FED.RD. DIV.NO.	FEDERAL PROJECT NO.		SHEET NO.
6	BR 2024(461)		1
STATE	STATE DIST.	COUNTY	
TEXAS	AMA	CARSON, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0275	04	061, ETC.	IH 40, ETC.

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
FEDERAL PROJECT: BR 2024(461)
HIGHWAY - IH 40, ETC.
COUNTY - CARSON, ETC.

CONTROL: 0275-04-061, ETC.

FOR THE CONSTRUCTION OF 2023 BMIP PROGRAM.
CONSISTING OF DECK OVERLAY, RAIL RETROFIT, BRIDGE REPAIR, MBGF, AND STRIPING AT VARIOUS LOCATIONS.

DESIGN SPEED = N/A
2021 ADT = N/A
2041 ADT = N/A
INTERSTATE

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR : _____

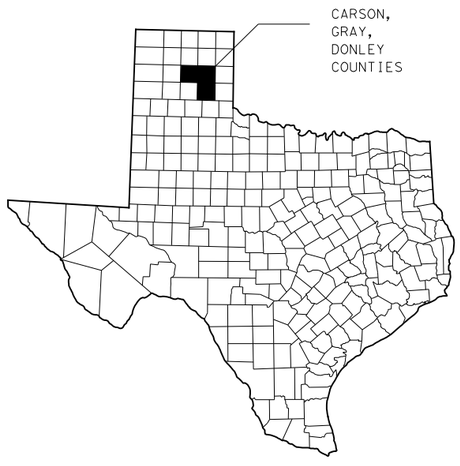
AREA ENGINEER: _____ Date: _____

INDEX OF SHEETS

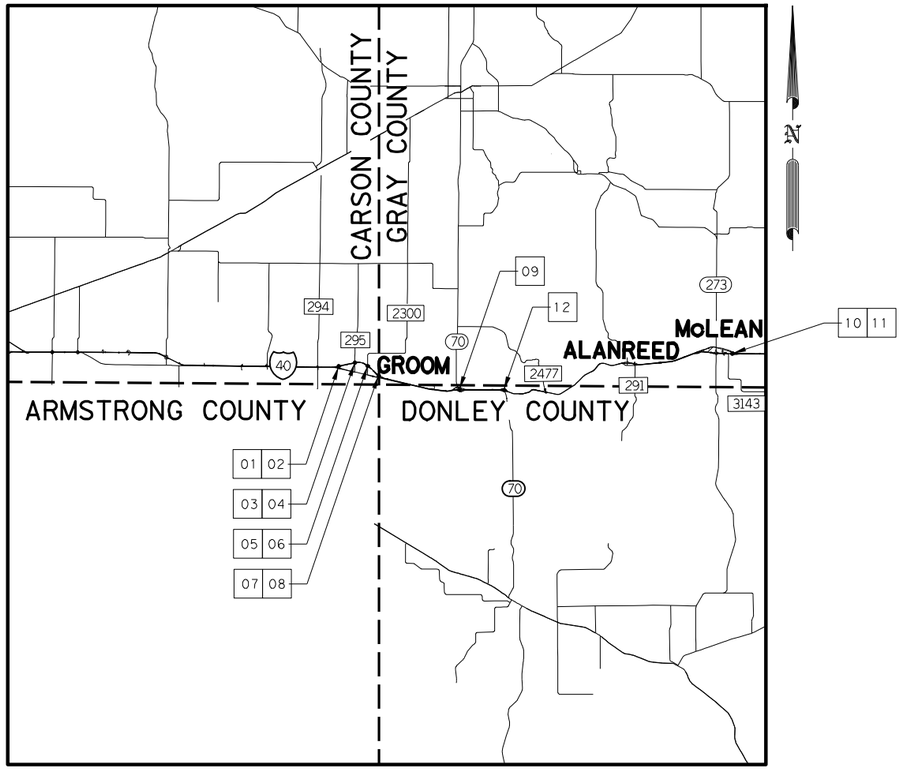
LOCATION SUMMARY

LOCATION	CSJ	NBI NUMBER	HIGHWAY	CROSSING
REF 01	0275-04-061	04-033-0-0275-04-119	IH 40 WB	BI 40F
REF 02	0275-04-062	04-033-0-0275-04-120	IH 40 EB	BI 40F
REF 03	0275-04-063	04-033-0-0275-04-121	IH 40 WB	FM 295
REF 04	0275-04-064	04-033-0-0275-04-122	IH 40 EB	FM 295
REF 05	0275-04-065	04-033-0-0275-04-123	IH 40 WB	FM 2300
REF 06	0275-04-066	04-033-0-0275-04-124	IH 40 EB	FM 2300
REF 07	0275-05-048	04-091-0-0275-05-125	IH 40 WB	IH 40F FR CONN
REF 08	0275-05-049	04-091-0-0275-05-126	IH 40 EB	IH 40F FR CONN
REF 09	0309-01-045	04-091-0-0275-07-108	SH 70(NORTH)	IH 40
REF 10	0275-11-086	04-091-0-0275-11-145	IH 40 WB	IH 40H FR CONN
REF 11	0275-11-087	04-091-0-0275-11-146	IH 40 EB	IH 40H FR CONN
REF 12	0310-01-045	25-065-0-0275-07-107	SH 70(SOUTH)	IH 40

SEE LOCATION MAP FOR ADDITIONAL INFORMATION NOT SHOWN



KEY TO COUNTIES



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)

2023 Texas Department of Transportation

RECOMMENDED FOR LETTING: DATE: 10/3/2023
DocuSigned by: Zachary K Mayer P.E.
3719DE174B2A4C6...
AREA ENGINEER

DATE: 10/4/2023
DocuSigned by: Kit Black
9B5A6EA6AE8B46E...
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: DATE: 10/5/2023
DocuSigned by: Blair Johnson
8B80E3AEB2BC43A...
DISTRICT ENGINEER

PENTABLE: 10359132 AMA.tbl
DATE: 7/7/2023
FILE: AMA BMIP Title sheet.dgn

FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

INDEX OF SHEETS

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER

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

SIGNATURE OF REGISTRANT, P.E. 07/11/2023 DATE

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

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

Brett RC Allen
SIGNATURE OF REGISTRANT, P.E. 07/11/2023 DATE

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

INDEX OF SHEETS

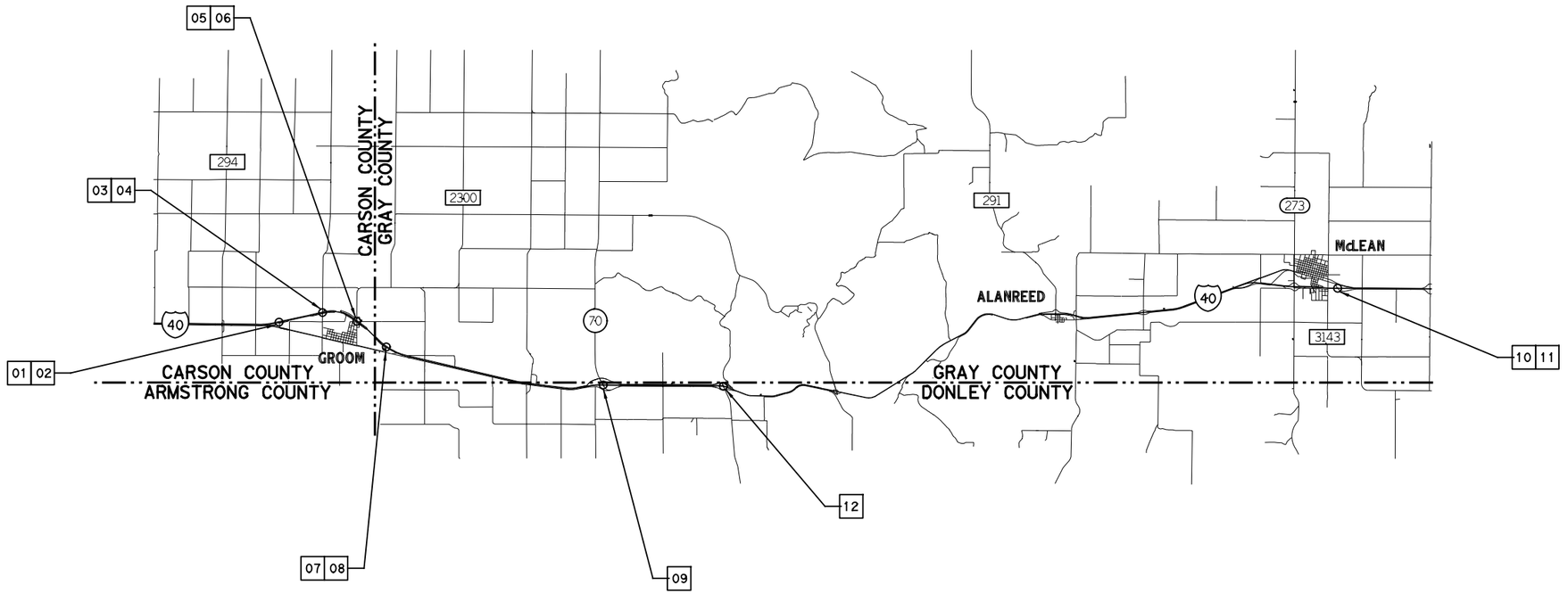
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		2

DATE: 7/7/2023 5:00:47 PM
FILE: AMA BMP Index.dgn

FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



LOCATION SUMMARY

LOCATION	CSJ	NBI NUMBER	HIGHWAY	CROSSING	REF MARKER
REF 01	0275-04-061	04-033-0-0275-04-119	IH 40 WB	BI 40F	336-0.232 MI
REF 02	0275-04-062	04-033-0-0275-04-120	IH 40 EB	BI 40F	336-0.217 MI
REF 03	0275-04-063	04-033-0-0275-04-121	IH 40 WB	FM 295	102+0.132 MI
REF 04	0275-04-064	04-033-0-0275-04-122	IH 40 EB	FM 295	102+0.150 MI
REF 05	0275-04-065	04-033-0-0275-04-123	IH 40 WB	FM 2300	104+1.690 MI
REF 06	0275-04-066	04-033-0-0275-04-124	IH 40 EB	FM 2300	104+1.712 MI
REF 07	0275-05-048	04-091-0-0275-05-125	IH 40 WB	IH 40F FR CONN	340+0.232 MI
REF 08	0275-05-049	04-091-0-0275-05-126	IH 40 EB	IH 40F FR CONN	340+0.215 MI
REF 09	0309-01-045	04-091-0-0275-07-108	SH 70 (NORTH)	IH 40	120+0.883 MI
REF 10	0275-11-086	04-091-0-0275-11-145	IH 40 WB	IH 40H FR CONN	143+0.810 MI
REF 11	0275-11-087	04-091-0-0275-11-146	IH 40 EB	IH 40H FR CONN	143+0.817 MI
REF 12	0310-01-045	25-065-0-0275-07-107	SH 70 (SOUTH)	IH 40	124+0.481 MI

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

LOCATION MAP

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		3

DATE: 7/7/2023 5:00:59 PM
FILE: AMA BMP Location Map.dgn

GENERAL NOTES

CSJ: 0275-04-061, ETC				
BASIS OF ESTIMATE FOR CONSTRUCTION				
Item	Description	Unit	Rate	
3077	TACK COAT	GAL	0.10 GAL / SY	
3077(1)	SUPERPAVE MIXTURES	TON	2”	220 LB/SY/2000
NOTE:				
(1)	SP-D PG70-28 Weight Based On 110Lbs/SY/In			

General

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

TO:	Pampa Area Engineer	Zachary.Mayer@txdot.gov
CC:	Assistant Area Engineer	Ivan.Fuentes@txdot.gov
	Director of Construction	Kenneth.Petr@txdot.gov
	Construction Manager	LaDenia.Jewitt@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/

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

The following Standard Detail Sheets have been modified:

C-RAIL-R (MOD)
SEJ-M (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.

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

Do not store any equipment or material under any bridge.

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.

Any work necessary to provide temporary ingress and egress during construction (such as building gravel ramps, etc.) Will not be paid for directly, but will be considered as subsidiary work to the various bid items.

Item 5 Control of the Work

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with “Standard Operating Procedure for Alternate Precast Proposal Submission” found online at:

https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design

Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 6 Control of Materials

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit a notarized 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 *0.964* 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.

Milestone A CSJ: 0309-01-045 SH 70 (North)

Milestone A: to facilitate construction at SH 70 (North) bridge as designated as fast as possible.

The time allowed for Milestone A construction is 66 working days in accordance with Article 8.3.1.1 Five-Day Workweek.

Milestone A time charges will start when:
The SH 70 (North) bridge is closed for construction. Closed is defined as when all bridge traffic is routed along the detour.
Milestone A time charges will end when:
The bridge is opened to all traffic and will remain open for the remaining duration of the project.

If the Milestone A is complete, as defined above, earlier than the stated number of working days, a bonus of $3,500 per day for a maximum of 15 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 $1,300 per day will be assessed for each day more than the stated number of allowable working days for Milestone A until the bridge is completed and open to traffic. The working period charged for Milestone A shall also be included in the computation of the total time charges for the total completion of the project.

Milestone B CSJ: 0310-01-045 SH 70 (South)

Milestone B: to facilitate construction at SH 70 (South) bridge as designated as fast as possible.

The time allowed for Milestone B construction is 66 working days in accordance with Article 8.3.1.1 Five-Day Workweek.

Milestone B time charges will start when:
The SH 70 (South) bridge is closed for construction. Closed is defined as when all bridge traffic is routed along the detour.
Milestone B time charges will end when:
The bridge is opened to traffic and will remain open for the remaining duration of the project.

If the Milestone B is complete, as defined above, earlier than the stated number of working days, a bonus of $3,500 per day for a maximum of 15 days will be awarded. If the Milestone B is not completed, as defined above, within the stated number of days, contract administration and road user liquidated damages of $1,300 per day will be assessed for each day more than the stated number of allowable working days for Milestone B until the bridge is completed and open to traffic. The working period charged for Milestone B shall also be included in the computation of the total time charges for the total completion of the project.

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 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 427 Surface Finishes for Concrete

Si-Rex03 or Sikagard-550W may be used as alternative products for Epoxy Waterproof Finish (Ty X).

Item 429 Concrete Structure Repair

Areas to be repaired at each location shall be repaired in accordance with the Department's Concrete Repair Manual. The Contractor must prepare and submit formal procedures outlining repair plans and which proprietary implementation so the Engineer has sufficient time to review. The Engineer must approve in writing any procedures that differ from those in the Concrete Repair Manual or materials that are not included in one of TxDOT's MPLS materials they plan to utilize. Submit the package a minimum of two weeks prior to performing repair.

A hard copy of the Department's Concrete Repair Manual shall be on-hand whenever concrete repairs are being performed.

For Vertical and Overhead repairs use preapproved Type C Repair Material.

Provide containment for repair materials to prevent materials from falling into the water.

Remove any repair materials that do fall into the water.

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.

Item 439 Bridge Deck Overlays

Mask existing joints and deck drains.

Reapply roadway striping to match the original striping.

Item 450 Railing

Do not use drain slots in bridge rail.

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.

For Expansion Joints SPS 400 and SF 400 type SEJ's are not to be utilized.

(SEE LINK BELOW FOR UPDATED LIST OF APPROVED JOINTS SYSTEMS)
https://www.txdot.gov/business/resources/materials/material-producer-list.html

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.

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 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 IH 40 at FM 2161

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 IH 40 at FM 2161. 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 514 Permanent Concrete Traffic Barrier

The "Type 2" precast concrete traffic barrier is to be joined together using a "Type B" joint. Any anchorage required for rail installation will be subsidiary to rail bid item(s).

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.

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 ground mount applications provide hollow or tubular posts embedded in concrete using plastic wedged anchor system.

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.

Blast cleaning will be required for surface preparation prior to placing prefabricated pavement markings as directed by the Engineer.

Item 677 Eliminating Existing Pavement Markings and Markers

Do not remove any existing pavement markings in any area in which the contractor is not able to place work zone pavement markings at the proper location within the same day.

Item 712 Cleaning and Sealing Joints and Cracks

Use Cap Option A with 20 GA metal flashing for concrete riprap in contact with the abutment and wingwalls.

Use Class B rubber-asphalt crack sealer.

All equipment and vehicles are to be approved by the Engineer prior to use and be able to efficiently produce the desired results.

Item 713 Crack Cleaning and Sealing

Use joint sealant class 4, 5, 7 or 8 for crack repair. Do not use backer rod for riprap cracks.

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.

All SP-C on this project is considered surface mix. The Contractor may use a substitute PG binder one grade below the PG binder originally specified; however, the mixture made with the substitute PG binder must meet the minimum number of passes on the Hamburg Wheel test (TEX-242-F) for the originally specified PG binder grade as shown in Table 11.

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
3077	From April 15th through October 31st

Item 6001 Portable Changeable Message Sign

Supply 4 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, (2-4)-18, (2-6)-18, (3-1)-13, (3-2)-13, (3-3)-14, (6-1)-12 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 0275-04-061 **DISTRICT** Amarillo **COUNTY** Carson, Donley, Gray
HIGHWAY IH 40, SH 70

			CONTROL SECTION JOB	**0275-04-061**		**0275-04-062**		**0275-04-063**		**0275-04-064**		**0275-04-065**		**0275-04-066**	
			PROJECT ID	**A00186243**		**A00186244**		**A00186245**		**A00186246**		**A00186247**		**A00186248**	
			COUNTY	**Carson**		**Carson**		**Carson**		**Carson**		**Carson**		**Carson**	
			HIGHWAY	**IH 40**		**IH 40**		**IH 40**		**IH 40**		**IH 40**		**IH 40**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	104-6009	REMOVING CONC (RIPRAP)	SY	7.000		13.000		16.000		9.000		20.000		20.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY									9.000		4.000	
	354-6048	PLANE ASPH CONC PAV (3")	SY												
	354-6049	PLANE ASPH CONC PAV (6")	SY							1,190.000					
	354-6064	PLANE ASPH CONC PAV (2 1/2")	SY												
	354-6075	PLANE ASPH CONC PAV (2" TO 6.5")	SY	1,174.000		1,174.000		1,174.000		1,174.000		1,174.000		1,174.000	
	354-6076	PLANE ASPH CONC PAV (6.5")	SY	1,050.000				1,190.000				1,307.000			
	354-6100	PLANE ASPH CONC PAV (5")	SY											1,307.000	
	354-6137	PLANE ASPH CONC PAV (5.5")	SY			1,050.000									
	401-6001	FLOWABLE BACKFILL	CY	5.000		5.000		5.000		5.000		5.000		10.000	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY												
	427-6007	EPOXY WATERPROOF FINISH (TY X)	SF	2,571.000		2,413.000		2,430.000		2,430.000		3,074.000		3,074.000	
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	95.000		95.000		110.000		110.000		120.000		120.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	25.000		25.000		25.000		25.000		30.000		30.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	113.000		107.000		134.000		172.000		154.000		186.000	
	431-6002	PNEUMATICALLY PLACED CONC (REPAIR)	CF												
	432-6001	RIPRAP (CONC)(4 IN)	CY	101.000		105.000		108.000		84.000		113.000		120.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	38.000		34.000		35.000		35.000		33.000		38.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF												
	438-6010	RESIZING AND SEALING JOINTS	LF												
	439-6001	CONCRETE OVERLAY (1.5 IN)	SY												
	439-6003	CONCRETE OVERLAY (2.5 IN)	SY												
	439-6004	CONCRETE OVERLAY (3 IN)	SY	1,340.000		1,340.000		1,472.000		1,472.000		1,587.000		1,587.000	
	439-6011	REINFORCED CONCRETE OVERLAY (4.0 IN)	SY												
	450-6023	RAIL (TY SSTR)	LF												
	450-6054	RAIL (TY SSTR) (W/DRAIN SLOTS)	LF												
	451-6024	RETROFIT RAIL (TY SSTR)	LF	422.000		422.000		460.000		460.000		506.000		506.000	
	483-6005	HYDRO-DEMOLITION (1 IN)	SY	1,046.000		1,046.000		1,178.000		1,178.000		1,293.000		1,293.000	
	483-6006	HYDRO-DEMOLITION (1 1/2 IN)	SY	294.000		294.000		294.000		294.000		294.000		294.000	
	496-6056	REMOVE STR (STL SECTIONS)	LF	14.000		14.000				7.000					
	500-6001	MOBILIZATION	LS	0.100		0.100		0.100		0.100		0.100			
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		2.000		4.000		2.000		2.000		2.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	112.000		112.000		112.000		112.000		112.000		112.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	112.000		112.000		112.000		112.000		112.000		112.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	500.000		500.000		500.000		500.000		500.000		500.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	500.000		500.000		500.000		500.000		500.000		500.000	
	512-6017	PORT CTB (DES SOURCE)(F-SHAPE)(TY 1)	LF	810.000		810.000									

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

			CONTROL SECTION JOB	**0275-04-061**		**0275-04-062**		**0275-04-063**		**0275-04-064**		**0275-04-065**		**0275-04-066**	
			PROJECT ID	**A00186243**		**A00186244**		**A00186245**		**A00186246**		**A00186247**		**A00186248**	
			COUNTY	**Carson**		**Carson**		**Carson**		**Carson**		**Carson**		**Carson**	
			HIGHWAY	**IH 40**		**IH 40**		**IH 40**		**IH 40**		**IH 40**		**IH 40**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	810.000		810.000		1,620.000		1,620.000		1,620.000		1,620.000	
	512-6041	PORT CTB (STKPL)(F-SHAPE)(TY 1)	LF												
	514-6001	PERM CTB (SGL SLOPE) (TY 1) (42)	LF	570.000		570.000		570.000		540.000		570.000		570.000	
	514-6003	PERM CTB (SGL SLOPE) (TY 3) (42)	LF	20.000		20.000		20.000		20.000		20.000		20.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF												
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA												
	540-6010	MTL W-BEAM GD FEN ADJUSTMENT	LF	250.000		200.000		300.000		50.000		350.000		250.000	
	540-6011	MTL THRIE-BEAM GD FEN ADJUSTMENT	LF	38.000		38.000		38.000		38.000		38.000		38.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA												
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF												
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA												
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA												
	543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	1.000								1.000		1.000	
	543-6021	REMOVE CABLE BARRIER	LF	65.000								25.000		70.000	
	543-6022	REMOVE CABLE BARRIER TERMINAL SECTION	EA	1.000								1.000		1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA												
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA												
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	1.000		1.000		2.000		2.000		2.000		2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA												
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	1.000		1.000		1.000		1.000		1.000		1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	1.000		1.000									
	636-6011	REPLACE EXISTING ALUMINUM SIGNS (TY O)	EA	1.000		1.000		1.000		1.000		1.000		1.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA												
	644-6074	RELOCATE SM RD SN SUP&AM(RAIL MOUNT)	EA												
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	3.000		3.000		3.000		3.000		3.000		3.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA												
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	3.000		3.000		3.000		3.000		3.000		3.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	5.000		5.000		5.000		5.000		5.000		5.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA												
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	3.000		2.000		2.000		2.000		2.000		3.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	5,880.000		5,880.000		5,880.000		5,880.000		5,880.000		5,880.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	4,485.000		4,485.000		4,485.000		4,485.000		4,485.000		4,485.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	219.000		219.000		219.000		219.000		219.000		219.000	
	666-6225	PAVEMENT SEALER 6"	LF	5,840.000		5,840.000		5,840.000		5,840.000		5,840.000		5,840.000	
	666-6305	RE PM W/RET REQ TY I (W)6"(BRK)(090MIL)	LF	640.000		640.000		640.000		640.000		640.000		640.000	
	666-6308	RE PM W/RET REQ TY I (W)6"(SLD)(090MIL)	LF	2,650.000		2,650.000		2,650.000		2,650.000		2,650.000		2,650.000	
	666-6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF	2,550.000		2,550.000		2,550.000		2,550.000		2,550.000		2,550.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

			CONTROL SECTION JOB	**0275-04-061**		**0275-04-062**		**0275-04-063**		**0275-04-064**		**0275-04-065**		**0275-04-066**	
			PROJECT ID	**A00186243**		**A00186244**		**A00186245**		**A00186246**		**A00186247**		**A00186248**	
			COUNTY	**Carson**		**Carson**		**Carson**		**Carson**		**Carson**		**Carson**	
			HIGHWAY	**IH 40**		**IH 40**		**IH 40**		**IH 40**		**IH 40**		**IH 40**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	5,820.000		5,820.000		5,820.000		5,820.000		5,820.000		5,820.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	680.000		680.000		680.000		680.000		680.000		680.000	
	678-6005	PAV SURF PREP FOR MRK (10")	LF	90.000		90.000		90.000		90.000		90.000		90.000	
	712-6009	JT / CRCK SEAL (HOT - POURED RUBBER)	LF	454.000		443.000		299.000		300.000		437.000		411.000	
	713-6005	CRACK CLEANING AND SEALING (JCP)	LF	146.000		146.000		156.000		156.000		195.000		198.000	
	785-6004	BRIDGE JOINT REPAIR (ARMOR)	LF												
	785-6010	BRIDGE JOINT REPLACEMENT (ARMOR)	LF												
	785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	76.000		76.000		76.000		76.000		76.000		76.000	
	785-6015	BRIDGE JOINT REPLACEMENT (SPECIAL)	LF	135.000		135.000		138.000		184.000		220.000		220.000	
	786-6001	CARBON FIBER REINF POLYMER PROTECTION	SF					32.000		284.000				99.000	
	3077-6057	SP MIXES SP-D PG70-28	TON	102.000		102.000		102.000		102.000		102.000		102.000	
	3077-6075	TACK COAT	GAL	92.000		92.000		92.000		92.000		92.000		92.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4.000											
	6019-6006	PREFB PV MK W/WNTY TY B (W)(6")(SLD)	LF	340.000		340.000		340.000		340.000		340.000		340.000	
	6019-6007	PREFB PV MK W/WNTY TY B(W)6"(BRK)CNTST	LF	90.000		90.000		90.000		90.000		90.000		90.000	
	6019-6014	PREFB PV MK W/WNTY TY B (Y)(6")(SLD)	LF	340.000		340.000		340.000		340.000		340.000		340.000	
	6185-6002	TMA (STATIONARY)	DAY	400.000											
	6185-6003	TMA (MOBILE OPERATION)	HR	96.000											
	6362-6004	REC REFL PAV MRKR TY II-A-A	EA												
	6362-6005	REC REFL PAV MRKR TY II-C-R	EA	38.000		38.000		38.000		38.000		38.000		38.000	
	7309-6001	CLEANING STRUCTURE (BENT)	EA	2.000		2.000		2.000		2.000		2.000		2.000	
	7309-6002	CLEANING STRUCTURE (ABUTMENT)	EA	2.000		2.000		2.000		2.000		2.000		2.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000											
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000											

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

				CONTROL SECTION JOB	0275-05-048		0275-05-049		0275-11-086		0275-11-087		0309-01-045		0310-01-045	
				PROJECT ID	A00186604		A00186607		A00186626		A00186628		A00186249		A00190955	
				COUNTY	Gray		Gray		Gray		Gray		Gray		Donley	
				HIGHWAY	IH 40		IH 40		IH 40		IH 40		SH 70		SH 70	
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	104-6009	REMOVING CONC (RIPRAP)	SY		12.000		9.000		32.000		30.000		16.000		25.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY												5.000	
	354-6048	PLANE ASPH CONC PAV (3")	SY						1,280.000		1,280.000				2,201.000	
	354-6049	PLANE ASPH CONC PAV (6")	SY													
	354-6064	PLANE ASPH CONC PAV (2 1/2")	SY										2,469.000			
	354-6075	PLANE ASPH CONC PAV (2" TO 6.5")	SY		1,174.000		1,174.000						534.000		428.000	
	354-6076	PLANE ASPH CONC PAV (6.5")	SY		1,050.000											
	354-6100	PLANE ASPH CONC PAV (5")	SY													
	354-6137	PLANE ASPH CONC PAV (5.5")	SY				1,050.000									
	401-6001	FLOWABLE BACKFILL	CY		5.000		5.000		15.000		5.000		5.000		5.000	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY										105.000		16.800	
	427-6007	EPOXY WATERPROOF FINISH (TY X)	SF		2,302.000		2,334.000		3,002.000		3,002.000		3,811.000		3,474.000	
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF		95.000		95.000		120.000		120.000		225.000		200.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF		25.000		25.000		30.000		30.000		40.000		45.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF		111.000		107.000		138.000		131.000		595.000		606.000	
	431-6002	PNEUMATICALLY PLACED CONC (REPAIR)	CF						27.000		28.000					
	432-6001	RIPRAP (CONC)(4 IN)	CY		87.000		88.000		64.000		64.000		5.000		6.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY		38.000		38.000		92.000		99.000		55.000		59.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF						244.000		201.000					
	438-6010	RESIZING AND SEALING JOINTS	LF										122.000		100.000	
	439-6001	CONCRETE OVERLAY (1.5 IN)	SY						241.000		241.000					
	439-6003	CONCRETE OVERLAY (2.5 IN)	SY										2,463.000		2,197.000	
	439-6004	CONCRETE OVERLAY (3 IN)	SY		1,340.000		1,340.000									
	439-6011	REINFORCED CONCRETE OVERLAY (4.0 IN)	SY						1,026.000		1,026.000					
	450-6023	RAIL (TY SSTR)	LF										630.000			
	450-6054	RAIL (TY SSTR) (W/DRAIN SLOTS)	LF										120.000		120.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF		422.000		422.000		541.000		541.000		673.000		734.000	
	483-6005	HYDRO-DEMOLITION (1 IN)	SY		1,046.000		1,046.000		1,026.000		1,026.000					
	483-6006	HYDRO-DEMOLITION (1 1/2 IN)	SY		294.000		294.000		241.000		241.000		2,463.000		2,197.000	
	496-6056	REMOVE STR (STL SECTIONS)	LF													
	500-6001	MOBILIZATION	LS		0.100		0.100		0.100		0.100				0.100	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO		2.000		2.000		2.000		2.000		2.000		2.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY		112.000		112.000		112.000		112.000					
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY		112.000		112.000		112.000		112.000					
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF		500.000		500.000		1,850.000		1,875.000		1,425.000		875.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF		500.000		500.000		1,850.000		1,875.000		1,425.000		875.000	
	512-6017	PORT CTB (DES SOURCE)(F-SHAPE)(TY 1)	LF													

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

				CONTROL SECTION JOB	0275-05-048		0275-05-049		0275-11-086		0275-11-087		0309-01-045		0310-01-045	
				PROJECT ID	A00186604		A00186607		A00186626		A00186628		A00186249		A00190955	
				COUNTY	Gray		Gray		Gray		Gray		Gray		Donley	
				HIGHWAY	IH 40		IH 40		IH 40		IH 40		SH 70		SH 70	
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF		1,620.000		1,620.000		1,620.000		1,620.000					
	512-6041	PORT CTB (STKPL)(F-SHAPE)(TY 1)	LF						810.000		810.000					
	514-6001	PERM CTB (SGL SLOPE) (TY 1) (42)	LF		540.000		570.000		480.000		480.000		20.000		20.000	
	514-6003	PERM CTB (SGL SLOPE) (TY 3) (42)	LF		20.000		20.000		20.000		20.000		130.000		130.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF						1,775.000		1,925.000		475.000		425.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA						3.000		3.000		5.000		6.000	
	540-6010	MTL W-BEAM GD FEN ADJUSTMENT	LF		150.000		300.000									
	540-6011	MTL THRIE-BEAM GD FEN ADJUSTMENT	LF		38.000		38.000									
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA						1.000		1.000					
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF						1,850.000		1,875.000		1,050.000		500.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA						2.000		1.000				4.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA								1.000		1.000			
	543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA		1.000		1.000		1.000							
	543-6021	REMOVE CABLE BARRIER	LF				75.000		25.000							
	543-6022	REMOVE CABLE BARRIER TERMINAL SECTION	EA		1.000		1.000		1.000							
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA						2.000		2.000		5.000		6.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA						2.000		2.000		3.000			
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA		2.000		2.000		2.000		2.000					
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA						1.000		1.000					
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA		1.000		1.000		1.000		1.000		2.000		2.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA													
	636-6011	REPLACE EXISTING ALUMINUM SIGNS (TY O)	EA		1.000		1.000		1.000		1.000		2.000		2.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA												2.000	
	644-6074	RELOCATE SM RD SN SUP&AM(RAIL MOUNT)	EA												3.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA		3.000		3.000		2.000		3.000		14.000			
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA												8.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA		3.000		3.000		3.000		3.000					
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA		5.000		5.000		20.000		19.000		8.000			
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA												8.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA		3.000		3.000		2.000		3.000					
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF		5,880.000		5,880.000		5,880.000		5,880.000					
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF		4,485.000		4,485.000		4,485.000		4,485.000					
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA		219.000		219.000		219.000		219.000					
	666-6225	PAVEMENT SEALER 6"	LF		5,950.000		5,950.000						340.000		320.000	
	666-6305	RE PM W/RET REQ TY I (W)6"(BRK)(090MIL)	LF		640.000		640.000						20.000			
	666-6308	RE PM W/RET REQ TY I (W)6"(SLD)(090MIL)	LF		2,705.000		2,705.000						160.000		160.000	
	666-6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF		2,605.000		2,605.000						160.000		160.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

				CONTROL SECTION JOB	0275-05-048		0275-05-049		0275-11-086		0275-11-087		0309-01-045		0310-01-045	
				PROJECT ID	A00186604		A00186607		A00186626		A00186628		A00186249		A00190955	
				COUNTY	Gray		Gray		Gray		Gray		Gray		Donley	
				HIGHWAY	IH 40		IH 40		IH 40		IH 40		SH 70		SH 70	
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF		5,820.000		5,820.000		5,820.000		5,820.000					
	678-6002	PAV SURF PREP FOR MRK (6")	LF		570.000		570.000		5,880.000		5,880.000		1,484.000		1,656.000	
	678-6005	PAV SURF PREP FOR MRK (10")	LF		90.000		90.000		730.000		730.000		100.000			
	712-6009	JT / CRCK SEAL (HOT - POURED RUBBER)	LF		324.000		344.000		601.000		827.000		526.000		146.000	
	713-6005	CRACK CLEANING AND SEALING (JCP)	LF		154.000		154.000		140.000		140.000		186.000		190.000	
	785-6004	BRIDGE JOINT REPAIR (ARMOR)	LF						4.000							
	785-6010	BRIDGE JOINT REPLACEMENT (ARMOR)	LF								43.000		330.000		310.000	
	785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF		84.000		84.000									
	785-6015	BRIDGE JOINT REPLACEMENT (SPECIAL)	LF		90.000		180.000		129.000		129.000					
	786-6001	CARBON FIBER REINF POLYMER PROTECTION	SF										473.000		312.000	
	3077-6057	SP MIXES SP-D PG70-28	TON		102.000		102.000						59.000		48.000	
	3077-6075	TACK COAT	GAL		92.000		92.000						54.000		43.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA													
	6019-6006	PREFB PV MK W/WNTY TY B (W)(6")(SLD)	LF		285.000		285.000		2,990.000		2,990.000		742.000		828.000	
	6019-6007	PREFB PV MK W/WNTY TY B(W)6"(BRK)CNTST	LF		90.000		90.000		730.000		730.000		100.000			
	6019-6014	PREFB PV MK W/WNTY TY B (Y)(6")(SLD)	LF		285.000		285.000		2,890.000		2,890.000		742.000		828.000	
	6185-6002	TMA (STATIONARY)	DAY													
	6185-6003	TMA (MOBILE OPERATION)	HR													
	6362-6004	REC REFL PAV MRKR TY II-A-A	EA										20.000			
	6362-6005	REC REFL PAV MRKR TY II-C-R	EA		38.000		38.000		38.000		38.000					
	7309-6001	CLEANING STRUCTURE (BENT)	EA		2.000		2.000		3.000		3.000		3.000		3.000	
	7309-6002	CLEANING STRUCTURE (ABUTMENT)	EA		2.000		2.000		2.000		2.000		2.000		2.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS													
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS													

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

				CONTROL SECTION JOB	TOTAL EST.	TOTAL FINAL
				PROJECT ID		
				COUNTY		
				HIGHWAY		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**			
	104-6009	REMOVING CONC (RIPRAP)	SY	209.000		
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	18.000		
	354-6048	PLANE ASPH CONC PAV (3")	SY	4,761.000		
	354-6049	PLANE ASPH CONC PAV (6")	SY	1,190.000		
	354-6064	PLANE ASPH CONC PAV (2 1/2")	SY	2,469.000		
	354-6075	PLANE ASPH CONC PAV (2" TO 6.5")	SY	10,354.000		
	354-6076	PLANE ASPH CONC PAV (6.5")	SY	4,597.000		
	354-6100	PLANE ASPH CONC PAV (5")	SY	1,307.000		
	354-6137	PLANE ASPH CONC PAV (5.5")	SY	2,100.000		
	401-6001	FLOWABLE BACKFILL	CY	75.000		
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	121.800		
	427-6007	EPOXY WATERPROOF FINISH (TY X)	SF	33,917.000		
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	1,505.000		
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	355.000		
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	2,554.000		
	431-6002	PNEUMATICALLY PLACED CONC (REPAIR)	CF	55.000		
	432-6001	RIPRAP (CONC)(4 IN)	CY	945.000		
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	594.000		
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	445.000		
	438-6010	RESIZING AND SEALING JOINTS	LF	222.000		
	439-6001	CONCRETE OVERLAY (1.5 IN)	SY	482.000		
	439-6003	CONCRETE OVERLAY (2.5 IN)	SY	4,660.000		
	439-6004	CONCRETE OVERLAY (3 IN)	SY	11,478.000		
	439-6011	REINFORCED CONCRETE OVERLAY (4.0 IN)	SY	2,052.000		
	450-6023	RAIL (TY SSTR)	LF	630.000		
	450-6054	RAIL (TY SSTR) (W/DRAIN SLOTS)	LF	240.000		
	451-6024	RETROFIT RAIL (TY SSTR)	LF	6,109.000		
	483-6005	HYDRO-DEMOLITION (1 IN)	SY	11,178.000		
	483-6006	HYDRO-DEMOLITION (1 1/2 IN)	SY	7,494.000		
	496-6056	REMOVE STR (STL SECTIONS)	LF	35.000		
	500-6001	MOBILIZATION	LS	1.000		
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	27.000		
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	1,120.000		
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	1,120.000		
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	10,025.000		
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	10,025.000		
	512-6017	PORT CTB (DES SOURCE)(F-SHAPE)(TY 1)	LF	1,620.000		

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

		CONTROL SECTION JOB		TOTAL EST.	TOTAL FINAL
		PROJECT ID			
		COUNTY			
		HIGHWAY			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**		
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	14,580.000	
	512-6041	PORT CTB (STKPL)(F-SHAPE)(TY 1)	LF	1,620.000	
	514-6001	PERM CTB (SGL SLOPE) (TY 1) (42)	LF	5,500.000	
	514-6003	PERM CTB (SGL SLOPE) (TY 3) (42)	LF	460.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	4,600.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	17.000	
	540-6010	MTL W-BEAM GD FEN ADJUSTMENT	LF	1,850.000	
	540-6011	MTL THRIE-BEAM GD FEN ADJUSTMENT	LF	304.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	5,275.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	7.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	2.000	
	543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	6.000	
	543-6021	REMOVE CABLE BARRIER	LF	260.000	
	543-6022	REMOVE CABLE BARRIER TERMINAL SECTION	EA	6.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	15.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	7.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	18.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	2.000	
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	14.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	2.000	
	636-6011	REPLACE EXISTING ALUMINUM SIGNS (TY O)	EA	14.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2.000	
	644-6074	RELOCATE SM RD SN SUP&AM(RAIL MOUNT)	EA	3.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	43.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	8.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	30.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	87.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	8.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	25.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	58,800.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	44,850.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	2,190.000	
	666-6225	PAVEMENT SEALER 6"	LF	47,600.000	
	666-6305	RE PM W/RET REQ TY I (W)6"(BRK)(090MIL)	LF	5,140.000	
	666-6308	RE PM W/RET REQ TY I (W)6"(SLD)(090MIL)	LF	21,630.000	
	666-6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF	20,830.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0275-04-061

DISTRICT Amarillo
HIGHWAY IH 40, SH 70

COUNTY Carson, Donley, Gray

				CONTROL SECTION JOB	TOTAL EST.	TOTAL FINAL
				PROJECT ID		
				COUNTY		
				HIGHWAY		
ALT	BID CODE	DESCRIPTION	UNIT			
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	58,200.000		
	678-6002	PAV SURF PREP FOR MRK (6")	LF	20,120.000		
	678-6005	PAV SURF PREP FOR MRK (10")	LF	2,280.000		
	712-6009	JT / CRCK SEAL (HOT - POURED RUBBER)	LF	5,112.000		
	713-6005	CRACK CLEANING AND SEALING (JCP)	LF	1,961.000		
	785-6004	BRIDGE JOINT REPAIR (ARMOR)	LF	4.000		
	785-6010	BRIDGE JOINT REPLACEMENT (ARMOR)	LF	683.000		
	785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	624.000		
	785-6015	BRIDGE JOINT REPLACEMENT (SPECIAL)	LF	1,560.000		
	786-6001	CARBON FIBER REINF POLYMER PROTECTION	SF	1,200.000		
	3077-6057	SP MIXES SP-D PG70-28	TON	923.000		
	3077-6075	TACK COAT	GAL	833.000		
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4.000		
	6019-6006	PREFB PV MK W/WNTY TY B (W)(6")(SLD)	LF	10,160.000		
	6019-6007	PREFB PV MK W/WNTY TY B(W)6"(BRK)CNTST	LF	2,280.000		
	6019-6014	PREFB PV MK W/WNTY TY B (Y)(6")(SLD)	LF	9,960.000		
	6185-6002	TMA (STATIONARY)	DAY	400.000		
	6185-6003	TMA (MOBILE OPERATION)	HR	96.000		
	6362-6004	REC REFL PAV MRKR TY II-A-A	EA	20.000		
	6362-6005	REC REFL PAV MRKR TY II-C-R	EA	380.000		
	7309-6001	CLEANING STRUCTURE (BENT)	EA	28.000		
	7309-6002	CLEANING STRUCTURE (ABUTMENT)	EA	24.000		
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		

SUMMARY OF SIGNAGE, DELINEATION AND PAVEMENT MARKING ITEMS

ITEM NO.	636-6011	644-6068	644-6074	658-6013	658-6014	658-6026	658-6061	658-6062	658-6064	666-6225	666-6305	666-6308	666-6320	6362-6004	6362-6005	678-6002	678-6005	6019-6006	6019-6007	6019-6014
DESCRIPTION	REPLACE EXISTING ALUMINUM SIGNS (TY O) **	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM (RAIL MOUNT)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2	INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2 (BI)	INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2	PAVEMENT SEALER 6"	RE PM W /RET REQ TY I (W)6" (BRK) (090MIL)	RE PM W /RET REQ TY I (W)6" (SLD) (090MIL)	RE PM W /RET REQ TY I (Y)6" (SLD) (090MIL)	REC REFL PAV MRKR TY II-A-A	REC REFL PAV MRKR TY II-C-R	PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (10")	PREFB PV MK W/WNTY TY B (W) (6") (SLD)	PREFB PV MK W/WNTY TY B(W)6" (BRK)CNTST ***	PREFB PV MK W/WNTY TY B (Y) (6") (SLD)
	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	LF	LF	LF	LF	LF
REF 01: IH 40 WB OVERPASS AT BI 40F	1			3		3	5		3	5,840	640	2,650	2,550		38	680	90	340	90	340
REF 02: IH 40 EB OVERPASS AT BI 40F	1			3		3	5		2	5,840	640	2,650	2,550		38	680	90	340	90	340
REF 03: IH 40 WB OVERPASS AT FM 295	1			3		3	5		2	5,840	640	2,650	2,550		38	680	90	340	90	340
REF 04: IH 40 EB OVERPASS AT FM 295	1			3		3	5		2	5,840	640	2,650	2,550		38	680	90	340	90	340
REF 05: IH 40 WB OVERPASS AT FM 2300	1			3		3	5		2	5,840	640	2,650	2,550		38	680	90	340	90	340
REF 06: IH 40 EB OVERPASS AT FM 2300	1			3		3	5		3	5,840	640	2,650	2,550		38	680	90	340	90	340
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	1			3		3	5		3	5,950	640	2,705	2,605		38	570	90	285	90	285
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	1			3		3	5		3	5,950	640	2,705	2,605		38	570	90	285	90	285
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)	2			14			8			340	20	160	160	20		1,484	100	742	100	742
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	1			2		3	20		2						38	5,880	730	2,990	730	2,890
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	1			3		3	19		3						38	5,880	730	2,990	730	2,890
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)	2	2	3		8			8		320		160	160			1,656	0	828		828
SIGNAGE, DELINEATION AND PVMT MARKING TOTALS	14	2	3	43	8	30	87	8	25	47,600	5,140	21,630	20,830	20	380	20,120	2,280	10,160	2,280	9,960

** - THIS QUANTITY CONSISTS OF REPLACEMENT OF EACH BRIDGE MOUNTED CLEARANCE SIGN.

*** - BROKEN CONTRAST STRIPING ONLY ON CONCRETE PAVEMENT SURFACE.

SUMMARY OF TRAFFIC CONTROL ITEMS

ITEM NO.	512-6017	512-6029	512-6041	545-6003	545-6005	545-6019	662-6067	662-6098	662-6109	677-6002
DESCRIPTION	PORT CTB (DES SOURCE) (F-SHAPE) (TY 1) *	PORT CTB (MOVE) (F-SHAPE) (TY 1)	PORT CTB (STKPL) (F-SHAPE) (TY 1)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (S) (N) (TL3)	WK ZN PAV MRK REMOV (W)6" (SLD)	WK ZN PAV MRK REMOV (Y)6" (SLD)	WK ZN PAV MRK SHT TERM (TAB) TY W	ELIM EXT PAV MRK & MRKS (6")
	LF	LF	LF	EA	EA	EA	LF	LF	EA	LF
TCP PHASE 1										
REF 01: IH 40 WB OVERPASS AT BI 40F	810					1	2,890	1,595		4,425
REF 02: IH 40 EB OVERPASS AT BI 40F	810					1	2,890	1,595		4,425
REF 03: IH 40 WB OVERPASS AT FM 295		810		1			2,890	1,595		4,425
REF 04: IH 40 EB OVERPASS AT FM 295		810		1			2,890	1,595		4,425
REF 05: IH 40 WB OVERPASS AT FM 2300		810		1			2,890	1,595		4,425
REF 06: IH 40 EB OVERPASS AT FM 2300		810		1			2,890	1,595		4,425
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN		810		1			2,890	1,595		4,425
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN		810		1			2,890	1,595		4,425
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)										
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN		810		1			2,890	1,595		4,425
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN		810		1			2,890	1,595		4,425
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)										
TCP PHASE 2										
REF 01: IH 40 WB OVERPASS AT BI 40F		810		1			2,990	2,890	219	1,395
REF 02: IH 40 EB OVERPASS AT BI 40F		810		1			2,990	2,890	219	1,395
REF 03: IH 40 WB OVERPASS AT FM 295		810		1			2,990	2,890	219	1,395
REF 04: IH 40 EB OVERPASS AT FM 295		810		1			2,990	2,890	219	1,395
REF 05: IH 40 WB OVERPASS AT FM 2300		810		1			2,990	2,890	219	1,395
REF 06: IH 40 EB OVERPASS AT FM 2300		810		1			2,990	2,890	219	1,395
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN		810		1			2,990	2,890	219	1,395
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN		810		1			2,990	2,890	219	1,395
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)										
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN		810	810	1	1		2,990	2,890	219	1,395
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN		810	810	1	1		2,990	2,890	219	1,395
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)										
TRAFFIC CONTROL TOTALS	1,620	14,580	1,620	18	2	2	58,800	44,850	2,190	58,200

* - DESIGNATED SOURCE FOR PCTB LOCATED AT SW CORNER OF FM 2161 AND IH 40.

NO.	DATE	REVISION	APPR BY

RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

Texas Department of Transportation

QUANTITY SUMMARIES

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		6

DATE: 9/21/2023 4:29:09 PM
FILE: AMA-RDWY-QTYSUM01.dgn

SUMMARY OF ROADWAY ITEMS

ITEM NO.	354-6048	354-6049	354-6064	354-6075	354-6076	354-6100	354-6137	420-6066	432-6045	439-6004	450-6023	483-6006	540-6002	540-6006
DESCRIPTION	PLANE ASPH CONC PAV (3")	PLANE ASPH CONC PAV (6")	PLANE ASPH CONC PAV (2 1/2")	PLANE ASPH CONC PAV (2" TO 6.5")	PLANE ASPH CONC PAV (6.5")	PLANE ASPH CONC PAV (5")	PLANE ASPH CONC PAV (5.5") *	CL C CONC (RAIL FOUNDATION)	RIPRAP (MOW STRIP) (4 IN)	CONCRETE OVERLAY (3 IN) **	RAIL (TY SSTR)	HYDRO -DEMOLITION (1 1/2 IN)	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (THRIE -BEAM)
	SY	SY	SY	SY	SY	SY	SY	CY	CY	SY	LF	SY	LF	EA
REF 01: IH 40 WB OVERPASS AT BI 40F				1,174	1,050				38	294		294		
REF 02: IH 40 EB OVERPASS AT BI 40F				1,174			1,050		34	294		294		
REF 03: IH 40 WB OVERPASS AT FM 295				1,174	1,190				35	294		294		
REF 04: IH 40 EB OVERPASS AT FM 295		1,190		1,174					35	294		294		
REF 05: IH 40 WB OVERPASS AT FM 2300				1,174	1,307				33	294		294		
REF 06: IH 40 EB OVERPASS AT FM 2300				1,174		1,307			38	294		294		
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN				1,174	1,050				38	294		294		
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN				1,174			1,050		38	294		294		
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)			2,469	534				88.2	41		630		425	3
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	1,280								92				1,775	3
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	1,280								99				1,925	3
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)	2,201			428					45				375	4
ROADWAY TOTALS	4,761	1,190	2,469	10,354	4,597	1,307	2,100	88.2	566	2,352	630	2,352	4,500	13

* - PLANING DEPTH IS 5.25"

** - CONCRETE OVERLAY DEPTH VARIES FROM 2" TO 3.5"

SUMMARY OF ROADWAY ITEMS - CONTINUED

ITEM NO.	540-6010	540-6011	540-6016	542-6001	542-6002	542-6003	544-6001	544-6003	3077-6057	3077-6075
DESCRIPTION	MTL W-BEAM GD FEN ADJUSTMENT	MTL THRIE -BEAM GD FEN ADJUSTMENT	DOWNSTREAM ANCHOR TERMINAL SECTION	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE DOWNSTREAM ANCHOR TERMINAL	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	SP MIXES SP -D PG70-28 (220 LB/SY)	TACK COAT (0.10 GAL/SY)
	LF	LF	EA	LF	EA	EA	EA	EA	TON	GAL
REF 01: IH 40 WB OVERPASS AT BI 40F	250	38							102	92
REF 02: IH 40 EB OVERPASS AT BI 40F	200	38							102	92
REF 03: IH 40 WB OVERPASS AT FM 295	300	38							102	92
REF 04: IH 40 EB OVERPASS AT FM 295	50	38							102	92
REF 05: IH 40 WB OVERPASS AT FM 2300	350	38							102	92
REF 06: IH 40 EB OVERPASS AT FM 2300	250	38							102	92
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	150	38							102	92
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	300	38							102	92
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)				1,050		1	3	3	59	54
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN			1	1,850	2		2	2		
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN			1	1,875	1	1	2	2		
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)				500	4		4		48	43
ROADWAY TOTALS	1,850	304	2	5,275	7	2	11	7	923	833

SUMMARY OF COLUMN PROTECTION ITEMS

ITEM NO.	420-6066	432-6045	450-6054	514-6001	514-6003	540-6002	540-6006	544-6001	545-6007
DESCRIPTION	CL C CONC (RAIL FOUNDATION)	RIPRAP (MOW STRIP) (4 IN)	RAIL (TY SSTR) (W /DRAIN SLOTS)	PERM CTB (SGL SLOPE) (TY 1) (42)	PERM CTB (SGL SLOPE) (TY 3) (42)	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (THRIE -BEAM)	GUARDRAIL END TREATMENT (INSTALL)	CRASH CUSH ATTEN (INSTL) (L) (N) (TL3)
	CY	CY	LF	LF	LF	LF	EA	EA	EA
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)	16.8	13.8	120	20	130	50	2	2	2
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)	16.8	13.8	120	20	130	50	2	2	2
COLUMN PROTECTION TOTALS	33.6	27.6	240	40	260	100	4	4	4

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

QUANTITY SUMMARIES

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		7

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SUMMARY OF MEDIAN PROTECTION ITEMS

ITEM NO.	432-6001	514-6001	514-6003	543-6020	543-6021	543-6022	545-6007
DESCRIPTION	RIPRAP (CONC) (4 IN)	PERM CTB (SGL SLOPE) (TY 1) (42)	PERM CTB (SGL SLOPE) (TY 3) (42)	CABLE BARRIER TERMINAL SECTION (TL-4)	REMOVE CABLE BARRIER	REMOVE CABLE BARRIER TERMINAL SECTION	CRASH CUSH ATTEN (INSTL) (L) (N) (TL3)
	CY	LF	LF	EA	LF	EA	EA
REF 01: IH 40 WB OVERPASS AT BI 40F	100	570	20	1	65	1	1
REF 02: IH 40 EB OVERPASS AT BI 40F	99	570	20				1
REF 03: IH 40 WB OVERPASS AT FM 295	101	570	20				1
REF 04: IH 40 EB OVERPASS AT FM 295	79	540	20				1
REF 05: IH 40 WB OVERPASS AT FM 2300	108	570	20	1	25	1	1
REF 06: IH 40 EB OVERPASS AT FM 2300	112	570	20	1	70	1	1
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	83	540	20	1		1	1
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	83	570	20	1	75	1	1
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	54	480	20	1	25	1	1
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	57	480	20				1
MEDIAN PROTECTION TOTALS	876	5,460	200	6	260	6	10

SUMMARY OF EROSION CONTROL ITEMS

ITEM NO.	506-6020	506-6024	506-6040	506-6043
DESCRIPTION	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	LF	LF
REF 01: IH 40 WB OVERPASS AT BI 40F	112	112	500	500
REF 02: IH 40 EB OVERPASS AT BI 40F	112	112	500	500
REF 03: IH 40 WB OVERPASS AT FM 295	112	112	500	500
REF 04: IH 40 EB OVERPASS AT FM 295	112	112	500	500
REF 05: IH 40 WB OVERPASS AT FM 2300	112	112	500	500
REF 06: IH 40 EB OVERPASS AT FM 2300	112	112	500	500
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	112	112	500	500
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	112	112	500	500
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)			1,425	1,425
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	112	112	1,850	1,850
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	112	112	1,875	1,875
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)			875	875
EROSION CONTROL TOTALS	1,120	1,120	10,025	10,025

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP
TBPE #5887

Texas Department of Transportation

QUANTITY SUMMARIES

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		8

DATE: 7/10/2023 1:43:45 PM
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FINAL SUBMITTAL (100%)

DW:	CAM	LJG	DW:	CAM	LJG
	CK:	CK:		CK:	CK:

SUMMARY OF BRIDGE ITEMS

	104 6009	132 6003	401 6001	427 6007	429 6003	429 6005	429 6007	431 6002	432 6001	438 6004	438 6010	439 6001	439 6003	439 6004
	REMOVING CONC (RIPRAP)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	FLOWABLE BACKFILL	EPOXY WATERPROOF FINISH (TY X)	CONC STR REPAIR (DECK REP (PART DEPTH))	CONC STR REPAIR (DECK REP (FULL DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	PNEUMATICALLY PLACED CONC (REPAIR)	RIPRAP (CONC) (4 IN)	CLEANING AND SEALING EXIST JOINTS (CL7)	RESIZING AND SEALING JOINTS	CONCRETE OVERLAY (1.5 IN)	CONCRETE OVERLAY (2.5 IN)	CONCRETE OVERLAY (3 IN)
	SY	CY	CY	SF	SF	SF	SF	CF	CY	LF	LF	SY	SY	SY
REF 01: IH 40 WB OVERPASS AT BI 40F	7		5	2571	95	25	113		1					1046
REF 02: IH 40 EB OVERPASS AT BI 40F	13		5	2413	95	25	107		6					1046
REF 03: IH 40 WB OVERPASS AT FM 295	16		5	2430	110	25	134		7					1178
REF 04: IH 40 EB OVERPASS AT FM 295	9		5	2430	110	25	172		5					1178
REF 05: IH 40 WB OVERPASS AT FM 2300	20	9	5	3074	120	30	154		5					1293
REF 06: IH 40 EB OVERPASS AT FM 2300	20	4	10	3074	120	30	186		8					1293
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	12		5	2302	95	25	111		4					1046
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	9		5	2334	95	25	107		5					1046
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)	16		5	3811	225	40	595		5		122		2463	
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	32		15	3002	120	30	138	27	10	244		241		
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	30		5	3002	120	30	131	28	7	201		241		
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)	25	5	5	3474	200	45	606		6		100		2197	
PROJECT TOTALS	**209**	**18**	**75**	**33917**	**1505**	**355**	**2554**	**55**	**69**	**445**	**222**	**482**	**4660**	**9126**

SUMMARY OF BRIDGE ITEMS (CONTINUED)

	439 6011	451 6024	483 6005	483 6006	496 6056	712 6009	713 6005	785 6004	785 6010	785 6011	785 6015	786 6001	7309 6001	7309 6002
	REINFORCED CONCRETE OVERLAY (4.0 IN)	RETROFIT RAIL (TY SSTR)	HYDRO-DEMOLITION (1 IN)	HYDRO-DEMOLITION (1 ½ IN)	REMOVE STR (STL SECTIONS)	JT / CRCK SEAL (HOT - POURED RUBBER)	CRACK CLEANING AND SEALING (JCP)	BRIDGE JOINT REPAIR (ARMOR)	BRIDGE JOINT REPLACEMENT (ARMOR)	BRIDGE JOINT REPLACEMENT (SEJ)	BRIDGE JOINT REPLACEMENT (SPECIAL)	CARBON FIBER REINF POLYMER PROTECTION	CLEANING STRUCTURE (BENT)	CLEANING STRUCTURE (ABUTMENT)
	SY	LF	SY	SY	LF	LF	LF	LF	LF	LF	LF	SF	EA	EA
REF 01: IH 40 WB OVERPASS AT BI 40F		422	1046		14	454	146			76	135		2	2
REF 02: IH 40 EB OVERPASS AT BI 40F		422	1046		14	443	146			76	135		2	2
REF 03: IH 40 WB OVERPASS AT FM 295		460	1178			299	156			76	138	32	2	2
REF 04: IH 40 EB OVERPASS AT FM 295		460	1178		7	300	156			76	184	284	2	2
REF 05: IH 40 WB OVERPASS AT FM 2300		506	1293			437	195			76	220		2	2
REF 06: IH 40 EB OVERPASS AT FM 2300		506	1293			411	198			76	220	99	2	2
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN		422	1046			324	154			84	90		2	2
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN		422	1046			344	154			84	180		2	2
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)		673		2463		526	186		330			473	3	2
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	1026	541	1026	241		601	140	4			129		3	2
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	1026	541	1026	241		827	140		43		129		3	2
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)		734		2197		146	190		310			312	3	2
PROJECT TOTALS	**2052**	**6109**	**11178**	**5142**	**35**	**5112**	**1961**	**4**	**683**	**624**	**1560**	**1200**	**28**	**24**

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

QUANTITY SUMMARIES

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		9

DATE: 7/10/2023 9:54:05 AM
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

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SHEET 1 OF 12

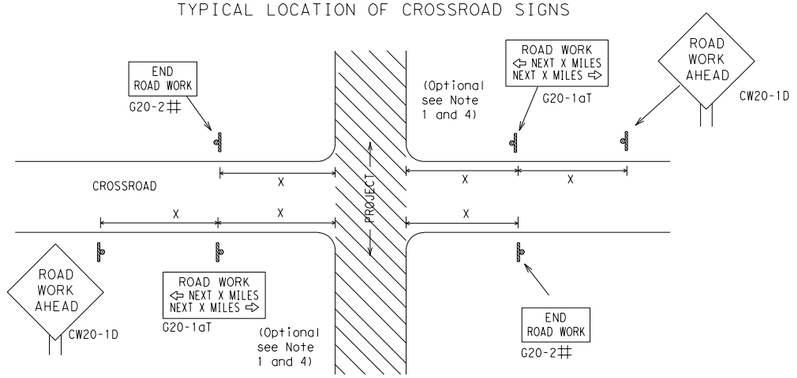
Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	AMA	CARSON, ETC.		10
5-10 5-21				

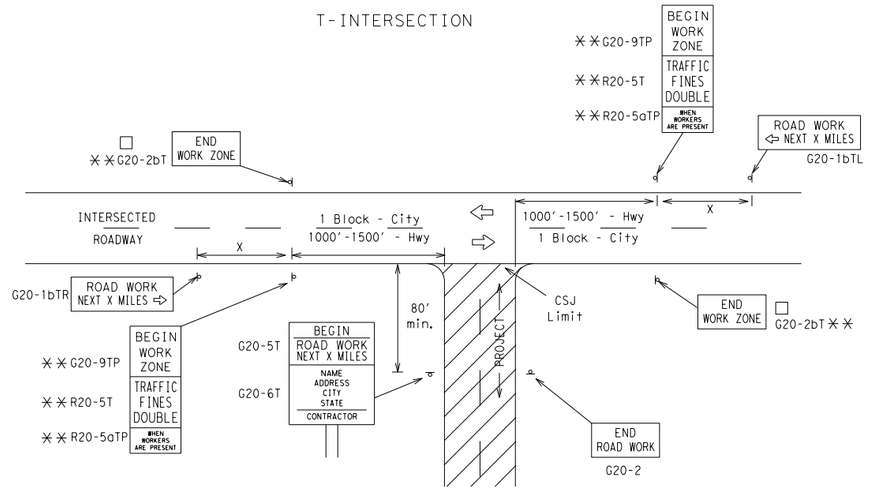
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

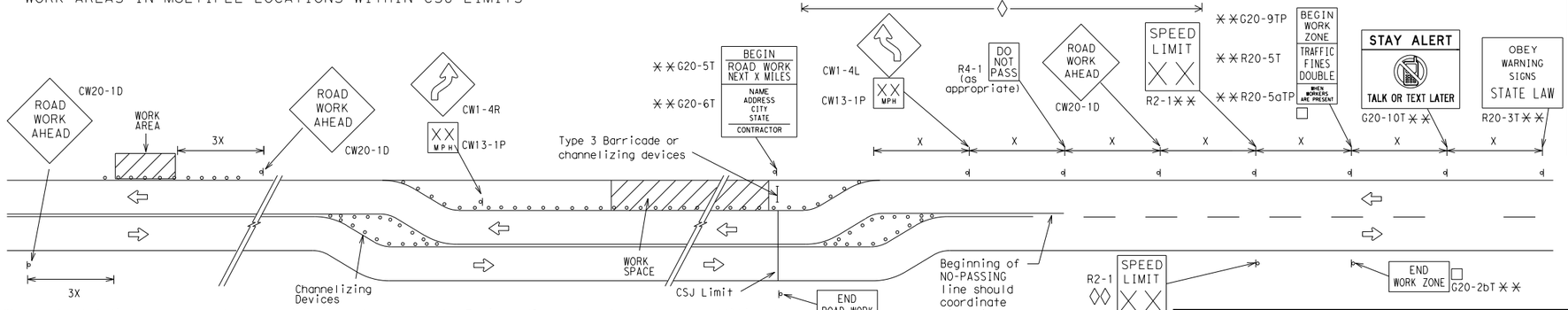
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

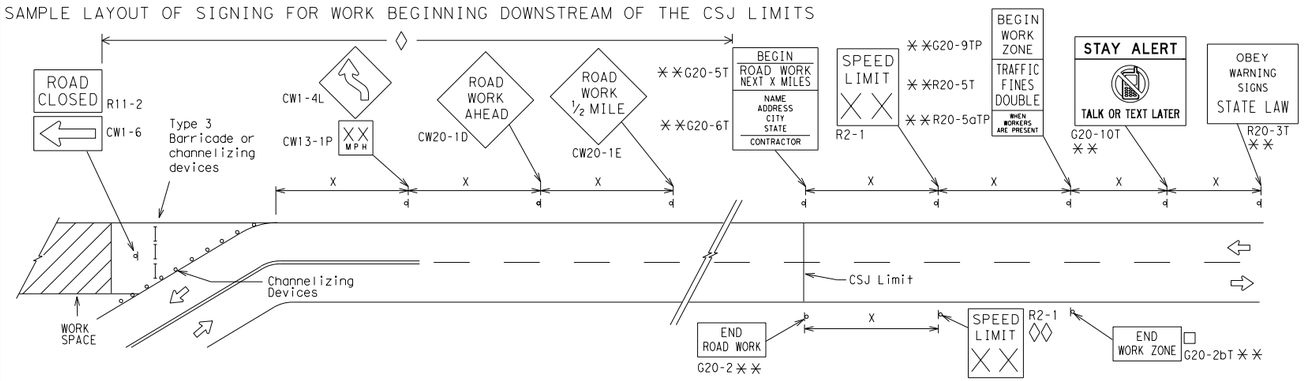
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

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	0275	04	061,ETC.	IH 40,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	CARSON,ETC.		11

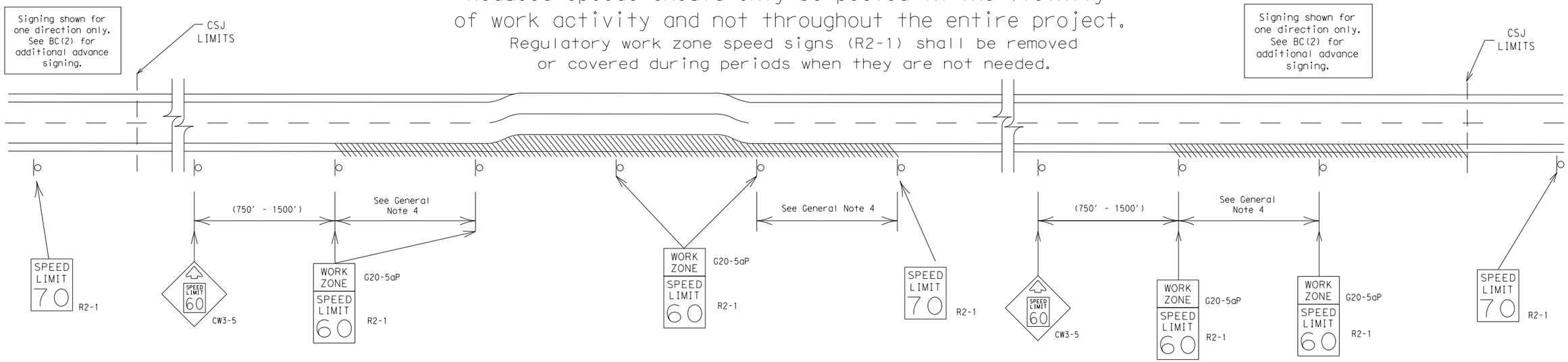
DATE: 7/6/2023 1:55:56 PM
FILE: BC-21.dgn

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 9-07 8-14 7-13 5-21	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		12

DATE: 7/6/2023 1:55:56 PM
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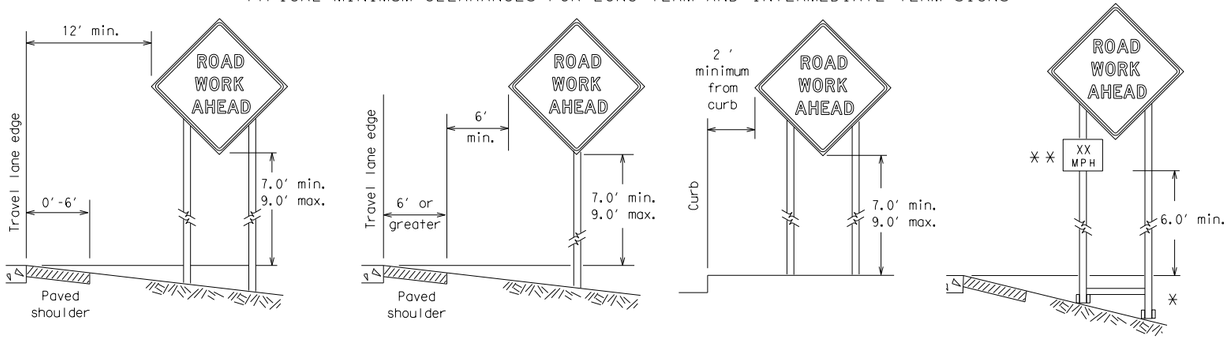
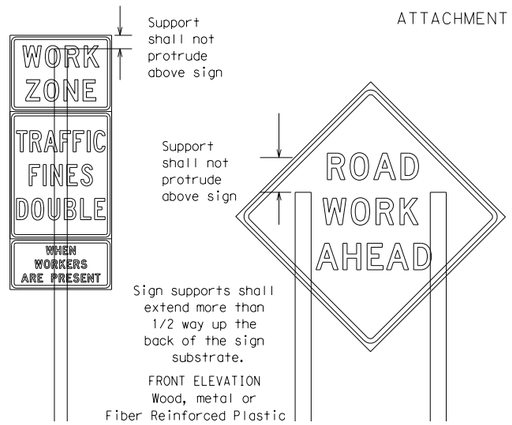
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

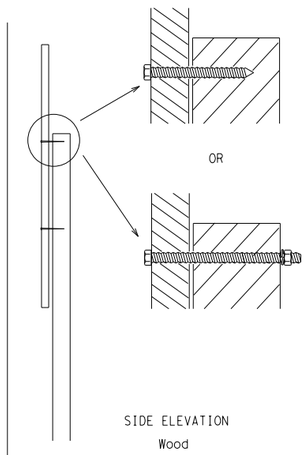


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





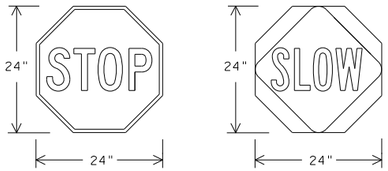
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061,ETC.	IH 40,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	CARSON,ETC.		13

DATE: 7/6/2023 1:55:56 PM
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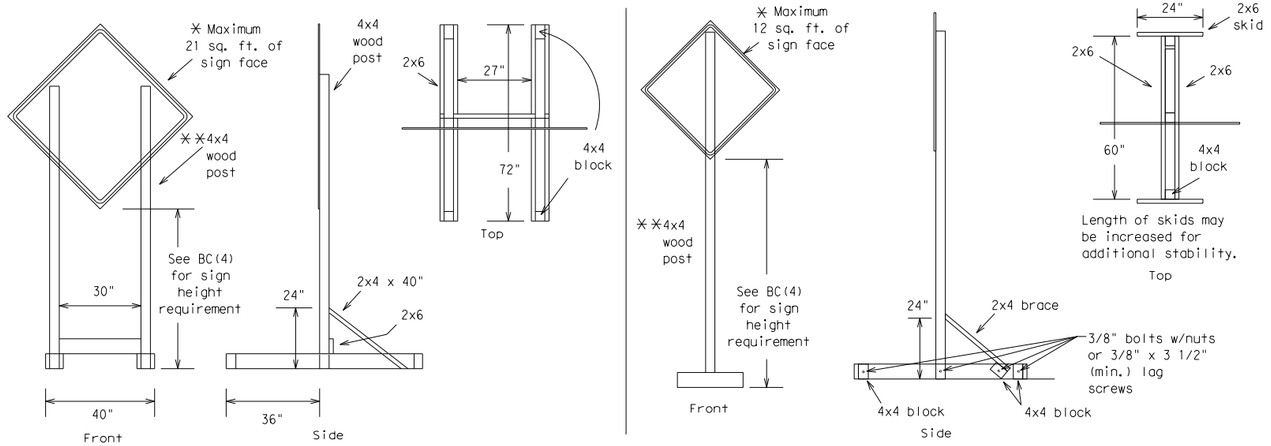
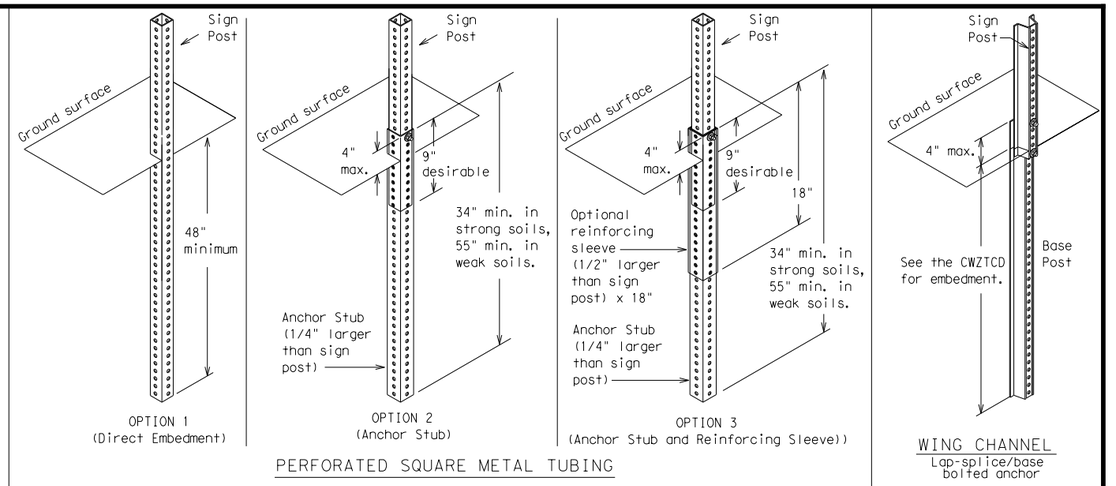


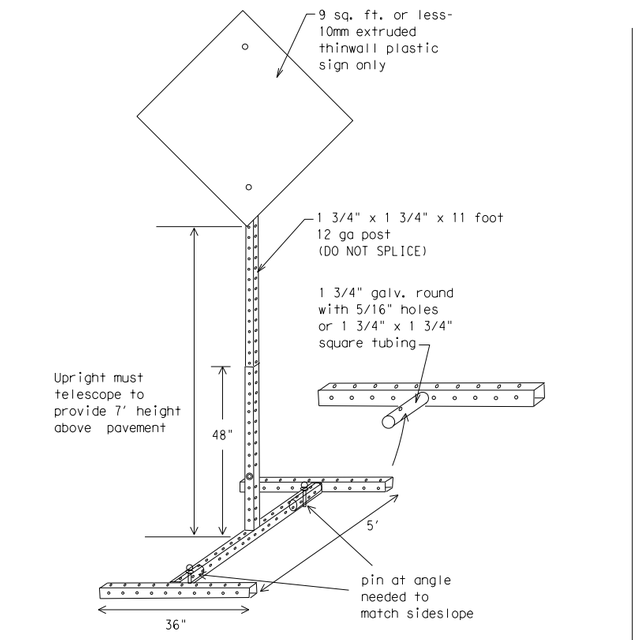
SKID MOUNTED WOOD SIGN SUPPORTS

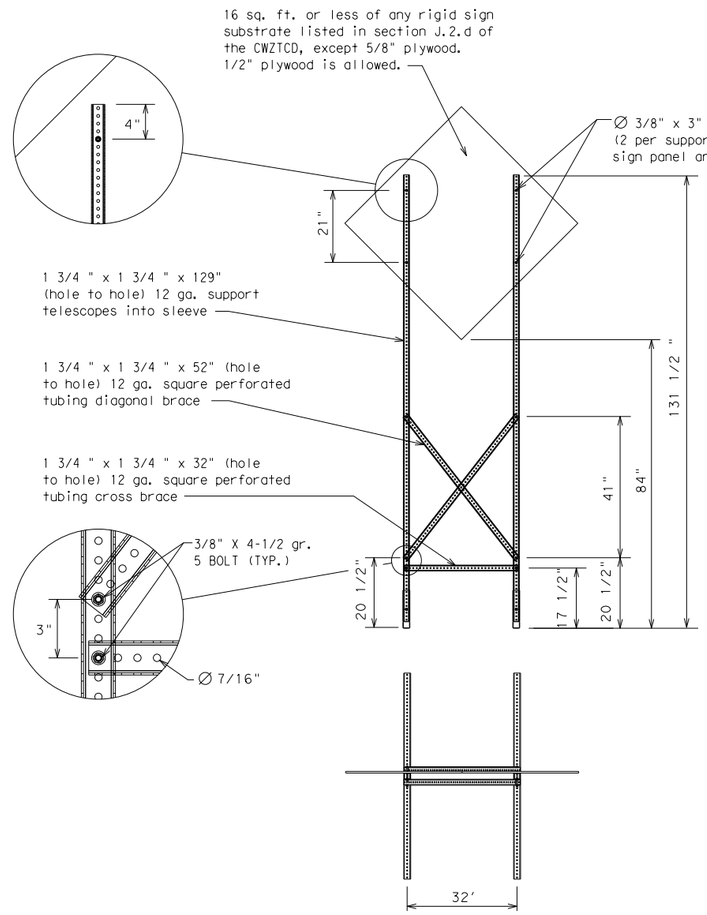
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

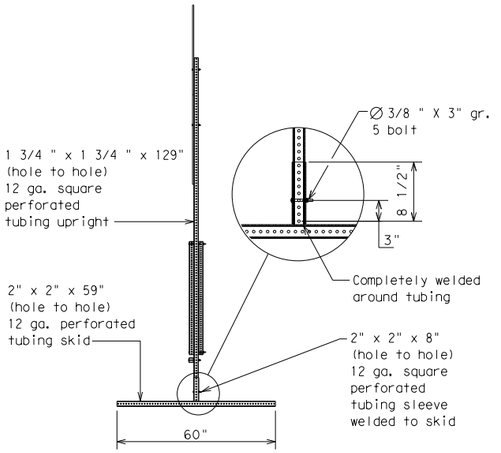


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	CARSON, ETC.		14

DATE: 7/6/2023 1:55:56 PM
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	CARSON, ETC.		15

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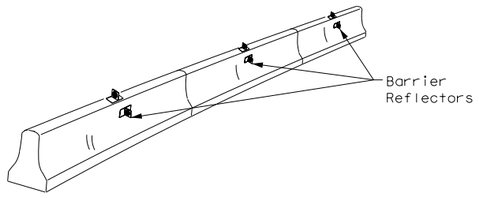
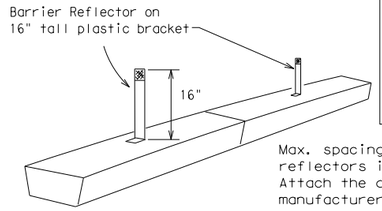
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

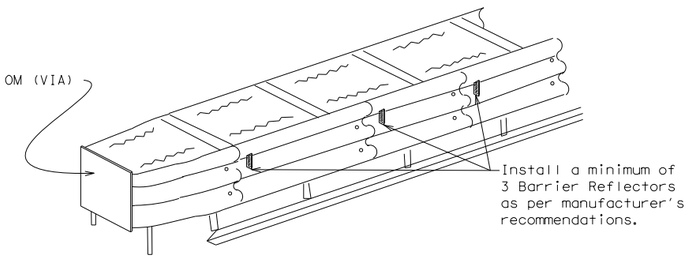


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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



DELINEATION OF END TREATMENTS

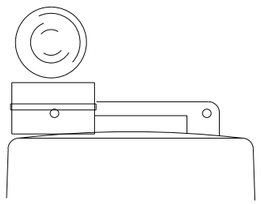
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

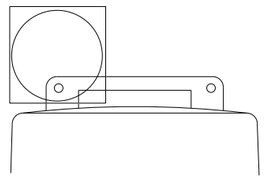
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this 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.



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

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.



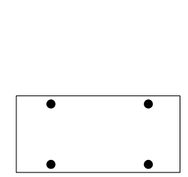
Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

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

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

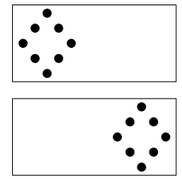
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

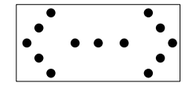


4 CORNER CAUTION

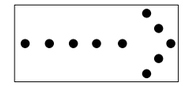
OR



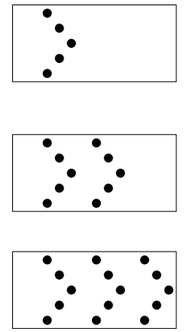
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



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



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

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

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	0275	04	061,ETC.	IH 40,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	CARSON,ETC.		16

DATE: 7/6/2023 1:55:57 PM
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DATE: 7/6/2023 1:55:57 PM
FILE: BC-21.dgn

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

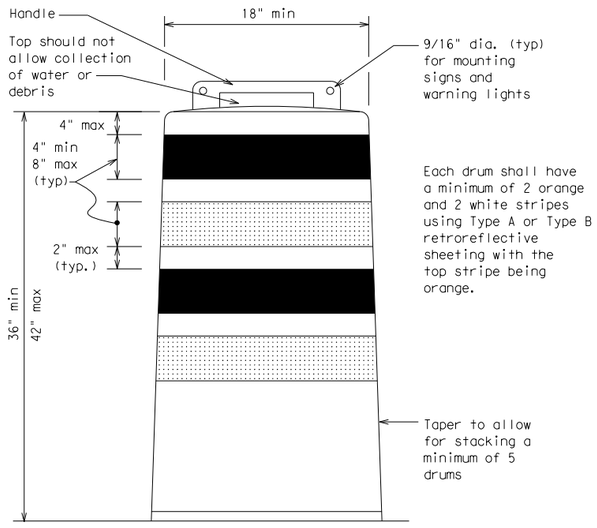
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

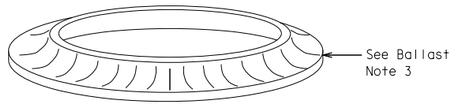
RETROREFLECTIVE SHEETING

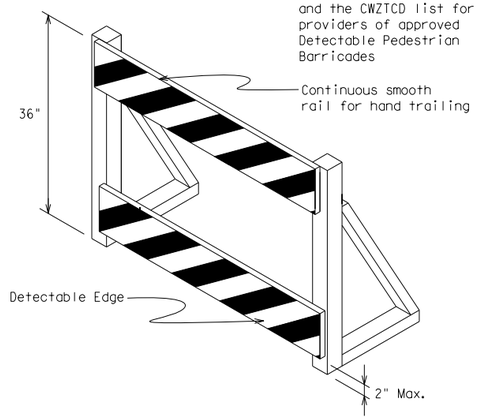
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

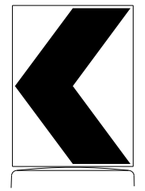




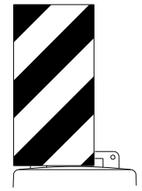


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

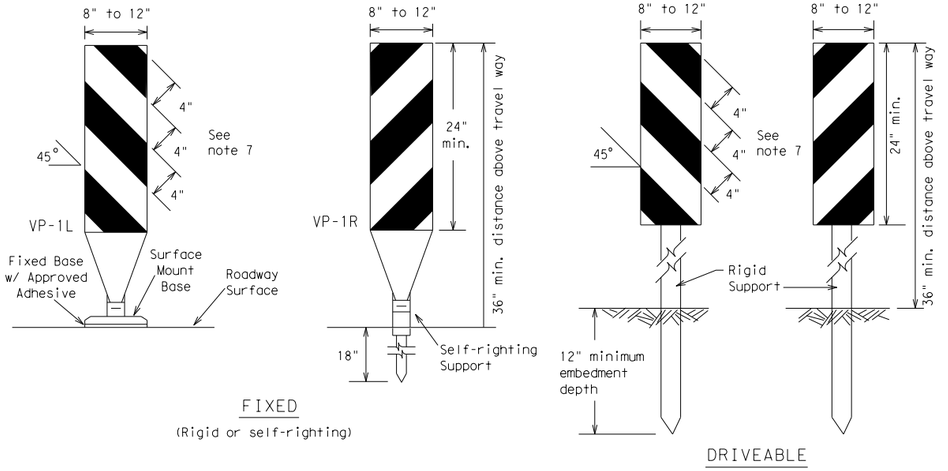
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	AMA	CARSON, ETC.		17
7-13				

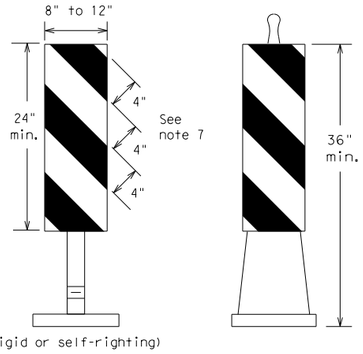
102



FIXED

(Rigid or self-righting)

DRIVEABLE

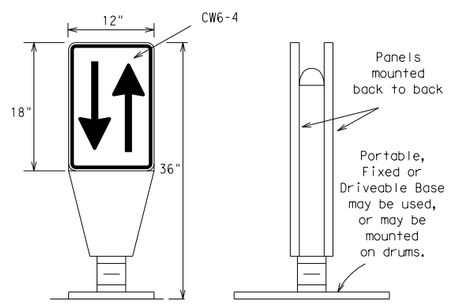


(Rigid or self-righting)

PORTABLE

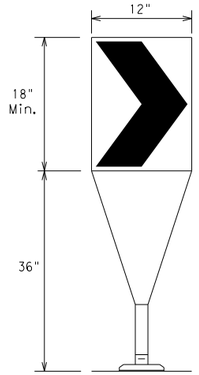
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



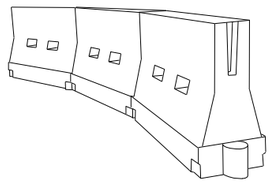
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0275	04	061,ETC.	IH 40,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	CARSON,ETC.		18

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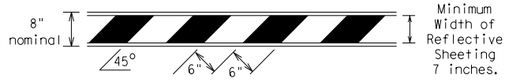
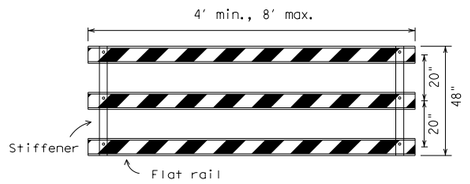
TYPE 3 BARRICADES

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.



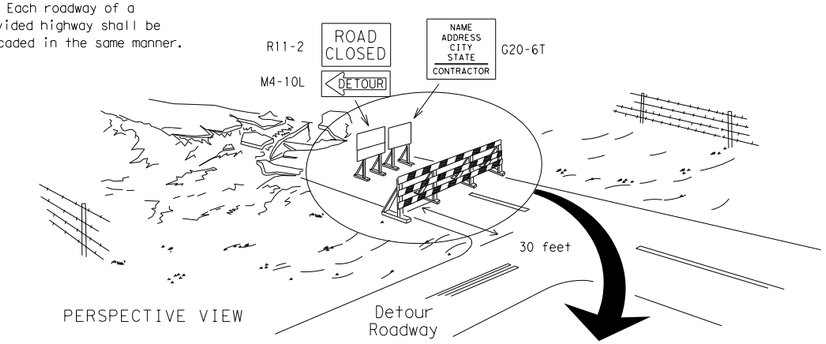
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

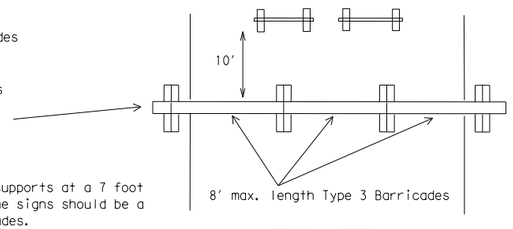
Each roadway of a divided highway shall be barricaded in the same manner.



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.

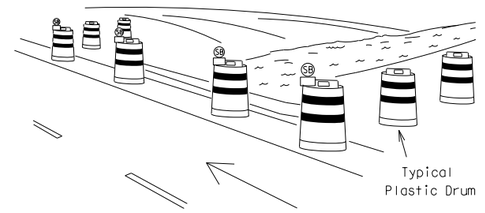
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

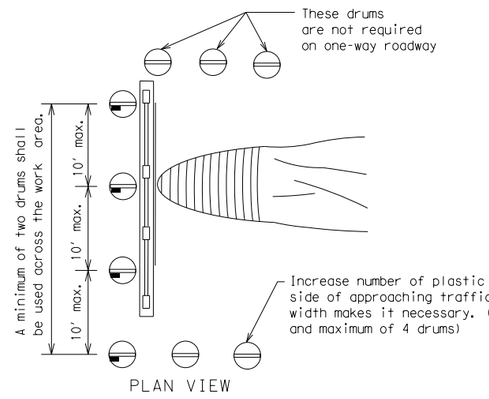
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

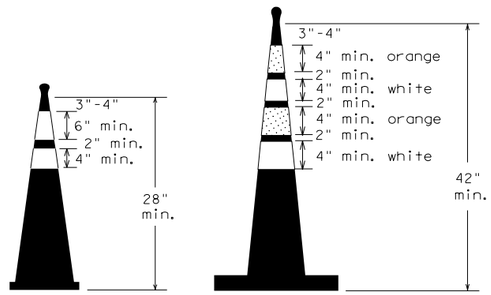
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

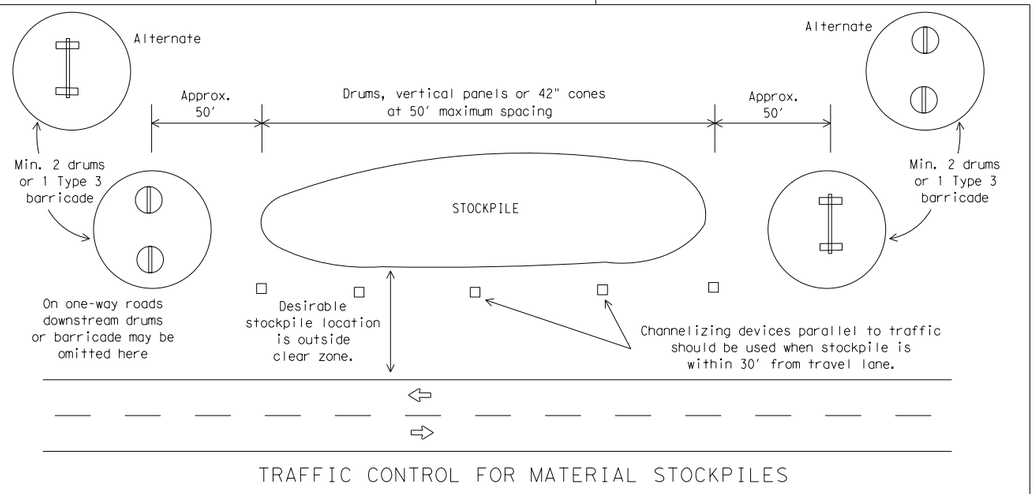
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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REVISIONS	0275	04	061,ETC.	IH 40,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

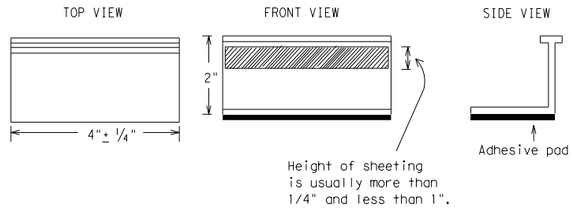
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		20

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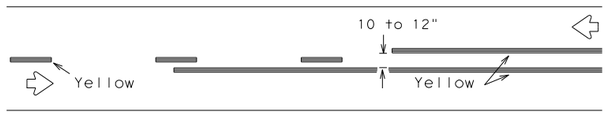
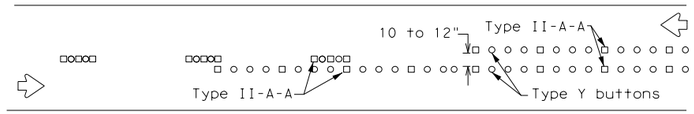
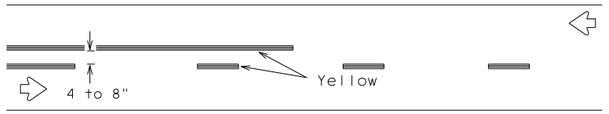
PAVEMENT MARKING PATTERNS



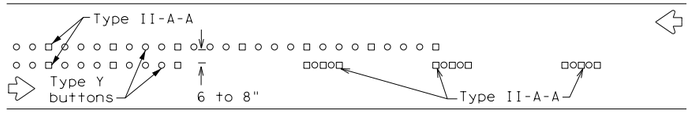
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



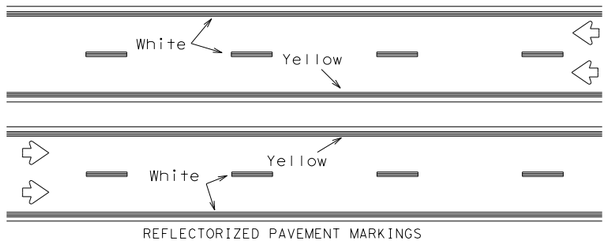
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



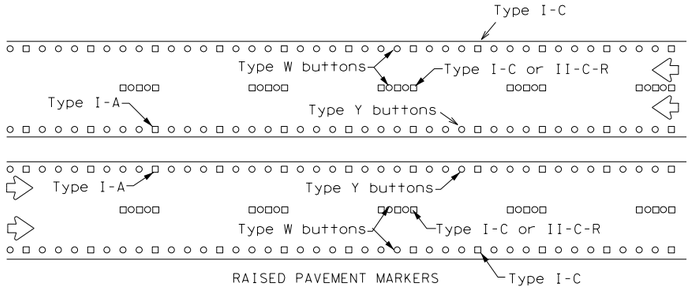
RAISED PAVEMENT MARKERS - PATTERN B

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

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



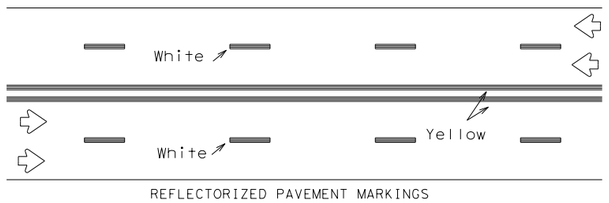
REFLECTORIZED PAVEMENT MARKINGS



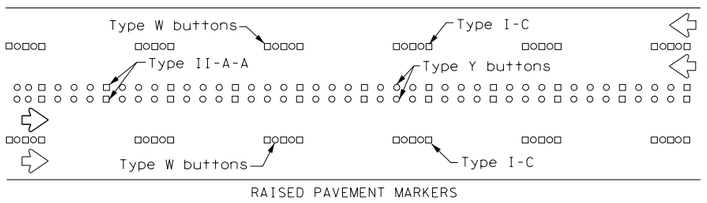
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



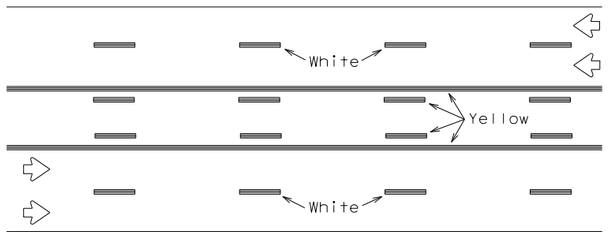
REFLECTORIZED PAVEMENT MARKINGS



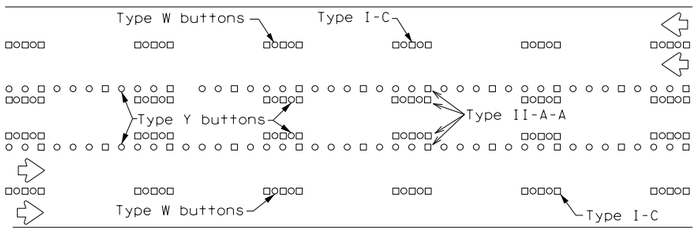
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

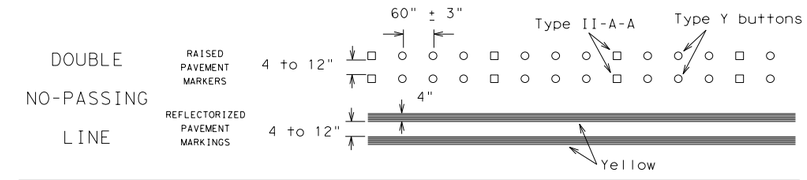
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

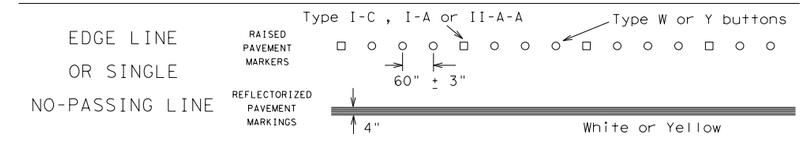
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

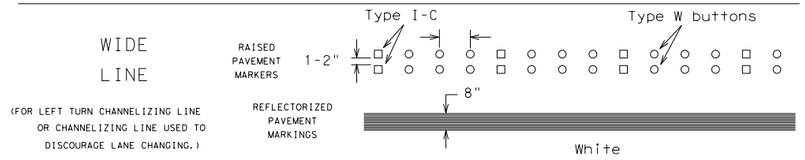


EDGE LINE OR SINGLE NO-PASSING LINE



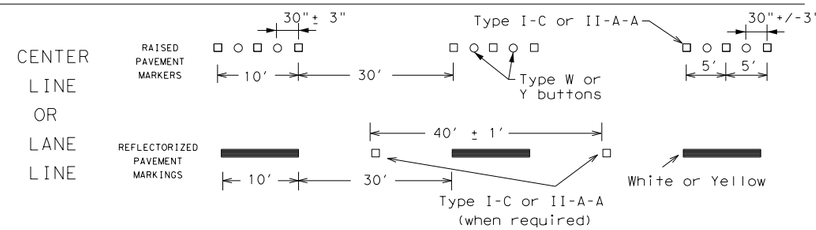
WIDE LINE

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

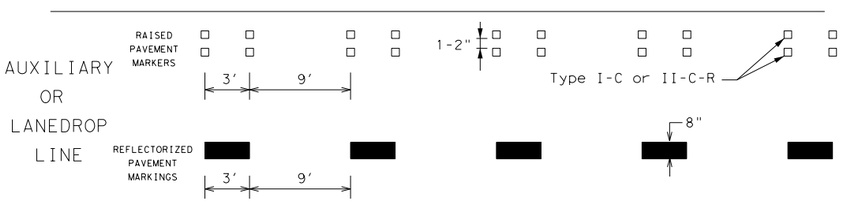


BROKEN LINES

CENTER LINE OR LANE LINE

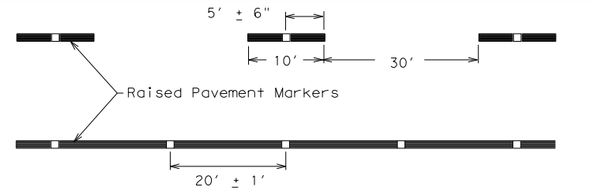


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		21

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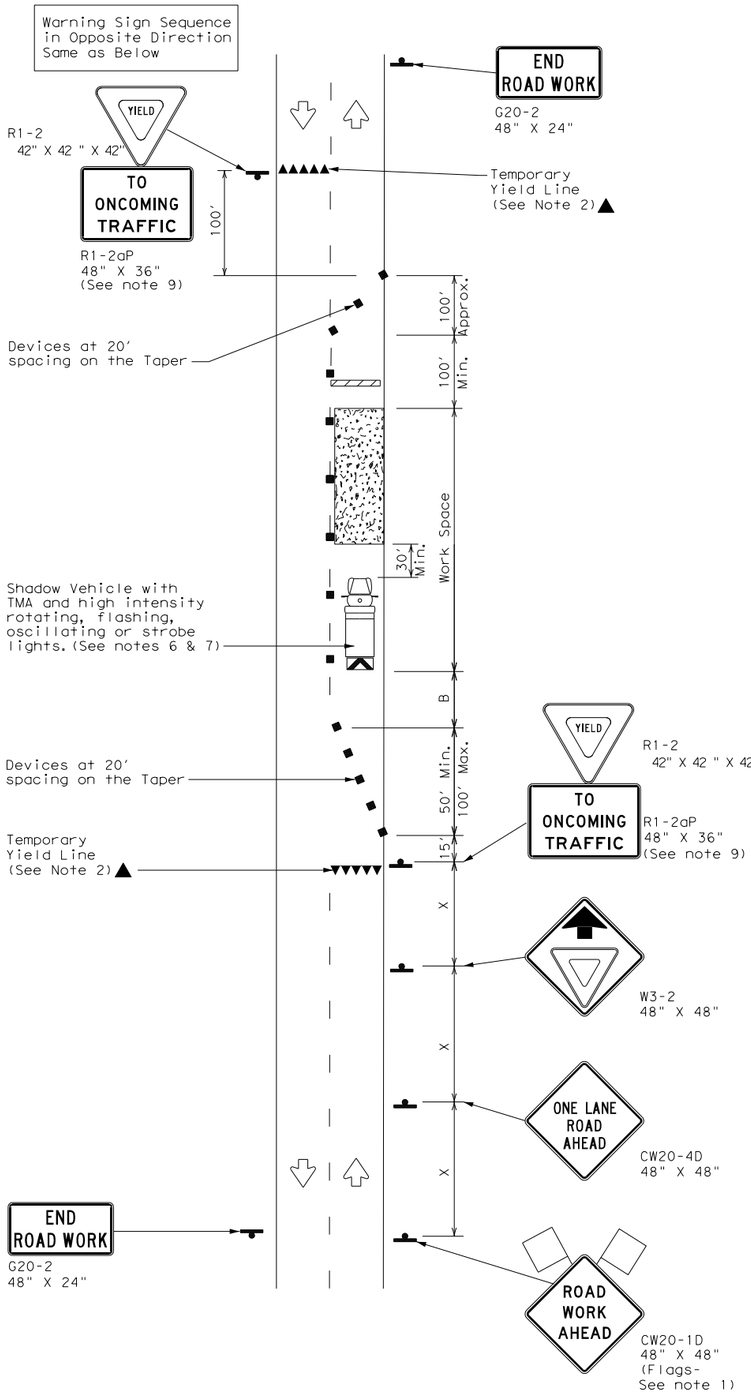
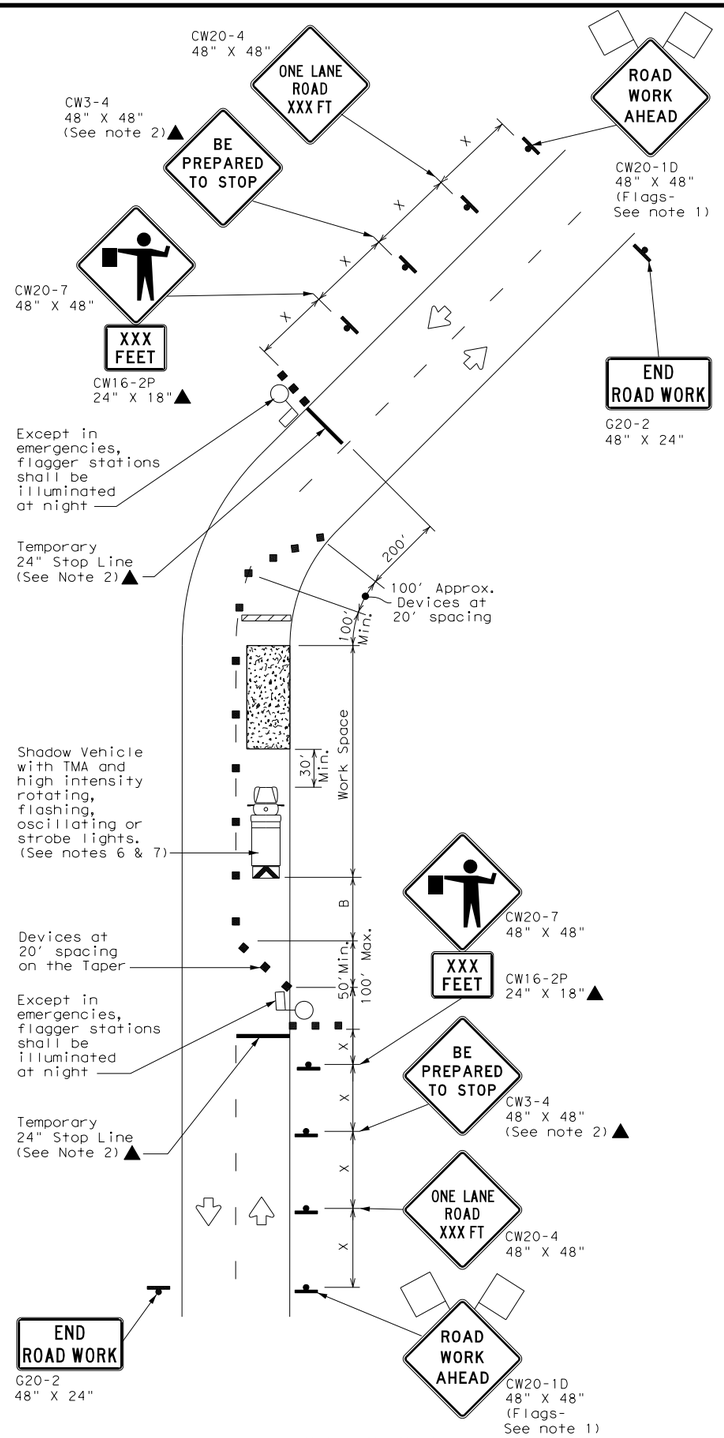


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND			
	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 1-97 2-12 4-98 2-18	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		22

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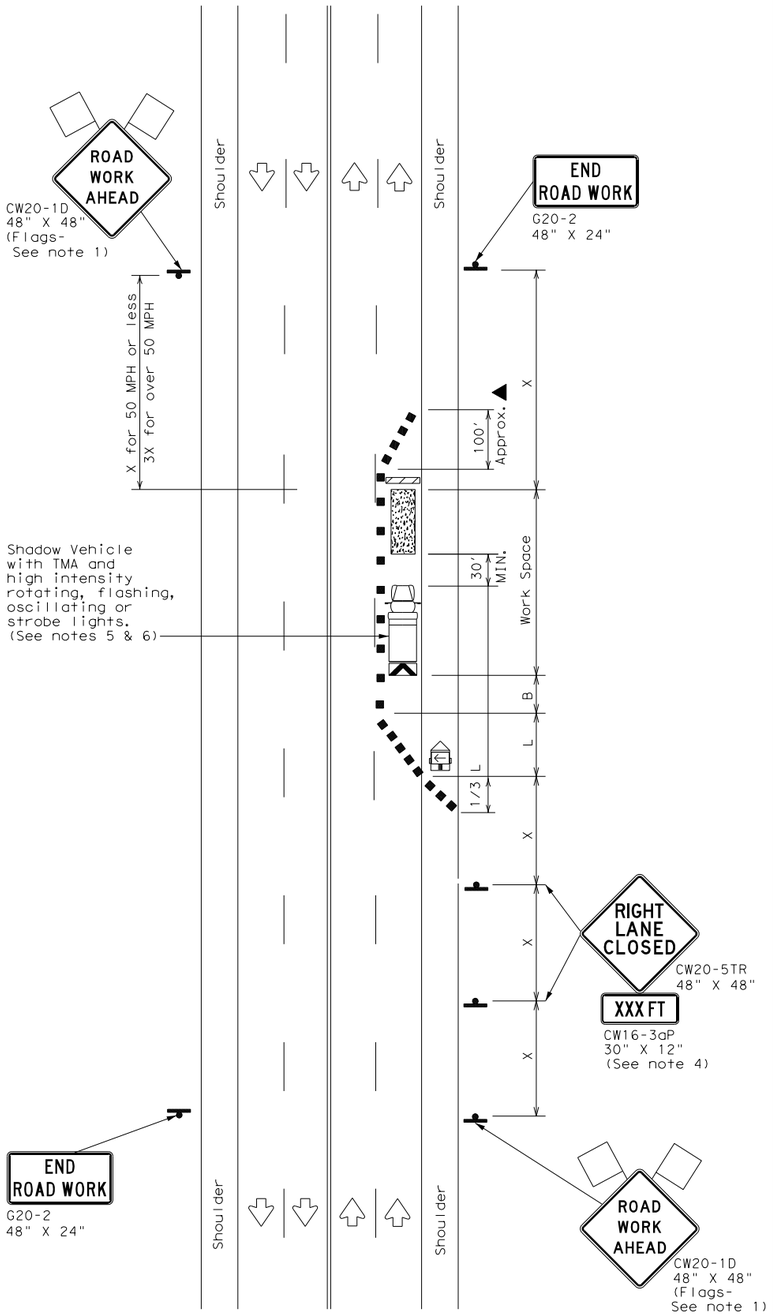
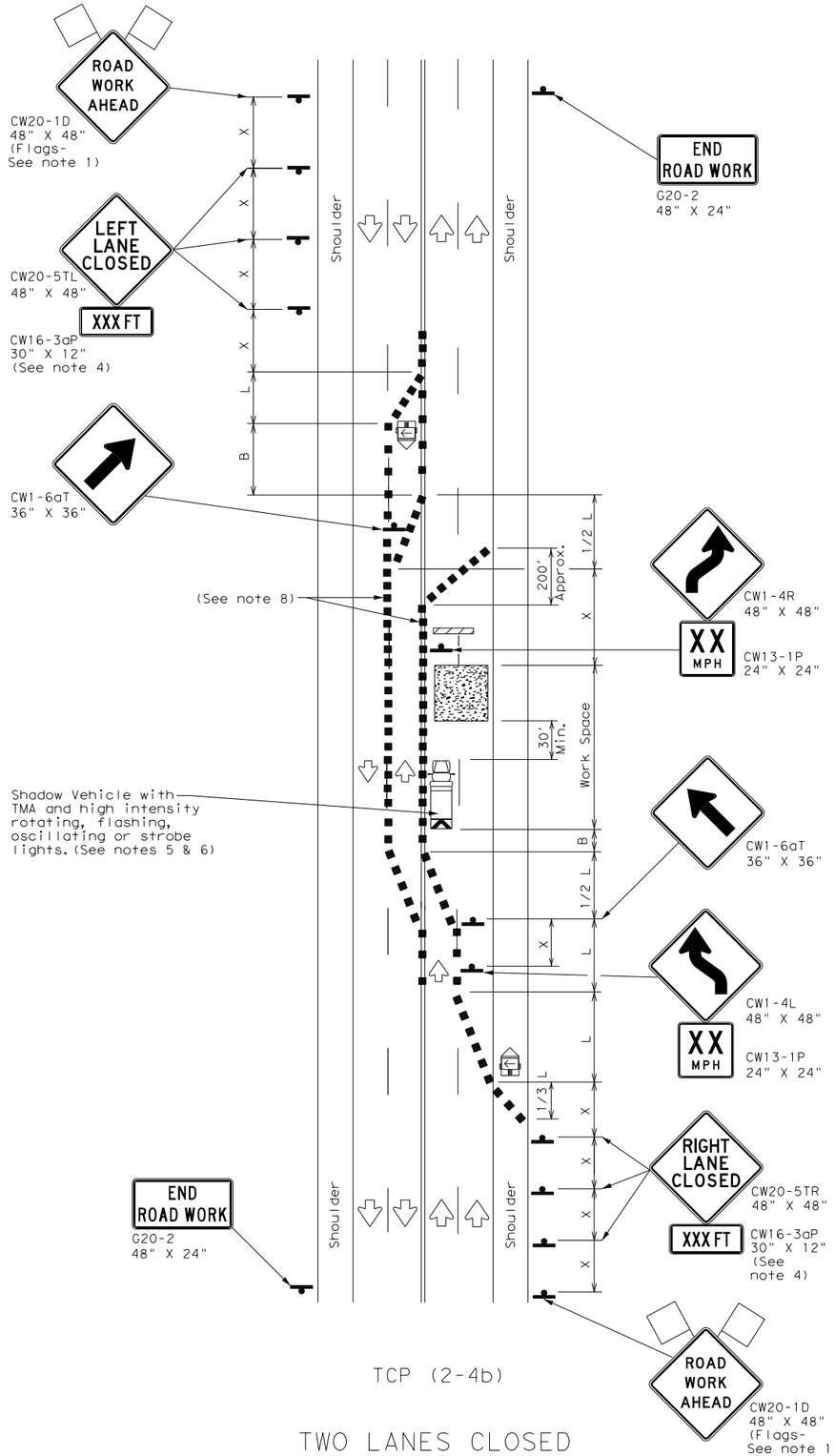


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP (2-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0275	04	061,ETC.	IH 40,ETC.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	AMA	CARSON,ETC.		23

164

DATE: 7/6/2023 1:56:38 PM
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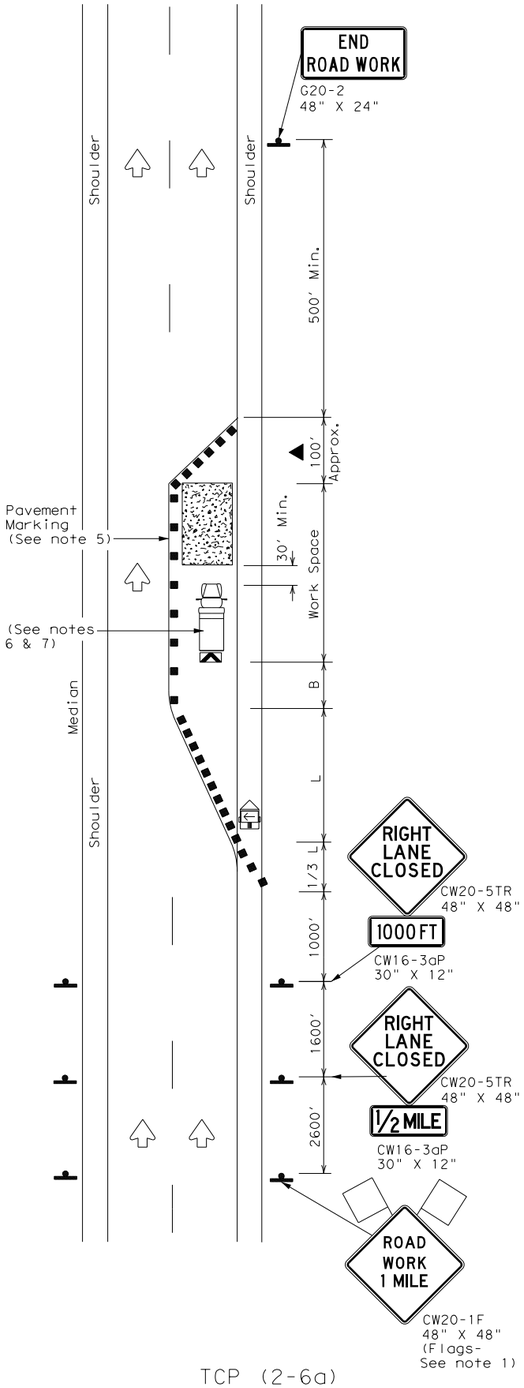
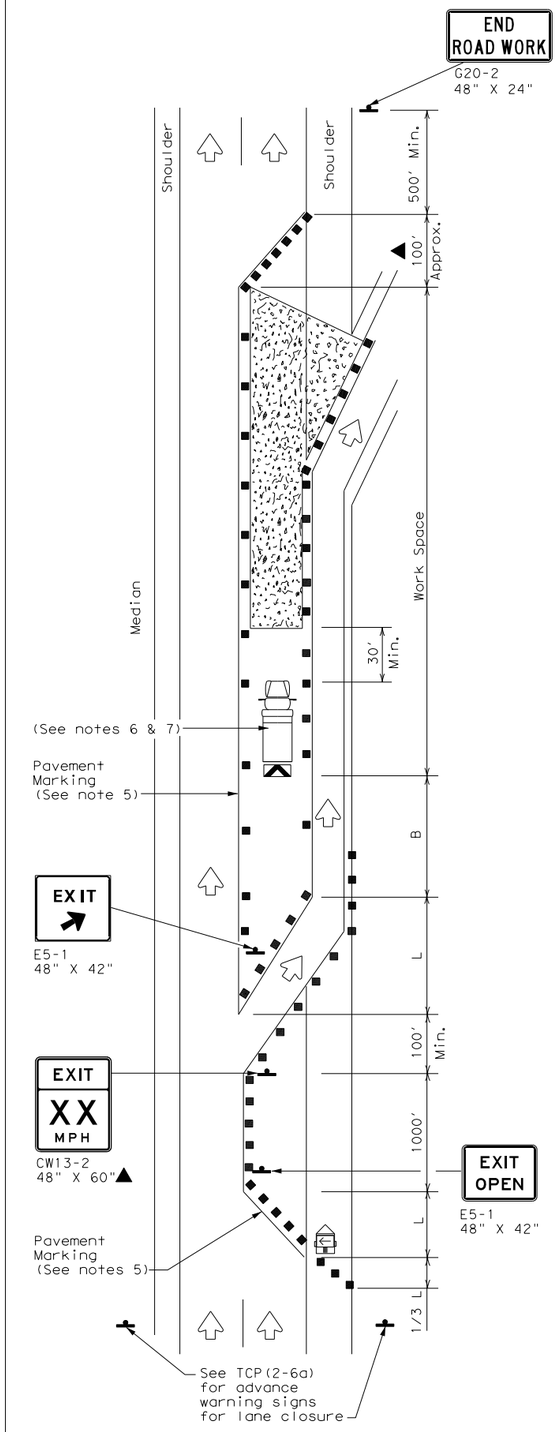


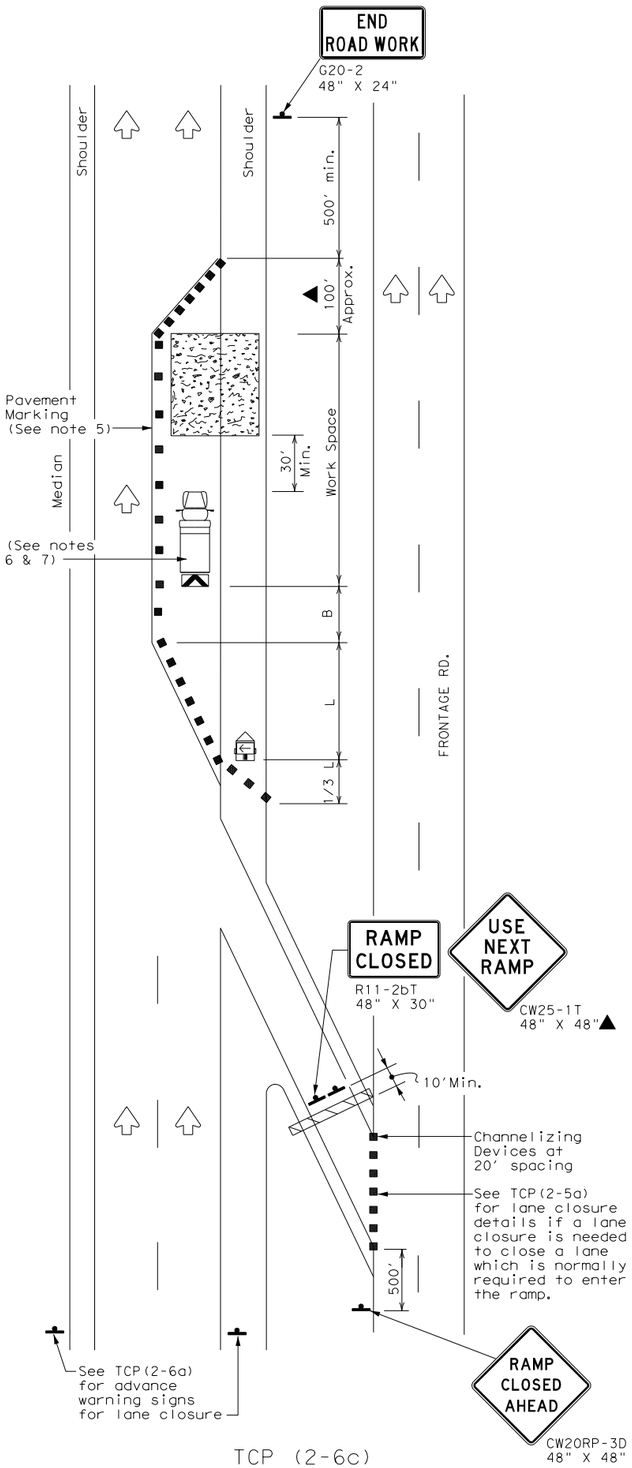
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP (2-6)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		24

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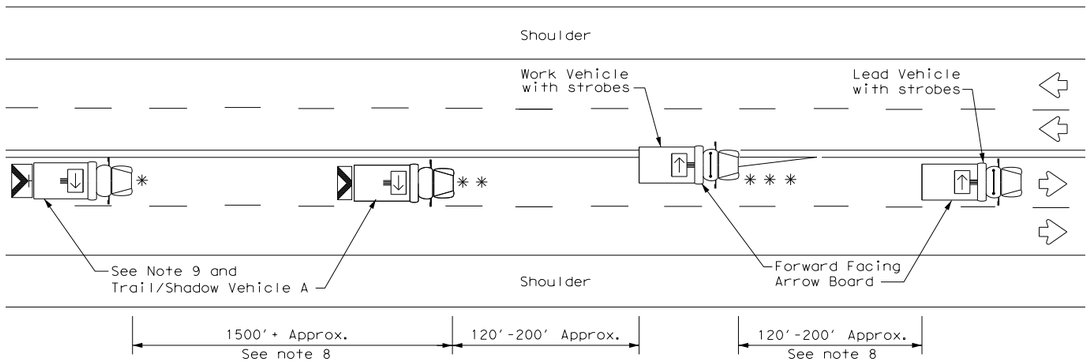
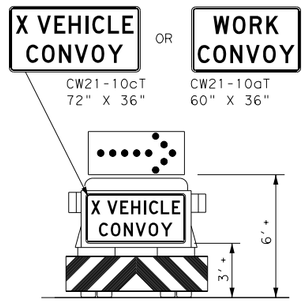


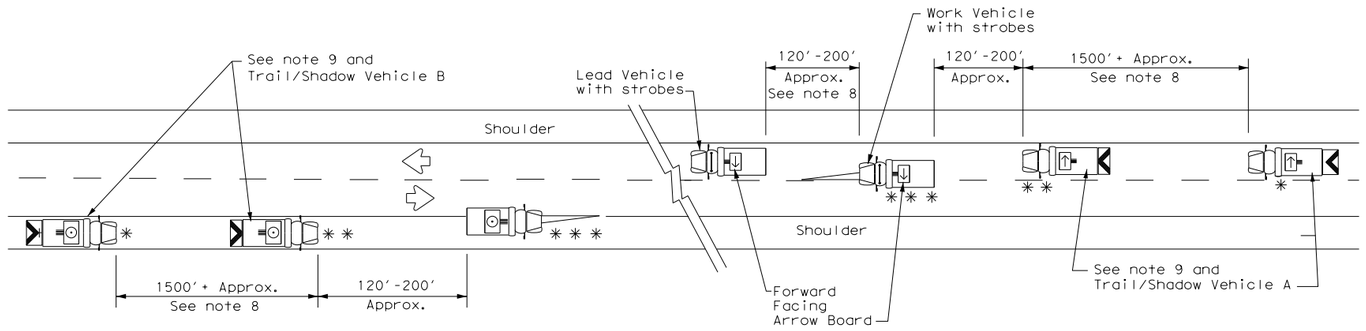
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

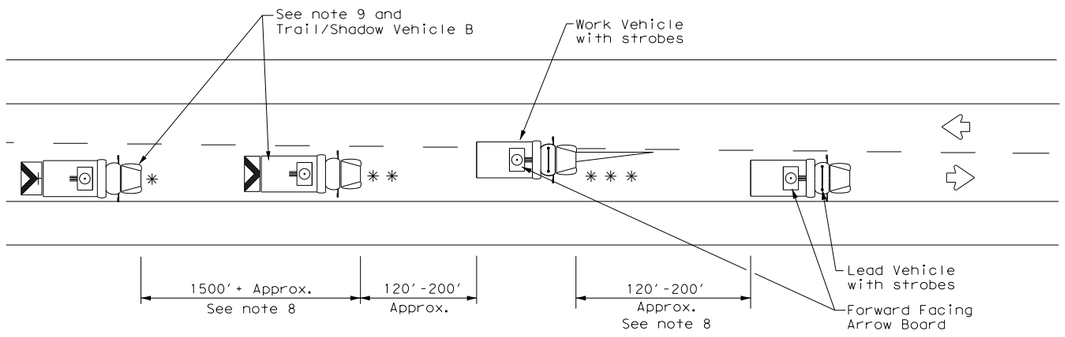


WORK ON SHOULDER

WORK ON TRAVEL LANE

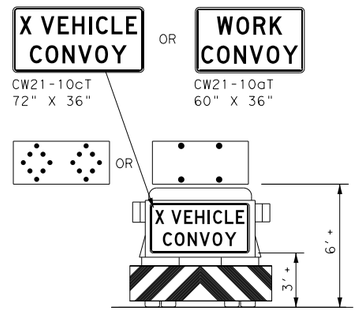
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

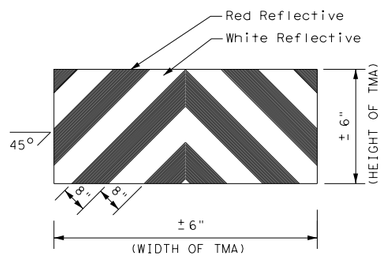
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP (3-1)-13

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8-95 7-13	AMA	CARSON, ETC.		25
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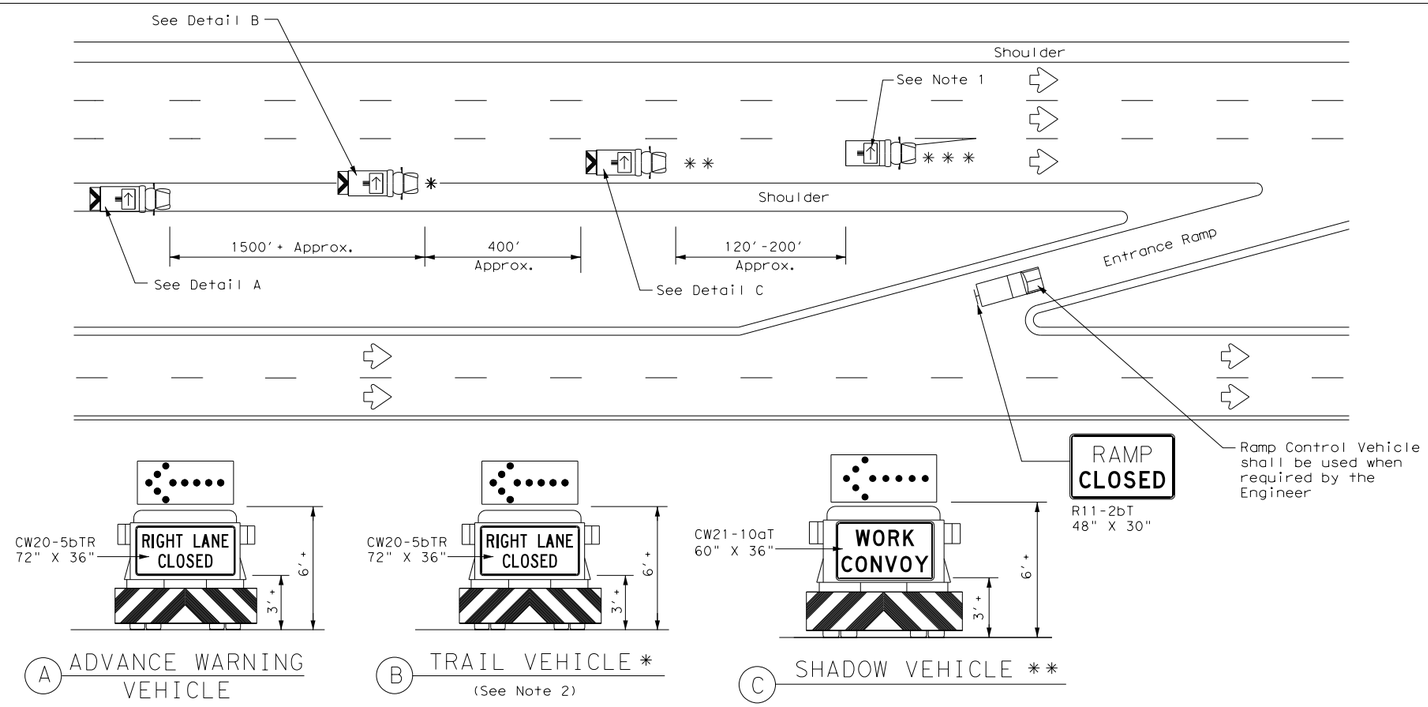
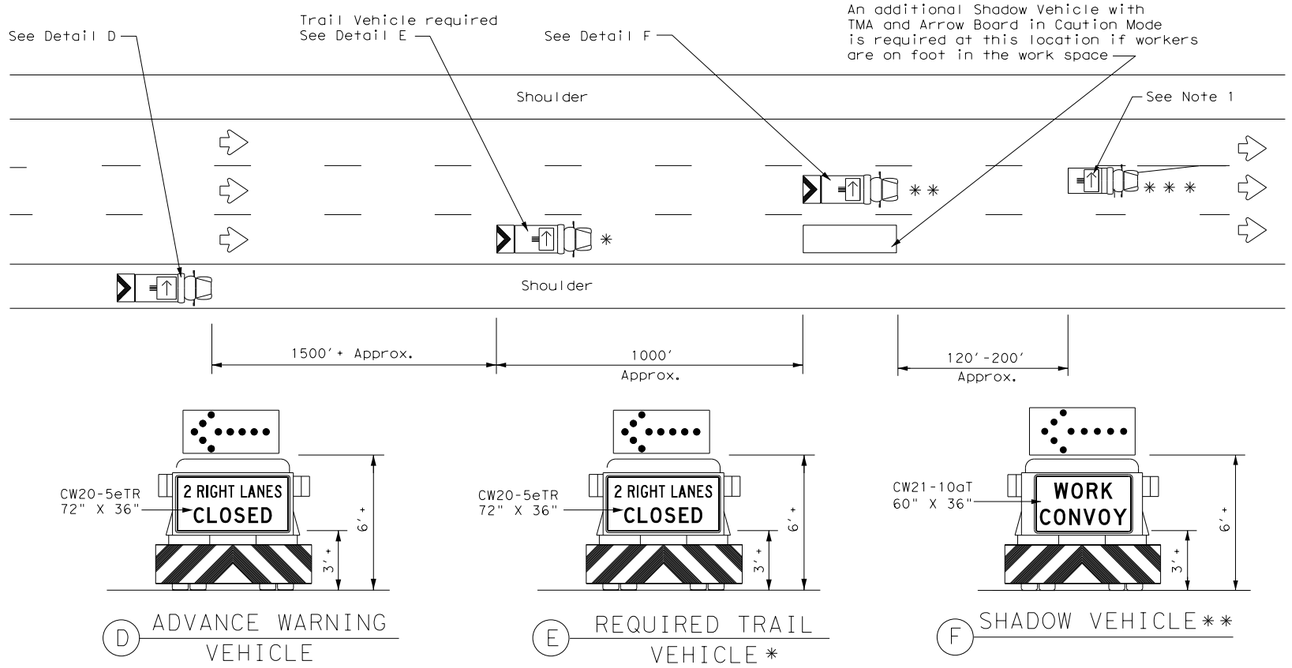


A ADVANCE WARNING VEHICLE

B TRAIL VEHICLE * (See Note 2)

C SHADOW VEHICLE **

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



D ADVANCE WARNING VEHICLE

E REQUIRED TRAIL VEHICLE *

F SHADOW VEHICLE **

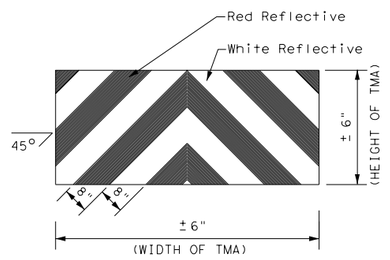
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		26

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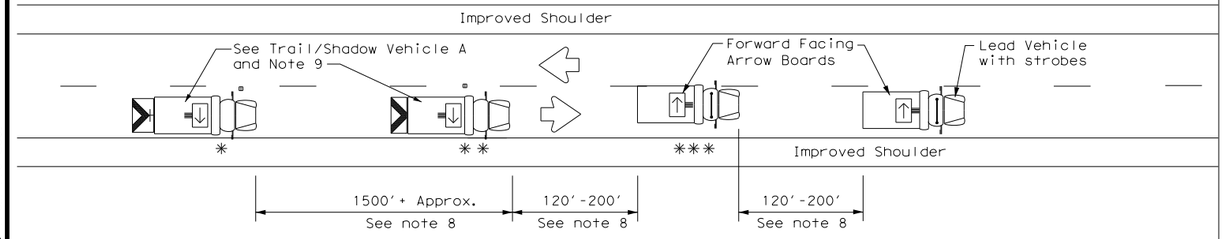
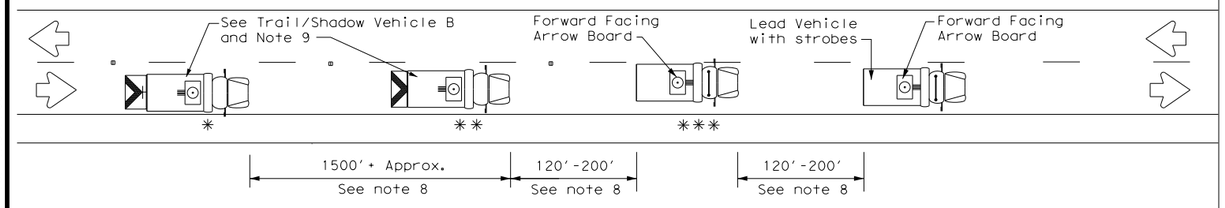


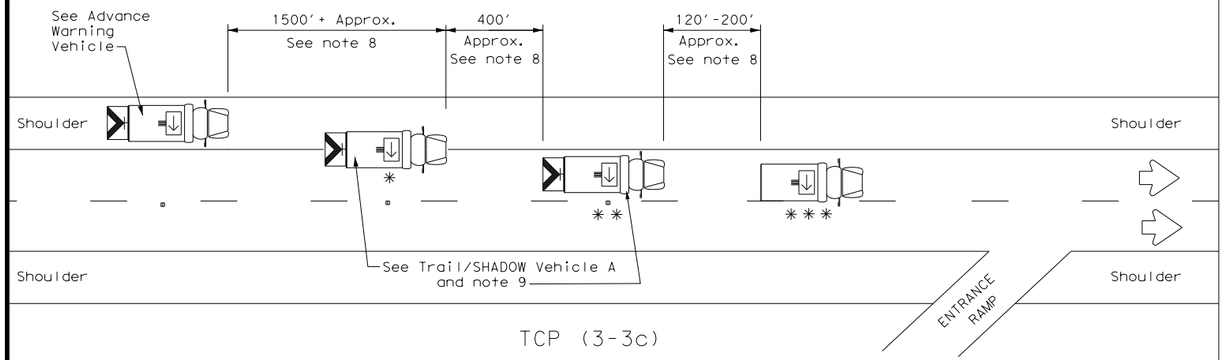
TCP (3-3a)

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



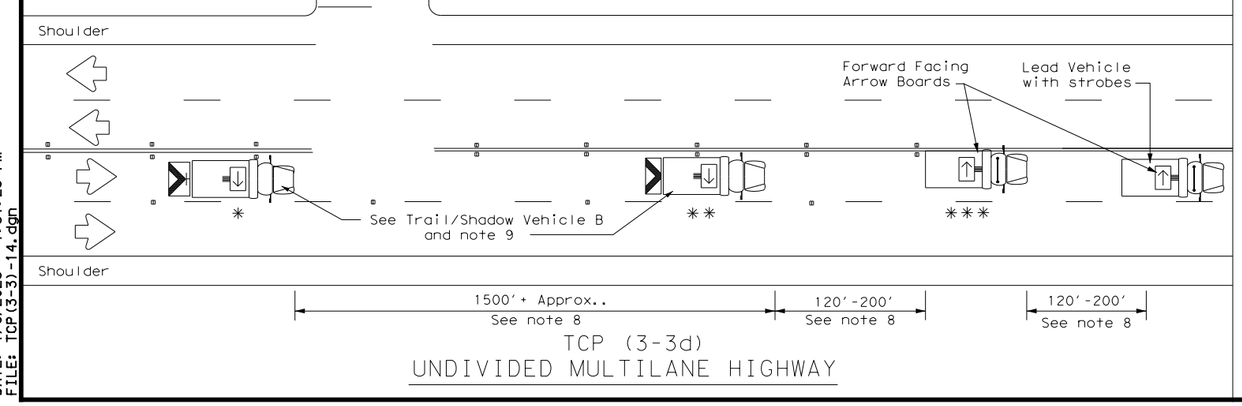
TCP (3-3b)

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



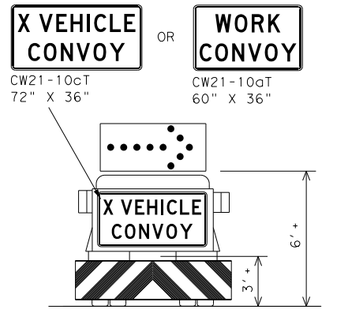
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



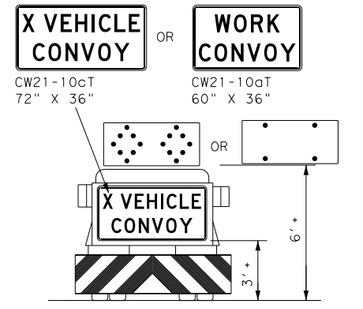
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



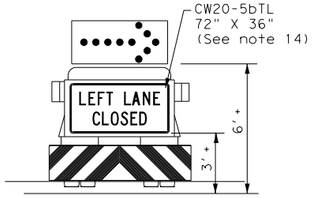
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

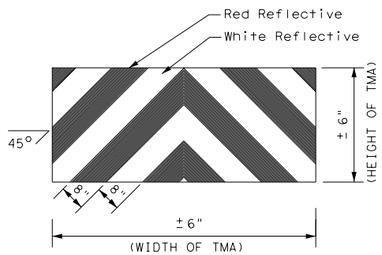


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
*	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	0275	04	061, ETC.	IH 40, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	AMA	CARSON, ETC.		27
1-97 7-14				

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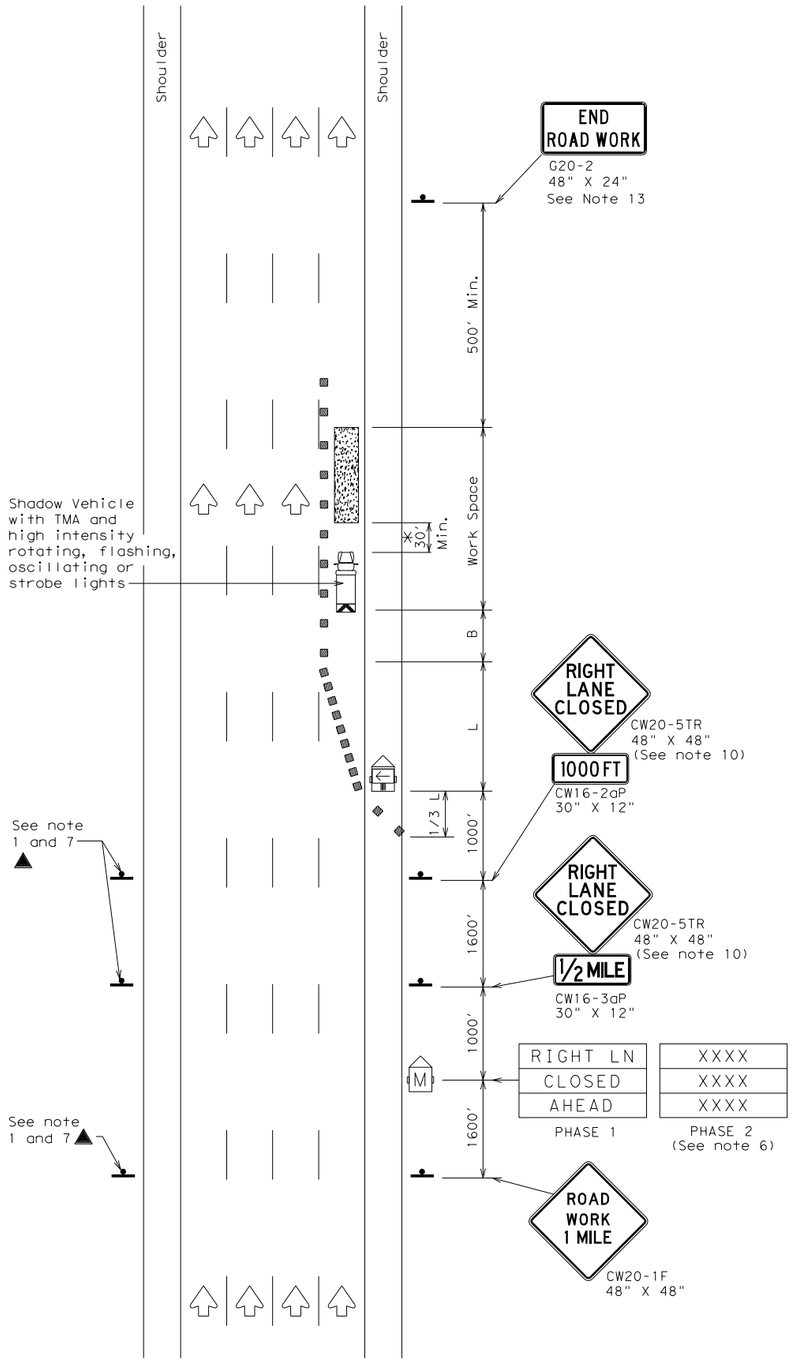
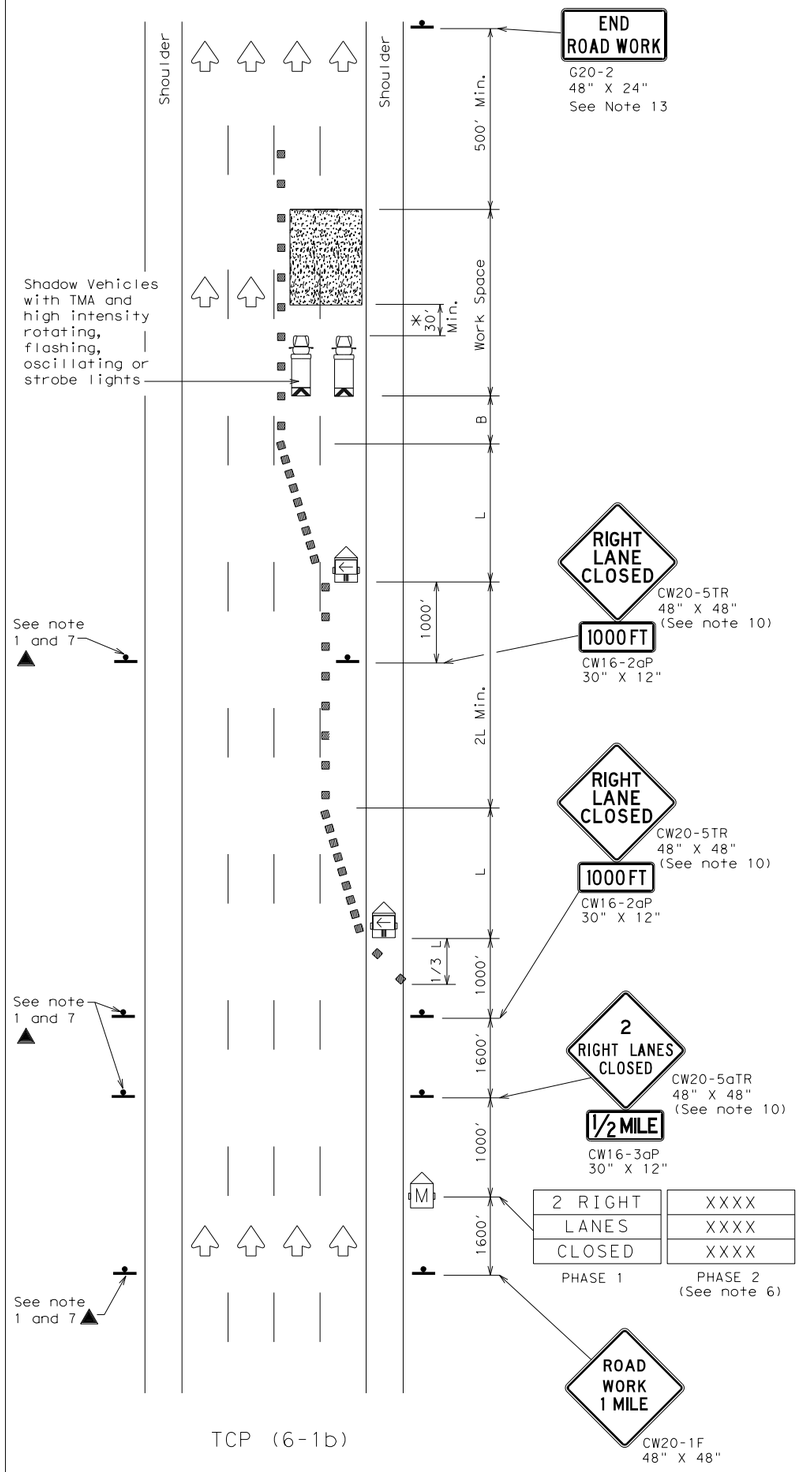


TCP (6-1a)

TYPICAL FREEWAY
ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY
TWO LANE CLOSURE

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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. 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	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		28

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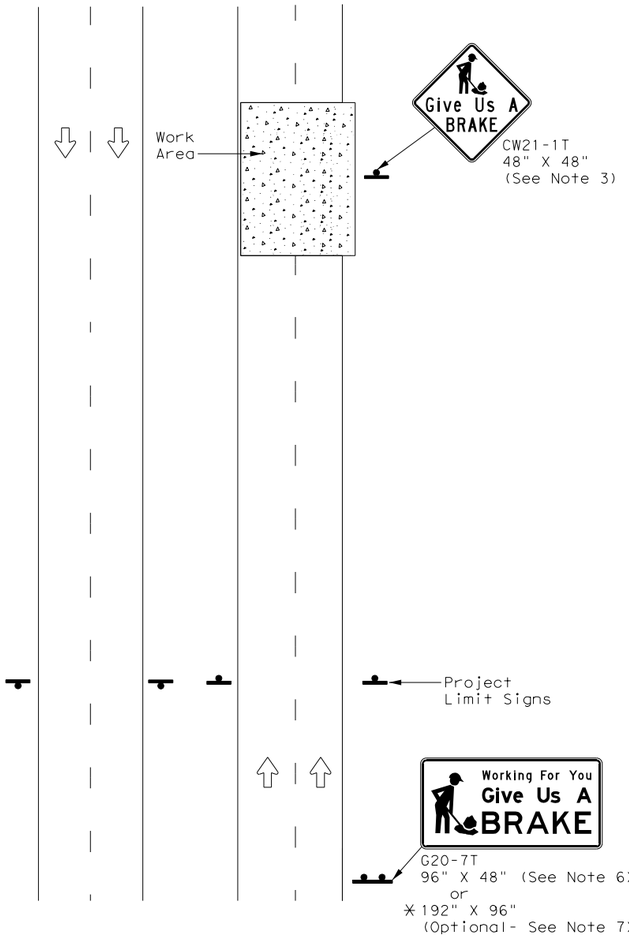
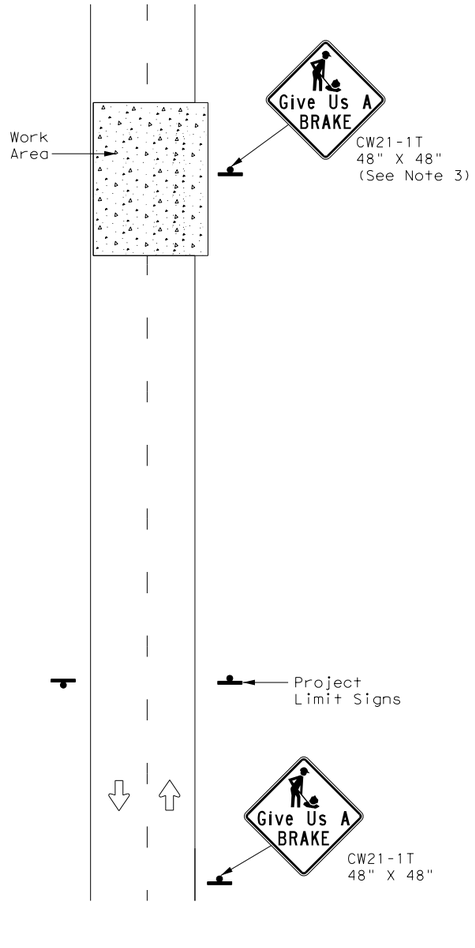


DIVIDED HIGHWAY



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.

Texas Department of Transportation — Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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6-96 5-98 7-13 8-96 3-03	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		29

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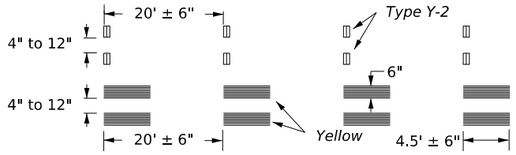
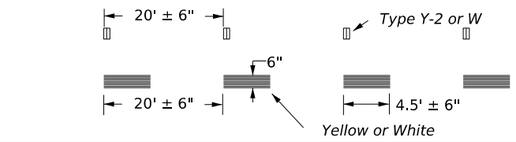
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

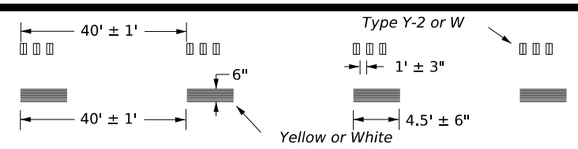


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



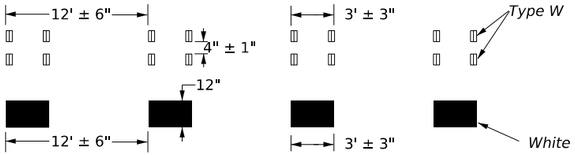
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

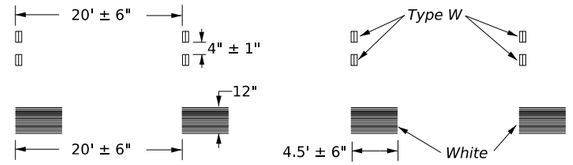


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



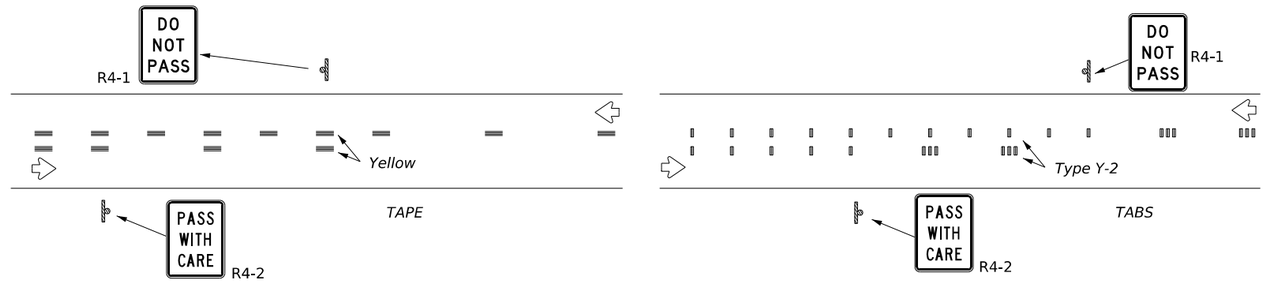
NOTES:

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

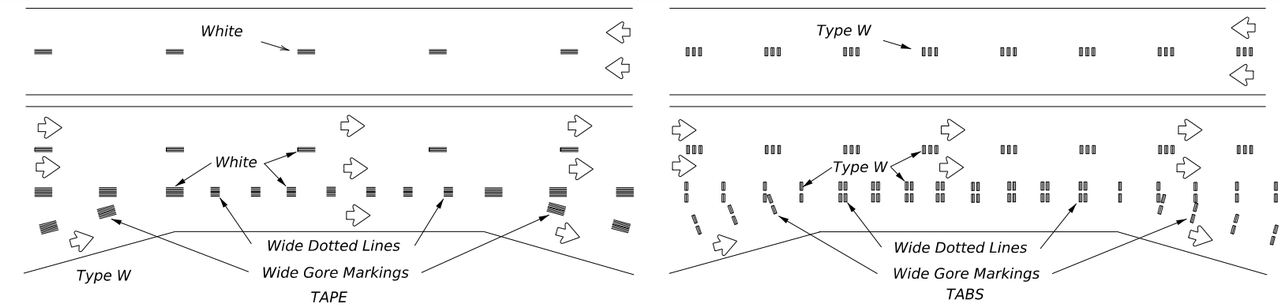
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

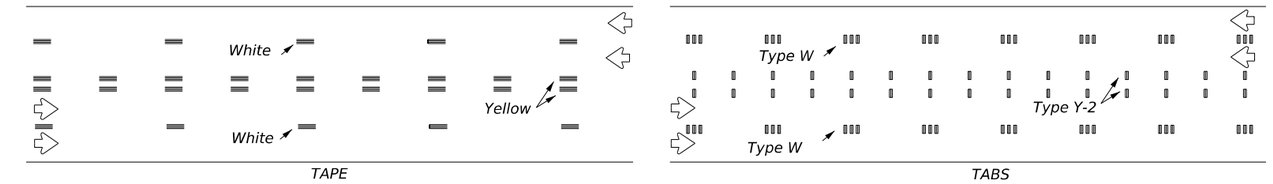
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



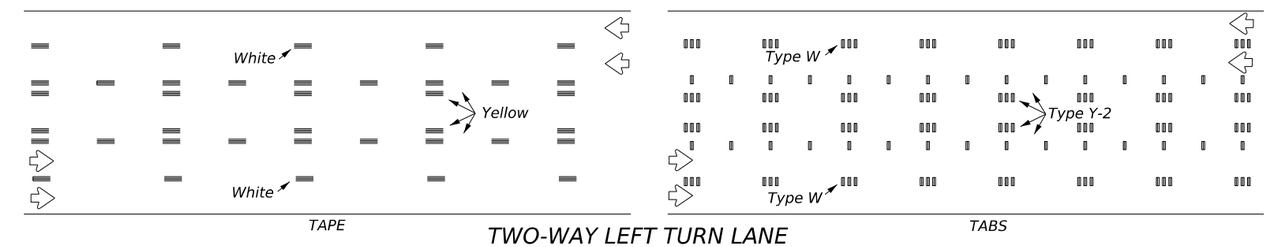
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



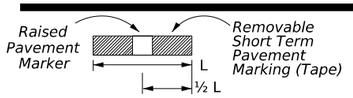
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061,ETC.	IH 40,ETC.
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	AMA	CARSON,ETC.		30
3-03				

DATE: 7/6/2023 1:57:56 PM
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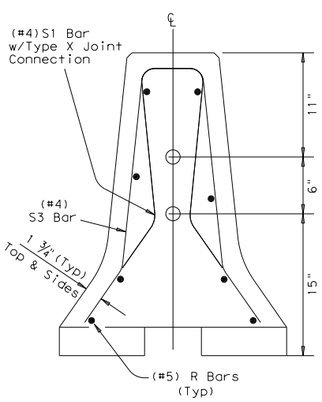
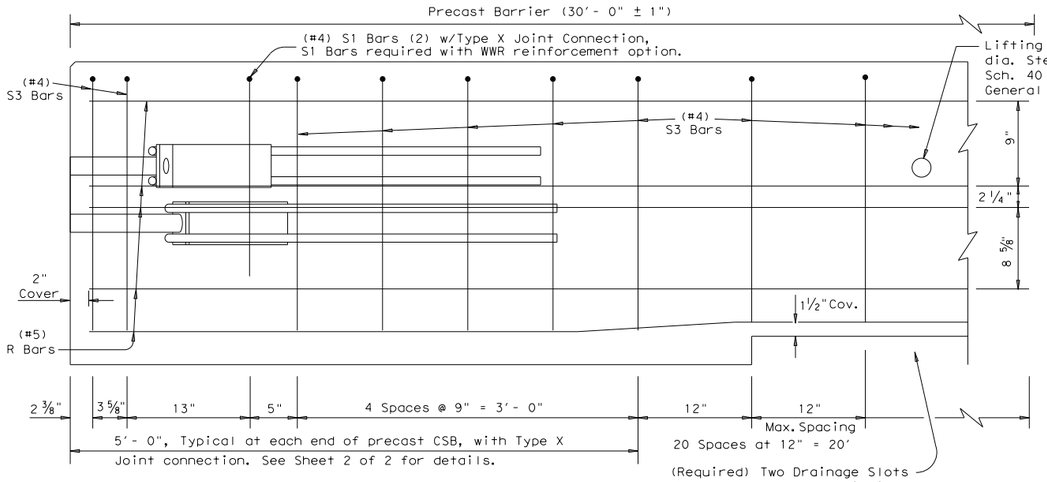


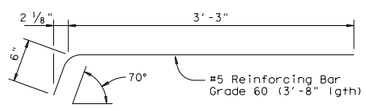
End View
Precast Barrier

See sheet 2 of 3 for Joint connection Type X



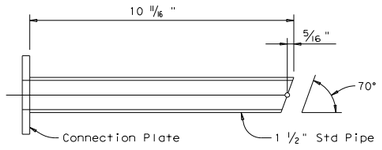
Reinforcement for Precast (CSB)
Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



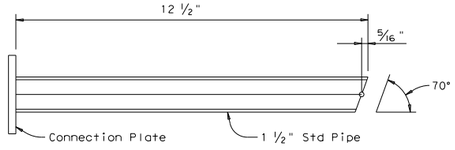
DEFORMED BAR ANCHOR DETAILS

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



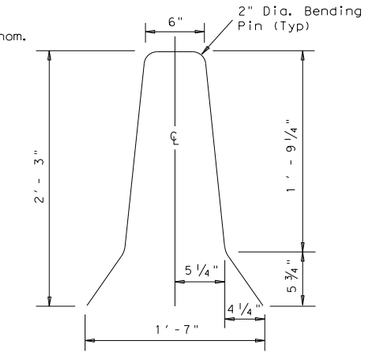
UPPER CONNECTION PIPE DETAILS

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

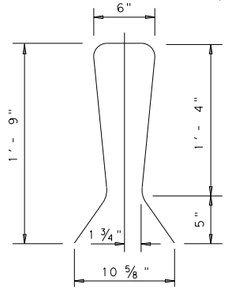


LOWER CONNECTION PIPE DETAILS

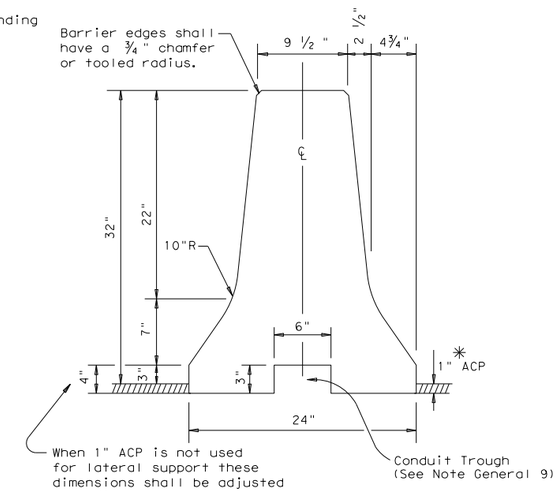
One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.



S3 Bar
#4 Bar



S1 Bar
#4 Bar (2)
(Joint Type X)

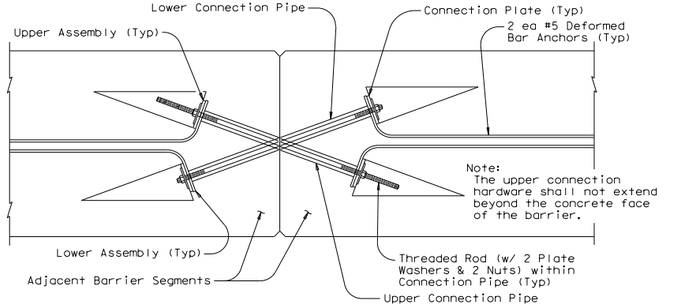


Concrete Safety Barrier

✳ 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 3/4" 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.

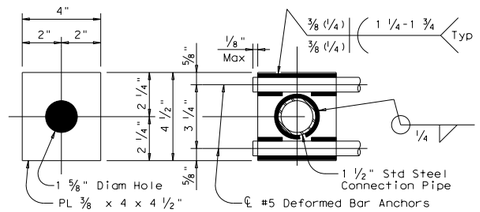
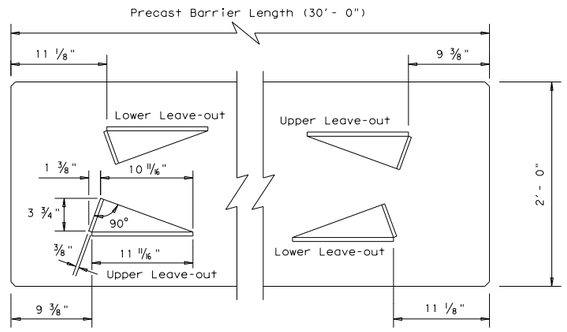


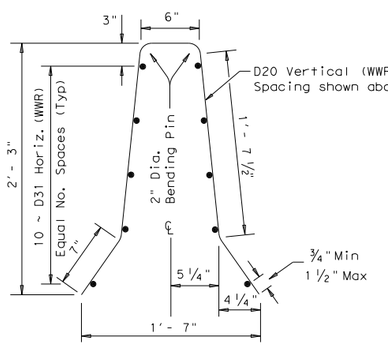
PLATE DIMENSIONS WELDING DETAILS

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.



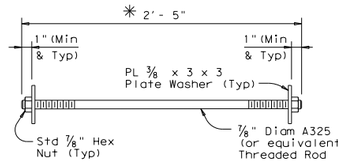
BARRIER PLAN AT END JOINTS



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

(WWR) General Notes

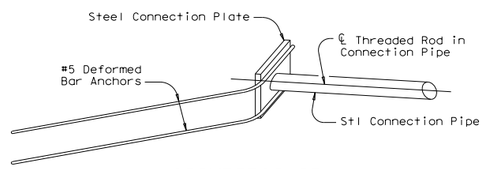
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing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

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
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	AMA	CARSON, ETC.		31

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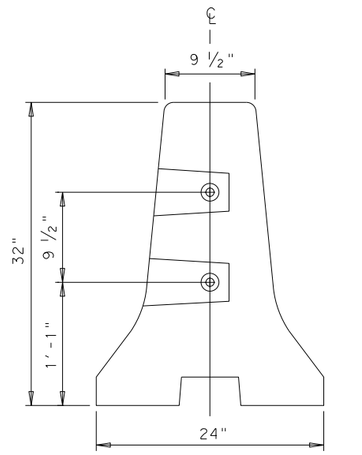
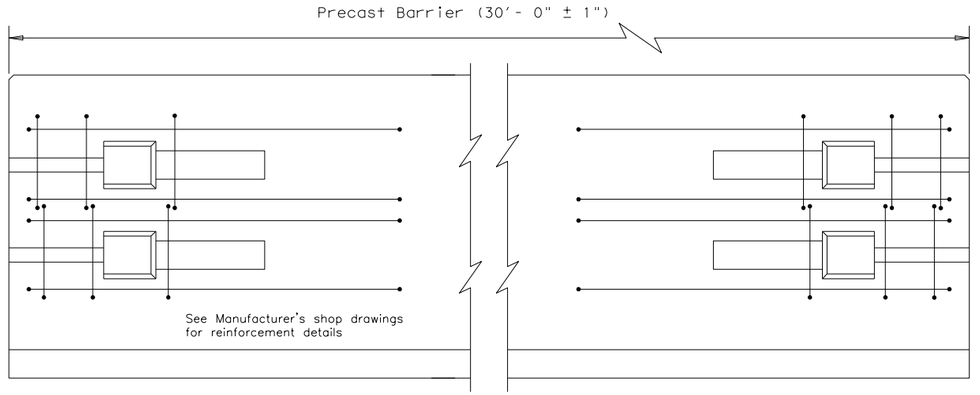


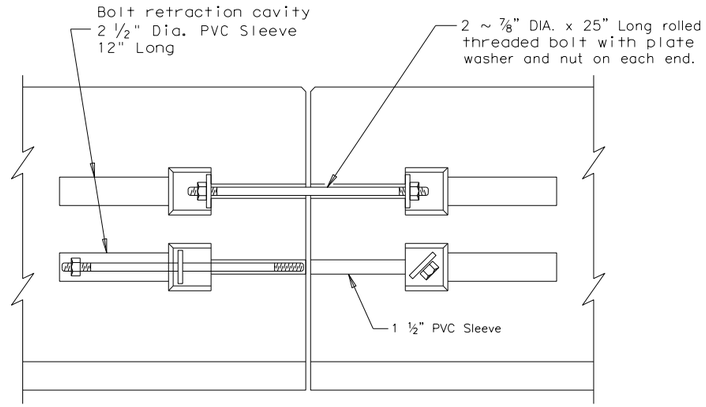
END VIEW (CSB) QUICK-BOLT

QUICK-BOLT POCKET LOCATIONS



ELEVATION (CSB) QUICK-BOLT

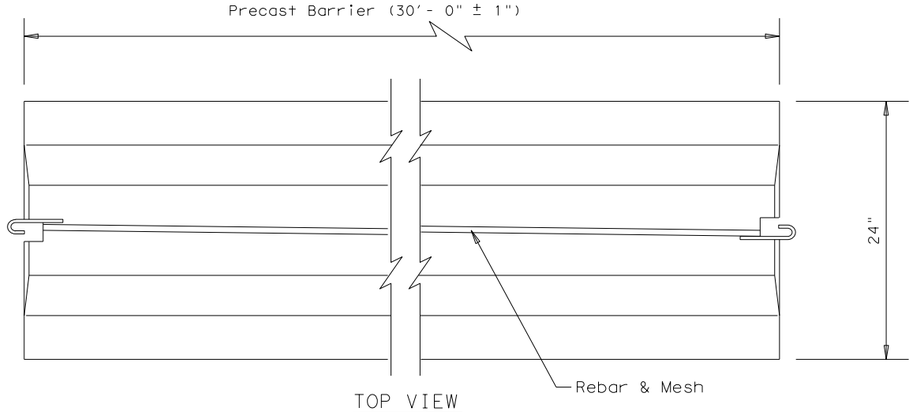
See Manufacturer's shop drawing for additional details



ELEVATION VIEW SHOWING JOINT CONNECTION

"QUICK-BOLT"

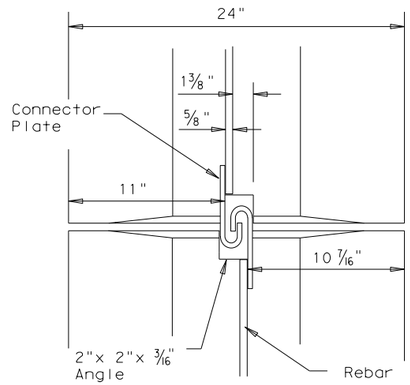
Joint Connection (Type Q)



TOP VIEW

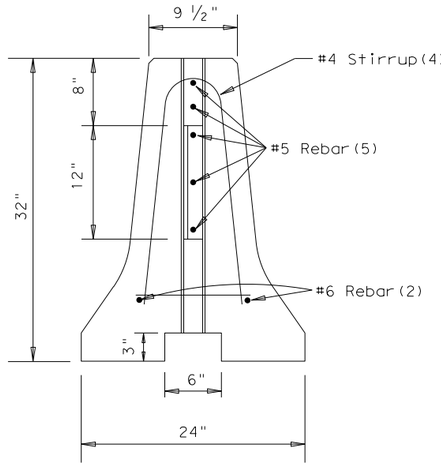
PRECAST (CSB) WITH J-J HOOKS

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.

SHEET 2 OF 2

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	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		32

DATE: 7/6/2023 1:58:12 PM
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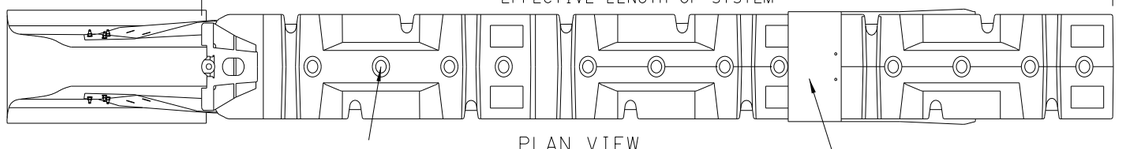
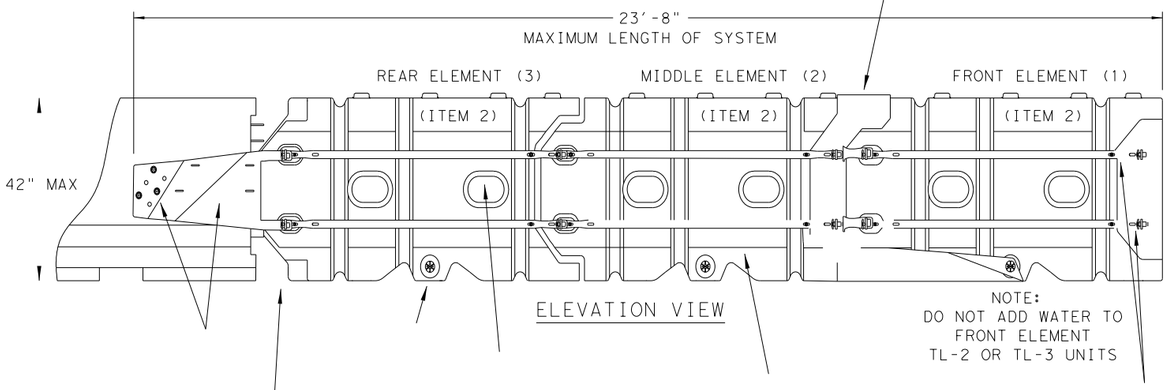
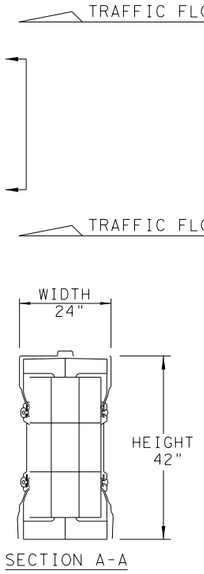
SYSTEM SHOWN - ABSORB-M TL-3



PLAN VIEW



ELEVATION VIEW



SECTION A-A

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"

GENERAL NOTES

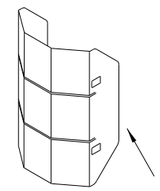
1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M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

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

* COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

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



NOSE PLATE

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

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

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

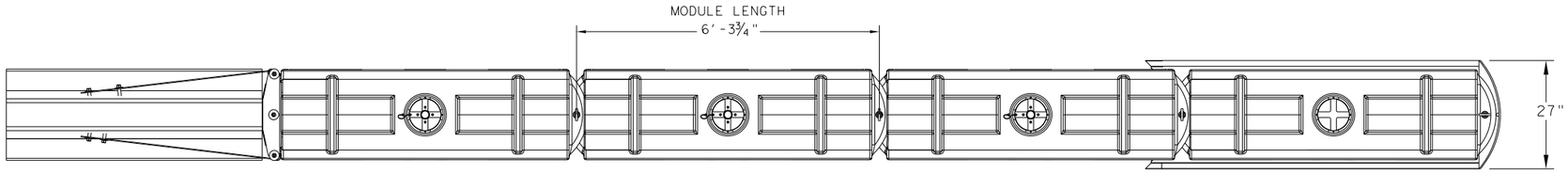
SACRIFICIAL

Texas Department of Transportation — Design Division Standard

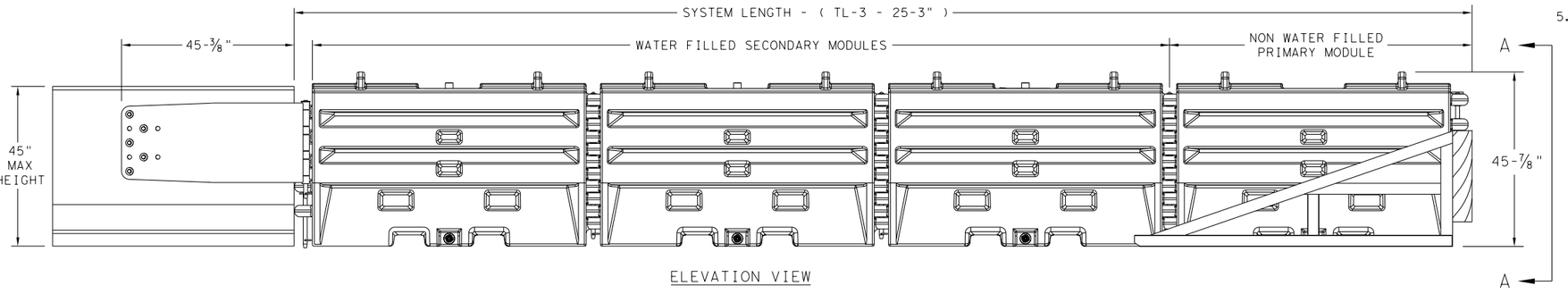
LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		33

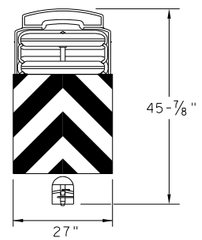
DATE: 7/6/2023
FILE: ABSORB(M)-19.dgn



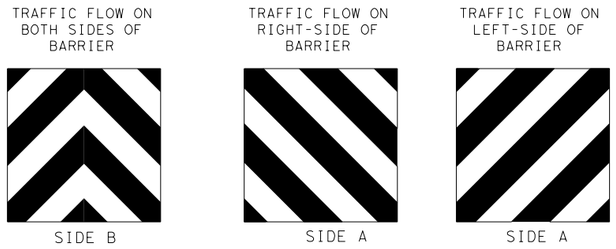
PLAN VIEW



ELEVATION VIEW



SECTION A-A



NOSE SHEETING PANEL DELINEATION

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

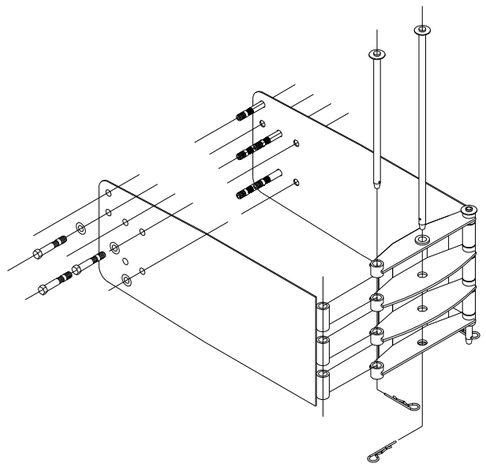
TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25′ 3"

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

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



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

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	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		34

DATE: 7/6/2023
FILE: SLED-19.dgn

DATE: 7/6/2023 1:58:47 PM
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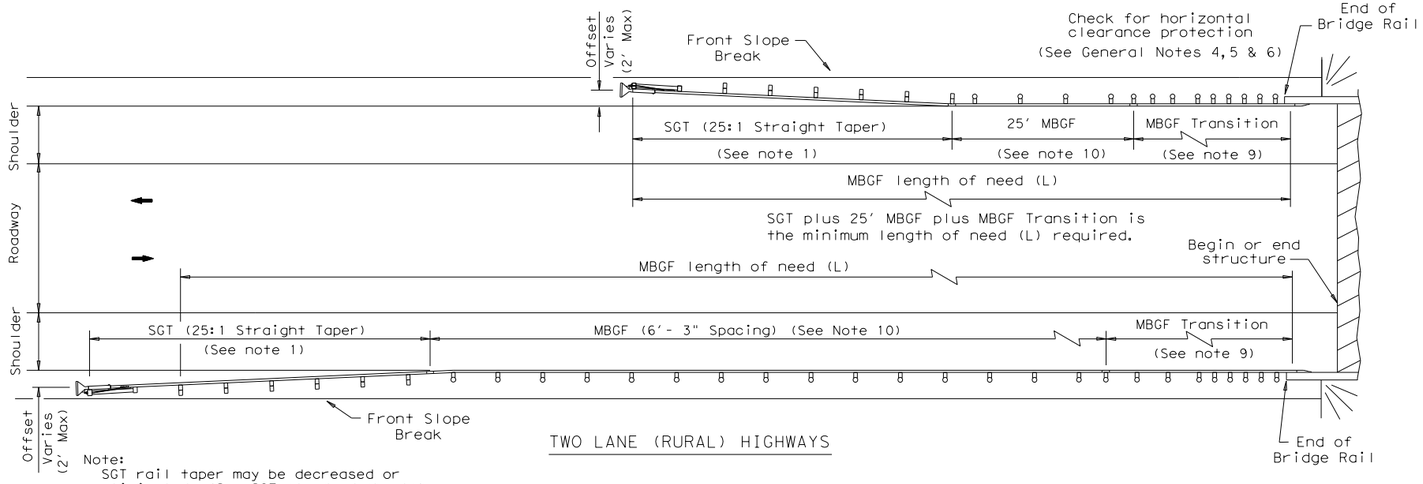
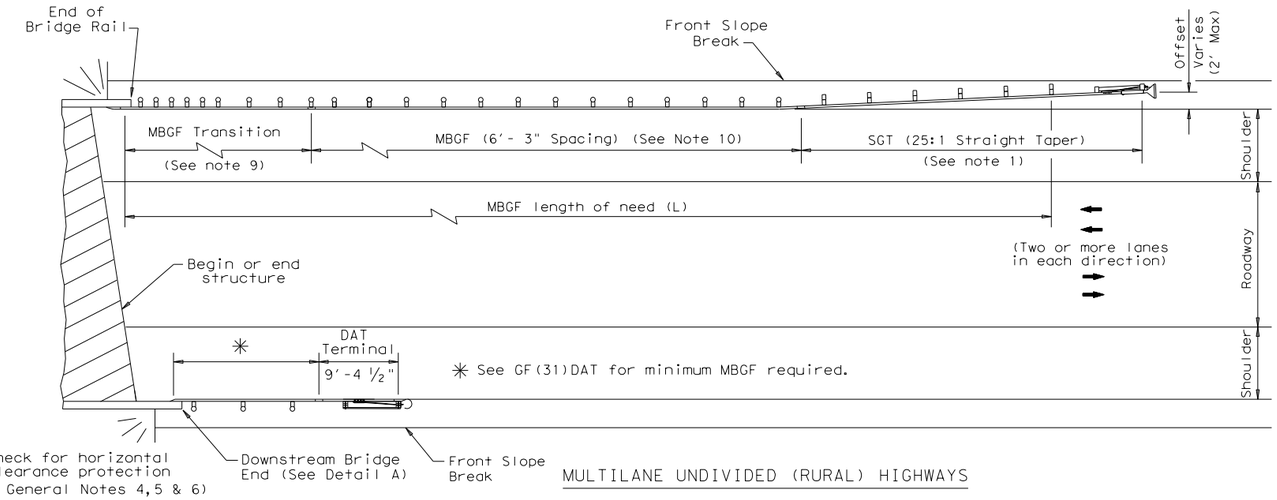
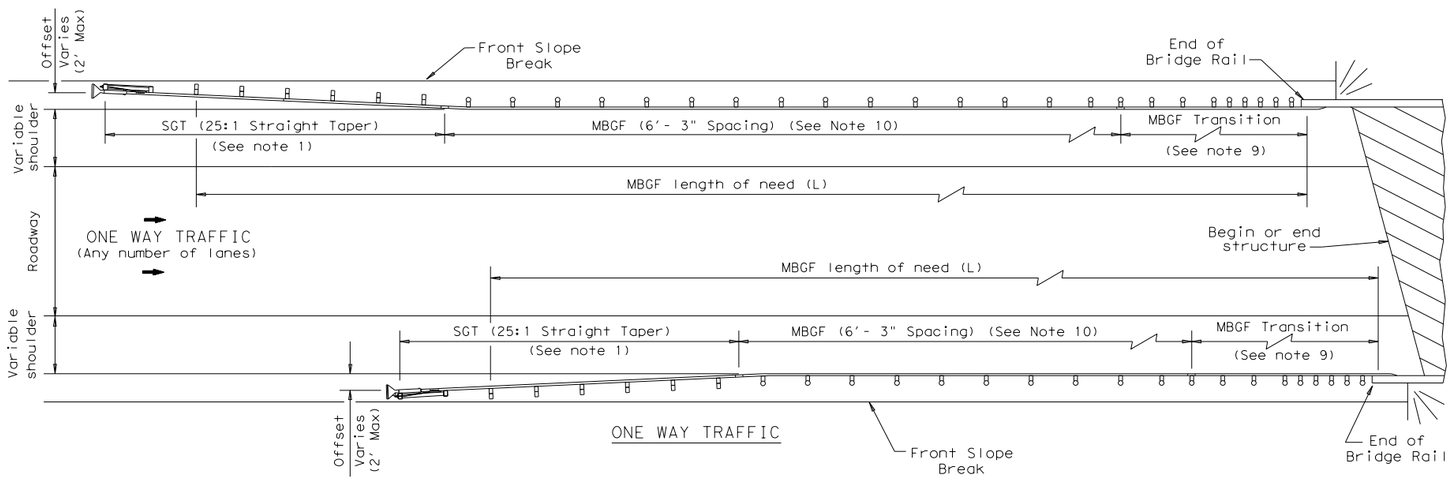


TWO LANE (RURAL) HIGHWAYS

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



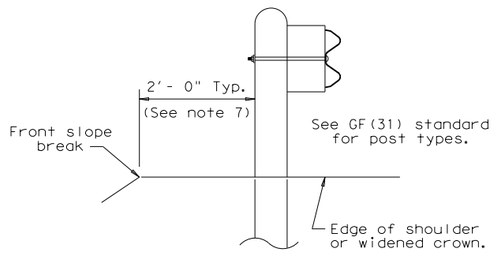
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



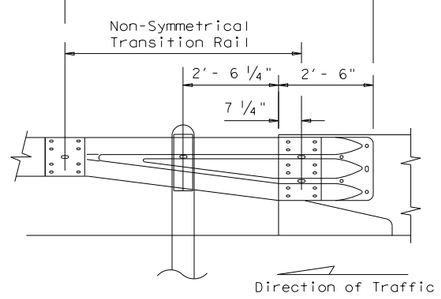
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. 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

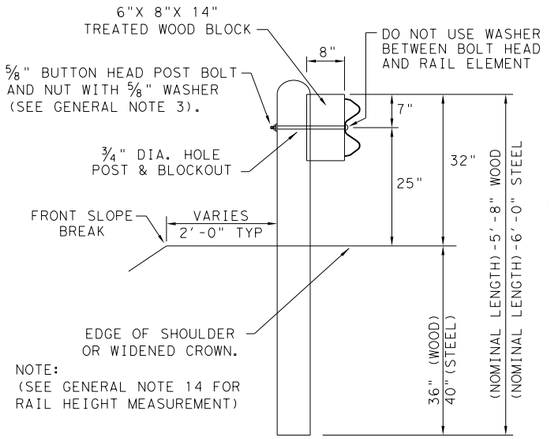
Design Division Standard

BRIDGE END DETAILS

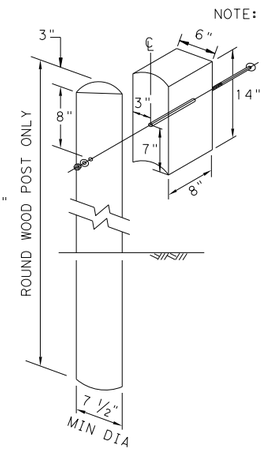
(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

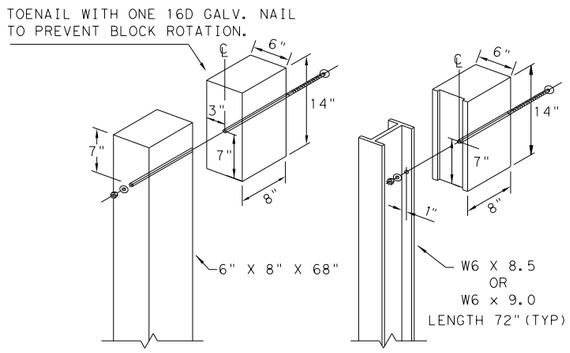
FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		35



TYPICAL POST PLACEMENT



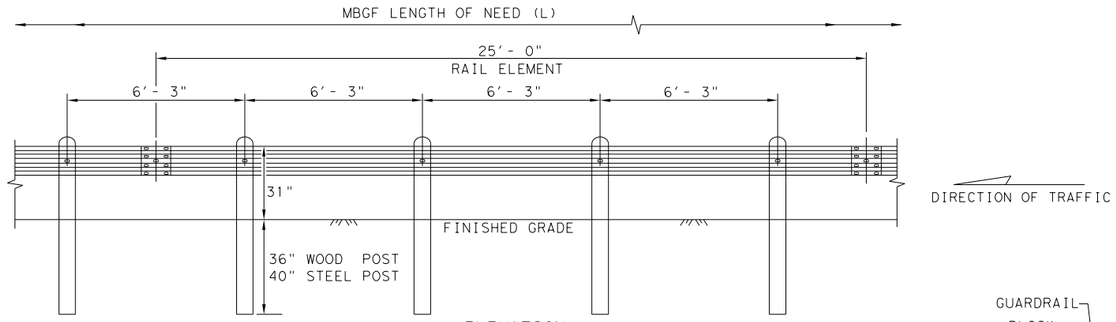
WOOD BLOCK TO
ROUND WOOD POST



WOOD BLOCK TO
RECTANGULAR WOOD POST

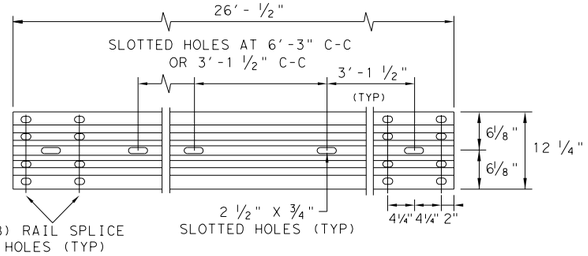
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

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



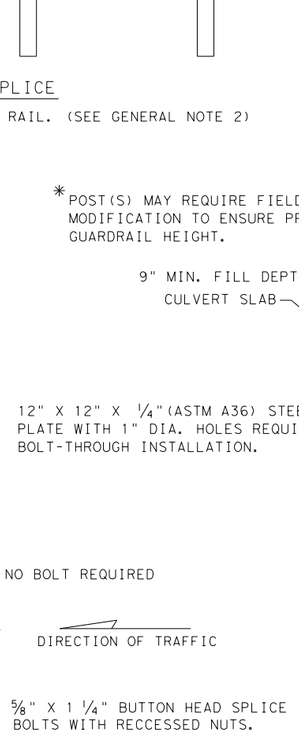
ELEVATION
MID-SPAN RAIL SPLICE

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



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

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



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

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

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

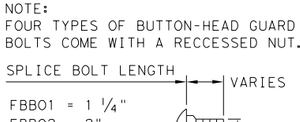
1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

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

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

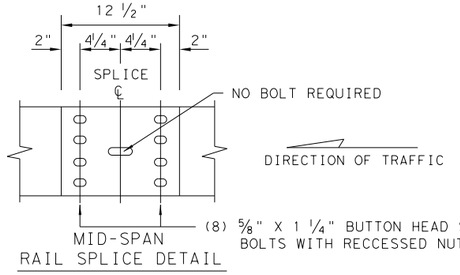
NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

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



BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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

GENERAL NOTES

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

Texas Department of Transportation — Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
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	AMA	CARSON, ETC.		36

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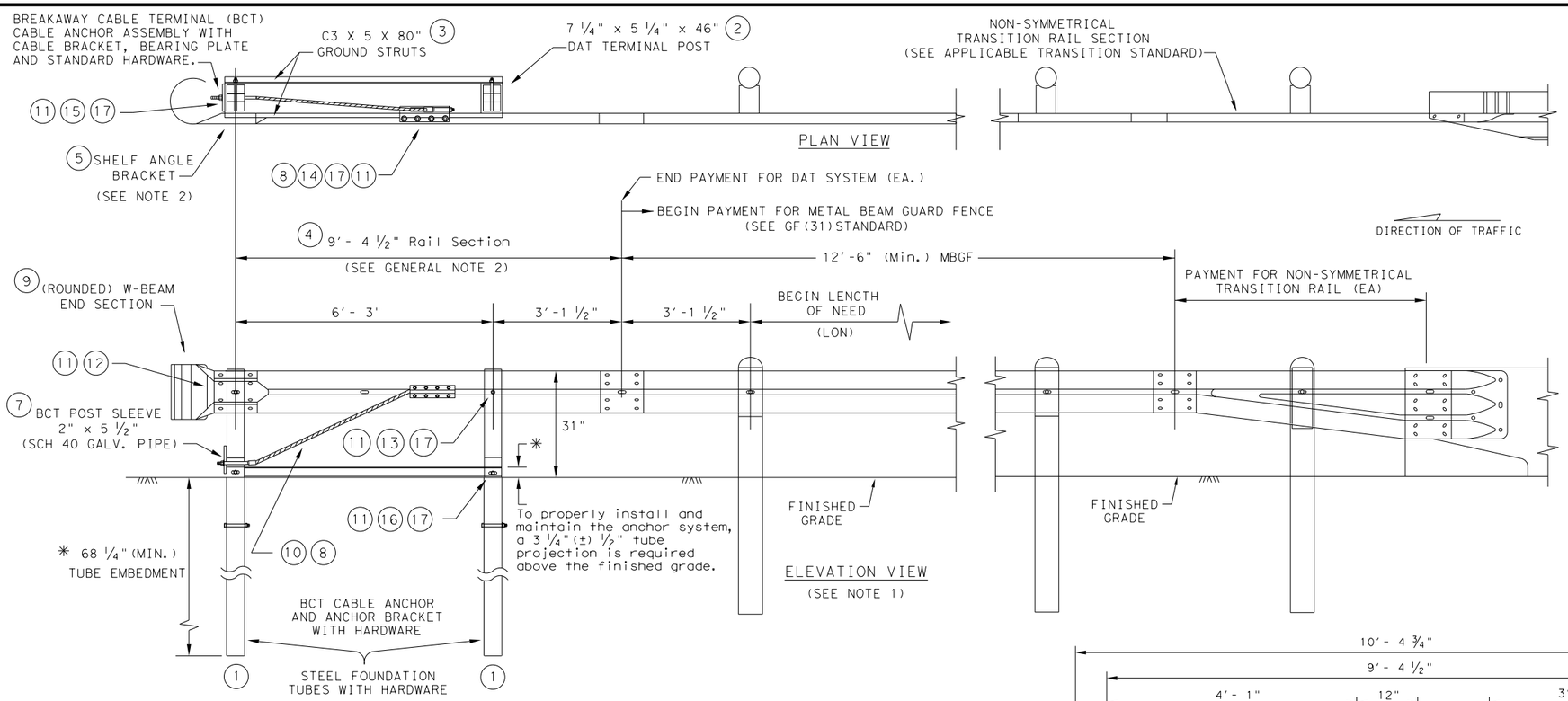


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

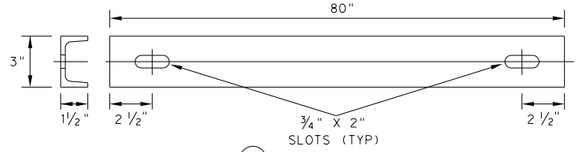
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN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

MOW STRIP INSTALLATION

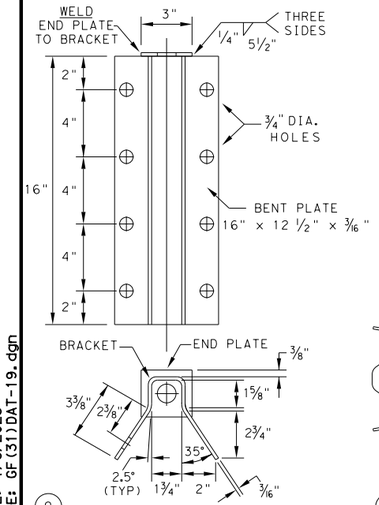
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

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

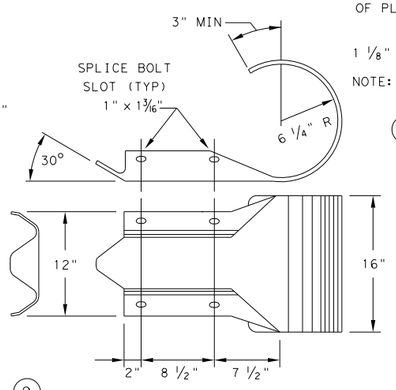
(4) TERMINAL RAIL ELEMENT FOR DAT



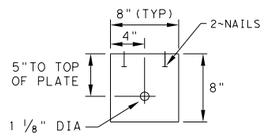
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

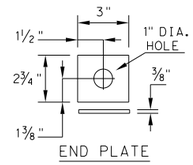


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

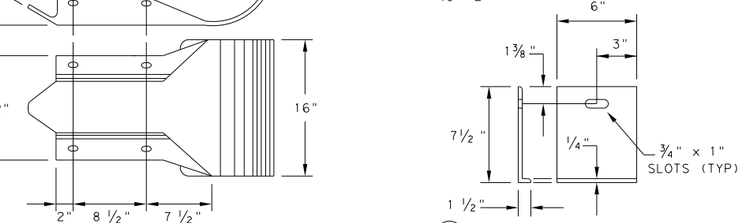


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

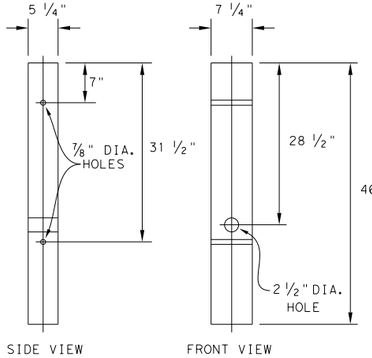
(6) BEARING PLATE
8"x 8"x 5/8" PL



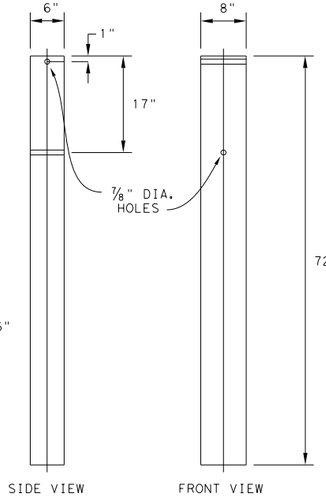
END PLATE



(5) SHELF ANGLE BRACKET



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



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

Texas Department of Transportation

Design Division Standard

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

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061,ETC.	IH 40,ETC.
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	AMA	CARSON,ETC.		37

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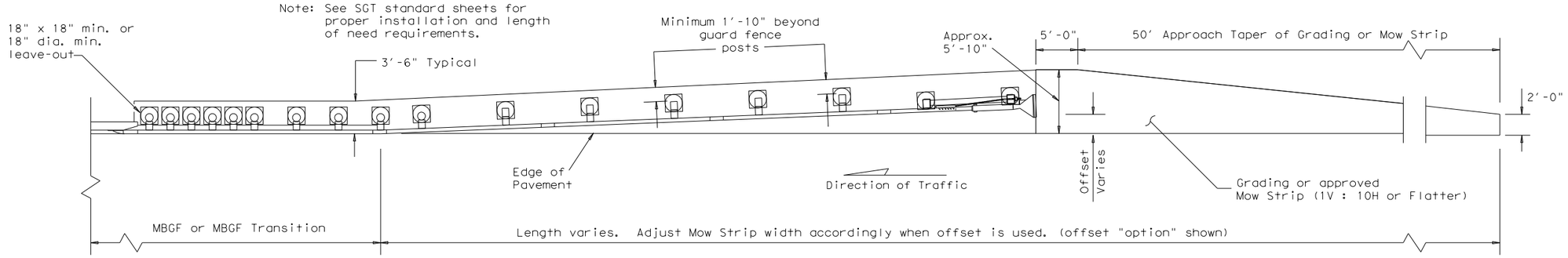
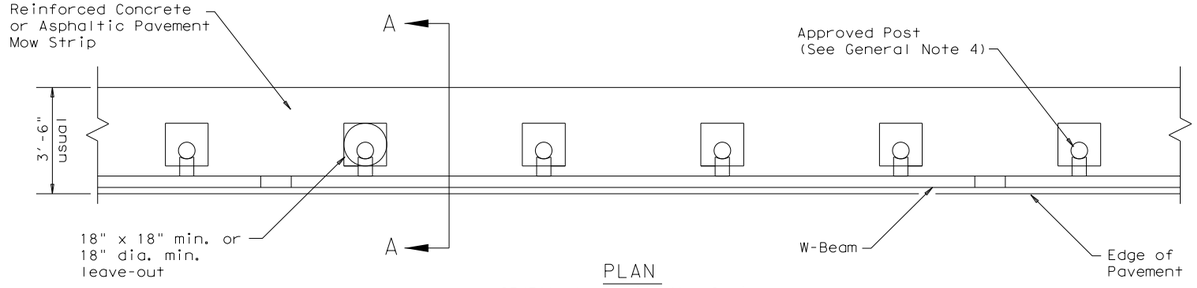
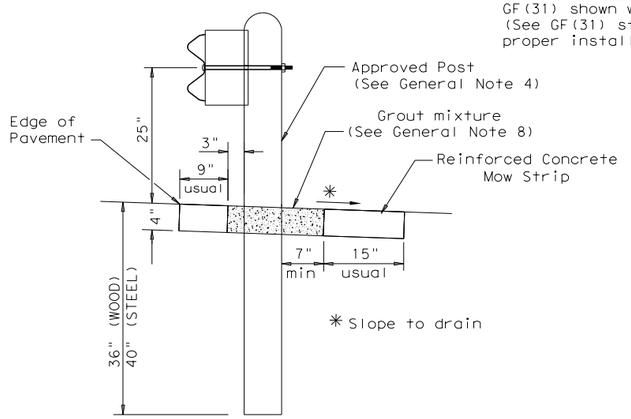


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



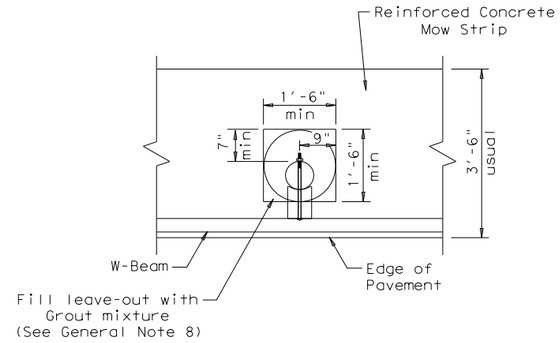
PLAN

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.

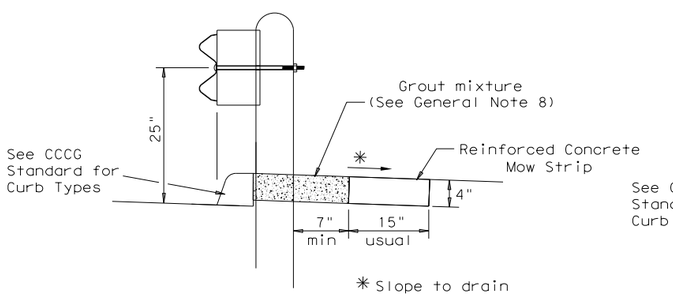
Note: Site Condition(s)

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.

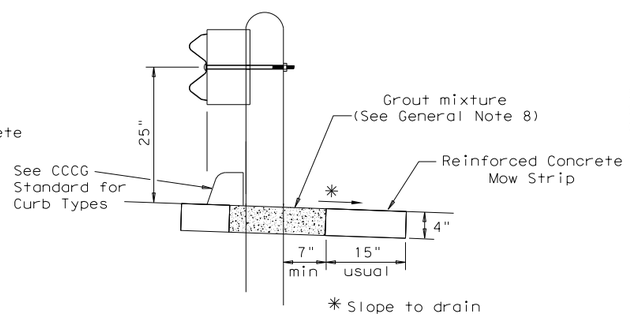
GENERAL NOTES

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.



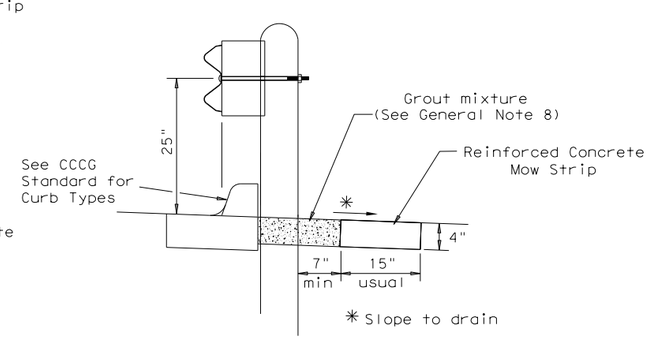
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Texas Department of Transportation

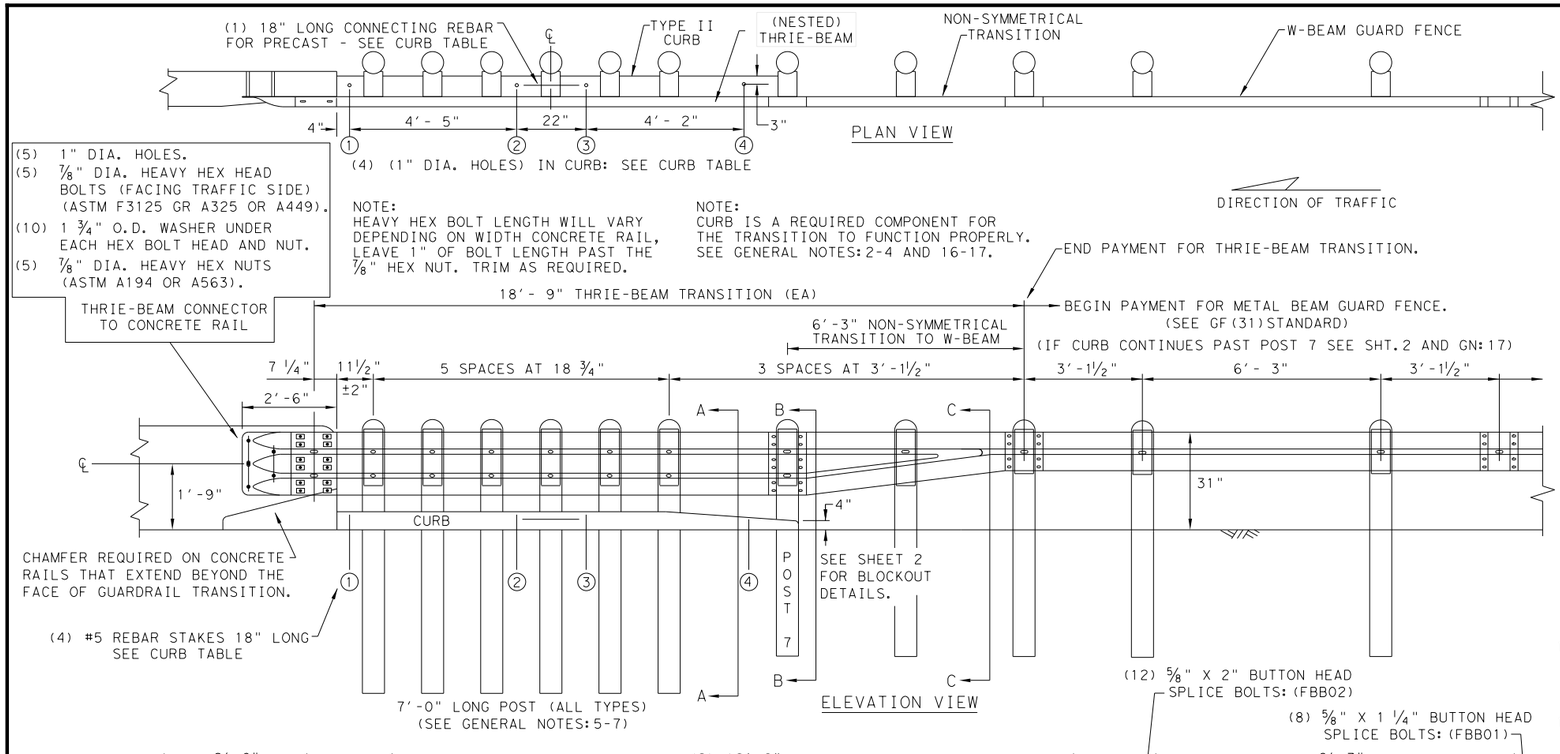
Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		38

DATE: 7/6/2023
FILE: GF(31)MS-19.dgn



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.

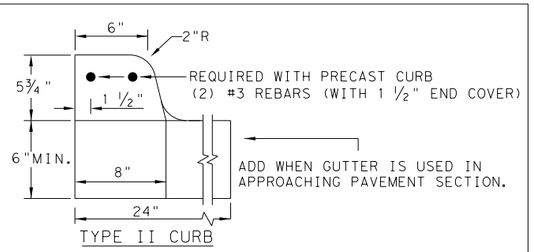
THRIE-BEAM TERMINAL - CURB TABLE

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

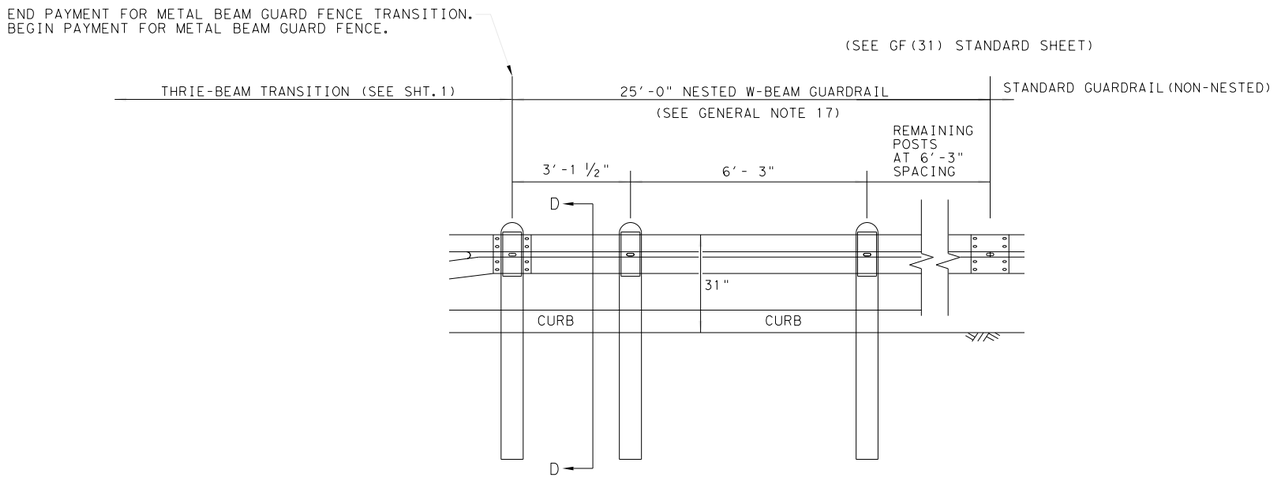
GF(31)TR TL3-20

FILE: gf31tr-tl320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0275	04	061, ETC.		IH 40, ETC.	
	DIST	COUNTY			SHEET NO.	
	AMA	CARSON, ETC.			39	

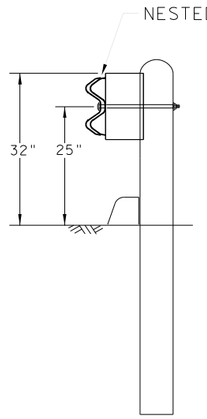
DATE: 7/6/2023
FILE: GF(31)TR TL3-20.dgn

DATE: 7/6/2023
FILE: GF(31)TR TL3-20.dgn

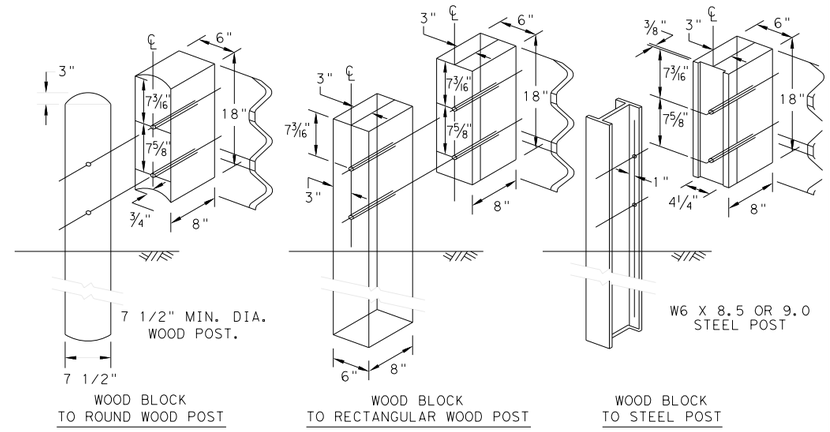
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
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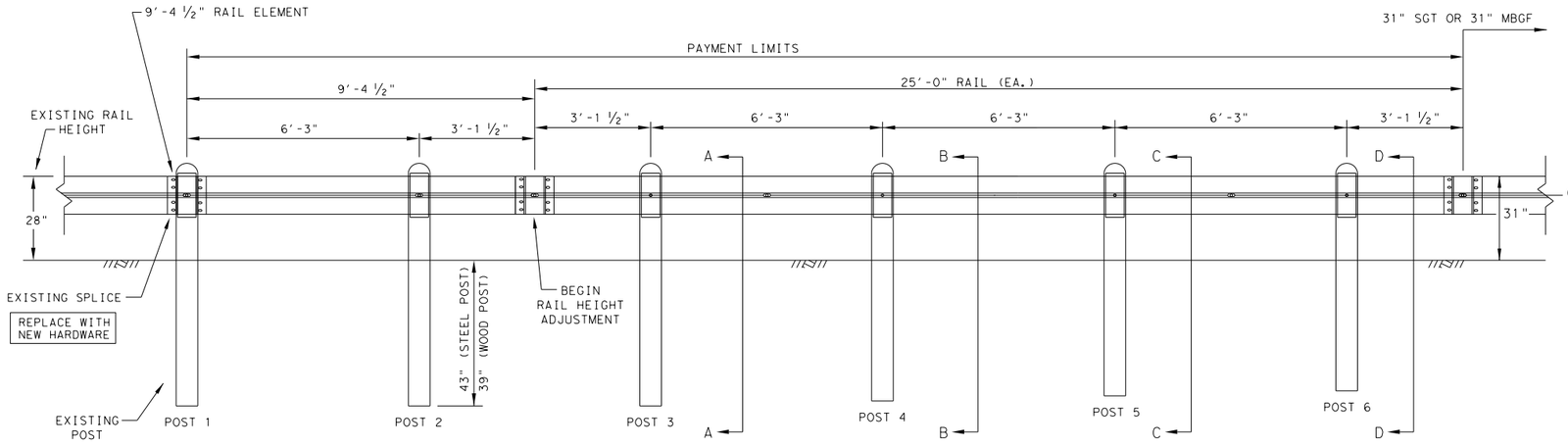
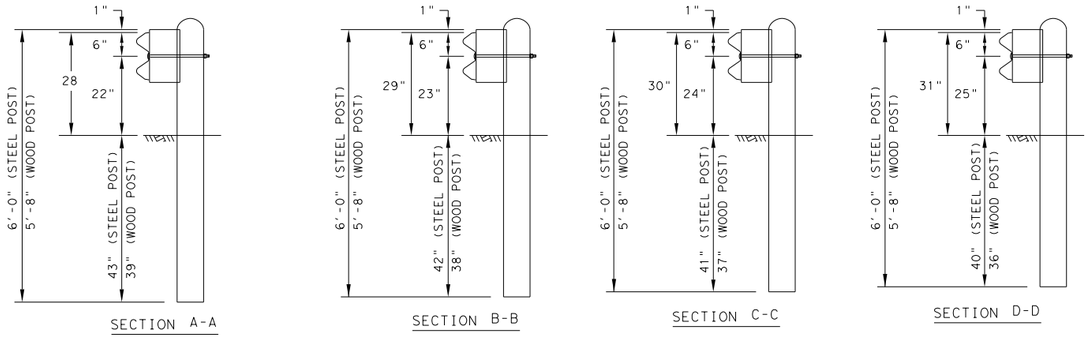
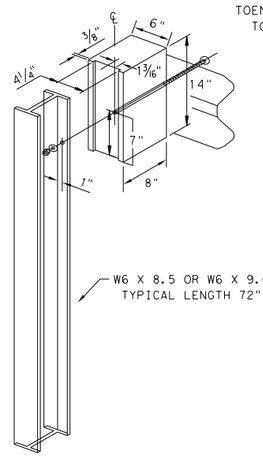


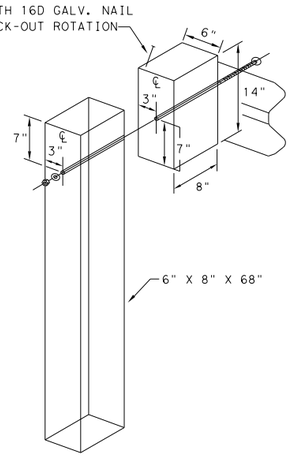
ELEVATION VIEW

✳ "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

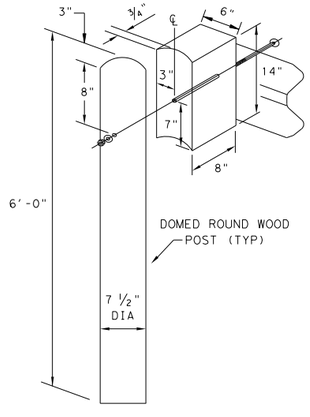




ROUTED WOOD BLOCK-OUT TO STEEL POST



WOOD BLOCK TO RECTANGULAR WOOD POST



WOOD BLOCK-OUT TO DOMED ROUND WOOD POST

POST AND BLOCK-OUT TYPES AVAILABLE

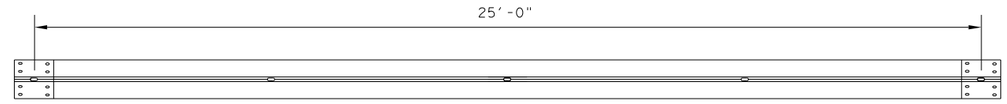
HARDWARE LIST	
QTY	DESCRIPTION
1	9′-4 ½" W-BEAM RAIL ELEMENT 12GA.
1	25′-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
6	7 ½" DIA X 6′-0" DOMED ROUND WOOD POSTS (TYP)
6	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
6	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
6	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
FOR WOOD POST 6	⅝" X 18" GUARDRAIL BOLTS WITH NUTS (FBB04)
6	⅝" ROUND WASHERS (ASTM F436)(FWC16a)
FOR STEEL POST 6	⅝" X 10" GUARDRAIL BOLTS WITH NUTS (FBB03)
24	⅝" X 1- ¼" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.

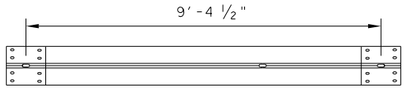
GUARDRAIL POST BOLTS (ASTM A307 GR.A)
GUARDRAIL ROUND WASHERS (ASTM F436)
GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
GUARDRAIL SPLICE BOLTS (ASTM A307 GR.A)
GUARDRAIL SPLICE NUTS (ASTM A563)

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 AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25′- 0", OR 12′- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3′- 1 ½" C-C OR 6′-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND ⅝" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE ⅝" X 1- ¼" WITH ⅝" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
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. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. 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.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.



25′-0" (NOM.) W-BEAM RAIL ELEMENT



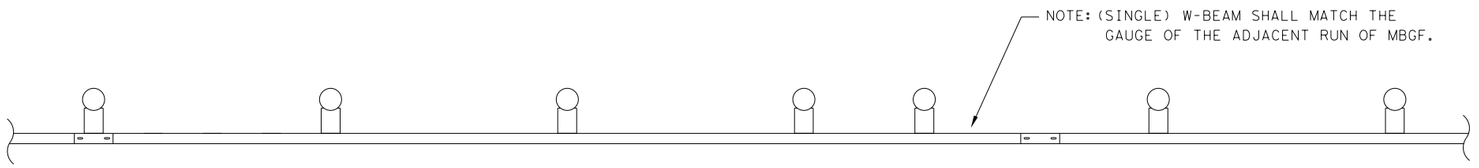
9′-4 ½" (NOM.) W-BEAM RAIL ELEMENT

Texas Department of Transportation — Design Division Standard

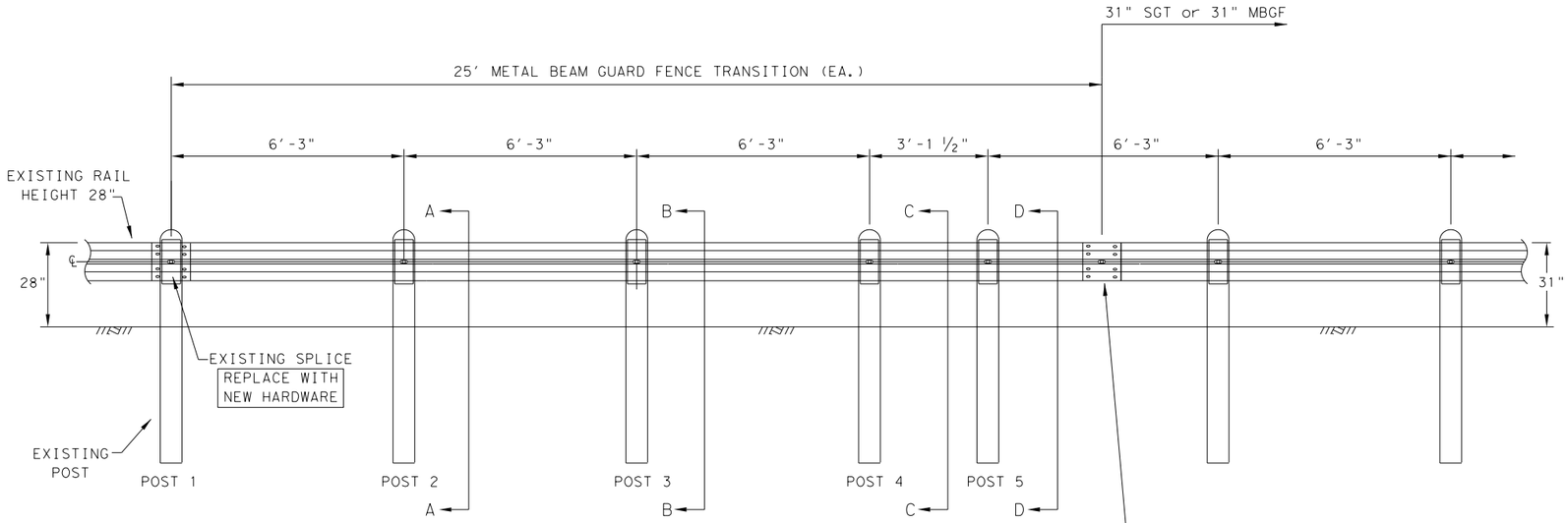
METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT

RAIL-ADJ(A)-19

FILE: railadja19	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0275	04	061, ETC.	IH 40, ETC.	
	DIST	COUNTY		SHEET NO.	
	AMA	CARSON, ETC.		41	

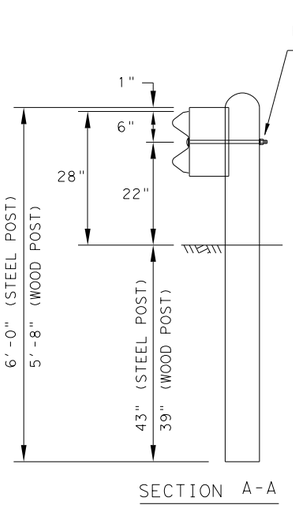


PLAN VIEW

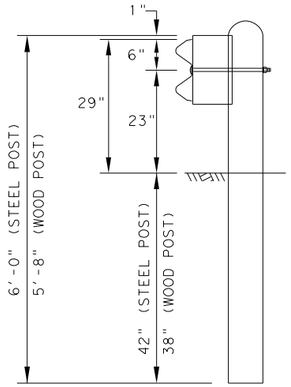


ELEVATION VIEW

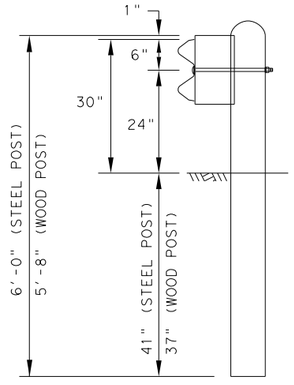
* "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



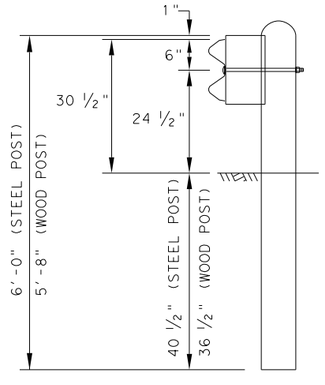
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

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 AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT 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 TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 5/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 5/8" X 1- 1/4" WITH 5/8" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
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. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. 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.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.

HARDWARE LIST	
QTY	DESCRIPTION
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
5	7 1/2" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
5	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
5	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
5	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
5	5/8" X 18" GUARDRAIL BOLTS AND NUTS (FBB04)
5	5/8" ROUND WASHERS (ASTM F436)(FWC16a)
5	5/8" X 10" GUARDRAIL BOLTS AND NUTS (FBB03)
16	5/8" X 1- 1/4" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

POST AND BLOCK-OUT TYPES AVAILABLE

FOR WOOD POST

FOR STEEL POST

NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.

GUARDRAIL POST BOLTS (ASTM A307 GR.A)
GUARDRAIL ROUND WASHERS (ASTM F436)
GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
GUARDRAIL SPLICE BOLTS (ASTM A307 GR.A)
GUARDRAIL SPLICE NUTS (ASTM A563)

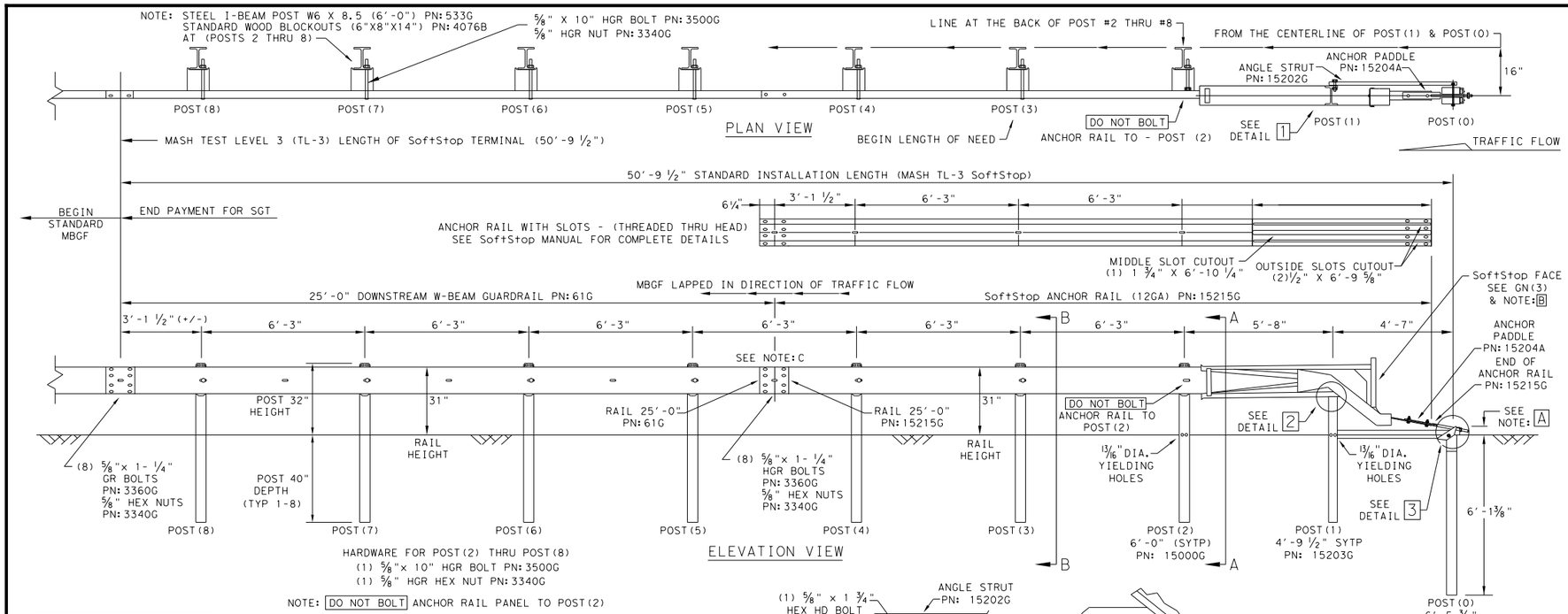
Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT RAIL-ADJ(B)-19

FILE: railadjb19	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		42

DATE: 7/6/2023
FILE: RAIL-ADJ(B)-19.dgn



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 7/8")
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.

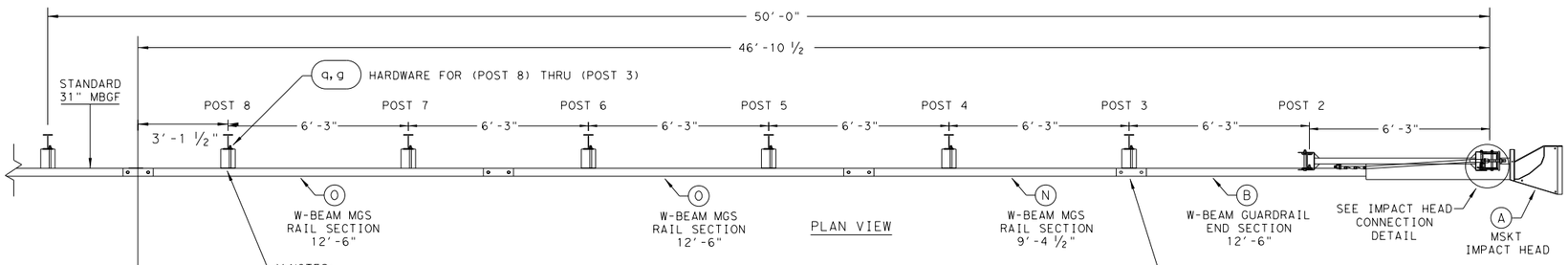
Texas Department of Transportation

Design Division Standard

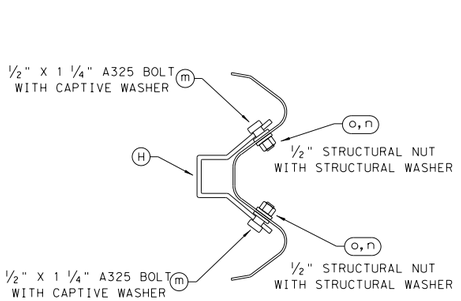
TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP		
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0275	04	061, ETC.	IH 40, ETC.		
	DIST	COUNTY		SHEET NO.		
	AMA	CARSON, ETC.		43		

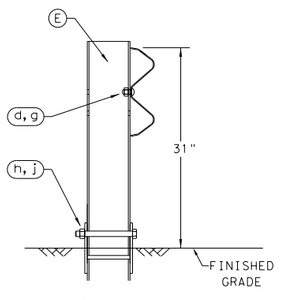
DATE: 7/6/2023
FILE: SGT(10S)31-16.dgn



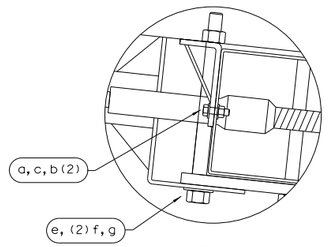
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



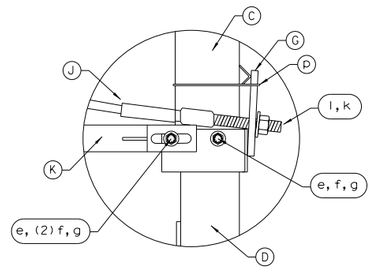
SECTION B-B
ANCHOR BRACKET



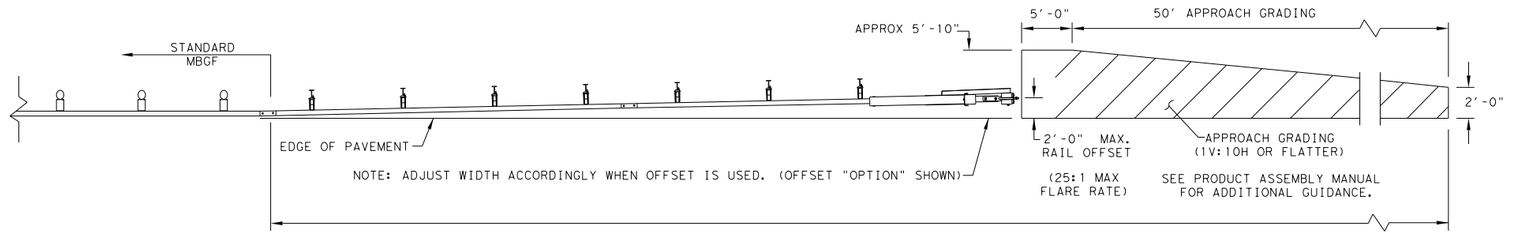
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



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.

SEE NOTES: ✳

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

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

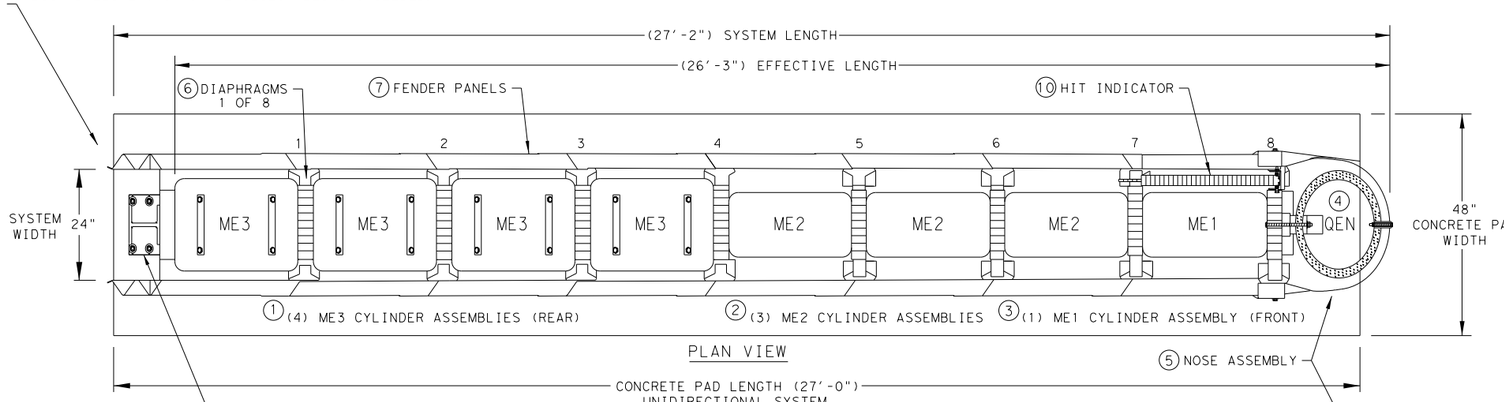
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		44

DATE: 7/6/2023
FILE: SGT(12S)31-18.dgn

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

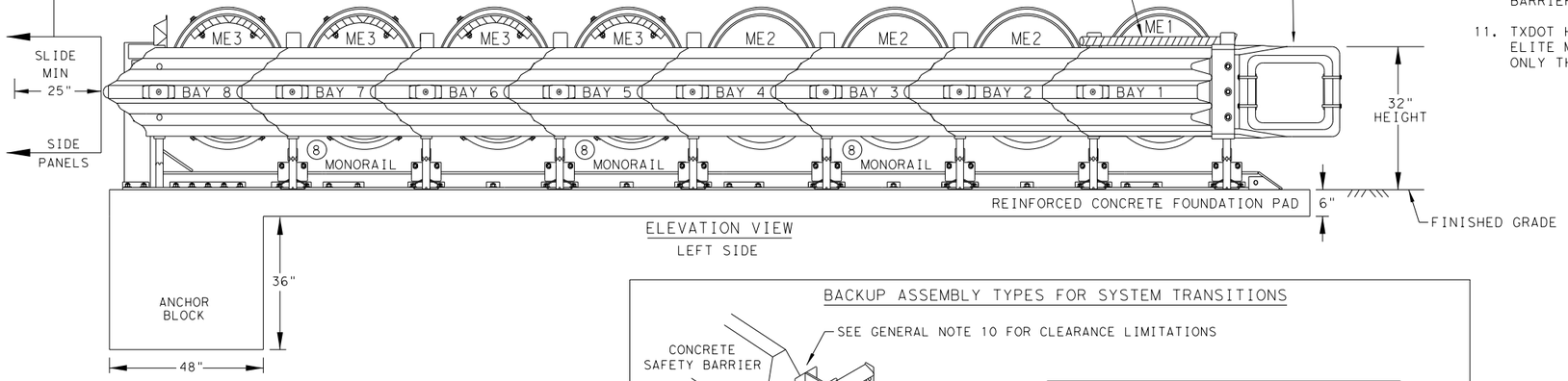
9 SHOWN WITH TENSION STRUT BACKUP ASSEMBLY

4 QEN CYLINDER INSTALLED INSIDE OF NOSE BELT ASSEMBLY 5

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

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

NOTE:
HIT INDICATOR WILL RAISE UPON IMPACT.



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.

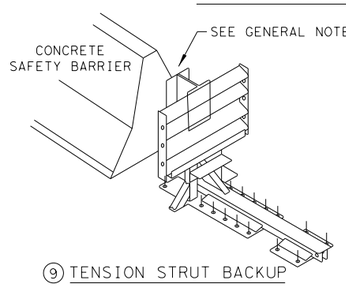
8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

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

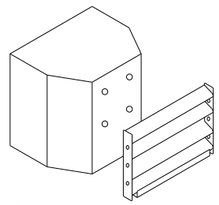


9 TENSION STRUT BACKUP

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

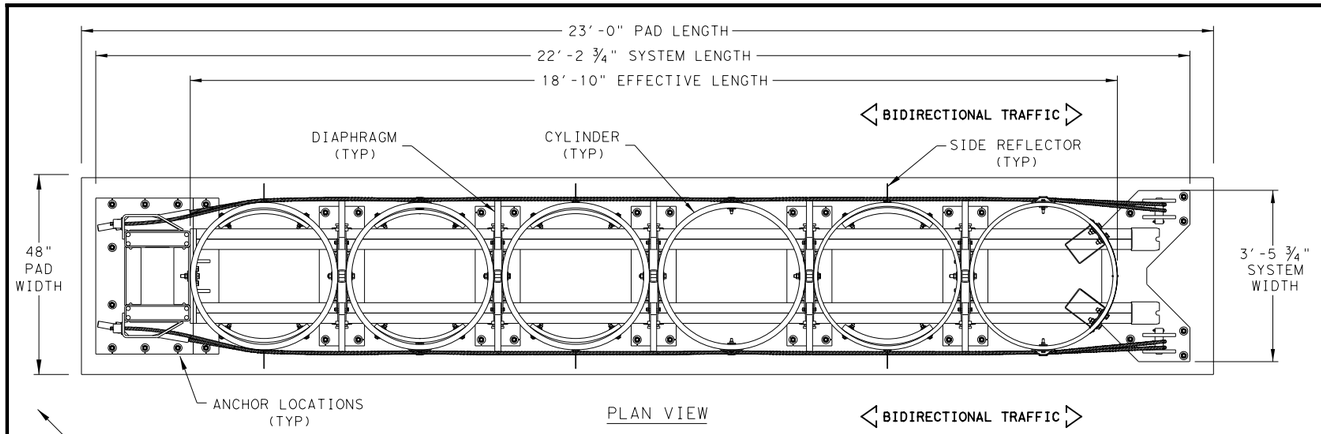
Texas Department of Transportation — Design Division Standard

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

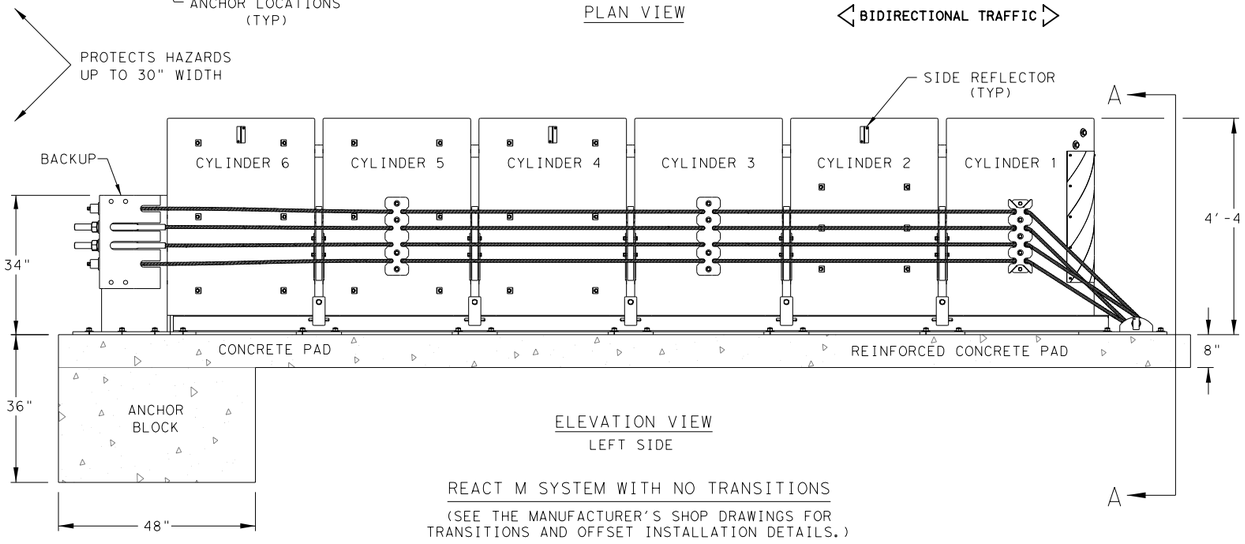
QGELITE(M10)(N)-20

FILE: qgelitem10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		45

DATE: 7/6/2023
FILE: QGELITE(M10)(N)-20.dgn



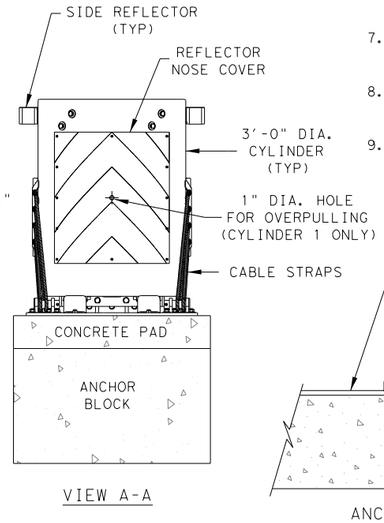
PLAN VIEW



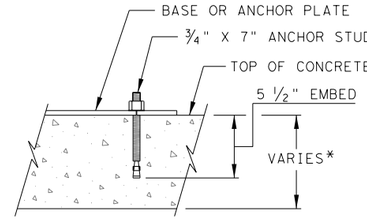
ELEVATION VIEW
LEFT SIDE

REACT M SYSTEM WITH NO TRANSITIONS

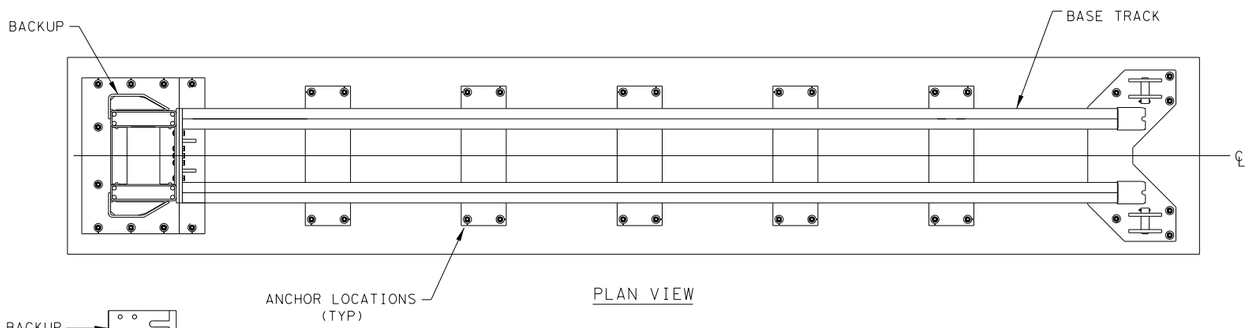
(SEE THE MANUFACTURER'S SHOP DRAWINGS FOR TRANSITIONS AND OFFSET INSTALLATION DETAILS.)



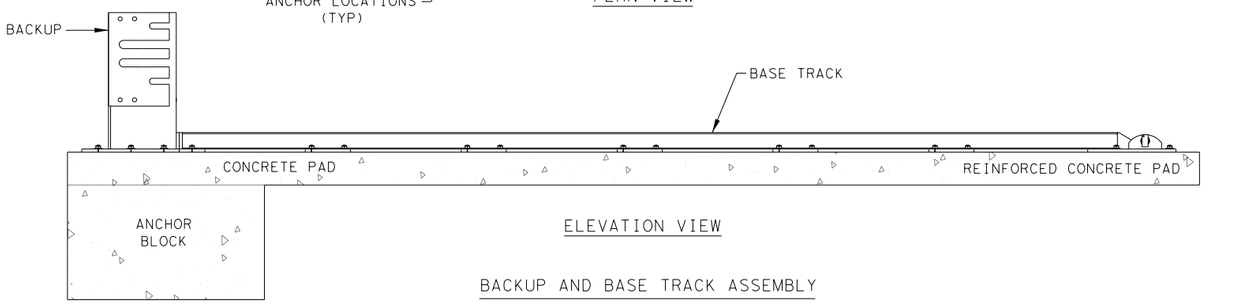
VIEW A-A



ANCHORING DETAIL
*SEE FOUNDATION TYPES TABLE



PLAN VIEW



ELEVATION VIEW

BACKUP AND BASE TRACK ASSEMBLY

(SEE THE MANUFACTURER'S SHOP DRAWINGS FOR TRANSITIONS, OFFSETS, BIDIRECTIONAL AND UNIDIRECTIONAL INSTALLATION DETAILS.)

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY - ENERGY ABSORPTION AT 1(888)323-6374 OR WEBSITE: www.trinityhighway.com.
2. THE NOSE OF THE REACT M SHALL BE CLAD WITH A PLASTIC WRAP WITH STANDARD DELINEATION ADHERED TO THE WRAP AND SHALL HAVE A SERIES OF SIDE MARKER REFLECTORS ON BOTH SIDES OF THE UNIT. SEE SITE PLAN VIEWS FOR MARKER AND PLASTIC WRAP COLOR ORIENTATION.
3. FOR BI-DIRECTIONAL TRAFFIC, APPROPRIATE TRANSITION DETAILS WILL BE AS SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS.
4. DETAILS OF COMPONENTS FOR THE REACT M, BACKUPS AND REINFORCING DETAILS WILL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS FURNISHED TO THE ENGINEER.
5. IF THE CROSS-SLOPE VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
6. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
7. THE REACT M SYSTEM SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTERLINE OF MERGING BARRIERS.
8. ALL STEEL COMPONENTS TO BE HOT DIPPED GALVANIZED EXCEPT STAKES, DRIVE SPIKES, THREADED BOLTS IN BACKUP UNIT, AND WEDGE FITTINGS ON CABLES.
9. THIS DRAWING REPRESENTS THE REACT M TL-3 SYSTEM, RE-DIRECTIVE, NON-GATING CRASH CUSHION THAT CAN PROTECT HAZARDS UP TO 30-INCHES IN WIDTH.

DESIGN DATA TABLE FOR REACT M

TEST NUMBER	TEST LEVEL	OVERALL LENGTH	TRANSITION LENGTH	SYSTEM WIDTH
3-30 TO 3-36	TL-3	22′-2 ¾"	-	3′-5 ¾"
3-37A	TL-3	22′-2 ¾"	9′-10 ¾"	3′-5 ¾"
3-38	TL-3	22′-2 ¾"	-	3′-5 ¾"

ANCHOR SYSTEM TYPE

APPROVED ADHESIVE, 7" STUDS, 5.5" EMBEDMENT

FOUNDATION TYPES

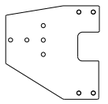
MINIMUM 8" REINFORCED PORTLAND CEMENT CONCRETE PAD (REQUIRED REINFORCING STEEL FOR CONCRETE PAD SHALL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS.

MINIMUM 8" NON-REINFORCED PORTLAND CEMENT CONCRETE ROADWAY MEASURING AT LEAST 12′ WIDE BY 50′ LONG)

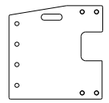
MINIMUM 7" CONCRETE DECK STRUCTURE, OR MINIMUM 6" REINFORCED CONCRETE ROADWAY

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

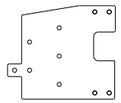
BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS



SAFETY SHAPE BARRIER TRANSITION (ADAPTER)
TRANSITION PLATE(S)(OPTIONAL) REQUIRED W/BI-DIRECTIONAL TRAFFIC FLOWS ONLY.



VERTICAL WALL BARRIER TRANSITION (ADAPTER)
TRANSITION PLATE(S)(OPTIONAL) REQUIRED W/UNIDIRECTIONAL TRAFFIC FLOWS ONLY.



VERTICAL WALL BARRIER TRANSITION (ADAPTER)
TRANSITION PLATE(S)(OPTIONAL) REQUIRED W/BI-DIRECTIONAL TRAFFIC FLOWS ONLY.

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.

LOW MAINTENANCE

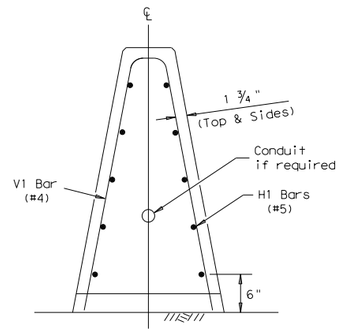
Texas Department of Transportation — Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION CRASH CUSHION REACT M (NARROW) (MASH TL-3)

REACT(M)-21

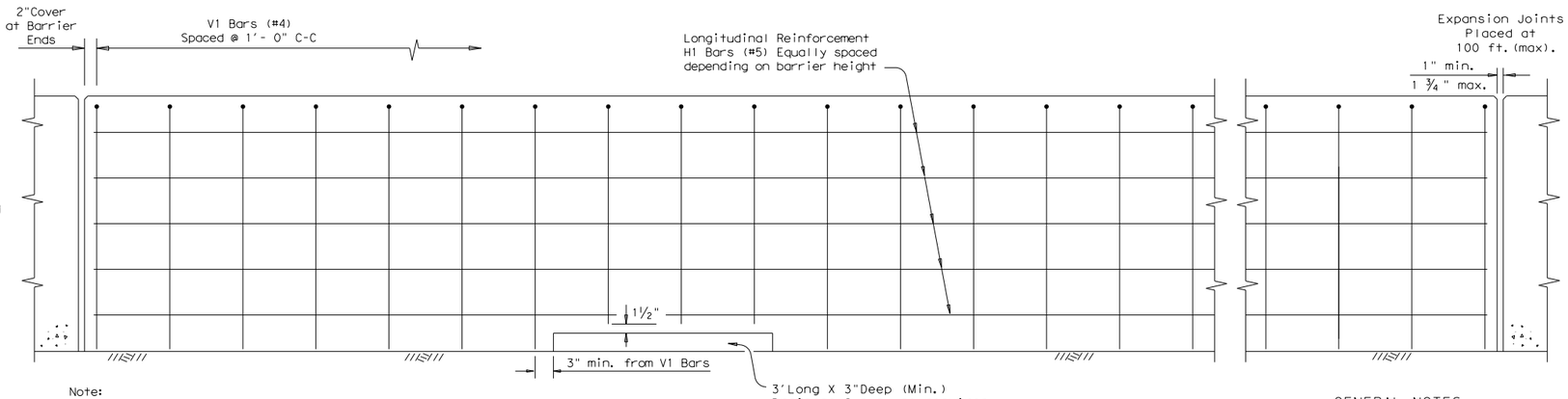
FILE: reactm21.dgn	DN: TXDOT	CK: KM	DW: SS	CK: CL
©TxDOT: JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		46

DATE: 7/6/2023
FILE: $FILE$



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.

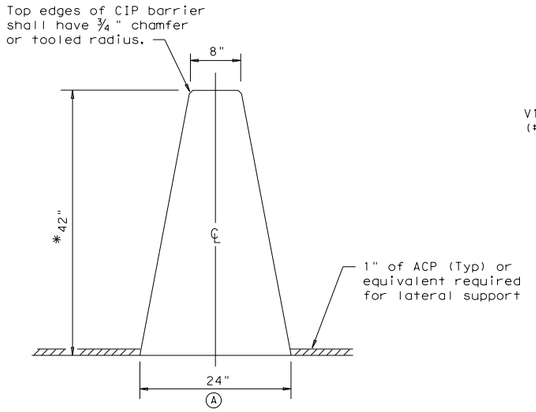
Reinforcement around the drainage slots may be cut or bent to accommodate the edge and top clearances.

ELEVATION VIEW

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

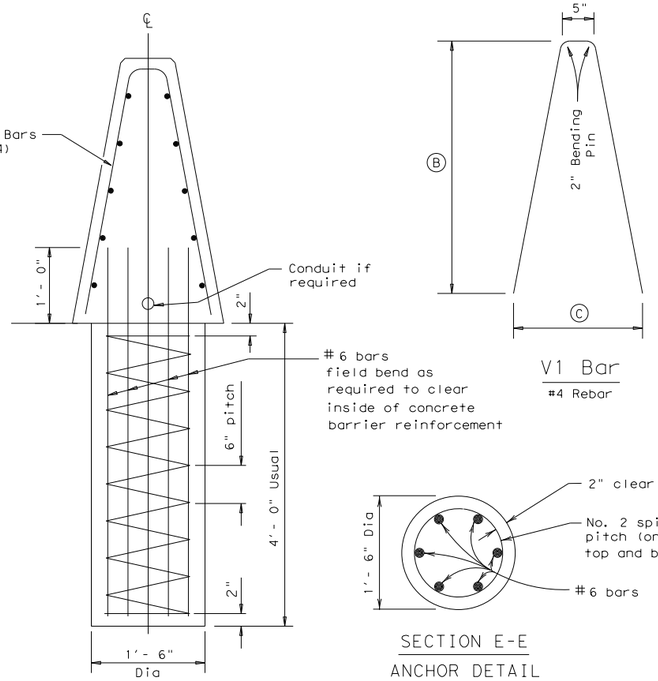
GENERAL NOTES

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

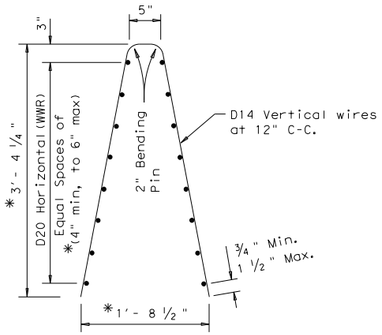
#4 Rebar

BARRIER HEIGHT (IN.)	* DIMENSIONS (IN.)		
	Ⓐ	Ⓑ	Ⓒ
42	24	40 ¼	20 ½
48	26 ¼	46 ¼	22 ¾
54	28 ½	52 ¼	25 ⅛

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

SECTION E-E

ANCHOR DETAIL



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

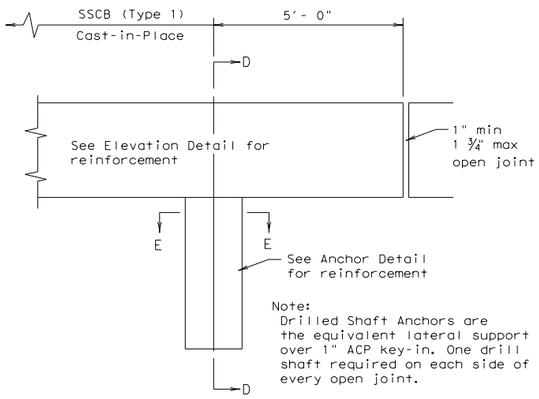
(WWR) General Notes

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. Welded wire splice 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".

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

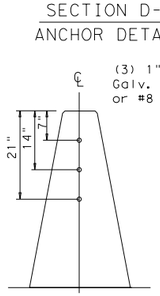
Cast-in-Place barrier may be connected to precast SSCB. Joint connection "Types" may be used in Cast-in-Place barrier, to match the precast barrier connection. (See required connection "Type" elsewhere in the plans)

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



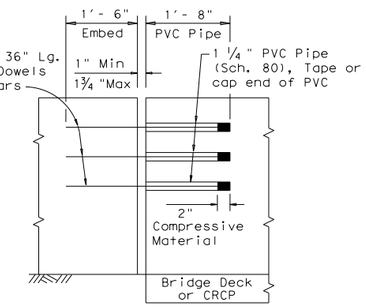
ELEVATION

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.

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	0275	04	061,ETC.	IH 40,ETC.
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	AMA	CARSON,ETC.		47

DATE: 7/6/2023
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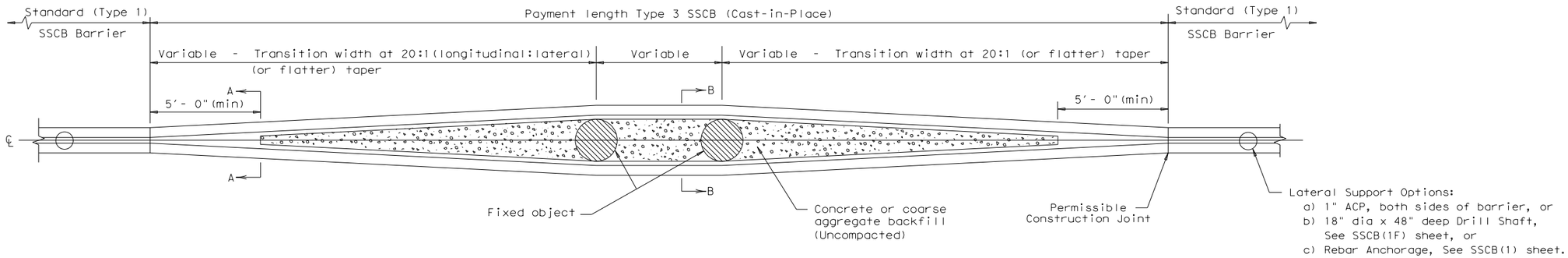
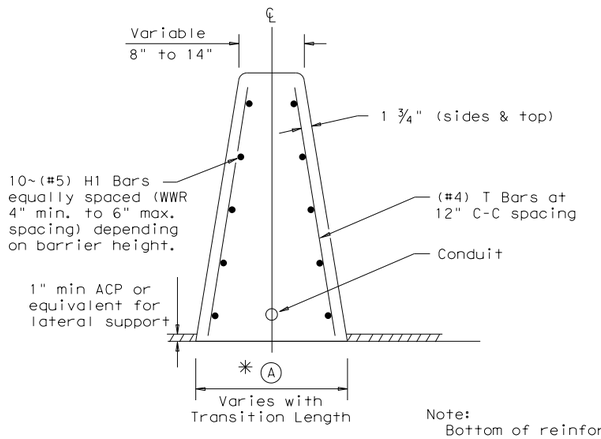
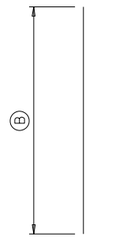


PLAN (TYPE 3) BARRIER

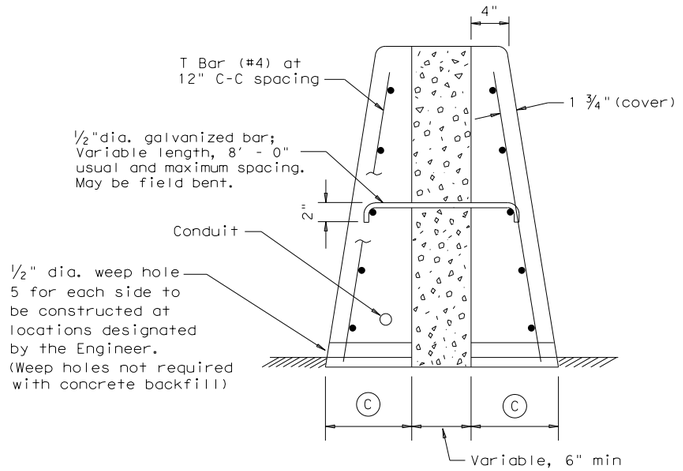


SECTION A-A



T BAR (#4)

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



SECTION B-B

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.

Barrier height (IN.)	✳ Dimensions (IN.)		
	Ⓐ	Ⓑ	Ⓒ
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".

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	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		48

DATE: 7/6/2023
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DATE: 7/6/2023 11:02:35 PM
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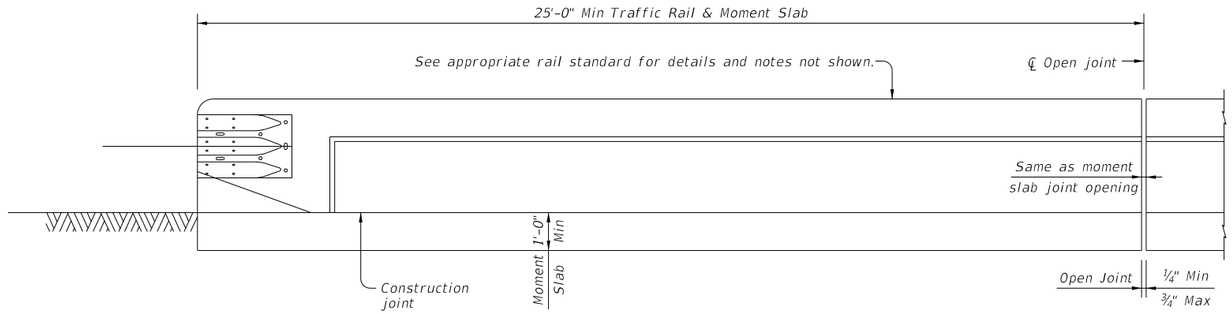
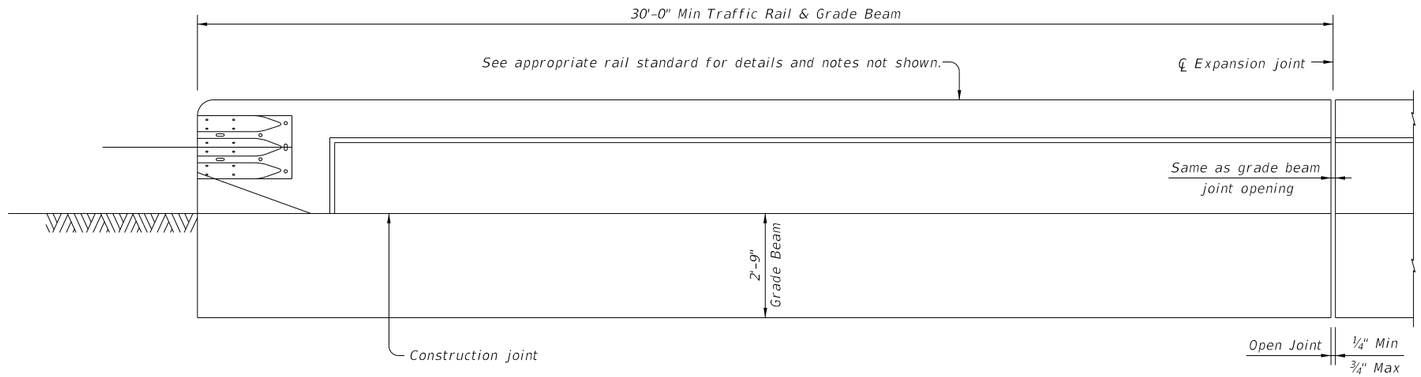


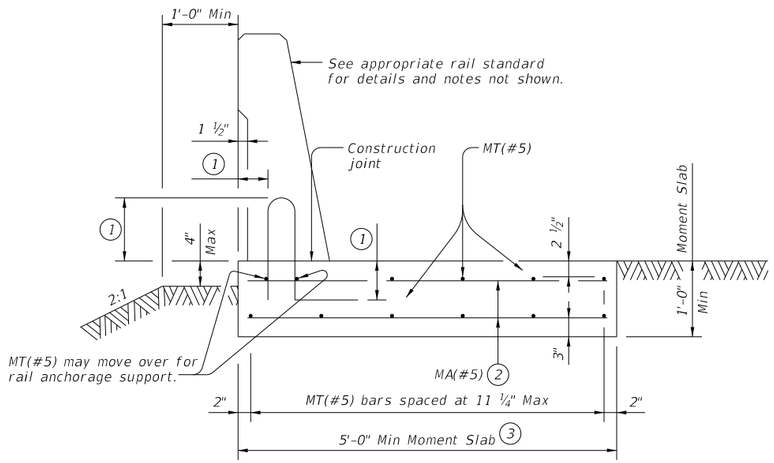
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



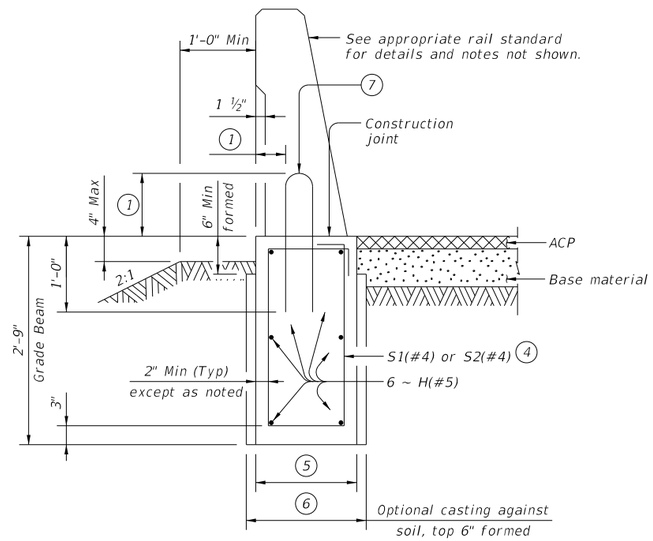
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



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

(Showing SSTR rail other rails are similar.)

(1) See applicable bridge rail standard.

(2) MA(#5) space longitudinally along moment slab at 12" Max.
(Spaced 2 ½" longitudinally from outside edge of moment slab).

(3) Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.

(4) S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max.
(Spaced 2 ½" longitudinally from outside edge of grade beam).

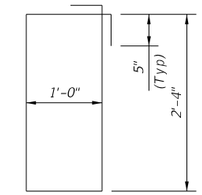
(5) Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66.
Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.

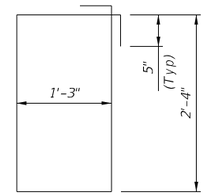
(6) 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

1'-9" bridge rail types: T66 and C66.

(7) Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

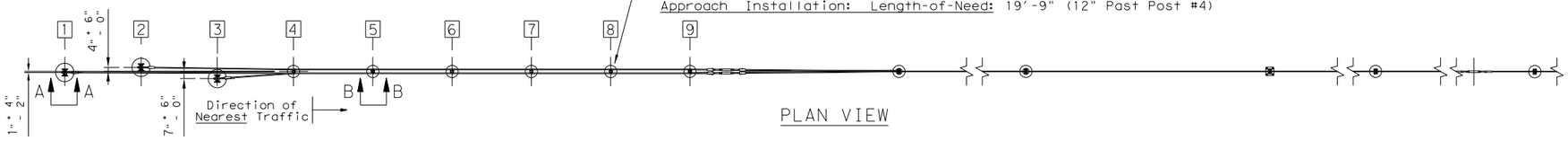
TRAFFIC RAIL FOUNDATIONS
FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

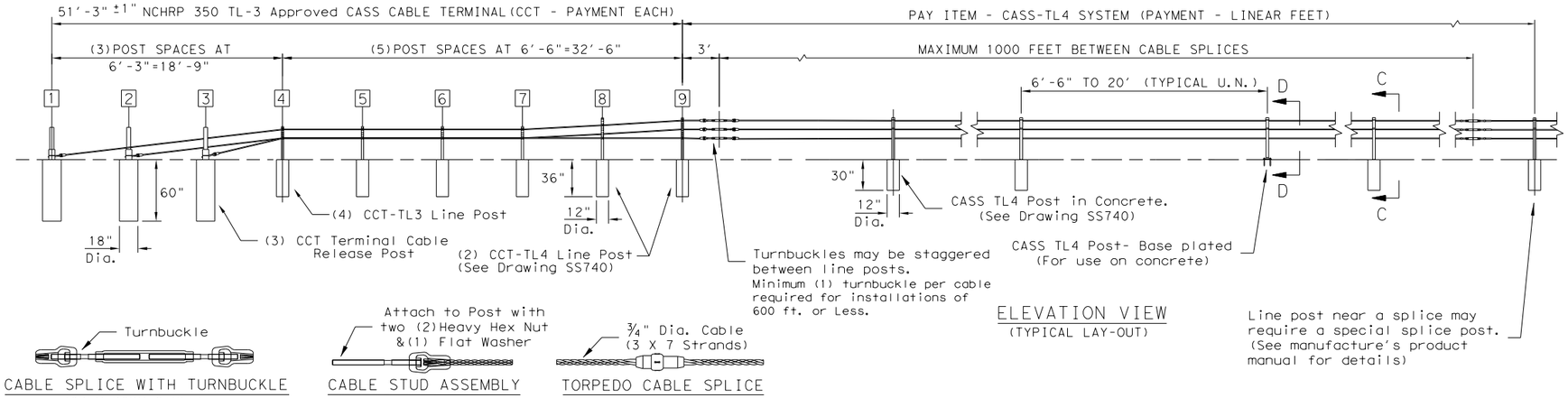
FILE:	rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0275	04	061, ETC.	IH 40, ETC.
07-20: Added moment slab with rail foundation lengths.		DIST	COUNTY		SHEET NO.
		AMA	CARSON, ETC.		49

Preferred Installation: Locate post #2 away from nearest traffic.
System has been succesfully tested with opposite installation.

Length-of-Need Cass Cable Terminal (CCT):
Departure Installation: Length-of-Need: 44'-9" (At Post #8)
Approach Installation: Length-of-Need: 19'-9" (12" Past Post #4)



PLAN VIEW



ELEVATION VIEW
(TYPICAL LAY-OUT)

CABLE SPLICE WITH TURNBUCKLE
(OPEN BODY STYLE)

CABLE STUD ASSEMBLY

TORPEDO CABLE SPLICE

GENERAL NOTES

1. This drawing is a general overview of CASS TL-4 Barrier System. See SS-740 (latest version) for specific details of CASS cable terminal (CCT) and cable safety system (CASS) requirements, proper installation, options and specification.
2. CASS is designed for bi-directional traffic flows and can be installed on either side of the median. Contact Trinity (800-527-6050) or consult the design, installation, or repair manual(s) for additional information.
3. All concrete for CASS footings shall be TxDOT class A. If class A or stronger concrete is utilized for the mowstrip, please see chart below for allowable footing depth and sleeve deviations.
4. All posts shall be socketed unless otherwise specified. All cables shall be pre-stretched unless otherwise specified.
5. For payment see Special Specification "Cable Barrier System".
6. CASS-TL4 shall be installed on shoulders or medians with slopes of 6:1 or flatter without obstructions, depressions, etc. That may significantly affect the stability of an errant vehicle. Grading of site and/or appropriate fill materials may be required. The designer/installer shall "Flatten" or "Round" various topographical inconsistencies that could interfere with the ability of the installer to consistently maintain the design height (in relation to the terrain) of the cables. Please consult manual(s) and / or TxDOT Memo(s) for installations in "Ditch Sections".
7. CASS TL-4 post spacing may be modified to avoid obstacles that conflict with the installation of cass-tl4 line posts or to reduce deflection on radiuses. No post space can exceed the maximum post TxDOT space limit of 20'. Reducing or increasing post spacing affects deflection. CASS TL-4 may be laterally transferred at a rate not to exceed 30:1.
8. Post foundations may be drilled through existing pavement. Please see line post foundation chart for minimum footing requirements in various applications.
9. For aesthetic purposes Trinity recommends all sleeves, driven posts, and lower cable release posts to be installed reasonably plumb (approximately 1/8" per foot).
10. CASS TL-4 shall be installed in well-drained, compacted, NCHRP Report 350 Standard soil. If soil does not meet this classification, if solid rock/concrete is encountered below grade or if soil is susceptable to severe freeze/thaw cycles, please contact Trinity about alternate footing design(s). Trinity suggests the use of "Mow strips" for erosion prevention and ease of maintenance / installation.
11. See the Texas MUTCD for proper "Barrier" Delineation.

MOW STRIP DETAIL*			CONCRETE FOOTING CHART		
MOW STRIP	DEPTH	WIDTH	FOOTING	TUBE SLEEVE	REBAR RING
NONE			30" Min.	27" Min.	YES
HMA	6" Min.	3' Min.	27" Min.	15" Min.	NO
HMA	8" Min.	3' Min.	24" Min.	15" Min.	NO
RC	3" Min.	3' Min.	24" Min.	15" Min.	NO

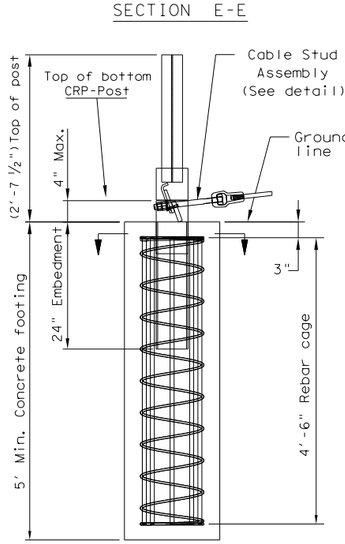
Chart does not apply to Terminal Posts 1 thru 9.
* Mow strip or pavement.
HMA = Hot Mix Asphalt (Not Recycled Asphalt Pavement).
RC = Reinforced Concrete (TxDOT Class A Minimum).

CABLE TENSION CHART	
FAHRENHEIT	PRE-STRETCHED
DEGREES	LB / FORCE
-10	7300
0	7000
10	6600
20	6300
30	6000
40	5600
50	5300
60	5000
70	4600
80	4300
90	4000
100	3600
110	3300
120	3000
130	2700
140	2500
150	2300

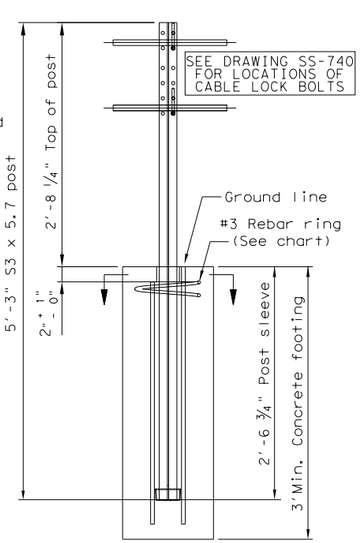
Allowable deviation from chart in tangent sections: +800, -200 pounds/force. Cable tension readings are typically higher in curved cable sections.

Trinity Highway Products, LLC.
2525 Stemmons Freeway
Dallas, TX 75207
Phone: (800) 644-7976

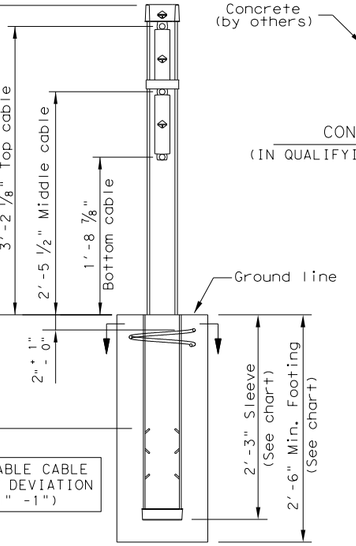
Product.INFO@TRIN.NET



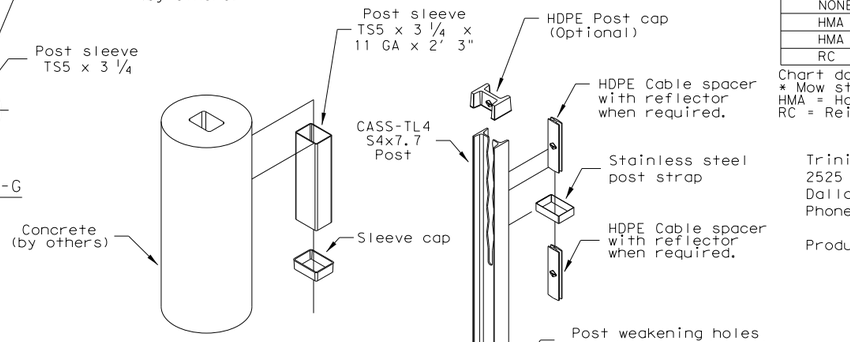
SECTION E-E



SECTION F-F



SECTION G-G

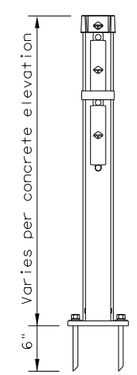


CONCRETE FOOTING
(IN QUALIFYING MOW STRIP SEE CHART)

VIEW A-A
(CABLE RELEASE POST 1-3)

VIEW B-B
(TERMINAL LINE POST 4-7)

SECTION C-C
(SOCKETED POST)



SECTION D-D
(BASE PLATED POST)

STANDARD POST & CONCRETE FOOTING
(SOCKETED POST)

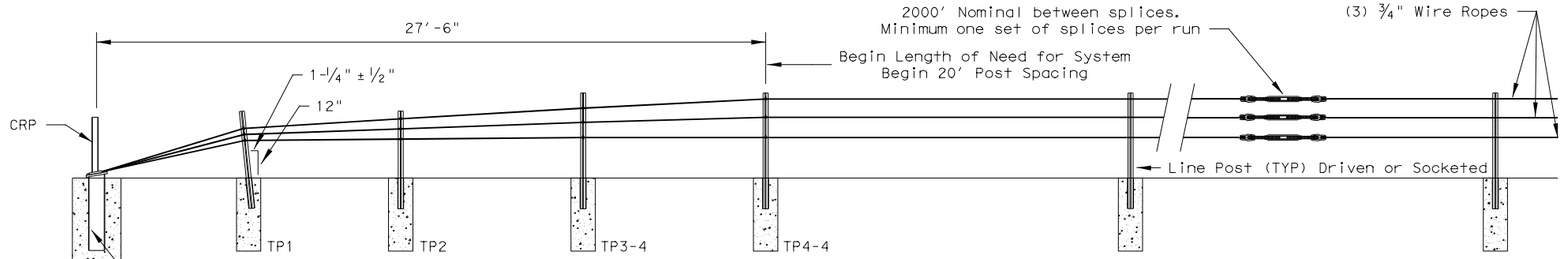
Texas Department of Transportation — Design Division Standard

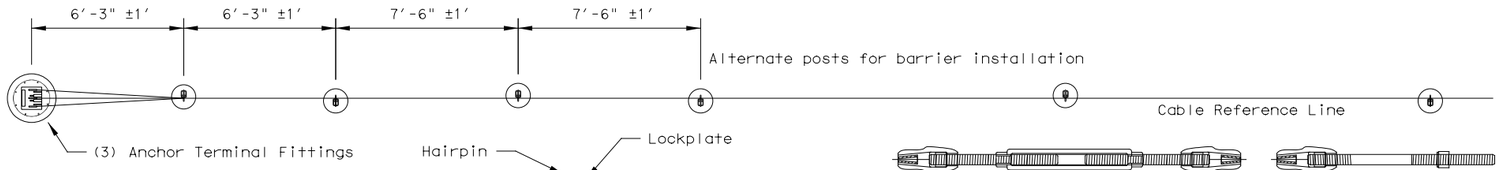
TRINITY CABLE SAFETY SYSTEM (TL-4)

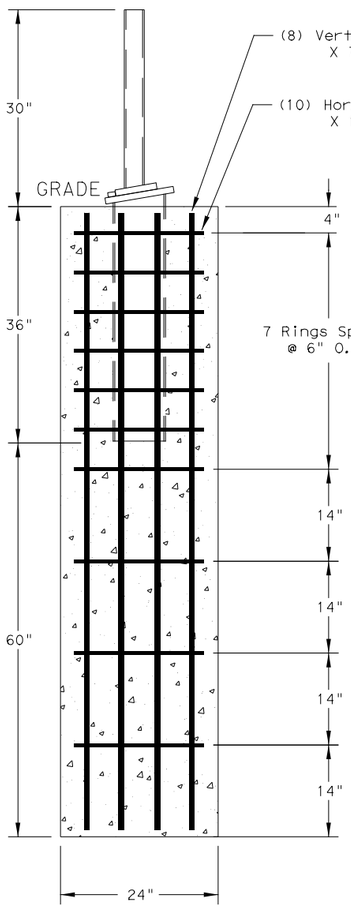
CASS(TL4)-14

FILE: casstl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:	
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0275	04	061, ETC.	IH 40, ETC.	
	DIST	COUNTY		SHEET NO.	
	AMA	CARSON, ETC.		50	

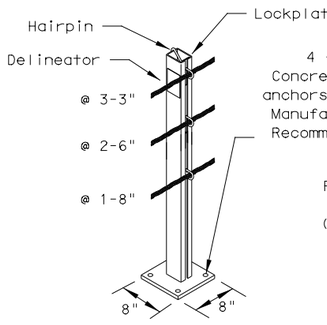
DATE: 7/6/2023
FILE: CASS(TL4)-14.dgn



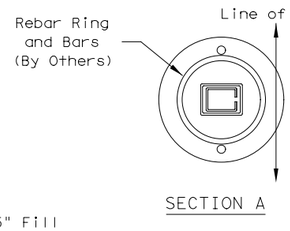




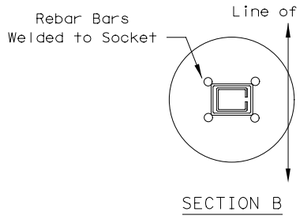
CABLE RELEASE AND ANCHOR POST



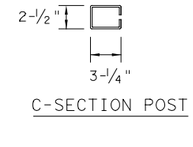
LINE POST
(BASE-PLATED OPTION)
Low-Fill Box Culvert Less than 15" Fill



SECTION A



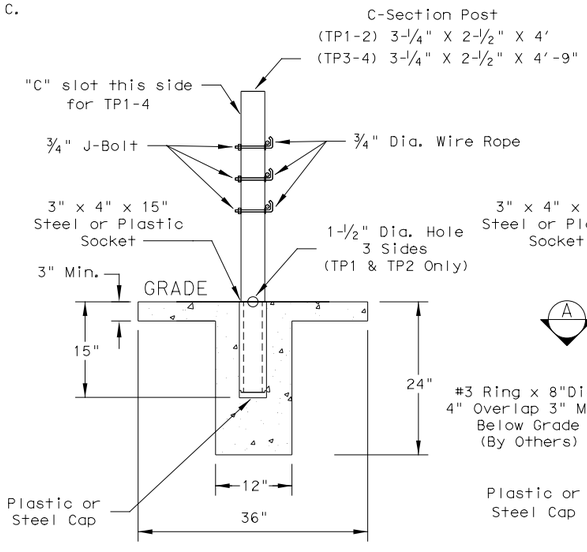
SECTION B



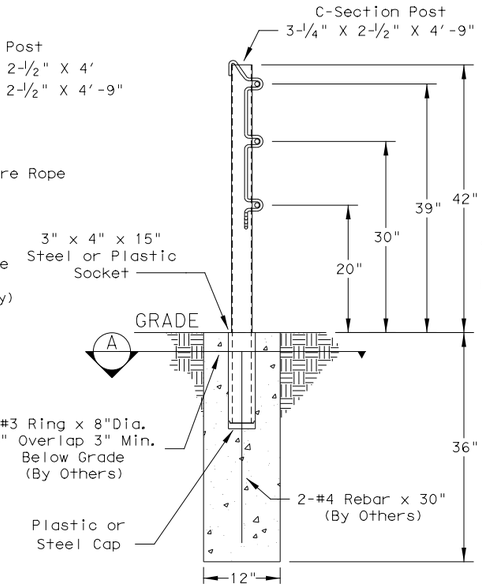
C-SECTION POST

GENERAL NOTES

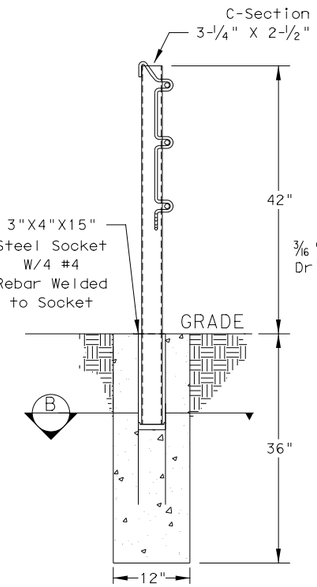
1. For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
2. All concrete shall be CLASS A.
3. The Cable Barrier System shall be installed on shoulders or on medians with slopes of 6:1 or flatter. If installed on slopes steeper than 6:1 up to 4:1 the TL-4 system performs as a TL-3 and Gibraltar must be contacted for various guidelines related to placement.
4. The Cable Barrier System is accepted by the FHWA Test Level - 4.
5. See the Texas MUTCD for proper "Barrier" delineation.
6. Rock Clause: Where solid rock is encountered:
   A. For socketed post, continue digging 12" diameter, 15" deep into rock or the required plan depth, whichever comes first.
   B. For driven post, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
   C. For Anchor post, continue digging 24" diameter, 30" deep into rock or the required plan depth, whichever comes first.
7. Tolerances:
   * LP = 3" out of plumb, at top
   * Cable height = 1"
   * Anchor Post = 5" off of Cable Reference Line
8. The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
9. All non-welded rebar by others.
10. Minimum recommended line post foundation.
    A. Without mowstrip, 36" Deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long
    B. With 4" minimum depth hot mix asphalt, 30" deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long.
    C. With 3" minimum depth concrete mowstrip, 24" deep x 12" diameter foundations. (No rebar required)
    D. Direct drive post 42" deep.



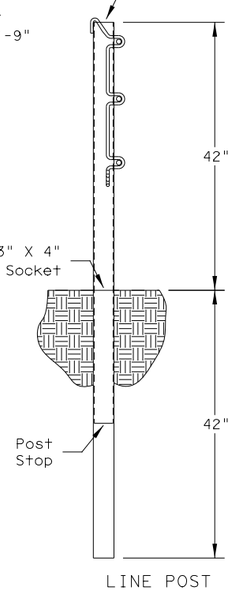
TERMINAL POST
(SHOWN WITH CONCRETE MOWSTRIP)
(Shown with Tube Plate Option)
(See Note 10)



LINE POST SOCKETED
(Shown with Rebar Ring/Bars Socket Option)
(See Note 9)



LINE POST SOCKETED
(Shown with Welded Rebar Socket Option)
(See Note 9)



LINE POST
(DRIVEN OPTION)
(Shown with Driven
Socket Option)
(See Note 9)

DEFLECTION	
Deflection	Post Spacing
8'-0"	20 FT
7'-0"	12 FT
6'-8"	10 FT

* Allowable Deviation from Chart +/- 10%

CABLE TENSION CHART*	
-10 °F	8000
0 °F	7600
10 °F	7200
20 °F	6800
30 °F	6400
40 °F	6000
50 °F	5600
60 °F	5200
70 °F	4800
80 °F	4400
90 °F	4000
100 °F	3600
110 °F	3200

Texas Department of Transportation — Design Division Standard

GIBRALTAR
CABLE BARRIER SYSTEM
(TL-4)

GBRLTR(TL4)-14

FILE: gbrltrtl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		51

DATE: 7/6/2023
FILE: GBRLTR(TL4)-14.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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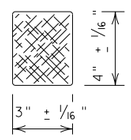
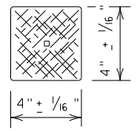
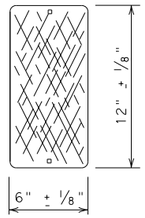
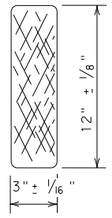
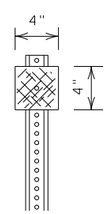
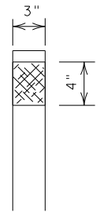
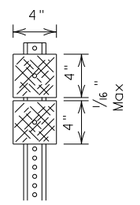
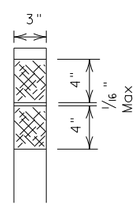
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
- S = Single
- D = Double

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

REFLECTOR UNIT SIZE
- 1 or 2

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

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

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

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

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

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

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

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

DIRECTION
If Required
- BI = Bi-Directional

OBJECT MARKERS

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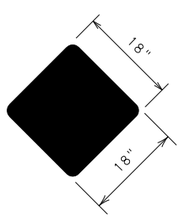
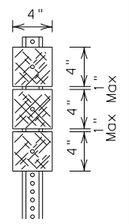
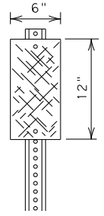
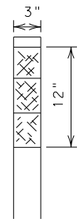
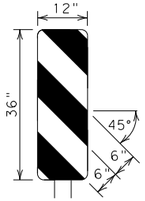
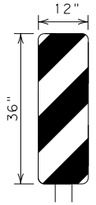
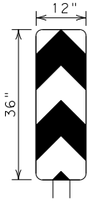
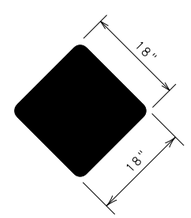
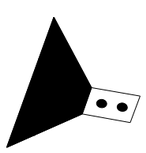
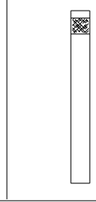
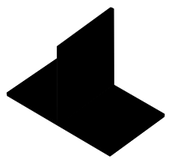
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL}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

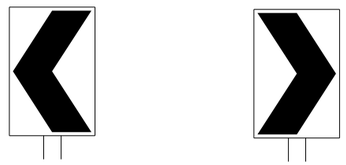
DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



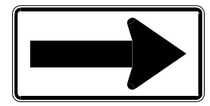
W1-8

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

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

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

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061,ETC.	IH 40,ETC.
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	CARSON,ETC.		52

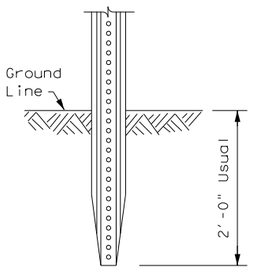
20A

DATE: 7/6/2023 11:04:46 PM
FILE: D&OM(1)-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

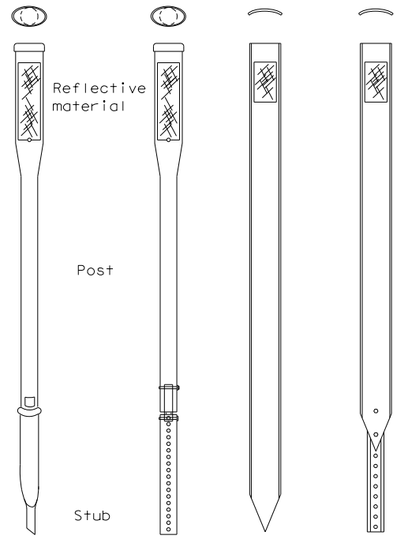


NOTES

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

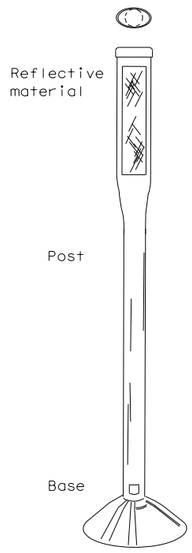
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



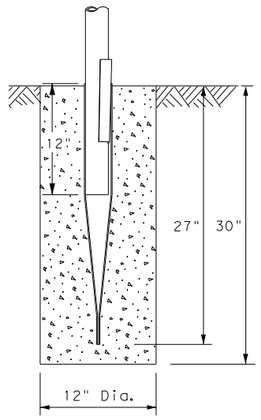
SURFACE MOUNT

NOTES

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

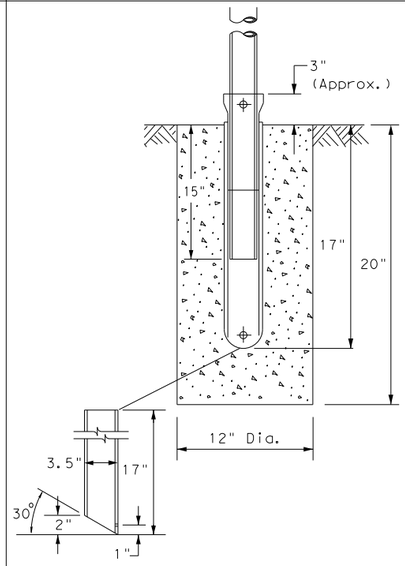
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

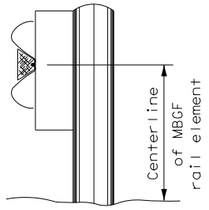
NOTE

1. Install per manufacturer's recommendations.

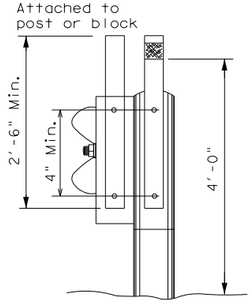
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

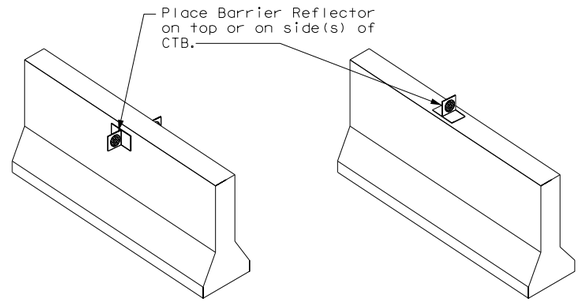
GF1



GF2



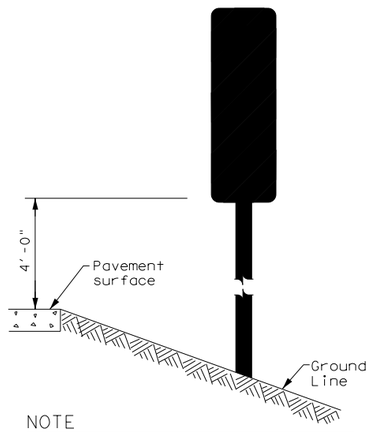
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

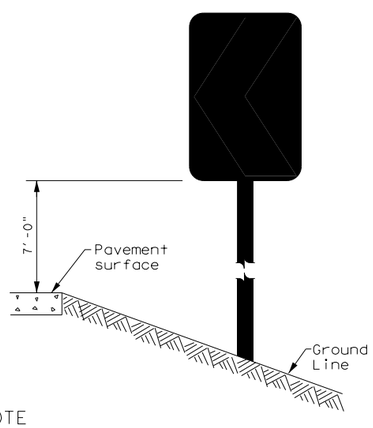
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

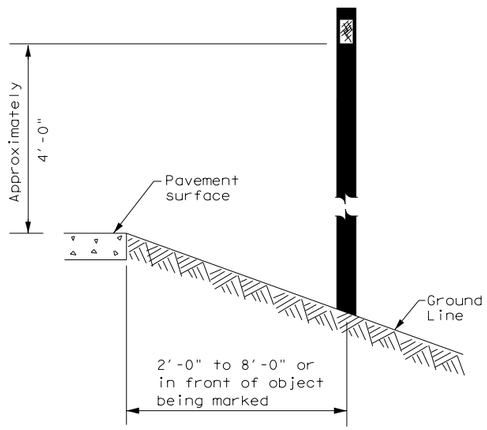
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	CARSON, ETC.		53

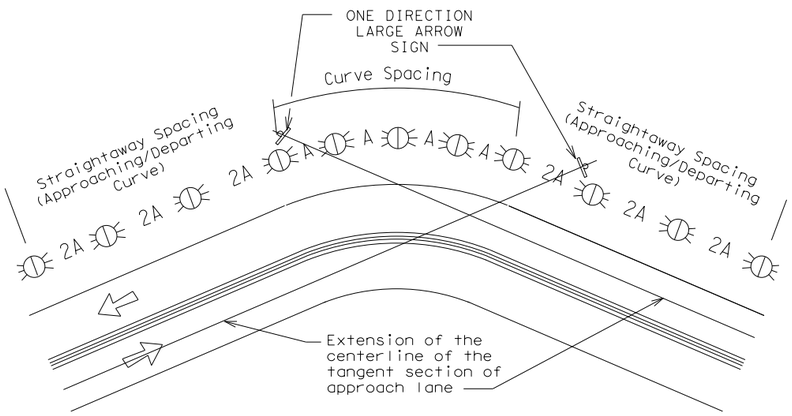
20B

DATE: 7/6/2023 11:05:37 PM
FILE: D&OM(2)-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

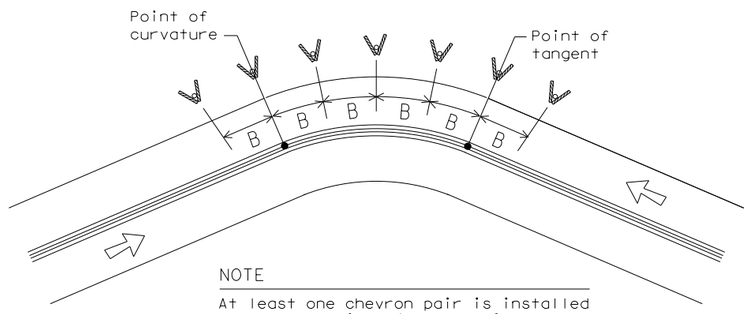
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

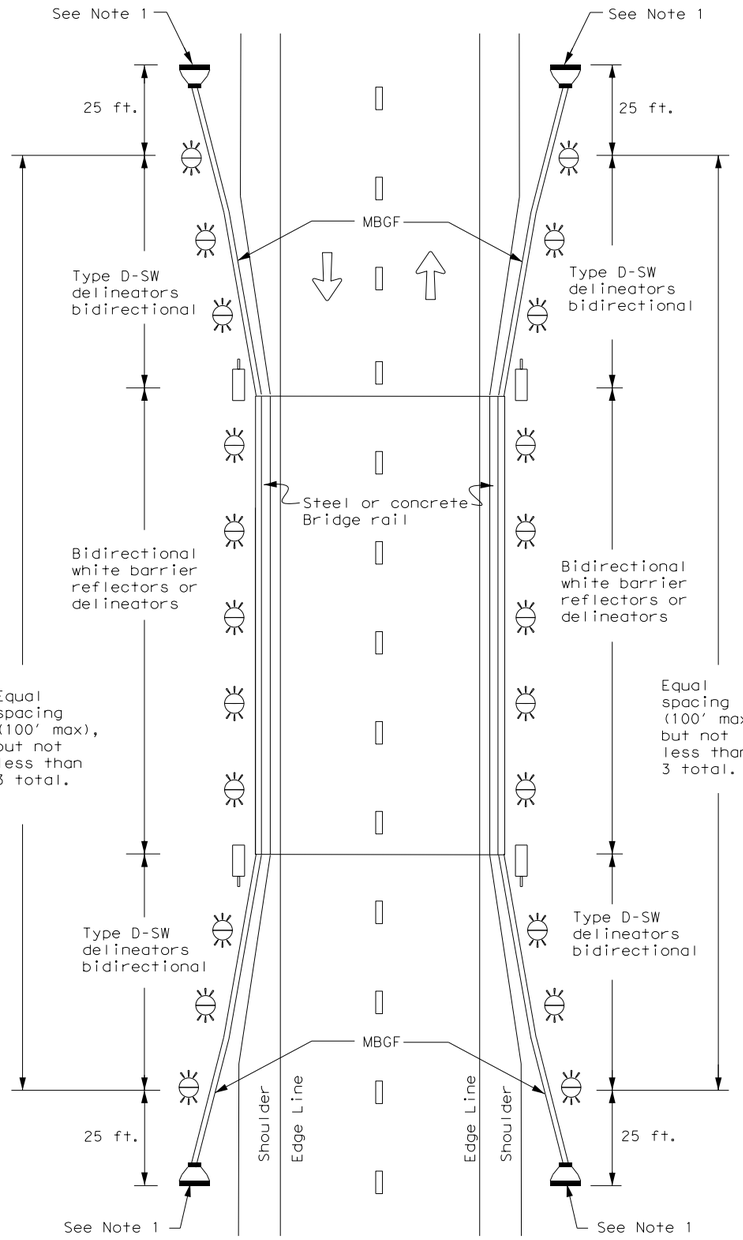
FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		54

20C

DATE: 7/6/2023 11:06:20 PM
FILE: D&OM(3)-20.dgn

DATE: 7/6/2023 11:07:06 PM
FILE: D&OM(5)-20.dgn

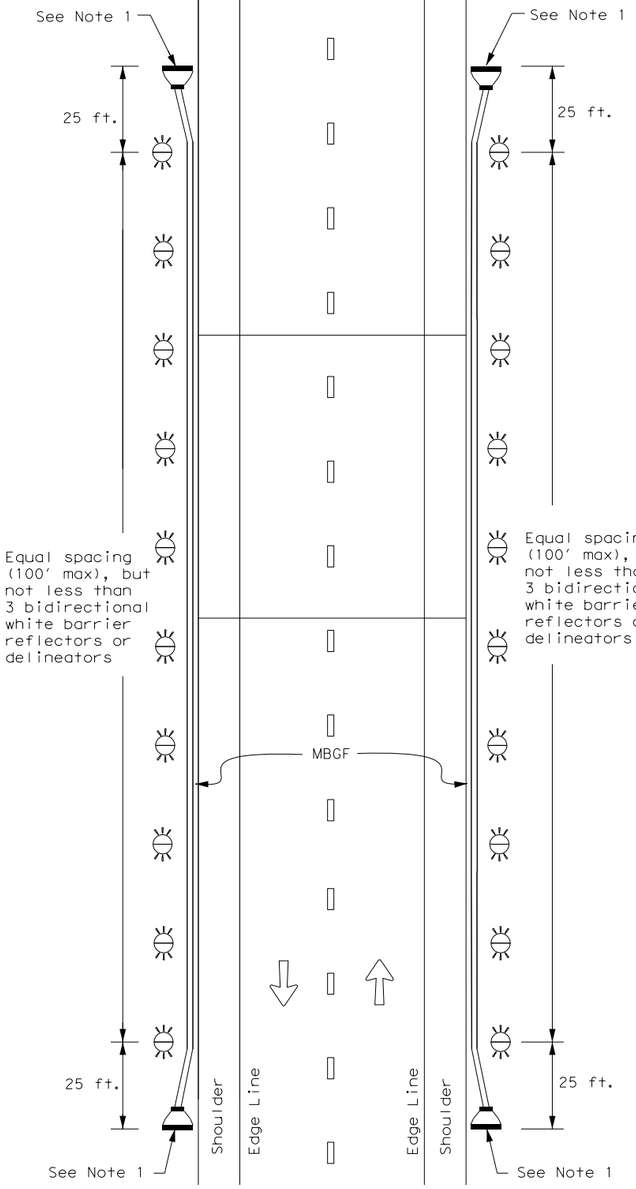
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

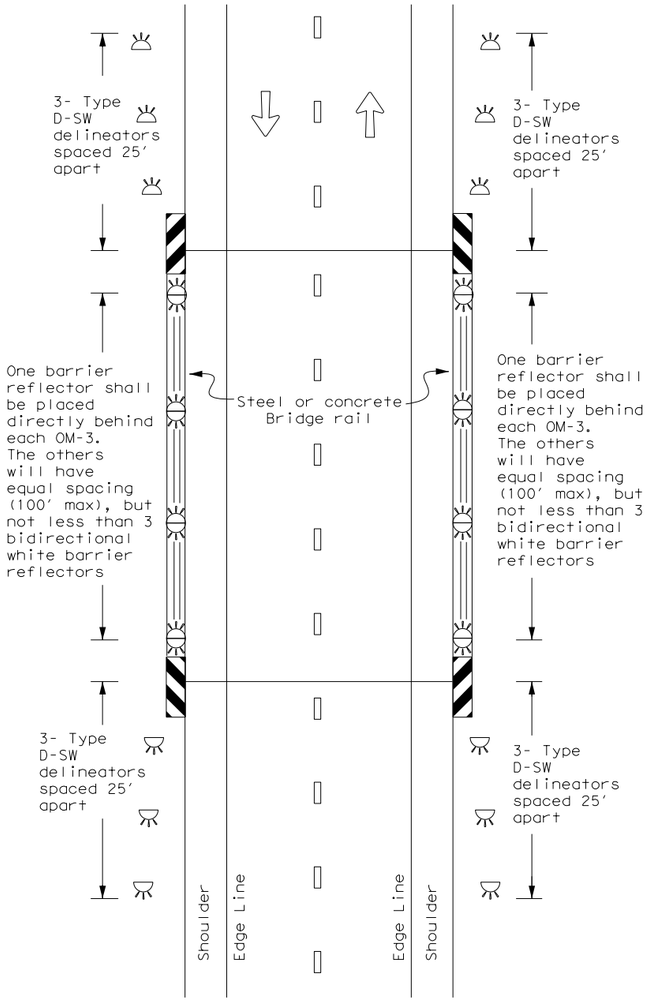
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

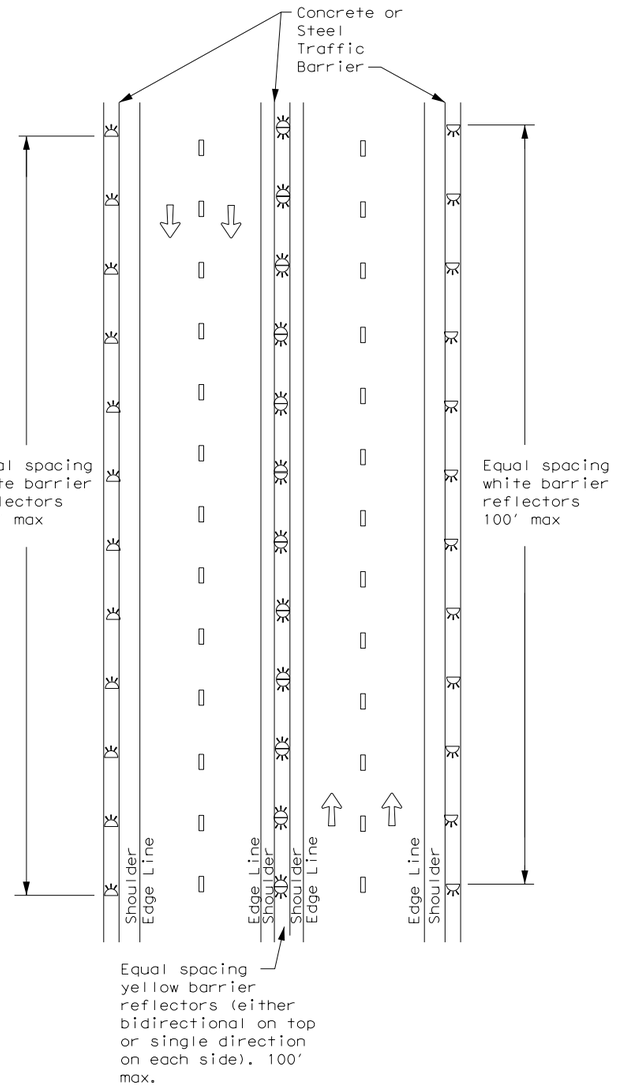
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

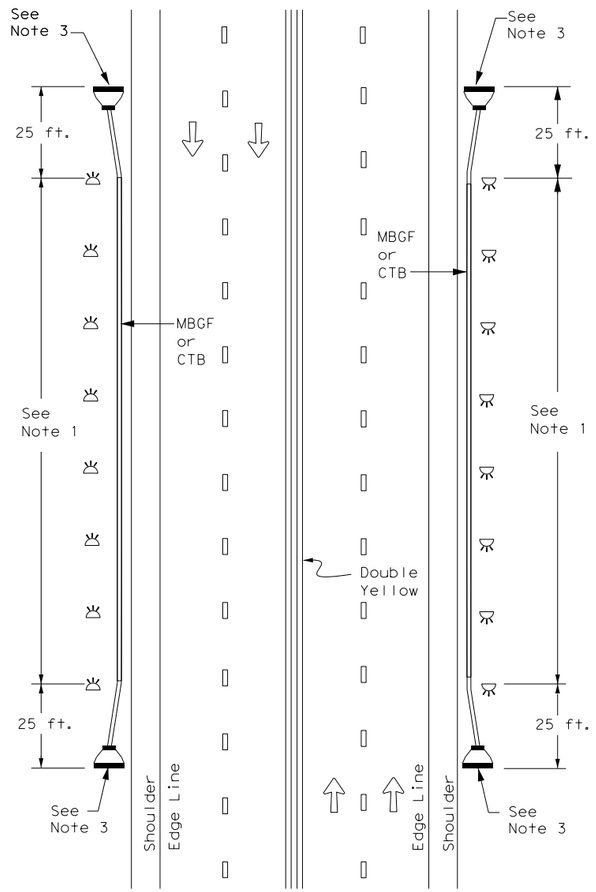
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-20	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		55

20E

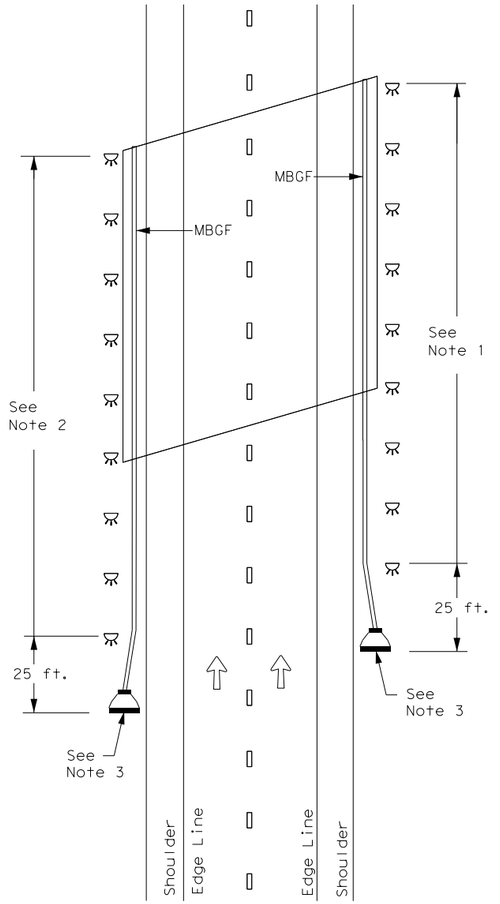
CONTINUOUS CONCRETE OR STEEL BARRIER



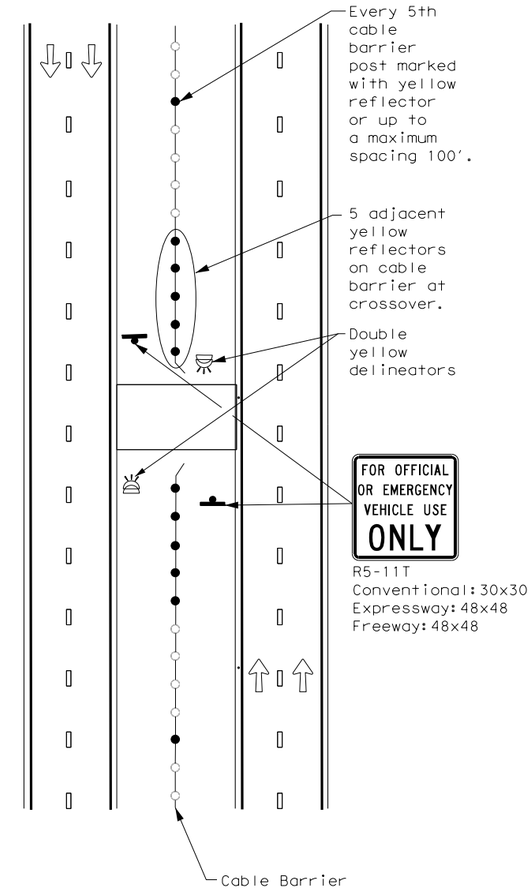
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
7-20	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		56

20F

DATE: 7/6/2023 11:07:47 PM
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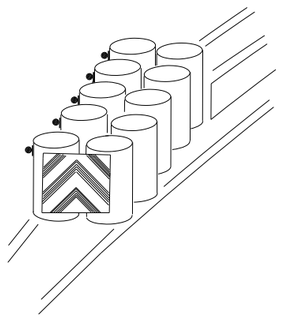
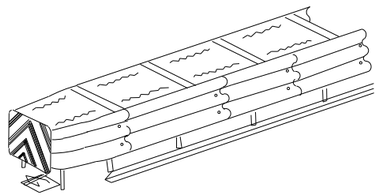
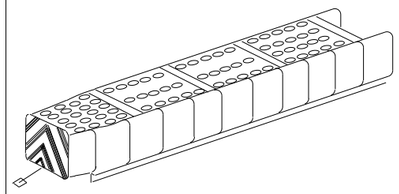
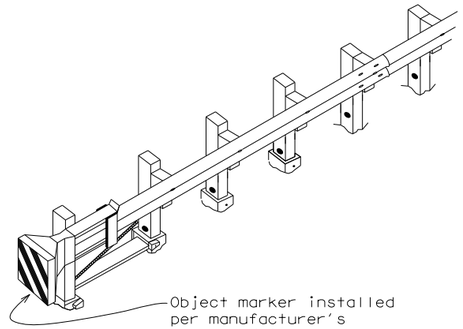
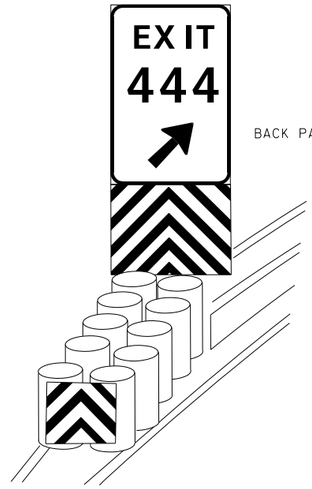
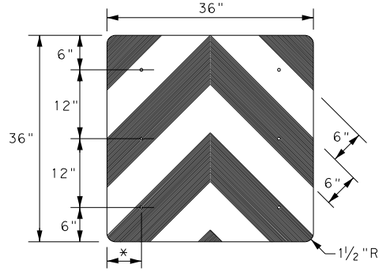


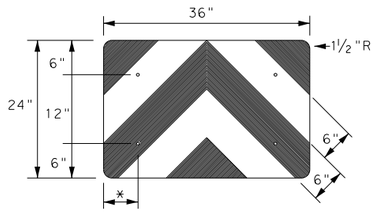




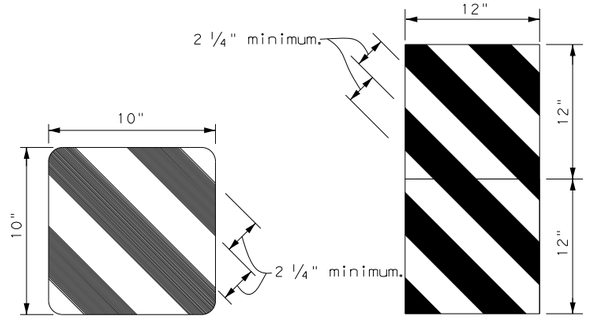




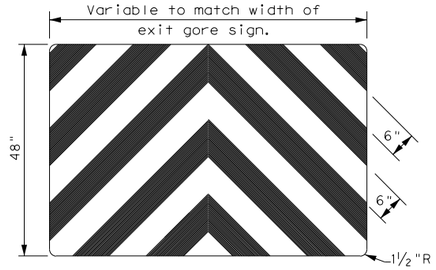


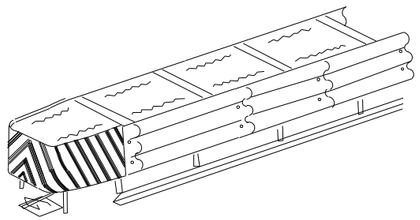


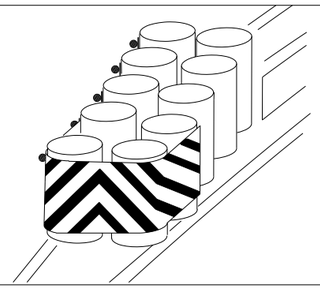
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

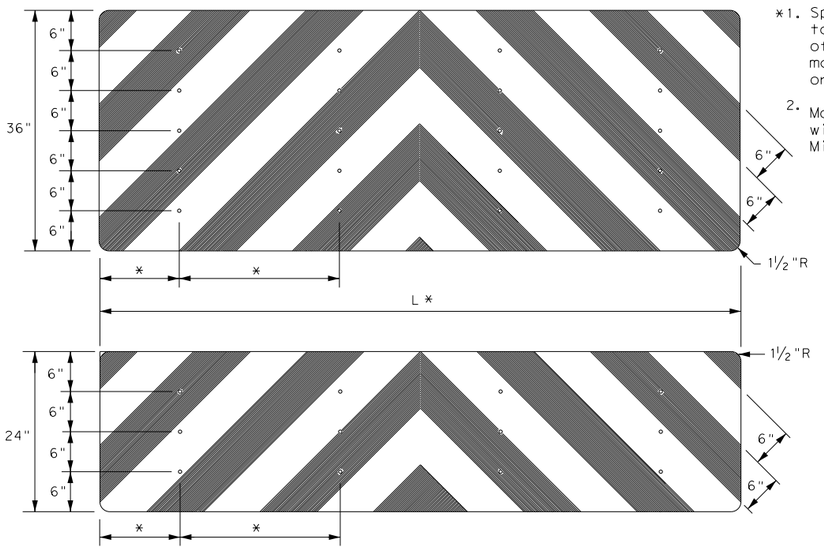


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	AMA	CARSON, ETC.		57
4-98 7-20				
20G				

DATE: 7/6/2023 11:08:30 PM
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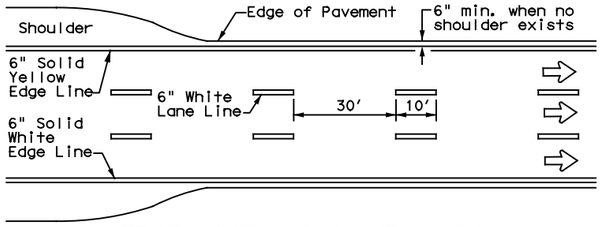
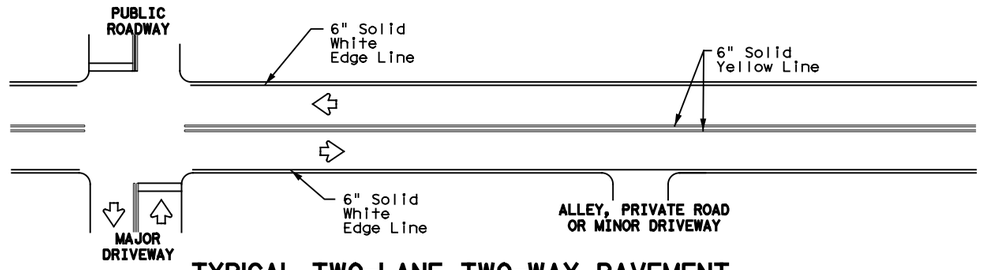
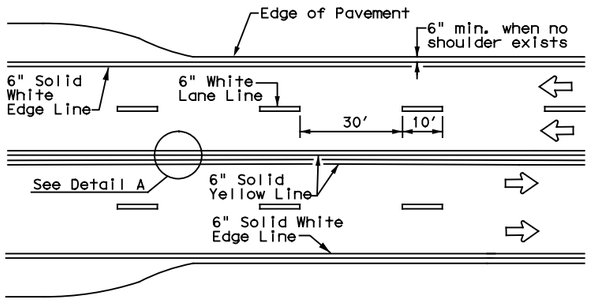
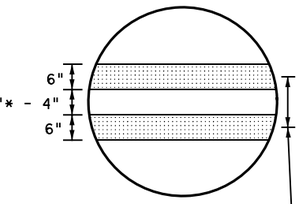


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





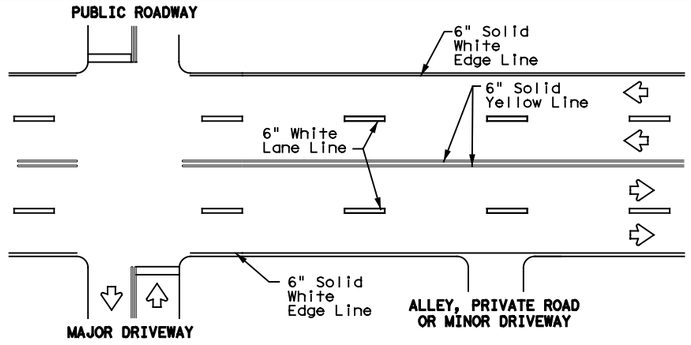
DETAIL "A"

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

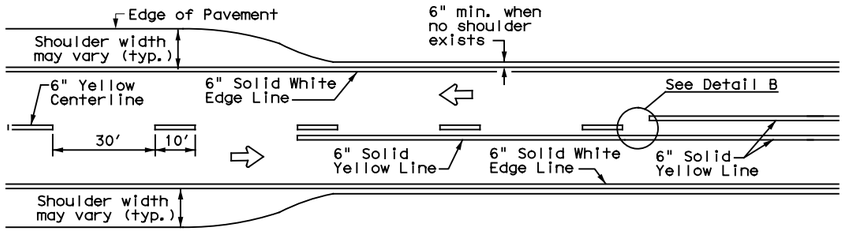
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

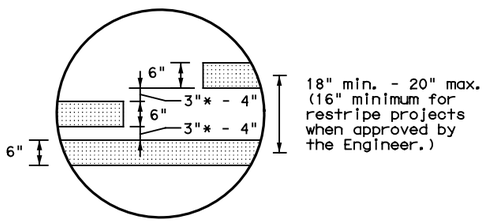
** 8" minimum for restripe projects when approved by the Engineer.



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

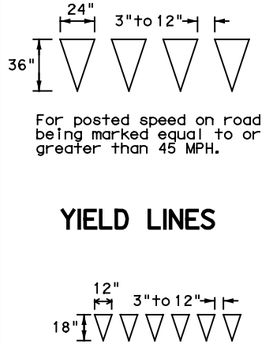


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

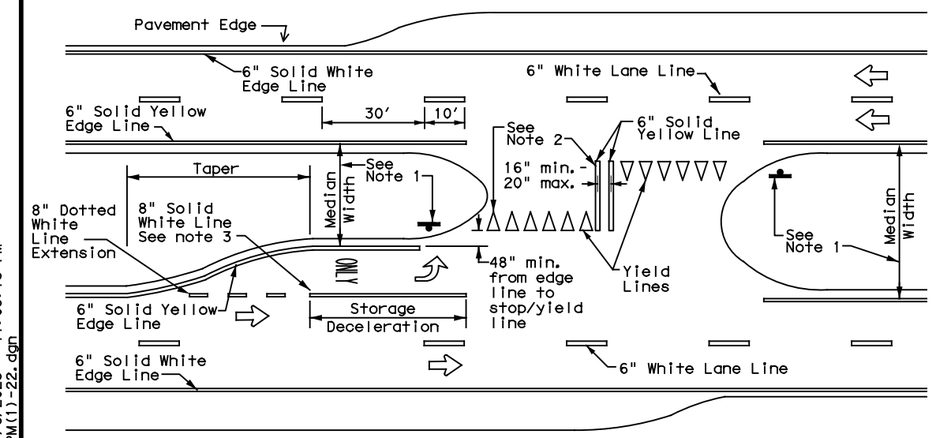


DETAIL "B"

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



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

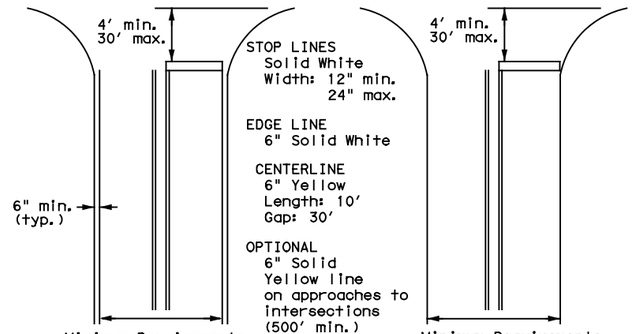
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

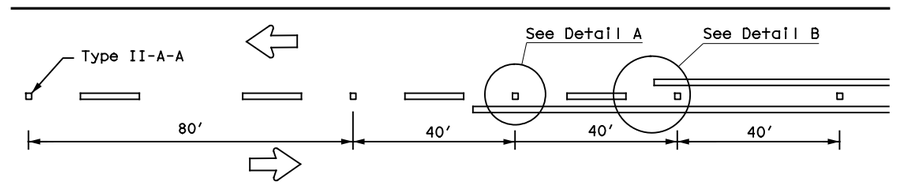
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 / 8-95 3-03 12-22 / 5-00 2-12	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		58

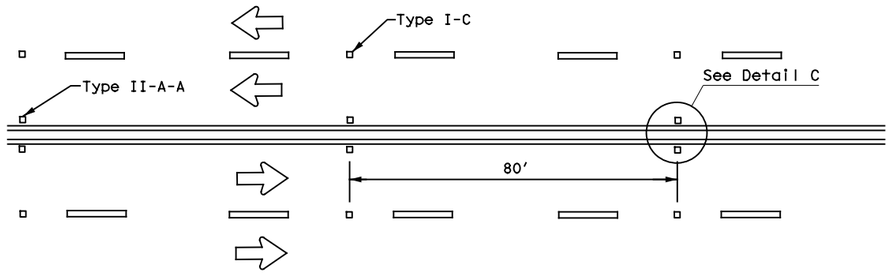
22A

DATE: 7/6/2023 11:09:13 PM
FILE: PM(1)-22.dgn

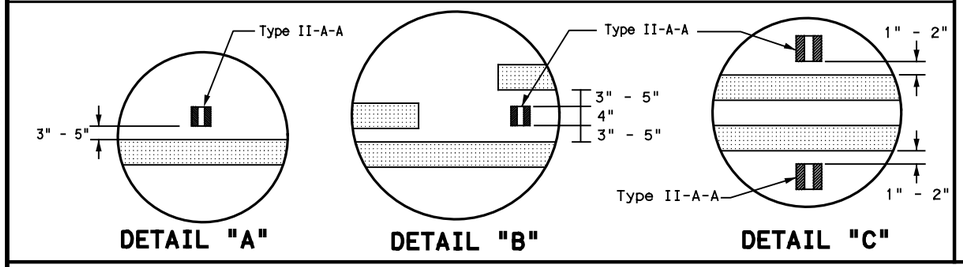
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

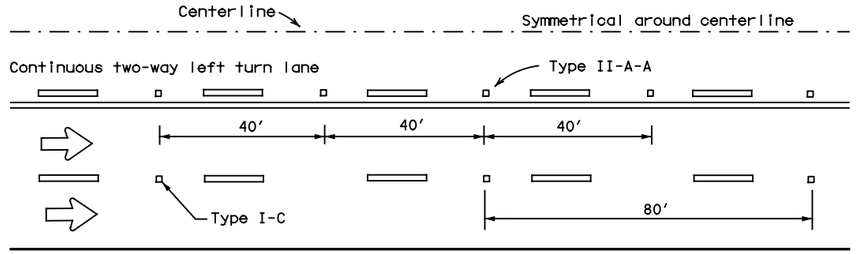


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

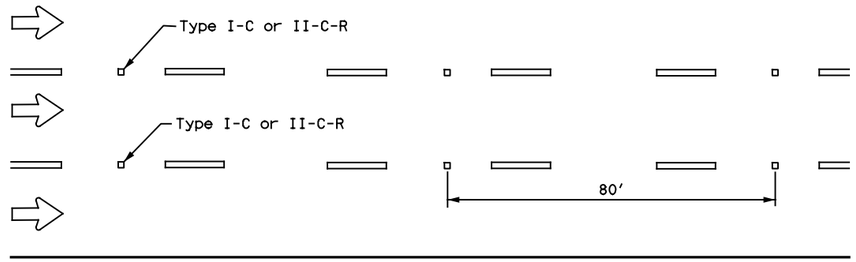


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





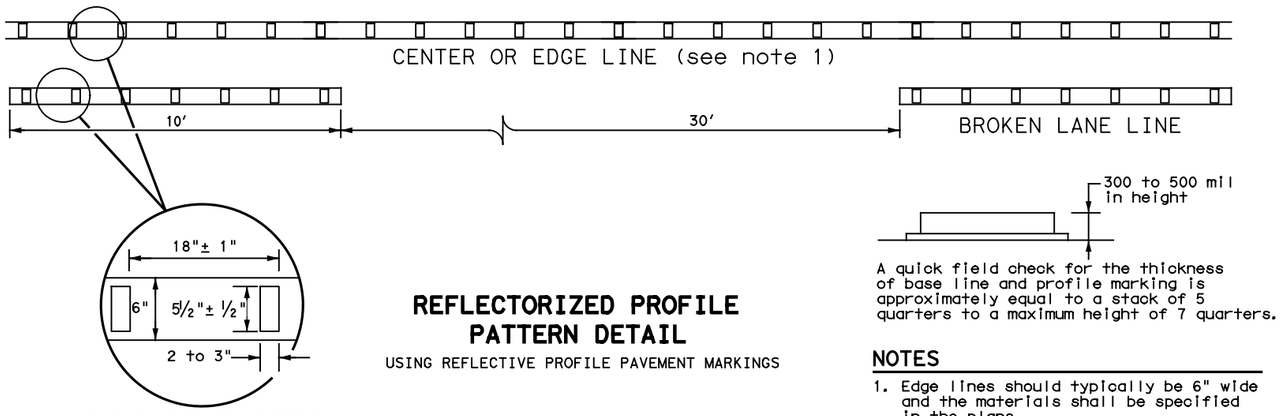
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTES

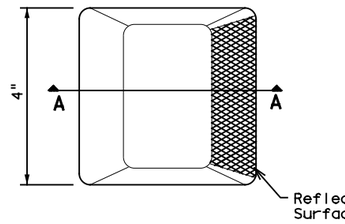
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

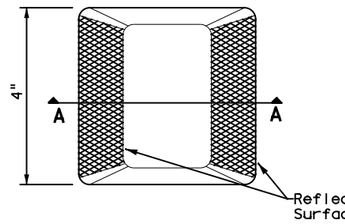
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

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

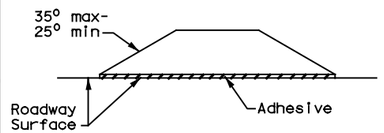
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

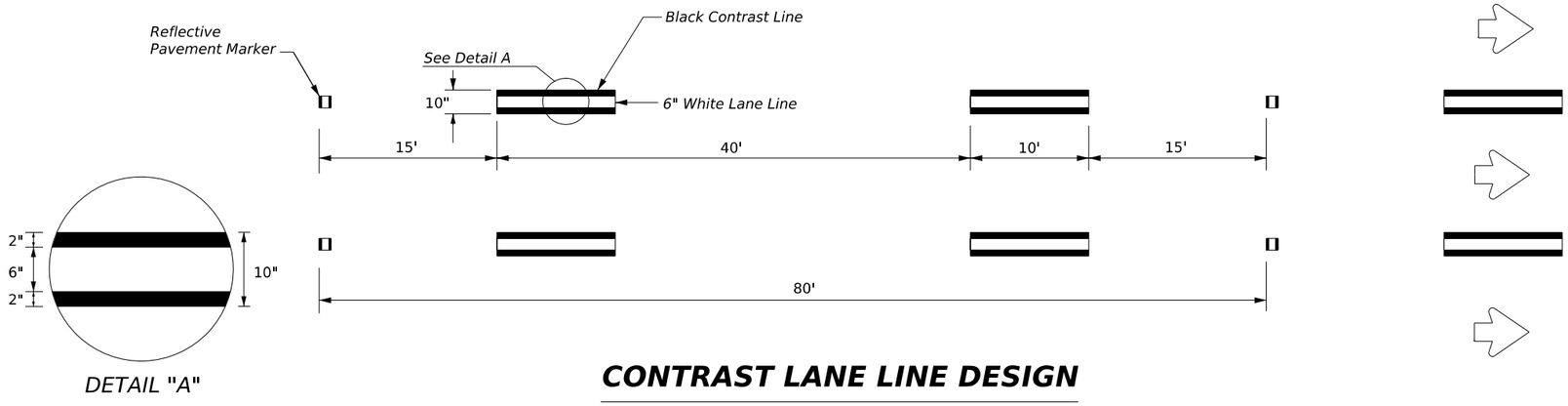
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		59

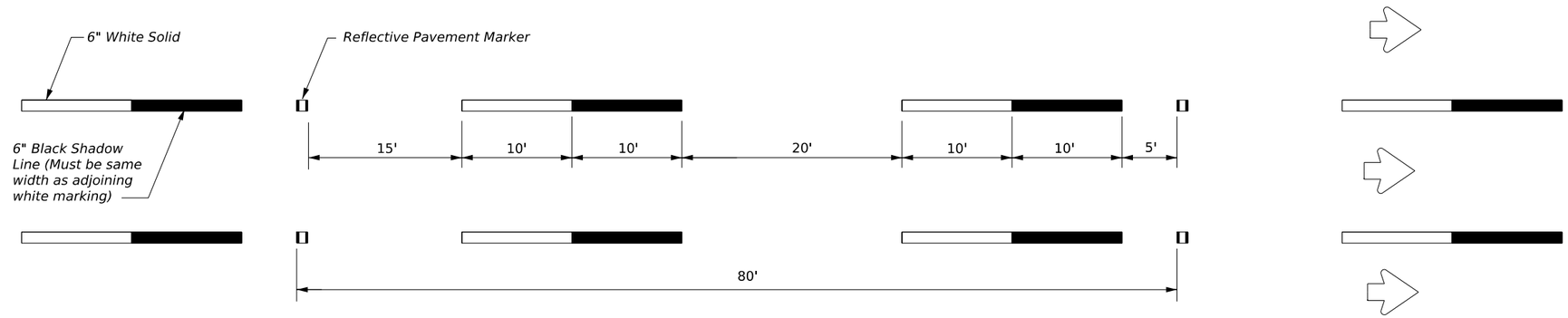
22B

DATE: 7/6/2023 11:09:56 PM
FILE: PM(2)-22.dgn

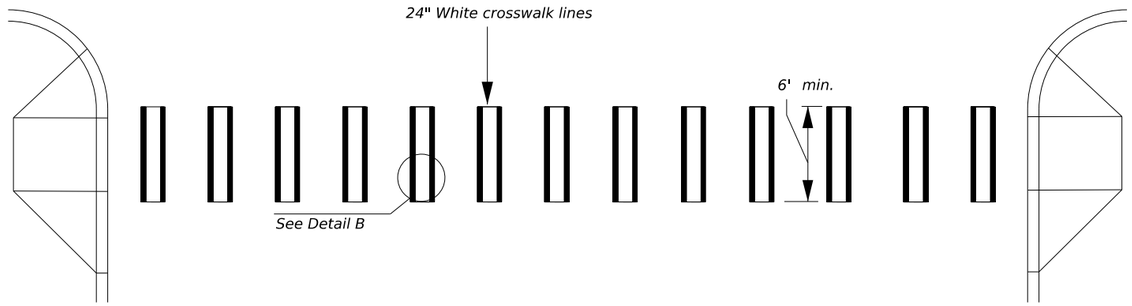


DETAIL "A"

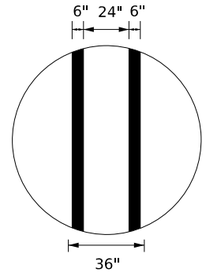
CONTRAST LANE LINE DESIGN



SHADOW LANE LINE DESIGN



CONTRAST CROSSWALK DESIGN



DETAIL "B"

(See PM(4) for crosswalk line placement details)

GENERAL NOTES

1. Contrast and Shadow markings may only be used on concrete pavements.
2. Contrast and Shadow markings shall not be used on edge lines.
3. Contrast lane lines shall be permanent prefabricated pavement markings meeting DMS 8240.
4. Shadow lane line designs shall be a liquid markings system approved by TxDOT.
5. All raised reflective pavement markers placed in broken lines shall be placed in line with and midway between the white stripes.
6. See PM(2) for raised reflective pavement markings installation details.

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

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

Texas Department of Transportation

Traffic Safety Division Standard

CONTRAST AND SHADOW PAVEMENT MARKINGS

CPM(1)-23

FILE: CPM(1)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-14 2-23	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		60

22N

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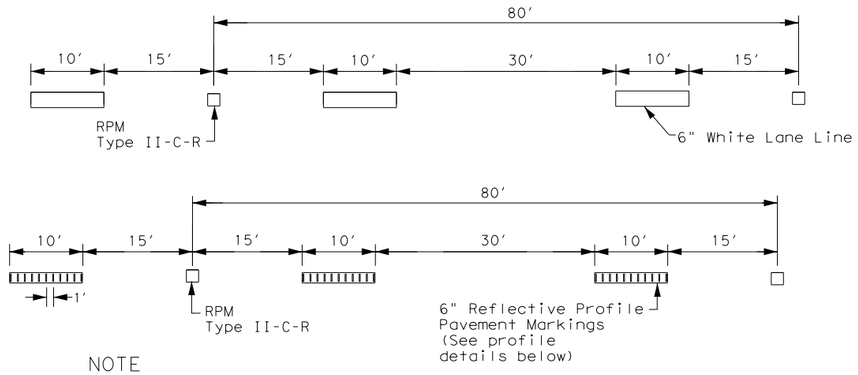
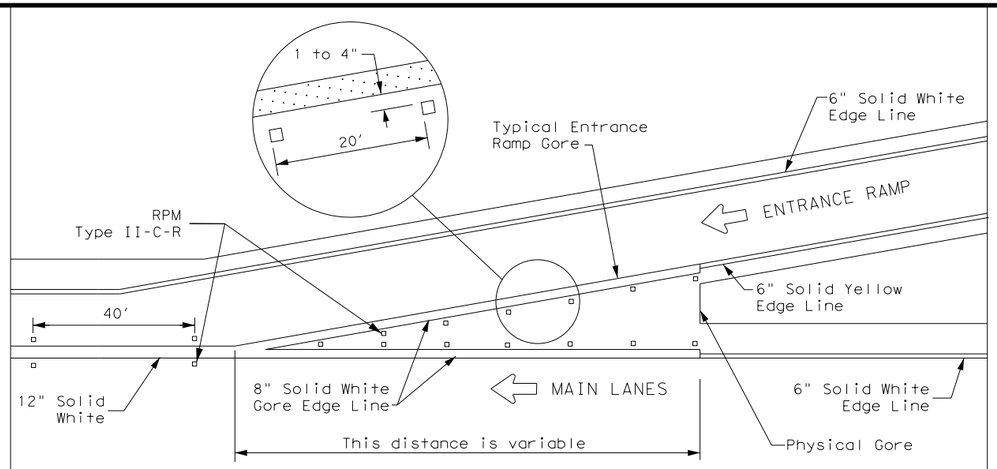


NOTE

Reflectorized raised pavement markers Type II-C-R shall be spaced on 80'centers with the clear face toward normal traffic and the red face toward wrong way traffic. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.

TRAFFIC LANE LINES PAVEMENT MARKING

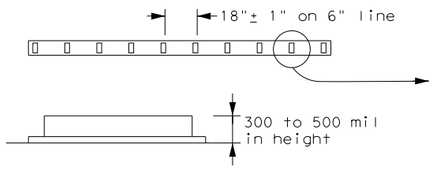


TYPICAL ENTRANCE RAMP GORE MARKING

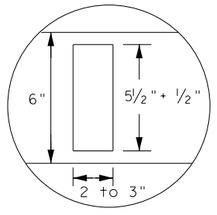
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R



Reflective Profile Pavement Markings

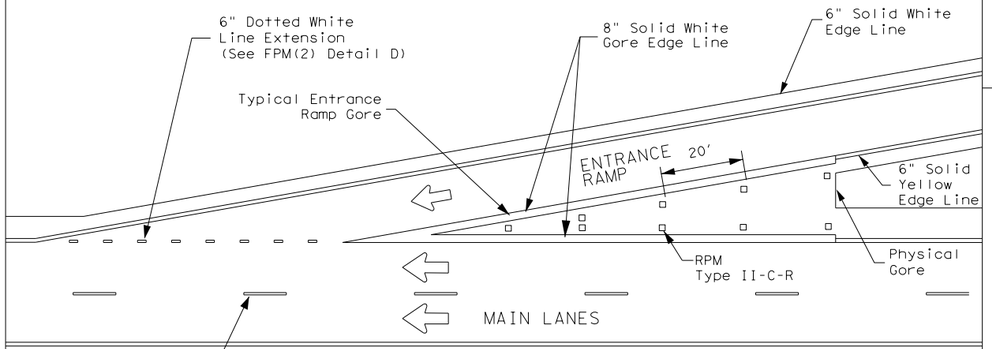


Standard 6" Profile Detail

NOTE

Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

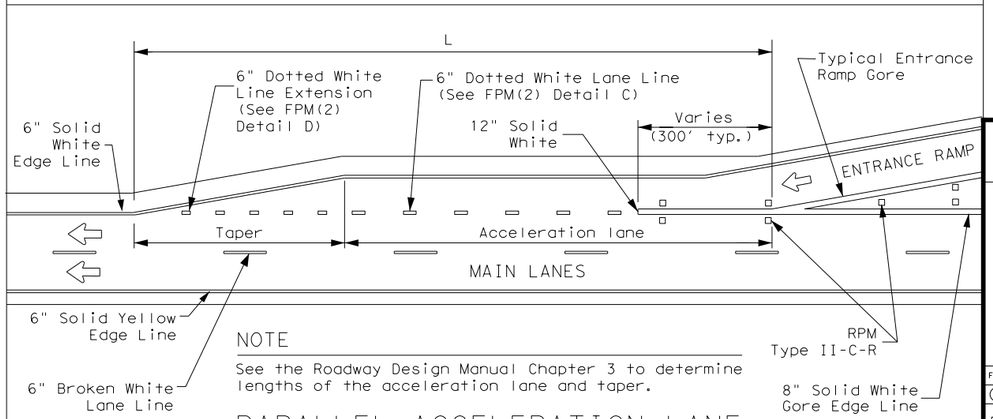
EDGE LINE PAVEMENT MARKINGS



NOTE

See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

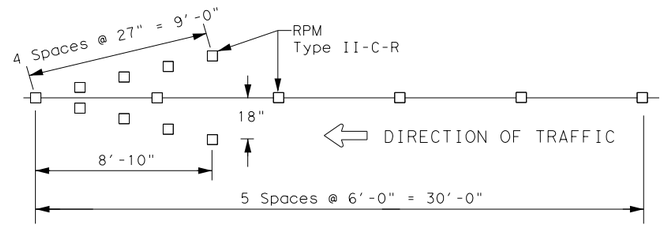
TAPERED ACCELERATION LANE



NOTE

See the Roadway Design Manual Chapter 3 to determine lengths of the acceleration lane and taper.

PARALLEL ACCELERATION LANE



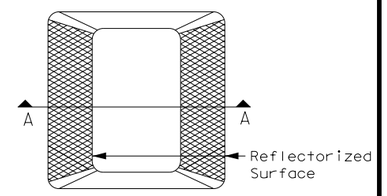
NOTES

1. Reflectorized raised pavement markers Type-II-C-R in the wrong way arrow shall have the clear face toward normal traffic and the red face toward the wrong way traffic.
2. Red reflectorized wrong way arrows, not to exceed two, may be placed on exit ramps. Locations of the arrows shall be as shown in the plans or as directed by the engineer.

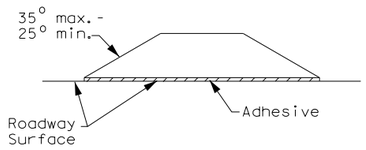
WRONG WAY ARROW

GENERAL NOTE

On concrete pavements the raised pavement markers shall be placed to one side of the longitudinal joints.



Type II (Top View)



SECTION A

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

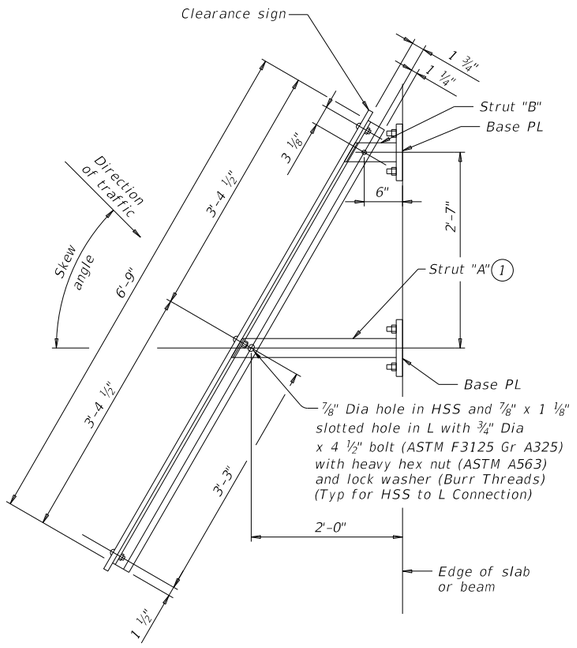
FPM(1)-22

FILE: fpm(1)-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-74 8-00 2-12	0275	04	061,ETC.	IH 40,ETC.
4-92 2-08 10-22	DIST	COUNTY		SHEET NO.
5-00 2-10	AMA	CARSON,ETC.		61

23A

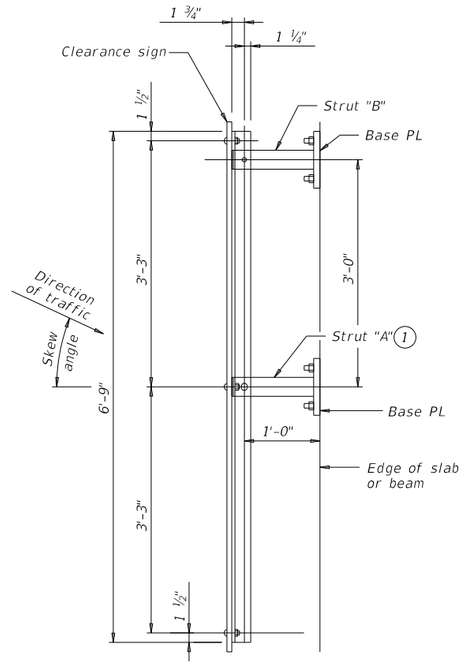
DATE: 7/6/2023 11:11:22 PM
FILE: FPM(1)-22.dgn

DATE: 7/6/2023 11:12:05 PM
FILE: BMCS.dgn



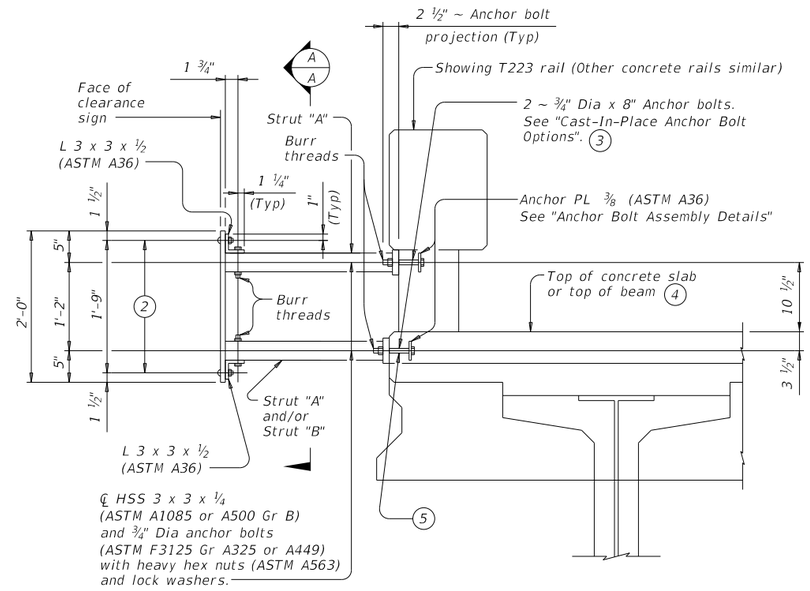
PLAN OF TYPE S MOUNT

(Used for skews over 30°)

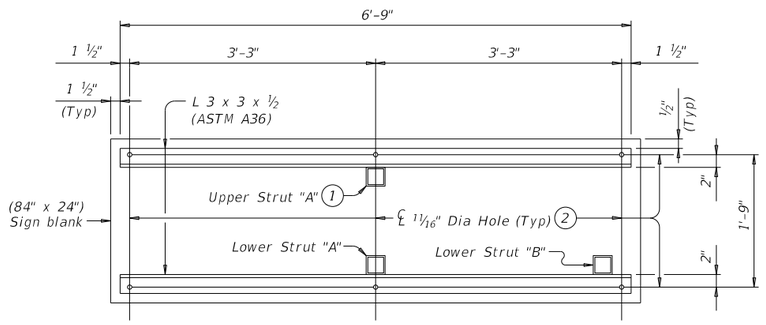


PLAN OF TYPE N MOUNT

(Used for 0° to 30° skews)



SECTION



SECTION A-A

1. Locate centerline of Strut A no closer than 12" from a vertical concrete edge.
2. ℄ ⅝" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.
3. At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
4. For decked slab beams topped with a 2 course surface treatment and ACP overlay.
5. Anchor bolts to be cast into decked slab beams topped with a 2 course surface treatment or ACP overlay. Anchor bolts with heavy hex nuts, regular lock washers, hardened washers and anchor plate that is embedded in the beam will be provided by the beam Fabricator.

CONSTRUCTION NOTES:

Install the vertical face of clearance sign plumb unless otherwise approved by the Engineer.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 1 anchor per bridge mounted clearance sign installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components after fabrication unless otherwise noted.

GENERAL NOTES:

This standard provides details to mount a vertical clearance sign (84" x 24") to bridges. Rail Types T631, T631LS, PR11, PR22 and PR3 are not accommodated.

The Engineer will furnish the clearance to be shown on the sign.

See Bridge Layout for sign location and mounting type (Type N or S).

Cost of furnishing, installing, relocating or removing a clearance sign, including structural steel for sign mount, is included in unit price bid for Item 644, "Small Roadside Sign Assemblies".

One Sign Blank (84" x 24") is 14 SF.

Average steel weight for one complete Type N Mount is 219 Lb.

Average steel weight for one complete Type S Mount is 233 Lb.

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		62

DATE: 7/6/2023 11:12:07 PM
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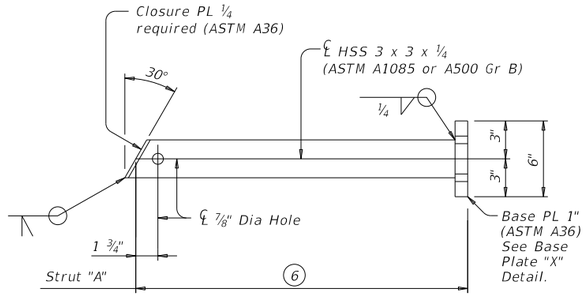
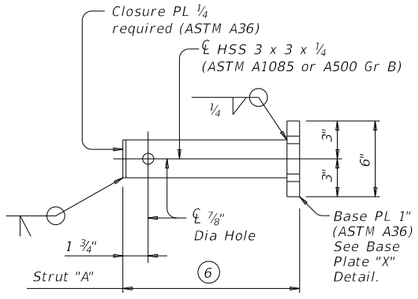
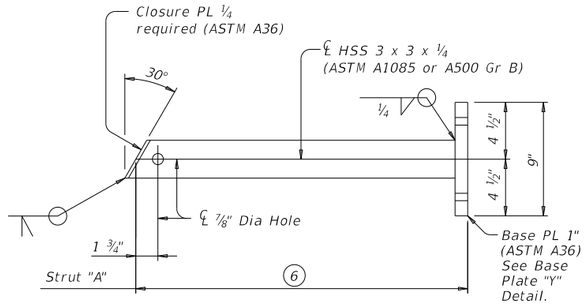


FOR T411 AND C411 RAIL TYPES



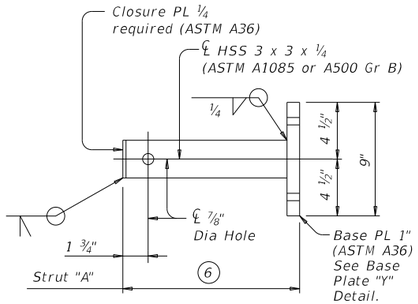
FOR T411 AND C411 RAIL TYPES



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

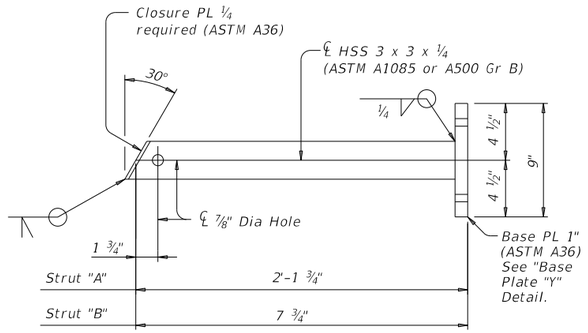
(Used for skews over 30°)



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

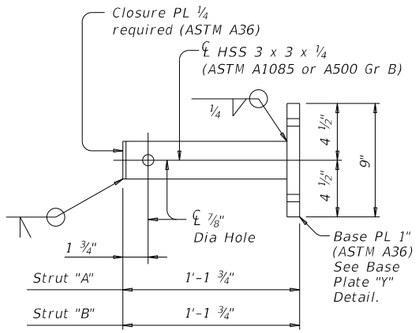
UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



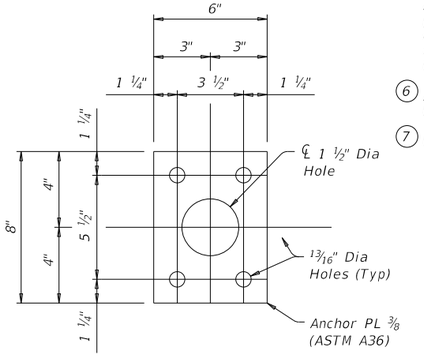
LOWER STRUT DETAILS FOR (TYPE S MOUNT)

(Used for skews over 30°)

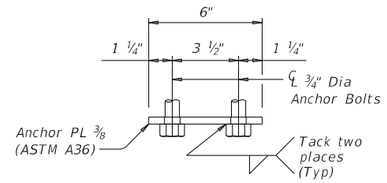


LOWER STRUT DETAILS FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



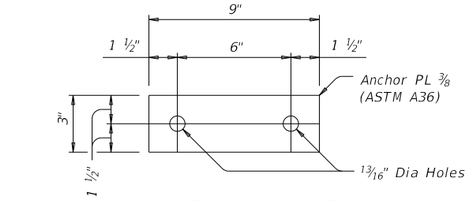
PLAN OF ANCHOR PLATE



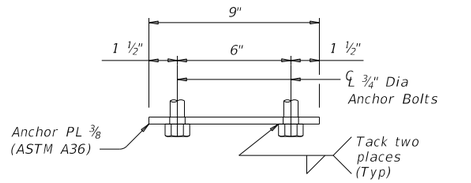
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

(Used on Base Plate "X" with T411 and C411 rail types.)



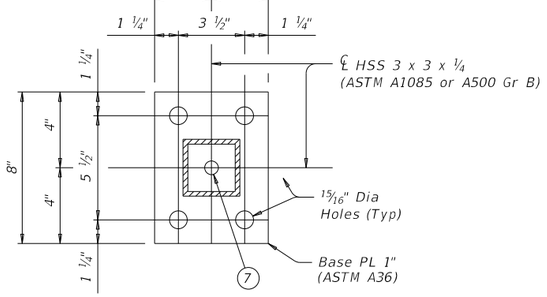
PLAN OF ANCHOR PLATE



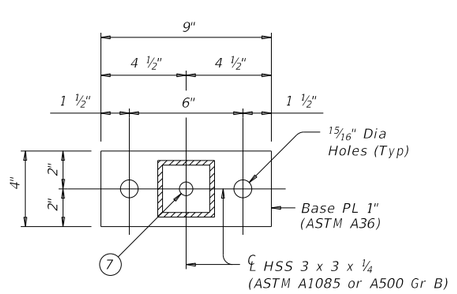
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

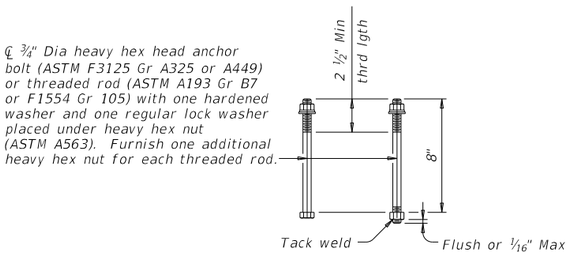
(Used on Base Plate "Y" and with T1F, T2P, C2P, T1W, C1W, T66 and C66 rail types.)



BASE PLATE "X" DETAIL



BASE PLATE "Y" DETAIL



CAST-IN-PLACE ANCHOR BOLT OPTIONS (3)

(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(7) Hole required to drain zinc from base plate during galvanizing.

Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		63

DATE: 7/6/2023 11:12:10 PM
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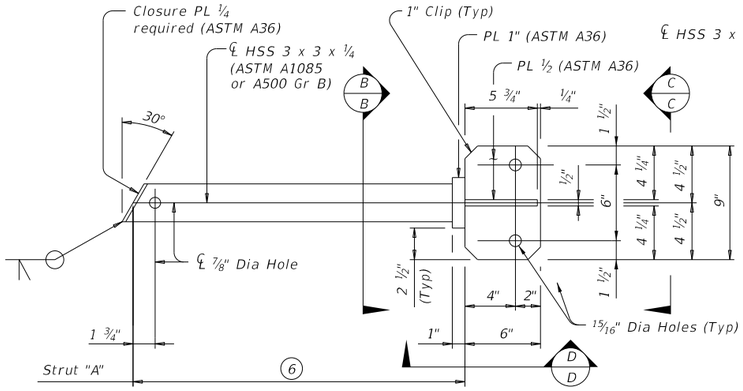
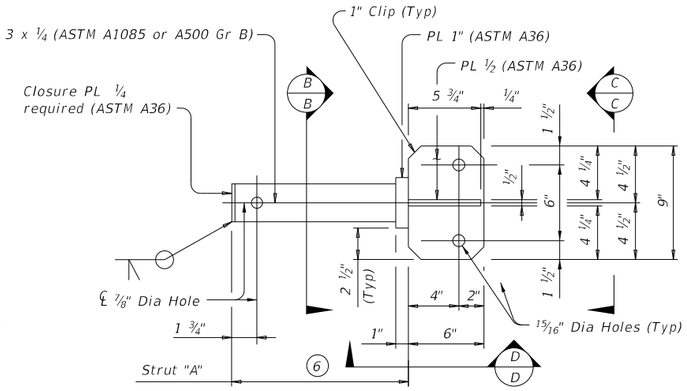


FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

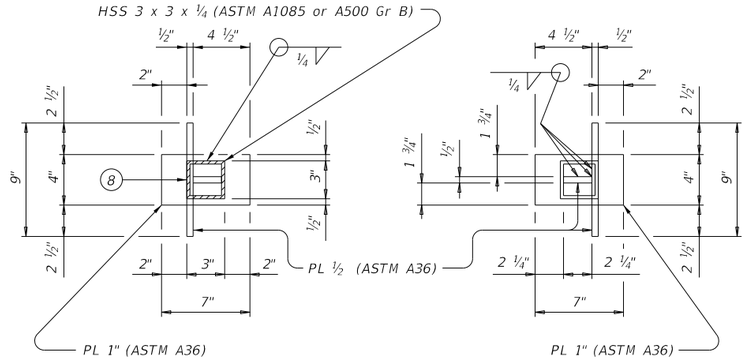
(Used for skews over 30°)



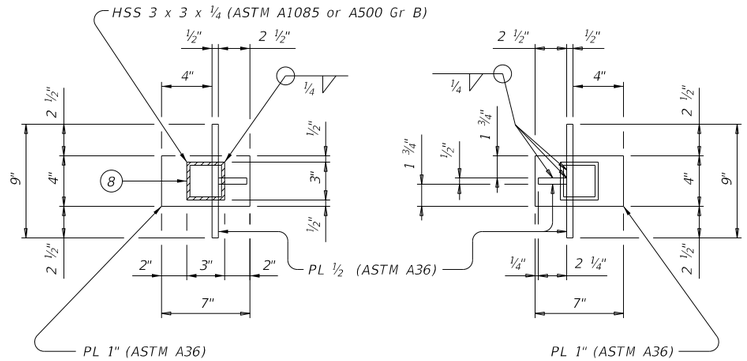
FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



FOR 9" HIGH CURBS



FOR 11" HIGH CURBS

(2) ℄ ⅝" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.

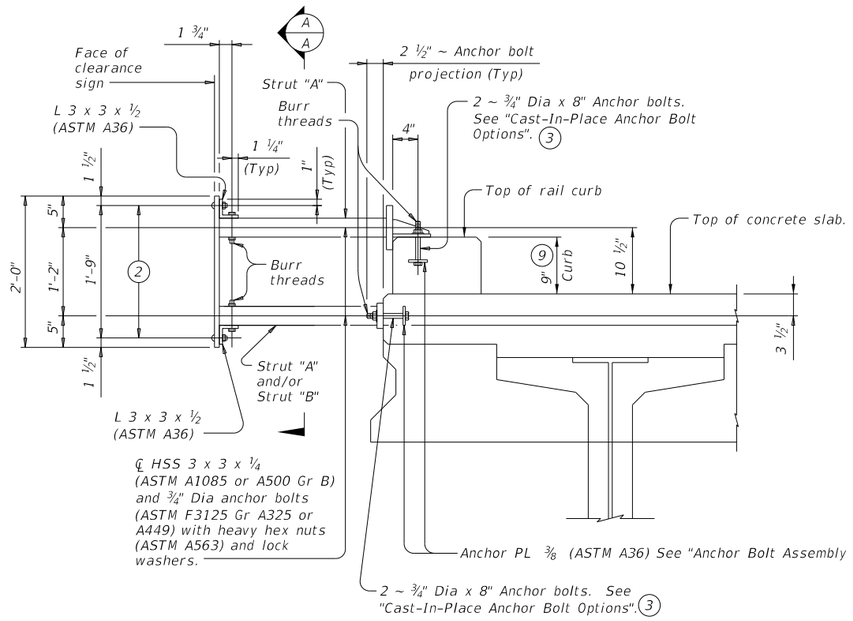
(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(4) For decked slab beams topped with a 2 course surface treatment and ACP overlay.

(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(8) Hole required in bottom of HSS to drain zinc during galvanizing.

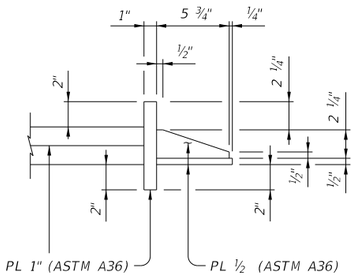
(9) 11" curb is for structures with 2" ACP overlay.



SECTION THRU T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL CURB

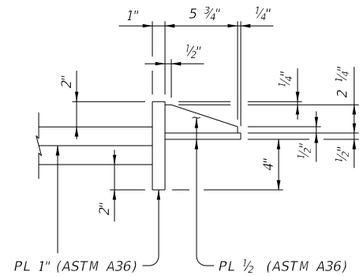
Showing sign mount on a 9" high curb, 11" high curb similar.

SECTION B-B



FOR 9" HIGH CURBS

VIEW C-C



FOR 11" HIGH CURBS

VIEW D-D

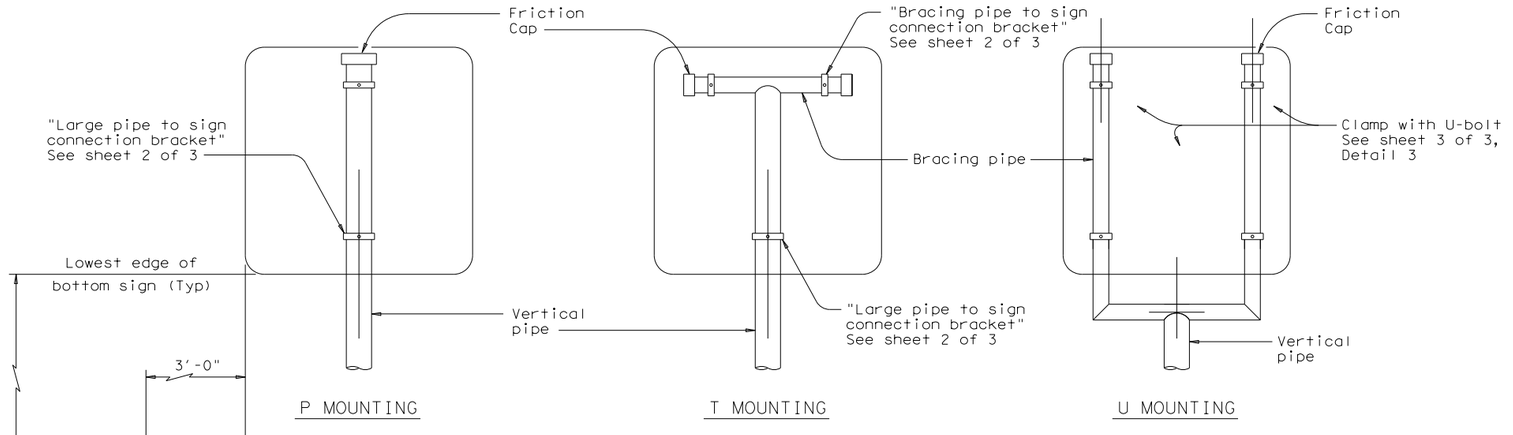
Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

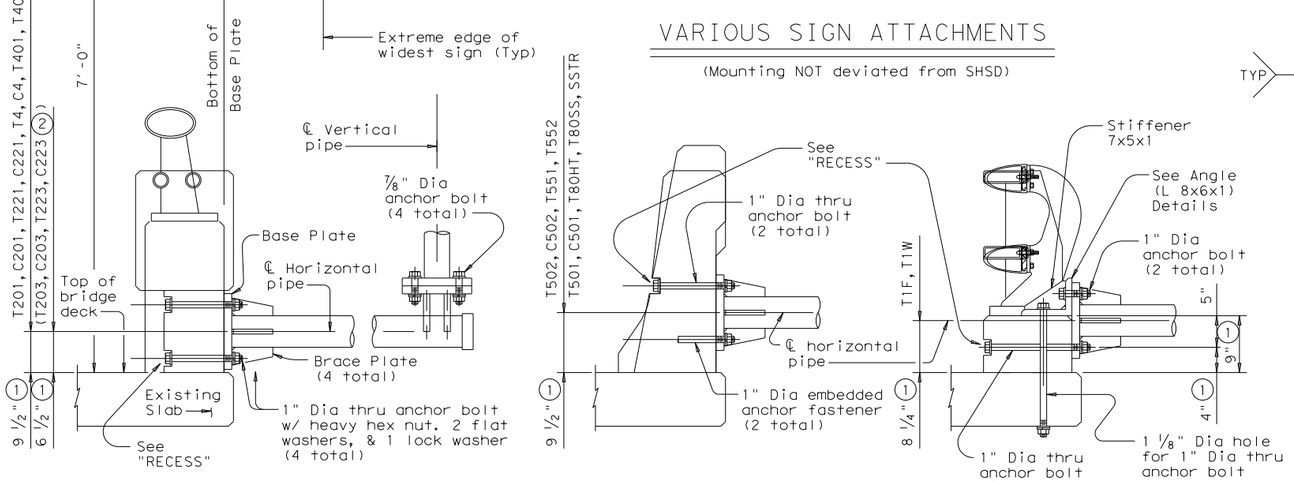
BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		64



VARIOUS SIGN ATTACHMENTS

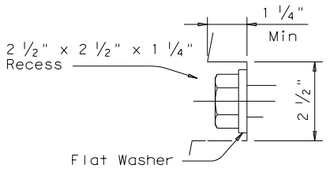
(Mounting NOT deviated from SHSD)



LONGITUDINAL SECTION THROUGH RAILING & SIGN MOUNT

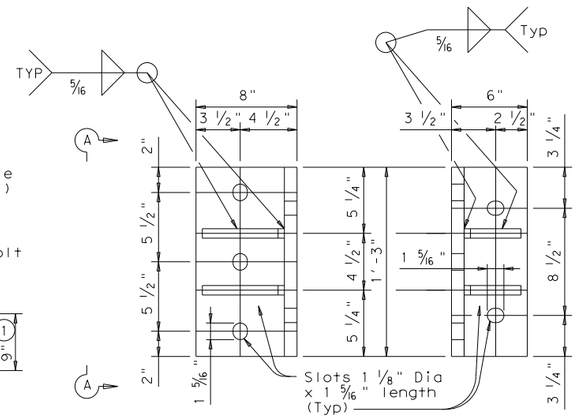
(1) Increase 2" for structure with overlay.

(2) Attached at ℄ post.



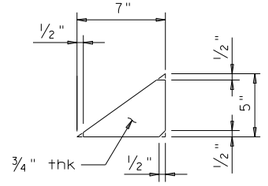
RECESS

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")



PLAN VIEW

SECTION A-A



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	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		65

DATE: 7/6/2023 11:12:56 PM
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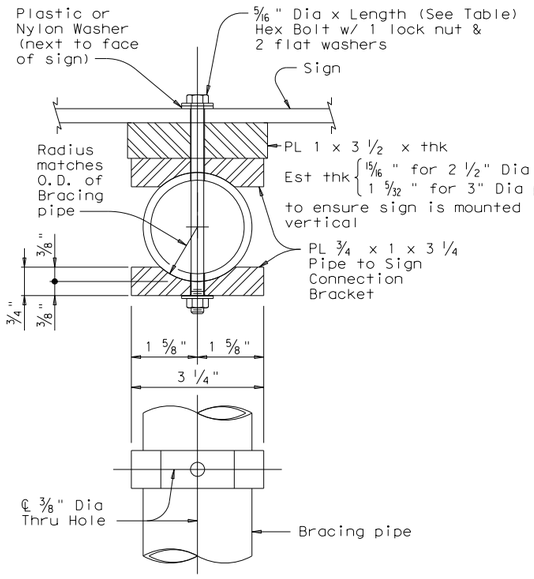
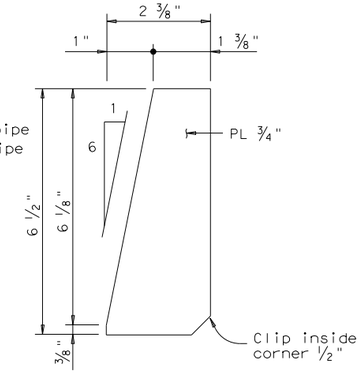
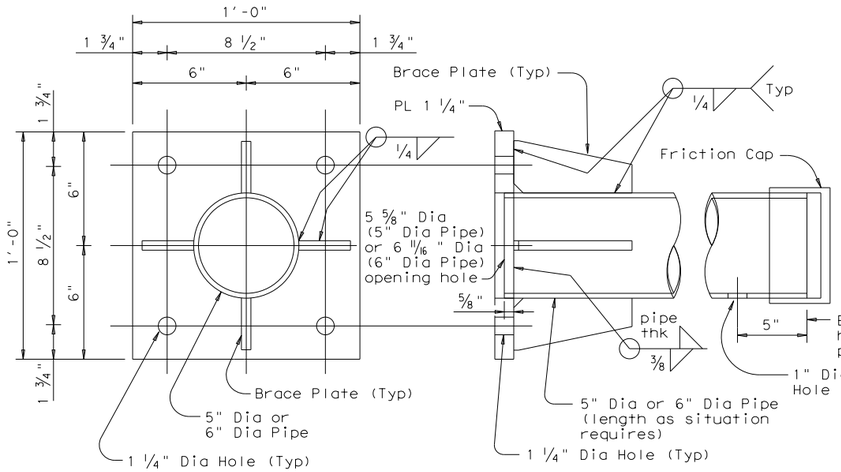


BRACING PIPE TO SIGN CONNECTION BRACKET DETAILS

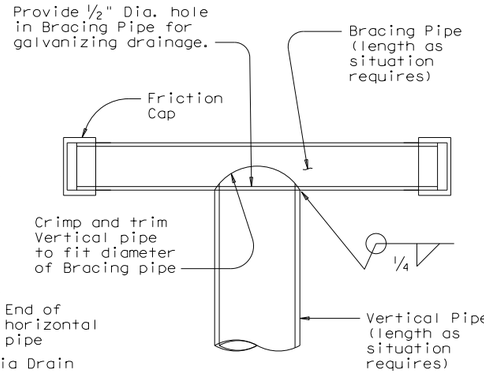
(Showing T Mounting)

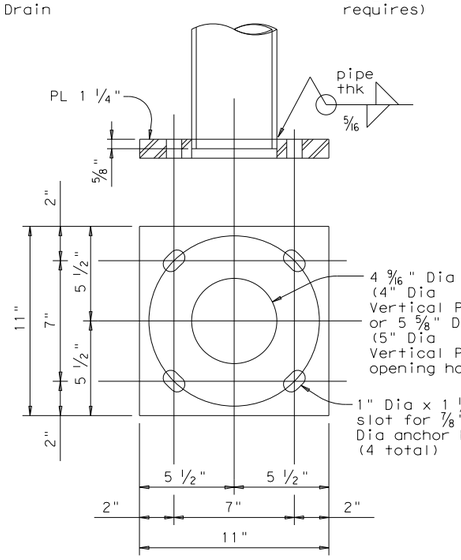


BRACE PLATE DETAILS



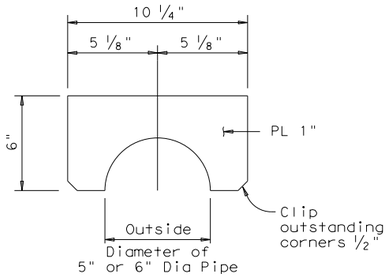
BASE PLATE DETAILS



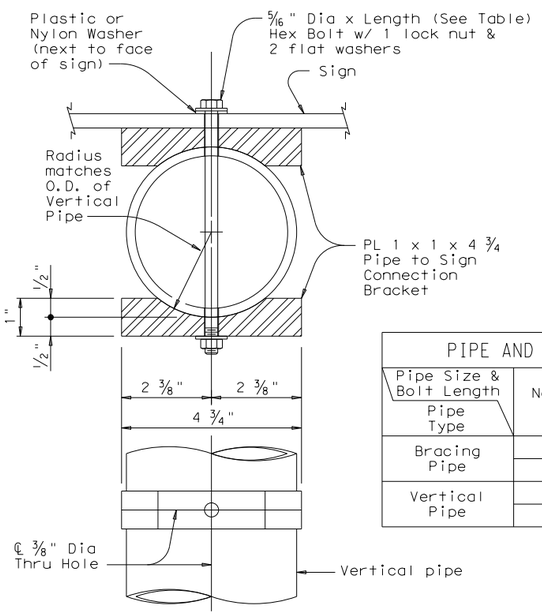


SIGN POLE & POLE BASE PLATE DETAILS

(Showing only T Mounting)



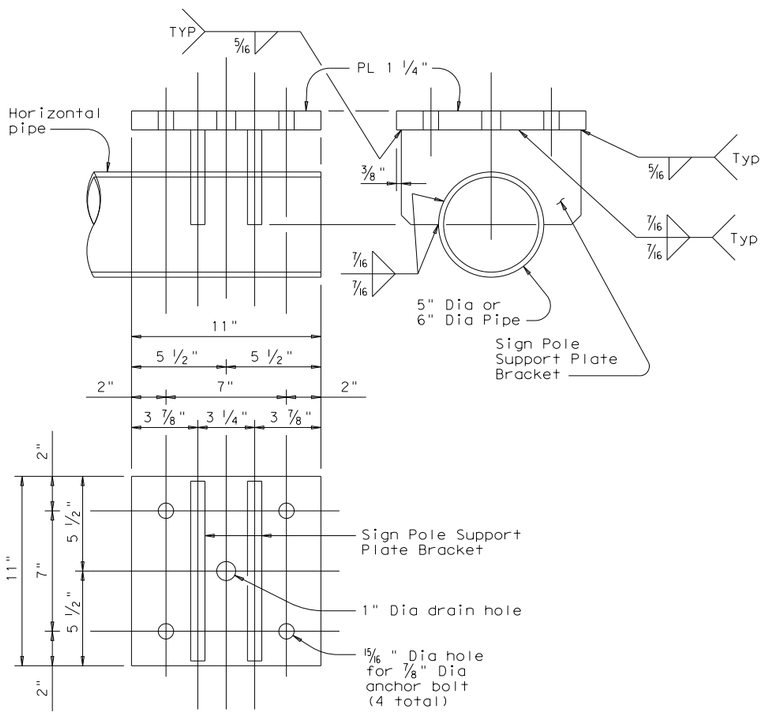
SIGN POLE SUPPORT PLATE BRACKET DETAILS



LARGE PIPE TO SIGN CONNECTION BRACKET DETAILS

(Showing P or T Mounting)

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



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

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		66

26H

DATE: 7/6/2023 11:12:57 PM
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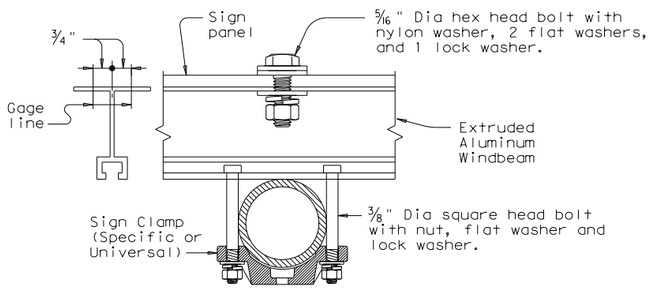
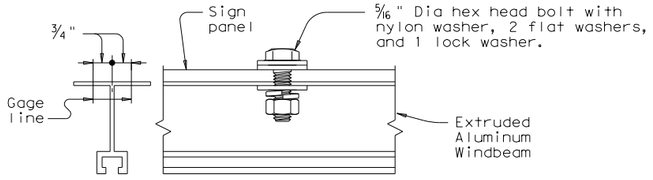
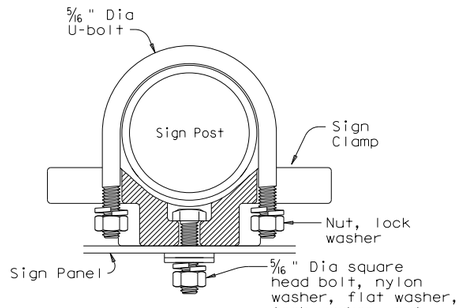


DETAIL 1



DETAIL 2

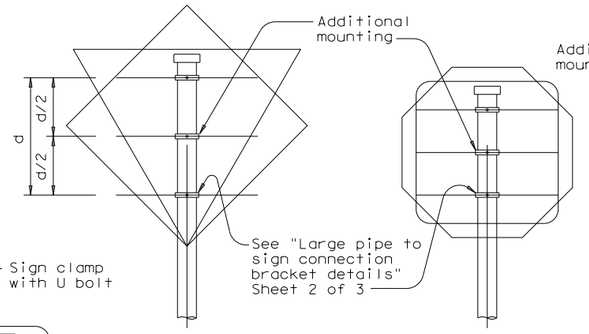


DETAIL 3

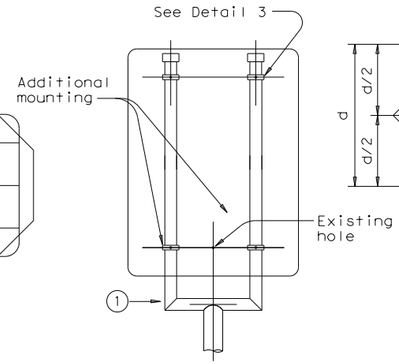
SIGN SHAPE	SQUARE			HORIZONTAL RECTANGLE			VERTICAL RECTANGLE			DIAMOND			OCTAGON			EQUILATERAL TRIANGLE			INTERSTATE SHIELD	PENTAGON (SCHOOL)	
Type of Sign Mounting on SHSD / Design Wind Speed	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	P	T
90 mph					(Type 23) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 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.

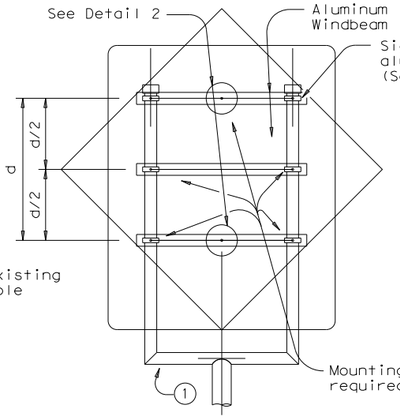
(1) In lieu of welding, the Fabricator may bend bracing pipe elbows if the following conditions are met:
a. Spacing between vertical bracing pipes is equal to or greater than 2'-6".
b. Bending radius is 12".
c. The distance between the lowest clamp and centerline of horizontal bent pipe is 13" max.



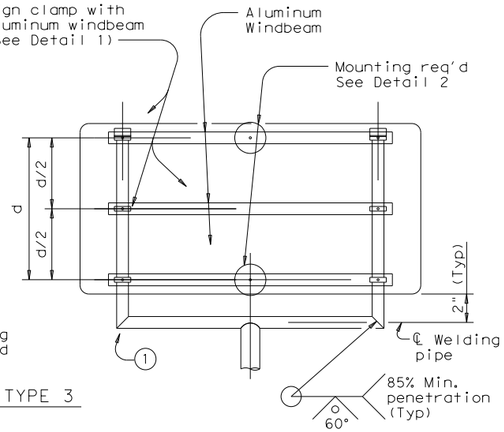
TYPE 1

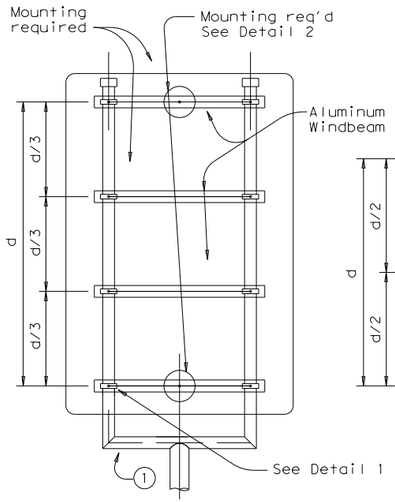


TYPE 2

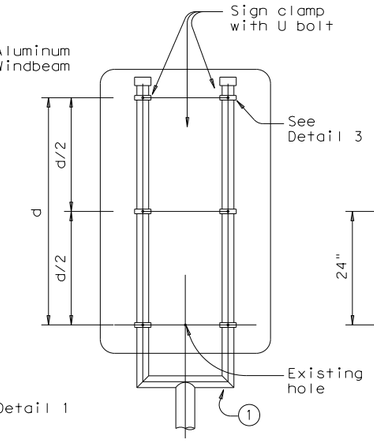


TYPE 3

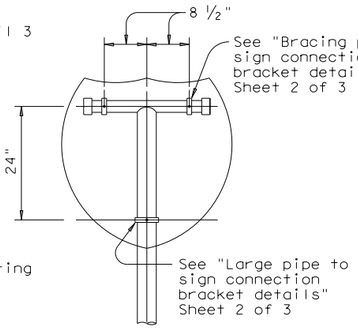




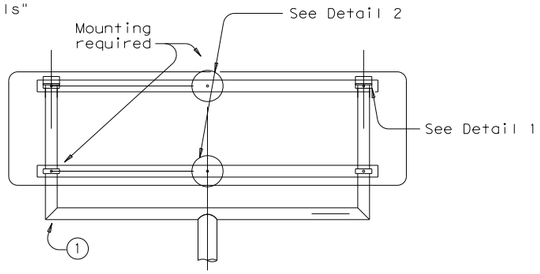
TYPE 4



TYPE 32



TYPE SPECIAL



TYPE 23

SHEET 3 OF 3

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
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REVISIONS	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		67

DATE: 7/6/2023 11:12:58 PM
FILE: SMD(BR-1)-14.dgn

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

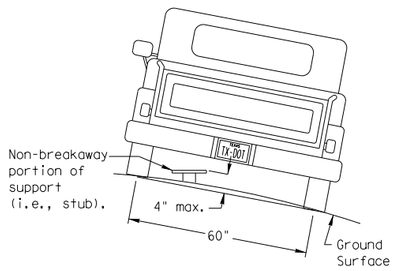
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

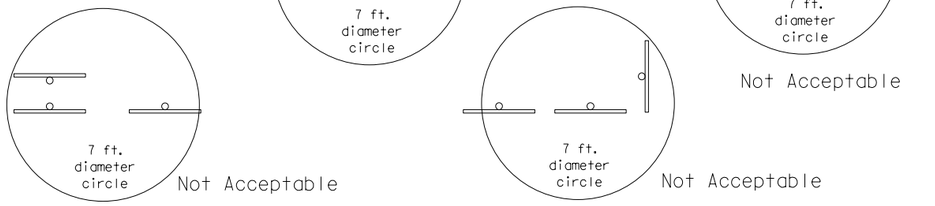
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



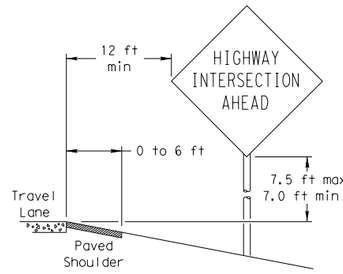
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



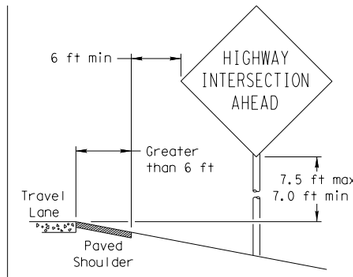
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

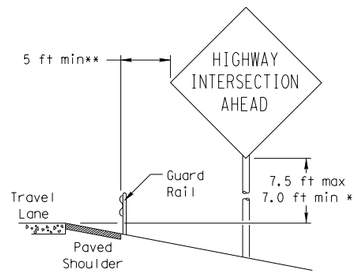
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



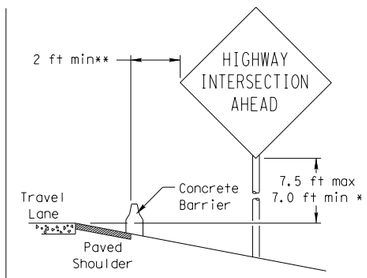
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



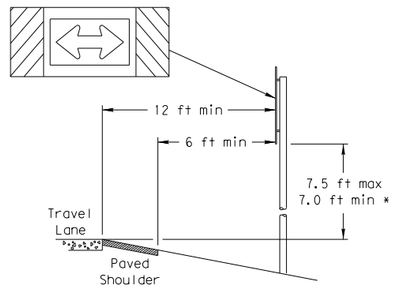
BEHIND GUARDRAIL



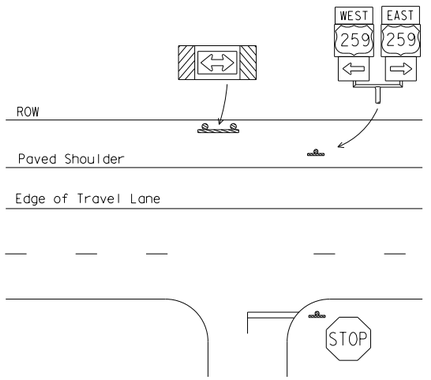
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

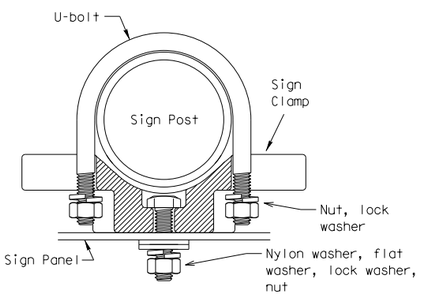
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

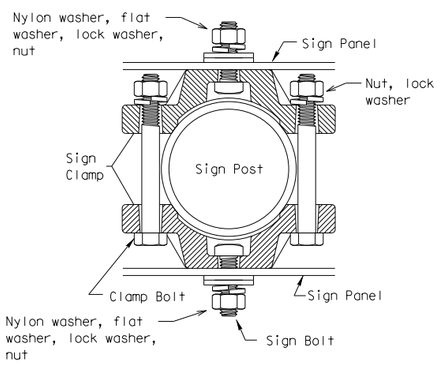


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

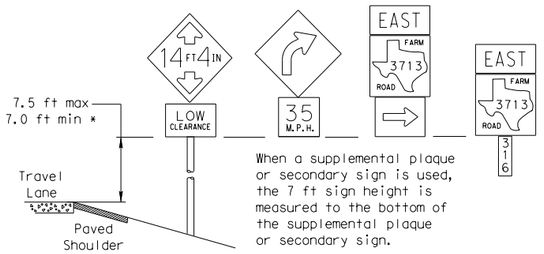
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



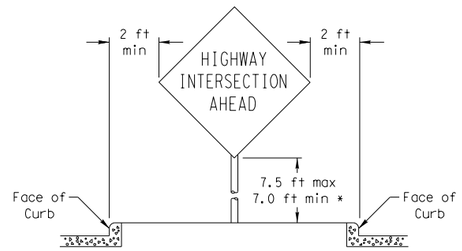
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



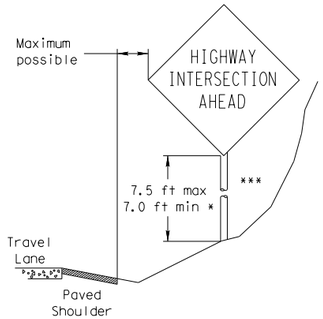
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

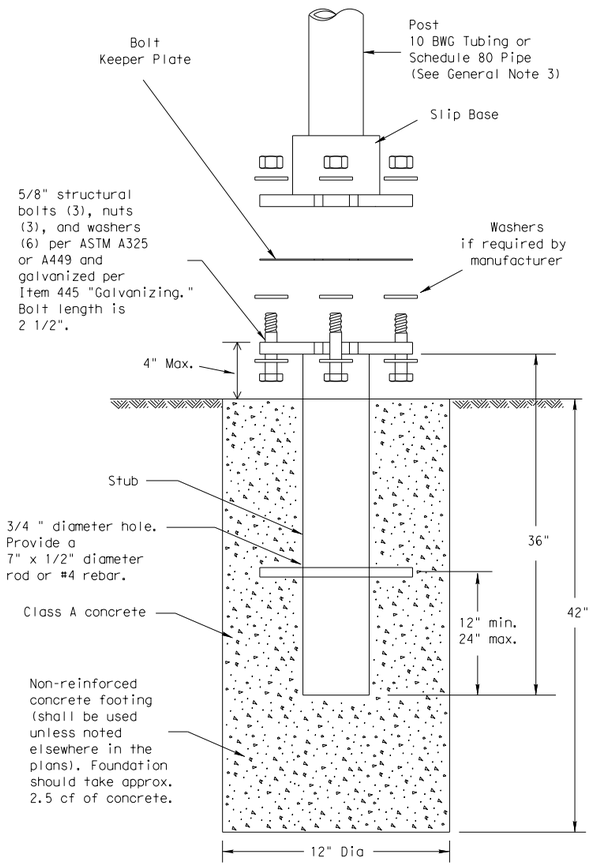
SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		68

26A

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

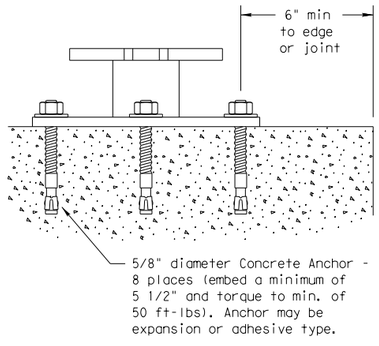
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

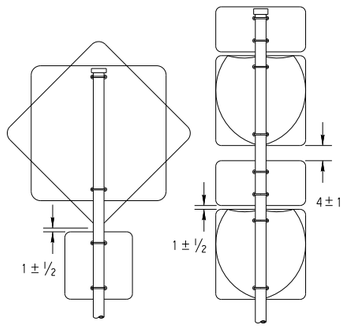
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

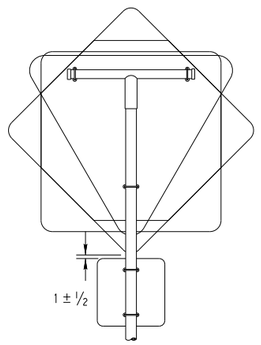
CONT	SECT	JOB	HIGHWAY
0275	04	061,ETC.	IH 40,ETC.

DIST	COUNTY	SHEET NO.
AMA	CARSON,ETC.	69

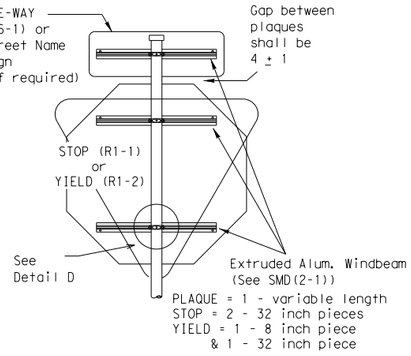
DATE:
FILE:



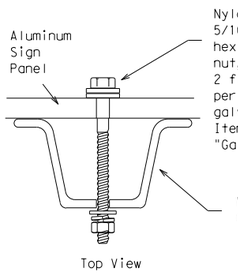
SM RD SGN ASSM TY XXXXX(1)XX(P)



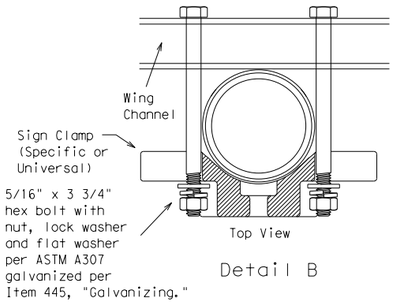
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



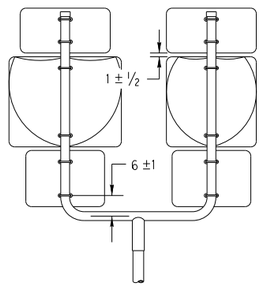
Detail B

GENERAL NOTES:

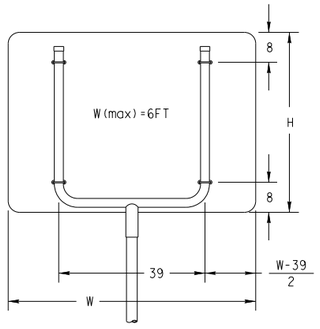
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

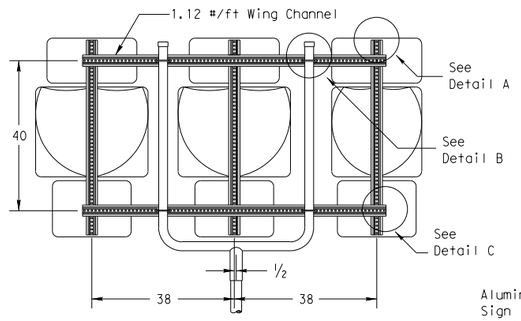
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



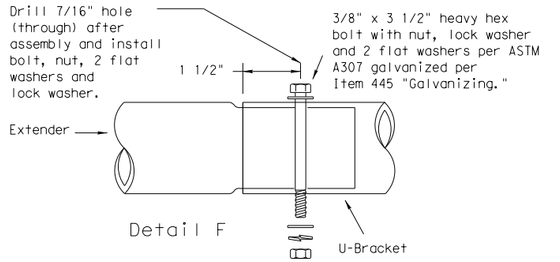
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

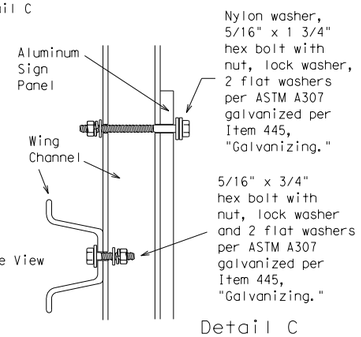


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

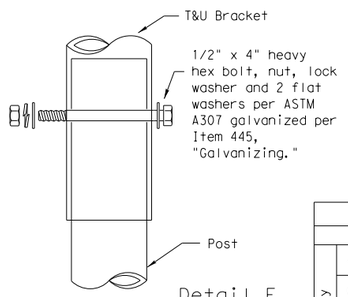


Detail F

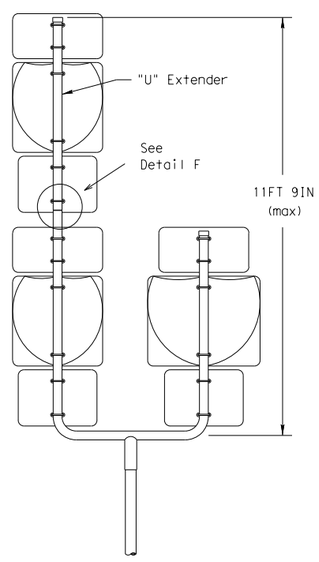
Splices shall only be allowed behind the sign substrate.



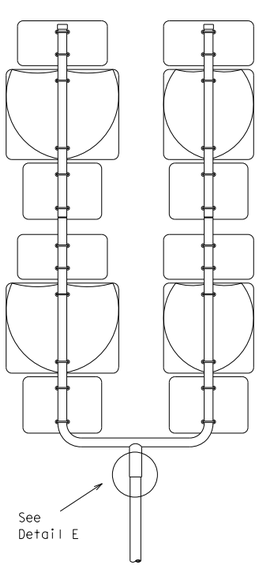
Detail C



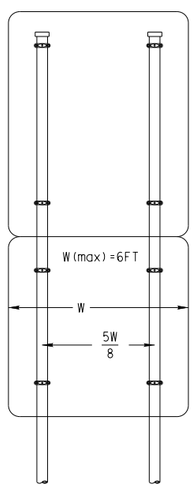
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

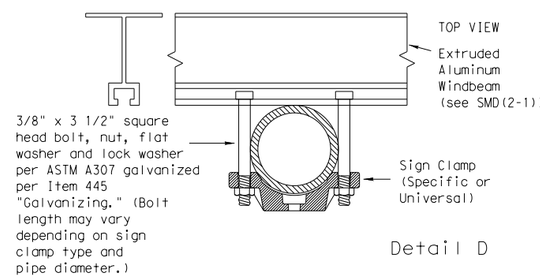


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

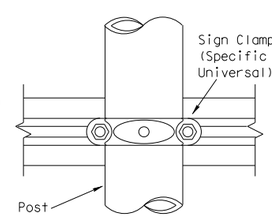


SM RD SGN ASSYM TY XXXXX(2)XX(P)

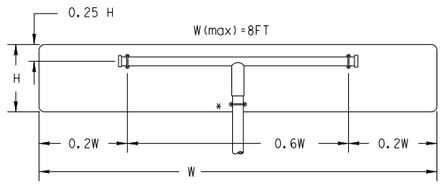
SIDE VIEW



Detail D



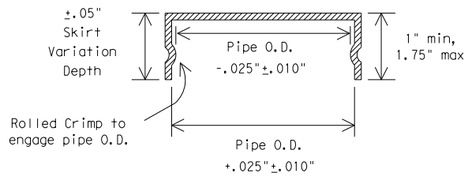
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

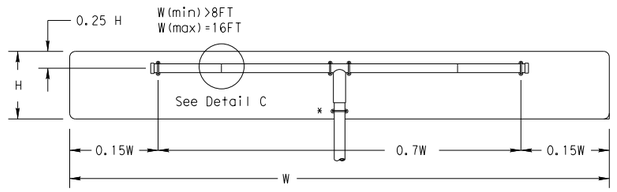
SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON,ETC.		70

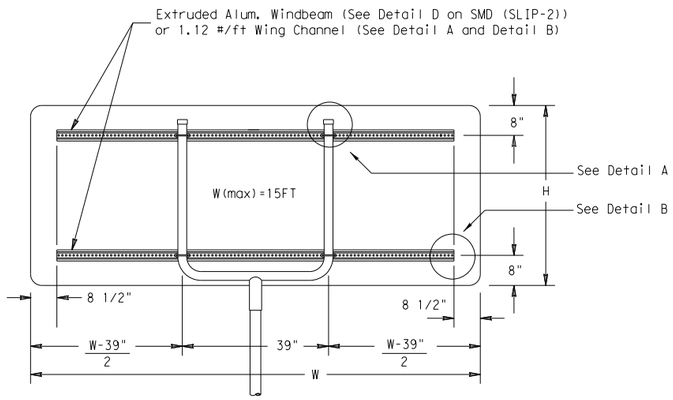
26C

DATE:
FILE:

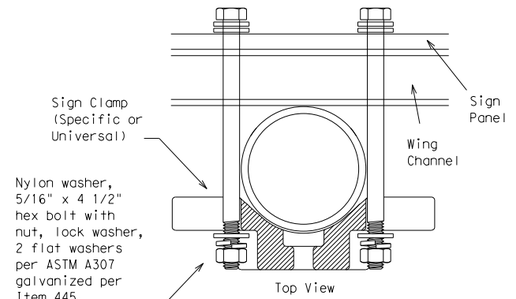
DATE:
FILE:



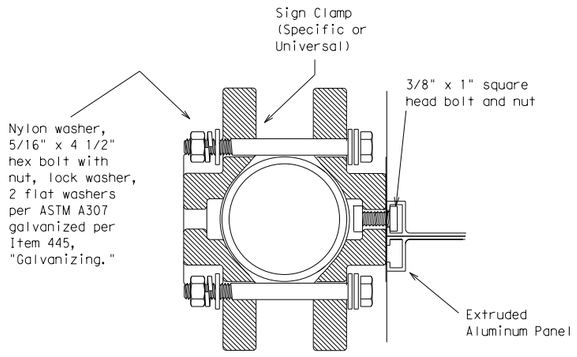
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



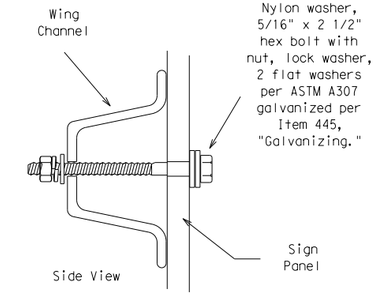
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



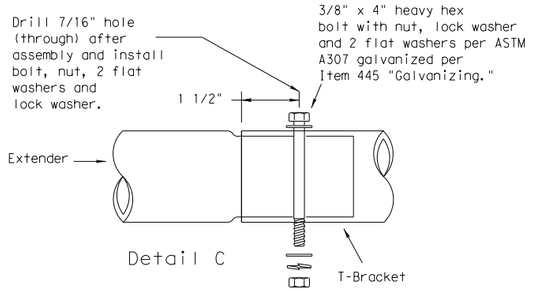
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

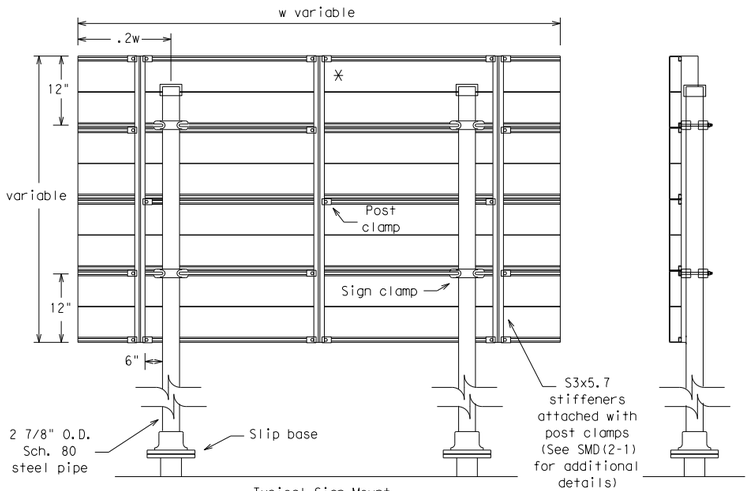


Detail B



Detail C

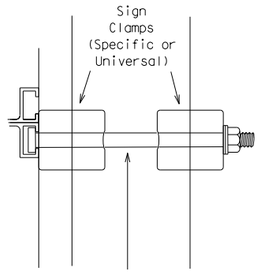
Splices shall only be allowed behind the sign substrate.



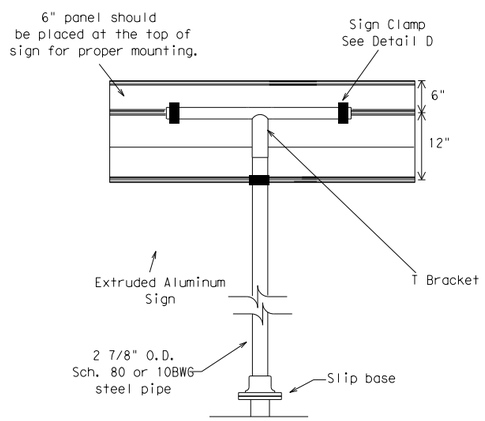
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

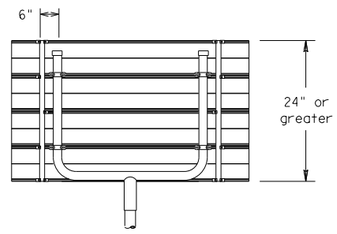
See Detail E
for clamp installation



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

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

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.

DIST	COUNTY	SHEET NO.
AMA	CARSON, ETC.	71

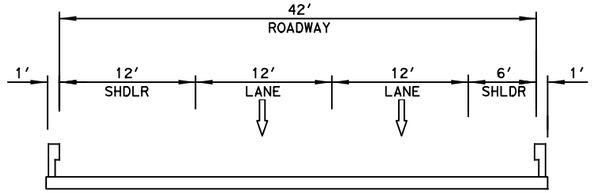
26D

CK
DW
CK
DW

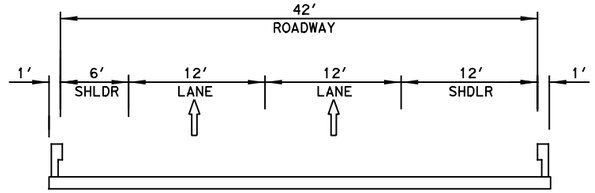
GENERAL SEQUENCE OF CONSTRUCTION:

1. CONSTRUCT EACH PROJECT AS DESCRIBED HERE. CONSECUTIVE IH 40 BRIDGES MAY NOT BE CLOSED CONCURRENTLY.
2. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS AND TCP DEVICES AS SHOWN ON THE PLANS AND/OR AS DIRECTED. DROP OFF CONDITIONS GREATER THAN 1 FEET MUST HAVE A 3:1 SAFETY SLOPE AT THE END OF EACH WORK DAY, AND AT ALL TIMES THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED.
3. PLACE PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) 7 CALENDAR DAYS IN ADVANCE OF LANE CLOSURES AND CHANGES IN TRAFFIC PATTERNS IN ACCORDANCE WITH THE TMUTCD & BC(6)-21.
4. PLACE EROSION CONTROL DEVICES PRIOR TO ANY SOIL DISTURBING ACTIVITIES AS DIRECTED.
5. PERFORM PROJECT CLEAN-UP PRIOR TO REMOVING EROSION CONTROL DEVICES.

REF 01: IH 40 WB OVERPASS AT BI 40F
REF 02: IH 40 EB OVERPASS AT BI 40F
REF 03: IH 40 WB OVERPASS AT FM 295
REF 04: IH 40 EB OVERPASS AT FM 295
REF 05: IH 40 WB OVERPASS AT FM 2300
REF 06: IH 40 EB OVERPASS AT FM 2300
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN



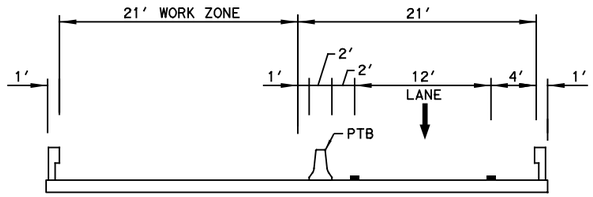
IH 40 WB - EXISTING



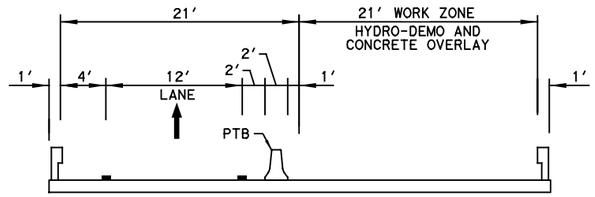
IH 40 EB - EXISTING

PHASE 1

1. FURNISH AND PLACE PCMS IN AN UNOBSCURED LOCATION AT PROJECT LIMITS TO ALERT MOTORISTS OF UPCOMING CHANGES IN TRAFFIC PATTERN.
2. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND LATEST TMUTCD.
3. CLOSE THE OUTSIDE LANES OF IH 40 AND SHIFT INSIDE LANES IN ACCORDANCE WITH THE WB & EB IH 40 TRAFFIC CONTROL PLAN SHEETS.
4. PERFORM BRIDGE REPAIRS AS DETAILED ON THE BRIDGE LOCATION REPAIR PLAN. REPLACE EXISTING BRIDGE RAIL ON OUTSIDE LANE.
5. HYDRO-DEMOLITION WORK OR ANY OTHER OVERHEAD REPAIRS WILL NOT OCCUR OVER LIVE TRAFFIC. CLOSE TRAVEL LANE BELOW WORK UTILIZING TCP(2-2)-18; ONE LANE TWO-WAY TRAFFIC CONTROL WITH FLAGGERS. TEMPORARY 24" STOP LINE MAY BE OMITTED FOR THIS WORK.
6. ADJUST EXISTING MBGF AND THRIE-BEAM TRANSITION TO NEW SSTR AND INSTALL MOW STRIP ALONG OUTSIDE LANE. PLANE AND TEXTURE EXISTING ASPHALT CONCRETE UP TO APPROACH SLAB.



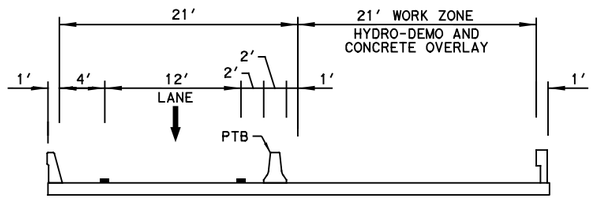
IH 40 WB - PHASE 1



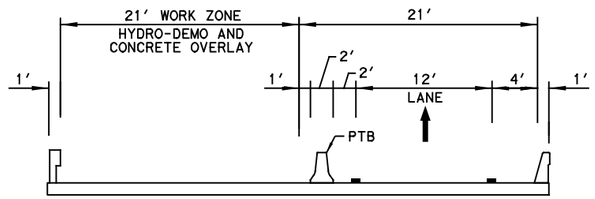
IH 40 EB - PHASE 1

PHASE 2

1. CLOSE THE INSIDE LANES OF IH 40 AND SHIFT OUTSIDE LANES IN ACCORDANCE WITH THE WB & EB IH 40 TRAFFIC CONTROL PLAN SHEETS.
2. PERFORM REMAINING BRIDGE REPAIRS AS DETAILED ON THE BRIDGE LOCATION REPAIR PLAN. REPLACE EXISTING BRIDGE RAIL ON INSIDE LANE.
3. HYDRO-DEMOLITION WORK OR ANY OTHER OVERHEAD REPAIRS WILL NOT OCCUR OVER LIVE TRAFFIC. CLOSE TRAVEL LANE BELOW WORK UTILIZING TCP(2-2)-18; ONE LANE TWO-WAY TRAFFIC CONTROL WITH FLAGGERS. TEMPORARY 24" STOP LINE MAY BE OMITTED FOR THIS WORK.
4. ADJUST EXISTING MBGF AND THRIE-BEAM TRANSITION TO NEW SSTR AND INSTALL MOW STRIP ALONG INSIDE LANE. PLANE AND TEXTURE EXISTING ASPHALT CONCRETE UP TO APPROACH SLAB. CONSTRUCT MEDIAN PROTECTION ITEMS IN MEDIAN OF ROADWAY.
5. INSTALL SHORT TERM PAVEMENT MARKINGS (TABS) AFTER WORK IS COMPLETE.
6. REMOVE TRAFFIC CONTROL DEVICES AND OPEN ROADWAY.
7. INSTALL FINAL PAVEMENT MARKINGS WITH MOBILE OPERATIONS TRAFFIC CONTROL.



IH 40 WB - PHASE 2



IH 40 EB - PHASE 2

NOTES:

1. TCP CHANNELIZING DEVICES ARE PLASTIC DRUMS AS DESCRIBED ON BC(8)-21.
2. OTHER TCP PHASING OPTIONS MAY BE USED IF APPROVED BY ENGINEER. SUBMIT PROPOSED TCP IN WRITING AT LEAST TWO WEEKS PRIOR TO BEGINNING REVISED PHASING OF WORK.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER

7/10/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

TCP NARRATIVE

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		72

DATE: 7/10/2023 10:38:49 AM
FILE: AMA-TCP-NARR01.dgn

CK
DW
CK
DW

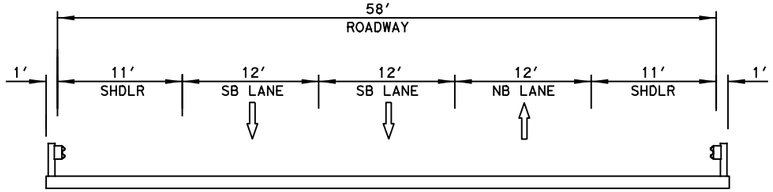
GENERAL SEQUENCE OF CONSTRUCTION:

1. CONSTRUCT EACH PROJECT AS DESCRIBED HERE.
2. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS AND TCP DEVICES AS SHOWN ON THE PLANS AND/OR AS DIRECTED. DROP OFF CONDITIONS GREATER THAN 1 FEET MUST HAVE A 3:1 SAFETY SLOPE AT THE END OF EACH WORK DAY, AND AT ALL TIMES THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED.
3. PLACE PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) 7 CALENDAR DAYS IN ADVANCE OF LANE CLOSURES AND CHANGES IN TRAFFIC PATTERNS IN ACCORDANCE WITH THE TMUTCD & BC(6)-21.
4. PLACE EROSION CONTROL DEVICES PRIOR TO ANY SOIL DISTURBING ACTIVITIES AS DIRECTED.
5. PERFORM PROJECT CLEAN-UP PRIOR TO REMOVING EROSION CONTROL DEVICES.

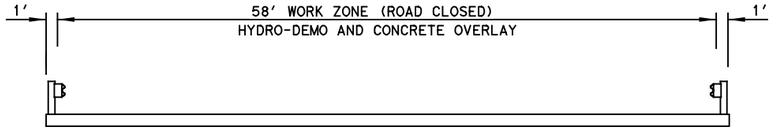
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)

PHASE 1

1. FURNISH AND PLACE PCMS IN AN UNOBSCURED LOCATION AT PROJECT LIMITS TO ALERT MOTORISTS OF UPCOMING CHANGES IN TRAFFIC PATTERN.
2. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND LATEST TMUTCD.
3. CLOSE BRIDGE AND DETOUR EXISTING TRAFFIC IN ACCORDANCE WITH DETOUR LAYOUT FOR SH 70 (NORTH).
4. PERFORM BRIDGE REPAIRS AS DETAILED ON THE BRIDGE LOCATION REPAIR PLAN. REPLACE EXISTING BRIDGE RAIL
5. HYDRO-DEMOLITION WORK OR ANY OTHER OVERHEAD REPAIRS WILL NOT OCCUR OVER LIVE TRAFFIC. CLOSE SINGLE IH 40 TRAVEL LANE BELOW WORK UTILIZING TCP(6-1)-12; TYPICAL FREEWAY ONE LANE CLOSURE.
6. REPLACE EXISTING MBGF AND APPURTENANCES AND INSTALL MOW STRIP AND PROPOSED TRAFFIC RAIL.
7. INSTALL FINAL PAVEMENT MARKINGS.
8. REMOVE TRAFFIC CONTROL DEVICES AND OPEN ROADWAY.
9. CLOSE IH 40 SHOULDERS UTILIZING PLASTIC DRUMS AND CONSTRUCT BRIDGE COLUMN PROTECTION ALONG CENTERLINE AND OUTSIDE IH 40 BENT LOCATIONS.



SH 70 (NORTH) OVER IH 40 - EXISTING

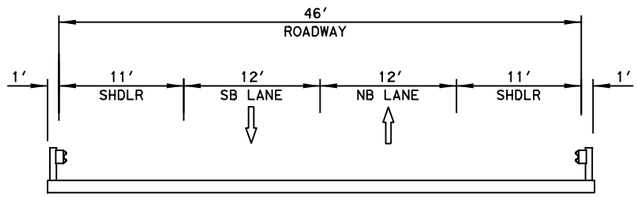


SH 70 (NORTH) OVER IH 40 - PHASE 1

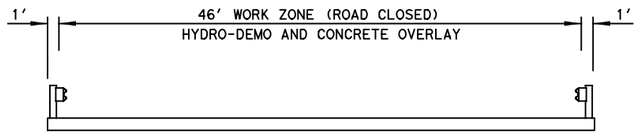
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)

PHASE 1

1. FURNISH AND PLACE PCMS IN AN UNOBSCURED LOCATION AT PROJECT LIMITS TO ALERT MOTORISTS OF UPCOMING CHANGES IN TRAFFIC PATTERN.
2. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND LATEST TMUTCD.
3. CLOSE BRIDGE AND DETOUR EXISTING TRAFFIC IN ACCORDANCE WITH DETOUR LAYOUT FOR SH 70 (SOUTH).
4. PERFORM BRIDGE REPAIRS AS DETAILED ON THE BRIDGE LOCATION REPAIR PLAN. REPLACE EXISTING BRIDGE RAIL
5. HYDRO-DEMOLITION WORK OR ANY OTHER OVERHEAD REPAIRS WILL NOT OCCUR OVER LIVE TRAFFIC. CLOSE SINGLE IH 40 TRAVEL LANE BELOW WORK UTILIZING TCP(6-1)-12; TYPICAL FREEWAY ONE LANE CLOSURE.
6. REPLACE EXISTING MBGF AND APPURTENANCES AND INSTALL MOW STRIP AND LEVEL UP.
7. INSTALL FINAL PAVEMENT MARKINGS.
8. REMOVE TRAFFIC CONTROL DEVICES AND OPEN ROADWAY.
9. CLOSE IH 40 SHOULDERS UTILIZING PLASTIC DRUMS AND CONSTRUCT BRIDGE COLUMN PROTECTION ALONG CENTERLINE AND OUTSIDE IH 40 BENT LOCATIONS.



SH 70 (SOUTH) OVER IH 40 - EXISTING



SH 70 (SOUTH) OVER IH 40 - PHASE 1

NOTES:

1. TCP CHANNELIZING DEVICES ARE PLASTIC DRUMS AS DESCRIBED ON BC(8)-21.
2. OTHER TCP PHASING OPTIONS MAY BE USED IF APPROVED BY ENGINEER. SUBMIT PROPOSED TCP IN WRITING AT LEAST TWO WEEKS PRIOR TO BEGINNING REVISED PHASING OF WORK.
3. SH 70 BRIDGE STRUCTURES ARE NOT ALLOWED TO BE CLOSED SIMULTANEOUSLY.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

TCP NARRATIVE

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		73

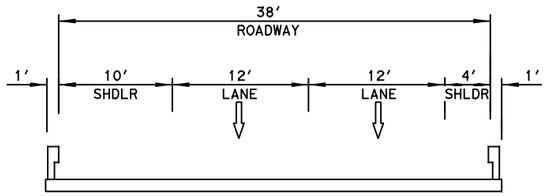
DATE: 7/7/2023 1:43:09 PM
FILE: AMA-TCP-NARR02.dgn

CK
DW
CK
DW

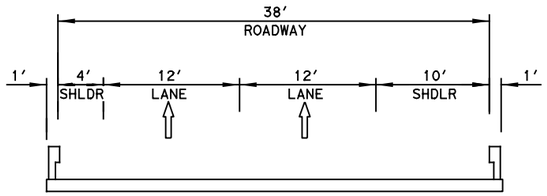
GENERAL SEQUENCE OF CONSTRUCTION:

1. CONSTRUCT EACH PROJECT AS DESCRIBED HERE.
2. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS AND TCP DEVICES AS SHOWN ON THE PLANS AND/OR AS DIRECTED. DROP OFF CONDITIONS GREATER THAN 1 FEET MUST HAVE A 3:1 SAFETY SLOPE AT THE END OF EACH WORK DAY, AND AT ALL TIMES THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED.
3. PLACE PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) 7 CALENDAR DAYS IN ADVANCE OF LANE CLOSURES AND CHANGES IN TRAFFIC PATTERNS IN ACCORDANCE WITH THE TMUTCD & BC(6)-21.
4. PLACE EROSION CONTROL DEVICES PRIOR TO ANY SOIL DISTURBING ACTIVITIES AS DIRECTED.
5. PERFORM PROJECT CLEAN-UP PRIOR TO REMOVING EROSION CONTROL DEVICES.

REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN



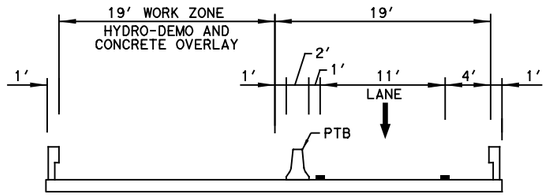
IH 40 WB - EXISTING



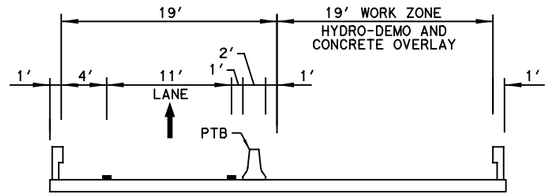
IH 40 EB - EXISTING

PHASE 1

1. FURNISH AND PLACE PCMS IN AN UNOBSCURED LOCATION AT PROJECT LIMITS TO ALERT MOTORISTS OF UPCOMING CHANGES IN TRAFFIC PATTERN.
2. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND LATEST TMUTCD.
3. CLOSE THE OUTSIDE LANES OF IH 40 AND SHIFT INSIDE LANES IN ACCORDANCE WITH THE WB & EB IH 40 TRAFFIC CONTROL PLAN SHEETS.
4. PERFORM BRIDGE REPAIRS AS DETAILED ON THE BRIDGE LOCATION REPAIR PLAN. REPLACE EXISTING BRIDGE RAIL ON OUTSIDE LANE.
5. HYDRO-DEMOLITION WORK OR ANY OTHER OVERHEAD REPAIRS WILL NOT OCCUR OVER LIVE TRAFFIC. CLOSE TRAVEL LANE BELOW WORK UTILIZING TCP(2-2)-18; ONE LANE TWO-WAY TRAFFIC CONTROL WITH FLAGGERS. TEMPORARY 24" STOP LINE MAY BE OMITTED FOR THIS WORK.
6. REPLACE EXISTING MBGF AND APPURTENANCES AND INSTALL MOW STRIP ALONG OUTSIDE LANE.



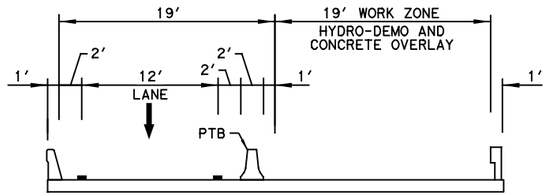
IH 40 WB - PHASE 1



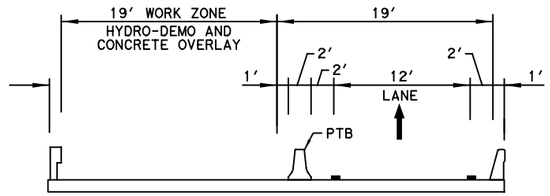
IH 40 EB - PHASE 1

PHASE 2

1. CLOSE THE INSIDE LANES OF IH 40 AND SHIFT OUTSIDE LANES IN ACCORDANCE WITH THE WB & EB IH 40 TRAFFIC CONTROL PLAN SHEETS.
2. PERFORM REMAINING BRIDGE REPAIRS AS DETAILED ON THE BRIDGE LOCATION REPAIR PLAN. REPLACE EXISTING BRIDGE RAIL ON INSIDE LANE.
3. HYDRO-DEMOLITION WORK OR ANY OTHER OVERHEAD REPAIRS WILL NOT OCCUR OVER LIVE TRAFFIC. CLOSE TRAVEL LANE BELOW WORK UTILIZING TCP(2-2)-18; ONE LANE TWO-WAY TRAFFIC CONTROL WITH FLAGGERS. TEMPORARY 24" STOP LINE MAY BE OMITTED FOR THIS WORK.
4. REPLACE EXISTING MBGF AND APPURTENANCES AND INSTALL MOW STRIP ALONG INSIDE LANE. CONSTRUCT MEDIAN PROTECTION ITEMS IN MEDIAN OF ROADWAY.
5. INSTALL SHORT TERM PAVEMENT MARKINGS (TABS) AFTER WORK IS COMPLETE.
6. REMOVE TRAFFIC CONTROL DEVICES AND OPEN ROADWAY.
7. INSTALL FINAL PAVEMENT MARKINGS WITH MOBILE OPERATIONS TRAFFIC CONTROL.



IH 40 WB - PHASE 2



IH 40 EB - PHASE 2

NOTES:

1. TCP CHANNELIZING DEVICES ARE PLASTIC DRUMS AS DESCRIBED ON BC(8)-21.
2. OTHER TCP PHASING OPTIONS MAY BE USED IF APPROVED BY ENGINEER. SUBMIT PROPOSED TCP IN WRITING AT LEAST TWO WEEKS PRIOR TO BEGINNING REVISED PHASING OF WORK.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER

P.E. 7/10/2023

NO.	DATE	REVISION	APPR BY

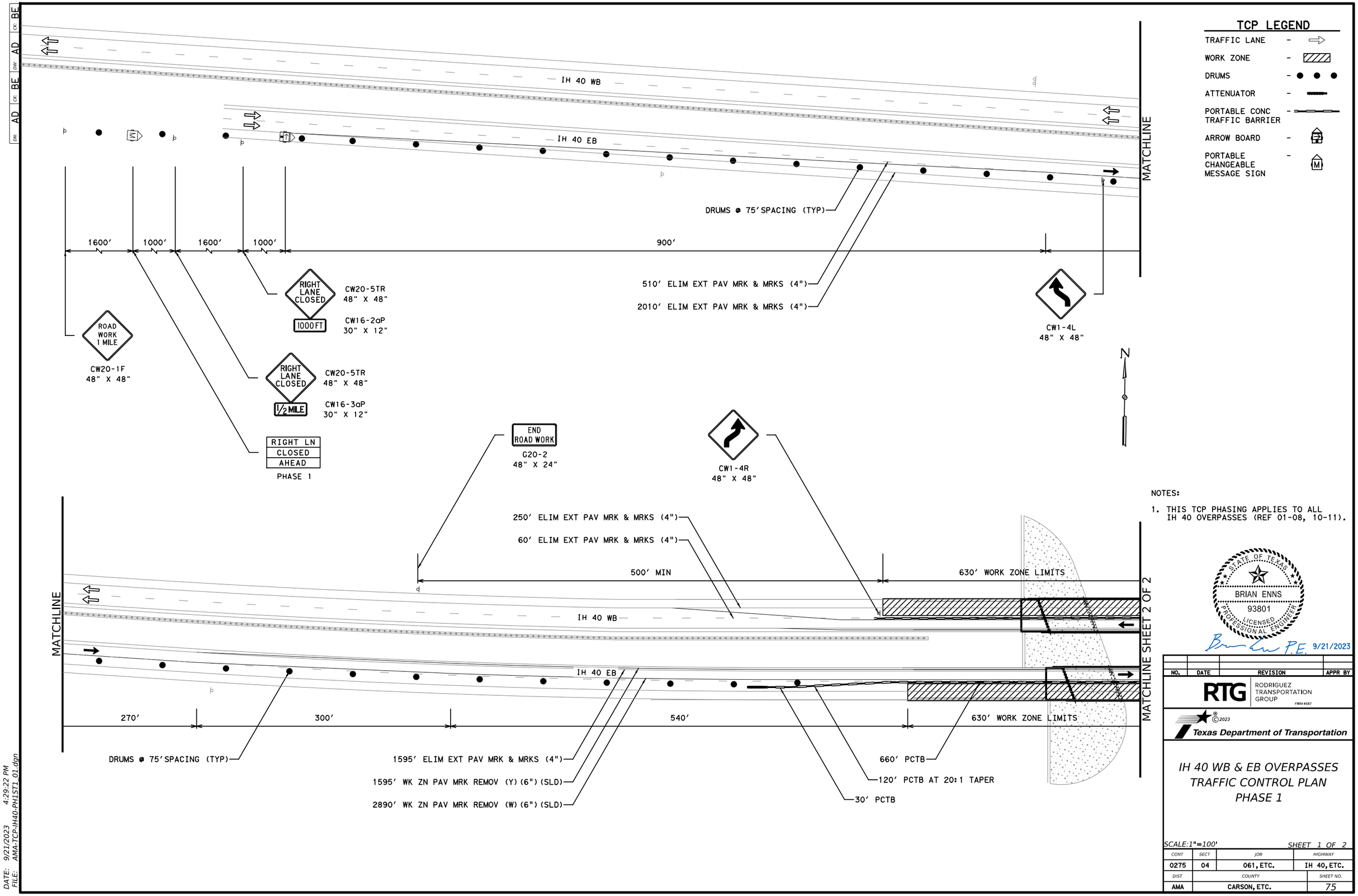
RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

TCP NARRATIVE

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		74

DATE: 7/10/2023 10:31:29 AM
FILE: AMA-TCP-NARR03.dgn



TCP LEGEND

- TRAFFIC LANE
- WORK ZONE
- DRUMS
- ATTENUATOR
- PORTABLE CONC TRAFFIC BARRIER
- ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. THIS TCP PHASING APPLIES TO ALL IH 40 OVERPASSES (REF 01-08, 10-11).

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 9/21/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

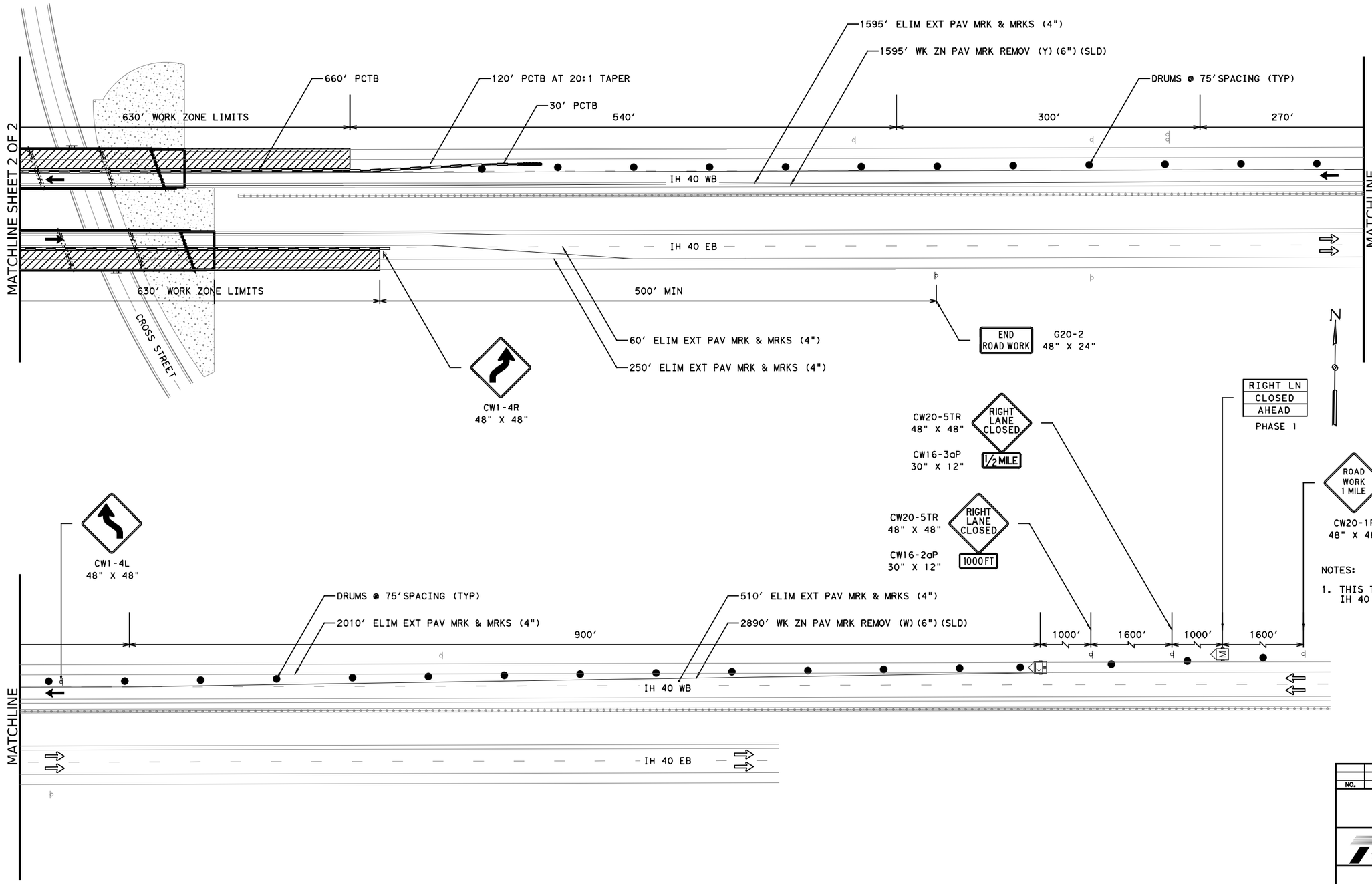
IH 40 WB & EB OVERPASSES TRAFFIC CONTROL PLAN PHASE 1

SCALE:1"=100' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		75

DATE: 9/21/2023 4:29:22 PM
FILE: AMA-TCP-IH40-PH1ST1 01.dgn

DW AD | DW BE | CK AD | CK BE



TCP LEGEND

- TRAFFIC LANE
- WORK ZONE
- DRUMS
- ATTENUATOR
- PORTABLE CONC TRAFFIC BARRIER
- ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. THIS TCP PHASING APPLIES TO ALL IH 40 OVERPASSES (REF 01-08, 10-11).

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 9/21/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

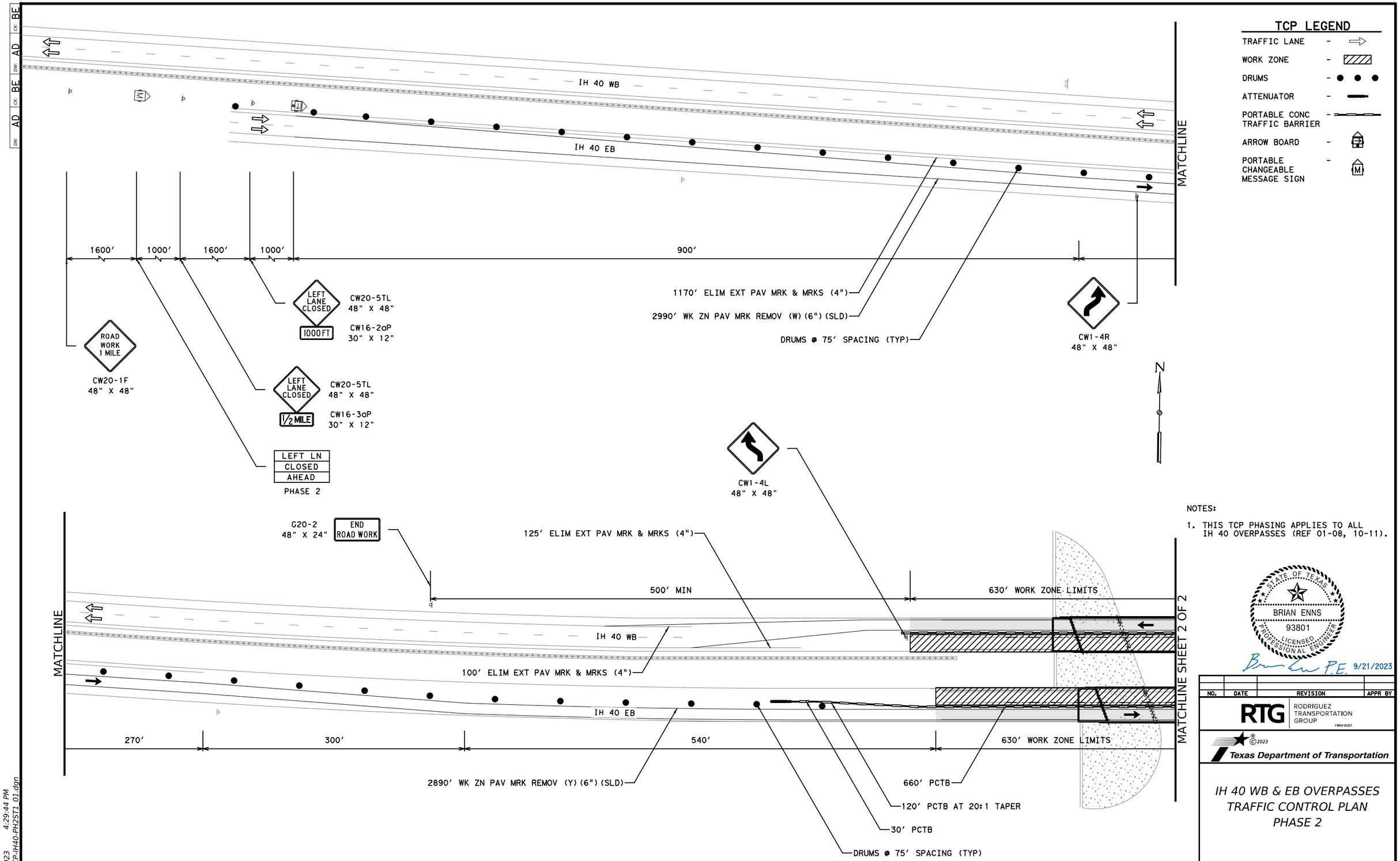
Texas Department of Transportation

IH 40 WB & EB OVERPASSES TRAFFIC CONTROL PLAN PHASE 1

SCALE:1"=100' SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		76

DATE: 9/21/2023 4:29:33 PM
FILE: AMA-TCP-IH40-PH1ST1 02.dgn



TCP LEGEND

- TRAFFIC LANE
- WORK ZONE
- DRUMS
- ATTENUATOR
- PORTABLE CONC TRAFFIC BARRIER
- ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. THIS TCP PHASING APPLIES TO ALL IH 40 OVERPASSES (REF 01-08, 10-11).

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 9/21/2023

NO.	DATE	REVISION	APPR BY

RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

Texas Department of Transportation

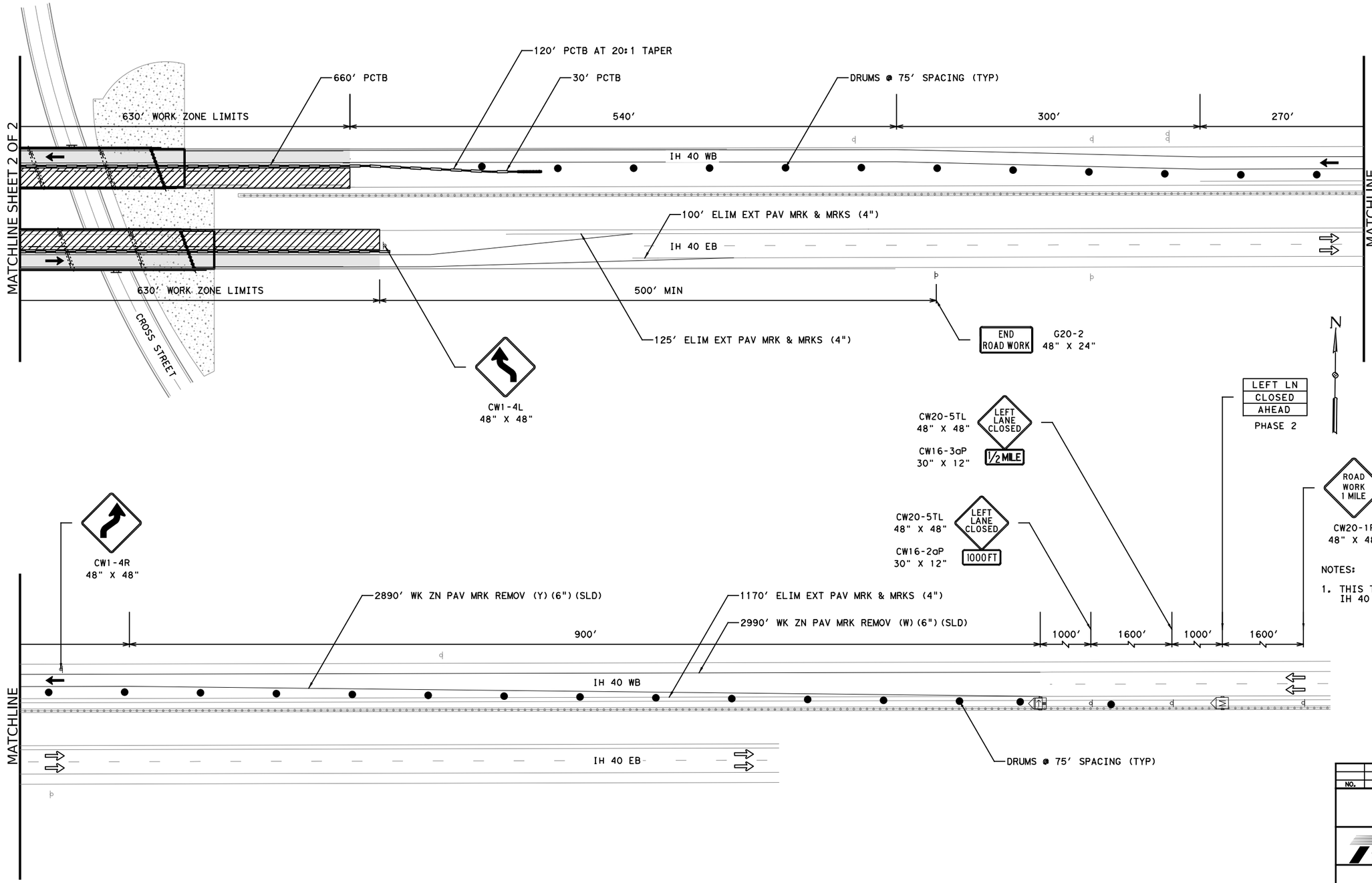
IH 40 WB & EB OVERPASSES TRAFFIC CONTROL PLAN PHASE 2

SCALE:1"=100' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		77

DATE: 9/21/2023 4:29:44 PM
FILE: AMA-TCP-IH40-PH2ST1 01.dgn

DW AD | CK BE | DW AD | CK BE



TCP LEGEND

- TRAFFIC LANE
- WORK ZONE
- DRUMS
- ATTENUATOR
- PORTABLE CONC TRAFFIC BARRIER
- ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. THIS TCP PHASING APPLIES TO ALL IH 40 OVERPASSES (REF 01-08, 10-11).

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 9/21/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

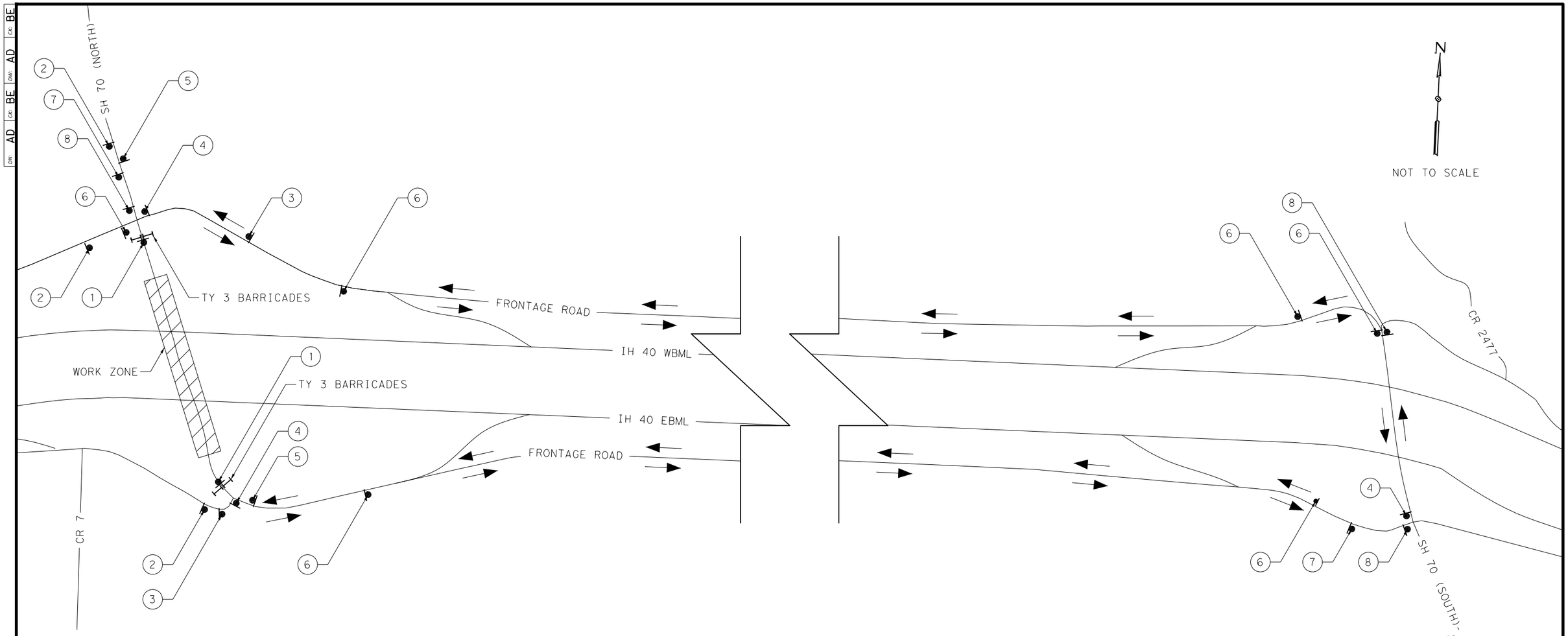
IH 40 WB & EB OVERPASSES TRAFFIC CONTROL PLAN PHASE 2

SCALE:1"=100' SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061,ETC.	IH 40,ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON,ETC.		78

DATE: 9/21/2023 4:29:55 PM
FILE: AMA-TCP-IH40-PH2ST1 02.dgn

BE | CK | AD | DW
BE | CK | AD | DW



1		2		3		4		5	6		7		8		
ROAD CLOSED	R11-2 48" X 30"	DETOUR AHEAD	CW20-2D 48" X 48"	DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"	END DETOUR	DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"	
				70 TEXAS	M1-6T 24" X 24"	70 TEXAS	M1-6T 24" X 24"	M4-8a 24" X 18"	70 TEXAS	M1-6T 24" X 24"	70 TEXAS	M1-6T 24" X 24"	70 TEXAS	M1-6T 24" X 24"	
					M5-1R 21" X 15"		M6-1 21" X 15"			M6-3 21" X 15"		M5-1L 21" X 15"		M6-1 21" X 15"	

NOTES:
1. REFER TO BC(2)-21 FOR SIGN SPACING REQUIREMENTS.
2. THIS DETOUR APPLIES TO REF 09 BRIDGE.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
P.E. 7/7/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

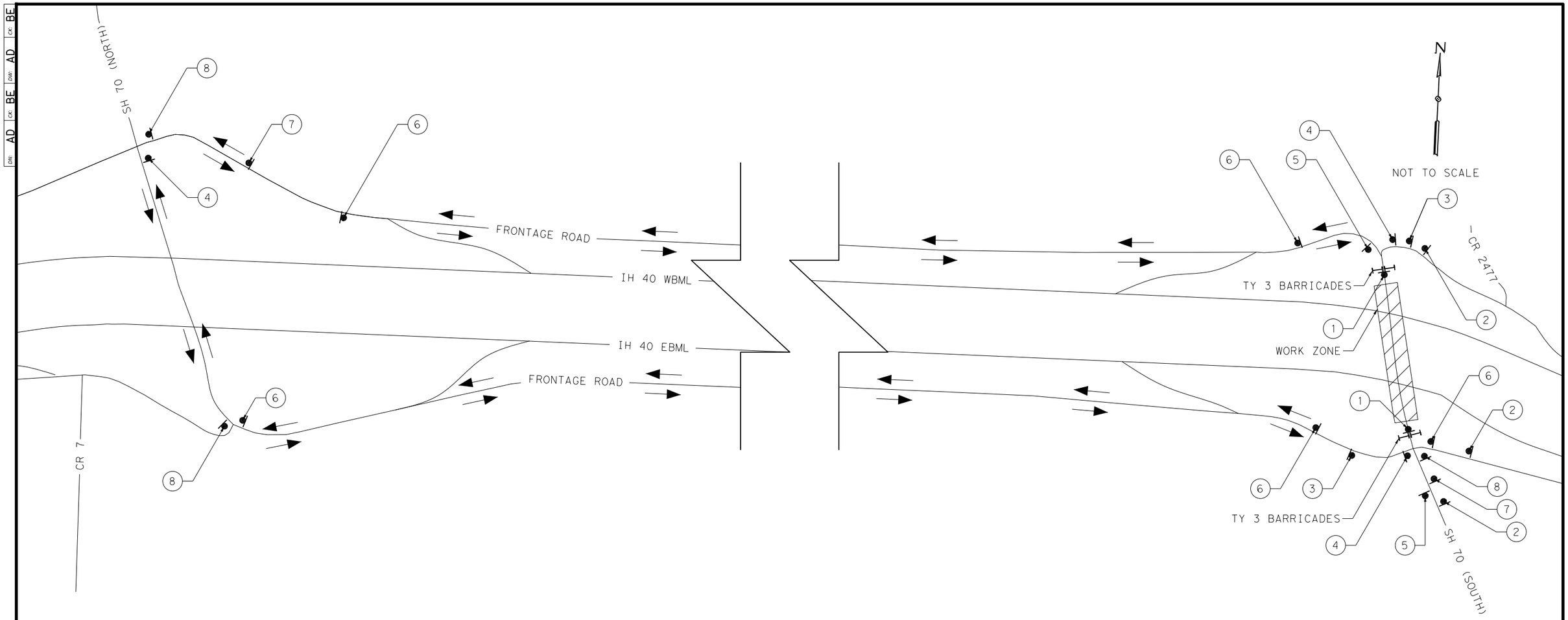
TRAFFIC CONTROL PLAN
SH 70 NORTH
DETOUR

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		79

DATE: 7/7/2023 1:44:23 PM
FILE: AMA-TCP-DET01.dgn

DW AD | DW BE | CK AD | DW BE | CK AD | DW BE



1	2	3	4	5	6	7	8
ROAD CLOSED R11-2 48" X 30"	DETOUR AHEAD CW20-2D 48" X 48"	DETOUR M4-8 24" X 12"	DETOUR M4-8 24" X 12"	END DETOUR M4-8a 24" X 18"	DETOUR M4-8 24" X 12"	DETOUR M4-8 24" X 12"	DETOUR M4-8 24" X 12"
		70 TEXAS M1-6T 24" X 24"	70 TEXAS M1-6T 24" X 24"		70 TEXAS M1-6T 24" X 24"	70 TEXAS M1-6T 24" X 24"	70 TEXAS M1-6T 24" X 24"
		M5-1R 21" X 15"	M6-1 21" X 15"		M6-3 21" X 15"	M5-1L 21" X 15"	M6-1 21" X 15"

NOTES:
1. REFER TO BC(2)-21 FOR SIGN SPACING REQUIREMENTS.
2. THIS DETOUR APPLIES TO REF 12 BRIDGE.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER
P.E. 7/7/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

TRAFFIC CONTROL PLAN
SH 70 SOUTH
DETOUR

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		80

DATE: 7/7/2023 1:44:35 PM
FILE: AMA-TCP-DET02.dgn

LOC NO.	TCP PHASE	ROADWAY PORTION	LOCATION	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
														MOVE / RESET		L	L	R	R	S	S
						PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC. #	N	W	N	W	N	W
1	PHASE 1	OUTSIDE CLOSURE	REF 01: IH 40 WB OVERPASS AT BI 40F	TL-3	UNI			F SHAPE CTB	24"	32"		1								X	
2	PHASE 2	INSIDE CLOSURE	REF 01: IH 40 WB OVERPASS AT BI 40F	TL-3	UNI			F SHAPE CTB	24"	32"				1	1					X	
3	PHASE 1	OUTSIDE CLOSURE	REF 02: IH 40 EB OVERPASS AT BI 40F	TL-3	UNI			F SHAPE CTB	24"	32"		1								X	
4	PHASE 2	INSIDE CLOSURE	REF 02: IH 40 EB OVERPASS AT BI 40F	TL-3	UNI			F SHAPE CTB	24"	32"				1	3					X	
5	PHASE 1	OUTSIDE CLOSURE	REF 03: IH 40 WB OVERPASS AT FM 295	TL-3	UNI			F SHAPE CTB	24"	32"				1	2					X	
6	PHASE 2	INSIDE CLOSURE	REF 03: IH 40 WB OVERPASS AT FM 295	TL-3	UNI			F SHAPE CTB	24"	32"				1	5					X	
7	PHASE 1	OUTSIDE CLOSURE	REF 04: IH 40 EB OVERPASS AT FM 295	TL-3	UNI			F SHAPE CTB	24"	32"				1	4					X	
8	PHASE 2	INSIDE CLOSURE	REF 04: IH 40 EB OVERPASS AT FM 295	TL-3	UNI			F SHAPE CTB	24"	32"				1	7					X	
9	PHASE 1	OUTSIDE CLOSURE	REF 05: IH 40 WB OVERPASS AT FM 2300	TL-3	UNI			F SHAPE CTB	24"	32"				1	6					X	
10	PHASE 2	INSIDE CLOSURE	REF 05: IH 40 WB OVERPASS AT FM 2300	TL-3	UNI			F SHAPE CTB	24"	32"				1	9					X	
11	PHASE 1	OUTSIDE CLOSURE	REF 06: IH 40 EB OVERPASS AT FM 2300	TL-3	UNI			F SHAPE CTB	24"	32"				1	8					X	
12	PHASE 2	INSIDE CLOSURE	REF 06: IH 40 EB OVERPASS AT FM 2300	TL-3	UNI			F SHAPE CTB	24"	32"				1	11					X	
13	PHASE 1	OUTSIDE CLOSURE	REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"				1	10					X	
14	PHASE 2	INSIDE CLOSURE	REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"				1	13					X	
15	PHASE 1	OUTSIDE CLOSURE	REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"				1	12					X	
16	PHASE 2	INSIDE CLOSURE	REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"				1	15					X	
17	PHASE 1	OUTSIDE CLOSURE	REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"				1	14					X	
18	PHASE 2	INSIDE CLOSURE	REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"			1	1	17					X	
19	PHASE 1	OUTSIDE CLOSURE	REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"				1	16					X	
20	PHASE 2	INSIDE CLOSURE	REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	TL-3	UNI			F SHAPE CTB	24"	32"			1	1	19					X	
21	PERMANENT	IH 40 WBML	REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)	TL-3	BI			SSCB	24"	32"		1				X					
22	PERMANENT	IH 40 EBML	REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)	TL-3	BI			SSCB	24"	32"		1				X					
23	PERMANENT	IH 40 WBML	REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)	TL-3	BI			SSCB	24"	32"		1				X					
24	PERMANENT	IH 40 EBML	REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)	TL-3	BI			SSCB	24"	32"		1				X					
25	PERMANENT	IH 40 WBML	REF 01: IH 40 WB OVERPASS AT BI 40F	TL-3	BI			SSCB	24"	32"		1				X					
26	PERMANENT	IH 40 EBML	REF 02: IH 40 EB OVERPASS AT BI 40F	TL-3	BI			SSCB	24"	32"		1				X					
27	PERMANENT	IH 40 WBML	REF 03: IH 40 WB OVERPASS AT FM 295	TL-3	BI			SSCB	24"	32"		1				X					
28	PERMANENT	IH 40 EBML	REF 04: IH 40 EB OVERPASS AT FM 295	TL-3	BI			SSCB	24"	32"		1				X					
29	PERMANENT	IH 40 WBML	REF 05: IH 40 WB OVERPASS AT FM 2300	TL-3	BI			SSCB	24"	32"		1				X					
30	PERMANENT	IH 40 EBML	REF 06: IH 40 EB OVERPASS AT FM 2300	TL-3	BI			SSCB	24"	32"		1				X					
31	PERMANENT	IH 40 WBML	REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN	TL-3	BI			SSCB	24"	32"		1				X					
32	PERMANENT	IH 40 EBML	REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN	TL-3	BI			SSCB	24"	32"		1				X					
33	PERMANENT	IH 40 WBML	REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	TL-3	BI			SSCB	24"	32"		1				X					
34	PERMANENT	IH 40 EBML	REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN	TL-3	BI			SSCB	24"	32"		1				X					
											TOTALS	16	2	18							

LEGEND:

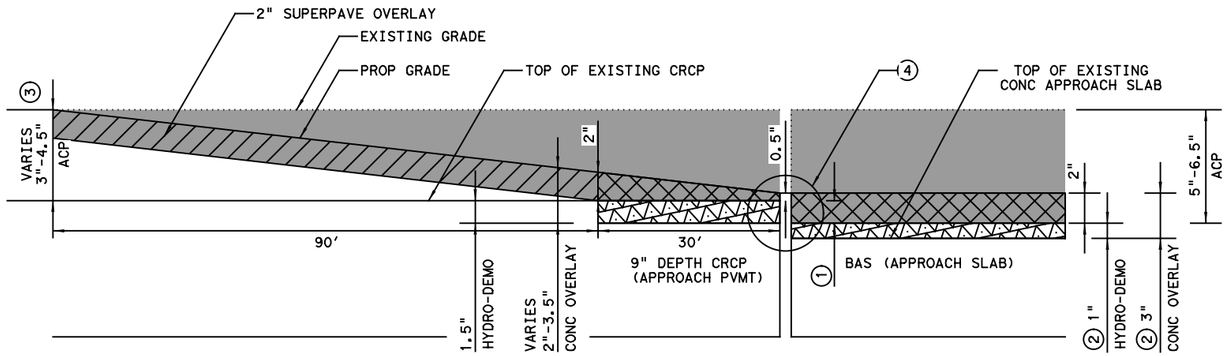
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

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

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
P.E. 7/1/2023

CRASH CUSHION SUMMARY SHEET

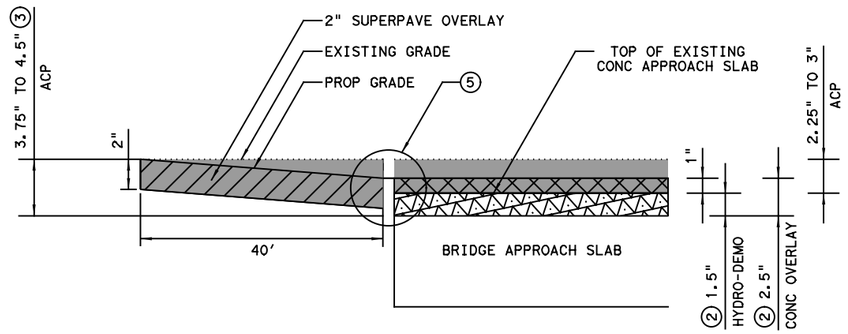
FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061,ETC.	IH 40,ETC.
	DIST	COUNTY	
	AMA	CARSON,ETC.	
	FEDERAL AID PROJECT	SHEET NO.	
	SEE TITLE SHEET	81	



PAVEMENT TRANSITION DETAIL 1 (ELEVATION VIEW)

REF 01: IH 40 WB OVERPASS AT BI 40F
REF 02: IH 40 EB OVERPASS AT BI 40F
REF 03: IH 40 WB OVERPASS AT FM 295
REF 04: IH 40 EB OVERPASS AT FM 295
REF 05: IH 40 WB OVERPASS AT FM 2300
REF 06: IH 40 EB OVERPASS AT FM 2300
REF 07: IH 40 WB OVERPASS AT FR CONN
REF 08: IH 40 EB OVERPASS AT FR CONN

NOT TO SCALE



PAVEMENT TRANSITION DETAIL 2 (ELEVATION VIEW)

REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)

NOT TO SCALE

LEGEND

- PLANE ASPH CONC PVMT
- 2" SP-D PG70-28 OVERLAY
- HYDRO-DEMOLITION AND CONCRETE OVERLAY
- CONCRETE OVERLAY

1. TOP OF CRCP IS APPROXIMATELY 1.75" TO 2" HIGHER THAN THE TOP OF BAS AND BRIDGE DECK ACCORDING TO THE 2011 AS BUILT REPAIR PLANS.
2. SEE PERTINENT BRIDGE PLANS FOR HYDRO-DEMO AND CONCRETE OVERLAY OVER THE APPROACH SLAB AND BRIDGE DECK.
3. ESTIMATED ACP THICKNESS BASED IN AS-BUILT PLANS. ACTUAL THICKNESS MAY VARY.
4. RELIEF JOINT TO BE REPLACED. SEE SEJ REPLACEMENT DETAIL ON THE MISCELLANEOUS BRIDGE REPAIR DETAILS SHEETS FOR EXISTING AND PROPOSED DETAILS. THE PROPOSED CONCRETE OVERLAY ON THE CRCP SHALL BE CAST MONOLITHICALLY WITH THE PROPOSED SEJ.
5. RELIEF JOINT TO BE RESIZED AND SEALED. SEE PERTINENT BRIDGE PLANS FOR DETAILS.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
P.E. 7/7/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

ROADWAY PAVEMENT TRANSITION DETAILS

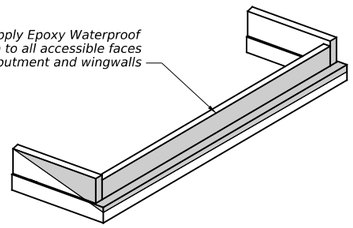
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		82

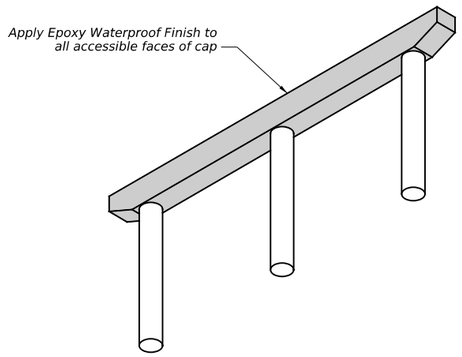
DATE: 7/7/2023 1:46:18 PM
FILE: AMA-RDWY-PVMNT-DET01.dgn

FINAL SUBMITTAL (100%)

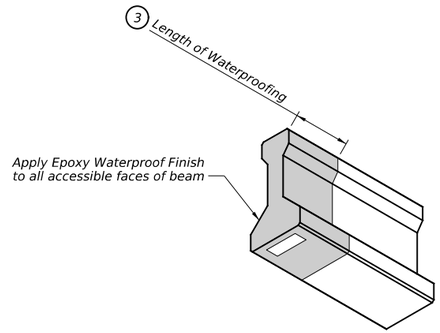
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



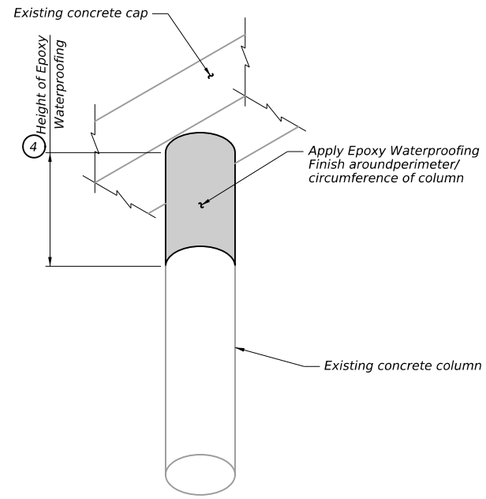
TYPICAL ABUTMENT (1)



TYPICAL BENT (1)



TYPICAL PRESTRESSED BEAM (2)



COLUMN DETAIL

(1) The abutment and bent shown are generic. Similar abutments and bents will be found in the field. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometric sheets for square foot area of waterproofing required.

(2) This prestressed beam section is generic and other sections may be found in field.

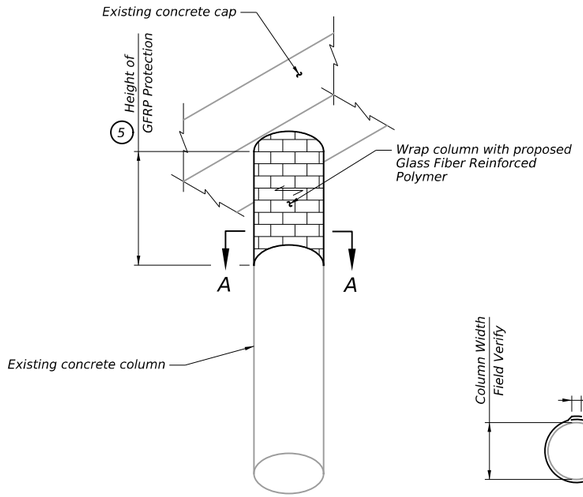
(3) See Table of Beam Repairs on the Bridge Location Repair Plan sheets for length and area of waterproofing required.

(4) See Substructure Isometrics for height of Waterproofing.

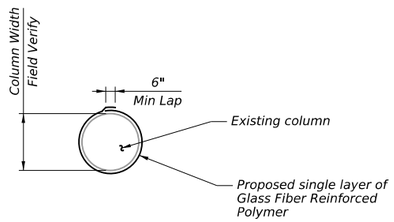
EPOXY WATERPROOF FINISH DETAIL

EPOXY WATERPROOF FINISH NOTES:

1. Perform all concrete repair work in accordance with Item 429 prior to cleaning surfaces for waterproofing.
2. Blast clean surfaces and apply waterproofing in accordance with Item 427, "Surface Finishes for Concrete".
3. Refer to Item 427 of the General Notes for additional notes about waterproofing.



ISOMETRIC



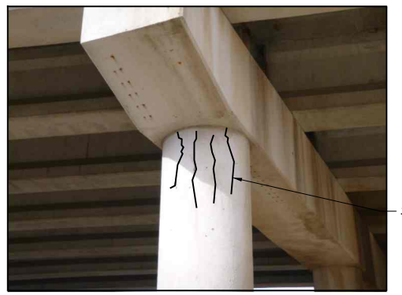
SECTION A-A

GFRP COLUMN WRAPPING DETAIL

(5) See Substructure Isometrics for height of GFRP Protection

GFRP COLUMN WRAPPING NOTES:

1. Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer.
2. Perform all concrete repair work prior to surface preparation for Glass Fiber Reinforced Polymer (GFRP) in accordance with Item 429.
3. Prepare concrete surface and install Externally Bonded FRP Structural Member Protection consisting of glass fibers in accordance with DMS-4700 and Item 786, "Carbon Fiber Reinforced Polymer". Substitution of carbon fiber is permissible. Payment is per Item 786, "Carbon Fiber Reinforced Polymer (CFRP)".
4. Wrap columns beginning from the bottom and proceed upward.
5. Orient unidirectional fibers horizontally, around the perimeter/circumference of the column. Utilize largest widths practical and overlap successive wraps by 6" minimum.
6. GFRP is for protection and confinement only. Working drawings are not required.
7. Clean and paint completed GFRP with UV protective paint as recommended by manufacturer. Match color to surrounding concrete as approved by the Engineer.



TYPICAL COLUMN SPLIT CRACKING

(Showing Bent 3 Column 3 from IH 40 WB Overpass at FM 295)

STATE OF TEXAS
BRETT R.C. ALLEN
133221
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Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

MISCELLANEOUS BRIDGE REPAIR DETAILS

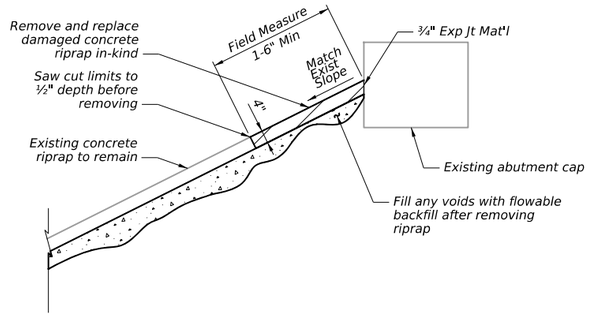
SCALE: N.T.S. SHEET 1 OF 6

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		83

DATE: 7/8/2023 2:31:39 PM
FILE: AMA_DET01.dgn

FINAL SUBMITTAL (100%)

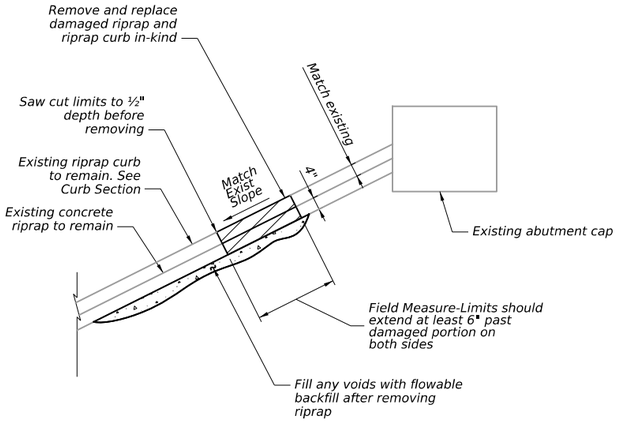
DW:	CAM	Ck:	LJG	DW:	CAM	Ck:	LJG



CONCRETE RIPRAP AT ABUTMENT DETAIL

TYPICAL RIPRAP DAMAGE AT ABUTMENT

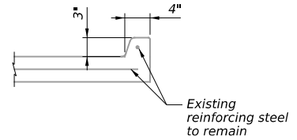
(Showing Abutment 1 SE face from IH 40 WB Overpass at IH 40H FR Conn)



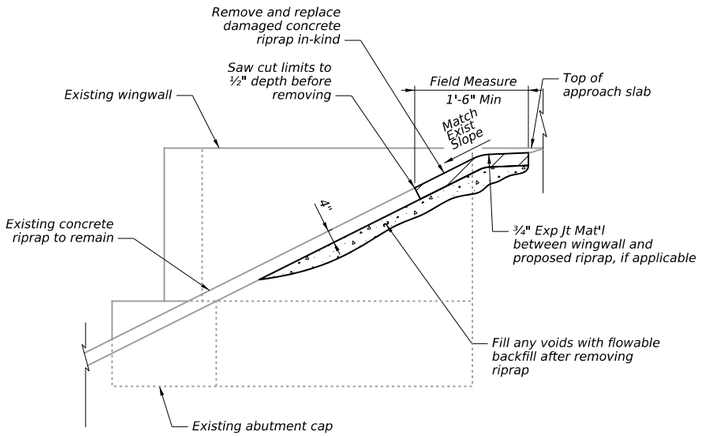
CONCRETE RIPRAP CURB DETAIL

TYPICAL RIPRAP CURB DAMAGE

(Showing riprap curb at Abutment 1 from IH 40 WB Overpass at FM 295)



CURB SECTION



CONCRETE RIPRAP AT WINGWALL DETAIL

Beams and railings not shown for clarity

TYPICAL RIPRAP DAMAGE AT WINGWALL

(Showing Abutment 4 NE face from IH 40 EB Overpass at IH 40F FR Conn)

CONCRETE RIPRAP NOTES:

1. Quantity estimates of repairs are based on as-builts and the most recent inspection. Field verify limits of repairs and report deviations to the Engineer.
2. Sawcut and remove concrete in accordance with Item 104, "Removing Concrete".
3. Existing reinforcing steel shall be cleaned, straightened and left in place. Replace any damaged reinforcing in accordance with Item 432, "Riprap".
4. If any voids are discovered after removing the riprap, they are to be backfilled with flowable fill as specified in Item 401, "Flowable Backfill".
5. Install proposed riprap in accordance with item 432, "Riprap," to match the slope of the existing riprap.
6. Refer to CRR standard for further information on riprap. Refer to Item 432 of the General Notes for additional notes about riprap joints.

CONCRETE RIPRAP DETAILS

STATE OF TEXAS
BRETT R.C. ALLEN
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LICENSED PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

MISCELLANEOUS BRIDGE REPAIR DETAILS

SCALE: N.T.S.

SHEET 2 OF 6

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		84

DATE: 7/7/2023 5:04:20 PM
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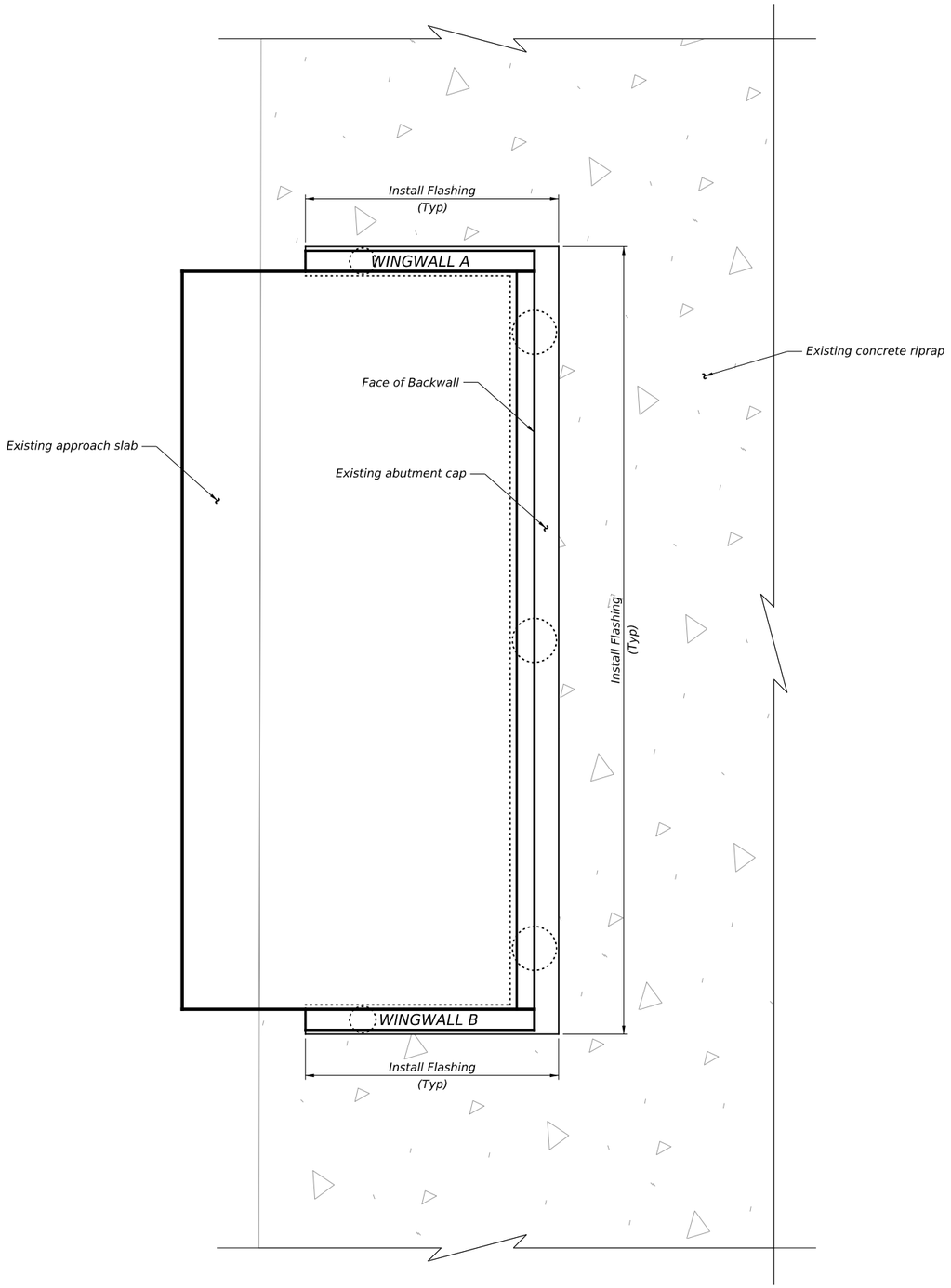
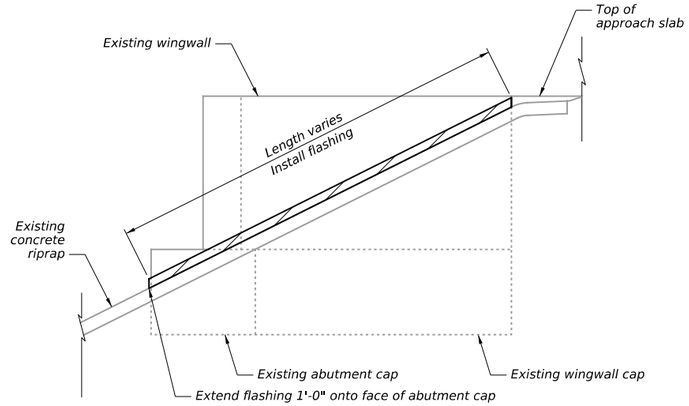
FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



ABUTMENT PLAN VIEW: SHOWING RIPRAP (TYP)

Deck not shown for clarity



WINGWALL ELEVATION VIEW (TYP): SHOWING RIPRAP

Beams and railings not shown for clarity

CONCRETE RIPRAP JOINT SEAL FLASHING NOTES:

1. Flashing will be paid for under Item 713.
2. Remove any existing joint material and clean debris and vegetation between the riprap and abutment joint. This work is subsidiary to Item 713 and will not be paid for separately.
3. Refer to Cap Option A on CRR Standard for any pertinent details not shown on this sheet.

CONCRETE RIPRAP JOINT SEAL FLASHING DETAIL

STATE OF TEXAS
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PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

MISCELLANEOUS BRIDGE
REPAIR DETAILS

SCALE: N.T.S.

SHEET 3 OF 6

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		85

DATE: 7/7/2023 5:04:32 PM
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FINAL SUBMITTAL (100%)

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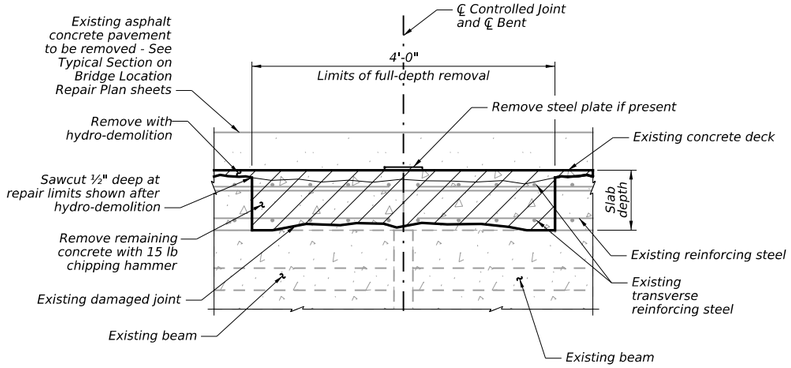
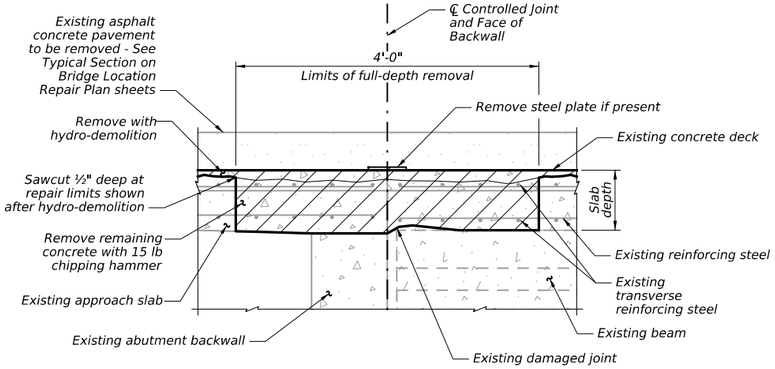
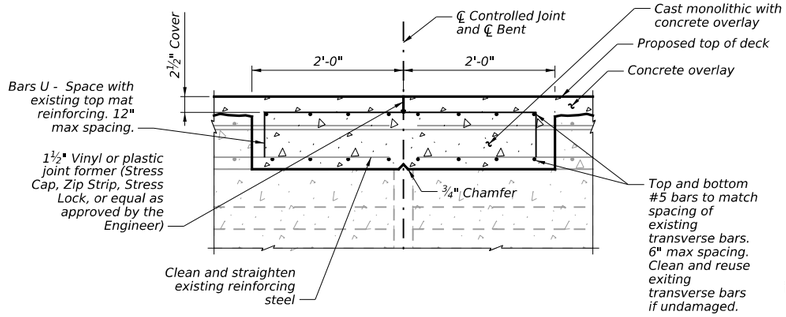


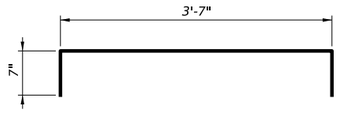
AT BENT - EXISTING



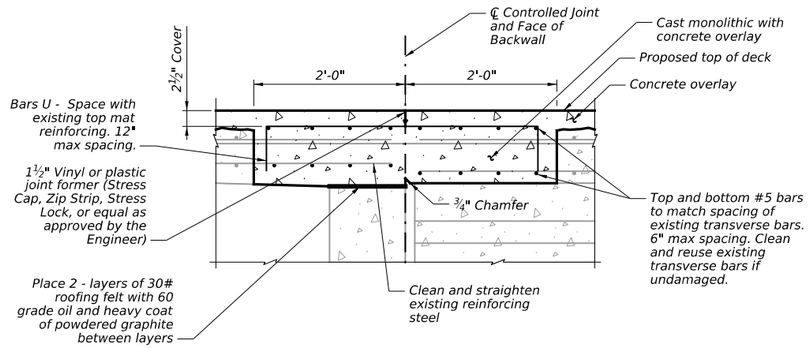
AT ABUTMENT - EXISTING



AT BENT - PROPOSED



BARS U (#5)



AT ABUTMENT - PROPOSED

TYPICAL DAMAGE IN DECK SOFFIT
AT JOINTS AT INTERIOR BENTS
(Showing Joint 2 from IH 40 WB Overpass at BI 40F)

FULL-DEPTH CONTROLLED JOINT REPLACEMENT NOTES:

1. *Identify and mark all repair areas prior to beginning work. Verify areas and quantities with the Engineer.*
2. *Prepare detailed repair procedure in accordance with Item 785, "Bridge Joint Repair or Replacement" and Chapter 3, Section 4 of the TxDOT Concrete Repair Manual and detail herein.*
3. *Deck concrete shall be Class S concrete (f'c = 4000 psi)*
4. *Reinforcing steel shall be Grade 60, and all new reinforcing steel in the deck shall be epoxy coated. Replace existing reinforcing as directed by the Engineer. Lap length is 3'-0" for #5 bars; lap length is 2'-5" for #4 bars. Refer to Item 440 of the General Notes about reinforcement.*
5. *Avoid damage to existing beams, backwall, and diaphragms. Repair concrete damage per Item 785, "Bridge Joint Repair or Replacement".*

TYPICAL DAMAGE IN DECK SOFFIT
AT JOINTS AT ABUTMENTS
(Showing Joint 1 from IH 40 WB Overpass at FM 295)

FULL-DEPTH CONTROLLED JOINT REPLACEMENT DETAIL

STATE OF TEXAS
BRETT R.C. ALLEN
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LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

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Texas Department of Transportation

MISCELLANEOUS BRIDGE
REPAIR DETAILS

SCALE: N.T.S.

SHEET 4 OF 6

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		86

DATE: 7/10/2023 9:47:57 AM
FILE: AMA_DET04.dgn

FINAL SUBMITTAL (100%)

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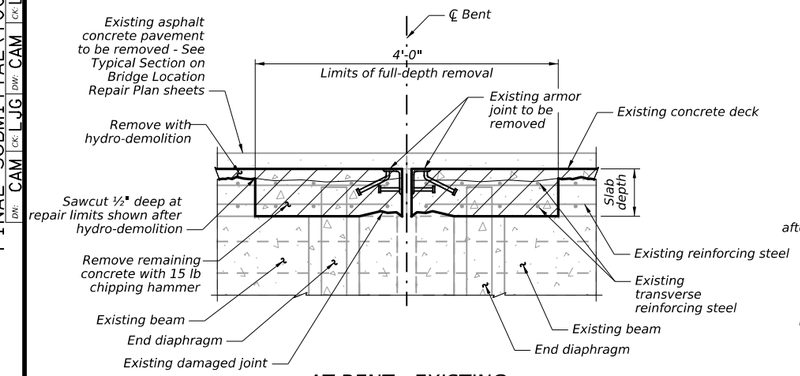
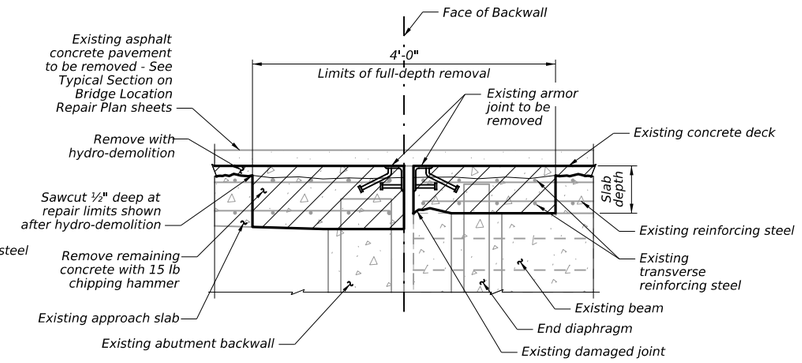


AT BENT - EXISTING



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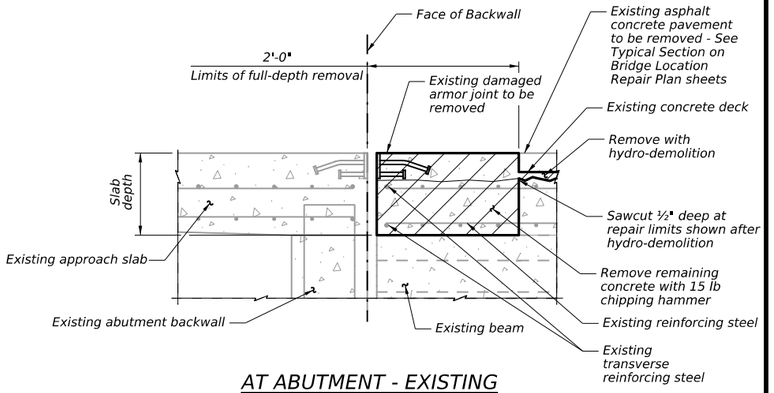

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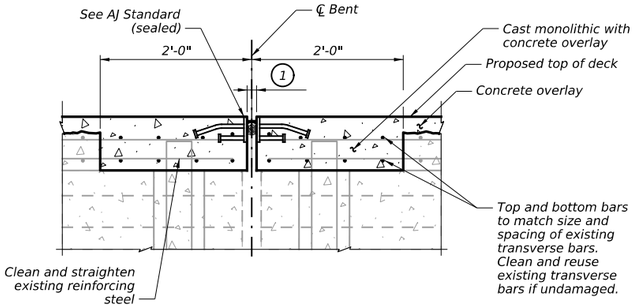
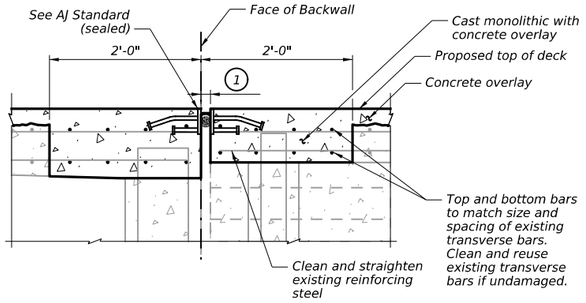


AT BENT - PROPOSED



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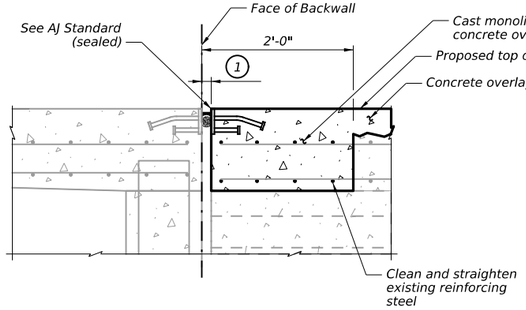

AT ABUTMENT - PROPOSED

ARMOR JOINT REPLACEMENT DETAIL

ARMOR JOINT REPAIR DETAIL

(IH 40 WB Overpass at IH 40H FR Conn)

TYPICAL DAMAGE IN DECK SOFFIT AT ARMOR JOINTS AT INTERIOR BENTS

(Showing Joint 3 from IH 40 WB Underpass at SH 70 (North))

(1) Set joint opening to width shown on AJ Standard.

ARMOR JOINT REPLACEMENT & REPAIR NOTES:

1. Identify and mark all repair areas prior to beginning work. Verify areas and quantities with the Engineer.
2. Prepare detailed repair procedure in accordance with Item 785, "Bridge Joint Repair or Replacement" and Chapter 3, Section 4 of the TxDOT Concrete Repair Manual and detail herein.
3. Deck concrete shall be Class S concrete (f'c = 4000 psi)
4. Reinforcing steel shall be Grade 60, and all new reinforcing steel in the deck shall be epoxy coated. Replace existing reinforcing as directed by the Engineer. Lap length is 3'-0" for #5 bars; lap length is 2'-5" for #4 bars. Refer to Item 440 of the General Notes about reinforcement.
5. Avoid damage to existing beams, backwall, and diaphragms. Repair concrete damage per Item 785, "Bridge Joint Repair or Replacement".

TYPICAL DAMAGE IN DECK SOFFIT AT ARMOR JOINTS AT ABUTMENTS

(Showing Joint 5 from IH 40 WB Underpass at SH 70 (North))

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Texas Department of Transportation

MISCELLANEOUS BRIDGE REPAIR DETAILS

SCALE: N.T.S.

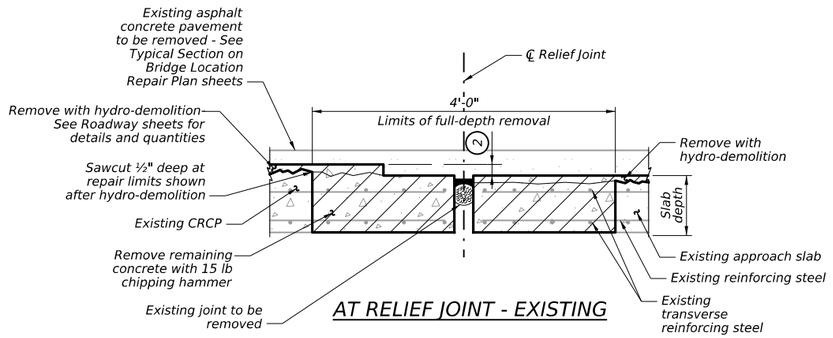
SHEET 5 OF 6

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		87

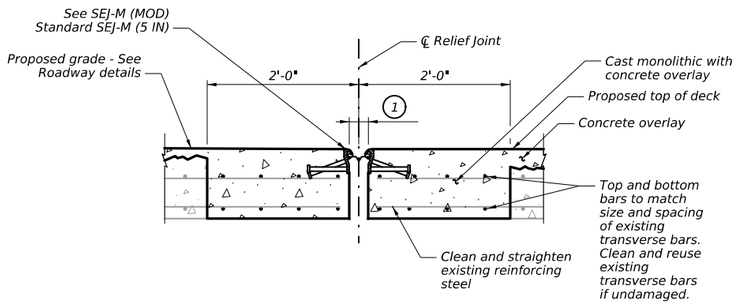
DATE: 7/10/2023 9:48:10 AM
FILE: AMA_DET05.dgn

FINAL SUBMITTAL (100%)

DW:	CAM	Ck:	LJG	DW:	CAM	Ck:	LJG



AT RELIEF JOINT - EXISTING



AT RELIEF JOINT - PROPOSED

TYPICAL DAMAGE IN ASPHALT PAVEMENT ABOVE RELIEF JOINTS AT APPROACH SLABS

(Showing far relief joint from IH 40 EB Overpass at BI 40F)

(1) Set joint opening to width shown on SEJ-M (MOD) Standard.

(2) Top of CRCP is approximately 1.75" to 2" higher than the top of BAS and the bridge deck according to the 2011 as-built repair plans.

SEJ REPLACEMENT NOTES:

1. Identify and mark all repair areas prior to beginning work. Verify areas and quantities with the Engineer.
2. Prepare detailed repair procedure in accordance with Item 785, "Bridge Joint Repair or Replacement" and Chapter 3, Section 4 of the TxDOT Concrete Repair Manual and detail herein.
3. Deck concrete shall be Class S concrete (f'_c = 4000 psi)
4. Reinforcing steel shall be Grade 60, and all new reinforcing steel in the deck shall be epoxy coated. Replace existing reinforcing as directed by the Engineer. Lap length is 3'-0" for #5 bars; lap length is 2'-5" for #4 bars. Refer to Item 440 of the General Notes about reinforcement.
5. Avoid damage to existing beams, backwall, and diaphragms. Repair concrete damage per Item 785, "Bridge Joint Repair or Replacement".

SEJ REPLACEMENT DETAIL

STATE OF TEXAS
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MISCELLANEOUS BRIDGE REPAIR DETAILS

SCALE: N.T.S.

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		88

DATE: 7/10/2023 9:48:22 AM
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CONCRETE OVERLAY (CO) NOTES:

Perform work in accordance with Item 439, "Bridge Deck Overlays" and instructions below.

1. Plane asphalt from bridge deck per Item 354, "Planing and Texturing Pavement." See each bridge's Typical Section on the Bridge Location Repair Plan sheets for the thickness of the existing ACP.
2. Prepare concrete deck surface for overlay installation. See SURFACE PREPARATION NOTES.
3. Inspect the bridge deck for any potential deck repairs or delaminated concrete. Perform partial and/or full depth bridge deck repairs in accordance with Item 429, "Concrete Structure Repair" and Chapter 3, Section 4 of TxDOT Concrete Repair Manual. Cure repairs in accordance with Manufacturer's recommendations followed by shot blasting before placing overlay, unless approved otherwise. Partial depth deck repairs can occur concurrently with overlay operation with the Engineer's approval. This work will be paid for in accordance with Item 429, "Concrete Structure Repair."
4. Water blast surface and any exposed steel with minimum 5,000 psi blast to remove all dirt, loose rust, and other contaminants and then use dry compressed air until the surface is cleared of debris. Pressure blasting shall be done no earlier than 24 hours before placing the overlay.
5. Cover the surface with wet cotton mats or wet burlap and opaque/white plastic sheets, and keep saturated for a minimum of 8 hours before placement of overlay.
6. Immediately before placing concrete, remove cover and blow off any standing water. Maintain saturated surface dry (SSD) condition on deck to receive overlay.
7. Mask existing joints and deck drains. Saw cutting of joints after overlay installation is prohibited. For any unrepaired controlled joints, see Joint Former Installation Detail.
8. Adjust the screed and screed rail as necessary to provide the approved grade and required thickness. Adjustments should be made during the screed dry run. Correct any areas with insufficient clearance by adjusting the screed and rail system or by chipping or scarifying as approved by the Engineer. Clean areas where removal occurs by pressure washing with a minimum of 5,000 psi.
9. Verify that ambient temperature, wind speed, and relative humidity are within the limits specified by the Engineer. Wind screens and fog spray may be submitted as part of the placement plan to minimize evaporation.
10. Place the specified concrete overlay. See each bridge's Table of Repairs on the Bridge Location Repair Plan sheets for overlay thickness. Consolidate concrete around joints with a pencil vibrator. Use an internal vibrator for areas with 3" depth or greater in advance of the screed.
11. Provide final surface texture in accordance with Article 422.4.11.
12. Cure as required by Item 439, "Bridge Deck Overlays." See CURING NOTES.
13. The Contractor is responsible for the ride quality of the finished surface. See Article 422.4.10, "Defective Work," for acceptance criteria to be enforced for this work.
14. Groove surface in accordance with Article 422.4.11 "Final Surface Texture."
15. Install pavement markings as shown on plans.
16. Seal all the expansion joints. See elsewhere in plans for joint details.

HYDRO-DEMOLITION NOTES:

Perform work in accordance with Item 483, "Concrete Bridge Deck Surfacing" and instructions below.

1. Block all inlets during hydro-demolition and overlay operations. Do not perform hydro-demolition work over open roadways or sidewalks. Do not permit any vehicular or pedestrian traffic below the bridge deck during hydro-demolition activities.
2. Provide a combination of milling and hydro-demolition sufficient to provide for the specified (nominal) inlay depth. See each bridge's Table of Repairs on the Bridge Location Repair Plan sheets for nominal inlay depth. At a minimum, hydro-demolition will be no less than 3/4" in unless otherwise shown in the plans.
3. Ensure all unsound concrete is being removed. Do not damage reinforcing steel. If bond between steel and concrete is destroyed, remove concrete (15 lb max chipping hammer) to expose bar and provide a clearance of not less than 3/4".
4. Submit a water disposal plan associated with the work for approval. Protect surrounding property and traffic from water spray and material that is dislodged. Provide water for hydro-demolition that meets the requirements of Article 421.2.5, Table 1. Additional cost for disposal of contaminated water is subsidiary to the hydro-demolition.
5. Sound surfaces with sounding hammer, chain drag, or other acceptable device after hydro-demolition to ensure the delaminated surfaces have been removed. Additional hydro-demolition or chipping (with chipping hammers) may be required to remove remaining delaminated areas.
6. Provide remotely operated vacuum unit to reclaim water, debris and concrete cuttings. Collect water, debris and concrete cuttings in a separate unit located off of the bridge deck. Do not allow loaded reclamation units on bridge deck after hydro-demolition has occurred without a structural analysis signed and sealed by a licensed professional engineer. All equipment on bridge deck must be in accordance with Articles 7.16.2 and 7.16.3.
7. Demonstrate hydro-demolition on test areas as designated to calibrate machine to obtain concrete removal depth and finish as specified and as approved.

SURFACE PREPARATION NOTES:

Concrete removal and surface preparation beyond cleaning utilizing air, water, and abrasive blasting will be paid for in accordance with Item 483, "Concrete Bridge Deck Surfacing."

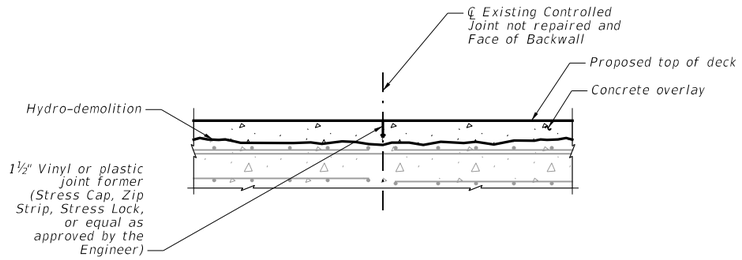
HYDRO-DEMOLITION

1. Perform hydro-demolition on bridge deck to remove specified depth of deck surface. See Table of Repairs for specified depth of deck surface to be removed. Provide a surface profile with no less than ½" deviation. See HYDRO-DEMOLITION NOTES.

CURING NOTES:

CONCRETE OVERLAY (CO) CURING NOTES:

1. Apply wet burlap to cure the overlay as soon as possible after the concrete has been textured. Keep the burlap continuously wet for 4 days. Cover burlap with opaque or white polyethylene sheeting for duration of wet cure period.
2. Water cure the overlay in accordance with Article 422.4.8, "Final Curing," for an additional 4 days. Maintain the surface temperature of the concrete above 40°F for the required curing period.
3. Do not open to traffic until overlay concrete has reached a minimum f'c of 4,000 psi.



JOINT FORMER INSTALLATION DETAIL

(At unrepaired controlled joint)

Installation of Joint Former will not be paid directly, but is considered subsidiary to Item 439, "Bridge Deck Overlays".

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Brett RC Allen 07/10/2023

SHEET 1 OF 1

Texas Department of Transportation — Bridge Division

BRIDGE DECK OVERLAY NOTES

FILE: WD-BDON-22.dgn	DN: TxDOT	CK: TxDOT	DW: CAM	CK: LJG
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40, ETC.
01-20-2023: Update for Hydro-demo and Concrete overlay only. Added Joint Former Installation Detail.	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		89

DATE: 7/7/2023 2:32:35 PM
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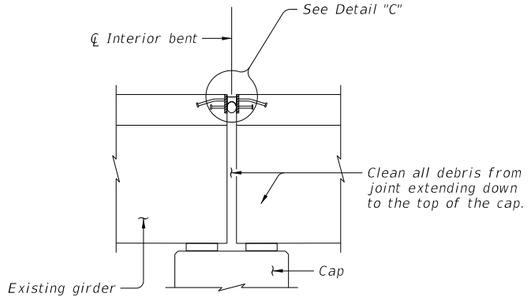
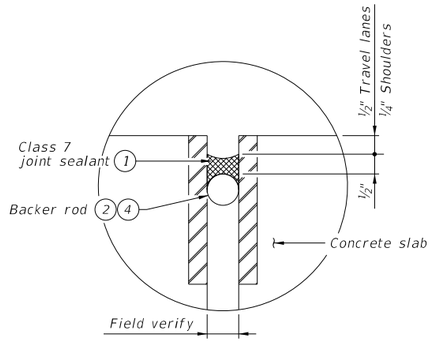


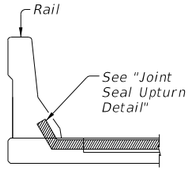
ARMOR JOINT

(Shown without ACP overlay. Armor joint with ACP overlay similar.)



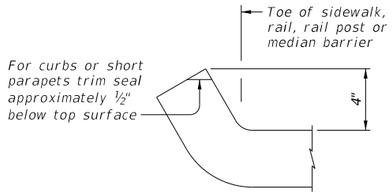
DETAIL "C"

(Stud anchors not shown for clarity.)



AT CONCRETE BRIDGE RAIL

JOINT SEALANT TERMINATION DETAILS



JOINT SEAL UPTURN DETAIL

PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS:

1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.

2) Abrasive blast clean existing steel surface where silicone seal is to be placed.

3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

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

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

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

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

(3) Not used.

(4) Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

GENERAL NOTES:

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

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

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

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

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

SHEET 1 OF 1

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Brett RC Allen 07/10/2023

Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

FILE: WD-CSBJ-22.dgn	DN: TxDOT	CK: TxDOT	DW: CAM	CK: LJG
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40, ETC.
03-17-2023: Update for Armor Joint only.	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		90

DATE: 7/7/2023 2:32:48 PM
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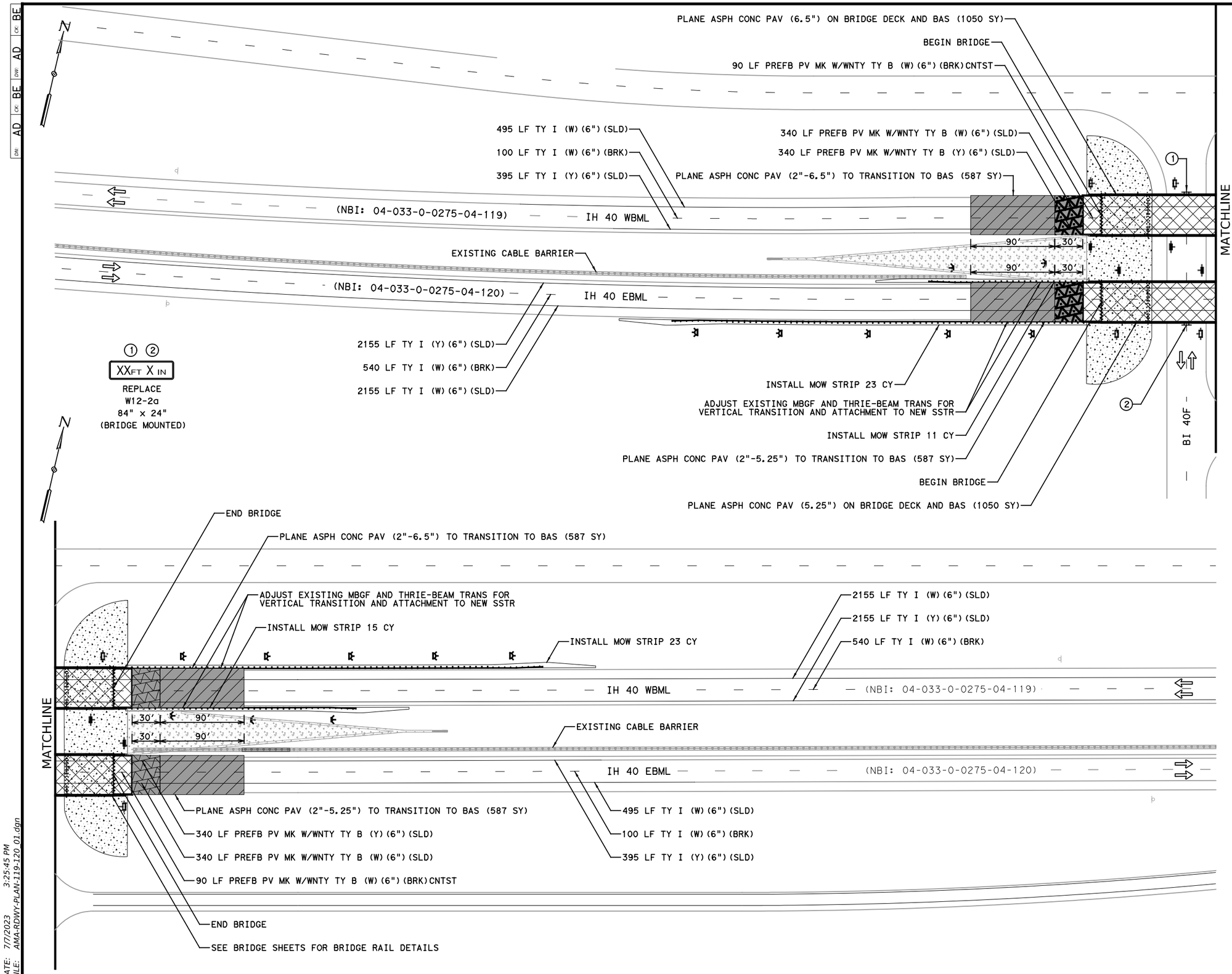

LEGEND

- EXIST TRAFFIC LANE
- PLANE ASPH CONC PVMT (BRIDGE AND BAS)
- PLANE ASPH CONC PVMT (APPROACH)
- 2" SP-D PG70-28 OVERLAY
- 1.5" HYDRO-DEMOLITION AND 2"-3.5" CONCRETE OVERLAY
- DEL ASSM (D-SW)SZ 1(BRF)GF2
- DEL ASSM (D-SY)SZ 1(BRF)GF2
- DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
- DEL ASSM (D-SW)SZ (BRF)CTB
- DEL ASSM (D-SY)SZ (BRF)CTB
- DEL ASSM (D-SW)SZ (BRF)CTB (BI)

NOTES:

1. FOR THE TRANSITION SECTION REFER TO THE ROADWAY PAVEMENT TRANSITION DETAILS.
2. FOR THE MEDIAN SECTION REFER TO THE MEDIAN PROTECTION PLANS.

STATE OF TEXAS
BRIAN ENNS
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LICENSED PROFESSIONAL ENGINEER

P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT BI 40F ROADWAY PLAN

NBI#: 04-033-0-0275-04-119 & 120

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		91

DATE: 7/7/2023 3:25:45 PM
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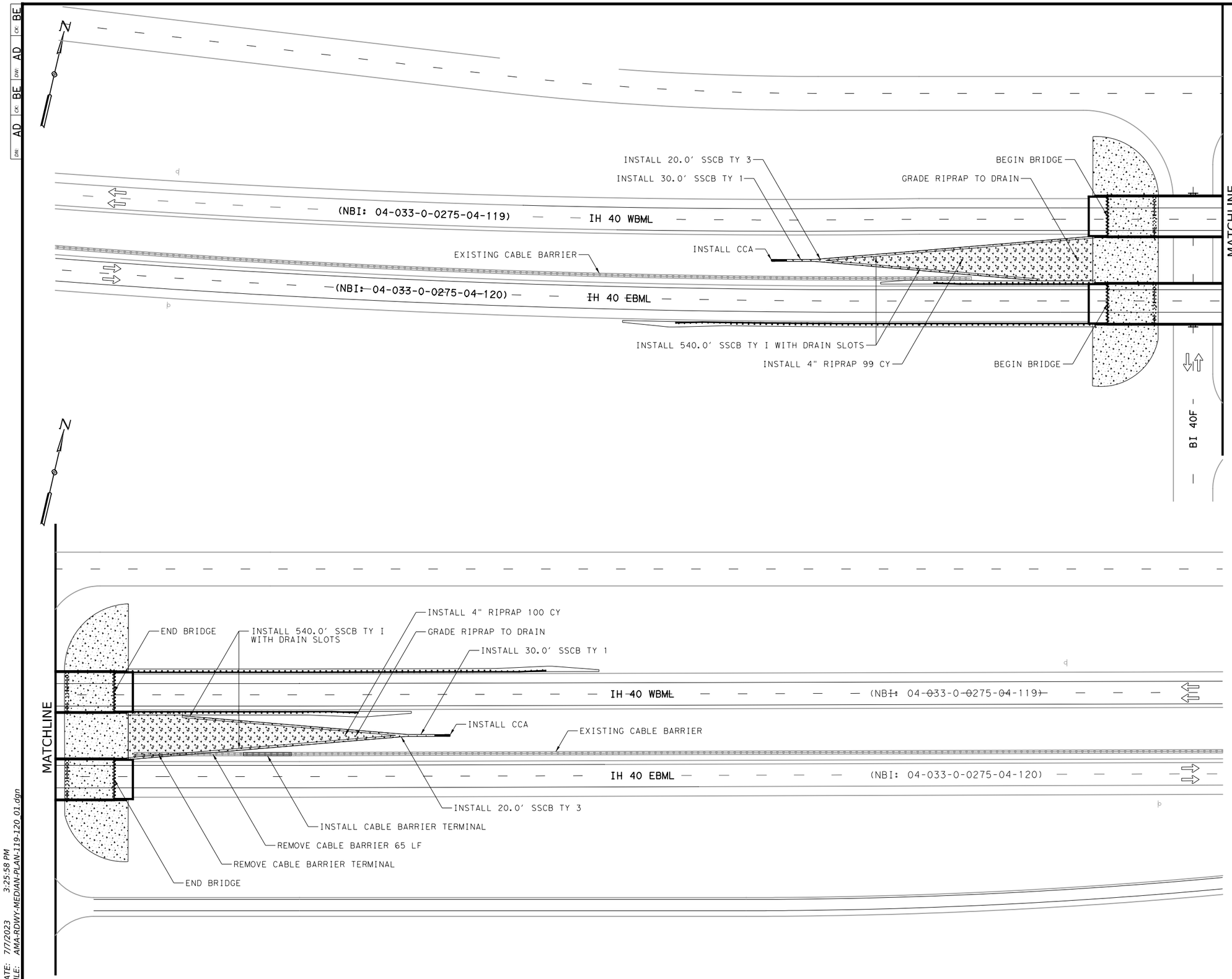

LEGEND

EXIST TRAFFIC LANE ⇨

NOTES:

1. SSCB TY I INSTALLED WITH DRILLED SHAFT ANCHORS AND DRAIN SLOTS.
2. TRANSITION FROM SINGLE SSCB TO DUAL SSCB PAID FOR WITH SSCB TY 3.

STATE OF TEXAS
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93801
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P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT BI 40F MEDIAN PROTECTION PLAN

NBI#: 04-033-0-0275-04-119 & 120

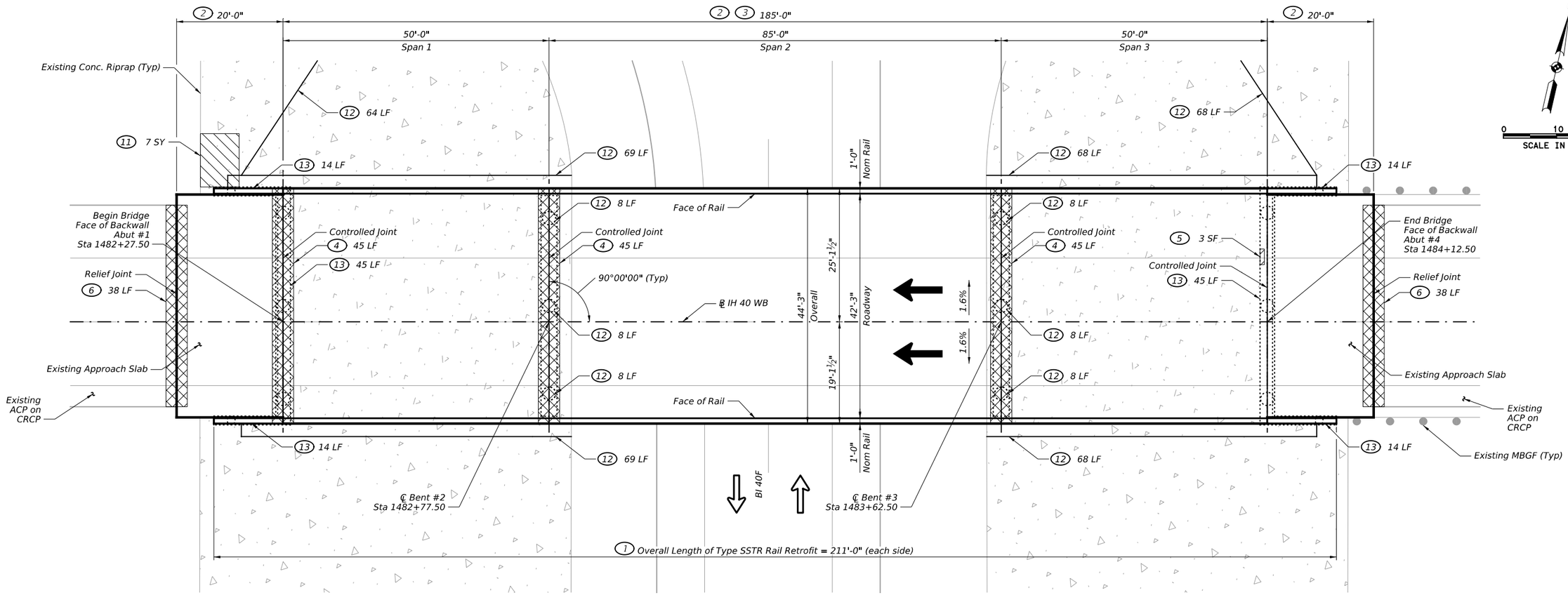
SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		92

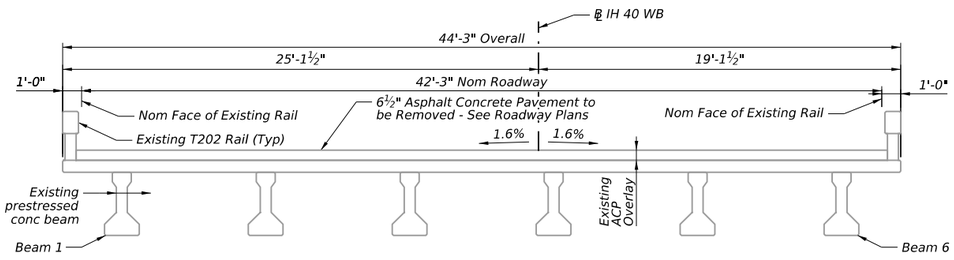
DATE: 7/7/2023 3:25:58 PM
FILE: AMA-RDWY-MEDIAN-PLAN-119-120 01.dgn

FINAL SUBMITTAL (100%)

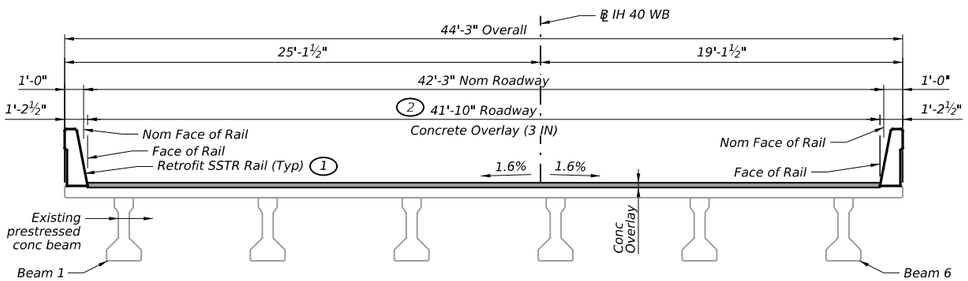
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



PLAN

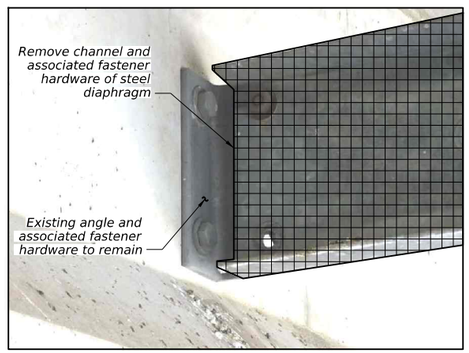


EXISTING TYPICAL SECTION



* Hydro-demolition (1 IN) before placing Conc Overlay

PROPOSED TYPICAL SECTION



8 **REMOVAL OF STEEL DIAPHRAGM**

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Removal of Diaphragm
- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
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LICENSED PROFESSIONAL ENGINEER
09/29/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS AT BI 40F BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-119

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		93

DATE: 9/28/2023 2:39:10 PM
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FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
1	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	422	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
2	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1046	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 95 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	95	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1046	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
3	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 90 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 25 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	90	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	25	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
4	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	135	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
5	Repair damaged deck soffit. See Plan for location.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	3	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
6	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	76	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
7	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	11	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	885	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
8	Remove steel intermediate diaphrams with missing bolts in Span 1, Bays 2 & 3.	496	REMOVE STR (STL SECTIONS)	14	LF	
9	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	9	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
9A	Apply Type X Epoxy Waterproof Finish to columns. See Substructure Repair Isometrics for locations.	427	EPOXY WATERPROOF FINISH (TY X)	32	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
10	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	1654	SF	
11	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	7	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	1	CY	
12	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	454	LF	
13	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	146	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

7 TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity	Waterproofing	
				Length	Area
1	2	Abutment 1	1 SF	10 LF	97 SF
	3	Abutment 1	-	10 LF	97 SF
	5	Abutment 1	-	10 LF	97 SF
	6	Abutment 1	2 SF	1.5 LF	18 SF
	1	Bent 2	1 SF	1.5 LF	18 SF
2	1	Bent 2	3 SF	1.5 LF	18 SF
	2	Bent 2	2 SF	1.5 LF	18 SF
	6	Bent 2	2 SF	1.5 LF	18 SF
All remaining beam ends (28) have 1.5 LF of waterproofing with 18 SF area of waterproofing.					
TOTAL			11 SF	885 SF	

STATE OF TEXAS
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133221
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PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

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IH 40 WB OVERPASS AT BI 40F BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-119

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		94

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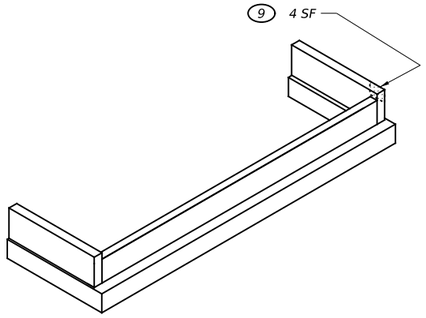
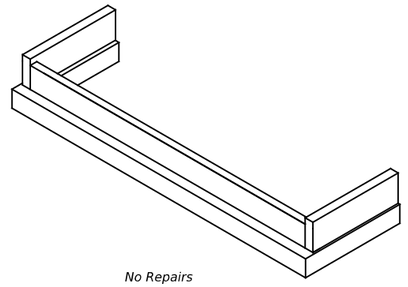
FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



EAST FACE
Looking Northwest

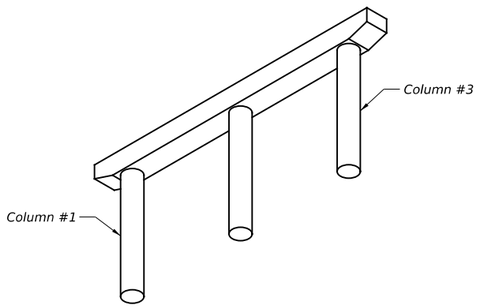
ABUTMENT 1



No Repairs

WEST FACE
Looking Northeast

ABUTMENT 4



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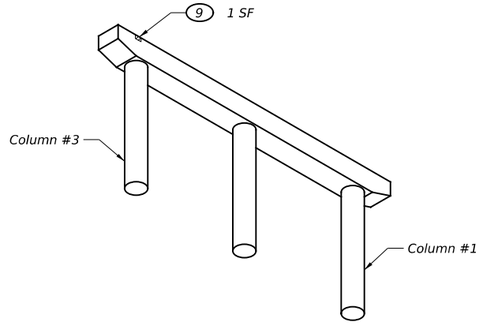
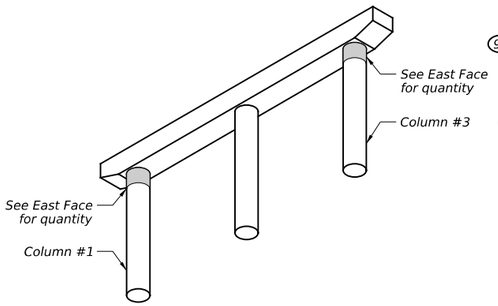
Looking Northeast

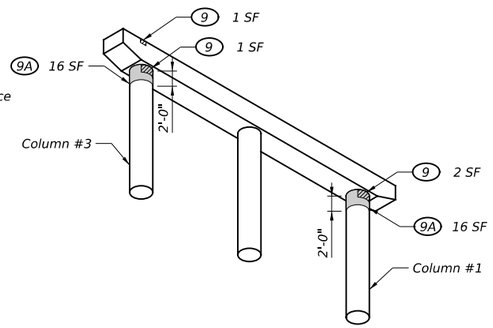


EAST FACE
Looking Northwest

BENT 2



WEST FACE
Looking Northeast



EAST FACE
Looking Northwest

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

(10) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE

SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	355 SF
BENTS 2 & 3	472 SF
TOTAL	1654 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Type X Epoxy Waterproof Finish
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

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IH 40 WB OVERPASS
AT BI 40F
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-033-0-0275-04-119

SCALE: N.T.S.

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		95

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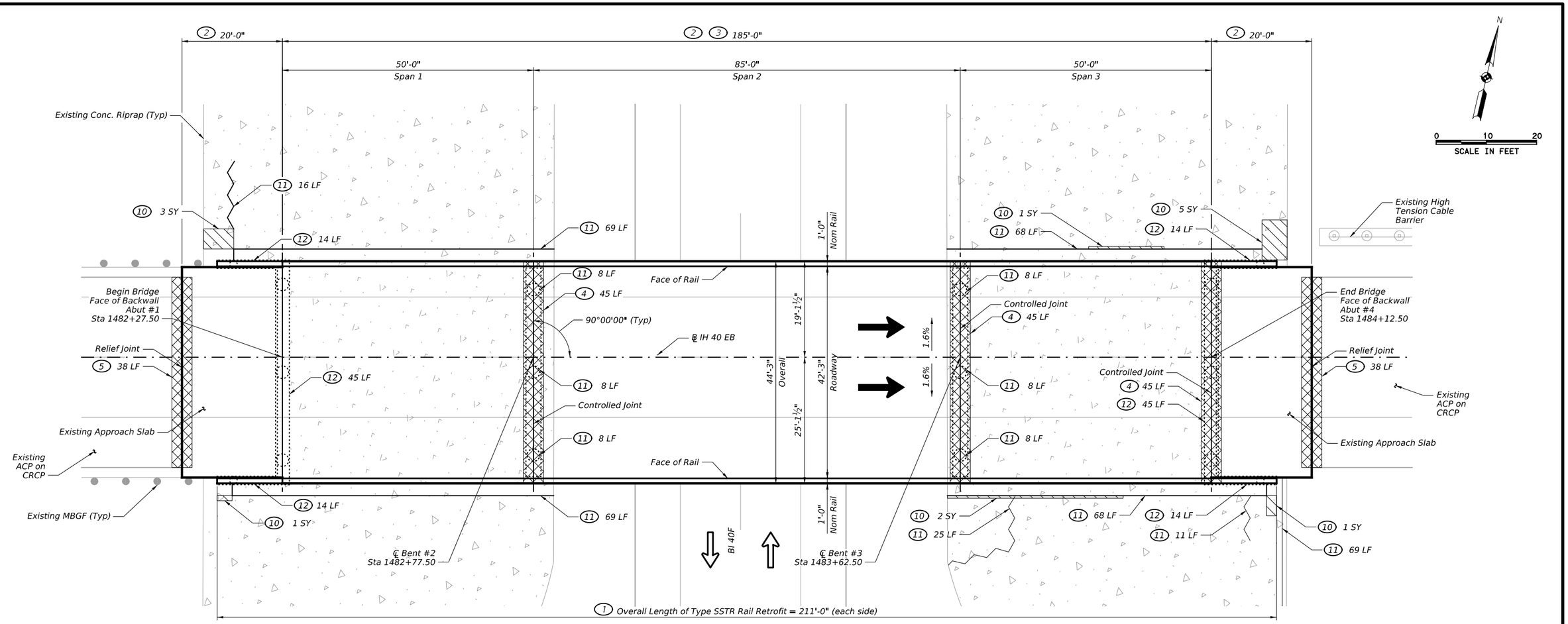
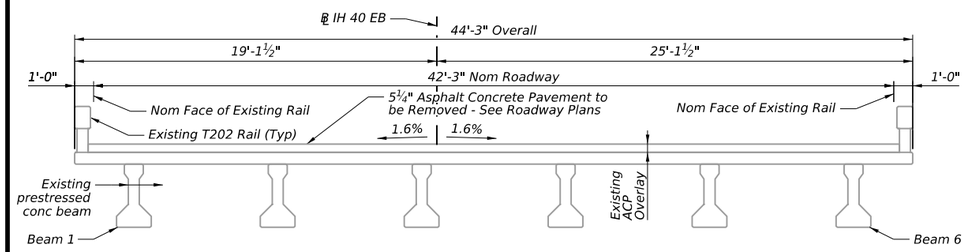
FINAL SUBMITTAL (100%)

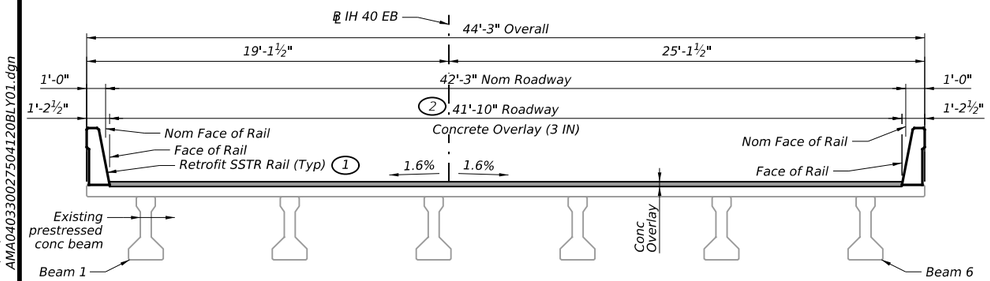
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



PLAN

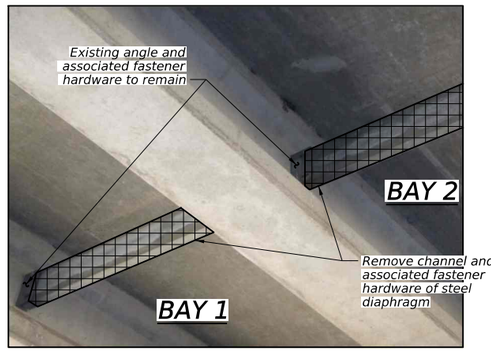


EXISTING TYPICAL SECTION



* Hydro-demolition (1 IN) before placing Conc Overlay

PROPOSED TYPICAL SECTION



7 REMOVAL OF STEEL DIAPHRAGM

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Removal of Diaphragm
- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

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IH 40 EB OVERPASS AT BI 40F BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-120

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		96

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FINAL SUBMITTAL (100%)

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DW:	LJG	CK:	CAM
DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
1	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	422	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
2	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1046	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 95 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	95	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1046	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
3	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 90 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 25 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	90	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	25	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
4	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	135	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
5	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	76	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
6	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	6	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	727	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
7	Remove steel intermediate diaphrams with missing bolts in Span 2, Bays 1 & 2.	496	REMOVE STR (STL SECTIONS)	14	LF	
8	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	11	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
8A	Apply Type X Epoxy Waterproof Finish to columns. See Substructure Repair Isometrics for locations.	427	EPOXY WATERPROOF FINISH (TY X)	32	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
9	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	1654	SF	
10	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	13	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	6	CY	
11	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	443	LF	
12	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	146	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

(6) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity	Waterproofing	
				Length	Area
2	2	Bent 2	1 SF	1.5 LF	18 SF
	6	Bent 2	1 SF	1.5 LF	18 SF
	1	Bent 3	1 SF	1.5 LF	18 SF
	3	Bent 3	1 SF	1.5 LF	18 SF
3	1	Bent 3	1 SF	1.5 LF	18 SF
	5	Abutment 4	1 SF	10 LF	97 SF
All remaining beam ends (30) have 1.5 LF of waterproofing with 18 SF area of waterproofing.					
TOTAL			6 SF	727 SF	

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IH 40 EB OVERPASS AT BI 40F BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-120

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		97

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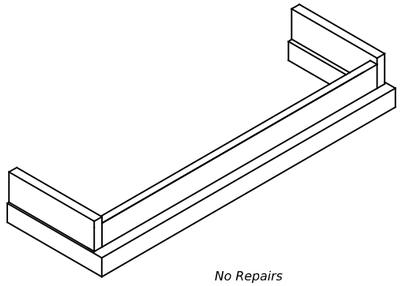
FINAL SUBMITTAL (100%)

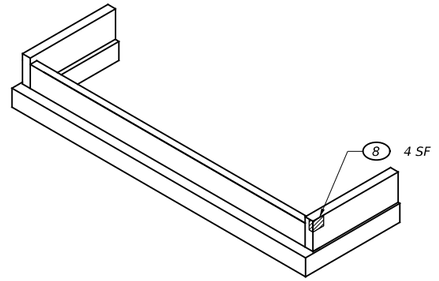
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



No Repairs

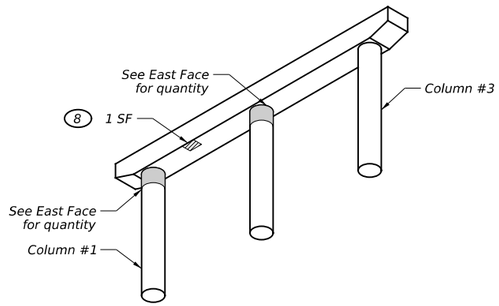
EAST FACE
Looking Northwest

ABUTMENT 1

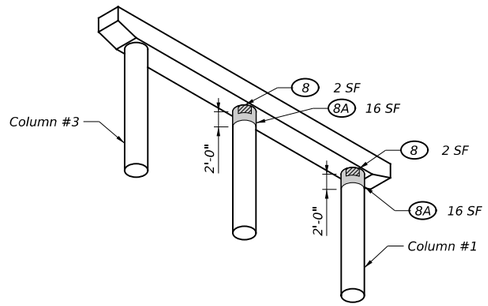


WEST FACE
Looking Northeast

ABUTMENT 4

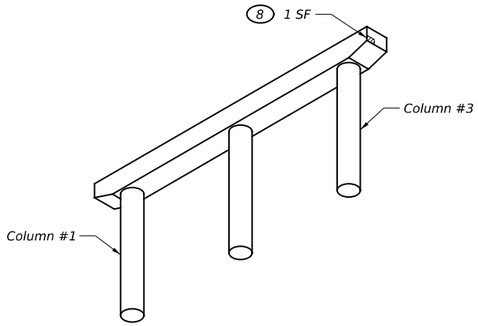


WEST FACE
Looking Northeast

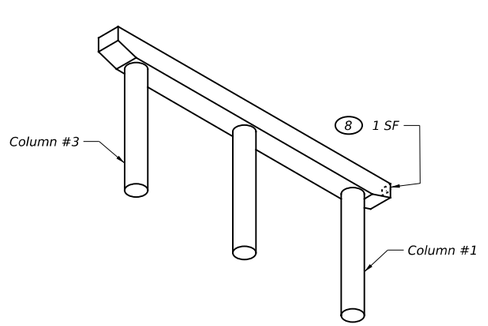


EAST FACE
Looking Northwest

BENT 2



WEST FACE
Looking Northeast



EAST FACE
Looking Northwest

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

(9) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE	
SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	355 SF
BENTS 2 & 3	472 SF
TOTAL	1654 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Type X Epoxy Waterproof Finish
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

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IH 40 EB OVERPASS
AT BI 40F
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-033-0-0275-04-120

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		98

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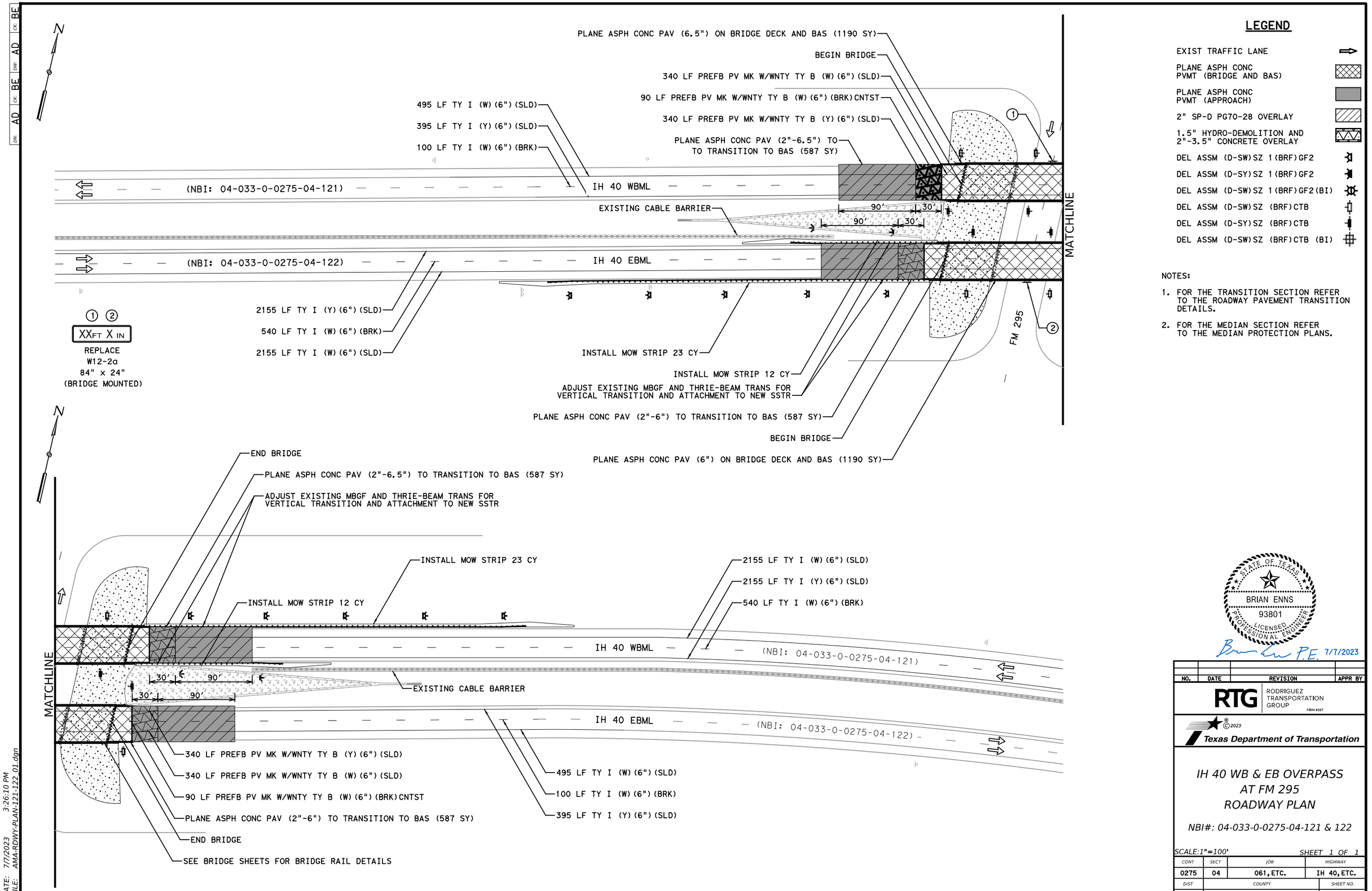

LEGEND

- EXIST TRAFFIC LANE
- PLANE ASPH CONC PVMT (BRIDGE AND BAS)
- PLANE ASPH CONC PVMT (APPROACH)
- 2" SP-D PG70-28 OVERLAY
- 1.5" HYDRO-DEMOLITION AND 2"-3.5" CONCRETE OVERLAY
- DEL ASSM (D-SW)SZ 1(BRF)GF2
- DEL ASSM (D-SY)SZ 1(BRF)GF2
- DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
- DEL ASSM (D-SW)SZ (BRF)CTB
- DEL ASSM (D-SY)SZ (BRF)CTB
- DEL ASSM (D-SW)SZ (BRF)CTB (BI)

NOTES:

1. FOR THE TRANSITION SECTION REFER TO THE ROADWAY PAVEMENT TRANSITION DETAILS.
2. FOR THE MEDIAN SECTION REFER TO THE MEDIAN PROTECTION PLANS.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER
P.E. 7/7/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT FM 295 ROADWAY PLAN

NBI#: 04-033-0-0275-04-121 & 122

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		99

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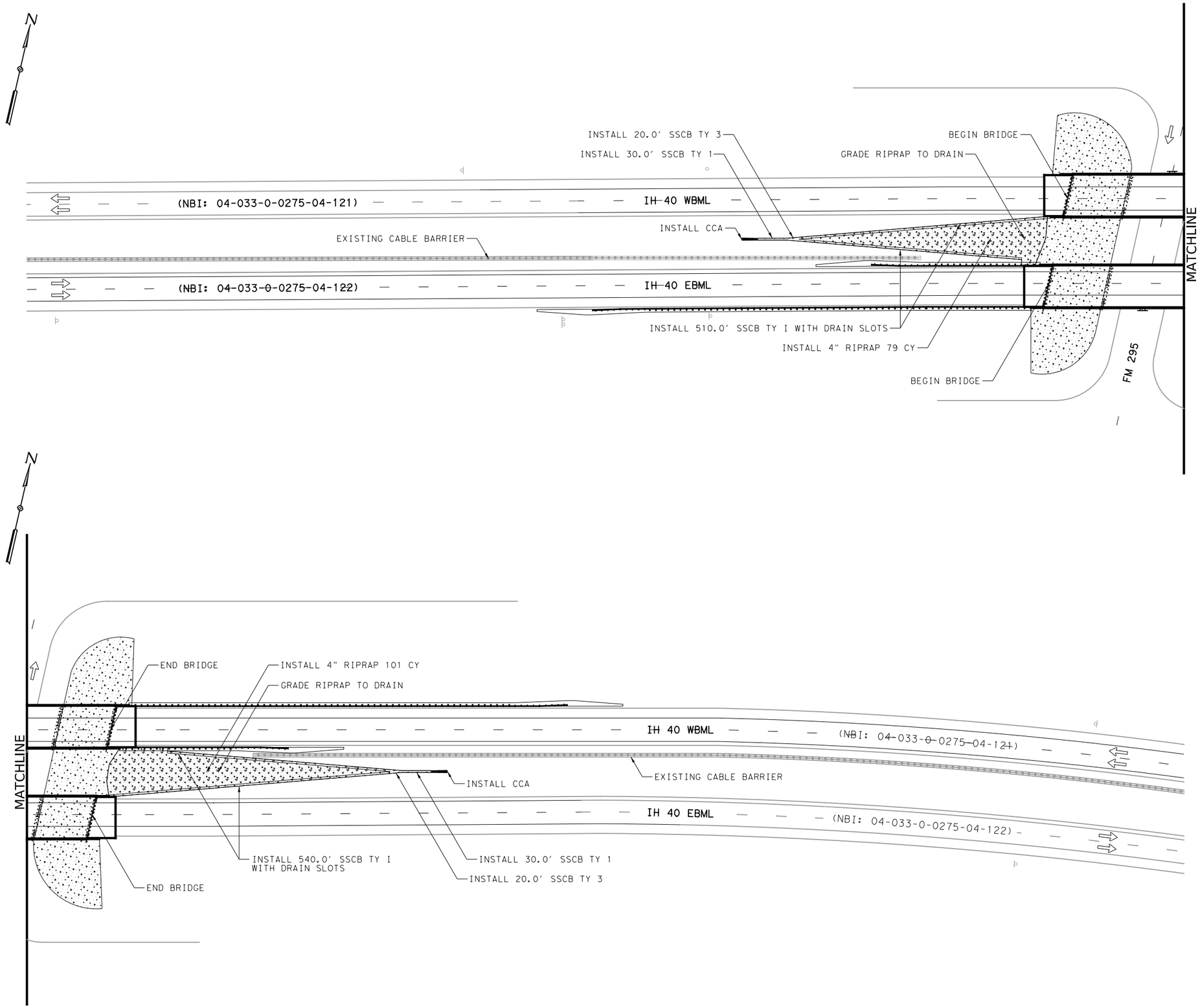
DW AD | CK BE | DW AD | CK BE



LEGEND

EXIST TRAFFIC LANE ⇨

NOTES:

1. SSCB TY I INSTALLED WITH DRILLED SHAFT ANCHORS AND DRAIN SLOTS.
2. TRANSITION FROM SINGLE SSCB TO DUAL SSCB PAID FOR WITH SSCB TY 3.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT FM 295 MEDIAN PROTECTION PLAN

NBI#: 04-033-0-0275-04-121 & 122

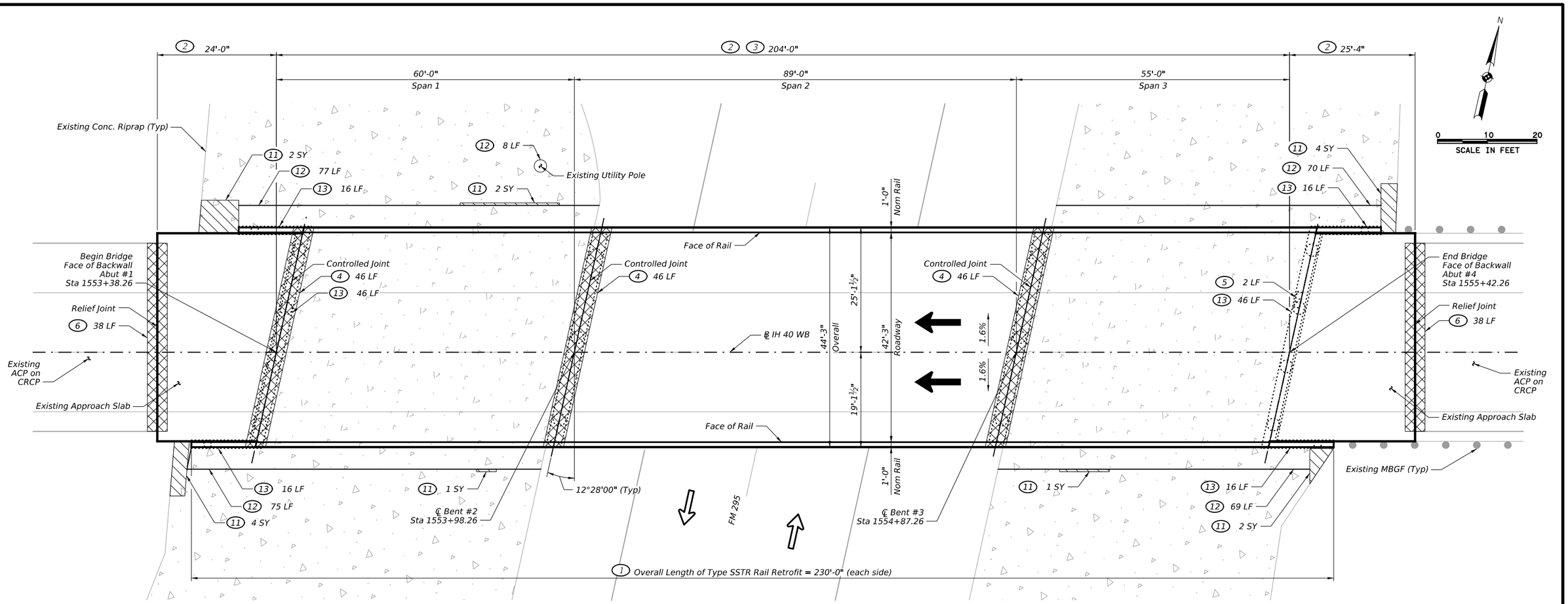
SCALE:1"=100' SHEET 1 OF 1

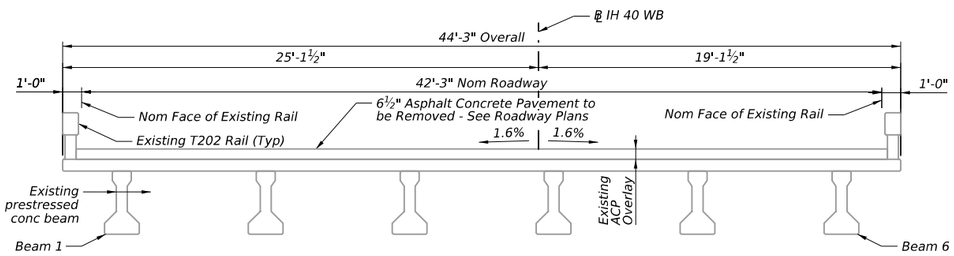
CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		100

DATE: 7/7/2023 3:26:23 PM
FILE: AMA-ROWY-MEDIAN-PLAN-121-122_01.dgn

FINAL SUBMITTAL (100%)

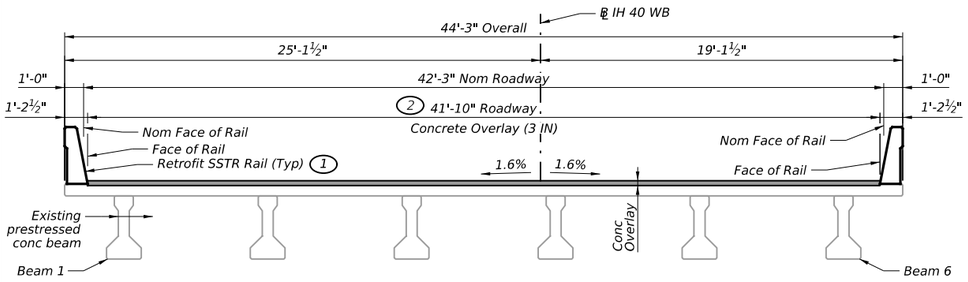
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG





EXISTING TYPICAL SECTION

(Spans 1 & 3 shown, Span 2 similar)



PROPOSED TYPICAL SECTION

(Spans 1 & 3 shown, Span 2 similar)

* Hydro-demolition (1 IN) before placing Conc Overlay

PLAN

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
Brett RC Allen 09/29/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS AT FM 295 BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-121

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		101

DATE: 9/28/2023 2:39:33 PM
FILE: AMA040330027504121BLY01.dgn

FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
1	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	460	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
2	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1178	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 110 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	110	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1178	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
3	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 100 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 25 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	100	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	25	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
4	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	138	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
5	Repair damaged deck soffit. See Plan for location.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	2	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
6	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	76	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
7	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	8	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	684	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
8	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	24	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
9	Wrap GFRP Protection around columns. See Substructure Repair Isometrics for locations.	786	CARBON FIBER REINF POLYMER PROTECTION	32	SF	See GFRP Column Wrapping Detail on the Miscellaneous Bridge Repair Detail sheets.
10	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	1746	SF	
11	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	16	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	7	CY	
12	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	299	LF	
13	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	156	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

(7) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	1	Abutment 1	1 SF
	2	Abutment 1	1 SF
2	3	Bent 2	1 SF
	7	Bent 2	1 SF
	1	Bent 3	1 SF
3	1	Bent 3	2 SF
	6	Bent 3	1 SF
TOTAL			8 SF

All beam ends (38) have 1.5 LF of waterproofing with 18 SF area of waterproofing for a total of 684 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Firm Registration No. F-754
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Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS AT FM 295 BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-121

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		102

DATE: 7/10/2023 9:56:09 AM
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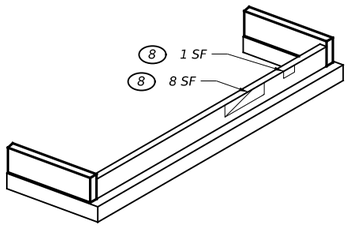
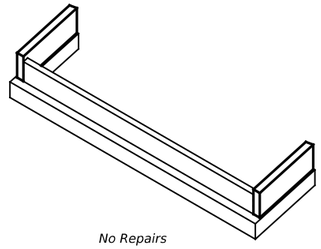
FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



EAST FACE
Looking Northwest

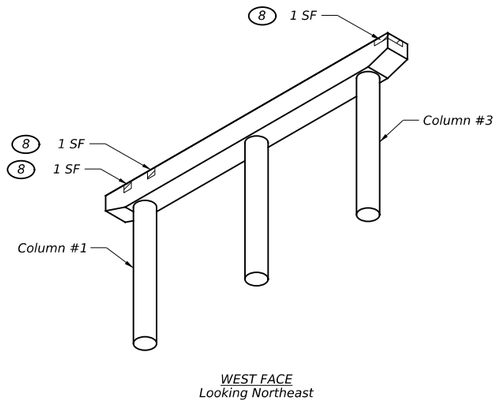
ABUTMENT 1



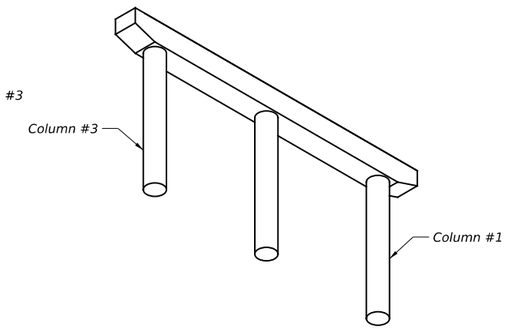
No Repairs

WEST FACE
Looking Northeast

ABUTMENT 4

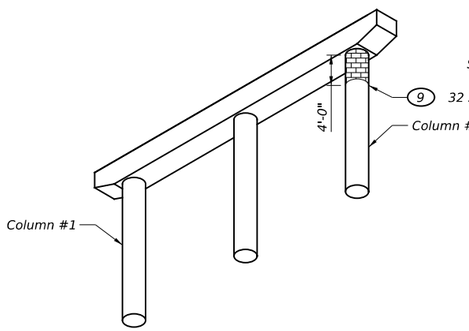


WEST FACE
Looking Northeast

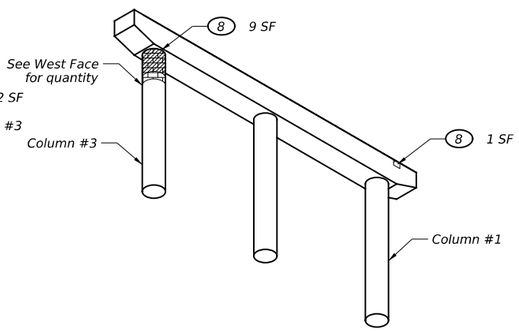


EAST FACE
Looking Northwest

BENT 2



WEST FACE
Looking Northeast



EAST FACE
Looking Northwest

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

(10) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE

SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	362 SF
BENTS 2 & 3	511 SF
TOTAL	1746 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Glass Fiber Reinf. Polymer Protection
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Dallas, Texas 75248
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Texas Department of Transportation

IH 40 WB OVERPASS
AT FM 295
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-033-0-0275-04-121

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		103

DATE: 7/7/2023 5:14:49 PM
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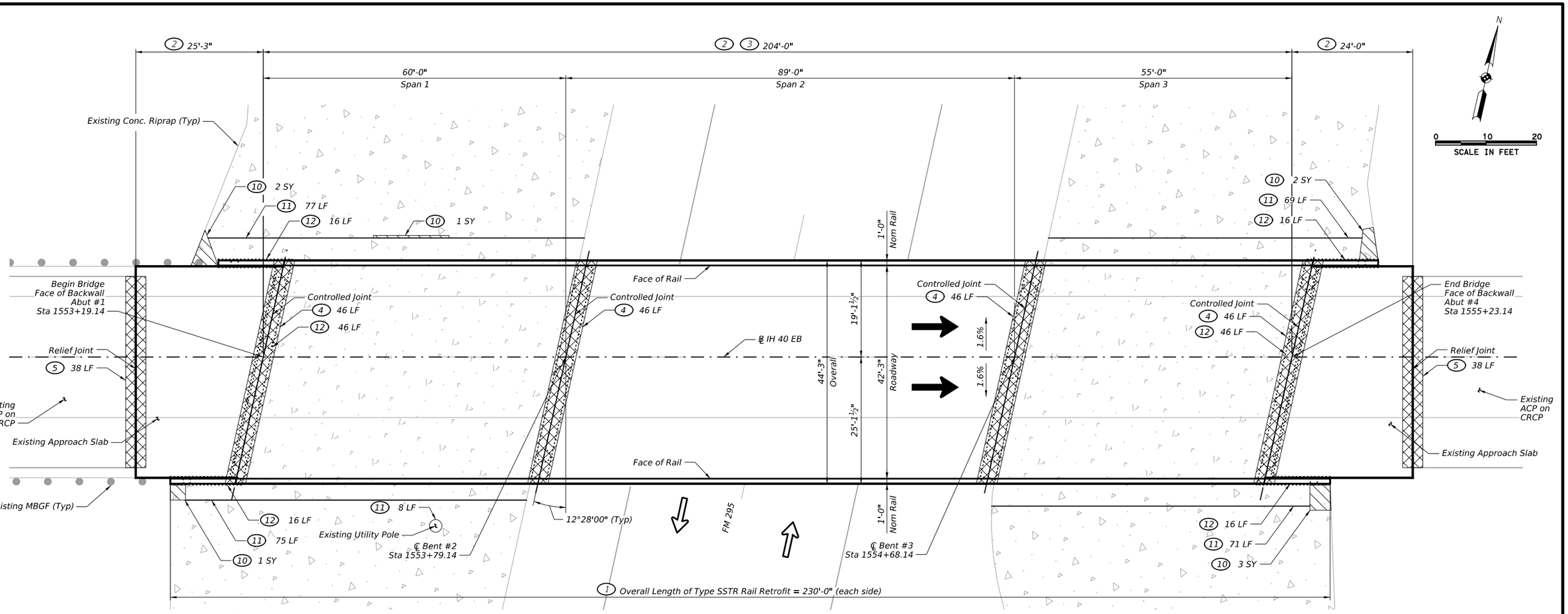
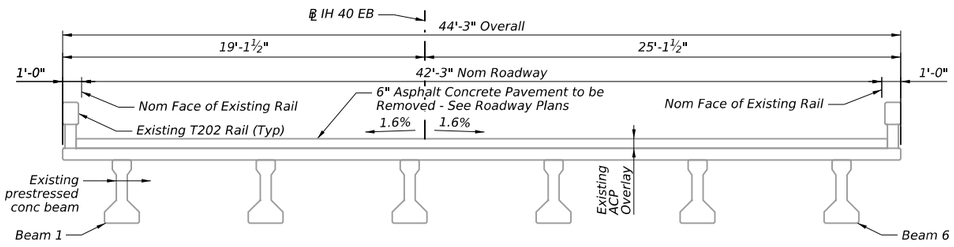
FINAL SUBMITTAL (100%)

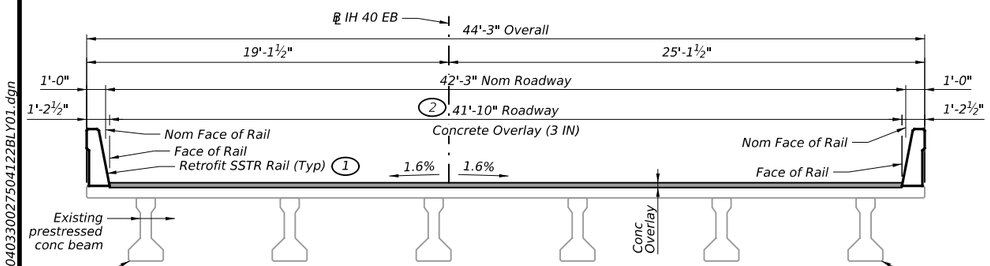
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG





EXISTING TYPICAL SECTION

(Spans 1 & 3 shown, Span 2 similar)

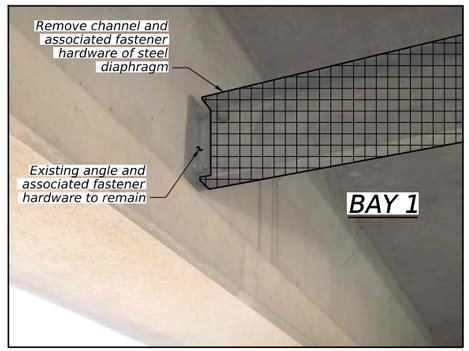


PROPOSED TYPICAL SECTION

(Spans 1 & 3 shown, Span 2 similar)

* Hydro-demolition (1 IN) before placing Conc Overlay

PLAN



7 REMOVAL OF STEEL DIAPHRAGM

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Removal of Diaphragm
- Conc Riprap Repair
- Full Depth Joint Replacement
- XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
09/29/2023

NO.	DATE	REVISION	APPR BY

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Firm Registration No. F-754
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Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS AT FM 295 BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-122

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		104

DATE: 9/28/2023 2:39:45 PM
FILE: AMA040330027504122BLY01.dgn

FINAL SUBMITTAL (100%)

DW:	CK:	DW	CK
CAM	LJG	CAM	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	460	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1178	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 110 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	110	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1178	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(3)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 100 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 25 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	100	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	25	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(4)	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	184	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(5)	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	76	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(6)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	13	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	684	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(7)	Remove steel intermediate diaphrams with missing bolts in Span 3, Bay 1.	496	REMOVE STR (STL SECTIONS)	7	LF	
(8)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	59	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(8A)	Wrap GFRP Protection around columns. See Substructure Repair Isometrics for locations.	786	CARBON FIBER REINF POLYMER PROTECTION	284	SF	See GFRP Column Wrapping Detail on the Miscellaneous Bridge Repair Detail sheets.
(9)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	1746	SF	
(10)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	9	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	5	CY	
(11)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	300	LF	
(12)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	156	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

(6) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	5	Abutment 1	2 SF
2	4	Bent 2	2 SF
	7	Bent 2	1 SF
	1	Bent 3	2 SF
	4	Bent 3	1 SF
	7	Bent 3	2 SF
3	6	Bent 3	2 SF
	6	Abutment 4	1 SF
TOTAL			13 SF

All beam ends (38) have 1.5 LF of waterproofing with 18 SF area of waterproofing for a total of 684 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS AT FM 295 BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-122

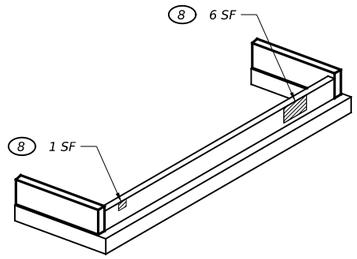
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		105

DATE: 7/10/2023 9:56:21 AM
FILE: AMA040330027504122BLY02.dgn

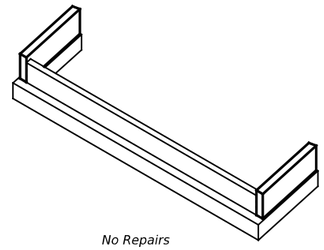
FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



EAST FACE
Looking Northwest

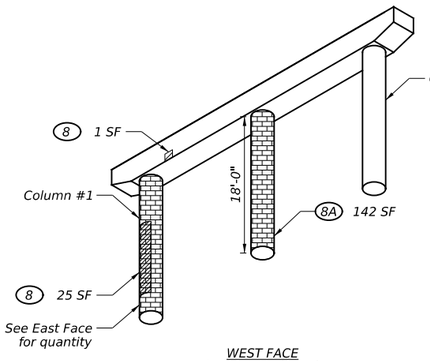
ABUTMENT 1



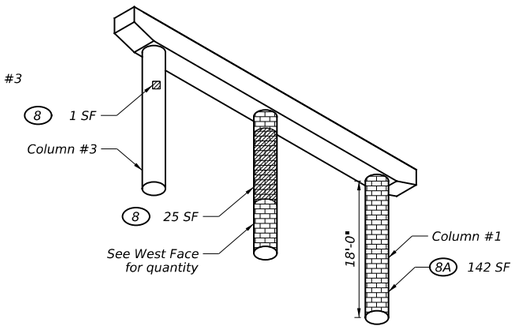
No Repairs

WEST FACE
Looking Northeast

ABUTMENT 4

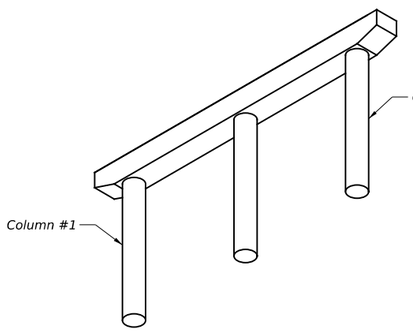


WEST FACE
Looking Northeast

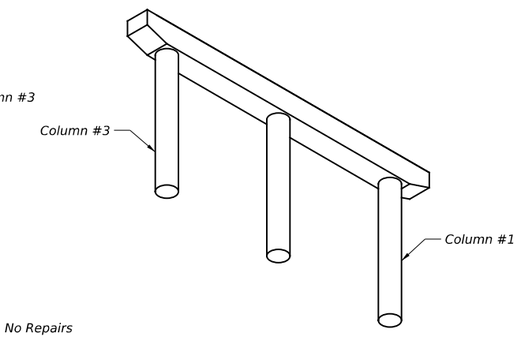


EAST FACE
Looking Northwest

BENT 2



WEST FACE
Looking Northeast



No Repairs

EAST FACE
Looking Northwest

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

(9) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE

SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	362 SF
BENTS 2 & 3	511 SF
TOTAL	1746 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Glass Fiber Reinf. Polymer Protection
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS
AT FM 295
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-033-0-0275-04-122

SCALE: N.T.S.

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		106

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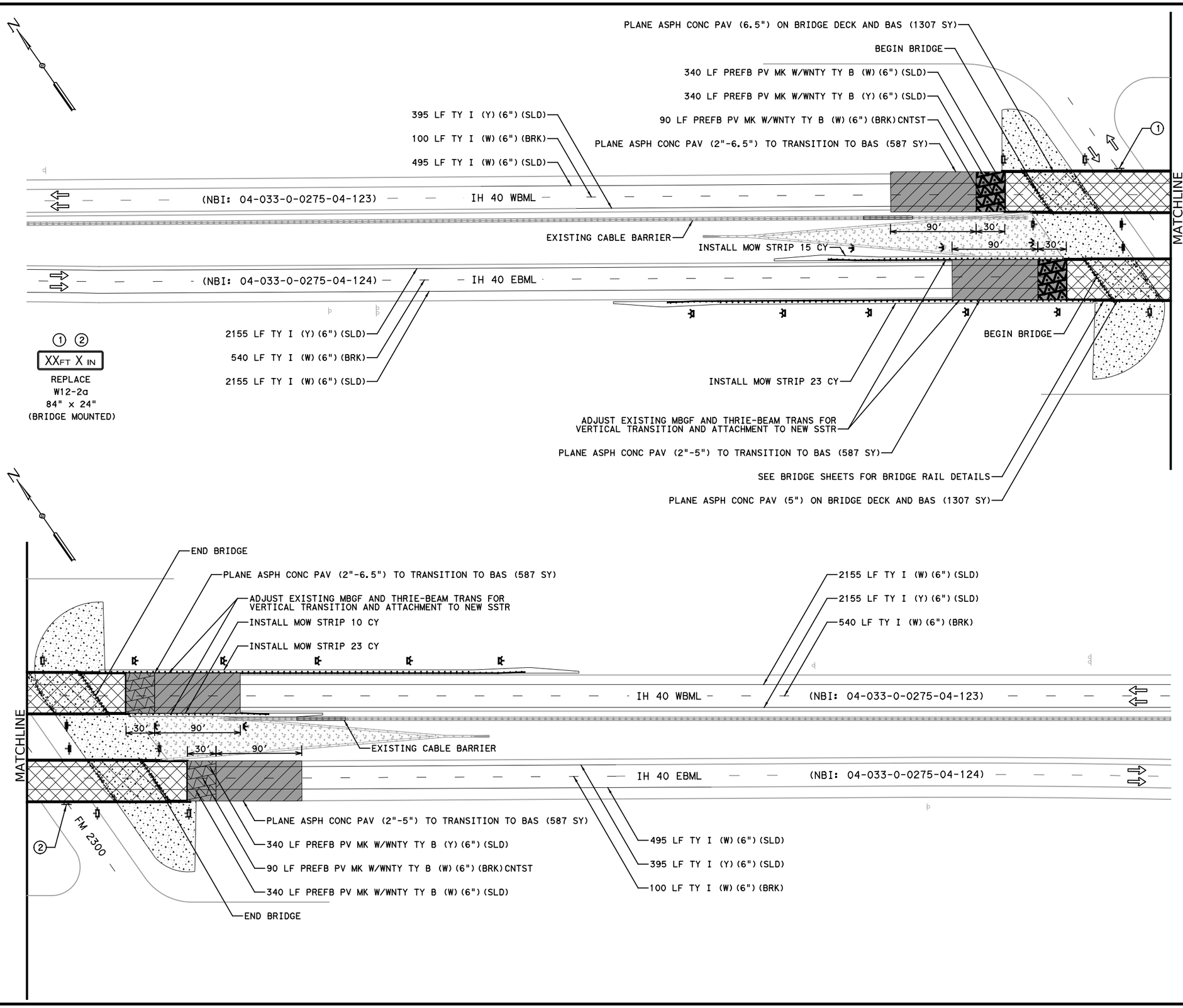

LEGEND

- EXIST TRAFFIC LANE
- PLANE ASPH CONC PVMT (BRIDGE AND BAS)
- PLANE ASPH CONC PVMT (APPROACH)
- 2" SP-D PG70-28 OVERLAY
- 1.5" HYDRO-DEMOLITION AND 2"-3.5" CONCRETE OVERLAY
- DEL ASSM (D-SW)SZ 1(BRF)GF2
- DEL ASSM (D-SY)SZ 1(BRF)GF2
- DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
- DEL ASSM (D-SW)SZ (BRF)CTB
- DEL ASSM (D-SY)SZ (BRF)CTB
- DEL ASSM (D-SW)SZ (BRF)CTB (BI)

NOTES:

1. FOR THE TRANSITION SECTION REFER TO THE ROADWAY PAVEMENT TRANSITION DETAILS.
2. FOR THE MEDIAN SECTION REFER TO THE MEDIAN PROTECTION PLANS.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT FM 2300 ROADWAY PLAN

NBI#: 04-033-0-0275-04-123 & 124

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		107

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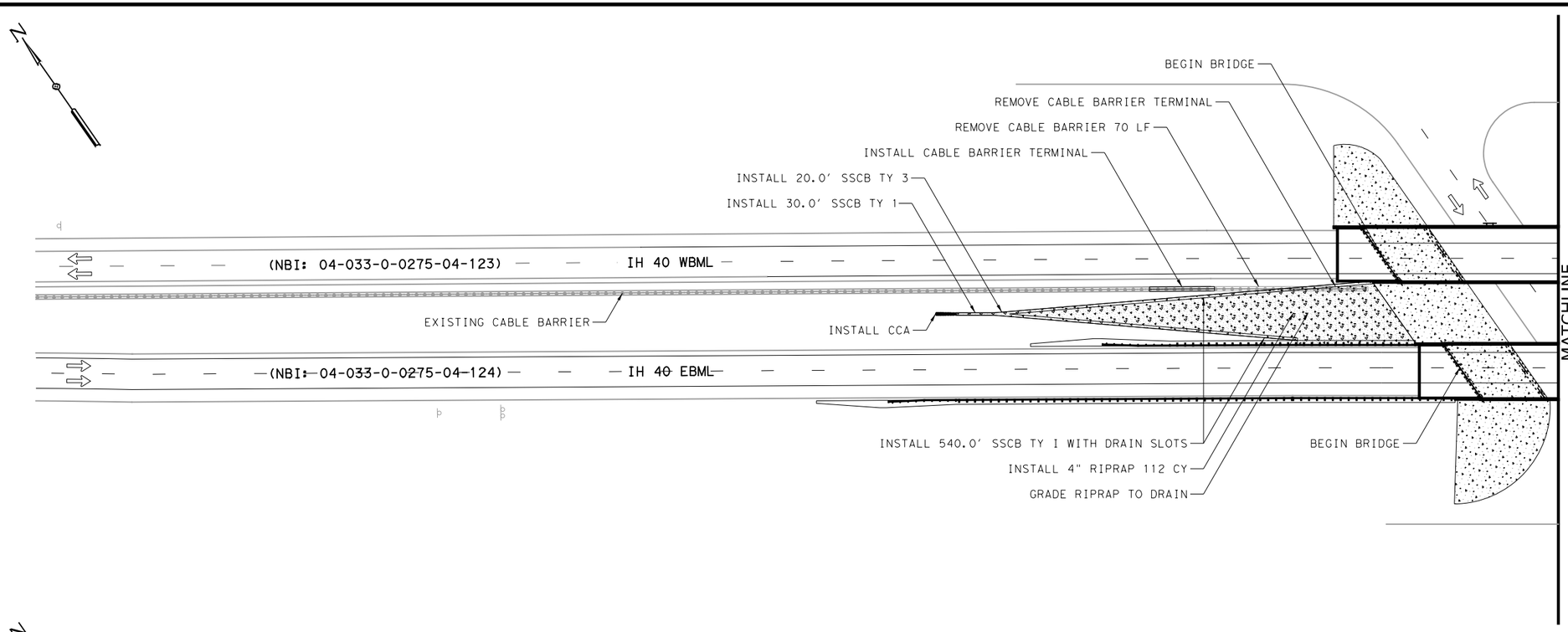
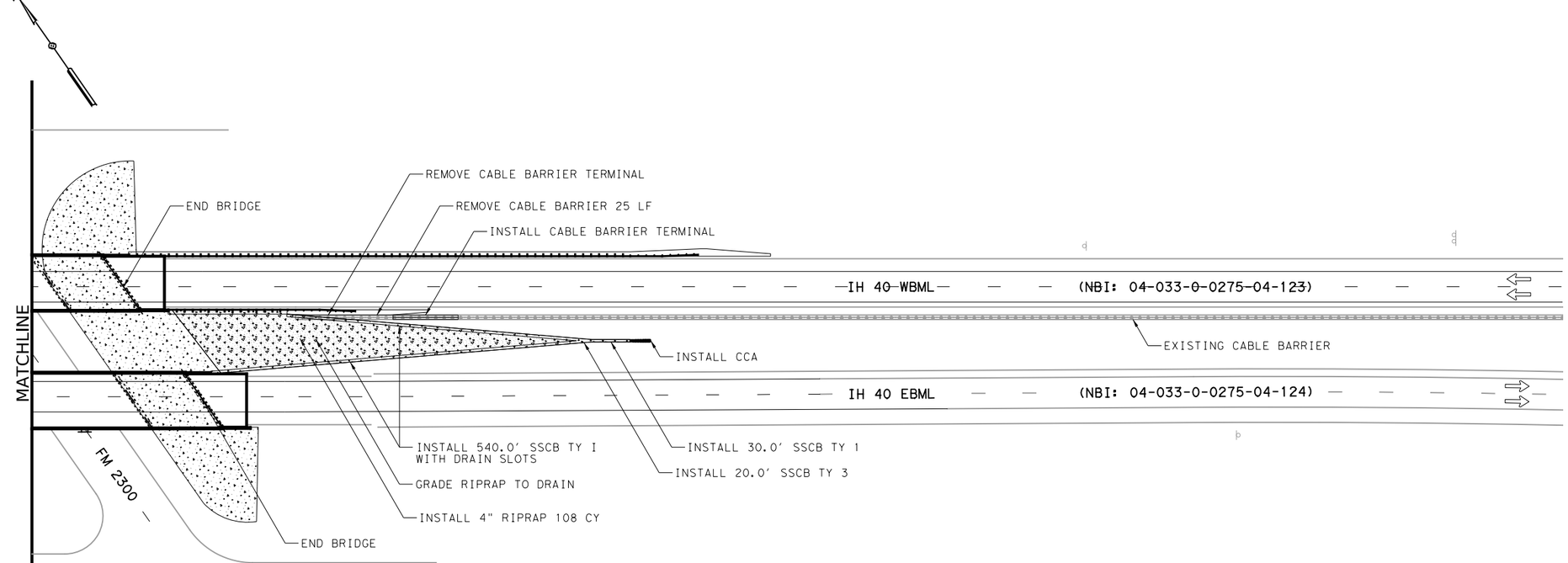
BE | CK | BE
AD | DW | AD





LEGEND

EXIST TRAFFIC LANE ⇨

NOTES:

1. SSCB TY I INSTALLED WITH DRILLED SHAFT ANCHORS AND DRAIN SLOTS.
2. TRANSITION FROM SINGLE SSCB TO DUAL SSCB PAID FOR WITH SSCB TY 3.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

Brian Enns P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT FM 2300 MEDIAN PROTECTION PLAN

NBI#: 04-033-0-0275-04-123 & 124

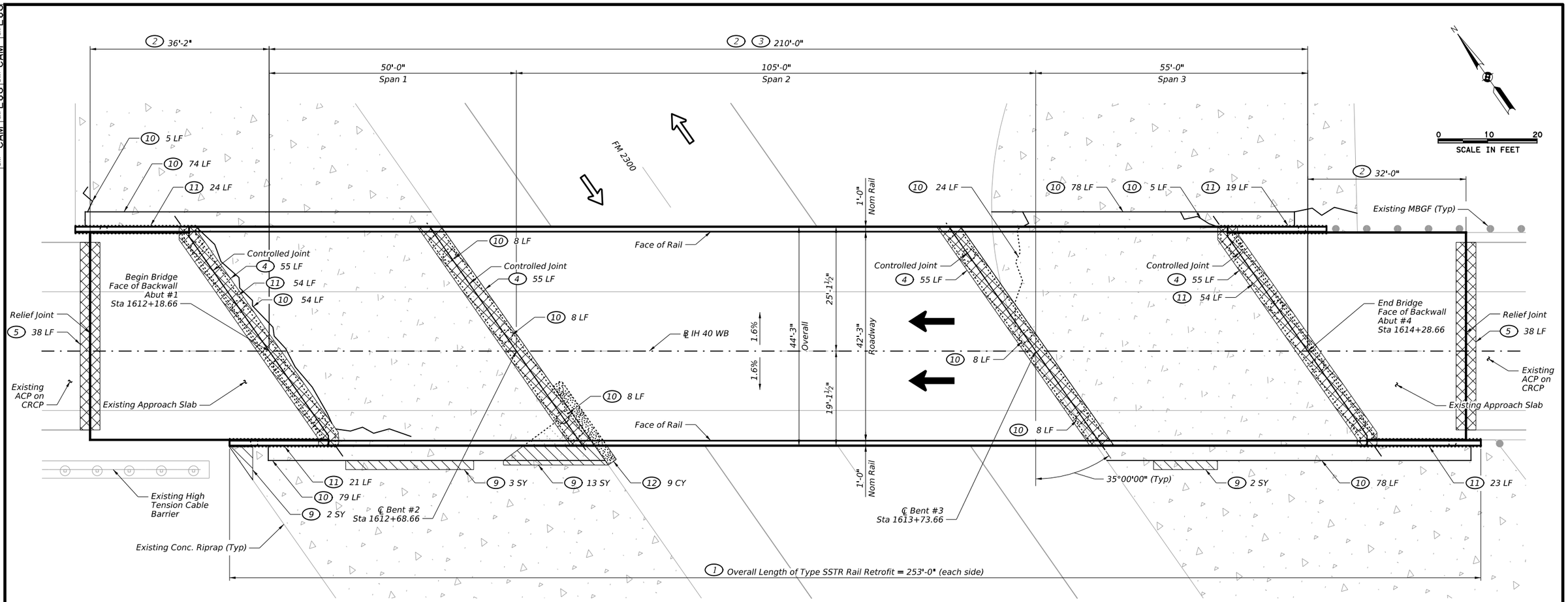
SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		108

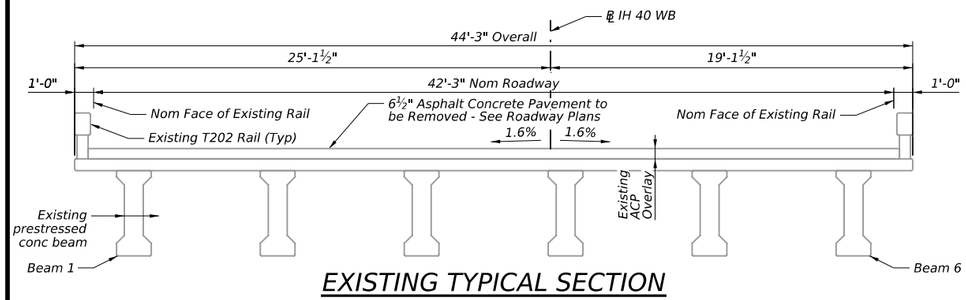
DATE: 7/7/2023 3:26:49 PM
FILE: AMA-RDWY-MEDIAN-PLAN-123-124 01.dgn

FINAL SUBMITTAL (100%)

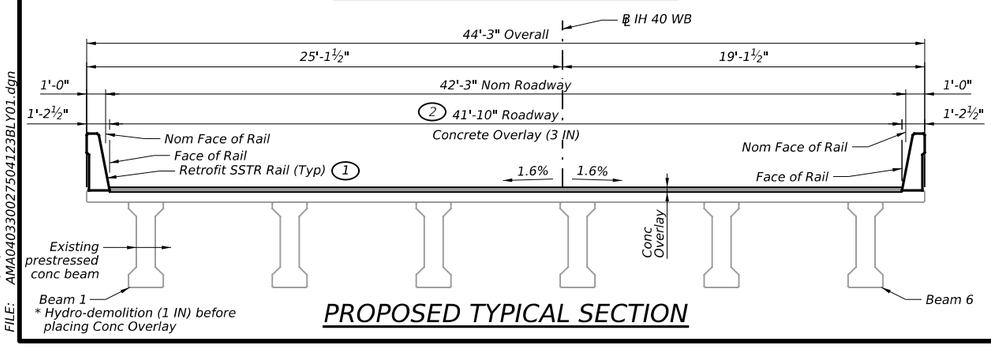
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



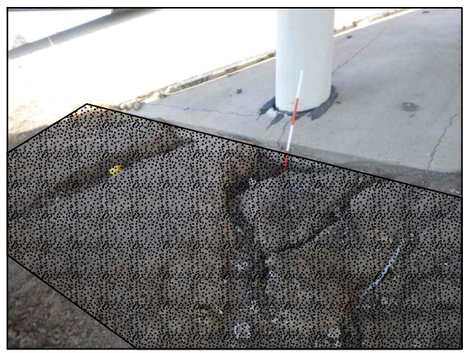
PLAN



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION



(12) **EXPOSED TOE RIPRAP TO BE COVERED WITH EMBANKMENT**

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Replace Embankment
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
09/29/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS AT FM 2300 BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-123

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		109

DATE: 9/28/2023 2:39:56 PM
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FINAL SUBMITTAL (100%)

DW:	CAM	Ck:	LJG	DW:	CAM	Ck:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	506	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1293	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 120 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	120	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1293	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(3)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 105 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 30 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	105	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	30	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(4)	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	220	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(5)	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	76	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(6)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	33	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	756	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(7)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	16	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(8)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	2318	SF	
(9)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	20	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	5	CY	
(10)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	437	LF	
(11)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	195	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.
(12)	Place embankment material to cover exposed toe of concrete riprap. See Plan for locations.	132	EMBANKMENT (FINAL)(ORD COMP)(TY B)	9	CY	

(6) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	2	Abutment 1	1 SF
	3	Abutment 1	2 SF
	6	Abutment 1	1 SF
	5	Bent 2	3 SF
	6	Bent 2	8 SF
2	1	Bent 2	1 SF
	3	Bent 2	1 SF
	4	Bent 2	2 SF
	5	Bent 2	1 SF
	6	Bent 3	2 SF
3	2	Bent 3	1 SF
	3	Bent 3	1 SF
	4	Bent 3	5 SF
	5	Bent 3	3 SF
	6	Bent 3	1 SF
TOTAL			33 SF

All beam ends in Spans 1 & 3 are Type 54 Beams (24) have 1.5 LF of waterproofing with 20 SF area of waterproofing.
All beam ends in Span 2 are Type 54 MOD Beams (12) have 1.5 LF of waterproofing with 23 SF area of waterproofing.
Total area of waterproofing equals 756 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS
AT FM 2300
BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-123

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		110

DATE: 7/10/2023 9:56:32 AM
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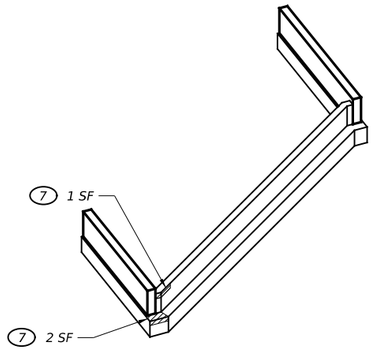
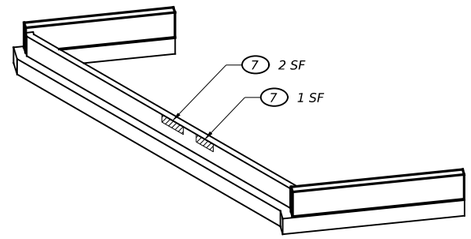
FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



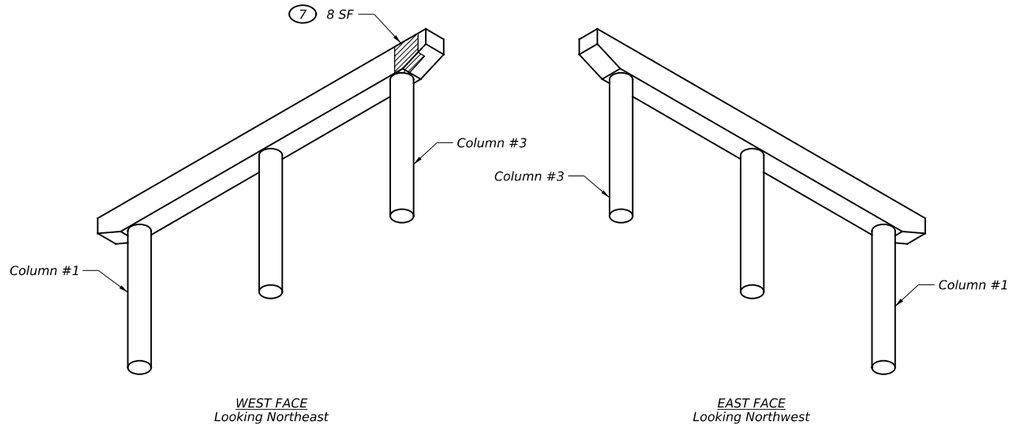
EAST FACE
Looking Northwest

ABUTMENT 1



WEST FACE
Looking Northeast

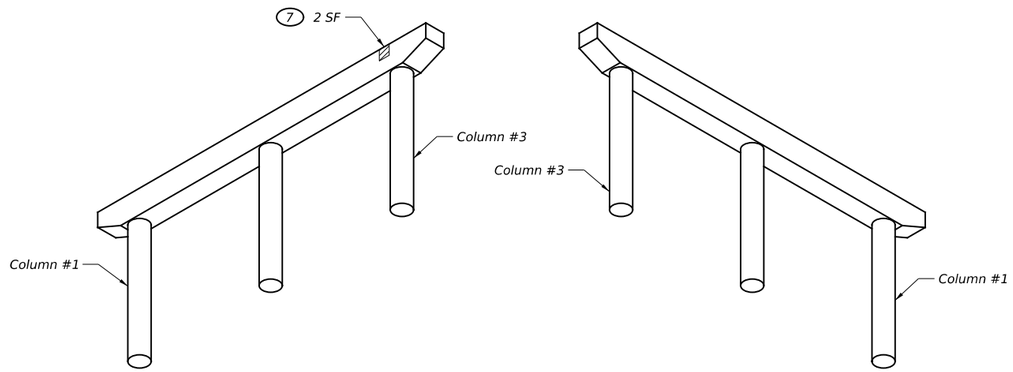
ABUTMENT 4



WEST FACE
Looking Northeast

EAST FACE
Looking Northwest

BENT 2



WEST FACE
Looking Northeast

EAST FACE
Looking Northwest

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

(9) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE	
SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	514 SF
BENTS 2 & 3	645 SF
TOTAL	2318 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc.
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS
AT FM 2300
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-033-0-0275-04-123

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		111

DATE: 7/7/2023 5:17:11 PM
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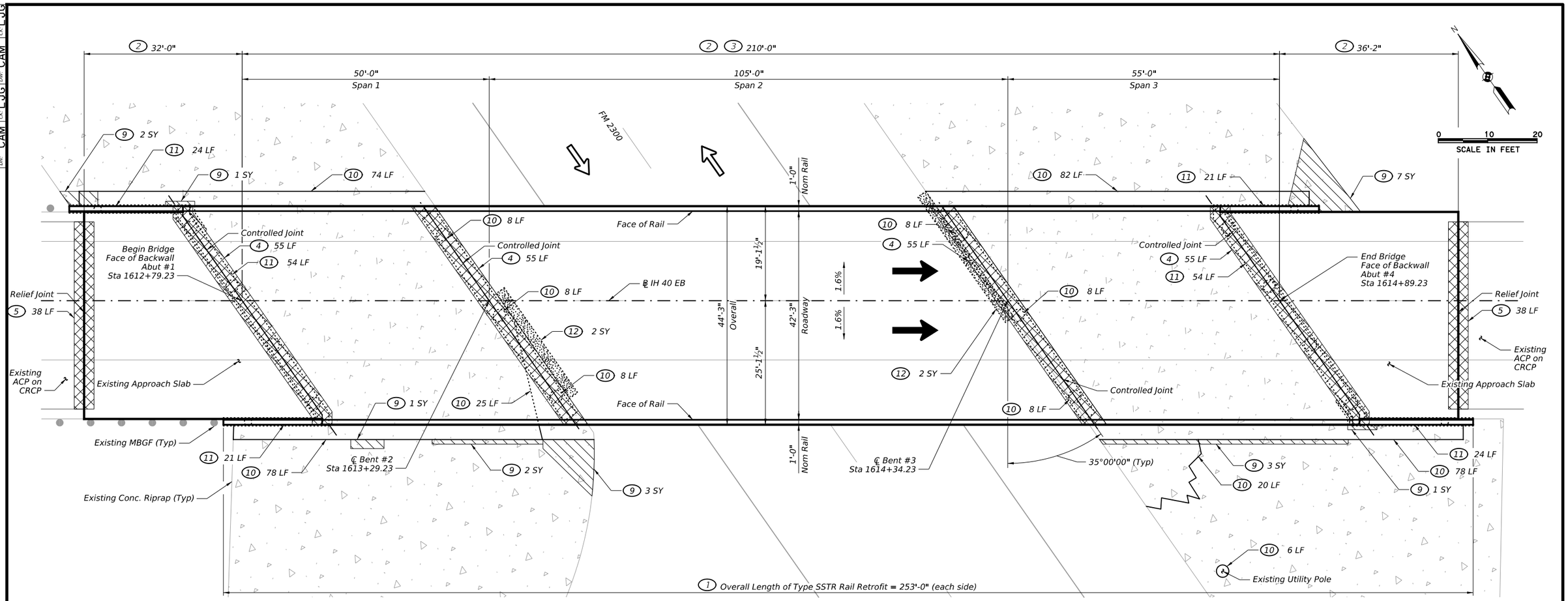
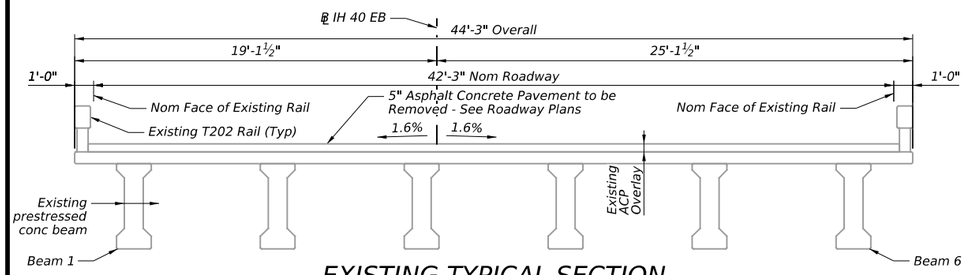
FINAL SUBMITTAL (100%)

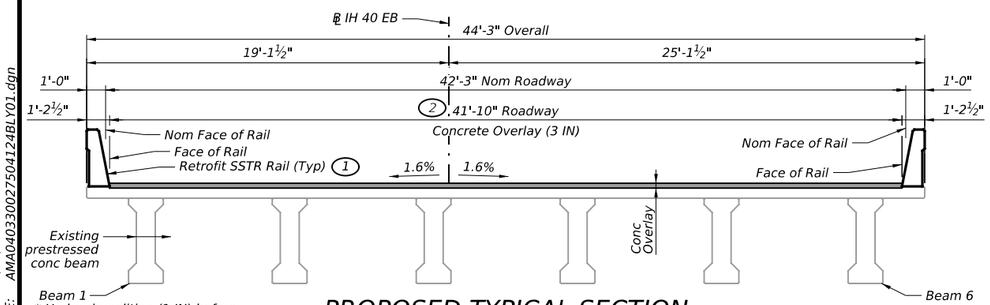
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



PLAN



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

12 EXPOSED TOE RIPRAP TO BE COVERED WITH EMBANKMENT

(East Riprap Shown, West Riprap Similar)

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Replace Embankment
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
09/29/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc.
Firm Registration No. F-754
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Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS AT FM 2300 BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-124

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		112

DATE: 9/28/2023 2:40:07 PM
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FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	506	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1293	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 120 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	120	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1293	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(3)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 105 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 30 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	105	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	30	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(4)	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	220	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(5)	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	76	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(6)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	33	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	756	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(7)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	48	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(7A)	Wrap GFRP Protection around columns. See Substructure Repair Isometrics for locations.	786	CARBON FIBER REINF POLYMER PROTECTION	99	SF	See GFRP Column Wrapping Detail on the Miscellaneous Bridge Repair Detail sheets.
(8)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	2318	SF	
(9)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 10 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	20	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	10	CY	
		432	RIPRAP (CONC)(4 IN)	8	CY	
(10)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	411	LF	
(11)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	198	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.
(12)	Place embankment material to cover exposed toe of concrete riprap. See Plan for locations.	132	EMBANKMENT (FINAL)(ORD COMP)(TY B)	4	CY	

(6) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	3	Abutment 1	1 SF
	6	Abutment 1	2 SF
	1	Bent 2	4 SF
	3	Bent 2	1 SF
	5	Bent 2	1 SF
	6	Bent 2	2 SF
2	1	Bent 2	2 SF
	6	Bent 2	6 SF
	5	Bent 3	1 SF
3	4	Bent 3	2 SF
	6	Bent 3	1 SF
	1	Abutment 4	1 SF
	2	Abutment 4	2 SF
	3	Abutment 4	2 SF
	4	Abutment 4	1 SF
	5	Abutment 4	1 SF
	6	Abutment 4	3 SF
TOTAL			33 SF

All beam ends in Spans 1 & 3 are Type 54 Beams (24) have 1.5 LF of waterproofing with 20 SF area of waterproofing.
All beam ends in Span 2 are Type 54 MOD Beams (12) have 1.5 LF of waterproofing with 23 SF area of waterproofing.
Total area of waterproofing equals 756 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS AT FM 2300 BRIDGE LOCATION REPAIR PLAN

NBI# 04-033-0-0275-04-124

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		113

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FINAL SUBMITTAL (100%)

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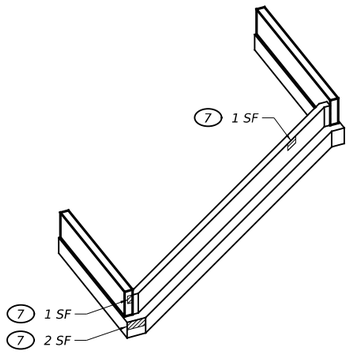
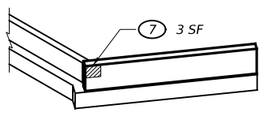
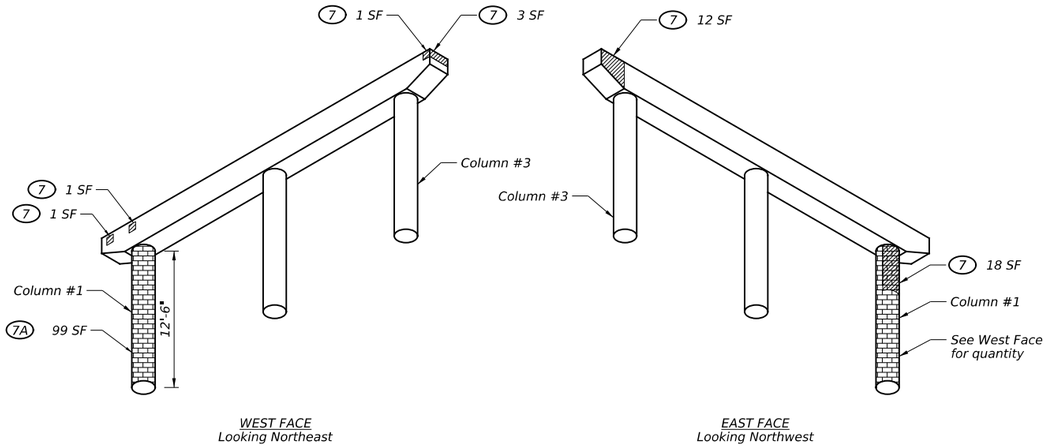


EAST FACE
Looking Northwest



NORTH WINGWALL
Looking Southwest

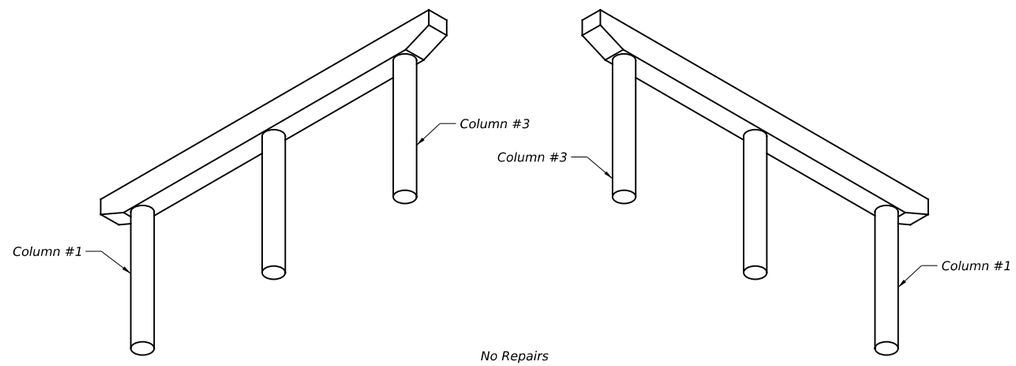
ABUTMENT 1



WEST FACE
Looking Northeast

EAST FACE
Looking Northwest

BENT 2

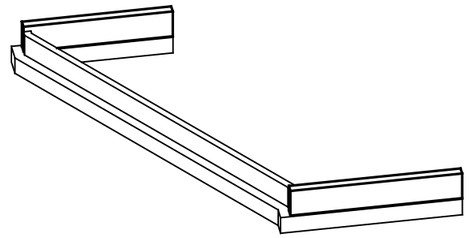


No Repairs

WEST FACE
Looking Northeast

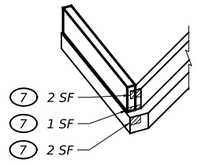
EAST FACE
Looking Northwest

BENT 3



WEST FACE
Looking Northeast

ABUTMENT 4



NORTH WINGWALL
Looking Southeast

SUBSTRUCTURE REPAIR ISOMETRICS

(9) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE	
SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	514 SF
BENTS 2 & 3	645 SF
TOTAL	2318 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Glass Fiber Reinf. Polymer Protection
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Firm Registration No. F-754
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972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS
AT FM 2300
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-033-0-0275-04-124

SCALE: N.T.S.

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		114

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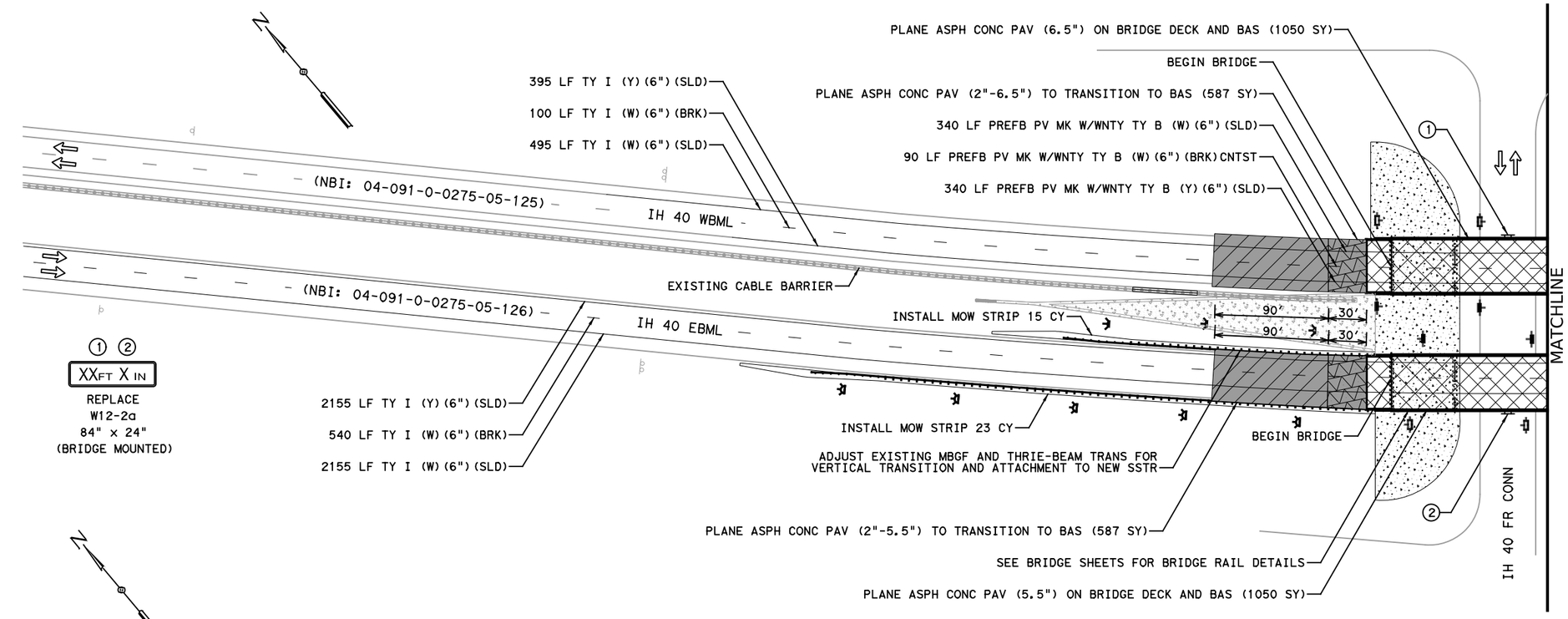

LEGEND

- EXIST TRAFFIC LANE
- PLANE ASPH CONC PVMT (BRIDGE AND BAS)
- PLANE ASPH CONC PVMT (APPROACH)
- 2" SP-D PG70-28 OVERLAY
- 1.5" HYDRO-DEMOLITION AND 2"-3.5" CONCRETE OVERLAY
- DEL ASSM (D-SW)SZ 1(BRF)GF2
- DEL ASSM (D-SY)SZ 1(BRF)GF2
- DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
- DEL ASSM (D-SW)SZ (BRF)CTB
- DEL ASSM (D-SY)SZ (BRF)CTB
- DEL ASSM (D-SW)SZ (BRF)CTB (BI)

NOTES:

1. FOR THE TRANSITION SECTION REFER TO THE ROADWAY PAVEMENT TRANSITION DETAILS.
2. FOR THE MEDIAN SECTION REFER TO THE MEDIAN PROTECTION PLANS.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

Brian Enns P.E. 7/10/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT IH 40F FR CONN ROADWAY PLAN

NBI#: 04-091-0-0275-05-125 & 126

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		115

DATE: 7/10/2023 10:31:42 AM
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AD | DW | AD
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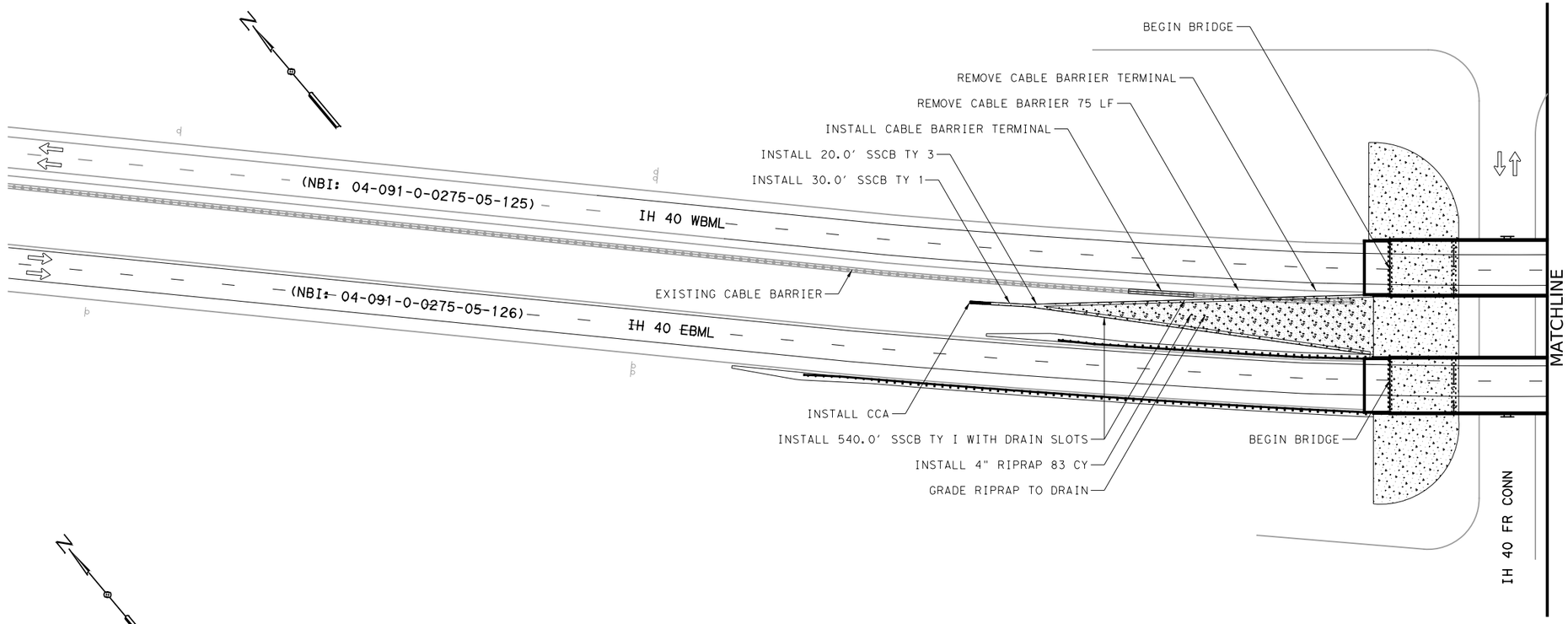
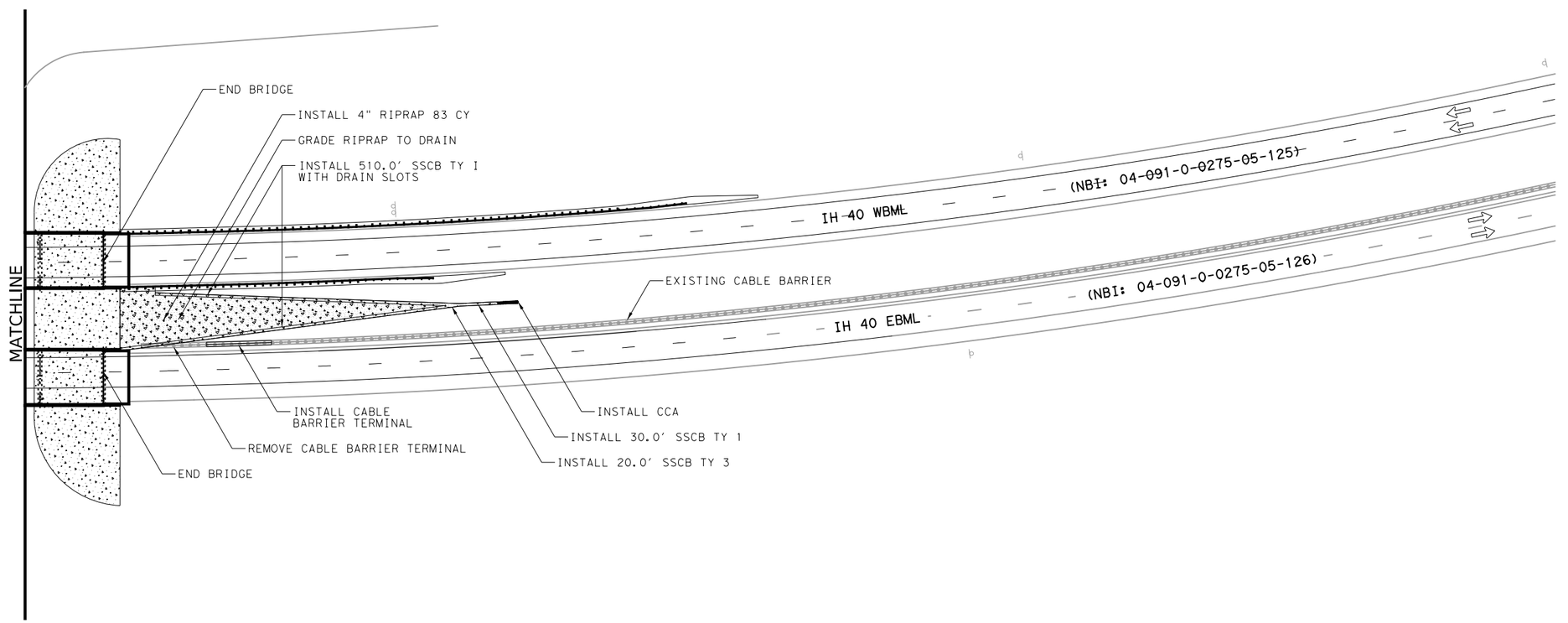
AD | DW | AD





LEGEND

EXIST TRAFFIC LANE ⇨

NOTES:

1. SSCB TY I INSTALLED WITH DRILLED SHAFT ANCHORS AND DRAIN SLOTS.
2. TRANSITION FROM SINGLE SSCB TO DUAL SSCB PAID FOR WITH SSCB TY 3.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 7/10/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM# 8587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT IH 40F FR CONN MEDIAN PROTECTION PLAN

NBI#: 04-091-0-0275-05-125 & 126

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		116

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FINAL SUBMITTAL (100%)

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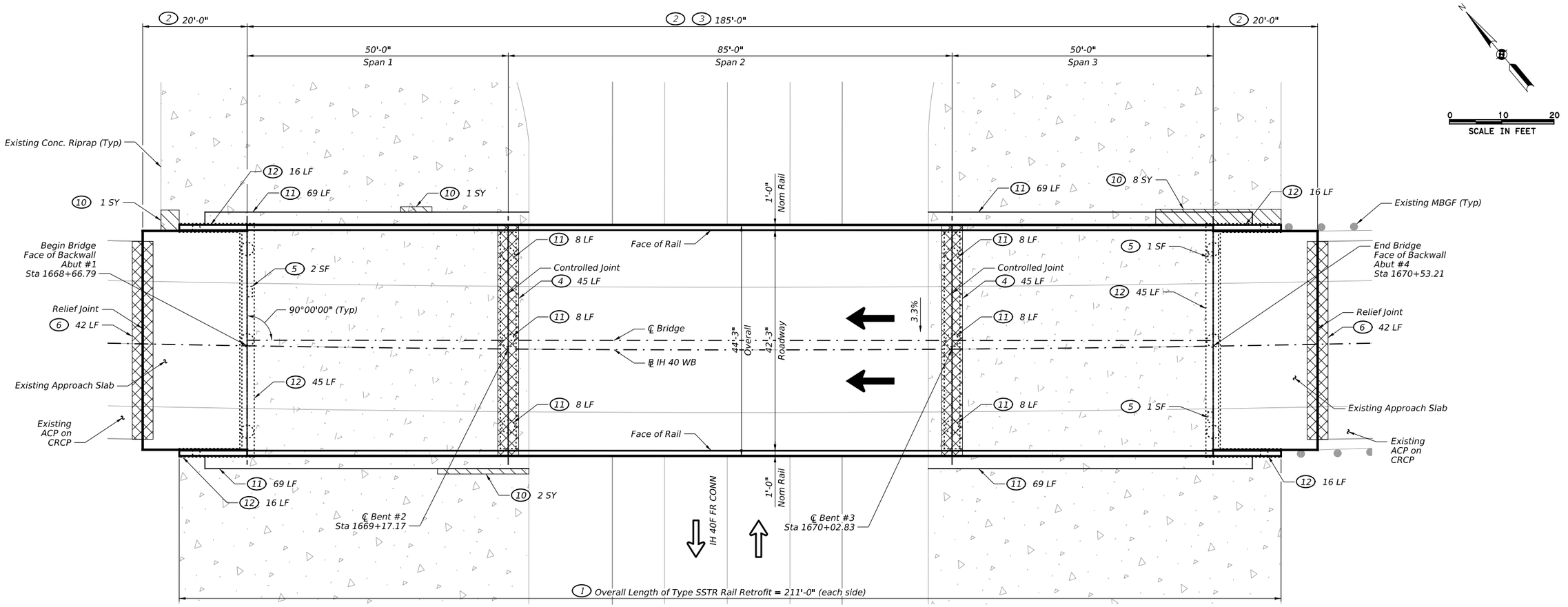
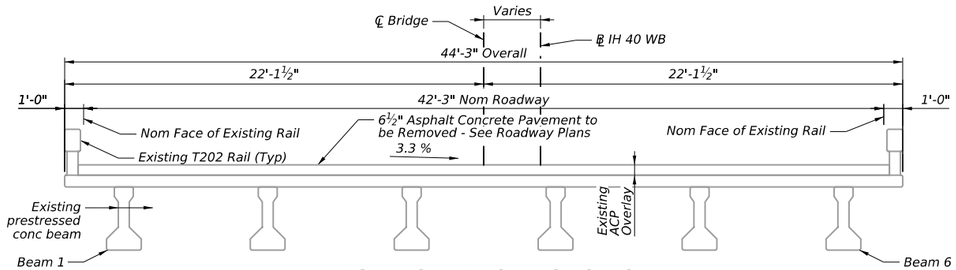
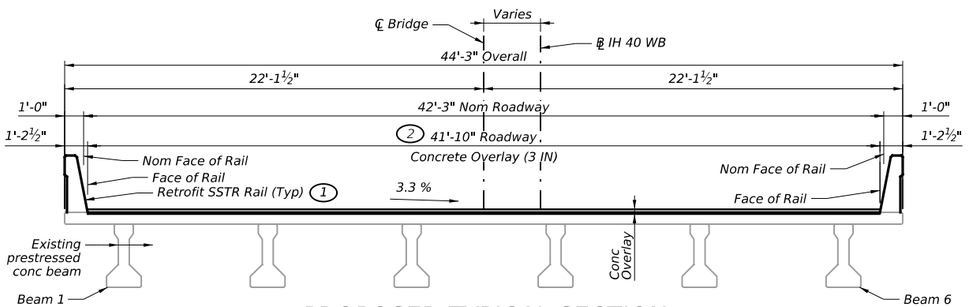


PLAN



EXISTING TYPICAL SECTION



* Hydro-demolition (1 IN) before placing Conc Overlay

PROPOSED TYPICAL SECTION

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
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PROFESSIONAL ENGINEER
09/29/2023

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Texas Department of Transportation

IH 40 WB OVERPASS AT IH 40F FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-05-125

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		117

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FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	422	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1046	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 95 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	95	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1046	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(3)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 90 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 25 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	90	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	25	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(4)	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	90	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(5)	Repair damaged deck soffit. See Plan for location.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	4	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(6)	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	84	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(7)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	7	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	648	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(8)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	10	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(9)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	1654	SF	
(10)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	12	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	4	CY	
(11)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	324	LF	
(12)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	154	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

(7) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
2	4	Bent 2	2 SF
	5	Bent 2	1 SF
	1	Bent 3	1 SF
	6	Bent 3	2 SF
3	2	Bent 3	1 SF
TOTAL			7 SF

All beam ends (36) have 1.5 LF of waterproofing with 18 SF area of waterproofing for a total of 648 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS AT IH 40F FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-05-125

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		118

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FINAL SUBMITTAL (100%)

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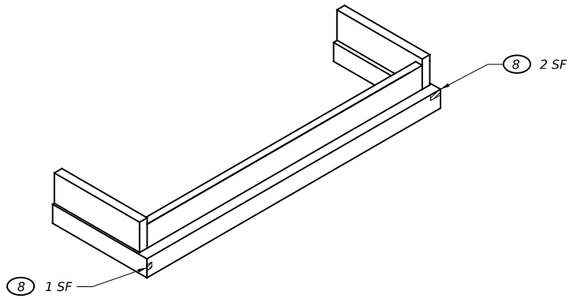
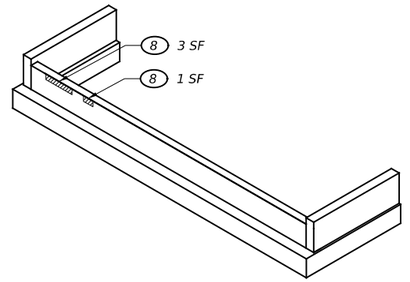


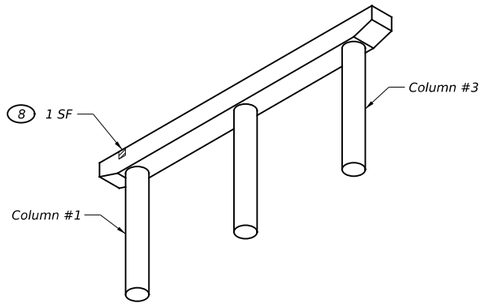
SOUTHEAST FACE
Looking North

ABUTMENT 1

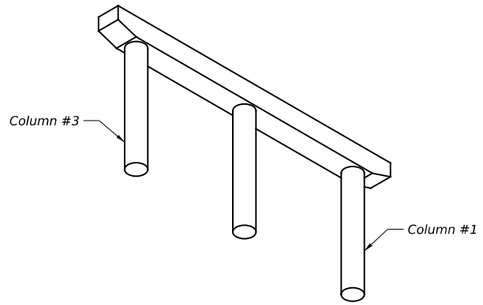


NORTHWEST FACE
Looking East

ABUTMENT 4

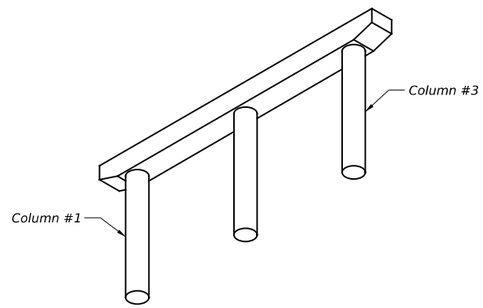


NORTHWEST FACE
Looking East

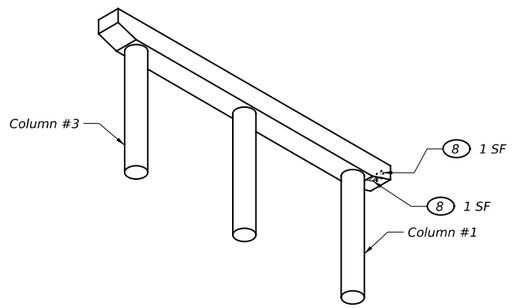


SOUTHEAST FACE
Looking North

BENT 2



NORTHWEST FACE
Looking East



SOUTHEAST FACE
Looking North

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

(9) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE

SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	355 SF
BENTS 2 & 3	472 SF
TOTAL	1654 SF

REPAIR CALL-OUT LEGEND

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
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17111 Preston Road, Suite 300
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Texas Department of Transportation

IH 40 WB OVERPASS
AT IH 40F FR CONN
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-091-0-0275-05-125

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061,ETC.	IH 40,ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON,ETC.		119

DATE: 7/7/2023 5:19:09 PM
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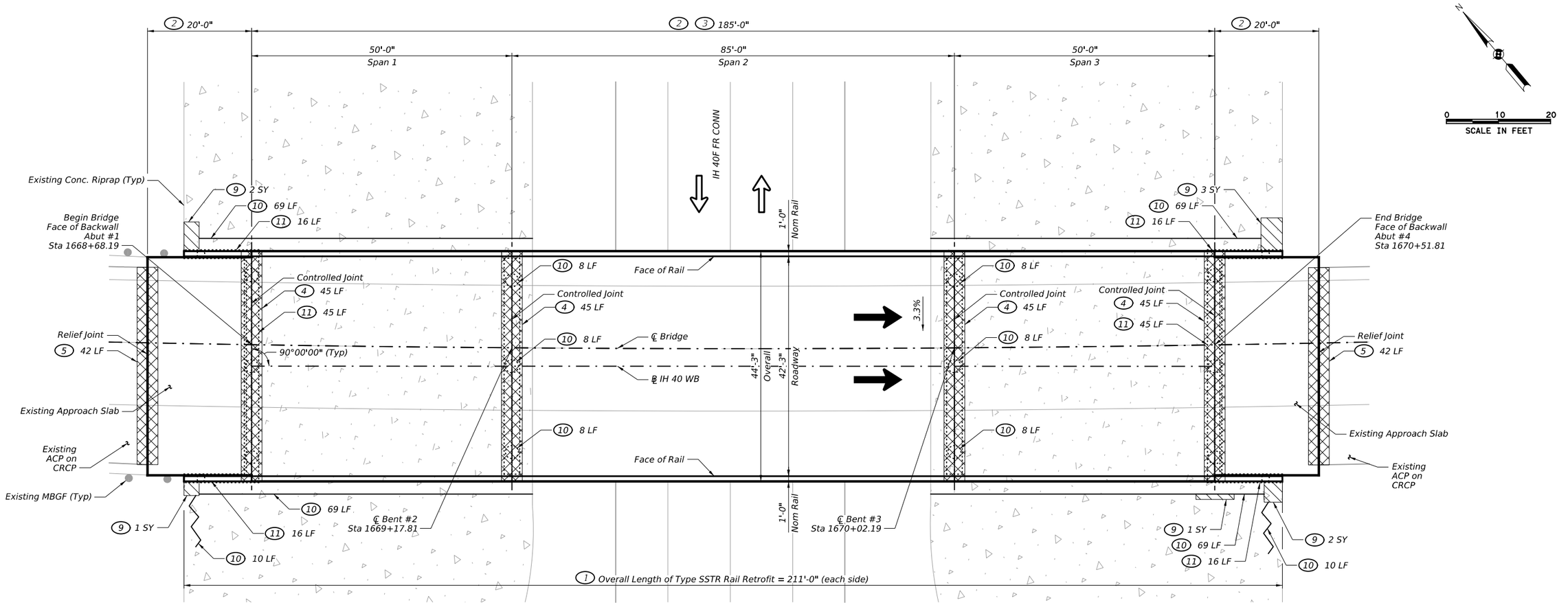
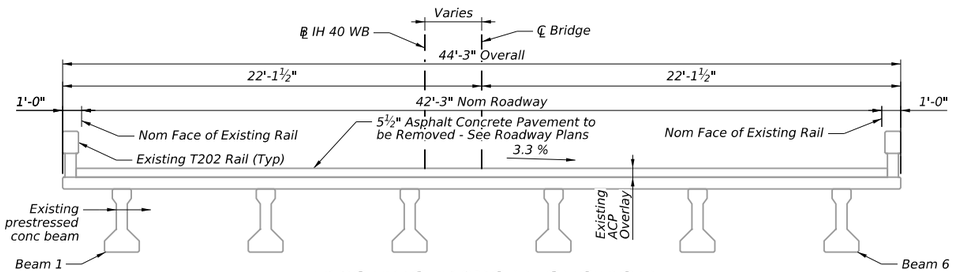
FINAL SUBMITTAL (100%)

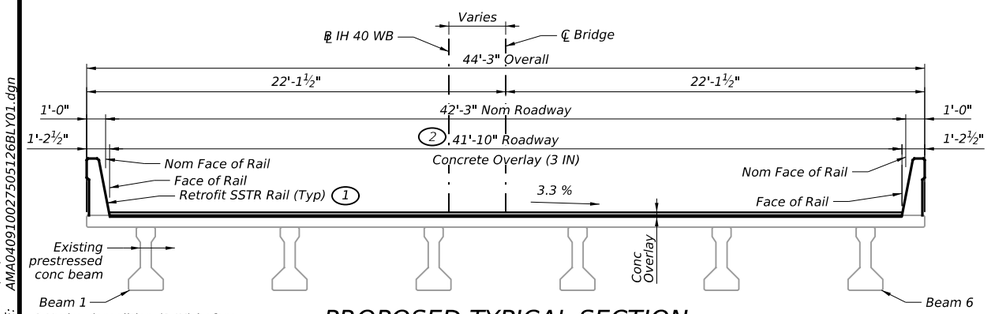
DW:	CAM	CK	LJG	DW:	CAM	CK	LJG



PLAN



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

* Hydro-demolition (1 IN) before placing Conc Overlay

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
Brett RC Allen 09/29/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS AT IH 40F FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-05-126

SCALE:1"=20' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		120

DATE: 9/28/2023 2:40:34 PM
FILE: AMA040910027505126BLY01.dgn

FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing Type T202 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	422	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1046	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 95 SF (1% of deck area and approach slab area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	95	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (3 IN)	1046	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(3)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 90 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 25 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	90	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	25	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(4)	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	180	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(5)	Install SEJ-M (5IN) type expansion joints at existing relief joints. Install in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SEJ)	84	LF	See SEJ Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(6)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	4	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	648	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(7)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	13	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(7A)	Apply Type X Epoxy Waterproof Finish to columns. See Substructure Repair Isometrics for locations.	427	EPOXY WATERPROOF FINISH (TY X)	32	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(8)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	2	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	1654	SF	
(9)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	9	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	5	CY	
(10)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	344	LF	
(11)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	154	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

(6) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	6	Abutment 1	1 SF
	6	Bent 2	2 SF
3	5	Abutment 4	1 SF
TOTAL			4 SF

All beam ends (36) have 1.5 LF of waterproofing with 18 SF area of waterproofing for a total of 648 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
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PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Dallas, Texas 75248
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Texas Department of Transportation

IH 40 EB OVERPASS
AT IH 40F FR CONN
BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-05-126

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		121

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FINAL SUBMITTAL (100%)

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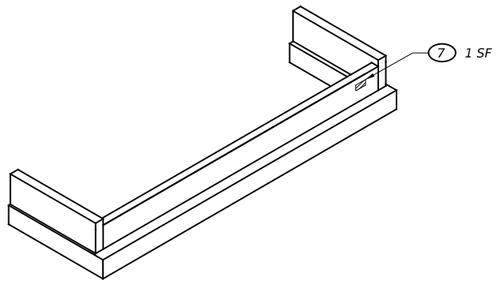
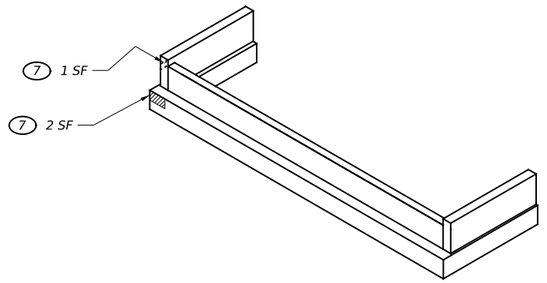


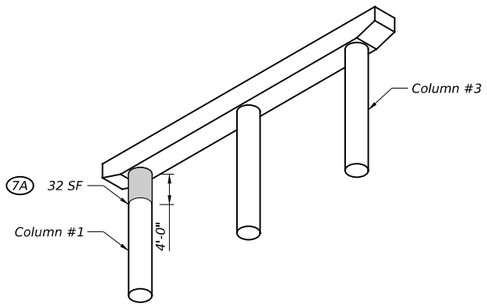
SOUTHEAST FACE
Looking North

ABUTMENT 1



NORTHWEST FACE
Looking East

ABUTMENT 4



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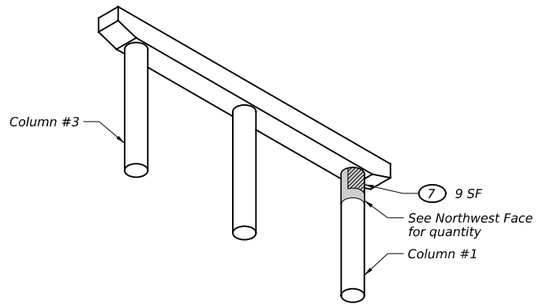
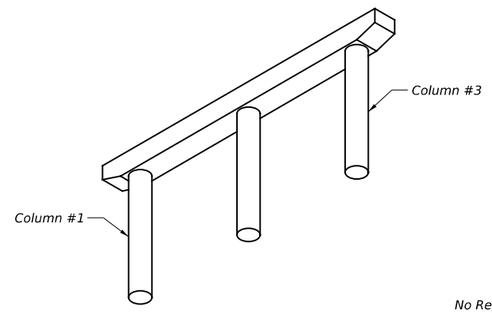
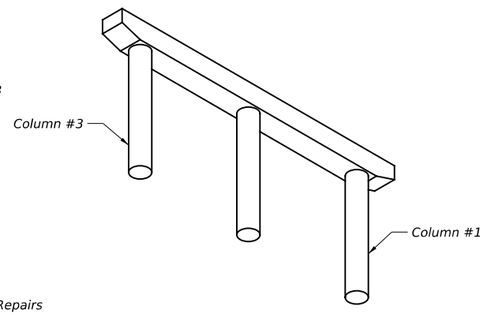


SOUTHEAST FACE
Looking North

BENT 2



NORTHWEST FACE
Looking East



SOUTHEAST FACE
Looking North

No Repairs

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

(8) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE

SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 4	355 SF
BENTS 2 & 3	472 SF
TOTAL	1654 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Type X Epoxy Waterproof Finish
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
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Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS
AT IH 40F FR CONN
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-091-0-0275-05-126

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		122

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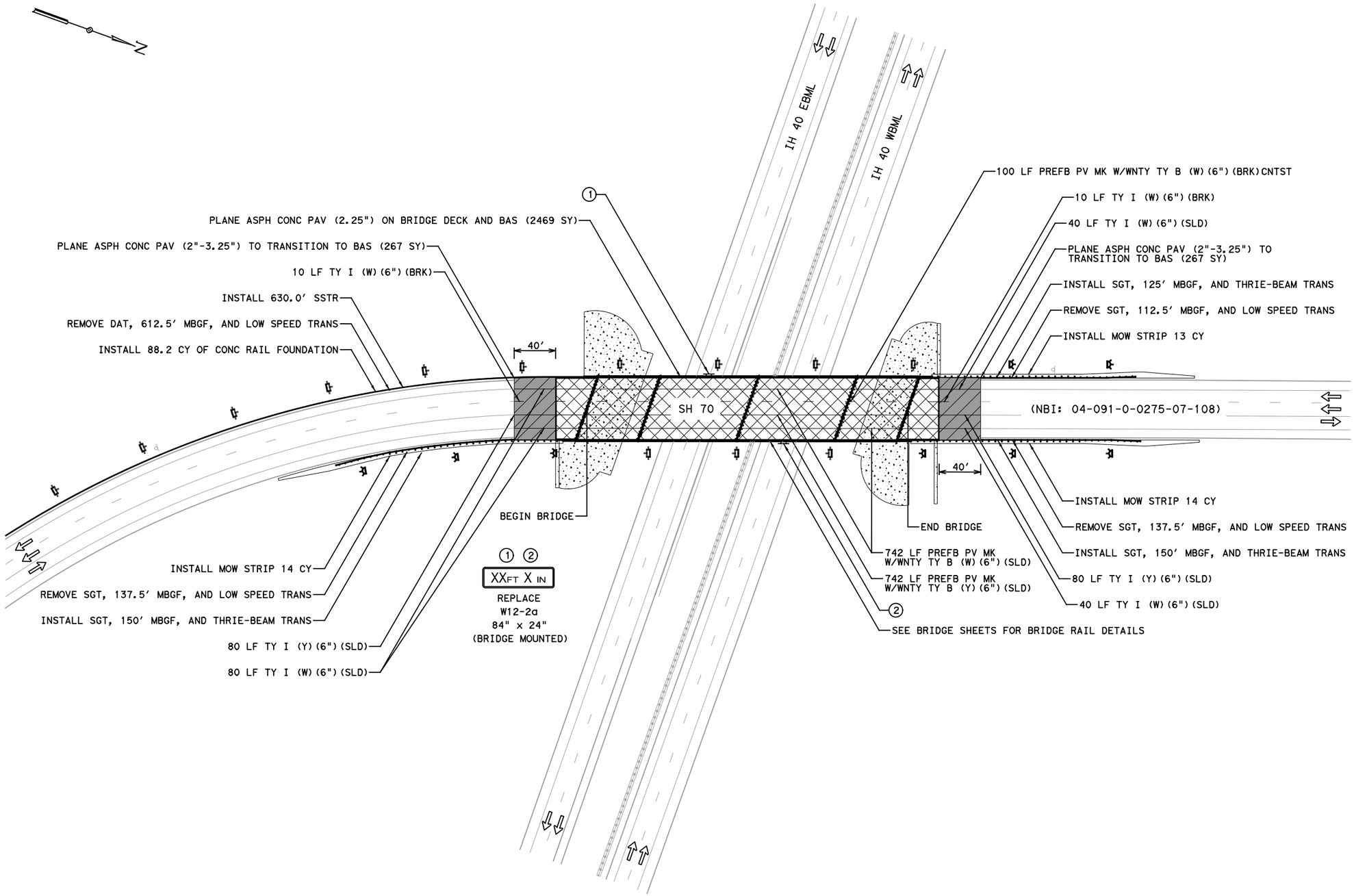

LEGEND

- EXIST TRAFFIC LANE
- PLANE ASPH CONC PVMT (BRIDGE AND BAS)
- PLANE ASPH CONC PVMT (APPROACH)
- 2" SP-D PG70-28 OVERLAY
- 1.5" HYDRO-DEMOLITION AND 2"-3.5" CONCRETE OVERLAY
- DEL ASSM (D-SW)SZ 1(BRF)GF2
- DEL ASSM (D-SY)SZ 1(BRF)GF2
- DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
- DEL ASSM (D-SW)SZ (BRF)CTB
- DEL ASSM (D-SY)SZ (BRF)CTB
- DEL ASSM (D-SW)SZ (BRF)CTB (BI)

NOTES:

1. FOR THE TRANSITION SECTION REFER TO THE ROADWAY PAVEMENT TRANSITION DETAILS.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

Brian Enns P.E. 7/10/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (NORTH) ROADWAY PLAN

NBI#: 04-091-0-0275-07-108

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		123

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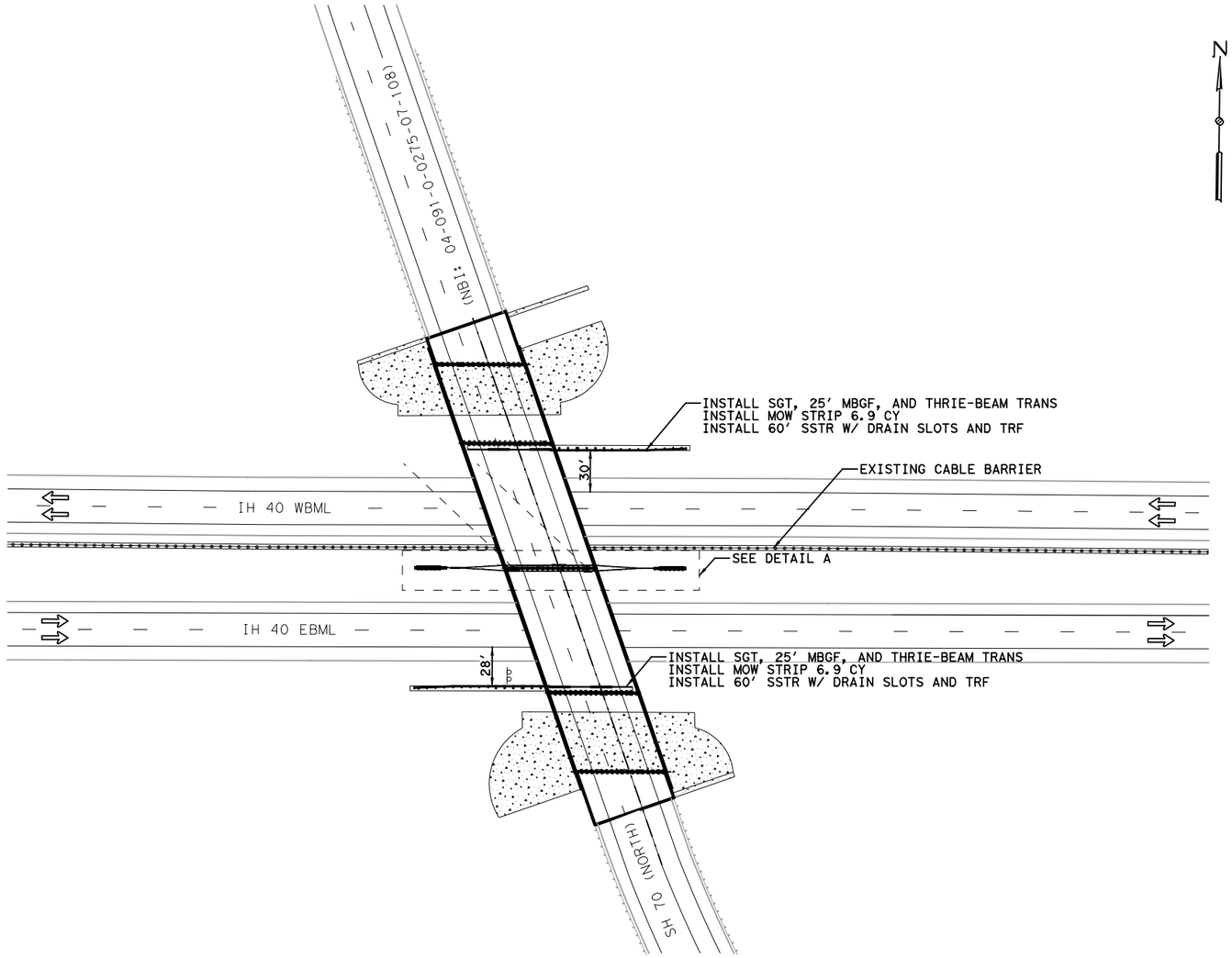

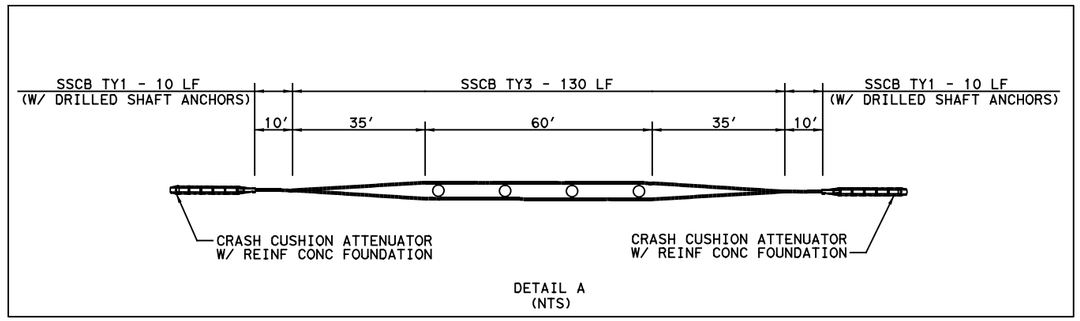

DETAIL A
(NTS)

NOTES

1. INSTALL EXPANSION JOINT (DOWEL CONNECTION) BETWEEN SSCB TY1 AND SSCB TY3. SEE STANDARD SSCB(1F)-10 FOR DETAILS.
2. SEE STANDARD SSCB(1F)-10 FOR DRILLED SHAFT ANCHOR PLACEMENT ON SSCB TY1.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 7/7/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (NORTH) COLUMN PROTECTION PLAN

NBI#: 04-091-0-0275-07-108

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		124

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FINAL SUBMITTAL (100%)

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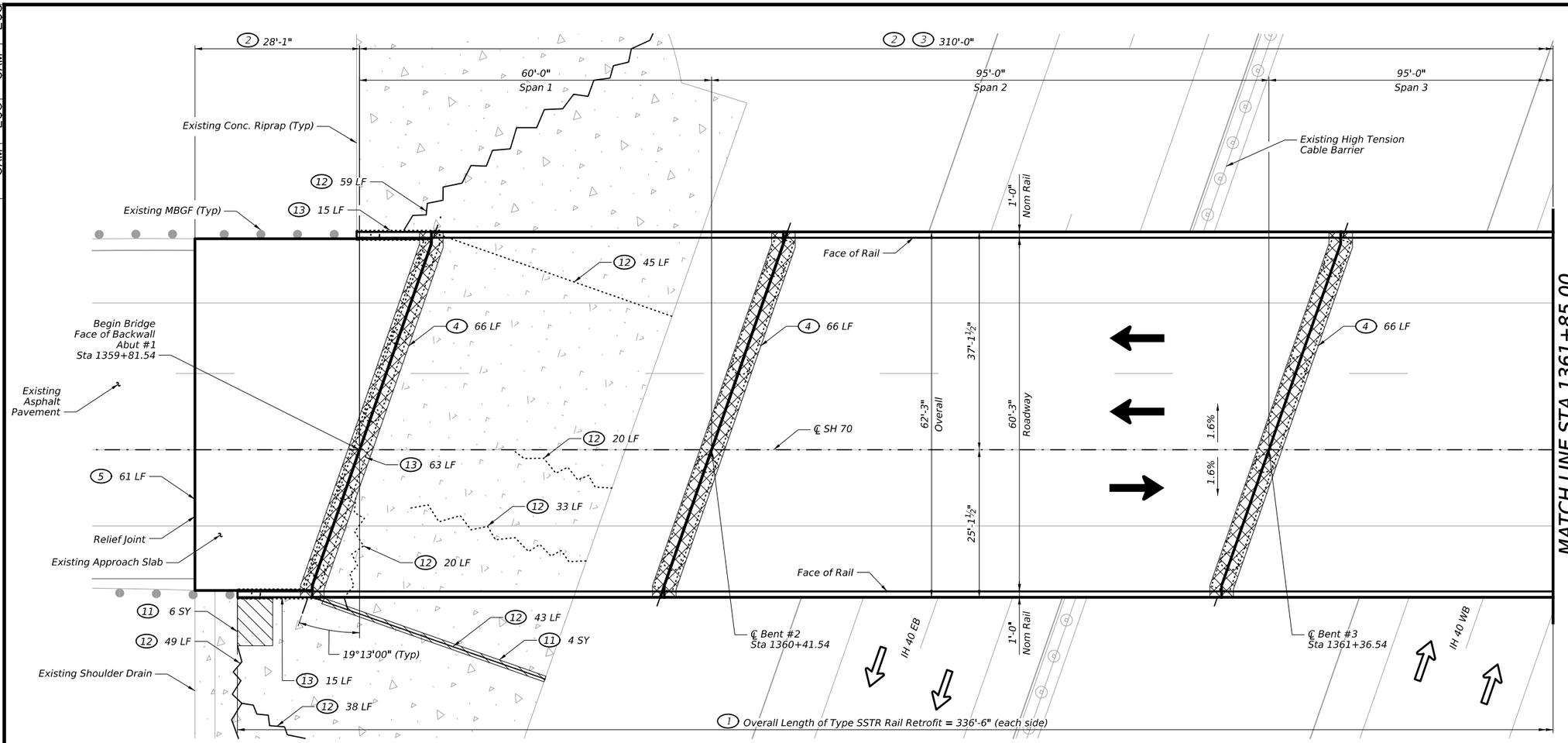

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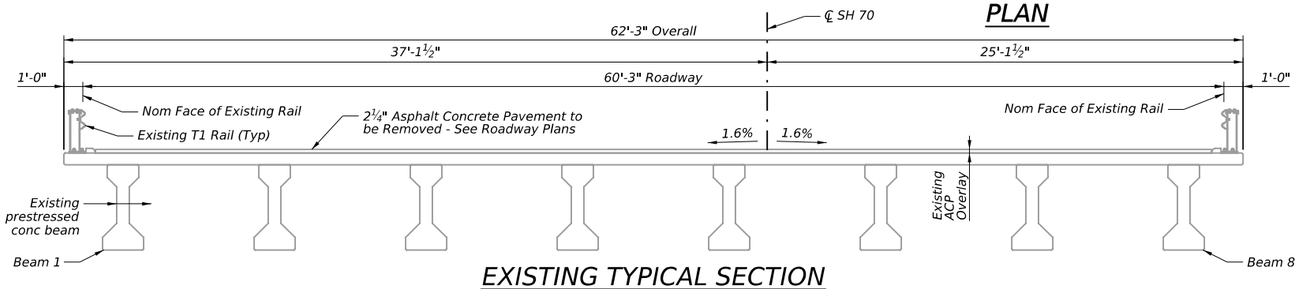
SCALE IN FEET

PLAN



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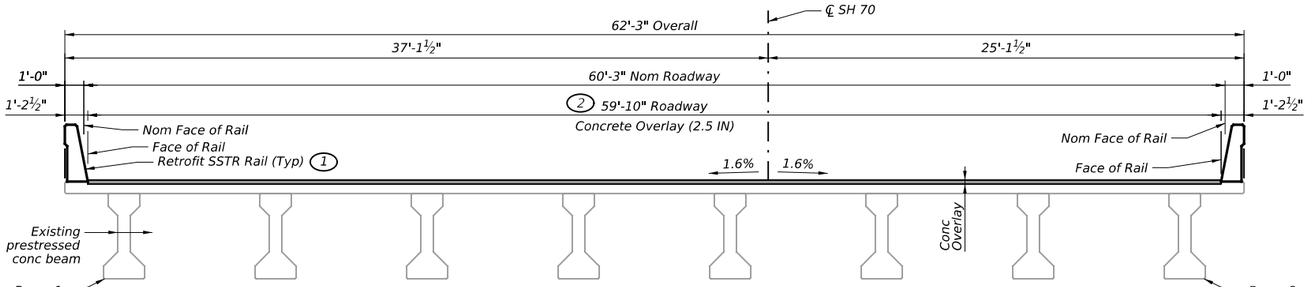

PROPOSED TYPICAL SECTION

* Hydro-demolition (1½ IN) before placing Conc Overlay

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
09/29/2023

NO.	DATE	REVISION	APPR BY

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972.960.4400

Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (NORTH) BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-07-108

SCALE:1"=20' SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		125

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FINAL SUBMITTAL (100%)

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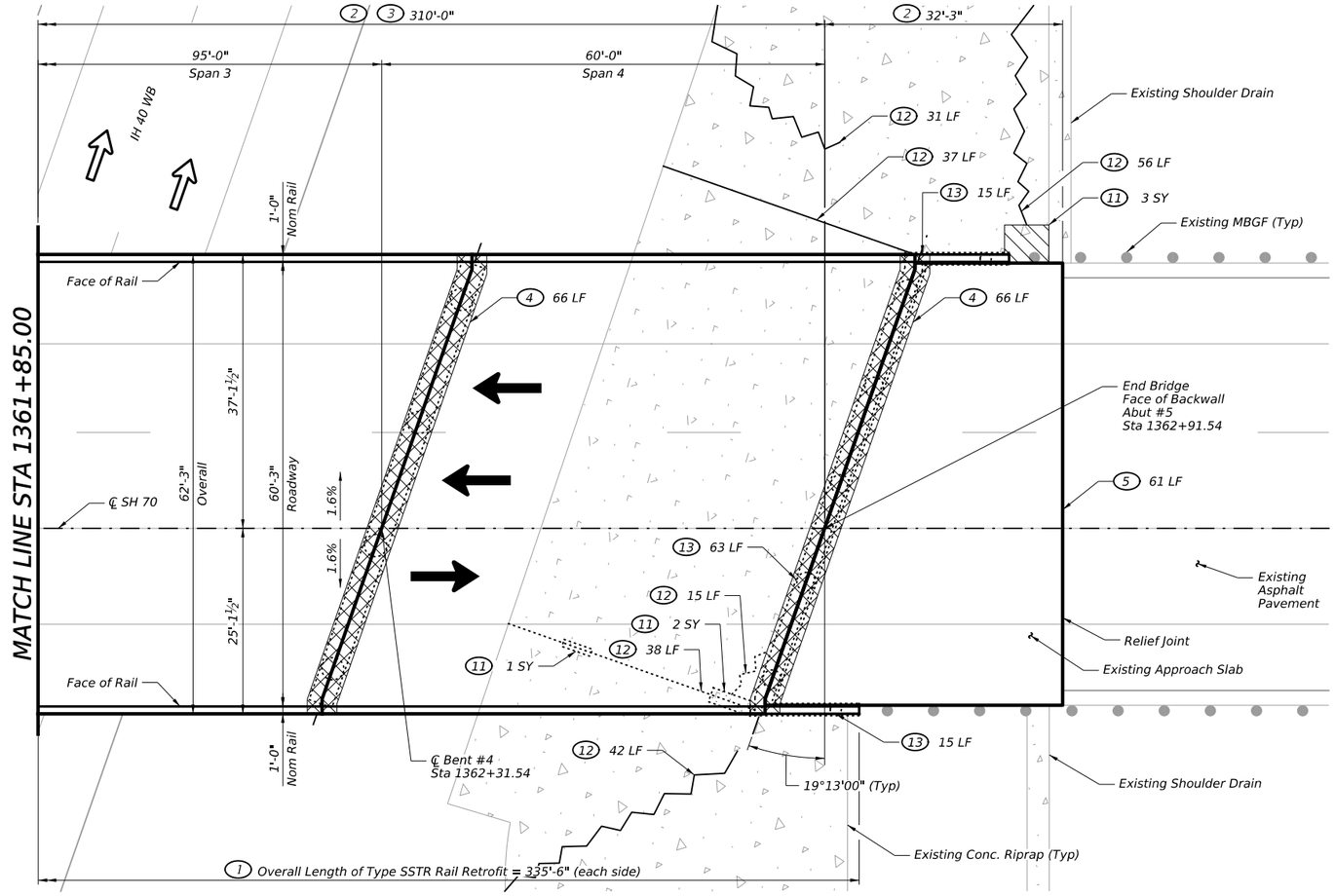

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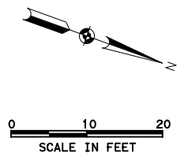

REPAIR CALL-OUT LEGEND

- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
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972.960.4400

Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (NORTH) BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-07-108

SCALE:1"=20' SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		126

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FINAL SUBMITTAL (100%)

DN:	CAM	CK:	LJG	DW:	LJG	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
1	Remove existing T1 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	673	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
2	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 ½ IN)	2463	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 225 SF (1% of deck area and approach slab) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	225	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (2.5 IN)	2463	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
3	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 150 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 40 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	150	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	40	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
4	After completion of hydro-demolition, perform full depth armor joint replacement, both sides of noted joint. Perform in conjunction wih rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (ARMOR)	330	LF	See Armor Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
5	Resize and reseal relief joints. See Plan for locations.	438	RESIZING AND SEALING JOINTS	122	LF	See Transverse Formed Expansion Joint on the JS-14.
6	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	124	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	1408	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
7	Repair damaged concrete diaphragms. See Table of Diaphragms for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	72	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
8	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	249	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
9	Wrap GFRP Protection around columns. See Substructure Repair Isometrics for locations.	786	CARBON FIBER REINF POLYMER PROTECTION	473	SF	See GFRP Column Wrapping Detail on the Miscellaneous Bridge Repair Detail sheets.
10	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	3	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	2403	SF	
11	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	16	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	5	CY	
12	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	526	LF	
13	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	186	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

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Firm Registration No. F-754
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Dallas, Texas 75248
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Texas Department of Transportation

IH 40 UNDERPASS
AT SH 70 (NORTH)
BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-07-108

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		127

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FILE: AMA04091002750710BLY03.dgn

FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

⑥ TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	2	Abutment 1	4 SF
	3	Abutment 1	4 SF
	4	Abutment 1	4 SF
	5	Abutment 1	4 SF
	6	Abutment 1	4 SF
	7	Abutment 1	4 SF
	8	Abutment 1	4 SF
2	1	Bent 2	4 SF
	2	Bent 2	4 SF
	4	Bent 2	4 SF
	5	Bent 2	4 SF
	7	Bent 2	4 SF
	3	Bent 3	4 SF
	5	Bent 3	4 SF
	6	Bent 3	4 SF
	7	Bent 3	4 SF
3	6	Bent 3	4 SF
	6	Bent 4	4 SF
	7	Bent 4	4 SF
	8	Bent 4	4 SF
4	1	Bent 4	4 SF
	2	Bent 4	4 SF
	4	Bent 4	4 SF
	1	Abutment 5	4 SF
	2	Abutment 5	4 SF
	3	Abutment 5	4 SF
	4	Abutment 5	4 SF
	5	Abutment 5	4 SF
	6	Abutment 5	4 SF
	7	Abutment 5	4 SF
	8	Abutment 5	4 SF
TOTAL			124 SF

All beam ends in Spans 1 & 4 are Type 54 Beams (32) have 1.5 LF of waterproofing with 20 SF area of waterproofing.
All beam ends in Span 2 & 3 are Type IV Beams (32) have 1.5 LF of waterproofing with 24 SF area of waterproofing.
Total area of waterproofing equals 1408 SF.

⑦ TABLE OF DIAPHRAGM REPAIRS

Span	Bay	Location	Spall Repair Quantity
1	1	Abutment 1	3 SF
	3	Abutment 1	3 SF
	4	Abutment 1	3 SF
	6	Abutment 1	3 SF
	7	Abutment 1	3 SF
	2	Bent 2	3 SF
	5	Bent 2	3 SF
	6	Bent 2	3 SF
	7	Bent 2	3 SF
3	1	Bent 2	3 SF
	3	Bent 2	3 SF
	7	Bent 2	3 SF
	3	Bent 3	3 SF
	4	Bent 3	3 SF
	5	Bent 3	3 SF
	6	Bent 3	3 SF
	7	Bent 3	3 SF
3	2	Bent 3	3 SF
	1	Bent 4	3 SF
4	2	Bent 4	3 SF
	3	Bent 4	3 SF
	4	Bent 4	3 SF
	7	Bent 4	3 SF
	5	Abutment 5	3 SF
TOTAL			72 SF

STATE OF TEXAS
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Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (NORTH) BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-07-108

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		128

DATE: 7/7/2023 5:21:20 PM
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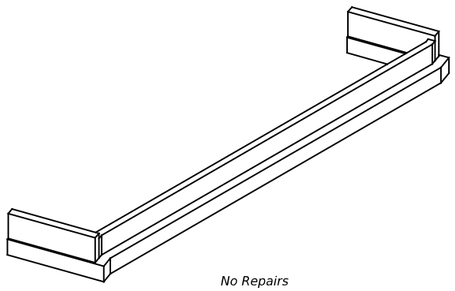
FINAL SUBMITTAL (100%)

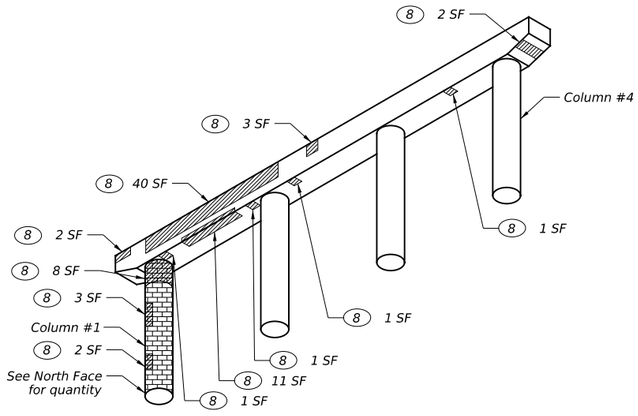
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



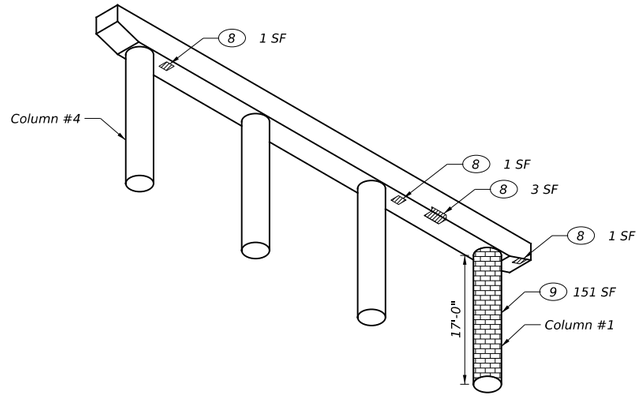
No Repairs

NORTH FACE
Looking Southwest

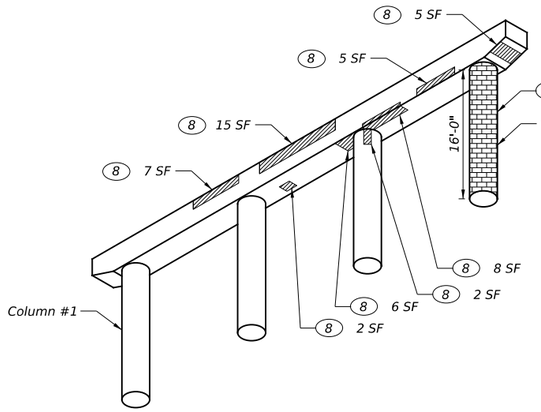
ABUTMENT 1



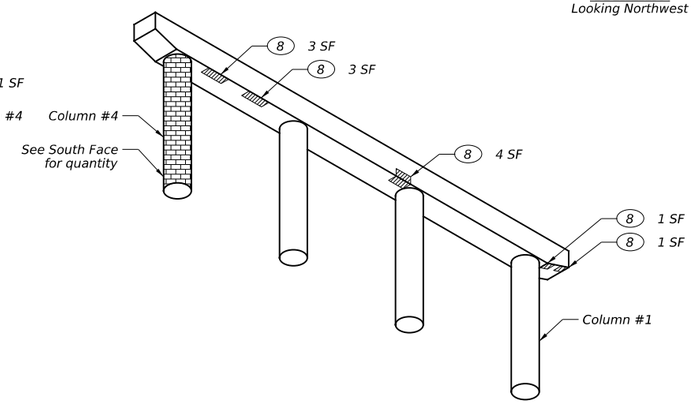
SOUTH FACE
Looking Northwest



NORTH FACE
Looking Southwest

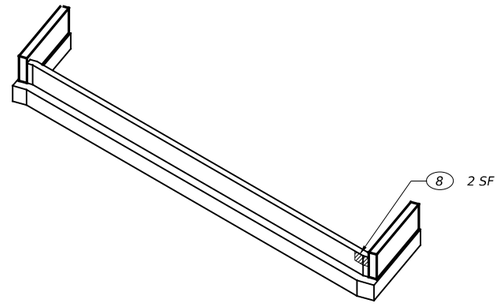


SOUTH FACE
Looking Northwest



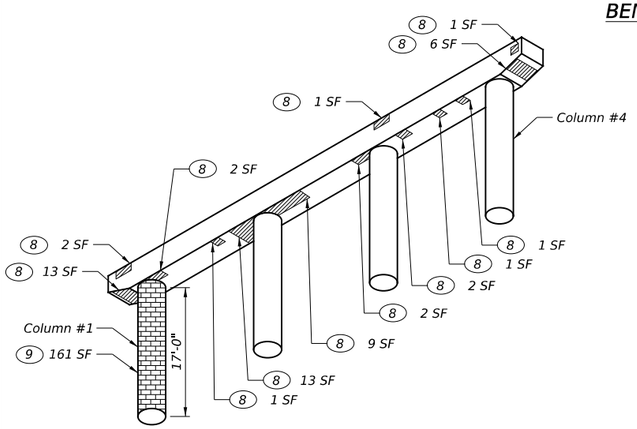
NORTH FACE
Looking Southwest

BENT 4

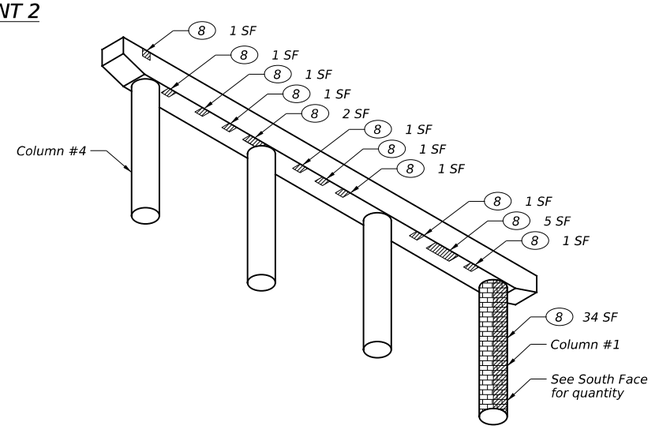


SOUTH FACE
Looking Northwest

BENT 2



SOUTH FACE
Looking Northwest



NORTH FACE
Looking Southwest

BENT 3

ABUTMENT 5

SUBSTRUCTURE REPAIR ISOMETRICS

(9) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE	
SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 5	555 SF
BENTS 2, 3 & 4	431 SF
TOTAL	2403 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Glass Fiber Reinf. Polymer Protection
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
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PROFESSIONAL ENGINEER
Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Texas Department of Transportation

IH 40 UNDERPASS
AT SH 70 (NORTH)
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-091-0-0275-07-108

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		129

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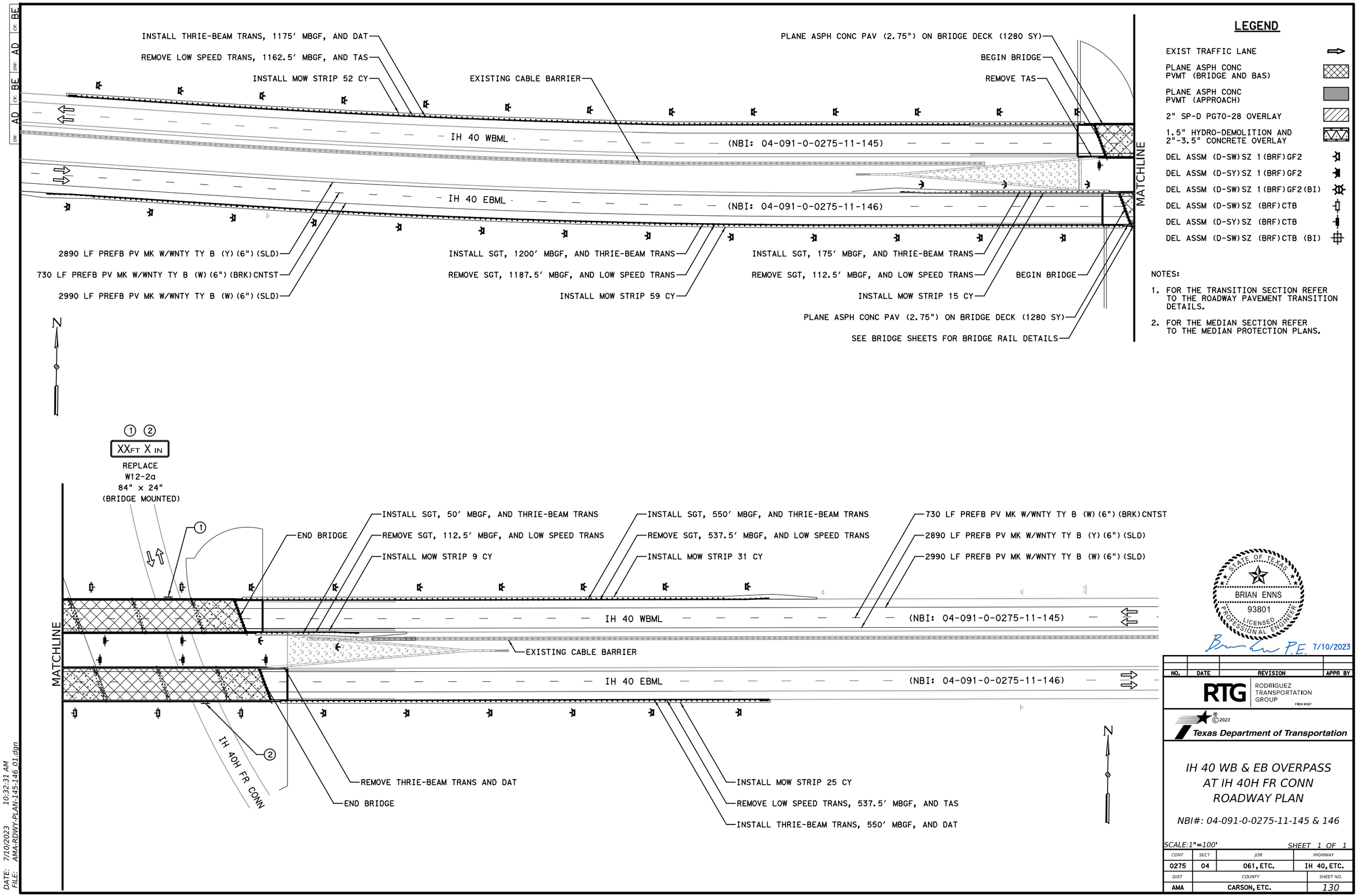

LEGEND

- EXIST TRAFFIC LANE
- PLANE ASPH CONC PVMT (BRIDGE AND BAS)
- PLANE ASPH CONC PVMT (APPROACH)
- 2" SP-D PG70-28 OVERLAY
- 1.5" HYDRO-DEMOLITION AND 2"-3.5" CONCRETE OVERLAY
- DEL ASSM (D-SW)SZ 1(BRF)GF2
- DEL ASSM (D-SY)SZ 1(BRF)GF2
- DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
- DEL ASSM (D-SW)SZ (BRF)CTB
- DEL ASSM (D-SY)SZ (BRF)CTB
- DEL ASSM (D-SW)SZ (BRF)CTB (BI)

NOTES:

1. FOR THE TRANSITION SECTION REFER TO THE ROADWAY PAVEMENT TRANSITION DETAILS.
2. FOR THE MEDIAN SECTION REFER TO THE MEDIAN PROTECTION PLANS.

BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
P.E. 7/10/2023

NO.	DATE	REVISION	APPR BY

RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 WB & EB OVERPASS AT IH 40H FR CONN ROADWAY PLAN

NBI#: 04-091-0-0275-11-145 & 146

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		130

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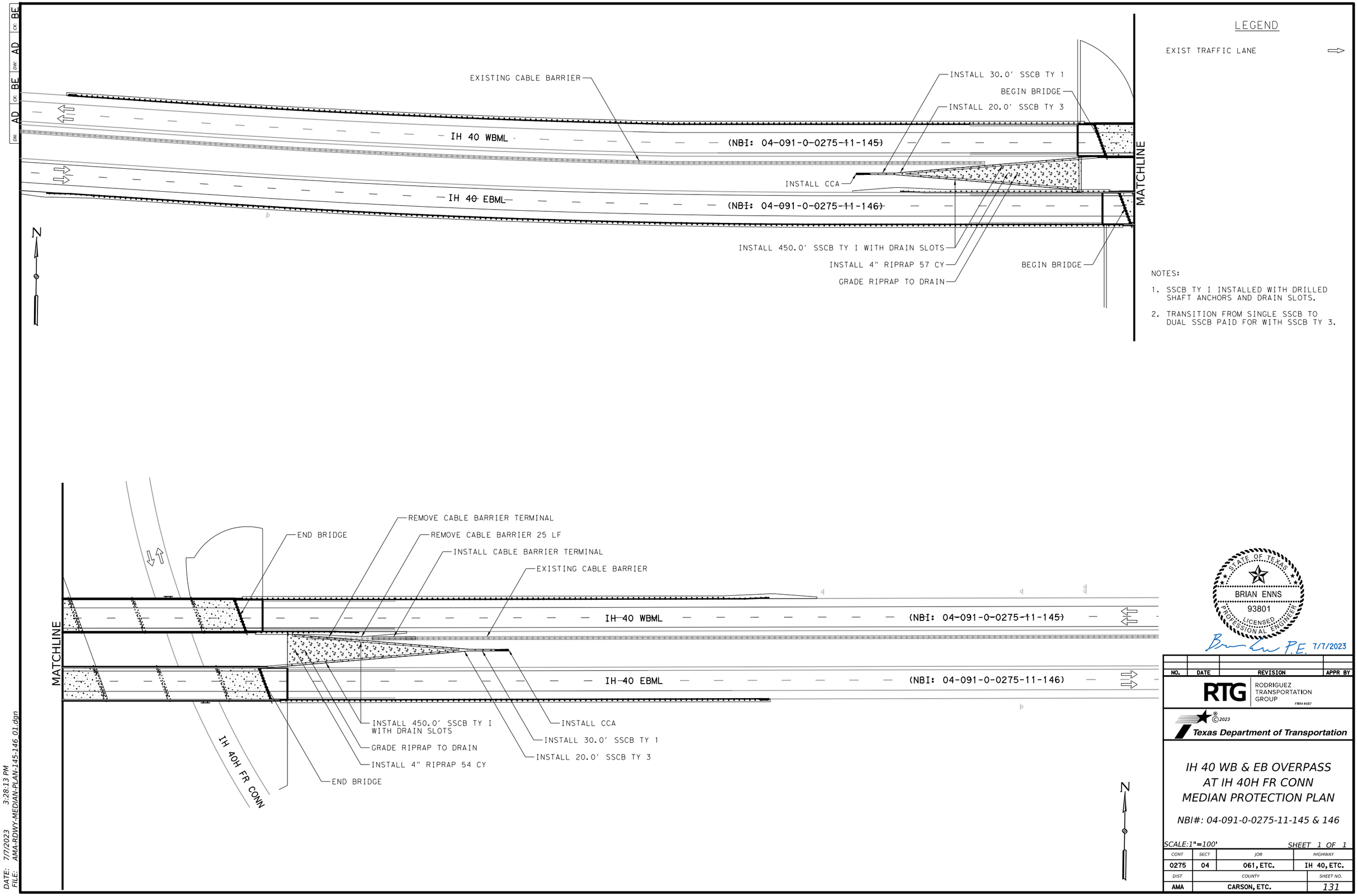

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM# 9587

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IH 40 WB & EB OVERPASS AT IH 40H FR CONN MEDIAN PROTECTION PLAN

NBI#: 04-091-0-0275-11-145 & 146

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		131

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FINAL SUBMITTAL (100%)

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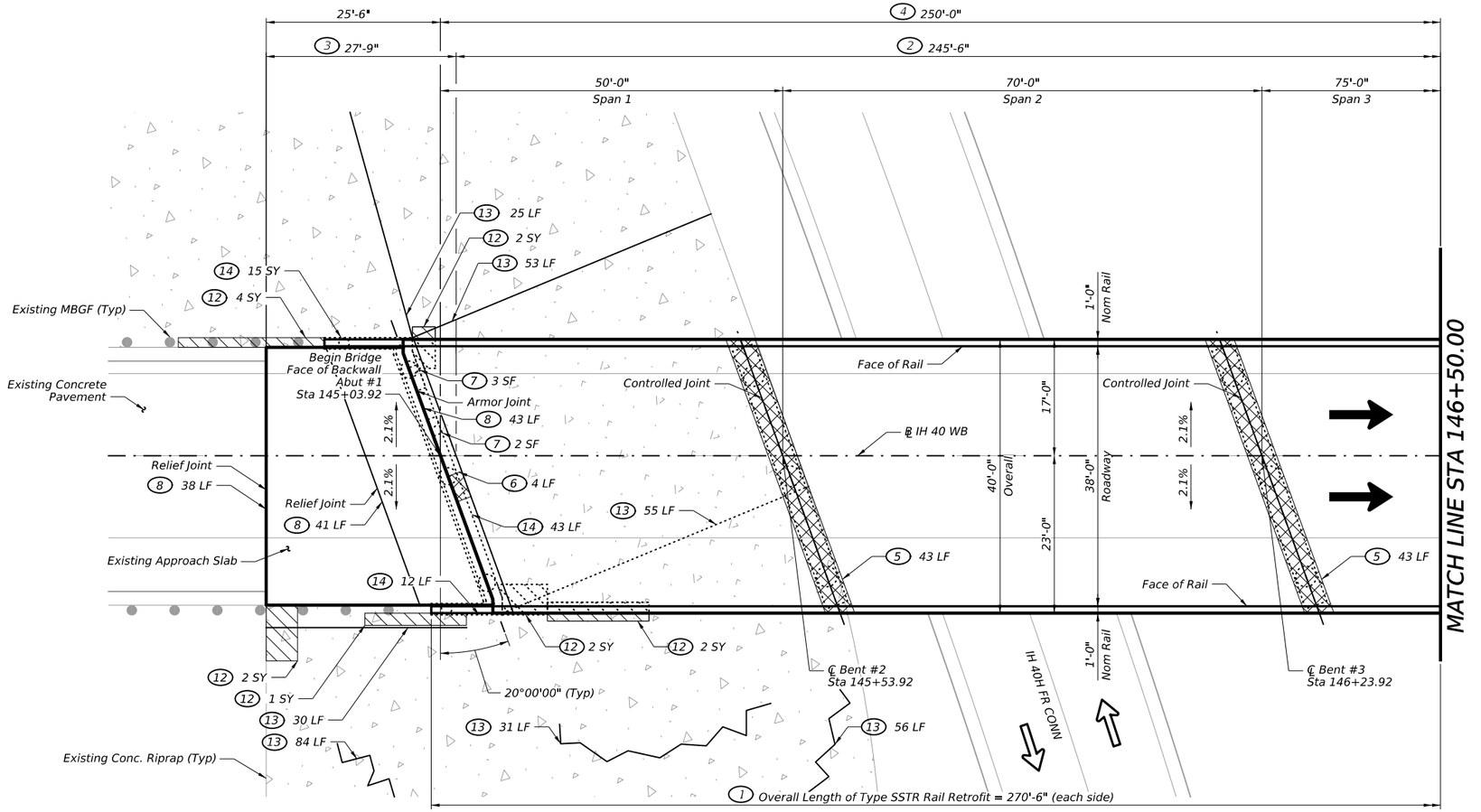
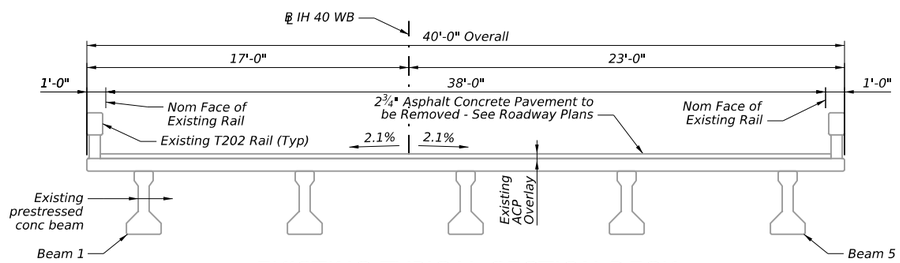
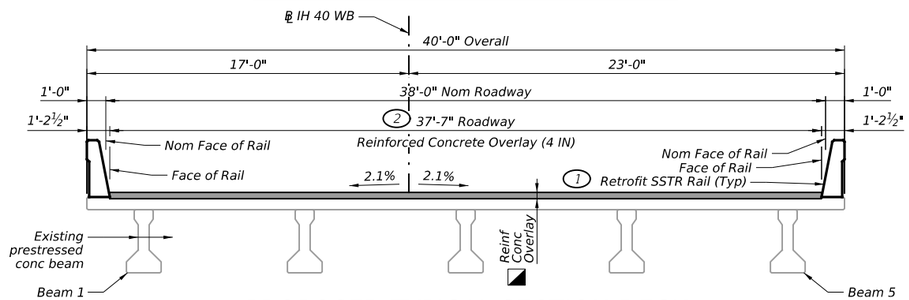


PLAN



EXISTING TYPICAL SECTION-DECK



PROPOSED TYPICAL SECTION-DECK

* Hydro-demolition (1 IN) before placing Reinf Conc Overlay

Provide #4 reinforcing bars spaced at a maximum of 1'-6" in each direction. Provide Grade 60 reinforcing steel, epoxy coated. The clear cover for the top of reinforcing shall be 2½". Provide 2" cover at bar ends at the edge of the overlay.

Deformed welded wire reinforcement (WWR)(ASTM A1064) of equal size and spacing may be substituted. WWR shall be epoxy coated.

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement or Repair
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
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Brett RC Allen 09/29/2023

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Texas Department of Transportation

IH 40 WB OVERPASS AT IH 40H FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-11-145

SCALE:1"=20' SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0275	04	061,ETC.	IH 40,ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON,ETC.		132

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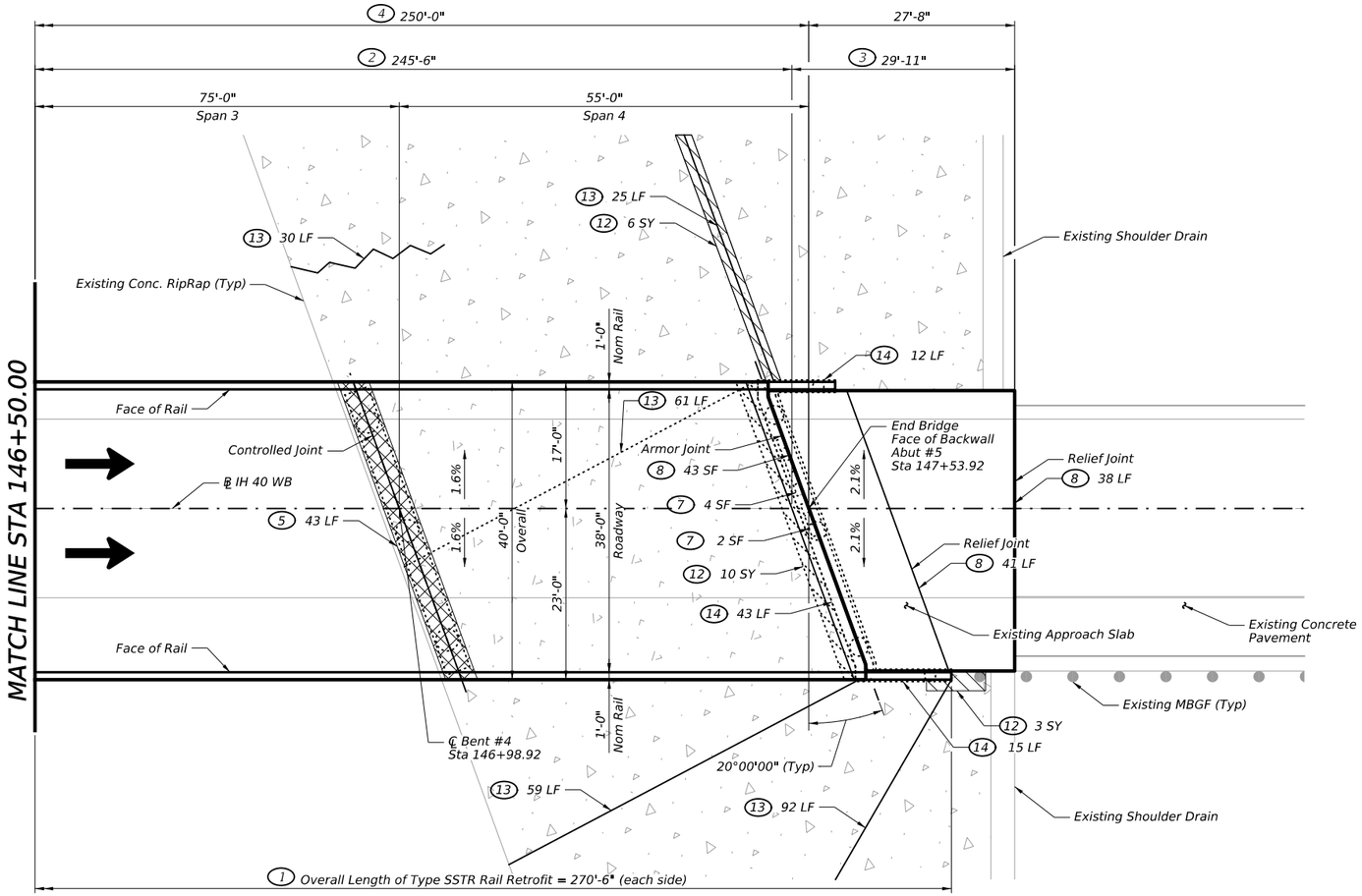
FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



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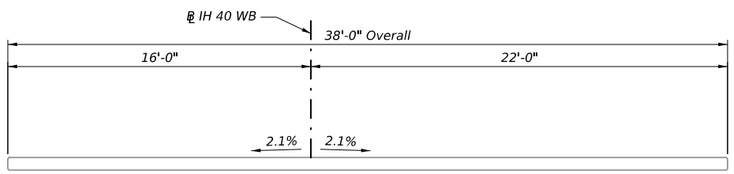
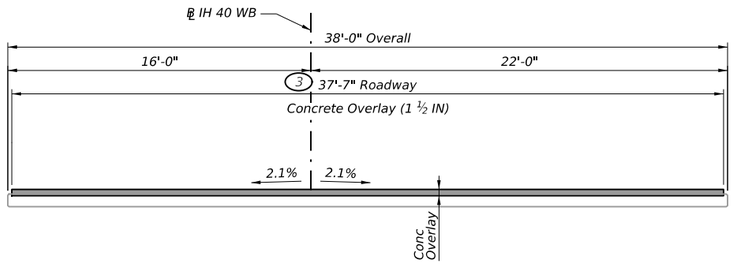


EXISTING TYPICAL SECTION-APPROACH SLAB

(Extension 2ft onto deck similar)



PROPOSED TYPICAL SECTION-APPROACH SLAB

(Extension 2ft onto deck similar)

* Hydro-demolition (1 ½ IN) before placing Conc Overlay

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement or Repair
- XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
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PROFESSIONAL ENGINEER

Brett RC Allen 09/29/2023

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Texas Department of Transportation

IH 40 WB OVERPASS AT IH 40H FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-11-145

SCALE:1"=20' SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		133

DATE: 9/28/2023 2:41:06 PM
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FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG
DW:	LJG	CK:	CAM
DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing Type T202 rail and replace with TYPE SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	541	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck to prepare surface for reinforced concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1026	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 95 SF (1% of deck area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	95	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck with concrete overlay after completion of hydro-demolition & deck repairs.	439	REINFORCED CONCRETE OVERLAY (4.0 IN)	1026	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD). New reinforcing steel in deck shall be epoxy coated.
(3)	Perform hydro-demolition on concrete approach slab and parts of concrete bridge deck to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 ½ IN)	241	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the WD-BDON-22 (MOD).
	Repair the spalls/delaminations in the deck and approach slab surfaces uncovered via hydro-demolition. Assumed allowance of 25 SF (1% of the affected areas) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	25	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete approach slab and part of concrete bridge deck with concrete overlay after completion of hydro-demolition and deck repairs.	439	CONCRETE OVERLAY (1.5 IN)	241	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(4)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 120 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 30 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	120	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	30	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(5)	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	129	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(6)	After completion of hydro-demolition, perform full depth armor joint repair. Perform in conjunction with concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPAIR (ARMOR)	4	LF	See Armor Joint Repair Detail on Miscellaneous Bridge Repair Detail sheets.
(7)	Repair damaged deck soffit. See Plan for location.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	11	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(8)	Clean and reseal armor joints & relief joints. See Plan for locations.	438	CLEANING AND SEALING EXIST JOINTS(CL7)	244	LF	See the Cleaning and Sealing Existing Bridge Joints sheet.
(9)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	7	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	720	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(10)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	431	PNEUMATICALLY PLACED CONC (REPAIR)	27	CF	Repair as intermediate spalls per Item 431, "Pneumatically Placed Concrete".
(11)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	3	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	2282	SF	
(12)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 15 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	32	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	15	CY	
		432	RIPRAP (CONC)(4 IN)	10	CY	
(13)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	601	LF	
(14)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	140	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

(9) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	1	Abutment 1	1 SF
	3	Abutment 1	1 SF
3	5	Bent 3	2 SF
	6	Bent 4	2 SF
4	5	Abutment 5	1 SF
TOTAL			7 SF

All beam ends (40) have 1.5 LF of waterproofing with 18 SF area of waterproofing for a total of 720 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

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Texas Department of Transportation

IH 40 WB OVERPASS AT IH 40H FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-11-145

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		134

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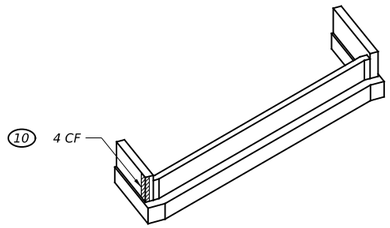
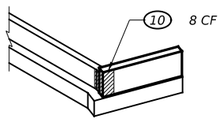
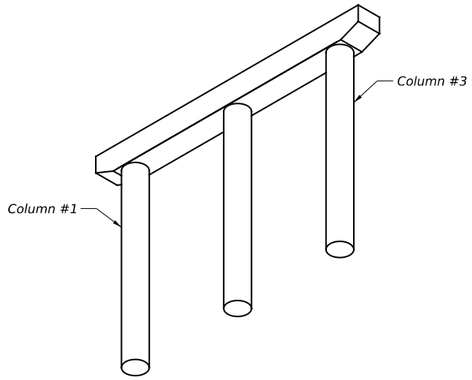


WEST FACE
Looking Southeast



SOUTH WINGWALL
Looking Northwest

ABUTMENT 1



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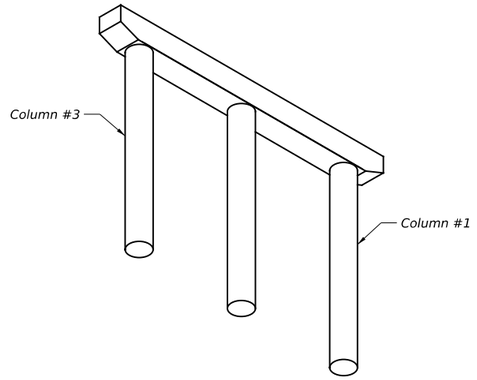
Looking Southwest

No Repairs



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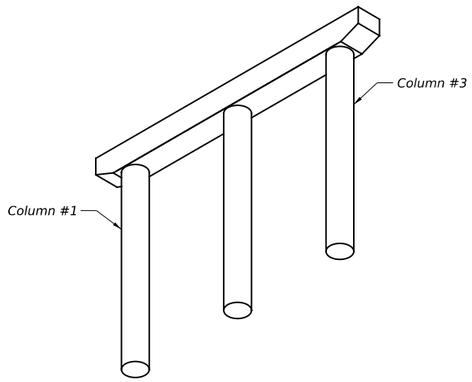
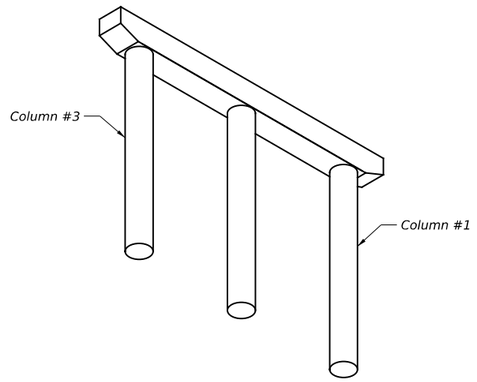
Looking Southeast

BENT 2



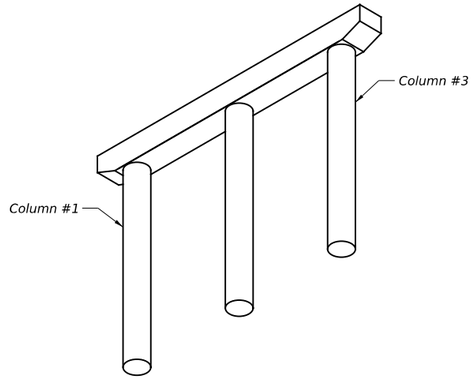
EAST FACE
Looking Southwest

No Repairs



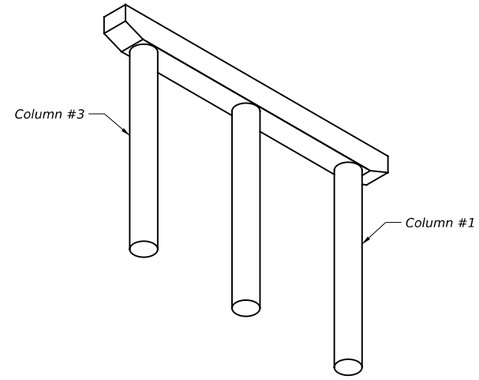
WEST FACE
Looking Southeast

BENT 3



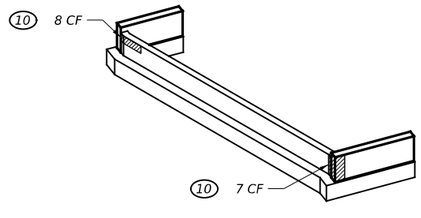
EAST FACE
Looking Southwest

No Repairs



WEST FACE
Looking Southeast

BENT 4



EAST FACE
Looking Southwest

ABUTMENT 5

SUBSTRUCTURE REPAIR ISOMETRICS

(11) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE	
SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 5	328 SF
BENTS 2-4	542 SF
TOTAL	2282 SF

REPAIR CALL-OUT LEGEND

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 WB OVERPASS
AT IH 40H FR CONN
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-091-0-0275-11-145

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		135

DATE: 7/7/2023 5:22:58 PM
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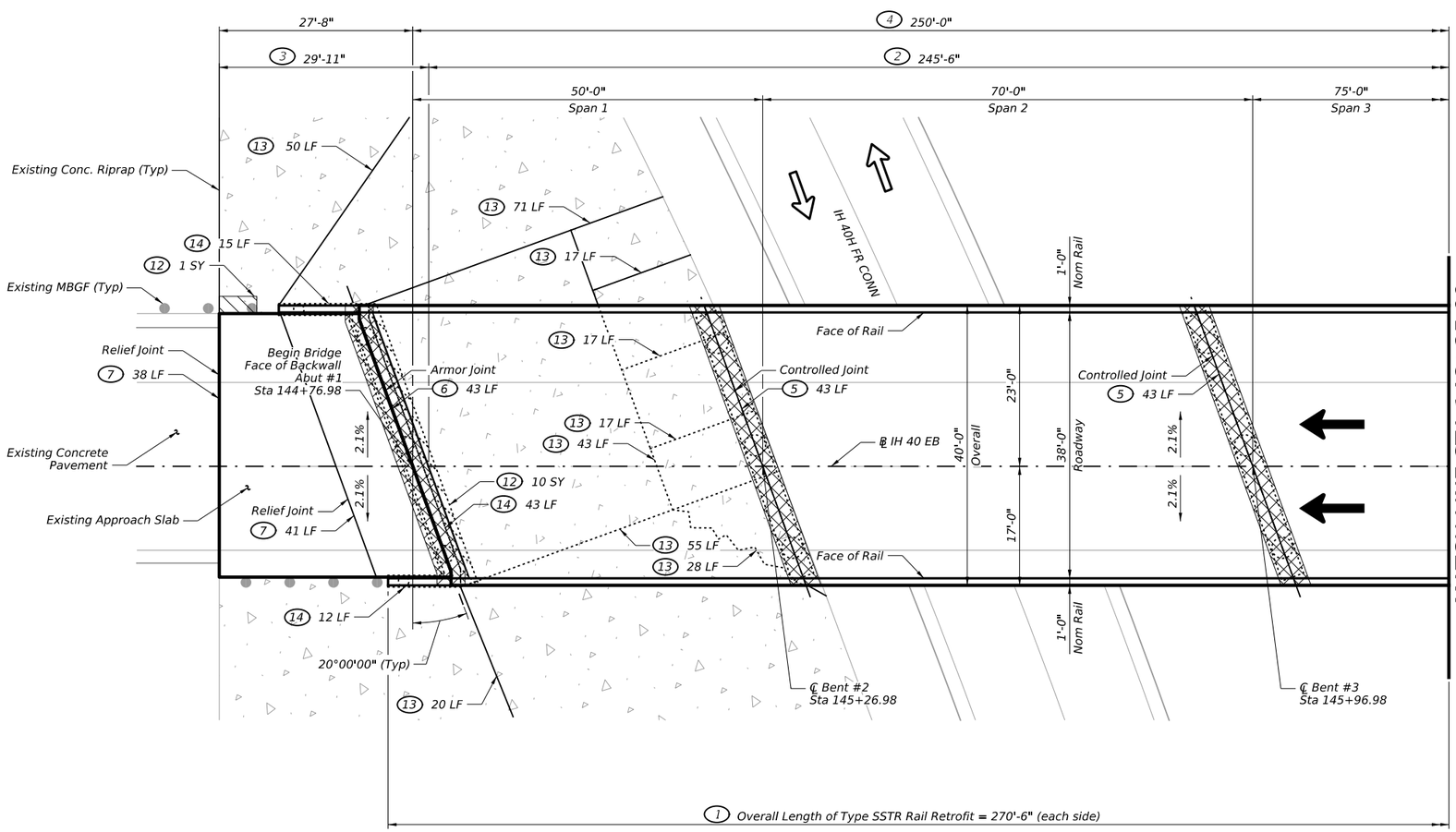
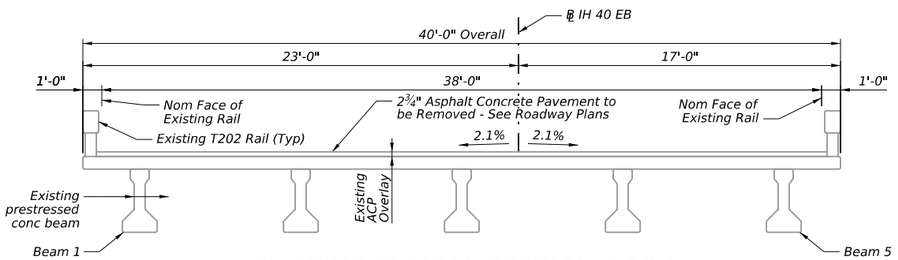
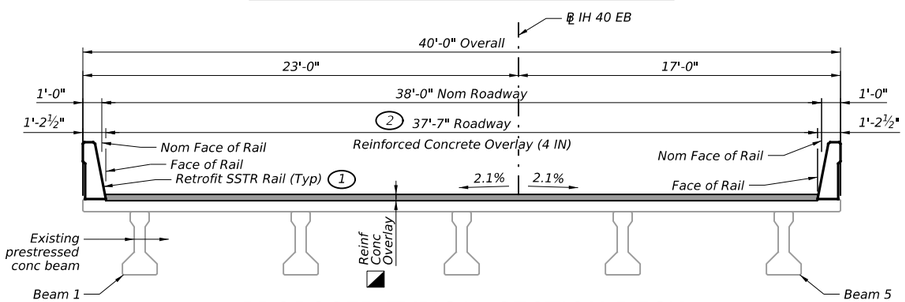


1 Overall Length of Type SSTR Rail Retrofit = 270'-6" (each side)

PLAN



EXISTING TYPICAL SECTION-DECK



PROPOSED TYPICAL SECTION-DECK

* Hydro-demolition (1 IN) before placing Reinf Conc Overlay

Provide #4 reinforcing bars spaced at a maximum of 1'-6" in each direction. Provide Grade 60 reinforcing steel, epoxy coated. The clear cover for the top of reinforcing shall be 2½". Provide 2" cover at bar ends at the edge of the overlay.

Deformed welded wire reinforcement (WWR)(ASTM A1064) of equal size and spacing may be substituted. WWR shall be epoxy coated.

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
09/29/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc.
Firm Registration No. F-754
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Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS AT IH 40H FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-11-146

SCALE:1"=20' SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		136

DATE: 9/28/2023 2:41:17 PM
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FINAL SUBMITTAL (100%)

DW:	CAM	Ck:	LJG	DW:	CAM	Ck:	LJG

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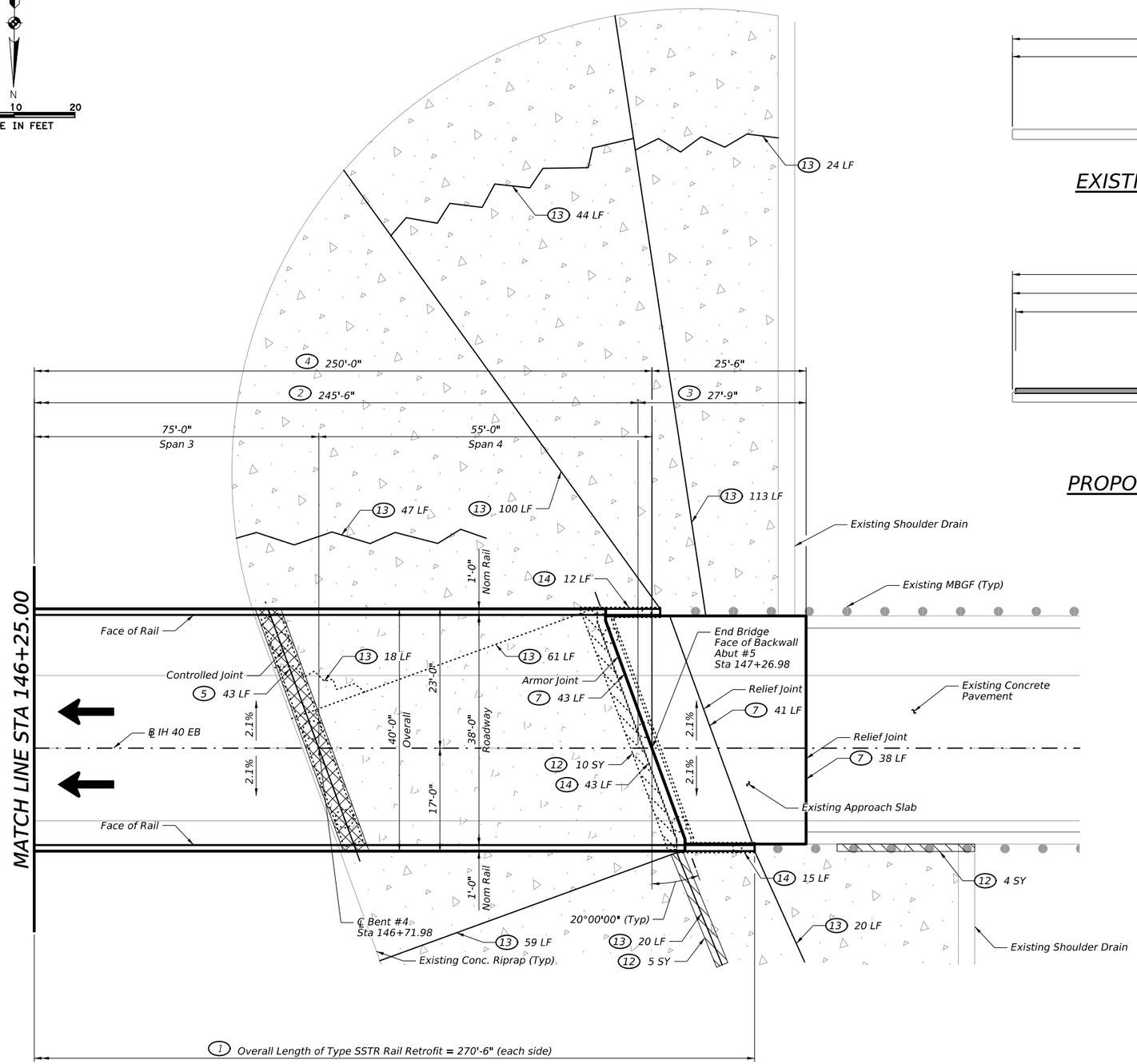
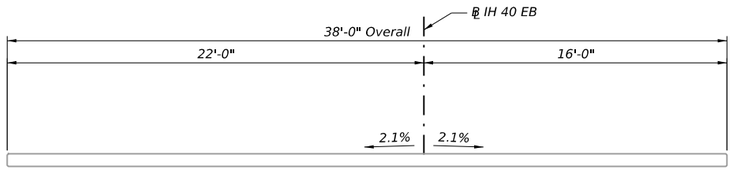
SCALE IN FEET

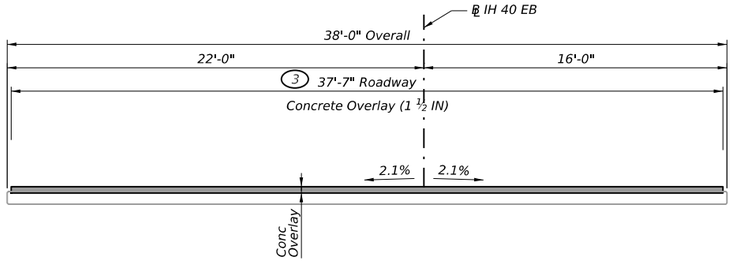


PLAN



EXISTING TYPICAL SECTION-APPROACH SLAB

(Extension 2ft onto deck similar)



PROPOSED TYPICAL SECTION-APPROACH SLAB

(Extension 2ft onto deck similar)

* Hydro-demolition (1½ IN) before placing Conc Overlay

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
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Texas Department of Transportation

IH 40 EB OVERPASS AT IH 40H FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-11-146

SCALE:1"=20' SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		137

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FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing Type T202 rail and replace with TYPE SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	541	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck to prepare surface for reinforced concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 IN)	1026	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 95 SF (1% of deck area) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	95	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck with concrete overlay after completion of hydro-demolition & deck repairs.	439	REINFORCED CONCRETE OVERLAY (4.0 IN)	1026	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD). New reinforcing steel in deck shall be epoxy coated.
(3)	Perform hydro-demolition on concrete approach slab and parts of concrete bridge deck to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 ½ IN)	241	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the WD-BDON-22 (MOD).
	Repair the spalls/delaminations in the deck and approach slab surfaces uncovered via hydro-demolition. Assumed allowance of 25 SF (1% of the affected areas) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	25	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete approach slab and part of concrete bridge deck with concrete overlay after completion of hydro-demolition and deck repairs.	439	CONCRETE OVERLAY (1.5 IN)	241	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(4)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 120 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 30 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	120	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	30	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(5)	After completion of hydro-demolition, perform full depth joint replacement, both sides of noted joint. Perform in conjunction with rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (SPECIAL)	129	LF	See Full Depth Controlled Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(6)	After completion of hydro-demolition, perform full depth armor joint replacement, both sides of noted joint. Perform in conjunction wih rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (ARMOR)	43	LF	See Armor Joint Replacement Detail on Miscellaneous Bridge Repair Details sheets.
(7)	Clean and reseal armor joints & relief joints. See Plan for locations.	438	CLEANING AND SEALING EXIST JOINTS(CL7)	201	LF	See the Cleaning and Sealing Existing Bridge Joints sheet.
(8)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	3	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	720	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(9)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	8	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(10)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	431	PNEUMATICALLY PLACED CONC (REPAIR)	28	CF	Repair as intermediate spalls per Item 431, "Pneumatically Placed Concrete".
(11)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	3	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	2282	SF	
(12)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	30	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	7	CY	
(13)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	827	LF	
(14)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	140	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.

(8) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	2	Abutment 1	1 SF
	4	Abutment 1	1 SF
2	4	Bent 2	1 SF
TOTAL			3 SF

All beam ends (40) have 1.5 LF of waterproofing with 18 SF area of waterproofing for a total of 720 SF.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
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PROFESSIONAL ENGINEER
Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS AT IH 40H FR CONN BRIDGE LOCATION REPAIR PLAN

NBI# 04-091-0-0275-11-146

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		138

DATE: 7/7/2023 5:23:24 PM
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FINAL SUBMITTAL (100%)

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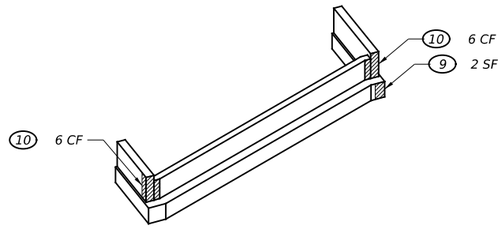
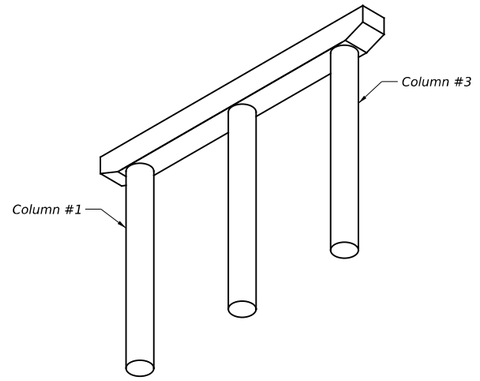


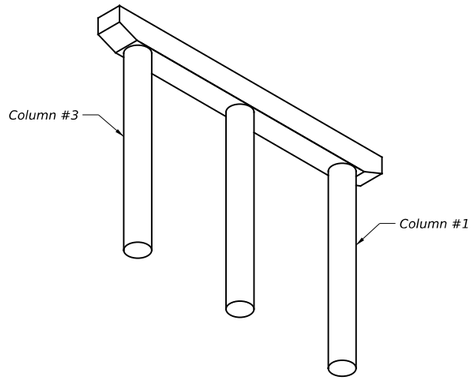
WEST FACE
Looking Southeast

ABUTMENT 1



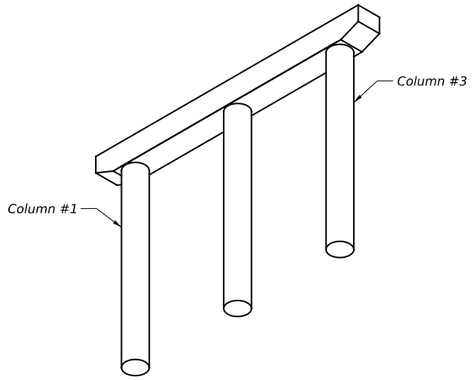
EAST FACE
Looking Southwest

No Repairs

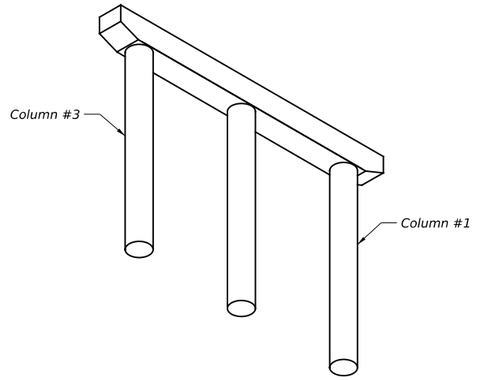


WEST FACE
Looking Southeast

BENT 4

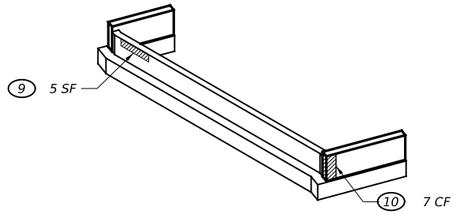


EAST FACE
Looking Southwest

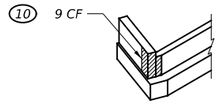


No Repairs

WEST FACE
Looking Southeast

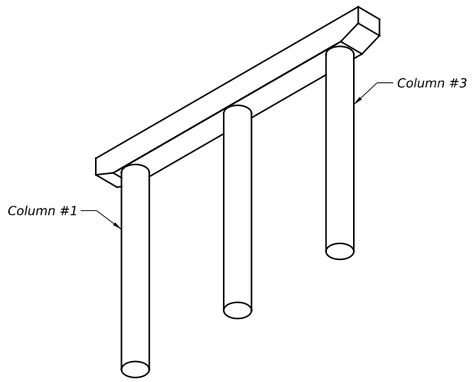


EAST FACE
Looking Southwest



SOUTH WINGWALL
Looking Northwest

BENT 2



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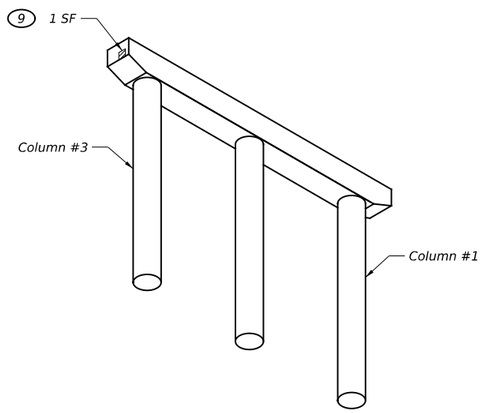

WEST FACE
Looking Southeast

BENT 3

ABUTMENT 5

SUBSTRUCTURE REPAIR ISOMETRICS

(11) SUBSTRUCTURE CONCRETE WATERPROOFING TABLE	
SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 5	328 SF
BENTS 2-4	542 SF
TOTAL	2282 SF

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

XX XX
- Repair Quantity Unit
- Estimated Repair Quantity At Each Location
- Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

NO.	DATE	REVISION	APPR BY

HDR Engineering, Inc
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248
972.960.4400

Texas Department of Transportation

IH 40 EB OVERPASS
AT IH 40H FR CONN
SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 04-091-0-0275-11-146

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061,ETC.	IH 40,ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON,ETC.		139

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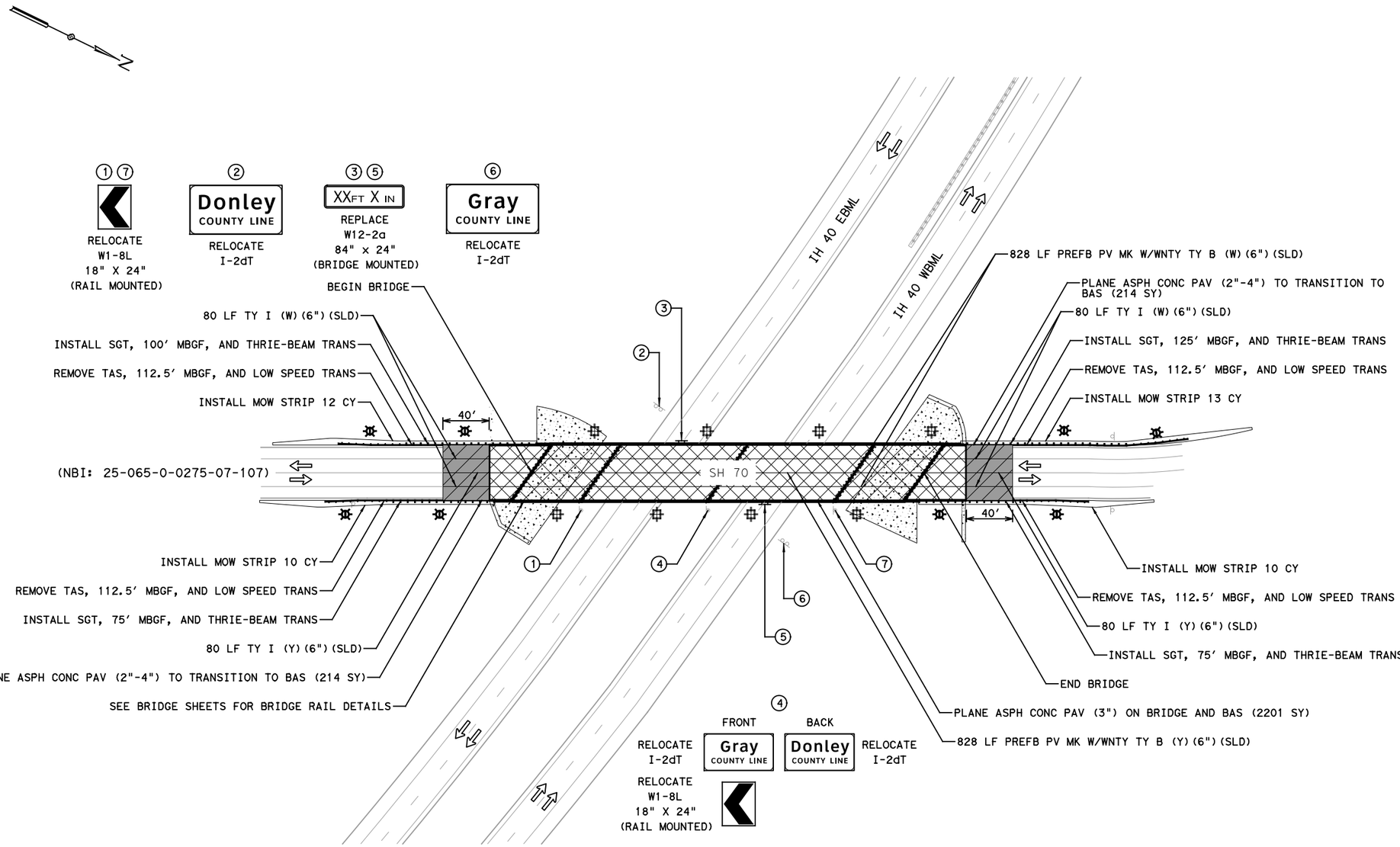

LEGEND

- EXIST TRAFFIC LANE
- PLANE ASPH CONC PVMT (BRIDGE AND BAS)
- PLANE ASPH CONC PVMT (APPROACH)
- 2" SP-D PG70-28 OVERLAY
- 1.5" HYDRO-DEMOLITION AND 2"-3.5" CONCRETE OVERLAY
- DEL ASSM (D-SW)SZ 1(BRF)GF2
- DEL ASSM (D-SY)SZ 1(BRF)GF2
- DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
- DEL ASSM (D-SW)SZ (BRF)CTB
- DEL ASSM (D-SY)SZ (BRF)CTB
- DEL ASSM (D-SW)SZ (BRF)CTB (BI)

NOTES:

1. FOR THE TRANSITION SECTION REFER TO THE ROADWAY PAVEMENT TRANSITION DETAILS.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER

P.E. 7/10/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP
TBPE #5887

Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (SOUTH) ROADWAY PLAN

NBI#: 25-065-0-0275-07-107

SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		140

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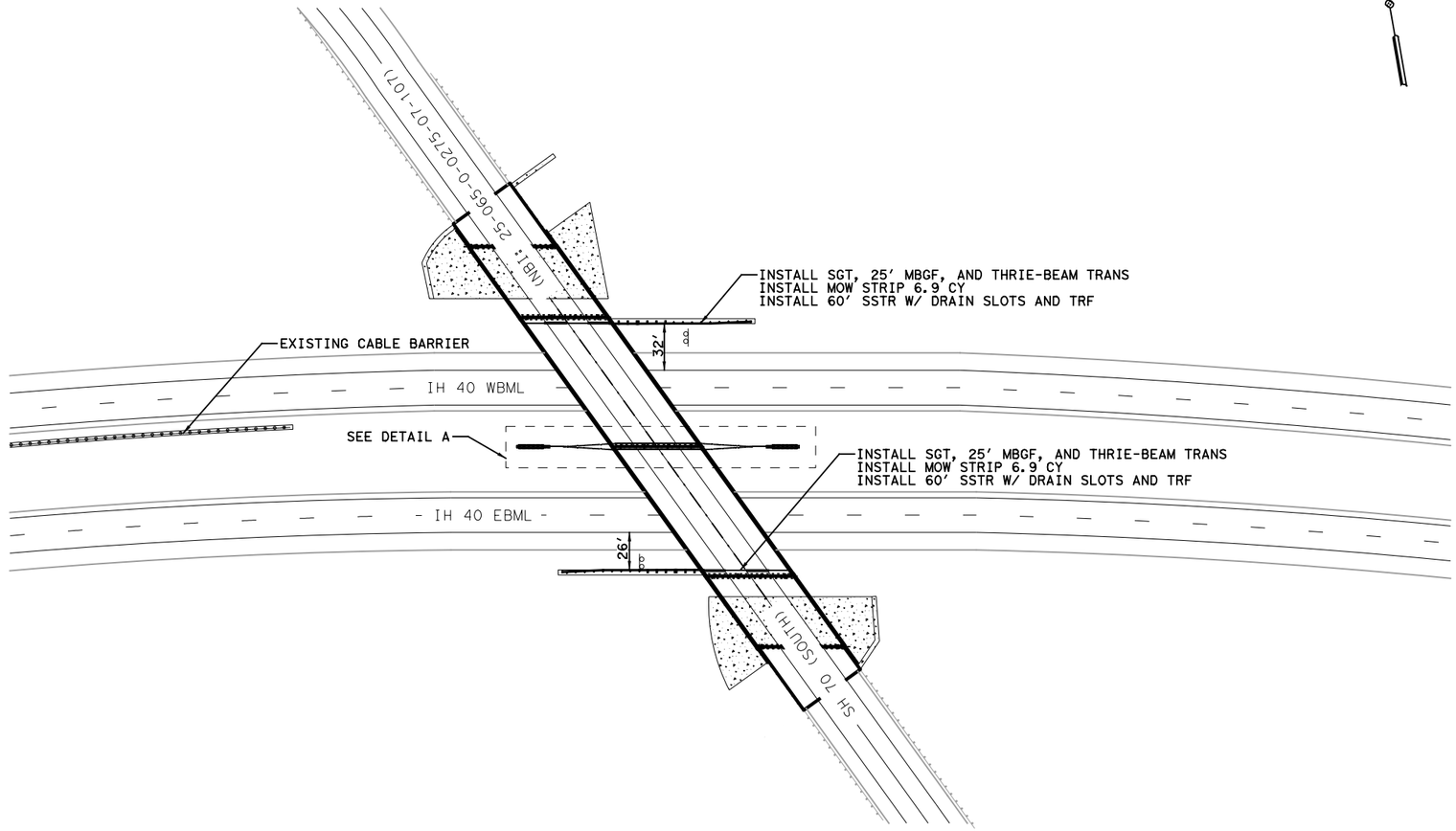
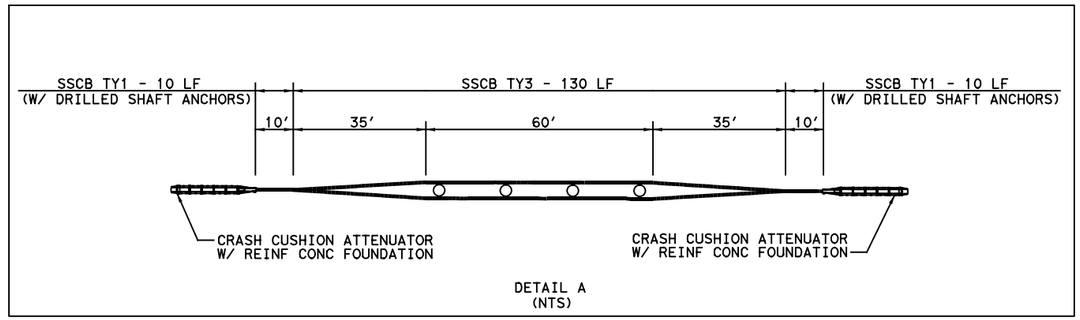
DW AD | BE CK | DW AD | BE CK





DETAIL A
(NTS)

NOTES

1. INSTALL EXPANSION JOINT (DOWEL CONNECTION) BETWEEN SSCB TY1 AND SSCB TY3. SEE STANDARD SSCB(1F)-10 FOR DETAILS.
2. SEE STANDARD SSCB(1F)-10 FOR DRILLED SHAFT ANCHOR PLACEMENT ON SSCB TY1.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 7/1/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (SOUTH) COLUMN PROTECTION PLAN

NBI#: 25-065-0-0275-07-107

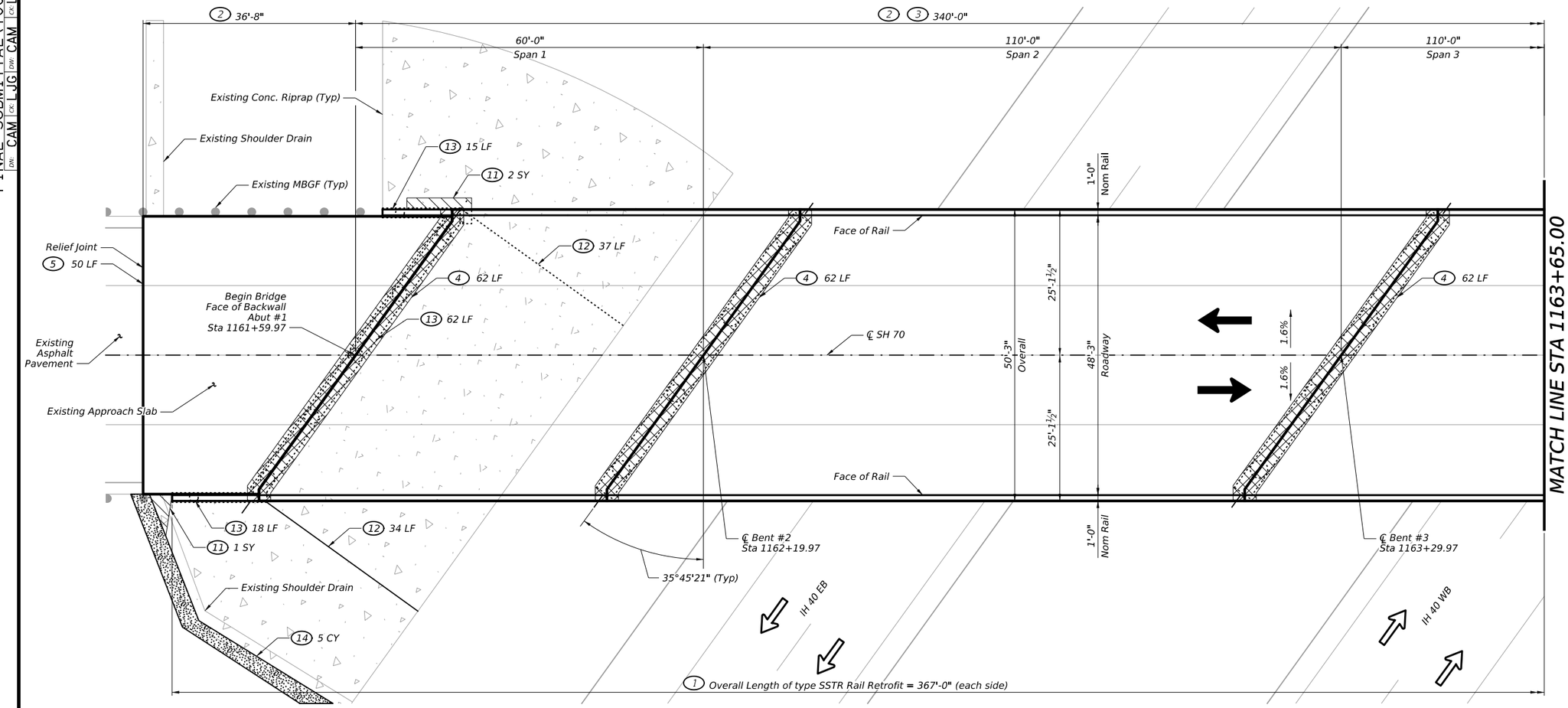
SCALE:1"=100' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061,ETC.	IH 40,ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON,ETC.		141

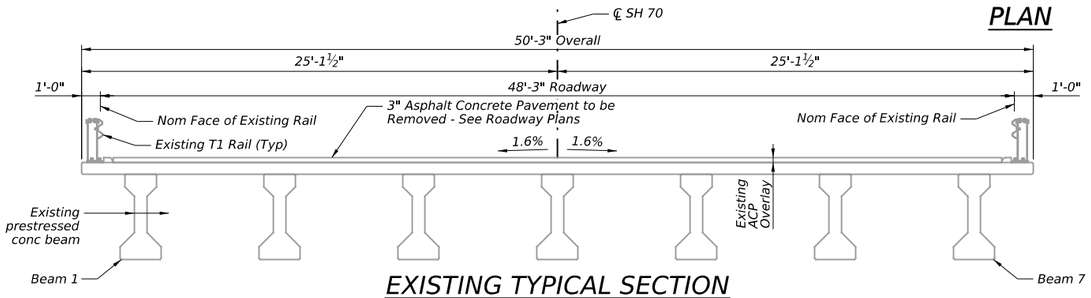
DATE: 7/7/2023 3:28:38 PM
FILE: AMA-COL-PROT-PLAN-107 01.dgn

FINAL SUBMITTAL (100%)

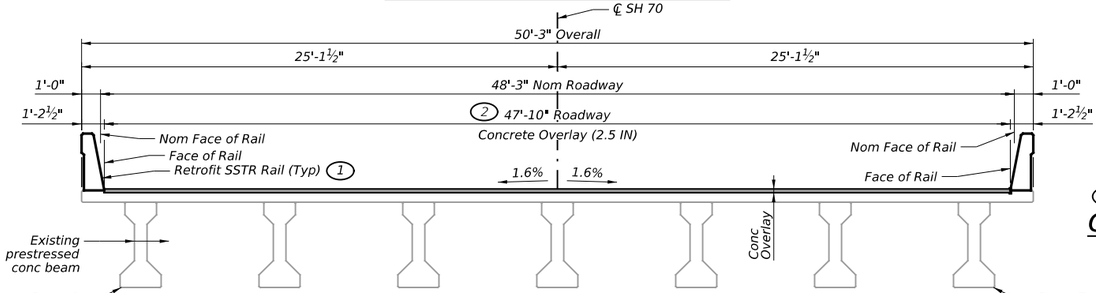
DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG



PLAN



EXISTING TYPICAL SECTION



* Hydro-demolition (1½ IN) before placing Conc Overlay

PROPOSED TYPICAL SECTION

14 EXPOSED RIPRAP TO BE COVERED WITH EMBANKMENT

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids, and all locations shall be approved by the Engineer prior to beginning repair work. Field verify limits and quantities with the Engineer. Payment will be for the field measured repair at the unit price bid.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Replace Embankment
- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
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09/29/2023

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Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (SOUTH) BRIDGE LOCATION REPAIR PLAN

NBI# 25-065-0-0275-07-107

SCALE:1"=20' SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		142

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FINAL SUBMITTAL (100%)

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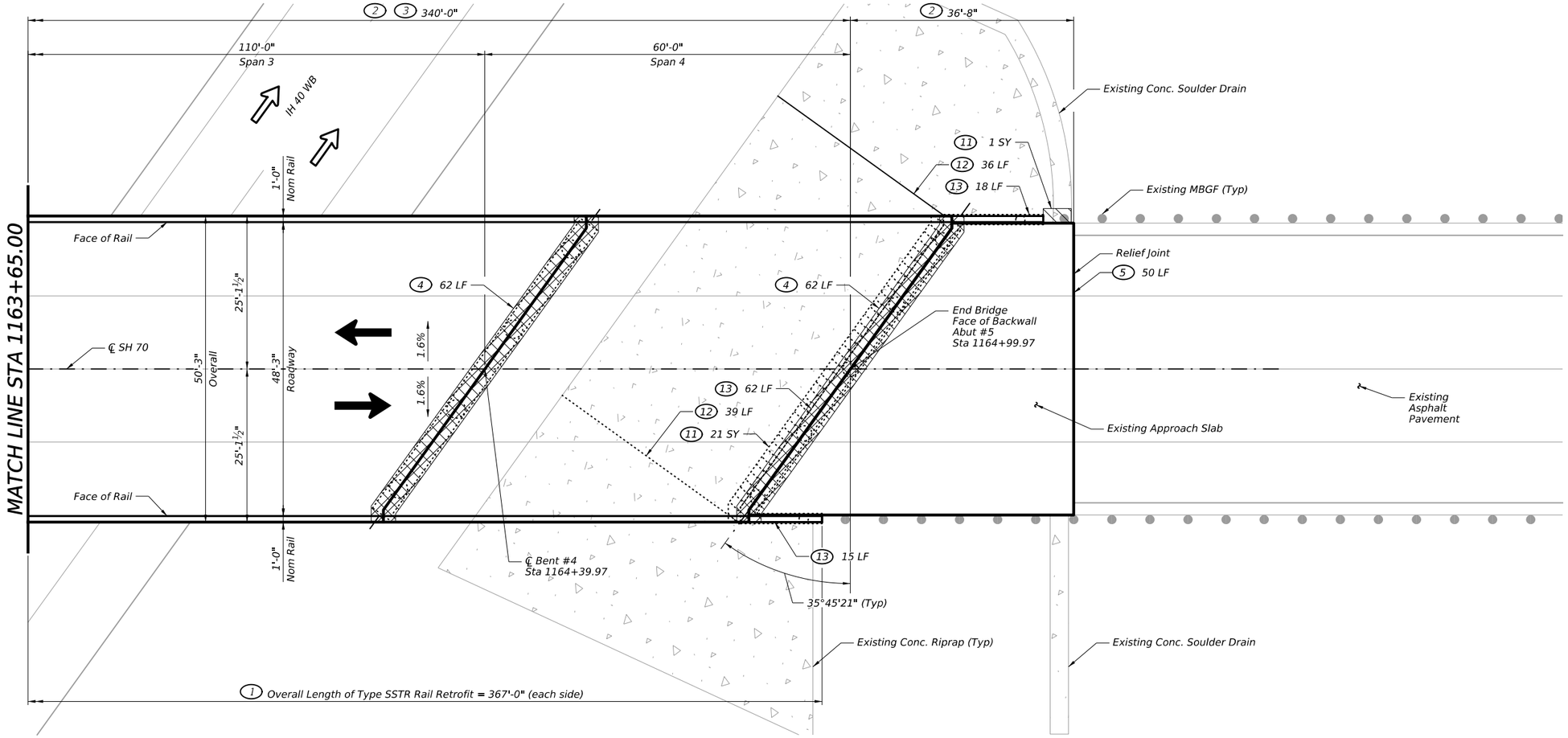

PLAN

REPAIR CALL-OUT LEGEND

- Conc Riprap Repair
- Full Depth Joint Replacement
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
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133221
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Brett RC Allen 07/10/2023

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Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (SOUTH) BRIDGE LOCATION REPAIR PLAN

NBI# 25-065-0-0275-07-107

SCALE:1"=20' SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		143

DATE: 7/7/2023 5:25:15 PM
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FINAL SUBMITTAL (100%)

DW:	CAM	CK:	LJG	DW:	CAM	CK:	LJG

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Remove existing T1 rail and replace with Type SSTR Rail. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	734	LF	See SSTR Rail Retrofit Details on the C-RAIL-R (M0D). New reinforcing steel for the railing shall be epoxy coated.
(2)	Perform hydro-demolition on concrete bridge deck and approach slab to prepare surface for concrete overlay. See Plan for locations.	483	HYDRO-DEMOLITION (1 ½ IN)	2197	SY	See Hydro-Demolition Notes and Surface Preparation Notes on the Bridge Deck Overlay Notes sheet.
	Repair the spalls/delaminations in the deck surface uncovered via hydro-demolition. Assumed allowance of 200 SF (1% of deck area and approach slab) is provided to be used as directed by Engineer.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	200	SF	Repair as partial-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
	Overlay concrete bridge deck and approach slab with concrete overlay after completion of hydro-demolition & deck repairs.	439	CONCRETE OVERLAY (2.5 IN)	2197	SY	See Concrete Overlay (CO) Notes and Curing Notes on the WD-BDON-22 (MOD).
(3)	Repair the spalls/delaminations in the deck overhang. Perform in conjunction with rail retrofit. Assumed allowance of 165 SF Vertical and Overhead Repair for spalls/delamination in the deck soffit (8% of deck overhang area), and an additional allowance of 45 SF Full Depth Deck Repair for full depth damage discovered (2% of deck overhang area). Both are provided to be used as directed by Engineer. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	165	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		429	CONC STR REPAIR(DECK REP (FULL DEPTH))	45	SF	Repair as full-depth deck repairs per the TxDOT Concrete Repair Manual, Chapter 3, Section 4.
(4)	After completion of hydro-demolition, perform full depth armor joint replacement, both sides of noted joint. Perform in conjunction wih rail retrofit and concrete overlay. See Plan for locations.	785	BRIDGE JOINT REPLACEMENT (ARMOR)	310	LF	See Armor Joint Replacement Detail on the Miscellaneous Bridge Repair Details sheets.
(5)	Resize and seal relief joints. See Plan for locations.	438	RESIZING AND SEALING JOINTS	100	LF	See Transverse Formed Expansion Joint on the JS-14.
(6)	Repair damaged beam ends & waterproof the beam ends. See Table of Beam Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	172	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
		427	EPOXY WATERPROOF FINISH (TY X)	1120	SF	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
(7)	Repair damaged concrete diaphragms. See Table of Diaphragms for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	60	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(8)	Repair the spalls/delaminations in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	209	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual, Chapter 3, Section 2.
(9)	Wrap GFRP Protection around columns. See Substructure Repair Isometrics for locations.	786	CARBON FIBER REINF POLYMER PROTECTION	312	SF	See GFRP Column Wrapping Detail on the Miscellaneous Bridge Repair Detail sheets.
(10)	Clean Abutments and Bents. Apply Type X Epoxy Waterproof Finish to all faces of Bent caps and Abutments. See Substructure Concrete Waterproofing Table on the Substructure Repair Isometrics sheets.	7309	CLEANING STRUCTURE (BENT)	3	EA	See Epoxy Waterproof Finish Detail on the Miscellaneous Bridge Repair Details Sheets.
		7309	CLEANING STRUCTURE (ABUTMENT)	2	EA	
		427	EPOXY WATERPROOF FINISH (TY X)	2354	SF	
(11)	Remove and replace concrete riprap & riprap curbs. Where voids are present, fill with flowable backfill before replacing concrete riprap & curbs. A quantity allowance of 5 CY of flowable backfill is provided to be used as directed by the Engineer. See Plan for locations.	104	REMOVING CONC (RIPRAP)	25	SY	See Concrete Riprap Details on the Miscellaneous Bridge Repair Detail sheets.
		401	FLOWABLE BACKFILL	5	CY	
		432	RIPRAP (CONC)(4 IN)	6	CY	
(12)	Clean and seal construction joints and cracks in riprap. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	146	LF	
(13)	Clean and seal joints between riprap and abutments/wingwalls. Additionally, install flashing. See Plan for locations.	713	CRACK CLEANING AND SEALING (JCP)	190	LF	See Concrete Riprap Joint Seal Flashing Detail on the Miscellaneous Bridge Repair Detail sheets.
(14)	Place embankment material to cover exposed concrete riprap. See Plan for locations.	132	EMBANKMENT (FINAL)(ORD COMP)(TY B)	5	CY	

STATE OF TEXAS
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Texas Department of Transportation

IH 40 UNDERPASS
AT SH 70 (SOUTH)
BRIDGE LOCATION REPAIR PLAN

NBI# 25-065-0-0275-07-107

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		144

DATE: 7/10/2023 9:57:07 AM
FILE: AMA25065002750710TBLY03.dgn

FINAL SUBMITTAL (100%)

DW:	CAM	Ck:	LJG	DW:	CAM	Ck:	LJG

(6) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity
1	1	Abutment 1	4 SF
	2	Abutment 1	4 SF
	3	Abutment 1	4 SF
	4	Abutment 1	4 SF
	5	Abutment 1	4 SF
	6	Abutment 1	4 SF
	7	Abutment 1	4 SF
	1	Bent 2	4 SF
	2	Bent 2	4 SF
	3	Bent 2	4 SF
	5	Bent 2	4 SF
2	1	Bent 2	4 SF
	2	Bent 2	4 SF
	4	Bent 2	4 SF
	7	Bent 2	4 SF
	1	Bent 3	4 SF
	2	Bent 3	4 SF
	3	Bent 3	4 SF
	5	Bent 3	4 SF
	6	Bent 3	4 SF
	7	Bent 3	4 SF
3	1	Bent 3	4 SF
	2	Bent 3	4 SF
	3	Bent 3	4 SF
	4	Bent 3	4 SF
	6	Bent 3	4 SF
	7	Bent 3	4 SF
	1	Bent 4	4 SF
	2	Bent 4	4 SF
	4	Bent 4	4 SF
	5	Bent 4	4 SF
	6	Bent 4	4 SF
	7	Bent 4	4 SF
4	1	Bent 4	4 SF
	2	Bent 4	4 SF
	3	Bent 4	4 SF
	5	Bent 4	4 SF
	6	Bent 4	4 SF
	1	Abutment 5	4 SF
	2	Abutment 5	4 SF
	3	Abutment 5	4 SF
	5	Abutment 5	4 SF
	6	Abutment 5	4 SF
TOTAL			172 SF

All beam ends (56) have 1.5 LF of waterproofing with 20 SF area of waterproofing for a total of 1120 SF.

(7) TABLE OF DIAPHRAGM REPAIRS

Span	Bay	Location	Spall Repair Quantity
1	1	Abutment 1	3 SF
	2	Abutment 1	3 SF
	3	Abutment 1	3 SF
	5	Abutment 1	3 SF
	6	Abutment 1	3 SF
	1	Bent 2	3 SF
	2	Bent 2	3 SF
	3	Bent 2	3 SF
2	1	Bent 2	3 SF
	3	Bent 2	3 SF
	3	Bent 3	3 SF
	4	Bent 3	3 SF
3	1	Bent 3	3 SF
	6	Bent 3	3 SF
	1	Bent 4	3 SF
4	2	Bent 4	3 SF
	3	Bent 4	3 SF
	4	Bent 4	3 SF
	5	Bent 4	3 SF
	6	Abutment 5	3 SF
TOTAL			60 SF

STATE OF TEXAS
BRETT R.C. ALLEN
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PROFESSIONAL ENGINEER

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IH 40 UNDERPASS AT SH 70 (SOUTH) BRIDGE LOCATION REPAIR PLAN

NBI# 25-065-0-0275-07-107

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		145

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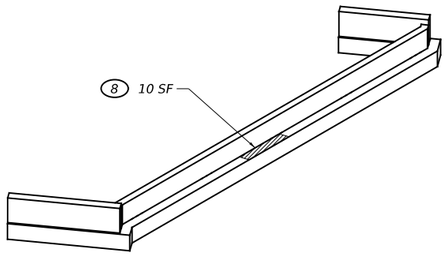
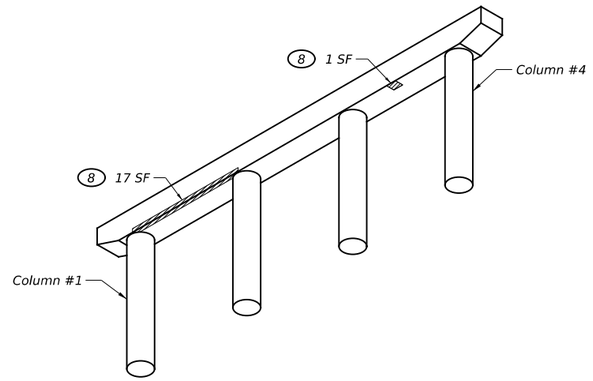
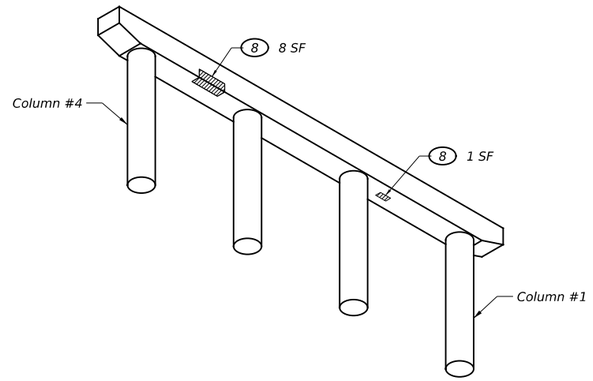


NORTH FACE
Looking Southwest

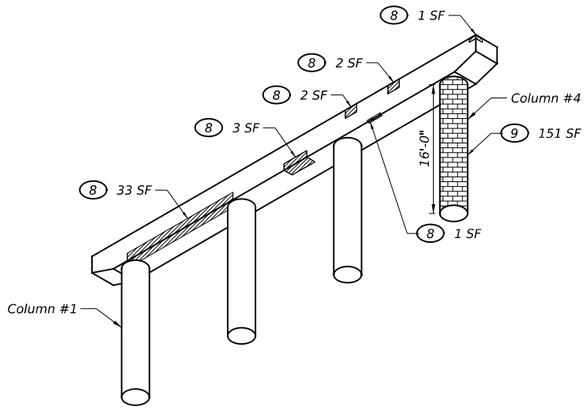
ABUTMENT 1



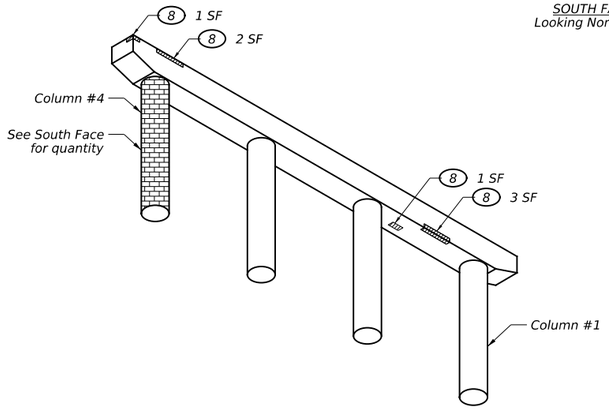
SOUTH FACE
Looking Northwest



NORTH FACE
Looking Southwest

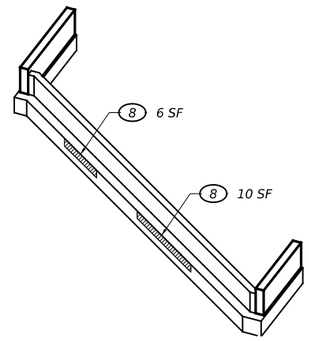


SOUTH FACE
Looking Northwest



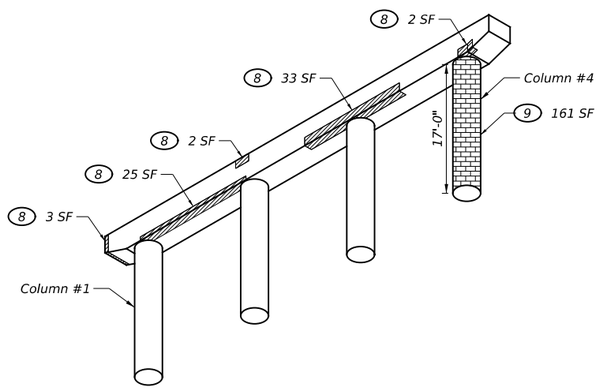
NORTH FACE
Looking Southwest

BENT 4

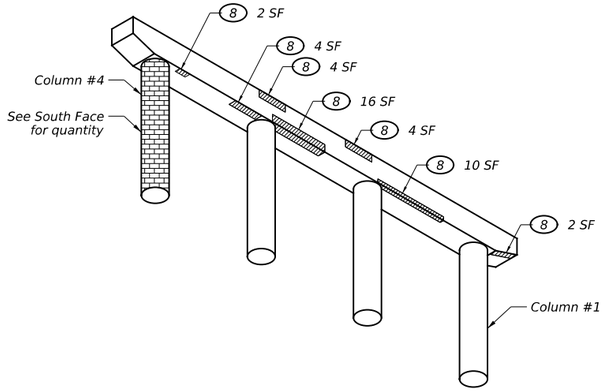


SOUTH FACE
Looking Northwest

BENT 2



SOUTH FACE
Looking Northwest



NORTH FACE
Looking Southwest

BENT 3

ABUTMENT 5

SUBSTRUCTURE REPAIR ISOMETRICS

9 SUBSTRUCTURE CONCRETE WATERPROOFING TABLE

SUBSTRUCTURES	AREA PER UNIT
ABUTMENTS 1 & 5	574 SF
BENTS 2-4	402 SF
TOTAL	2354 SF

REPAIR CALL-OUT LEGEND

- Spall/Delamination Repair
- Glass Fiber Reinf. Polymer Protection
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
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PROFESSIONAL ENGINEER

Brett RC Allen 07/10/2023

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Texas Department of Transportation

IH 40 UNDERPASS AT SH 70 (SOUTH) SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 25-065-0-0275-07-107

SCALE: N.T.S.

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		146

DATE: 7/7/2023 5:25:38 PM
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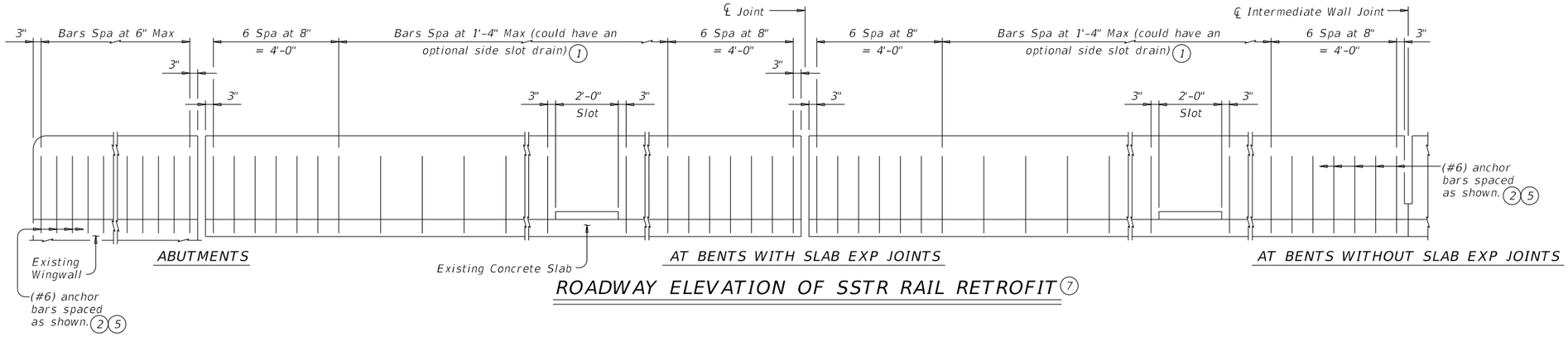
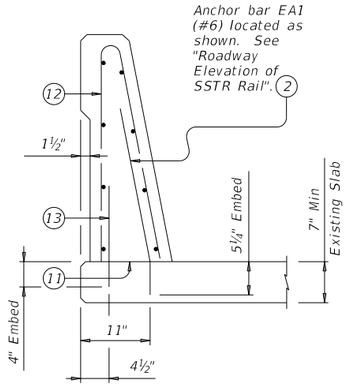
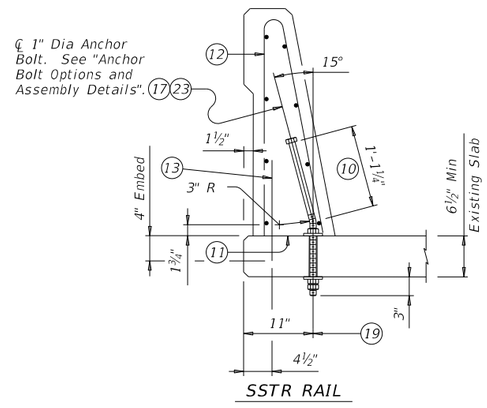


ROADWAY ELEVATION OF SSTR RAIL RETROFIT (7)



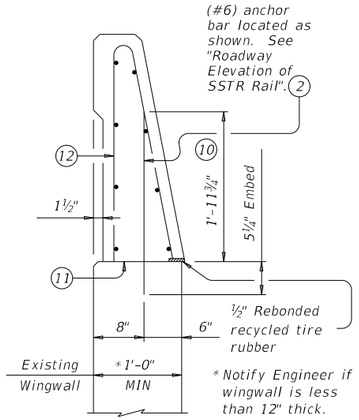
SSTR RAIL

RAIL RETROFIT SECTIONS ON CONCRETE SLABS USING ADHESIVE ANCHORS (9)



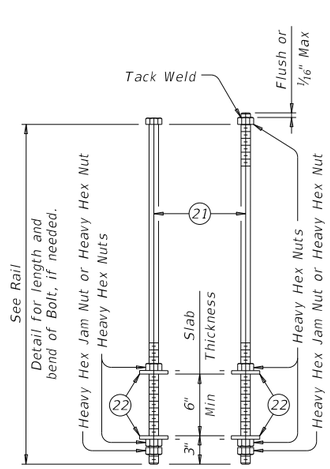
SSTR RAIL

RAIL RETROFIT SECTIONS ON SLABS USING ANCHOR BOLTS (20)



SSTR RAIL

RAIL RETROFIT SECTIONS ON WINGWALLS USING ADHESIVE ANCHORS (9)



ANCHOR BOLT OPTIONS AND ASSEMBLY DETAILS (23)

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

By adding additional anchorage, welding can be performed at a minimum spacing of 3 ft between the cage and additional anchorage. By satisfying additional anchorage requirements slip forming is allowed. Do not weld to the required anchorage.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

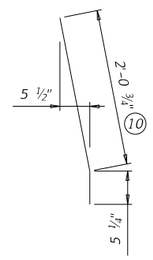
(#6) and (#4) anchor bars used for the epoxied anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:

Use of these retrofit details will result in a railing acceptable for the MASH Test Level indicated on the applicable rail standard.

Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.

Payment for a rail retrofit will be as per Item 451, "Retrofit Rail (Ty SSTR)". All details shown herein are subsidiary to rail retrofit.



ANCHOR BAR EA1 (#6)

Reinforcing bar dimensions shown are out-to-out of bar.

(1) When side slot drains are used, provide 8'-0" Min clear spacing between drain slots.

(2) Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5¼". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(3) Not used.

(4) Not used.

(5) See SSTR Rail Sections in "Rail Retrofit Section on Wingwalls using Adhesive Anchors" and/or "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors".

(6) Not used.

(7) Showing spacing of (#6) adhesive anchor in a rail retrofit condition. Secondary (#4) adhesive anchor in a rail retrofit not shown for clarity. Reinforcing steel and terminal connections not shown for clarity. See rail standard for details and notes not shown.

(8) Not used.

(9) Showing location or locations of anchor bars in a rail retrofit condition. See SSTR rail standard for details and notes not shown.

(10) Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.

(11) Do not cast rails or parapet walls on top of overlays/seal coats.

(12) See appropriate rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.

(13) Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).

(14) Not used.

(15) Not used.

(16) Not used.

(17) ℄ 1" Dia Anchor Bolt Spaced longitudinally along rail at 24" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).

(18) Not used.

(19) ℄ 1 1/16" to 1¼" Dia holes. Core drill holes through existing deck (percussion drilling not permitted). Concrete spalls in the bottom of the deck exceeding ½" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense.

(20) Showing location of anchor bars and anchor bolts in a rail retrofit condition. See appropriate rail standard for details and notes not shown.

(21) ℄ 1" Dia ASTM F1554 Gr 55 Anchor Bolt or Threaded Rod. Nuts must conform to ASTM A563 requirements.

(22) Place Washer ⅜ x 3 x 3 ASTM with 1 1/16" Dia Hole centered.

(23) Galvanize anchor bolts, nuts and plate washers.

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PROFESSIONAL ENGINEER
Brett RC Allen 07/10/2023

SHEET 1 OF 1

Texas Department of Transportation

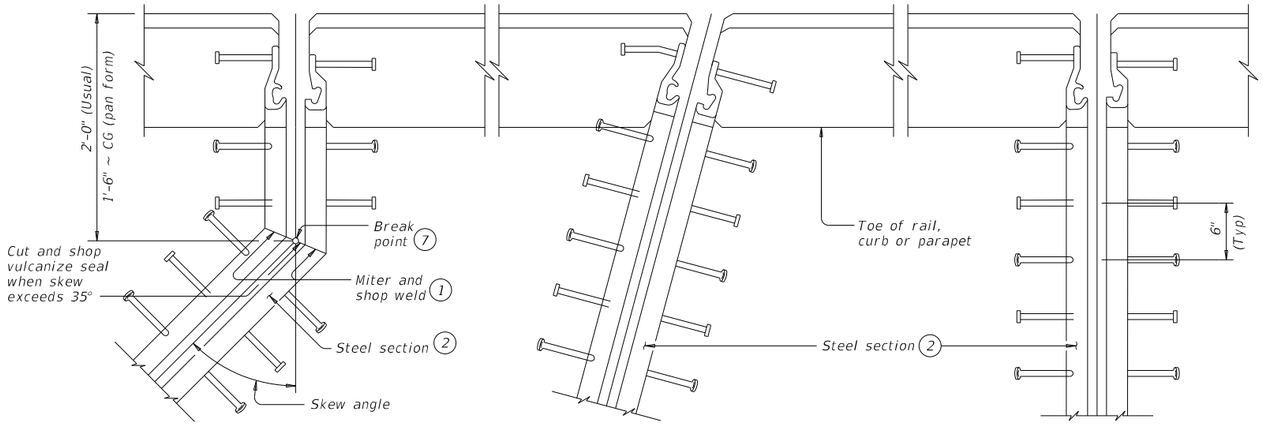
Bridge Division Standard

RETROFIT GUIDE FOR CONCRETE RAILS (SSTR) (RETROFIT)

C-RAIL-R (MOD)

FILE: rlstds22.dgn	DN: TxDOT	CK: TxDOT	DW: CAM	CK: LJG
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40,ETC.
07-20: Text change from epoxy to adhesive and changed MASH Test Level note.	DIST	COUNTY		SHEET NO.
03-23: Update to SSTR Rail Retrofit.	AMA	CARSON,ETC.		147

DATE: 7/7/2023 2:15:50 PM
FILE: sejmste1-19(MOD).dgn

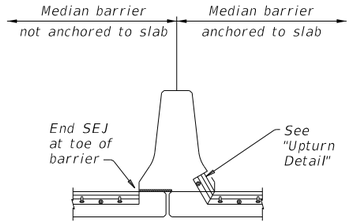


SHOWING SKEWS WITH SLAB BREAKBACKS

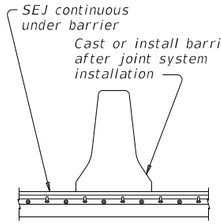
SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

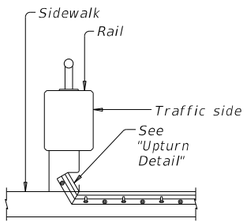
PLANS OF END CONDITIONS



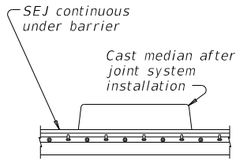
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



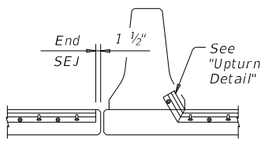
AT MEDIAN BARRIER



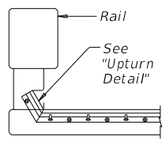
AT SIDEWALK BEHIND BRIDGE RAIL



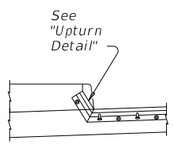
AT RAISED MEDIAN



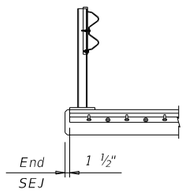
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

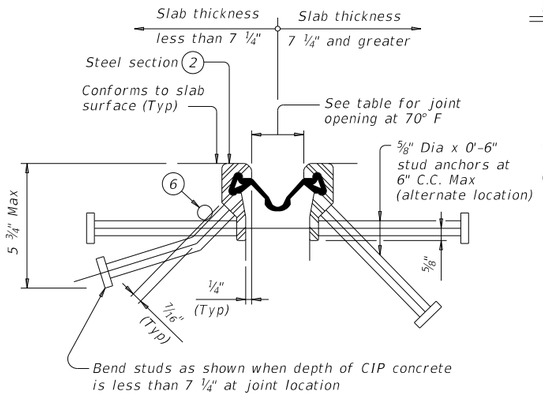


AT SIDEWALK

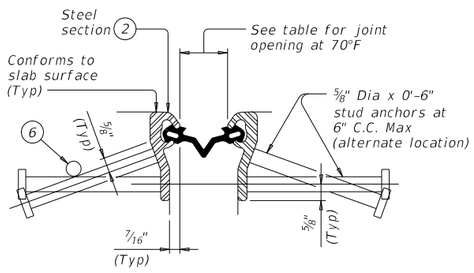


AT STEEL POST BRIDGE RAIL

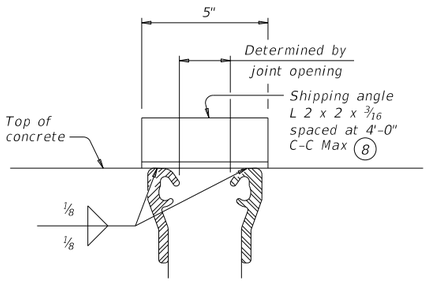
TYPICAL SECTIONS (5)



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS



SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Ty SSCM2)
(All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2" 3"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2" 3"

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

(1) Remove all burrs which will be in contact with seal prior to making splice.

(2) Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.

(3) These openings are also the recommended minimum installation openings.

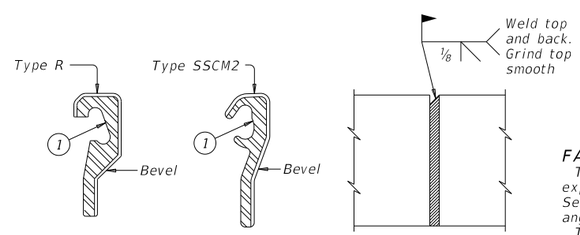
(4) Reduce for sidewalk or parapet heights less than 6".

(5) Other conditions affecting the joint profile should be noted elsewhere.

(6) Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.

(7) See Span details for location of break point.

(8) Align shipping angle perpendicular to joint.



WELD LIMITS WELD LIMITS REAR VIEW

FIELD SPLICE DETAIL

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

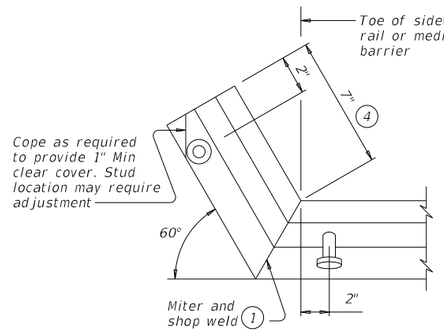
Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Field Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.



UPTURN DETAIL

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 ½".

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PROFESSIONAL ENGINEER
Brett RC Allen 07/10/2023

Texas Department of Transportation

Bridge Division Standard

SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY

SEJ-M (MOD)

FILE: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40, ETC.
04-05-2023: Updated strip seal information.	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		148

DATE: 7/7/2023 2:16:21 PM
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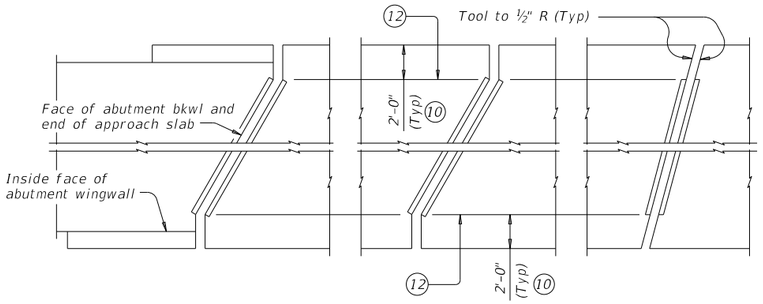
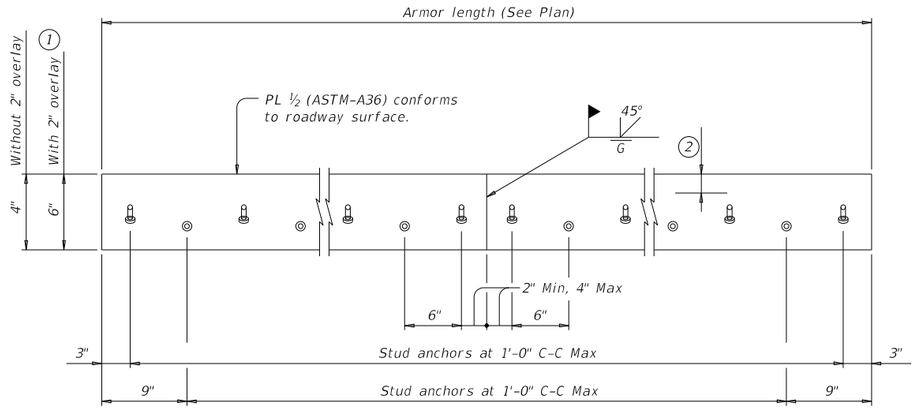


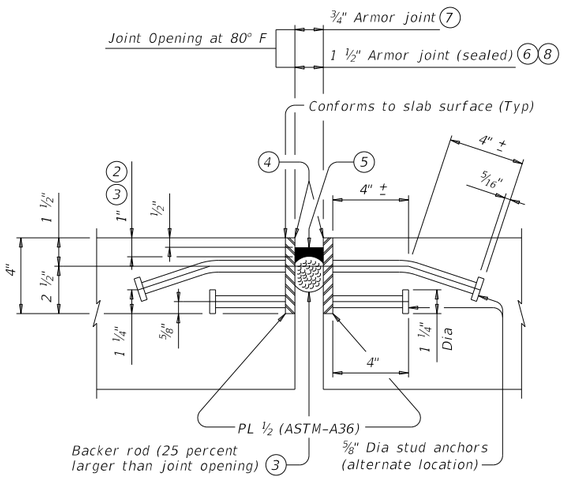
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

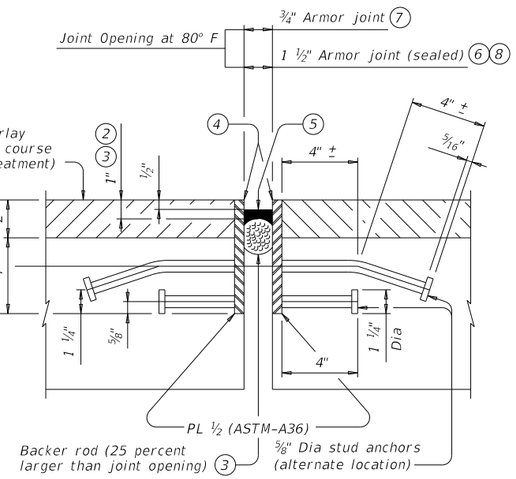


ELEVATION OF BASIC ARMOR PLATE

1. Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each ½" variation in thickness.
2. Do not paint top 1 ½" of plate if using sealed armor joint.
3. Set top of backer rod 1" below top of armor plate. 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.
4. Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
5. Use Class 7 joint sealant that conforms to DMS-6310.
6. Place sealant while ambient temperature is between 55°F and 80°F and is rising.
7. Armor joint does not include joint sealant or backer rod.
8. Armor joint (sealed) includes Class 7 joint sealant and backer rod.
9. Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
10. Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
11. See "Plans of Armor Plates".
12. At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
13. Align shipping angle perpendicular to joint.



SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION



SHOWN WITH 2" OVERLAY AT JOINT LOCATION 1

ARMOR JOINT SECTIONS

Showing Armor Joint (Sealed)

FABRICATION NOTES:

Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts.

Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

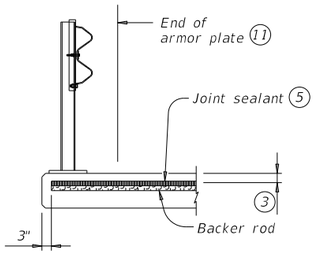
Secure armor joints in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Armor Joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

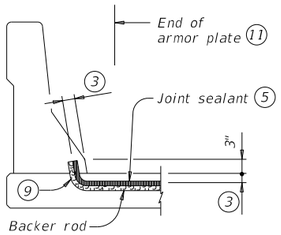
GENERAL NOTES:

Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans. These joint details accommodate a joint movement range of 1 ⅜" (¾" opening movement and ⅝" closure movement).

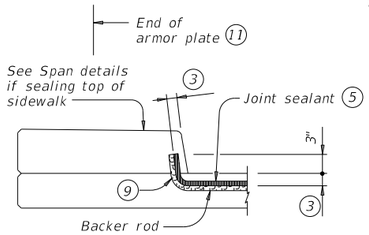
Payment for armor joint, with or without seal, is based on length of armor plate.



AT STEEL POST BRIDGE RAIL



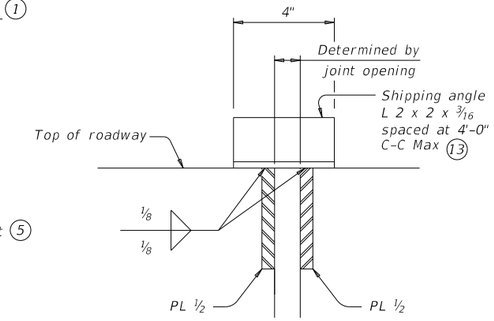
AT CONCRETE BRIDGE RAIL



AT SIDEWALK

JOINT SEALANT TERMINATION DETAILS

Armor joint (sealed) only. Armor plate is not shown for clarity.



SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION

With overlay similar

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY 1	22.90 plf

Texas Department of Transportation

Bridge Division Standard

ARMOR JOINT DETAILS

AJ

FILE: ajstde01-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0275	04	061	IH 40, ETC.
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	AMA	CARSON, ETC.		149

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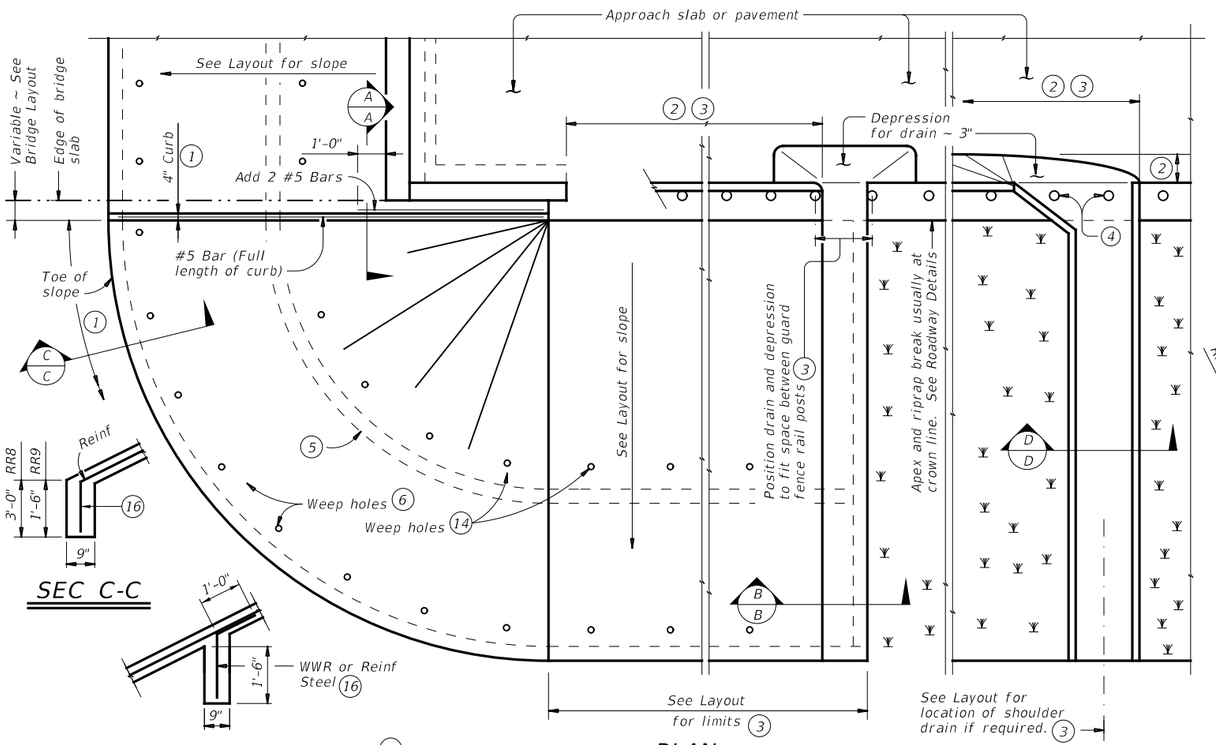
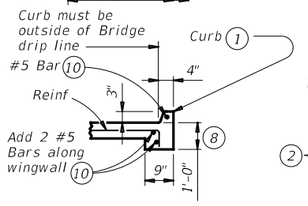


PLAN

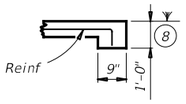
SEC C-C

INTERMEDIATE TOEWALL

ELEVATION

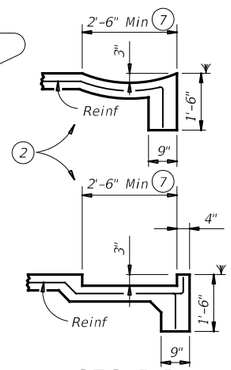


SEC A-A



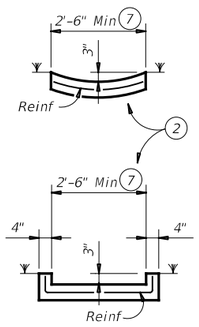
SEC B-B

(No drain)



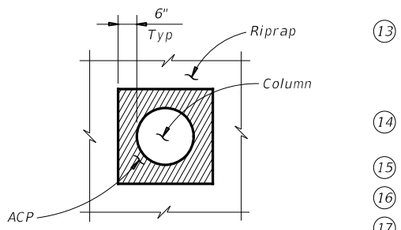
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

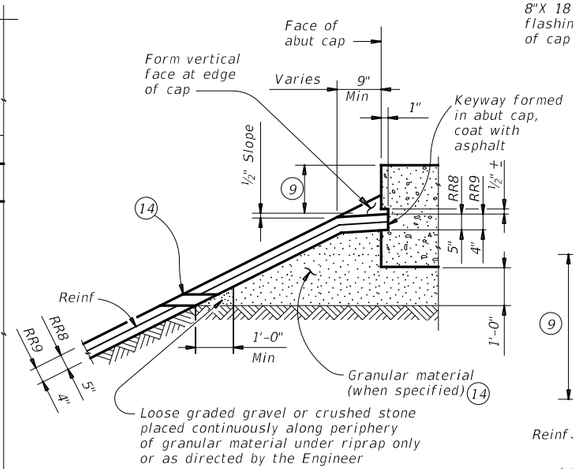
(Shoulder drain)



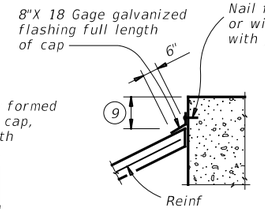
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

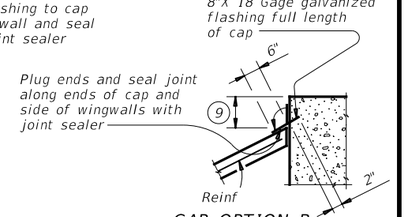
(As directed by the Engineer)



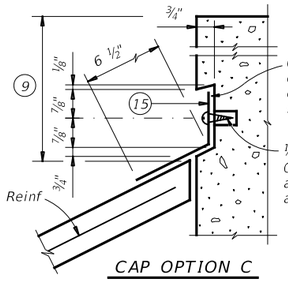
SHOWING KEYWAY OPTION



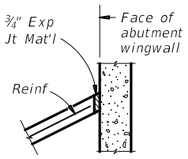
CAP OPTION A



CAP OPTION B

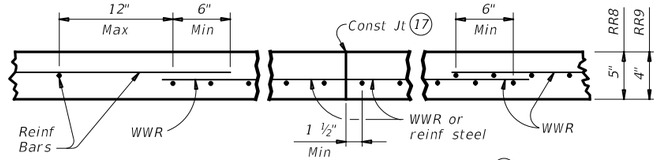


CAP OPTION C



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

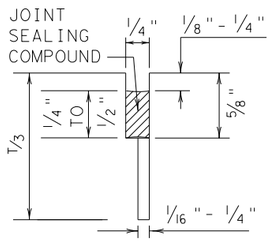
Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

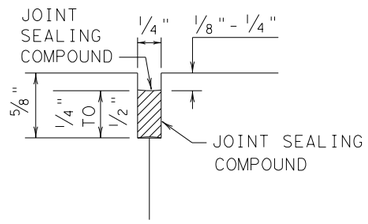
CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		150

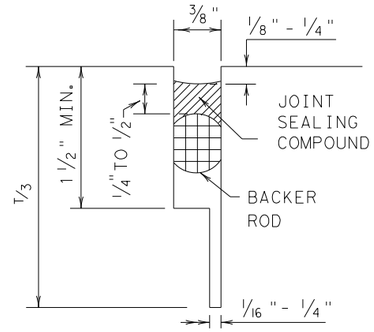
METHOD B: JOINT SEALING COMPOUND



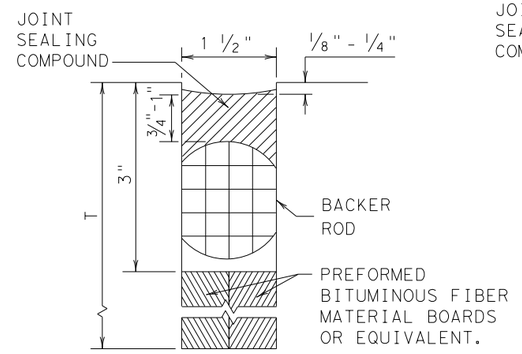
LONGITUDINAL SAWED
CONTRACTION JOINT



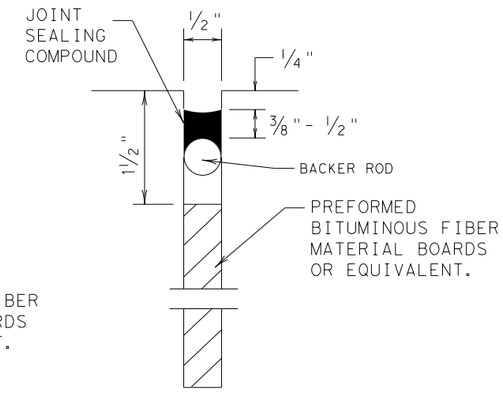
LONGITUDINAL OR TRANSVERSE
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT

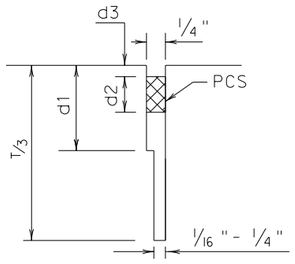


TRANSVERSE FORMED
EXPANSION JOINT

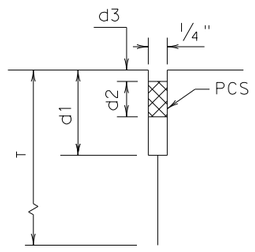


FORMED
ISOLATION JOINT

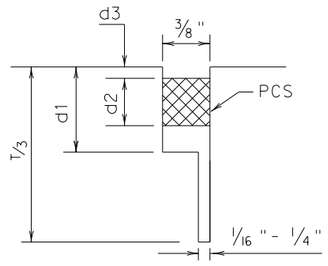
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



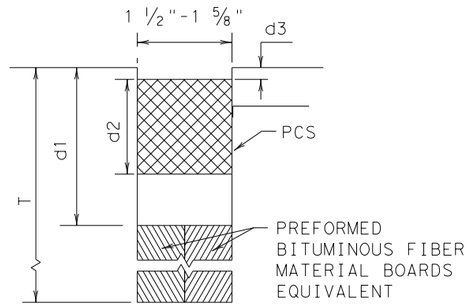
LONGITUDINAL SAWED
CONTRACTION JOINT



LONGITUDINAL
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT



TRANSVERSE FORMED
EXPANSION JOINT

GENERAL NOTES

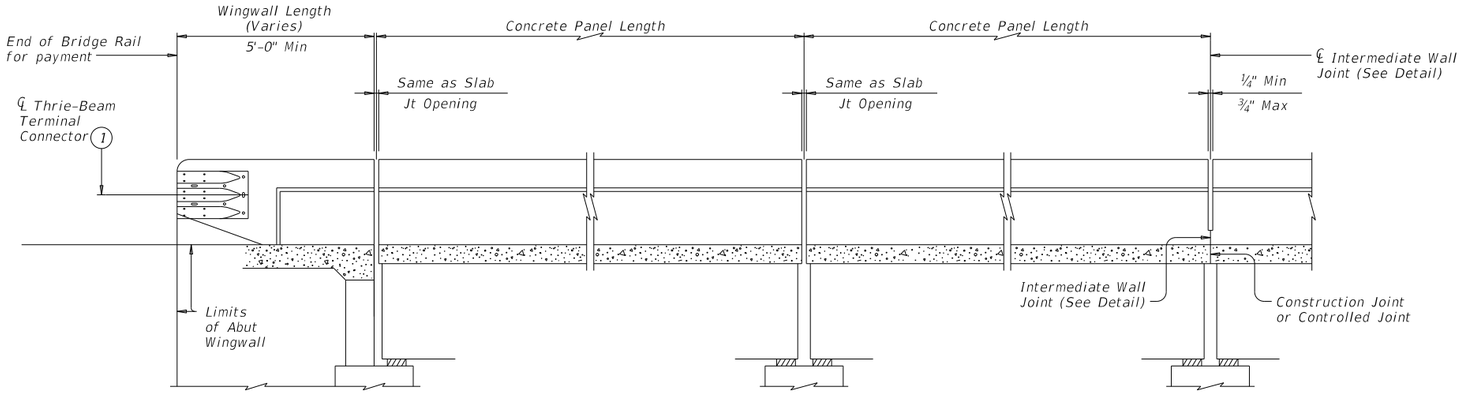
1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation — Design Division Standard

CONCRETE PAVING DETAILS
JOINT SEALS
JS-14

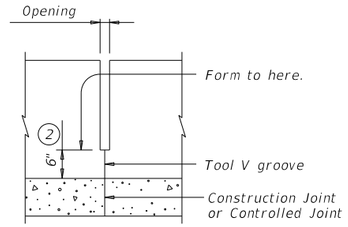
FILE: js14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		151

DATE: 7/7/2023
FILE: js14.dgn



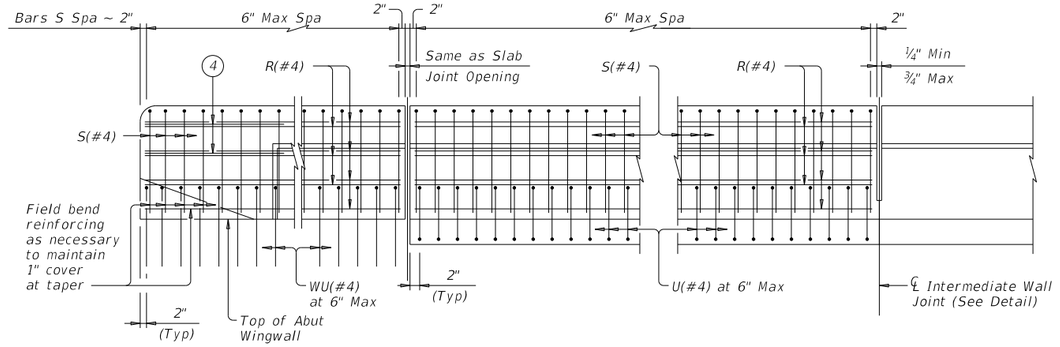
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



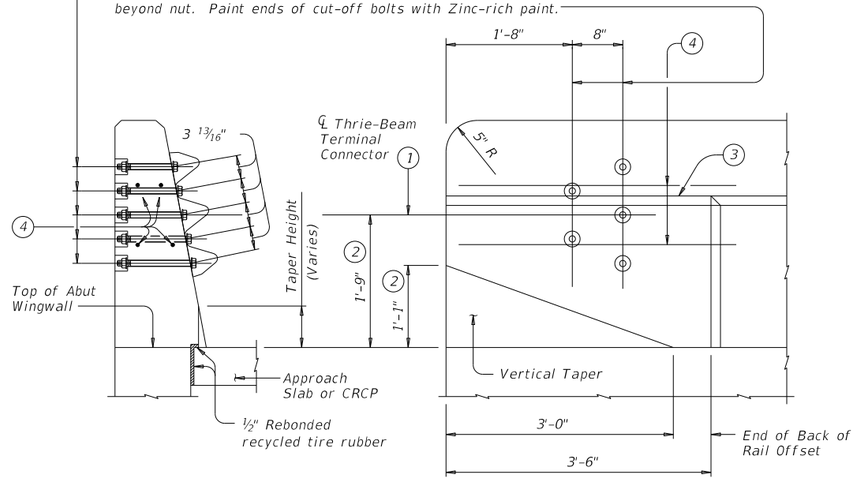
INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



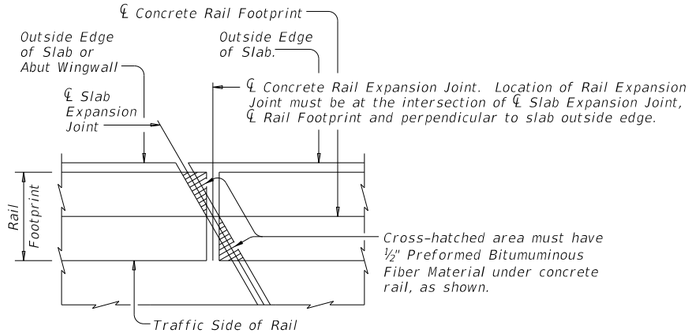
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

℄ 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



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

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

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		152

DATE: 7/7/2023 2:16:52 PM
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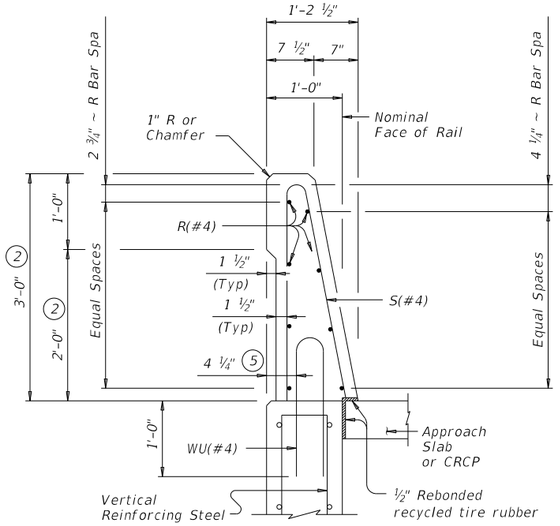
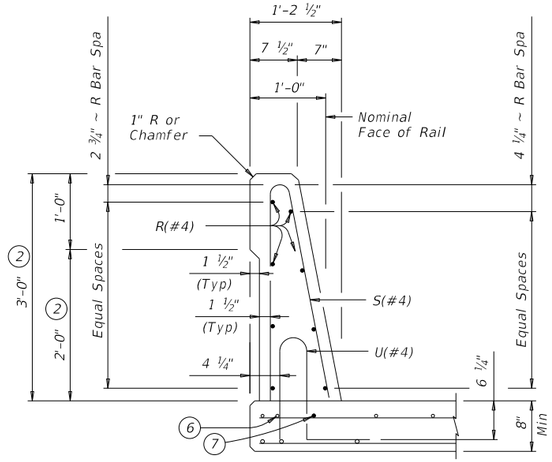


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



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.

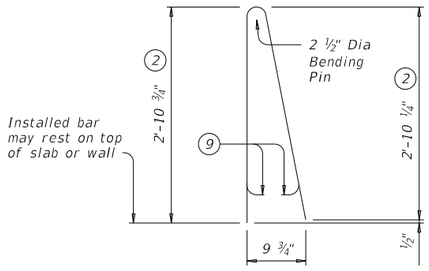
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

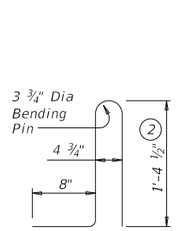
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

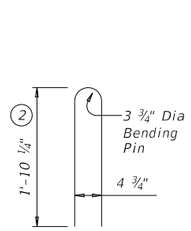
Reinforcing bar dimensions shown are out-to-out of bar.



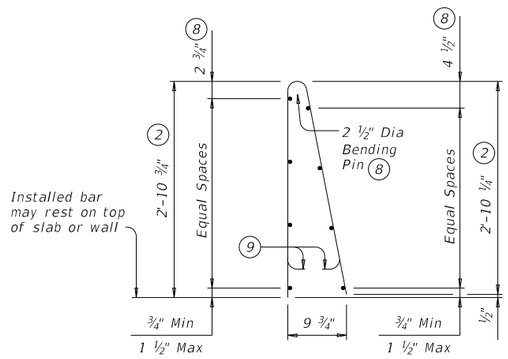
BARS S (#4)



BARS U (#4)

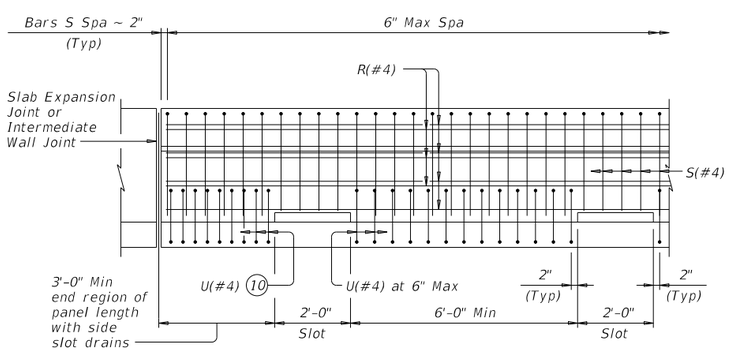


BARS WU (#4)

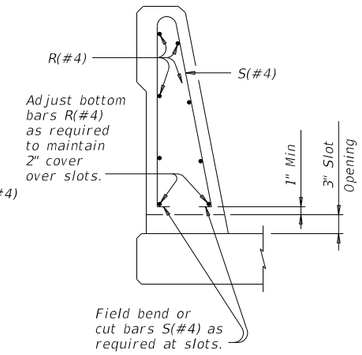


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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



SECTION THRU OPTIONAL SIDE SLOT DRAIN

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: r1std014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		153

DATE: 7/7/2023 2:16:52 PM
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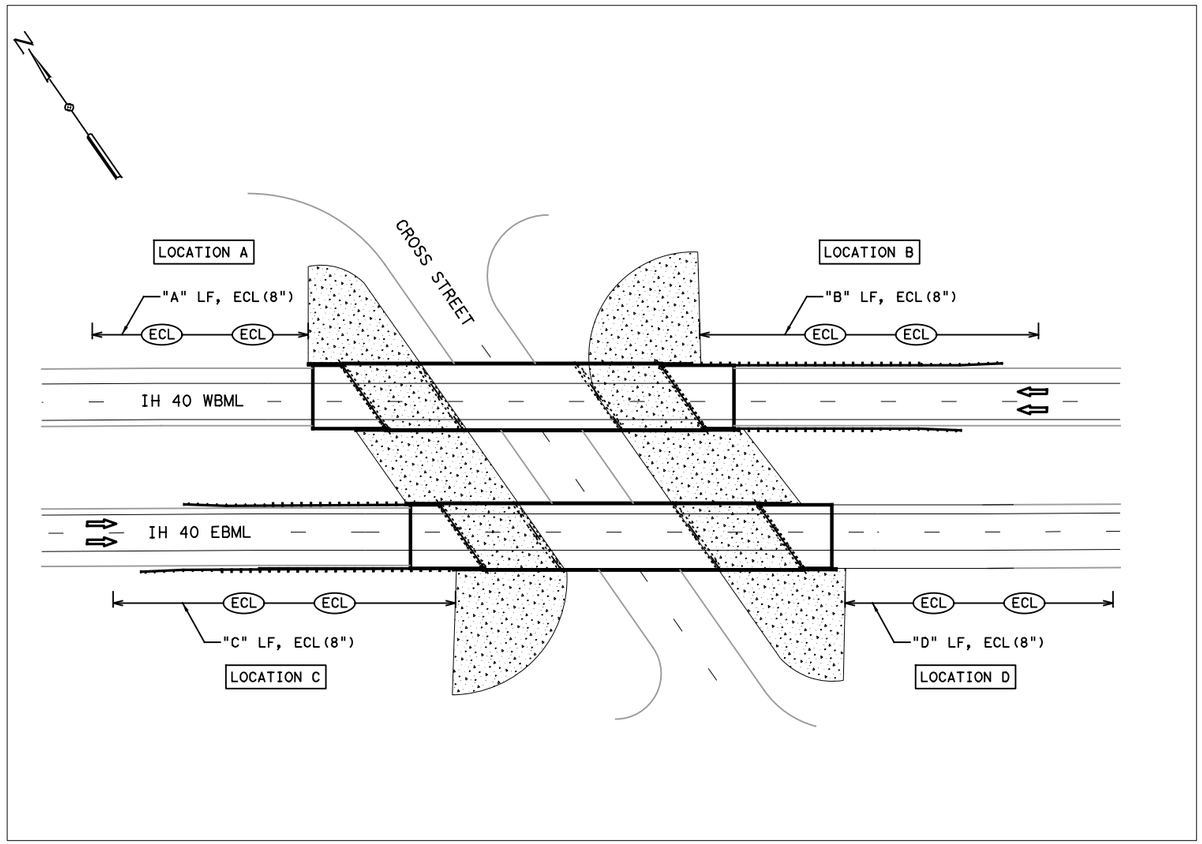
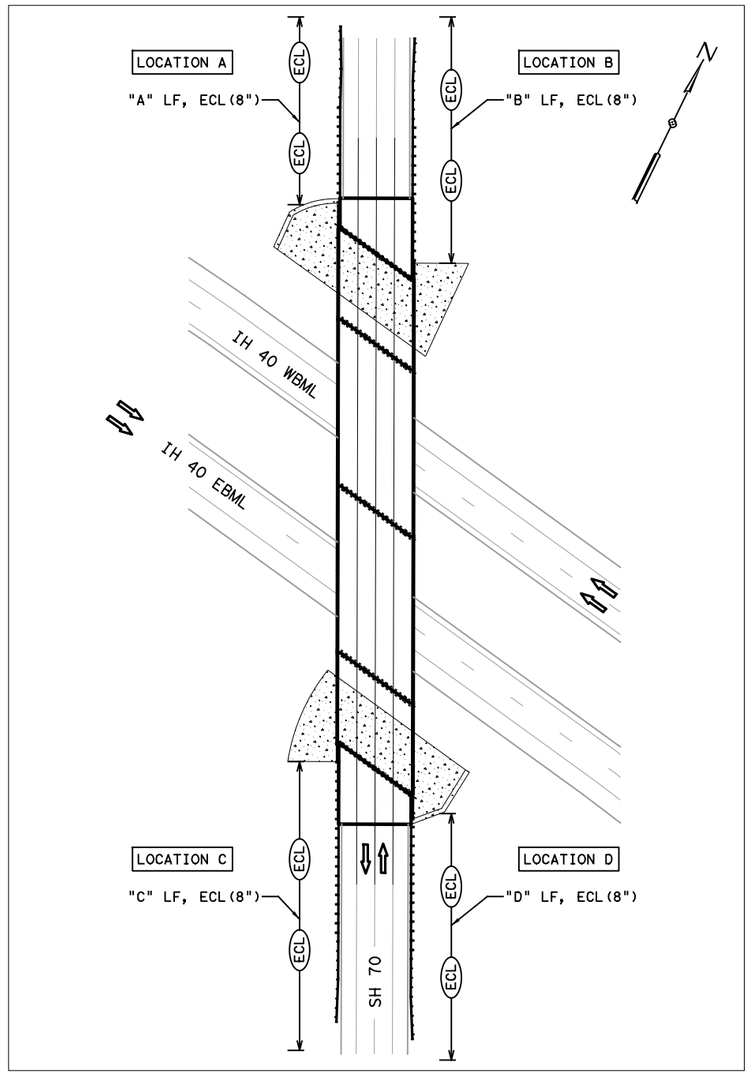


IH 40 BRIDGES TYPICAL SWP3 LAYOUT

REF 01: IH 40 WB OVERPASS AT BI40F
REF 02: IH 40 EB OVERPASS AT BI40F
REF 03: IH 40 WB OVERPASS AT FM 295
REF 04: IH 40 EB OVERPASS AT FM 295
REF 05: IH 40 WB OVERPASS AT FM 2300
REF 06: IH 40 EB OVERPASS AT FM 2300
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN



SH 70 BRIDGES TYPICAL SWP3 LAYOUT

REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)

LEGEND

EXIST TRAFFIC LANE
EROSION CONTROL LOG — ECL

NOTES:

1. EROSION/SEDIMENT CONTROL DEVICES SHALL BE INSTALLED PRIOR TO CONSTRUCTION ACTIVITY AND REMAIN UNTIL CONSTRUCTION IS COMPLETE.
2. PROVIDE CONSTRUCTION EXITS AS DIRECTED BY ENGINEER. EACH EXIT SIZED 50'BY 20'.
3. LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS DETERMINED IN THE FIELD BY THE ENGINEER.

EROSION CONTROL LOG LOCATION

DESCRIPTION	LOCATION A	LOCATION B	LOCATION C	LOCATION D	DATE INSTALLED	DATE REMOVED
	LF	LF	LF	LF		
REF 01: IH 40 WB OVERPASS AT BI 40F		500				
REF 02: IH 40 EB OVERPASS AT BI 40F			500			
REF 03: IH 40 WB OVERPASS AT FM 295		500				
REF 04: IH 40 EB OVERPASS AT FM 295			500			
REF 05: IH 40 WB OVERPASS AT FM 2300		500				
REF 06: IH 40 EB OVERPASS AT FM 2300			500			
REF 07: IH 40 WB OVERPASS AT IH 40F FR CONN		500				
REF 08: IH 40 EB OVERPASS AT IH 40F FR CONN			500			
REF 09: IH 40 UNDERPASS AT SH 70 (NORTH)	250	250	650	275		
REF 10: IH 40 WB OVERPASS AT IH 40H FR CONN	1,200	650				
REF 11: IH 40 EB OVERPASS AT IH 40H FR CONN			1,300	575		
REF 12: IH 40 UNDERPASS AT SH 70 (SOUTH)	250	200	225	200		

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
P.E. 7/7/2023

NO.	DATE	REVISION	APPR BY

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

Texas Department of Transportation

SWP3 TYPICAL LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0275	04	061, ETC.	IH 40, ETC.
DIST	COUNTY		SHEET NO.
AMA	CARSON, ETC.		154

DATE: 7/7/2023 3:45:48 PM
FILE: AMA-RDWY-SW3P TYP LAYOUT.dgn

DW AD CK BE DW AD CK BE

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0275-04-019

1.2 PROJECT LIMITS:
From: 1.88 MILES WEST OF GROOM ON IH 40

To: 0.75 MILES EAST OF MCLEAN ON IH 40

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 35°12' 30.70" N ,(Long) 101°08' 25.24" W

END: (Lat) 35°13' 35.66" N ,(Long) 100°35' 14.70" W

1.4 TOTAL PROJECT AREA (Acres): 6.250

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.964

1.6 NATURE OF CONSTRUCTION ACTIVITY:
SAFETY IMPROVEMENTS CONSISTING OF BRIDGE PLANING AND OVERLAY, REPLACING MBGF AND INSTALLATION OF MOW STRIPS.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
MILES LOAMY FINE SAND (0-1% SLOPE)	CONSISTS OF VERY DEEP, WELL-DRAINED, MODERATELY PERMEABLE SOILS
PULLMAN CLAY (0-1% SLOPE)	CONSISTS OF VERY DEEP, WELL-DRAINED, MODERATELY PERMEABLE SOILS
RANDALL CLAY (0-1% SLOPE)	CONSISTS OF VERY DEEP, WELL-DRAINED, MODERATELY PERMEABLE SOILS
PANTEX SILTY CLAY LOAM (0-1% SLOPE)	CONSISTS OF VERY DEEP, WELL-DRAINED, MODERATELY PERMEABLE SOILS
ESTACADO CLAY (0-1% SLOPE)	CONSISTS OF VERY DEEP, WELL-DRAINED, MODERATELY PERMEABLE SOILS

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
- X PSLs determined during construction
- ☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

- X 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)
- X Remove existing metal beam guard fence (MBGF), bridge rail
- ☐ Install proposed pavement per plans
- ☐ Install culverts, culvert extensions, SETs
- X 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:

- X Sediment laden stormwater from stormwater conveyance over disturbed area
- X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- X Solvents, paints, adhesives, etc. from various construction activities
- X Transported soils from offsite vehicle tracking
- X Construction debris and waste from various construction activities
- ☐ Contaminated water from excavation or dewatering pump-out water
- X Sanitary waste from onsite restroom facilities
- X Trash from various construction activities/receptacles
- ☐ Long-term stockpiles of material and waste
- ☐ 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
Non-Jurisdictional playas	
McClellan Creek	Perennial Stream
South Long Dry Creek	Intermittent Stream

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- X Perform SWP3 inspections
- X Maintain SWP3 records and update to reflect daily operations
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- X Day To Day Operational Control
- X Maintain schedule of major construction activities
- X Install, maintain and modify BMPs
- X Other: COMPLY WITH TxDOT EMS
- X Other: COMPLY WITH ALL FEDERAL, STATE, AND LOCAL RULES AND REGULATIONS AS APPLICABLE.

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		155
STATE	STATE DIST.	COUNTY	
TEXAS	AMA	CARSON, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0275	04	061, ETC.	IH 40, ETC.

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [X] [X] 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

- [X] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Dewatering Controls
- [ ] [ ] Inlet Protection
- [ ] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [ ] [ ] Sediment Control Fence
- [X] [ ] Stabilized Construction Exit
- [ ] [ ] Floating Turbidity Barrier
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Vegetated Filter Strips
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
NO PERMANENT CONTROLS PLANNED		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- [X] Excess dirt/mud on road removed daily
- [ ] Haul roads dampened for dust control
- [X] Loaded haul trucks to be covered with tarpaulin
- [ ] Stabilized construction exit
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [ ] Chemical Management
- [X] Concrete and Materials Waste Management
- [X] Debris and Trash Management
- [ ] Dust Control
- [X] Sanitary Facilities
- [X] Other: THE DISPOSAL OF WASH OUT WATER FROM CONCRETE TRUCKS MUST NOT CAUSE OR CONTRIBUTE TO GROUNDWATER CONTAMINATION.
- [X] Other: CONCRETE WASH OUT IS PERMITTED ON TxDOT ROW ONLY IF IN AN APPROPRIATELY LINED PIT OR CONTAINER.
- [ ] 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
NO SURFACE WATERS PRESENT, VEGETATED BUFFER PLANNED		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [ ] Fire hydrant flushings
- [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 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		156
STATE	STATE DIST.	COUNTY	
TEXAS	AMA	CARSON, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0275	04	061, ETC.	IH 40, ETC.

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. None

☐ No Action Required ☒ Required Action

Action No.

1. Comply with Construction General Permit and implement project SW3P's.
2. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
3. Less than 1 acre of disturbed area including any PSLs within 1 mile needs no posting on the project. Binder needs to be maintained and inspection completed by TxDOT weekly.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☐ No Action Required ☒ Required Action

Action No.

1. In the event that unanticipated archaeological deposits are encountered during construction, work in the immediate area will cease, and TxDOT archaeological staff will be contacted to initiate post-review discovery procedures.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

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 Carson, Donley, or Gray County T&E list is sighted in the project area during construction, stop construction and notify the Area engineer.
2. 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.
3. 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

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Texas Department of Transportation

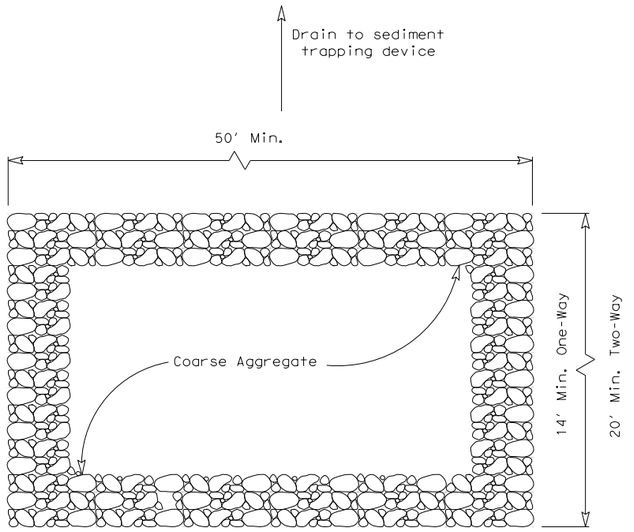
Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

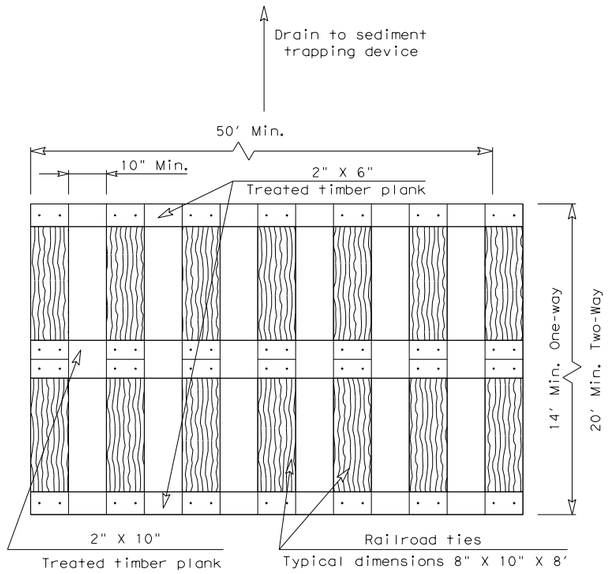
EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0275	04	061	IH 40, ETC.	
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.	
05-07-14 ADDED NOTE SECTION IV.	AMA	CARSON, ETC.		157	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.					

DATE: 7/7/2023
FILE: epic.dgn



PLAN VIEW



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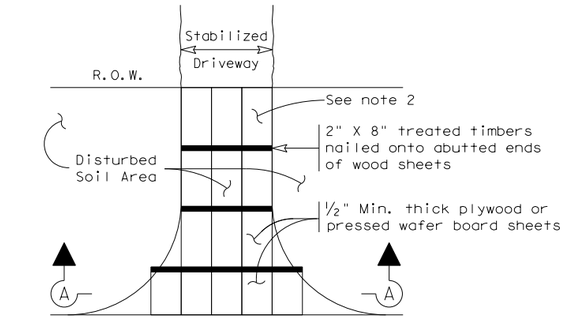

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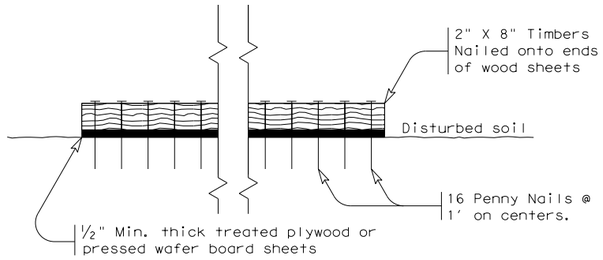
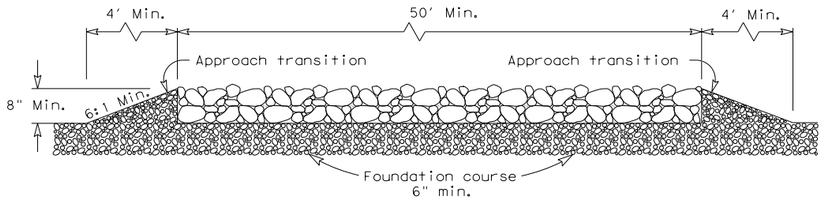


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

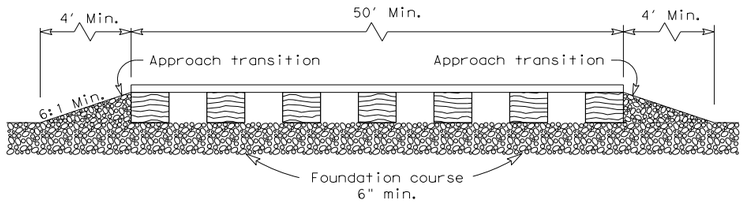
SHORT TERM



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

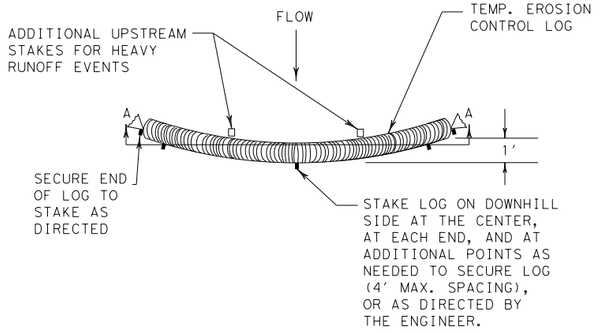
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

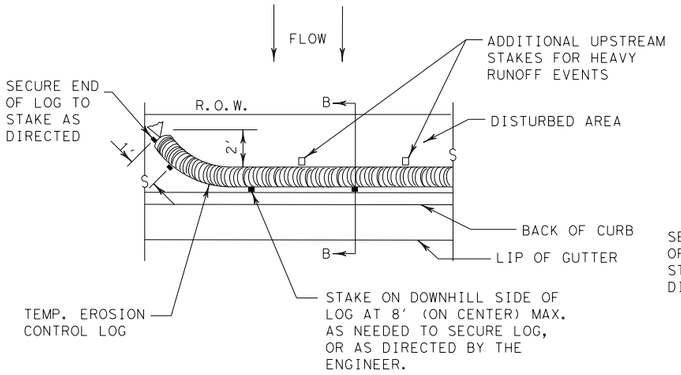
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		158

DATE: 7/6/2023
FILE: EC(3)-16.dgn



PLAN VIEW



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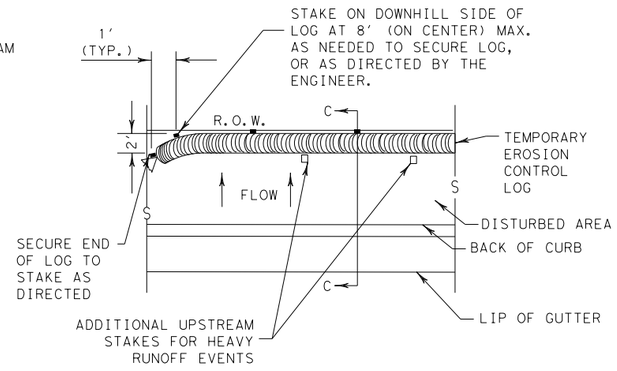

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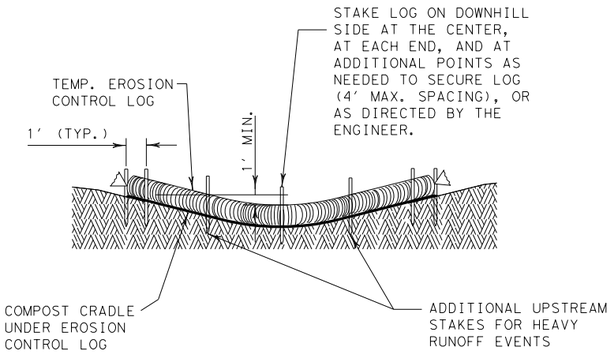
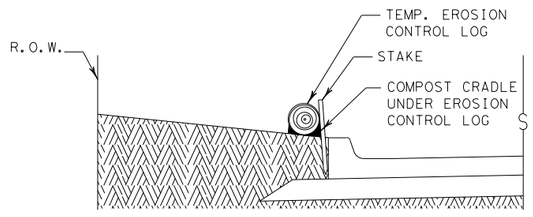


SECTION A-A

EROSION CONTROL LOG DAM

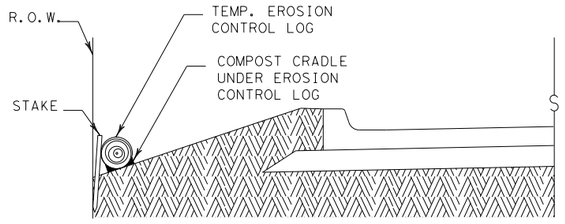
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



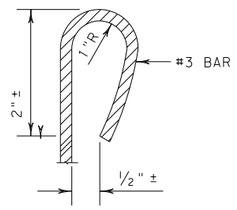
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

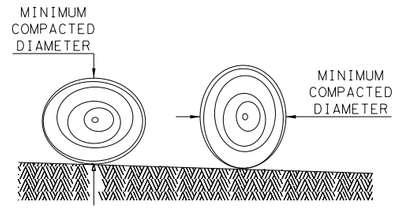
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

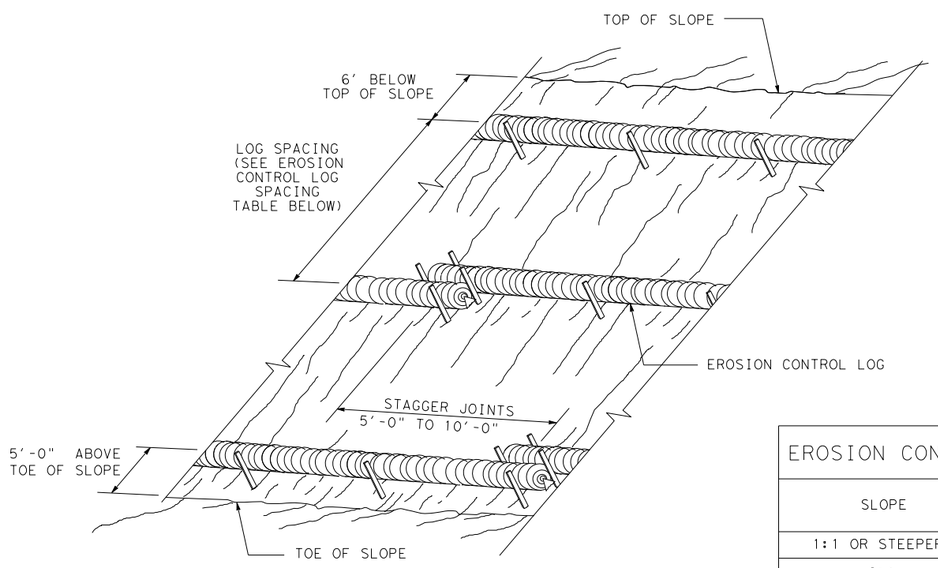
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

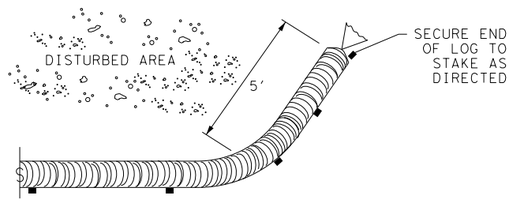
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		159

DATE: 7/6/2023
FILE: EC(9)-16.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

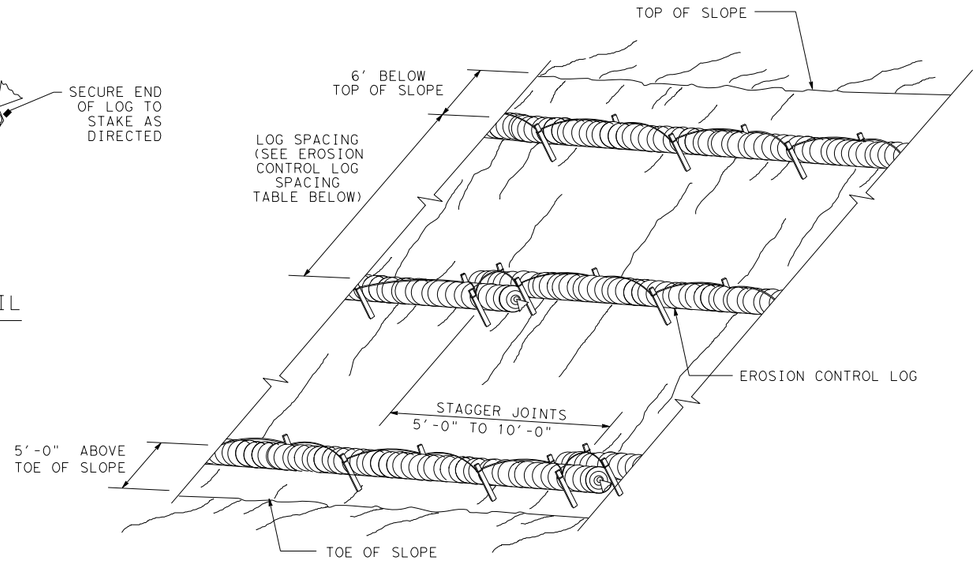
CL-SST



END SECTION RAP DETAIL

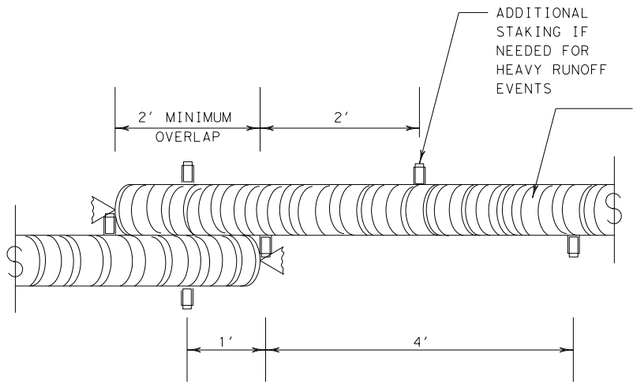
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

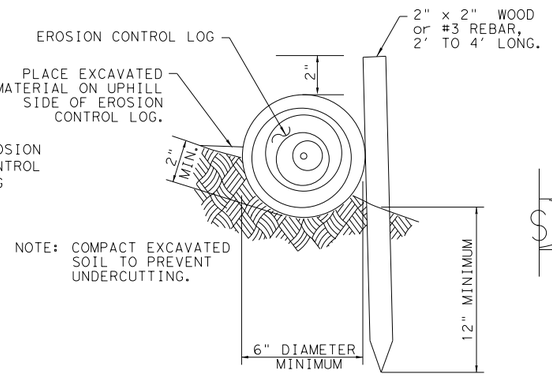
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

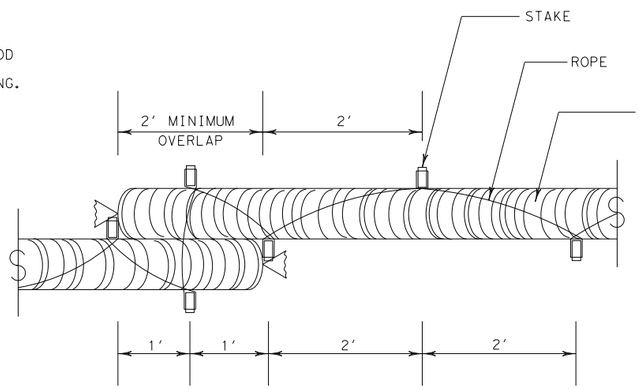


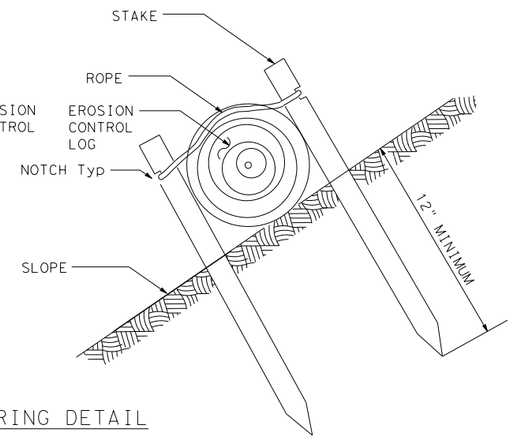


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

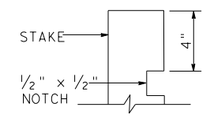
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

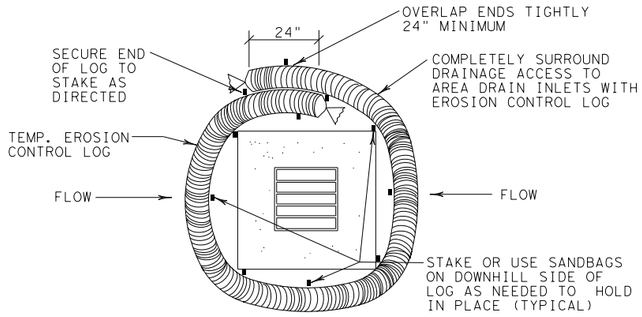
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

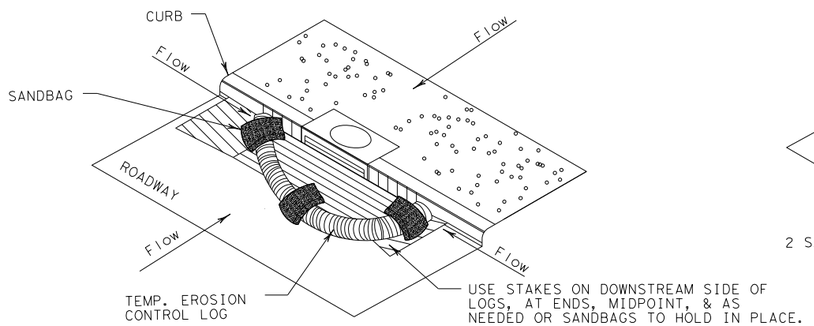
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0275	04	061, ETC.	IH 40, ETC.
	DIST	COUNTY		SHEET NO.
	AMA	CARSON, ETC.		160

DATE: 7/6/2023
FILE: EC(9)-16.dgn



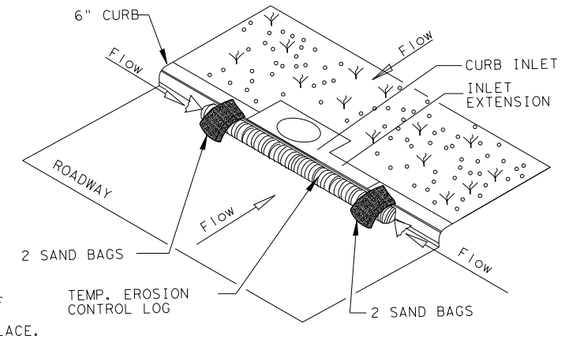
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

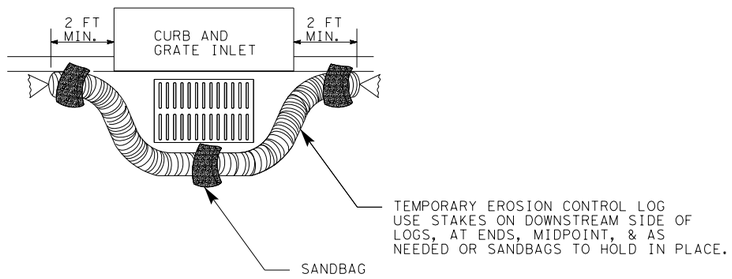
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

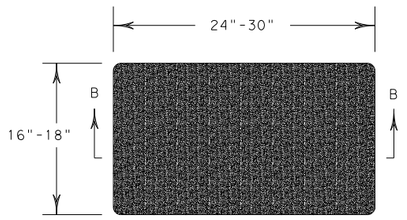
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0275	04	061, ETC.		IH 40, ETC.		
	DIST	COUNTY			SHEET NO.		
	AMA	CARSON, ETC.			161		

DATE: 7/6/2023
FILE: EC(9)-16.dgn