SEE SHEET 2 FOR INDEX

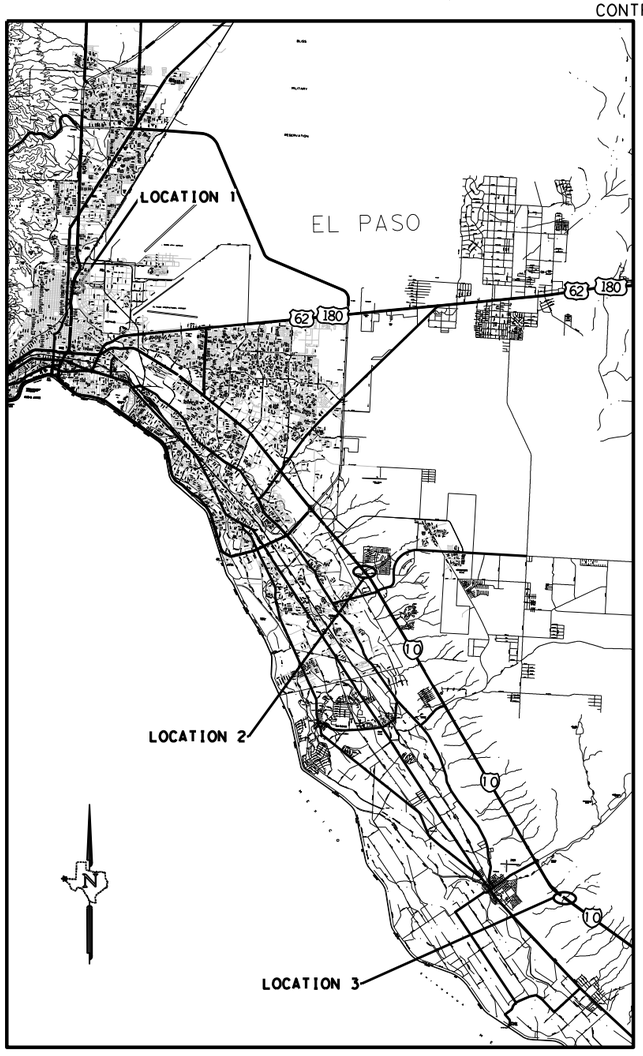
	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	1
CONTROL	SECTION	JOB	
6351	25	001	

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

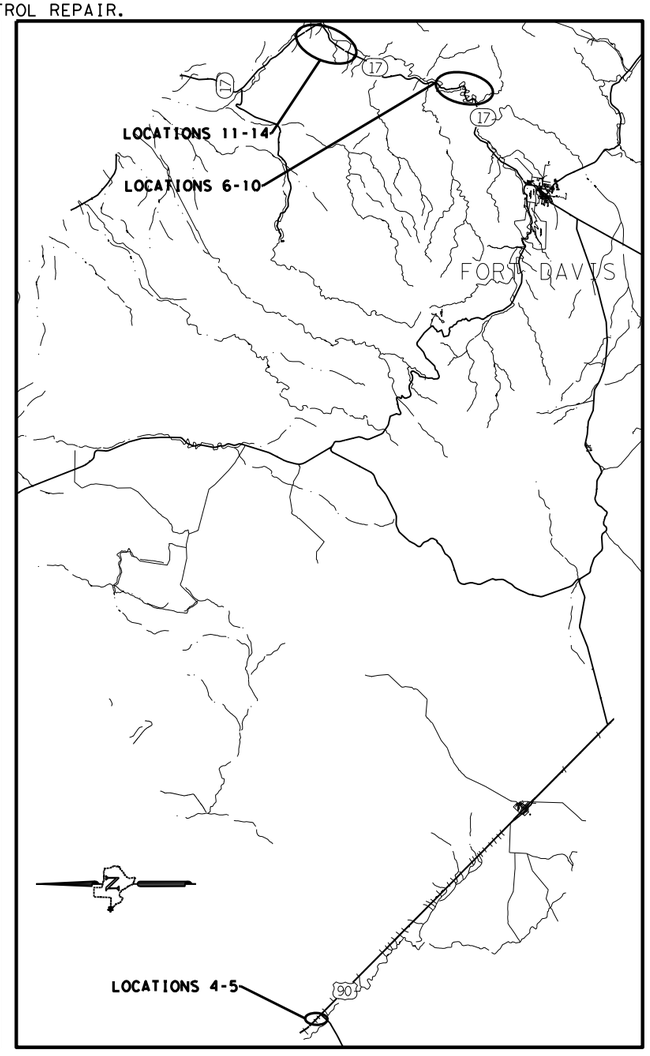
PLANS OF PROPOSED
HIGHWAY ROUTINE MAINTENANCE CONTRACT
6351-25-001

2021 BRIDGE PREVENTIVE MAINTENANCE (BPM)
EL PASO AND JEFF DAVIS COUNTIES

FOR THE CONSTRUCTION AND MAINTENANCE OF BRIDGE JOINT REPAIR, CONCRETE STRUCTURE REPAIR AND CHANNEL EROSION CONTROL REPAIR.



EL PASO COUNTY



JEFF DAVIS COUNTY

NTS

RAILROAD CROSSING: STRUCTURE - 014
NO TDLR INSPECTION REQUIRED
NO EXCEPTIONS
NO EQUATIONS

NOTE:
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOV 1, 2014, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY, 2012)

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

PLANS PREPARED BY:
Kimley»Horn F-928

SUBMITTED FOR LETTING 12/23/2020

PROJECT MANAGER
KIMLEY-HORN AND ASSOCIATES, INC.

FINAL PLANS

NAME OF CONTRACTOR: _____
TIME CHARGES BEGAN: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS COMPLETED: _____
DATE WORK WAS ACCEPTED: _____
TOTAL DAYS CHARGED: _____
ORIGINAL CONTRACT AMOUNT: _____
AMOUNT OF CONTRACT AMENDMENTS: _____
FINAL CONTRACT COST: _____
_____ 20 _____

_____
AREA ENGINEER

TEXAS COUNTY MAP
N. T. S.

RECOMMENDED FOR LETTING 12/28/2020
DocuSigned by: Eduardo Perales, P.E.
2778C60AE3F742E...
SAFETY REVIEW CHAIRMAN

RECOMMENDED FOR LETTING 12/28/2020
DocuSigned by:
CEE681BD3536485...
MAINTENANCE ENGINEER/ CONTRACT MANAGER

APPROVED FOR LETTING: 12/28/2020
DocuSigned by: Omar Madrid, P.E.
2D8D99B8F780488...
DIRECTOR OF OPERATIONS

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STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

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

AUSTIN HELTON, P.E. 12/23/2020

Kimley»Horn F-928

Texas Department of Transportation

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	2
CONT.	SECT.	JOB	
6351	25	001	

General Notes:

Tests to be in accordance with the Department's Standard Test Methods

Maintain the entire project area in a neat and orderly manner throughout the duration of the work. Remove all construction litter and undesirable vegetation within the right of way inside the project limits. This work will be subsidiary to the various bid items.

Become familiar with project site prior to submitting bids.

Where nighttime work is approved, provide adequate lighting for the entire work site as directed. This will be considered subsidiary to the various bid items.

Comply with all Occupational Safety & Health Administration (OSHA) and United States Environmental Protection Agency (EPA) regulations as well as all local and State requirements.

Refer to the various traffic control plan project overview sheets for the proposed sequence of work. Changes will not be permitted, except as approved in writing by the Engineer.

General Requirements

General Project Description – This project consists of performing Bridge Preventive Maintenance (BPM) on various structures along various roadways in El Paso and Jeff Davis counties.

The project will be managed by the participating Area Engineer and Maintenance Supervisor listed below:

Mohammad Moabed, P.E., West AE
4201 Hondo Pass Drive
El Paso, Texas 79904
(915) 757-5901

Chad Chairez, MSS
4201 Hondo Pass Drive
El Paso, Texas 79904
(915) 757-5921

Ricardo Romero, P.E., East AE
1430 Joe Battle Blvd.
El Paso, Texas 79936
(915) 849-5552

Manuel Molina Jr, MSS
13301 Gateway West Blvd
El Paso, Texas 79936
(915) 849-5555

Christopher Weber, P.E. Alpine AE
2400 N. Hwy. 118
Alpine, Texas 79830
(432) 837-3391

David Luce,
Alpine, Fort Davis, Presidio MSS
2400 N. Hwy. 118
Alpine, TX 79830
(432) 837-3391

Ruben Florez, Van Horn MSS
US 90, 1.5 Miles S of IH 10
Van Horn, TX 79855
(432) 283-2501

Each Contract awarded by the Department stands on its own and as such, is separate from other contracts. A contractor awarded multiple contracts, must be capable and sufficiently staffed to concurrently process any or all contracts at the same time.

Perform all work for this contract in accordance with the Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (2014) and all applicable State Standards.

Various bid items and their associated quantities have been provided within this contract in order to establish bid prices for the proposed work. Actual work performed as directed will be paid utilizing these prices with no further compensation made regardless of the final quantities.

Obtain Engineer approval for all equipment and vehicles prior to use.

Designate an on-site representative who will have full authority to speak and make decisions on his behalf.

Repair work must be performed within forty-eight (48) hours of notification from the Department. Contact the contract manager to receive direction and approval.

Closure of the Cassidy Road Bridge (24-072-0167-01-014) is only permitted between midnight (12 am) Sunday morning and 4 am Monday morning. Fort Bliss must be notified a minimum of 30 days prior to closure of the bridge. Contractor shall coordinate with TxDOT on notification to Fort Bliss. Fort Bliss main point of contact is Christopher Mcconnaughey (Christopher.mcconnaughey.civ@mail.mil), and secondary point of contact is Marie Helwig (marie.k.helwig.civ@mail.mil).

Item 2 – Instructions to Bidders

Contractor questions will only be accepted through email to the above individuals.

View plans on-line or download from the web at:

http://www.txdot.gov/business/plansonline/plansonline.html

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

Monica Dubrule Monica.Dubrule@txdot.gov

Contractor questions will only be accepted through email to the above individual.

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

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

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

Request a proposal electronically from the Department's website:
http://www.txdot.gov/business-cq/pr.htm

Or use the electronic bidding site:
https://www.txdot.gov/business/letting-bids/ebs.html

A bid summation will be available on-line at:
http://www.txdot.gov/business/bt.html

Item 3 – Award and Execution of Contract

Work order may be issued until August 31, 2021. No work orders will be issued after this date unless there is a mutual agreement between the Contractor and the Department. The Contract will be in effect until the work on the last work order is completed.

Item 4 – Scope of Work

Provide vehicular and pedestrian access at all times, including Saturdays, Sundays, and holidays. This access includes, but is not limited to, driveways, streets, parking areas, and walkways. This shall be considered subsidiary to the various bid items.

Schedule and perform all work to assure proper drainage during the course of construction operations. All labor, tools, equipment and supervision required, to ensure drainage, removal, and handling of water shall be considered incidental work.

Repair any existing pavement, utilities, structures, etc., damaged as a result of construction operations, at no additional cost to the Department.

Maintain all Contract items until final acceptance of the project.

Item 6 – Control of Materials

Furnish all materials on this Contract except for the following that the Department will provide:

- Radios
- Starting Aids
- High Pressure Sodium Lamps
- Mercury Lamps, Fluorescent Tubes, or Metal Halide Ramps
- Transformer Bases
- Luminaires
- Poles/Mast Arms
- Anchor Bolts (installation of foundations)
- Shorting Cap or Photocell
- Antenna
- Ballasts

Materials to be furnished by the Department can be picked up at the Traffic Signal Shop designated below. Contact the supervisor twenty-four (24) hours in advance of picking up materials.

Item 7 – Legal Relations and Responsibilities

Comply with all requirements of the Environmental Permits Issues and Commitments (EPIC) Sheet.

Dispose of all waste materials in compliance with Local, State, and Federal regulations. Submit list of all approved waste sites to the Engineer for review.

Do not discharge any liquid pollutant from vehicles onto the roadside. Immediately clean spills and dispose in compliance with local, state, and federal regulations to the satisfaction of the Engineer at no additional cost to the Department.

Occupational Safety & Health Administration (OSHA) regulations prohibit operations that bring people or equipment within 10 ft. of an energized electrical line. Where workers and/or equipment may be close to an energized electrical line, notify the electrical power company and make all necessary adjustments to ensure the safety of workers near the energized line.

No significant traffic generator events identified.

Item 8 – Prosecution and Progress

Working days will be calculated in accordance with Section 8.3.1.4., "Standard Workweek."

A bar chart schedule is required for this project conforming to Section 8.5.5.1., "Bar Chart." Provide updates as directed by the Engineer.

Prior to beginning operations, schedule and attend a preconstruction conference with the Engineer. Provide the Department a written outline of the proposed sequence of work (Bar Chart Schedule) and an estimated progress schedule.

Keep traveled surfaces used in hauling operations clear and free of dirt or other material.

Existing pavement, utilities, structures, etc. damaged as a result of the operations will be repaired at no additional cost to the Department.

Protect from damage and destruction all areas of the right of way, which are not included in the actual limits of the proposed construction areas. Exercise care to prevent damage to trees, vegetation, and other natural features.

Protect trees, shrubs, and other landscape features from abuse, marring, or damage within the actual construction and/or fenced protection areas designated for preservation. Restore any area disturbed or damaged to a condition “as good as” or “better than” prior to start of construction operation. This work will be at the Contractor’s expense.

All work and lane closures are restricted to non-peak hours defined as 9 A.M. to 4 P.M. Monday through Friday or night-time hours of 7 P.M. to 6 A.M. Sunday through Thursday, unless otherwise directed in writing.

Perform striping maintenance operations in accordance with the appropriate traffic control standard in the plan set, for site conditions, or as determined by the Engineer. The Engineer may allow the Contractor to work on several roadways at one time provided the Contractor demonstrates the ability and possesses the resources to perform work at the various locations.

All quantities of materials are for estimating purposes and actual quantities will be determined in the field by the Engineer. (Applies to both Traffic and Maintenance)

Item 9 – Measurement and Payment

Submit Material on Hand (MOH) payment requests at least **two (2)** working days before the end of the month for payment consideration on that month’s estimate.

Item 132 – Embankment

Locate all material sources out of sight from the roadway at an approved location.

Scarify and compact top 6 in. of existing roadway as directed before additional embankment or base course is placed. This work is subsidiary to various bid items.

Track the side slopes of the embankment to control erosion. This work will be subsidiary to various bid items.

Subgrade compaction will be density control and subsidiary to this Item.

Item 421 – Hydraulic Cement Concrete

Provide strength-testing equipment in accordance with the Contract controlling test(s). Furnish curing facilities adequately sized for this project as approved. Strength-testing equipment and curing facilities shall be at a location approved by the Engineer.

Furnish and properly maintain all test molds. Furnish test molds meeting the requirements of Tex-447-A. The test molds must be ready for use when needed. The Contractor will be responsible for curing and transporting concrete specimens as directed. Furnish proper equipment to remove concrete specimens from the molds. For all concrete items, provide a wheelbarrow or other acceptable container to the Engineer. This will not be paid directly, but will be subsidiary to the various bid items.

Obtain approval for all concrete mix designs and concrete aggregate sources.

Provide sulfate-resistant concrete for all structural concrete in contact with soil or groundwater.

Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water at designated areas approved by the Engineer.

Item 429 – Concrete Structure Repair

Use Department approved products to accomplish full depth, horizontal and vertical concrete repairs. Follow the procedures outlined in the Concrete Repair Manual unless approved otherwise. Submit for approval all materials and methods of application at least 3 weeks before beginning any repair work.

Item 432 – Riprap

Obtain approval for all stone riprap material sources.

Item 480 – Cleaning Existing Culverts

This Item will be paid for by the cubic yard and the volume of material to be removed will be computed by the method of average ends areas in its original position. Material removed at the entrance or exit of the culvert in order to gain access to or facilitate the function of the structure, will also be paid for by the cubic yard (average end method).

Dispose of excess material in accordance with applicable federal, state, and local regulations, or place on right of way, as directed.

Hauling and disposal of the excavated materials will not be paid for directly, but will be subsidiary to this Item.

Item 500 – Mobilization

The Contractor will be paid in accordance with the associated Item based work performed. This will fully compensate the Contractor for all associated activities.

Item 502 – Barricades, Signs, and Traffic Handling

Prior to beginning construction, the Engineer will approve the routing of traffic and sequence of work.

Additional signs and barricades, placed as directed, will be considered subsidiary to this Item.

In accordance with Section 7.2.6.1, designate, in writing, a Contractor Responsible Person (CRP) and a CRP alternate to take full responsibility for the set-up, maintenance, and necessary corrective measures of the traffic control plan. The CRP or CRP alternate must be present at site and implement the initial set up of every traffic control phase/stage, at each location, and/or each call out, for the entire duration of the project.

At the written request of the Engineer, immediately remove the CRP or CRP alternate from the project if, in the opinion of the Engineer, is not competent, not present at initial TCP set-ups, or does not perform in a proper, skillful, or safe manner. These individuals shall not be reinstated without written consent of the Engineer.

CRP and CRP alternate must be trained using Department approved training. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 1 for Department approved Training.

Table 1

Contractor Responsible Person and Alternate

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCS	Traffic Control Supervisor	2 days	
National Highway Institute	133112 133113	Design and Operation of Work Zone Traffic Control Work Zone Traffic Control for Maintenance Operations	1 day 1 day	Both courses are required to meet minimum required training.

Texas Engineering Extension Services	133112A	Design and Operation of Work Zone Traffic Control	3 days	
University of Texas Arlington Division for Enterprise Development	WKZ421	Traffic Control Supervisor	16 hours	Contact UTA for training needs.

All contractor workers involved with the traffic control implementation and maintenance must participate and complete a Department approved training course. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 2 for Department approved training.

Table 2

Other Work Zone Personnel

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCT	Traffic Control Technician	1 day	
Texas Engineering Extension Services	HWS002	Work Zone Traffic Control	16 hours	Identical to HWS-410. Counts for 3 year CRP requirement.
National Highway Institute	133116	Maintenance of Traffic for Technicians	5 hours	Web based
National Highway Institute	134109-I	Maintenance Training Series: Basics of Work Zone Traffic Control	1 hour	Free, Web based
University of Texas at Arlington, Division for	WKZ100	Work Zone Safety:	4 hours	Note name change. Free, Web based

Enterprise Development		Temporary Traffic Control		
TxDOT/AGC Joint Development	N/A	Safe Workers Awareness Highway Construction Work Zone Hazards	16 minutes 18 minutes	Videos available through AGC of Texas offices. English & Spanish
AGC America	N/A	Highway Work Zone Safety Training	1 day	
Texas Engineering Extension Service	HWS400	Temporary Traffic Control Worker	4 hours	Contact TEEX, if interested in course
TxDOT/AGC Joint Development	N/A	Work Zone Fundamentals	10 minutes	Videos available through ACT of Texas offices. English & Spanish

Contractor may choose to train workers involved with the traffic control implementation and maintenance with a contractor developed training in lieu of Department approved training. Contractor developed training must be equivalent to the Department approved training shown in Table 2. Provide the Engineer a copy of the course curriculum for pre-approval, prior to conducting the contractor developed training. Provide the Engineer a copy of the log of attendees after training completion for project records.

Existing regulatory signs, route marker auxiliaries, guide signs, and warning signs that must be removed due to widening shall be relocated temporarily and erected on approved supports at locations shown in the plans, or as directed. This work will not be paid for directly, but considered subsidiary to this Item.

Notify the Department officials when major traffic changes are to be made, such as detours. Coordinate with the Department on all traffic changes. Advance notification for the following week's work must be made by 5 P.M. on Wednesdays.

If Law Enforcement Personnel is required by the Engineer, coordinate with local law enforcement as directed or agreed. Complete the weekly tracking form provided by the Department and submit

invoices with 5% allowance for Law Enforcement payments by Contractor that agree with the tracking form for payment at the end of each month where approved services were provided.

Provide access to intersecting side roads and driveways at all times, unless otherwise directed.

Any approved change to the sequence of work or TCP, must be signed and sealed by a Contractor's Licensed Professional Engineer assuming full responsibility for any additional barricade signs and devices needed.

Use striping operations to channelize traffic into the newly completed roadway, as directed. Maintain shoulders and median areas in a condition capable of serving as emergency paths, as approved. This work will be subsidiary to this Item.

Use portable changeable message signs (PCMS) to alert public of construction two weeks prior to construction.

Use flaggers when directed. Provide two-way radio communication for all flaggers.

Place and maintain sufficient additional warning signs, beacons, delineators, and barricades to warn and guide the public of all hazards through the construction zone at all times, and as directed.

Use flashing arrow boards on all tapers for each lane closure.

Some signs, barricades, and channelization devices may not be shown at the precise or measured position. Place the barricades, devices, or signs, with approval, in positions to meet field conditions.

Fill any holes left by barricade or sign supports and restore the area to its original condition.

Use Type A flashing warning lights or delineators to mark open excavation, footings, foundations, or other obstructions near lanes that may be open to traffic, as directed.

For additional information pertaining to channelization, signing, spacing details, and flagging procedures required to regulate, warn, and guide traffic through project, refer to the "Barricade and Construction Standards," BC(1)-14 and to the current *Texas Manual on Uniform Traffic Control Devices(TMUTCD).*

Remove or cover signs that do not apply to current conditions at the end of each day's work.

Repair and/or replace all signs damaged by the public or due to weather events.

Safety Contingency

The contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancement, to improve the effectiveness of the TCP that

could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Item 506 – Temporary Erosion, Sedimentation, and Environmental Controls

Place Best Method Practices (BMP's) in locations as designated in the plans or as directed to meet field conditions.

Place rain gauge(s) at locations as designated.

Establish the authorization requirements for Storm Water Discharges for soil disturbed area in this project, all project locations in the Contract, and Contractor Project Specific Locations (PSLs), within one mile of the project limits. Both the Department and the Contractor shall obtain an authorization to discharge storm water from TCEQ for the construction activities shown on the plans. Obtain required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off right of way.

Best Method Practices (BMP's) may be adjusted to meet field conditions, or as directed. The Engineer will verify all locations prior to placement of BMPs. Maintain and properly place the erosion control measures to prevent storm water pollution to the Waters of the United States, as directed. Within the project limits, keep all inlets functional as long as possible to accept storm water as part of the Storm Water Pollution Prevention Plan (SWP3), as directed.

Grading operations will be limited to the catch point of the proposed cross-section.

Preserve any vegetation outside these limits.

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

All TMA Operators must participate in a TMA workshop to be conducted by the El Paso District Safety Office, on the proper use of TMAs, prior to working on Department Right of Way (ROW). A certificate of completion will be issued to TMA Operators that successfully complete the TMA workshop. The certificate of completion must be carried by TMA Operators at all times while working on Department right of way.

Acquire the TCP and TMA Operator's certificates of completion prior to the authorization to begin work. No time suspension will be granted and no traffic control work will be allowed without certificates of completion.

The supporting vehicle for the TMA shall have a minimum gross (i.e., ballasted) vehicular weight of 19,000 pounds.

Basis of Estimate for Stationary TMAs				
		TMA(Stationary)		
Phase	Standard	Required	Additional	TOTAL
047	TCP(2-1)	23	-	23
064	TCP(5-1) TCP(6-1) TCP(6-4)	11	-	11
115	TCP(2-1)	9	-	9
116	TCP(2-1)	6	-	6
033	TCP(2-1)	17	-	17
036	TCP(2-1)	21	-	21
037	TCP(2-1)	13	-	13
038	TCP(2-1)	21	-	21
066	TCP(2-1)	23	-	23
058	TCP(2-1)	21	-	21
061	TCP(2-1) TCP(2-2)	19	-	19
062	TCP(2-1)	15	-	15
063	TCP(2-1) TCP(2-2)	23	-	23

Item 6001 – Portable Changeable Message Sign

Provide messages as directed.

Portable Changeable Message Sign to be available as deemed necessary.

BRIDGE MAINTENANCE ITEMS

SPEC ITEM #	0104 6028	0132 6003	0429 6007	0432 6031	0438 6001	0459 6001	0459 6002	0480 6002	0496 6072	0760 6003	0780 6002
ITEM DESCRIPTION	REMOVING CONC (MISC)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (STONE PROTECTION) (12 IN)	CLEANING AND SEALING EXISTING JOINTS	GABIONS (GALV)	GABIONS MATTRESSES (GALV)	CLEAN EXIST CULVERTS	REMOVING ROCK RIPRAP	DITCH CLEANING/ RESHAPING (CU YD IN VEHICLE)	CNC CRACK REPAIR (DISCRETE) (INJECT)
UNITS	SY	CY	SF	CY	LF	CY	CY	CY	LF	CY	LF
24-072-0-0167-01-014			8		70						27
24-072-0-2121-04-047		51	4	18			103	24			44
24-072-0-2121-05-064			5		30						3
24-123-0-0020-03-115			13								10
24-123-0-0020-03-116			10								
24-123-0-0104-02-033			4				34	19		16	13
24-123-0-0104-02-036			9				133	6		22	5
24-123-0-0104-02-037						7	80			6	21
24-123-0-0104-02-038			2				61	80	67	8	6
24-123-0-0104-02-066		34	4	15		186					21
24-123-0-0104-03-058		79		16		219					4
24-123-0-0104-03-061	12	4		12	44	47					4
24-123-0-0104-03-062		4	2	0		58			43		9
24-123-0-0104-03-063		47		12	43	156					18
TOTAL	12	219	61	73	187	673	411	129	110	52	185

EROSION CONTROL ITEMS

SPEC ITEM #	0506 6003	0506 6011	0506 6038	0506 6039
ITEM DESCRIPTION	ROCK FILTER DAMS (INSTALL) (TY 3)	ROCK FILTER DAMS (REMOVE)	TEMP SDMT CONT FENCE (INSTALL)	TEMP SDMT CONT FENCE (REMOVE)
UNITS	LF	LF	LF	LF
24-072-0-0167-01-014				
24-072-0-2121-04-047			66	66
24-072-0-2121-05-064				
24-123-0-0020-03-115				
24-123-0-0020-03-116				
24-123-0-0104-02-033			69	69
24-123-0-0104-02-036			58	58
24-123-0-0104-02-037			30	30
24-123-0-0104-020-38			41	41
24-123-0-0104-02-066	103	103	270	270
24-123-0-0104-03-058	63	63		
24-123-0-0104-03-061	67	67		
24-123-0-0104-03-062	74	74		
24-123-0-0104-03-063	46	46	189	189
TOTAL	353	353	723	723

TRAFFIC CONTROL ITEMS

SPEC ITEM #	0502 6001	6001 6001	6185 6002
ITEM DESCRIPTION	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
UNITS	MO	DAY	DAY
TCP	4	80	222
TOTAL	4	80	222

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Kimley»Horn F-928

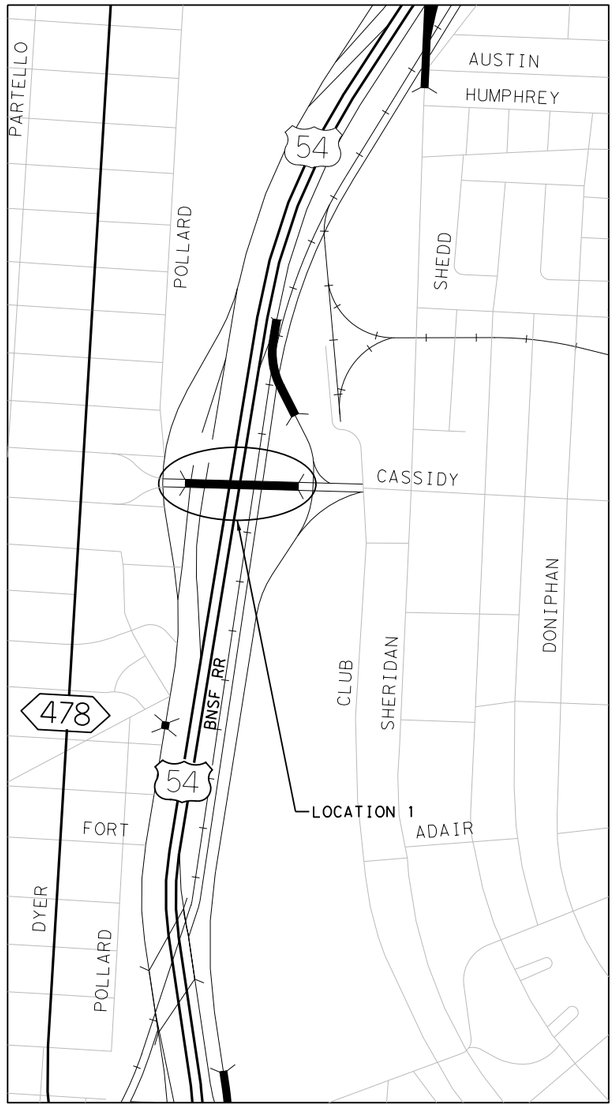
Texas Department of Transportation

BPM FY 21
QUANTITY SUMMARY

SHEET 1 OF 1

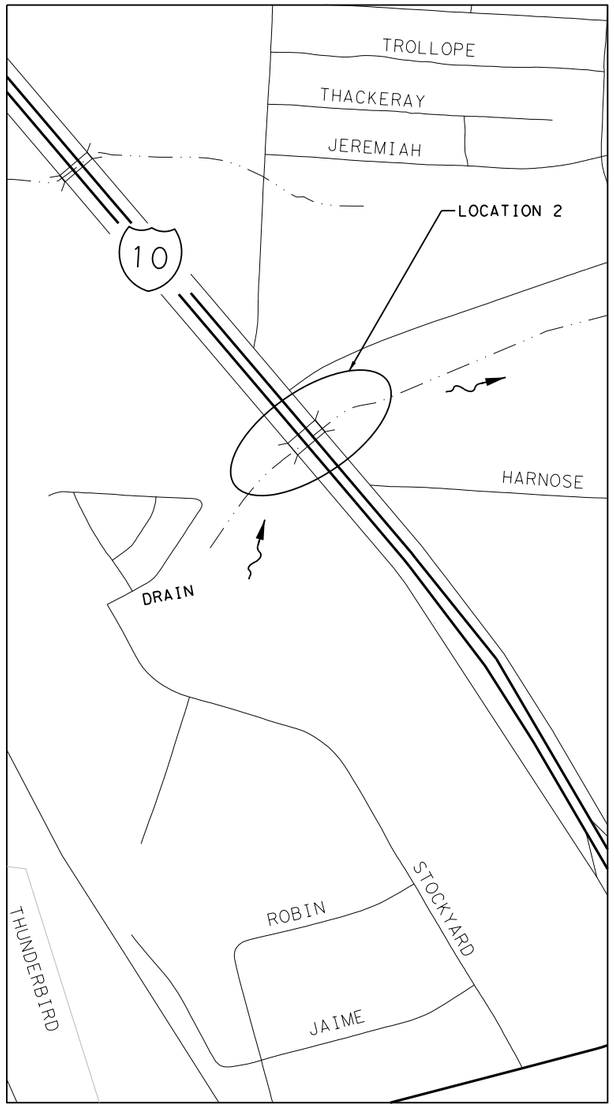
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	5
CONT.	SECT.	JOB	
6351	25	001	



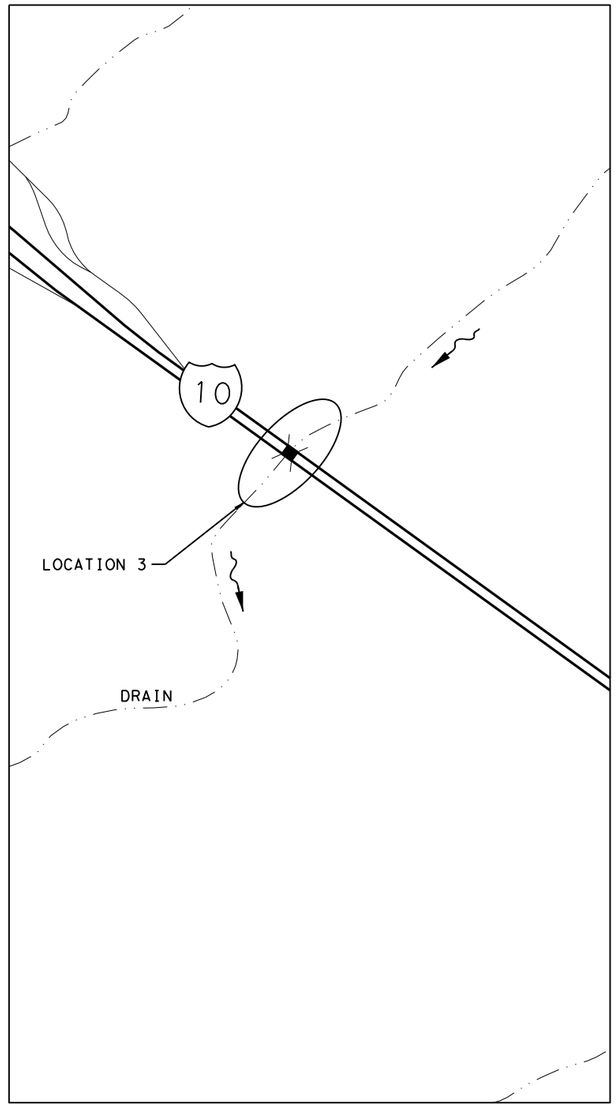
LOCATION MAP 1

N.T.S.



LOCATION MAP 2

N.T.S.



LOCATION MAP 3

N.T.S.

LOCATION MAPS 1, 2, & 3						
LOCATION #	NBI #	FACILITY CARRIED	FEATURE CROSSED	LOCATION	LATITUDE	LONGITUDE
1	24-072-0167-01-014	CASSIDY RD	US 54 & BNSF RR	2.8 MI N OF IH 10	31.81252	-106.44134
2	240-72-2121-04-047	IH 10	DRAIN	3.1 MI E OF LOOP 375	31.66942	-106.24837
3	24-072-2121-05-064	IH 10 WB	DRAIN	1.7 MI E OF FM 793	31.50086	-106.11166

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PROJECT LOCATION MAPS

SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	6
CONT.	SECT.	JOB	
6351	25	001	

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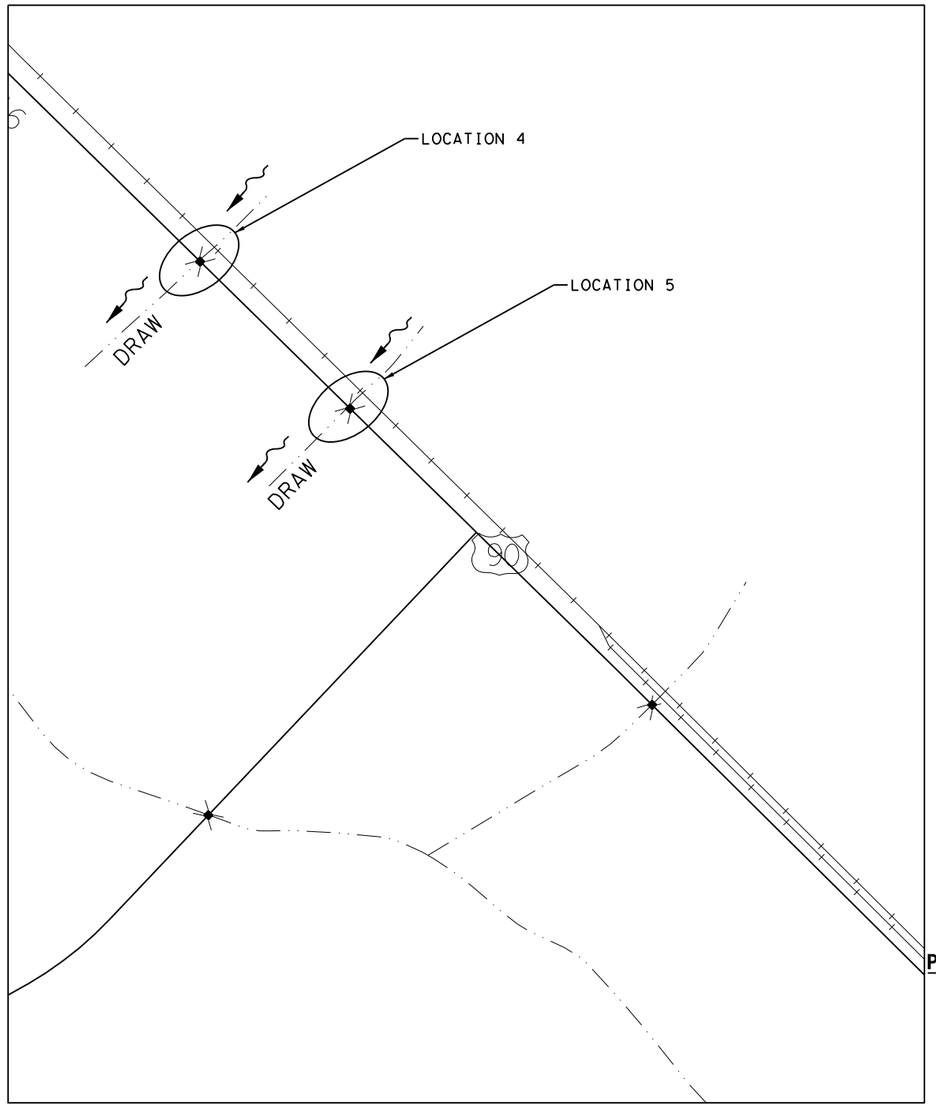
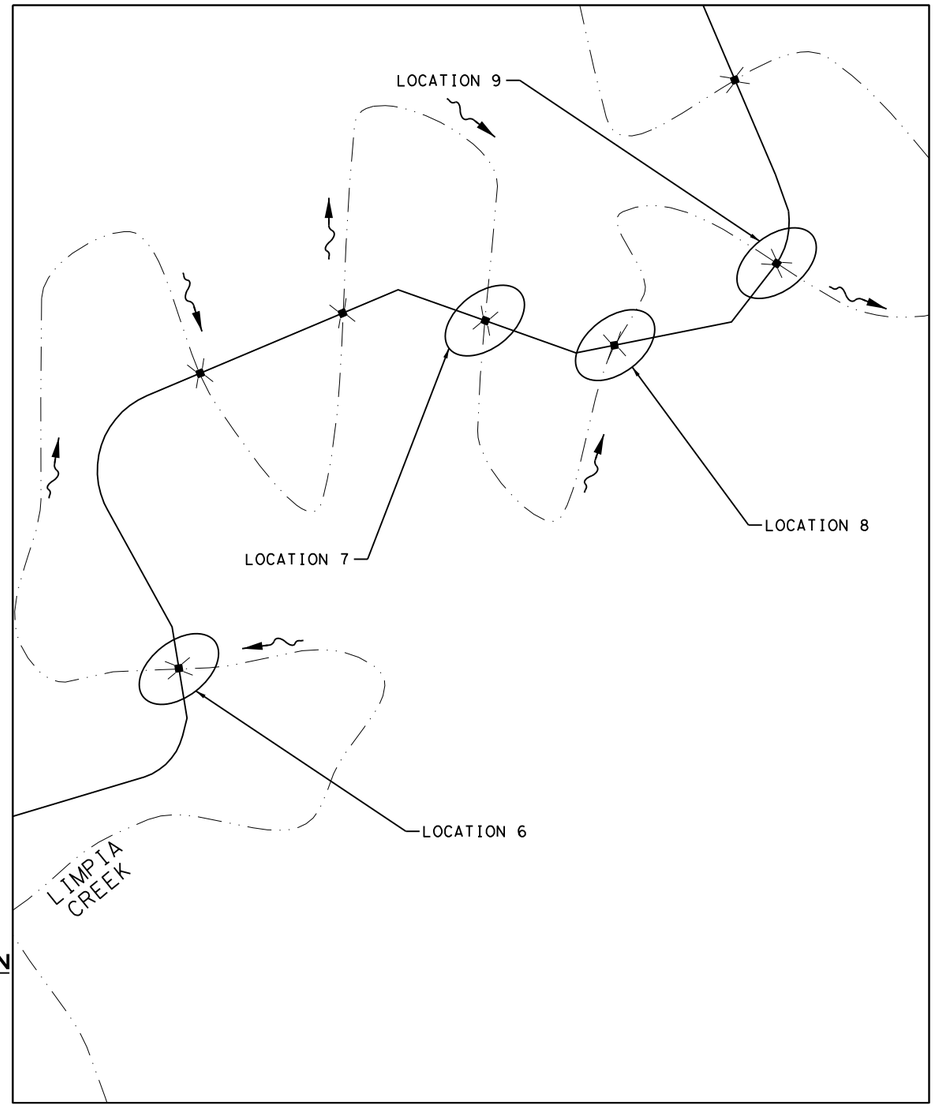


LOCATION MAP 4

N.T.S.



LOCATION MAP 5

N.T.S.

PLAN

LOCATION MAPS 4 & 5						
LOCATION #	NBI #	FACILITY CARRIED	FEATURE CROSSED	LOCATION	LATITUDE	LONGITUDE
4	24-123-0020-03-115	US 90	DRAW	1.09 MI SE CULBERSON C/L	30.75615	-104.71206
5	24-123-0020-03-116	US 90	DRAW	1.37 MI SE CULBERSON C/L	30.75359	-104.70878
6	24-123-0104-03-058	SH 17	LIMPIA CREEK	6.8 MI NE OF SH 118	30.65302	-103.80404
7	24-123-0104-03-061	SH 17	LIMPIA CREEK	7.6 MI NE OF SH 118	30.65955	-103.79783
8	24-123-0104-03-062	SH 17	LIMPIA CREEK	7.8 MI NE OF SH 118	30.65918	-103.79508
9	24-123-0104-03-063	SH 17	LIMPIA CREEK	8.0 MI NE OF SH 118	30.66078	-103.79172

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PROJECT LOCATION MAPS

SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	7
CONT.	SECT.	JOB	
6351	25	001	

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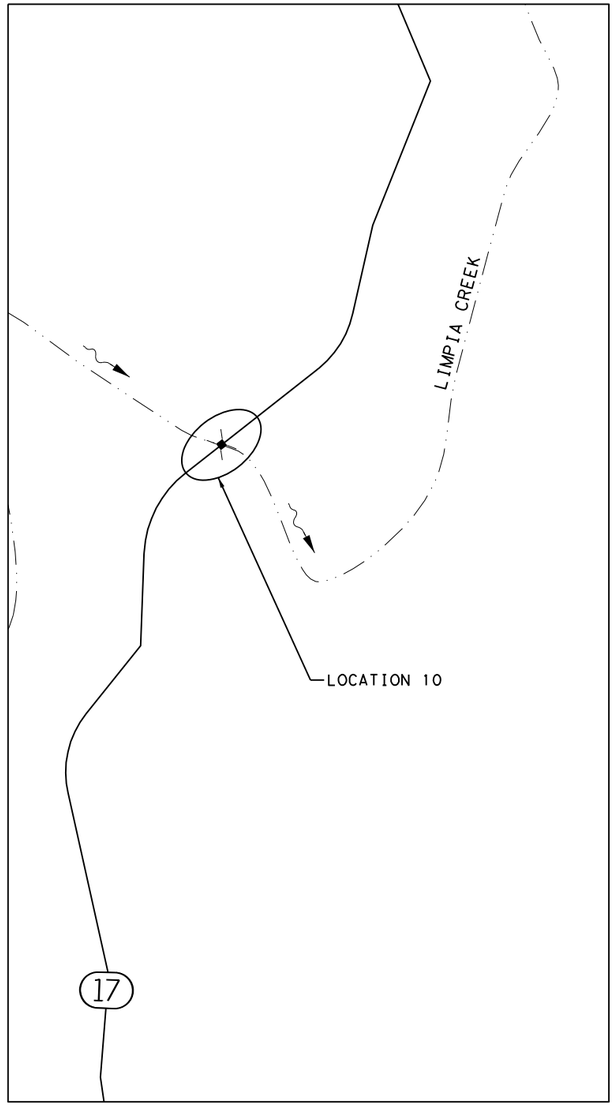
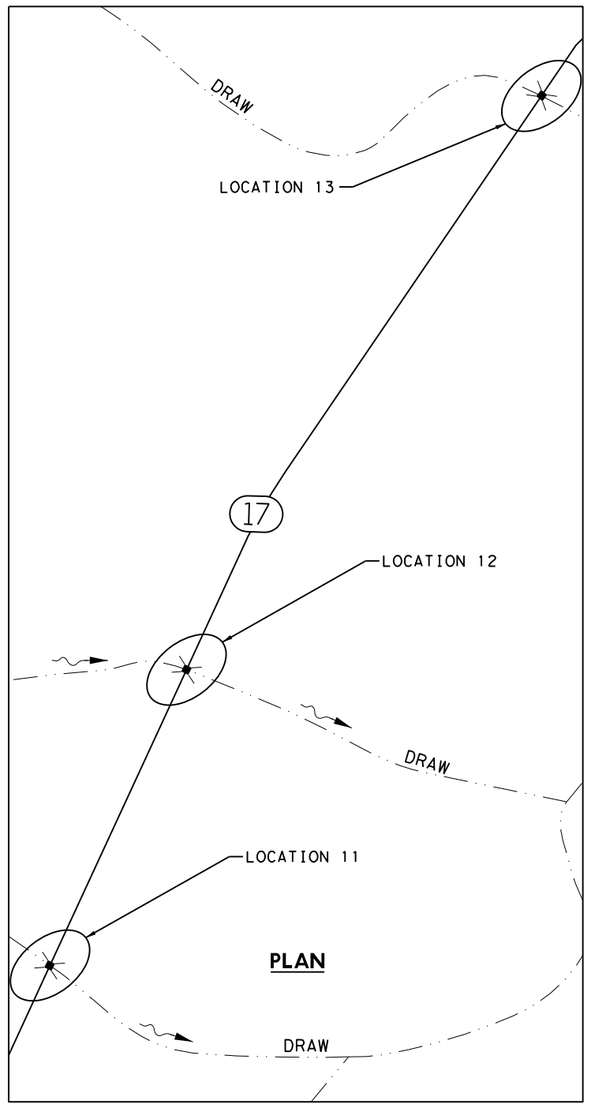


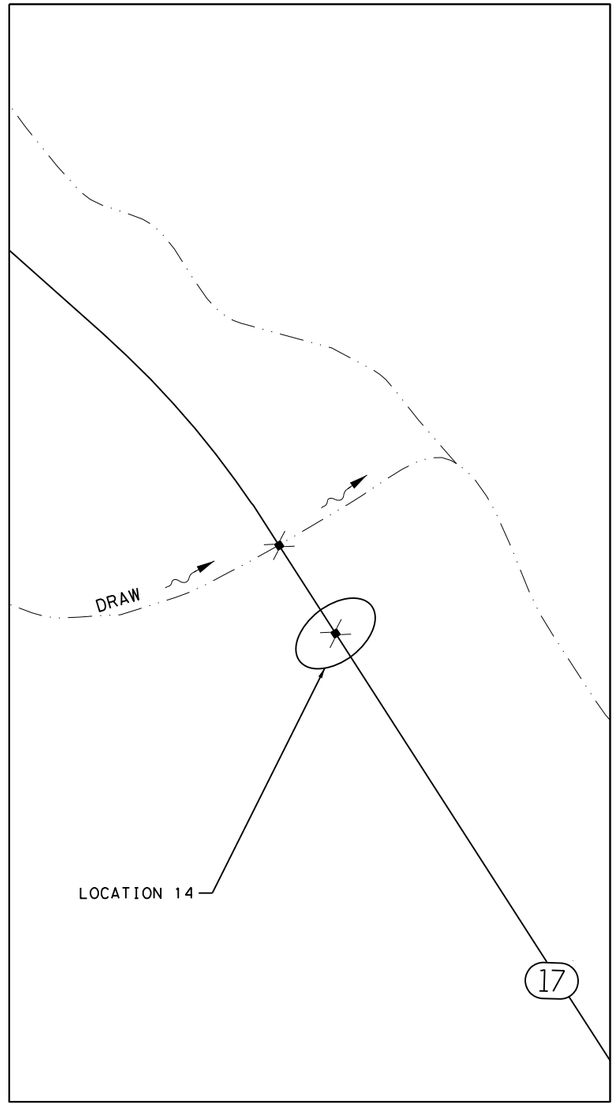
LOCATION MAP 6

N.T.S.



LOCATION MAP 7

N.T.S.



LOCATION MAP 8

N.T.S.

LOCATION MAPS 6, 7, & 8						
LOCATION #	NBI #	FACILITY CARRIED	FEATURE CROSSED	LOCATION	LATITUDE	LONGITUDE
10	24-123-0104-02-066	SH 17	LIMPIA CREEK	9.5 MI NE OF SH 118	30.68126	-103.79254
11	24-123-0104-02-038	SH 17	DRAW	12.8 MI S OF REEVES C/L	30.75431	-103.76502
12	24-123-0104-02-037	SH 17	DRAW	12..4 MI S OF REEVES C/L	30.7598	-103.76234
13	24-123-0104-02-036	SH 17	DRAW	11.5 MI S OF REEVES C/L	30.77049	-103.75525
14	24-123-0104-02-033	SH 17	DRAW	8.40 MI S OF REEVES C/L	30.80279	-103.74887

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PROJECT LOCATION MAPS

SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	8
CONT.	SECT.	JOB	
6351	25	001	

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LOCATION: 1

*CASSIDY RD AT US 54 AND BNSF RR

NBI: 24-072-0-0167-01-014

PROPOSED WORK:

*REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION

*REPAIR BRIDGE JOINT

TCP NARRATIVE:

*SHOULDER CLOSURE OF SB RAMP AND SB US 54 MAINLANE AS REQUIRED FOR CONCRETE STRUCTURE REPAIR ON BENT.

*CLOSE CASSIDY ROAD BRIDGE AND DETOUR TRAFFIC DURING BRIDGE DECK AND JOINT REPAIRS. REFER TO LOCATION 1 DETOUR SHEET FOR DETOUR LAYOUT.

*BRIDGE CLOSURE CAN ONLY OCCUR BETWEEN THE HOURS OF MIDNIGHT SUNDAY MORNING TO 4:00 AM MONDAY. FORT BLISS MUST BE NOTIFIED A MINIMUM OF 30 DAYS PRIOR TO BRIDGE CLOSURE.

TCP STANDARDS:

*WZ(RCD)-13 AND TCP(5-1B)-18

LOCATION: 2

*IH10 AT DRAIN

NBI: 24-072-0-2121-04-047

PROPOSED WORK:

*REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION

*INSTALL GABION MATTRESS

*INSTALL STONE PROTECTION RIPRAP

*CLEAN EXISTING CULVERT

*INSTALL EMBANKMENT

TCP NARRATIVE:

*SHOULDER CLOSURE OF IH 10 FRONTAGE ROADS AS REQUIRED

*CONTRACTOR TO ACCESS WINGWALLS FROM BEHIND EXISTING MBGF TO AVOID LANE CLOSURES

TCP STANDARDS:

*TCP(5-1B)-18

LOCATION: 3

*IH10 WB AT DRAIN

NBI: 24-072-0-2121-05-064

PROPOSED WORK:

*REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION

* REPAIR BRIDGE JOINT

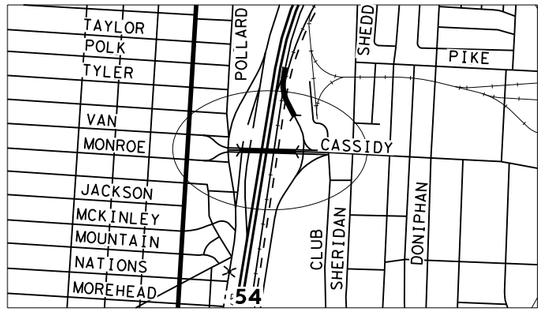
TCP NARRATIVE:

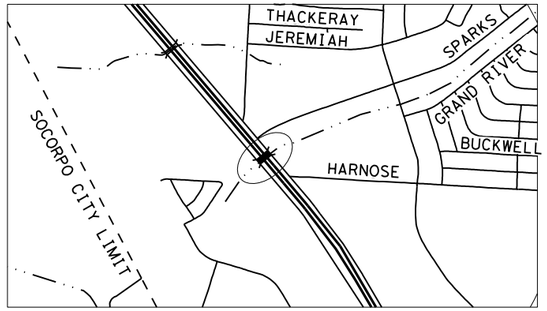
* ONE LANE AND/OR SHOULDER CLOSURE OF IH 10 MAINLANES AS REQUIRED

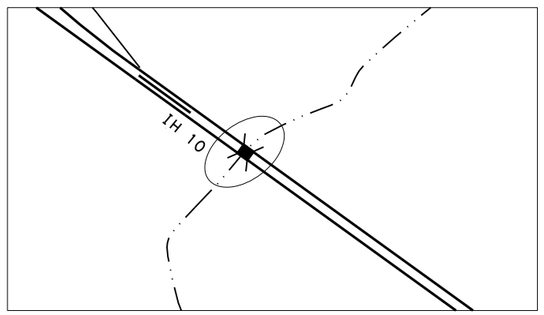
* CONTRACTOR TO ACCESS FROM BEHIND EXISTING MBGF TO AVOID LANE CLOSURES

TCP STANDARDS:

* TCP(5-1B)-18, TCP(6-1A)-12 AND TCP(6-4B)-12







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BPM FY 21
TCP NARRATIVE

SHEET 1 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	9
CONT.	SECT.	JOB	
6351	25	001	

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LOCATION: 4

* US 90 AT DRAW

NBI: 24-123-0-0020-03-115

PROPOSED WORK:

*REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION

TCP NARRATIVE:

* SHOULDER CLOSURE OF US 90 AS REQUIRED

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18

LOCATION: 5

* US 90 AT DRAW

NBI: 24-123-0-0020-03-116

PROPOSED WORK:

*REPAIR CONCRETE STRUCTURE

TCP NARRATIVE:

* SHOULDER CLOSURE OF US 90 AS REQUIRED

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18

LOCATION: 6

* SH 17 AT DRAW

NBI: 24-123-0-0104-02-033

PROPOSED WORK:

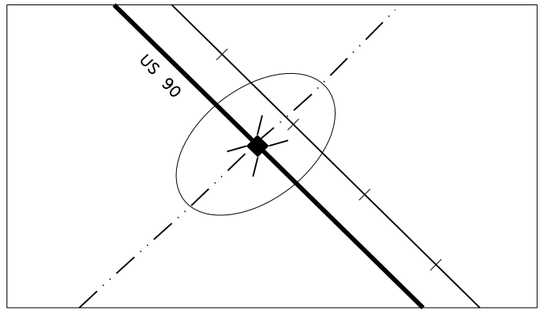
* REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION
* INSTALL GABION MATTRESS
* CLEAN EXISTING CULVERT
* CLEAN AND RESHAPE DITCH

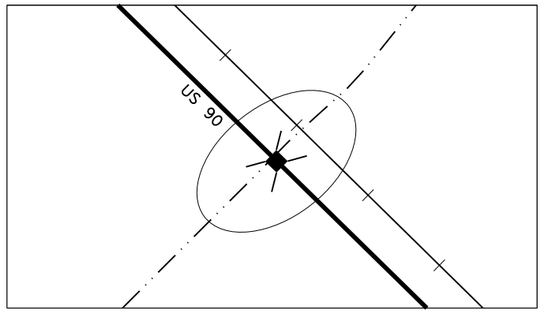
TCP NARRATIVE:

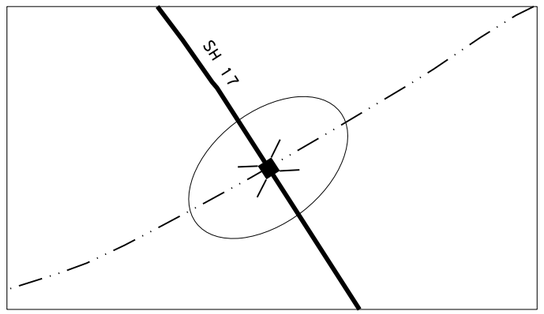
* SHOULDER CLOSURE OF SH 17 AS REQUIRED

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18







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TCP NARRATIVE

SHEET 2 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	10
CONT.	SECT.	JOB	
6351	25	001	

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PLOTTED: 12/23/2020 7:23:35 AM

LOCATION: 7

* SH 17 AT DRAW

NBI: 24-123-0-0104-02-036

PROPOSED WORK:

* REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION
* INSTALL GABION MATTRESS
* CLEAN EXISTING CULVERT
* CLEAN AND RESHAPE DITCH

TCP NARRATIVE:

* SHOULDER CLOSURE OF SH 17 AS REQUIRED

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18

LOCATION: 8

* SH 17 AT DRAW

NBI: 24-123-0-0104-02-037

PROPOSED WORK:

* EPOXY CRACK INJECTION
* INSTALL GABION MATTRESS
* CLEAN AND RESHAPE DITCH

TCP NARRATIVE:

* SHOULDER CLOSURE OF SH 17 AS REQUIRED

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18

LOCATION: 9

* SH 17 AT DRAW

NBI: 24-123-0-0104-02-038

PROPOSED WORK:

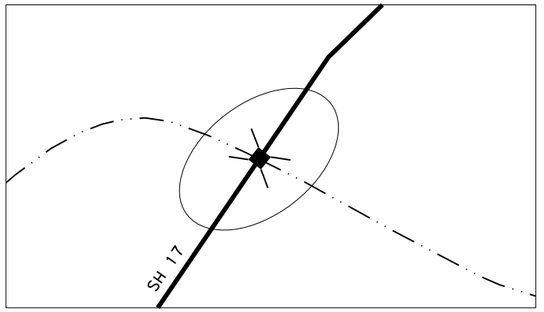
* REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION
* INSTALL GABION MATTRESS
* CLEAN EXISTING CULVERT
* CLEAN AND RESHAPE DITCH
* REMOVE EXISTING BOULDERS
* REMOVE EXISTING GABIONS

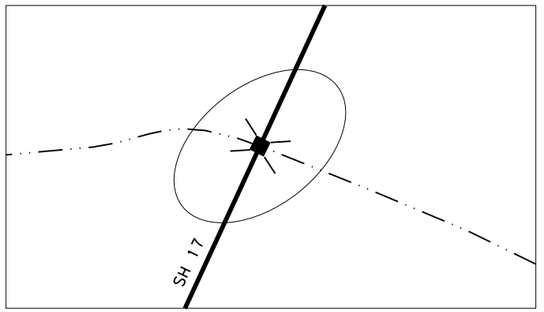
TCP NARRATIVE:

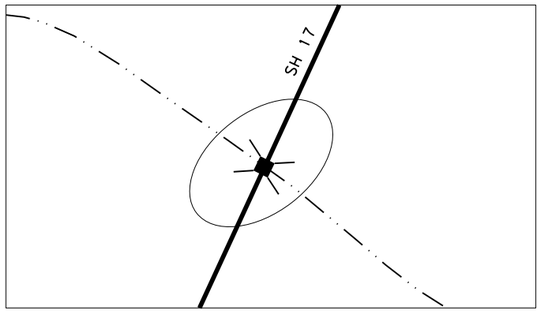
* SHOULDER CLOSURE OF SH 17 AS REQUIRED

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP (2-1C)-18







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TCP NARRATIVE

SHEET 3 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	11
CONT.	SECT.	JOB	
6351	25	001	

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PLOTTED: 12/23/2020 7:23:40 AM

LOCATION: 10

* SH 17 AT LIMPIA CREEK

NBI: 24-123-0-0104-02-066

PROPOSED WORK:

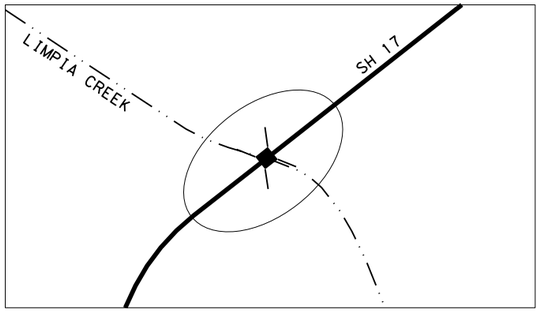
* REPAIR CONCRETE STRUCTURE AND EPOXY CRACK INJECTION
* INSTALL GABION BASKET
* INSTALL STONE PROTECTION RIPRAP
* INSTALL EMBANKMENT

TCP NARRATIVE:

* SHOULDER CLOSURE OF SH 17 AS REQUIRED
* CONTRACTOR TO ACCESS ABUTMENTS FROM BEHIND EXISTING MBGF TO AVOID LANE CLOSURES

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18



LOCATION: 11

* SH 17 AT LIMPIA CREEK

NBI: 24-123-0-0104-03-058

PROPOSED WORK:

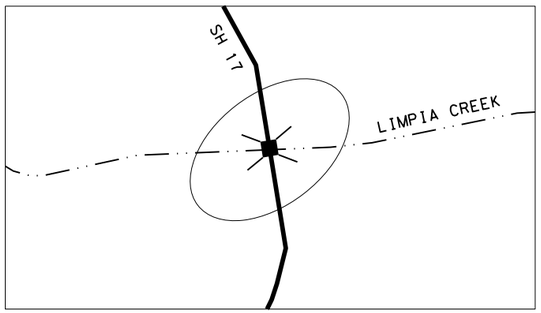
* EPOXY CRACK INJECTION
* INSTALL GABION BASKET
* INSTALL STONE PROTECTION RIPRAP
* INSTALL EMBANKMENT

TCP NARRATIVE:

* SHOULDER CLOSURE OF SH 17 AS REQUIRED
* CONTRACTOR TO ACCESS FROM BEHIND EXISTING MBGF TO AVOID LANE CLOSURES

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18



LOCATION: 12

* SH 17 AT LIMPIA CREEK

NBI: 24-123-0-0104-03-061

PROPOSED WORK:

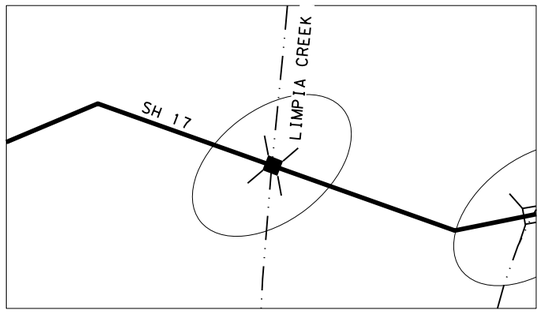
* EPOXY CRACK INJECTION
* REPAIR BRIDGE JOINT
* INSTALL GABION BASKET
* INSTALL STONE PROTECTION RIPRAP
* INSTALL EMBANKMENT
* REMOVE EXIST CONCRETE FILL

TCP NARRATIVE:

* SHOULDER CLOSURE OF SH 17 AS REQUIRED
* ONE LANE CLOSURE AS REQUIRED FOR JOINT REPAIRS. USE ONE LANE TWO WAY TRAFFIC CONTROL WITH FLAGGERS.
* CONTRACTOR TO INCREASE BUFFER DISTANCE TO MAINTAIN STOPPING SIGHT DISTANCE TO THE FLAGGER AND A QUEUE OF STOPPED VEHICLES.

TCP STANDARDS:

* TCP(2-1A)-18, TCP(2-1C)-18 AND TCP(2-2B)-18



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TCP NARRATIVE

SHEET 4 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	12
CONT.	SECT.	JOB	
6351	25	001	

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PLOTTED: 12/23/2020 7:23:45 AM

LOCATION: 13

* SH 17 AT LIMPIA CREEK

NBI: 24-123-0-0104-03-062

PROPOSED WORK:

* EPOXY CRACK INJECTION
* INSTALL GABION BASKET
* INSTALL EMBANKMENT
* REMOVE EXISTING BOULDERS

TCP NARRATIVE:

* SHOULDER CLOSURE OF SH 17 AS REQUIRED
* CONTRACTOR TO ACCESS FROM BEHIND EXISTING MBGF TO AVOID LANE CLOSURES

TCP STANDARDS:

* TCP(2-1A)-18 AND TCP(2-1C)-18

LOCATION: 14

* SH 17 AT LIMPIA CREEK

NBI: 24-123-0-0104-03-063

PROPOSED WORK:

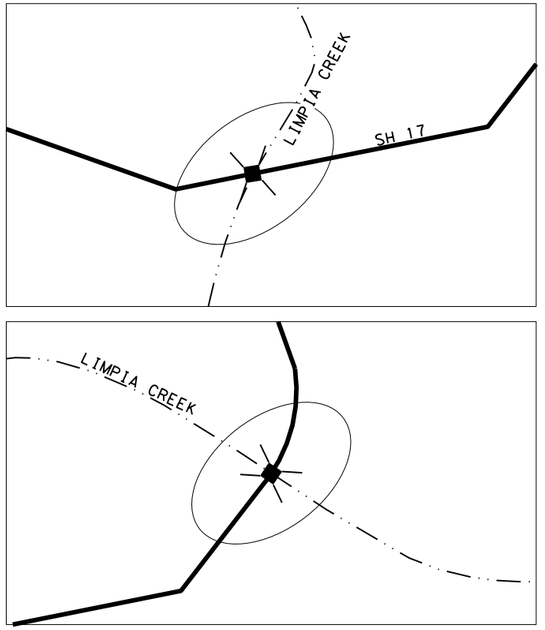
* EPOXY CRACK INJECTION
* REPAIR BRIDGE JOINT
* INSTALL GABION BASKET
* INSTALL STONE PROTECTION RIPRAP
* INSTALL EMBANKMENT

TCP NARRATIVE:

* SHOULDER CLOSURE OF SH 17 AS REQUIRED
* ONE LANE CLOSURE AS REQUIRED FOR JOINT REPAIRS. USE ONE LANE TWO WAY TRAFFIC CONTROL WITH FLAGGERS.
* CONTRACTOR TO INCREASE BUFFER DISTANCE TO MAINTAIN STOPPING SIGHT DISTANCE TO THE FLAGGER AND A QUEUE OF STOPPED VEHICLES.

TCP STANDARDS:

* TCP(2-1A)-18, TCP(2-1C)-18 AND TCP(2-2B)-18



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TCP NARRATIVE

SHEET 5 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	13
CONT.	SECT.	JOB	
6351	25	001	

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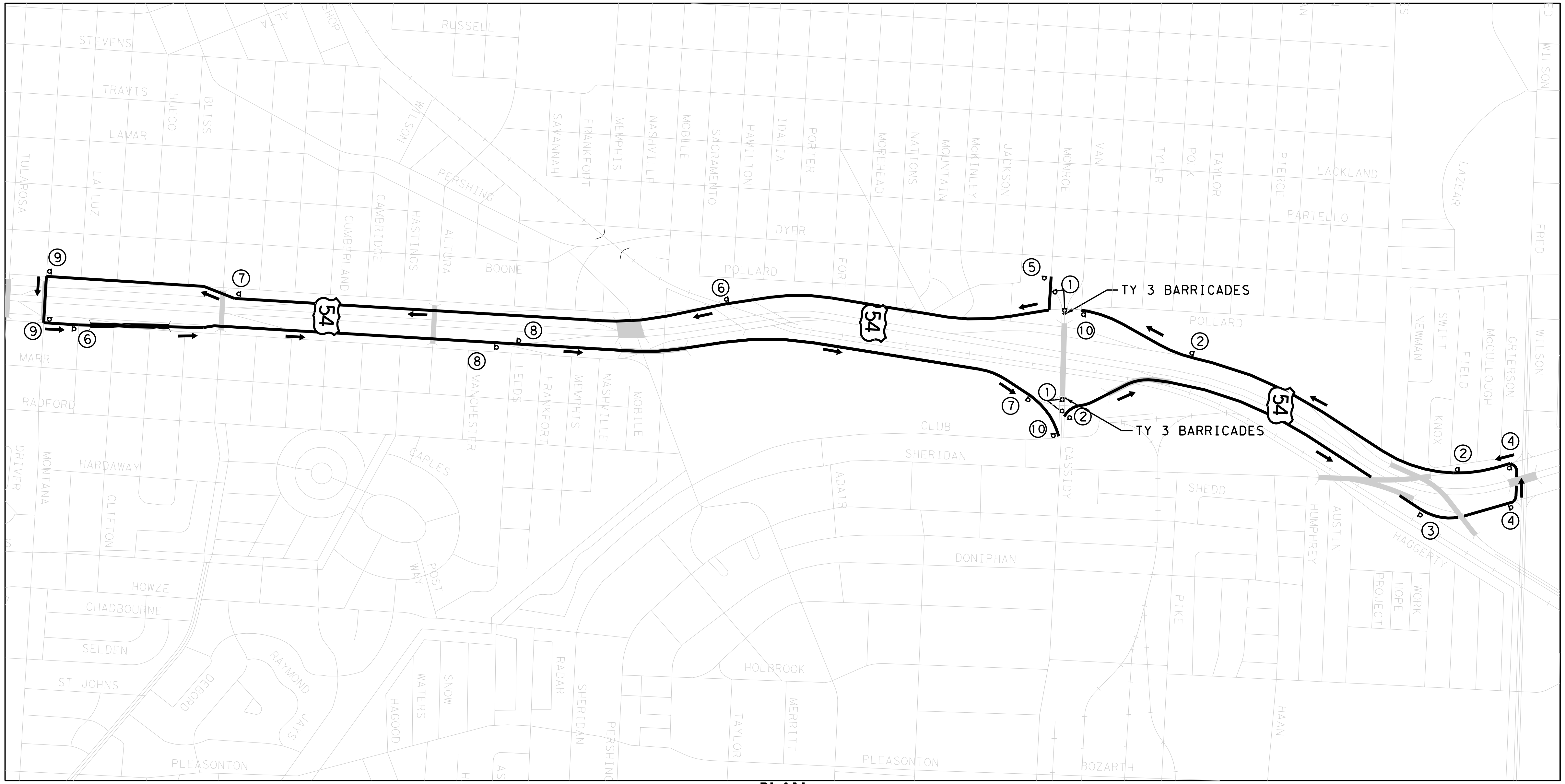

PLAN

No.	Sign	Designation / Size
1	ROAD CLOSED	R11-2 48" X 30"
10	END DETOUR	M4-8 24" X 12"
2	DETOUR / WEST / VAN / ↗	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"
3	DETOUR / WEST / VAN / ↖	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"
4	DETOUR / WEST / VAN / ↰	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"
5	DETOUR / EAST / CASSIDY / ↱	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"
6	DETOUR / EAST / CASSIDY / ↖	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"
7	DETOUR / EAST / CASSIDY / ↗	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"
8	DETOUR / EAST / CASSIDY / ↑	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"
9	DETOUR / EAST / CASSIDY / ↰	M4-8 24" X 12"; M3-4 24" X 12"; M4-12T VAR X 12"; M5-1L 24" X 12"

NOTES:

1. REFER TO TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING REQUIREMETNS.
2. REFER TO BC AND TCP STANDARDS.
3. COORDINATE WITH SCHOOLS, EMERGENCY SERVICES AND OTHER ONGOING PROJECTS IN THE VICINITY.
4. PLACE PORTABLE MESSAGE BOARDS PRIOR TO ROAD CLOSURE.
5. REFER TO TXDOT STANDARD WZ(RCD)-13 FOR ADDITIONAL SIGNAGE.

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED PROFESSIONAL ENGINEER

12/23/2020

Kimley»Horn F-928

 Texas Department of Transportation

BPM FY 21

LOCATION 1

DETOUR

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	14
CONT.	SECT.	JOB	
6351	25	001	

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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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

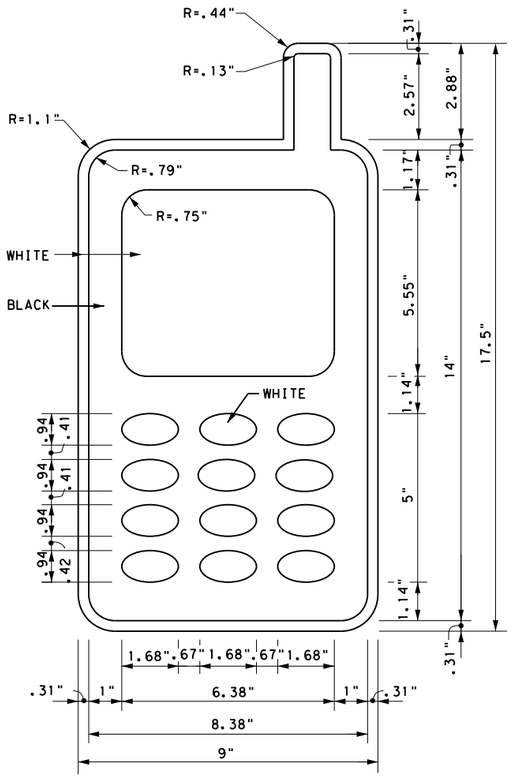
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

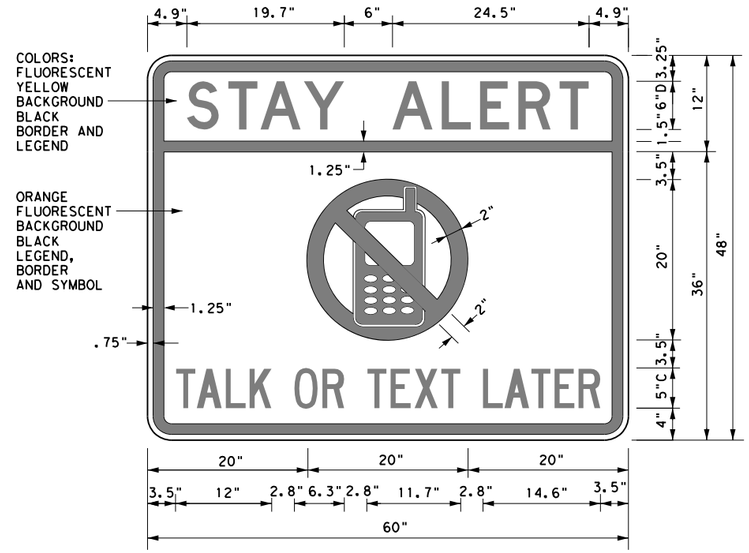
12. The Engineer has the final decision on the location of all traffic control devices.

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 APPAREL 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.





3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

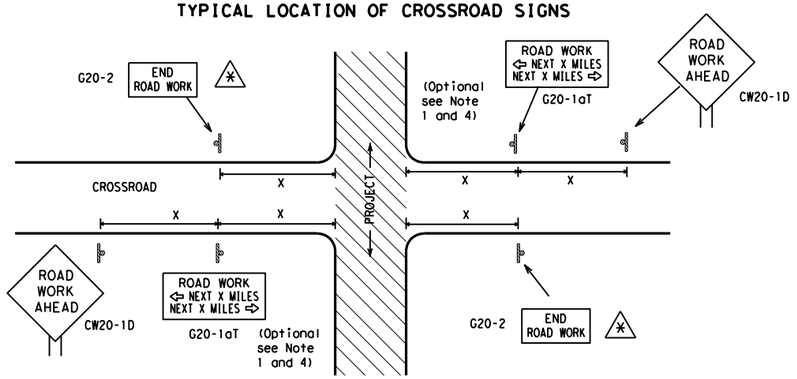
Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	ELP	JEFF DAVIS, ETC.		15

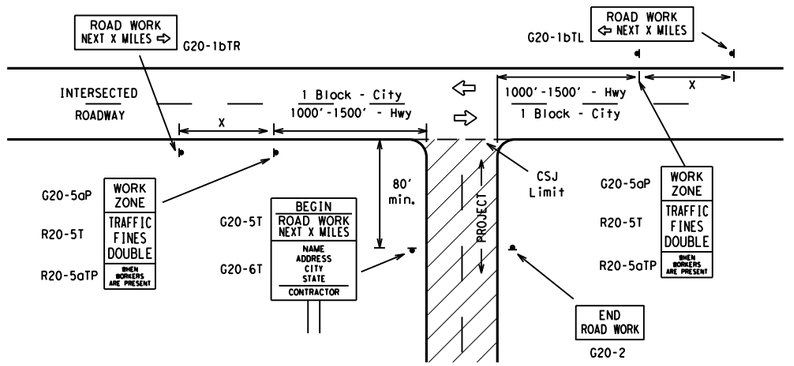
TYPICAL LOCATION OF CROSSROAD SIGNS



✱ 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. 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]

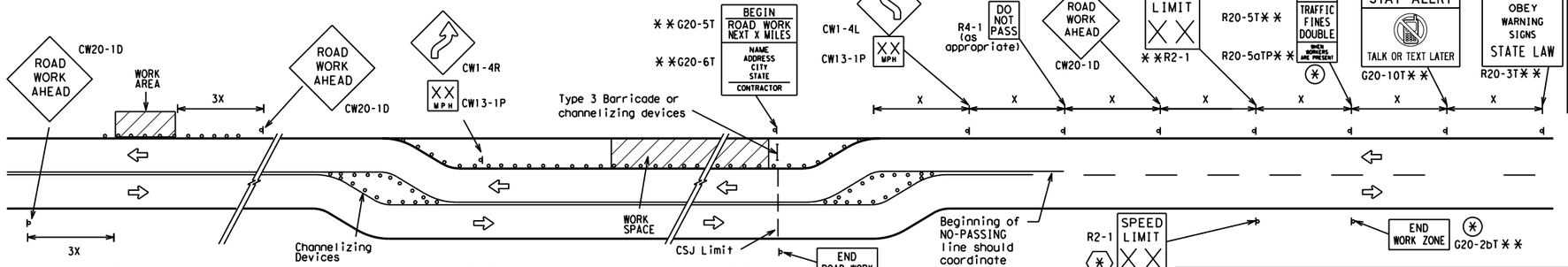
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

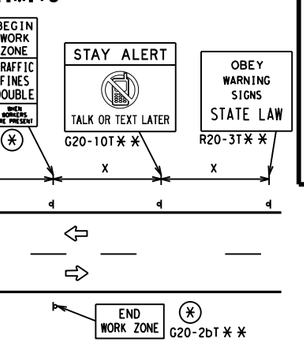
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

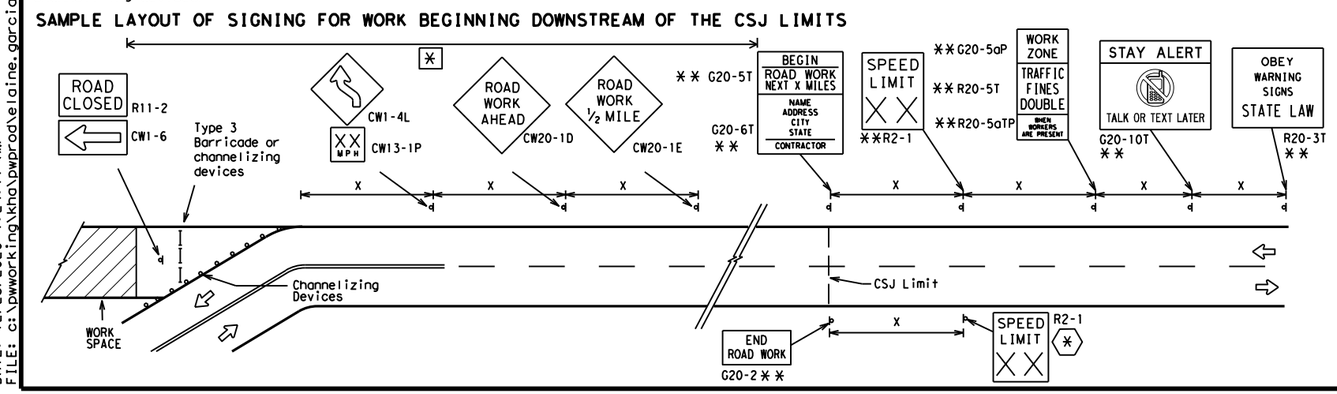


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

✱✱ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

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

(✱) Contractor will install a regulatory speed limit sign at the end of the work zone.

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	ELP	JEFF DAVIS, ETC.		16

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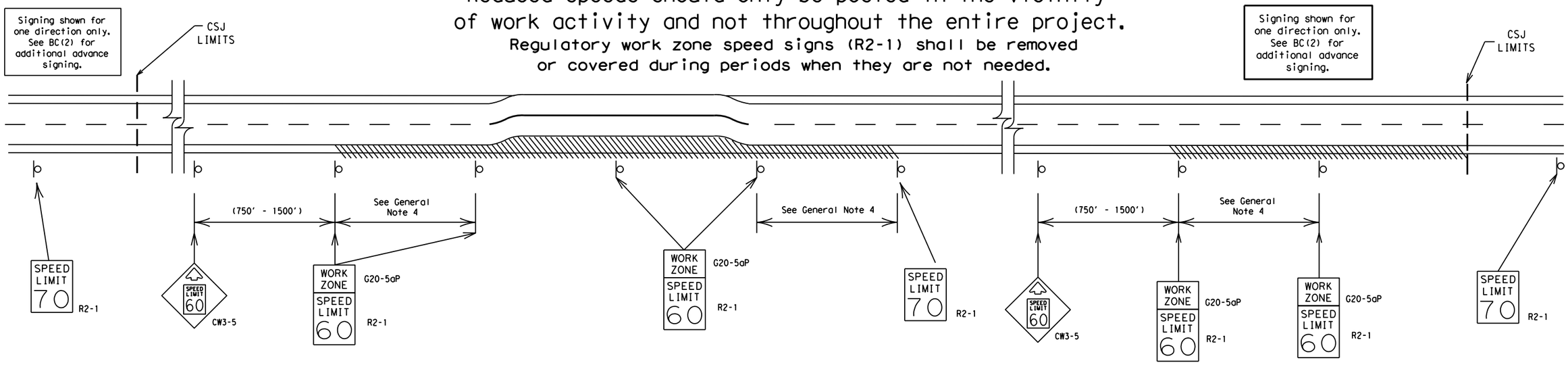
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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 travelled 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 Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	6351	25	001	VARIES
	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		17

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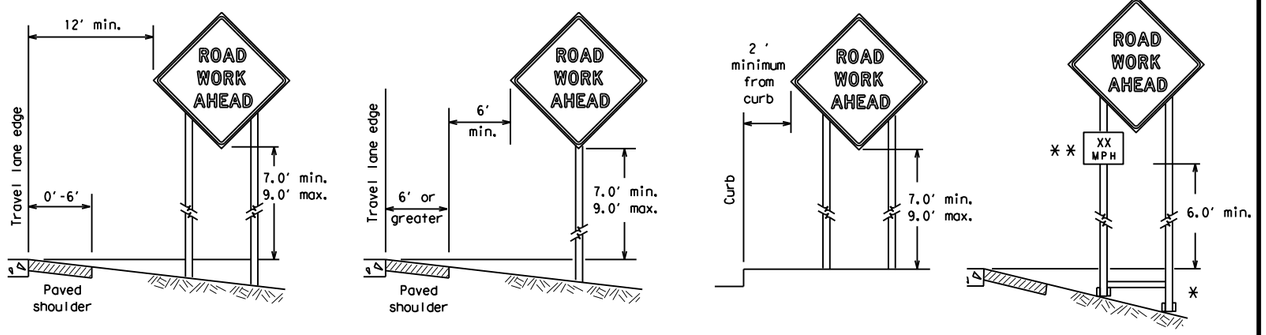
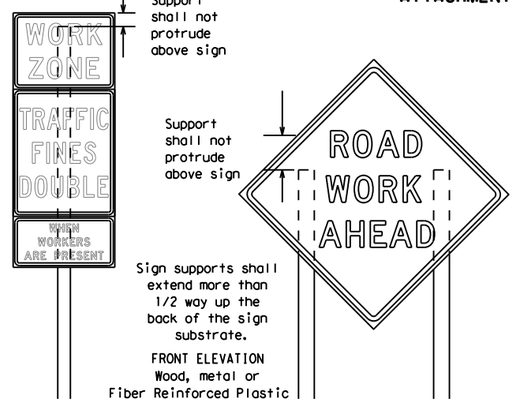
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

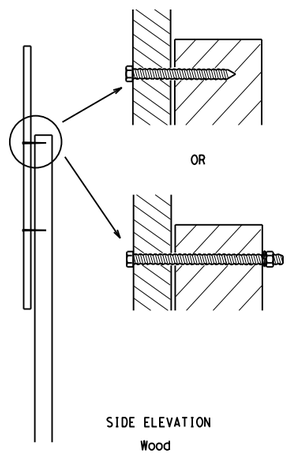


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





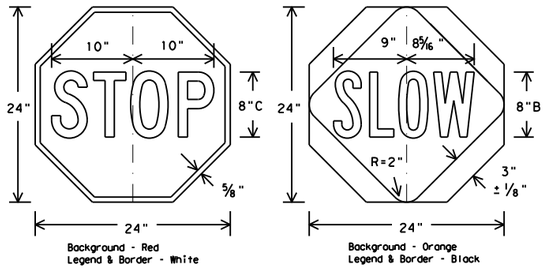
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
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.



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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). 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 Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	ELP	JEFF DAVIS, ETC.		18

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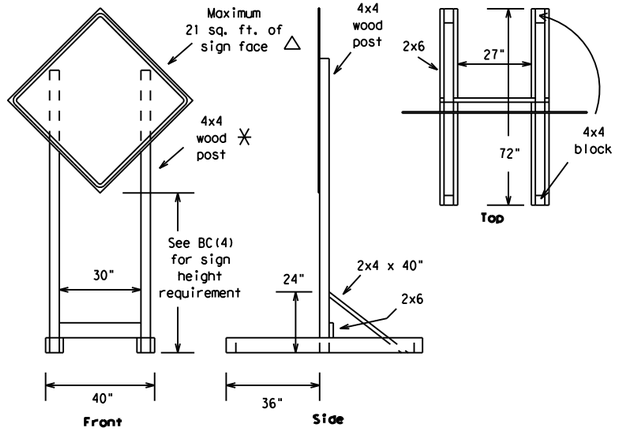
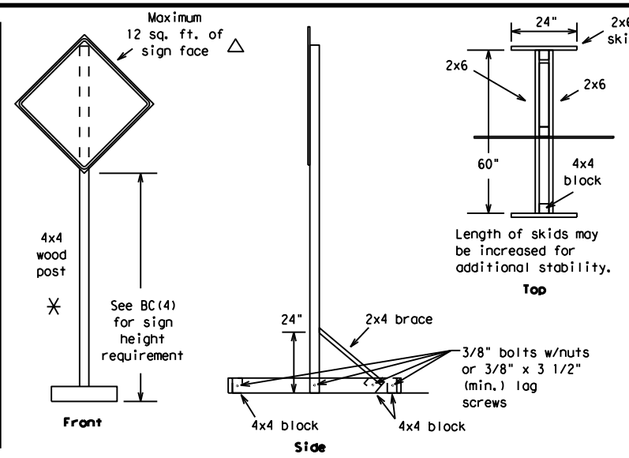
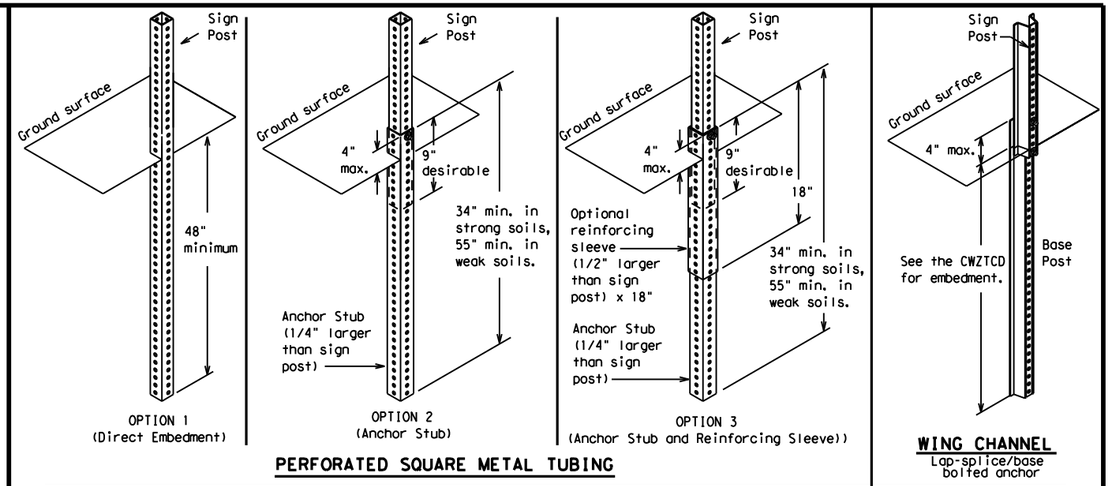




SKID MOUNTED WOOD SIGN SUPPORTS

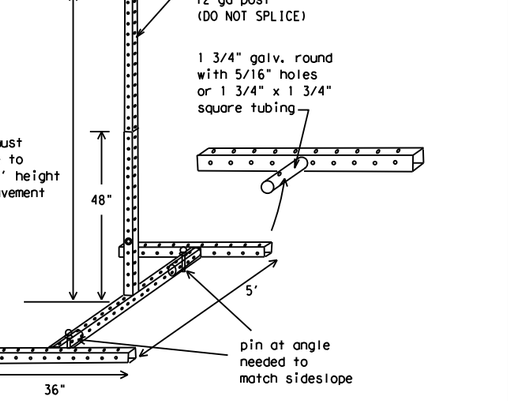
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

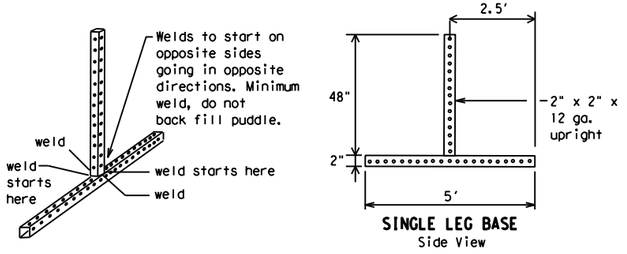


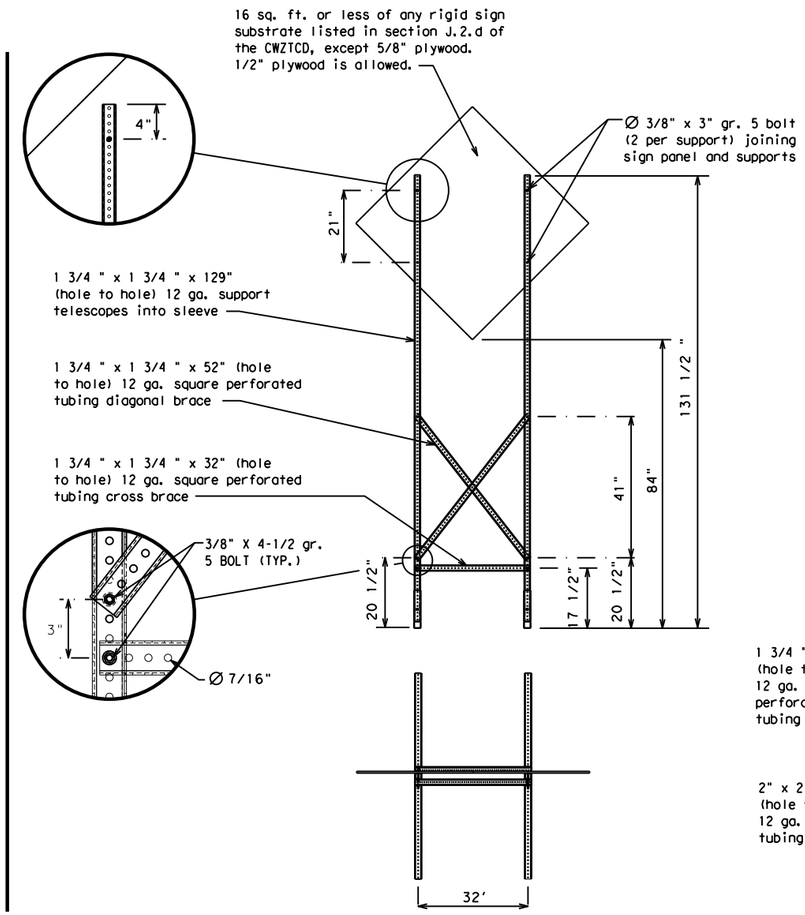
PERFORATED SQUARE METAL TUBING

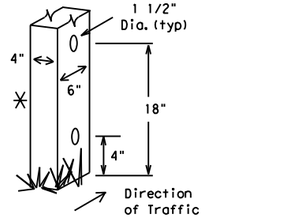
GROUND MOUNTED SIGN SUPPORTS

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.



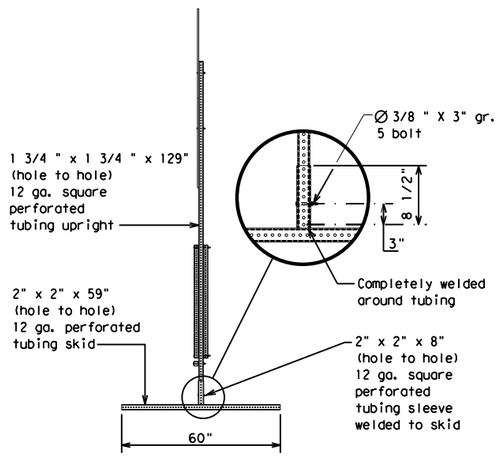






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING 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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	ELP	JEFF DAVIS, ETC.		19

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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

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

** 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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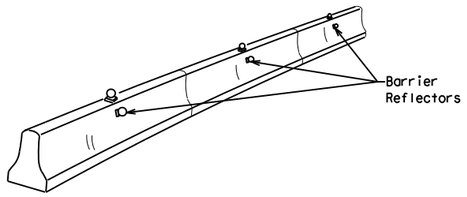
REVISIONS	6351	25	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	ELP	JEFF DAVIS, ETC.		20

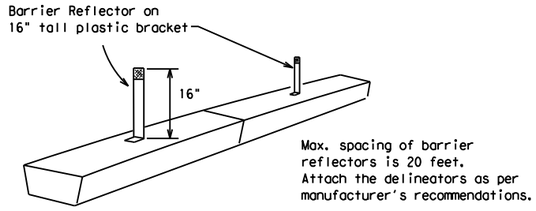
100

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

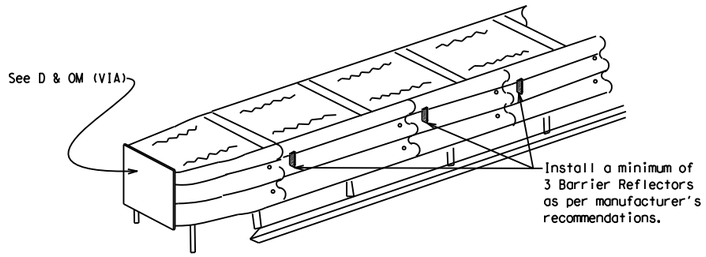


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

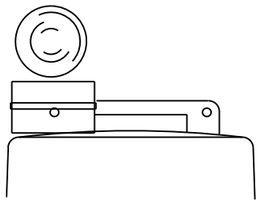


DELINEATION OF END TREATMENTS

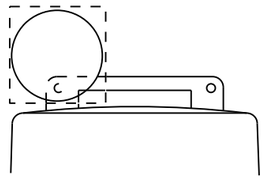
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. 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

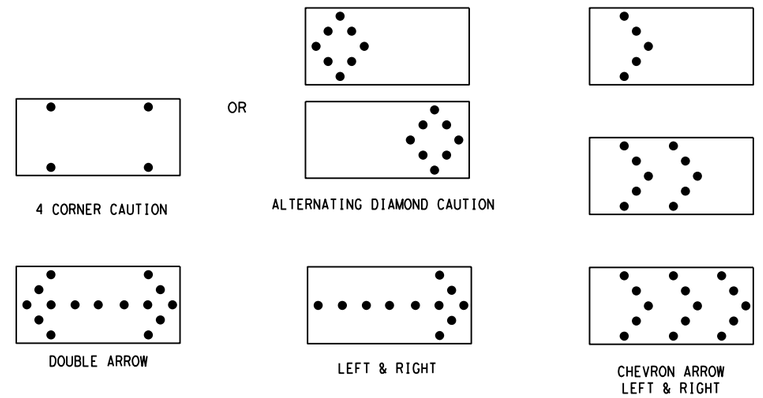
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 National Cooperative Highway Research Report No. 350 (NCHRP 350) or 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 Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	6351	25	001	VARIES
	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		21

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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:

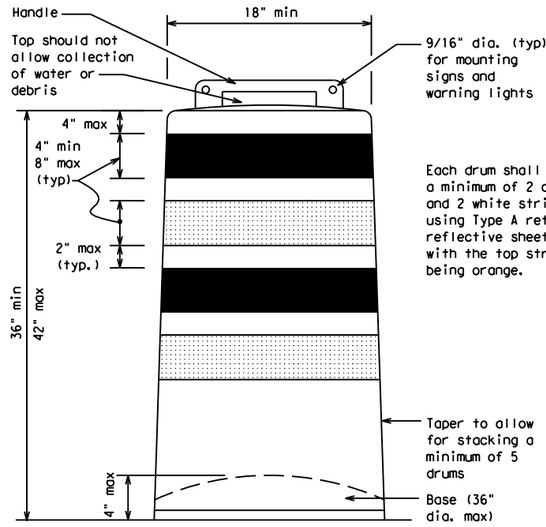
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

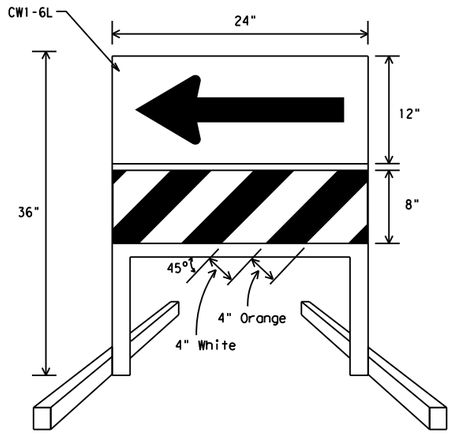
RETROREFLECTIVE SHEETING

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 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

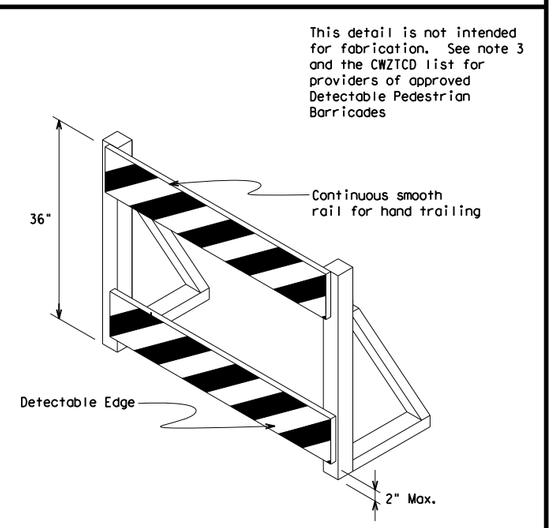
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other 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.





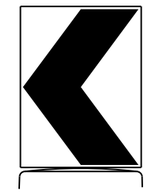
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

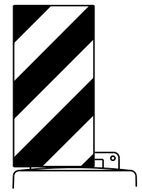


DETECTABLE PEDESTRIAN BARRICADES

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.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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 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 Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	6351	25	001	VARIES
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	ELP	JEFF DAVIS, ETC.		22

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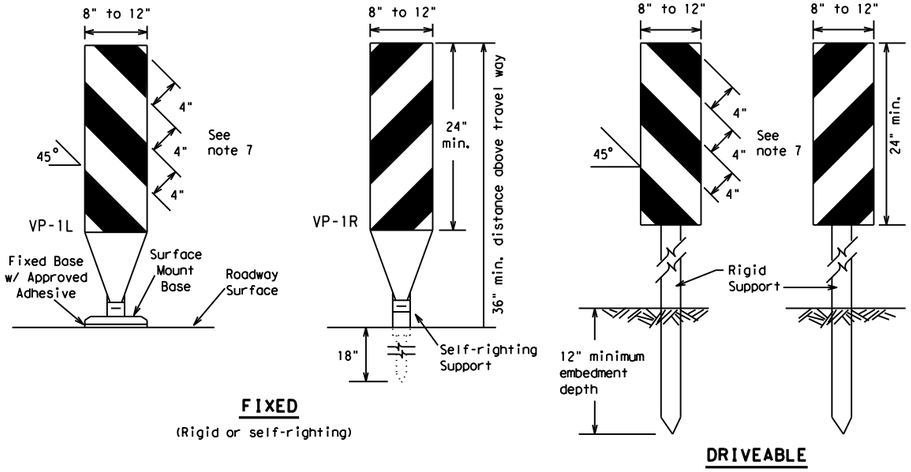
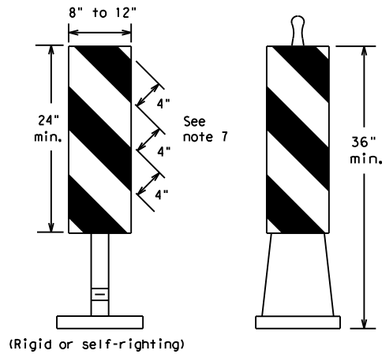


FIXED
(Rigid or self-righting)

DRIVEABLE

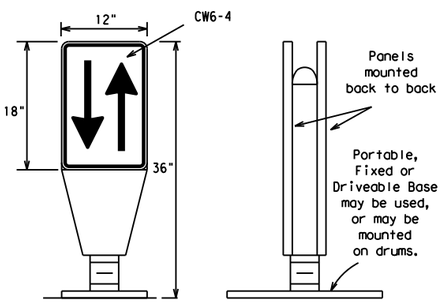


(Rigid or self-righting)

PORTABLE

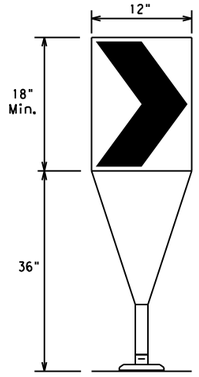
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

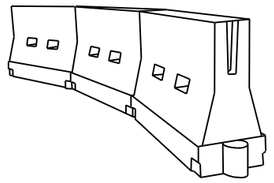
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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



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) placed 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 NCHRP 350 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

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.

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	ELP	JEFF DAVIS, ETC.		23

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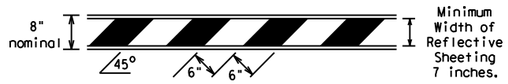
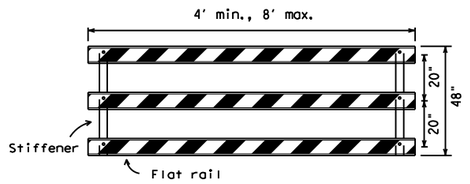
TYPE 3 BARRICADES

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 conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



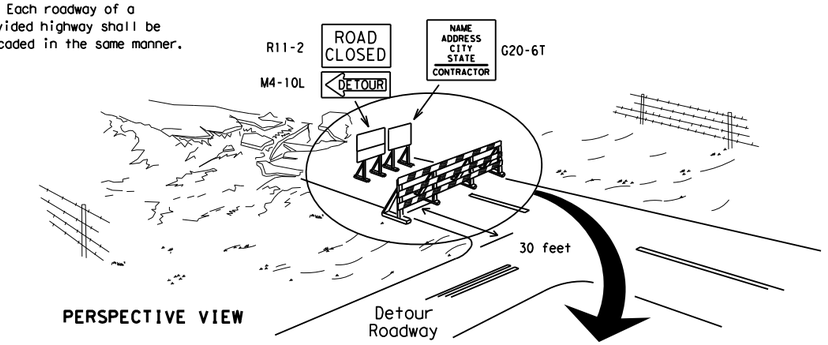
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

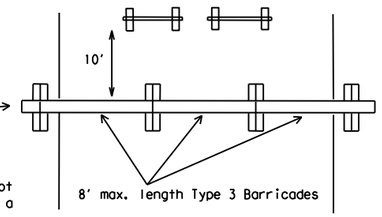
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

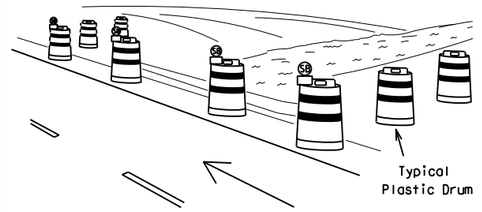
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

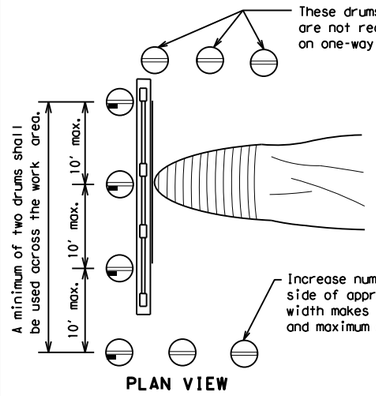
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

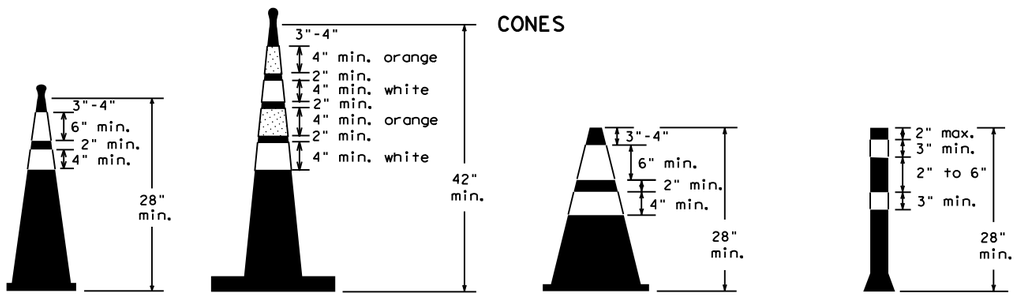
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

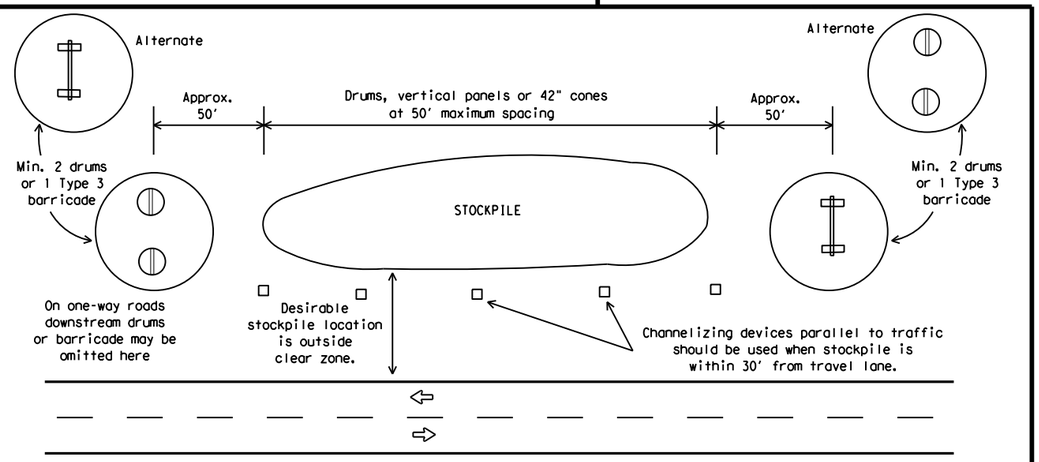
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

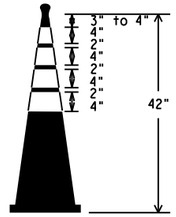
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	6351	25	001	VARIES
	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		24

104

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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.

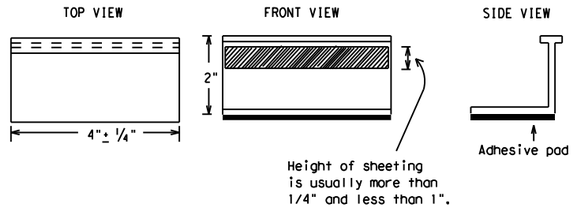
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13	ELP	JEFF DAVIS, ETC.		25
11-02 8-14				

105

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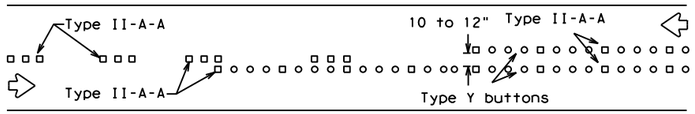
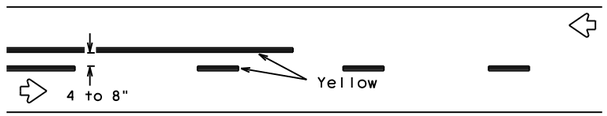
PAVEMENT MARKING PATTERNS

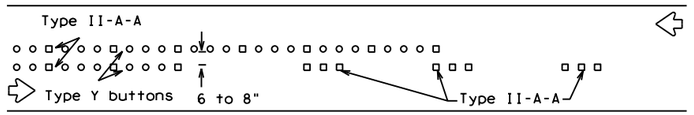
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



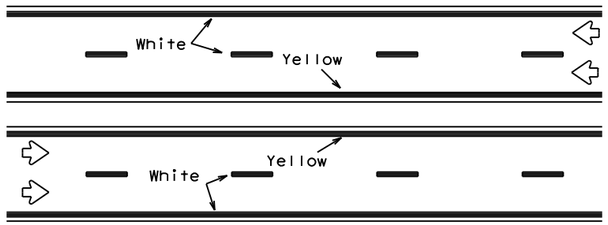
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



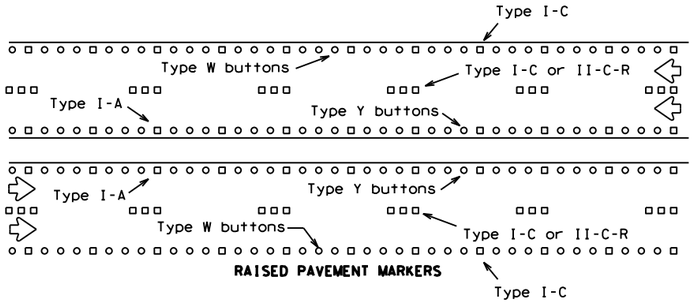
RAISED PAVEMENT MARKERS - PATTERN B

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



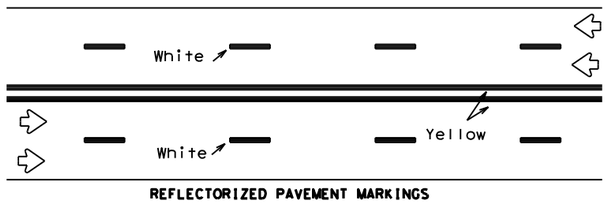
REFLECTORIZED PAVEMENT MARKINGS



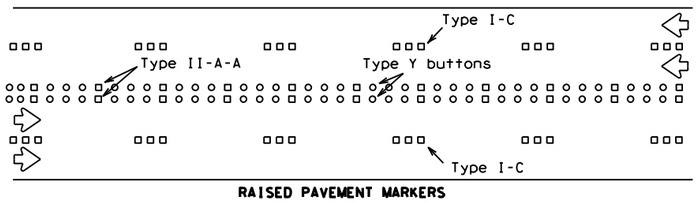
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



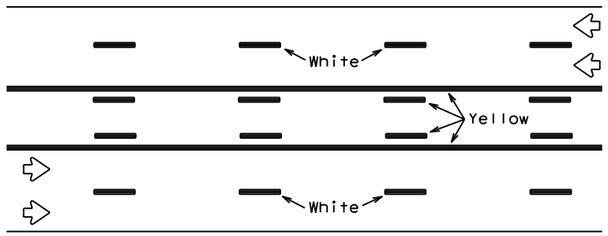
REFLECTORIZED PAVEMENT MARKINGS



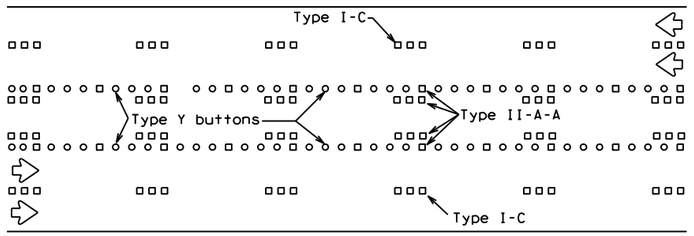
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

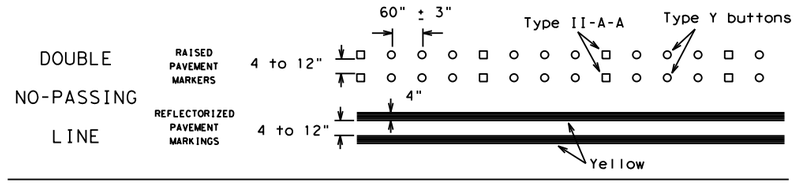
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

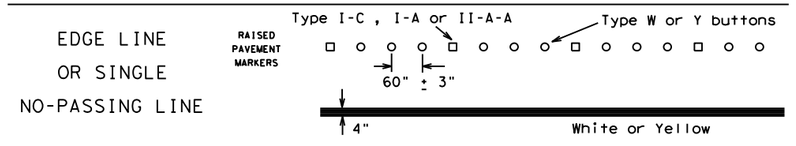
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

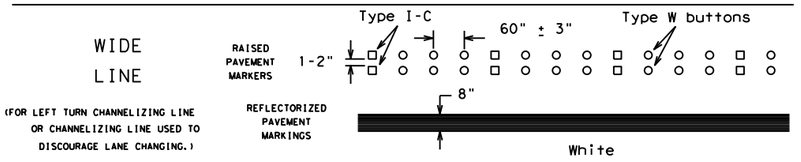


EDGE LINE OR SINGLE NO-PASSING LINE



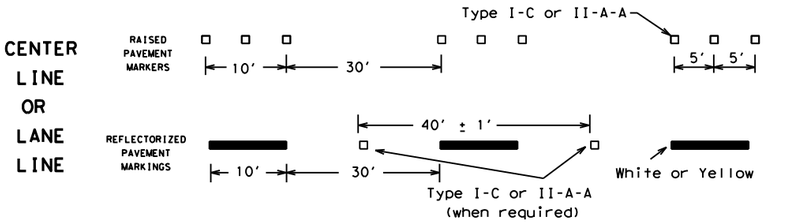
WIDE LINE

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

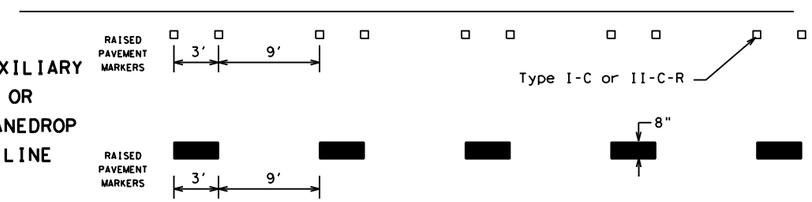


BROKEN LINES

CENTER LINE OR LANE LINE

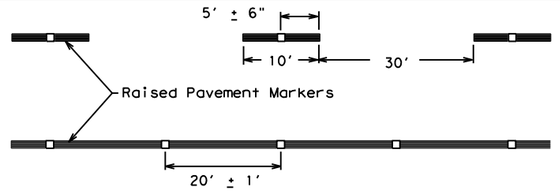


AUXILIARY OR LANEDROP LINE



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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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2-98 7-13	ELP	JEFF DAVIS, ETC.		26
11-02 8-14				

106

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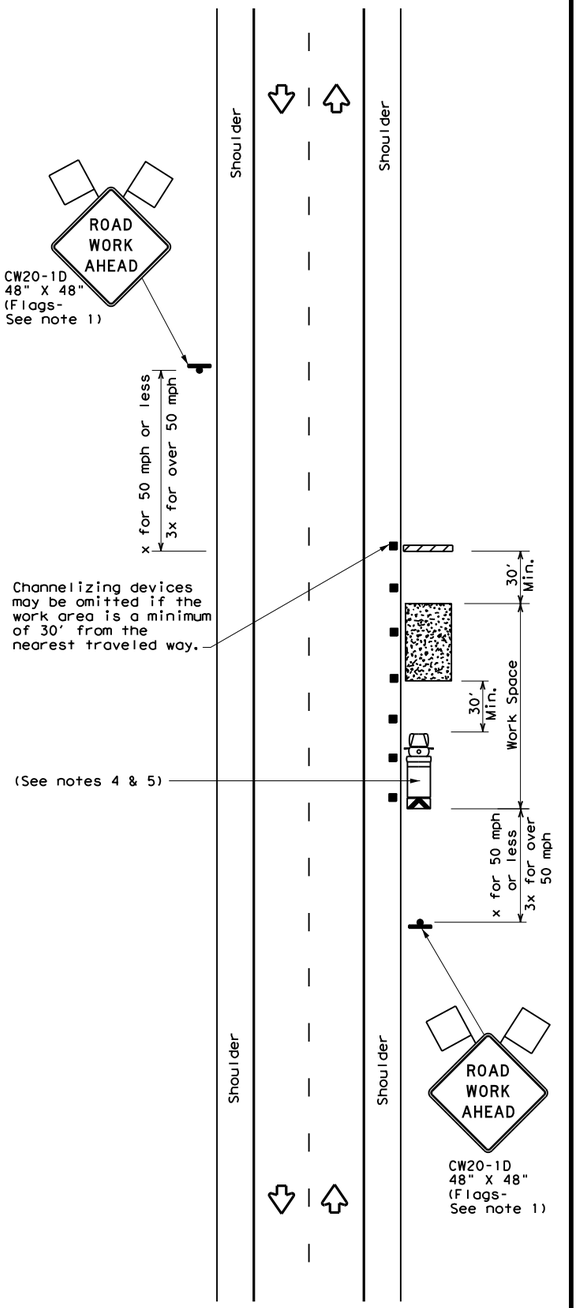
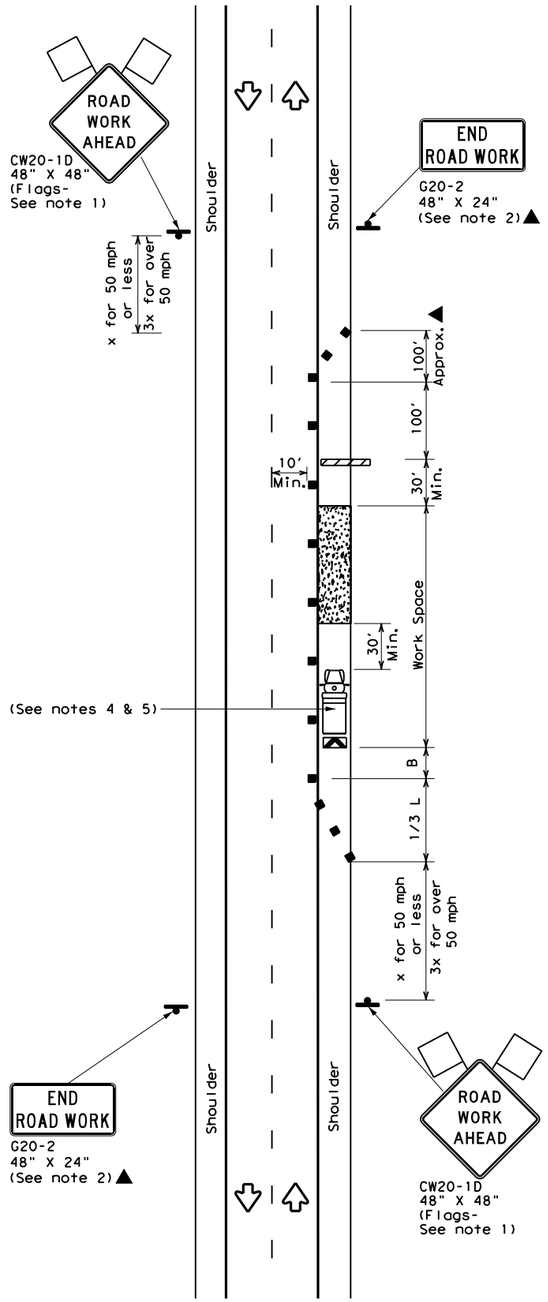


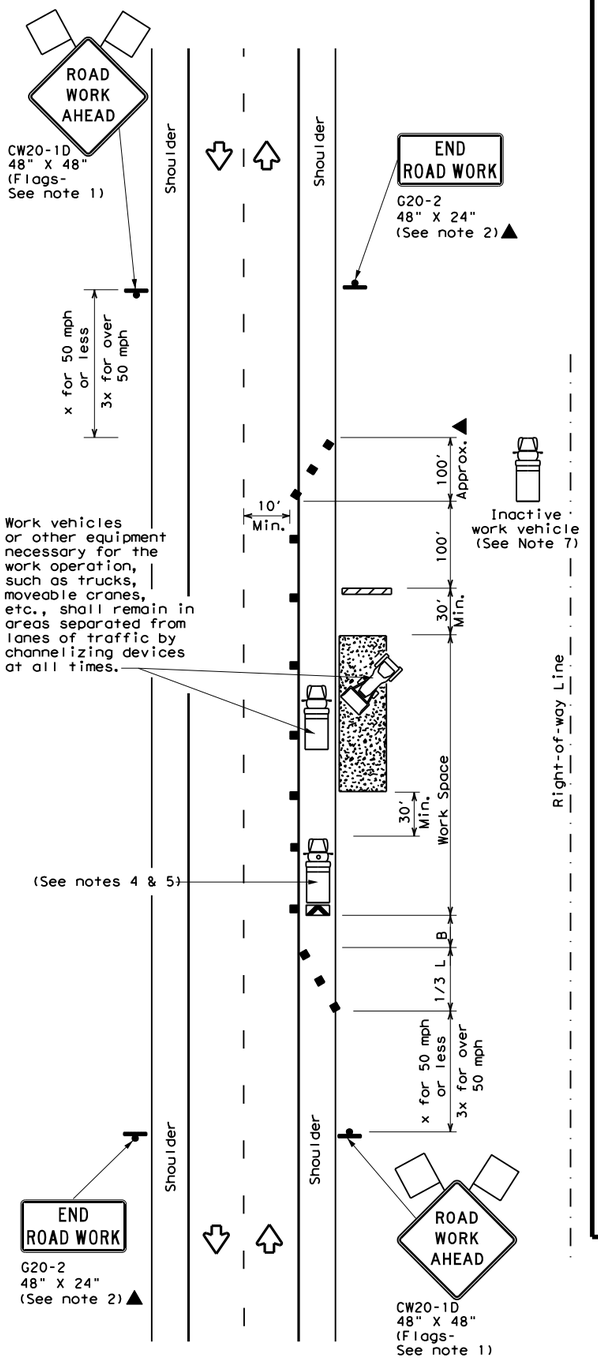
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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 in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
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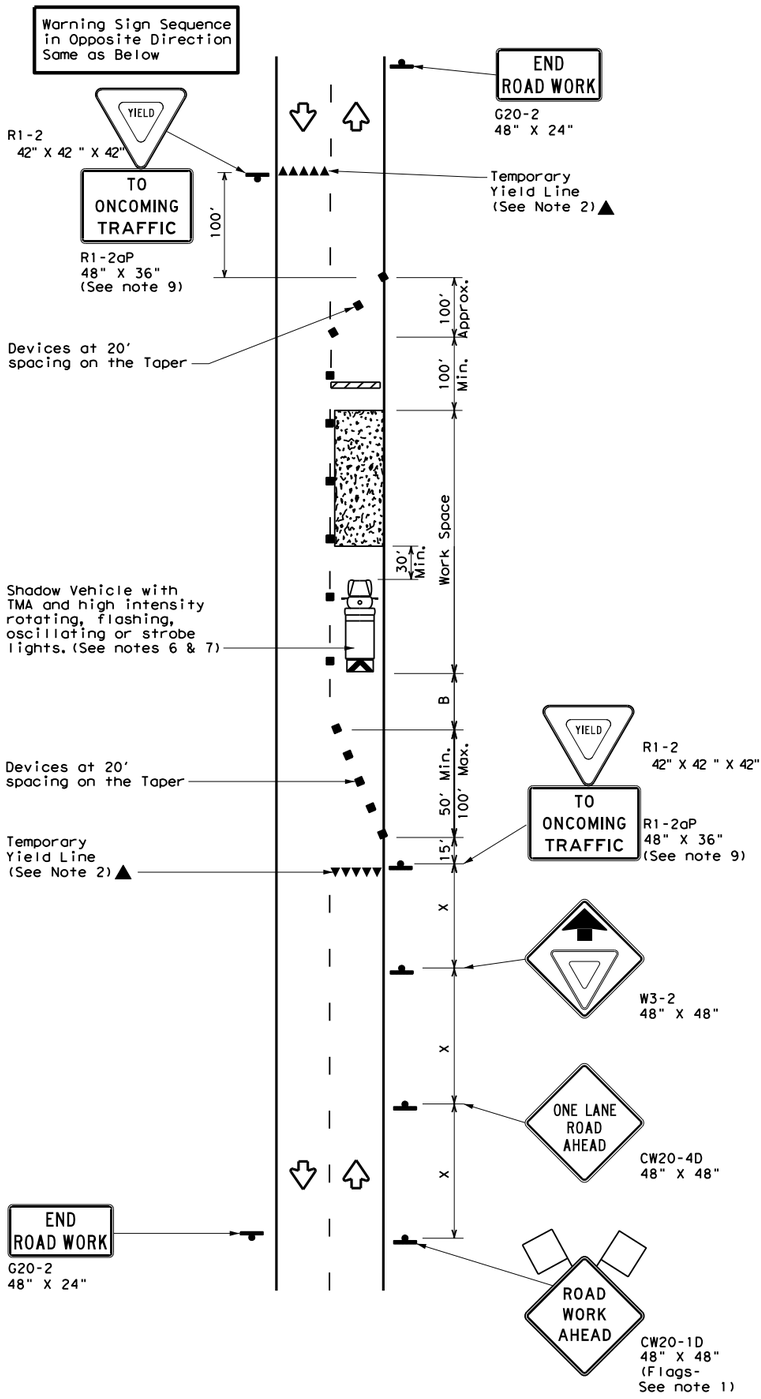
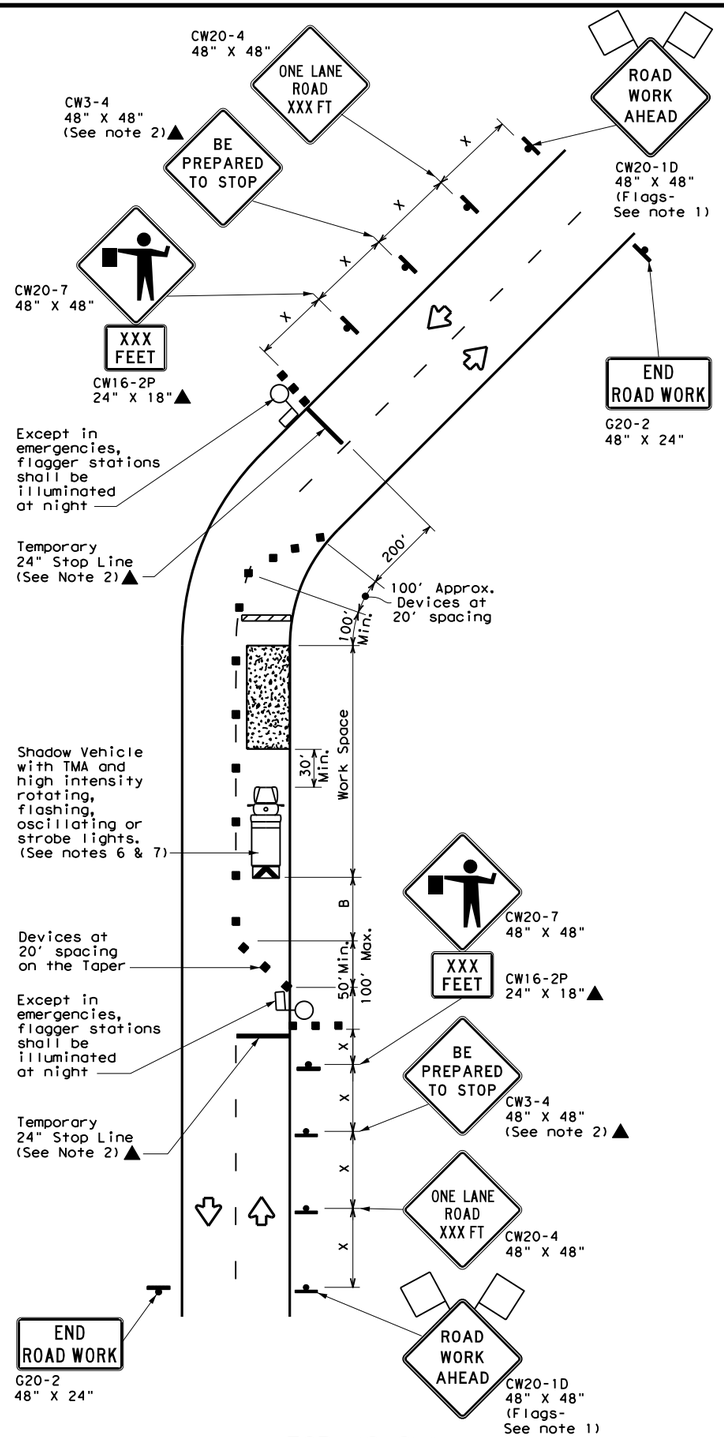
8-95 2-12	ELP	JEFF DAVIS, ETC.		27
1-97 2-18				



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



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

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

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

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	6351	25	001	VARIES
	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		28

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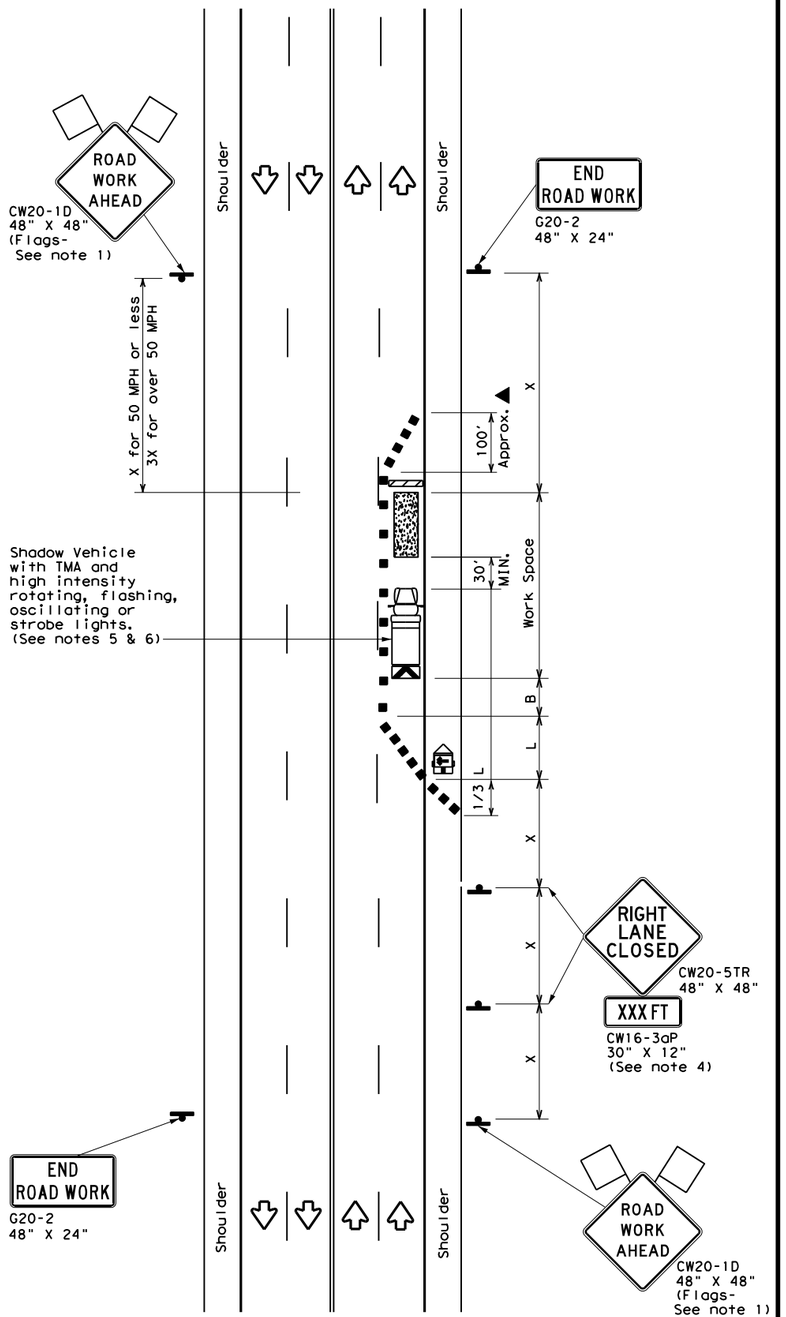
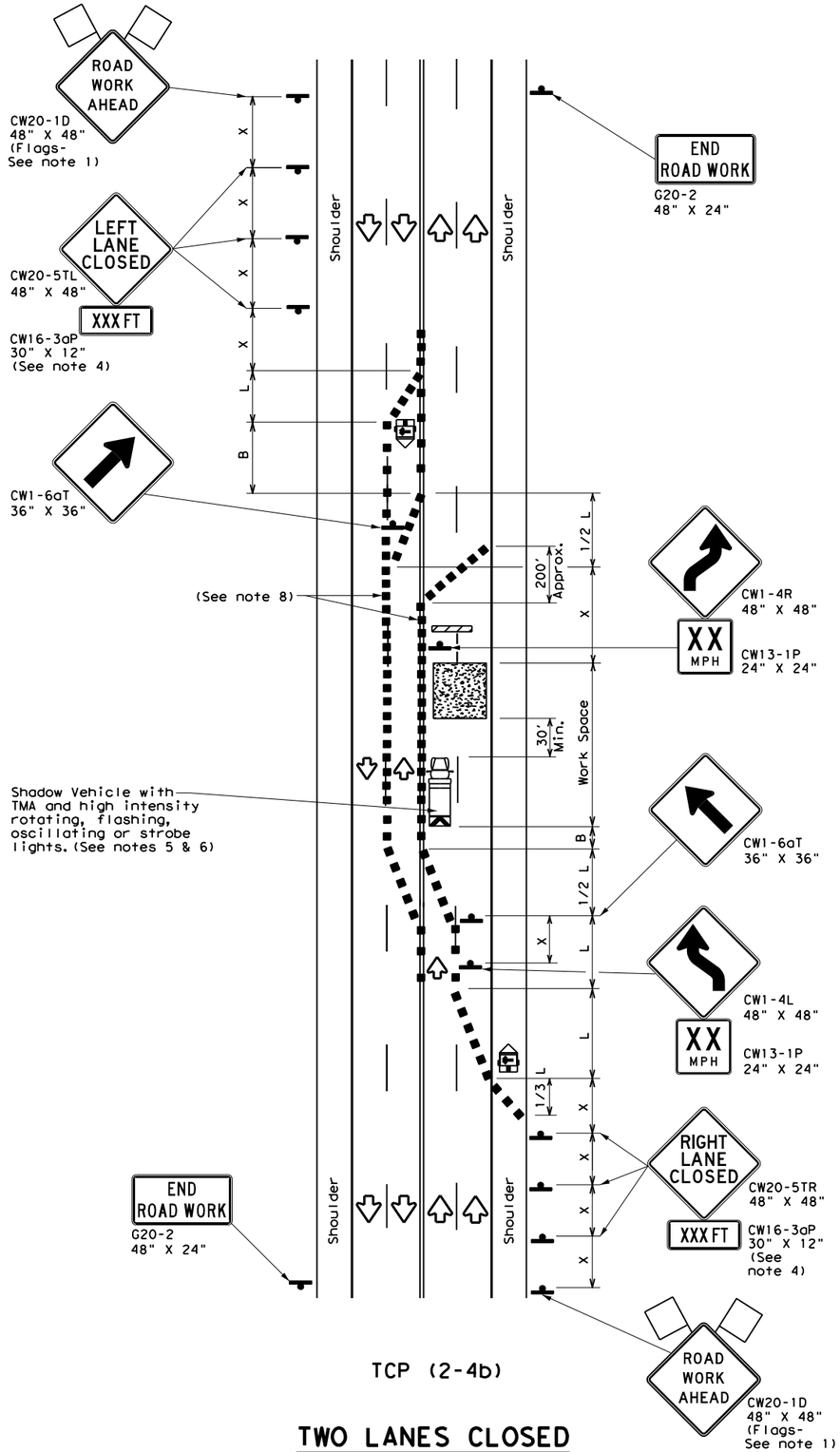


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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4-98 2-18	ELP	JEFF DAVIS, ETC.		29

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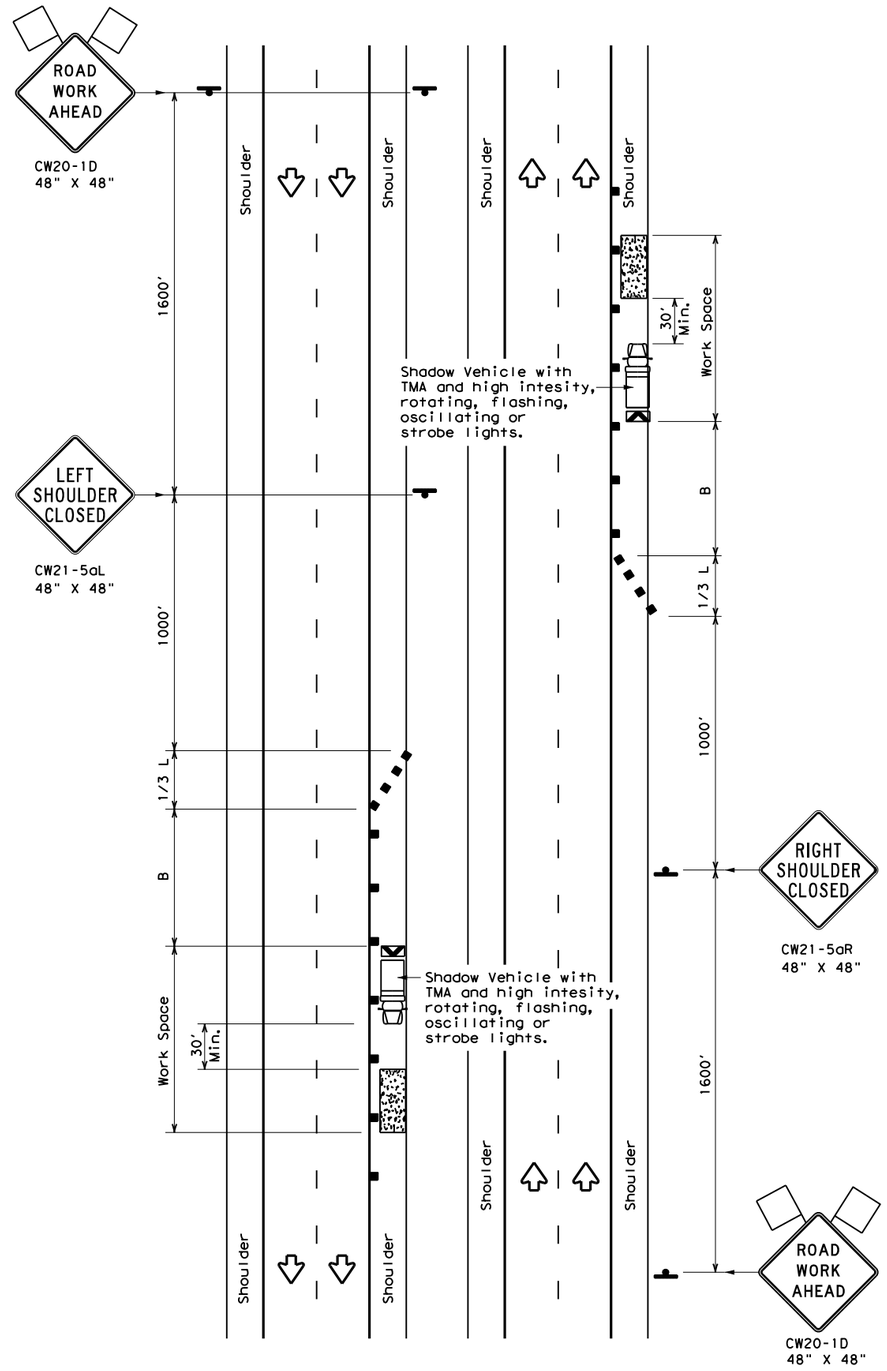
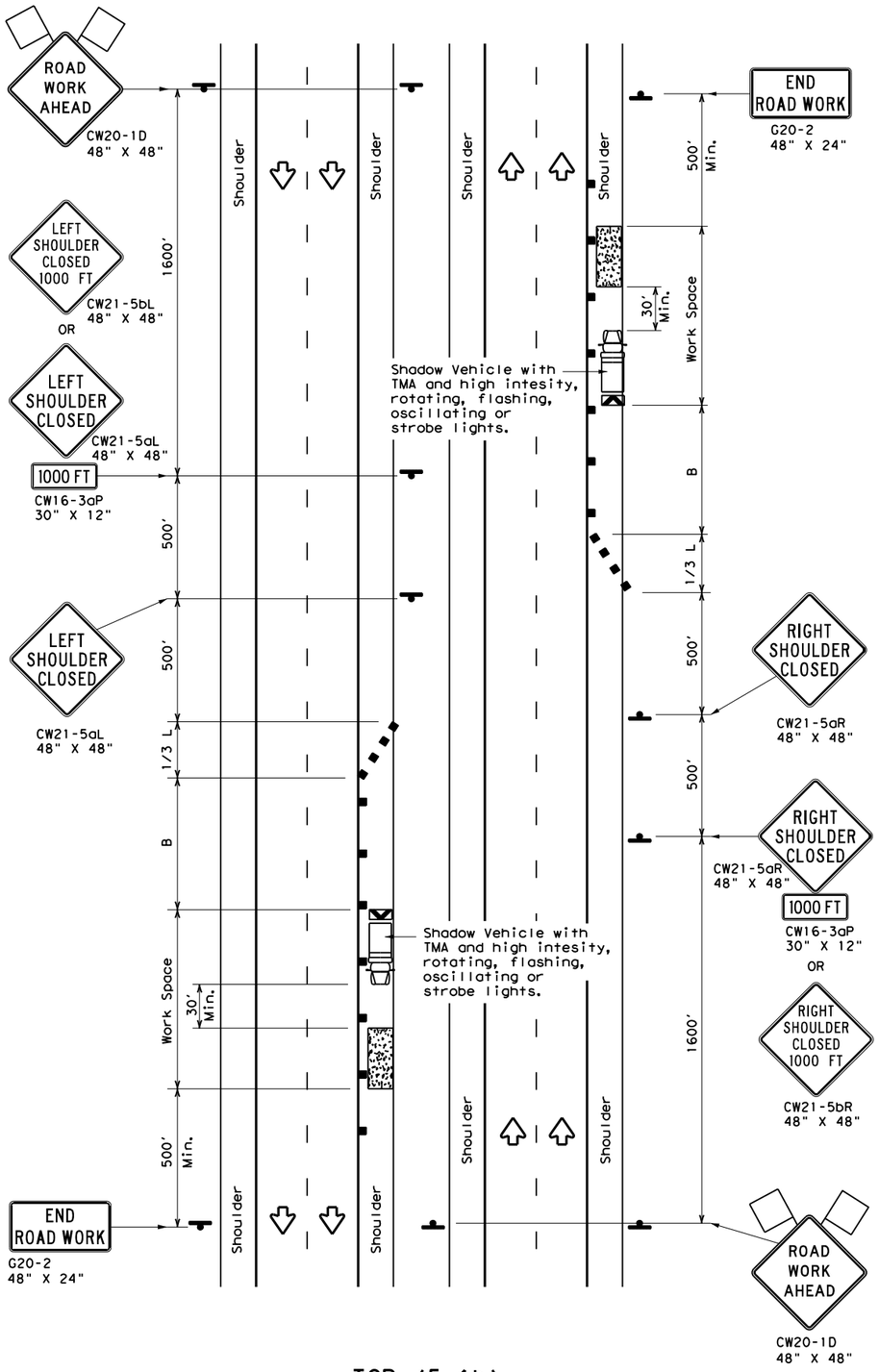


TCP (5-1a)

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

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©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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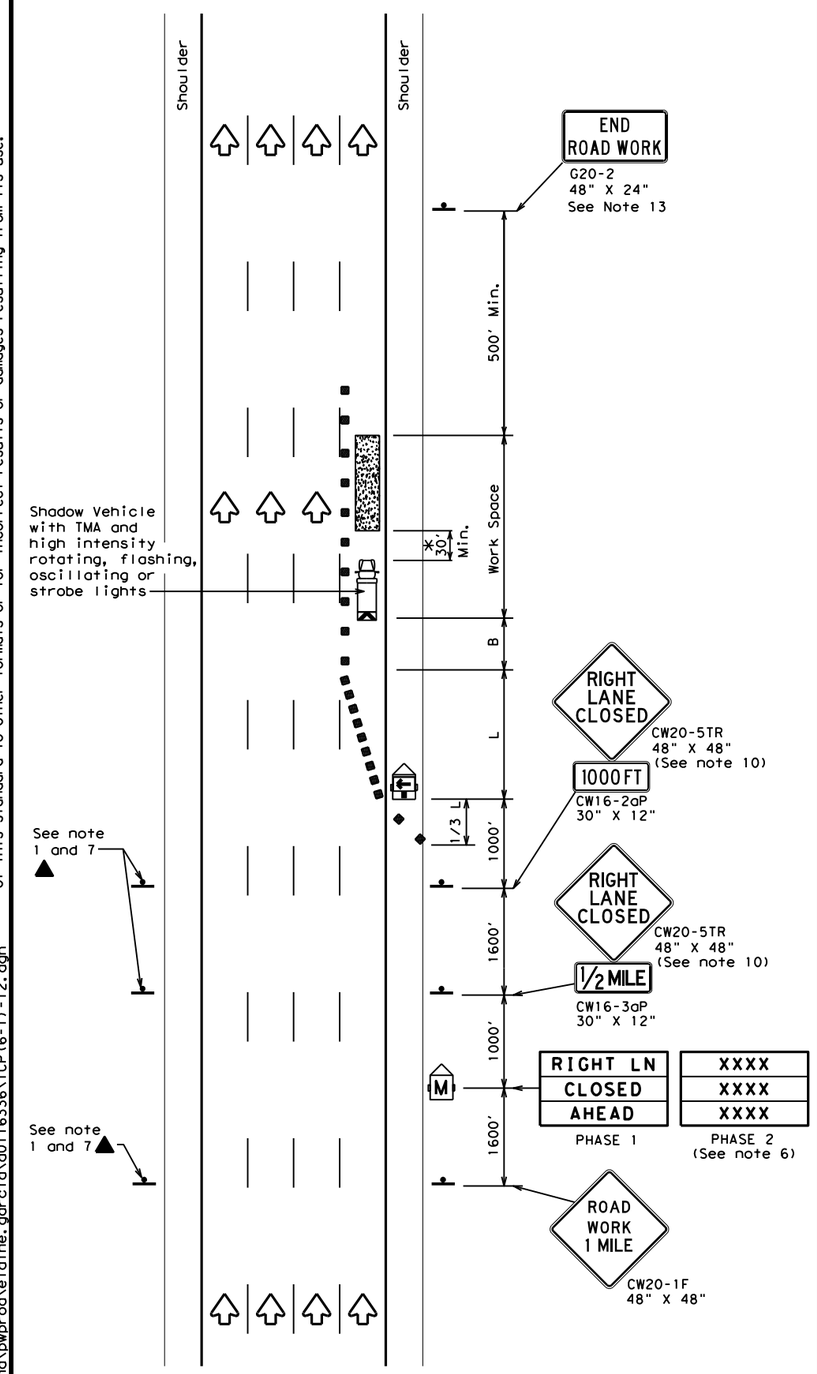
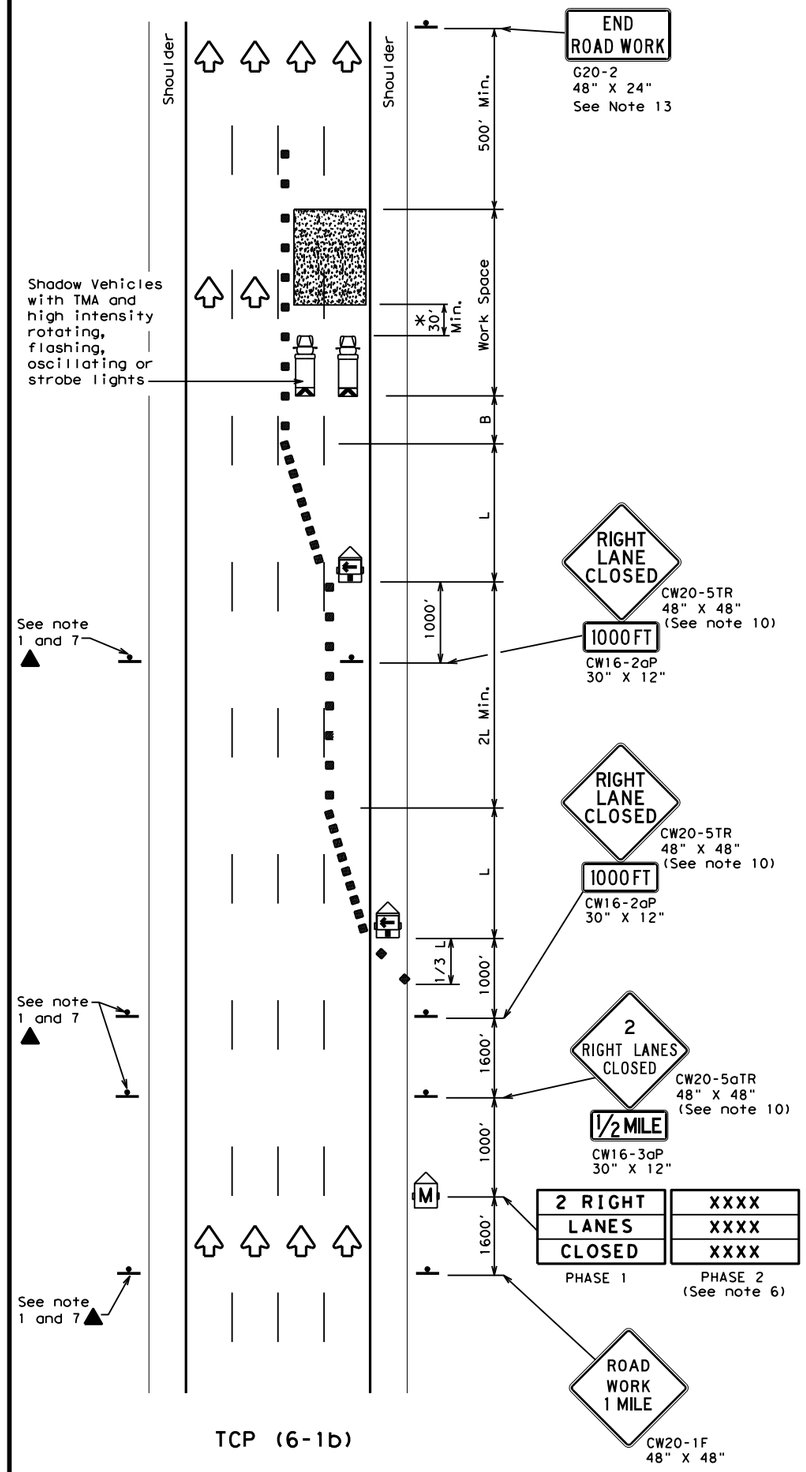


TCP (6-1a)

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

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		31

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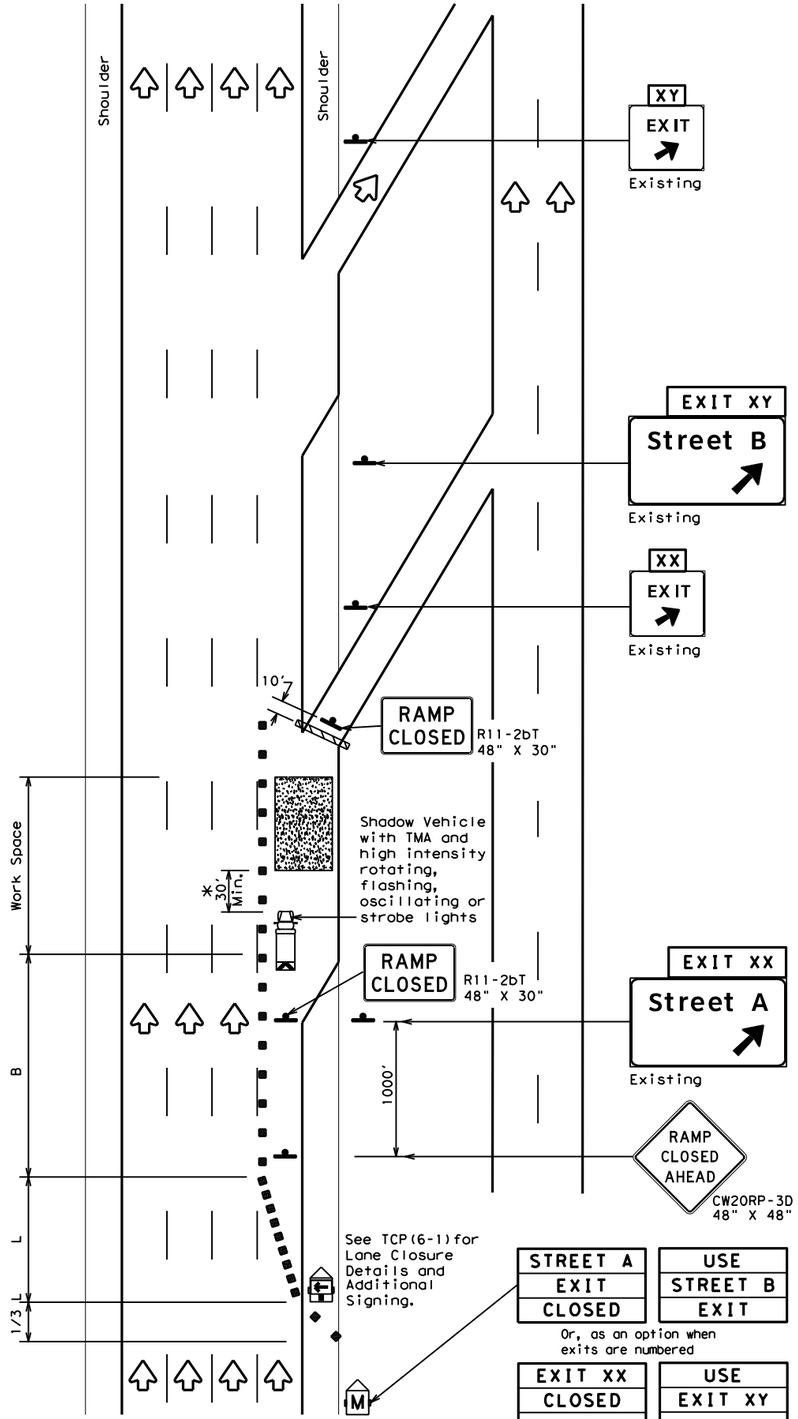
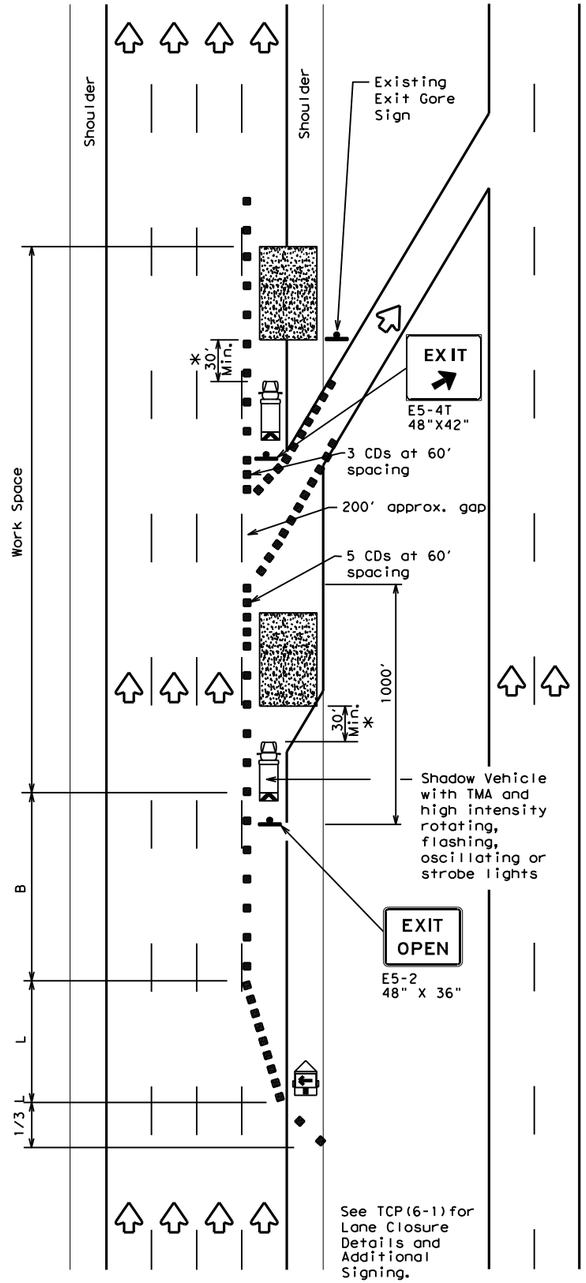


TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

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

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

SHEET 1 OF 1

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

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©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
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4-98 8-12	ELP	JEFF DAVIS, ETC.		32

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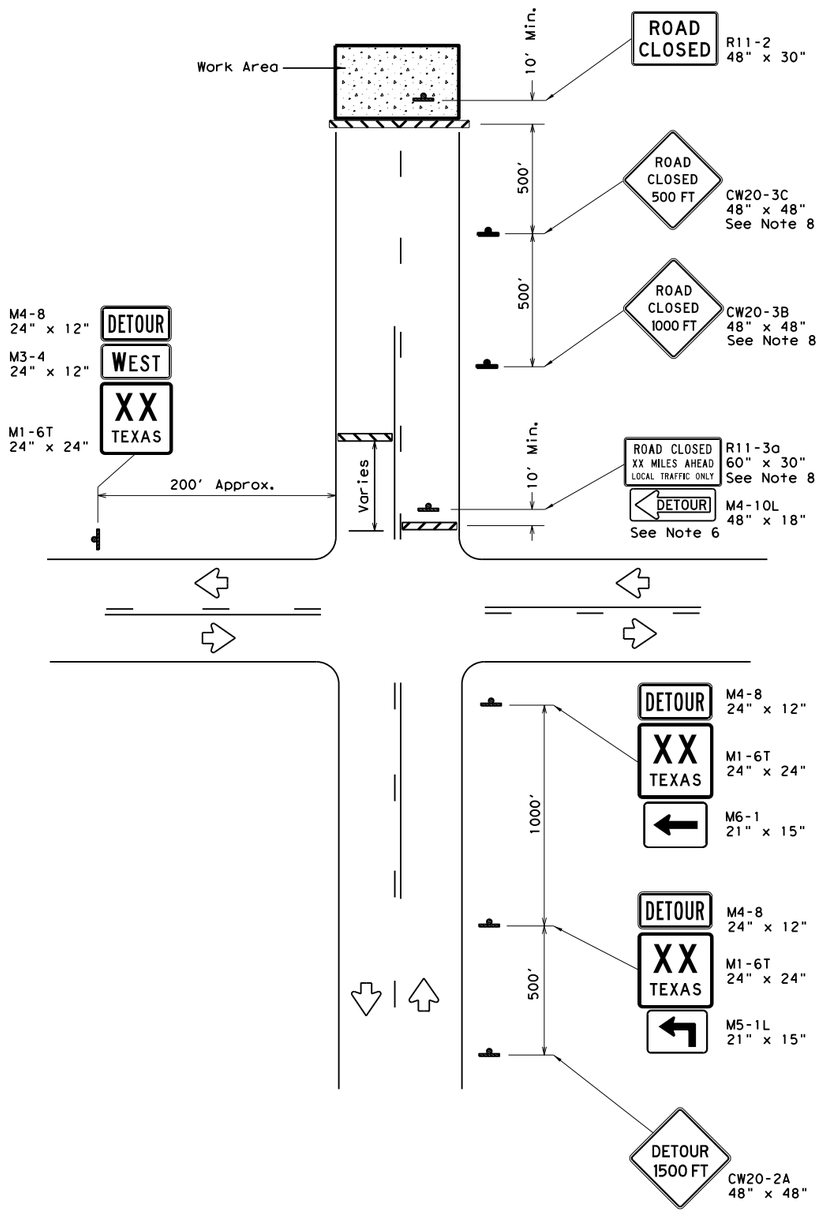
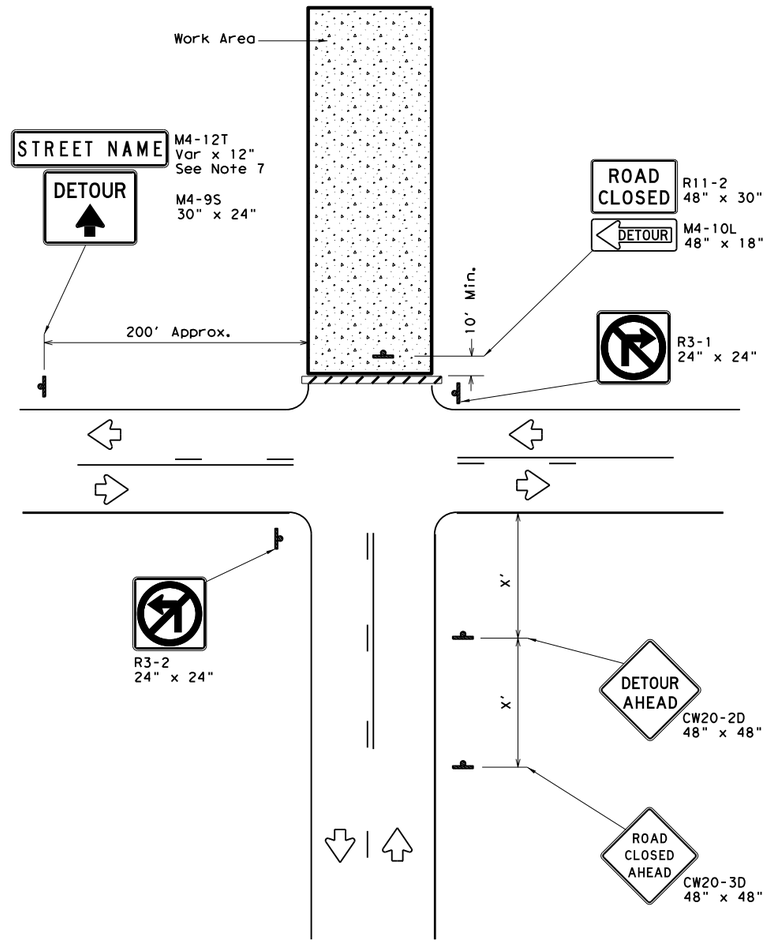


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

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

LEGEND	
	Type 3 Barricade
	Sign

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

* Conventional Roads Only

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

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©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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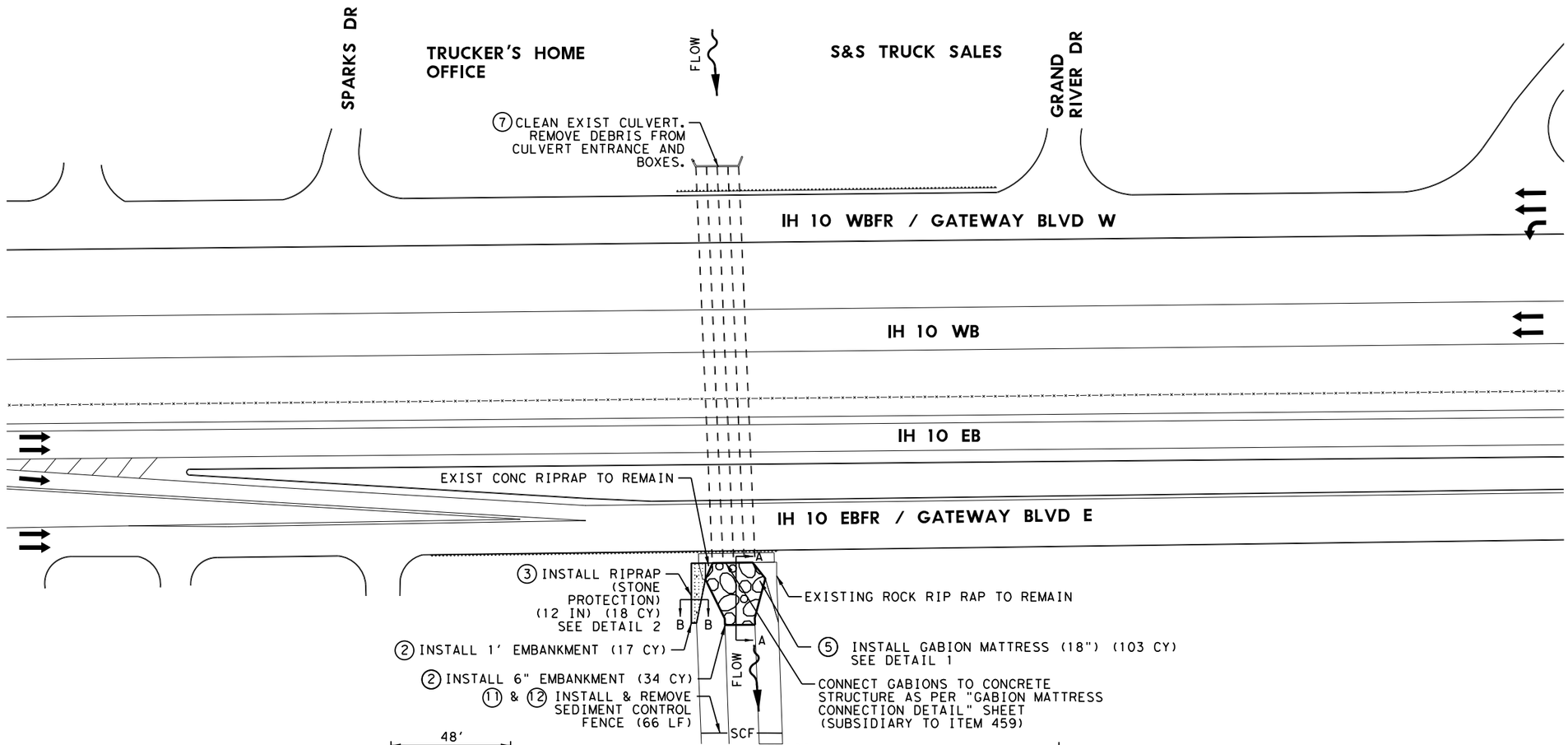
2-98 3-03	ELP	JEFF DAVIS, ETC.		33



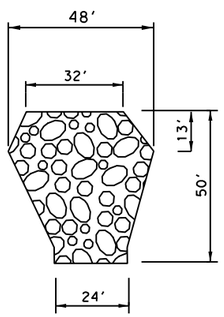
PLAN

LEGEND

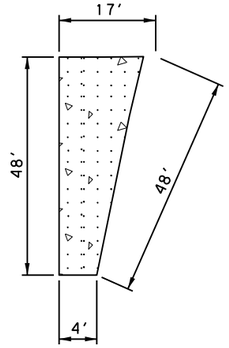
- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

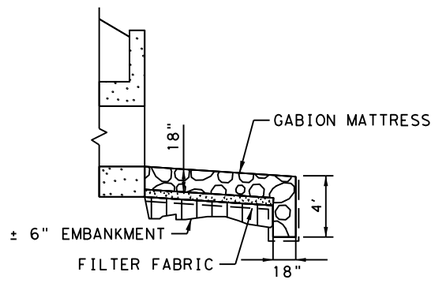


DETAIL 1
N.T.S.

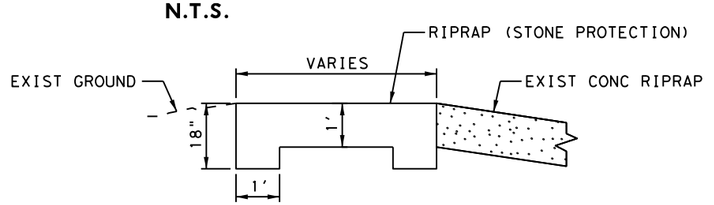


DETAIL 2
N.T.S.

24-072-0-2121-04-047				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
2	0132 6003	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	51
3	0432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	18
5	0459 6002	GABION MATTRESSES (GALV)	CY	103
7	0480 6002	CLEAN EXIST CULVERTS	CY	24
11	0506 6038	TEMP SDMT CONT FENCE (INSTALL)	LF	66
12	0506 6039	TEMP SDMT CONT FENCE (REMOVE)	LF	66



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED PROFESSIONAL ENGINEER

12/23/2020

0' 50' 100' HORZ
0' 50' 100' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21 IH 10 AT DRAIN SCOUR PROTECTION LAYOUTS

NBI: 24-072-0-2121-04-047

SHEET 1 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	34
CONT.	SECT.	JOB	
6351	25	001	

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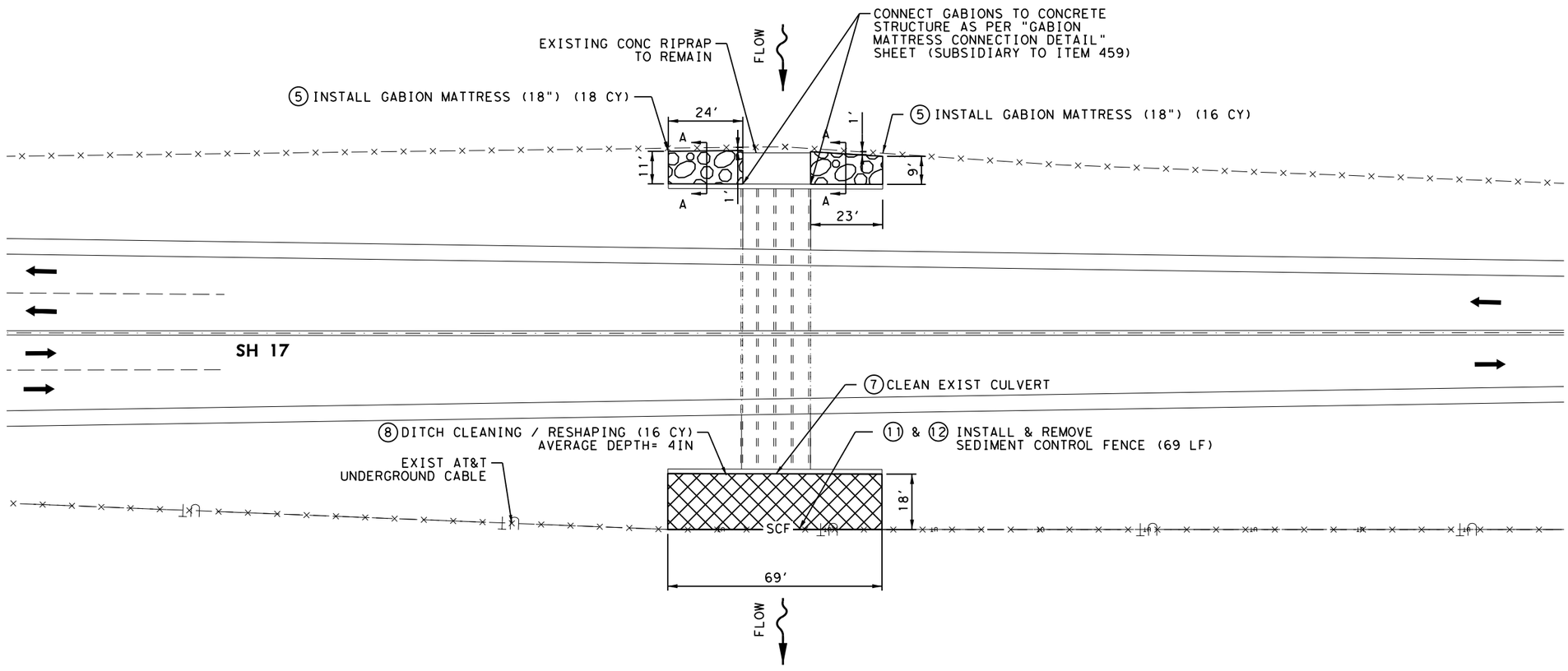

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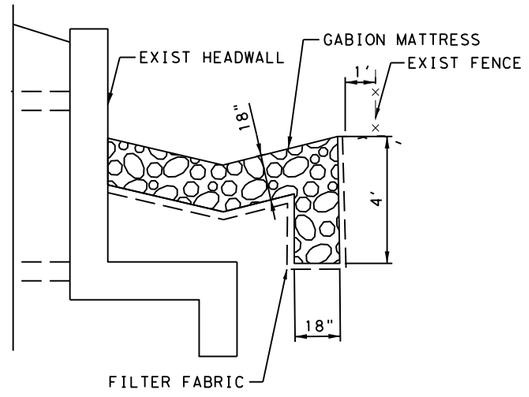

SECTION A-A
N.T.S.

LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER
12/23/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

24-123-0-0104-02-033				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
5	0459 6002	GABION MATTRESSES (GALV)	CY	34
7	0480 6002	CLEAN EXIST CULVERTS	CY	19
8	0760 6003	DITCH CLEAN/RESHAPING(CU YD IN VEHICLE)	CY	16
11	0506 6038	TEMP SDMT CONT FENCE (INSTALL)	LF	69
12	0506 6039	TEMP SDMT CONT FENCE (REMOVE)	LF	69

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
SCOUR PROTECTION
LAYOUTS

NBI: 24-123-0-0104-02-033

SHEET 2 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	35
CONT.	SECT.	JOB	
6351	25	001	

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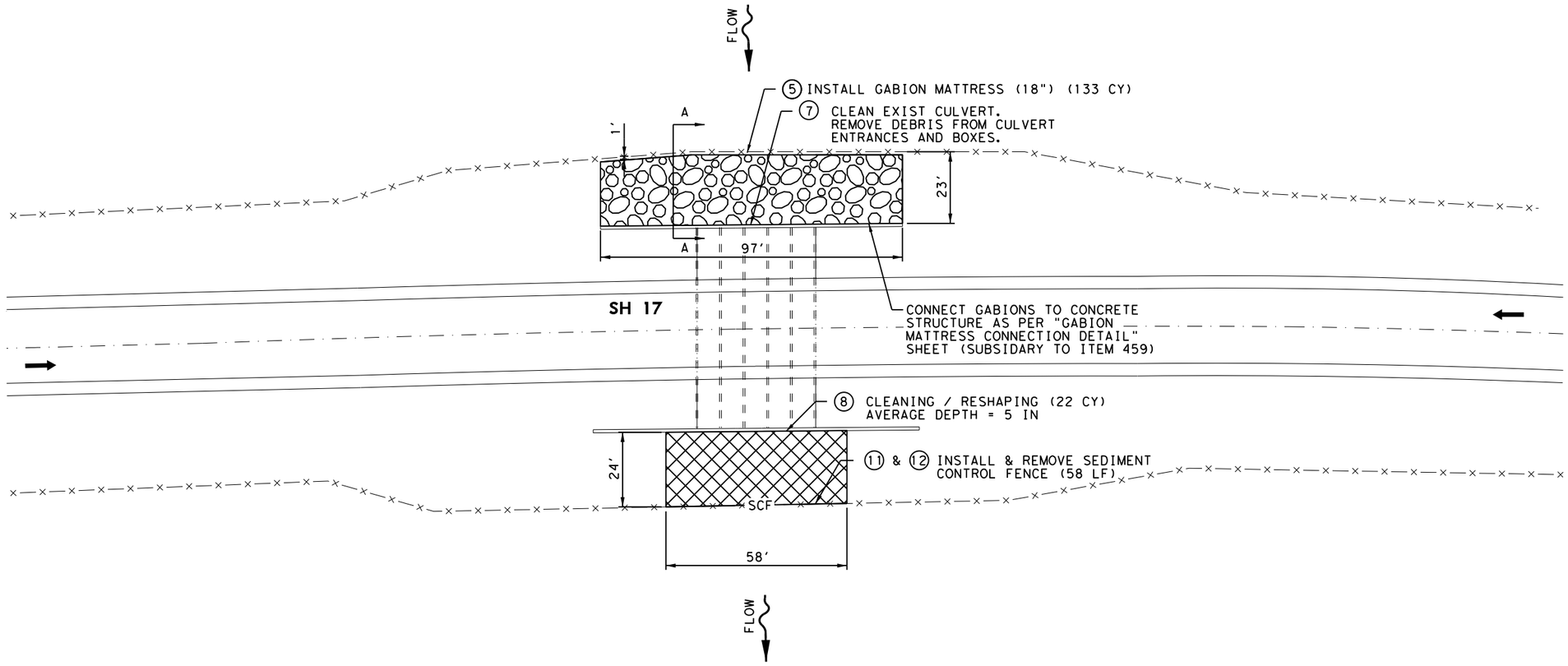

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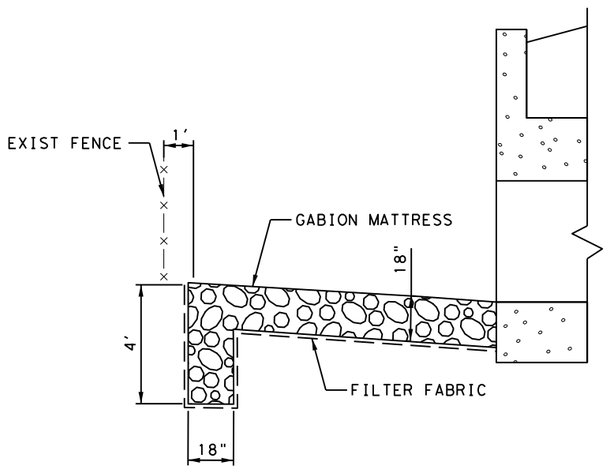

SECTION A-A
N.T.S.

24-123-0-0104-02-036				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
5	0459 6002	GABION MATTRESSES (GALV)	CY	133
7	0480 6002	CLEAN EXIST CULVERTS	CY	6
8	0760 6003	DITCH CLEAN/RESHAPING(CU YD IN VEHICLE)	CY	22
11	0506 6038	TEMP SDMT CONT FENCE (INSTALL)	LF	58
12	0506 6039	TEMP SDMT CONT FENCE (REMOVE)	LF	58

LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER
12/23/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
SCOUR PROTECTION
LAYOUTS

NBI: 24-123-0-0104-02-036

SHEET 3 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	36
CONT.	SECT.	JOB	
6351	25	001	

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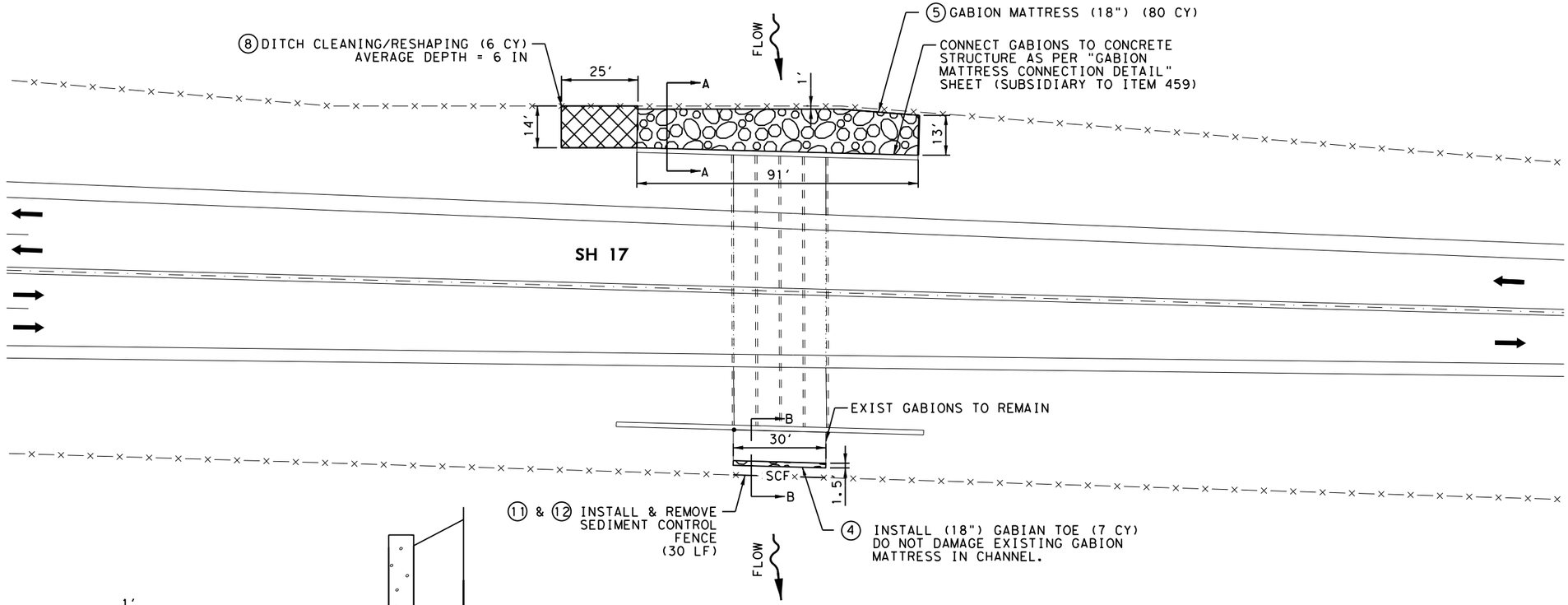

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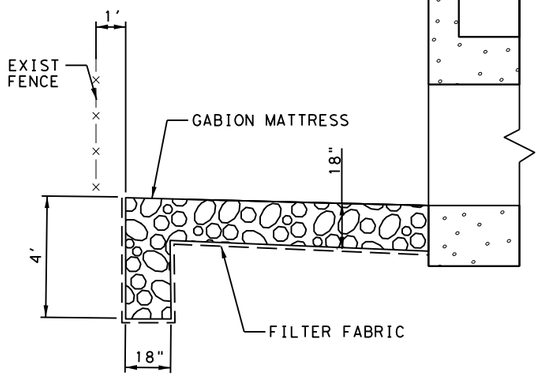
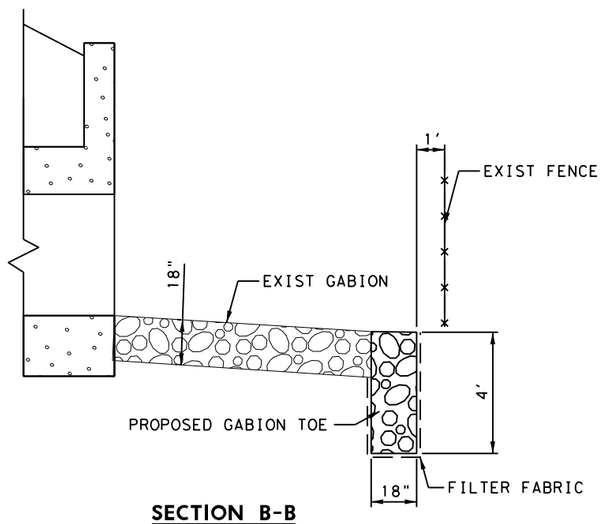


SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

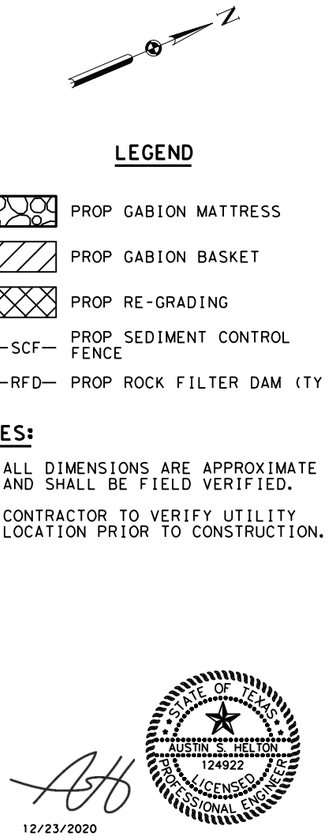
24-123-0-0104-02-037				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
4	0459 6001	GABIONS (GALV)	CY	7
5	0459 6002	GABION MATTRESSES (GALV)	CY	80
8	0760 6003	DITCH CLEAN/RESHAPING(CU YD IN VEHICLE)	CY	6
11	0506 6038	TEMP SDMT CONT FENCE (INSTALL)	LF	30
12	0506 6039	TEMP SDMT CONT FENCE (REMOVE)	LF	30

LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.



12/23/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
SCOUR PROTECTION
LAYOUTS

NBI: 24-123-0-0104-02-037

SHEET 4 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	37
CONT.	SECT.	JOB	
6351	25	001	

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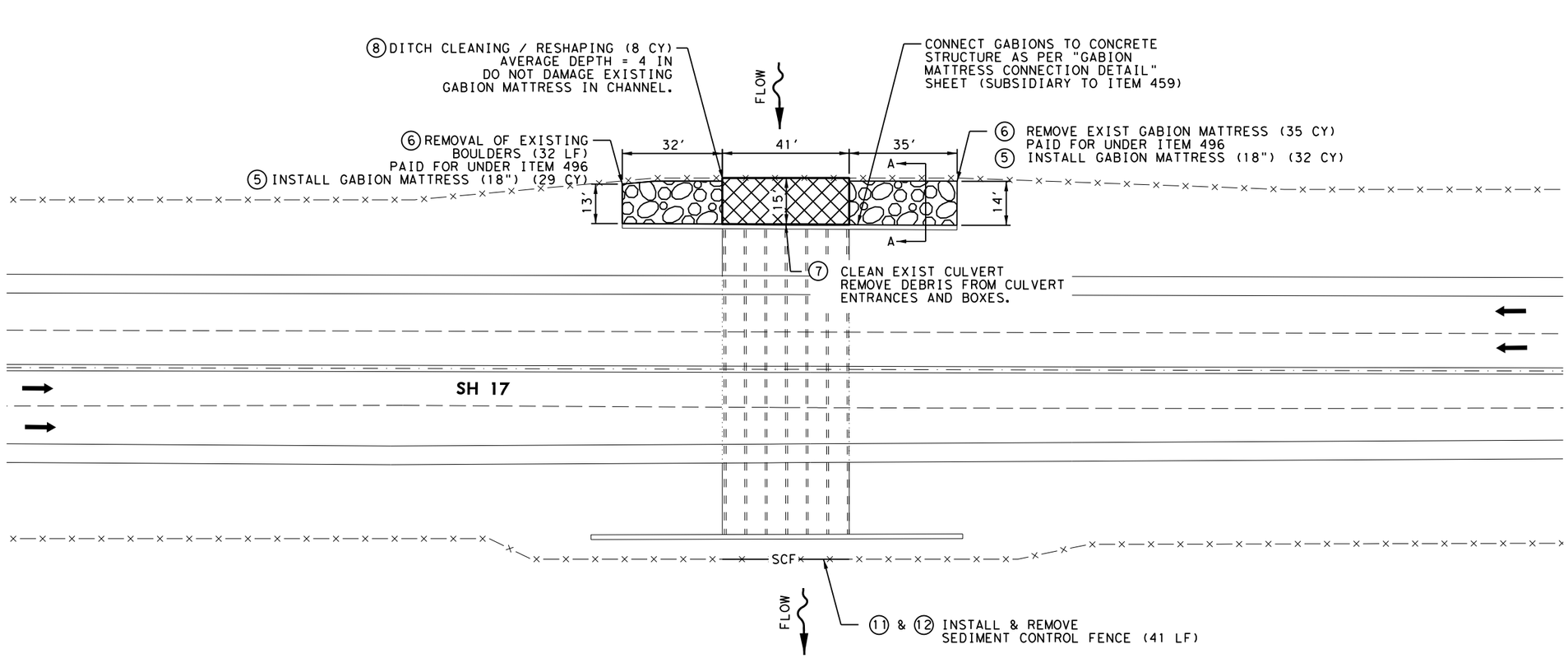

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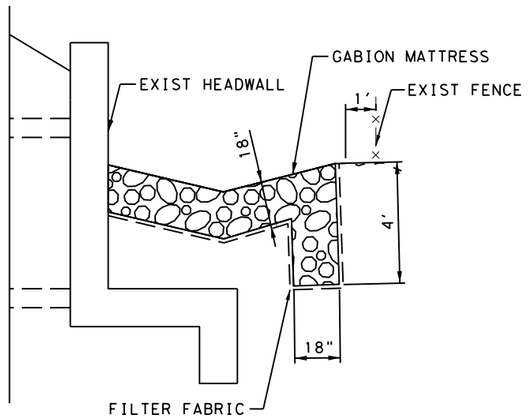
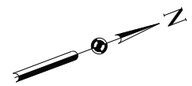


SECTION A-A
N.T.S.

24-123-0-0104-02-038				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
5	0459 6002	GABION MATTRESSES (GALV)	CY	61
6	0496 6072	REMOVING ROCK RIPRAP	LF	67
7	0480 6002	CLEAN EXIST CULVERTS	CY	80
8	0760 6003	DITCH CLEAN/RESHAPING(CU YD IN VEHICLE)	CY	8
11	0506 6038	TEMP SDMT CONT FENCE (INSTALL)	LF	41
12	0506 6039	TEMP SDMT CONT FENCE (REMOVE)	LF	41



LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

12/23/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
SCOUR PROTECTION
LAYOUTS

NBI: 24-123-0-0104-02-038

SHEET 5 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	38
CONT.	SECT.	JOB	
6351	25	001	

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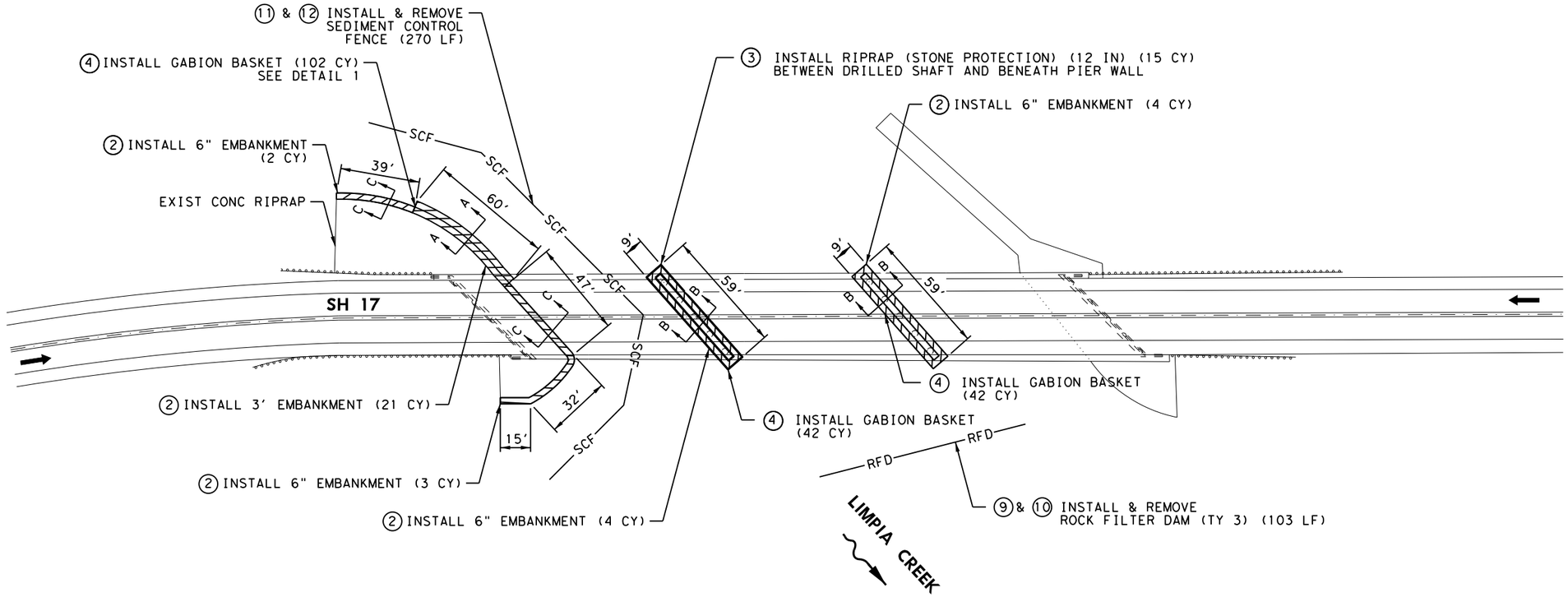

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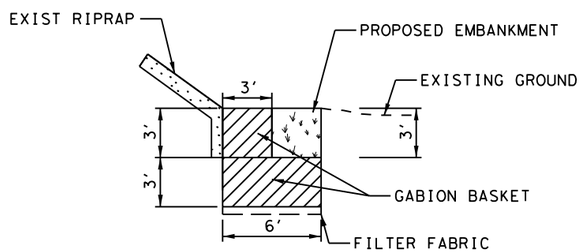
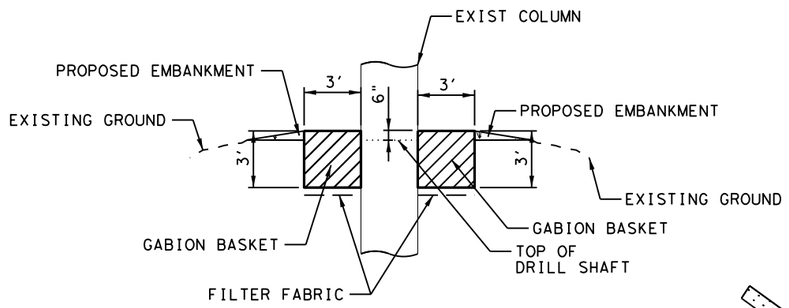
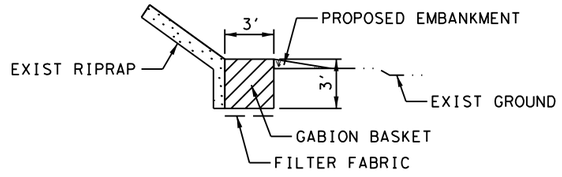


SECTION A-A
N.T.S.



SECTION B-B
N.T.S.



SECTION C-C
N.T.S.

24-123-0-0104-02-066				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
2	0132 6003	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	34
3	0432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	15
4	0459 6001	GABIONS (GALV)	CY	186
9	0506 6003	ROCK FILTER DAMS (TY 3)	LF	103
10	0506 6011	ROCK FILTER DAMS (REMOVE)	LF	103
11	0506 6038	TEMP SDMT CONT FENCE (INSTALL)	LF	270
12	0506 6039	TEMP SDMT CONT FENCE (REMOVE)	LF	270

N

LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO INSTALL GABION BASKETS A MIN OF 6" ABOVE TOP OF DRILLED SHAFT.
3. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

12/23/2020

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK SCOUR PROTECTION LAYOUTS

NBI: 24-123-0-0104-02-066

SHEET 6 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	39
CONT.	SECT.	JOB	
6351	25	001	

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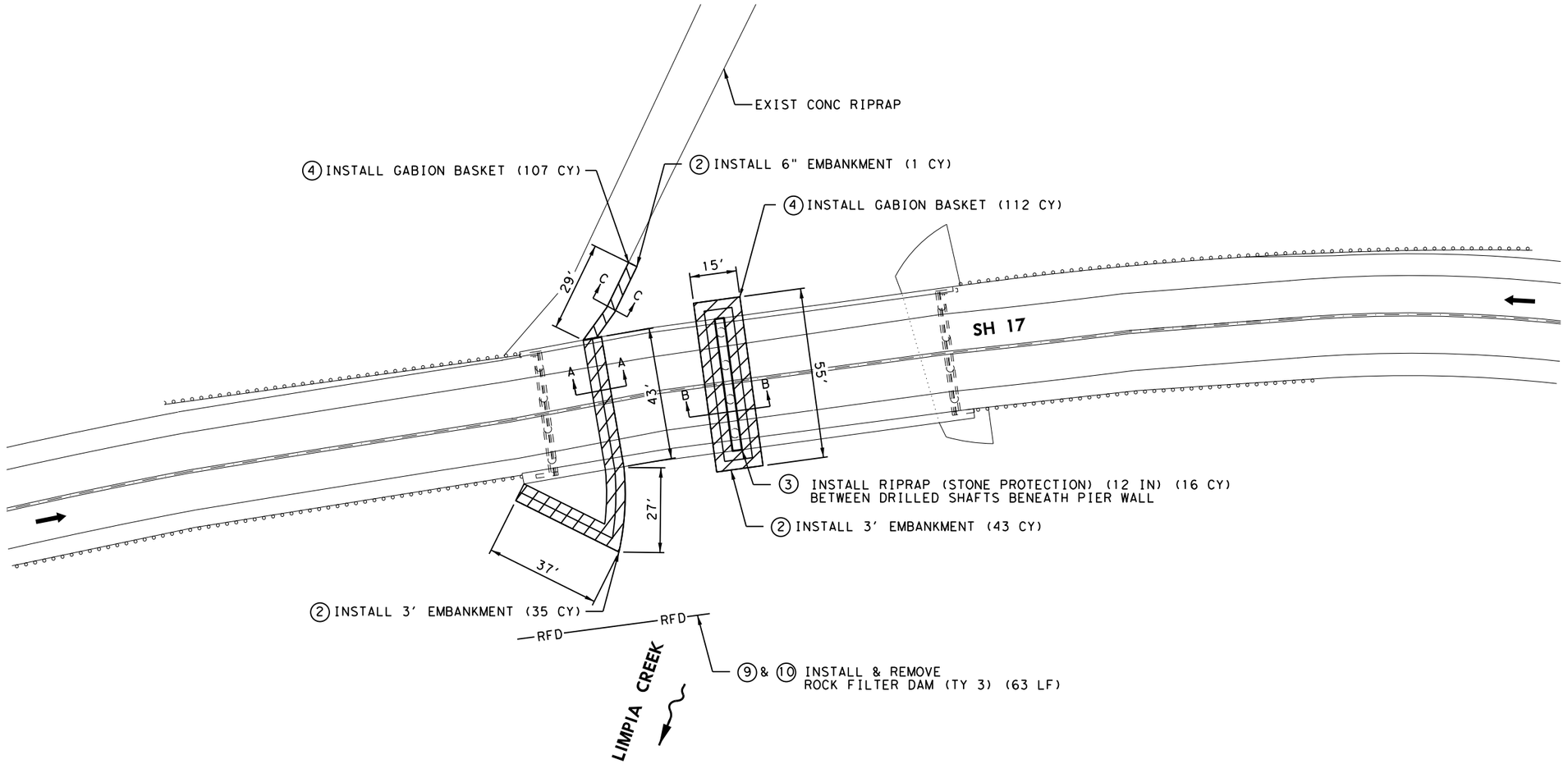


PLAN

LEGEND

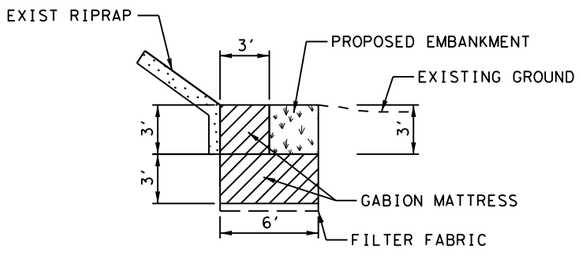
- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

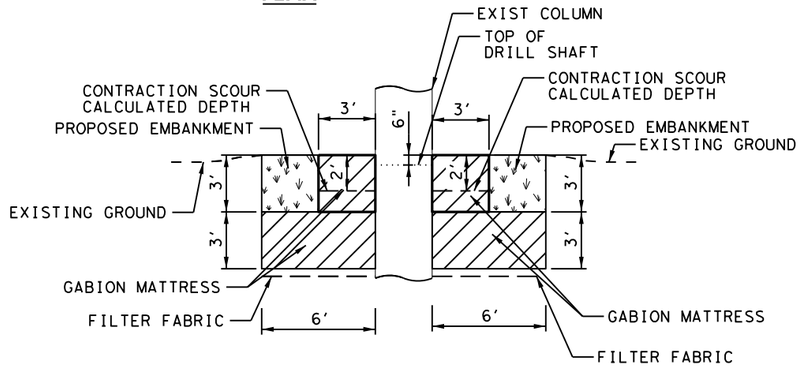
1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO INSTALL GABION BASKET A MIN 6" ABOVE TOP OF DRILLED SHAFT.
3. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

12/23/2020

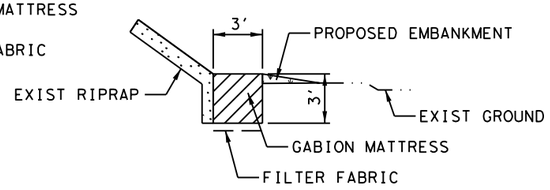
STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.



SECTION C-C
N.T.S.

24-123-0-0104-03-058 ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
2	0132 6003	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	79
3	0432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	16
4	0459 6001	GABIONS (GALV)	CY	219
9	0506 6003	ROCK FILTER DAMS (TY 3)	LF	63
10	0506 6011	ROCK FILTER DAMS (REMOVE)	LF	63

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK SCOUR PROTECTION LAYOUTS

NBI: 24-123-0-0104-03-058

SHEET 7 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	40
CONT.	SECT.	JOB	
6351	25	001	

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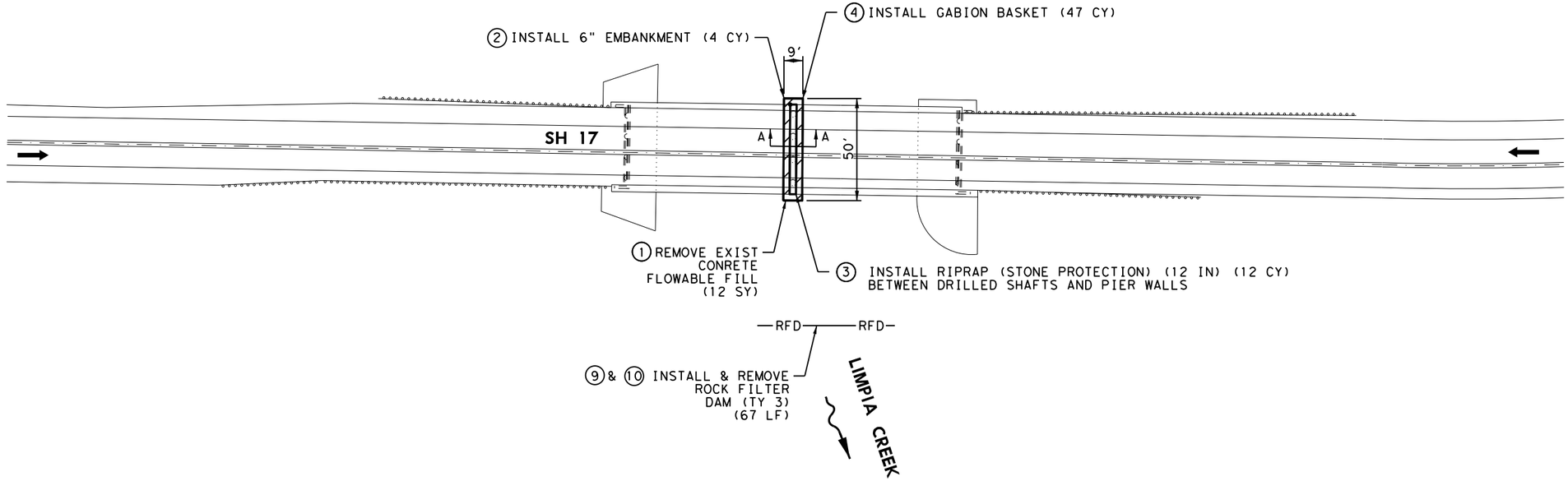

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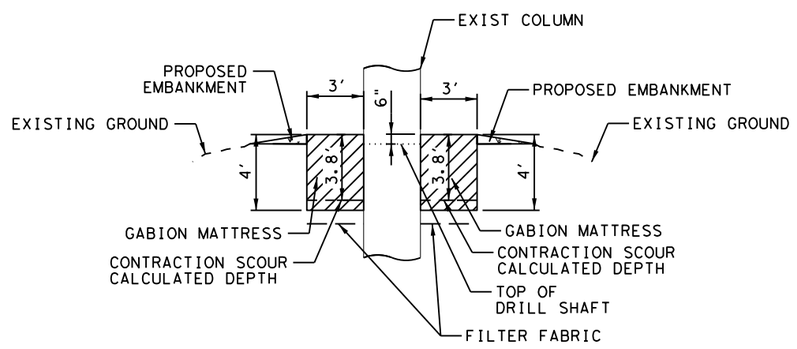
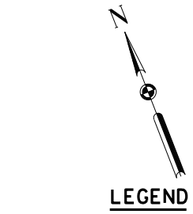


SECTION A-A
N.T.S.

24-123-0-0104-03-061				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
1	0104 6028	REMOVING CONC (MISC)	SY	12
2	0132 6003	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	4
3	0432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	12
4	0459 6001	GABIONS (GALV)	CY	47
9	0506 6003	ROCK FILTER DAMS (TY 3)	LF	67
10	0506 6011	ROCK FILTER DAMS (REMOVE)	LF	67



LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO INSTALL GABION BASKETS A MIN 6" ABOVE TOP OF DRILLED SHAFT.
3. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

12/23/2020

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK SCOUR PROTECTION LAYOUTS

NBI: 24-123-0-0104-03-061

SHEET 8 OF 10

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	41
CONT.	SECT.	JOB	
6351	25	001	

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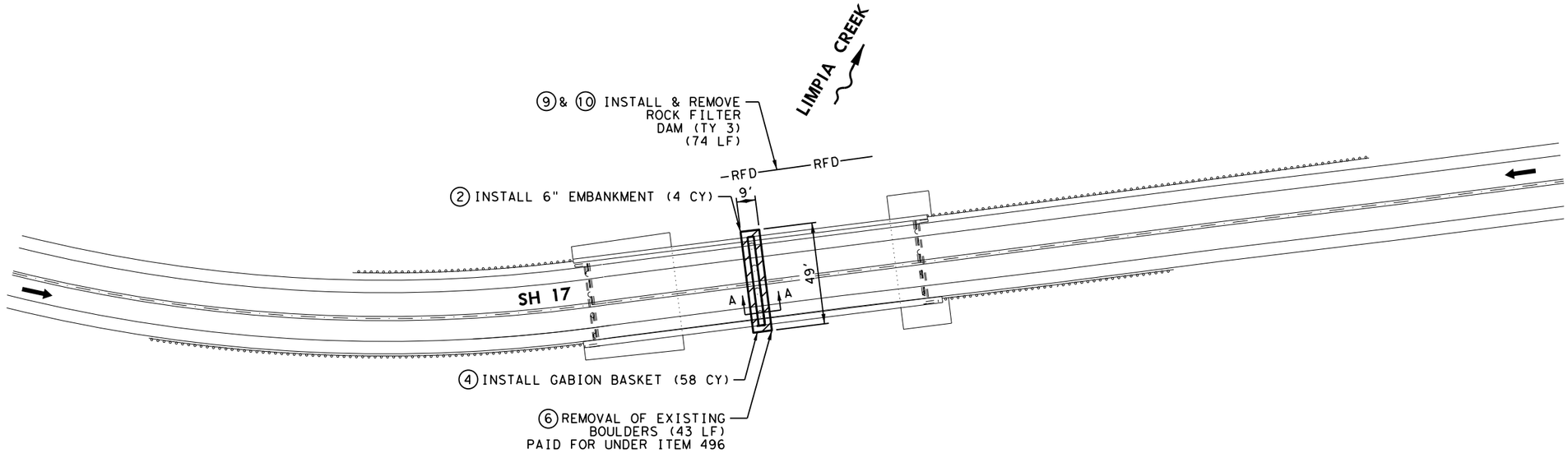


N

LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO INSTALL GABION BASKET A MIN 6" ABOVE TOP OF DRILLED SHAFT.
3. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

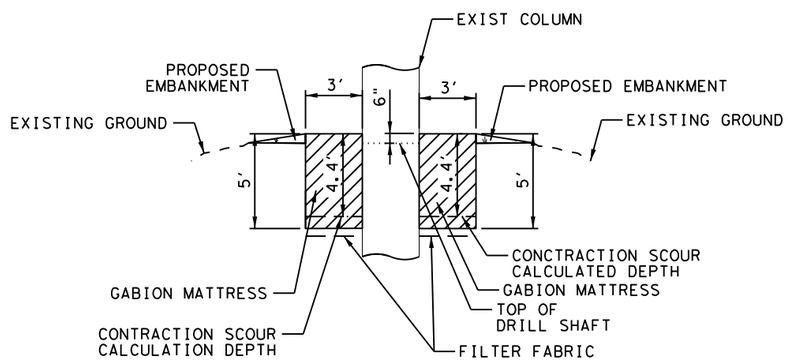
STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

12/23/2020

PLAN

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

24-123-0-0104-03-062				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
2	0132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	4
4	0459 6001	GABIONS (GALV)	CY	58
6	0496 6072	REMOVING ROCK RIPRAP	LF	43
9	0506 6003	ROCK FILTER DAMS (TY 3)	LF	74
10	0506 6011	ROCK FILTER DAMS (REMOVE)	LF	74



SECTION A-A
N.T.S.

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK SCOUR PROTECTION LAYOUTS

NBI: 24-123-0-0104-03-062

SHEET 9 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	42
CONT.	SECT.	JOB	
6351	25	001	

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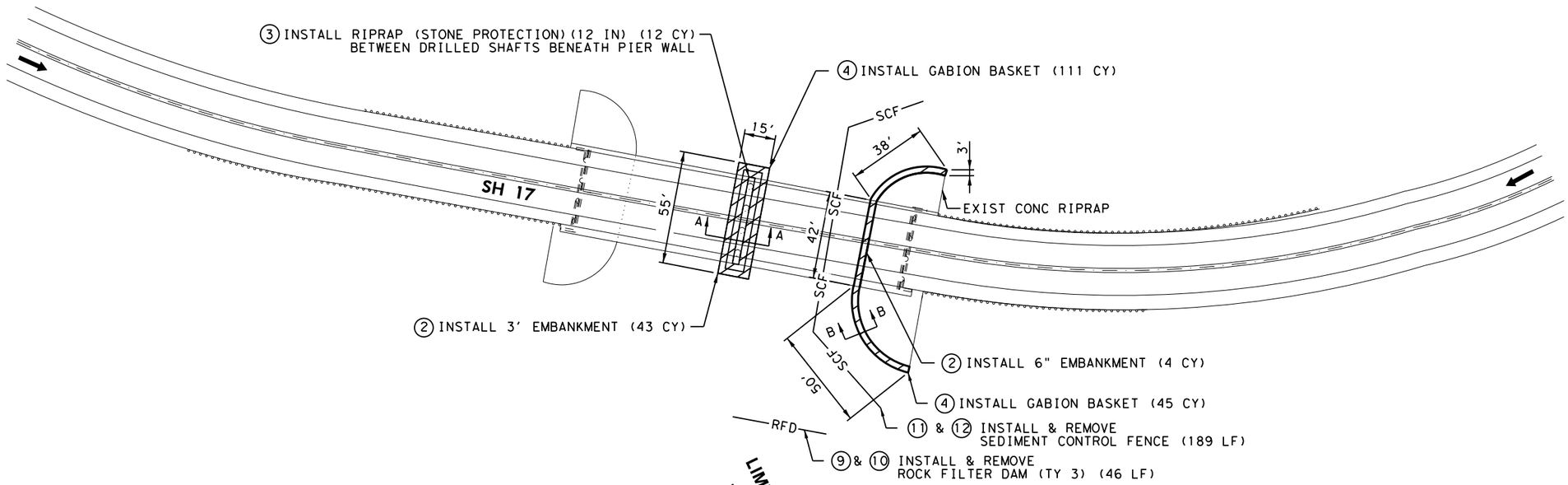
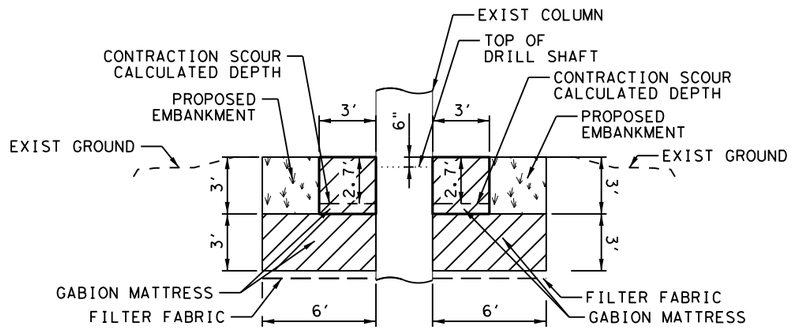
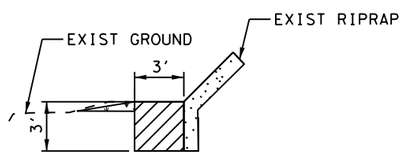


PLAN



SECTION A-A
N.T.S.

24-123-0-0104-03-063				
ESTIMATED QUANTITIES				
ID	ITEM NO.	DESCRIPTION	UNIT	QUANT
2	0132 6003	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	47
3	0432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	12
4	0459 6001	GABIONS (GALV)	CY	156
9	0506 6003	ROCK FILTER DAMS (TY 3)	LF	46
10	0506 6011	ROCK FILTER DAMS (REMOVE)	LF	46
11	0506 6038	TEMP SDMT CONT FENCE (INSTALL)	LF	189
12	0506 6039	TEMP SDMT CONT FENCE (REMOVE)	LF	189



SECTION B-B
N.T.S.

LEGEND

- PROP GABION MATTRESS
- PROP GABION BASKET
- PROP RE-GRADING
- —SCF— PROP SEDIMENT CONTROL FENCE
- —RFD— PROP ROCK FILTER DAM (TY 3)

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
2. CONTRACTOR TO INSTALL GABION BASKET A MIN 6" ABOVE TOP OF DRILLED SHAFT.
3. CONTRACTOR TO VERIFY UTILITY LOCATION PRIOR TO CONSTRUCTION.

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

12/23/2020

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK
SCOUR PROTECTION
LAYOUTS

NBI: 24-123-0-0104-03-063

SHEET 10 OF 10

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	43
CONT.	SECT.	JOB	
6351	25	001	

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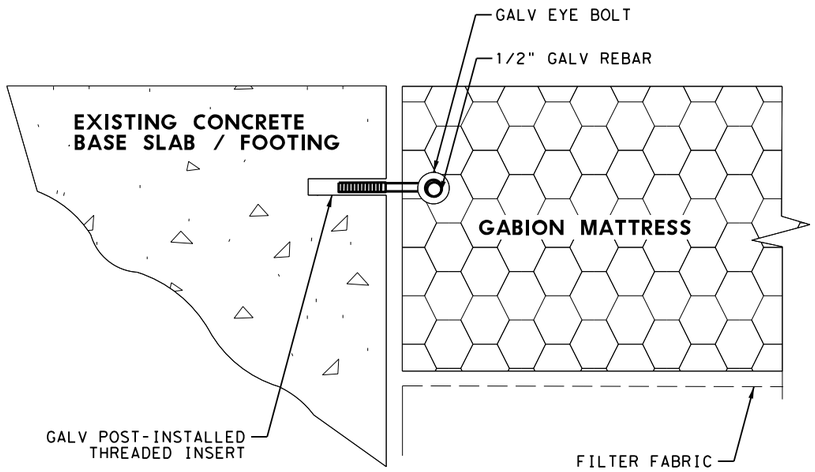
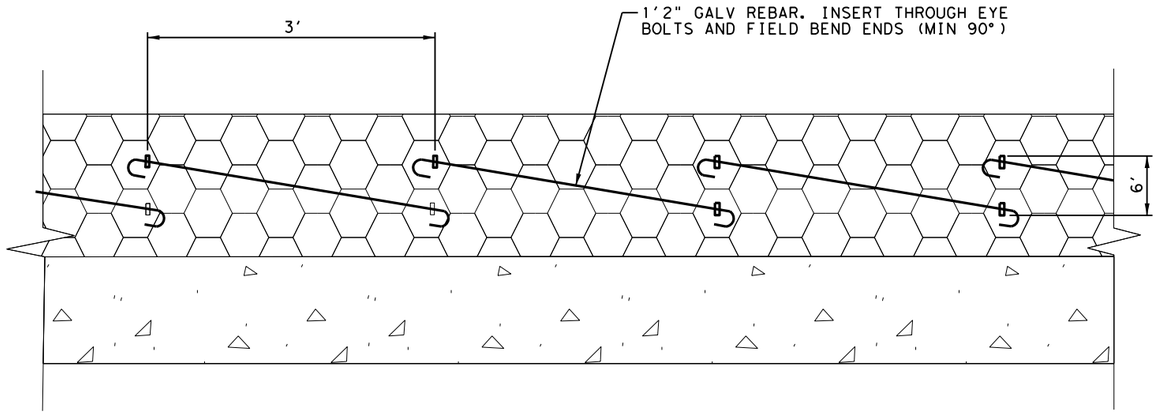
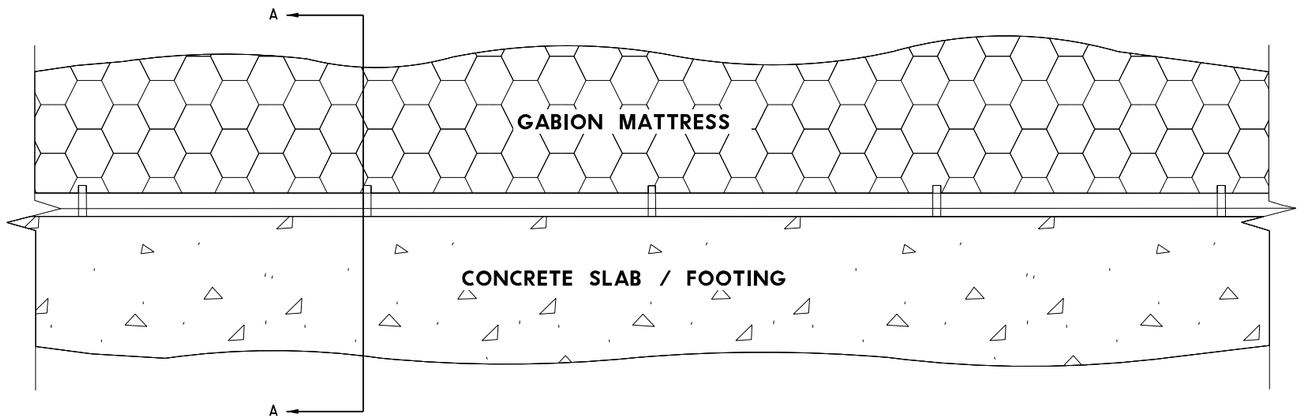




ELEVATION
N. T. S.

SECTION A-A
N. T. S.



PLAN
N. T. S.

12/23/2020

NOTES:

1. CONTRACTOR MAY SELECT FITTINGS (INSERT AND EYEBOLTS) TO ACHIEVE 4,500 LB PULL OUT RESISTANCE PER FITTING.
2. INSTALLATION OF EYE BOLTS, INSERTS AND REBAR SUBSIDARY TO ITEM 459.

Kimley»Horn F-928

Texas Department of Transportation

BPM FY 21 GABION MATTRESS CONNECTION DETAIL

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	44
CONT.	SECT.	JOB	
6351	25	001	

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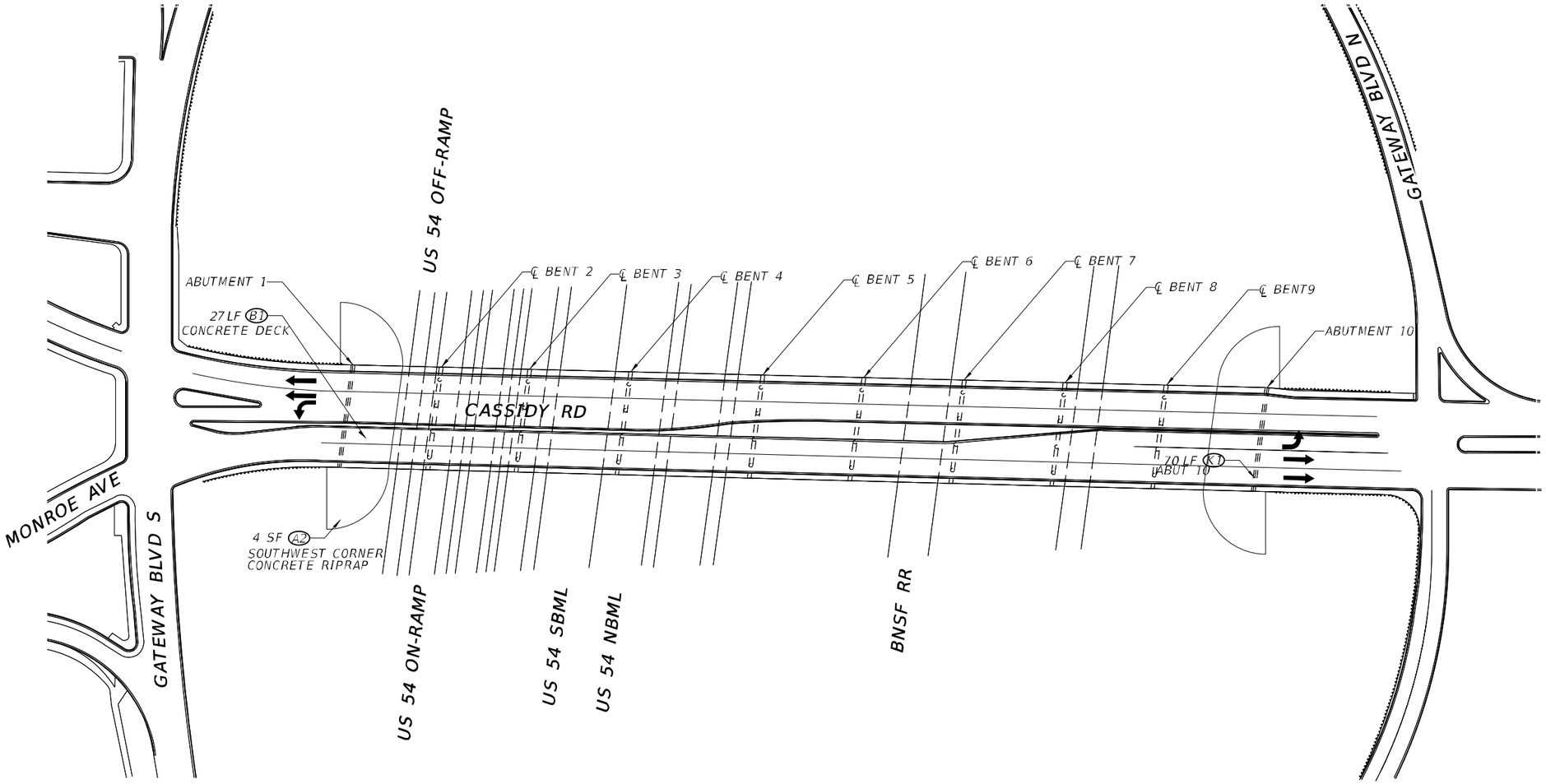

PLAN

REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

- (A2) INTERMEDIATE SPALL (VERTICAL & OVERHEAD)
- (B1) EPOXY INJECT CRACK
- (K1) JOINT CLEANING AND SEALING

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.
2. REFER TO BENT ELEVATION VIEWS SHEET FOR ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QTY
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	27
438	6001	CLEANING AND SEALING EXITING JOINTS	LF	70
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	4

STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez 12/22/2020

0' 50' 100' HORZ
0' 50' 100' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
CASSIDY RD. AT US 54 & BNSF RR
BRIDGE REPAIR LAYOUT

NBI: 24-072-0-0167-01-014

1 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	45
CONT.	SECT.	JOB	
6351	25	001	

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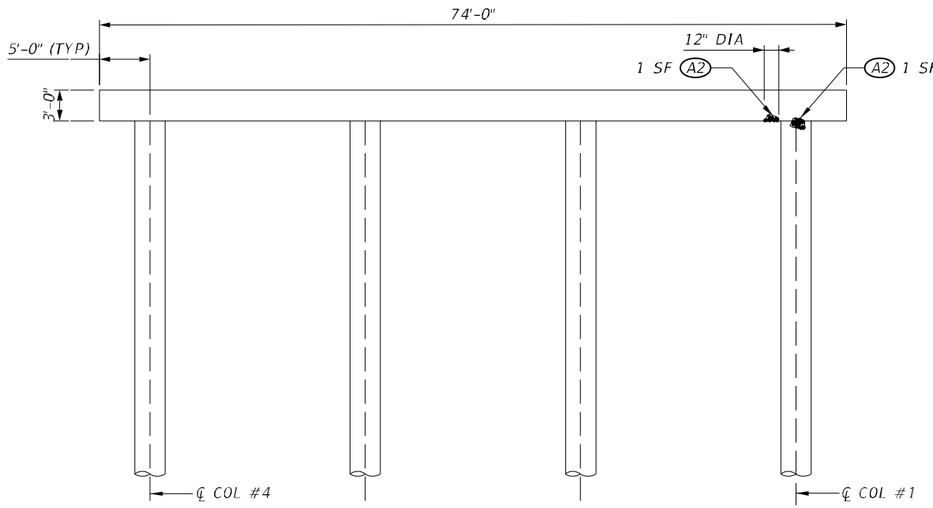
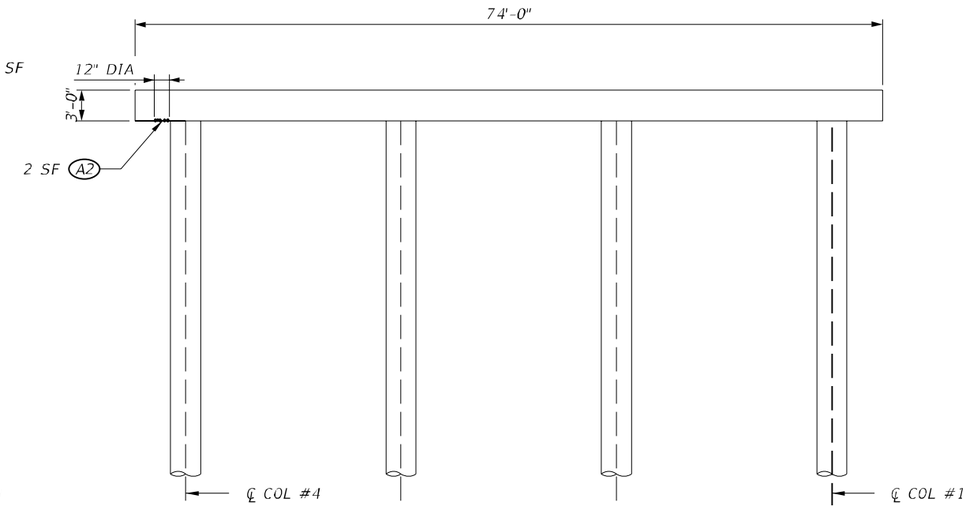


BENT 3 ELEVATION (LOOKING EAST)



BENT 8 ELEVATION (LOOKING EAST)

N

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

A2 INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	4

STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez

12/22/2020

0' 7.5' 15' HORZ
0' 7.5' 15' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
CASSIDY RD. AT US 54 & BNSF RR
BRIDGE REPAIR LAYOUT

NBI: 24-072-0-0167-01-014

2 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	46
CONT.	SECT.	JOB	
6351	25	001	

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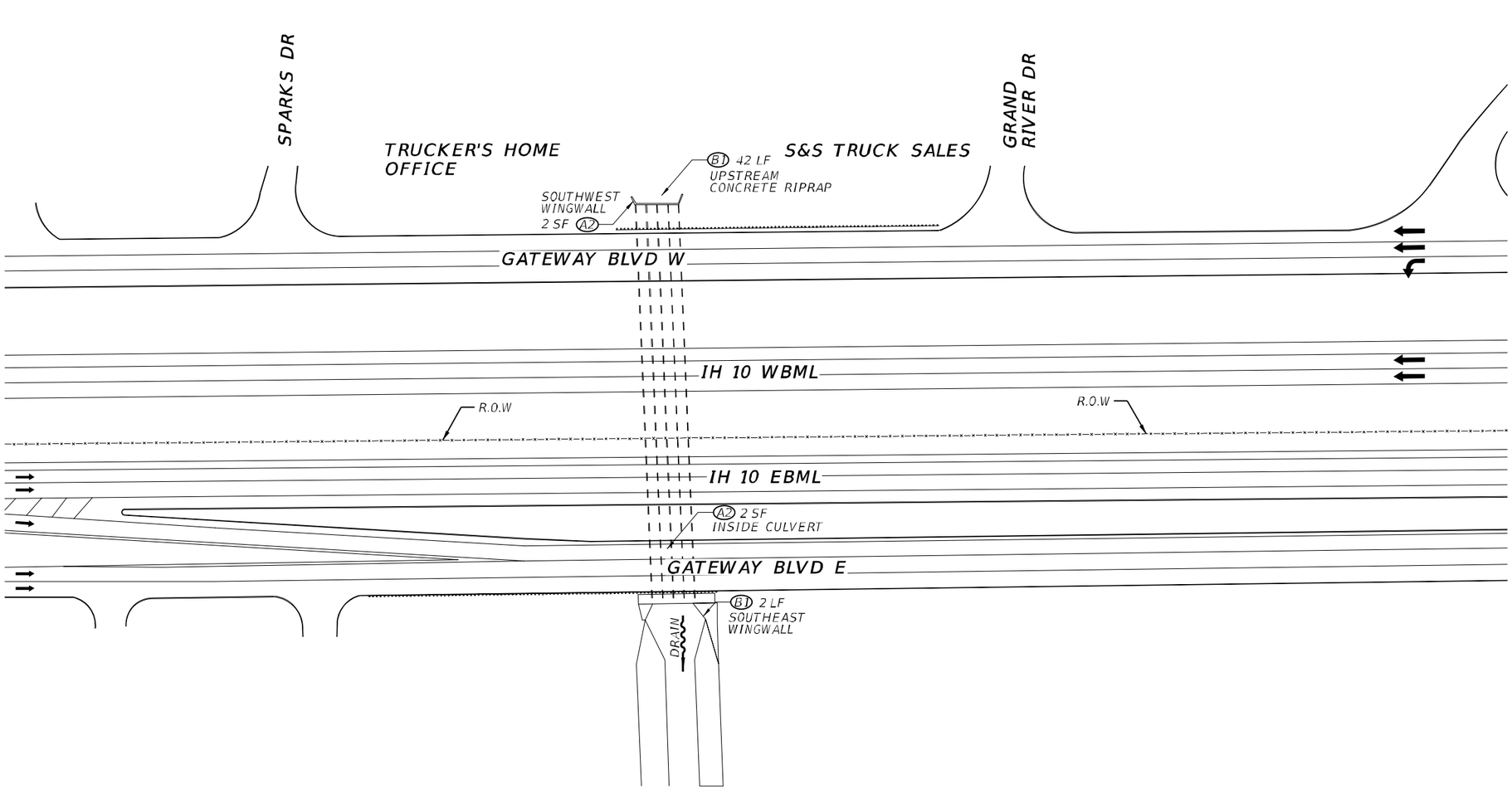

PLAN

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

- A2 INTERMEDIATE SPALL (VERTICAL & OVERHEAD)
- B1 EPOXY INJECT CRACK

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	44
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	4

STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez 12/22/2020

0' 50' 100' HORZ
0' 50' 100' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
IH 10 AT DRAIN
BRIDGE REPAIR LAYOUT

NBI: 24-072-0-2121-04-047

3 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	47
CONT.	SECT.	JOB	
6351	25	001	

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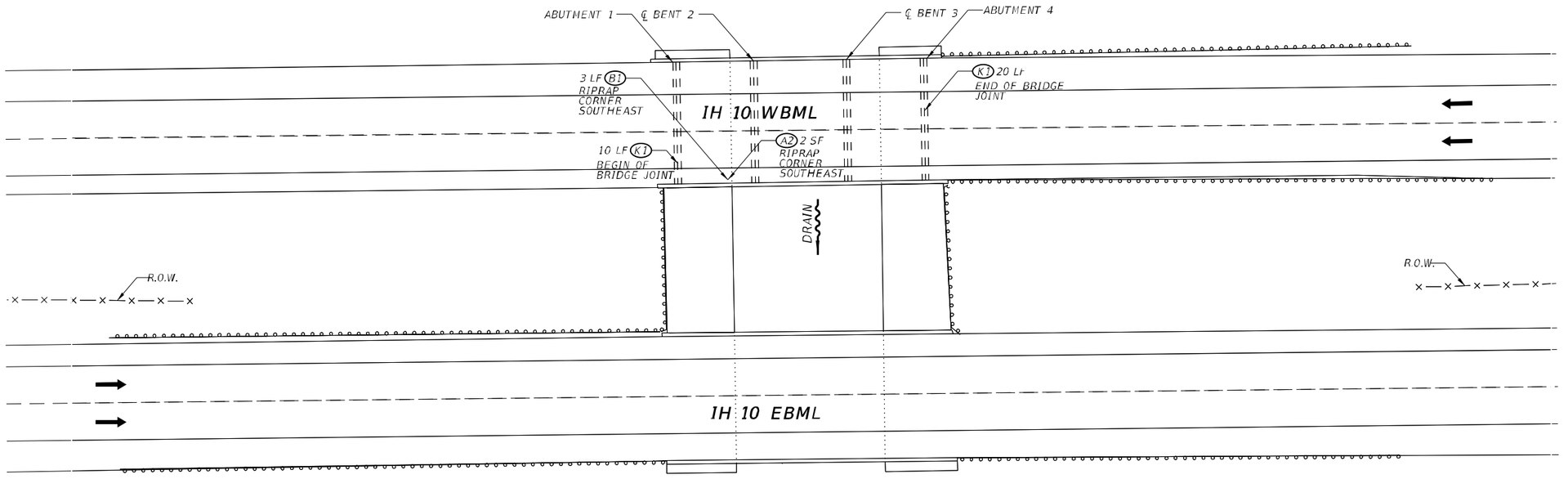

PLAN

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
438	6001	CLEANING AND SEALING EXISTING JOINTS	LF	30
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	3
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	2

REPAIR CALL-OUT LEGEND

(XX) YX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

- (A2) INTERMEDIATE SPALL (VERTICAL & OVERHEAD)
- (B1) EPOXY INJECT CRACK
- (K1) JOINT CLEANING AND SEALING

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.
2. REFER TO BRIDGE ELEVATION VIEWS SHEET FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez 12/22/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
IH 10 WB AT DRAIN
BRIDGE REPAIR LAYOUT

NBI: 24-072-0-2121-05-064

4 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	48
CONT.	SECT.	JOB	
6351	25	001	

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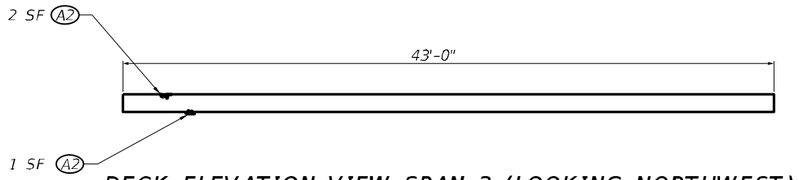
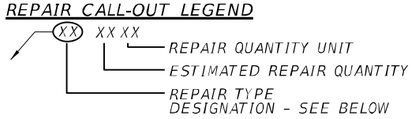


DECK ELEVATION VIEW SPAN 3 (LOOKING NORTHWEST)

REPAIR CALL-OUT LEGEND



REPAIR TYPE DESCRIPTION

A2 INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	3

STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez 12/22/2020

0' 5' 10' HORZ
0' 5' 10' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
IH 10 WB AT DRAIN
BRIDGE REPAIR LAYOUT

NBI: 24-072-2121-05-064

5 OF 16

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	49
CONT.	SECT.	JOB	
6351	25	001	

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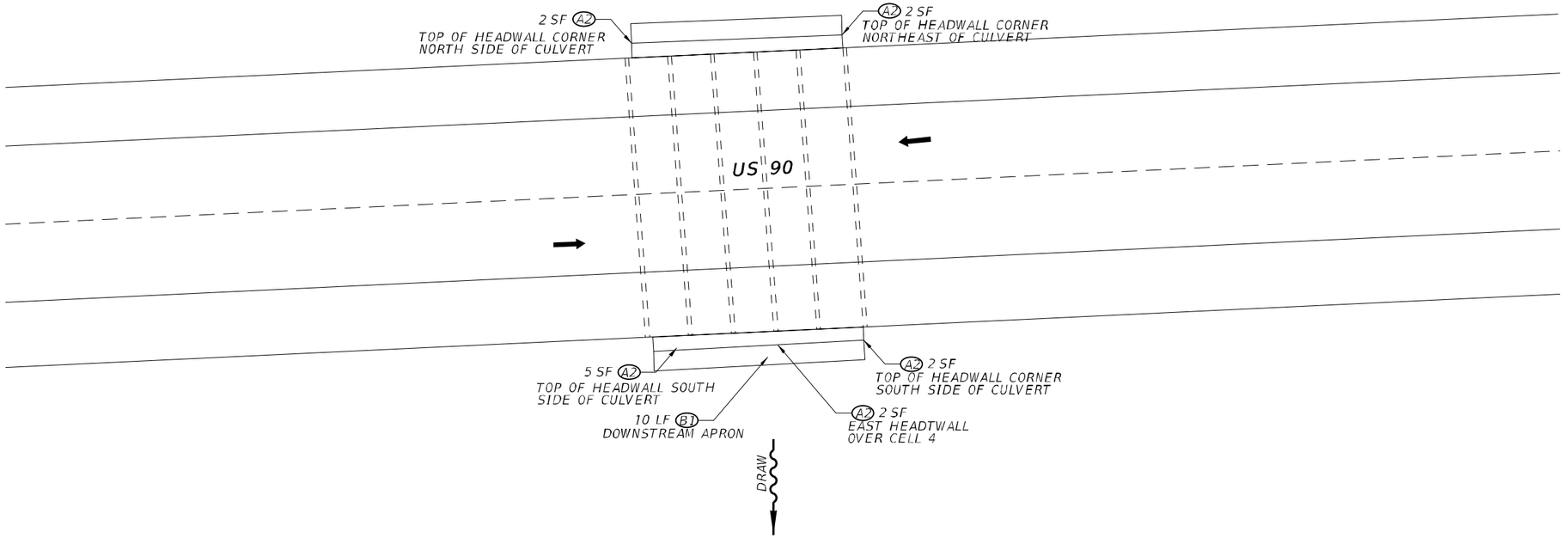

PLAN

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR QUANTITY UNIT
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR TYPE DESIGNATION – SEE BELOW

REPAIR TYPE DESCRIPTION

A2 INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

B1 EPOXY INJECT CRACK

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	13
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	10

SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

12/22/2020

0' 10' 20' HORZ
0' 10' 20' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
US 90 AT DRAW
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0020-03-115

6 OF 16

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	50
CONT.	SECT.	JOB	
6351	25	001	

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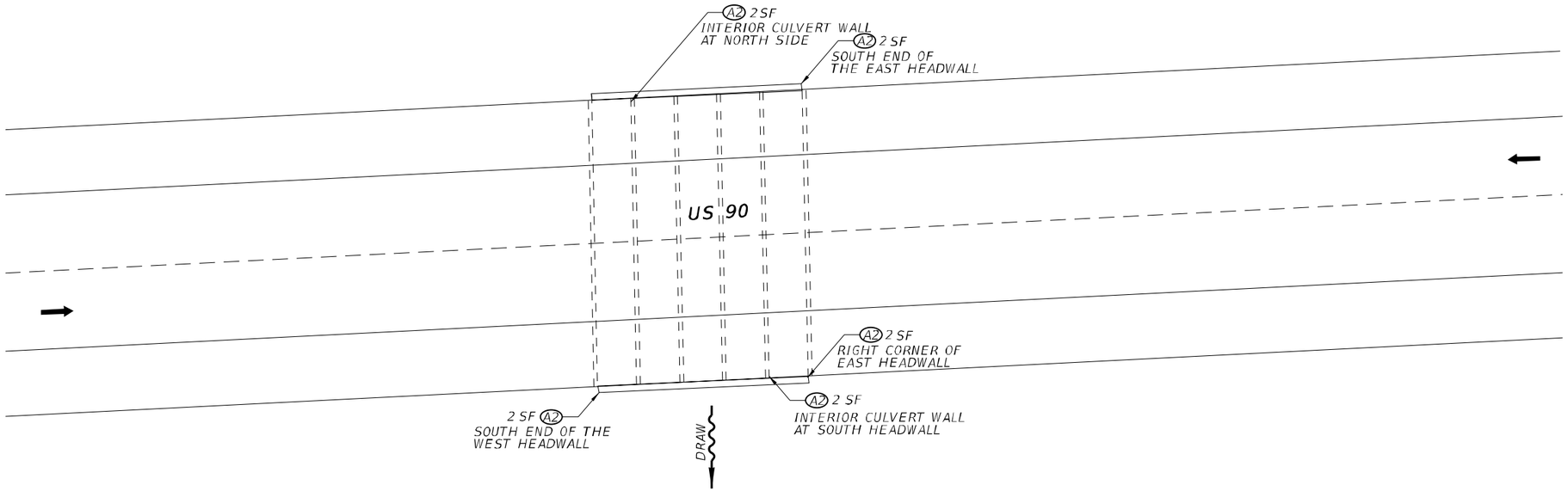
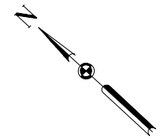


PLAN



REPAIR CALL-OUT LEGEND

(XX) XX XX
- XX XX — REPAIR QUANTITY UNIT
- XX — ESTIMATED REPAIR QUANTITY
- (XX) — REPAIR TYPE DESIGNATION – SEE BELOW

REPAIR TYPE DESCRIPTION

(A2) INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	10

12/22/2020

0' 10' 20' HORZ
0' 10' 20' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
US 90 AT DRAW
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0020-03-116

7 OF 16

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	51
CONT.	SECT.	JOB	
6351	25	001	

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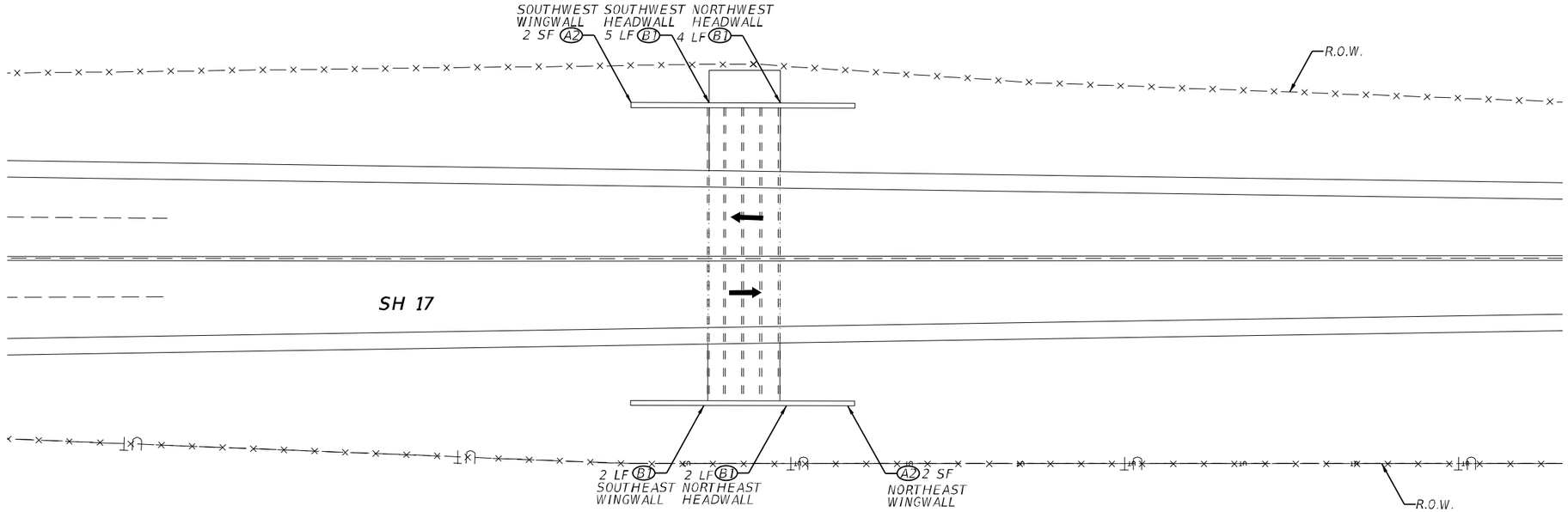

PLAN

REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

(A2) INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

(B1) EPOXY INJECT CRACK

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	4
780	6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	13

SERGIO MENDEZ 121993 LICENSED PROFESSIONAL ENGINEER

Sergio Mendez 12/22/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

CONSOR F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-02-033

8 OF 16

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	52
CONT.	SECT.	JOB	
6351	25	001	

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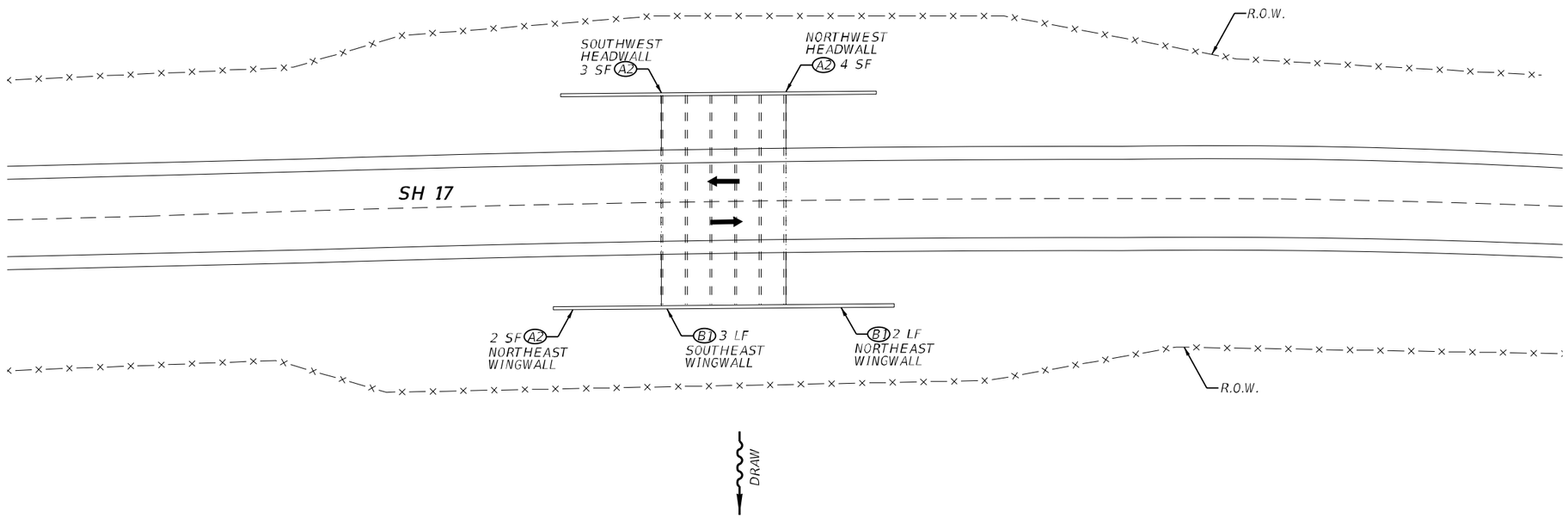

PLAN

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

- A2 — INTERMEDIATE SPALL (VERTICAL & OVERHEAD)
- B1 — EPOXY INJECT CRACK

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	9
780	6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	5

STATE OF TEXAS — SERGIO MENDEZ — 121993 — LICENSED — PROFESSIONAL ENGINEER

Sergio Mendez

12/22/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

CONSOR F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-02-036

9 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	53
CONT.	SECT.	JOB	
6351	25	001	

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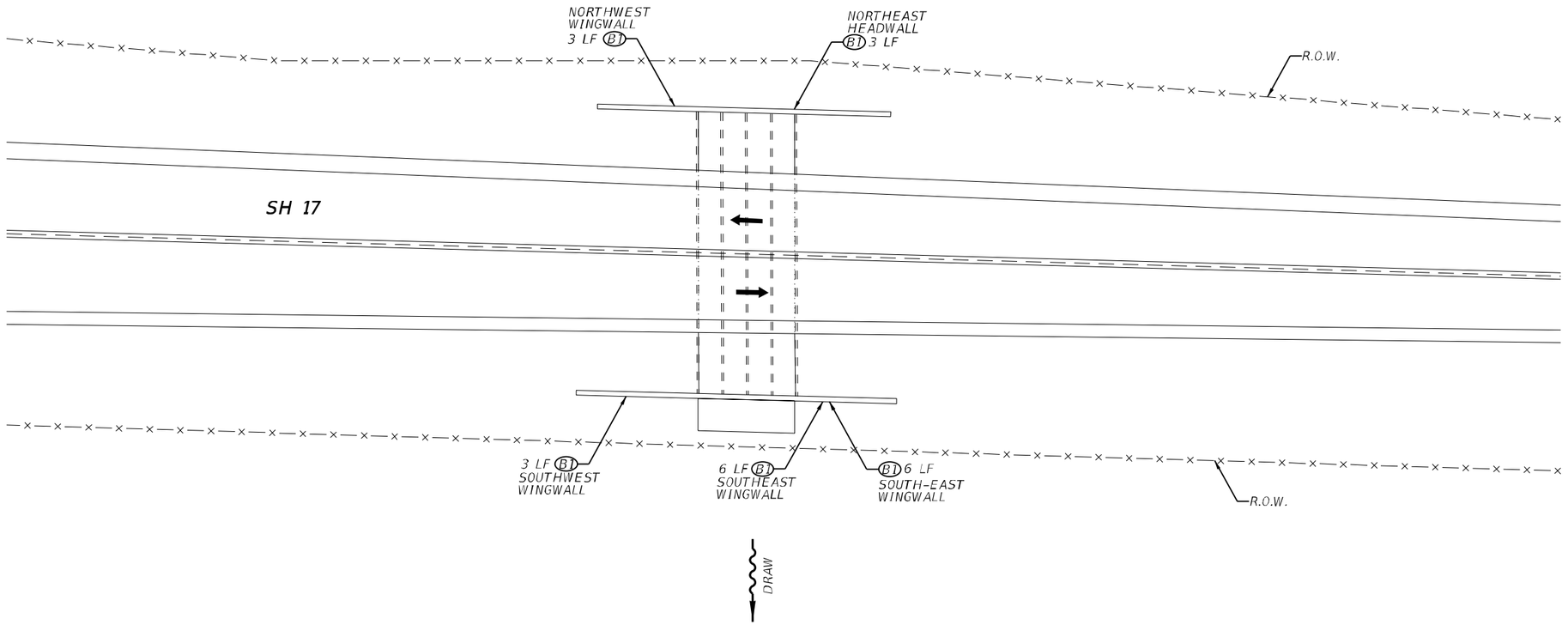

PLAN

N

REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

(B1) EPOXY INJECT CRACK

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
780	6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	21

12/22/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-02-037

10 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	54
CONT.	SECT.	JOB	
6351	25	001	

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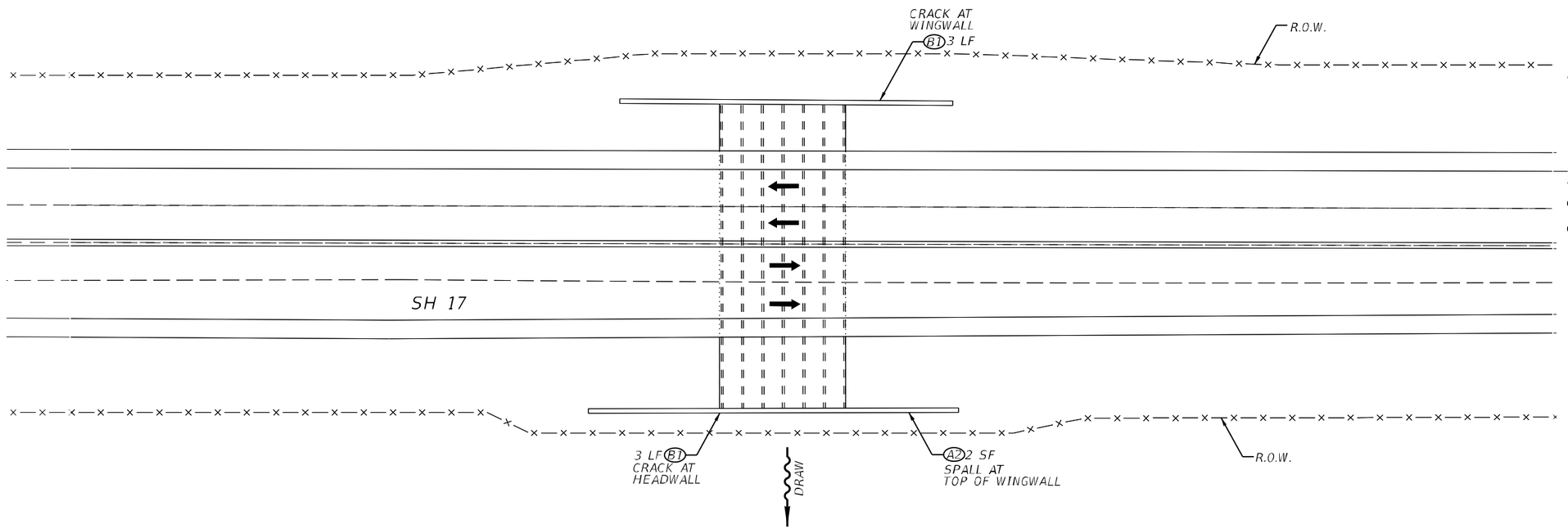


PLAN

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

A2 INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

B1 EPOXY INJECT CRACK

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	2
780	6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	6

SERGIO MENDEZ 121993 LICENSED PROFESSIONAL ENGINEER

Sergio Mendez

12/22/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

CONSOR F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT DRAW
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-02-038

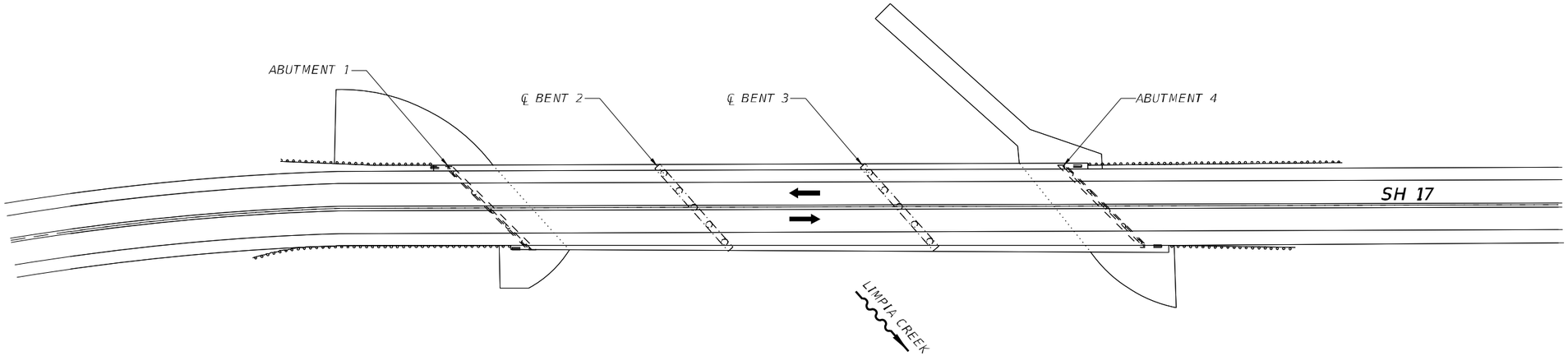
11 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	55
CONT.	SECT.	JOB	
6351	25	001	

FILENAME: C:ELP_BPM_BRG_09.dgn
PLOTTED: 12/22/2020 $$SYTIME$

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	4
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	21



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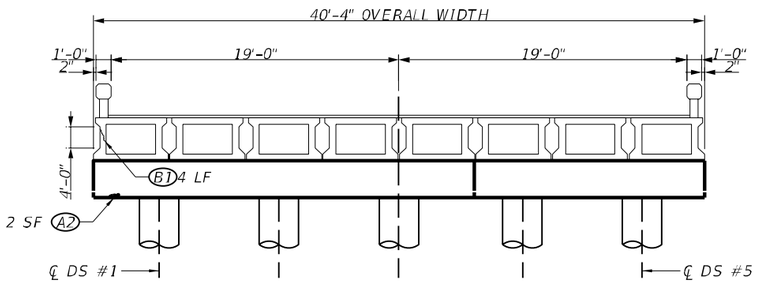
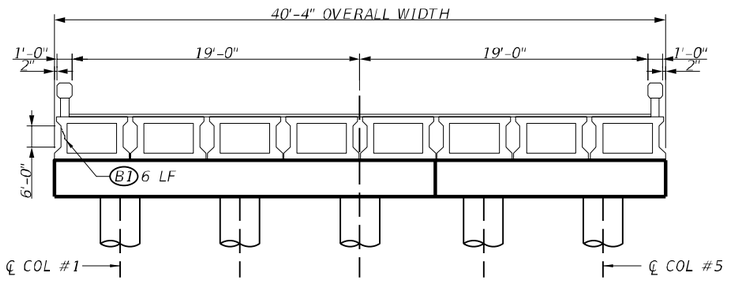


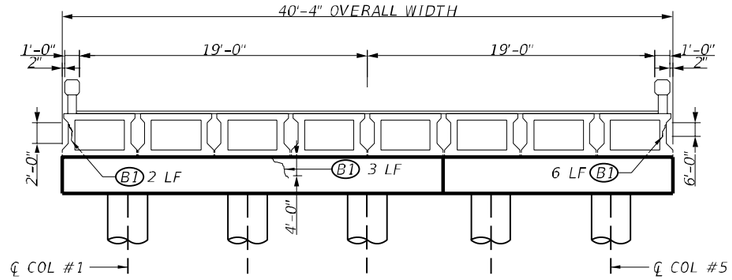
ABUTMENT 1 ELEVATION (LOOKING SOUTHWEST)

NTS



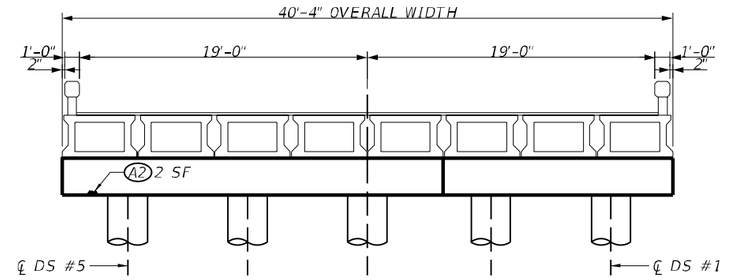
BENT 2 ELEVATION (LOOKING SOUTHWEST)

NTS



BENT 3 ELEVATION (LOOKING SOUTHWEST)

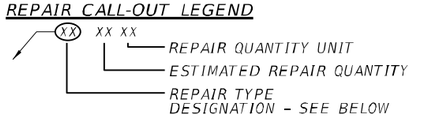
NTS



ABUTMENT 4 ELEVATION (LOOKING NORTHEAST)

NTS

REPAIR CALL-OUT LEGEND



REPAIR TYPE DESCRIPTION

A2 INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

B1 EPOXY INJECT CRACK

NOTES:

1. REFER TO BRIDGE REPAIR DETAILS FOR REPAIR INSTRUCTIONS.

STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez 12/22/2020

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-02-066

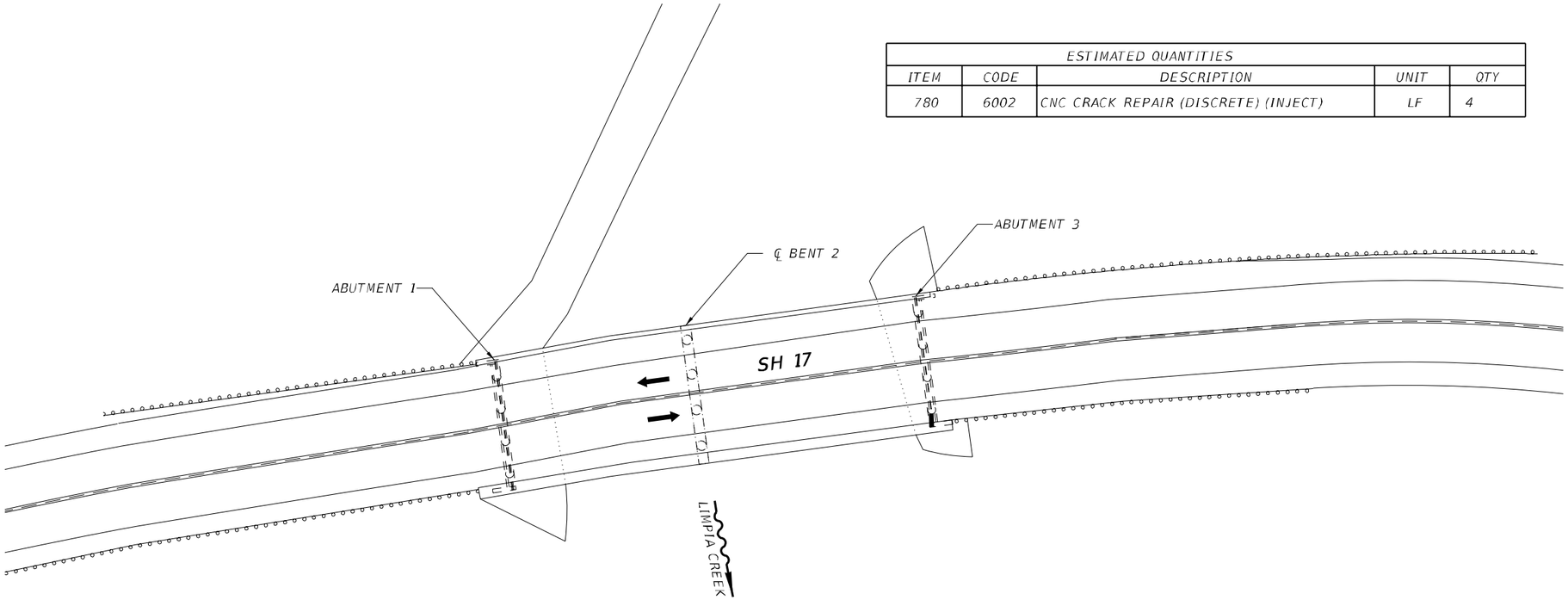
12 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

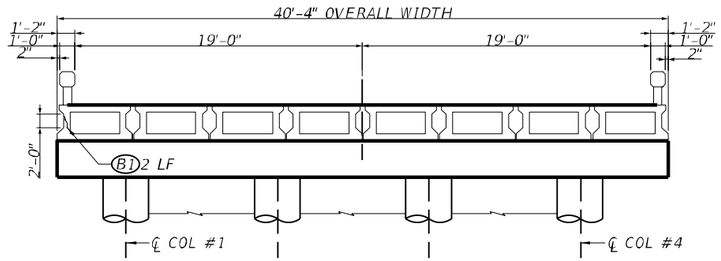
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	56
CONT.	SECT.	JOB	
6351	25	001	

FILENAME: C:_ELP_BPM_BRG_10.dgn
PLOTTED: 12/22/2020 9:51 AM

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	4

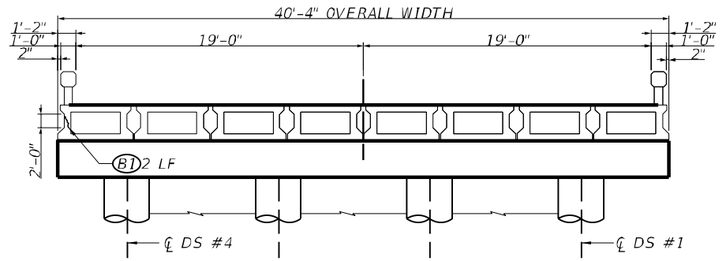


PLAN



BENT 2 ELEVATION (LOOKING NORTH)

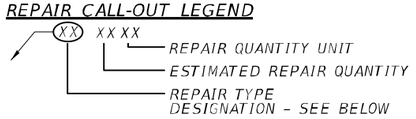
NTS



ABUTMENT 3 ELEVATION (LOOKING SOUTH)

NTS

REPAIR CALL-OUT LEGEND



REPAIR TYPE DESCRIPTION

(B1) EPOXY INJECT CRACK

NOTES:

1. REFER TO BRIDGE REPAIR DETAILS FOR REPAIR INSTRUCTIONS.

SERGIO MENDEZ 121993 LICENSED PROFESSIONAL ENGINEER

12/22/2020

0' 20' 40' HORZ
0' 20' 40' VERT
SCALE

CONSOR F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-03-058

13 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	57
CONT.	SECT.	JOB	
6351	25	001	

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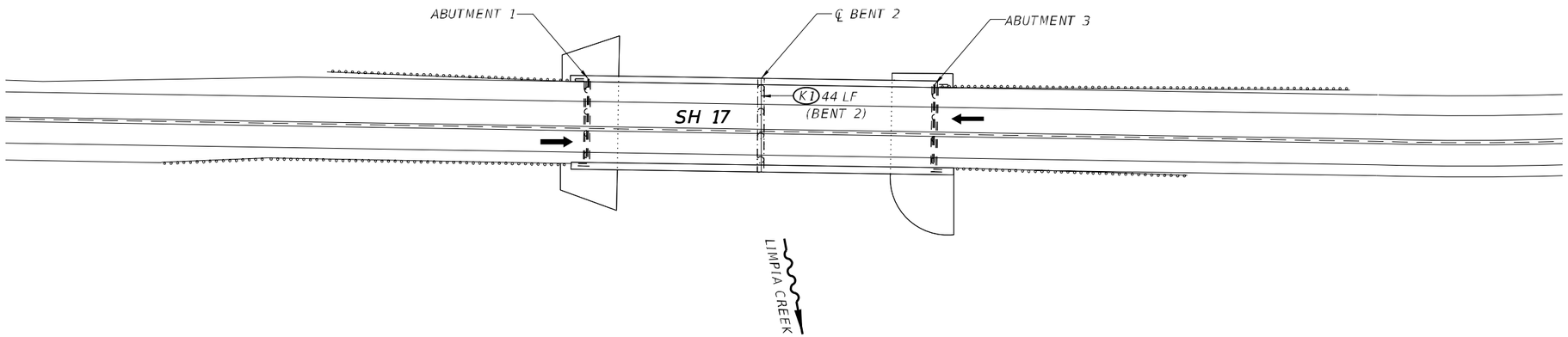
ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
438	6001	CLEANING AND SEALING EXISTING JOINTS	LF	44
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	4



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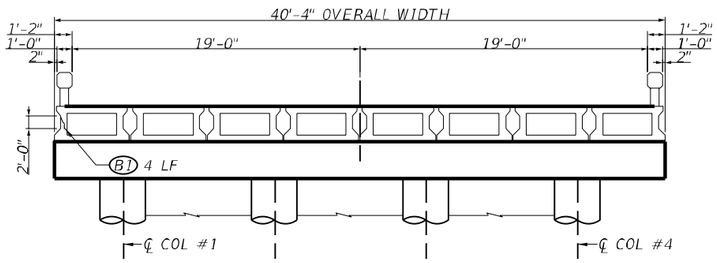

BENT 2 ELEVATION (LOOKING NORTHWEST)

NTS

REPAIR CALL-OUT LEGEND

REPAIR TYPE DESCRIPTION

K1 JOINT CLEANING AND SEALING

B1 EPOXY INJECT CRACK

NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

12/22/2020

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-03-061

14 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	58
CONT.	SECT.	JOB	
6351	25	001	

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ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	2
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	9

N

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

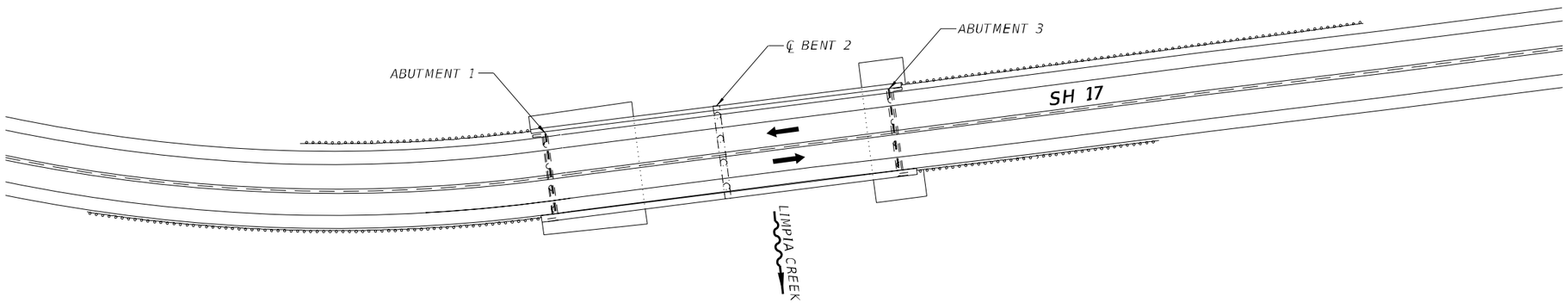
(A2) INTERMEDIATE SPALL (VERTICAL & OVERHEAD)

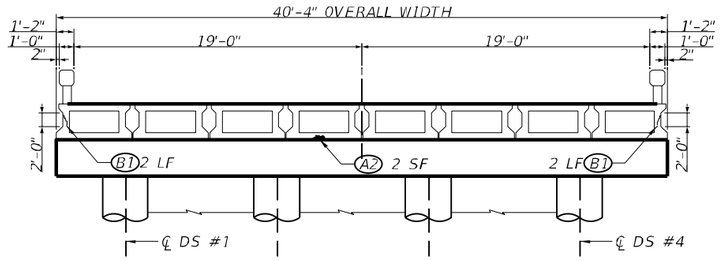
(B1) EPOXY INJECT CRACK

NOTES:

1. REFER TO BRIDGE REPAIR DETAILS FOR REPAIR INSTRUCTIONS.

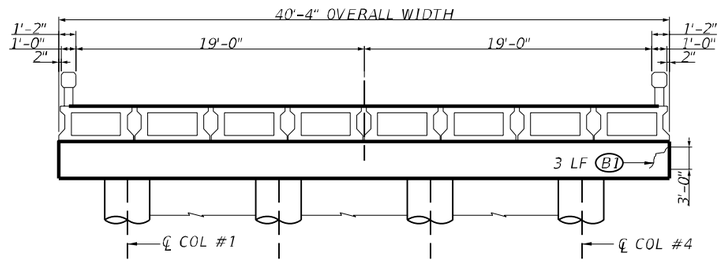
PLAN





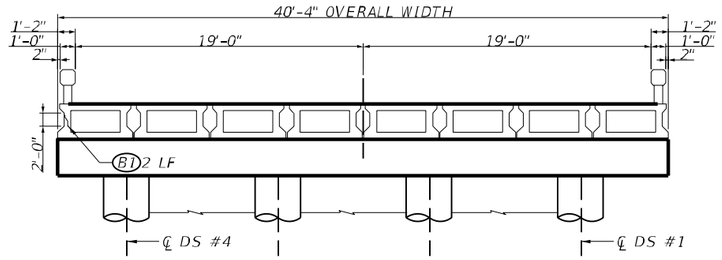
ABUTMENT 1 ELEVATION (LOOKING WEST)

NTS



BENT 2 ELEVATION (LOOKING SOUTHWEST)

NTS



ABUTMENT 3 ELEVATION (LOOKING NORTHEAST)

NTS

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez 12/22/2020

CONSOR F-12040

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BPM FY 21
SH 17 AT LIMPIA CREEK
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-03-062

15 OF 16

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIES
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	59
CONT.	SECT.	JOB	
6351	25	001	

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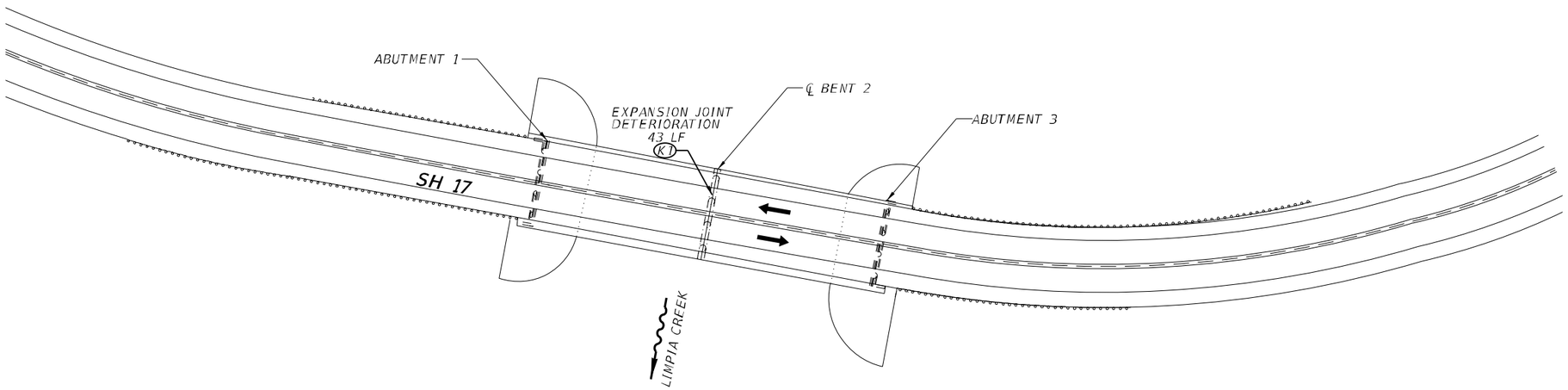
ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
438	6001	CLEANING AND SEALING EXISTING JOINTS	LF	43
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	LF	18



PLAN

REPAIR CALL-OUT LEGEND

(XX) XX XX
- XX XX — REPAIR QUANTITY UNIT
- XX XX — ESTIMATED REPAIR QUANTITY
- (XX) — REPAIR TYPE DESIGNATION - SEE BELOW

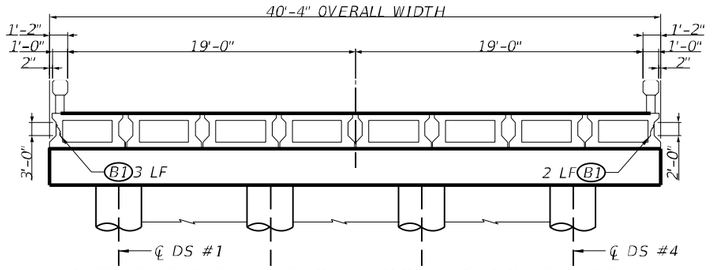
REPAIR TYPE DESCRIPTION

(K1) JOINT CLEANING AND SEALING

(B1) EPOXY INJECT CRACK

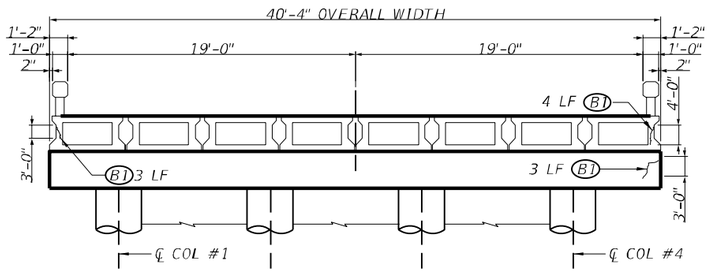
NOTES:

1. SEE "BRIDGE REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.



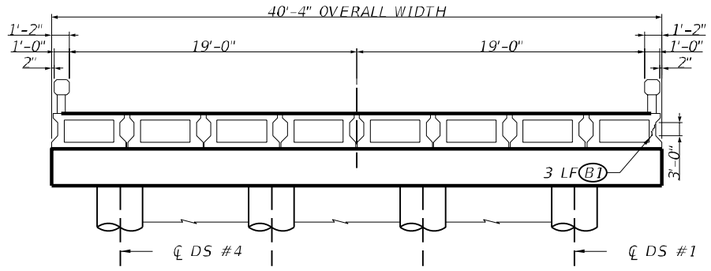
ABUTMENT 1 ELEVATION (LOOKING SOUTHWEST)

NTS



BENT 2 ELEVATION (LOOKING SOUTHWEST)

NTS



ABUTMENT 3 ELEVATION (LOOKING NORTHEAST)

NTS

SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

12/22/2020

0' 30' 60' HORZ
0' 30' 60' VERT
SCALE

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
SH 17 AT LIMPIA CREEK
BRIDGE REPAIR LAYOUT

NBI: 24-123-0-0104-03-063

16 OF 16

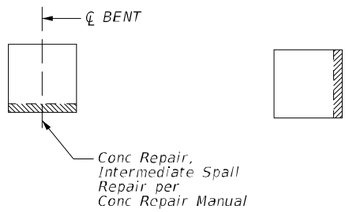
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	60
CONT.	SECT.	JOB	
6351	25	001	

FILENAME: C_ELP_BPM_BRG_14.dgn
PLOTTED: 12/22/2020 9:51:11 AM

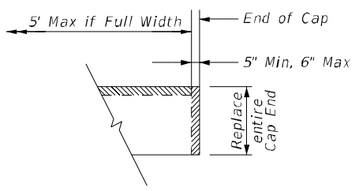
(A1) Minor Spall
1. Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.
2. Prepare detailed repair procedure in accordance with Chapter 3, Section 1 of the TxDOT Concrete Repair Manual.
3. If greater than ½ of bar is exposed, proceed as Intermediate Spall Repair.
4. Repairs are paid as Item 429 6002 Conc Str Repair (Epoxy Mortar).

(A2) Intermediate Spall (Vertical & Overhead)
1. Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.
2. Prepare detailed repair procedure in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual and Intermediate Concrete Repair Delail.
3. Trowel apply repair materials to a maximum depth of 4". Repairs deeper than 4" should be formed and poured in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual. Bagged concrete (extended) is permissible for formed and poured repairs.
4. Repairs are paid as Item 429 Concrete Structure Repair (Vertical and Overhead).
5. Applies to following scenarios.

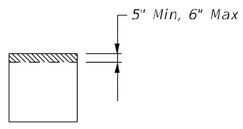


SECTION (BENT) PLAN (COLUMN/PILE)

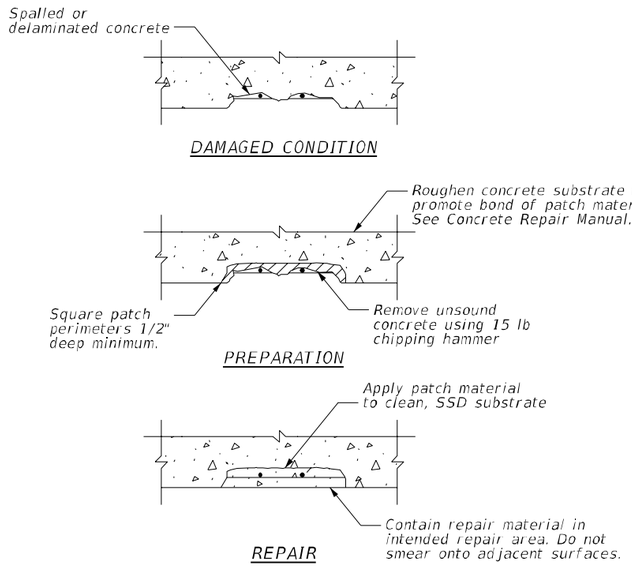
(A3) Intermediate Spall (Standard)
1. Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.
2. Prepare detailed repair procedure in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual and Intermediate Concrete Repair Detail.
3. Use batched concrete or Type D repair materials, extended with aggregate.
4. Where intermediate spalls extend full width of bent cap, perform repairs incrementally with a maximum length of 5' along cap at any time. Allow previously repaired segment fully cure prior to proceeding with addition repairs.
5. Combine repairs with less than 6" between prepared areas.
6. Provide access to Engineer to verify prepared repair areas prior to proceeding with repair.
7. Repairs are paid as Item 429 Concrete Structure Repair (Standard) for following scenarios:



SECTION (BENT)

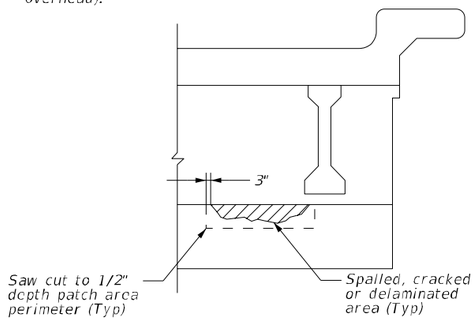


SECTION (BENT)



INTERMEDIATE CONCRETE (A2) (A3) REPAIR DETAIL

(J1) Intermediate Abutment Cap Spall
1. Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.
2. Prepare detailed repair procedure in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual and detail below.
3. Repairs are paid as Item 429 Concrete Structure Repair (Vertical and Overhead).

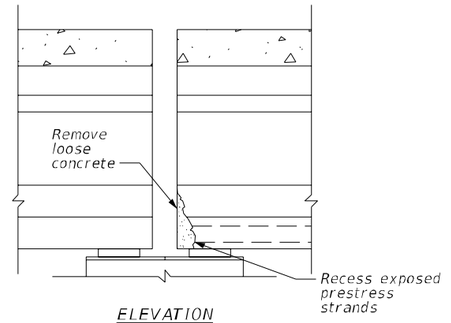


ABUTMENT CAP SPALL REPAIR

(B1) Epoxy Inject Crack
1. Perform epoxy injection in accordance with TxDOT Concrete Repair Manual, Chapter 3, Section 5 and Item 780.
2. Repairs are paid as Item 780 Concrete Crack Repair (Discrete) (Inject).

(B2) Rout & Seal Crack
1. Perform rout & seal crack repairs in accordance with TxDOT Concrete Repair Manual, Chapter 3, Section 7 and Item 780.
2. Repairs are paid as Item 780 Conc Crack Repair (Discrete) (Rout & Seal).

(C1) Minor Beam End Spall
1. Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.
2. Prepare detailed repair procedure in accordance with Chapter 3, Section 1 of the TxDOT Concrete Repair Manual and detail below.
3. If prepared area is deeper than 2" or if mild reinforcing is exposed proceed with Type C2, Intermediate Beam End Spall procedure.
4. Recess exposed prestressed strands ¾" into prepared surface using a torch or other approved method.
5. Repairs are paid as Item 429 Concrete Structure Repair (Clean and Coat with Epoxy).



ELEVATION

MINOR BEAM END SPALL (C1)

12/22/2020

SCALE: NTS

CONSOR F-12040

Texas Department of Transportation

BPM FY 21
BRIDGE REPAIR DETAILS

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	61
CONT.	SECT.	JOB	
6351	25	001	

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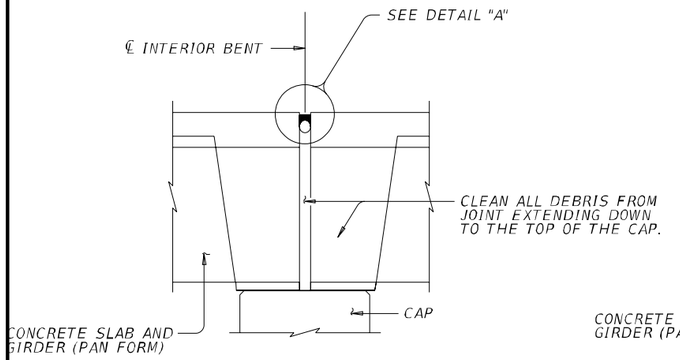
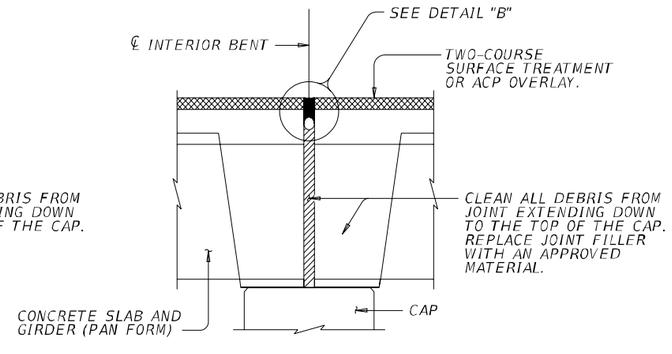


JOINT WITH
SILICONE SEAL

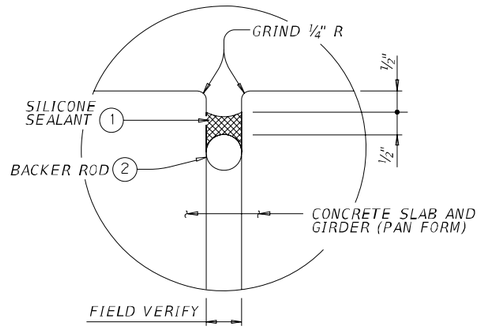
(USED WITHOUT ACP OVERLAY)



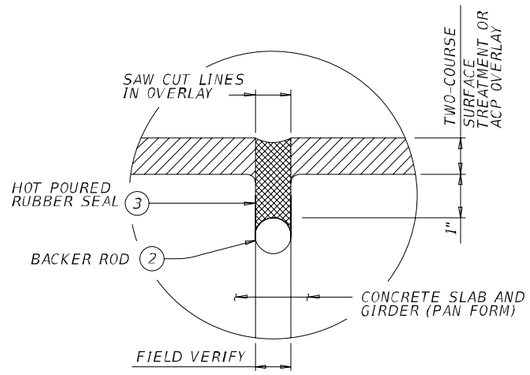
JOINT WITH
HOT POURED RUBBER SEAL

(USED WITH ACP OVERLAY)

EXISTING CONCRETE SLAB & GIRDER JOINT REPAIR



DETAIL "A"



DETAIL "B"

(1) USE CLASS 7 SILICONE SEALANT. PREPARE JOINT AND SEAL IN ACCORDANCE WITH ITEM 438 "CLEANING AND SEALING JOINTS."

(2) BACKER ROD MUST BE 25% LARGER THAN JOINT OPENING AND MUST BE COMPATIBLE WITH THE SEALANT.

(3) USE CLASS 3 HOT POURED RUBBER SEAL. PREPARE JOINT AND SEAL IN ACCORDANCE WITH ITEM 438 "CLEANING AND SEALING JOINTS."

GENERAL NOTES

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

Obtain approval for all tools, equipment, materials and techniques proposed for use to prepare the joint.

For Class 3 Hot Poured Rubber Seal, provide backer rod compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

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

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

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

(K1) PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH SILICONE SEAL:

1. Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints and Cracks". Clean joint out full depth of the joint.
2. Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3. Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening.
4. Seal the joint opening with a Class 7 Silicone. Recess seal ½" below the top of concrete in travel lanes and ⅛" below top of concrete in shoulders.

(K1) PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH HOT POURED RUBBER SEAL:

1. Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½ minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all othe deleterious materials in accordance with Item 438 "Cleaning and Sealing Joints and Cracks".
2. Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3. Place backer rod into joint opening 1" below the top of concrete. Backer rod must be of the type that can handle the heat and be compatible with the hot poured rubber seal. The backer rod must be 25% larger than the joint opening.
4. Seal the joint opening with a Class 3, "Hot Poured Rubber". Seal flush to the top of the asphaltic concrete pavement..

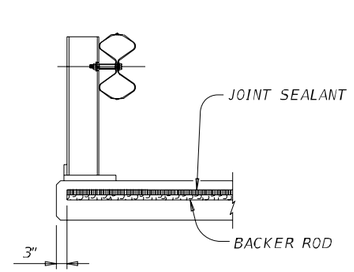
(K1) PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS:

1. Remove existing seal.
2. Abrasive blast clean existing steel surface where silicone seal is to be placed.
3. Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
4. Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening.
5. Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.

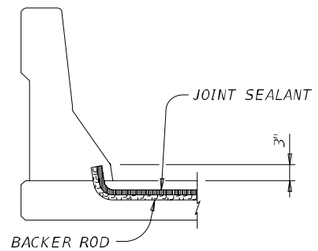
STATE OF TEXAS
SERGIO MENDEZ
121993
LICENSED
PROFESSIONAL ENGINEER

Sergio Mendez

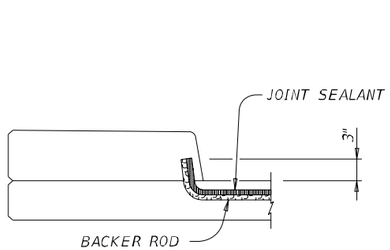
12/22/2020



SHOWN AT STEEL RAIL

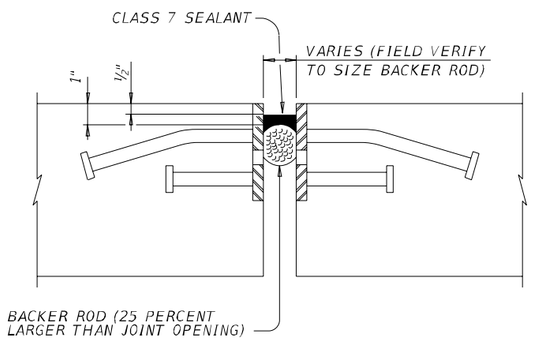


SHOWN AT BARRIER RAIL



SHOWN AT CURB

JOINT SEALANT TERMINATION DETAILS



CLEANING AND SEALING EXISTING ARMOR JOINTS

(SHOWING ARMOR JOINT SECTION)

SCALE: NTS

CONSOR
F-12040

Texas Department of Transportation

BPM FY 21
BRIDGE REPAIR DETAILS

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		VARIES

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	ELP	JEFF DAVIS, ETC.	62
CONT.	SECT.	JOB	
6351	25	001	

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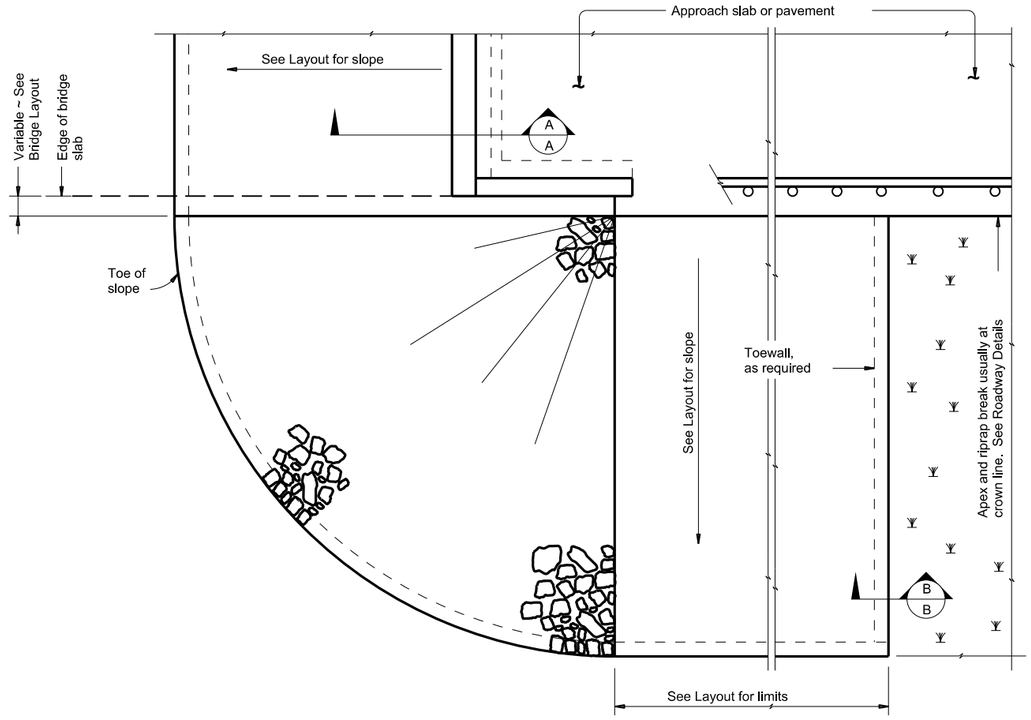
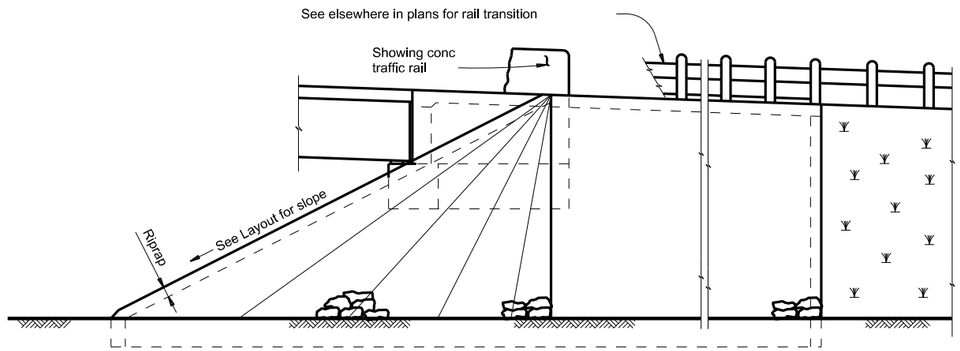
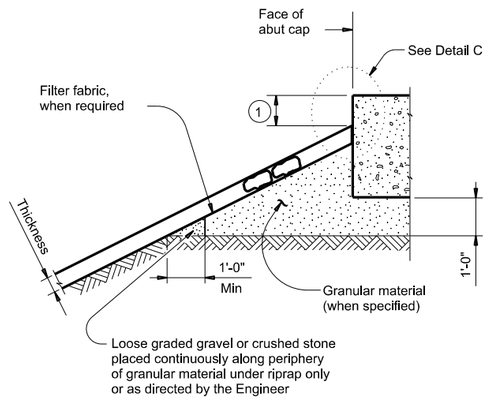


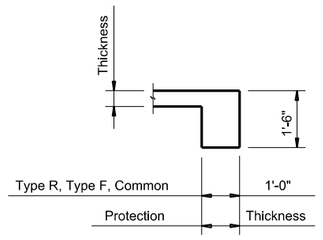
PLAN



ELEVATION

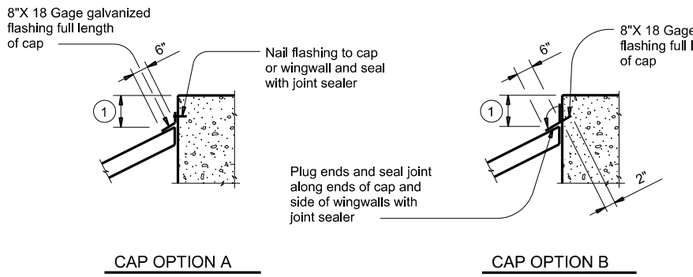


SECTION A-A AT CAP



SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:

Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.

See elsewhere in plans for locations and details of shoulder drains.

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SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		63

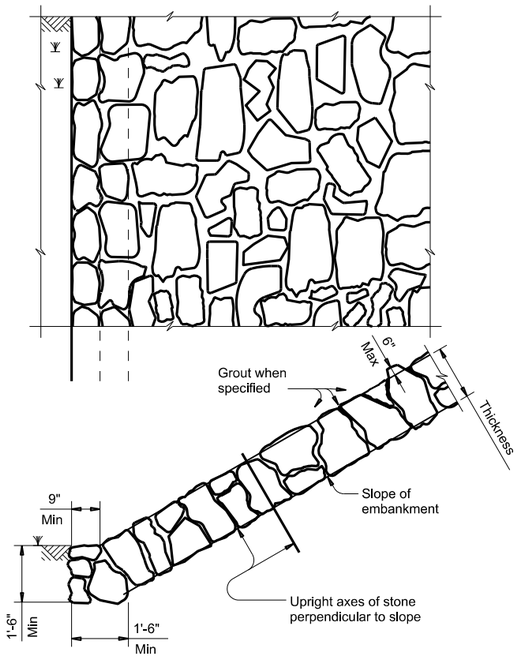


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

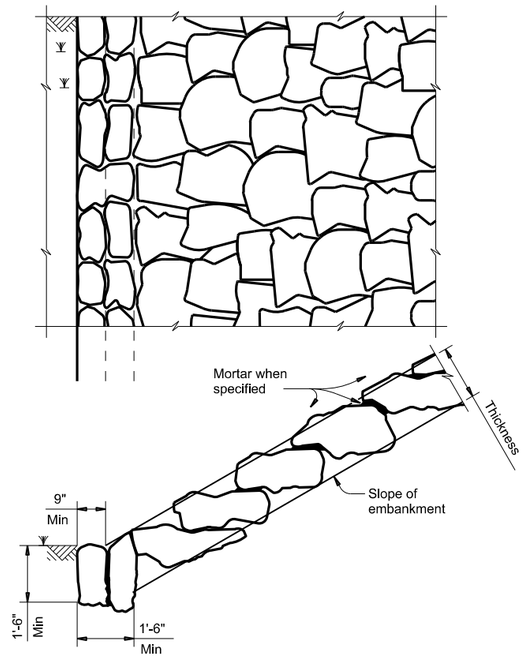


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

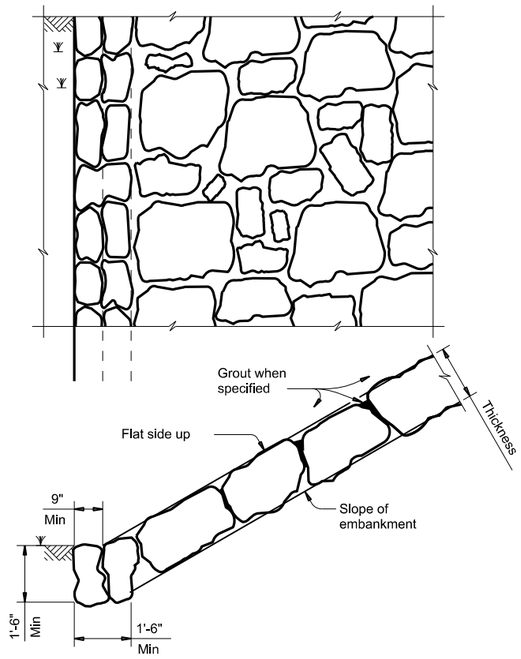


FIGURE 3 ~ TYPE F STONE RIPRAP

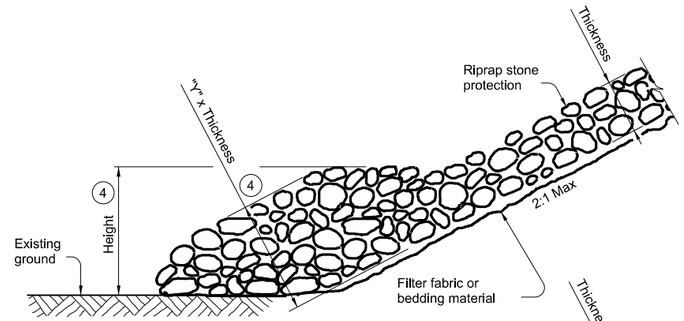
grouted

2 Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

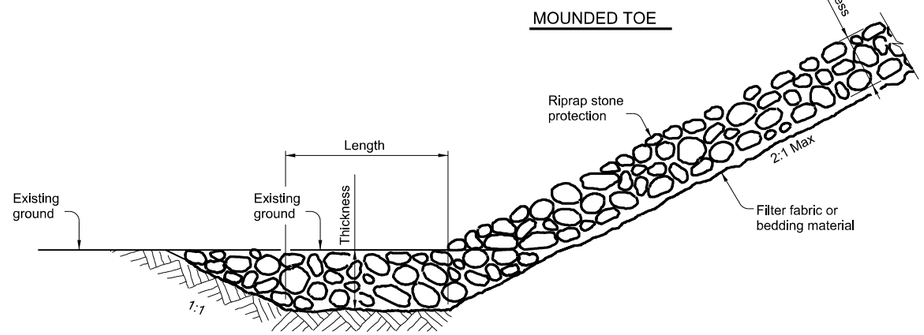
3 Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

4 "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

5 List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

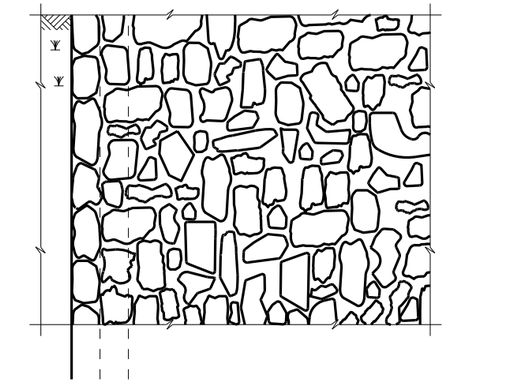


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

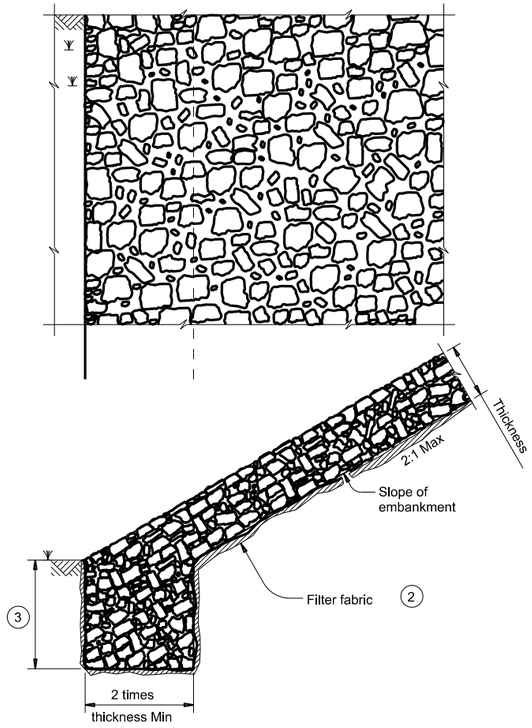


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		64

DATE: 12/23/2020 7:26:58 AM
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STORM WATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TPDES General Permit TXR150000. The operator, The Texas Department of Transportation ensures that: Project specifications provide that adequate BMPs have been developed for this project. The contractor shall be the party responsible for implementing the BMPs described herein. The contractor shall implement changes approved by the Project Engineer to the SWP3 within the times specified in the SWP3 or the TPDES General Permit. Operators affected by modifications to specifications will be notified in a timely manner.

1. SITE OR PROJECT DESCRIPTION:

NATURE OF THE CONSTRUCTION ACTIVITY: SEE TITLE SHEET

POTENTIAL POLLUTANTS AND SOURCES:

Sediment laden storm water	*Storm water conveyance over disturbed areas*
Fuels, oils, and lubricants	*Construction vehicles and storage areas*
Construction debris and waste	*Various construction activities*
Sanitary waste	*Restroom facilities*
Trash	*Construction site and Receptacles*

SEQUENCE OF ACTIVITIES THAT WILL DISTURB SOILS:

1. *REHABILITATION OF EXISTING STRUCTURES.*
2. *INSTALLATION OF STONE RIPRAP AND GABION MATTRESSES.*
3. *CHANNEL/CULVERT EXCAVATIONS AND SHAPING.*
4. *INSTALLATION OF TRAFFIC CONTROL DEVICES AND CLEAN UP SITE.*

AREAS:

TOTAL AREA OF PROJECT: N/A ACRES

TOTAL AREA OF SOIL DISTURBANCE: N/A ACRES

TOTAL AREA OFF-SITE: N/A

WEIGHTED RUNOFF COEFFICIENT (BEFORE AND AFTER CONSTRUCTION): *N/A*

DATA DESCRIBING THE SOIL: *N/A*

GENERAL LOCATION MAP: SEE TITLE SHEET

DETAILED SITE MAP: SEE SCOUR PROTECTION LAYOUT SHEETS.

THE LOCATION AND DESCRIPTION OF CONCRETE AND ASPHALT PLANTS:

Supporting Concrete Plant Facilities shall be located off site.

Supporting Asphalt Plant Facilities shall be located off site.

NAME OF RECEIVING WATERS: *VARIOUS*

A COPY OF TPDES CGP TXR150000 IS INCLUDED IN THE SWP3 FILE.

REMARKS: *See Environmental Assessment report for environmental, archeological, and historical documentation.*

401 WATER QUALITY CERTIFICATION: YES____ NO__X__

2. BEST MANAGEMENT PRACTICES (BMPs):

EROSION AND SEDIMENT CONTROLS: Erosion and sediment controls have been designed to retain sediment on-site. Controls shall be utilized to reduce off site transport of suspended sediments and pollutants if it is necessary to pump water from the site. Control measures shall be installed per specifications or as directed. Sediment must be removed from controls per the plan requirements or manufacturers recommendations, but no later than the time that design capacity has been reduced by 50%. If sediment escapes the site, accumulations will be removed to minimize further negative effects. Controls will be developed to limit the off site transportation of litter, construction debris, and construction materials.

INTERIM(INT), PERMANENT(PER), AND 401 CERTIFICATION BMP'S:

EROSION CONTROLS:	401	INT	PER
☒ *Compaction & Tracking of slopes*	__	__	__
☐ *Diversion Dike*	__	__	__
☐ *Preserve Existing Vegetation*	__	__	__
☒ *Soil Stabilization*	__	__	__
☐ *Permanent Vegetation*	__	__	__
☐ *No Erosion Controls are Required.*			

SEDIMENT CONTROLS:	401	INT	PER
☒ *Silt Fence*	__	X	__
☒ *Rock Berm*	__	X	__
☐ *Buffer Zones*	__	__	__
☐ *Vegetative Filter Strips*	__	__	__
☐ *Ditch Block*	__	__	__
☐ *Erosion Control Logs*	__	__	__

POST CONSTRUCTION TSS CONTROL (401 CERTIFICATION ONLY):

- ☐ *Vegetation Lined Drainage Ditch*
- ☐ *Retention/Irrigation*
- ☐ *Erosion Control Compost*
- ☐ *Grassy Swales*
- ☐ *Vegetative Filter Strips*
- ☒ *No Post Construction TSS Control Required.*

SEQUENCE OR SCHEDULE OF IMPLEMENTATION:

1. *Install initial storm pollution prevention measures, i.e. silt fencing, rock berms.*
2. *Perform bridge repairs.*
3. *Perform erosion control repairs.*
4.
5.
6.

The El Paso District of the Texas Department of Transportation uses Site-Manager, a computer based construction record-keeping system. Documentation describing major grading activities, temporary or permanent cessation of construction, and stabilization measures is a part of this system and is incorporated by reference into this SWPPP.

Stabilization measures must be initiated within 14 days when practicable in portions of the site where construction has temporarily or permanently ceased, if earth disturbing activities will not be resumed within 21 days.

3. STRUCTURAL CONTROL PRACTICES:

Structural control practices for this project are listed elsewhere herein.

4. PERMANENT STORM WATER CONTROLS:

Structural control practices installed during construction will be maintained and inspected after construction has ceased on the site and until final stabilization is attained. Unless specified in the plans, after project acceptance TxDOT will assume maintenance responsibilities for the controls and measures. Other permanent controls include existing and proposed; riprap at culvert inlets and outlets, diversion dikes, swales, retaining walls, and other similar devices.

5. OTHER CONTROLS:

OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST: The off site vehicle tracking of sediments shall be minimized by removal of excess dirt from the road and at entrances to the work site. The generation of dust will be minimized as directed by the Project Engineer by dampening haul roads and covering haul trucks with a tarpaulin.

CONSTRUCTION AND WASTE MATERIALS: The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and Local waste management guidelines. No construction waste will be buried or burned on site. Spoils disposal, material storage, and materials resulting from the destruction of existing roads and structures shall be stored in areas designated by the Project Engineer and protected from run-off. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work, piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

POLLUTANT SOURCES FROM AREAS OTHER THAN CONSTRUCTION: Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants. If potential pollutant sources are identified after the start of construction, controls and measures shall be implemented as directed by the Project Engineer.

5. OTHER CONTROLS (CONT):

DEDICATED ASPHALT PLANTS: Asphalt or asphaltic material for this project will be produced off site. If the project requires a dedicated asphalt plant and the plant within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer.

DEDICATED CONCRETE PLANTS: Cement or Concrete material for this project will be produced off site. If the project requires a dedicated concrete plant and the plant is within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer. Concrete trucks shall be wasted or washed out in locations designated by the Project Engineer. The locations shall be protected by a berm sufficient to contain all waste and wash water. Wash water shall not be allowed to enter any storm drainage system or waterway. The residual material and contaminated soil shall be collected and disposed of in accordance with Federal, State, and Local guidelines. Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants.

HAZARDOUS MATERIALS AND SPILL REPORTING: The contractor shall take appropriate measures to prevent, minimize, and control the spillage or leakage of hazardous materials and any associated wastes on site and in maintenance and staging areas. hazardous materials shall include but are not limited to paints, acids, solvents, asphalt products, chemical additives, curing compounds, oils, fuels, and lubricants. Hazardous materials shall not be stored, accumulated, or transported in open containers subject to precipitation or spillage, but shall be stored, accumulated, or transported in closed containers of the type recommended by the manufacturer. In the event of a spill the Project Engineer should be contacted immediately. All spills shall be immediately cleaned and any contaminated soil removed and disposed of in accordance with Local, State, and Federal laws. Fuel tanks shall be protected by a secondary containment, such as a lined berm, capable of containing 1.5 times the capacity of the tank, or as approved by the Project Engineer.

OFF SITE PSLs: All off site project specific locations including dedicated asphalt plants, concrete plants, or utility installations, required by the contractor, are the contractor's responsibility. The contractor shall secure all permits required by local, state, or federal laws for off site PSLs. The contractor shall provide diagrams and areas of disturbance for all PSL's within 1 mile of the project.

SANITARY FACILITIES: All sanitary or septic wastes that are generated onsite shall be treated and disposed of in accordance with state and local regulations. Raw sewage or septage shall not be discharged or buried on site. Precaution shall be taken to prevent illicit discharges to storm water. Licensed waste management contractors shall be required to dispose of sanitary waste. Porta johns will be required for the construction site or as directed by the Project Engineer.

VELOCITY DISSIPATION DEVICES: Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as shown in the plans or as directed by the Project Engineer to provide a non-erosive flow velocity from the structure to a watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

6. APPROVED STATE AND LOCAL PLANS:

This SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or permits approved by federal, state, or local officials.

7. MAINTENANCE:

Control measures shall be properly installed according to specifications. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must replace or modify the control as soon as practicable after discovery. Control measures shall be maintained in effective operating condition. If inspections determine that BMPs are not operating effectively maintenance will be performed as necessary to continue the effectiveness of the controls. Maintenance must be accomplished as soon as practicable. Controls adjacent to creeks, culverts, bridges, and water crossings shall have priority. Controls that have been disabled, run over, removed, or otherwise rendered ineffective must be corrected immediately upon discovery.

8. INSPECTION OF CONTROLS:

A TxDOT inspector will inspect disturbed areas of the site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion controls measures identified in the SWP3 will be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site will be inspected for evidence of off-site vehicle tracking. Inspections will be conducted every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. The SWP3 will be modified based on the result of these inspections. Revisions will be completed within 7 Calendar days following the inspection. Revised implementation schedules will be described in the SWP3 and implemented as soon as practicable. Rain gages will be maintained on site for the duration of the project. Reports summarizing the scope of the inspections are included in the SWP3 file.

9. NON-STORM WATER COMPONENTS:

The contractor shall be required to implement appropriate pollution prevention controls and measures for all eligible non-storm water components of the discharge as approved and directed by the Project Engineer.

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

REV: 01-25-05

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

12/23/2020

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			65
STATE	STATE DIST.	COUNTY	
TEXAS	ELP	JEFF DAVIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6351	25	001	VARIES

SWP3 Notes.dgn

During the planning phase of project development the following environmental permits, issues and commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities, as additional environmental clearances may be required.

I. Clean Water Act, Section 402 Texas Pollutant Discharge Elimination System

(Addresses MS4 requirements for project)

☐ ☒ Required Action

Action No.	Waters of the US/Station # R/L of Centerline	Commitment
1.	NOI Required	
2.		
3.		
4.		
5.		

II. Clean Water Act, Section 401 and 404 Compliance

Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet areas is prohibited unless specified in the USACE permit and approved by the Engineer.

☐ ☒ 404 Permit and 401 Certification Required

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

Permit	Required Action	Waters of the US	Applicable Plan Sheet Title
1.	NWP 14 at Locations 2, 3, 11, and 12 without PCN		
2.	NWP 14 at Locations 6, 7, 8, 9, and 10 with PCN		
3.	No permits for Locations 1, 4, 5, 13, and 14		
4.			
5.			

III. Cultural Resources

☒ No Action Required ☐ Required Action

Action No.	Station # R/L of Centerline	Commitment
1.		Work will stop if evidence of archeological deposits is encountered during construction.
2.		
3.		
4.		
5.		

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.

IV. Hazardous Materials or Contamination Issues

☒ No Action Required ☐ Required Action

Action No.	Station # R/L of Centerline	Commitment
1.		Appropriate measures to manage and contain any previously undiscovered hazardous materials encountered
2.		Take appropriate measures to prevent , minimize, and control the spill of hazardous materials in staging areas.
3.		All materials removed and/or disposed of by the contractor will be done in accordance w/ state and federal laws and by approval of TX DOT.
4.		
5.		

If potentially hazardous material and/or contaminated media (i.e. soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, cease work in the immediate area and contact the Engineer immediately.

V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds

☒ No Action Required ☐ Required Action

Action No.	Station # R/L of Centerline	Commitment
1.		Minimize the amount of wildlife habitat disturbed.
2.		Where possible native species of shrubs and trees will be replanted.
3.		Efforts will be made to avoid impacts to nests and eggs of migratory birds during construction.
4.		
5.		

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.

VI. Vegetation Resources

☒ No Action Required ☐ Required Action

Action No.	Station # R/L of Centerline	Commitment
1.		Minimize the amount of wildlife habitat disturbed.
2.		
3.		
4.		
5.		

VII. Edwards Aquifer

☒ No Action Required ☐ Required Action

Action No.	Station # R/L of Centerline	Commitment
1.		
2.		
3.		
4.		
5.		

VIII. Other Environmental Issues

☒ No Action Required ☐ Required Action

Action No.	Station # R/L of Centerline	Commitment
1.		Make reasonable efforts to minimize construction noise.
2.		
3.		
4.		
5.		

The above commitments, issues and permit conditions have been addressed and / or incorporated into the Plans.

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

12/23/2020 , P.E.

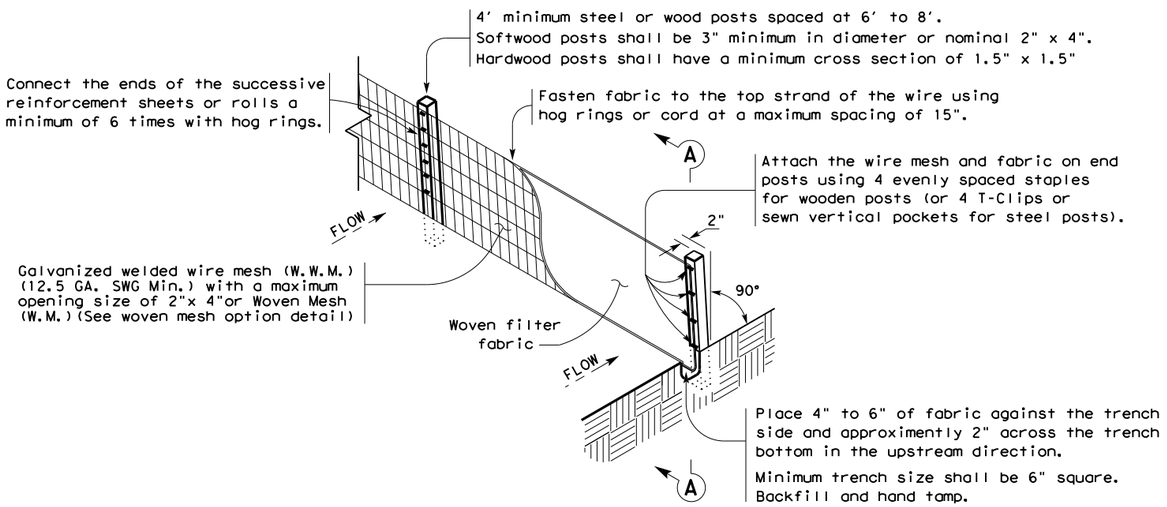
 Texas Department of Transportation
El Paso District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED. RD. DIV. NO.			HIGHWAY NO.
6			VARIES
STATE	DISTRICT	COUNTY	
TEXAS	ELP	JEFF DAVIS, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
6351	25	001	66

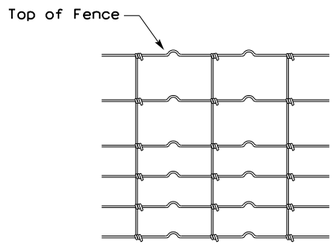
Note To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from it's relative position.

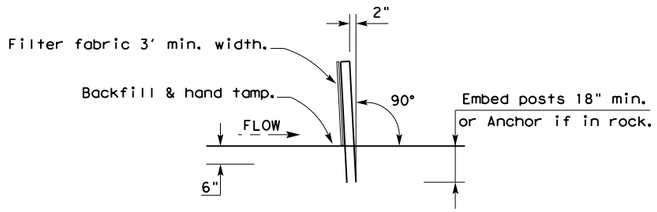
Revised 9-08-03



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

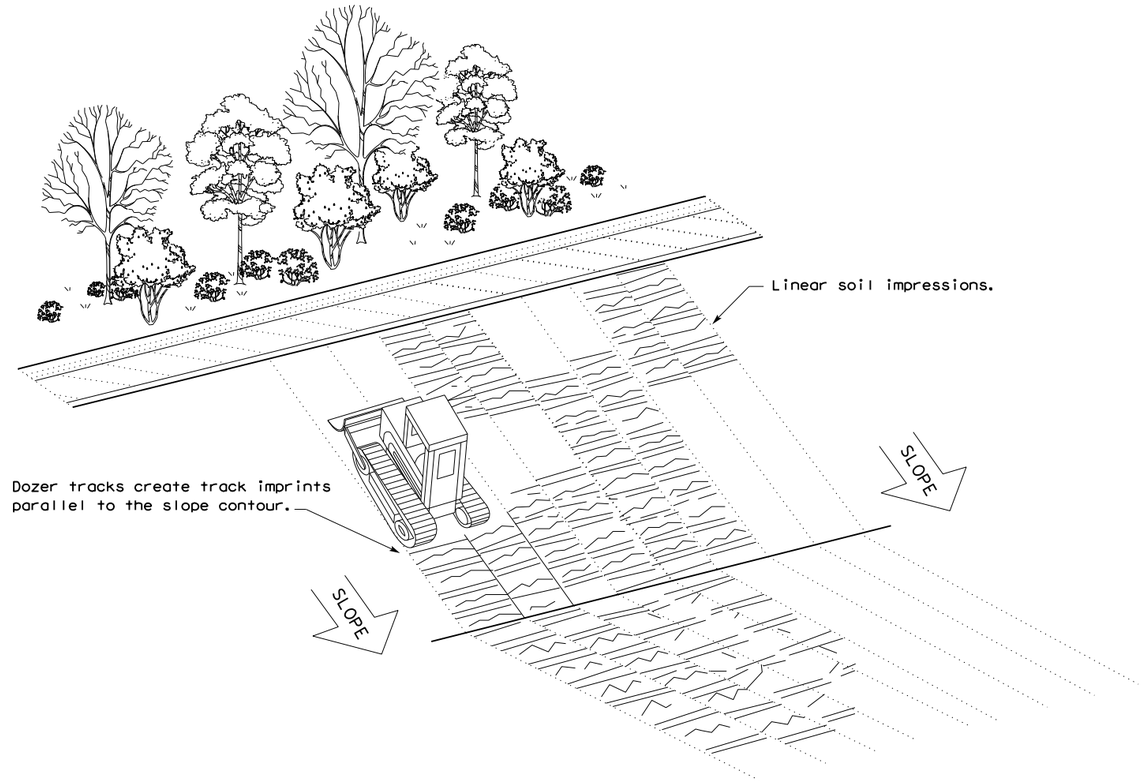
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

SHEET 1 OF 1

Texas Department of Transportation

Design Division Standard

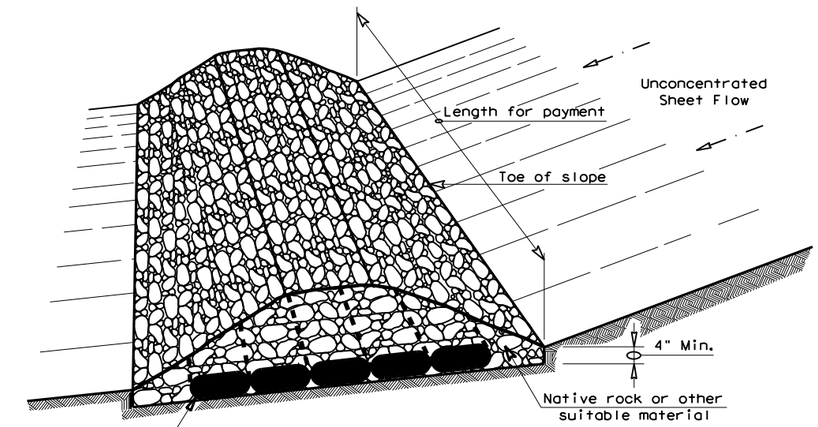
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

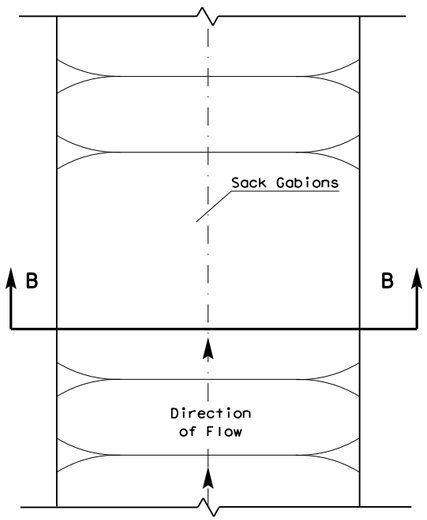
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	6351	25	001	VARIES
	DIST	COUNTY		SHEET NO.
	ELP	JEFF DAVIS, ETC.		67

DATE: 12/23/2020
FILE: c:\pwworking\kho\pwprod\elaine.garcia\d0116336\EC(2)-16.dgn

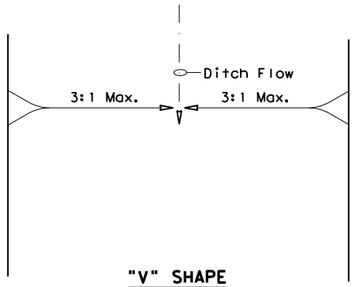


FILTER DAM AT TOE OF SLOPE

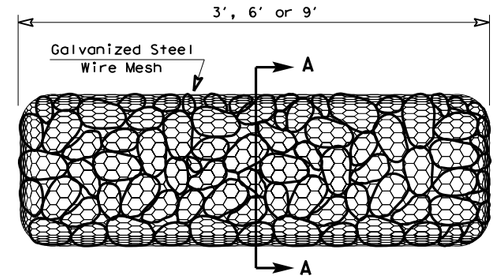
RFD1



PLAN VIEW



"V" SHAPE PLAN VIEW

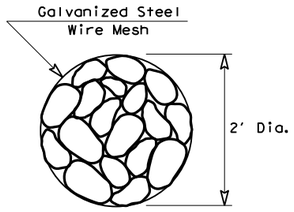


TYPE 4 (SACK GABIONS)

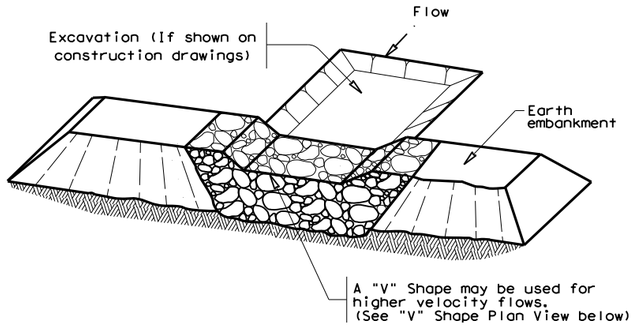
RFD4

¾" Dia.
Rebar Stakes

SECTION B-B

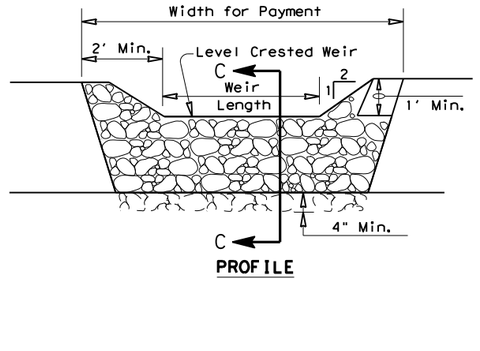


SECTION A-A

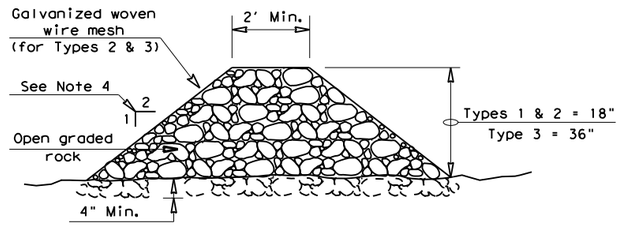


FILTER DAM AT SEDIMENT TRAP

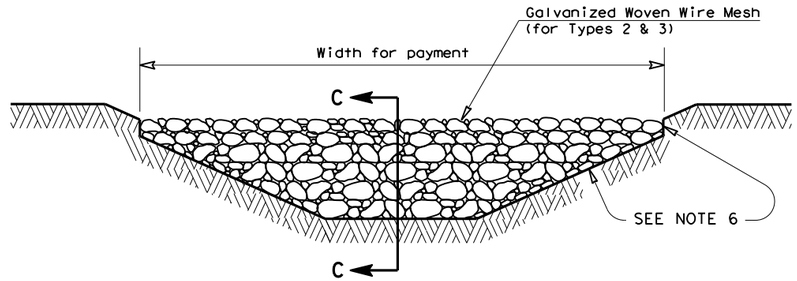
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam — RFD1
Type 2 Rock Filter Dam — RFD2
Type 3 Rock Filter Dam — RFD3
Type 4 Rock Filter Dam — RFD4

SHEET 1 OF 1

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	6351	25	001		VARIES		
	DIST	COUNTY			SHEET NO.		
	ELP	JEFF DAVIS, ETC.			68		