

FHWA TEXAS DIVISION			SHEET NO.
			1
STATE	DISTRICT	COUNTY	
TEXAS	PAR	LAMAR, ETC	
CONTROL	SECTION	JOB	HIGHWAY NO.
0901	29	091, ETC	CR, ETC.

INDEX OF SHEETS
 SEE SHEET 2 FOR INDEX OF SHEETS AND SHEET 3 FOR LOCATION MAP

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT.
 BR 2021 (303), ETC.

CR 15100, ETC. LAMAR COUNTY, ETC.

LIMITS: CR 15100 AT BRANCH OF CUTHAND CREEK
 LIMITS: CR 3440 AT JENNINGS CREEK

FOR THE CONSTRUCTION OF: BRIDGE REPLACEMENT
 CONSISTING OF: BRIDGE REPLACEMENT

FINAL PLANS

LETTING DATE: _____
 DATE CONTRACTOR BEGAN WORK: _____
 DATE WORK WAS COMPLETED: _____
 DATE WORK WAS ACCEPTED: _____
 ORIGINAL CONTRACT WORKING DAYS: _____
 USED _____ OF _____ WORKING DAYS
 NO. OF CHANGE ORDERS: _____
 FINAL CONTRACT COST: _____
 PERCENT OVER/UNDER RUN: _____
 CONTRACTOR: _____

ROAD NAME	LOCATION	CSJ	PROJECT NO.	COUNTY	STATIONING		BRIDGE LENGTH		ROADWAY LENGTH		TOTAL LENGTH		DESIGN SPEED	CURRENT	ADT YEAR	FUTURE	ADT YEAR	FUNCTIONAL
					BEGIN	END	FEET	MILES	FEET	MILES	FEET	MILES	MPH	ADT		ADT		CLASSIFICATION
CR 15100	BRANCH OF CUTHAND CREEK	0901-29-091	BR 2021 (303)	LAMAR	2+56	6+15	50	0.009	309	0.059	359	0.068	15 MPH	60	2010	85	2030	LOCAL
CR 3440	JENNINGS CREEK	0901-31-132	BR 2021 (132)	DELTA	0+00	3+41	50	0.009	291	0.055	341	0.065	15 MPH	10	2010	60	2030	LOCAL

I CERTIFY THAT THIS PROJECT WAS BUILT IN ACCORDANCE WITH PLANS AND SPECIFICATIONS.

AREA ENGINEER _____ DATE _____

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



SUBMITTED FOR LETTING: Jan. 4, 2022

Monte R. Pate P.E.
 DESIGN ENGINEER

RECOMMENDED FOR LETTING: 1/4/2022

Amiel H. Taylor P.E.
 AREA ENGINEER

APPROVED FOR LETTING: 1/5/2022

Noel Paramanathan
 DISTRICT ENGINEER

CONCURRENCE: 1/4/2022

Brandon Bell
 LAMAR COUNTY JUDGE

CONCURRENCE: 1/4/2022

Jason Murray
 DELTA COUNTY JUDGE

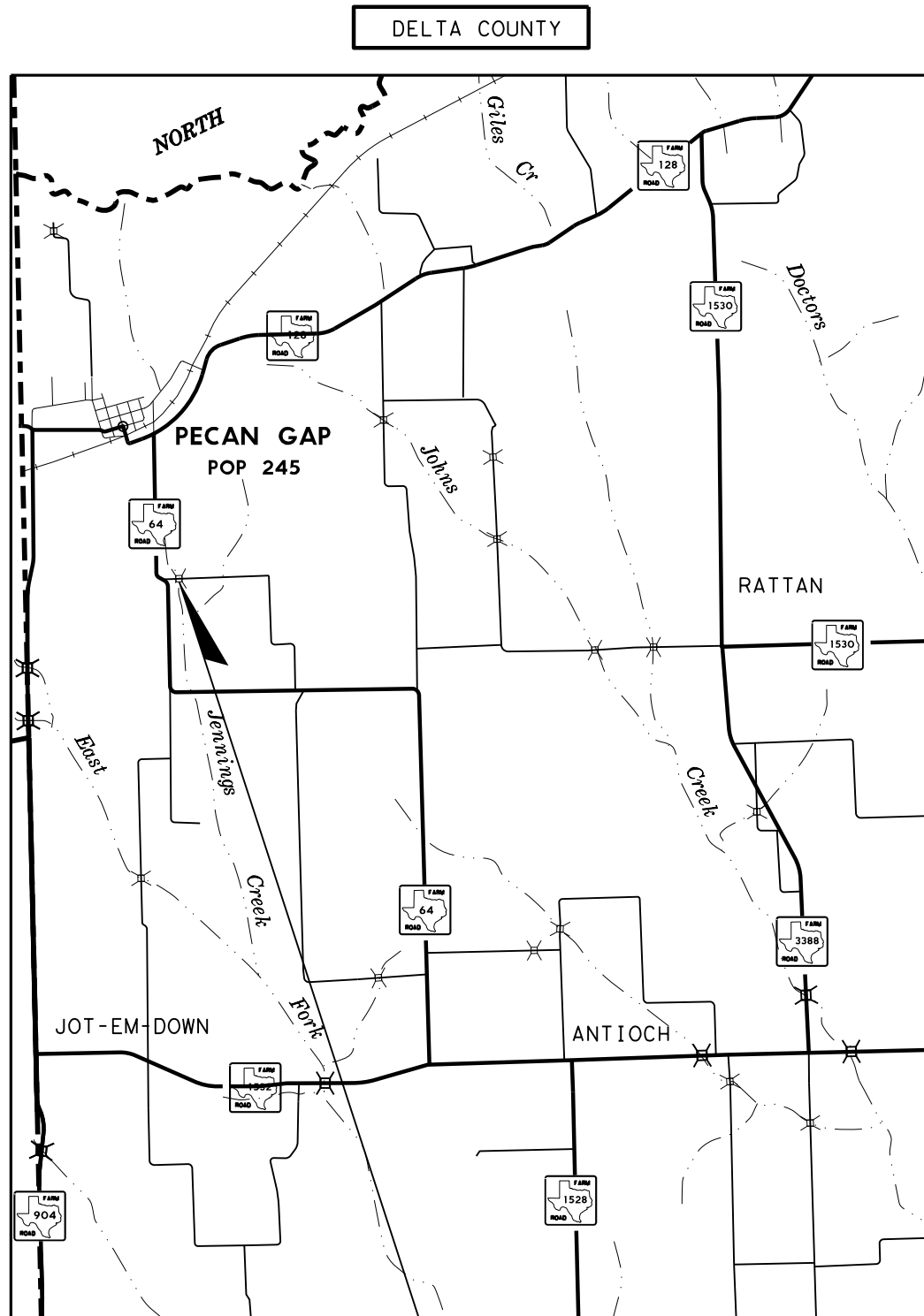
EXCEPTIONS: N/A
 EQUATIONS: N/A
 RAILROAD CROSSINGS: N/A

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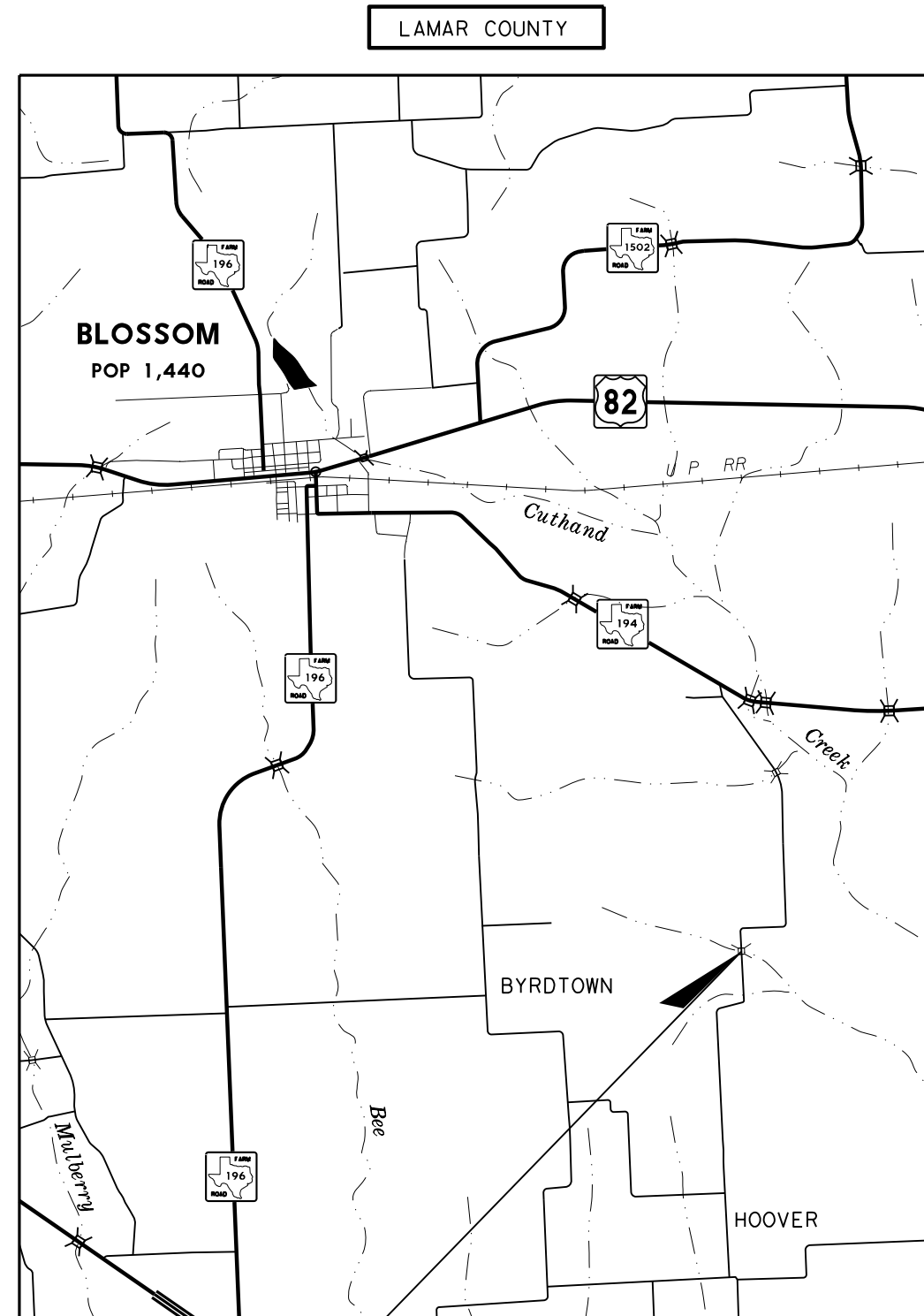
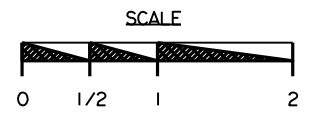
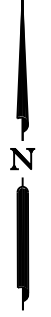
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012)

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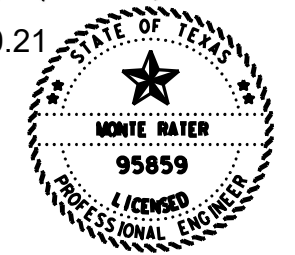


PROJECT LOCATION:
 CR 3440 @ JENNINGS CREEK
 CSJ: 0901-31-132
 EXISTING NBI: 01-060-AA01-13-001
 BEGIN CSJ: STA 0+00
 END CSJ: STA 3+03

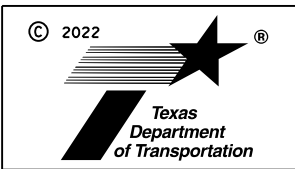


PROJECT LOCATION:
 CR 15100 @ BRANCH OF CUTHAND CREEK
 CSJ: 0901-29-091
 EXISTING NBI: 01-060-AA01-13-001
 BEGIN CSJ: STA 2+56
 END CSJ: STA 6+15

Monte R. Rater P.E.
 12.30.21



CR 15100 @ CUTHAND CREEK
0901-29-091, ETC
 LOCATION MAPS



CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		3

County: Lamar, Etc.

Control: 0901-29-091, Etc.

Highway: CR, Etc.

Sheet:

GENERAL NOTES

General:

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

Paris Area Office

Daniel Taylor - Daniel.Taylor@txdot.gov

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

All contractor questions will be reviewed by the Engineer. 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%20Responses/>

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

Earthwork cross sections may be obtained from the Area Engineer's office.

Dispose of waste materials at an approved site. Furnish written approval from the property owner before disposal of waste materials.

Locate equipment a minimum of 30 feet from roadway when possible. Place signs and barricades as approved.

Stockpile sites for construction materials must be approved. Give at least 48 hours notification prior to stockpiling material.

Item 2 Instructions to Bidders:

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

<http://www.txdot.gov/business/letting-bids/plans-online.html>

Order plans from any of the plan reproduction companies shown on the web at:

<http://www.txdot.gov/business/letting-bids/repro-companies.html>

Item 5 Control of the Work:

The responsibility for the construction surveying on this contract will be in accordance with Section 5.9.3, Method A.

Working days will be computed and charged in accordance with Article 8.3.1.4 Standard Work Week.

County: Lamar, Etc.

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Sheet: 4

Right and left are determined based upon the forward direction of stationing in the specific control section.

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

Item 7 Legal Relations and Responsibilities:

No significant traffic generator events identified.

Item 8 Prosecution and Progress:

Before beginning work on this project submit in writing, for approval, a plan of construction operations outlining in detail a sequence of work to be followed.

Provide a Bar Chart progress schedule for this project.

Item 9 Measurement and Payment:

Items of work for the Monthly Estimate will be cut off on the 25th of each month. Items of work performed after the 25th will be processed and paid on the following month's estimate. Material On Hand (MOH) will cut off on the 20th of each month. Special circumstances will be considered on a case by case basis.

Item 100 Preparing Right of Way:

Remove all trees 20 foot from centerline on both sides of roadway. At cross structures, remove trees to ROW line and within 100' of the structure, parallel to the roadway. Remove underbrush and neatly trim trees and overhanging branches to produce a 60' vertical clear area within the limits of Prep ROW. Remove any trees or underbrush that interferes with any construction operation, including relocation of ditches or other drainage elements. Receive approval of equipment used to trim limbs. A boom axe will not be allowed. Remove all trimmed debris from the ROW or mulch all debris and incorporate into the topsoil on State ROW to the satisfaction of the Engineer.

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Sheet:

Item 110 Excavation:

Before excavation operations the existing topsoil shall be salvaged in a manner to preserve the vigor of the existing Bermuda grass sod per Item 160.

Item 132 Embankment:

Test potential embankment sources using Tex-145-E to determine the presence and concentration of sulfates. Do not bring soil with greater than 3000 ppm sulfates into project.

Excavation pits for project embankment made within 250 feet of State Right of Way must be approved.

Before embankment operations the existing topsoil shall be salvaged in a manner to preserve the vigor of the existing Bermuda grass sod per Item 160.

Item 164 Seeding for Erosion Control, 166 Fertilizer:

Apply fertilizer with a ratio of 3-1-2 (N-P-K) over the areas to be seeded. This work will not be paid for directly, but will be considered subsidiary.

Item 168 Vegetative Watering:

Use water trucks equipped with a sprinkler system adequate to permit coverage of the entire seeded area from the roadbed. This equipment must be available to perform watering throughout the duration of vegetative establishment.

Water all seeded areas the day seed is applied. Thereafter, maintain the seeded areas in a well-watered condition throughout the duration of vegetative establishment.

Item 247 Flexible Base:

Grading requirements

Tests to be in accordance with TxDOT Standard Test Methods

Soil Constants

Item Desc.	Linear Shrinkage	LL	Wet Ball	WBMV(incr. passing #40 sieve)
Item 247 Flex Base	6.0 max.	40 max.	40 max.	20% max.

PERCENT RETAINED ON SIEVE:

1-3/4"	7/8"	3/8"	No. 4	No. 40
0	10-35	30-50	45-65	70-85

Flexible Base will not contain more than 1% by weight of clay balls.

Place blue top hubs for alignment and elevations of new base at centerline and edge of pavement.

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Highway: CR, Etc.

Sheet: 4A

Item 416 Drill Shaft Foundations:

One core hole per bent/abutment required.

Item 420 Concrete Structures:

Do not use membrane curing for structural elements.

The Type "A" joint as detailed in the plans will be subsidiary to this Item and no further payment will be made.

Item 421 Hydraulic Cement Concrete:

TY A expansion joint is subsidiary to Item 421

Item 422 Concrete Superstructures:

Saw-cut grooves on bridge deck are not required.

Item 432 Riprap:

The Engineer may adjust placement of riprap in the field.

Filter fabric is required for stone riprap.

Bridge demolition waste concrete may be used for stone rip rap. Cut protruding rebar within 2" of concrete surface. Maximum waste concrete cobble size shall match proposed stone rip rap Dmax size.

Item 496 Removing Structure:

The Contractor shall coordinate with the county commissioner for transferring salvageable materials such as beams, piling, and concrete riprap. The Contractor shall dispose of remaining materials.

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Control: 0901-29-091, Etc.

Highway: CR, Etc.

Sheet:

Item 502 Barricades, Signs and Traffic Handling:

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

The following items will be required for flagger on this project:

1. Flaggers are required to wear a white hard hat while performing flagging operations.
2. Flaggers will be required at the intersection of all State maintained roadways.
3. Flaggers may be required at other high traffic generating intersections as deemed necessary by the Area Engineer.

The traffic control plan for this contract consists of the installation and maintenance of warning signs and other traffic control devices shown in the plans, specification data which may be included in the general notes, applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD), traffic control plan sheets included in the plans, standard BC sheets and Item 502 of the Standard Specifications.

Do not begin Item 502, Barricades, Signs, and Traffic Handling, on the roadway until both of the following conditions are met:

1. The work schedule is approved.
2. No more than 5 workdays will pass between the beginning of Item 502 and the actual commencement of roadway work bid items.

The final estimate will be withheld until all disturbed areas are covered with at least 70% perennial vegetative cover.

Correct all deficiencies within the time frame noted on the Traffic Control Device Inspection Form 599. Failure to make corrections within time frame specified may result in no payment for this Item for the month of the noted deficiency.

Item 506 Temporary Erosion, Sedimentation & Environmental Controls:

The Temporary Erosion Control measures for this project will consist of using the following items, as directed:

1. Temporary Silt Fence
2. Rock Filter Dams: All rock filter dams shall be installed with 6:1 slopes regardless of their location on the project. Failure to do so will result in no payment for the dam.

Silt fences will remain the property of the Contractor upon completion of the project. The final estimate will not be released until all silt fences have been properly removed, or as directed and 70% establishment of vegetative cover is obtained.

County: Lamar, Etc.

Control: 0901-29-091, Etc.

Highway: CR, Etc.

Sheet: 4B

Acquire approval for any change to the location of temporary sediment fence, as shown in the plans, prior to installation. Placement of erosion protection devices may be altered, as directed, to satisfy the requirements of the SW3P.

The pay item to remove rock filter dams will require only a partial removal after 70 percent perennial vegetation has been established and approved. When removing the rock filter dams, leave the lower layer of rock adjacent to the ground in place so as not to disturb the soil.

Refer to the SW3P sheet for the total disturbed area for the project.

The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs) within one mile of the project limits will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within one mile of the project limits exceeds five acres, provide a copy of the Contractors NOI for PSLs on the ROW (to the appropriate MS4 operator when on an off-system route).

Item 540 Metal Beam Guard Fence:

MBGF delineation shall be installed within ten (10) working days of the completion of each MBGF section. Concrete mow strip is not considered to be a part of this work.

Removed MBGF rail shall be retained by the Contractor.

Provide steel posts for Thrie beam transitions.

Item 644 Small Roadside Sign Support and Assemblies:

Upon removal of sign assemblies, deliver sign faces to TxDOT office at; 3600 SW Loop 286, Paris TX. Dispose of foundations, posts, and hardware.

Use the Southern Plains style triangular slip base for all post types.

Remove the existing city street and county road topper from city and county signs and install on the new city street and county road stop sign assemblies. This work will be subsidiary to Item 644.

Stake proposed sign locations and obtain Engineer's approval of locations prior to placing foundations.

Contact the Engineer to obtain updated curve travel speeds before manufacture of curve speed warning signs.



CONTROLLING PROJECT ID 0901-29-091

DISTRICT Paris
HIGHWAY CR

Estimate & Quantity Sheet

COUNTY Delta, Lamar

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	100-6002	PREPARING ROW	STA	8.000	
	110-6001	EXCAVATION (ROADWAY)	CY	78.000	
	110-6002	EXCAVATION (CHANNEL)	CY	298.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	623.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY	938.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY	938.000	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	SY	1,876.000	
	168-6001	VEGETATIVE WATERING	MG	13.000	
	169-6003	SOIL RETENTION BLANKETS (CL 1) (TY C)	SY	263.000	
	247-6064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	1,543.000	
	400-6005	CEM STABIL BKFL	CY	80.000	
	416-6002	DRILL SHAFT (24 IN)	LF	261.000	
	420-6013	CL C CONC (ABUT)	CY	44.600	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	2,600.000	
	425-6012	PRESTR CONC SLAB BEAM (5SB15)	LF	494.210	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	360.000	
	450-6019	RAIL (TY T631LS)	LF	248.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	2.000	
	500-6001	MOBILIZATION	LS	1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	72.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	72.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	266.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	266.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	788.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	788.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	200.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	8.000	
	552-6003	WIRE FENCE (TY C)	LF	255.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	1.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	24.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	

ESTIMATE & QUANTITY



DISTRICT	COUNTY	CCSJ	SHEET
Paris	Lamar	0901-29-091	5

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- 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).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:


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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

- Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
- Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

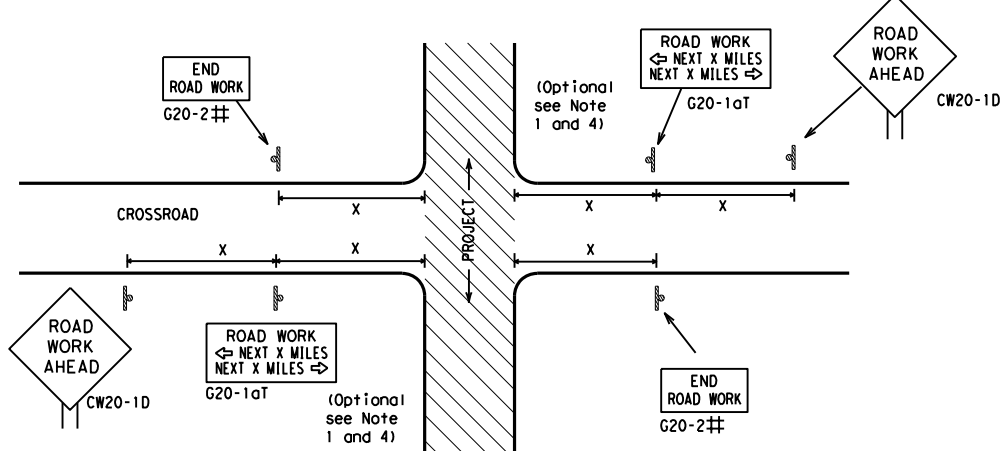
THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS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

SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC (1) - 21			
FILE:	bc-21.dgn	DN:	TxDOT
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		DW:	TxDOT
		CK:	TxDOT
REVISIONS	CONT	SECT	JOB
4-03 7-13	0901	29	091, ETC
9-07 8-14			CR, ETC
5-10 5-21	DIST	COUNTY	SHEET NO.
	PAR	LAMAR, ETC	6

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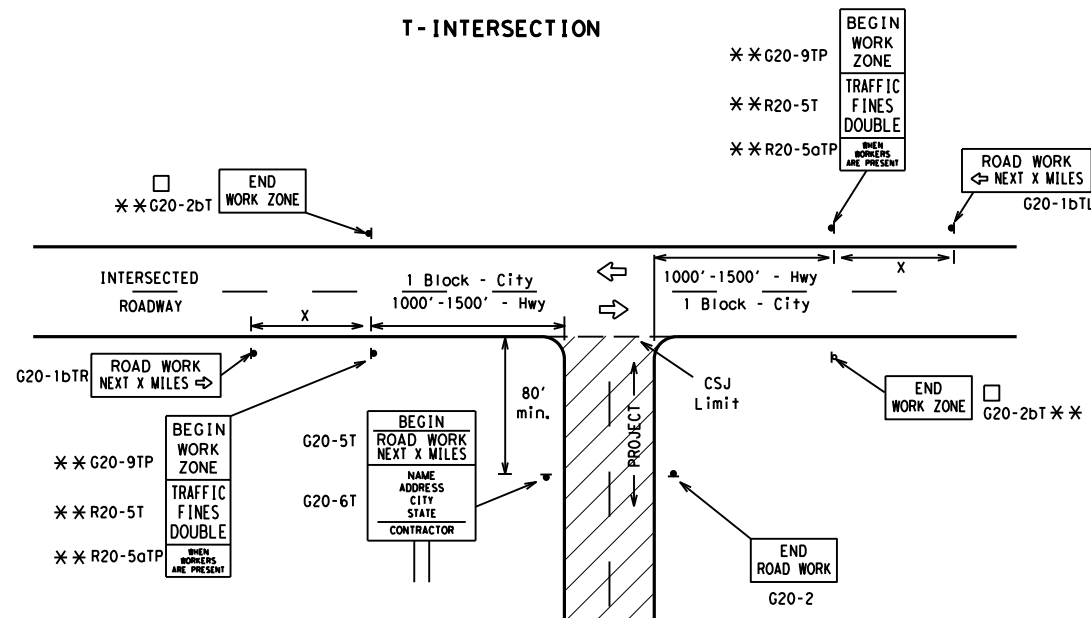
TYPICAL LOCATION OF CROSSROAD SIGNS



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

- 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.
- The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
- 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.
- 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.
- Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
- 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

- 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.
- 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}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

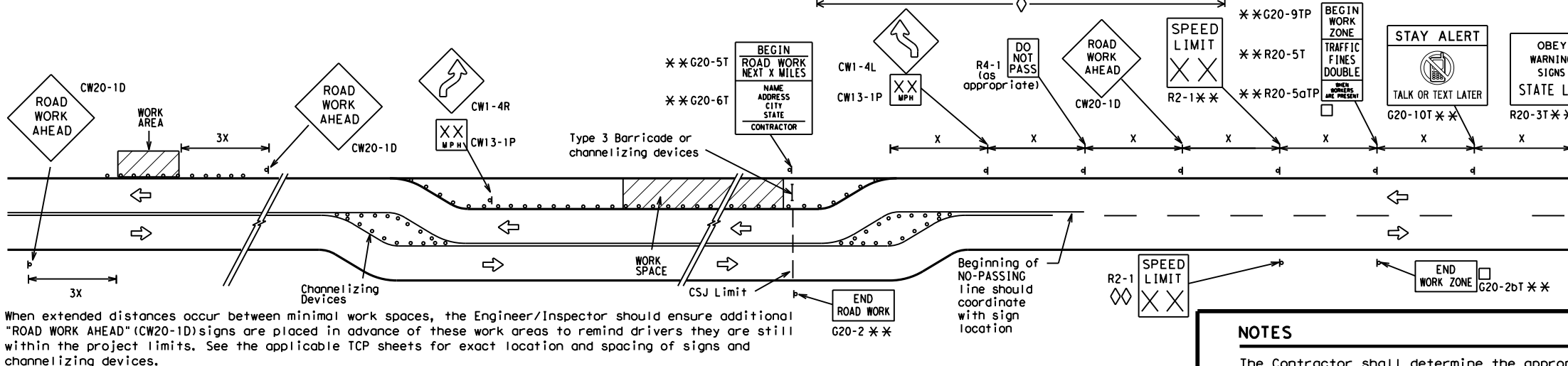
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

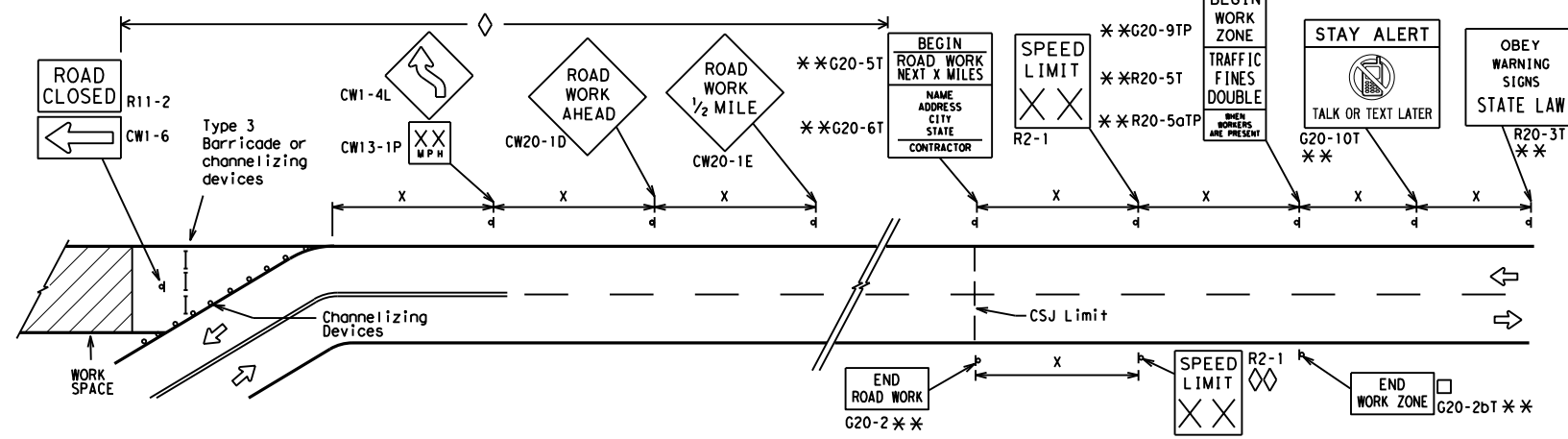
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

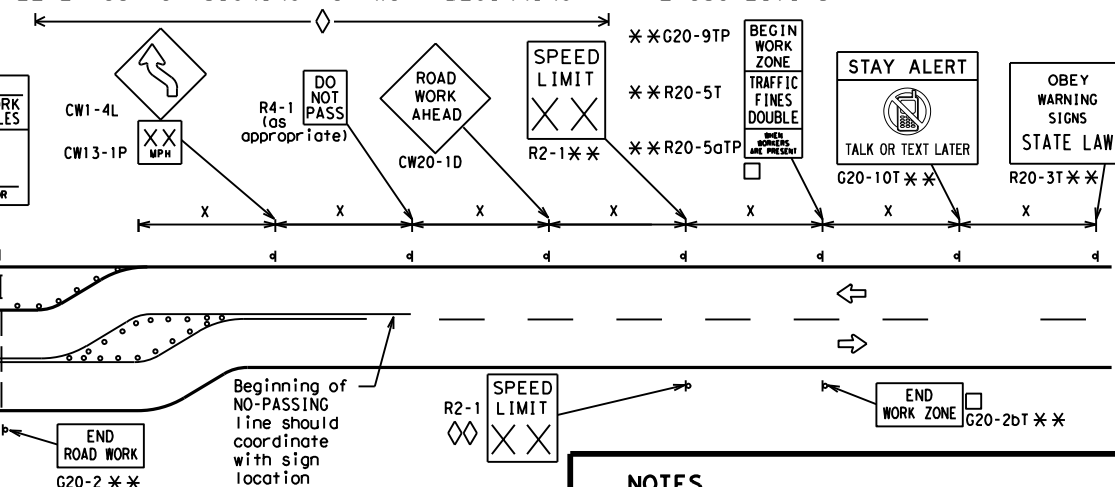


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

BARRICADE AND CONSTRUCTION PROJECT LIMIT

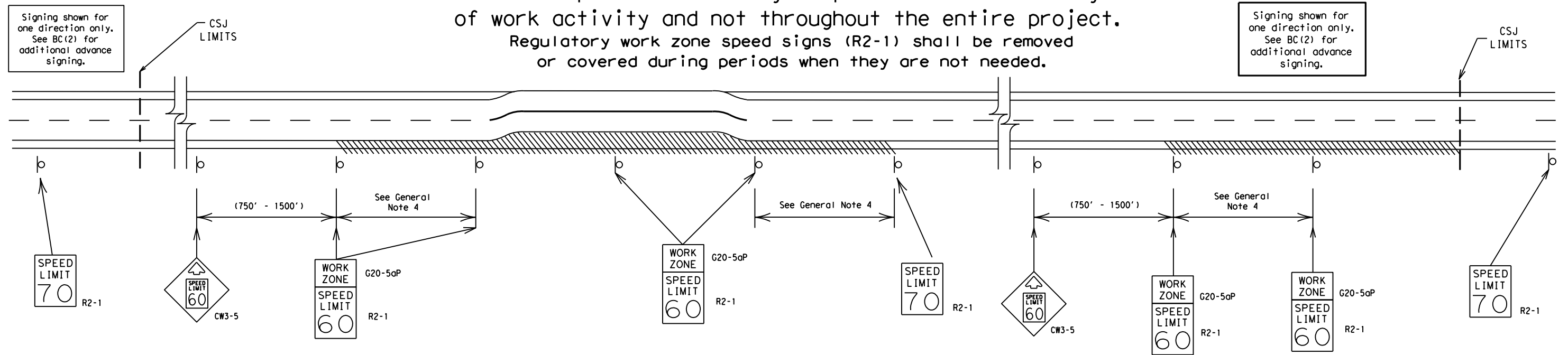
BC (2) - 21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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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:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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.

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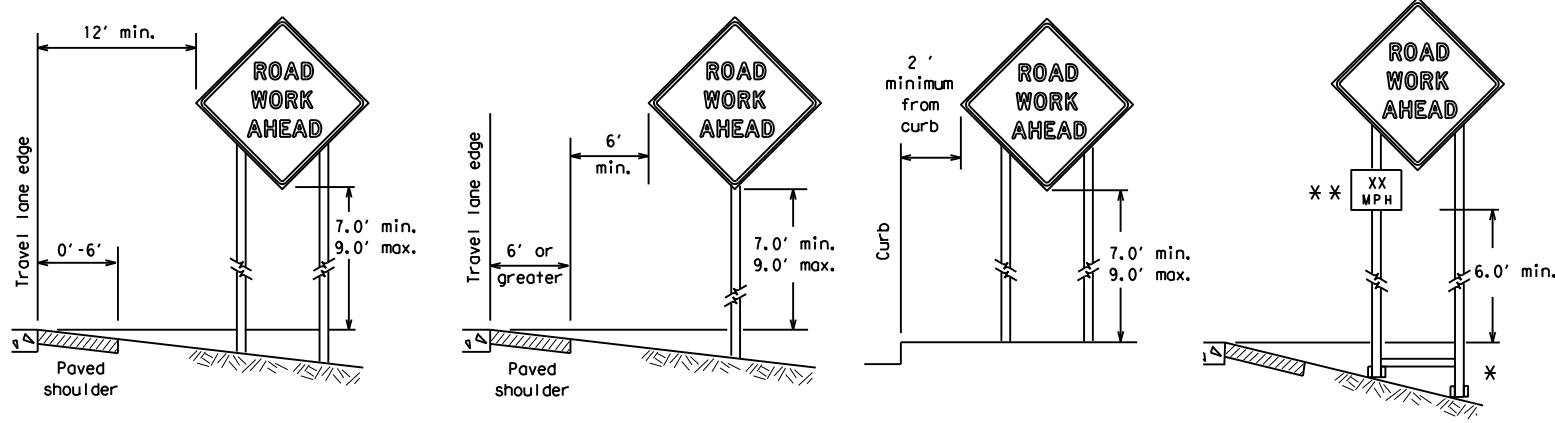
SHEET 3 OF 12

		Traffic Safety Division Standard	
<h2>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2>			
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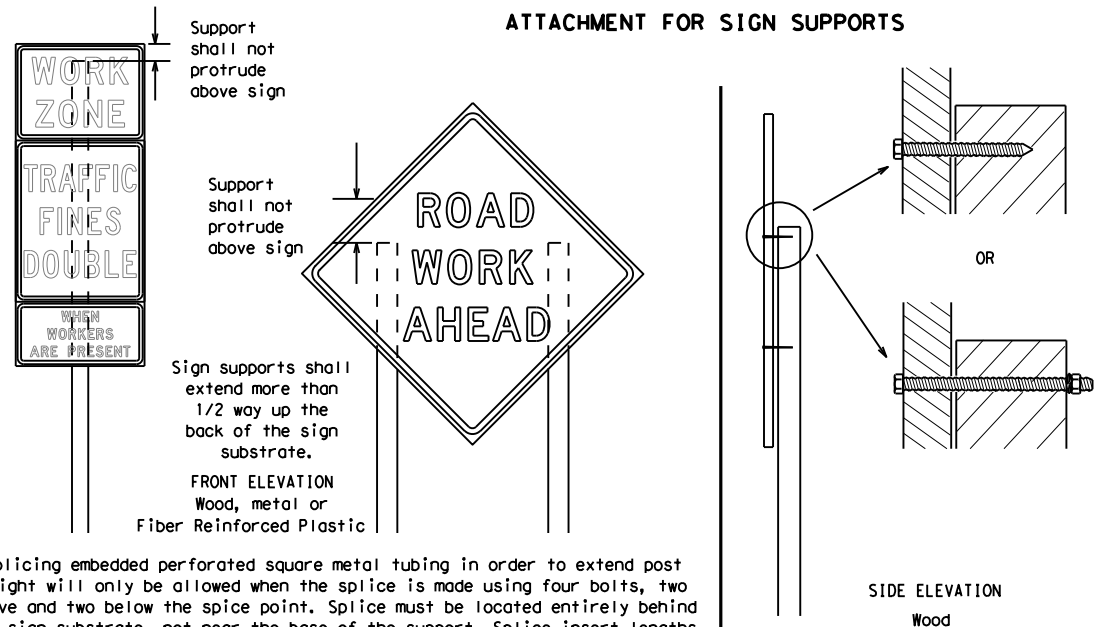
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* 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



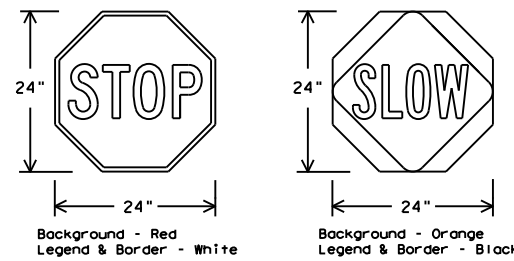
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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 splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

SHEET 4 OF 12



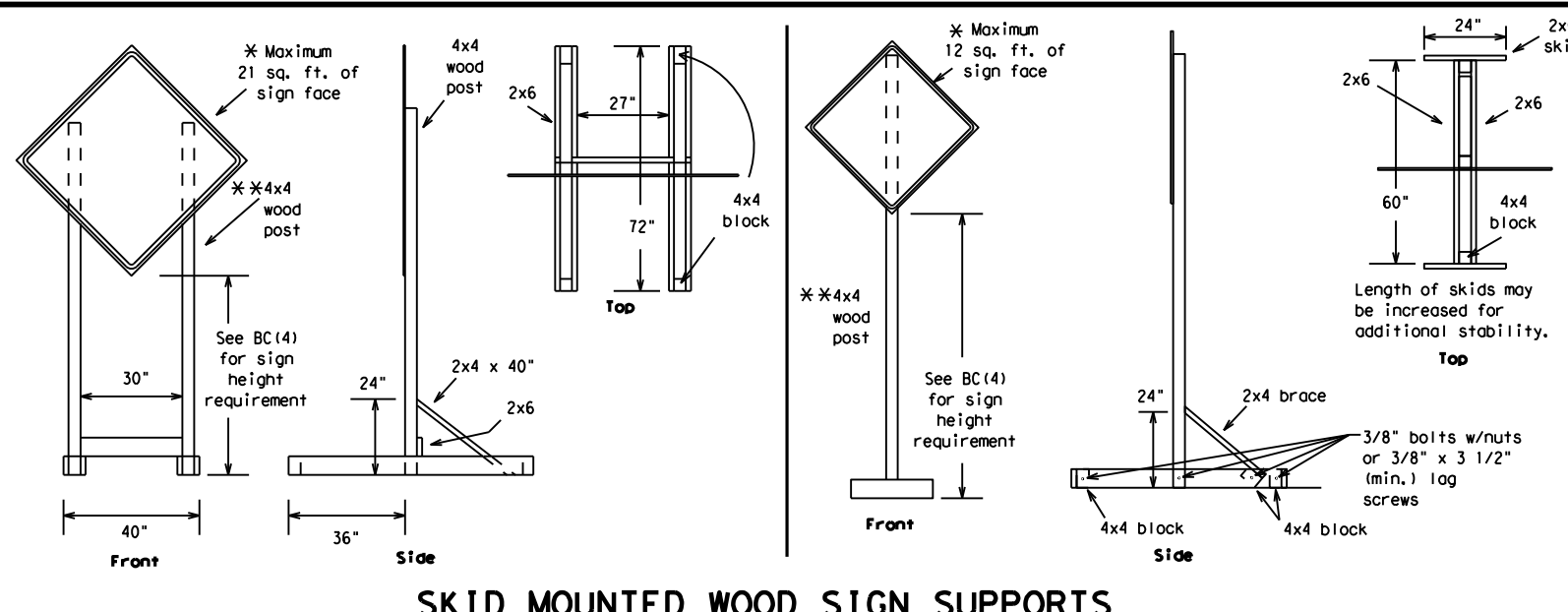
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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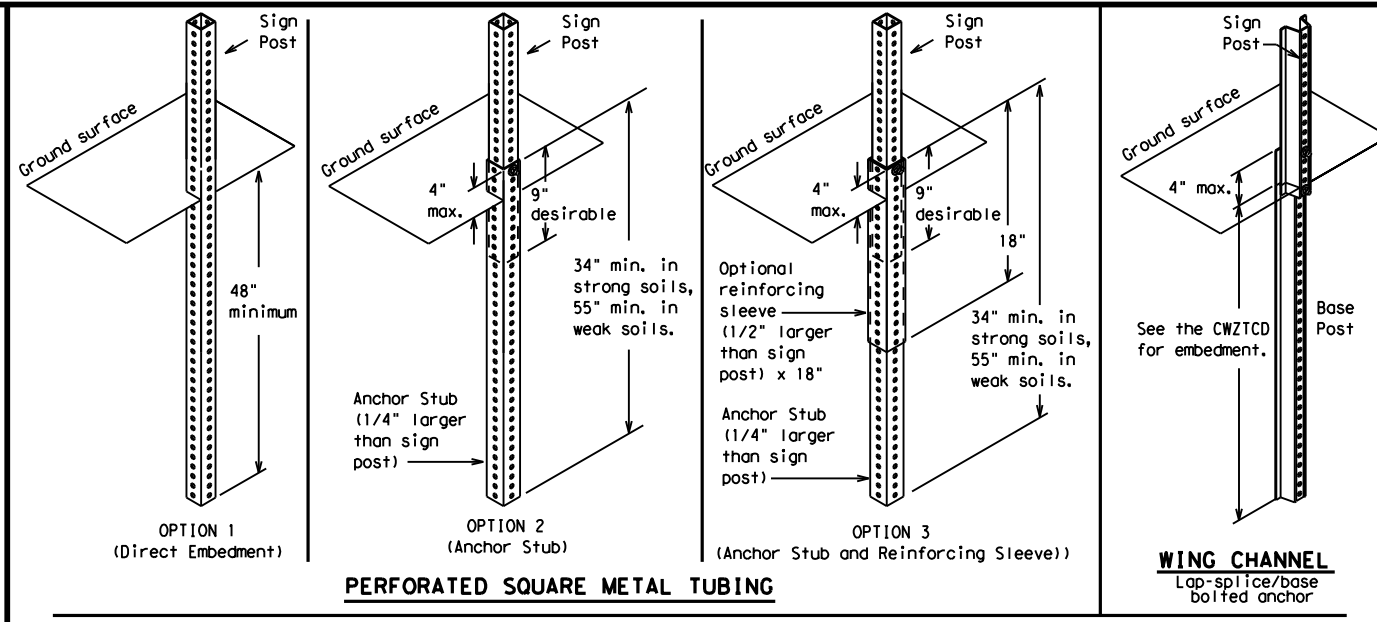
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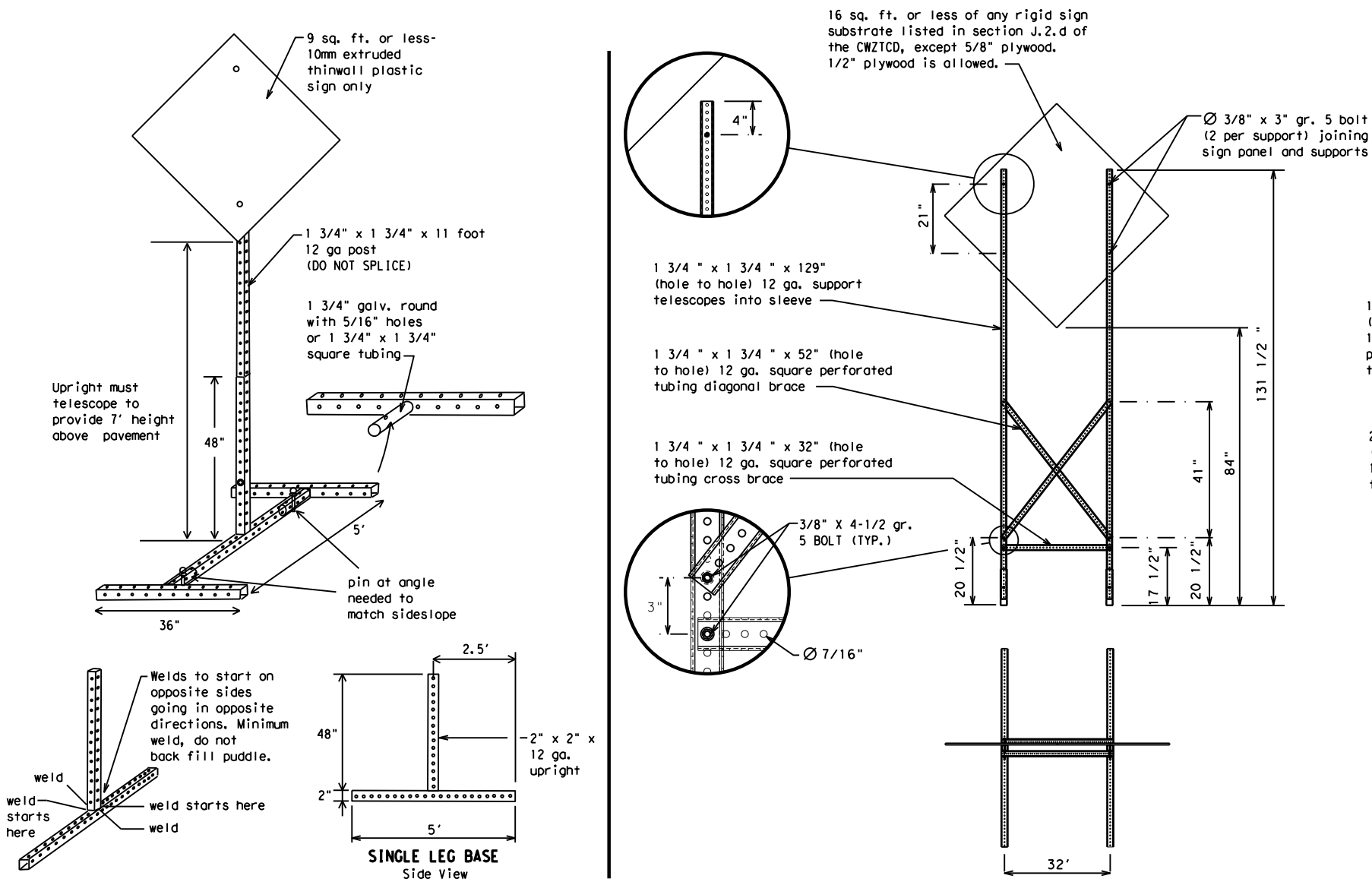
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

- 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.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- 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



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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7-13	5-21	PAR:	LAMAR, ETC	10					

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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.
- 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.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

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
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

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

Texas Department of Transportation
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

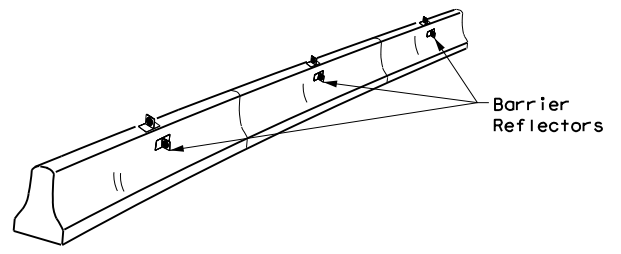
BC (6) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0901	29	091, ETC	CR, ETC
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	PAR	LAMAR, ETC		11

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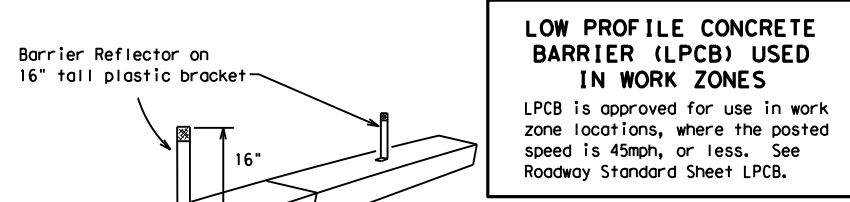
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



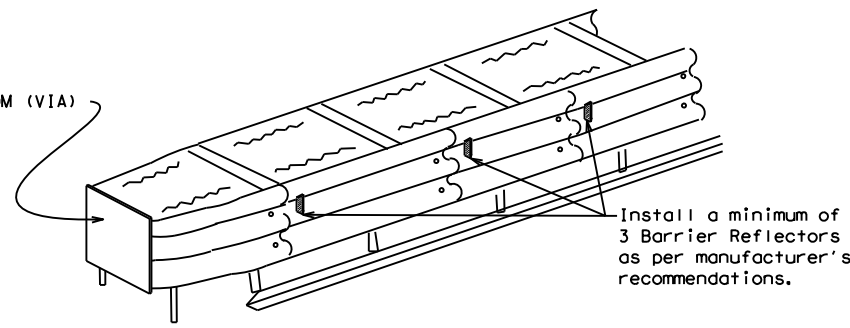
CONCRETE TRAFFIC BARRIER (CTB)

- 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

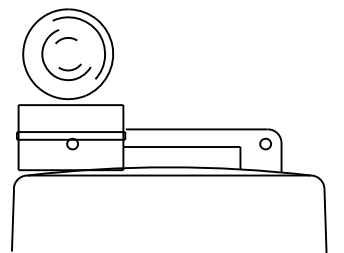
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

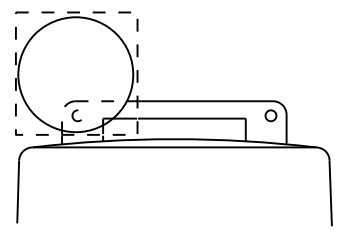
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- 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

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



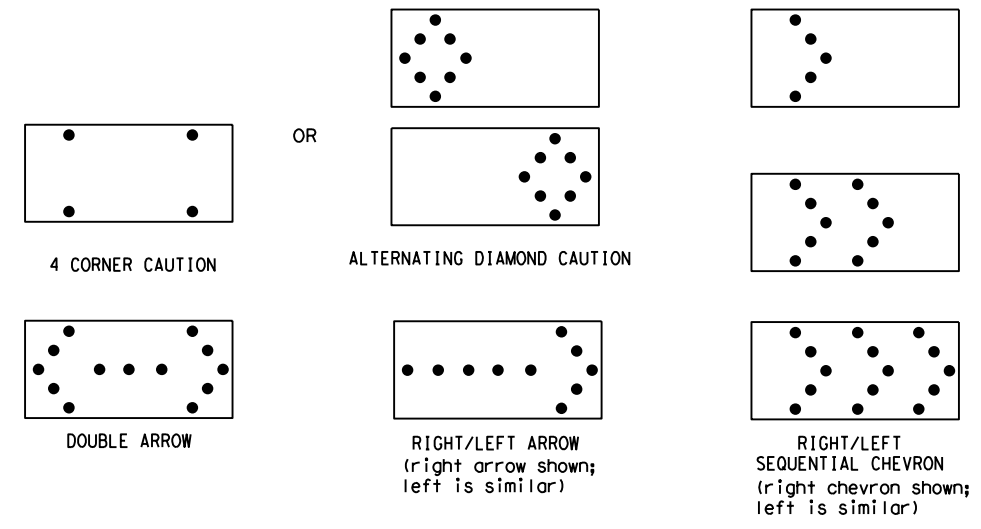
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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.

- 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.
- 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.
- 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.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- 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.
- 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

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- 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.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

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

BC (7) -21

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7-13 5-21	PAR	LAMAR, ETC	12	

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- 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.
- 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:

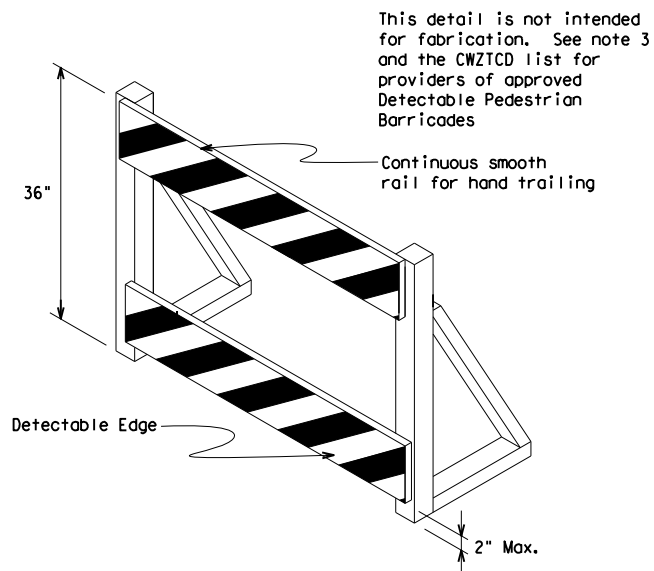
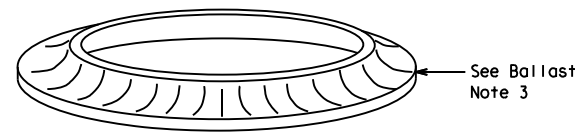
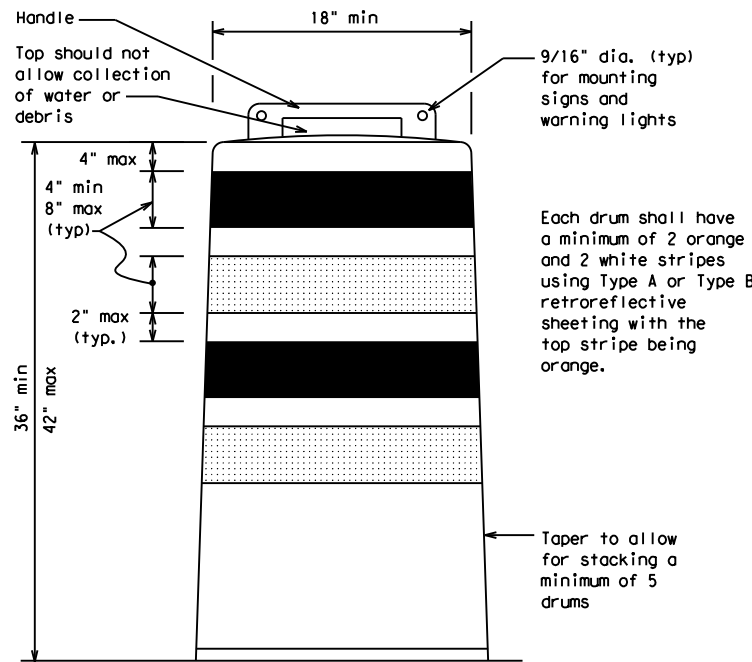
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- 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.
- 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.
- 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.
- 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.
- 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.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

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

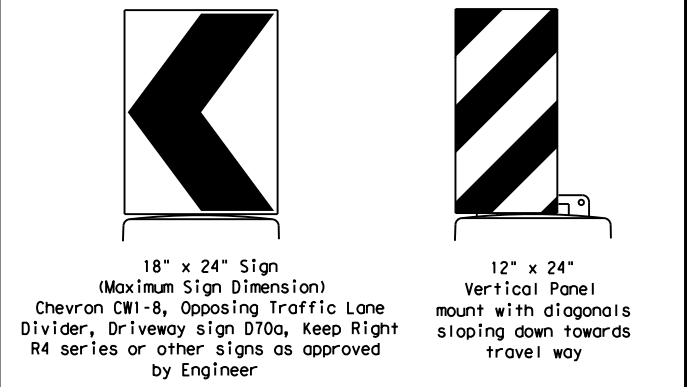
BALLAST

- 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.
- 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.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.
- 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.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.



DETECTABLE PEDESTRIAN BARRICADES

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



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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

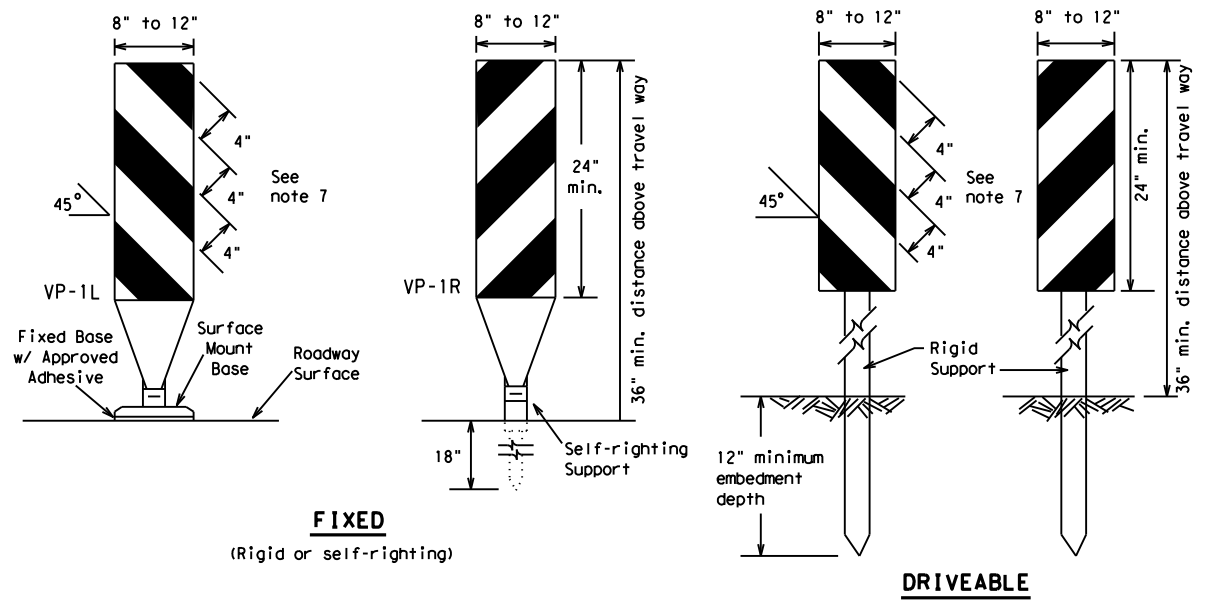
- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- 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.
- 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.

SHEET 8 OF 12

		Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES			
BC (8) - 21			
FILE: bc-21.dgn	DW: TxDOT	CK: TxDOT	OW: TxDOT
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9-07 5-21	DIST	COUNTY	SHEET NO.
7-13	PAR	LAMAR, ETC	13

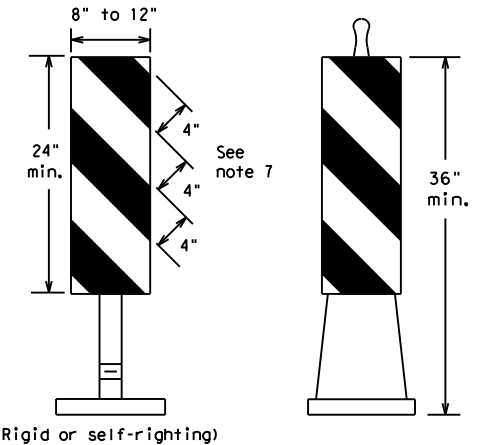
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(Rigid or self-righting)

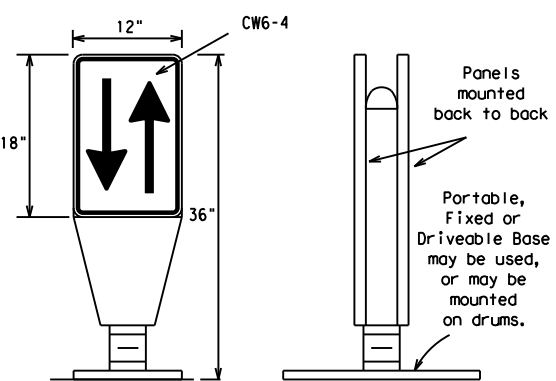
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PORTABLE

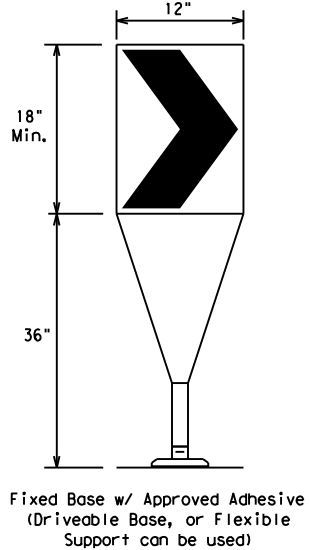
VERTICAL PANELS (VPs)

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



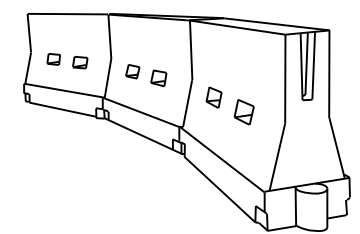
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- 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.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- 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.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- 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.
- 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)

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- 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.
- 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.
- 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.
- 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

- 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).
- 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.
- 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).
- 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.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- 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 * *			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = 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



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

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7-13 5-21	PAR	LAMAR, ETC	14	

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TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.

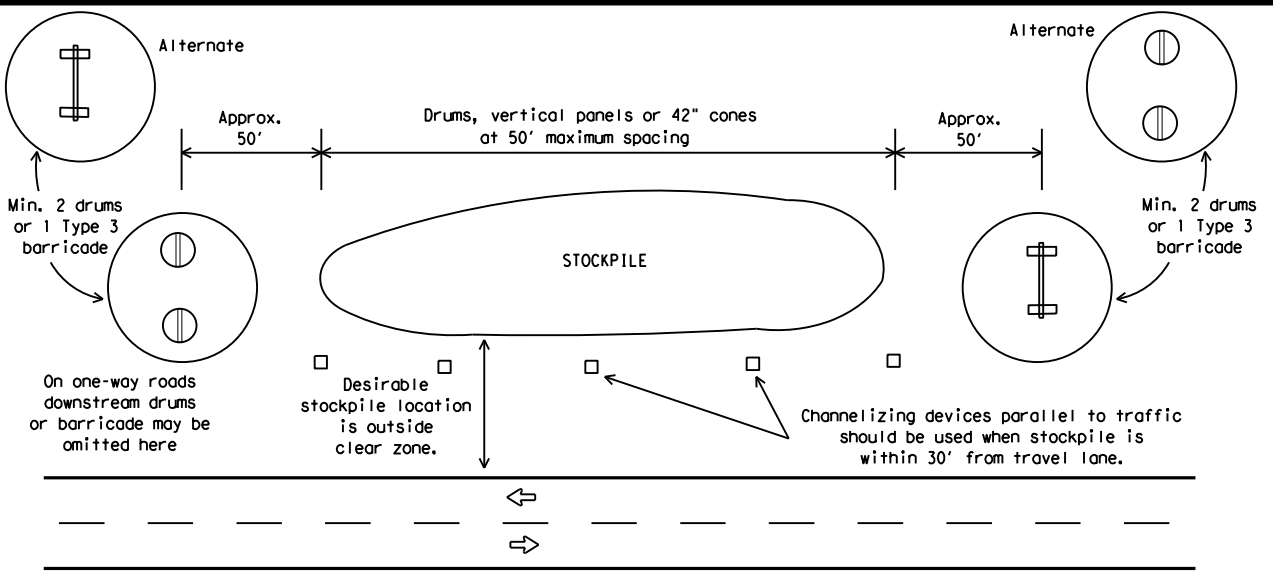


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

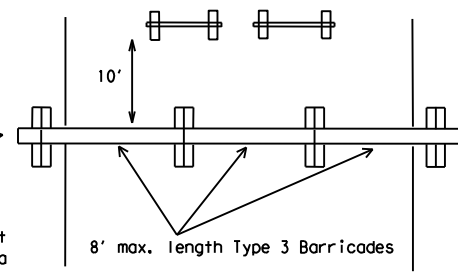
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

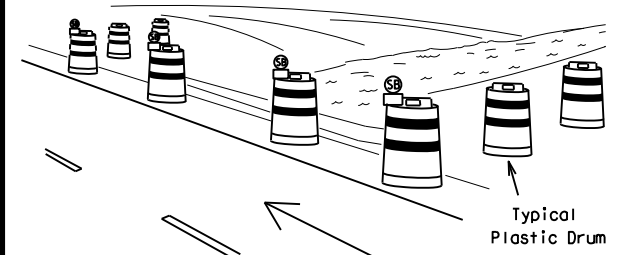
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.

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.

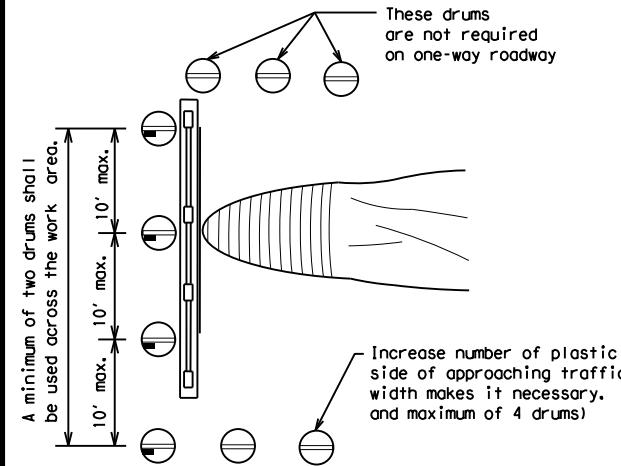


PLAN VIEW

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

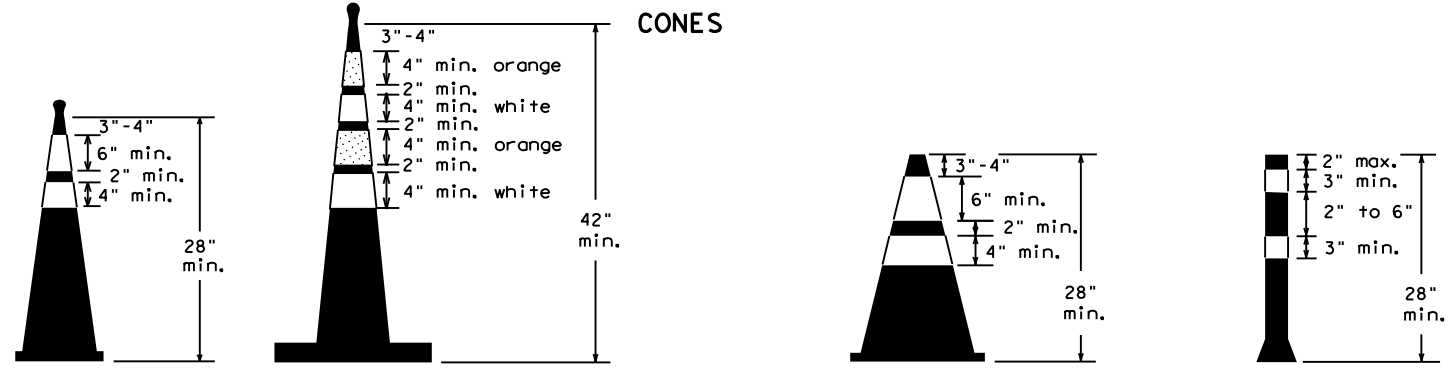


PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

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

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



Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.
 42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- 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

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

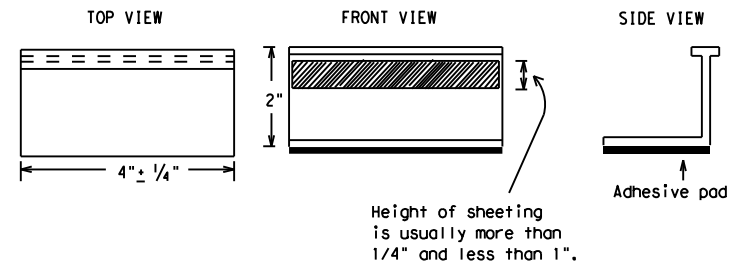
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- 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.
- 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**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
 - 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.
 - 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.
- Small design variances may be noted between tab manufacturers.
- 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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).

SHEET 11 OF 12



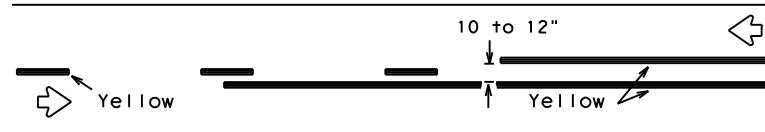
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

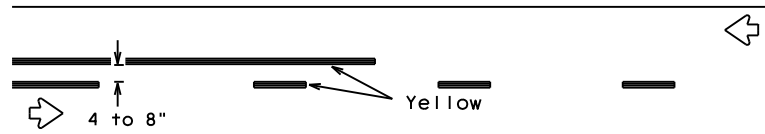
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PAVEMENT MARKING PATTERNS

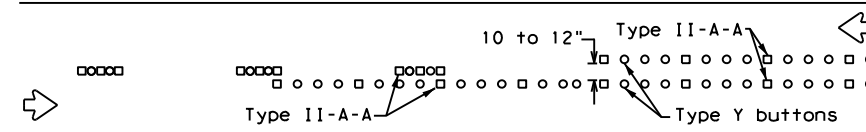


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

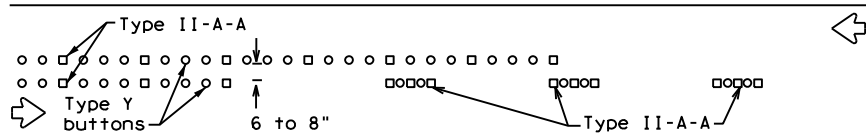


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.

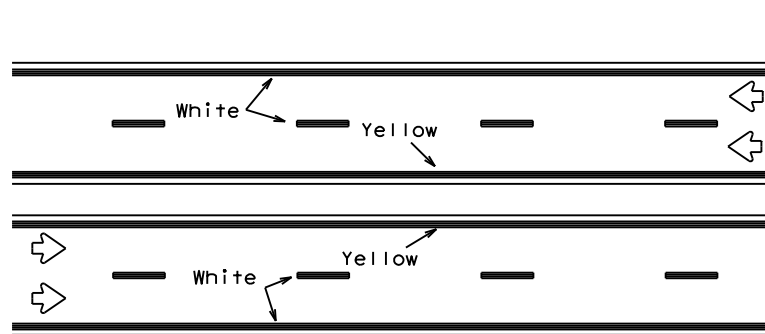


RAISED PAVEMENT MARKERS - PATTERN A



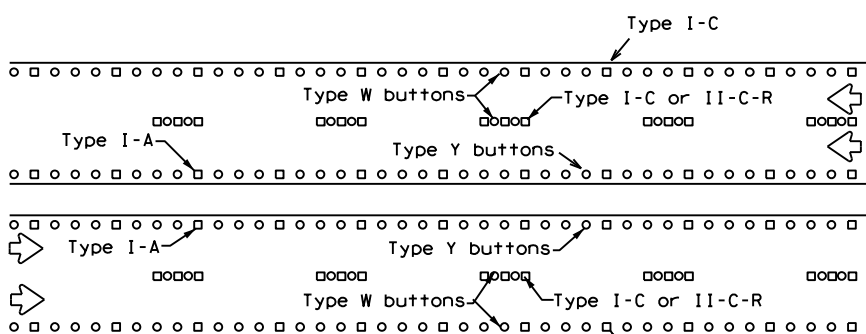
RAISED PAVEMENT MARKERS - PATTERN B

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



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



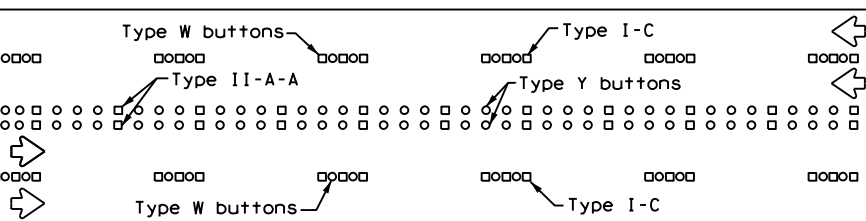
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



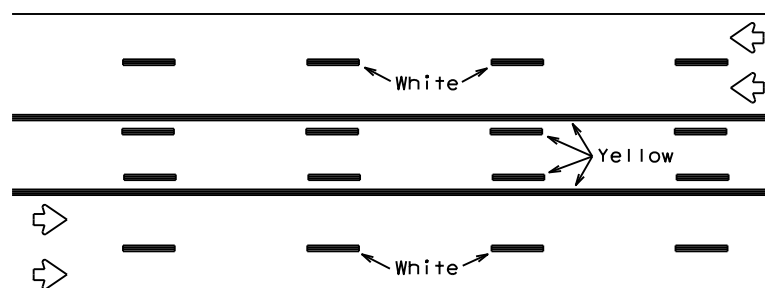
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



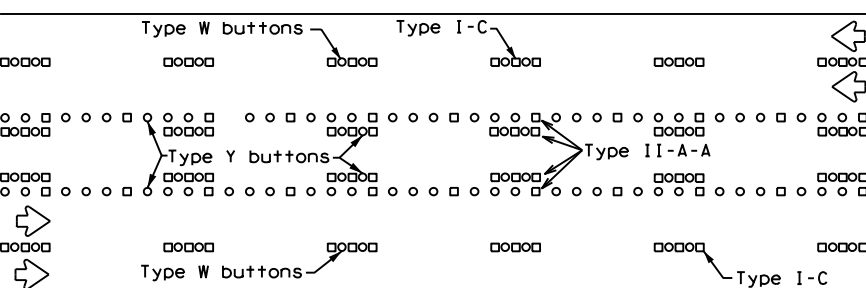
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



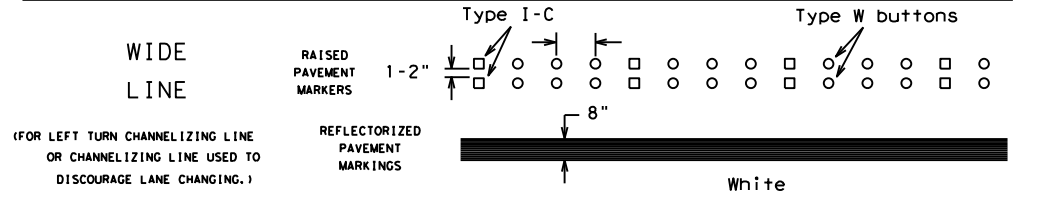
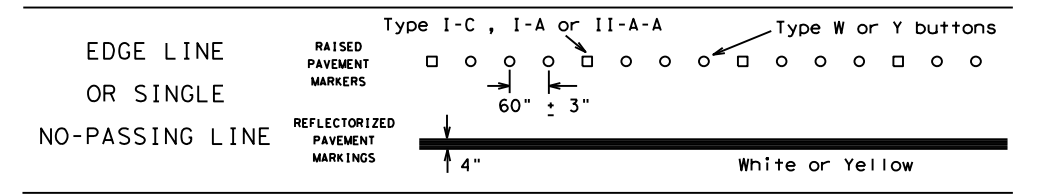
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

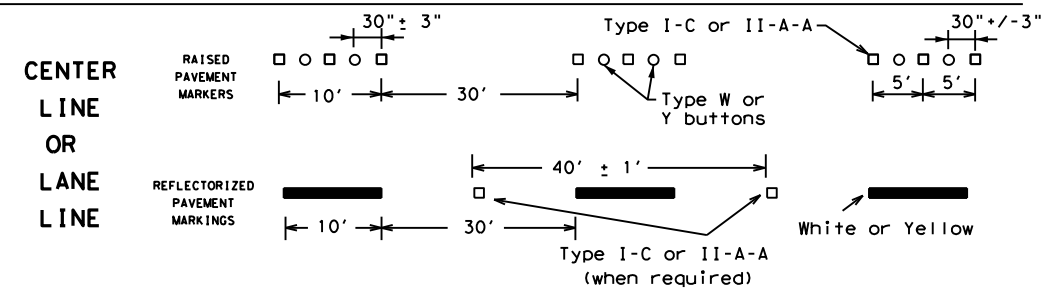
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



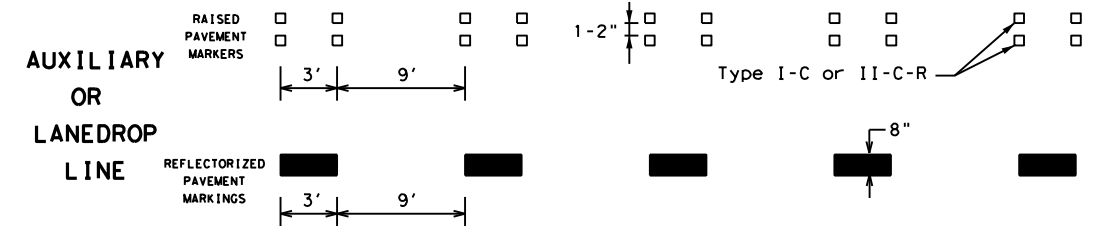
SOLID LINES



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



BROKEN LINES



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.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

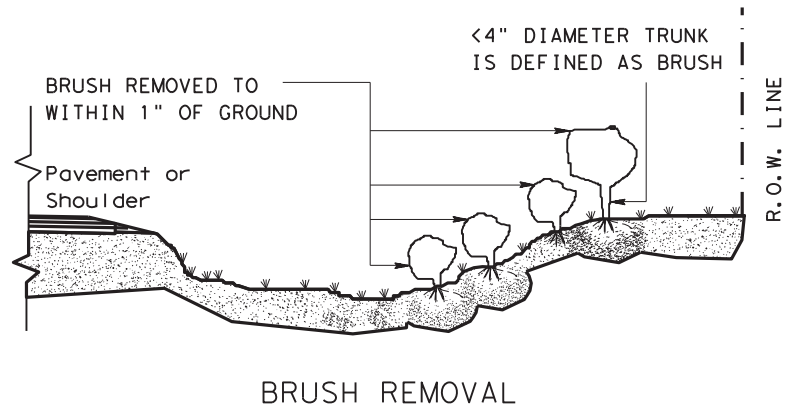
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11-02 8-14				

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."

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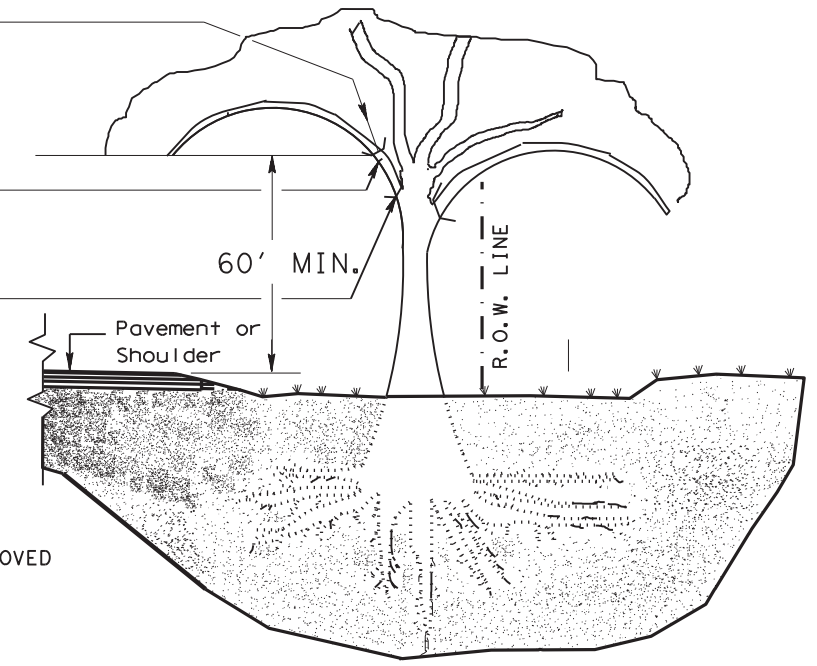
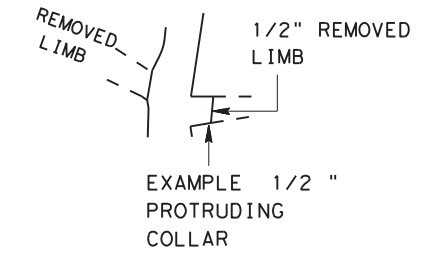


BRUSH REMOVAL

STEP 1:
 CUT 1/3 WAY THROUGH BOTTOM OF LIMB 8" TO 12" ABOVE MAIN STEM (OR TRUNK).

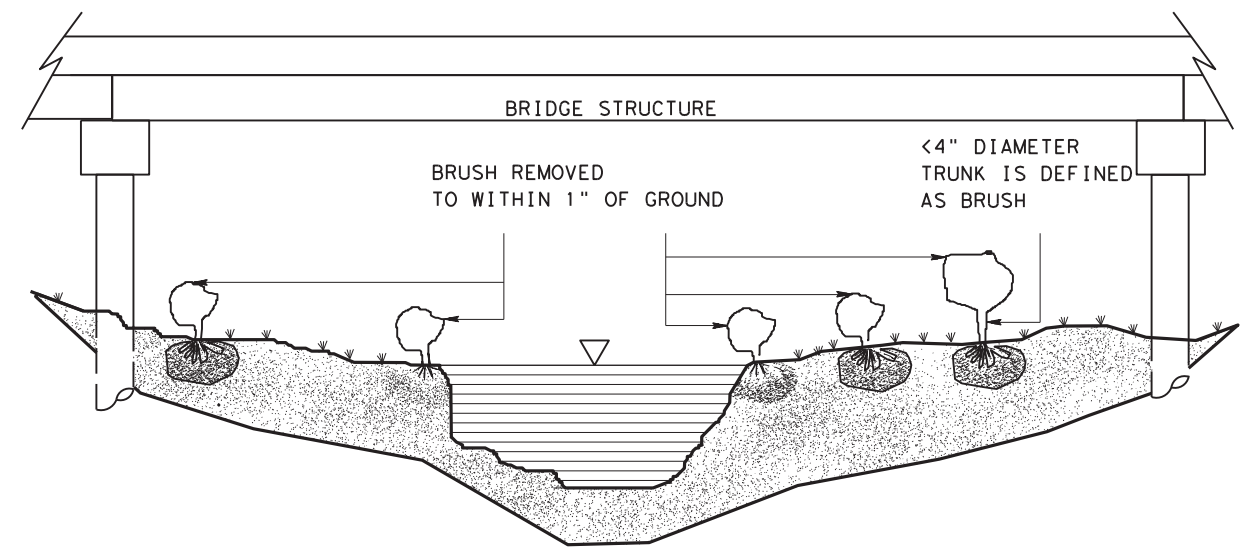
STEP 2:
 REMOVE LIMB 4" TO 6" BEYOND THE FIRST CUT

STEP 3:
 REMOVE STUB WITH A SMOOTH CUT SO THAT TRACE COLLAR OF THE REMOVED LIMB PROTRUDES APPROXIMATELY 1/2" FROM THE MAIN STEM

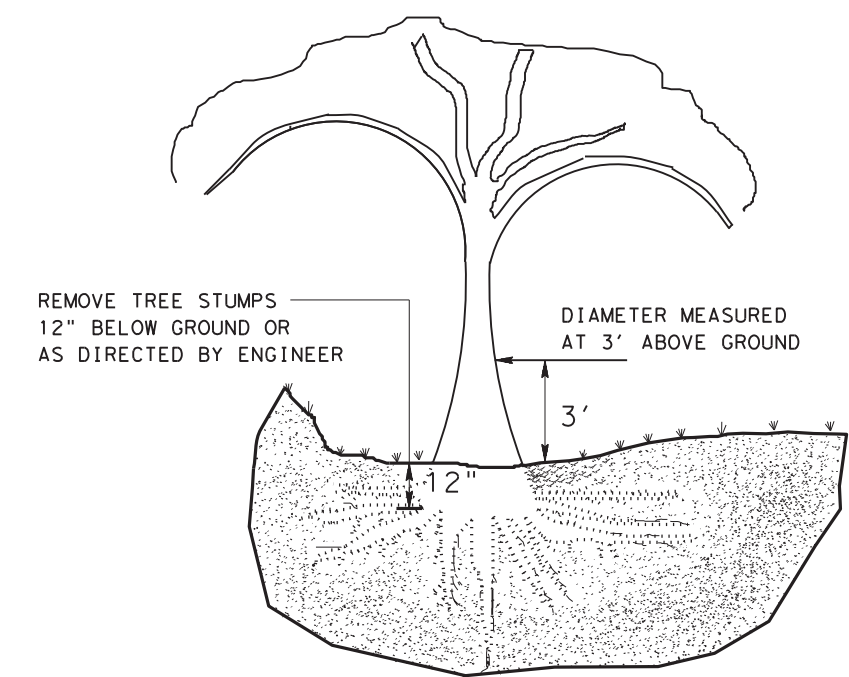


STEPS 1, 2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.

TREE TRIMMING



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

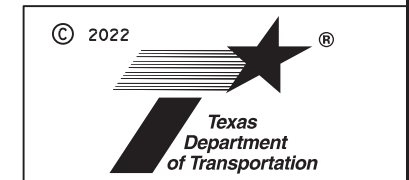


TREE REMOVAL
 SPECIFIC LOCATION SPECIFIED IN PLANS

Monte R. Rater P.E.
 12.30.21

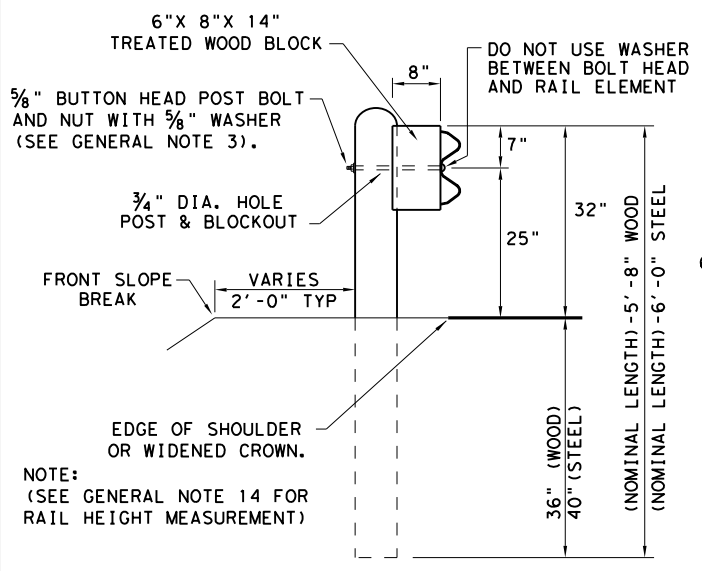
CR 15100 @
 CUTHAND CREEK
 0901-29-091, ETC
 TREE TRIMMING
 AND
 BRUSH REMOVAL

NOT TO SCALE

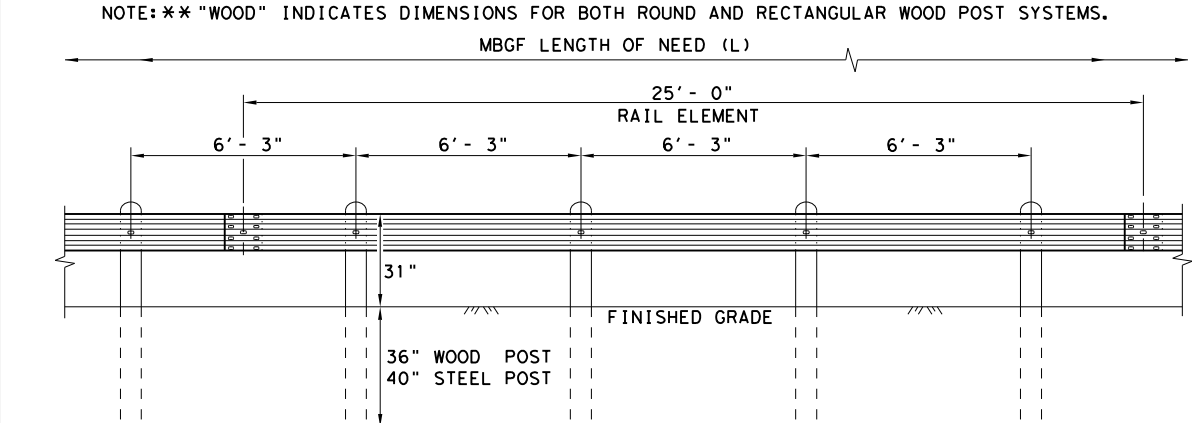


CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		18

DATE: 12/30/2021
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TYPICAL POST PLACEMENT



WOOD BLOCK TO ROUND WOOD POST

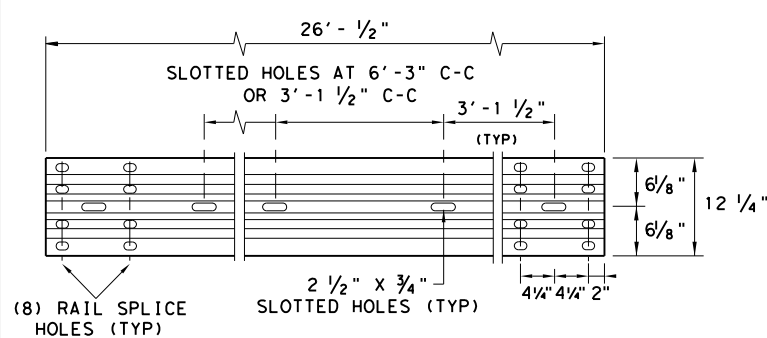
WOOD BLOCK TO RECTANGULAR WOOD POST

ROUTED WOOD BLOCK TO I-BEAM STEEL POST



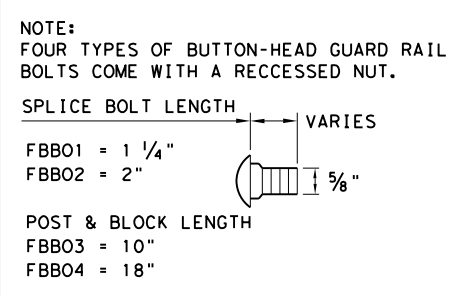
ELEVATION MID-SPAN RAIL SPLICE

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



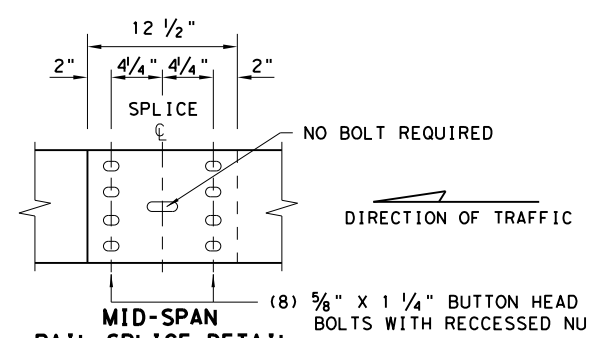
ELEVATION 25' - 0" (NOM.) W-BEAM SECTION

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



BUTTON HEAD BOLT

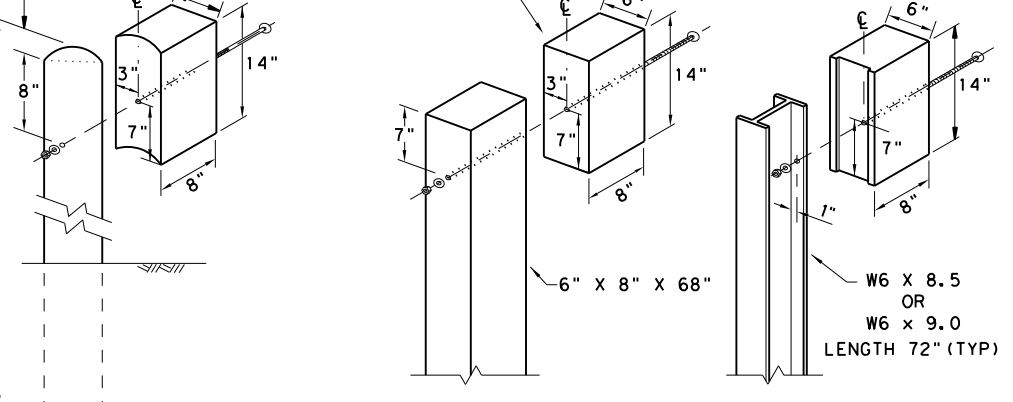
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

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

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

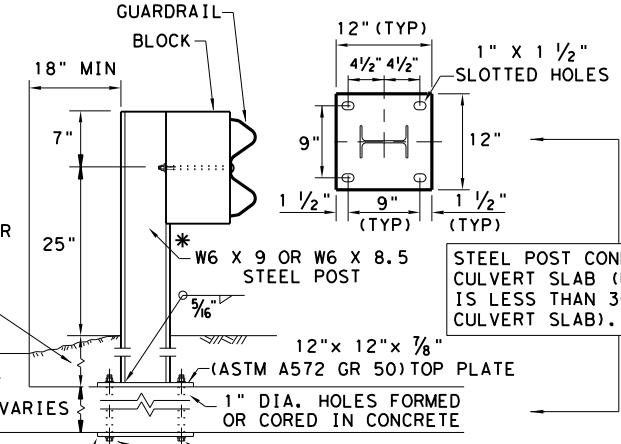


WOOD BLOCK TO RECTANGULAR WOOD POST

ROUTED WOOD BLOCK TO I-BEAM STEEL POST

12" x 12" x 1/4" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST



- NOTE: TWO INSTALLATION OPTIONS.
- BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
 - EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

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

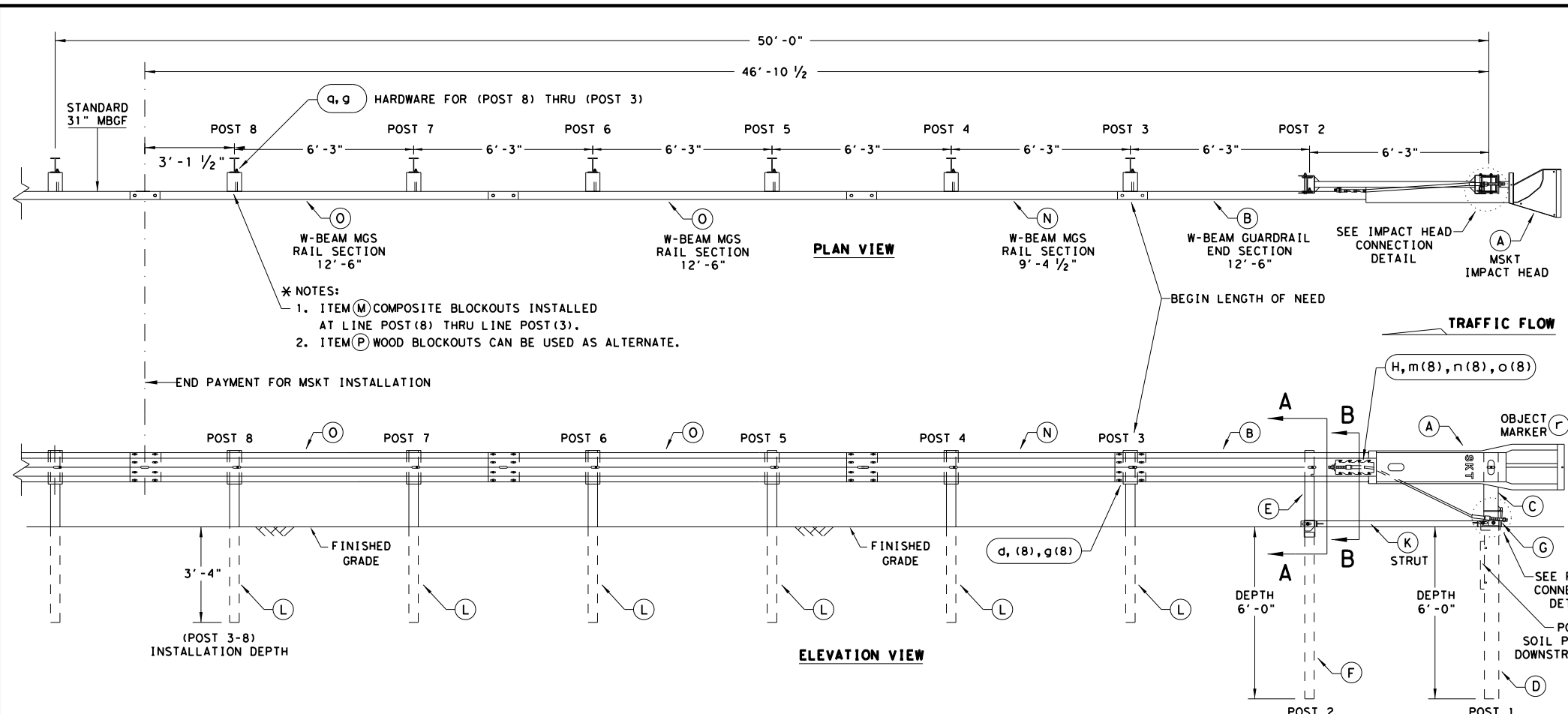
GENERAL NOTES

- THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
- RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25' - 0", OR 12' - 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
- BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
- FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
- CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
- THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
- IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
- UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
- APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
- POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
- SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
- UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
- FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
- GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

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

		Design Division Standard	
METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT GF (31) - 19			
FILE: gf3119.dgn	DN: IxDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	0901 29	091, ETC	CR, ETC
	DIST	COUNTY	SHEET NO.
	PAR	LAMAR, ETC	19

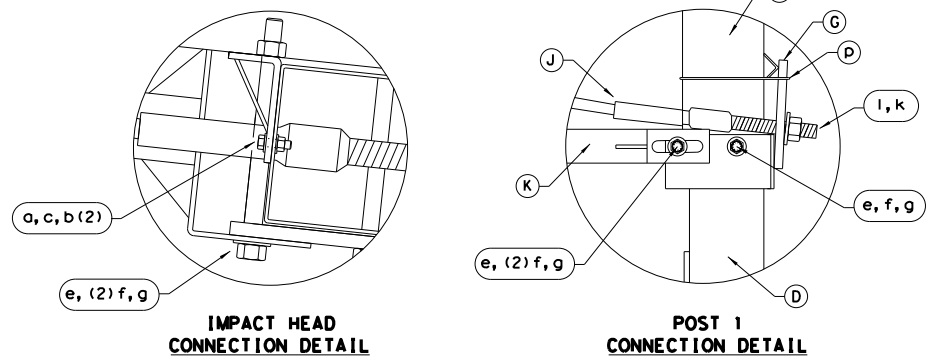
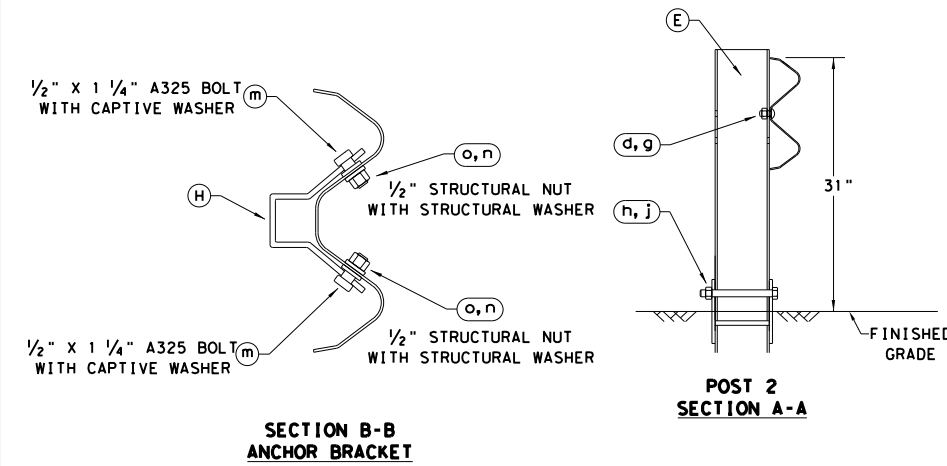
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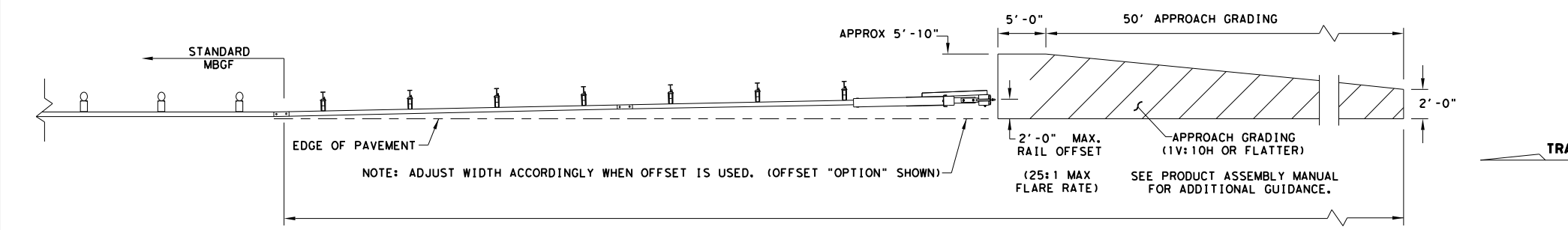
- * NOTES:**
- ITEM (M) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (8) THRU LINE POST (3).
 - ITEM (P) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Go.	SF1303
C	1	POST 1 - TOP (6" x 6" x 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6X9 OR W6X8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
SMALL HARDWARE			
o	2	3/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	3/8" WASHER	W0516
c	2	3/8" HEX NUT	N0516
d	25	3/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	3/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	3/8" WASHER	W050
g	33	3/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/8" O.D. x 3/8" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	3/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



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



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

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

Design Division Standard

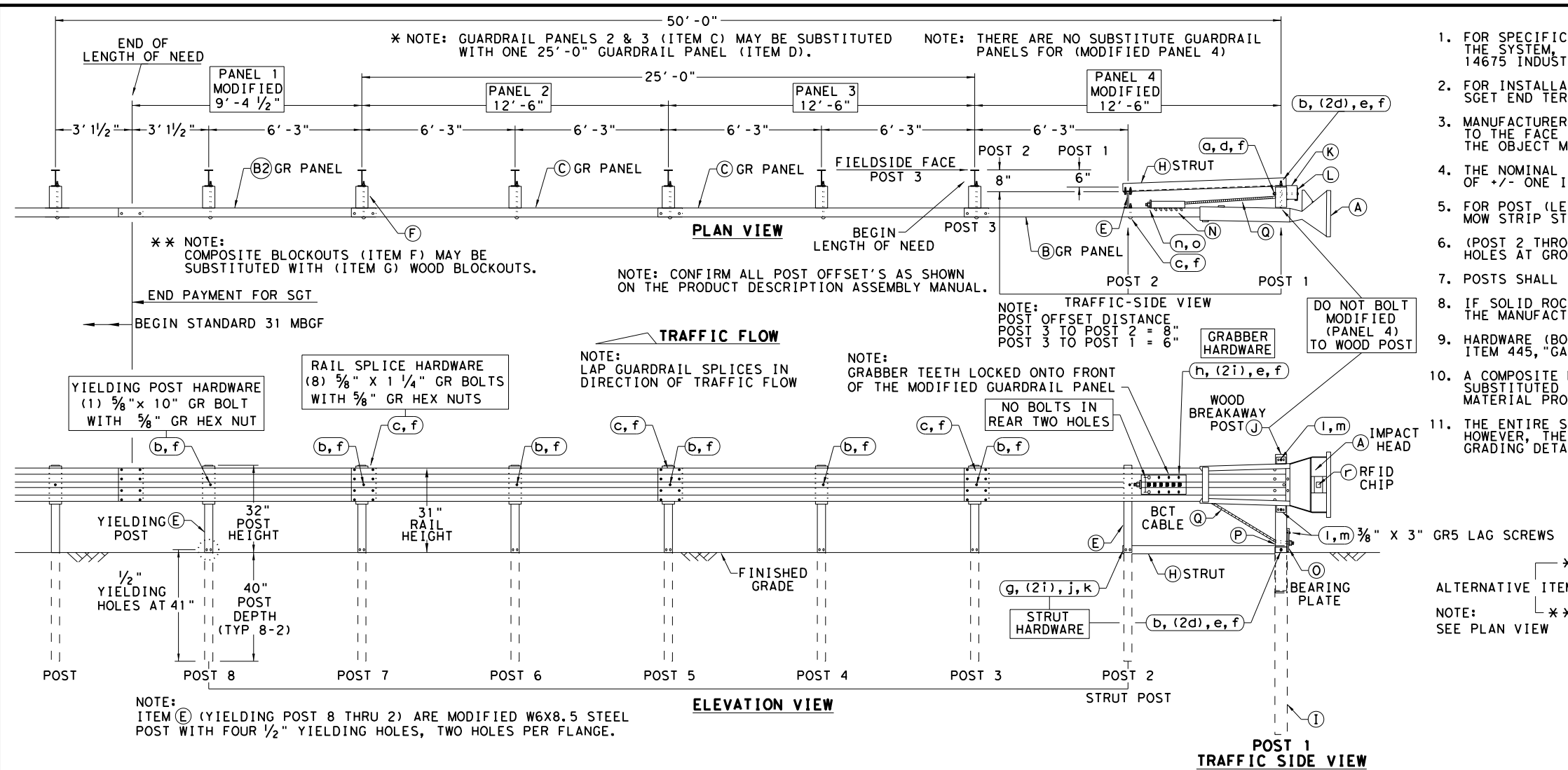
SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT (12S) 31-18

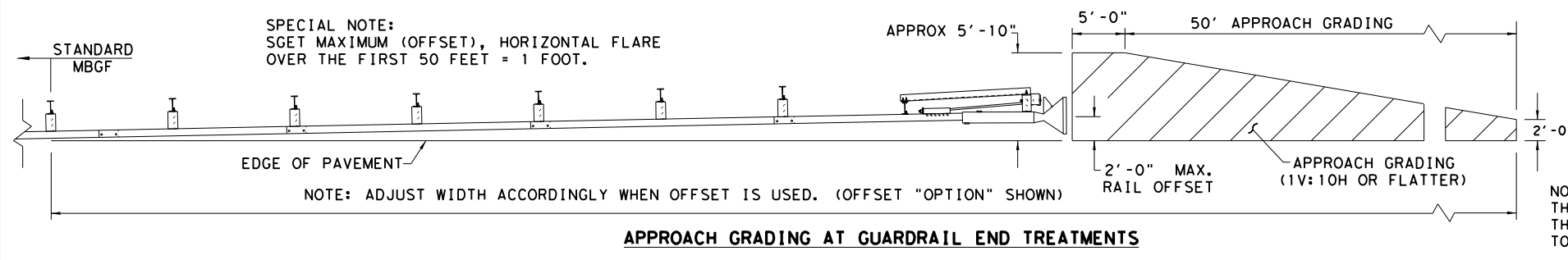
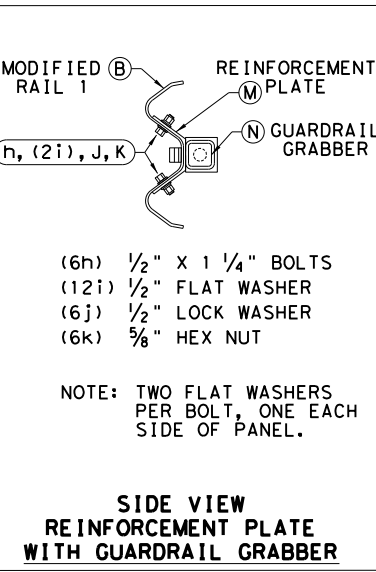
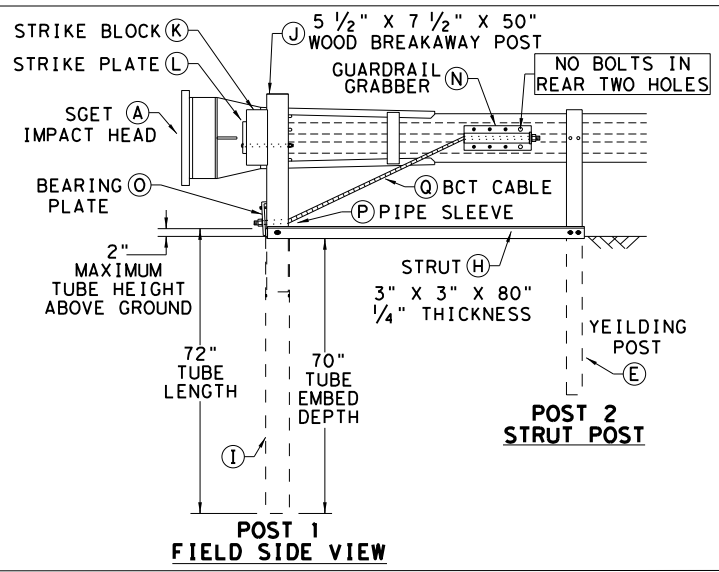
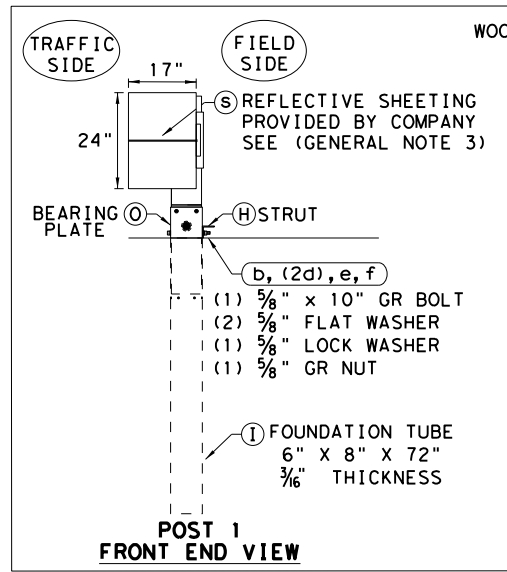
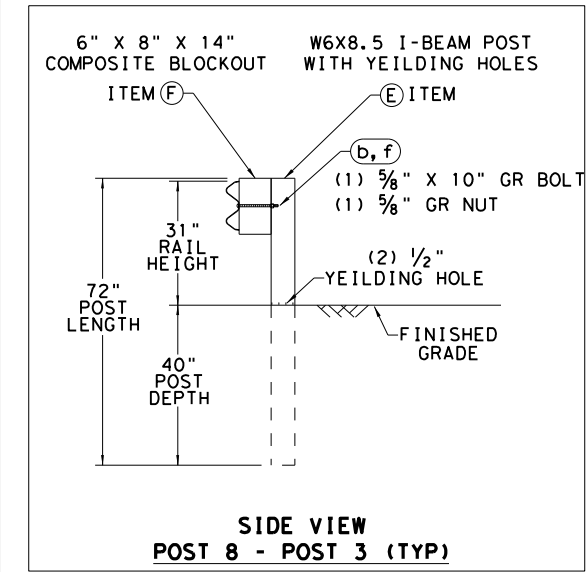
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REVISIONS				
0901	29	091, ETC	CR	ETC
DIST	COUNTY	SHEET NO.		
PAR	LAMAR, ETC	20		

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- ### GENERAL NOTES
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
 - MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
 - THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
 - THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WB08
H	1	STRUT 3" X 3" X 80" X 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" X 3/8"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" X 7 1/2" X 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
SMALL HARDWARE			
o	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPlice BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563HD HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

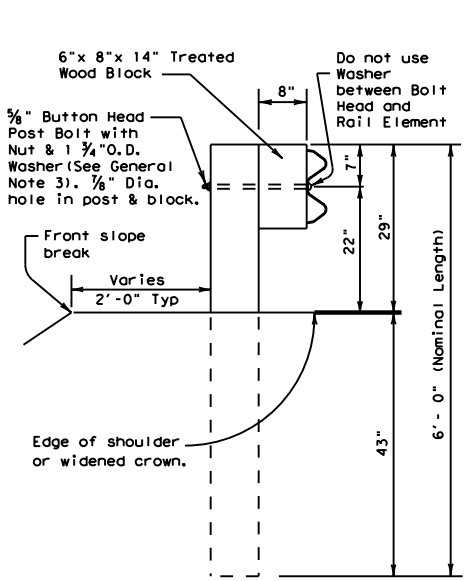


NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

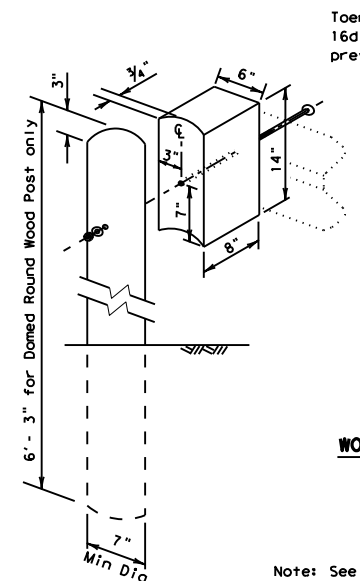
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT (15) 31-20

FILE: sg153120.dgn	DN: TXDOT	CK: KM	DW: VP	CK: VP
© TXDOT: APRIL 2020	CONT: 0901	SECT: 29	JOB: 091, ETC	HIGHWAY: CR, ETC
REVISIONS	DIST: LAMAR, ETC	COUNTY:	SHEET NO.:	21

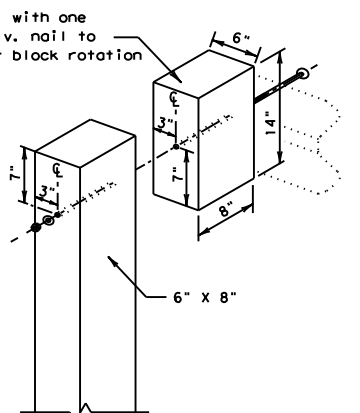
DATE: 12/30/2021
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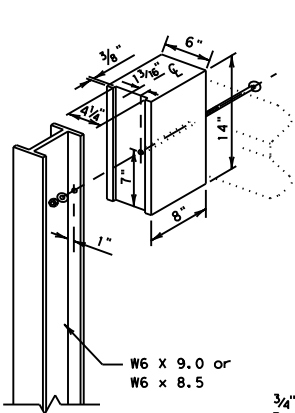
TYPICAL POST



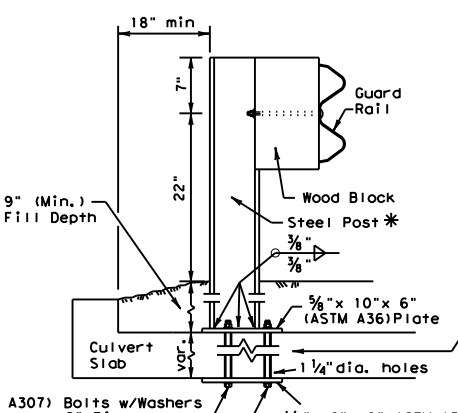
WOOD BLOCK TO ROUND WOOD POST



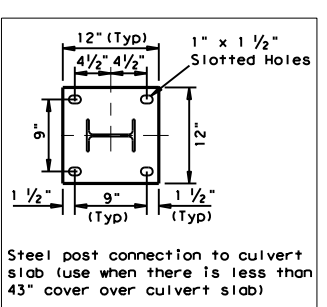
WOOD BLOCK TO RECTANGULAR WOOD POST



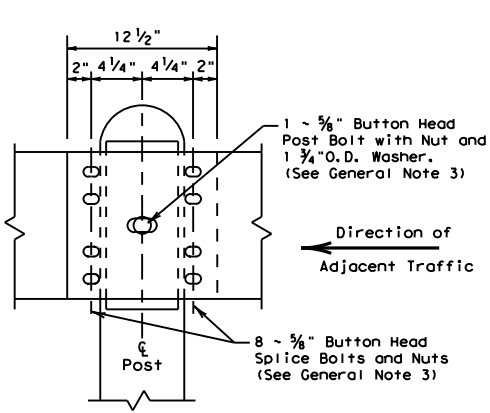
WOOD BLOCK TO STEEL POST



*** LOW FILL CULVERT POST**
FOR USE ON NON-BRIDGE CLASS CULVERTS ONLY



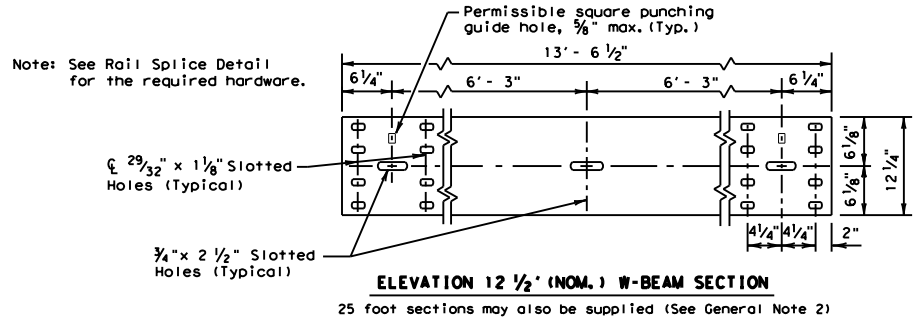
* Post(s) may require field modifications to ensure proper guardrail height.



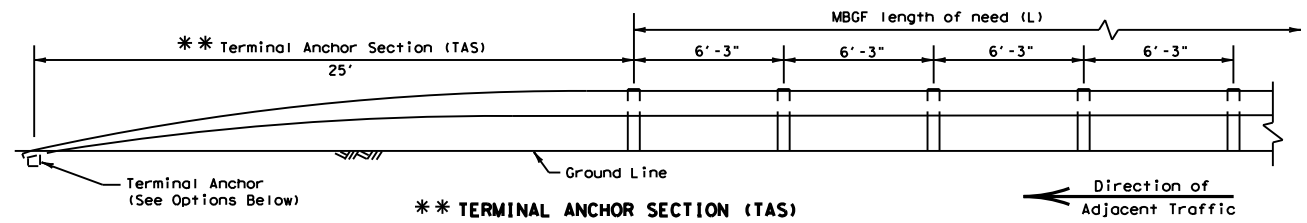
RAIL SPLICE DETAIL

GENERAL NOTES

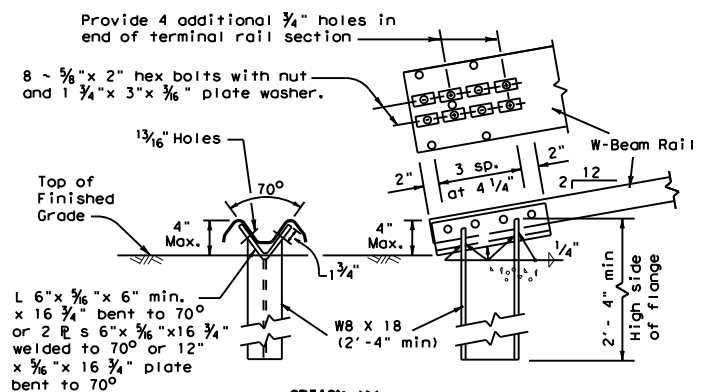
- The type of post (round wood post, rectangular wood post, or steel post) will be shown elsewhere in the plans. The exact position of MGBF shall be shown elsewhere in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
- Rail element shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified on the plans. The Contractor may furnish rail elements of 12 1/2 or 25 foot nominal lengths.
- Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and Type A (1 3/4 inch O.D.) washer and not more than 1 inch beyond it. Button head "splice" bolts (ASTM A307) are 3/8 inch x 1 1/4 inch (or 2 inch long at triple rail splices) with a 3/8 inch double recessed nut (ASTM A563).
- Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
- Crown shall be widened to accommodate the Metal Beam Guard Fence.
- The lateral approach to the guard fence, shall have a slope rate of not more than 1V:10H.
- Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be positioned so that the face of curb is located directly below or behind the face of the block. Rail placed over curbs shall be installed so that the post bolt is located approximately 21 inches above the gutter pan or roadway surface.
- If solid rock is encountered within 0 to 18 inches of the finished grade, drill a 22 inch dia. hole, 24 inches into the rock, or drill two 12 inch dia. front to back overlapping holes, 24 inches into the rock. If solid rock is encountered below 18 inches, drill a 12 inch dia. hole, 12 inches into the rock or to the standard embedment depth, whichever is less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
- Posts shall not be set in concrete, of any depth.
- Special fabrication will be required at installations having a curvature of less than 150 ft. radius.
- The terminal anchor section (TAS) post shall be set in Class A concrete (unless otherwise shown in the plans) in accordance with Item 421, "Hydraulic Cement Concrete." Concrete shall be subsidiary to the bid item requiring construction of the terminal anchor section (TAS). Terminal anchor post to be galvanized in accordance with Item 445, "Galvanizing."
- Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL can furnish composite material posts and/or blocks.



ELEVATION 12 1/2' (NOM.) W-BEAM SECTION
 25 foot sections may also be supplied (See General Note 2)

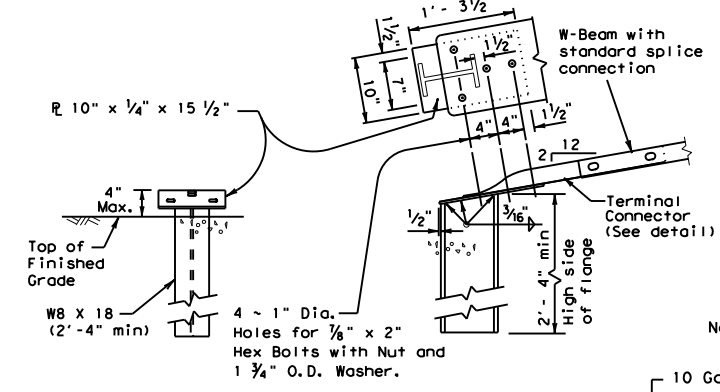


**** TERMINAL ANCHOR SECTION (TAS)**
 Terminal anchor sections are only for downstream use, when located outside the horizontal clearance area of opposing traffic.



OPTION (1)

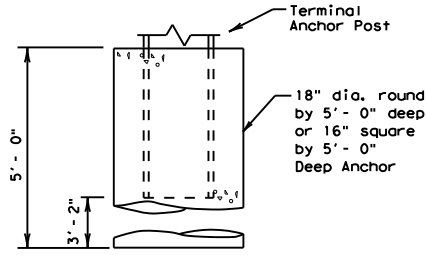
Note: This anchor post requires four additional 3/4 inch holes (shop or field) in the rail member with eight 3/8 inch hex bolts with nut and plate washer.



OPTION (2)

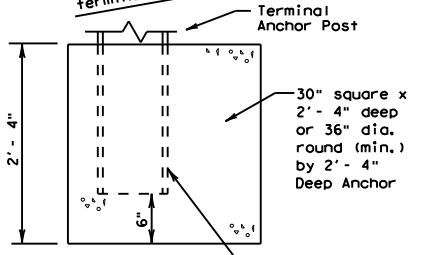
Note: This anchor post requires the use of the 10 ga. terminal connector with four 1/2 inch hex bolts with nut and washer.

TERMINAL ANCHOR POST OPTIONS
 (See General Note 11)

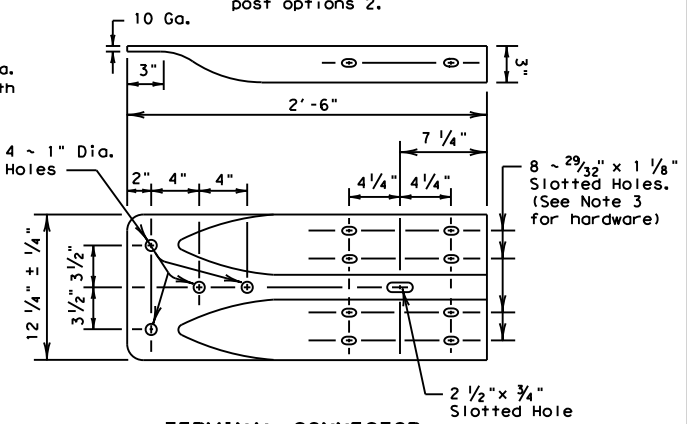


Notes:
 Either concrete anchor may be used with either post option above.
 No construction joint is allowed in the concrete anchor.
 Terminal rail may be bolted to post and in twist position prior to placing concrete anchor.
 If concrete anchor is precast, the area should be compacted as directed by the Engineer, when placed in the field.

TERMINAL CONCRETE ANCHOR OPTIONS
 (See General Note 11)



Place face of post approx. on center of anchor



TERMINAL CONNECTOR

For connection hardware to concrete rails, see the MGBF transition standards.

ONLY FOR USE IN MAINTENANCE REPAIRS OR HIGHLY CONSTRAINED SITE CONDITIONS.

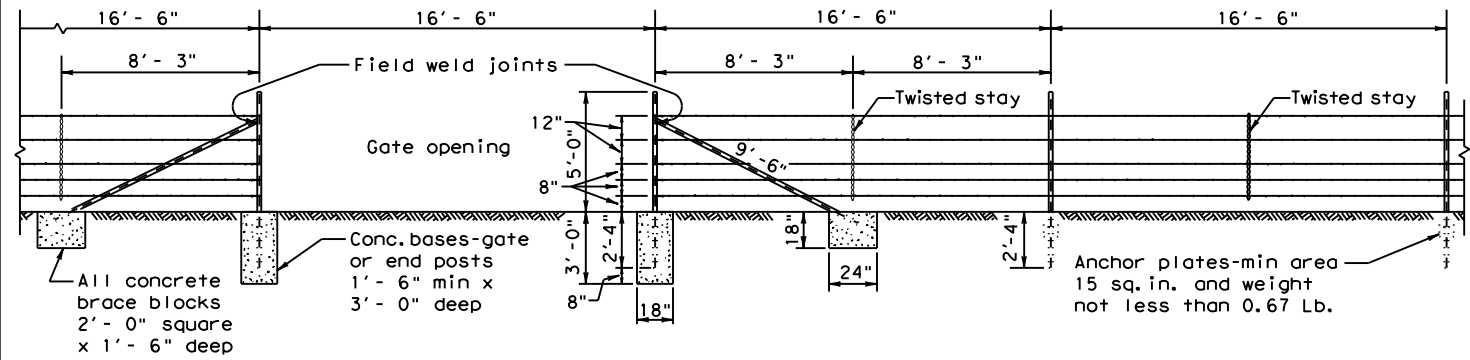


METAL BEAM GUARD FENCE

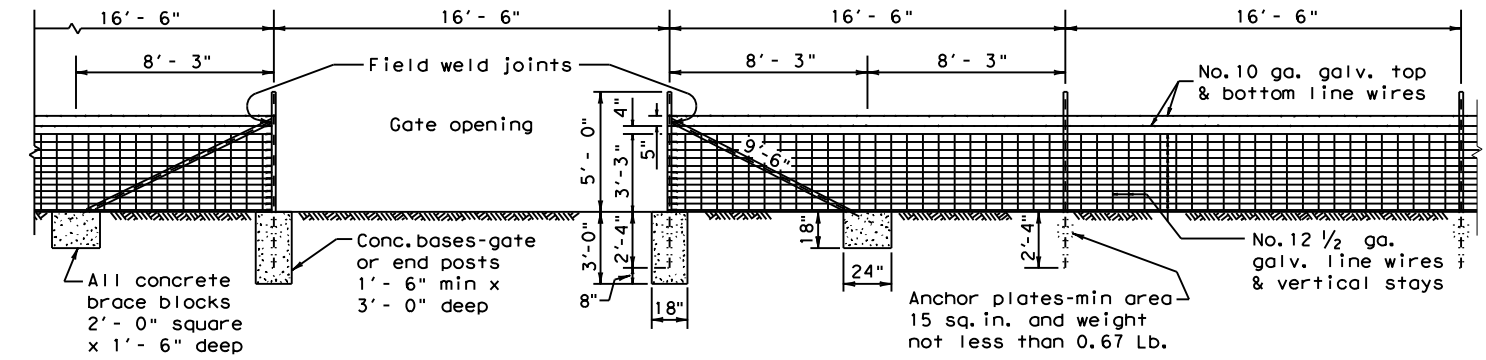
MBGF-19

FILE: mbgf19.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
© TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	090129	091, ETC	CR, ETC	
	DIST	COUNTY	SHEET NO.	
	PAR	LAMAR, ETC	22	

DATE: 12/30/2021
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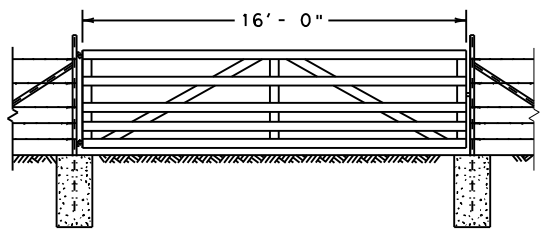
SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS
 BRACING DETAIL USED AT ENDS AND GATES
TYPE "C" FENCE
 (See General Note 8)



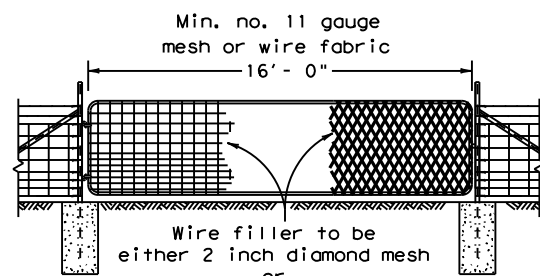
SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS
 BRACING DETAIL USED AT ENDS AND GATES
TYPE "D" FENCE
 (See General Note 8)

Note:
 For Steel pipe and T-Post requirements.
 (See General Notes 6 & 7)

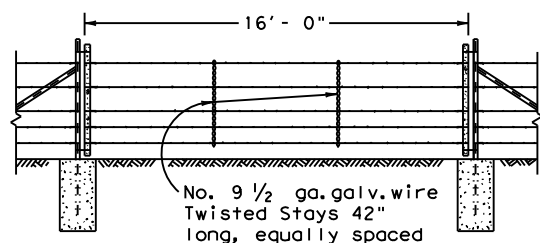
Metal gate shall consist of 5 panels not less than 4'-4" high and shall be aluminum or galvanized metal and of good quality. Gate and hardware shall meet the approval of the engineer.



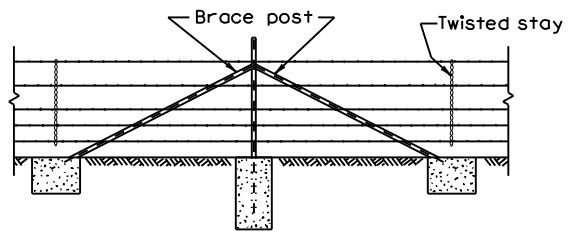
DETAIL TYPE 1 GATE



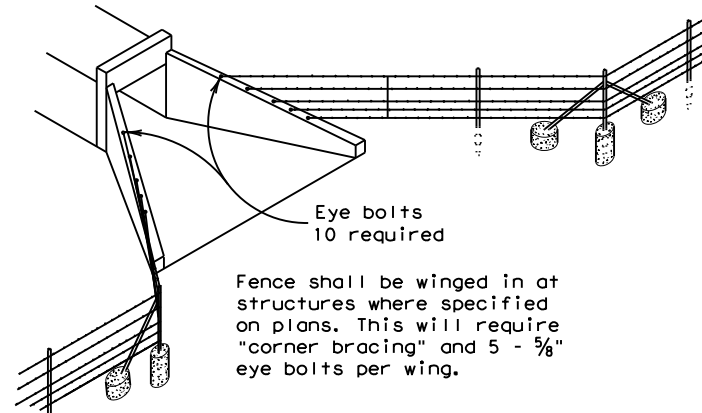
DETAIL TYPE 2 GATE



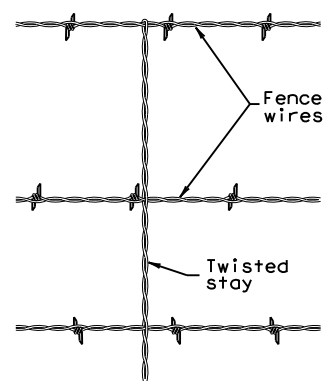
DETAIL TYPE 3 GATE



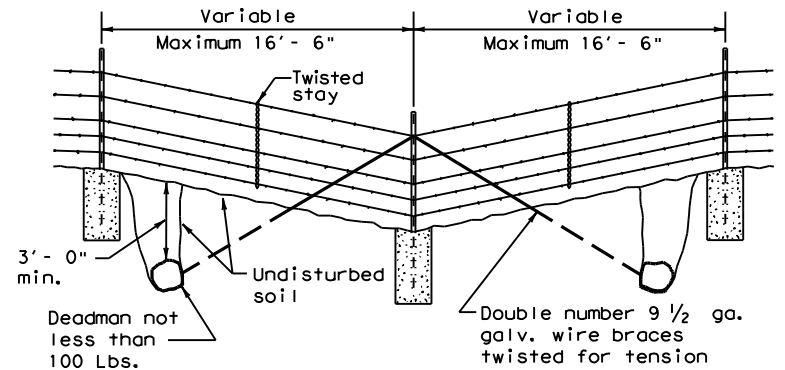
CORNER OR PULL POST ASSEMBLY



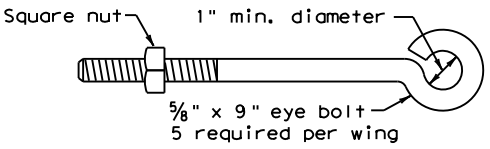
DETAIL OF FENCE TREATMENT AT STRUCTURES



DETAIL OF STAY (Barbed Wire Fence)



DETAIL OF FENCE SAG



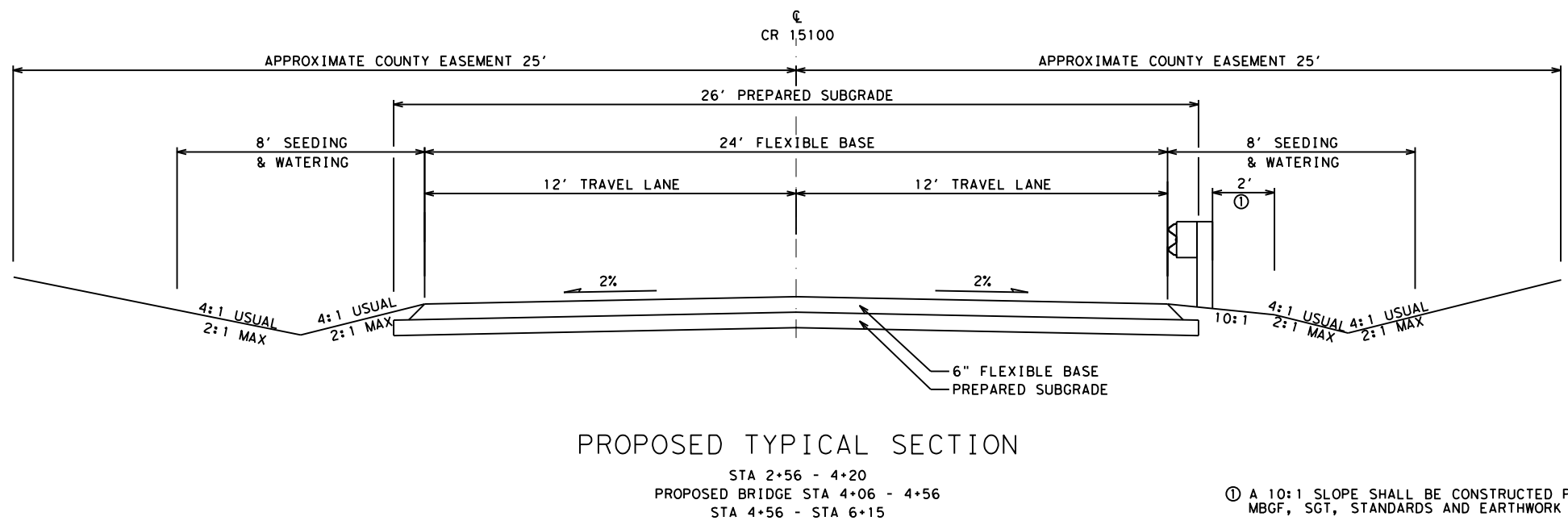
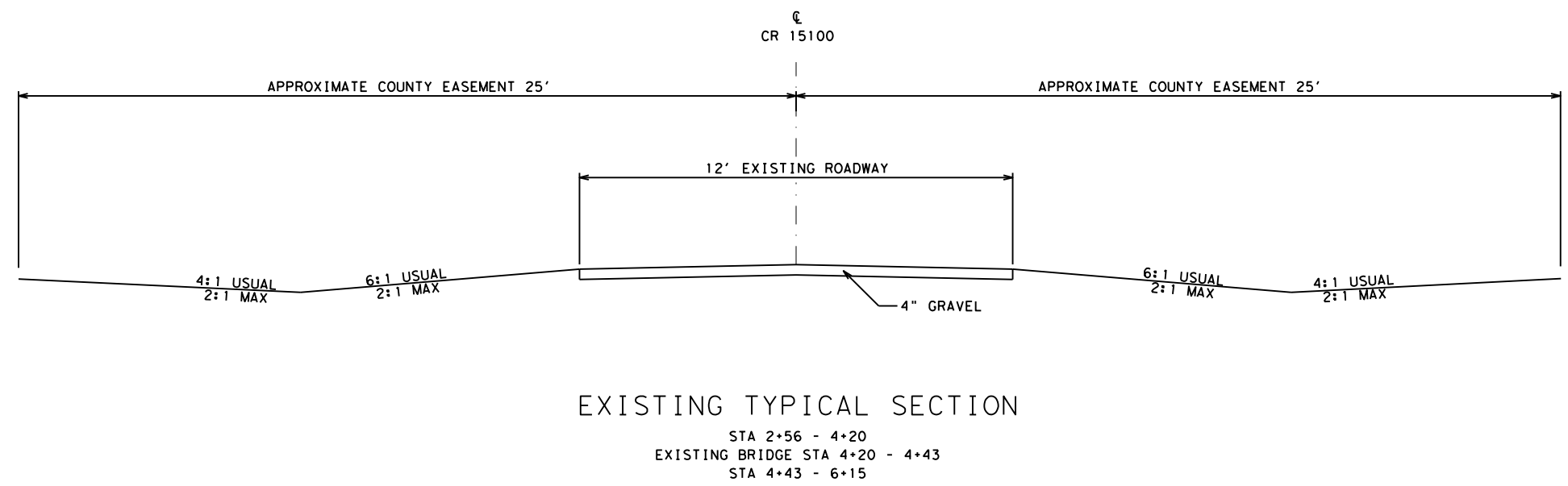
DETAIL OF EYE BOLT

GENERAL NOTES

- Any high point which interferes with the placing of wire mesh shall be excavated to provide a 2 inch clearance.
 - Latches for Type 1 and Type 2 gates shall be good commercial quality and design latch of the spring, fork or chain type. All latches shall be suitable to the gate and shall be approved by the Engineer.
 - Hinges for Type 2 gates shall be a commercial design approved by the Engineer suitable for post and gate.
 - Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
 - Steel anchor plates shall be of a design and thickness sufficient to prevent turning of the post in firm soil.
 - Steel pipe end posts, corner and pull posts shall be a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 1/4" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer. Fasteners for securing barbed wire or woven wire fence to metal posts shall be a minimum of 11 gauge galvanized steel wire. Tubular posts shall be fitted with water malleable iron caps.
 - If Steel pipe is used for posts and braces, use standard pipe in accordance with ASTM A 53, Class B or A 501. For T-Posts use steel that meets ASTM A 702. Metal line posts shall be not less than 6'-6" in length and shall weigh not less than (1.33 lbs./lin.ft.). These items shall be in accordance with Item 552, "Wire Fence."
 - Barbed Wire shall be in accordance with ASTM A 121, Class 1 Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.
- Woven Wire Fence (Type D) shall be in accordance with ASTM A 116, Class 1 No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
- The location of gates and corner posts will be as indicated elsewhere in these plans.

		Design Division Standard	
BARBED WIRE AND WOVEN WIRE FENCE (STEEL POSTS) WF (2) - 10			
FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP
© TxDOT 1996	CONT	SECT	JOB
REVISIONS	0901 29	091, ETC	CR, ETC
	DIST	COUNTY	SHEET NO.
	PAR	LAMAR, ETC	23

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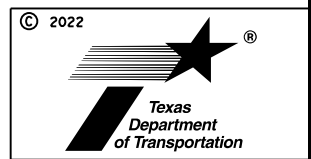


TRANSITION FROM EXISTING TO PROPOSED
 STA 2+72 - 3+22
 STA 5+41 - 5+91

① A 10:1 SLOPE SHALL BE CONSTRUCTED PER THE MBGF, SGT, STANDARDS AND EARTHWORK CROSS SECTIONS.

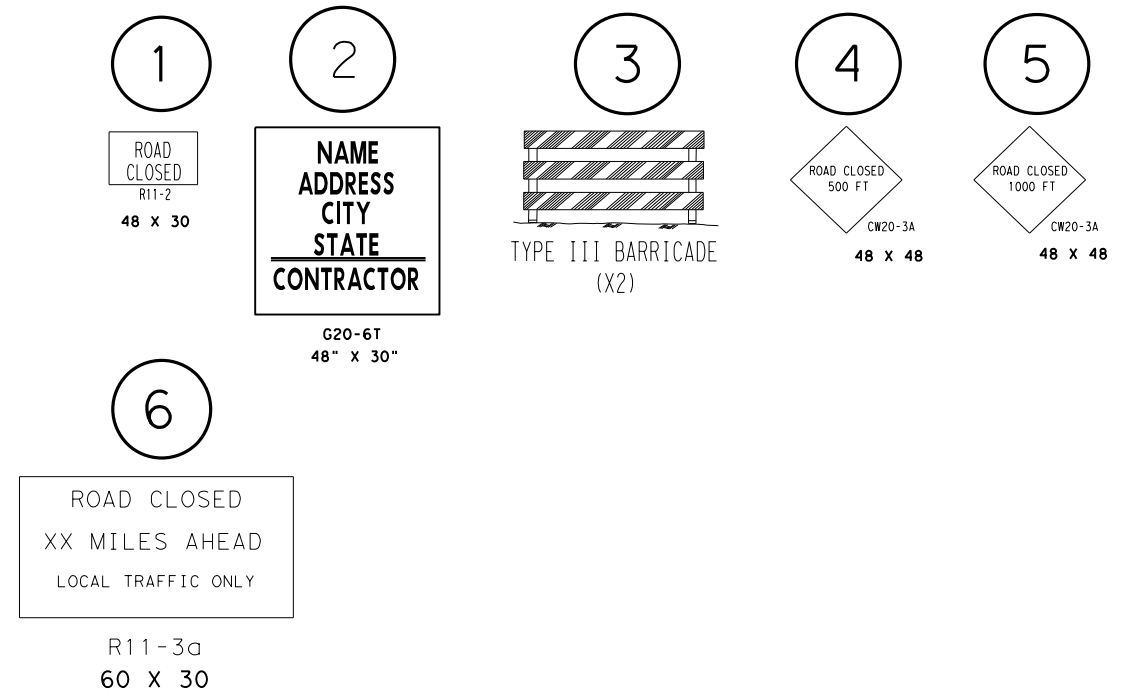
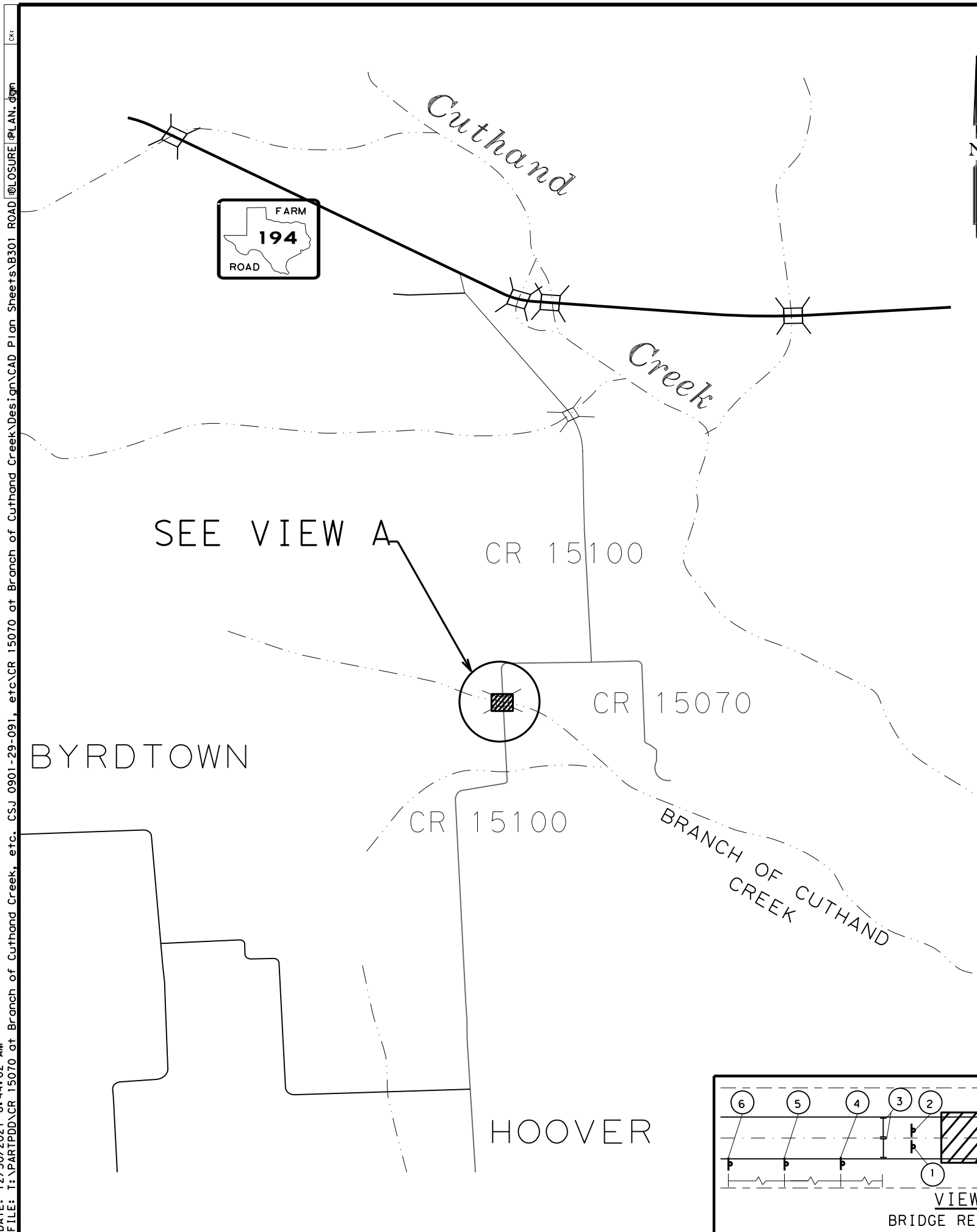
Monte R. Rater P.E.
 12.30.21

CR 15100 @
BRANCH OF
CUTHAND CREEK
0901-29-091
TYPICAL SECTION



CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY	SHEET NO.	
PAR	LAMAR, ETC	24	

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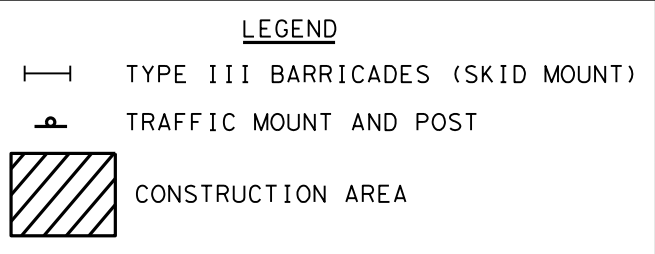
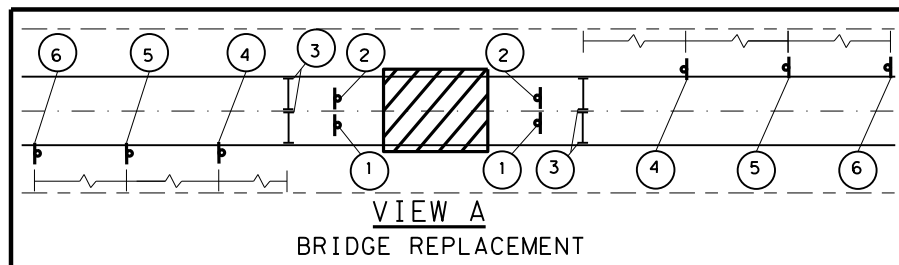
NOTES:
 UTILIZE THE TRAFFIC CONTROL DEVICES ON THIS PAGE WITH THOSE REQUIRED ON WZ(RCD) AND BC(1)-21 THROUGH BC(12)-21 WITH SUPPORT FROM THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

SIGN SPACING NOT TO SCALE UTILIZE TXDOT STANDARDS OR THE TMUTCD FOR APPROPRIATE SIGN/DEVICE SIZE AND SPACING.

Monte R. Rater P.E.
 12.30.21

 CR 15100 @
 BRANCH OF
 CUTHAND CREEK
 0901-29-091
 ROAD CLOSURE
 PLAN

NOT TO SCALE



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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		25

DATE: 12/30/2021 8:44:04 AM
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SUMMARY OF ROADWAY ITEMS

LOCATION		LENGTH	EXISTING WIDTH	PROPOSED WIDTH	100 6002	110 6001	110 6002	132 6003	247 6064
FROM	TO	LF	LF	LF	PREPARING ROW STA	EXCAVATION (ROADWAY) CY	EXCAVATION (CHANNEL) CY	EMBANKMENT (FINAL) (ORD COMP) (TY B) CY	FL BS (CMP IN PLC) (TY A GR 4) SY
2+56	2+72	16	12	12	0.16	6		2	21
2+72	3+22	50	12	*18	0.5			27	100
3+22	4+06	84	12	24	0.84	2		61	224
4+06	4+56	50	12	24	0.5		56		133
4+56	5+41	85	12	24	0.85	3		156	227
5+41	5+91	50	12	*18	0.5	10		57	100
5+91	6+15	24	12	12	0.24	6		3	32
CSJ 0901-29-091 TOTALS					4	27	56	306	805

* AVERAGE WIDTH

SUMMARY OF LANDSCAPE ITEMS

LOCATION	LT/RT	WIDTHS	164 6009	164 6011	164 6023	168 6001	FERTILIZER 3-1-2 (3) LBS
			BROADCAST SEED (TEMP) (WARM) SY	BROADCAST SEED (TEMP) (COOL) SY	CELL FBR MLCH SEED (PERM) (RURA L) (CLAY) SY	VEGETATIVE WATERING (2) MG	
2+56 - 4+00	LT	8	64	64	128	1	13
2+56 - 4+00	RT	9	72	72	144	1	14
4+60 - 6+15	LT	15	129	129	258	2	26
4+60 - 6+15	RT	25	215	215	430	3	42
PROJECT TOTALS			480	480	960	7	95

(2) WATERING BASED ON 2 APPLICATION, 0.5" RAINFAALL EQUIVALENT = 0.0028 MG/SY/CYCLE
 (3) FOR CONTRACTOR'S INFORMATION ONLY: 2 CYCLES AT 50 LBS NITROGEN PER ACRE AT 21-7-14 (NPK) ANALYSIS = 0.0492 LBS/SY/CYCLE

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	LT/RT	169 6003	506 6001	506 6011	506 6038	506 6039	506 6020	506 6024
		SOIL RETENTION BLANKET (TY C) (CL 1) SY	ROCK FILTER DAMS (INSTALL) (TY 1) LF	ROCK FILTER DAMS (REMOVE) LF	TEMP SEDMT CONT FENCE (INSTALL) LF	TEMP SEDMT CONT FENCE (REMOVE) LF	CONSTRUCTION EXITS (INSTALL) (TY 1) SY	CONSTRUCTION EXITS (REMOVE) SY
2+56 - 2+66	LT				10	10		
2+76 - 4+00	LT				124	124		
2+56 - 4+00	RT				144	144	133	133
4+06	LT		10	10				
4+06	RT		10	10				
4+56	LT		10	10				
4+56	RT		10	10				
4+60 - 5+25	LT	78						
4+60 - 5+25	RT	185						
PROJECT TOTALS		263	40	40	278	278	133	133

SUMMARY OF WIRE FENCE ITEMS

LOCATION	552 6003
	WIRE FENCE (TY C) LF
3+00 - 5+53 LT	255
CSJ 0901-29-091 TOTALS	
	255

SUMMARY OF REMOVAL ITEMS


LOCATION		496 6009
FROM	TO	REMOV STR (BRIDGE 0 - 99 FT LENGTH) EA
4+20	4+43	1
CSJ 0901-29-091 TOTALS		1

SUMMARY OF GUARD FENCE ITEMS

LOCATION	540 6002	544 6001	658 6062
	MTL W-BEAM GD FEN (STEEL POST) LF	GUARDRAIL END TREATMENT (INSTALL) EA	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI) EA
SOUTH BOUND APPROACH	25	1	3
SOUTH BOUND DEPARTURE	25	1	3
NORTH BOUND APPROACH	25	1	3
NORTH BOUND DEPARTURE	25	1	3
CSJ 0901-29-091 TOTALS		100	4
			12

**CR 15100 @
 BRANCH OF
 CUTHAND CREEK
 0901-29-091
 QUANTITY SUMMARY**

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		26

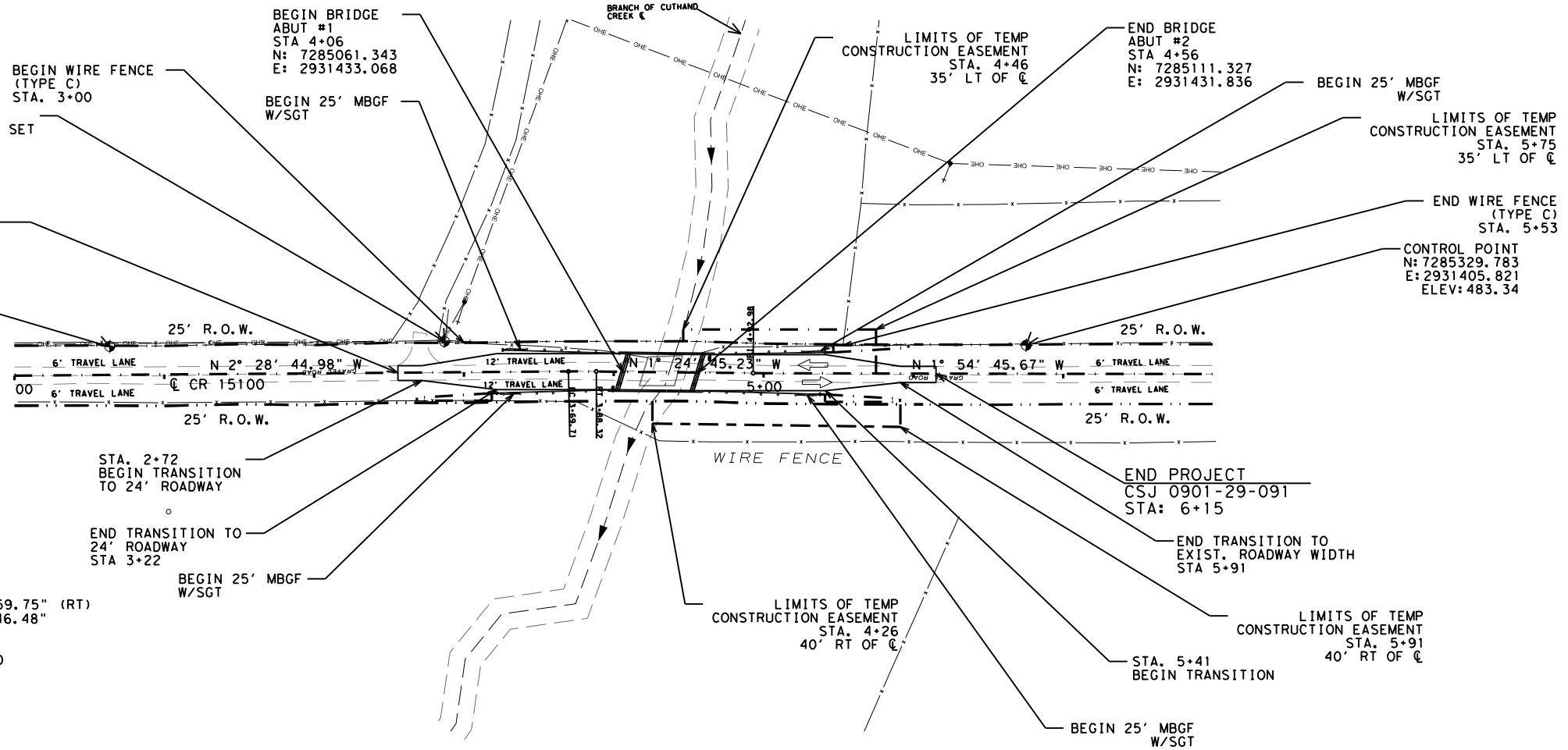
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PI STATION = 3+79.02
 DELTA = 1° 03' 59.75" (RT)
 DEGREE OF CURVE = 5° 43' 46.48"
 TANGENT = 9.31
 LENGTH = 18.62
 RADIUS = 1,000.00
 PC STATION = 3+69.71
 PT STATION = 3+88.32

BEGIN PROJECT
 CSJ 0901-29-091
 STA: 2+56

CONTROL POINT
 N: 7284718.526
 E: 2931428.315
 ELEV: 486.03

BENCHMARK
 RAILROAD SPIKE SET
 IN POWER POLE
 ELEV: 485.00



BRIDGE DATA

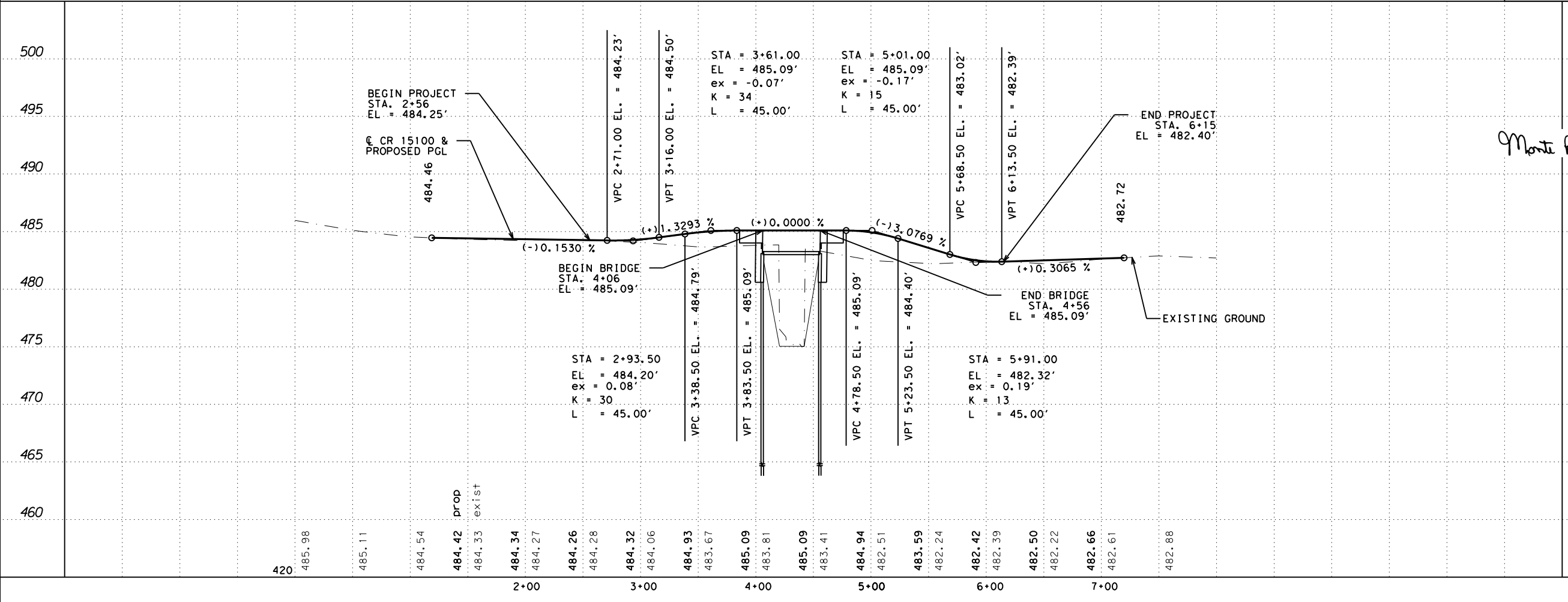
DESIGN SPEED: 15 MPH
 AADT: 40 (2010) 60 (2030)
 FUNCTIONAL CLASS: Local
 LEVEL TERRAIN

EXISTING STRUCTURE:
 NBI#: 01-139-0-AA03-28-001
 STA. 4+20 - 4+43
 2-(10' x 8.5') MBC

PROPOSED STRUCTURE:
 NBI#: 01-139-0-AA48-00-001
 STA. 4+06 - 4+56
 50' SPAN PRESTRESSED
 CONCRETE SLAB BEAMS
 15° SKEW

LEGEND

- ROADWAY CENTERLINE
- R.O.W.
- LIMITS OF TEMP CONSTRUCTION
- CHANNEL OVERBANK
- CHANNEL FLOW LINE
- FENCE
- ELECTRIC UTILITY LINE



BENCHMARK
 RAILROAD SPIKE SET
 IN POWER POLE
 STA. 2+87
 OFFSET = 20.65' LT
 EL = 485.00'
 12.30.21

Monte R. Rater P.E.

CR 15100 @
 BRANCH OF
 CUTHAND CREEK
 0901-29-091
 PLAN AND PROFILE

SCALE
 HORIZONTAL: 1" = 100'
 VERTICAL: 1" = 10'

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		27

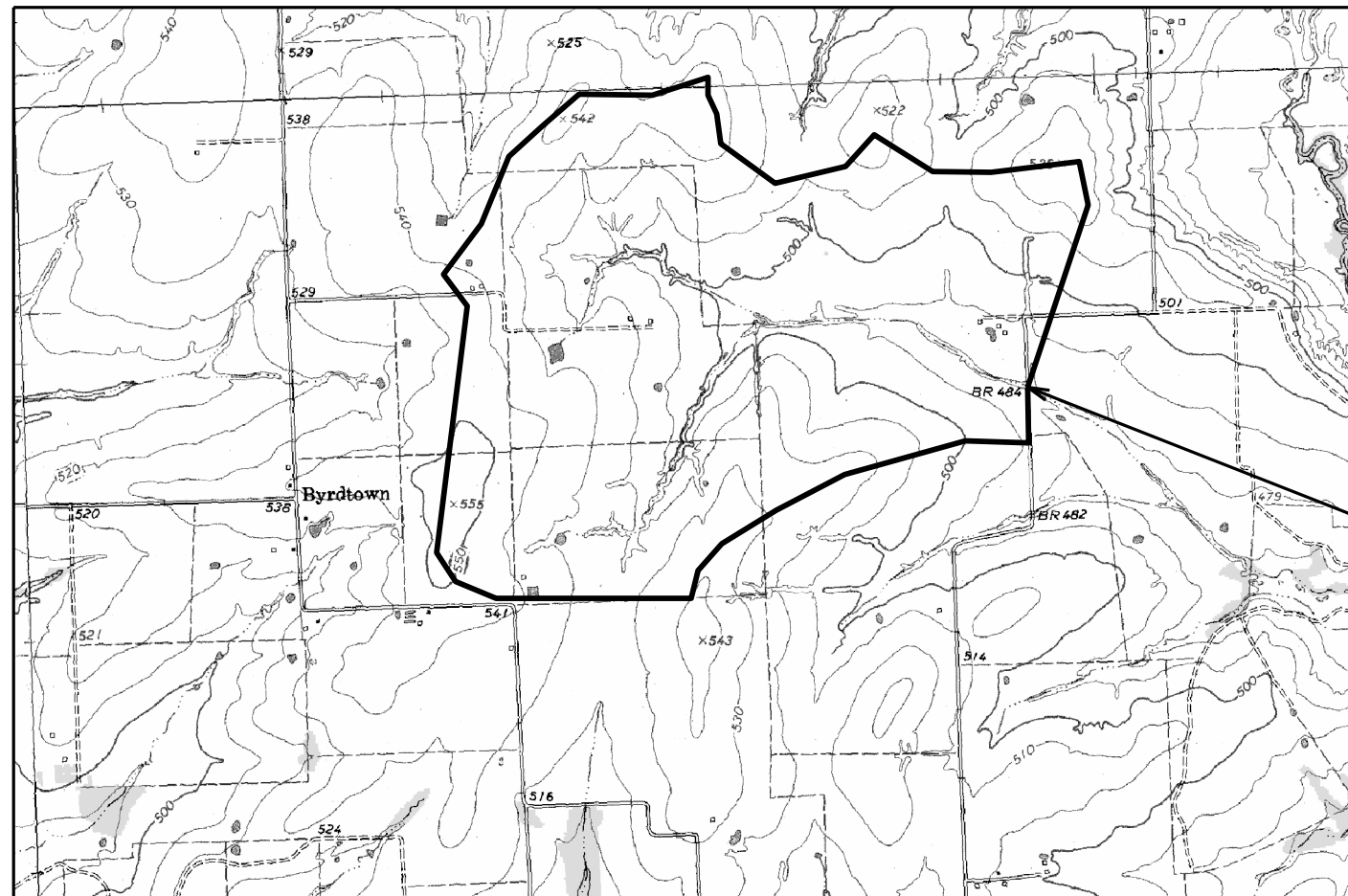
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HYDROLOGIC METHOD

DRAINAGE AREAS WERE DETERMINED BY SURVEY DATA, USGS TOPOGRAPHIC MAPS, DIGITAL ELEVATION MODELS AND FIELD OBSERVATIONS.

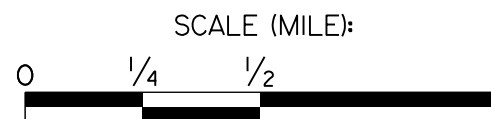
PEAK FLOWS WERE DETERMINED USING A FREQUENCY STORM RAINFALL DISTRIBUTION UTILIZING THE SCS CURVE NUMBER LOSS METHOD AND SCS UNIT HYDROGRAPH.

NRCS Method		
Frequency (yrs)	Volume (in)	Flow (cfs)
2 year	2.03	545.2
5 year	3.04	798.5
10 year	3.84	996.7
25 year	4.96	1257.5
50 year	5.83	1459.3
100 year	6.75	1661.2
Lag minutes		56.67
Time Interval min		10.0
Curve Number		80.6

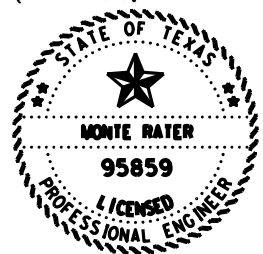


BRANCH OF CUTHAND CREEK BRIDGE
1.11 SQ MI

DRAINAGE AREA MAP



Monte R. Rater P.E.
12.30.21



CR 15100 @
BRANCH OF
CUTHAND CREEK
0901-29-091
HYDRAULIC DATA

SHEET 1 OF 2

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		28

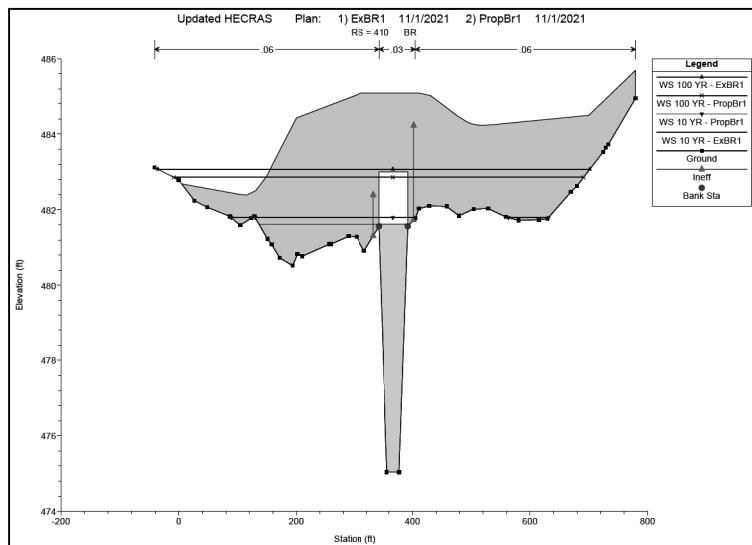
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	EXISTING	PROPOSED
BRANCH OF CUTHAND CREEK LOW CHORD (FT)	482.90	483.00
LOWEST ROAD ELEVATION (FT)	482.27	482.39

HEC-RAS 10 Year Flood Event						
River Station	Exist Water Surface Elev (ft)	Prop Water Surface Elev (ft)	Difference (ft)	Exist Channel Velocity (ft/s)	Prop Channel Velocity (ft/s)	Difference (ft)
1395	484.07	484.05	-0.02	3.65	3.68	0.03
1295	483.96	483.93	-0.03	3.73	3.77	0.04
1195	483.83	483.8	-0.03	3.84	3.89	0.05
695	482.77	482.63	-0.14	5.09	5.33	0.24
656	482.77	482.63	-0.14	4.28	4.48	0.2
630	482.62	482.44	-0.18	4.93	5.25	0.32
592	482.34	482.06	-0.28	5.8	6.44	0.64
567	482.3	482.02	-0.28	5.46	5.99	0.53
536	482.26	481.96	-0.3	5.08	5.61	0.53
495	482.25	481.93	-0.32	4.44	4.94	0.5
468	482.24	481.91	-0.33	4.08	4.57	0.49
421	481.98	481.76	-0.22	5.22	4.93	-0.29
Bridge						
390	481.67	481.74	0.07	5.68	4.39	-1.29
329	481.67	481.67	0	4.41	4.41	0
300	481.64	481.64	0	4.38	4.38	0
256	481.73	481.73	0	2.8	2.8	0
154	481.66	481.66	0	3.33	3.33	0
105	481.64	481.64	0	3.3	3.3	0
48	481.59	481.59	0	3.5	3.5	0
-50	481.52	481.52	0	3.5	3.5	0

HEC-RAS 100 Year Flood Event						
River Station	Exist Water Surface Elev (ft)	Prop Water Surface Elev (ft)	Difference (ft)	Exist Channel Velocity (ft/s)	Prop Channel Velocity (ft/s)	Difference (ft)
1395	484.96	484.96	0	3.98	3.99	0.01
1295	484.86	484.86	0	4.03	4.04	0.01
1195	484.75	484.75	0	4.1	4.11	0.01
695	483.98	483.95	-0.03	4.99	5.07	0.08
656	484	483.98	-0.02	4.24	4.29	0.05
630	483.95	483.92	-0.03	4.52	4.58	0.06
592	483.87	483.82	-0.05	4.79	4.9	0.11
567	483.75	483.69	-0.06	5.18	5.33	0.15
536	483.71	483.65	-0.06	4.98	5.13	0.15
495	483.74	483.68	-0.06	4.21	4.31	0.1
468	483.74	483.68	-0.06	3.96	4.09	0.13
421	483.25	483.41	0.16	6.36	5.37	-0.99
Bridge						
390	482.41	482.28	-0.13	6.05	6.49	0.44
329	482.24	482.24	0	5.87	5.87	0
300	482.25	482.25	0	5.5	5.5	0
256	482.37	482.37	0	3.59	3.59	0
154	482.32	482.32	0	3.78	3.78	0
105	482.31	482.31	0	3.55	3.55	0
48	482.26	482.26	0	3.83	3.83	0
-50	482.19	482.19	0	3.83	3.83	0

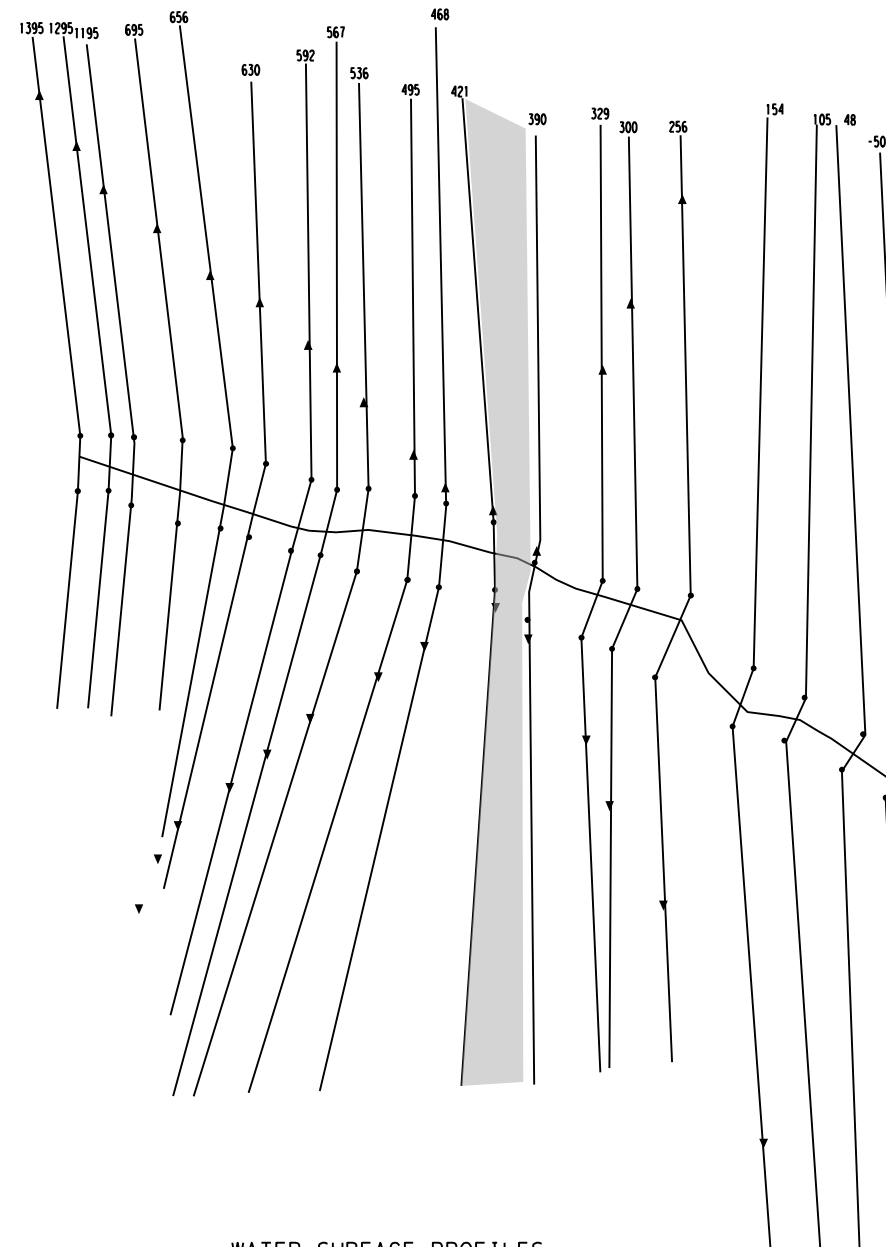
SECTION AT DOWNSTREAM BRIDGE FACE
RIVER STA. 410



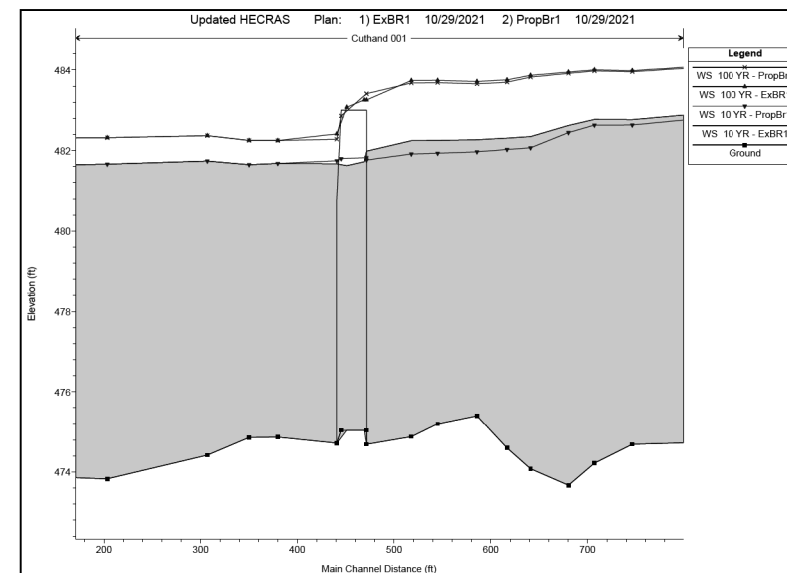
NOTES:

1. THE EXISTING AND PROPOSED WATER SURFACE ELEVATIONS WERE COMPUTED USING HEC-RAS 5.0.7.
2. THE EXISTING BRIDGE AND PROPOSED BRIDGE CONDITIONS WERE MODELED IN HEC-RAS USING THE ENERGY (STANDARD STEP) METHOD FOR LOW FLOW AND THE PRESSURE AND/OR WEIR METHOD FOR HIGH FLOW. THE REACH BOUNDARY CONDITIONS WERE ESTABLISHED BY CALCULATING NORMAL DEPTH WITH A CHANNEL SLOPE OF 0.0007 AT THE FARTHEST DOWNSTREAM CROSS SECTION.
3. THIS SITE LIES WITHIN A FLOOD HAZARD AREA (ZONE A) AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP NO. 48277C0500C.
4. COORDINATION WITH THE LAMAR COUNTY FLOODPLAIN ADMINISTRATOR WAS COMPLETED ON 1/07/2022.

CROSS-SECTION LAYOUT



WATER SURFACE PROFILES



Monte R. Rater P.E.
 12.30.21

 CR 15100 @
 BRANCH OF
 CUTHAND CREEK
 0901-29-091
 HYDRAULIC DATA

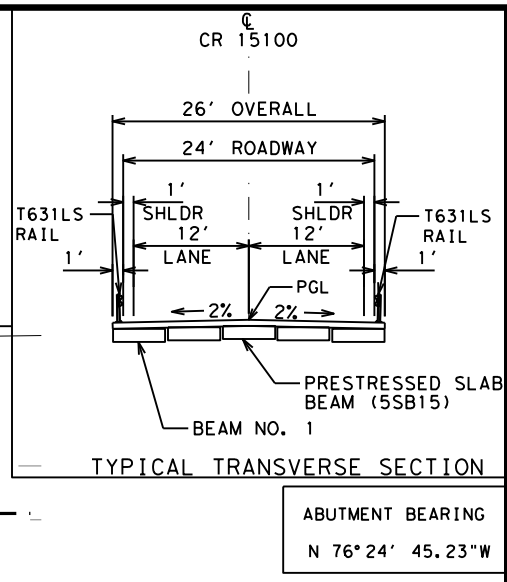
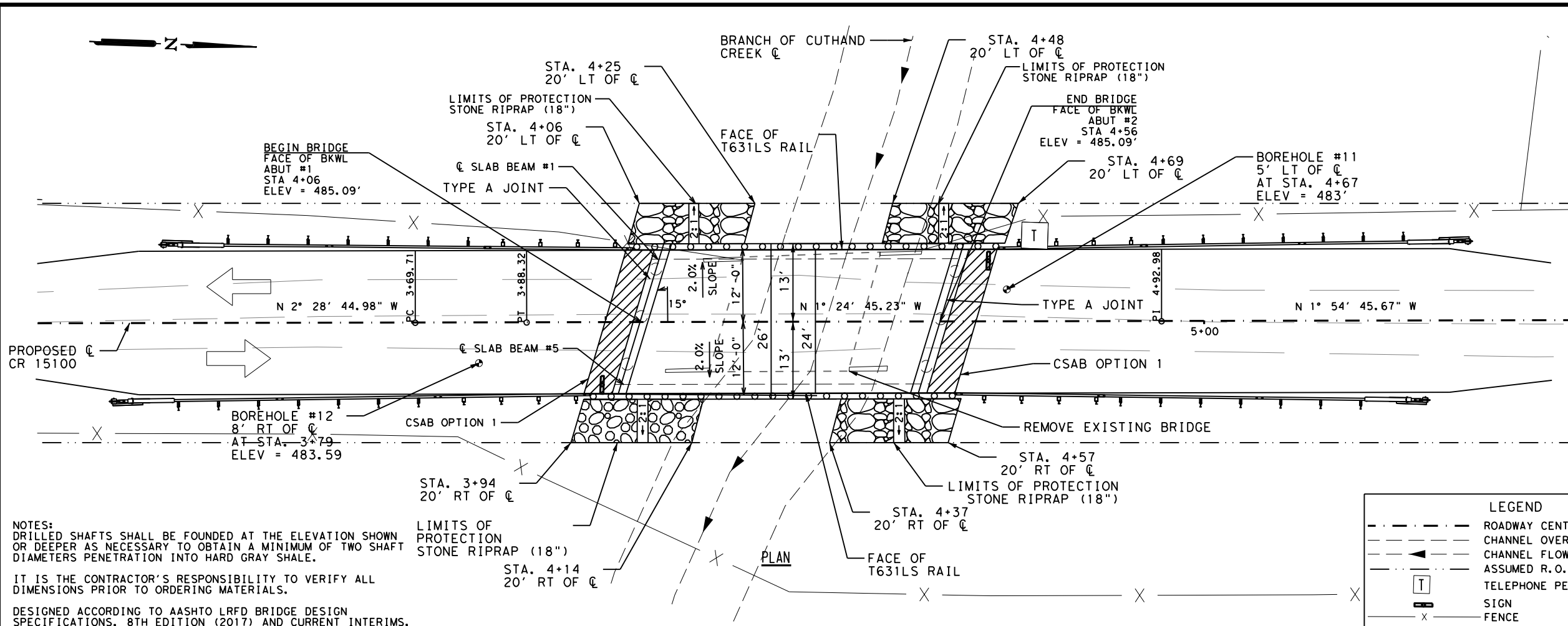
SHEET 2 OF 2

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 Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		29

DATE: 12/30/2021 8:44:24 AM
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BRIDGE DATA

DESIGN SPEED: 15 MPH
 AADT: 40 (2010) 60 (2030)
 FUNCTIONAL CLASS: Local LEVEL TERRAIN

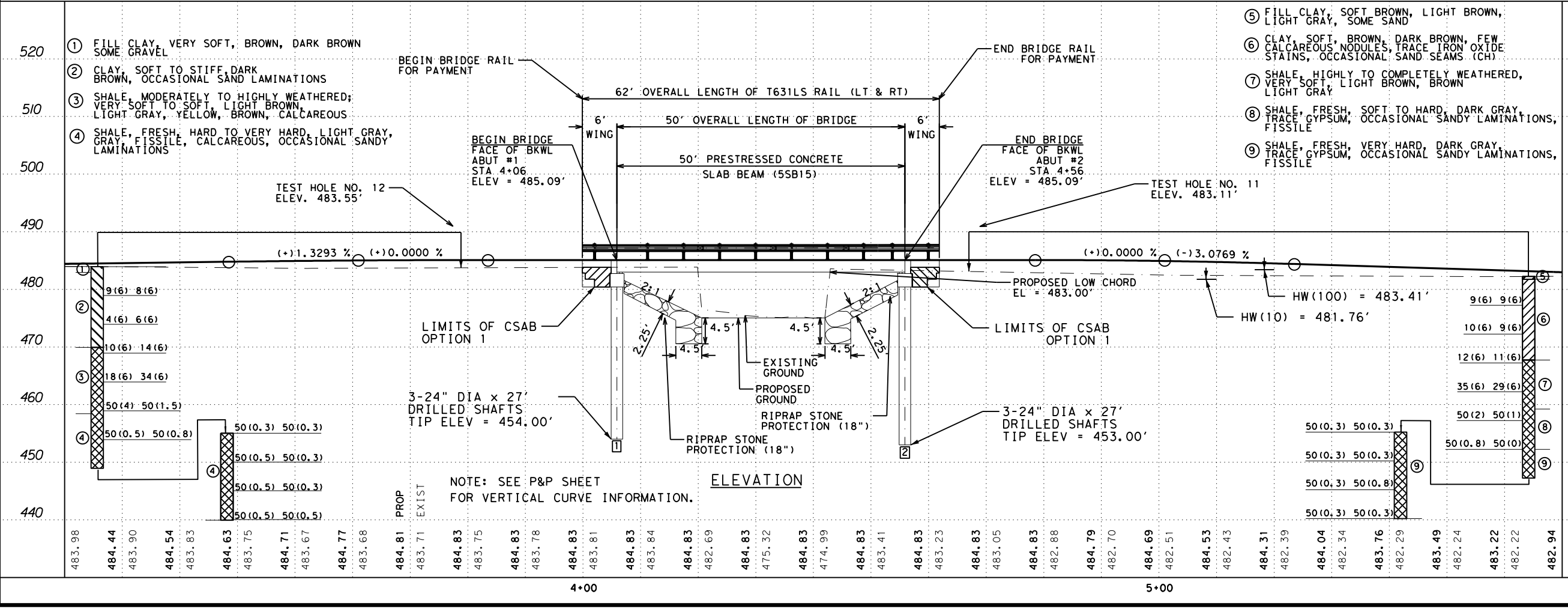
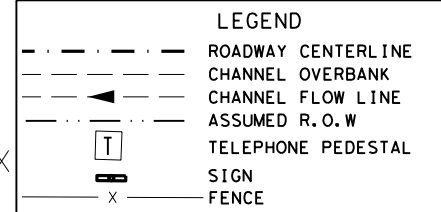
EXISTING STRUCTURE:
 NBI#: 01-139-0-AA03-28-001
 STA. 4+20 - 4+43
 2-(10' x 8.5') OPEN BOTTOM BOX

PROPOSED STRUCTURE:
 NBI#: 01-139-0-AA48-00-001
 STA. 4+06 - 4+56
 50' SPAN PRESTRESSED CONCRETE SLAB BEAMS
 15° SKEW

NOTES:
 DRILLED SHAFTS SHALL BE FOUNDED AT THE ELEVATION SHOWN OR DEEPER AS NECESSARY TO OBTAIN A MINIMUM OF TWO SHAFT DIAMETERS PENETRATION INTO HARD GRAY SHALE.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS.

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017) AND CURRENT INTERIMS.



REFER TO PLAN AND PROFILE SHEETS FOR CONTROL INFORMATION

Monte R. Pater P.E.
 12.30.21

CR 15100 @ BRANCH OF CUTHAND CREEK 0901-29-091 BRIDGE LAYOUT

SCALE
 VERTICAL: 1"=20'
 HORIZONTAL: 1"=20'

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		30

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 FILE: I:\PARTPDD\CR 15070 of Branch of Cuthand Creek, etc. CSJ 0901-29-091, etc\CR 15070 of Branch of Cuthand Creek\Design\CAD Plan Sheets\0901 BRIDGE QUANTITIES AND BEARING SEAT E


SUMMARY OF BRANCH OF CUTHAND CREEK BRIDGE ITEMS							
LOCATION	400 6005	416 6002	420 6013	422 6007	425 6012	432 6033	450 6019
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (SSB15)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY T631LS)
	CY	LF	CY	SF	LF	CY	LF
STA 4+06 - 4+56	40	162	21	1300	247.1	110	124
CSJ 0901-29-091 TOTALS	40	162	21	1300	247.1	110	124

CAP ELEVATIONS (FT)

	STEP 1 (RIGHT)	STEP 3 (LT.SIDE) (RT.SIDE)	STEP 4 (LT.SIDE) (RT.SIDE)	STEP 6 (LEFT)
ABUT 1 (FWD)	482.830	483.037 483.037	483.037 483.037	482.830
	STEP 1 (RIGHT)	STEP 3 (LT.SIDE) (RT.SIDE)	STEP 4 (LT.SIDE) (RT.SIDE)	STEP 6 (LEFT)
ABUT 2 (BK)	482.830	483.037 483.037	483.037 483.037	482.830

CR 15100 @
 BRANCH OF
 CUTHAND CREEK
 0901-29-091
 BRIDGE QUANTITIES
 AND BEARING SEAT
 ELEVATIONS

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		31

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SITE DESCRIPTION

PROJECT LIMITS: THIS PROJECT IS IN NORTHEAST LAMAR COUNTY ON COUNTY ROAD 15100 (CR 15100) AT BRANCH OF CUTHAND CREEK

PROJECT DESCRIPTION: BRIDGE REPLACEMENT

MAJOR SOIL DISTURBING ACTIVITIES:

INCLUDES PREP ROW, EMBANKMENT FOR FILL, CHANNEL EXCAVATION, DITCH GRADING, EROSION AND SEDIMENTARY CONTROLS, AND TOPSOIL WORK FOR FINAL SEEDING.

TOTAL PROJECT AREA: 0.48 ACRES

TOTAL AREA TO BE DISTURBED: 0.20 AC (50%)

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

The existing soil consists of farmland complex consisting primarily of Elbon Silty Clay and similar soils with only 5% minor components, moderately well drained, slowly permeable soils. Slopes range from 0 to 1 percent. Native grasses, brush, and trees cover the existing soil.

NAME OF RECEIVING WATERS:

Branch of Cuthand Creek flows approximately 2.6 miles and joins Cuthand Creek, segment 0303J. Cuthand Creek then flows approximately 37 miles and empties into Sulphur River, segment 0303.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES & STRUCTURAL PRACTICES:

EROSION CONTROL:

- TEMPORARY SEEDING
- PERMANENT PLANTING, SODDING, OR SEEDING
- MULCHING
- SOIL RETENTION BLANKET
- BUFFER ZONES
- PRESERVATION OF NATURAL RESOURCES

OTHER:

DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITY HAS CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME AND DO WITHIN 21 DAYS.

SEDIMENTATION CONTROL:

- SILT FENCES
- HAY BALES
- ROCK BERMS
- EROSION CONTROL LOGS
- DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- DIVERSION DIKE AND SWALE COMBINATIONS
- PIPE SLOPE DRAINS
- PAVED FLUMES
- ROCK BEDDING AT CONSTRUCTION EXIT
- TIMBER MATTING AT CONSTRUCTION EXIT
- CHANNEL LINERS
- SEDIMENT TRAPS
- SEDIMENT BASINS
- STORM INLET SEDIMENT TRAP
- STONE OUTLET STRUCTURES
- CURBS AND GUTTERS
- STORM SEWERS
- VELOCITY CONTROL DEVICES

POST-CONSTRUCTION CONTROLS:

- RETENTION / IRRIGATION
- EXTENDED DETENTION BASIN (ie: ROCK BERMS)
- VEGETATIVE FILTER STRIPS
- GRASSY SWALES
- VEGETATIVE LINED DRAINAGE DITCHES
- CONSTRUCTED WET LANDS
- WET BASINS
- SAND FILTER SYSTEMS

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:

MAJOR SOIL DISTURBING ACTIVITIES SHALL NOT BE PERFORMED UNTIL EMBANKMENT PLACEMENT IS SCHEDULED TO BEGIN WITHIN FIVE (5) WORKING DAYS.

INSTALL EROSION AND SEDIMENTATION CONTROLS PRIOR TO SOIL DISTURBANCE WHENEVER POSSIBLE.

ONCE BEGUN, EARTHWORK ACTIVITIES SHALL BE PROGRESSED WITHOUT DELAY, UNLESS APPROVED BY THE ENGINEER, UNTIL FINAL GRADING IS ACCOMPLISHED.

EROSION CONTROL MEASURES SHALL BE APPLIED IMMEDIATELY UPON COMPLETION OF THE EMBANKMENT PLACEMENT TO MINIMIZE POTENTIAL WATER QUALITY IMPACTS.

REMARKS: 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, waterbody or streambed.

The Contractor shall designate a location for, construct, and maintain an area for concrete mixing, handling and delivery equipment to wash out.

Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.

All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

MAINTENANCE: All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

INSPECTION: An inspection will be performed by a TxDOT Inspector at least once every seven (7) calendar days. An inspection and maintenance report will be made per each inspection. Stormwater controls will be modified as directed by the Engineer based on these reports.

OTHER EROSION AND SEDIMENT CONTROLS:

WASTE MATERIALS: All trash and construction debris from the job site will be disposed of by the Contractor at a local dump. No construction materials will be buried on site.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): Any hazardous waste spills shall be reported to the TxDOT Safety Officer in Paris. It shall be the responsibility of the waste owner to provide for the required clean-up. If the owner cannot be determined, the district laboratory shall direct in the clean-up operation.

SANITARY WASTE: Any sanitary waste shall be collected from portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor. All sanitary waste from permanent sites will be collected by local sanitary sewer systems.

OFFSITE VEHICLE TRACKING:

- HAUL ROADS DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- EXCESS DIRT ON ROAD REMOVED DAILY
- STABILIZED CONSTRUCTION ENTRANCE

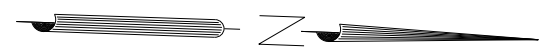
THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL SUBCONTRACTORS ARE AWARE OF AND COMPLY WITH ALL COMPONENTS OF THE SW3P.

Monte R. Rater P.E.
12.30.21
STATE OF TEXAS
MONTE RATER
95859
LICENSED PROFESSIONAL ENGINEER
CR 15100 @
BRANCH OF
CUTHAND CREEK
0901-29-091
SW3P



CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		32

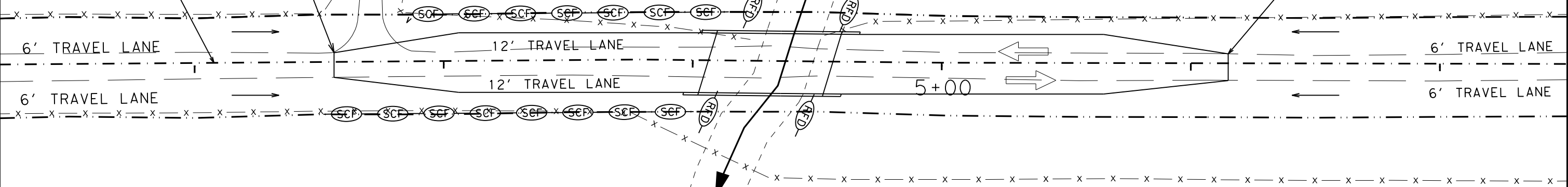
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BEGIN PROJECT
 CSJ: 0901-29-091
 STA: 2+56

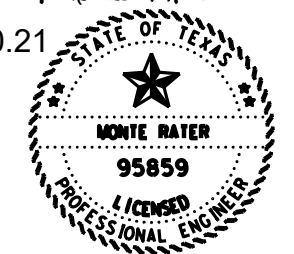
END PROJECT
 CSJ: 0901-29-091
 STA: 6+15

CR 15100 &
 PROPOSED PGL

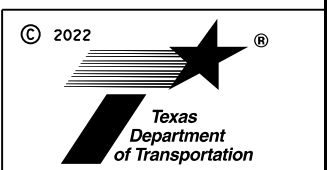


- LEGEND
- - - - ROADWAY CENTERLINE
 - . - . - ASSUMED EXISTING R.O.W.
 - - - - CHANNEL OVERBANK
 - ▲— CHANNEL FLOW LINE
 - ← DITCH FLOW ARROW
 - x-x-x FENCE
 - SCF- SEDIMENT CONTROL FENCE
 - RFD- ROCK FILTER DAM (TYPE 1)

Monte R. Rater P.E.
 12.30.21



CR 15100 @
 BRANCH OF
 CUTHAND CREEK
 0901-29-091
 SW3P LAYOUT



CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		33

DATE: 12/30/2021
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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.
2.
- No Action Required Required Action

Action No.

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

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

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

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

- No Permit Required
- Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
- Individual 404 Permit Required
- Other Nationwide Permit Required: NWP# _____

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

1.
2.
3.
4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

- No Action Required Required Action

Action No.

1.
2.
3.
4.

IV. VEGETATION RESOURCES

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

- No Action Required Required Action

Action No.

- Temporary Best Management Practices or other suitable means of containment will be used to re-establish vegetative areas.
- Post construction Best Management Practices will be used to re-establish vegetative areas.
-
-

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

- No Action Required Required Action

Action No.

- 1.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

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

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

- Yes No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

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

- Yes No

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

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

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

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

- No Action Required Required Action

Action No.

- 1.

VII. OTHER ENVIRONMENTAL ISSUES

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

- No Action Required Required Action


Action No.

- 1.

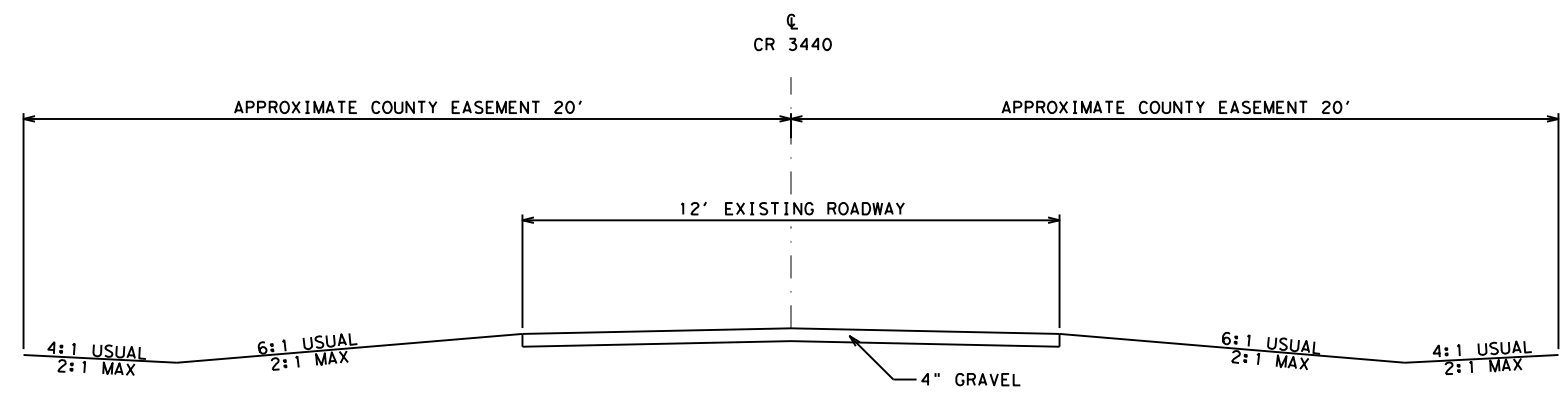
- 2.

- 3.

**CR 15100 @
BRANCH OF
CUTHAND CREEK
0901-29-091**

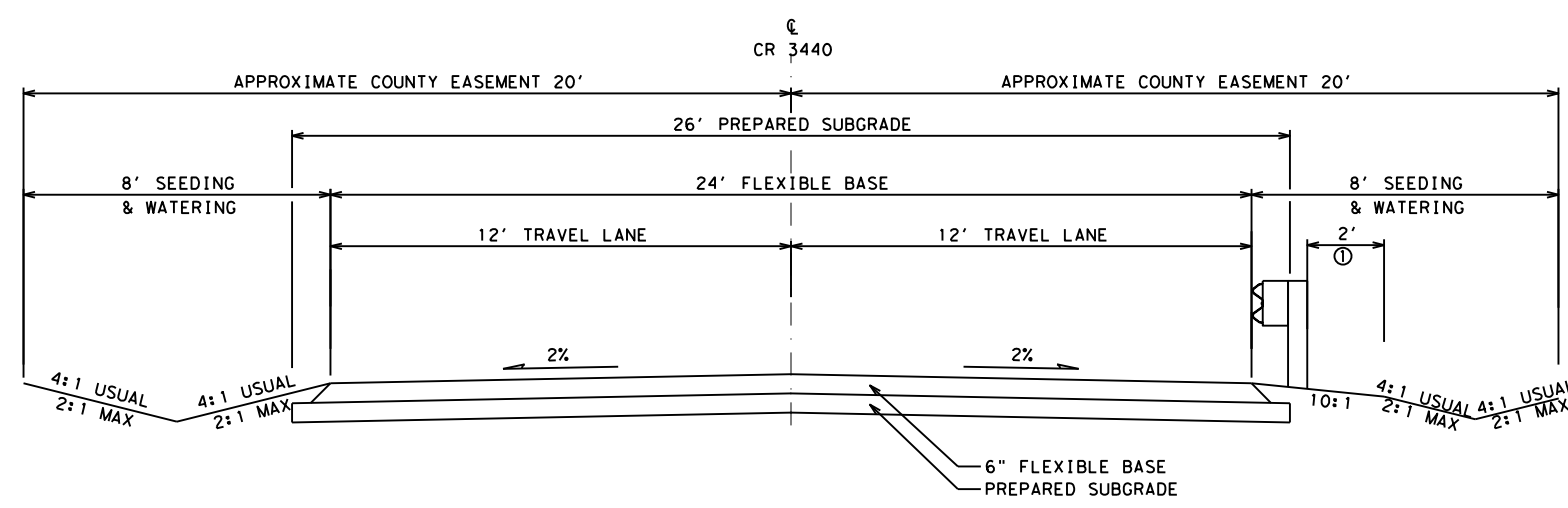
 Texas Department of Transportation		Design Division Standard	
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC			
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP
©TxDOT: February 2015	CONT	SECT	JOB
12-12-2011 (DS) REVISIONS	0901	29	091, ETC
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	PAR	LAMAR, ETC	34

DATE: 12/30/2021 8:44:32 AM
 FILE: I:\PARTPDD\CR_3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\A020 TYPICAL SECTION.dgn



EXISTING TYPICAL SECTION

STA 0+00 - 1+26
 EXISTING BRIDGE STA 1+27 - 1+67
 STA 1+67 - 3+41



PROPOSED TYPICAL SECTION

STA 0+00 - 1+29
 PROPOSED BRIDGE STA 1+29 - 1+79
 STA 1+79 - STA 2+72

TRANSITION FROM EXISTING TO PROPOSED
 STA 2+72 - 3+41

① A 10:1 SLOPE SHALL BE CONSTRUCTED PER THE MBGF, SGT, STANDARDS AND EARTHWORK CROSS SECTIONS.

12.30.21

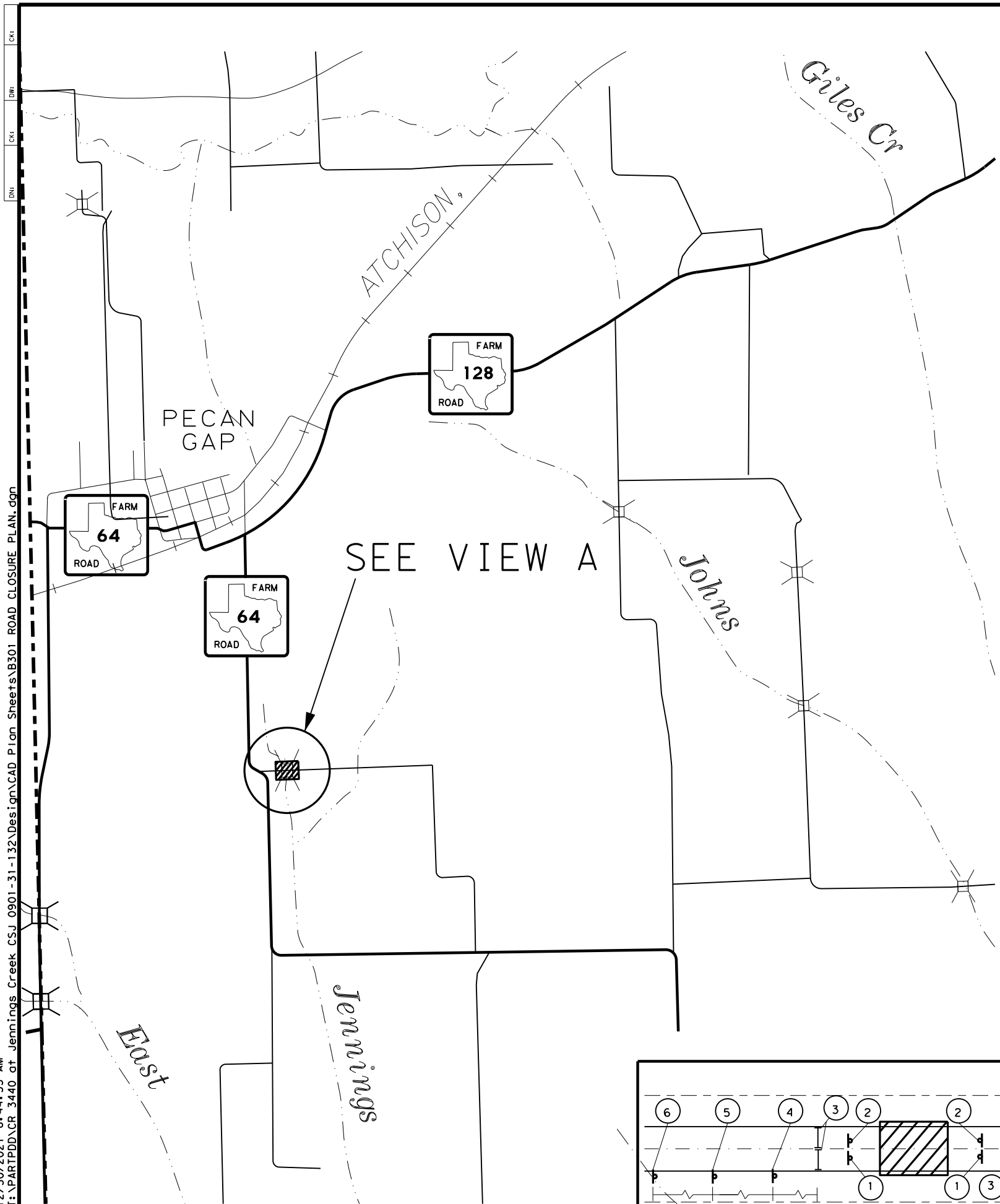
Monte R. Rater P.E.

CR 3440 @
 JENNINGS CREEK
 0901-31-132
 TYPICAL SECTION

© 2022

CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		35

DATE: 12/30/2021 8:44:35 AM
 FILE: T:\PARTPDD\CR_3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\B301 ROAD CLOSURE PLAN.dgn

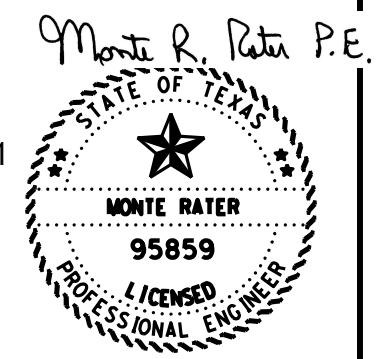


- ① ROAD CLOSED
X.XX MILES AHEAD
LOCAL TRAFFIC ONLY
R11-3g
60 X 30
- ② ROAD CLOSED
1000 FT
CW20-3B
48 X 48
- ③ ROAD CLOSED
500 FT
CW20-3C
48 X 48
- ④ TYPE III BARRICADE
- ⑤ ROAD CLOSED
R11-2
48 X 30
- ⑥ NAME
ADDRESS
CITY
STATE
CONTRACTOR
G20-6T
48" X 30"

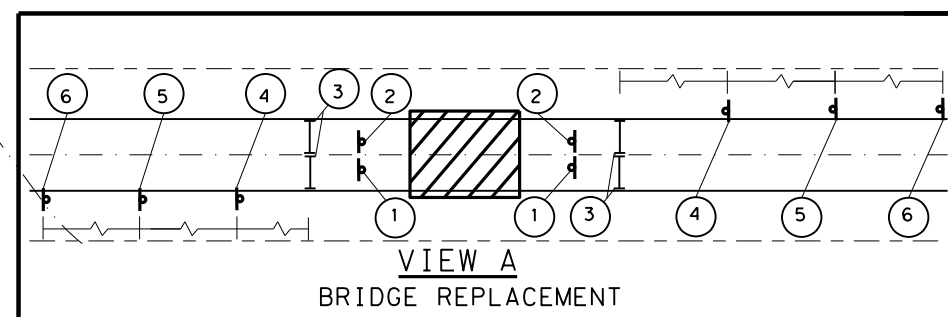
NOTES:
 UTILIZE THE TRAFFIC CONTROL DEVICES ON THIS PAGE WITH THOSE REQUIRED ON WZ(RCD) AND BC(1)-21 THROUGH BC(12)-21 WITH SUPPORT FROM THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

12.30.21

SIGN SPACING NOT TO SCALE UTILIZE TXDOT STANDARDS OR THE TMUTCD FOR APPROPRIATE SIGN/DEVICE SIZE AND SPACING.



CR 3440 @
 JENNINGS CREEK
 0901-31-132
 ROAD CLOSURE
 PLAN



LEGEND

- TYPE III BARRICADES (SKID MOUNT)
- TRAFFIC MOUNT AND POST
- CONSTRUCTION AREA

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		36

DATE: 12/30/2021 8:44:37 AM
FILE: I:\PARTPDD\CR_3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\B501 QUANTITY SUMMARY.dgn

LOCATION		WIDTH	100 6002	110 6001	110 6002	132 6003	247 6064
FROM	TO		PREPARING ROW	EXCAVATION (ROADWAY)	EXCAVATION (CHANNEL)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	FL BS (CMP IN PLC) (TY A GR 4) (6")
FROM	TO		STA	CY	CY	CY	SY
0+00	1+29	24	1	7		235	344
1+29	1+79	26	1		242	1	
1+79	2+72	24		24		78	248
2+72	3+22	*17	1	15		2	95
3+22	3+41	10	1	3		1	51
CSJ 0901-31-132 TOTALS			4	51	242	317	738

* AVERAGE WIDTH

LOCATION		506 6001	506 6011	506 6020	506 6024	506 6038	506 6039
FROM	TO	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
FROM	TO	LF	LF	SY	SY	LF	LF
0+00	1+29	16	16	133	133	250	250
1+79	3+41	16	16			260	260
CSJ 0901-31-132 TOTALS		32	32	133	133	510	510

LOCATION		LT/RT	540 6002	544 6001	658 6062
FROM	TO		MTL W-BEAM GD FEN (STEEL POST)	GUARDRAIL END TREATMENT (INSTALL)	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)
FROM	TO		LF	EA	EA
0+54	1+29	RT	25	1	3
0+40	1+15	LT	25	1	3
1+79	2+54	RT	25	1	3
1+93	2+68	LT	25	1	3
CSJ 0901-31-132 TOTALS			100	4	12

LOCATION		WIDTH	164 6009	164 6011	164 6023	168 6001	FERTILIZER 3-1-2
FROM	TO		BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)	CELL FBR MLCH SEED (PERM) (RURA L) (CLAY)	VEGETATIVE WATERING	
FROM	TO	LF	SY	SY	SY	MG	LBS
0+00	1+29	30	215	215	430	3	43
1+79	3+41	27	243	243	486	3	48
CSJ 0901-31-132 TOTALS			458	458	916	6	91

* FOR CONTRACTOR'S INFORMATION ONLY: 2 CYCLES AT 50 LBS NITROGEN PER ACRE
AT 21-7-14 (NPK) ANALYSIS = 0.0492 LBS/SY/CYCLE

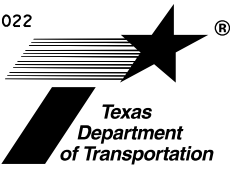
WATERING: BASED ON 2 APPLICATIONS, 0.5" RAINFALL EQUIVALENT = 0.0028 MG/SY/CYCLE

LOCATION		644 6068
STA.	OFFSET	RELOCATE SM RD SN SUP&AM TY 10BWG EA
0+07	25.5' LT	1
CSJ 0901-31-132 TOTALS		1

LOCATION		496 6009
STA.	OFFSET	REMOV STR (BRIDGE 0 - 99 FT LENGTH) EA
1+27 - 1+67		1
CSJ 0901-31-132 TOTALS		1

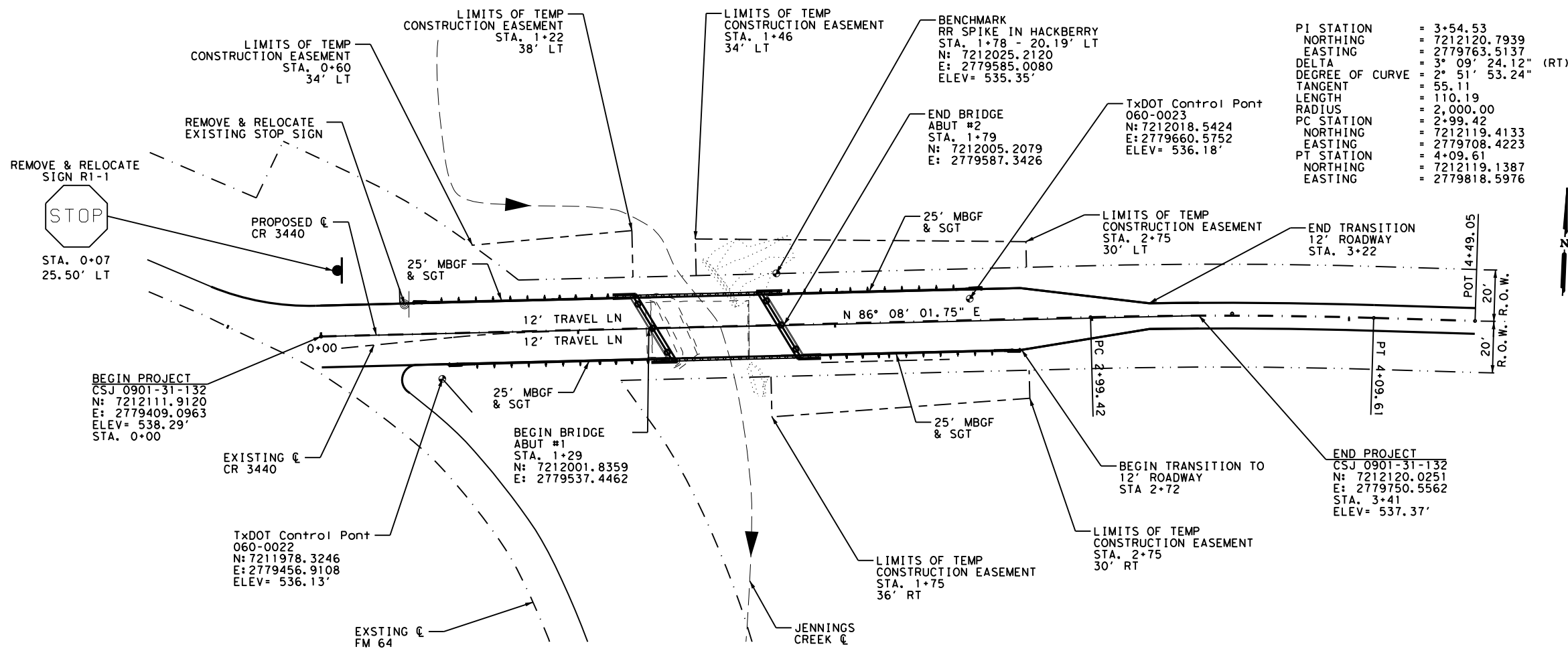
**CR 3440 @
JENNINGS CREEK
0901-31-132
QUANTITY SUMMARY**

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		37

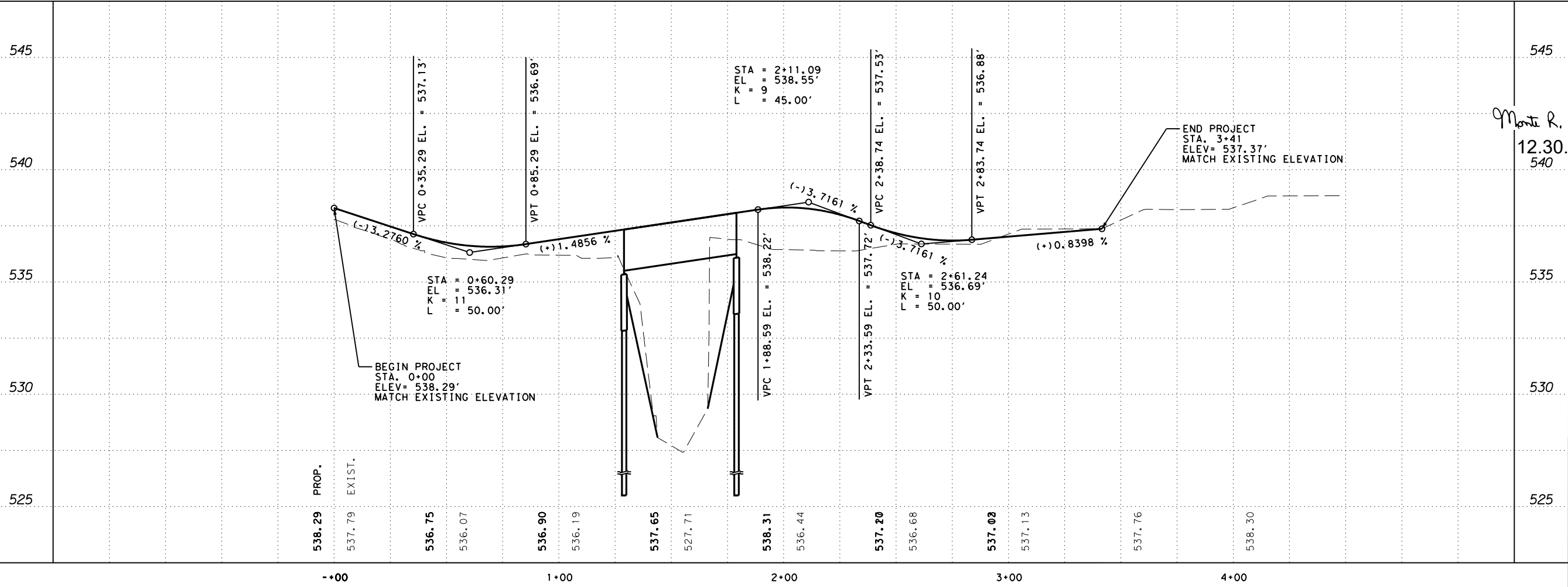
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DESIGN SPEED: 15 MPH
 AADT: 10(2010) 60(2030)
 FUNCTIONAL CLASS: OFF-SYSTEM RURAL
 LOCAL ROAD
 LEVEL TERRAIN

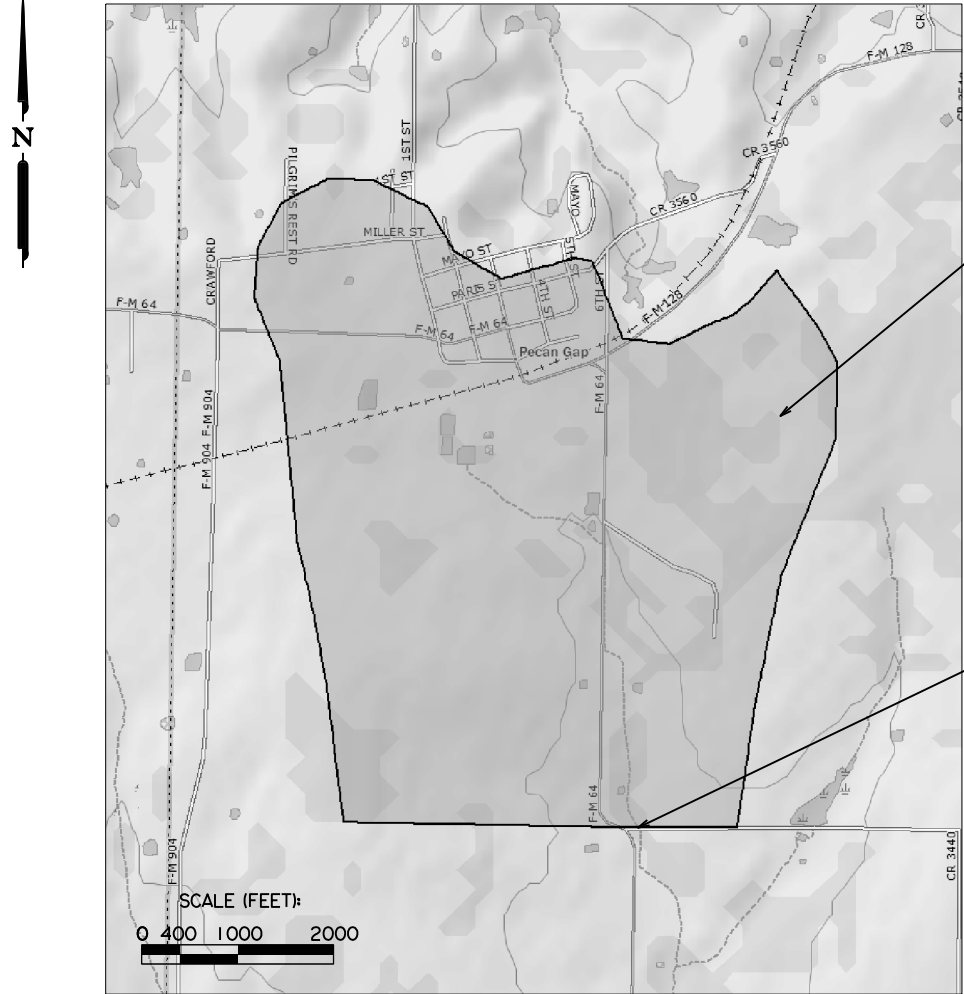
ORIGINAL EXISTING STRUCTURE:
 NBI#: 01-060-0-AA01-13-001
 STA. 1+26.57 - 1+66.57
 40' SINGLE-SPAN STEEL GIRDER
 0° SKEW

PROPOSED STRUCTURE:
 NBI#: 01-060-0-AA34-40-001
 STA. 1+29 - 2+79
 50' SINGLE-SPAN PRESTRESSED
 CONCRETE SLAB BEAMS (5SB15)
 30° SKEW



DN: C&G: DM: C&G: CK:

DATE: 1/7/2022 8:02:11 AM
 FILE: I:\PARTPDD\CR_3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\020 HYDRAULIC DATA.dgn



DRAINAGE AREA = 1.07 SQ. MI.

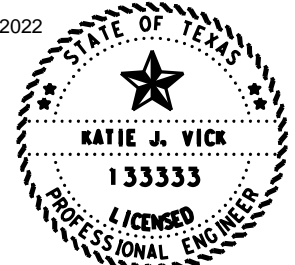
JENNINGS CREEK BRIDGE

HYDROLOGIC METHOD

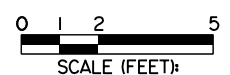
DRAINAGE AREAS WERE DETERMINED BY SURVEY DATA, USGS TOPOGRAPHIC MAPS, DIGITAL ELEVATION MODELS AND FIELD OBSERVATIONS.

PEAK FLOWS WERE DETERMINED USING A FREQUENCY STORM RAINFALL DISTRIBUTION UTILIZING THE SCS CURVE NUMBER LOSS METHOD AND SCS UNIT HYDROGRAPH.

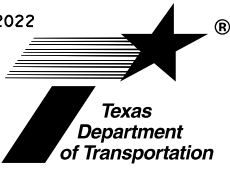
HEC-HMS Output	
Recurrence	Flow (cfs)
2 year	719.5
5 year	1047.3
10 year	1293
25 year	1619.5
50 year	1855.8
100 year	2094.4
Lag minutes	39.49
Time Interval min	5.00
DA (sq mi)	1.0700

Katie J. Vick, P.E.
 01/07/2022


**CR 3440 @
 JENNINGS CREEK
 0901-31-132
 HYDRAULIC DATA**



SHEET 1 OF 2

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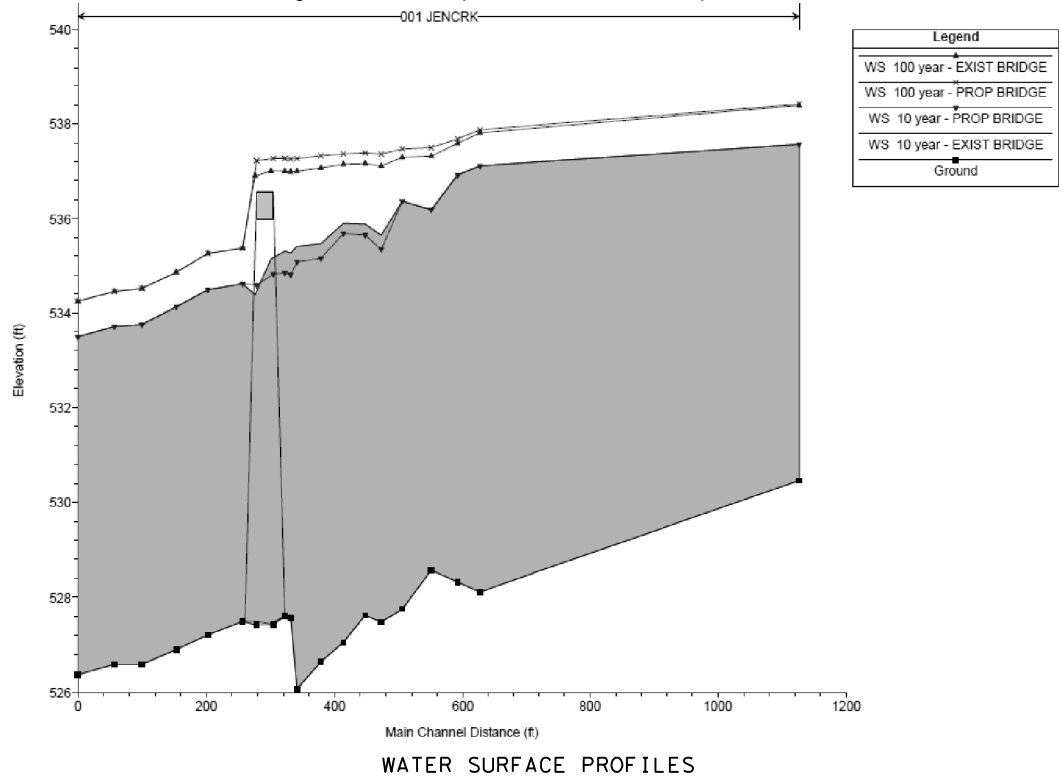
CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		39

C&G:
D&E:
C&G:
D&E:

	EXISTING	PROPOSED
LOW CHORD (FT)	535.36	535.23
LOWEST ROAD ELEVATION (FT)	535.98	536.57

CR 3440 at Jennings Creek Plan: 1) EXIST BRIDGE 8/4/2021 2) PROP BRIDGE 8/4/2021

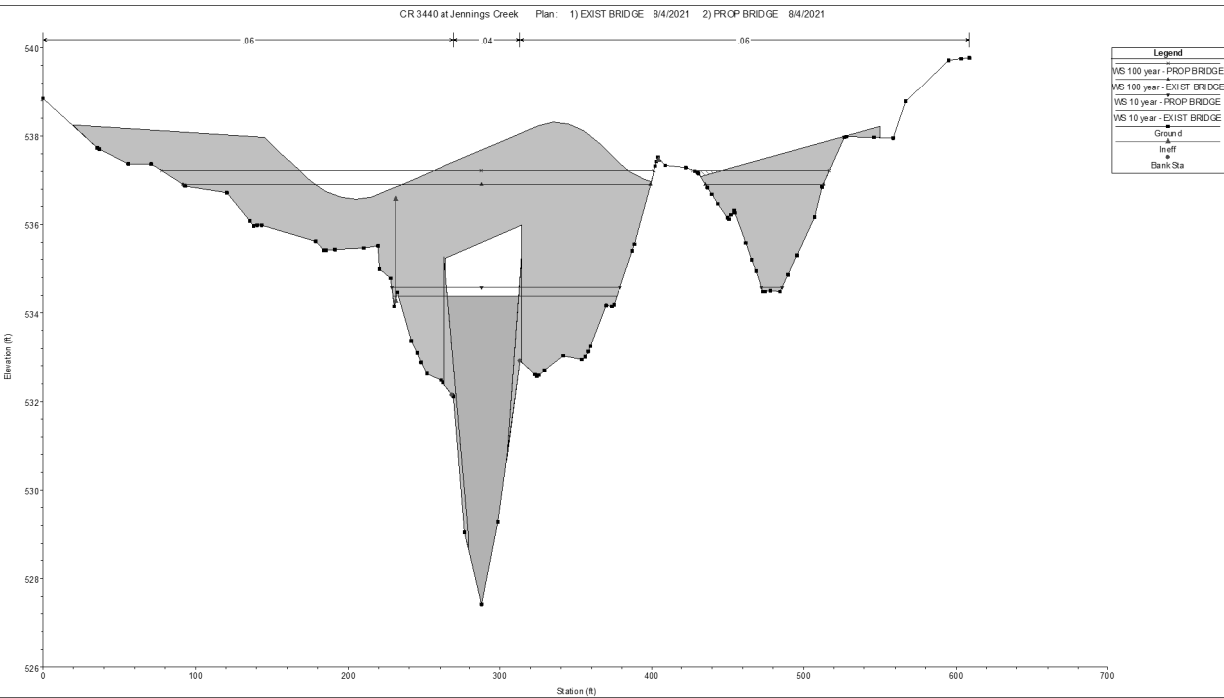
HEC-RAS 10 YEAR FLOOD EVENT						
RIVER STATION	EXISTING WATER SURFACE ELEVATION (FT)	PROPOSED WATER SURFACE ELEVATION (FT)	DIFFERENCE (FT)	EXISTING CHANNEL VELOCITY (FT/S)	PROPOSED CHANNEL VELOCITY (FT/S)	DIFFERENCE (FT/S)
1186	537.57	537.57	0	5.09	5.09	0
686	537.11	537.11	0	2.98	2.98	0
651	536.92	536.92	0	4.5	4.5	0
609	536.18	536.19	0.01	7.68	7.66	-0.02
564	536.37	536.37	0	5.15	5.14	-0.01
531	535.65	535.34	-0.31	7.78	8.69	0.91
507	535.89	535.66	-0.23	5.22	5.78	0.56
473	535.9	535.69	-0.21	4.15	4.48	0.33
438	535.47	535.15	-0.32	6.06	6.65	0.59
401	535.41	535.07	-0.34	5.49	5.96	0.47
391	535.26	534.81	-0.45	6.15	6.99	0.84
382	535.3	534.84	-0.46	5.58	6.47	0.89
347						
316	534.61	534.61	0	5.97	5.97	0
261	534.49	534.49	0	4.87	4.87	0
212	534.13	534.13	0	5.99	5.99	0
159	533.75	533.75	0	6.73	6.73	0
116	533.71	533.71	0	5.83	5.83	0
58	533.49	533.49	0	5.83	5.83	0



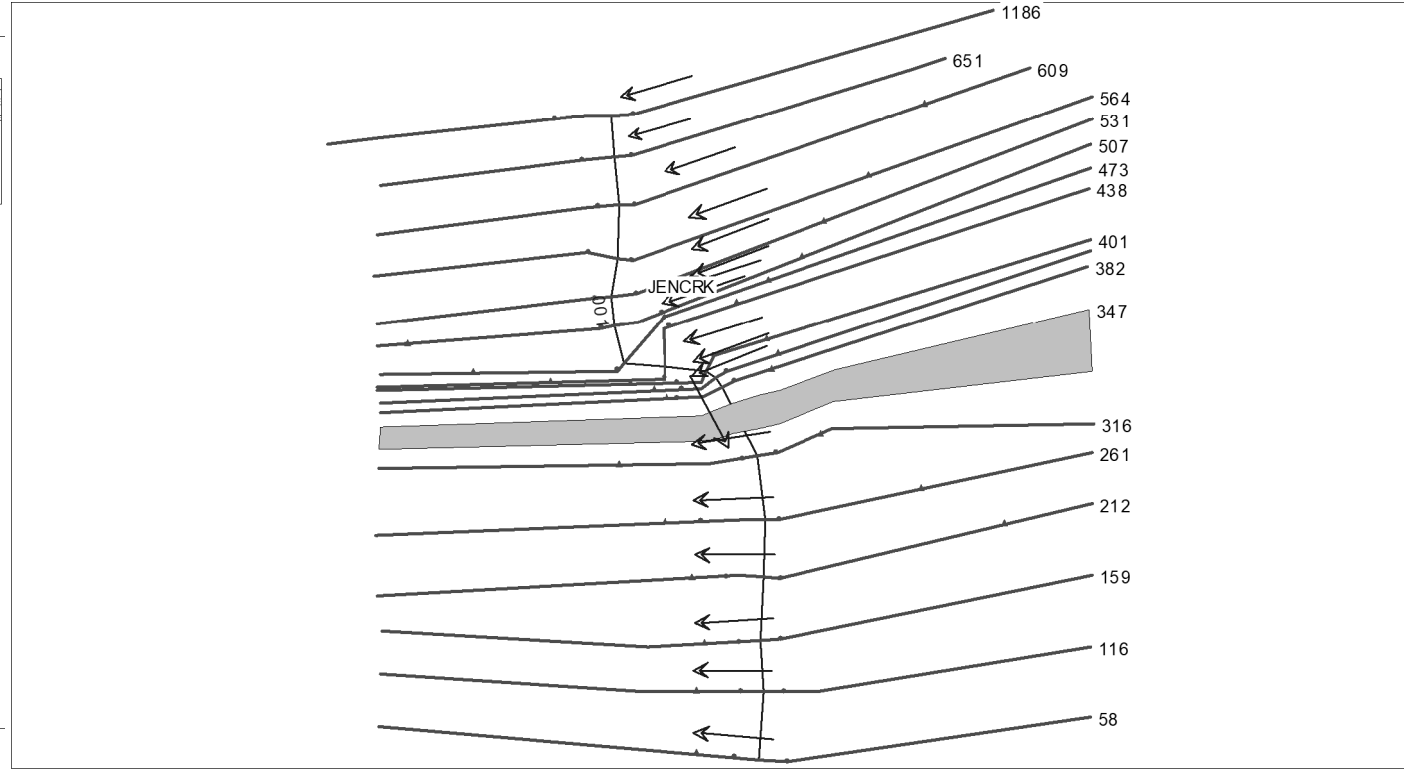
HEC-RAS 100 YEAR FLOOD EVENT						
RIVER STATION	EXISTING WATER SURFACE ELEVATION (FT)	PROPOSED WATER SURFACE ELEVATION (FT)	DIFFERENCE (FT)	EXISTING CHANNEL VELOCITY (FT/S)	PROPOSED CHANNEL VELOCITY (FT/S)	DIFFERENCE (FT/S)
1186	538.39	538.41	0.02	6.64	6.6	-0.04
686	537.81	537.87	0.06	3.87	3.79	-0.08
651	537.59	537.68	0.09	5.53	5.33	-0.2
609	537.32	537.5	0.18	6.96	6.37	-0.59
564	537.29	537.47	0.18	5.65	5.26	-0.39
531	537.11	537.36	0.25	6.42	5.72	-0.7
507	537.16	537.39	0.23	4.92	4.48	-0.44
473	537.15	537.37	0.22	4.25	3.98	-0.27
438	537.07	537.33	0.26	4.73	4.24	-0.49
401	537	537.27	0.27	4.73	4.26	-0.47
391	536.99	537.26	0.27	4.83	4.36	-0.47
382	537	537.27	0.27	4.36	3.97	-0.39
347						
316	535.37	535.37	0	7.49	7.49	0
261	535.25	535.25	0	5.79	5.79	0
212	534.86	534.86	0	7.08	7.08	0
159	534.51	534.51	0	7.71	7.71	0
116	534.45	534.45	0	6.83	6.83	0
58	534.24	534.24	0	6.53	6.53	0

- NOTES:
1. THE EXISTING AND PROPOSED WATER SURFACE ELEVATIONS WERE COMPUTED USING HEC-RAS 5.0.7.
 2. THE PROPOSED BRIDGE CONDITIONS WERE MODELED IN HEC-RAS USING THE ENERGY (STANDARD STEP) METHOD FOR LOW FLOW AND THE PRESSURE AND/OR WEIR METHOD FOR HIGH FLOW. THE REACH BOUNDARY CONDITIONS WERE ESTABLISHED BY CALCULATING NORMAL DEPTH WITH A CHANNEL SLOPE OF 0.0047 UPSTREAM AND 0.0042 DOWNSTREAM.
 3. DELTA COUNTY DOES NOT PARTICIPATE IN THE NATIONAL FLOOD INSURANCE PROGRAM. NO FEMA INFORMATION EXISTS.

DATE: 1/7/2022 8:02:16 AM
FILE: I:\PARTIPD\CR_3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\030 HYDRAULIC DATA.dgn



SECTION AT DOWNSTREAM BRIDGE FACE
RIVER STA. 347



CROSS-SECTION LAYOUT

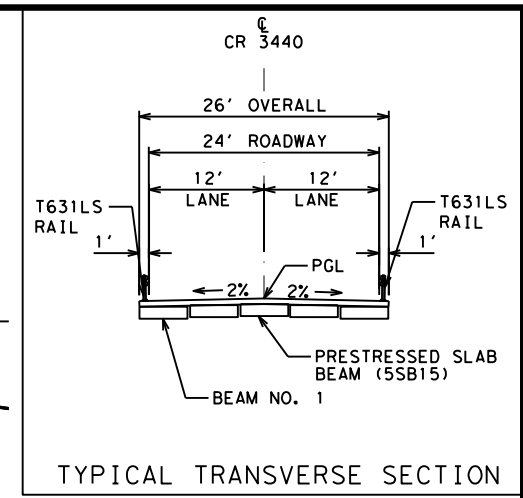
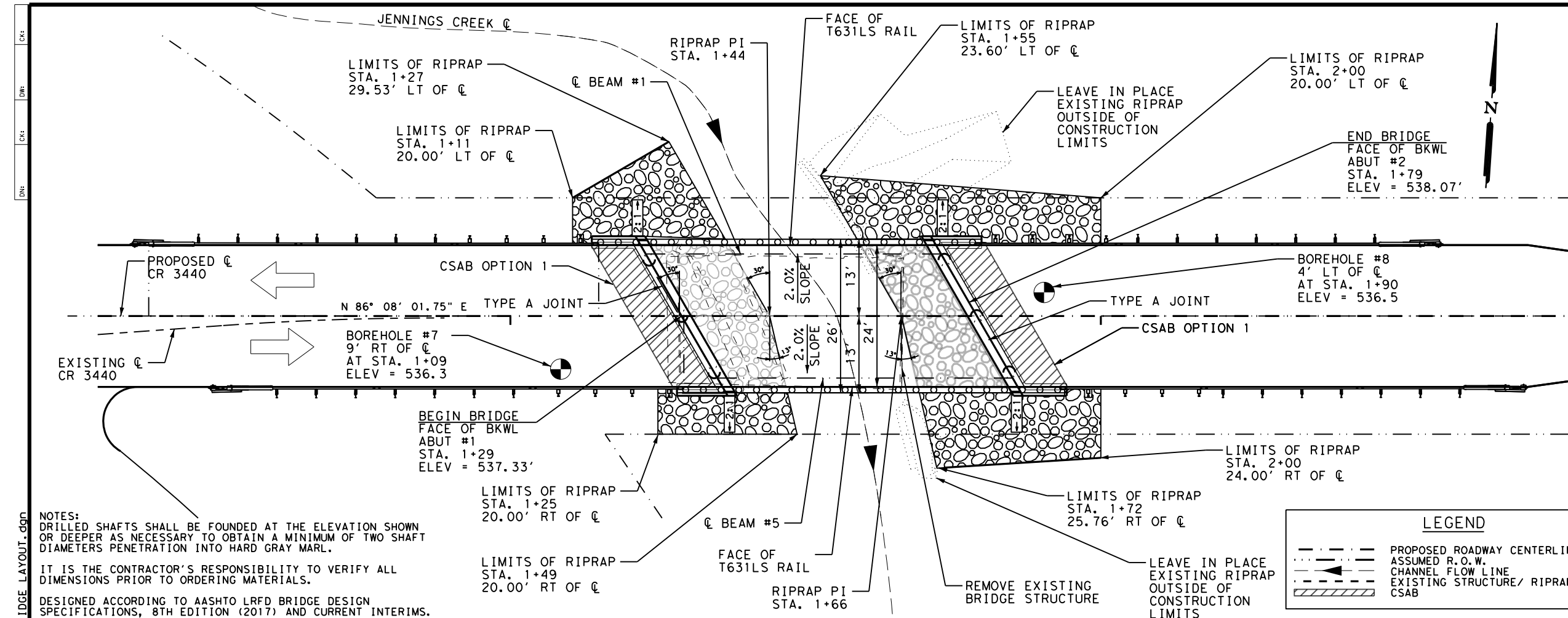
Katie J. Vick, P.E.
01/07/2022

CR 3440 @ JENNINGS CREEK
0901-31-132
HYDRAULIC DATA

SHEET 2 OF 2

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		40



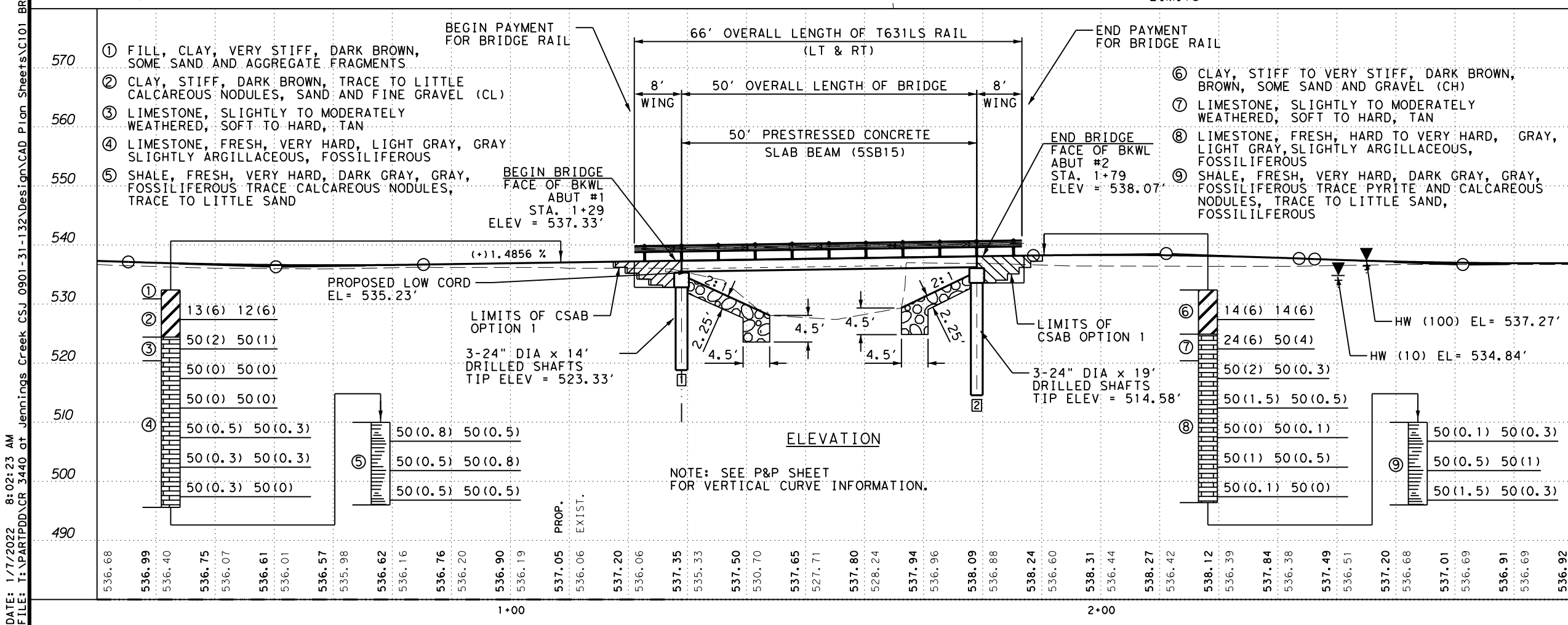
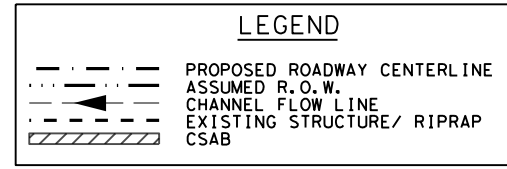
ALL ABUTMENTS AND BENTS ARE ON BEARING N33°-51'-12.7"W

BRIDGE DATA

DESIGN SPEED: 15 MPH
 AADT: 10(2010) 60(2030)
 FUNCTIONAL CLASS: OFF-SYSTEM RURAL LOCAL ROAD
 LEVEL TERRAIN

ORIGINAL EXISTING STRUCTURE:
 NBI#: 01-060-0-AA01-13-001
 STA. 1+26.57 - 1+66.57
 40' SINGLE-SPAN STEEL GIRDER 0° SKEW

PROPOSED STRUCTURE:
 NBI#: 01-060-0-AA34-40-001
 STA. 1+29 - 2+79
 50' SINGLE-SPAN PRESTRESSED CONCRETE SLAB BEAMS (5SB15) 30° SKEW

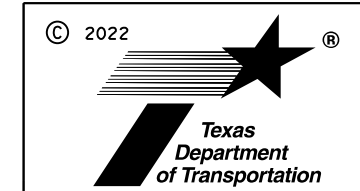


REFER TO PLAN AND PROFILE SHEETS FOR CONTROL INFORMATION

01.07.21

Monte R. Rater P.E.
 CR 3440 @ JENNINGS CREEK
 0901-31-132
 BRIDGE LAYOUT

SCALE
 HORIZONTAL: 1" = 20'
 VERTICAL: 1" = 20'



CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		41

DATE: 1/7/2022 8:02:23 AM
 FILE: I:\PARTDD\CR 3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\VC101 BRIDGE LAYOUT.dgn

DATE: 12/30/2021 8:44:54 AM
 FILE: I:\PARTPDD\CR_3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\0901 BRIDGE QUANTITIES & BEARING SEAT ELEVATIONS.dgn

DWG: CHK: DWF: CKE:

SUMMARY OF BRIDGE ■ 1 ITEMS							
LOCATION	400 6005	416 6002	420 6013	422 6007	425 6012	432 6033	450 6019
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (SSB15)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY T631LS)
	CY	LF	CY	SF	LF	CY	LF
STA. 1+29 - 1+79	40	99	23.6	1300	247.11	250	124
CSJ 0901-31-132 TOTALS	40	99	23.6	1300	247.11	250	124

	CAP ELEVATIONS (FT)					
	STEP 1 (RIGHT)	STEP 3 (LT. SIDE)	STEP 3 (RT. SIDE)	STEP 4 (LT. SIDE)	STEP 4 (RT. SIDE)	STEP 6 (LEFT)
ABUT 1 (FWD)	534.986	535.282	535.282	535.327	535.327	535.208
	STEP 1 (RIGHT)	STEP 3 (LT. SIDE)	STEP 3 (RT. SIDE)	STEP 4 (LT. SIDE)	STEP 4 (RT. SIDE)	STEP 6 (LEFT)
ABUT 2 (BK)	535.702	535.998	535.998	536.043	536.043	535.924

**CR 3440 @
 JENNINGS CREEK
 0901-31-132**
 BRIDGE QUANTITIES
 AND BEARING SEAT
 ELEVATIONS

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		42

DATE: 12/30/2021 8:44:56 AM
FILE: I:\PARTIPDD\CR_3440 at Jennings Creek CSJ 0901-31-132\Design\CAD Plan Sheets\G201 SW3P.dgn

SITE DESCRIPTION

PROJECT LIMITS: THIS PROJECT IS IN NORTHWEST DELTA COUNTY ON CR 3440 AT JENNINGS CREEK

PROJECT DESCRIPTION: BRIDGE REPLACEMENT, APPROACHES, AND ROAD WIDENING

MAJOR SOIL DISTURBING ACTIVITIES:

INCLUDES PREP ROW, EMBANKMENT FOR FILL, EROSION AND SEDIMENTARY CONTROLS, AND TOPSOIL WORK FOR FINAL SEEDING.

TOTAL PROJECT AREA: .42 ACRES

TOTAL AREA TO BE DISTURBED: 0.19 AC (45%)

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

The existing soil consists of farmland complex consisting primarily of Leson clay and similar soils with only 5% minor components, moderately well drained, slowly permeable soils. Slopes range from 1 to 3 percent. Native grasses, brush, and trees cover the existing soil.

NAME OF RECEIVING WATERS:

Jennings Creek flows approximately 2 miles and joins East Fork Jemigan Creek, segment 0307D which then empties into Cooper Lake, segment 0307.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES & STRUCTURAL PRACTICES:

EROSION CONTROL:

- TEMPORARY SEEDING
- PERMANENT PLANTING, SODDING, OR SEEDING
- MULCHING
- SOIL RETENTION BLANKET
- BUFFER ZONES
- PRESERVATION OF NATURAL RESOURCES

OTHER:

DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITY HAS CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME AND DO WITHIN 21 DAYS.

SEDIMENTATION CONTROL:

- SILT FENCES
- HAY BALES
- ROCK BERMS
- EROSION CONTROL LOGS
- DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- DIVERSION DIKE AND SWALE COMBINATIONS
- PIPE SLOPE DRAINS
- PAVED FLUMES
- ROCK BEDDING AT CONSTRUCTION EXIT
- TIMBER MATTING AT CONSTRUCTION EXIT
- CHANNEL LINERS
- SEDIMENT TRAPS
- SEDIMENT BASINS
- STORM INLET SEDIMENT TRAP
- STONE OUTLET STRUCTURES
- CURBS AND GUTTERS
- STORM SEWERS
- VELOCITY CONTROL DEVICES

POST-CONSTRUCTION CONTROLS:

- RETENTION / IRRIGATION
- EXTENDED DETENTION BASIN (ie: ROCK BERMS)
- VEGETATIVE FILTER STRIPS
- GRASSY SWALES
- VEGETATIVE LINED DRAINAGE DITCHES
- CONSTRUCTED WET LANDS
- WET BASINS
- SAND FILTER SYSTEMS

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:

MAJOR SOIL DISTURBING ACTIVITIES SHALL NOT BE PERFORMED UNTIL EMBANKMENT PLACEMENT IS SCHEDULED TO BEGIN WITHIN FIVE (5) WORKING DAYS.

INSTALL EROSION AND SEDIMENTATION CONTROLS PRIOR TO SOIL DISTURBANCE WHENEVER POSSIBLE.

ONCE BEGUN, EARTHWORK ACTIVITIES SHALL BE PROGRESSED WITHOUT DELAY, UNLESS APPROVED BY THE ENGINEER, UNTIL FINAL GRADING IS ACCOMPLISHED.

EROSION CONTROL MEASURES SHALL BE APPLIED IMMEDIATELY UPON COMPLETION OF THE EMBANKMENT PLACEMENT TO MINIMIZE POTENTIAL WATER QUALITY IMPACTS.

REMARKS: 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, waterbody or streambed. The Contractor shall designate a location for, construct, and maintain an area for concrete mixing, handling and delivery equipment to wash out. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

MAINTENANCE: All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

INSPECTION: An inspection will be performed by a TxDOT Inspector at least once every seven (7) calendar days. An inspection and maintenance report will be made per each inspection. Stormwater controls will be modified as directed by the Engineer based on these reports.

OTHER EROSION AND SEDIMENT CONTROLS:

WASTE MATERIALS: All trash and construction debris from the job site will be disposed of by the Contractor at a local dump. No construction materials will be buried on site.

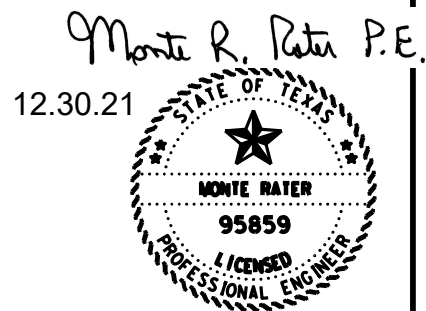
HAZARDOUS WASTE (INCLUDING SPILL REPORTING): Any hazardous waste spills shall be reported to the TxDOT Safety Officer in Paris. It shall be the responsibility of the waste owner to provide for the required clean-up. If the owner cannot be determined, the district laboratory shall direct in the clean-up operation.

SANITARY WASTE: Any sanitary waste shall be collected from portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor. All sanitary waste from permanent sites will be collected by local sanitary sewer systems.

OFFSITE VEHICLE TRACKING:

- HAUL ROADS DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- EXCESS DIRT ON ROAD REMOVED DAILY
- STABILIZED CONSTRUCTION ENTRANCE

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL SUBCONTRACTORS ARE AWARE OF AND COMPLY WITH ALL COMPONENTS OF THE SW3P.



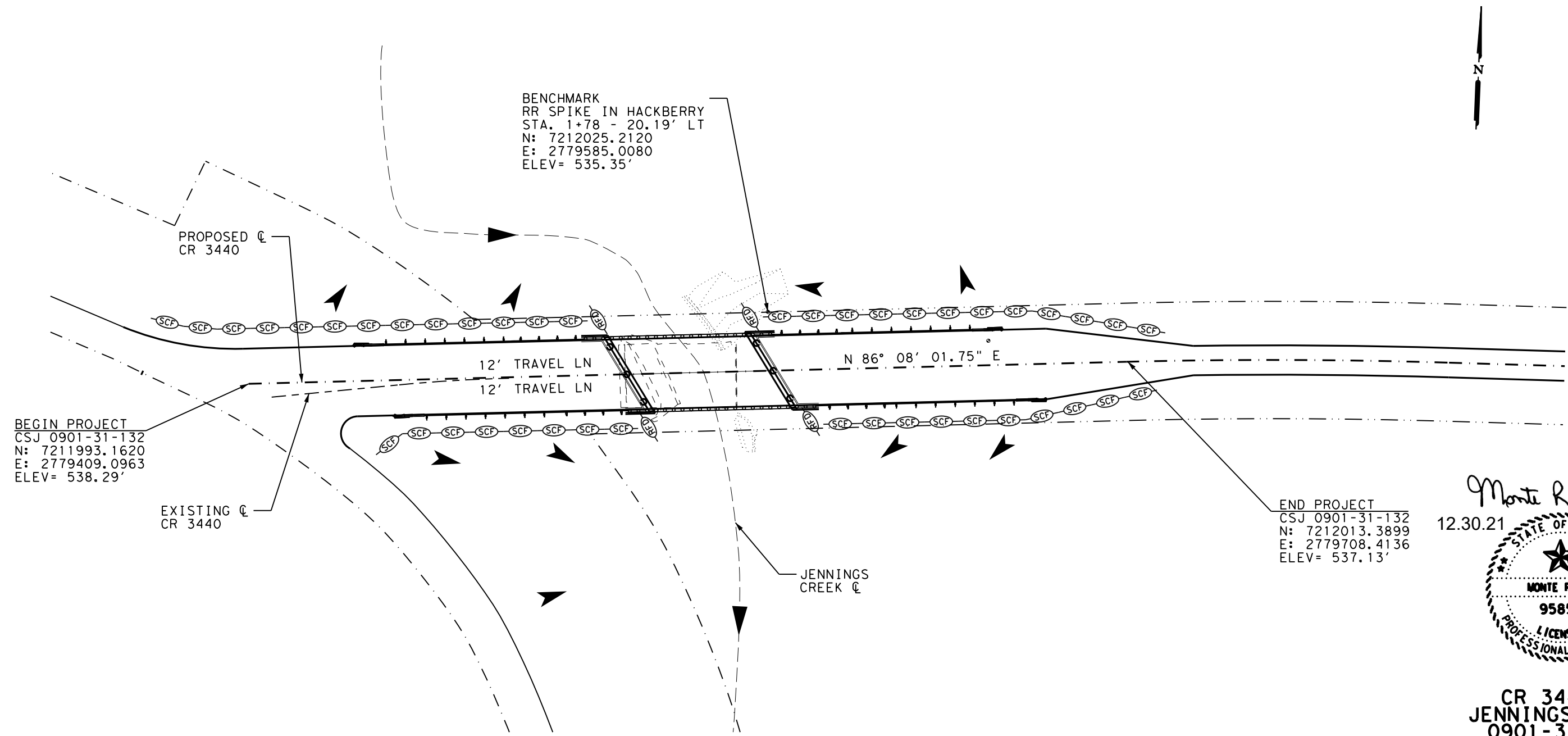
CR 3440 @
JENNINGS CREEK
0901-31-132
SW3P

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CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		43

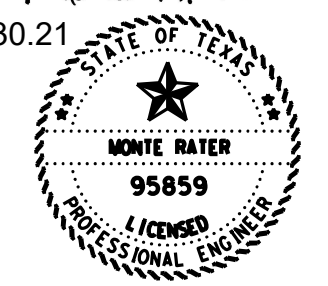
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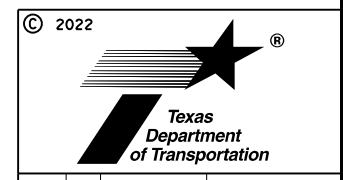
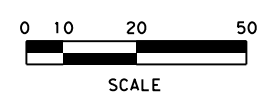


LEGEND	
	ASSUMED R.O.W.
	CHANNEL FLOW LINE
	DRAINAGE FLOW
	SILT FENCE
	ROCK FILTER DAM

Monte R. Rater P.E.
 12.30.21



CR 3440 @
 JENNINGS CREEK
 0901-31-132
 SW3P LAYOUT



CONT	SECT	JOB	HIGHWAY
0901	29	091, ETC	CR, ETC
DIST	COUNTY		SHEET NO.
PAR	LAMAR, ETC		44

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DATE: FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.
2.
 No Action Required Required Action

Action No.

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

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

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

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

- No Permit Required
 Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
 Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
 Individual 404 Permit Required
 Other Nationwide Permit Required: NWP# _____

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

1.
2.
3.
4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

- No Action Required Required Action

Action No.

1.
2.
3.
4.

IV. VEGETATION RESOURCES

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

- No Action Required Required Action

Action No.

- Temporary Best Management Practices or other suitable means of containment will be used to re-establish vegetative areas.
- Post construction Best Management Practices will be used to re-establish vegetative areas.
-
-

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

- No Action Required Required Action

Action No.

- 1.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

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

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

- Yes No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

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

- Yes No

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

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

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

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

- No Action Required Required Action

Action No.

- 1.

VII. OTHER ENVIRONMENTAL ISSUES

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

- No Action Required Required Action

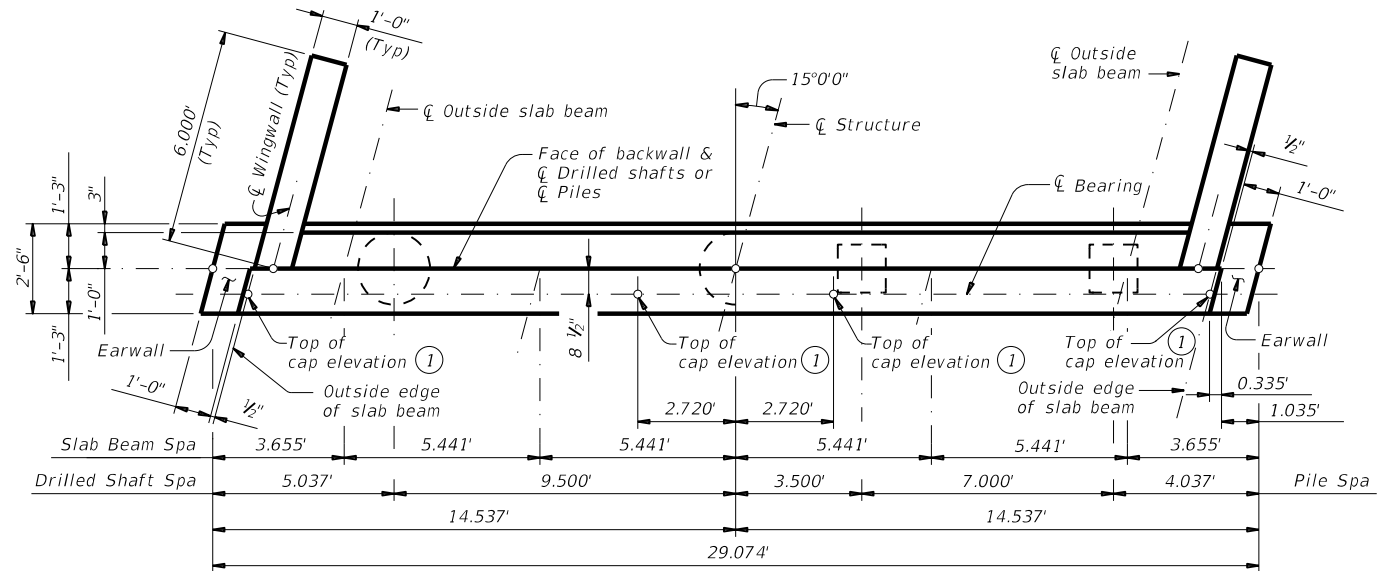
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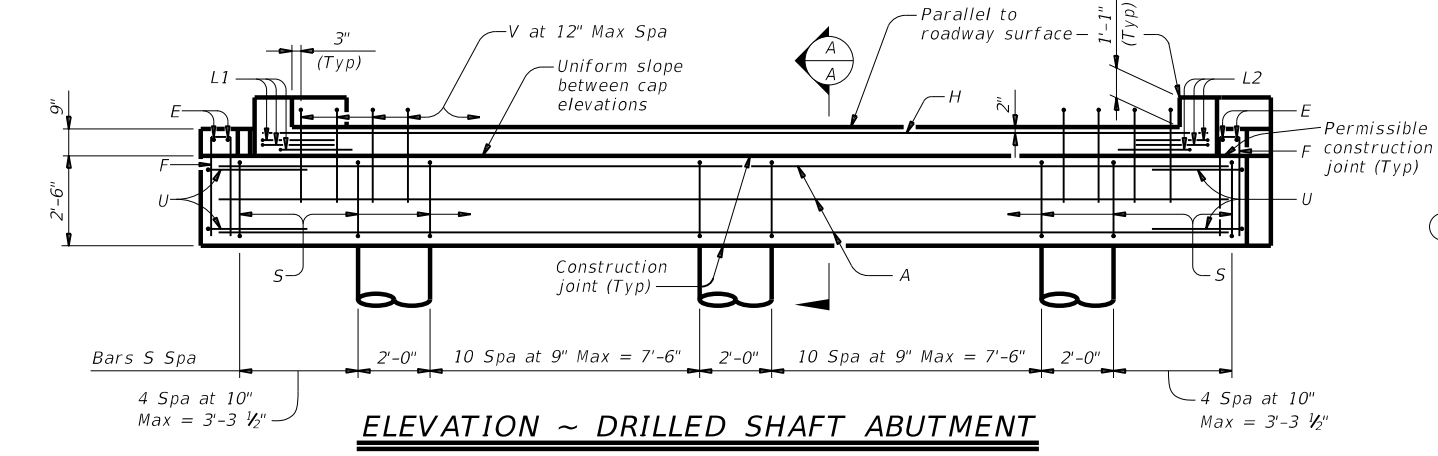
**CR 3440 @
JENNINGS CREEK
0901-31-132**

		Design Division Standard	
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC			
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©TxDOT: February 2015	CONT	SECT	JOB
12-12-2011 (DS) REVISIONS	0901	29	091, ETC
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	PAR	LAMAR, ETC	45

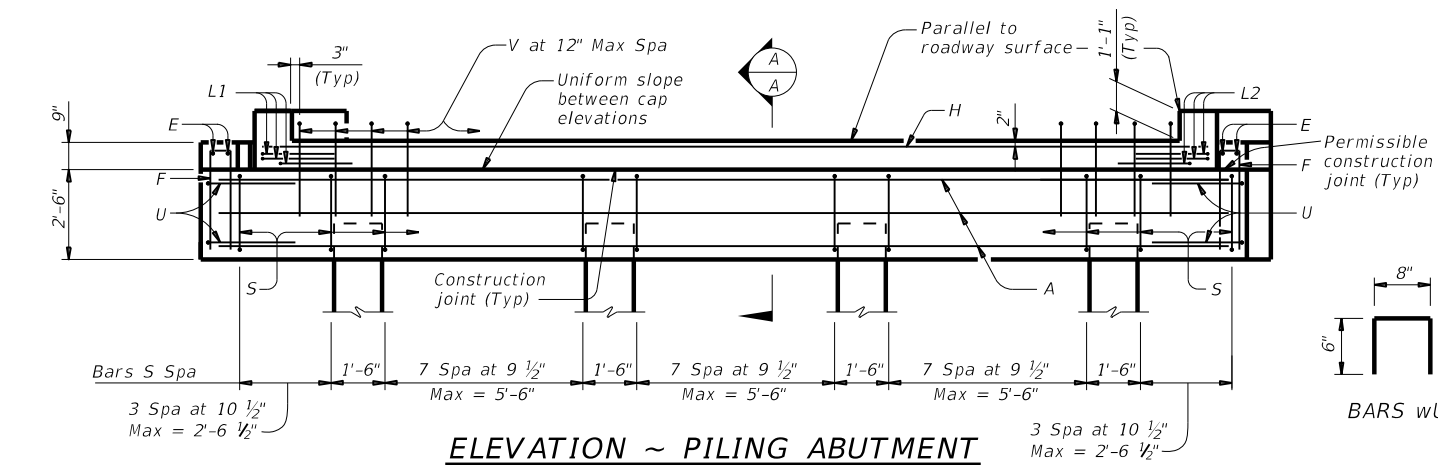
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SHOWING DRILLED SHAFTS **SHOWING PILES**
PLAN

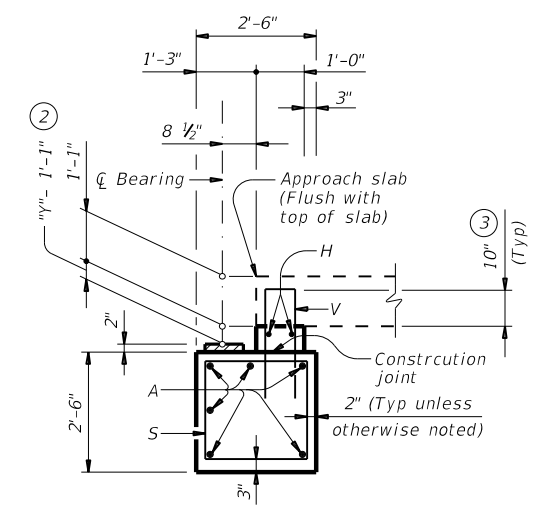
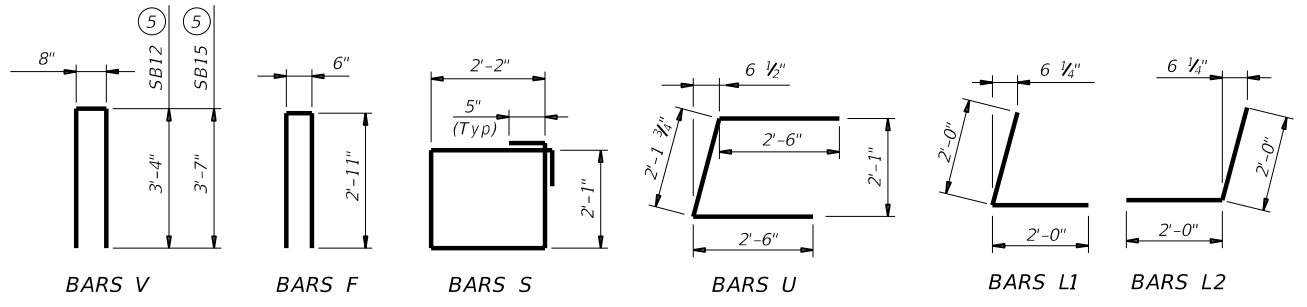


ELEVATION ~ DRILLED SHAFT ABUTMENT



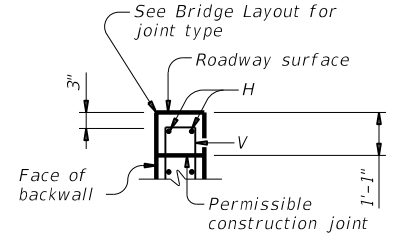
ELEVATION ~ PILING ABUTMENT

Note: For piles larger than 16", adjust Bars S spacing as required to avoid piles.



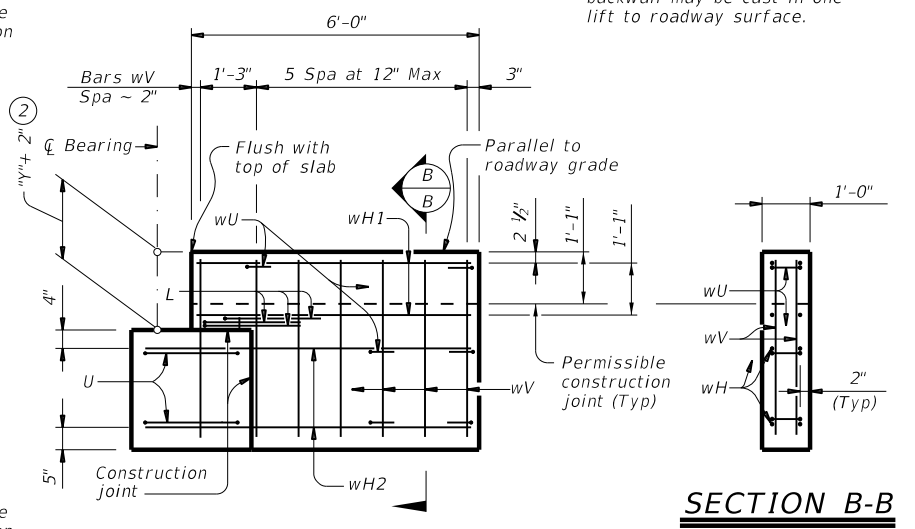
SECTION A-A (4)

(With approach slab)
 Note: At Contractor's option, backwall may be cast with approach slab.



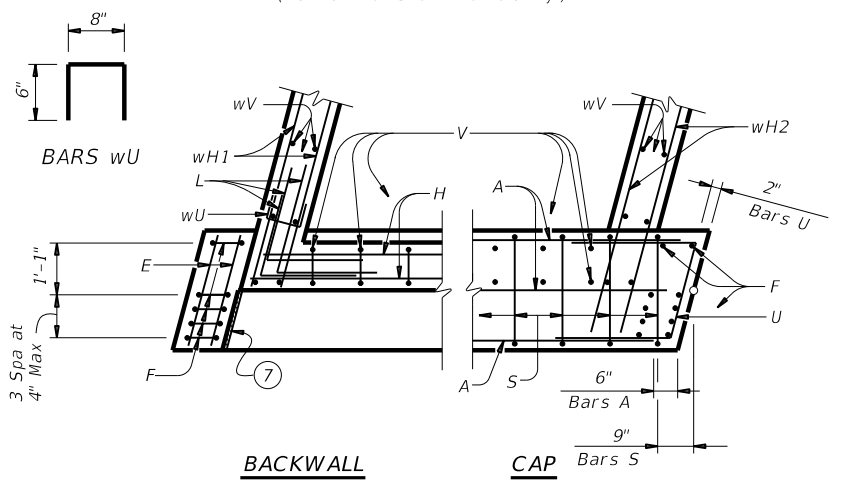
BACKWALL DETAIL (4)

(Without approach slab)
 Note: At Contractor's option, backwall may be cast in one lift to roadway surface.



WINGWALL ELEVATION

(Earwall not shown for clarity.)



BACKWALL **CAP**
CORNER DETAILS

FOUNDATION LOADS

Span Length	Drilled Shaft Loads		Vertical Pile Loads	
	5SB12	5SB15	5SB12	5SB15
Ft	Tons/DS	Tons/DS	Tons/Pile	Tons/Pile
25	39	41	29	31
30	44	46	33	35
35	48	51	36	38
40	52	55	39	41
45		59		45
50		63		48

TABLE OF ESTIMATED QUANTITIES (6)

Bar	No.	Size	Length (5)		Weight (5)	
			5SB12	5SB15	5SB12	5SB15
A	6	#11	28'-1"	28'-1"	895	895
E	4	#4	2'-3"	2'-3"	6	6
F	10	#4	6'-4"	6'-4"	43	43
H	2	#5	26'-7"	26'-7"	56	56
L1	3	#6	4'-0"	4'-0"	18	18
L2	3	#6	4'-0"	4'-0"	18	18
S	32	#4	9'-4"	9'-4"	200	200
U	4	#6	7'-2"	7'-2"	43	43
V	26	#5	7'-4"	7'-10"	199	212
wH1	8	#6	5'-8"	5'-8"	68	68
wH2	8	#6	6'-11"	6'-11"	83	83
wU	12	#4	1'-8"	1'-8"	14	14
wV	28	#5	3'-10"	4'-1"	112	119
Reinforcing Steel				Lb	1,755	1,775
CI "C" Conc (Abut)				CY	9.1	9.5

- Top of cap elevations are based on section depths shown on Span Details.
- See Span Details for "y".
- Increase as required to maintain 3" from finished grade.
- See Bridge Layout to determine if approach slab is present.
- See Bridge Layout for beam type used in the superstructure.
- Quantities shown are for one abutment only (with approach slab). Without approach slab, add 1.0 CY Class "C" concrete and 56 Lb reinforcing steel for 2 additional Bars H.
- 1/2" preformed bituminous fiber material between slab beam and earwall. Bond to earwall with an approved adhesive. Cast inside face of earwall perpendicular to cap. (Typ)

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Designed for a normal embankment header slope of 3:1 and a maximum span length of 50 feet.
 See Bridge Layout for header slope and foundation type, size, and length.
 See Common Foundation Details (FD) standard sheet for all foundation details and notes.
 See Concrete Riprap (CRR) standard sheet or Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.
 See applicable rail details for rail anchorage in wingwalls.
 Details are drawn showing right forward skew. See Bridge Layout for actual skew direction.
 These abutment details may be used with standard SPSB-24-15 only.

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

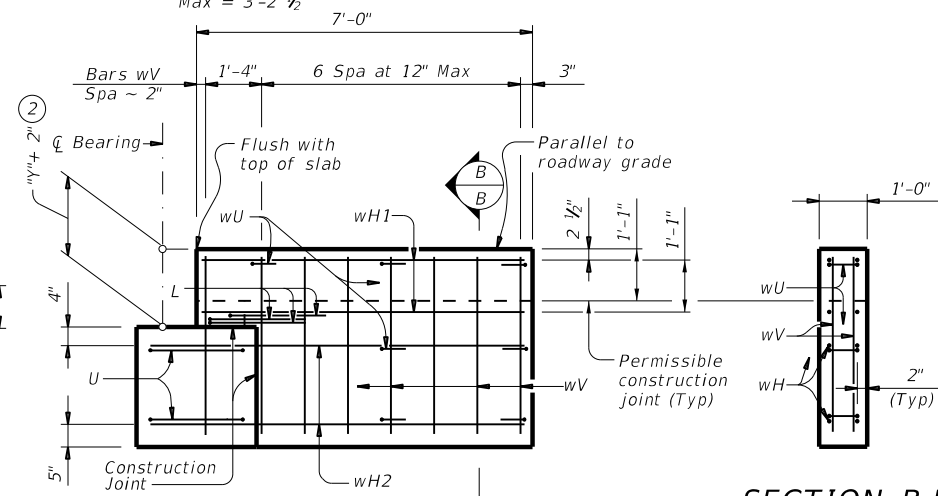
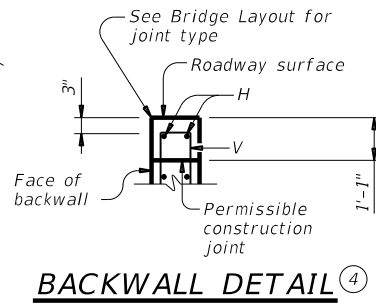
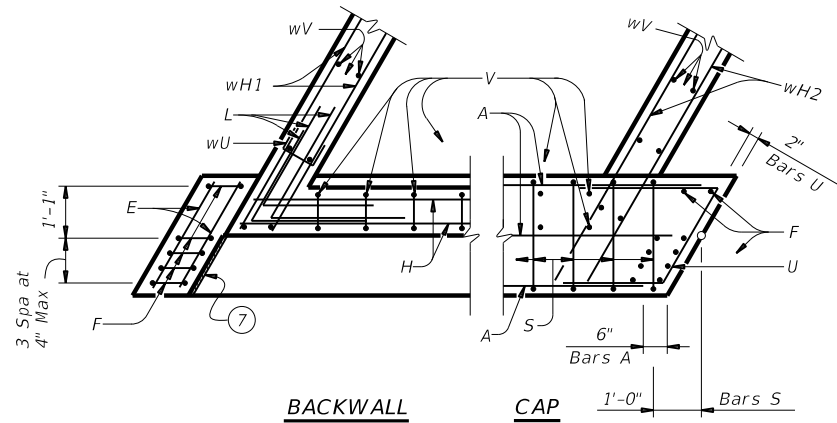
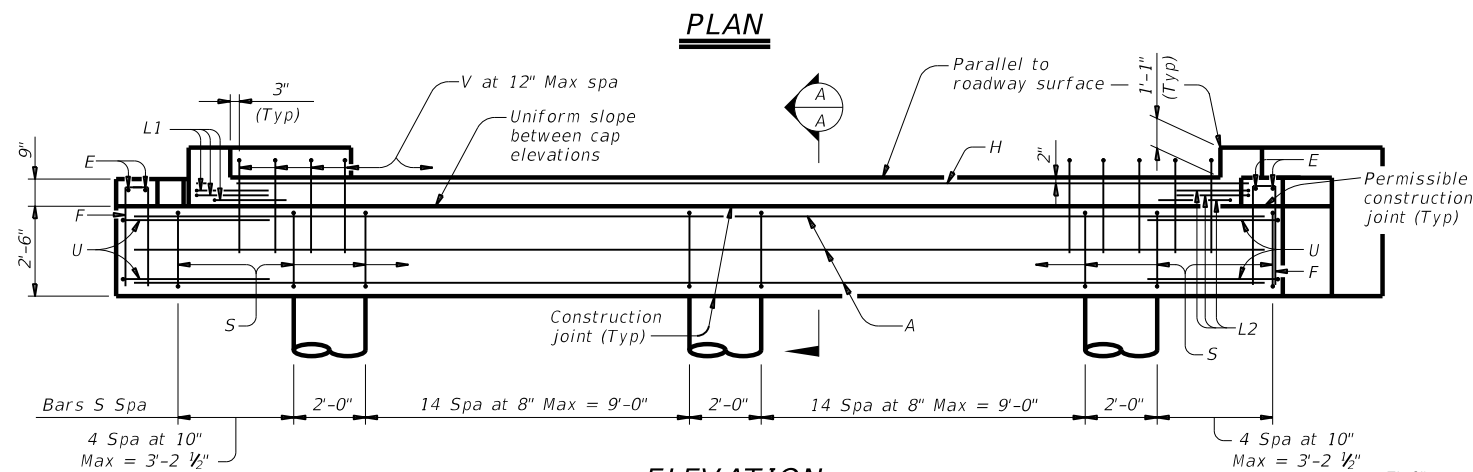
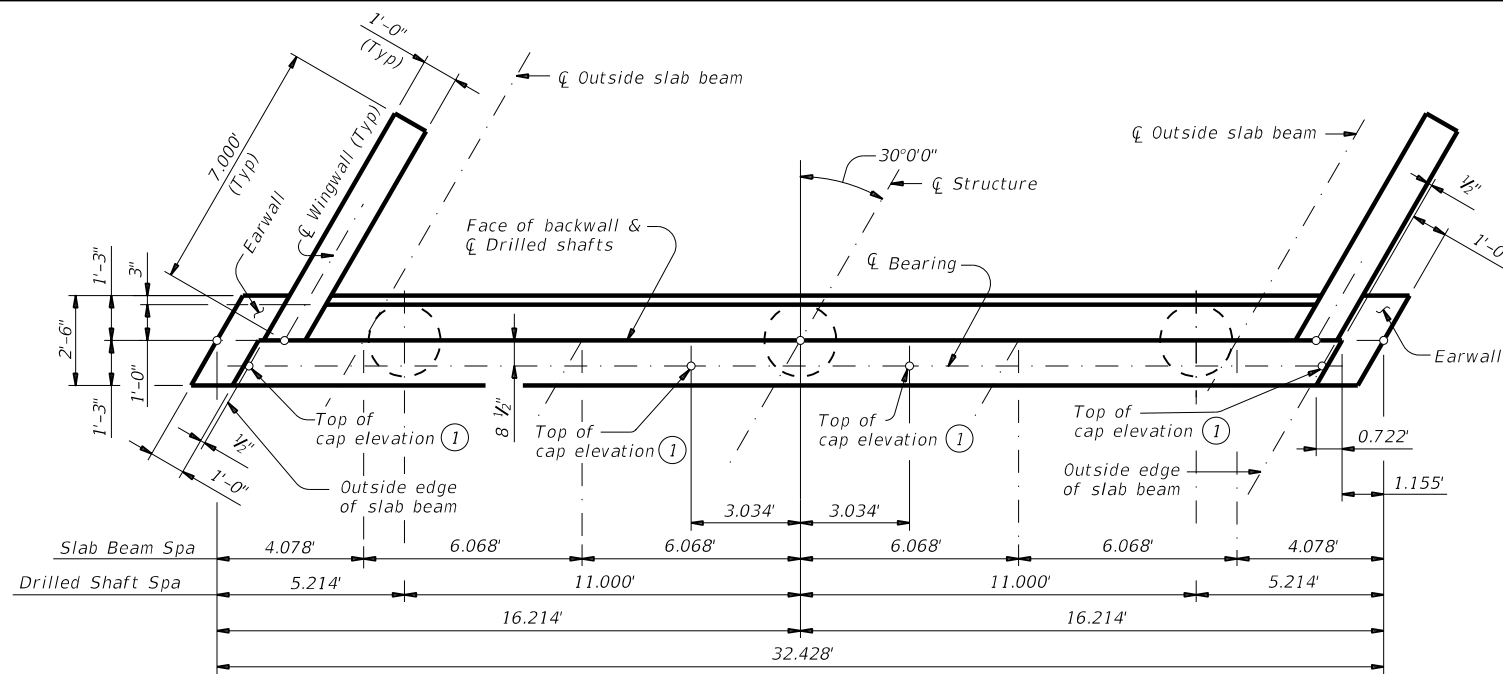
MATERIAL NOTES:
 Provide Class C concrete (f'c = 3,600 psi).
 Provide Class C (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.

HL93 LOADING

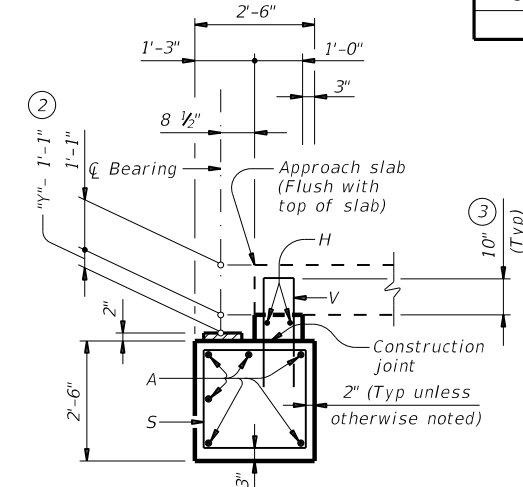
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ABUTMENTS					
PRESTR CONCRETE SLAB BEAM					
24' ROADWAY			15° SKEW		
APSB-24-15					
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©TxDOT January 2017	CONTRACT	SECTION	JOB	HIGHWAY	
REVISIONS	0901 29	091, ETC	CR, ETC		
DIST	COUNTY	SHEET NO.			
PAR	LAMAR, ETC	46			

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SECTION B-B



SECTION A-A
 (With approach slab)
 Note: At Contractor's option, backwall may be cast with approach slab.

FOUNDATION LOADS		
Span Length	Drilled Shaft Loads	
	5SB12	5SB15
Ft	Tons/DS	
25	40	42
30	44	47
35	49	52
40	53	56
45	60	
50	64	

TABLE OF ESTIMATED QUANTITIES							
Bar	No.	Size	Length (5)		Weight (5)		
			5SB12	5SB15	5SB12	5SB15	
A	6	#11	31'-5"	31'-5"	1,002	1,002	
E	4	#4	2'-6"	2'-6"	7	7	
F	10	#4	6'-6"	6'-6"	44	44	
H	2	#5	29'-8"	29'-8"	62	62	
L1	3	#6	4'-0"	4'-0"	18	18	
L2	3	#6	4'-0"	4'-0"	18	18	
S	40	#4	9'-4"	9'-4"	250	250	
U	4	#6	7'-5"	7'-5"	45	45	
V	29	#5	7'-4"	7'-10"	222	237	
wH1	8	#6	6'-8"	6'-8"	80	80	
wH2	8	#6	7'-11"	7'-11"	95	95	
wU	14	#4	1'-8"	1'-8"	16	16	
wV	32	#5	3'-10"	4'-1"	128	136	
Reinforcing Steel					Lb	1,987	2,010
CI "C" Conc (Abut)					CY	10.3	10.7

- Top of cap elevations are based on section depths shown on Span Details.
- See Span Details for "Y".
- Increase as required to maintain 3" from finished grade.
- See Bridge Layout to determine if approach slab is present.
- See Bridge Layout for beam type used in the superstructure.
- Quantities shown are for one abutment only (with approach slab). Without approach slab, add 1.1 CY Class "C" concrete and 62 Lb reinforcing steel for 2 additional Bars H.
- 1/2" preformed bituminous fiber material between slab beam and earwall. Bond to earwall with an approved adhesive. Cast inside face of earwall perpendicular to cap.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Designed for a normal embankment header slope of 3:1 and a maximum span length of 50 feet.
 See Bridge Layout for header slope and foundation type, size, and length.
 See Common Foundation Details (FD) standard sheet for all foundation details and notes.
 See Concrete Riprap (CRR) standard sheet or Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.
 See applicable rail details for rail anchorage in wingwalls.
 Details are drawn showing right forward skew. See Bridge Layout for actual skew direction.
 These abutment details may be used with standard SPSB-24-30 only.

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

MATERIAL NOTES:
 Provide Class C concrete (f'c = 3,600 psi).
 Provide Class C (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.

HL93 LOADING

Texas Department of Transportation Bridge Division Standard

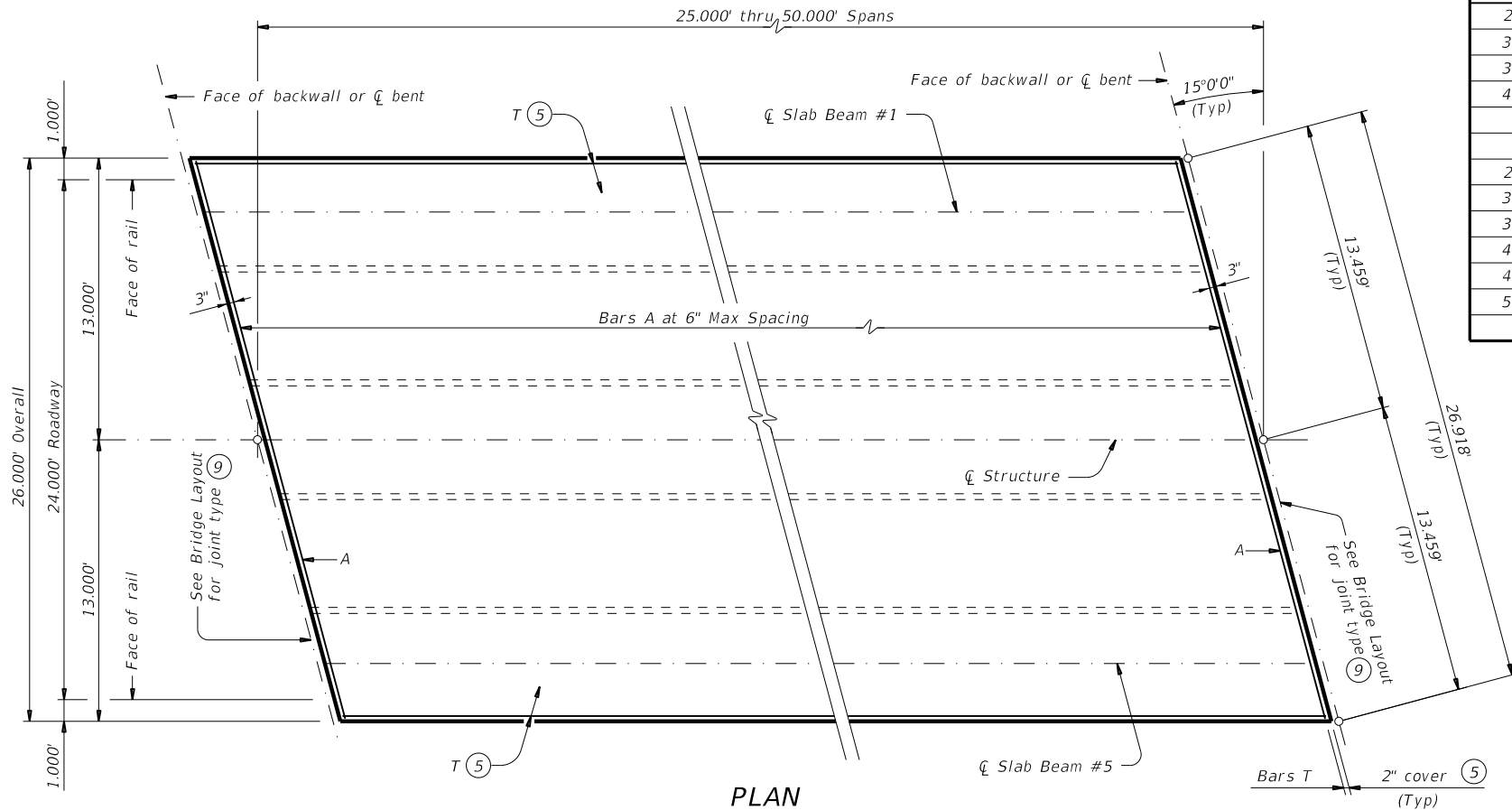
ABUTMENTS
 PRESTR CONCRETE SLAB BEAM (DRILLED SHAFTS)
 24' ROADWAY 30° SKEW

APSBD-24-30

FILE: psbste11-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONV	SECT	JOB	HIGHWAY
REVISIONS	0901	29	091, ETC	CR, ETC
DIST	COUNTY	SHEET NO.		
PAR	LAMAR, ETC	47		

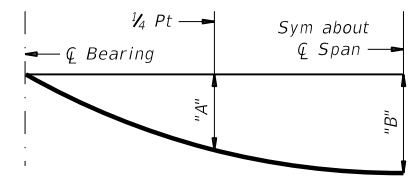
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PLAN

TABLE OF VARIABLE VALUES					
Span Length	Beam Type	Dead Load Deflection		Section Depths	
		"A"	"B"	"X"	"Y"
Ft	(1)	Ft	Ft	In	Ft/In
25	5SB12	0.004	0.005	5 1/4"	1'-5 1/4"
30	5SB12	0.008	0.011	5 1/2"	1'-5 1/2"
35	5SB12	0.015	0.021	6"	1'-6"
40	5SB12	0.026	0.036	6 1/2"	1'-6 1/2"
25	5SB15	0.002	0.003	5 1/4"	1'-8 1/4"
30	5SB15	0.004	0.006	5 1/2"	1'-8 1/2"
35	5SB15	0.008	0.011	5 1/2"	1'-8 1/2"
40	5SB15	0.013	0.019	5 3/4"	1'-8 3/4"
45	5SB15	0.022	0.030	6 1/2"	1'-9 1/2"
50	5SB15	0.034	0.047	7"	1'-10"

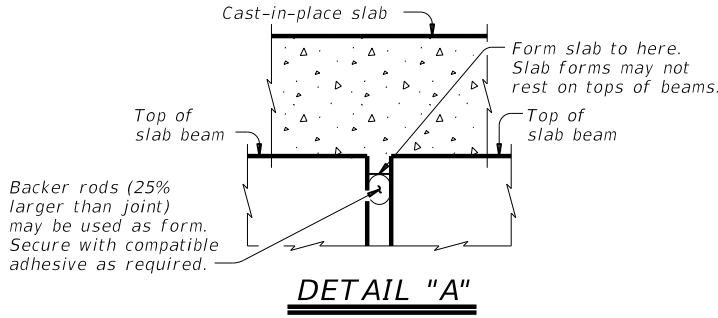


DEAD LOAD DEFLECTION DIAGRAM

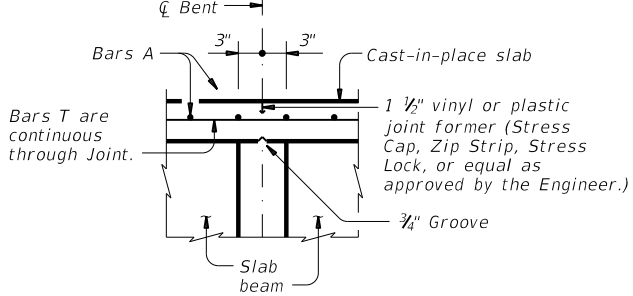
NOTE: Deflections shown are due to concrete slab only ($E_c = 5,000$ ksi). Calculated deflections shown are theoretical and actual dimensions may vary. Adjust based on field verification.

BAR TABLE

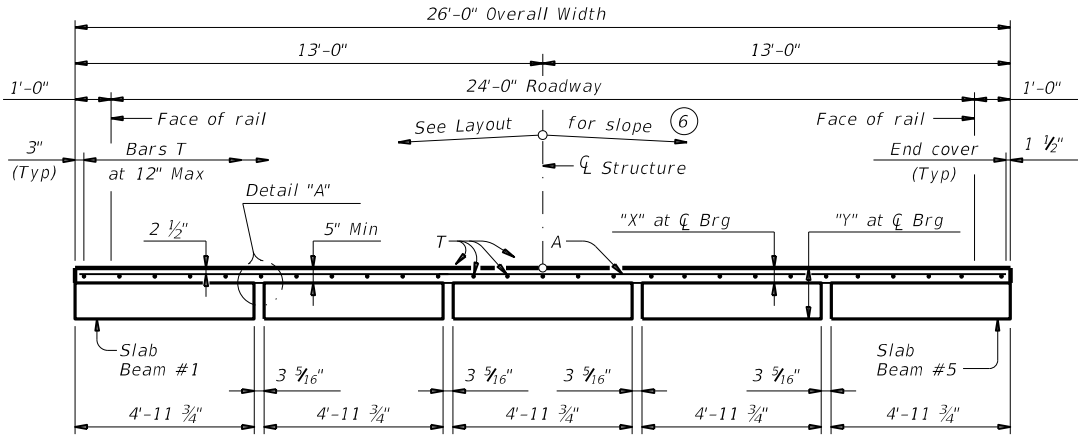
BAR	SIZE
A	#5
T	#4



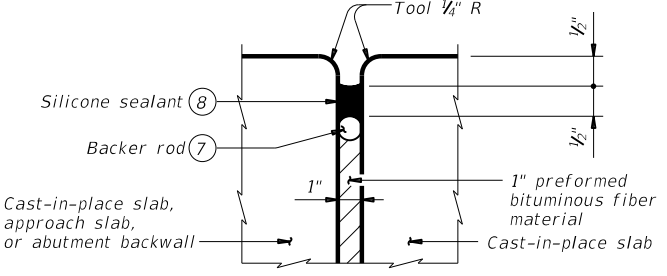
DETAIL "A"



CONTINUOUS SLAB DETAIL



TYPICAL TRANSVERSE SECTION



TYPE A JOINT DETAIL

TABLE OF ESTIMATED QUANTITIES					
SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (5SB12 OR 5SB15)			TOTAL REINF STEEL
		ABUT TO INT BT	INT BT TO INT BT	ABUT TO ABUT	
Ft	SF	LF (4)	LF (4)	LF (4)	Lb
25	650	122.46	122.50	122.41	1,820
30	780	147.46	147.50	147.41	2,180
35	910	172.46	172.50	172.41	2,550
40	1,040	197.46	197.50	197.41	2,910
45	1,170	222.46	222.50	222.41	3,280
50	1,300	247.46	247.50	247.41	3,640

- See Bridge Layout for beam type used in the superstructure. These standards do not provide for the use of both SB12 and SB15 beams within the same structure.
- Reinforcing steel weight is calculated using an approximate factor of 2.8 Lbs/SF.
- Based on theoretical beam camber, dead load deflections of 5" cast-in-place concrete slab and a constant grade.
- Fabricator will adjust beam lengths for beam slopes as required.
- Where slab is continuous over Interior Bents, Bars T are continuous through Joint. See "Continuous Slab Detail".
- This standard does not provide for changes in roadway cross-slopes within the structure.
- 1 1/2" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- See Bridge Layout for expansion joint locations. If using Type A expansion joints, the maximum distance between joints is 100 feet. Type A joints are subsidiary to Item 422, "Concrete Superstructures".

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. This standard does not provide for vertical curves in roadway grade within the structure.
 Two- or three-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet. See applicable rail details for rail anchorage in slab. Details are drawn showing right forward skew. See Bridge Layout for actual skew direction.
 This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:
 Provide Class 5 concrete ($f'_c = 4,000$ psi).
 Provide Class 5 (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.
 Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 ~ #5 = 2'-0"
 Epoxy coated ~ #4 = 2'-5"
 ~ #5 = 3'-0"
 Deformed welded wire reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise.

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM SPANS (TY SB12 OR SB15)

24' ROADWAY 15° SKEW

SPSB-24-15

FILE: pbsste31-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CON: SECT	JOB: 0901 29	091, ETC	HIGHWAY: CR, ETC
REVISIONS	DIST: PAR	COUNTY: LAMAR, ETC	SHEET NO. 48	

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DATE: 12/30/2021 8:45:15 AM
 FILE: T:\PARTDPD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091.dgn

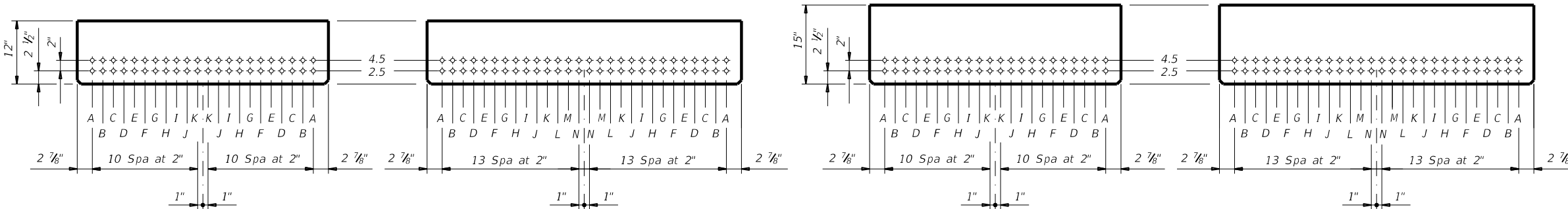
STRUCTURE	DESIGNED BEAMS (STRAIGHT STRANDS)																			OPTIONAL DESIGN					LOAD RATING			
	SPAN LENGTH (ft)	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS							DIST FROM BOTTOM (in)	DEBONDED STRANDS PER ROW					CONCRETE		DESIGN LOAD COMP STRESS (TOP ε) (SERVICE I) fct (ksi)	DESIGN LOAD TENSILE STRESS (BOTT ε) (SERVICE III) fcb (ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR		STRENGTH I			SERVICE III	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	TOT NO. DEB		TOTAL	DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end)								RELEASE STRGTH ① f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	②		Inv	Opr	Inv
														3	6	9	12	15						Moment	Shear			
24' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	4.000	5.000	0.914	-1.217	448	0.450	0.450	1.40	1.82	1.71	
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	4.000	5.000	1.292	-1.685	530	0.450	0.450	1.25	1.62	1.29		
	35	ALL	5SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	4.000	5.000	1.730	-2.219	675	0.450	0.450	1.33	1.73	1.23		
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	4.000	5.000	2.218	-2.796	820	0.440	0.440	1.34	1.74	1.12		
24' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	4.000	5.000	0.725	-0.897	551	0.450	0.450	1.77	2.29	2.41		
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	4.000	5.000	1.020	-1.244	574	0.450	0.450	1.23	1.59	1.45		
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	4.000	5.000	1.361	-1.640	708	0.450	0.450	1.15	1.49	1.14		
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	4.000	5.000	1.739	-2.068	864	0.440	0.440	1.32	1.71	1.19		
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	4.000	5.000	2.179	-2.574	1054	0.440	0.440	1.34	1.73	1.08		
	50	ALL	5SB15		24	0.6	270	5.00	5.00	8	2.5	24	8	4	4	0	4.000	5.000	2.680	-3.153	1276	0.440	0.440	1.33	1.72	1.11		
28' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	4.000	5.000	0.903	-1.184	444	0.430	0.430	1.47	1.91	1.80		
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	4.000	5.000	1.276	-1.639	508	0.430	0.430	1.32	1.71	1.37		
	35	ALL	5SB12		12	0.6	270	3.50	3.50	0	2.5	12	0	0	0	0	4.000	5.000	1.708	-2.159	647	0.430	0.430	1.18	1.53	1.02		
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	4.000	5.000	2.200	-2.744	799	0.430	0.430	1.37	1.78	1.17		
28' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	4.000	5.000	0.716	-0.874	529	0.430	0.430	1.85	2.40	2.53		
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	4.000	5.000	1.007	-1.212	570	0.430	0.430	1.29	1.67	1.53		
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	4.000	5.000	1.343	-1.598	680	0.430	0.430	1.21	1.57	1.22		
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	4.000	5.000	1.725	-2.032	842	0.430	0.430	1.36	1.76	1.24		
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	4.000	5.000	2.149	-2.508	1013	0.420	0.420	1.41	1.82	1.16		
	50	ALL	5SB15		22	0.6	270	5.00	5.00	6	2.5	22	6	4	2	0	4.000	5.000	2.643	-3.073	1227	0.420	0.420	1.33	1.72	1.01		
30' ROADWAY SB12 BEAM	25	ALL	4SB12		6	0.6	270	3.50	3.50	0	2.5	6	0	0	0	0	4.000	5.000	0.904	-1.187	341	0.340	0.340	1.38	1.79	1.67		
	30	ALL	4SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	4.000	5.000	1.277	-1.646	407	0.340	0.340	1.32	1.71	1.37		
	35	ALL	4SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	4.000	5.000	1.711	-2.169	518	0.340	0.340	1.24	1.60	1.08		
	40	ALL	4SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	4.000	5.000	2.205	-2.758	640	0.340	0.340	1.34	1.73	1.11		
30' ROADWAY SB15 BEAM	25	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	4.000	5.000	0.723	-0.888	431	0.350	0.350	1.69	2.19	2.32		
	30	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	4.000	5.000	1.017	-1.231	438	0.350	0.350	1.16	1.50	1.37		
	35	ALL	4SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	4.000	5.000	1.346	-1.605	545	0.340	0.340	1.21	1.57	1.21		
	40	ALL	4SB15		12	0.6	270	5.00	5.00	0	2.5	12	0	0	0	0	4.000	5.000	1.729	-2.043	675	0.340	0.340	1.47	1.91	1.38		
	45	ALL	4SB15		14	0.6	270	5.00	5.00	2	2.5	14	2	2	0	0	4.000	5.000	2.166	-2.542	823	0.340	0.340	1.33	1.73	1.06		
	50	ALL	4SB15		18	0.6	270	5.00	5.00	4	2.5	18	4	2	2	0	4.000	5.000	2.665	-3.115	998	0.340	0.340	1.32	1.71	1.02		

① Based on the following allowable stresses (ksi):
 Compression = 0.65 f'ci
 Tension = 0.24 √f'ci
 Optional designs must likewise conform.

② Portion of full HL93.

DESIGN NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation. Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:
 Provide Class H concrete. Provide Grade 60 reinforcing steel. Use low relaxation strands, each pretensioned to 75 percent of fpu. Full-length debonded strands are not permitted in positions "A" and "B". Strand debonding must comply with Item 424.4.2.2.4. When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas. Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:
 1) Locate a strand in each "A" position.
 2) Place strand symmetrically about vertical centerline of beam.
 3) Space strands as equally as possible across the entire width. Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.



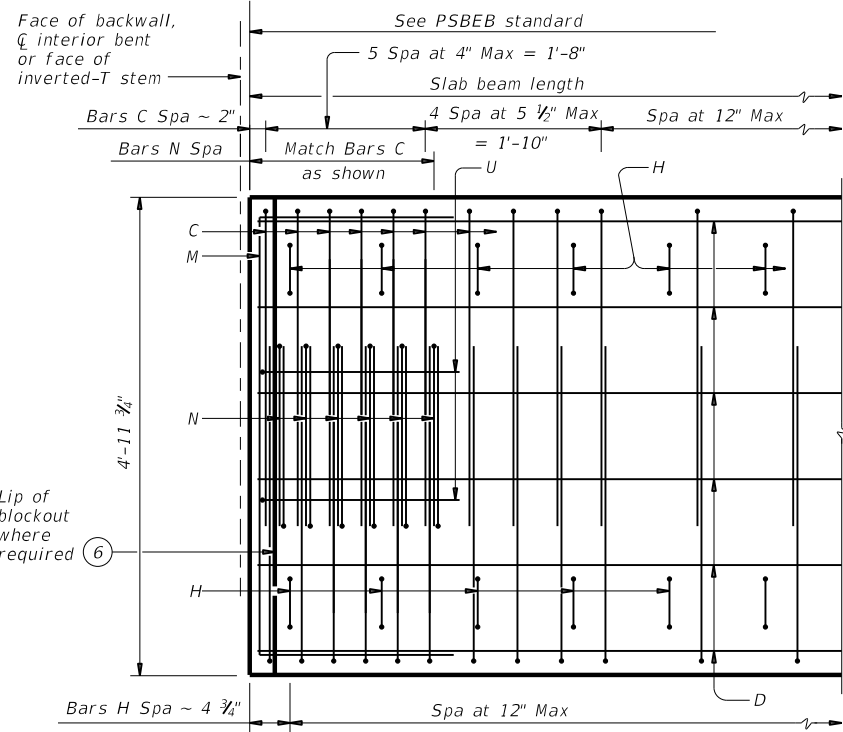
TxDOT 4SB12 SLAB BEAM TxDOT 5SB12 SLAB BEAM TxDOT 4SB15 SLAB BEAM TxDOT 5SB15 SLAB BEAM

HL93 LOADING

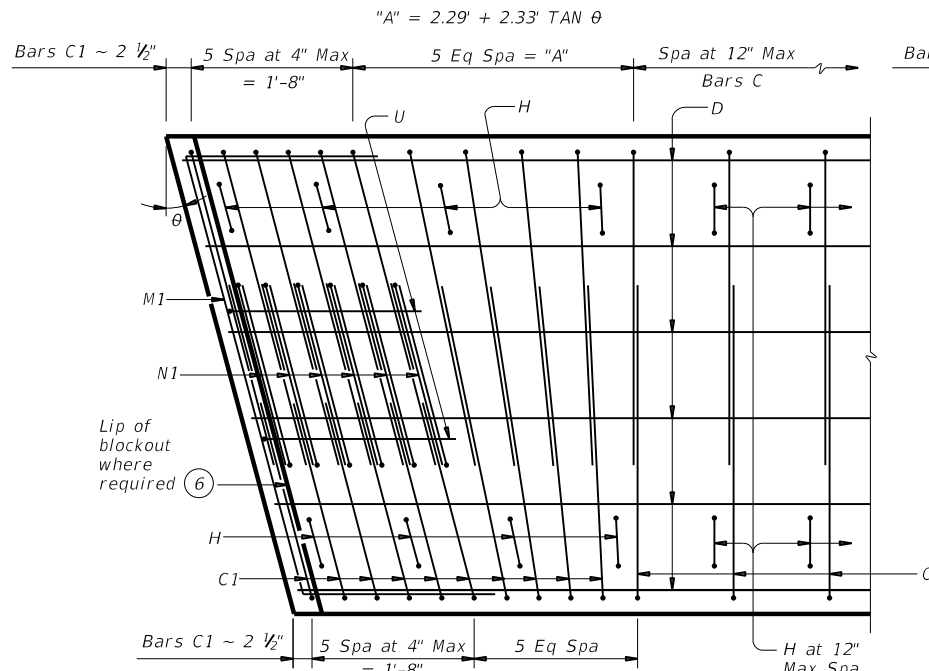
Texas Department of Transportation		Bridge Division Standard	
PRESTRESSED CONCRETE SLAB BEAM STD DESIGNS (TY SB12 OR SB15)			
24', 28' & 30' ROADWAY			
PSBSD			
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CTxDOT January 2017	CONT SECT	JOB	HIGHWAY
REVISIONS	0901 29	091, ETC	CR, ETC
1-21: Added load rating.	DIST	COUNTY	SHEET NO.
PAR	LAMAR, ETC		50

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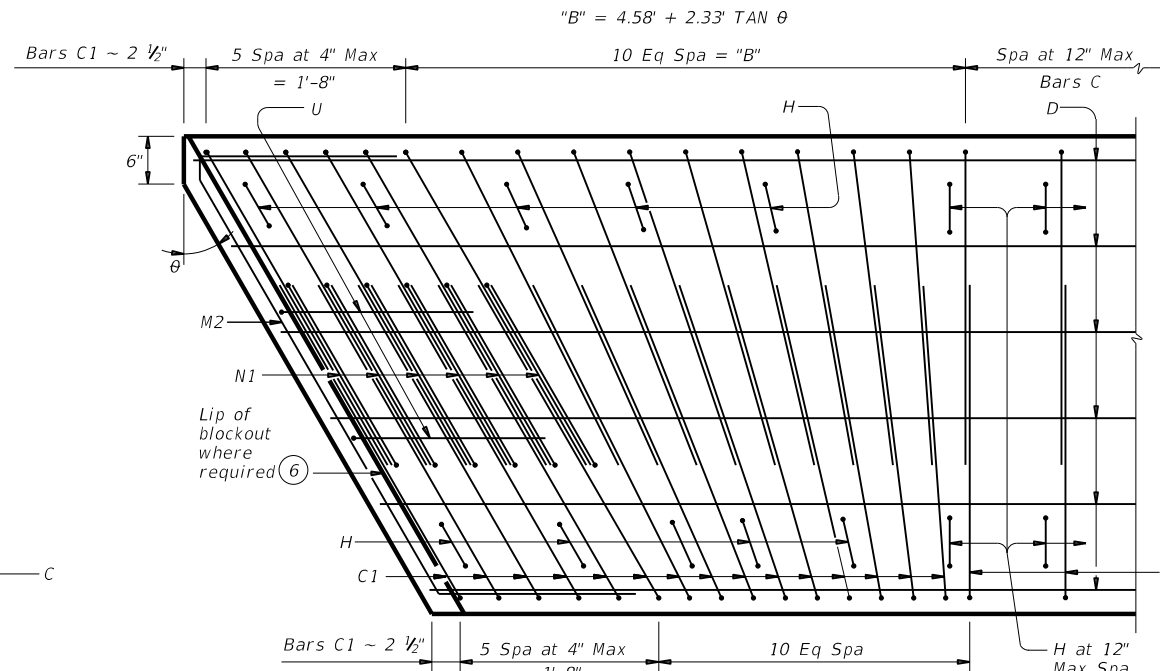
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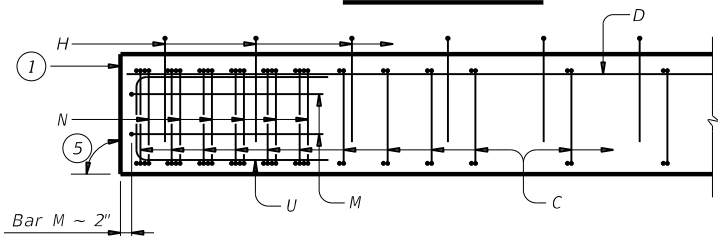
PART PLAN



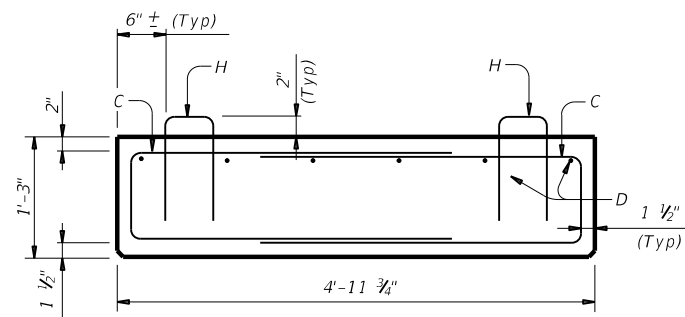
PART SKEW PLAN
 (Showing θ over 0° to 15° skew)



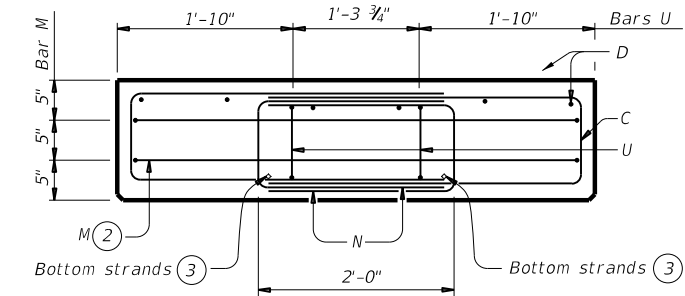
PART SKEW PLAN
 (Showing θ over 15° to 30° skew)



ELEVATION

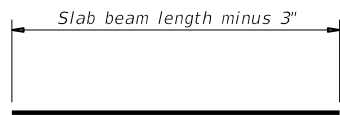


SECTION

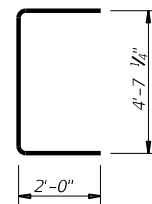


END MAT REINFORCING

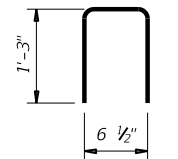
Bars H not shown for clarity.



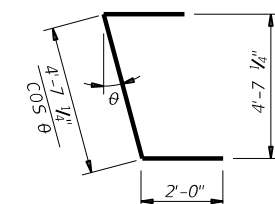
BARS D(#6)



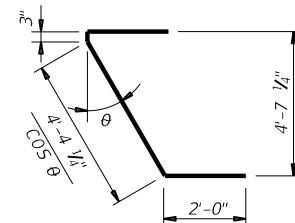
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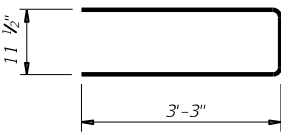
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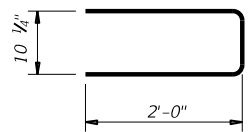
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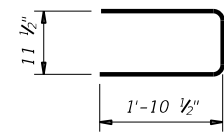
BARS M2(#4)



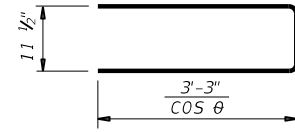
BARS C(#4)



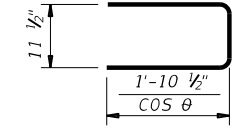
BARS U(#5)



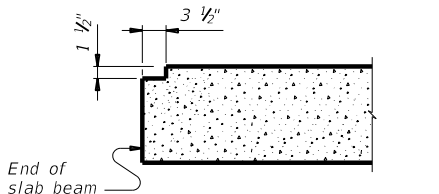
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT

BEAM PROPERTIES		
Area	in ²	896.2
Y top	in	7.50
Y bott	in	7.50
I	in ⁴	16,805
Weight	lb/ft	934

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.
 An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.
 These details can be used for any skew angle up to a maximum of 30 degrees.
 Chamfer all exposed corners 3/4" or round to a 3/4" radius.
 Details are drawn showing right forward skew. See Bridge Layout for actual direction.

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

- ① See End Mat Reinforcing detail.
- ② Adjust bars M vertically to avoid strands.
- ③ See sheet PSBND or PSBSD for strand locations.
- ④ Assumes 150 pcf weight density of concrete.
- ⑤ 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.
- ⑥ Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

		Bridge Division Standard	
PRESTRESSED CONCRETE SLAB BEAM DETAILS (TYPE 5SB15)			
PSB-5SB15			
FILE: psbsts04-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT January 2017	CONTRACT NO. 0901 29	SECTION NO. 091, ETC	HIGHWAY CR, ETC
REVISIONS	DIST. PAR	COUNTY LAMAR, ETC	SHEET NO. 51

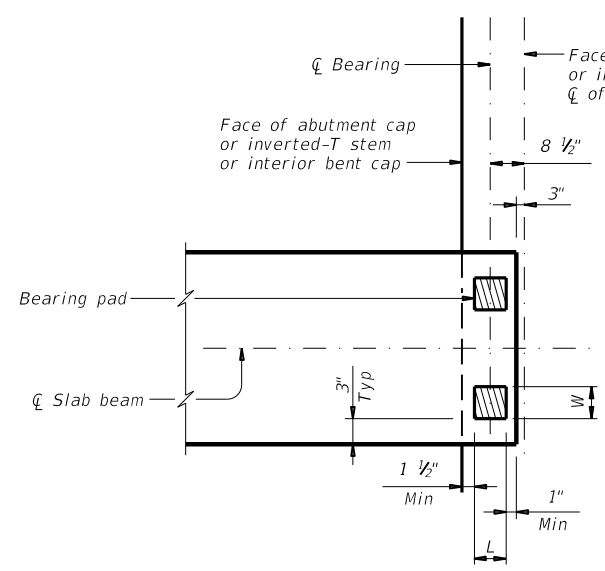
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or the accuracy of the information provided. This drawing was prepared by PSBEB.dgn

DATE: 12/30/2021 8:45:19 AM
 FILE: T:\PARTD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091.dwg

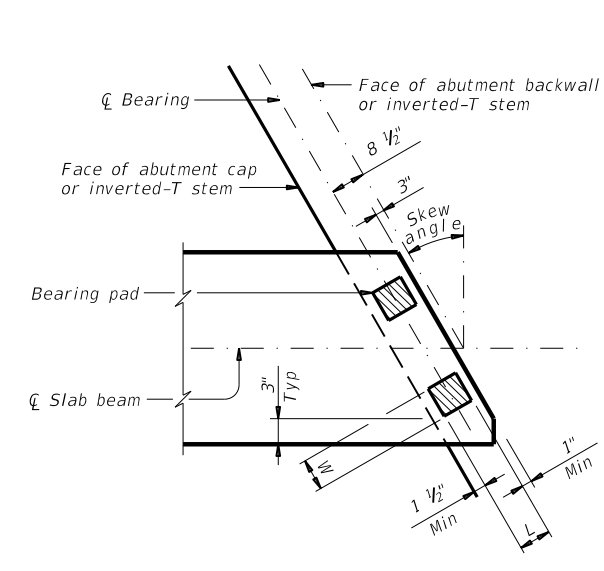
TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

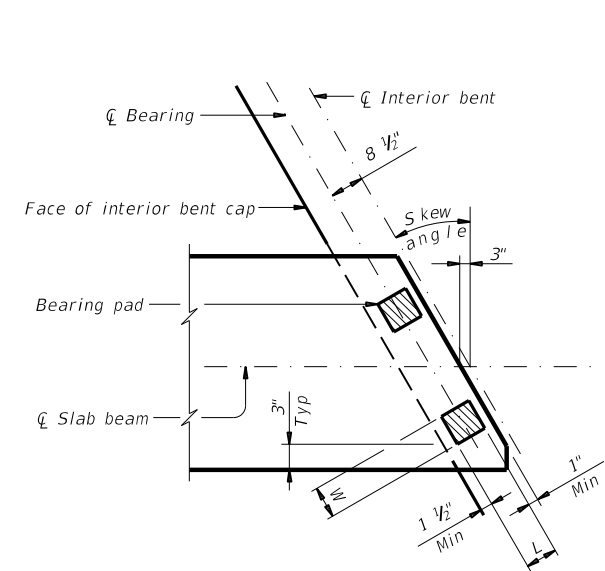
Pad sizes shown are applicable for the following conditions:
 (1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
 (2) Skews less than or equal to 30°.



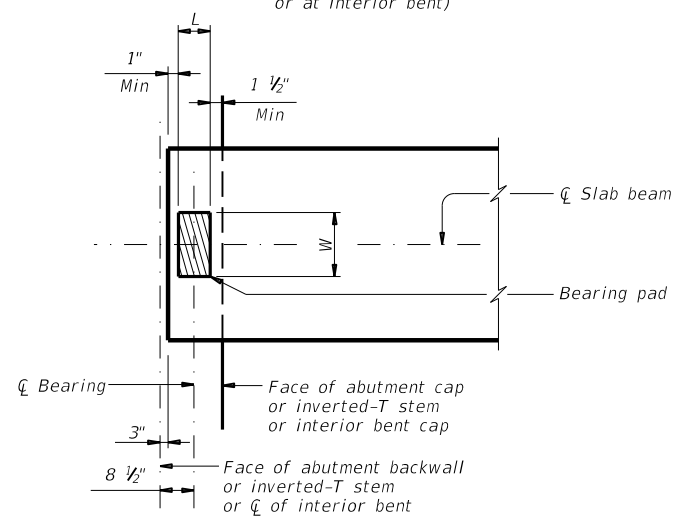
TWO-PAD DETAIL PLAN
 (At abutment or inverted-T cap or at interior bent)



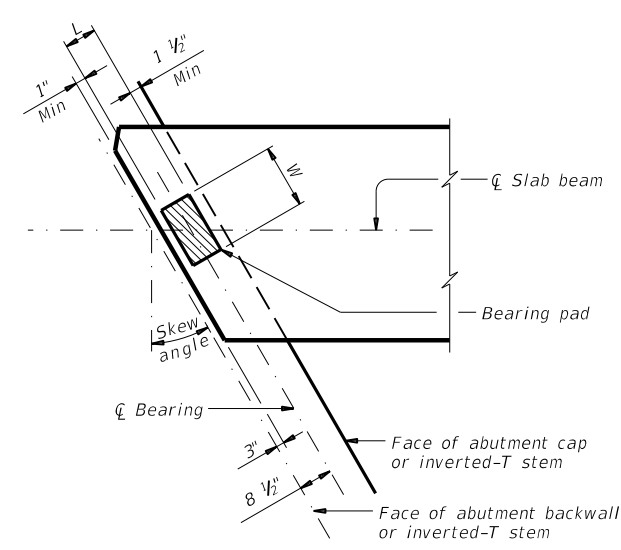
TWO-PAD DETAIL SKEW PLAN
 (At abutment or inverted-T cap)



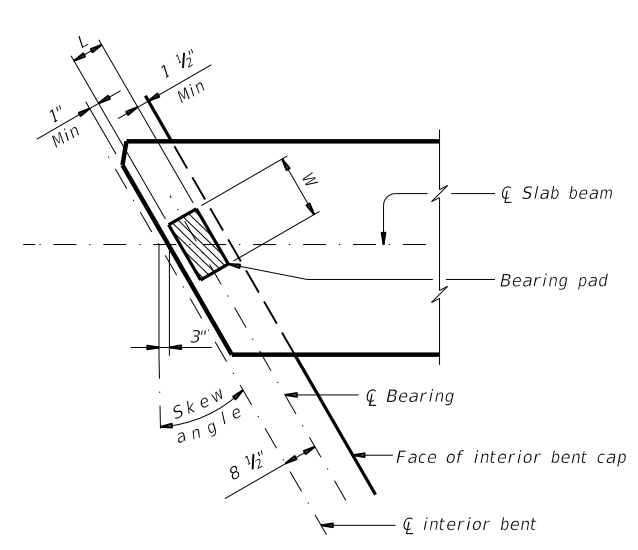
TWO-PAD DETAIL SKEW PLAN
 (At interior bent)



ONE-PAD DETAIL PLAN
 (At abutment or inverted-T cap or at interior bent)



ONE-PAD DETAIL SKEW PLAN
 (At abutment or inverted-T cap)

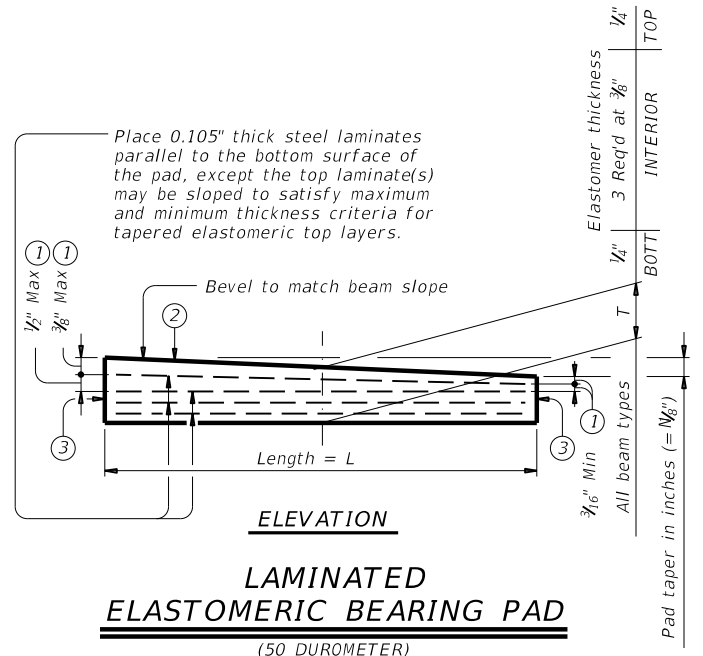


ONE-PAD DETAIL SKEW PLAN
 (At interior bent)

GENERAL NOTES:
 These details accommodate skew angles up to 30°. Shop drawings for approval are required. A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer. Cost of furnishing and installing elastomeric bearings must be included in unit price bid for "Prestressed Concrete Slab Beams".

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
 Place two bearing pads at back station beam end.



LAMINATED ELASTOMERIC BEARING PAD
 (50 DUROMETER)

- Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark. Examples: N=0, (for 0" taper) N=1, (for 1/8" taper) N=2, (for 1/4" taper) (etc.) Fabricated pad top surface slope must not vary from plan beam slope by more than (0.0625" / Length) IN/IN.
- Locate permanent mark here.

HL93 LOADING

Texas Department of Transportation
 Bridge Division Standard

ELASTOMERIC BEARING AND BEAM END DETAILS

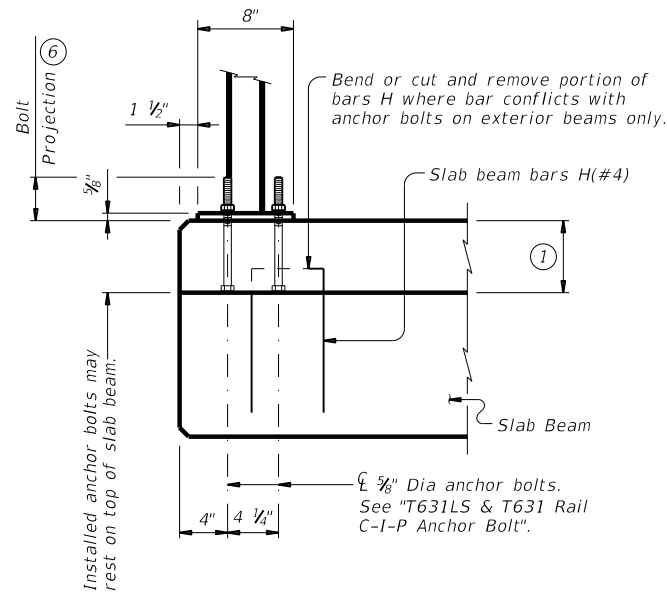
PRESTR CONCRETE SLAB BEAM

PSBEB

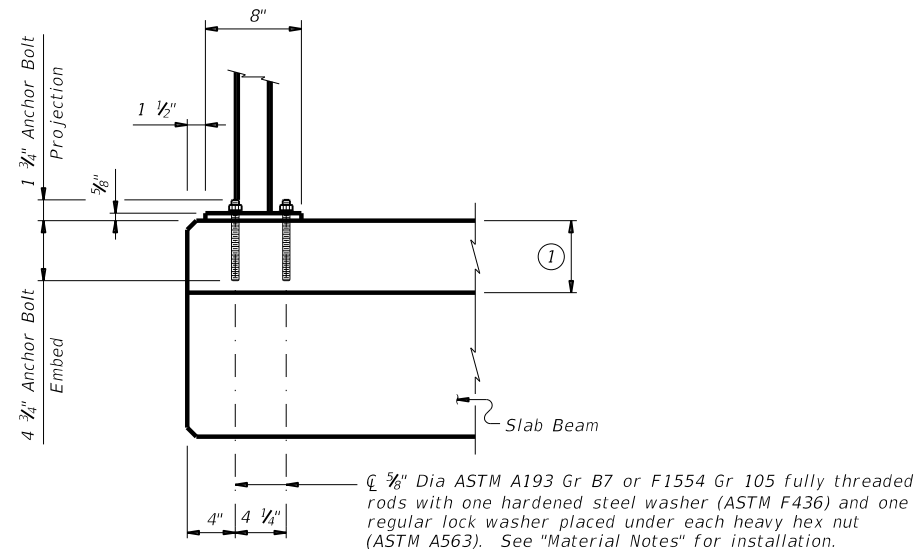
FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0901	29	091, ETC	CR, ETC
DIST	COUNTY	SHEET NO.		
PAR	LAMAR, ETC			52

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DATE: 12/30/2021 8:45:20 AM
 FILE: T:\PARTPDD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091.dgn

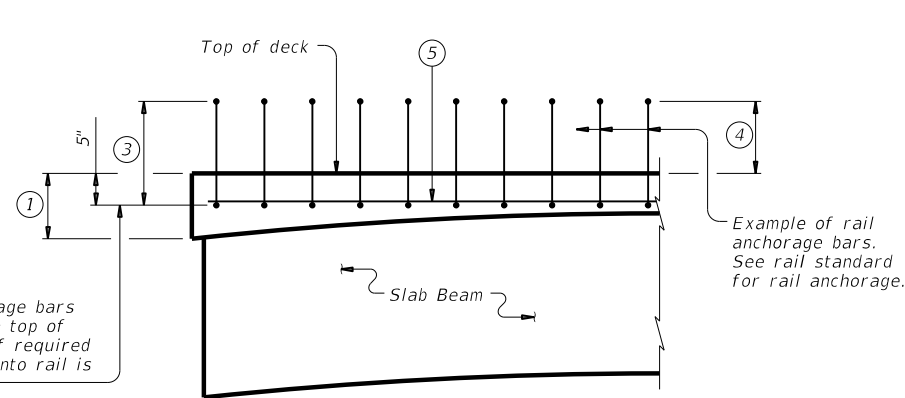


CAST-IN-PLACE ANCHORAGE OPTION

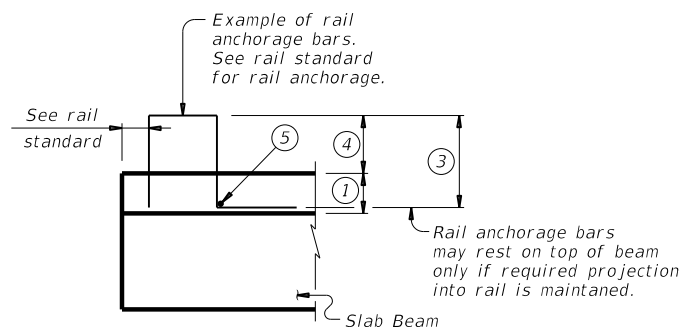


ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT (2)(7)



PART SPAN ELEVATION

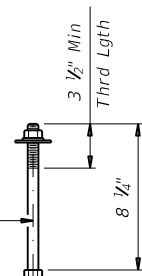


SECTION

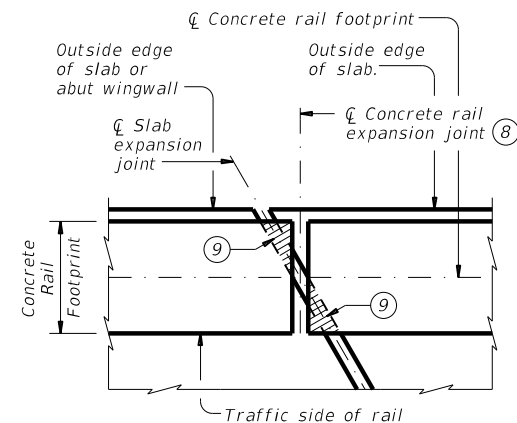
TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

3/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563).



T631LS & T631 RAIL C-I-P ANCHOR BOLT



PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

- Cast-in-place slab thickness varies due to beam camber (5" minimum).
- Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
- Bar length shown on rail standard, minus 1 1/4". Adjust bar length for a raised sidewalk.
- See rail standard for projection from finished grade or top of sidewalk.
- Place additional (#5) longitudinal bar.
- Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than 1/2" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
- Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only) 30° Skew: 1'-3" (acute corner only)
- Location of rail expansion joint must be at the intersection of centerline of slab expansion joint, centerline of rail footprint and perpendicular to slab outside edge.
- Cross-hatched area must have 1/2" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets. Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system. Provide Grade 60 reinforcing steel. Cast-in-place anchorage system for T631LS and T631 Rail must be 3/8" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 1/2" minimum. Adhesive anchors for T631LS and T631 Rail must be 3/8" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 3/4". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

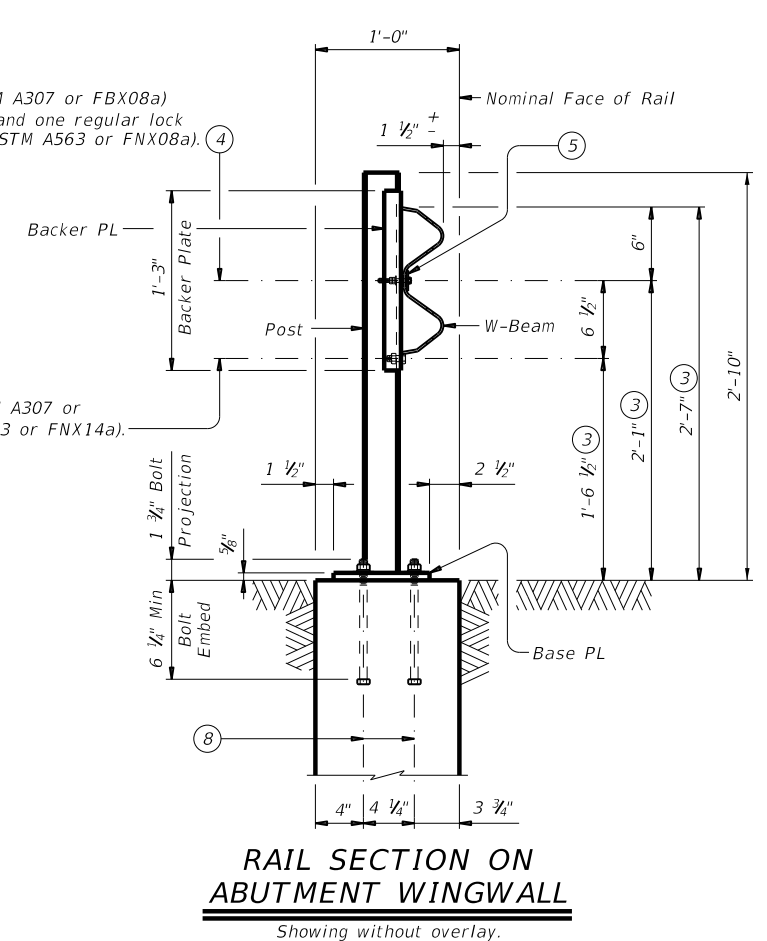
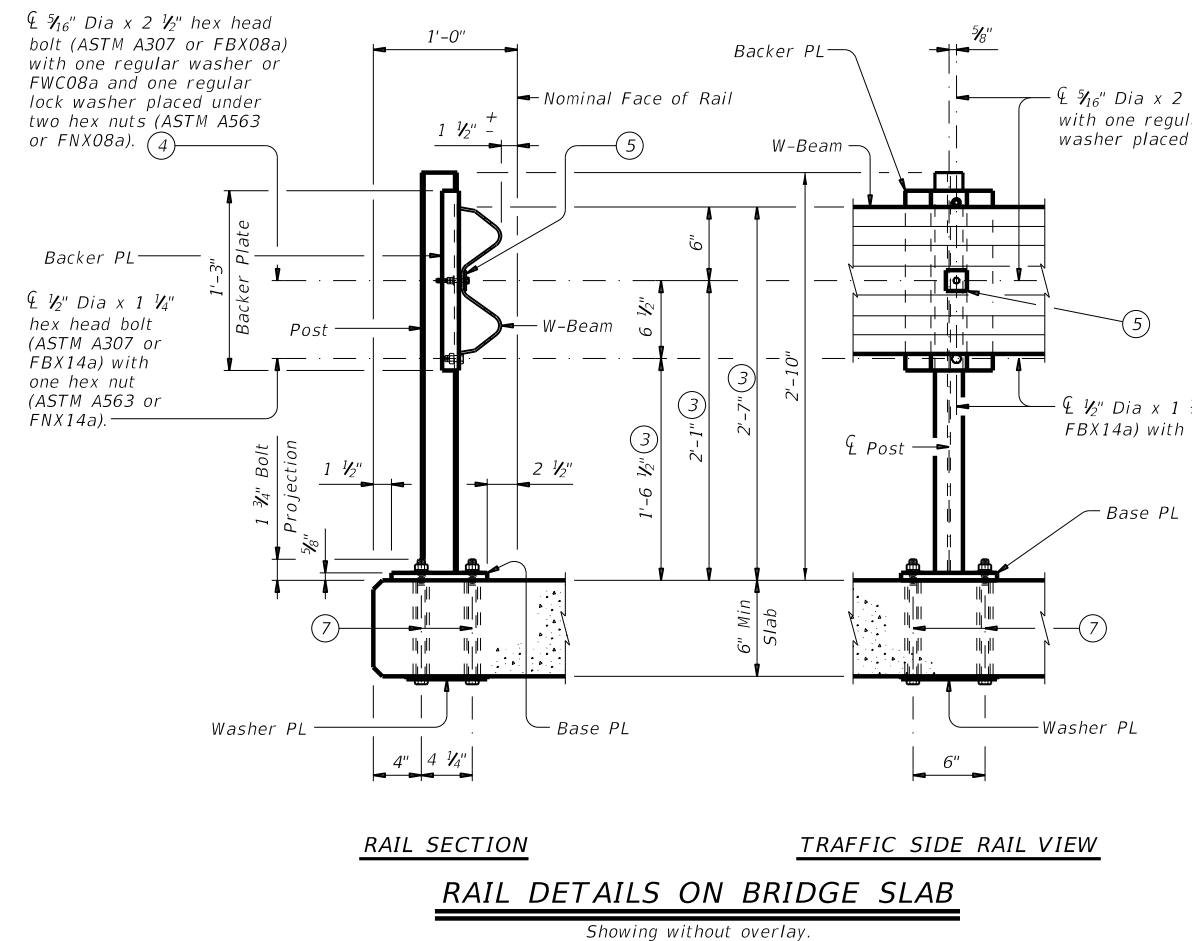
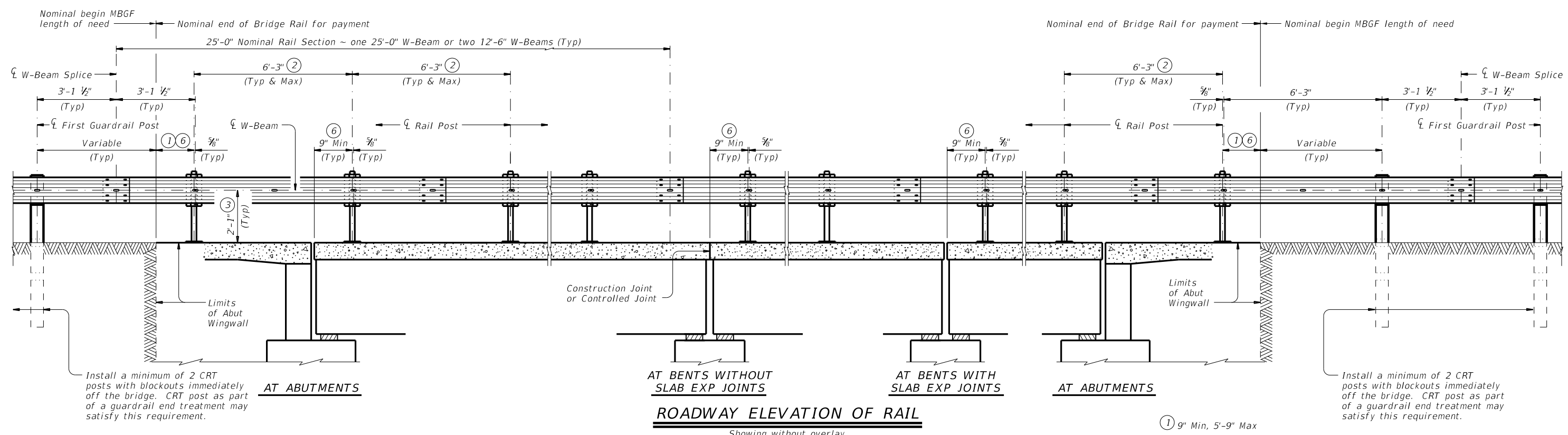
GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications. This standard is for use with structures with a 5" minimum cast-in-place concrete slab. This standard may require modification for interior rails. This standard does not apply to median barriers. This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges. See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

		Bridge Division Standard	
<h2>RAIL ANCHORAGE DETAILS</h2>			
<h3>PRESTR CONCRETE SLAB BEAMS</h3>			
<h3>PSBRA</h3>			
FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT January 2017	CONV	SECT	JOB
REVISIONS	0901 29	091, ETC	CR, ETC
03-18: Updated adhesive anchor notes.	DIST	COUNTY	SHEET NO.
PAR	LAMAR, ETC		53

DATE: 12/30/2021 8:45:22 AM
 FILE: T:\PARTPDD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091 of the CR 15070 at Branch of Cuthand Creek, etc. TYPE T631LS.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.



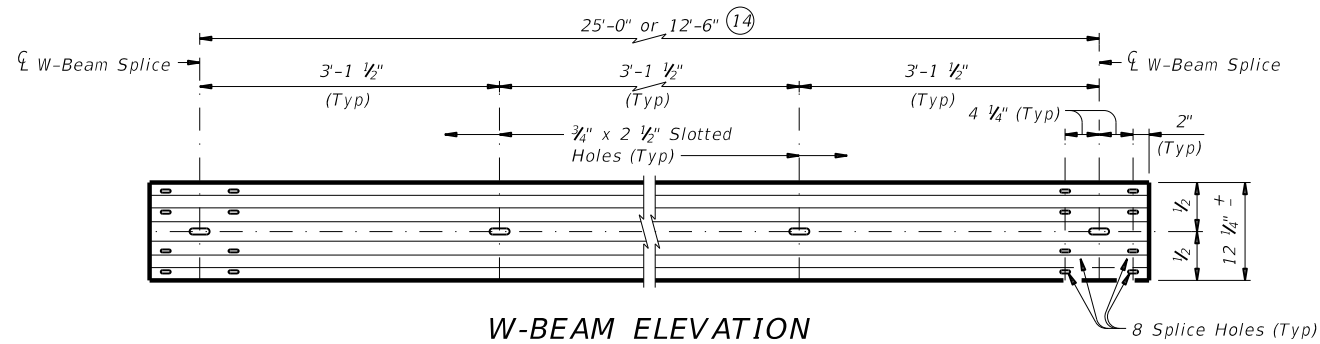
- ① 9" Min, 5'-9" Max
- ② Maintain 6'-3" Rail Post spacing wherever possible for use with nominal 25'-0" or 12'-6" W-Beam sections. Symmetry of post spacing on both sides and along the structure is not necessary.
- ③ Increase 2" for structures with overlay.
- ④ Tighten the first hex nut by hand until the top and bottom edges of the W-Beam engage the Backer Plate (Backer Plate should be snug against the post). Then tighten hex nut one revolution with wrench and secure with the second hex nut.
- ⑤ PL 1/8" x 1 3/4" x 1 3/4" with 5/8" Dia Hole centered in PL (ASTM A36). Square Guardrail Washer (FWR01).
- ⑥ The post nearest to a slab joint or end of structure may be shifted up to 9" in order to satisfy the minimum offset dimension. Drill a new 3/4" Dia hole in the centerline of W-beam for shifted post. Paint hole with two coats of zinc-rich paint conforming to the Item "Galvanizing". All other posts must remain on the typical spacing.
- ⑦ 5/8" Dia formed holes for 5/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ASTM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".
- ⑧ 5/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ASTM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".

The use of this railing is restricted to speeds of 45 mph or less.

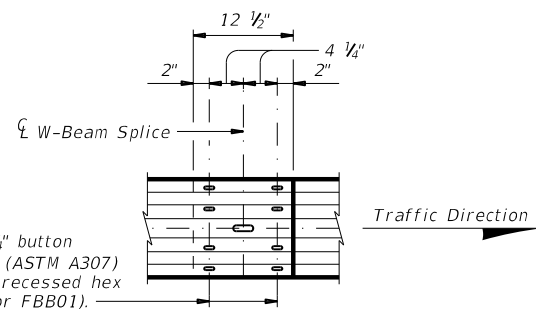
SHEET 1 OF 2

		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T631LS</h2>			
FILE: r1std037-20.dgn	DN: TxDOT	CK: AES	DW: JTR
©TxDOT September 2019	CONV	SECT	JOB
REVISIONS	0901 29	091, ETC	CR, ETC
07-20: Allowing 9'-4" or 6'-3" W-Beam sections.	DIST	COUNTY	SHEET NO.
PAR	LAMAR, ETC		54

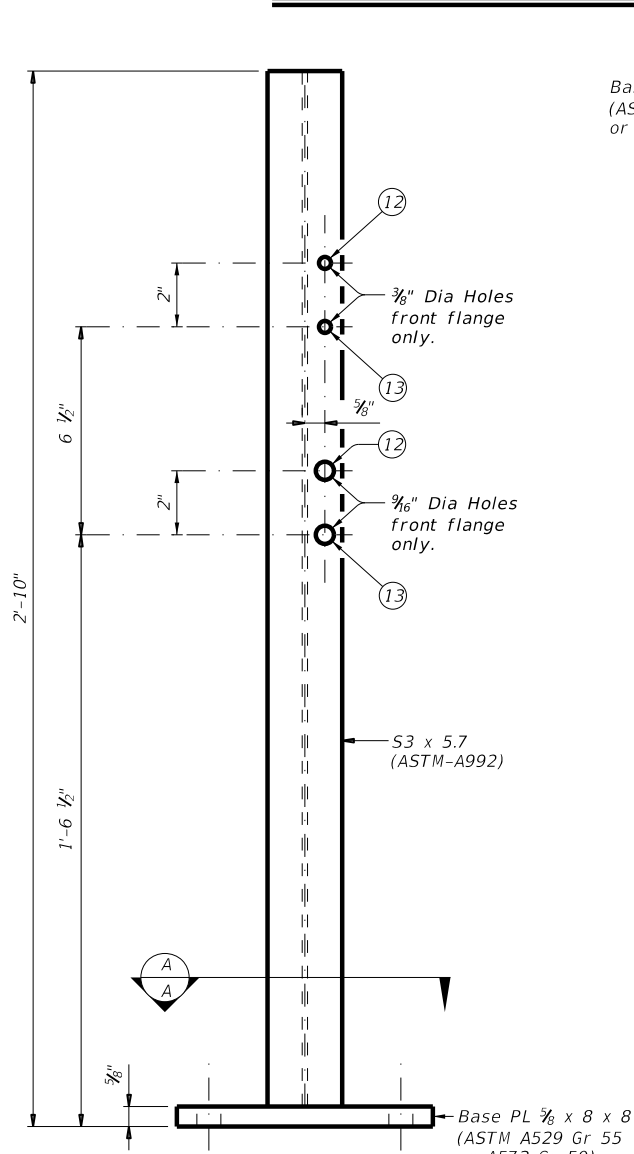
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 FILE: T:\PARTDPD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091 of the CR 15070 of the Branch of Cuthand Creek, etc. TYPE T631LS.dgn
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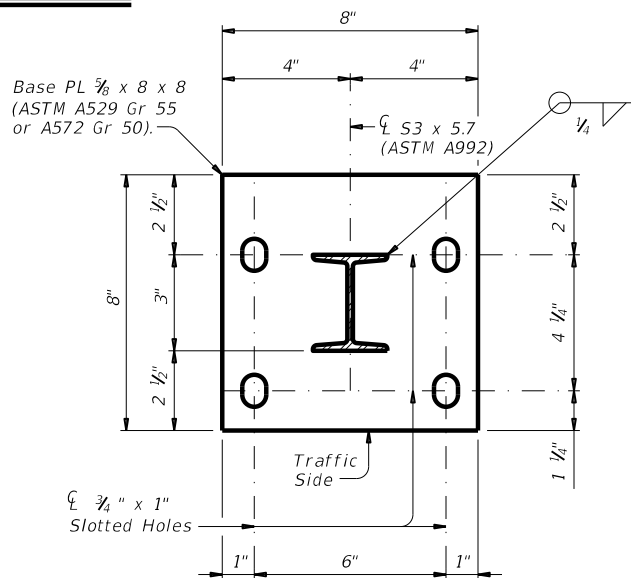
W-BEAM ELEVATION



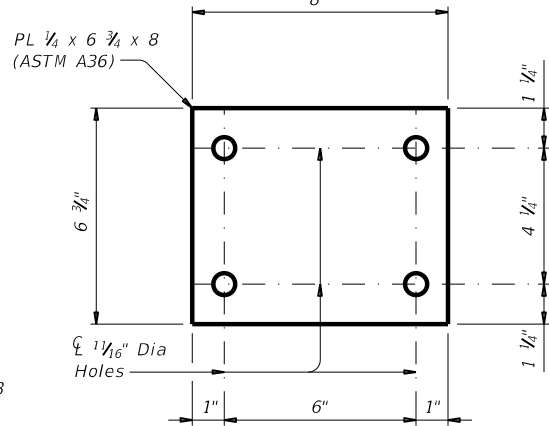
W-BEAM SPLICE ELEVATION



POST ELEVATION

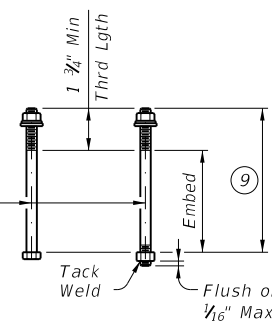


SECTION A-A



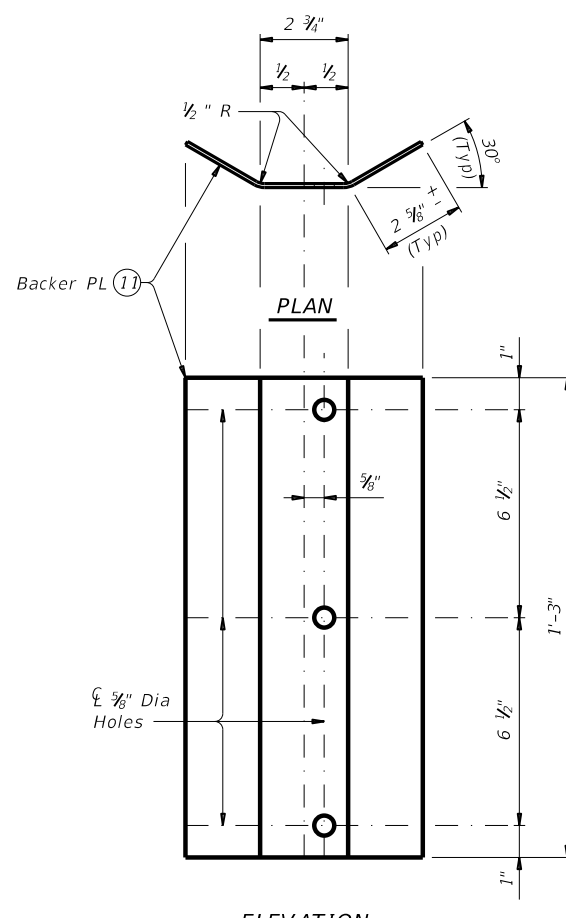
WASHER PLATE DETAIL

$\frac{3}{8}$ " Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS (10)

- 9 See "Rail Details On Bridge Slab" and/or "Rail Section On Abutment Wingwall".
- 10 See "Material Notes" for anchor bolt information.
- 11 Backer PL $\frac{1}{4}$ " x 8 x 1'-3" (ASTM A1011 CS or SS Gr 33, or A1008 CS or SS Gr 33 (11 Gage acceptable)).
- 12 Used for structures with overlay.
- 13 Used for structures without overlay.
- 14 At the nominal end of the bridge rail for payment, one 9'-4 1/2" or 6'-3" W-beam section is permitted in order to achieve the required W-Beam splice location on the MBGF.



BACKER PLATE

MBGF AND END TREATMENT NOTES:

This traffic railing must be anchored by metal beam guard fence (MBGF) and/or guard fence end treatments. Determine MBGF length of need in accordance with the Roadway Design Manual, unless otherwise specified. The minimum MBGF length of need required for anchoring the railing is: SGT; or DAT plus 12.5' of MBGF, as applicable. Provide CRT posts as shown in "Roadway Elevation of Rail."

CONSTRUCTION NOTES:

Face of rail post must be plumb unless otherwise approved by the Engineer. Post must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than $\frac{1}{16}$ " exist.

Fully anchored guardrail must be attached to each end of rail. A metal beam guard fence transition is not used with this rail.

At the Contractor's option anchor bolts may be an adhesive anchor system. See "Material Notes".

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

It is recommended to show a Rail Layout with rail posts and W-beam splices. Fabricator must submit erection drawings to the Engineer for approval.

Round or chamfer exposed edges of rail post and backer plate to approximately $\frac{1}{16}$ " by grinding.

Shop drawings are not required for this rail.

MATERIAL NOTES:

Galvanize all steel components.

Anchor bolts for base plate must be $\frac{3}{8}$ " Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Optional adhesive anchorage system must be $\frac{3}{8}$ " Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 $\frac{3}{4}$ ". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

W-beam must meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans. The Contractor may furnish rail elements of 25'-0" or 12'-6" (Nominal) lengths and a single rail element of 9'-4 1/2" or 6'-3" (Nominal) length. W-Beam must have slotted holes at 3'-1 1/2".

Some part numbers from the "Task Force 13" Guide to Standardized Highway Barrier Hardware have been furnished for quick reference.

GENERAL NOTES:

This railing has been successfully evaluated by full-scale crash test to meet MASH TL-2 criteria. This railing can be used for speeds of 45 mph and less.

This rail is designed to deflect approximately 2' to 2'-6" as it contains and redirects the errant vehicle. This rail may not be installed on top of or behind curbs that project above finished grade, on bridges with expansion joints providing more than 5" movement, on retaining walls, or on grade separations and interchanges.

Repairs to impact-damaged post and base plate unit are not permitted. Replace all impact-damaged posts with a new post and base plate unit.

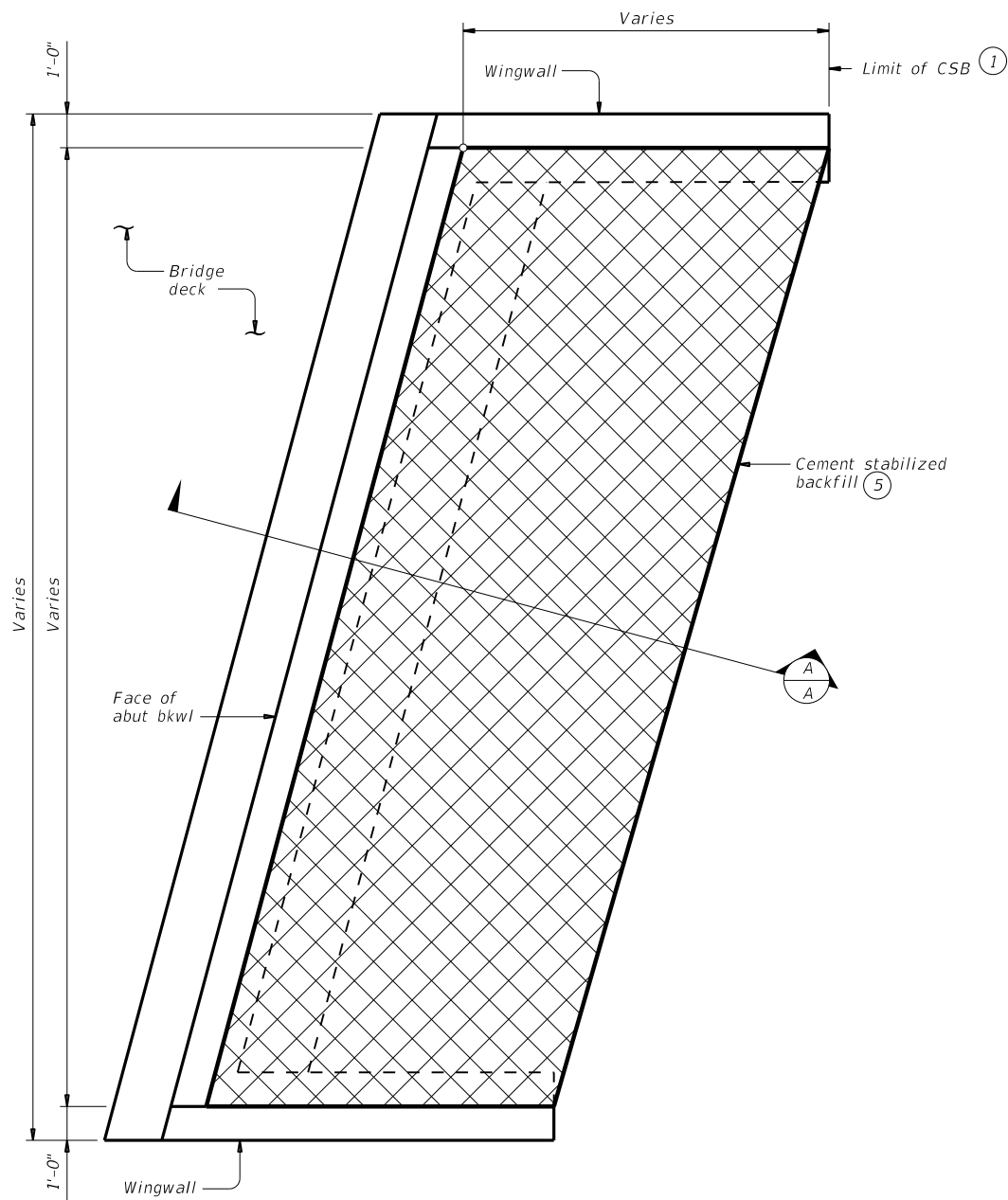
Average weight of railing with no overlay: 13 plf total.

SHEET 2 OF 2

		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T631LS</h2>			
FILE: r1std037-20.dgn	DN: TxDOT	CK: AES	DW: JTR
REVISED: September 2019	CONTRACT: 0901 29	SECTION: 091, ETC	CITY: CR, ETC
07-20: Allowing 9'-4 1/2" or 6'-3" W-Beam sections.	DIST: PAR	COUNTY: LAMAR, ETC	SHEET NO: 55

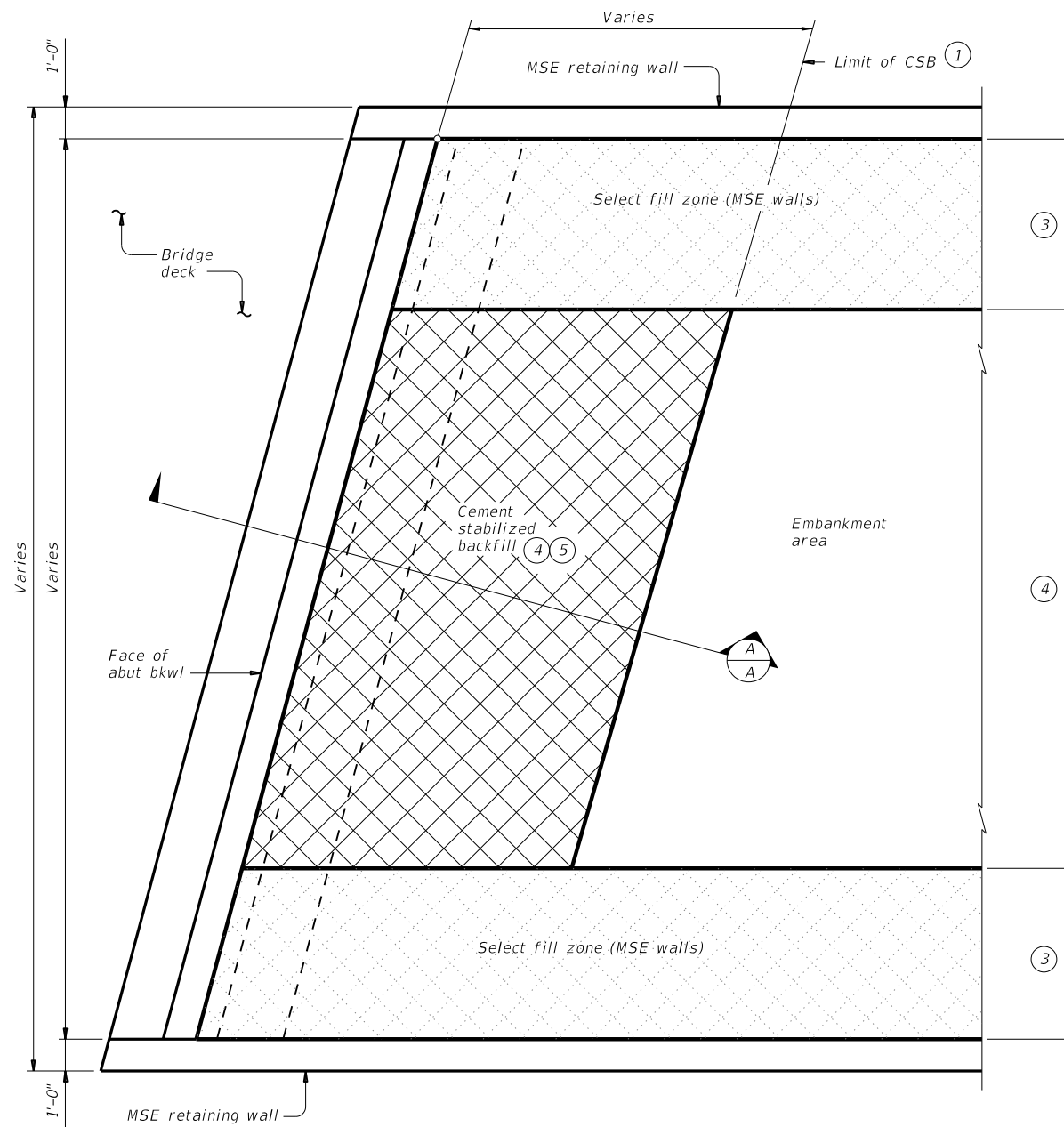
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.

DATE: 12/30/2021 8:45:26 AM
 FILE: T:\PARTPDD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091.dgn



OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

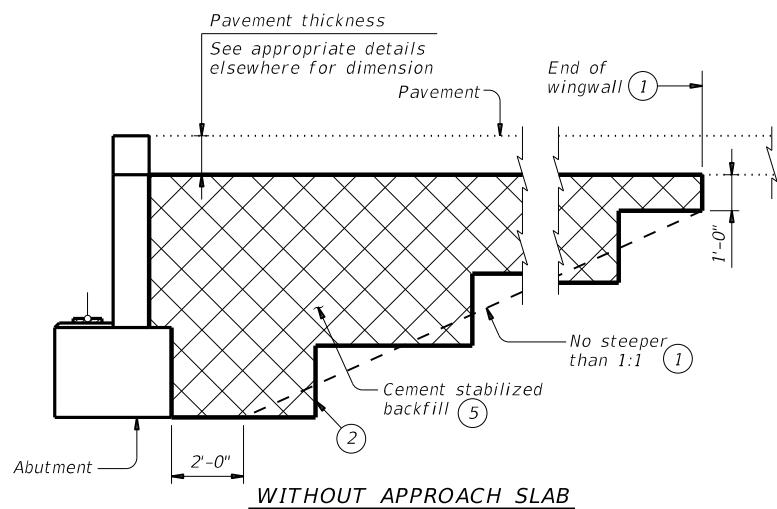


OPTION 1 ~ PLAN WITH MSE RETAINING WALLS

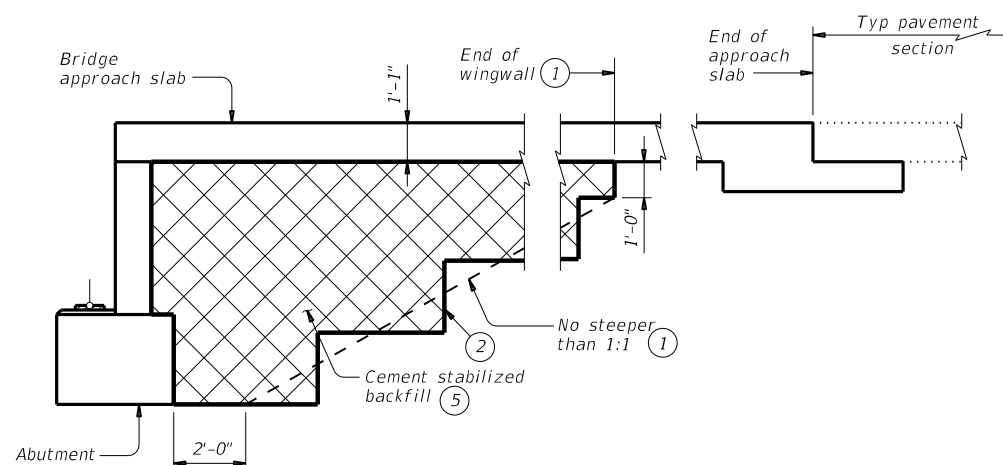
- 1 Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- 2 Bench backfill as shown with 12" (approximate) bench depths.
- 3 Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- 4 When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- 5 If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a) If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
 - b) Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments. If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments. Details are drawn showing left forward skew. See Bridge Layout for actual skew direction. These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
 (Showing BAS-C, BAS-A similar.)

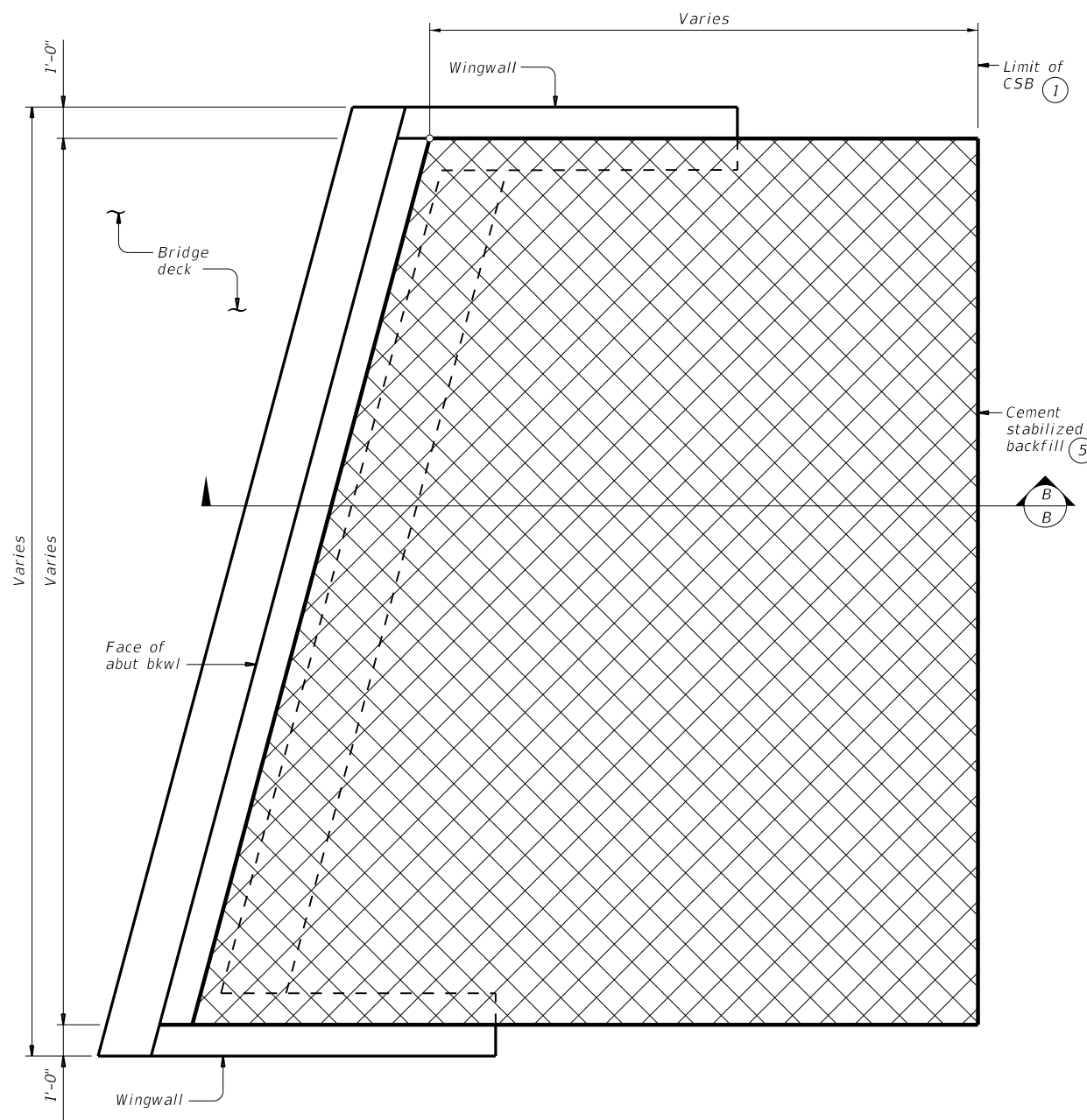
SECTION A-A

SHEET 1 OF 2

		Bridge Division Standard	
CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT			
CSAB			
FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
©TxDOT	REVISIONS	CONTRACT	HIGHWAY
0901 29	091, ETC	CR	ETC
02-20: Added Option 2.	DIST	COUNTY	SHEET NO.
PAR	LAMAR, ETC		56

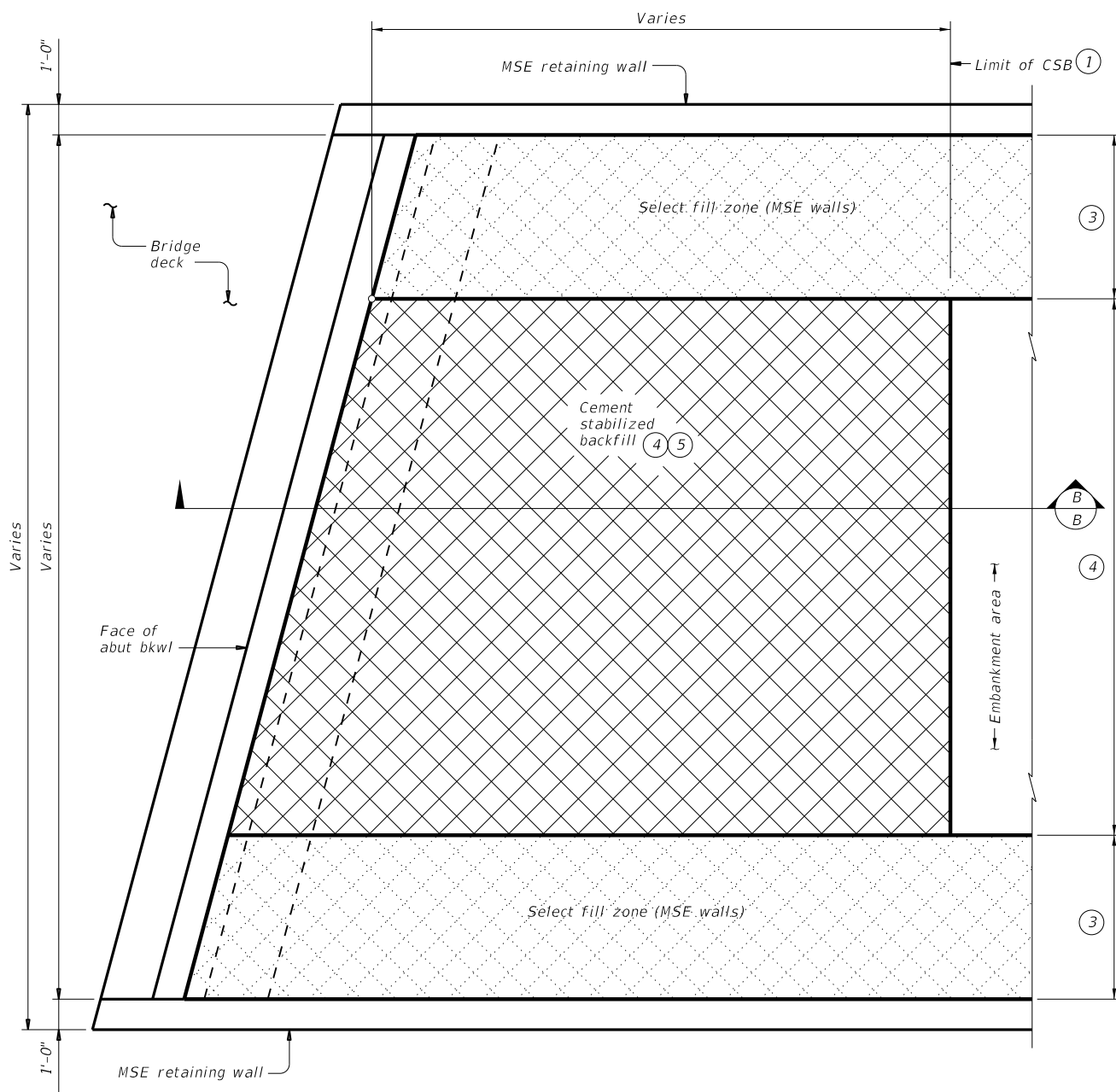
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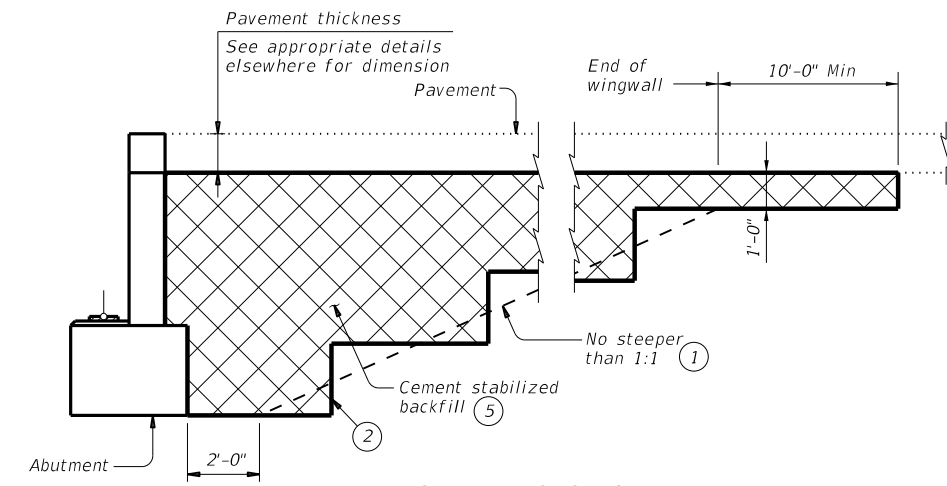
OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

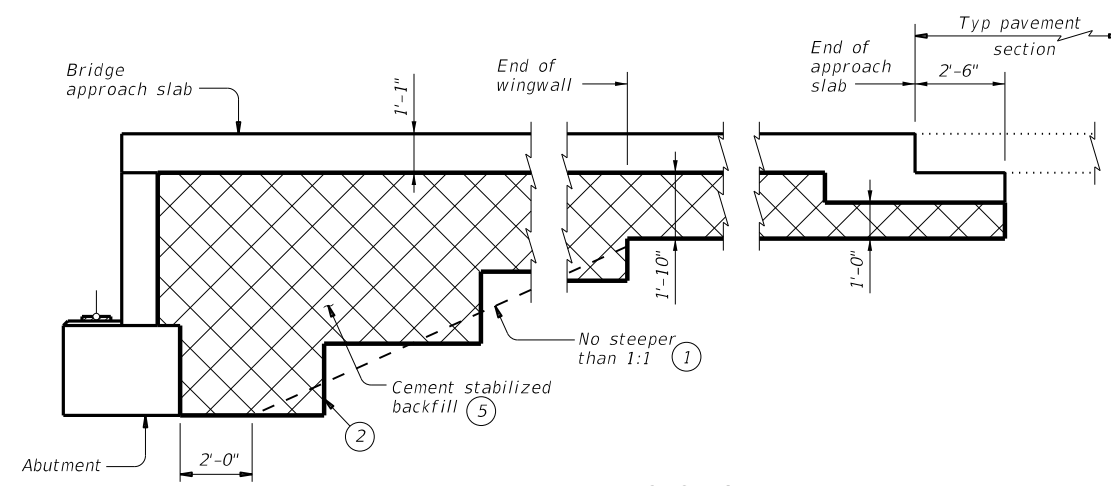


OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ④ When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- ⑤ If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
 - b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).



WITHOUT APPROACH SLAB



SECTION B-B

WITH APPROACH SLAB
 (Showing BAS-C, BAS-A similar.)

SHEET 2 OF 2



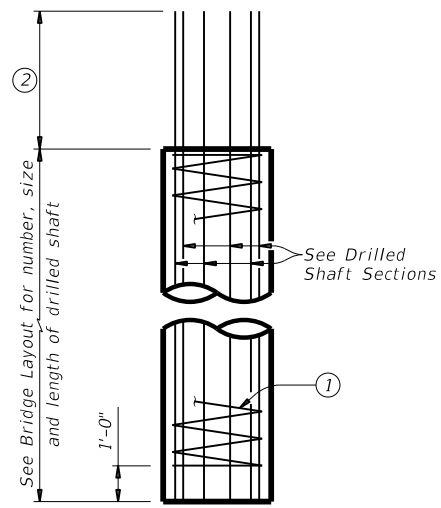
CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT

CSAB

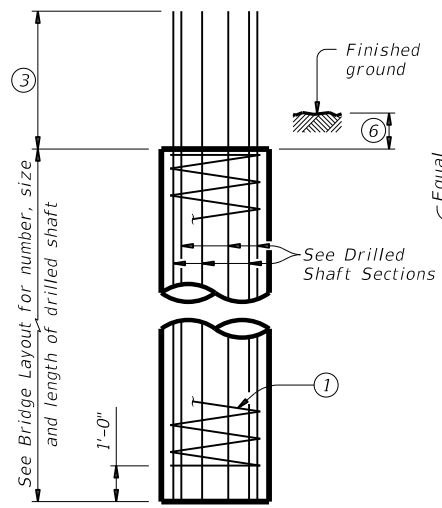
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©TxDOT April 2019	CONTRACT	SECTION	JOB	HIGHWAY
REVISIONS	0901 29	091, ETC	CR, ETC	
02-20: Added Option 2.	DIST	COUNTY	SHEET NO.	
	PAR	LAMAR, ETC	57	

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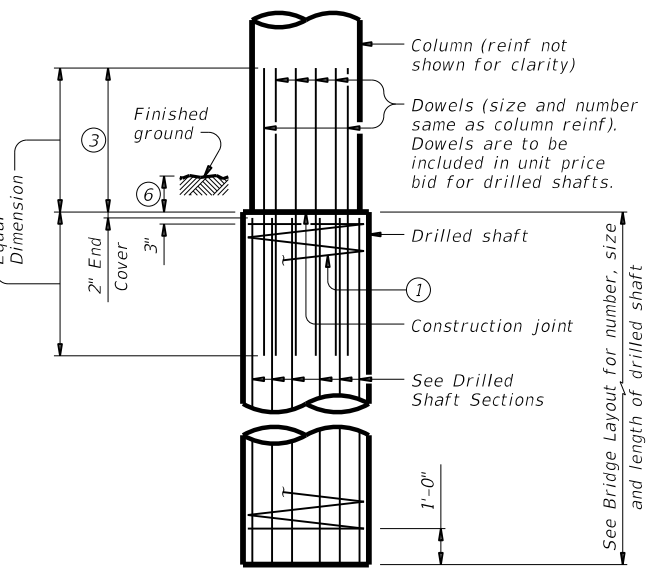
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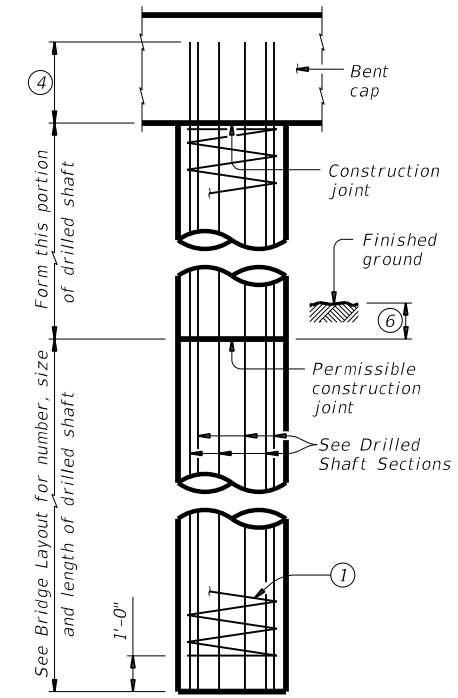
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



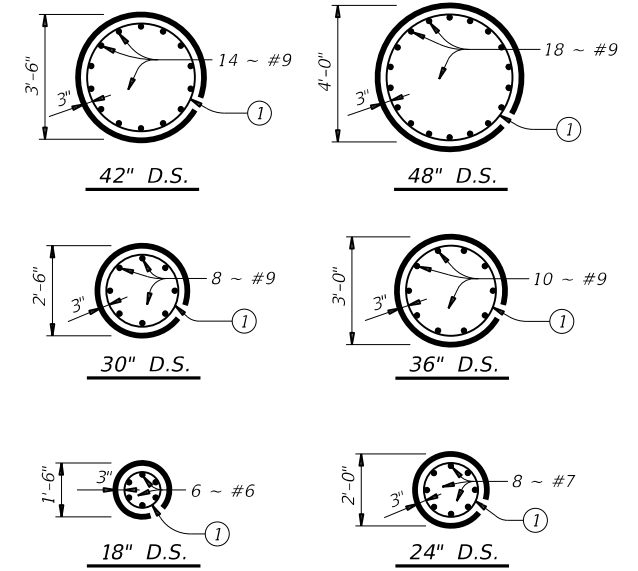
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL

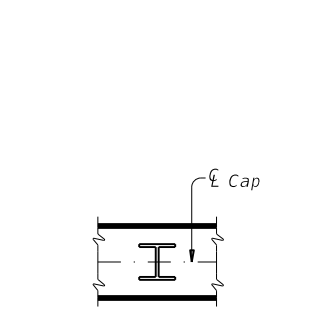


DRILLED SHAFT SECTIONS

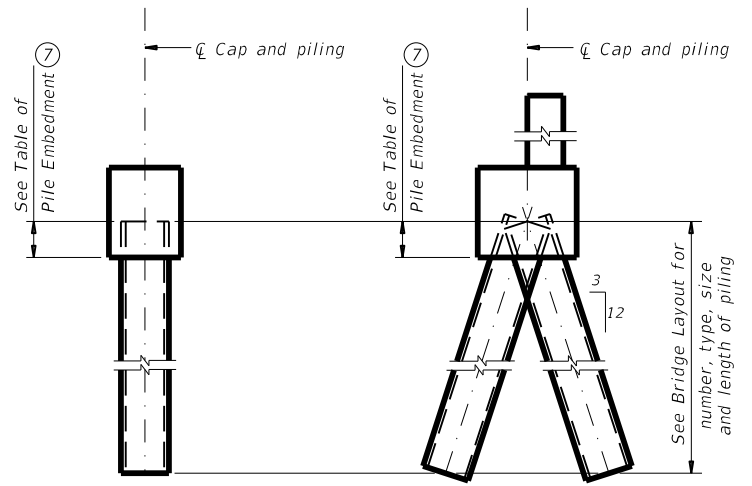
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.

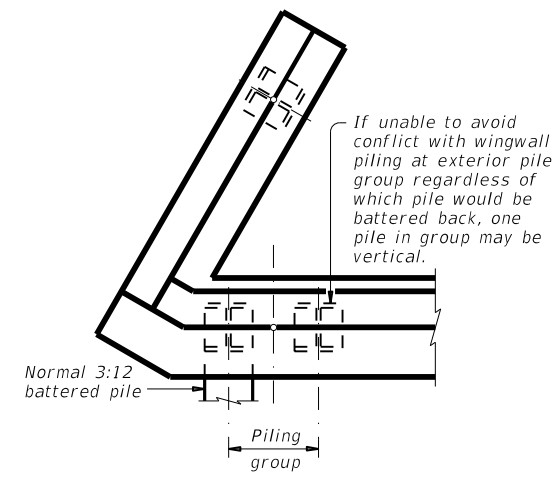


ORIENTATION OF STEEL H-PIILING



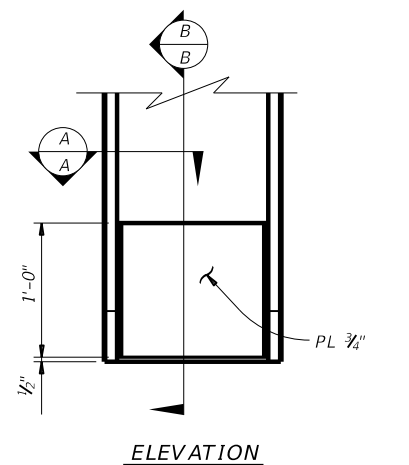
VERTICAL PILE BATTERED PILE

PIILING DETAILS
(Concrete or steel H)

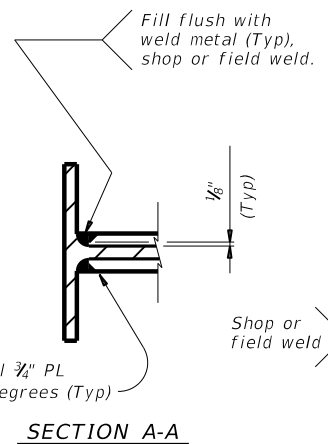


DETAIL "A"
(Showing plan view of a 30° skewed abutment)

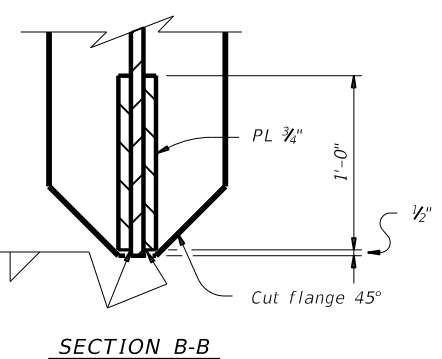
- ① #3 spiral at 6" pitch (one and a half flat turns top and bottom).
- ② Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"
- ③ Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"
- ④ Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"
- ⑤ Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
- ⑥ 1'-0" Min, unless shown otherwise on plans.
- ⑦ Or as shown on plans.



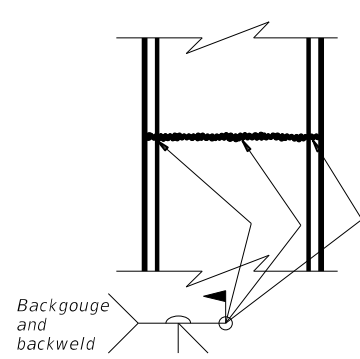
ELEVATION



SECTION A-A

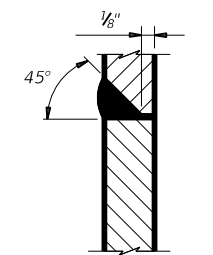


SECTION B-B



STEEL H-PILE SPLICE DETAIL

Use when required.



SECTION THRU FLANGE OR WEB

STEEL H-PILE TIP REINFORCEMENT

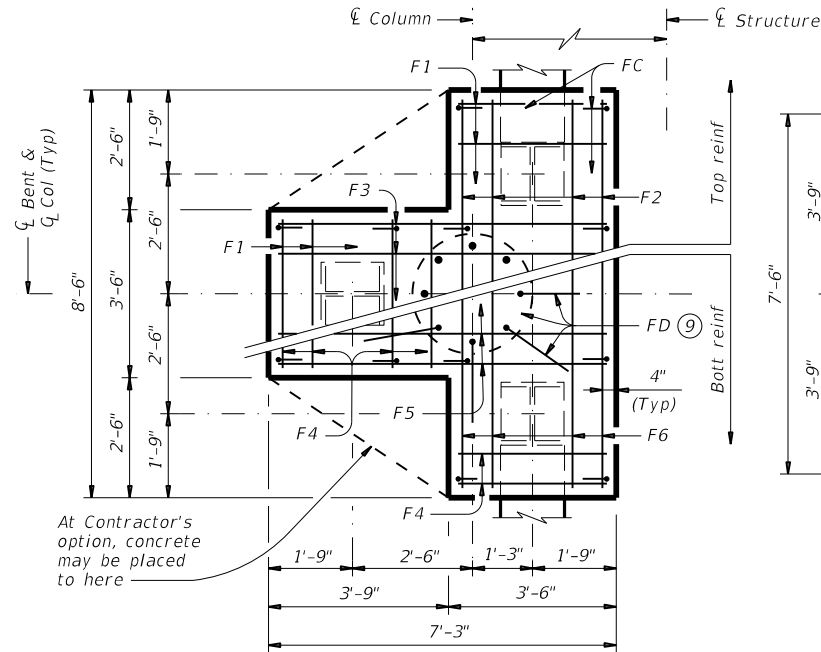
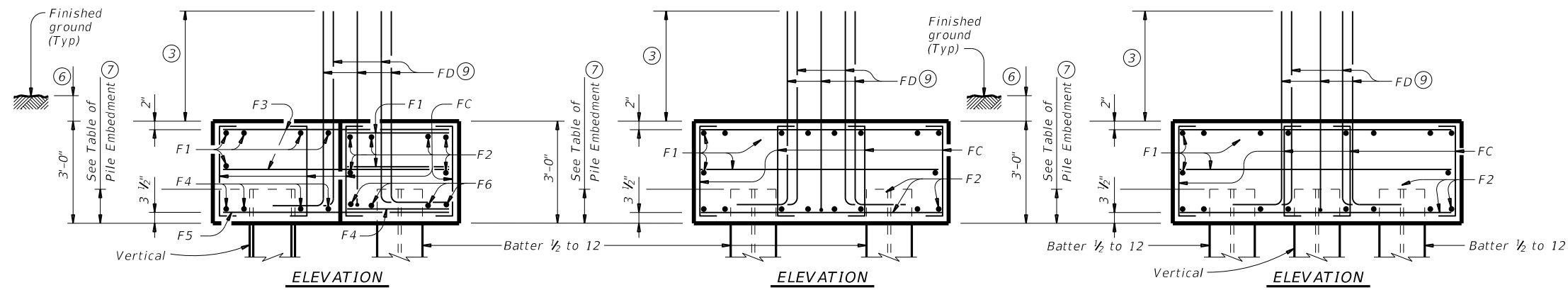
See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.

SHEET 1 OF 2

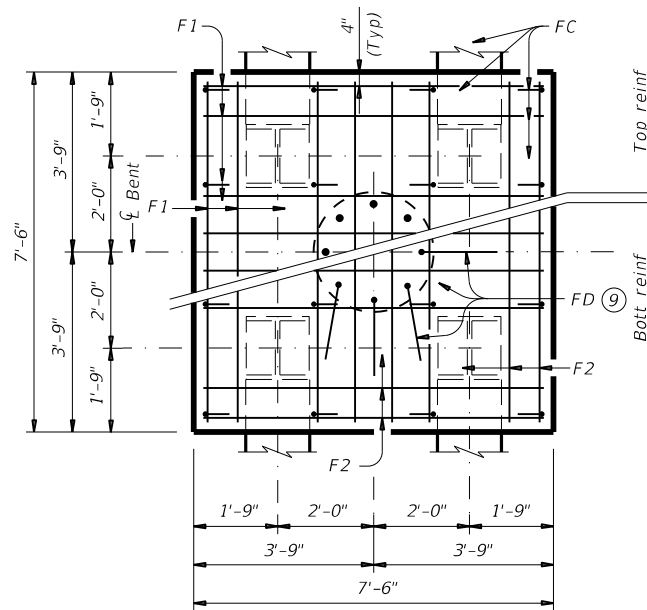
Texas Department of Transportation		Bridge Division Standard	
COMMON FOUNDATION DETAILS			
FD			
FILE: fstd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONTRACT	SECTION	JOB
0901 29	091, ETC	CR, ETC	
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.
PAR	LAMAR, ETC		58

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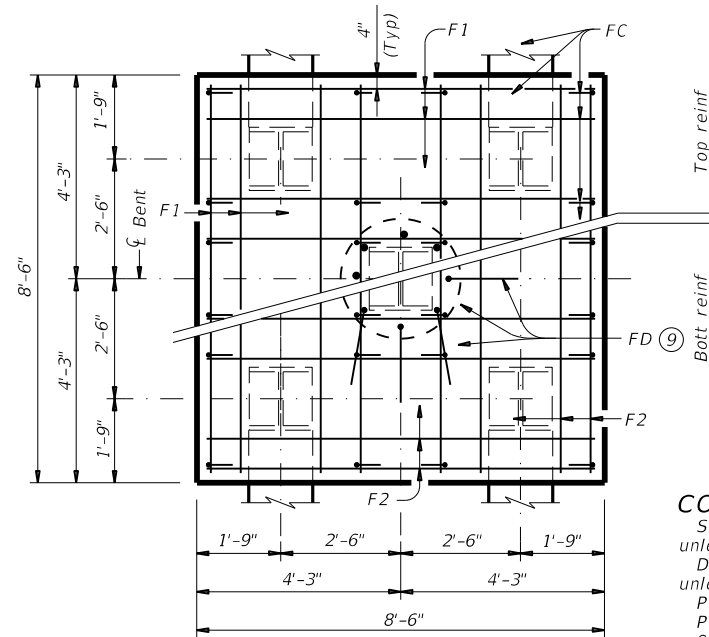
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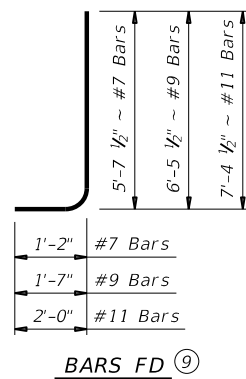
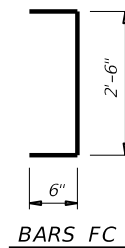
THREE PILE FOOTING^⑧
 For 36" Dia and smaller columns.



FOUR PILE FOOTING^⑧
 For 42" Dia and smaller columns.



FIVE PILE FOOTING^⑧
 For 42" Dia and smaller columns.



- ③ Min lap with column reinforcing:
 #7 Bars = 2'-11"
 #9 Bars = 3'-9"
 #11 Bars = 4'-8"
- ⑥ 1'-0" Min, unless shown otherwise on plans.
- ⑦ Or as shown on plans.
- ⑧ See Bridge Layout for type, size and length of piling.
- ⑨ Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.
- ⑩ Adjust FD quantity, size and weight as needed to match column reinforcing.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	11	#4	3'- 2"	23	
F2	6	#4	8'- 2"	33	
F3	6	#4	6'- 11"	28	
F4	8	#9	3'- 2"	86	
F5	4	#9	6'- 11"	94	
F6	4	#9	8'- 2"	111	
FC	12	#4	3'- 6"	28	
FD ^⑩	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	623
Class "C" Concrete				CY	4.8
ONE 4 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	20	#4	7'- 2"	96	
F2	16	#8	7'- 2"	306	
FC	16	#4	3'- 6"	37	
FD ^⑩	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	659
Class "C" Concrete				CY	6.3
ONE 5 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	20	#4	8'- 2"	109	
F2	16	#9	8'- 2"	444	
FC	24	#4	3'- 6"	56	
FD ^⑩	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	829
Class "C" Concrete				CY	8.0

CONSTRUCTION NOTES:

- See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.
- Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.
- Provide Class C Concrete ($f'_c = 3,600$ psi), unless shown otherwise.
- Provide Grade 60 reinforcing steel.
- Galvanize reinforcing if shown elsewhere in the plans.
- Provide bar laps for drilled shaft reinforcing, where required, as follows:
 Uncoated or galvanized (#6) ~ 2'-6"
 Uncoated or galvanized (#7) ~ 2'-11"
 Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications.
- Cover dimensions are clear dimensions, unless noted otherwise.
- Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:

- Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.
- Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.
- Maximum allowable pile loads for the footings shown are:
 72 Tons/Pile with 24" Dia Columns
 80 Tons/Pile with 30" Dia Columns
 100 Tons/Pile with 36" Dia Columns
 120 Tons/Pile with 42" Dia Columns

SHEET 2 OF 2



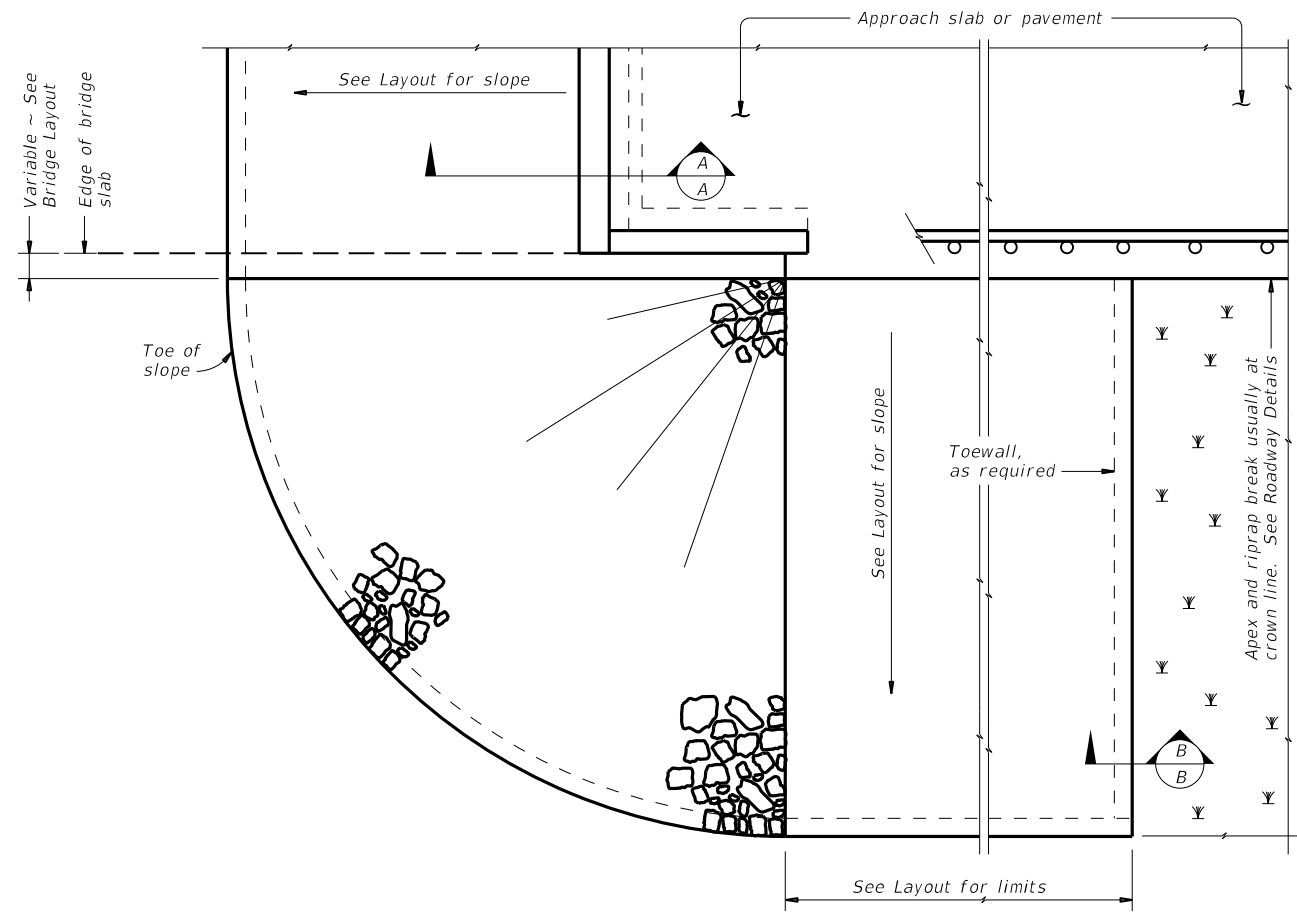
COMMON FOUNDATION DETAILS

FD

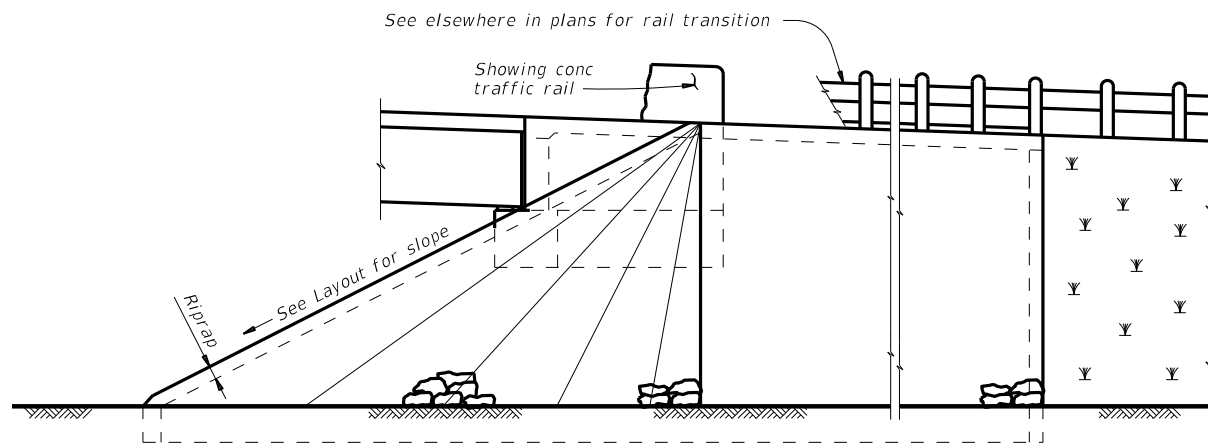
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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0901	29	091, ETC	CR, ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.	
	PAR	LAMAR, ETC	59	

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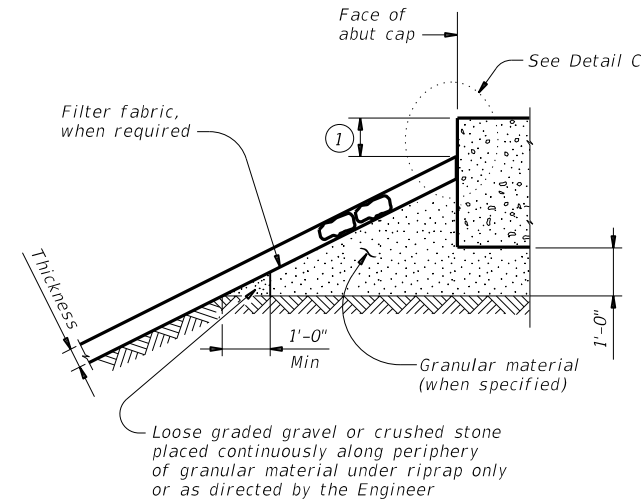
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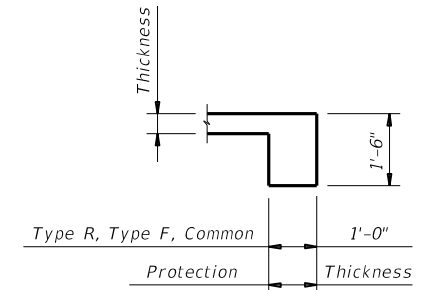
PLAN



ELEVATION

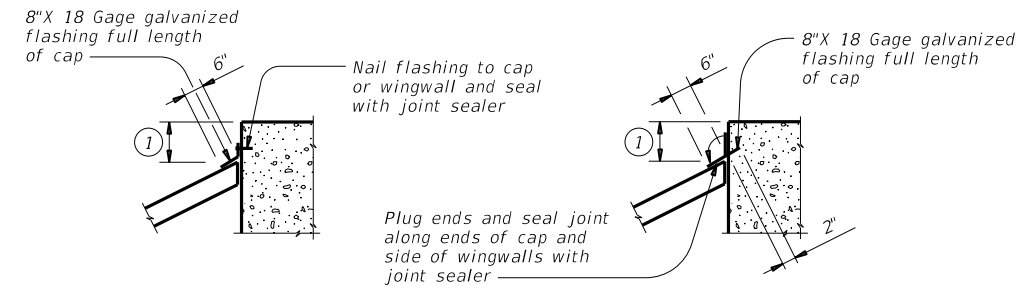


SECTION A-A AT CAP



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.

SHEET 1 OF 2

		Bridge Division Standard	
<h1>STONE RIPRAP</h1>			
<h2>SRR</h2>			
FILE: srrstd1-19.dgn	DN: AES	CK: JGD	DW: BWH
©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	0901	29	091, ETC
DIST	COUNTY	SHEET NO.	
PAR	LAMAR, ETC	60	

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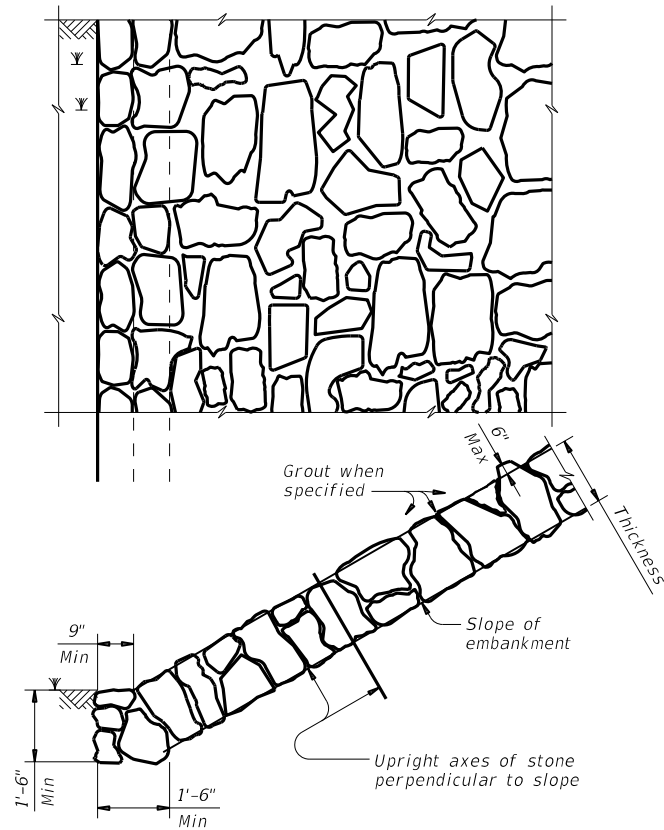


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

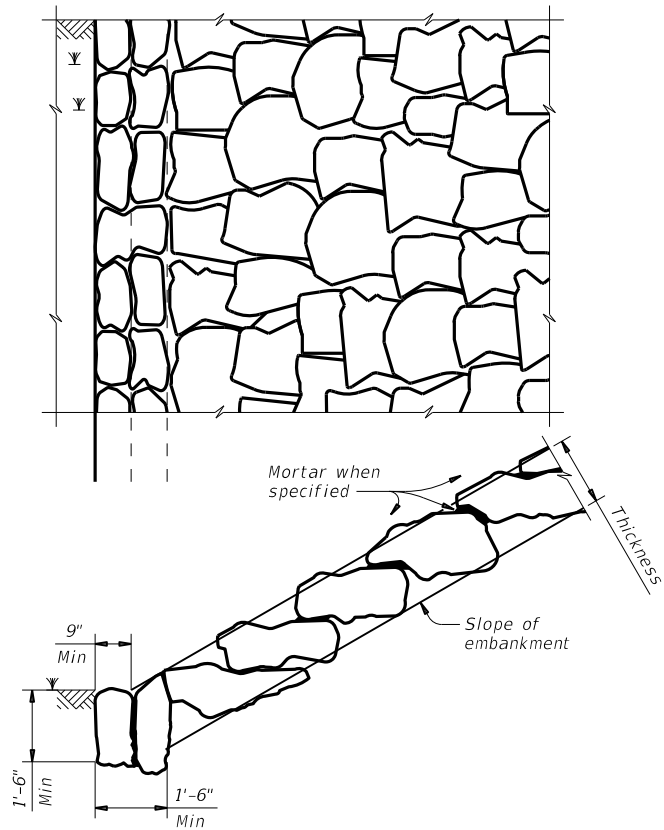


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

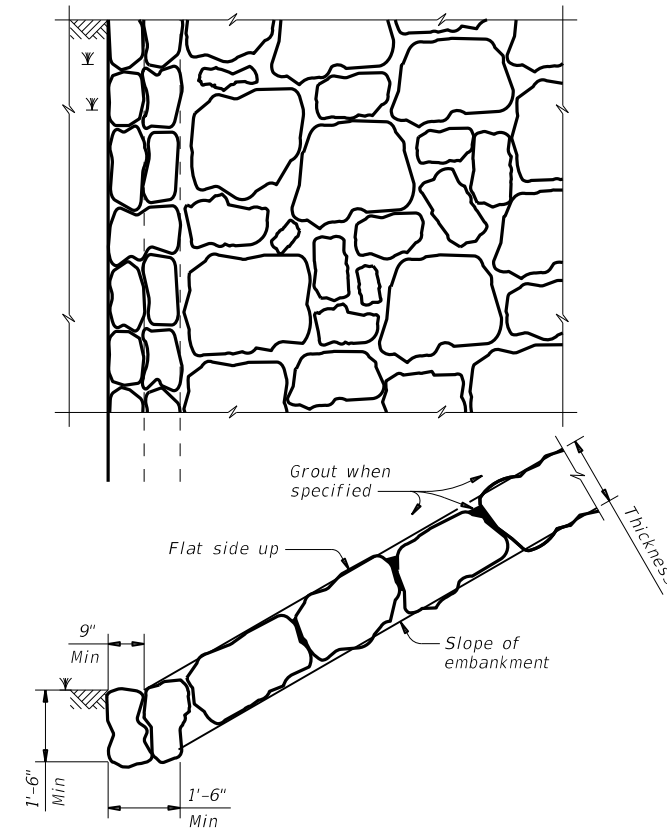
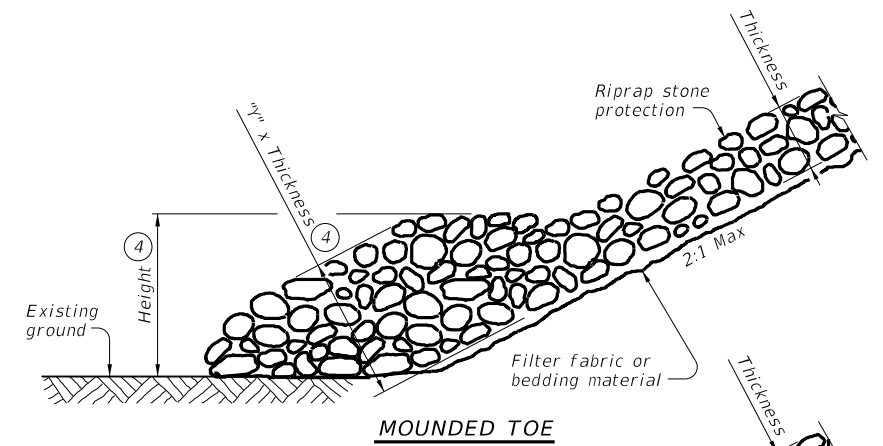
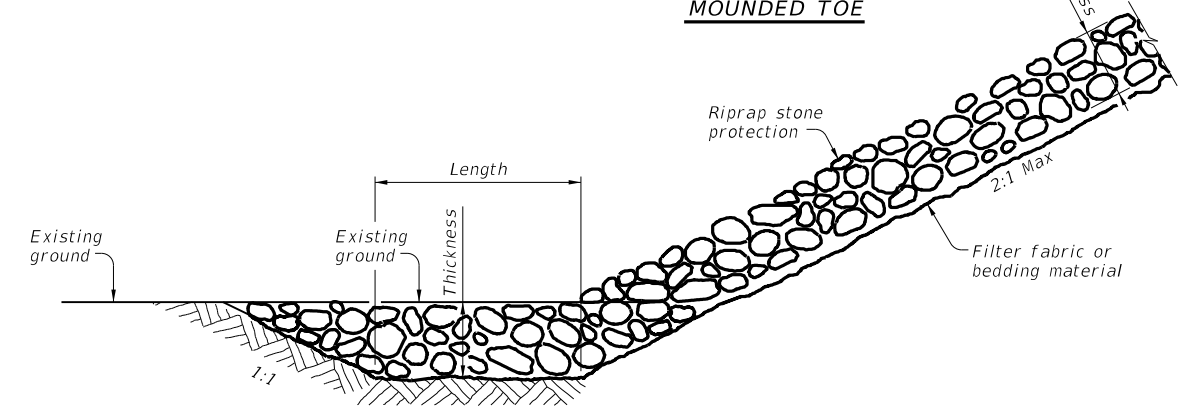


FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

- 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

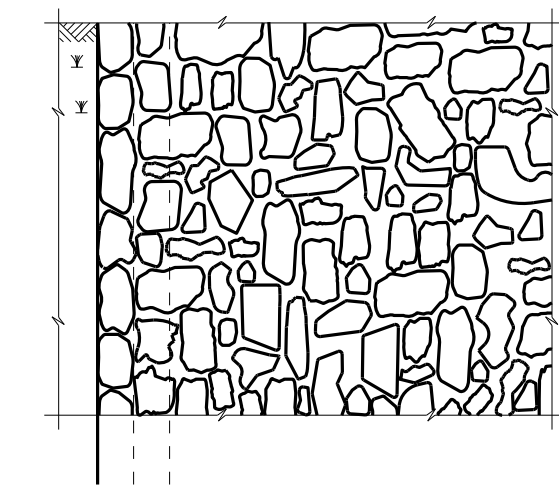


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted

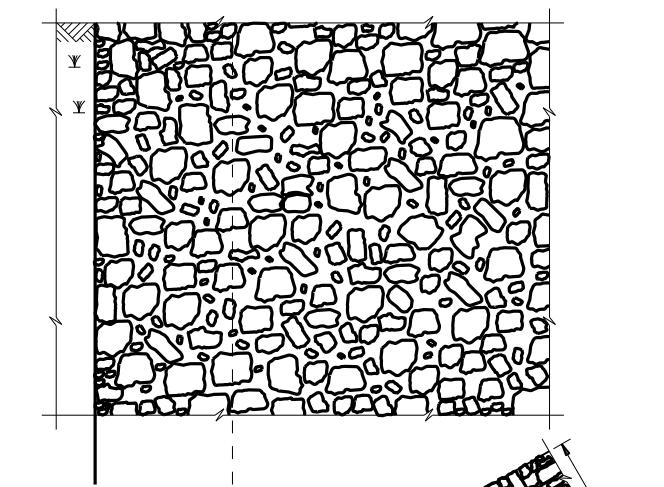


FIGURE 5 ~ PROTECTION STONE RIPRAP ⑤

SHEET 2 OF 2

		Bridge Division Standard	
<h2>STONE RIPRAP</h2>			
<h3>SRR</h3>			
FILE: srrside1-19.dgn	DN: AES	CK: JGD	DW: BWH
©TxDOT April 2019	CONT SECT	JOB	HIGHWAY
REVISIONS	0901 29	091, ETC	CR, ETC
	DIST	COUNTY	SHEET NO.
	PAR	LAMAR, ETC	61

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DATE: 12/30/2021 8:45:35 AM
 FILE: I:\PARTPDD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091.dwg

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES	
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	DEVICE	SINGLE	DOUBLE	INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX (XX)	
								NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post YFLX = Yellow Flexible Post WFLX = White Flexible Post BRF = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount	
SHEETING: Yellow, White or Red Type B or C reflective sheeting				SHEETING: Yellow, White or Red Type B or C Reflective Sheeting				DIRECTION: If Required, BI = Bi-Directional, BR = Bi-Directional with red on back	
POST TYPE: WC, YFLX, WFLX				MOUNT TYPE: GND, SRF				INSTL OM ASSM (OM-XX) (XXXX)XXX (XX)	

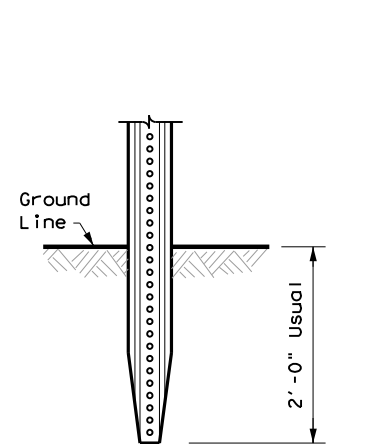
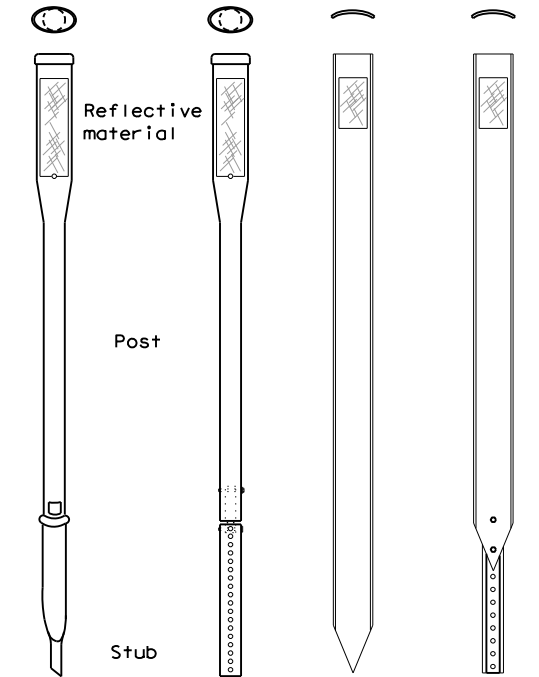
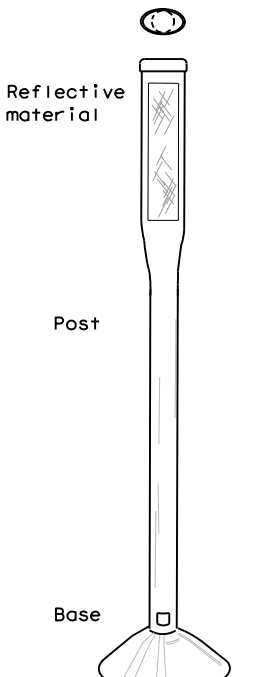
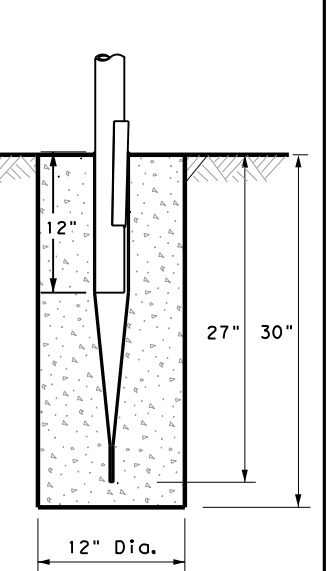
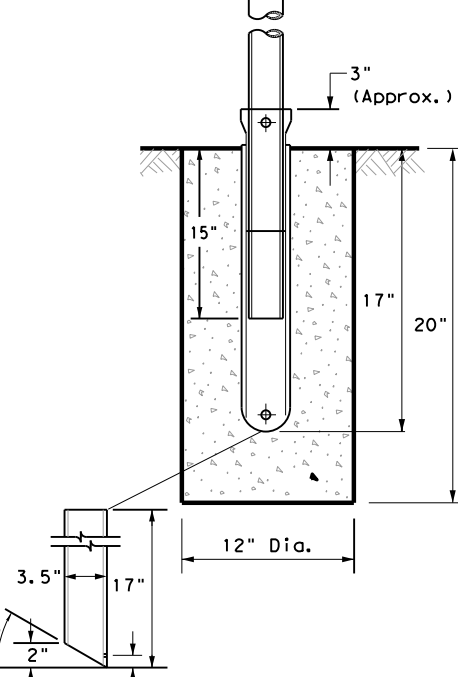
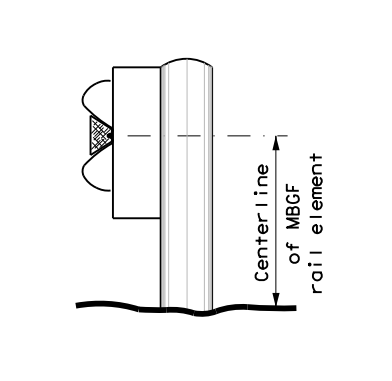
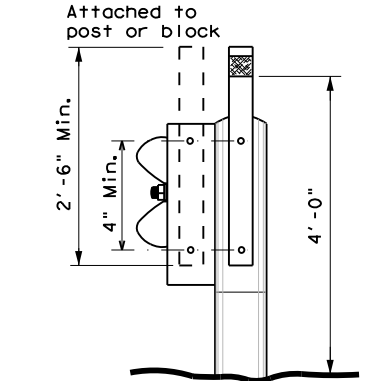
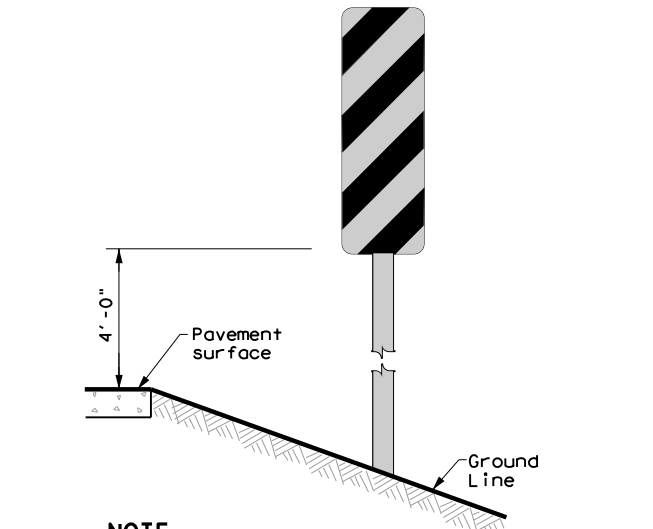
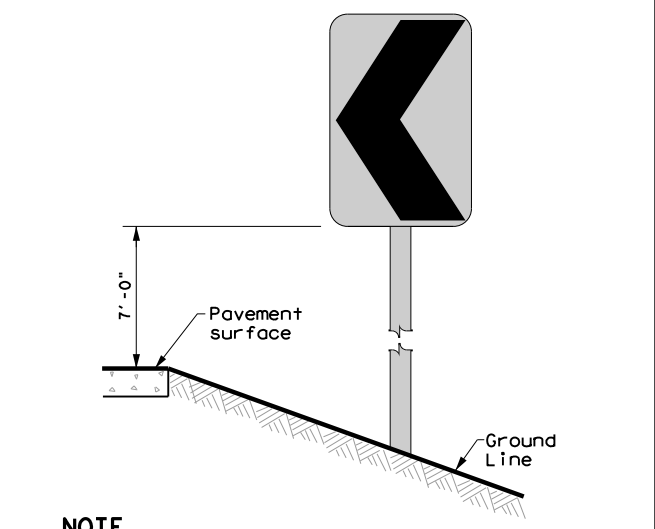
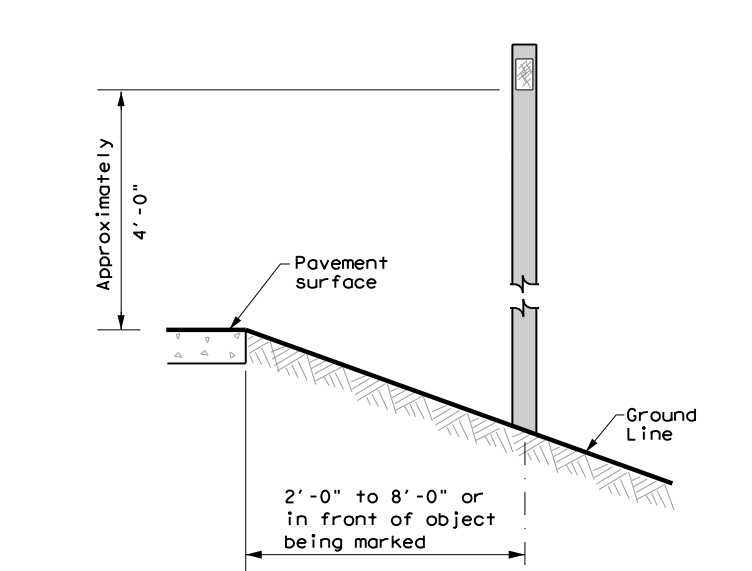
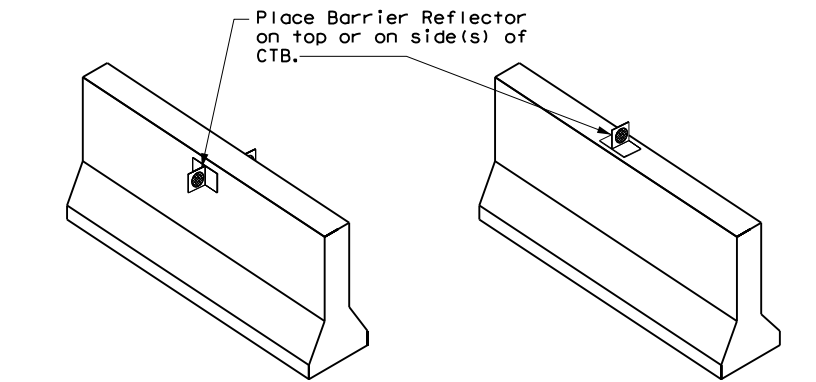

OBJECT MARKERS								D & OM DESCRIPTIVE CODES		
DEVICE	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)	INSTL OM ASSM (OM-XX) (XXXX)XXX (XX)	
									TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector units (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post WFLX = White Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION: If Required, BI = Bi-Directional	
SHEETING: Yellow-Type B _{FL} or C _{FL} Sheeting		SHEETING: Yellow - Type B or C Sheeting			SHEETING: Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			SHEETING: Red -Type B _{FL} or C _{FL} Sheeting		
POST TYPE: TWT		POST TYPE: WC			POST TYPE: WFLX			POST TYPE: TWT		
MOUNT TYPE: WAS, WAP		MOUNT TYPE: GND			MOUNT TYPE: GND, SRF			MOUNT TYPE: WAS, WAP		

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

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE:																										
DEVICE				DEVICE W1-8				DEVICE W1-6		Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.																									
SHEETING	Yellow, White, Red			MOUNTING HEIGHT: 4'-0" or 7'-0"				MOUNTING HEIGHT: 7'-0"																											
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.			1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).				DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION D & OM(1)-20																											
<table border="1"> <tr> <td>FILE: dom1-20.dgn</td> <td>DN: TXDOT</td> <td>CK: TXDOT</td> <td>DW: TXDOT</td> <td>CR: TXDOT</td> </tr> <tr> <td>© TXDOT August 2004</td> <td>CONT</td> <td>SECT</td> <td>JOB</td> <td>HIGHWAY</td> </tr> <tr> <td>REVISIONS</td> <td>0901 29</td> <td>091, ETC</td> <td>CR, ETC</td> <td></td> </tr> <tr> <td>10-09 3-15</td> <td>DIST</td> <td>COUNTY</td> <td>SHEET NO.</td> <td></td> </tr> <tr> <td>4-10 7-20</td> <td>PAR</td> <td>LAMAR, ETC</td> <td>62</td> <td></td> </tr> </table>											FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CR: TXDOT	© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY	REVISIONS	0901 29	091, ETC	CR, ETC		10-09 3-15	DIST	COUNTY	SHEET NO.		4-10 7-20	PAR	LAMAR, ETC	62	
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CR: TXDOT																															
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY																															
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4-10 7-20	PAR	LAMAR, ETC	62																																

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POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS																										
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT																									
GND	GND	SRF	WAS	WAP	GF 1																									
 <p style="text-align: center;">2'-0" Usual</p>	 <p style="text-align: center;">Reflective material</p> <p style="text-align: center;">Post</p> <p style="text-align: center;">Stub</p>	 <p style="text-align: center;">Reflective material</p> <p style="text-align: center;">Post</p> <p style="text-align: center;">Base</p>	 <p style="text-align: center;">12" Dia.</p> <p style="text-align: center;">27" 30"</p>	 <p style="text-align: center;">3" (Approx.)</p> <p style="text-align: center;">15" 17" 20"</p> <p style="text-align: center;">12" Dia.</p> <p style="text-align: center;">3.5" 17" 30° 2" 1"</p>	 <p style="text-align: center;">Centerline of MBCF rail element</p>	 <p style="text-align: center;">Attached to post or block</p> <p style="text-align: center;">2'-6" Min.</p> <p style="text-align: center;">4" Min.</p> <p style="text-align: center;">4'-0"</p>																								
	EMBEDDED		SURFACE MOUNT	STEEL	PLASTIC	GF 2																								
NOTES 1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only. 2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.			NOTES 1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices. 2. Install per manufacturer's recommendations. 3. Post length may vary to meet field conditions. 4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.		NOTE 1. Install per manufacturer's recommendations.																									
TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS		CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN		DELINEATORS AND TYPE 2 OBJECT MARKERS																										
 <p style="text-align: center;">4'-0"</p> <p style="text-align: center;">Pavement surface</p> <p style="text-align: center;">Ground Line</p>		 <p style="text-align: center;">7'-0"</p> <p style="text-align: center;">Pavement surface</p> <p style="text-align: center;">Ground Line</p>		 <p style="text-align: center;">Approximately 4'-0"</p> <p style="text-align: center;">Pavement surface</p> <p style="text-align: center;">Ground Line</p> <p style="text-align: center;">2'-0" to 8'-0" or in front of object being marked</p>																										
NOTE Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)		NOTE Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.		NOTE See general notes 1, 2 and 3.																										
CONCRETE TRAFFIC BARRIER (CTB)						 <p style="text-align: center;">Place Barrier Reflector on top or on side(s) of CTB.</p>																								
GENERAL NOTES																														
1. Place delineators on a section of roadway at a consistent distance from the edge of pavement. 2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction. 3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible. 4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation. 5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface. 6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.																														
 Traffic Safety Division Standard																														
DELINEATOR & OBJECT MARKER INSTALLATION																														
D & OM(2)-20																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>FILE: dom2-20.dgn</td> <td>DN: TxDOT</td> <td>CK: TxDOT</td> <td>DW: TxDOT</td> <td>CR: TxDOT</td> </tr> <tr> <td>© TxDOT August 2004</td> <td>CONT</td> <td>SECT</td> <td>JOB</td> <td>HIGHWAY</td> </tr> <tr> <td>REVISIONS</td> <td>0901 29</td> <td>091, ETC</td> <td>CR, ETC</td> <td></td> </tr> <tr> <td>10-09 3-15</td> <td>DIST</td> <td>COUNTY</td> <td>SHEET NO.</td> <td></td> </tr> <tr> <td>4-10 7-20</td> <td>PAR</td> <td>LAMAR, ETC</td> <td>63</td> <td></td> </tr> </table>						FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY	REVISIONS	0901 29	091, ETC	CR, ETC		10-09 3-15	DIST	COUNTY	SHEET NO.		4-10 7-20	PAR	LAMAR, ETC	63	
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© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY																										
REVISIONS	0901 29	091, ETC	CR, ETC																											
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4-10 7-20	PAR	LAMAR, ETC	63																											
20B																														

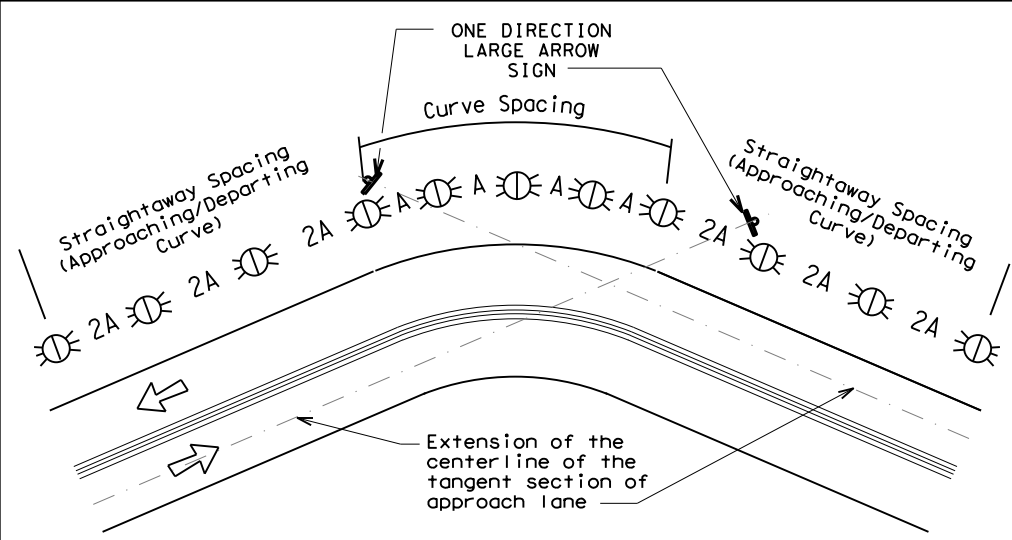
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MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

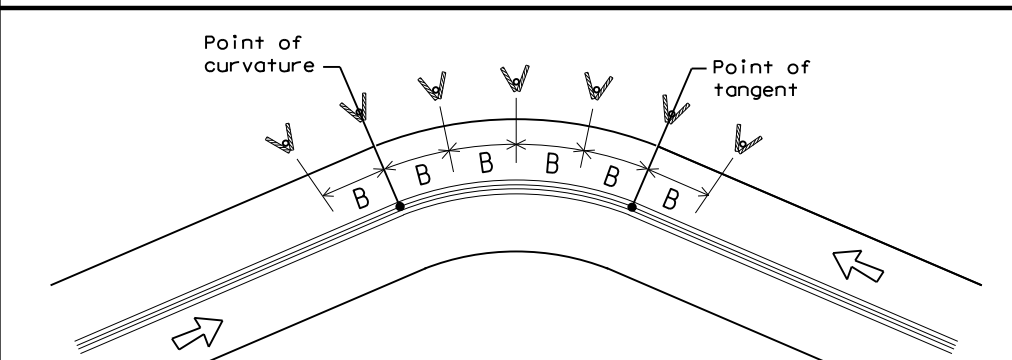
Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions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

SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



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

DELINEATOR AND CHEVRON SPACING

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN			
Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

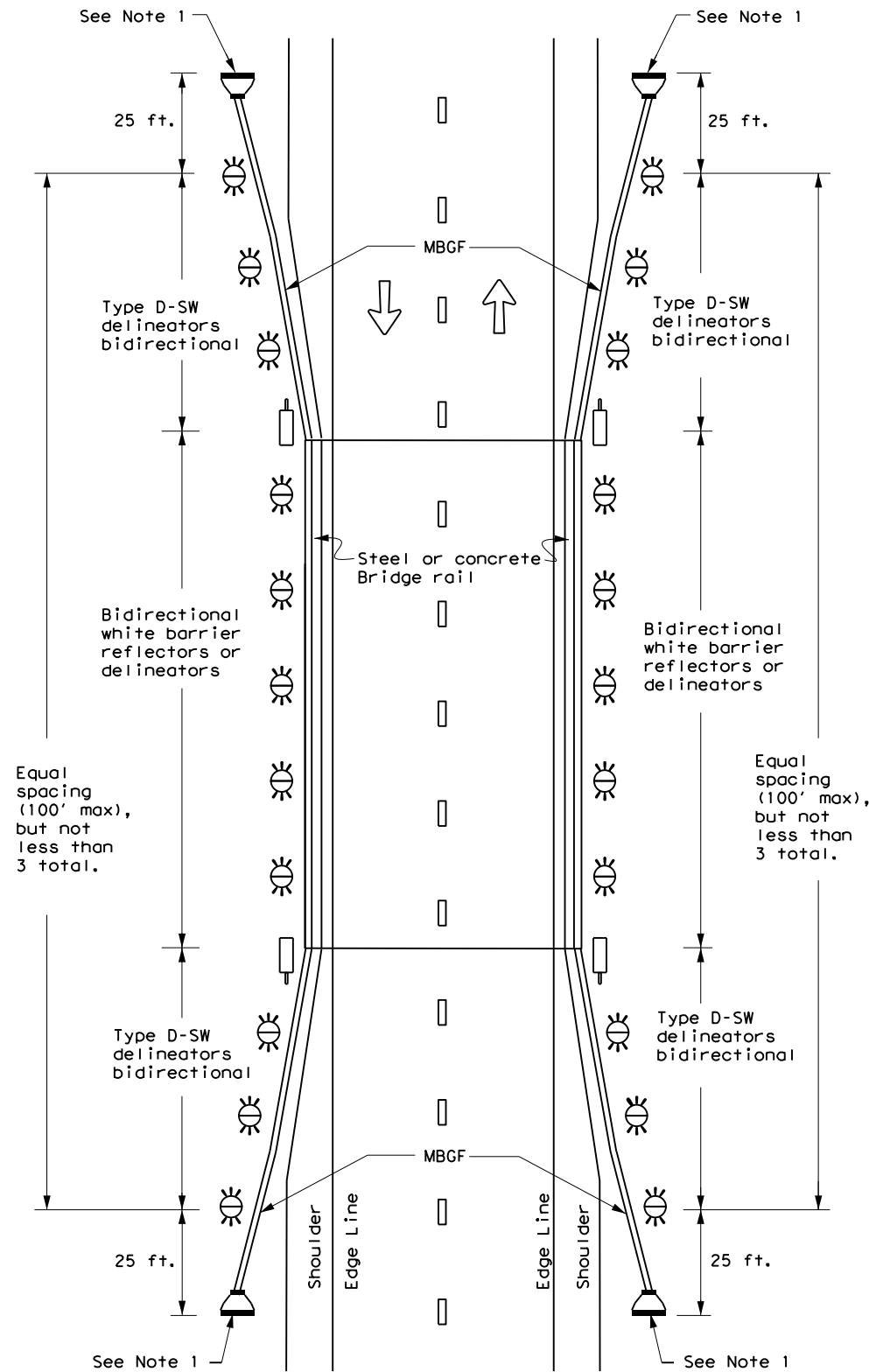
Texas Department of Transportation
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

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3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	PAR	LAMAR, ETC	64	

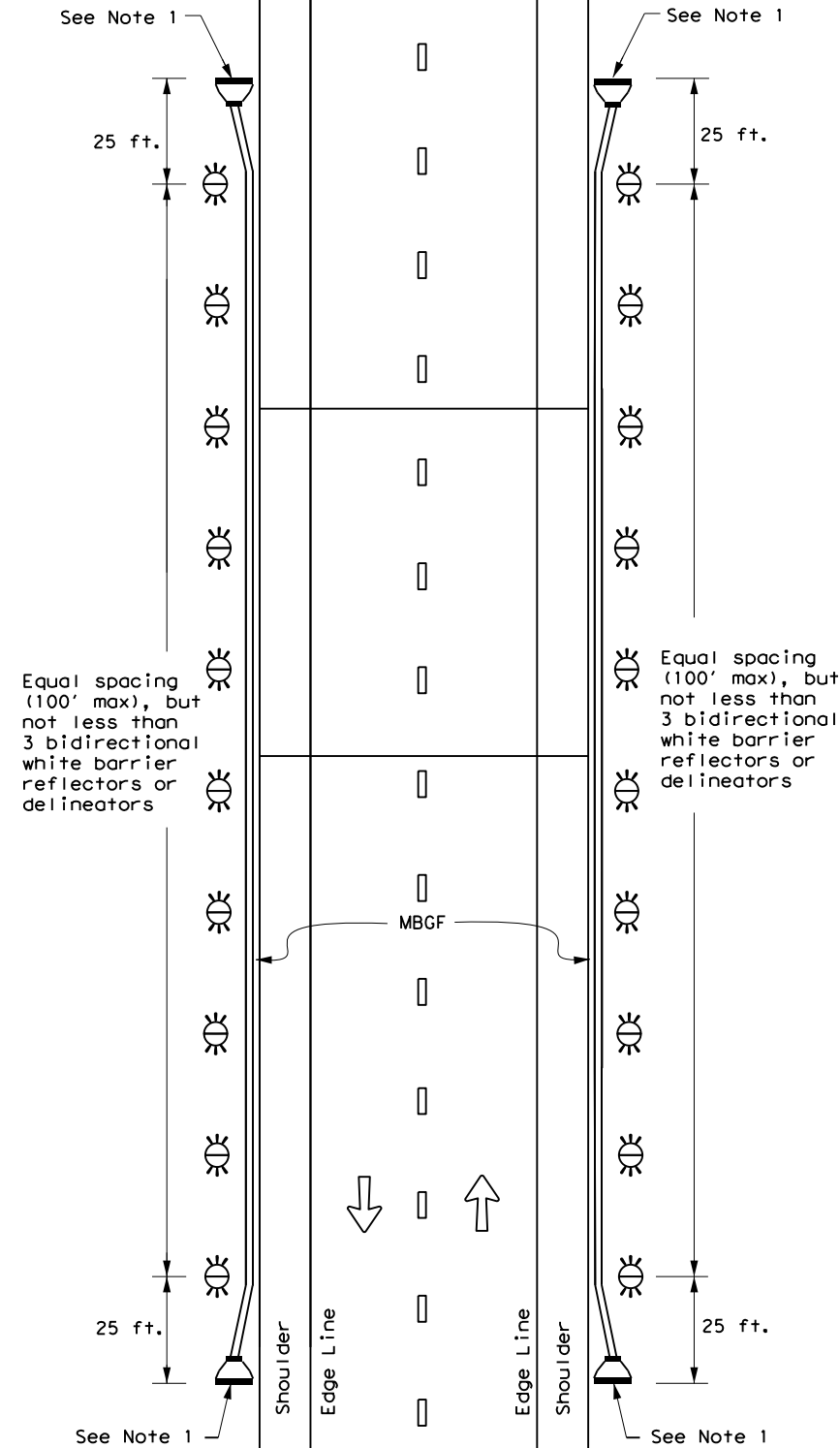
**TWO-WAY, TWO LANE ROADWAY
WITH REDUCED WIDTH APPROACH RAIL**



NOTE:

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

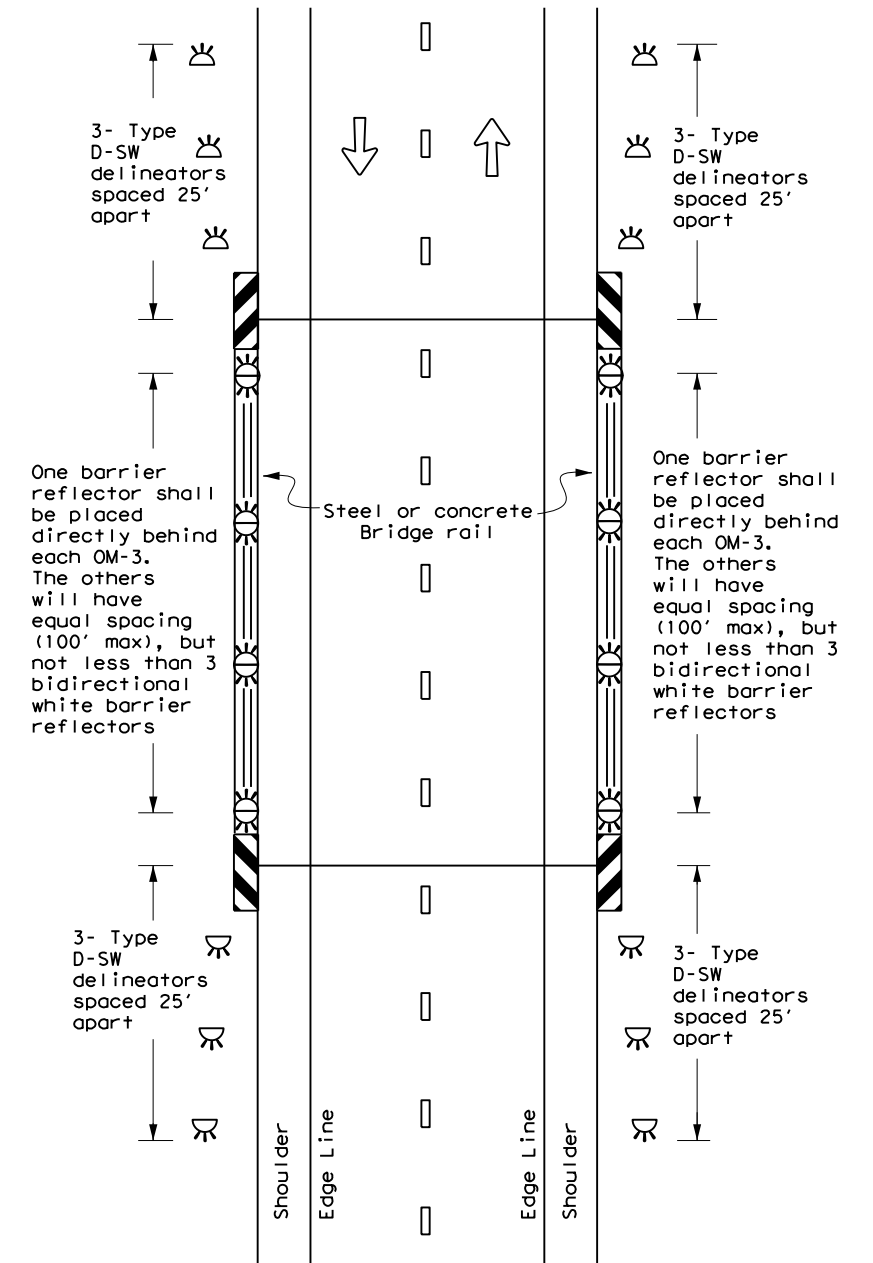
**TWO-WAY, TWO LANE ROADWAY
WITH METAL BEAM GUARD FENCE (MBGF)**



NOTE:

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

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



LEGEND

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



**DELINEATOR &
OBJECT MARKER
PLACEMENT DETAILS**

D & OM(5)-20

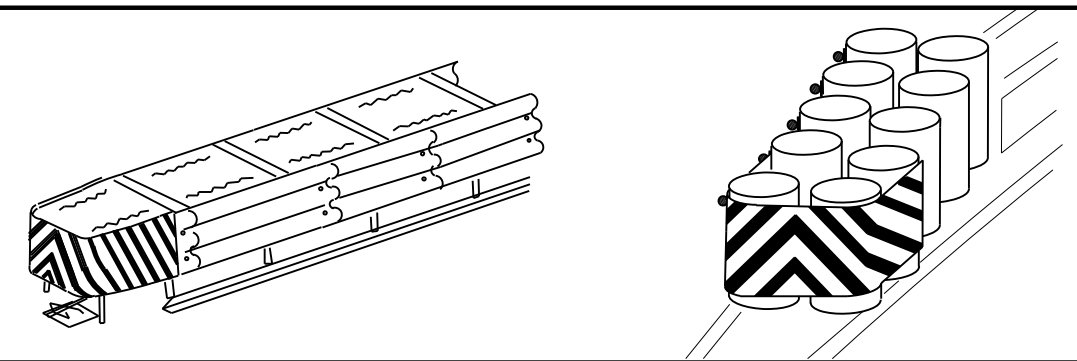
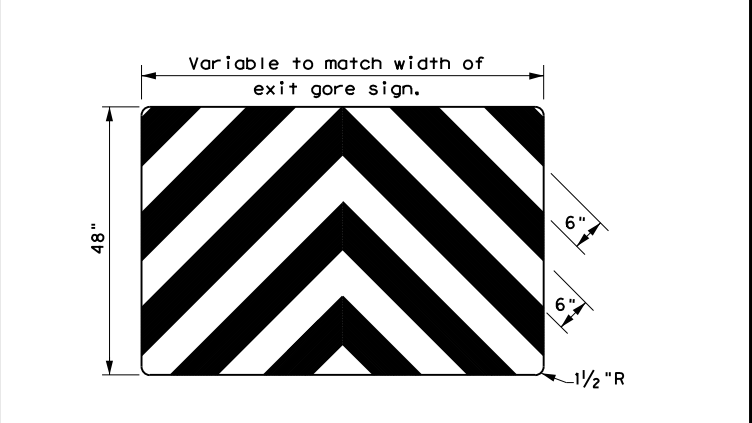
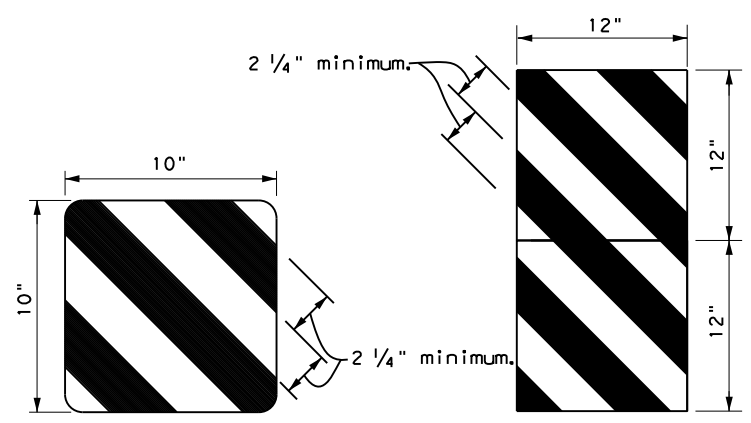
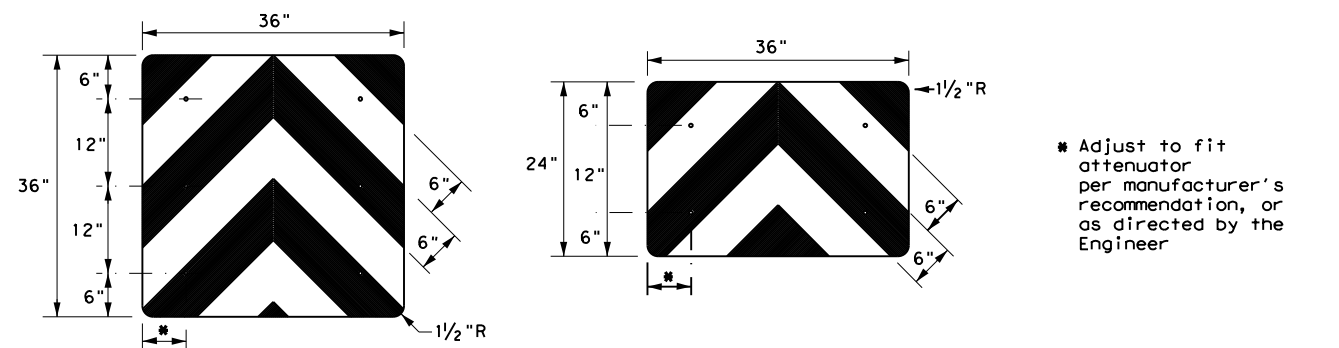
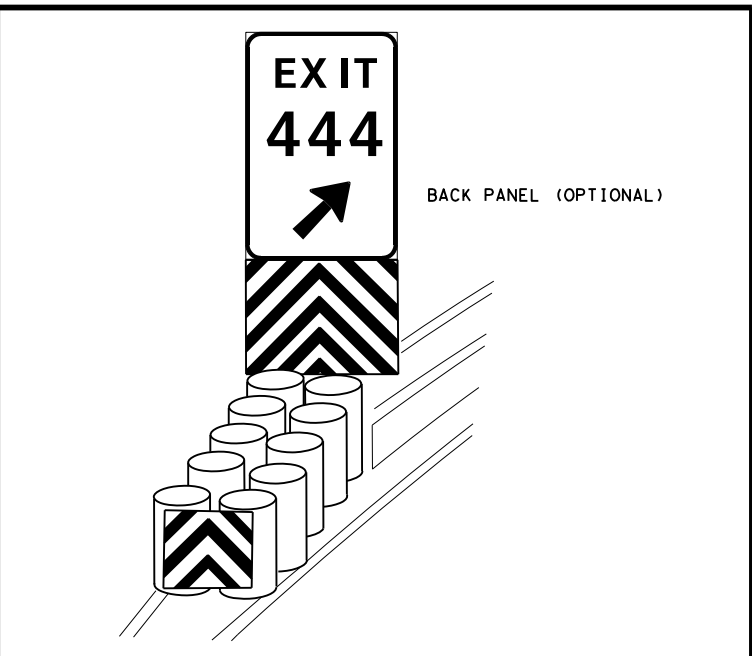
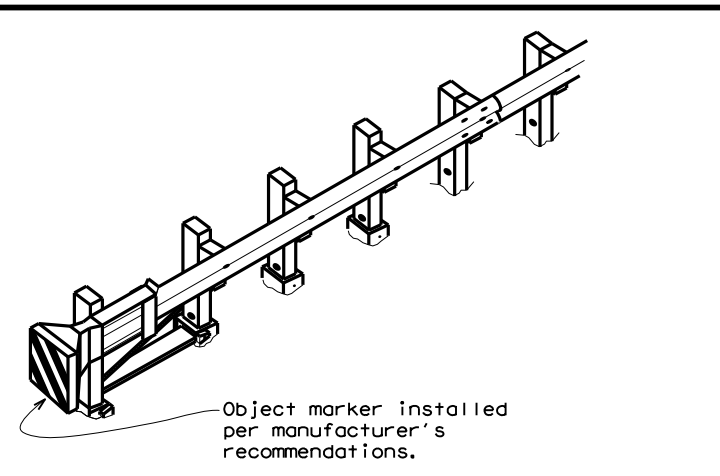
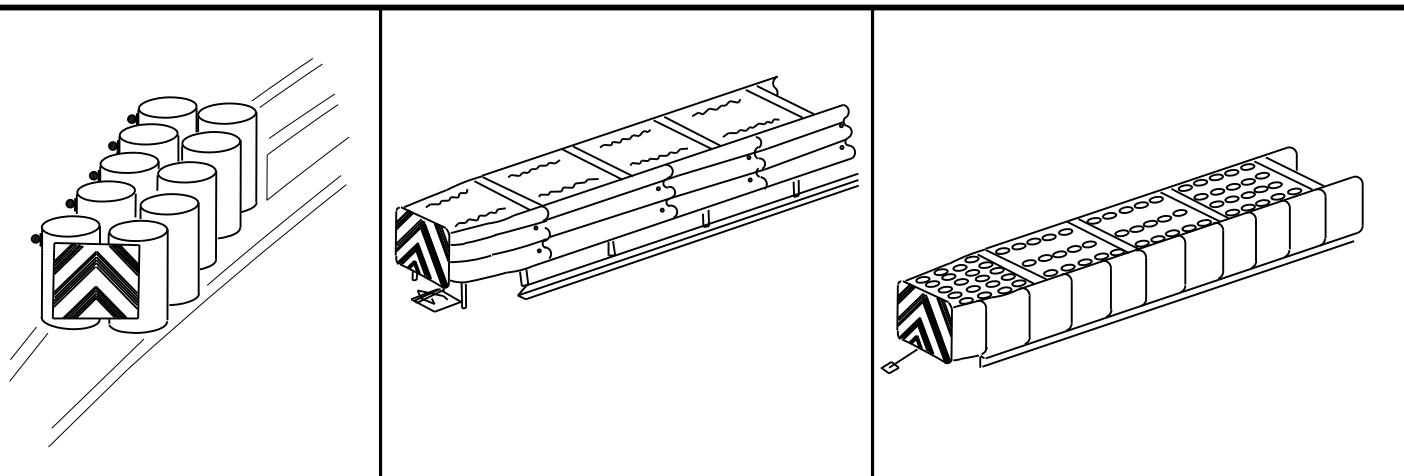
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7-20	DIST	COUNTY	SHEET NO.	
	PAR	LAMAR, ETC	65	

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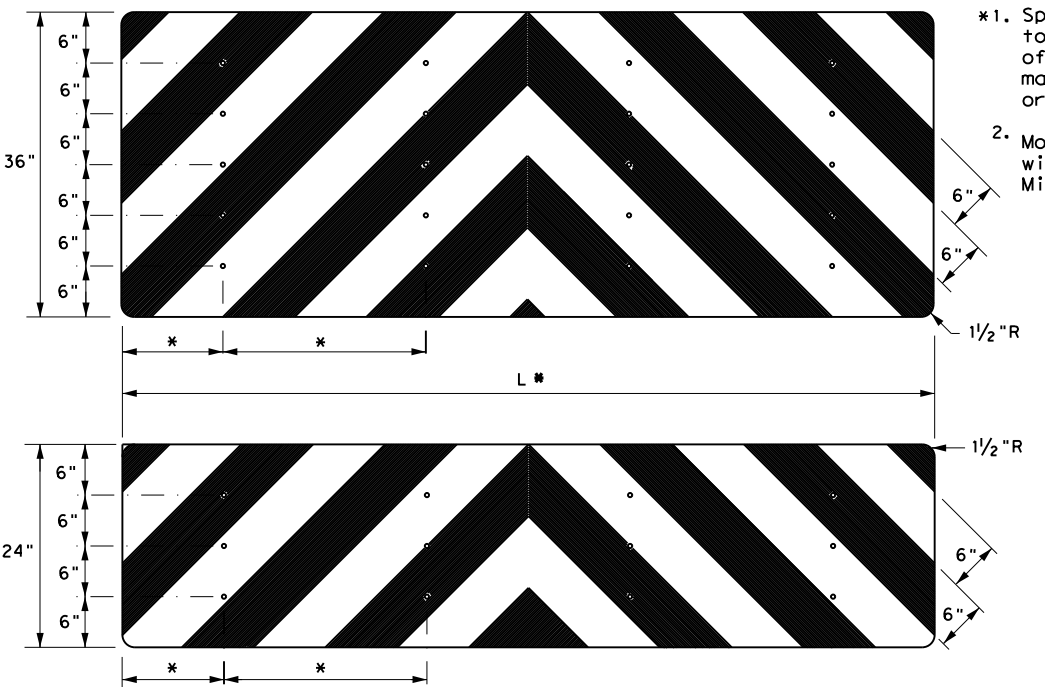
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OBJECT MARKERS SMALLER THAN 3 FT²



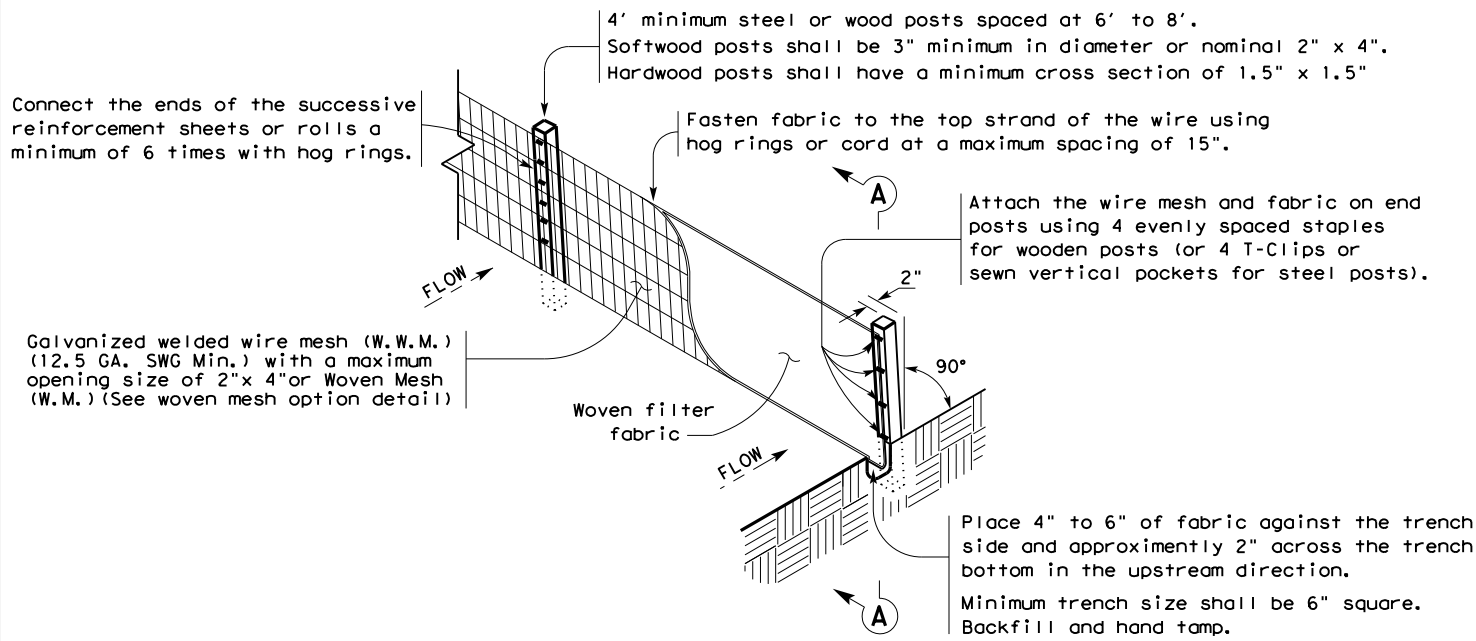
- NOTES**
- *1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturer's recommendation, or as directed by the Engineer.
 - *2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

- Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.
- Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.
- Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 1/4".
- Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.
- Object Marker at nose of attenuator is subsidiary to the attenuator.
- See D & OM (1-4) for required barrier reflectors.

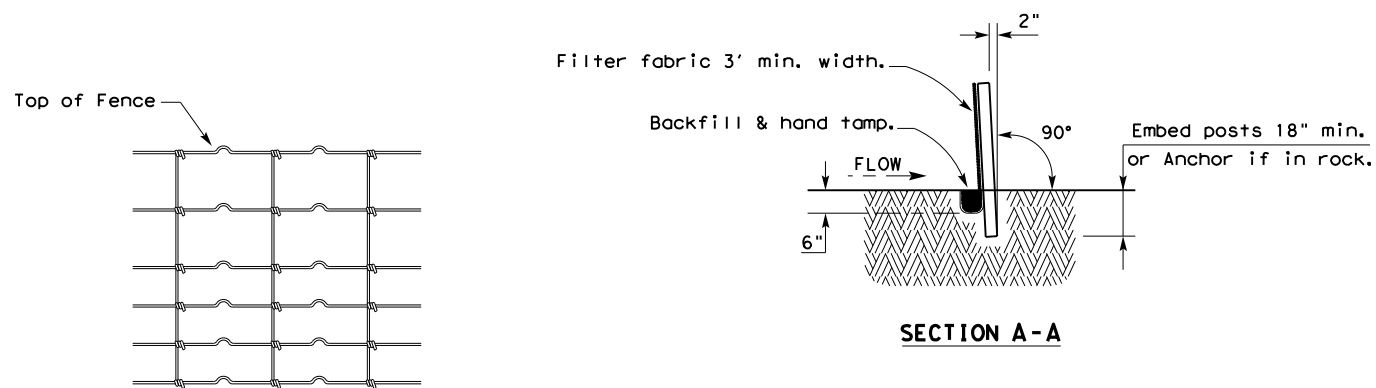
		Traffic Safety Division Standard	
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS D & OM(VIA) -20			
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	OW: TXDOT
© TXDOT December 1989	CONT	SECT	JOB
REVISIONS		0901 29	091, ETC
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	PAR	LAMAR, ETC	66
4-98 7-20			
20G			

10/13/2021
 T:\BARTPDD\CR 15070 at Branch of Cuthand Creek, etc., CSJ_0901-29-091, etc\CR 15070 at Branch of Cuthand Creek\Design\CAD_Standards\EC(1)-16.dgn
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TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

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/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

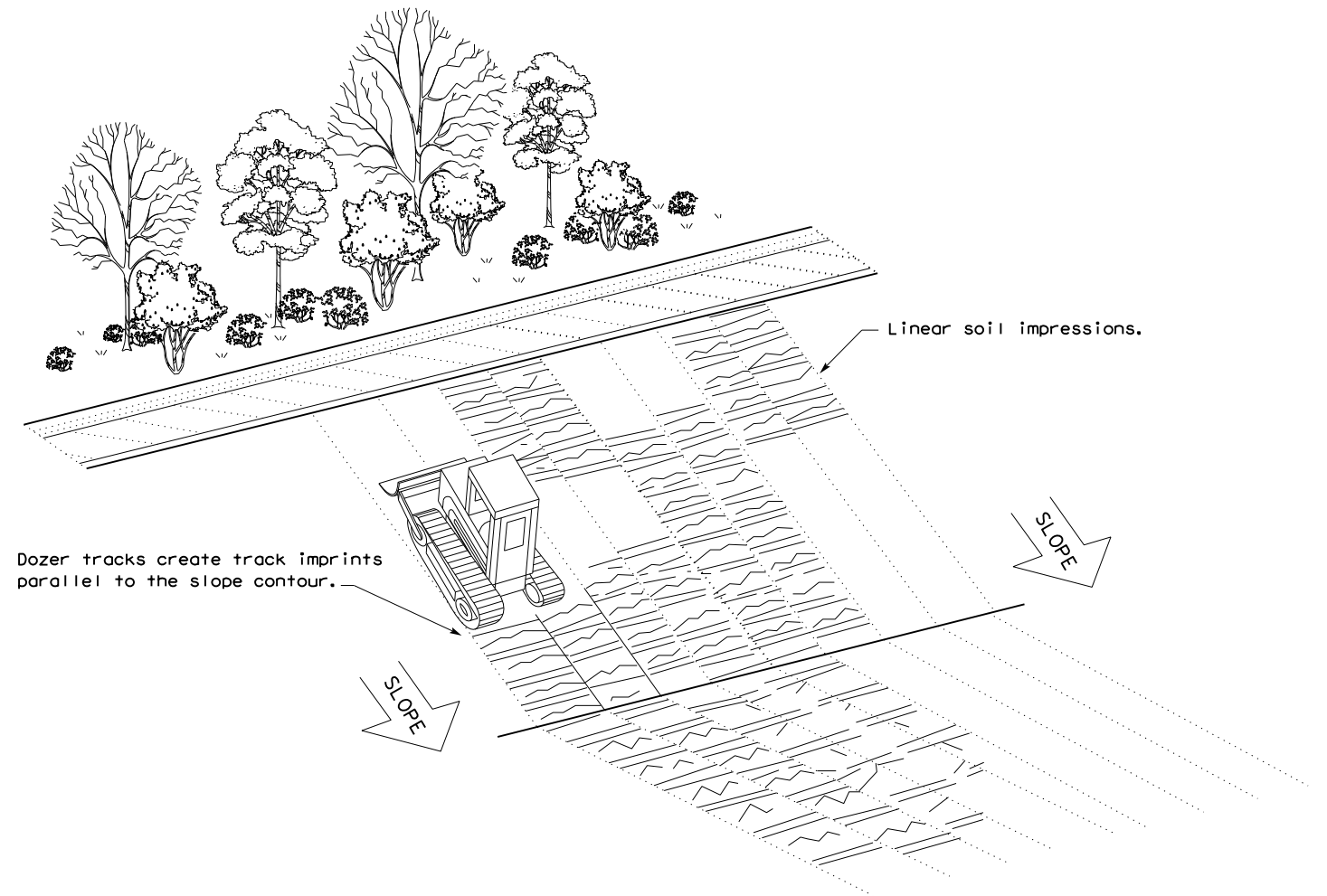
LEGEND

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 continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

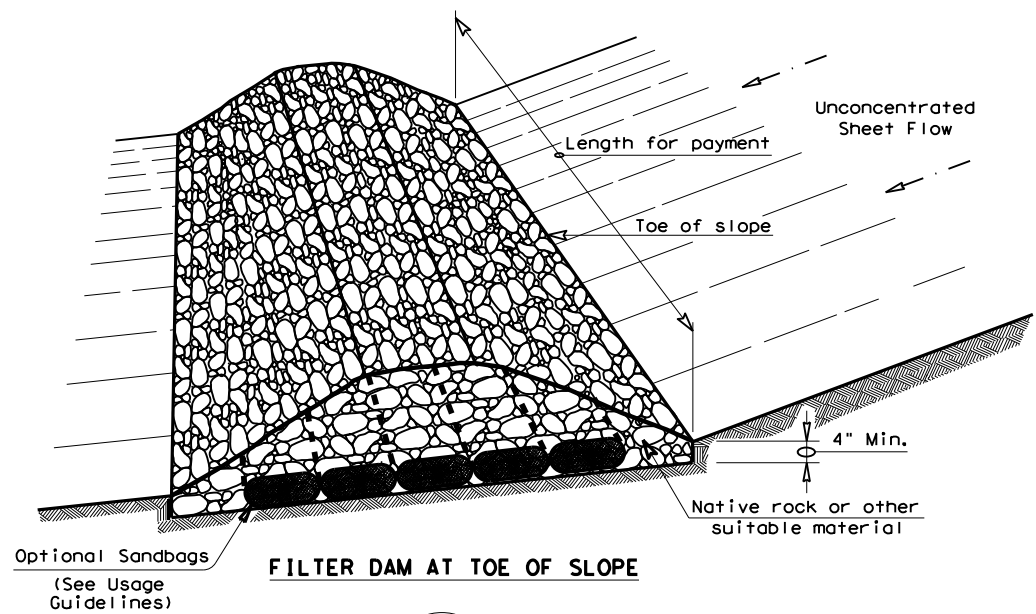


VERTICAL TRACKING

				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	0901	29	091, ETC	CR, ETC	
	DIST	COUNTY	SHEET NO.		
	PAR	LAMAR, ETC	67		

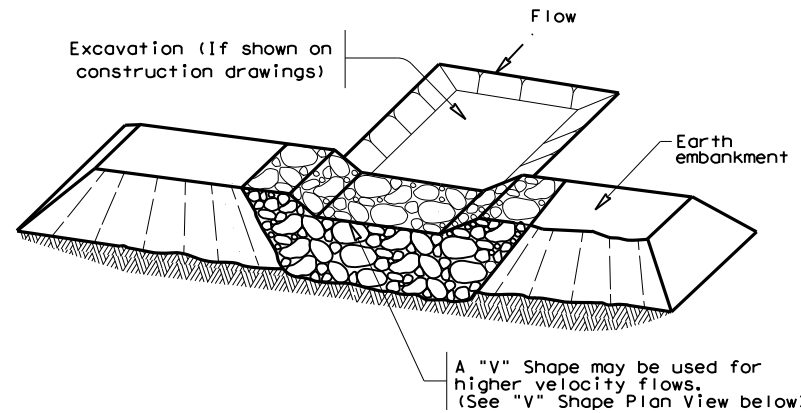
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DATE: 12/30/2021
 FILE: T:\PARTPDD\CR 15070 at Branch of Cuthand Creek, etc. CSJ 0901-29-091, etc\CR 15070 at Branch of Cuthand Creek\Design\CAD Standards\EC(2)-16.dgn



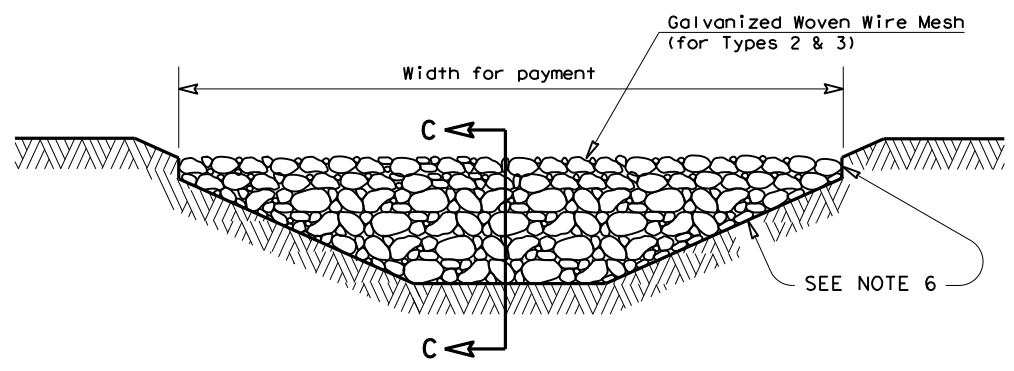
FILTER DAM AT TOE OF SLOPE

(RFD1)



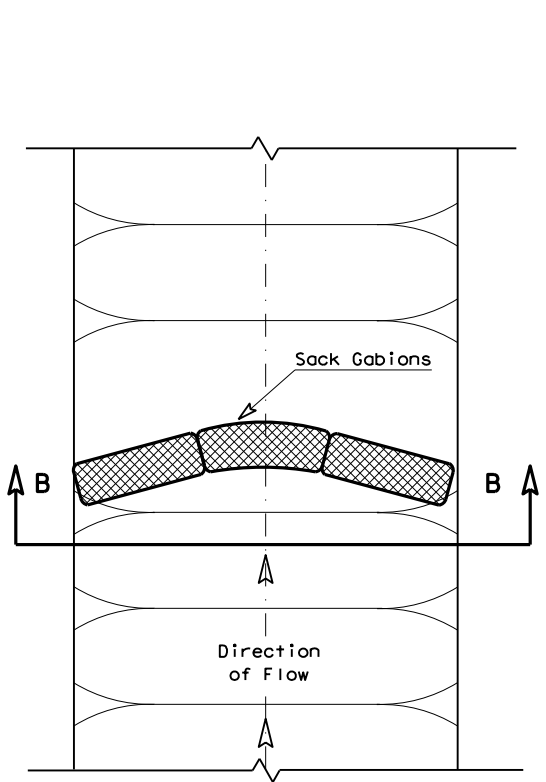
FILTER DAM AT SEDIMENT TRAP

(RFD1) OR (RFD2)

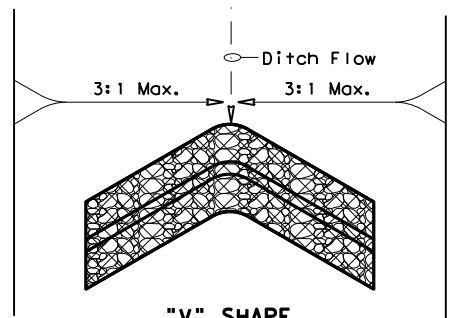


FILTER DAM AT CHANNEL SECTIONS

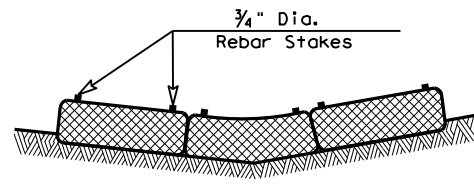
(RFD1) OR (RFD2) OR (RFD3)



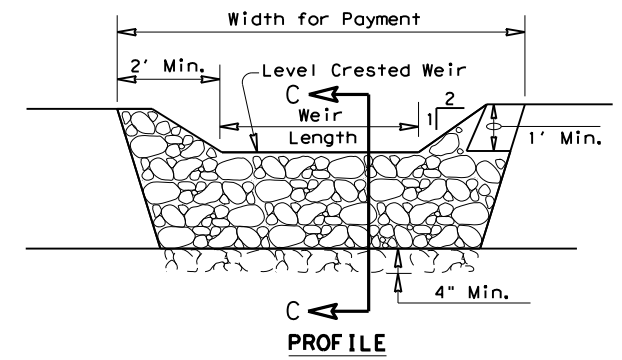
PLAN VIEW



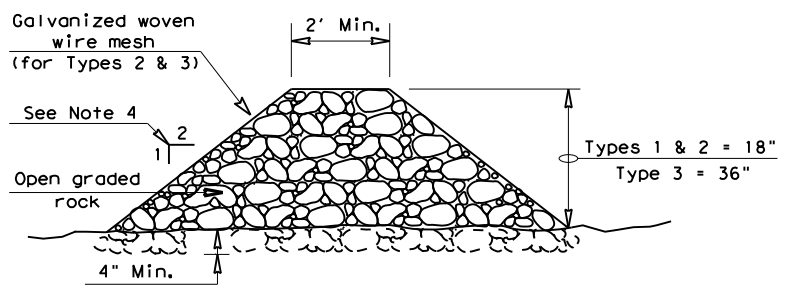
"V" SHAPE PLAN VIEW



SECTION B-B



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² 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 (approximately 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.

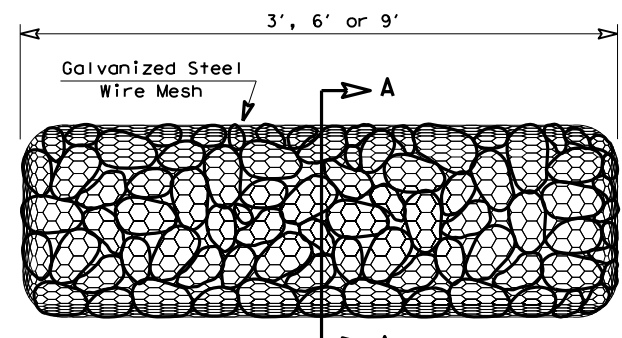
Type 5: Provide rock filter dams as shown on plans.

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 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
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.

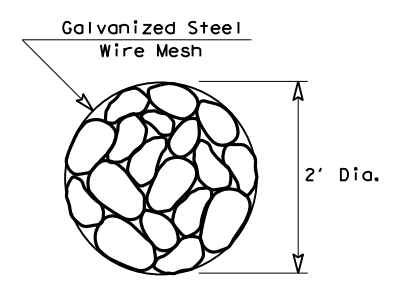
PLAN SHEET LEGEND

- Type 1 Rock Filter Dam (RFD1)
- Type 2 Rock Filter Dam (RFD2)
- Type 3 Rock Filter Dam (RFD3)
- Type 4 Rock Filter Dam (RFD4)



TYPE 4 (SACK GABIONS)

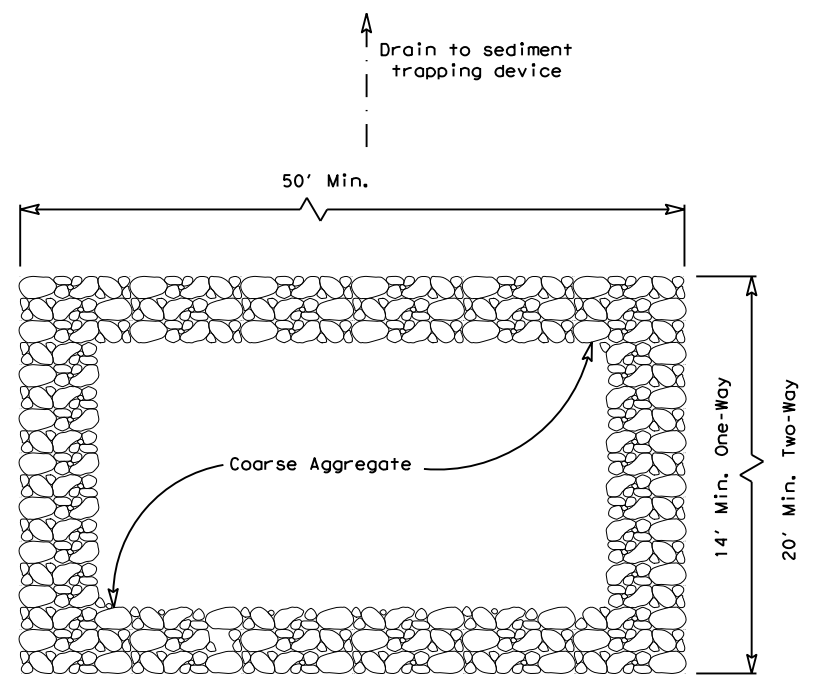
(RFD4)



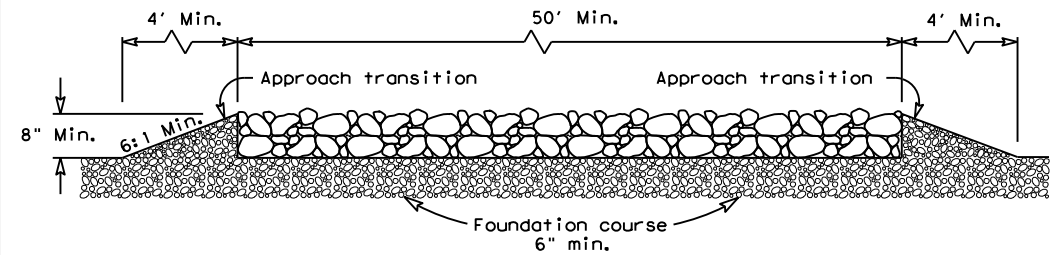
SECTION A-A

		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
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REVISIONS	0901 29	091, ETC	CR, ETC
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PLAN VIEW

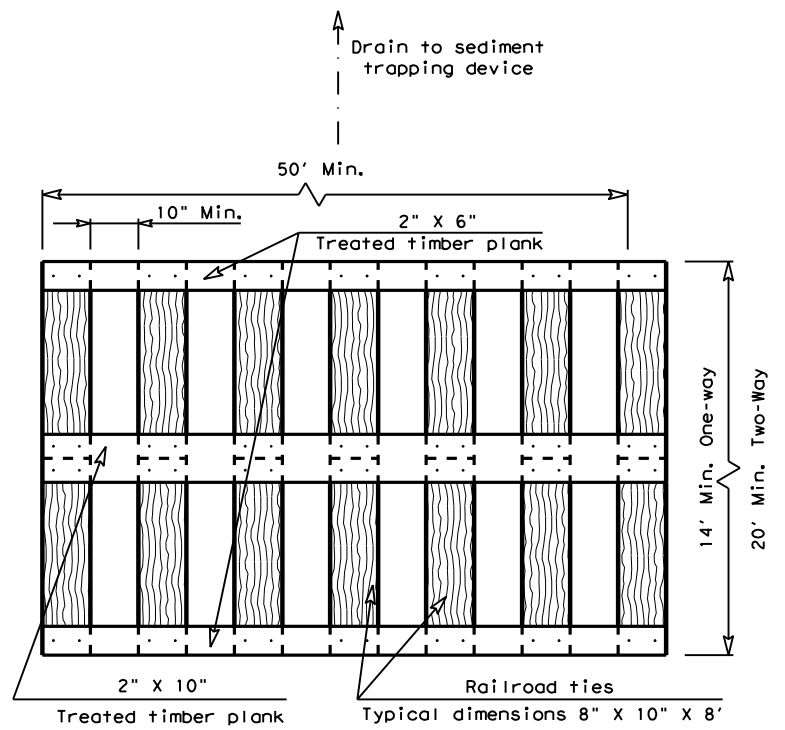


ELEVATION VIEW

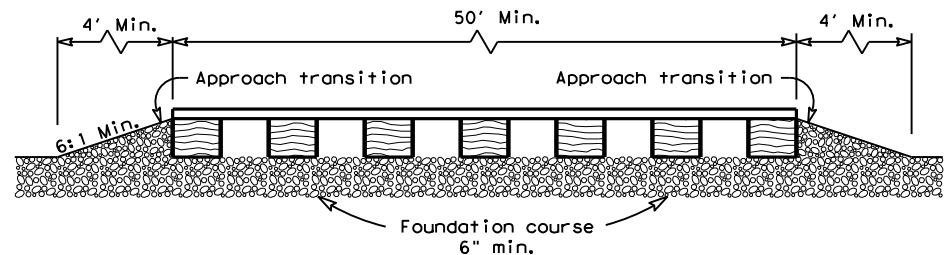
CONSTRUCTION EXIT (TYPE 1)
ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

- The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
- The coarse aggregate should be open graded with a size of 4" to 8".
- The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
- The construction exit shall be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

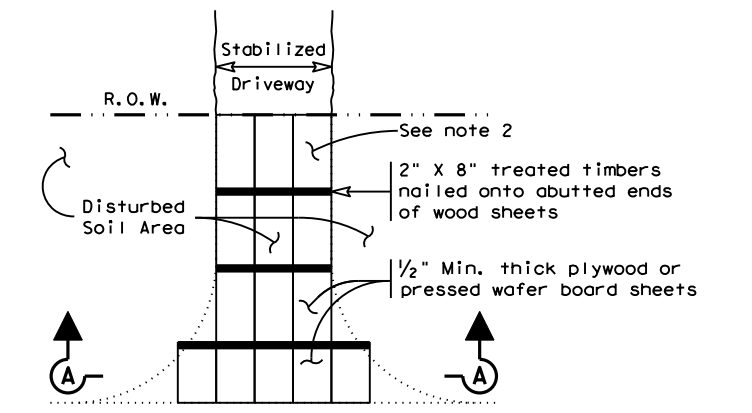


ELEVATION VIEW

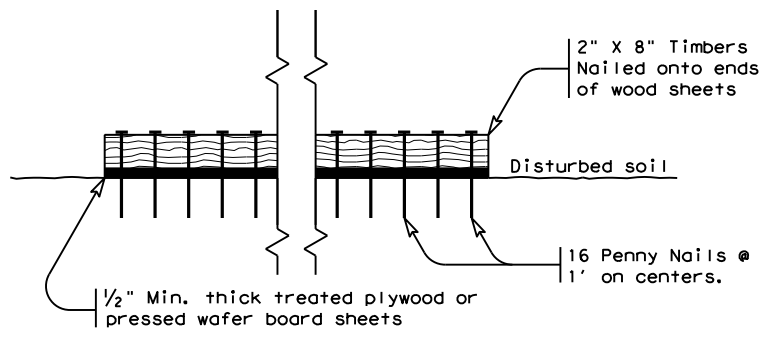
CONSTRUCTION EXIT (TYPE 2)
TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

- The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
- The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
- The construction exit should be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



SECTION A-A
CONSTRUCTION EXIT (TYPE 3)
SHORT TERM

GENERAL NOTES (TYPE 3)

- The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
- The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
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DIST	COUNTY	SHEET NO.	
PAR	LAMAR, ETC	69	