FED. RD. DIV. NO.	FEDERAL PROJECT NO.		SHEET NO.
6	BR 2024(730)		1
STATE	STATE DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	HIGHWAY NO.
0090	05	108	IH 40

DESIGN SPEED = 30
2023 ADT = 100
2043 ADT = 200
RURAL LOCAL ROAD

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

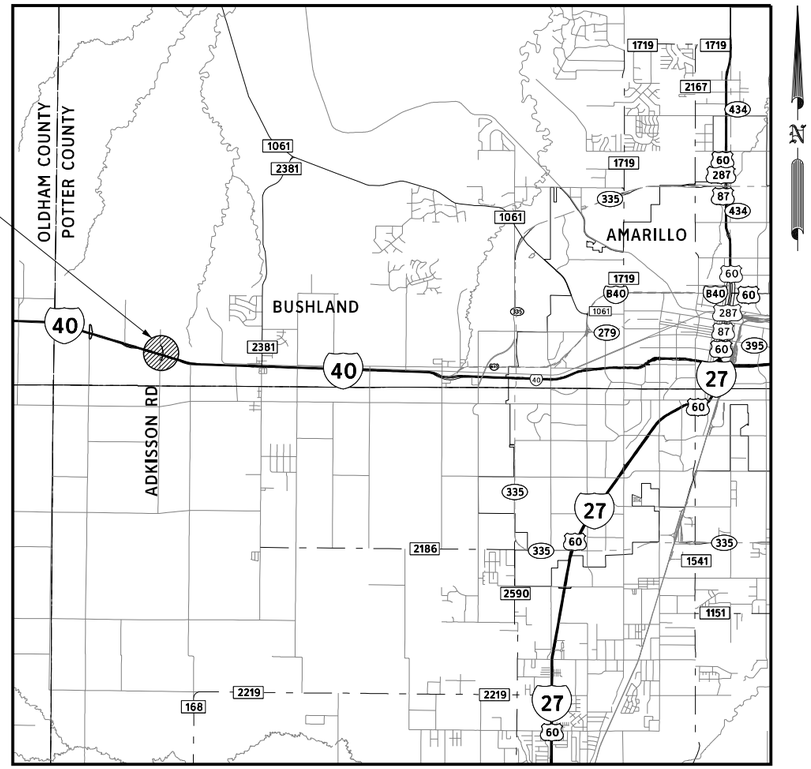
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
FEDERAL PROJECT : BR 2024(730)
HIGHWAY - IH 40
POTTER COUNTY

CONTROL: 0090-05-108

FOR THE CONSTRUCTION OF REPLACEMENT OF STRUCTURE
CONSISTING OF BRIDGE AND APPROACHES.

CSJ: 0090-05-108
LIMITS AT: ADKISSON ROAD
BRIDGE LENGTH = 540 FT. = 0.102 MILES
ROADWAY LENGTH = 1495 FT. = 0.283 MILES
TOTAL LENGTH = 2035.40 FT. = 0.385 MILES
NBI EXISTING = 04-188-0-0090-05-064
NBI PROPOSED = 04-188-0-0090-05-593

BEGIN PROJECT STA: 9+82.60
END PROJECT STA: 30+18.00



EXCEPTIONS:
NONE

RAILROADS:
NONE

EQUATIONS:
NONE

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

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR : _____

AREA ENGINEER: _____

Texas Department of Transportation

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

DATE: 11/30/2023

RECOMMENDED FOR LETTING:

DocuSigned by:
Joe Crumpett
2A500C249D094BA...

AREA ENGINEER

DATE: 12/4/2023

DocuSigned by:
Kit Black
9B5A6EA6AE8B46E...

DISTRICT DIRECTOR OF TRANSPORTATION
PLANNING AND DEVELOPMENT

DATE: 12/4/2023

APPROVED FOR LETTING:

DocuSigned by:
Blair Johnson
8B80E3AEB2BC43A...

DISTRICT ENGINEER

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THE STANDARD SHEETS IDENTIFIED HERE WERE SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER
10/19/23
James W. Langston PE

Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

IH-40 AT ADKISSON ROAD

INDEX OF SHEETS

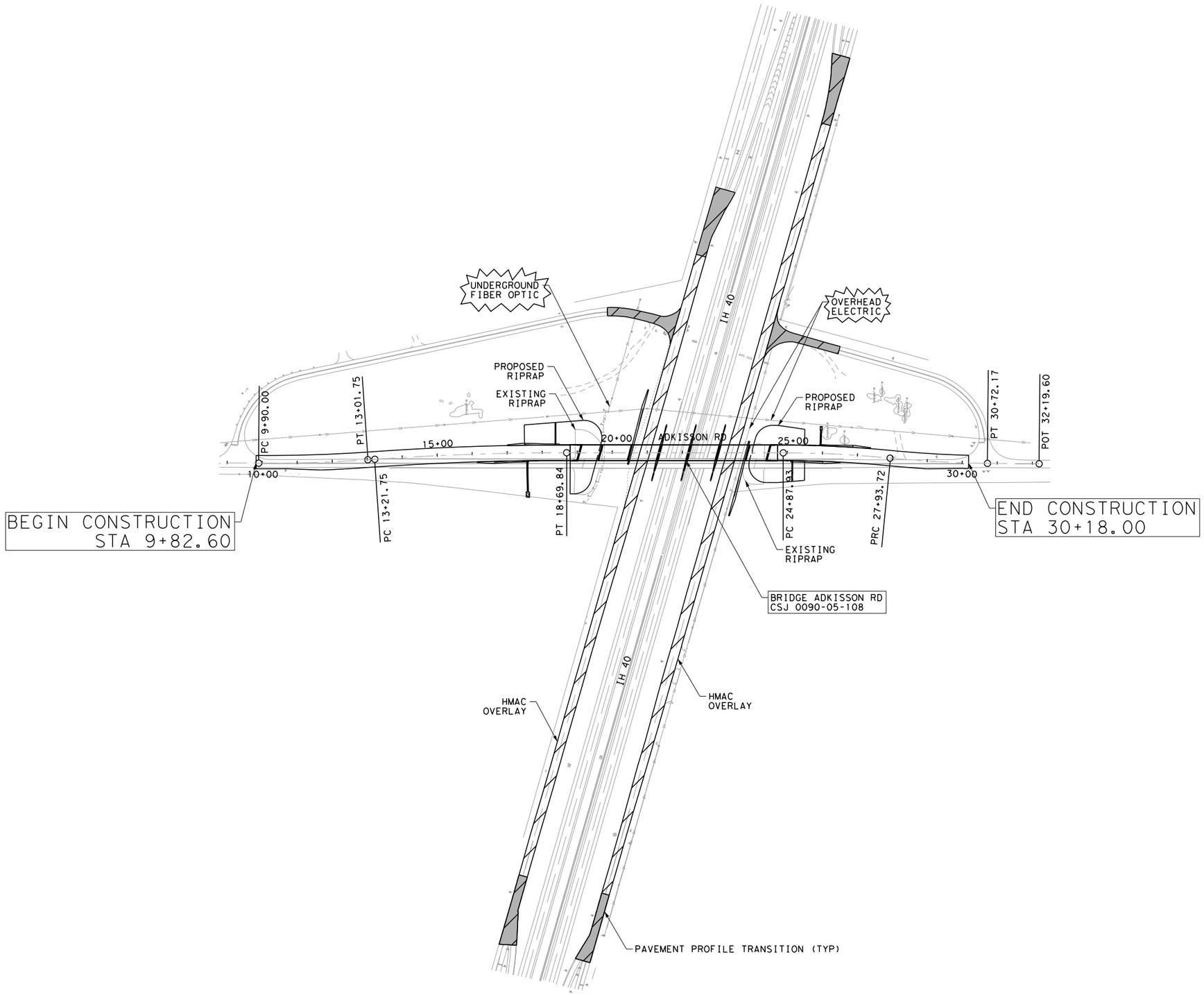
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DA	6	SEE TITLE SHEET		IH 40
GRAPHICS DA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JL	TEXAS	AMA	POTTER	002
CHECK	CONTROL	SECTION	JOB	
	0090	05	108	

300 0 300 600
SCALE: 1" = 300'

LIMITS OF OVERLAY PROFILE TRANSITIONS.
SEE TYPICAL SECTION 2 OF 2
FOR PROFILE TRANSITION DETAILS.

HMAC OVERLAY



10/12/23

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER

James W. Langston PE

Bridgefarmer & Associates, Inc.
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NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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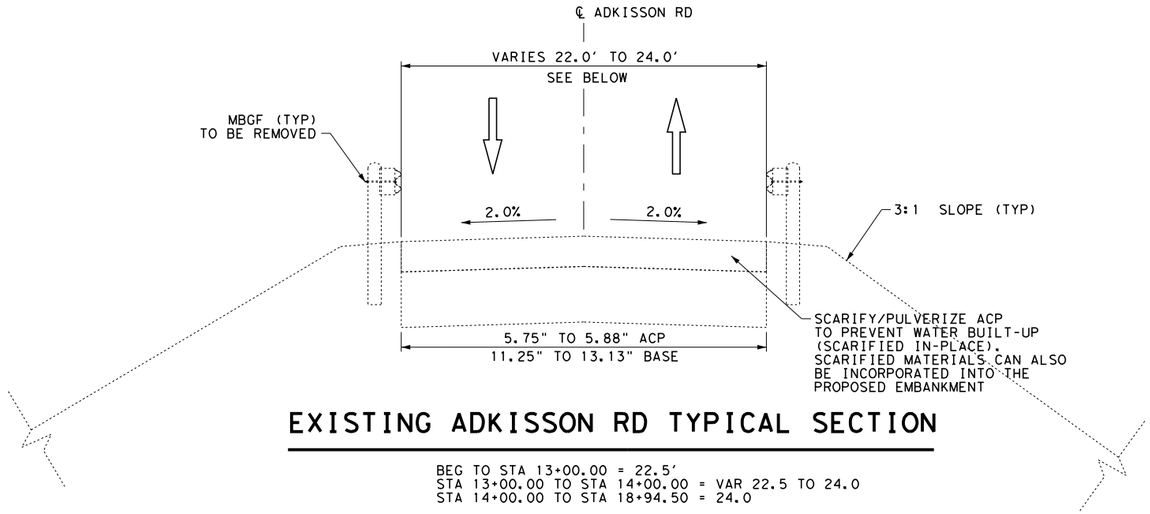
IH-40 AT ADKISSON ROAD

PROJECT LAYOUT

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS CG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JWL	TEXAS	AMA	POTTER	003
CHECK CK2	CONTROL	SECTION	JOB	
	0090	05	108	

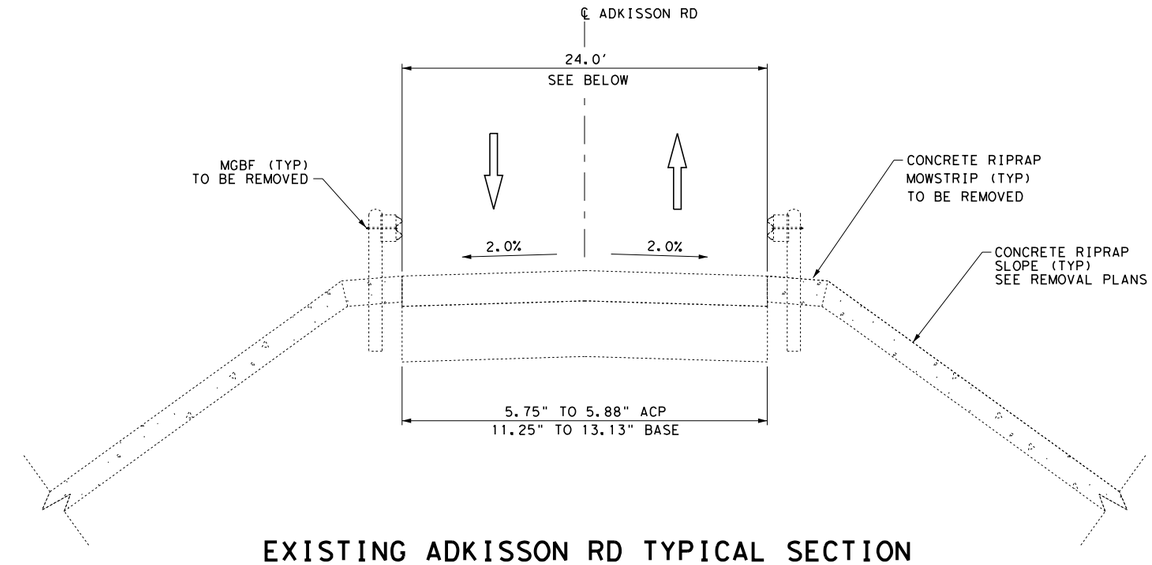
5 0 5 10
SCALE: 1" = 10'



EXISTING ADKISSON RD TYPICAL SECTION

BEG TO STA 13+00.00 = 22.5'
STA 13+00.00 TO STA 14+00.00 = VAR 22.5 TO 24.0
STA 14+00.00 TO STA 18+94.50 = 24.0

STA 24+31.50 TO STA 25+00.00 = 24.0'
STA 25+00 TO STA 26+57.00 = VAR 24.0' TO 22.0'
STA 26+57.00 TO END = 22.0'



EXISTING ADKISSON RD TYPICAL SECTION

STA 18+94.50 TO STA 19+17.50
STA 24+07.50 TO STA 24+31.50

EXISTING BRIDGE LIMITS

STA 19+17.50 TO 24+07.50

10/12/23

STATE OF TEXAS
JAMES W. LANGSTON
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James W. Langston PE
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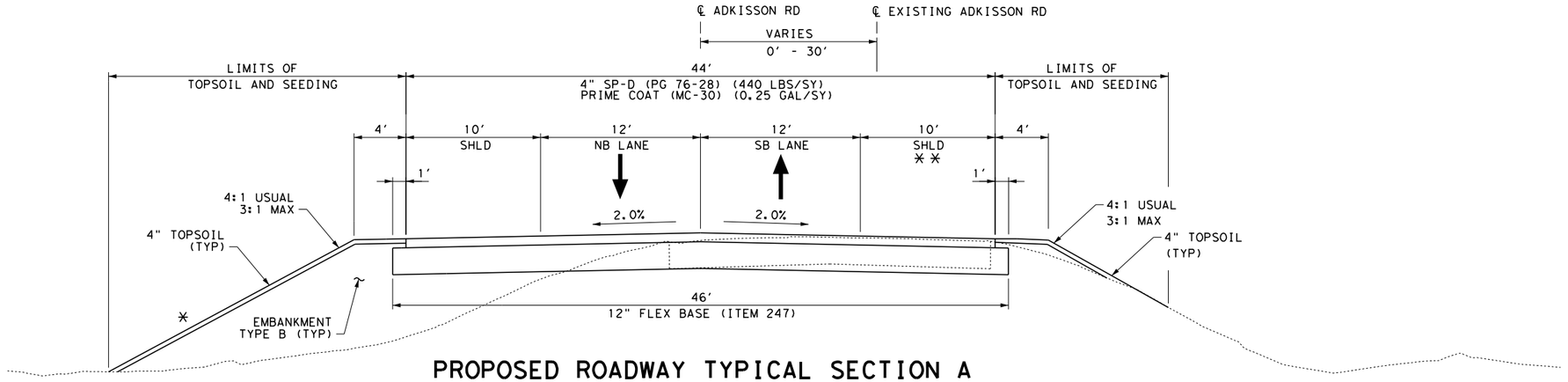
IH-40 AT ADKISSON ROAD

EXISTING TYPICAL SECTIONS

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS DA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JWL	TEXAS	AMA	POTTER	004
CHECK	CONTROL	SECTION	JOB	
	0090	05	108	

SCALE: 1" = 10'



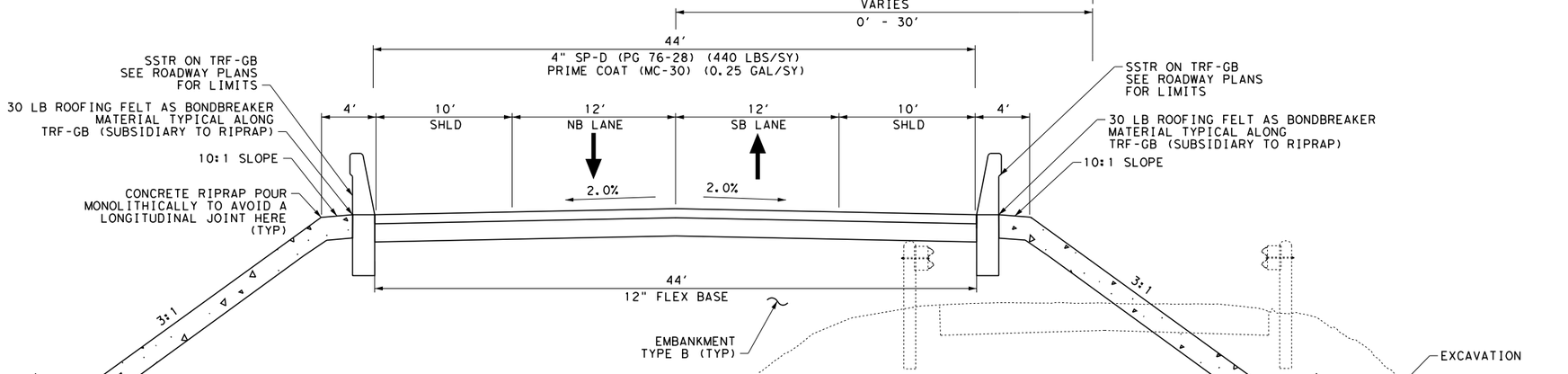
PROPOSED ROADWAY TYPICAL SECTION A

STA 9+82.60.00 TO 18+79.84
STA 24+72.16 TO 30+18.00

NOTES:
** 4' TO 10' SHOULDER BEG STA TO STA 11+68.00
10' TO 4' SHOULDER STA 29+00.00 TO END STA

* CONCRETE RIPRAP
FROM STA 17+50.00 TO 18+79.84

NOTES:
1. REMOVE EXISTING ACP AND BASE AS NEEDED TO ALLOW A TOPSOIL COVER.



PROPOSED ROADWAY TYPICAL SECTION B

STA 18+79.84 TO STA 19+06.00
STA 24+46.00 TO STA 24+72.16
SEE BRIDGE PLANS FOR RIPRAP LIMITS AND DETAILS

PROPOSED BRIDGE TYPICAL SECTION

STA 19+06.00 TO 24+46.00

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER
10/12/23
James W. Langston PE
Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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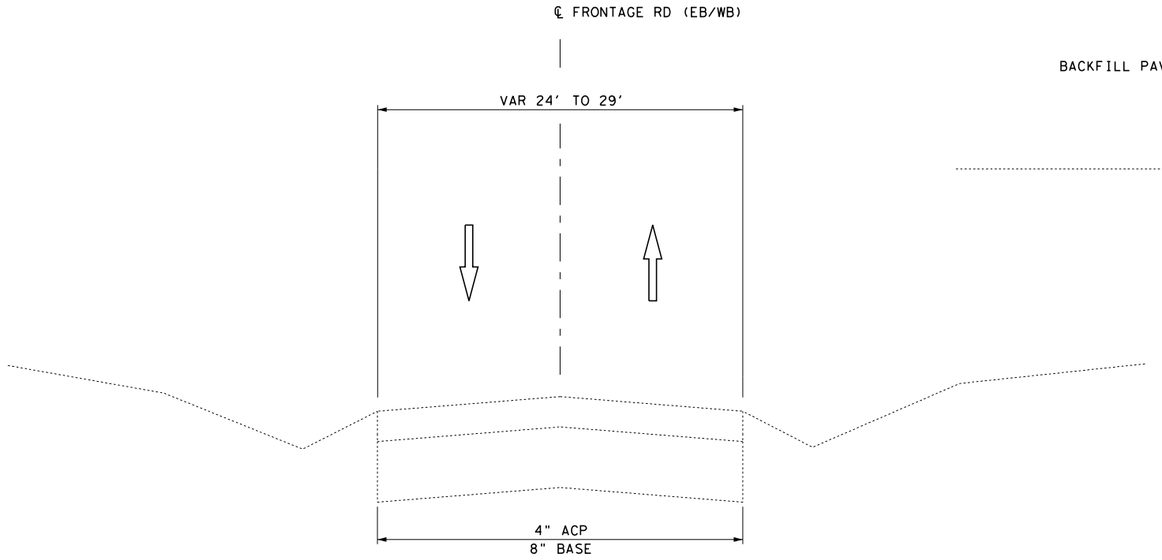
IH-40 AT ADKISSON ROAD

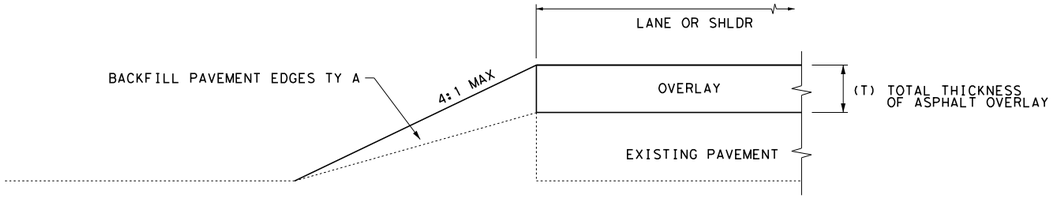
PROPOSED TYPICAL SECTIONS

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DA	TEXAS	AMA	POTTER	005
CHECK	CONTROL	SECTION	JOB	
JWL	0090	05	108	
CHECK				

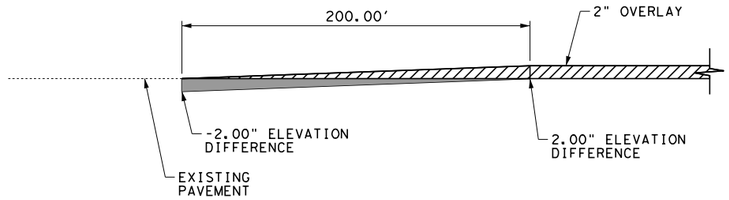
SCALE: 1" = 10'





PAVEMENT EDGE DETAIL

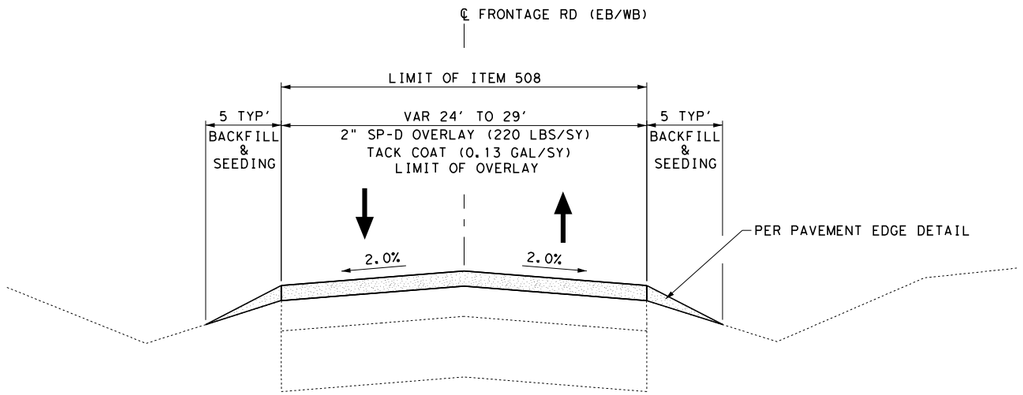
NOT TO SCALE



OVERLAY PAVEMENT PROFILE TRANSITION DETAIL

NOT TO SCALE

EXISTING FRONTAGE ROAD TYPICAL SECTION



PROPOSED FRONTAGE ROAD TYPICAL SECTION

SEE TCP PHASE 1 FOR LIMITS OF OVERLAY
PAVEMENT OVERLAY WILL BE PAID FOR UNDER ITEM 508-6004 CONSTRUCTING DETOURS

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER
10/19/23

James W. Langston PE

Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

TYPICAL SECTIONS FRONTAGE ROADS

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DA	TEXAS	AMA	POTTER	006
CHECK	CONTROL	SECTION	JOB	
JWL	0090	05	108	
CHECK				

GENERAL NOTES

CSJ: 0090-05-108				
BASIS OF ESTIMATE FOR CONSTRUCTION				
Item	Description	Unit	Rate	
164	SEEDING		SEE PLAN SHEETS	
166	FERTILIZER		SEE PLAN SHEETS	
310	PRIME COAT (MC-30)	GAL	0.25 GAL/SY	
3077(1)	SUPERPAVE MIXTURES	TON	4"	440 LB/SY/2000
NOTE:				
(1)	SP-D SAC-A PG70-28 Weight Based On 110Lbs/SY/In			

General

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

TO:	Amarillo Area Engineer	Joe Chappell@txdot.gov
CC:	Assistant Area Engineer	CC.Sysombath@txdot.gov
	Director of Construction	Kenneth.Petr@txdot.gov
	Construction Manager	Darrell.Caldwell@txdot.gov

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

For Q&A's on Proposals navigate to:

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

Use 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 of the project you want to view the Q&A for and click on the link in the window that pops up.

All relevant project documentation including CTD and cross sections (if applicable) will be posted to TxDOT District's FTP website.

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

Verify all survey control prior to beginning construction. Notify Engineer of any discrepancies in control prior to beginning construction.

There are no "reference markers" within the project limits.

The following Standard Detail Sheets have been modified:

BAS-A (MOD)
PBC-RC (MOD)

Remove all excess material from bridge substructure resulting from all construction including planing, seal coat and ACP overlays. This work will not be paid for directly, but will be considered subsidiary to various bid items in the contract.

If Contractor damages any sprinkler heads, risers or water lines that are not to be relocated, he or she is required to replace or repair all damage at his or her own expense and to the Engineer's satisfaction.

If portions of the right-of-way is used to store materials, equipment, and other uses with the approval of the Engineer, materials, equipment, etc., must either be located outside the *30* feet traffic safety clearance zone or be adequately protected.

Contractor facilities, such as asphalt plants, concrete plants, rock crushers, etc. are not allowed to be located within Department right of way.

The slopes indicated on the typical sections may be varied when fixed features required slopes are re-established as directed by the Engineer.

Dust caused by construction operations is to be controlled by applying water in conformance with the requirements of Item 204, "Sprinkling". Sprinkling for dust control will not be paid for directly, but will be considered as subsidiary work to the various bid items.

Verify all existing grades, elevations, and cross slopes that will connect to any proposed grades and elevations. If adjustments are warranted, the Contractor is to submit proposed changes to the Engineer for verification.

Where a precast or cast-in-place concrete element is shown in the plans, Contractor may submit a precast concrete alternate in accordance with the TxDOT Standard Operating Procedure found online here:
https://ftp.txdot.gov/pub/txdot-info/brg/design/alternate-precast-proposal-submission.pdf
Acceptance or denial of any precast alternate design proposal is at the sole discretion of the Engineer.

Item 6 Control of Materials

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

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

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

Item 7 Legal Relations and Responsibilities

No significant traffic generator events identified.

The total area disturbed for this project is approximately *8.9* acres. The disturbed area in this project, all project locations in the Contract, and the Contractor Project Specific Locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer and to the local government that operates a separate storm sewer system.

Item 8 Prosecution and Progress

Create, maintain, and submit for acceptance, a Critical Path Method (CPM) project schedule and a Project Schedule Summary Report (PSSR) using computer software that is fully compatible with the latest version of Primavera Systems, Inc. or Primavera P6.

Provide CPM scheduling, in accordance to Item 8. Submit a separate detailed schedule and plan for the Bridge Demolition and Construction Phase a minimum of four weeks prior to the anticipated start of this work. When the Contractor has made a final determination of the start date, the Contractor must notify the Engineer a minimum of seven days in advance.

Prosecute the work following the sequence shown in the traffic control plan narrative and corresponding traffic control plan. Prosecuting the work in concurrent phases is not allowed unless approved in writing by the engineer

All working days will be computed and charged in accordance with Article 8.3.1.1 Five-Day Workweek.

Lane Rental CSJ: 0090-05-108 (IH 40 and Adkisson Road)

IH 40: The Contractor will be assessed lane rental charges anytime the IH 40 eastbound or westbound main lanes or frontage roads have a lane closure.

All bridge related work within 16’ lateral clearance of either IH 40 or frontage road travel lanes will require a lane closure of the closest travel lane(s). Multi Lane Closure is when both travel lanes on a single roadbed are closed to traffic.

The table below defines peak hours and off-peak hours for CSJ: 0090-05-108

Peak Hours	Off-Peak Hours
Monday through Sunday 8 AM to 7 PM	Monday through Sunday 7 PM to 8 AM

The lane rental charge will be assessed as follows when any lane(s) eastbound or westbound, main lane or frontage road is closed or obstructed:

LANE RENTAL RATES – IH 40 MAINLANES AT ADKISSON RD West-bound				
IH 40 Main Lane Closures	Peak Hours		Off-Peak Hours	
	Hourly Rental Rate	Closure Hours Credited	Hourly Rental Rate	Closure Hours Credited
Single Lane	$50/hour	220	$200/hour	60
Multi Lane Closure	$400/hour	80	$800/hour	22

LANE RENTAL RATES – IH 40 MAINLANES AT ADKISSON RD East-bound				
IH 40 Main Lane Closures	Peak Hours		Off-Peak Hours	
	Hourly Rental Rate	Closure Hours Credited	Hourly Rental Rate	Closure Hours Credited
Single Lane	$50/hour	160	$200/hour	60
Multi Lane Closure	$400/hour	140	$800/hour	22

LANE RENTAL RATES – IH 40 FRONTAGE ROAD AT ADKISSON RD North Frontage Road				
IH 40 Main Lane Closures	Peak Hours		Off-Peak Hours	
	Hourly Rental Rate	Closure Hours Credited	Hourly Rental Rate	Closure Hours Credited
Single Lane	$50/hour	300	$50/hour	60
Multi Lane Closure	$100/hour	100	$200/hour	30

LANE RENTAL RATES – IH 40 FRONTAGE ROAD AT ADKISSON RD South Frontage Road				
IH 40 Main Lane Closures	Peak Hours		Off-Peak Hours	
	Hourly Rental Rate	Closure Hours Credited	Hourly Rental Rate	Closure Hours Credited
Single Lane	$50/hour	220	$50/hour	60
Multi Lane Closure	$100/hour	160	$200/hour	33

*For Example:

1) A multi main lane closure for 3 hours during peak hours will result in 3 hrs, x 1 multi main lane closure = 3 hrs subtracted from the credited hours or $400 x 3 hrs x 1 multi main lane closure = $1200 if contractor has exhausted all credit hours allotted.

2) A single main lane closure for 2 hours during off - peak hours will result in 2 hrs, x 1 single main lane closure = 2 hrs subtracted from the credited hours or $800 x 2 hrs x 1 single main lane closure = $1600 if contractor has exhausted all credit hours allotted.

Milestone A CSJ: 0090-05-108 (IH 40 and Adkisson Road) Bridge replacement

A Milestone A to construct Adkisson Road bridge is designated to facilitate construction as fast as possible.

The time allowed for the Adkisson Bridge construction is 186 working days in accordance with Article 8.3.1.1 Five-Day Workweek.

Milestone A time charges will start when the Adkisson Road bridge is closed for construction. Closed is defined as when all traffic is closed to the bridge. Milestone A time charges will end when the following requirement are met.

1. The bridge and approach roadway has one North-bound lane and one South-bound lane open to traffic and will remain open for the remaining duration of the project.
2. Once Adkisson bridge is open to traffic, any lane closure for bridge work greater than 10 hour duration will count as a Milestone working day.

If the Milestone A is complete, as defined above, earlier than the stated number of working days, a bonus of $1,000 per day for a maximum of 30 days will be awarded. If the Milestone A is not completed, as defined above, within the stated number of days, contract administration and road user liquidated damages of $500 per day will be assessed for each day more than the stated number of allowable working days for the Adkisson Road project until the bridge is completed and open to traffic. The working period charged during the Adkisson Road bridge Milestone A shall also be included in the computation of the total time charges for total project completion.

Item 100 Preparing Right Of Way

Preparing right of way will consist exclusively of mowing the vegetation to the width shown in the plans for Backfilling Pavement Edges. Set mower cutting height to cut as low as practical but no higher than 6 inches. Payment for Preparing Right Of Way will be made only in the case where mowing is actually used.

No tree removals are anticipated. If a tree is removed for contractor convenience, all tree removal activities are to take place outside nesting season. See EPIC for nesting season.

Item 110 Excavation

Prior to excavation and placement of embankment, the top-soil (6-inch depth) within the areas to be disturbed will be bladed into a windrow, or stockpiled, outside the limits of the fill slope. After all grading is completed; the top soil (6-inch depth) will be spread over the disturbed areas that will not receive concrete riprap. This work is not paid for directly, but will be considered as subsidiary work to the various bid items.

Item 132 Embankment

The plasticity index for *TY B* will not exceed 25.

Materials excavated from the project will be allowed to be used on the project as directed by the Engineer.

Item 134 Backfilling Pavement Edges

Mow according to Item 100 just prior to backfill pavement edge operations.

Do not overlay any roadway unless the pavement edges can be backfilled within 24 hours. Preferably, both edges of all roadways should be completely backfilled at the end of each day's overlay operations. Damage to delineators, signs, or other roadside features will be repaired or replaced at the expense of the Contractor.

The backfill material will not be obtained from within the right-of-way or from any area that contains perennial plants such as “bindweed” or “jointgrass” that would be detrimental to agricultural land.

Item 160 Topsoil

Salvage approximately 1112 cubic yards of topsoil from areas in the median and along the side slopes where new riprap is shown on the plans. Maximum salvage depth is 6-in. Place 4-in. layer of Topsoil to designated areas.

Item 164 Seeding for Erosion Control

Perform planting operations in accordance with the recommendations contained in the latest version of the TxDOT manual "A Guide to Roadside Vegetation Establishment" developed by the Vegetation Management Section of the Maintenance Division.

Seeding may require more than one mobilization, depending upon the Contractor's sequence of work.

Item 166 Fertilizer

Fertilize all areas of project to be seeded or sodded in accordance with the Amarillo District Vegetation Specification Sheet.

Item 169 Soil Retention Blankets

All Class 1 Slope Protection will be the roll-out type, having netting on both sides. Hydraulically placed materials will not be allowed.

Item 247 Flexible Base

SPECIFICATION FOR FLEX BASE TY A, B OR D, GR 4								
GRADING REQUIREMENTS PERCENT RETAINED – SIEVES SIEVE SIZES INCHES					***SOIL CONSTANTS***		***MAX WET BALL ****	***MAX % INCREASE IN PASSING # 40 ****
1 3/4	***7/8***	***3/8***	***# 4***	***# 40***	*L.L. MAX*	*P.I. MAX*		
0	*17-32*	*40-60*	*50-70*	*70-85*	*40*	*12*	*45*	*20*

*Applies to TY A material only.

Item 320 Equipment for Asphalt Concrete Pavement

A self-propelled, wheel mounted material transfer vehicle (MTV) capable of receiving hot mix from the haul trucks separate from the paver is required on all courses and all types of hot mix for this project. The MTV is to have a minimum storage capacity of approximately 25 tons, and equipped with a pivoting discharge conveyor and a means of completely remixing the hot mix prior to placement. The paver hopper is to be equipped with a separate surge storage insert with a minimum capacity of approximately 20 tons.

If used, the IR bar read out screen must be visible at all times to the Engineer.

When performing any scheduled work during night time hours (sunset to sunrise) all work areas will be fully illuminated using devices designed to not incumber or distract oncoming traffic. All illumination equipment must be approved by the Engineer in writing 48 hours before any scheduled night time work can begin. All associated equipment and labor is considered subsidiary to the item of work and will not be paid for directly.

Item 354 Planing and Texturing Pavement

The Contractor will retain ownership of planed materials.

Item 416 Drilled Shaft Foundations

A stabilization method is to be used to prevent caving of the material and is to be submitted as part of the Contractor's Safety Plan.

The Engineer will provide strength-testing equipment when required in accordance with the Contract-controlling tests.

Furnish and maintain the following testing equipment:

- ♦ Test Molds

Item 420 Concrete Substructures

Slope top of abutment caps, bent caps, except the bearing seats, such that water will drain away from the backwall. This work will not be paid for directly but will be considered subsidiary to pertinent items.

Item 421 Hydraulic Cement Concrete

The sand equivalent value of fine aggregate is not to be less than 85 when subjected to test method tex-203-F.

The Engineer will perform all job control testing for acceptance.

The Engineer will provide strength-testing equipment when required in accordance with the Contract-controlling tests.

Furnish and maintain the following testing equipment:

- ♦ Test Molds

All cast-in-place concrete except for drilled shafts are to be air-entrained. Pre-cast and drilled shaft concrete may be air-entrained at the Contractor's option.

Item 422 Concrete Superstructures

For the concrete for bridge deck, provide Class S concrete meeting the following:

- Do not use silica fume as a cement replacement.
- Include synthetic macro-fibers in all bridge slabs at a rate of 4 lbs/CY. The fibers shall conform to ASTM C1116 , Type III and have a minimum length of 2 inches. The following macro-fibers are approved for this project:
  - Euclid Tuf-Strand SF
  - Forta-Ferro
- Include a Shrinkage Reducing Admixture (SRA)(capillary tension reducing type) at a minimum rate of 1 gal/cy in cast-in-place bridge deck concrete. The shrinkage reducing admixture must be compatible with other admixture(s) in the mix and mix adjusted to maintain the required air-entrainment. Include type and dosage information in proposed mixed design for approval.

Provide a minimum of two work bridges for finishing operations, application of evaporation protection and application of interim cure.

Provide a minimum of 1 immersion type vibrator having a rubber or non-metallic head for each 25 ft. of bridge deck placement width. Additional vibrators may be required if the concrete consolidation required by the specification is not achieved.

Thoroughly saturate precast deck panels to obtain saturated surface dry (SSD) a minimum of 3 hours prior to placing concrete. Maintain SSD condition until deck concrete is placed.

The use of evaporation protection is required. Use the Wet Burlap method for evaporation protection, in accordance with Article 7 Section 1.2. The use of evaporation retardant is not allowed.

Use cotton mats for final curing. The burlap placed for evaporation protection can be left in place and covered with the cotton mats. At a minimum, cover the cotton mats with plastic and install soaker hoses sufficient to keep the cotton mats continuously wet for the duration of the required curing time.

Thickened slab ends will be required on all bridges regardless of skew.

Item 424 Precast Concrete Structures (Fabrication)

Submit shop drawings for the following non-stressed members:

- Precast abutment
- Precast bent cap

Item 425 Prestressed Concrete Structural Members

Calcium Nitrite, an inorganic corrosion inhibitor admixture, is to be added to prestressed concrete beams and panels at a dosage rate of 3.0 gal/cy.

Vertical clearance is less than or equal to 20 feet, provide Bars C and CH for the full length of the girder per the IGD standard.

Item 427 Surface Finishes for Concrete

Provide a rub finish to Surface Area II as described in the standard specification.

Item 432 Riprap

All concrete riprap in contact with bridge abutments is to have joints made with a 6" fiber expansion joint material and be sealed with a joint sealer as approved by the Engineer. Afterward, use Cap Option A with 20 GA metal flashing for concrete riprap in contact with the abutment and wingwalls.

24" tie bars (#3 bars at 18" c-c) are to be used across all construction joints. Tie bars should be 12'' into each side of the construction joint. When tying new riprap into existing riprap drill and epoxy grout 8" minimum into existing concrete. This is to be considered subsidiary to the payment for riprap.

Provide an intermediate toe wall when rip rap exceeds 25' vertically.

Item 440 Reinforcement for Concrete

At the Contractor's option, galvanized, low-carbon chromium (ASTM A1035), or zinc-coated hot-dip galvanized reinforcing steel may be substituted for the specified epoxy coated reinforcing steel. Any substitution will be done at no additional cost to the Department.

For bridge decks, provide GFRP bar reinforcement conforming to ASTM D7957/7957M in the top mat, except provide a minimum modulus of elasticity of 7,500ksi.

For bridge decks, provide galvanized or low-carbon chromium (ASTM A1035) reinforcement in the bottom mat of the overhangs. GFRP bars are permitted in the bottom mat if an alternative GFRP slab design with calculations signed and sealed by a professional engineer are provided.

Provide bar laps, where required, as follows:

galvanized or low-carbon chromium (ASTM A1035) - #4 = 2'-5"
GFRP - #5 = 2'-9"

Tie reinforcement for the top mat in the bridge slab at all intersections regardless of reinforcement spacing.

Item 454 Bridge Expansion Joints

Use Sealtite Bridge Joint Sealant 50N or Chase Construction products Phyzite 380 premolded preformed compressible joint material or approved equal. Install per manufacturer's recommendation.

https://www.txdot.gov/business/resources/materials/material-producer-list.html

Item 496 Removing Structures

Provide the Engineer a minimum of 15 working days' notice prior to beginning bridge demolition.

Removal of the approach slabs, abutments, bents, rails, columns/drilled shafts, and all superstructure and substructure elements is considered subsidiary to this item.

The following items have tested positive for asbestos: Textured Surface Coating (paint).

TxDOT will be responsible for abating asbestos containing materials prior to letting in accordance with TxDOT 2014 Standard Specification 6.10 and applicable regulatory requirements, including 40 CFR 61.145 (Renovation and Demolition of Structures-Asbestos NESHAP) and OSHA 29 CFR 1926.1101 (Asbestos Standard for Construction).

Item 502 Barricades, Signs, and Traffic Handling

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

The Contractor is to have the option of using either plastic drums, vertical panels, grabber cones or a combination where drums are shown as channelizing devices, as approved by the Engineer. Plastic drums are to be used in all transition areas in accordance with BC(8)-21 and WZ(TD)-17.

Furnish and install "soft shoulder" signs as directed by the Engineer. This work will not be paid for directly, but will be considered as subsidiary to item 502, "Barricades, Signs and Traffic Handling".

Provide a 3:1 backfill "safety slope" at the end of the day for any drop off exceeding 2" that is adjacent to a travel lane.

If more than one lane closure location is desired a minimum of 2 miles passing zone is required between each location.

Notify the Engineer 24 hours prior to any lane closure.

Any work being done above travel lanes will require the lanes to be closed for traffic safety.

Item 504 Field Office and Laboratory

The following building(s) will be required for this project:

One Type (D) structure, asphalt mix control laboratory

Each building is to be provided before work is begun on the pertinent construction items for which it is needed.
Any laboratory furnished is to be a minimum of 10 ft in width.

All-weather parking area and chain link security fence will not be required.

The Type D structures are to be equipped with the following in addition to requirements specified under item 504:

a. Safety equipment
   (1) One eye wash station
   (2) One fire extinguisher
   (3) One first aid kit

Furnish a Type D structure for the asphalt mix control laboratory for the Engineer's exclusive use. In addition to requirements of item 504, this structure is to have a minimum height of 8 feet and provide a minimum 400 square feet gross floor area for permanently located plants or 200 square feet for temporary located plants serving one project. The floor area will be partitioned into a minimum of two interconnected rooms, each room furnished with an exterior door and a minimum of two windows. The floor is to have sufficient strength to support the testing equipment and have an impervious covering.

The Type D structures are to be adequately air conditioned and be furnished with a minimum of one desk and three chairs. The structure is to be provided with a 240-volt electrical service entrance. The service is to consist of a minimum of 4 - 120 volt circuits with 20 amp breakers and no more than two grounded convenience outlets per circuit and provisions for a minimum of two 220-volt ovens with vents to the outside. The structure is to have a minimum of 2 convenience outlets per wall, and a utility sink with an adequate clean potable water supply for testing. The state building is to be equipped with at minimum a hot water dispenser or hot water heater capable of generating 1 gallon of water per use at 140° F with adequate water pressure. Space heaters for heating the structure are unacceptable. Portable structures are to be support blocked for stability and are to be tied down.

For this project, asphalt content will be determined utilizing the ignition method so the structure is to provide for the following in lieu of the item 504 requirements for asphalt content by extraction. The room to contain the ignition oven is to be adequately power ventilated and contain a NEMA 6-50r (208/240 v, 50 a) outlet within 2.5 feet of the ignition oven location and an independent exhaust outlet to the outside no further than 8 feet from the oven.

The surface for the ignition oven location is to be level, sturdy, and fireproof with at least 6-inch clearance between the furnace and other vertical surfaces.

If needed, each building is to be moved to a new location as directed by the Engineer. Any building that is no longer required on the job after completion of the pertinent construction items may be released to the Contractor upon consent of the Engineer.

Item 506 Temporary Erosion, Sedimentation, and Environmental Controls

Erosion control devices are to be installed as needed in coordination with the work progress, or as directed by the Engineer.

Item 512 Portable Concrete Traffic Barrier

The state will furnish the portable concrete traffic barrier sections for Item 512, "Port. Concrete Traffic Barrier (Des Source)", the state will supply sufficient hardware to connect the sections together. The sections will be available at project location.

When the Engineer determines that all phases of construction involving portable concrete traffic barriers are complete, the Contractor is to remove and deliver the PCTB sections, complete with all mounting hardware, to the same source stockpile location where they were picked up. The stockpile location at the intersection of IH 40 and Adkisson Road.

The Engineer will designate a location for unloading the PCTB sections. This work will be measured and paid for at the unit price bid for item 512, "Port Concrete Traffic Barrier (STKPL)".

Item 540 Metal Beam Guard Fence

Drive steel posts for metal beam guard fence a minimum of 1/3 of the post length to final specified depth.

Item 542 Removing Metal Beam Guard Fence

All MBGF, GET & TAS materials will remain property of the Contractor.

Item 544 Guardrail End Treatments

Use Single Guardrail End Treatment (Ty III)(Steel Post).

Item 644 Small Roadside Sign Supports and Assemblies

All slip base signs will have a triangular slip base with a 2-bolt clamp to prevent rotation of signpost. Set screw type slip base will not be allowed.
A 7" x 1/2" diameter galvanized rod or #4 rebar is to be installed in the sign stub as shown on SMD(SLIP-1)-08 to prevent rotation of the sign stub in the concrete footing.

The exact locations of the large and small roadside signs are to be as designated by the Engineer.

The existing riprap aprons are to be removed and disposed of as approved by the Engineer. This work is not to be paid for directly, but will be considered subsidiary to the removal of foundations under this item.

Probe before drilling for foundations to determine the location of all utilities and structures. This work will not be paid for directly, but will be considered subsidiary to bid items involved.

Details for standard signs not shown on the signing standards of the signing detail plan sheets are to be in conformance with the department's "Standard Highway Sign Designs for Texas" Manual, Latest Edition.

Install a wrap of retroreflective sheeting conforming to DMS-8300 on all posts for small road sign assemblies. Sign post wraps will not be paid for directly, but are considered subsidiary to Item 644.
Install red sheeting on the posts containing the following signs:
Stop, Yield, Wrong Way & Do Not Enter

Install yellow sheeting on all other small sign posts.

Install all retroreflective wraps at a height of 4 ft. from bottom of the wrap to the edge of the travel lane surface. All retroreflective wraps will cover the full circumference of the sign post for a vertical width of 12 inches.

Item 658 Delineator and Object Marker Assemblies

For all concrete barrier, bridge rail, and guard fence post mounted applications provide hollow or tubular posts with approved anchorage.

Item 666 Reflectorized Pavement Markings

Retroreflectivity Requirements:

All Type I markings must meet the minimum retroreflectivity values for edgeline markings, centerline or no passing barrier-line, and lane lines when measured any time after 3 days, but not later than 10 days after application:

- White markings: 250 millicandelas per square meter per lux (mcd/m^2/lx)
- Yellow markings: 175 mcd/m^2/lx

Retroreflectivity Measurements: Mobile or portable retroreflectometers may be used at the Contractor's discretion.

All Type I markings must meet the minimum retroreflectivity values for edgeline markings, centerline or no passing barrier-line, and lane lines when measured any time after 3 days, but not later than 10 days after application.

Item 3077 Superpave Mixtures

Use aggregate that meets the SAC requirement of class A.

Only fractionated RAP is allowed.

Use of RAS is not allowed.

All SP-D on this project is considered surface mix. A substitution PG binder is not allowed, as shown in Table 5.

When laying ACP on a roadway that has two or more lanes and the work is being done under traffic, then the adjacent lane or lanes are to be overlaid by the end of the following day.

Make a smooth, clean, minimum 1 inch deep butt joint where each end of the new pavement joins the existing pavement. Any method approved by the Engineer can be used to make the joint.

The District Lab will perform a maximum of 2(two) design verification tests. If additional verification tests are needed, the Contractor will be billed $3,500.00 per each additional verification test required to obtain an approved asphaltic concrete pavement mix design.

If lime is not used as an antistrip agent, then the production and placement testing frequency for the Boil test (TEX-530-C) shown in the table below.

Description	Test Method	Minimum Contractor Testing Frequency	Minimum Engineer Testing Frequency
Boil test	Tex-530-C	1 per lot	1 per 12 sublots

If used, the IR bar read out screen must be visible at all times to the Engineer.

Item 3096 Asphalts, Oils, and Emulsions

Asphalt from different sources is not to be blended.

The "Open" seasons for applying asphaltic materials and mixtures for the listed items are to be as follows, unless authorized otherwise in writing by the Engineer:

ITEMS	OPEN SEASON
310	All Year
3077	From April 15th through October 31st

Item 6001 Portable Changeable Message Sign

Supply 2 Portable Changeable Message Signs (Type II – Lamp Matrix) for this project.
No payment will be made for removing and replacing damaged PCMS.

If the Contractor chooses to have more than one lane closure set-up at a time, provide additional PCMS in accordance with TCP at no additional charge to the department.

Item 6185 Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide 0 additional shadow vehicle(s) with TMA for TCP (2-2)-18, (2-6)-18, (3-1)-13, (3-2)-13, (3-3)-14, (6-1)-12, (6-2)-12, (6-4)-12, (6-6)-12, (6-7)-12, (6-8)-14 as detailed on the General Notes of this standard sheets.

Therefore, 2 total shadow vehicles with TMA will be required for this type of work. 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 needed for the project.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0090-05-108 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY IH 40

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0090-05-108**			
		PROJECT ID		**A00183718**			
		COUNTY		**Potter**			
		HIGHWAY		**IH 40**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6009	REMOVING CONC (RIPRAP)	SY	2,103.000		2,103.000	
	104-6027	REMOVING CONC (APPR SLAB)	SY	131.000		131.000	
	110-6001	EXCAVATION (ROADWAY)	CY	7,830.000		7,830.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY	21,887.000		21,887.000	
	134-6001	BACKFILL (TY A)	STA	53.000		53.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	10,007.000		10,007.000	
	164-6004	BROADCAST SEED (PERM) (RURAL) (CLAY)	AC	9.000		9.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	10,164.000		10,164.000	
	247-6472	FL BS(CMP IN PLC)(TY A,B OR D GR4)(12")	SY	7,484.000		7,484.000	
	310-6009	PRIME COAT (MC-30)	GAL	1,871.000		1,871.000	
	354-6002	PLAN & TEXT ASPH CONC PAV(0" TO 2")	SY	4,299.000		4,299.000	
	400-6005	CEM STABIL BKFL	CY	148.000		148.000	
	416-6001	DRILL SHAFT (18 IN)	LF	188.000		188.000	
	416-6004	DRILL SHAFT (36 IN)	LF	460.000		460.000	
	416-6006	DRILL SHAFT (48 IN)	LF	1,292.000		1,292.000	
	420-6014	CL C CONC (ABUT)(HPC)	CY	56.800		56.800	
	420-6030	CL C CONC (CAP)(HPC)	CY	124.200		124.200	
	420-6038	CL C CONC (COLUMN)(HPC)	CY	146.700		146.700	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	50.000		50.000	
	422-6001	REINF CONC SLAB	SF	24,840.000		24,840.000	
	422-6015	APPROACH SLAB	CY	96.600		96.600	
	425-6036	PRESTR CONC GIRDER (TX34)	LF	3,219.490		3,219.490	
	427-6007	EPOXY WATERPROOF FINISH (TY X)	SF	1,324.000		1,324.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	606.000		606.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	56.000		56.000	
	450-6023	RAIL (TY SSTR)	LF	1,486.000		1,486.000	
	454-6007	HEADER TYPE EXPANSION JOINT	LF	190.000		190.000	
	496-6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	10.000		10.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	156.000		156.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	156.000		156.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4,100.000		4,100.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4,100.000		4,100.000	
	508-6001	CONSTRUCTING DETOURS	SY	16,266.000		16,266.000	
	512-6017	PORT CTB (DES SOURCE)(F-SHAPE)(TY 1)	LF	600.000		600.000	
	512-6041	PORT CTB (STKPL)(F-SHAPE)(TY 1)	LF	600.000		600.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0090-05-108 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY IH 40

		CONTROL SECTION JOB		**0090-05-108**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00183718**			
		COUNTY		**Potter**			
		HIGHWAY		**IH 40**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	514-6003	PERM CTB (SGL SLOPE) (TY 3) (42)	LF	720.000		720.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	300.000		300.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.000		2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	1,850.000		1,850.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	4.000		4.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	2.000		2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	6.000		6.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000		2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	4.000		4.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	8.000		8.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	6.000		6.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	16.000		16.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	378.000		378.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	34.000		34.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA	8.000		8.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	70.000		70.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	2,160.000		2,160.000	
	3077-6058	SP MIXES SP-D SAC-A PG70-28	TON	1,521.000		1,521.000	
	4171-6001	INSTALL BRIDGE IDENTIFICATION NUMBERS	EA	2.000		2.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6024-6011	HPPM W/RET REQ TY I(W)6"(SLD)(090MIL)	LF	4,746.000		4,746.000	
	6024-6020	HPPM W/RET REQ TY I(Y)6"(BRK)(090MIL)	LF	1,235.000		1,235.000	
	6024-6023	HPPM W/RET REQ TY I(Y)6"(SLD)(090MIL)	LF	5,302.000		5,302.000	
	6185-6002	TMA (STATIONARY)	DAY	20.000		20.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	40.000		40.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	134 6001	354 6002	508 6001	512 6017	512 6041	545 6005	545 6019	662 6111
	BACKFILL (TY A)	PLAN & TEXT ASPH CONC PAV(0" TO 2")	CONSTRUCTING DETOURS	PORT CTB (DES SOURCE) (F-SHAPE) (TY 1)	PORT CTB (STKPL) (F-SHAPE) (TY 1)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (S) (N) (TL3)	WK ZN PAV MRK SHT TERM (TAB)TY Y-2
	STA	SY	SY	LF	LF	EA	EA	EA
TRAFFIC CONTROL PLAN PHASE 1	53	4299	16266	600			2	378
TRAFFIC CONTROL PLAN PHASE 2					600	2		
PROJECT TOTALS	**53**	**4299**	**16266**	**600**	**600**	2	2	**378**

SUMMARY OF REMOVAL ITEMS

LOCATION	104 6009	104 6027	542 6001	542 6002	542 6003	544 6003	545 6005
	REMOVING CONC (RIPRAP)	REMOVING CONC (APPR SLAB)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE DOWNSTREAM ANCHOR TERMINAL	GUARDRAIL END TREATMENT (REMOVE)	CRASH CUSH ATTEN (REMOVE)
	SY	SY	LF	EA	EA	EA	EA
REMOVAL PLAN	2103	131	1850	4	2	2	2
PROJECT TOTALS	**2103**	**131**	**1850**	**4**	**2**	**2**	**2**

SUMMARY OF ROADWAY ITEMS

LOCATION	110 6001	132 6004	160 6003	247 6472	310 6009	420 6066	432 6001	432 6045	450 6023	3077 6058	514 6003	540 6002	540 6006	540 6016	544 6001	545 6019
	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(DENS CONT)(TY B)	FURNISHING AND PLACING TOPSOIL (4")	FL BS(CMP IN PLC)(TY A,B OR D GR4)(12")	PRIME COAT (MC-30) 0.25 GAL/SY	CL C CONC (RAIL FOUNDATION)	RIPRAP (CONC)(4 IN)	RIPRAP (MOW STRIP) (4 IN)	RAIL (TY SSTR)	SP MIXES SP-D SAC-A PG70-28 (4": 440LB/SY/2000)	PERM CTB (SGL SLOPE) (TY 3) (42)	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	DOWNSTREAM ANCHOR TERMINAL SECTION	GUARDRAIL END TREATMENT (INSTALL)	CRASH CUSH ATTEN (INSTL) (S) (N) (TL3)
	CY	CY	SY	SY	GAL	CY	CY	CY	LF	TON	LF	LF	EA	EA	EA	EA
WB FRONTAGE ROAD								12			240	100		1	1	2
EB FRONTAGE ROAD								12			240	100		1	1	2
PLAN & PROFILE SHT 1 OF 2	7112	8943		4712	1178	25	6	16	177	945		50	2		2	
PLAN & PROFILE SHT 2 OF 2	718	12944		2772	693	25	3	15	177	576	240	50	2		2	2
PROPOSED TYPICAL SECTION			10007													
PROJECT TOTALS	7830	21887	10007	7484	1871	50	9	56	354	1521	720	300	4	2	6	6

EARTHWORK SUMMARY TABLE - SHEET 1

STATION	CUT (CY)	FILL (CY)	SUM (CY)
10+00.00	0.00	0.00	0.00
10+50.00	83.00	34.00	-49.00
11+00.00	84.00	32.00	-52.00
11+50.00	83.00	41.00	-42.00
12+00.00	80.00	62.00	-18.00
12+50.00	76.00	75.00	-1.00
13+00.00	70.00	98.00	28.00
13+50.00	77.00	153.00	76.00
14+00.00	98.00	251.00	153.00
14+50.00	131.00	380.00	249.00
15+00.00	193.00	517.00	324.00
15+50.00	290.00	648.00	358.00
16+00.00	414.00	758.00	344.00
16+50.00	573.00	841.00	268.00
17+00.00	767.00	922.00	155.00
17+50.00	956.00	857.00	-99.00
18+00.00	1105.00	773.00	-332.00
18+50.00	1205.00	825.00	-380.00
19+00.00	687.00	890.00	203.00
19+14.00	54.00	252.00	198.00
19+25.00	41.00	184.00	143.00
19+50.00	39.00	295.00	256.00
19+60.00	6.00	55.00	49.00
SUBTOTAL SHT 1 OF 2	7112.00	8943.00	1831.00

EARTHWORK SUMMARY TABLE - SHEET 2

24+25.00	312.00	3540.00	3228.00
24+44.00	19.00	440.00	421.00
24+50.00	5.00	216.00	211.00
25+00.00	23.00	1911.00	1888.00
25+50.00	16.00	1798.00	1782.00
26+00.00	7.00	1501.00	1494.00
26+50.00	0.00	1250.00	1250.00
27+00.00	0.00	952.00	952.00
27+50.00	0.00	615.00	615.00
28+00.00	0.00	365.00	365.00
28+50.00	0.00	190.00	190.00
29+00.00	15.00	85.00	70.00
29+50.00	46.00	36.00	-10.00
30+00.00	76.00	19.00	-57.00
30+50.00	96.00	15.00	-81.00
31+00.00	103.00	11.00	-92.00
SUBTOTAL SHT 2 OF 2	718.00	12944.00	12226.00
TOTAL	7830.00	21887.00	14057.00

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

IH-40 AT ADKISSON ROAD

QUANTITY SUMMARY TABLES

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CG	TEXAS	AMA	POTTER	009
CHECK	CONTROL	SECTION	JOB	
JWL	0090	05	108	
CHECK				
PF				

SUMMARY OF SIGNING PAVEMENT MARKING ITEMS									
LOCATION	644	658	668	668	672	678	6024	6024	6024
	6004	6062	6076	6092	6009	6002	6011	6020	6023
	IN SM RD SN SUP & AM TY10BWG(1)SA(T)	INSTL DEL ASSM (D-SW) SZ 1(BRF) GF2(BI)	PREFAB PAV MRK TY C (W)24"(SLD)	PREFAB PAV MRK TY C (W) 36" (YLD TRI)	REFL PAV MRKR TY II-A-A	PAV SURF PREP FOR MRK (6")	HPPM TY I (W) (6") (SLD) (90MIL)	HPPM W/RET REQ TY I(Y)6" (BRK)(090MIL)	HPPM W/RET REQ TY I(Y)6"(SLD)(090 MIL)
	EA	EA	LF	EA	EA	LF	LF	LF	LF
PAVEMENT MARKING & SIGNAGE	6	16	34	8	70	2160	4746	1235	5302
PROJECT TOTALS	**6**	**16**	**34**	**8**	**70**	**2160**	**4746**	**1235**	**5302**

SUMMARY OF SWP3 ITEMS						
LOCATION	506	506	506	506	169	164
	6038	6039	6020	6024	6001	6004
	TEMPORARY SEDIMENT CONTROL FENCE (INSTALL)	TEMPORARY SEDIMENT CONTROL FENCE (REMOVE)	CONSTRUCTION EXITS (INSTALL) TY 1	CONSTRUCTION EXITS (REMOVE)	SOIL RETENTION BLANKETS (CL 1) (TY A)	BROADCAST SEED (PERM) (RURAL) (CLAY)
	LF	LF	SY	SY	SY	AC
SW3P LAYOUT	4100	4100	156	156	10164	9
PROJECT TOTALS	**4100**	**4100**	**156**	**156**	**10164**	**9**

NO.	DATE	DESCRIPTION	APPROV.

2M ASSOCIATES, LLC
5930 PRESTON VIEW BLVD., SUITE A
DALLAS, TEXAS 75240
TBPE REGISTRATION NO.12158
PH. 214.983-1377
FAX 888-528-9180

QUANTITY SUMMARY TABLES

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DH	6	SEE TITLE SHEET		IH 40
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MK	TEXAS	AMA	POTTER	010
CHECK	CONTROL	SECTION	JOB	
AM	0090	05	108	
CHECK				
DH				

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JWL

c:\bms\bridgefarmer-pw\jim.langston\dms21624\QUANTITY SUMMARY TABLE 2.dgn

TCP NARRATIVE:

GENERAL TCP NOTES:

* PROVIDE TWO (2) PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) FOR USE DURING CONSTRUCTION AND PLACED AS DIRECTED BY THE ENGINEER

PHASE 1

1. OVERLAY THE FRONTAGE ROADS PER TCP GUIDANCE SHOWN ON STD TCP(2-2)-18.

2. APPLY PERMANENT PAVEMENT MARKINGS ALONG THE NEW OVERLAYED PAVEMENT.

3. PLACE ADKISSON RD DETOUR SIGNAGE AND BARRICADES.

4. SET PCTB AND CRASH CUSHIONS IN THE IH 40 CENTER MEDIAN.

PHASE 2

1. CLOSE ADKISSON RD BETWEEN THE RAMP INTERSECTIONS AND DETOUR ALL LOCAL TRAFFIC.

2. SETUP TEMPORARY FRONTAGE RD CLOSURE FOR ACTIVE WORK OVER EACH FRONTAGE ROAD.

3. DEMOLISH THE BRIDGE SPANS OVER EACH FRONTAGE ROAD. USE ONE FRONTAGE ROAD CLOSURE AT A TIME AND DETOUR TRAFFIC .
   MAINTAIN THE BRIDGE SPANS IN-PLACE OVER IH 40 MAINLANES.

4. TO DEMOLISH BRIDGES OVER IH 40 MAIN LANES, CLOSE IH 40 AND SHIFT TRAFFIC TO THE ADJOINING FRONTAGE ROAD PER STD TCP (6-6)-12. WHEN IH 40 TRAFFIC IS ON THE FRONTAGE ROAD, TWO-WAY TRAFFIC IS NOT ALLOWED ON THAT FRONTAGE ROAD. MAINTAIN 2-WAY TRAFFIC ON THE OTHER FRONTAGE ROAD AWAY FROM CONSTRUCTION.

5. WHEN WORKING OVER IH 40 MAIN LANES, ONE SIDE OF IH 40 TRAFFIC AT A TIME CAN BE SHIFTED TO A TEMPORARY ONE-WAY, ONE-LANE, OPERATION ON THE ADJOINING FRONTAGE ROAD. THIS OPERATION WILL BE ALLOWED ONLY ON THE SAME SIDE WHERE WORK IS OCCURRING.

6. ONLY ONE FRONTAGE ROAD AT A TIME CAN BE CLOSED.

7. IH 40 TRAFFIC CANNOT BE SHIFTED TO OPERATE ON THE FRONTAGE ROAD WITHOUT PRIOR APPROVAL. ALL FRONTAGE ROAD CLOSURES MUST BE PRE-APPROVED BY THE ENGINEER. THE CONTRACTOR IS TO PROVIDE 3 WEEKS ADVANCE NOTICE OF ANY POTENTIAL ROAD CLOSURE, AND ADVERTISE FOR 2 WEEKS PRIOR TO THE ROAD CLOSURE USING CHANGEABLE MESSAGE BOARDS.

8. CONSTRUCT THE ADKISSON RD APPROACHES AND BRIDGE SPANS OVER THE EB AND WB FRONTAGE ROADS.

   TO MAINTAIN ADKISSON RD TRAFFIC:
   -ROUTE WB TRAFFIC ONTO IH-40 AT FM 2381.
   -ROUTE EB TRAFFIC ONTO IH-40 AT LOCUST RD.

9. SET BEAMS AND PANELS. DO NOT WORK OVER TRAFFIC. BEAMS OVER THE FRONTAGE ROAD AND IH 40 CAN BE SET BY CLOSING ONE FRONTAGE ROAD OR SHIFTING IH 40 TRAFFIC ONTO THE FRONTAGE ROAD. USE A NIGHT WORK OPERATION AND FOLLOW THE PREVIOUS NOTES ON FRONTAGE ROAD CLOSURES.

Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

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BRIDGEFARMER & ASSOCIATES, INC.
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TBPE REGISTRATION NO. 264

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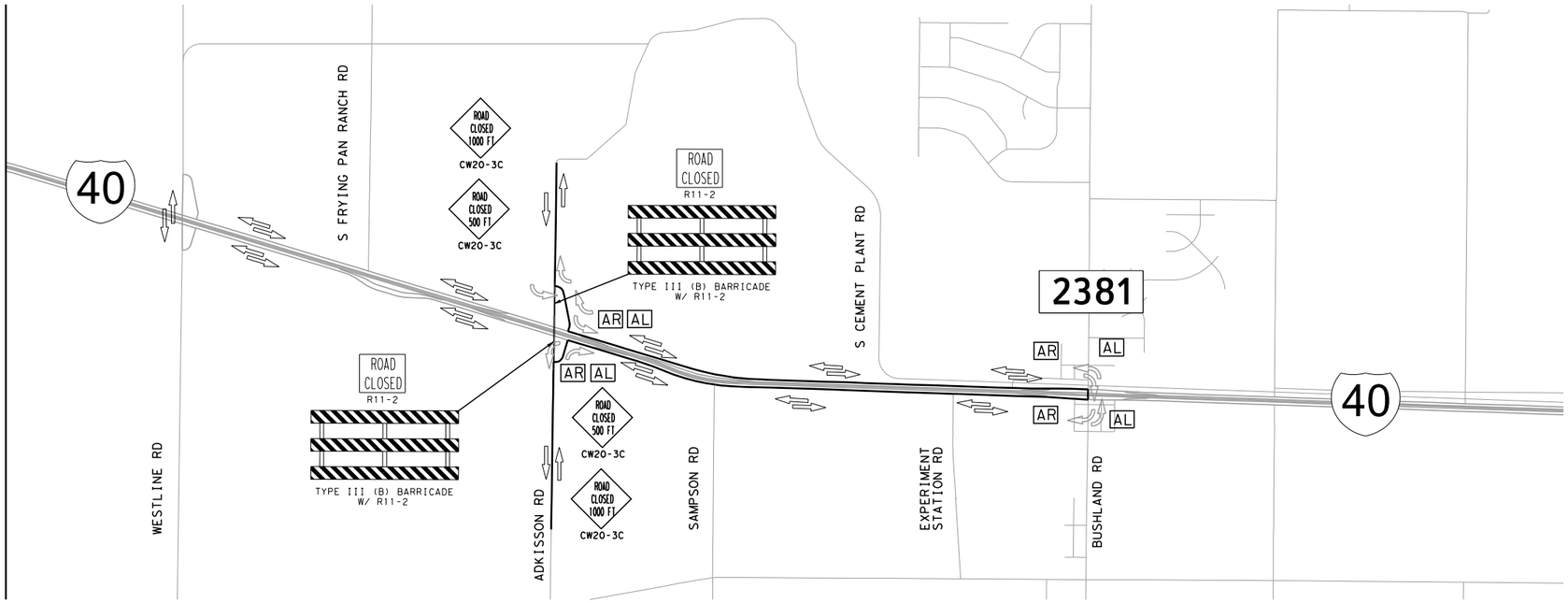
IH-40 AT ADKISSON ROAD

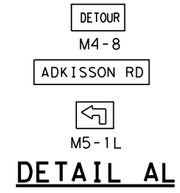
TCP NARRATIVE

SHEET 1 OF 1

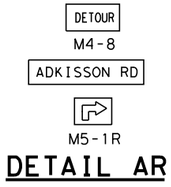
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS CG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JL	TEXAS	AMA	POTTER	011
CHECK MS	CONTROL	SECTION	JOB	
	0090	05	108	



ADKISSON RD DETOUR IN TWO-WAY OPERATION



DETAIL AL



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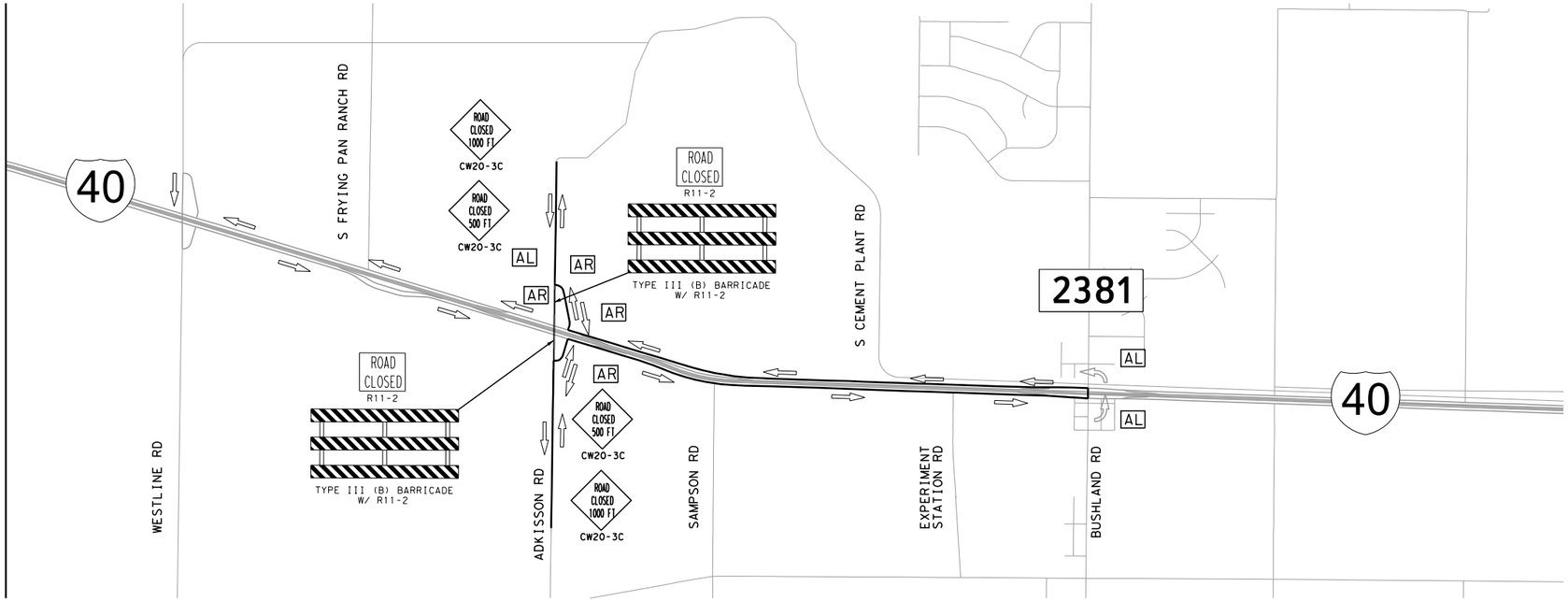

ADKISSON RD DETOUR IN ONE-WAY OPERATION

10/12/23

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER

James W Langston PE

Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

NO.	DATE	DESCRIPTION	APPROV.

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CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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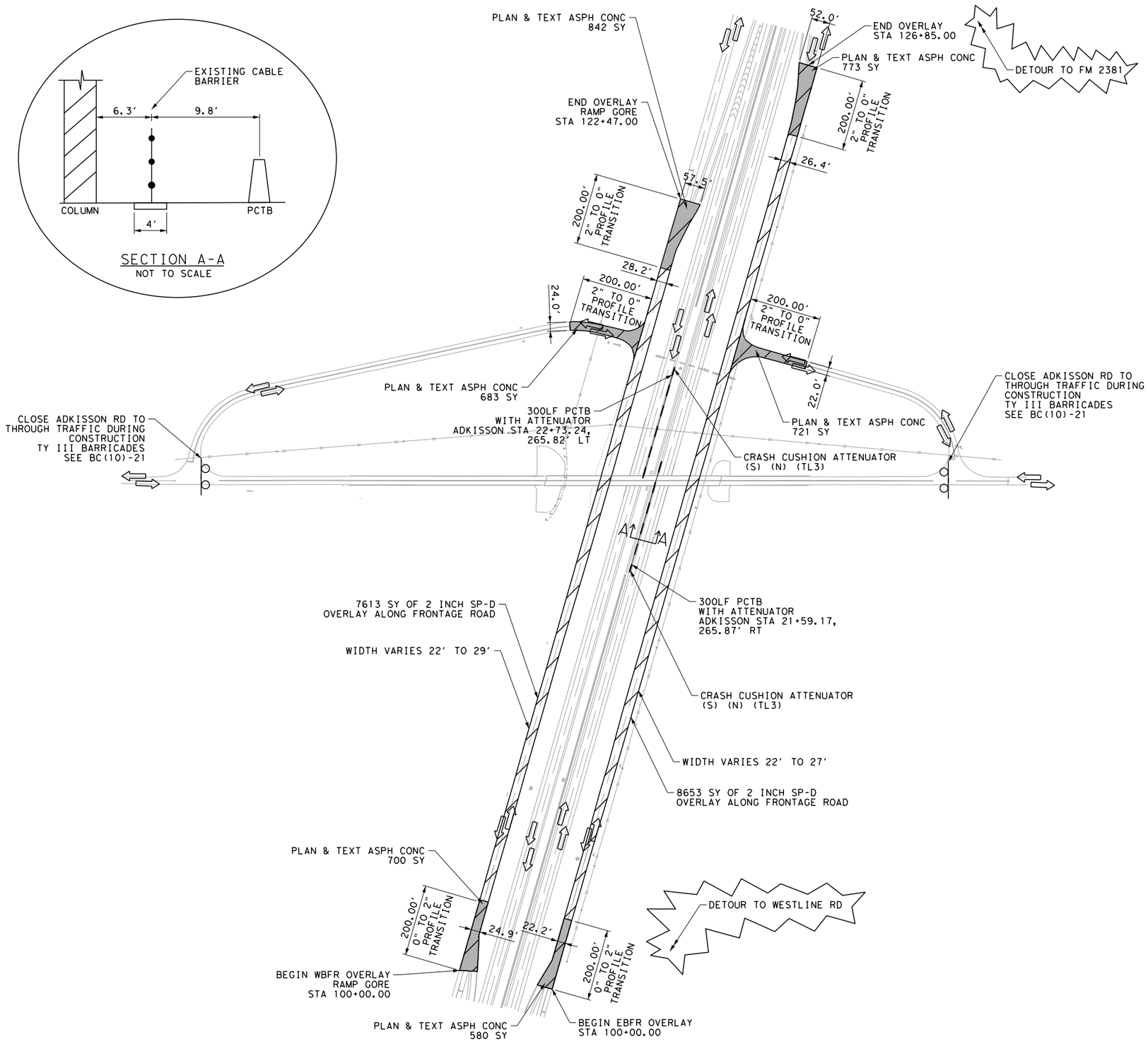
IH-40 AT ADKISSON ROAD

DETOUR LAYOUT

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CG	TEXAS	AMA	POTTER	012
CHECK	CONTROL	SECTION	JOB	
JL	0090	05	108	
CHECK				
MS				

SECTION A-A
NOT TO SCALE



300 0 300 600
SCALE: 1" = 300'

TCP LEGEND

- EXISTING TRAFFIC FLOW
- PROPOSED TRAFFIC FLOW
- PROPOSED PAVEMENT/OVERLAY
- PROPOSED BRIDGE
- PREVIOUSLY CONSTRUCTED PAVEMENT/OVERLAY
- PROPOSED CONCRETE RIPRAP
- CONC TRAFFIC BARRIER (CTB)
- IMPACT ATTENUATOR
- METAL BEAM GUARD FENCE
- METAL BEAM GUARD FENCE TRANSITION
- GUARDRAIL END TREATMENT
- TYPE 3 BARRICADE

NOTES:

1. SEE DETOUR LAYOUT FOR SIGNING PLAN DURING IH-40 CLOSURES.
2. FRONTAGE ROAD DIMENSIONS ARE APPROXIMATE.
3. STRIPE FRONTAGE ROAD WITH PERMANENT PAVEMENT MARKINGS AFTER OVERLAY.
4. SEE PAVEMENT MARKINGS AND SIGNAGE SHEETS FOR PERMANENT FRONTAGE ROAD STRIPING.

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NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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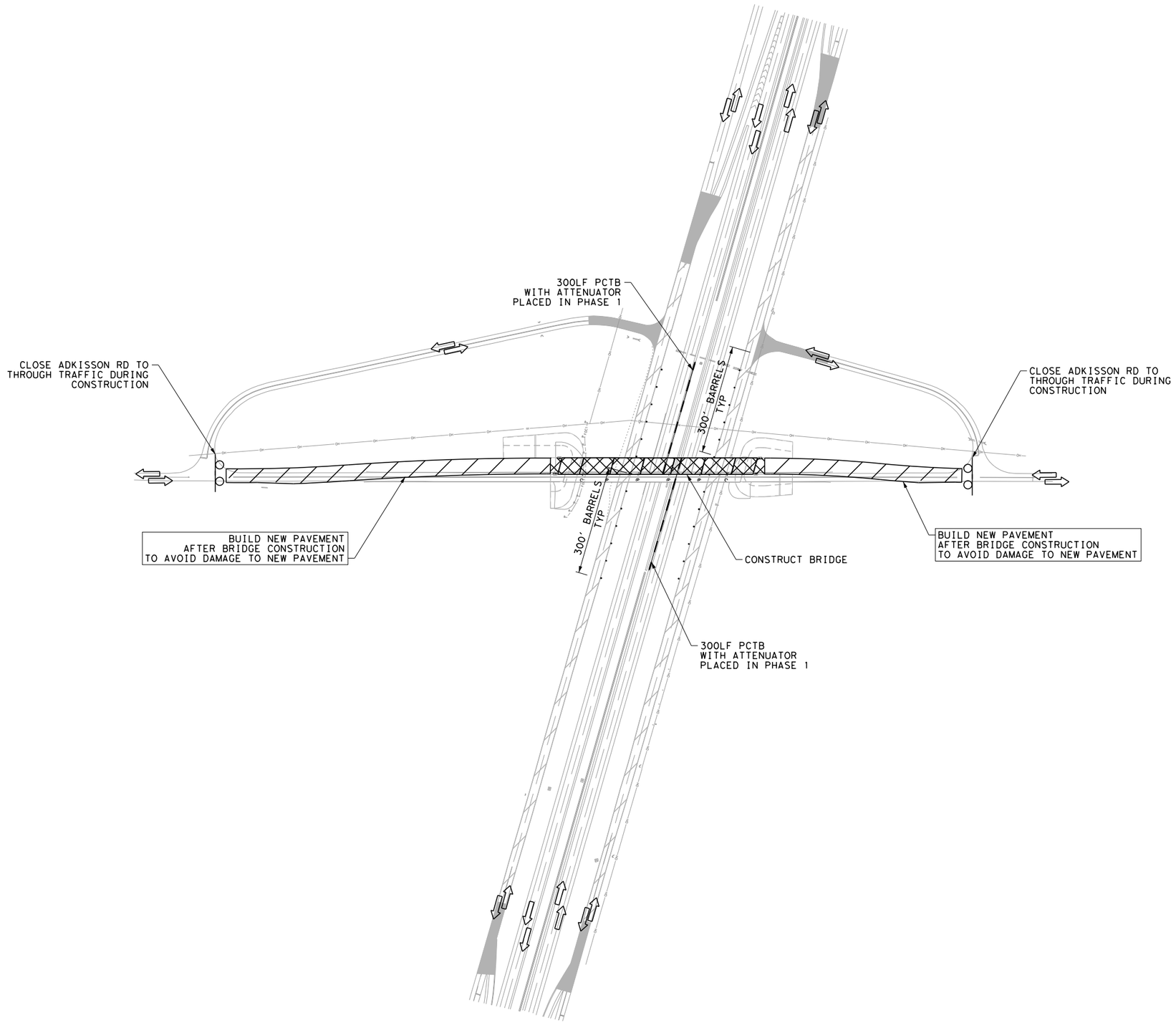
IH-40 AT ADKISSON ROAD

TRAFFIC CONTROL PLAN PHASE 1

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CG	TEXAS	AMA	POTTER	013
CHECK	CONTROL	SECTION	JOB	
JL	0090	05	108	
CHECK				
MS				

300 0 300 600
SCALE: 1" = 300'



TCP LEGEND

- EXISTING TRAFFIC FLOW
- PROPOSED TRAFFIC FLOW
- PROPOSED PAVEMENT/OVERLAY
- PROPOSED BRIDGE
- PREVIOUSLY CONSTRUCTED PAVEMENT/OVERLAY
- PROPOSED CONCRETE RIPRAP
- CONC TRAFFIC BARRIER (CTB)
- IMPACT ATTENUATOR
- METAL BEAM GUARD FENCE
- METAL BEAM GUARD FENCE TRANSITION
- GUARDRAIL END TREATMENT
- TYPE 3 BARRICADE

NOTES:
1. FOR FREEWAY CLOSURE, FOLLOW TCP(6-6)-12.
2. PAYMENT FOR FREEWAY CLOSURE IS CONSIDERED SUBSIDIARY TO TRAFFIC CONTROL.

STATE OF TEXAS
JAMES W. LANGSTON
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James W Langston PE

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NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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IH-40 AT ADKISSON ROAD
TRAFFIC CONTROL PLAN PHASE 2

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS CG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JL	TEXAS	AMA	POTTER	014
CHECK MS	CONTROL	SECTION	JOB	
	0090	05	108	

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Vidal.Ngoumnai

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		015

DATE: 10/11/2023 11:51:00 AM
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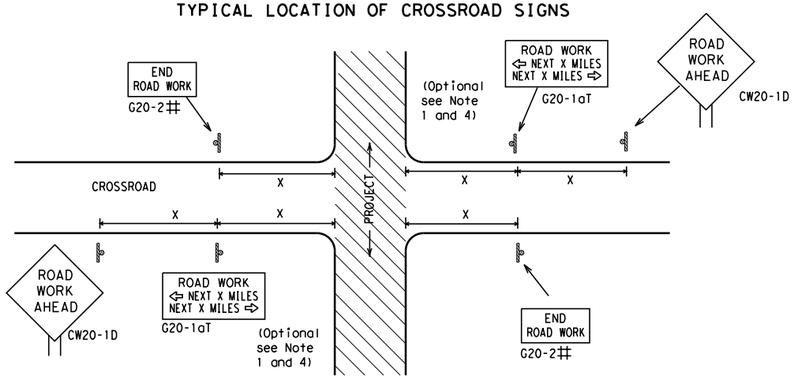
Vidal.Ngoumnai

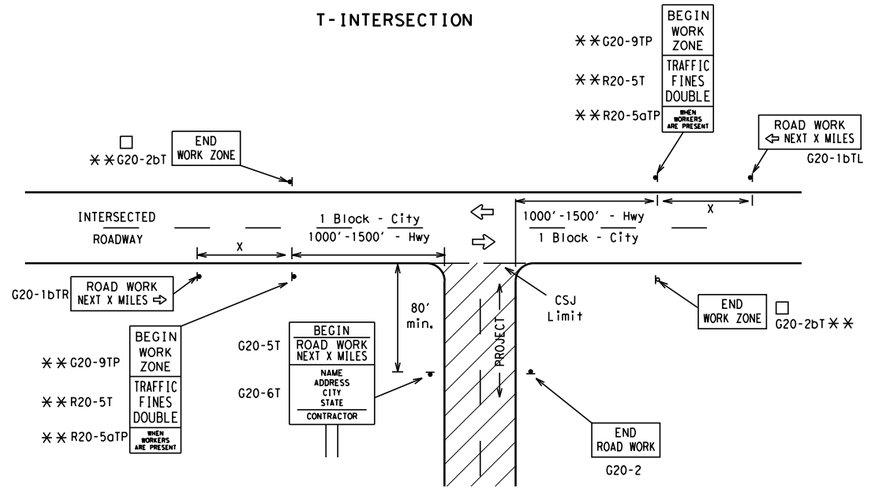
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

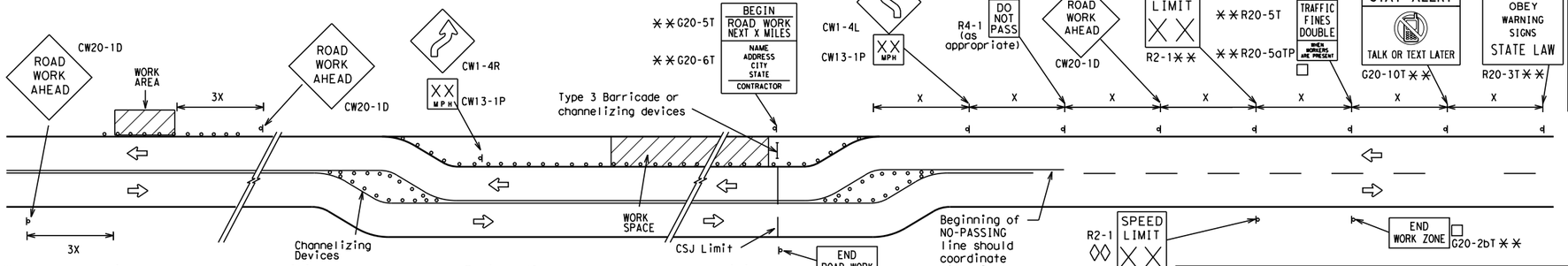
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

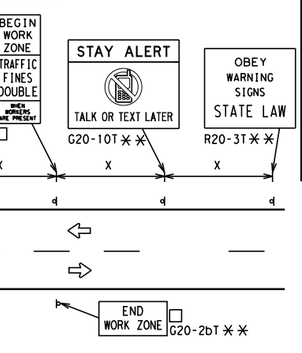
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

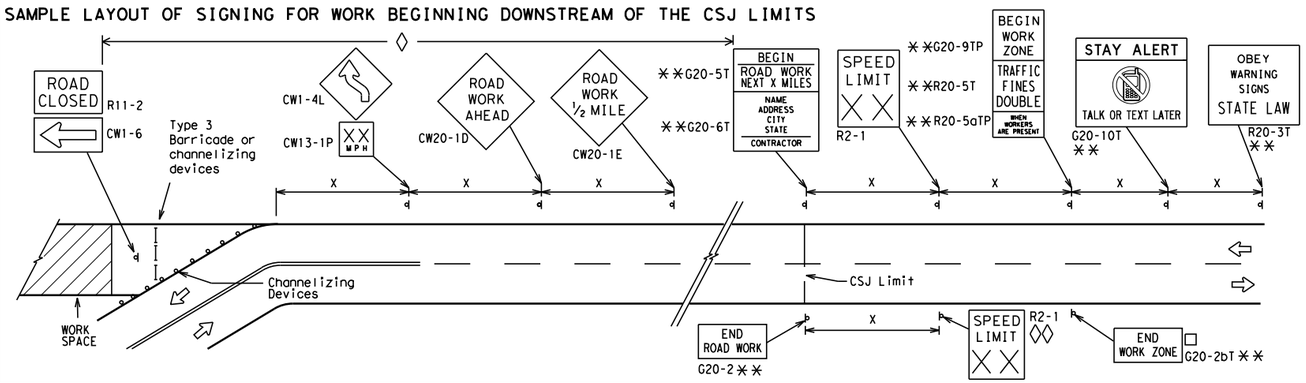


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		016

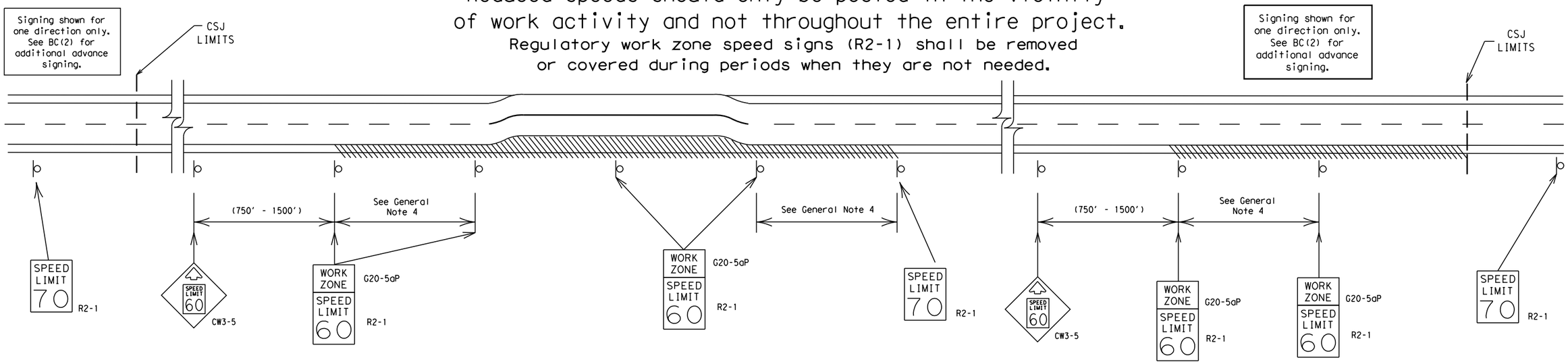
DATE: 10/11/2023 11:51:16 AM
FILE: \\bms\bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com\dms21550\bc-21(3).dgn
Vidal.Ngoumnai

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	0090	05	108	IH 40
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		017

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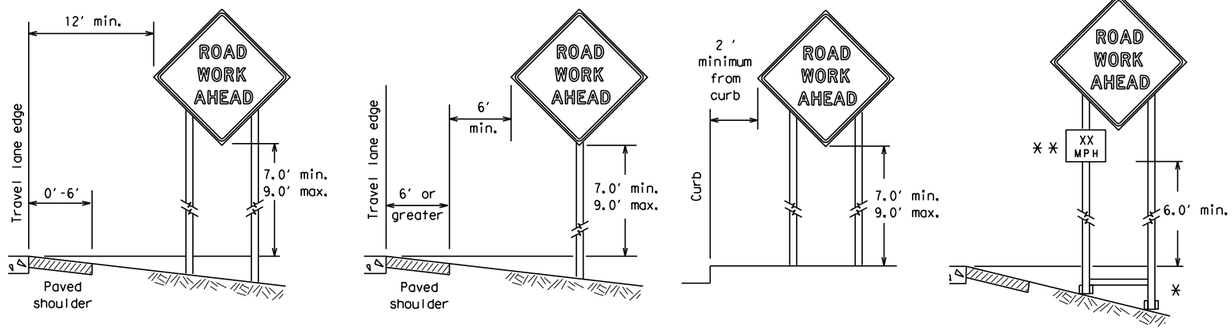
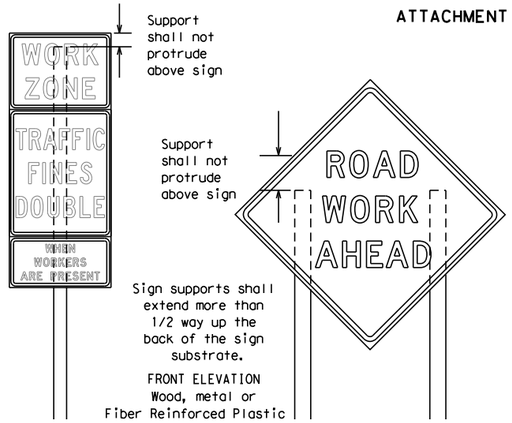
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

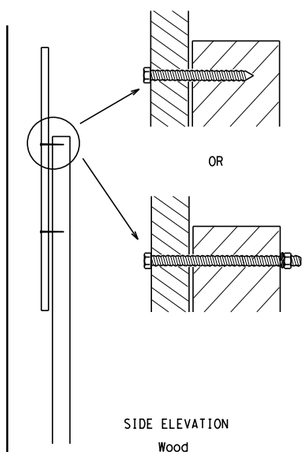


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





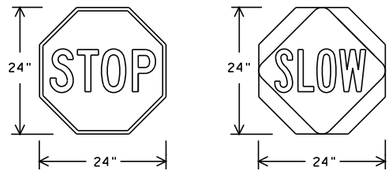
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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
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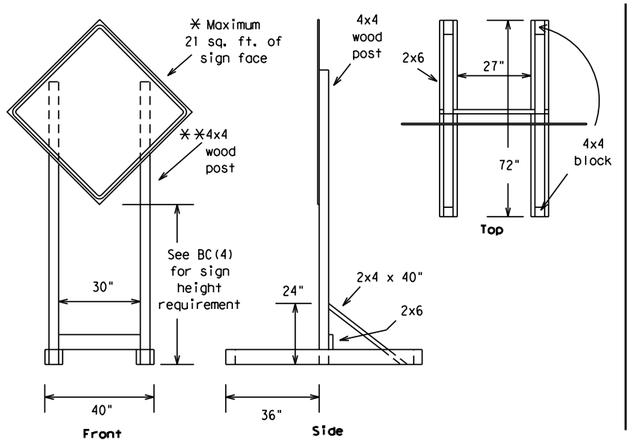
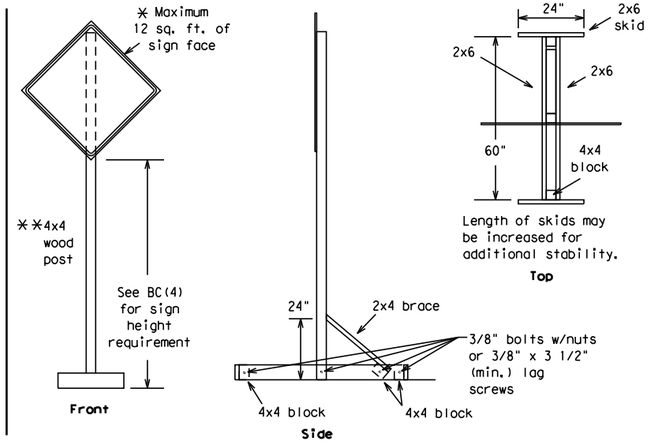
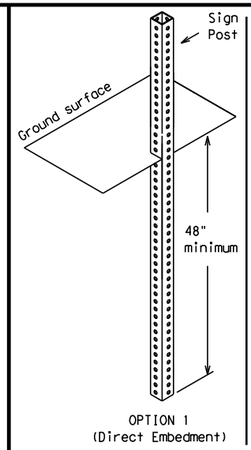
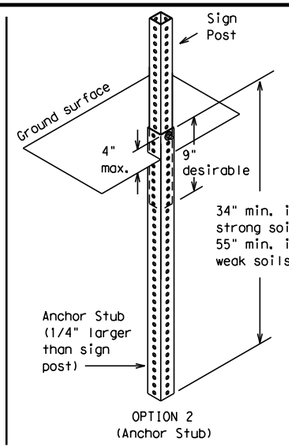


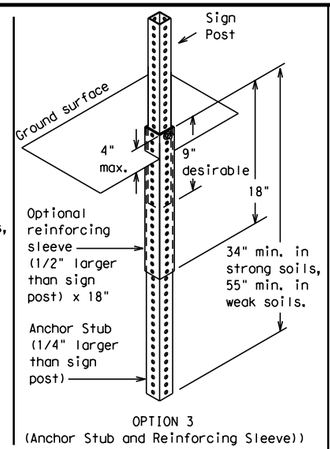


SKID MOUNTED WOOD SIGN SUPPORTS

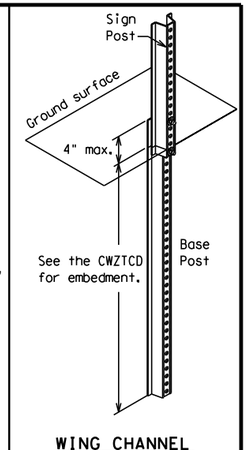
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







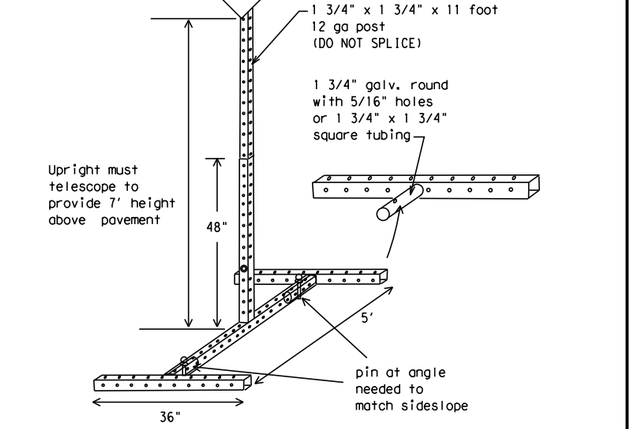
PERFORATED SQUARE METAL TUBING

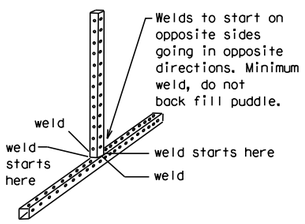


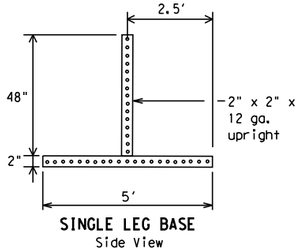
WING CHANNEL
Lap-splice/base bolted anchor

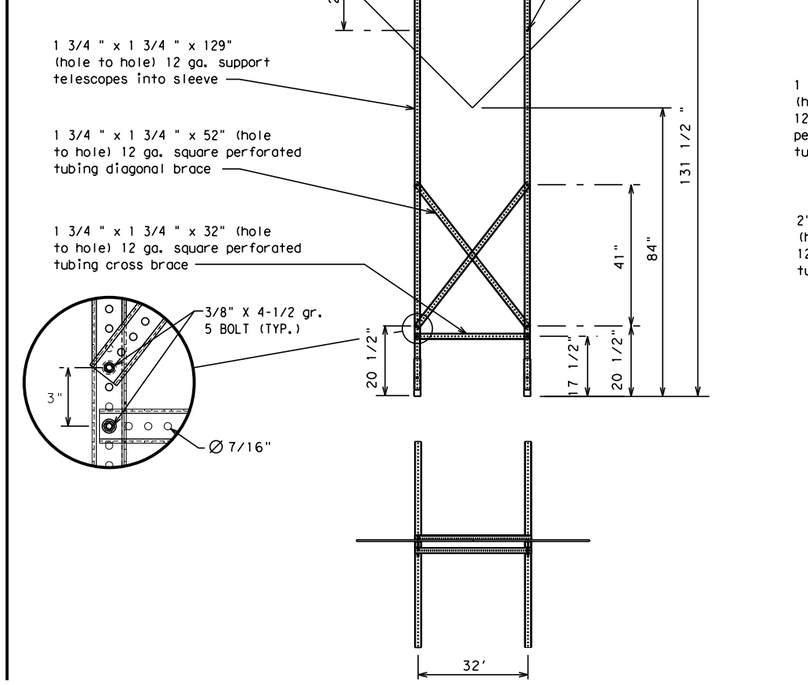
GROUND MOUNTED SIGN SUPPORTS

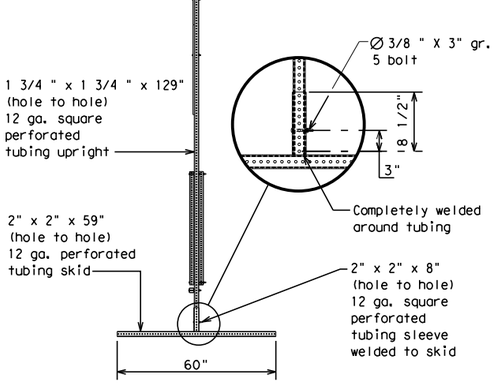
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.











SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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
REVISIONS	0090	05	108	IH 40
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		019

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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	0090	05	108	IH 40
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		020

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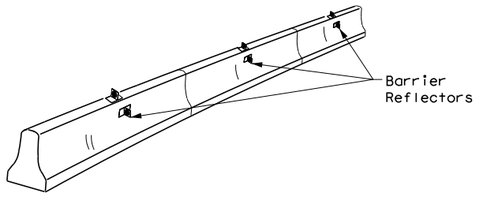
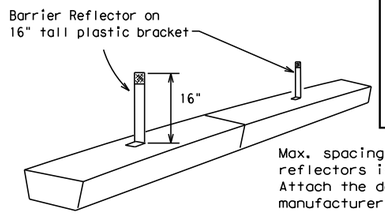
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

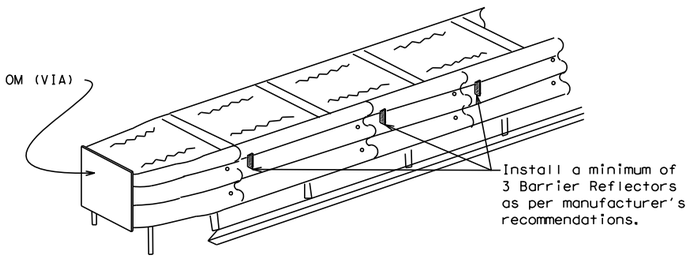


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

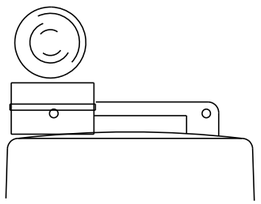


DELINEATION OF END TREATMENTS

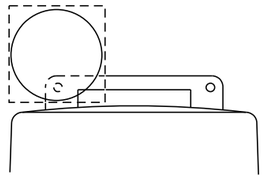
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

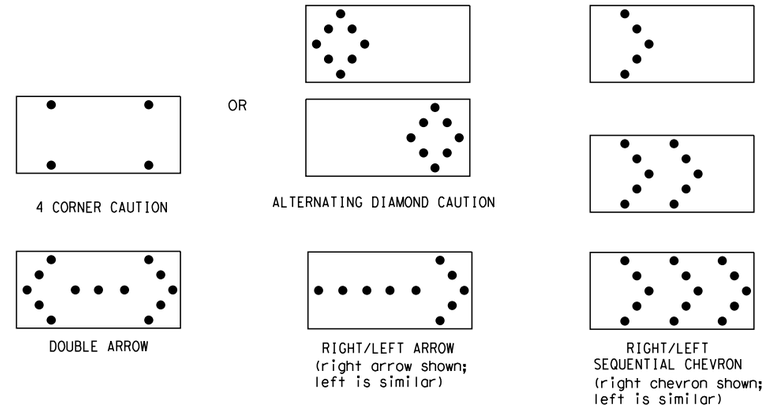
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		021

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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:

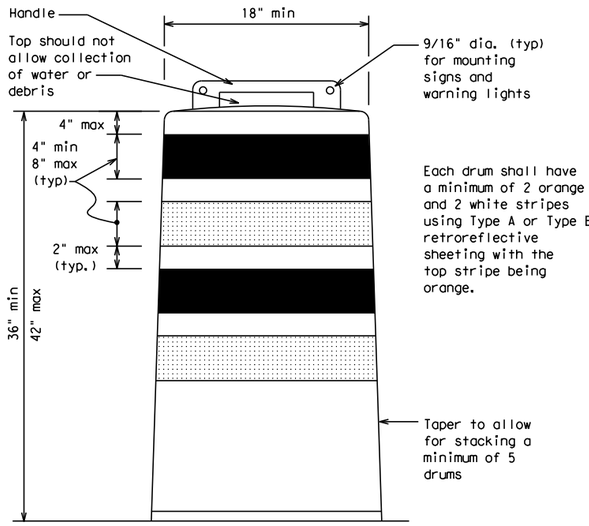
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

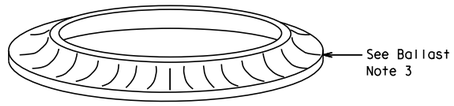
RETROREFLECTIVE SHEETING

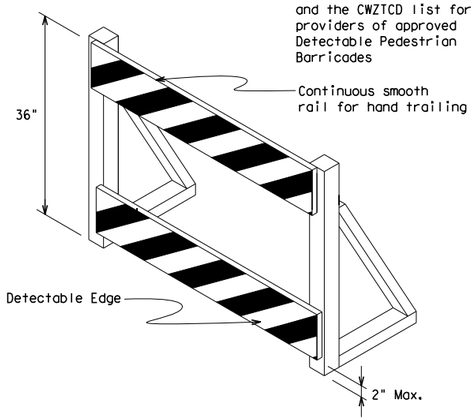
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

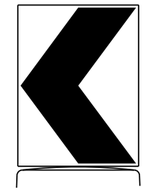




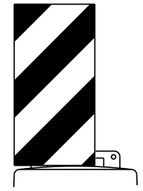


DETECTABLE PEDESTRIAN BARRICADES

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
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9-07 5-21	AMA	POTTER		022
7-13				

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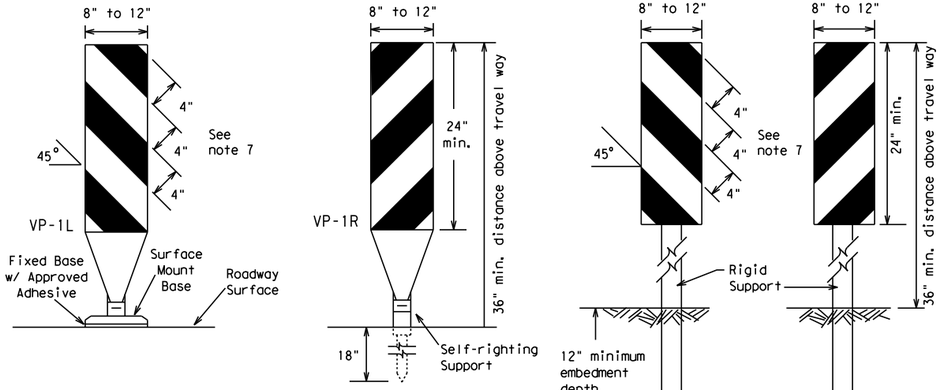
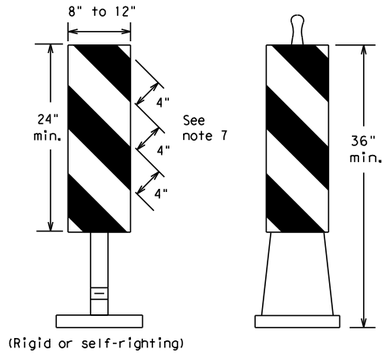


FIXED
(Rigid or self-righting)

DRIVEABLE

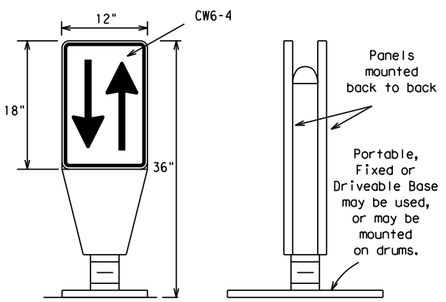


(Rigid or self-righting)

PORTABLE

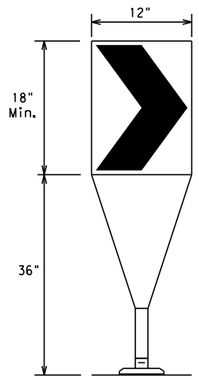
VERTICAL PANELS (VPs)

1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual 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.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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.



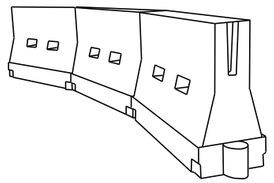
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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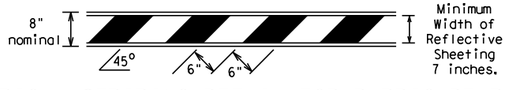
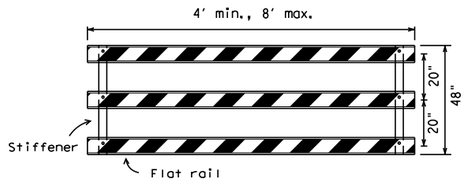
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



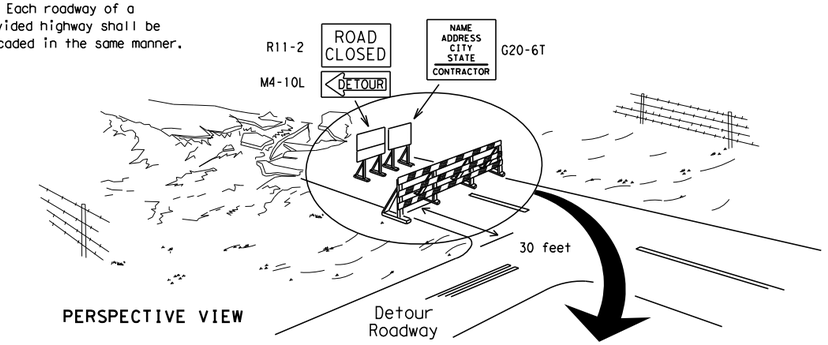
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

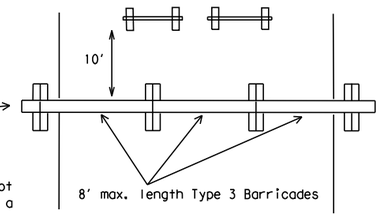
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

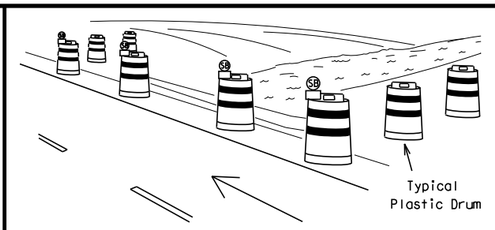
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

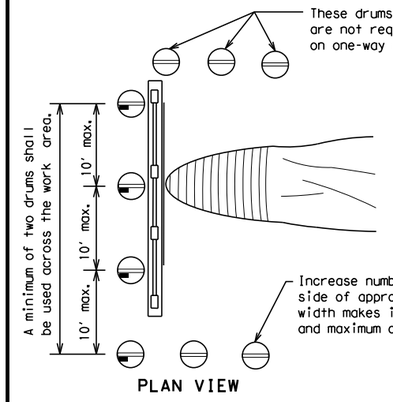
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

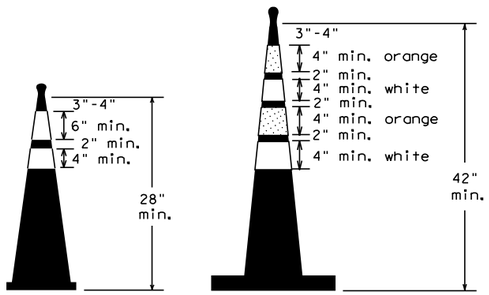
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



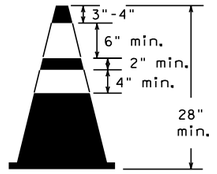
PLAN VIEW

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

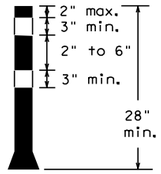
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

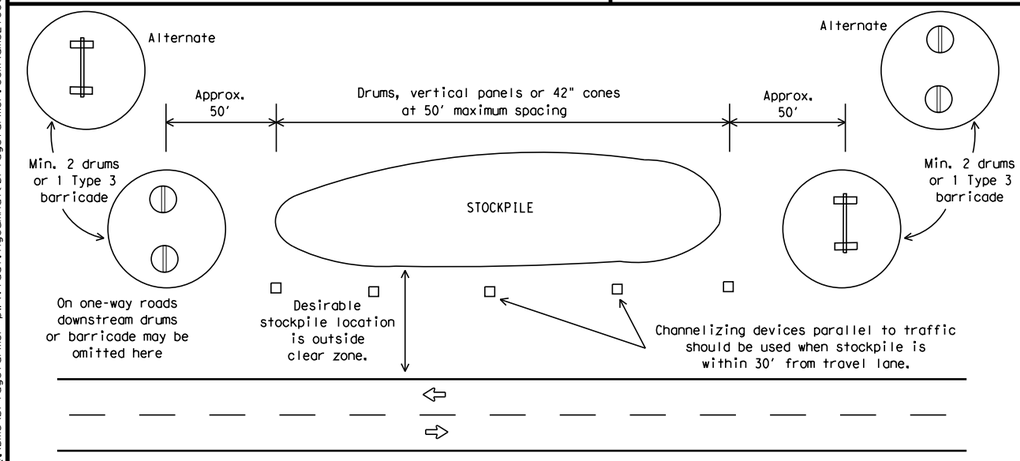


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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7-13 5-21	AMA	POTTER		024

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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.

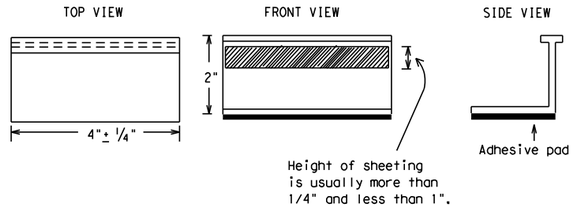
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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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REVISIONS	0090	05	108	IH 40
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1-02 7-13	AMA	POTTER		025
11-02 8-14				

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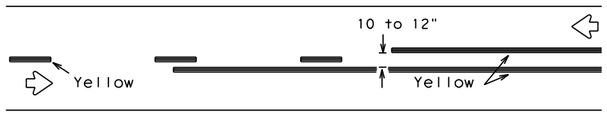
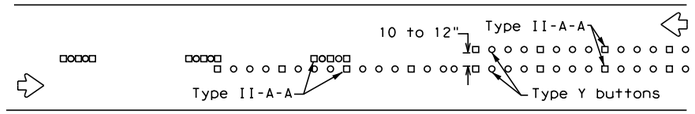
Vidal Ngoumnai

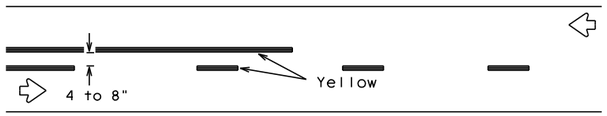
PAVEMENT MARKING PATTERNS



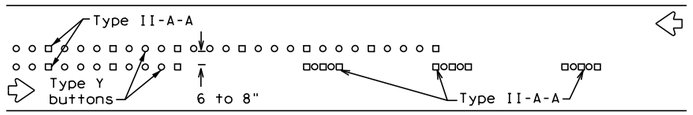
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



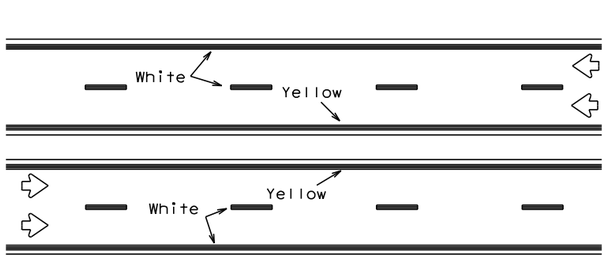
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



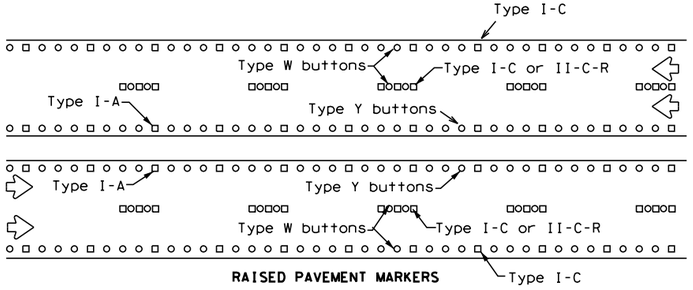
RAISED PAVEMENT MARKERS - PATTERN B

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

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



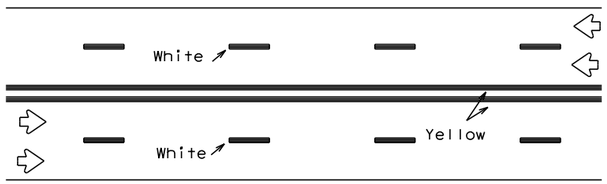
REFLECTORIZED PAVEMENT MARKINGS



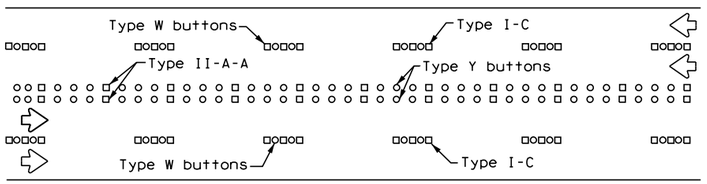
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



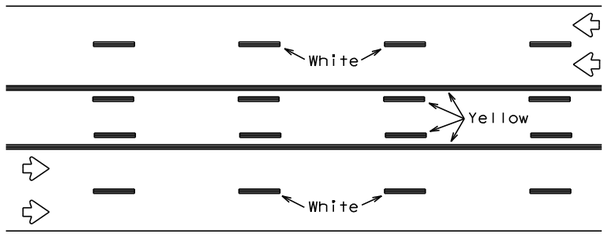
REFLECTORIZED PAVEMENT MARKINGS



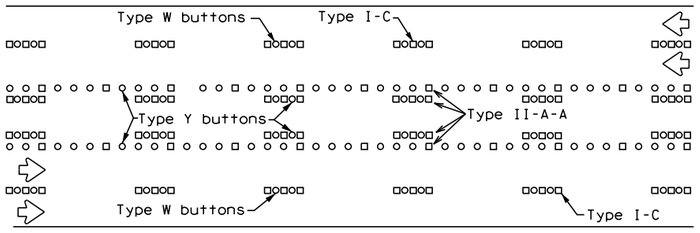
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

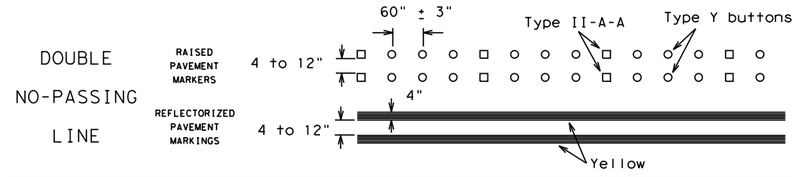
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

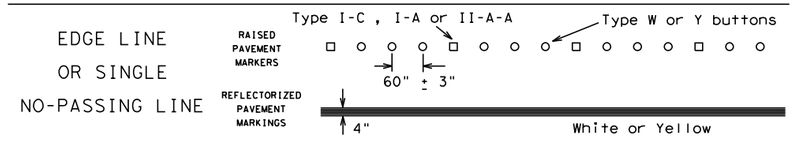
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

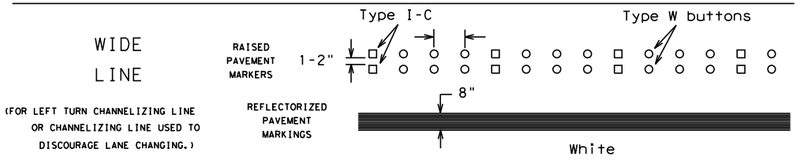


EDGE LINE OR SINGLE NO-PASSING LINE



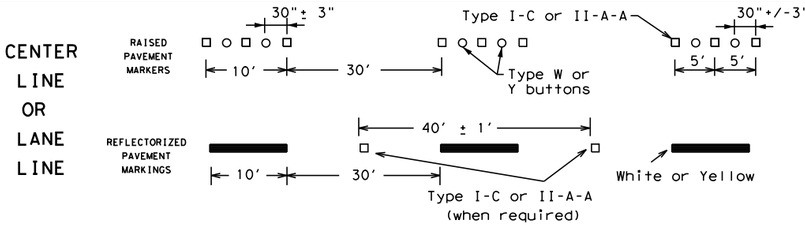
WIDE LINE

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

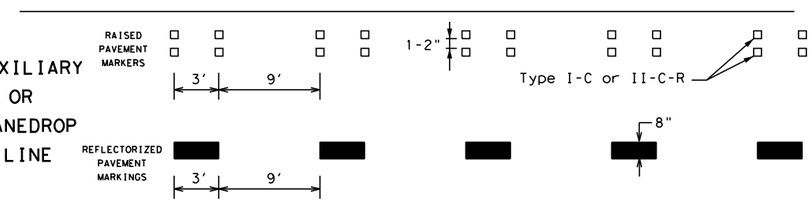


BROKEN LINES

CENTER LINE OR LANE LINE

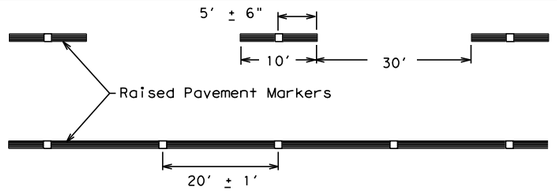


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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	AMA	POTTER		026

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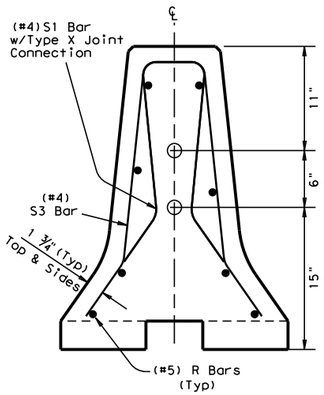
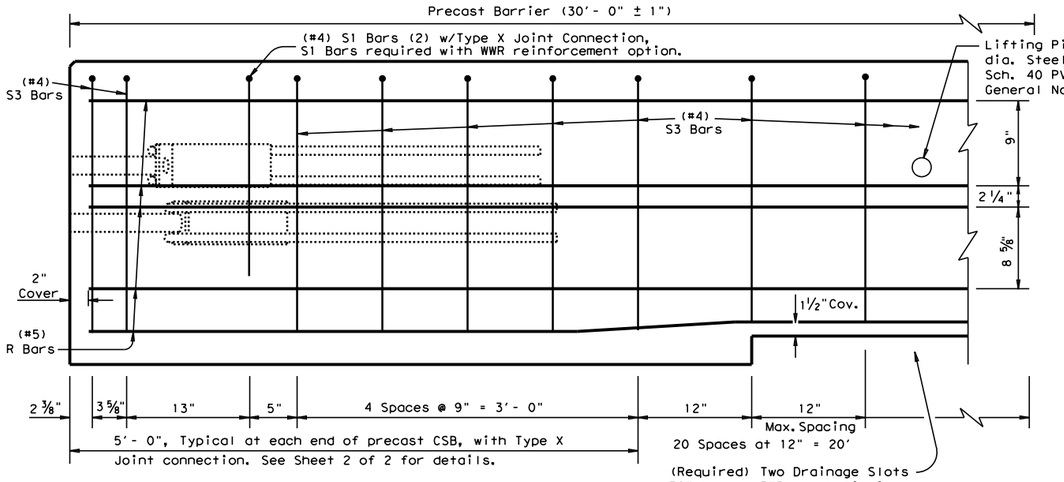


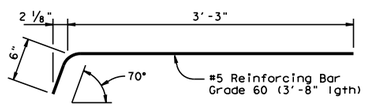
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



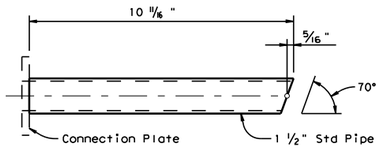
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



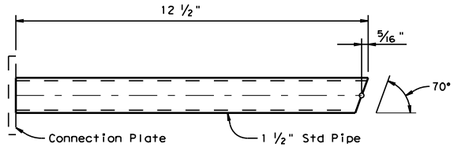
DEFORMED BAR ANCHOR DETAILS

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



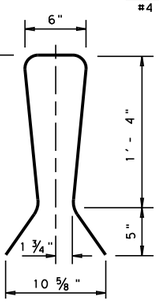
UPPER CONNECTION PIPE DETAILS

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



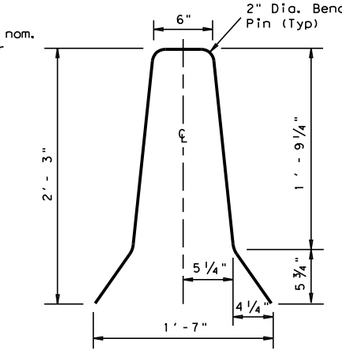
LOWER CONNECTION PIPE DETAILS

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



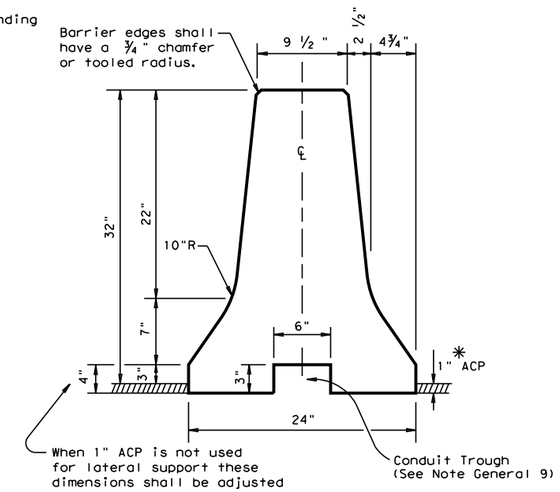
S1 Bar

#4 Bar (2)
(Joint Type X)



S3 Bar

#4 Bar

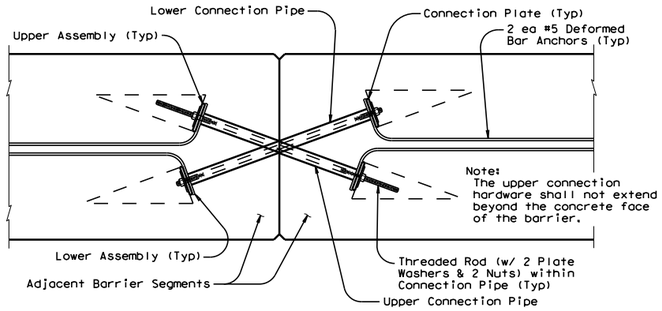


Concrete Safety Barrier

✳ When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

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 tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
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 involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



TYPE X JOINT INSTALLATION DETAIL

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

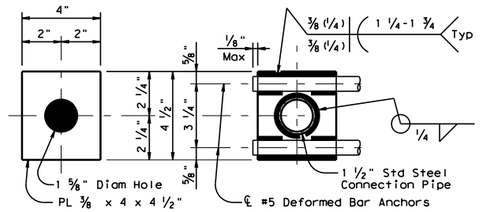
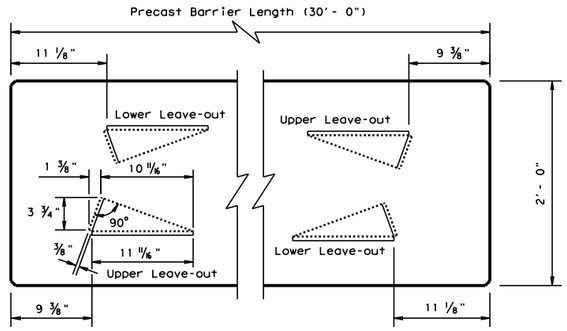


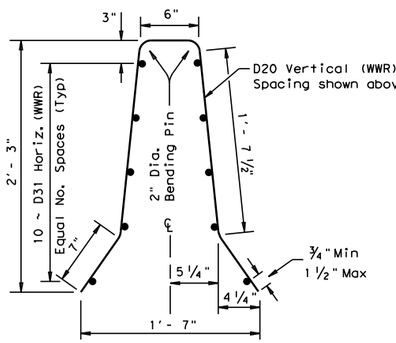
PLATE DIMENSIONS WELDING DETAILS

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.



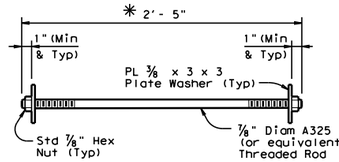
BARRIER PLAN AT END JOINTS



Welded Wire Reinforcement (WWR) Option for Bars R and S3

(WWR) General Notes

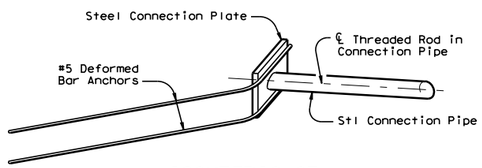
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing 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".



CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per Joint.

✳ 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.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

CSB(1)-10

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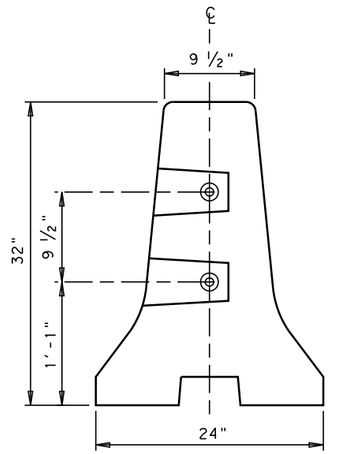
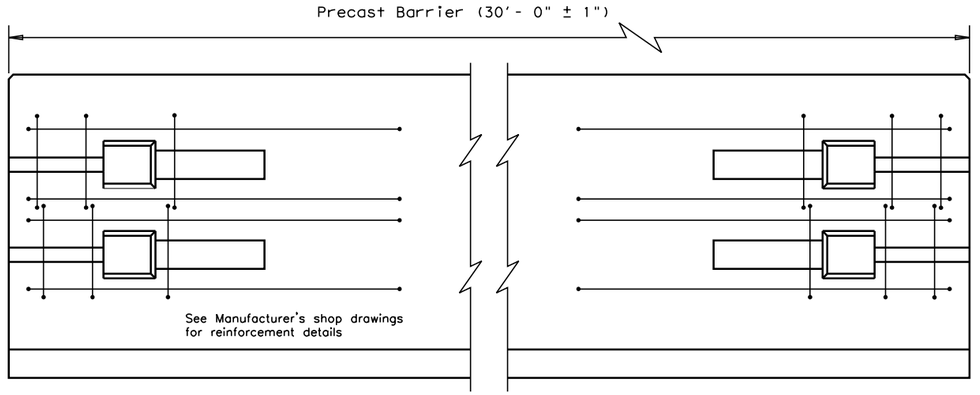
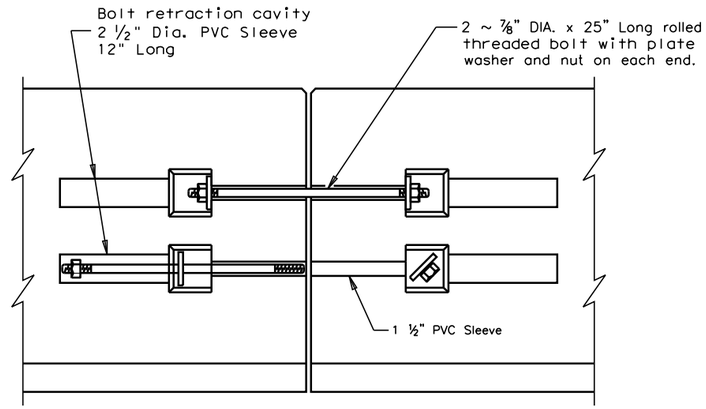


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

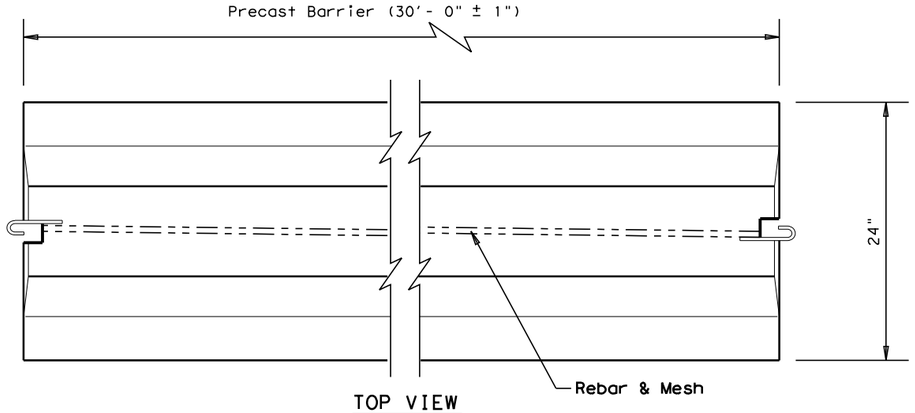


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

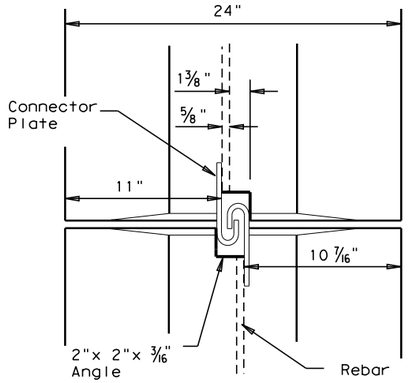


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

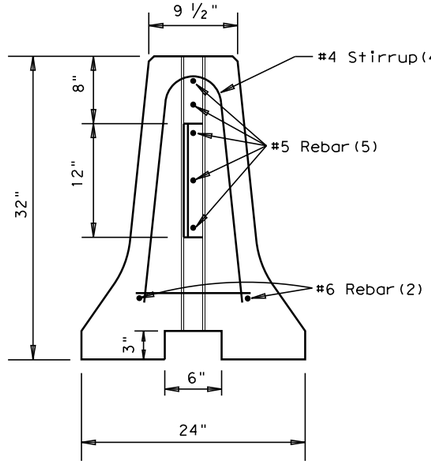
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)

Proprietary Joint Connections (CSB)

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.

Texas Department of Transportation
Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		028

DATE: 10/11/2023 11:53:37 AM
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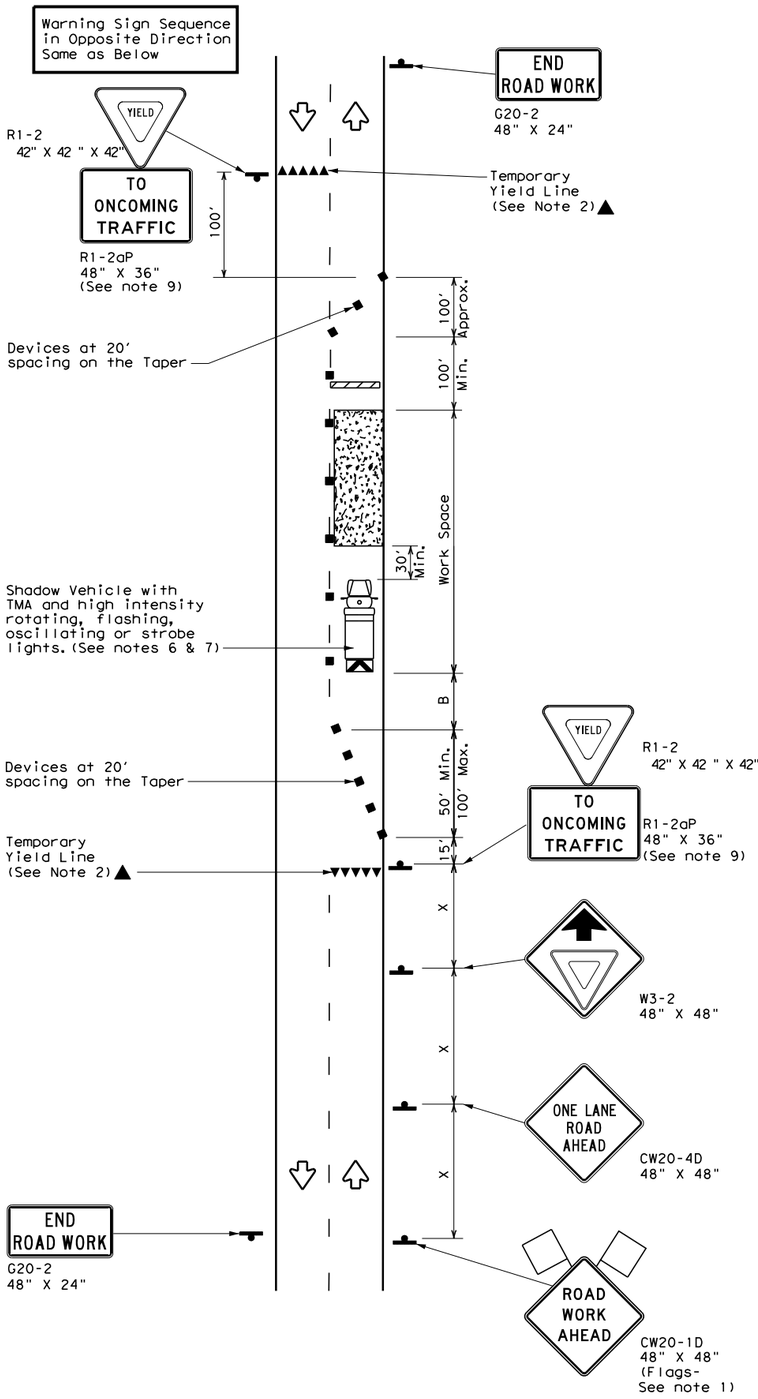
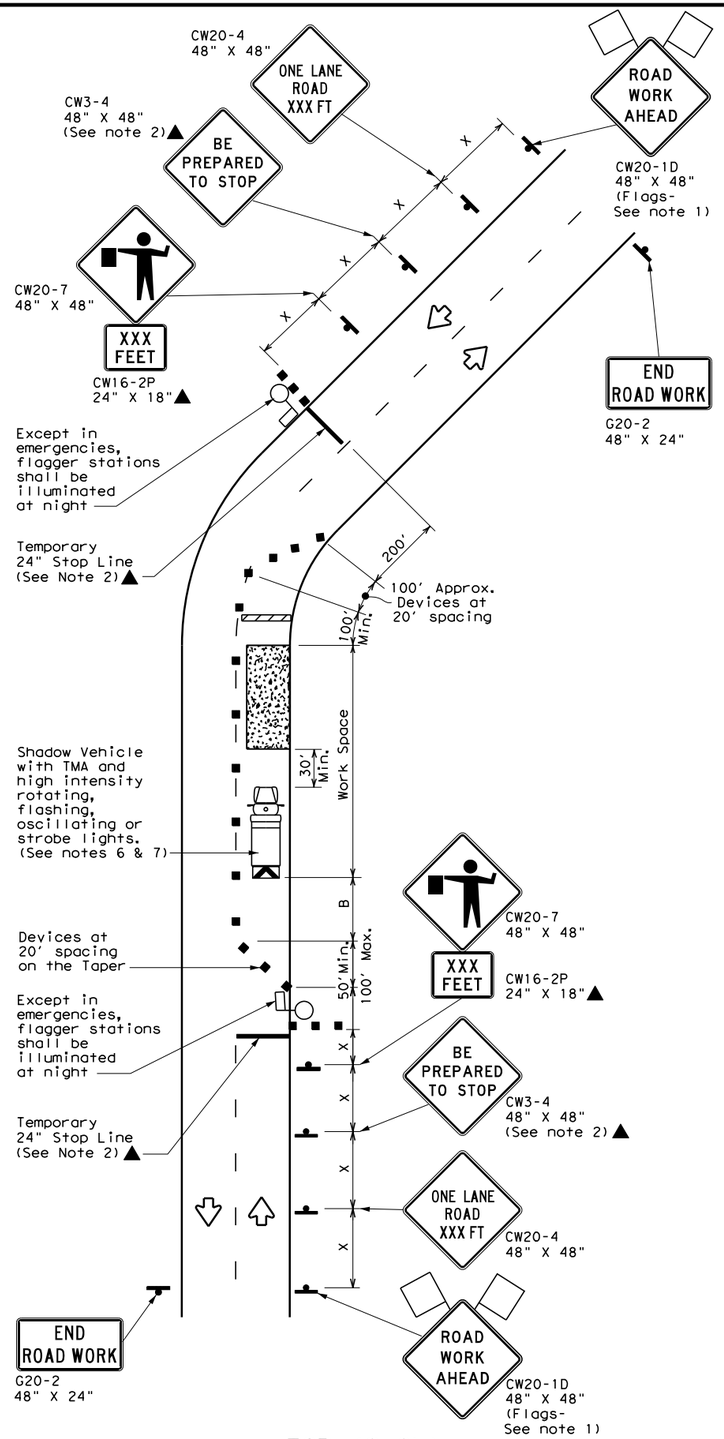
Vidal.Ngoumnai



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



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

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0090	05	108	IH 40
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	AMA	POTTER		029

DATE: 10/11/2023 11:55:13 AM
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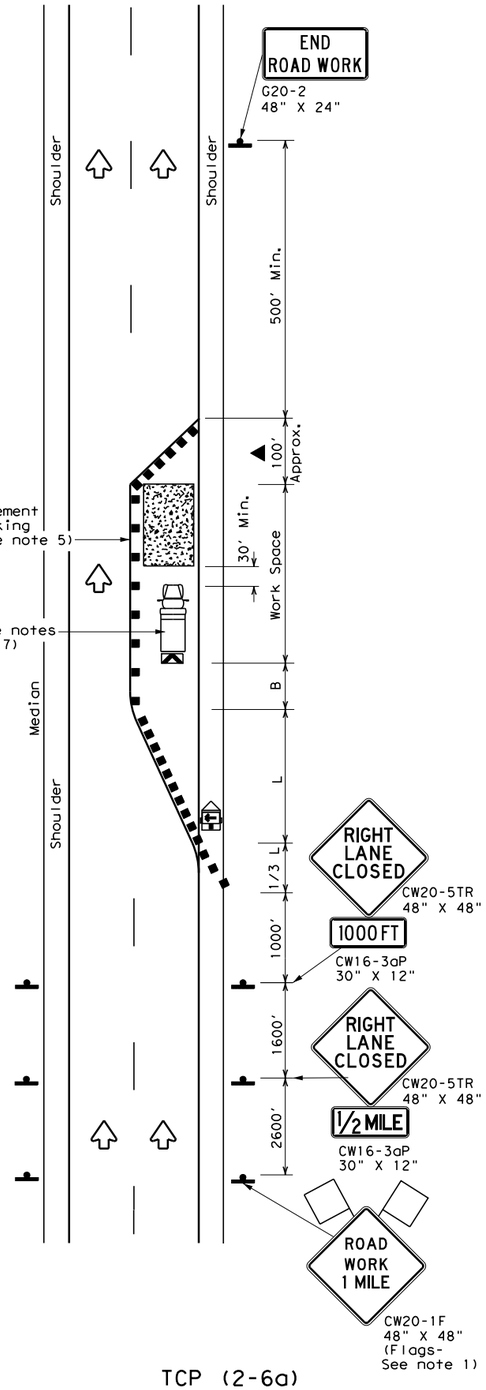
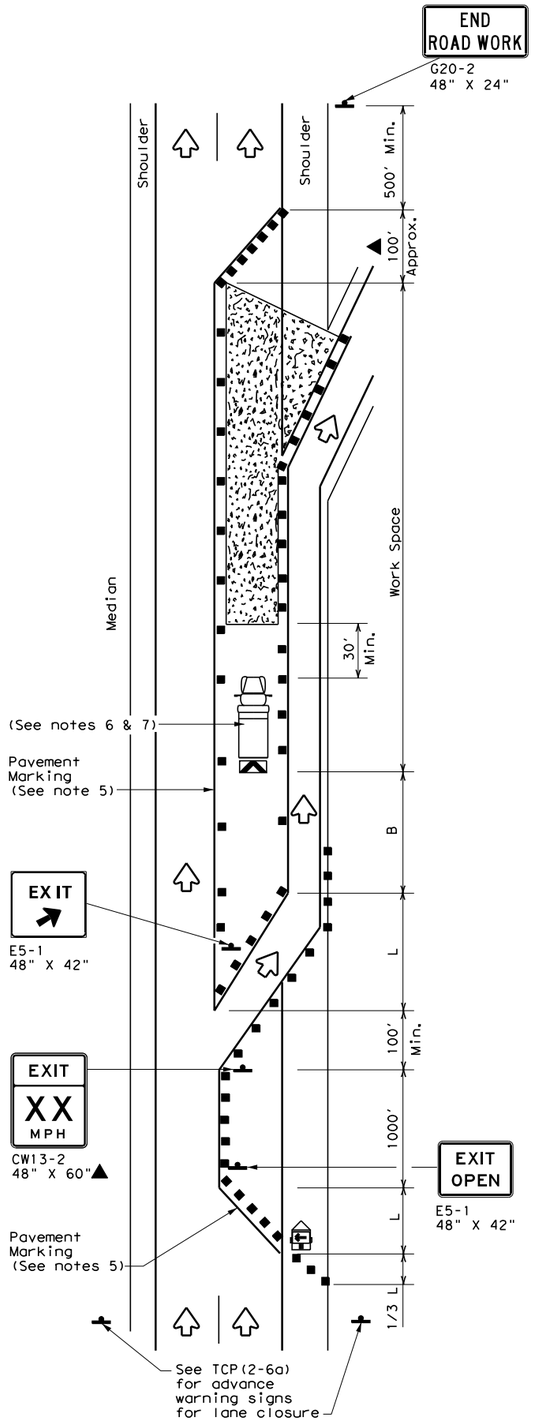
Vidal.Ngoumnai



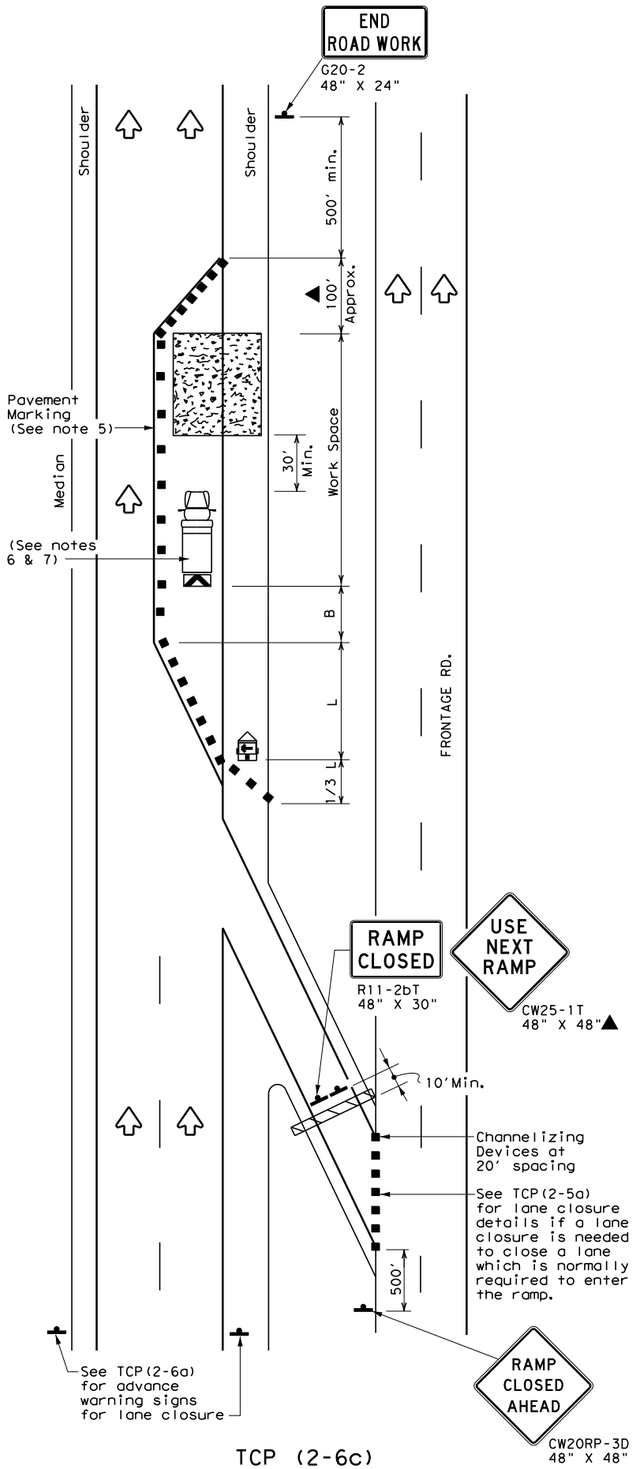
TCP (2-6a)

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
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AMA	POTTER		030
1-97 2-18				

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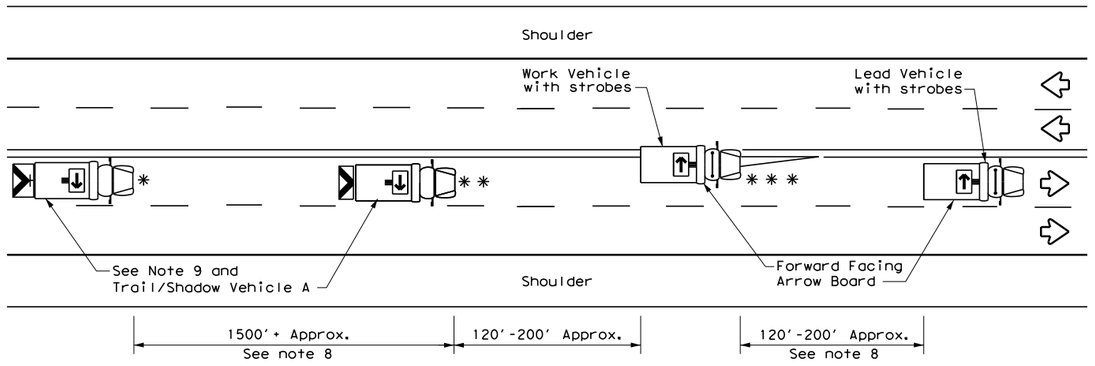
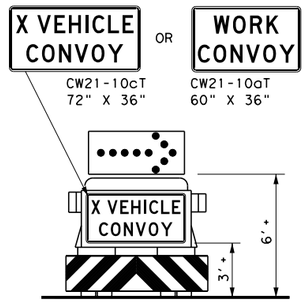


TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY

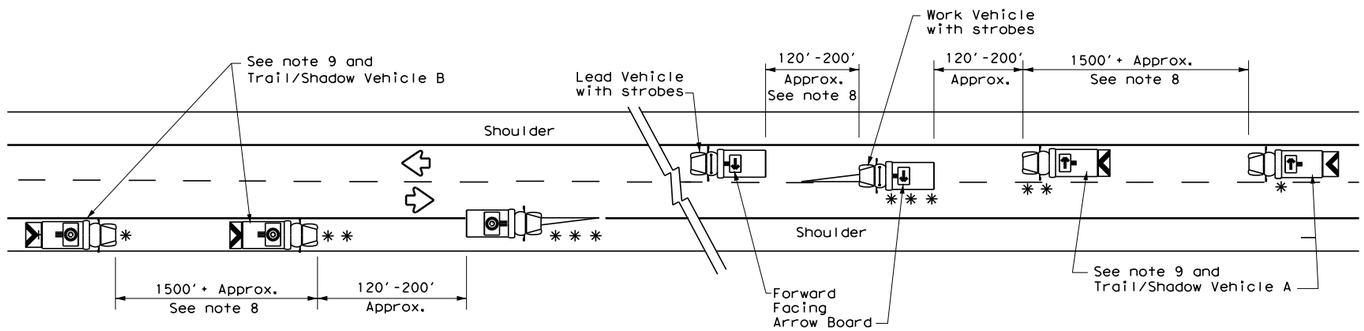


TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

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
✓				

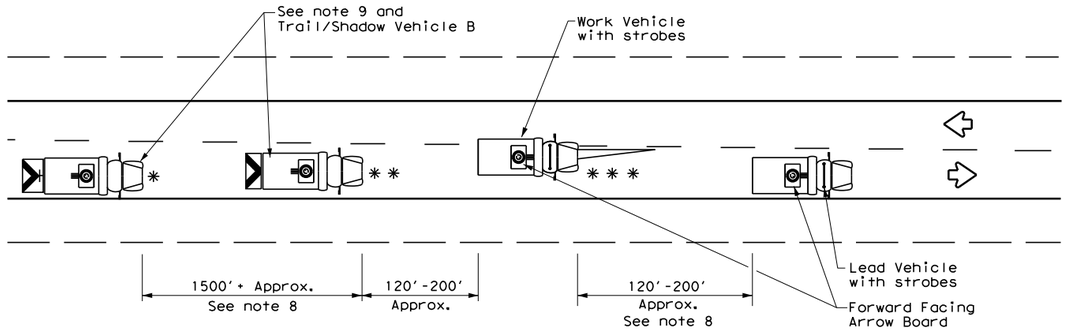


WORK ON SHOULDER

WORK ON TRAVEL LANE

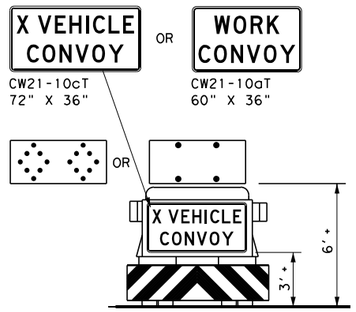
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS

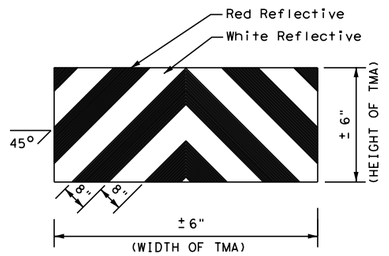


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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8-95 7-13	AMA	POTTER		031
1-97				

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© TxDOT December 1985
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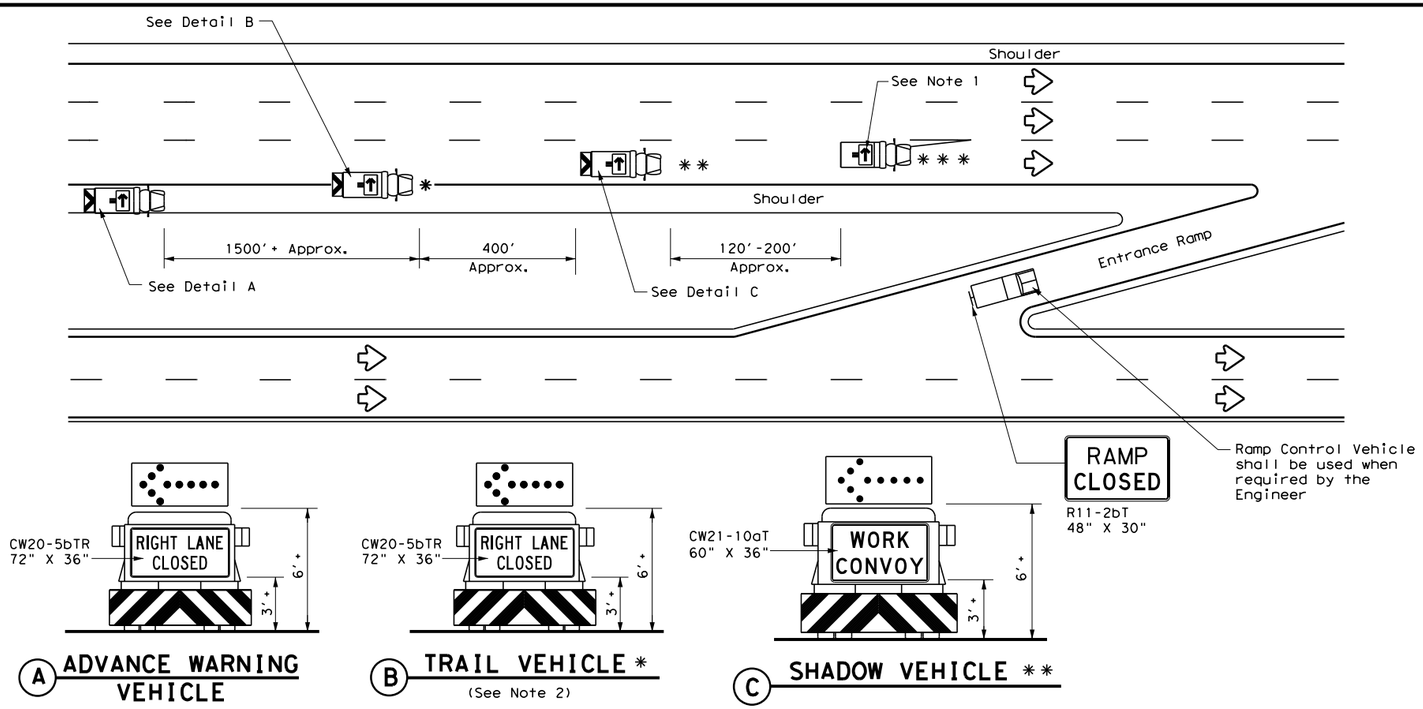
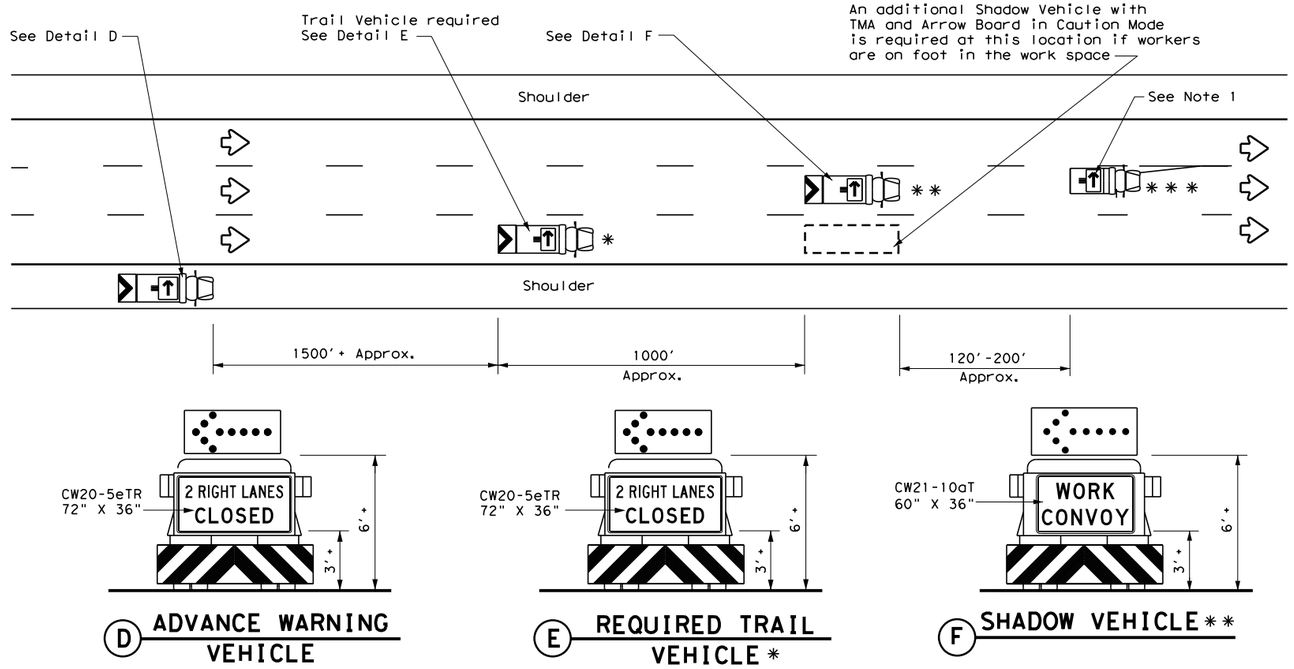


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



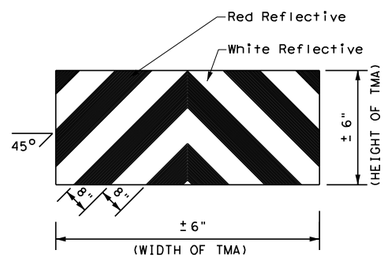
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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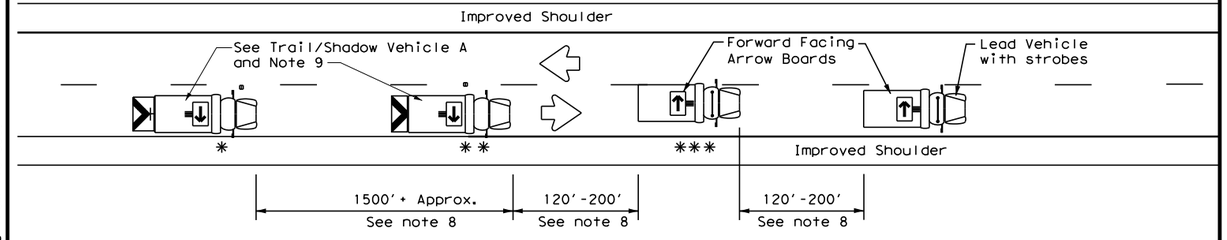
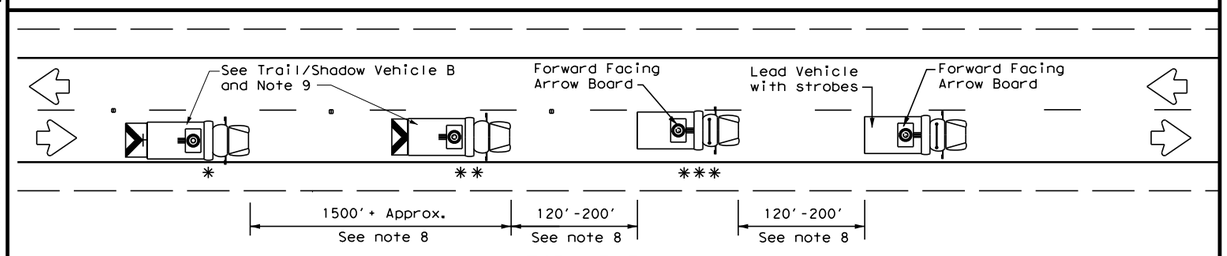


TCP (3-3a)

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



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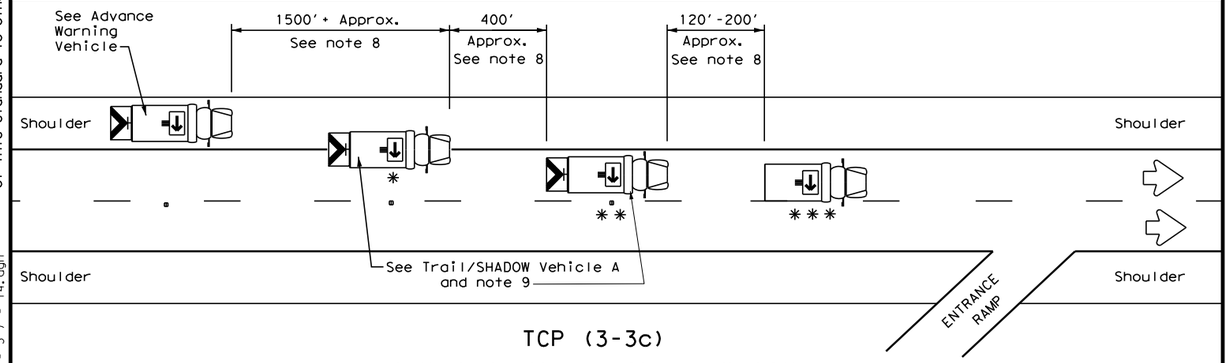
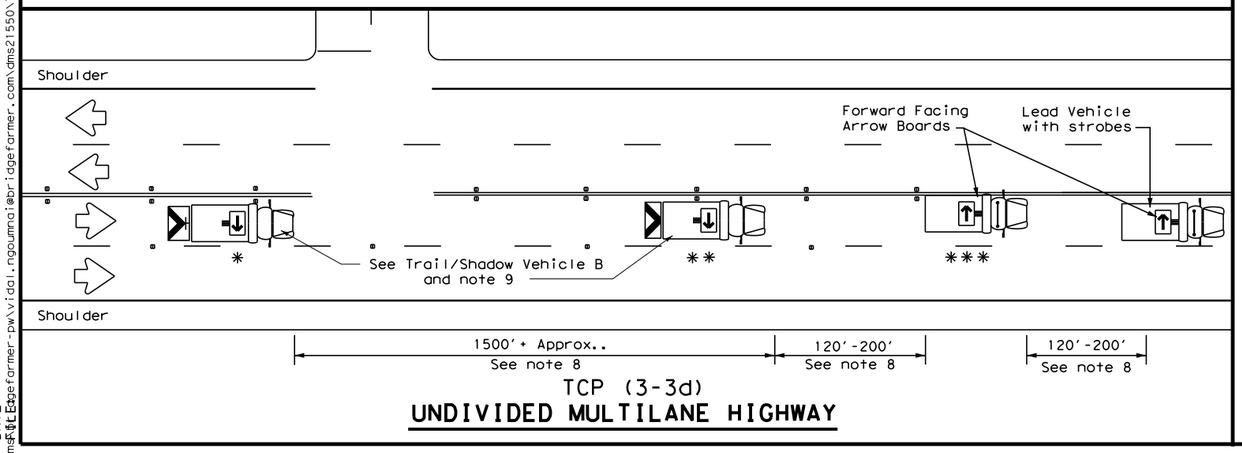
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



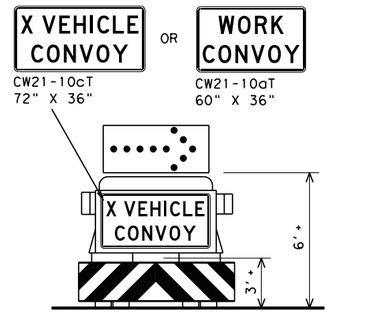
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



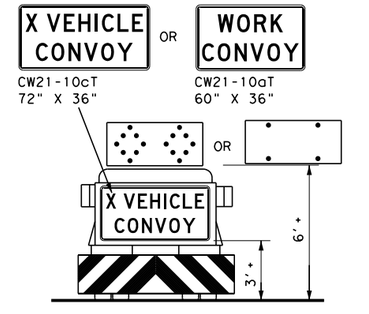
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



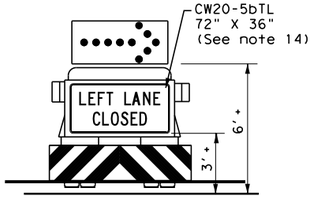
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

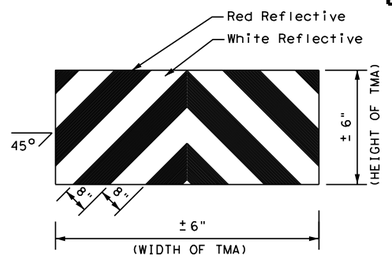


TRAIL/SHADOW VEHICLE B

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	0090	05	108	IH 40
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	AMA	POTTER		033
1-97 7-14				

DATE: 10/11/2023 11:55:28 AM
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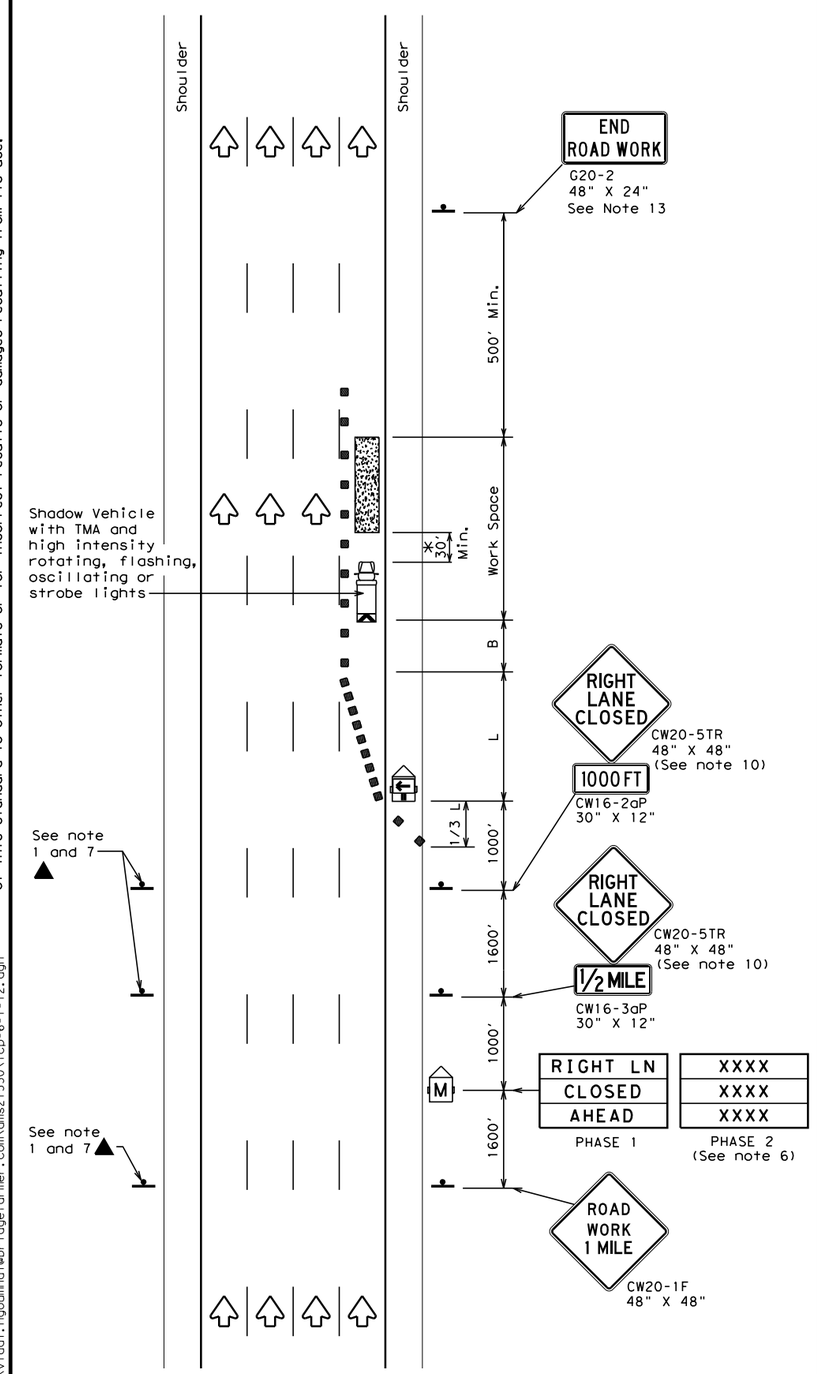
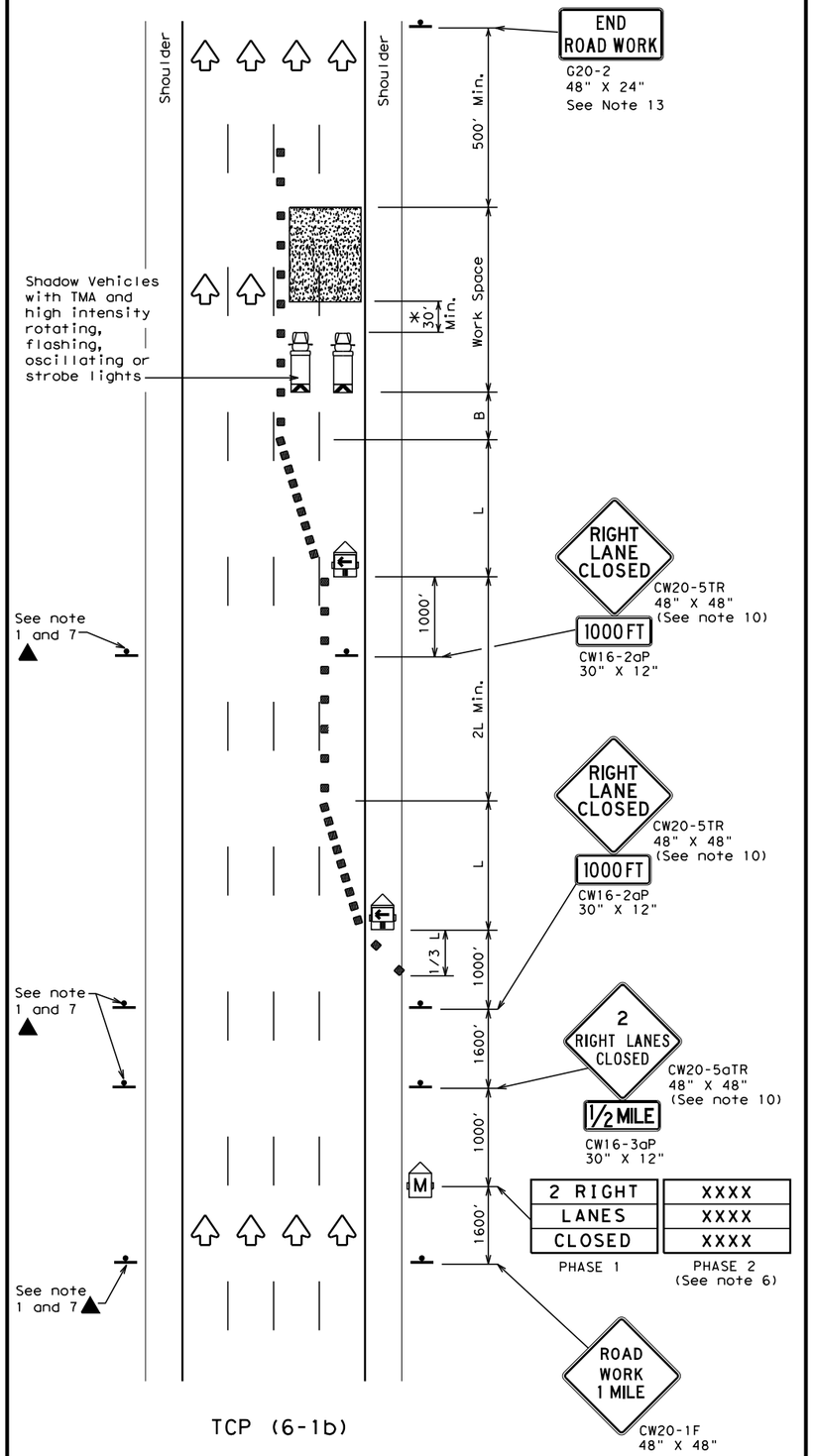
Vidal.Ngoumnai



TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		034

DATE: 10/11/2023 11:55:41 AM
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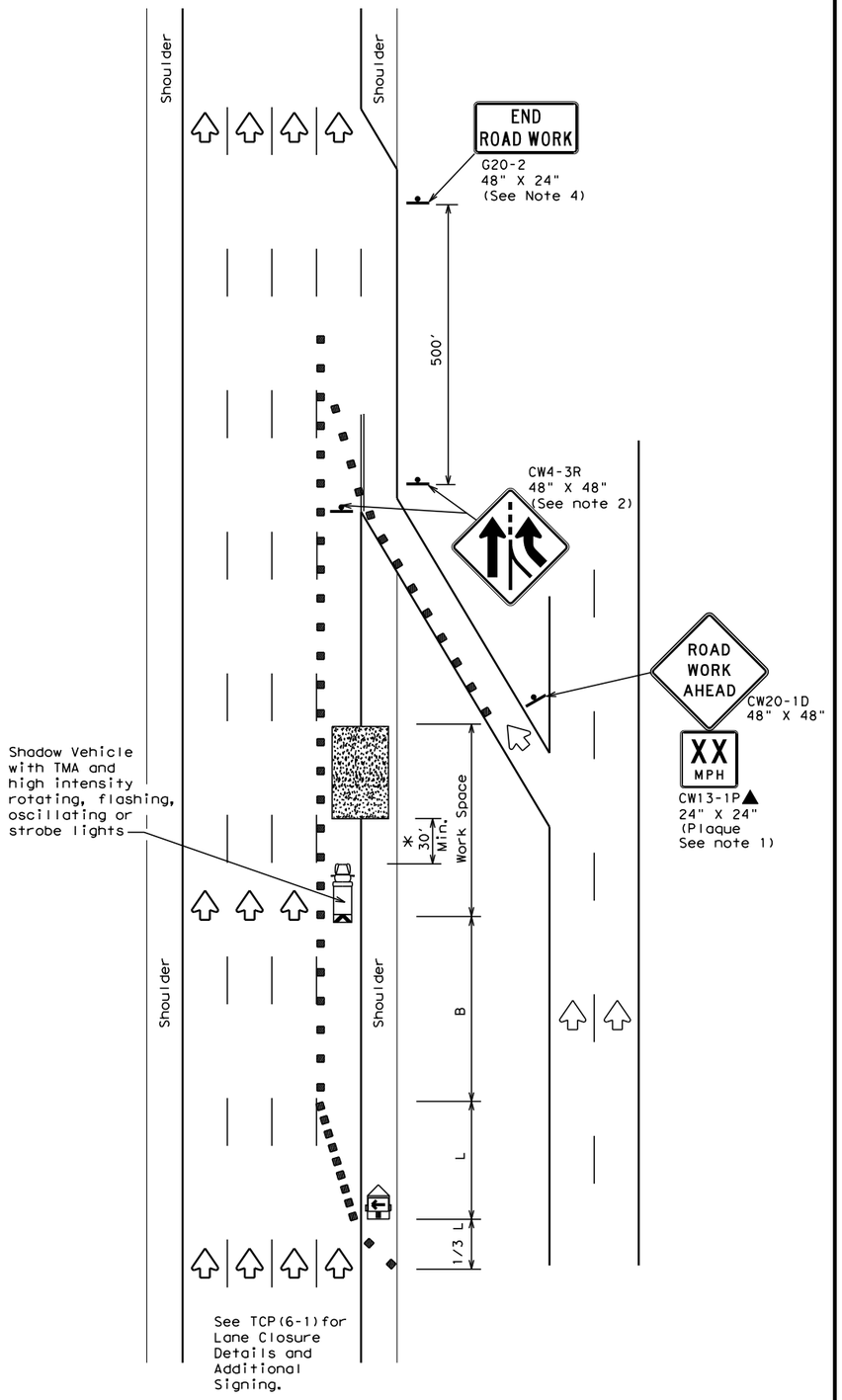
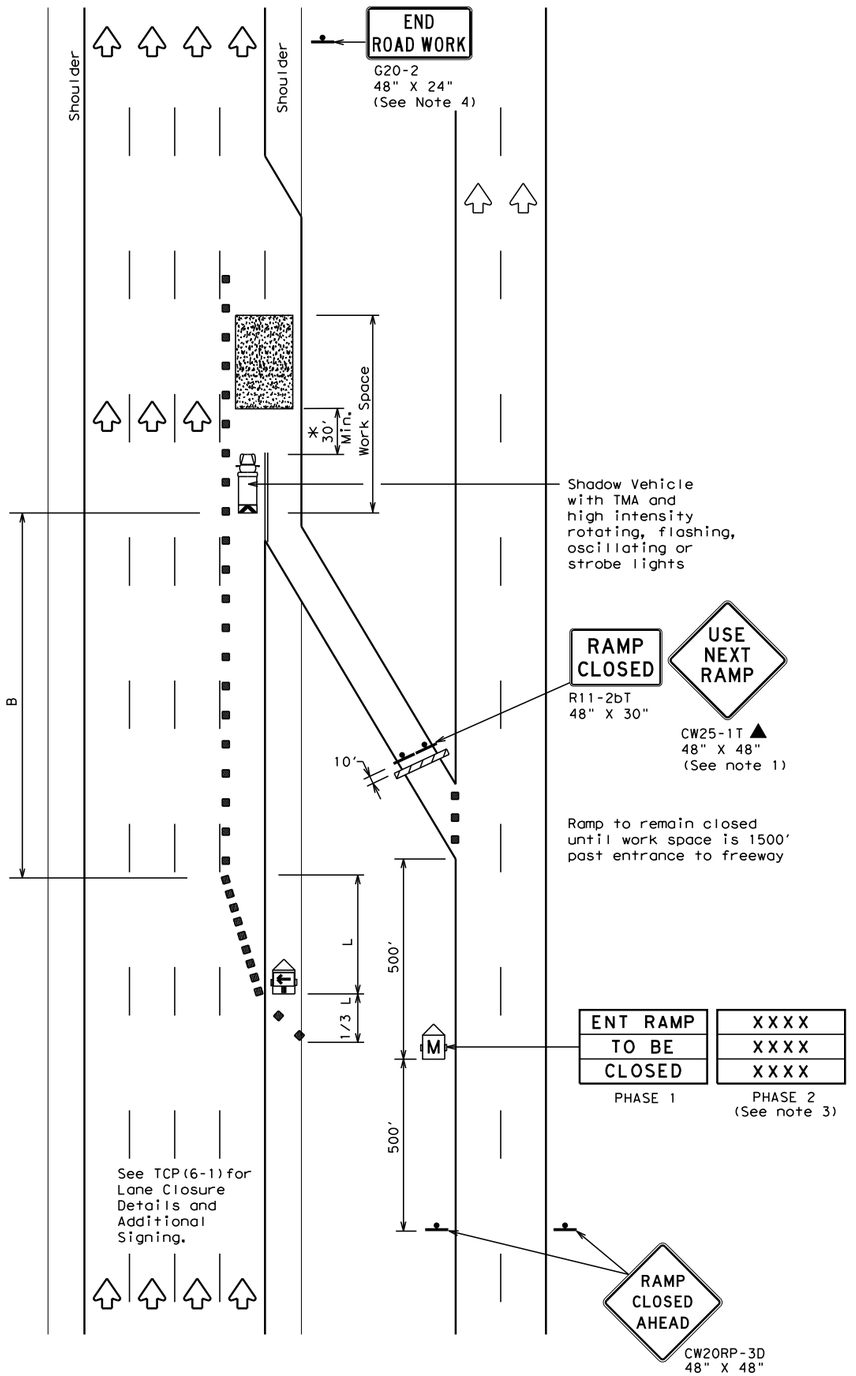
Vidal.Ngoumnai



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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. 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
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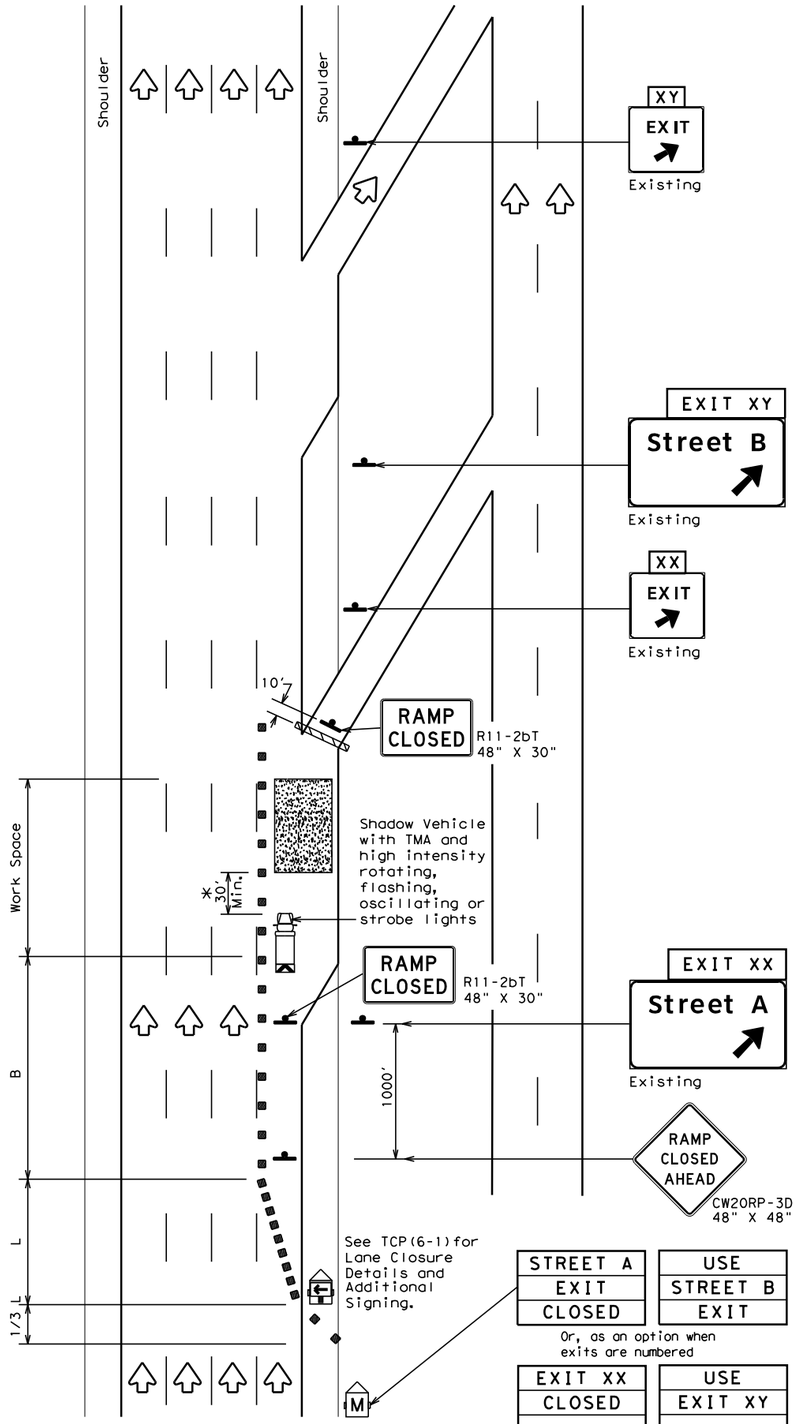
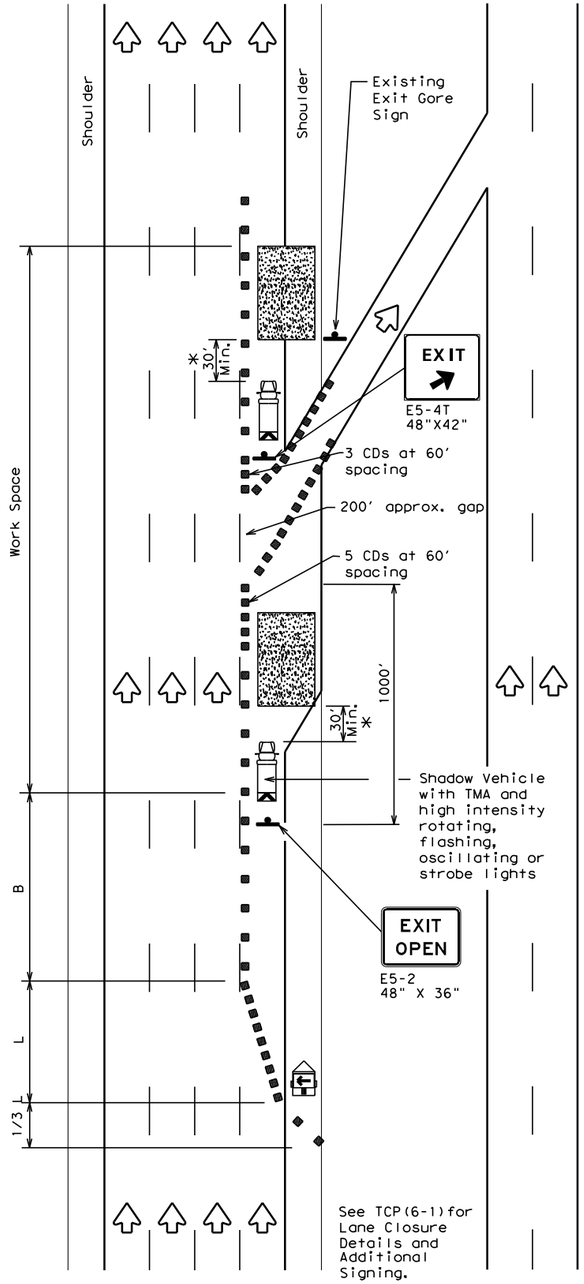
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER		035



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	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. See BC Standards for sign details.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
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1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER		036

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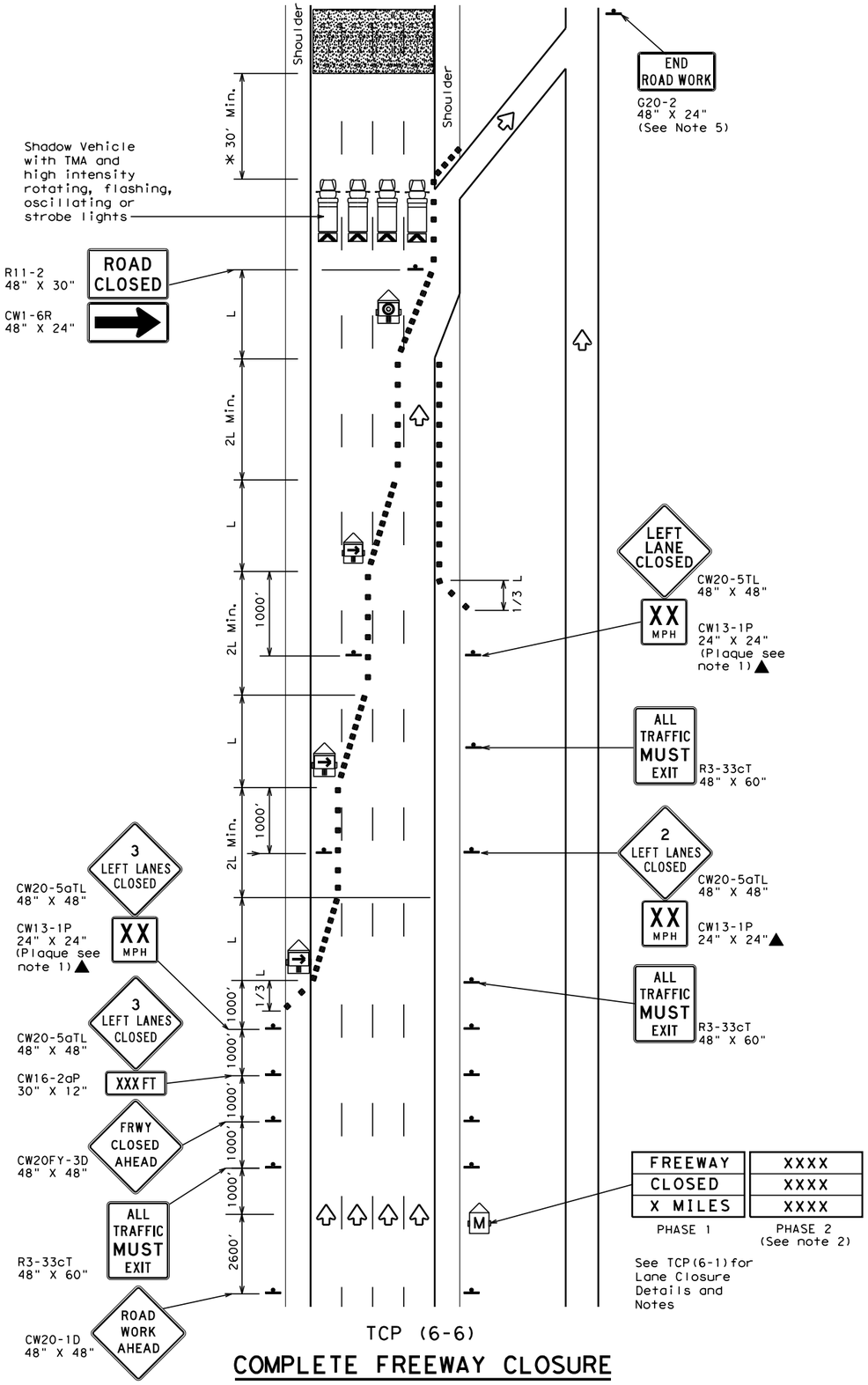

TCP (6-6)

COMPLETE FREEWAY CLOSURE

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

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. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE RIGHT," recommended speed, delay, exit information, or other specific warnings.
3. Where queuing is anticipated beyond signing shown, additional PCMS signs, other warning signs, devices or Law Enforcement Officers should be available to warn approaching high speed traffic of the end of the queue, as directed by the Engineer.
4. Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
5. 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 FREEWAY CLOSURE

TCP(6-6)-12

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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	AMA	POTTER		037

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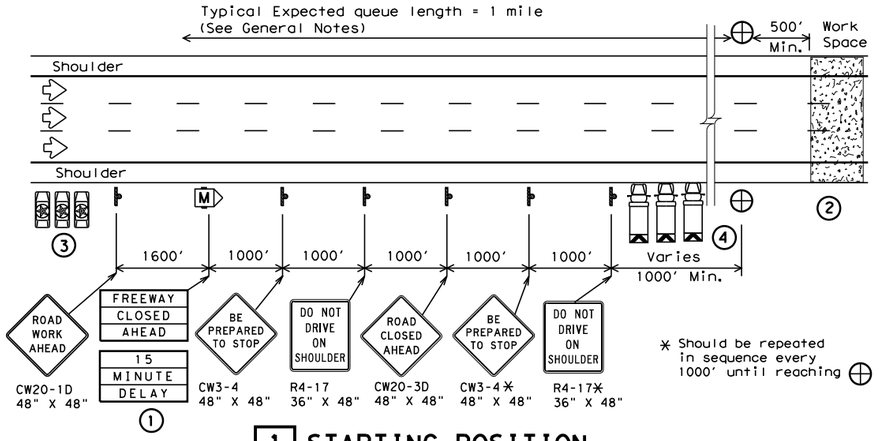
Vidal.Ngoumnai 10/11/2023 11:55:52 AM



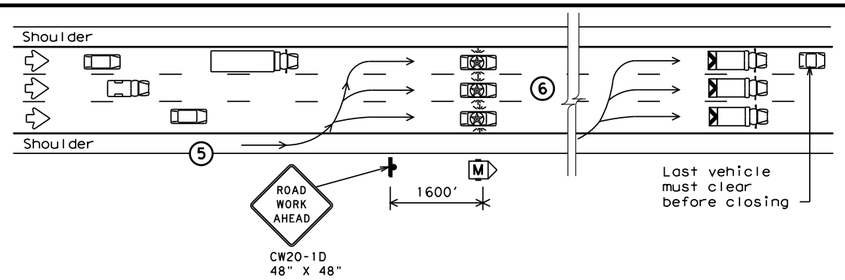
1 STARTING POSITION

(1) Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.

(2) Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.

(3) There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.

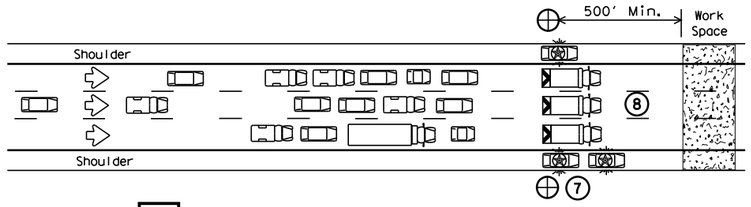
(4) One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



2 REDUCING SPEED OPERATION

(5) Starting position of the LEOVs should be in advance of the most distant warning signs.

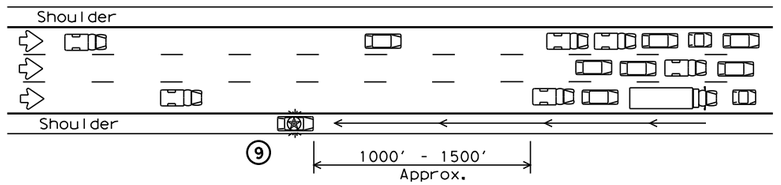
(6) Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.



3 ALL TRAFFIC STOPPED AT CP

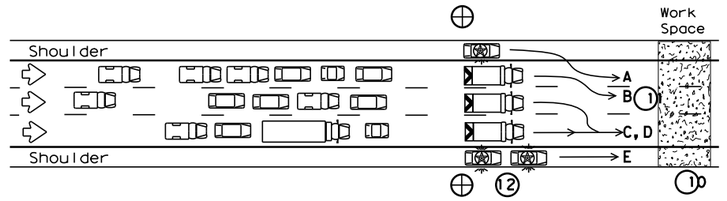
(7) Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

(8) The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.



4 WARNING THE TRAFFIC QUEUE

(9) The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed 1/4 mile or more in advance of the queue.



5 RELEASING STOPPED TRAFFIC

(10) All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.

(11) When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.

(12) The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.

(13) LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

LEGEND			
■ ■	Channelizing Devices	⊕	Control Position (CP)
M	Portable Changeable Message Sign (PCMS)		Barrier Vehicle with Truck Mounted Attenuator
	Law Enforcement Officer's Vehicle(LEOV)		Traffic Flow

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

GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.

2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.

3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9).

4. The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.

5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.

6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.

7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

TCP(6-7)-12

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LEGEND

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

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

Texas Department of Transportation

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WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

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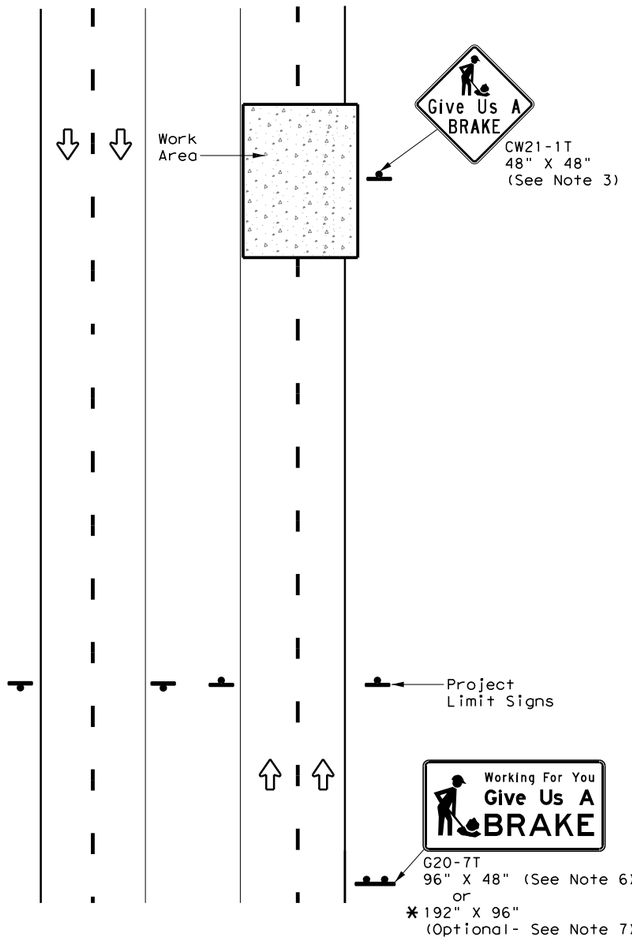
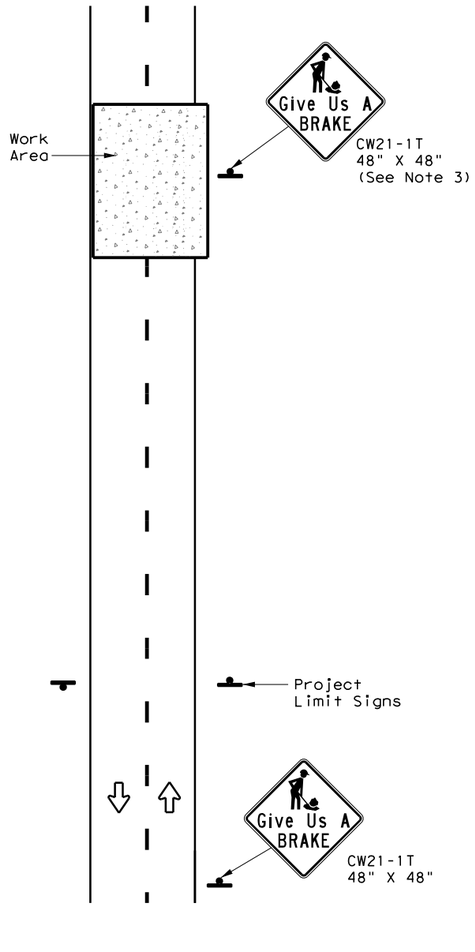


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 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.

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WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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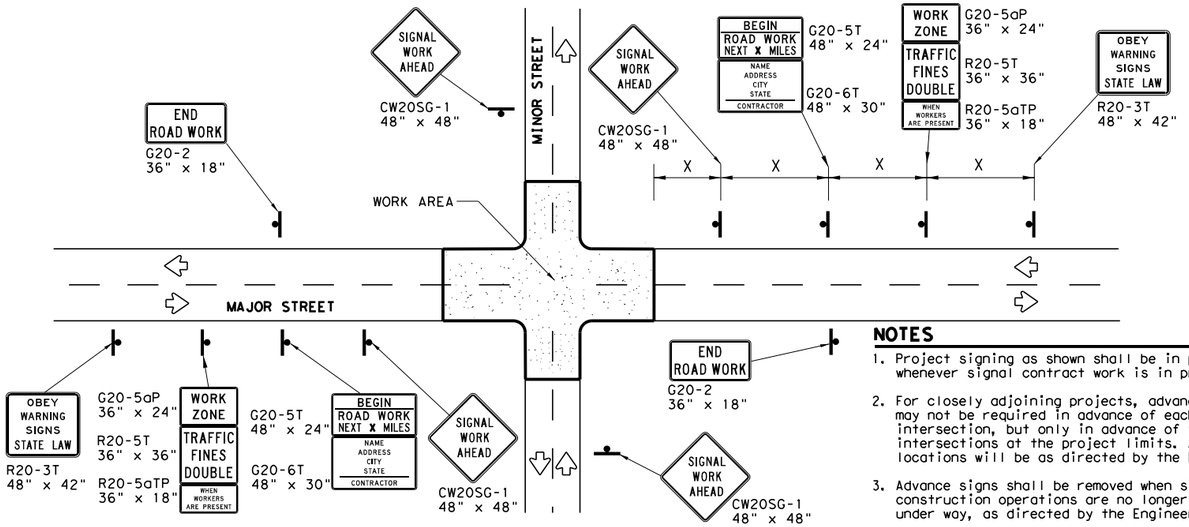


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

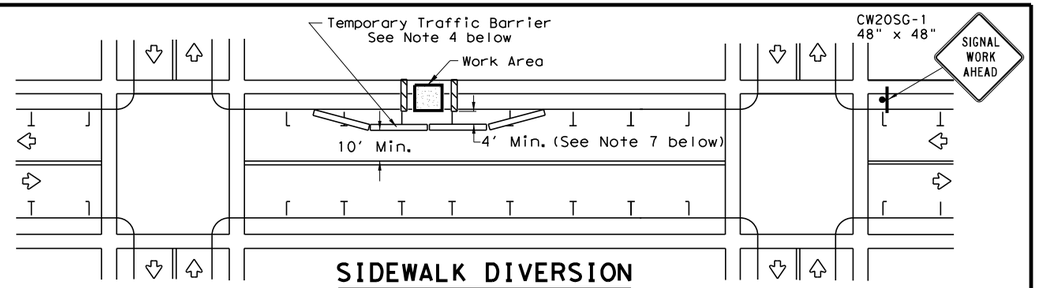
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 fastners. 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.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

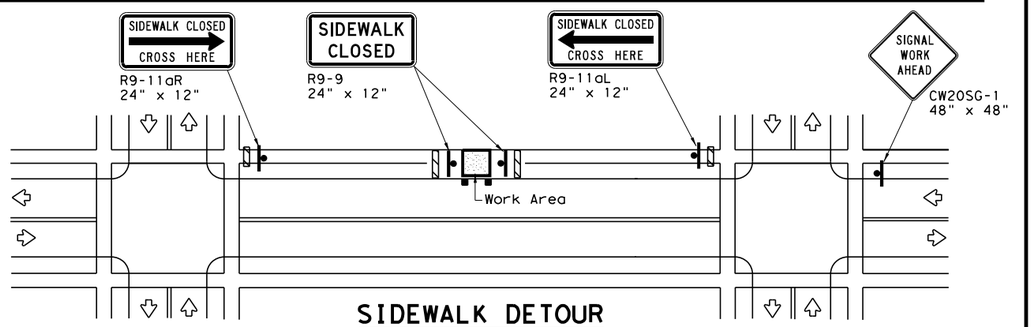
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

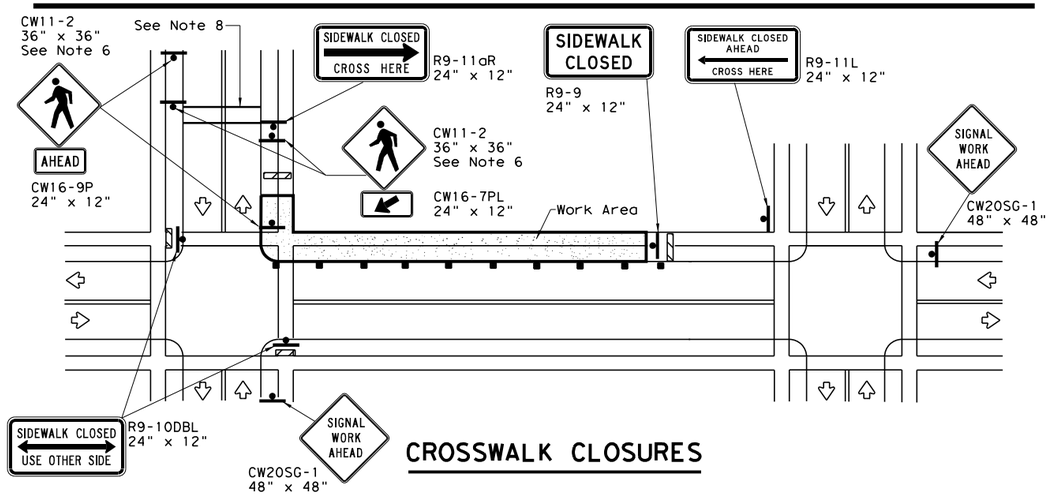
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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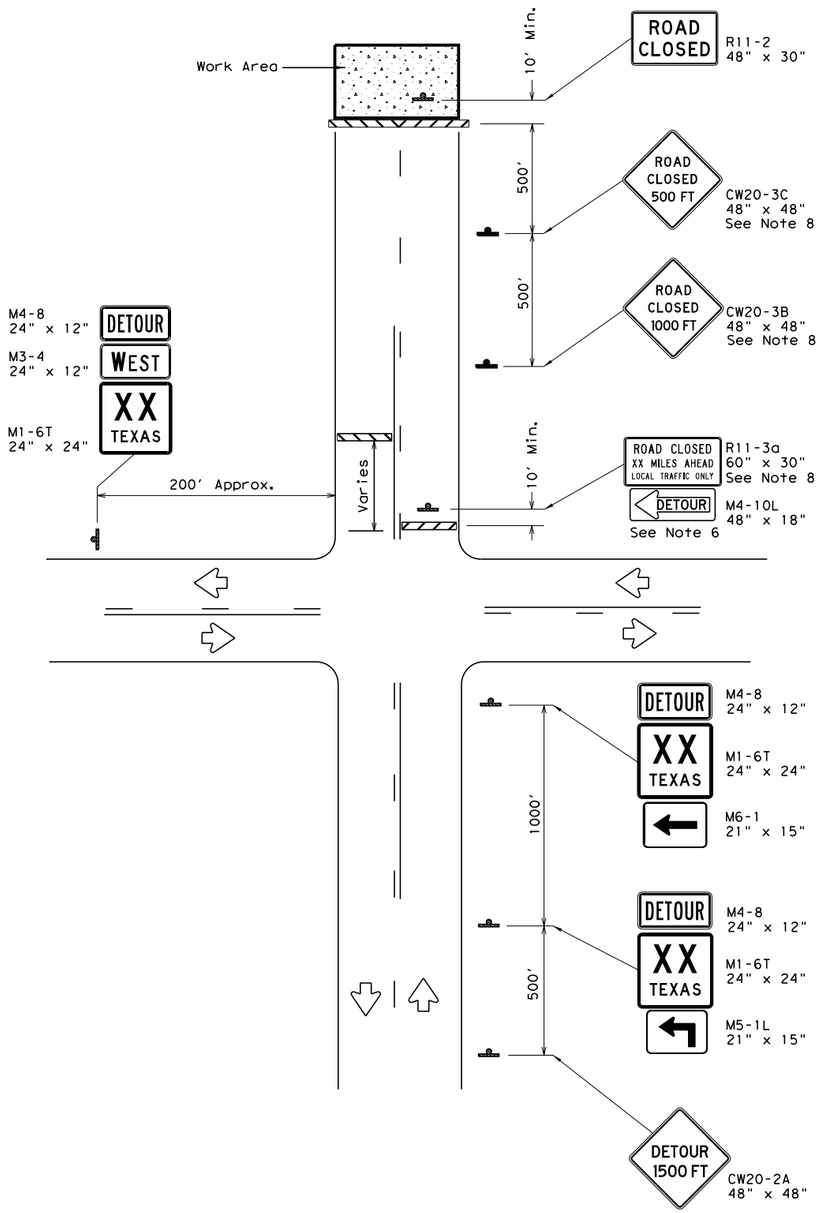
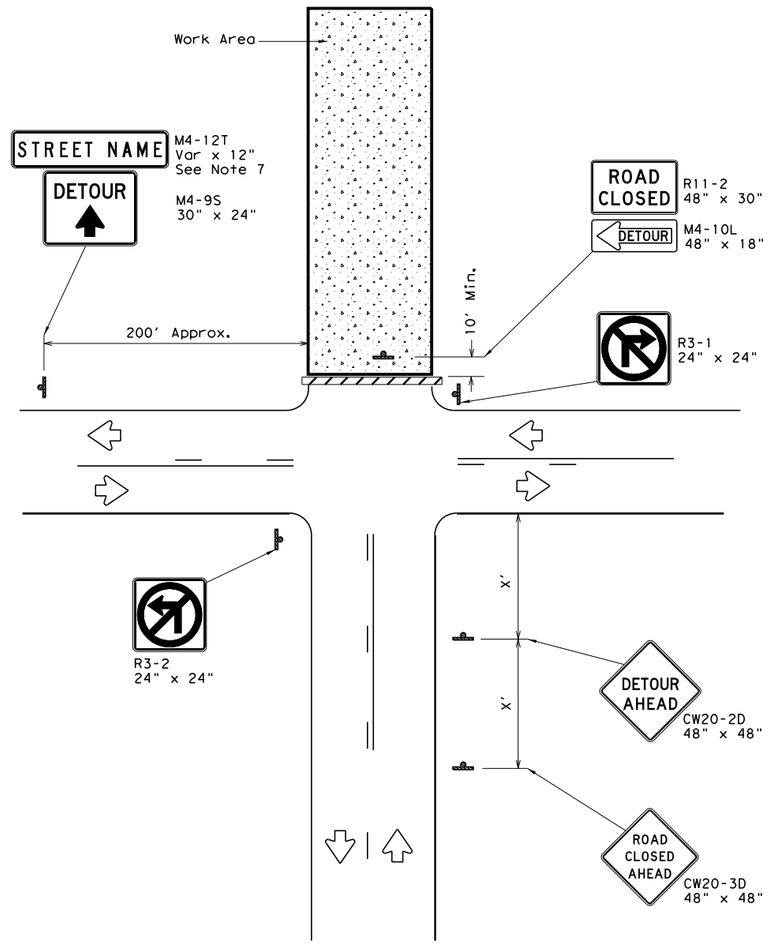


ROAD CLOSURE BEYOND THE INTERSECTION

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

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WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

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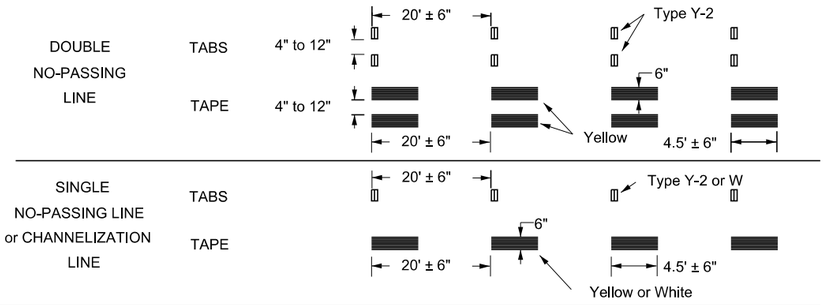
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



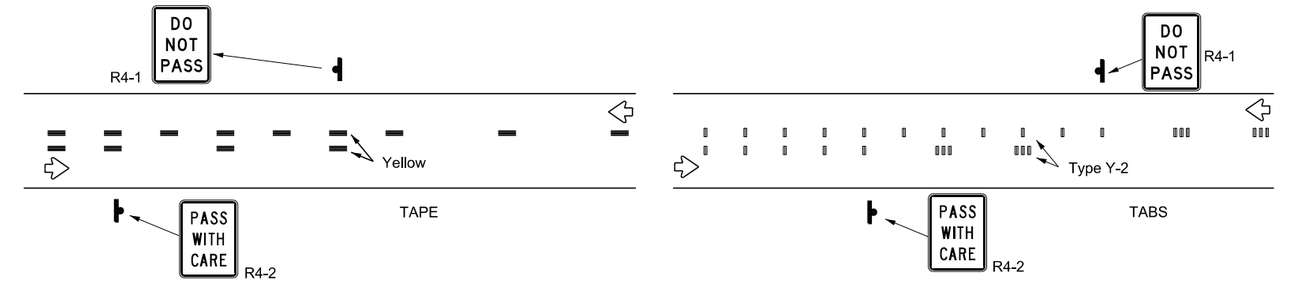
NOTES:

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

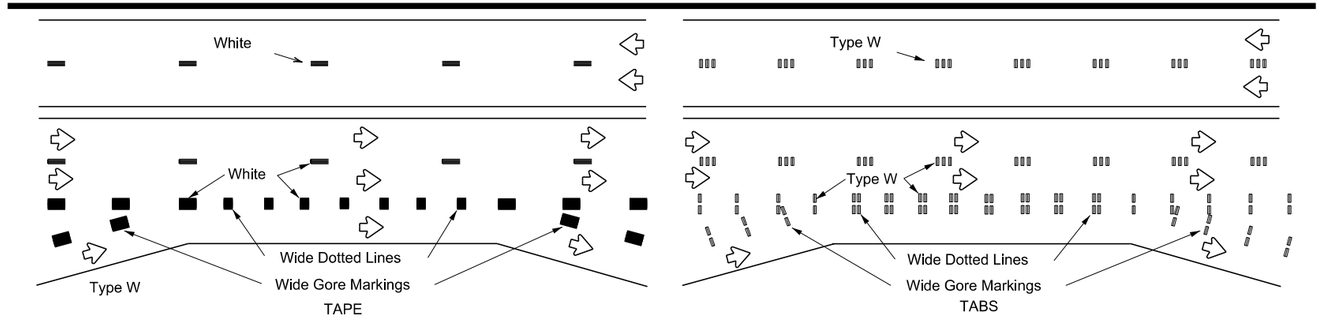
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

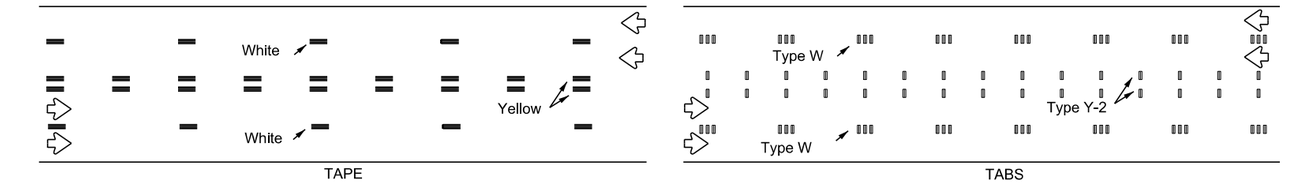
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



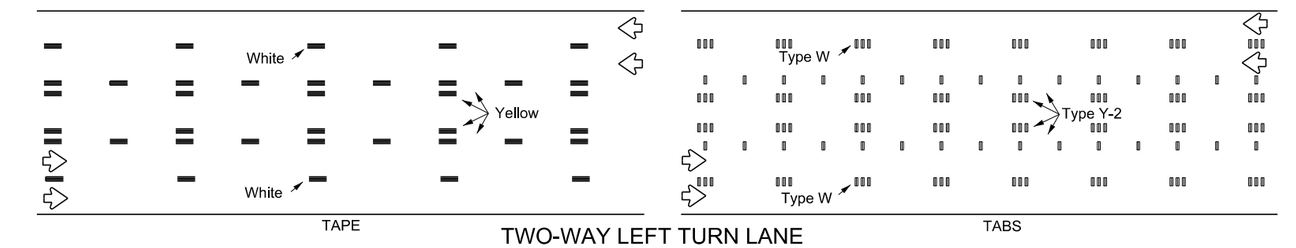
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



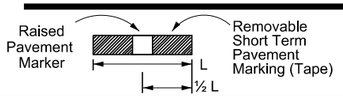
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

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Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

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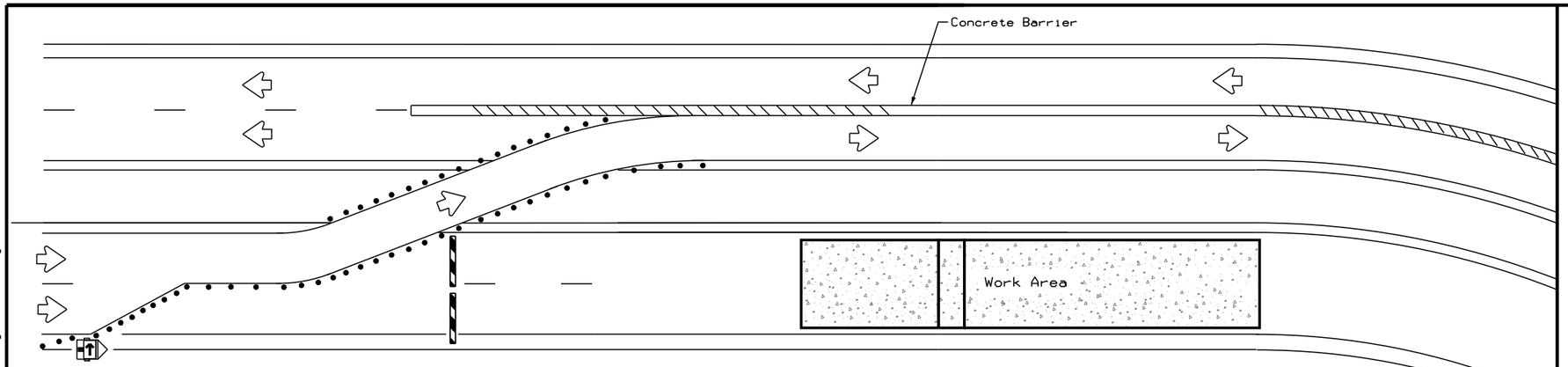


NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

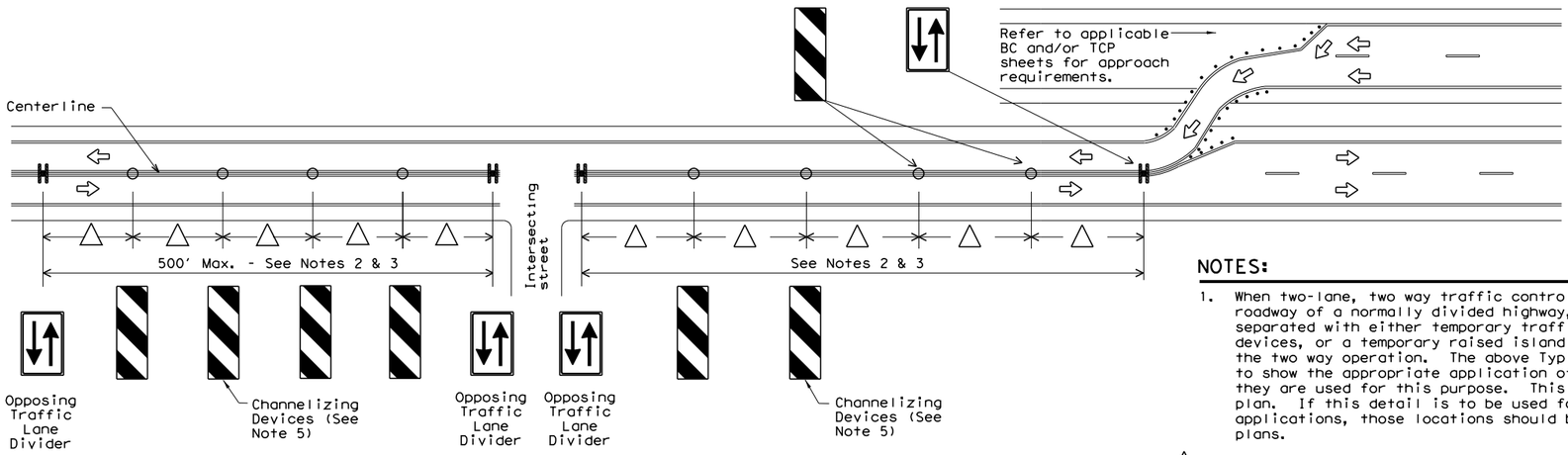
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\\\\	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD)describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

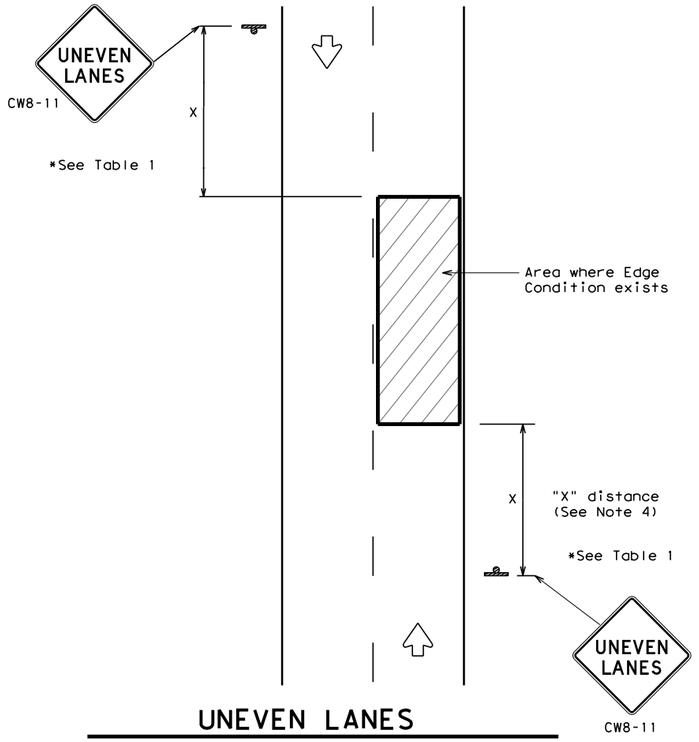
TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

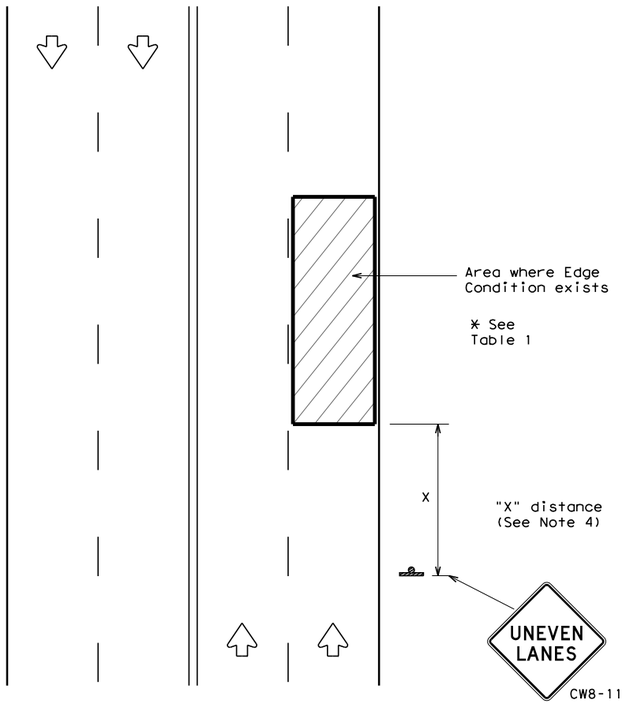
FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		044

110

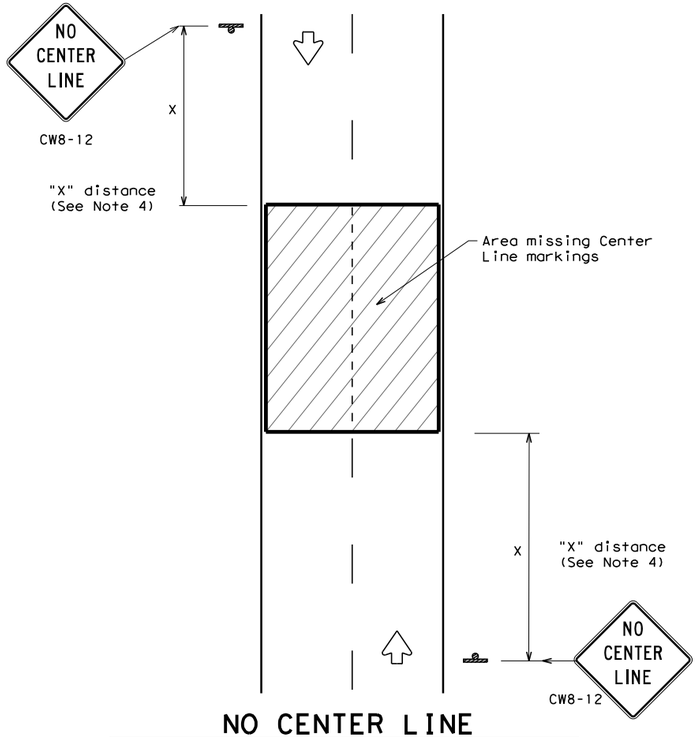
DATE: 10/11/2023 11:56:30 AM
FILE: c:\projects\bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com\dms21550\WZ (UL) - 13.dgn
Vidal.Ngoumnai



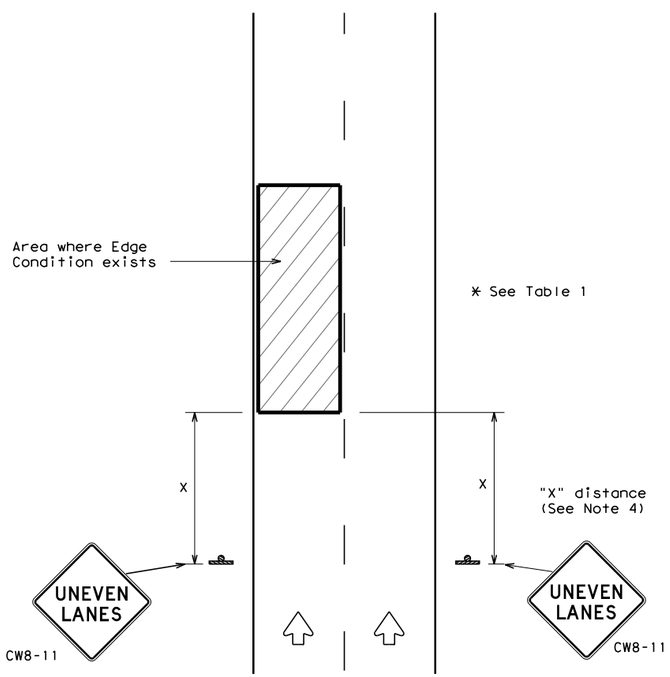
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

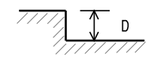
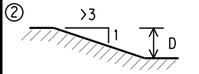
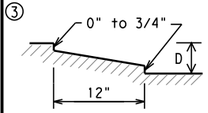
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

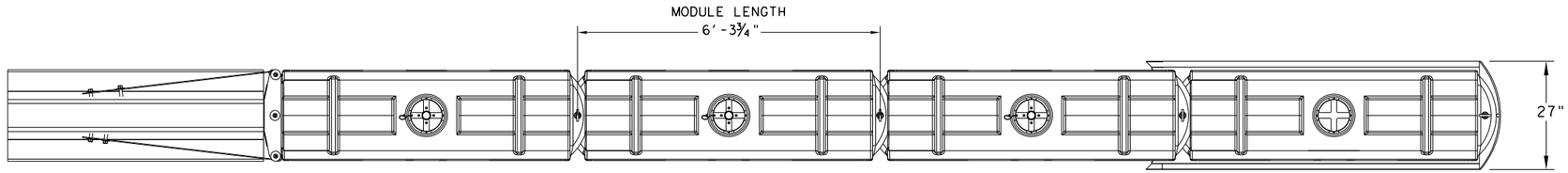
Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

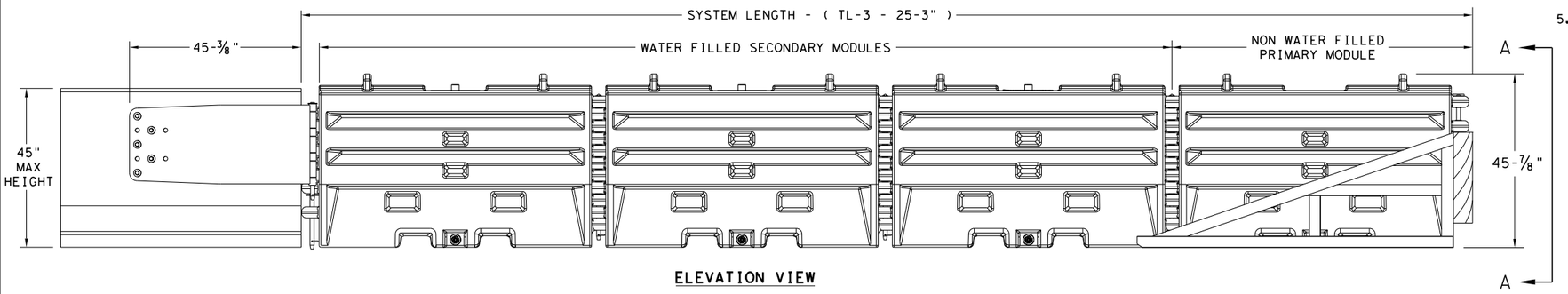
WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	AMA	POTTER		045

DATE:
FILE: c:\dms\bridgefarmer-pw\vidal.ngaunmai@bridgefarmer.com\dms21550\SLED-19.dgn



PLAN VIEW



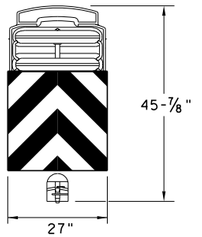
ELEVATION VIEW

GENERAL NOTES

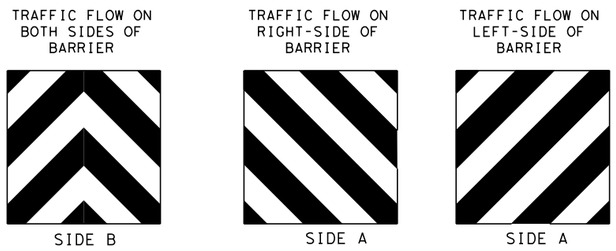
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, 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"

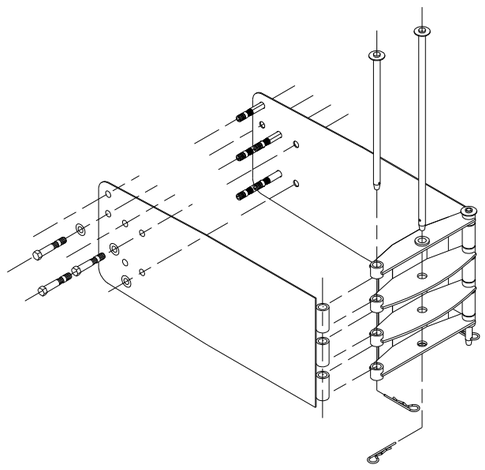


SECTION A-A



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

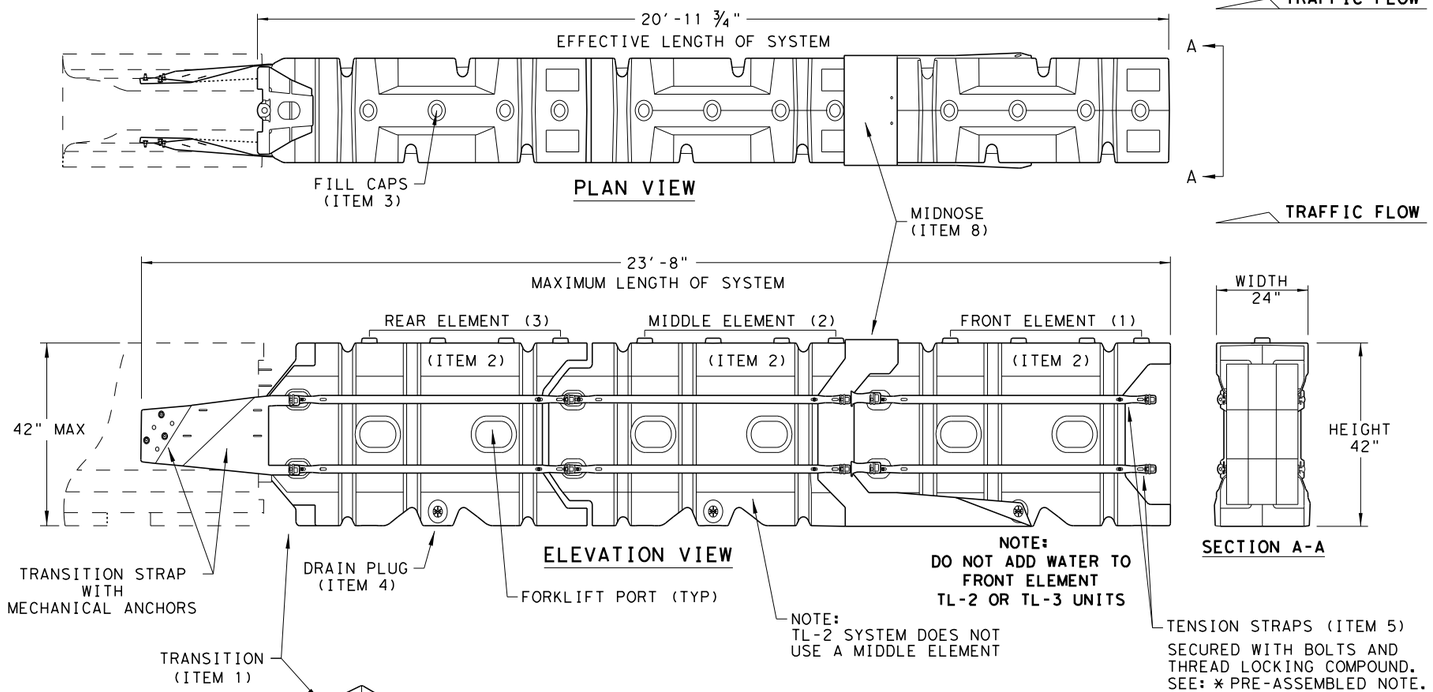
Design Division Standard

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	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		046

DATE:
FILE:

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.

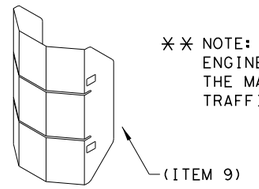
GENERAL NOTES

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

**APPLY DECAL



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.

DELINEATION DECAL PLACEMENT GUIDE

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

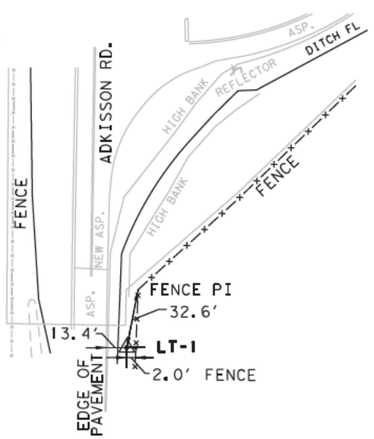
SACRIFICIAL

Texas Department of Transportation — Design Division Standard

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

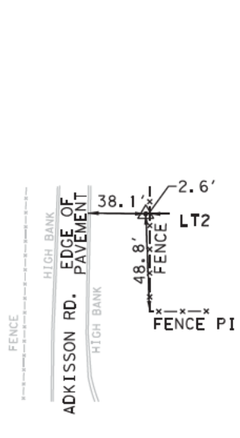
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				047

LT-1
SET TXDOT CAP
N = 3,716,551.28
E = 472,723.85
ELEV= 3,856.72'



ALONG ADKISSON RD, 0.15 MILE (830 FEET) SOUTH OF THE BRIDGE CROSSING I-40, 13 FEET EAST OF THE PAVEMENT

LT2
SET TXDOT CAP
N = 3,719,069.20
E = 472,783.97
ELEV= 3,861.12'

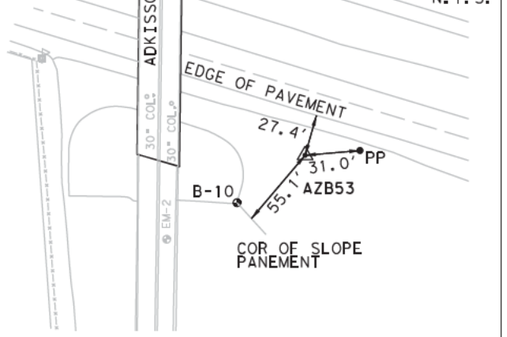


ALONG ADKISSON RD, 0.20 MILE (1,150 FEET) NORTH OF THE BRIDGE CROSSING I-40, 38 FEET EAST OF THE PAVEMENT.

*AZB42
FND. TxDOT DISK AZB
N = 3,717,805.51
E = 472,845.05
ELEV= 3,860.91'

AT THE NORTHERN END OF THE BRIDGE OF ADKISSON RD, CROSSING I-40, 80 FEET NORTH OF THE US ROUT 66 PAVEMENT AND 80 FEET SOUTHEAST OF SLOPE PANEMENT OF BRIDGE.

*AZB53
FND. TxDOT DISK AZB 53
N = 3,717,412.06
E = 472,809.35
ELEV= 3,860.39'



AT THE SOUTHERN END OF THE BRIDGE OF ADKISSON RD, CROSSING I-40, 30 FEET SOUTH OF I-40 PAVEMENT AND 45 FEET EAST OF SLOPE PANEMENT OF BRIDGE.

NOTE: * INDICATES OBSERVED VALUES OF EXISTING, CONTROL.

NOTE:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH ZONE, (4201), NORTH AMERICAN DATUM OF 1983 (NAD 83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE COMBINED ADJUSTMENT FACTOR OF 1.000250413.

2. HORIZONTAL CONTROL WAS DERIVED FROM TXDOT RTN (VRS) GPS OBSERVATIONS BASED ON TxDOT REGIONAL REFERENCE POINT TXN. HORIZONTAL SURVEY METHOD: TXDOT RTN

3. ALL ELEVATIONS HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

4. VERTICAL CONTROL WAS DERIVED FROM HOLDING THE PUBLISHED ELEVATION OF TXDOT CONTROL MONUMENT NO. AZB53 WITH AN ELEVATION OF (3,860.39) AS INDICATED ON IH-40 HORIZONTAL AND VERTICAL CONTROL LOCATION SKETCHES (CSJ 0090-05-097) SURVEY DATE NOV./DEC. 2016 BY RODS SURVEY, INC. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

5. UNIT OF MEASURE: U.S. SURVEY FEET

6. FIELD SURVEYS WERE PERFORMED BETWEEN JULY - SEPTEMBER 2022.

NO.	DATE	DESCRIPTION	APPROV.

LANDTECH
2525 North Loop West, Suite 300,
Houston, Texas 77008
T: 713-861-7068 F: 713-861-4131
TBPELS Registration No. 10019100

THIS SURVEY WAS PERFORMED UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
JACOB J. LUPHER
6606
A PROFESSIONAL LAND SURVEYOR

JACOB J. LUPHER 10/26/2023
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 6606

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

IH-40 AT ADKISSON
HORIZONTAL & VERTICAL

SCALE: AS NOTED SHEET OF

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET	IH-40
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AMA	POTTER	048
CHECK	CONTROL	SECTION	JOB	
	0090	05	108	

10/26/2023 1:03:46 PM

mphung

S:\2022\2220119-AMARILLO BRIDGES\CADD\Adkisson\IH-40A (ADKISSON) _SCM.dgn

CURVE ADKISSON C1

P.C. STATION		10+00.00
N		3,718,815.76
E		472,731.77
DELTA	=	03°34'52" (LT)
TANGENT	=	250.08'
LENGTH	=	500.00'
RADIUS	=	8,000.00'
LONG CHORD	=	499.92'
CHORD BEAR	=	S 01°01'56" E

CURVE ADKISSON C2

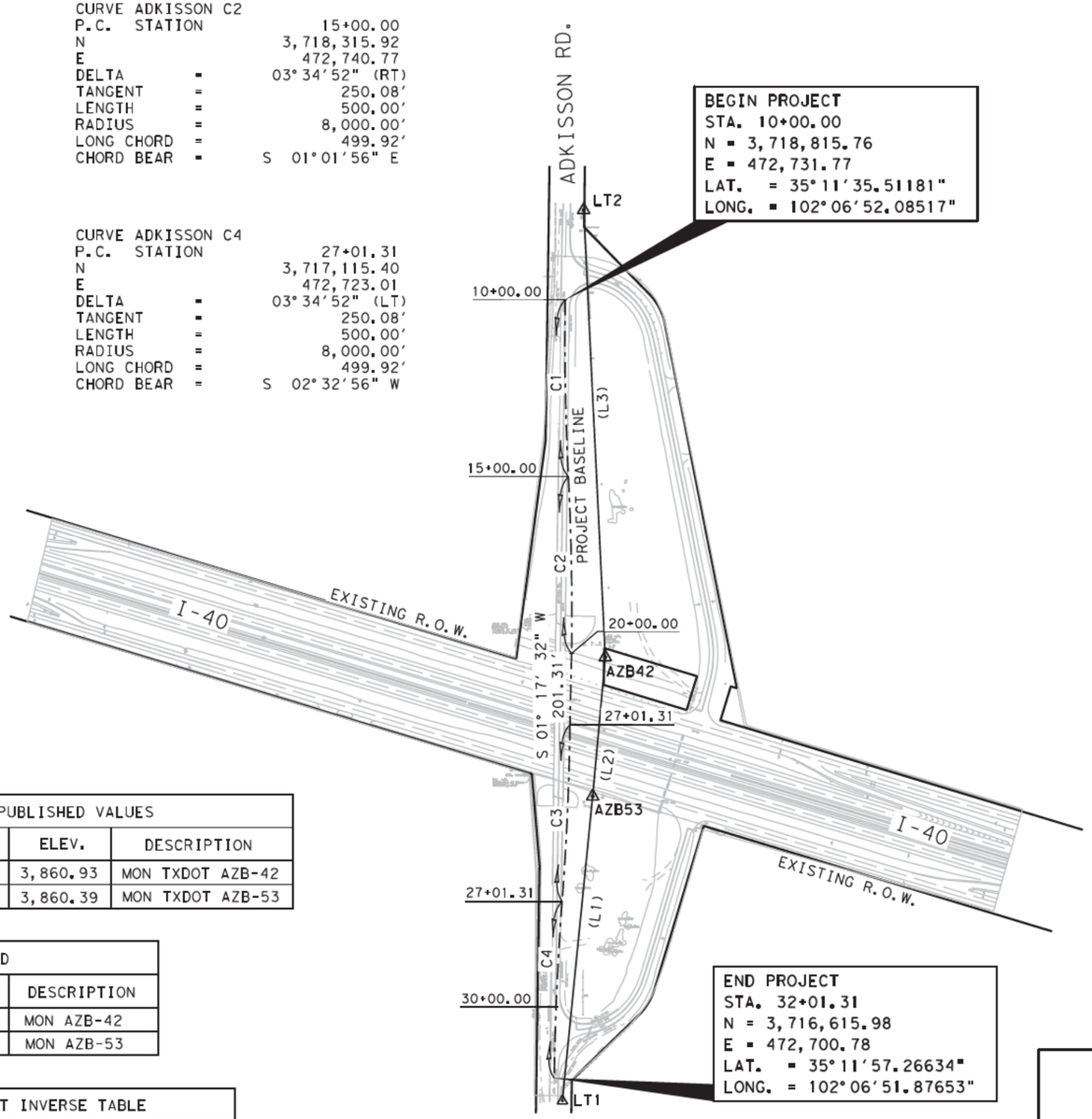
P.C. STATION		15+00.00
N		3,718,315.92
E		472,740.77
DELTA	=	03°34'52" (RT)
TANGENT	=	250.08'
LENGTH	=	500.00'
RADIUS	=	8,000.00'
LONG CHORD	=	499.92'
CHORD BEAR	=	S 01°01'56" E

CURVE ADKISSON C3

P.C. STATION		22+01.31
N		3,717,614.83
E		472,745.24
DELTA	=	03°34'52" (RT)
TANGENT	=	250.08'
LENGTH	=	500.00'
RADIUS	=	8,000.00'
LONG CHORD	=	499.92'
CHORD BEAR	=	S 02°32'56" W

CURVE ADKISSON C4

P.C. STATION		27+01.31
N		3,717,115.40
E		472,723.01
DELTA	=	03°34'52" (LT)
TANGENT	=	250.08'
LENGTH	=	500.00'
RADIUS	=	8,000.00'
LONG CHORD	=	499.92'
CHORD BEAR	=	S 02°32'56" W



SCALE IN FEET
0 400 800

NOTE:

1. ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH ZONE, (4201), NORTH AMERICAN DATUM OF 1983 (NAD 83), 2011 ADJUSTMENT, EPOCH 2010.00. ALL DISTANCES AND COORDINATES SHOWN ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE COMBINED ADJUSTMENT FACTOR OF 1.000250413.

2. HORIZONTAL CONTROL WAS DERIVED FROM TXDOT RTN (VRS) GPS OBSERVATIONS BASED ON TXDOT REGIONAL REFERENCE POINT TXN. HORIZONTAL SURVEY METHOD: TXDOT RTN

3. ALL ELEVATIONS HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

4. VERTICAL CONTROL WAS DERIVED FROM HOLDING THE PUBLISHED ELEVATION OF TXDOT CONTROL MONUMENT NO. AZB53 WITH AN ELEVATION OF (3,860.39) AS INDICATED ON IH-40 HORIZONTAL AND VERTICAL CONTROL LOCATION SKETCHES (CSJ 0090-05-097) SURVEY DATE NOV./DEC. 2016 BY RODS SURVEY, INC. VERTICAL SURVEY METHOD: DIGITAL LEVELING.

5. UNIT OF MEASURE: U.S. SURVEY FEET

6. FIELD SURVEYS WERE PERFORMED BETWEEN JULY - SEPTEMBER 2022.

CONTROL MONUMENT TABLE PUBLISHED VALUES

POINT	NORTHING (Y)	EASTING (X)	ELEV.	DESCRIPTION
AZB-42	3,717,805.53	472,845.09	3,860.93	MON TXDOT AZB-42
AZB-53	3,717,412.07	472,809.35	3,860.39	MON TXDOT AZB-53

Δ OBSERVED/PUBLISHED

POINT ID	Δ N	Δ E	ΔELEV	DESCRIPTION
*AZB-42	-0.0186	-0.0347	-0.022	MON AZB-42
*AZB-53	-0.0102	-0.0033	-0.000	MON AZB-53

SURVEY CONTROL MONUMENT INVERSE TABLE

LINE #	FROM POINT	BEARING	DISTANCE	TO POINT
L1	LT-1	N 05°40'21" E	865.02'	AZB-53
L2	*AZB-53	N 05°11'05" E	395.07'	AZB-42
L3	*AZB-42	N 02°46'03" W	1,265.16'	LT-2

CONTROL MONUMENTATION TABLE

POINT	NORTHING(Y)	EASTING(X)	ELEVATION	STATION	OFFSET	DESCRIPTION
LT2	3,719,069.20	472,783.97	3,861.12'	N/A	N/A	SET TXDOT CAP - LT 2
*AZB42	3,717,805.51	472,845.05	3,860.91'	20+08.42	95.49' LT	FND. TxDOT DISK AZB 42
*AZB53	3,717,412.06	472,809.35	3,860.39'	24+01.50	69.32' LT	FND. TxDOT DISK AZB 53
LT1	3,716,551.28	472,723.85	3,856.72'	N/A	N/A	SET TXDOT CAP - LT 1

NOTE: * INDICATES OBSERVED VALUES OF EXISTING, CONTROL.

LANDTECH
2525 North Loop West, Suite 300,
Houston, Texas 77008
T: 713-861-7068 F: 713-861-4131
TBPELS Registration No. 10019100

THIS SURVEY WAS PERFORMED UNDER MY SUPERVISION.

STATE OF TEXAS REGISTERED JACOB J. LUPHER 6606 PROFESSIONAL LAND SURVEYOR

JACOB J. LUPHER 10/26/2023
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 6606

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

IH-40 AT ADKISSON
SURVEY CONTROL INDEX SHEET

SCALE: AS NOTED SHEET OF

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		IH-40
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AMA	POTTER	049
	CONTROL	SECTION	JOB	
CHECK	0090	05	108	

EXISTING ADKISSON ROAD CENTERLINE

Beginning chain ADKISSONEXIST description

Point A01 N 3,718,915.7207 E 472,734.4267 Sta 9+00.00

Course from A01 to A4 S 0° 50′ 18.67" W Dist 2,317.8981

Equation: Sta 32+17.90 (BK) = Sta 32+19.60 (AH) End Region 1 / Begin Region 2

Point A4 N 3,716,598.0709 E 472,700.5056 Sta 32+19.60

Ending chain ADKISSONEXIST description

PROPOSED ADKISSON ROAD CENTERLINE

Beginning chain ADKISSON description

Point A01 N 3,718,915.7207 E 472,734.4267 Sta 9+00.00

Course from A01 to PC ADK1 S 1° 10′ 24.04" W Dist 90.0000

Curve Data

Curve ADK1					
P.I. Station	11+45.95	N	3,718,669.8246	E	472,729.3904
Delta =	4° 21′ 23.42" (LT)				
Degree =	1° 23′ 50.85"				
Tangent =	155.9477				
Length =	311.7451				
Radius =	4,100.0000				
External =	2.9647				
Long Chord =	311.6700				
Mid. Ord. =	2.9626				
P.C. Station	9+90.00	N	3,718,825.7396	E	472,732.5838
P.T. Station	13+01.75	N	3,718,514.1175	E	472,738.0499
C.C.		N	3,718,741.7828	E	476,831.7241
Back = S	1° 10′ 24.04" W				
Ahead = S	3° 10′ 59.39" E				
Chord Bear = S	1° 00′ 17.68" E				

Course from PT ADK1 to PC ADK2 S 3° 10′ 59.39" E Dist 20.0000

Curve Data

Curve ADK2					
P.I. Station	15+95.91	N	3,718,220.4113	E	472,754.3840
Delta =	3° 59′ 25.11" (RT)				
Degree =	0° 43′ 40.90"				
Tangent =	274.1601				
Length =	548.0986				
Radius =	7,870.0000				
External =	4.7739				
Long Chord =	547.9878				
Mid. Ord. =	4.7710				
P.C. Station	13+21.75	N	3,718,494.1484	E	472,739.1604
P.T. Station	18+69.84	N	3,717,946.2784	E	472,750.5220
C.C.		N	3,718,057.1422	E	464,881.3029
Back = S	3° 10′ 59.39" E				
Ahead = S	0° 48′ 25.73" W				
Chord Bear = S	1° 11′ 16.83" E				

Course from PT ADK2 to PC ADK3 S 0° 48′ 25.73" W Dist 618.0846

Curve Data

Curve ADK3					
P.I. Station	26+40.95	N	3,717,175.2535	E	472,739.6595
Delta =	5° 35′ 51.35" (RT)				
Degree =	1° 49′ 49.93"				
Tangent =	153.0167				
Length =	305.7900				
Radius =	3,130.0000				
External =	3.7380				
Long Chord =	305.6684				
Mid. Ord. =	3.7336				
P.C. Station	24+87.93	N	3,717,328.2551	E	472,741.8151
P.T. Station	27+93.72	N	3,717,023.1918	E	472,722.5903
C.C.		N	3,717,372.3470	E	469,612.1256
Back = S	0° 48′ 25.73" W				
Ahead = S	6° 24′ 17.07" W				
Chord Bear = S	3° 36′ 21.40" W				

Curve Data

Curve ADK4					
P.I. Station	29+33.03	N	3,716,884.7452	E	472,707.0495
Delta =	5° 05′ 49.55" (LT)				
Degree =	1° 49′ 49.93"				
Tangent =	139.3161				
Length =	278.4484				
Radius =	3,130.0000				
External =	3.0989				
Long Chord =	278.3566				
Mid. Ord. =	3.0959				
P.C. Station	27+93.72	N	3,717,023.1918	E	472,722.5903
P.T. Station	30+72.17	N	3,716,745.4654	E	472,703.8702
C.C.		N	3,716,674.0366	E	475,833.0550
Back = S	6° 24′ 17.07" W				
Ahead = S	1° 18′ 27.52" W				
Chord Bear = S	3° 51′ 22.30" W				

Course from PT ADK4 to A4 S 1° 18′ 27.52" W Dist 147.4330

Point A4 N 3,716,598.0709 E 472,700.5056 Sta 32+19.60

Ending chain ADKISSON description

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER
10/12/23
James W Langston PE

Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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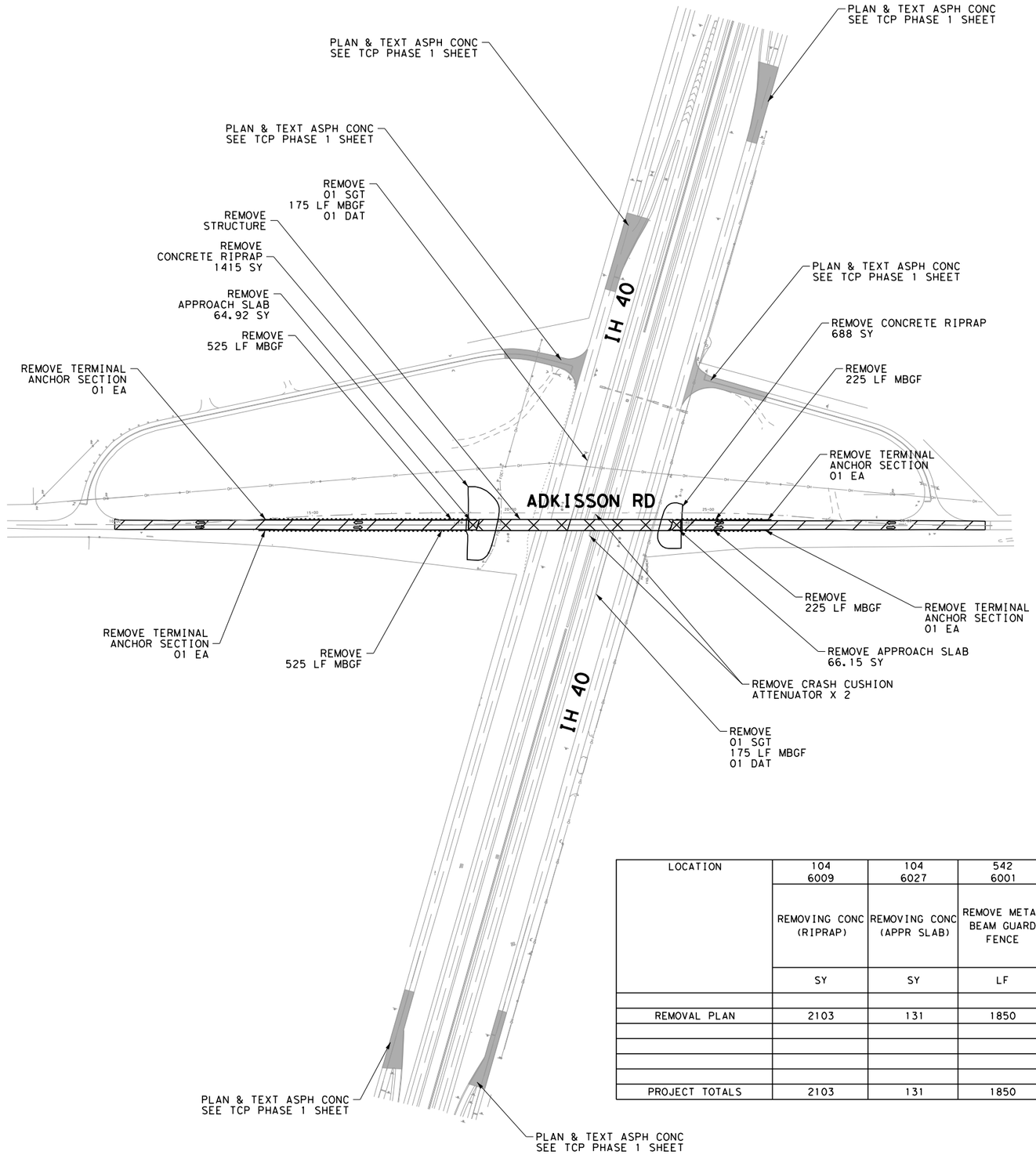
IH-40 AT ADKISSON ROAD

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS CG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JL	TEXAS	AMA	POTTER	050
CHECK MS	CONTROL 0090	SECTION 05	JOB 108	



LOCATION	104 6009	104 6027	542 6001	542 6002	542 6003	544 6003	545 6005
	REMOVING CONC (RIPRAP)	REMOVING CONC (APPR SLAB)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE DOWNSTREAM ANCHOR TERMINAL	GUARDRAIL END TREATMENT (REMOVE)	CRASH CUSH ATTEN (REMOVE)
	SY	SY	LF	EA	EA	EA	EA
REMOVAL PLAN	2103	131	1850	4	2	2	2
PROJECT TOTALS	2103	131	1850	4	2	2	2

300 0 300 600
SCALE: 1" = 300'

LEGEND

- EXISTING TRAFFIC FLOW
- PROPOSED TRAFFIC FLOW
- EXISTING PAVEMENT
- EXISITNG BRIDGE/SLAB
- EXISITNG CONCRETE RIPRAP
- PLAN & TEXT ASPHALT CONCRETE
- METAL BEAM GUARD FENCE
- METAL BEAM GUARD FENCE TRANSITION
- GUARDRAIL END TREATMENT

NOTES:

1. STA REFERS TO ℄ ADKISSON Road.
2. REMOVAL OF ANY CURB AND GUTTER WILL BE SUBSIDIARY TO OTHER REMOVAL ITEMS.
3. REMOVE MBGF INCLUDE ALL APPURTENANCES.
4. REMOVAL OF CRASH WALLS AND BRIDGE RAILS WILL BE SUBSIDIARY TO REMOVE STRUCTURE.
5. REMOVAL OF RIPRAP IN THE CENTER OF THE DITCH BETWEEN THE EB AND WB OF MAINLANES WILL BE SUBSIDIARY TO REMOVE CRASH CUSHION ATTENUATOR.
6. SCARIFIED MATERIALS CAN ALSO BE INCORPORATED INTO THE PROPOSED EMBANKMENT.

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER
10/19/23

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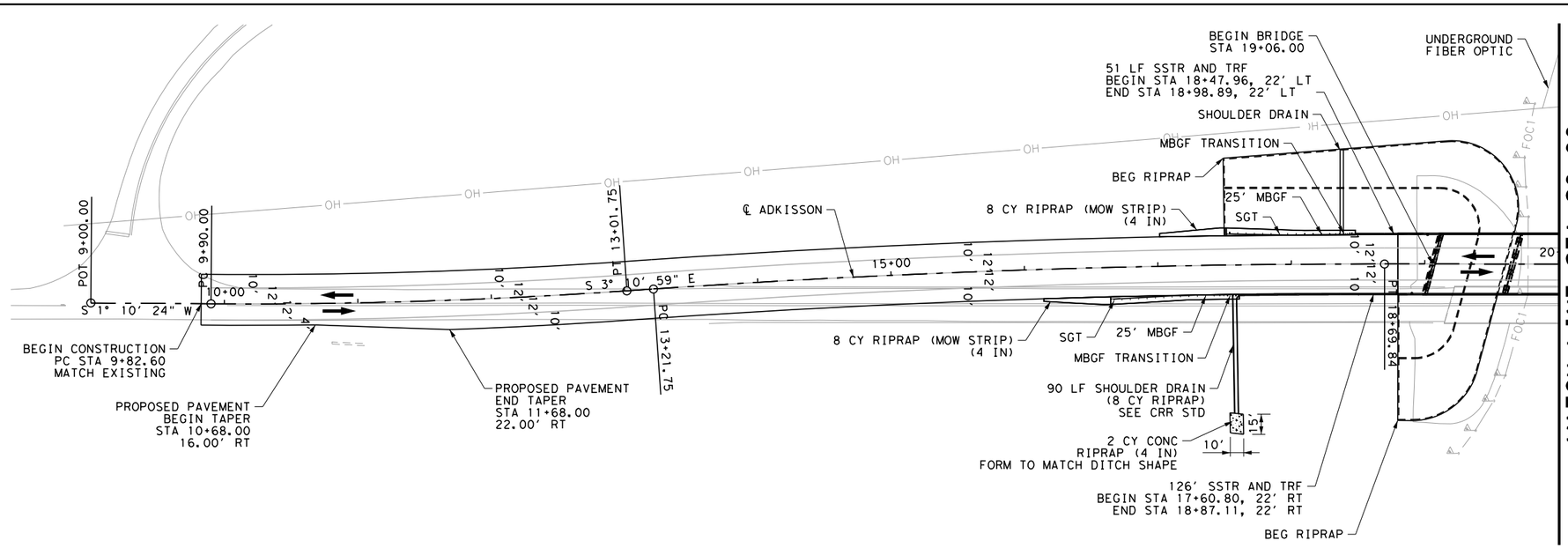
TBPE REGISTRATION NO. 264

IH-40 AT ADKISSON ROAD

REMOVAL PLAN

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS CG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JL	TEXAS	AMA	POTTER	051
CHECK MS	CONTROL	SECTION	JOB	
	0090	05	108	

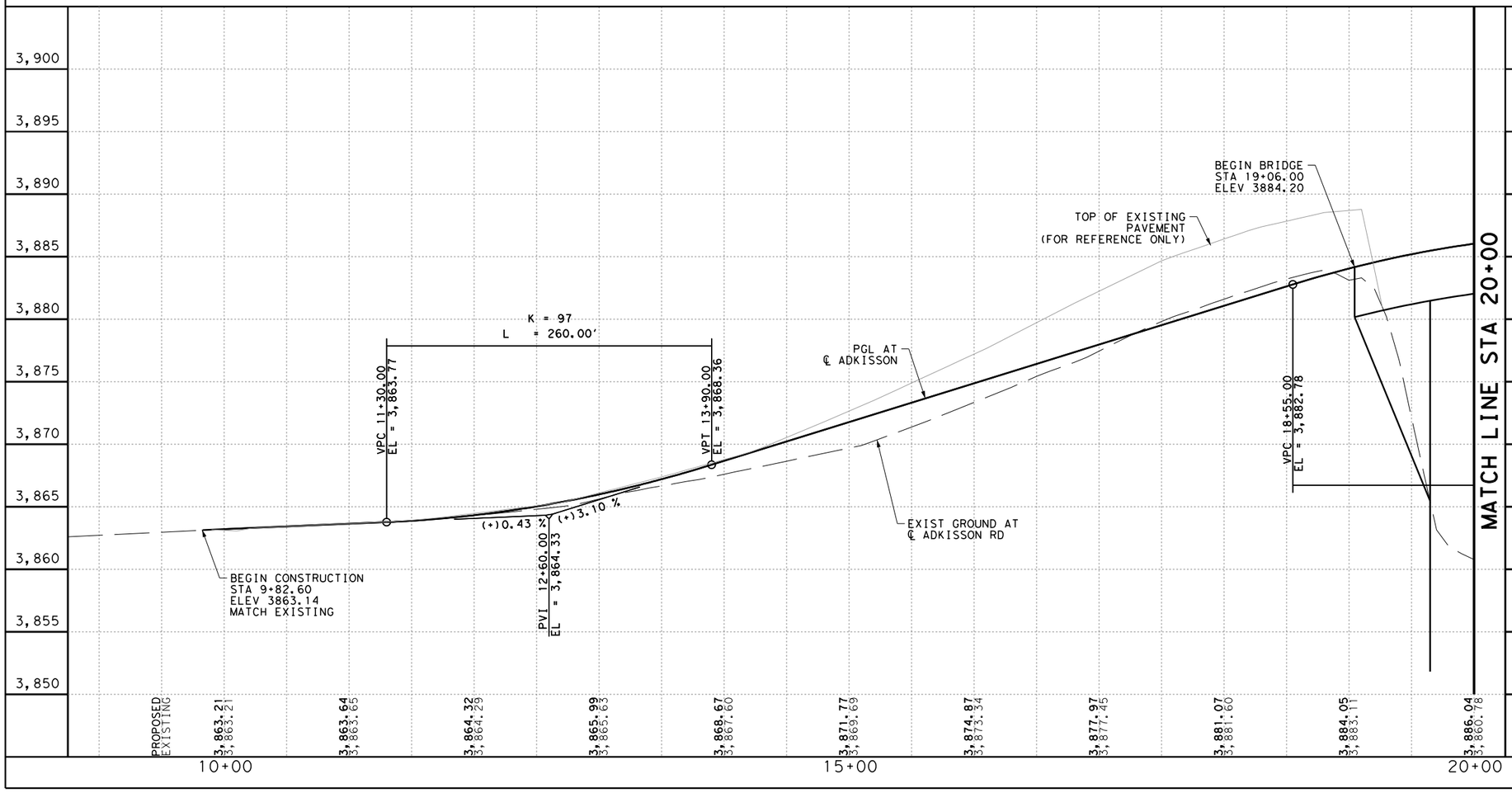


50 0 50 100
SCALE: 1" = 100' HORIZONTAL

5 0 5 10
SCALE: 1" = 10' VERTICAL

NOTES:

1. SSCB IS NOT TO HAVE DRAIN SLOTS. CONCRETE BACKFILL AS SHOWN PER SSCB(3)-10 STANDARD.
2. MBGF UNDER ADKISSON RD IS INTENDED TO BE PLACED PARALLEL TO THE ROADWAY.
2. SEE RIPRAP LIMITS SHEET FOR DETAILS ON RIPRAP.
3. CCA = CRASH CUSHION ATTENUATOR



10/12/23

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER

James W. Langston PE

Bridgefarmer & Associates, Inc.
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TBPE REGISTRATION NO. 264

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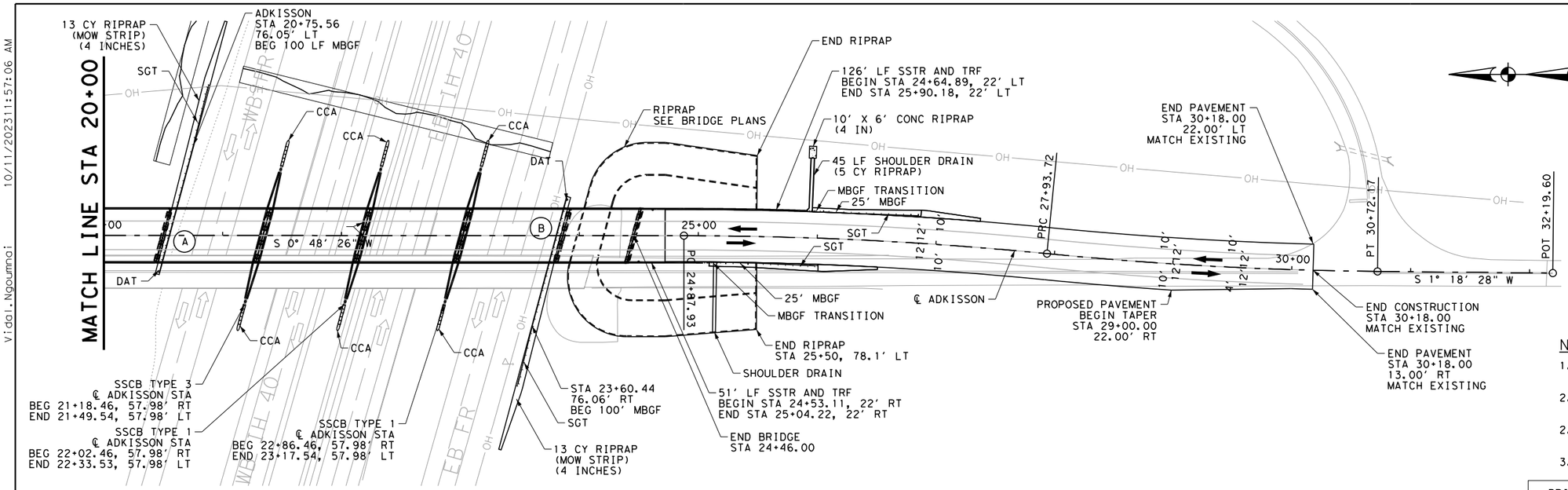
IH-40 AT ADKISSON ROAD

PLAN & PROFILE
STA 10+00 TO 21+00

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CG	TEXAS	AMA	POTTER	052
CHECK	CONTROL	SECTION	JOB	
JL	0090	05	108	
CHECK				
MS				



50 0 50 100
SCALE: 1" = 100' HORIZONTAL
5 0 5 10
SCALE: 1" = 10' VERTICAL

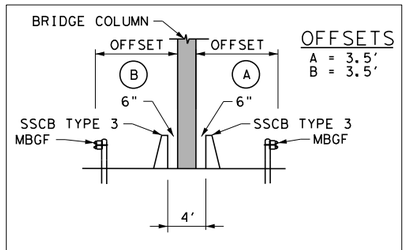
10/12/23

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER
James W Langston PE

Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

NOTES:

1. SSCB IS NOT TO HAVE DRAIN SLOTS. CONCRETE BACKFILL AS SHOWN PER SSCB(3)-10 STANDARD.
2. MBGF UNDER ADKISSON RD IS INTENDED TO BE PLACED PARALLEL TO THE ROADWAY.
2. SEE RIPRAP LIMITS SHEET FOR DETAILS ON RIPRAP.
3. CCA = CRASH CUSHION ATTENUATOR



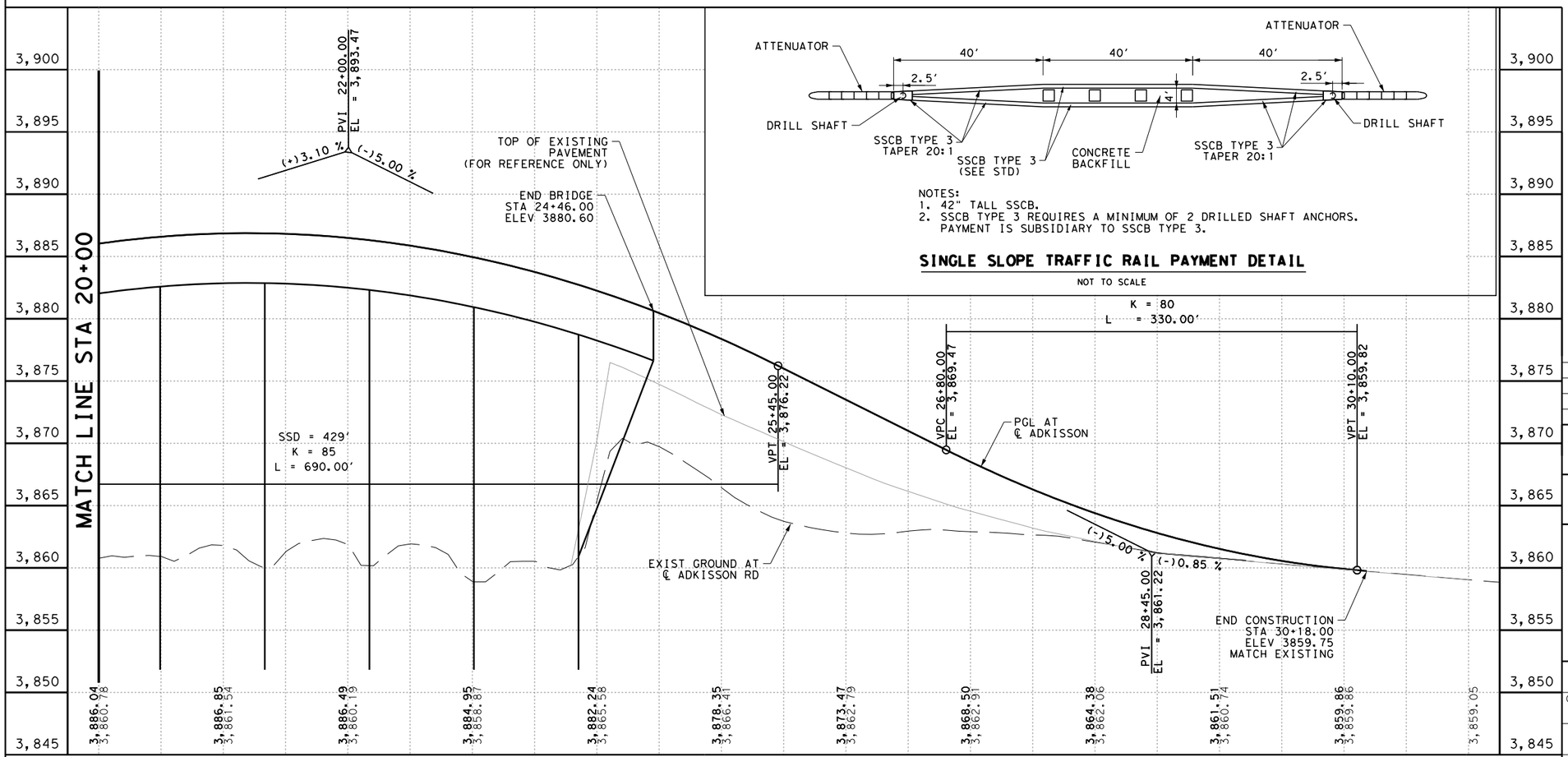
OFFSETS
A = 3.5'
B = 3.5'

RAIL PLACEMENT UNDER ADKISSON

NOTES:
1. 42" TALL SSCB.
2. SSCB TYPE 3 REQUIRES A MINIMUM OF 2 DRILLED SHAFT ANCHORS. PAYMENT IS SUBSIDIARY TO SSCB TYPE 3.

SINGLE SLOPE TRAFFIC RAIL PAYMENT DETAIL

NOT TO SCALE



NO.	DATE	DESCRIPTION	APPROV.

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CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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IH-40 AT ADKISSON ROAD

PLAN & PROFILE STA 20+00 TO END

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS CG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JL	TEXAS	AMA	POTTER	053
CHECK MS	CONTROL	SECTION	JOB	
	0090	05	108	

10/11/202311:57:06 AM Vidal.Ngoumnai

c:\dms\bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com\dms21553\038402108-RDWY-PP-02.dgn

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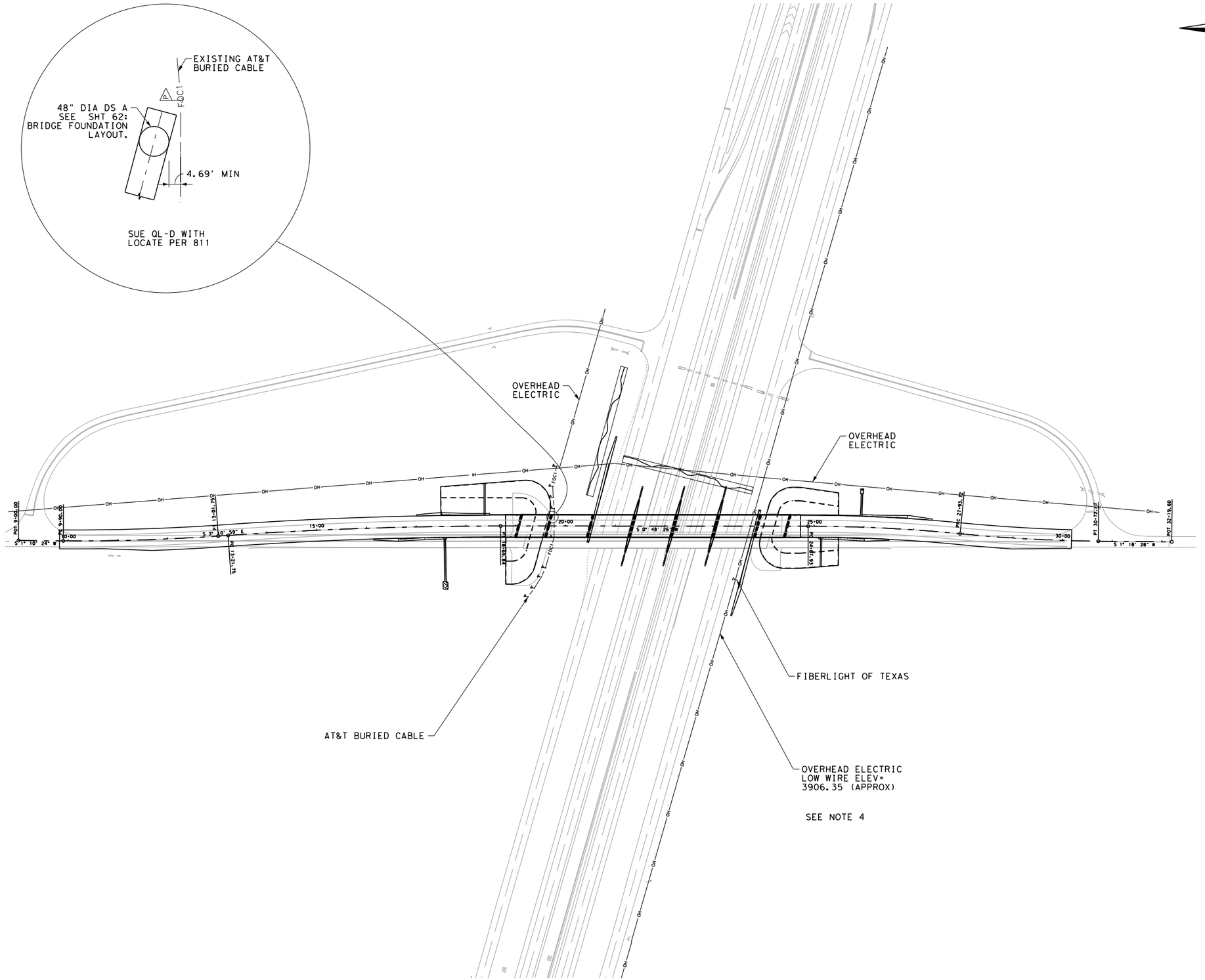
SCALE: 1" = 100'



NOTES:

1. UTILITIES ARE SHOWN BASED ON BEST INFORMATION AVAILABLE. VERIFY CLEARANCES AND LOCATIONS PRIOR TO WORK.
2. SUE QL A WAS NOT OBTAINED
3. LOW WIRE ELEVATION WAS OBTAINED IN AUG 2022
4. OVERHEAD ELECTRIC IS PLANNED TO BE REPLACED UNDER GROUND. CONTRACTOR TO CONFIRM LOCATION PRIOR TO STARTING WORK.

10/12/23

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER

James W. Langston PE

Bridgefarmer & Associates, Inc.
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IH-40 AT ADKISSON ROAD

EXISTING UTILITIES

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CG	6	SEE TITLE SHEET		IH 40
GRAPHICS CG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JL	TEXAS	AMA	POTTER	054
CHECK MS	CONTROL 0090	SECTION 05	JOB 108	

DATE: 10/17/2023 11:37:13 AM
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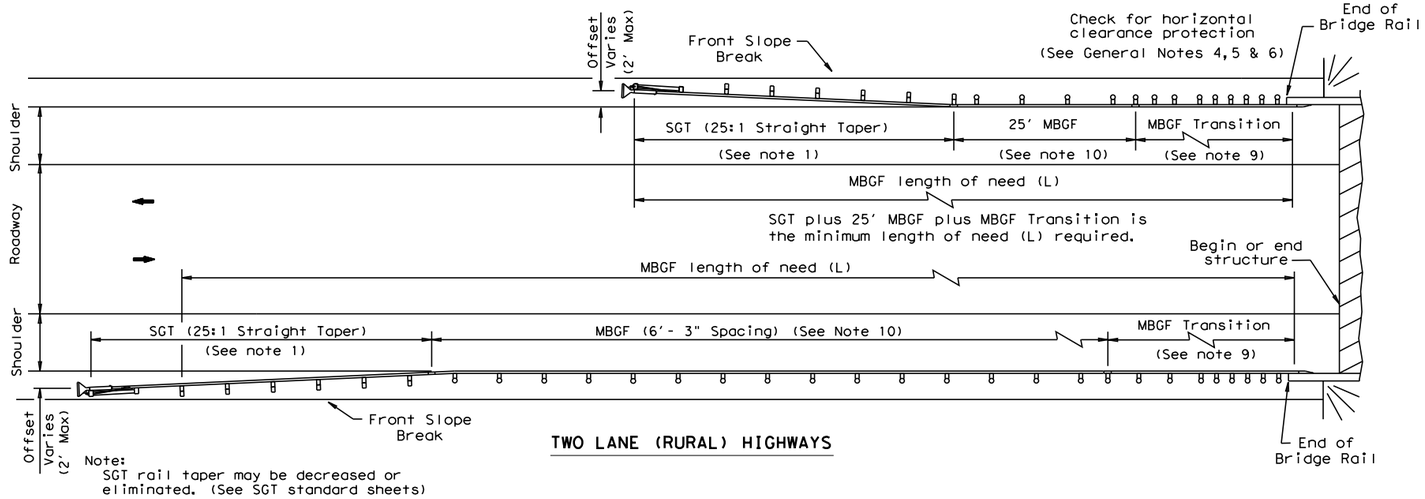
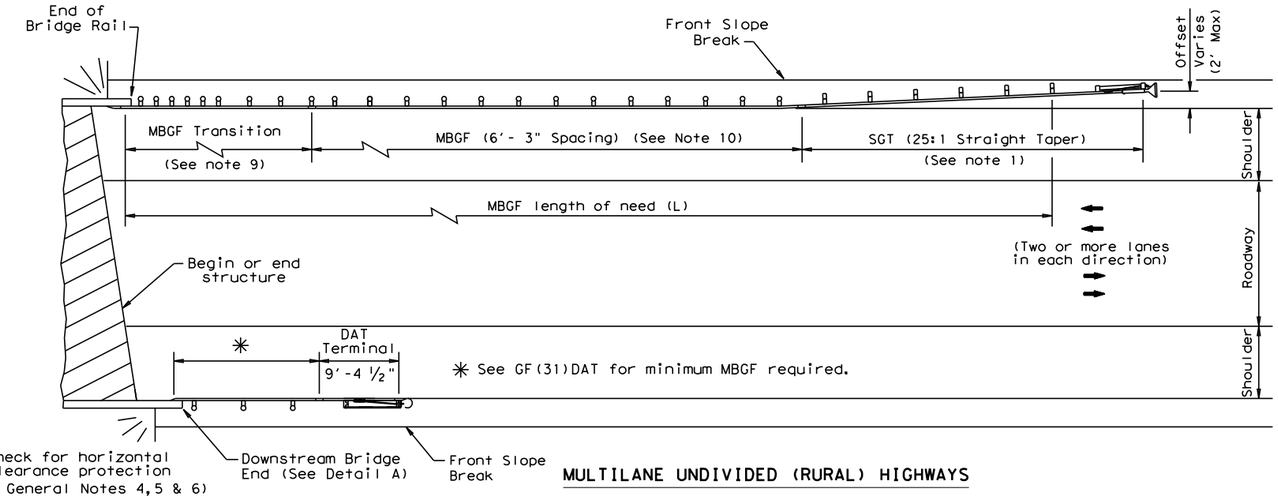
Vidal.Ngoumnai

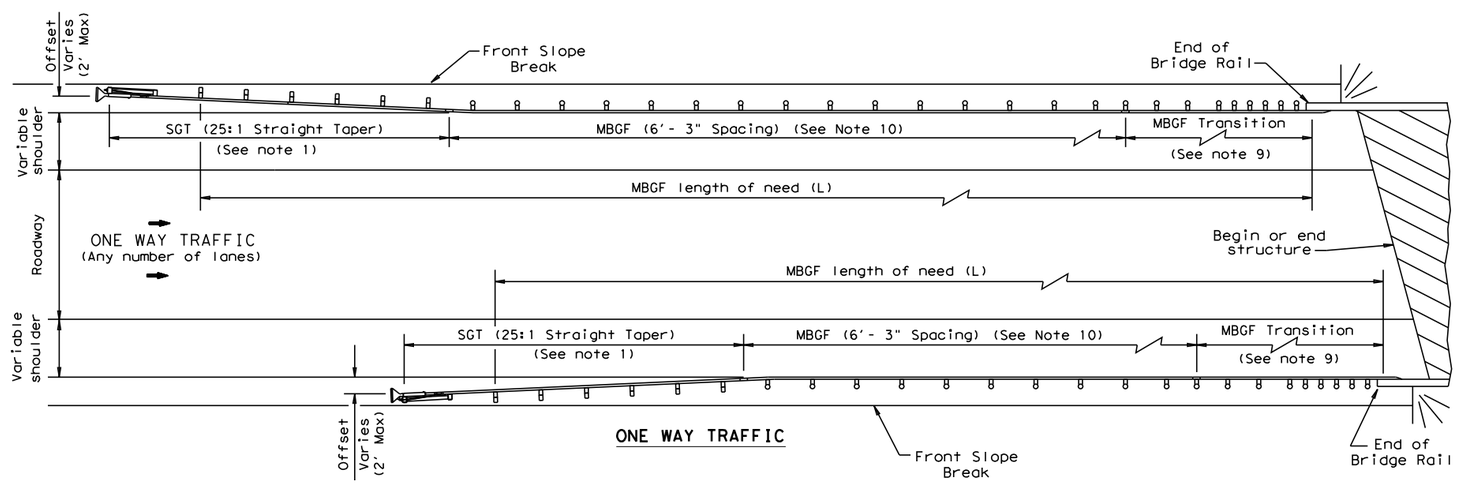


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



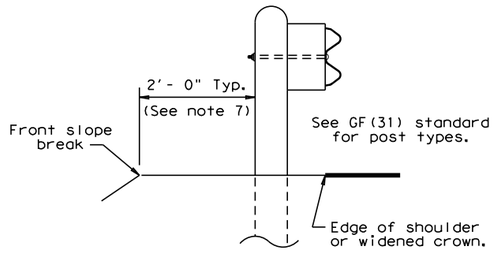
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



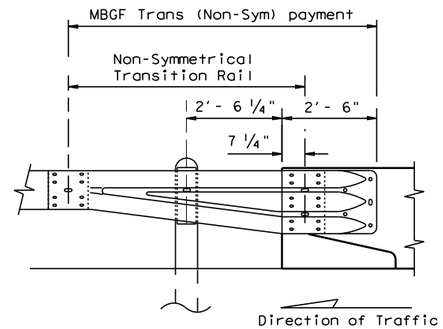
ONE WAY TRAFFIC

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. For restrictive bridge widths: 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)	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		055

DATE: 10/11/2023 11:57:17 AM
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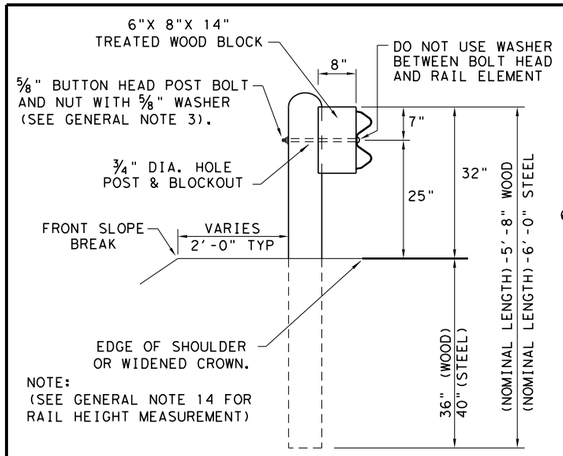
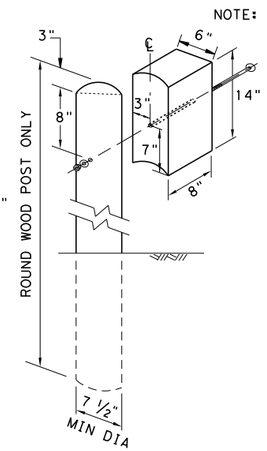
Vidal.Ngoumnai

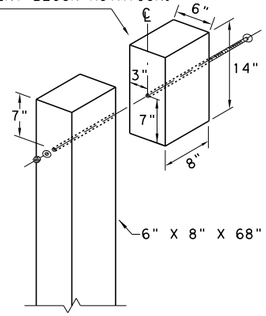


TYPICAL POST PLACEMENT

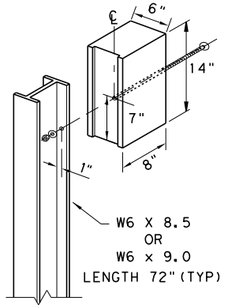


WOOD BLOCK TO
ROUND WOOD POST

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



WOOD BLOCK TO
RECTANGULAR WOOD POST

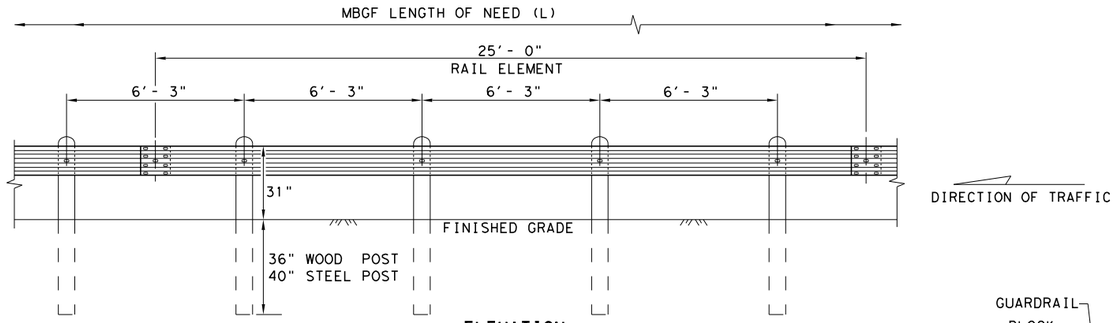


ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

GENERAL NOTES

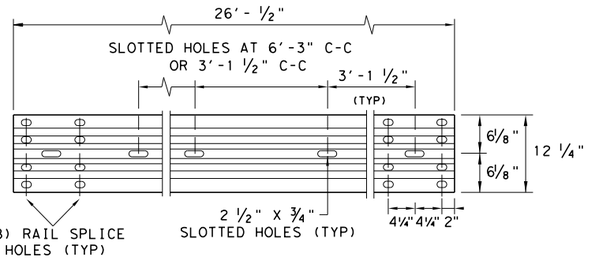
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS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

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



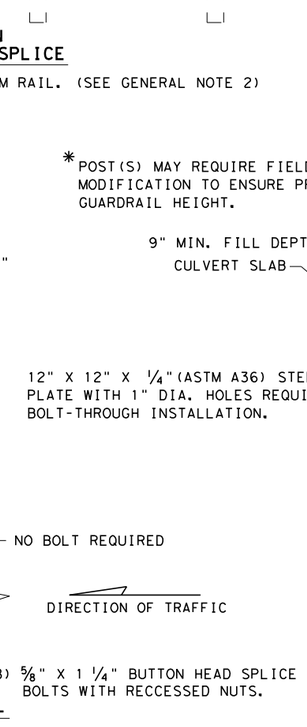
ELEVATION
MID-SPAN RAIL SPLICE

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.



* 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. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" 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 1/4" 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.

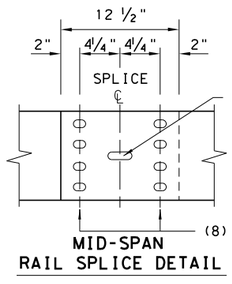
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH — VARIES
FBB01 = 1 1/4"
FBB02 = 2"
5/8"

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

BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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

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

C3 X 5 X 80" (3) GROUND STRUTS

7 ¼" x 5 ¼" x 46" (2) DAT TERMINAL POST

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

(11) (15) (17)

(5) SHELF ANGLE BRACKET (SEE NOTE 2)

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

PLAN VIEW

END PAYMENT FOR DAT SYSTEM (EA.)

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

DIRECTION OF TRAFFIC

(4) 9'- 4 ½" Rail Section (SEE GENERAL NOTE 2)

12'-6" (Min.) MBGF

PAYMENT FOR NON-SYMMETRICAL TRANSITION RAIL (EA)

(9) (ROUNDED) W-BEAM END SECTION

6'- 3" | 3'-1 ½" | 3'-1 ½" | BEGIN LENGTH OF NEED (LON)

(11) (12)

(7) BCT POST SLEEVE 2" x 5 ½" (SCH 40 GALV. PIPE)

(11) (13) (17)

31"

* 68 ¼" (MIN.) TUBE EMBEDMENT

(11) (16) (17)

To properly install and maintain the anchor system, a 3 ¼" (±) ½" tube projection is required above the finished grade.

FINISHED GRADE

FINISHED GRADE

(10) (8)

BCT CABLE ANCHOR AND ANCHOR BRACKET WITH HARDWARE

(1) STEEL FOUNDATION TUBES WITH HARDWARE (1)

ELEVATION VIEW

(SEE NOTE 1)

DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

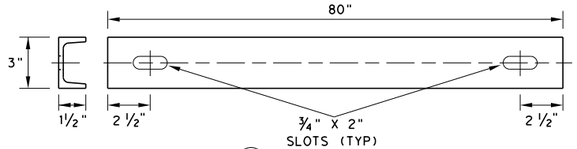
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 ¾" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

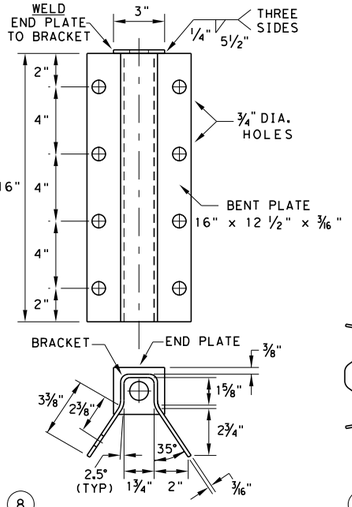
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 ¼" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	⅝" X 2" HEX HEAD BOLT	8
(15)	⅝" X 8" HEX HEAD BOLT	4
(16)	⅝" X 10" HEX HEAD BOLT	2
(17)	⅝" FLAT WASHER	18

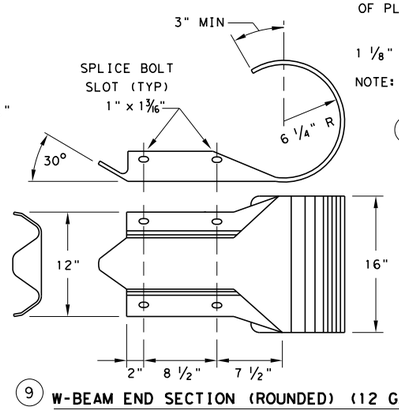
(4) TERMINAL RAIL ELEMENT FOR DAT



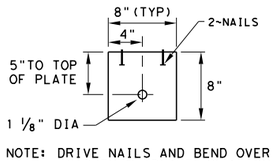
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

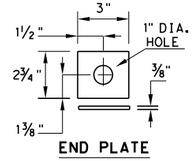


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)



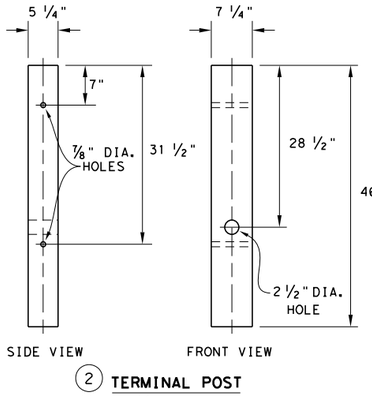
NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

(6) BEARING PLATE
8"x 8"x ⅝" ℞

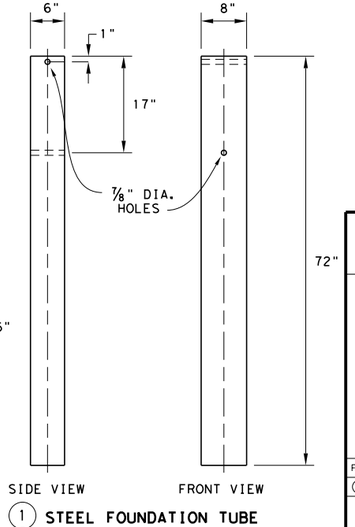


END PLATE

(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 ¼"x 5 ¼"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x ⅛" x 72" STEEL TUBE

Texas Department of Transportation

Design Division Standard

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

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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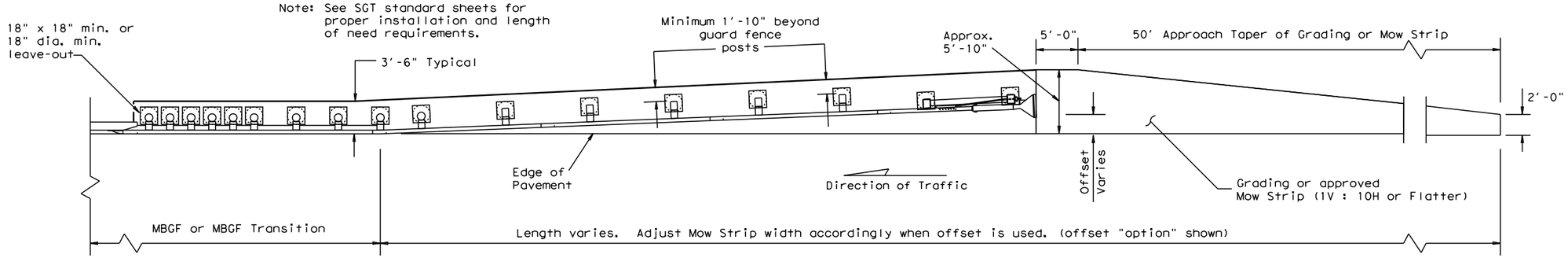
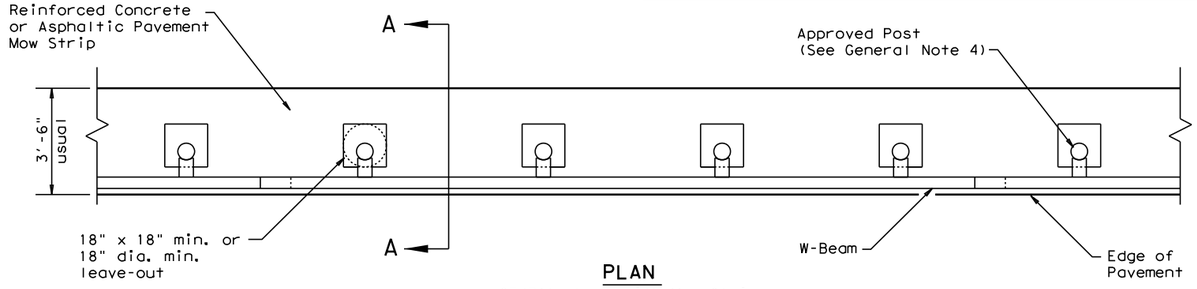
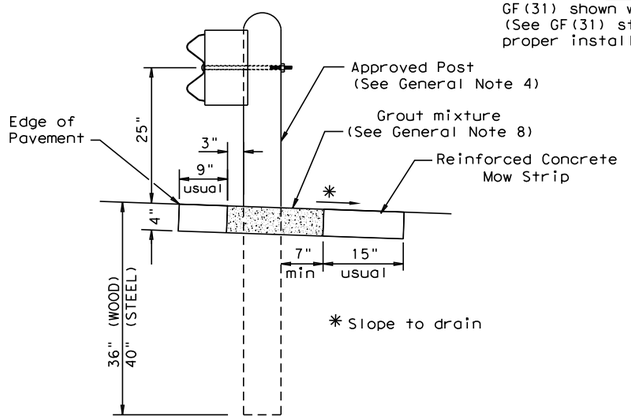


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

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

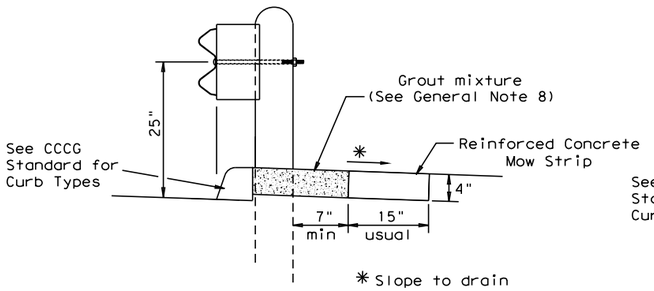


SECTION A-A

Typical

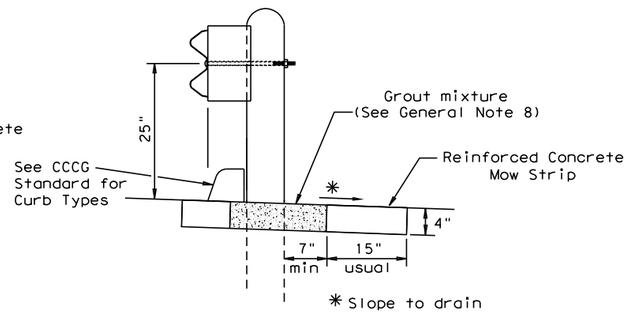
MOW STRIP DETAIL

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



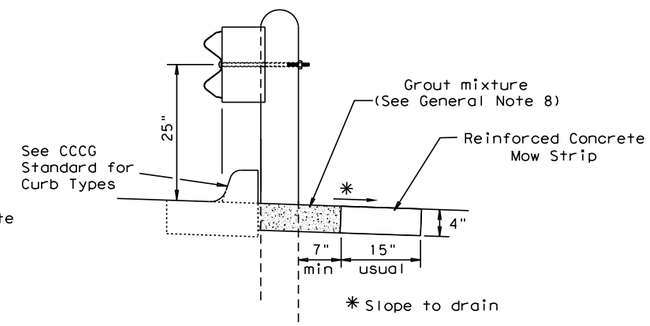
CURB OPTION (1)

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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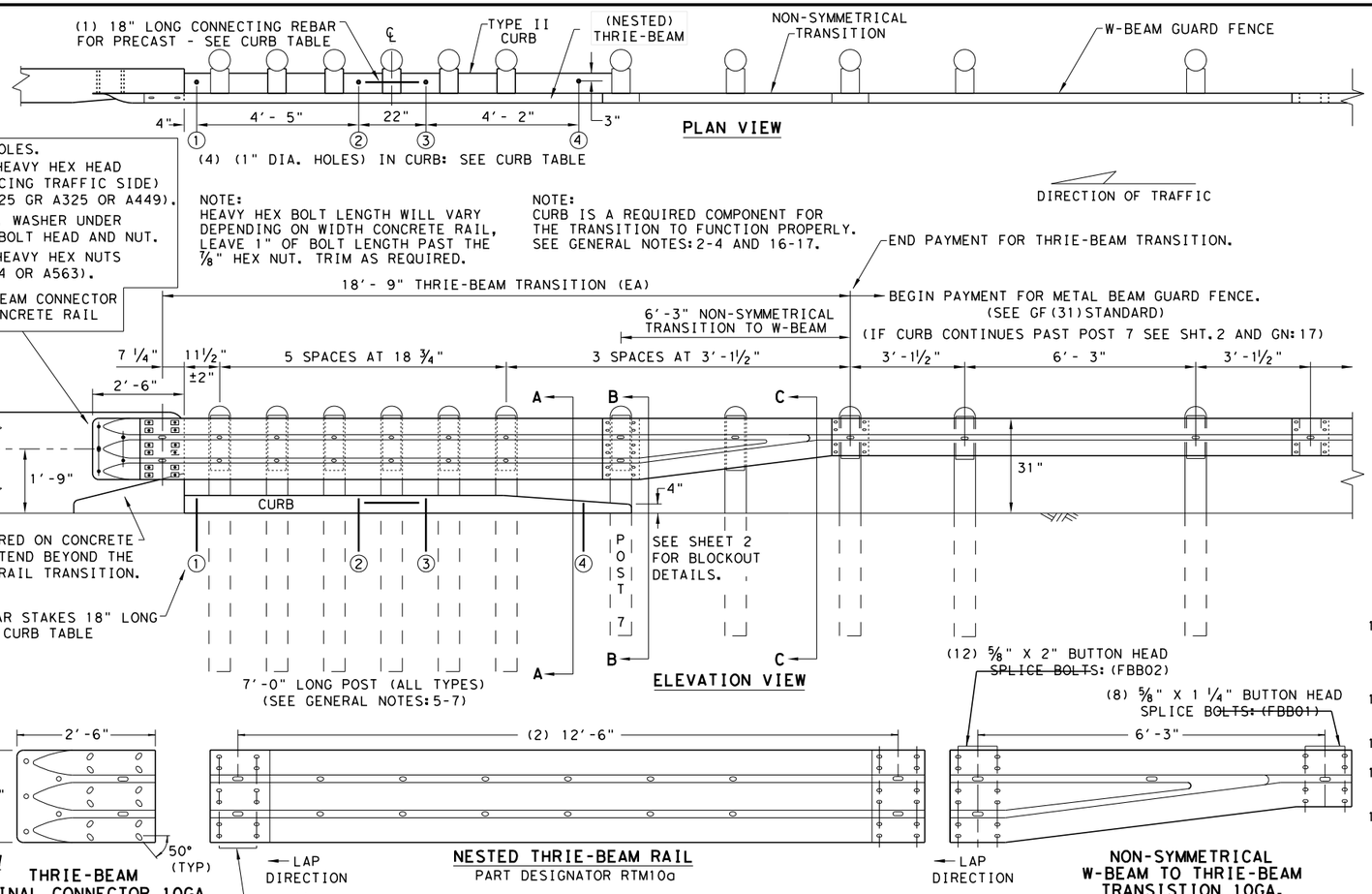


GENERAL NOTES

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.

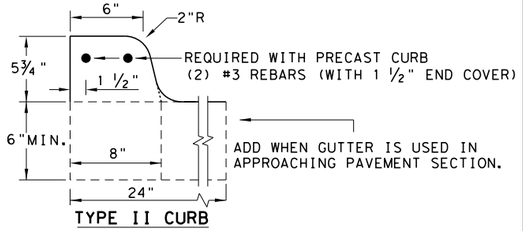
THRIE-BEAM TERMINAL - CURB TABLE

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.



TYPE II CURB

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

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

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		059

DATE: 10/11/2023 11:57:32 AM
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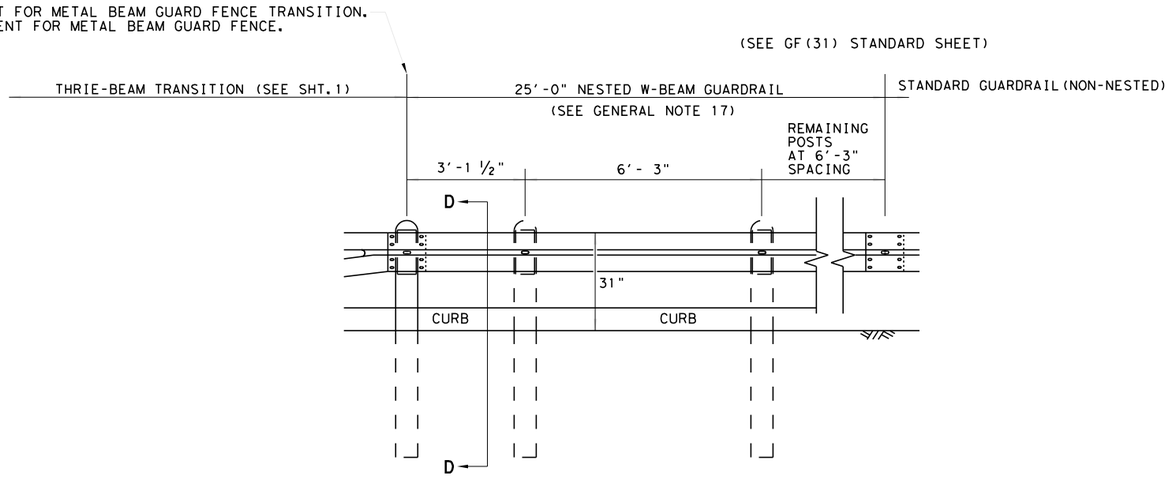
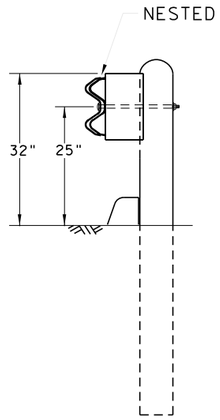
Vidal.Ngoumnai

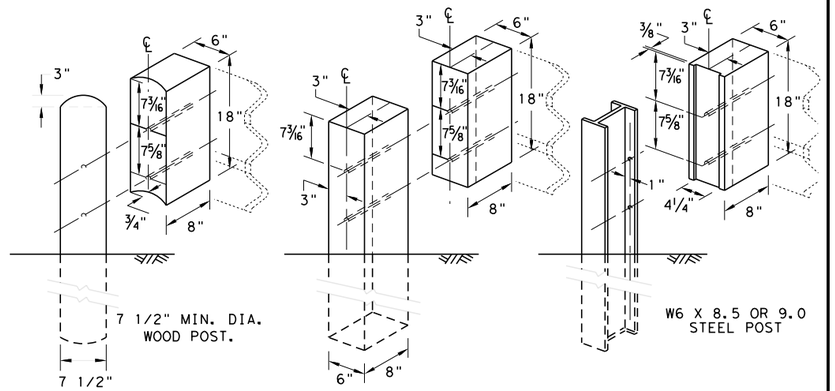
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		060

DATE: 10/11/2023 11:57:36 AM
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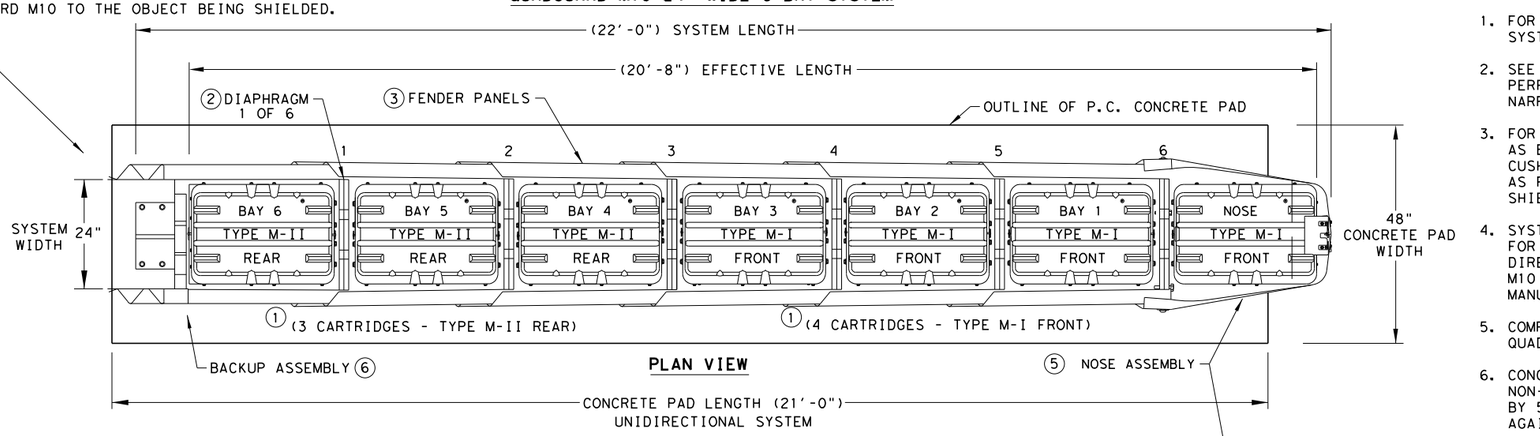
Vidal.Ngoumnai

NOTE:
A TRANSITION MAY BE REQUIRED TO INSTALL THE QUADGUARD M10 TO THE OBJECT BEING SHIELDED.

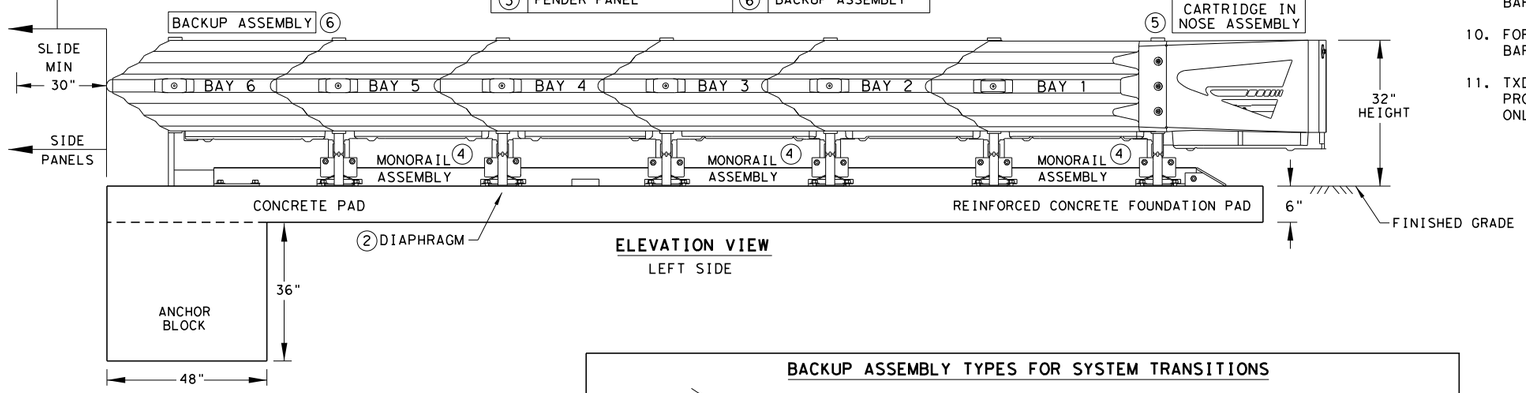
QUADGUARD M10 24" WIDE 6-BAY SYSTEM



PLAN VIEW

KEY		KEY	
(1)	QUADGUARD CARTRIDGE	(4)	MONORAILS
(2)	DIAPHRAGM	(5)	NOSE ASSEMBLY
(3)	FENDER PANEL	(6)	BACKUP ASSEMBLY

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 30" MIN.



ELEVATION VIEW
LEFT SIDE

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR CONCRETE PAD AND ANCHOR BLOCK INSTALLATION REQUIREMENTS.

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD M10 (N) INSTALATION AND DETAILED INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY FOR THE REQUIRED TRANSITION WILL BE PROVIDED TO THE ENGINEER AND INSTALLER.

6" REINFORCED CONCRETE PAD REQUIRES THE INSTALLATION OF AN ANCHOR BLOCK AS SHOWN ON THE MANUFACTURER'S DRAWING PACKAGE.

8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

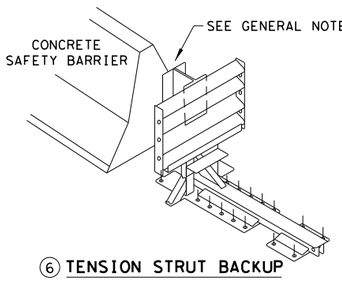
CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

NOTE:
THE QUADGUARD M10 24" WIDE 6-BAY - NARROW SYSTEM HAS BEEN TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024	CARTRIDGE TYPES IN BAYS		
BAYS	6	TYPE-MII	TYPE-MI	TYPE-MI
DIAPHRAGMS	6	3	3	1
WIDTH	24"	REAR	FRONT	NOSE

TL-2 MODEL #	QM7024	CARTRIDGE TYPES IN BAYS		
BAYS	3	TYPE-MII	TYPE-MI	TYPE-MI
DIAPHRAGMS	3	1	2	1
WIDTH	24"	REAR	FRONT	NOSE

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS



⑥ TENSION STRUT BACKUP

SYSTEM TRANSITIONS TYPES	
1	QUAD-BEAM TO CONCRETE SAFETY BARRIER
2	QUAD-BEAM TO CONCRETE BRIDGE RAIL
3	QUAD-BEAM TO CONCRETE END SHOE
4	QUAD-BEAM TO THRIE-BEAM RAIL
5	QUAD-BEAM TO W-BEAM RAIL

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR THE CORRECT BACKUP ASSEMBLY AND TRANSITION PANELS OR SIDE PANELS USED FOR STANDARD AND BI-DIRECTIONAL INSTALLATIONS: AT DIVIDED-HIGHWAY MEDIANS OR UNDIVIDED ROADWAYS WHERE THE SYSTEM IS EXPOSED TO IMPACTS FROM ONE OR TWO DIFFERENT DIRECTIONS OF TRAFFIC FLOW.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY - ENERGY ABSORPTION INC. AT 1(888)323-6374.
2. SEE THE RECENT QUADGUARD M10 PRODUCT DESCRIPTION ASSEMBLY MANAUAL FOR IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITIONS AND THE DRAWING PACKAGE FOR THE NARROW 24" SYSTEM BEFORE INSTALLING THE QUADGUARD M10 SYSTEM AT ANY GIVEN LOCATION.
3. FOR BI-DIRECTIONAL TRAFFIC: THE PLACEMENT OF THE QUADGUARD M10 IS RESTRICTED. AS BI-DIRECTIONAL TRAFFIC APPROACHES THE REAR OF THE QUADGUARD M10 THE CRASH CUSHION MUST BE PLACED SUCH THAT THE TRAFFIC SIDE OF CRASH CUSHION IS AT LEAST AS FAR FROM ADJACENT TRAVEL LANE LINE AS THE TRAFFIC SIDE OF BARRIER/OBJECT BEING SHIELDED.
4. SYSTEM TRANSITION: APPROPRIATE TRANSITION PANELS OR SIDE PANELS WILL BE REQUIRED FOR PROPER IMPACT PERFORMANCE. THE CORRECT PANEL(S) TO USE WILL DEPEND ON THE DIRECTION OF TRAFFIC FLOW AND WHAT TYPE OF BARRIER OR ROAD FEATURE THE QUADGUARD M10 SYSTEM IS SHIELDING. SEE THE QUADGUARD M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL FOR FURTHER DETAILS.
5. COMPONENTS FOR THE QUADGUARD M10 BACKUP AND REINFORCING DETAILS ARE SHOWN ON THE QUADGUARD M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL.
6. CONCRETE PAD SHALL BE 6" MIN. REINFORCED 28MPa [4,000 PSI] (P.C.) OR 8" MIN. NON-REINFORCED 28MPa [4,000 PSI] CONCRETE ROADWAY MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG. ANCHOR BLOCK IS NOT REQUIRED WHEN USING 8" CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE, E.G. CONCRETE WALL.
7. 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%.
8. THE INSTALLATION AREA SHOULD BE FREE OF CURBS, ELEVATED OBJECTS,OR DEPRESSIONS.
9. THE QUADGUARD M10 SYSTEM SHOULD BE INSTALLED APPROXIMATELY PARALLEL WITH THE BARRIER.
10. FOR THE TENSION STRUT BACKUP THE DISTANCE BETWEEN THE BACK OF BACKUP AND THE BARRIER WALL SHOULD NOT EXCEED 7" IN ANY CASE.
11. TXDOT HAS ONLY APPROVED THE 24" WIDE QUADGUARD M10 SYSTEM. THE QUADGUARD M10 PRODUCT DESCRIPTION AND ASSEMBLEY MANUAL INCLUDES SYSTEM WIDTH OF 24". ONLY THE 24" SYSTEM IS ALLOWED TO BE INSTALLED ON TEXAS ROADWAYS.

FOUNDATION & ANCHORING REQUIREMENTS
FOUNDATION TYPES: A, B, C, & D

FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

KEY:
ASPHALT CONCRETE (A.C.)
COMPACTED SUBBASE (C.S.)
PORTLAND CEMENT CONCRETE (P.C.C.)

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

TENSION STRUT BACKUP MAY BE USED IN CONSTRUCTION ZONES ON ASPHALT CONCRETE (A.C.) FOR TEMPORARY USE ONLY.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE QUADGUARD M10 SYSTEM AND IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

REUSABLE

Texas Department of Transportation
Design Division Standard

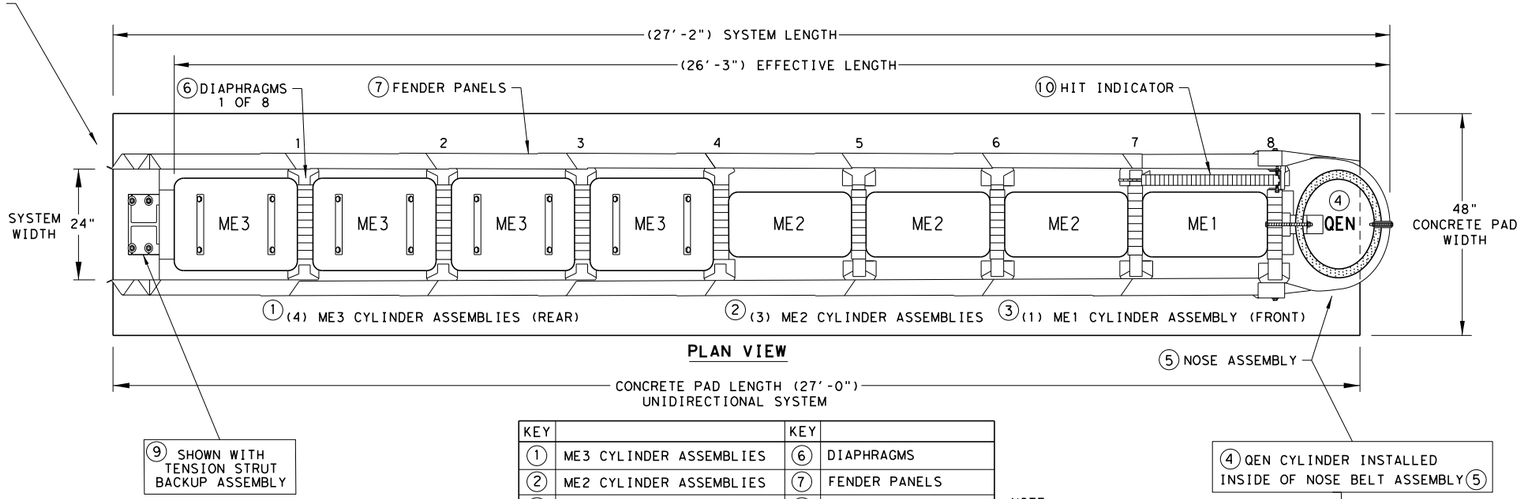
TRINITY HIGHWAY
ENERGY ABSORPTION
QUADGUARD M10
(MASH TL-3 & TL-2 NARROW-24"ONLY)

QGUARD(M10)(N)-20

FILE: qguardm10n20.dgn	DN:TxDOT	CK:KM	DW:VP	CK:AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0090	05	108	IH 40	
	DIST	COUNTY		SHEET NO.	
	AMA	POTTER		061	

NOTE:
A TRANSITION MAY BE REQUIRED TO INSTALL THE QUADGUARD ELITE M10 TO THE OBJECT BEING SHIELDED.

QUADGUARD EITE M10 24" WIDE (8 BAY) SYSTEM



PLAN VIEW

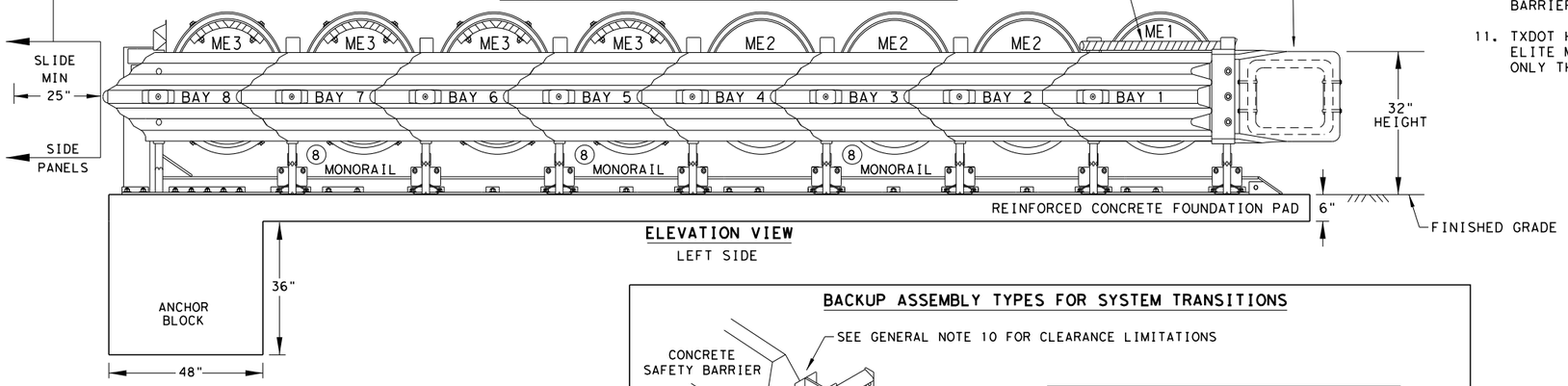
⑨ SHOWN WITH TENSION STRUT BACKUP ASSEMBLY

KEY		KEY	
①	ME3 CYLINDER ASSEMBLIES	⑥	DIAPHRAGMS
②	ME2 CYLINDER ASSEMBLIES	⑦	FENDER PANELS
③	ME1 CYLINDER ASSEMBLY	⑧	MONORAILS
④	QEN CYLINDER	⑨	TYPE OF BACKUP
⑤	NOSE BELT ASSEMBLY	⑩	HIT INDICATOR

④ QEN CYLINDER INSTALLED INSIDE OF NOSE BELT ASSEMBLY ⑤

NOTE:
HIT INDICATOR WILL RAISE UPON IMPACT.
⑩ HIT INDICATOR

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 25" MIN.



ELEVATION VIEW
LEFT SIDE

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR CONCRETE PAD AND ANCHOR BLOCK INSTALLATION REQUIREMENTS.

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD ELITE M10 FIELD INSTALATION AND INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY REQUIRED FOR THE TRANSITION WILL BE PROVIDED BY THE MANUFACTURER TO THE ENGINEER AND INSTALLER.

6" REINFORCED CONCRETE PAD REQUIRES THE INSTALLATION OF AN ANCHOR BLOCK AS SHOWN ON THE MANUFACTURER'S DRAWING PACKAGE.

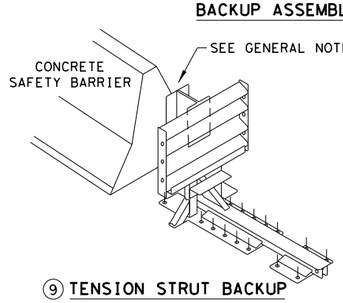
8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

NOTE:
THE QUADGUARD ELITE M10 8-BAY, 24" WIDE - NARROW SYSTEM TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024E	CYLINDER TYPES IN BAYS			
BAYS	8	TYPE-ME3	TYPE-ME2	TYPE-ME1	TYPE-QEN
DIAPHRAGMS	8	4	3	1	1
WIDTH	24"	REAR	FRONT		NOSE

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS

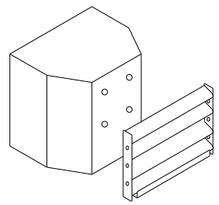


⑨ TENSION STRUT BACKUP

SYSTEM TRANSITIONS TYPES	
1	QUAD-BEAM TO CONCRETE SAFETY BARRIER
2	QUAD-BEAM TO CONCRETE BRIDGE RAIL
3	QUAD-BEAM TO CONCRETE END SHOE
4	QUAD-BEAM TO THRIE-BEAM RAIL
5	QUAD-BEAM TO W-BEAM RAIL

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD ELITE M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).



⑨ CONCRETE BACKUP

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR THE CORRECT BACKUP ASSEMBLY AND TRANSITION PANELS OR SIDE PANELS USED FOR STANDARD AND BI-DIRECTIONAL INSTALLATIONS: AT DIVIDED-HIGHWAY MEDIANS OR UNDIVIDED ROADWAYS WHERE THE SYSTEM IS EXPOSED TO IMPACTS FROM ONE OR TWO DIFFERENT DIRECTIONS OF TRAFFIC FLOW.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE QUADGUARD ELITE M10 SYSTEM AND 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: TRINITY HIGHWAY - ENERGY ABSORPTION INC. AT 1(888)323-6374.
2. SEE THE RECENT QUADGUARD ELITE M10 PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS AND THE DRAWING PACKAGE FOR THE NARROW 24" SYSTEM BEFORE INSTALLING THE QUADGUARD ELITE M10 AT ANY GIVEN LOCATION.
3. FOR BI-DIRECTIONAL TRAFFIC: THE LOCATION AND OR WIDTH OF THE QUADGUARD ELITE M10 IS RESTRICTED. AS BI-DIRECTIONAL TRAFFIC APPROACHES THE REAR OF THE QUADGUARD ELITE M10, THE QUADGUARD ELITE M10 SHOULD NOT EXTEND FURTHER INTO THE TRAFFIC-SIDE OF THE BARRIER THAN THE OBSTACLE. ANY TRANSITION INSTALLED MUST EITHER BE TANGENT TO BOTH QUADGUARD ELITE M10 AND OBSTACLE OR MUST ANGLE TOWARD FIELD SIDE OF THE BARRIER.
4. SYSTEM TRANSITION: APPROPRIATE TRANSITION PANELS OR SIDE PANELS WILL BE REQUIRED FOR PROPER IMPACT PERFORMANCE. THE CORRECT PANEL(S) TO USE WILL DEPEND ON THE DIRECTION OF TRAFFIC FLOW AND WHAT TYPE OF BARRIER OR ROAD FEATURE THE QUADGUARD ELITE M10 SYSTEM IS SHIELDING. SEE THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL FOR FURTHER DETAILS.
5. COMPONENTS FOR THE QUADGUARD ELITE (M10) BACKUP AND REINFORCING DETAILS ARE SHOWN ON THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL.
6. CONCRETE PAD SHALL BE 6" MIN. REINFORCED 28MPa [4,000 PSI] (P.C.) OR 8" MIN. NON-REINFORCED 28MPa [4,000 PSI] CONCRETE ROADWAY MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG. ANCHOR BLOCK IS NOT REQUIRED WHEN USING 8" CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE, E.G. CONCRETE WALL.
7. 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%.
8. THE INSTALLATION AREA SHOULD BE FREE OF CURBS, ELEVATED OBJECTS,OR DEPRESSIONS.
9. THE QUADGUARD ELITE M10 SYSTEM SHOULD BE INSTALLED APPROXIMATELY PARALLEL WITH THE BARRIER.
10. FOR THE TENSION STRUT BACKUP THE DISTANCE BETWEEN THE BACK OF BACKUP AND THE BARRIER WALL SHOULD NOT EXCEED 7" IN ANY CASE.
11. TXDOT HAS ONLY APPROVED THE 24" WIDE QUADGUARD ELITE M10 SYSTEM. THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION AND ASSEMBLY MANUAL INCLUDES SYSTEM WIDTH OF 24". ONLY THE 24" SYSTEM IS ALLOWED TO BE INSTALLED ON TEXAS ROADWAYS.

FOUNDATION & ANCHORING REQUIREMENTS FOUNDATION TYPES: A, B, C, & D	
FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

KEY:
ASPHALT CONCRETE (A.C.)
COMPACTED SUBBASE (C.S.)
PORTLAND CEMENT CONCRETE (P.C.C.)

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

TENSION STRUT BACKUP MAY BE USED IN CONSTRUCTION ZONES ON ASPHALT CONCRETE (A.C.) FOR TEMPORARY USE ONLY.

LOW MAINTENANCE

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD ELITE M10 (MASH TL-3)

QGELITE(M10)(N)-20

FILE: qgelitem10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		062

DATE: 10/17/2023 11:57:42 AM
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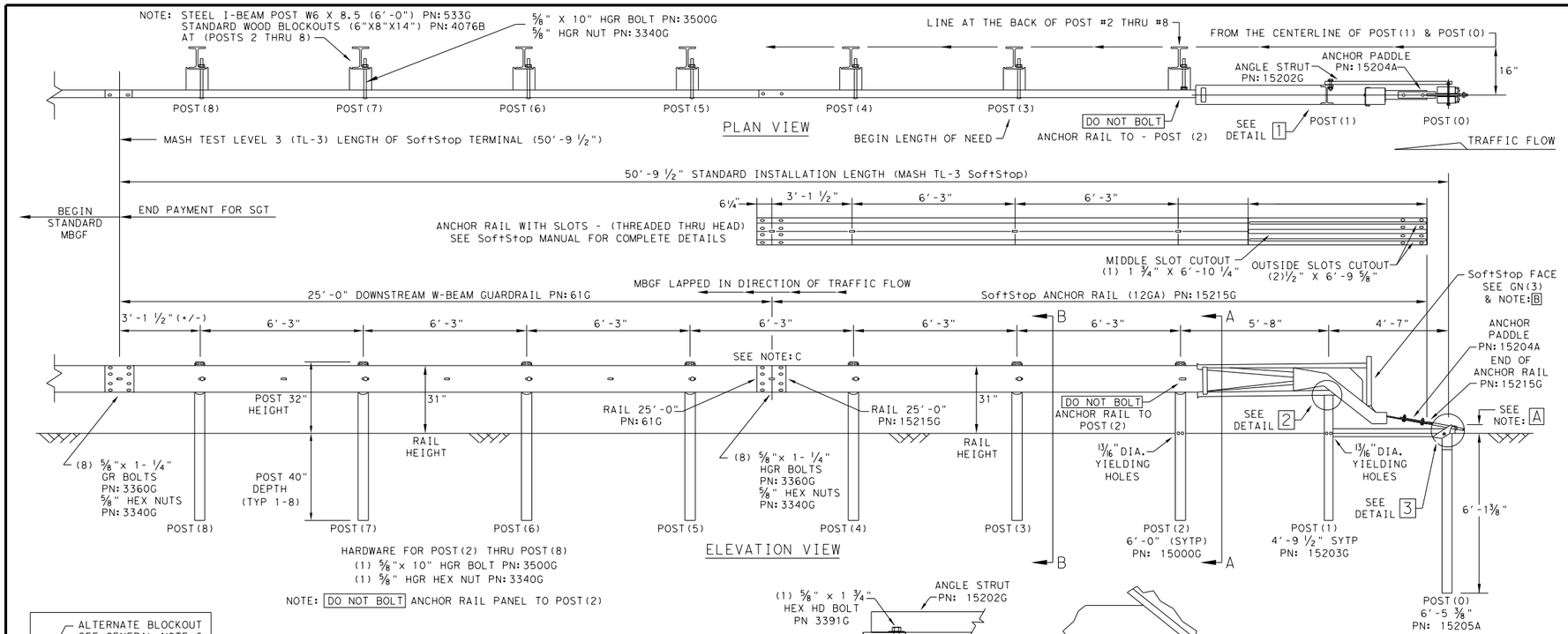

GENERAL NOTES

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 3-3/4" 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 5/8")
15203G	1	POST #1 - (SYTP) (4'- 9 1/2")
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 1/2" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" 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	3/4" x 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" x 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" x 10" HGR POST BOLT A307
3391G	1	5/8" x 1 3/4" HEX HD BOLT A325
4489G	1	5/8" x 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/8" x 2 1/2" HEX HD BOLT GR-5
105286G	1	5/8" x 1 1/2" HEX HD BOLT GR-5
3240G	6	5/8" ROUND WASHER (WIDE)
3245G	3	5/8" 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	0090	05	108	IH 40
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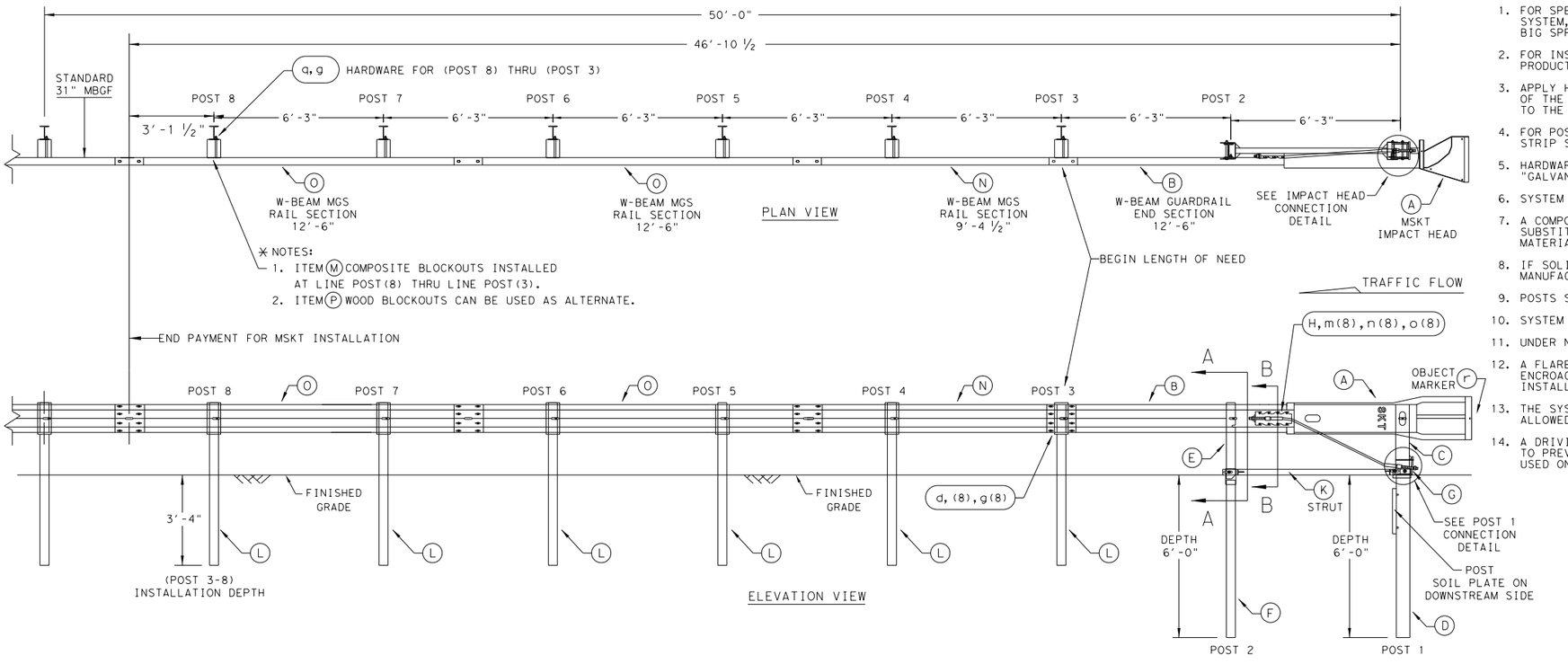
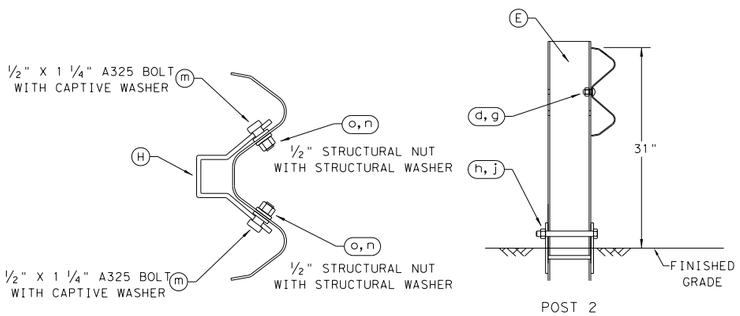
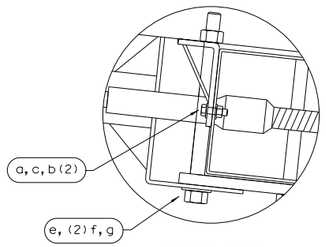


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

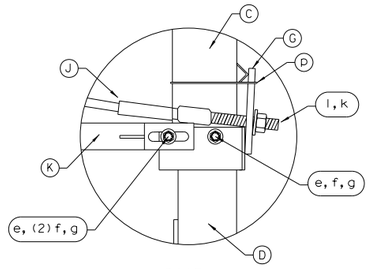


SECTION B-B
ANCHOR BRACKET

POST 2
SECTION A-A



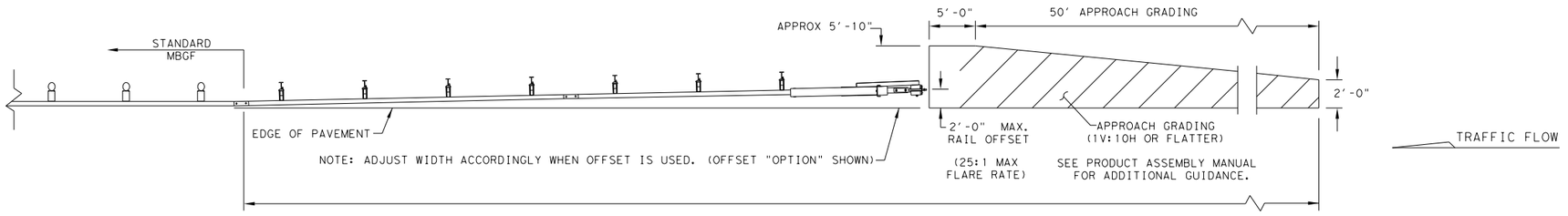
IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

SEE NOTES: ✳

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



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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 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 1/16" O.D. x ⅝" 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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

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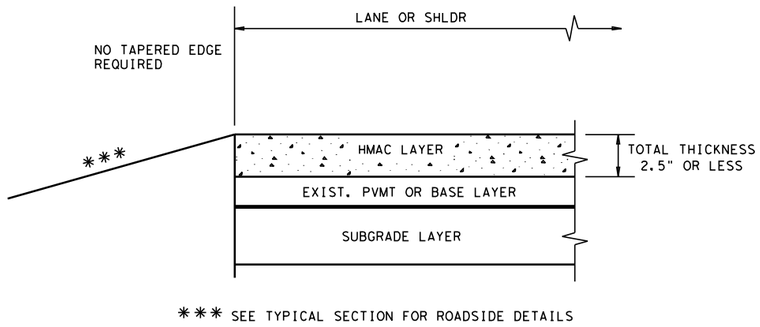
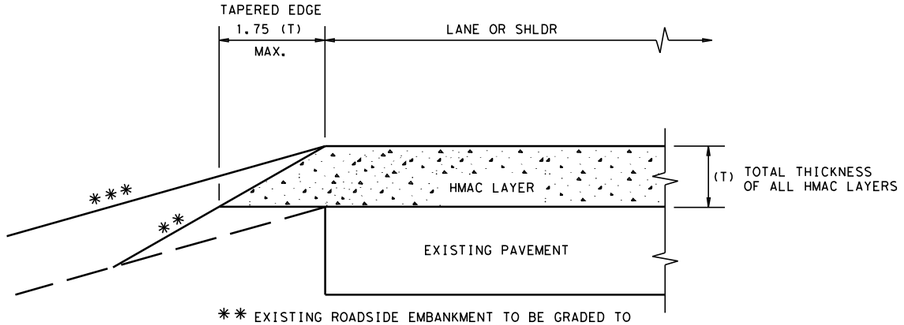


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

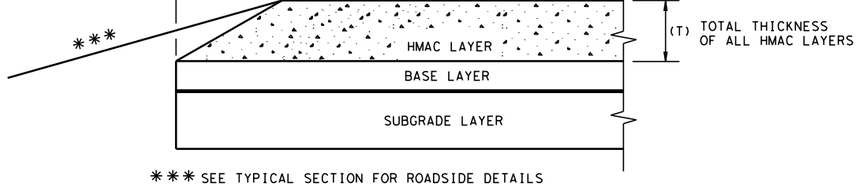
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



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

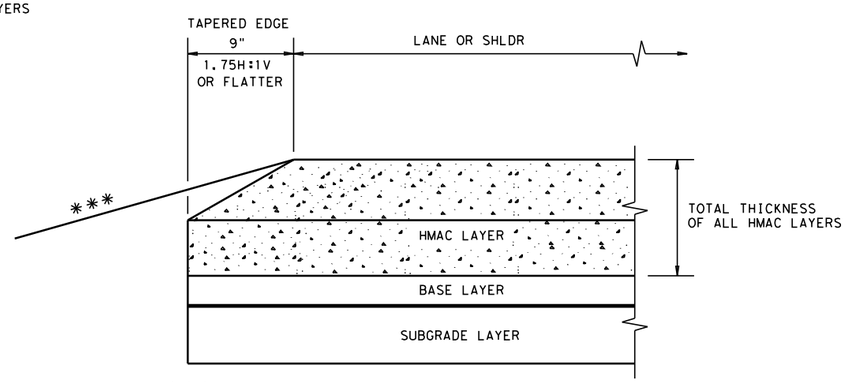
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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

(NOT TO SCALE)

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

TAPERED EDGE DETAILS HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:		
© TxDOT January 2011	CONT	SECT	JOB		HIGHWAY	
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	AMA	POTTER			065	

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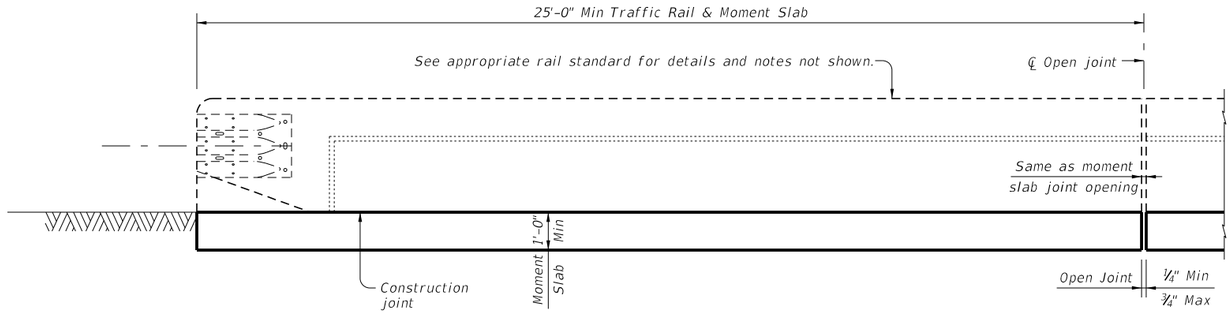
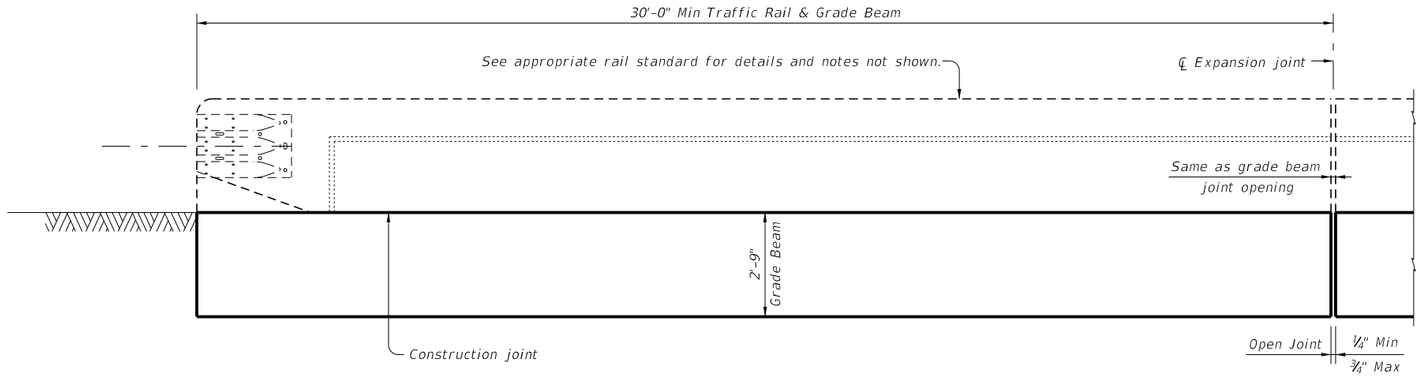


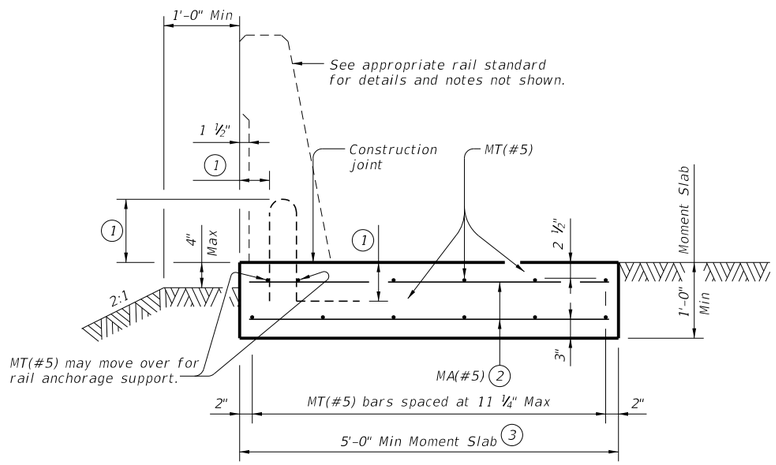
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(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)

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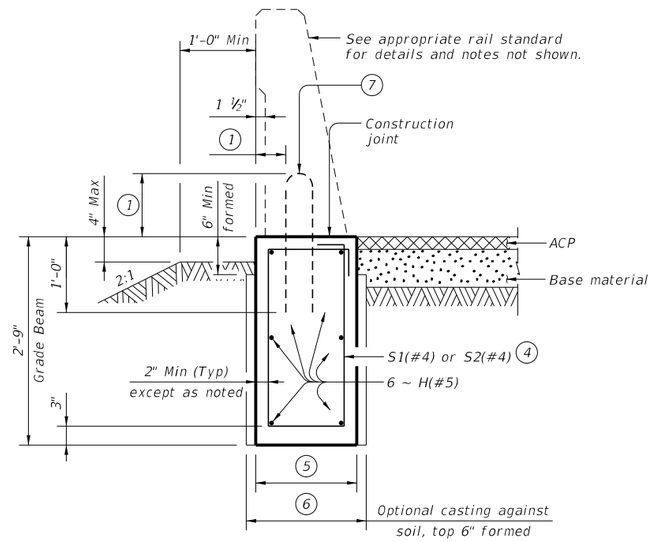


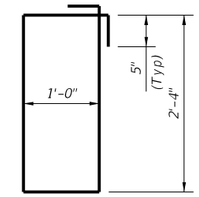
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

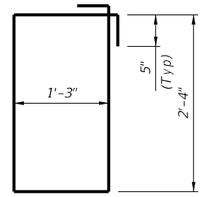
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam 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

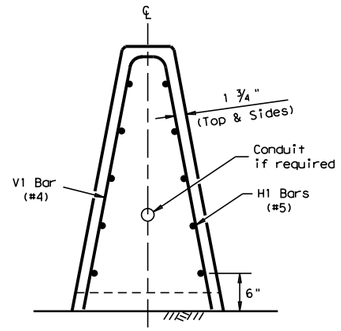
TRAFFIC RAIL FOUNDATIONS

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 07-20: Added moment slab with rail foundation lengths.	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		066

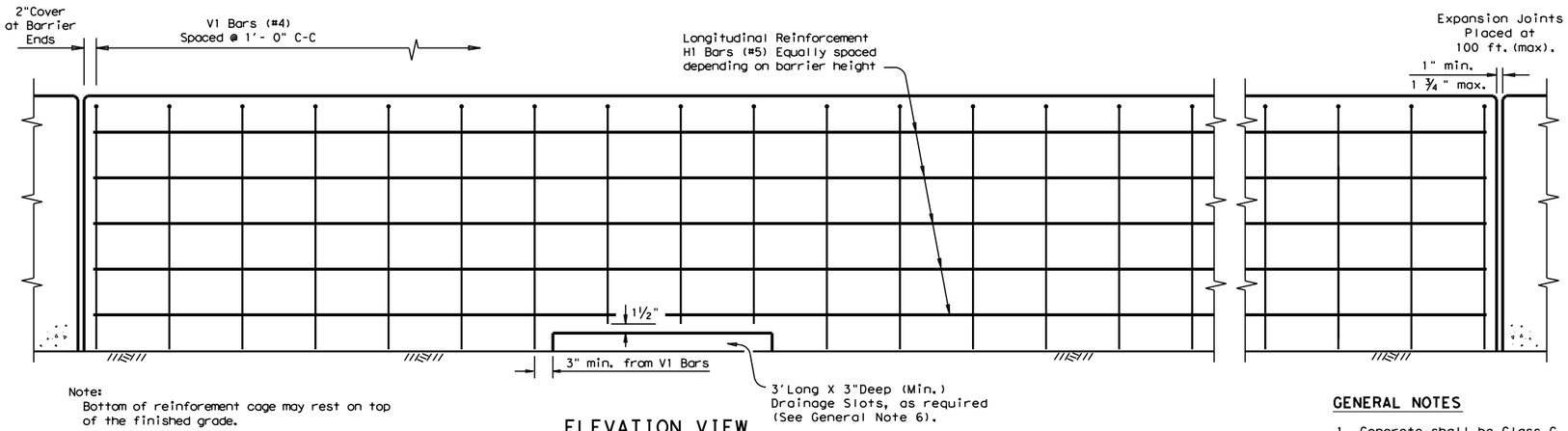
DATE: 10/11/2023 11:38:00 AM
FILE: ms\bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com\dms21555\SSCB(1F)-10.dgn
Vidal.Ngoumnai



END VIEW

CAST-IN-PLACE (CIP) BARRIER

Barrier is Symmetrical About the Center Line



Note:
Bottom of reinforcement cage may rest on top of the finished grade.

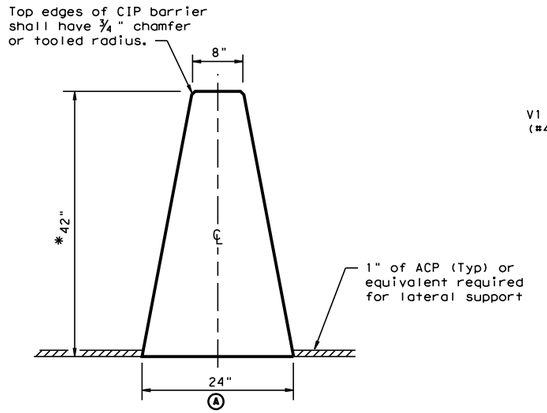
Reinforcement around the drainage slots may be cut or bent to accommodate the edge and top clearances.

ELEVATION VIEW

Cast-in-Place (SSCB)(Type 2)on Roadway

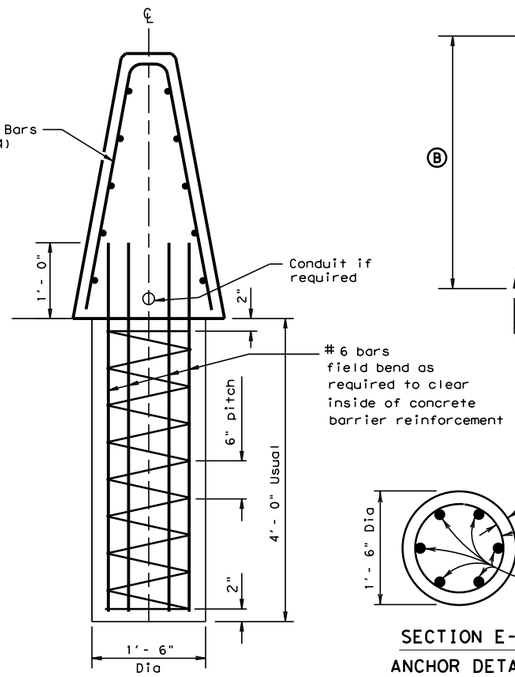
GENERAL NOTES

1. Concrete shall be Class C. Unless otherwise specified in the plans.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. These details cover barrier per Item 514, "Permanent Concrete Traffic Barrier".
4. The Anchorage shown is considered subsidiary to the bid item.
5. Top edges of CIP barrier shall have a ¾" chamfer or tooled radius.
6. Drainage slot locations (12'- 0", C-C Min. Spacing) are shown elsewhere, or as directed by the Engineer. Drainage slot heights on the SSCB may be increased to a maximum of 5 inches, without geometric changes to the barrier face.
7. Cast-in-place barrier may be slip formed. Bracing may be tied or tack welded to the reinforcement cage to provide cage stability. Do not weld to anchorage.
8. For locations where lighting is required, see the SSCB(4) sheet for the proper reinforcement and anchorage.



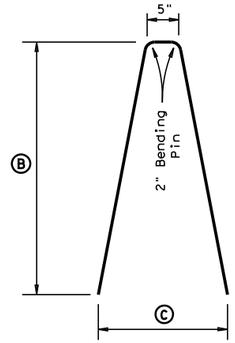
SINGLE SLOPE CONCRETE BARRIER

(SSCB)(42")



SECTION D-D

ANCHOR DETAIL



V1 Bar

#4 Rebar

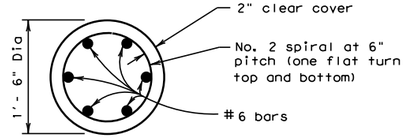
BARRIER HEIGHT (IN.)	* DIMENSIONS (IN.)		
	Ⓐ	Ⓑ	Ⓒ
42	24	40 ¼	20 ½
48	26 ¼	46 ¼	22 ¾
54	28 ½	52 ¼	25 ⁹⁄₁₆

*(SSCB)(42") Barrier height may be increased to 48" or 54". This would increase the barrier and reinforcement dimensions accordingly.

Cast-In-Place (CIP) or Slip-Formed (SSCB)

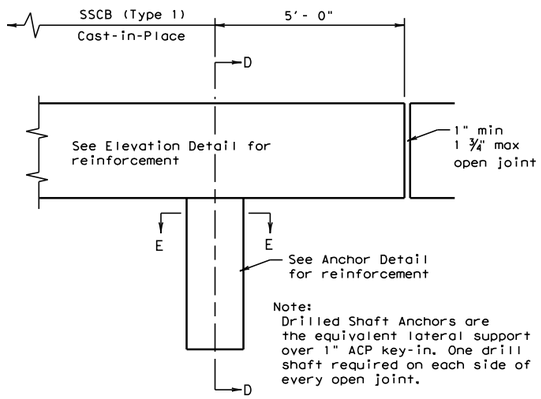
Cast-in-Place barrier may be connected to precast SSCB. Joint connection "Types" may be used in Cast-in-Place barrier, to match the precast barrier connection. (See required connection "Type" elsewhere in the plans)

The weight of Cast-in-Place (SSCB)42" is approx. 717 lbs per ft.



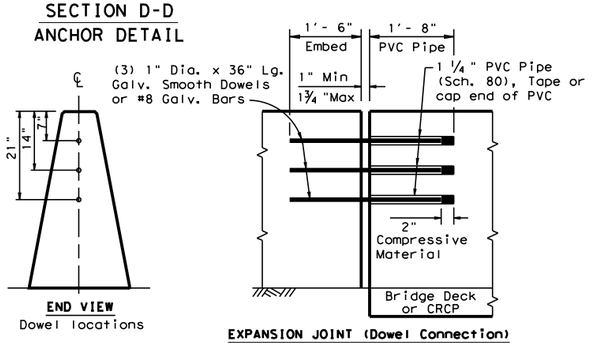
SECTION E-E

ANCHOR DETAIL



ELEVATION

ANCHOR LOCATION

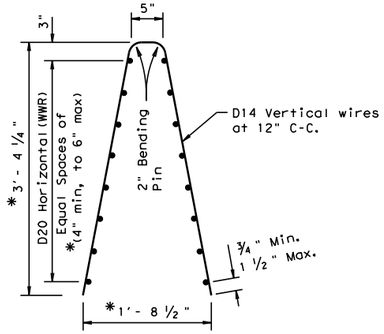


END VIEW

Dowel locations

EXPANSION JOINT (Dowel Connection)

Dowels may be used, as directed by the Engineer, in locations where the barrier could be laterally displaced.



Welded Wire Reinforcement (WWR) Option for Bars V1 and H1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut and bent to accommodate the drainage slots, as directed by the Engineer.
3. Weled wire spilce locations shall have a "minimum" splice lap length of 12".
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".

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

CAST-IN-PLACE

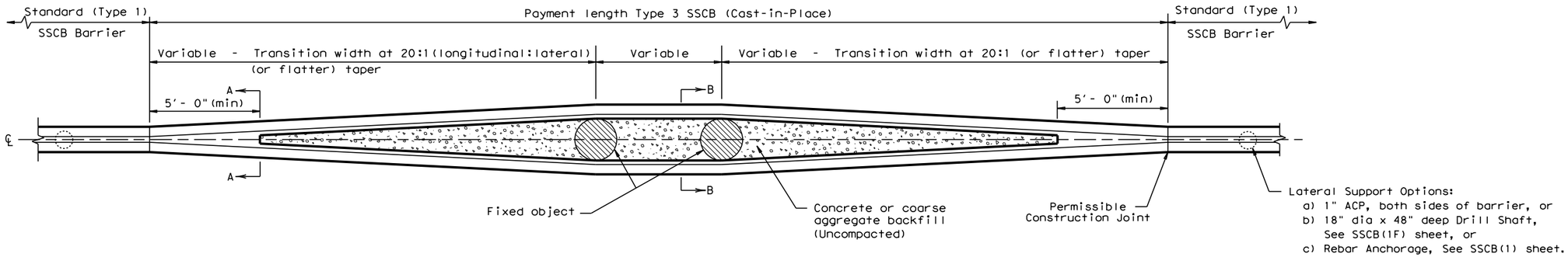
(TYPE 1)

(FLEXIBLE PAVEMENT)

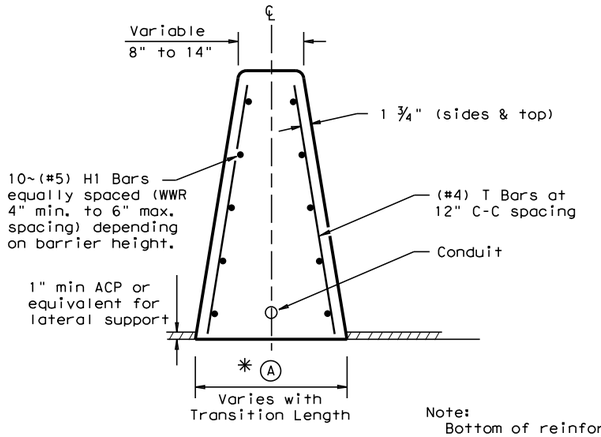
SSCB(1F)-10

FILE: sscb1f10.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		067

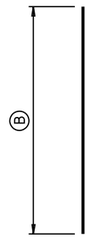
DATE: 10/11/2023 11:58:22 AM
FILE: e:\dms\bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com\dms21555\SSCB(3)-10.dgn
Vidal.Ngoumnai



PLAN (TYPE 3) BARRIER

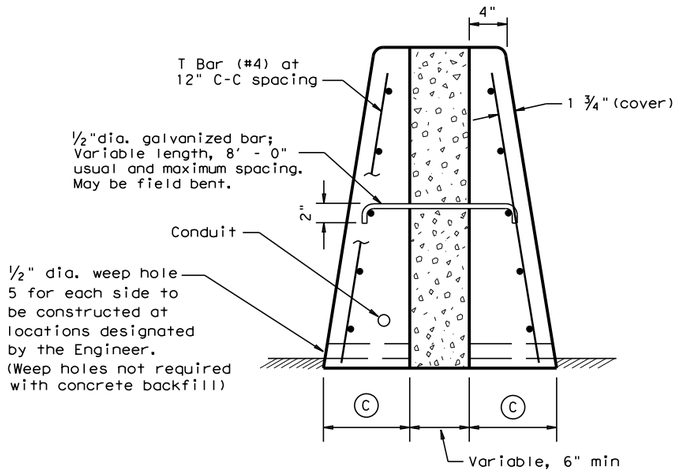


SECTION A-A



T BAR (#4)

Note:
Bottom of reinforcement cage may rest on top of finished grade.



SECTION B-B

Barrier height (IN.)	✳ Dimensions (IN.)		
	(A)	(B)	(C)
42	24 Plus	40 ¼	12
48	26 ¼ Plus	46 ¼	13 ⅛
54	28 ½ Plus	52 ¼	14 ¼

✳(SSCB)(42") Barrier height may be increased to 48" or 54". This would increase the barrier and reinforcement dimensions accordingly.

Welded Wire Reinforcement (WWR) Option for Bars T and H1 (Type 3) Barrier

(WWR) General Notes

1. WWR design required for (Type 3) SSCB barrier: D14 vertical (12" C-C) x D20 horizontal wires spaced (4" min. to 6" max.) as height requires.
2. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
3. Welded wire cage may be cut and bent to accommodate the drainage slots, as directed by the Engineer.
4. Welded wire splice locations shall have a "minimum" splice lap length of 12".
5. 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".

GENERAL NOTES

1. Axis of concrete barrier shall be vertical, except where roadway is superelevated, then axis shall be normal to roadway surface.
2. All steel that requires galvanizing shall be in accordance with Item 445, "Galvanizing."
3. Bid price per liner foot of (Type 3) SSCB, including anchor sections, shall include all of the concrete, reinforcement, and aggregate backfill.
4. All concrete shall be Class C.
5. Longitudinal and vertical bars for roadway barrier shall conform to ASTM A615 (Grade 60), unless otherwise specified.
6. At construction joints the longitudinal bars shall extend beyond the joint so that bar splices will be a minimum of two feet from the construction joint.
7. Welded wire reinforcement (WWR) may be used as an option to conventional reinforcement and shall meet requirements shown.
8. Any method devised by the contractor and approved by the Engineer that will assure the longitudinal steel for and (Type 3) SSCB will be positioned ± ½inch as dimensioned will be satisfactory.
9. Conduit to be provided only when called for elsewhere in the plans. Position of conduit may be adjusted to facilitate construction subject to the approval of the Engineer.
10. See SSCB(4) standard for barrier with illumination.

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

CAST-IN-PLACE
(TYPE 3)
AT FIXED OBJECTS

SSCB(3)-10

FILE: sscb310.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		068

11/15/2023 4:17:16 PM

zBeil

ALL ABUTMENTS AND BENTS ARE LOCATED ALONG A BEARING OF N74°11'34.27"W

LIMITS OF RR9 (4") SEE CONCRETE RIPRAP LAYOUT SHEETS FOR DETAILS NOT SHOWN.

EXIST RIPRAP TO BE REMOVED

SHOULDER DRAIN SEE CRR STANDARD FOR DETAILS NOT SHOWN.

ADKISSON-2

℄ ADKISSON & PGL

18+00

19+00

20+00

21+00

ADKISSON RD

BEGIN BRIDGE FACE OF ABUT 1 BKWL STA 19+06.00 EL = 3884.20'

PT 18+69.84

HEADER EXPANSION JOINT (4")

CSAB OPTION 1

3:1 RR9

5:1 RR9

32'-4" BAS-A (MOD)

20'-0" BAS-A (MOD)

15°0'0" SKEW

SPAN 1

SPAN 2

SPAN 3

SPAN 4

46'-0"

44'-0"

12'-0" SHDR

12'-0" LANE

10'-0" SHDR

1'-0" RAIL

NOM FACE OF SSTR RAIL

℄ BENT 2 STA 19+66.00

℄ BENT 3 STA 20+50.00

℄ BENT 4 STA 21+34.00

℄ GDR 1 (TYP)

℄ GDR 6 (TYP)

POINT OF MIN VERT CLR

2.00%

BORING B-8 STA 21+31.28 8.39' LT

23'-7 1/4" MIN HORIZ. CLR

31'-6 1/2" MIN HORIZ. CLR

25'-10" MIN HORIZ. CLR

S 0° 48' 26" W

EXISTING BRIDGE TO BE REMOVED

1

BORING E-1 STA 18+77.35 24.42' RT

BORING B-7 STA 19+94.65 53.03' RT

EXIST FIBER OPTIC CABLE

WB IH-40 FR

WB IH-40

MATCH LINE STA 21+80

HORIZ. CURVE DATA

CURVE ADKISSON-2

PI STATION =	15+95.91
DELTA =	3°59'29.1"
DEGREE OF CURVATURE =	0°43'40.9"
TANGENT =	274.16'
LENGTH =	548.10'
RADIUS =	7,870.00'
PC STATION =	13+21.75
PT STATION =	18+69.84

1 EXISTING 490'-0" LONG BRIDGE WITH 7 SPANS (50'-0", 70'-0", 85'-0", 85'-0", 85'-0", 75'-0", 40'-0") TO BE REMOVED. BRIDGE CONSISTS OF PRESTRESSED CONCRETE BEAMS AND HAS A BRIDGE WIDTH OF 28'-3". SALVAGE EXISTING TYPE T-1 BRIDGE RAIL.

PLAN

END OF BRIDGE RAIL (LT & RT) FOR PAYMENT

13.00' WINGWALL

OVERALL LENGTH OF SSTR RAIL = 566.00' (EA SIDE)

OVERALL LENGTH OF BRIDGE = 540.00'

144.00' PCG UNIT 1 (60.00', 84.00')

252.00' PCG UNIT 2 (84.00', 84.00', 84.00')

I-GIRDER SPAN 4 - 84.00' TX34 PRESTR CONC I-GIRDER

SPAN 1 - 60.00' TX34 PRESTR CONC. I-GIRDER

SPAN 2 - 84.00' TX34 PRESTR CONC. I-GIRDER

SPAN 3 - 84.00' TX34 PRESTR CONC. I-GIRDER

BEGIN BRIDGE FACE OF ABUT 1 BKWL STA 19+06.00 EL 3884.20'

PGL

TY SSTR RAIL

(+)3.10 %

VPC 18+55.00 EL = 3,882.78'

3:1 RR9

H" = 15'

H" = 19'

H" = 20'

20'-9" MIN VERT. CLR

℄ WB IH-40 FR

EXIST GROUND

4-48" DIA DS x 56'

4-48" DIA DS x 61'

4-48" DIA DS x 62'

2-18" DIA DS x 47' (1 PER WINGWALL)

5-36" DIA DS x 47'

EXIST 30" DIA DS & 102" DIA BELL FOOTING APPROX ~ 17 FT DEEP.

EXIST 30" DIA DS & 108" DIA BELL FOOTING APPROX ~ 16 FT DEEP.

MATCH LINE STA 21+80

ELEVATION

3,920 / 3,900 / 3,880 / 3,860 / 3,840 / 3,820 / 3,800 / 3,780

18+00 19+00 20+00 21+00

SCALE: 1" = 40'

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. SEE RDWY PLANS FOR LOCATION OF BENCHMARKS FOR HORIZONTAL AND VERTICAL CONTROL.
3. SEE EXISTING UTILITY PLANS FOR IDENTIFICATION OF EXISTING UTILITIES.
4. SAW-CUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS REQUIRED.
5. ENUMERATED GEOTECHNICAL BORING TEST HOLES ARE LABELED AND LOCATED IN PLAN. FOR LOGS OF CORRESPONDING HOLE NUMBER, SEE BORING LOG SHEET.
6. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION, EXCAVATION, OR DRILLING.
7. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR VERTICAL GRADE AND SUPERELEVATION WHERE APPROPRIATE.
8. "D" DENOTES BENTS WITH DOWEL BARS FOR EXTERIOR BEAMS.
9. "H" HEIGHTS SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
10. BRIDGE TO BE CLOSED DURING CONSTRUCTION. SEE TCP FOR ADDITIONAL DETAILS.
11. REMOVE EXISTING STRUCTURE 2 FEET BELOW EXISTING GROUND.

(1) SEE HEADER TYPE EXPANSION JOINT DETAIL SHEET FOR DETAILS AND NOTES NOT SHOWN HEREIN.

DESIGN SPEED: 30 MPH
ADT (2023) = 100
ADT (2043) = 200
FUNCT CLASS = RURAL LOCAL
EXIST NBI: 04-188-0090-05-064
PROP NBI: 04-188-0-0090-05-593

SUPERSTRUCTURE INV/OPR RATINGS: 1.19/1.78

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
11-15-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD BRIDGE LAYOUT

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	069
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

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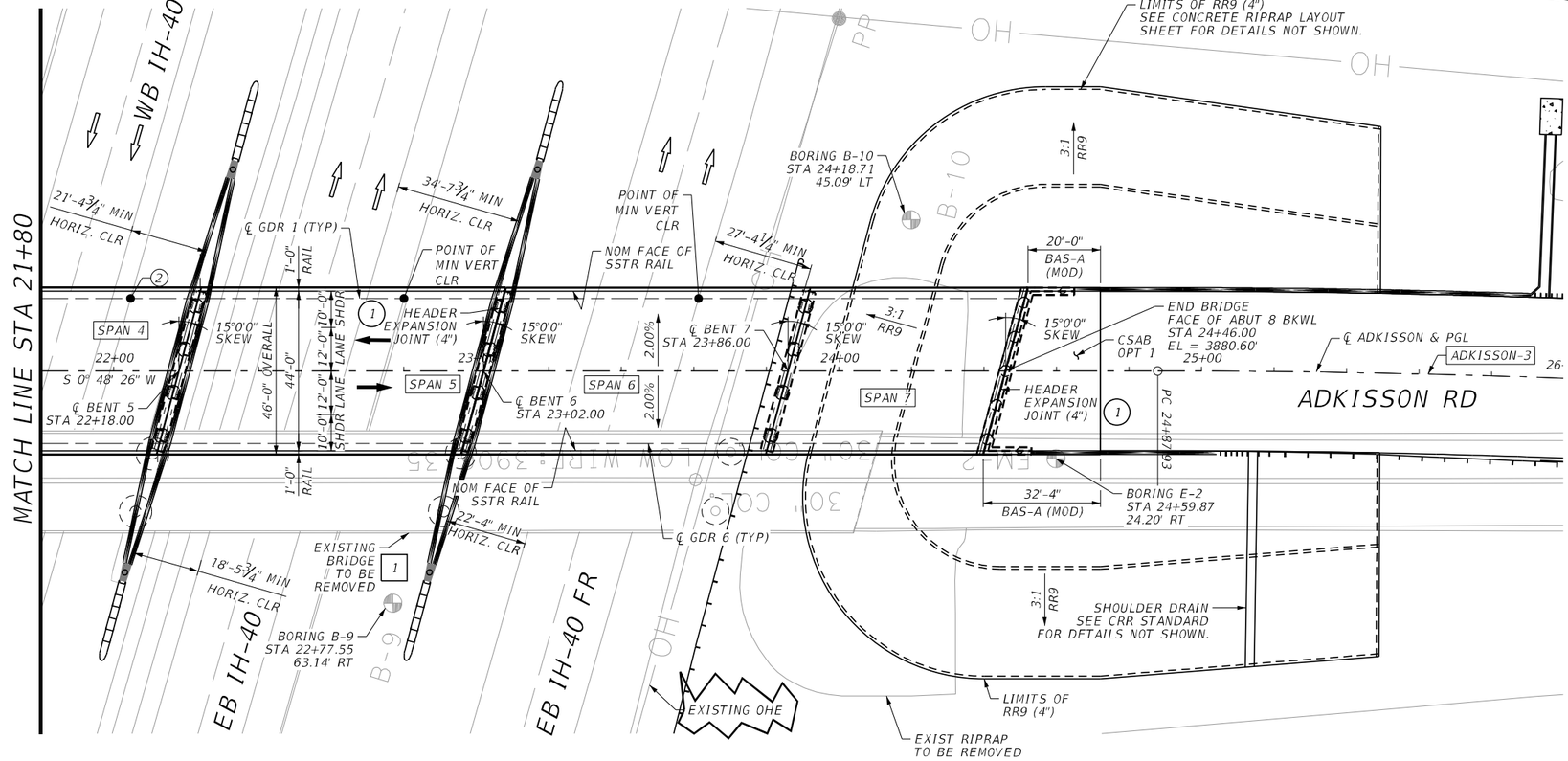


NOTES:

SEE SHEET 01 OF 02 FOR GENERAL NOTES

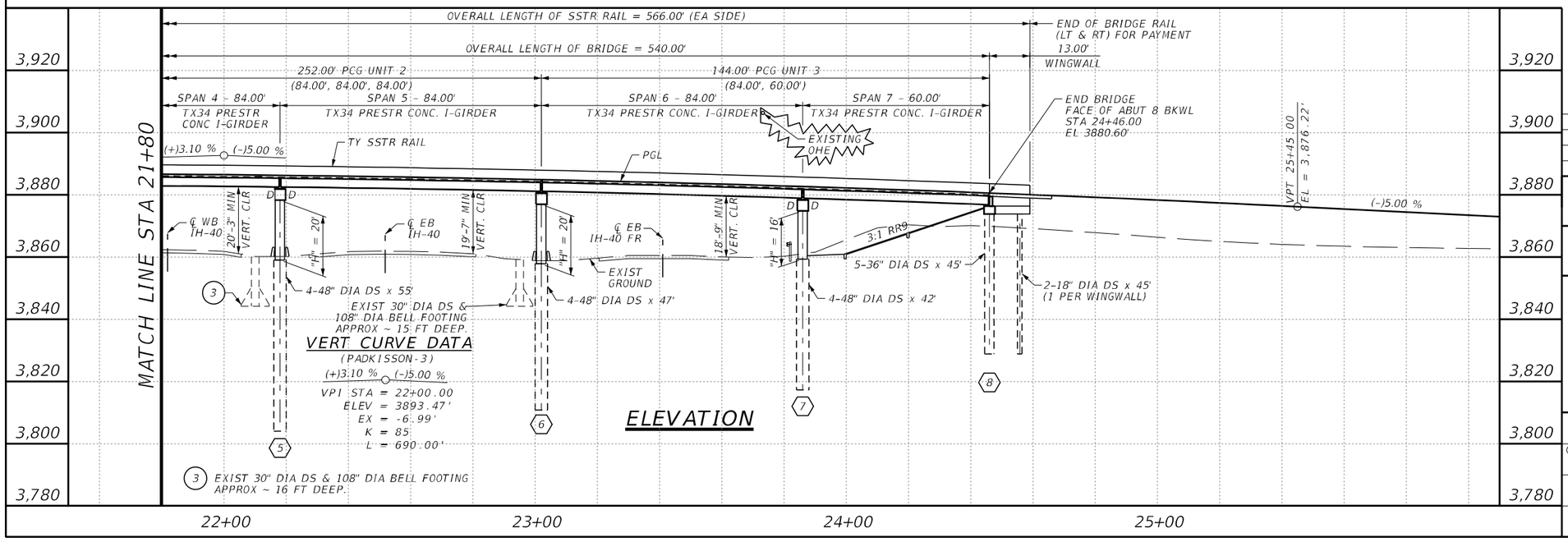
1. SEE HEADER TYPE EXPANSION JOINT DETAIL SHEET FOR DETAILS AND NOTES NOT SHOWN HEREIN.
2. POINT OF MIN VERT CLR

HORIZ. CURVE DATA

CURVE ADKISSON-3

PI STATION =	26+40.95
DELTA =	5°35'51.35"
DEGREE OF CURVATURE =	1°49'49.93"
TANGENT =	153.02'
LENGTH =	305.79'
RADIUS =	3,130.00'
PC STATION =	24+87.93
PT STATION =	27+93.72

1 EXISTING 490'-0" LONG BRIDGE WITH 7 SPANS (50'-0", 70'-0", 85'-0", 85'-0", 85'-0", 75'-0", 40'-0") TO BE REMOVED. BRIDGE CONSISTS OF PRESTRESSED CONCRETE BEAMS AND HAS A WIDTH OF 28'-3". SALVAGE EXISTING TYPE T-1 BRIDGE RAIL.



STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J. Beil
11-15-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD BRIDGE LAYOUT

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	070
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

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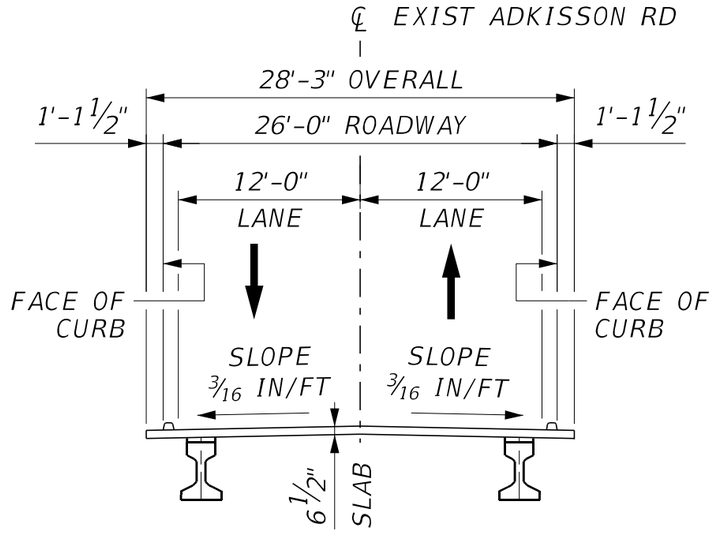
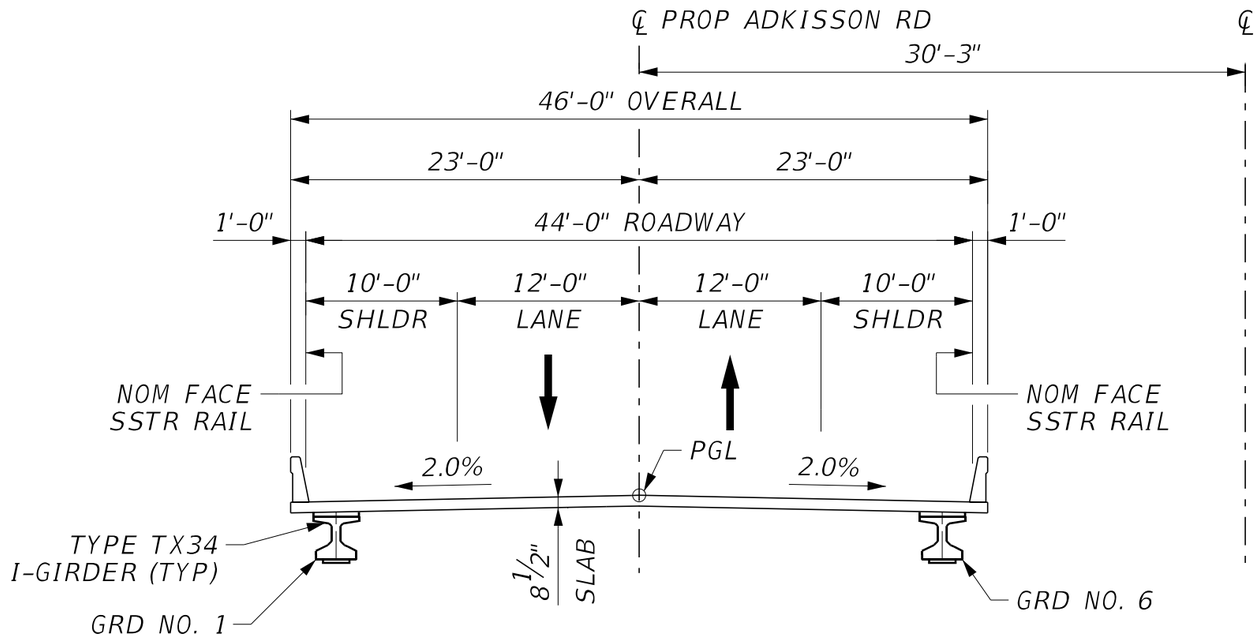


EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

(SPANS 1-7)

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD BRIDGE TYPICAL SECTIONS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	071
CHECK ZJB	CONTROL 0090	SECTION 05	JOB 108	

ESTIMATE OF QUANTITIES

ITEM	400	416	416	416	420	420	420	422
CODE	6005	6001	6004	6006	6014	6030	6038	6001
BID ITEM DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (18 IN)	DRILL SHAFT (36 IN)	DRILL SHAFT (48 IN)	CL C CONC (ABUT)(HPC)	CL C CONC (CAP)(HPC)	CL C CONC (COLUMN)(HPC)	REINF CONC SLAB
BRIDGE ELEMENT	CY	LF	LF	LF	CY	CY	CY	SF
2 ~ ABUTMENTS	148	188	460		56.8			
6 ~ INTERIOR BENTS				1,292		124.2	146.7	
1 ~ 144.00' PRESTR CONC I-GIRDER UNIT								6,624
1 ~ 252.00' PRESTR CONC I-GIRDER UNIT								11,592
1 ~ 144.00' PRESTR CONC I-GIRDER UNIT								6,624
TOTALS	148	188	460	1,292	56.8	124.2	146.7	24,840

ITEM	422	425	427	432	450	454	496	4171
CODE	6015	6036	6007	6001	6023	6007	6010	6001
BID ITEM DESCRIPTION	APPROACH SLAB	PRESTR CONC GIRDER (TX34)	EPOXY WATERPROOF FINISH (TY X)	RIPRAP (CONC)(4 IN)	RAIL (TY SSTR)	HEADER TYPE EXPANSION JOINT	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	INSTALL BRIDGE IDENTIFICATION NUMBERS
BRIDGE ELEMENT	CY	LF	SF	CY	LF	LF	EA	EA
2 ~ ABUTMENTS	96.6		456	597	52.0	95		
6 ~ INTERIOR BENTS			868			95		
1 ~ 144.00' PRESTR CONC I-GIRDER UNIT		858.07			288.0			1
1 ~ 252.00' PRESTR CONC I-GIRDER UNIT		1,503.08			504.0			
1 ~ 144.00' PRESTR CONC I-GIRDER UNIT		858.34			288.0			1
REMOVAL							1	
TOTALS	96.6	3219.49	1,324	597	1,132.0	190	1	2

BEARING SEAT ELEVATIONS

			GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6
ABUT	1	(FWD)	3879.983	3880.091	3880.198	3880.144	3879.931	3879.716
BENT	2	(BK)	3881.192	3881.315	3881.436	3881.398	3881.198	3880.998
		(FWD)	3881.227	3881.350	3881.472	3881.434	3881.235	3881.036
BENT	3	(BK)	3882.245	3882.388	3882.531	3882.513	3882.335	3882.157
		(FWD)	3882.260	3882.404	3882.547	3882.530	3882.352	3882.174
BENT	4	(BK)	3882.469	3882.633	3882.797	3882.801	3882.644	3882.486
		(FWD)	3882.464	3882.629	3882.793	3882.797	3882.641	3882.484
BENT	5	(BK)	3881.864	3882.050	3882.235	3882.260	3882.124	3881.988
		(FWD)	3881.840	3882.026	3882.212	3882.237	3882.101	3881.966
BENT	6	(BK)	3880.432	3880.639	3880.845	3880.890	3880.776	3880.661
		(FWD)	3880.388	3880.595	3880.802	3880.848	3880.734	3880.619
BENT	7	(BK)	3878.171	3878.399	3878.626	3878.693	3878.600	3878.505
		(FWD)	3878.107	3878.335	3878.563	3878.630	3878.538	3878.444
ABUT	8	(BK)	3876.050	3876.293	3876.535	3876.618	3876.539	3876.460

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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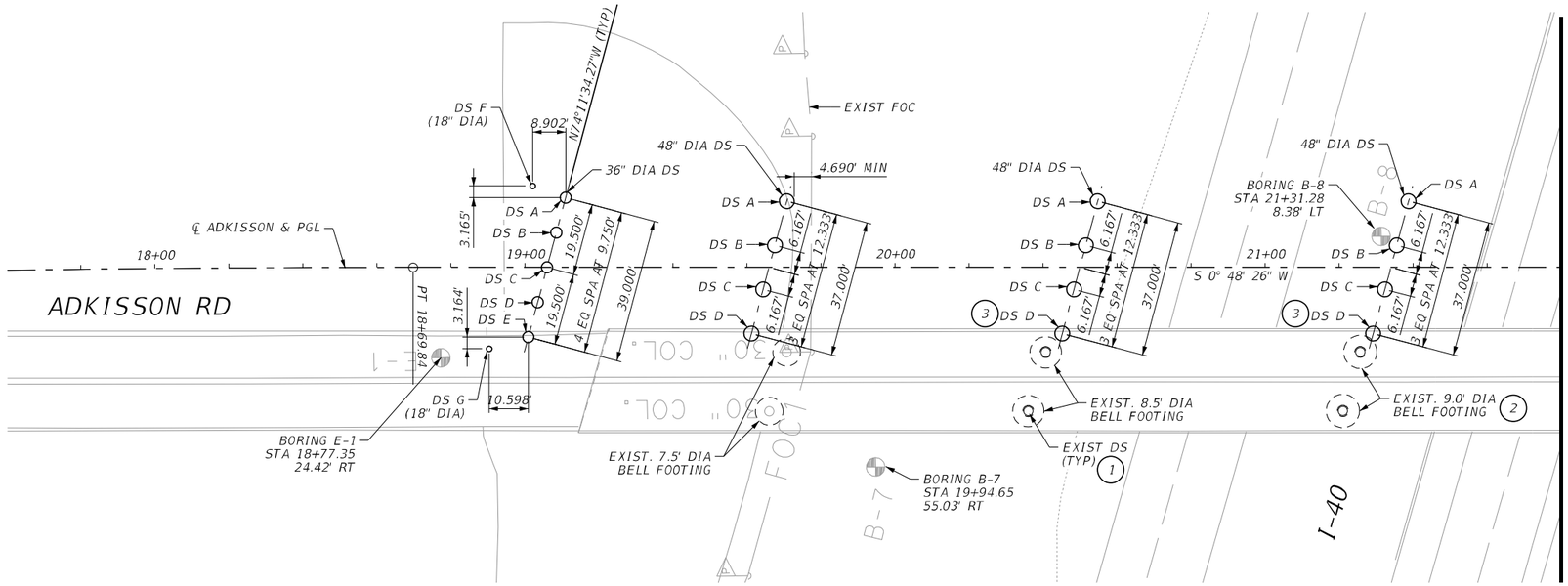
IH-40 AT ADKISSON ROAD

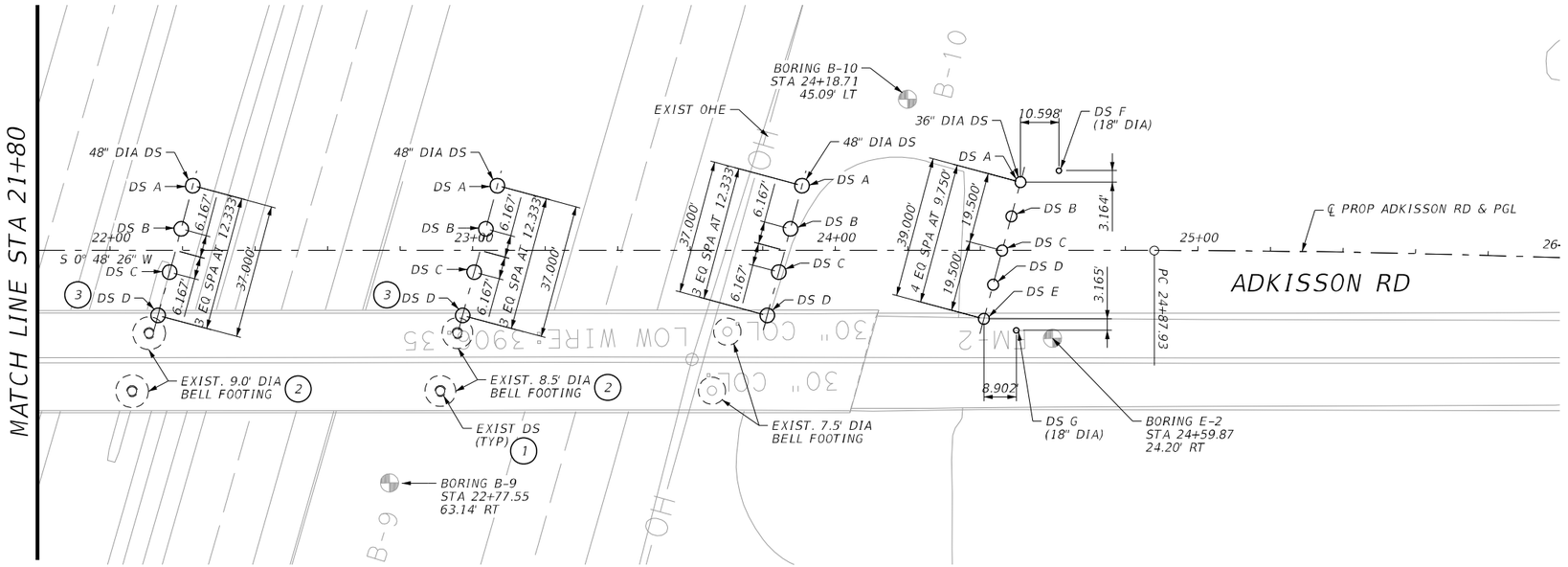
IH-40 UNDERPASS AT ADKISSON ROAD

ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	072
CHECK ZJB	CONTROL 0090	SECTION 05	JOB 108	





20 0 20 40
SCALE: 1" = 40'

GENERAL NOTES:

1. FOR SOIL BORING INFORMATION SEE "BORE LOG" SHEET.
2. DRILLED SHAFTS HAVE BEEN DESIGNED FOR BOTH SKIN FRICTION AND END BEARING. ALL DRILLED SHAFTS SHALL BE EXTENDED FOR LENGTH SHOWN ON BRIDGE LAYOUT.
3. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION, EXCAVATION, OR DRILLING.
4. SEE "TYPICAL COLUMN FOUNDATION DETAILS" SHEET FOR NOTES AND DETAILS NOT SHOWN HEREIN.
5. REINFORCING STEEL & CONCRETE FOR DRILLED SHAFTS SHALL BE PLACED IMMEDIATELY AFTER COMPLETED FOUNDATION EXCAVATION. UNDER NO CIRCUMSTANCES, COMPLETED FOUNDATION EXCAVATION REMAINS OPEN OVERNIGHT.
6. GROUNDWATER SEEPAGE FLOW IS NOT PERMITTED INTO THE SHAFT EXCAVATION AND SHALL BE CONTROLLED PRIOR TO CONCRETE PLACEMENT. A WATER HEAD MAY BE USED TO CONTROL THE SEEPAGE IF NECESSARY.

(1) EXISTING DRILLED SHAFT LOCATIONS ARE APPROXIMATE BASED OFF OF AS-BUILTS. CONTRACTOR TO FIELD VERIFY.

(2) EXISTING BELL FOOTINGS ARE UNREINFORCED PERMISSIBLE TO DRILL THROUGH EXISTING BELL FOOTING TO INSTALL PROPOSED DRILL SHAFT.

(3) PROPOSED EXTERIOR 48" DRILLED SHAFT D ARE IN CLOSE PROXIMITY OR IN CONFLICT WITH EXISTING BELLED DRILLED SHAFT FOUNDATIONS. CONTRACTOR TO UTILIZE PROPER TOOLING NECESSARY TO ADVANCE THE PROPOSED DRILLED SHAFTS TO THE TARGET DESIGN LENGTH WHILE MAINTAINING VERTICAL AND HORIZONTAL SHAFT ALIGNMENT. CONTRACTOR TO INCLUDE PROPOSED METHODOLOGY AND EQUIPMENT IN THE REQUIRED DRILLED SHAFT INSTALLATION PLAN.

STATE OF TEXAS
ZACHARY J. BEIL
139718
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PROFESSIONAL ENGINEER
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10-09-2023

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CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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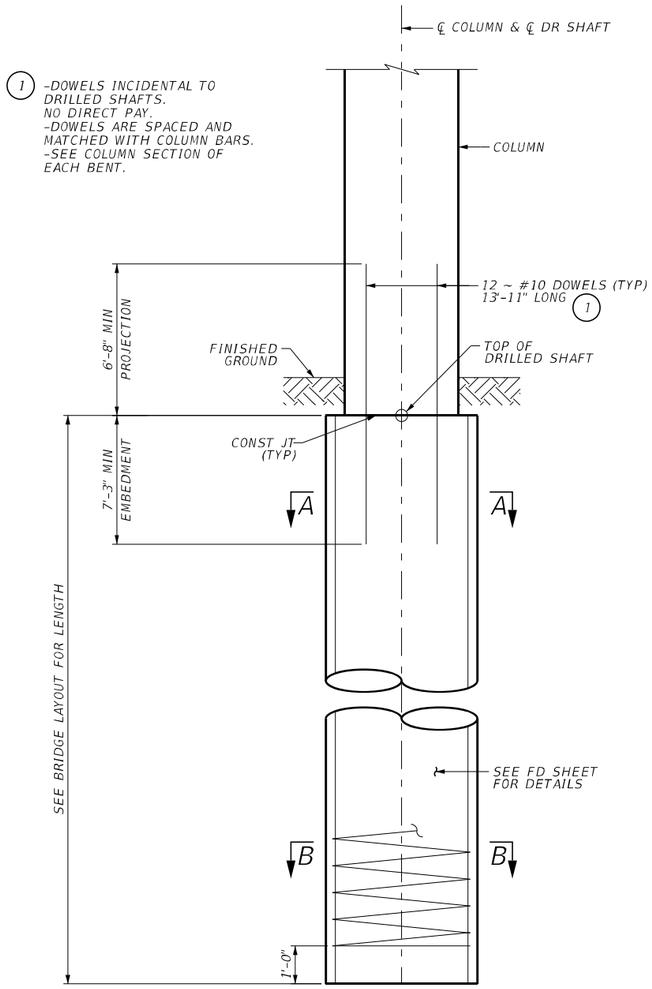
IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD FOUNDATION LAYOUT

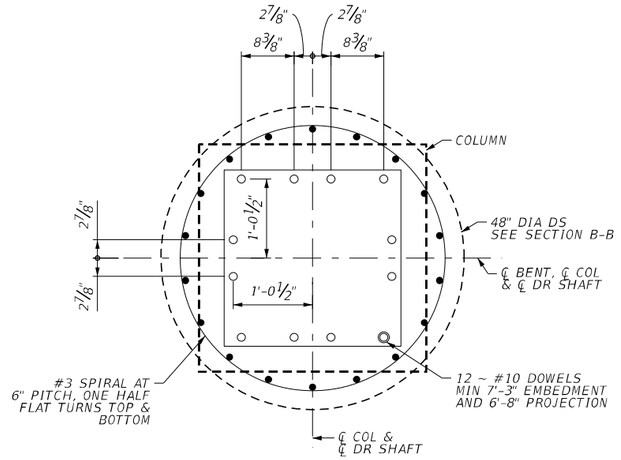
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	073
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



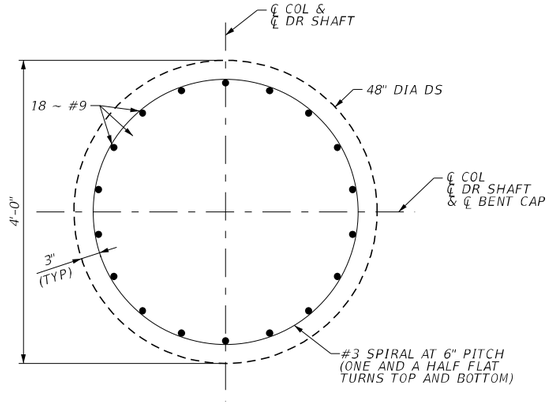
ELEVATION 48" DIA DRILLED SHAFT

SCALE: 1/4" = 1'-0"



SECTION A-A

N.T.S,



SECTION B-B

N.T.S.

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATION, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. SEE "TYPICAL COLUMN DETAILS SHEET FOR ALL COLUMN DETAILS AND NOTES NOT SHOWN.

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3600 PSI)
2. PROVIDE GRADE 60 REINFORCING STEEL.
3. PROVIDE GRADE 60 EPOXY-COATED REINFORCING STEEL FOR DOWEL BARS.

STATE OF TEXAS
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10-09-2023

HL 93 LOADING

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BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD

TYPICAL COLUMN FOUNDATION DETAILS

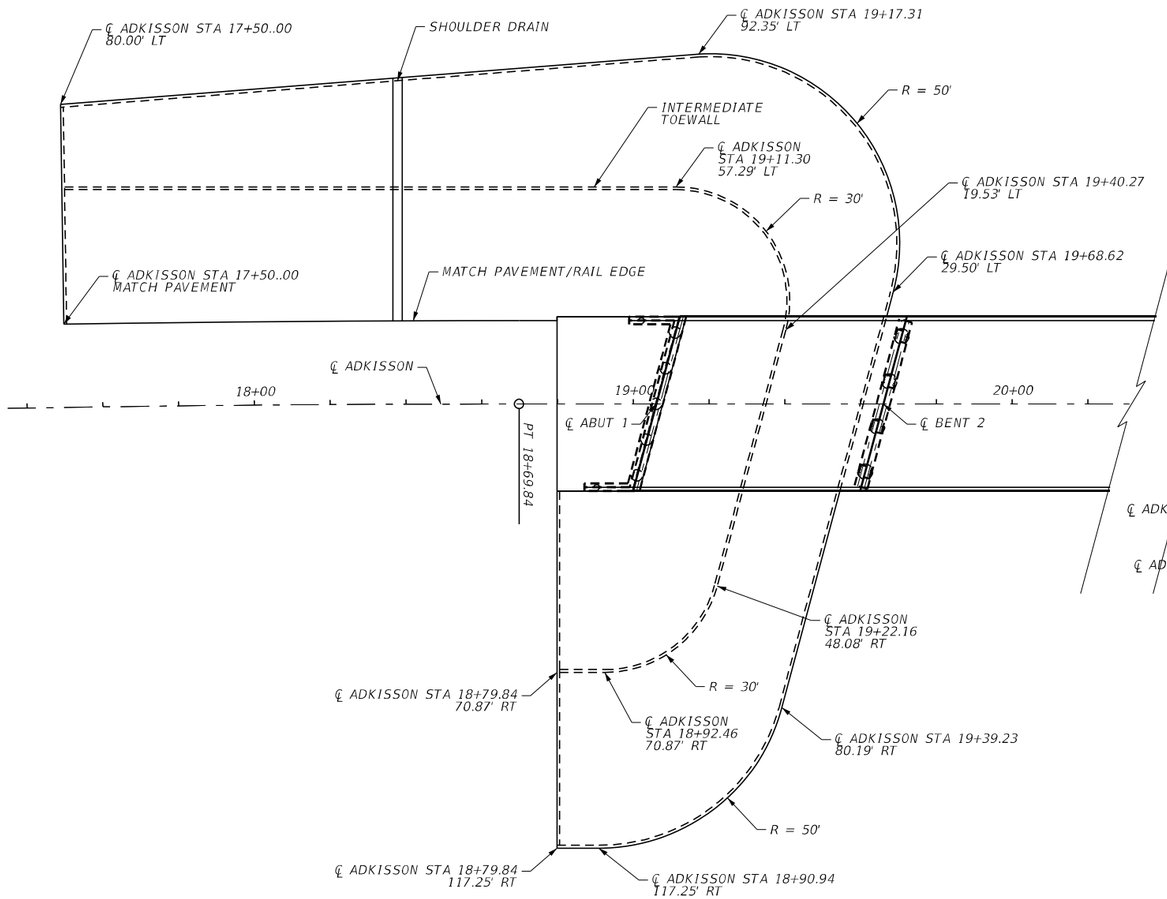
SHEET 1 OF 1

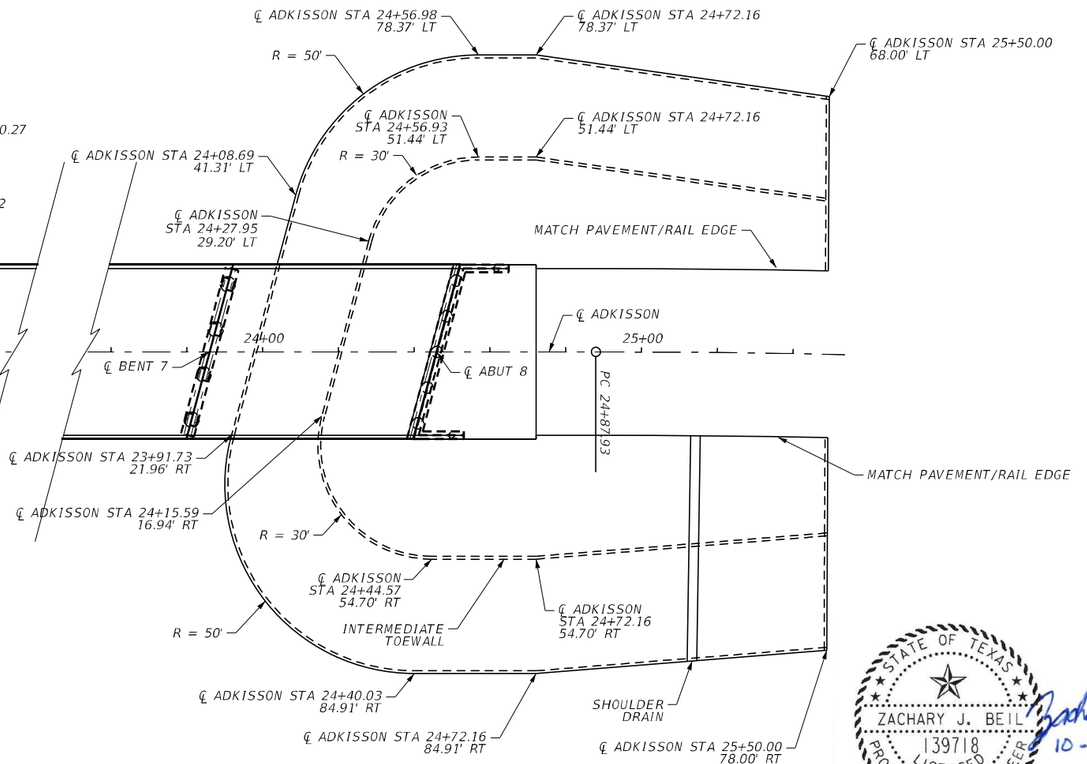
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	074
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

20 0 20 40
SCALE: 1" = 40'

GENERAL NOTES:

1. SEE TXDOT CRR STANDARD FOR DETAILS NOT SHOWN.





CONCRETE RIPRAP LIMITS

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

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CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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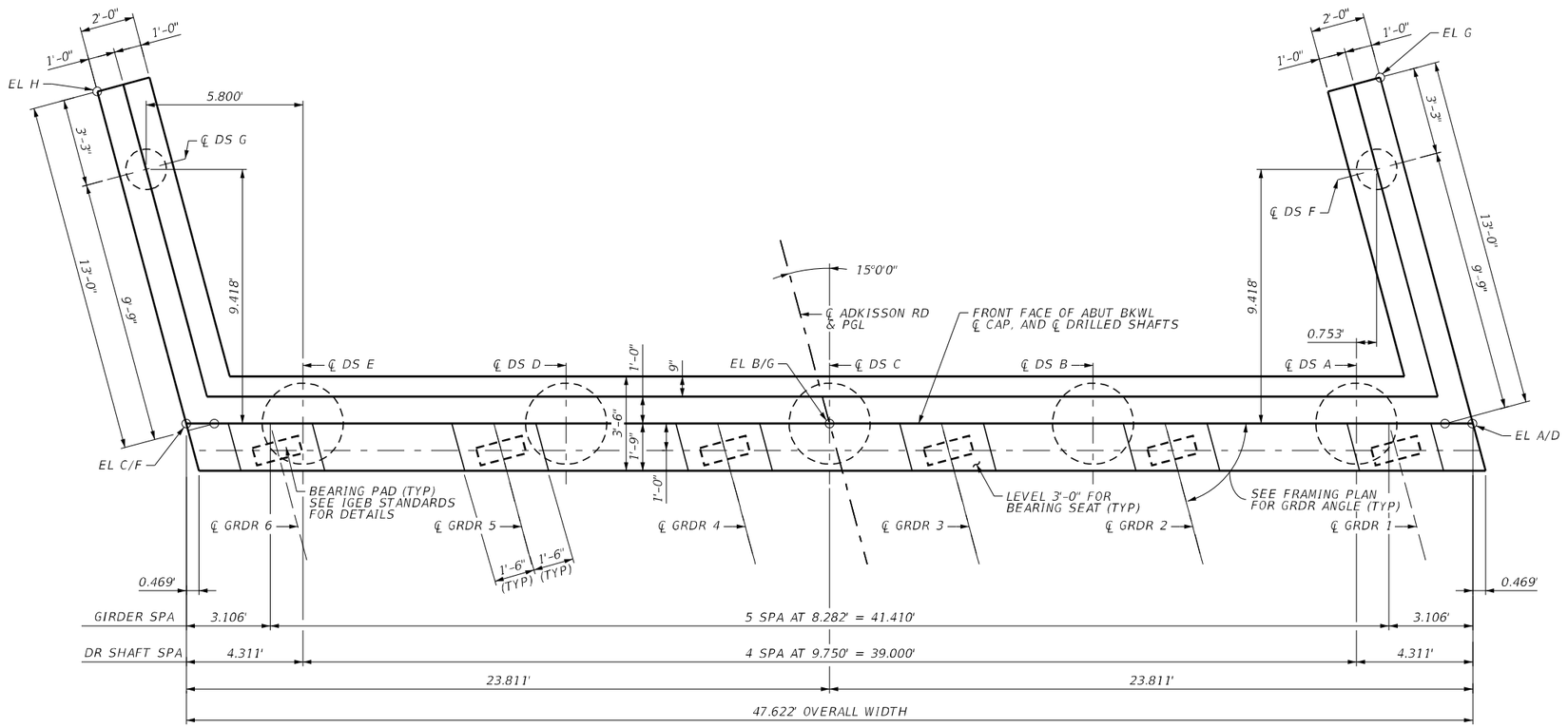
IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD CONCRETE RIPRAP LIMITS

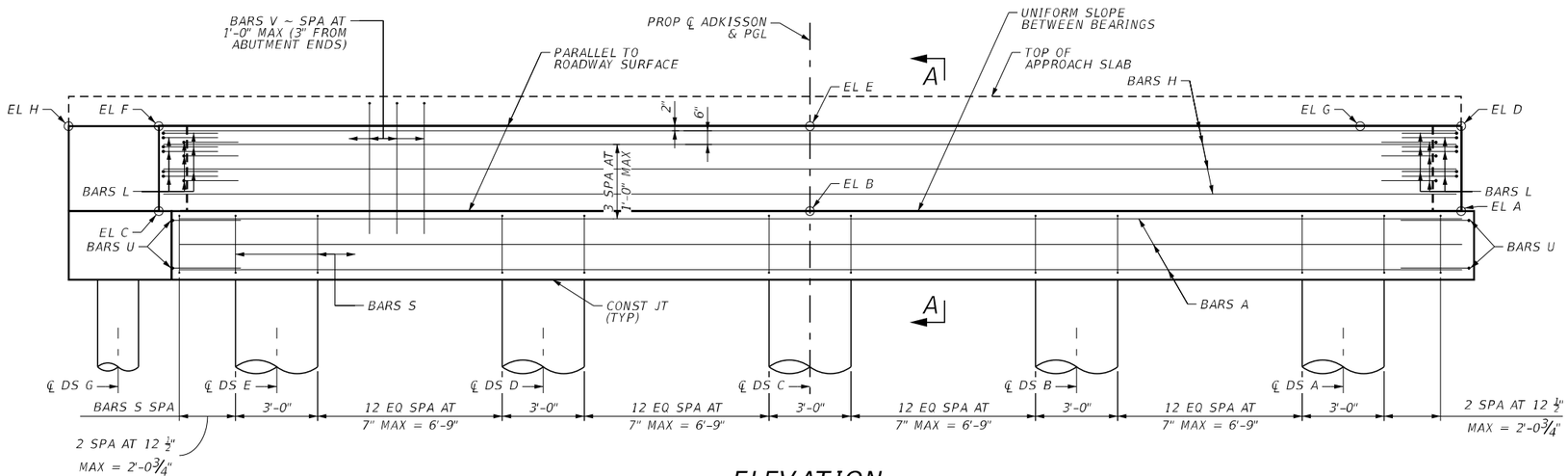
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	075
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.
3. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
4. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS.
5. SEE TY SSTR STANDARD FOR RAIL ANCHORAGE IN APPROACH SLAB.
6. SEE AMARILLO WATERPROOFING DETAIL SHEET FOR WATERPROOFING DETAILS NOT SHOWN.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "BRIDGE ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS" SHEET.
8. CALCULATED FOUNDATION LOADS = 95 TONS/DS

MATERIAL NOTES:

1. PROVIDE CLASS C (HPC) CONCRETE (f'c = 3600 PSI)
2. PROVIDE GRADE 60 EPOXY-COATED REINFORCING STEEL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
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Zachary J Beil
10-09-2023

HL 93 LOADING

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CONSULTING ENGINEERS
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IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD ABUTMENT 01 DETAILS

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	076
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

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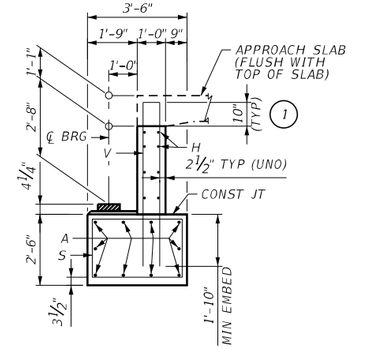
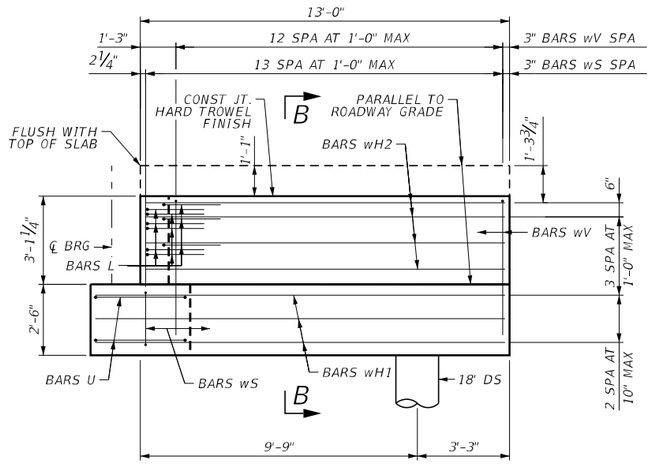


SECTION A-A

SCALE: 3/16" = 1'-0"

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE



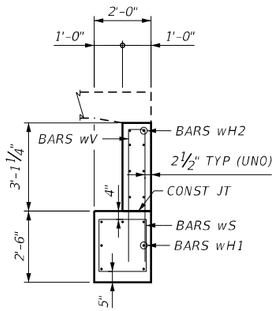
WINGWALL ELEVATION

SCALE: 3/16" = 1'-0"

CONTROL ELEVATIONS														
TOP OF CAP			TOP OF BACKWALL						TOP OF DRILL SHAFT					
ELEV A	ELEV B	ELEV C	ELEV D	ELEV E	ELEV F	ELEV G	ELEV H	D.S. A	D.S. B	D.S. C	D.S. D	D.S. E	D.S.F	D.S.G
3879.793	3880.101	3879.484	3883.897	3884.205	3883.588	3883.564	3883.251	3877.349	3877.475	3877.601	3877.349	3877.096	3877.063	3876.755

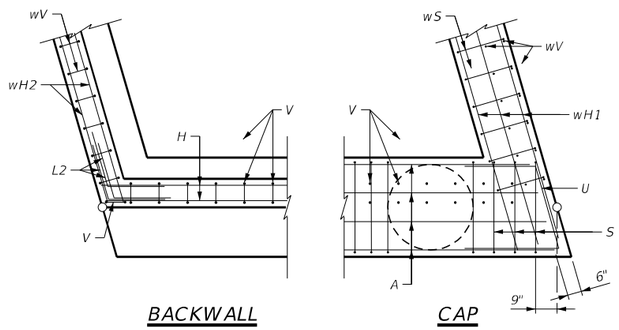
TABLE OF CAP QUANTITIES						
BAR SCHEDULE ~ 1 CAP ONLY						
BAR	TYPE	NO.	SIZE		LENGTH	WEIGHT
A	ST	10	#	11	46'-7"	2,477
H	ST	8	#	6	45'-3"	544
L1	BT	18	#	6	4'-0"	108
L2	BT	18	#	6	4'-0"	108
S	BT	58	#	5	11'-2"	676
U	BT	4	#	6	8'-1"	49
V	BT	46	#	5	12'-2"	582
wH1	ST	14	#	6	15'-3"	322
wH2	ST	16	#	6	13'-6"	324
wS	BT	28	#	4	7'-6"	140
wV	BT	26	#	5	9'-11"	269
~ REINF STEEL					LB	5,599
CL C CONC(ABUT)(HPC)					CY	28.4

~ FOR CONTRACTOR'S INFORMATION ONLY



SECTION B-B

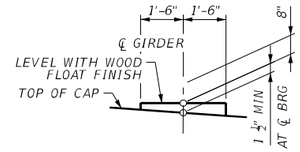
SCALE: 3/16" = 1'-0"



BACKWALL CAP

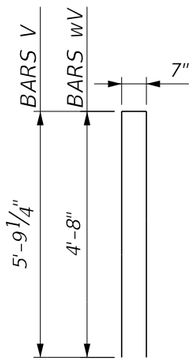
CORNER DETAILS

SCALE: 3/16" = 1'-0"

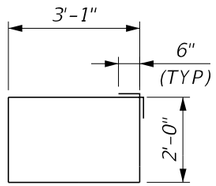


BEARING SEAT DETAIL

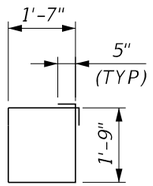
(BEARING SURFACE SHALL BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



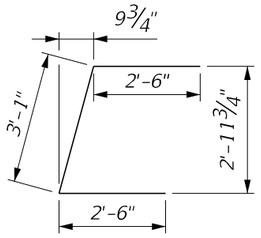
BARS V & wV



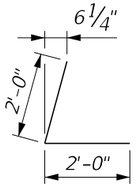
BARS S



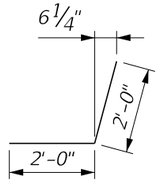
BARS wS



BARS U



BARS L1



BARS L2

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

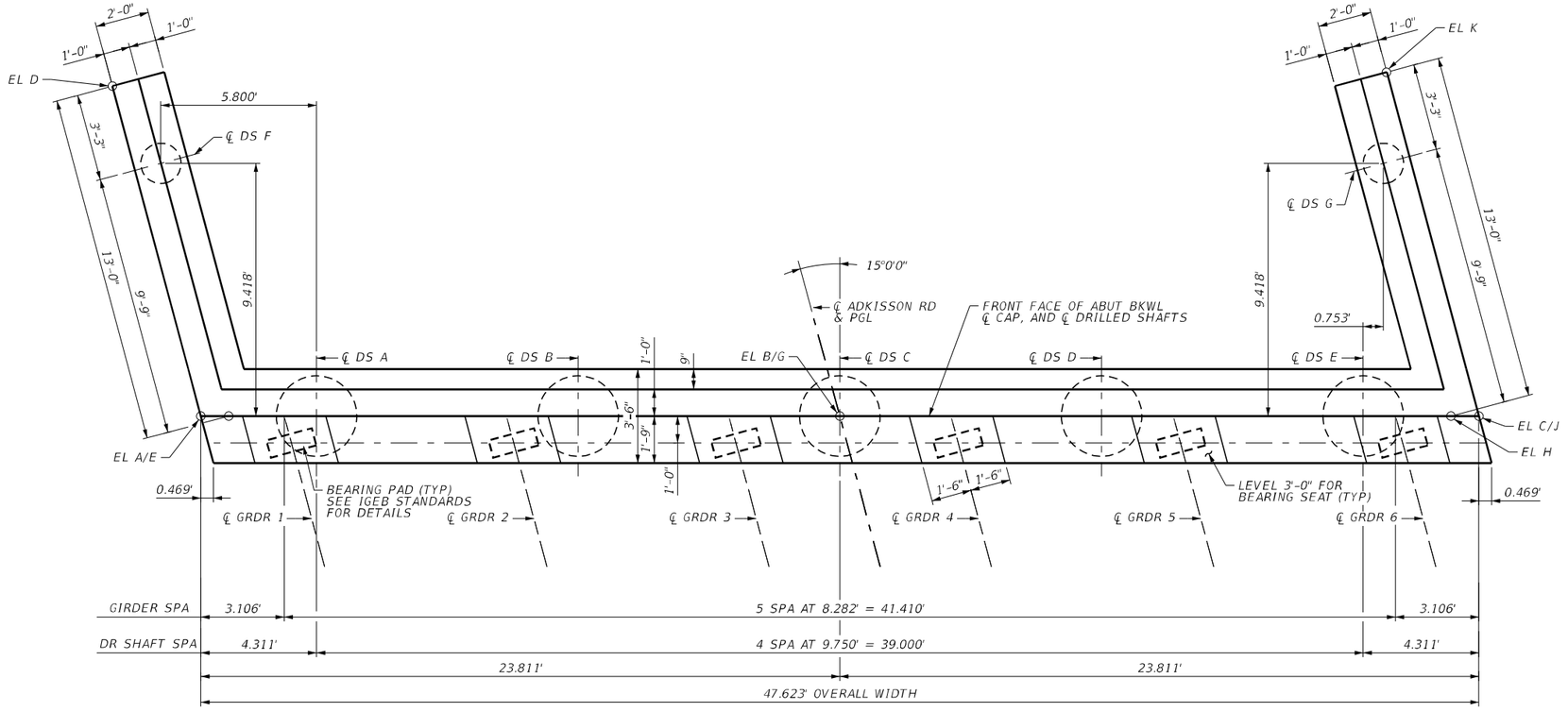
Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD ABUTMENT 01 DETAILS

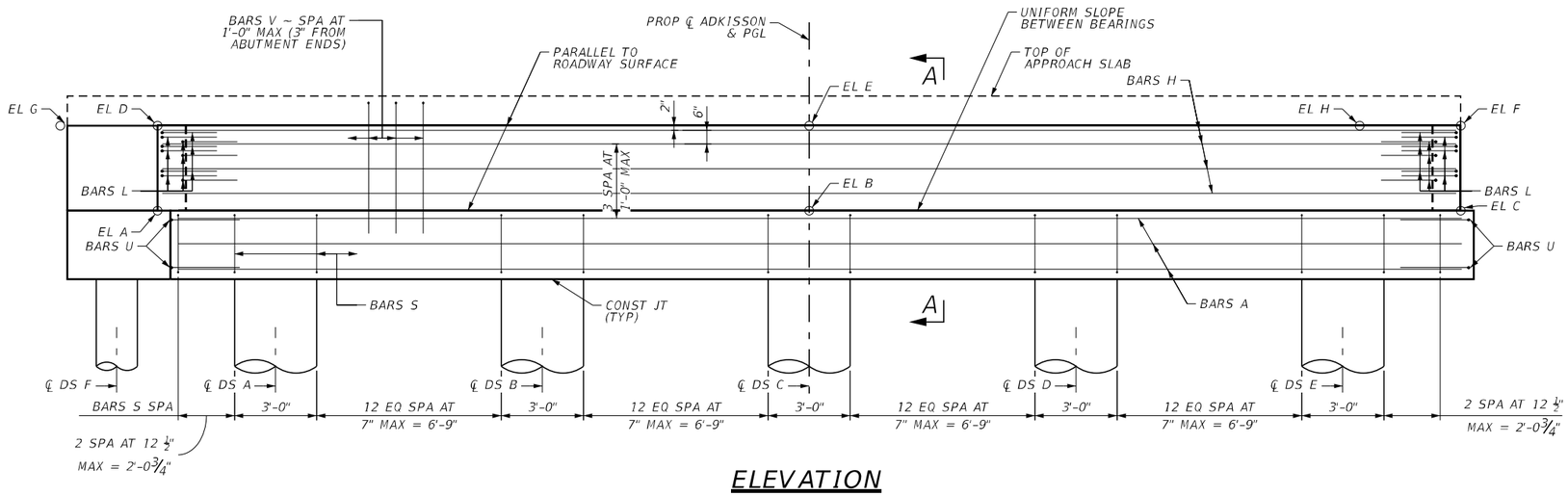
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	077
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



PLAN

SCALE: 3/16" = 1'-0"



ELEVATION

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.
3. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
4. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS.
5. SEE TY SSTR STANDARD FOR RAIL ANCHORAGE IN APPROACH SLAB.
6. SEE AMARILLO WATERPROOFING DETAIL SHEET FOR WATERPROOFING DETAILS NOT SHOWN.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "BRIDGE ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS" SHEET.
8. CALCULATED FOUNDATION LOADS = 95 TONS/DS

MATERIAL NOTES:

1. PROVIDE CLASS C (HPC) CONCRETE (f'c = 3600 PSI)
2. PROVIDE GRADE 60 EPOXY-COATED REINFORCING STEEL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
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10-09-2023

HL 93 LOADING

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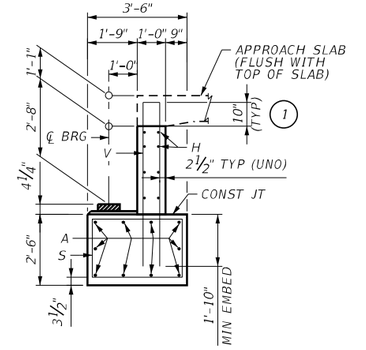
IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD ABUTMENT 08 DETAILS

SHEET 1 OF 2

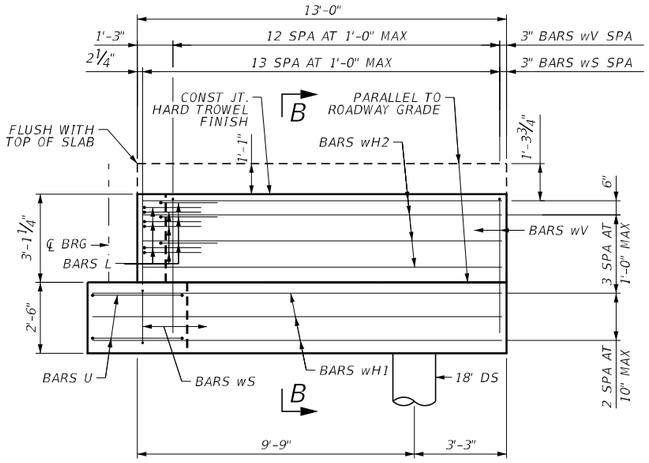
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB				
GRAPHICS	6	SEE TITLE SHEET		IH 40
AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AMA	POTTER	078
KDH	CONTROL	SECTION	JOB	
CHECK	0090	05	108	
ZJB				



SECTION A-A

SCALE: 3/16" = 1'-0"

1 INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE



WINGWALL ELEVATION

SCALE: 3/16" = 1'-0"

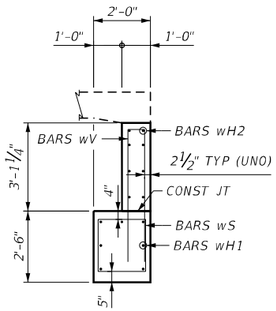
CONTROL ELEVATIONS															
TOP OF CAP			TOP OF BACKWALL						TOP OF DRILL SHAFT						
ELEV A	ELEV B	ELEV C	ELEV D	ELEV E	ELEV F	ELEV G	ELEV H	D.S. A	D.S. B	D.S. C	D.S. D	D.S. E	D.S.F	D.S.G
3875.793	3875.461	3876.266	3879.897	3880.596	3880.370	3879.390	3879.860	3873.420	3873.706	3873.992	3873.900	3873.808	3871.906	3873.403

TABLE OF CAP QUANTITIES

BAR SCHEDULE ~ 1 CAP ONLY

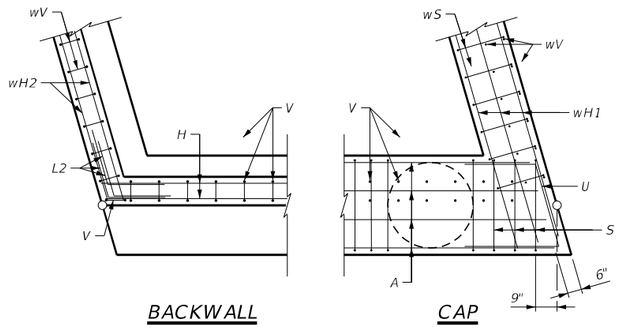
BAR	TYPE	NO.	SIZE		LENGTH	WEIGHT
A	ST	10	#	11	46'-7"	2,477
H	ST	8	#	6	45'-3"	544
L1	BT	18	#	6	4'-0"	108
L2	BT	18	#	6	4'-0"	108
S	BT	58	#	5	11'-2"	676
U	BT	4	#	6	8'-1"	49
V	BT	46	#	5	12'-2"	582
wH1	ST	14	#	6	15'-3"	322
wH2	ST	16	#	6	13'-6"	324
wS	BT	28	#	4	7'-6"	140
wV	BT	26	#	5	9'-11"	269
~ REINF STEEL					LB	5,599
CL C CONC(ABUT)(HPC)					CY	28.4

~ FOR CONTRACTOR'S INFORMATION ONLY



SECTION B-B

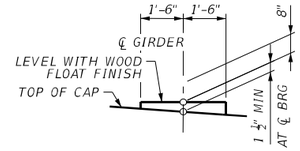
SCALE: 3/16" = 1'-0"



BACKWALL CAP

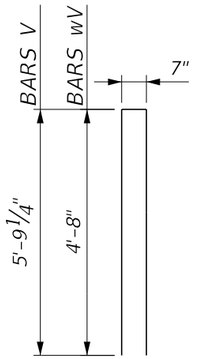
CORNER DETAILS

SCALE: 3/16" = 1'-0"

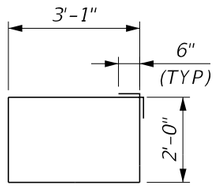


BEARING SEAT DETAIL

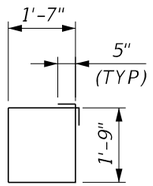
(BEARING SURFACE SHALL BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



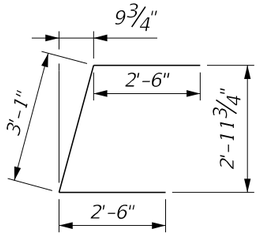
BARS V & wV



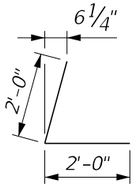
BARS S



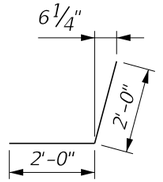
BARS wS



BARS U



BARS L1



BARS L2

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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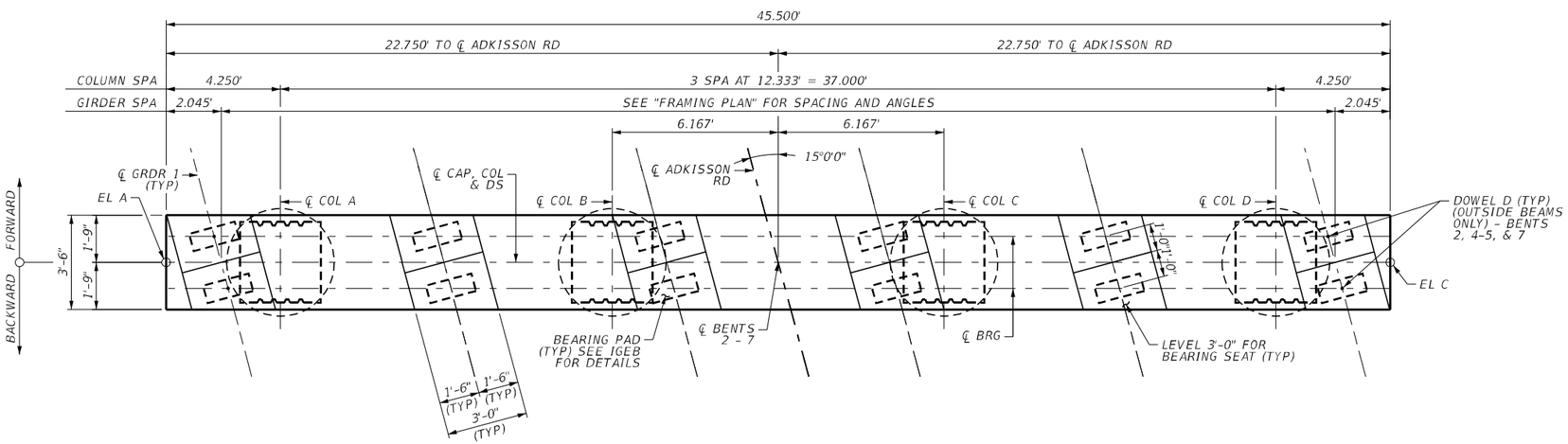
IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD ABUTMENT 08 DETAILS

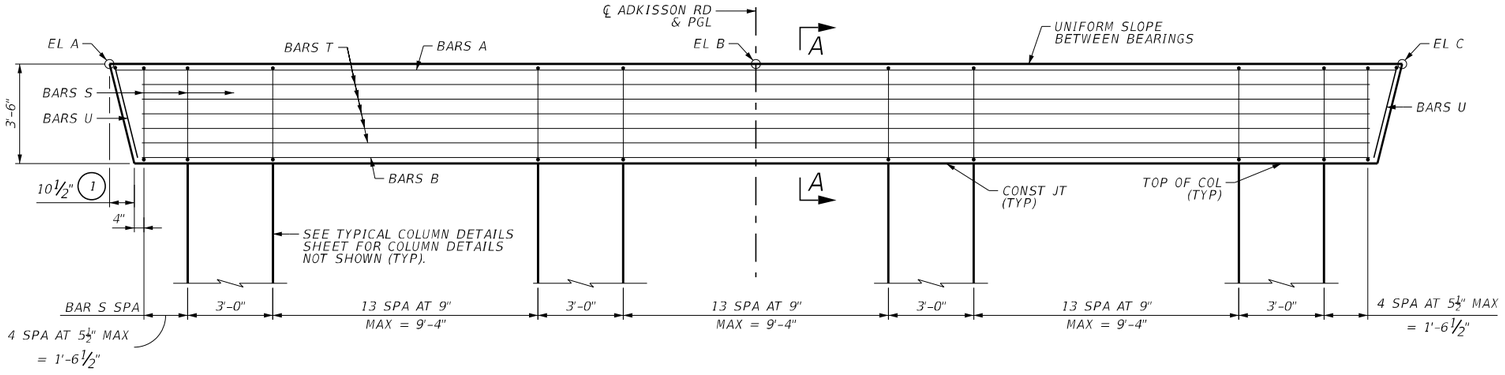
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	079
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



PLAN

SCALE: $\frac{3}{16}$" = 1'-0"



ELEVATION

SCALE: $\frac{3}{16}$" = 1'-0"

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPCIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. SEE BRIDGE LAYOUT FOR FOUNDATION TYPE, SIZE AND LENGTH.
3. SEE TYPICAL COLUMN FOUNDATION DETAILS SHEET FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.
4. SEE BRIDGE COLUMN FINISH DETAILS FOR AESTHETIC DETAILS.
5. SEE AMARILLO WATERPROOFING DETAIL SHEET FOR WATERPROOFING DETAILS NOT SHOWN.
6. FOR FRAMING DETAILS NOT SHOWN, SEE "FRAMING PLAN".
7. LEAVE CAP FROM SUPPORTS IN PLACE UNTIL ENTIRE CAP IS READY FOR FORM REMOVAL.
8. SEE ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS SHEET FOR BEARING SEAT ELEVATIONS.
9. USING PRECAST CONC. BENT CAP OPTION IS PERMITTED. SEE PBC-RC(MOD) SHEET FOR NOTES AND DETAILS.
10. CALCULATED FOUNDATION LOADS = 200 TONS/DS BENTS 2 & 7
    230 TONS/DS BENTS 3 - 6

MATERIAL NOTES"

1. PROVIDE CLASS C (HPC) CONCRETE (f'c = 3600 PSI)
2. PROVIDE GRADE 60 EPOXY-COATED REINFORCING STEEL
3. GALVANIZE DOWEL BARS D

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

(1) MEASURED PARALLEL TO TOP OF CAP CROSS-SLOPE.

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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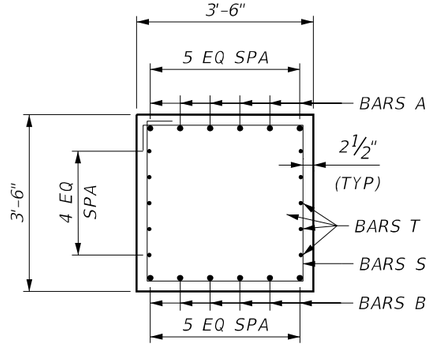
IH-40 AT ADKISSON ROAD

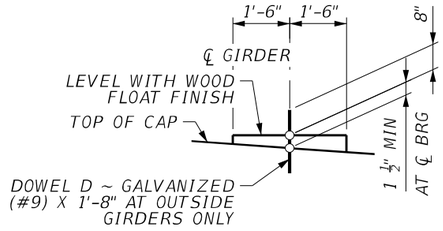
IH-40 UNDERPASS AT ADKISSON ROAD BENT 02 - 07 DETAILS

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	080
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

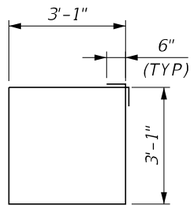


SECTION A-A

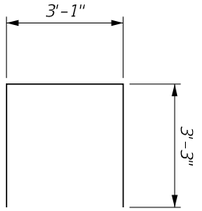


BEARING SEAT DETAIL

(BEARING SURFACE SHALL BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



BARS S



BARS U

BENTS 2, 4-5 & 7

BAR SCHEDULE ~ 1 CAP ONLY

BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
A	ST	6	# 11	45'-0"	1,435
B	ST	6	# 11	43'-3"	1,379
T	ST	10	# 5	43'-3"	451
S	BT	52	# 5	13'-4"	723
D	ST	4	# 9	1'-8"	23
U	BT	2	# 5	9'-7"	20
~ REINF STEEL				LB	4,011
CL C CONC(CAP)(HPC)				CY	20.7

~ FOR CONTRACTOR'S INFORMATION ONLY

BENTS 3 & 6

BAR SCHEDULE ~ 1 CAP ONLY

BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
A	ST	6	# 11	45'-0"	1,435
B	ST	6	# 11	43'-3"	1,379
T	ST	10	# 5	43'-3"	451
S	BT	52	# 5	13'-4"	723
U	BT	2	# 5	9'-7"	20
~ REINF STEEL				LB	4,008
CL C CONC(CAP)(HPC)				CY	20.7

~ FOR CONTRACTOR'S INFORMATION ONLY

TABLE OF ESTIMATED QUANTITIES

ITEM	UNIT	BENT 02	BENT 03	BENT 04	BENT 05	BENT 06	BENT 07
~ REINF STEEL	LB	4,011	4,008	4,011	4,011	4,008	4,011
DRILL SHAFT (48")	LF	224	240	248	128	128	164
CL C CONC(CAP)(HPC)	CY	20.7	20.7	20.7	20.7	20.7	20.7
CL C CONC(COLUMN)(HPC)	CY	20.0	25.3	26.7	26.7	26.7	21.3

~ FOR CONTRACTOR'S INFORMATION ONLY

CONTROL ELEVATIONS							
LOCATION	TOP OF CAP			TOP OF COLUMN			
	ELEV A	ELEV B	ELEV C	COL A	COL B	COL C	COL D
BENT 2	3882.054	3882.390	3880.825	3882.117	3881.281	3877.724	3877.427
BENT 3	3882.074	3882.467	3881.988	3882.147	3882.371	3878.845	3878.580
BENT 4	3882.293	3882.744	3882.319	3882.377	3882.628	3879.134	3878.900
BENT 5	3881.679	3882.189	3881.806	3881.775	3882.041	3878.579	3878.376
BENT 6	3880.222	3880.790	3880.465	3880.328	3880.626	3877.195	3877.024
BENT 7	3877.936	3878.562	3878.295	3878.053	3878.383	3874.983	3874.843

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

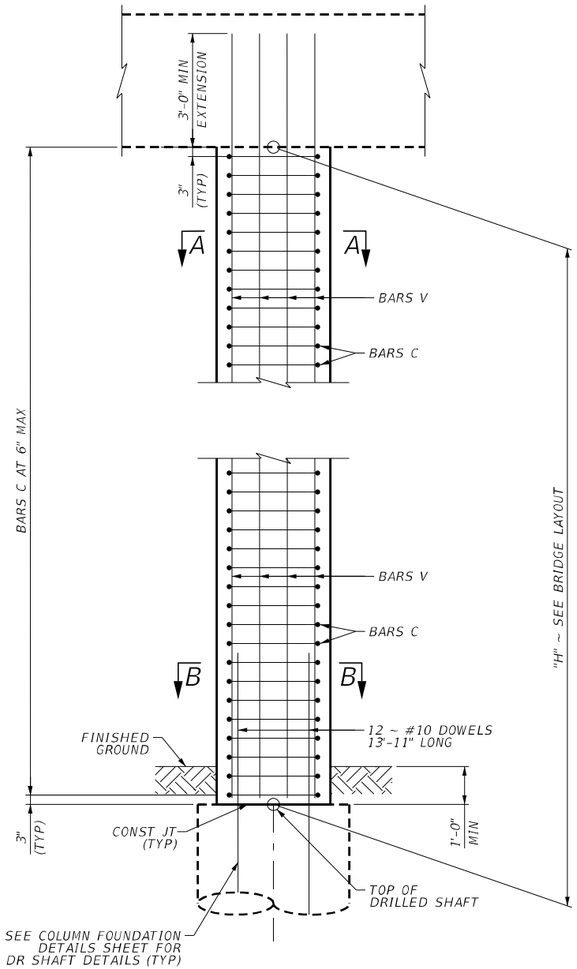
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD BENTS 02 - 07 DETAILS

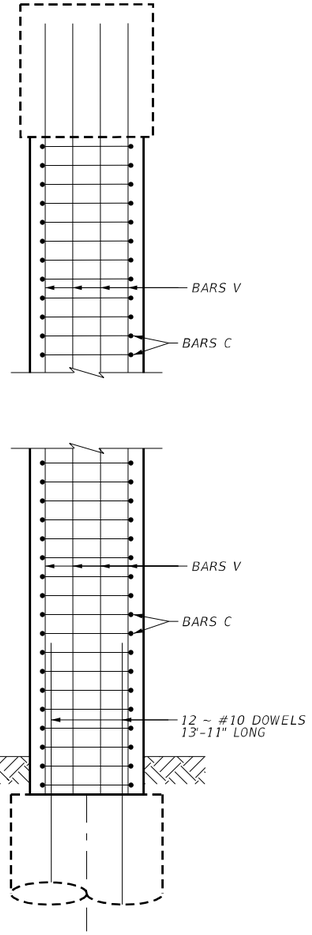
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	081
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



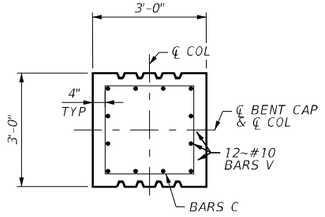
FRONT ELEVATION

SCALE: 1/4" = 1'-0"



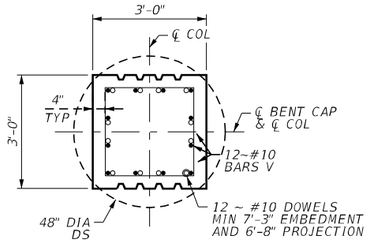
SIDE ELEVATION

SCALE: 1/4" = 1'-0"



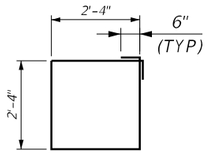
SECTION A-A

SCALE: 1/4" = 1'-0"



SECTION B-B

SCALE: 1/4" = 1'-0"



BARS C

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. SEE TYPICAL COLUMN FOUNDATION DETAILS FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.
3. SEE BRIDGE COLUMN FINISH DETAILS SHEET FOR COLUMN AESTHETIC DETAILS NOT SHOWN.

MATERIAL NOTES:

1. PROVIDE CLASS C (HPC) CONCRETE (f'c = 3600 PSI)
2. PROVIDE GRADE 60 EPOXY-COATED REINFORCING STEEL

COLUMN SCHEDULE ~ ONE COLUMN

	"H"	12 BARS V-#10		BARS C-#5		EST.QUANT.~4 COL. REINF. STEEL	EST.QUANT.~4 COL. CLASS C CONC.
	FT	LENGTH	WEIGHT	LENGTH	WEIGHT	LBS	CY
BENT 2	15	18'-0"	929	10'-4"	323	5,008	20.0
BENT 3	19	22'-0"	1,136	10'-4"	410	6,184	25.3
BENT 4	20	23'-1"	1,192	10'-4"	442	6,536	26.7
BENT 5	20	23'-0"	1,188	10'-4"	431	6,476	26.7
BENT 6	20	23'-0"	1,188	10'-4"	431	6,476	26.7
BENT 7	16	19'-0"	981	10'-4"	345	5,304	21.3

ADJUST ESTIMATED QUANTITY OF CONCRETE FOR EACH COLUMN BY 0.178 CY FOR EACH 0.5' VARIATION IN "H" VALUE.

ADJUST ESTIMATED QUANTITY OF REINFORCING STEEL FOR EACH COLUMN BY 35.5 LB FOR EACH 0.5' VARIATION IN "H" VALUE.

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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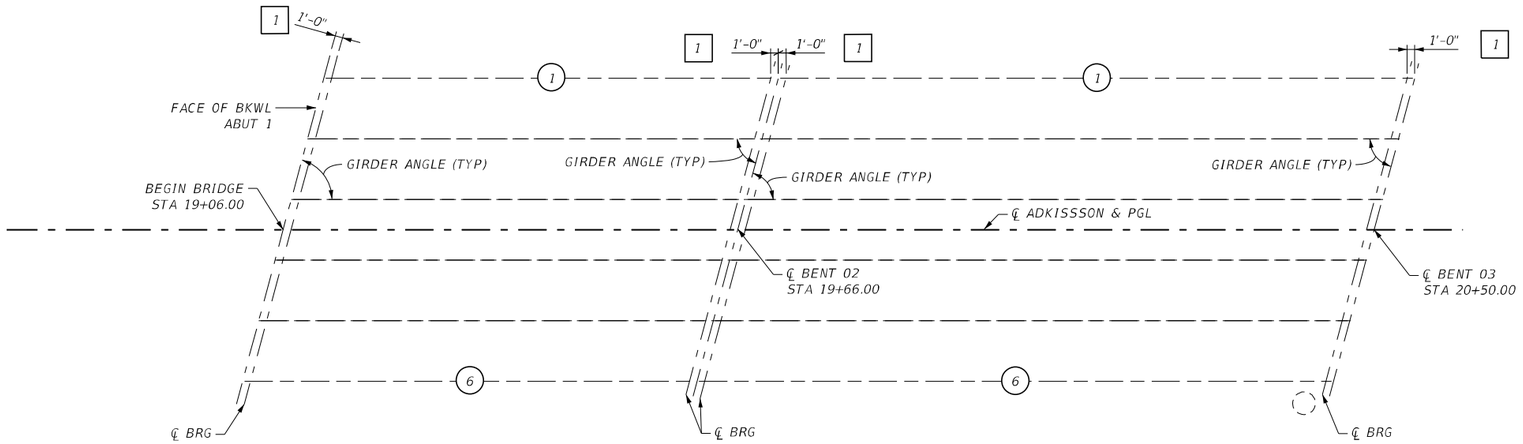
IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD TYPICAL COLUMN DETAILS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	082
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

10 0 10 20
SCALE: 1" = 20'



SPAN 1
(TX34 GIRDERS)

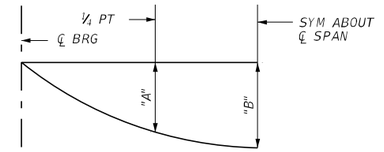
SPAN 2
(TX34 GIRDERS)

FRAMING PLAN

(#) DENOTES BEAM NUMBER

[1] SEE IGEB STANDARD FOR OREINTATION OF DIMENSION.

* ALL BEAM LENGTHS SHOWN ARE HORIZONTAL DISTANCES, WITHOUT ANY ADJUSTMENT MADE FOR LONGITUDINAL SLOPE. THE EXCEPTION IS THE 'TRUE LENGTH', WHERE THE LENGTHS SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENT MADE FOR THE BEAM SLOPE. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SHOWN.



NOTE:
DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec=5000 KSI). ADJUST SCREED FOR DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

BENT REPORT

ABUT NO.1 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (ABUT BKWL)	GIRDER ANGLE D M S
SPAN 1	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.2 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 2	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.2 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 1	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.3 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 2	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

GIRDER REPORT

GIRDER REPORT, SPAN 1

			HORIZONTAL DISTANCE * C-C BENT	E-E BM.	C-C BRG.	TRUE LENGTH BOT.BM.FLG.	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER	1		60.000	59.49	57.965	59.50	0.0209	0.028	0.040
GIRDER	2		60.000	59.49	57.965	59.50	0.0211	0.032	0.045
GIRDER	3		60.000	59.49	57.965	59.50	0.0214	0.032	0.045
GIRDER	4		60.000	59.49	57.965	59.51	0.0216	0.032	0.045
GIRDER	5		60.000	59.49	57.965	59.51	0.0219	0.032	0.045
GIRDER	6		60.000	59.49	57.965	59.51	0.0221	0.028	0.040
TOTAL						357.03			

GIRDER REPORT, SPAN 2

			HORIZONTAL DISTANCE * C-C BENT	E-E BM.	C-C BRG.	TRUE LENGTH BOT.BM.FLG.	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER	1		84.000	83.50	82.000	83.51	0.0124	0.110	0.155
GIRDER	2		84.000	83.50	82.000	83.51	0.0127	0.125	0.175
GIRDER	3		84.000	83.50	82.000	83.51	0.0129	0.125	0.175
GIRDER	4		84.000	83.50	82.000	83.51	0.0132	0.125	0.175
GIRDER	5		84.000	83.50	82.000	83.51	0.0134	0.125	0.175
GIRDER	6		84.000	83.50	82.000	83.51	0.0137	0.110	0.155
TOTAL						501.04			

STATE OF TEXAS
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139718
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10-09-2023

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BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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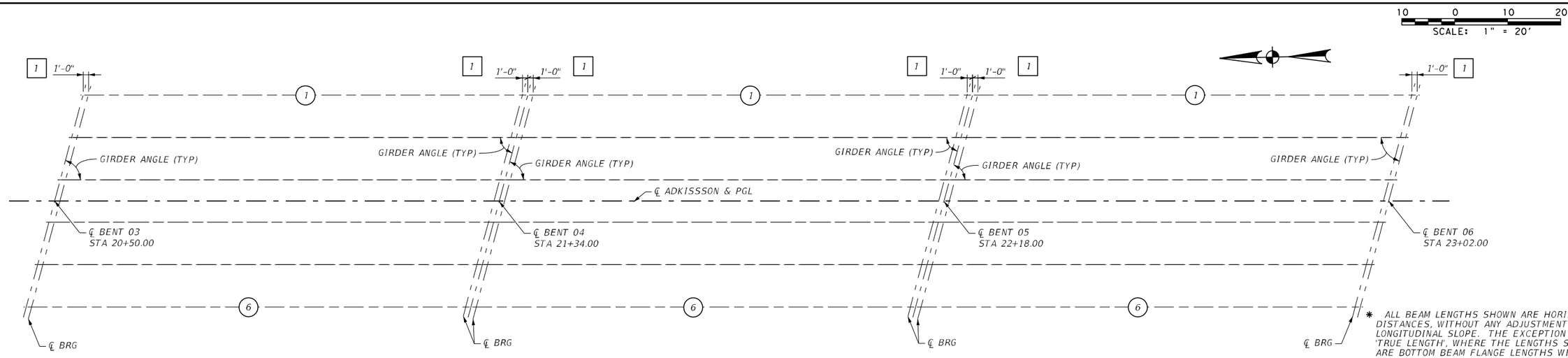
IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD FRAMING PLAN

SCALE: 1" = 20' SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	083
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

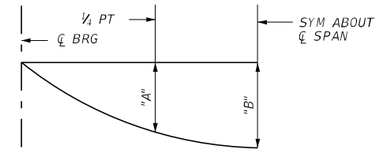


FRAMING PLAN

(#) DENOTES BEAM NUMBER

[1] SEE IGEB STANDARD FOR OREINTATION OF DIMENSION.

* ALL BEAM LENGTHS SHOWN ARE HORIZONTAL DISTANCES, WITHOUT ANY ADJUSTMENT MADE FOR LONGITUDINAL SLOPE. THE EXCEPTION IS THE 'TRUE LENGTH', WHERE THE LENGTHS SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENT MADE FOR THE BEAM SLOPE. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SHOWN.



NOTE:
DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec=5000 KSI). ADJUST SCREED FOR DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

BENT REPORT

BENT NO.3 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 3	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.4 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 4	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.5 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 5	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.4 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 3	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.5 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 4	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.6 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 5	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

GIRDER REPORT

GIRDER REPORT, SPAN 3

			HORIZONTAL DISTANCE * C-C BENT	E-E BM.	C-C BRG.	TRUE LENGTH BOT.BM.FLG.	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER	1		84.000	83.50	82.000	83.50	0.0025	0.110	0.155
GIRDER	2		84.000	83.50	82.000	83.50	0.0028	0.125	0.175
GIRDER	3		84.000	83.50	82.000	83.50	0.0031	0.125	0.175
GIRDER	4		84.000	83.50	82.000	83.50	0.0033	0.125	0.175
GIRDER	5		84.000	83.50	82.000	83.50	0.0036	0.125	0.175
GIRDER	6		84.000	83.50	82.000	83.50	0.0038	0.110	0.155
TOTAL						501.00			

GIRDER REPORT, SPAN 4

			HORIZONTAL DISTANCE * C-C BENT	E-E BM.	C-C BRG.	TRUE LENGTH BOT.BM.FLG.	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER	1		84.000	83.50	82.000	83.50	-0.0073	0.110	0.155
GIRDER	2		84.000	83.50	82.000	83.50	-0.0071	0.125	0.175
GIRDER	3		84.000	83.50	82.000	83.50	-0.0068	0.125	0.175
GIRDER	4		84.000	83.50	82.000	83.50	-0.0066	0.125	0.175
GIRDER	5		84.000	83.50	82.000	83.50	-0.0063	0.125	0.175
GIRDER	6		84.000	83.50	82.000	83.50	-0.0061	0.110	0.155
TOTAL						501.01			

GIRDER REPORT, SPAN 5

			HORIZONTAL DISTANCE * C-C BENT	E-E BM.	C-C BRG.	TRUE LENGTH BOT.BM.FLG.	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER	1		84.000	83.50	82.000	83.51	-0.0172	0.110	0.155
GIRDER	2		84.000	83.50	82.000	83.51	-0.0169	0.125	0.175
GIRDER	3		84.000	83.50	82.000	83.51	-0.0167	0.125	0.175
GIRDER	4		84.000	83.50	82.000	83.51	-0.0164	0.125	0.175
GIRDER	5		84.000	83.50	82.000	83.51	-0.0162	0.125	0.175
GIRDER	6		84.000	83.50	82.000	83.51	-0.0159	0.110	0.155
TOTAL						501.07			

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

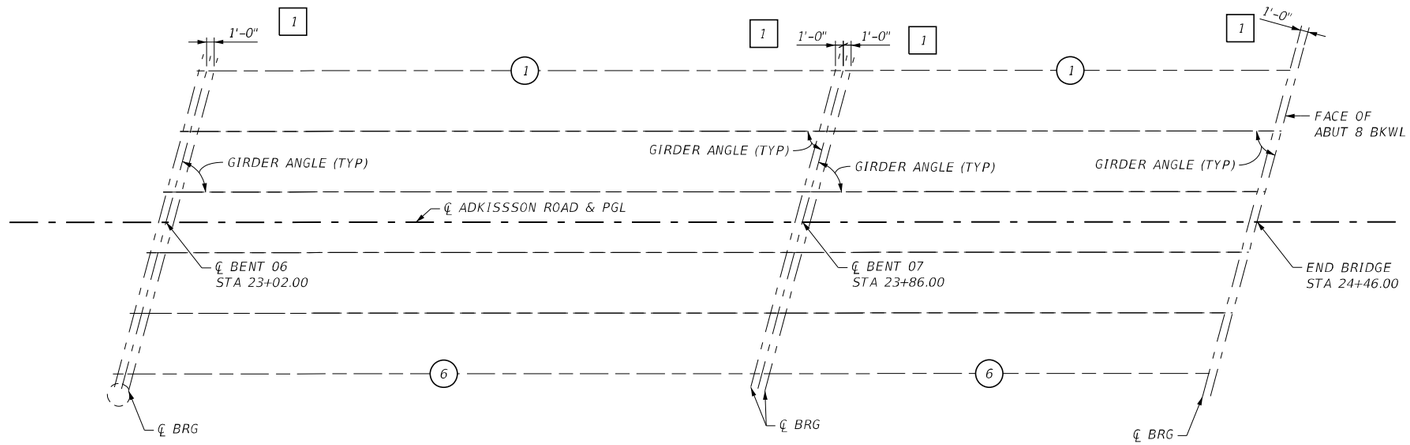
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD FRAMING PLAN

SCALE: 1" = 20' SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	084
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



SPAN 6
(TX34 GIRDERS)

SPAN 7
(TX34 GIRDERS)

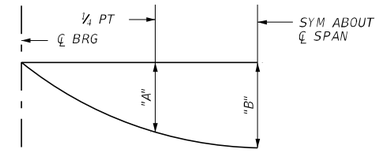
FRAMING PLAN

10 0 10 20
SCALE: 1" = 20'

(#) DENOTES BEAM NUMBER

[1] SEE IGEB STANDARD FOR OREINTATION OF DIMENSION.

* ALL BEAM LENGTHS SHOWN ARE HORIZONTAL DISTANCES, WITHOUT ANY ADJUSTMENT MADE FOR LONGITUDINAL SLOPE. THE EXCEPTION IS THE 'TRUE LENGTH', WHERE THE LENGTHS SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENT MADE FOR THE BEAM SLOPE. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SHOWN.



NOTE:
DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec=5000 KSI). ADJUST SCREED FOR DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

BENT REPORT

BENT NO.6 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 6	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.7 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 7	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

BENT NO.7 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 6	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

ABUT NO.8 (S 74 11 34 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 20.706 L

			GIRDER SPAC. (ABUT BKWL)	GIRDER ANGLE D M S
SPAN 7	GIRDER	1	0.000	75 00 00
	GIRDER	2	8.282	75 00 00
	GIRDER	3	8.282	75 00 00
	GIRDER	4	8.282	75 00 00
	GIRDER	5	8.282	75 00 00
	GIRDER	6	8.282	75 00 00
	TOTAL		41.411	

GIRDER REPORT

GIRDER REPORT, SPAN 6

			HORIZONTAL DISTANCE * C-C BENT	E-E BM.	C-C BRG.	TRUE LENGTH BOT.BM.FLG.	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER	1		84.000	83.50	82.000	83.53	-0.0270	0.110	0.155
GIRDER	2		84.000	83.50	82.000	83.53	-0.0268	0.125	0.175
GIRDER	3		84.000	83.50	82.000	83.53	-0.0265	0.125	0.175
GIRDER	4		84.000	83.50	82.000	83.53	-0.0263	0.125	0.175
GIRDER	5		84.000	83.50	82.000	83.53	-0.0260	0.125	0.175
GIRDER	6		84.000	83.50	82.000	83.53	-0.0258	0.110	0.155
TOTAL						501.17			

GIRDER REPORT, SPAN 7

			HORIZONTAL DISTANCE * C-C BENT	E-E BM.	C-C BRG.	TRUE LENGTH BOT.BM.FLG.	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER	1		60.000	59.49	57.965	59.53	-0.0355	0.028	0.040
GIRDER	2		60.000	59.49	57.965	59.53	-0.0352	0.032	0.045
GIRDER	3		60.000	59.49	57.965	59.53	-0.0350	0.032	0.045
GIRDER	4		60.000	59.49	57.965	59.53	-0.0347	0.032	0.045
GIRDER	5		60.000	59.49	57.965	59.53	-0.0345	0.032	0.045
GIRDER	6		60.000	59.49	57.965	59.53	-0.0342	0.028	0.040
TOTAL						357.16			

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

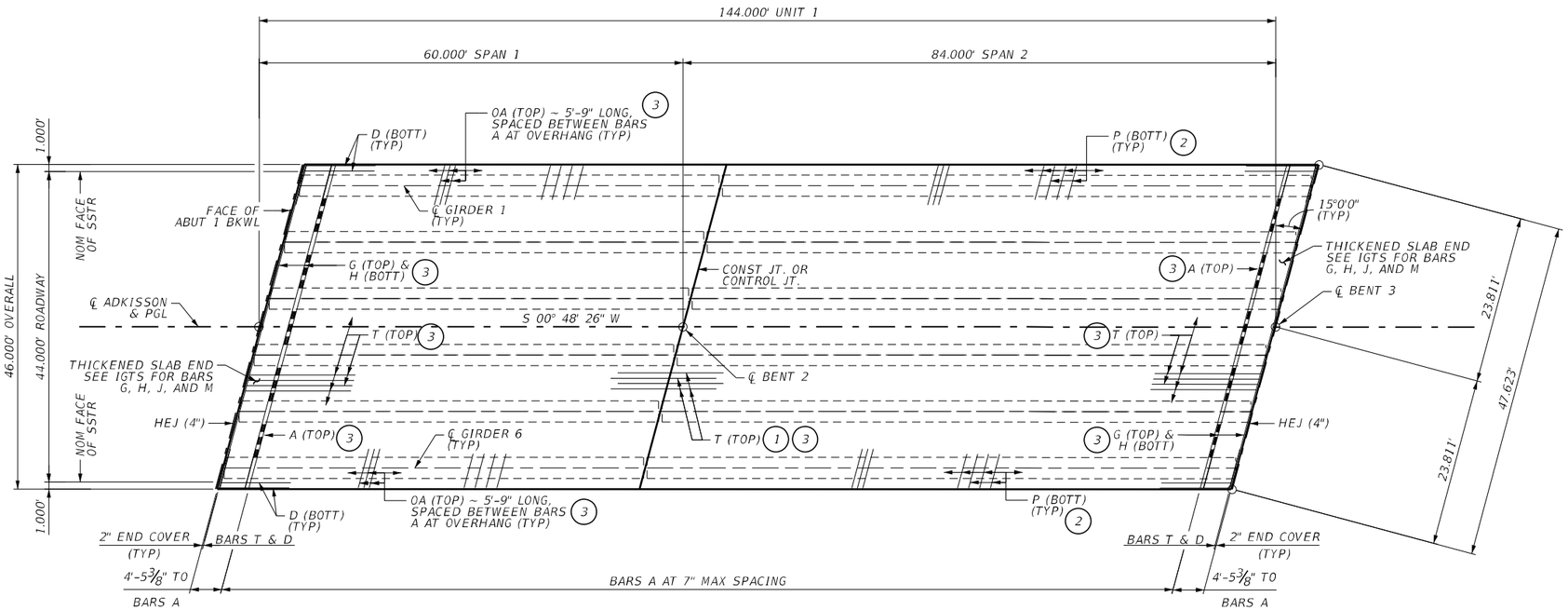
Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD FRAMING PLAN

SCALE: 1" = 20' SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	085
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



PLAN

10 0 10 20
SCALE: 1" = 20'

GENERAL NOTES:

1. PROVIDE CLASS S CONCRETE, F'c = 4 KSI.
   PROVIDE CLASS C CONCRETE FOR BRIDGE RAILS.
2. FOR ALL TOP MAT REINFORCEMENT, PROVIDE GFRP BARS CONFORMING TO ASTM D7957/7957M, EXCEPT PROVIDE A MINIMUM MODULUS OF ELASTICITY OF 7,5000 KSI.
   FOR ALL BOTTOM MAT REINFORCEMENT, GRADE 60 EPOXY COATED REINFORCING STEEL OR GALVANIZED STEEL ARE PERMITTED. GFRP BARS ARE PERMITTED IN THE BOTTOM MAT IF AN ALTERNATIVE GFRP SLAB DESIGN WITH CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER ARE PROVIDED.
   PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   GFRP #5 = 2'-9"
   EPOXY COATED #4 = 2'-5"
   LAPS IN BARS A SHALL BE STAGGERED AND ALTERNATED TO MAXIMIZE THE DISTANCE BETWEEN ADJACENT SPLICES.
3. FOR GIRDER, BEARING PAD, MISC. SLAB, CONTINUOUS SLAB OVER INTERIOR BENTS AND THICKENED SLAB END DETAILS NOT SHOWN, SEE IGD, IGEB, IGMS, IGCS, IGTS AND IGND.
4. FOR GLASS FIBER REINFORCED POLYMER DETAILS NOT SHOWN, SEE IGFRP.
5. FOR HEADER JOINT DETAILS AND NOTES NOT SHOWN, SEE HEJ DETAIL SHEET.
6. FOR HEADER JOINT QUANTITIES NOT SHOWN, SEE SUMMARY OF ESTIMATED QUANTITIES.
7. PLACE AND FINISH NOT LESS THAN 30 FEET OF BRIDGE DECK CONCRETE PER HOUR.
8. FOR REINFORCING STEEL TO BE WELDED, PROVIDE BARS CONFORMING TO ASTM DESIGNATION A706 OR HAVING A CARBON EQUIVALENCY PER SPECIFICATION ITEM 440.
9. FOR FRAMING DETAILS NOT SHOWN, SEE FRAMING PLAN.
10. FOR DETAILS AND QUANTITIES NOT SHOWN SEE PRESTRESSED CONC GIRDER UNIT SECTION SHEET.
11. SEE PCP, PCP-FAB OR PMDF STANDARDS FOR DETAILS AND QUANTITY ADJUSTMENTS IF EITHER OPTIONS ARE USED.
12. SEE BRIDGE LAYOUT FOR SURFACE TEXTURE REQUIREMENTS.
13. FOR RAIL DETAILS AND ANCHORAGE IN SLAB, SEE TRAFFIC RAIL TYPE SSTR. SEE BRIDGE LAYOUT FOR LIMITS.

(1) REINFORCING MUST BE CONTINUOUS THROUGH THE JOINT.

(2) SEE PCP STANDARD SHEETS FOR DETAILS NOT SHOWN

(3) SEE IGFRP STANDARD FOR TOP MAT REINFORCEING DETAILS ONLY.

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

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IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD
144.00' PRESTR CONC GIRDER UNIT 1
SPANS 1 - 2

SCALE: 1" = 20' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	086
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

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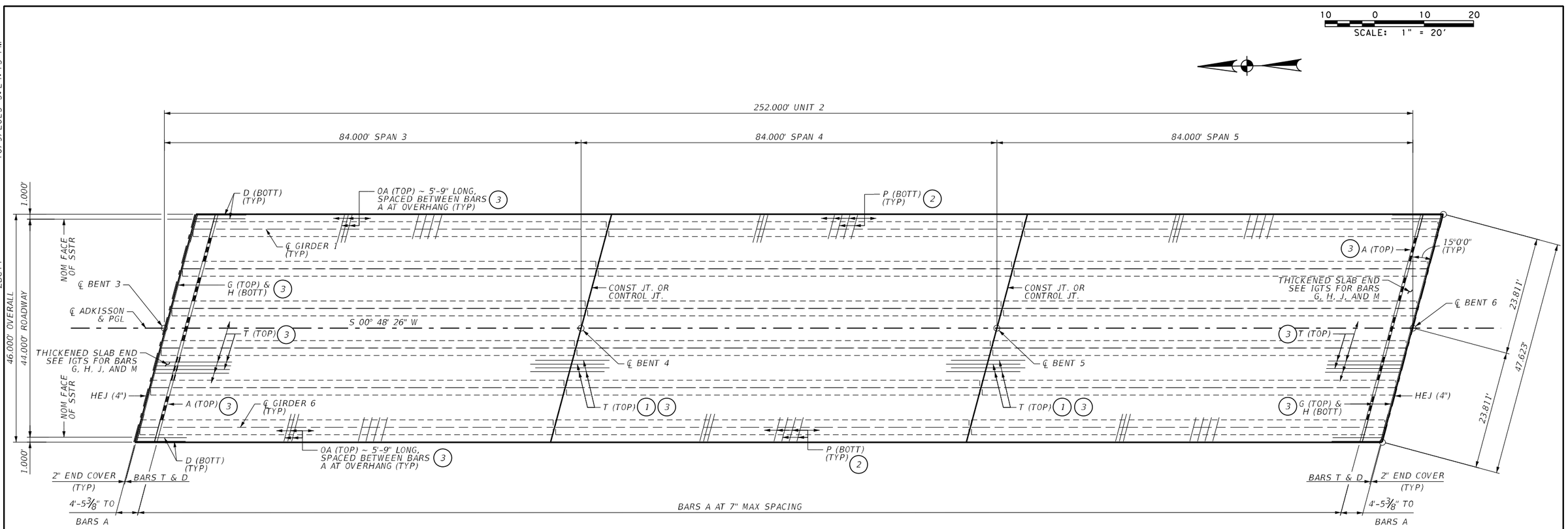

PLAN

1. REINFORCING MUST BE CONTINUOUS THROUGH THE JOINT.
2. SEE PCP STANDARD SHEETS FOR DETAILS NOT SHOWN
3. SEE IGFRP STANDARD FOR TOP MAT REINFORCEING DETAILS ONLY.

GENERAL NOTES:

1. PROVIDE CLASS S CONCRETE, F'c = 4 KSI. PROVIDE CLASS C CONCRETE FOR BRIDGE RAILS.
2. FOR ALL TOP MAT REINFORCEMENT, PROVIDE GFRP BARS CONFORMING TO ASTM D7957/7957M, EXCEPT PROVIDE A MINIMUM MODULUS OF ELASTICITY OF 7,5000 KSI. FOR ALL BOTTOM MAT REINFORCEMENT, GRADE 60 EPOXY COATED REINFORCING STEEL OR GALVANIZED STEEL ARE PERMITTED. GFRP BARS ARE PERMITTED IN THE BOTTOM MAT IF AN ALTERNATIVE GFRP SLAB DESIGN WITH CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER ARE PROVIDED.
   PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   GFRP #5 = 2'-9"
   EPOXY COATED #4 = 2'-5"
   LAPS IN BARS A SHALL BE STAGGERED AND ALTERNATED TO MAXIMIZE THE DISTANCE BETWEEN ADJACENT SPLICES.
3. FOR GIRDER, BEARING PAD, MISC. SLAB, CONTINUOUS SLAB OVER INTERIOR BENTS AND THICKENED SLAB END DETAILS NOT SHOWN, SEE IGD, IGEB, IGMS, IGCS, IGTS AND IGND.
4. FOR GLASS FIBER REINFORCED POLYMER DETAILS NOT SHOWN, SEE IGFRP.
5. FOR HEADER JOINT DETAILS AND NOTES NOT SHOWN, SEE HEJ DETAIL SHEET.
6. FOR HEADER JOINT QUANTITIES NOT SHOWN, SEE SUMMARY OF ESTIMATED QUANTITIES.
7. PLACE AND FINISH NOT LESS THAN 30 FEET OF BRIDGE DECK CONCRETE PER HOUR.
8. FOR REINFORCING STEEL TO BE WELDED, PROVIDE BARS CONFORMING TO ASTM DESIGNATION A706 OR HAVING A CARBON EQUIVALENCY PER SPECIFICATION ITEM 440.
9. FOR FRAMING DETAILS NOT SHOWN, SEE FRAMING PLAN.
10. FOR DETAILS AND QUANTITIES NOT SHOWN SEE PRESTRESSED CONC GIRDER UNIT SECTION SHEET.
11. SEE PCP, PCP-FAB OR PMDF STANDARDS FOR DETAILS AND QUANTITY ADJUSTMENTS IF EITHER OPTIONS ARE USED.
12. SEE BRIDGE LAYOUT FOR SURFACE TEXTURE REQUIREMENTS.
13. FOR RAIL DETAILS AND ANCHORAGE IN SLAB, SEE TRAFFIC RAIL TYPE SSTR. SEE BRIDGE LAYOUT FOR LIMITS.

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD
252.00' PRESTR CONC GIRDER UNIT 2
SPANS 3 - 5

SCALE: 1" = 20' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB				
GRAPHICS AKH	6	SEE TITLE SHEET		IH 40
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	087
	CONTROL	SECTION	JOB	
CHECK ZJB	0090	05	108	

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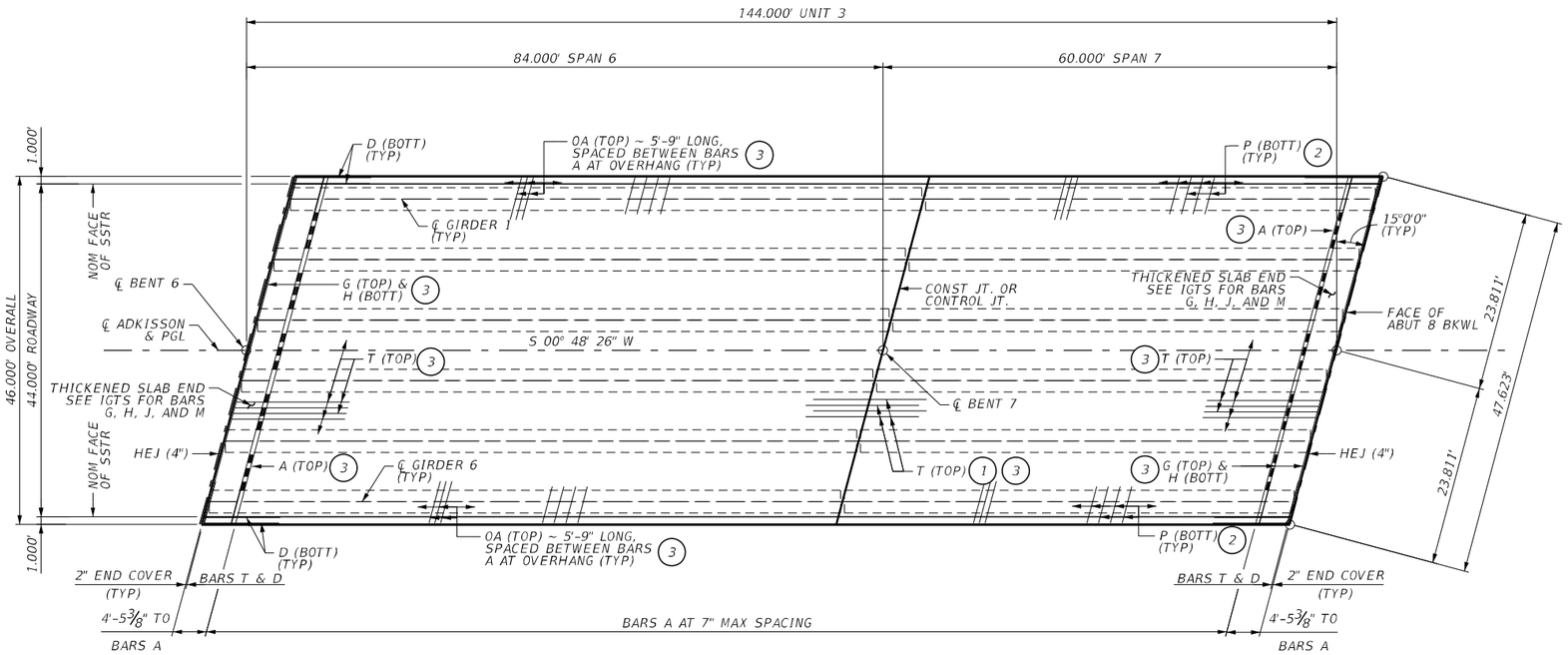


PLAN

10 0 10 20
SCALE: 1" = 20'

GENERAL NOTES:

1. PROVIDE CLASS S CONCRETE, F'c = 4 KSI.
   PROVIDE CLASS C CONCRETE FOR BRIDGE RAILS.
2. FOR ALL TOP MAT REINFORCEMENT, PROVIDE GFRP BARS CONFORMING TO ASTM D7957/7957M, EXCEPT PROVIDE A MINIMUM MODULUS OF ELASTICITY OF 7,5000 KSI.
   FOR ALL BOTTOM MAT REINFORCEMENT, GRADE 60 EPOXY COATED REINFORCING STEEL OR GALVANIZED STEEL ARE PERMITTED. GFRP BARS ARE PERMITTED IN THE BOTTOM MAT IF AN ALTERNATIVE GFRP SLAB DESIGN WITH CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER ARE PROVIDED.
   PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   GFRP #5 = 2'-9"
   EPOXY COATED #4 = 2'-5"
   LAPS IN BARS A SHALL BE STAGGERED AND ALTERNATED TO MAXIMIZE THE DISTANCE BETWEEN ADJACENT SPLICES.
3. FOR GIRDER, BEARING PAD, MISC. SLAB, CONTINUOUS SLAB OVER INTERIOR BENTS AND THICKENED SLAB END DETAILS NOT SHOWN, SEE IGD, IGEB, IGMS, IGCS, IGTS AND IGND.
4. FOR GLASS FIBER REINFORCED POLYMER DETAILS NOT SHOWN, SEE IGFRP.
5. FOR HEADER JOINT DETAILS AND NOTES NOT SHOWN, SEE HEJ DETAIL SHEET.
6. FOR HEADER JOINT QUANTITIES NOT SHOWN, SEE SUMMARY OF ESTIMATED QUANTITIES.
7. PLACE AND FINISH NOT LESS THAN 30 FEET OF BRIDGE DECK CONCRETE PER HOUR.
8. FOR REINFORCING STEEL TO BE WELDED, PROVIDE BARS CONFORMING TO ASTM DESIGNATION A706 OR HAVING A CARBON EQUIVALENCY PER SPECIFICATION ITEM 440.
9. FOR FRAMING DETAILS NOT SHOWN, SEE FRAMING PLAN.
10. FOR DETAILS AND QUANTITIES NOT SHOWN SEE PRESTRESSED CONC GIRDER UNIT SECTION SHEET.
11. SEE PCP, PCP-FAB OR PMDF STANDARDS FOR DETAILS AND QUANTITY ADJUSTMENTS IF EITHER OPTIONS ARE USED.
12. SEE BRIDGE LAYOUT FOR SURFACE TEXTURE REQUIREMENTS.
13. FOR RAIL DETAILS AND ANCHORAGE IN SLAB, SEE TRAFFIC RAIL TYPE SSTR. SEE BRIDGE LAYOUT FOR LIMITS.

(1) REINFORCING MUST BE CONTINUOUS THROUGH THE JOINT.

(2) SEE PCP STANDARD SHEETS FOR DETAILS NOT SHOWN

(3) SEE IGFRP STANDARD FOR TOP MAT REINFORCEING DETAILS ONLY.

STATE OF TEXAS
ZACHARY J. BELL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Bell
10-09-2023

HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

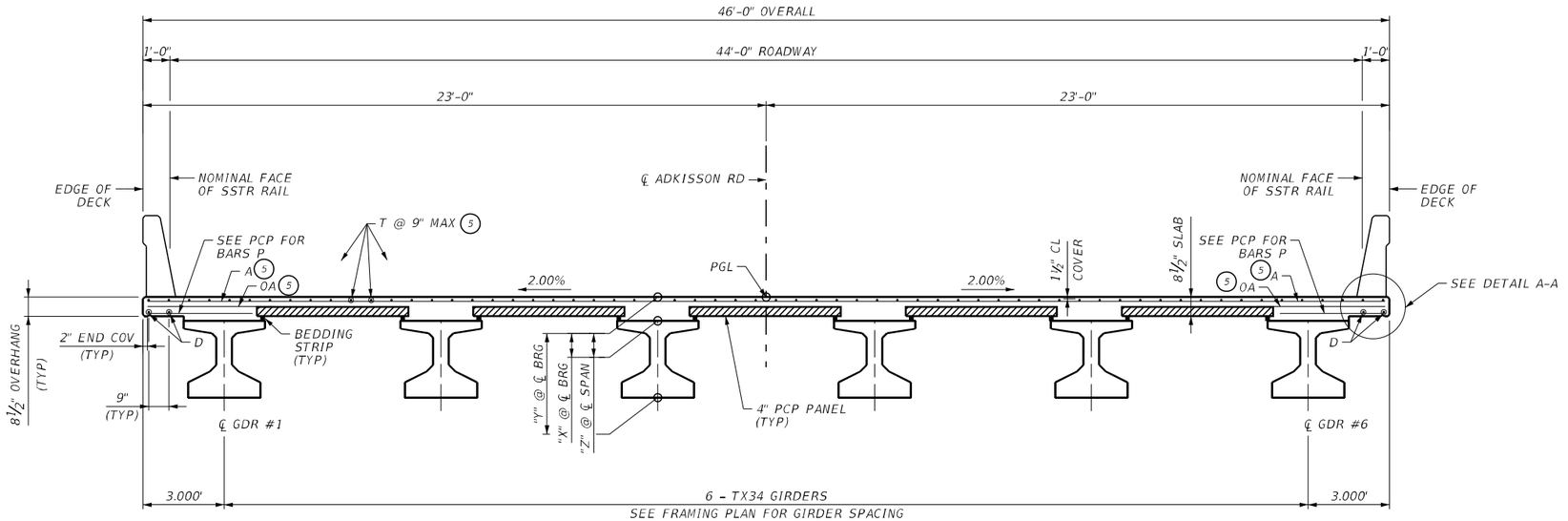
Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD
144.00' PRESTR CONC GIRDER UNIT 3
SPANS 6 - 7

SCALE: 1" = 20' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	088
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	



TYPICAL TRANSVERSE SECTION

(SPANS 1 - 7, TX34)
SCALE: 3/16" = 1'-0"

TABLE OF SECTION DEPTHS (1)			
SPAN NO.	"X" @ C/L BRG	"Y" @ C/L BRG	"Z" @ MIDSPAN
1	11"	3'-9"	10 3/8"
2	11"	3'-9"	9 3/4"
3	11"	3'-9"	9 3/4"
4	11"	3'-9"	9 3/4"
5	11"	3'-9"	9 3/4"
6	11"	3'-9"	9 3/4"
7	11"	3'-9"	10 3/8"

TABLE OF ESTIMATED QUANTITIES					
UNIT	SPAN	REINF CONC SLAB	PRESTRESSED CONC GIRDERS (Tx34) (3)	◥ CLASS "S" CONC (HPC) (4)	◥ TOTAL REINFORCING STEEL (2)
		SF	LF	CY	LB
UNIT 1	1	2,760	357.03	80.1	6,348
	2	3,864	501.04	110.3	8,887
UNIT 2	3	3,864	501.00	110.3	8,887
	4	3,864	501.01	109.7	8,887
	5	3,864	501.07	110.3	8,887
UNIT 3	6	3,864	501.17	110.3	8,887
	7	2,760	357.16	80.1	6,348
TOTAL		24,840	3,219.49	711.1	57,131

◥ FOR CONTRACTOR'S INFORMATION ONLY

GENERAL NOTES:

1. FOR DECK FORMS, SEE PCP STANDARDS FOR DETAILS.
2. THE DECK DESIGN IS BASED ON 8.5" SLAB THICKNESS. WHEN USING PCP OPTION, THE 8.5" SLAB THICKNESS SHALL BE MAINTAINED BY VARYING HEIGHT OF BEDDING STRIP ALONG THE GIRDER.
3. SEE HAUNCH REINFORCING DETAILS ON IGMS AND PCP STANDARDS FOR REQUIRED U BARS WHEN HAUNCH IS GREATER THAN 3½".
4. FOR PREDICTED DEFLECTIONS, SEE CORRESPONDING FRAMING PLAN.
5. SEE TRAFFIC RAIL TYPE SSTR STANDARD SHEET FOR RAIL ANCHORAGE DETAILS AND NOTES NOT SHOWN HERE.

BAR TABLE	
BAR	SIZE
A	#5
D	#4
G	#5
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#5

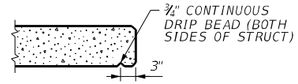
(1) THEORETICAL DIMENSION.

(2) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 psf.

(3) QUANTITIES SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEET FOR GIRDER LENGTHS.

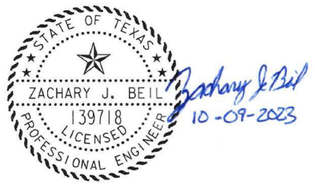
(4) QUANTITIES INCLUDE THICKENED SLAB END AND HAUNCH.

(5) SEE IGFRP STANDARD SHEETS FOR TOP MAT REINFORCING DETAILS ONLY.



DETAIL A-A

NOT TO SCALE



HL 93 LOADING

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

IH-40 UNDERPASS AT ADKISSON ROAD

PRESTR CONC GIRDER UNIT SECTION

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	089
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	

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
I-40 Underpass at Adkisson Road	1 & 7	1-6	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.000	5.500	1.937	-2.441	2555	0.680	0.858	1.37	1.78	1.31
	2-5	1-6	Tx34		34	0.6	270	11.48	7.25	6	30.5	5.800	7.300	3.732	-4.429	4342	0.620	0.863	1.59	2.12	1.19

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.

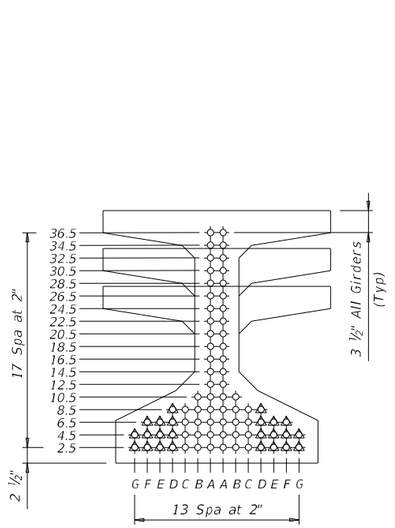
Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

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.

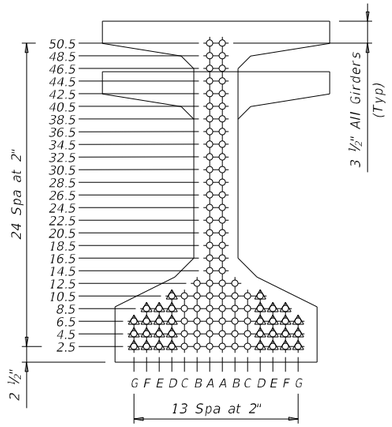
Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

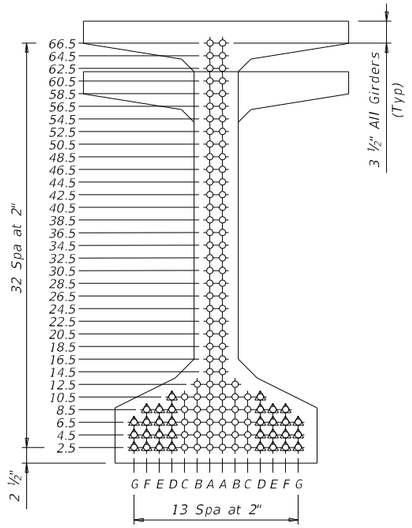
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands 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

STATE OF TEXAS
ZACHARY J. BELL
139718
LICENSED
PROFESSIONAL ENGINEER
10-09-2023

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND

FILE: igndsts1-22.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.	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		090

DATE: 10/9/2023 4:21:01 PM
FILE: c:\users\vidal.ngoumnai\appdata\local\temp\acpublish_25752\igndsts1-22.dgn

DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-7	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/11/2022
CSJ	0090-05-108	Station	19+94.65	Grnd. Elev.	3861.24 ft
		Offset	53.03' RT	GW Elev.	N/A

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, Lean, stiff to very stiff, dry to moist, brown and reddish-brown to 5', light reddish-brown from 5' to 10', reddish-brown below 10', trace to few calcareous deposits; few Gravel to 2'; trace to few roots to 5', blocky from 2' to 10' (CL)			11	34	20		SSS@0', N=19, -200=87.4%
						11				SSS@1.5', N=17, -200=86.5%
						12	42	26		SSS@3.0', N=18
5		38 (6) 43 (6)								SSS@6.4', N=26
						12				SSS@8.0', N=13
10		15 (6) 15 (6)								SSS@11.5', N=8
						13				SSS@13.0', N=12
3847.2										
15		7 (6) 8 (6)	CLAY, Lean with Sand, soft, moist, reddish-brown, trace calcareous deposits (CL)			15	35	21		SSS@16.5', N=7, -200=84.9%
3842.2										
20		14 (6) 14 (6)	CLAY, Lean with Sand, stiff to very stiff, moist, reddish-brown, trace to few calcareous deposits, trace fine Gravel below 45' (CL)							SSS@21.5', N=17
25		11 (6) 12 (6)				19				SSS@26.5', N=13
30		18 (6) 23 (6)				18	47	29		SSS@31.5', N=36, -200=76.2%
35		12 (6) 13 (6)								SSS@36.5', N=15
40		17 (6) 15 (6)								

Remarks: LAT: 35.196511, LONG: -101.974046. Drill Rig: CME-75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample. Drilling Method: Continuous Flight Auger to 30'; Mud Rotary thereafter.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC Organization: Foresight PES, LLC

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DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-7	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/11/2022
CSJ	0090-05-108	Station	19+94.65	Grnd. Elev.	3861.24 ft
		Offset	53.03' RT	GW Elev.	N/A

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, Lean with Sand, stiff to very stiff, moist, reddish-brown, trace to few calcareous deposits, trace fine Gravel below 45' (CL)			17	34	20		SSS@41.5', N=19, -200=84.9%
45		12 (6) 13 (6)								SSS@46.5', N=17
50		19 (6) 18 (6)				20				SSS@51.4', N=20
55		12 (6) 14 (6)								SSS@56.5', N=26
3802.2										
60		26 (6) 30 (6)	CLAY, Sandy Lean, stiff to hard, moist, trace calcareous deposits (CL)			15	34	21		SSS@61.3', N=67, -200=55.1%
65		11 (6) 14 (6)								SSS@66.5', N=18
70		50 (4.25) 32 (6)								
3790.2										Boring terminated at 71.0'
75										
80										

Remarks: LAT: 35.196511, LONG: -101.974046. Drill Rig: CME-75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample. Drilling Method: Continuous Flight Auger to 30'; Mud Rotary thereafter.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC Organization: Foresight PES, LLC

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STATE OF TEXAS
MARCUS J. GALVAN
80192
REGISTERED PROFESSIONAL ENGINEER

10/26/2023

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

BORING LOGS

SHEET 1 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	091
CHECK ZJB	CONTROL 0090	SECTION 05	JOB 108	

DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-8	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/12/2022
CSJ	0090-05-108	Station	21+31.28	Grnd. Elev.	3860.12 ft
		Offset	8.39' 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	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Lean with Sand, moist, brown, trace Gravel and roots, trace calcareous deposits below 3' (CL)			8				SSS@0', N=17
						12	47	30		SSS@1.5', N=18, -200=77.4%
						18				SSS@3.0', N=31
3856.1										
5		48 (6) 50 (4)	CLAY, Lean, very stiff to hard, moist, brown to 10', reddish-brown below 10', trace roots to 8', trace calcareous deposits to 10' (CL)			16				SSS@6.2', N=39
						19	44	26		SSS@8.0', N=27, -200=87.3%
10		21 (6) 22 (6)								SSS@11.3', N=19
						18				SSS@13.5', N=23
3846.1										
15		15 (6) 15 (6)	CLAY, Lean, stiff, moist, reddish-brown (CL)			20	49	33		SSS@16.5', N=22, -200=93.5%
20		13 (6) 15 (6)								SSS@21.5', N=14
25		10 (6) 10 (6)				23				SSS@26.5', N=13
30		9 (6) 16 (6)				20	40	25		SSS@31.5', N=16, -200=89.6%
3826.1										
35		7 (6) 8 (6)	CLAY, Lean, soft, moist, reddish-brown, trace calcareous deposits (CL)							SSS@36.5', N=10
40		9 (6) 9 (6)								

Remarks: LAT: 35.187605, LONG: -102.114513. Drill Rig: CME-75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample. Drilling Method: Continuous Flight Auger to 25'; Mud Rotary thereafter.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC Organization: Foresight PES, LLC

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DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-8	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/12/2022
CSJ	0090-05-108	Station	21+31.28	Grnd. Elev.	3860.12 ft
		Offset	8.39' 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	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Lean, soft, moist, reddish-brown, trace calcareous deposits (CL)			20				SSS@41.5', N=12
45		9 (6) 9 (6)								SSS@46.5', N=13
3811.1										
50		11 (6) 9 (6)	CLAY, Lean with Sand, stiff to very stiff, moist, reddish-brown, trace to few calcareous deposits (CL)			22	32	18		SSS@51.4', N=11, -200=84.8%
55		10 (6) 11 (6)								SSS@56.5', N=8
60		10 (6) 12 (6)				20	36	18		SSS@61.5', N=14, -200=78.8%
65		16 (6) 23 (6)								SSS@66.5', N=37
70		27 (6) 48 (6)								Boring terminated at 71.3'
3788.8										
75										
80										

Remarks: LAT: 35.187605, LONG: -102.114513. Drill Rig: CME-75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample. Drilling Method: Continuous Flight Auger to 25'; Mud Rotary thereafter.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC Organization: Foresight PES, LLC

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STATE OF TEXAS
MARCUS J. GALVAN
80192
REGISTERED PROFESSIONAL ENGINEER

10/26/2023

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

BORING LOGS

SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	092
CHECK ZJB	CONTROL 0090	SECTION 05	JOB 108	

DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-9	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/10/2022
CSJ	0090-05-108	Station	22+77.55	Grnd. Elev.	3859.22 ft
		Offset	63.14' RT	GW Elev.	N/A

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, Lean, very stiff, dry to moist, brown to 2', reddish-brown from 2' to 5', light reddish-brown below 5', trace to few calcareous deposits; trace fine Gravel to 2', trace roots to 4', blocky below 5' (CL)			9				SSS@0', N=12
						10	42	27		SSS@2.0', N=19, -200=86.3%
						10				SSS@3.5', N=10
5		25 (6) 26 (6)								
										SSS@6.4', N=27
3851.2						12	32	17		SSS@8.0', N=15, -200=94.6%
10		12 (6) 13 (6)	CLAY, Lean, stiff to very stiff, moist, light reddish-brown, trace to few calcareous deposits, blocky (CL)							
										SSS@11.5', N=15
						13				SSS@13.0', N=9
15		24 (6) 27 (6)								
										SSS@16.3', N=25
20		28 (6) 37 (6)								
						11	40	23		SSS@21.3', N=35, -200=88.5%
3835.2										
25		15 (6) 16 (6)	CLAY, Lean, stiff to very stiff, moist, reddish-brown to 30', light reddish-brown below 30', trace calcareous deposits (CL)							
						13				SSS@26.5', N=18
30		24 (6) 42 (6)								
										SSS@31.3', N=49
3825.2										
35		50 (5) 49 (6)	CLAY, Lean with Sand, very stiff to hard, moist, light reddish-brown, trace calcareous deposits, blocky (CL)			12	28	12		SSS@36.2', N=36, -200=84.6%
40		50 (6) 50 (6)								

Remarks: LAT: 35.195736, LONG: -102.114554. Drill Rig: CME-75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample. Drilling Method: Continuous Flight Auger.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC **Organization: Foresight PES, LLC**

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DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-9	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/10/2022
CSJ	0090-05-108	Station	22+77.55	Grnd. Elev.	3859.22 ft
		Offset	63.14' RT	GW Elev.	N/A

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, Lean with Sand, very stiff to hard, moist, light reddish-brown, trace calcareous deposits, blocky (CL)							SSS@41.3', N=35
45		35 (6) 47 (6)								
						13				SSS@46.2', N=39
50		27 (6) 46 (6)								
										SSS@51.3', N=53
3805.2			CLAY, Lean with Sand, hard to very hard, dry to moist, light reddish-brown, trace calcareous deposits, blocky (CL)							
55		50 (5) 50 (4)				12	33	16		SSS@56.0', N=72, -200=70.9%
60		50 (4) 48 (6)								
										SSS@61.0', N=43
65		50 (2.75) 50 (1.75)				13				SSS@65.5', N=50,50/4.5"
3788.7										
70		50 (3) 50 (1.5)								Boring terminated at 70.5'
75										
80										

Remarks: LAT: 35.195736, LONG: -102.114554. Drill Rig: CME-75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample. Drilling Method: Continuous Flight Auger.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC **Organization: Foresight PES, LLC**

C:\Users\HoracioMontejano\Foresight Planning & Engineering Services, LLC\Bridgefarmer - Documents\36-0IDP5103 BRG\Amarillo\Logs\60\Submital\Adkisson\B-9.CLG

STATE OF TEXAS
MARCUS J. GALVAN
80192
REGISTERED PROFESSIONAL ENGINEER

10/26/2023

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

BORING LOGS

SHEET 3 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	093
CHECK ZJB	CONTROL 0090	SECTION 05	JOB 108	

DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-10	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/9/2022
CSJ	0090-05-108	Station	24+18.71	Grnd. Elev.	3860.35 ft
		Offset	45.09' 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	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Lean with Sand, stiff, dry to moist, brown to 2', dark reddish-brown from 2' to 4', reddish-brown below 4', trace roots to 2', trace fine Gravel to 4', trace calcareous deposits below 4', blocky from 4' to 6' (CL)			9				SSS@0', N=15
						9	41	24		SSS@2.0', N=10, -200=84.7%
										PTS@4', PP=4.5
5		14 (6) 14 (6)								
						12				SSS@6.5', N=13
										PTS@8.0', PP=4.5
3851.3										
10		9 (6) 10 (6)	CLAY, Lean, soft to stiff, moist, reddish-brown, trace to few calcareous deposits (CL)							
						13	31	17		SSS@11.5', N=11, -200=94.0%
15		3 (6) 7 (6)								
										SSS@16.5', N=11
20		16 (6) 15 (6)								
						13				SSS@21.4', N=16
3836.3										
25		21 (6) 21 (6)	CLAY, Lean with Sand, stiff to very stiff, moist, reddish-brown, trace to few calcareous deposits, 6" reddish-brown SM deposit below 27.2' (CL)							
						13				SSS@26.4', N=23
30		30 (6) 34 (6)								
						15	35	19		SSS@31.3', N=33, -200=82.3%
35		14 (6) 18 (6)								
										SSS@36.5', N=23
40		13 (6) 21 (6)								

Remarks: LAT: 35.195341, LONG: -102.114204. Drill Rig: CME 55 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf). Drilling Method: Continuous Flight Auger to 30'; Mud Rotary thereafter.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC Organization: Foresight PES, LLC

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DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	B-10	District	Amarillo
Highway	IH 40	Structure	Bridge	Date	6/9/2022
CSJ	0090-05-108	Station	24+18.71	Grnd. Elev.	3860.35 ft
		Offset	45.09' 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	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Lean with Sand, stiff to very stiff, moist, reddish-brown, trace to few calcareous deposits, 6" reddish-brown SM deposit below 27.2' (CL)			16				SSS@41.5', N=28
3816.3										
45		21 (6) 22 (6)	CLAY, Lean with Sand, very stiff to hard, moist, reddish-brown, trace to few calcareous deposits (CL)							
										SSS@46.5', N=37
50		31 (6) 32 (6)								
						13	39	21		SSS@51.3', N=41, -200=75.5%
55		38 (6) 36 (6)								
										SSS@56.3', N=55
60		50 (4) 50 (3)								
						14				SSS@60.8', N=34,50/4.5"
65		50 (4.5) 50 (3.5)								
										SSS@65.9', N=50/5.75"
70		50 (5.5) 50 (2.5)								
3789.4										Boring terminated at 70.9'
75										
80										

Remarks: LAT: 35.195341, LONG: -102.114204. Drill Rig: CME 55 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf). Drilling Method: Continuous Flight Auger to 30'; Mud Rotary thereafter.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC Logger: LC Organization: Foresight PES, LLC

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STATE OF TEXAS
MARCUS J. GALVAN
80192
REGISTERED PROFESSIONAL ENGINEER

10/26/2023

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation ©2023

IH-40 AT ADKISSON ROAD

BORING LOGS

SHEET 4 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	094
CHECK ZJB	CONTROL 0090	SECTION 05	JOB 108	

DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	E-1	District	Amarillo
Highway	IH 40	Structure	Embankment	Date	6/9/2022
CSJ	0090-05-108	Station	18+77.35	Grnd. Elev.	3888.49 ft
		Offset	24.42' RT	GW Elev.	N/A

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
			OTHER, HMAC: 5.75"; BASE: 13.125"							
3886.9			CLAY, Lean, soft, moist, reddish-brown, trace Gravel and calcareous deposits (CL)			18				SSS@2.0', N=9
						19	41	27		PTS@4.0', PP=2.0, -200=89.6%
5		6 (6) 5 (6)								
						20				SSS@6.5', N=11
						17				PTS@8.0', PP=4.5
10		6 (6) 8 (6)								
						18	33	18		SSS@11.5', N=17, -200=91.9%
15		5 (6) 4 (6)								
						16				SSS@16.5', N=16
3870.5			CLAY, Lean, stiff, moist, reddish-brown, trace Gravel and calcareous deposits (CL)			14	34	22		PTS@18.0', PP=4.5, -200=91.7%
3868.520		11 (6) 18 (6)								Boring Terminated at 21.5'

Remarks: LAT: 35.196833, LONG: -102.114411. Drill Rig: CME 55 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: Continuous Flight Auger.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC **Logger:** LC **Organization:** Foresight PES, LLC

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DRILLING LOG

WinCore Version 3.3

County	Potter	Hole	E-2	District	Amarillo
Highway	IH 40	Structure	Embankment	Date	6/9/2022
CSJ	0090-05-108	Station	24+59.87	Grnd. Elev.	3874.31 ft
		Offset	24.20' RT	GW Elev.	N/A

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
			OTHER, HMAC: 5.875"; BASE: 11.25"							
3872.9			CLAY, Lean, very soft, moist, reddish-brown, trace calcareous deposits and organic nodules (CL)			17				PTS@2.0', PP=3.0
						17	32	19		PTS@3.0', PP=3.5, -200=91.9%
5		4 (6) 3 (6)								
						21				SSS@6.5', N=8
3866.3			CLAY, Lean with Sand, stiff, moist, dark brown, trace calcareous deposits, 1" calcareous seam below 13' (CL)			17	37	22		PTS@8.0', PP=2.25, -200=79.5%
10		9 (6) 13 (6)								
						19				SSS@11.5', N=21
				0	26.4	18	46	29		PTS@13.0', PP=3.25, -200=81.6%
15		10 (6) 11 (6)								
3856.3			CLAY, Lean, very stiff, moist, dark brown to reddish-brown, trace calcareous deposits (CL)			16	35	18		PTS@18.0', PP=4.5, -200=90.6%
3854.320		21 (6) 19 (6)								Boring Terminated at 21.5'

Remarks: LAT: 35.195233, LONG: -102.114426. Drill Rig: CME 55 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: Continuous Flight Auger.

The ground water elevation was not determined during the course of this boring.

Driller: Beyond Engineering and Testing, LLC **Logger:** LC **Organization:** Foresight PES, LLC

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STATE OF TEXAS
MARCUS J. GALVAN
80192
REGISTERED PROFESSIONAL ENGINEER

10/26/2023

NO.	DATE	DESCRIPTION	APPROV.

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

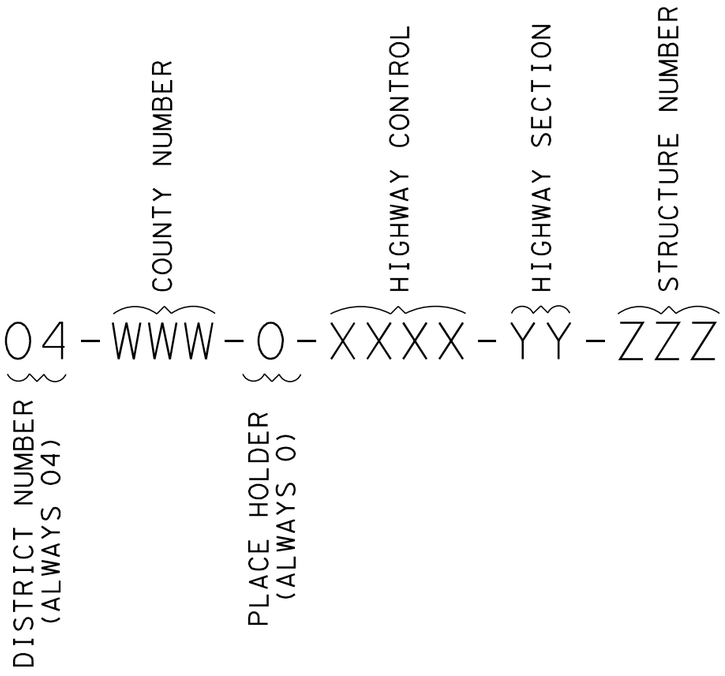
Texas Department of Transportation ©2023

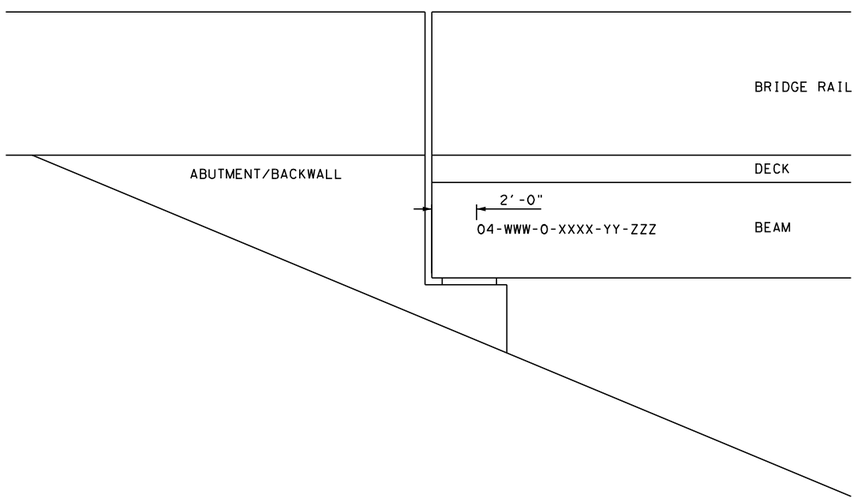
IH-40 AT ADKISSON ROAD

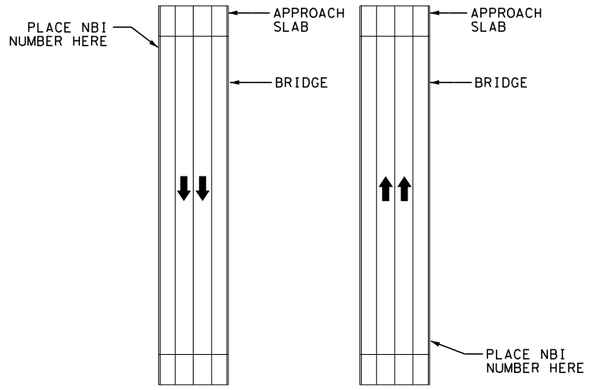
BORING LOGS

SHEET 5 OF 5

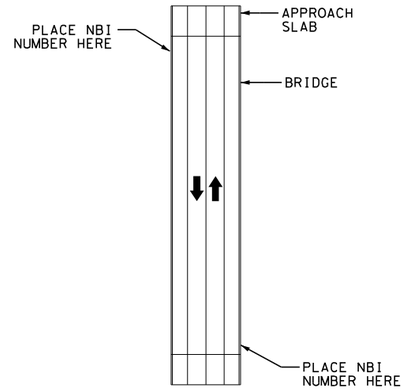
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ZJB	6	SEE TITLE SHEET		IH 40
GRAPHICS AKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KDH	TEXAS	AMA	POTTER	095
CHECK ZJB	CONTROL	SECTION	JOB	
	0090	05	108	







DIVIDED HIGHWAY
NBI PLACEMENT



UNDIVIDED HIGHWAY
NBI PLACEMENT

NOTE:

LETTER HEIGHT WILL BE 3"

PAINT COLOR WILL BE BLACK, UNLESS THE BRIDGE BEAMS ARE UNPAINTED STEEL AND THEN THE PAINT COLOR WILL BE WHITE.

PAINT WILL BE OIL BASED.

NBI WILL VERTICALLY BE PLACED IN THE CENTER OF THE BEAM.

STENCILING WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO PLACEMENT OF THE BEAMS.

COUNTY NUMBERS:

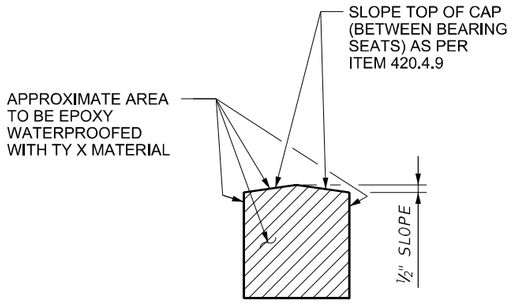
ARMSTRONG	006
CARSON	033
DALLAM	056
DONLEY	065
DEAF SMITH	059
GRAY	091
HANSFORD	099
HARTLEY	104
HEMPHILL	107
HUTCHINSON	118
LIPSCOMB	148
MOORE	171
OCHILTREE	179
OLDHAM	180
POTTER	188
RANDALL	191
ROBERTS	197
SHERMAN	211
WHEELER	242

AMARILLO DISTRICT BRIDGE NBI GUIDANCE

2023 Texas Department of Transportation

SHEET 1 OF 1

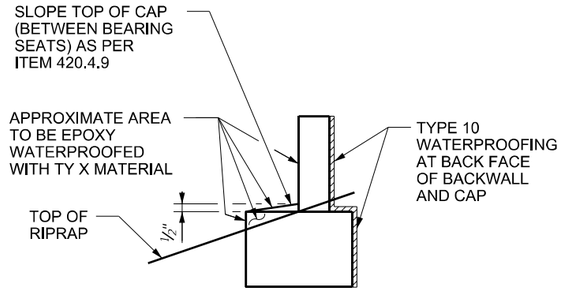
DSN	CK	CONT	SECT	JOB	HIGHWAY
CS	JR	0090	05	108	IH 40
DRWN	CK	DIST	COUNTY		SHEET NO.
CS	JR	AMA	POTTER		096



(7) BENT CAP WATERPROOFING DETAIL

TREAT THE FRONT, BACK, ENDS, AND TOP OF THE CAP AS SHOWN, EXCEPT FOR BEARING SEAT BUILDUPS, WITH TYPE X EPOXY COATING FOR CONCRETE PER DMS-6100 AND SPECIAL PROVISION 427-003.

(7) *PROVIDE WATERPROOFING AT BENTS 3 & 5 ONLY.*



ABUTMENT WATERPROOFING DETAIL

TREAT THE FACE OF BACKWALL, TOP, FRONT AND ENDS OF CAPS AS SHOWN, EXCEPT BEARING SEATS, WITH TYPE X EPOXY COATING FOR CONCRETE PER DMS-6100 AND SPECIAL PROVISION 427-003. TYPE 10 WATERPROOFING MEMBRANE (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT) (HPC).

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER

Zachary J Beil
10-09-2023

ADKISSON ROAD
AMARILLO DISTRICT WATERPROOFING DETAILS

SCALE: NTS

2023 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
ZJB	KDH	0090	05	108	IH 40
DRWN	CK	DIST	COUNTY		SHEET NO.
AKH	ZJB	AMA	POTTER		097

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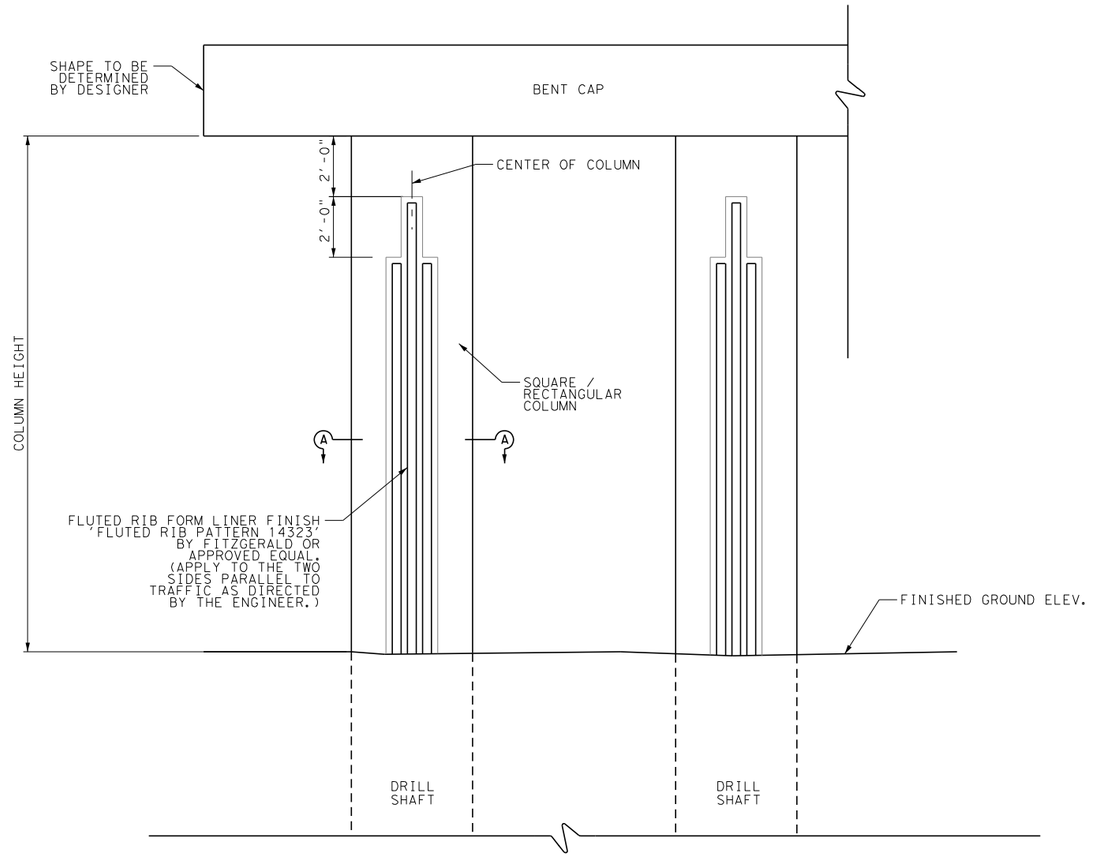
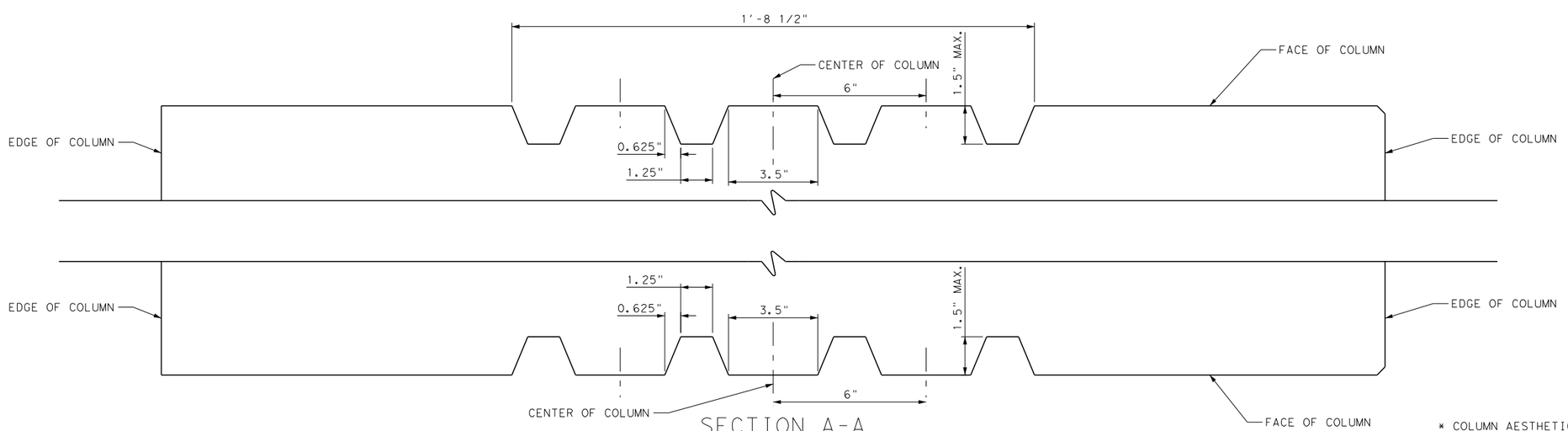


TYPICAL STANDARD BENT
AESTHETIC DETAIL



SECTION A-A
FLUTED RIB
FORM LINER DETAIL

* COLUMN AESTHETIC TREATMENT IS SUBSIDIARY TO THE VARIOUS BID ITEMS

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

BRIDGE COLUMN FINISH DETAILS

SCALE: N.T.S.

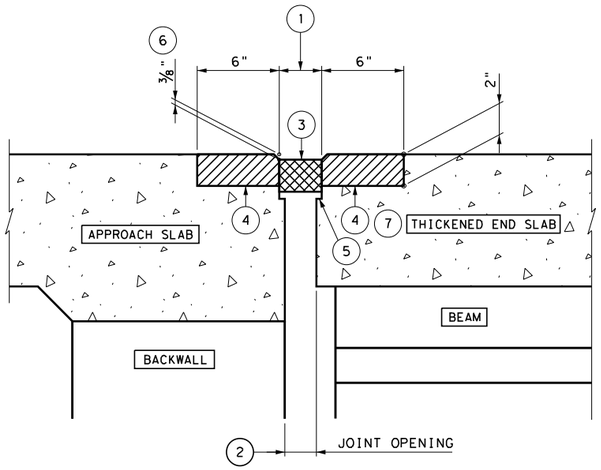
Texas Department of Transportation

SHEET 1 OF 1

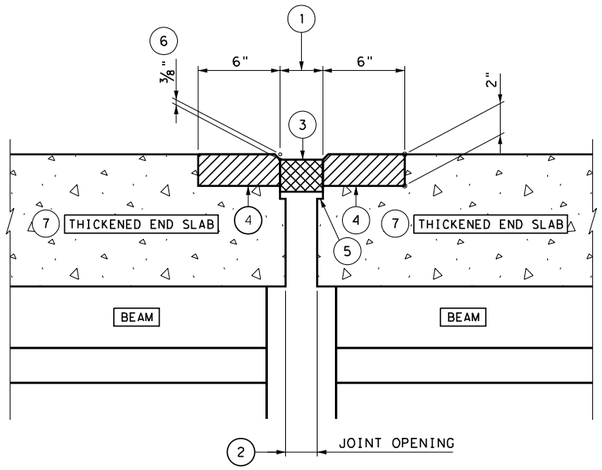
DN: CH	CK: GK	DW: CH	CK: GK
FEDERAL REGION	PROJECT NO.		STATE
6	SEE TITLE SHEET		TEXAS

CONT	SECT	JOB	HIGHWAY
0090	05	108	IH 40
DIST	COUNTY		SHEET NO.
AMA	POTTER		098

DATE:
FILE: vidal.ngoumnai@bridgefarmer.com\dms21579\038402-BRIDGECOLUMN+FINISHDETAILS.dgn
Vidal.Ngoumnai 10/9/2023 4:21:50 PM



SECTION THROUGH EXPANSION JOINT AT ABUTMENT



SECTION THROUGH EXPANSION JOINT AT INTERIOR BENT

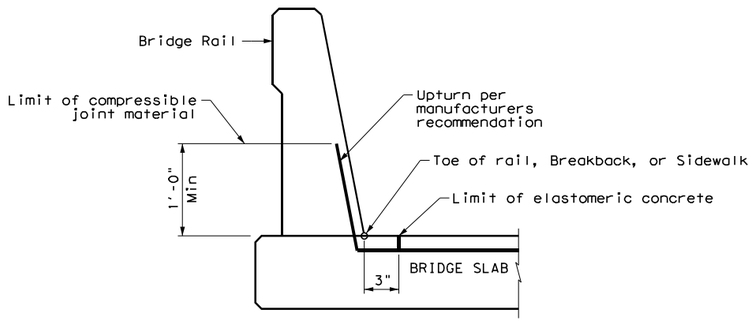
1. Adjust width for actual temperature at installation:
   (2½" at 55° for length of expansion up to 160')
   (3" at 55° for length of expansion up to 300')
2. Adjust width for actual temperature at installation:
   (1½" at 55° for length of expansion up to 160')
   (2" at 55° for length of expansion up to 300')
3. Premolded preformed compressible joint material shall be 25% larger than joint opening:
   (3⁄8" for 2½" opening)
   (3¾" for 3" opening).
4. Approved materials listed in the materials producer list for DMS-6140, "Elastomeric concrete for bridge joint systems". Install per manufacturer's recommendation.
5. Form as necessary to accommodate depth of premolded joint material plus ¼".
6. Recess ⅜". Chamfer each side of header joint ⅜".
7. Precast concrete panel option 2 will not be allowed. a thickened slab end will be required.

Joint openings are based on an installation temperature of 55°F (Midpoint Temperature with a range of -10°F to 120°F). For an installation temperature below 55°F increase the joint openings using the calculation shown below. For an installation temperature above 55°F decrease the joint openings using the calculation shown below.

Change in opening width (in) = C_{exp} * $\left(\frac{12\ in}{1\ ft}\right)$ * (L_{exp}) * ΔT

C_{exp} = for Concrete Beams = 0.000006 in/in/°F

C_{exp} = for Concrete Beams = 0.0000065 in/in/°F



JOINT SEALANT TERMINATION DETAIL

GENERAL NOTES:

Place the elastomeric concrete at locations shown on the plans and in the manner prescribed in the application procedures published by the manufacturer of the Binder.

Arrange for a technical service representative of the Binder manufacturer to be present on the project during the placement of the Elastomeric Concrete.

The elastomeric concrete shall be subsidiary to the bid item, "Header Type Expansion Joint" and will not be measured for payment.

Payment is based on length of premolded preformed compressible joint material.

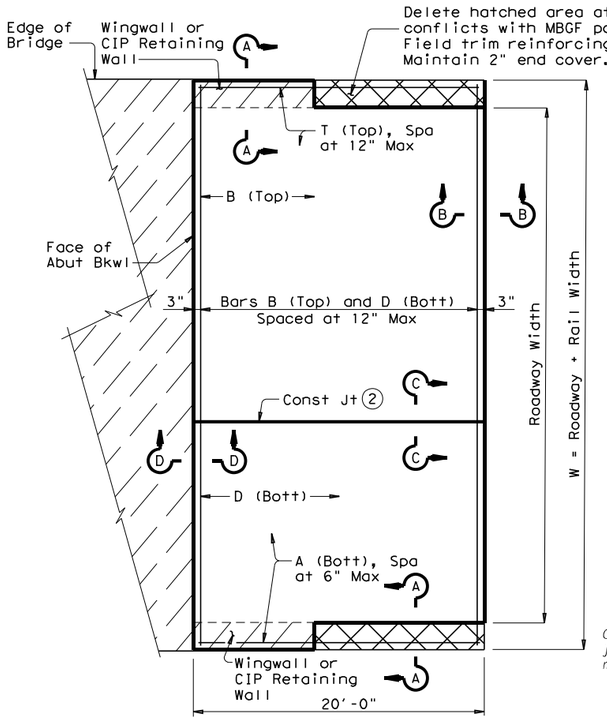
This detail shall not be used for joints with a length of expansion (L_{exp}) greater than 300'. For an Abutment, the length of expansion is half the Unit length adjacent to the Abutment. For an Interior Bent, the length is the average of the Unit length on each side of the Bent.

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

Texas Department of Transportation
Amarillo District

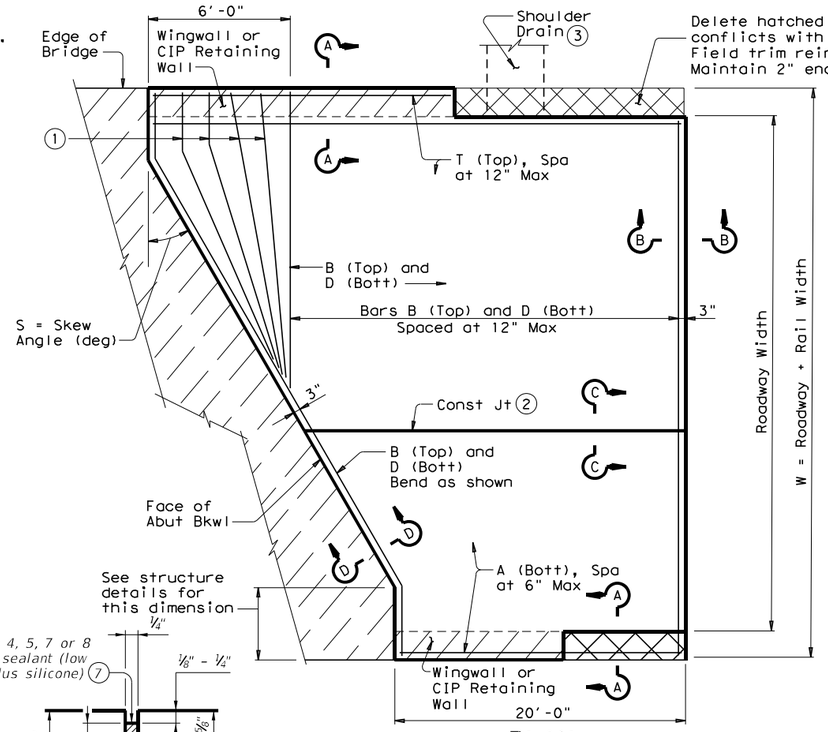
HEADER TYPE EXPANSION JOINT DETAIL

FILE: Header Jt-Amarillo District Standard	DN: RJH	CK:	DW:	CK:
© TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		099



PLAN

(Showing Non-Skewed Approach Slab)



PLAN

(Showing Skewed Approach Slab)

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
T	#5

APPROXIMATE QUANTITIES 4

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Volume of Appr Slab Conc (CY) = $0.802W + 0.02W^2 \tan S$

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

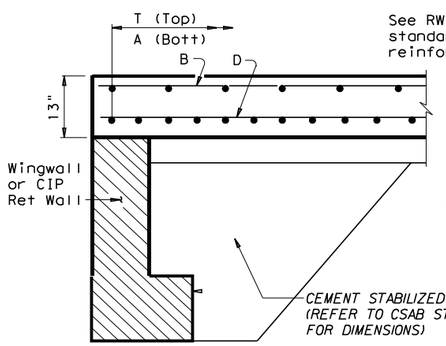
1. Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.
2. Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints 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. Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.
6. See details elsewhere in plans for required cross-slope.
7. Place in accordance with Item 438.
8. OMITTED

GENERAL NOTES:

1. Construct approach slab in accordance with Item 422.
2. Concrete shall be Class "S" with a minimum compressive strength of 4,000 psi.
3. All reinforcing steel shall be Grade 60.
4. Construct the subgrade or subbase from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
5. 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.
6. Cure for 4 days using water or membranE curing per Item 422.
7. All details shown herein are subsidiary to bridge approach slab.

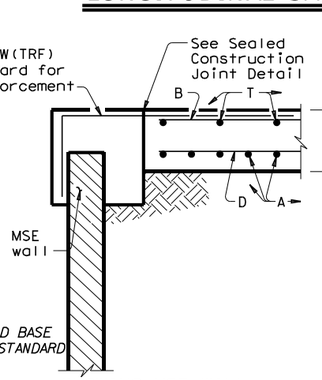
Cover dimensions are clear dimensions, unless noted otherwise.

LONGITUDINAL SAW CUT JOINT DETAIL

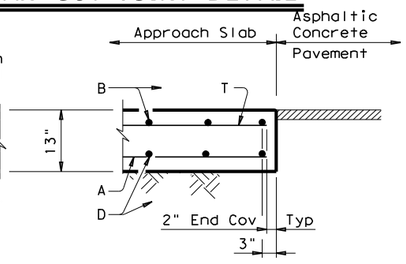


SHOWING WINGWALL OR CIP RETAINING WALL

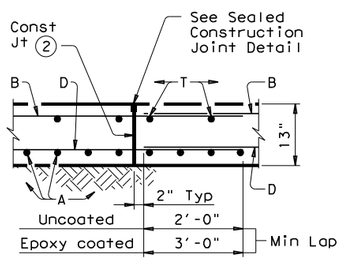
SECTION A-A



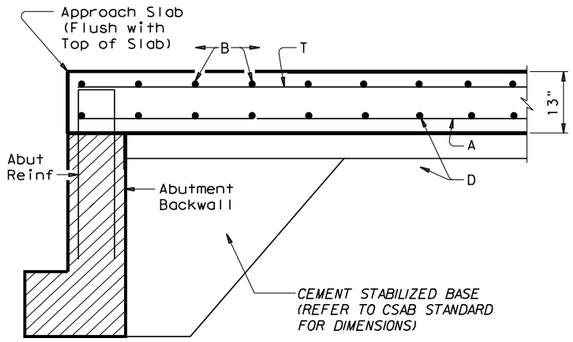
SHOWING MSE WALL



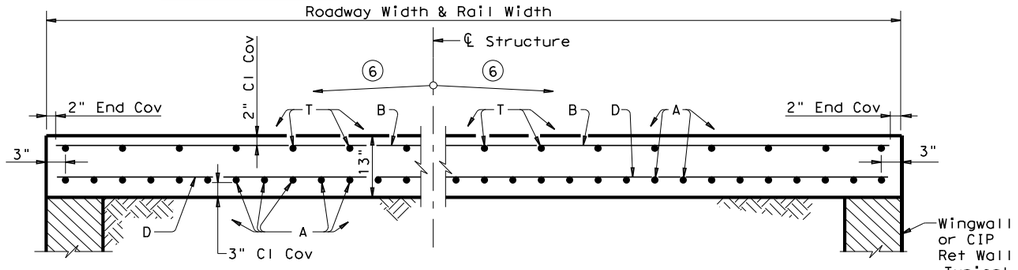
SECTION B-B



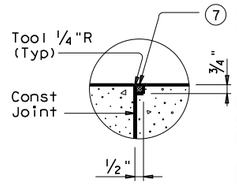
SECTION C-C 5



SECTION D-D



TYPICAL TRANSVERSE SECTION



SEALED CONSTRUCTION JOINT DETAIL

STATE OF TEXAS
ZACHARY J. BEIL
139718
LICENSED
PROFESSIONAL ENGINEER
Zachary J Beil
10-09-2023

Texas Department of Transportation

BRIDGE APPROACH SLAB

ASPHALTIC CONCRETE PAVEMENT

BAS-A (MOD)

FILE: STDB10A.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 2006	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS 7/19/2021 Revised for Statewide Standard 9-28-2022 Revised for Statewide Standard	AMA	SEE TITLE SHEET		100
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	POTTER	0090	05	108	IH-40

STDB10A

DATE: 10/11/2023 12:01:25 PM
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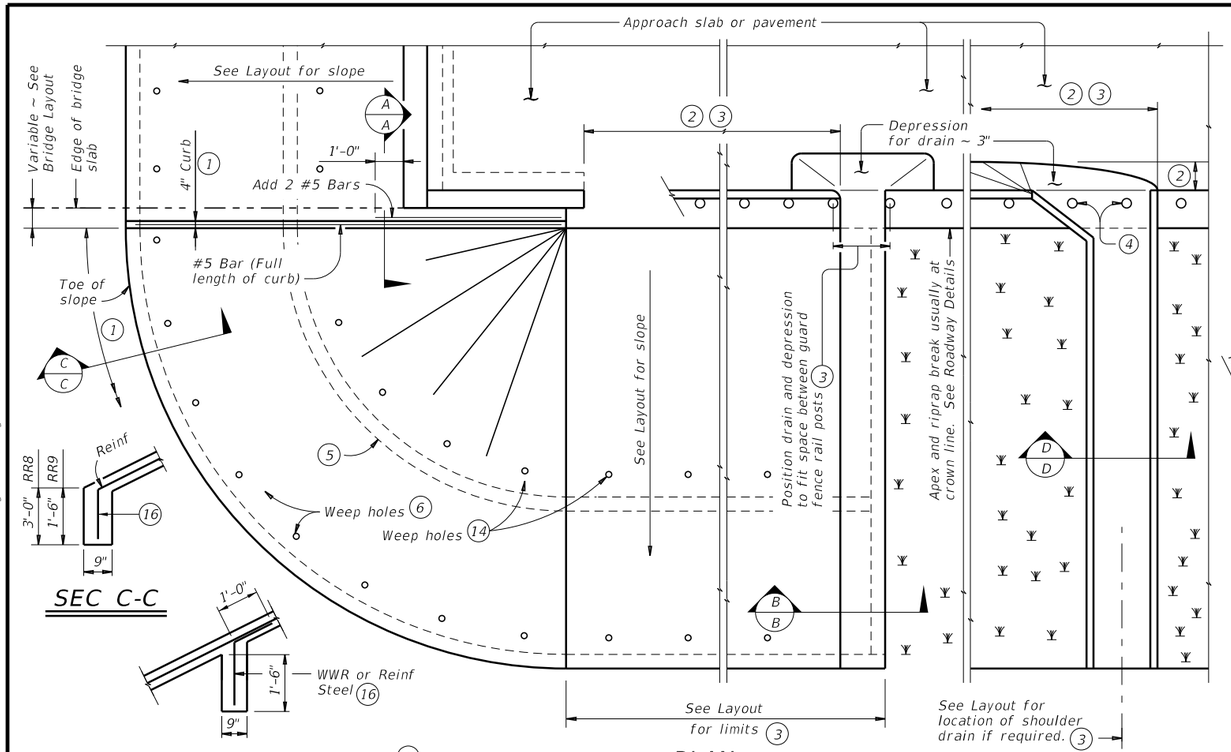
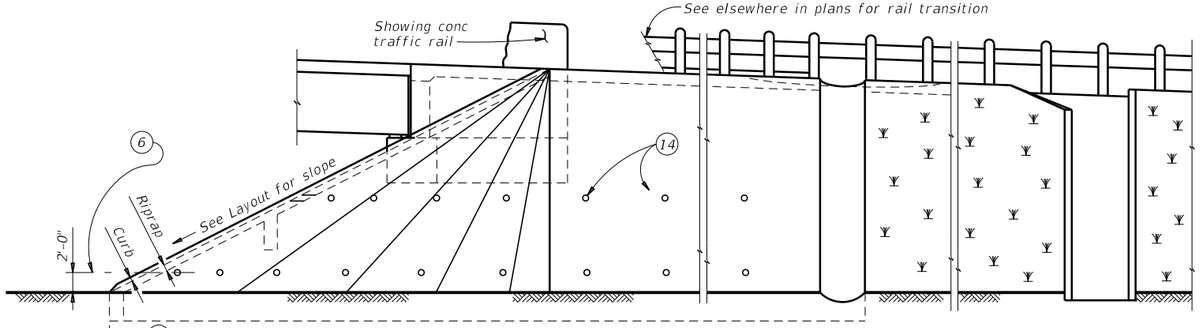


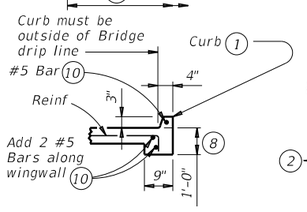
PLAN

SEC C-C

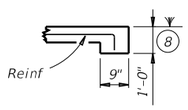
INTERMEDIATE TOEWALL



ELEVATION

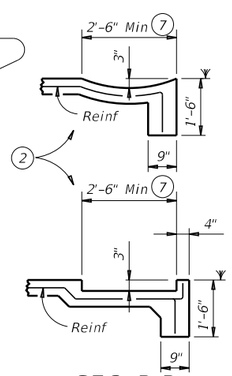


SEC A-A



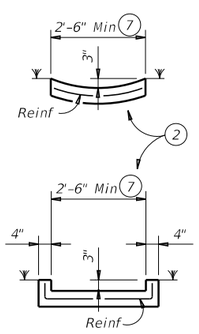
SEC B-B

(No drain)



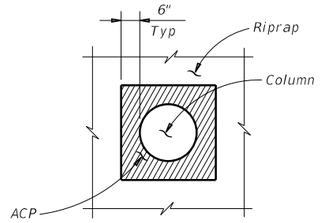
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

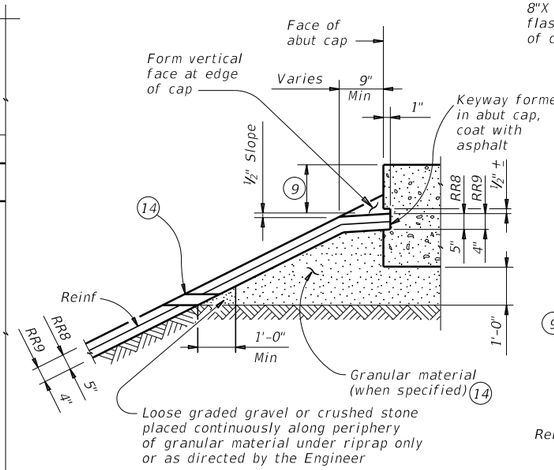
(Shoulder drain)



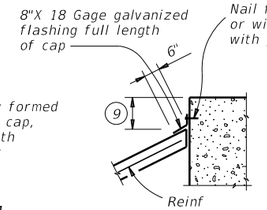
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

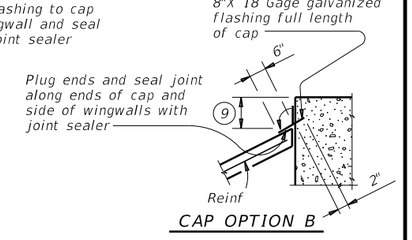
(As directed by the Engineer)



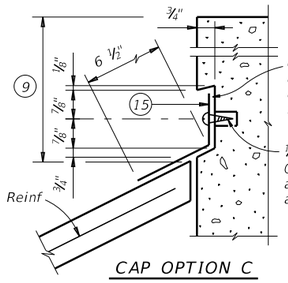
SHOWING KEYWAY OPTION



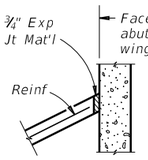
CAP OPTION A



CAP OPTION B

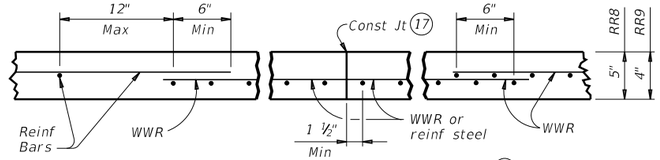


CAP OPTION C



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

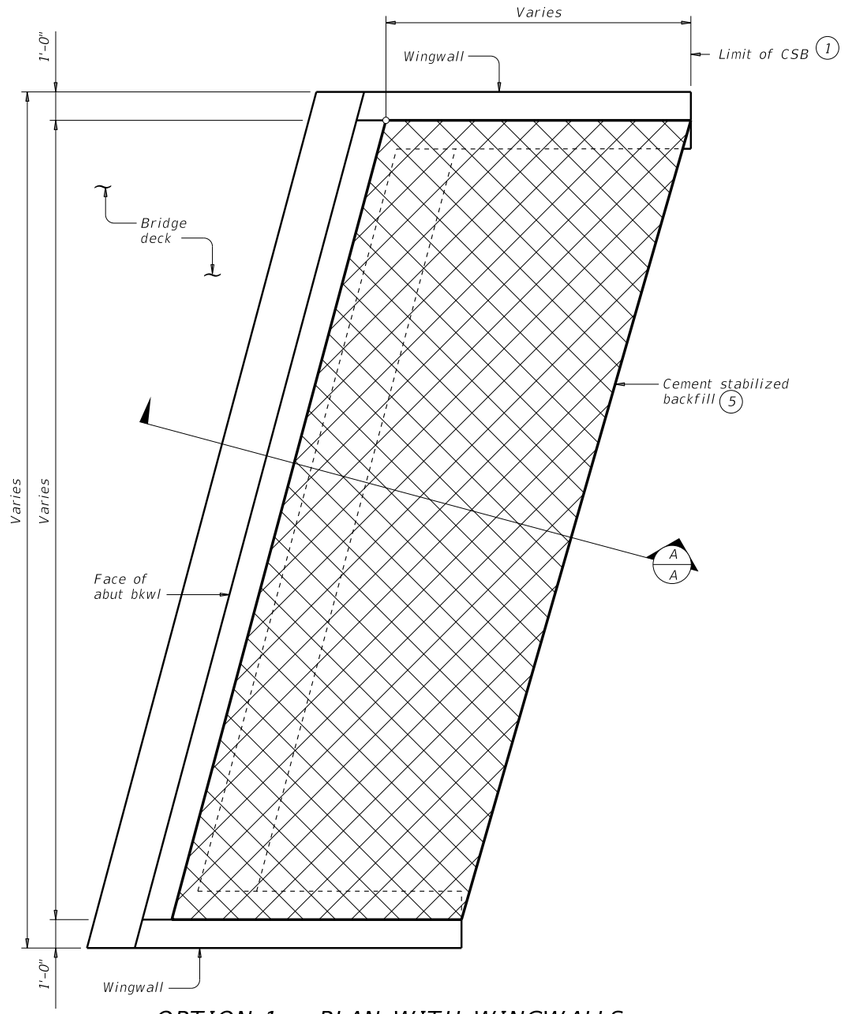
Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

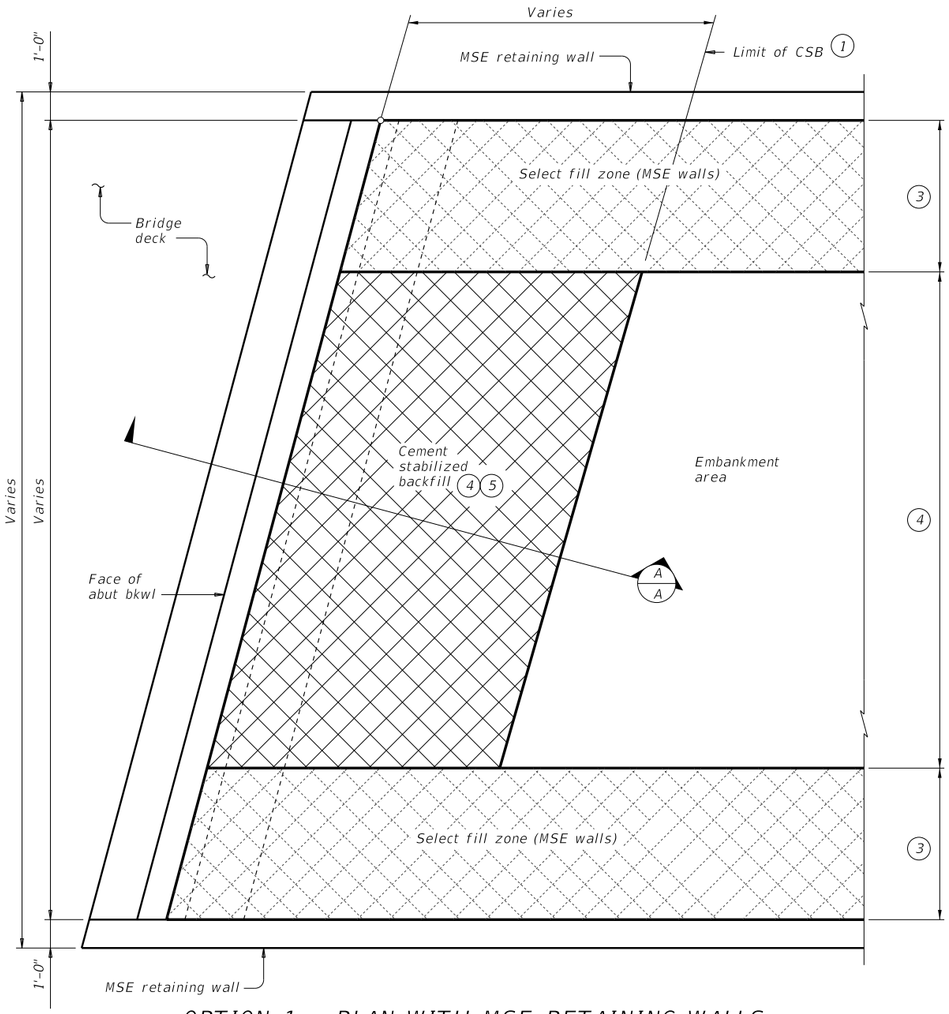
FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		104

DATE:
FILE:

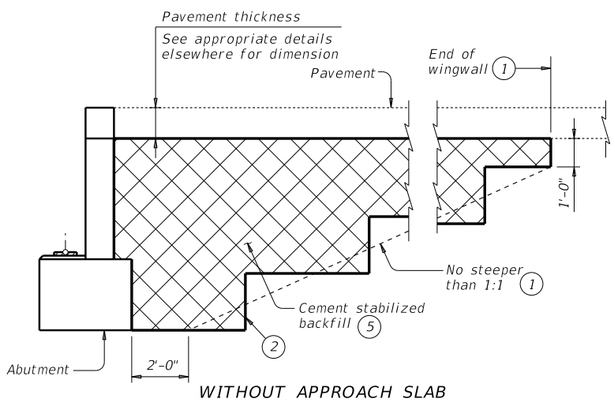


OPTION 1 ~ PLAN WITH WINGWALLS

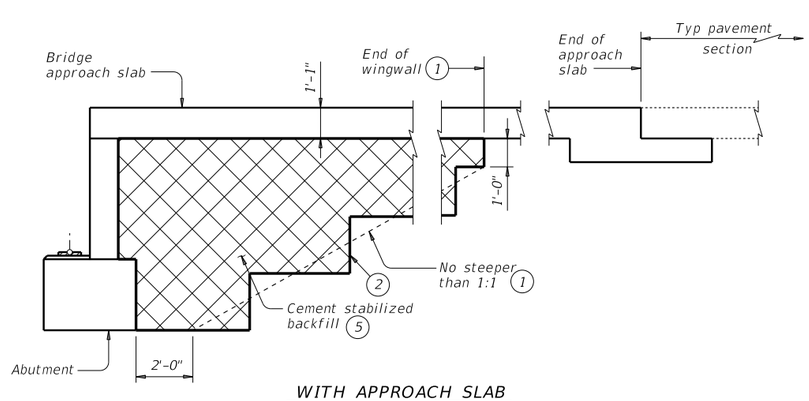
Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

(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.

Texas Department of Transportation

Bridge Division Standard

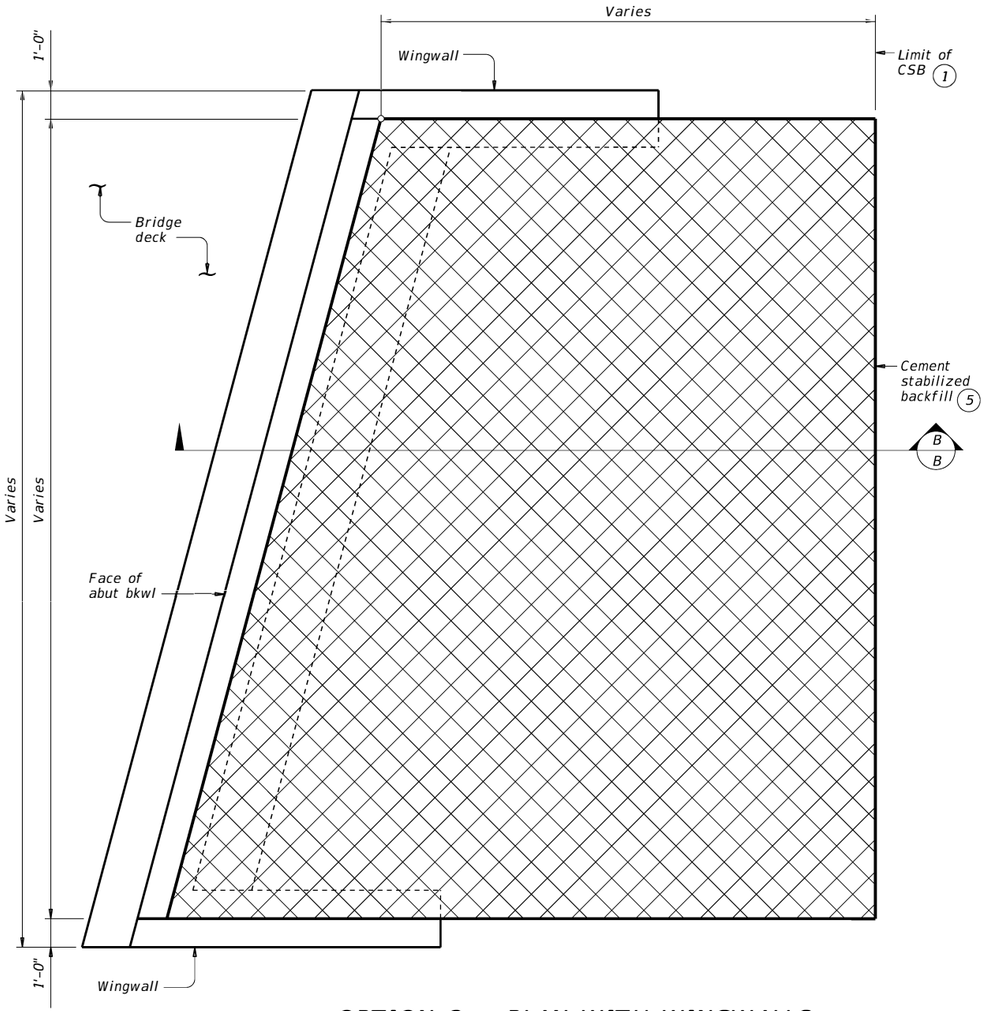
CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

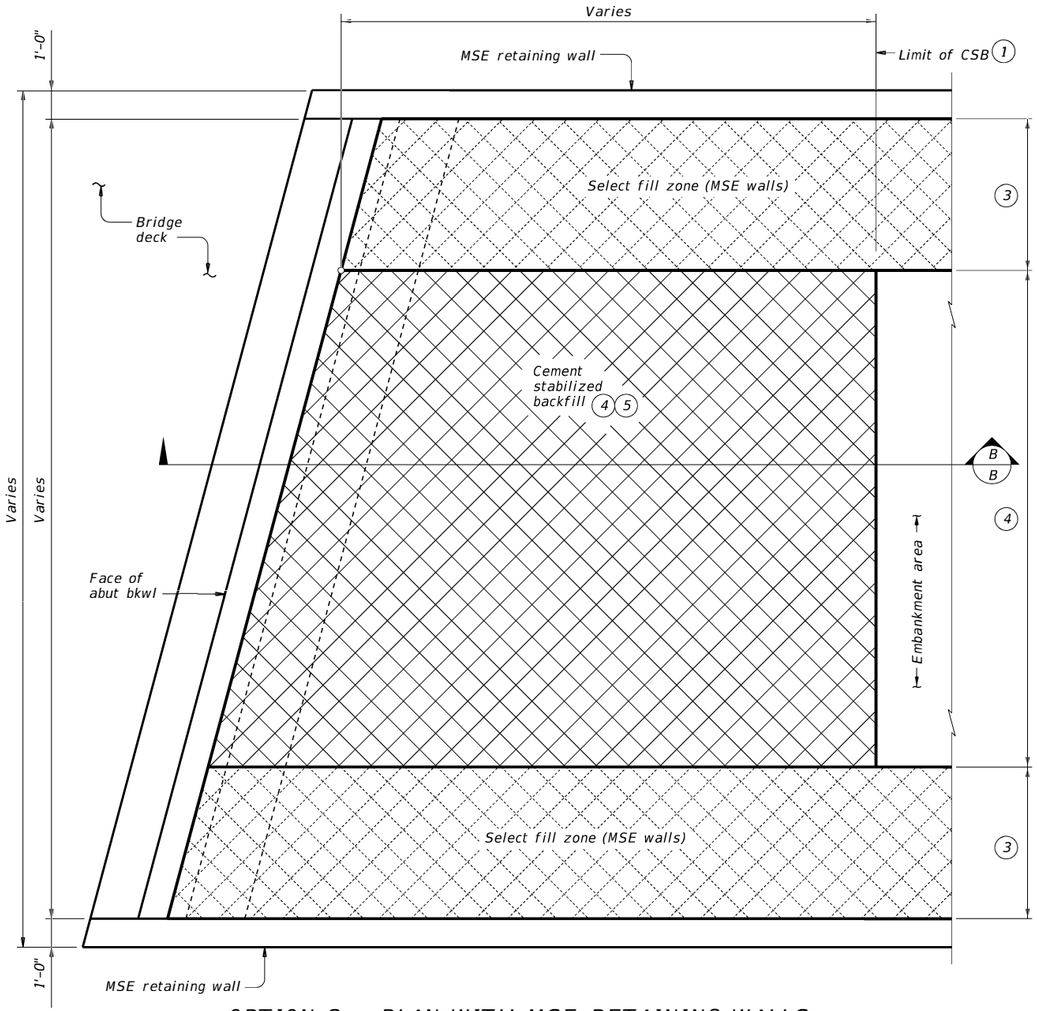
FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
03-23: Updated General Notes.	AMA	POTTER		105

DATE:
FILE:



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.*

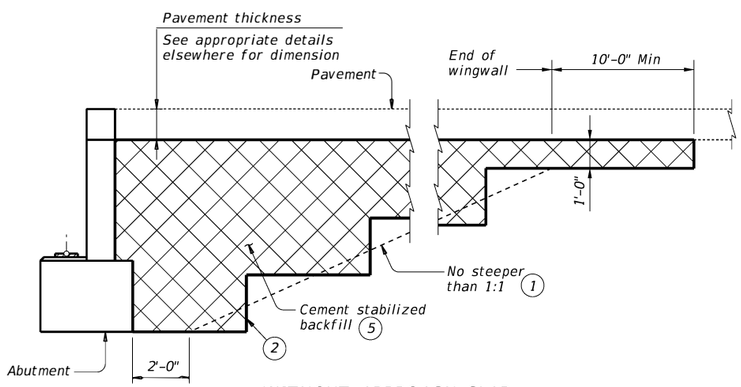
(2) *Bench backfill as shown with 12" (approximate) bench depths.*

(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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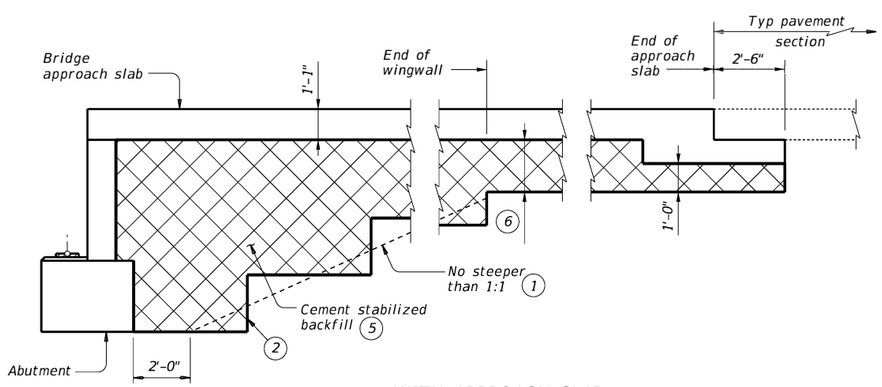

WITH APPROACH SLAB

(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: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		106

DATE: Vidal.Ngoumnai 10/11/2023 12:02:02 PM
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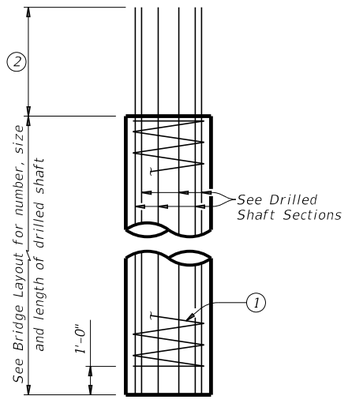
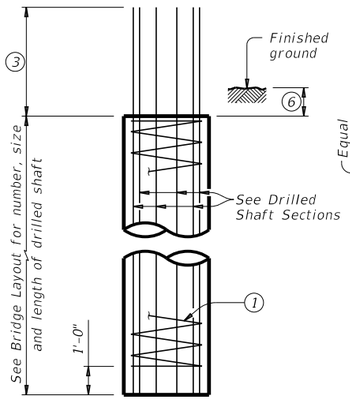
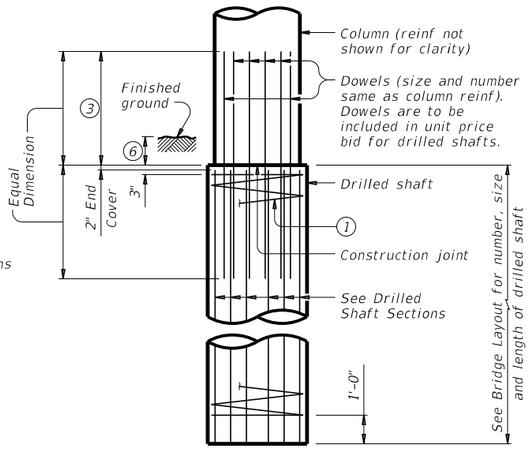


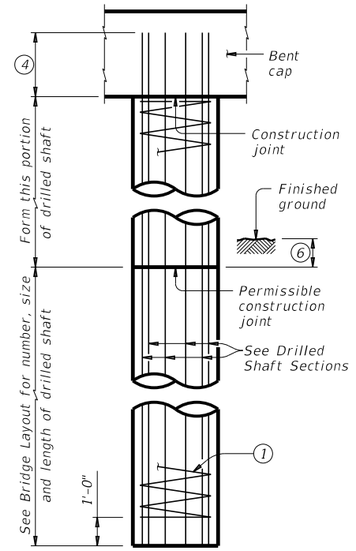
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



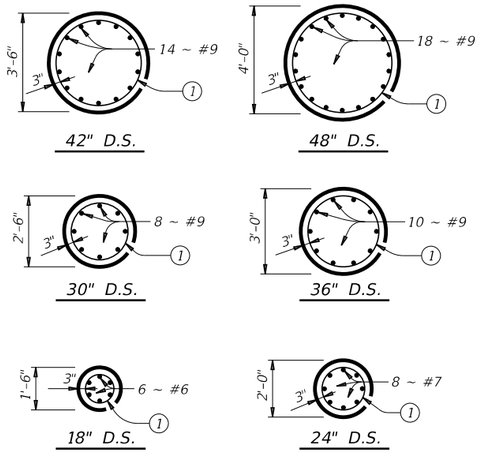
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

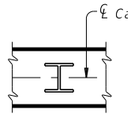


DRILLED SHAFT SECTIONS

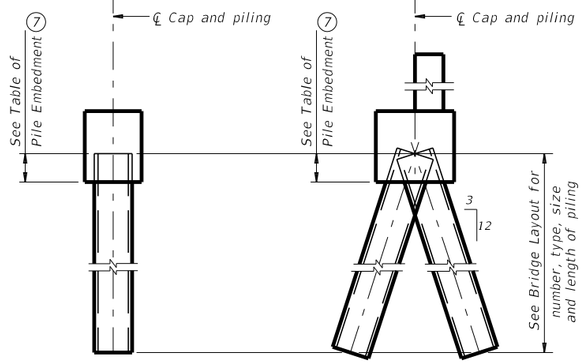
DRILLED SHAFT DETAILS

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"

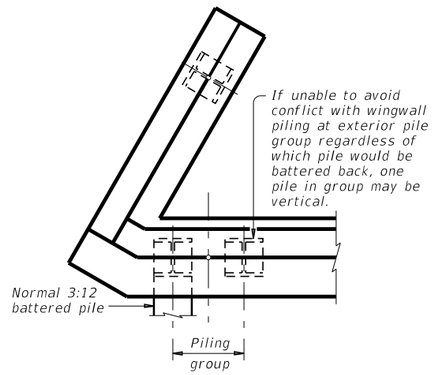
See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



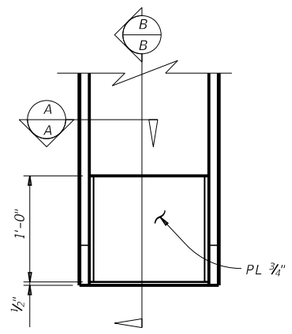
ORIENTATION OF STEEL H-PILING



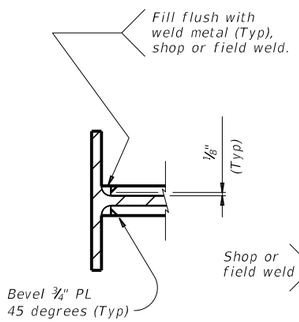
PILING DETAILS
(Concrete or steel H)



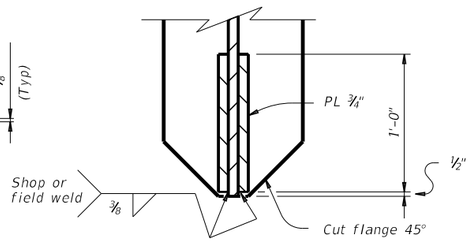
DETAIL "A"
(Showing plan view of a 30° skewed abutment)



ELEVATION

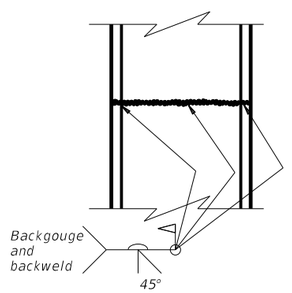


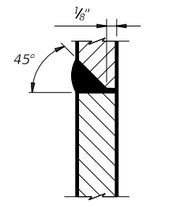
SECTION A-A



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.

SHEET 1 OF 2

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	0090	05	108	IH 40
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		107

DATE: 10/11/2023 12:02:22 PM
FILE: fdstde01-20x02.dgn
Vidal.Ngoumnai
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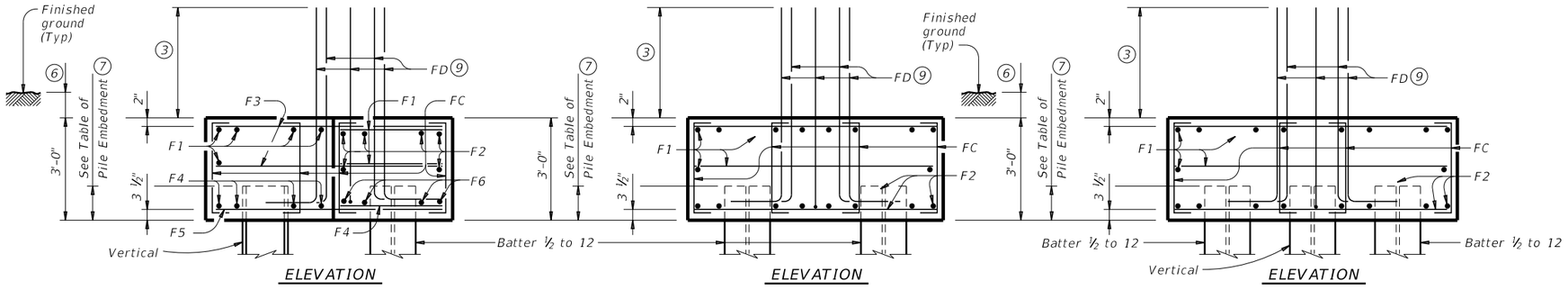
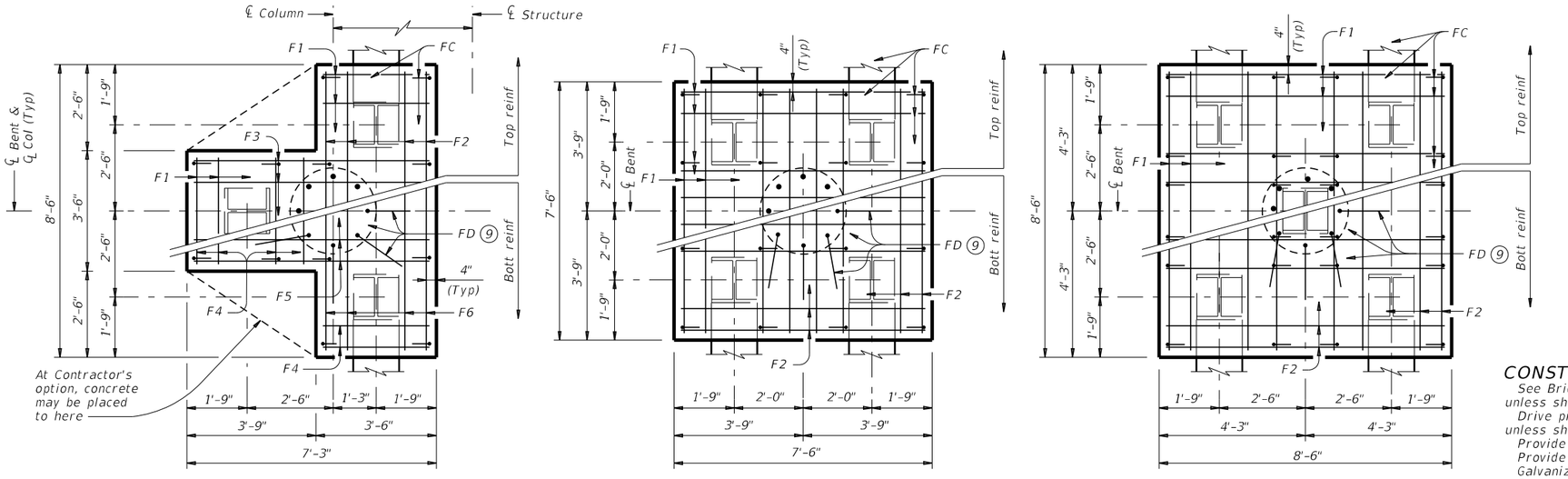
bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com





THREE PILE FOOTING (8)

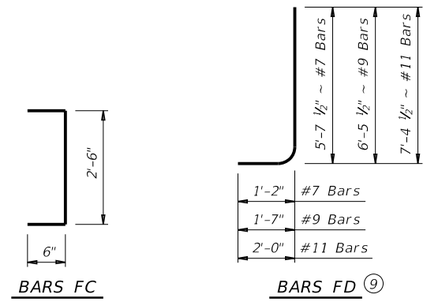
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



(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

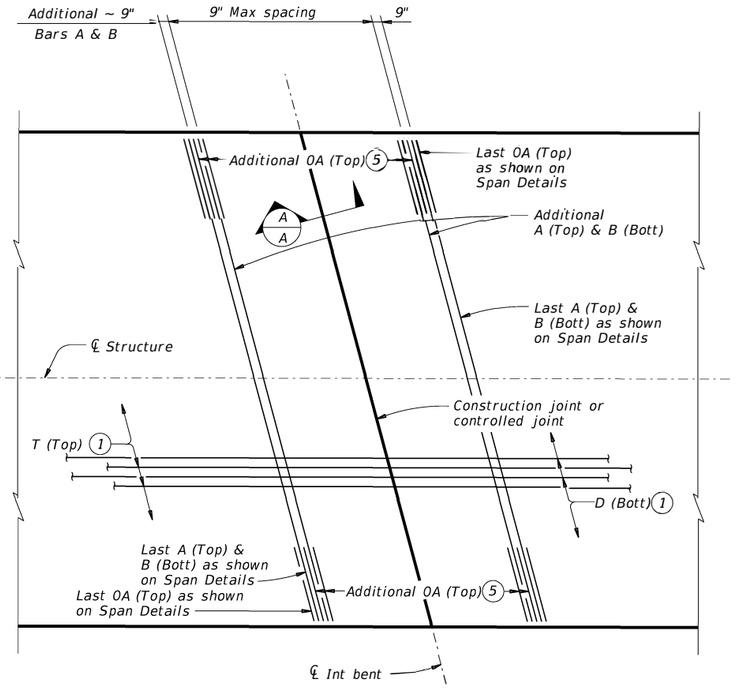
Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

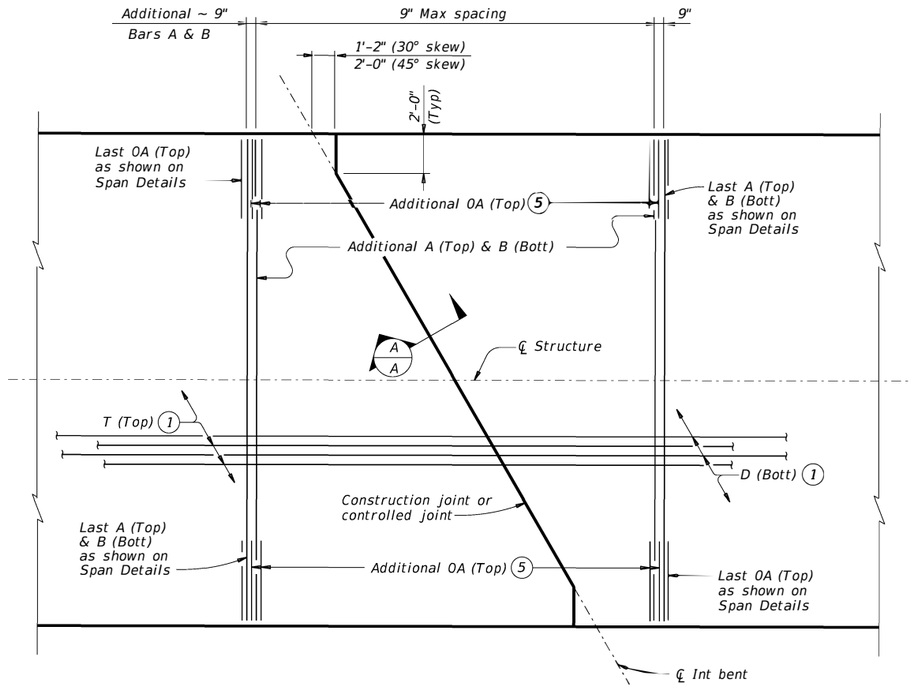
FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		108

DATE:
FILE:



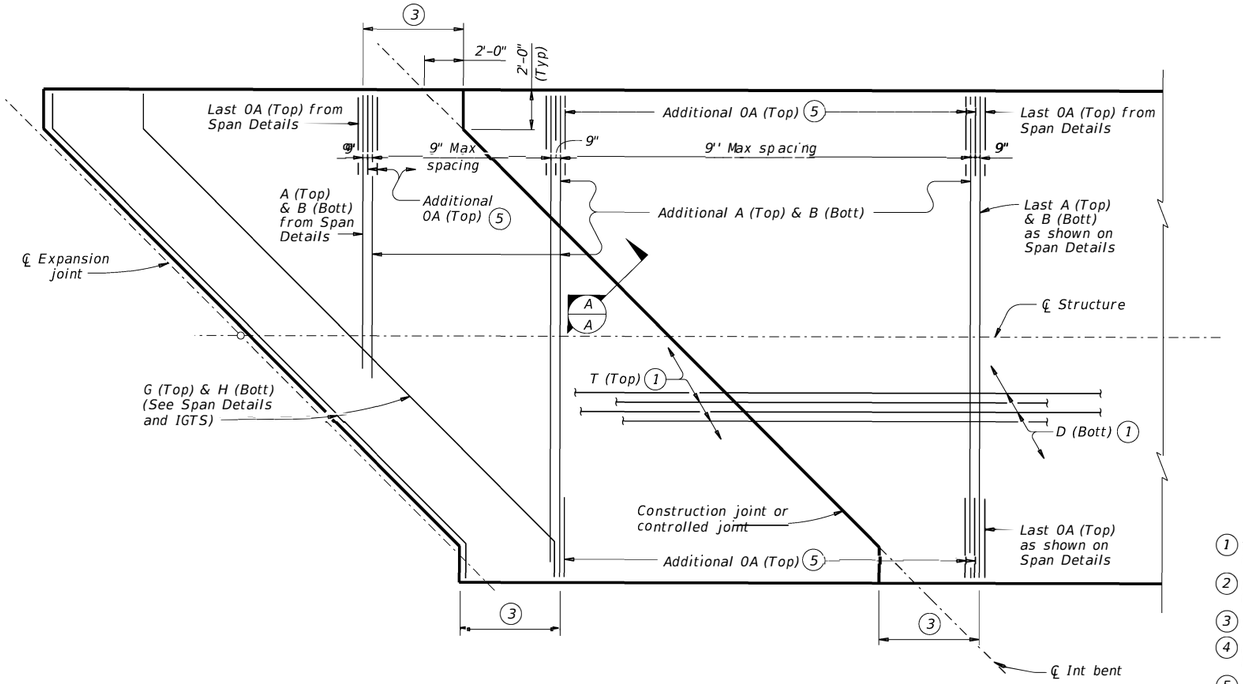
PLAN FOR 0° OR 15° SKEW

(Showing 15° skew)



PLAN FOR 30° OR 45° SKEW

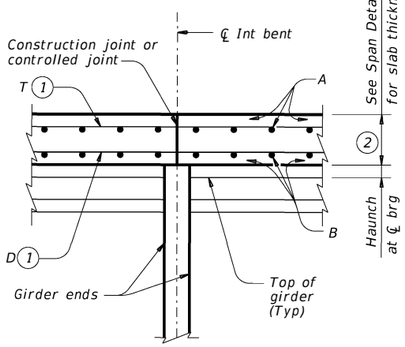
(Showing 30° skew)



PLAN FOR 45° SKEW 4

(Showing short span condition.)

BARS 0A (#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: IG-IGCS-23.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
10-19: Added bubble note 6. 01-23: Added 34' Rdwy.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		109

DATE: 7/24/2023 3:28:41 PM
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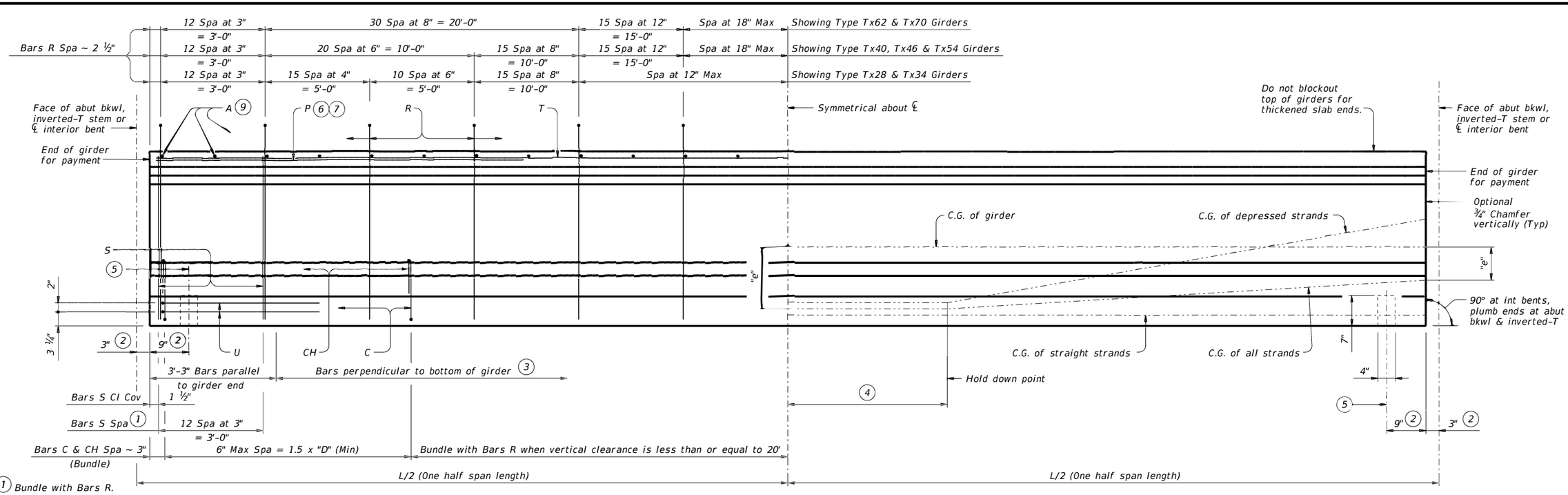


(1) Bundle with Bars R.

(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 ⅝") 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.

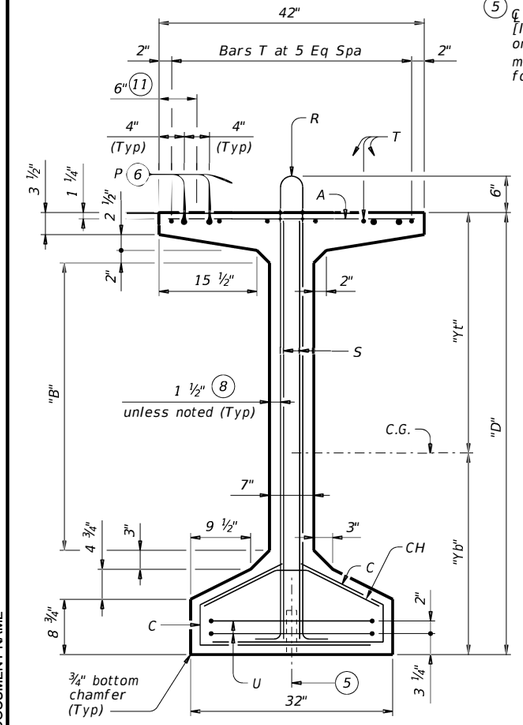
(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

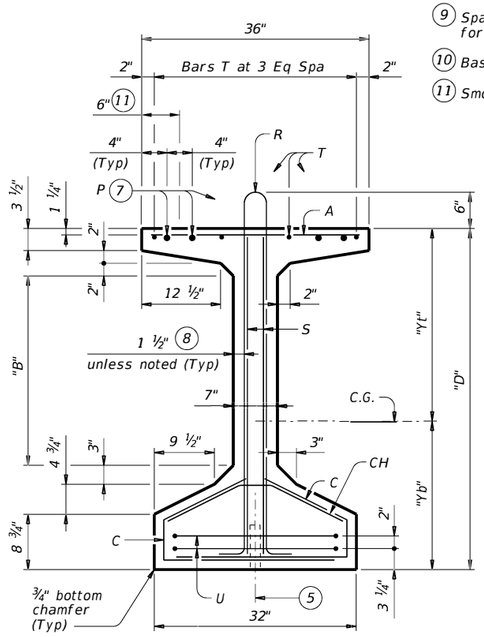
(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

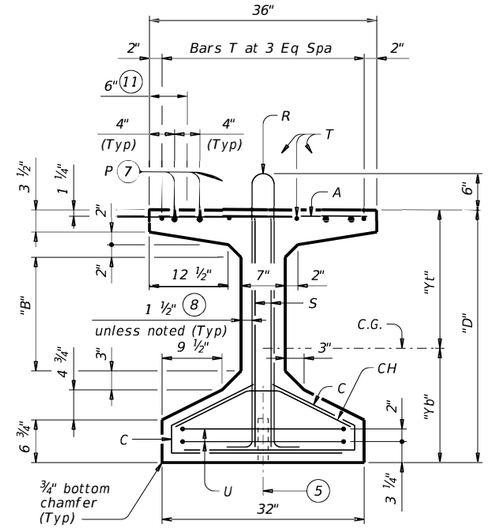
(11) Smooth trowel finish on the slab overhang side of exterior girder.



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

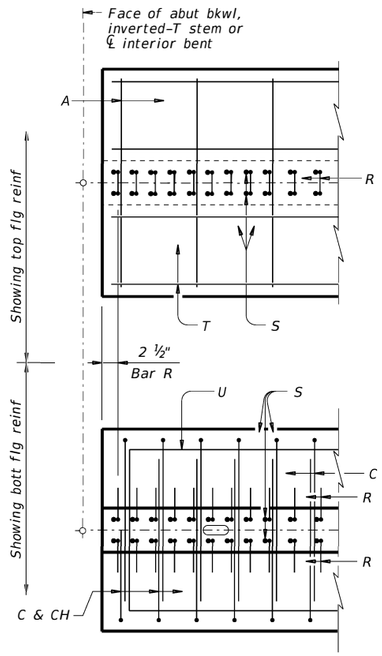
Texas Department of Transportation

Bridge Division Standard

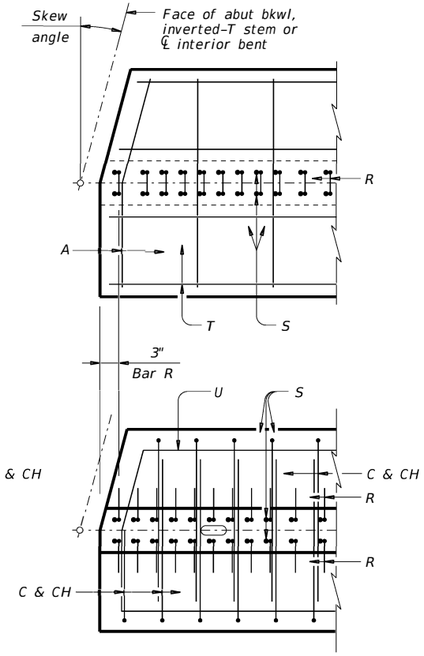
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

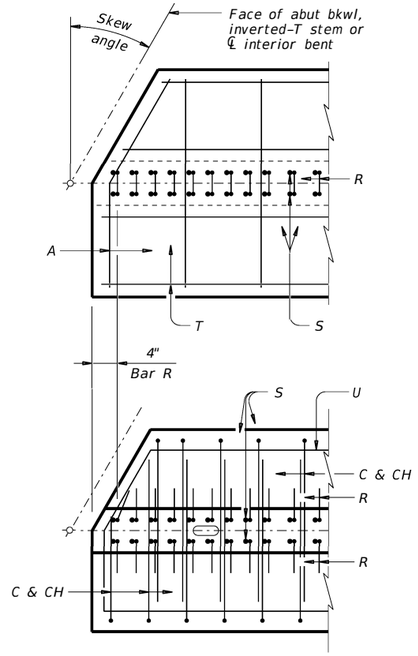
FILE: IG-IGD-23.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		110



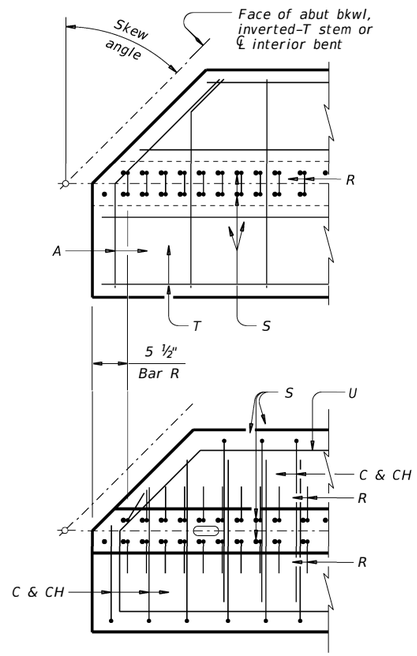
0° SKEW



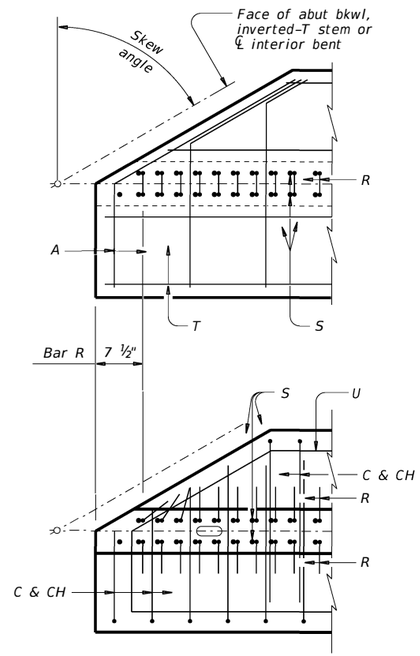
15° SKEW



30° SKEW



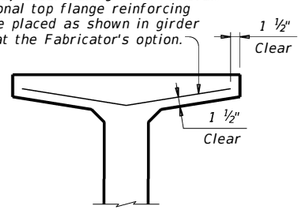
45° SKEW



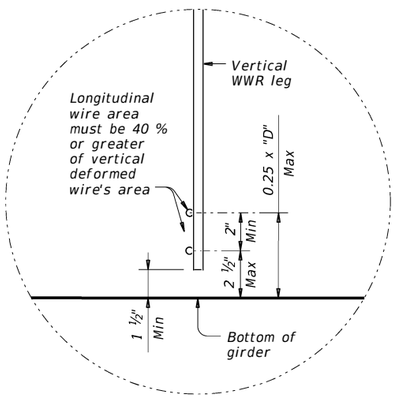
60° SKEW

PLAN OF GIRDER ENDS (12)

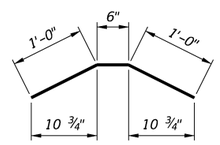
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



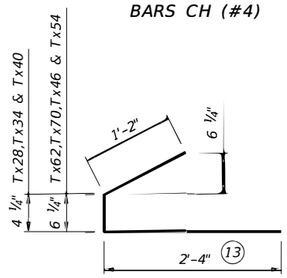
OPTIONAL TOP FLANGE REINFORCING DETAIL



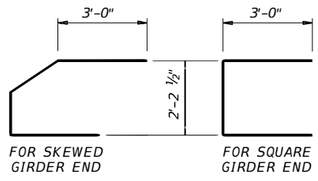
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



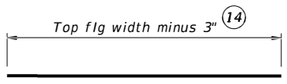
BARS CH (#4)



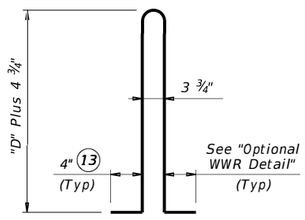
BARS C (#4)



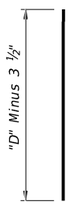
BARS U (#5)



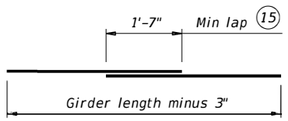
BARS A (#3)



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

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: IG-IGD-23.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		111

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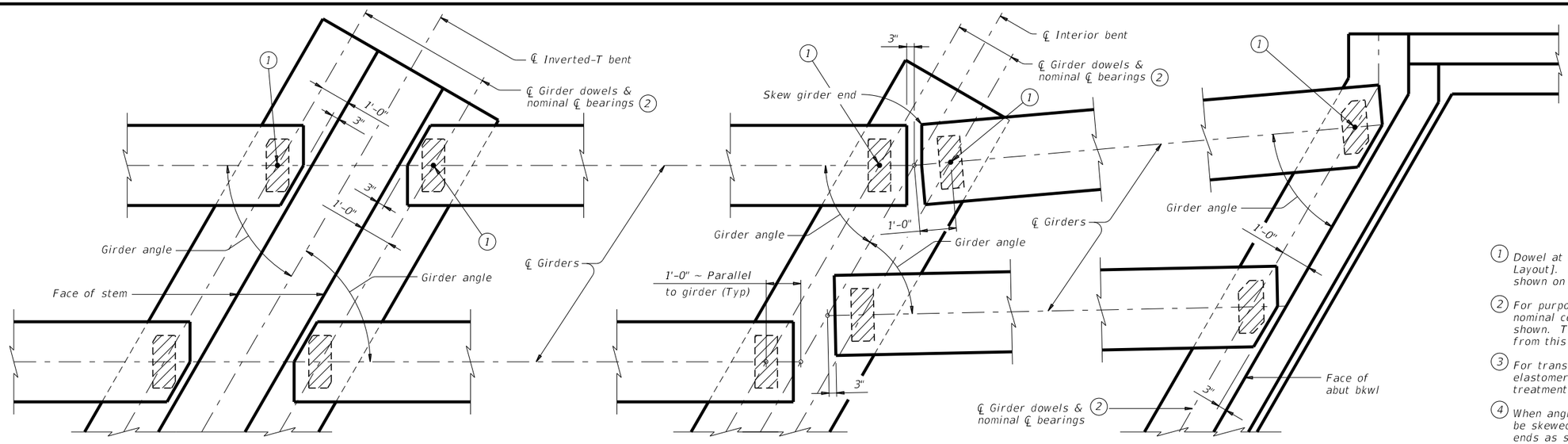


AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW (3)

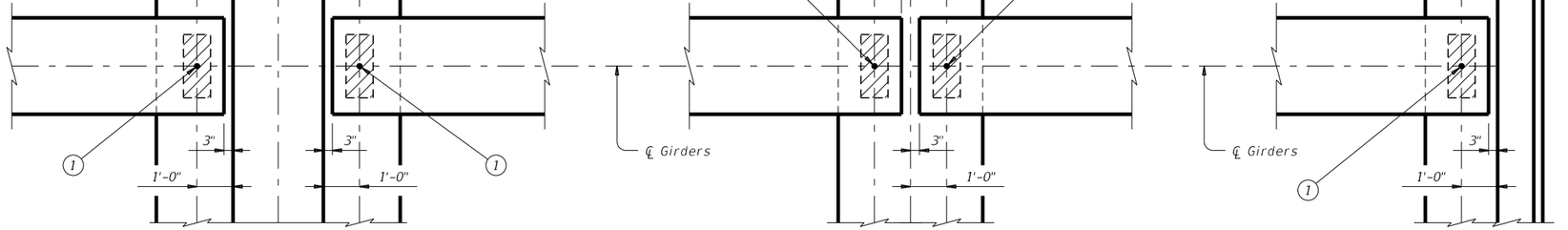
(1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.

(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.

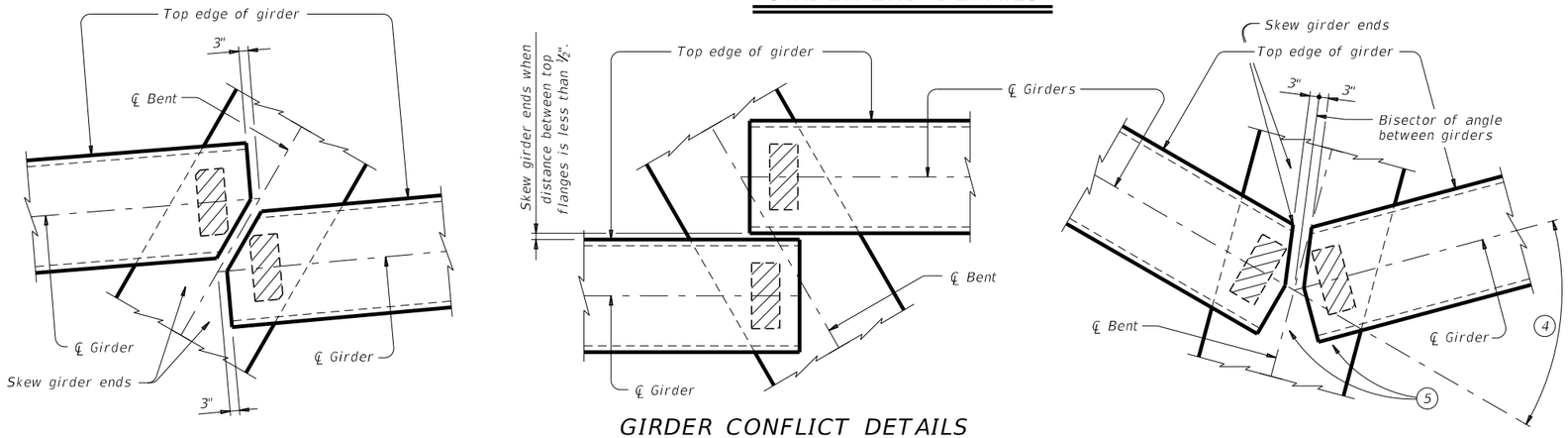


AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT (3)

GIRDER END DETAILS



GIRDER CONFLICT 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".

HL93 LOADING

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

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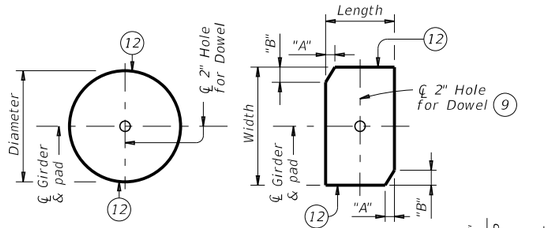
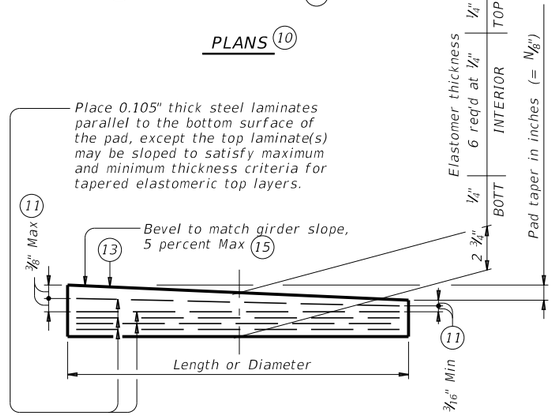


PLANS (10)



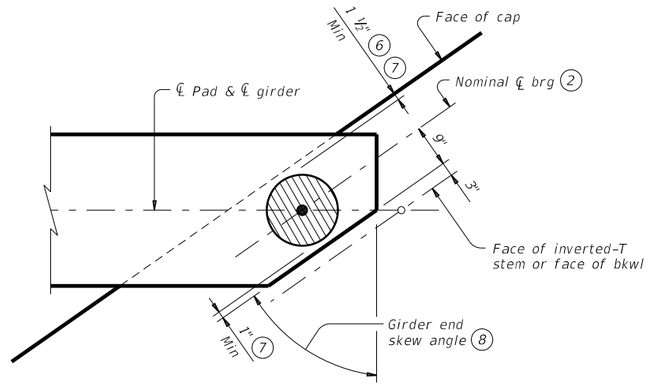
ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

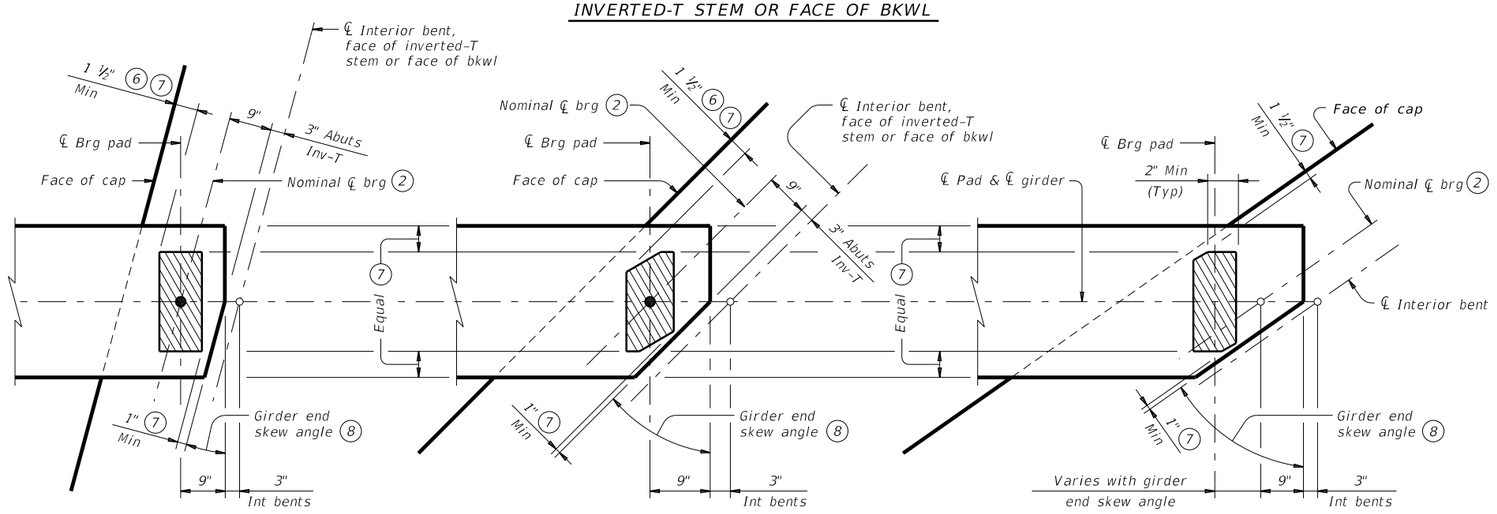
(50 DUROMETER)

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)			
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	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 Width	Pad Clip Dimensions	
					"A"	"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"



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

(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

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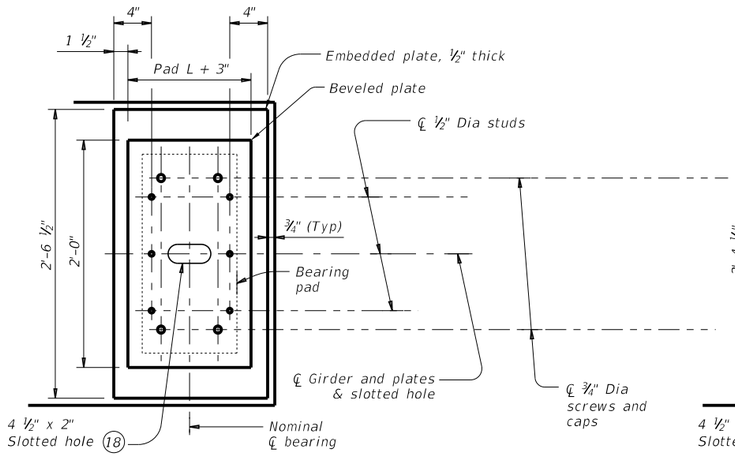
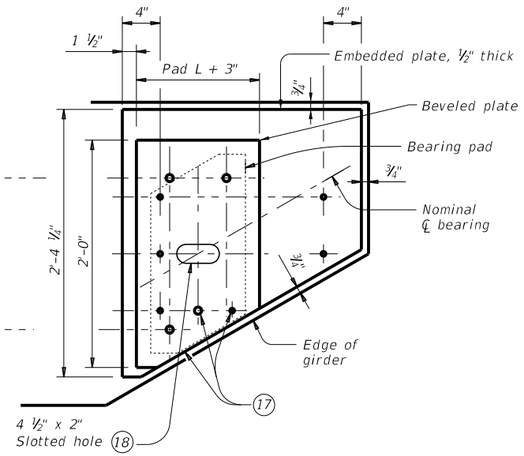
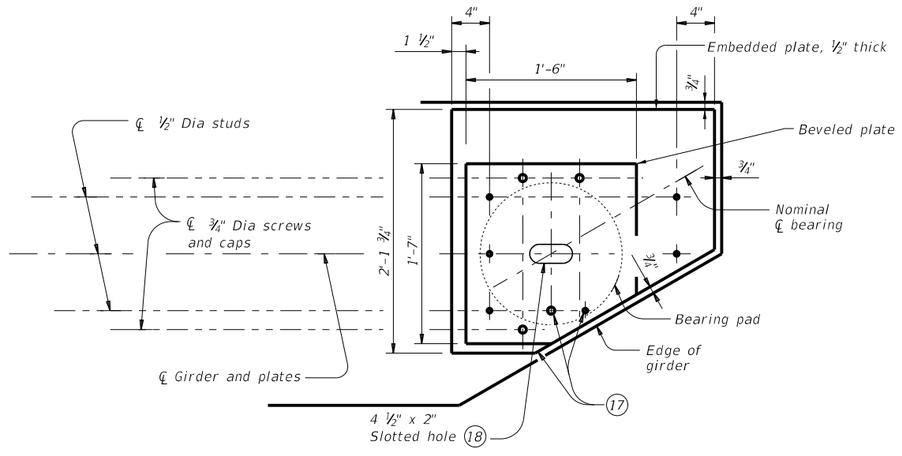


NORMAL GIRDER END
RECTANGULAR BEARING PAD

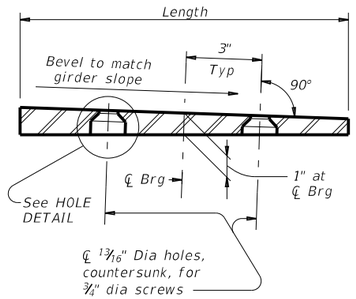


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

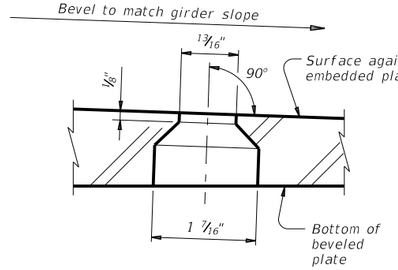


SKEWED GIRDER END
15" DIA BEARING PAD

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.

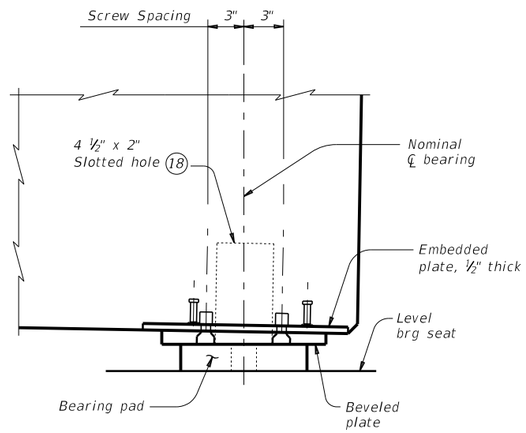
When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

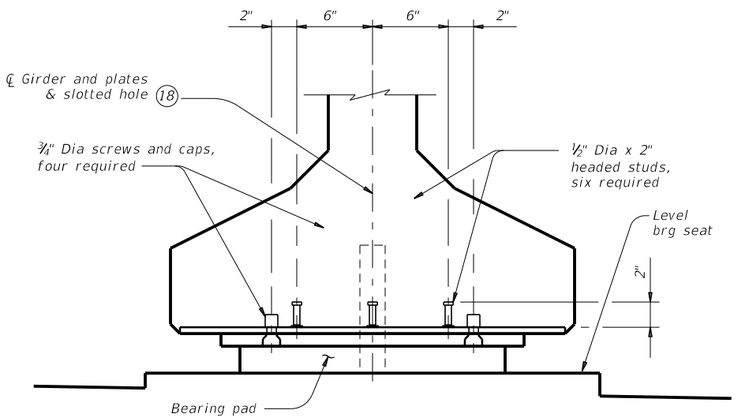
¾" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a ¾" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga 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

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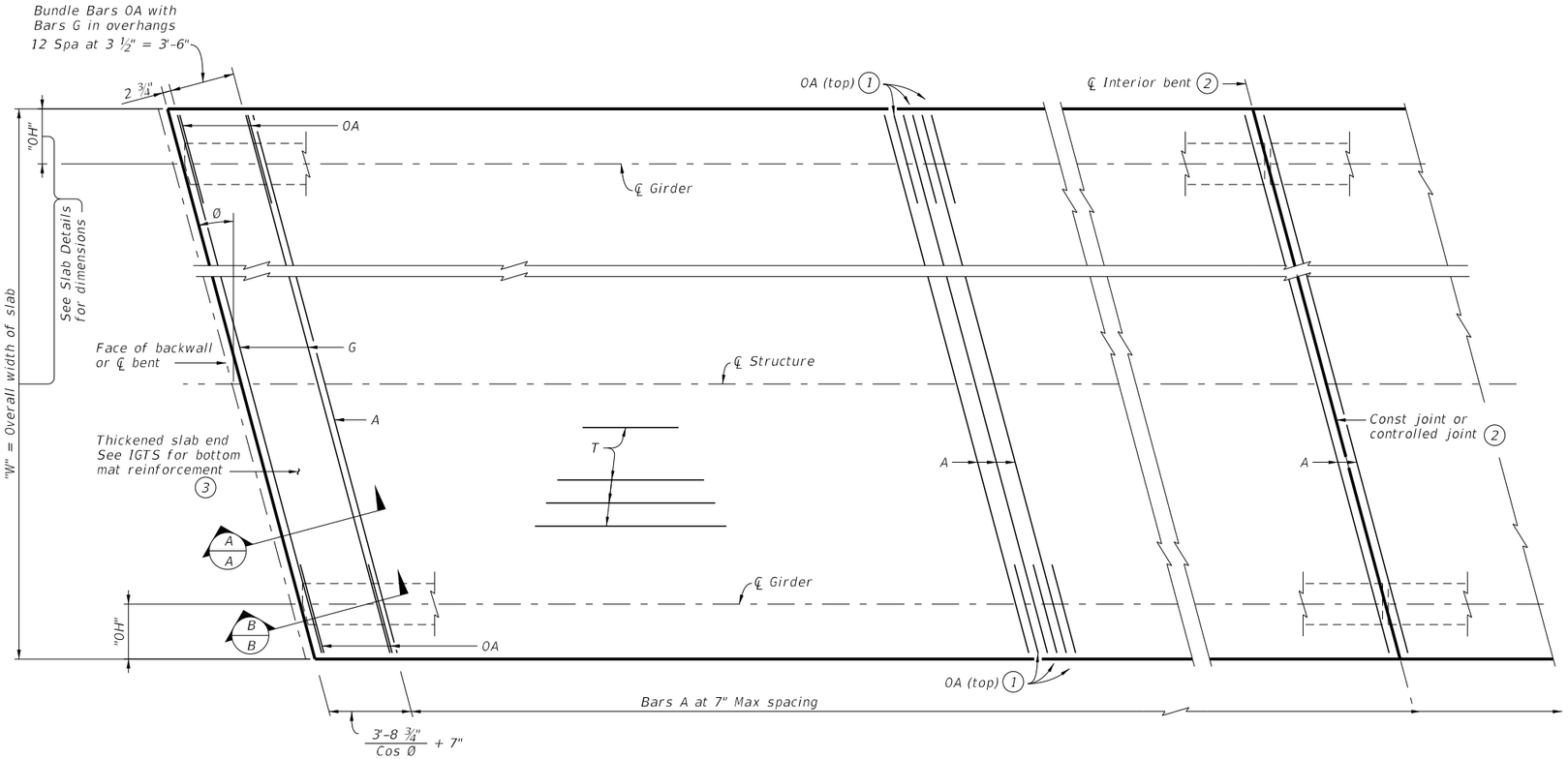
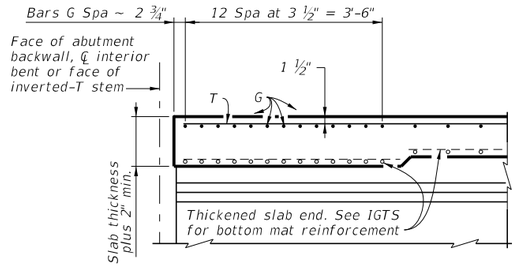


AT THICKENED SLAB END

AT SLAB CONTINUOUS OVER INTERIOR BENTS

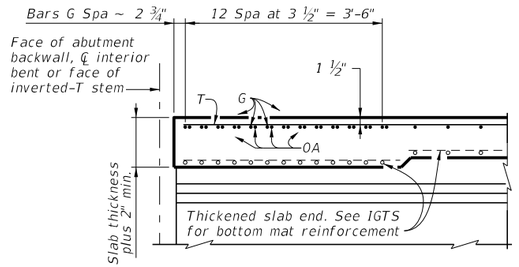
PLAN FOR SLABS WITHOUT BREAKBACKS

Showing top mat reinforcement only.



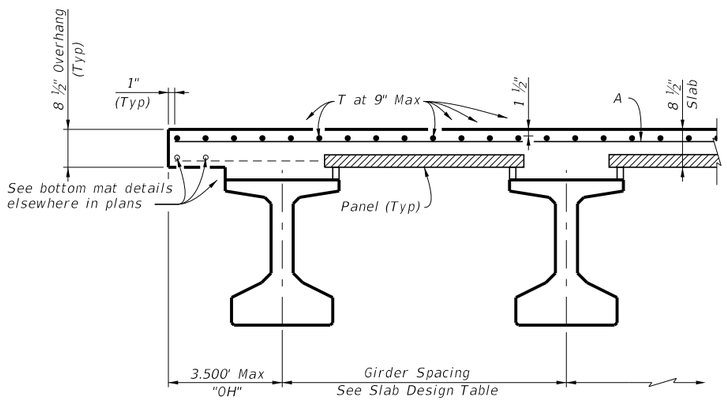
SECTION A-A

Showing Thickened Slab End with PCP Option 1. Option 2 similar.

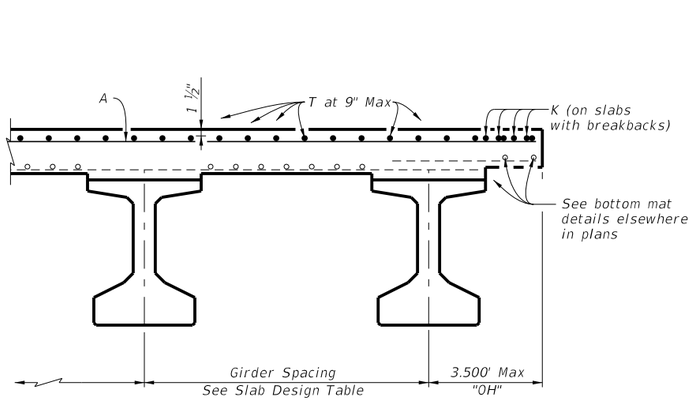


SECTION B-B

Showing Thickened Slab End with PCP Option 1. Option 2 similar.



PARTIAL TYPICAL TRANSVERSE SECTION



SECTION OF THICKENED SLAB END

Showing PCP Option 1. Option 2 similar.

1. Place Bars 0A midway between Bars A at overhang.
2. Bars are continuous through joint.
3. Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

GFRP SLAB TOP MAT REINFORCEMENT

PRESTRESSED CONC I-GIRDER SPANS

IGFRP

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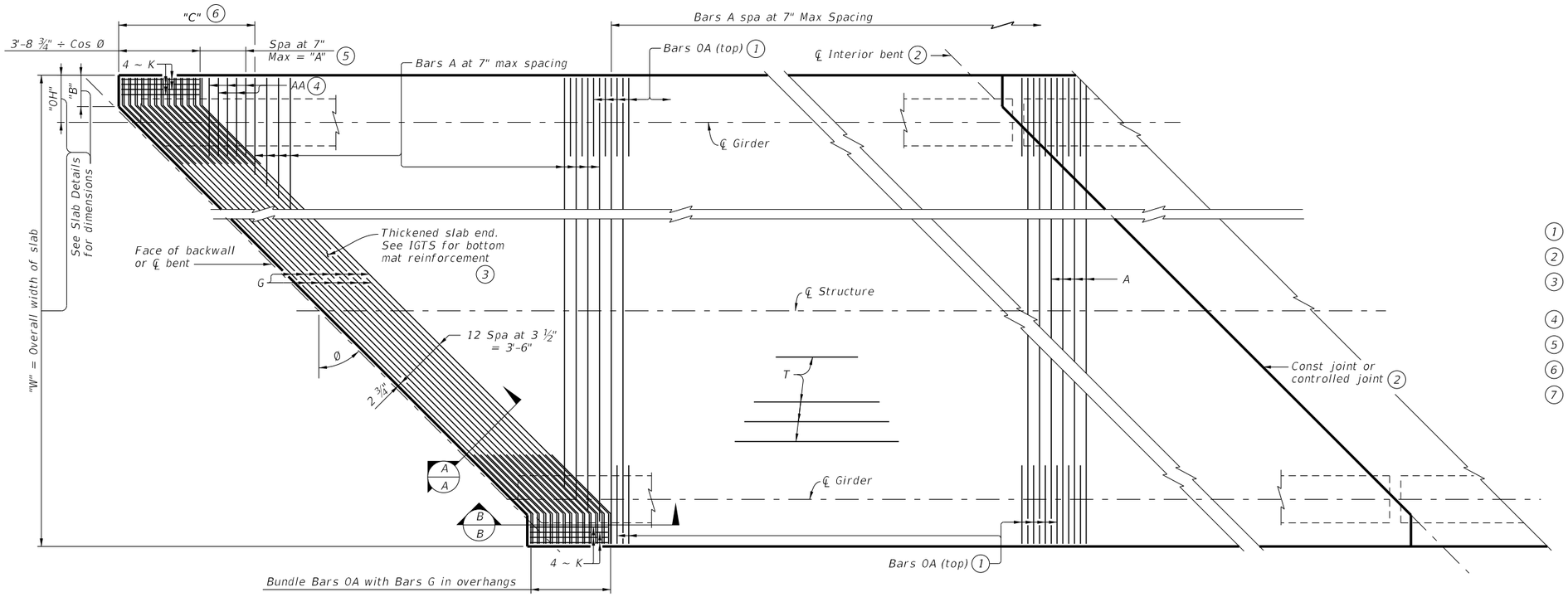


AT THICKENED SLAB END

BAR TABLE

BAR	SIZE
A	#5
AA	#5
G	#5
K	#5
0A	#5
T	#5

(1) Place Bars 0A midway between Bars A at overhang.

(2) Bars are continuous through joint.

(3) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

(4) Tie Bars AA to bottom of Bars G in this location.

(5) A = ("0H" + 2.333' - "B") x Tan Ø

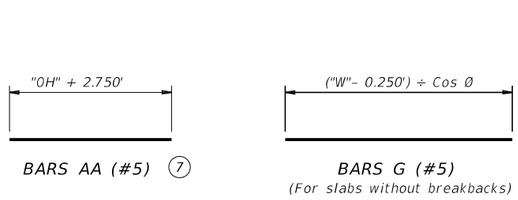
(6) C = $\frac{3.729'}{\text{Cos } Ø}$ + "A" + Bar A spacing

(7) Only required on slabs with breakbacks.

PLAN FOR SLABS WITH BREAKBACKS

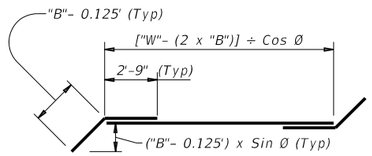
Showing top mat reinforcement only.

AT SLAB CONTINUOUS OVER INTERIOR BENTS

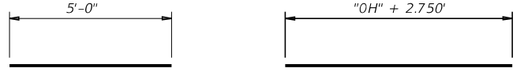


BARS AA (#5) (7)

BARS G (#5)
(For slabs without breakbacks)

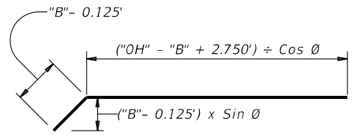


BARS G (#5)
(For slabs with breakbacks)



BARS K (#5) (7)

BARS OA (#5)



BARS OA (#5)
(For slabs with breakbacks)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications and AASHTO LRFD Bridge Design Guide Specifications for GFRP-Reinforced Concrete, 2nd Edition.

These details are restricted to Prestressed Concrete I-Girder spans with an 8 ½" slab and up to a 10'-0" girder spacing.

These details are to be used in conjunction with the Span Details and PCP Standard (if prestressed concrete panels are used).

This standard provides Glass Fiber Reinforced Polymer (GFRP) reinforcement details for the top mat of slab reinforcement. The bottom mat reinforcement and other slab details are as shown elsewhere in the plans.

The Contractor has the option to provide GFRP reinforcement, in accordance with the details shown, when epoxy-coated steel bars are specified for the deck slab. The Contractor may provide an alternate GFRP slab design with calculations signed and sealed by a Professional Engineer.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

MATERIAL NOTES:

Provide GFRP bars, conforming to ASTM D7957/7957M, except provide a minimum modulus of elasticity of 7,500 ksi.

Provide Grade 60 steel bars for all bottom mat reinforcement as shown elsewhere in plans.

Provide bar laps, where required, as follows:
#5 GFRP bar = 2'-9"

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

GFRP SLAB TOP MAT REINFORCEMENT

PRESTRESSED CONC I-GIRDER SPANS

IGFRP

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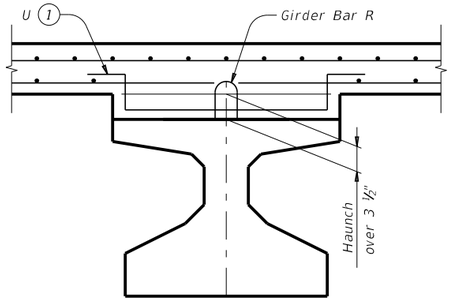
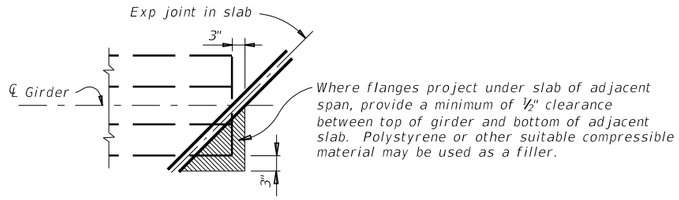
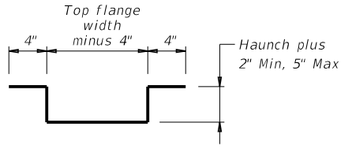


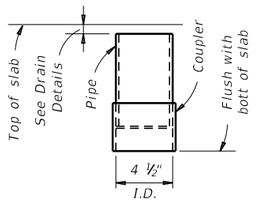
HAUNCH REINFORCING DETAIL



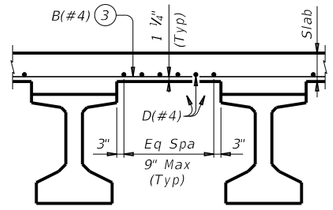
TREATMENT AT GIRDER END FOR SKEWED SPANS



BARS U (#4)

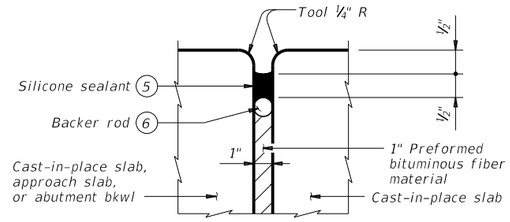


C-I-P DRAIN DETAIL (2)

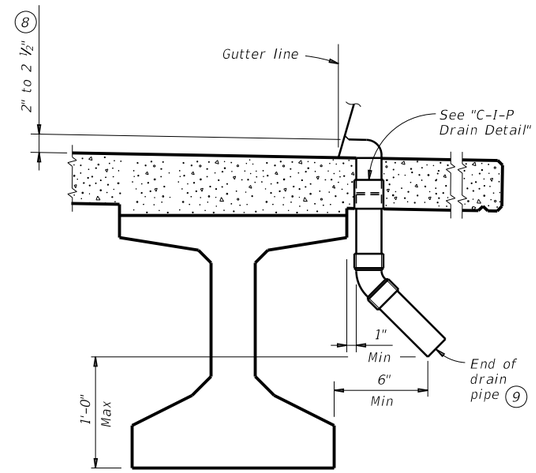


TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.



TYPE A JOINT DETAIL (7)



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(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.
4. Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
   Uncoated ~ #4 = 1'-7"
   Epoxy coated ~ #4 = 2'-5"
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 fittings 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 finishing 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 Specifications.

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.

SHEET 1 OF 2

Texas Department of Transportation

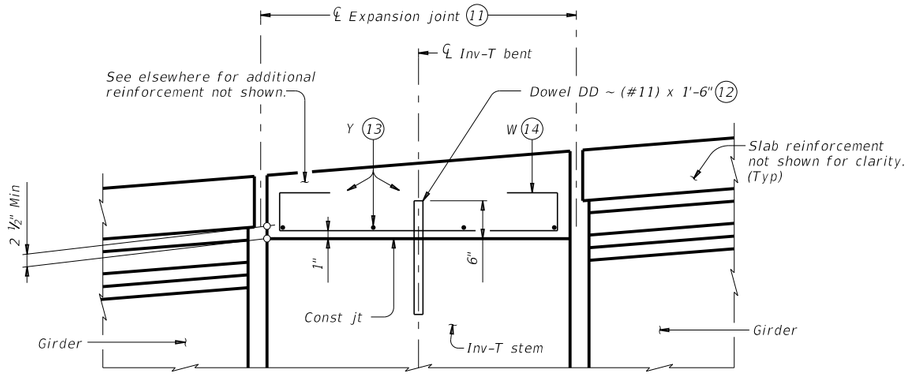
Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

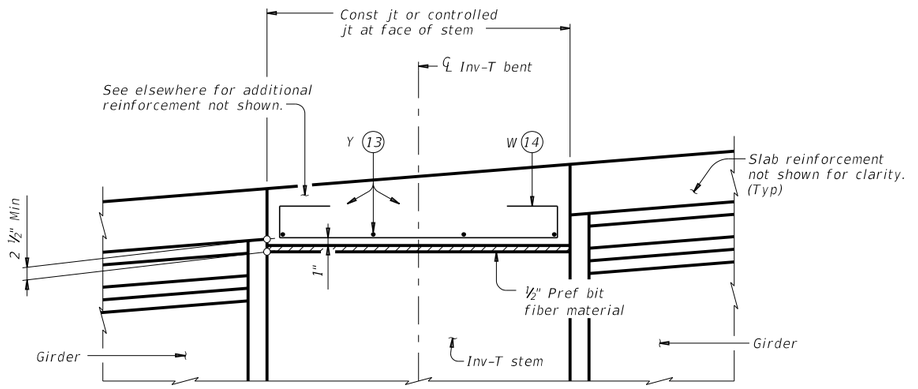
PRESTR CONCRETE I-GIRDERS

IGMS

FILE: igmsstsl-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
10-19: Modified Note 7. Type A now a pay item.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		117

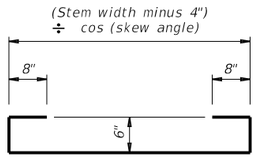


SHOWING EXPANSION JOINTS

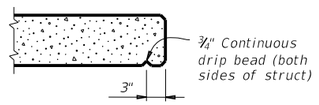


SHOWING CONST JTS OR CONTROLLED JTS

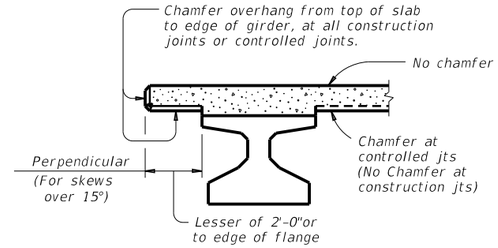
REINFORCEMENT OVER INV-T BENTS



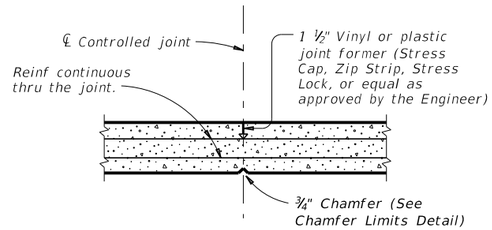
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(11) See Layout for joint type.

(12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.

(13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

(15) See Span details for type of joint and joint locations.

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Vidal.Ngoumnai

SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS

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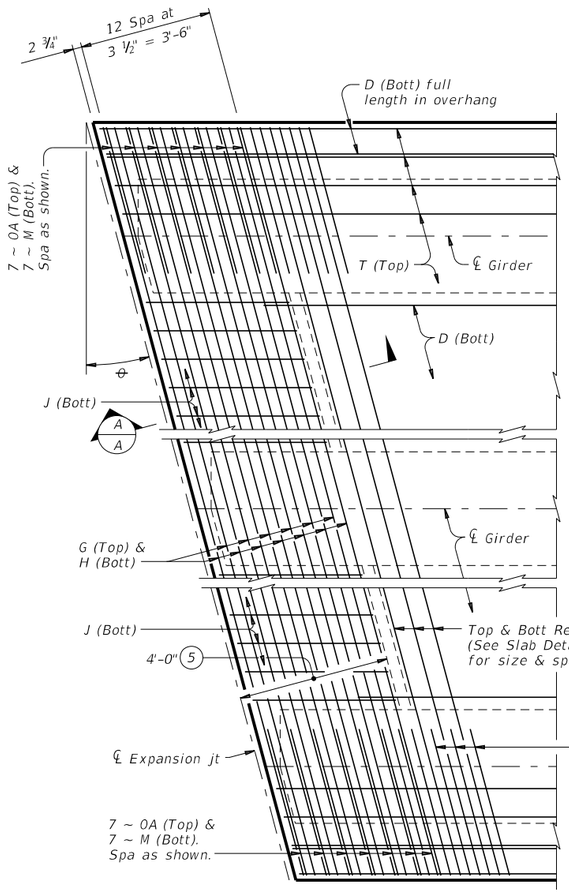
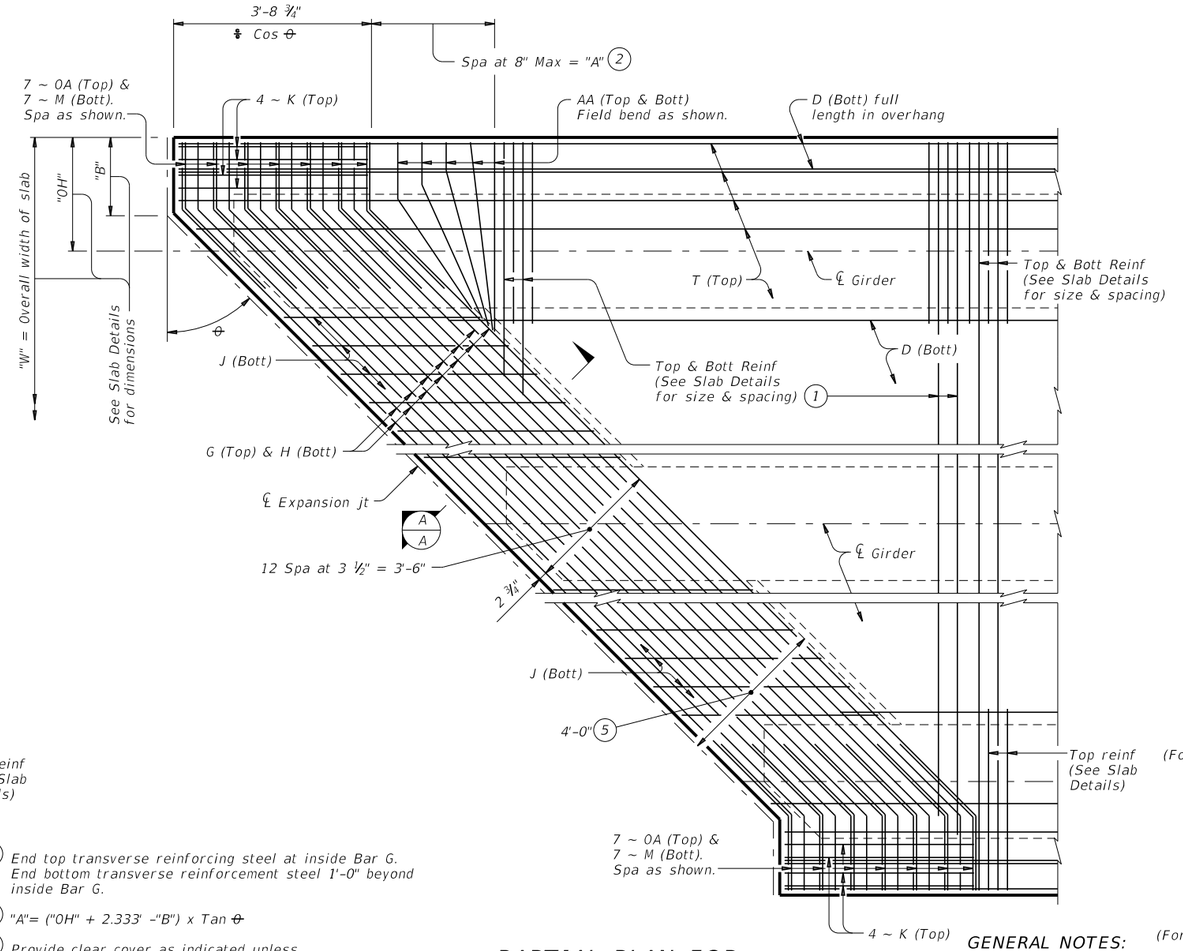
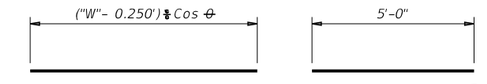


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



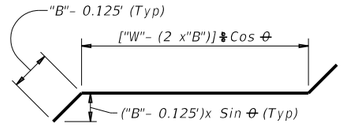
PARTIAL PLAN FOR SLABS WITH BREAKBACK

1. End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
2. "A"= ("0H" + 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.

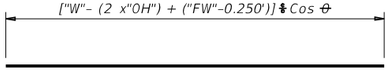


BARS G (#4) (For slabs without breakbacks)

BARS K (#4) (4)



BARS G (#4) (For slabs with breakbacks)

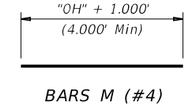


"FW" = girder's top flange width (ft)

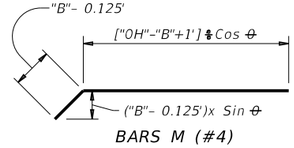
BARS H (#4)

BARS AA (#5) (4)

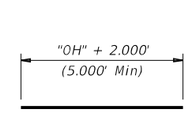
BARS J (#4)



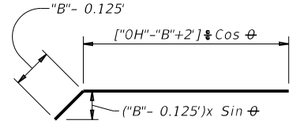
BARS M (#4) (For slabs without breakbacks)



BARS M (#4) (For slabs with breakbacks)



BARS OA (#5) (For slabs without breakbacks)



BARS OA (#5) (For slabs with breakbacks)

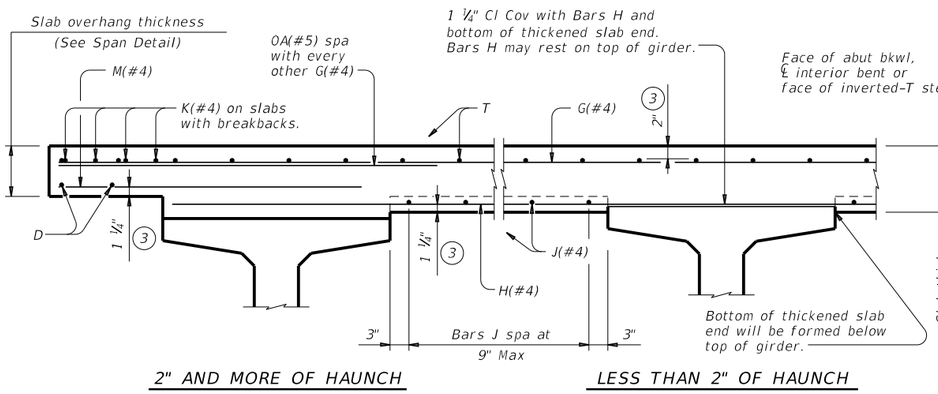
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
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, K and OA 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"
Epoxy Coated ~ #4 = 2'-5"

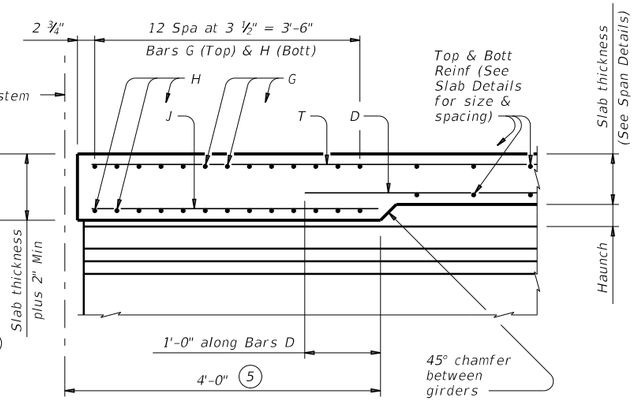
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



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)

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

THICKENED SLAB END DETAILS

PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS

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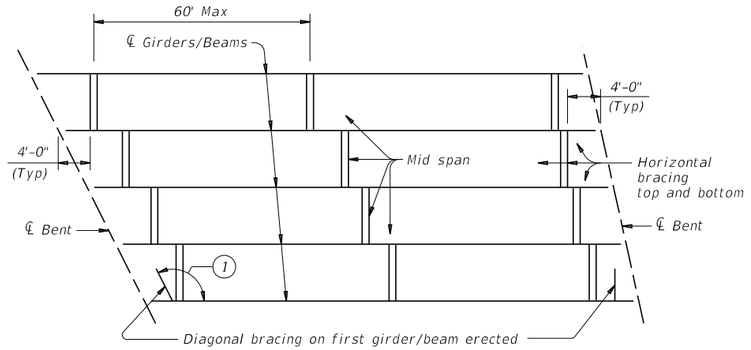
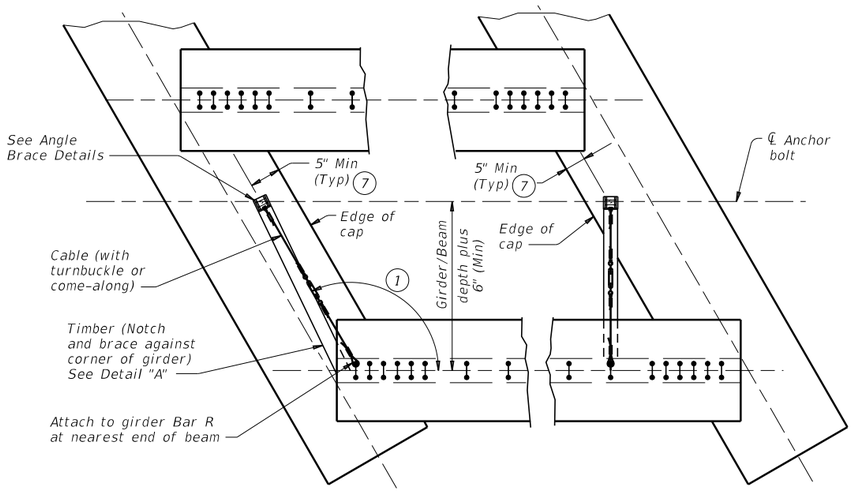
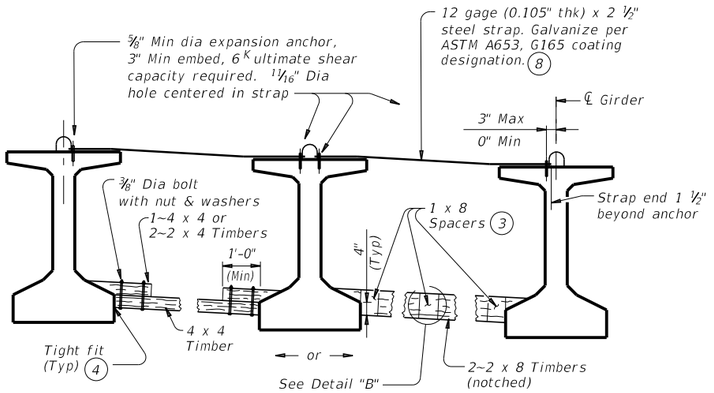


ERECTION BRACING

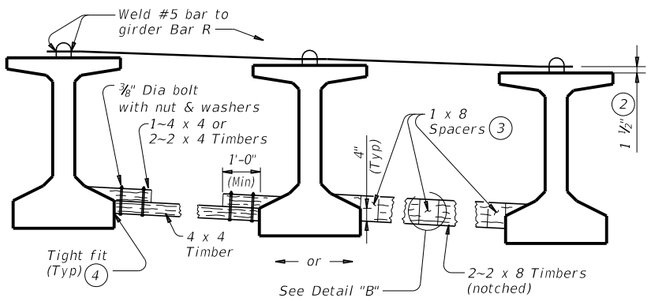


PLAN



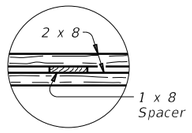
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



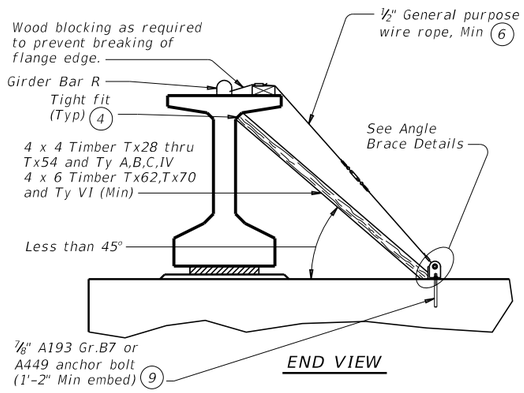
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS 5



PLAN

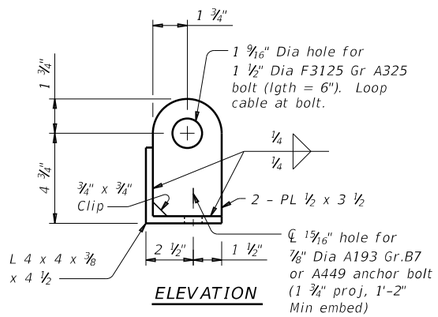
DETAIL "B"



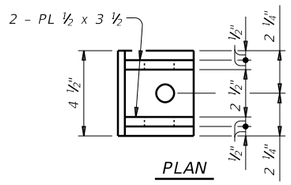
END VIEW

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.

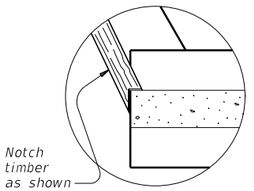
ERECTION BRACING:

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
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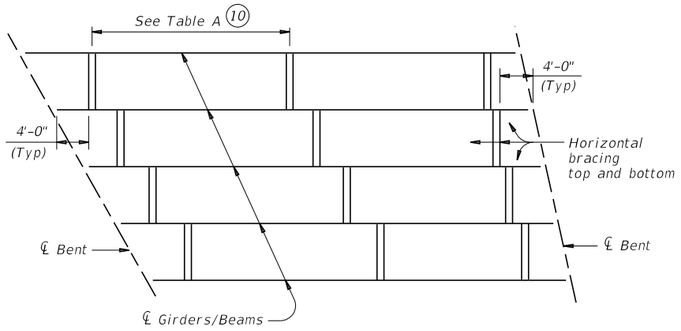
	AMA	POTTER		120



SLAB PLACEMENT BRACING

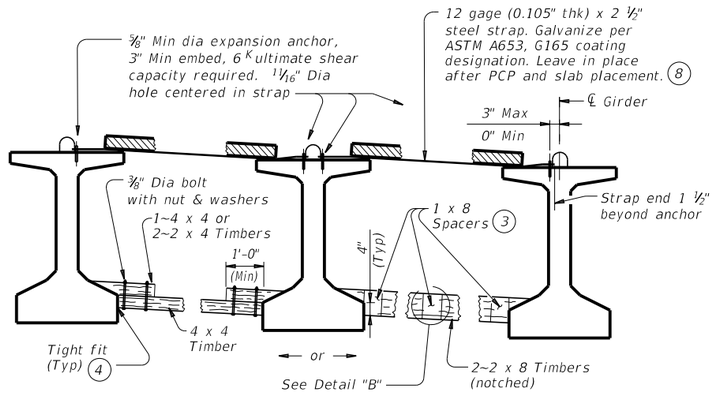
TABLE A

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

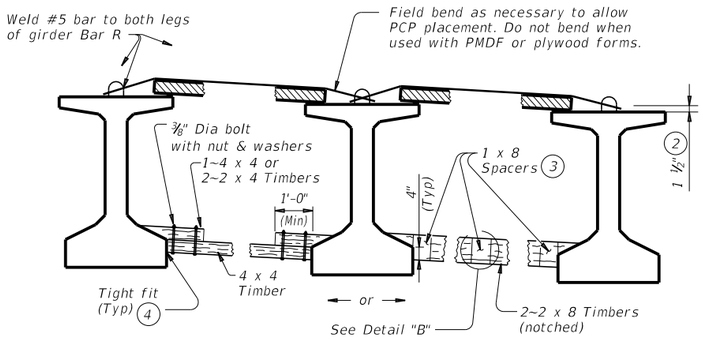
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

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

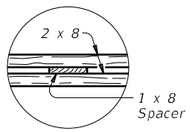
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



PLAN

DETAIL "B"

(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".

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	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		121

DATE: 10/11/2023 12:04:15 PM
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DATE: 10/9/2023 5:40:38 PM
FILE: c:\tms\bridgeformer-pw\zach.beil\dms21579\038402-pbcstd01-21-MOD-01.dgn
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See Interior Bent sheet for cap reinforcing not shown.

℄ Bent & ℄ Column

6 Bars PS4(#4)

8 Bars PD(#11) (2)

4'-0" Min

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

PART PLAN
(42" Dia Column)

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

6 Bars PS4(#4) at 6" Spa

See Interior Bent sheet for cap reinforcing not shown.

Bars PD(#11) Embed into bent cap

2'-10" Min

½" ±

4'-0" Min

Grout

1 ½" Min
4" Max

8 Bars PD(#11) (2)

1'-0"

3'-6"

1'-0"

3 ES

1'-0"

1'-0"

5'-6" Min

Bars PD(#11) embed into column (1)

℄ Bent cap and ℄ Column

End column Bars V 1 ½" and Bars Z 2" below top of concrete.

"H" ~ See Bridge Layout (1)

℄ Column

See Interior Bent sheet for column reinforcing not shown.

Top of drilled shaft or footing

See Bridge Layout for foundation type. See Common Foundation Details (FD) standard for details.

PART ELEVATION
(42" Dia Column)

See Interior Bent sheet for cap reinforcing not shown.

℄ Bent & ℄ Column

6 Bars PS3(#4)

6 Bars PD(#11) (2)

3'-3" Min

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

PART PLAN
(36" Dia Column)

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

6 Bars PS3(#4) at 6" Spa

See Interior Bent sheet for cap reinforcing not shown.

Bars PD(#11) Embed into bent cap

2'-10" Min

¼" ±

3'-6" Min

Grout

1 ½" Min
4" Max

6 Bars PD(#11) (2)

9 ½"

3'-0"

9 ½"

9 ½"

9 ½"

5'-6" Min

Bars PD(#11) embed into column (1)

℄ Bent cap and ℄ Column

End column Bars V 1 ½" and Bars Z 2" below top of concrete.

"H" ~ See Bridge Layout (1)

℄ Column

See Interior Bent sheet for column reinforcing not shown.

Top of drilled shaft or footing

See Bridge Layout for foundation type. See Common Foundation Details (FD) standard for details.

PART ELEVATION
(3'-0" Square Column)

See Interior Bent sheet for cap reinforcing not shown.

℄ Bent & ℄ Column

5 Bars PS2(#4)

6 Bars PD(#9) (2)

2'-9" Min

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

PART PLAN
(30" Dia Column)

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

5 Bars PS2(#4) at 6" Spa

See Interior Bent sheet for cap reinforcing not shown.

Bars PD(#9) Embed into bent cap

2'-3" Min

¼" ±

3'-0" Min

Grout

1 ½" Min
4" Max

6 Bars PD(#9) (2)

7 ½"

2'-6"

7 ½"

7 ½"

7 ½"

3'-6" Min

Bars PD(#9) embed into column (1)

℄ Bent cap and ℄ Column

End column Bars V 1 ½" and Bars Z 2" below top of concrete.

"H" ~ See Bridge Layout (1)

℄ Column

See Interior Bent sheet for column reinforcing not shown.

Top of drilled shaft or footing

See Bridge Layout for foundation type. See Common Foundation Details (FD) standard for details.

PART ELEVATION
(30" Dia Column)

See Interior Bent sheet for cap reinforcing not shown.

℄ Bent & ℄ Column

4 Bars PS1(#4)

4 Bars PD(#9) (2)

2'-6" Min

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

PART PLAN
(24" Dia Column)

4" Dia galvanized 26 gage spiral steel ducts. Install plumb.

4 Bars PS1(#4) at 6" Spa

See Interior Bent sheet for cap reinforcing not shown.

Bars PD(#9) Embed into bent cap

2'-0" Min

½" ±

2'-6" Min

Grout

1 ½" Min
4" Max

4 Bars PD(#9) (2)

5 ½"

2'-0"

5 ½"

5 ½"

5 ½"

3'-6" Min

Bars PD(#9) embed into column (1)

℄ Bent cap and ℄ Column

End column Bars V 1 ½" and Bars Z 2" below top of concrete.

"H" ~ See Bridge Layout (1)

℄ Column

See Interior Bent sheet for column reinforcing not shown.

Top of drilled shaft or footing

See Bridge Layout for foundation type. See Common Foundation Details (FD) standard for details.

PART ELEVATION
(24" Dia Column)

PS1	1'-4 ¼"
PS2	1'-8 ¼"
PS3	2'-0 ¼"
PS4	2'-5 ¼"

5" (Typ)

PS1	PS2	PS3	PS4
1'-4 ¼"	1'-8 ¼"	2'-0 ¼"	2'-5 ¼"

BARS PS (#4)

1 MOD 10/09/2023 Modified 36" dia. column to 3'-0" square column.

SIGNING ENGINEER RESPONSIBLE FOR MODIFICATIONS AS NOTES. ALL OTHER DETAILS INT HE UNMODIFIED CONDITION ARE SHOWN IDENTICAL TO THE UNMODIFIED STANDARD.

(1) Bars PD may need to be embedded in footing or drilled shaft for short columns.

(2) Location tolerance of dowels in columns/drilled shafts is ½" from plan location, transversely and longitudinally.

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10-09-2023

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CONCRETE BENT CAP OPTION
FOR ROUND COLUMNS

PBC-RC(MOD)

FILE: pbcstd01-21.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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	AMA	POTTER		122

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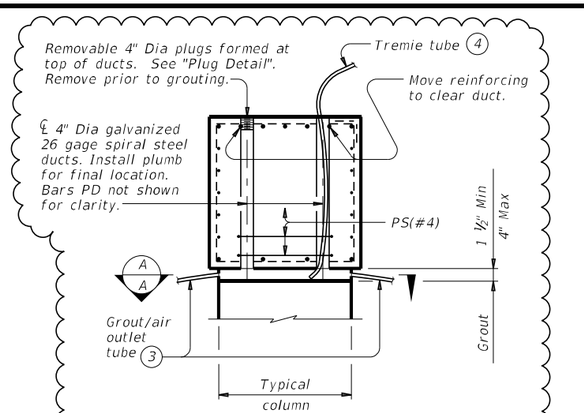
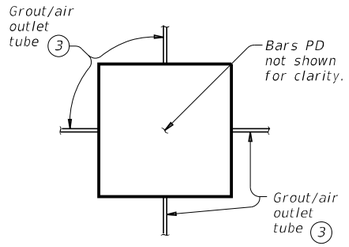
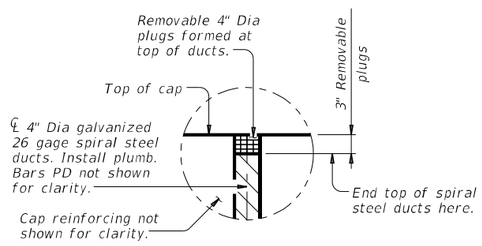


TYPICAL SECTION THRU CAP

(Showing example of ducts and cap reinforcing.)

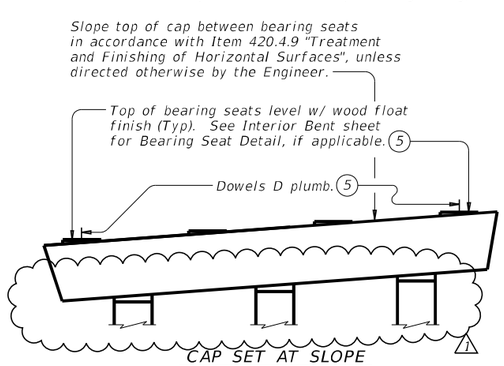


SECTION A-A

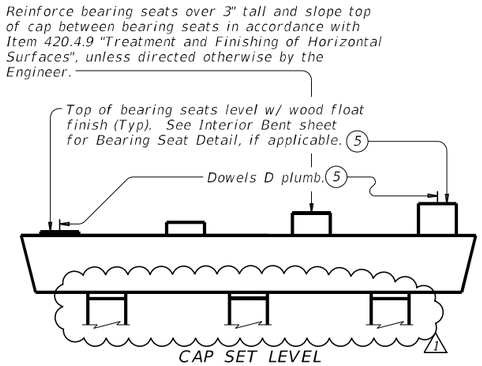


PLUG DETAIL

(Plug is used to keep concrete out of ducts during concrete placement. Remove prior to grouting)



CAP SET AT SLOPE



CAP SET LEVEL

EXAMPLES OF PRECAST BENTS WITH DOWELS D

(3) Provide at least 4 grout/air outlet tubes equally spaced around the perimeter of the column. Install at bottom of cap to avoid air entrapment. Seal off tubes sequentially when a steady flow of grout without air occurs. Secondary tubes to help drain water, located at top of column, may also be installed.

(4) Continuous gravity-flow grouting through a tremie tube is recommended. With this method, lower a flexible tremie tube through one of the vertical ducts to the bottom of the bedding layer and fill the connection from the bottom upward with a continuous flow of grout. This method requires a sufficient amount of grout to be mixed prior to grouting and that the funnel connected to the tremie tube have adequate volume capacity (4 quarts Min is recommended). A valve may be used to stop the flow during grouting to allow refilling the funnel or to tamp the grout. The tube should remain within the grout and gradually withdrawn as the level of the grout rises in the ducts. It is critical to ensure a continuous flow of grout to avoid air entrapment. Alternative methods, including pressure grouting with low pressure pumps, may be used provided they are proved effective in providing void-free connections during the mock-up phase.

(5) Unless otherwise shown.

CONSTRUCTION NOTES:

Cap Fabrication:

Construct and cure cap in accordance with Item 420, "Concrete Substructures". If fabricated at an offsite location, construct and cure cap in accordance with Item 424, "Precast Concrete Structural Members (Fabrication)". Secure ducts to prevent their movement during concrete placement. Location tolerance of ducts is ½" from plan location, transversely and longitudinally. Seal ducts to prevent intrusion of concrete.

Bearing seats may be precast with the cap. Bearing seats over 3" in height must be reinforced as per Item 420.4.9. Do not locate lift points at bearing seats if bearing seats are precast.

Cap concrete must achieve a compressive strength of 2,500 psi prior to lifting. Limit flexural stress in cap to 250 psi during handling and storage. Store and handle caps in accordance with Item 424, "Precast Concrete Structural Members (Fabrication)". Do not stack caps. Caps that become cracked or otherwise damaged may be rejected.

Cap-to-Column Connection:

Make a trial batch of grout using the same material, equipment and personnel to be used for actual grouting operations and grout a mock-up of the connection at least one week before grouting and in the presence of the Engineer. This mock-up test must demonstrate the reliability of the Contractor's grouting procedures to provide a connection free of voids. Field test the trial batch grout to the same level required for the actual grouting.

Caps may be placed on columns/drilled shafts after column/drilled shaft concrete has achieved a flexural stress of 355 psi (or 2,500 psi compressive strength). Use plastic shims or friction collars to support the cap at the proper elevation prior to grouting. Total area of plastic shims used on top of each column may not exceed 6 percent of the column area. Column/drilled shaft curing may be interrupted a maximum of 2 hours for placement of plastic shims or friction collars and cap placement.

Surfaces in contact with grout must be clean and in a saturated, surface-dry condition, immediately prior to grouting. Provide water tight forms. Fill the forms with water and drain just prior to grouting. Ponding or free-standing water is not permitted. Use compressed air to blow out excess water.

Mix grout in accordance with the manufacturer's directions. Evidence of frothing, foaming, or segregation is cause for rejection. Transport grout from mixer to final location by wheel barrow, bucket or pumping.

Perform sampling and testing of grout by trained personnel at the Contractor's expense and while witnessed by the Engineer. Grouted connections must be free of voids.

Trowel finish top surface of cap anchorage ducts flush with top of cap. Wet mat cure these locations for at least 48 hours. Recess lifting loops 1-inch minimum using exothermic cutting rods. Do not overheat or damage the surrounding concrete. Abrade the concrete surfaces of excavation and end of the lifting loop to remove all slag with a needle gun, steel brush, or other suitable means. Coat the inside of the recessed area, including the lifting loops, with 10 mils (minimum) of neat, Type VIII epoxy and patch the recess with epoxy mortar.

Friction collars may be removed, if used, and beams placed on the cap after the grout obtains a compressive strength of 2,500 psi. Subsequent loading can occur when the grout reaches its final required 28 day compressive strength.

MATERIAL NOTES:

Provide a pre-qualified grout from TxDOT's Material Producer List "Cementitious Grouts and Mortars for Miscellaneous Applications", conforming to DMS-4675.

Provide semi-rigid spirally crimped, corrugated duct of galvanized, cold rolled steel conforming to ASTM A653. Corrugations must have a minimum amplitude of 0.094".

Grout tubes and forms must be approved prior to grouting.

Provide Grade 60 reinforcing steel. Epoxy coat or galvanize all reinforcement if column reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

The Contractor has the option to provide precast bent caps in accordance with the details shown. No additional payment will be made if the Contractor uses precast caps.

Submit shop drawings of precast caps for approval prior to construction. Indicate lifting attachments and locations on the shop drawings.

Precast Concrete Bent Cap Option shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

See Interior Bent sheet for details and notes not shown.

Reinforcing bar dimensions shown are out-to-out of bar.

1 MOD 10/09/2023 Modified 36" dia. column to 3'-0" square column.

SIGNING ENGINEER RESPONSIBLE FOR MODIFICATIONS AS NOTES. ALL OTHER DETAILS INT HE UNMODIFIED CONDITION ARE SHOWN IDENTICAL TO THE UNMODIFIED STANDARD.

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10-09-2023

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CONCRETE BENT CAP OPTION FOR ROUND COLUMNS

PBC-RC (MOD)

FILE: pbcstd01-21.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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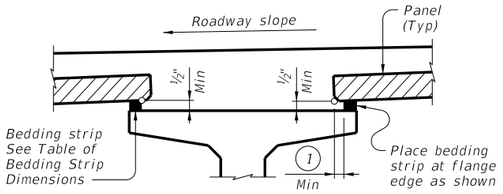
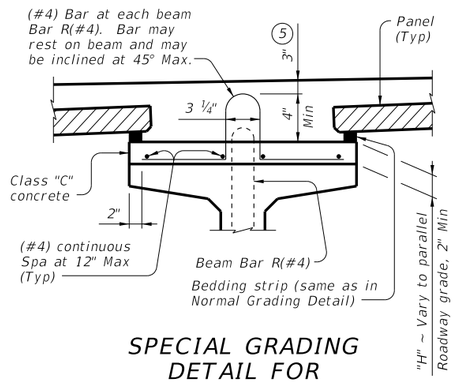


NORMAL GRADING DETAIL (3)

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. Transverse 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"

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.

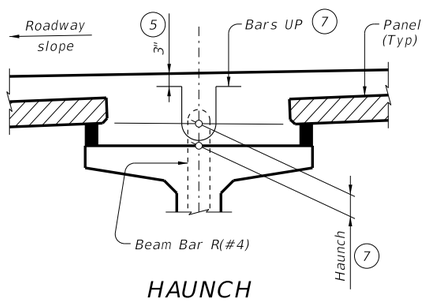
These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings.

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".

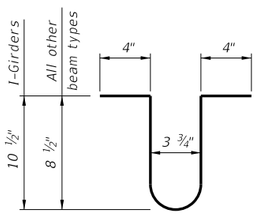
Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

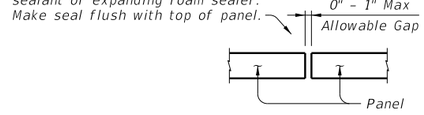


HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)

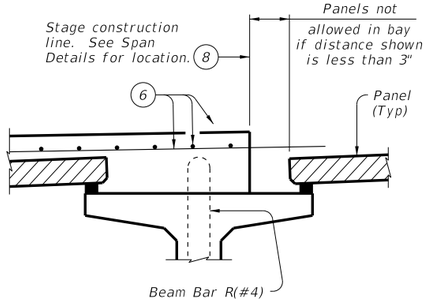


BARS UP (#4) (7)

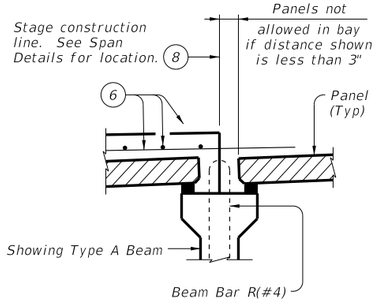


PANEL JOINTS

(Panel reinforcing not shown for clarity.
The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



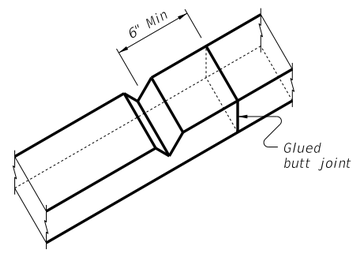
PRESTR CONC I-GIRDERS



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 — Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		124

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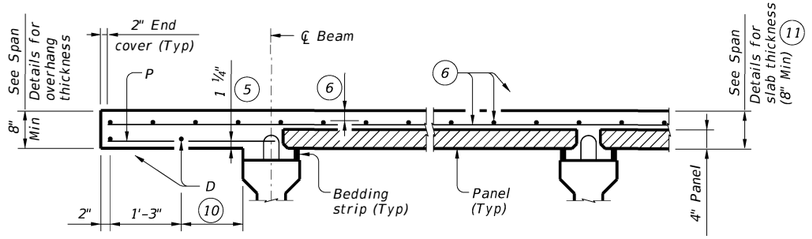
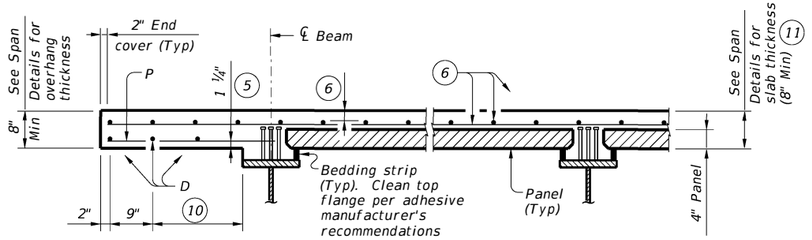
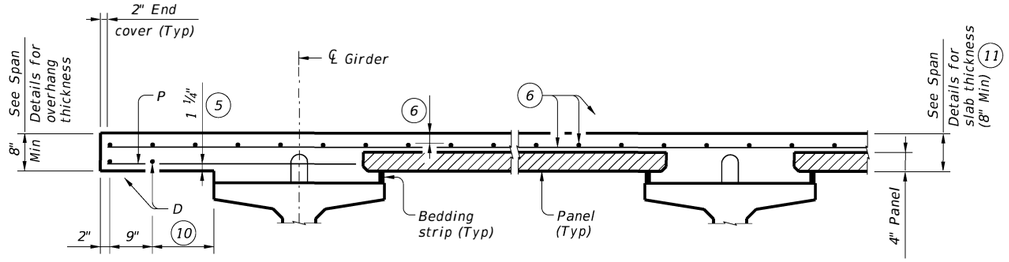


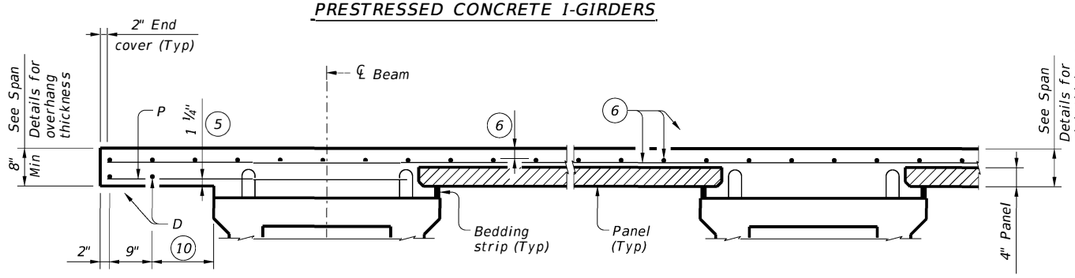
PRESTRESSED CONCRETE I-BEAMS



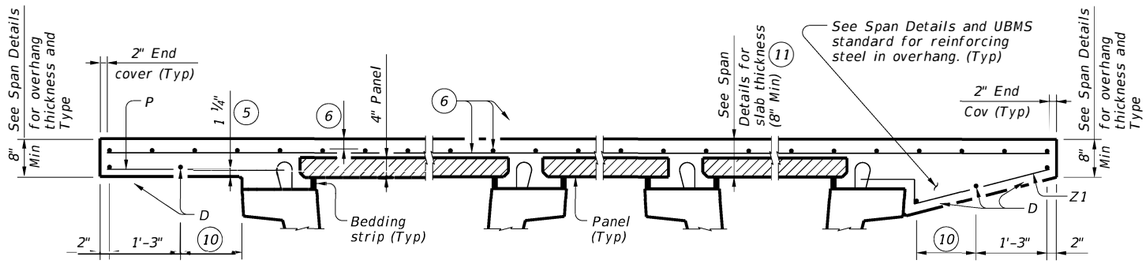
STEEL BEAMS (13)



PRESTRESSED CONCRETE I-GIRDERS



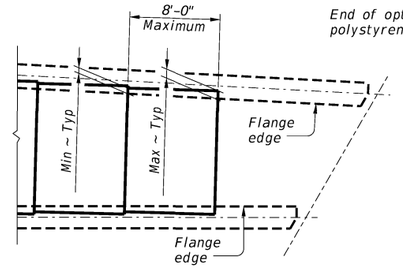
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

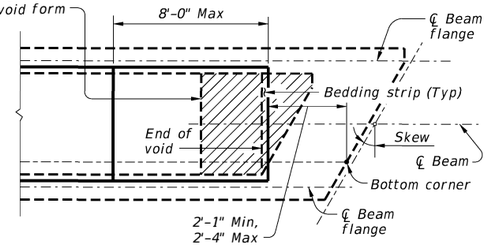
SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS



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. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

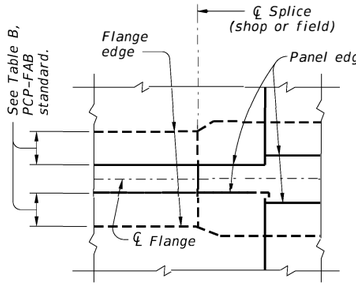
(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(10) Equally space additional bar if more than 1'-3" 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.

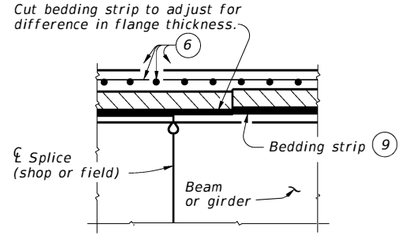
(12) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.

(13) Panels are allowed over top tension flanges, as approved by the 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.



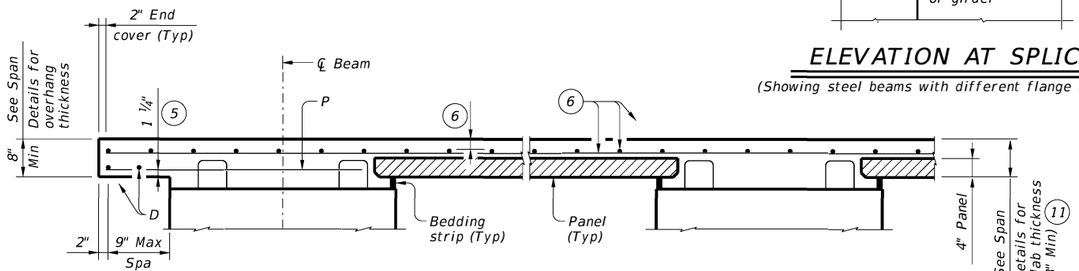
PLAN AT SPLICE

(Showing steel beams with flange width transition)



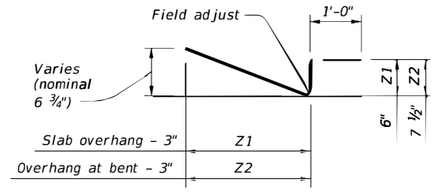
ELEVATION AT SPLICE

(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)

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Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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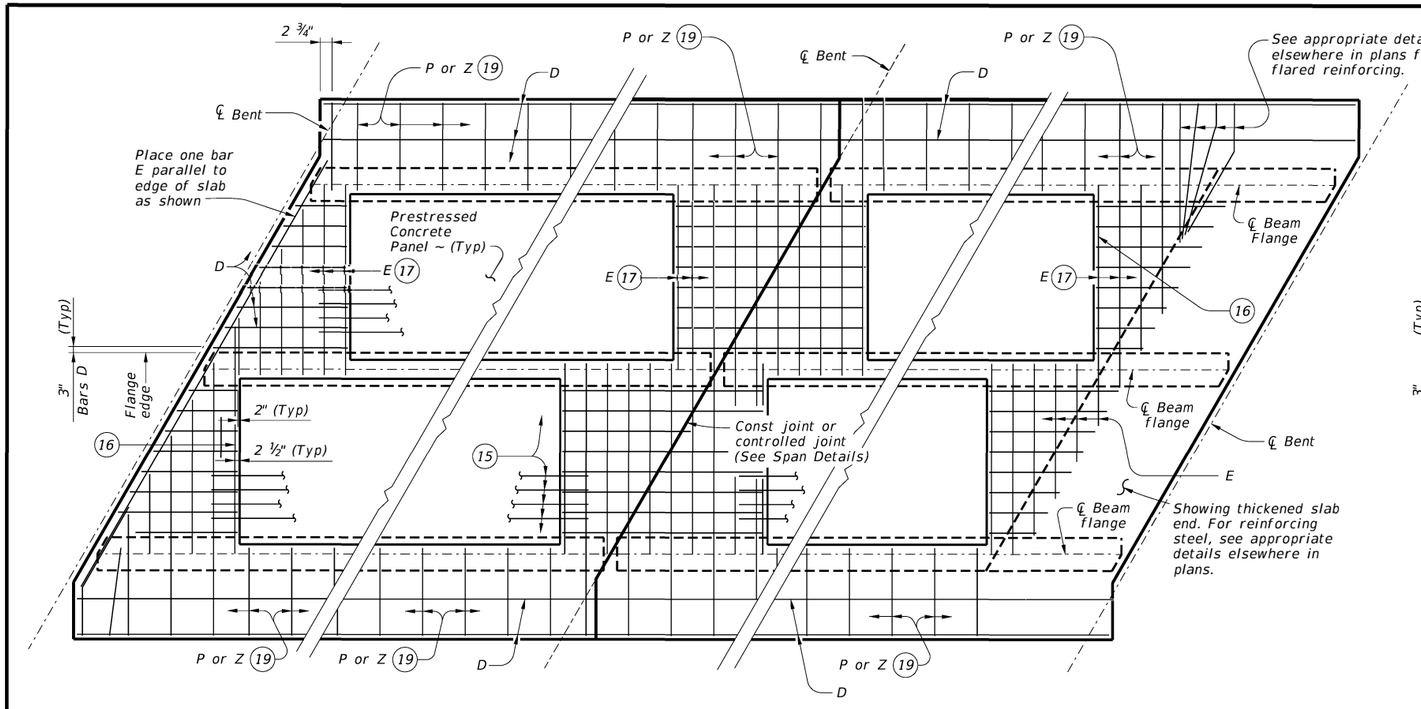
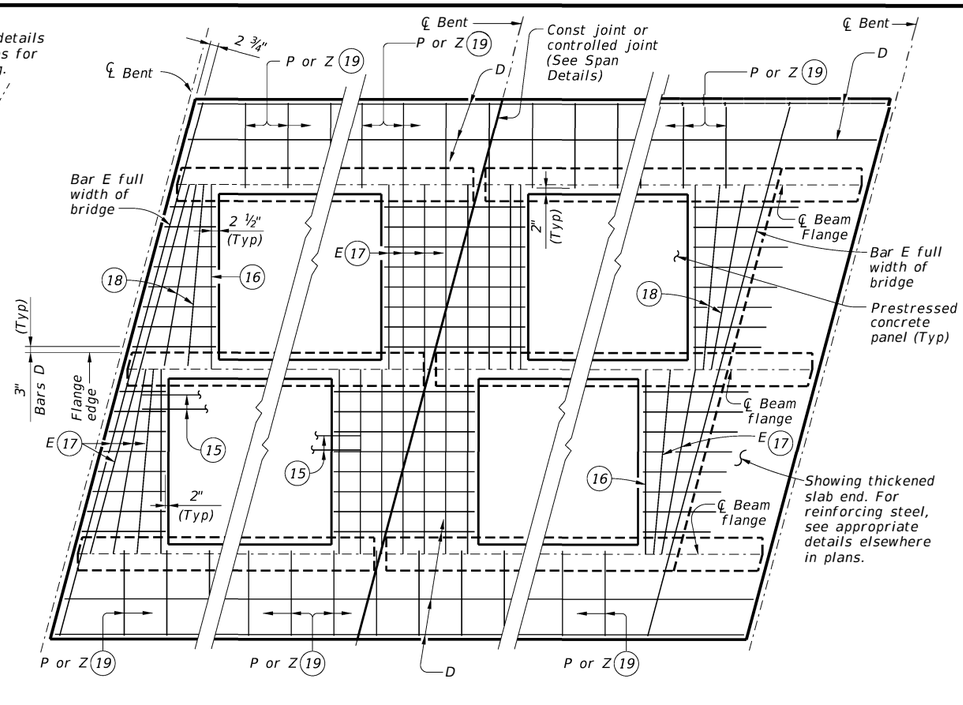
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		125

DATE:
FILE:



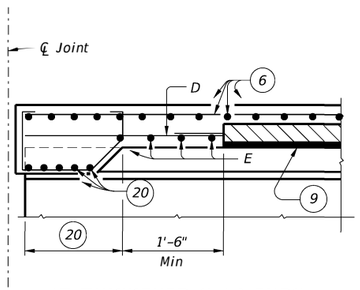
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

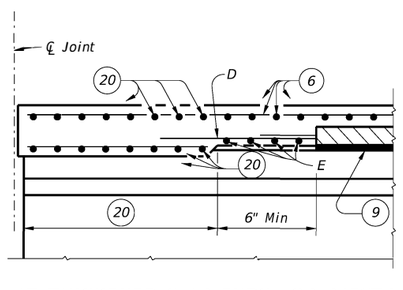


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

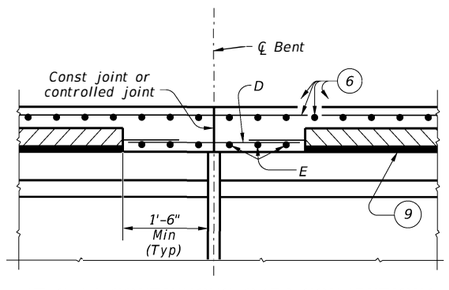
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



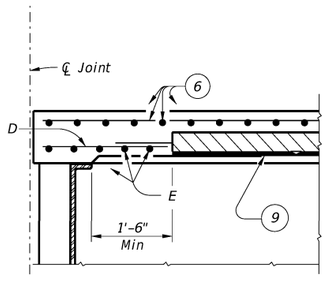
AT THICKENED SLAB ENDS FOR PRESTR CONCRETE U-BEAMS



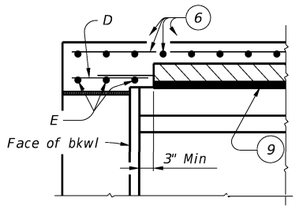
AT THICKENED SLAB ENDS FOR PRESTR CONCRETE I-BEAMS AND STEEL BEAMS



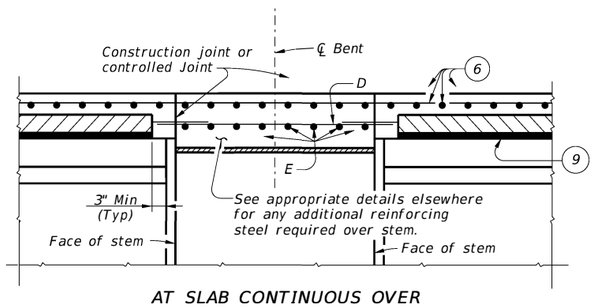
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BEAMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BEAMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BEAMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BEAMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse 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(#4) parallel to panel ends (Typ).

(17) Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.

(18) Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.

(19) Where possible, Bars E(#4) 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	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

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Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
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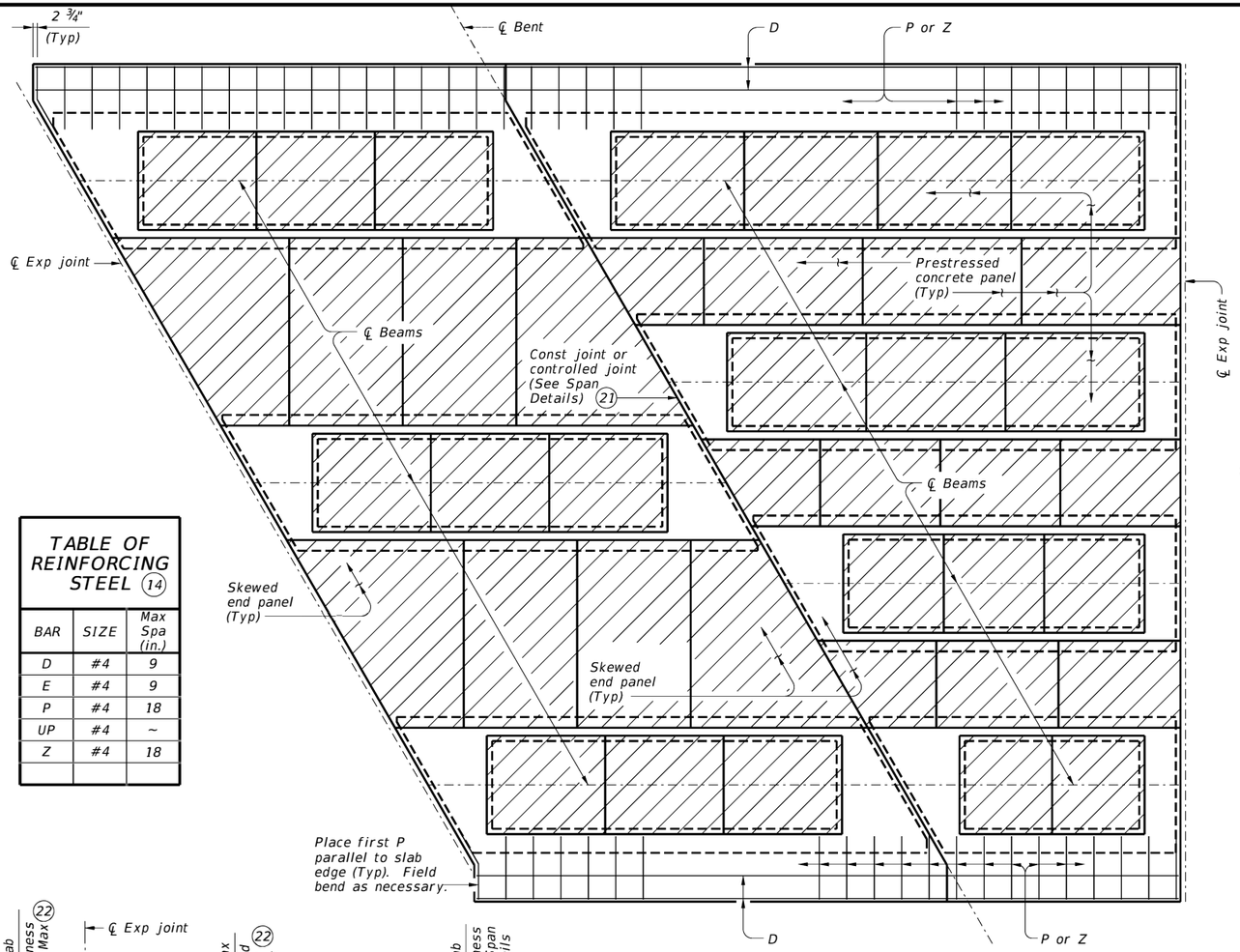
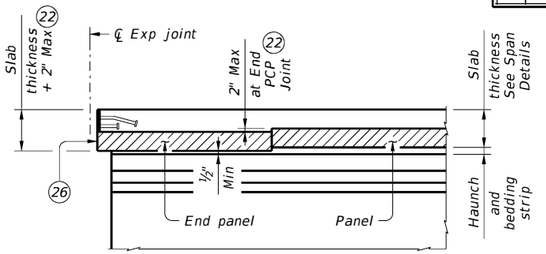


OPTION 2 ~ PLAN OF SLAB

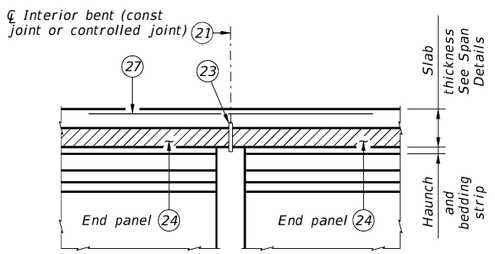
(Showing U-Beams; other beams similar)

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



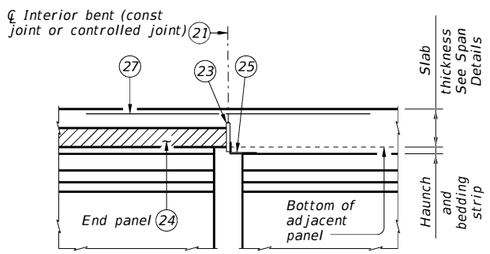
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-B, SEJ-M, SEJ-S(0), AJ, and Type A expansion joints only.



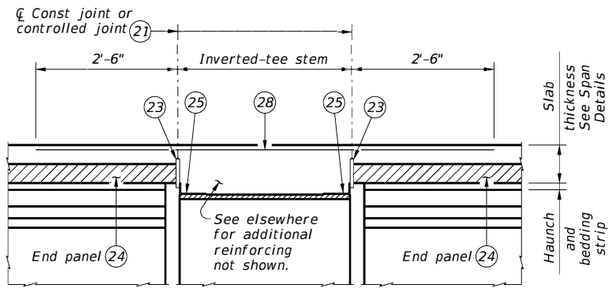
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

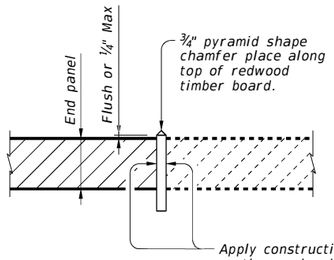
Panel against beam/girder end in adjacent span.



INVERTED-T BENT

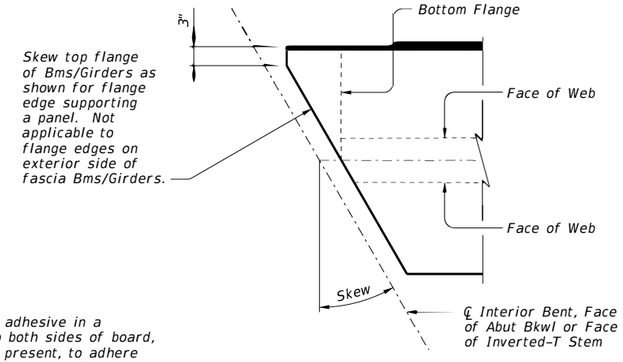
Panels against inverted-tee stem

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. Transverse 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, K and 0A from standard IGTS in the slab.

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PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		127

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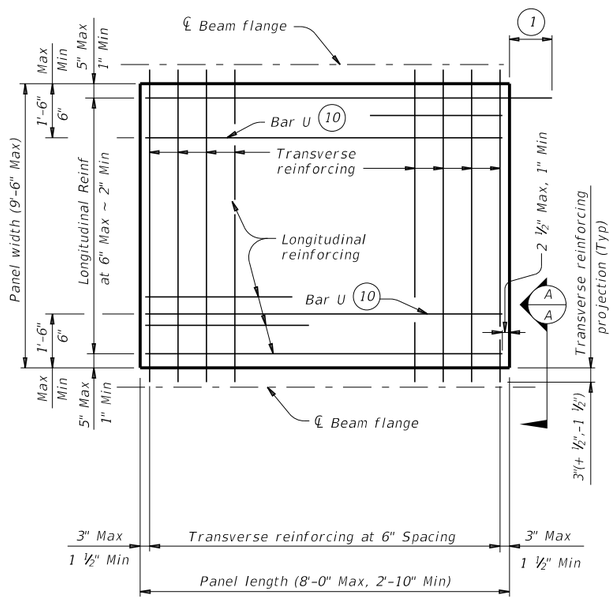
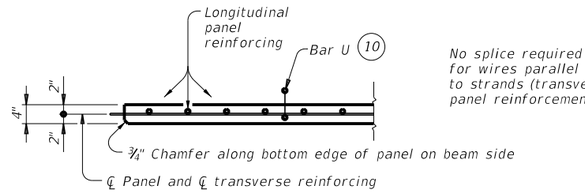
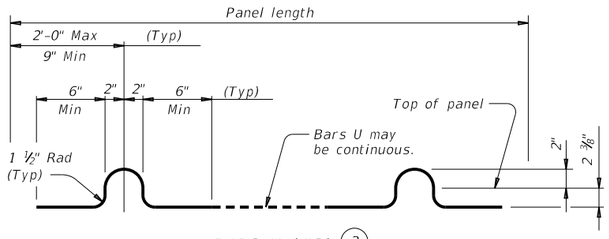


TYPICAL NON-SKEWED PANEL PLAN

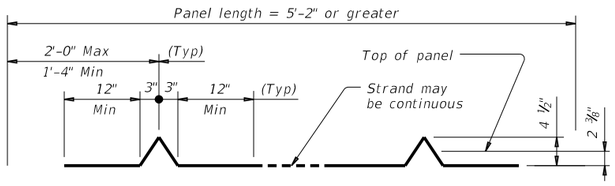


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)

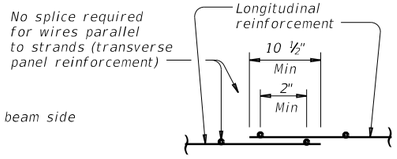


BARS U (#3) (2)



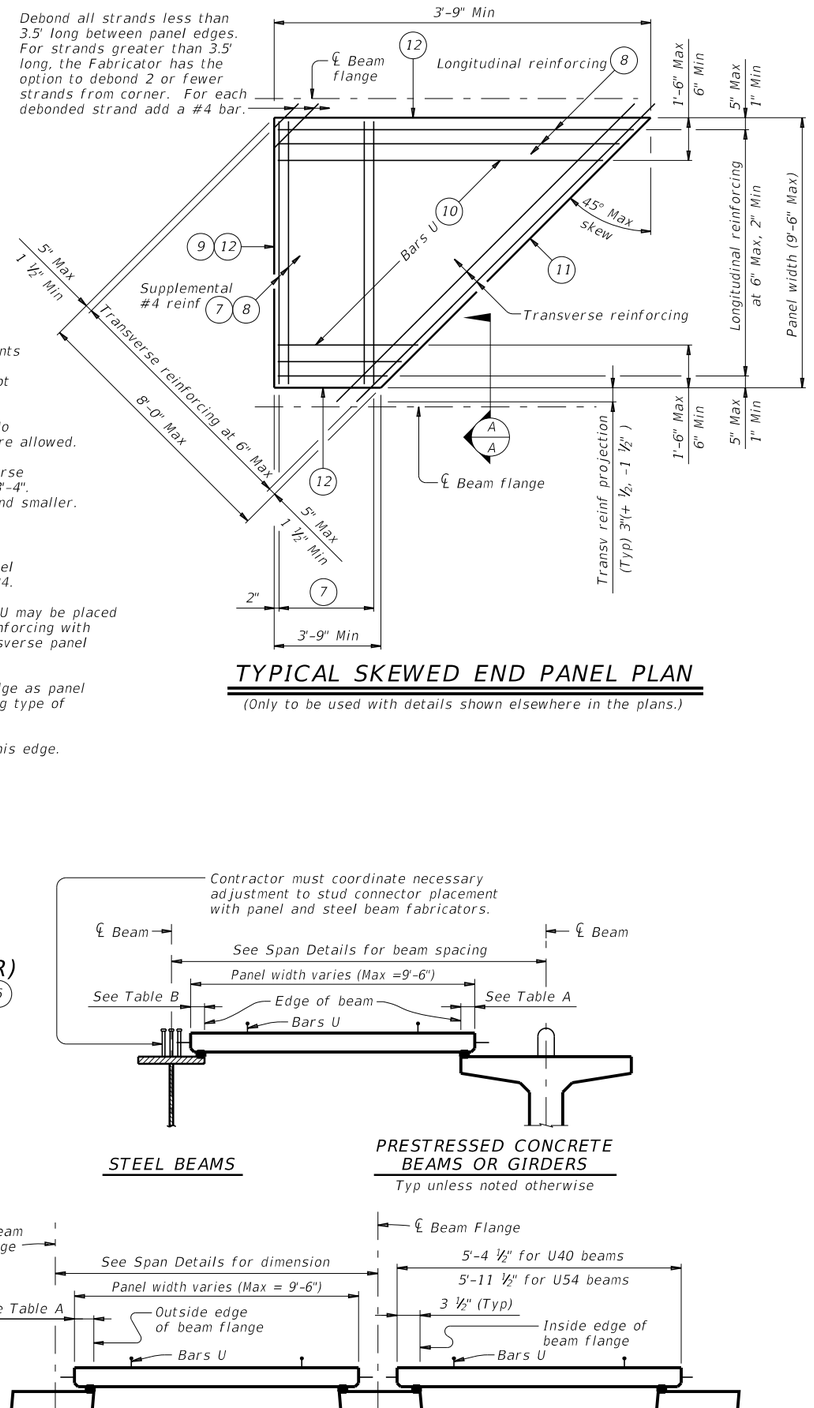
OPTIONAL STRAND FOR BARS U (3)

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.



WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)

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.



TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

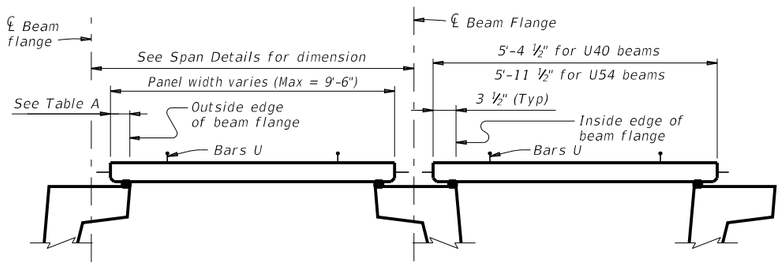
TABLE A (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½"	8 ½
U40 – 54	5 ½	5 ½	7
Tx28–70	6	5	7 ½
XB20 – 40	4	3	4 ½
XSB12 – 15	4	3	4 ½

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

STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

Typ unless noted otherwise



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

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.

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 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AMA	POTTER		128

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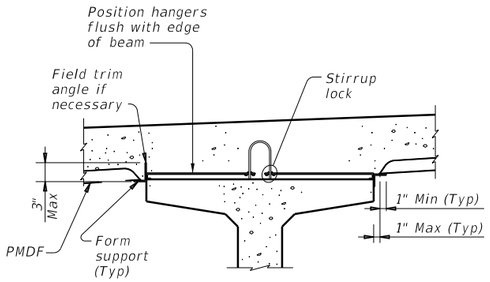
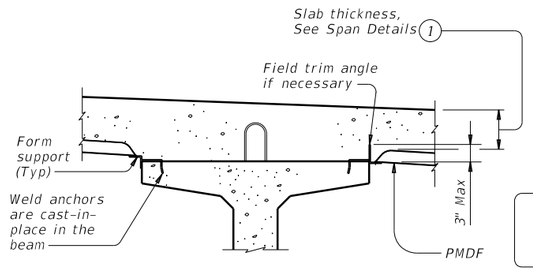
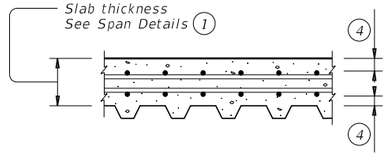


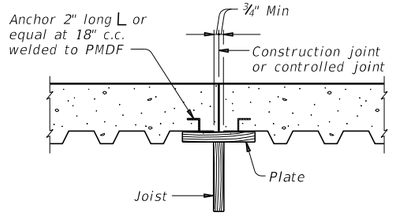
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS

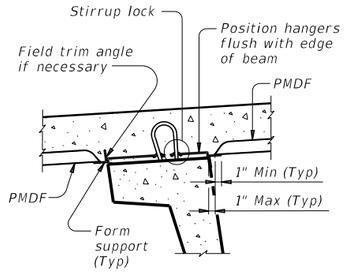


TYP LONGITUDINAL SLAB SECTION

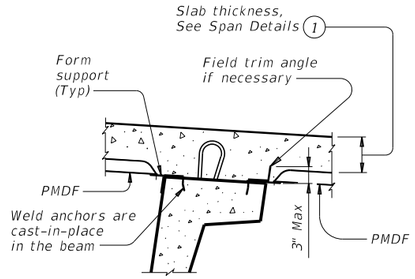


Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

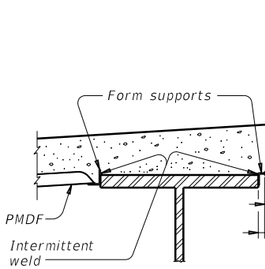
SECTION THRU CONSTRUCTION JOINT



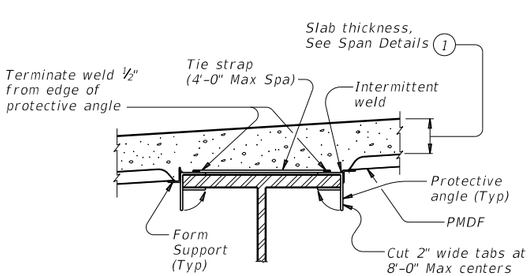
U-BEAMS WITH STIRRUP LOCKS



U-BEAMS WITH WELD ANCHORS

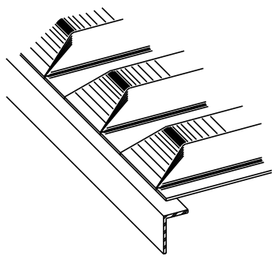


STEEL BEAMS AT COMPRESSION FLANGES



STEEL BEAMS AT TENSION FLANGES (2)

TYPICAL TRANSVERSE SECTIONS



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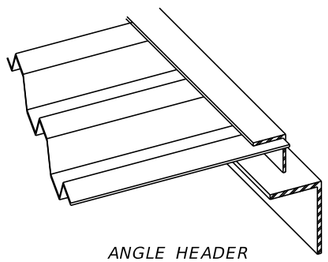
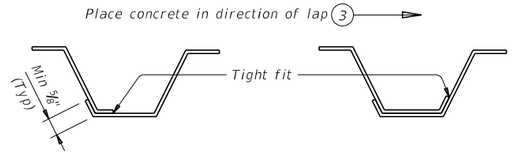


ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES



SIDE LAP DETAILS

(1) Slab thickness minus ⅝" if corrugations match reinforcing bars.

(2) Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.

(3) The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.

(4) See Span details for cover requirements.

FOR PRESTR CONC U-BEAM AND STEEL GIRDER BRIDGES:
Unless shown elsewhere in the plans, size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5. Bottom mat reinforcement and additional concrete is subsidiary to Item 422 "Concrete Superstructures."

FOR PRESTR CONC TX-GIRDER BRIDGES:
See Miscellaneous Slab Details, Prestr Concrete I-Girders (IGMS) standard sheet for bottom mat reinforcing.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.

Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.

The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.

All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:

As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.

Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

1/240 of the form design span, but not more than 0.75", for all design spans of railroad overpass bridge spans fully or partially over railroad right-of-way, and for all bridge spans of railroad underpass structures.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:

Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.

All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.

Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.

A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

Texas Department of Transportation

Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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02-20: Modified box note by adding steel beams/girders and subsidiary. 12-21: Updated max deflection for RR.	DIST	COUNTY		SHEET NO.
	AMA	POTTER		129

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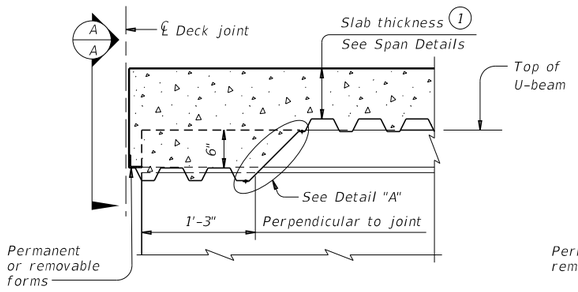
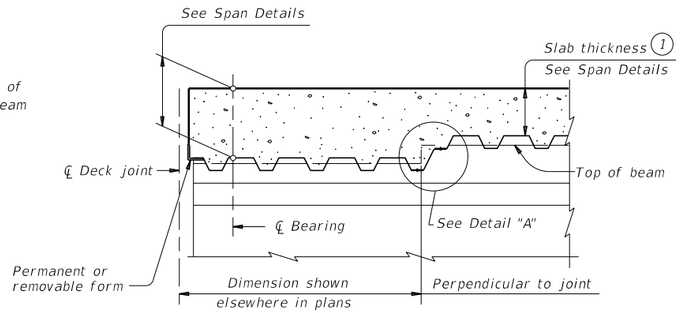
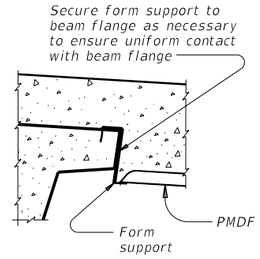


AT THICKENED SLAB END FOR U-BEAMS

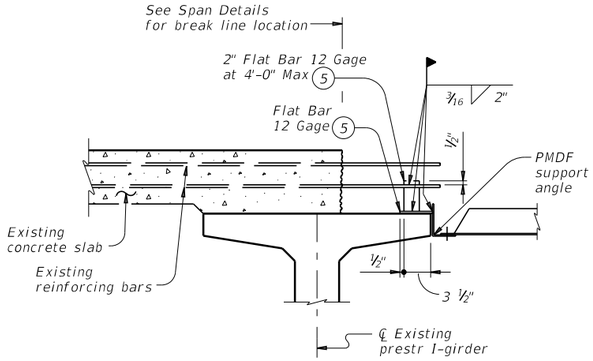


AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS

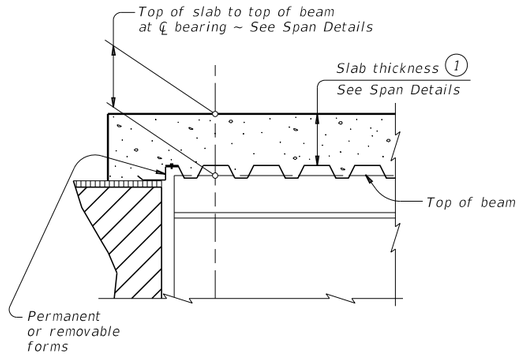
Showing I-beam block-out. No block-out for I-girders or steel beams.



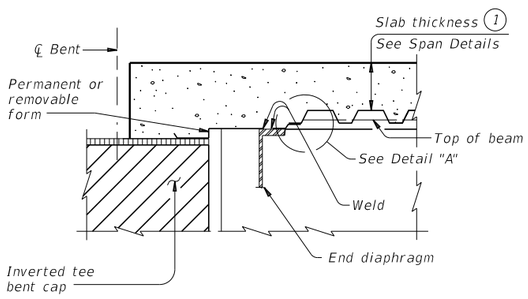
SECTION A-A



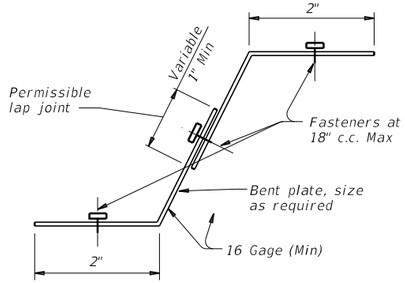
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



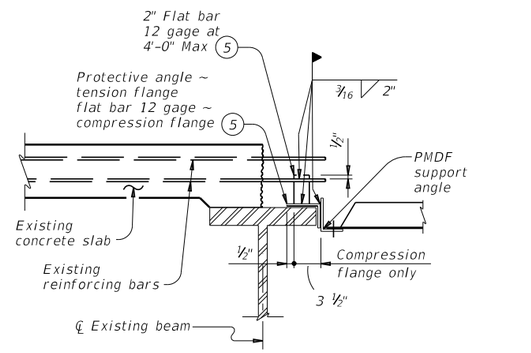
AT SLAB OVER ABUTMENT BACKWALL OR INVERTED-T STEM FOR CONCRETE BEAMS WITHOUT THICKENED SLAB END



AT SLAB OVER INVERTED-T STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END

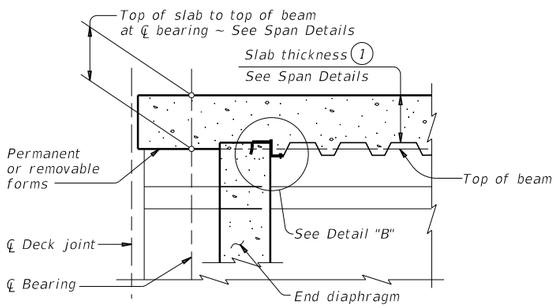


DETAIL "A"

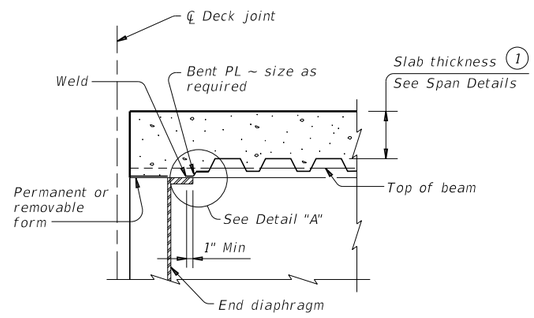


SHOWING STEEL BEAMS

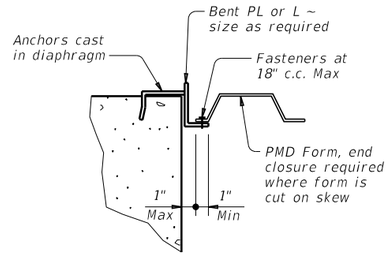
WIDENING DETAILS



AT CONCRETE END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

(1) Slab thickness minus 3/8" if corrugations match reinforcing bars

(5) Minimum yield stress of 12 gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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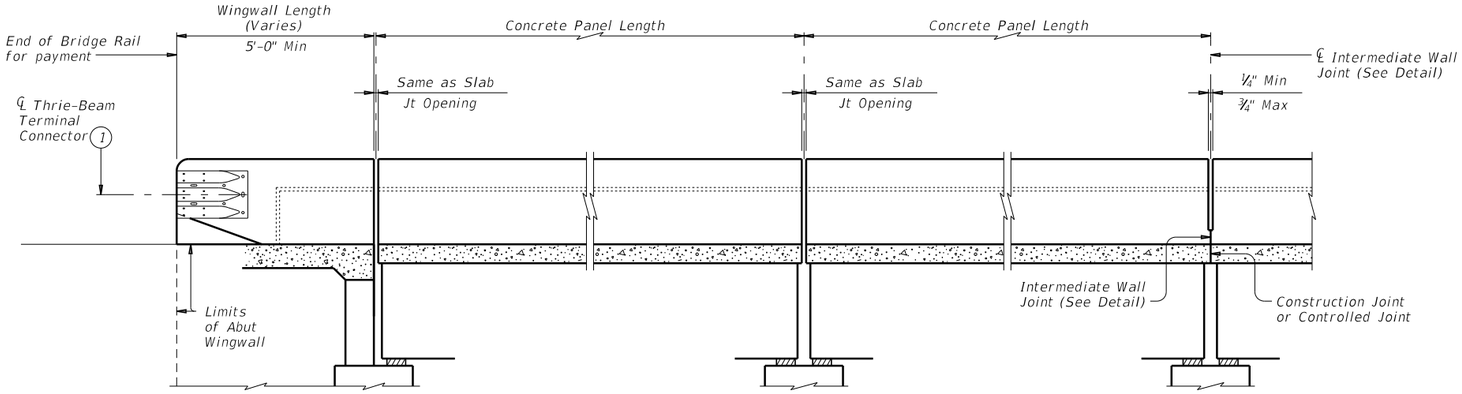
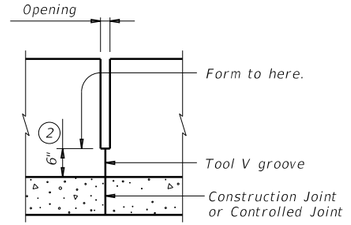


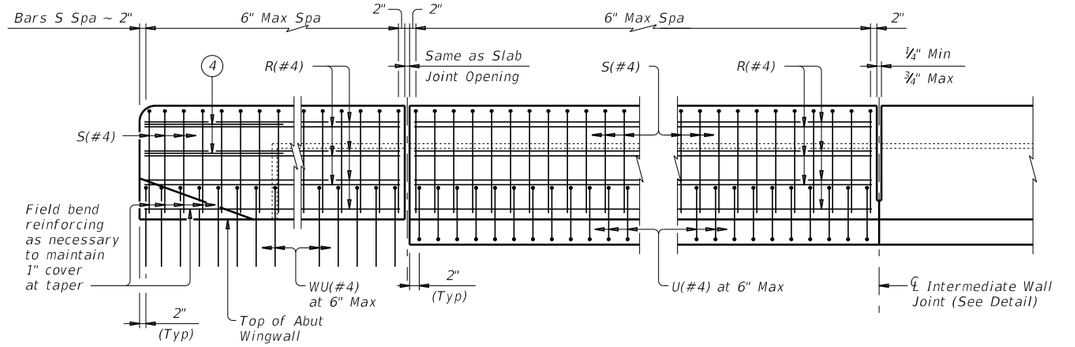
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

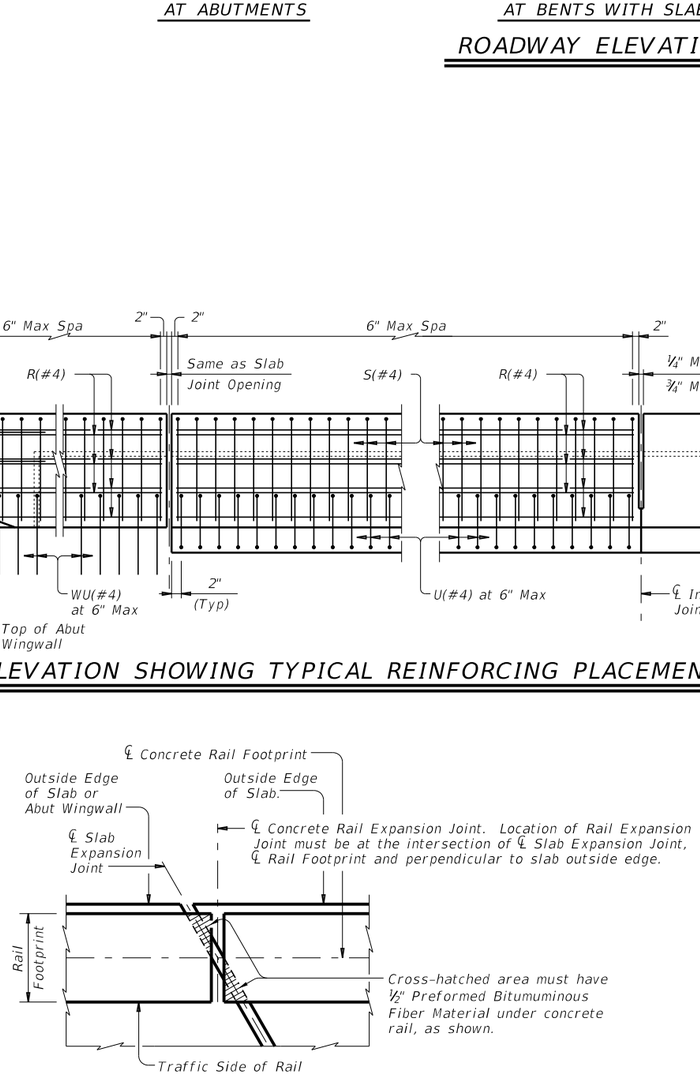


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



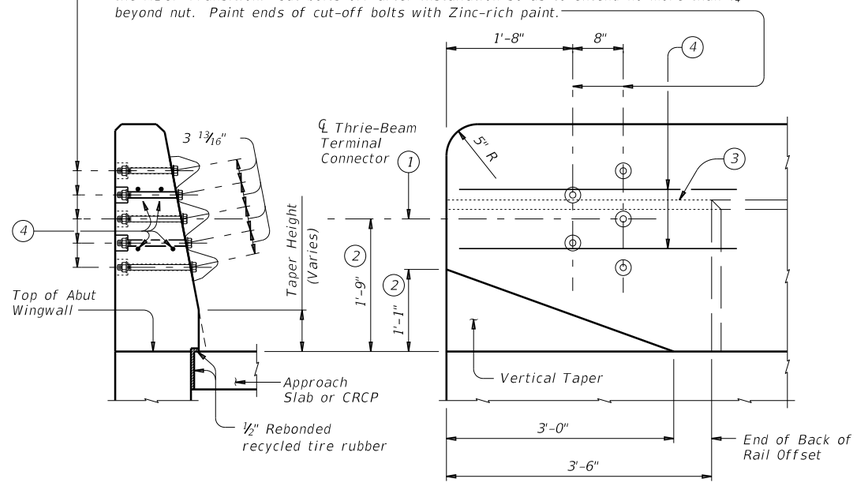
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.



SECTION | ELEVATION

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. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
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.

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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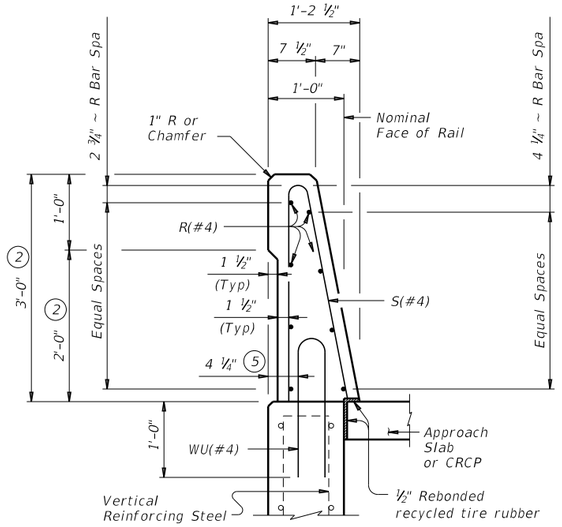
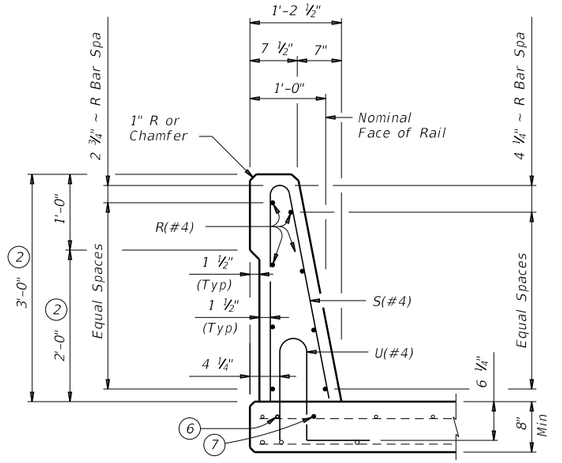


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) 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 must be furnished at the Contractor's expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

(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 greator 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.

The back of railing must be vertical unless otherwise shown in 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 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 A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than 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 successfully evaluated by full-scale crash test to meet MASH TL-4 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 will not be required for this rail.

Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

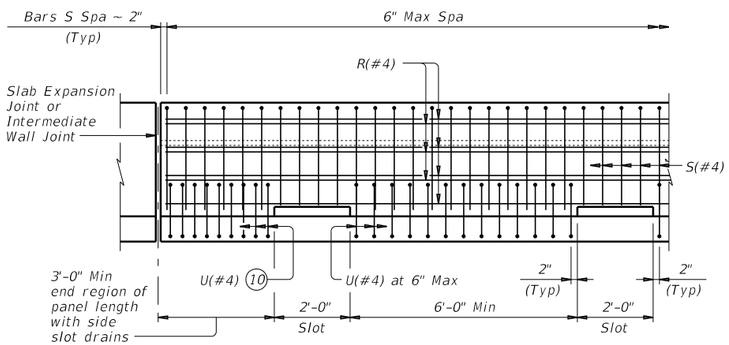
BARS S (#4)

BARS U (#4)

BARS WU (#4)

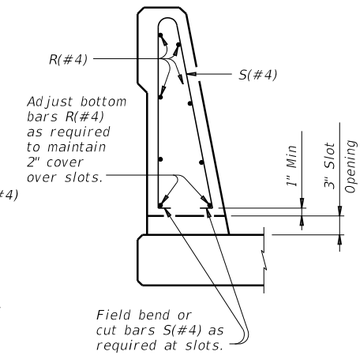
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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

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.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		132

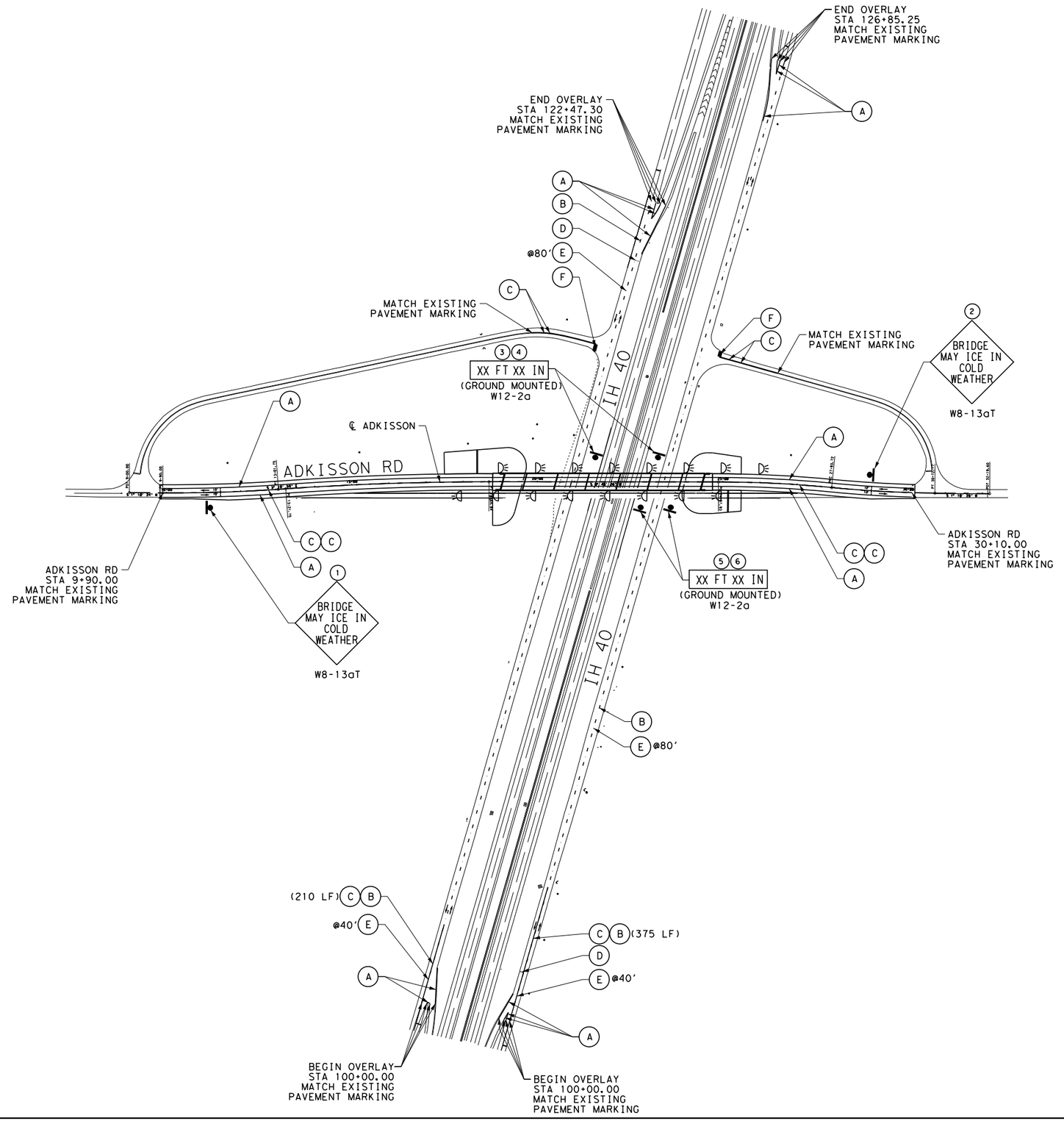
11/15/202311:46:47 AM

mkhan

c:\bms\bridgefarmer-pw\mkhan@two-mm.com\dms21624\PAVEMENT MARKING PLAN 01.dgn

150 0 150 300

SCALE: 1" = 300'



LEGEND

- (A) HPPM W/RET REQ TY I(W)6"(SLD)(90MIL)
- (B) HPPM W/RET REQ TY I (Y) 6" (BRK)(90MIL)
- (C) HPPM W/RET REQ TY I (Y) 6" (SLD)(90MIL)
- (D) PREFAB PAV MRK TY C (W) (36") (YLD TRI)
- (E) REFL PAV MRKR TY II-A-A
- (F) PREFAB PAV MRK TY C (W) (24") (SLD)
- DE DEL ASSM (D-SW) SZ I (BRF) GF2 (BI)
- TRAFFIC FLOW

STATE OF TEXAS
DAVID ALLEN HOWARD
69370
LICENSED
PROFESSIONAL ENGINEER
11-15-23

NO.	DATE	DESCRIPTION	APPROV.

2M ASSOCIATES, LLC
5930 PRESTON VIEW BLVD. SUITE A
DALLAS, TEXAS 75240
TBPE REGISTRATION NO.12158
PH. 214.663-1377
FAX 888-528-9180

IH 40 AT ADKISSON ROAD PAVEMENT MARKING AND SIGNAGE

STA 10+00 TO STA 30+00

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DH	6	SEE TITLE SHEET		IH 40
GRAPHICS MK	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK AM	TEXAS	AMA	POTTER	133
CHECK DH	CONTROL	SECTION	JOB	
	0090	05	108	

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36	X		10BWG	1	SA	T		
	2	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36	X		10BWG	1	SA	T		
	3	W12-2a	XX FT XX IN	84X24	X		10BWG	1	SA	T		
	4	W12-2a	XX FT XX IN	84X24	X		10BWG	1	SA	T		
	5	W12-2a	XX FT XX IN	84X24	X		10BWG	1	SA	T		
	6	W12-2a	XX FT XX IN	84X24	X		10BWG	1	SA	T		

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

IH 40 AT ADKISSON ROAD

SUMMARY OF SMALL SIGNS

SOSS

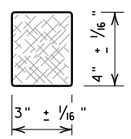
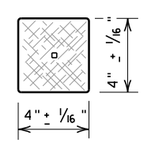
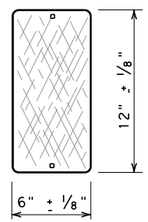
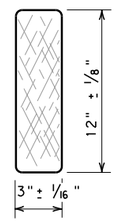
SHEET 1 OF 1

FILE: XXXX	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT SEPT. 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
4-16 8-16	DIST	COUNTY		SHEET NO.
	AMA	POTTER		134

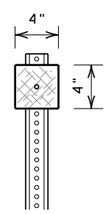
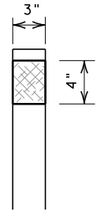
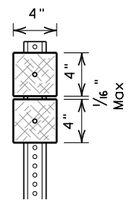
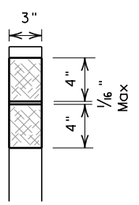
mkhan 11/15/2023 11:53:14 AM
c:\pms\bridgefarmer-pw\mkhan@two-mm.com\dms21624\SIGN+SUM .dgn

DATE: 10/11/2023 12:05:16 PM
FILE: c:\Users\vidal.ngoumnai\bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com\dms21624\D & OM (1) - 20.dgn
Vidal.Ngoumnai

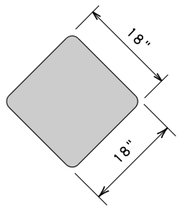
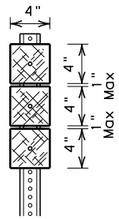
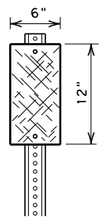
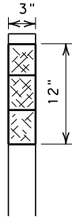
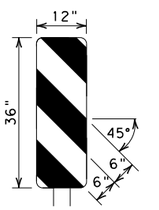
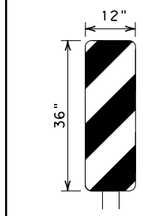
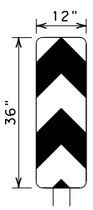
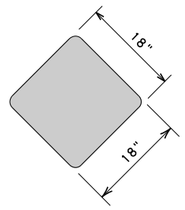
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

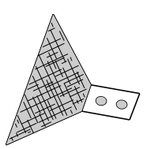
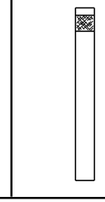
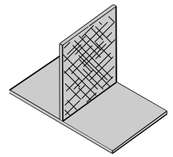
DELINEATORS

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

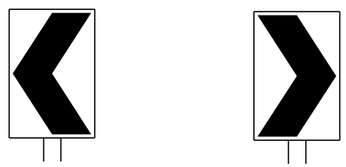
OBJECT MARKERS

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

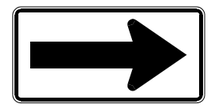
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

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

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

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

DIRECTION
If Required
BI = Bi-Directional

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

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

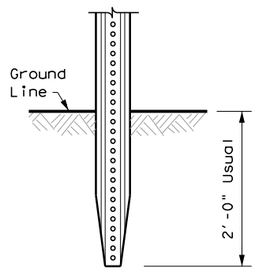
D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	POTTER		135

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

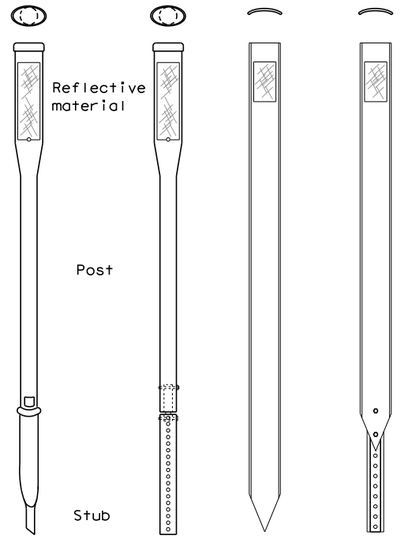


NOTES

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.

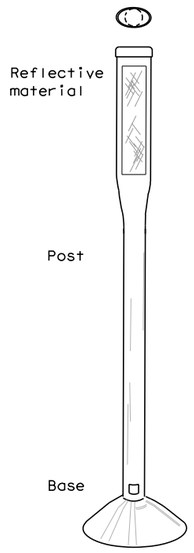
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



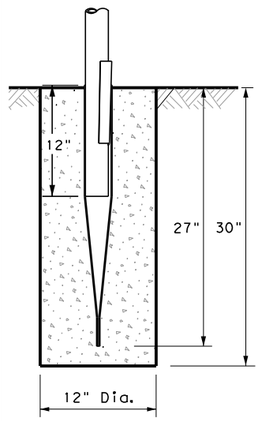
SURFACE MOUNT

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.

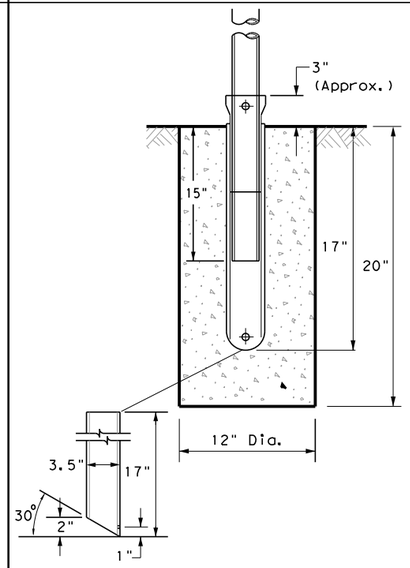
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

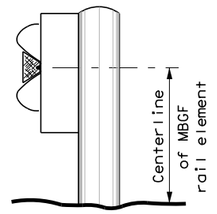
NOTE

1. Install per manufacturer's recommendations.

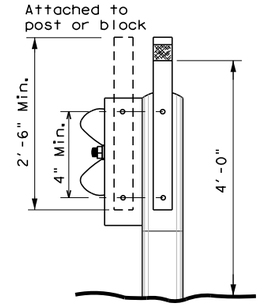
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

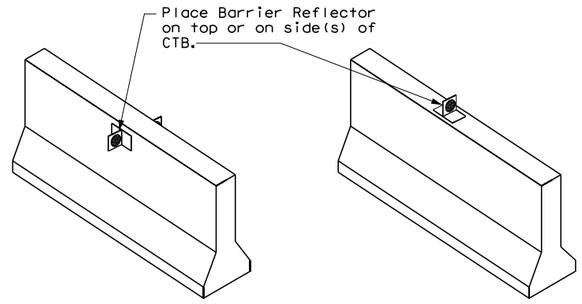
GF1



GF2



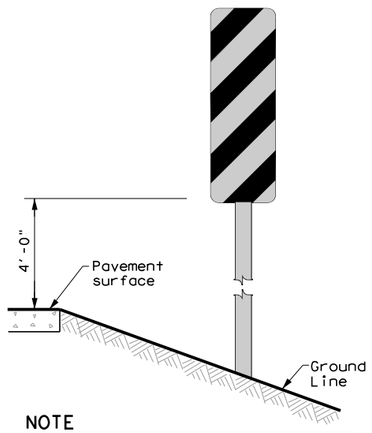
CONCRETE TRAFFIC BARRIER (CTB)



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.

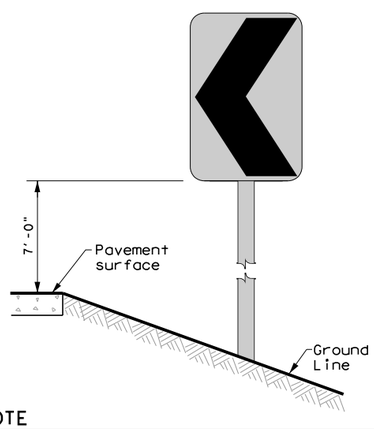
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

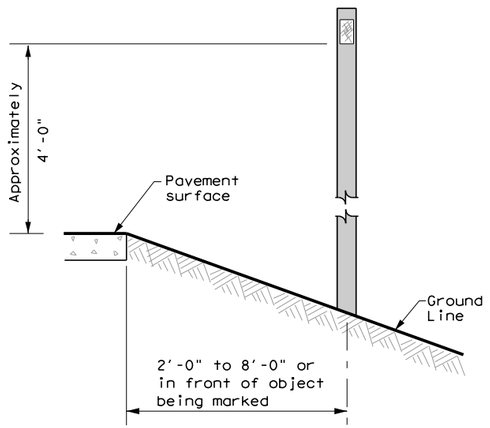
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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	0090	05	108	IH 40
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	POTTER		136

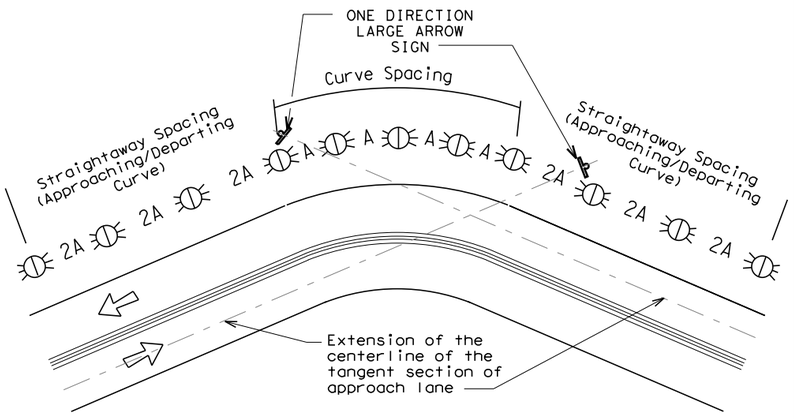
20B

DATE: 10/11/2023 12:05:24 PM
FILE: c:\Users\vidal.ngoumnai\Bridgefarmer\Bridgefarmer - pw\vidal.ngoumnai@bridgefarmer.com\dms21624\D & OM (3) - 20.dgn
Vidal.Ngoumnai

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

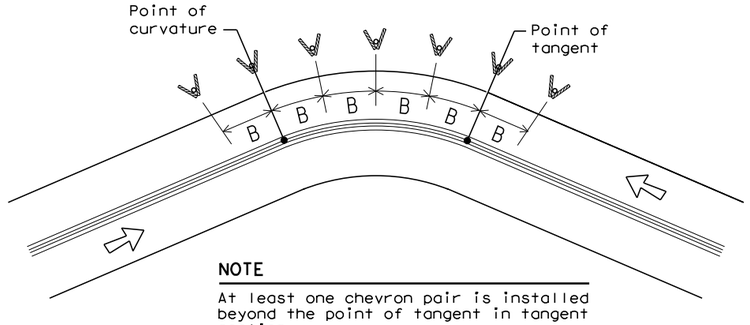
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

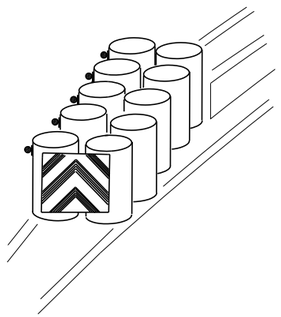
Traffic Safety Division Standard

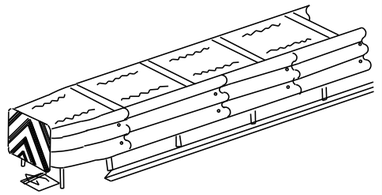
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

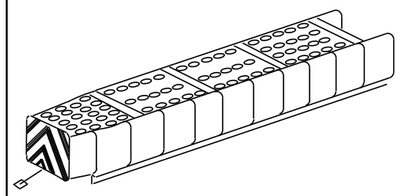
D & OM(3)-20

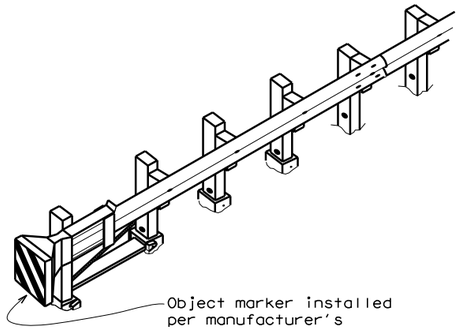
FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	AMA	POTTER		137

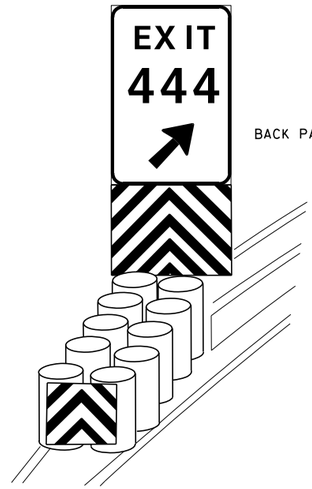
20C

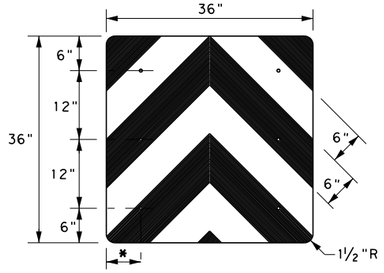


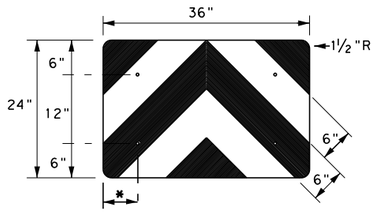




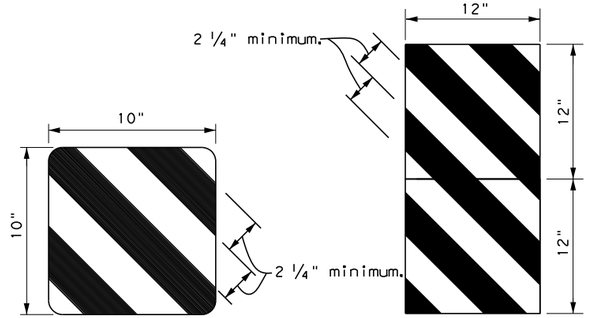




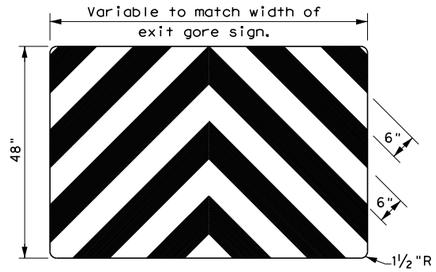


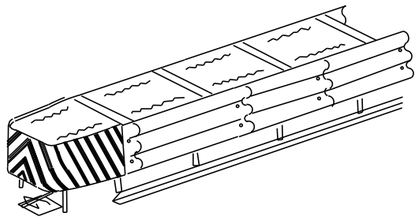


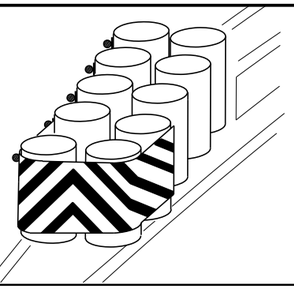
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

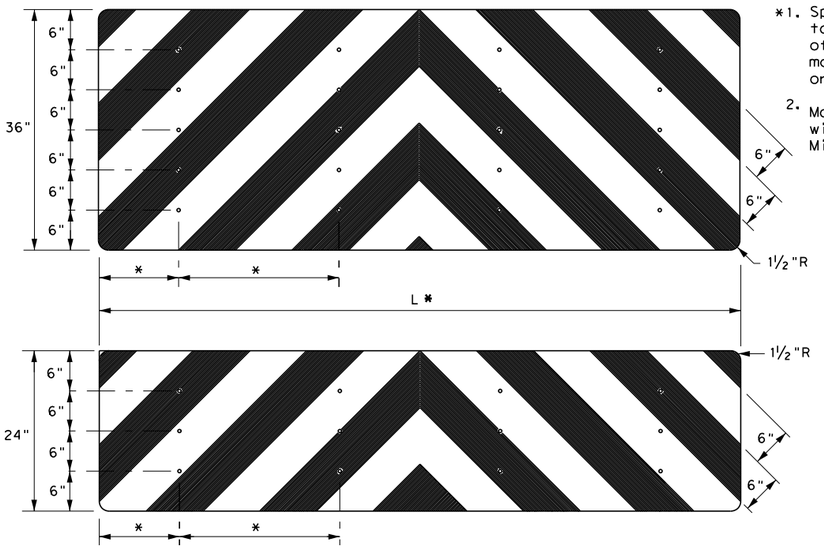


OBJECT MARKERS SMALLER THAN 3 FT^2









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
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4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	AMA	POTTER		138
4-98 7-20				

20C

DATE:
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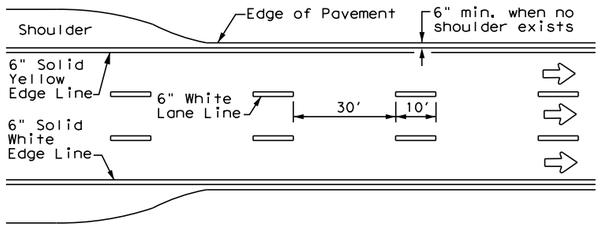
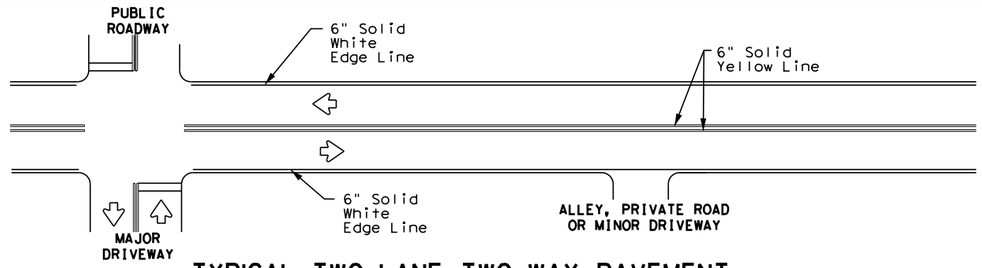
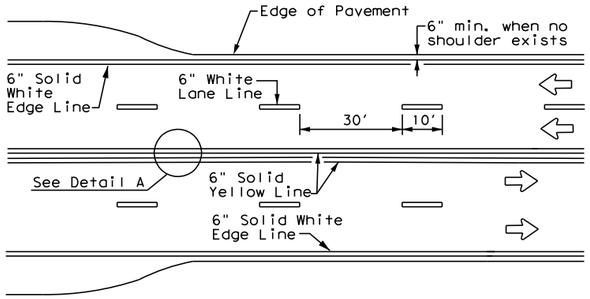
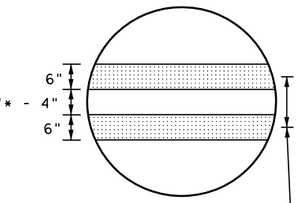


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





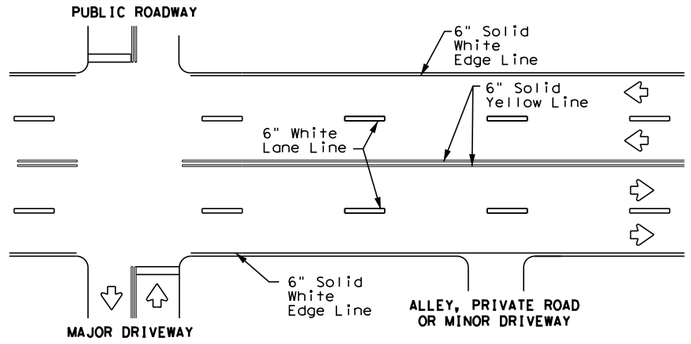
DETAIL "A"

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

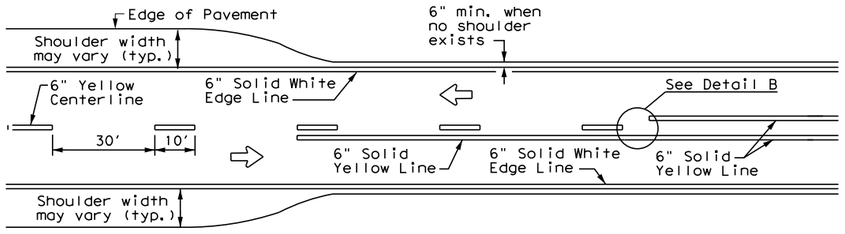
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

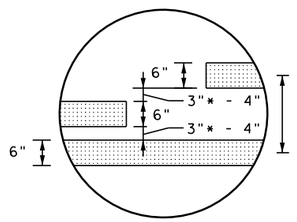
** 8" minimum for restripe projects when approved by the Engineer.



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

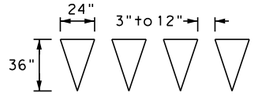


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



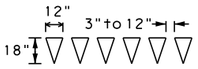
DETAIL "B"

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

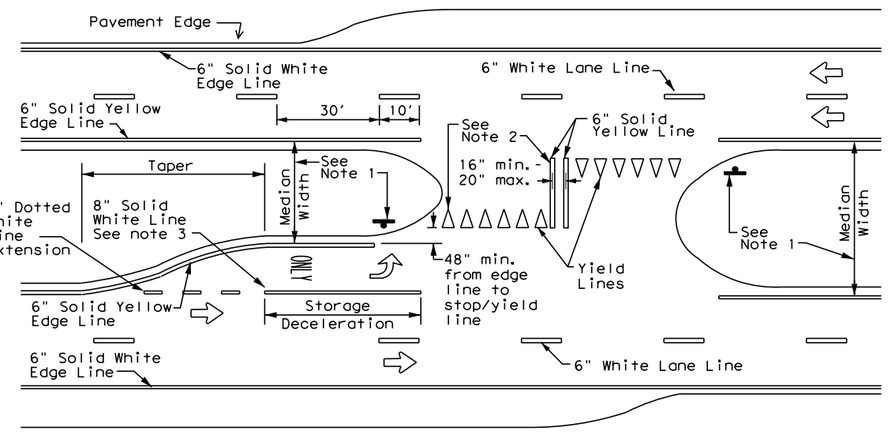


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

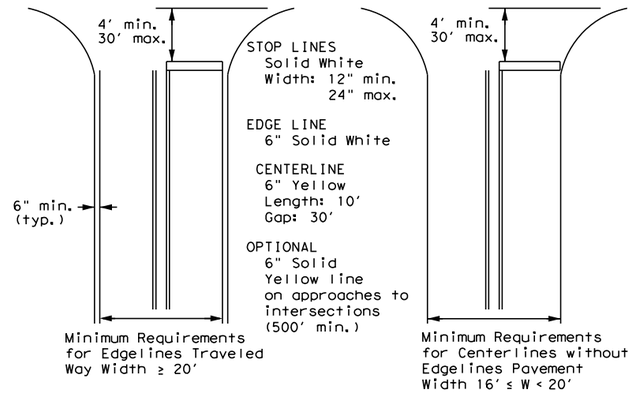
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

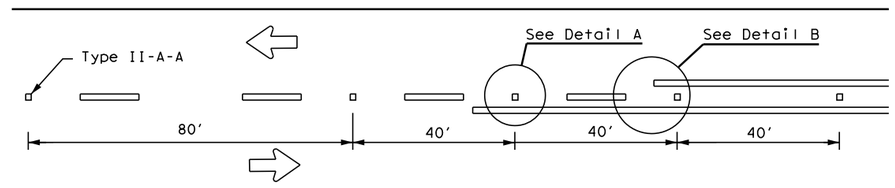
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

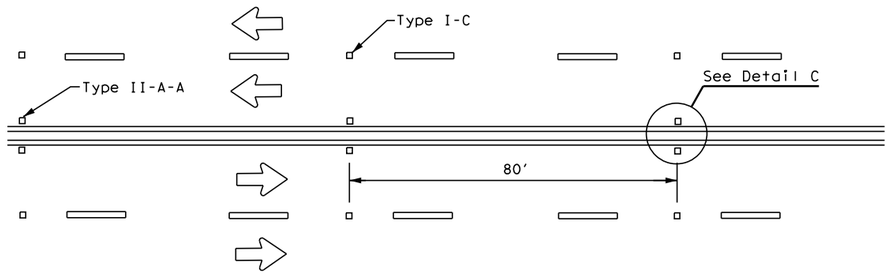
FILE: pm1-22.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0090	05	108	IH 40
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	AMA	POTTER		139

22A

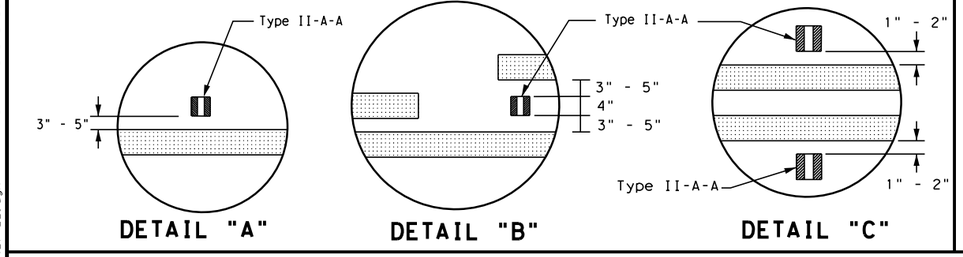
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

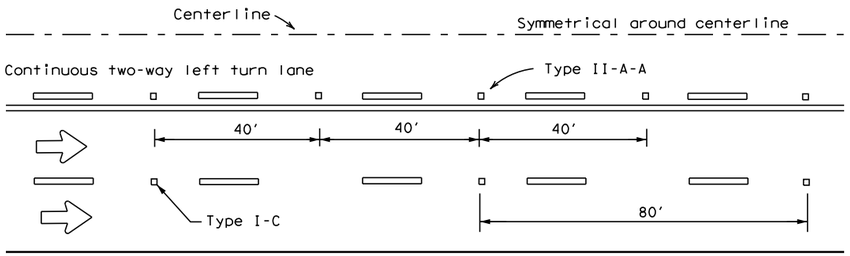


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

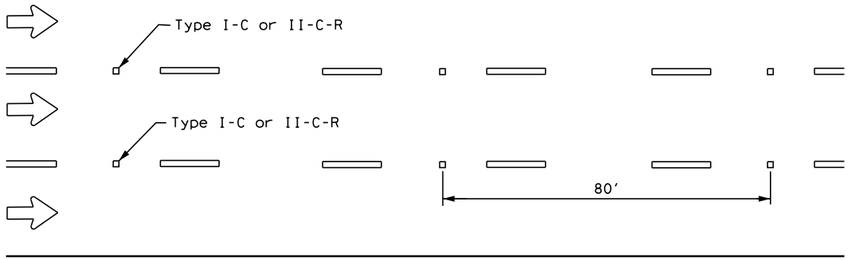


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



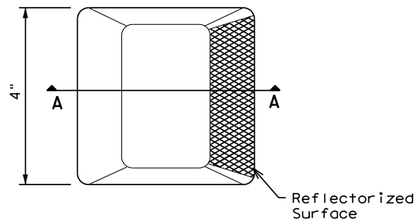
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

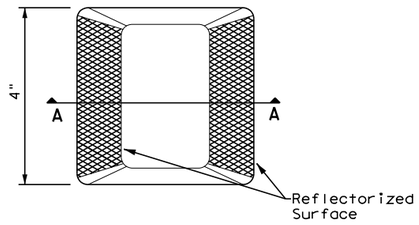
See Note 3.

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

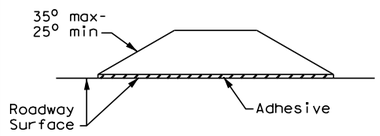
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

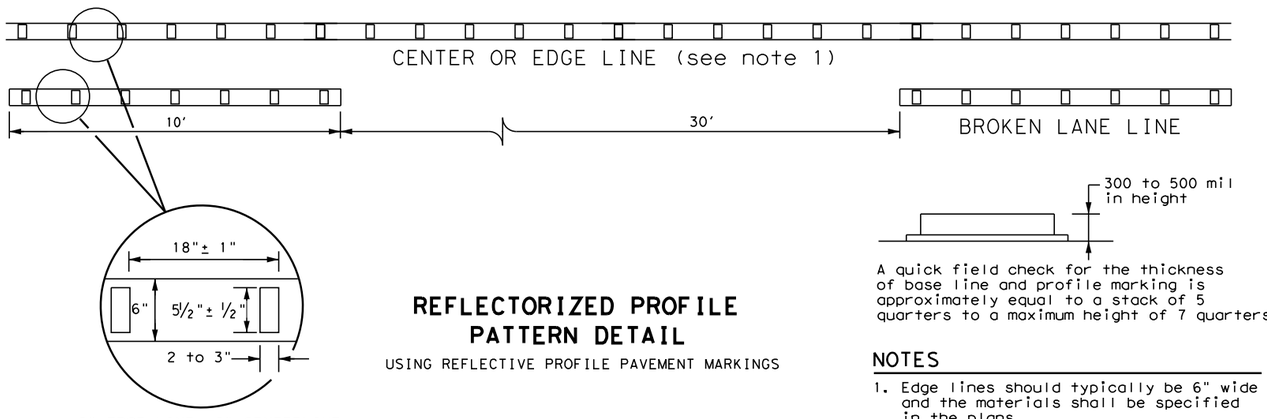


Type II (Top View)



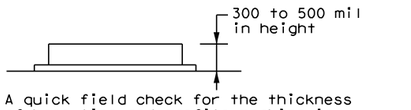
SECTION A

RAISED PAVEMENT MARKERS



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: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	AMA	POTTER		140
5-00 2-12				

22B

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

DATE: 10/11/2023 12:05:35 PM
FILE: \\bms\bridgefarmer-pw\vidal.ngoumnai@bridgefarmer.com\dms21624\PM(2)-22.dgn
Vidal.Ngoumnai

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

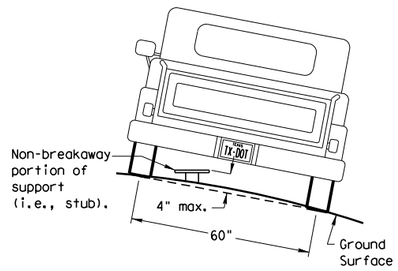
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

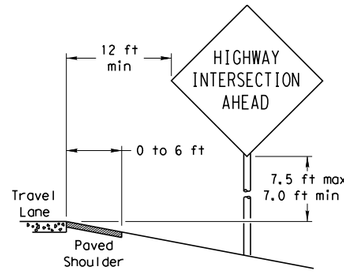
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

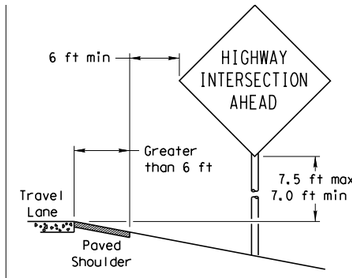
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

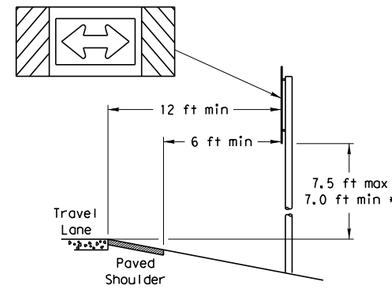
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



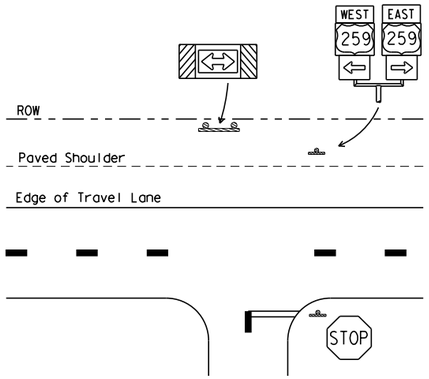
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

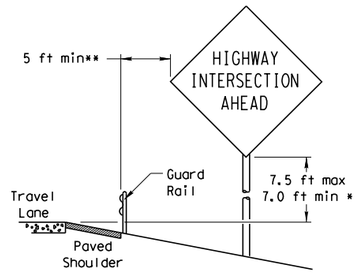
T-INTERSECTION



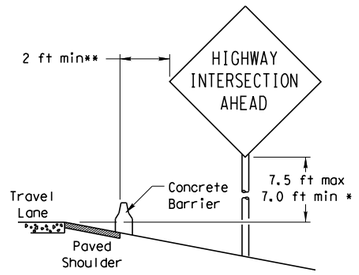
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

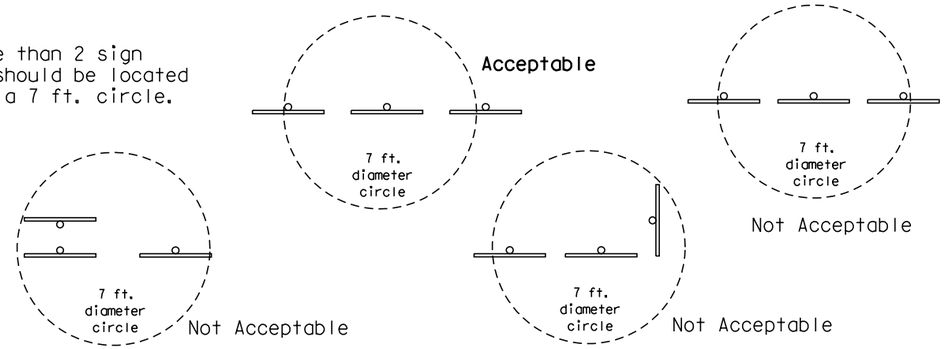
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

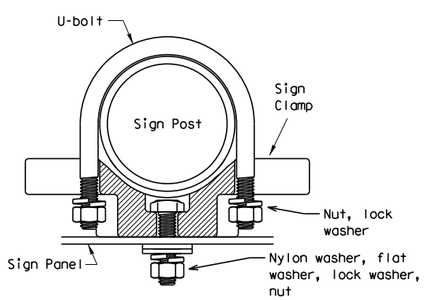
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

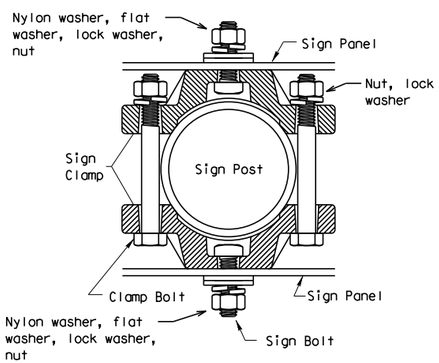


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

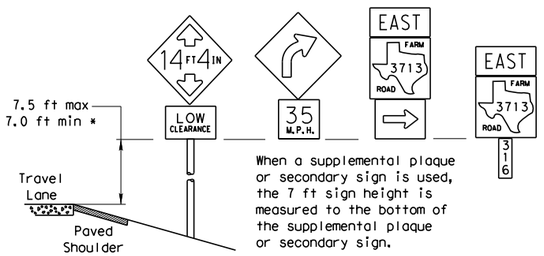
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



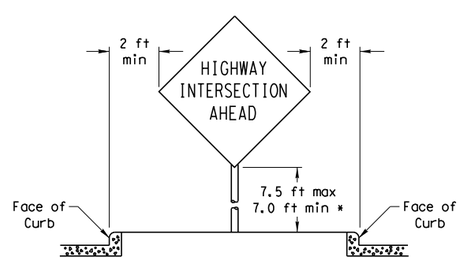
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



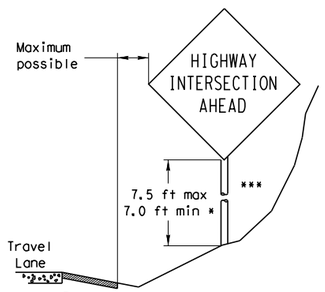
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

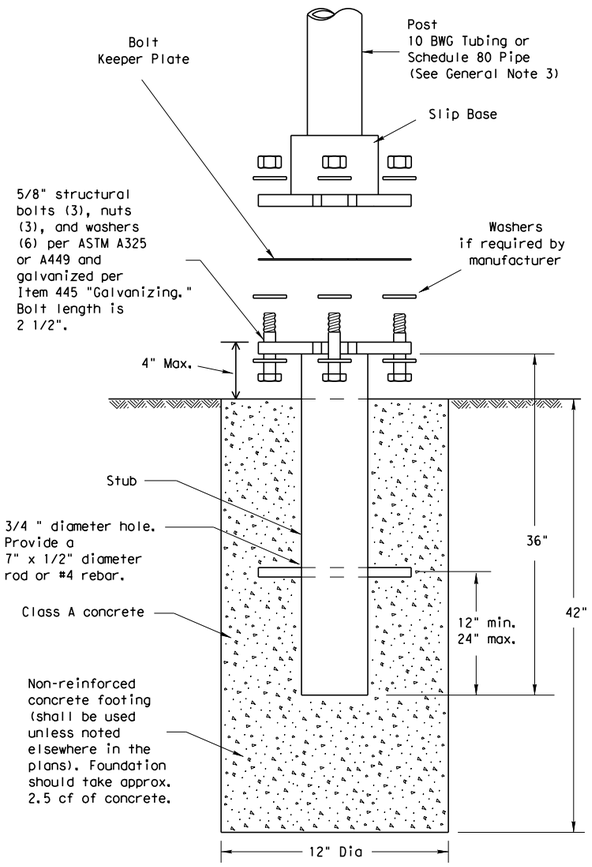
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0090	05	108	IH 40
DIST	COUNTY		SHEET NO.
AMA	POTTER		141

26A

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

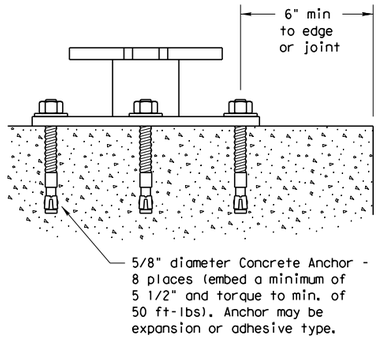
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS			
9-08			

CONT	SECT	JOB	HIGHWAY
0090	05	108	IH 40

DIST	COUNTY	SHEET NO.
AMA	POTTER	142

DATE: 10/11/2023 12:05:45 PM
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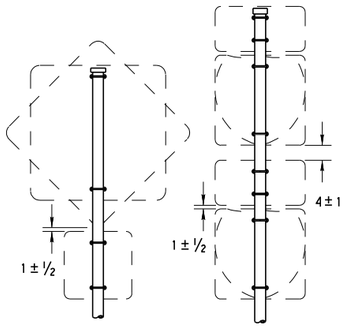
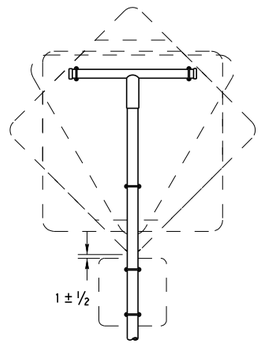
Vidal.Ngoumnai



SM RD SGN ASSM TY XXXXX(1)XX(P)



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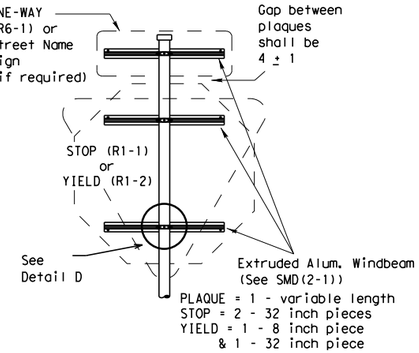

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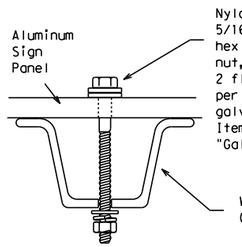
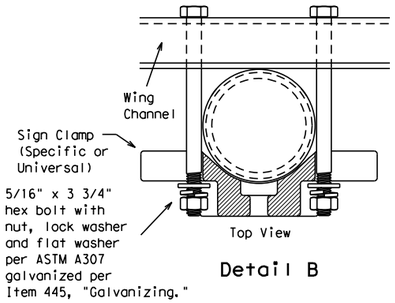
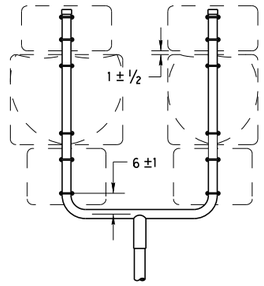


Detail A



Detail B



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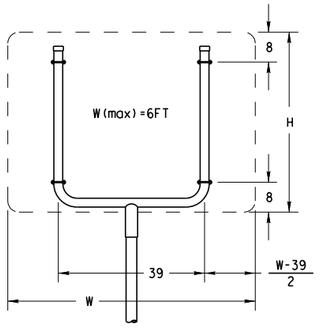

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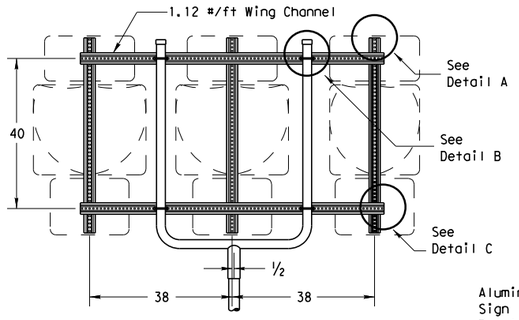
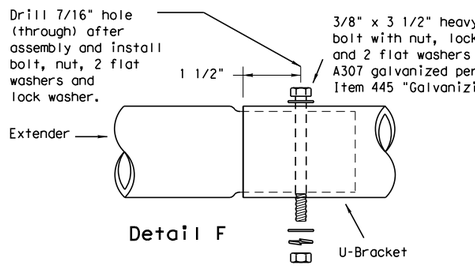
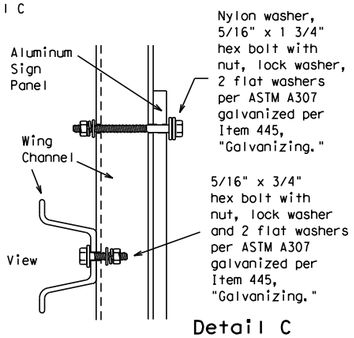


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

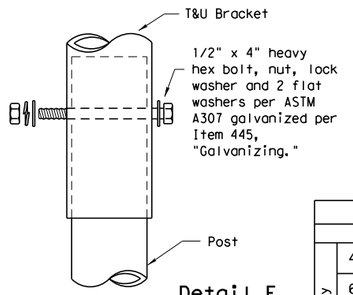


Detail F

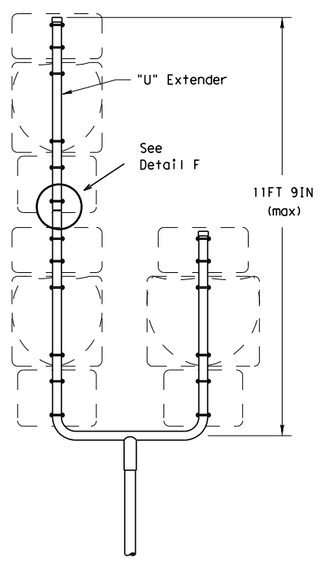
Splices shall only be allowed behind the sign substrate.



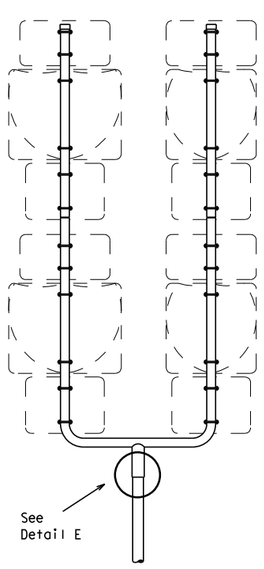
Detail C



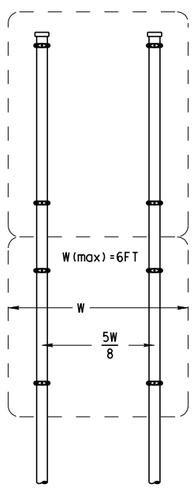
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

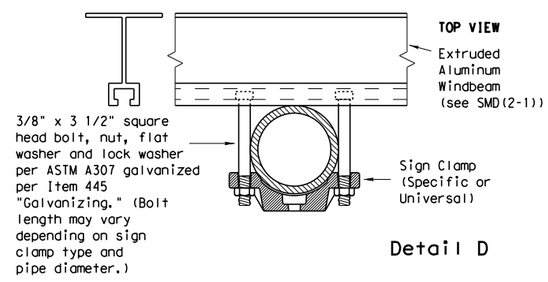


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

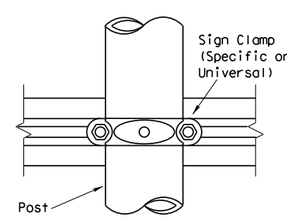


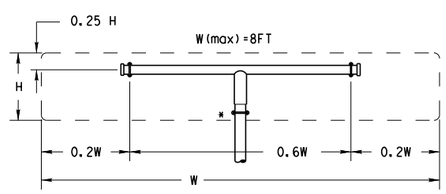
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

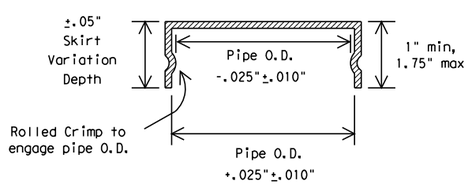




All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0090	05	108	IH 40

DIST	COUNTY	SHEET NO.
AMA	POTTER	143

9-08 REVISIONS

26C

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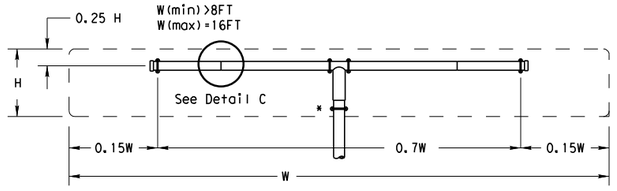
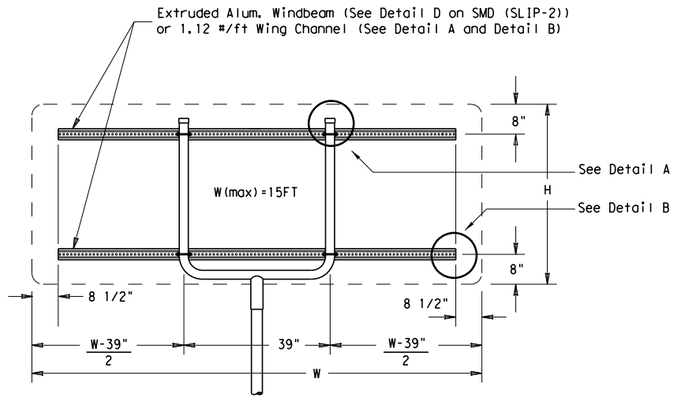
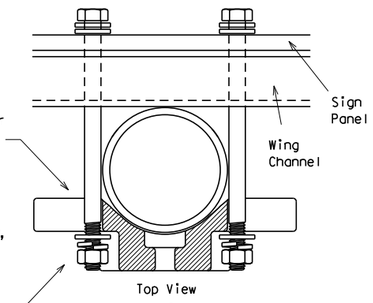


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

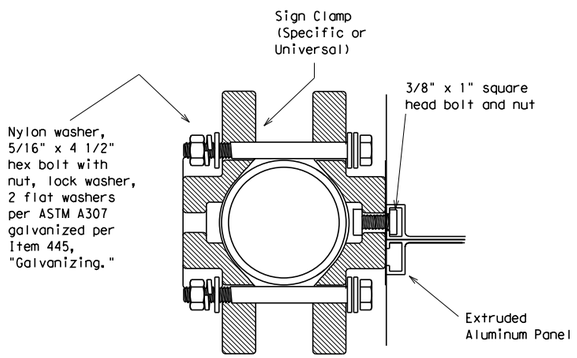
(* - See Note 12)



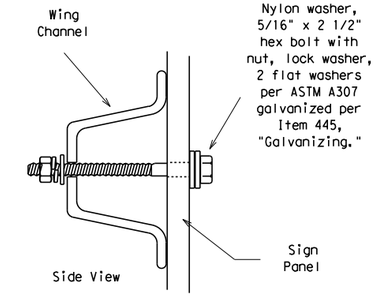
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



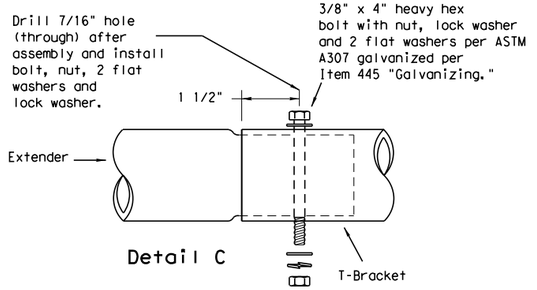
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

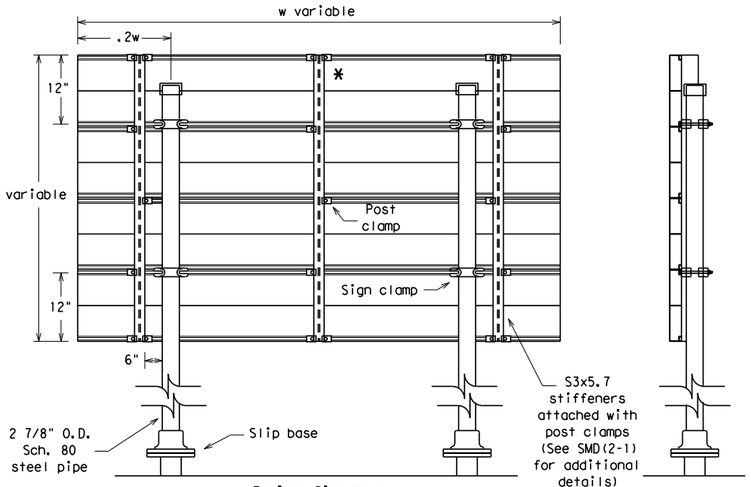


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

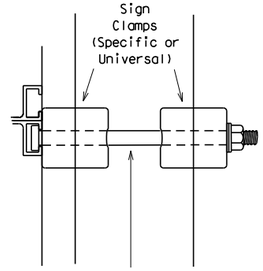


Typical Sign Mount

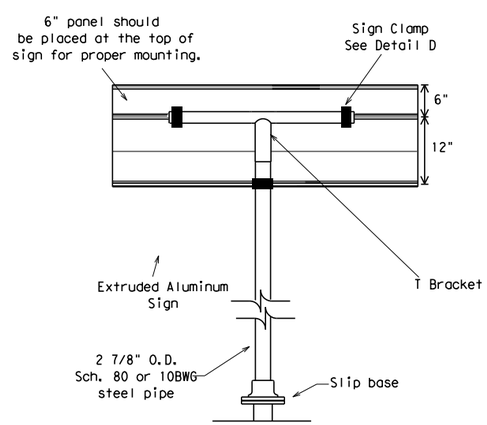
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

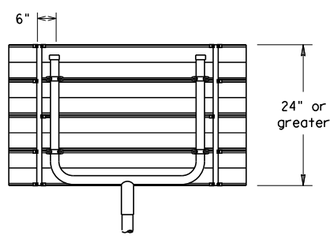
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0090	05	108	IH 40
DIST	COUNTY		SHEET NO.
AMA	POTTER		144

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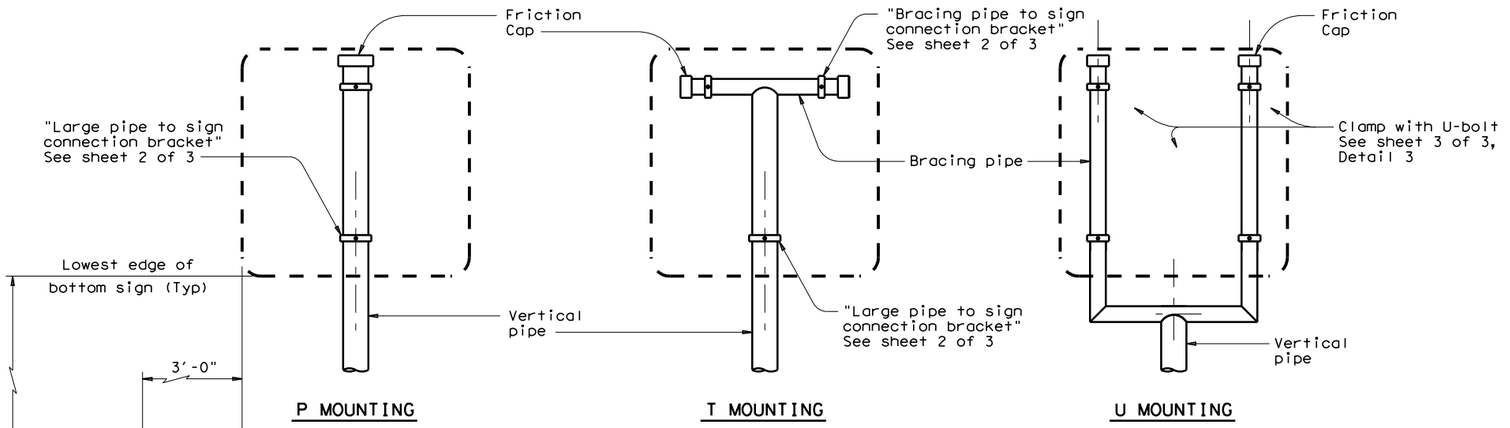
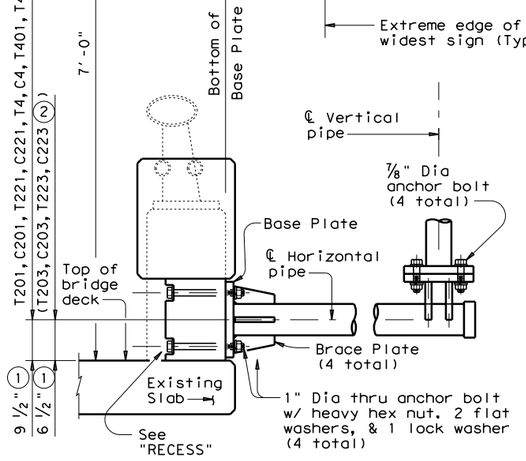
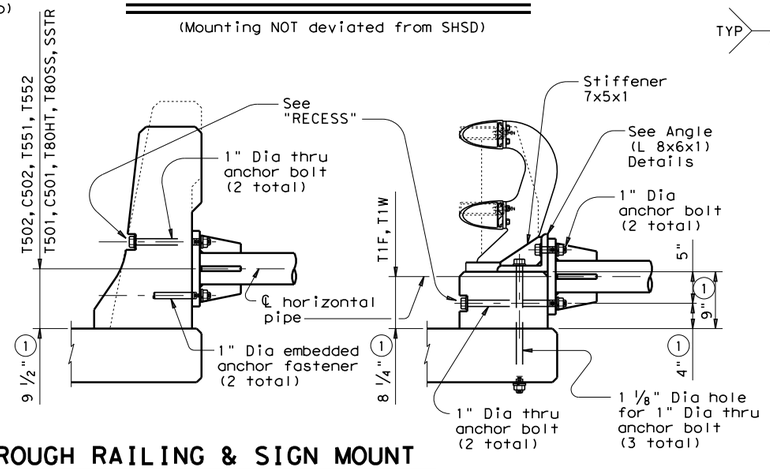


VARIOUS SIGN ATTACHMENTS

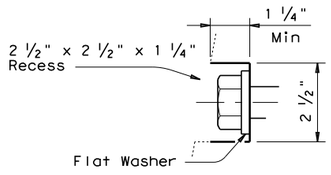
(Mounting NOT deviated from SHSD)





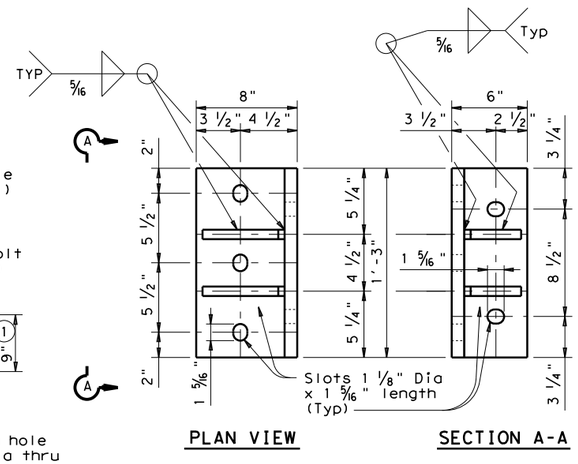
LONGITUDINAL SECTION THROUGH RAILING & SIGN MOUNT

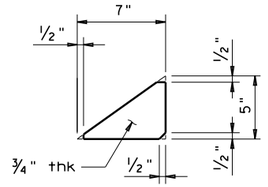
(1) Increase 2" for structure with overlay.
(2) Attached at ℄ post.



RECESS

PIPE SIZE AND THICKNESS			
Pipe Placement / Design Wind Speed	Horizontal	Vertical	Bracing
90 mph	5" X-Strong (.375")	4" X-Strong (.337")	2 ½" Standard (.203")
130 mph	6" X-Strong (.432")	5" X-Strong (.375")	3" X-Strong (.300")





STIFFENER

ANGLE (L 8x6x1) DETAILS

GENERAL NOTES:

Design conforms to 2013 AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design 3-second gust wind speeds of 90 mph and 130 mph with a 1.14 gust factor, and a wind importance factor of 1.0 (50-year mean recurrence interval) for the supporting structures. For mounting connection between sign panel and pipe, wind importance factors of 0.71 and 0.54, for 90 mph and 130 mph winds, respectively, are applied to adjust the wind speeds to a 10-year mean recurrence interval.

See standard sheet WV & IZ(LTS2013) for the boundaries of each design wind zone. All mounting shall be based on 130 mph wind speed design except when located in 90 mph wind zone. Maximum panel area is 30 sq. ft. Maximum design height is 50 ft, with design height defined as the distance between natural ground (average elevation of surrounding terrain) and the center of sign(s) at the mounting location.

Material for pipe shall be ASTM A53 Grade B, or A501. Structural steel plates shall be ASTM A36, A572 Grade 50, or A588. Bolts used to connect pipe and mounting bracket, and wind beam to sign panel shall be ASTM A307. Anchor bolts shall be ASTM A325 or A193 B7. Each anchor bolt shall be provided with 2 flat washers, 1 lock washer, and 1 heavy hex nut. All parts shall be galvanized in accordance with Standard Specifications Item 445, "Galvanizing".

Attach horizontal pipe at least 2'-0" from the edge of any nearby drain slot.

Contractor shall verify applicable field dimensions before fabrication. Holes drilled through the railing parapet wall shall be drilled with rotary (coring or masonry drill) type equipment. Percussion (star) drilling shall not be allowed. Anchorage for pipe attached to rail shall be placed using an anchoring system approved by the engineer. Installation of anchor fasteners including hole depth, diameter and material shall be in accordance with the manufacturers' recommendation.

Each embedded anchor fastener shall resist an allowable design loading (after applying the reduction factors of bolt spacing and bolt edge distance) of:

	130 mph	90 mph
Tension	12.5 kips	7.5 kips
Shear	9.0 kips	5.0 kips

Each anchoring system shall provide a capacity to resist the required tension and shear acting simultaneously.

For sign connection to mounting, shop drill holes on sign blank in accordance with the current Standard Highway Sign Designs for Texas (SHSD). Additional hole(s) needed to meet a stipulated-type mounting may be field drilled. For multi-sign or back-to-back signs mounting, the engineer shall determine the proper type which ensures each individual mounting meets requirements.

Refer to Standard sheets SMD(GEN), SMD(SLIP-2 and SMD(2-1) for details not covered here.

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-1)-14

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		145

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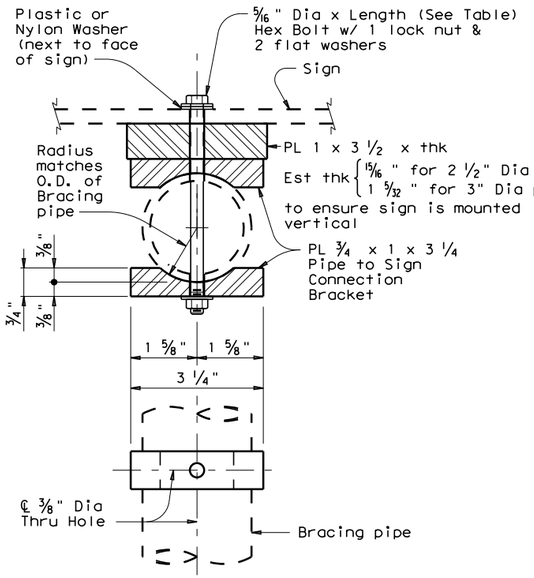
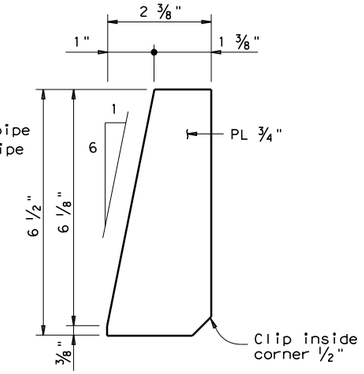
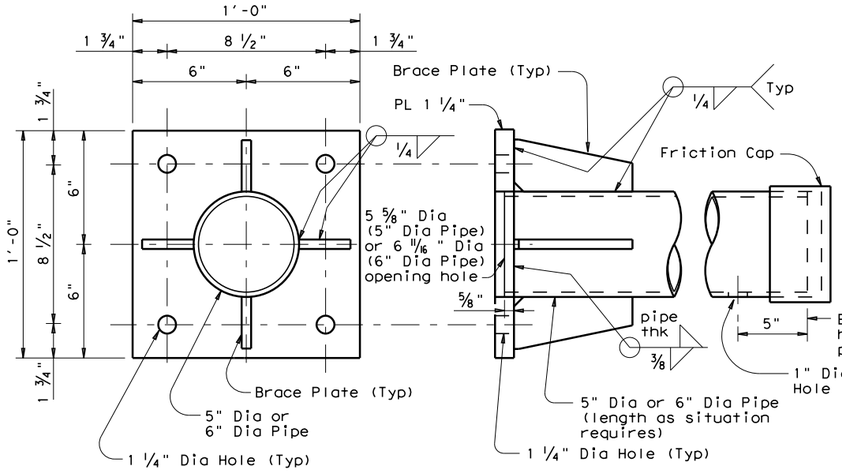


BRACING PIPE TO SIGN CONNECTION BRACKET DETAILS

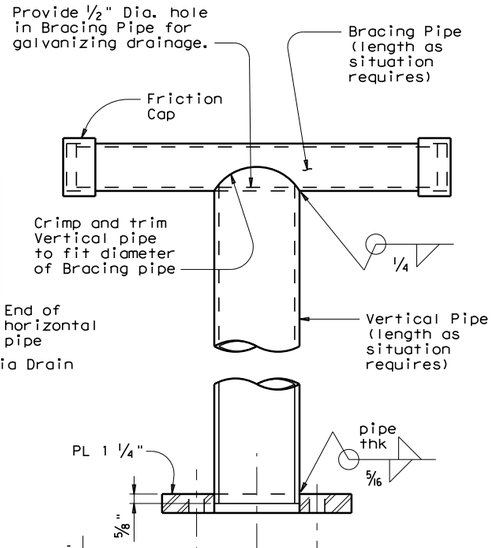
(Showing T Mounting)



BRACE PLATE DETAILS

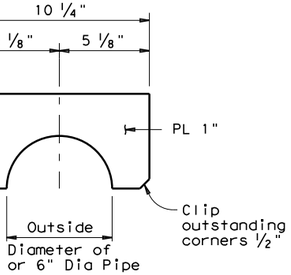


BASE PLATE DETAILS

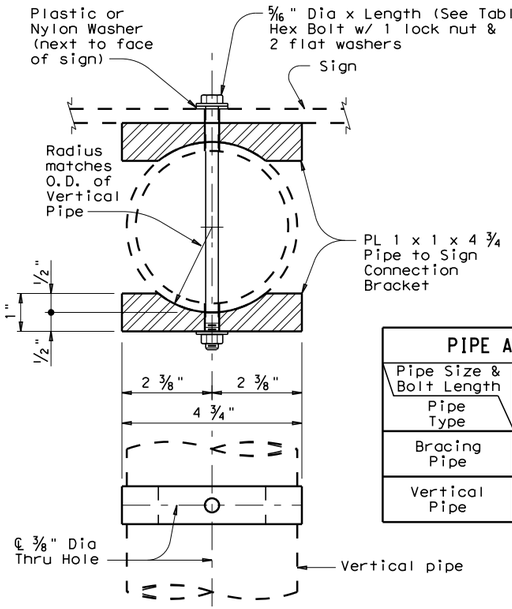


SIGN POLE & POLE BASE PLATE DETAILS

(Showing only T Mounting)



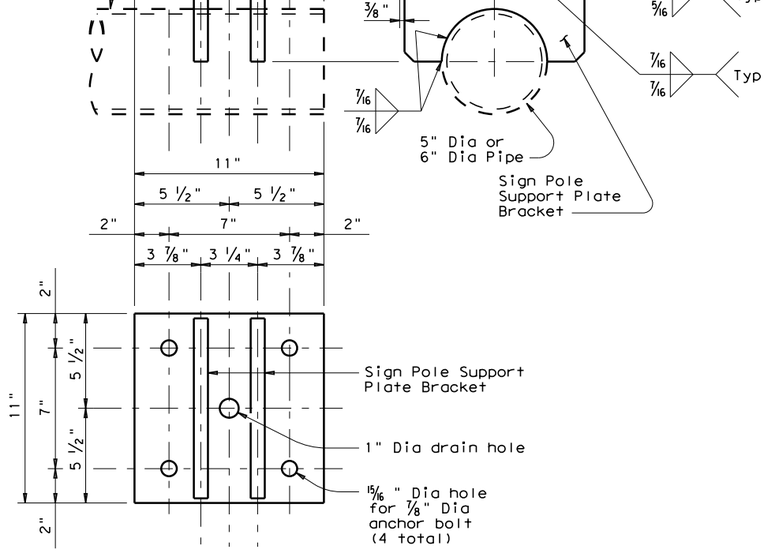
SIGN POLE SUPPORT PLATE BRACKET DETAILS



PIPE AND BOLT SPECIFICATIONS		
Pipe Size & Bolt Length / Pipe Type	Nominal Pipe Dia (in.)	Bolt Length (in.)
Bracing Pipe	2 1/2	6
	3	7
Vertical Pipe	4	7
	5	8

LARGE PIPE TO SIGN CONNECTION BRACKET DETAILS

(Showing P or T Mounting)



SIGN POLE SUPPORT PLATE DETAILS

SHEET 2 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-2)-14

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©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AMA	POTTER		146

26H

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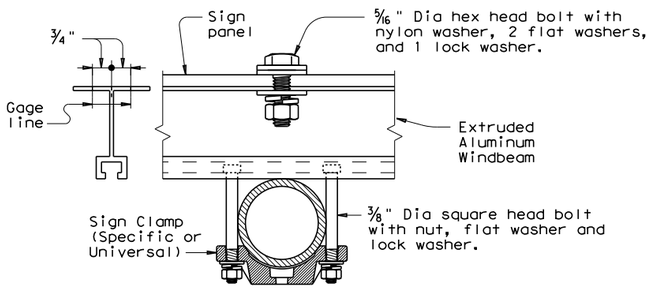
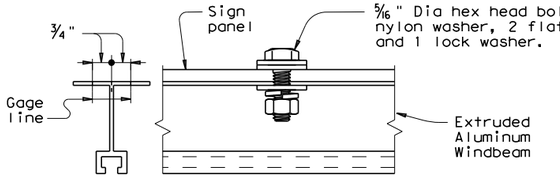
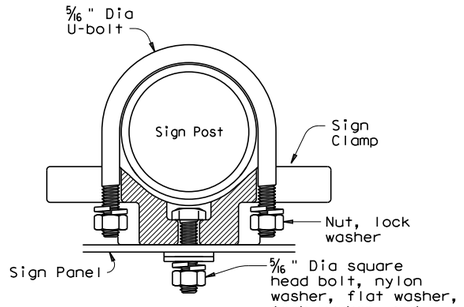


DETAIL 1



DETAIL 2

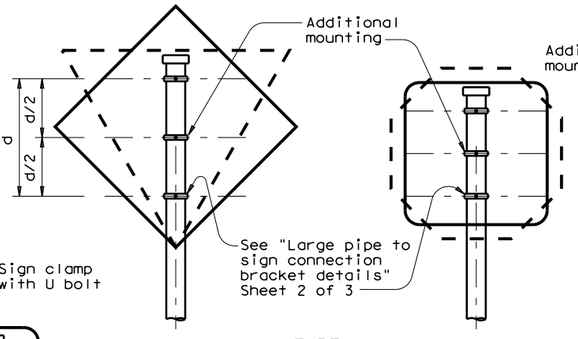


DETAIL 3

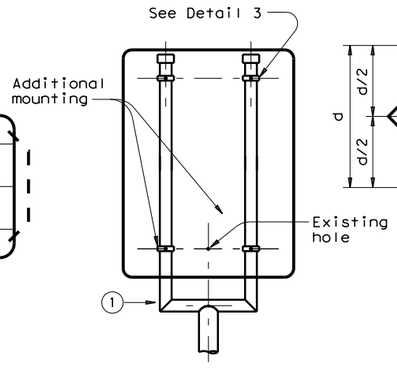
SIGN SHAPE	SQUARE			HORIZONTAL RECTANGLE			VERTICAL RECTANGLE			DIAMOND			OCTAGON			EQUILATERAL TRIANGLE			INTERSTATE SHIELD	PENTAGON (SCHOOL)	
Type of Sign Mounting on SHSD / Design Wind Speed	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	P	T
90 mph					(Type 23) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"		(Type 2) 36"x48" (Type 32) 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" 48"x72" (Type 3) 48"x84"			(Type 3) 60"x60"									(Type Special) 45"x36"		
130 mph	(Type 1) 30"x30" 36"x36"	(Type 3) 48"x48"		(Type 1) 36"x24" 36"x30"	(Type 23) 48"x42" 54"x42" 60"x30" 66"x36" 84"x24" (Type 3) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"	(Type 1) 30"x36" 30"x42"	(Type 3) 36"x48" 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" (Type 4) 48"x72" 48"x84"	(Type 3) 48"x60"	(Type 1) 36"x36"	(Type 3) 48"x48" 60"x60"					(Type 1) 48"x48"			(Type Special) 36"x36" 45"x36"		

Notes:
1. Drill holes in addition to the hole pattern of the Standard Highway Sign Designs for Texas (SHSD) at specified locations to meet a stipulated-type mounting indicated in the parenthesis ( ).
2. "Blank" in the above table indicates all other signs excluded from stipulated mounting shall be mounted in accordance with SHSD.

(1) In lieu of welding, the Fabricator may bend bracing pipe elbows if the following conditions are met:
a. Spacing between vertical bracing pipes is equal to or greater than 2'-6".
b. Bending radius is 12".
c. The distance between the lowest clamp and centerline of horizontal bent pipe is 13" max.



TYPE 1



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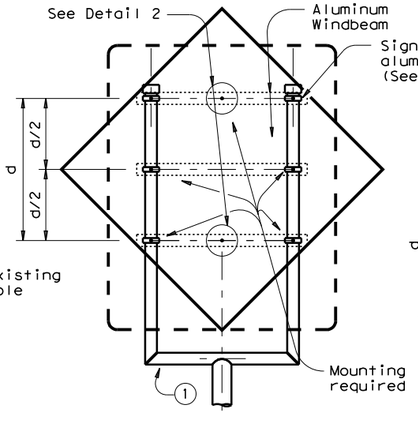
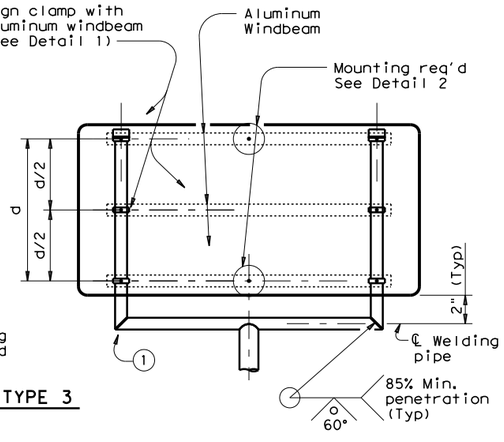
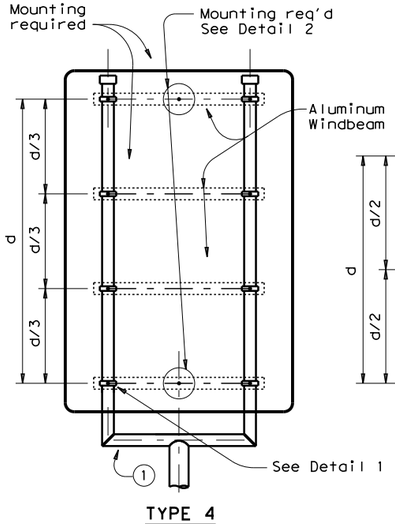
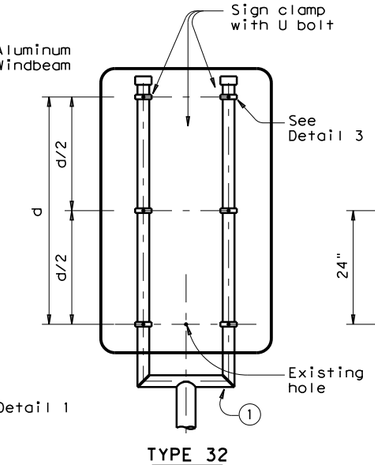




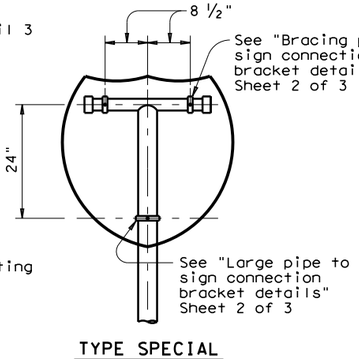
TYPE 3



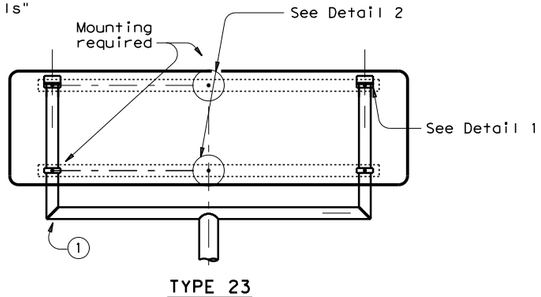
TYPE 4



TYPE 32



TYPE SPECIAL



TYPE 23

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-3)-14

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		147

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. N/A

☐ No Action Required ☒ Required Action

Action No.

1. Comply with Construction General Permit and implement project SW3P's.
2. Post a small construction site notice (CSN) with SW3P information on or near the site, accessible to the public, TCEQ, EPA, and other inspectors.
3. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
4. Comply with the SW3P and revise when necessary to control pollution as required by the Engineer
5. May need a Large Construction Site Notice and Submit an NOI to TCEQ for >5 acres of disturbance.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area will cease and TxDOT archeological staff will be contacted to initiate post-review discovery procedures.

☒ No Action Required ☐ Required Action

IV. VEGETATION RESOURCES

Comply with Executive Order 13112 on Invasive Species and the intent of the Executive Order Memorandum on Beneficial Landscapes for re-vegetating the project area. The proposed seed mixture (both grasses and forbs) would be in accordance with Item 164, Seeding for Erosion Control in TxDOT's Standard Specifications for the construction of Highways, Streets, and Bridges.

☒ No Action Required ☐ Required Action

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. If any species on the Potter County Threatened & Endangered List is sighted in the project area during construction, stop construction and notify the Area Engineer.

2. Eastern Spotted Skunk, Swift Fox: Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered, and to avoid unnecessary impacts to dens.

3. Woodhouse's Toad, Texas Horned Lizard, Western Box Turtle, Western Hognose Snake, Western Massasauga, Prairie Rattlesnake: Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered. This should include avoiding harvester ant beds in the selection of Project Specific Locations (PSL's).

5. Bird BMP's: a) Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season; b) avoid the removal of unoccupied, inactive nests, as practicable; c) do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

6. The Migratory Bird Treaty Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, egg in part or in whole, without a Federal permit issued in accordance within the Act's policies and regulations. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young would be avoided.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☒ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☒ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☐ No Action Required ☒ Required Action

Action No.

1. If erosion control blankets or soil retention blankets are needed, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: 038402108-EPIC.dgn	DN: TxDOT	CK: CG	DW: JL	CK: MS			
©TxDOT: February 2023	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0090	05	108		IH 40		
	DIST	COUNTY			SHEET NO.		
	AMA	POTTER			148		

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):
090-05-108

1.2 PROJECT LIMITS:
(IH 40) ADKISSON ROAD BRIDGE

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 35.193382,(Long) 102.114510

END: (Lat)35.199637,(Long)102.114416

1.4 TOTAL PROJECT AREA (Acres): 9.5

1.5 TOTAL AREA TO BE DISTURBED (Acres): 8.9

1.6 NATURE OF CONSTRUCTION ACTIVITY:
FOR CONSTRUCTION CONSISTING OF REPLACEMENT OF STRUCTURE FOR THE CONSTRUCTION OF BRIDGE AND APPROACHES.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
PANTEX SILTY CLAY LOAM	0-7" SILTY CLAY LOAM, 7-34" SILTY CLAY
AfU (AMARILLO URBAN LAND COMPLEX)	0-9": FINE SANDY LOAM 9"-38":SANDY CLAY LOAM 38"-80":CLAY LOAM

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☒ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☐ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
☐ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☐ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
☐ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ 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
TECOVAS CREEK: INTERMITENT	UNCALSSIFIED
CANADIAN RIVER	CLASSIFIED, *SEGMENT 0103-01 IMPAIRED FOR CHLORIDE

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

MAHYAR RAZAZ
146001
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
12/19/23

NO.	DATE	DESCRIPTION	APPROV.

2M ASSOCIATES, LLC
5930 PRESTON VIEW BLVD., SUITE A
DALLAS, TEXAS 75240
TBPE REGISTRATION NO.12158
PH. 214.663-1377
FAX 888-528-9160

Texas Department of Transportation

IH-40 AT ADKISSON ROAD

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MR	6	SEE TITLE SHEET		IH 40
GRAPHICS MR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DH	TEXAS	AMA	POTTER	149
CHECK AM	CONTROL	SECTION	JOB	
	0090	05	108	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☒ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☒ ☐ Sediment Control Fence
- ☒ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
RIP/RAP		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☒ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☒ Loaded haul trucks to be covered with tarpaulin
- ☒ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 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
MAHYAR RAZAZ
146001
LICENSED
PROFESSIONAL ENGINEER
12/19/23

NO.	DATE	DESCRIPTION	APPROV.

2M ASSOCIATES
2M ASSOCIATES, LLC
5930 PRESTON VIEW BLVD, SUITE A
DALLAS, TEXAS 75240
TBPE REGISTRATION NO.12158
PH: 214.663-1377
FAX 888-505-9180

Texas Department of Transportation

IH-40 AT ADKISSON ROAD

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MR	6	SEE TITLE SHEET		IH 40
GRAPHICS MR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DH	TEXAS	AMA	POTTER	150
CHECK AM	CONTROL	SECTION	JOB	
	0090	05	108	

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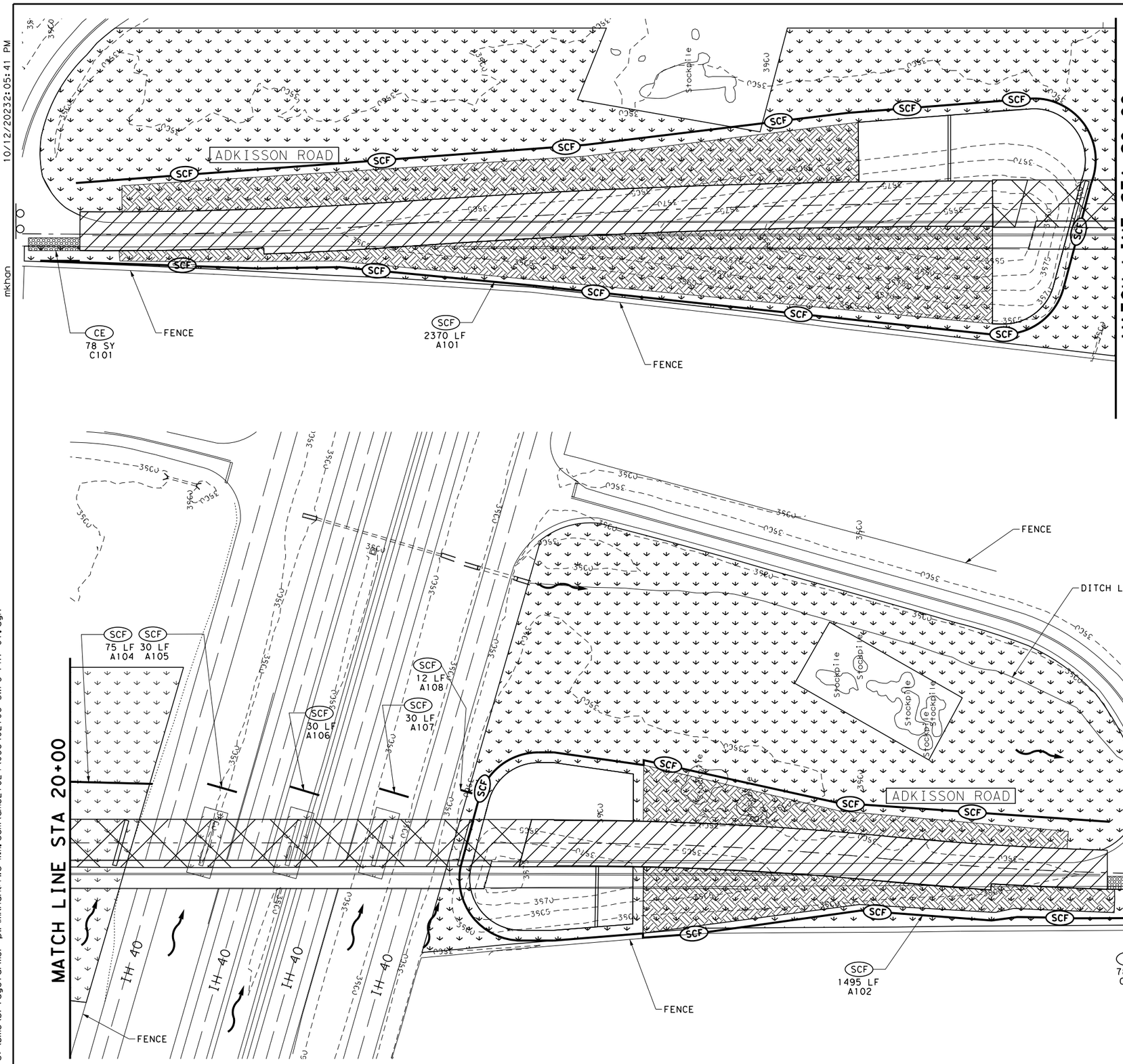
mkhan



50 0 50 100

SCALE: 1" = 100'

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- CE — CONSTRUCTION ENTRANCE AND EXIT
- SURFACE FLOW
- PROPOSED PAVEMENT
- PROPOSED BRIDGE
- SEEDING
- SOIL RETENTION BLANKETS

I.D #	INSTALL DATE:	REMOVE DATE:
A101		
A102		
A103		
A104		
A105		
A106		
A107		
A108		
A109		
C101		
C102		

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.

2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.

3. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE, AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.

4. ALL INLETS AND JUNCTION BOXES WITHIN THE PROJECT LIMITS OR AFFECTED BY CONSTRUCTION DEBRIS SHALL BE PROTECTED AT ALL TIME.

DATE DISTURBED: _____
DATE STABILIZED: _____

ITEM	QUANTITIES
169-6001	SY
SOIL RETENTION BLANKETS (CL1) (TY A)	10,164

ITEM	QUANTITIES
164-6004	AC
BROADCAST SEED (PERM) (RURAL) (CLAY)	9

STATE OF TEXAS
DAVID ALLEN HOWARD
69370
LICENSED
PROFESSIONAL ENGINEER
10-12-23

NO.	DATE	DESCRIPTION	APPROV.

2M ASSOCIATES, LLC
5930 PRESTON VIEW BLVD., SUITE A
DALLAS, TEXAS 75240
TBPE REGISTRATION NO.12158
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IH-40 AT ADKISSON ROAD

IH - 40 AT ADKISSON RD SWP3 LAYOUT PH1 & PH2 STA 10+00 TO STA 30+00

SCALE: 1" = 100' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MR	6	SEE TITLE SHEET		IH 40
GRAPHICS MR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DH	TEXAS	AMA	POTTER	151
CHECK AM	CONTROL 0090	SECTION 05	JOB 108	

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ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERM) (RURAL or URBAN) (SAND or CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 15th THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE: BUFFALO GRASS (Texoka) "Fluffy" WESTERN WHEATGRASS (ARRIBA) "Hard" BERMUDA GRASS (BLACK JACK) "Hard Tiny Seed" 100% "Unhulled"	 3.0 LBS PLS / ACRE 6.0 LBS PLS / ACRE 5.0 LBS PLS / ACRE @ ¼"-½" SOIL DEPTH
PERMANENT and TEMP. LATE SPRING SEED FROM MAY 15th THROUGH AUGUST 1st AS AREAS OF THE ROW THAT ARE LAID BY BUT DETERMINED TO BE OUT OF SEASON FOR PERMANENT DRILL SEEDING.	TYPE: MILLET (BROWN TOP) "Hard Shell, "Small Seed" - Nurse crop BERMUDA GRASS (BLACK JACK) "Hard Tiny Seed" 100% "Unhulled"	30. LBS PLS / ACRE @ ¼" SOIL DEPTH 5.0 LBS PLS / ACRE
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER.		

NOTES:

1. ALL SEED MIXTURE TYPES SHALL BE PURCHASED IN PRE- MIXED BAGS, "BY TYPE" BLENDED BY THE GROWER SHIPPER.
2. SOILS THAT ARE COMPACTED, HAVE CLODS, SHALL BE REWORKED UNTIL READY FOR SEEDING. AS DIRECTED.
3. ALL SOIL SURFACES SHALL BE LEVEL WITH NATURAL FLOWING SMOOTH GRADES. NO TIRE RUTS OR FURTHER TRAFFIC ALLOWED.
4. SOIL SURFACE SHALL BE FIRM BUT NOT COMPACTED, ALLOWING 1/4" DEPRESSION UNDER NORMAL FOOT TRAFFIC.
5. SEED 100% OF THE BED AREA. NO SKIPS OR VOID AREAS ALLOWED. EXAMPLE: AREAS AROUND SIGN POSTS AND INLETS.
6. SEED UP TO THE FIRST 6" OF THE EDGE OF PAVEMENT. AS DIRECTED, HAND RAKE ISOLATED SEEDED AREAS.
7. WEIGH ALL CALIBRATED SEED SAMPLES FOR ACCURACY AND PRESENT DOCUMENTATION TO ENGINEER.

FOR DRILL SEEDING

1. USE ONLY PROFESSIONAL NATIVE GRASS OR TURF GRASS (MULTI- 3 BIN) DRILL SEEDERS.
2. CALIBRATE DRILL SEEDER FOR SPECIFIED (PLS) PER ACRE BEFORE DRILL SEEDING.
3. DRILL SEEDER MUST BE EQUIPPED WITH THE LARGE FRONT CUTTING COULTERS DURING THE INSPECTION OF DRILL SEEDER.

FOR BROADCAST SEEDING

1. USE ONLY COMMERCIAL TYPE CYCLONE TYPE SPREADERS.
2. CALIBRATE CYCLONE SPREADER FOR 1000 Sq. Ft. (PLS) PER ACRE BEFORE SEEDING.
3. TO PREVENT SEED SEPARATION IN SPREADERS, SPREAD ALL SEED TYPES INDEPENDENTLY IN A SEPARATE APPLICATION.
4. IMMEDIATELY AFTER SEEDING, IN ONE OR TWO OPERATIONS, CULTI-PACK THE SEEDED SOILS AND FIRM SEED INTO SURFACE.
5. DISCONTINUE SEEDING IF WIND EXCEEDS 10 MPH.

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH
TEMPORARY: EARLY FALL SEED FROM AUGUST 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE: WESTERN WHEATGRASS "Hard Shell" RED WINTER WHEAT, VAR: TAM III "Hard Shell"	6.0 LBS PLS / ACRE 34. LBS PLS / ACRE @ 1" SOIL DEPTH
TEMPORARY: LATE FALL SEED FROM DECEMBER 1st THROUGH DECEMBER 31ST. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE: RED WINTER WHEAT, VAR: TAM III "Hard Shell"	34. LBS ACRE / PLS @ 1" SOIL DEPTH
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER.		

ITEM 314 EMULSIFIED ASPHALT TREATMENT

TIME SCHEDULE:

IMMEDIATELY AFTER SOIL PREPARATION OR WITHIN 24 HOURS AFTER SEEDING, APPLY THE TACK COAT TO DESIGNATED SOIL SURFACES.

FUNCTIONAL USE:
SOIL EROSION CONTROL, OR MOISTURE RETENTION BARRIER.

NOTES:

1. ALL TRUCK APPLICATIONS SHALL BE COMPLETED IN ONE PASS OF THE DISTRIBUTOR. ALL TOUCH UP WORK WILL BE FINISHED BY HAND AND HOSE PROCEDURES. APPLY FROM EDGE OF PAVEMENT THROUGH THE FULL SPECIFIED AREAS.
2. ENGINEER WILL INSPECT FOR ACCURACY THE OVERALL DEPTH OF THE APPLIED TACK COAT MATERIALS.
3. FURTHER VEHICULAR TRAFFIC IS NOT ALLOWED ON LAID BY TACK COAT SURFACES. AT THE CONTRACTORS EXPENSE ALL DAMAGES TO TACK COAT SURFACES WILL BE RE -SHOT AS DIRECTED BY THE ENGINEER.

ITEM 166 FERTILIZER

TIME SCHEDULE:

AFTER TOPSOIL PLOWING PEPARATIONS ARE COMPLETED, FERTILIZE R.O.W. SOIL SURFACES AND HARROW 2" TO 4" DEEP INTO PLACE.

FUNCTIONAL USE:
PLANT NUTRIENTS FOR PLANT AND ROOT DEVELOPMENT.

FERTILIZER SHALL BE EVENLY DISTRIBUTED AT A RATE OF 28 LBS OF NITROGEN PER ACRE.
THE BREAK DOWN OF THE NITROGEN ELEMENT SHALL BE IN A 50% SLOW RELEASE FORM.
ANALYSIS OF THE (NPK) IS: 1-5-0 A HIGH PHOSPHATE BLEND.
AS DIRECTED BY THE VEGETATION MANAGER.

ITEM 166 NOTES:

1. BROADCAST SPECIFIED FERTILIZER FROM THE EDGE OF PAVEMENT, THROUGH THE ENTIRE ROW SEED BED AREA. APPLICATIONS FOR EDGE OF PAVEMENT, CULVERTS, SIGN POST AREAS, GUARD RAILS AND ISOLATED AREAS SHALL BE APPLIED BY WALK BEHIND SPREADERS AND BY HAND. NO FERTILIZER ALLOWED ON PAVEMENT SURFACES.
2. ALL SPREADERS SHALL BE CALIBRATED BY THE CONTRACTOR AND THE ENGINEER FOR ACCURACY AND PERFORMANCE. SHALL USE UNOPENED 50# BAGS OF SPECIFIED FERTILIZER FOR DAILY CALIBRATIONS. APPLICATION SHALL BE AN EVEN DISTRIBUTION OF PRODUCT ON DESIGNATED SOIL SURFACES.
3. FERTILIZER SHALL BE DELIVERED IN 50# BAGS UNLESS OTHERWISE SPECIFIED OR APPROVED PRIOR TO DELIVERY. BAGS SHALL BE CLEARLY LABELED SHOWING CONTENTS. IF BULK FERTILIZER IS APPROVED, DOCUMENTATION WILL BE REQUIRED FOR EACH LOAD OF MATERIAL DELIVERED VERIFYING AUTHENTICITY OF THE MATERIAL. CULTURAL PROCEDURES ARE UNDER THE DIRECTION OF THE TXDOT VEGETATION MANAGER.

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER
10/12/23
James W Langston PE
Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

Texas Department of Transportation

AMARILLO DISTRICT STANDARD

VEGETATION SPECIFICATION SHEET

FEDERAL AID PROJECT	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
	CONT	SECT	JOB	HIGHWAY
REVISIONS 03/27/20	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		152

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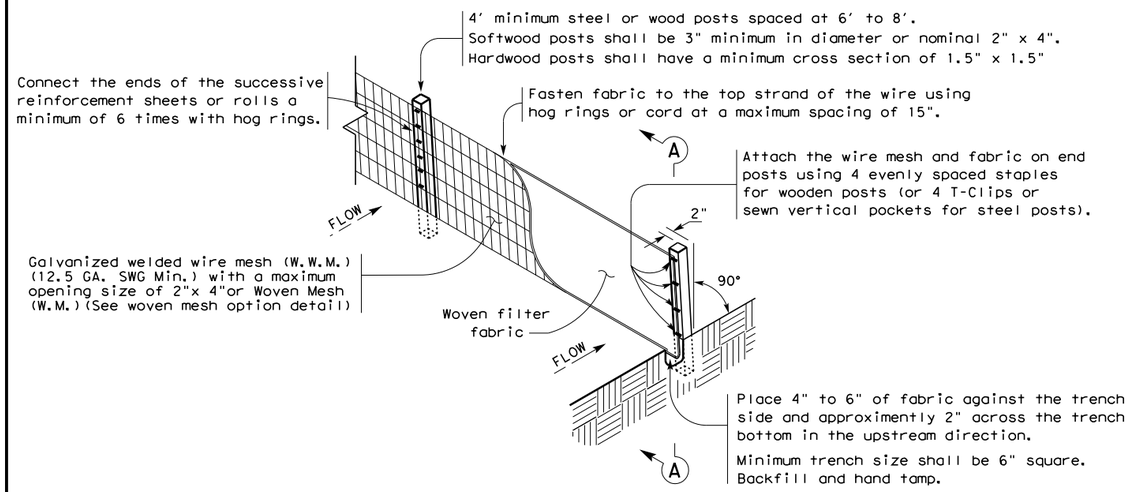
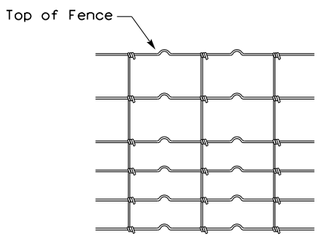
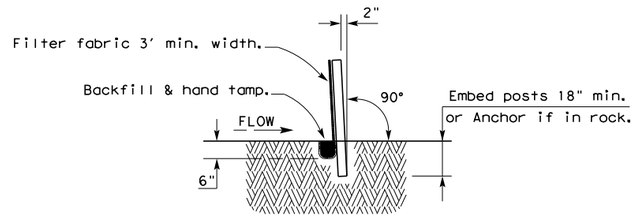
Vidal.Ngoumnai



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

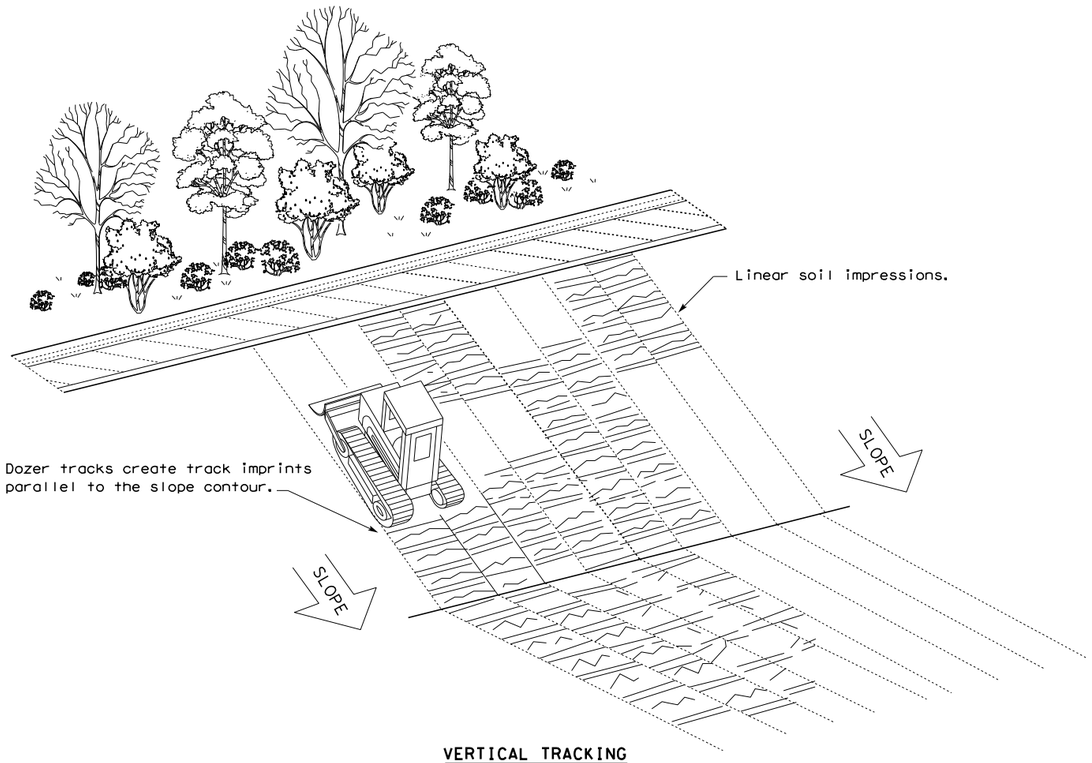
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS		
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
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	DIST	COUNTY			SHEET NO.	
	AMA	POTTER			153	

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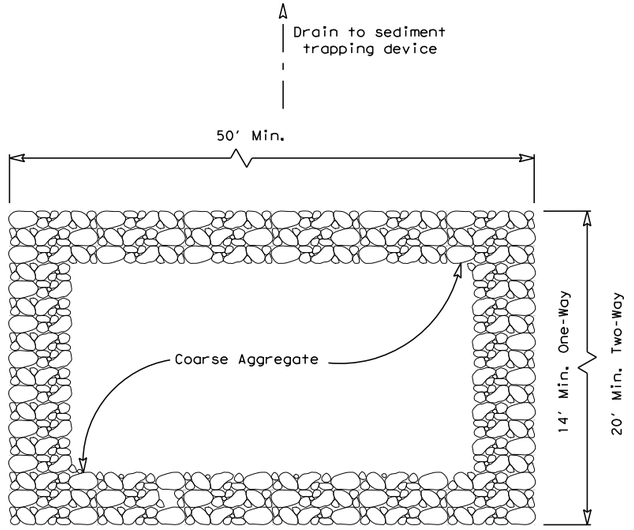
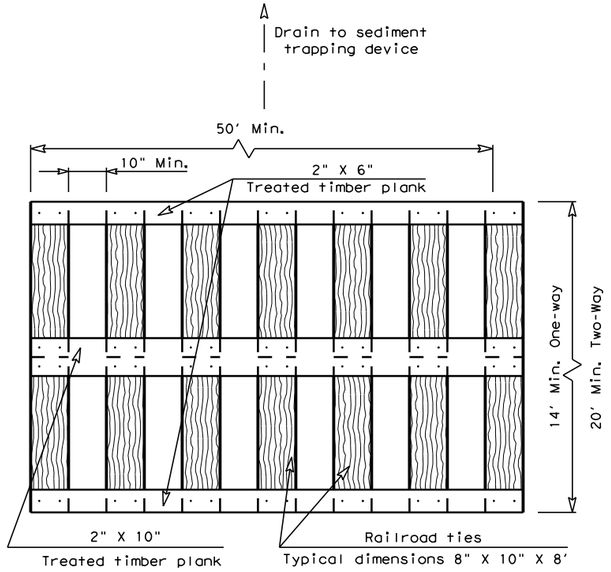
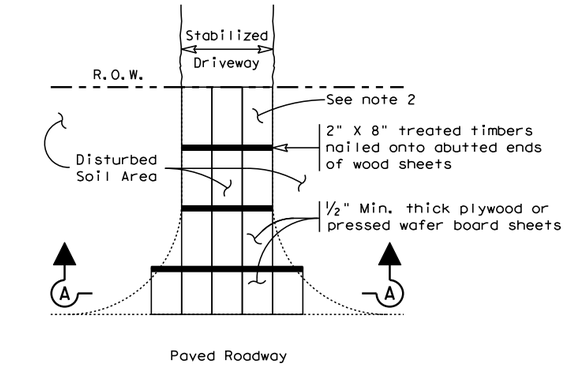


PLAN VIEW



PLAN VIEW



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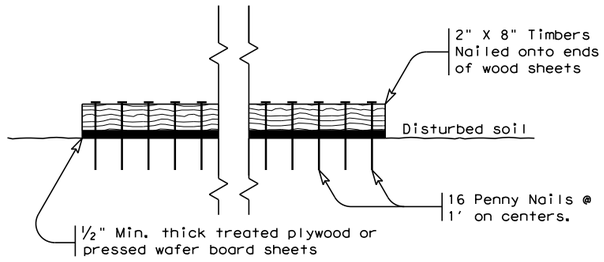
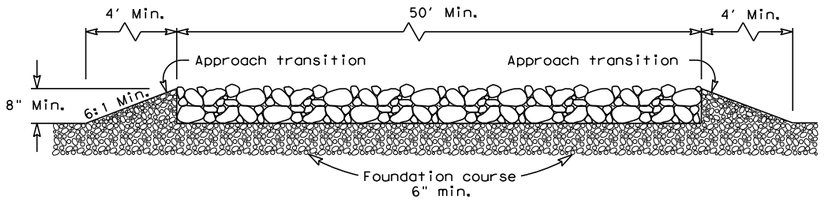


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

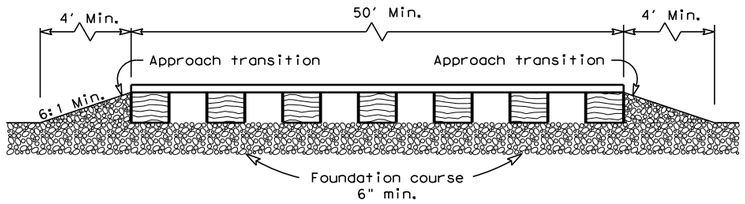
SHORT TERM



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

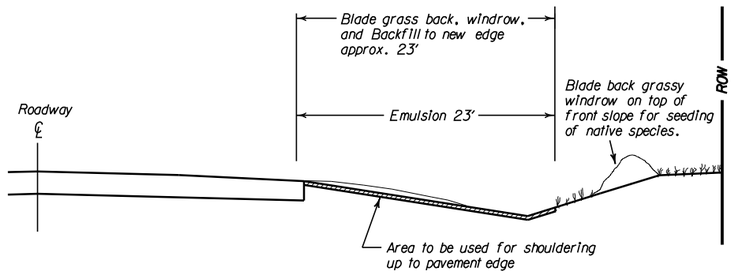
Design Division Standard

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	0090	05	108	IH 40
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		154



TYPICAL DITCH SECTION

STATE OF TEXAS
JAMES W. LANGSTON
73891
LICENSED
PROFESSIONAL ENGINEER

10/19/23

James W. Langston PE

Bridgefarmer & Associates, Inc.
TBPE Registration No. 264

Texas Department of Transportation

SW3P
DETAILS

SCALE: AS NOTED

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		IH 40
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AMA	POTTER	155
CHECK	CONTROL	SECTION	JOB	
	0090	05	108	