STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO.			
F 2024(110)			
CONT	SECT	JOB	HIGHWAY
0902	90	300	VA
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		1

FEDERAL-AID PROJECT # F 2024(110)
VA
TARRANT COUNTY

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

FUNCTIONAL CLASS:
URBAN/PRINCIPAL ARTERIAL AND MINOR ARTERIAL.
RURAL/ PRINCIPAL ARTERIAL AND MAJOR COLLECTOR.

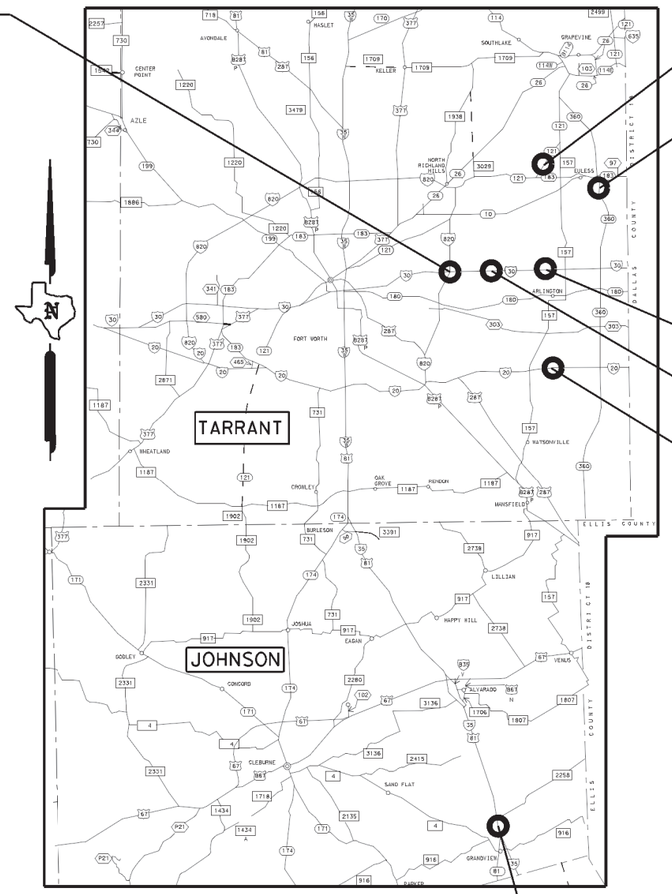
DESIGN SPEED= VARIES

TOTAL LENGTH OF PROJECT =

ROADWAY	*=000.00*	*FT.*	*= 0.000 MI.*
BRIDGE	*=5,346.00*	*FT.*	*= 1.013 MI.*
TOTAL	*=5,346.00*	*FT.*	*= 1.013 MI.*

FOR THE CONSTRUCTION OF BRIDGE MAINTENANCE WORK CONSISITING OF MISCELLANEOUS BRIDGE REPAIR WORKS.

NBI # 02-220-0-1068-02-376
CONNECTION D FROM IH 820 TO IH 30



NBI # 02-220-0-0364-01-114
BEDFORD RD. AT SH 121

NBI # 02-220-0-2266-02-042
FAA BLVD. AT SH 360

NBI # 02-220-0-1068-02-039
FIELDER RD. AT IH 30

NBI # 02-220-0-1068-02-047
RANDOL MILL RD. AT IH 30

NBI # 02-220-0-2374-05-443
NBI # 02-220-0-2374-05-281
MATLOCK RD. AT IH 20
MATLOCK RD. W TA AT IH 20

NBI # 02-127-0-0014-22-29
SH 81 AT IH 35W

LETTING DATE: _____
CONTRACTOR: _____
_____
WORK BEGAN: _____
WORK COMPLETED: _____
WORK ACCEPTED: _____
CHANGE ORDERS: _____

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

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, FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 2022)

EQUATIONS : NONE
RAILROAD : NONE
EXCEPTIONS : NONE
NO TDLR REQUIRED

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DocuSigned by: Zelma A. Noyola, P.E. CB3D3F930ED34AD... 7/13/2023
CENTRAL DESIGN ENGINEER

RECOMMENDED FOR LETTING: 7/20/2023
DocuSigned by: 7879B0B92E5D403...
DIR, TP&D

APPROVED FOR LETTING: 7/20/2023
DocuSigned by: David M Salazar, P.E. B741E64FAD82411...

DATE: 7/13/2023 2:27:40 PM
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STATE OF TEXAS
HAILU AYALEW
117326
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY A " $ " HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

NAME P.E. 7/11/2023 DATE

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY A " # " HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

NAME P.E. 7/11/2023 DATE

Texas Department of Transportation

INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		2

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Control: 0902-90-300

County: Tarrant

Highway: VA

Special Notes

Electronic files containing answered pre-letting questions and other project related design information will be placed in the following FTP site periodically.

Check this site for new information. Notices of new postings will not be sent out by the Engineer.

The data located in these files is for non-construction purposes only and can be found at

TxDOT's public FTP site at https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting Responses/.

Access is read-only.

All files in the FTP site are subject to the License Agreement shown on the FTP site.

To obtain a copy of the project plans free of charge, submit a request from the following site: http://www.txdot.gov/business/letting-bids/plans-online.html

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

Area Engineer's Email: Maribel.Rangel@txdot.gov
Assistant Area Engineer's Email: Maribel.Rangel@txdot.gov
Design Manager's Email: Jeremy.Arreguin@txdot.gov

Contractor questions will be accepted through email, phone, and 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 for the project you want to view the Q&A for and click on the link in the window that pops up.

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

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Single lane closures, except as otherwise shown in the plans, will be restricted to off-peak hours as defined in the following table:

Peak Hours		Off-Peak Hours	
6 to 9 AM Monday through Friday	3 to 7 PM Monday through Friday	9 AM to 3 PM and 7 PM to 6 AM Monday through Friday	All day Saturday and Sunday

Work that requires closure of multiple travel lanes in the same direction, except as otherwise shown in the plans, are restricted to night hours between 9 PM and 6 AM.

Existing storm sewers and utilities are shown from the best available information. Verify the location of all underground facilities prior to starting work.

For dimensions of right-of-way not shown on the plans, see right-of-way map on file at the TxDOT District Office.

Modifications to Lane Closure / Work Restrictions:

Submit a request in writing for approval by the Engineer a minimum of 10 days in advance of implementing a change to lane closure restrictions.

When deemed necessary, the Engineer will lengthen, shorten, or otherwise modify lane closure restrictions as traffic conditions warrant.

When deemed necessary, the Engineer will modify the list of major events when new events develop, existing events are rescheduled, or when warranted.

Special Events/ Special Situations will be handled on a case-by-case basis. No work restricting lane closures is allowed from 3 PM a day before to 9 AM the day after the Special Event or Special Situation.

Remove all existing fences within the right of way and remove and replace all existing fences within easements where such fences conflict with the work. Protect the remaining fence from damage due to slacking. Erect temporary fencing in the easement areas as necessary to secure the property. Provide at least one week notice to the property owner prior to removing or relocating the fence. Restore permanent fencing to an equal or better condition.

Provide all-weather surface for temporary ingress and egress to adjacent property, as directed. Materials, labor, equipment and incidentals necessary to provide temporary ingress and egress will not be paid for directly, but will be subsidiary to the various bid items.

Provide temporary drain openings at all low points or other drainage structures, as required, at the Contractor's expense.

Remove any obstructions to existing drainage due to the contractor's operations, as required, at the Contractor's expense.

Item 4 – Scope of Work

Reimbursement for project overhead will not be considered until project completion has extended beyond the original Contract Time.

Item 5. Control of the Work

When supplementary bridge plans, shop drawings, shop details, erection drawings, working drawings, forming plans, or other drawings are required, prepare and submit drawings on sheets 8-1/2 by 11 inches, 17 by 22 inches, or full size drawings reduced to half scale if completely legible. If, in the opinion of the Engineer, the drawings are not completely legible, prepare and submit on sheets 22 by 34 inches, with a 1-1/2 inch left margin, and 1/2 inch top, right, and bottom margins.

Submit all sheets with a title in the lower right hand corner. The title must include the sheet index data shown on the lower right corner of the project plans, name of the structure or element or stream, sheet numbering for the shop drawings, name of the fabricator and the name 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.

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Item 7. Legal Relations and Responsibilities

Do not initiate activities in a project specific location (PSL) associated with a U.S. Army Corps of Engineers (USACE) permit area that has not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to haul roads, equipment staging areas, borrow and disposal sites. "Associated" as defined here means materials are delivered to or from the PSL. The permit area includes all waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. The contractor will be responsible for all consultations with the USACE regarding activities, including project specific locations (PSLs) that have not been previously evaluated by the USACE. Provide the Department with a copy of all consultations or approvals from the USACE prior to initiating activities.

The Contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The contractor is solely responsible for documenting any determinations that their activities do not affect a USACE permit area. Maintain copies of these determinations for review by the Department or any regulatory agency.

Document and coordinate with the USACE, if required, prior to any excavation hauled from or embankment hauled into a USACE permit area by either (1) or (2) below.

(1) Restricted Use of Materials for Previously Evaluated Permit Areas. Document both the project specific location (PSL) and its authorization. Maintain copies for review by the Department or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:

a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in Item 110 is used for permanent or temporary fill (Item 132, Embankment) within a USACE permit area;
b. Suitable embankment (Item 132) from within the USACE permit area is used as fill within a USACE evaluated area; and,
c. Unsuitable excavation or excess excavation ["Waste"] (Item 110) that is disposed of at a location approved by the Engineer within a USACE evaluated area.

(2) Contractor Materials from Areas Other than Previously Evaluated Areas. Provide the Department with a copy of all USACE coordination or approvals prior to initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to haul roads, equipment staging areas, borrow and disposal sites:

a. Item 132, Embankment, used for temporary or permanent fill within a USACE permit area; and,

b. Unsuitable excavation or excess excavation [“Waste”] (Item 110, Excavation) that is disposed of outside a USACE evaluated area.

The total area disturbed for this project is 0 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 right of way. 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 right of way to the Engineer and to the local government that operates a separate storm sewer system.

Prevention of Migratory Bird Nesting

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

Structures

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

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

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows. This work is subsidiary to the various bid items.

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The following Holiday/Event lane closure restriction requirements apply to this project:
No work that restricts or interferes with traffic shall be allowed between 3 PM on the day preceding a Holiday or Event and 9 AM on the day after the Holiday or Event.

Holiday Lane Closure Restrictions	
New Year’s Eve and New Year’s Day (December 31 through January 1)	3 PM December 30 through 9 AM January 2
Easter Holiday Weekend (Friday through Sunday)	3PM Thursday through 9 AM Monday
Memorial Day Weekend (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
Independence Day (July 3 through July 5)	3 PM July 2 through 9 AM July 6
Labor Day Weekend (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
Thanksgiving Holiday (Wednesday through Sunday)	3 PM Tuesday through 9 AM Monday
Christmas Holiday (December 23 through December 26)	3 PM December 22 through 9 AM December 27

Plan work schedules around the appropriate dates above to ensure productive work is performed without lane closures.

Event Lane Closure Restrictions 3 PM the day before Event to 9 AM the day after the Event
Within one mile radius of major retail traffic generators i.e. malls (Thanksgiving Day through January 2)
Arlington Entertainment District
Grapevine Festivals (Including but not limited to: Carol of Lights, Black Friday Weekend, Christmas Parade, and weekends during Christmas Capital of Texas)

Item 8. Prosecution and Progress

Working days will be computed and charged in accordance with Section 8.3.1.1, 'Five-Day Workweek.'

Only nighttime work will be allowed, unless written permission from the Engineer is provided.

Before starting night work on a construction project, prepare and submit work zone light system design in accordance to NCHRP Report 476, Section 3 for approval by the Engineer. The Engineer will review the work zone light system design and notify the contractor of its acceptability. Do not start until the work zone light system design is accepted.

The number of working days for final acceptance will be 150 working days.

Use Critical Path Method (CPM) schedule in P6 format for this project. Submit the baseline schedule and obtain approval prior to beginning construction. The baseline schedule working days will be the same as the number of working days established by the Contract. The Estimate will be held if a monthly schedule update is not submitted. Also submit the XER file.

Item 428. Penetrating Concrete Surface Treatment

Provide a Type 1-Silane surface treatment to the areas shown on the detail sheets.

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 typically 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.

Permanent signs may be installed when construction in an area is complete and they will not conflict with the traffic control plan for the remainder of the job.

Existing signs are to remain as long as they do not interfere with construction and they do not conflict with the traffic control plan.

Any sign not detailed in the plans but called for in the layout will be as shown in the current "Standard Highway Sign Designs for Texas".

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When traffic is obstructed, arrange warning devices in accordance with the latest edition of the "Texas Manual on Uniform Traffic Control Devices".

Cover or remove any work zone signs when work or condition referenced is not occurring.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets. Provide access to all driveways during all phases of construction unless otherwise noted in the plans or as directed.

Item 506. Temporary Erosion, Sedimentation, and Environmental Controls

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7.

Item 780. Concrete Crack Repair

Provide Type III Epoxy to repair the cracks shown on the detail sheets.

Item 6001. Portable Changeable Message Signs

Provide all portable changeable message signs and arrow panels with a photoelectric device to allow for automatic dimming of operations to approximately 50% of their normal brightness when ambient light drops to approximately five footcandles, and then increase back again for daytime operations.

9 electronic portable changeable message sign unit(s) will be required. Individual or collective use of signs will be required by the Engineer when deemed necessary to supplement the traffic control plan.

Each sign must have programmed in its permanent memory the following 15 messages:

1. Exit Closed Ahead
2. Use Other Routes
3. Right Lane
4. Left Lane
5. Closed Ahead
6. Two Lane
7. Detour Ahead
8. Thru Traffic
9. Prepare To Stop

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County: Tarrant

Highway: VA

10. Merging Traffic
11. Expect 15 Minute Delay
12. Max Speed ** MPH
13. Merge Right
14. Merge Left
15. No Exit Next ** Miles

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 2 additional shadow vehicle(s) with TMA as detailed on the Project Traffic Control Plans and applicable standard sheets.

Therefore, 5 total shadow vehicles with TMA will be required for this type of work. Determine 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 0902-90-300 **DISTRICT** Fort Worth **COUNTY** Tarrant
HIGHWAY Various

		CONTROL SECTION JOB		**0902-90-300**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00195830**			
		COUNTY		**Tarrant**			
		HIGHWAY		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	183.000		183.000	
	429-6001	CONC STR REPAIR(CLEAN & COAT WTH EPOXY)	SF	38.000		38.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	10.000		10.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	55.000		55.000	
	429-6009	CONC STR REPAIR (STANDARD)	SF	10.000		10.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	7.000		7.000	
	776-6036	REPAIR (STL POST RETROFIT)	EA	1.000		1.000	
	776-6049	REPAIR (STL POST W/DOUBLED W-BEAMS-T6)	EA	2.000		2.000	
	780-6010	CNC CRACK REPAIR (DISCRETE)(SURF SEAL)	LF	32.000		32.000	
	784-6003	REP STL BRIDGE MEMBER (DIAPHRAGM)	EA	1.000		1.000	
	784-6034	REP STL BRIDGE MEMBER(STRAIGHTEN MEMB)	EA	2.000		2.000	
	784-6035	REP STL BRIDGE MEMBER (STIFF)	EA	1.000		1.000	
	784-6037	REP STL BRIDGE MEMBER (WEB REP)	EA	1.000		1.000	
	785-6005	BRIDGE JOINT REPAIR (SEJ)	LF	56.000		56.000	
	788-6002	CONCRETE BEAM REPAIR (CFRP)	EA	5.000		5.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	208.000		208.000	
	6185-6002	TMA (STATIONARY)	DAY	202.000		202.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF BRIDGES

LAYOUT SHEET NO.	NBI #	DESCRIPTIONS	0428-6001 Penetrating Concrete Surface Treatment (SY)	0429-6001 Conc Str Repair (Clean & Coat with Epoxy) (SF)	0429-6005 (1) Conc Str Repair (Deck Repair (Full Depth)) (SF)	0429-6007 (1) Conc Str Repair (Vertical & Overhead) (SF)	0429-6009 (1) Conc Str Repair (Standard) (SF)	0776-6036 Repair (Stl Post Retrofit) (EA)	0776-6049 Repair (Stl Post W/Doubled W-Beams-T6) (EA)	0780-6010 CNC Crack Repair (Discrete) (Surf Seal) (LF)	0784-6003 Repl Stl Bridge Member (Diaphragm) (EA)	0784-6034 Repl Stl Bridge Member (Straighten Memb) (EA)	0784-6035 Rep Stl Bridge Member (Stiff) (EA)	0784-6037 Rep Stl Bridge Member (Web Rep) (EA)	0785-6005 Bridge Joint Repair (SEJ) (LF)	0788-6002 Concrete Beam Repair (CFRP) (EA)
	JOHNSON															
	02-127-0-0014-22-293	SH 81 @ IH 35W	183	20	~	55	~	~	2	32	~	~	~	~	~	1
	TARRANT															
	02-220-0-0364-01-114	BEDFORD RD. @ SH 121	~	7	~	~	~	~	~	~	~	~	~	~	~	2
	02-220-0-1068-02-039	FIELDER RD @ IH 30	~	~	~	~	~	~	~	~	~	~	~	~	~	2
	02-220-0-1068-02-047	RANDOL MILL RD. @ IH 30	~	~	~	~	~	~	~	~	1	2	1	1	~	~
	02-220-0-1068-02-376	CONNECTION "D" FROM IH 820 TO IH 30	~	~	~	~	10	~	~	~	~	~	~	~	56	~
	02-220-0-2266-02-042	F.A.A. BLVD. @ SH 360	~	2	10	~	~	1	~	~	~	~	~	~	~	~
	02-220-0-2374-05-281	MATLOCK RD. @ IH 20	~	3	~	~	~	~	~	~	~	~	~	~	~	~
	02-220-0-2374-05-443	MATLOCK RD. W TA @ IH 20	~	6	~	~	~	~	~	~	~	~	~	~	~	~
	TOTAL		183	38	10	55	10	1	2	32	1	2	1	1	56	5

(1) For additional information and details, see "Concrete Structure Details" sheet.

DESCRIPTIONS:

Summary of Bridges and Index
SH 81 @ IH 35W
BEDFORD RD. @ SH 121
FIELDER RD @ IH 30
RANDOL MILL RD. @ IH 30
CONNECTION "D" FROM IH 820 TO IH 30
F.A.A. BLVD. @ SH 360
MATLOCK RD. @ IH 20
MATLOCK RD. W TA @ IH 20
BEAM REPAIR SUMMARY
CONCRETE STRUCTURE DETAILS
SEJ-B (SEALED EXPANSION JOINT TYPE B)

FOR CONTRACTOR'S REFERENCE ONLY:
TYPE 6 (MOD) (METAL BEAM RAILING)
DECK AND GIRDER DETAIL
GIRDERS DETAIL
DIAPHRAGM DETAILS
C301 (MOD) (TRAFFIC RAIL)

T:\BRIDGE\share\BEAM, BRIDGE, & WALL REPAIRS\CFRP\0902-90-300\DGN\Summary of Bridges.dgn

SHEET 1 OF 1

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation
Fort Worth Bridge Design

SUMMARY OF BRIDGES

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		5

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS		
LOCATION	6001 6001	6185 6002
	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
	DAY	DAY
NBI 02-220-0-0014-22-293 SH 81 AT IH 35W	58	54
NBI 02-220-0-0364-01-144 BEDFORD RD AT SH 121	57	53
NBI 02-220-0-1068-02-039 FIELDER RD AT IH 30	30	60
NBI 02-220-0-1068-02-047 RANADOL MILL RD AT IH 30	16	18
NBI 02-220-0-1068-02-376 CONNECTION "D" FROM IH 820 TO IH 30	21	0
NBI 02-220-0-2266-02-042 FAA BLVD AT SH 360	14	15
NBI 02-220-0-2374-05-281 MATLOCK RD AT IH 20	10	1
NBI 02-220-0-2374-05-443 MATLOCK RD AT IH 20	2	1
PROJECT TOTALS	208	202

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Texas Department of Transportation

SUMMARY OF QUANTITY

WORK ZONE TRAFFIC CONTROL ITEMS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		6

TRAFFIC CONTROL NOTES

1. THIS IS A SUGGESTED TRAFFIC CONTROL PLAN (TCP). THE CONTRACTOR MAY SUBMIT AN ALTERNATE TRAFFIC CONTROL PLAN, SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN TEXAS, FOR APPROVAL BY THE ENGINEER.

2. REFER TO ITEM 8 "PROSECUTION OF WORK" AND PROJECT GENERAL NOTES FOR TRAFFIC CONTROL PLAN.

3. FURNISH AND INSTALL ALL TRAFFIC CONTROL PLANS DEVICES, INCLUDING BUT NOT LIMITED TO BARRICADES, SIGNS, AND WORK ZONE MARKINGS, IN COMPLIANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD), THE STATE STANDARD TRAFFIC CONTROL PLANS (TCP) SHEETS, AND THE BARRICADES AND CONSTRUCTION (BC) SHEETS. REFER TO THE PROJECT GENERAL NOTES FOR ADDITIONAL INFORMATION REGARDING THE TRAFFIC CONTROL PLAN.

4. VERIFY THE LOCATION AND SPACING OF SIGNS, BARRICADES, AND CHANNELIZING DEVICES PRIOR TO THEIR PLACEMENT ALONG VERTICAL CURVES, HORIZONTAL CURVES, AND OTHER GEOMETRIC CONSTRAINTS TO ENSURE VISIBILITY TO ALL MOTORISTS.

5. COVER ALL EXISTING SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL PLAN AND UNCOVER DURING NON-WORKING HOURS OR AS DIRECTED BY THE ENGINEER. PARTIAL COVERAGE OF THE SIGN OR COVERAGE BY MATERIAL THAT WILL NOT COVER THE ENTIRE SIGN ALL THE TIME IS NOT PERMITTED.

6. VARY THE SPACING OF SIGNS TO MEET TRAFFIC CONDITIONS OR AS DIRECTED BY THE ENGINEER AND ENSURE THAT ALL TRAFFIC CONTROL DEVICES AND WORK ZONE PAVEMENT MARKINGS ARE KEPT IN A HIGHLY VISIBLE CONDITION (CLEAN, UPRIGHT AND AT PROPER LOCATION).

7. CONDUCT CONSTRUCTION OPERATIONS SO AS TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC AND TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES OR AS PERMITTED BY THE SEQUENCE OF CONSTRUCTION. PROVIDE FOR SAFE AND CONVENIENT ACCESS TO ABUTTING PROPERTIES, HIGHWAYS, PUBLIC ROADS, AND STREET CROSSINGS EXCEPT AS OTHERWISE SHOWN ON THE SEQUENCE OF CONSTRUCTION.

8. REGULATE ALL CONSTRUCTION TRAFFIC SO AS TO CAUSE A MINIMAL INCONVENIENCE TO THE TRAVELING PUBLIC. AT THE TIMES WHEN IT IS NECESSARY FOR TRUCKS TO STOP, UNLOAD OR CROSS ROADWAYS UNDER TRAFFIC, PROVIDE WARNING SIGNS AND FLAGGERS AS NEEDED TO ADEQUATELY PROTECT THE TRAVELING PUBLIC.

9. NOTIFY THE ENGINEER IN WRITING TWO WEEKS PRIOR TO SHIFTING OF TRAFFIC WITHIN EACH PHASE OF THE TRAFFIC CONTROL PLAN.

10. MOVING AN EXISTING SIGN TO A TEMPORARY LOCATION IS SUBSIDIARY TO ITEM 502. INSTALLATIONS WITH PERMANENT SUPPORTS AT PERMANENT LOCATIONS WILL BE PAID FOR UNDER THE APPLICABLE BID ITEM(S).

11. USE OF PORTABLE CHANGEABLE MESSAGE SIGNS AS ADVANCE NOTICE OF LANE CLOSURES WILL BE REQUIRED, AS DIRECTED BY THE ENGINEER. FOR LOCATIONS THAT ARE ADJACENT TO EACH OTHER, A SINGLE SIGN IN ADVANCE OF THE ENTIRE WORK AREA IS ACCEPTABLE.

12. PLACE PORTABLE CHANGEABLE MESSAGE SIGNS AT LOCATIONS REQUIRING LANE CLOSURES FOR SEVEN DAYS PRIOR TO THE CLOSURES OR AS DIRECTED BY THE ENGINEER.

13. ADDITIONAL SIGNS, BARRICADES AND CHANNELIZING DEVICES MAY BE REQUIRED TO MAINTAIN TRAFFIC DURING CONSTRUCTION, AS SHOWN ON TCP STANDARDS. ADDITIONAL SIGNS, BARRICADES, ETC. (IF ANY), WILL BE SUBSIDIARY TO ITEMS 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING".

14. PROVIDE LIGHTS TO ILLUMINATE THE FLAGGERS AND WORK AREA DURING NIGHTTIME OPERATIONS. CLASS 3 GARMENTS WILL BE REQUIRED FOR ALL WORKERS AND FLAGGERS DURING NIGHTTIME WORK.

15. CONTRACTOR SHALL COORDINATE TCP WITH ANY ADJACENT CONSTRUCTION PROJECTS TO ENSURE NO CONFLICTING TRAFFIC CONTROL EXISTS.

16. FOLLOW THE CONSTRUCTION SEQUENCING UNLESS OTHERWISE APPROVED BY THE ENGINEER.

17. BEFORE BEGINNING WORK, PLACE APPLICABLE BARRICADES IN ACCORDANCE WITH TXDOT STANDARDS BC (1-12)-21.

18. ALL TCP DEVICES SHALL BE PICKED UP PRIOR TO OPENING AFFECTED LANES TO TRAFFIC.

19. A TRUCK MOUNTED ATTENUATOR SHALL BE USED ON SHADOW VEHICLE. STRIPING ON THE BACK PANEL OF ALL TRUCK MOUNTED ATTENUATORS SHALL BE 8" RED AND WHITE REFLECTIVE SHEETING PLACED IN AN INVERTED "V" DESIGN. REFLECTIVE SHEETING SHALL MEET OR EXCEED THE REFLECTIVITY AND COLOR REQUIREMENTS OF DEPARTMENTAL MATERIAL SPECIFICATION DMS-8300, TYPE A.

20. ANY WORK REQUIRING FULL CLOSURE OF INTERSECTIONS SHALL BE COORDINATED WITH LOCAL CITY OFFICIALS TO DETERMINE IF ANY SIGNAL TIMING ADJUSTMENTS NEED TO BE MADE FOR THE DURATION OF THE CLOSURE.

21. CONTRACTOR SHALL COORDINATE WITH THE AREA OFFICE PRIOR TO COMMENCING WORK.

22. CONTRACTOR SHALL REFER TO THE TRAFFIC CONTROL PLAN LAYOUTS, APPLICABLE TRAFFIC CONTROL PLAN STANDARDS, AND DETOUR LAYOUTS OR AS DIRECTED BY THE ENGINEER.

23. ANY WORK OUTSIDE OF THE RECOMMENDED PHASES AND STEPS SHALL BE APPROVED BY THE ENGINEER.

24. FULL LANE AND/OR RAMP CLOSURES SHALL ONLY BE USED AT NIGHTTIME UNLESS DIRECTED OTHERWISE BY THE ENGINEER. REFER TO GENERAL NOTES FOR NIGHTTIME LIGHTING REQUIREMENTS.

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TRAFFIC CONTROL NOTES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		7

DATE: 7/12/2023 2:16:29 PM
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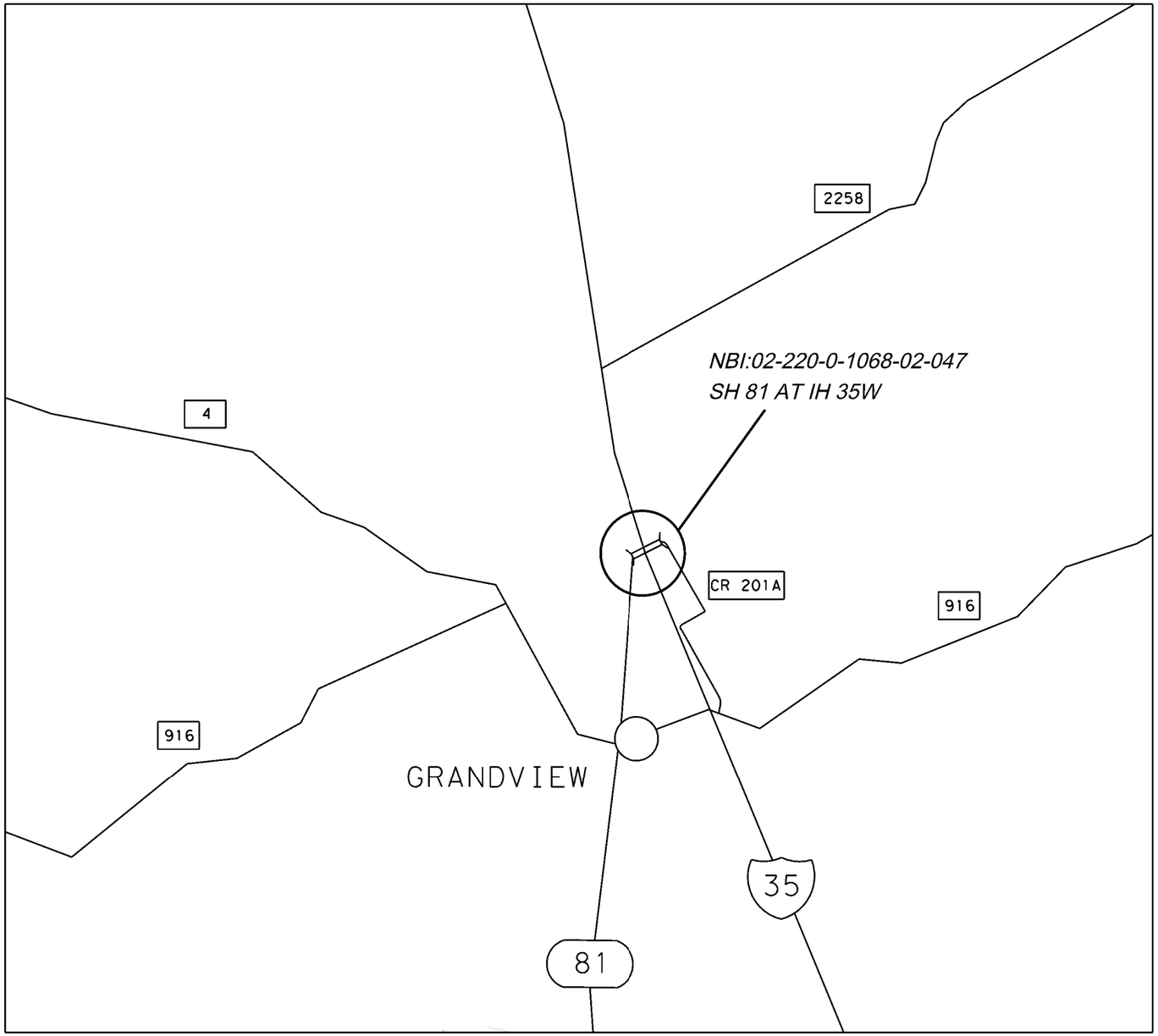
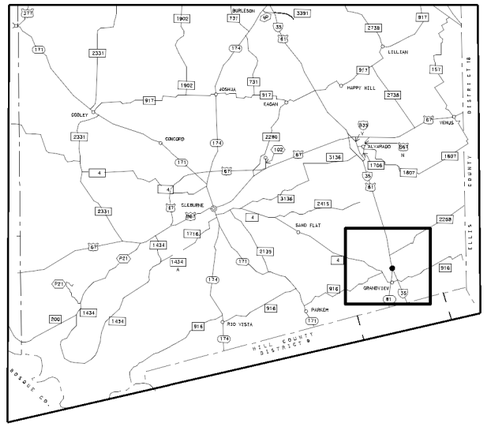


LOCATION MAP

N.T.S.



JOHNSON COUNTY

NBI# 02-127-0-0014-22-293

Texas Department of Transportation

2024 BEAM REPAIR LOCATION MAP

SH 81
AT IH 35W

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		8

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SEQUENCE OF WORK

PHASE I STEP 1 - SH 81 AT NB IH 35W

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE NB IH 35W AT SH 81 CLOSURE BY CLOSING THE IH 35W NB MAINLANES AS SHOWN ON THE TRAFFIC CONTROL PLAN.
3. CLOSE THE SH 81 EB LANE TO PRE-LOAD THE SPAN OVER THE DAMAGED BEAM AS SHOWN ON THE TRAFFIC CONTROL PLAN.
4. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR SH 81 AT IH 35W.
5. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES FROM IH 35W NB MAINLAINES. TRAFFIC CONTROL DEVICES REMAIN ON SH 81 EB LANE UNTIL STRUCTURE ACHIEVES DESIRED STRENGTH.

PHASE I STEP 2 - SH 81 AT NB & SB IH 35W

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE NB AND SB IH 35W AT SH 81 CLOSURE BY CLOSING THE TWO INSIDE SHOULDERS AS SHOWN ON THE TRAFFIC CONTROL PLAN.
3. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR SH 81 AT IH 35W.
4. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

PHASE I STEP 3 - SH 81 AT NB & SB IH 35W

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE NB AND SB IH 35W AT SH 81 CLOSURE BY CLOSING THE TWO OUTSIDE SHOULDERS ACCORDING TO TCP (5-1)-18.
3. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR SH 81 AT IH 35W.
4. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

PHASE I STEP 4 - WB SH 81 AT IH 35W

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE WB SH 81 AT IH 35W CLOSURE BY CLOSING THE WB LANE AS SHOWN ON THE TRAFFIC CONTROL PLAN.
3. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR SH 81 AT IH 35W.
4. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

TRAFFIC CONTROL PLAN

PHASE I STEP 1 - SH 81 AT NB IH 35W

1. SB IH 35W TRAFFIC REMAINS UNDISTURBED.
2. THE IH 35W NB MAINLANES REMAIN CLOSED DURING BEAM REPAIRS. IH 35W NB TRAFFIC TAKES EXIT 16 AND MERGES BACK ONTO NB IH 35W AS SHOWN ON THE DETOUR LAYOUT.
3. THE SH 81 EB LANE REMAINS CLOSED DURING BEAM LOADING. SH 81 EB TRAFFIC TAKES SB IH 35W TO EXIT 15 AND TURNS LEFT ON E CRINER ST TO MERGE BACK ONTO NB IH 35W AS SHOWN ON THE DETOUR LAYOUT.
4. THE SH 81 WB LANE REMAINS UNDISTURBED.

PHASE I STEP 2 - SH 81 AT NB & SB IH 35W

1. NB AND SB IH 35W TRAFFIC CONTINUES ON MAINLANES.
2. SH 81 TRAFFIC REMAINS UNDISTURBED.

PHASE I STEP 3 - SH 81 AT NB & SB IH 35W

1. NB AND SB IH 35W TRAFFIC CONTINUES ON MAINLANES.
2. SH 81 TRAFFIC REMAINS UNDISTURBED.

PHASE I STEP 4 - WB SH 81 AT IH 35W

1. NB AND SB IH 35W TRAFFIC CONTINUES ON MAINLANES.
2. EB SH 81 OPERATES AS ONE LANE TWO-WAY TRAFFIC WITH FLAGGERS.

STATE OF TEXAS
HAILU AYALEW
117326
LICENSED PROFESSIONAL ENGINEER

07/13/2023

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SEQUENCE OF WORK

SH 81 AT IH 35W

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		9

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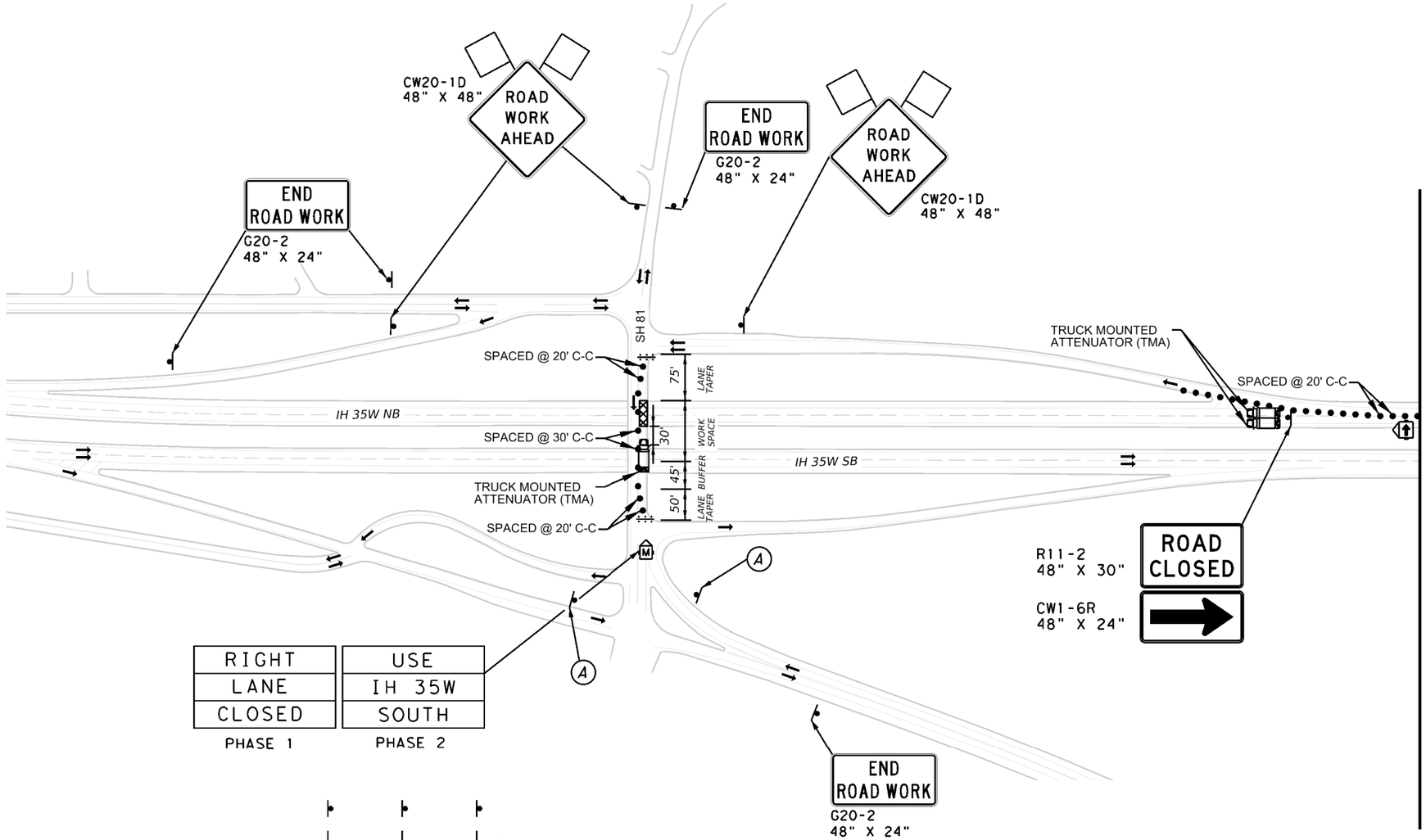

MATCHLINE A

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

HAILU AYALEW
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LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
07/13/2023

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Texas Department of Transportation

TRAFFIC CONTROL PLAN

PHASE I STEP 1
SH 81 AT IH 35W

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		10

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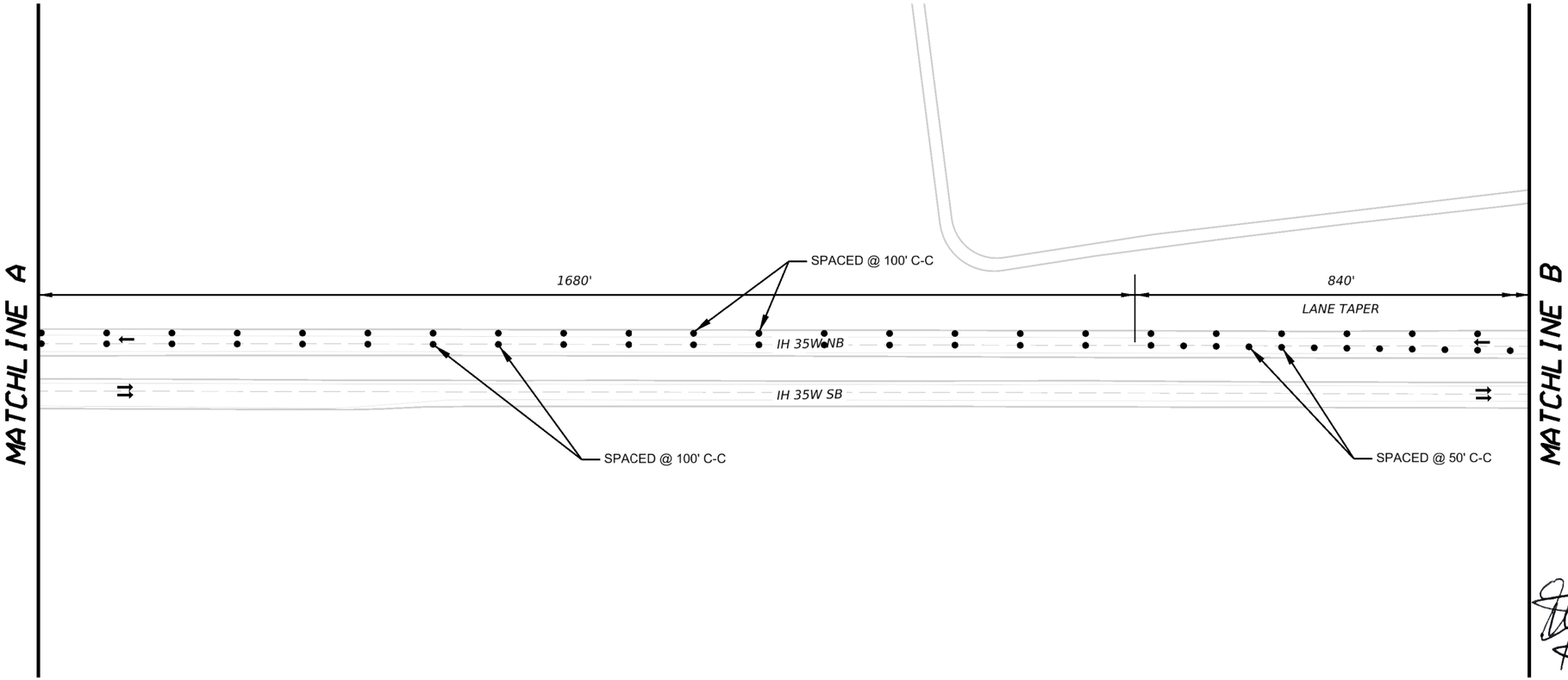

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
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NOTES:

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Texas Department of Transportation

TRAFFIC CONTROL PLAN

PHASE I STEP 1
SH 81 AT IH 35W

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		11

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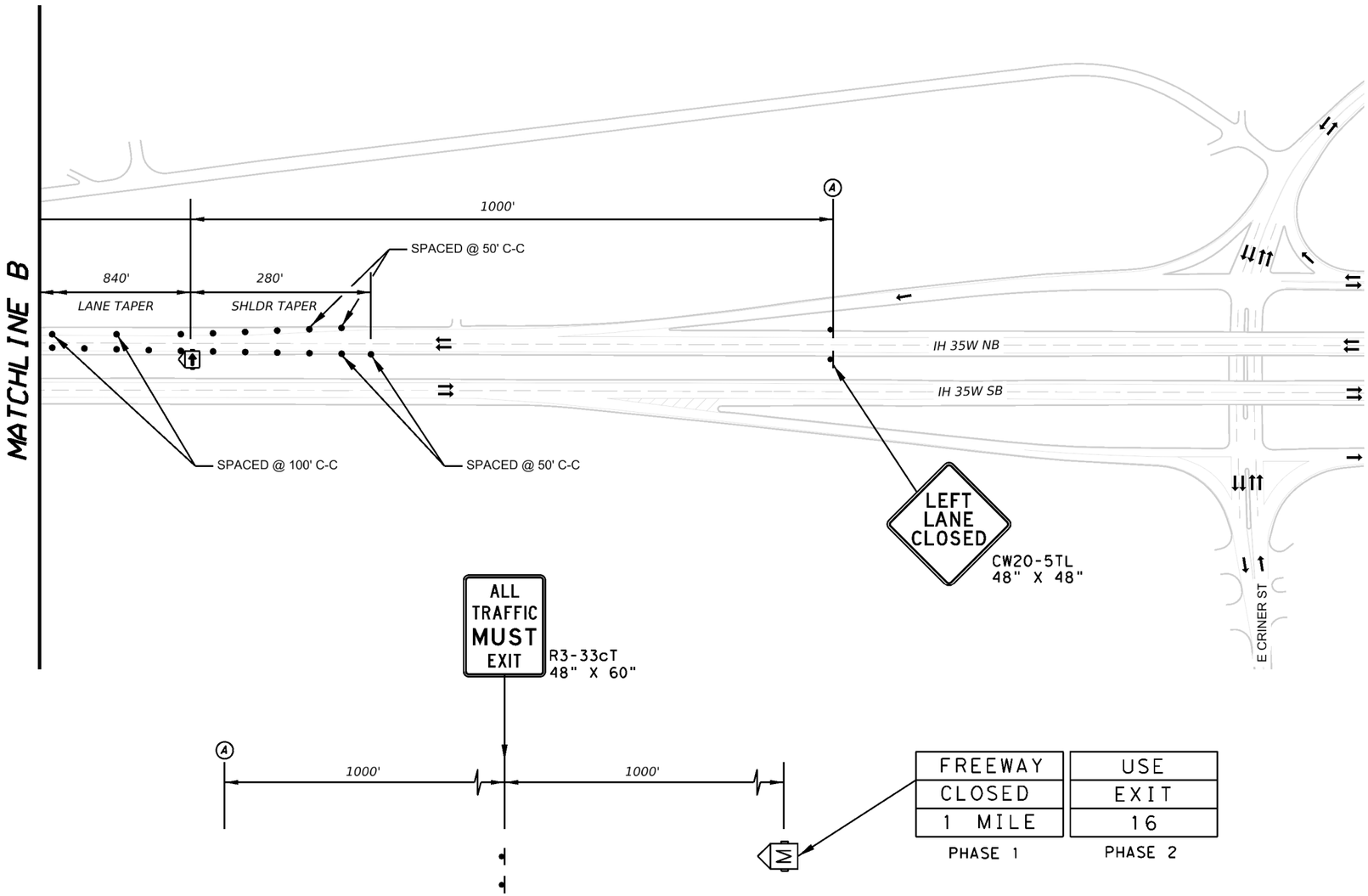

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
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STATE OF TEXAS
07/13/2023

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TRAFFIC CONTROL PLAN

PHASE I STEP 1
SH 81 AT IH 35W

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		12

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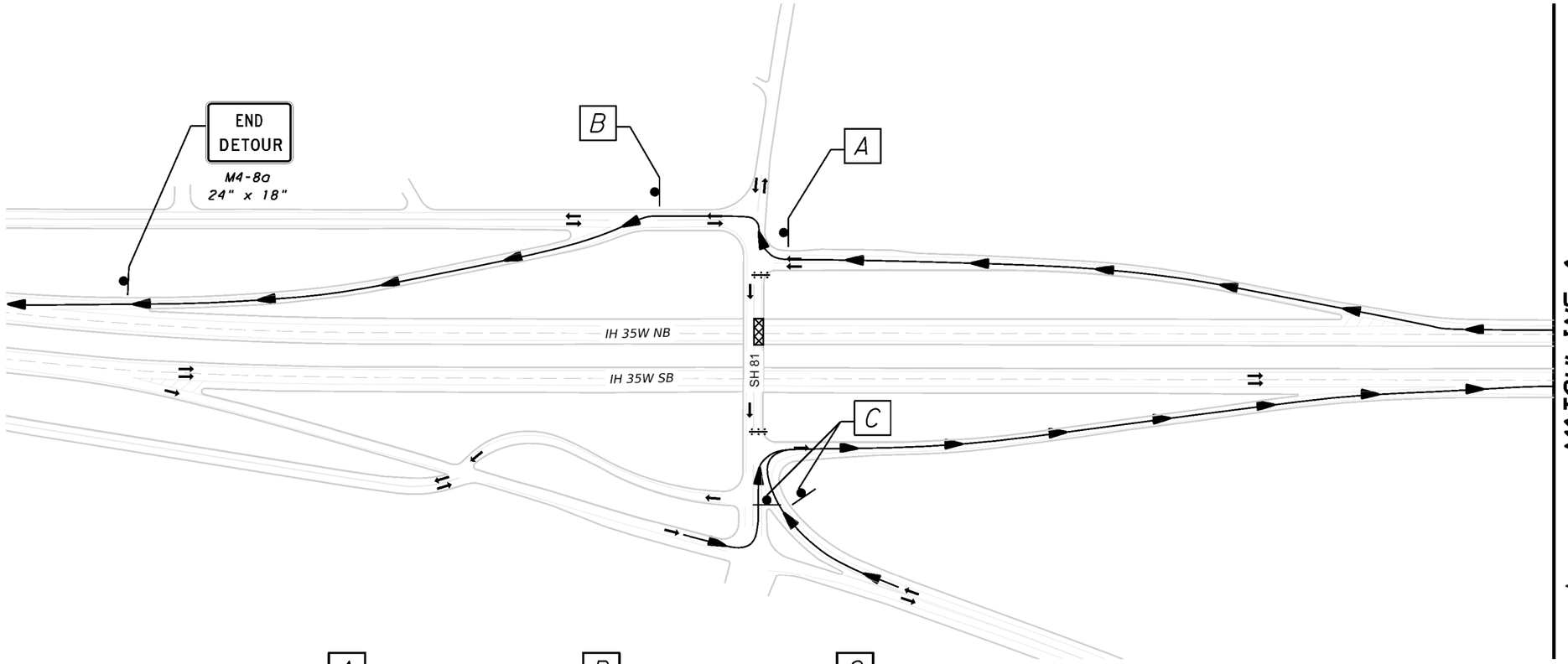

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)
- DETOUR PATH

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

A		B		C	
DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"
NORTH	M3-3 24" X 12"	NORTH	M3-3 24" X 12"	NORTH	M3-3 24" X 12"
INTERSTATE 35W	M1-1 30" x 24"	INTERSTATE 35W	M1-1 30" x 24"	INTERSTATE 35W	M1-1 30" x 24"
⇧	M6-3 21" X 15"	↖	M6-2L 21" X 15"	⇨	M6-2L 21" X 15"

STATE OF TEXAS
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DETOUR LAYOUT

SH 81 AT IH 35W

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		13

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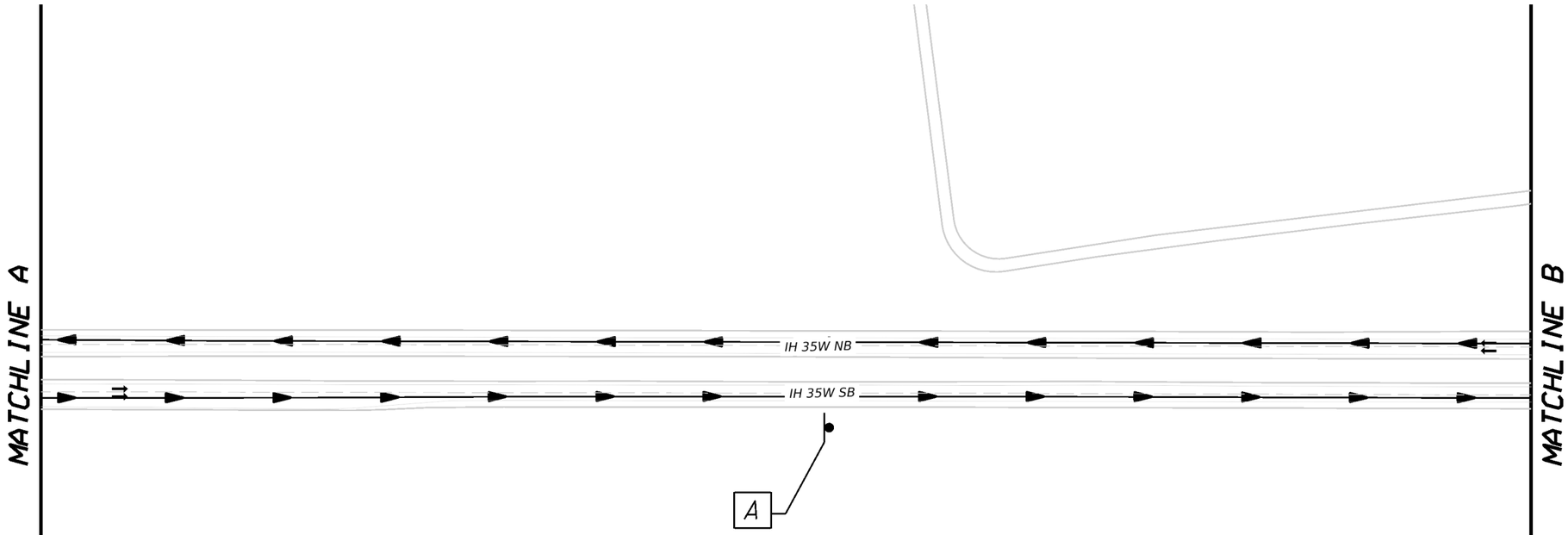

A

DETOUR	M4-8 24" X 12"
NORTH	M3-3 24" X 12"
INTERSTATE 35W	M1-1 30" x 24"
	M6-3 21" X 15"

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)
- DETOUR PATH

NOTES:

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DETOUR LAYOUT

SH 81 AT IH 35W

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		14

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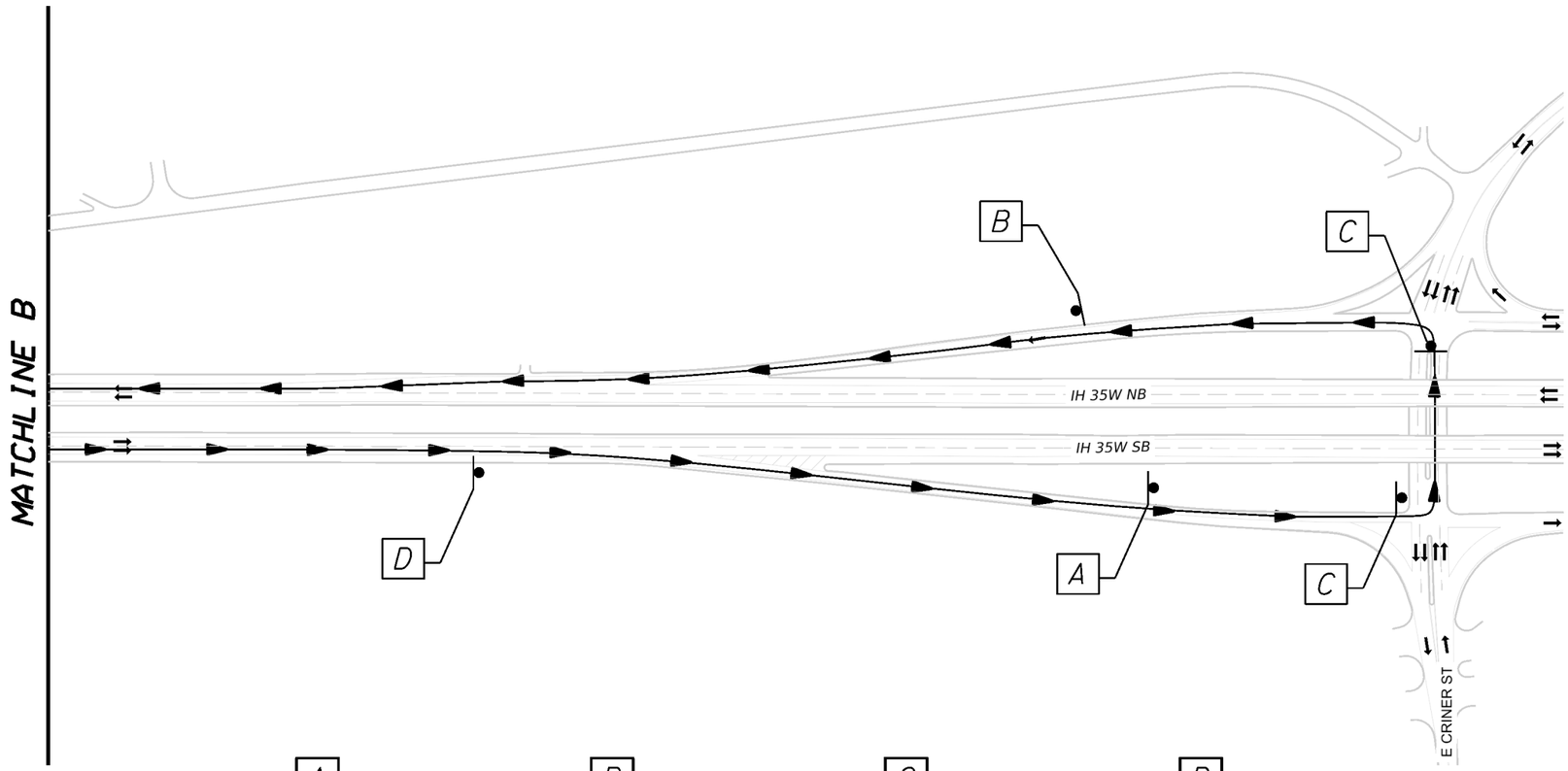

A		B		C		D	
DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"
NORTH	M3-3 24" X 12"	NORTH	M3-3 24" X 12"	NORTH	M3-3 24" X 12"	NORTH	M3-3 24" X 12"
INTERSTATE 35W	M1-1 30" x 24"	INTERSTATE 35W	M1-1 30" x 24"	INTERSTATE 35W	M1-1 30" x 24"	INTERSTATE 35W	M1-1 30" x 24"
	M6-3 21" X 15"		M6-2L 21" X 15"		M6-2L 21" X 15"		M6-2L 21" X 15"

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
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NOTES:

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Texas Department of Transportation

DETOUR LAYOUT

SH 81 AT IH 35W

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		15

DATE: 7/12/2023 2:18:14 PM
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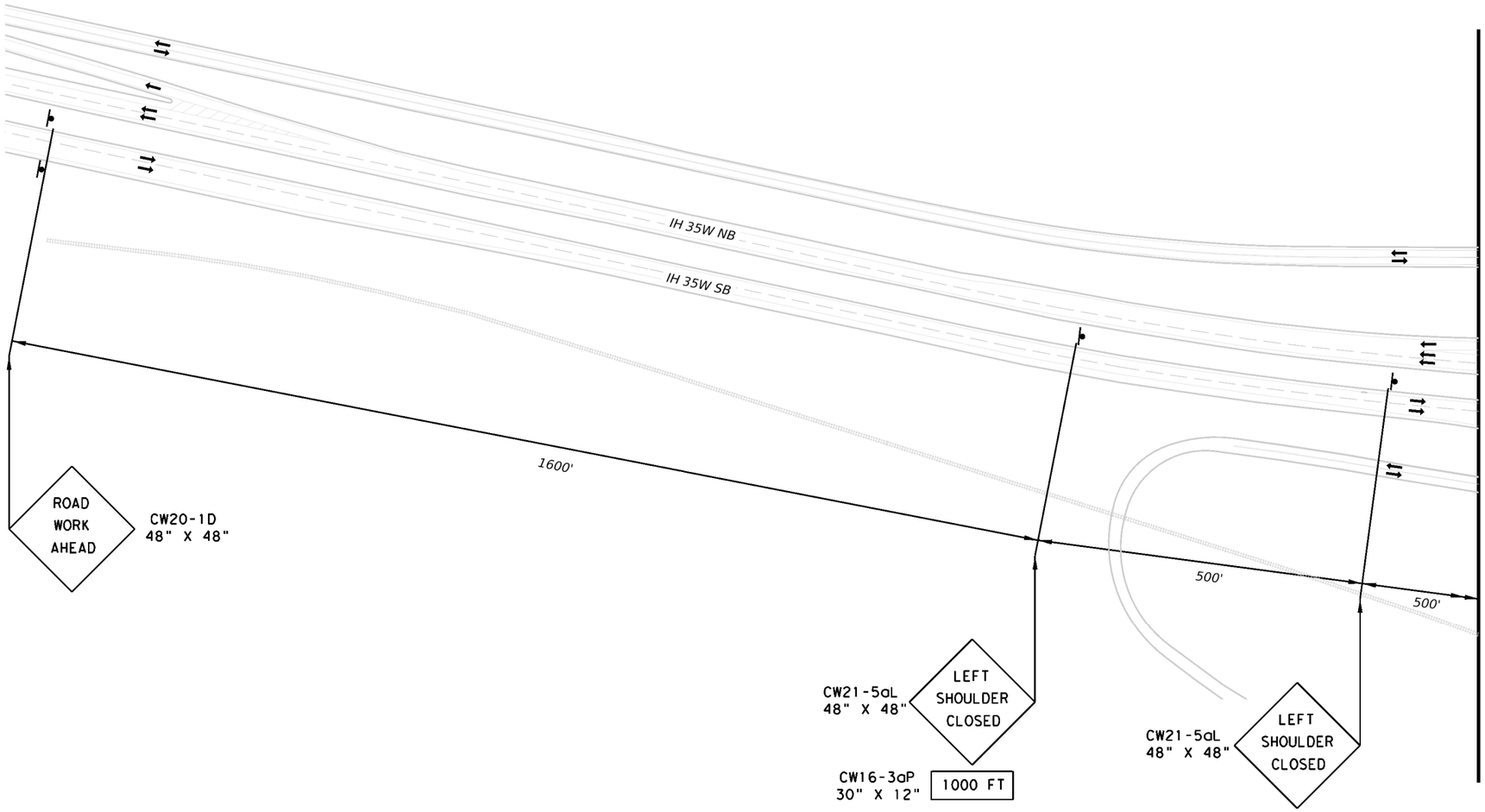

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
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- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
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NOTES:

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STATE OF TEXAS
07/13/2023

0 100 200
SCALE IN FEET

Texas Department of Transportation

TRAFFIC CONTROL PLAN

PHASE I STEP 2
SH 81 AT IH 35W

SHEET 1 OF 3

CONT.	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		16

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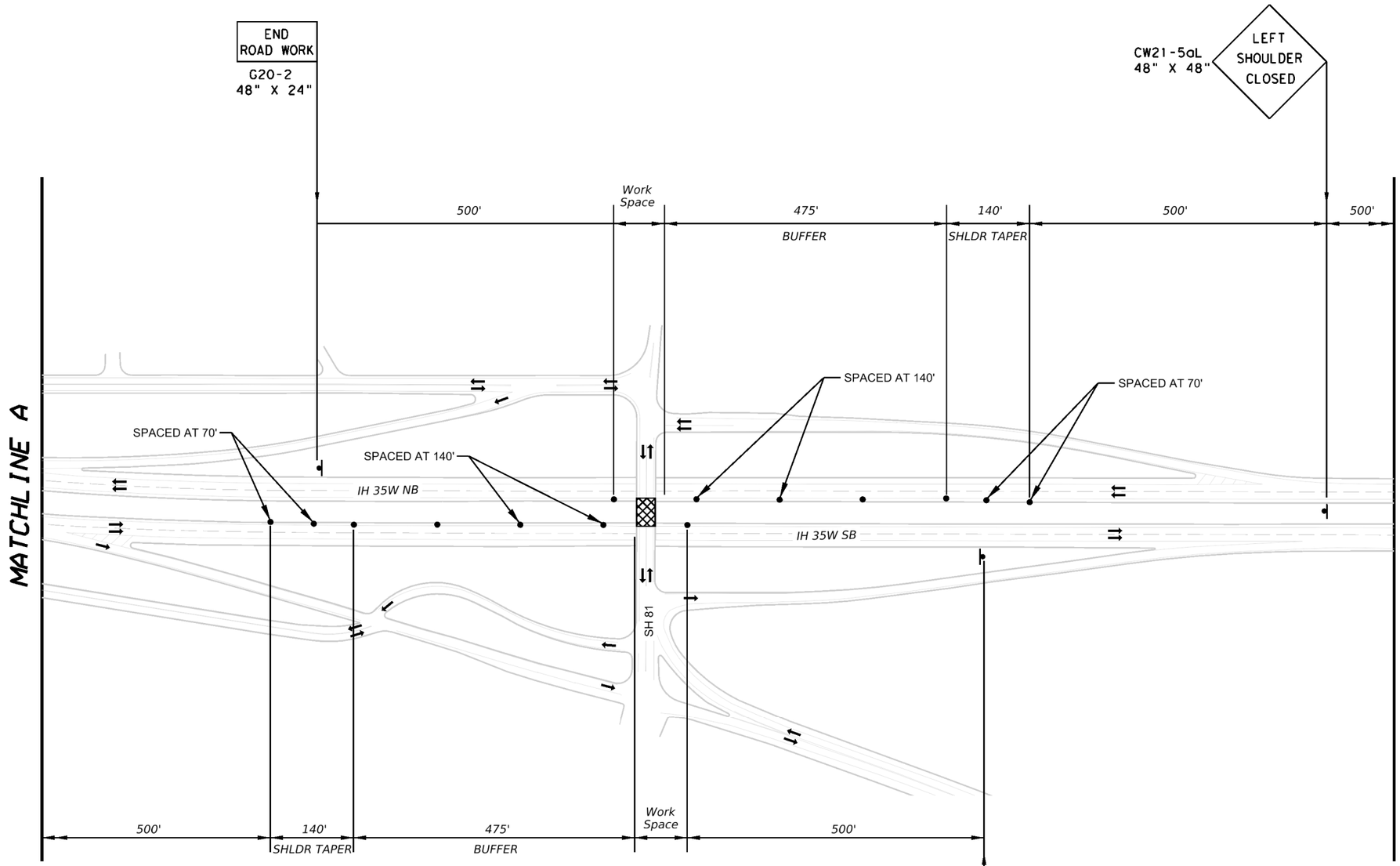

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)

NOTES:

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STATE OF TEXAS
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117326
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PROFESSIONAL ENGINEER

07/13/2023

0 100 200
SCALE IN FEET

Texas Department of Transportation

TRAFFIC CONTROL PLAN

PHASE I STEP 2
SH 81 AT IH 35W

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		17

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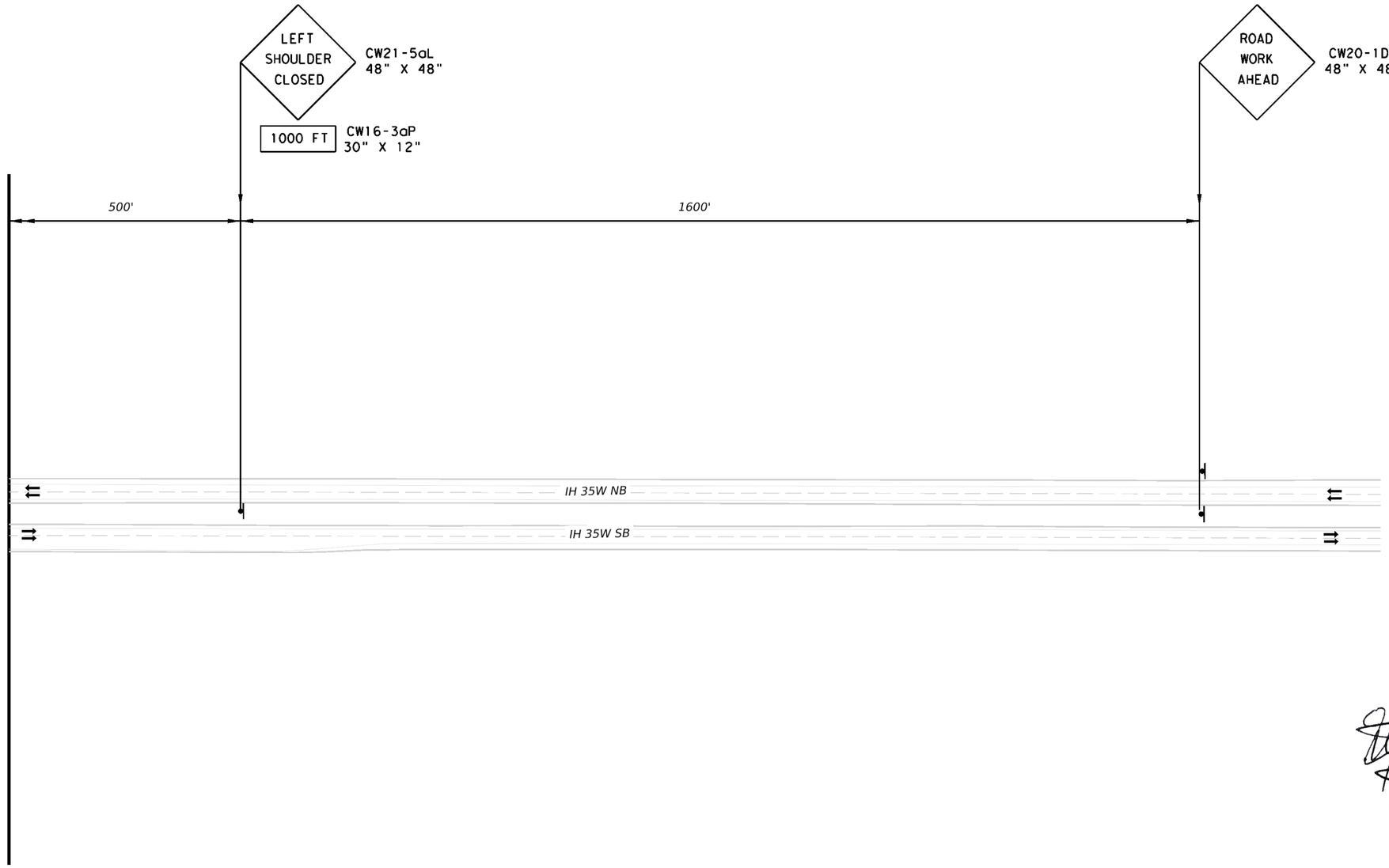

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

STATE OF TEXAS
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117326
LICENSED
PROFESSIONAL ENGINEER

07/13/2023

0 100 200
SCALE IN FEET

Texas Department of Transportation

TRAFFIC CONTROL PLAN

PHASE I STEP 2
SH 81 AT IH 35W

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		18

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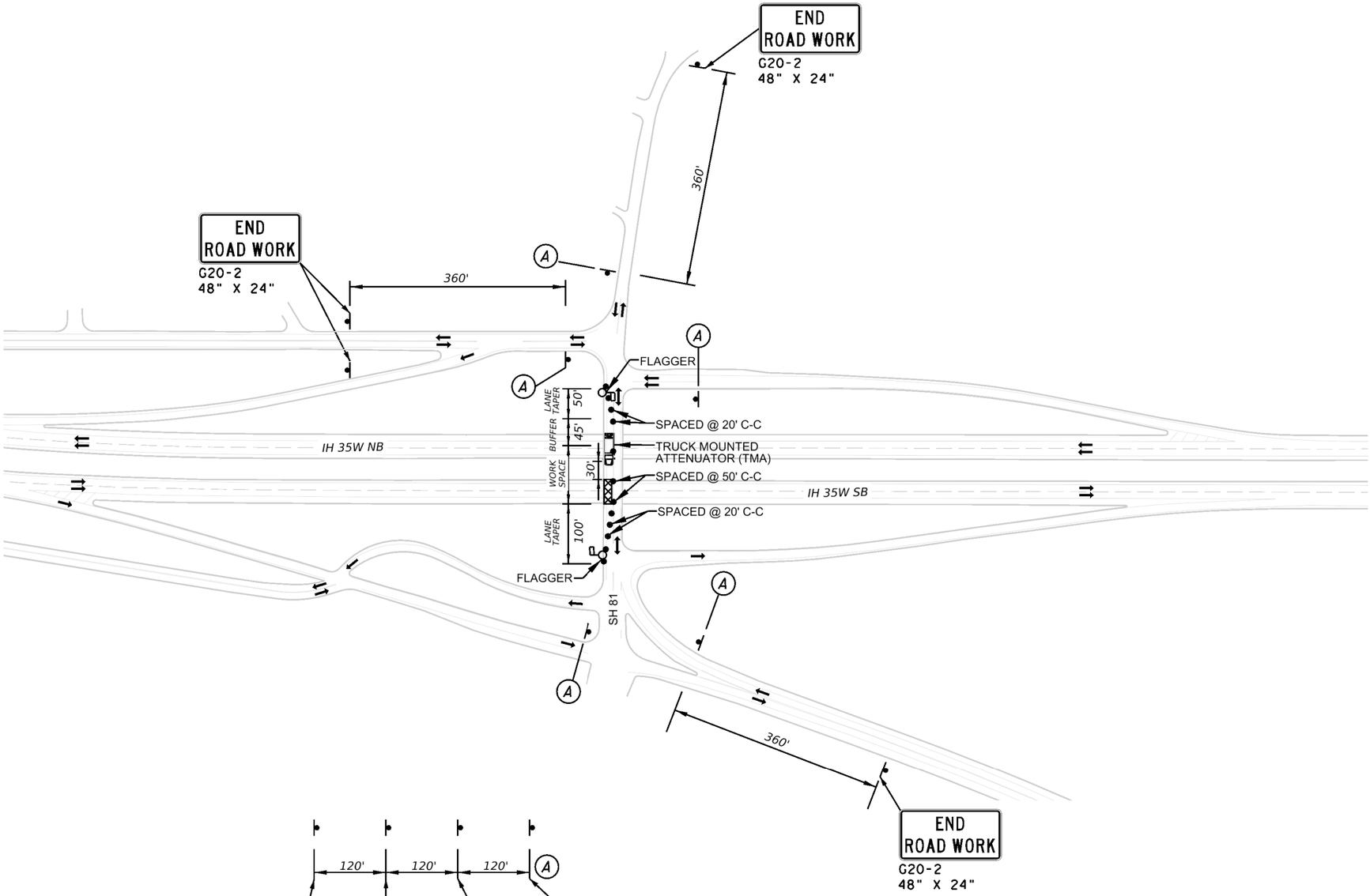

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

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0 100 200
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TRAFFIC CONTROL PLAN

PHASE I STEP 4
SH 81 AT IH 35W

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		19

DATE: 7/14/2023 8:51:12 AM
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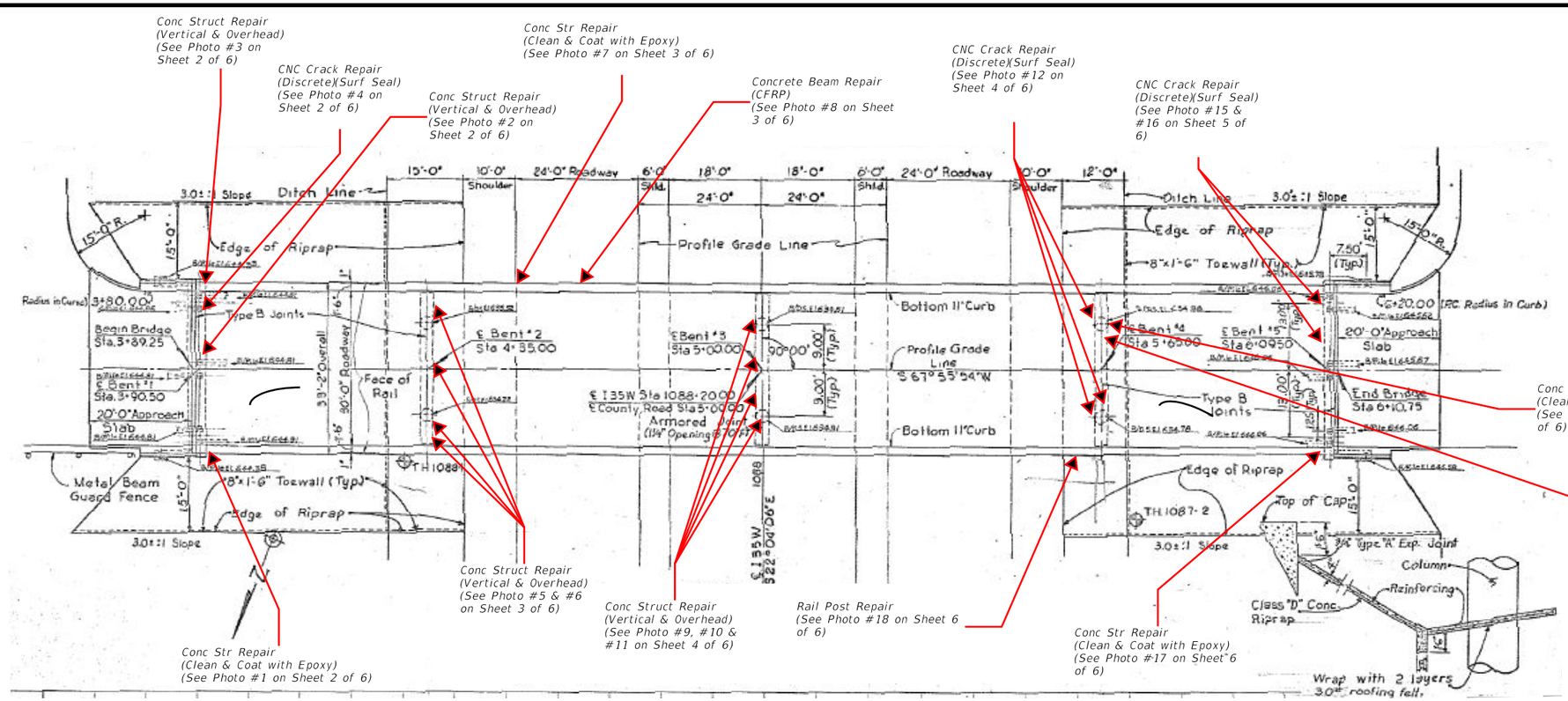
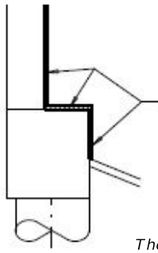
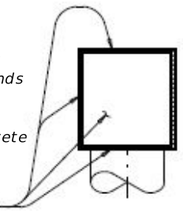




The front face of backwall and cap, top of cap except under bearing areas, and ends shall be treated according to Item 428,"Penetrating Concrete Surface Treatment".

ABUTMENT

Abut #1 = 30 SY
Abut #5 = 30 SY



The top, except under bearing areas, bottom, sides, and ends, shall be treated according to Item 428 "Penetrating Concrete Surface Treatment".

INTERIOR BENT

Bent #2 = 41 SY
Bent #3 = 41 SY
Bent #4 = 41 SY

GENERAL NOTES:

1. Provide Class "C" concrete (f'c = 3,000 Psi).
2. Additional damages incurred by the contractor during removal or repairs shall be at the contractor's expense.
3. Contractor to field verify dimensions of proposed repairs and notify EOR of any differences before commencing work.

ESTIMATED QUANTITIES

Items	Description		Total
0428 6001	Penetrating Concrete Surface Treatment	SY	183
0429 6001	Concrete Str Repair (Clean & Coat with Epoxy)	SF	20
0429 6007	Concrete Str Repair (Verical & Overhead)	SF	55
0776 6049	Repair (Stl Post W/Doubled W-Beams-T6)	EA	2
0780 6010	CNC Crack Repair (Discrete)(Surf Seal)	LF	32
0788 6002	Concrete Beam Repair (CFRP)	EA	1

CONCRETE SURFACE TREATMENT DETAIL

The caps shall be cleaned of debris of foreign materials before shot or abrasive blasting and application of waterproofing treatment per Item 428. dumping removed materials onto the riprap is not allowed. Debris and materials removed from the caps shall be removed from the site.

NBI#: 02-127-0-0014-22-293

SHEET 1 OF 6

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Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

SH 81 @ IH 35W

		DN: SI	CK: MC	DW: GC/SR	CK: MC/SR		
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0902	90	300	VARIOUS			
	DIST	COUNTY		SHEET NO.			
	02	TARRANT, ETC		20			

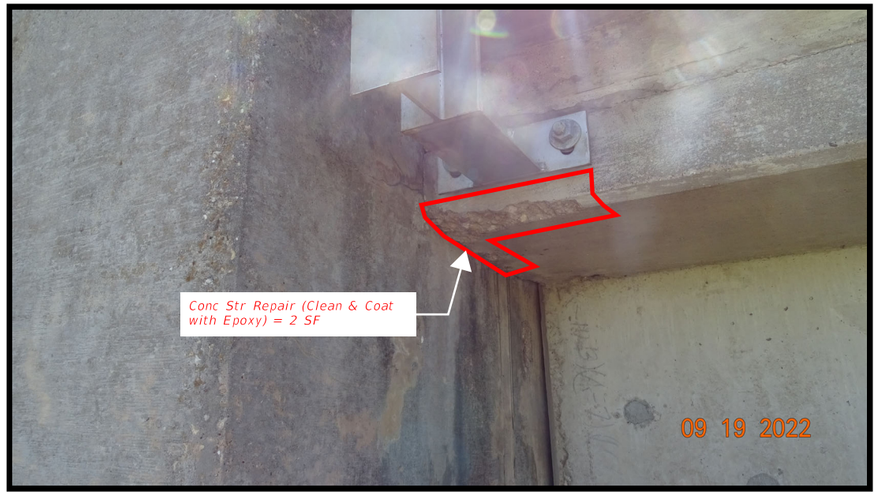

PHOTO 1
Beam #4

PHOTO 2
Abutment #1

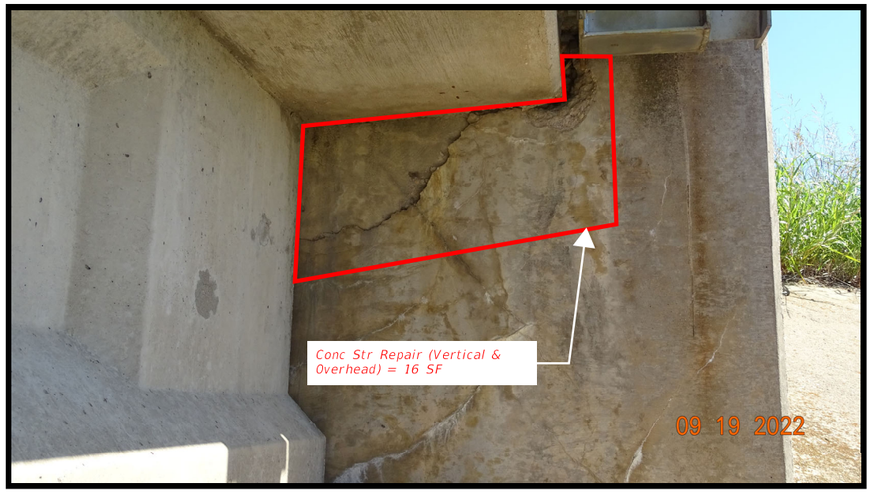

PHOTO 3
Abutment #1

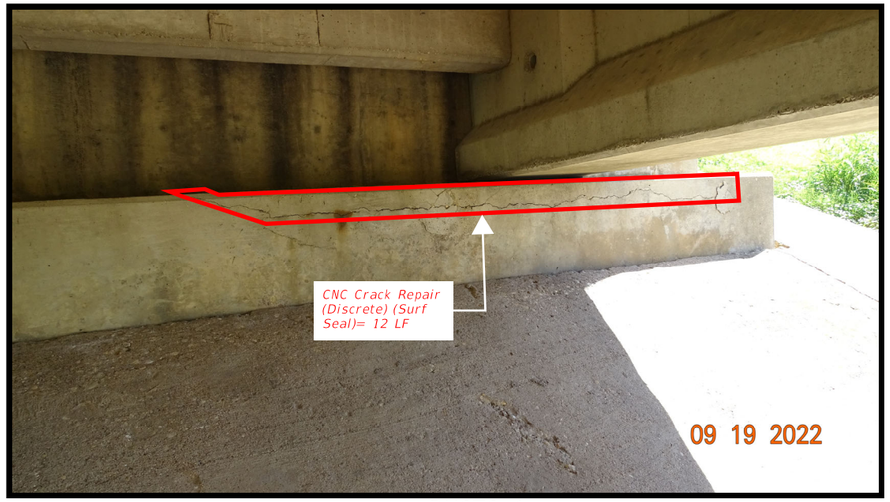

PHOTO 4
Abutment #1

NBI#: 02-127-0-0014-22-293

SHEET 2 OF 6

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Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

SH 81 @ IH 35W

DN: SI	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		21

PHOTO 5
Bent #2

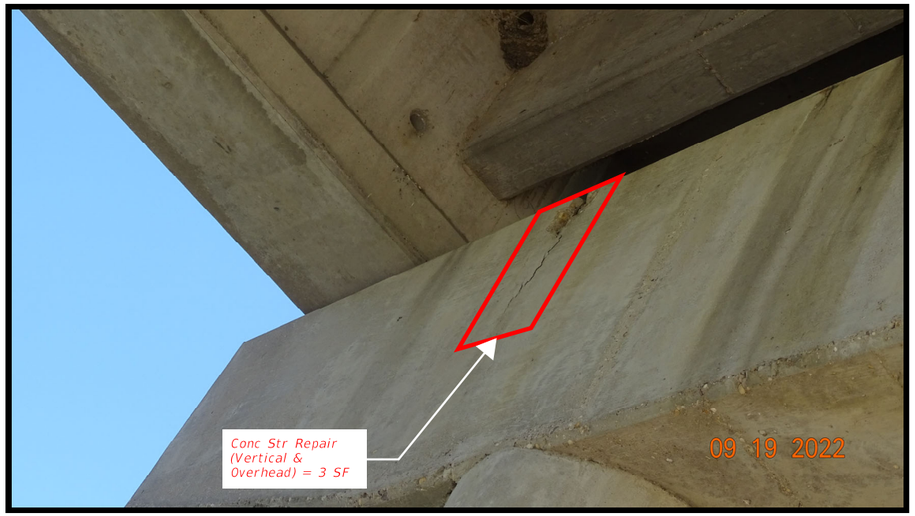

PHOTO 6
Bent #2

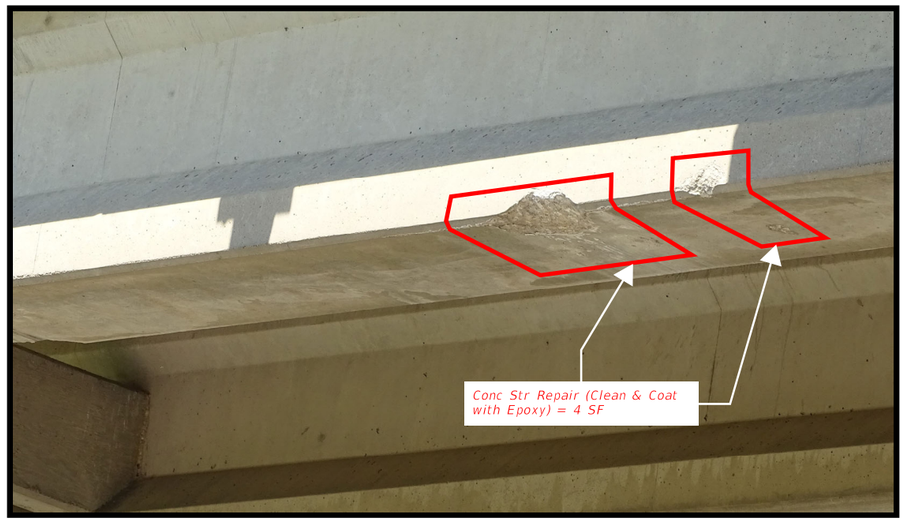

PHOTO 7
Beam #1

PHOTO 8
Beam #1

NBI#: 02-127-0-0014-22-293

SHEET 3 OF 6

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Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

SH 81 @ IH 35W

	DN: SI	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		22

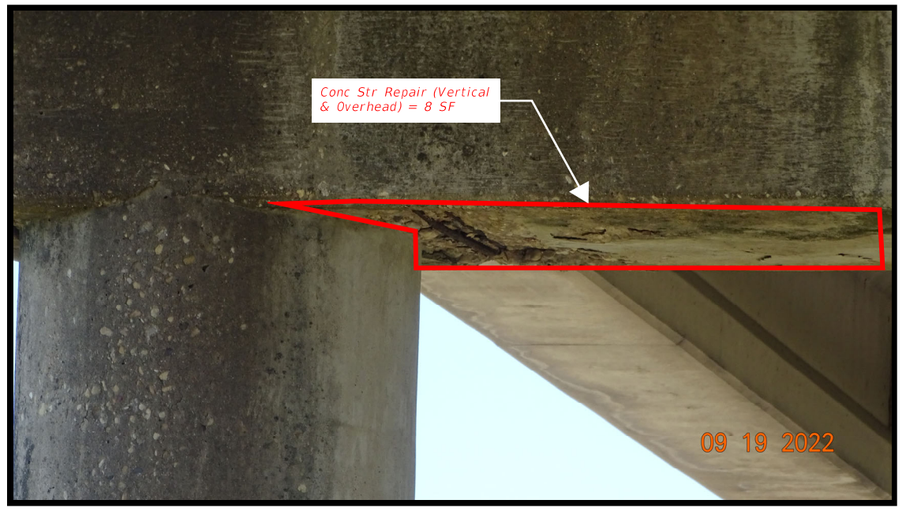

PHOTO 9
Bent #3

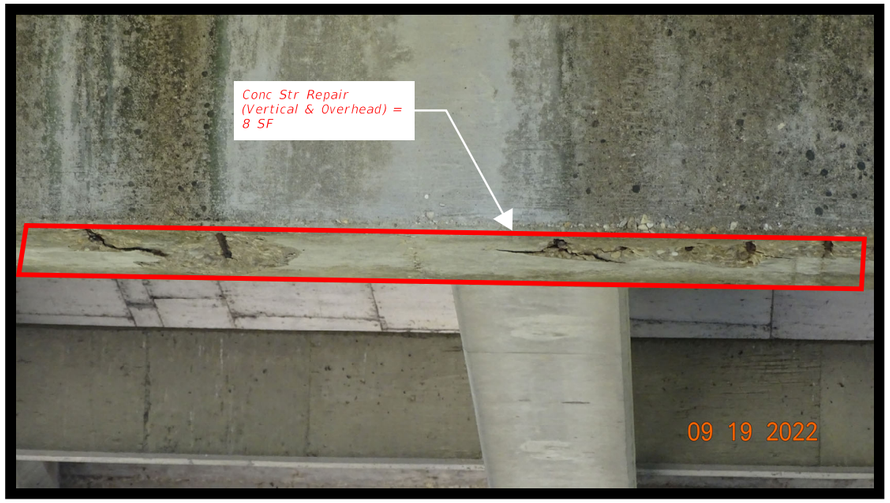

PHOTO 10
Bent #3

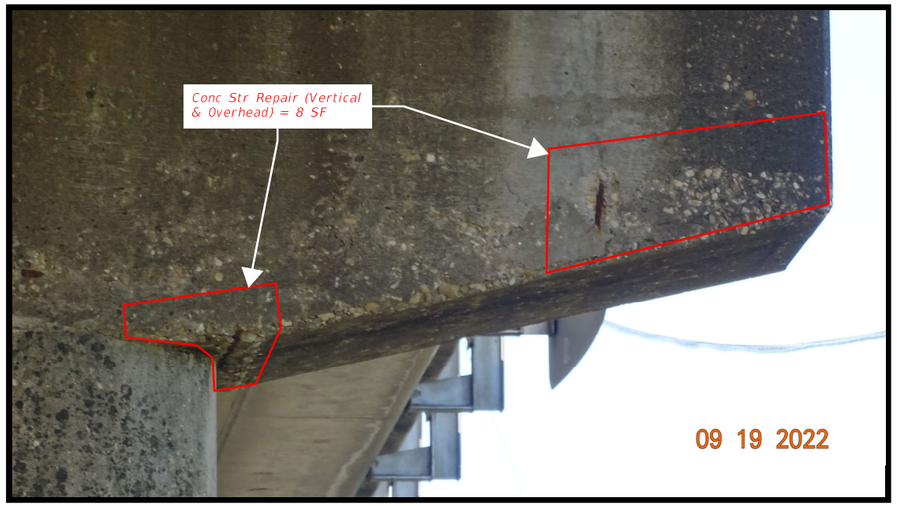

PHOTO 11
Bent #3

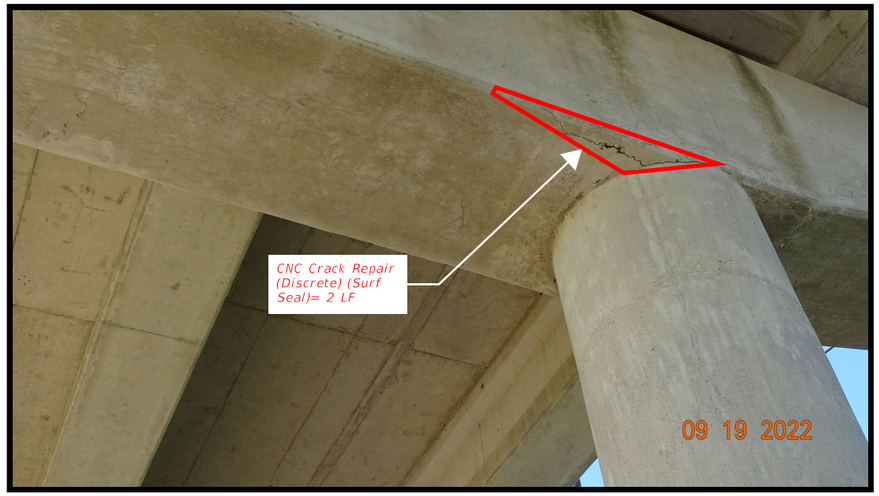

PHOTO 12
Bent #4 (Typ)

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SHEET 4 OF 6

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MISCELLANEOUS BRIDGE REPAIRS

SH 81 @ IH 35W

DN: SI	CK: MC	DW: GC/SR	CK: MC/SR
© TxDOT 07-10-23 REVISIONS			

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
02	TARRANT, ETC		23

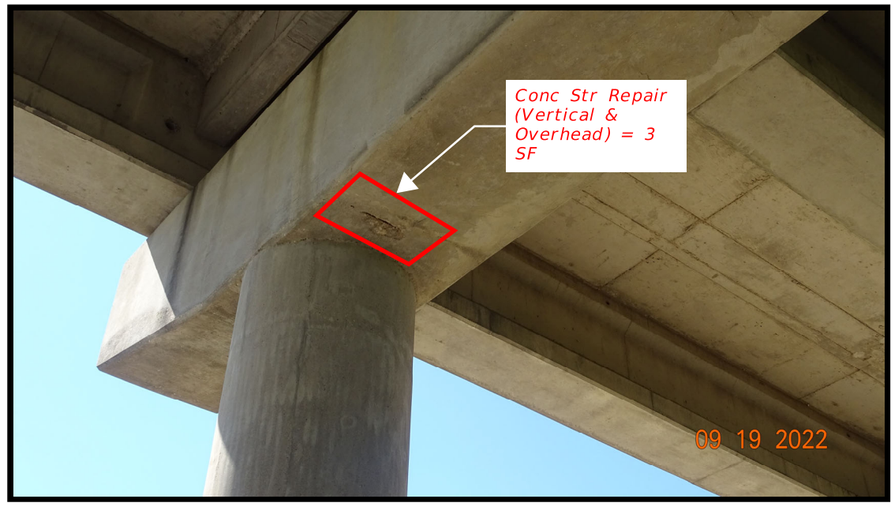

PHOTO 13
Bent #4

PHOTO 14
Bent #4

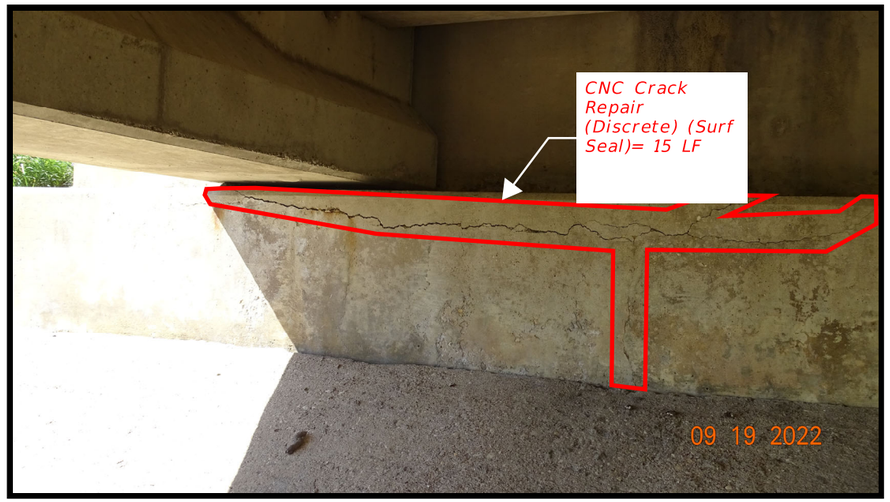

PHOTO 15
Abutment #5

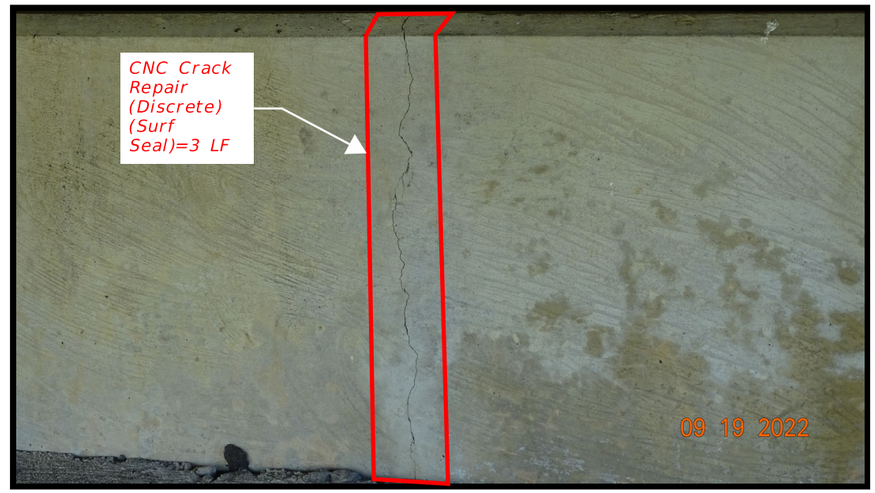

PHOTO 16
Abutment #5

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MISCELLANEOUS BRIDGE REPAIRS

SH 81 @ IH 35W

	DN: SI	CK: MC	DW: GC/SR	CK: MC/SR
© TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		24

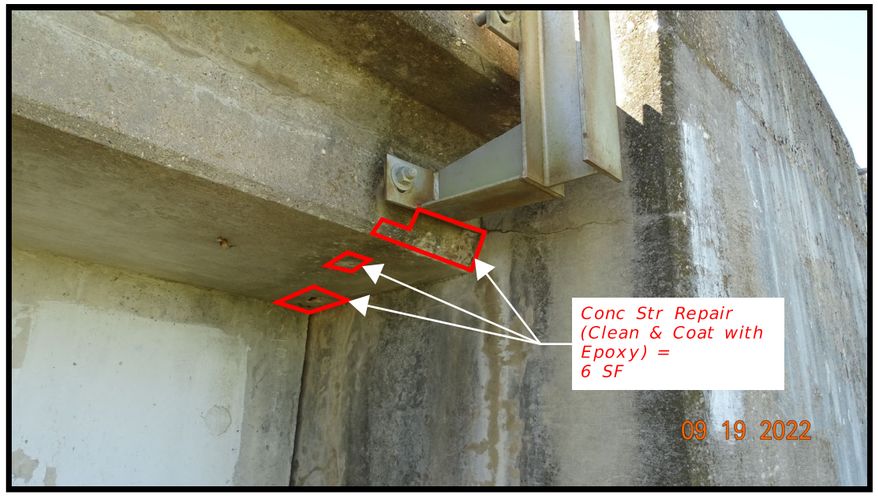

PHOTO 17
Abutment #5

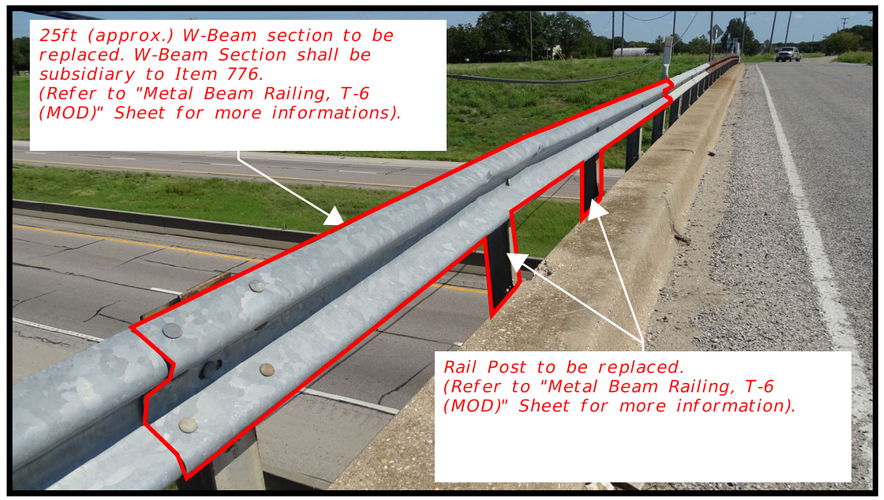

PHOTO 18
Bridge Rail

NBI#: 02-127-0-0014-22-293

SHEET 6 OF 6

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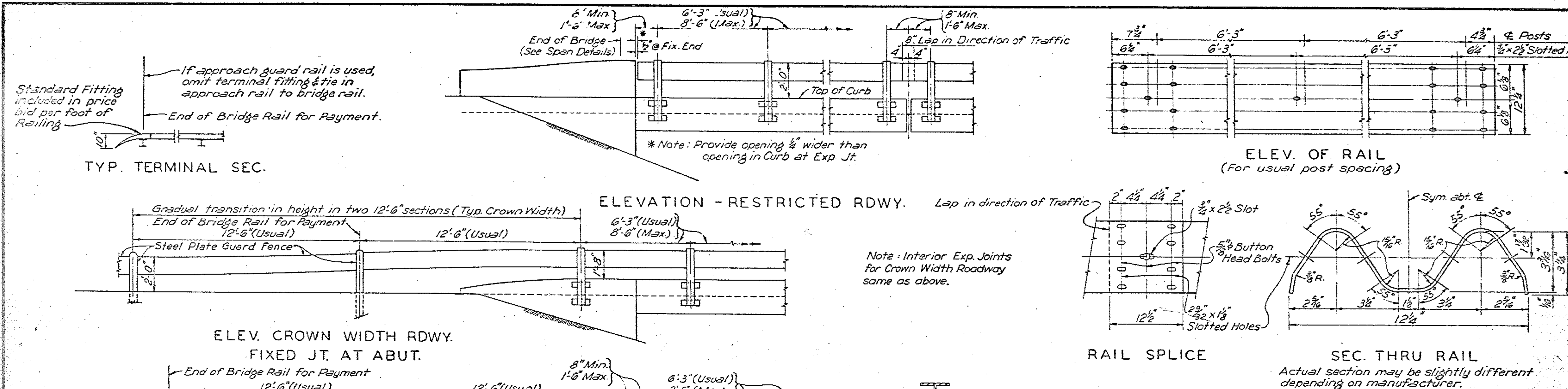
Fort Worth Bridge Design

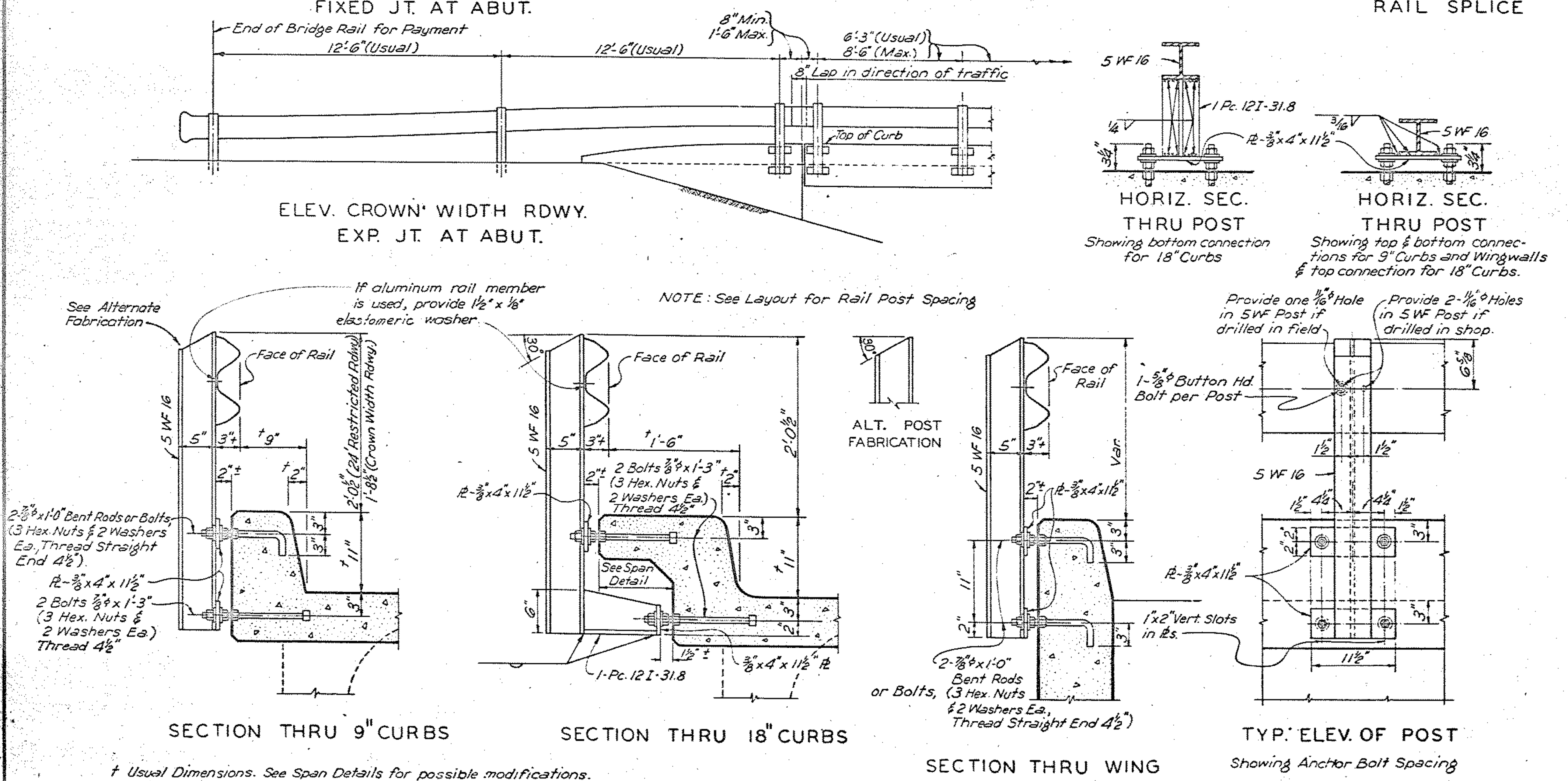
MISCELLANEOUS BRIDGE REPAIRS

SH 81 @ IH 35W

	DN: SI	CK: MC	DW: GC/SR	CK: MC/SR
© TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		25



NOTE: Elastomeric washers may be neroprene rubberasbetos, rubber fabric or any other elastome[ric] product having a durometer hardness between 70 and 100 as certified by the manufacturer.



For Contractor's Reference only
(Str# 02-127-0-0014-22-293)

GENERAL NOTES:-

All anchorage provisions, including bolts, nu[ts] and washers are considered as parts of the raili[ng].

The lower anchor bolts for posts at the acu[te] angle ends of skewed spans shall be bent as requ[ired] to provide a maximum penetration of bolt into slab and to provide a minimum cover of 1½" on the ...

Horizontal rail member may be spliced at al[ter]nate posts or at points other than at posts on structure only.

All posts shall be set vertically.

Anchor Bolts (or Rods), Nuts & Washers sh[all] be galvanized.

At the Contractor's option, this railing may be galva[nized] in lieu of painting. If galvanizing is selected, all parts o[f] railing including posts, bolts and fittings must be galvaniz[ed].

Where galvanized material is furnished, any dama[ge] to the protective coating shall be repaired by the appli[ca]tion of "Galvalloy, AMCO No. 321, or ZRC" in accorda[nce] with manufacturer's recommendations.

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

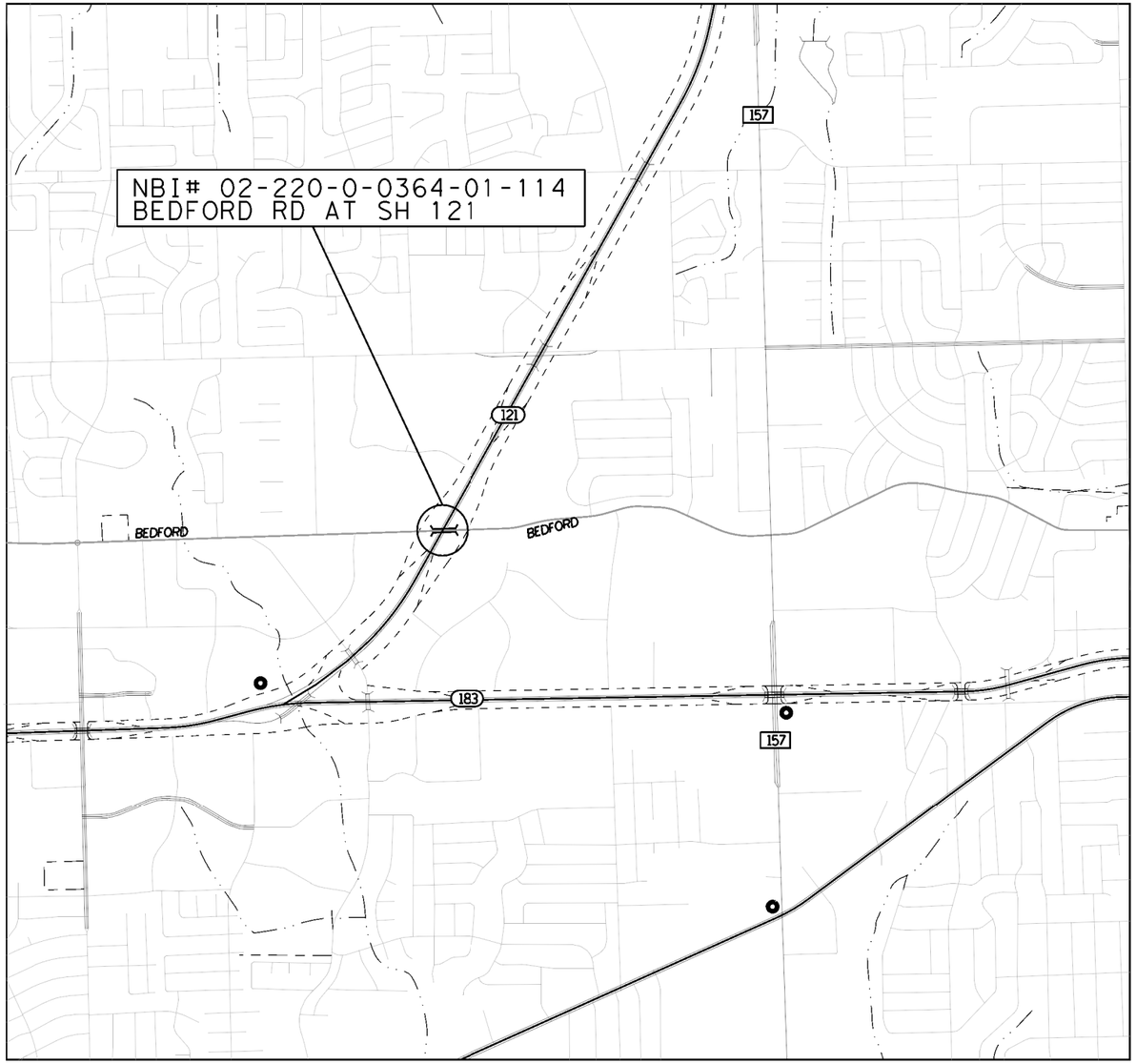
METAL BEAM RAILING

TYPE 6(MOD)

Dn. -R.L.R	DRAWING	DATE	FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.
Ck. Dn. -	ORIGINAL	AUG. '6?	6	TEXAS	I-35W-5(49)388
Dw. -GCK	Rev. June '62				
Ck. Dw. -R.L.R	Rev. June '63				
Tr. -			2		
Ck. Tr. -					

TYPE 6 (MOD) (METAL BEAM RAILING)
SHEET NO.
26

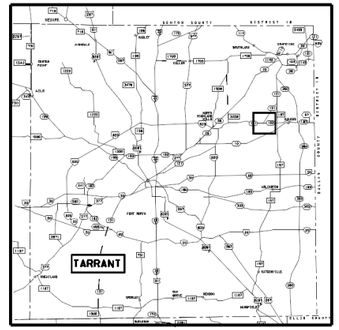
CK
DW
CK
DW



LOCATION MAP

N.T.S.

TARRANT COUNTY



NBI# 02-220-0-0364-01-114

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2024 BEAM REPAIR LOCATION MAP

BEDFORD RD AT SH 121

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		27

DATE: 7/12/2023 2:19:42 PM
FILE: c:\txdotpw onlinetxdot2\brandon.borinald0752662\2024 BEAM REPAIR LOCATION MAP BEDFORD RD AT SH 121.dgn

PHASE I STEP 1 -BEDFORD RD AT NB SH 121

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.

2. SET UP THE EB BEDFORD RD CLOSURE BY CLOSING THE OUTSIDE LANE ACCORDING TO THE TRAFFIC CONTROL PLAN.

3. SET UP THE NB SH 121 AT BEDFORD RD CLOSURE BY CLOSING THE INSIDE LANE ACCORDING TO TCP (6-1A) -12.

4. PERFORM THE BRIDGE REPAIR WORK AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR BEDFORD RD AT NB SH 121.

5. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

PHASE I STEP 2 -BEFORD RD AT SB SH 121

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.

2. EB BEDFORD RD OUTSIDE LANE CLOSURE REMAINS.

3. SET UP THE SB SH 121 AT BEDFORD RD CLOSURE BY CLOSING THE OUTSIDE LANE AS SHOWN ON THE TRAFFIC CONTROL PLAN.

4. CLOSE OUTSIDE SB SH 121 EXIT RAMP LANE AT MURPHY DR AS SHOWN ON THE TRAFFIC CONTROL PLAN. INSIDE SB SH 121 EXIT RAMP LANE AT MURCHY DR REMAINS OPEN.

5. CLOSE THE SB SH 121 ENTRANCE RAMP AT HARWOOD RD ON RAMP AS SHOWN TO THE TRAFFIC CONTROL PLAN.

6. PERFORM THE BRIDGE REPAIR WORK AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR BEDFORD RD AT SB SH 121.

7. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

PHASE I STEP 1 -BEDFORD RD AT NB SH 121

1. NB SH 121 MAINLANES TRAFFIC CONTINUES ON TWO OUTSIDE MAINLANES. THE SB SH 121 TRAFFIC REMAINS UNDISTURBED.

2. EB BEDFORD RD TRAFFIC CONTINUES ON THE INSIDE LANE. WB BEDFORD RD TRAFFIC REMAINS UNDISTURBED.

PHASE I STEP 2 -BEDFORD RD AT SB SH 121

1. SB SH 121 TRAFFIC CONTINUES ON THE TWO OUTSIDE MAINLANES. NB SH 121 TRAFFIC REMAINS UNDISTURBED.

2. EB BEDFORD RD TRAFFIC CONTINUES ON THE INSIDE LANE. WB BEDFORD RD TRAFFIC REMAINS UNDISTURBED.

3. THE OUTSIDE SB SH 121 EXIT RAMP LANE AT MURPHY DR REMAINS CLOSED.

4. THE SB SH 121 ENTRANCE RAMP AT HARWOOD RD REMAINS CLOSED.

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SEQUENCE OF WORK

BEDFORD RD. AT SH 121

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		28

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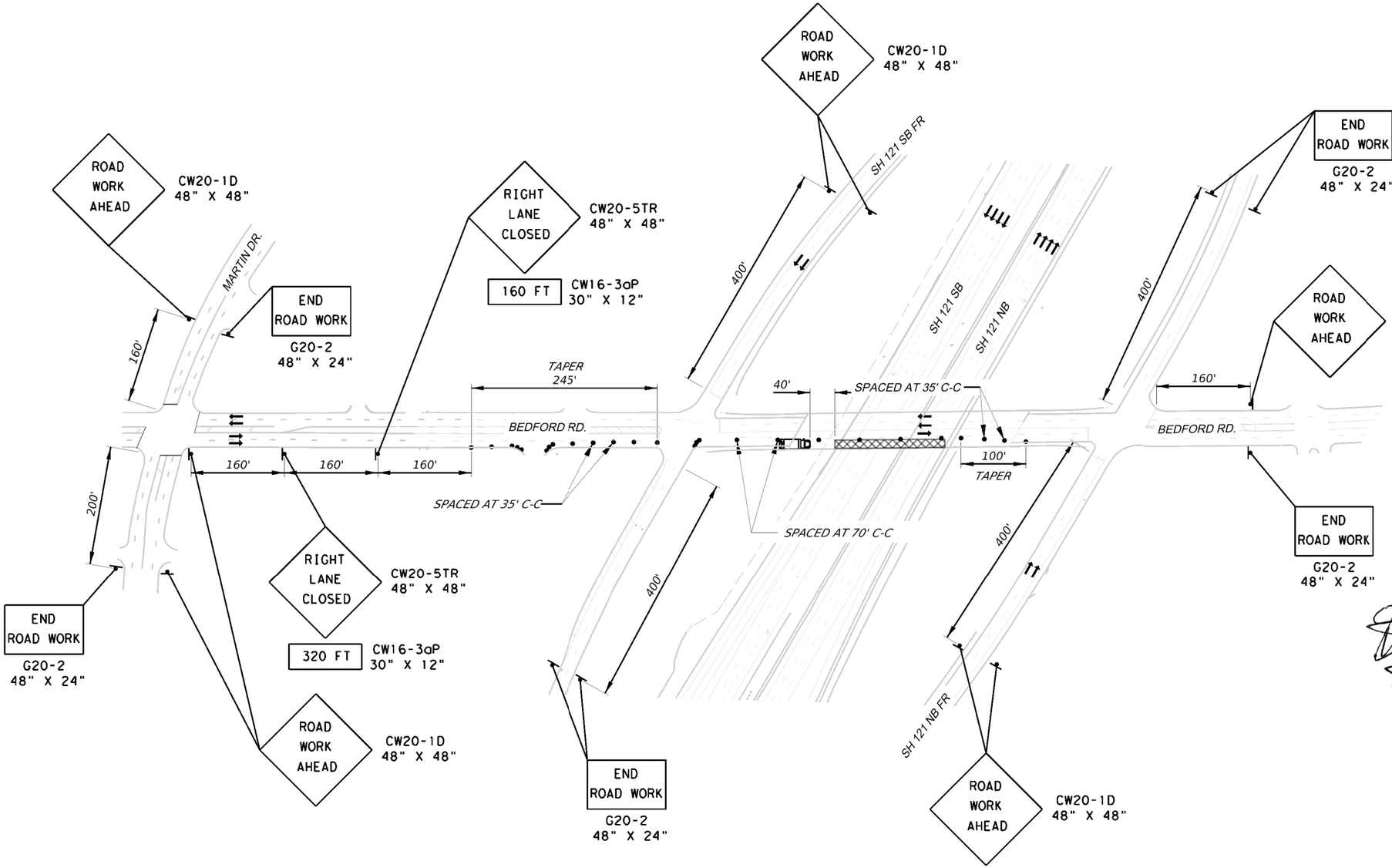

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)
- DETOUR PATH

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

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0 100 200
SCALE IN FEET

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TRAFFIC CONTROL PLAN

PHASE I STEP 1
BEDFORD RD. AT
SH 121

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		29

DATE: 7/12/2023 2:20:07 PM
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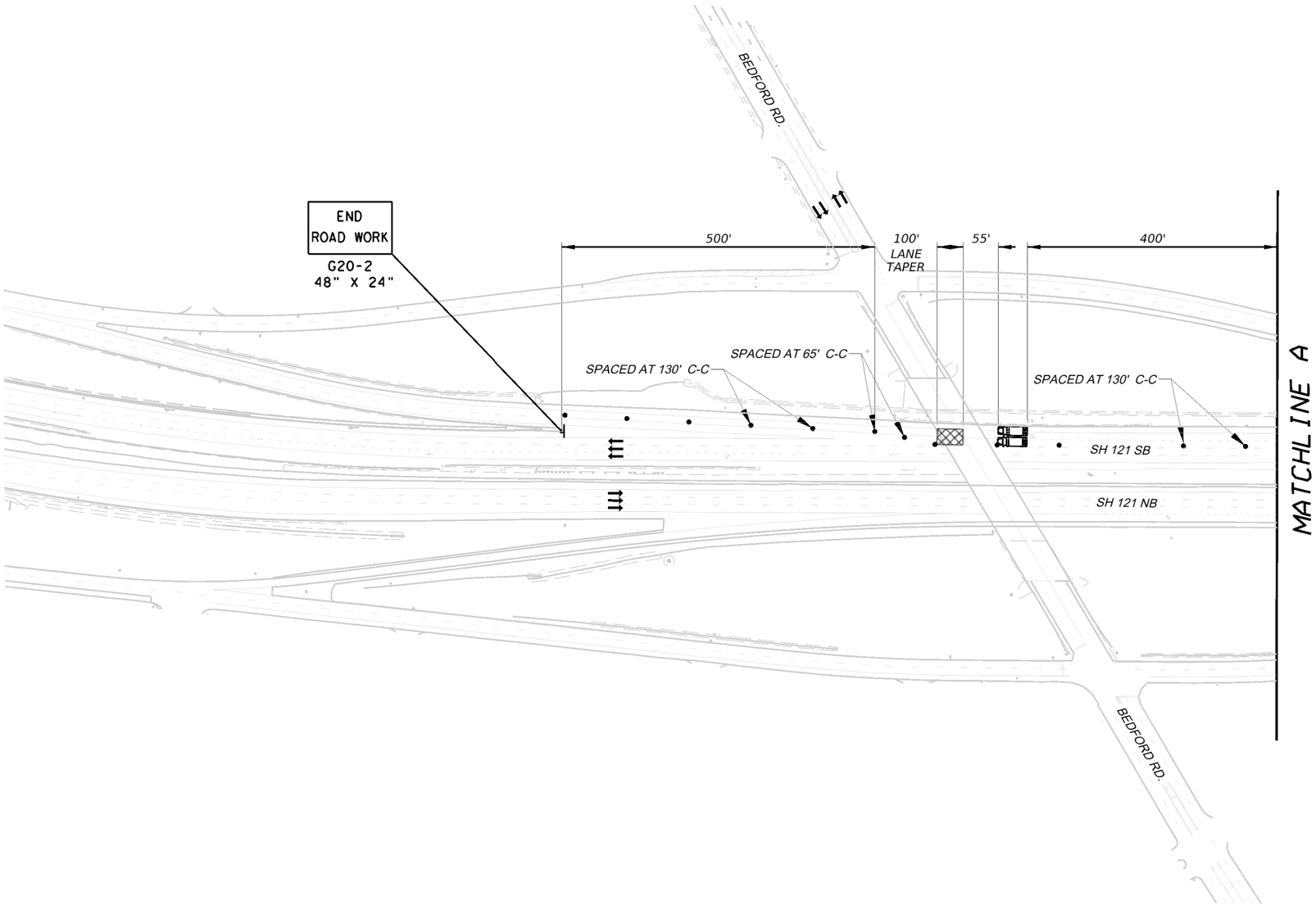

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)
- DETOUR PATH

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

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SCALE IN FEET

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TRAFFIC CONTROL PLAN

PHASE I STEP 2
BEDFORD RD. AT
SH 121

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		30

DATE: 7/12/2023 2:20:20 PM
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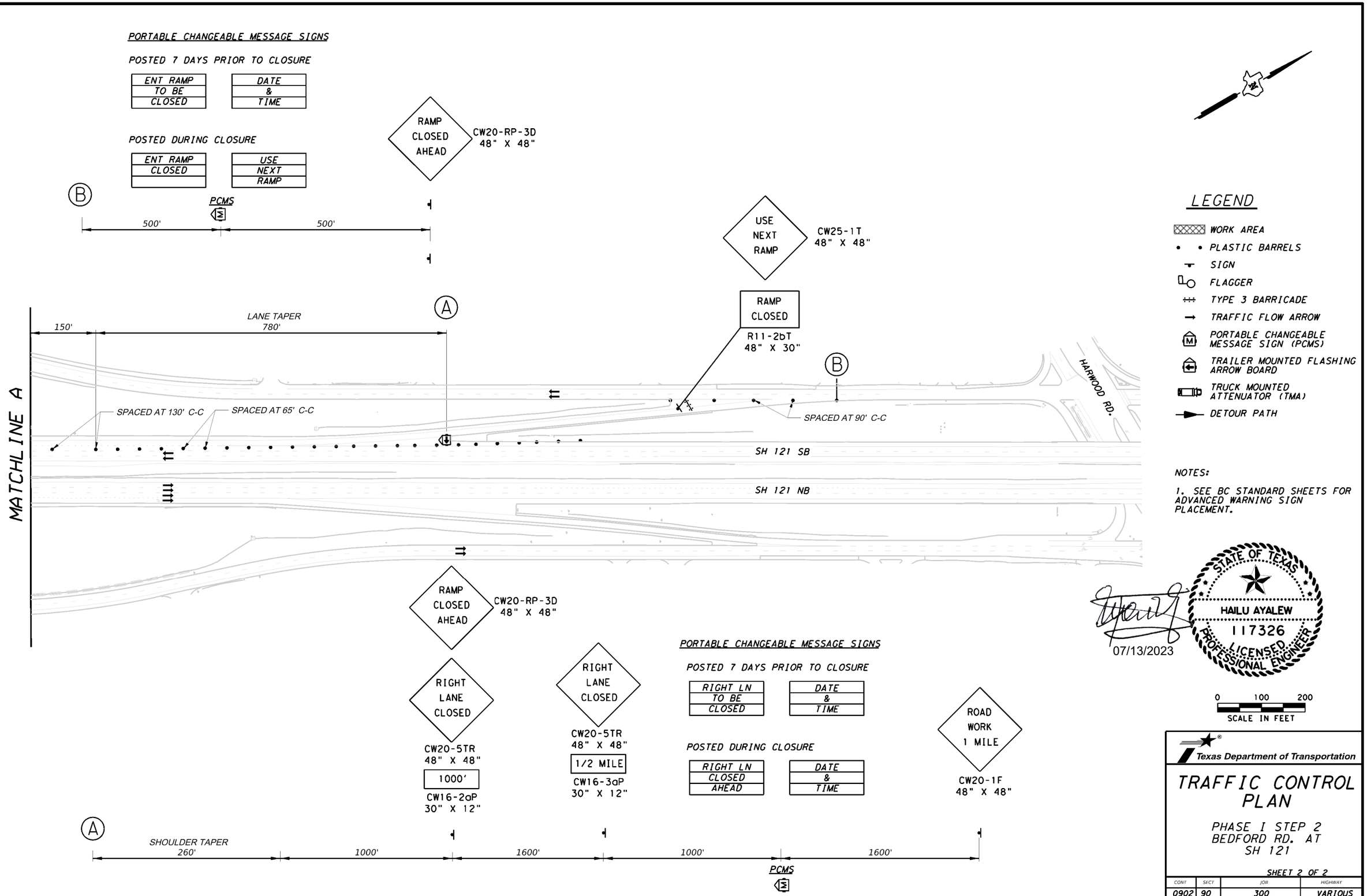

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
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- DETOUR PATH

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

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07/13/2023

0 100 200
SCALE IN FEET

Texas Department of Transportation

TRAFFIC CONTROL PLAN

PHASE I STEP 2
BEDFORD RD. AT
SH 121

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		31

DATE: 7/14/2023 8:57:10 AM
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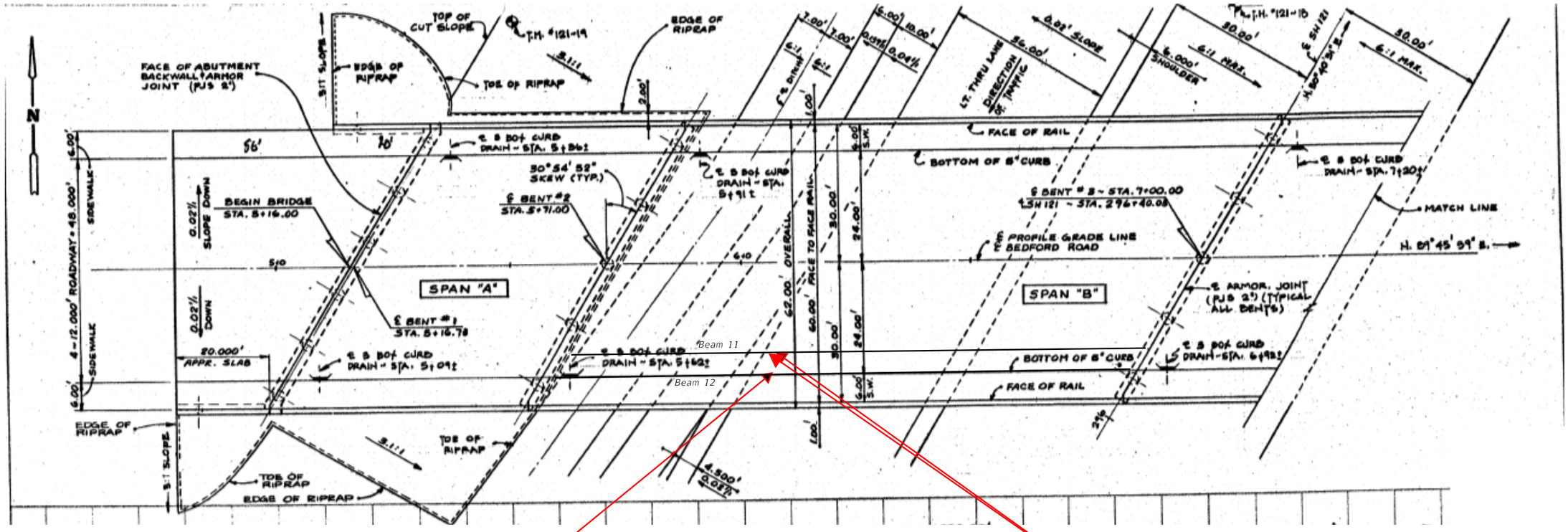

Concrete Beam Repair (CFRP) (See Photo 2-A and 2-B)

Conc Str Repair (Clean & Coat with Epoxy) (See Photo 2-A and 2-B)

PLAN

NOTE:

See "Beam Repair CFRP Details" sheet for additional information.

NBI#: 02-220-0-0364-01-114

SHEET 1 OF 3

ESTIMATED QUANTITIES

	Description		Total
0429-6001	Conc Str Repair (Clean & Coat with Epoxy)	SF	7
0788-6002	Concrete Beam Repair (CFRP)	EA	2

STATE OF TEXAS
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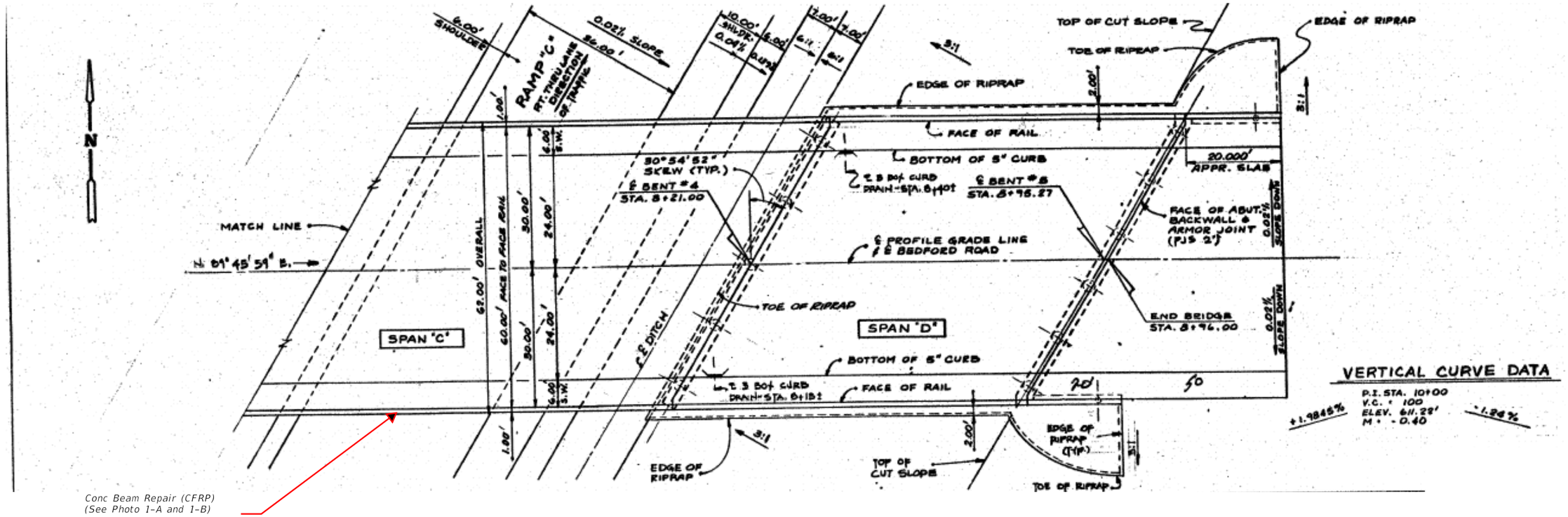
MISCELLANEOUS BRIDGE REPAIRS

BEDFORD RD. @ SH-121

DN: AW	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		32



Conc Beam Repair (CFRP)
(See Photo 1-A and 1-B)

PLAN

NOTE:

See "Beam Repair CFRP Details" sheet for additional information.

NBI#: 02-220-0-0364-01-114

SHEET 2 OF 3

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation
Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

BEDFORD RD. @ SH-121

	DN: AW	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		33

Concrete Beam Repair (CFRP)

PHOTO 1-A
(Showing beam damage at span 3)

PHOTO 1-B
(Showing beam damage at span 3)

Conc Str Repair (Clean & Coat with Epoxy) = 4 SF

Concrete Beam Repair (CFRP)

PHOTO 2-A
(Showing beam damage at span 2)

Conc Str Repair (Clean & Coat with Epoxy) = 3 SF

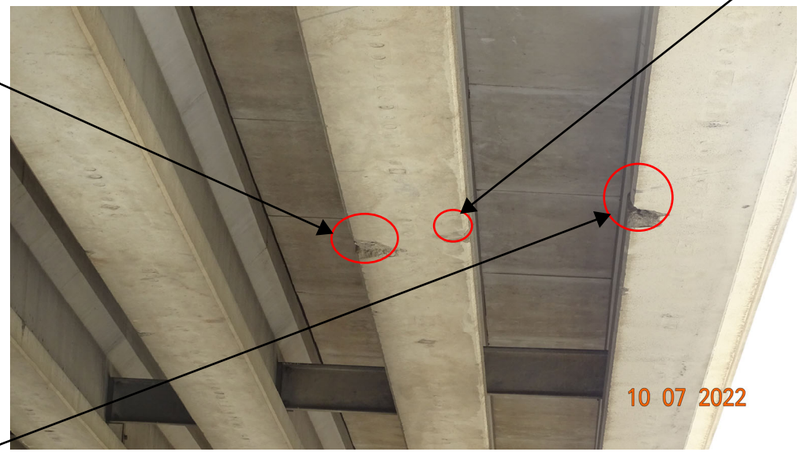


PHOTO 2-B
(Showing beam damage at span 2)

NBI#: 02-220-0-0364-01-114

SHEET 3 OF 3

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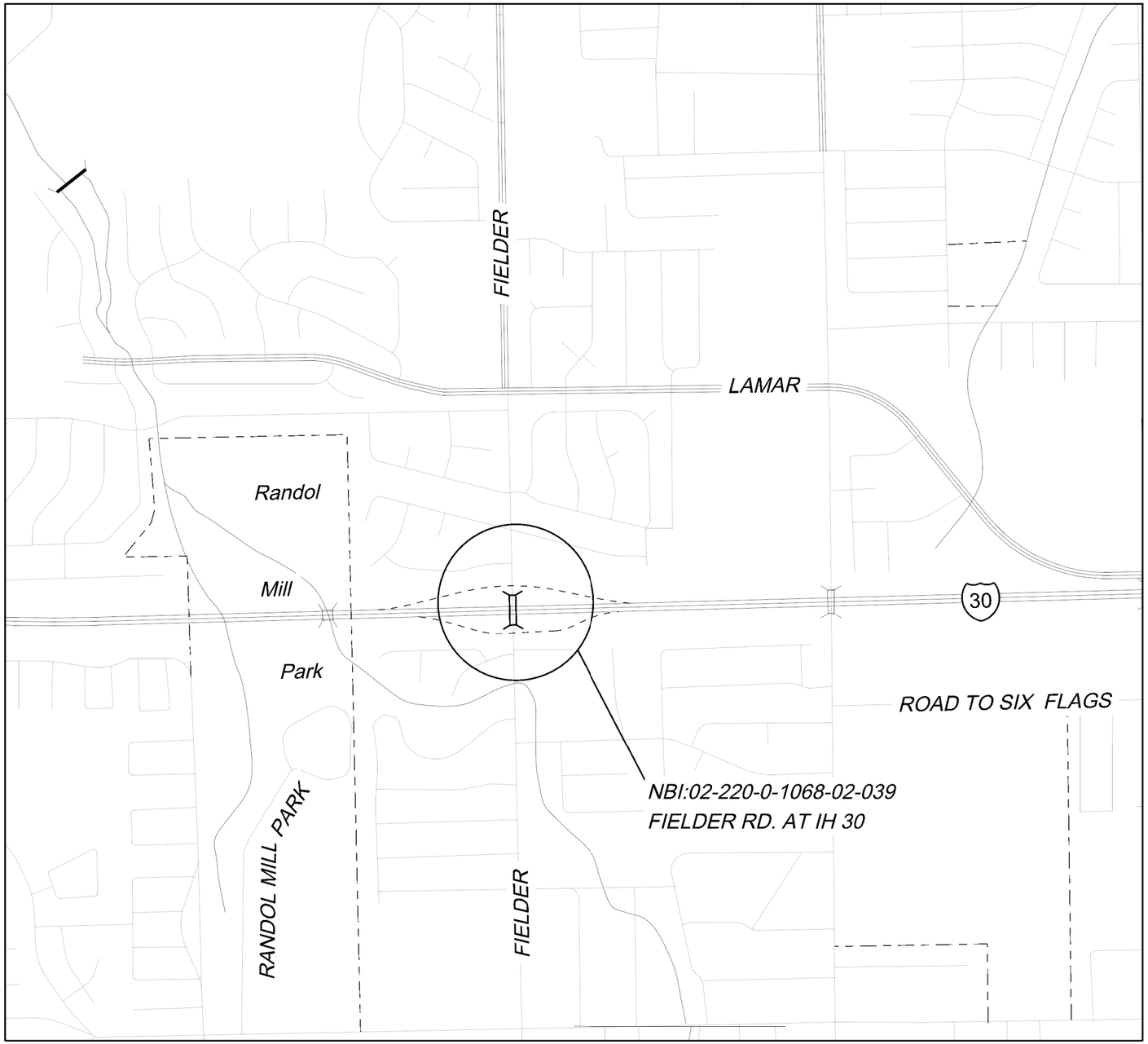
MISCELLANEOUS BRIDGE REPAIRS

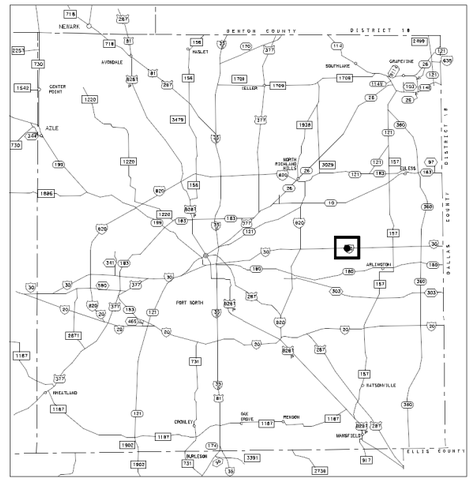
BEDFORD RD. @ SH-121

	DN: AW	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		34



LOCATION MAP

N.T.S.



TARRANT COUNTY

02-220-0-1068-02-039

Texas Department of Transportation

2024 BEAM REPAIR LOCATION MAP

FIELDER RD. AT IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		35

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DW: CK: DW: CK:

SEQUENCE OF WORK

PHASE I STEP 1 - EB IH 30 AT FIELDER RD

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.

2. SET UP THE EB IH 30 ROAD CLOSURE BY CLOSING THE TWO OUTSIDE LANES ACCORDING TO TCP (6-5B).

3. CLOSE THE SB FIELDER RD OUTSIDE LANE TO PRE-LOAD THE SPAN OVER THE DAMAGED BEAM AS SHOWN ON THE PHASE I STEP 1 TRAFFIC CONTROL PLAN.

4. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR IH 30 AT SB FIELDER RD.

5. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES FROM THE EB IH 30 TWO OUTSIDE LANES. TRAFFIC CONTROL DEVICES TO REMAIN ON SB FIELDER RD OUTSIDE LANE UNTIL STRUCTURE ACHIEVES DESIRED STRENGTH.

TRAFFIC CONTROL PLAN

PHASE I STEP 1 - EB IH 30 AT FIELDER RD

1. SB FIELDER RD TRAFFIC CONTINUES ON THE INSIDE LANE. THE NB FIELDER RD TRAFFIC REMAINS UNDISTURBED.

2. EB IH 30 TRAFFIC CONTINUES ON THE INSIDE MAINLANE, WB IH 30 TRAFFIC REMAINS UNDISTURBED.

SEQUENCE OF WORK

PHASE I STEP 2 - EB IH 30 AT FIELDER RD

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.

2. SET UP THE EB IH 30 ROAD CLOSURE BY CLOSING THE TWO OUTSIDE LANES ACCORDING TO TCP (6-5B).

3. CLOSE THE FIELDER RD INSIDE LANE AND TURN LANE TO PRE-LOAD THE SPAN OVER THE DAMAGED BEAM AS SHOWN ON THE PHASE I STEP 2 TRAFFIC CONTROL PLAN.

4. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR IH 30 AT SB FIELDER RD.

5. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES FROM THE EB IH 30 TWO OUTSIDE LANES. TRAFFIC CONTROL DEVICES TO REMAIN ON SB FIELDER RD INSIDE LANE AND TURN LANE UNTIL STRUCTURE ACHIEVES DESIRED STRENGTH.

TRAFFIC CONTROL PLAN

PHASE I STEP 2 - EB IH 30 AT FIELDER RD

1. SB FIELDER RD TRAFFIC CONTINUES ON THE OUTSIDE LANE. THE NB FIELDER RD TRAFFIC REMAINS UNDISTURBED.

2. EB IH 30 TRAFFIC CONTINUES ON THE INSIDE MAINLANE, WB IH 30 TRAFFIC REMAINS UNDISTURBED.

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SEQUENCE OF WORK

FIELDER RD. AT IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		36

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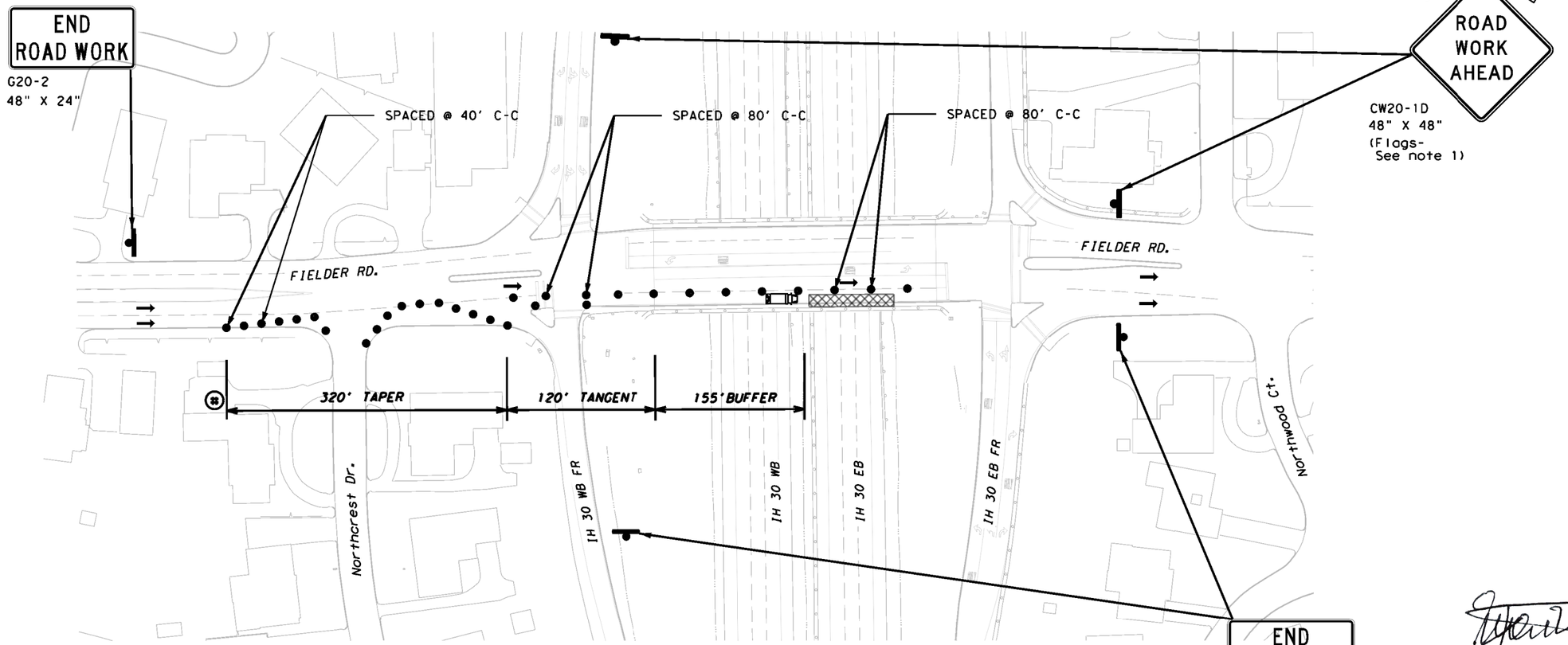

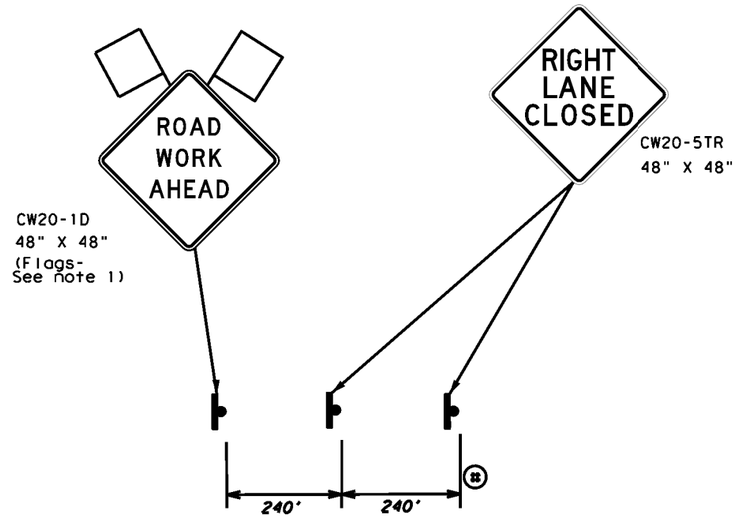

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH THE AREA OFFICE PRIOR TO BEGINNING WORK.

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

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0 100 200
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TRAFFIC CONTROL PLAN

PHASE 1 STEP 1
FIELDER RD.
AT IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		37

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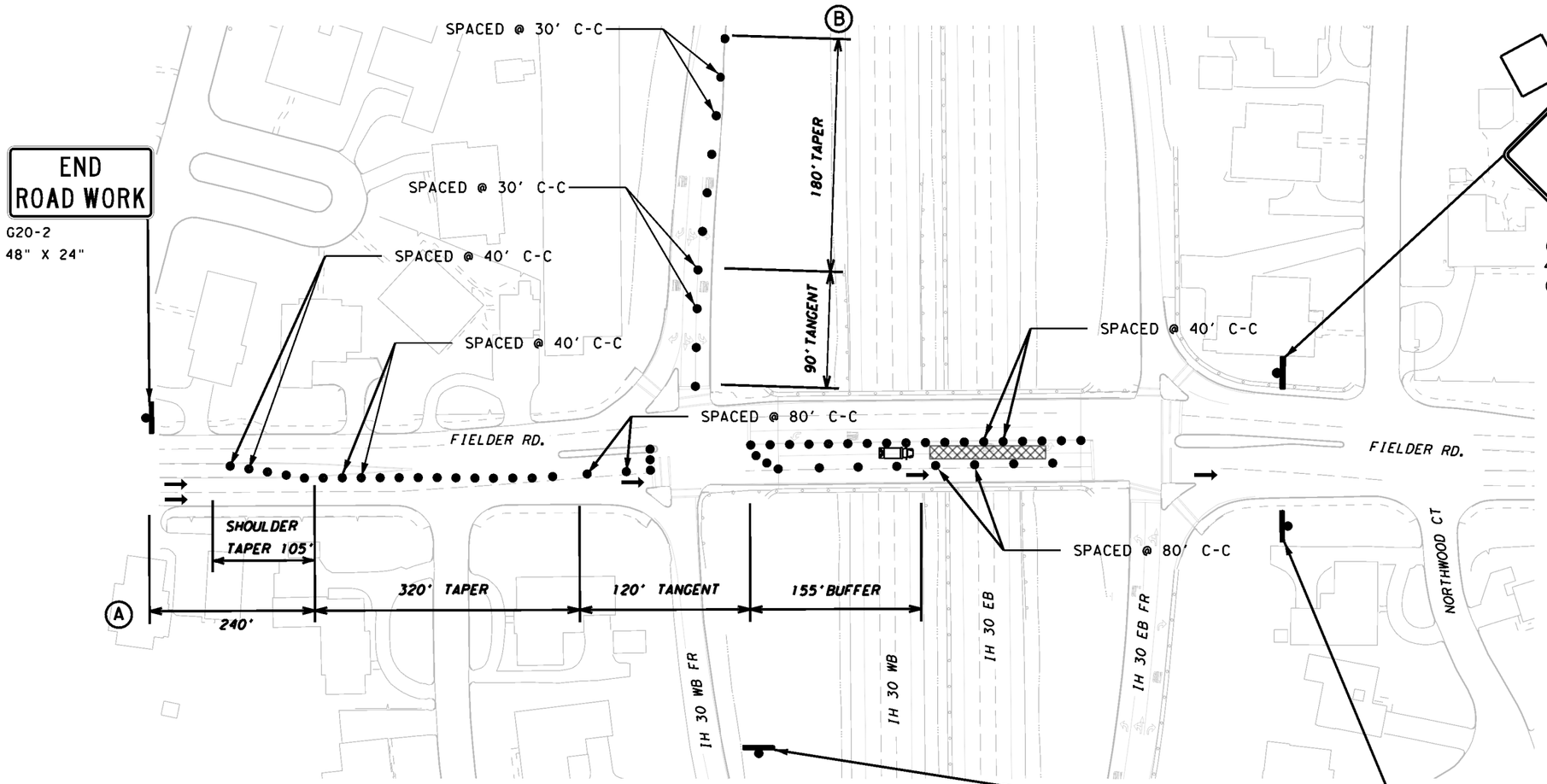

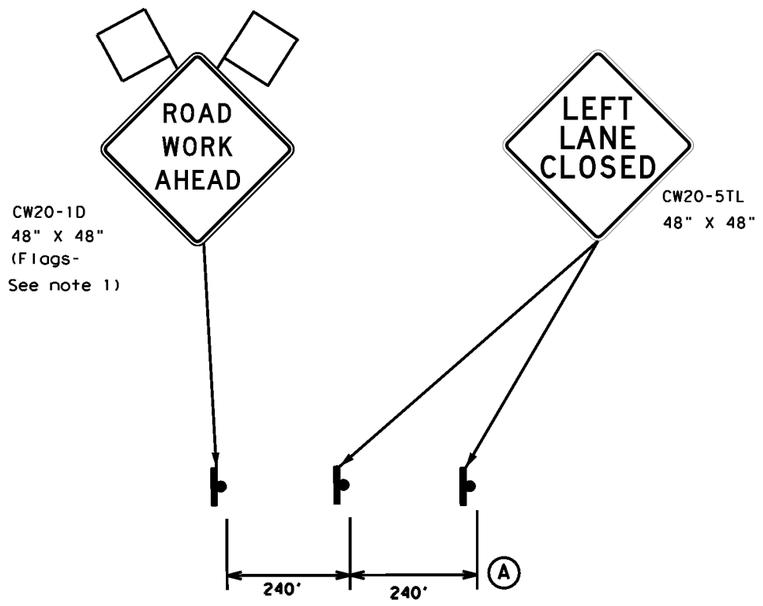

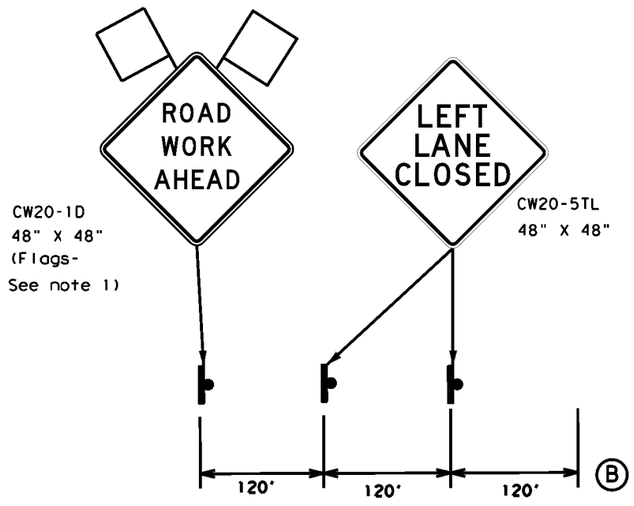

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH THE AREA OFFICE PRIOR TO BEGINNING WORK.

HAILU AYALEW
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STATE OF TEXAS
07/13/2023

0 100 200
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TRAFFIC CONTROL PLAN

PHASE 1 STEP 2
FIELDER RD.
AT IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		38

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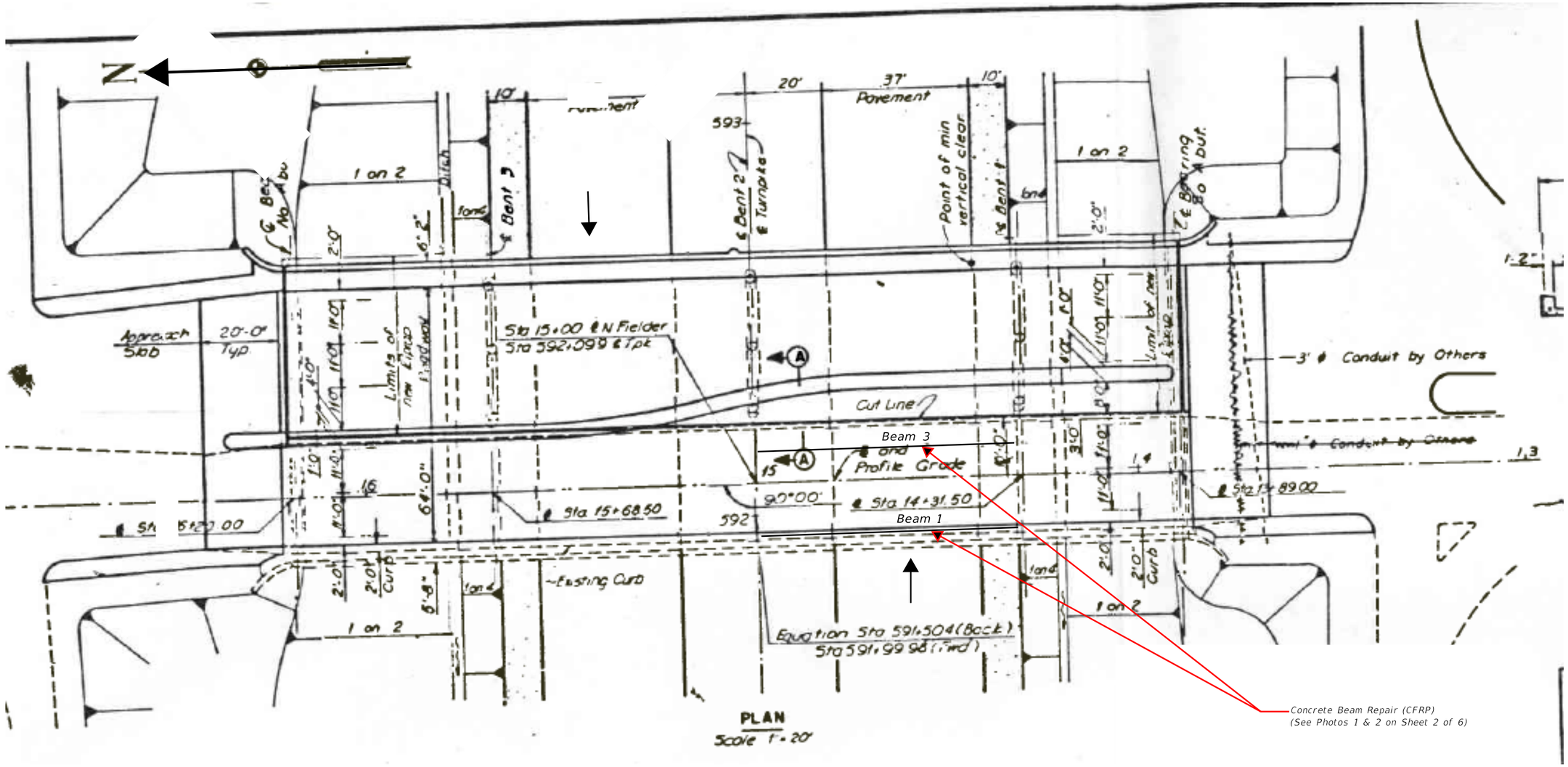

ESTIMATED QUANTITIES

Items	Description		Total
0788-6002	Concrete Beam Repair (CFRP)	EA	2

NBI#: 02-220-0-1068-02-039

SHEET 1 OF 6

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

FIELDER RD @ IH30

DN: JT	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	Various
	DIST	COUNTY		SHEET NO.
	02	Tarrant, ETC.		39

PHOTO 1
Span 3 Beam 1
(Looking Northeast)

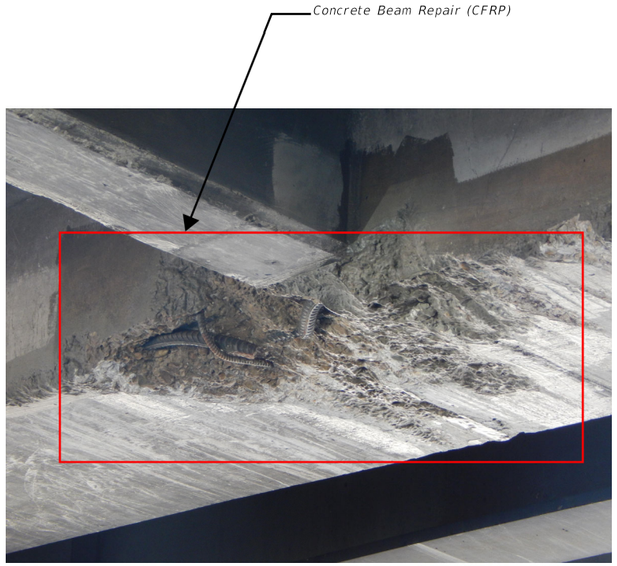

PHOTO 2
Span 3 Beam 3
(Looking Northeast)

NBI#: 02-220-0-1068-02-039

SHEET 2 OF 6

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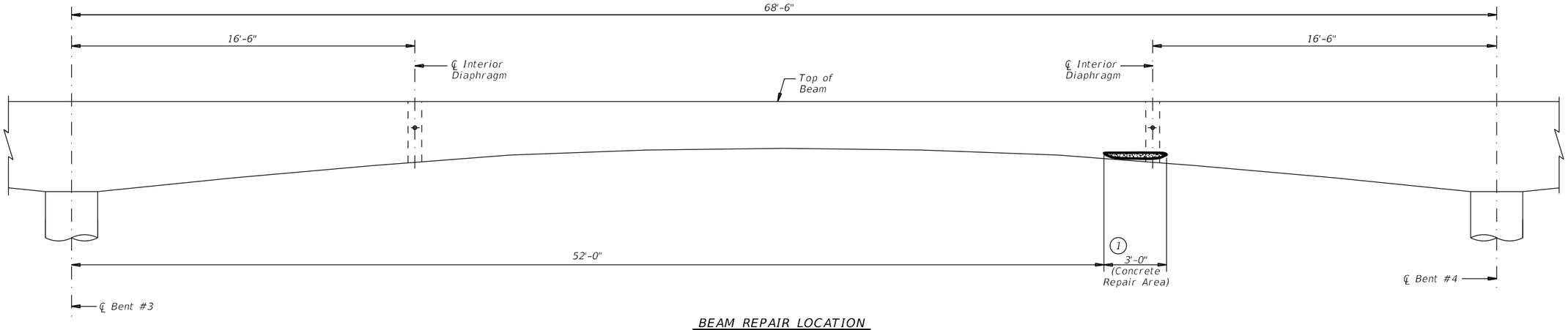
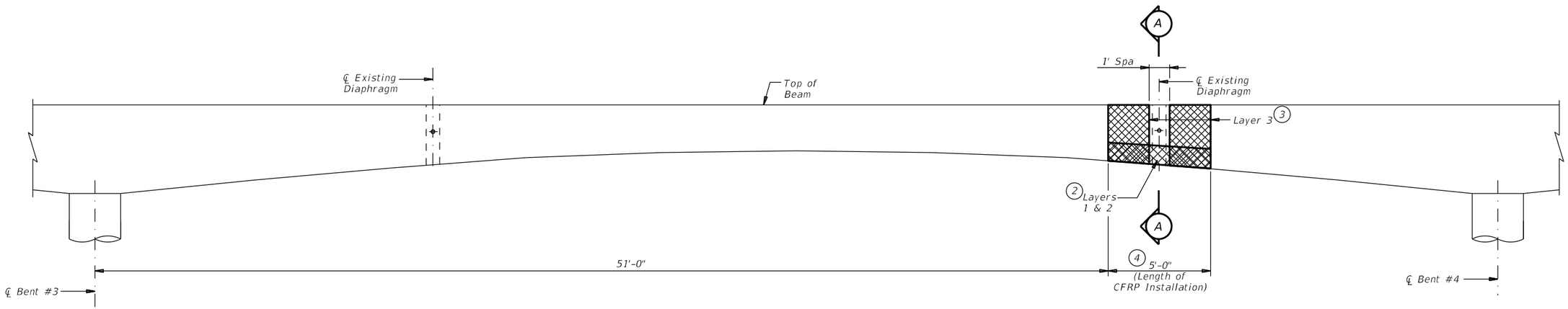
MISCELLANEOUS BRIDGE REPAIRS

FIELDER RD @ IH30

	DN: JT	CK:	DW: GC/SR	CK:
©TxDOT 4-28-2023	CONT	SECT	JOB	HIGHWAY
REVISIONS				Randol Mill Rd
	DIST	COUNTY		SHEET NO.
	02	Tarrant, ETC.		40



BEAM REPAIR LOCATION



CFRP WRAP LOCATION

ELEVATION CFRP ~ SPAN 3 BEAM 1 REPAIR

(LOOKING EAST)

Notes:

1. Remove loose concrete and prepare the repair area for Beam 1 in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged rebars. Use extreme care to protect the intact rebars and concrete. If cracking extends more than damaged area, notify the Engineer of Record.
2. Layers 1 & 2 – Place 24" wide x 5 ft long carbon fiber fabric sheets longitudinally on beam, with fiber orientation parallel to beam centerline. Locate sheets on bottom corners of beam as shown. Fabric sheets shall be overlapped 6" minimum in the longitudinal direction to achieve full installation length.
3. Layers 3 – Place 2 – 24" wide x (7.5' to 11.8') (±) ft long carbon fiber "U" strip fabric sheets transversely on beam, with fiber orientation perpendicular to beam centerline. Wrap sheets on bottom and sides of beam to limits shown. Butt joint wraps in the longitudinal direction to achieve full installation length.
4. The length of all layers may be adjusted in the field to cover more damaged area as determined by the Engineer of Record.

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7/10/2023

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MISCELLANEOUS BRIDGE REPAIRS

FIELDER RD @ IH30

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		41

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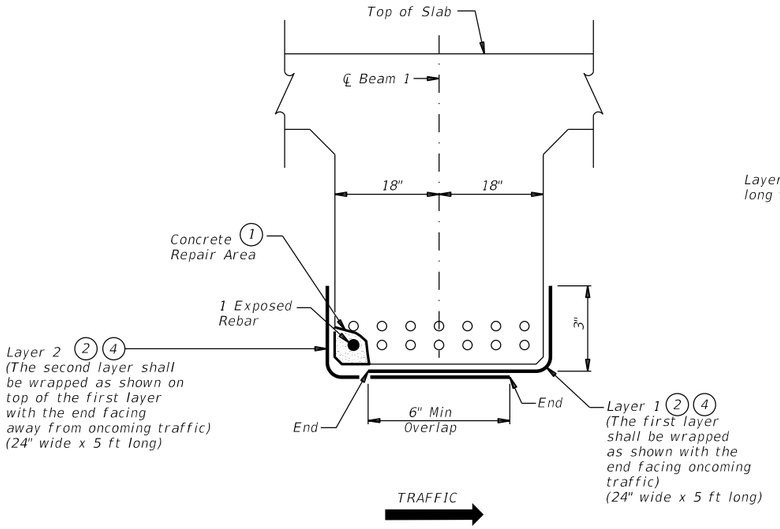
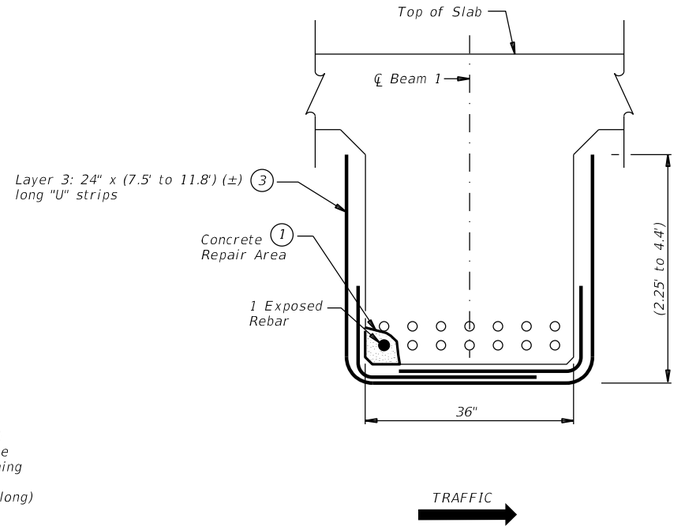


STEP 1



STEP 2

SECTION A-A

(LOOKING NORTH)

Notes:

1. Remove loose concrete and prepare the repair area for Beam 1 in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged rebars. Use extreme care to protect the intact rebars and concrete. If cracking extends more than damaged area, notify the Engineer of Record.
2. Layers 1 & 2 – Place 24" wide x 5 ft long carbon fiber fabric sheets longitudinally on beam, with fiber orientation parallel to beam centerline. Locate sheets on bottom corners of beam as shown. Fabric sheets shall be overlapped 6" minimum in the longitudinal direction to achieve full installation length.
3. Layers 3 – Place 2 – 24" wide x (7.5' to 11.8') (±) ft long carbon fiber "U" strip fabric sheets transversely on beam, with fiber orientation perpendicular to beam centerline. Wrap sheets on bottom and sides of beam to limits shown. Butt joint wraps in the longitudinal direction to achieve full installation length.
4. The length of all layers may be adjusted in the field to cover more damaged area as determined by the Engineer of Record.

GENERAL NOTES:

1. Damaged areas shown are for information only and may not be accurate in size, length, location, and area. Verify the extent of damages before beginning the work.
2. Remove loose concrete and prepare the repair area for the beams in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged strands. Notify the Engineer of Record if any additional damage is found.
3. Place a 10 yard dump truck loaded with 10 CY of sand, gravel, or equivalent material on the bridge to pre-load the span over the damaged beam prior to patching the concrete. Remove the loaded truck from bridge after curing requirements are complete and before CFRP installation.
4. Use prepackaged non-shrink Type A (neat) from DMS-4655 "Concrete Repair Manual" cementitious concrete mix capable of obtaining at least 3000 psi compressive strength in 12 hours and 4000 psi in 3 days for concrete repairs. Contractor shall be responsible for determining the concrete strength by testing the cementious concrete used for repair in cubes in accordance with Tex-307-D or ASTM C-109. Testing of cementious concrete for repair shall not be paid for directly but is considered subsidiary to Item 788, "Concrete Beam Repair". Spalled area of beam shall be patched in accordance with Item 788, "Concrete Beam Repair" and the manufacturer's recommendations for surface preparation, mixing, placing, and curing.
5. Install CFRP as shown in the plans.
6. Apply a top coat of concrete paint matching the existing concrete color.
7. All required testing and associated cost of the 10 CY dump truck will be subsidiary to Item 788.
8. Additional damages incurred by the Contractor during removal or repairs shall be at the Contractor"s expense.
9. Contractor to field verify dimensions of proposed repairs and notify EOR of any differences before commencing work.

CFRP STRENGTHENING NOTES:

1. Carbon fiber reinforced polymer (CFRP) for strengthening concrete structure members shall be furnished and installed in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)".
2. The work of CFRP Strengthening per Item 786 will be considered subsidiary to Item 788, "Concrete Beam Repair".

NBI# 02-220-0-1068-02-039

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MISCELLANEOUS BRIDGE REPAIRS

FIELDER RD @ IH30

		DN: SR	CK: MC	DW: GC/SR	CK: MC/SR	
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0902	90	300	VARIOUS		
	DIST	COUNTY		SHEET NO.		
	02	TARRANT, ETC		42		

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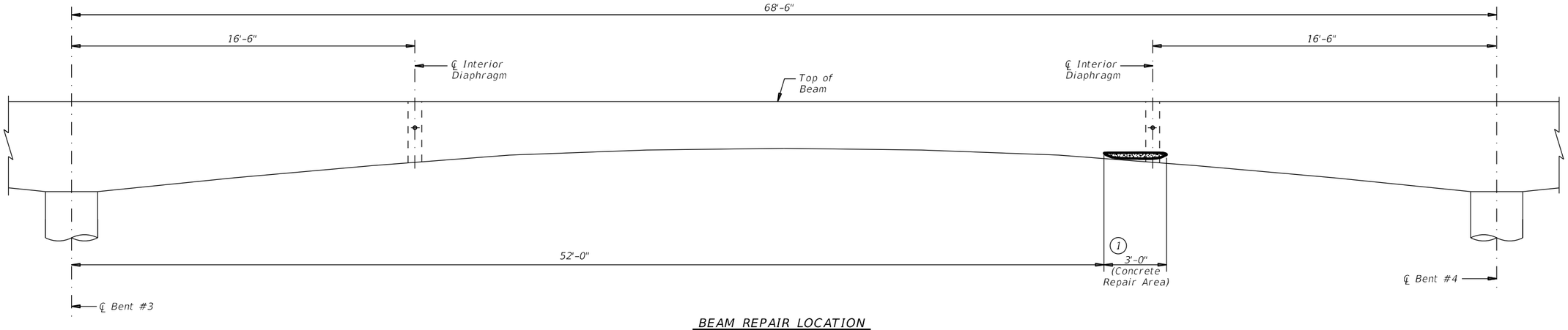
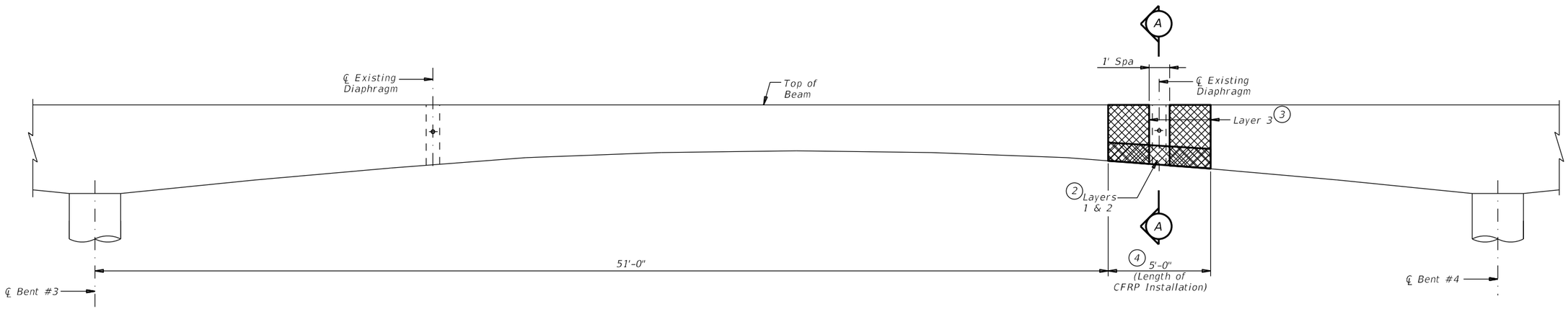


BEAM REPAIR LOCATION



CFRP WRAP LOCATION

ELEVATION CFRP ~ SPAN 3 BEAM 3 REPAIR

(LOOKING EAST)

Notes:

1. Remove loose concrete and prepare the repair area for Beam 3 in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged rebars. Use extreme care to protect the intact rebars and concrete. If cracking extends more than damaged area, notify the Engineer of Record.
2. Layers 1 & 2 – Place 24" wide x 5 ft long carbon fiber fabric sheets longitudinally on beam, with fiber orientation parallel to beam centerline. Locate sheets on bottom corners of beam as shown. Fabric sheets shall be overlapped 6" minimum in the longitudinal direction to achieve full installation length.
3. Layers 3 – Place 2 – 24" wide x (7.5' to 11.8') (±) ft long carbon fiber "U" strip fabric sheets transversely on beam, with fiber orientation perpendicular to beam centerline. Wrap sheets on bottom and sides of beam to limits shown. Butt joint wraps in the longitudinal direction to achieve full installation length.
4. The length of all layers may be adjusted in the field to cover more damaged area as determined by the Engineer of Record.

NBI# 02-220-0-1068-02-039

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7/10/2023

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MISCELLANEOUS BRIDGE REPAIRS

FIELDER RD @ IH30

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		43

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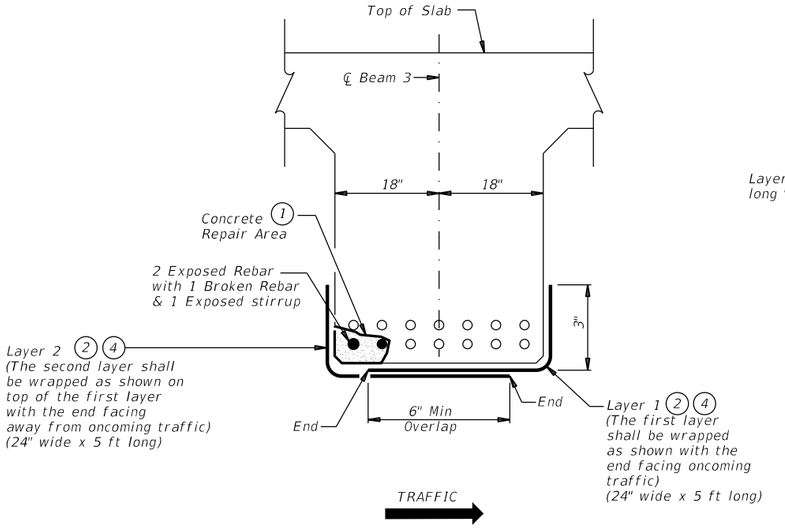
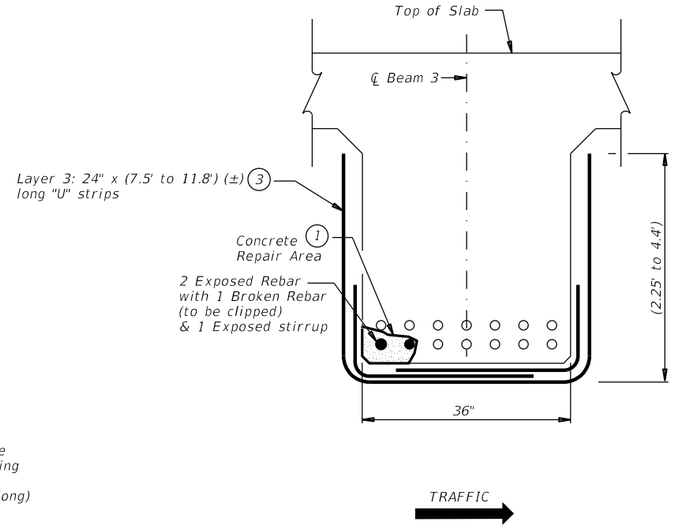


STEP 1



STEP 2

SECTION A-A

(LOOKING NORTH)

Notes:

1. Remove loose concrete and prepare the repair area for Beam 3 in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged rebars. Use extreme care to protect the intact rebars and concrete. If cracking extends more than damaged area, notify the Engineer of Record.
2. Layers 1 & 2 – Place 24" wide x 5 ft long carbon fiber fabric sheets longitudinally on beam, with fiber orientation parallel to beam centerline. Locate sheets on bottom corners of beam as shown. Fabric sheets shall be overlapped 6" minimum in the longitudinal direction to achieve full installation length.
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4. The length of all layers may be adjusted in the field to cover more damaged area as determined by the Engineer of Record.

GENERAL NOTES:

1. Damaged areas shown are for information only and may not be accurate in size, length, location, and area. Verify the extent of damages before beginning the work.
2. Remove loose concrete and prepare the repair area for the beams in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged strands. Notify the Engineer of Record if any additional damage is found.
3. Place a 10 yard dump truck loaded with 10 CY of sand, gravel, or equivalent material on the bridge to pre-load the span over the damaged beam prior to patching the concrete. Remove the loaded truck from bridge after curing requirements are complete and before CFRP installation.
4. Use prepackaged non-shrink Type A (neat) from DMS-4655 "Concrete Repair Manual" cementitious concrete mix capable of obtaining at least 3000 psi compressive strength in 12 hours and 4000 psi in 3 days for concrete repairs. Contractor shall be responsible for determining the concrete strength by testing the cementious concrete used for repair in cubes in accordance with Tex-307-D or ASTM C-109. Testing of cementious concrete for repair shall not be paid for directly but is considered subsidiary to Item 788, "Concrete Beam Repair". Spalled area of beam shall be patched in accordance with Item 788, "Concrete Beam Repair" and the manufacturer's recommendations for surface preparation, mixing, placing, and curing.
5. Install CFRP as shown in the plans.
6. Apply a top coat of concrete paint matching the existing concrete color.
7. All required testing and associated cost of the 10 CY dump truck will be subsidiary to Item 788.
8. Additional damages incurred by the Contractor during removal or repairs shall be at the Contractor"s expense.
9. Contractor to field verify dimensions of proposed repairs and notify EOR of any differences before commencing work.
10. Clip the broken rebar.

CFRP STRENGTHENING NOTES:

1. Carbon fiber reinforced polymer (CFRP) for strengthening concrete structure members shall be furnished and installed in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)".
2. The work of CFRP Strengthening per Item 786 will be considered subsidiary to Item 788, "Concrete Beam Repair".

NBI# 02-220-0-1068-02-039

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

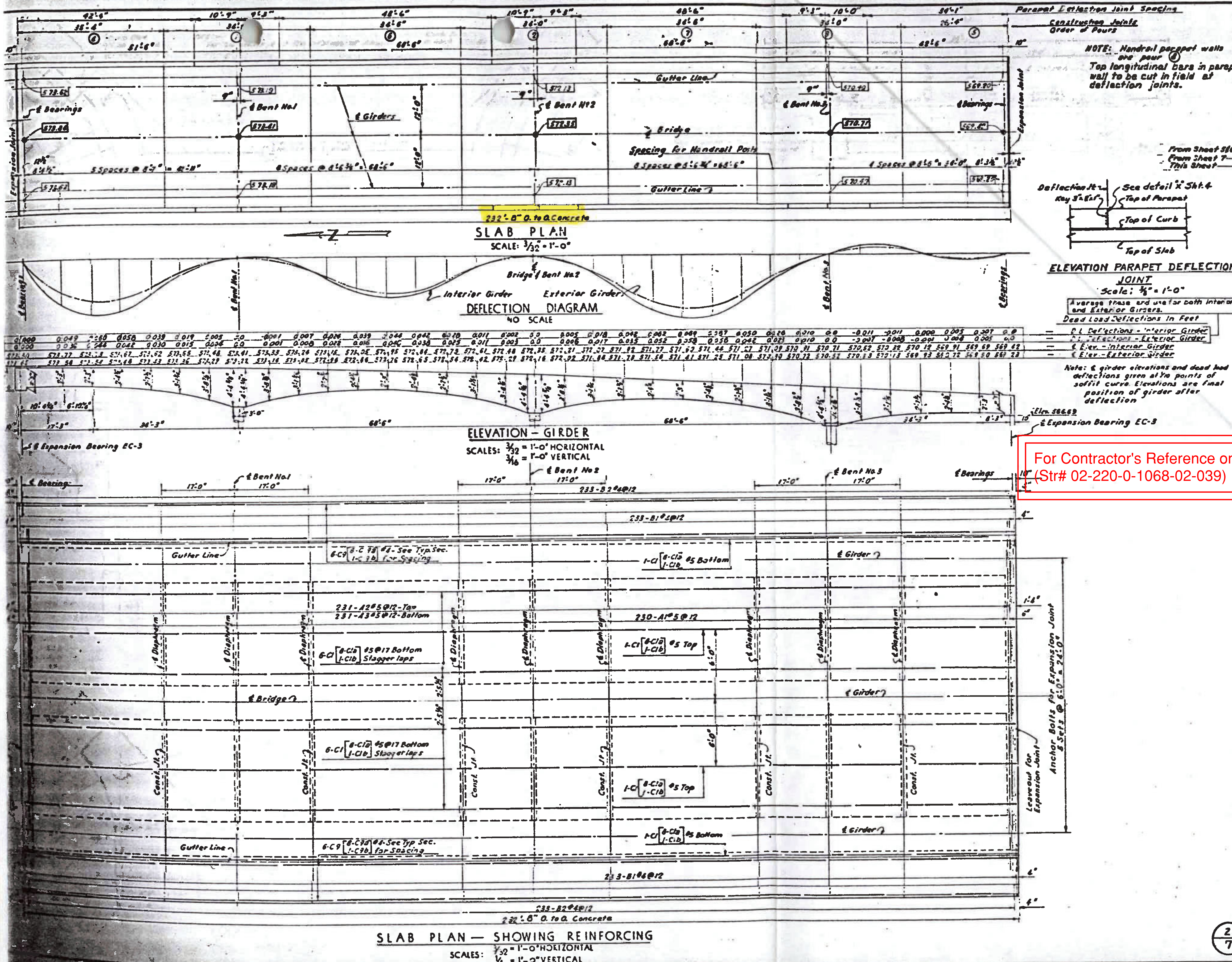
Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

FIELDER RD @ IH30

		DN: SR	CK: MC	DW: GC/SR	CK: MC/SR	
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0902	90	300	VARIOUS		
	DIST	COUNTY		SHEET NO.		
	02	TARRANT, ETC		44		

T:\BRIDGE\share\BEAM, BRIDGE, & WALL REPAIRS\CFRP\0902-90-300\DGN\IH30@SBFielderRd.dgn



For Contractor's Reference only.
(Str# 02-220-0-1068-02-039)

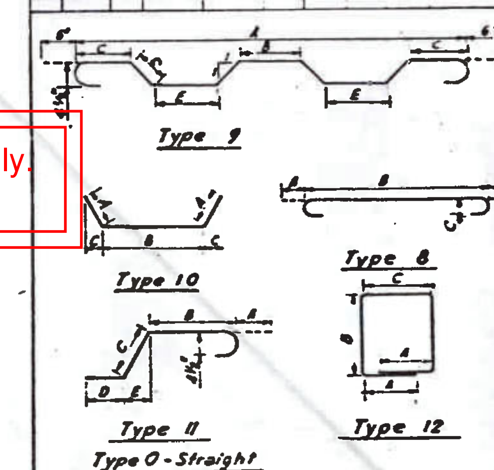
QUANTITIES				
No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	FINAL QUANTITY
403	CONCRETE-SLAB & GIRDERS			
	Pour 1	C.Y.	66.99	66.99
	2	"	66.99	66.99
	3	"	66.99	66.99
	4	"	53.43	53.43
	5	"	40.07	40.07
	6	"	50.60	50.60
	7	"	52.66	52.66
	8	"	23.45	23.45
	TOTAL	C.Y.	419.24	419.24
405	REINFORCING STEEL			
	Girders (3)	Lb.	90,945	90,945
	Diaphragms	"	3,634	3,634
	Slab Safety Curb/Parapet	"	32,240	32,240
	Total	Lb.	126,819	126,819
479	Railing, Type "A"	L.F.	465.17	465.17

From Sheet 5&6 → From Sheet 7 → This Sheet →

REINFORCING STEEL SCHEDULE

SLAB, SAFETY CURB & PARAPET

No	MARK	SIZE	LENGTH	WEIGHT	TYPE	A	B	C	D	E
[illegible]	A1	5	31-6	[illegible]	9	[illegible]	6-11	6-3	0-6	6-4
[illegible]	A2	5	33-7	[illegible]	8	0-6	29-7	3-6		
[illegible]	A3	5	32-0	[illegible]	10	1-4	[illegible]	[illegible]		
[illegible]	B1	4	6-3	[illegible]	11	2-6	2-2	1-6	1-2	0-6
[illegible]	B2	4	5-4	[illegible]	12	[illegible]	1-5	[illegible]		
[illegible]	C1a	5	33-0	[illegible]	0					
16	C1b	5	6-0	[illegible]	0					
96	C9a	4	33-0	[illegible]	0					
12	C9b	4	6-0	[illegible]	0					
TOTAL WEIGHT				32,240						



NOTES:
For reinforcing steel in girders see sheets No. 5&6
For reinforcing steel in diaphragms and end beams and details of bearings, expansion joint and leave-out see sheet No. 7
For handrail and curb details, see standard Drawing no. 51.
Tag reinforcing bars "Br. 13"

NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

DALLAS-FORT WORTH TURNPIKE

TARRANT COUNTY SECTION 2 STA. 592+C99 — TURNPIKE UNDER HENRY ROAD — BRIDGE NUMBER 13

DECK

TURNPIKE ENGINEERS
SECTION ENGINEER

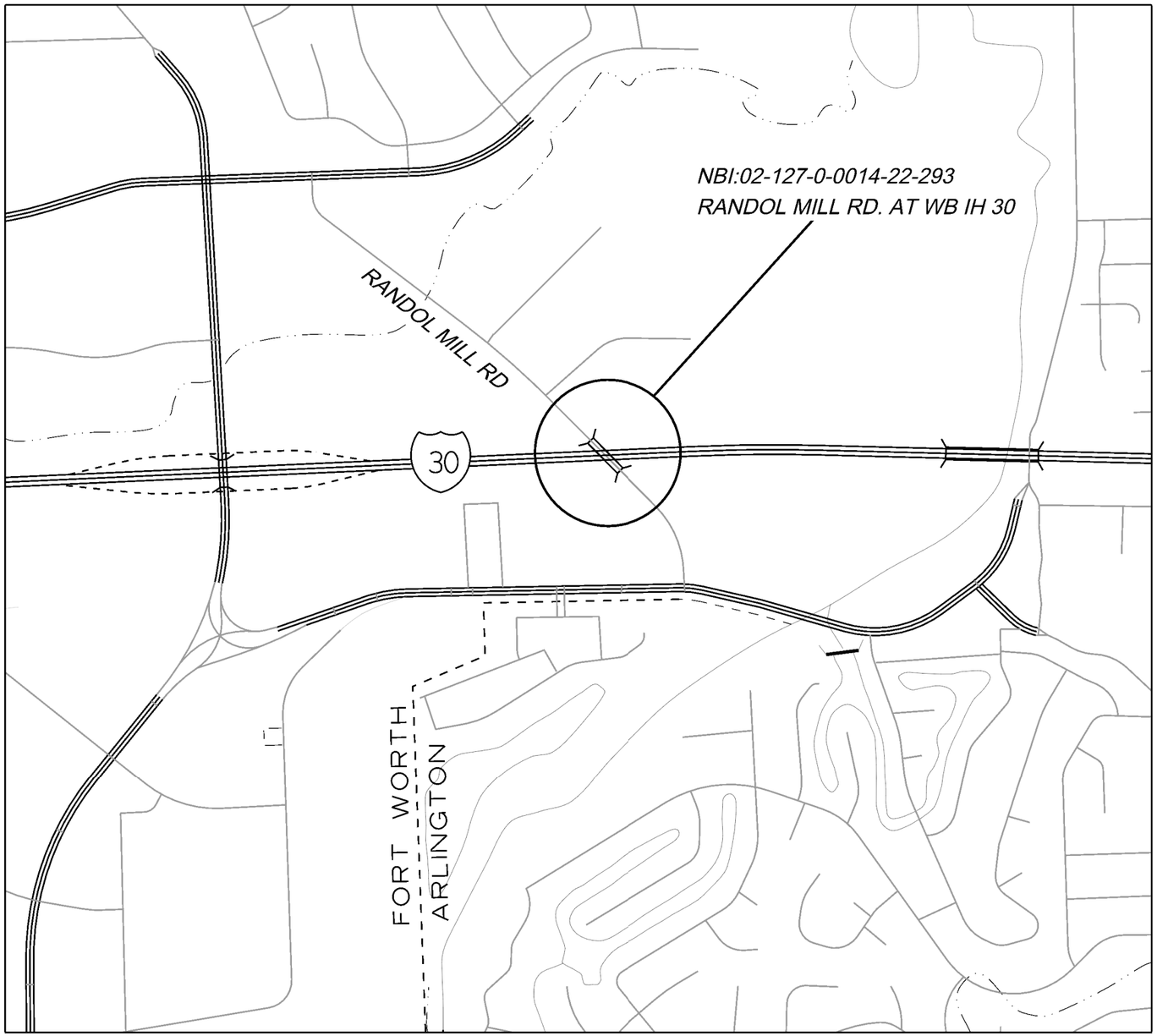
MADE S.P.P. DATE [illegible]
CHECKED G.L.C. DATE Aug. 1955

CONTRACT NO. D-FW-27 SHEET

DECK AND GIRDER DETAIL
SHEET NO.
45

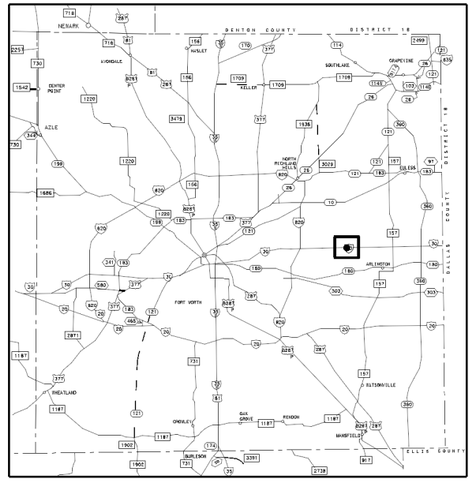
2/7

27-26



LOCATION MAP

N.T.S.



TARRANT COUNTY

NBI# 02-220-0-1068-02-047

Texas Department of Transportation

2024 BEAM REPAIR LOCATION MAP

RANDOL MILL RD.
AT IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		46

DATE: 7/12/2023 2:22:14 PM
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CK
DW
CK
DW

SEQUENCE OF WORK

PHASE I STEP 1 - RANDOL MILL RD. AT WB IH 30

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE WB IH 30 AT RANDOL MILL ROAD CLOSURE BY CLOSING THE TWO OUTSIDE LANES ACCORDING TO TCP (6-1b)-12.
3. SET UP THE SB RANDOL MILL ROAD CLOSURE BY CLOSING THE SB LANE ACCORDING TO TCP (1-2b)-18.
4. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR RANDOL MILL RD. AT IH 30.
5. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

PHASE I STEP 2 - RANDOL MILL RD. AT WB IH 30

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE WB IH 30 AT RANDOL MILL ROAD CLOSURE BY CLOSING THE TWO INSIDE LANES ACCORDING TO TCP (6-1b)-12.
3. SET UP THE SB RANDOL MILL ROAD CLOSURE BY CLOSING THE SB LANE ACCORDING TO TCP (1-2b)-18.
4. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR RANDOL MILL RD. AT IH 30.
5. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

TRAFFIC CONTROL PLAN

PHASE I STEP 1 - RANDOL MILL RD. AT WB IH 30

1. WB IH 30 TRAFFIC CONTINUES ON THE INSIDE MAIN LANE. EB IH 30 TRAFFIC REMAINS UNDISTURBED.
2. NB RANDOL MILL ROAD OPERATES AS ONE LANE TWO-WAY TRAFFIC WITH FLAGGERS.

PHASE I STEP 2 - RANDOL MILL RD. AT WB IH 30

1. WB IH 30 TRAFFIC CONTINUES ON THE OUTSIDE MAIN LANE. EB IH 30 TRAFFIC REMAINS UNDISTURBED.
2. NB RANDOL MILL ROAD OPERATES AS ONE LANE TWO-WAY TRAFFIC WITH FLAGGERS.

STATE OF TEXAS
HAILU AYALEW
117326
LICENSED PROFESSIONAL ENGINEER

07/13/2023

Texas Department of Transportation

SEQUENCE OF WORK

RANDOL MILL RD. AT IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		47

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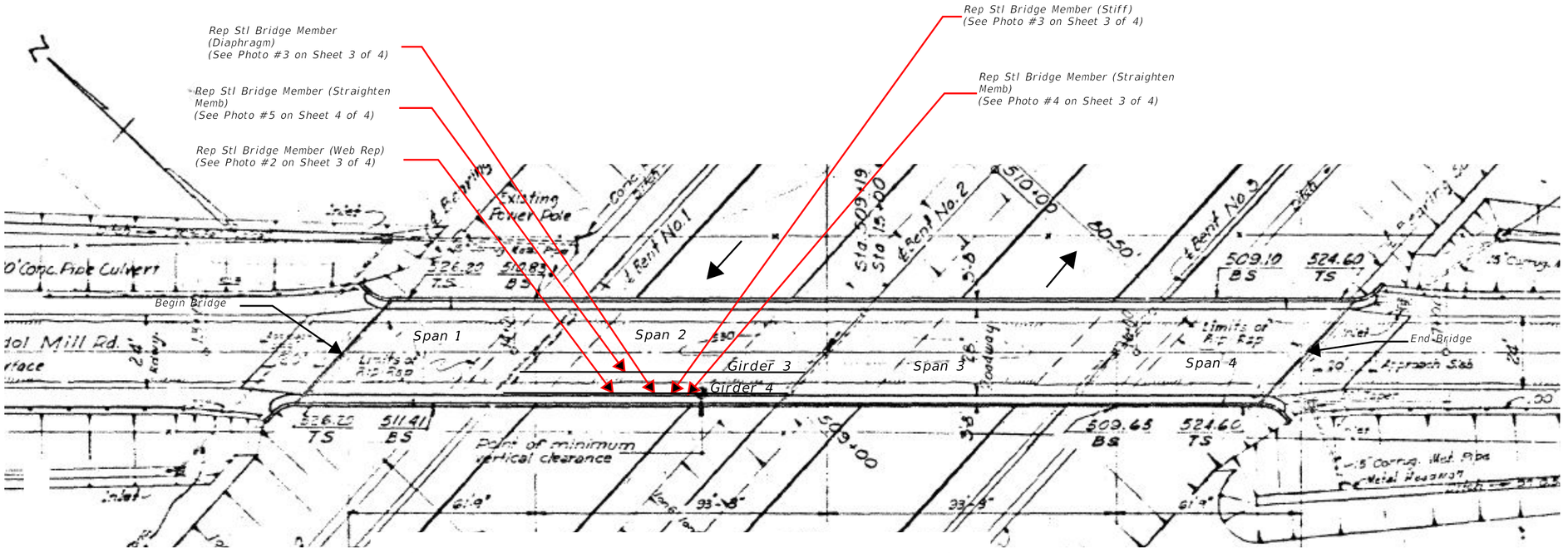


PLAN

ESTIMATED QUANTITIES

Items	Description		Total
0784 6003	Rep Stl Bridge Member (Diaphragm)	EA	1
0784 6034	Rep Stl Bridge Member (Straighten Memb)	EA	2
0784 6035	Rep Stl Bridge Member (Stiff)	EA	1
0784 6037	Rep Stl Bridge Member (Web Rep)	EA	1

NBI#: 02-220-0-1068-02-047

SHEET 1 OF 4

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER
7/10/2023

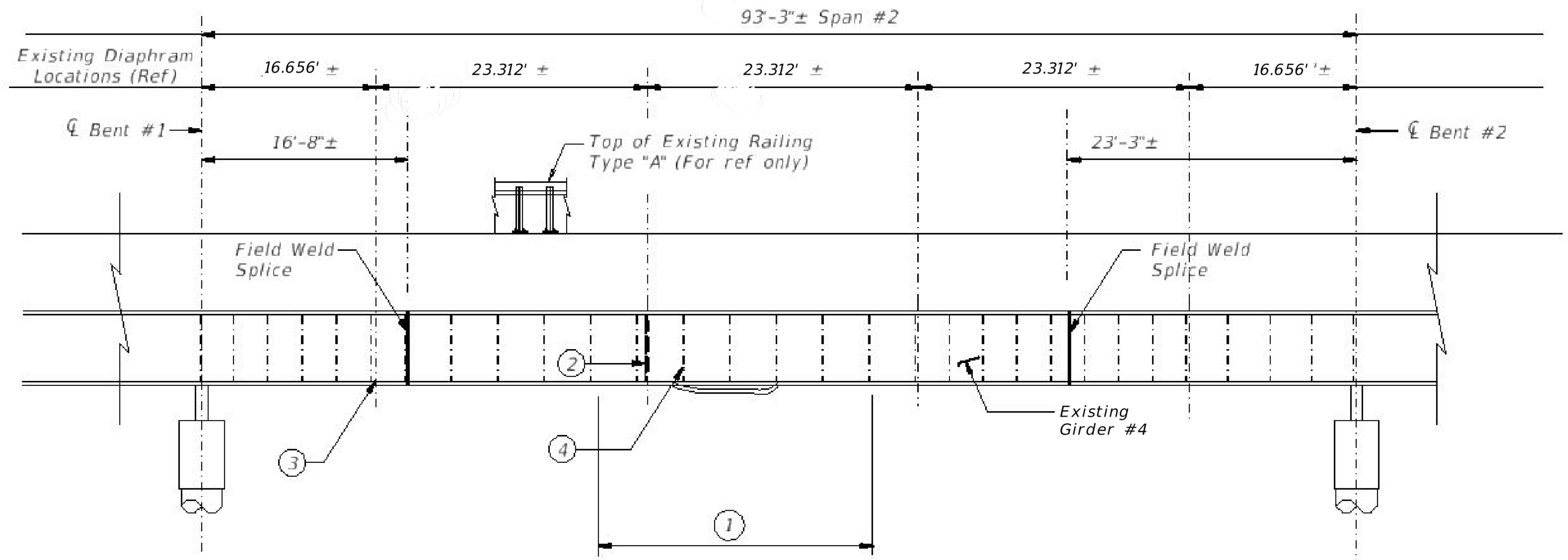
Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

RANDOL MILL RD @ IH30

	DN: SI	CK: MC	DW: GC/SR	CK: MC/SR	
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0902	90	300	Various	
	DIST	COUNTY		SHEET NO.	
	02	Tarrant, ETC.		48	



VIEW A-A
Girder #4

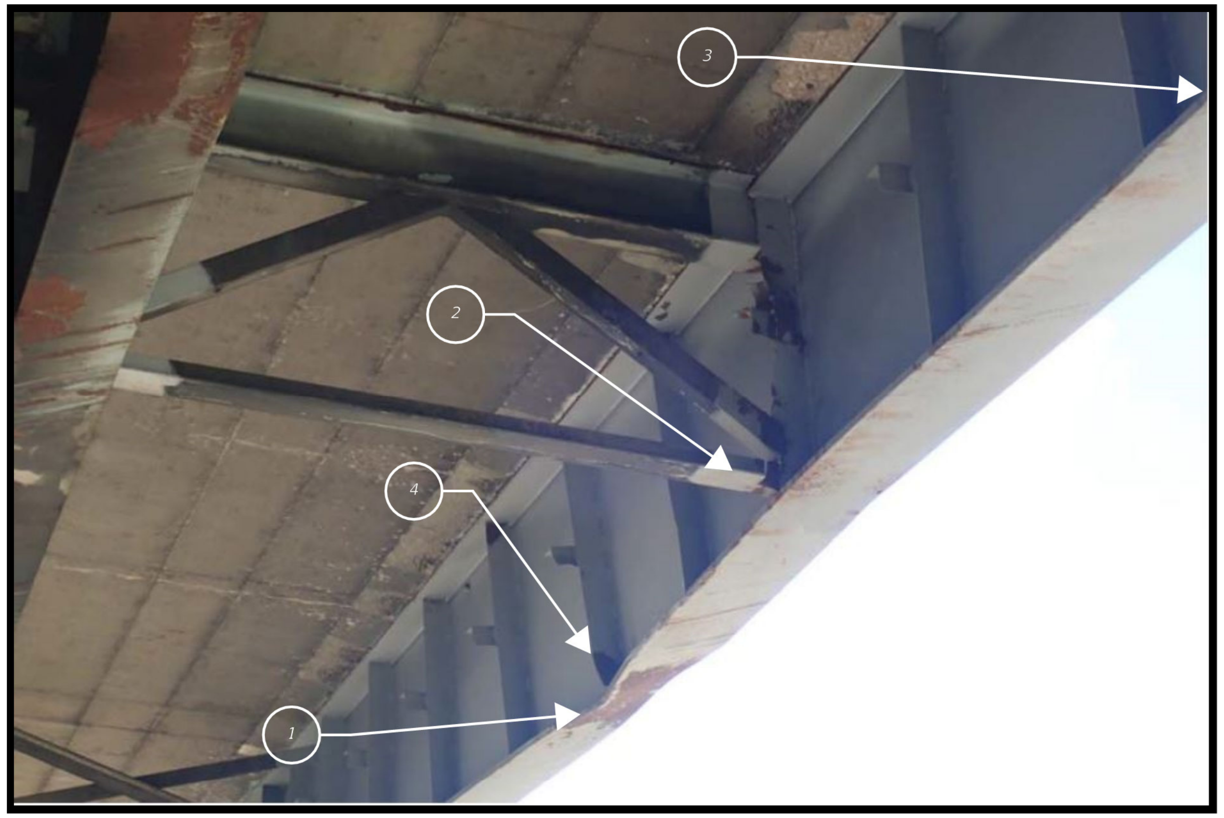


PHOTO 1
Girder #4

General Notes:

Damaged areas shown are for information only and may not be accurate in size, length, location and area. Verify the extent of the damages and notify EOR before beginning the work. Measurement and payment shall be in accordance with Item 0784, "Steel Member Repair".

Paint areas affected by repair in accordance with Item 0784.4.4.

Contractor shall submit heat straightening sequence of work to TxDOT 30 days prior to beginning work.

An excerpt of As-built is provided for contractor's reference at the end.

Keynotes:

1. Heat straighten section of Girder #4 on Span #2 (See Photo #4 on Sht 3 of 4).
2. Damaged Type "A" Diaphragm to be replaced (See Photo #3 on Sht 3 of 4).
3. Repair damaged Web at Girder #4, Span #2 (See Photo #2 on Sht 3 of 4).
4. Repair damaged Stiffener at Girder #4, Span #2 (See Photo #3 on Sht 3 of 4).

NBI#: 02-220-0-1068-02-047

SHEET 2 OF 4

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation
Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

RANDOL MILL RD @ IH 30

DN: SI	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS			
CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
02	TARRANT, ETC.		49

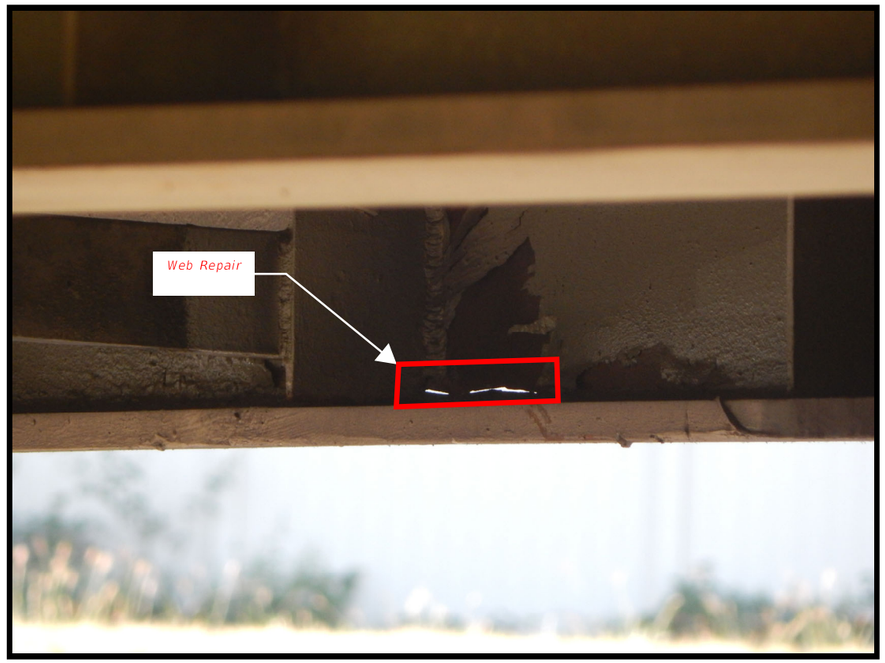


PHOTO 2
Girder #4

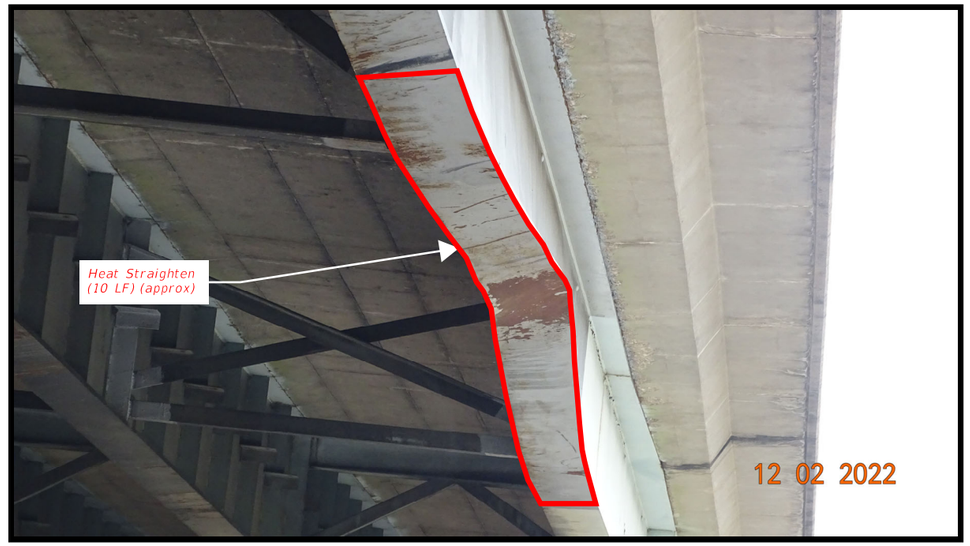


PHOTO 4
Girder #4

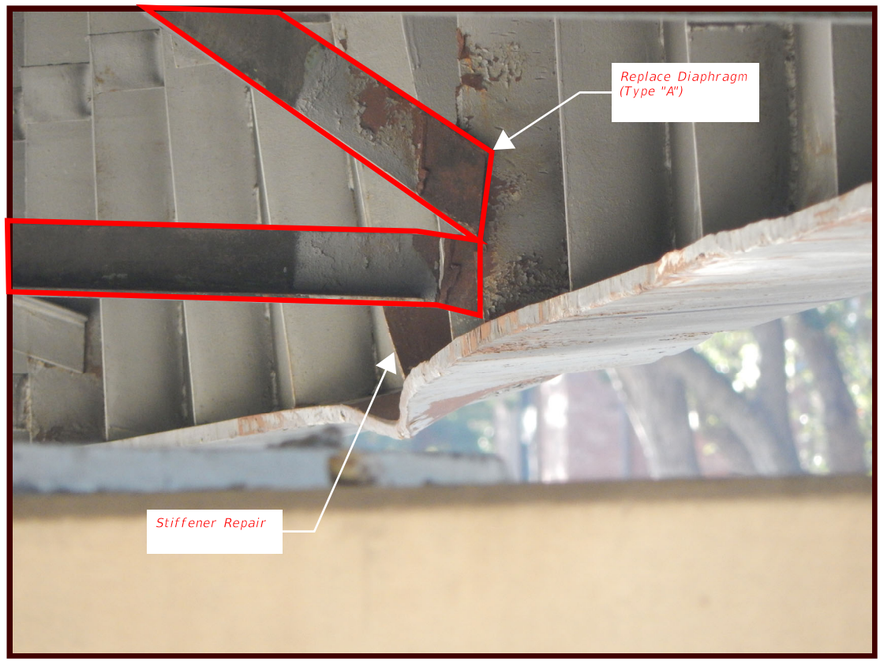


PHOTO 3
Girder #4

NBI#: 02-220-0-1068-02-047

SHEET 3 OF 4

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER
7/10/2023

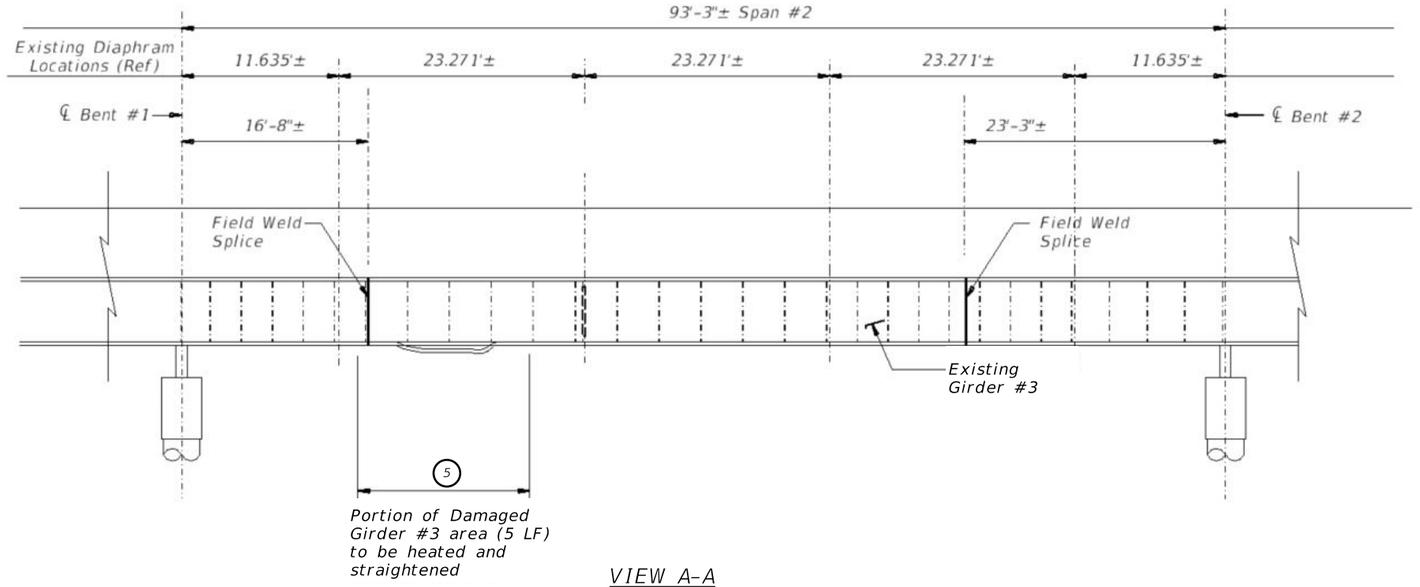
Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

RANDOL MILL RD @ IH 30

	DN: SI	CK: MC	DW: GC/SR	CK: MC/SR	
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0902	90	300	VARIOUS	
	DIST	COUNTY		SHEET NO.	
	02	TARRANT, ETC.		50	



VIEW A-A
Girder #3

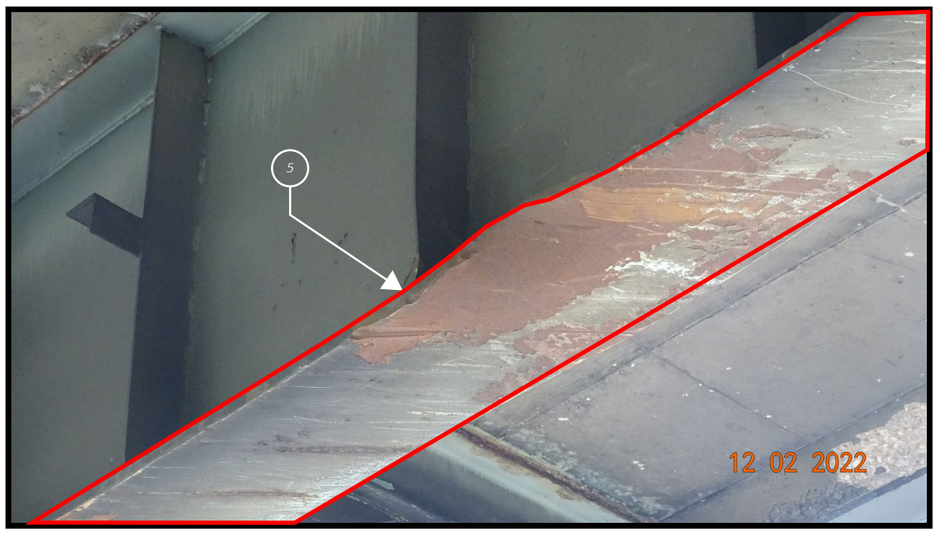


PHOTO 5
Girder #3

General Notes:

Damaged areas shown are for information only and may not be accurate in size, length, location and area. Verify the extent of the damages and notify EOR before beginning the work. Measurement and payment shall be in accordancewith Item 0784, "Steel Member Repair".

Paint areas affected by repair in accordance with Item 0784.4.4.

Contractor shall submit heat straightening sequence of work to TxDOT 30 days prior to beginning work.

Keynotes:

(5) Heat straighten (5 LF approx.) section of Girder #3 on Span #2 (See Photo #5)

NBI#: 02-220-0-1068-02-047

SHEET 4 OF 4

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER
7/10/2023

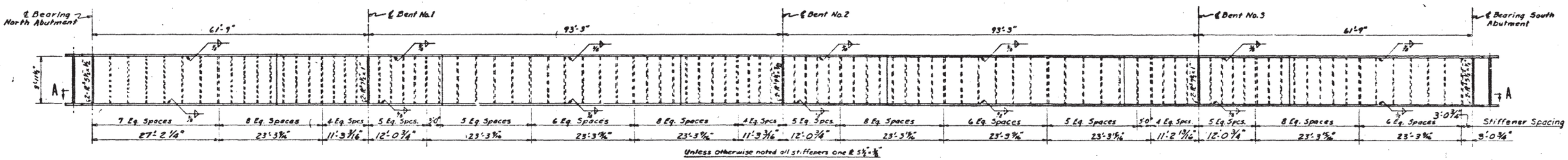
Texas Department of Transportation
Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

RANDOL MILL RD @ IH 30

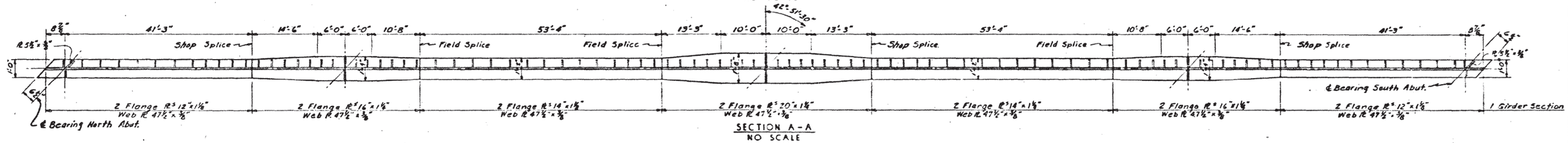
		DN: SI	CK: MC	DW: GC/SR	CK: MC/SR		
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0902	90	300	VARIOUS			
	DIST	COUNTY		SHEET NO.			
	02	TARRANT, ETC.		51			

QUANTITIES				
ITEM NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	FINAL QUANTITY



Unless otherwise noted all stiffeners one PL 5½"x⅜"

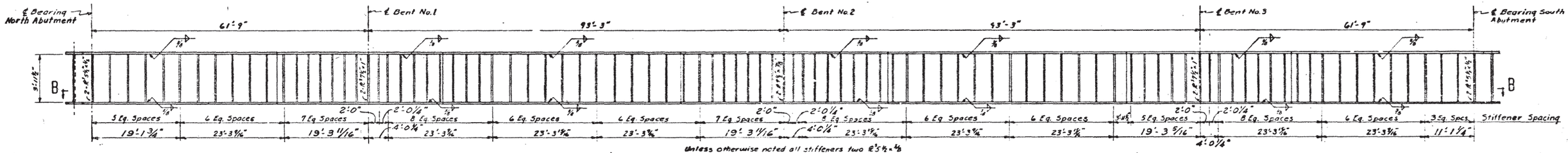
ELEVATION
NO SCALE



SECTION A-A
NO SCALE

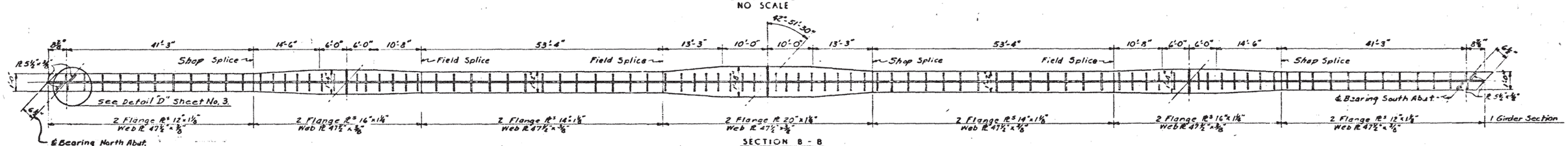
GIRDERS 1 & 4

GIRDER 4 SHOWN GIRDER 1 SAME BY ROTATION



Unless otherwise noted all stiffeners two PL 5½"x⅜"

ELEVATION
NO SCALE



SECTION B - B
NO SCALE

GIRDERS 2 & 3

GIRDER 3 SHOWN GIRDER 2 SAME BY ROTATION

For Contractor's Reference only
(Str# 02-220-1068-02-047)

NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

DALLAS-FORT WORTH TURNPIKE

TARRANT COUNTY SECTION 2 STA. 509+19.20 | TURNPIKE UNDER RANDOL MILL ROAD | BRIDGE NUMBER 11

GIRDER DETAILS

TURNPIKE ENGINEERS
SECTION ENGINEER SECTIONS 1-5

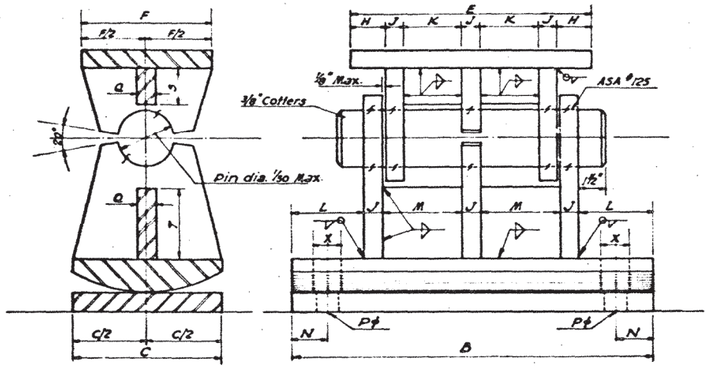
MADE D.E.G. DATE May 1955 | TRACED
CHECKED J.H.G. DATE July 55 | SCALE As

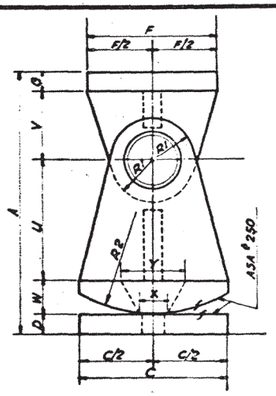
CONTRACT NO. D-FW-28 SHEET

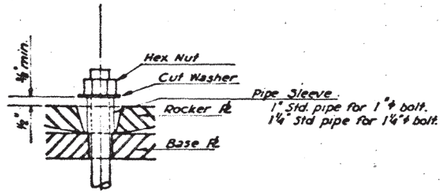
GIRDERS DETAIL SHEET NO. 52

4/9

28-31



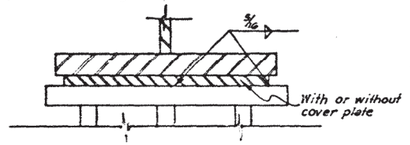




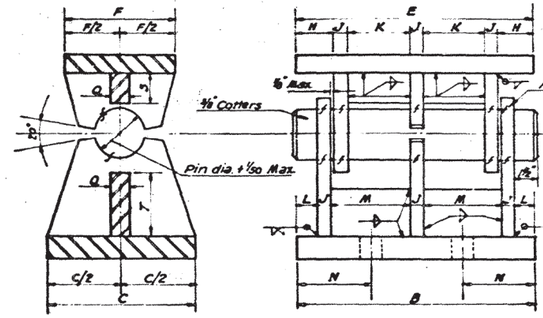
SETTING DETAIL
ANCHOR BOLTS FOR EXPANSION BEARINGS
NO SCALE

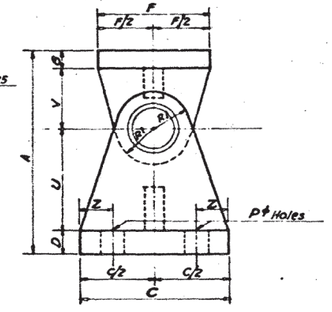
GENERAL NOTES For BEARING DEVICES
Anchor Bolt Embedment
1" ϕ bolt - 10"
1¼" ϕ bolt - 12"
1½" ϕ bolt - 15"
Fillet Weld Sizes:
5/16" Minimum
4/16" for R3 1¼" thick and less
5/16" for R3 over 1¼" thick

All parts of bearing devices shall be structural steel



DETAIL SHOWING CONNECTION OF SOLE PLATE TO GIRDER





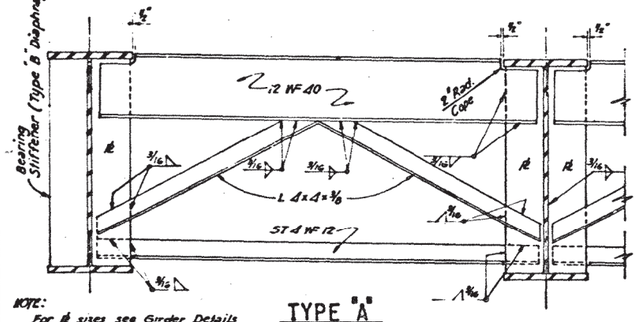
DIMENSIONS FOR FIXED BEARINGS

TYPE	REACTION	ANCHOR BOLTS	WEIGHT	PIN SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P#	Q	R1	S	T	U	V	Z
F-4	80K	4-1" ϕ x 14		2½" ϕ x 14⅛	11⅜	13	7	1¼	13	6	1	2	1	3	1⅛	4⅛	3⅜	1¼	1	2½	2	3½	6	3½	1½
F-5	100K	4-1" ϕ x 14	175	2½" ϕ x 14⅞	13⅜	14	8	1¼	13	7	1⅛	2⅜	1⅛	3	1⅛	4½	3⅝	1¼	1	2½	2	5⅛	8	3½	1¼
F-6	120K	4-1" ϕ x 14	193	2⅝" ϕ x 15⅞	14⅛	16	8	1¼	13	7	1⅛	1⅝	1¼	3	1⅛	4½	4⅛	1¼	1	2⅜	2½	5	8	3⅜	1¼
F-7	140K	4-1" ϕ x 14	237	3" ϕ x 15⅞	14⅝	16	9	1¼	13	7	1¼	1⅜	1¼	3	1⅛	4⅞	4⅛	1¼	1	2½	2¼	5⅛	8½	4	1¾
F-8	160K	4-1" ϕ x 14		3½" ϕ x 16⅝	15⅛	18	9	1¼	13	7	1⅛	1⅜	1⅜	3	2⅛	4½	4⅜	1¼	1	2⅝	2⅜	5⅛	8¼	4¼	1¼
F-9	180K	4-1¼" ϕ x 16	354	3⅝" ϕ x 18⅜	16	23	9	1¾	18	7	1½	3¼	1½	4	3⅝	5⅜	7¼	1⅝	1	2⅝	1½	5⅛	9¼	3½	2¼
F-10	200K	4-1¼" ϕ x 17		3¾" ϕ x 20⅛	16⅝	25	9	2	20	7	1¾	3⅛	1¾	4¼	3¼	6⅛	8	1½	1¼	3	1⅝	5	8½	4¼	2¼
F-11	220K	4-1¼" ϕ x 17		3¾" ϕ x 21⅝	17	25	10	2	22	8	1¾	3⅜	1⅞	4½	3¼	6⅝	8	1⅝	1¼	3⅜	2⅛	5⅛	9	4⅛	2¼
F-12	240K	4-1¼" ϕ x 17	568	4" ϕ x 22	17⅞	26	11	2	24	9	2	4⅛	1¾	5	3½	6½	8⅝	1½	1¼	3½	1¾	5½	9¼	4⅜	2¼
F-13	260K	4-1½" ϕ x 20		4⅛" ϕ x 23⅜	18⅛	26	12	2	24	9	2	3¼	2	5½	3⅝	7⅜	8¾	1¾	1½	3½	1⅞	6⅜	10¼	4¼	2¼
F-14	280K	4-1½" ϕ x 20		4⅛" ϕ x 24¼	18½	27	12	2	24	9	2	3½	2	5½	3⅝	7⅝	8¾	1¾	1½	3½	1⅞	6	10¼	4¼	2¼
F-15	300K	4-1½" ϕ x 20		4½" ϕ x 25¼	18½	28	12	2	24	9	2	3	2	6	3⅜	8⅝	9⅛	1¾	1½	3⅜	1⅞	6⅜	10¼	4¼	2¼

DIMENSIONS FOR EXPANSION BEARINGS

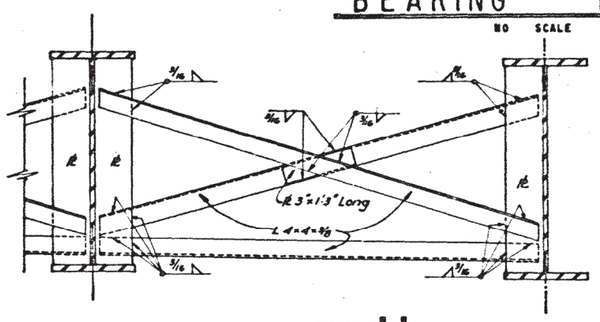
TYPE	REACTION	ANCHOR BOLTS	WEIGHT	PIN SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P#	Q	R1	R2	S	T	U	V	W	X	Y
E-4	80K	2-1" ϕ x 15	149	2½" ϕ x 14⅛	11⅜	18	6	1¼	13	6	1	2	1	3	3⅜	4⅛	1¾	1¼	1	2½	6	2	2¼	4⅝	3½	1⅜	1½	2½
E-5	100K	2-1⅜" ϕ x 18	223	2½" ϕ x 14⅞	14	19	7	1⅜	13	7	1⅛	1⅝	1⅛	3	3¼	4¼	1¾	1¼	1	2½	8	2	4⅛	6½	3½	1⅝	2	3½
E-6	120K	2-1¼" ϕ x 18	237	2⅝" ϕ x 15⅞	14½	19½	7	1½	13	7	1¼	1⅝	1¼	3	3¼	4⅛	1¾	1¼	1	2⅝	8	2⅜	3¼	6⅜	3¼	1⅝	2	3½
E-7	140K	2-1¼" ϕ x 18	285	3" ϕ x 15½	14⅝	20½	7	1½	13	7	1¼	1⅝	1¼	3	4	4⅛	1¾	1¼	1	2⅝	8	2¼	3⅜	6⅜	4	1⅝	2	3½
E-8	160K	2-1¼" ϕ x 18	320	3½" ϕ x 16⅝	15⅛	22	8	1¾	13	7	1¼	1⅞	1⅜	3	4⅞	4⅜	1⅜	1½	1	2⅝	8	2⅜	3⅜	6¼	4¼	1⅜	2	3½
E-9	180K	2-1⅜" ϕ x 19		3⅝" ϕ x 11⅜	16	24	8	2	18	7	1½	2⅜	1½	4	4⅛	5⅜	2	1½	1¼	2⅝	9	1½	3½	7	3½	2	2	3½
E-10	200K	2-1¾" ϕ x 19		3¾" ϕ x 20½	16½	26	8	2	20	7	1¾	3⅛	1¾	4⅜	4⅛	6⅛	2	1½	1¾	3	9	1⅝	3¾	7	3¾	2	2	3½
E-11	220K	2-1¾" ϕ x 19	467	3¾" ϕ x 21½	17	27	9	2	22	8	1¾	3⅜	1¾	4⅜	4¼	6⅜	2	1½	1¼	3⅜	9	2⅛	3⅜	7	4¼	2	2	3½
E-12	240K	2-1⅞" ϕ x 22		4" ϕ x 22	20"	28	10	2¼	24	9	2	4⅛	1¾	5	4½	6⅛	2	1¾	1½	3¼	11½	1¾	3½	7	4¼	2	2¼	4
E-13	260K	2-1⅞" ϕ x 22		4⅛" ϕ x 23⅜	18½	30	11	2¼	24	9	2	3¼	2	5¼	4⅝	7⅜	2¼	1¾	1½	3⅜	10	1⅜	4⅛	8	4⅛	2	2¼	4
E-14	280K	2-2" ϕ x 23		4⅛" ϕ x 24¼	18½	32	11	2¼	24	9	2	3½	2	5½	5⅜	7⅝	2¼	1⅝	1½	3½	10	1⅞	3¾	7½	4¼	2⅛	2¼	4
E-15	300K	2-1⅞" ϕ x 23		4½" ϕ x 25¼	18½	34	11	2¼	24	9	2	3	2	6	5¾	8⅛	2½	1¾	1½	3⅜	10	1⅞	3⅝	7½	4¼	2⅝	2¼	4

EXPANSION BEARING



TYPE "A"
TYPE "B"

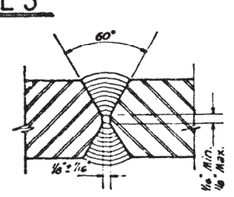
END DIAPHRAGM & SLAB JOINT DIAPHRAGM



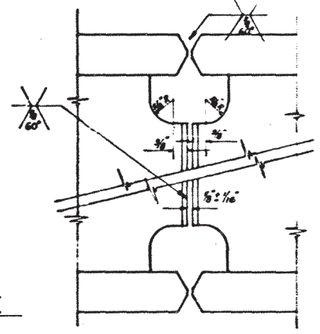
TYPE "C"

INTERIOR DIAPHRAGM

BEARING DETAILS
NO SCALE

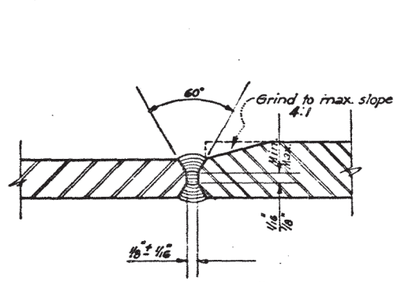


TYPICAL FLANGE & WEB SPLICE
NO SCALE
* Flange plates same thickness



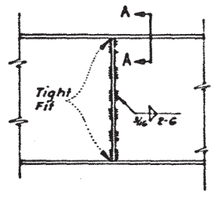
ELEVATION OF GIRDER AT SPLICE SHOWING PREPARATION OF WEB AND FLANGES
NO SCALE

NOTE:
Ends of girders to be welded shall be prepared in the shop, taking into account their relative position in the finished structure due to grade and curvature. Each splice shall be completely shop assembled, checked and match marked while assembled.

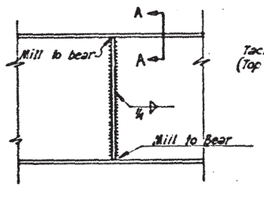


TYPICAL FLANGE* SPLICE
*Flange plates of different thickness.

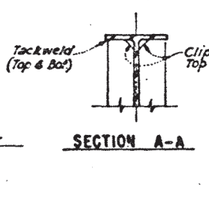
TYPICAL DIAPHRAGM FOR WELDED GIRDERS
NO SCALE

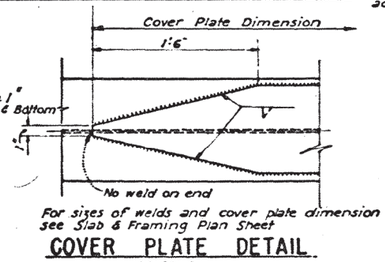


INTERMEDIATE STIFFENER
NO SCALE

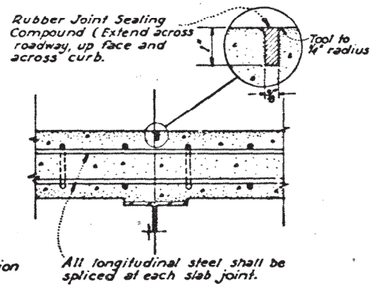


BEARING STIFFENER
NO SCALE





COVER PLATE DETAIL
NO SCALE



TYPICAL SLAB JOINT
NO SCALE

For Contractor's Reference only
(Str# 02-220-1068-02-047)

NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY
DALLAS-FORT WORTH TURNPIKE

GIRDER AND SHOE DETAILS
SPECIAL STANDARD SP-2

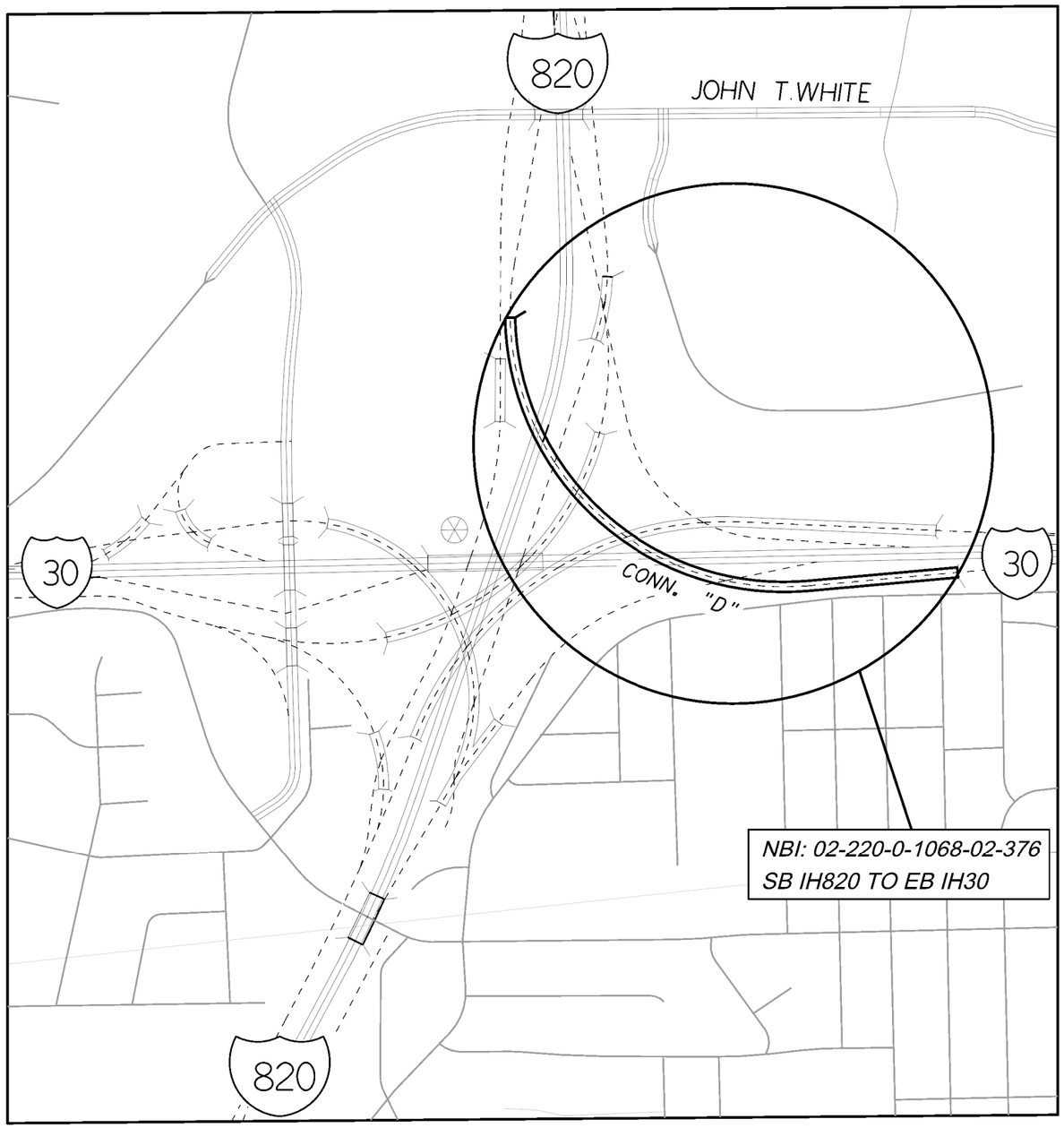
TURNPIKE ENGINEERS
SECTION ENGINEER SECTIONS 1-5

MADE LDP DATE June 1955 TRACED
CHECKED JCB DATE June 1955 SCALE

DIAPHRAGM DETAILS
SHEET NO. 53

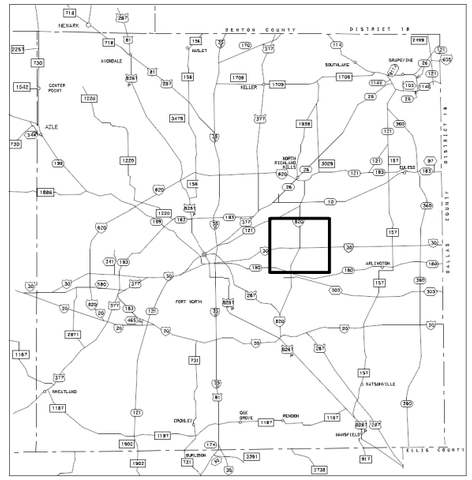
CONTRACT NO. D-FW 25 SHEET 4

28-46



LOCATION MAP

N.T.S.



TARRANT COUNTY

NBI# 02-220-0-1068-02-376

Texas Department of Transportation

2024 BEAM REPAIR LOCATION MAP

CONNECTION D
FROM IH 820 TO IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		54

DATE: 7/12/2023 4:33:53 PM
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DW: CK: DW: CK:

SEQUENCE OF WORK

PHASE I STEP 1 - CONNECTION D FROM IH820 TO IH30

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.

2. SET UP THE SB IH820 TO EB IH30 CONNECTOR CLOSURE BY CLOSING THE RAMP ACCORDING TO THE CONNECTION D LAYOUT SHEETS.

3. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR CONNECTION D.

4. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

TRAFFIC CONTROL PLAN

PHASE I STEP 1 - CONNECTION D FROM IH820 TO IH30

1. SB IH 820 TRAFFIC REMAINS UNDISTURBED, EB IH 30 TRAFFIC REMAINS UNDISTURBED.

2. THE SB IH 820 TO THE EB IH 30 CONNECTOR REMAINS CLOSED DURING BRIDGE REPAIR, TRAFFIC CONTINUES TO EXIT 29. TURNS LEFT ON MEADOWBROOK DR. THEN LEFT ON IH 820 NB FRONTAGE RD. MERGES ON TO NB IH 820 THEN TAKES EXIT 28A TO EB IH 30.

STATE OF TEXAS
HAILU AYALEW
117326
LICENSED PROFESSIONAL ENGINEER

07/13/2023

Texas Department of Transportation

SEQUENCE OF WORK

CONNECTION D
FROM IH 820 TO IH 30

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		55

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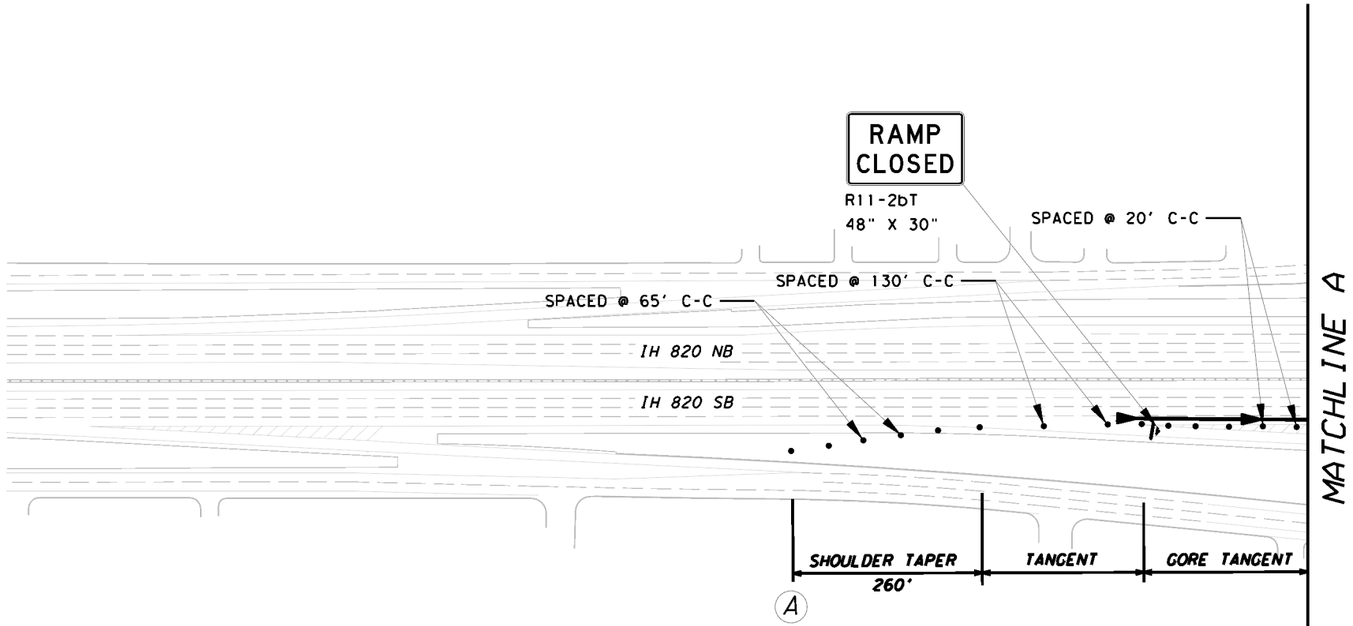

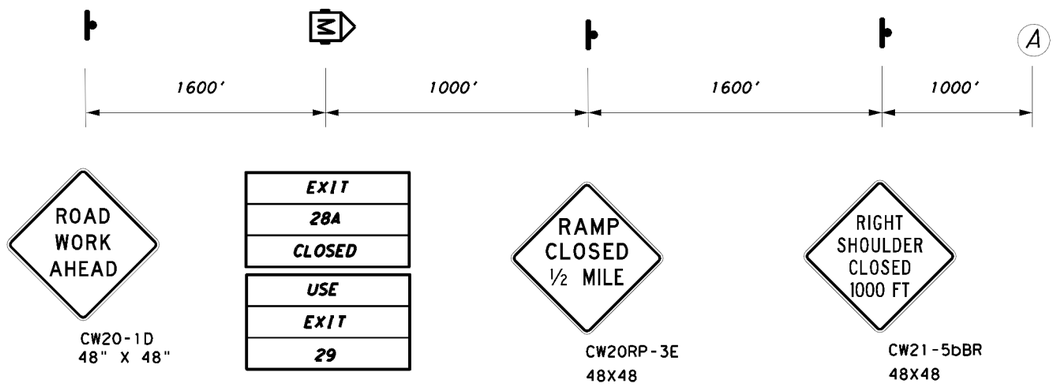

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)
- DETOUR PATH

NOTES:

1. SEE BC STANDARD SHEETS FOR ADVANCED WARNING SIGN PLACEMENT.

07/13/2023

STATE OF TEXAS
HAILU AYALEW
117326
LICENSED
PROFESSIONAL ENGINEER

NBI# 02-220-0-1068-02-376

0 100 200
SCALE IN FEET

Texas Department of Transportation

DETOUR LAYOUT

CONNECTION D
FROM IH 820 TO IH 30

SHEET 1 OF 6

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		56

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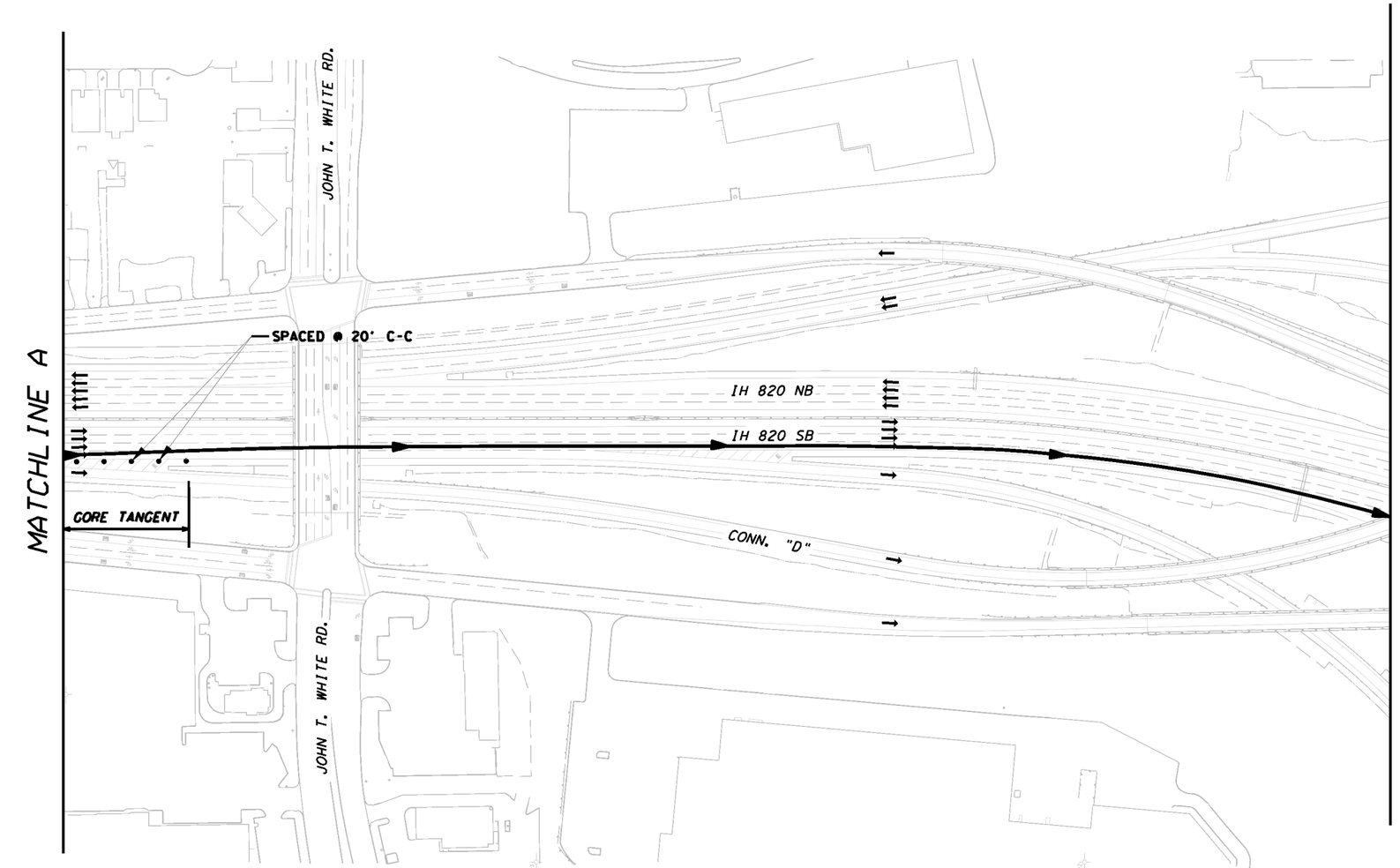

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
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07/13/2023

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

NBI= 02-220-0-1068-02-376

0 100 200
SCALE IN FEET

Texas Department of Transportation

DETOUR LAYOUT

CONNECTION D
FROM IH 820 TO IH 30

SHEET 2 OF 6

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		57

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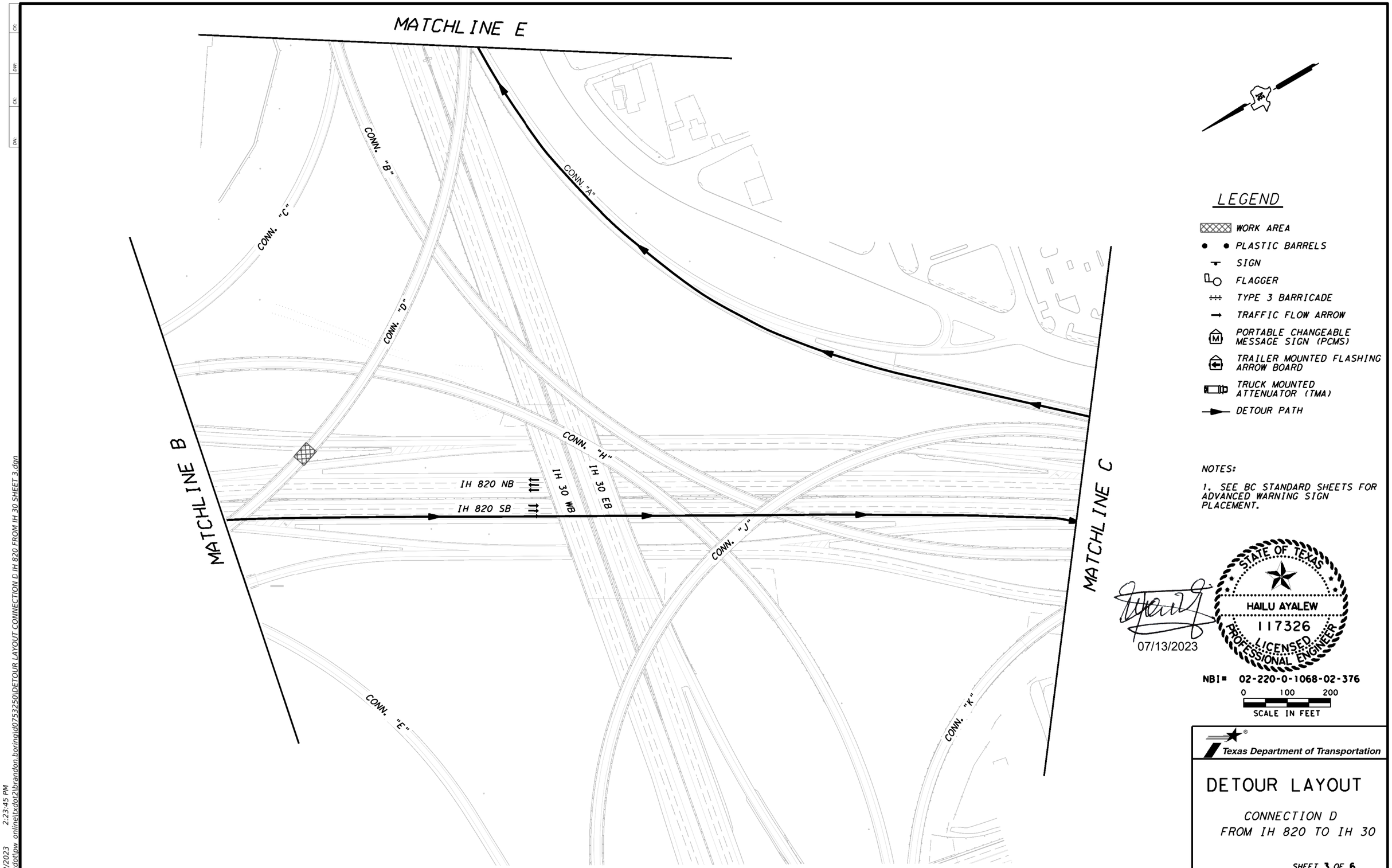

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)
- DETOUR PATH

NOTES:

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STATE OF TEXAS
HAILU AYALEW
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LICENSED PROFESSIONAL ENGINEER
07/13/2023

NBI= 02-220-0-1068-02-376

0 100 200
SCALE IN FEET

Texas Department of Transportation

DETOUR LAYOUT

CONNECTION D
FROM IH 820 TO IH 30

SHEET 3 OF 6

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		58

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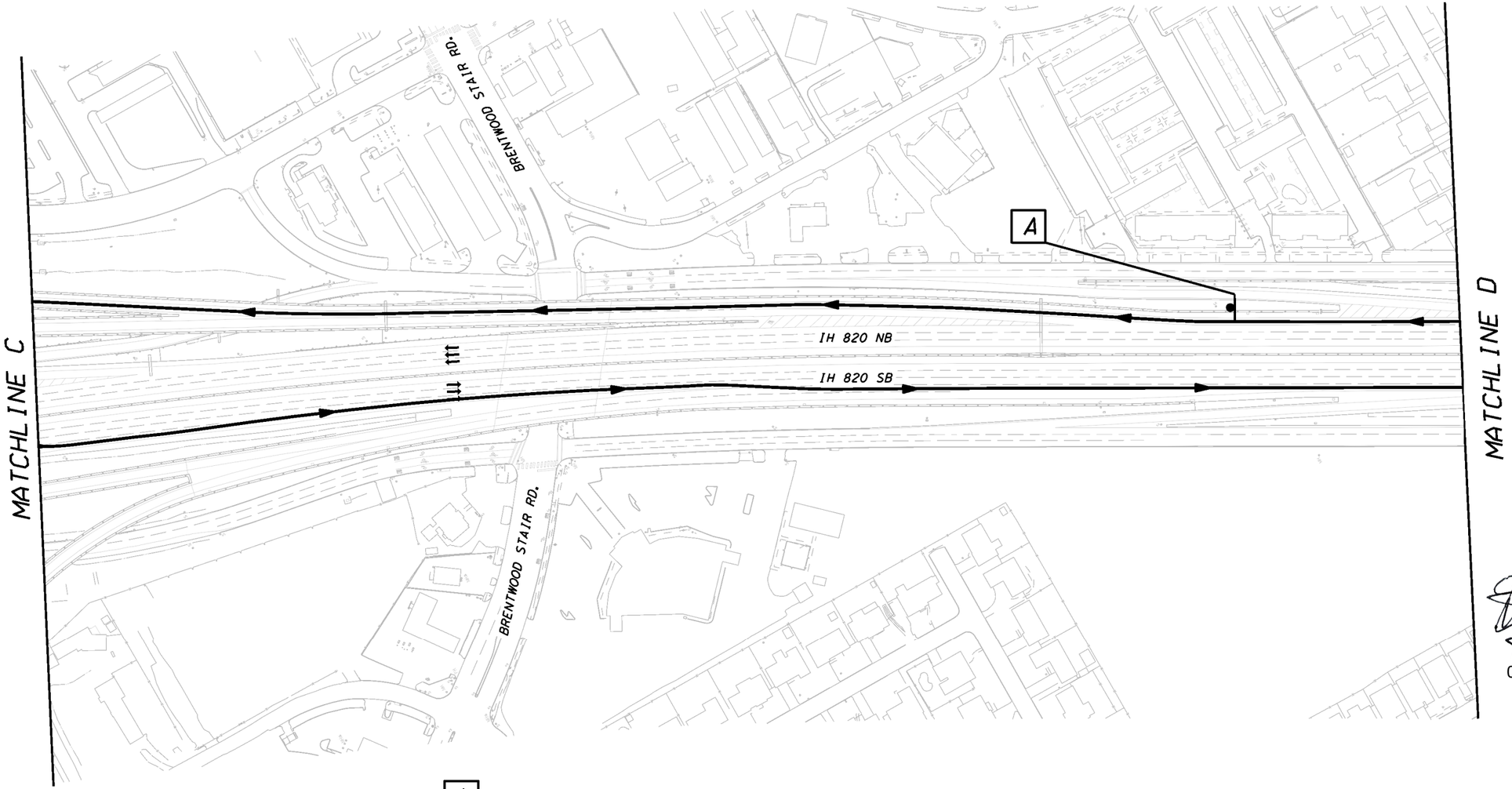

A

DETOUR M4-8 24" X 12"

EAST M3-3 24" X 12"

INTERSTATE 30 M1-1 30" x 24"

M6-3 21" X 15"

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)
- DETOUR PATH

NOTES:

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07/13/2023

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

NBI= 02-220-0-1068-02-376

0 100 200
SCALE IN FEET

Texas Department of Transportation

DETOUR LAYOUT

CONNECTION D
FROM IH 820 TO IH 30

SHEET 4 OF 6

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		59

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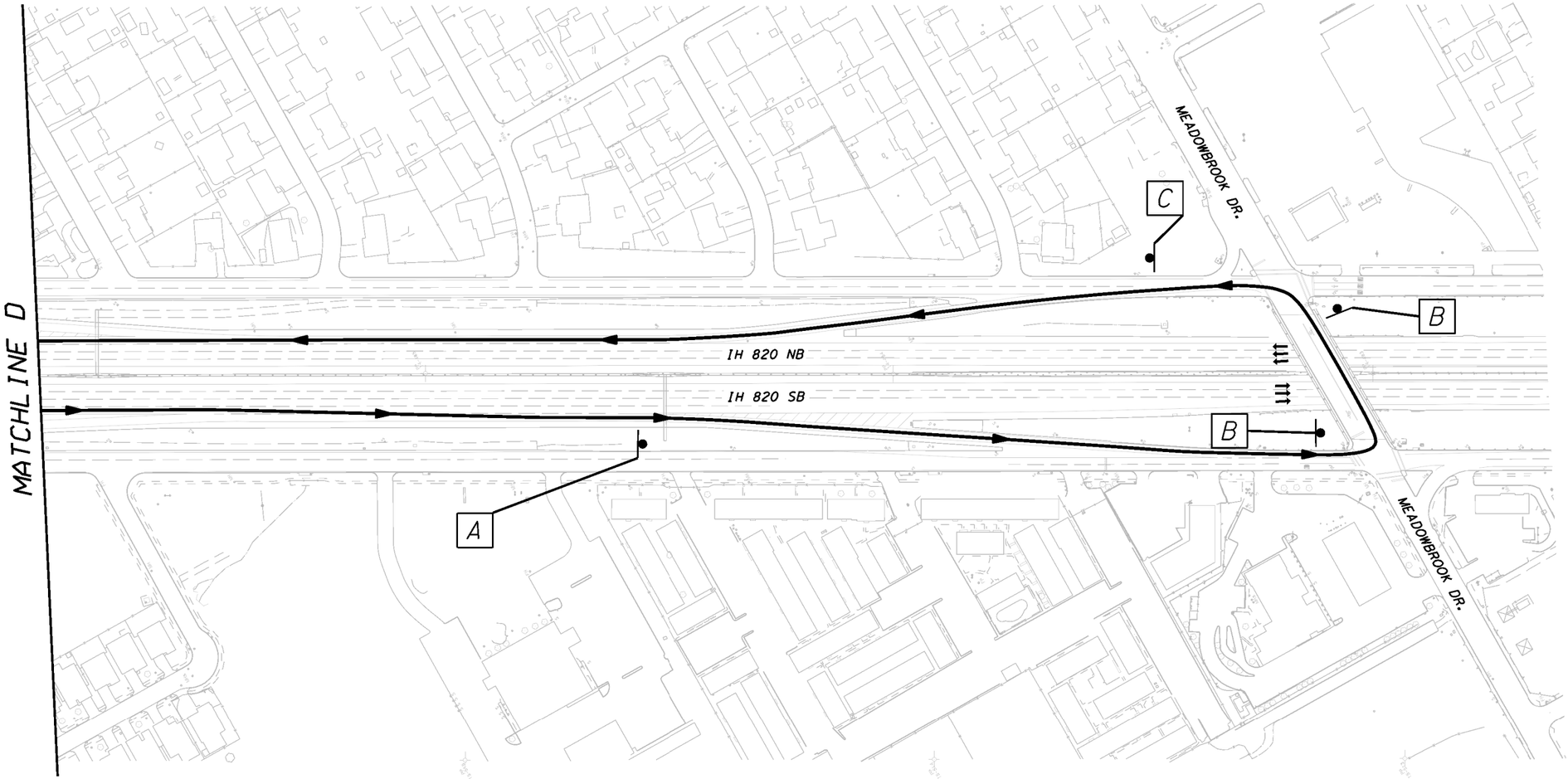

LEGEND

- WORK AREA
- PLASTIC BARRELS
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- FLAGGER
- TYPE 3 BARRICADE
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07/13/2023

STATE OF TEXAS
HAILU AYALEW
117326
LICENSED PROFESSIONAL ENGINEER

NBI= 02-220-0-1068-02-376

0 100 200
SCALE IN FEET

A		B		C	
DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"	DETOUR	M4-8 24" X 12"
EAST	M3-3 24" X 12"	EAST	M3-3 24" X 12"	EAST	M3-3 24" X 12"
INTERSTATE 30	M1-1 30" x 24"	INTERSTATE 30	M1-1 30" x 24"	INTERSTATE 30	M1-1 30" x 24"
	M6-3 21" X 15"		M6-2L 21" X 15"		M6-2L 21" X 15"

Texas Department of Transportation

DETOUR LAYOUT

CONNECTION D
FROM IH 820 TO IH 30

SHEET 5 OF 6

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		60

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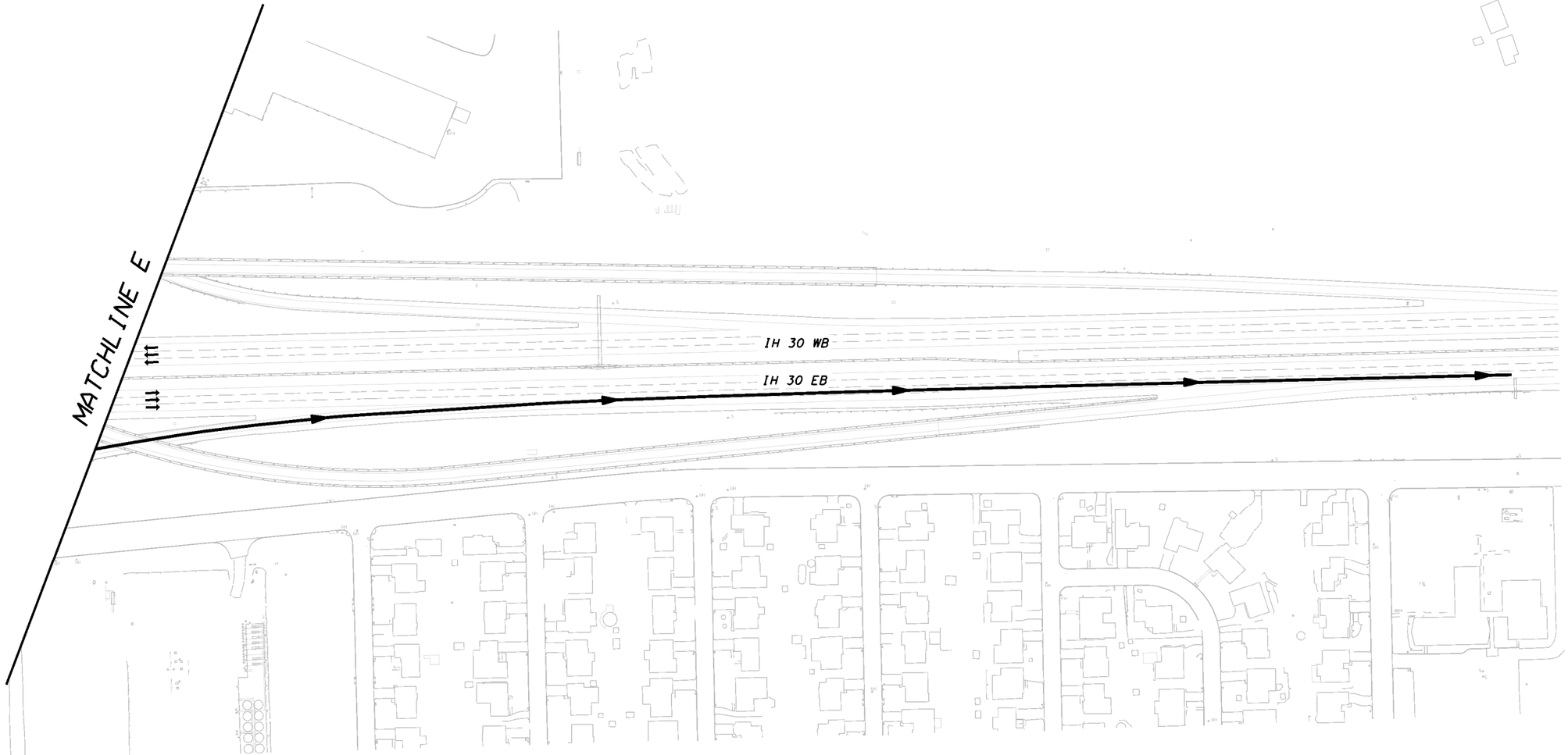

LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
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07/13/2023

STATE OF TEXAS
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PROFESSIONAL ENGINEER

NBI# 02-220-0-1068-02-376

0 100 200
SCALE IN FEET

Texas Department of Transportation

DETOUR LAYOUT

CONNECTION D
FROM IH 820 TO IH 30

SHEET 6 OF 6

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		61

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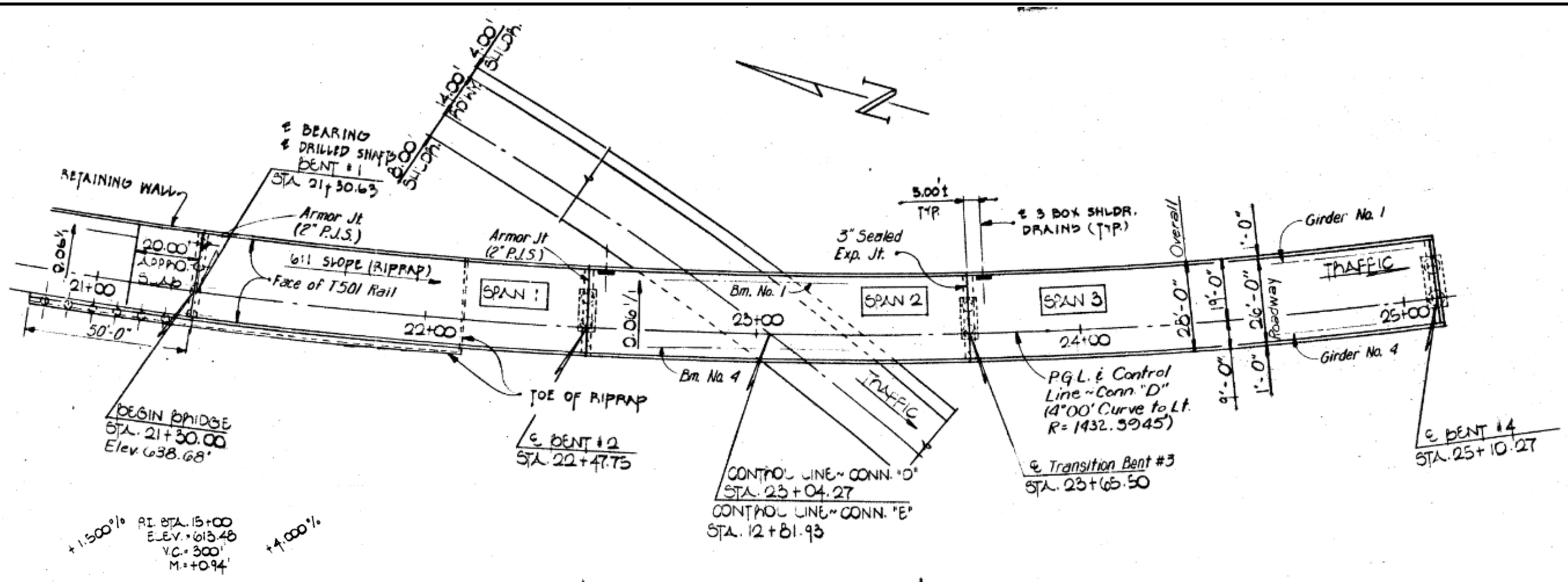


+1.500% PI. STA. 15+00
ELEV. = 613.48
V.C. = 300'
M. = +0.94'
+4.000%

VERTICAL CURVE DATA

P.I. Sta. = 37+05.07
Δ = 105°0'45.17" LT.
D = 4°00'
R = 1432.3945'
T = 1867.16'
L = 2625.31'

HORIZONTAL CURVE DATA

NOTE: ALL BENTS ARE PERPENDICULAR TO CONTROL LINE
BENTS #1 THRU #19 ARE ON ALONG RADIAL LINE.

NOTE:

Refer to Sheet 2, 4 and 7 of 9 for proposed work.

ESTIMATED QUANTITIES

	Description		Total
0429-6009	Conc Str Repair (Standard)	SF	10
0785-6005	Bridge Joint Repair (SEJ)	LF	28

NBI#: 02-220-0-1068-02-376

SHEET 1 OF 9

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

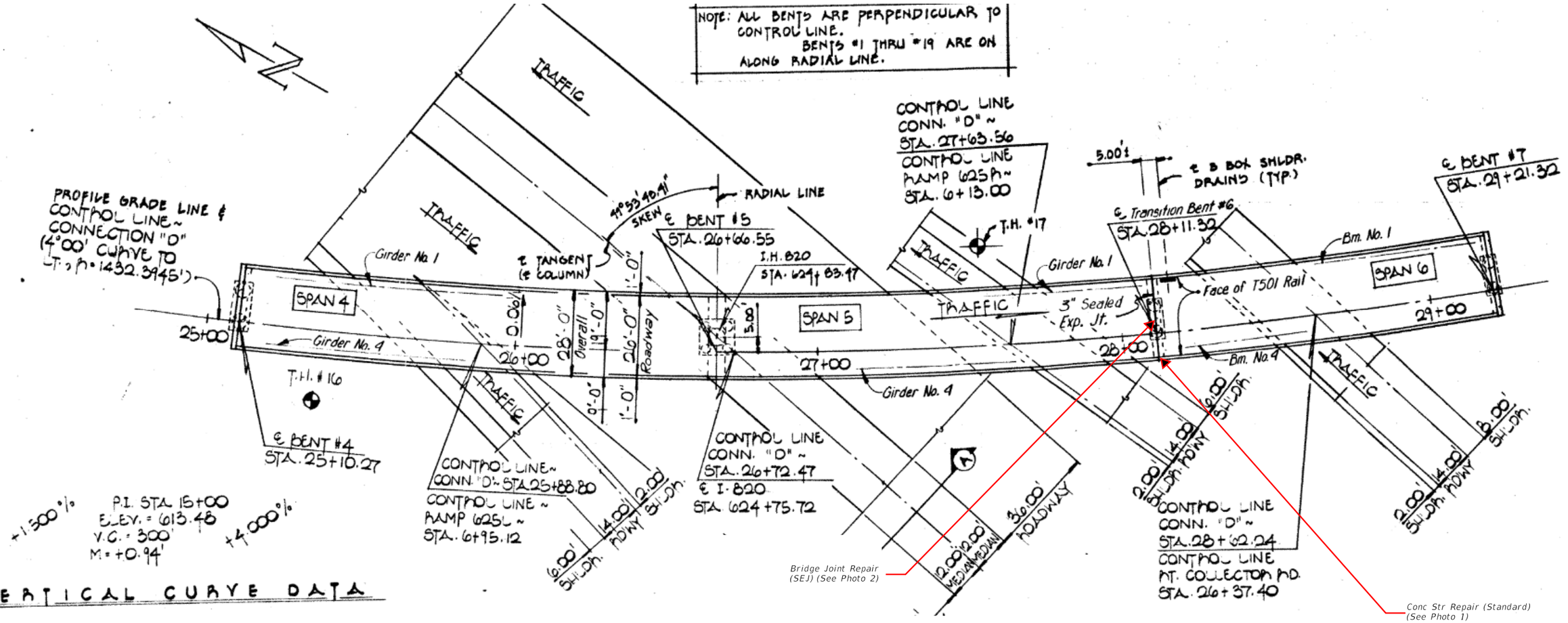
Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

CONNECTION "D" FROM IH820 TO IH30

	DN: ST	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	30	900	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		62

NOTE: ALL BENTS ARE PERPENDICULAR TO CONTROL LINE.
BENTS #1 THRU #19 ARE ON ALONG RADIAL LINE.



+1.500% P.I. STA 15+00 +4.000%
ELEV. = 613.48
V.C. = 300'
M = +0.94'

VERTICAL CURVE DATA

NBI#: 02-220-0-1068-02-376

SHEET 2 OF 9

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation
Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

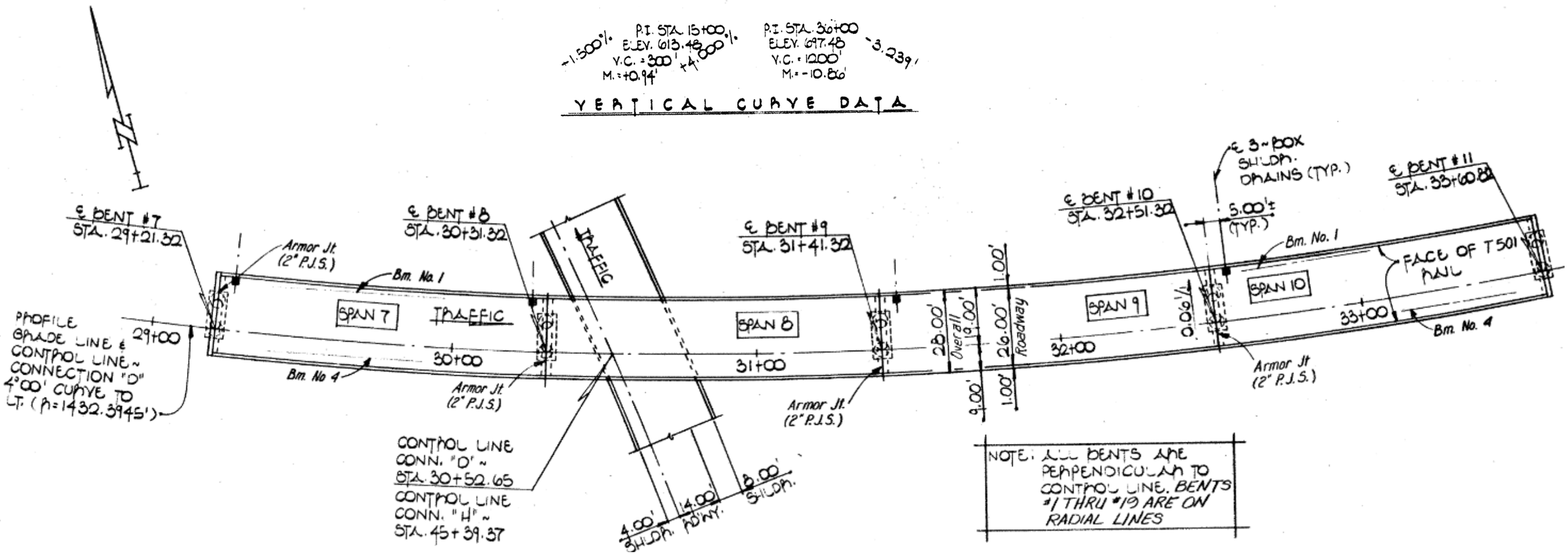
CONNECTION "D" FROM IH820 TO IH30

DN: ST	CK: MC	DW: GC/SR	CK: MC/SR

 07-10-23
REVISIONS

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS

DIST	COUNTY	SHEET NO.
02	TARRANT, ETC.	63



NBI#: 02-220-0-1068-02-376

STATE OF TEXAS
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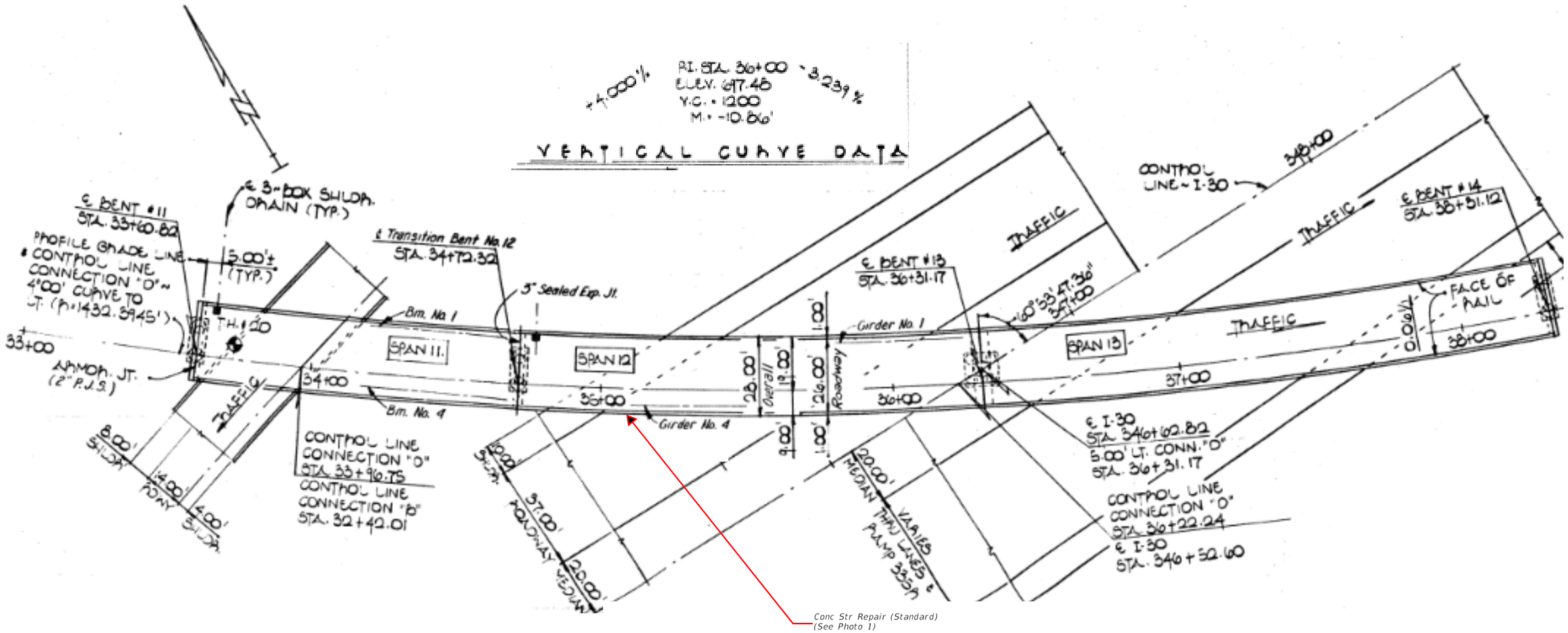
MISCELLANEOUS BRIDGE REPAIRS

CONNECTION "D" FROM IH820 TO IH30

	DN: ST	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		64



Conc Str Repair (Standard)
(See Photo 1)

NBI#: 02-220-0-1068-02-376

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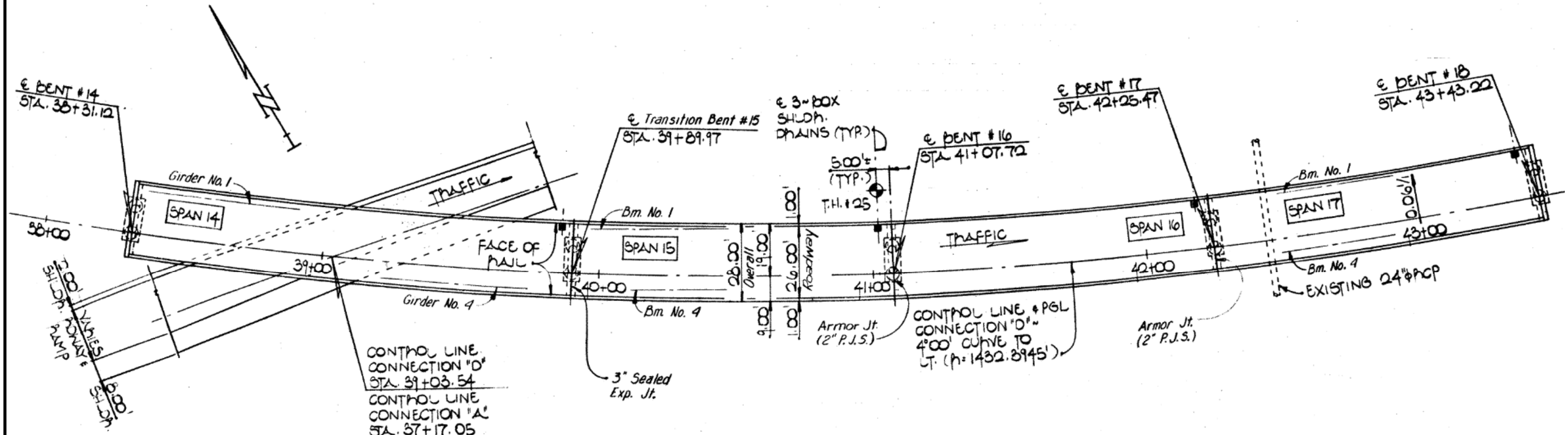
MISCELLANEOUS BRIDGE REPAIRS

CONNECTION "D" FROM IH820 TO IH30

	DN: ST	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		65



NOTE: ALL BENTS ARE PERPENDICULAR TO CONTROL LINE. BENTS #1 THRU #19 ARE ON RADIAL LINES.

+4.000% P.I. STA. 36+00 ELEV. 697.48' V.C.=1200' M.=-10.86' -3.239%

VERTICAL CURVE DATA

NBI#: 02-220-0-1068-02-376

SHEET 5 OF 9

STATE OF TEXAS
SANGIT RAUNIYAR
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7/10/2023

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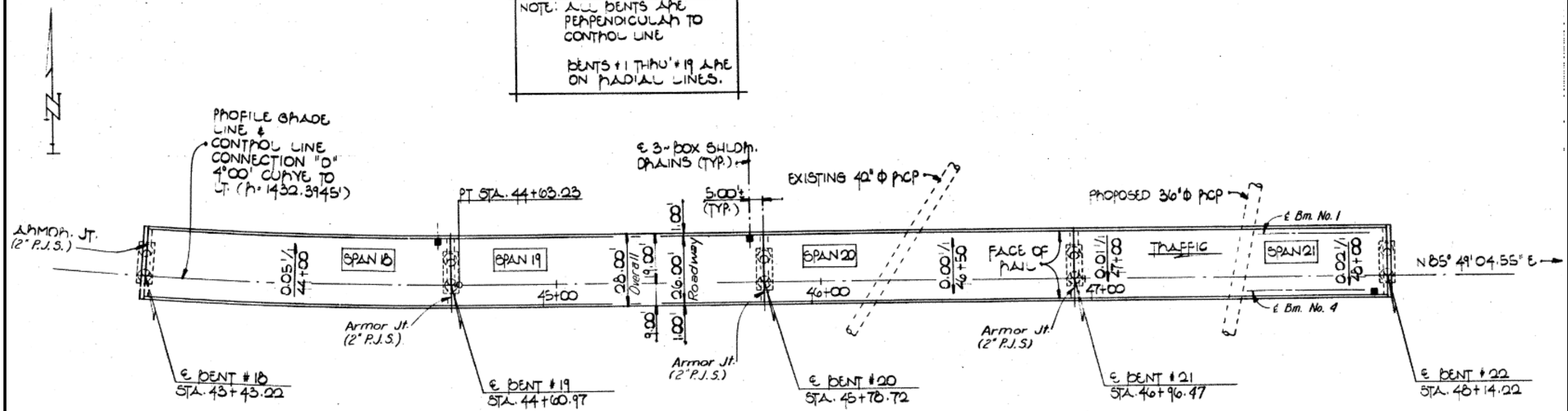
MISCELLANEOUS BRIDGE REPAIRS

CONNECTION "D" FROM IH820 TO IH30

			DN: ST	CK: MC	DW: GC/SR	CK: MC/SR	
©TxDOT 07-10-23	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0902	90	300		VARIOUS		
	DIST	COUNTY				SHEET NO.	
	02	TARRANT, ETC.				66	

NOTE: ALL BENTS ARE PERPENDICULAR TO CONTROL LINE

BENTS #1 THRU' #19 ARE ON RADIAL LINES.



-4.000% PI STA. 36+00 ELEV. 697.48 V.C.=1200' M.=-10.86' -3.239%

VERTICAL CURVE DATA

NBI#: 02-220-0-1068-02-376

SHEET 6 OF 9

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

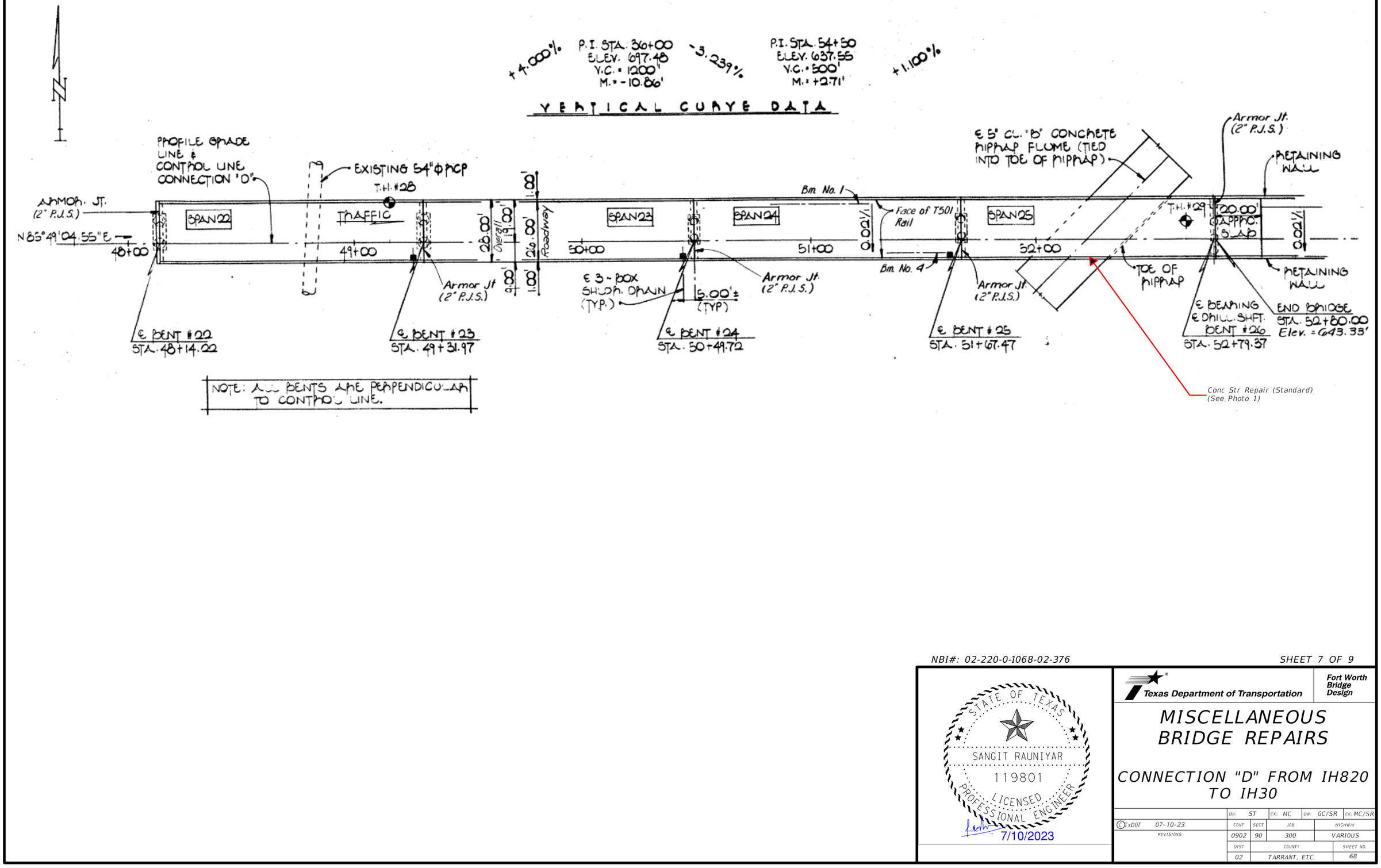
Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

CONNECTION "D" FROM IH820 TO IH30

	DN: ST	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		67



NOTE: ALL BENTS ARE PERPENDICULAR TO CONTROL LINE.

NBI#: 02-220-0-1068-02-376

SHEET 7 OF 9

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

CONNECTION "D" FROM IH820 TO IH30

DN: ST	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		68

Photo 1

(Showing damage at Bent 6)

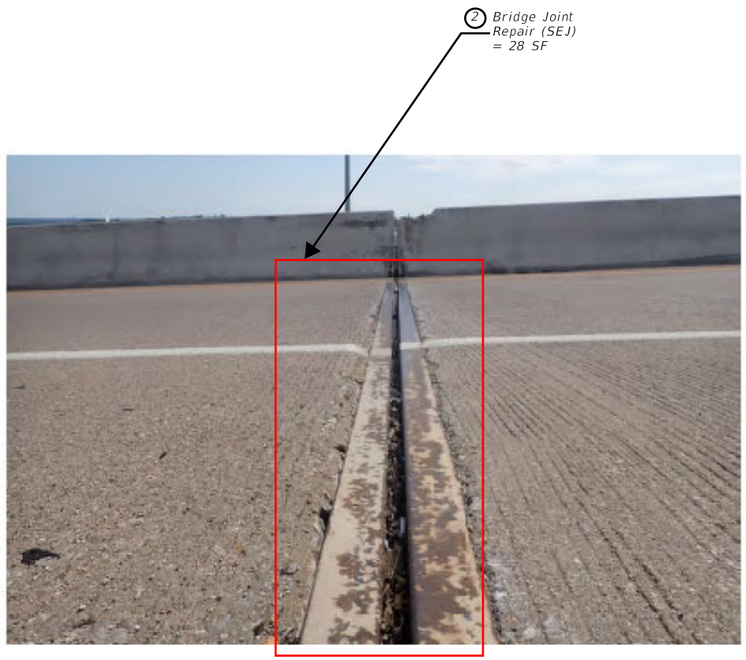


Photo 2

(Showing joint at Bent 6)

Keynotes:

1. Rail damage at Spans 12 and 25 similar to damage at Bent 6. The quantity includes damage at all these locations.

2. See Joint Repair details on Sheet 9 of 9.

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STATE OF TEXAS
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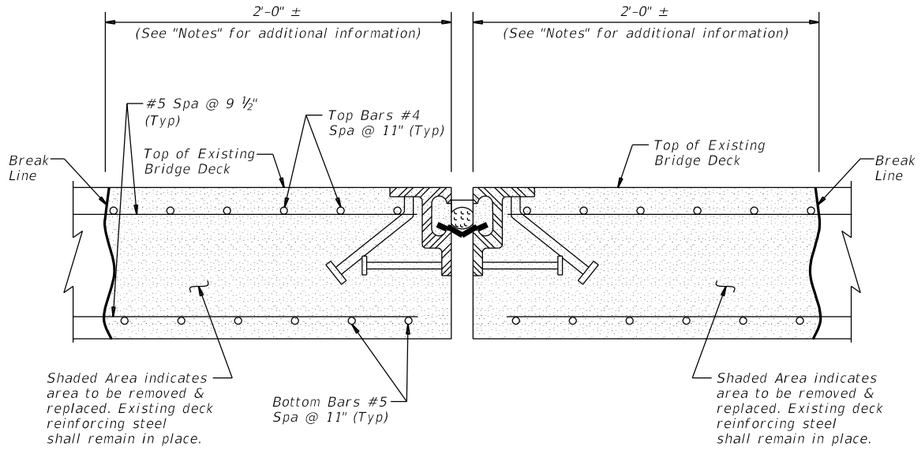
Fort Worth Bridge Design

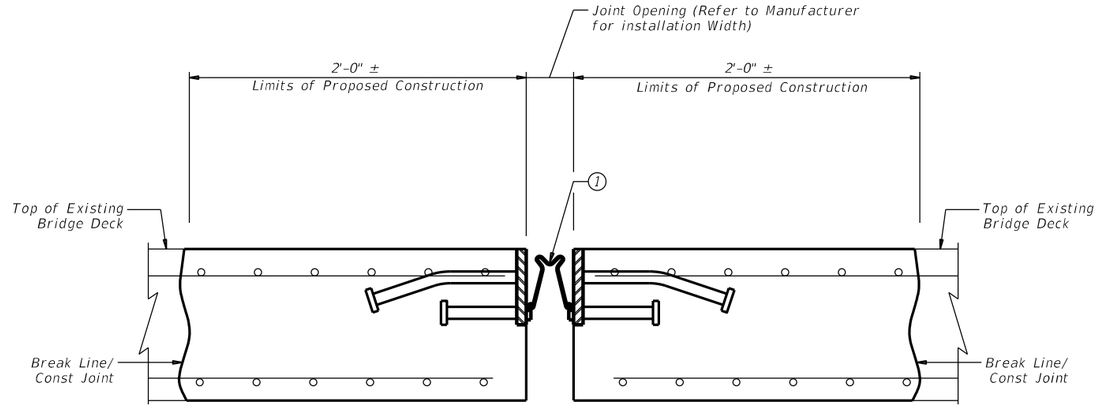
MISCELLANEOUS BRIDGE REPAIRS

CONNECTION "D" FROM IH820 TO IH30

	DN: ST	CK: MC	DW: GC/SR	CK: MC/SR
© TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		69



EXISTING JOINT AT BENT #6



1 Refer to SEJ-B standard for more details.

PROPOSED JOINT AT BENT #6

SECTION THRU JOINT AT BENT #6

BRIDGE DECK & JOINT REPAIR NOTES

1. Repair joint as indicated in accordance with Item 785.
2. Restore bridge deck integrity as indicated in accordance with Item 422.
3. Remove bridge deck concrete full depth as shown.
4. All existing bars should be kept and reused.
5. Saw cutting allowed for ½ inch depth.
6. Removing the bridge deck concrete and installing new bridge deck will be considered subsidiary to Item 785.
7. Prepackaged concrete materials must be used, and must meet the requirements of DMS-4655, Concrete Repair Materials, Type A. A list of pre-qualified materials is available for Concrete Repair Materials.
8. Obtain Engineer's approval for prepackaged concrete material before making a selection.
9. Concrete Material must attain a minimum strength of 3,000 psi in 12 hours, and before opening to traffic. Follow prepackaged concrete materials manufacturer's instructions with regard to surface preparation, mixing, placing, and curing methods. Contractor shall be responsible for determining the concrete strength by testing cementetious concrete used for repair in cubes in accordance with Tex-307-D or ASTM C-109. Testing of cementetious concrete for repair shall not be paid for directly, but is considered subsidiary to Item 785.
10. The Contractor shall reference all existing pavement markings before repair.
11. The Contractor shall match existing slopes and roadway.

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SHEET 9 OF 9

STATE OF TEXAS
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Texas Department of Transportation

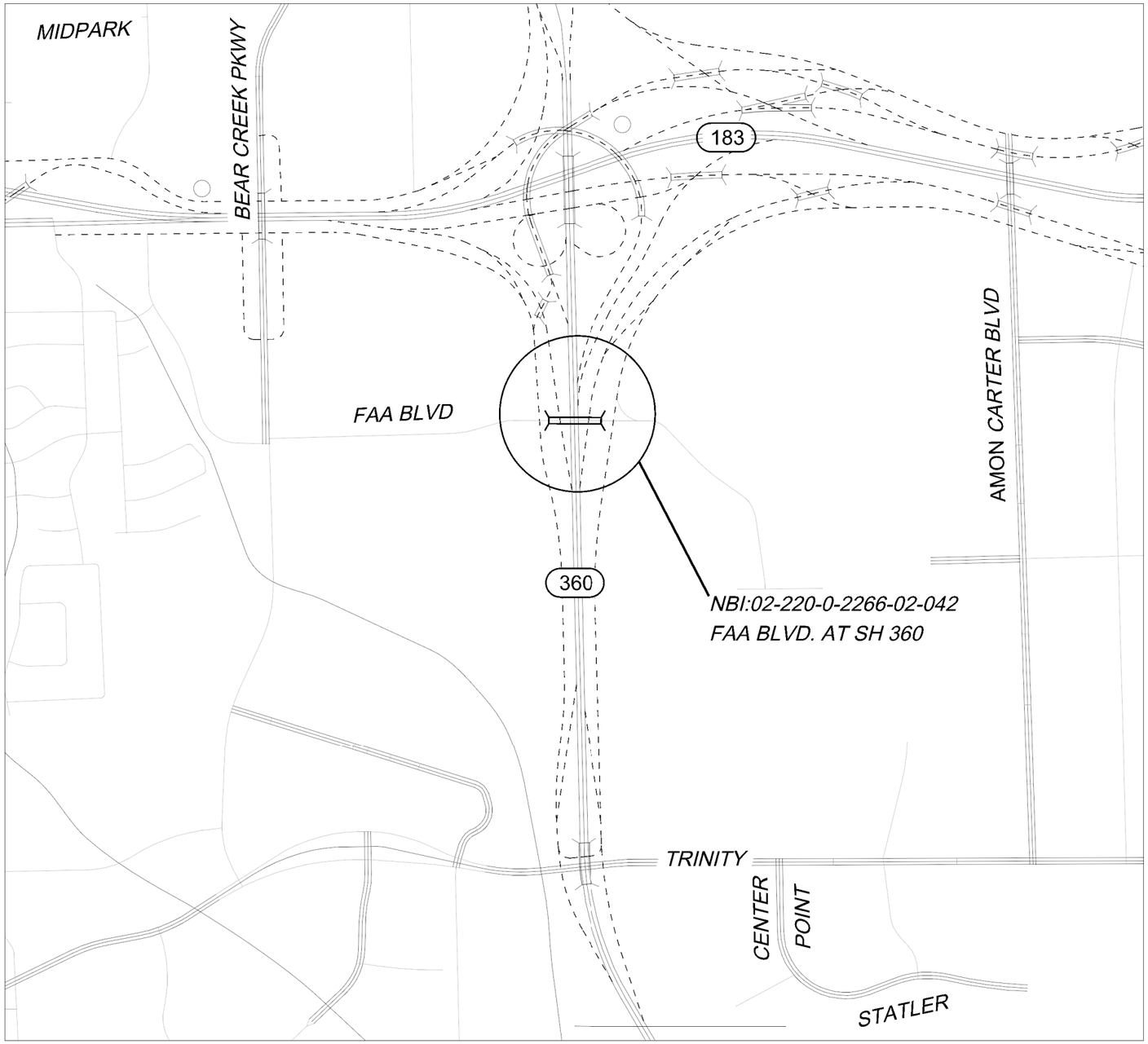
Fort Worth Bridge Design

JOINT REPAIR

CONNECTION "D" FROM IH 820 TO IH 30

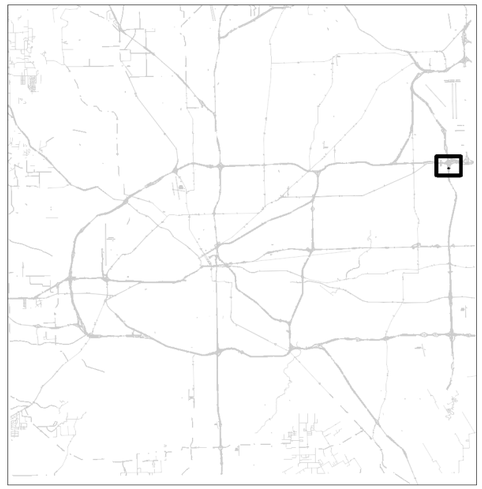
	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		70

T:\BRIDGE\share\BEAM, BRIDGE, & WALL REPAIRS\CFRP\0902-90-300\DGN\SEJ_Joint Detail.dgn



LOCATION MAP

N.T.S.



TARRANT COUNTY

02-220-0-2266-02-042

Texas Department of Transportation

2024 BEAM REPAIR LOCATION MAP

FAA BLVD. AT SH 360

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		71

DATE: 7/12/2023 2:25:05 PM
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SEQUENCE OF WORK

PHASE I STEP 1 - NB SH SH 360 AT FAA BLVD

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE NB SH 360 MAINLANES AT FAA BLVD CLOSURE BY CLOSING THE INSIDE LANE AND SHOULDER ACCORDING TO TCP (6-1)-12.
3. CLOSE THE EB FAA BLVD OUTSIDE LANE AS SHOWN ON THE TRAFFIC CONTROL PLAN.
4. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLENEOUS BRIDGE REPAIR" SHEETS FOR SH 360 AT FAA BLVD.
5. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

PHASE I STEP 2 - FAA BLVD. AT SH 360

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.
2. SET UP THE CONNECTION "E" EB SH 183 TO SB SH 360 AT FAA BLVD BY CLOSING THE OUTSIDE LANE AND SHOULDER ACCORDING TO TCP (2-6)-18.
3. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLENEOUS BRIDGE REPAIR" SHEETS FOR SH 360 AT FAA BLVD.
4. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

TRAFFIC CONTROL PLAN

PHASE I STEP 1 - NB SH SH 360 AT FAA BLVD

1. NB SH 360 TRAFFIC CONTINUES ON THE THREE OUTSIDE MAIN LANES. SB SH 360 TRAFFIC REMAINS UNDISTURBED.
2. EB FAA BLVD TRAFFIC CONTINUES ON THE INSIDE LANE. WB FAA BLVD TRAFFIC REMAINS UNDISTURBED.

PHASE I STEP 2 - FAA BLVD. AT SH 360

1. CONNECTION "E", EB SH 183 TO SB SH 360 AT FAA BLVD TRAFFIC CONTINUES ON INSIDE LANE.
2. THE EB FAA BLVD AND WB FAA BLVD TRAFFIC REMAINS UNDISTURBED.
3. NB AND SB SH 360 MAINLANES TRAFFIC REMAINS UNDISTUBED.

07/13/2023

Texas Department of Transportation

SEQUENCE OF WORK

FAA BLVD. AT SH 360

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		72

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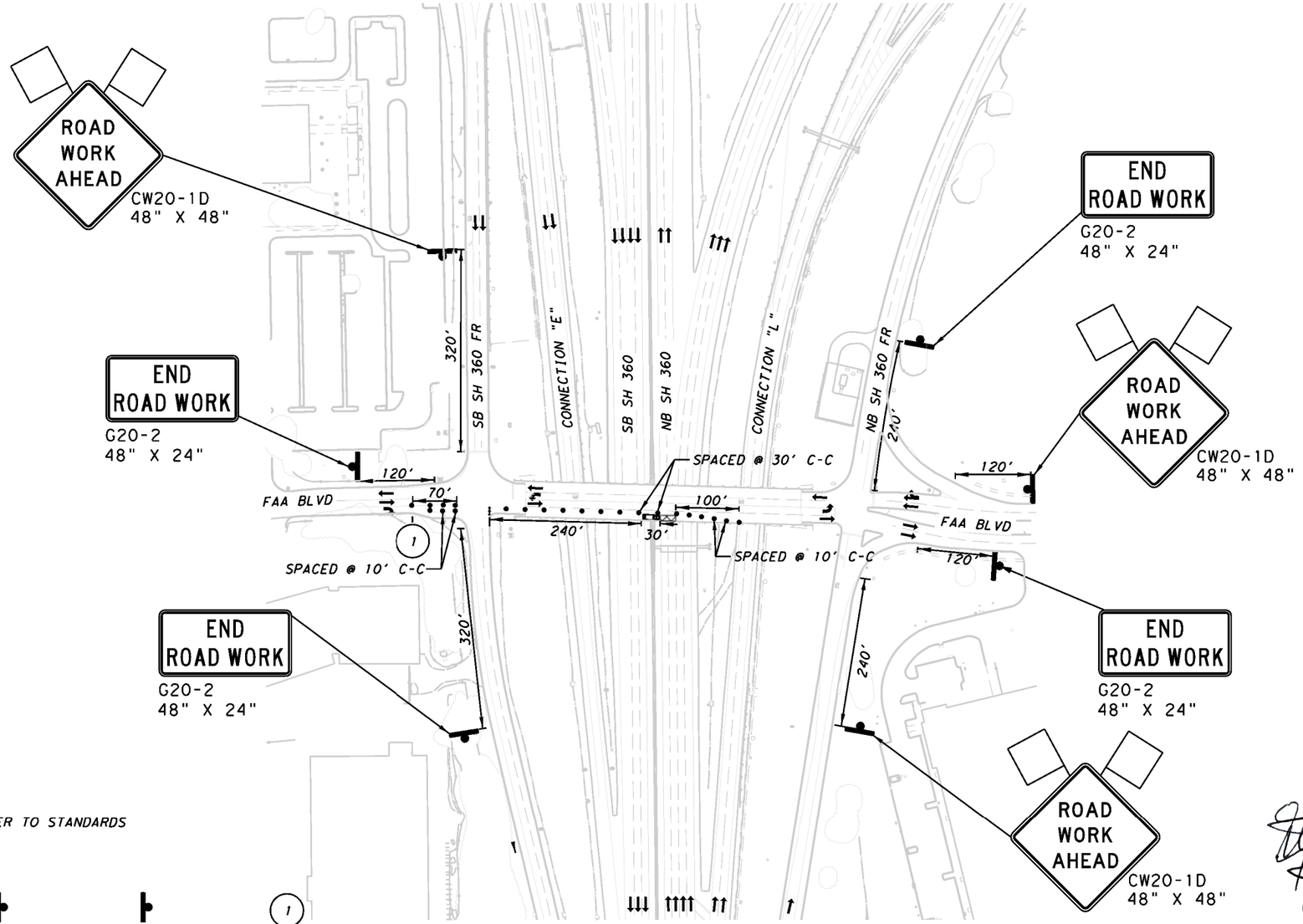
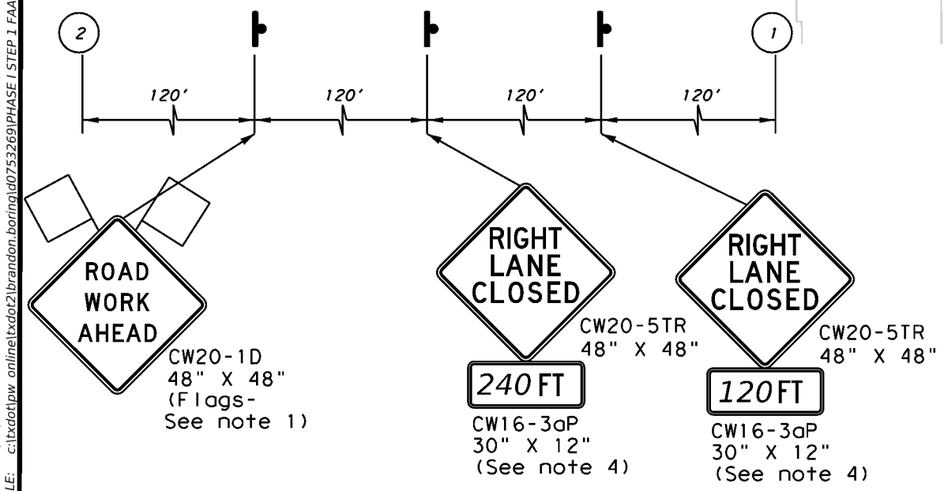


LEGEND

- WORK AREA
- PLASTIC BARRELS
- SIGN
- FLAGGER
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- TRUCK MOUNTED ATTENUATOR (TMA)

(2) FOR ADVANCED WARNING SIGNS REFER TO STANDARDS



NOTES:

1. CONTRACTOR SHALL COORDINATE WITH THE AREA OFFICE PRIOR TO BEGINNING WORK.
2. FOR NIGHTTIME WORK OPERATIONS, REFER TO GENERAL NOTES FOR NIGHTTIME LIGHTING REQUIREMENTS.
3. SEE ADVANCED WARNING SIGN LAYOUT SHEET FOR ADVANCED WARNING SIGN PLACEMENT.

07/13/2023

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STATE OF TEXAS

NBI# 02-220-0-2266-02-042

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SCALE IN FEET

Texas Department of Transportation

TRAFFIC CONTROL PLAN

PHASE I STEP 1
FAA BLVD. AT SH 360

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		73

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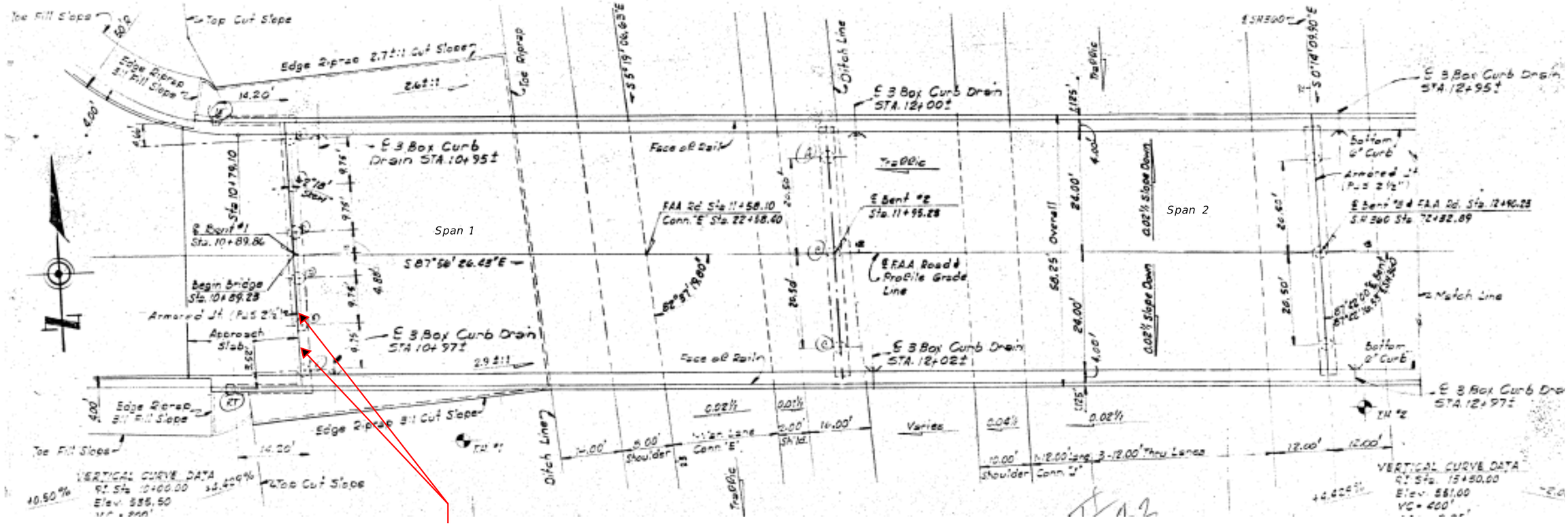

Conc Str Repair (Clean & Coat with Epoxy) (See Photo 3 and 4)

PLAN

ESTIMATED QUANTITIES			
	Description		Total
0429-6001	Conc Str Repair (Clean & Coat with Epoxy)	SF	2
0429-6005	Conc Str Repair (Deck Rep(Full Depth))	SF	10
0776-6036	Repair (Stl Post Retrofit)	EA	1

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SHEET 1 OF 4

STATE OF TEXAS
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7/10/2023

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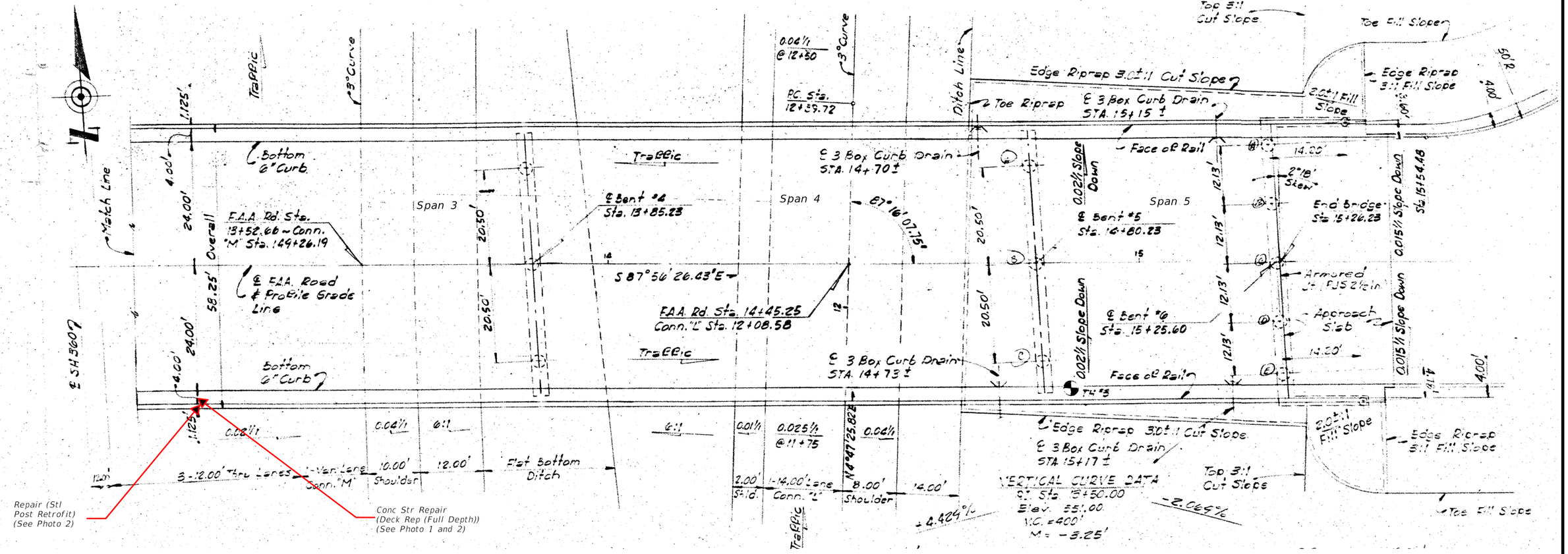
MISCELLANEOUS BRIDGE REPAIRS

F.A.A. BLVD @ SH 360

DN: AL	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		74



PLAN

NBI#: 02-220-0-2266-02-042

SHEET 2 OF 4

STATE OF TEXAS
SANGIT RAUNIYAR
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LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

F.A.A. BLVD @ SH 360

	DN: AL	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		75

Bridge Slab Conc Str Repair (Deck Repair (Full Depth)) = 10 SF

PHOTO 1

(Showing impact damage to overhang soffit in span #3 on the south overhang.)

① Repair (Stl Post Retrofit) = 1 EA

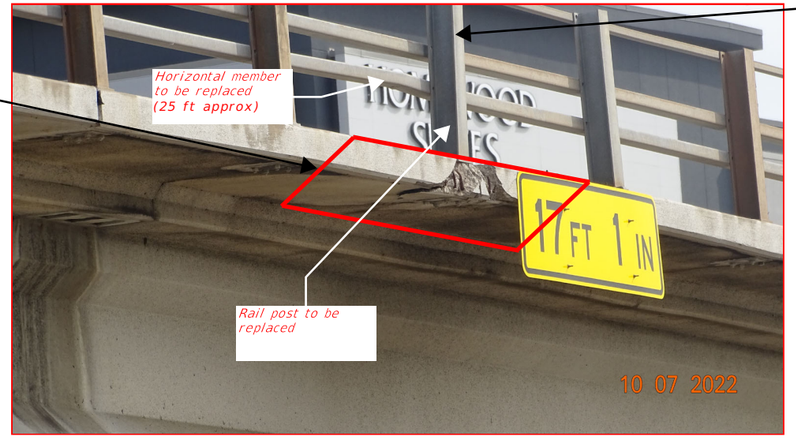

PHOTO 2

(Showing impact damage to overhang soffit in span #3 on the south overhang.)

Beam End Conc Str Repair (Clean & Coat with Epoxy) = 1 SF

Photo 3

(Showing spalling of beam #6 with exposed strand.)

Beam End Conc Str Repair (Clean & Coat with Epoxy) = 1 SF

PHOTO 4

(Showing spalling of beam #5 with exposed strand.)

Keynotes:

① Replace the post and bottom horizontal member full length (sleeve to sleeve). Type C301 (MOD) rail. Rail details sheet provided at the end for contractor's reference. All required work will be subsidiary to Item 776.

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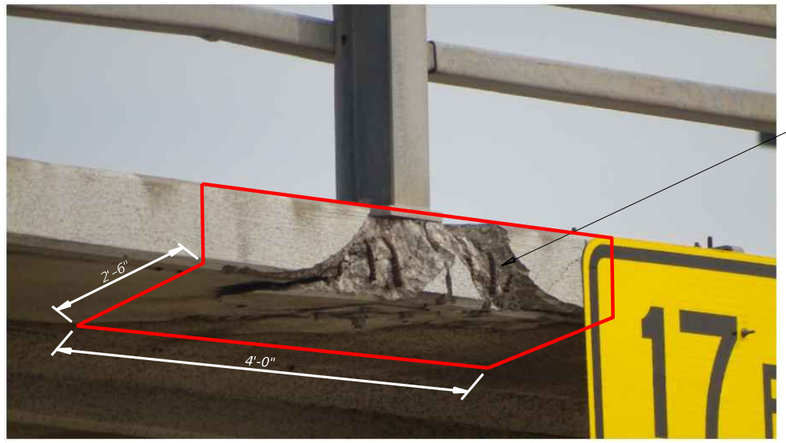
MISCELLANEOUS BRIDGE REPAIRS

F.A.A. BLVD @ SH 360

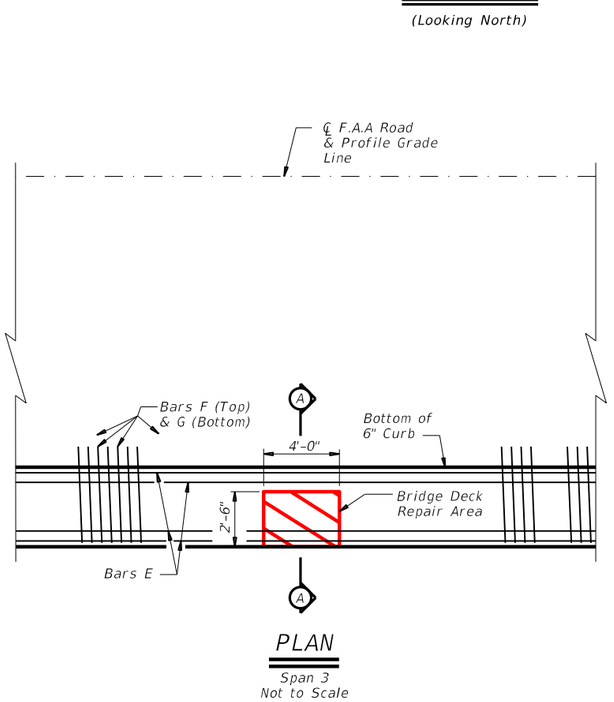
	DN: AL	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		76



Concrete Str Repair (Deck Repair) (Full Depth) = 10 SF

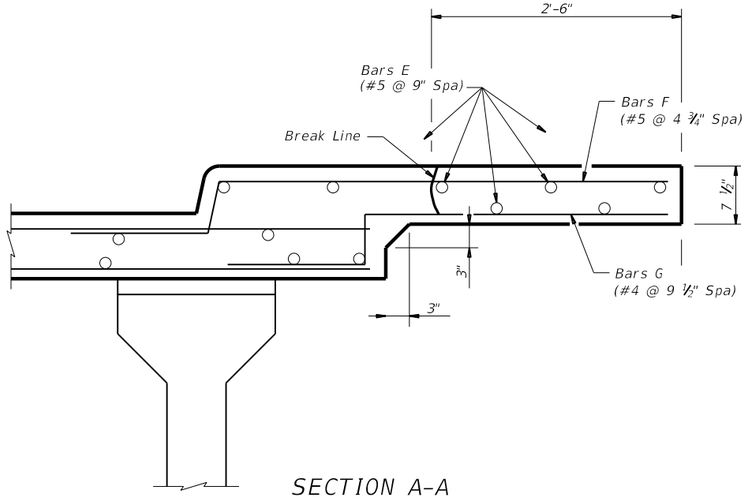
PHOTO 5

(Looking North)



PLAN

Span 3
Not to Scale



SECTION A-A

Not to Scale

DETAIL "A"

Material Notes:

1. Provide Grade 60 reinforcing steel.
2. Dimensions relating to reinforcing steel are to centers of bars.
3. Clean, straighten, and reuse existing steel. Notify EOR if not able to reuse.

Construction Notes:

1. Remove all unsound concrete from existing damaged bridge deck area as per Item 429, "Concrete Structure Repair", the Concrete Repair Manual, and these plans.
2. During the removal of concrete, if any reinforcing steel is damaged, replace the bars in kind using the following minimum splice length: For #4 bar use 1'-9", for #5 bar use 2'-2".
3. Use power-driven chipping tools or hydro-demolition equipment to remove concrete. Avoid damage to sound concrete to remain. Contractor may use up to 15 lbs hammers for the work. 15 lbs hammers or smaller must be used at the base and perimeter of the repair area to avoid damaging the surrounding concrete.
4. Saw cutting allowed for ½ inch depth.
5. Contractor shall follow the repair procedure (Full Depth), according to TxDOT "Concrete Repair Manual-2021" Chapter 3 section 4, "Bridge Deck Repair".
6. Prepackaged concrete material must be used, and must meet the requirements of DMS-4655, Concrete Repair Materials, Type A. A list of pre-qualified materials is available from the Material Producer List for Concrete Repair Materials.
7. Obtain Engineer's approval for prepackaged concrete material before making a selection.
8. Concrete Material must attain a minimum strength of 3,000 psi in 12 hours before opening to traffic. Follow prepackaged concrete matertials manufacturer's instructions with regard to surface preparation, mixing, placing, and curing methods. Contracor shall be responsible for determining the concrete strength by testing cementious concrete used for repair in cubes in accordanace with Tex-307-D or ASTM C-109. Testing of cementious concrete for repair shall not be paid for directly but is considered subsidiary to Item 429, "Concrete Structural Repair (Deck Repair Full Depth)".
9. Payment for repairs shall be as per Item 429, "Concrete Structure Repair".
10. Removal and reattachment of the existing vertical clearance sign will be considered subsidiary to Item 429. Vertical clearance sign must not be damaged and should be reused.

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Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

F.A.A. BLVD @ SH 360

DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		77

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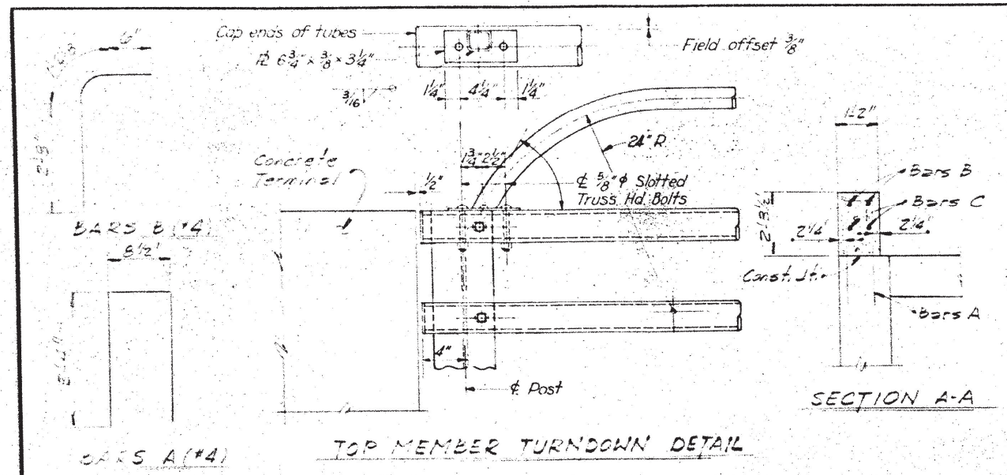
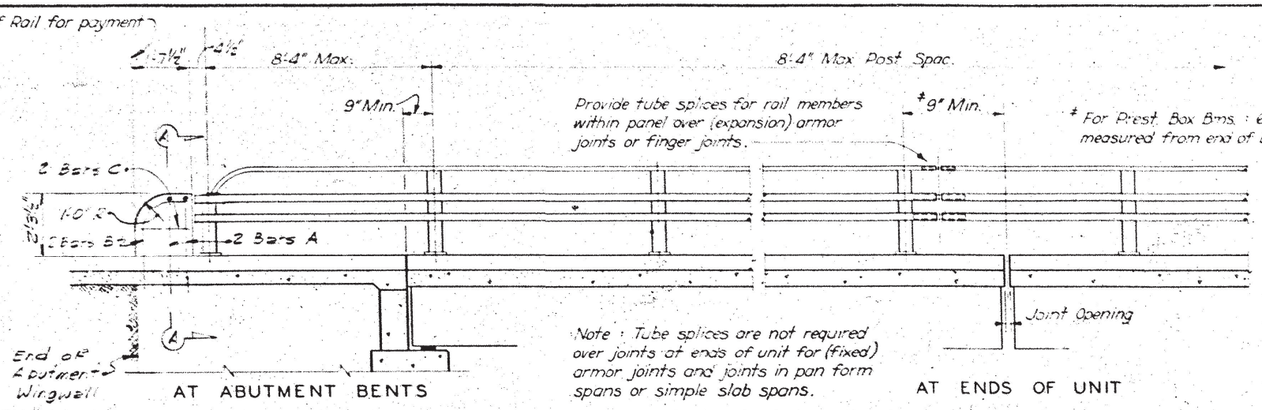
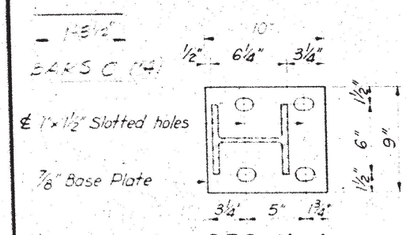
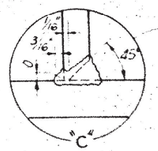


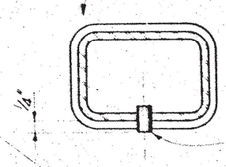


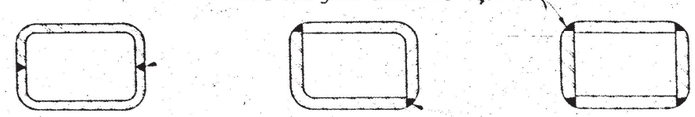
INSIDE ELEVATION OF RAIL





Note : In lieu of flange weld shown, a ⅜" fillet weld all around including edges of flange may be used.



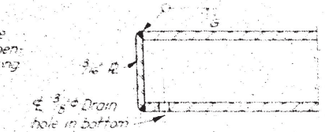


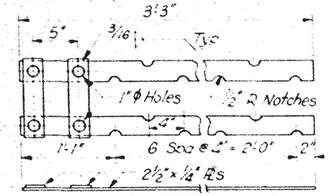
Note : Other sections of equal or greater strength are acceptable for sleeves

Note : The difference between the outside dimensions of the sleeve and the inside dimensions of the rail shall not exceed .125" along either axis.

TUBE & SLEEVE MEMBERS		
5"x 3" Tube Member		Sleeve Thickness
Material	Thickness	Matl. A36
A 500 Gr.B Mod.*	.188"	.188"
A 500 Gr. B	.250"	.250"
A 500 Gr. A or A 501	.313"	.250"
2"x 2" Tube Member		
Any of above or equal	.110"	.110"

* Conforms to A500 except material shall have a minimum yield strength of 50 ksi.





GENERAL NOTES:

Designed according to AASHTO 1973 Standard and current Interim Specifications.

Panel lengths of tube members shall be attached continuously to a minimum of three posts (except at abutments with exp. joints).

Rail posts shall be set perpendicular to roadway profile grade and cross slope of sidewalk.

Posts shall be seated on elastomeric pads 10"x 9"x 1/16". Additional pads or half pads may be used in shimming for alignment. Post heights shown will increase by the thickness of the pad.

All bolts, nuts, washers, anchorage plates, bottom plates, Conc. Term. (#4) reinforcing bars and elastomeric pads are considered as parts of the 1"ϕ pin.

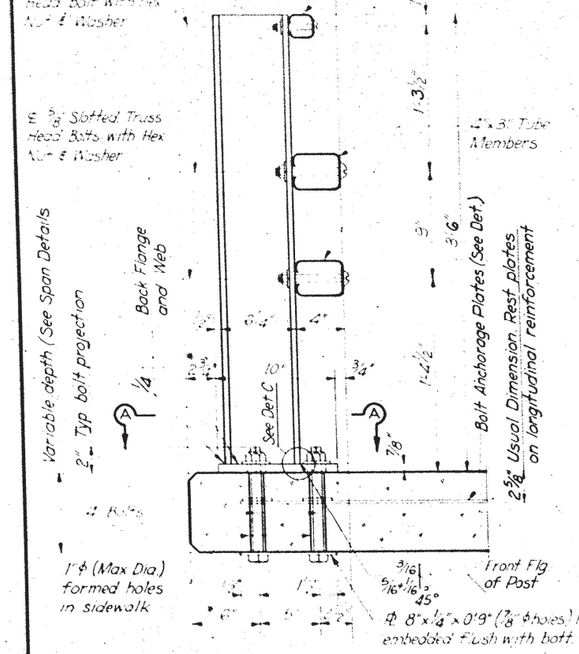
All steel connecting bolts and all anchor bolts, nuts, washers and bottom plates shall be galvanized after fabrication.

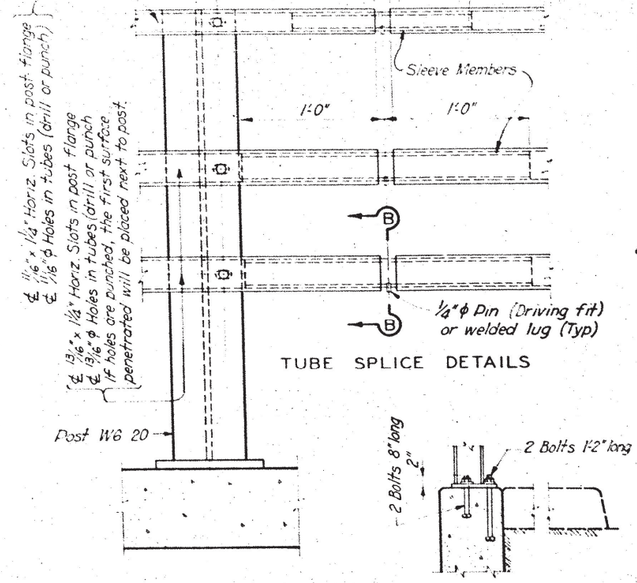
Anchor bolts shall be ¾"ϕ ASTM-A325 (or threaded rods A321 with tack welded nut) with hex nuts and washers as shown.

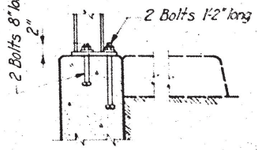
Shop drawings to be submitted to the Bridge Engineer for approval will be required only for rails on horizontal curves in which case the rail members shall be fabricated to the required radius for radii of 600' or less.

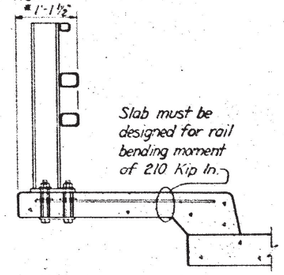
For rails not requiring shop drawings, erection drawings showing panel lengths, splice locations, rail post spacing and anchor bolt setting shall be submitted to the Resident Engineer for approval. Shop drawings may be submitted as 11"x17" prints provided they are clearly legible.

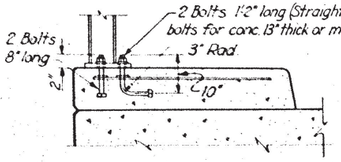
All open ends of rail tube shall be capped.











* Usual dimensions. See Structural Sheets.

POST MOUNTING DETAILS

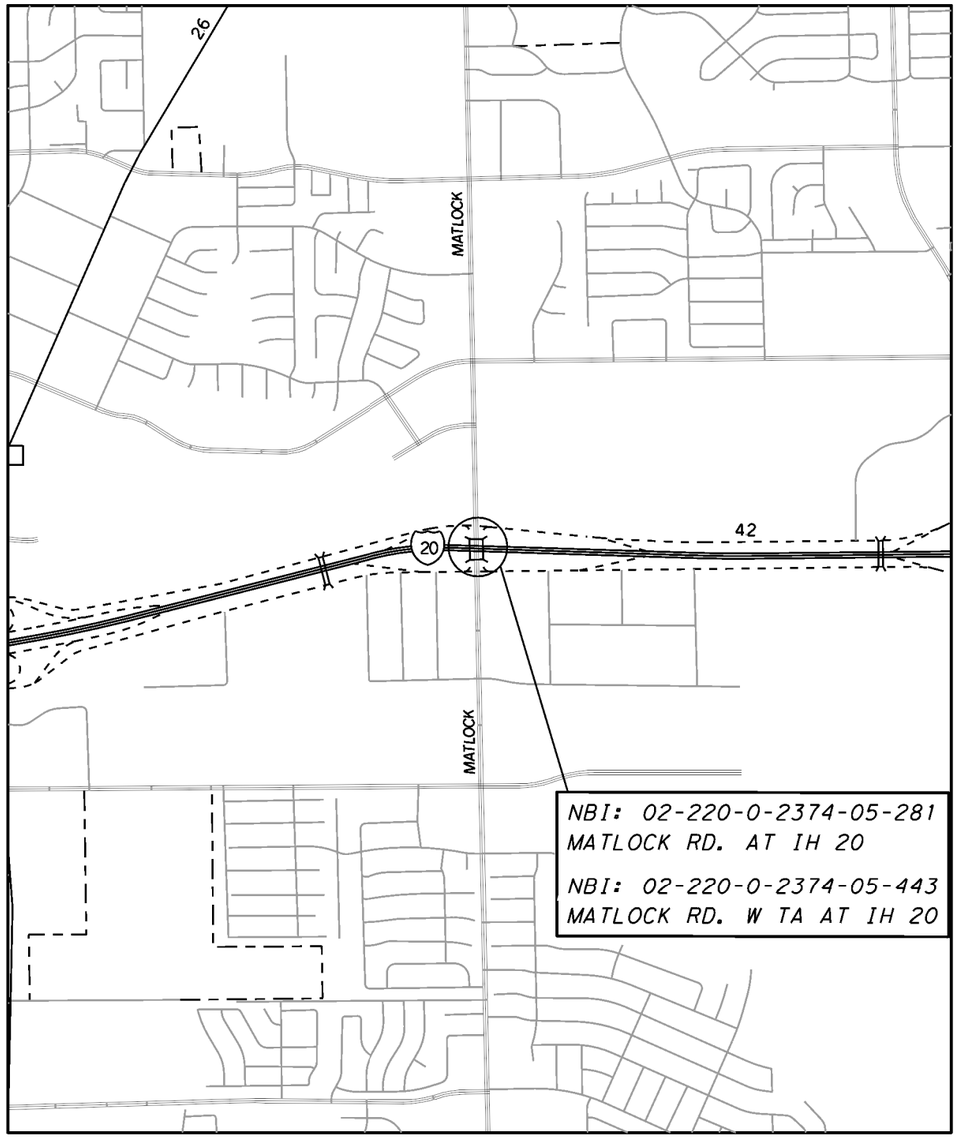
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

TRAFFIC RAIL TYPE C301 (MOD.)

254

ORIGINAL DRAWING DATE JULY 1976	STATE DISTRICT	FEDERAL REGION	PROJECT	SHEET
DN :- JJP	—	6	C301 (MOD) (TRAFFIC RAIL)	
CK :-	COUNTY		SHEET NO. 78	
DW :- RNS	—	—		
CK :- JJP				

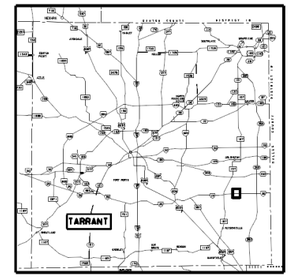
REVISIONS



LOCATION MAP

N.T.S.

TARRANT COUNTY



NBI:02-220-0-2374-05-281
NBI:02-220-0-2374-05-443

Texas Department of Transportation

2024 BEAM REPAIR LOCATION MAP

MATLOCK RD. AT IH 20 AND
MATLOCK RD. W TA AT IH 20

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		79

DATE: 7/14/2023 8:45:53 AM
FILE: c:\txdot\pw_online\txdot2\brandon.boring\d0754882\2024 BEAM REPAIR LOCATION MAP MATLOCK RD. AT IH20 & MATLOCK RD. W TA AT IH20.dgn

DW: CK: DW: CK:

SEQUENCE OF WORK
PHASE I STEP 1 - MATLOCK RD. AT IH 20

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.

2. SET UP THE EB IH 20 AT MATLOCK ROAD CLOSURE BY CLOSING THE TWO INSIDE LANES ACCORDING TO TCP (6-1b) -12.

3. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR MATLOCK RD. AT IH 20.

4. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

TRAFFIC CONTROL PLAN
PHASE I STEP 1 - MATLOCK RD. AT IH 20

1. EB IH 20 TRAFFIC CONTINUES ON THE TWO OUTSIDE MAIN LANES. WB IH 20 TRAFFIC REMAINS UNDISTURBED.

SEQUENCE OF WORK
PHASE I STEP 2 - MATLOCK RD. W TA AT IH 20

1. PLACE ADVANCE WARNING SIGNS IN CONFORMANCE WITH THE BARRICADE AND CONSTRUCTION (BC) STANDARDS.

2. SET UP THE EB IH 20 AT MATLOCK ROAD CLOSURE BY CLOSING THE TWO INSIDE LANES ACCORDING TO TCP (6-1b) -12.

3. PERFORM THE BRIDGE WORKS AS SHOWN ON THE "MISCELLANEOUS BRIDGE REPAIR" SHEETS FOR MATLOCK RD. W TA AT IH 20.

4. CLEAN UP AND REMOVE TRAFFIC CONTROL DEVICES.

TRAFFIC CONTROL PLAN
PHASE I STEP 2 - MATLOCK RD. W TA AT IH 20

1. EB IH 20 TRAFFIC CONTINUES ON THE TWO OUTSIDE MAIN LANES. WB IH 20 TRAFFIC REMAINS UNDISTURBED.

07/13/2023

Texas Department of Transportation

SEQUENCE OF WORK

MATLOCK RD. AT IH 20
AND MATLOCK RD.
W TA AT IH 20

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0902	90	300	VARIOUS
DIST	COUNTY		SHEET NO.
FTW	TARRANT, ETC.		80

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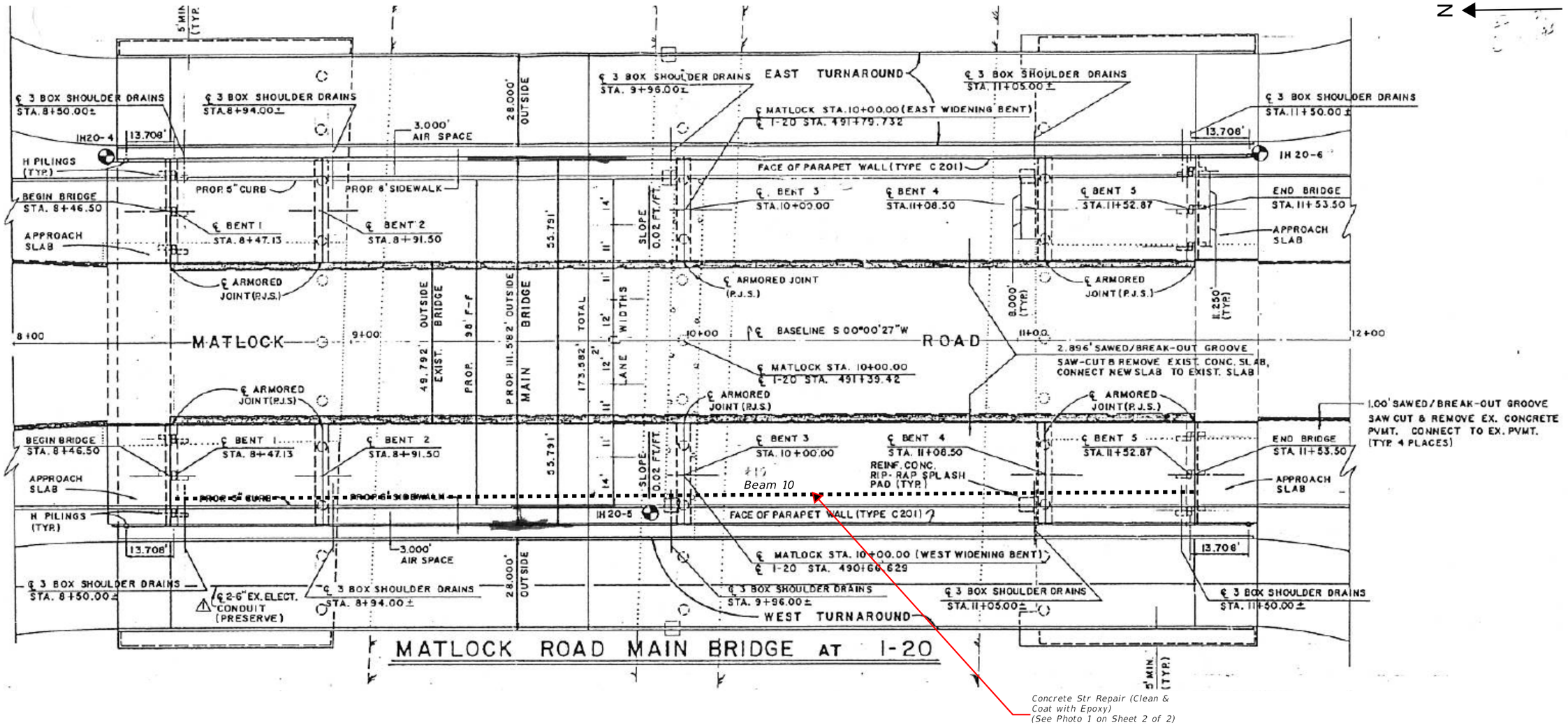


MATLOCK ROAD MAIN BRIDGE AT I-20

NBI#: 02-220-0-2374-05-281

SHEET 1 OF 2

ESTIMATED QUANTITIES

	Description		Total
0429-6001	Conc Str Repair (Clean & Coat with Epoxy)	SF	3

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

MATLOCK RD. @ IH 20

	DN: AL	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		81

PHOTO 1

Span 3, Beam 10

NBI#: 02-220-0-2374-05-281

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED
PROFESSIONAL ENGINEER
7/10/2023

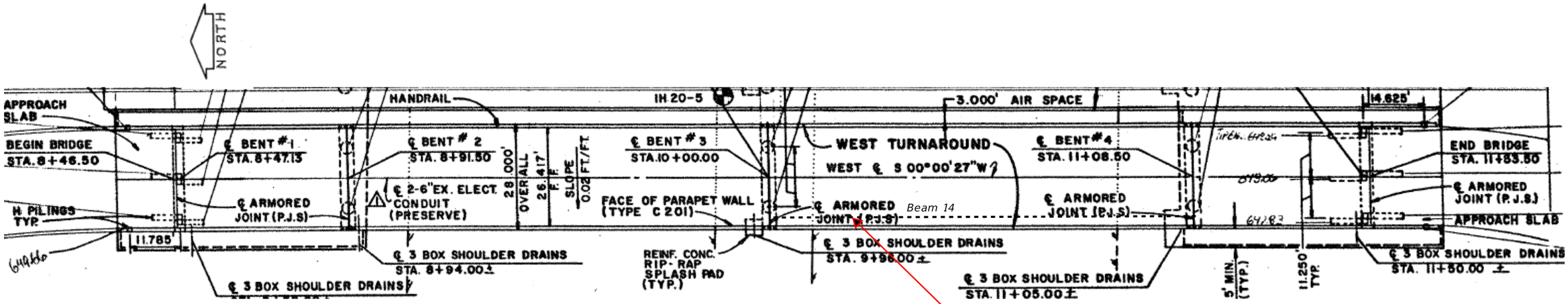
Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIRS

MATLOCK RD. @ IH 20

DN: AL	CK: MC	DW: GC/SR	CK: MC/SR
© TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		82



ESTIMATED QUANTITIES

	Description		Total
0429-6001	Conc Str Repair (Clean & Coat with Epoxy)	SF	6

NBI#: 02-220-0-2374-05-443

SHEET 1 OF 2

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIR

MATLOCK RD. W TA @ IH20

	DN: OE	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		83

PHOTO 1

Span 3, Beam 14

NBI#: 02-220-0-2374-05-443

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

MISCELLANEOUS BRIDGE REPAIR

MATLOCK RD. W TA @ IH20

	DN: OE		CK: MC	DW: GC/SR		CK: MC/SR	
©TxDOT 07-10-23	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0902	90	300		VARIOUS		
	DIST	COUNTY				SHEET NO.	
	02	TARRANT, ETC.				84	

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

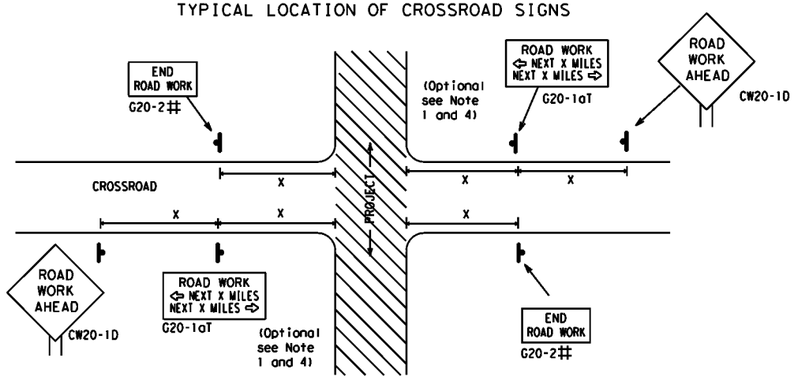
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
95	02	TARRANT, ETC.		85

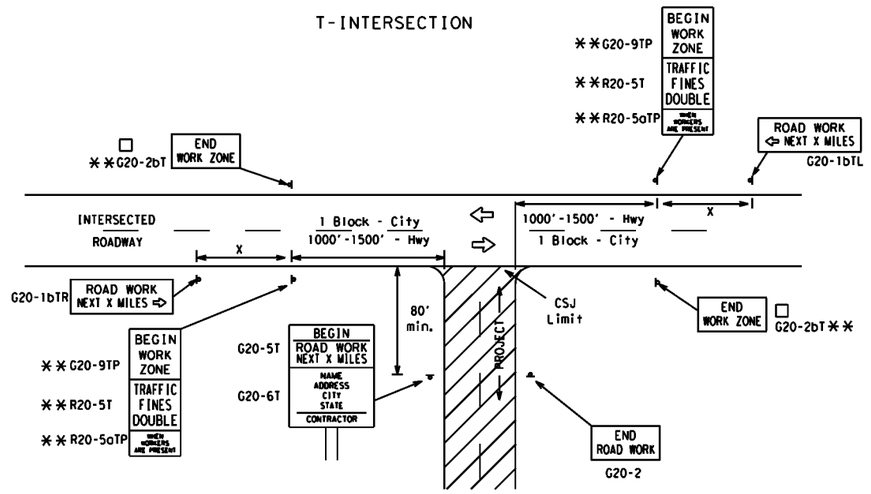
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

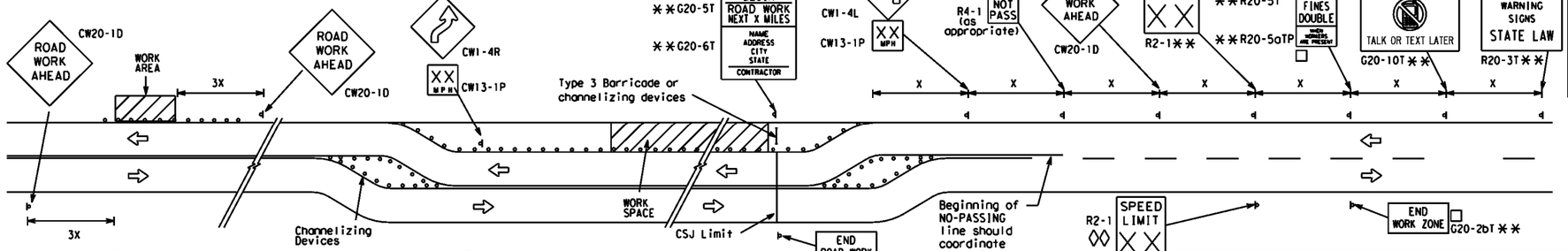
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

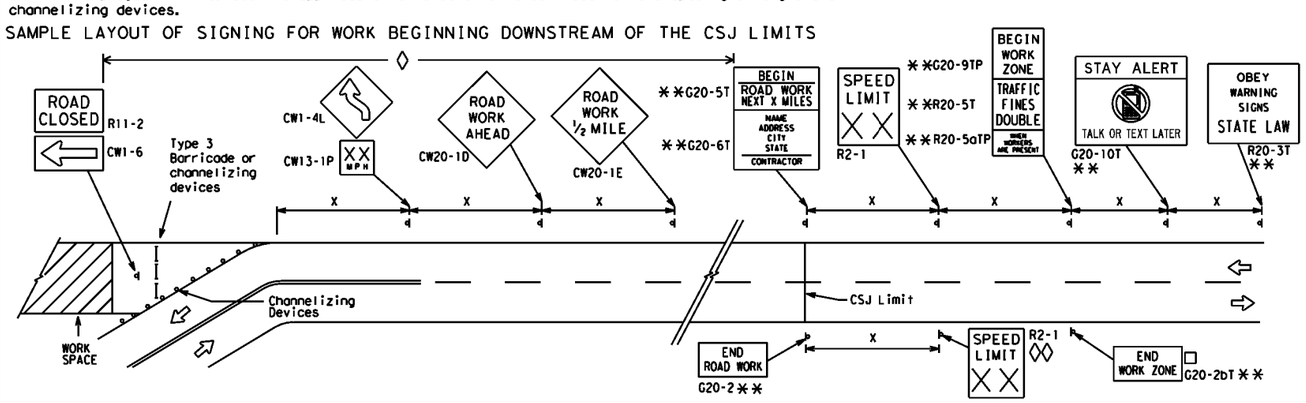
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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.

SHEET 2 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	02	TARRANT, ETC.		96

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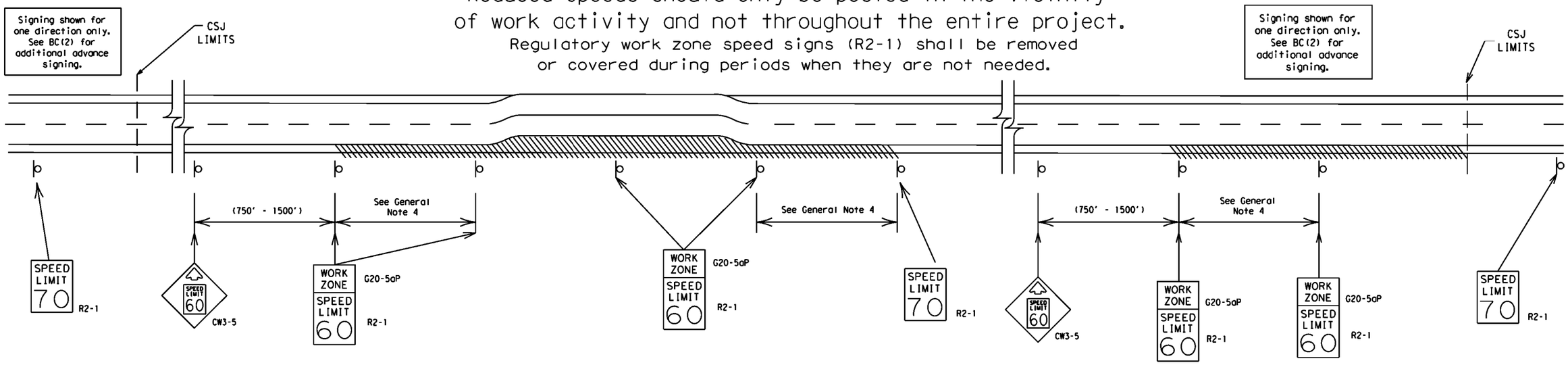
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.
Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	02	TARRANT, ETC.		87

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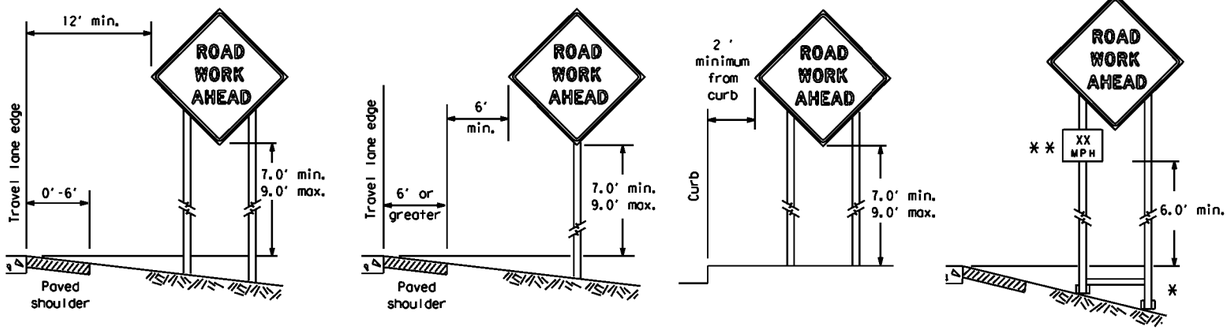
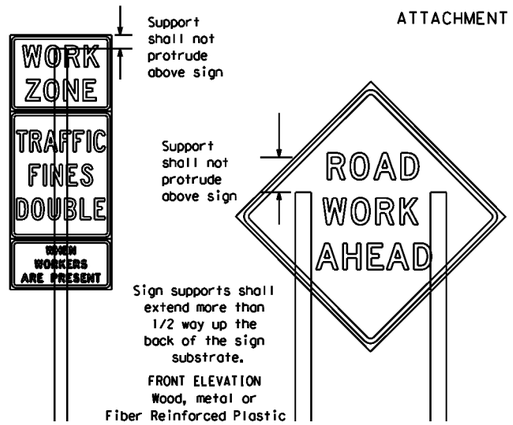
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

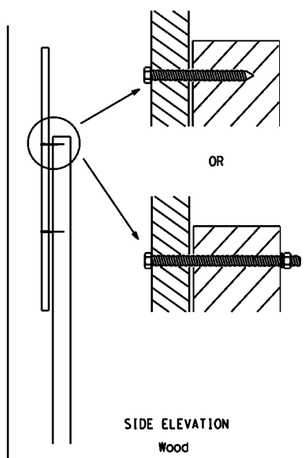


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





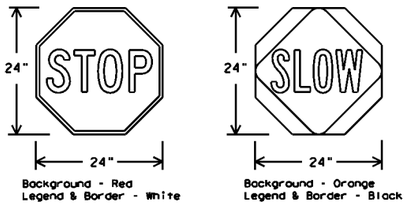
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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7-13 5-21	02	TARRANT, ETC.		88

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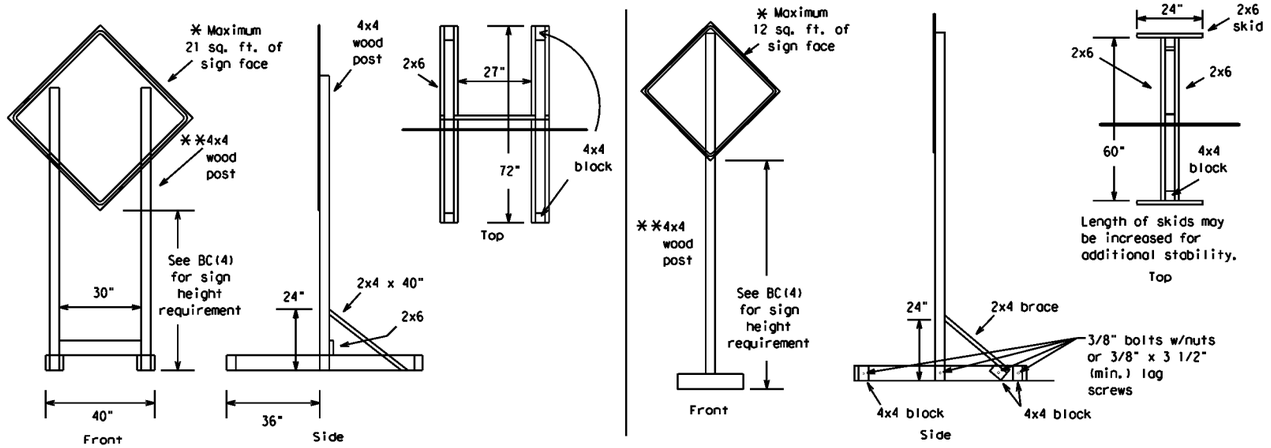
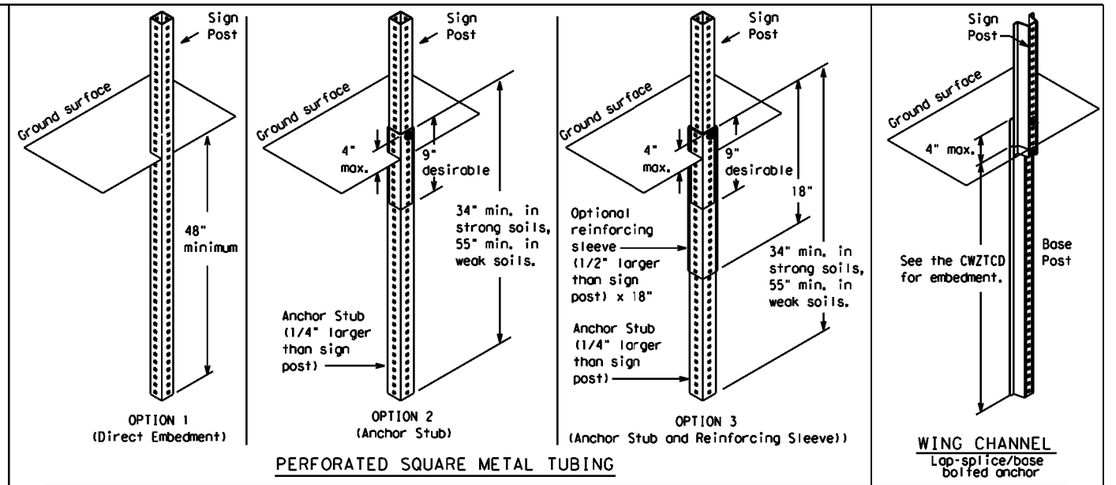


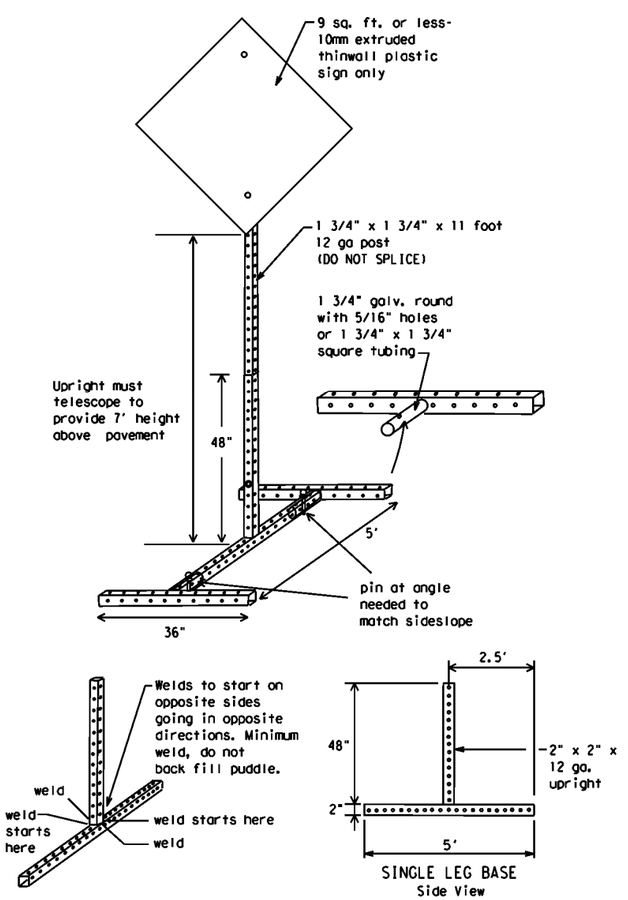
SKID MOUNTED WOOD SIGN SUPPORTS

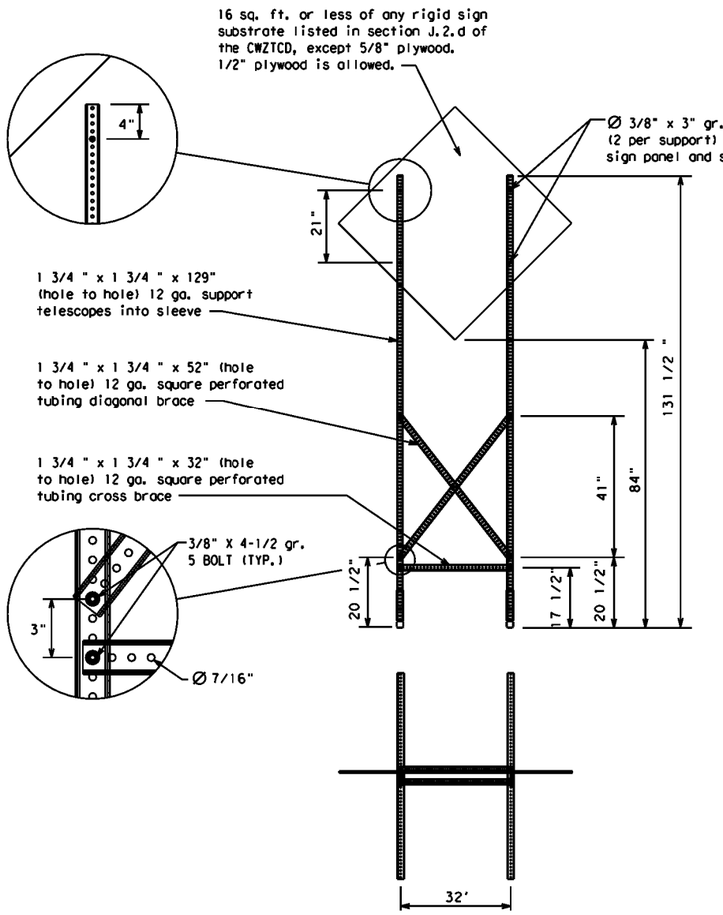
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

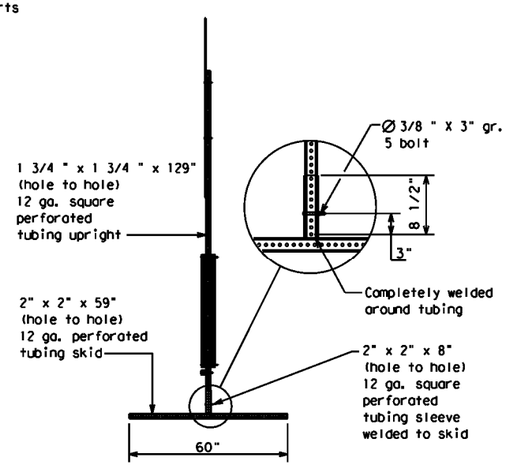


GROUND MOUNTED SIGN SUPPORTS

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.

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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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

** 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)

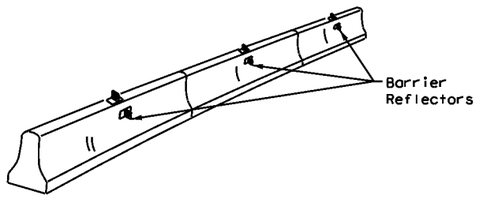
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	02	TARRANT, ETC.		90

100

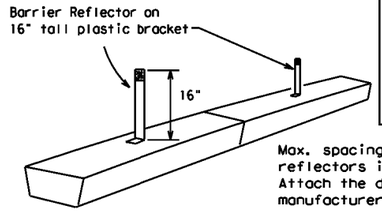
DATE: 7/12/2023 2:26:56 PM
FILE: c:\txdot\pw_online\txdot2\brandon.boring\d0759659\bc-21.dgn

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



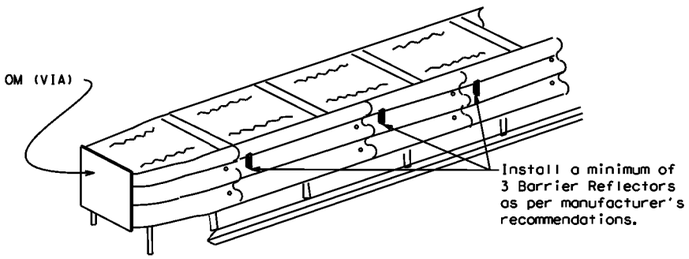
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

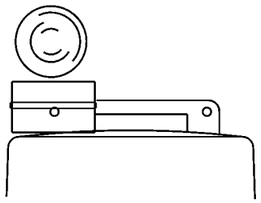
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

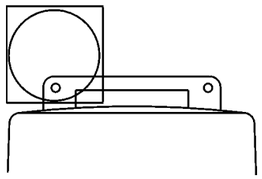
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

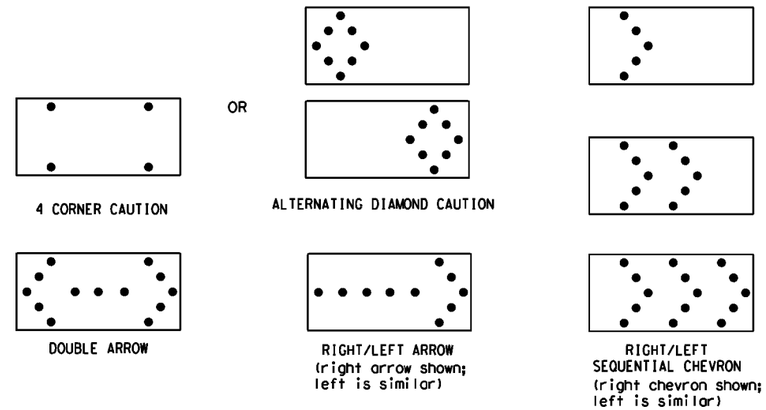
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	02	TARRANT, ETC.		91

101

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

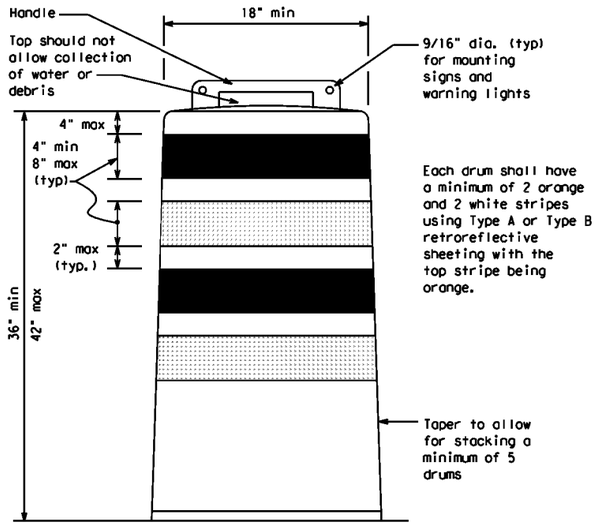
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

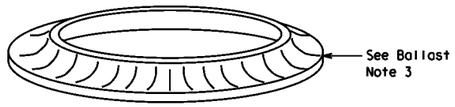
RETROREFLECTIVE SHEETING

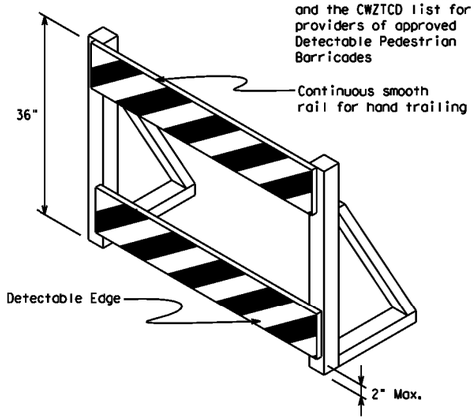
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

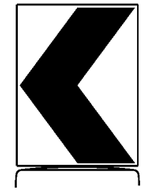




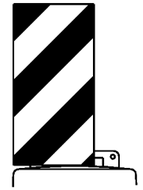


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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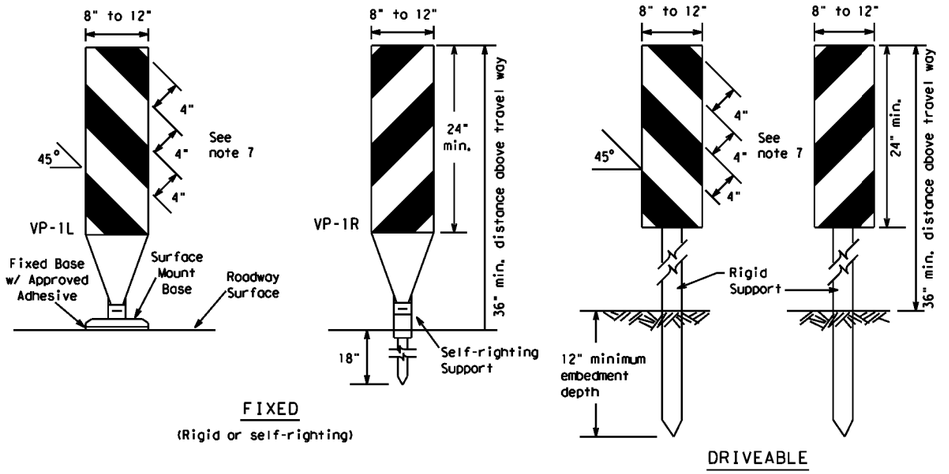
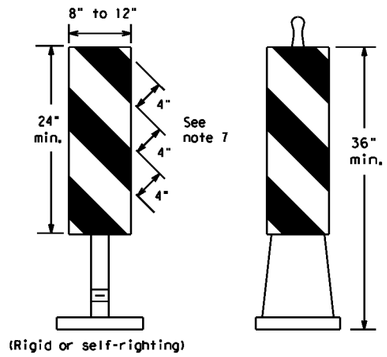
9-07 5-21	02	TARRANT, ETC.		92
7-13				
102				



FIXED

(Rigid or self-righting)

DRIVEABLE

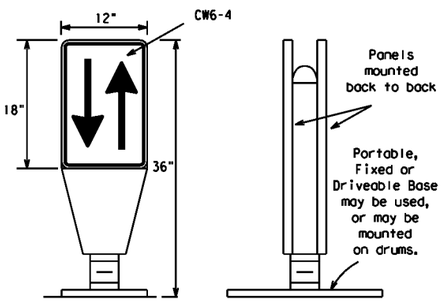


(Rigid or self-righting)

PORTABLE

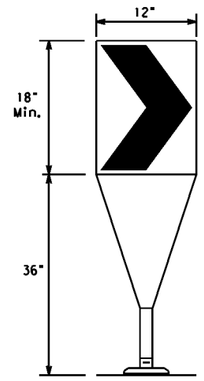
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



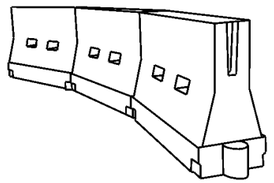
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
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7-13 5-21	02	TARRANT, ETC.		93

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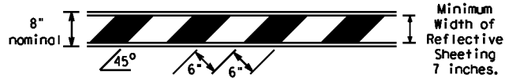
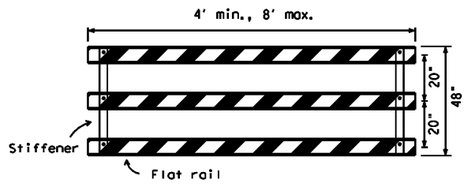
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



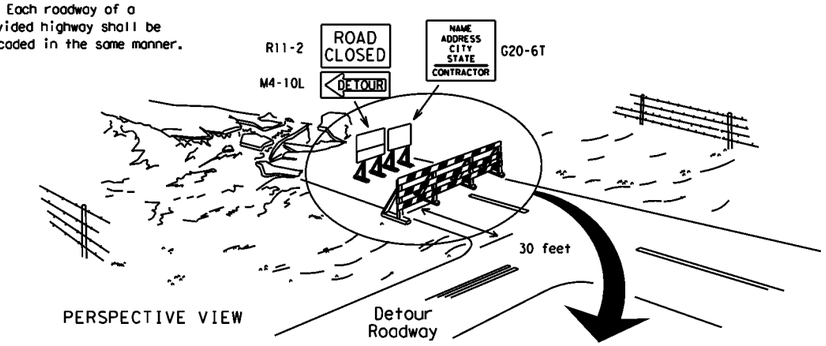
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

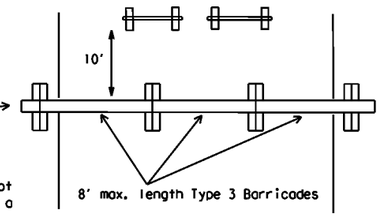
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

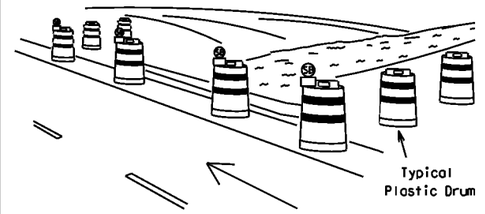
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

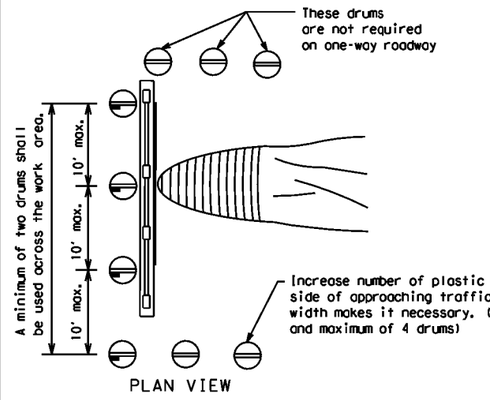
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

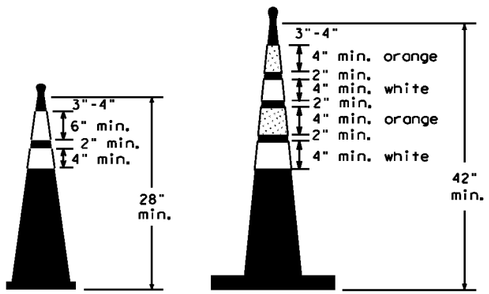
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



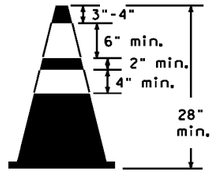
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

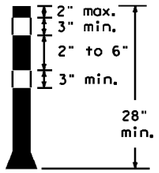
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

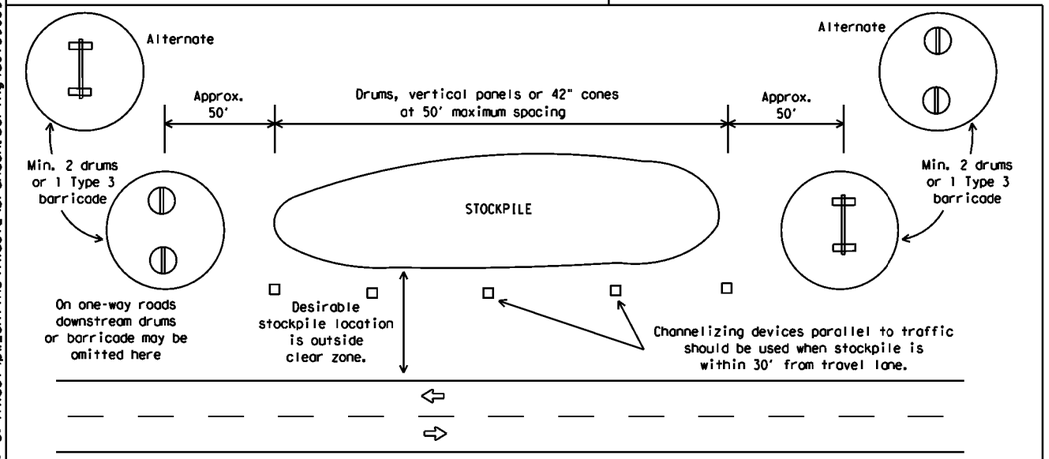


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		94

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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.

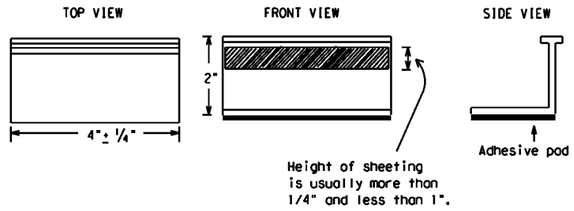
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

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REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0902	90	300	VARIOUS
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	02	TARRANT, ETC.		95

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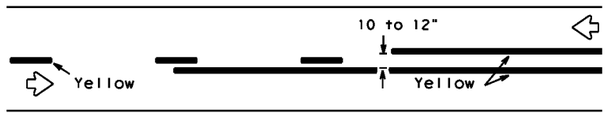
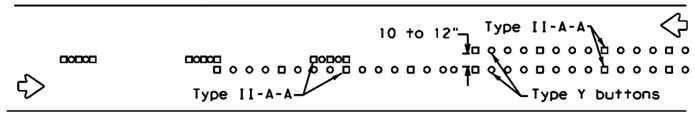
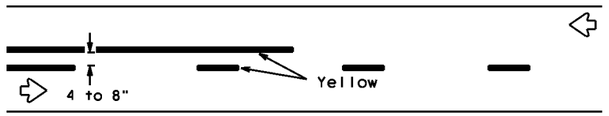
PAVEMENT MARKING PATTERNS



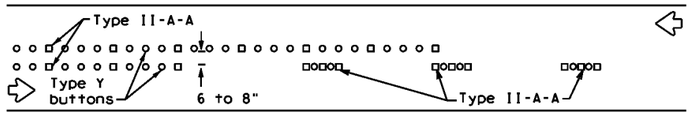
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



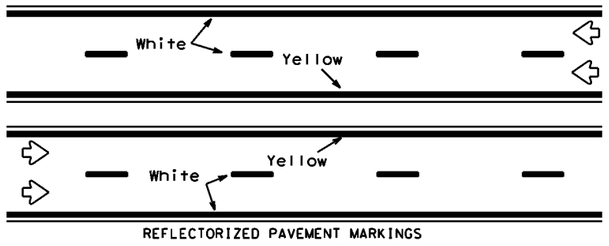
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



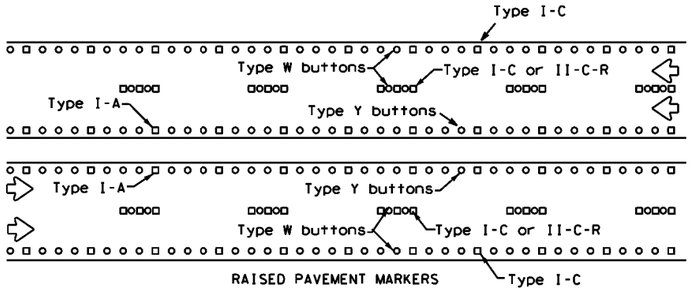
RAISED PAVEMENT MARKERS - PATTERN B

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

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



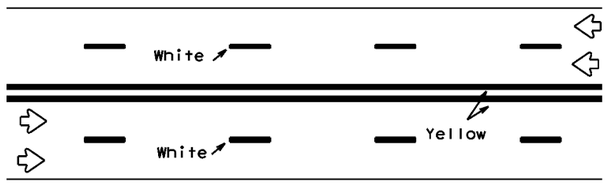
REFLECTORIZED PAVEMENT MARKINGS



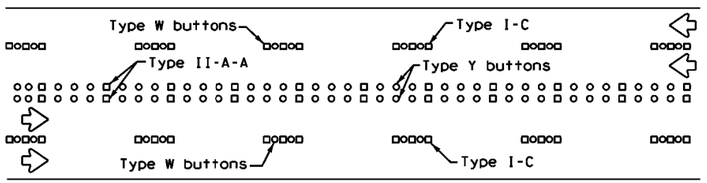
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



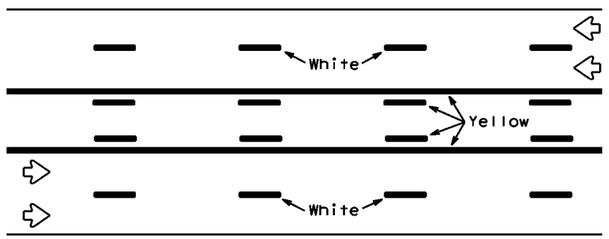
REFLECTORIZED PAVEMENT MARKINGS



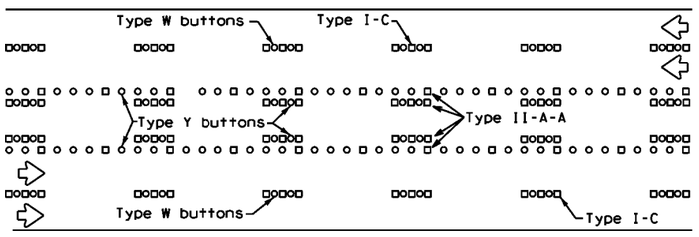
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

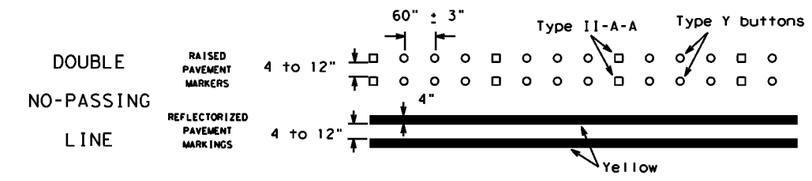
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

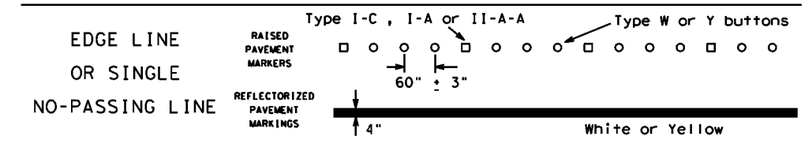
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

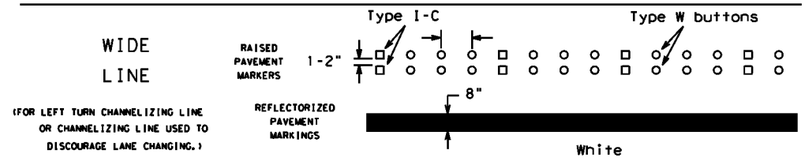


EDGE LINE OR SINGLE NO-PASSING LINE



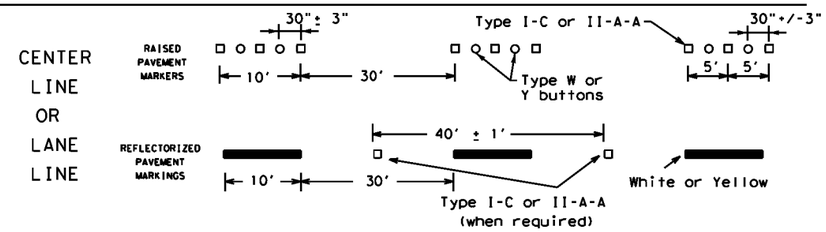
WIDE LINE

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

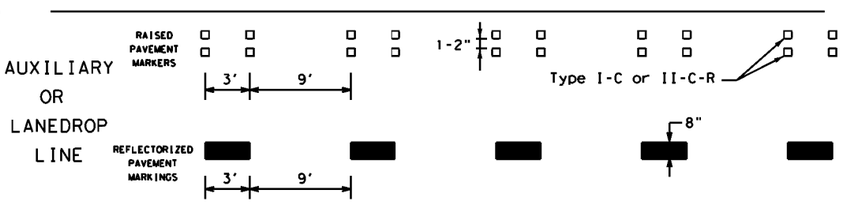


BROKEN LINES

CENTER LINE OR LANE LINE

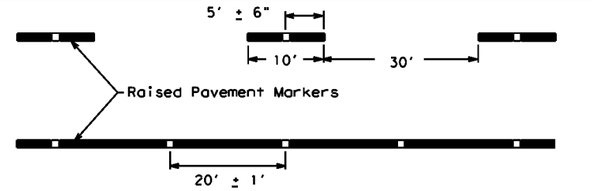


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		96

106

DATE: 7/12/2023 2:27:15 PM
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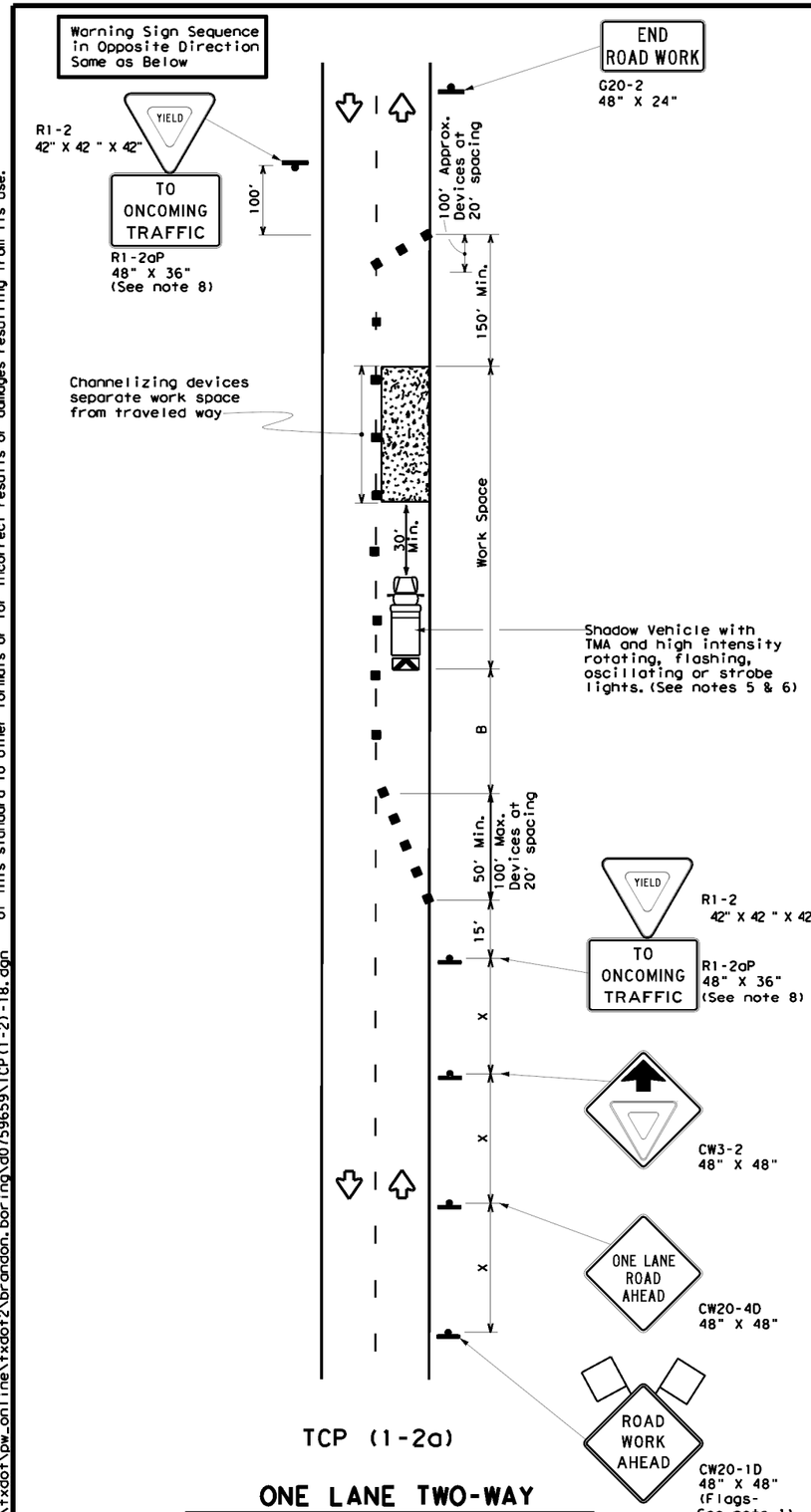
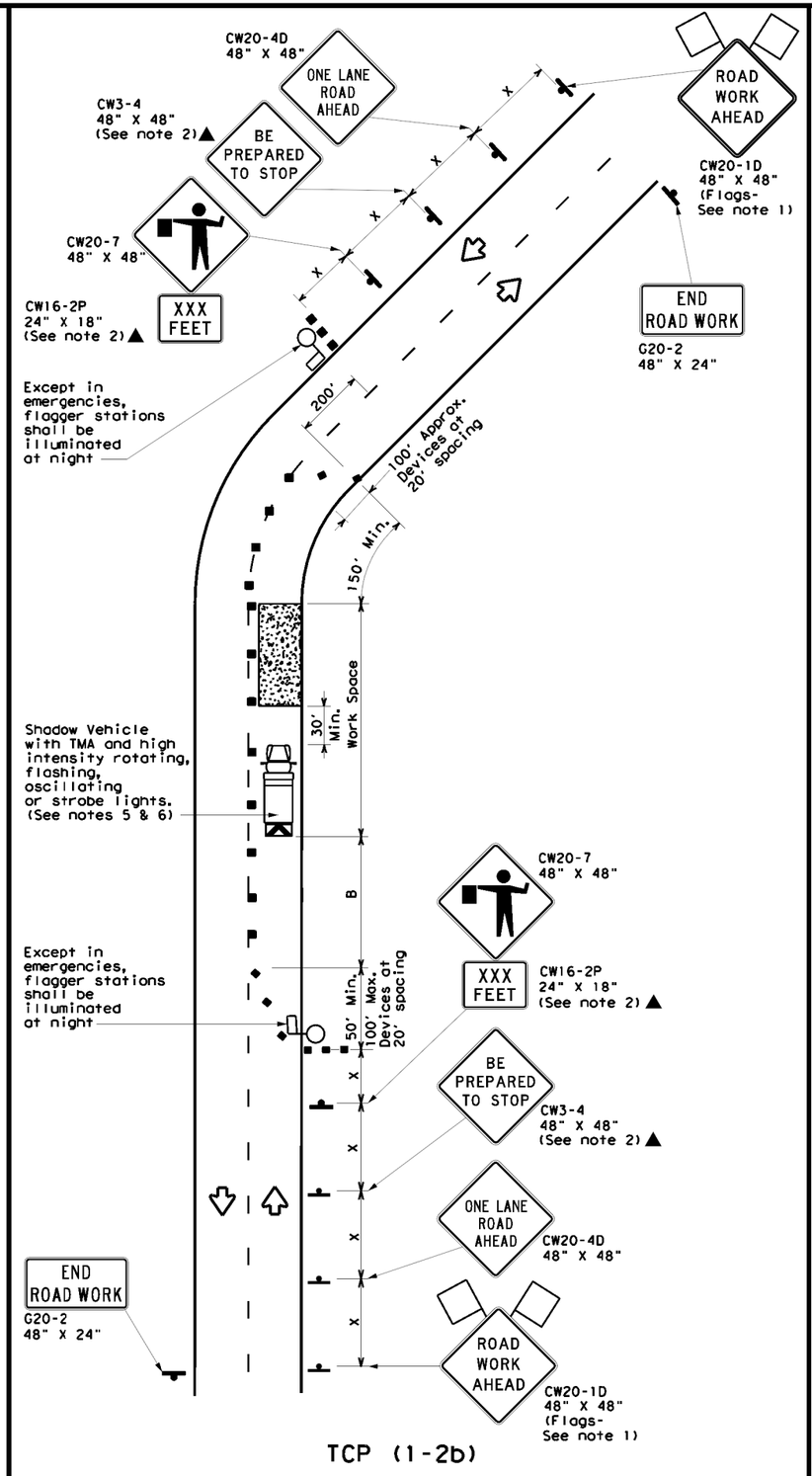


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

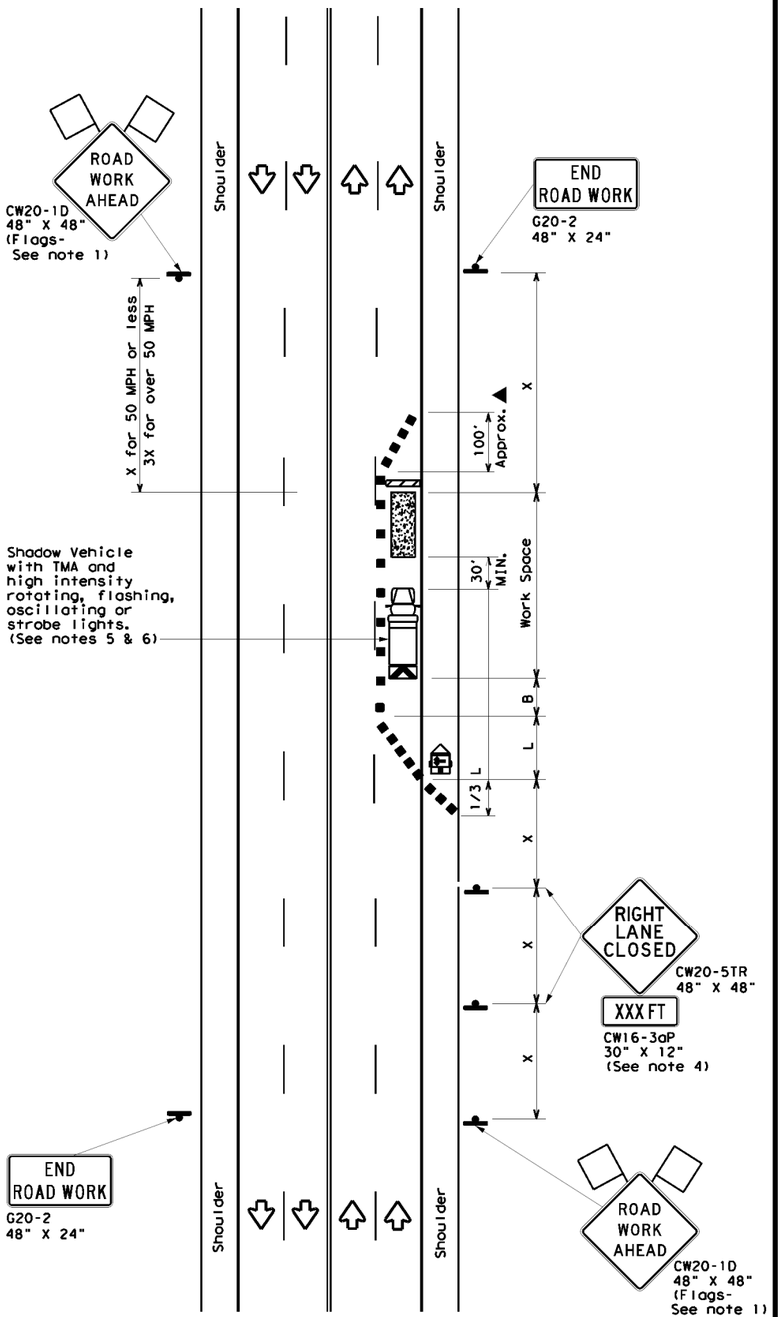
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

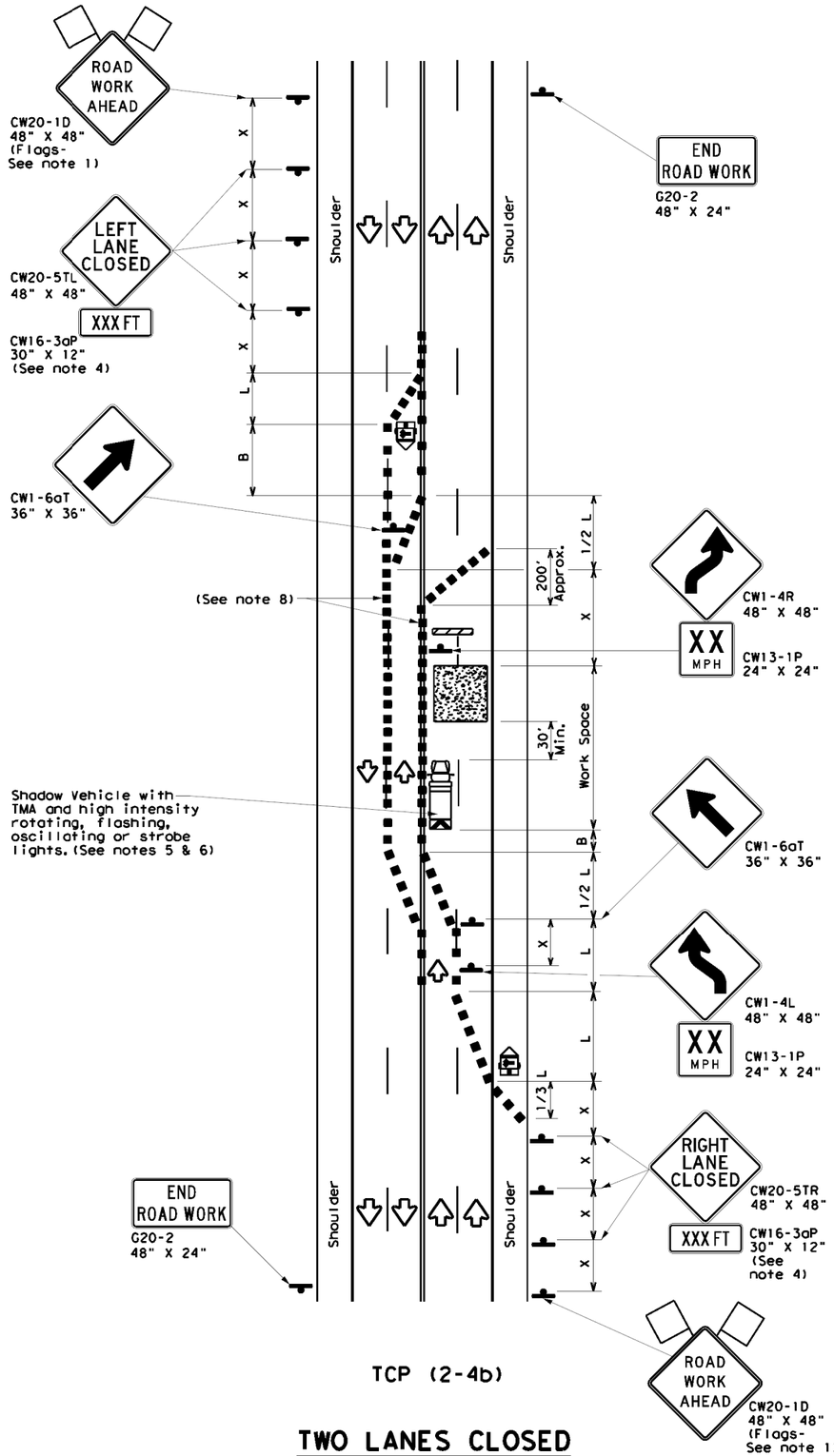
FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		97

DATE:
FILE:



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0902	90	300	VARIOUS
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	FTW	TARRANT, ETC.		98

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DATE:
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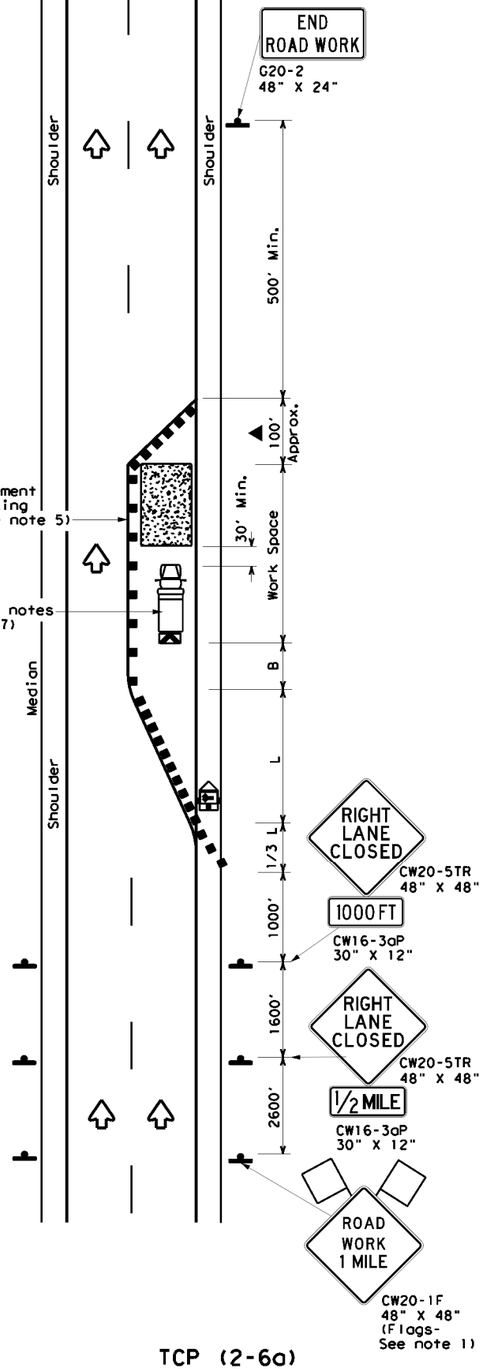
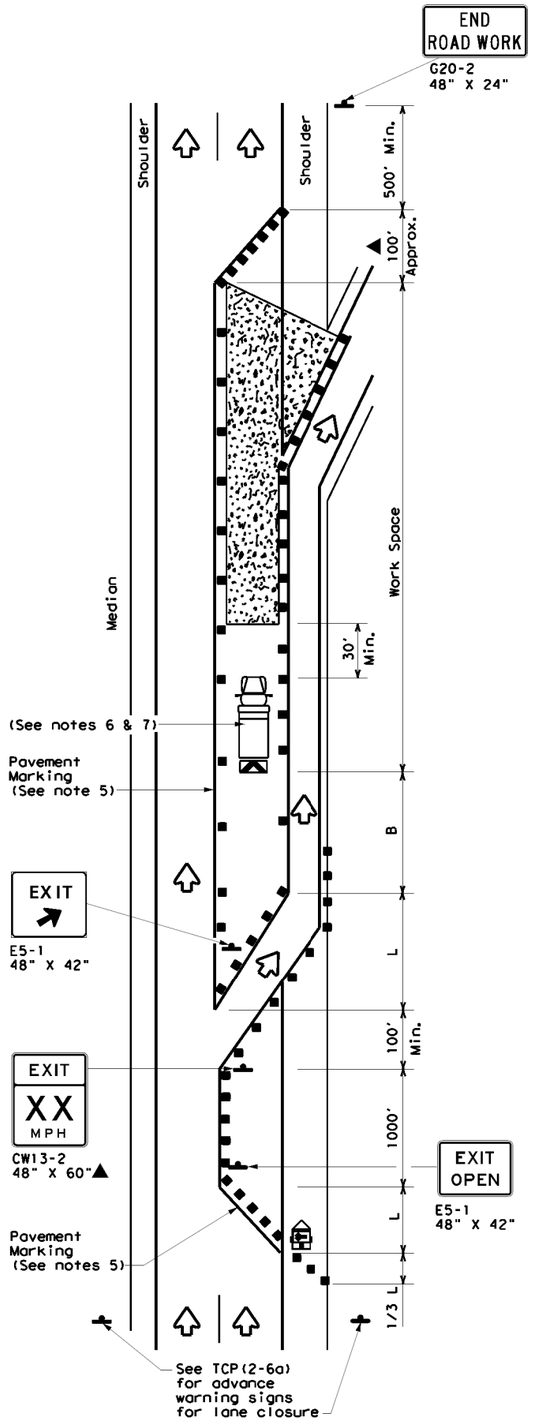


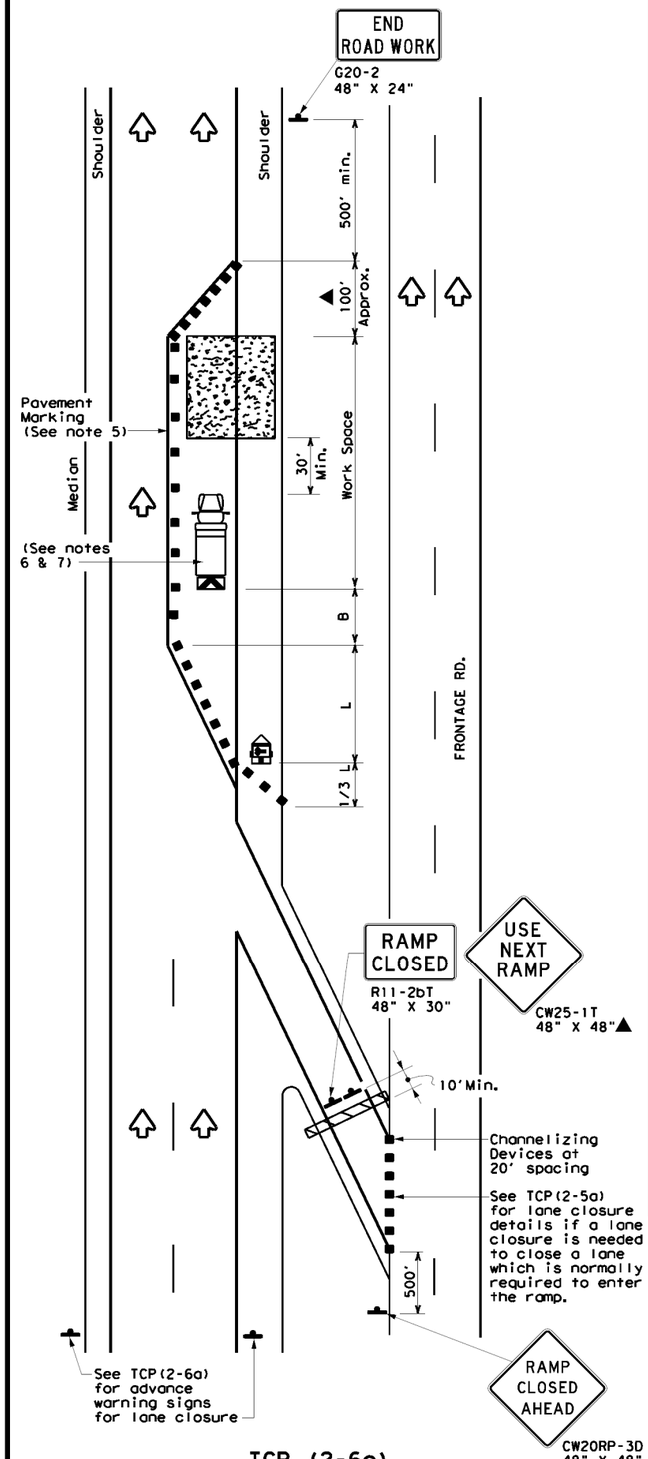
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	FTW	TARRANT, ETC.		99
1-97 2-18				

DATE:
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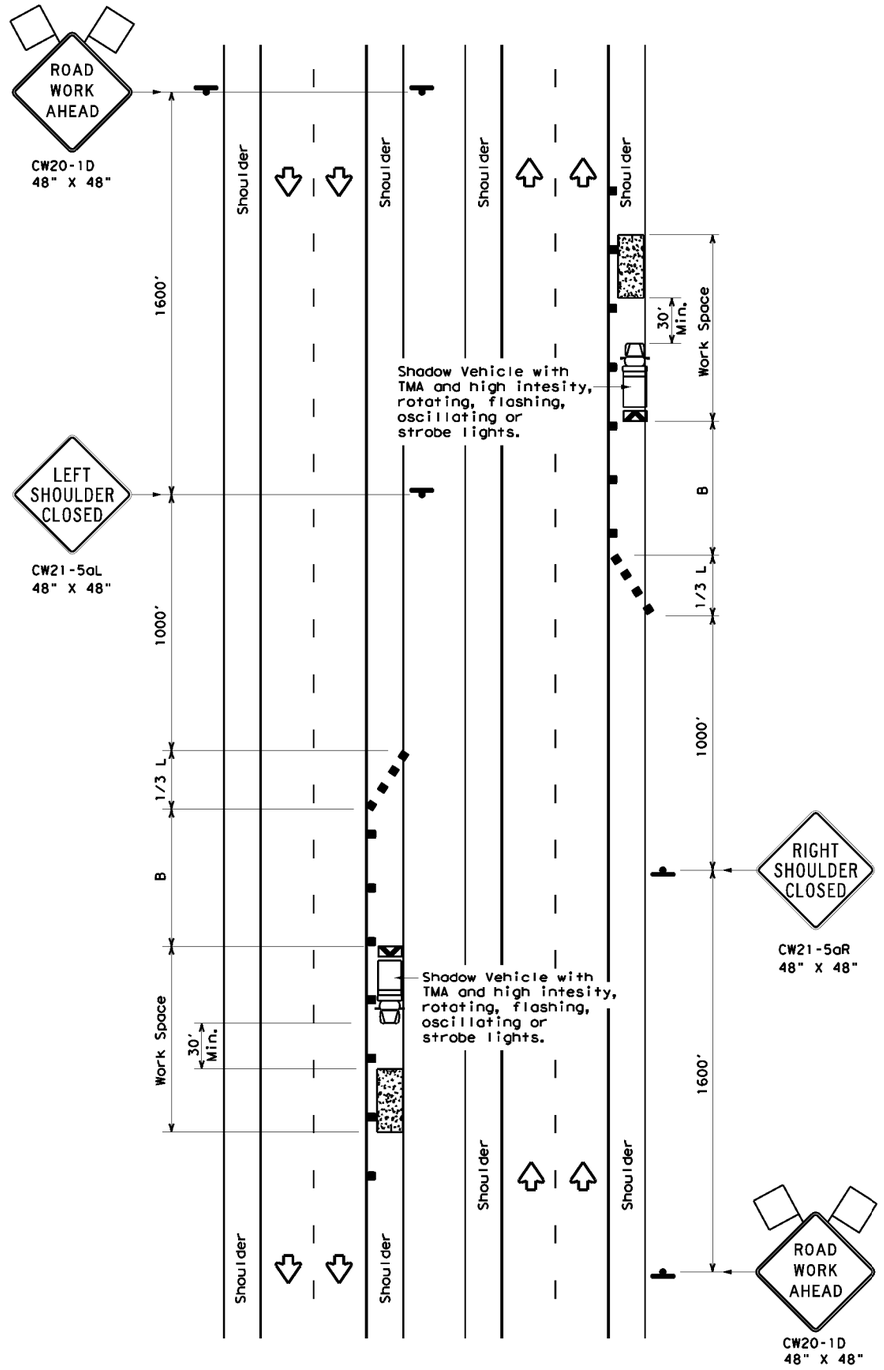
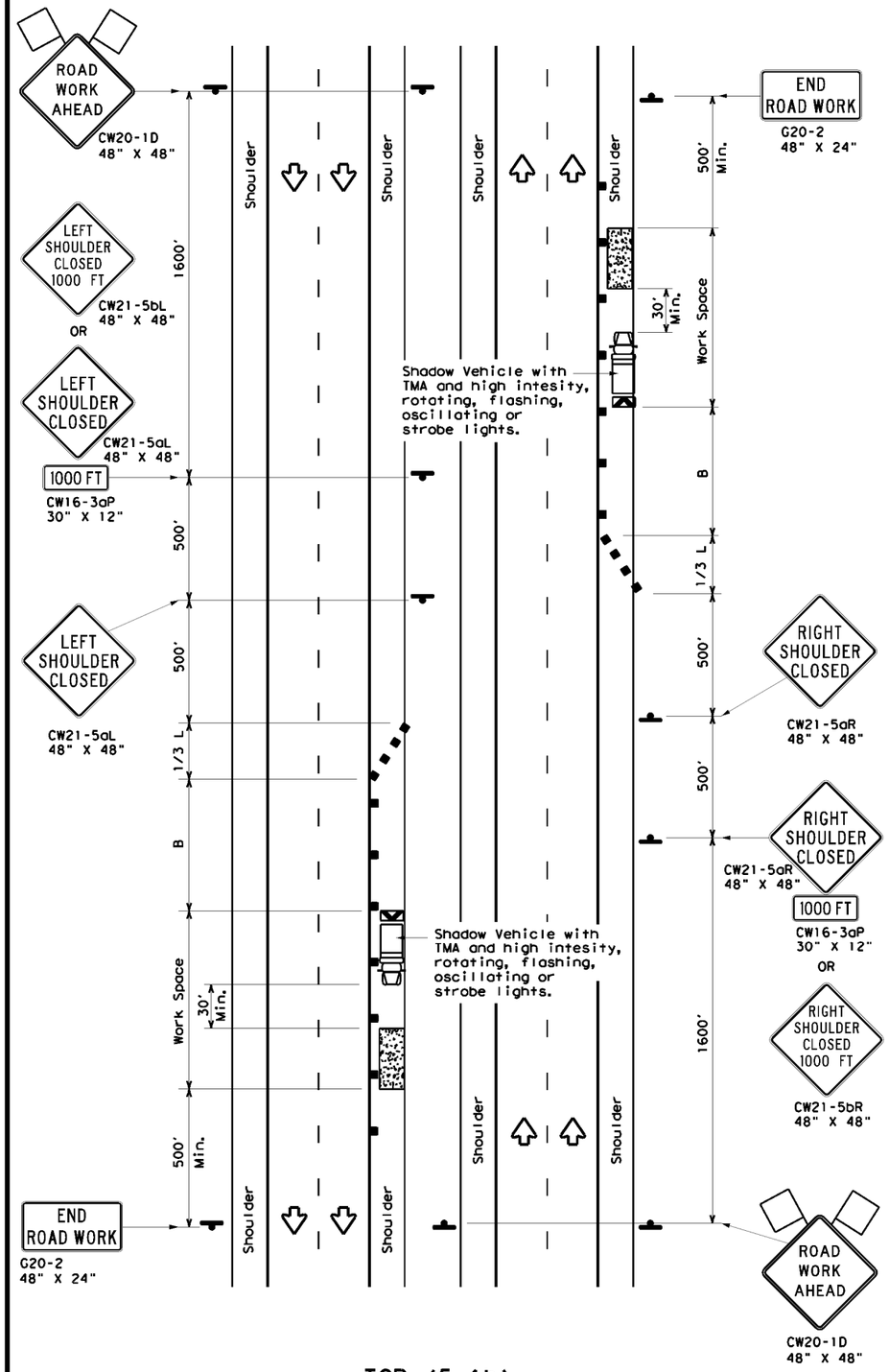


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

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

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	FTW	TARRANT, ETC.		100

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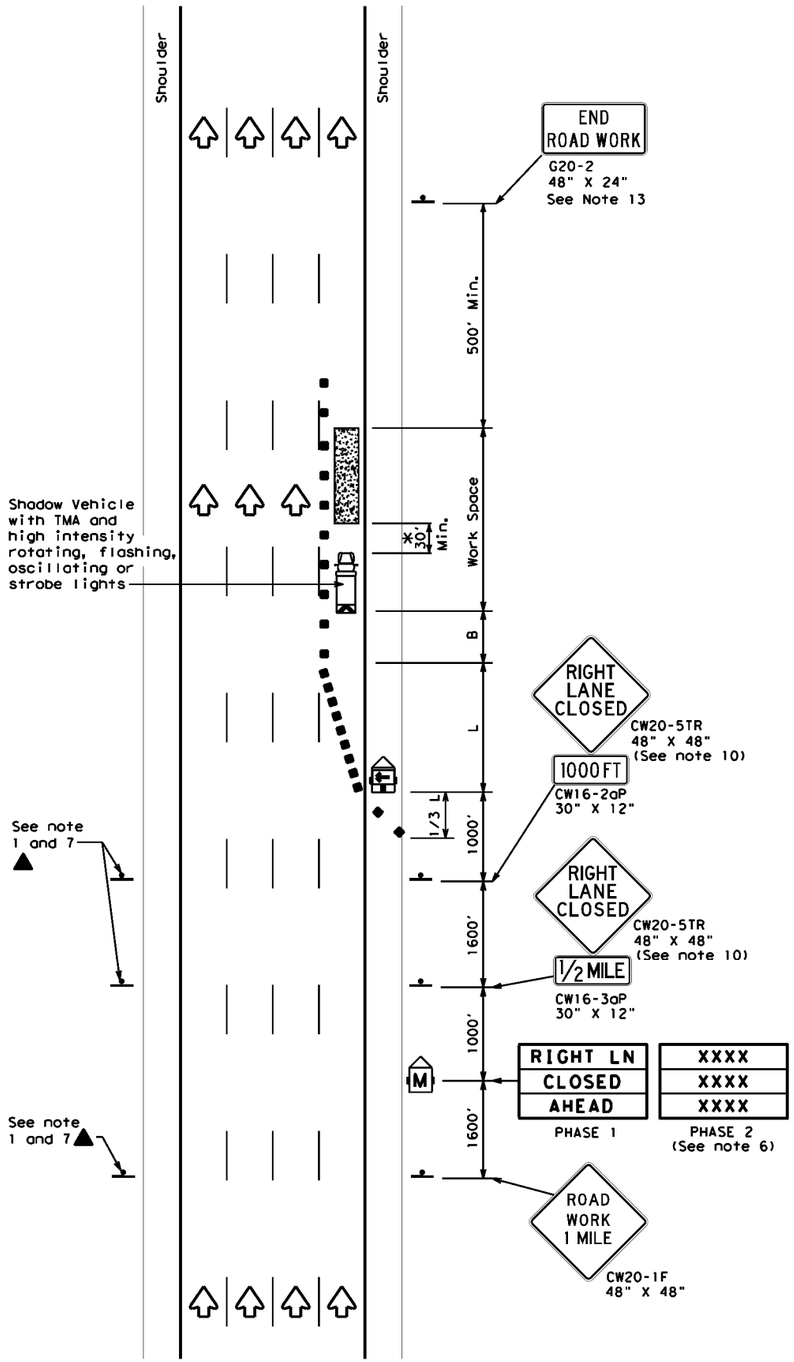
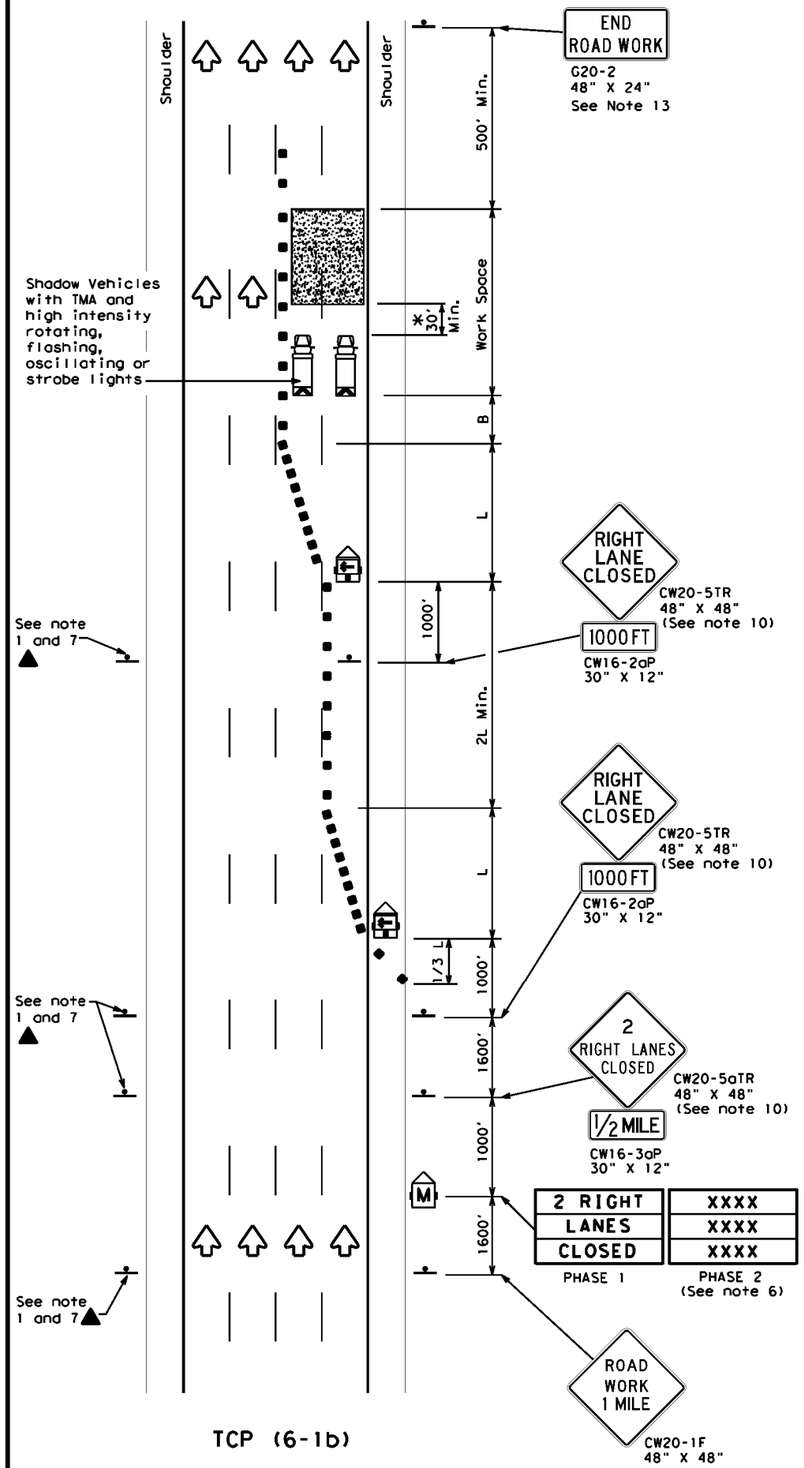


TCP (6-1a)

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

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
8-12	DIST	COUNTY		SHEET NO.
	FTW	TARRANT, ETC.		101

DATE:
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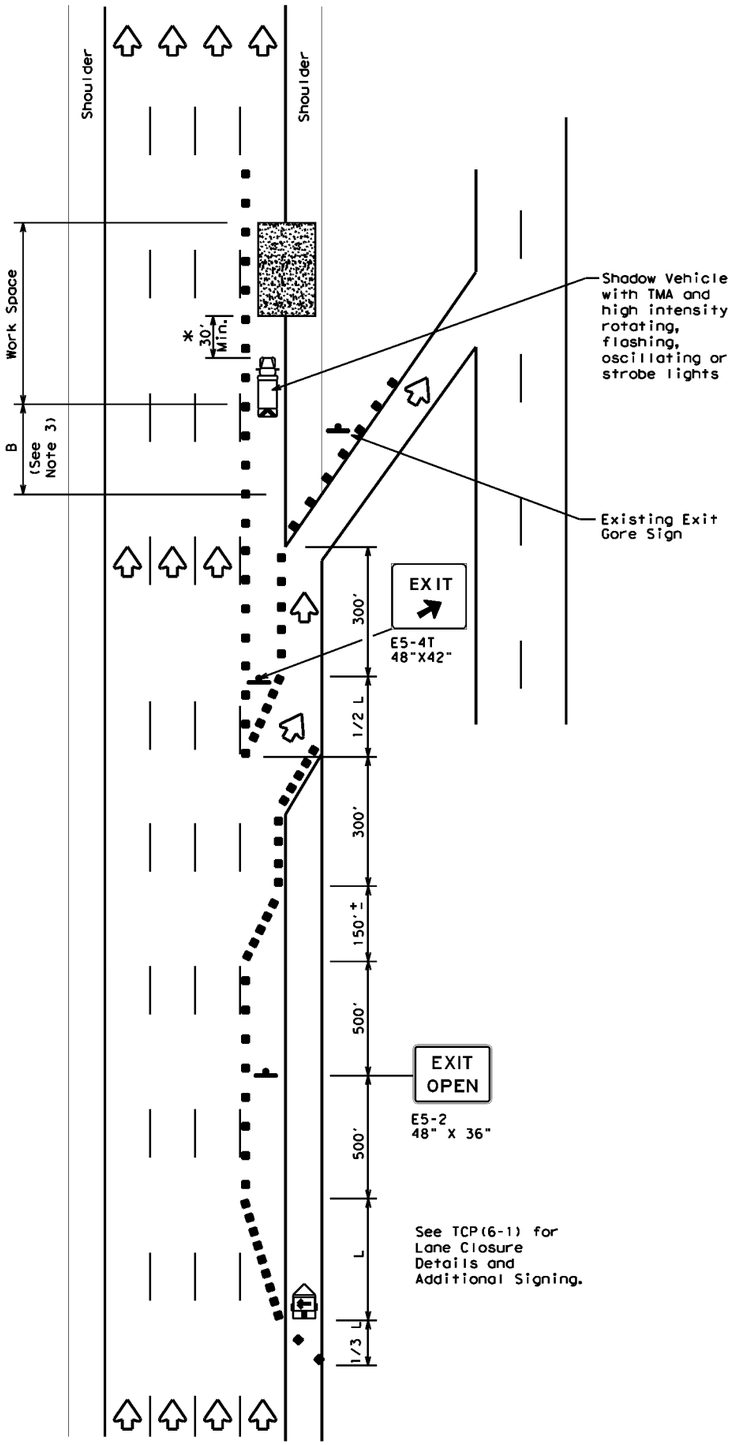
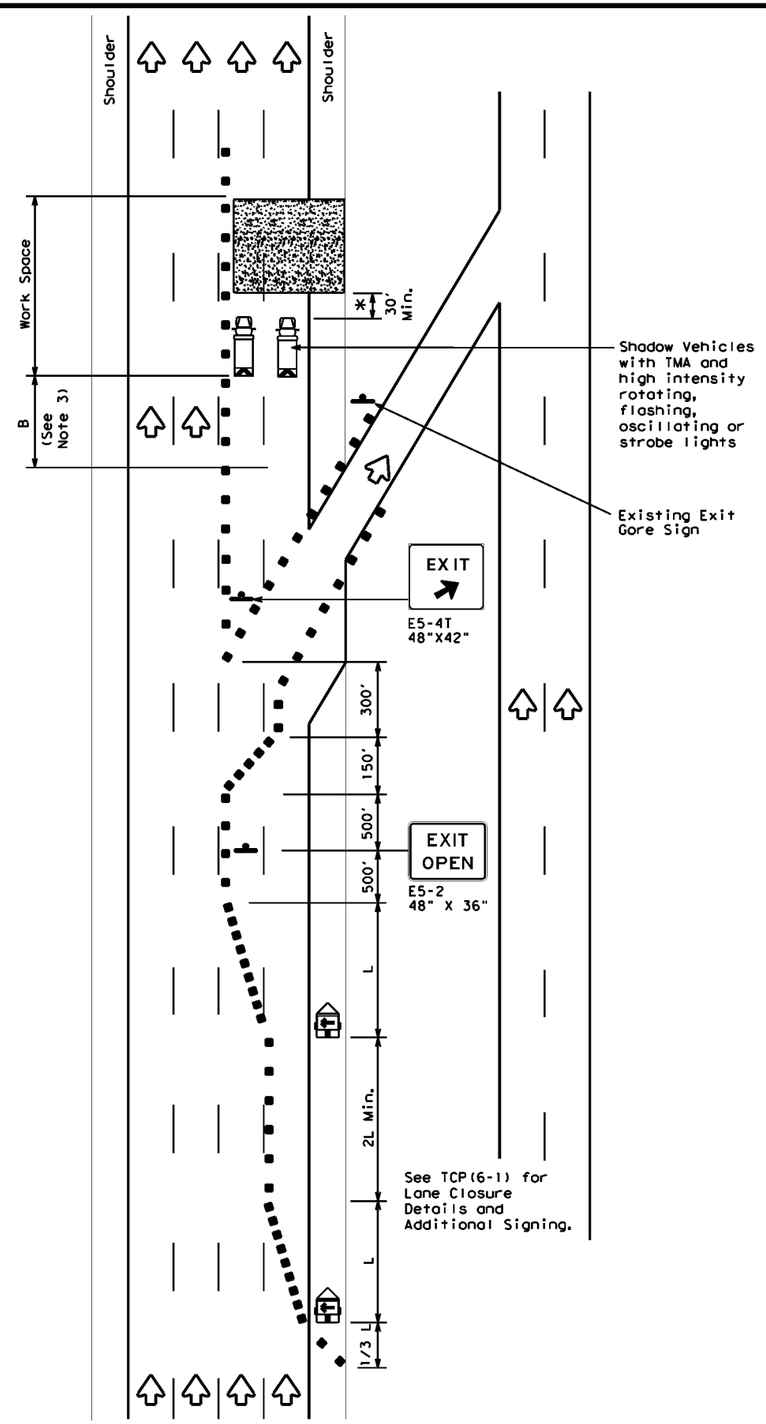


TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

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

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	FTW	TARRANT, ETC.		102

Structure NBI	Feature Carried	Feature Crossed	Elevation Looking Direction	Left Bent#	Right Bent#	Span# (S)	Beam# (B)	Beam Type	L (ft)	D (ft)	K (ft)	R (ft)	H (ft)	A (ft)	C (ft)	V (ft)	X (nos.)
02-127-0-0014-22-293	SH 81	IH 35W	North	3	2	2	1	Type C	65	22, 44	35	5	NA	30	11	8	4
02-220-0-0364-01-114	Bedford Rd	SH 121	South	3	2	2	12	AASHTO IV	129	43, 86	63	3	NA	62	5	10	2
02-220-0-0364-01-114	Bedford Rd	SH 121	North	3	4	3	11	AASHTO IV	121	40.3, 80.7	57	6	NA	56	8	10	3

NOTE:

Dimensions provided on table are approximate. Contractor to field verify before commencing work. Notify EOR if major deviation is found.

T:\BRIDGE\share\BEAM, BRIDGE, & WALL REPAIRS\CFRP\0902-90-300\DGN\CFRP DETAIL.dgn

STATE OF TEXAS
SANGIT RAUNIYAR
119801
LICENSED PROFESSIONAL ENGINEER
7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

BEAM REPAIR

CFRP DETAIL

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
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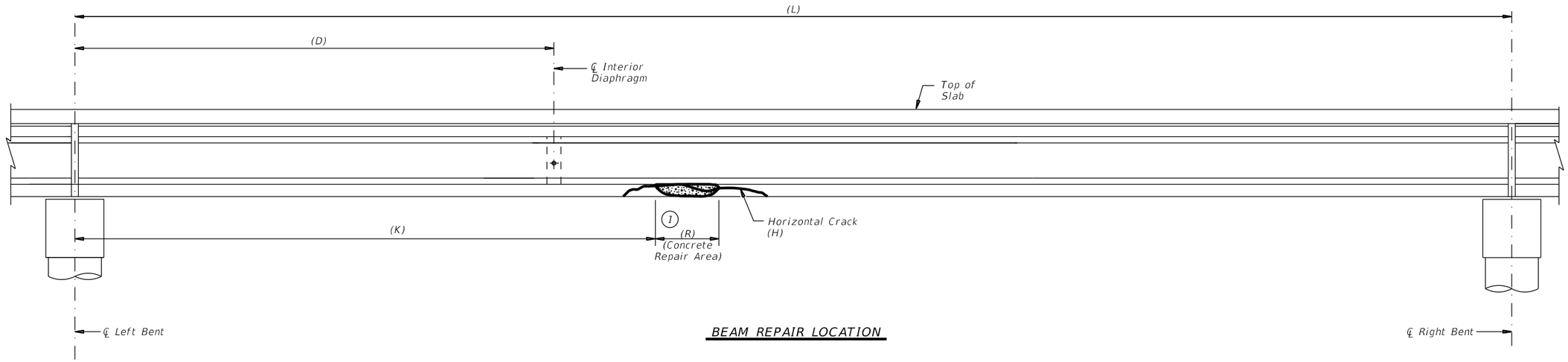
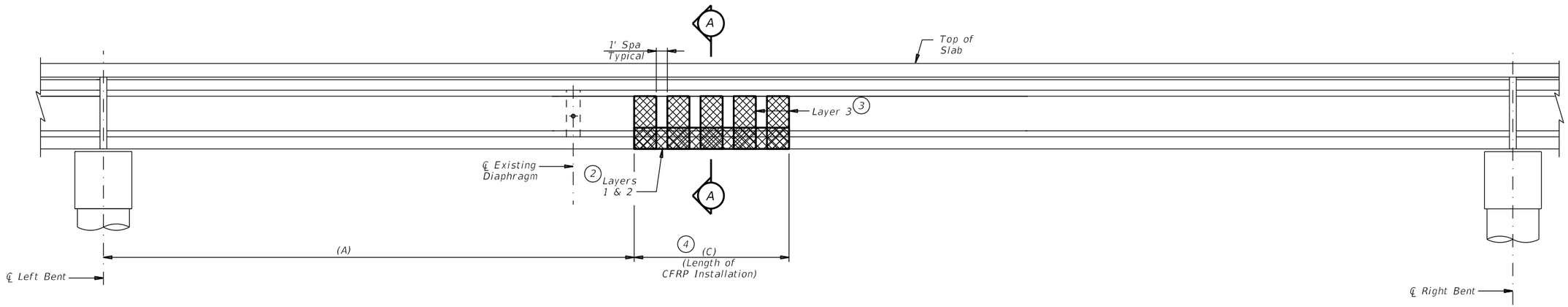
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		103



BEAM REPAIR LOCATION



CFRP WRAP LOCATION

ELEVATION CFRP ~ SPAN (S) BEAM (B) REPAIR

Notes:

1. Remove loose concrete and prepare the repair area for Beam # B (beam # shown on table on sheet 1 of 5) in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged strands. Use extreme care to protect the intact strands and concrete. If cracking extends more than damaged area, notify the Engineer of Record.
2. Layers 1 & 2 – Place 24" wide x (C) ft long (dimension C shown on table on sheet 1 of 5) carbon fiber fabric sheets longitudinally on beam, with fiber orientation parallel to beam centerline. Locate sheets on bottom corners of beam as shown. Fabric sheets shall be overlapped 6" minimum in the longitudinal direction to achieve full installation length.
3. Layers 3 – Place X (nos. of X shown on table on sheet 1 of 5) 24" wide x (V) ft long (dimension V shown on table 1 of 5) carbon fiber "U" strip fabric sheets transversely on beam, with fiber orientation perpendicular to beam centerline. Wrap sheets on bottom and sides of beam to limits shown. Butt joint wraps in the longitudinal direction to achieve full installation length.
4. The length of all layers may be adjusted in the field to cover more damaged area as determined by the Engineer of Record.

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BEAM REPAIR

CFRP DETAIL

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
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REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		104

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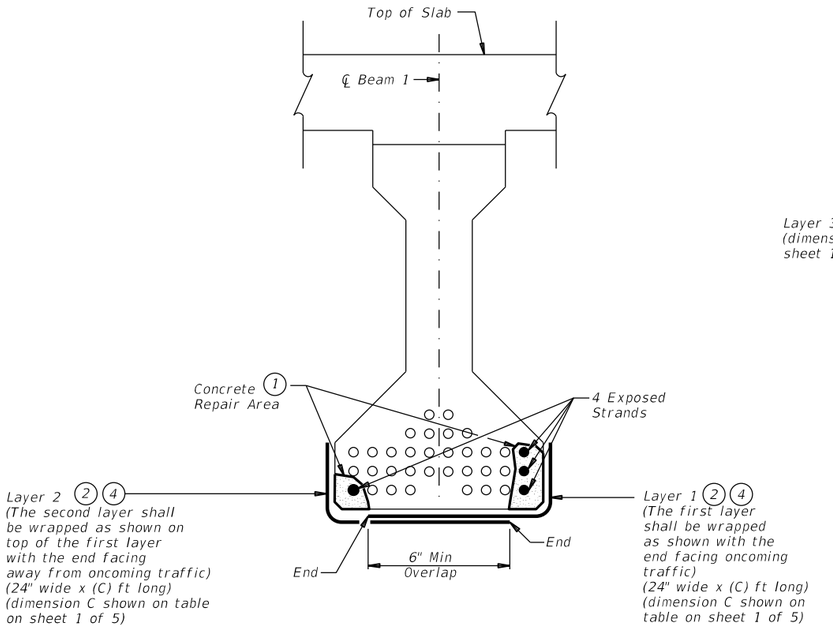
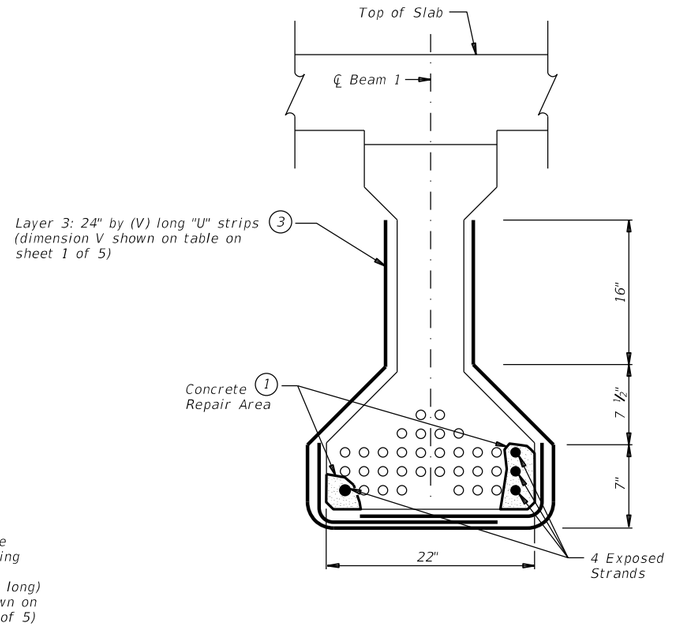


STEP 1



STEP 2

SECTION A-A
(LOOKING WEST)

SH 81 @ IH 35W

GENERAL NOTES:

1. Damaged areas shown are for information only and may not be accurate in size, length, location, and area. Verify the extent of damages before beginning the work.
2. Remove loose concrete and prepare the repair area for the beams in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged strands. Notify the Engineer of Record if any additional damage is found.
3. Place a 10 yard dump truck loaded with 10 CY of sand, gravel, or equivalent material on the bridge to pre-load the span over the damaged beam prior to patching the concrete. Remove the loaded truck from bridge after curing requirements are complete and before CFRP installation.
4. Use prepackaged non-shrink Type A (neat) from DMS-4655 "Concrete Repair Manual" cementitious concrete mix capable of obtaining at least 3000 psi compressive strength in 12 hours and 4000 psi in 3 days for concrete repairs. Contractor shall be responsible for determining the concrete strength by testing the cementious concrete used for repair in cubes in accordance with Tex-307-D or ASTM C-109. Testing of cementious concrete for repair shall not be paid for directly but is considered subsidiary to Item 788, "Concrete Beam Repair". Spalled area of beam shall be patched in accordance with Item 788, "Concrete Beam Repair" and the manufacturer's recommendations for surface preparation, mixing, placing, and curing.
5. Install CFRP as shown in the plans.
6. Apply a top coat of concrete paint matching the existing concrete color.
7. All associated cost of the 10 CY dump truck will be subsidiary to Item 788.
8. Additional damages incurred by the Contractor during removal or repairs shall be at the Contractor"s expense.
9. Contractor to field verify dimensions of proposed repairs and notify EOR of any differences before commencing work.

CFRP STRENGTHENING NOTES:

1. Carbon fiber reinforced polymer (CFRP) for strengthening concrete structure members shall be furnished and installed in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)".
2. The work of CFRP Strengthening per Item 786 will be considered subsidiary to Item 788, "Concrete Beam Repair".

NBI# 02-127-0-0014-22-293

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BEAM REPAIR

CFRP DETAIL

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
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	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		105

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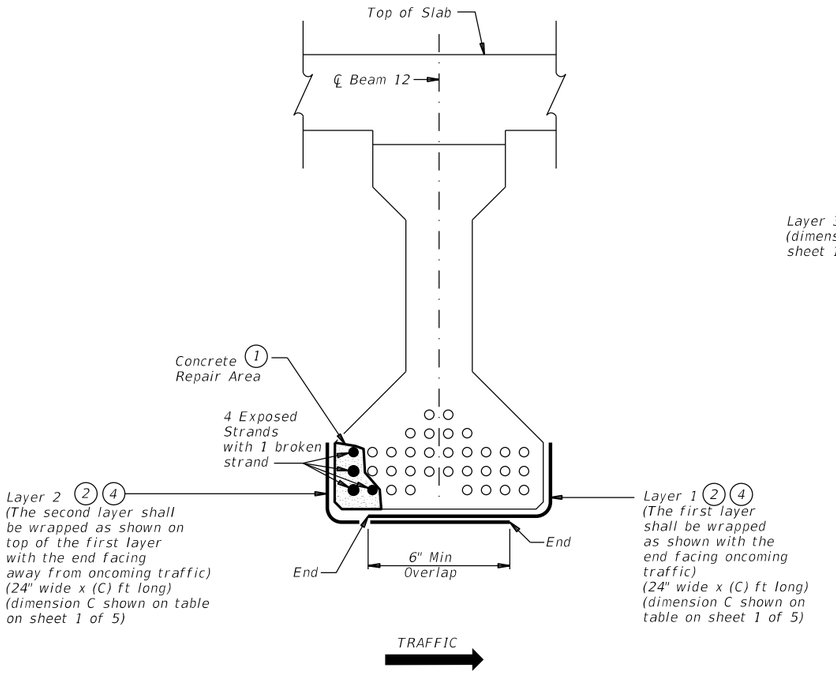
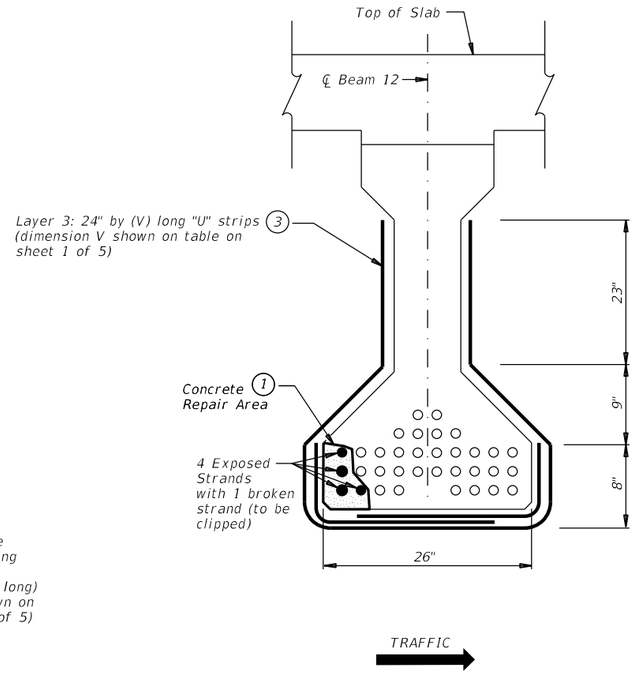


STEP 1



STEP 2

SECTION A-A

(LOOKING EAST)

BEDFORD RD @ SH 121 BEAM 12

GENERAL NOTES:

1. Damaged areas shown are for information only and may not be accurate in size, length, location, and area. Verify the extent of damages before beginning the work.
2. Remove loose concrete and prepare the repair area for the beams in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged strands. Notify the Engineer of Record if any additional damage is found.
3. Place a 10 yard dump truck loaded with 10 CY of sand, gravel, or equivalent material on the bridge to pre-load the span over the damaged beam prior to patching the concrete. Remove the loaded truck from bridge after curing requirements are complete and before CFRP installation.
4. Use prepackaged non-shrink Type A (neat) from DMS-4655 "Concrete Repair Manual" cementitious concrete mix capable of obtaining at least 3000 psi compressive strength in 12 hours and 4000 psi in 3 days for concrete repairs. Contractor shall be responsible for determining the concrete strength by testing the cementious concrete used for repair in cubes in accordance with Tex-307-D or ASTM C-109. Testing of cementious concrete for repair shall not be paid for directly but is considered subsidiary to Item 788, "Concrete Beam Repair". Spalled area of beam shall be patched in accordance with Item 788, "Concrete Beam Repair" and the manufacturer's recommendations for surface preparation, mixing, placing, and curing.
5. Install CFRP as shown in the plans.
6. Apply a top coat of concrete paint matching the existing concrete color.
7. All associated cost of the 10 CY dump truck will be subsidiary to Item 788.
8. Additional damages incurred by the Contractor during removal or repairs shall be at the Contractor"s expense.
9. Contractor to field verify dimensions of proposed repairs and notify EOR of any differences before commencing work.
10. Clip the broken strand.

CFRP STRENGTHENING NOTES:

1. Carbon fiber reinforced polymer (CFRP) for strengthening concrete structure members shall be furnished and installed in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)".
2. The work of CFRP Strengthening per Item 786 will be considered subsidiary to Item 788, "Concrete Beam Repair".

NBI# 02-220-0-0364-01-114

STATE OF TEXAS
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7/10/2023

Texas Department of Transportation

Fort Worth Bridge Design

BEAM REPAIR

CFRP DETAIL

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		106

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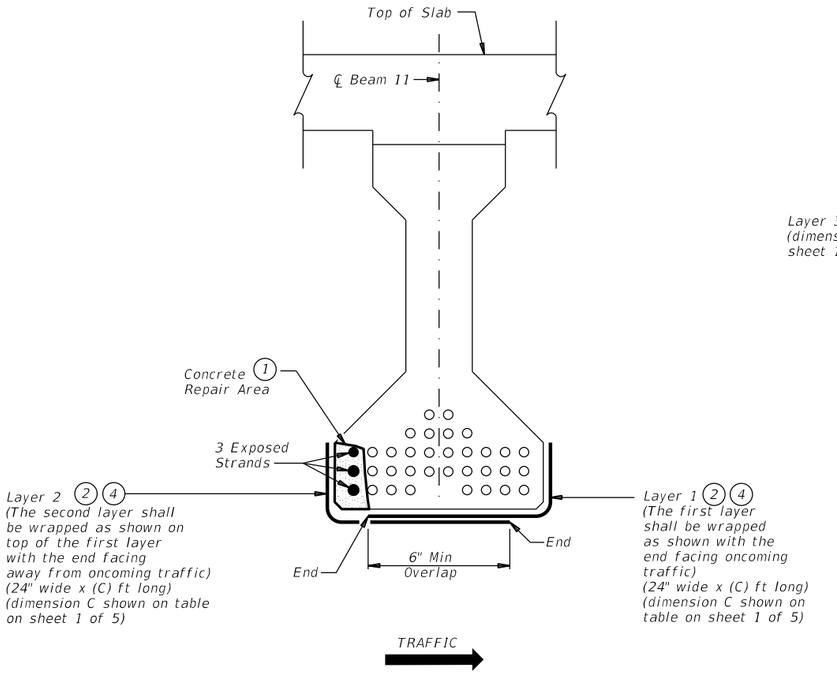
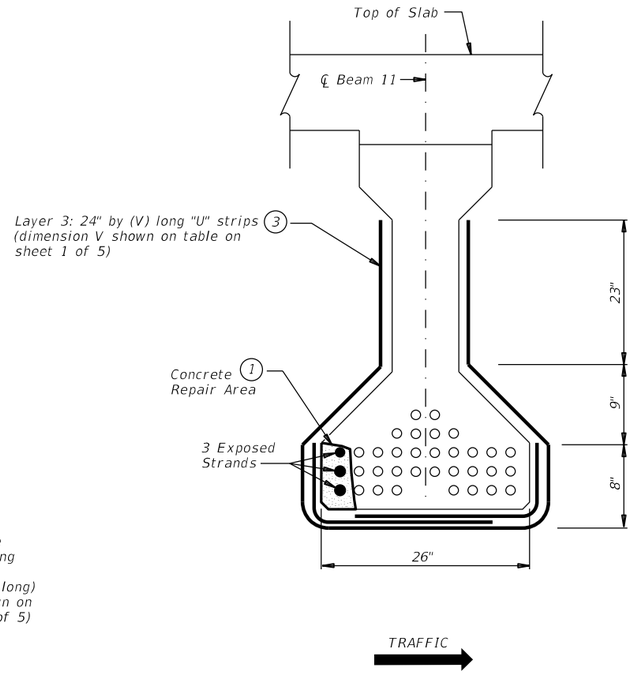


STEP 1



STEP 2

SECTION A-A
(LOOKING WEST)

BEDFORD RD @ SH 121 BEAM 11

GENERAL NOTES:

1. Damaged areas shown are for information only and may not be accurate in size, length, location, and area. Verify the extent of damages before beginning the work.
2. Remove loose concrete and prepare the repair area for the beams in accordance with Item 788, "Concrete Beam Repair" and the details shown in the plans. Do not remove concrete that is sound and firmly bonded with undamaged strands. Notify the Engineer of Record if any additional damage is found.
3. Place a 10 yard dump truck loaded with 10 CY of sand, gravel, or equivalent material on the bridge to pre-load the span over the damaged beam prior to patching the concrete. Remove the loaded truck from bridge after curing requirements are complete and before CFRP installation.
4. Use prepackaged non-shrink Type A (neat) from DMS-4655 "Concrete Repair Manual" cementitious concrete mix capable of obtaining at least 3000 psi compressive strength in 12 hours and 4000 psi in 3 days for concrete repairs. Contractor shall be responsible for determining the concrete strength by testing the cementious concrete used for repair in cubes in accordance with Tex-307-D or ASTM C-109. Testing of cementious concrete for repair shall not be paid for directly but is considered subsidiary to Item 788, "Concrete Beam Repair". Spalled area of beam shall be patched in accordance with Item 788, "Concrete Beam Repair" and the manufacturer's recommendations for surface preparation, mixing, placing, and curing.
5. Install CFRP as shown in the plans.
6. Apply a top coat of concrete paint matching the existing concrete color.
7. All associated cost of the 10 CY dump truck will be subsidiary to Item 788.
8. Additional damages incurred by the Contractor during removal or repairs shall be at the Contractor"s expense.
9. Contractor to field verify dimensions of proposed repairs and notify EOR of any differences before commencing work.

CFRP STRENGTHENING NOTES:

1. Carbon fiber reinforced polymer (CFRP) for strengthening concrete structure members shall be furnished and installed in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)".
2. The work of CFRP Strengthening per Item 786 will be considered subsidiary to Item 788, "Concrete Beam Repair".

NBI# 02-220-0-0364-01-114

STATE OF TEXAS
SANGIT RAUNIYAR
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7/10/2023

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BEAM REPAIR

CFRP DETAIL

	DN: SR	CK: MC	DW: GC/SR	CK: MC/SR
©TxDOT 07-10-23 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC		107

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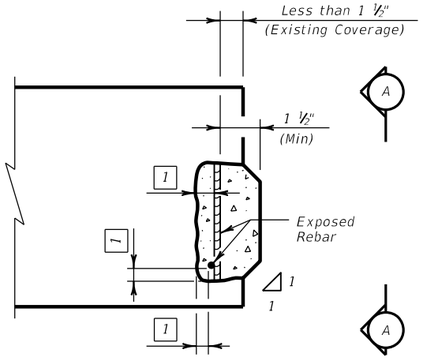
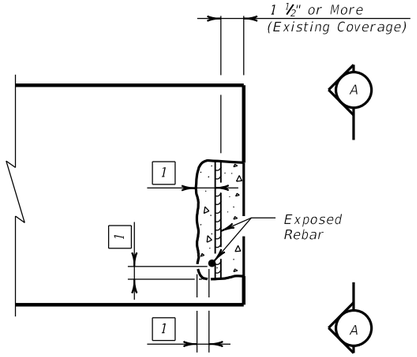
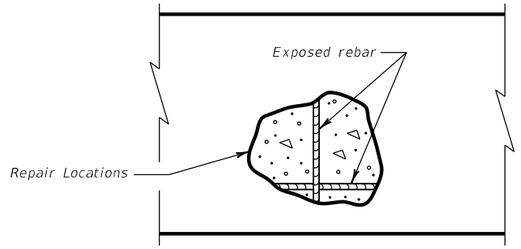


REPAIR AREAS WHERE EXISTING COVER IS LESS THAN 1 ½"



REPAIR AREAS WHERE EXISTING COVER IS 1 ½" OR MORE



VIEW A-A

THRU SECTION

TYPICAL CONCRETE STRUCTURE REPAIR DETAILS

[1] Provide ¾" clearance or 1.5 times the largest sized aggregate in the repair material, whichever is greater, between the steel and surrounding concrete to permit adequate flow of the repair material. Perform repairs conforming to Item 429, "Concrete Structure Repair" and "Concrete Repair Manual".

SHEET 1 OF 1

STATE OF TEXAS
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7/10/2023

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CONCRETE STRUCTURAL DETAILS

		DN: SR	CK: MC	DW: GC/SR	CK: MC/SR	
©TxDOT 07-10-23	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0902	90	300	VARIOUS		
	DIST	COUNTY		SHEET NO.		
	02	TARRANT, ETC		108		

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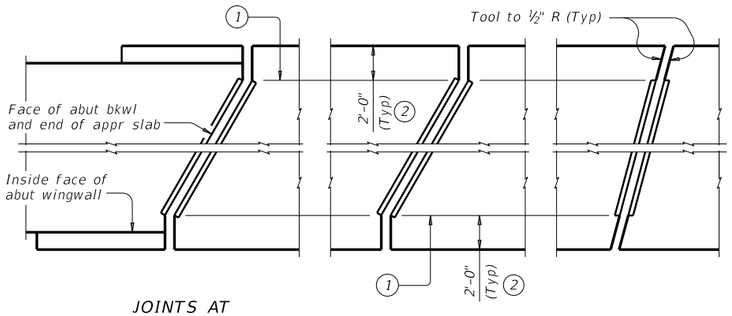
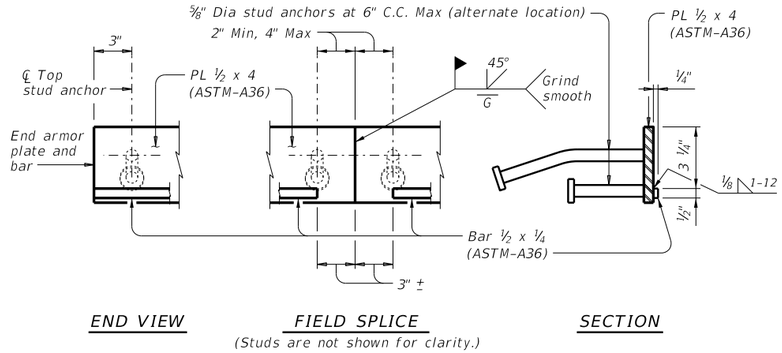


JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES



END VIEW | FIELD SPLICE | SECTION

(Studs are not shown for clarity.)

ELEVATION OF ARMOR PLATE

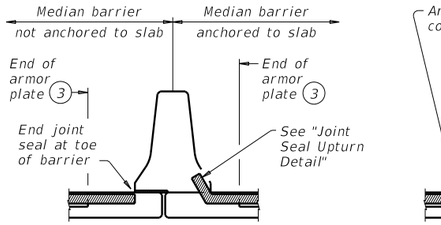
TABLE OF SEALED EXPANSION JOINT INFORMATION			
MANUFACTURER	STEEL SECTION (7)	STRIP SEAL 4" JOINT	
		Seal Type	Joint Opening (8)
D.S. Brown	As shown	V-400	2 ¼"
R.J. Watson	As shown	SF-400	2 ½"
SSI	As shown	SSS-400	2 ½"
Watson Bowman Acme	As shown	SPS-400	2"

REDUCED LONGITUDINAL MOVEMENT RANGE	
SKEW (deg)	JOINT SIZE 4"
0	4.0"
15	4.0"
30	3.5"
45	2.8"

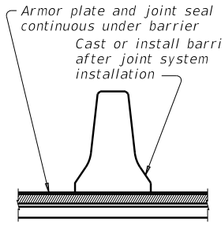
DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

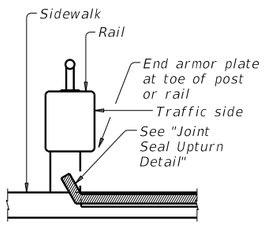
For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).



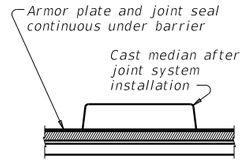
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



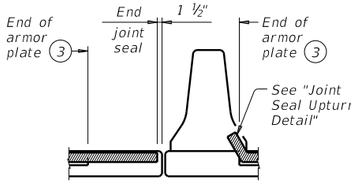
AT MEDIAN BARRIER



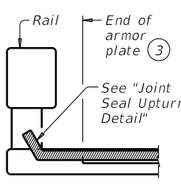
AT SIDEWALK BEHIND BRIDGE RAIL



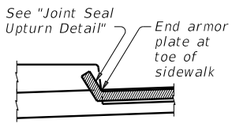
AT RAISED MEDIAN



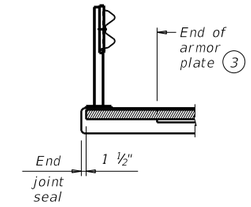
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



AT SIDEWALK



AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS OF ARMOR PLATES AND SEALS (4)

1. At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
2. Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
3. See "Plans of Armor Plates".
4. Other conditions affecting the joint profile should be noted elsewhere.
5. Align shipping angle perpendicular to joint.
6. Coat with Manufacturer's supplied epoxy primer above bar before installing sealant.
7. Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
8. These openings are also the recommended minimum installation openings.

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." 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.

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.

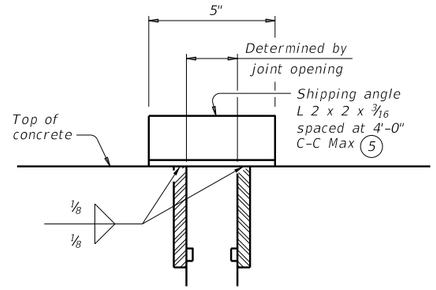
Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer.

Splice in joint seal may be performed in the field.

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-B is 6 ½".

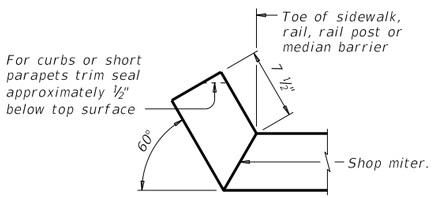


SHOWING ARMOR PLATE

(Studs not shown for clarity)

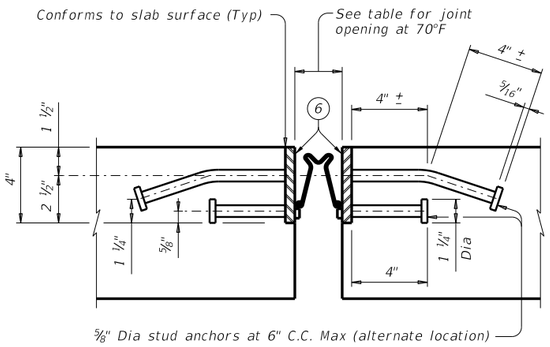
SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.



JOINT SEAL UPTURN DETAIL

Upturn seal only. Terminate armor plates as shown in "Plans of Armor Plates" and "Typical Sections of Armor Plates & Seals."



JOINT SECTION

Showing R J Watson strip seal. Other strip seals are similar.

Texas Department of Transportation

Bridge Division Standard

SEALED EXPANSION JOINT TYPE B WITHOUT OVERLAY

SEJ-B

FILE: sejbste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		109

DATE: 7/12/2023
FILE: c:\txdot\pw_online\txdot2\brandon.boring\d0744383\EPIC - 02127000142293.dgn

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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.

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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
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☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
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☐ 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

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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.

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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.

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V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ No Action Required ☐ Required Action

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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

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MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
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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:
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Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

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Are the results of the asbestos inspection positive (is asbestos present)?

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(includes regional issues such as Edwards Aquifer District, etc.)

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Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC
02-127-0-0014-22-293

FILE: epic.dgn	DN: TxDOT	CK: HA	DW: RO	CK: HA	
©TxDOT: February 2015	CONT	SECT	JOB		HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION 1 (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0902	90	300		VARIOUS
	DIST	COUNTY			SHEET NO.
	02	TARRANT, ETC.			110

DATE: 8/28/2023
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Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC
02-220-0-0364-01-114

FILE: epic.dgn	DN: TxDOT	CK: HA	DW: RO	CK: HA	
	CONT	SECT	JOB	HIGHWAY	
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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.

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- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
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- 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 [X] 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)?

[X] 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.

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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:

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC
02-220-0-1068-02-039

FILE: epic.dgn	DN: TxDOT	CK: HA	DW: RO	CK: HA
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION 1 (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		112

DATE: 7/12/2023
FILE: c:\txdot\ow_online\txdot2\brandon.boring\d0744383\EPIC - 02220010680204 7.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

[X] No Action Required [ ] Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000

2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.

3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

[X] No Permit Required

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[ ] 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.

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
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Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

[ ] No Action Required [X] Required Action

Action No.

1. *Lead was found in the green paint on the metal surfaces.*

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC
02-220-0-1068-02-047

FILE: epic.dgn	DN: TxDOT	CK: HA	DW: RO	CK: HA
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION 1 (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		113

DATE: 7/12/2023
FILE: c:\txdot\pw_online\txdot2\brandon.boring\d0744383\EPIC -02220010680237 6.dgn

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List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☒ No Action Required ☐ Required Action

Action No.

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☐ 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
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☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
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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.

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Action No.

1.

2.

3.

4.

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Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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Action No.

1.

2.

3.

4.

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☐ Yes ☒ No

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Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC
02-220-0-1068-02-376

FILE: epic.dgn	DN: TxDOT	CK: HA	DW: RO	CK: HA
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION 1 (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0902	90	300	VARIOUS
	DIST	COUNTY		SHEET NO.
	02	TARRANT, ETC.		114

DATE: 7/12/2023
FILE: c:\txdot\pw_online\txdot2\brandon.boring\d0744383\EPIC - 02220022660204 2.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☒ No Action Required ☐ Required Action

Action No.

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1.

2.

3.

4.

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3.

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Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC
02-220-0-2266-02-042

FILE: epic.dgn	DN: TxDOT	CK: HA	DW: RO	CK: HA
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION 1 (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0902	90	300	VARIOUS
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	02	TARRANT, ETC.		115

DATE: 7/12/2023
FILE: c:\txdot\pw_online\txdot2\brandon.boring\d0744383\EPIC - 02220023740528l.dgn

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1.

2.

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1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

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In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC
02-220-0-2374-05-281

FILE: epic.dgn	DN: TxDOT	CK: HA	DW: RO	CK: HA
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION 1 (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0902	90	300	VARIOUS
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	02	TARRANT, ETC.		116

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

[X] No Action Required [ ] Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
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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.

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Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC

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