENGINEER
Rajasegaram Ranjith
03/28/2024

Texas Department of Transportation
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STONE RIPRAP PROTECTION DETAIL

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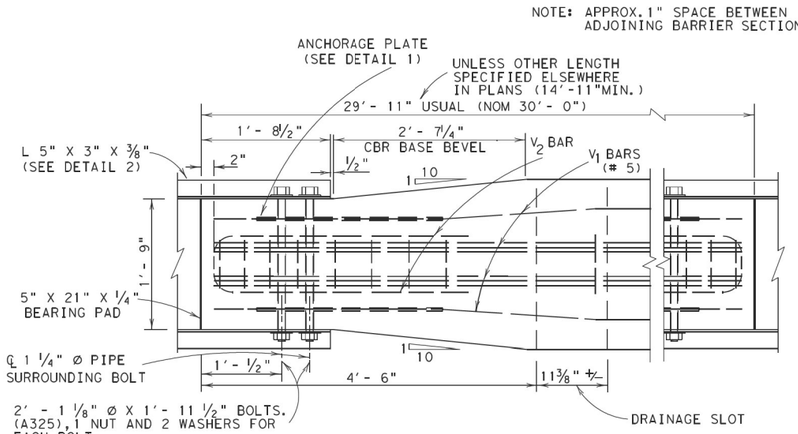
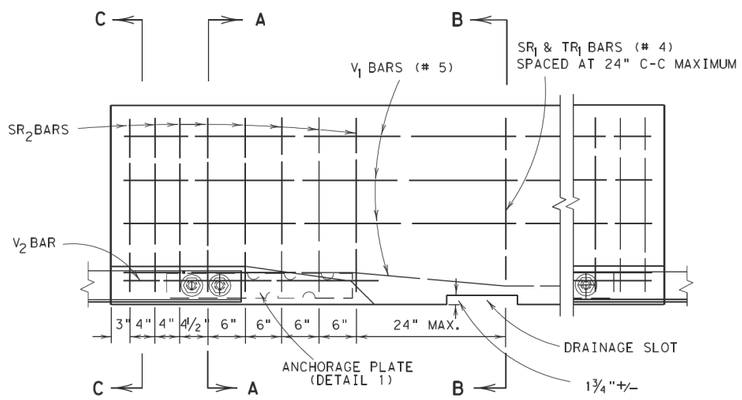


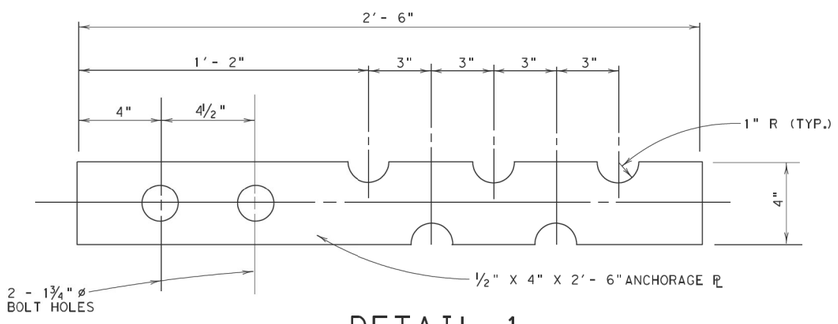
PLAN VIEW

(TYP. BOTH ENDS)

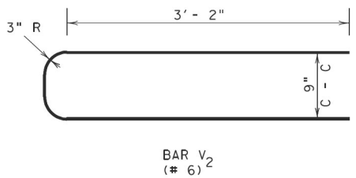


ELEVATION

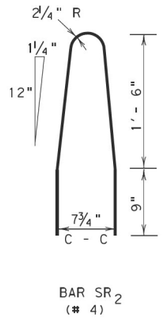
(TYP. BOTH ENDS)



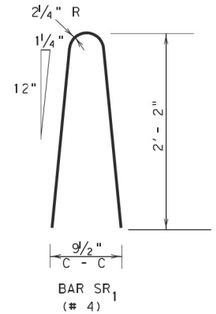
DETAIL 1



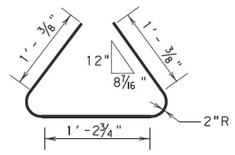
BAR V_2 (# 6)



BAR SR_2 (# 4)



BAR SR_1 (# 4)



BAR TR_1 (# 4)

REINFORCING STEEL DETAILS

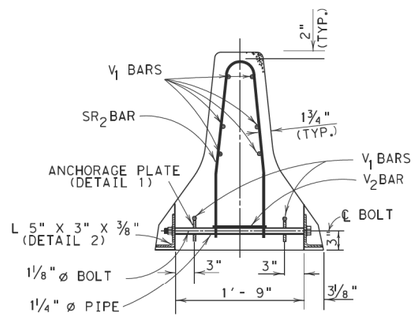
SECTION C-C

SECTION C-C IS IDENTICAL TO SECTION A-A W/O PIPE, BOLT OR ANCHORAGE PLATE

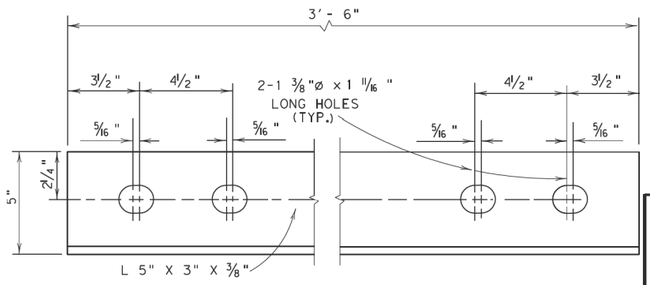
* APPROXIMATE QUANTITIES FOR A 30 FT. SECTION		
CONCRETE	CY	3.14
REINFORCING STEEL	LBS.	392

APPROX. WEIGHT PER FOOT IS 472 LBS.

* FOR CONTRACTOR'S INFORMATION ONLY

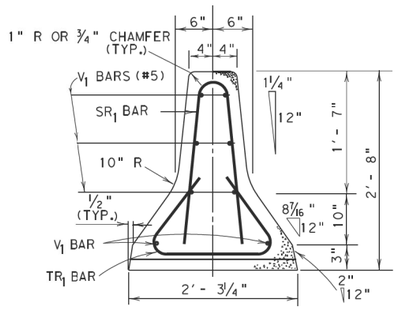


SECTION A-A



DETAIL 2

SECTION B-B



GENERAL NOTES

1. ANGLE SECTIONS AND ALL STEEL PLATES SHALL CONFORM TO ASTM DESIGNATION A36.
2. BEARING PADS SHALL BE MADE OF AN ELASTOMERIC MATERIAL WITH A HARDNESS OF 60 DUROMETER AND ARE TO BE EPOXIED TO EACH END OF BARRIER UNIT AFTER CASTING.
3. ALL CONCRETE SHALL BE CLASS A, C OR H, UNLESS OTHERWISE SPECIFIED.
4. ALL LONGITUDINAL REINFORCING STEEL SHALL BE GRADE 60; ALL VERTICAL STEEL SHALL BE GRADE 40.
5. EACH BARRIER SHALL BE DELIVERED WITH 2 SPLICE L 5" X 3" X 3/8" SECTIONS AND CONNECTING HARDWARE.
6. WHEN BARRIER IS TO BE PLACED IN A CURVING ALIGNMENT, THE ANGLE SECTIONS MAY BE HEATED AT THE MIDPOINT AND PRE-BENT.
7. ALL L 5" X 3" X ⅜" ANGLES SHALL BE HOT-DIP GALVANIZED IN CONFORMANCE TO ASTM DESIGNATION A123. BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED TO CONFORM TO ASTM DESIGNATION A153.
8. CHAMFER END EDGES 3/4-INCH.
9. LIFTING DEVICES OR ATTCHMENTS TO BARRIER SECTIONS SHALL BE APPROVED BY THE ENGINEER.
10. REINFORCING STEEL, BOLTS, NUTS, WASHERS, ANGLE SECTIONS AND ANCHORAGE PLATES SHALL BE CONSIDERED SUBSIDIARY TO THE BID ITEM.
11. WHEN SERVING TO CHANNELIZE TRAFFIC IN NIGHTTIME SITUATIONS, THE BARRIER SHOULD BE LIGHT IN COLOR AND SHALL BE SUPPLEMENTED BY THE USE OF STANDARD DELINEATION OR CHANNELIZATION MARKINGS OR DEVICES SUCH AS DELINEATORS OR VERTICAL PANELS.

FOR CONTRACTOR'S INFORMATION ONLY

Note: This standard is a substitute to the actual standard shown in the as-built. The actual standard in the as-built featured metric dimensions. The reason for this substitution is to simplify construction and prevent dimension discrepancies. Field varify existing CBR dimensions before pre-casting replacement CBR to make sure their dimensions are the same.

NOTE:
BARRIER FROM EXISTING STOCKPILES THAT SUBSTANTIALLY MEETS THE REQUIREMENTS SHOWN ON THIS SHEET MAY BE USED ON THIS PROJECT.

NEW BARRIER SHALL NOT BE CAST ACCORDING TO THE DETAILS SHOWN ON THIS SHEET.

Texas Department of Transportation
Design Division Standard

CONCRETE BARRIER RAIL (PORTABLE AND PRECAST)

CBR (P&P)-04

FILE: cbrpp04.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT January 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REV. 1-87 USE ANGLE CONNECTOR, BEVEL CBR NEAR JOINT, REPOSITION REINF. STEEL AND DRAINAGE SLOT.	DIST	COUNTY		SHEET NO.

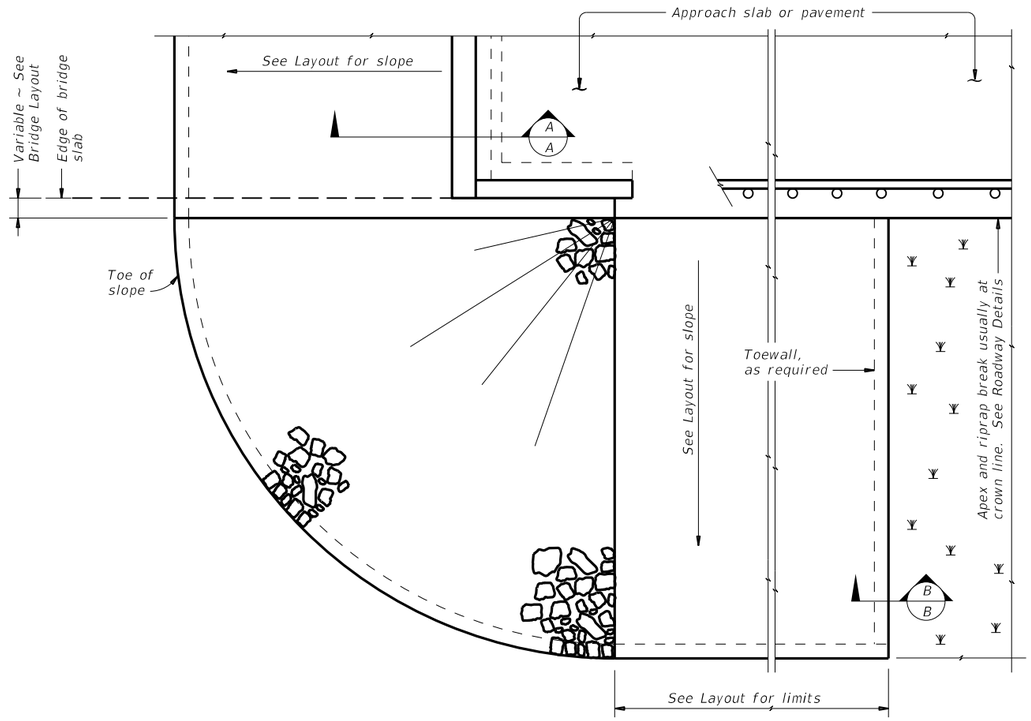
Texas Department of Transportation
Dallas District Bridge

IH 35E
IH 35E NBML
OVERPASS AT UPRR
AS-BUILTS

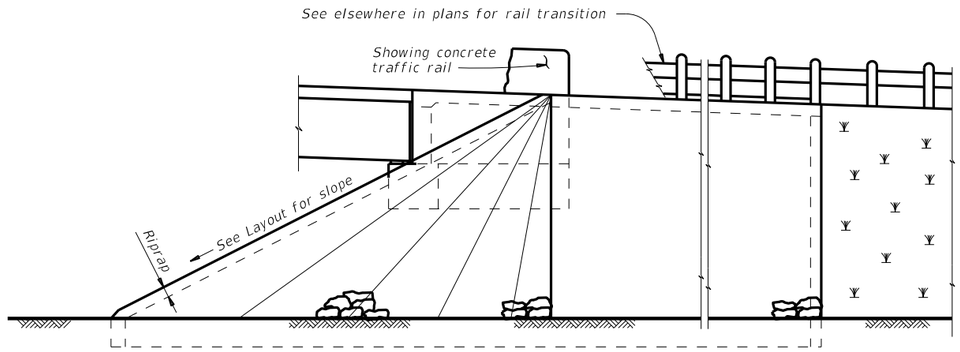
NBI: 18-061-0-0195-03-145

FILE:	DN: ER	CK: RR	DW: ER	CK: RR
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		198

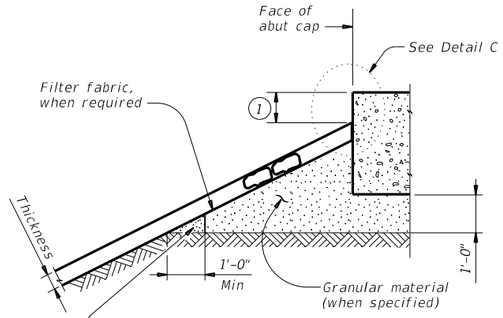
DATE: 3/28/2024 TIME: 2:32:20 PM FILE: T:\DALBRDG\0195-03-088 IH35E\Drawing\MS-SRR-19.dgn User: dalbrdg



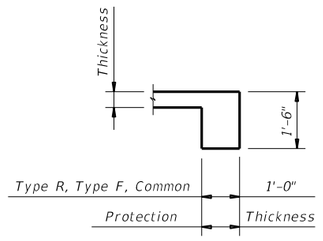
PLAN



ELEVATION

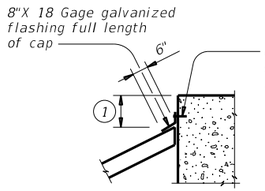


SECTION A-A AT CAP

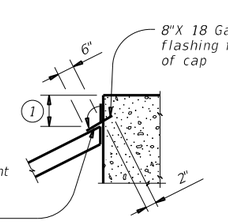


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A



CAP OPTION B

DETAIL C

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE:	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		199

DATE: 3/28/2024 TIME: 2:32:20 PM FILE: T:\DALBRDG\0195-03-088 IH35E\Drawing\MS-SRR-19.dgn User: dalbrdg

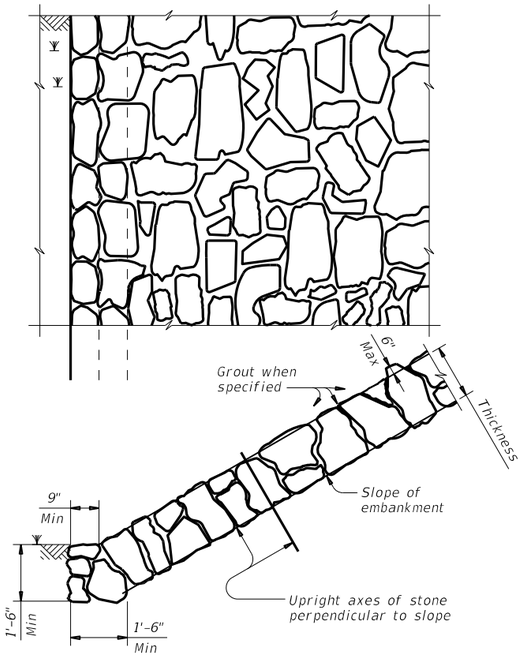


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

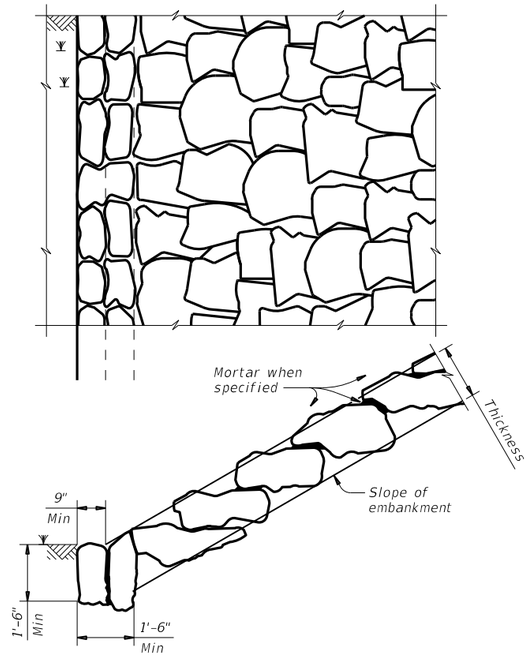


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

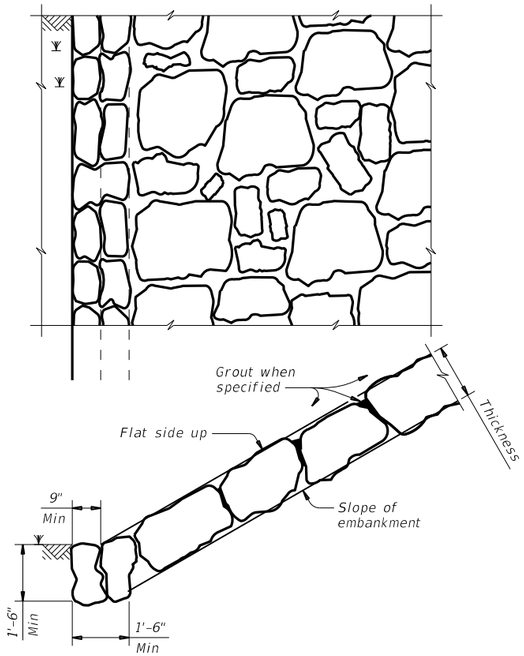


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

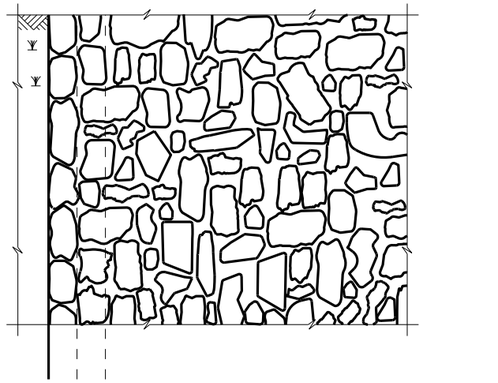


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

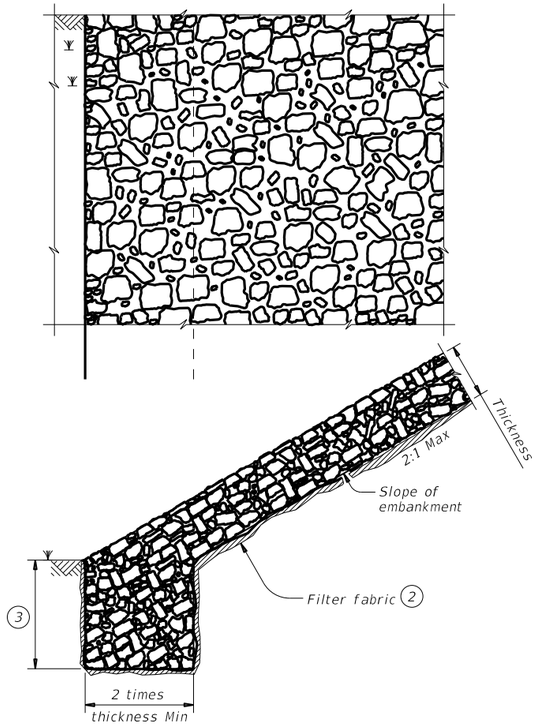


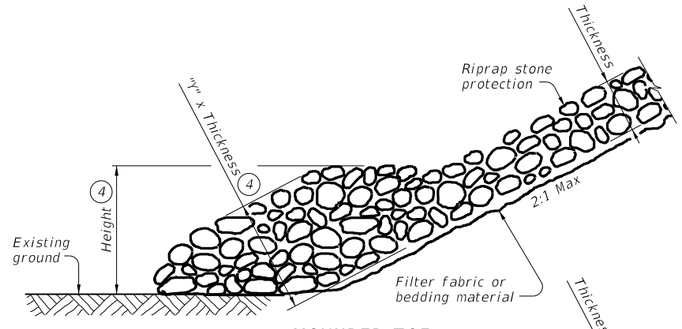
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

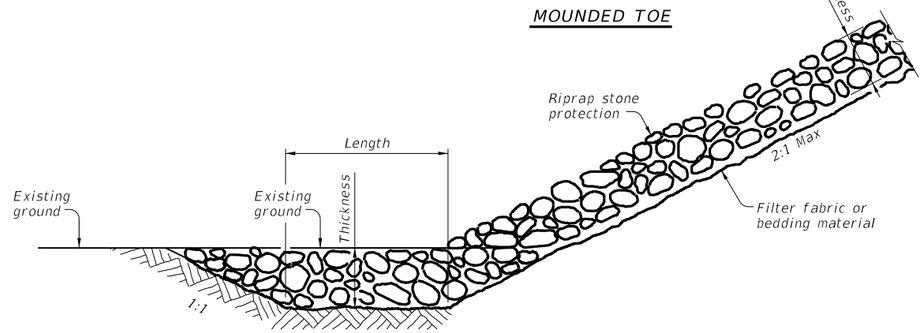
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE:	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,ETC	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		200

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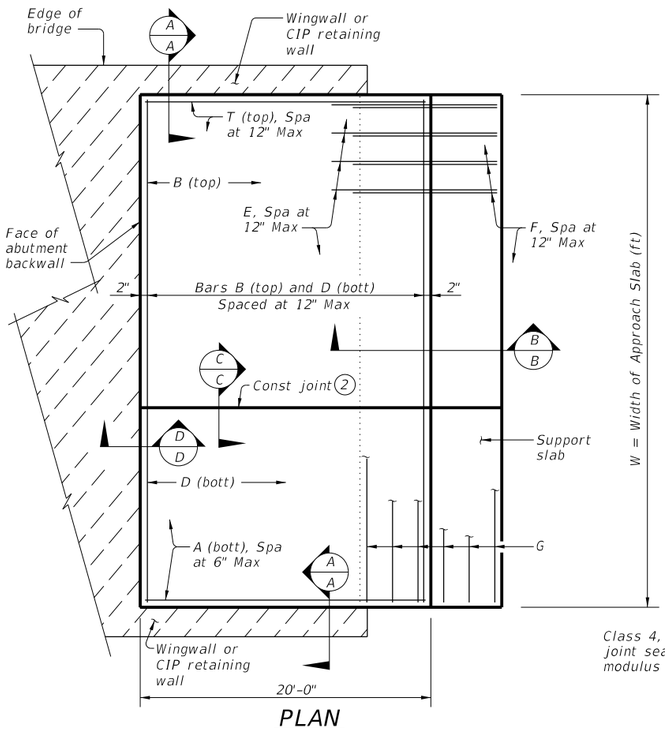
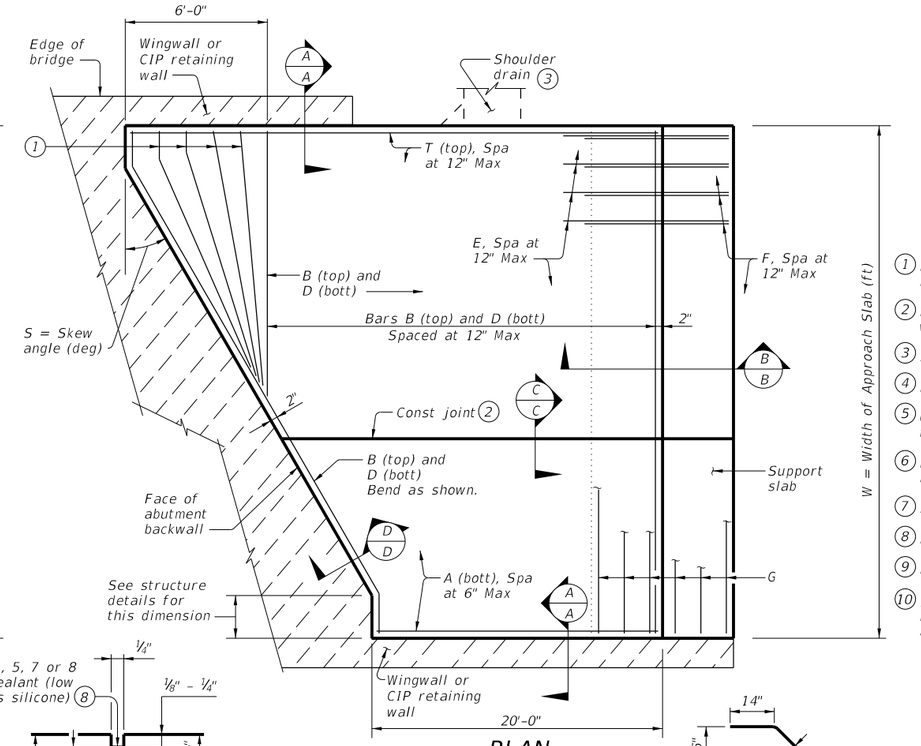


PLAN

(Showing non-skewed approach slab.)



PLAN

(Showing skewed approach slab.)

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab
= 18.4 Lbs/LF of Support Slab

Vol of Appr Slab Conc (CY) = 1.057W – 0.008W x T + 0.02W² Tan S
(Includes Support Slab)

W = Width of Approach Slab (ft)

T = Conc Pavement Thickness (in)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab only.

(5) On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete pavement thickness. Smooth trowel finish. Place two layers of 30# roofing felt.

(6) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

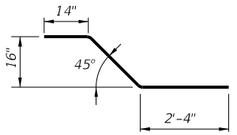
(7) See details elsewhere in plans for required cross-slope.

(8) Place in accordance with Item 438.

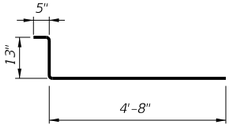
(9) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

(10) If bridge rail is present at the wingwall or CIP retaining wall, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

LONGITUDINAL SAW CUT JOINT DETAIL



BARS E (#5)



BARS F (#5)

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."

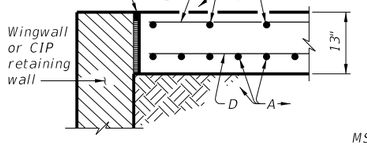
Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

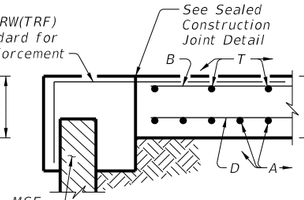
Cure for 4 days using water or membrane curing per Item 422.

All details shown herein are subsidiary to bridge approach slab.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

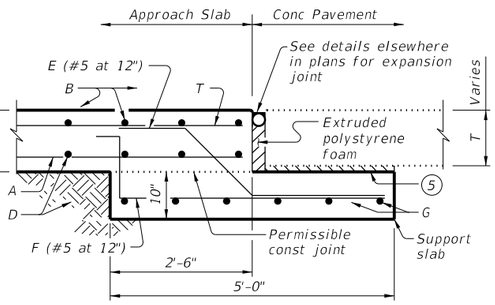


SHOWING WINGWALL OR CIP RETAINING WALL

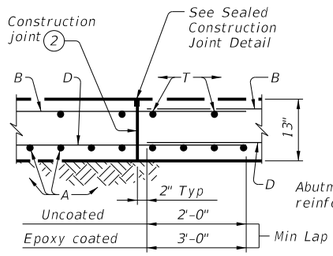


SHOWING MSE WALL

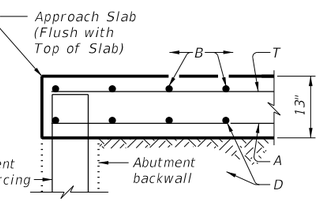
SECTION A-A



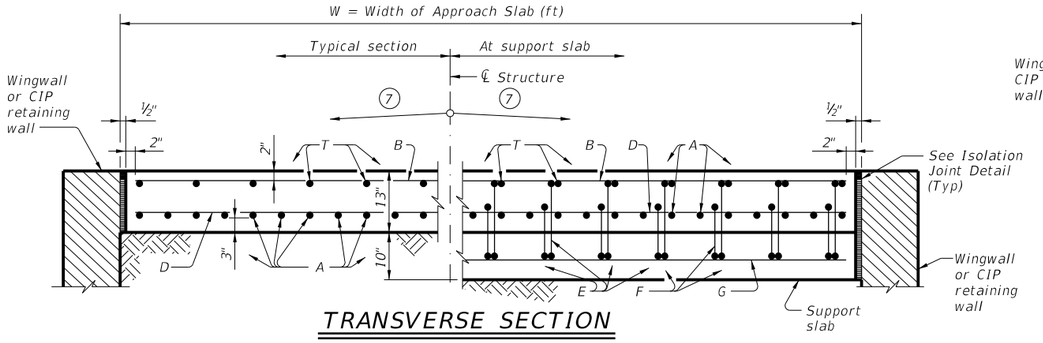
SECTION B-B



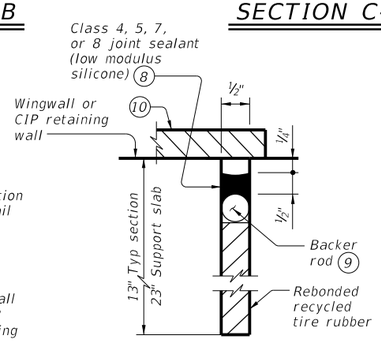
SECTION C-C (6)



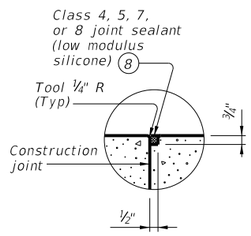
SECTION D-D



TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

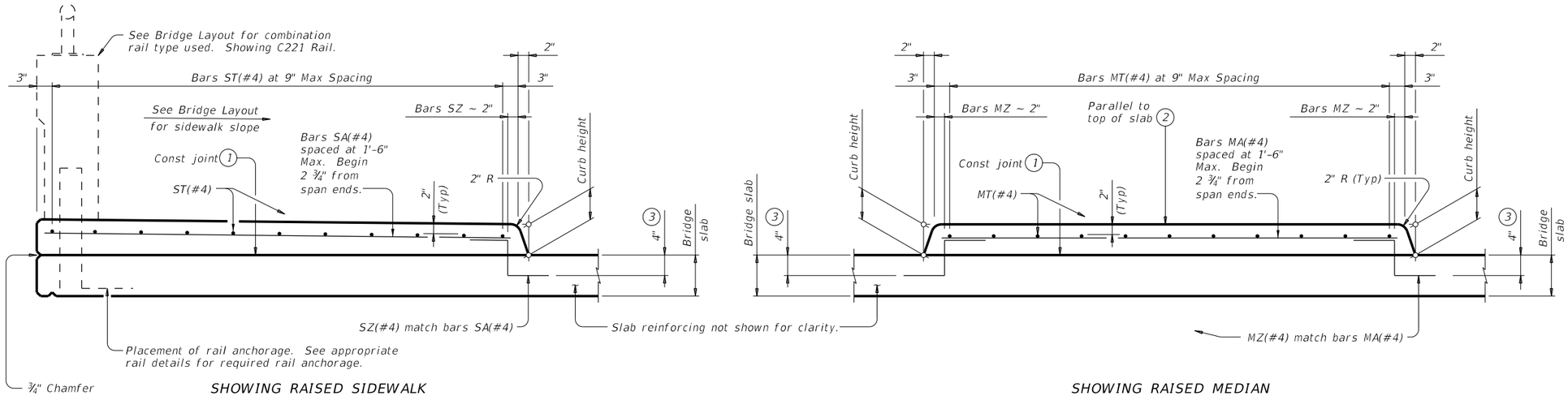
Bridge Division Standard

BRIDGE APPROACH SLAB
CONCRETE PAVEMENT

BAS-C

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
02-20: Removed stress relieving pad. 03-23: Note 5 changed.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		201

DATE:
FILE:



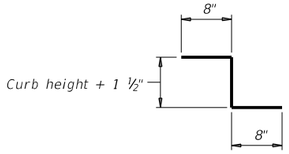
TYPICAL TRANSVERSE SECTIONS

See Span Details for dimensions not shown.

(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

(2) Unless noted otherwise on the span details.

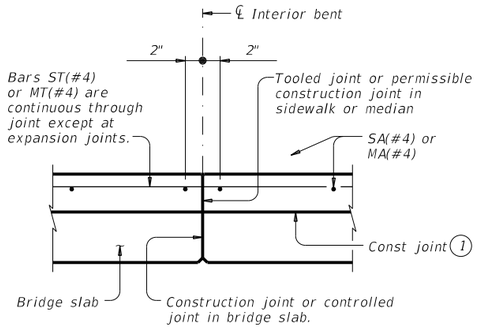
(3) Bars may rest on top of PCPs.



BARS SZ(#4) AND MZ(#4)

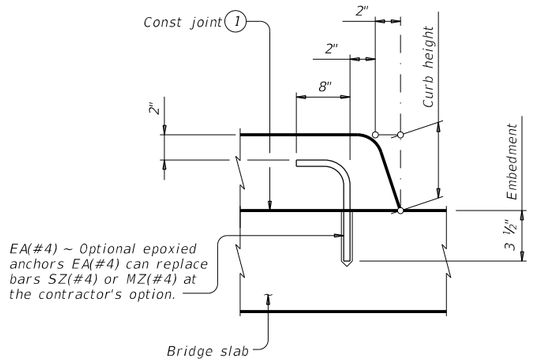
APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide drain cover plates fabricated with a product from this list. No exceptions are permitted.



LONGITUDINAL SECTION AT INTERIOR BENT

At bents with expansion joints, provide an open joint in the sidewalk/median matching the deck's joint width.



OPTIONAL EPOXY ANCHORS

Embed EA(#4) bar into concrete with a Type III (Class C, D, E, or F) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Follow manufacturer's directions for installing the epoxied anchor bars.

MATERIAL NOTES:

Provide the same concrete required for the bridge deck, Class S or Class S (HPC) concrete.

Provide Grade 60 reinforcing steel. Deformed welded wire reinforcement (WWR) meeting ASTM A1064 of equivalent size and spacing may be substituted for bars SA, ST, MA, and MT.

Provide epoxy coat or galvanize reinforcement if bridge deck reinforcement is required to be epoxy coated or galvanized.

Provide hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Chamfer or round edges approximately 1/16" prior to galvanizing.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide the following bar or wire lap lengths when required:
- Uncoated, 1'-7" Min
- Coated, 2'-5" Min

Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.

Raised sidewalks will be paid under Item 422 by the SF of Bridge Sidewalk or Bridge Sidewalk (HPC). Raised medians will be paid under Item 422 by the SF of Bridge Median or Bridge Median (HPC).

Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

DESIGNER NOTES:

These details do not apply for longitudinal grades exceeding 5 percent.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

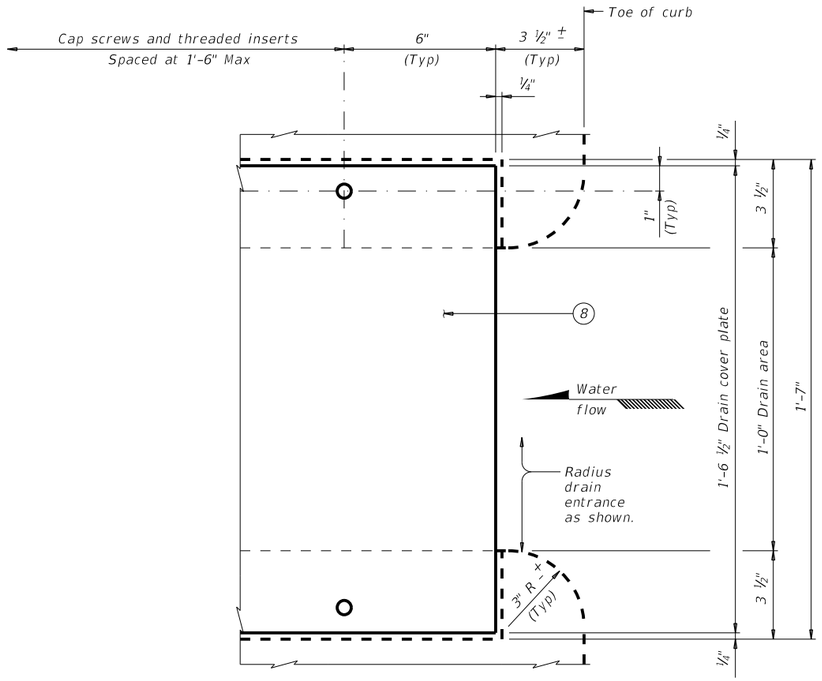
Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

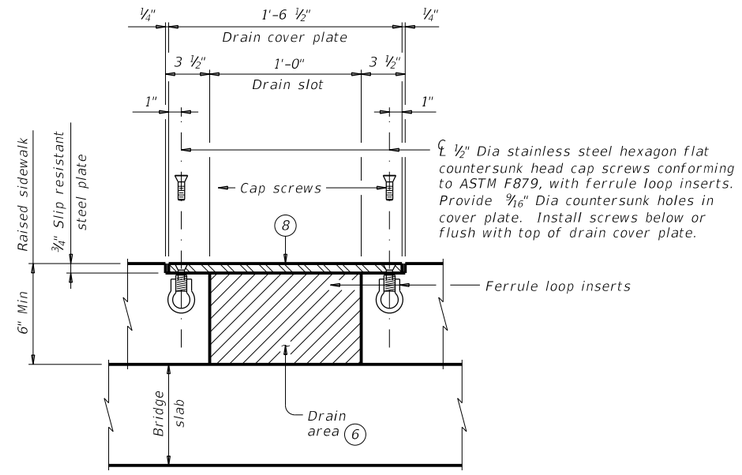
BRSM

FILE: brsmste1-19.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT	
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0195	03	088, ETC.	IH35E	
	DIST	COUNTY		SHEET NO.	
	DAL	DENTON		202	

DATE:
FILE:

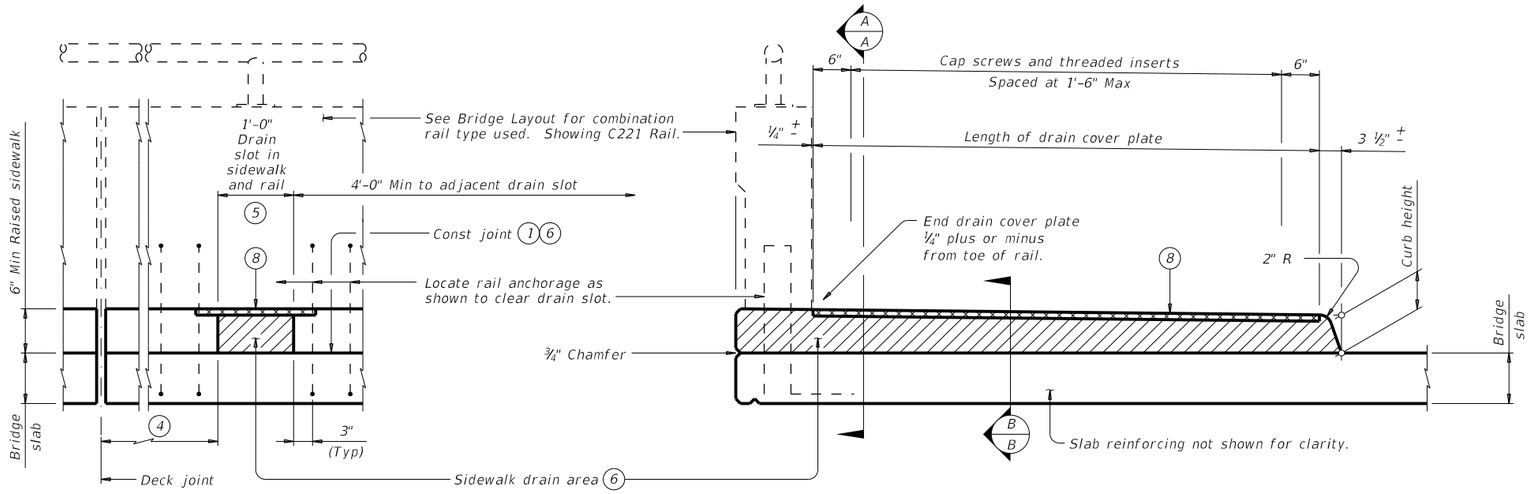


PARTIAL PLAN CURB DRAIN



SECTION B-B

Reinforcing not shown for clarity.



SECTION A-A

SHOWING RAISED SIDEWALK WITH DRAIN SLOT

OPTIONAL DRAIN DETAILS (7)

(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

(4) 3'-0" Min at deck expansion joints, deck construction joints or controlled joints, rail intermediate wall joints or from face of substructure.

(5) For rail Type C1W, center drain slots between posts.

(6) Steel trowel top surface of bridge deck in drain locations.

(7) Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. Place drain and cover plate perpendicular to toe of rail.

(8) Drain cover plate (PL ¾ x 18 ½ slip resistant steel plate). Install flush with top of sidewalk.

Texas Department of Transportation

Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

FILE: brsmste1-19.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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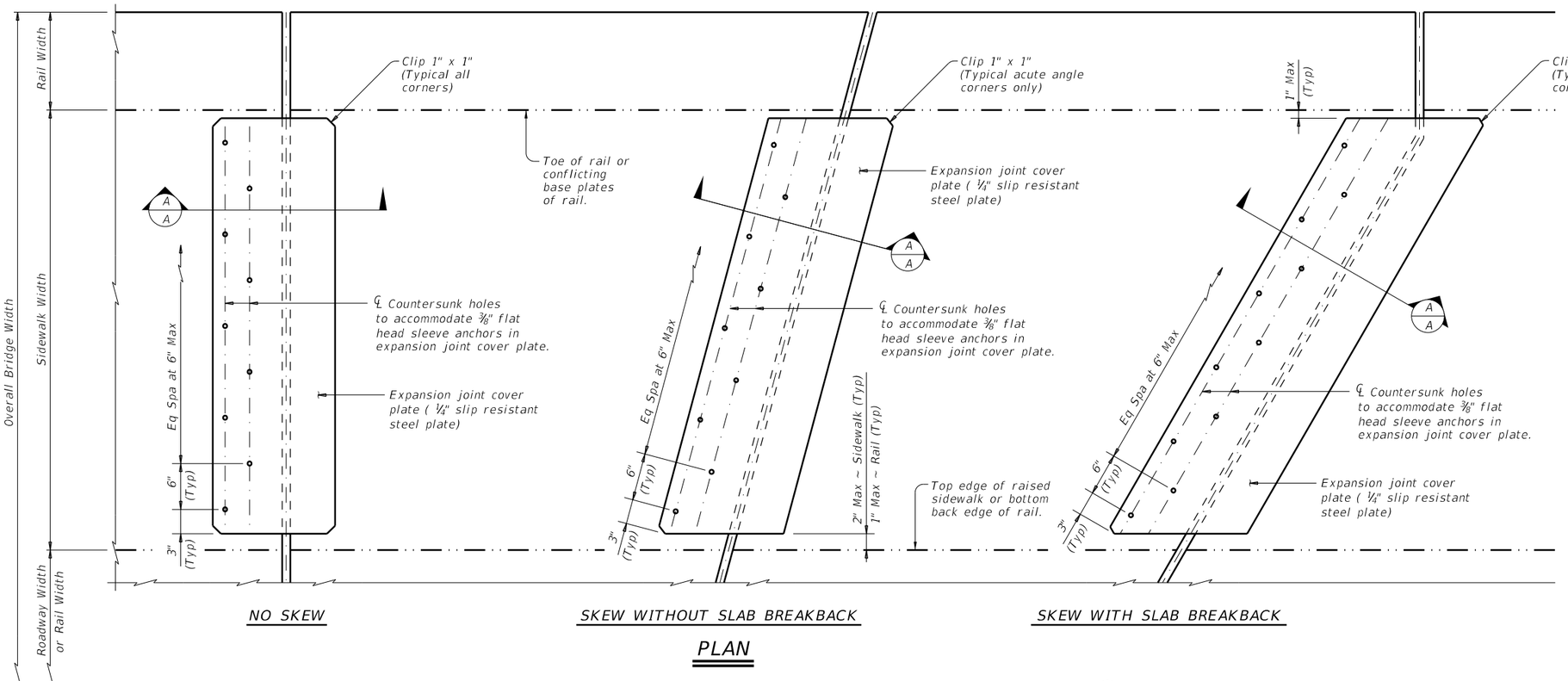
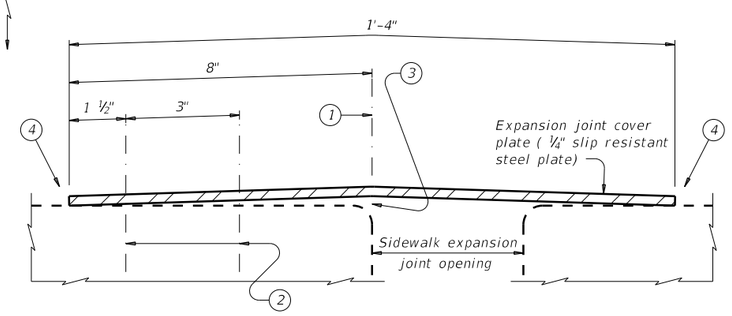
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		203

DATE:
FILE:

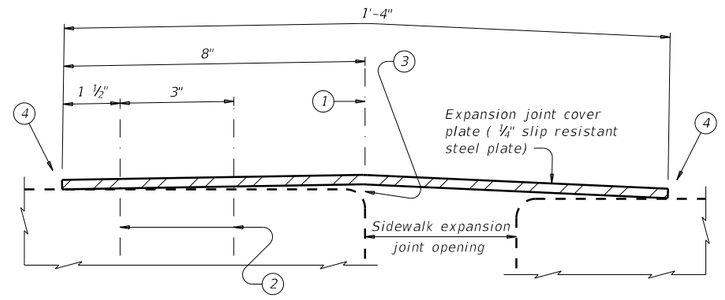


NO SKEW | SKEW WITHOUT SLAB BREAKBACK | SKEW WITH SLAB BREAKBACK

PLAN



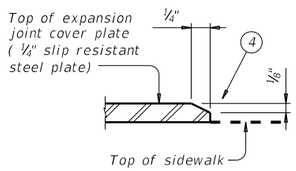
SHOWING LEVEL EXP JOINT



SHOWING UNLEVEL EXP JOINT
(Install sleeve anchors on high side of expansion joint)

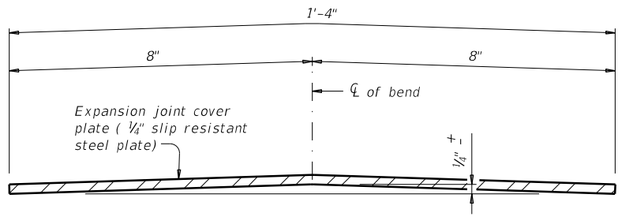
SECTION A-A

1. ℄ Expansion joint cover plate and edge of expansion joint.
2. ℄ ⅜" x 2 ½" Min, Flat Head Sleeve Anchors, Stainless Steel. Countersink Flat Head Sleeve Anchors in ¼" Slip Resistant Steel Plate.
3. It is not necessary to remove plate crown provided the plate is firmly secured to the sidewalk.
4. Transverse edges must be in contact with sidewalk surface after installation.



EXP JOINT COVER PLATE BEVEL DETAIL

Bevel all plate edges as shown.



BENDING DIAGRAM OF EXP JOINT COVER PLATE

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide cover plates fabricated with a product from this list. No exceptions are permitted.

FABRICATION NOTES:

Shop drawings for the fabrication of Bridge Sidewalk Expansion Joint Cover Plate will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A Bridge Sidewalk Expansion Joint Cover Plate Layout which identifies location side of sleeve anchors and orientation of all cover plate sections must be developed by the fabricator. Mark each steel section in accordance with the Bridge Sidewalk Expansion Joint Cover Plate Layout. A copy of the Bridge Sidewalk Expansion Joint Cover Plate Layout is to be provided to the Engineer.

Sidewalk expansion joint cover plates must be hot-dipped galvanized ¼" slip resistant steel plate. Checker plate or diamond plate is not allowed nor are slip resistant tapes, films and non-metallic coatings.

Minimum required yield strength of steel plate is 36 ksi.

Hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Provide stainless steel flat head sleeve anchors meeting the requirements of ASTM F 593, Group I, Alloy 304. Countersink holes in slip-resistant plate for sleeve anchors. Drill holes in sidewalk as per sleeve anchor manufacturer's recommendations. Install sleeve anchors flush with, or slightly recessed below, top surface of sidewalk expansion joint cover plate.

GENERAL NOTES:

Sidewalk expansion joint cover plates can only accommodate up to a 7" maximum expansion joint opening.

Details provided are applicable to concrete walkway surfaces only.

Payment for sidewalk expansion joint cover plates are by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures".

Estimated weight of one sidewalk expansion joint cover plate is 14 plf.

Texas Department of Transportation

Bridge Division Standard

BRIDGE SIDEWALK EXPANSION JOINT COVER PLATE (ALL SKEWS)

BS-EJCP

FILE: bsejste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
8-20: Closer tolerances on cover plate.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		204

DATE: 10/2/2023 8:34:13 PM
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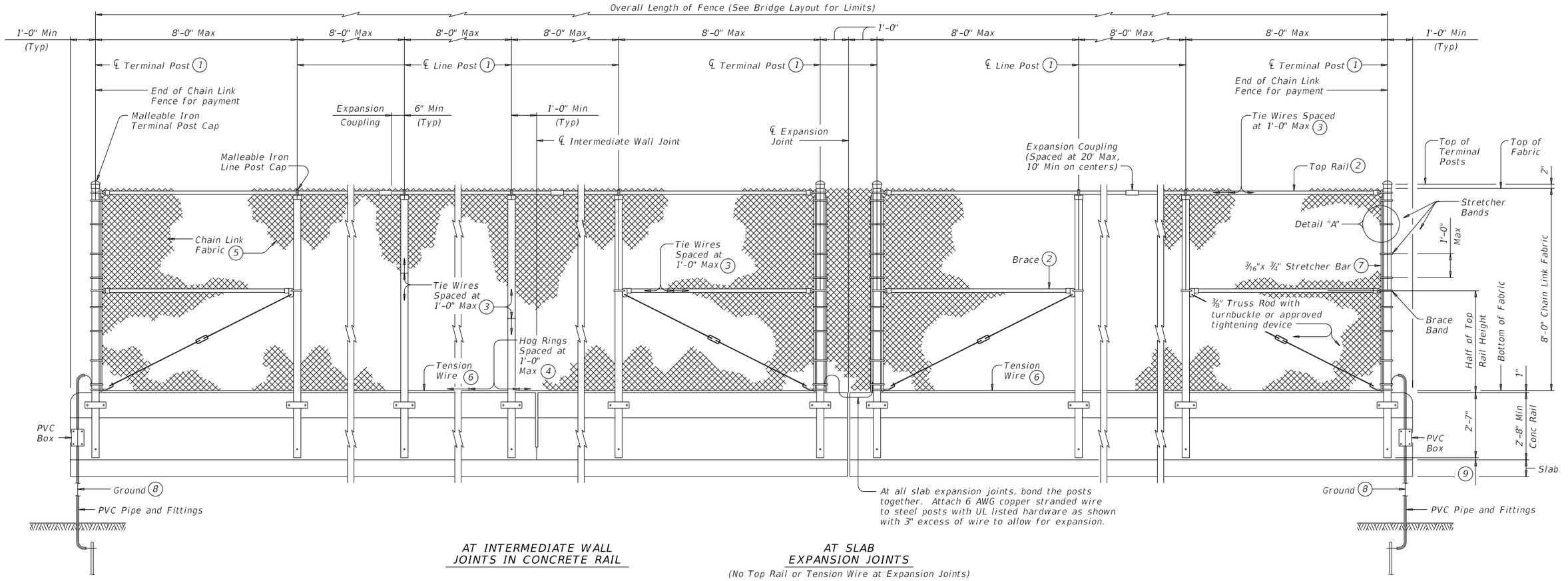
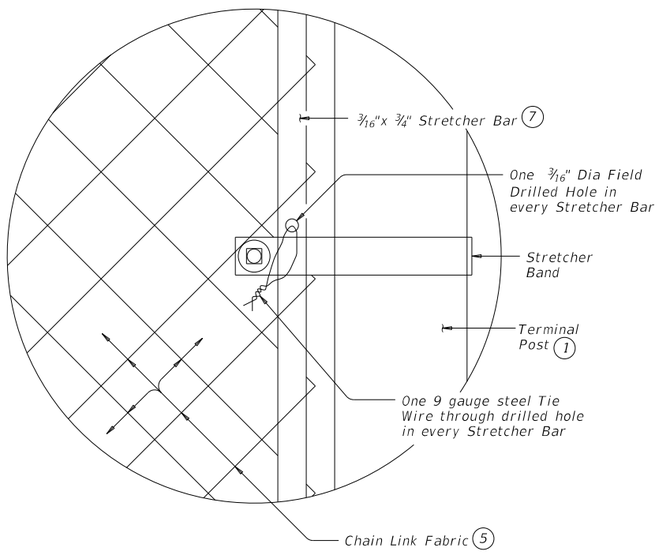


AT INTERMEDIATE WALL JOINTS IN CONCRETE RAIL

AT SLAB EXPANSION JOINTS
(No Top Rail or Tension Wire at Expansion Joints)

OUTSIDE ELEVATION OF CHAIN LINK FENCE



DETAIL "A"

(1) HSS 3.500 x 0.216 ASTM A1085 or A500 Gr B.

(2) HSS 1.660 x 0.140 ASTM A500 Gr B or A53 Gr B.

(3) 9 gauge steel Tie Wires attach chain link fabric to HSS.

(4) 9 gauge steel Hog Rings attach chain link fabric to tension wire.

(5) 9 gauge steel Chain Link Fabric, 2" Mesh, knuckle selvage top and bottom.

(6) 7 gauge steel Tension Wire.

(7) Contractor must field drill one 3/16" Dia hole in every stretcher bar and use a 9 gauge steel tie wire to tie one stretcher band and chain link fabric together. Locate drilled hole for tie wire at approximate mid-height of fence.

(8) Ground terminal post at the beginning and end of fence and down the nearest bent. Attach 6 AWG copper stranded wire to steel post with UL listed hardware and run other end of copper stranded wire to 5/8" Dia minimum copper-clad steel rod 8 ft in length. Install ground rod as per Item 550 and this sheet. The 6 AWG copper stranded wire must run through 1/2" Schedule 40 PVC pipe, fittings and PVC box attached to the back of rail.

(9) Dimension varies on rail types and superstructure type. T551, T221 and C221 Rails = 1" with no overlay, T222 Rail and SSTR Rail = 5" with no overlay, increased 2" for overlay. On bridges with significant beam camber variable length in dimension may be anticipated.

Texas Department of Transportation

Bridge Division Standard

8 FT CHAIN LINK FENCE FOR RAILROAD OVERPASS

CLF-RO

FILE: rlstd032-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		205

DATE: 10/2/2023 8:34:13 PM
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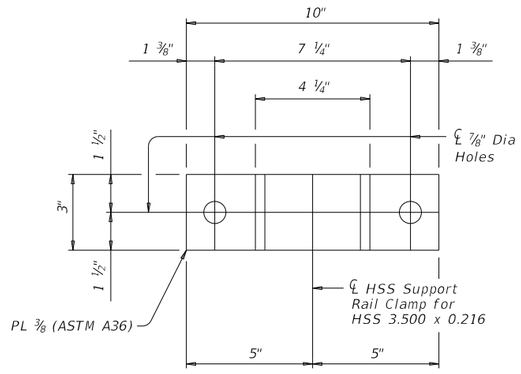
(1) HSS 3.500 x 0.216 ASTM A1085 or A500 Gr B.

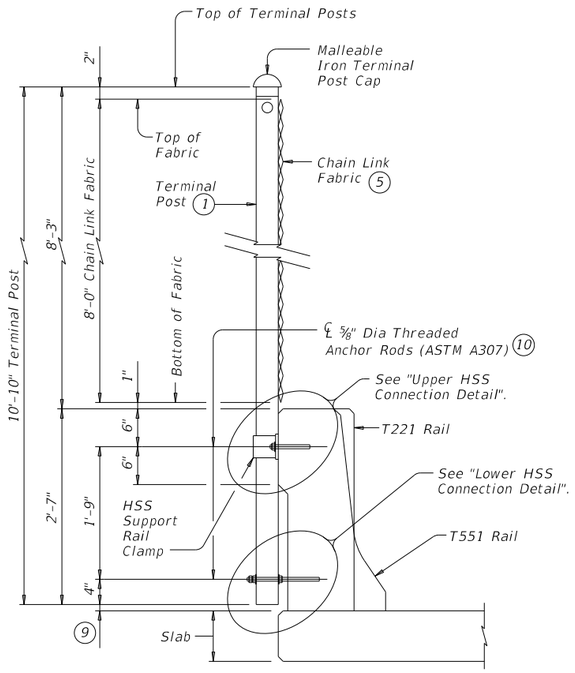
(5) 9 gauge steel Chain Link Fabric, 2" Mesh, knuckle selvage top and bottom.

(9) Dimension varies on rail types and superstructure type. T551, T221 and C221 Rails = 1" with no overlay, T222 Rail and SSTR Rail = 5" with no overlay, increased 2" for overlay. On bridges with significant beam camber variable length in dimension may be anticipated.

(10) See "Material Notes" for threaded anchor rod information.

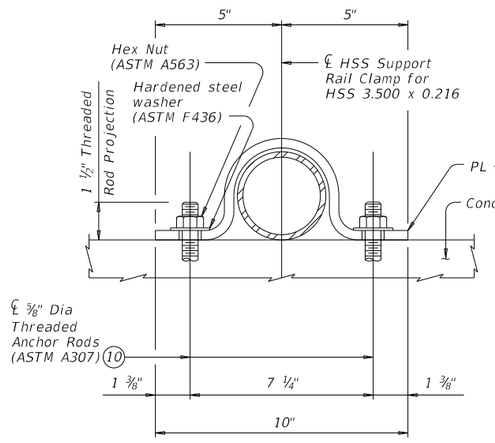


PIPE SUPPORT
RAIL CLAMP ELEVATION



CHAIN LINK FENCE SECTION

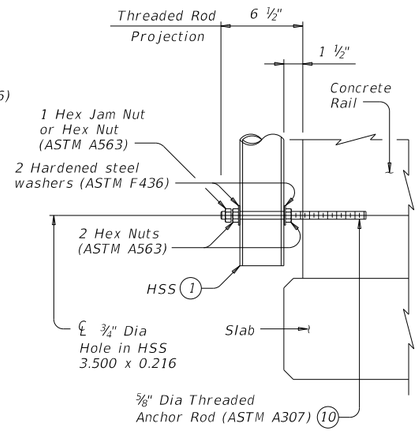
(Showing Terminal Post on a T551 or T221 Rail, Line Post, T222 Rail and SSTR Rail similar.)



HSS SUPPORT
RAIL CLAMP ASSEMBLY

UPPER HSS
CONNECTION DETAIL

(Dimensions may vary according to Manufacturer's specifications.)



LOWER HSS
CONNECTION DETAIL

(Showing Terminal Post or Line Post)

CONSTRUCTION NOTES:

Chain link fence post must be plumb unless otherwise approved.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

All Chain Link Fence materials must conform to standard specifications, Item "Chain Link Fence" unless shown otherwise.

Galvanize all steel components unless noted otherwise.

Provide ASTM A1085, A500 Gr B for HSS 3.500 x 0.216. Provide ASTM A500 Gr B or A53 Gr B for HSS 1.660 x 0.140.

Provide ASTM A36 for steel plates.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods. Hex nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 6 kips each anchor (edge distance and anchor spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

GENERAL NOTES:

This sheet must be used with a concrete Traffic or Combination Rail. Rails that can be used with this sheet are T551, SSTR, T221, T222, and C221 Rails. Chain link fence details shown on this standard are adequate for all speeds. If used, optional side slot drains shown on rail standards must not be any closer than 6" from chain link post to edge of side slot drains.

This railing cannot be used on bridges with expansion joints providing more than 5" movement.

Payment for materials, fabrication, and installation of this assembly are to be included in unit price bid in accordance with Item 450, "Rail (CLF-RO)".

Approximate weight of fence = 20 plf.

Texas Department of Transportation

Bridge Division Standard

8 FT CHAIN LINK FENCE FOR RAILROAD OVERPASS

CLF-RO

FILE: rlstd032-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
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DATE:
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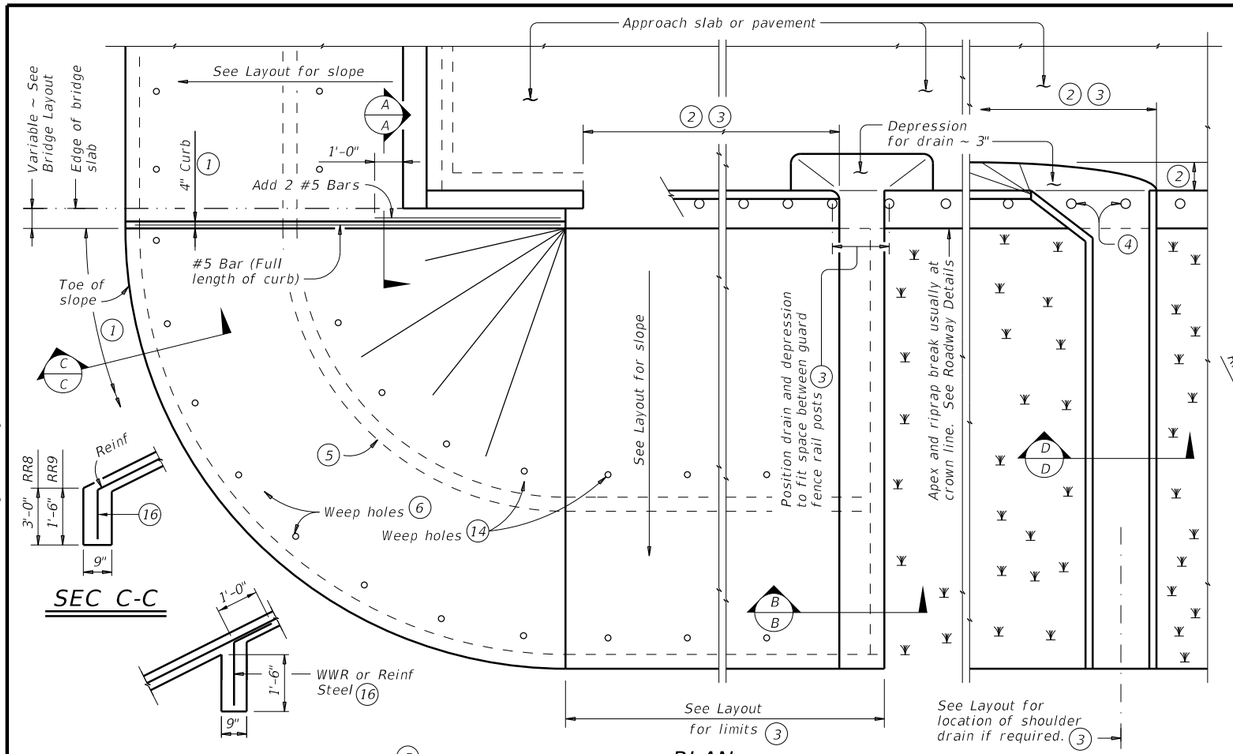
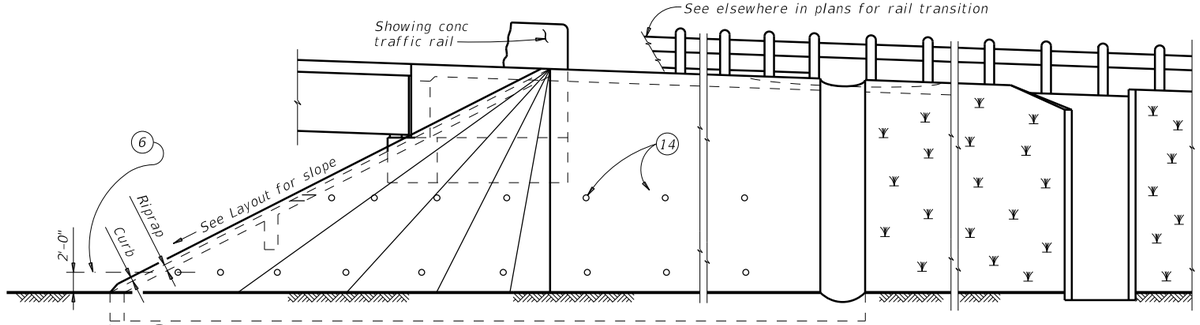


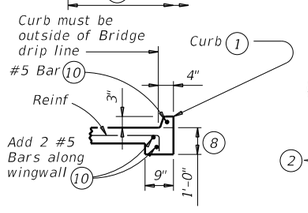
PLAN

SEC C-C

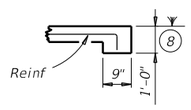
INTERMEDIATE TOEWALL (5)



ELEVATION

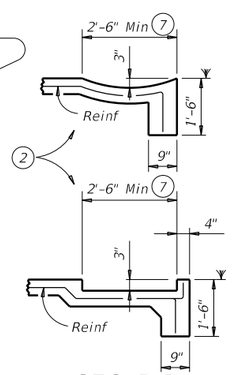


SEC A-A



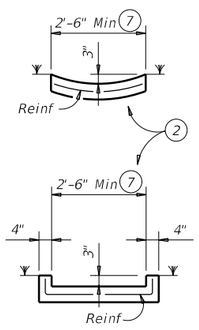
SEC B-B

(No drain)



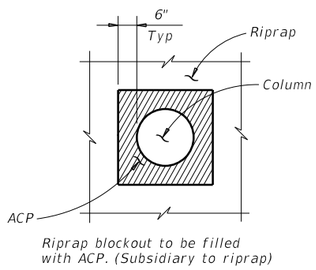
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

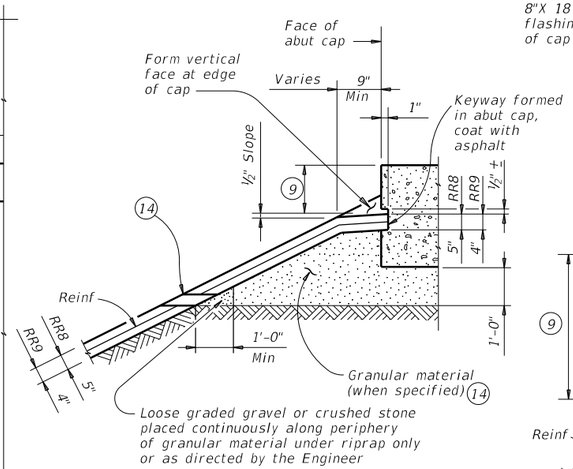
(Shoulder drain)



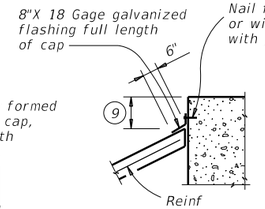
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

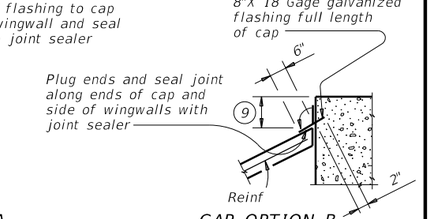
(As directed by the Engineer)



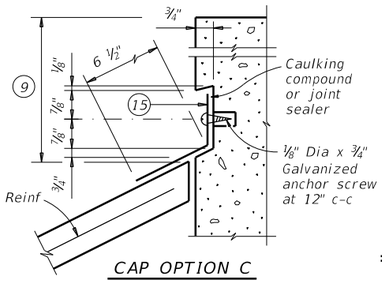
SHOWING KEYWAY OPTION



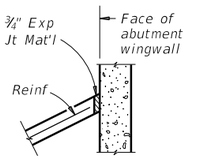
CAP OPTION A



CAP OPTION B

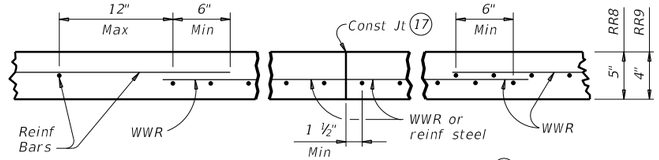


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		207

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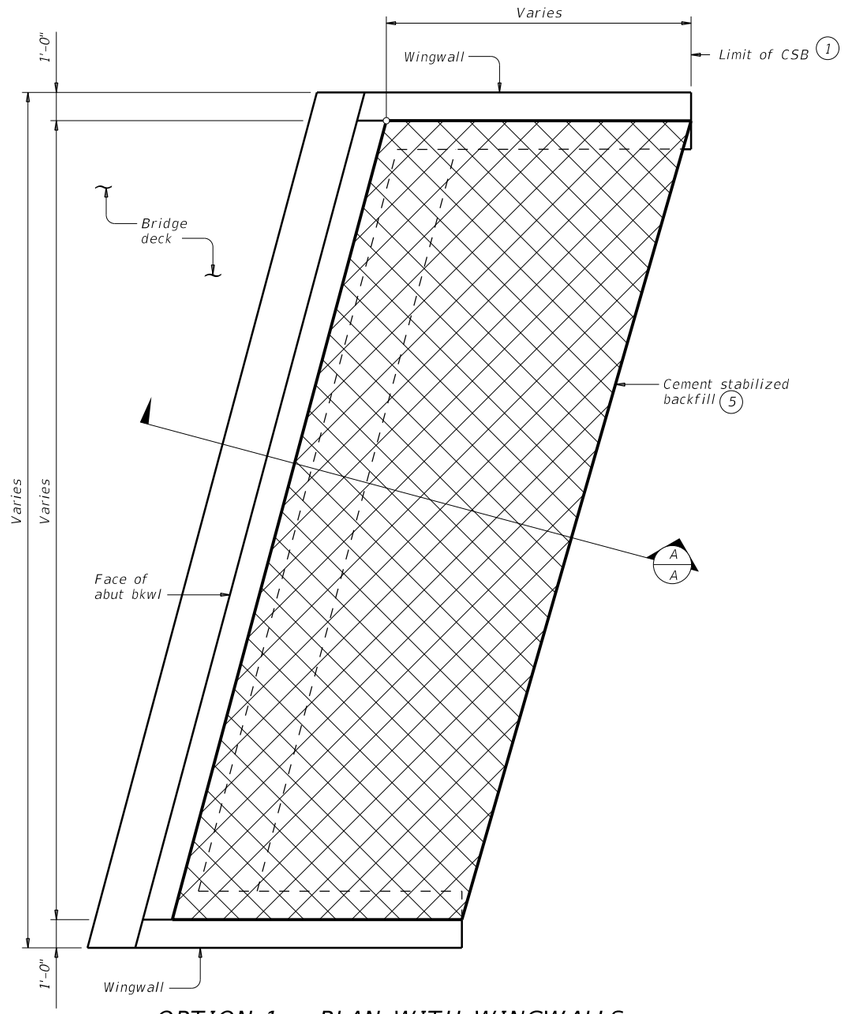
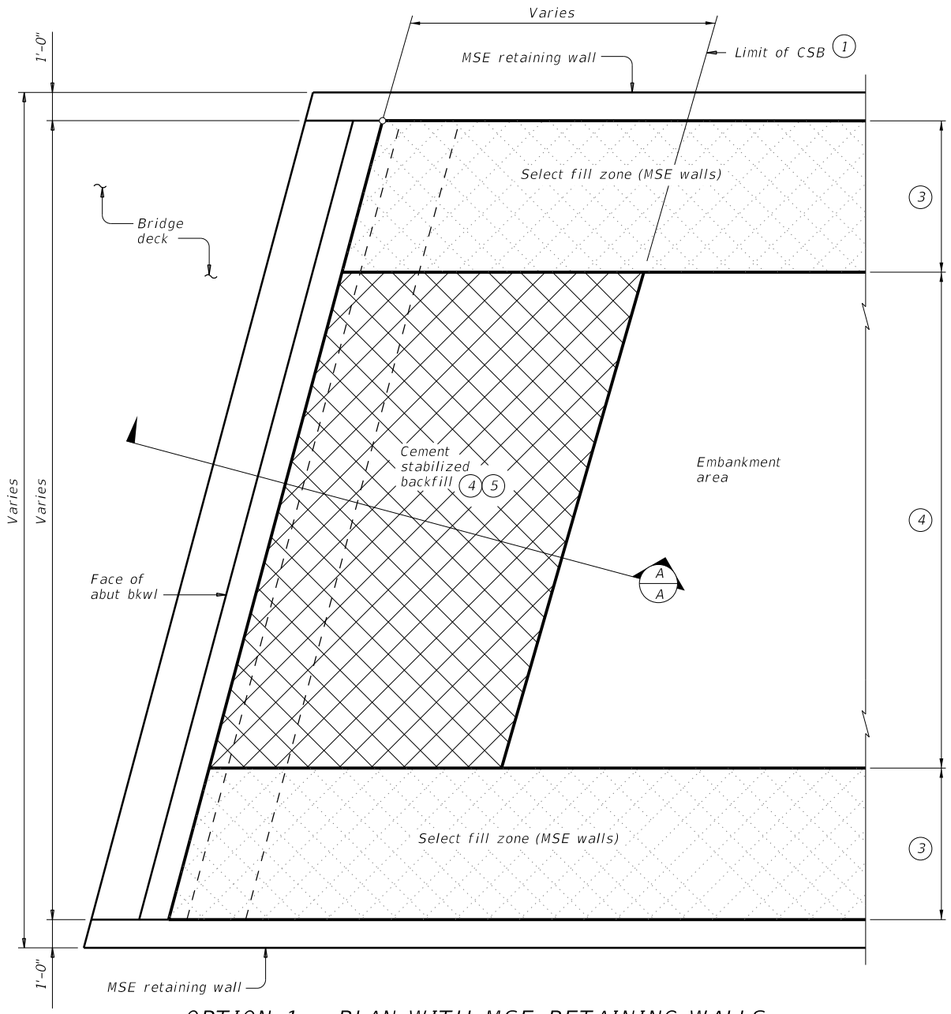


OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS

1. Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
2. Bench backfill as shown with 12" (approximate) bench depths.
3. Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
4. When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
5. If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
   a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
   b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 1 is intended for construction only requiring plasticity index (PI) controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Option 2 is intended for new construction requiring high plasticity embankment fill with a PI greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays.

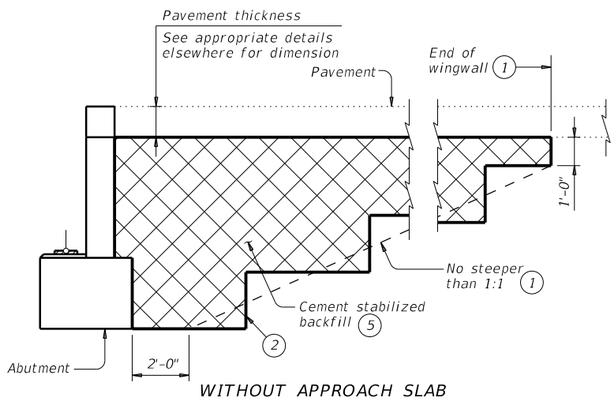
Construct abutment backfill in accordance with Item 400, "Excavation and Backfill for Structures".

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

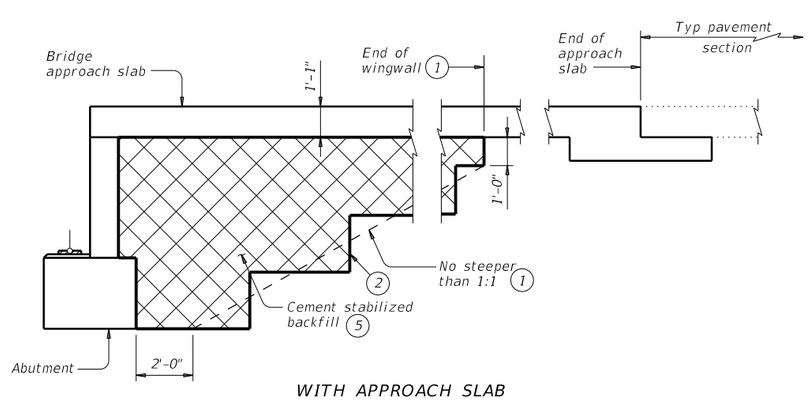
If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		208

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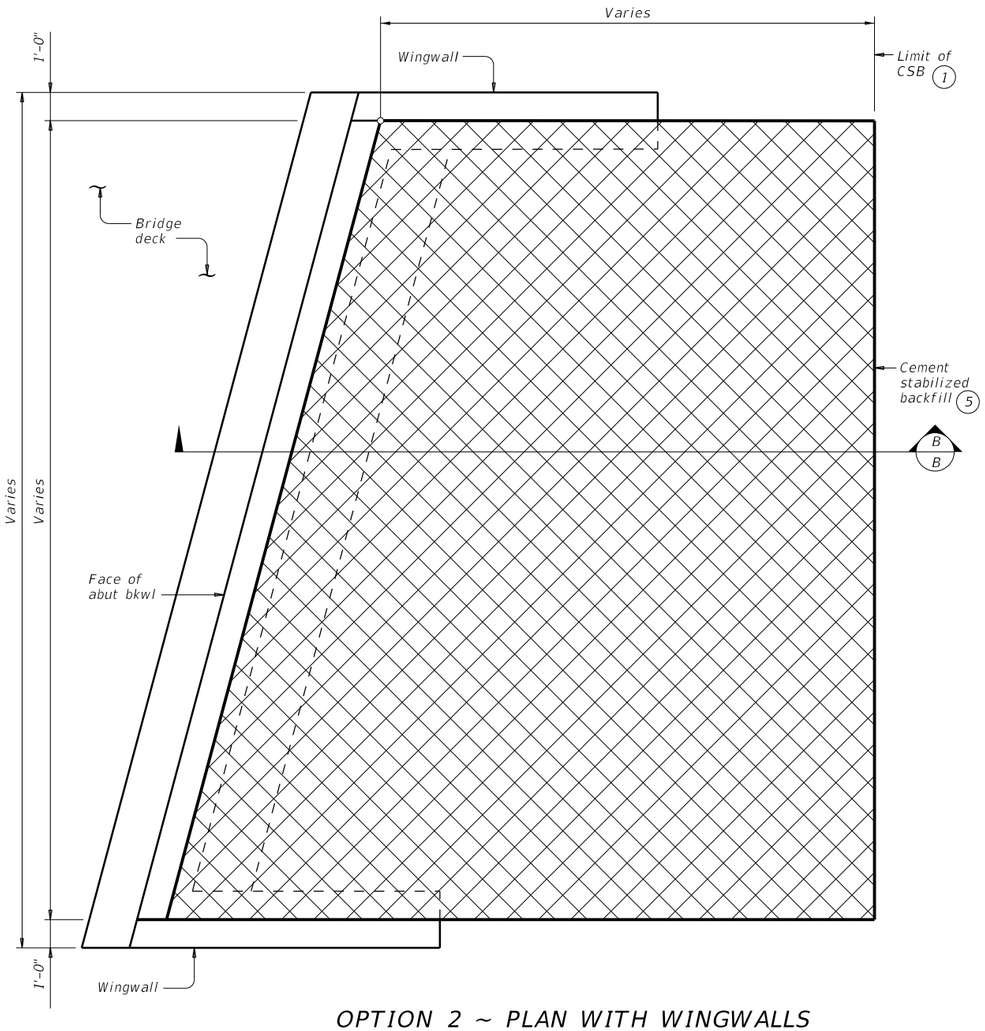
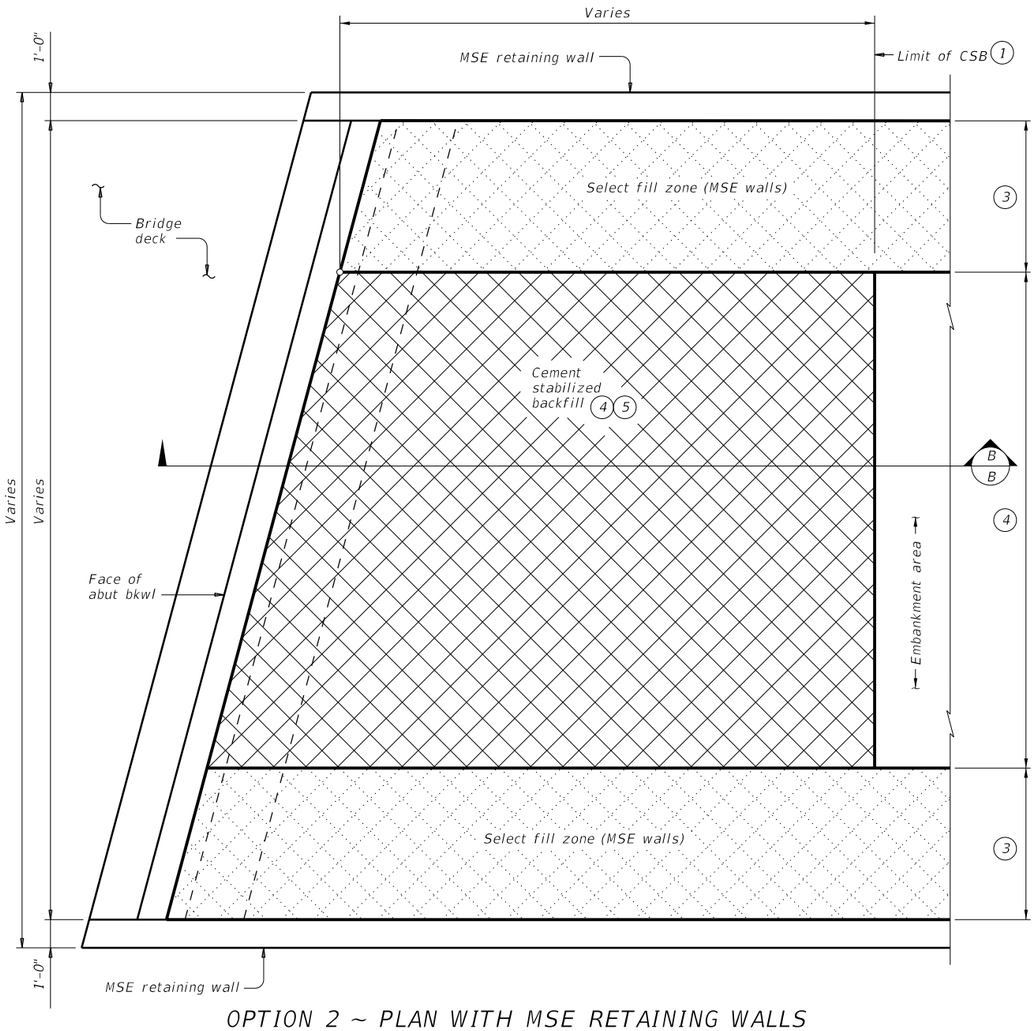


OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

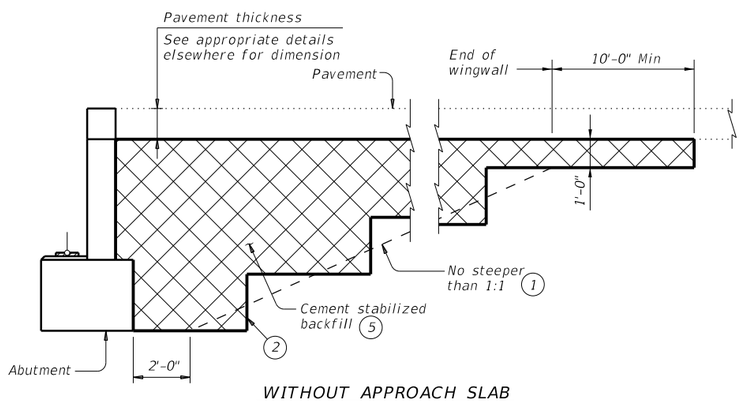
(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

(6) 1'-0" for BAS-A
1'-10" for BAS-C



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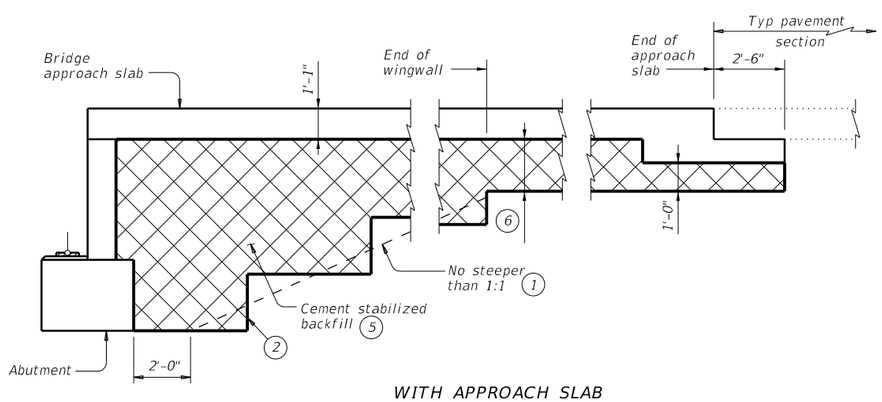

WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION B-B

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		209

DATE:
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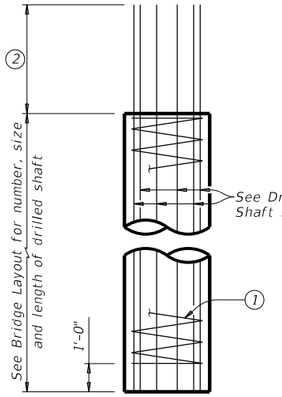
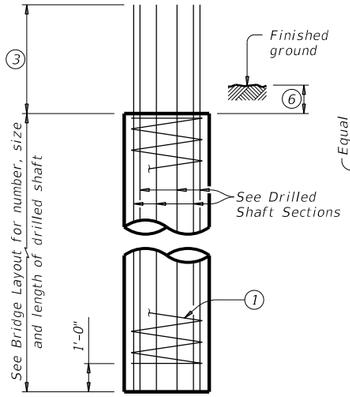
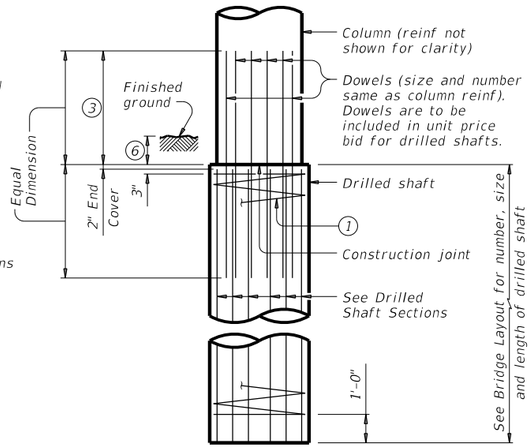


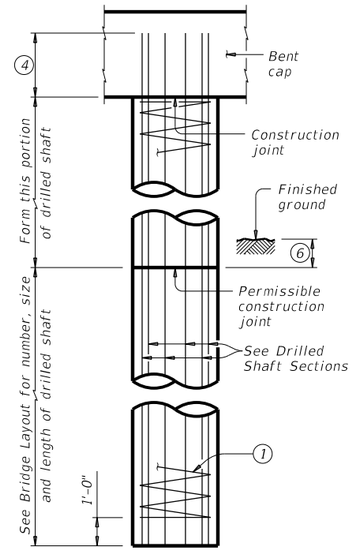
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



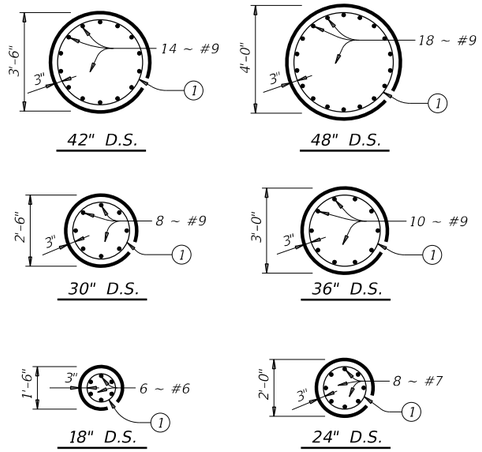
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

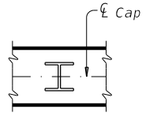


DRILLED SHAFT SECTIONS

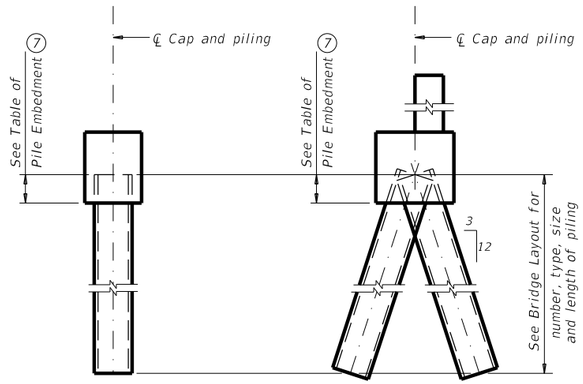
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

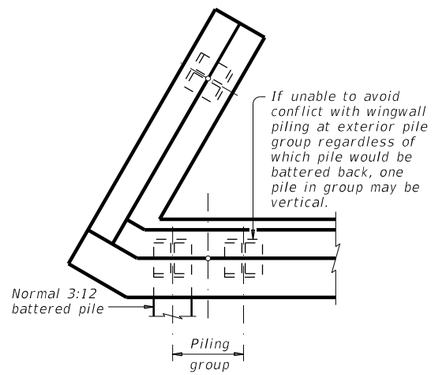
See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



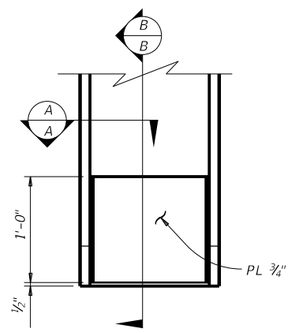
ORIENTATION OF STEEL H-PILING



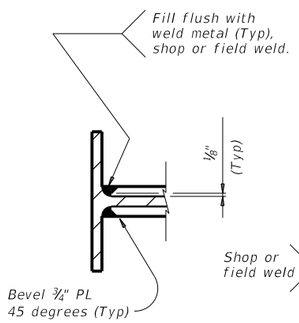
PILING DETAILS
(Concrete or steel H)



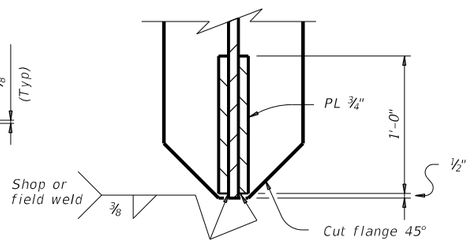
DETAIL "A"
(Showing plan view of a 30° skewed abutment)



ELEVATION



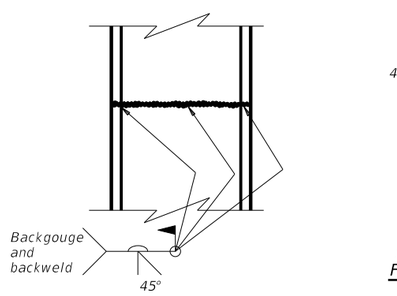
SECTION A-A

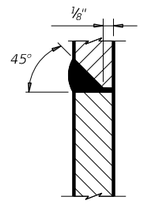


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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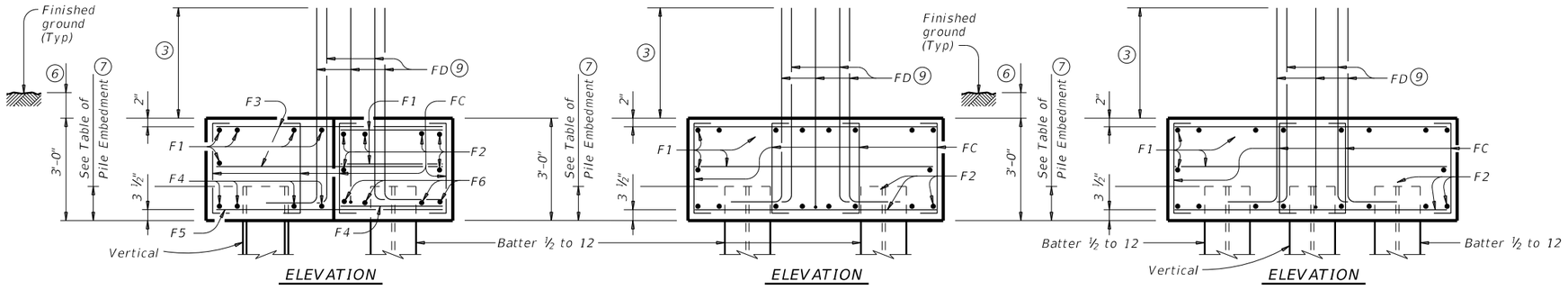
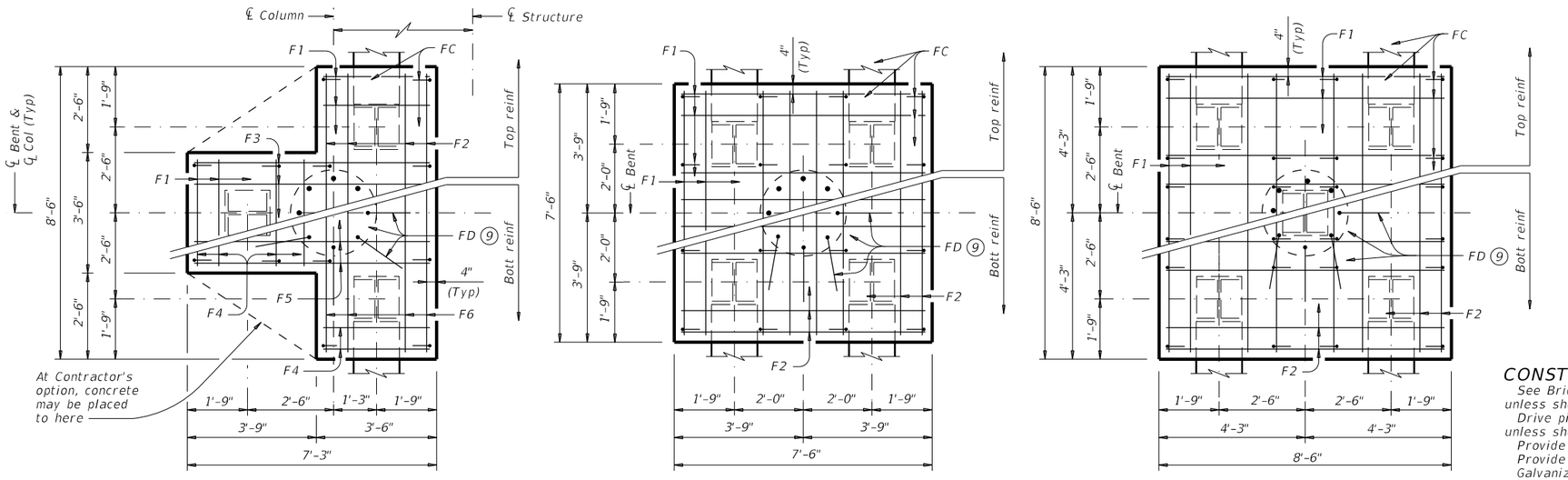
REVISIONS	0195	03	088, ETC.	IH35E
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		210





THREE PILE FOOTING (8)

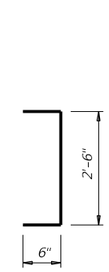
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

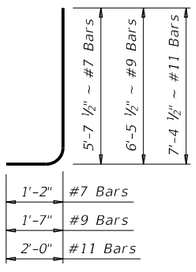
For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



BARS FC



BARS FD (9)

(3) *Min lap with column reinforcing:*
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(6) *1'-0" Min, unless shown otherwise on plans.*

(7) *Or as shown on plans.*

(8) *See Bridge Layout for type, size and length of piling.*

(9) *Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.*

(10) *Adjust FD quantity, size and weight as needed to match column reinforcing.*

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.

Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.

Maximum allowable pile loads for the footings shown are:

72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		211

DATE:
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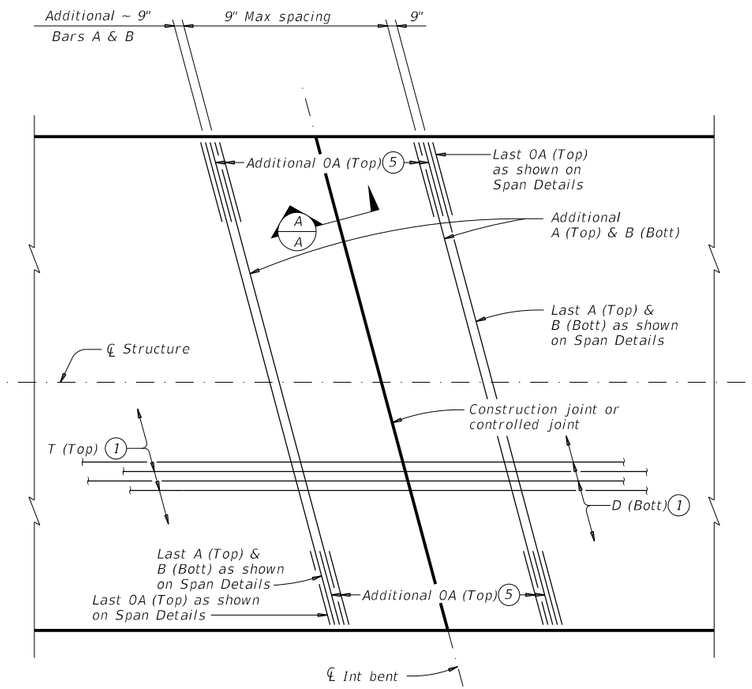
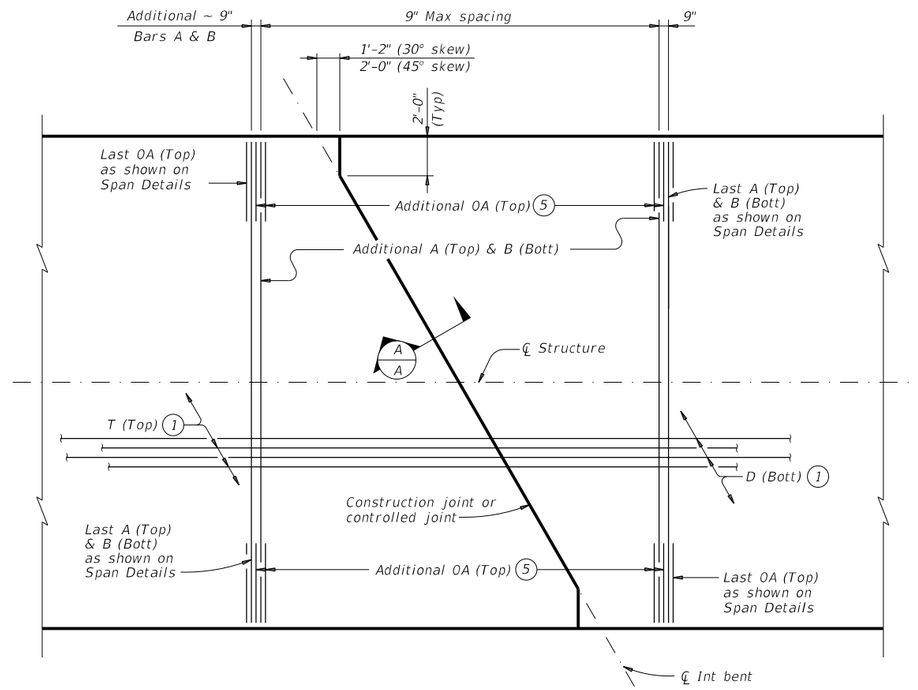


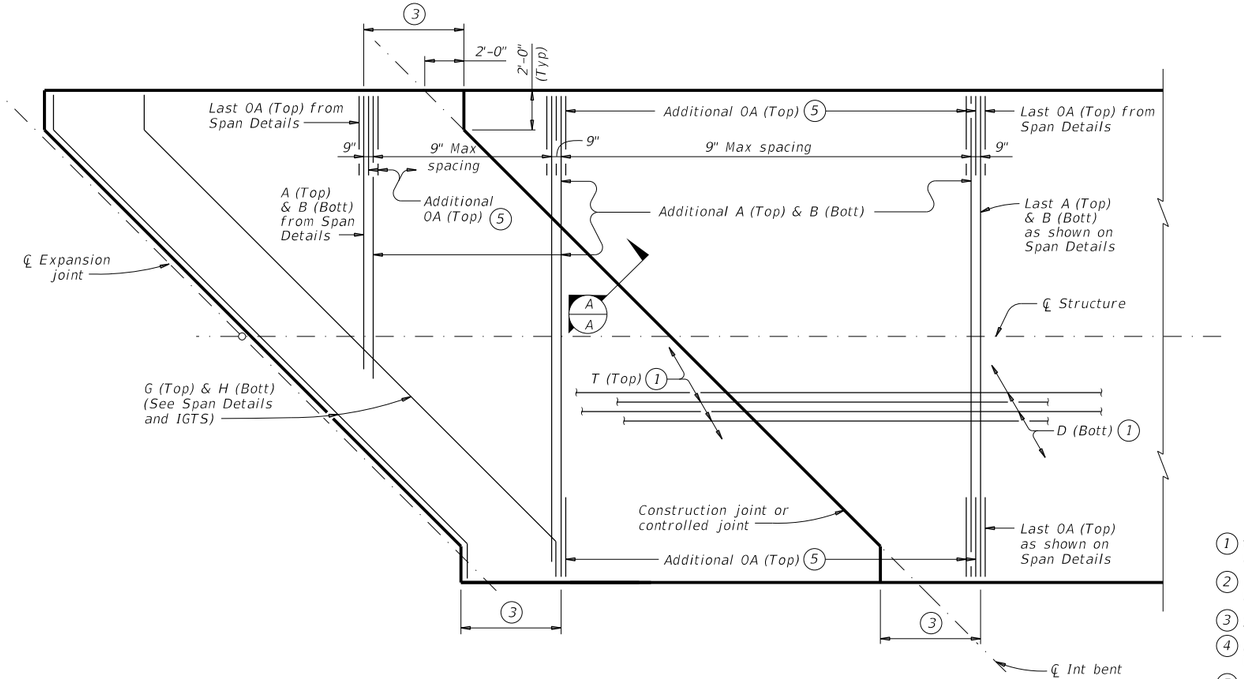
PLAN FOR 0° OR 15° SKEW

(Showing 15° skew)



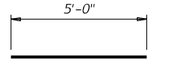
PLAN FOR 30° OR 45° SKEW

(Showing 30° skew)

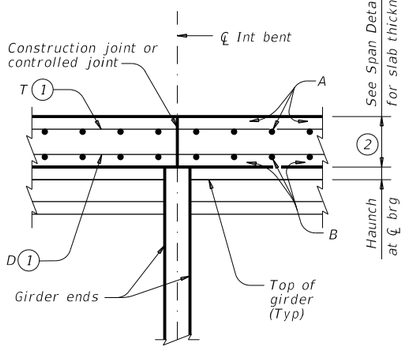


PLAN FOR 45° SKEW 4

(Showing short span condition.)



BARS OA (#5)



SECTION A-A

Bars 0A (Top) not shown for clarity.

1. Top and bottom mats must be continuous through joint.
2. Maintain a constant slab thickness over the bent.
3. 5'-4" as shown on Span Details.
4. Use these details when no full slab width bars A and B are shown on Span Details.
5. Bars 0A (Top) at 9" Max spacing between Bars A (Top).
6. Values in table assume a temperature change of 70° F after erection when calculating thermal movement in one direction (not total).

TABLE OF ⑥ ALLOWABLE UNIT LENGTH

Max Rdwy Grade, Percent	Unit Length Factor
0.00	4.1
1.00	3.9
2.00	3.7
3.00	3.5
4.00	3.3
5.00	3.1

Unit length must not exceed the length of the shortest end span times the Unit Length Factor shown in table or 400', whichever is less.

BAR TABLE

BAR	SIZE
A	#4
B	#4
D	#4
T	#4
0A	#5

The details shown on this sheet are applicable for two and three span units comprised of the same girder type.
Units may be comprised of different span lengths. See "Table of Allowable Unit Length".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.

CONSTRUCTION NOTES:

Where multi-span units are indicated on the Bridge Layout, the thickened slab end details and reinforcement shown on IGTS standard (Bars AA, G, H, J, K, and M) and on the Span Details will be omitted where slabs are continuous over interior bents. At these locations, the slab details and reinforcement will be as shown on this sheet or on PCP standard (if using this option).

Thickened slab end reinforcement and details still apply at expansion joint locations (ends of units).

See Span Details for remainder of slab reinforcement and details.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide Class "S" concrete (f'_c = 4,000 psi). Provide Class "S" (HPC) if shown elsewhere on the plans.

Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

The details shown on this sheet are applicable for use only with the Prestressed Concrete I-Girder Standard Designs shown on standards IGSD-24, IGSD-28, IGSD-30, IGSD-32, IGSD-34, IGSD-38, IGSD-40 and IGSD-44.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

CONTINUOUS SLAB DETAILS

PRESTR CONC I-GIRDER SPANS

IGCS

FILE:	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Added bubble note 6. 01-23: Added 34' Rdwy.	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		212

DATE: 10/2/2023 8:34:47 PM
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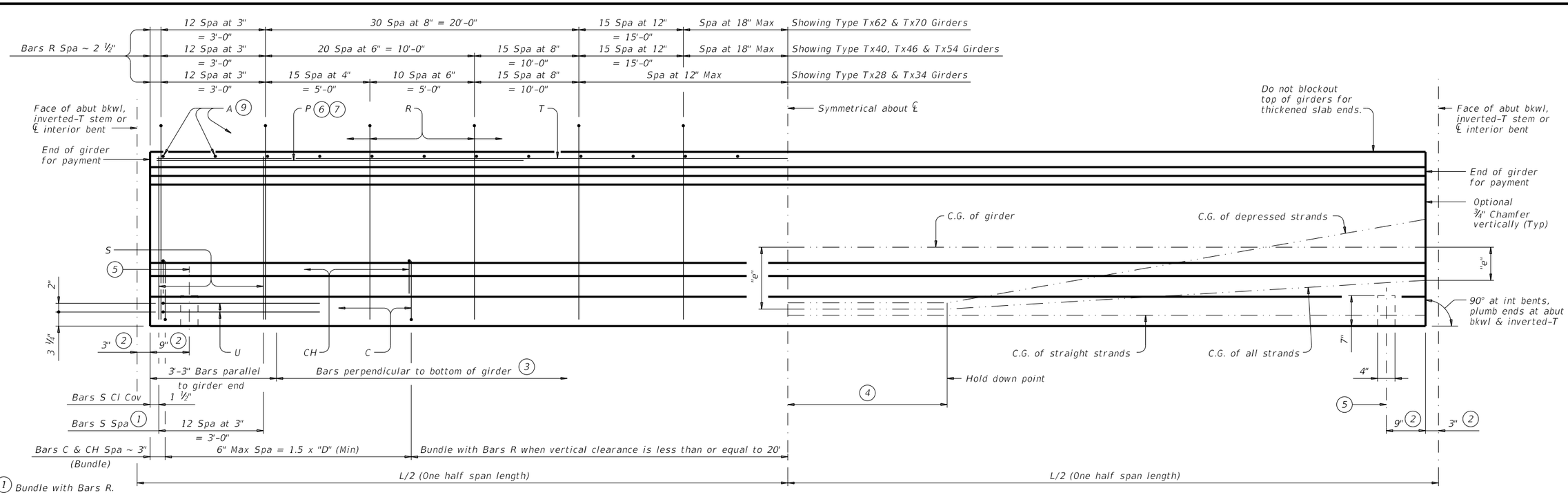


(1) Bundle with Bars R.

(2) Measured along ℄ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

(4) L/20, but not less than 5'-0" (-0,+2').

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 5/8") at base. If holes are formed with sheet metal, forms may be left in place.

GIRDER ELEVATION

(6) Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

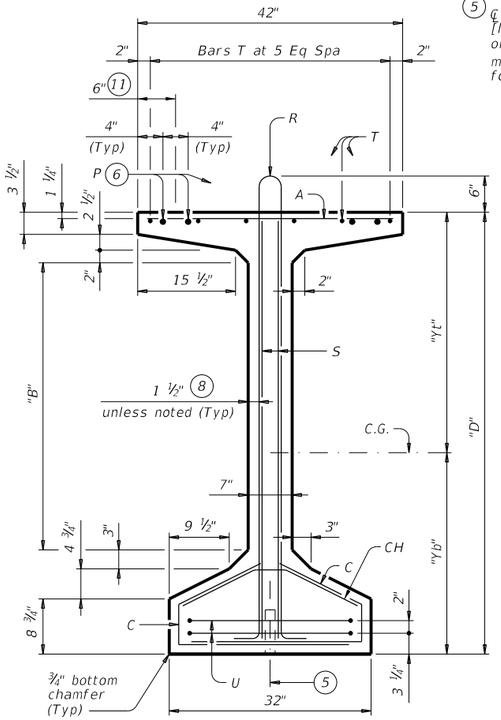
(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

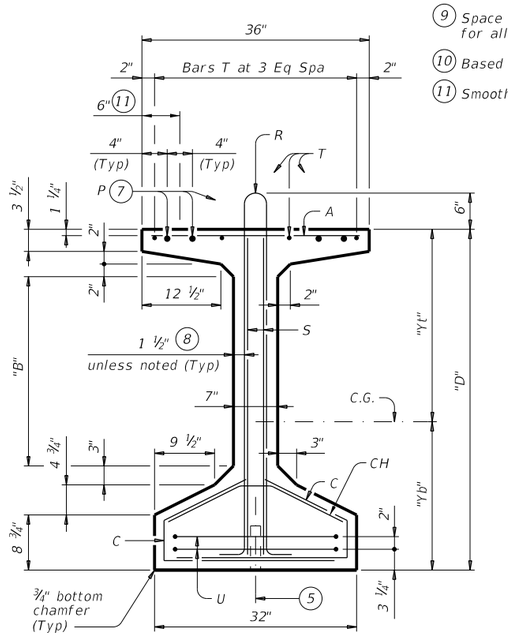
(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

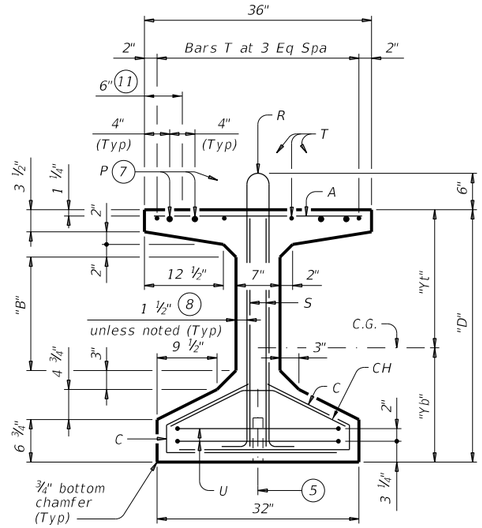
(11) Smooth trowel finish on the slab overhang side of exterior girder.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in.²)	"Ix" (in.⁴)	"Iy" (in.⁴)	Weight (10) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.
When vertical clearance of the span is less than or equal to 20', provide additional Bars C and CH in every girder of that span.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE:	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
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REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		213

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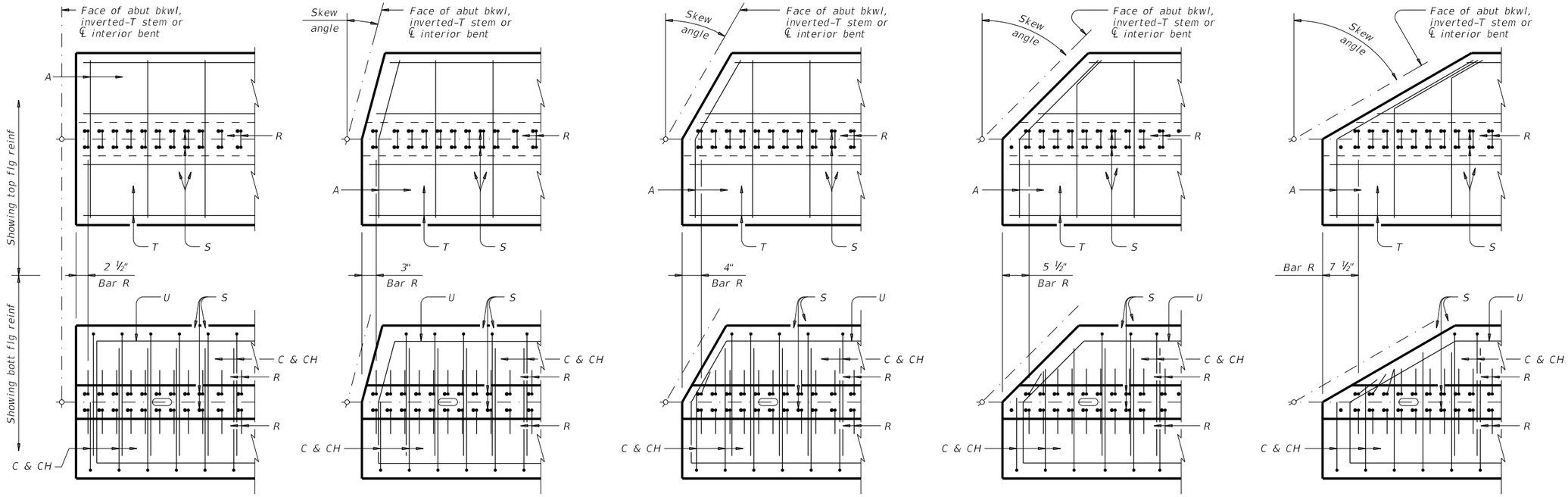
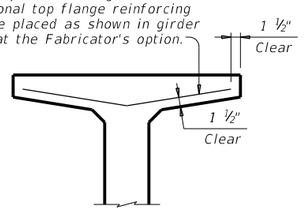
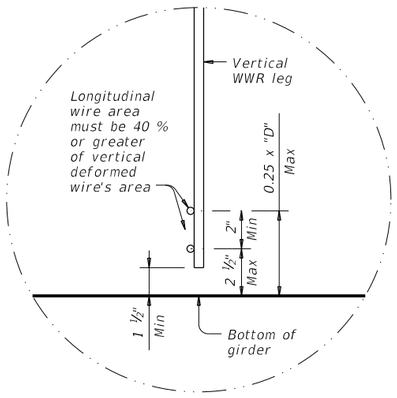


PLAN OF GIRDER ENDS (12)

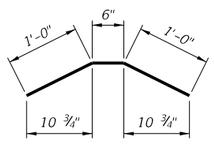
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



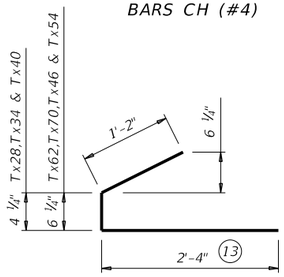
OPTIONAL TOP FLANGE REINFORCING DETAIL



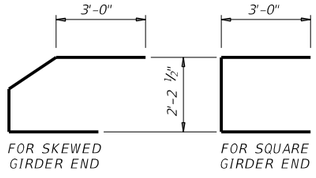
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



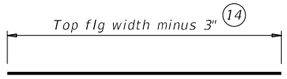
BARS CH (#4)



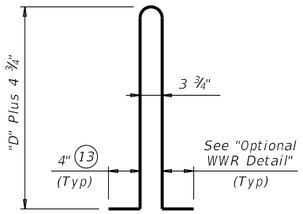
BARS C (#4)



BARS U (#5)

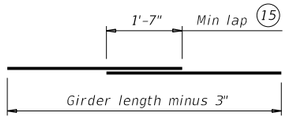


BARS A (#3)



BARS R (#4) (16)

BARS S (#6)



BARS T (#4)

(12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(13) Bars may be cut or bent at skewed end as required.

(14) Increase as necessary for bars at skewed end.

(15) No portion of bar less than 10 ft.

(16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

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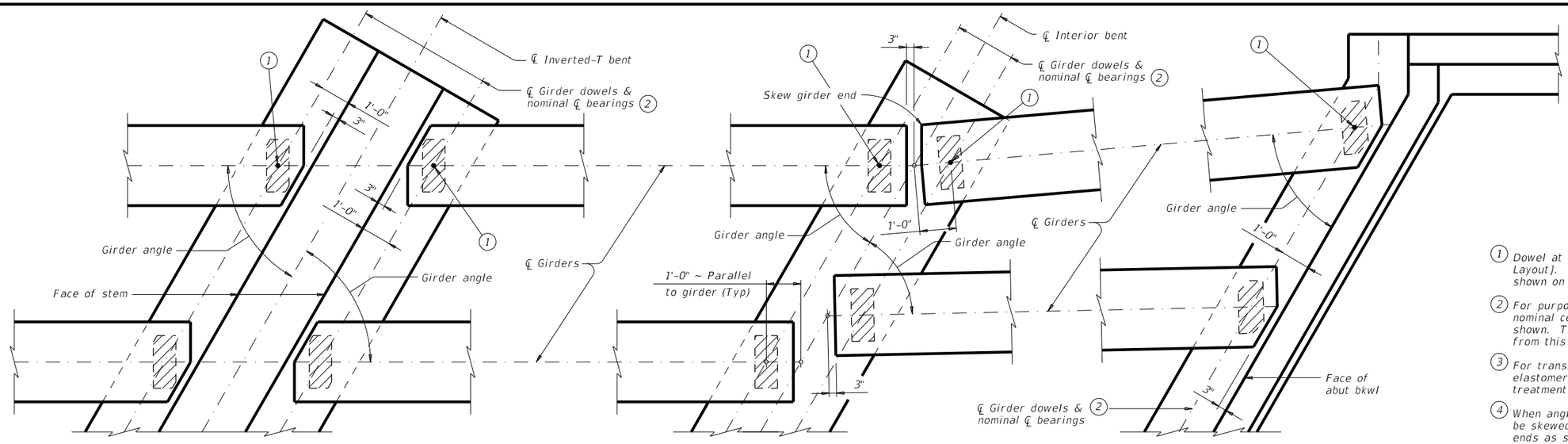
REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		214

DATE:
FILE:



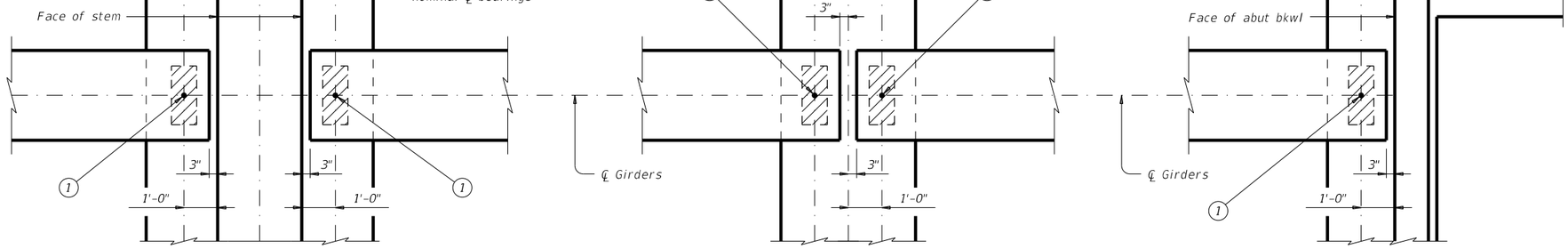
(1) *Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.*

(2) *For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.*

(3) *For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.*

(4) *When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.*

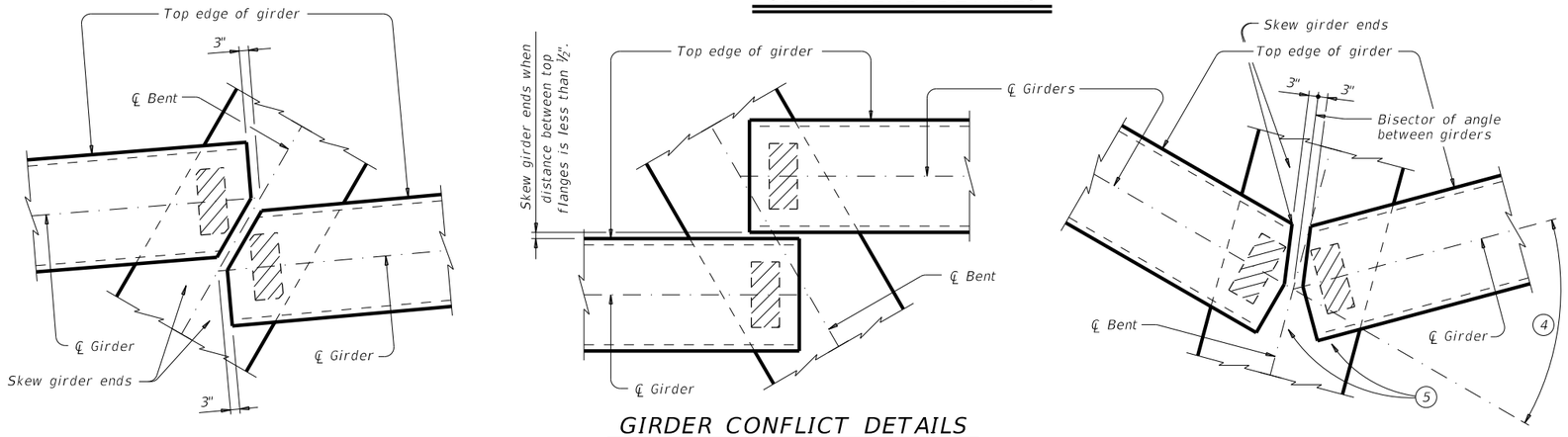
(5) *See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.*



GIRDER END DETAILS

GENERAL NOTES:

These details accommodate skew angles up to 60°.
Shop drawings for approval are required.
A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".



GIRDER CONFLICT DETAILS

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		215

DATE:
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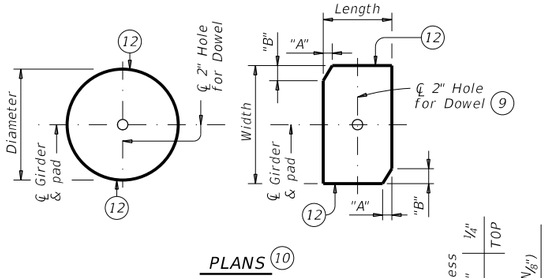
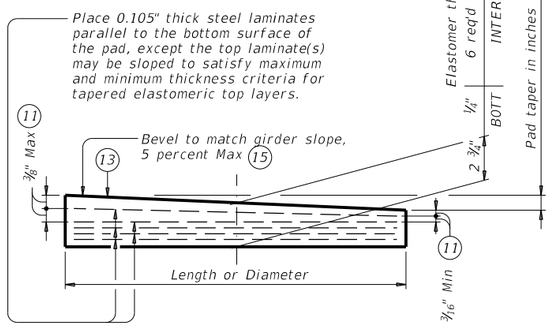


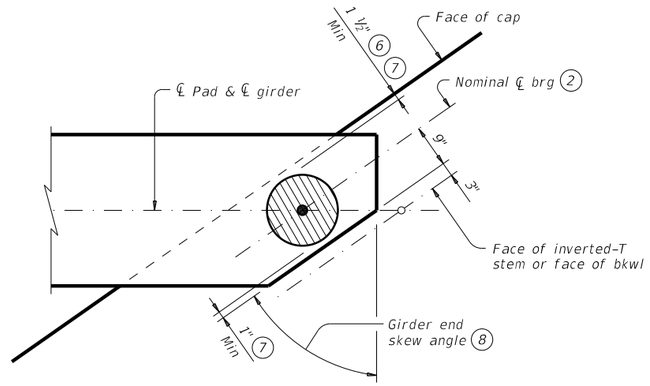
PLANS (10)



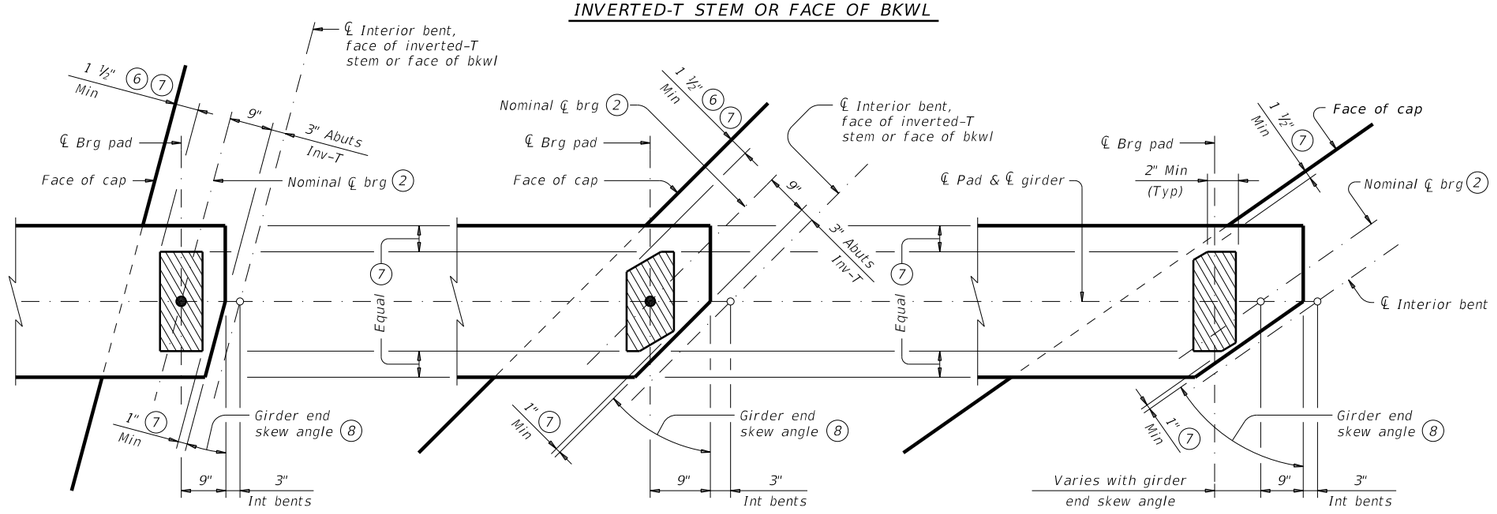
ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (16)

(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

Girder Type	Abutments: Face of Bkwl to Face of Cap	Int Bents: Overall Cap Width	Inv-T Bents: Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 ½"	4 ½"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 ½"	2 ½"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 ½"	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼"	4 ¼"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 ½"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 ½"	1 ½"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 ¾"

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for inverted-T.

(7) Place centerline pad as near nominal centerline bearing as possible between limits shown.

(8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

(11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
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	DIST	COUNTY		SHEET NO.
	DAL	DENTON		216

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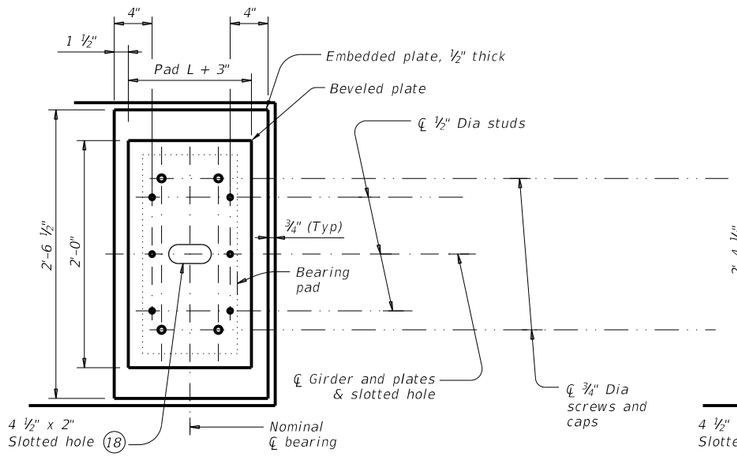
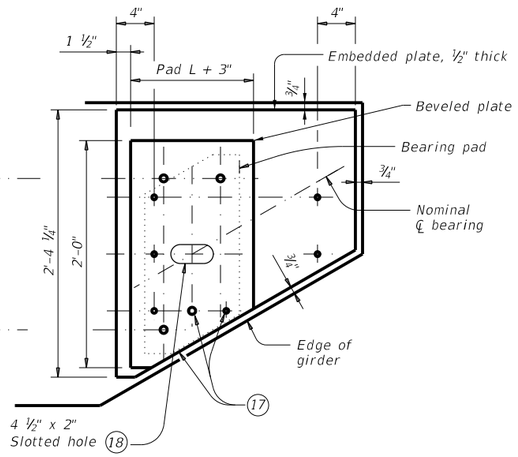
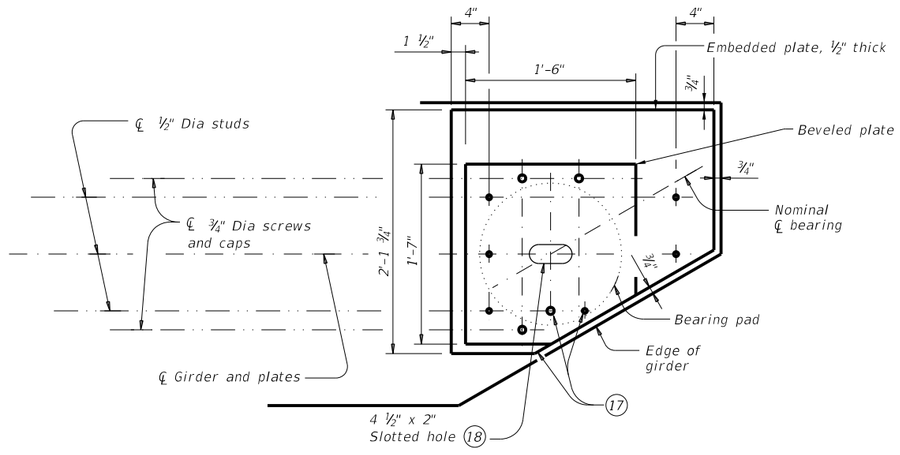


NORMAL GIRDER END
RECTANGULAR BEARING PAD

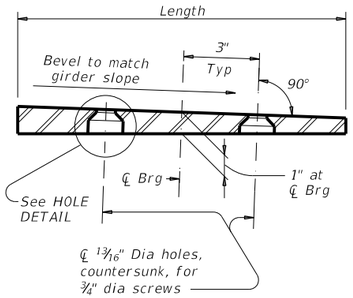


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

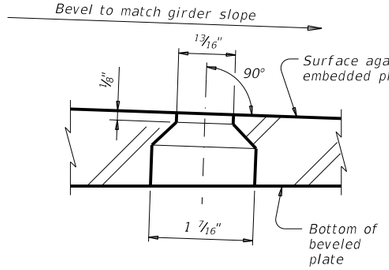


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



SECTION



HOLE DETAIL

(17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.

(18) Slotted hole is required at doweled girder end locations.

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1⁄16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1⁄16"+/-, except variation from a plane parallel to the theoretical top surface can not exceed 1⁄16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

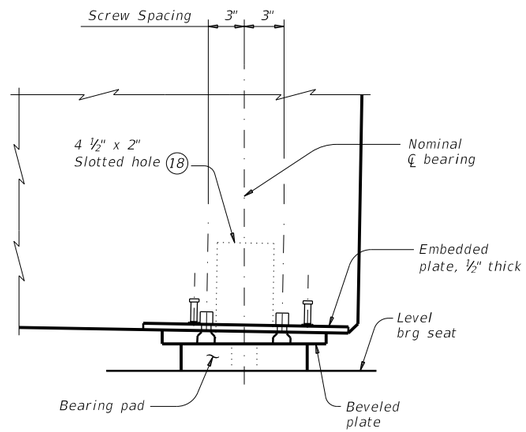
When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

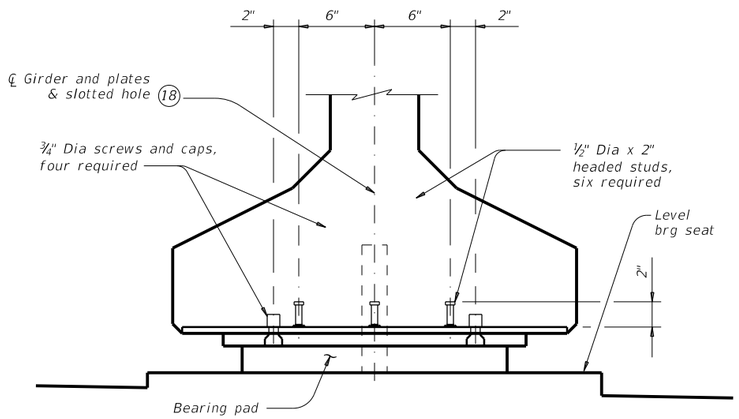
¾" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a ¾" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than ½" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation
Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

IGEB

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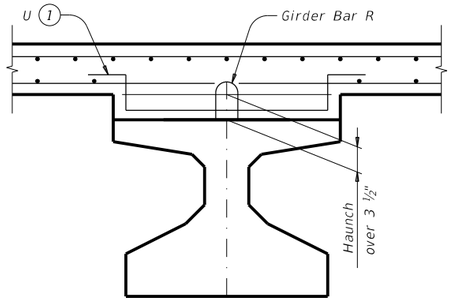
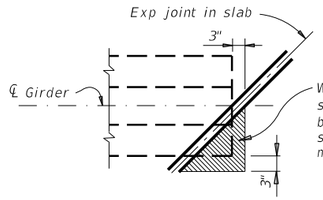
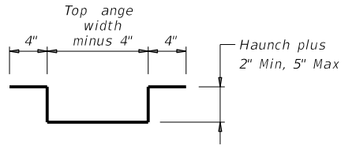


HAUNCH REINFORCING DETAIL

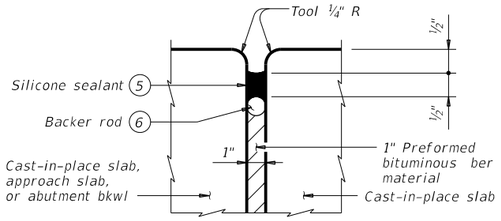


Where anges project under slab of adjacent span, provide a minimum of ½" clearance between top of girder and bottom of adjacent slab. Polystyrene or other suitable compressible material may be used as a ller.

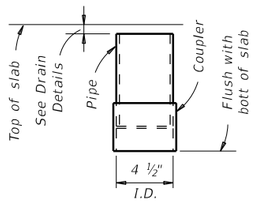
TREATMENT AT GIRDER END FOR SKEWED SPANS



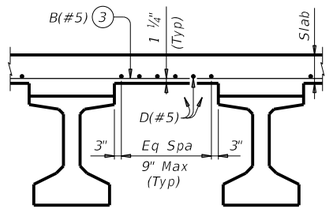
BARS U (#4)



TYPE A JOINT DETAIL (7)

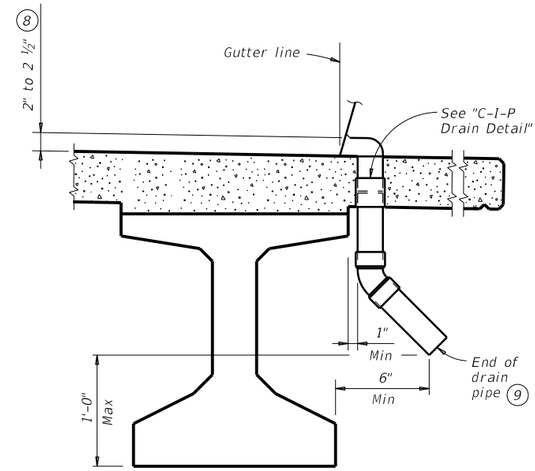


C-I-P DRAIN DETAIL (2)



TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.



DRAIN DETAIL (10)

(1) Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 ½".

(2) Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.

(3) Bars B(#5) spaced at 6" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#5) at centerline outside girder.

(4) Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
~ #5 = 2'-0"
Epoxy coated ~ #4 = 2'-5"
~ #5 = 3'-0"

(5) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(6) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(7) The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.

(8) Drain entrance formed in rail or sidewalk.

(9) Water may not be discharged onto girders.

(10) All drain pipe and ttings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface nishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Speci cations.

Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."

All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

DECK FORMWORK NOTES:

Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

Texas Department of Transportation

Dallas District Bridge

MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS (DAL)

FILE: igmssts1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 05-22: Converts to Dallas District Standard 09-26-23: Updates Inv-T reinforcing	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		218

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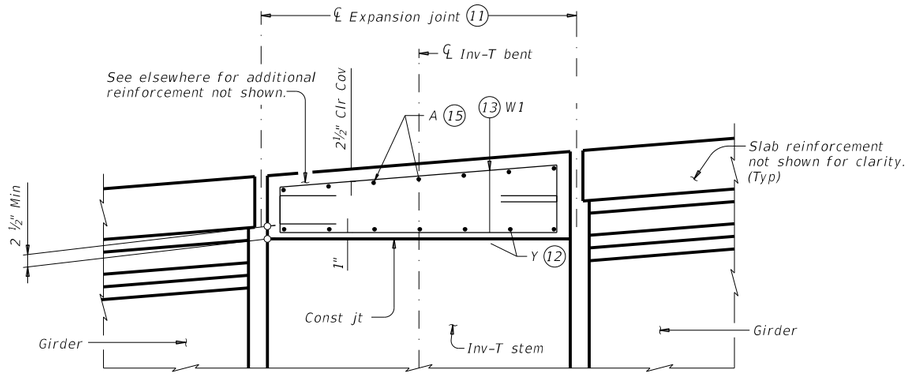
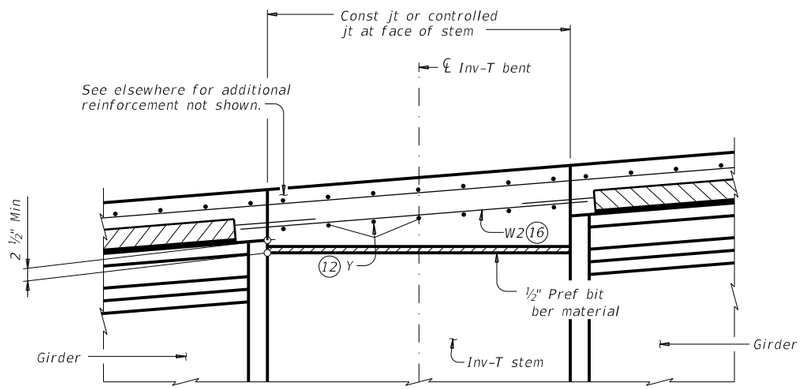
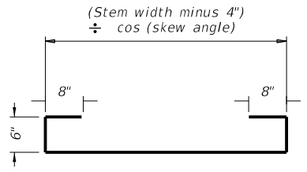


SHOWING EXPANSION JOINTS

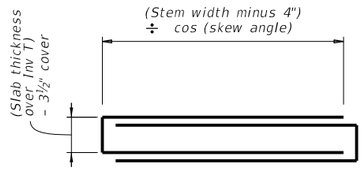


SHOWING CONST JTS OR CONTROLLED JTS

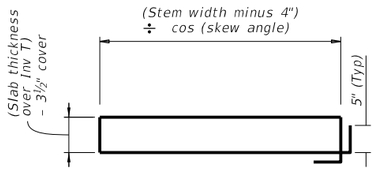
REINFORCEMENT OVER INV-T BENTS



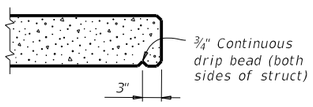
BARS W1 (#4)



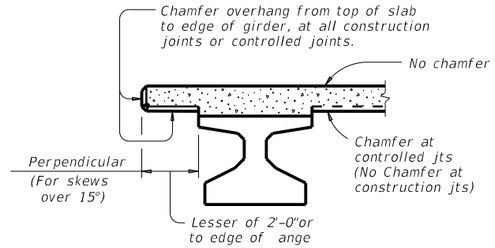
ALTERNATIVE BARS W1 (#4)



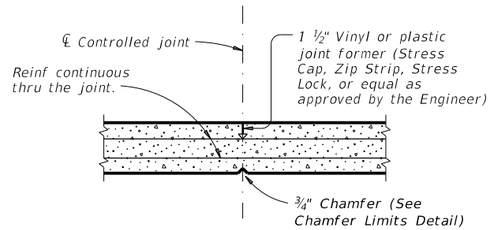
ALTERNATIVE BARS W1 (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (14)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(11) See Layout for joint type.

(12) Space Bars Y (#4) at 6" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(13) Space Bars W1 (#4) at 9" Max (3" from end of cap). Bundle alternating bars to form closed stirrup. Place parallel to longitudinal slab reinforcement. Bend bars if needed to match slab slope and maintain cover.

(14) See Span details for type of joint and joint locations.

(15) Space Bars A (#5) at 6" Max. Use 2" end cover. Number of Bars A must satisfy spacing limit. Place parallel to bent.

(16) Space Bars W2 (#4) at 9" Max. Use 2" end cover.

Texas Department of Transportation

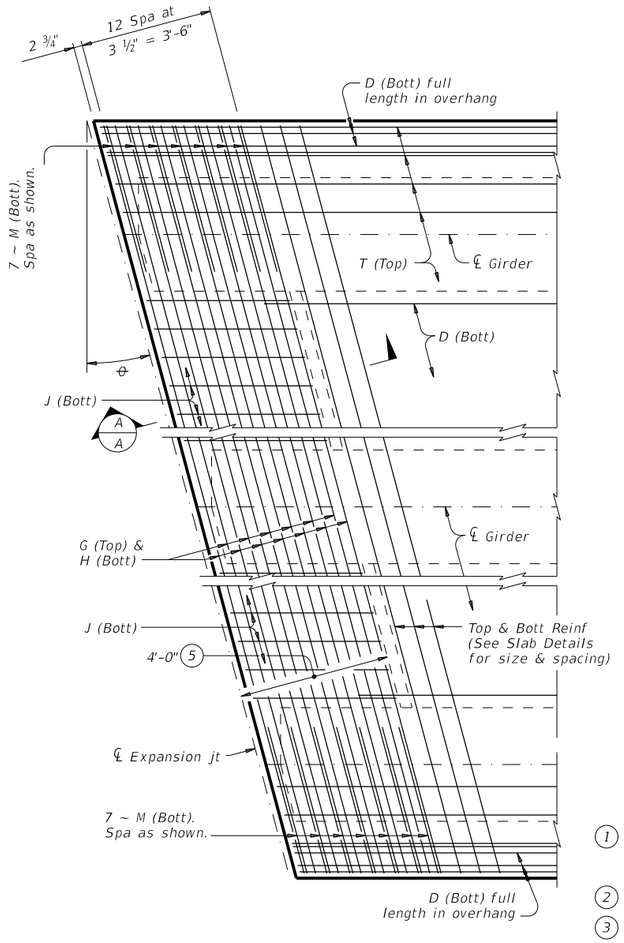
Dallas District Bridge

MISCELLANEOUS SLAB DETAILS

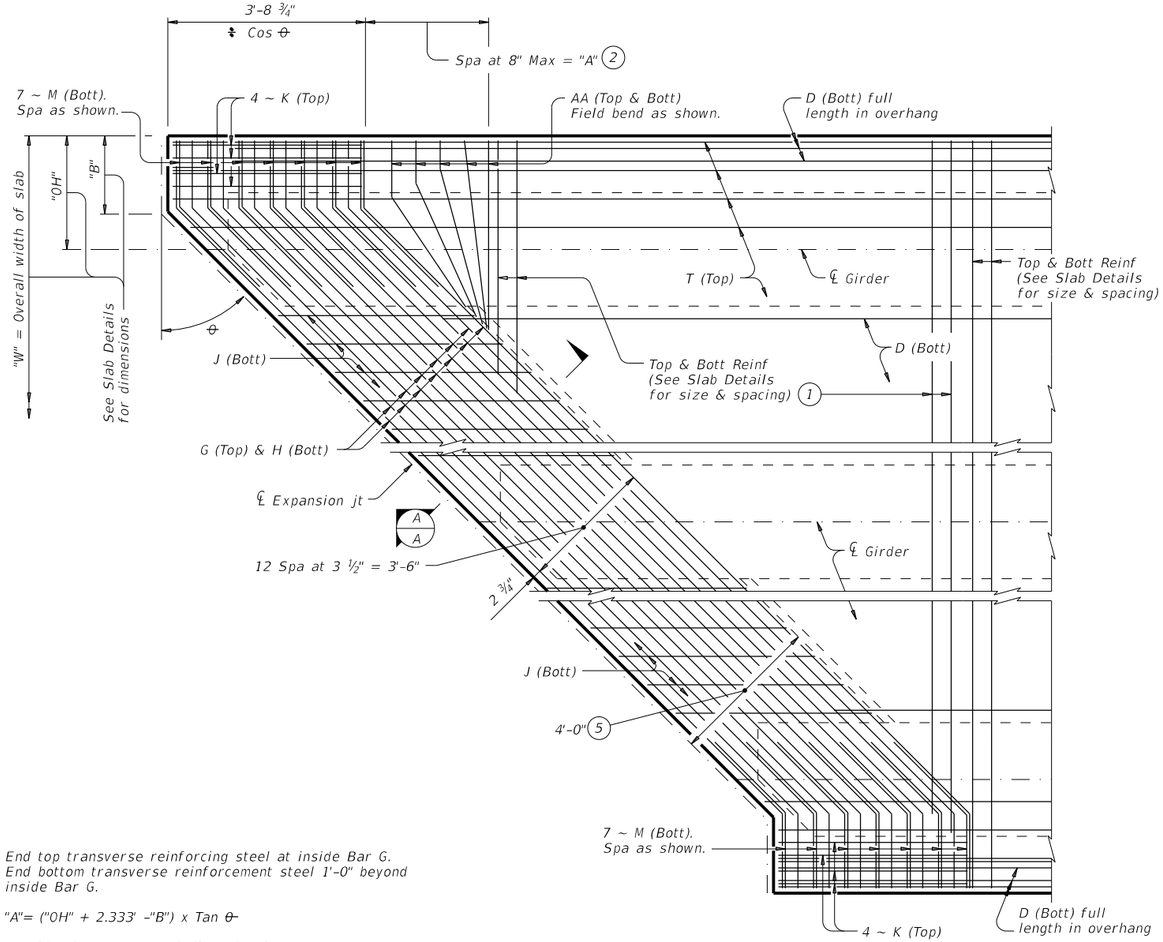
PRESTR CONCRETE I-GIRDERS

IGMS (DAL)

FILE: igmsstsl-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 05-22: Converts to Dallas District Standard 09-26-23: Updates Inv-T reinforcing	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		219



PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

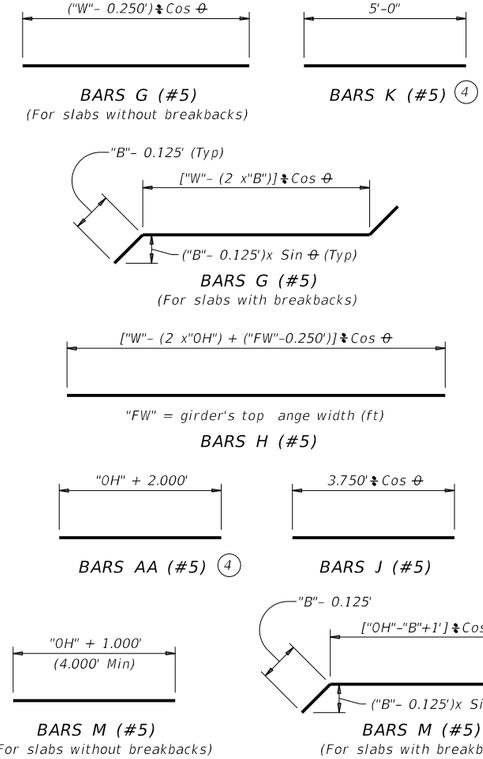
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

(2) "A"= ("OH" + 2.333' -"B") x Tan θ

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(4) Only required on slabs with breakbacks.

(5) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.



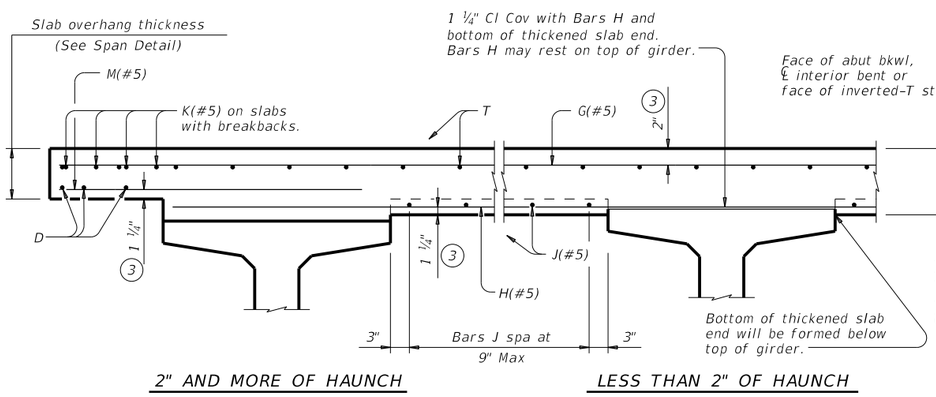
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Speci cations.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).
When Option 2 from PCP standard is used, provide Bars AA, G and K in the slab.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:

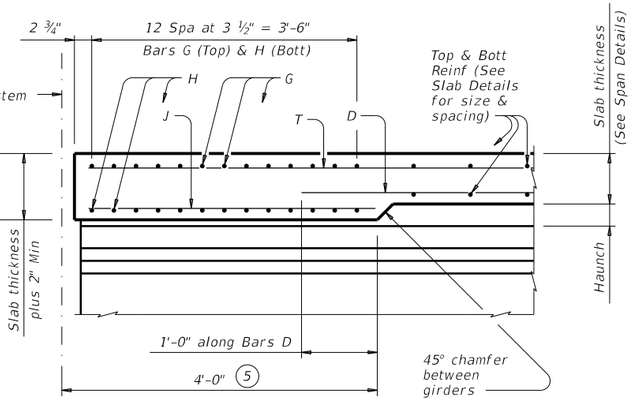
Uncoated ~ #4 = 1'-7"
~ #5 = 2'-0"
Epoxy Coated ~ #4 = 2'-5"
~ #5 = 3'-0"



2" AND MORE OF HAUNCH — LESS THAN 2" OF HAUNCH

TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at ℄ Brg)



SECTION A-A

(Showing with 2" and more of haunch)

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

Texas Department of Transportation

Dallas District Bridge

THICKENED SLAB END DETAILS

PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS (DAL)

FILE: igtssts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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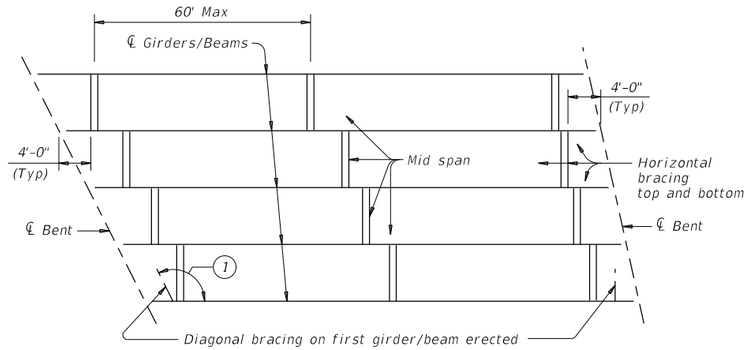
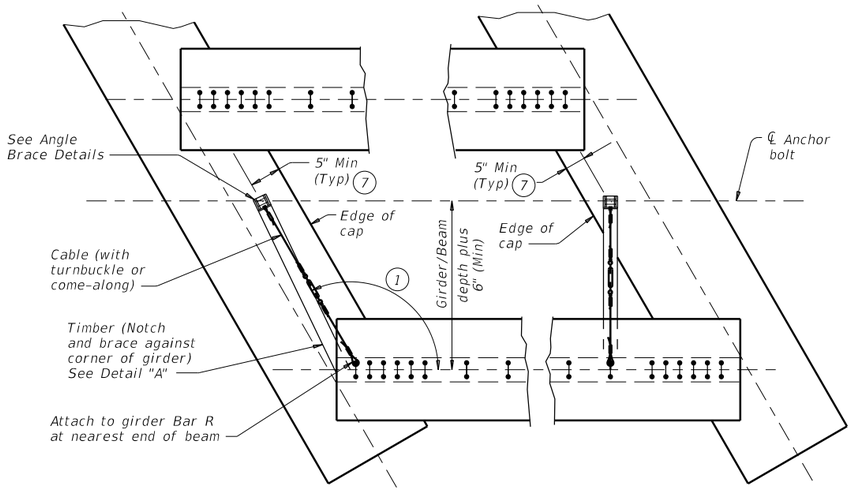
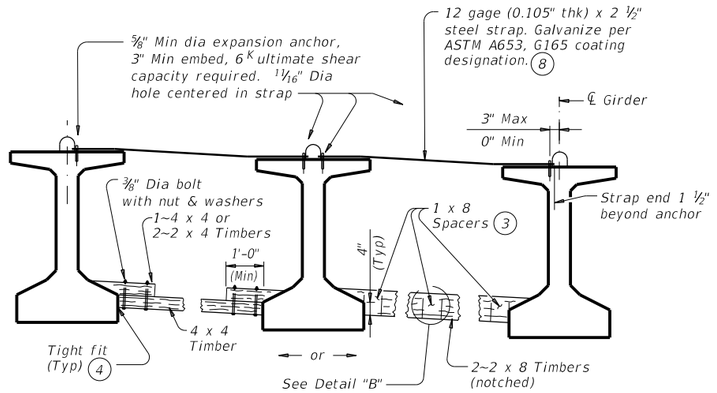


ERECTION BRACING

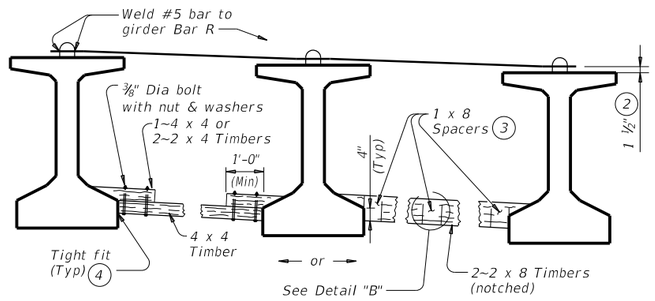


PLAN



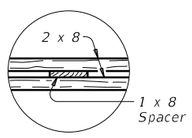
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



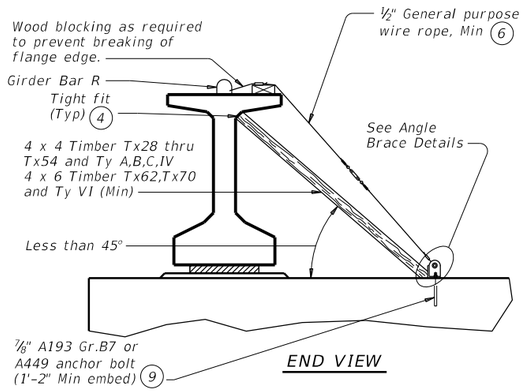
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS 5



PLAN

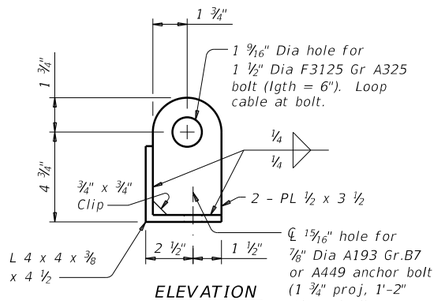
DETAIL "B"



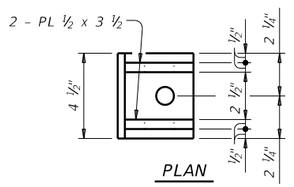
END VIEW

DIAGONAL BRACING DETAILS 5

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

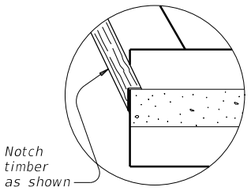
ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

(1) If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(6) All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.

(7) It is acceptable to tie anchor bolts to cap reinforcement.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(9) Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS
PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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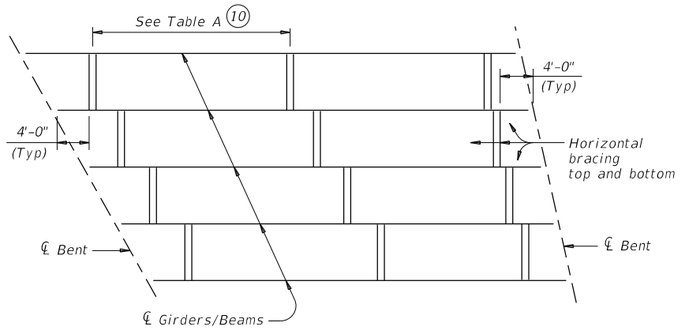
	DAL	DENTON		221



SLAB PLACEMENT BRACING

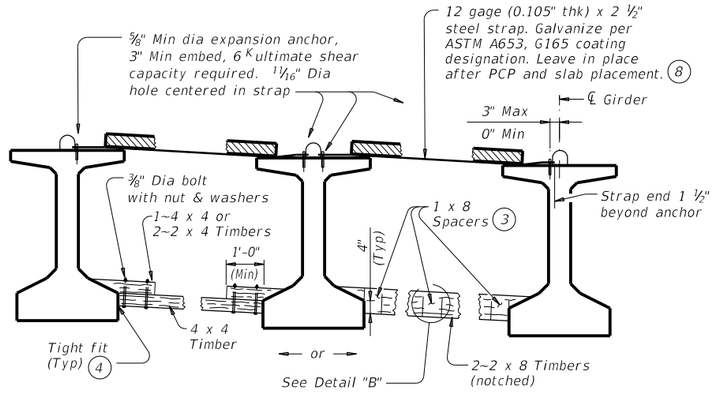
TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points
Tx34	¼ points	¼ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	⅛ points	⅛ points
B	⅛ points	⅛ points
C	⅛ points	⅛ points
IV	¼ points	⅛ points
VI	¼ points	⅛ points

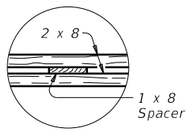
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	⅛ points
Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	¼ points	4.0 ft
VI	¼ points	4.0 ft



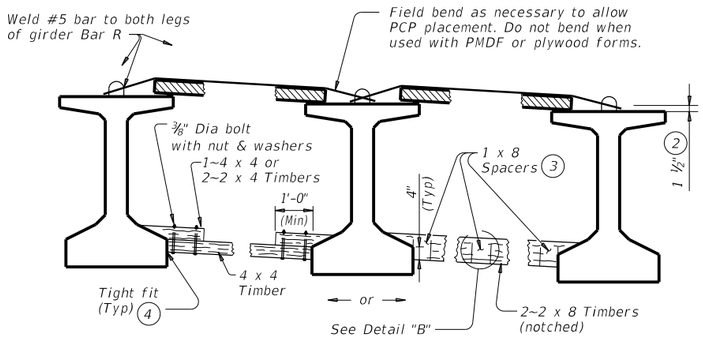
FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



PLAN

DETAIL "B"



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(10) Bracing spacing (¼ and ⅛ points) measured between first and last typical brace location.

(11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425.

Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

DATE:
FILE:

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		222

DATE: 5/28/2024 5:46:40 AM
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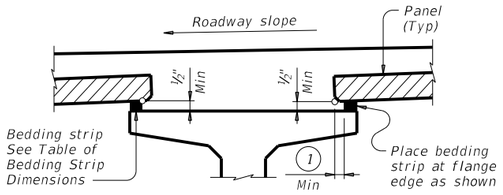
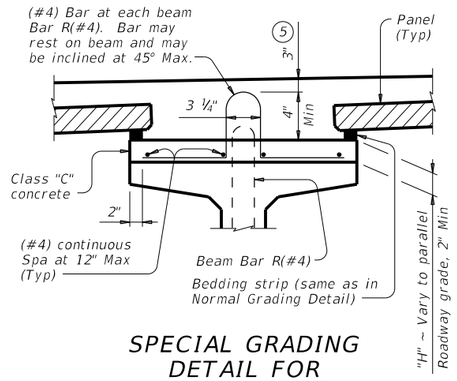


NORMAL GRADING DETAIL (3)

Showing prestressed concrete I-girders.
(Other beam types similar)



SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders.
(Other beam types similar)

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT (4)	
	Min	Max
1" (Min)	½"	2"
1 ¼"	½"	2 ½"
1 ½"	½"	3"
1 ¾"	½"	3 ½"
2"	½"	4"
2 ¼"	½"	4 ½" (2)
2 ½"	½"	5" (2)
2 ¾"	½"	5 ½" (2)
3" (Max)	½"	6" (2)

(1) 2" Min for I-girders, 1 ½" Min for all other beam types.

(2) Allowed for prestressed concrete I-girders, not allowed on other beam types.

(3) To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in ¼" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is ¼". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.

(4) Height must not exceed twice the width.

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(7) Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 ½" with I-girders, and 3" for all other beam types. Epoxy coating for Bars UP is not required.

(8) Do not locate construction joints on top of a panel.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

Placing panels to minimize joint openings is recommended.

If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 ½" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least ½". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows:

Uncoated	~ #4 = 1'-7"
Epoxy Coated	~ #4 = 2'-5"
Uncoated	~ #5 = 2'-0"
Epoxy Coated	~ #5 = 3'-0"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

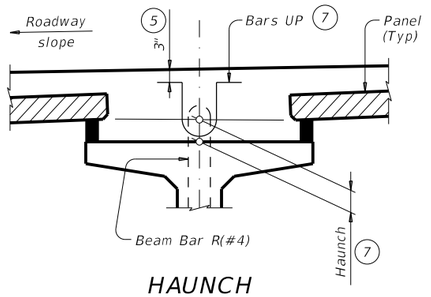
Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings.

When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer.

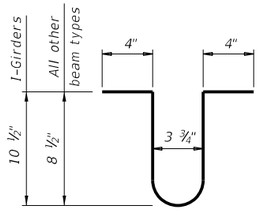
Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

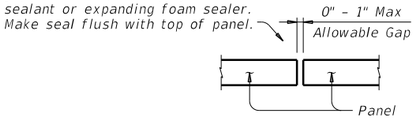


HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)

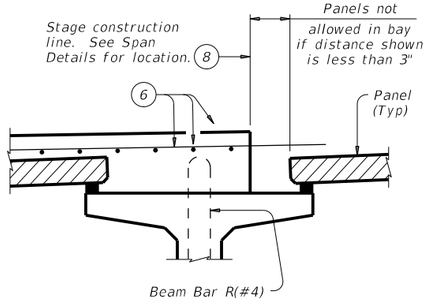


BARS UP (#4) (7)

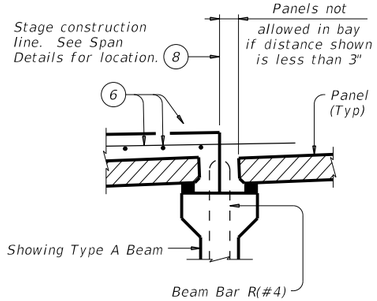


PANEL JOINTS

(Panel reinforcing not shown for clarity.
The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



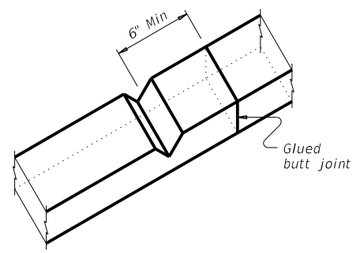
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)



BEDDING STRIP DETAIL (9)

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation
Dallas District Bridge

PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP (DAL)

FILE: DAL-MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS: 3-23: Removed top flange tension limit. 4-23: Revised reinforcement configuration and made District Standard. 6-23: Revised bars P and Z.	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		223

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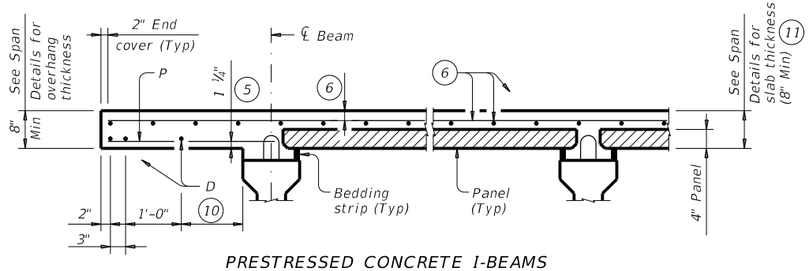
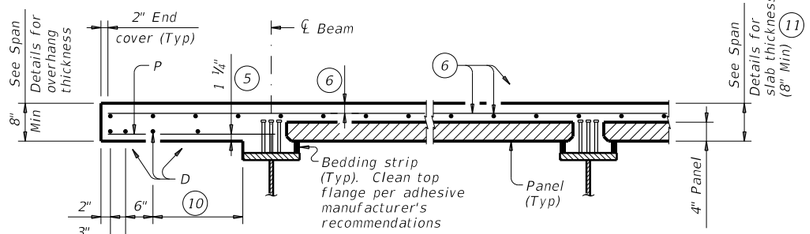
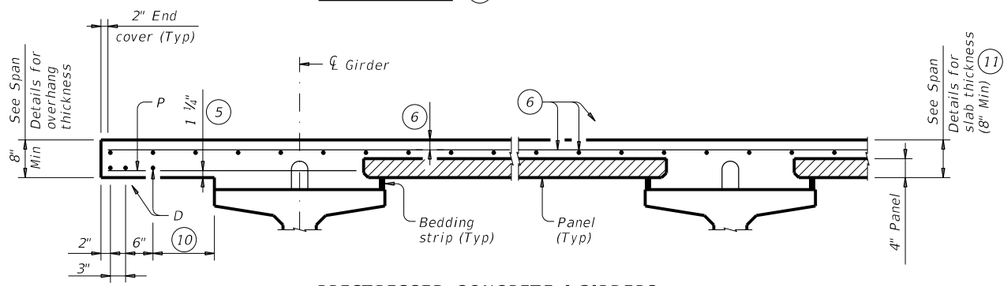


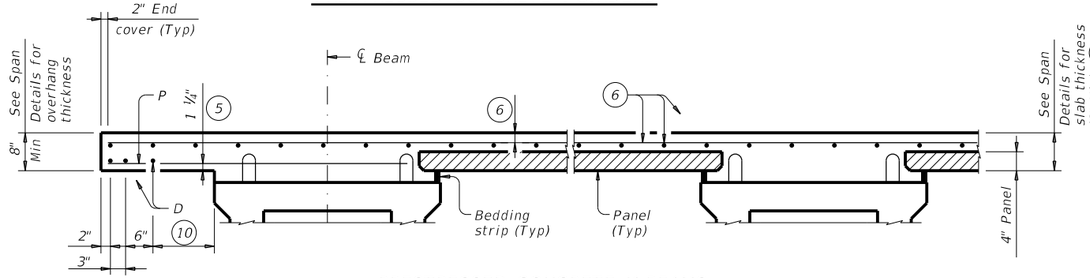
PRESTRESSED CONCRETE I-BEAMS



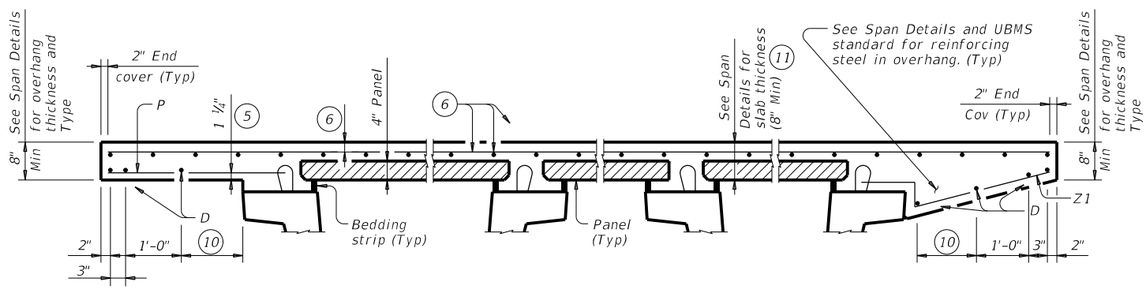
STEEL BEAMS (13)



PRESTRESSED CONCRETE I-GIRDERS



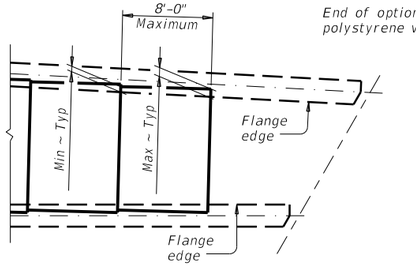
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

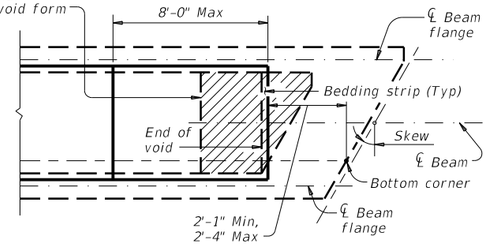
TYPICAL PART TRANSVERSE SECTIONS

SLOPED OVERHANG WITH PRESTR CONC U-BEAMS



AT FLARED BEAMS OR GIRDERS

See PCP-FAB standard for Min and Max dimensions based on beam/girder type.



OVER CONC U-BEAMS

PART PLANS OF PANEL PLACEMENT

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

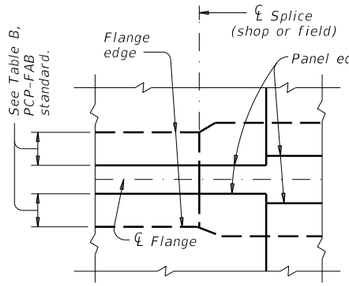
(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(10) Equally space additional bar if more than 11" Max.

(11) The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.

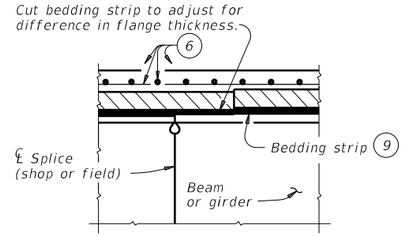
(12) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.

(13) Panels are allowed over top tension flanges, as approved by Engineer. See Span Details for additional top mat reinforcement required in tension zones. Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



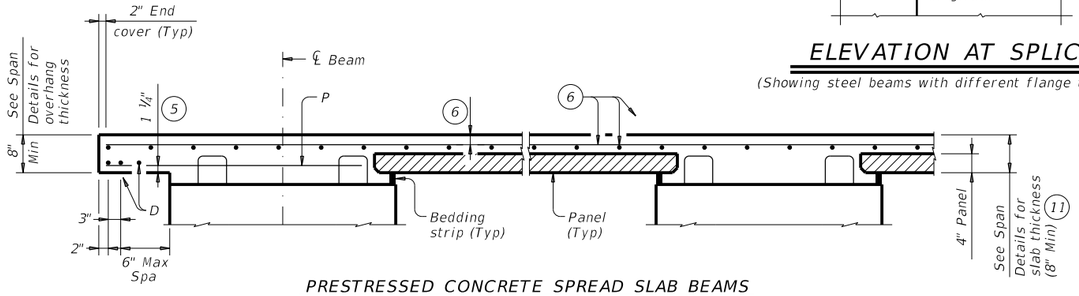
PLAN AT SPLICE

(Showing steel beams with flange width transition)



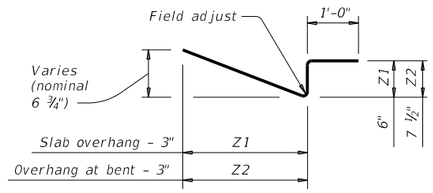
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) (12)

HL93 LOADING SHEET 2 OF 4

Texas Department of Transportation

Dallas District Bridge

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP (DAL)

FILE: DAL-MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS: 3-23: Removed top flange tension limit. 4-23: Revised reinforcement configuration and made District Standard. 6-23: Revised bars P and Z. 8-03: Revised lap lengths, Bar E spacing, and updated notes.	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		224

DATE: 5/28/2024 5:46:41 AM
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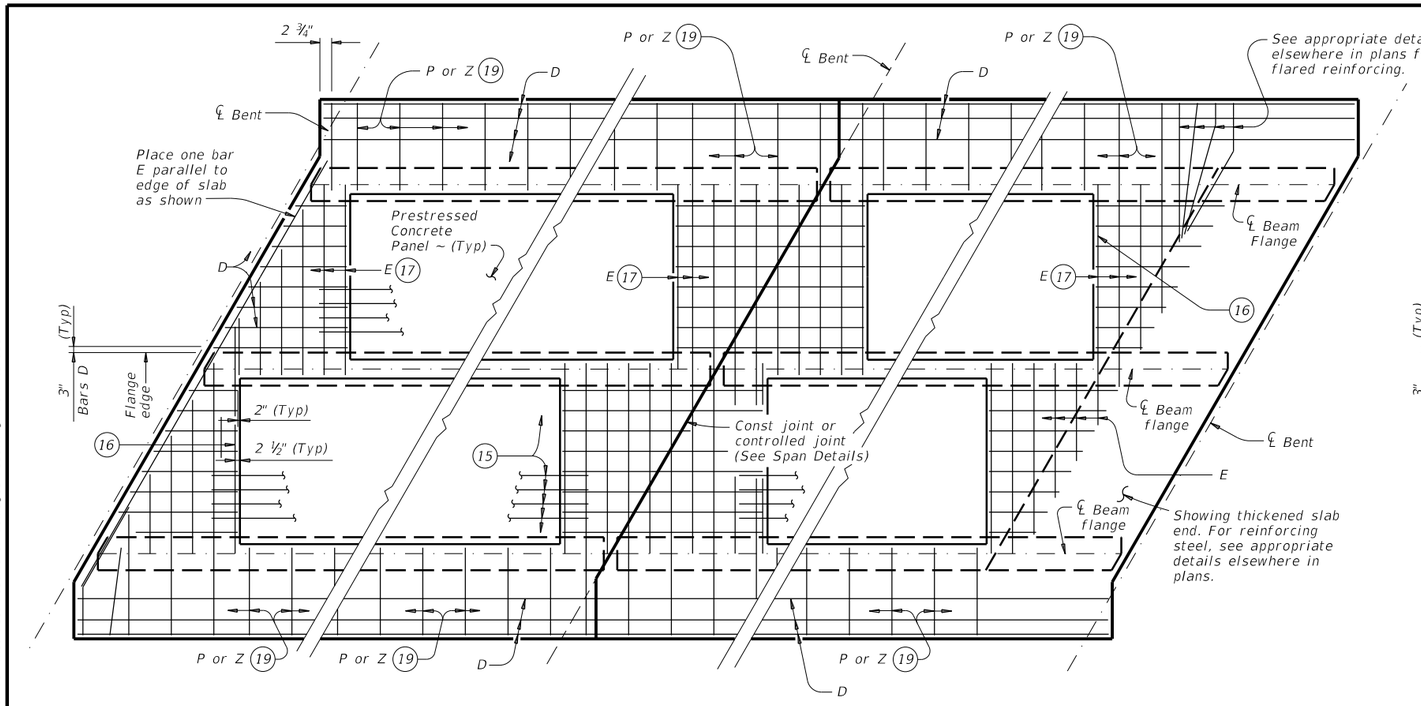
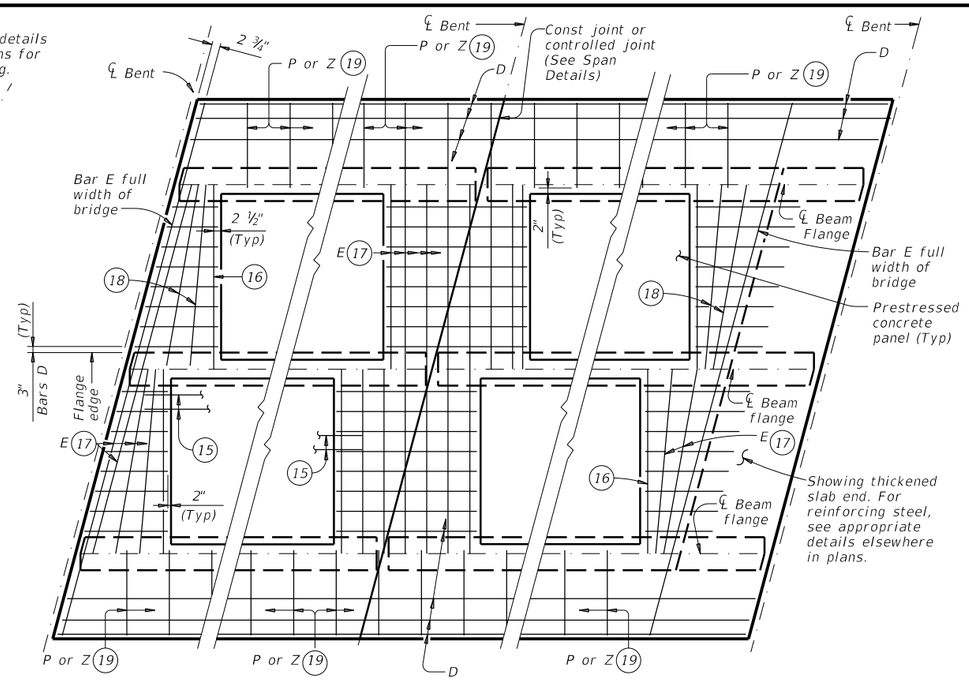


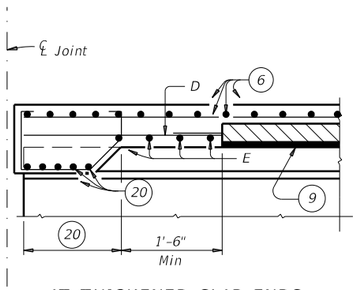
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

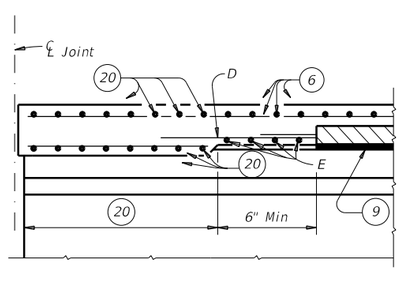


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

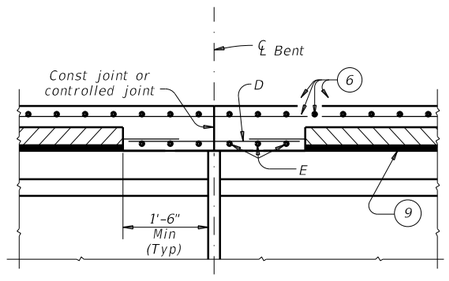
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



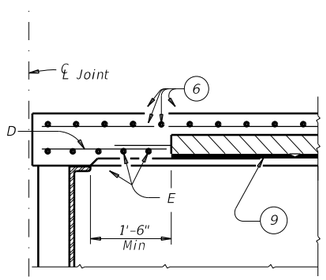
AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS



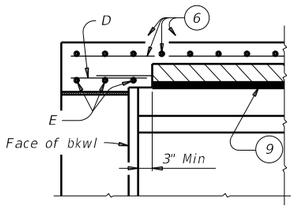
AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS



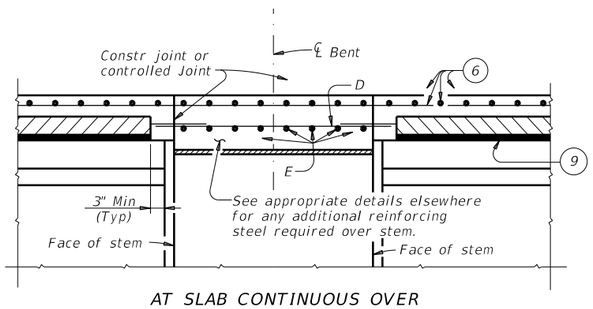
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c.

(14) Max Spacing as listed unless otherwise shown.

(15) At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.

(16) Maintain one Bar E(#5) parallel to panel ends (Typ).

(17) Bars E(#5) not continuous over beam flanges must overlap beam flange 6" Min.

(18) Add flared Bars E(#5) (Min Spa = 2", Max Spa = 10") as required at panel ends.

(19) Where possible, Bars E(#5) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.

(20) See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)

BAR	SIZE	Max Spa (in.)
D	#5	9
E	#5	6
P	#4	18
UP	#4	~
Z	#4	18

HL93 LOADING

Texas Department of Transportation

Dallas District Bridge

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP (DAL)

FILE: DAL-MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS: 3-23: Removed top flange tension limit. 4-23: Revised reinforcement configuration and made District Standard. 6-23: Revised bars P and Z.	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		225

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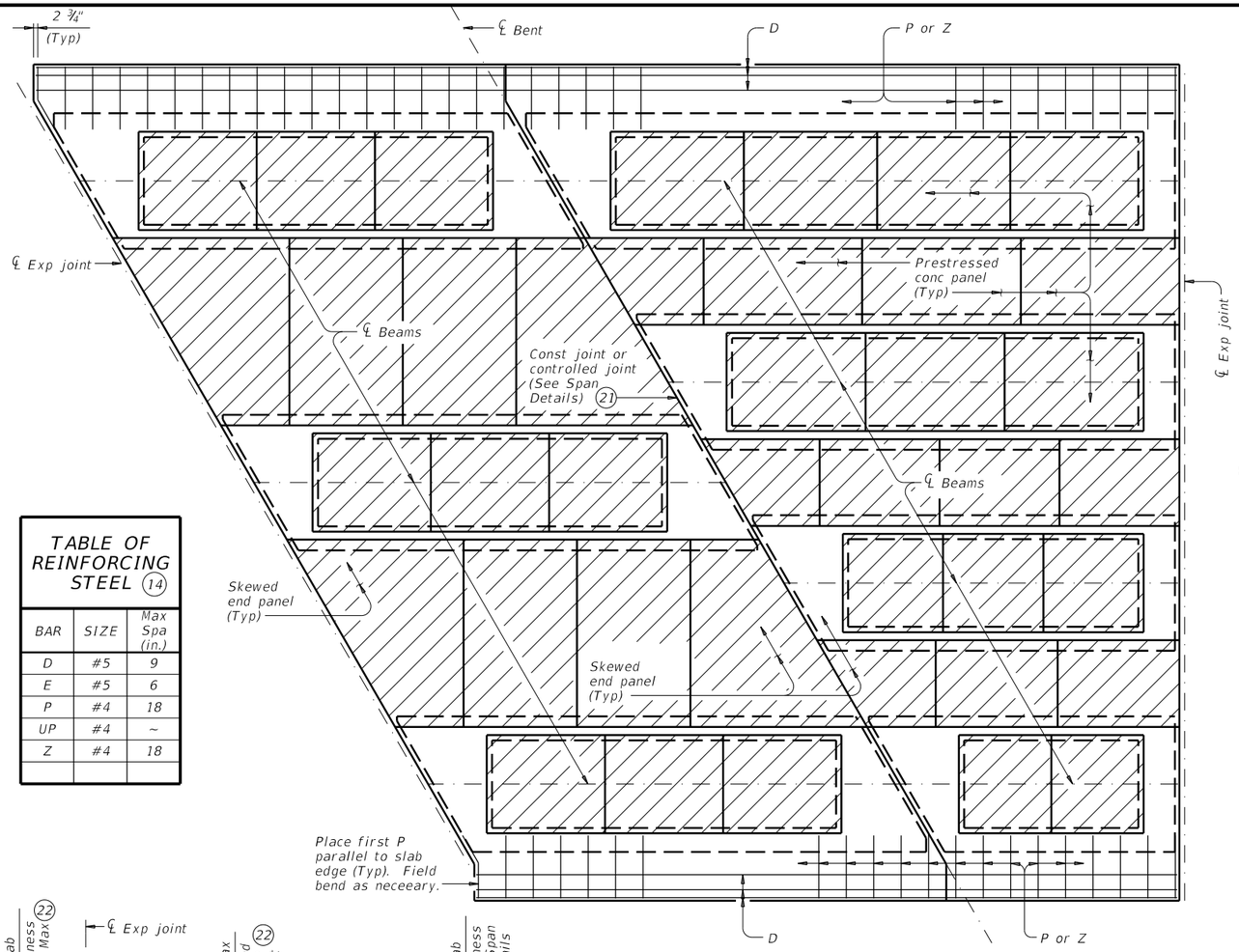
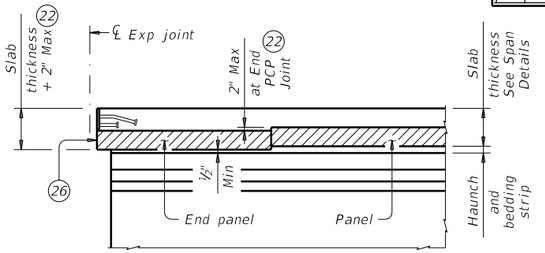


OPTION 2 ~ PLAN OF SLAB

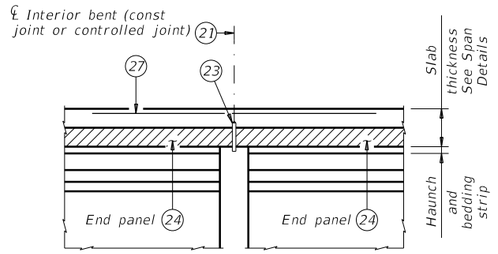
(Showing U-Beams; other beams similar)

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#5	9
E	#5	6
P	#4	18
UP	#4	~
Z	#4	18



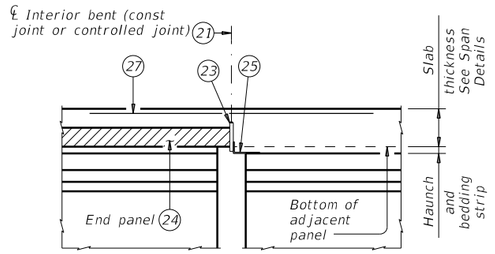
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-B, SEJ-M, SEJ-S(0), AJ, and Type A expansion joints only.



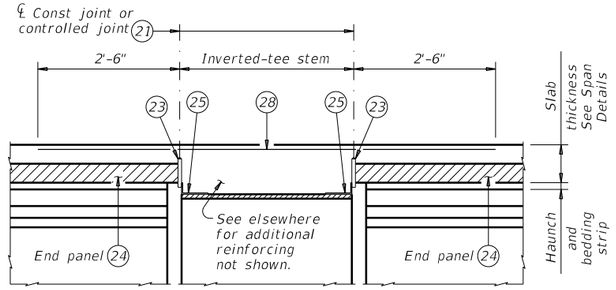
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

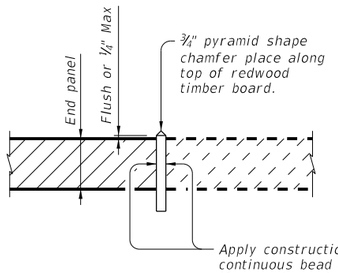
Panel against beam/girder end in adjacent span.



INVERTED-T BENT

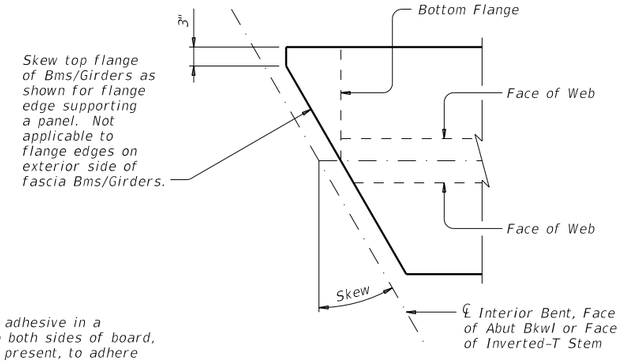
Panels against inverted-tee stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)



ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends".



OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Beam/I-Girder, U-Beams and Steel Beams similar.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(14) Max Spacing as listed unless otherwise shown.

(21) 1 ½" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

(22) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than ½" thick.

(23) ¾" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within ¼" Max above panel. Place ¾" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight, within ¼" of centerline of bent or face of inverted-tee, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.

(24) Place panel within ½" of ¾" thick board.

(25) Permanent galvanized steel sheet form. Removable formwork is acceptable.

(26) Place end panel within ½" of expansion joint opening. End panel cannot encroach on required expansion joint opening.

(27) Place additional (#4) bar 5'-0" in length between every slab bars T. Center (#4) bar on Joint.

(28) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.

SPECIAL OPTION 2 CONSTRUCTION NOTES:

When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet.

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 ½".

Do not extend the longitudinal panel reinforcement into the cast-in-place slab.

Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor studs of expansion joints shown on standards AJ, SEJ-B, SEJ-M, and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.

Provide Bars AA, G and K from standard IGTS-DAL in the slab.

HL93 LOADING SHEET 4 OF 4

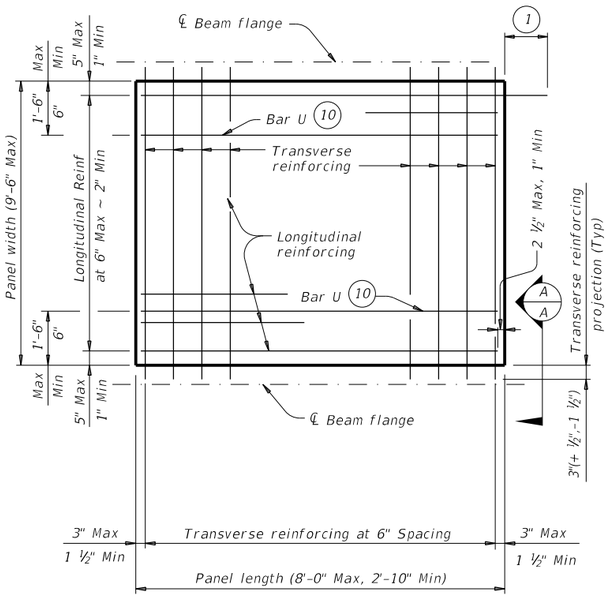
Texas Department of Transportation — Dallas District Bridge

PRESTRESSED CONCRETE PANELS
DECK DETAILS

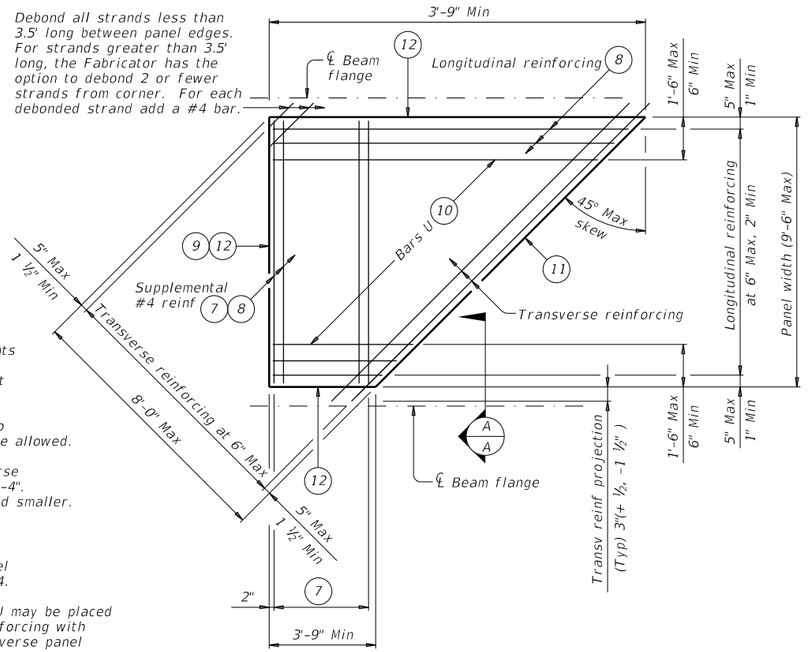
PCP (DAL)

FILE: DAL-MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS:	0195	03	088,etc.	IH 35E
3-23: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
4-23: Revised reinforcement configuration and made District Standard.	DAL	DENTON		226
6-23: Revised bars P and Z.				

DATE:
FILE:



TYPICAL NON-SKEWED PANEL PLAN



TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

1. At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2",-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
2. Four loops required per panel.
3. Four loops required per panel. ⅜" or ½" strands may be used.
4. Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
5. See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
6. One Splice allowed per panel. No more than two sheets of WWR are allowed.
7. Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
8. End Cover 2 ½" Max, 1" Min.
9. Recess strands on indicated panel edge in accordance with Item 424.
10. At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
11. Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
12. Timber form work permissible this edge.

Debond all strands less than 3.5' long between panel edges. For strands greater than 3.5' long, the Fabricator has the option to debond 2 or fewer strands from corner. For each debonded strand add a #4 bar.

TABLE A (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½"	8 ½
U40 – 54	5 ½	5 ½	7
Tx28-70	6	5	7 ½
XB20 – 40	4	3	4 ½
XSB12 – 15	4	3	4 ½

TABLE B (4) (5)			
Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 ¾	2 ½	2 ¾
Over 12" to 15"	3 ¼	3	3 ¼
Over 15" to 18"	4	3	4 ¾
Over 18"	5	3 ½	6 ¼

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3,500 psi. Minimum 28 day strength f'c=5,000 psi.

Provide ¾" chamfer along bottom edge of panel on beam side.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface.

Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.

For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).

Place transverse panel reinforcement at panel centroid and space at 6" Max.

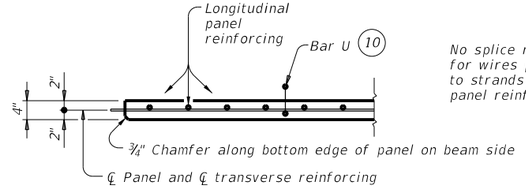
LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. ⅜" Dia prestressing strands at 4 ½" Max Spacing (unstressed). No splices allowed.
3. ½" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.

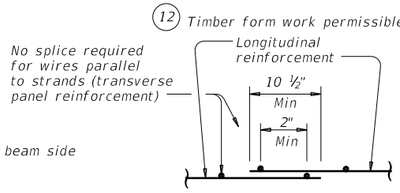
No combination of longitudinal reinforcement options in a panel is allowed.

Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

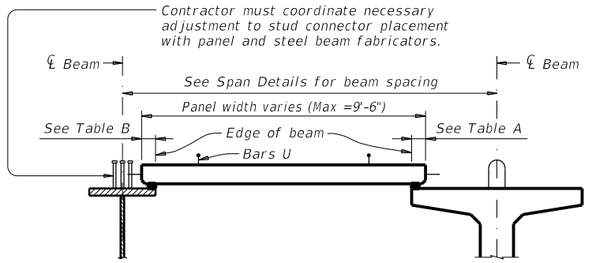


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)



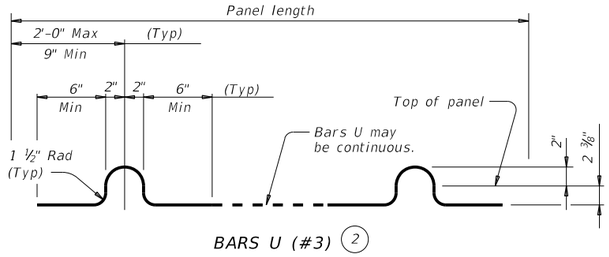
WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)



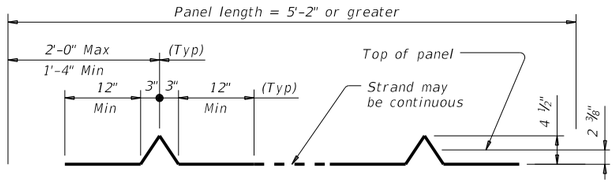
STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

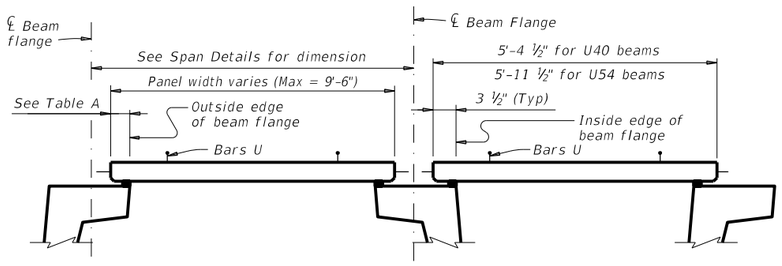
Typ unless noted otherwise



BARS U (#3) (2)



OPTIONAL STRAND FOR BARS U (3)



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

HL93 LOADING

Texas Department of Transportation

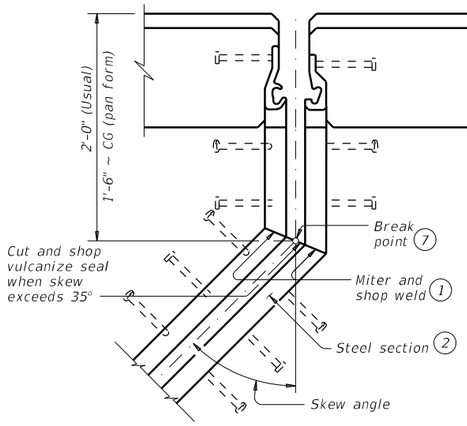
Bridge Division Standard

PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

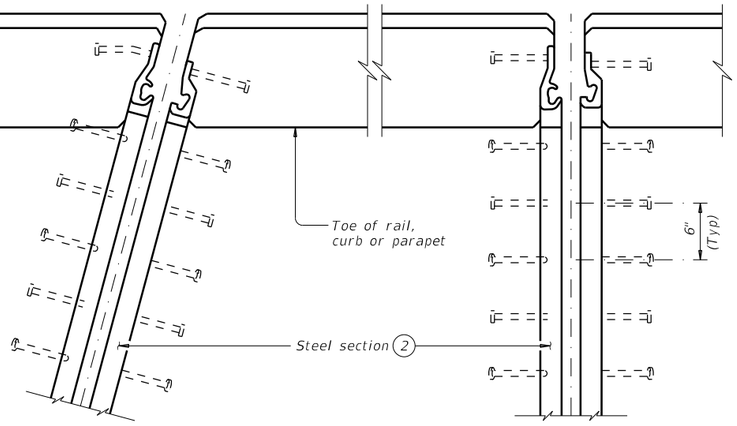
PCP-FAB

FILE: pcpstde2-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		227

DATE:
FILE:



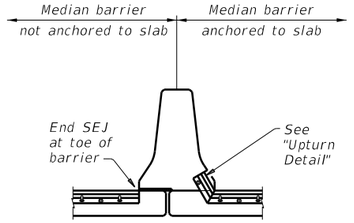
SHOWING SKEWS WITH SLAB BREAKBACKS



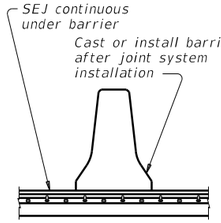
SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

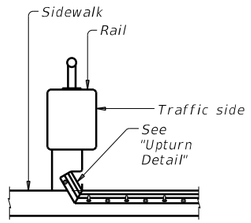
PLANS OF END CONDITIONS



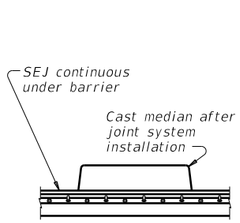
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



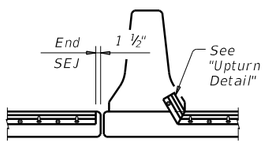
AT MEDIAN BARRIER



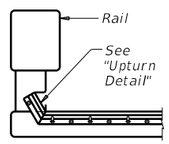
AT SIDEWALK BEHIND BRIDGE RAIL



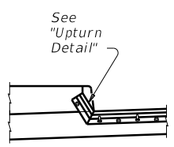
AT RAISED MEDIAN



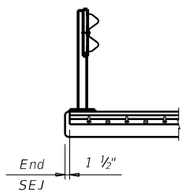
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

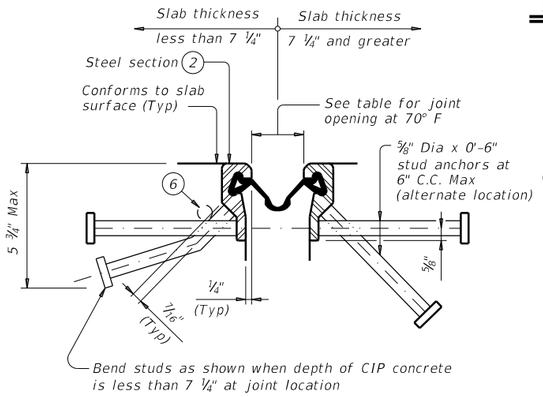


AT SIDEWALK

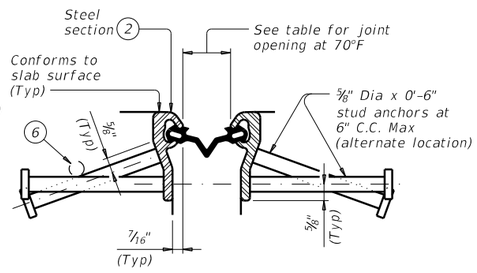


AT STEEL POST BRIDGE RAIL

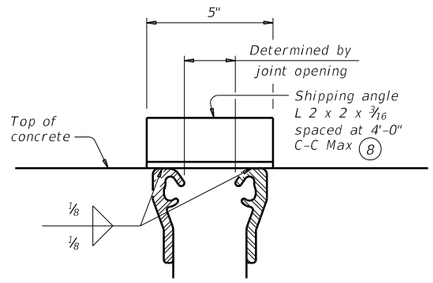
TYPICAL SECTIONS (5)



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS



SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Ty SSCM2)
(All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2"

REDUCED LONGITUDINAL MOVEMENT RANGE		
SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

(1) Remove all burrs which will be in contact with seal prior to making splice.

(2) Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.

(3) These openings are also the recommended minimum installation openings.

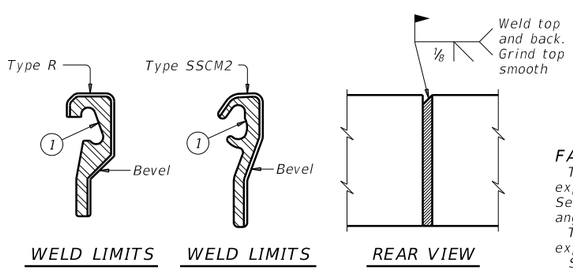
(4) Reduce for sidewalk or parapet heights less than 6".

(5) Other conditions affecting the joint profile should be noted elsewhere.

(6) Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.

(7) See Span details for location of break point.

(8) Align shipping angle perpendicular to joint.



WELD LIMITS WELD LIMITS REAR VIEW

FIELD SPLICE DETAIL

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

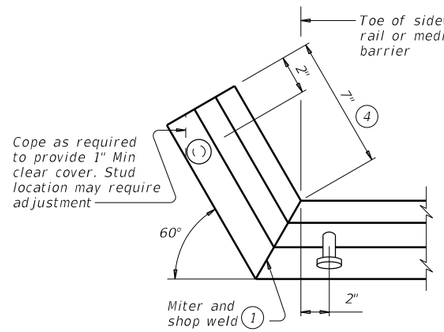
Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Feild Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.



UPTURN DETAIL

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 ½".

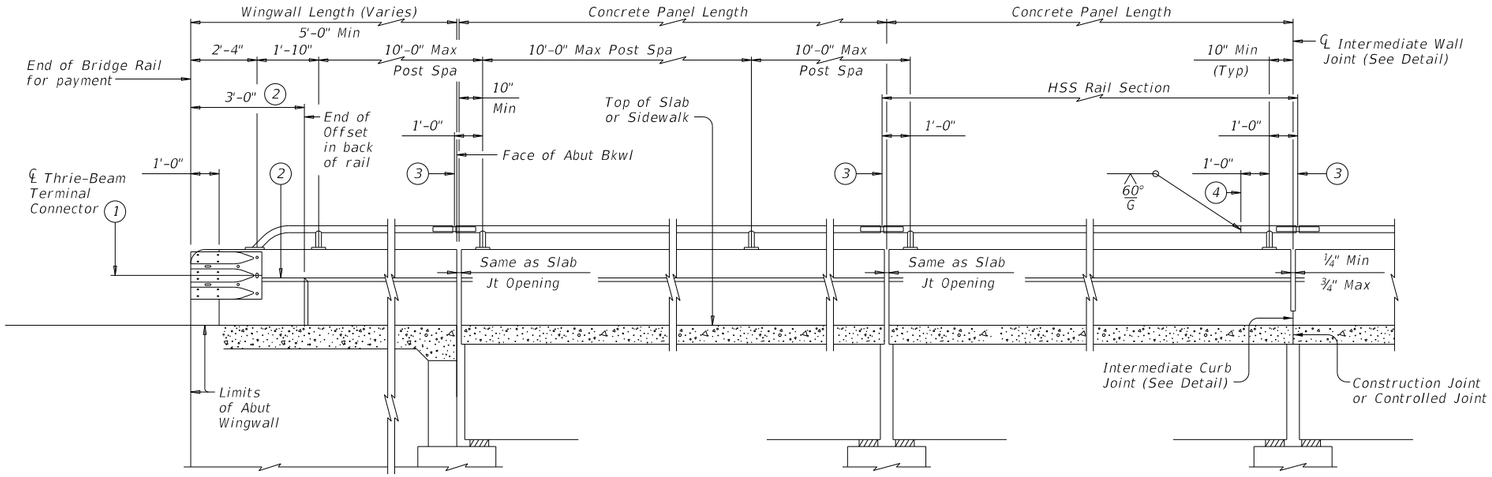
Texas Department of Transportation

Bridge Division Standard

SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY

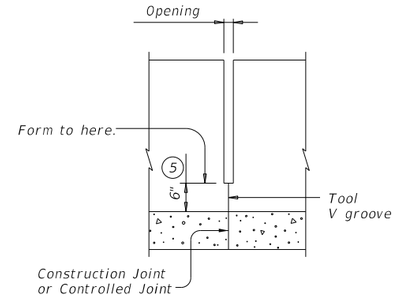
SEJ-M

FILE: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088, ETC.	IH35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		228



AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

(2) Back of rail offset may, with Engineer's approval, be continued to the end of the railing.

(3) ℄ Exp Joint or Splice Joint as required.

(4) One shop splice per HSS rail section is permitted with minimum 85 percent penetration. The weld may be square groove, or single vee groove. Grind smooth.

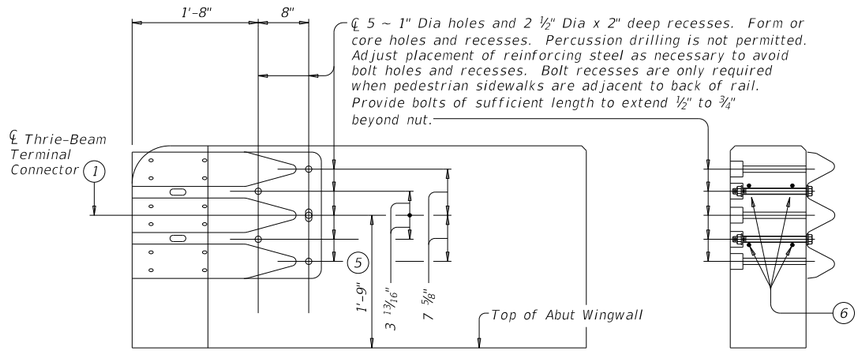
(5) Increase 2" for structures with overlay.

(6) Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

(7) HSS 2.875 x 0.203

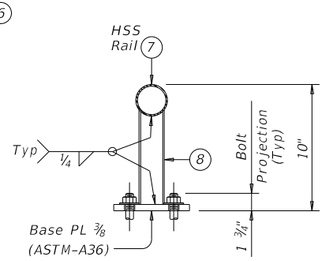
(8) HSS 2.375 x 0.154

(9) ⅜" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)

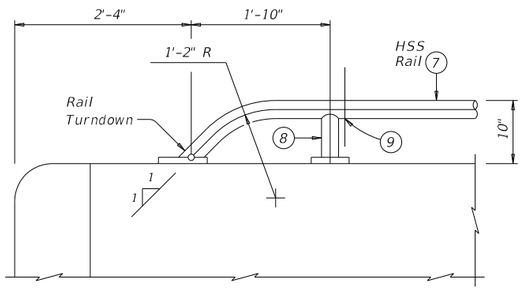


ELEVATION | SECTION

TERMINAL CONNECTION DETAILS

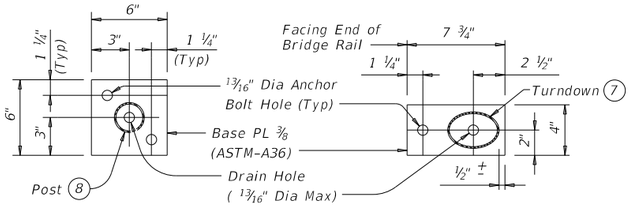


TRANSVERSE SECTION



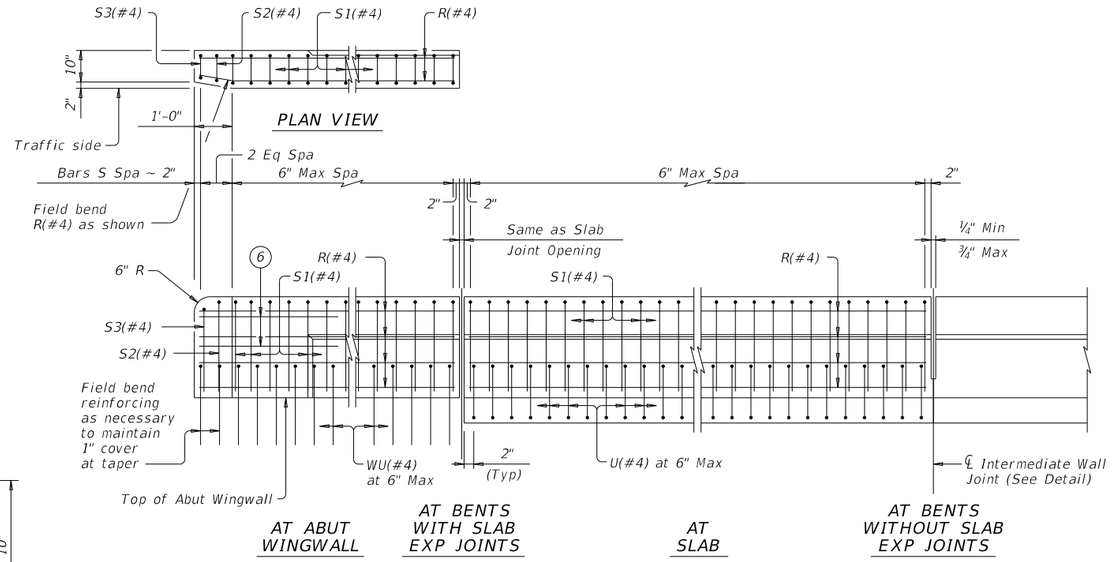
Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

HSS RAIL TERMINAL DETAIL



POST BASE PLATE PLAN | RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS



AT ABUT WINGWALL | AT BENTS WITH SLAB EXP JOINTS | AT SLAB | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

SHEET 1 OF 3

Texas Department of Transportation | Bridge Division Standard

COMBINATION RAIL

TYPE C221

FILE:	rlstd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0195	03	088,etc.	IH 35E
		DIST	COUNTY		SHEET NO.
		DAL	DENTON		229

DATE: 10/2/2023 8:35:31 PM
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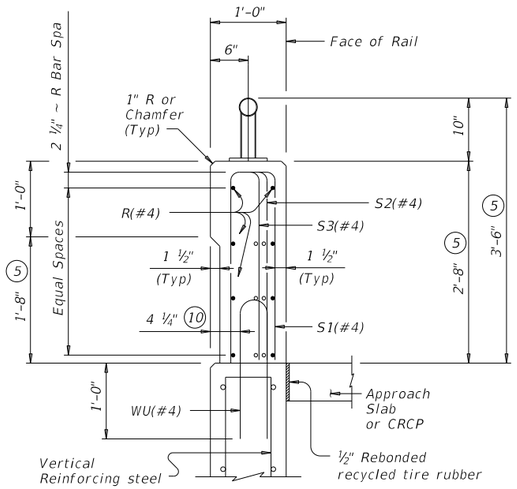
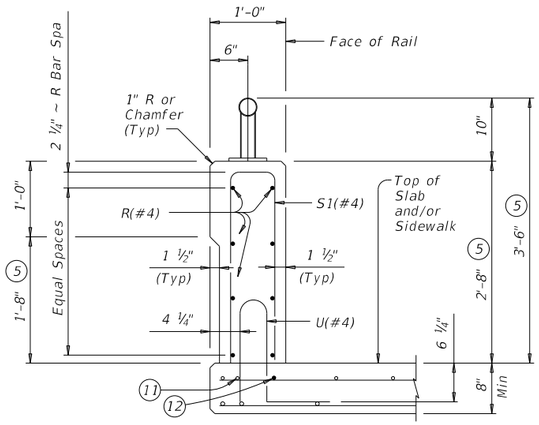
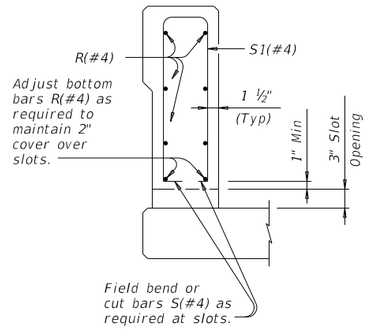


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

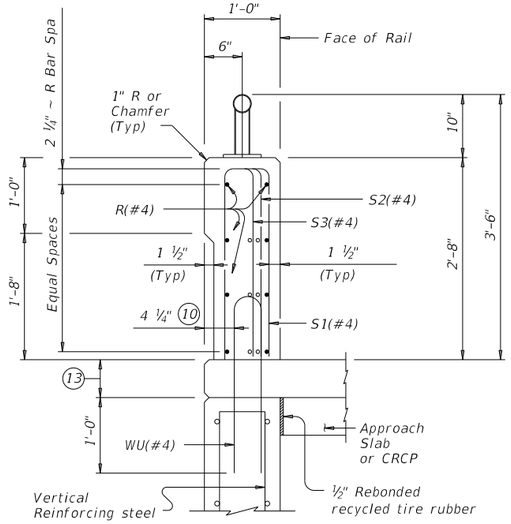


ON BRIDGE SLAB

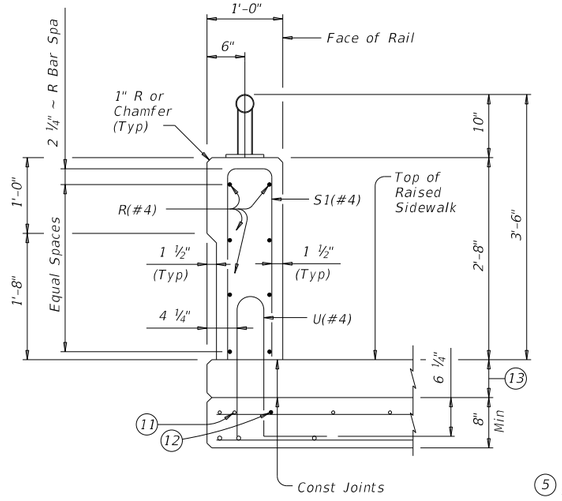
SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK



SECTION THRU OPTIONAL SIDE SLOT DRAIN

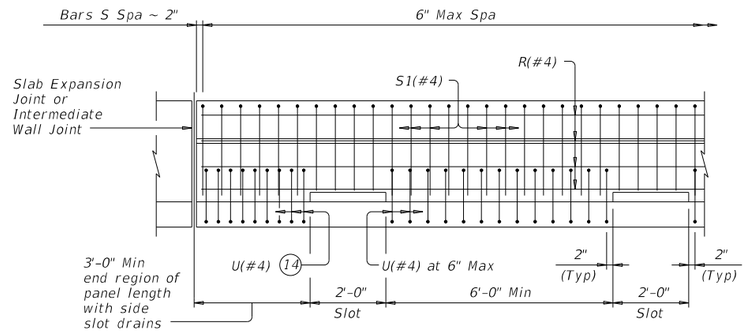


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

(5) Increase 2" for structures with overlay.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(11) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractors expense.

(12) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(13) Raised Sidewalk

(14) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

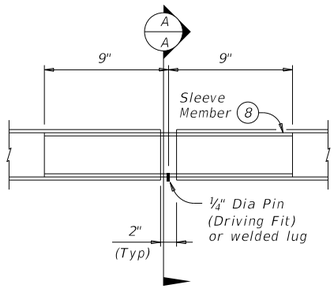
TYPE C221

FILE: r1std018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		230

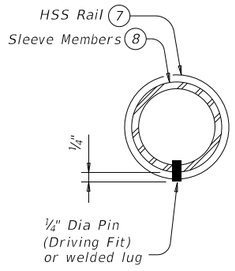
DATE: 10/2/2023 8:35:32 PM
FILE: c:\pwworking\aecom_ds16_nv\janell.steigerwald@aecom.com\d0552632\r1std018-19.dgn

RAIL DATA FOR HORIZONTAL CURVES

	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
HSS Rail	Over 2800'	29'-0"	Straight rail panels
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius

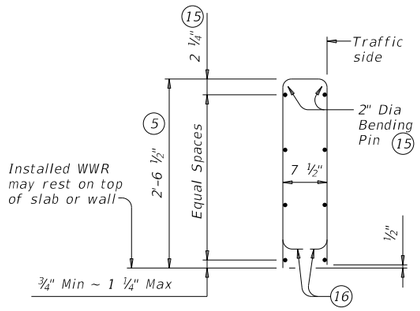


AT SPLICE OR EXP JTS



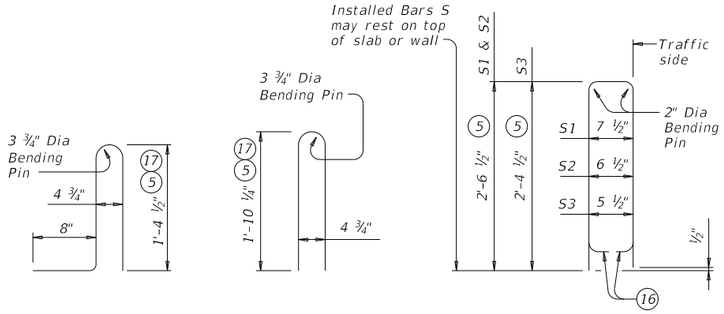
SECTION A-A

PIPE SPLICE DETAILS

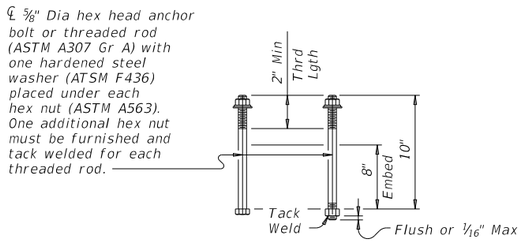


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

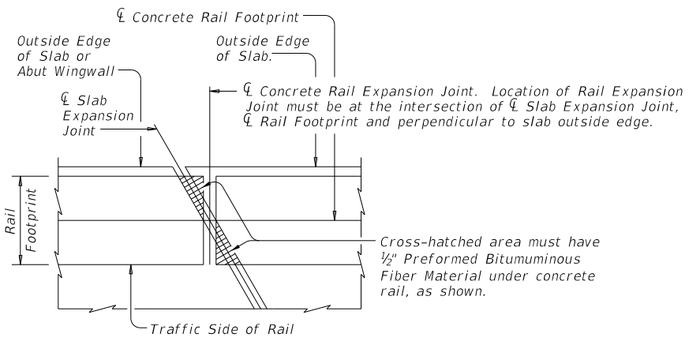
DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



BARS U (#4) BARS WU (#4) BARS S (#4)



CAST-IN-PLACE ANCHOR BOLT OPTIONS (18)



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

(5) Increase 2" for structures with overlay.
(7) HSS 2.875 x 0.203
(8) HSS 2.375 x 0.154
(15) No longitudinal wires may be in top center of cage.
(16) Bend or cut as required to clear drain slots.
(17) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
(18) See "Material Notes" for anchor bolt information.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer and when adhesive anchor bolts are used. Slipforming parapet is not allowed if anchor bolts are cast with parapet wall. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Face of rail, parapet must be plumb unless otherwise approved by the Engineer. HSS rail posts must be square to the top of parapet. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

Round or chamfer exposed edges of HSS rail and HSS rail posts to approximately 1/16" by grinding.

HSS rail sections must not include less than two posts, and no more than four (except at Abutments).

Chamfer all parapet exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Povide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Provide ASTM A1085 or A500 Gr B or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

Optional cast-in-place anchor bolts must be ⅝" Dia ASTM A307 Gr A bolts (or threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer (ASTM F436) at each bolt. Nuts must conform to ASTM A563 requirements.

Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting to the Engineer for approval.

Average weight of railing with no overlay: 380 plf (total)
370 plf (Conc)
10 plf (Steel)

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

FILE: r1std018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		231

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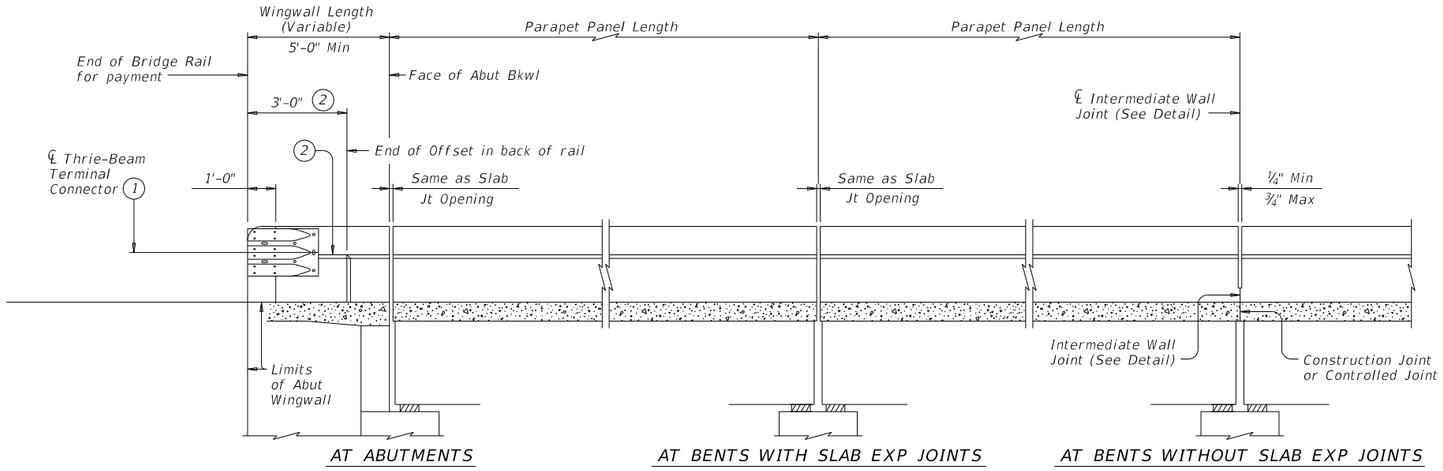
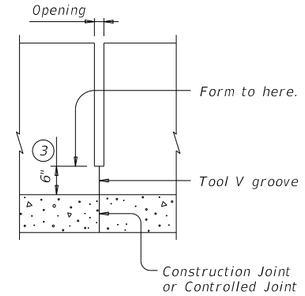
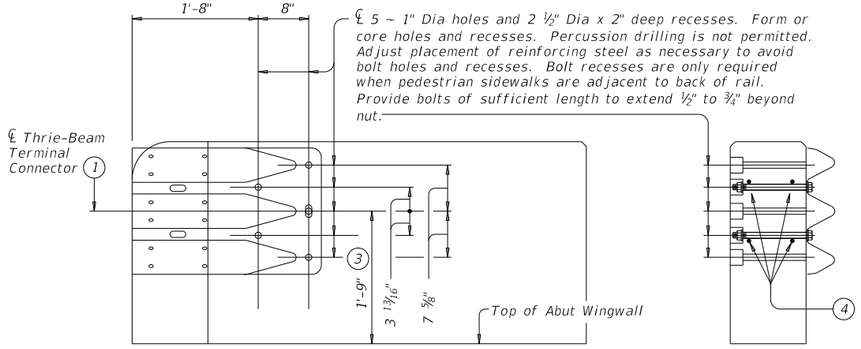


ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



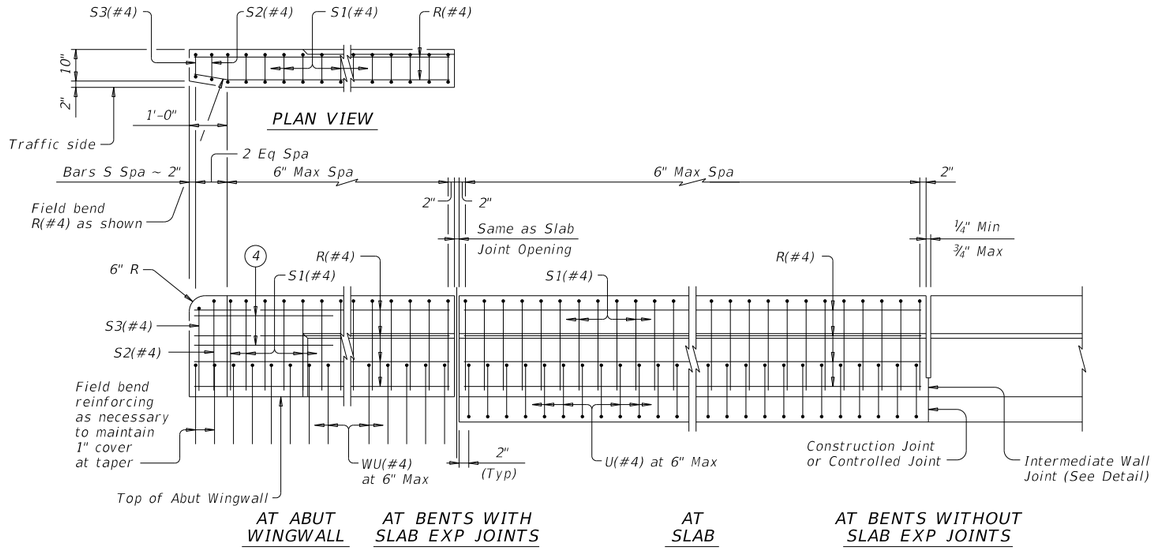
TERMINAL CONNECTION DETAILS

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

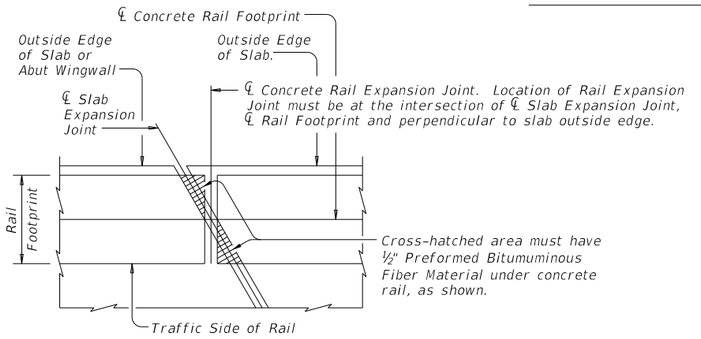
(2) Back of rail offset may, with Engineer's approval, be continued to the end of the railing.

(3) Increase 2" for structures with overlay.

(4) Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T221

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	DAL	DENTON		232

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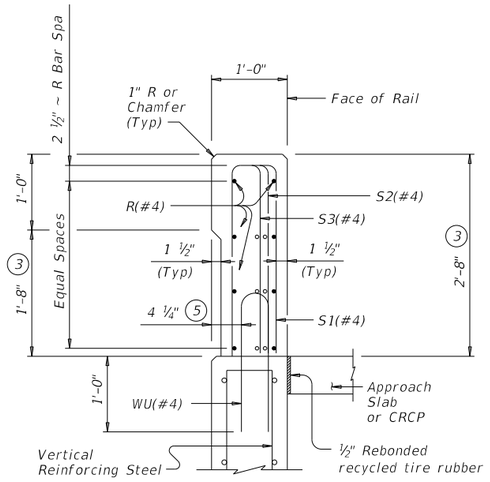
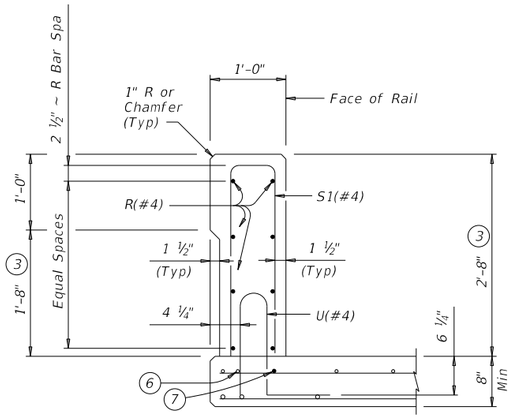


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(3) Increase 2" for structures with overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars will be furnished at the Contractors expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(8) Bend or cut as required to clear drain slots.

(9) No longitudinal wires may be in top center of cage.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

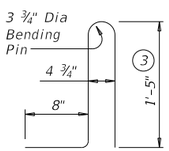
Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

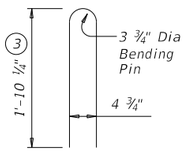
Shop drawings are not required for this rail.

Average weight of railing with no overlay is 370 plf.

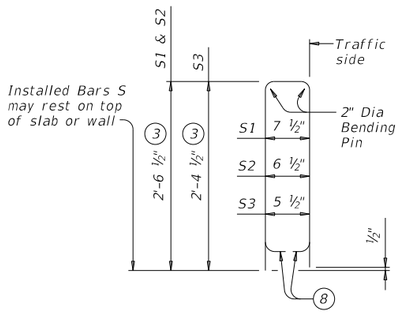
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



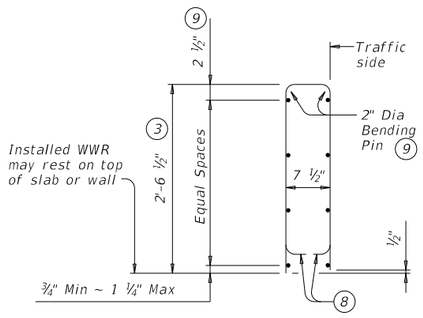
BARS U (#4)



BARS WU (#4)

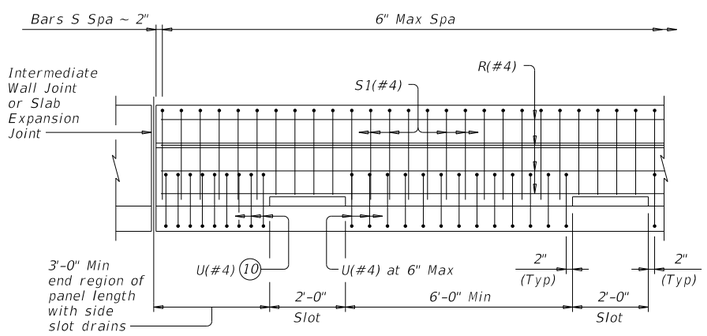


BARS S (#4)

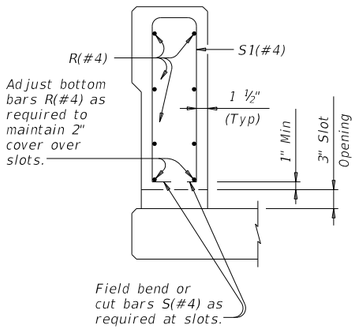


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL



SECTION THRU OPTIONAL SIDE SLOT DRAIN

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T221

FILE: r1std004-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		233

DN: AECOM CK: AECOM DN: AECOM CK: AECOM DN: AECOM CK: AECOM diana.cabrera

BEGIN PROJECT
CSJ: 0195-03-089
℄ PSBFR STA 3915+40.85

MATCH EXIST PAV MRK
℄ PSBFR STA 3915+40.85
1.64' RT
BEGIN (A)

MATCH EXIST PAV MRK
℄ PSBFR STA 3915+41.26
14.66' RT
BEGIN (C) (D)

℄ PSBFR STA 3916+90.01
1.49' LT

℄ PSBFR STA
3918+25.00
3.00' LT

℄ PSBFR

℄ PSBFR-ULT

℄ PSBFR STA 3921+02.97
3.00' LT
END (A)

℄ SBDRWY1 STA 10+87.73
3.87' RT
BEGIN 2' R

℄ SBDRWY1

℄ SBDRWY1 STA 10+87.03
0.00' RT

℄ SBDRWY1 STA 10+05.59
0.00' RT
BEGIN (D) (F)

℄ PSBFR-ULT STA 3921+78.06
15.63 LT
BEGIN 59' R

℄ PSBFR-ULT STA 3922+07.23
3.00' LT
BEGIN 40' R

℄ PSBFR-ULT STA 3922+21.09
14.00' LT
BEGIN (A)

℄ PSBFR STA
3925+29.85
14.00' LT

PROP ROW

EXIST ROW

3915+00

3920+00

3925+00

12+00

11+00

10+00

PROPOSED SOUTHBOUND
FRONTAGE ROAD

MATCH EXIST PAV MRK
℄ PSBFR STA 3915+41.97
23.72' RT
BEGIN (D) (F)

MATCH EXIST PAV MRK
℄ PSBFR STA 3915+42.35
35.86' RT
BEGIN (D) (F)

MATCH EXIST PAV MRK
℄ PSBFR STA 3915+43.31
49.62' RT
BEGIN (B)

(D) @ 20'

(D) @ 80'

(E)

(D) @ 20'

(D) @ 20'

℄ PSBFR STA 3925+29.85
3.00' LT
END (D) (F)

ONE WAY (2)
R6-1R
54"x18"

℄ SBDRWY1 STA 10+03.64
2.45' RT
BEGIN 2' R

STOP (1)
R1-1
36"X36"

℄ PSBFR STA 3917+06.77
20.11' RT
END (D) (F)

SOUTHBOUND IH 35E

NORTHBOUND IH 35E

MATCH EXIST PAV MRK
℄ PNBFR STA 2920+48.67
51.48' LT
BEGIN (B)

MATCH EXIST PAV MRK
℄ PNBFR STA 2920+48.17
37.49' LT
BEGIN (A)

(D) @ 20'

(D) @ 80'

℄ PNBFR

ONE WAY (4)
R6-1R
54"x18"

45' TAPER

APPROX 371'

EXIST ROW

MATCH EXISTING
END (A)

MATCH EXISTING
BEGIN (A)

PROP ROW

EXIST ROW

PROP ROW

2925+00

PROPOSED NORTHBOUND
FRONTAGE ROAD

BEGIN PROJECT
CSJ: 0195-03-088
℄ PNBFR STA 2920+40.00

END (A) (F) (D)
℄ PNBFR STA 2921+46.58
33.87' LT

END (B) (F) (D)
℄ PNBFR STA 2921+46.06
19.68' LT

MATCH EXISTING
BEGIN (A) (B) (C) (D)

END (A)
℄ PNBFR STA 2923+95.62
1.29' LT

END (D) (F)
BEGIN (A) DBL
℄ PNBFR STA 2924+05.66
23.61' LT

BEGIN (A)
℄ PNBFR STA 2924+65.00
3.00' RT

END (A) DBL
BEGIN (C) (D)
℄ PNBFR STA 2924+82.52
22.00' LT

BRIDGE
MAY ICE IN
COLD
WEATHER (3)
W8-13aT
36"x36"

℄ PNBFR STA 2926+20.54
3.00' RT
END (A)

℄ PNBFR STA 2927+13.39
3.00 RT
BEGIN (A)

SPEED
LIMIT
XX (5)
R2-1
30"x36"

MATCH LINE PSBFR STA 3926+00

N

0' 50' 100'
SCALE IN FEET

LEGEND

(A) RE PM W/RET REQ TY I (W) 6" (SLD)(100MIL)
(B) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W) 6" (BRK)(100MIL)
(D) REFL PAV MRKR TY II-C-R
(E) REFL PAV MRK TY I (W) 24" (SLD)(100 MIL)
(F) REFL PAV MRK TY I (W) 8" (SLD)(100 MIL)
(G) REFL PAV MRK TY II (R&W) 6" (FIRE LANE)
(H) REFL PAV MRK TY I (W) (ARROW) (100MIL)
INSTL DEL ASSM (D-SW)SZ CTB
INSTL DEL ASSM (D-SW)SZ GF1
INSTL DEL ASSM (D-SY)SZ GF1
INSTL OM ASSM (OM-2Z) (WFLX)GND
PROPOSED SMALL SIGN
(#) SMALL SIGN NUMBER
TRAFFIC FLOW

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
5/30/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

IH 35E
SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	234
CHECK AEC	CONTROL	SECTION	JOB	
	0195	03	088,ETC	

DATE: 5/30/2024 3:52:18 PM
FILE: c:\pwworking\aecom_dsl6_na\diana.cabrer@aecom.com\d0373510\I35_AEC_PM_001.dgn

MATCH LINE SBFR STA 3926+00

℄ PSBFR STA 3926+29.92
3.00' LT

PROPOSED SOUTHBOUND FRONTAGE ROAD

S LOCUST ST

PROP ROW

EXIST ROW

℄ PSBFR

℄ PSBFR STA 3934+08.64
3.00' LT
END (A)

℄ PSBFR 3934+91.45
3.00' LT
BEGIN (A)

MATCH EXIST PAV MRK
℄ PSBFR STA 3936+50.00
END (A)(C)(D)

END PROJECT
CSJ: 0195-03-089
℄ PSBFR STA 3936+50.00

MATCH EXIST PAV MRK
℄ PSBFR STA 3936+10.94
51.51' RT
END (B)

℄ PSBFR STA 3931+99.92
3.00' LT
BEGIN (A)

℄ PSBFR STA 3931+17.13
3.00' LT
END (A)

SOUTHBOUND IH 35E

NORTHBOUND IH 35E

ONE WAY
3 R6-1R 54"x18"

ONE WAY
4 R6-1R 54"x18"

ONE WAY
7 R6-1R 54"x18"

ONE WAY
5 R6-1R 54"x18"

⇦ Argyle
Denton ⇨
RELOCATE SIGN

6 W3-3 36"X36"

8

MATCH EXIST PAV MRK
℄ PNBFR STA 2937+28.17
6.37' LT
END (C)(D)

EXIST ROW

END PROJECT
CSJ: 0195-03-088
℄ PNBFR STA 2937+28.17

(US 377) FORT WORTH DR

EXIST ROW

12 ℄ PNBFR

PROPOSED NORTHBOUND FRONTAGE ROAD

℄ PNBFR STA 2931+92.37
3.00' RT
END (A)

S LOCUST ST

EXIST ROW

℄ PNBFR STA 2934+44.91
3.00' RT
BEGIN (A)

STOP
11 R1-1 36"X36"

℄ PNBFR
STA 2934+06.94
BEGIN (B)

℄ PNBFR
STA 2933+99.64
END (B)

℄ PNBLOCUST
STA 10+96.77
BEGIN 55' R

℄ PNBLOCUST
STA 10+84.87,
1.20' LT
BEGIN 100' R

℄ PNBLOCUST
STA 12+61.40
BEGIN (B)

℄ PNBFR STA 2933+65.75
3.00' RT
END (A)

℄ PNBFR STA 2933+12.13
3.00' RT
BEGIN (A)

℄ PNBLOCUST
STA 10+37.97
END (B)

STOP
10 R1-1 36"X36"

℄ PNBLOCUST
STA 10+39.17
BEGIN (B)

℄ PNBFR STA 2932+59.57
3.00' RT
END (A)(B)

℄ PNBFR STA 2932+44.31
3.00' RT
BEGIN (A)(B)

℄ PNBLOCUST STA 10+44.06,
5.67' LT
BEGIN 65.67' R

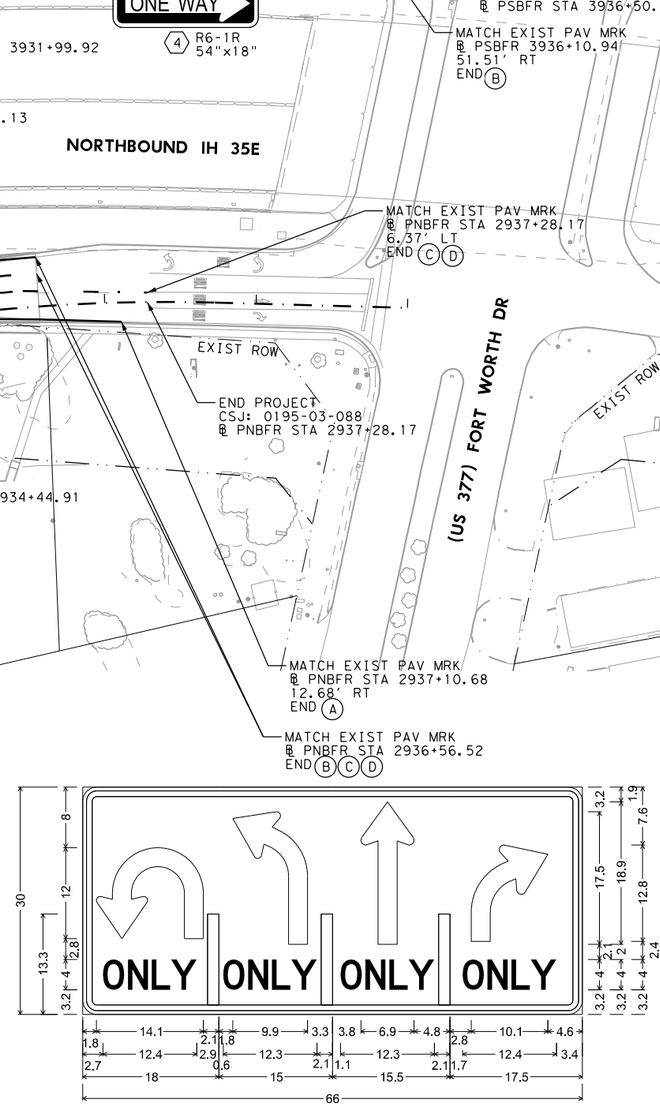
MATCH EXIST PAV MRK
℄ PNBFR STA 2937+10.68
12.68' RT
END (A)

MATCH EXIST PAV MRK
℄ PNBFR STA 2936+56.52
END (B)(C)(D)

STOP
1 R1-1 36"X36"
S. LOCUST ST 1900 *
N. I-35 E IH 100 *

BRIDGE MAY ICE IN COLD WEATHER
2 W8-13aT 36"x36"

STOP
9 R1-1 36"X36"
S. LOCUST ST FM 2164 1700 *
N. I-35 E HWY 300 *



1.9" Radius, 0.8" Border, 0.5" Indent, LaneMarker height: 12.0 LaneMarker width: 1.5Black on White; UL ir=3.5, s=2.5; "ONLY", D 50% spacing;

1.9" Radius, 0.8" Border, 0.5" Indent, LaneMarker height: 12.0 LaneMarker width: 1.5Black on White; LL ir=4.25, s=2.5; "ONLY", D 50% spacing;

1.9" Radius, 0.8" Border, 0.5" Indent, LaneMarker height: 12.0 LaneMarker width: 1.5Black on White; C h=18.875, s=2.5; "ONLY", D 50% spacing;

1.9" Radius, 0.8" Border, 0.5" Indent, Black on White; AR ir=4.5, s=2.5; "ONLY", D 50% spacing;

(8) R3-8ULSR
(12) 66"X30"

N

0' 50' 100'
SCALE IN FEET

LEGEND

(A) RE PM W/RET REQ TY I (W) 6" (SLD)(100MIL)
(B) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W) 6" (BRK)(100MIL)
(D) REFL PAV MRKR TY II-C-R
(E) REFL PAV MRK TY I (W) 24" (SLD)(100 MIL)
(F) REFL PAV MRK TY I (W) 8" (SLD)(100 MIL)
(G) REFL PAV MRK TY II (R&W) 6" (FIRE LANE)
(H) REFL PAV MRK TY I (W) (ARROW) (100MIL)
INSTL DEL ASSM (D-SW)SZ CTB
INSTL DEL ASSM (D-SW)SZ GF1
INSTL DEL ASSM (D-SY)SZ GF1
INSTL OM ASSM (OM-2Z) (WFLX)GND
PROPOSED SMALL SIGN
(#) SMALL SIGN NUMBER
TRAFFIC FLOW

* EXISTING SIGN NAME MUST BE RELOCATED TO PROPOSED SIGN POST BY THE CONTRACTOR.

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED
PROFESSIONAL ENGINEER
6/17/2024

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	235
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088, ETC	

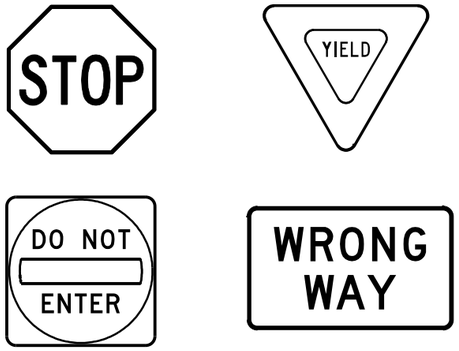
DN: AECOM CK: AECOM DW: AECOM CK: AECOM diana.cabrera

DATE: 6/17/2024 10:05:05 PM
FILE: c:\pwworking\aecom_ds16_na\diana.cabrera@aecom.com\d0375101\135_AEC_PM_002.dgn

DATE: 10/2/2023 8:37:26 PM
FILE: c:\pwworking\aecom_dsl6_na\janell.steigerwald@aecom.com\d0555323\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

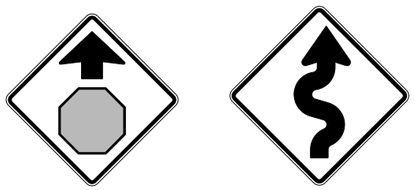
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

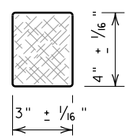
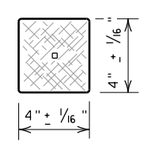
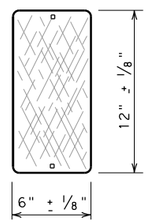
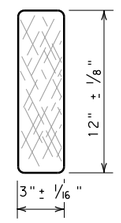
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		236

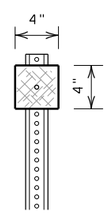
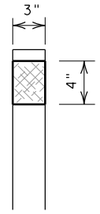
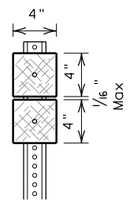
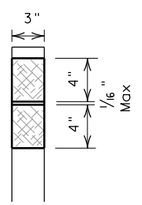
4

DATE: 10/2/2023 8:37:32 PM
FILE: c:\pwworking\aecom_dsl6_na\janell.steigerwald@aecom.com\d0555323\dom1-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

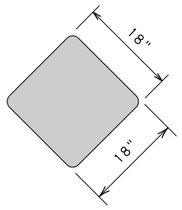
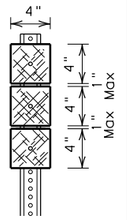
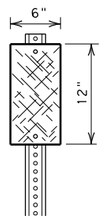
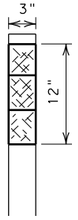
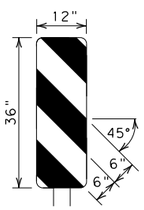
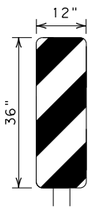
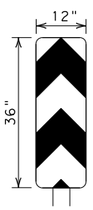
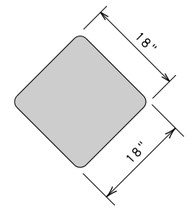
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

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

DIRECTION
If Required
BI = Bi-Directional

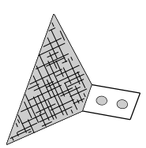
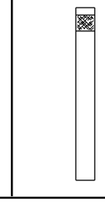
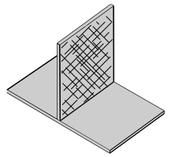
OBJECT MARKERS

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

DEPARTMENTAL MATERIAL SPECIFICATIONS

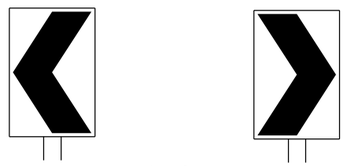
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



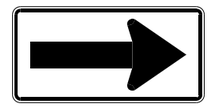
W1-8

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

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

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

NOTE:

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

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

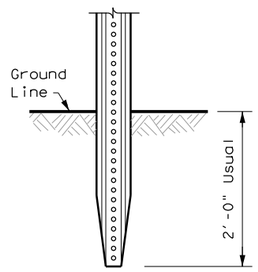
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	DAL	DENTON		237

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

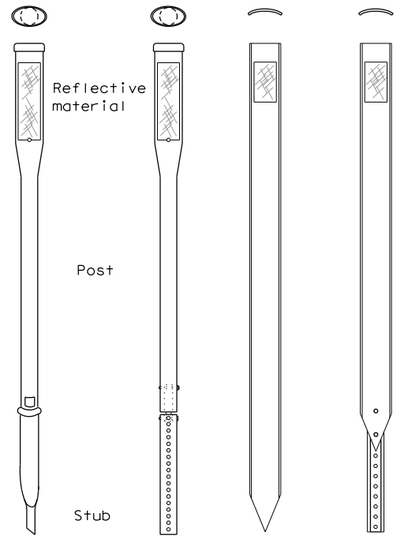


NOTES

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

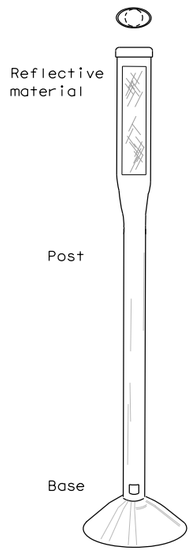
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



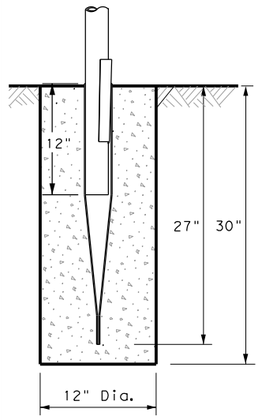
SURFACE MOUNT

NOTES

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

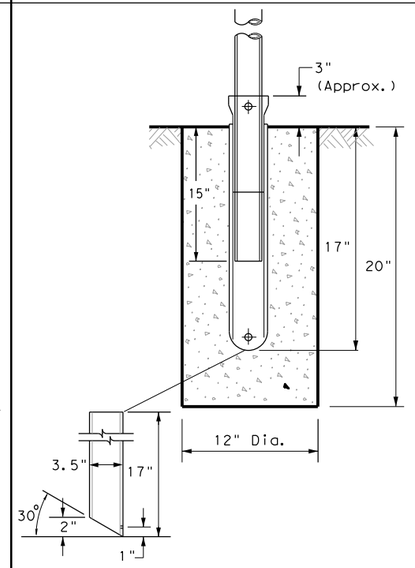
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

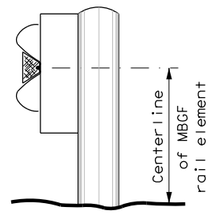
NOTE

1. Install per manufacturer's recommendations.

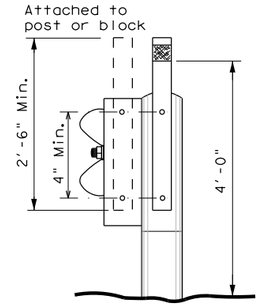
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

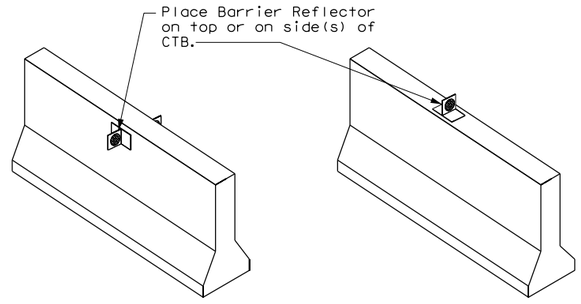
GF1



GF2



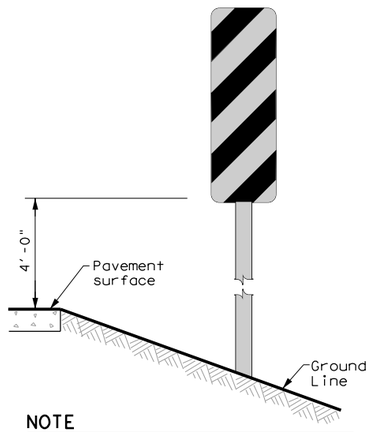
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

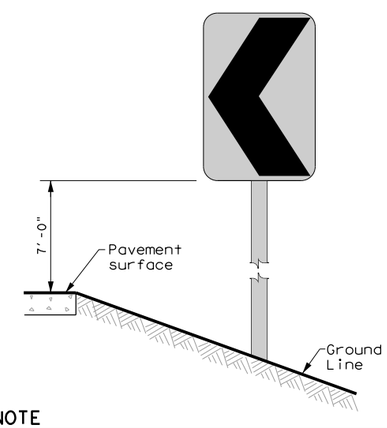
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

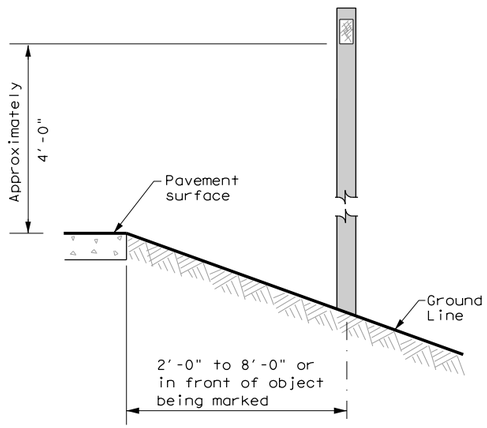
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	DAL	DENTON		238

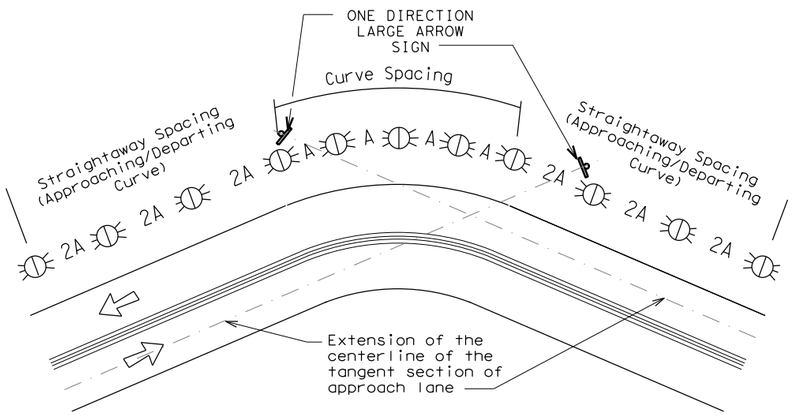
20B

DATE: 10/2/2023 8:37:44 PM
FILE: c:\pwworking\decom_ds16_na\janell.steigerwald@aecom.com\d0555323\dom3-2010.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

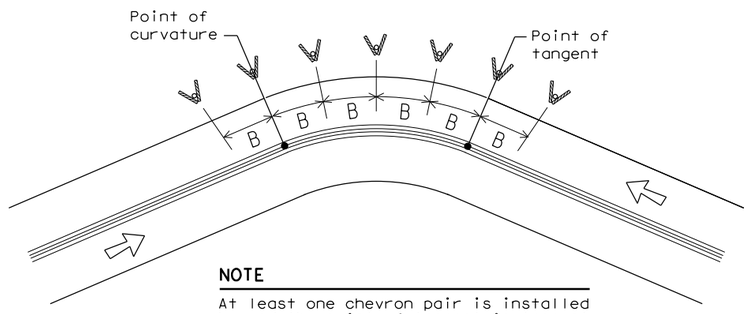
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	0195	03	088,etc.	IH 35E
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	DAL	DENTON		239

20C

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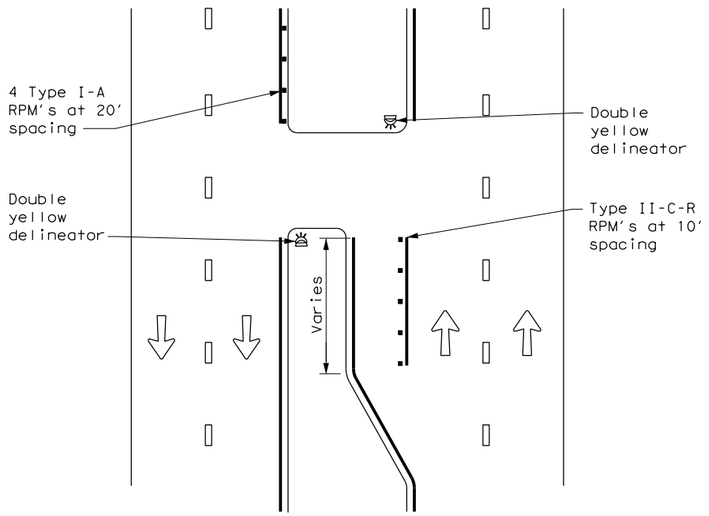
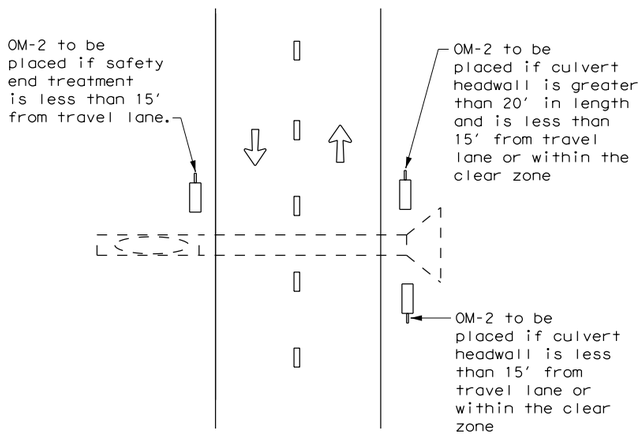
CROSSOVERS



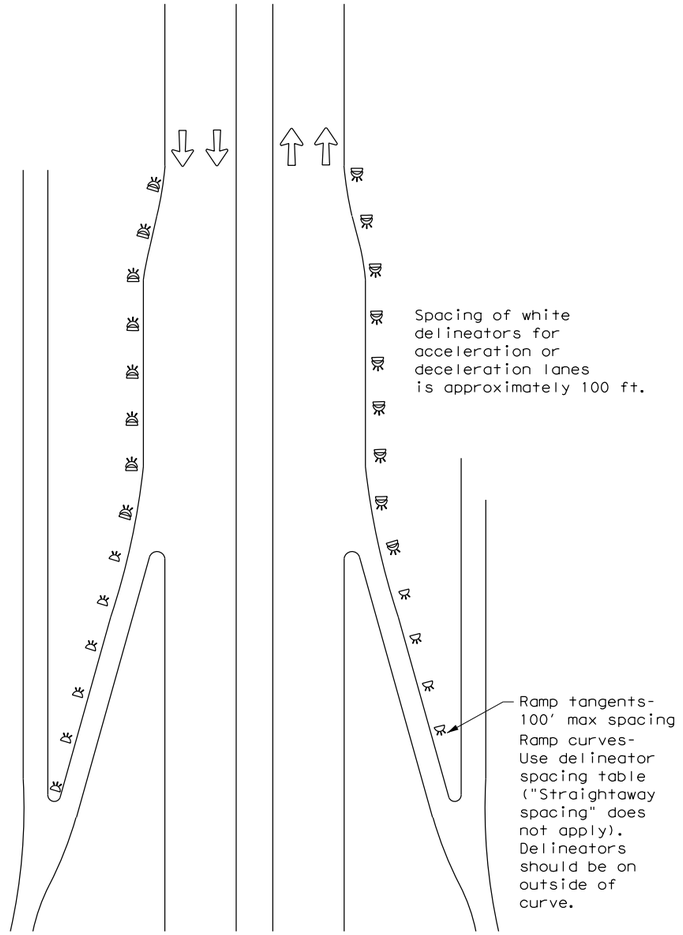
DETAIL 1

FOR CULVERTS WITHOUT MBGF



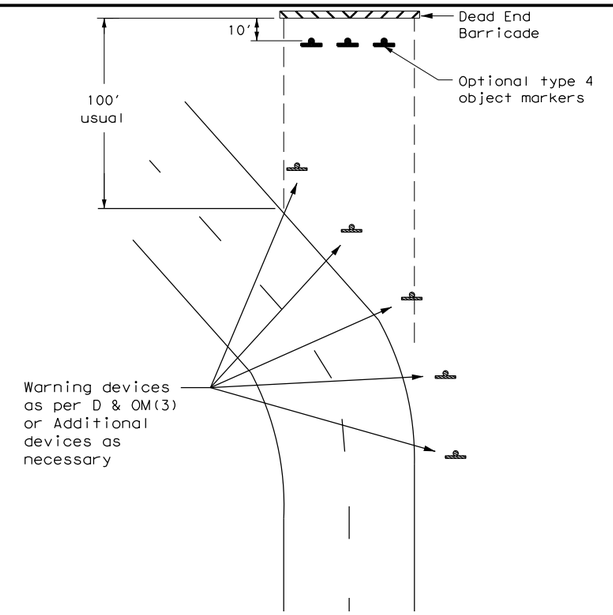
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



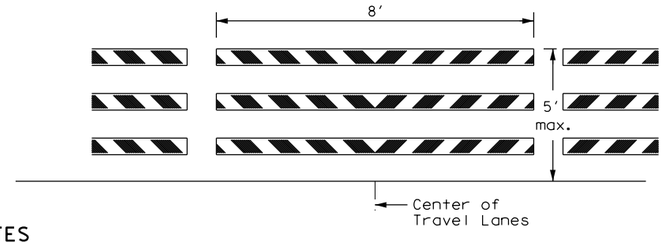
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

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

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

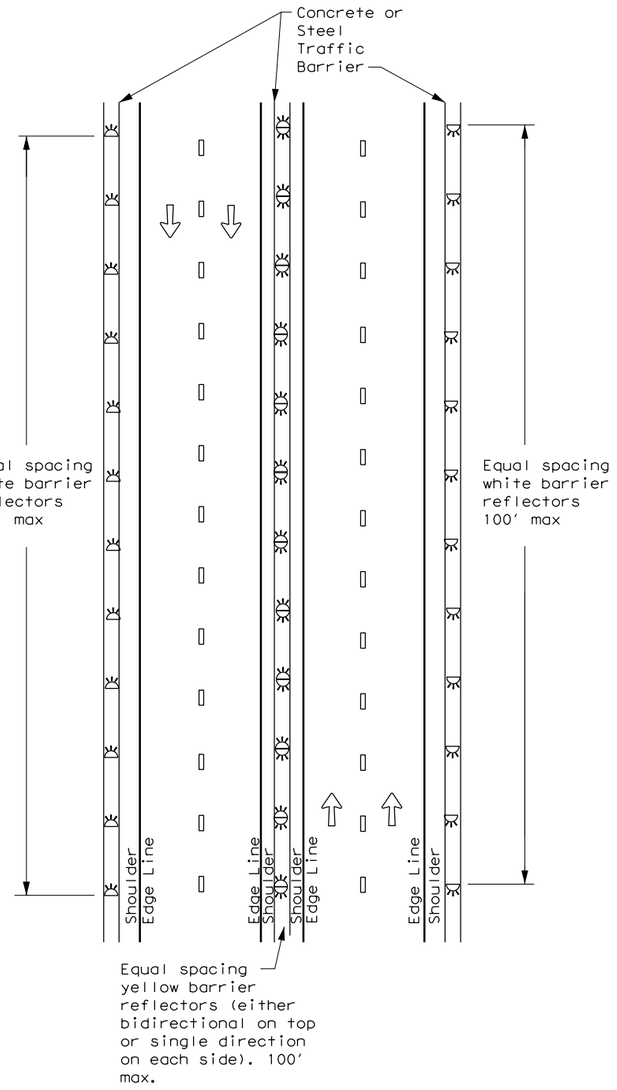
D & OM(4)-20

FILE: dom4-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
3-15	DIST	COUNTY		SHEET NO.
7-20	DAL	DENTON		240

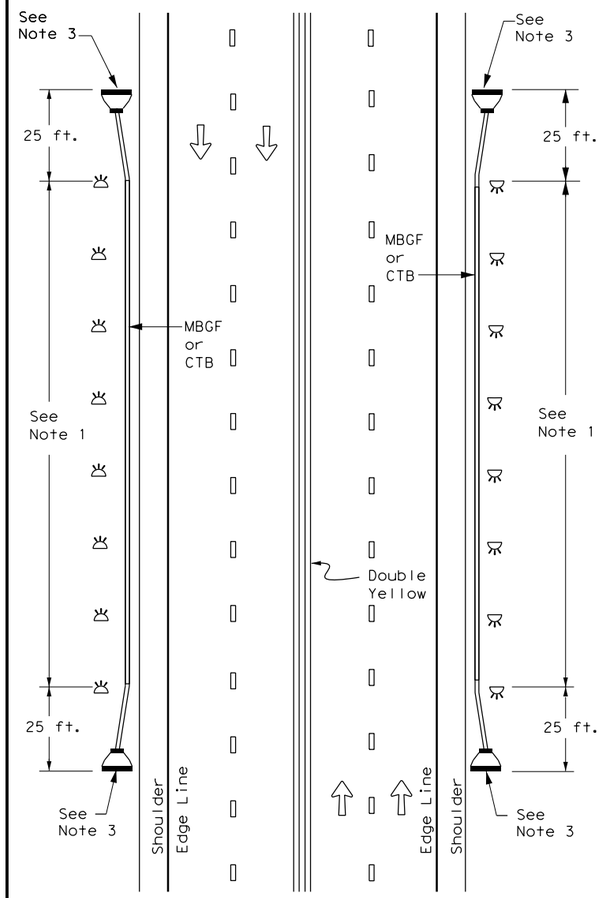
20D

DATE: 10/2/2023 8:37:53 PM
FILE: c:\pwworking\aecom_dsl6_na\janell.steigerwald@aecom.com\d0555323\dom6-20.dgn

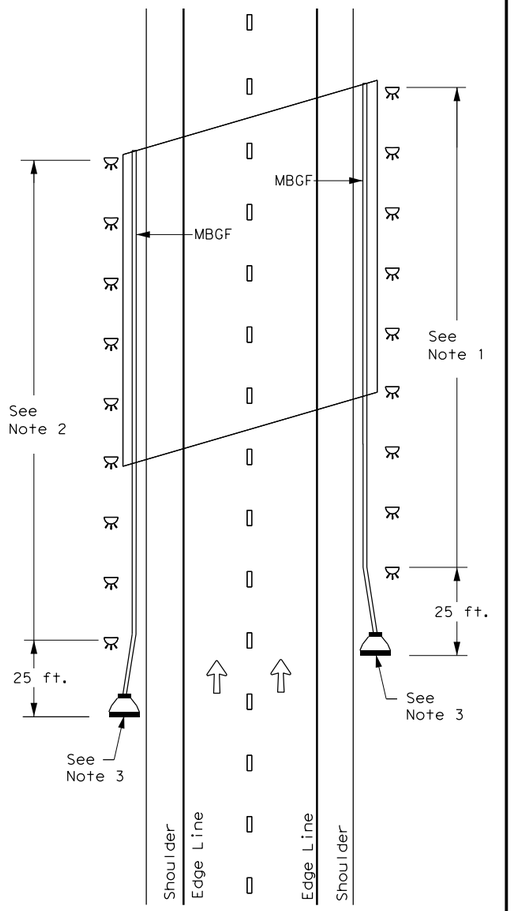
CONTINUOUS CONCRETE OR STEEL BARRIER



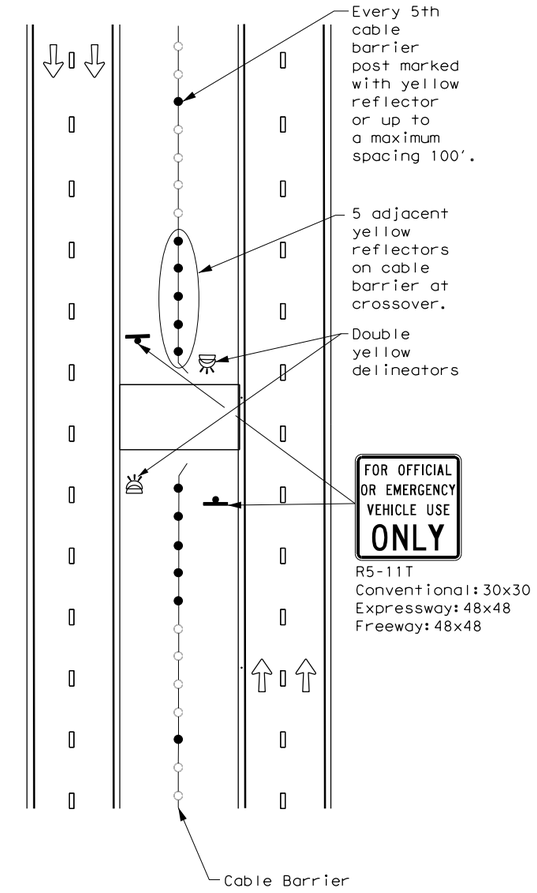
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

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

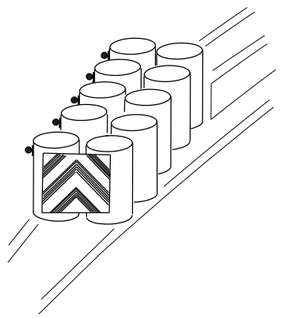
Texas Department of Transportation

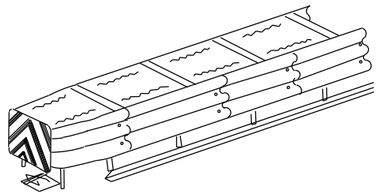
Traffic Safety Division Standard

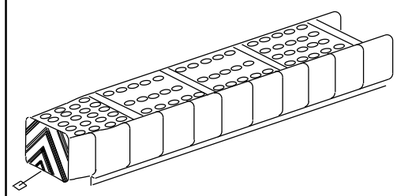
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

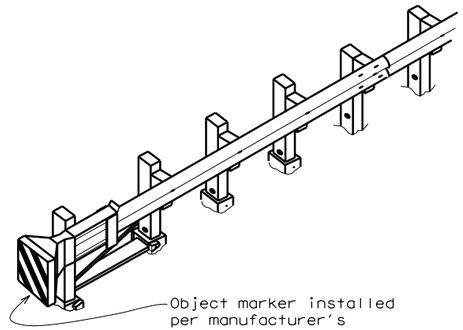
D & OM(6)-20

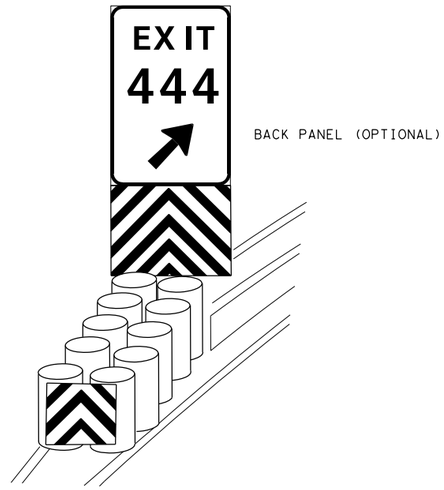
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
7-20	DIST	COUNTY		SHEET NO.
	DAL	DENTON		241

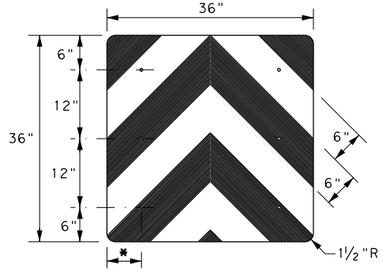


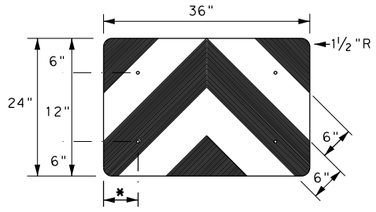




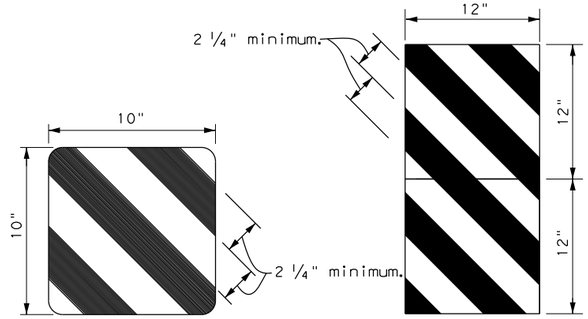




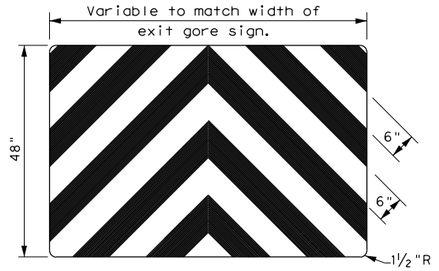


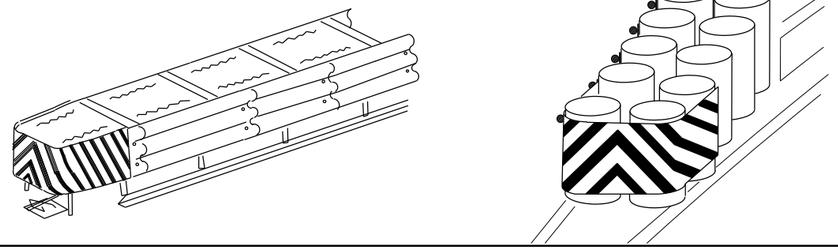


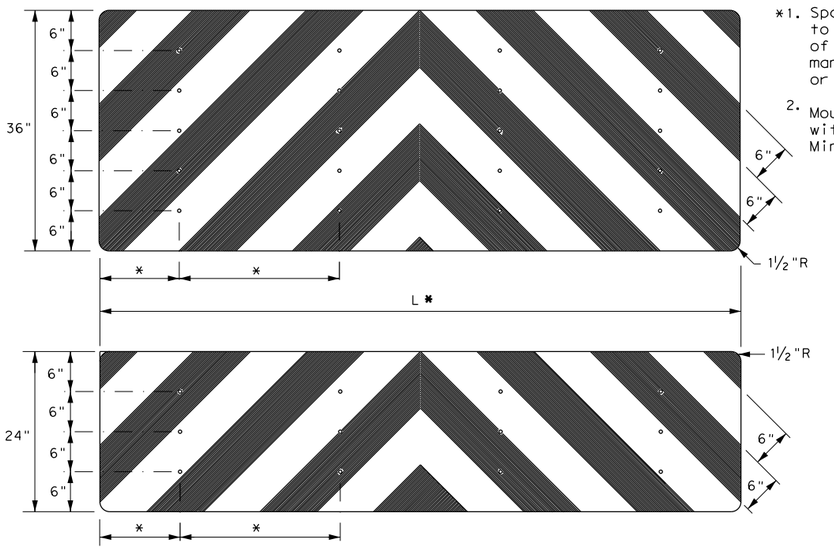
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer



OBJECT MARKERS SMALLER THAN 3 FT^2







NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	DAL	DENTON		242
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20G

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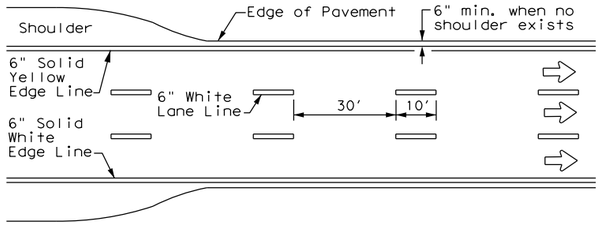
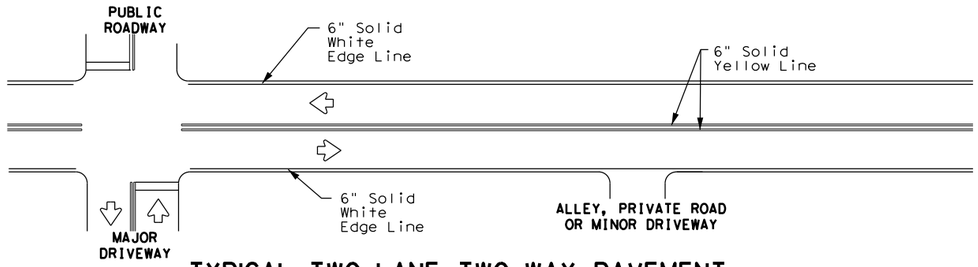
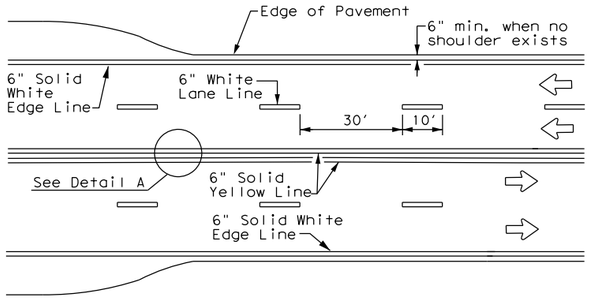
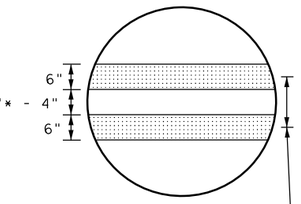


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





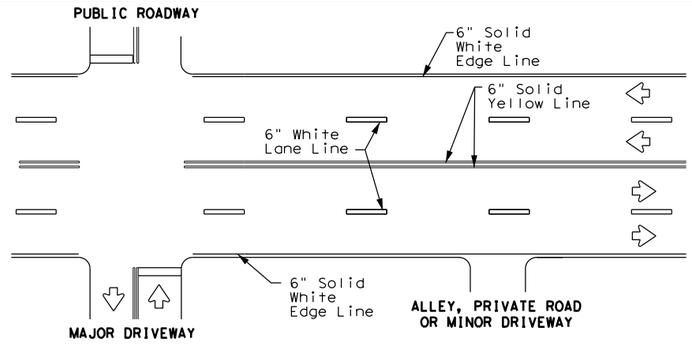
DETAIL "A"

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

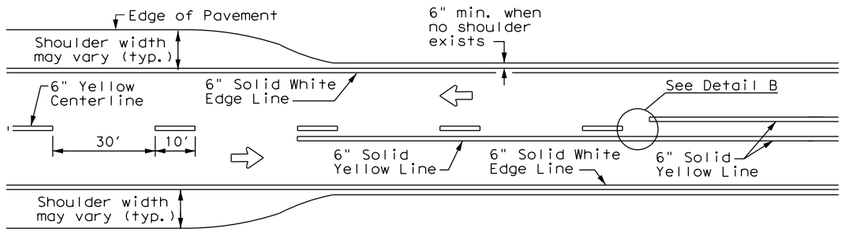
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

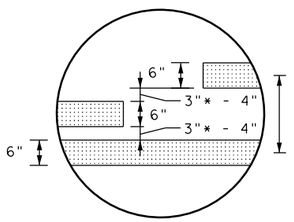
** 8" minimum for restripe projects when approved by the Engineer.



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



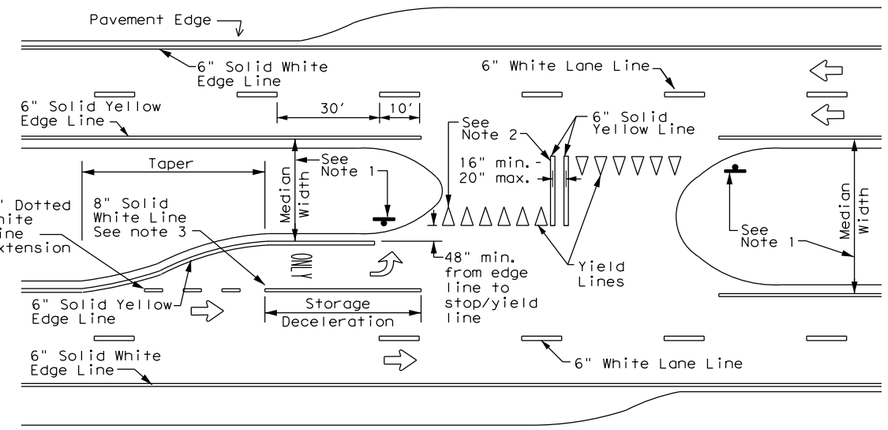
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



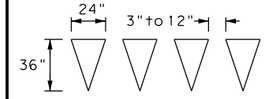
18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

DETAIL "B"

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

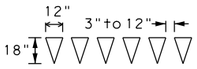


FOUR LANE DIVIDED ROADWAY CROSSOVERS



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.

NOTES

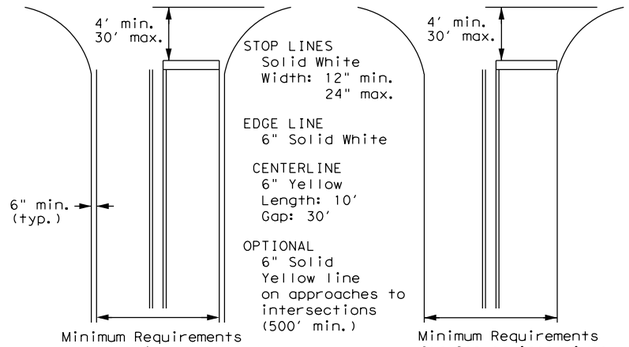
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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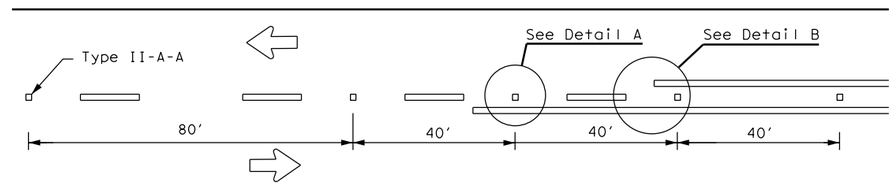
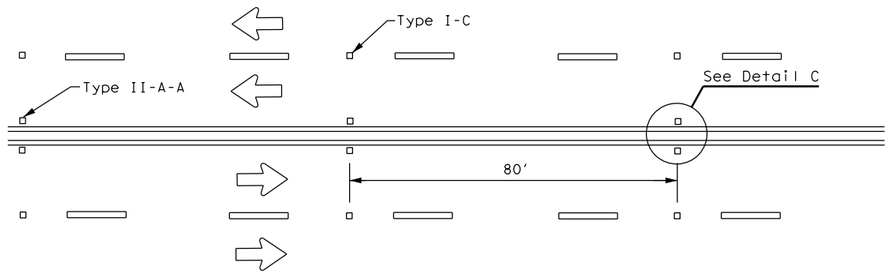
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	DAL	DENTON		243

22A

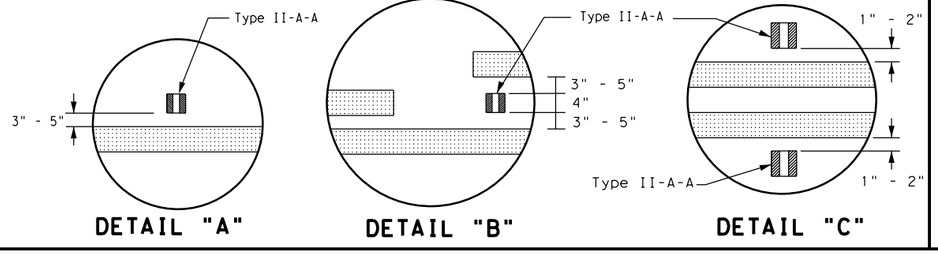
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

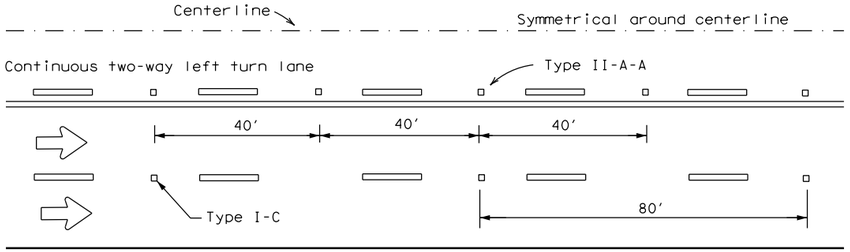


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

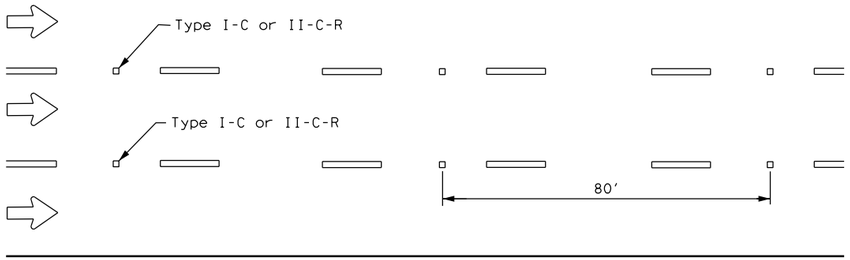


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



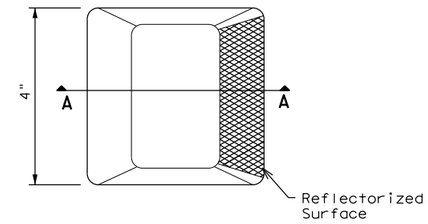
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

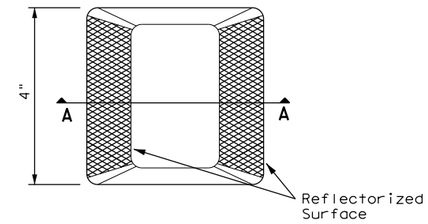
See Note 3.

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

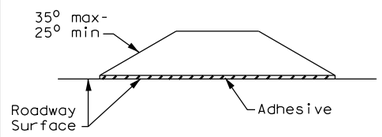
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

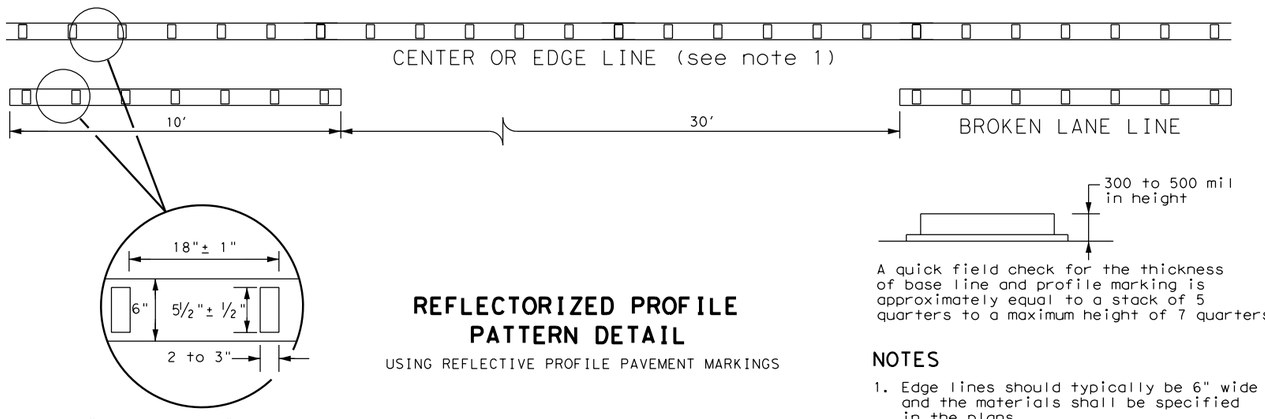


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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4-92 2-10 12-22	DAL	DENTON		244
5-00 2-12				

22B

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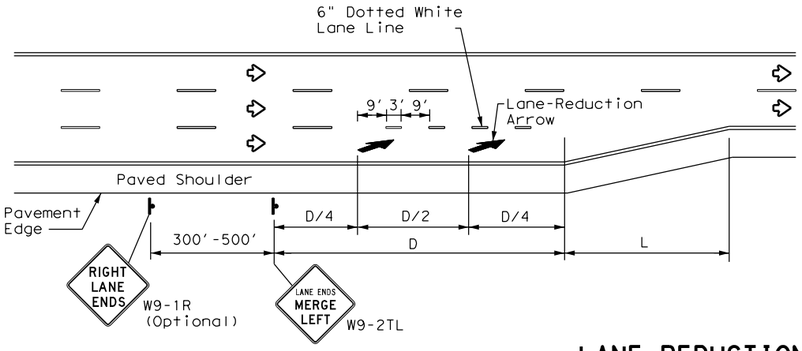
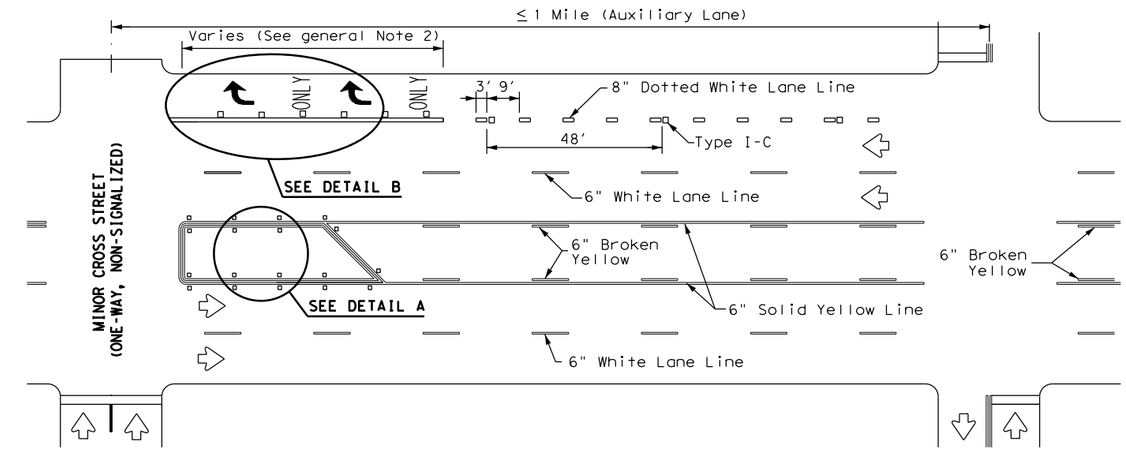


LANE REDUCTION

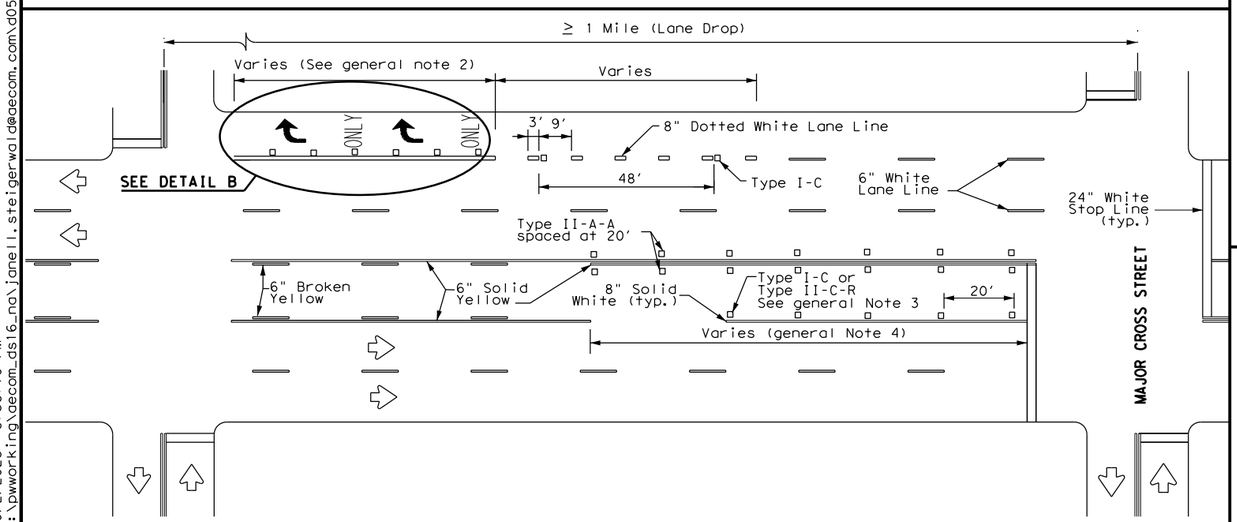
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

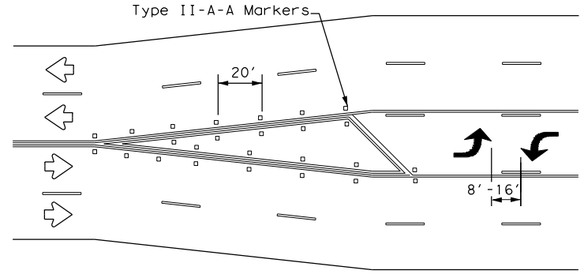
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

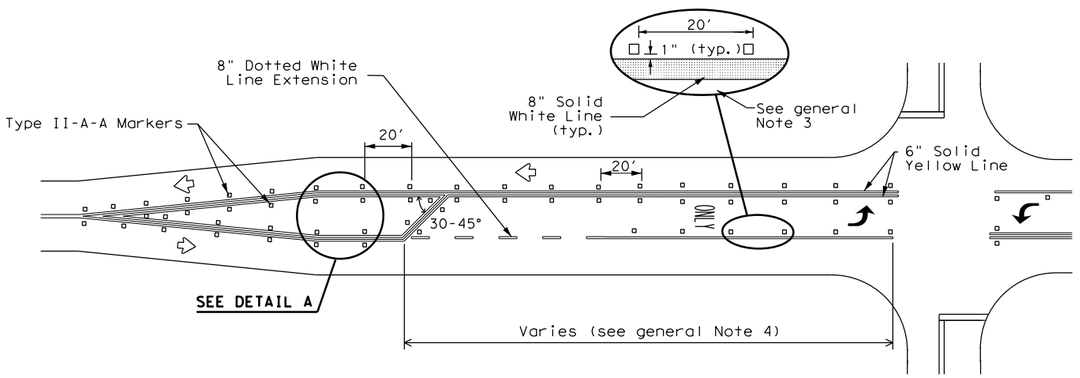
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

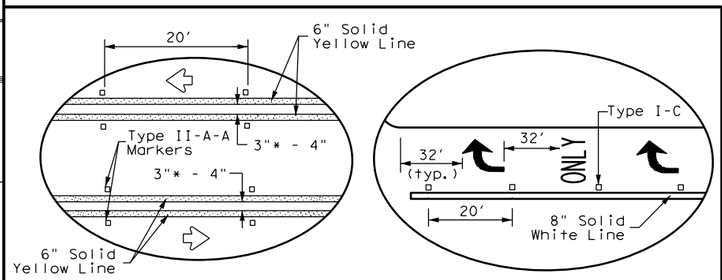
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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

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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		245

22C

DATE: 5/28/2024 6:04:30 AM
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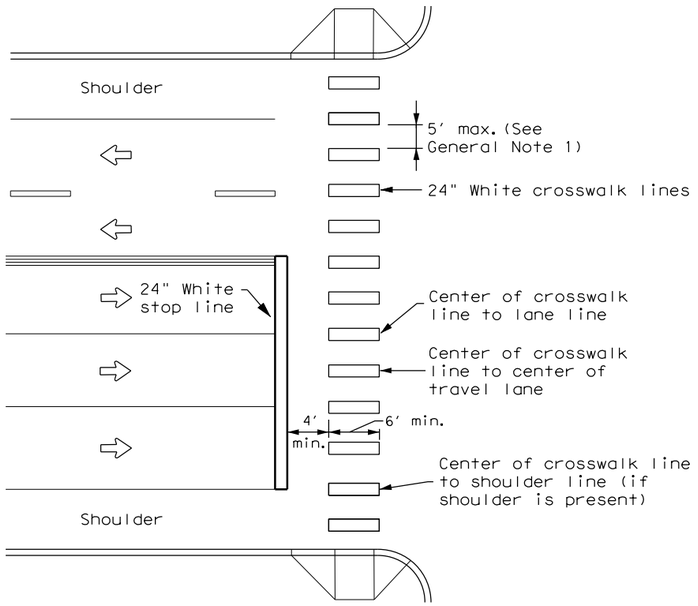


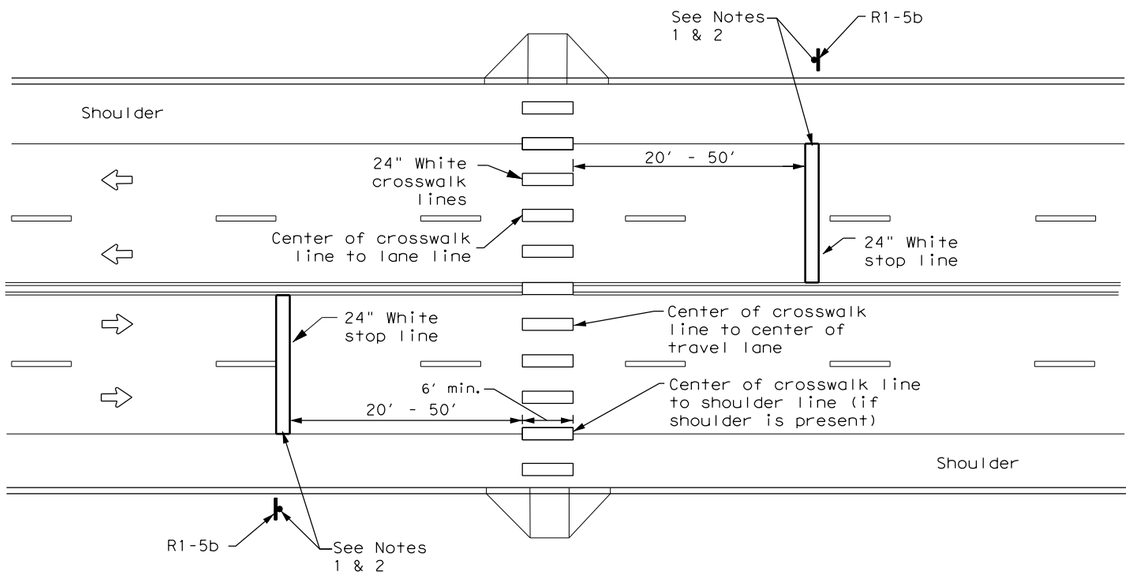
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6′ wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

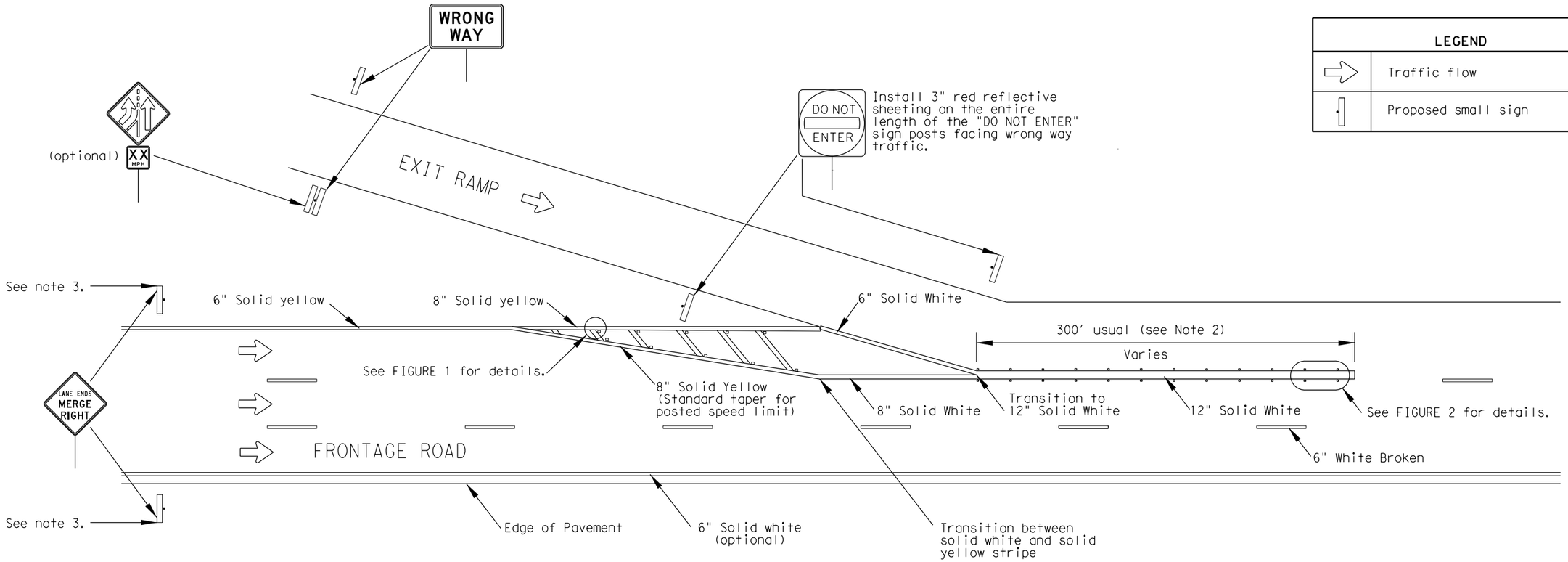
CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
6-20	DIST	COUNTY		SHEET NO.
6-22	DAL	DENTON		246
12-22				

22D

TYPICAL PAVEMENT MARKINGS
FREEWAY EXIT TO 3 LANE FRONTAGE RD.



LEGEND	
⇨	Traffic flow
▯	Proposed small sign

NOTES

1). FOR 2 LANE FRONTAGE ROADS, EXITING VOLUME VERSUS FRONTAGE ROAD VOLUME WITH A 2:1 RATIO SHALL HAVE THE SAME PAVEMENT MARKINGS. ALL OTHER CONDITIONS SHALL BE SIGNED AS A YIELD CONDITION.

2). LENGTH OF 12" WHITE LINE MAY VARY DEPENDING ON LOCATION.

3). REFER TO TMUTCD TABLE 2C-4 FOR ADVANCE WARNING SIGN PLACEMENT.

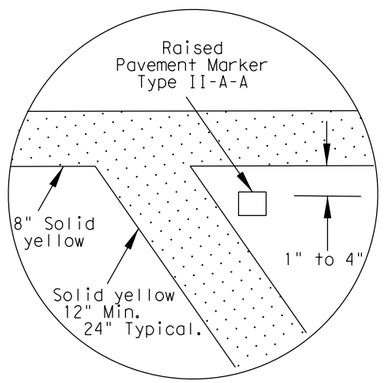


FIGURE 1

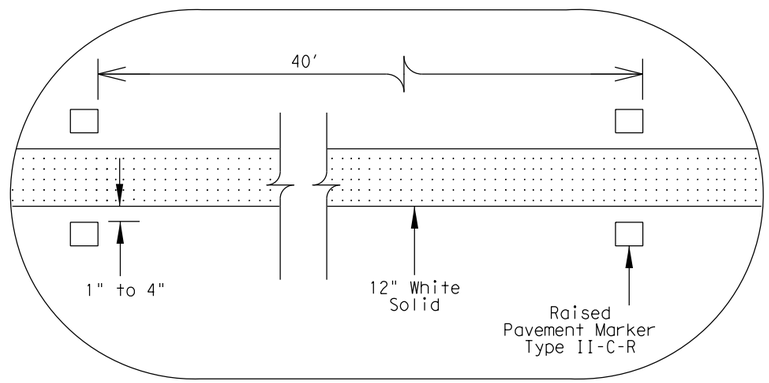


FIGURE 2

Texas Department of Transportation

PAVEMENT MARKINGS (EXIT TO FRONTAGE ROAD) DALLAS DISTRICT STANDARD

NOT TO SCALE

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MAA	6	(SEE TITLE SHEET)		IH 35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MAA	TEXAS	DALLAS	DENTON	247
CHECK	CONTROL	SECTION	JOB	
BLS	0195	03	088,etc.	
CHECK				
BA				

DATE: 10/2/2023 8:38:23 PM
FILE: c:\pwworking\aecom*ds16*na\janell.steigerwald@aecom.com\d0555323\smdgen.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

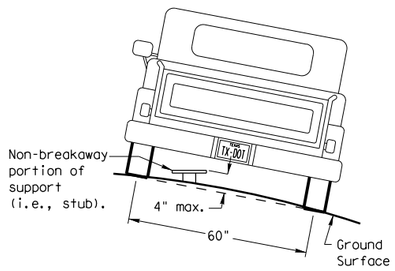
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

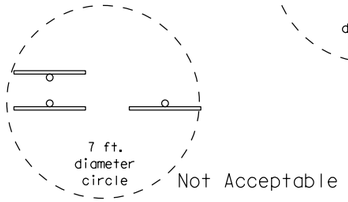
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

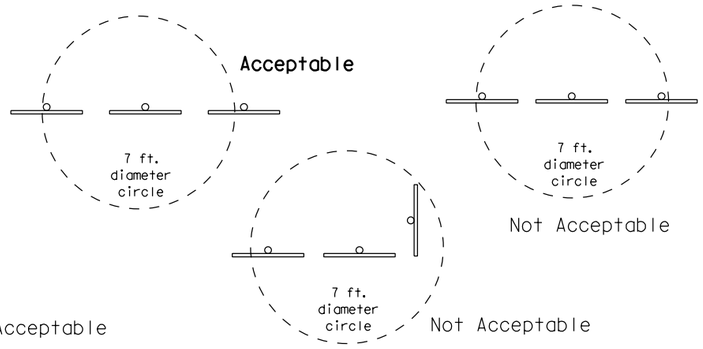
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

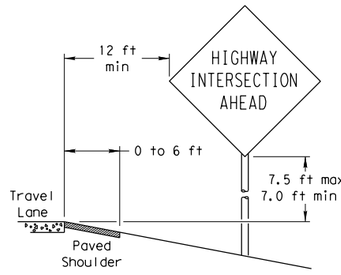
No more than 2 sign posts should be located within a 7 ft. circle.





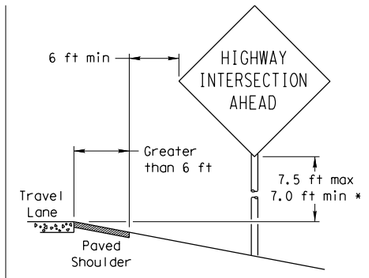
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

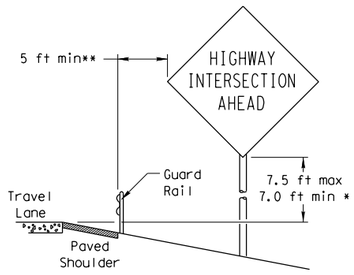
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



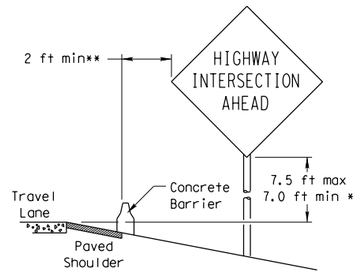
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



BEHIND GUARDRAIL

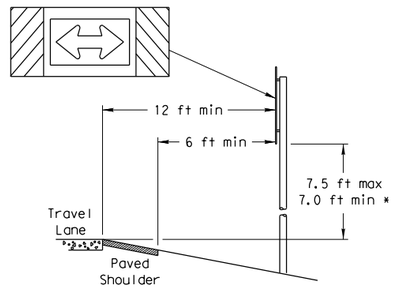


BEHIND CONCRETE BARRIER

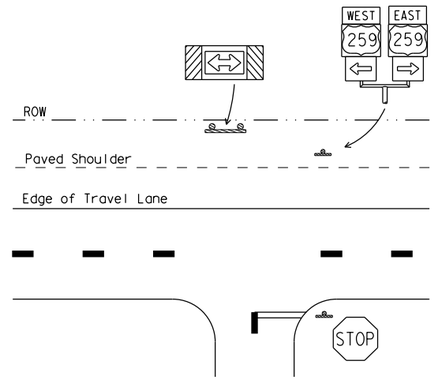
**BEHIND GUARDRAIL

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

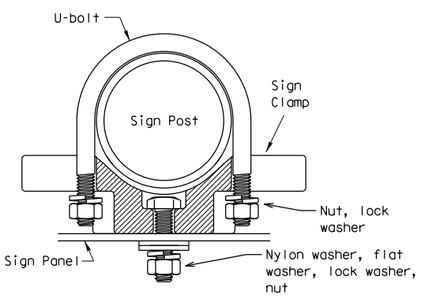
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

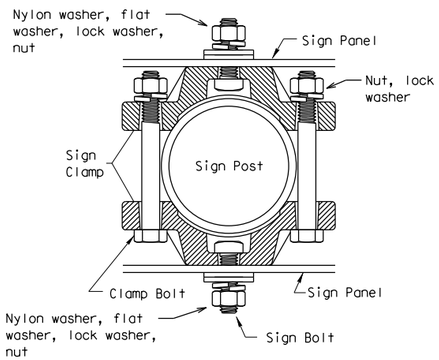


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

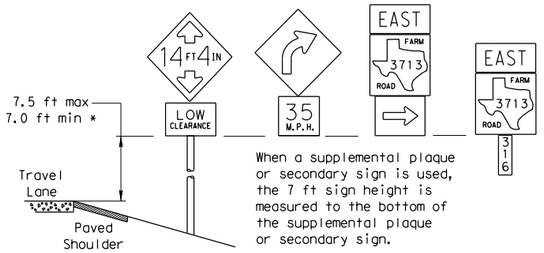
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



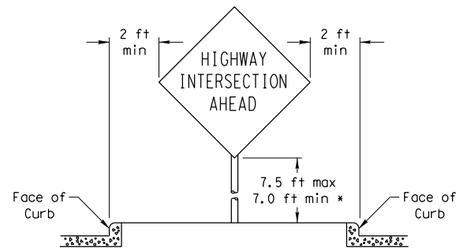
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



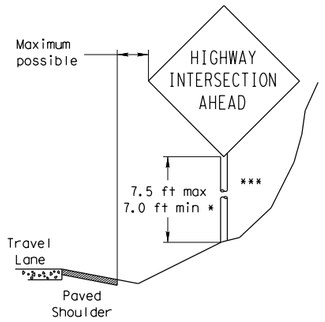
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

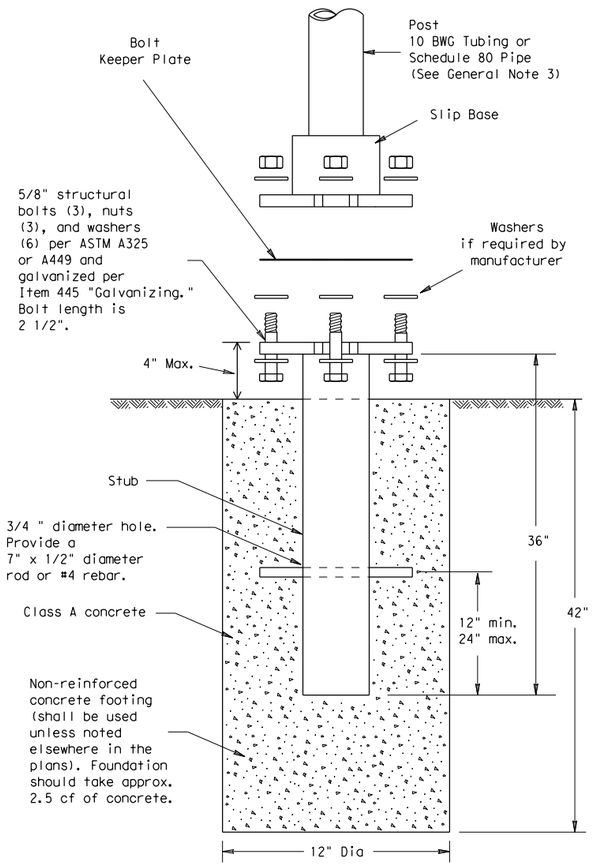
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0195	03	088,etc.	IH 35E

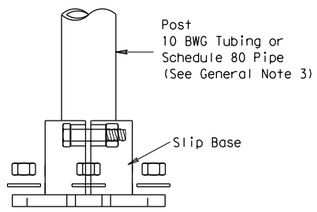
DIST	COUNTY	SHEET NO.
DAL	DENTON	248

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

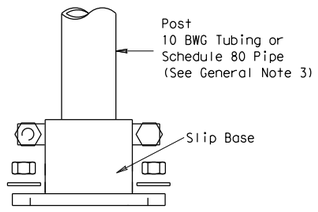


SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

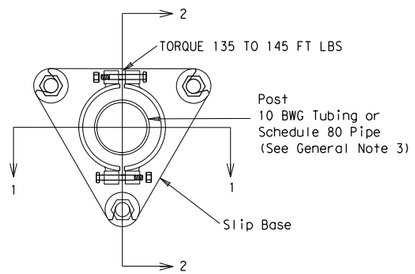
NOTE
The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.



SIDE VIEW 1-1



SIDE VIEW 2-2



TOP VIEW

DETAIL A

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is:
   http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

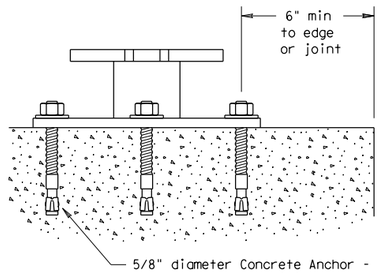
Foundation

1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

ADDED DETAIL A FOR CLAMP BASE

10-2010

Texas Department of Transportation
Dallas District Standard

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08(DAL)

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0195	03	088,etc.	IH 35E
12-10 (DISTRICT) ADDED CLAMP BASE DETAIL FOR SLIP BASE INSTALLATION	DIST	COUNTY		SHEET NO.
	DAL	DENTON		249

26B

DATE:
FILE:

DATE: 10/2/2023 8:38:31 PM
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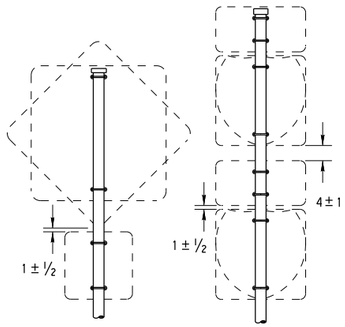
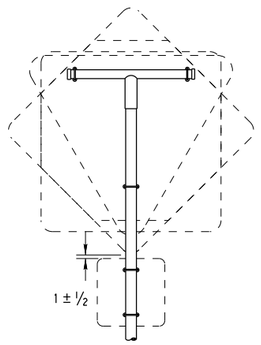


SM RD SGN ASSM TY XXXXX(1)XX(P)



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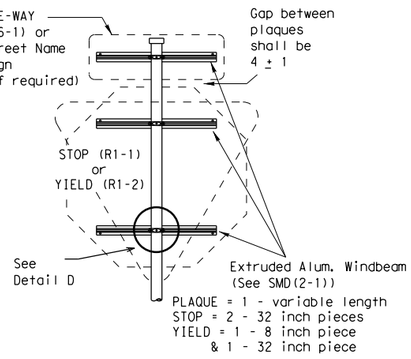

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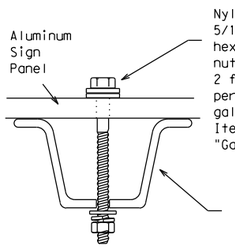
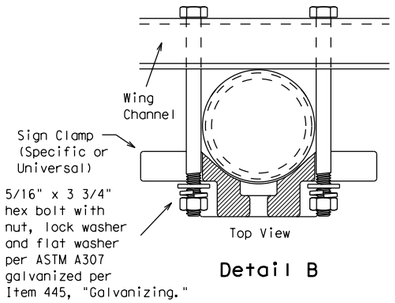


Detail A



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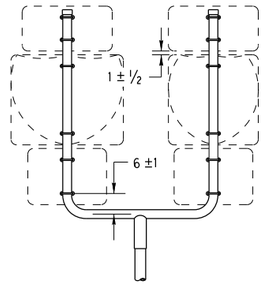

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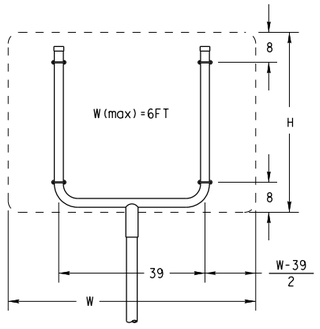

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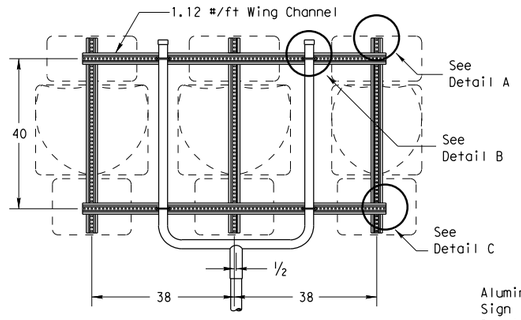
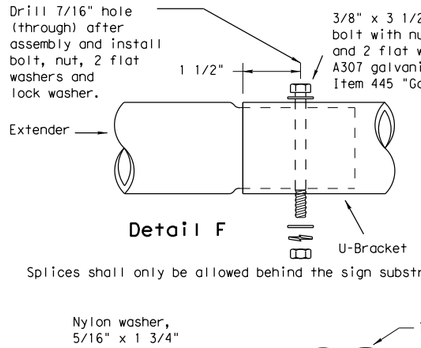
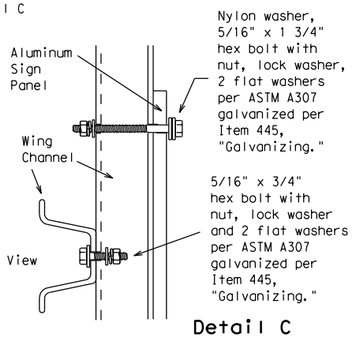


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

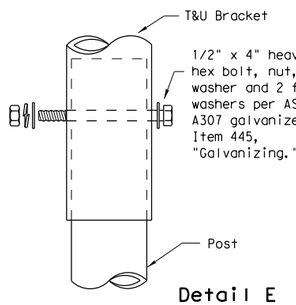


Detail F

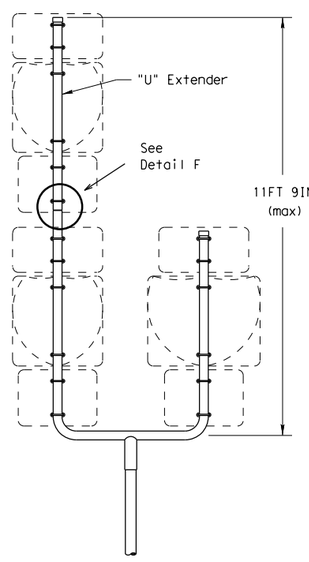
Splices shall only be allowed behind the sign substrate.



Detail C



Detail E



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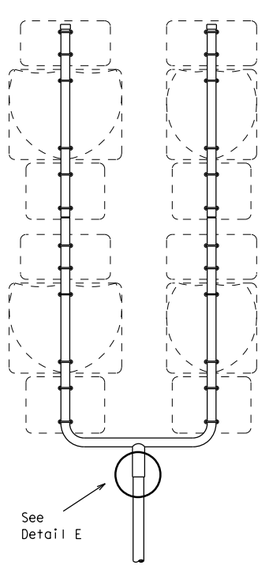

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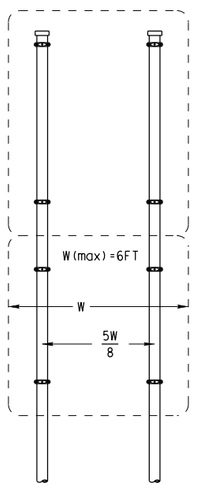
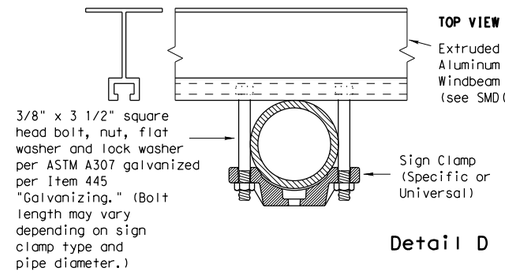
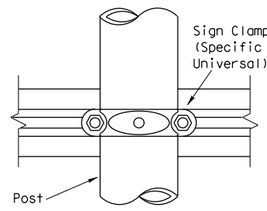


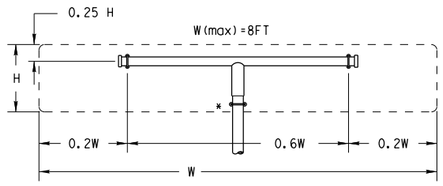
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

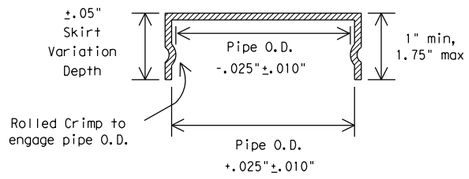




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		250

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

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

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.
List adjacent MS 4 Operator(s) that receive discharges from this project. They need to be notified prior to construction activities.
(Note: Leave blank only if no adjacent MS 4 Operator(s) are affected.)

1. Denton County Phase II MS4 - Contact Stephen Belknap

☐ No Action Required ☒ Required Action

Action Number:

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas. No equipment is allowed in any sream channel below the ordinary High Water Mark except on approved temporary stream crossings or drill pads.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# 3(a)

Required Actions: List Waters of the US Permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices for applicable 401 General Conditions:
(Note: If CORP Permit not required, do not check boxes.)

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action Number:

1.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751 & 752 in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action Number:

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

☐ No Action Required ☒ Required Action

1. The following species could occur in the project area: Monarch butterfly, American bumblebee, tricolored bat, eastern spotted skunk, swamp rabbit, slender glass lizard, Texas garter snake, and timber (canebrake) rattlesnake.

2. Follow the special note on the EPIC sheet and the BMPs listed below to protect these species. Contractor to implement the following BMPs from Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources available at https://ftp.txdot.gov/pub/txdot-info/env/toolkit/300-01-bmp.pdf.

a. Section 1.2 Vegetation BMP
b. Section 2.4.4 Insect Pollinator BMP
c. Section 2.5.3 Bat BMP
d. Section 2.6.2 Terrestrial Amphibian and Reptile BMP

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.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canisters, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation(s) or replacement(s) (bridge class structures not including box culverts)?
☒ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?
☒ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☒ Required Action

Action Number:
Abatement of ACMs and/or LBP will be required prior to repair/renovation on the following bridges: LBP on metal bridge rails - No abatement required - Contractor can unbolt segmented sections.

1. IH 35E NBFR over UP RAILROAD (NBI 18-061-0-0195-03-087) at STA 2928+36.00: ACM (10% chrysotile) gray expansion joint. Olive & Gray Paint LBP (119,000 ppm)on metal guardrails.
2. IH 35E SBFR over UP RAILROAD (NBI 18-061-0-0195-03-084) at STA 3926+74.00: ACM (10% chrysotile) gray expansion joint. Olive & Gray Paint LBP (109,000 ppm)on metal guardrails.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

GENERAL NOTE:

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

LAST REVISION: 1/15/15

 Texas Department of Transportation
Dallas District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC) - Sheet 1 of 1

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		IH 35E
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	DENTON	
CONTROL	SECTION	JOB	SHEET NO.
0195	03	088, ETC.	251

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

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

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

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

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0195-03-088, etc.

1.2 PROJECT LIMITS:

From: IH 35E NBFR at UPRR & IH 35E SBFR at UPRR

To:

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 33.19621° (N) 33.19528° (N) ,(Long) 97.13446° (W) 97.13350° (W)

END: (Lat) 33.19668° (N) 33.19613° (N) ,(Long) 97.13811° (W) 97.13935° (W)

1.4 TOTAL PROJECT AREA (Acres): 9.46

1.5 TOTAL AREA TO BE DISTURBED (Acres): 8.90

1.6 NATURE OF CONSTRUCTION ACTIVITY:
Construction of bridge replacement consisting of replacing bridges and approaches.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Birome-Rayex 2 to 12% slopes	Urban land complex, 40% clay, well drained, and high rate of runoff.
Birome, 1 to 5% slopes	Urban land complex, 46% clay, well drained, and medium rate of runoff
Arents, 10 to 30% slopes	Hilly, well drained, low rate of runoff, and occasionally flooded.
Land Cover Developed & Urban	Mostly lawn grasses with less than 20% impervious surfaces. Minimal grass/herbaceous cover with less than 10% trees and less than 20% shrubs.

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:

- [x] PSLs determined during preconstruction meeting
- [ ] PSLs determined during construction
- [ ] No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

- [x] Mobilization
- [x] Install sediment and erosion controls
- [x] Blade existing topsoil into windrows, prep ROW, clear and grub
- [x] Remove existing pavement
- [x] Grading operations, excavation, and embankment
- [x] Excavate and prepare subgrade for proposed pavement widening
- [ ] Remove existing culverts, safety end treatments (SETs)
- [x] Remove existing metal beam guard fence (MBGF), bridge rail
- [x] Install proposed pavement per plans
- [x] Install culverts, culvert extensions, SETs
- [x] Install mow strip, MBGF, bridge rail
- [ ] Place flex base
- [x] Rework slopes, grade ditches
- [ ] Blade windrowed material back across slopes
- [x] Revegetation of unpaved areas
- [x] Achieve site stabilization and remove sediment and erosion control measures
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- [x] Sediment laden stormwater from stormwater conveyance over disturbed area
- [x] Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- [x] Solvents, paints, adhesives, etc. from various construction activities
- [x] Transported soils from offsite vehicle tracking
- [x] Construction debris and waste from various construction activities
- [x] Contaminated water from excavation or dewatering pump-out water
- [x] Sanitary waste from onsite restroom facilities
- [x] Trash from various construction activities/receptacles
- [ ] Long-term stockpiles of material and waste
- [x] Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities.
- [ ] 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
Drainage to MS4	Flows to tributaries to Hickory Creek, then Lewisville Lake (segment 0823); no water quality impairments

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

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

MS4 Entity
City of Denton MS4 Phase II Contract - Stephen Belknap

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER
6/9/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	(SEE TITLE SHEET)		252
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	DENTON	
CONT.	SECT.	JOB	HIGHWAY NO.
0195	03	088, ETC.	IH 35E

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [x] [x] Protection of Existing Vegetation
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [x] [ ] Temporary Seeding
- [ ] [x] Permanent Planting, Sodding or Seeding
- [x] [ ] Biodegradable Erosion Control Logs
- [x] [ ] Rock Filter Dams/ Rock Check Dams
- [x] [ ] Vertical Tracking
- [ ] [ ] Interceptor Swale
- [ ] [x] Riprap
- [ ] [ ] Diversion Dike
- [ ] [ ] Temporary Pipe Slope Drain
- [ ] [ ] Embankment for Erosion Control
- [ ] [ ] Paved Flumes
- [ ] [x] Other: Preservation of natural resources
- [ ] [x] Other: Compost manufactured topsoil
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- [x] [ ] Biodegradable Erosion Control Logs
- [x] [ ] Dewatering Controls
- [x] [ ] Inlet Protection
- [x] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [x] [ ] Sediment Control Fence
- [x] [ ] Stabilized Construction Exit
- [ ] [ ] Floating Turbidity Barrier
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Vegetated Filter Strips
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

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

T / P

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

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
No permanent controls are planned.		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- [x] Excess dirt/mud on road removed daily
- [ ] Haul roads dampened for dust control
- [x] Loaded haul trucks to be covered with tarpaulin
- [x] Stabilized construction exit
- [ ] Daily street sweeping
- [x] Other: Dampen areas of disturbed soil as needed for dust control.
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [x] Chemical Management
- [x] Concrete and Materials Waste Management
- [x] Debris and Trash Management
- [x] Dust Control
- [x] Sanitary Facilities
- [x] Other: Avoid storing portable sanitary units, concrete washouts or chemicals within 50 feet upgradient of a receiving water or drainage conveyance without adequate pollution controls.
- [x] Other: Capture saw-cutting debris and slurry for proper disposal.
- [x] Other: Maintain paved surfaces and adjacent properties free of project sedimentation and loose materials.
- [ ] Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To
None planned. (No surface waters or native vegetation/habitat areas within or adjacent to project ROW.)		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [x] Fire hydrant flushings
- [x] Irrigation drainage
- [x] Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- [x] Potable water sources
- [x] Springs
- [x] Uncontaminated groundwater
- [x] Water used to wash vehicles or control dust
- [x] Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

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

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED
PROFESSIONAL ENGINEER
6/9/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

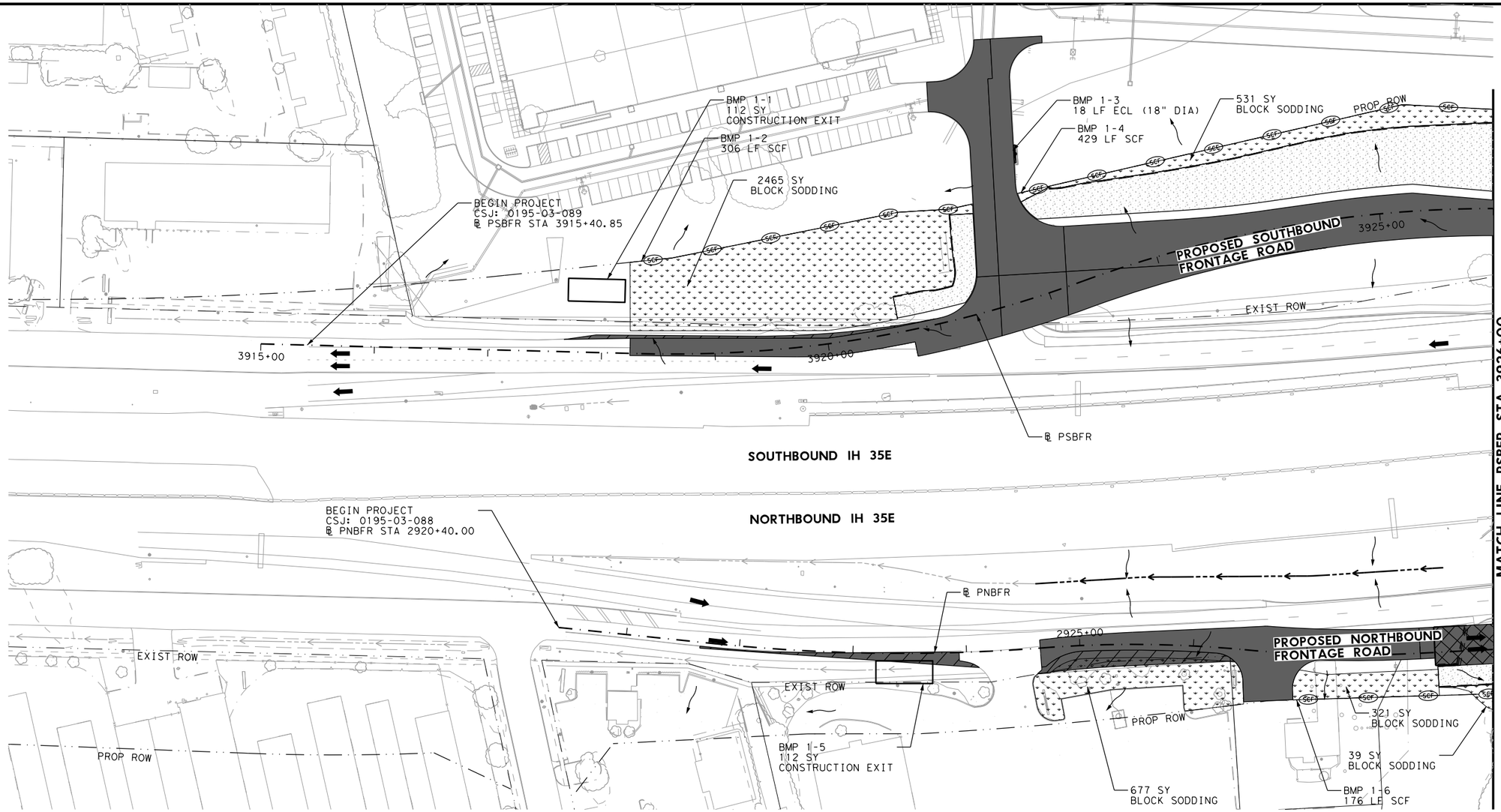
July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	(SEE TITLE SHEET)	253

STATE	STATE DIST.	COUNTY	
TEXAS	DAL	DENTON	
CONT.	SECT.	JOB	HIGHWAY NO.
0195	03	088, ETC.	IH 35E

DN: AECOM CK: AECOM DN: AECOM CK: AECOM diana.cabrera



N

0′ 50′ 100′

SCALE IN FEET

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- ECL — EROSION CONTROL LOG DAM (18")
- PERM SEEDING
- BLOCK SODDING
- PROPOSED CONCRETE RIPRAP
- PROPOSED DITCH
- EXISTING DITCH
- FLOW ARROW
- PERM PAVEMENT CONSTRUCTION IN THIS PHASE
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS PHASE
- BRIDGE CONSTRUCTION IN THIS PHASE
- BRIDGE CONSTRUCTION IN PREVIOUS PHASE

DISTURBED DATE:_____

STABILIZED DATE:_____

STATE OF TEXAS
SEAN K. YOUNG
96504
LICENSED PROFESSIONAL ENGINEER

6/17/2024

BMP ID	INSTALL DATE	REMOVAL DATE
BMP 1-1		
BMP 1-2		
BMP 1-3		
BMP 1-4		
BMP 1-5		
BMP 1-6		

NOTES:

1. BMPs SHALL BE INSTALLED NO SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBANCE OR POTENTIAL POLLUTANT-GENERATING ACTIVITIES IN THEIR CONTROL AREA, AND SHALL REMAIN IN PLACE UNTIL RE-VEGETATION HAS BEEN ESTABLISHED IN THEIR CONTROL AREA OR AS OTHERWISE DIRECTED BY ENGINEER.
2. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE, AND REMOVAL SHALL BE IN ACCORDANCE WITH TxDOT STANDARDS FOR EROSION CONTROL.
3. BMP LOCATIONS MAY BE ADJUSTED AS NEEDED AND AUTHORIZED BY ENGINEER.
4. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.

AECOM
AECOM Technical Services Inc.
13355 NOEL RD, STE 400
DALLAS, TEXAS 75240
214.741.7777 TBPE REG #3580

Texas Department of Transportation

IH 35E
SW3P SITE MAP

PHASE 1

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	254
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088, ETC	
CHECK				
AEC				

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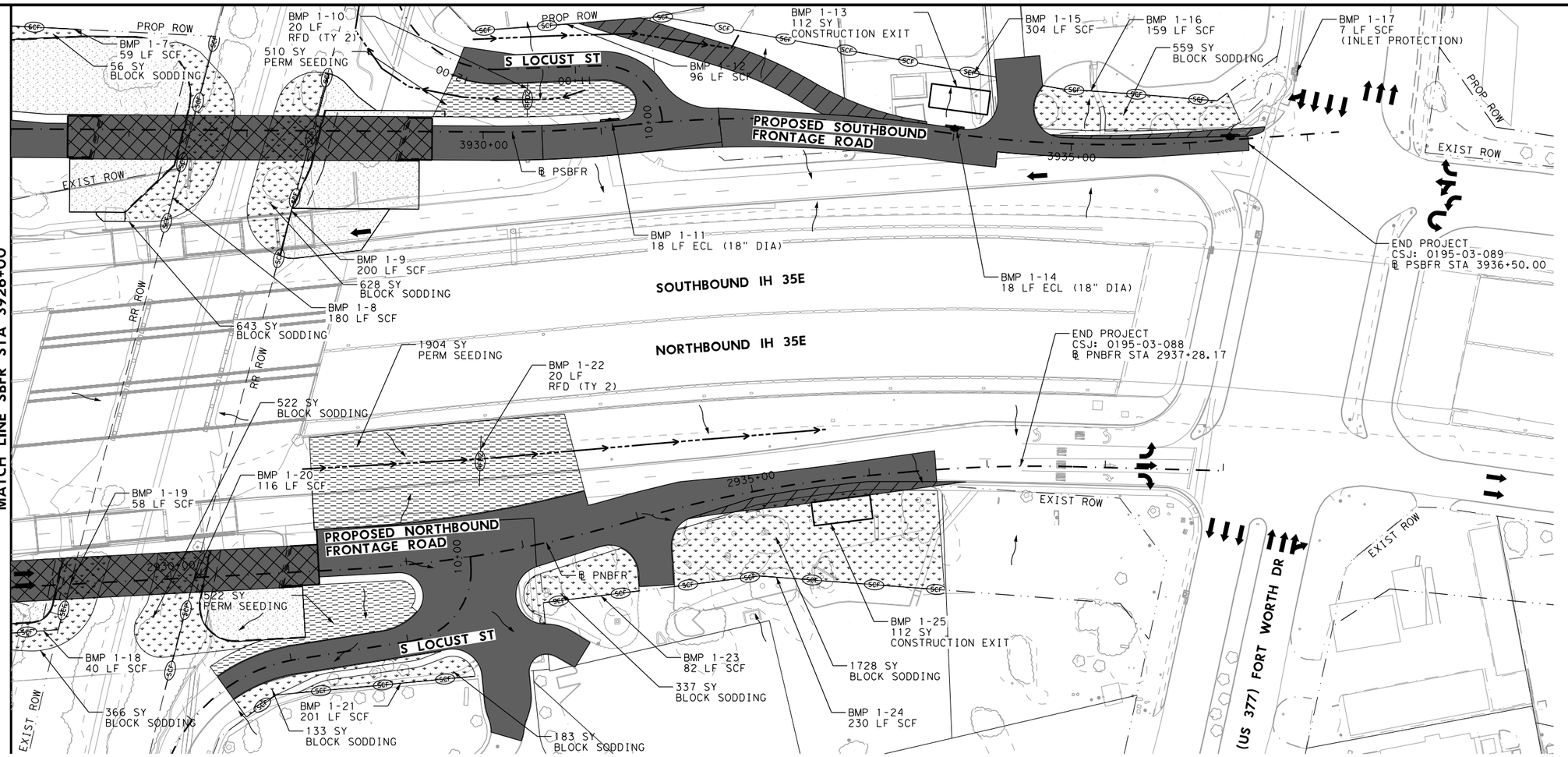

BMP ID	INSTALL DATE	REMOVAL DATE
BMP 1-7		
BMP 1-8		
BMP 1-9		
BMP 1-10		
BMP 1-11		
BMP 1-12		
BMP 1-13		
BMP 1-14		
BMP 1-15		
BMP 1-16		
BMP 1-17		
BMP 1-18		
BMP 1-19		
BMP 1-20		
BMP 1-21		
BMP 1-22		
BMP 1-23		
BMP 1-24		
BMP 1-25		

NOTES:

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STATE OF TEXAS
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PROFESSIONAL ENGINEER
6/17/2024

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IH 35E
SW3P SITE MAP

PHASE 1

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	255
CHECK AEC	CONTROL 0195	SECTION 03	JOB 088,ETC	

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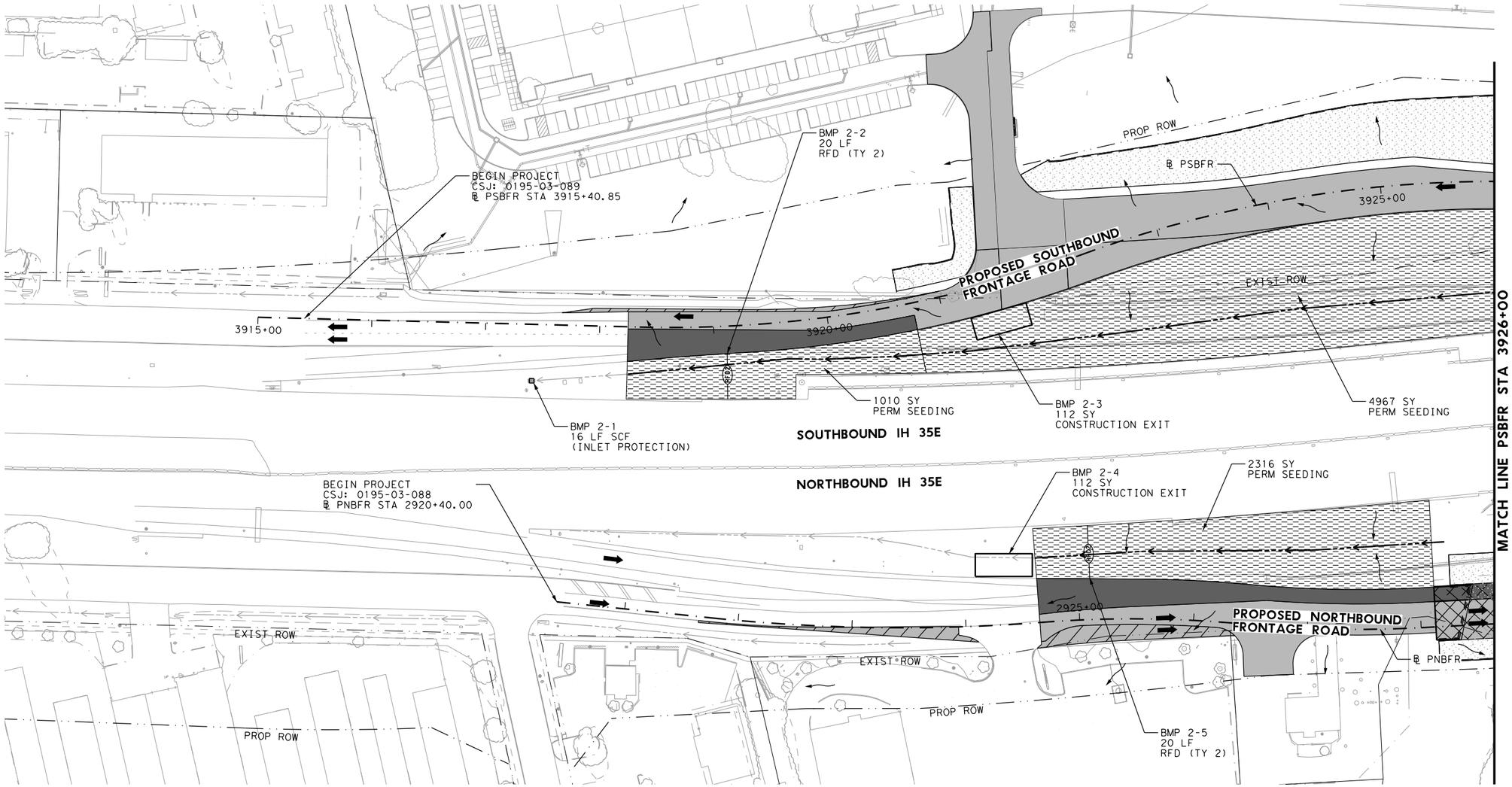
DN: AECOM CK: AECOM DM: AECOM CK: AECOM diana.cabrera

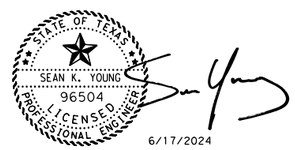


LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- ECL — EROSION CONTROL LOG DAM (18")
- PERM SEEDING
- BLOCK SODDING
- PROPOSED CONCRETE RIPRAP
- PROPOSED DITCH
- EXISTING DITCH
- FLOW ARROW
- PERM PAVEMENT CONSTRUCTION IN THIS PHASE
- PERM PAVEMENT CONSTRUCTED IN PREVIOUS PHASE
- BRIDGE CONSTRUCTION IN THIS PHASE
- BRIDGE CONSTRUCTION IN PREVIOUS PHASE

DISTURBED DATE:_____

STABILIZED DATE:_____



BMP ID	INSTALL DATE	REMOVAL DATE
BMP 2-1		
BMP 2-2		
BMP 2-3		
BMP 2-4		
BMP 2-5		

NOTES:

1. BMPs SHALL BE INSTALLED NO SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBANCE OR POTENTIAL POLLUTANT-GENERATING ACTIVITIES IN THEIR CONTROL AREA, AND SHALL REMAIN IN PLACE UNTIL RE-VEGETATION HAS BEEN ESTABLISHED IN THEIR CONTROL AREA OR AS OTHERWISE DIRECTED BY ENGINEER.
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3. BMP LOCATIONS MAY BE ADJUSTED AS NEEDED AND AUTHORIZED BY ENGINEER.
4. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.

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Texas Department of Transportation

IH 35E

SW3P SITE MAP

PHASE 2

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AEC	TEXAS	DALLAS	DENTON	256
CHECK	CONTROL	SECTION	JOB	
AEC	0195	03	088,ETC	
CHECK				
AEC				

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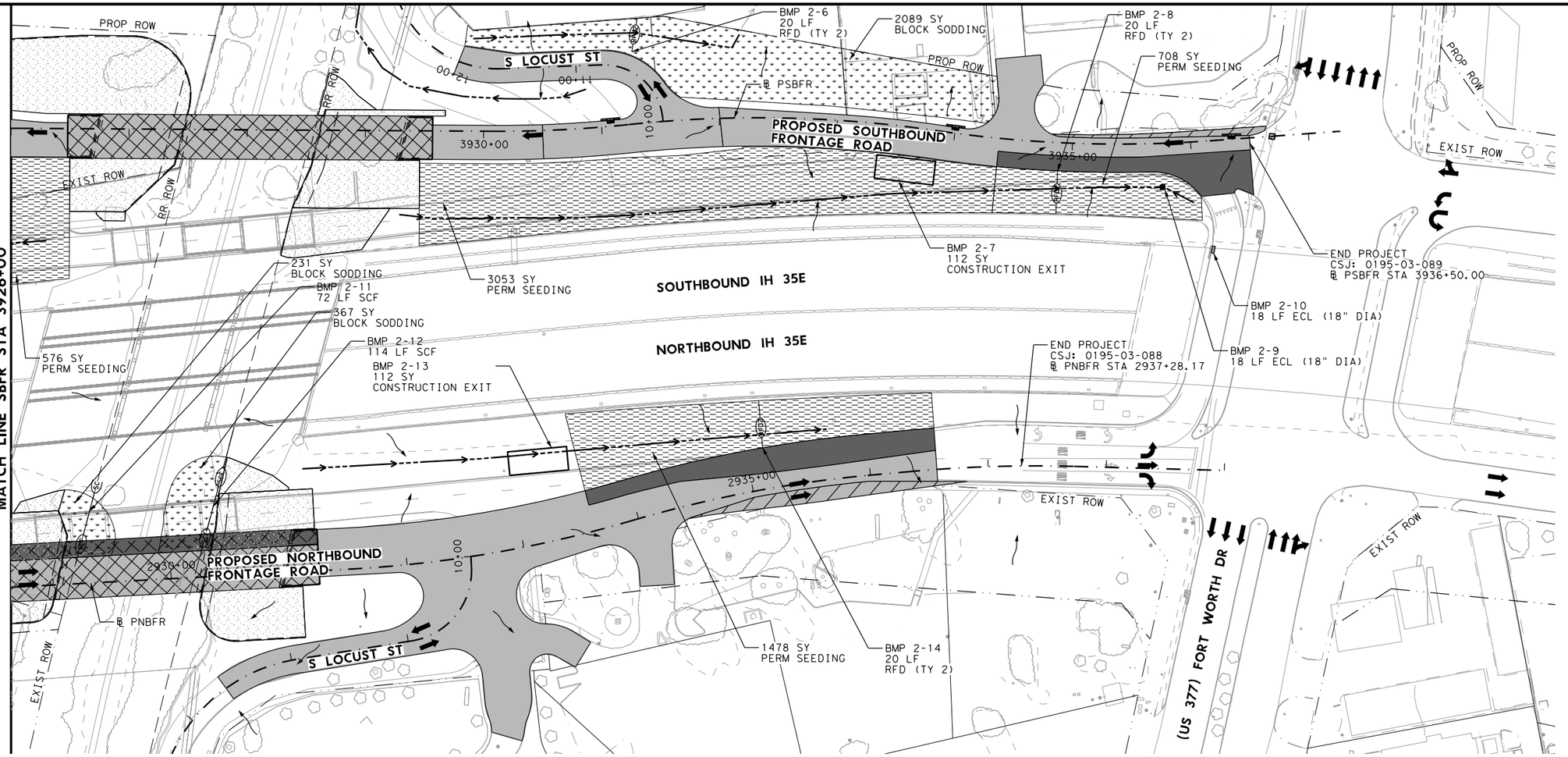

DISTURBED DATE:_____

STABILIZED DATE:_____

BMP ID	INSTALL DATE	REMOVAL DATE
BMP 2-6		
BMP 2-7		
BMP 2-8		
BMP 2-9		
BMP 2-10		
BMP 2-11		
BMP 2-12		
BMP 2-13		
BMP 2-14		

NOTES:

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STATE OF TEXAS
SEAN K. YOUNG
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LICENSED PROFESSIONAL ENGINEER
6/17/2024

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AECOM Technical Services Inc.
13355 NOEL RD, STE 400
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IH 35E
SW3P SITE MAP

PHASE 2

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AEC	6	(SEE TITLE SHEET)		IH35E
GRAPHICS AEC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AEC	TEXAS	DALLAS	DENTON	257
CHECK AEC	CONTROL 0195	SECTION 03	JOB 088,ETC	

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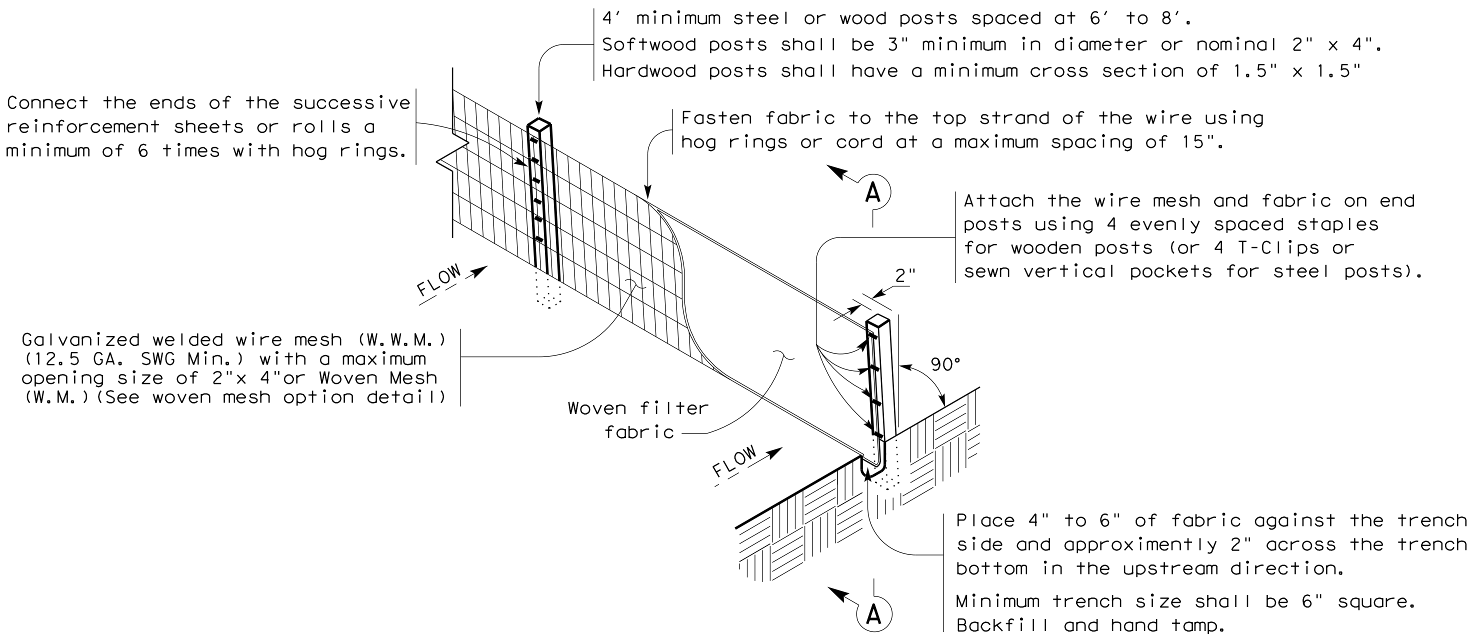
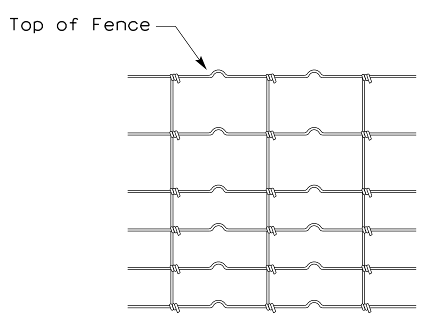


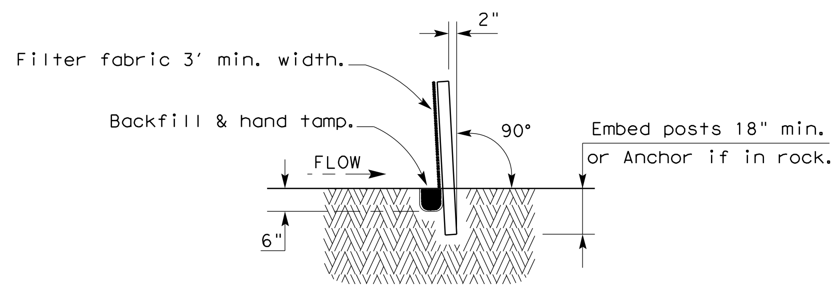
TEMPORARY SEDIMENT CONTROL FENCE

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.

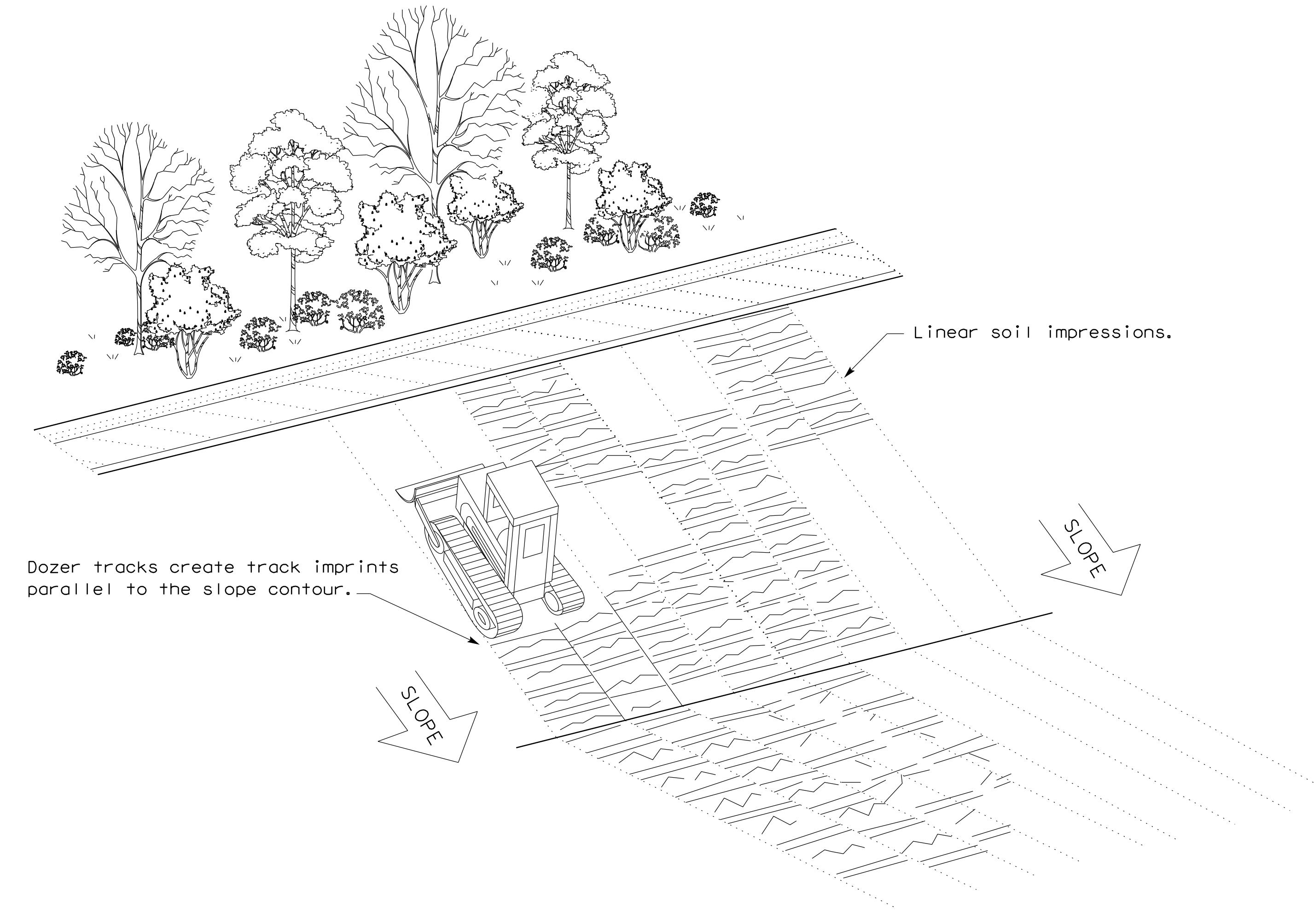
LEGEND

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 0195	SECT 03	JOB 088,etc.	HIGHWAY IH 35E
REVISIONS	DIST DAL	COUNTY DENTON		SHEET NO. 258

DATE: 10/2/2023
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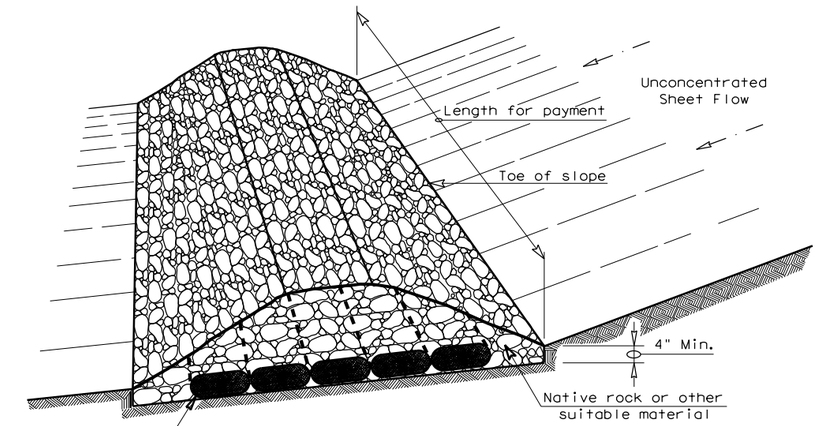
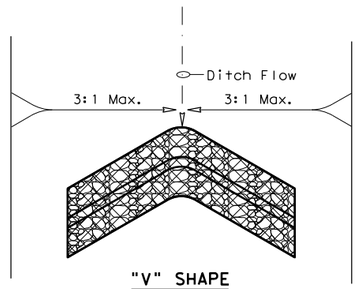
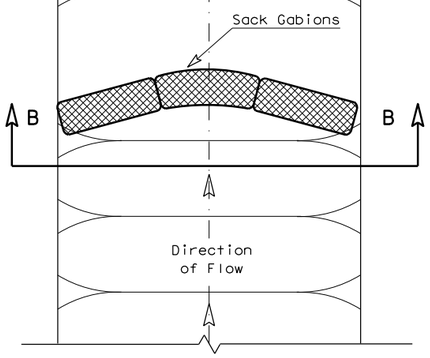


FILTER DAM AT TOE OF SLOPE

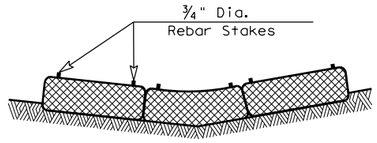
RFD1



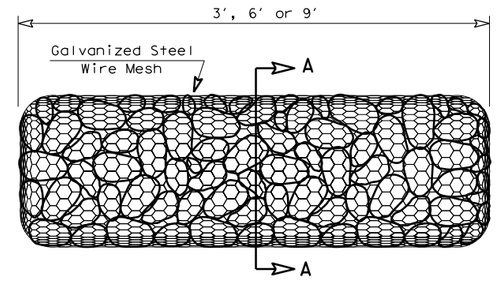
"V" SHAPE PLAN VIEW



PLAN VIEW

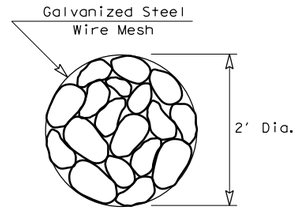


SECTION B-B

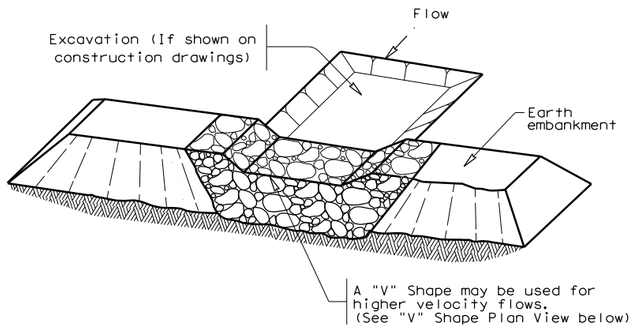


TYPE 4 (SACK GABIONS)

RFD4

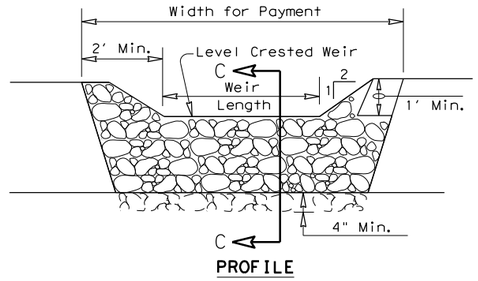


SECTION A-A

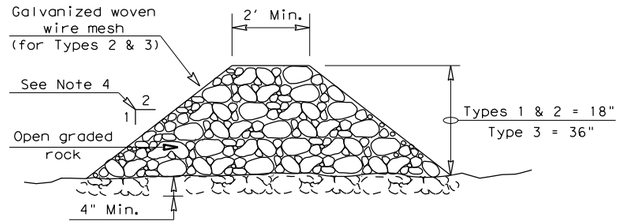


FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

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

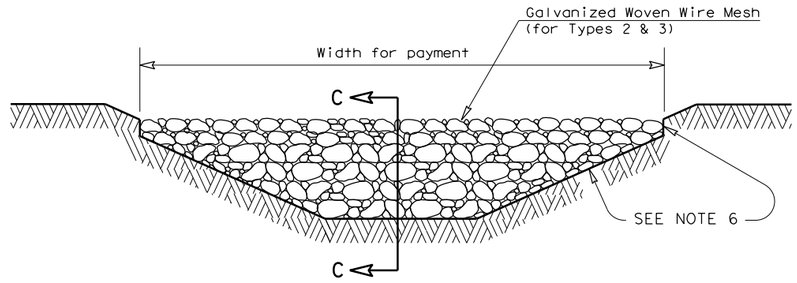
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity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

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

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

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

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



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

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

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		259

DATE: 10/2/2023
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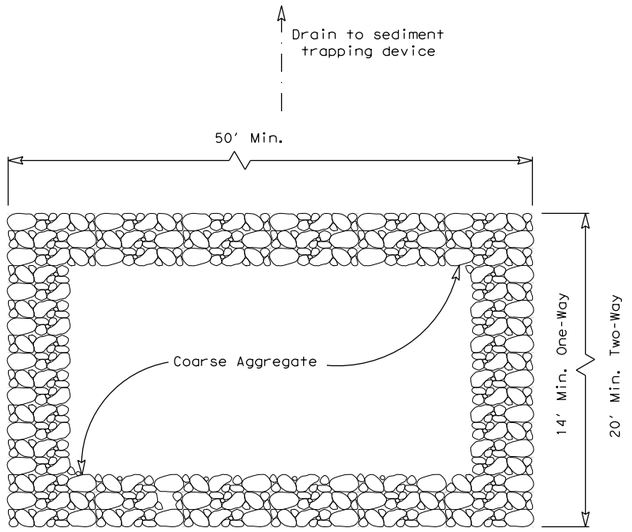
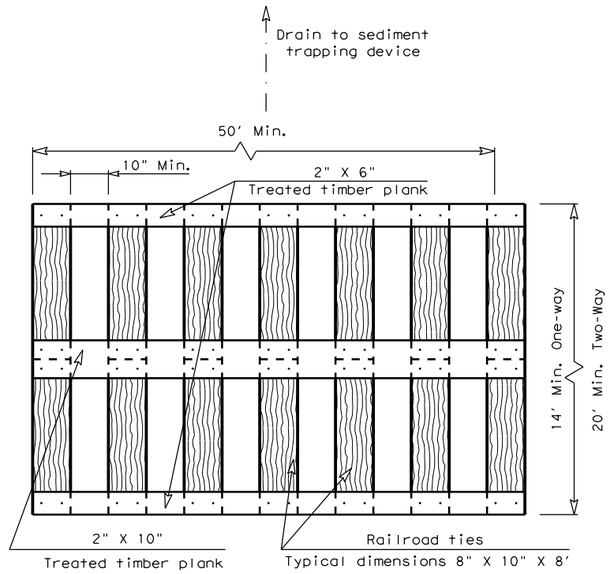
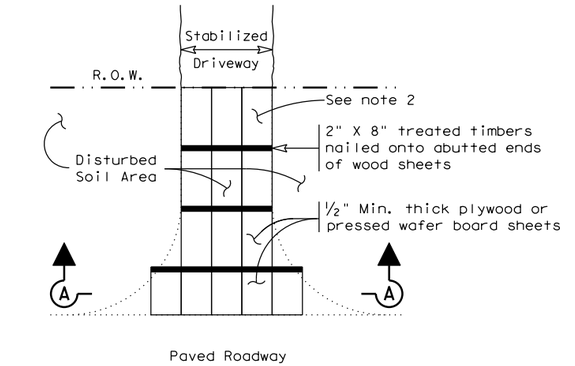


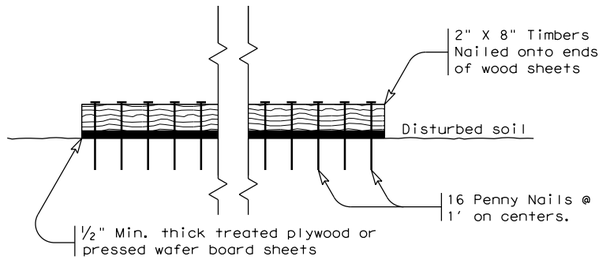
PLAN VIEW



PLAN VIEW



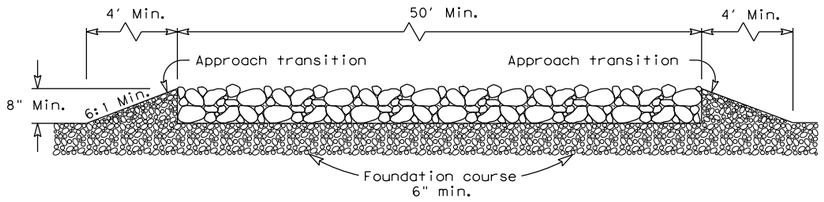
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

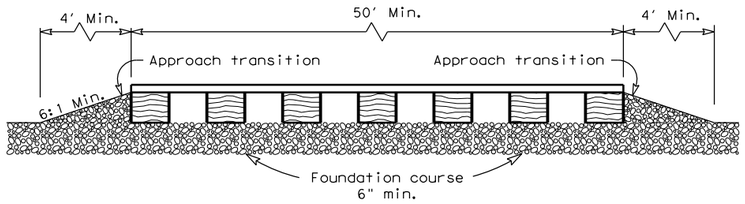
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50′.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0195	03	088,etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		260

DATE: 10/2/2023
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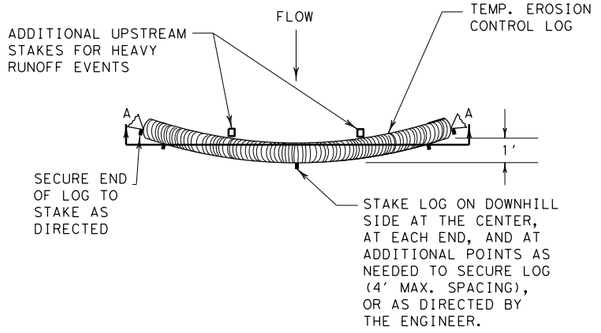
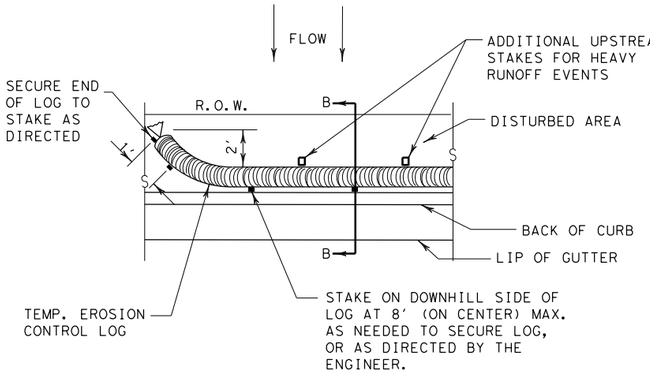


PLAN VIEW



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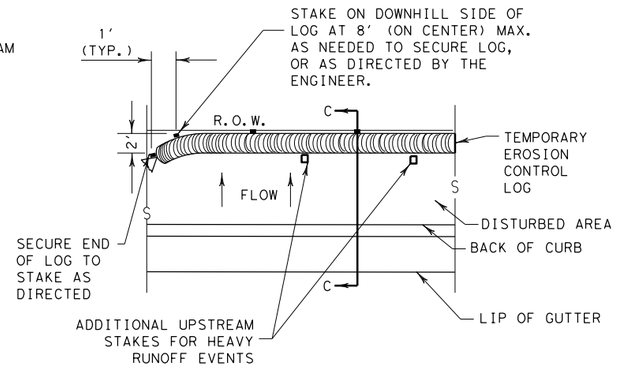
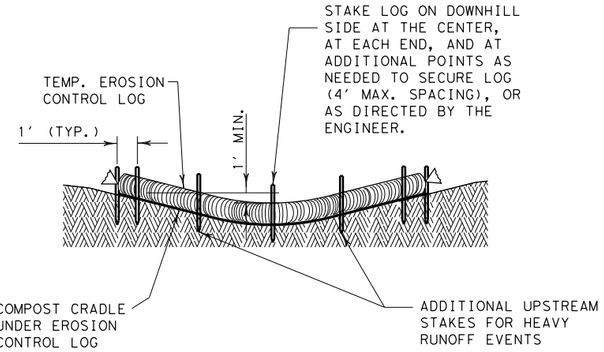


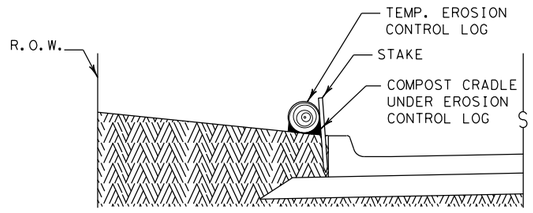
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

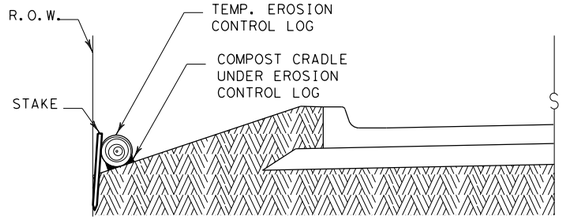
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

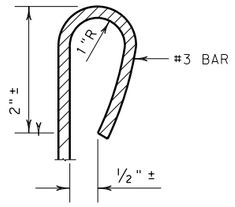
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

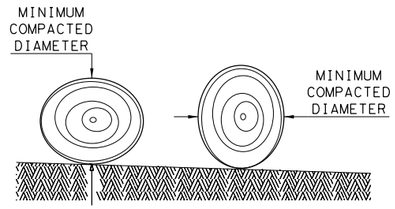
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

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

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

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916		DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0195	03	088,etc.		IH 35E	
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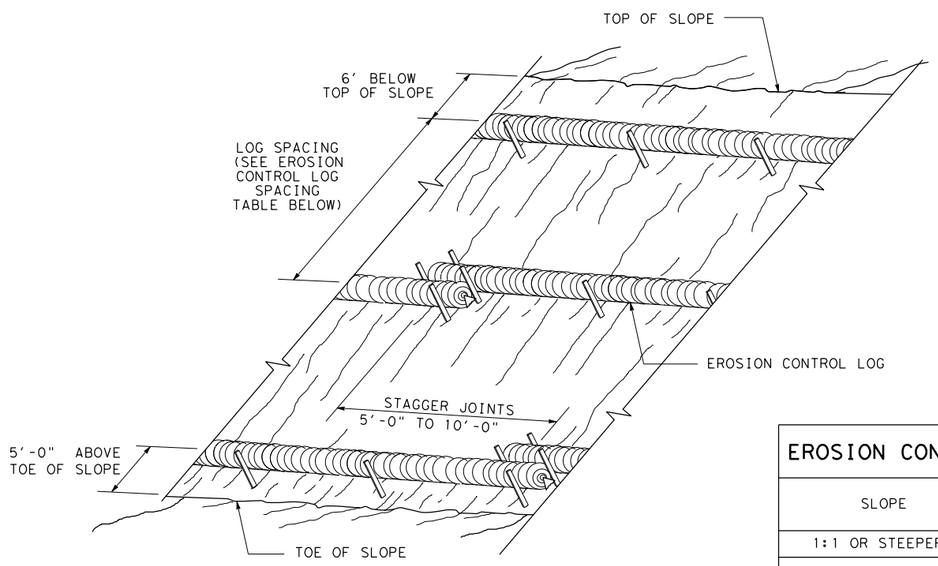
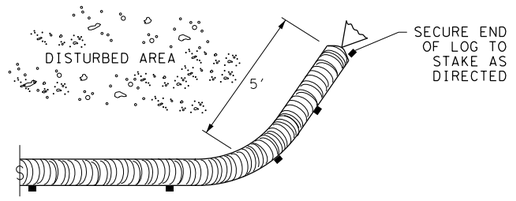
		DAL		DENTON			261



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

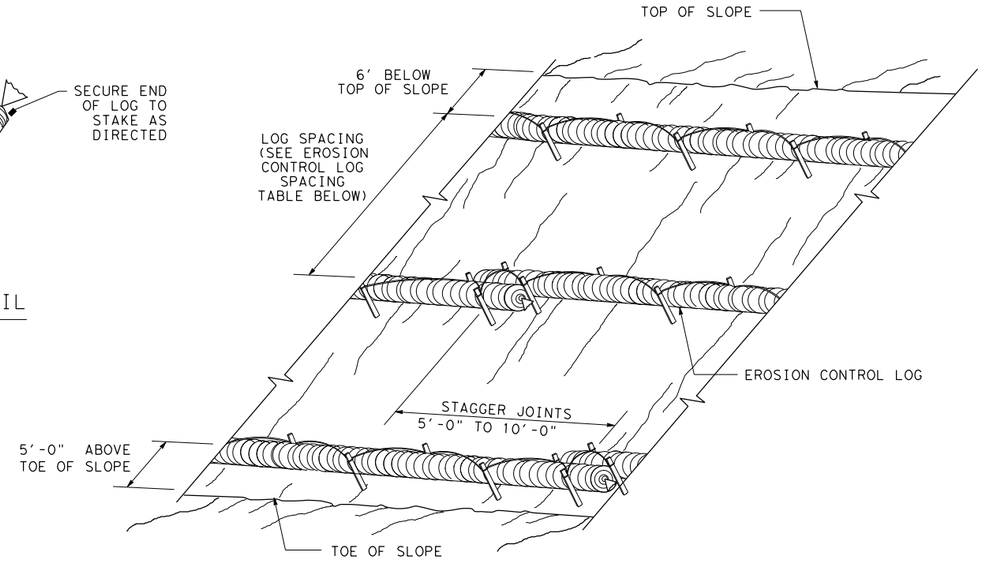
CL-SST



END SECTION RAP DETAIL

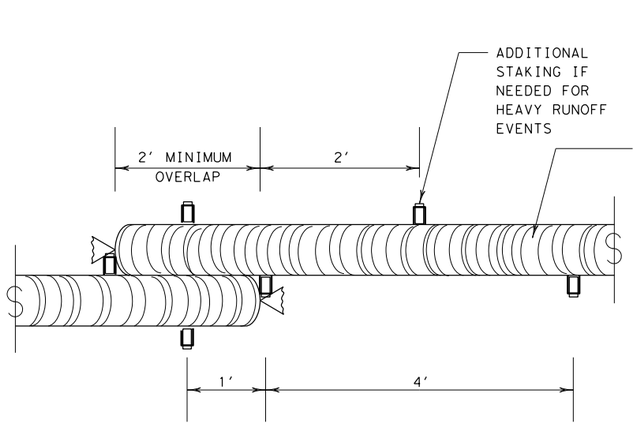
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

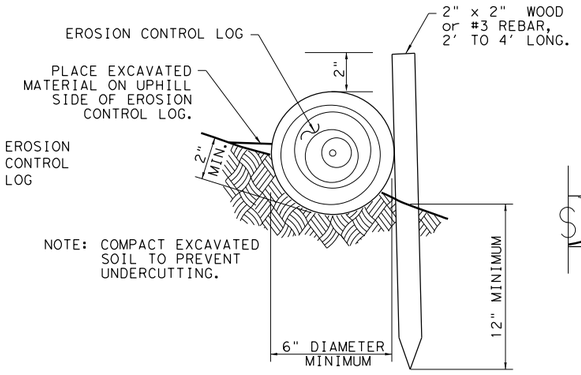
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

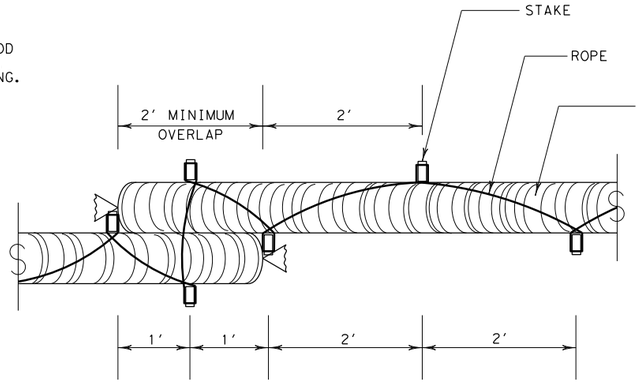


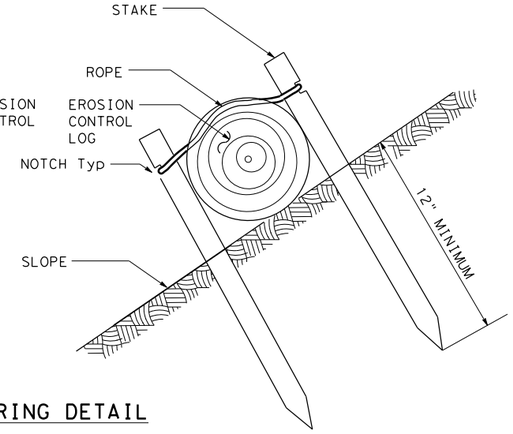


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

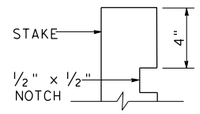
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

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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	
REVISIONS	0195	03	088,etc.		IH 35E	
	DIST	COUNTY			SHEET NO.	
	DAL	DENTON			262	

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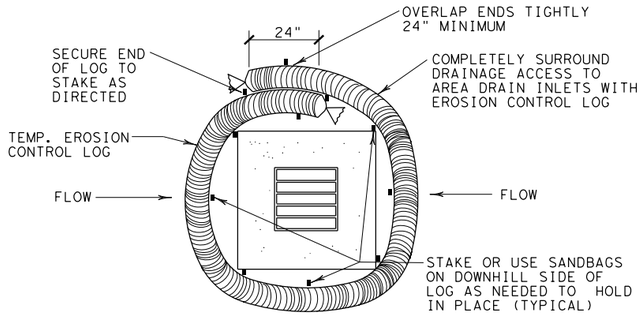
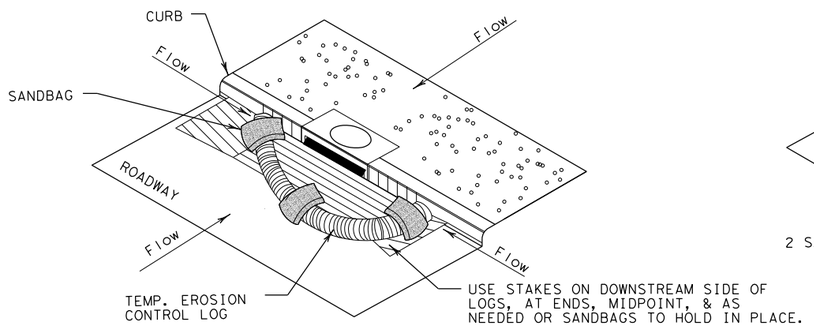


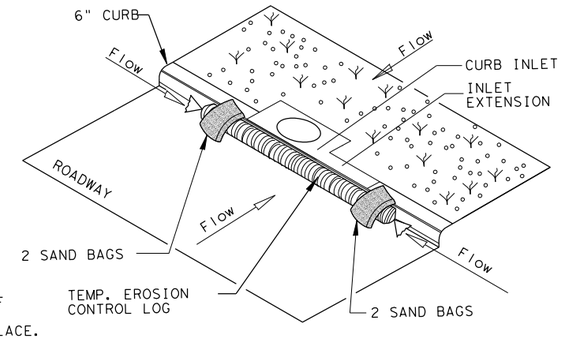
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

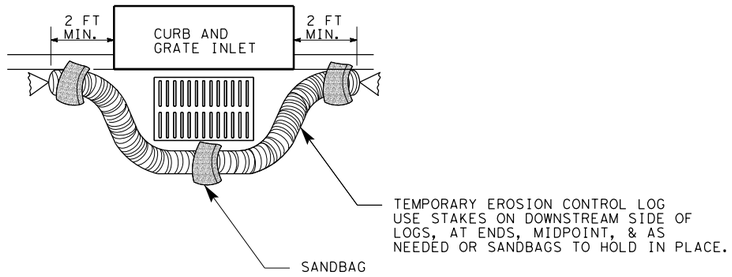
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

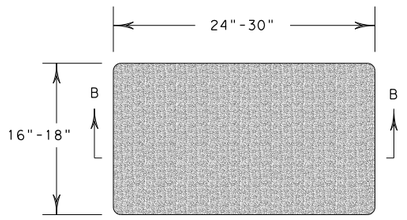
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



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

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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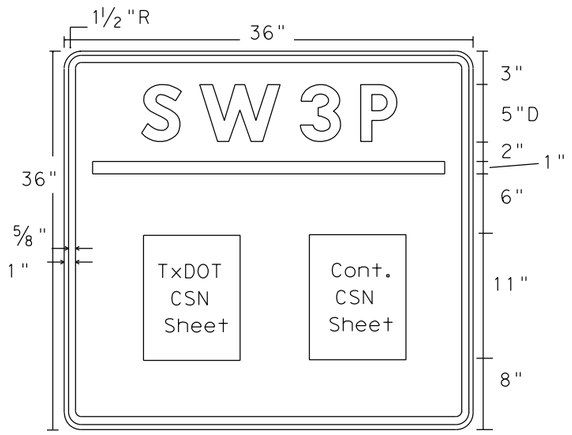
	DAL	DENTON		263



SW3P SIGN

TxDOT & Contractor Construction Site Note (CSN)

Sign Dimensions

36" X 36"

Letters - White
Numbers - White
Border - White
Background - Blue

GENERAL NOTES:

1. The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", (TMUTCD) latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
2. Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.
3. CSN Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry. (See Figure 1).
4. SW3P Signs should be placed just inside the ROW line at the project limits at a readable height. It may be placed perpendicular or parallel to ROW line. If the sign cannot be placed outside the clear zone, it will be mounted per TMUTCD requirements.
5. Final location of the signs will be as approved by the Engineer.

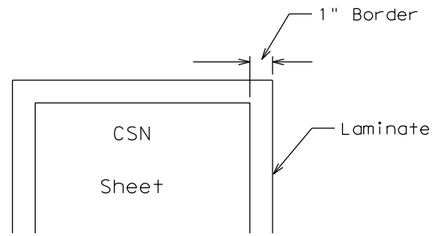
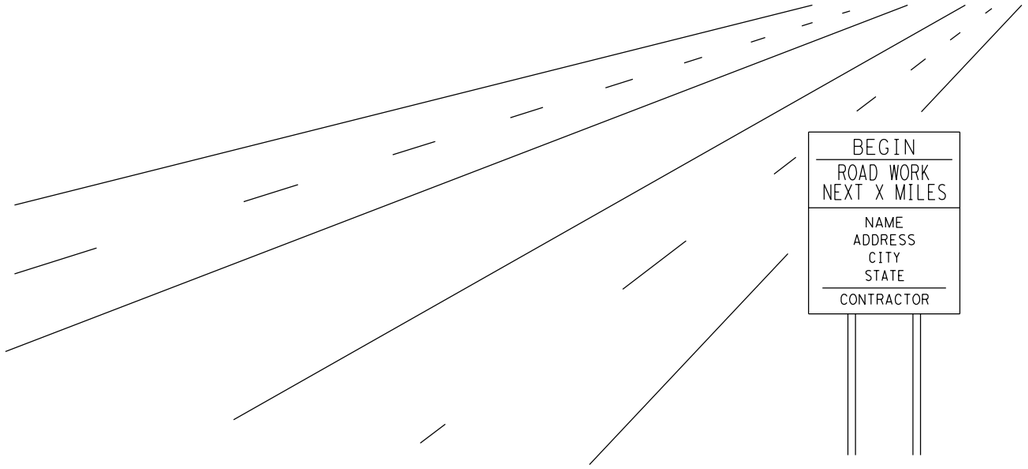
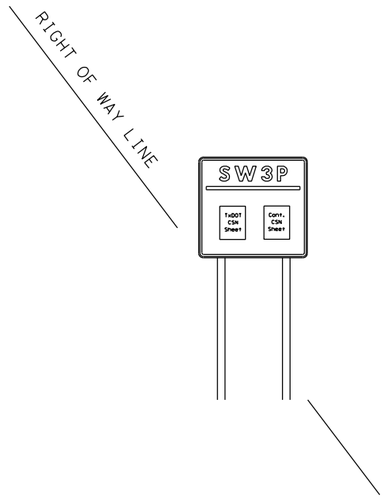


Figure 1





DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

Texas Department of Transportation
DALLAS DISTRICT STANDARD

SW3P SIGN SHEET

FILE:	DN: IxDOT	CK:	DW:	CK:	
©TxDOT 2016	DISTRICT	PROJECT NO.			SHEET
	18	SEE TITLE SHEET			264
REVISION DATE: 10-16-15	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	DENTON		0195	03	088, ETC	IH 35E

PATH:

LEVELS DISPLAYED
1

USER ID

SURFACE PREPARATION ITEM 160* TOPSOIL SY / ITEM 161* COMPOST MANUF. TOPSOIL (BOS) (4") SY

SURFACE PREPARATION

Prepare planting area surface BEFORE placing Topsoil, Compost, Fertilizer, Seed and/or Sod.
Once project area has been completed to final lines, grade and compaction, remove objectionable materials from planting area surface and cultivate existing surface to a depth of 4 inches, unless otherwise specified or directed.

Refer to Items 160 and 161 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.

TOPSOIL NOTES:
1. When Topsoil is specified under Item 160, use suitable material salvaged from the project ROW in accordance with Item 160 specifications, and/or secure additional good material from approved sources.
2. Topsoil shall include only the top 6 inches of its native surface, and be easily cultivated, fertile, erosion-resistant and free of objectionable materials.
3. Topsoil obtained from sites outside of the ROW must come from approved sources and have a pH between 5.5 and 8.5 su.
4. Place Topsoil on pre-cultivated surface, spread to a uniform loose cover at thickness specified, and shape per plans. Water and roll the finished surface with a light roller or other suitable equipment per Item 160.3; do not over-compact.

COMPOST NOTES:
1. When Compost Manufactured Topsoil (4") is specified under Item 161, use compost meeting all requirements of Item 161.2 and Table 1. Provide quality control (QC) documentation and obtain Engineer approval prior to compost delivery.
2. Contractor shall provide tickets/invoices that document material type, quantity and placement for all compost delivered.
3. Additional topsoil may be required to be imported to achieve the compost/topsoil mix ratio. Topsoil must meet Item 160 specifications.

APPLICATION OF COMPOST MANUFACTURED TOPSOIL (4")

AFTER Surface Preparation, uniformly spread a 1-inch layer of compost on-grade with 3 inches topsoil over pre-cultivated planting area. (25% compost and 75% topsoil = 1" compost and 3" topsoil.)
Then mix compost and topsoil together by cultivating the compost into the topsoil (by till or disk) to a 4-inch (4") depth.
Roll the finished surface with a light corrugated drum; do not over-compact.

FERTILIZER ITEM 166* FERTILIZER AC

SOIL ANALYSIS FOR FERTILIZER APPLICATION RATE

Unless otherwise stated in the plans, Contractor shall perform at least one soil analysis on each project before fertilization, and submit results to Engineer with recommended fertilizer rates based on soil analysis.
Engineer may direct sample location(s). Soil analysis may be waived if both compost and sod are used on entire project.

FERTILIZER NOTES:
1. Refer to Item 166 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Apply fertilizer BEFORE seeding, or AFTER placing sod.
3. Use fertilizer containing nitrogen (N), phosphoric acid (P) and potash (K) nutrients, unless otherwise specified. At least 50% of the Nitrogen component shall be a slow-release sulfur-coated urea as described in Item 166.3. Do not apply more than 60 lbs Nitrogen per acre without Engineer concurrence.
4. Deliver fertilizer in bags, clearly labeled to show contents, unless otherwise specified or approved prior to delivery. When non-bagged, loose fertilizer is approved, provide documentation for each load of material delivered, to validate authenticity of the material.
5. Apply fertilizer uniformly, as a dry, granular material, essentially dust-free, and do not mix with water for application as a slurry.
6. When both temporary and permanent seeding are specified for the same area, apply half of the required fertilizer before the temporary seeding operation and the other half before the permanent seeding operation.

SEEDING FOR EROSION CONTROL ITEM 164* DRILL SEEDING AC

RECOMMENDED PLANTING SEASON	PERMANENT RURAL SEED MIX ITEM 164 - DRILL SEEDING (PERM) (RURAL)(CLAY)	Pure Live Seed Rate**	PERMANENT URBAN SEED MIX ITEM 164 - DRILL SEEDING (PERM) (URBAN)(CLAY)	Pure Live Seed Rate**	TEMPORARY DRILL SEED MIX ITEM 164 - DRILL SEEDING (TEMP) (WARM OR COOL)	Pure Live Seed Rate**
WARM SEASON Mar.15th, April, May, June, July, August, Sept. 15th	Green Sprangletop (Van Horn)	- 1.0 lbs/AC	Green Sprangletop (Leptochloa dubia)	- 0.3 lbs/AC	Foxtail Millet (Setaria italica)	- 34 lbs/AC
	Sideoats Grama (Haskell)	- 1.0 lbs/AC	Sideoats Grama (El Reno)(Bouteloua curtipendula)	- 3.6 lbs/AC		
	Texas Grama (Atascosa)	- 1.0 lbs/AC	Buffalograss (Texoka)(Buchloe dactyloides)	- 1.6 lbs/AC		
	Hairy Grama (Chaparral)	- 0.4 lbs/AC	Bermudagrass (Cynodon dactylon)	- 2.4 lbs/AC		
	Shortspike Windmillgrass (Welder)	- 0.2 lbs/AC				
	Little Bluestem (OK Select)	- 0.8 lbs/AC				
	Purple Prairie Clover (Cuero)	- 0.6 lbs/AC				
	Engelmann Daisy (Eldorado)	- 0.75lbs/AC				
	Illinois Bundleflower	- 1.3 lbs/AC				
	Awnless Bushsunflower (Plateau)	- 0.2 lbs/AC				
COOL SEASON Sept 16th, Oct, Nov, Dec, Jan, Feb, Mar 14th					Tall Fescue (Festuca arundinaceae)	- 4.5 lbs/AC
					Western Wheatgrass (Agropyron smithii)	- 5.6 lbs/AC
					Red Winter Wheat (Triticum aestivum)	- 34 lbs/AC
					Cereal Rye	- 34 lbs/AC

SEEDING NOTES:
1. When seeding is specified under Item 164, refer to TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown. Materials and construction shall meet specifications.
2. Conduct seeding upon completion of each applicable construction stage (dependent upon planting season requirements), without compensation for additional move-ins.
3. Place seed AFTER preparing planting area surface. Refer to Surface Preparation detail this sheet, as well as Topsoil Item 160 and Compost Manufactured Topsoil Item 161 when specified. Apply fertilizer per Item 166 BEFORE seeding, per specifications and this sheet, to help drill the fertilizer into the soil.
4. When temporary grasses are well-established and more than 2 inches tall, mow planting area before seeding permanent grasses; mowing for this purpose will be subsidiary. When vegetation is not already well-established, cultivate planting area to a depth as described in Item 164.3, before temporary seeding and before permanent seeding.
5. Seed material must be appropriate to the location, soil type and season. Use the seed mix species and pure live seed rates designated in Tables 1-4 of the TxDOT 2014 Standard Specifications* for Item 164, unless otherwise specified.
6. All seed shall meet labeling, delivery, analysis, and testing requirements described in Item 164.2.1. Deliver seed in labeled, unopened bags or containers to Engineer prior to planting.
7. Uniformly plant seed over the designated planting area, along the contour of slopes, and drill seed to a depth as described in Item 164.3.4.
8. Hydroseeding may be allowed, when specified or Engineer concurs.
9. Implement and continue Vegetative Watering per the schedule, rate and volume specified under Item 168.

**Note: The amount of Pure Live Seed (PLS) in one pound of bulk seed is based on three factors: % Purity, % Germination, and % Dormant. Use the following formula to calculate PLS in bulk seed: PLS = % Purity X (% Germination + % Dormant) Ensure that the specified amount of pure live seed is placed.

TXDOT REFERENCE MATERIALS:

- * "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES" 2014
- "A GUIDANCE TO ROADSIDE VEGETATION ESTABLISHMENT" 2004
- ONLINE TRAINING COURSE: MNT415 REVEGETATION DURING CONSTRUCTION
- DALLAS DISTRICT "VEGETATION ESTABLISHMENT GUIDELINES"

SODDING FOR EROSION CONTROL ITEM 162* BLOCK SOD (BERMUDA) SY

BLOCK OR ROLL SOD	COMMON NAME	BOTANICAL NAME
	Common Bermuda Grass	Cynodon dactylon

SODDING NOTES:
1. Refer to Item 162 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Place sod between the average date of the last freeze in the Spring and 6 weeks before the average date of the first freeze in the Fall, per the Texas Almanac for the project area.
3. Place sod only AFTER soil surface preparation is complete as detailed in this sheet. Dry soil may require pre-watering.
4. Place all sod (blocks or rolls) within 24 hours of delivery to the site, and keep moist from the time it is dug up until it is planted. Sod with dried roots will not be accepted.
5. Place sod with joints alternating on each row to prevent all joints from lining up, and place blocks firmly against adjacent blocks. Roll, tamp and trim sod per Item 162.3.
6. Place fertilizer promptly AFTER sodding operation is complete in each area.
7. Water sod immediately following placement, and continue Vegetative Watering per Item 168.

VEGETATIVE WATERING FOR ESTABLISHING SEED AND SOD ITEM 168* VEGETATIVE WATERING MG

WATERING SCHEDULE

SEASON (Usual Months)	RATE	TIME SCHEDULE	TOTAL WATER ESTIMATE
SPRING & FALL (March, April, May, October)	7,000 gallons/acre per working day	Vegetative watering for seed shall begin on the day after rainfall described below and continue for 60 consecutive working days; vegetative watering for sod shall begin on the day the sod is placed and continue for a minimum of 15 consecutive working days.	420,000 gallons/acre (60 working days)
SUMMER (June, July, August, September)	12,000 gallons/acre per working day		720,000 gallons/acre (60 working days)
WINTER (November through February)	1,000 gallons/acre per working day	Vegetative watering for seed and/or sod shall begin on the day after placement for 15 consecutive working days	15,000 gallons/acre (15 working days)

Notes: Rate and frequency may be adjusted, with the approval of the Engineer, to meet site conditions (especially with sod).
For informational purposes only: 1,000 gallons equals 1 MG

VEGETATIVE WATERING NOTES:
1. Refer to Item 168 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Use clean water free of industrial waste and other substances harmful to vegetation growth, per Item 168.2.
3. Use Vegetative Watering to keep the seed bed moist during germination; not to provide initial watering. After drill seeding, postpone watering operations until site receives at least 1/2-inch of natural rainfall in a single day. Delay watering operations for warm season grasses until soil temperature exceeds 70 degrees F.
4. For sod, water immediately.
5. All water distribution equipment shall be furnished and operated to provide water at a uniform and controllable rate. Use a metering device on all watering equipment.
6. Evenly distribute water over entire area designated for seeding and/or sodding, using even spray patterns that do not disturb seed bed and/or dislodge seed from seed bed.
7. Do not water between the hours of 12:00 p.m. and 6:00 p.m. when daytime temperatures exceed 95 degrees F.
8. After initial establishment period, continue intermittent watering of newly established seed or sod at a rate of approximately 1-inch water/week, during summer months until end of contract.
9. If 1/4-inch or more of rainfall occurs on site on any given working day, no vegetative watering will be needed on that working day. (Note: 1/4-inch rain equals 7,000 gallons of water per acre.)
10. Should the Contractor fail to apply the specified amount of water within the time allowed, any seed or sod in poor condition shall be replaced, fertilized, and watered at Contractor's expense.

ROADSIDE MOWING ITEM 730* PROJECT MAINTENANCE AC

MOWING NOTES:
1. During project construction, once seed is established, use mowing to promote permanent grasses by mowing any remaining temporary grasses.
2. Also mow established turf and ROW grasses in designated areas of project limits as specified or directed by Engineer.
3. Remove litter and debris prior to mowing.
4. Do not mow on wet ground when soil rutting can occur.
5. Hand-trim around obstructions and stormwater control devices as needed.
6. Maintain paved surfaces free of tracked soils and clipped vegetation.

SEQUENCE OF WORK:

- CULTIVATE SURFACE SOIL.
- PREPARE / PLACE TOPSOIL, OR
- PREPARE / PLACE COMPOST MANUFACTURED TOPSOIL.
- APPLY FERTILIZER AND THEN PLACE SEEDING, OR
- PLACE SOD AND THEN APPLY FERTILIZER.
- CONDUCT VEGETATIVE WATERING.
- CONDUCT ROADSIDE MOWING, AS DIRECTED.

Texas Department of Transportation

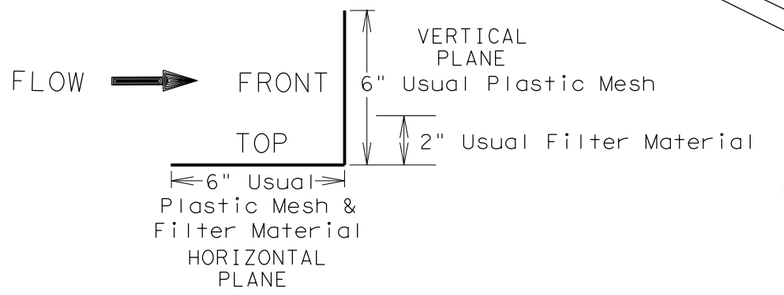
VEGETATION ESTABLISHMENT SHEET

(DALLAS DISTRICT)

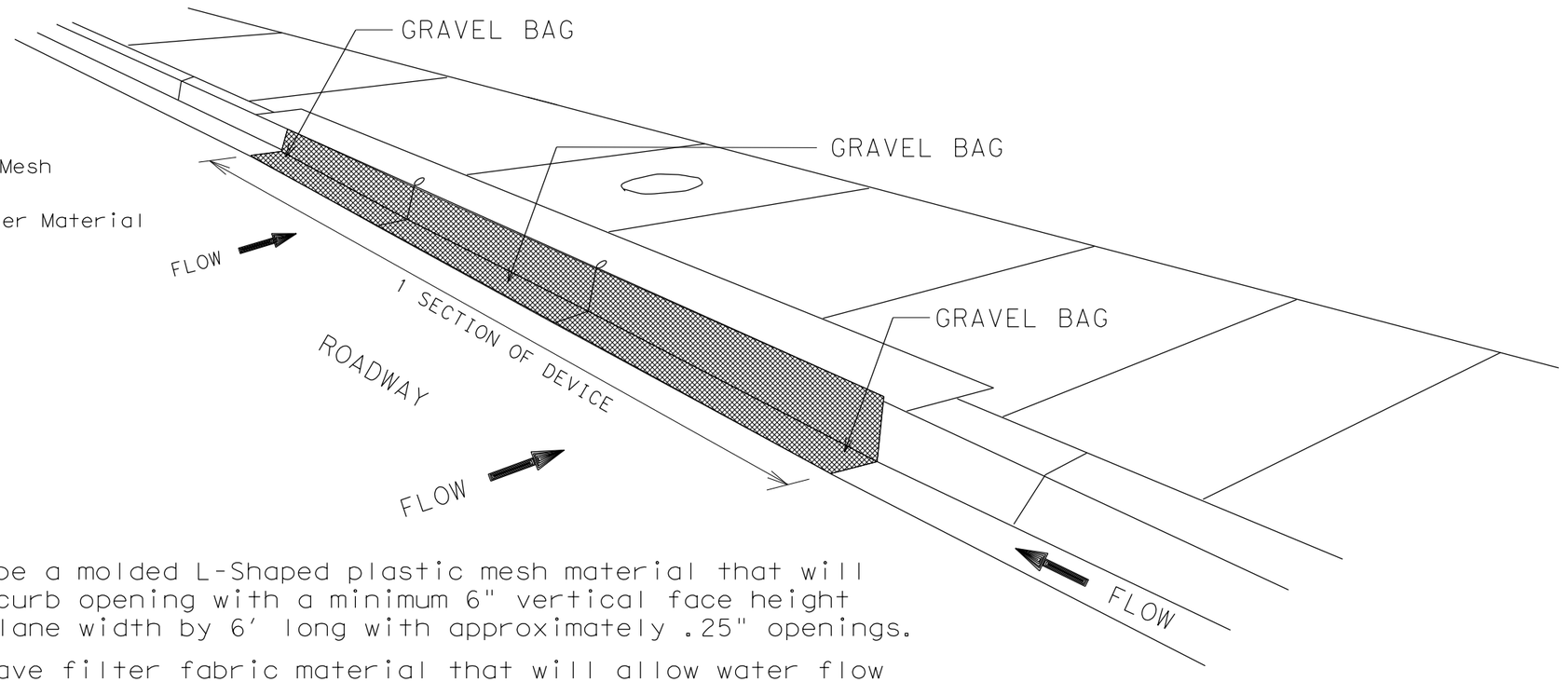
TEMPLATE REVISION DATE: 02/21/19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	(See Title Sheet)		IH 35E
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	DENTON	265
CHECK	CONTROL	SECTION	JOB	
	0195	03	088,etc.	

DATE



PLASTIC MESH L-SHAPE
CROSS SECTION



NOTES:

1. The device shall be a molded L-Shaped plastic mesh material that will cover the entire curb opening with a minimum 6" vertical face height by 6" horizonal plane width by 6' long with approximately .25" openings.
2. The device must have filter fabric material that will allow water flow but stop sediment. It will extend from bottom up vertical plane a minimum of 2" and full width of horizontal bottom plane. The filter fabric shall be attached to the back of the plastic mesh. It shall not cover more than 1/3 of the height of the vertical plane opening to allow overflow in larger strom events to prevent flooding of travel lanes.

Filter Fabric Physical Requirements Table

Apparent Opening Size (AOS)	400 to 600 microns
Percent Open Area (POA)	>10%
Flow Rate	130 gallons per SF per minute with clean water or greater.

3. Place with horizontal plane pointing away from curb.
4. For high openings, the device or attachment should extend above opening.
5. For long curb openings, overlap the segments 6". Tie together with 4 zip ties in 4 places, 2 at the top and 2 at the bottom.
6. Install gravel, not sand, bags at each end, at overlaps and in the middle of each section. Use 1/3 full bags for low profile and best traffic avoidance.
7. Use bags that will have long-term resistance to UV exposure.
8. Sediment should be removed and device cleaned when sediment reaches 1" in depth.

REVISED ON 9/10/08

DALLAS DISTRICT STANDARD

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CURB INLET SEDIMENT PROTECTION

FED. RD. DIV. NO.	PROJECT NUMBER		SHEET NUMBER
18	(SEE TITLE SHEET)		266
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	DENTON	
CONTROL	SECTION	SECTION	HIGHWAY NUMBER
0195	03	088,etc.	IH 35E

DATE: 5/4/2022 11:46:48 AM
FILE: c:\pwworking\aecom_dsi6_na\james.zapata@aecom.com\d0400996\IH35_AEC_RR_EX_0195-03-088.dgn

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

DOT #: 795323R
Crossing Type: HIGHWAY OVERPASS
RR Company Owning Track at Crossing: UPRR
Operating RR Company at Track: UPRR
RR MP: 720.484
RR Subdivision: CHOCTAW
City: DENTON
County: DENTON
CSJ at this Crossing: 0195-03-088, 0195-03-089
Highway/Roadway name crossing the railroad: IH 35E NBFR, IH 35E SBFR
# of regularly scheduled trains per day at this crossing: 17
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: _____

Scope of Work at this Crossing to Be Performed by State Contractor:
REMOVE AND REPLACE BRIDGES AND APPROACHES INCLUDING ROADWAY, DRAINAGE, RETAINING WALLS, SIGNING, PAVEMENT MARKINGS, TRAFFIC CONTROL AND SW3P

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING AND UP TO 180 DAYS OF INSPECTION

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

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

REMOVING TREES

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: UP TO 180 DAYS

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

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

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

Contact Information for Flagging:

☒ UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

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

☐ OTHERS _____

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☐ Not Required

☒ Required: Contact Information for Construction Inspection:

UPRR - "
Phone Number: 1-800-336-9193

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

☐ Required
☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit
Railroad Protective Liability	
☐ Not Required	
☐ Non - Bridge Projects	$2,000,000 / $6,000,000
☒ Bridge Projects	$5,000,000 / $10,000,000
☐ Other	

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

On this project, an ROE agreement is:

☐ Not Required
☒ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☐ Not Required
☒ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

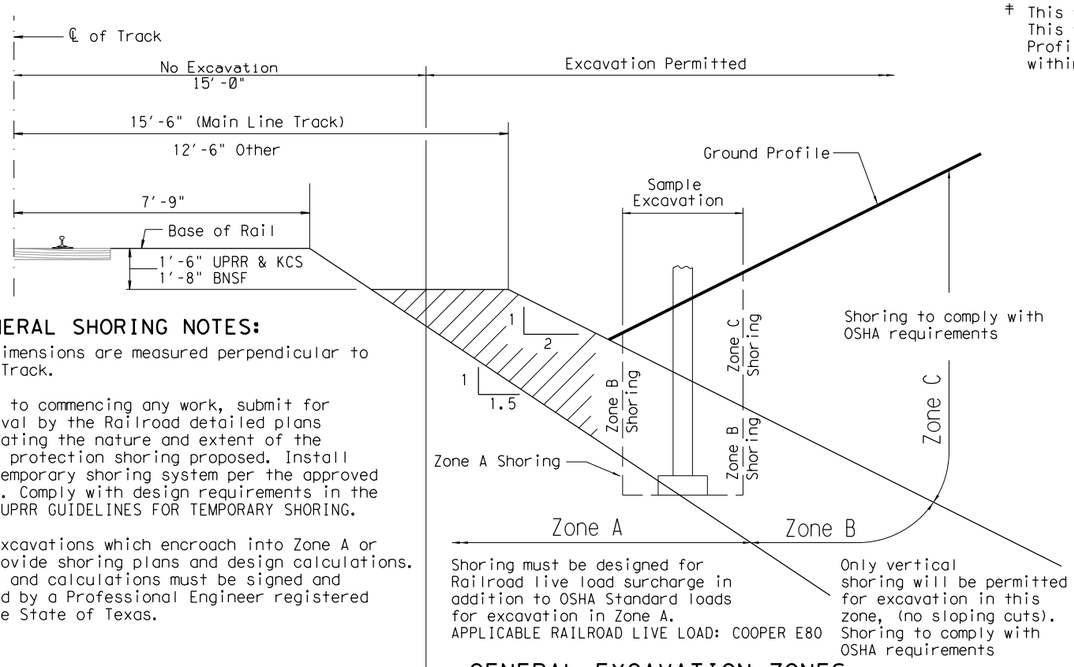
IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call UPRR
Railroad Emergency Line at 888-877-7267
Location: DOT 795323R
RR Milepost 0720.484
Subdivision CHOCTAW

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2020	0195	03	088, etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		267



GENERAL EXCAVATION ZONES

GENERAL SHORING NOTES:

1. All dimensions are measured perpendicular to ℄ of Track.
2. Prior to commencing any work, submit for approval by the Railroad detailed plans indicating the nature and extent of the track protection shoring proposed. Install the temporary shoring system per the approved plans. Comply with design requirements in the BNSF/UPRR GUIDELINES FOR TEMPORARY SHORING.
3. For excavations which encroach into Zone A or B, provide shoring plans and design calculations. Plans and calculations must be signed and sealed by a Professional Engineer registered in the State of Texas.

GENERAL SHORING REQUIREMENTS ‡

RAILROAD GENERAL NOTES:

1. Railroad review and approval of shoring, erection, demolition, and falsework is required. Allow a minimum of four weeks for the review and approval of each submittal.
2. The proposed grade separation project shall not increase the quantity and/or characteristics of the flow in the Railroad's ditches and/or drainage structures. In the rare event that a grade separation project will increase the quantity and/or characteristics of flow in such elements, such a design must be reviewed and approved by the Railroad.
3. Verify the elevation of the existing top-of-rail profile before beginning construction. Bring all discrepancies to the attention of the Railroad prior to construction.
4. Submit a proposed method of erosion and sediment control for approval by the Railroad.
5. Design and construct all shoring systems that impact the Railroad's operations and/or support the Railroad's embankment per current Railroad Guidelines for Temporary Shoring.
6. Comply with Railroad Demolition Guidelines for all demolitions within the Railroad's right of way and/or demolition that may impact the Railroad's tracks or operations.
7. Design erection methods over the Railroad's right of way to cause no interruption to the Railroad's operation, enabling the track(s) to remain open to traffic per the Railroad's requirements. Coordinate construction work windows with the Railroad's Designated Representative.
8. Design all construction phasing that may impact the Railroad operations to cause no interruption to the Railroad's operations, enabling the track(s) to remain open to traffic per the Railroad's requirements. Coordinate construction work windows with the Railroad's Designated Representative.
9. Comply with minimum construction clearances for falsework outlined in the Railroad's Guidelines.
10. Verify all permanent clearances before project closing.
11. For Railroad coordination please refer to Sheets 2 and 3 and the TxDOT Standard Specifications.

For shoring/excavations in Zone A or B, TxDOT requires a predesigned and approved shoring design in the PS&E. If this is the case no Contractor submittal is required.

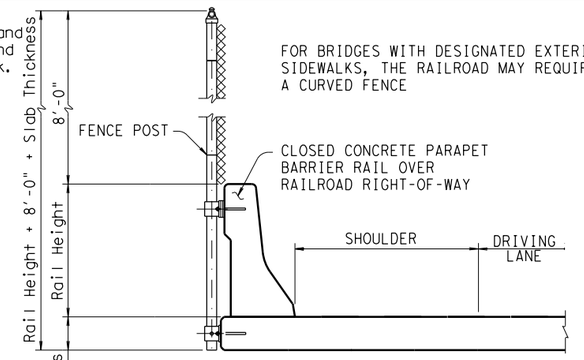
‡ This table is primarily required for overpass projects. This table is not required for underpass projects if the provided Plan and Profile sheets indicate this information at a minimum of every 100 ft and within bounds including 1500 ft before and after the limits of trackwork.

TABLE OF TOP OF RAIL PROFILE ‡

(STATIONS INCREASE WITH MILEPOST INCREASE)

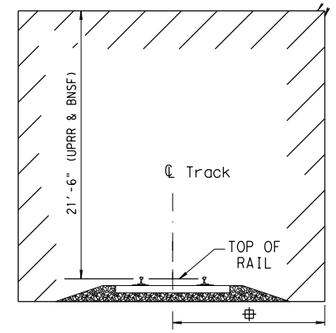
	MAIN LINE			
	ALIGNMENT: 100' STATIONS	LEFT RAIL ELEVATION	ALIGNMENT: 100' STATIONS	RIGHT RAIL ELEVATION
1000' PRIOR TO PROJECT	11100+00	682.00	11100+00	682.02
	11101+00	682.87	11101+00	682.89
	11102+00	683.80	11102+00	683.80
	11103+00	684.73	11103+00	684.71
	11104+00	685.77	11104+00	685.70
	11105+00	686.95	11105+00	686.82
	11106+00	688.18	11106+00	687.96
	11107+00	689.27	11107+00	688.98
	11108+00	690.16	11108+00	689.86
	11109+00	691.08	11109+00	690.80
WITHIN PROJECT	11110+00	692.05	11110+00	691.73
	11111+00	692.61	11111+00	692.55
	11112+00	693.48	11112+00	693.48
	11113+00	694.09	11113+00	694.10
	11114+00	694.42	11114+00	694.39
	11115+00	694.48	11115+00	694.49
1000' AFTER PROJECT	◒ 11116+00	694.05	◒ 11116+00	694.05
	11117+00	693.31	11117+00	693.32
	11118+00	692.38	11118+00	692.30
	11119+00	691.48	11119+00	691.47
	11120+00	690.64	11120+00	690.65
	11121+00	689.76	11121+00	689.76
	11122+00	688.92	11122+00	688.87
	11123+00	687.48	11123+00	687.92
	11124+00	686.94	11124+00	686.97
	11125+00	686.01	11125+00	686.00
	11126+00	684.98	11126+00	685.00

◒ ± EXISTING TRACK STA. 10+00
= ± CONSTRUCTION STA. XX+XX



TYPICAL FENCE ON BARRIER DETAIL

ONLY REQUIRED ON OVERPASSES IF SHOWN ON BRIDGE LAYOUT. (AREAS WITH PEDESTRIANS ON BRIDGE, RAIL YARDS, OR HISTORY OF VANDALISM)



MINIMUM CONSTRUCTION CLEARANCE ENVELOPE

(NORMAL TO RAILROAD)
15'-0" (UPRR), (BNSF)

GENERAL NOTES:

Design and Construction for Railroad Projects shall be in accordance with the AREMA Manual for Railway Engineering and BNSF/UPRR Guidelines for Railroad Grade Separation Projects or Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses, or DART Light Rail Project Design Criteria Manual, and the TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges AS APPLICABLE TO THE RAILROAD COMPANY INVOLVED.

See BNSF/UPRR Guidelines for Grade Seperation Projects Plan No. 711100 and TxDOT Railroad Fence Details Sheet for additional information. A curved top fence extending 8'-0" above top of sidewalk is acceptable only where there is a traffic rail between roadway and sidewalk.

See Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses for corresponding BNSF/UPRR sheets referenced.

FOR THE FOLLOWING INFORMATION PLEASE REFER TO THE PLAN AND ELEVATION DRAWINGS OF THE BRIDGE PLANS. THE PLAN AND ELEVATION DRAWINGS SHALL SHOW ALL REQUIRED INFORMATION PER BNSF/UPRR GUIDELINES FOR RAILROAD GRADE SEPARATION PROJECT PLAN NO. 711100 SHEET 2.

1. Centerline of bridge and/or centerline of project.
2. Track layout and limits of Railroad right of way with respect to centerline of main lines.
3. Future tracks, access roadways and existing tracks as main line, siding, spur, etc.
4. Point of minumum vertical clearance and distance, Measured perpendicular, from the centerline of nearest track.
5. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of obstruction such as substructure above grade.
6. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of nearest foundation below grade.
7. Horizontal spacing at right angle between centerlines of existing and/or future tracks.
8. Limits of shoring and minimum distance at right angle from centerline of nearest track.
9. All existing facilities and utilities and their proposed relocation, if required.
10. Toe of riprap or earth slope and/or limits of retaining wall.
11. Existing and proposed contours. (not required if the existing groundlines or drainage characteristics in Railroad ROW will not be altered).
12. Railroad Milepost and direction of increasing Milepost.
13. Direction of flow for all drainage systems within project limits.
14. Limits of barrier rail and fence with respect to centerline of track.
15. Depth of foundation below bottom of tie. (for footings only)
16. Top and bottom of pier protection wall elevation relative to top of rail elevation.
17. Controlling dimensions of drainage ditches and/or drainage structures.
18. Top of rail elevations for all tracks.
19. Minimum permanent vertical clearance above top of high rail to the lowest point under the bridge.
20. Existing and proposed groundline & roadway profile.
21. Type of riprap slope paving.
22. Location of deck drains.
23. Total width of superstructure.
24. Width of shoulder and/or sidewalk.

Geoffrey Scheid
STATE OF TEXAS
GEOFFREY SCHEID
122792
LICENSED
PROFESSIONAL ENGINEER
5/4/2022

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Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0195	03	088, etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		268

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PART 1 - GENERAL

1.01 DESCRIPTION

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

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

1.02 REQUEST FOR INFORMATION / CLARIFICATION

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

1.03 PLANS / SPECIFICATIONS

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

PART 2 - UTILITIES AND FIBER OPTIC

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

PART 3 - CONSTRUCTION

3.01 GENERAL

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

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

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

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

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

3.02 RAILROAD OPERATIONS

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

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

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

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

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

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

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

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

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.18 for railroad flagging requirements.

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

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

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

3.04 INSURANCE

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

3.05 RAILROAD SAFETY ORIENTATION

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

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

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

3.06 COOPERATION

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

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

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

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

3.08 APPROVAL OF REDUCED CLEARANCES

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

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

C. Do not commence work involving an approved infringement until receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

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RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION

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REVISIONS March 2020	0195	03	088, etc.	IH 35E
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		269

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3.09 CONSTRUCTION AND AS-BUILT SUBMITTALS

A. Provide TxDOT submittals for construction materials and procedures as outlined below and indicated in TxDOT Standard Specifications. A summary of most TxDOT submittal requirements can be found at: www.dot.state.tx.us/publications/bridge/items reviewed.pdf

B. The tables below provide the Railroad's minimum submittal requirements for the construction items noted. Submittal requirements are in addition to those specified elsewhere in these bid documents. The review times indicated below represent the total time, including the Railroad's required four (4) weeks.

C. TxDOT will forward relevant submittals to the Railroad Manager of Industry and Public Projects unless otherwise directed by the Railroad. TxDOT and the Engineer of Record will review and include comments prior to forwarding to the Railroad. Submit items in Table 1 for both railroad overpass and underpass projects, as applicable. Submit items in Table 2 for railroad underpass projects only.

TABLE 1 - RAILROAD SUBMITTAL REQUIREMENTS FOR OVERPASS & UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	REVIEW TIME
1	Shoring design and details	6	6 weeks
2	Falsework design and details	6	6 weeks
3	Drainage design provisions	6	6 weeks
4	Erection diagrams and sequence	6	6 weeks
5	Demolition diagram and sequence	6	6 weeks

TABLE 2 - RAILROAD SUBMITTAL REQUIREMENTS FOR UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	NOTES	REVIEW TIME
1	Shop drawings	6	Steel and Concrete members	6 weeks
2	Bearings	6	For all structures	6 weeks
3	Concrete Mix Designs	6	For all structures	6 weeks
4	Rebar & Strand certifications	6	For superstructure only	6 weeks
5	28 day concrete strength	6	For superstructure only	6 weeks
6	Waterproofing material certifications and installation procedure	6	Waterproofing & protective boards	6 weeks
7	Structural steel certifications	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
8	Fabrication and Test reports	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
9	Welding Procedures and Welder Certification	6	AWS requirements	6 weeks
10	Foundation Construction Reports or Notes	6	Pile driving, drilled shaft construction, bearing pressure test reports for spread footings	6 weeks
11	Compaction testing reports for backfill at abutments	6	Must meet 95% maximum dry density, Modified Procter ASTM D1557	6 weeks

D. TxDOT shall submit As-Built Records to the Railroad when TxDOT has processed the final project plans. These records shall consist of the following items:

Overpass Projects

1. Electronic files of all structure design drawings with as constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as constructed modifications shown.

Underpass Projects

1. Electronic files of all structure design drawings with as constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as constructed modifications shown.
3. Final approved copies of shop drawings for concrete and steel members.
4. Foundation Construction Reports
5. Compaction testing reports for backfill at abutments

3.10 APPROVAL OF DETAILS

Submit details of the construction affecting Railroad's tracks and property not already included in the Contract Plans to the Railroad Designated Representative through TxDOT for the Railroad's review and written approval before such work is undertaken. Allow a total six (6) weeks for review and approval of these submittals, which includes the Railroad's four (4) week review time.

3.11 MAINTENANCE OF RAILROAD FACILITIES

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

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

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

3.12 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

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

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

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

3.13 RAILROAD REPRESENTATIVES

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

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

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

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

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

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

3.14 WALKWAYS REQUIRED

Maintain along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than twelve feet (12') from centerline of track. Remove any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours before the close of each work day. Construct walkways with railings over open excavation areas when in close proximity of track. Do not violate allowable clearances of these railings to centerline of track: 8' - 6" horizontally for tangent track or 9' - 6" horizontally for curved track.

3.15 COMMUNICATIONS AND SIGNAL LINES

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

3.16 TRAFFIC CONTROL

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

3.17 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

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

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

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

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

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

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

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor-assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of ¼ inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.18 RAILROAD FLAGGING

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

3.19 CLEANING OF RIGHT-OF-WAY

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

Texas Department of Transportation — Rail Division

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	DAL	DENTON		270