FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C 24-8-148		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT
PROJECT NO. C 24-8-148
CSJ: 0024-08-148
BEXAR
US 90

LIMITS FROM: 0.8 Miles West of SH 151
TO: 1.1 Miles East of SH 151

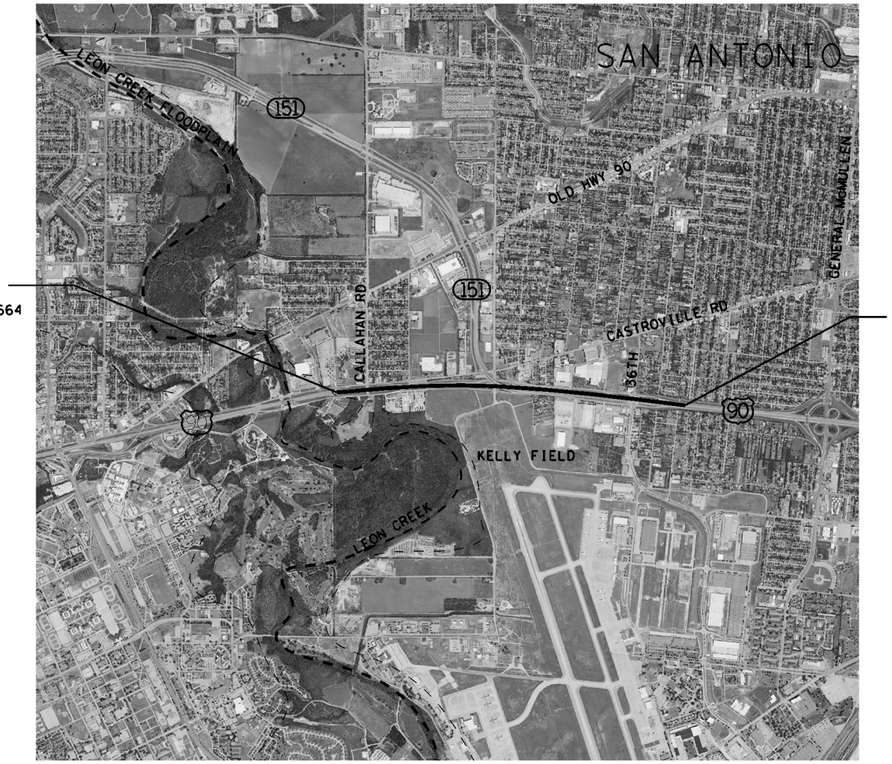
NET LENGTH OF ROADWAY = 10523.04 FT = 1.993 MI
NET LENGTH OF BRIDGE = 0.00 FT = 0.000 MI
NET LENGTH OF PROJECT = 10523.04 FT = 1.993 MI

FOR WORK CONSISTING OF LANDSCAPE AND IRRIGATION INSTALLATION

DESIGN SPEED = N/A
AREA OF DISTURBED SOIL = 0.31 ACRES
ADT: 151656

ACCESSIBILITY STANDARDS = N/A

REGISTERED ACCESSIBILITY SPECIALIST INSPECTION REQUIRED
TDLR NO. : N/A



SCALE: N.T.S

EXCEPTIONS: N/A
EQUATIONS: N/A
R.R. CROSSINGS: N/A

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000--008)

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

FILE LOCATION AND NAME
T:\Engdata\Standards\Design\TITLESHEET-2014Specs.DGN

LEVELS DISPLAYED
1

COUNTY_____ PROJ. NO._____
HWY. NO._____ LETTING DATE_____
DATE ACCEPTED_____

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

_____ P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 2/23/2024
DocuSigned by: Suman Shrestha
TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 2/26/2024
DocuSigned by: Clayton Ripps, P.E.
DEPUTY DISTRICT ENGINEER

REVIEWED FOR LETTING 2/26/2024
DocuSigned by: D.E. Ragsdale, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING 2/26/2024
DocuSigned by: Charles Benavidez
DISTRICT ENGINEER

STATE OF TEXAS
SANDRA SINTON
103770
LICENSED
PROFESSIONAL ENGINEER

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

DocuSigned by: Sandra Sinton 3DD32AD30EF84DC... — SIGNATURE

2/22/2024 — DATE

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

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

DocuSigned by: Jennifer Loa 0C3EE8BC0417449... — SIGNATURE

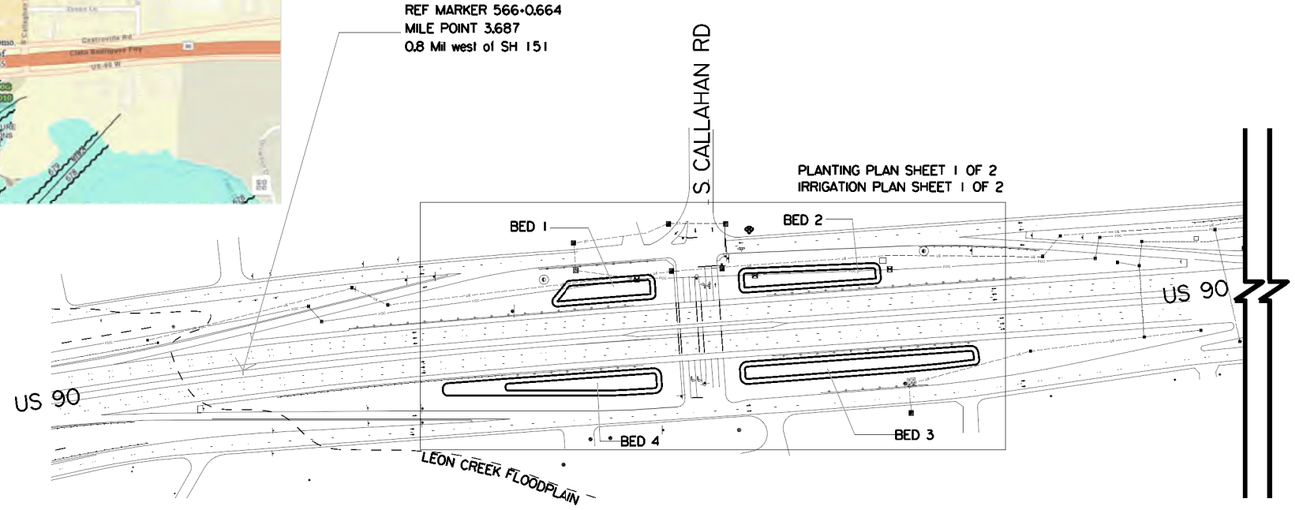
2/22/2024 — DATE

US 90

SHEET INDEX

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		2
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

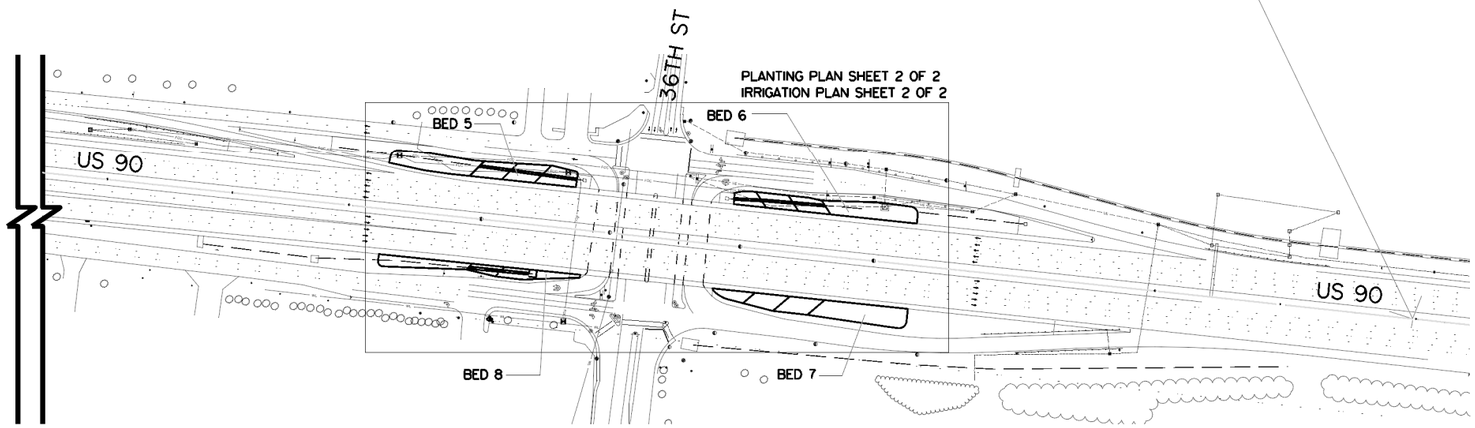
BEGIN PROJECT
REF MARKER 566+0.664
MILE POINT 3.687
0.8 Mil west of SH 151



GENERAL NOTE:

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT
2. FPA NOTIFICATION FOR BEXAR COUNTY/ CITY OF SAN ANTONIO WAS SUBMITTED IN WRITING ON FEBRUARY, 14TH, 2024.

END PROJECT
REF MARKER 568+0.612
MILE POINT 5.62
1.1 MILE EAST OF SH 151



REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

0 150 300

Texas Department of Transportation
© 2023 TxDOT

US 90

PROJECT LAYOUT

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		3
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

**********GENERAL NOTES**********
2014 Specification Book (Revised January 18, 2023)

--General--

Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

City of San Antonio: (210) 207-8642

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

If a sanitary sewer overflow (SSO) occurs:

1. Attempt to eliminate the source of the SSO.
2. Contain sewage from the SSO to the extent possible to prevent contamination of waterways.
3. Call SAWS at (210) 233-2015.

Submit locate request for SAWS water and sewer to TXDOTlocates@saws.org.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
Area Engineer, Christen Longoria, PE Christen.Longoria@txdot.gov
Assistant Area Engineer, Citlali Tapia, PE Citlali.Tapia@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and back feed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

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

Structures

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

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

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

Excavation within 5 feet of an existing CPS Energy pole will require pole bracing. Contact CPS Energy utility coordination to request pole bracing (Customer Engineering 210-353-4050). The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

Control: 0024-08-148

County: Bexar

Highway: US 90

Steel Wrapped or Asbestos Utility Lines:

Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

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

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

--Item 7--
The project's total disturbed area is 0.31 acres. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 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 PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

No significant traffic generators events identified.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4: Standard Work Week.

Create and maintain a Bar Chart schedule.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take “Safe and Effective Use of Law Enforcement Personnel in Work Zones” (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

--Item 161--
Approximately 1500 CY of existing topsoil may be salvaged and windrowed or stockpiled (as approved) for later use as Compost Manufactured Topsoil (CMT). Place erosion control measures for the stockpile and/or windrow.

--Item 192--
Plant material and planting bed locations. The Engineer/Landscape Architect may make adjustments to the plant and planting bed locations to meet field conditions. These changes are considered incidental and there will be no additional compensation.

Neither work subsoil for planting operations when moisture content is so great that excessive compaction will occur, nor when it is so dry that the clods will not break readily. Apply water if necessary. These conditions will be determined by the Engineer/Landscape Architect as planting operations begin.

It may be necessary to suspend planting operations if the Engineer/Landscape Architect determines that unusually hot, dry weather or water restrictions will affect thriving growth of plant material. If planting operations are suspended, time charges will also be suspended until the Engineer/Landscape Architect determines that planting operations can begin again. Continue to maintain previously planted plants during time suspension. No extra compensation will be allowed due to such suspensions.

Stake trees for support during the same day as planted. Ensure plants stand plumb after staking. Ensure material remains plumb and straight for all given conditions throughout the contract period. Staking method must allow trunk to sway with the wind while remaining plumb. Stake large trees at or below the halfway area of the trunk. Stake smaller trees around eighteen inches (18”) from the ground. Remove all nursery stakes which are attached to the trunk.

Begin maintenance phase of this Item when all of the plant material and other related items for the entire project are complete and in place and approved by the Engineer/Landscape Architect. Maintain (mow) grass areas immediately outside of planting beds to ten feet (10’).

--Item 193--
Costs for water applied through the irrigation system will be subsidiary to Item 193 – Irrigation System Operation and Maintenance. See Irrigation Specifications sheet for details.

--Item 496--
Provide for the safety and health of employees and abide by all OSHA Standards and Regulations. All costs incurred for proper management, shall be subsidiary to this Item.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Avoid placing stockpiles, equipment, and other construction materials within the roadway’s horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

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.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Cover permanent signs if not used. This is subsidiary to Item 502.

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 556--
Coarse Aggregate Grade 3 meeting requirements of Item 421, Table 4, is acceptable for Filter Material.

For reference only: The conduit depth for illumination under the City of San Antonio streets is 36 inches.

--Item 730--
Mow 10' from newly planted bedding areas after completion of landscape installation and repeat as necessary throughout the duration of the contract for plant maintenance, or when directed. Coordinate mowing to avoid rutting or compaction of the soil when mowing where supplemental irrigation is being used. Use mowing equipment that will not adversely affect mulches that have been applied. Work performed under this item is subsidiary to mulching requirements.

--Item 734--
Perform Litter Removal once a month or as directed by the Engineer. Work performed under this item is subsidiary to plant bed maintenance.

During hurricane season (June-October), special attention should be given to remove and dispose of litter and debris from the right of way. Work performed under this item is subsidiary to plant bed maintenance.

--Item 6185--
2 shadow vehicles with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project. See TMA and TA Summary sheet in the plans.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0024-08-148 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY US 90

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0024-08-148**			
			PROJECT ID		**A00198724**			
			COUNTY		**Bexar**			
			HIGHWAY		**US 90**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	161-6012	GENERAL USE COMPOST		CY	1,245.000		1,245.000	
	170-6001	IRRIGATION SYSTEM		LS	1.000		1.000	
	192-6002	PLANT MATERIAL (1-GAL)		EA	914.000		914.000	
	192-6004	PLANT MATERIAL (5-GAL)		EA	509.000		509.000	
	192-6005	PLANT MATERIAL (15-GAL)		EA	556.000		556.000	
	192-6006	PLANT MATERIAL (30-GAL)		EA	66.000		66.000	
	192-6013	MULCH		SY	11,564.000		11,564.000	
	192-6016	PLANT BED PREPARATION		SY	11,564.000		11,564.000	
	192-6049	PLANT MATERIAL (MIN 4' TRNK HT) (PALM)		EA	19.000		19.000	
	193-6001	PLANT MAINTENANCE		MO	9.000		9.000	
	193-6003	PLANT REPLACEMENT (1-GAL)		EA	92.000		92.000	
	193-6005	PLANT REPLACEMENT (5-GAL)		EA	54.000		54.000	
	193-6007	IRRIGATION SYSTEM OPER AND MAINT		MO	9.000		9.000	
	500-6001	MOBILIZATION		LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	9.000		9.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")		LF	3,002.000		3,002.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF	300.000		300.000	
	6185-6005	TMA (MOBILE OPERATION)		DAY	2.000		2.000	
	08	CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)		LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)		LS	1.000		1.000	

SUMMARY OF LANDSCAPE ITEMS

LOCATION	161 6012	170 6001	192 6002	192 6004	192 6005	192 6006	192 6013	192 6016	192 6049	193 6001
	GENERAL USE COMPOST	IRRIGATION SYSTEM	PLANT MATERIAL (1-GAL)	PLANT MATERIAL (5-GAL)	PLANT MATERIAL (15-GAL)	PLANT MATERIAL (30-GAL)	MULCH	PLANT BED PREPARATION	PLANT MATERIAL (MIN 4' TRNK HT) (PALM)	PLANT MAINTENANCE
	CY	LS	EA	EA	EA	EA	SY	SY	EA	MO
US 90 @ Callahan	725			74	343	66	6519	6519	9	
US 90 @ 36 TH	520		914	435	213		5045	5045	10	
		1								9
PROJECT TOTALS	**1245**	**1**	**914**	**509**	**556**	**66**	**11564**	**11564**	**19**	**9**

SUMMARY OF LANDSCAPE ITEMS

LOCATION	193 6003	193 6005	193 6007	506 6041	506 6043	6185 6005
	PLANT REPLACEMENT (1-GAL)	PLANT REPLACEMENT (5-GAL)	IRRIGATION SYSTEM OPER AND MAINT	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)	TMA (MOBILE OPERATION)
	EA	EA	MO	LF	LF	DAY
US 90 @ Callahan		10		2702		
US 90 @ 36 TH	92	44				
			9	300	300	2
PROJECT TOTALS	**92**	**54**	**9**	**3002**	**300**	**2**

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

US 90

QUANTITY SUMMARY

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		6
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.

(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.

(3) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.

(4) THE CONTRACTOR’S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, “LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC”AND ITEM 502, “BARRICADES, SIGNS, AND TRAFFIC HANDLING”, OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES.

(5) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

BEGINNING OF PROJECT

- INSTALL CONSTRUCTION BARRICADES AND PROJECT SIGNS AS PER BARRICADE AND CONSTRUCTION STANDARDS IN PLANS
- INSTALL SWP3 DEVICES AS SHOWN ON PLANTING PLANS
- USE AT LEAST ONE TRUCK/TRAILER MOUNTED ATTENUATOR (TMA) PER WORK AREA

ALL PHASES

- INSTALL AND PLACE TRAFFIC CONTROL DEVICES AS PER TRAFFIC CONTROL PLAN STANDARDS IN PLANS AS NEEDED
- CONDUCT LANDSCAPING WORK
- PERFORM CLEAN-UP ON WORK AREA

END OF PROJECT

- REMOVE ALL TRAFFIC CONTROL DEVICES, ADVANCED WARNING SIGNS, AND SWP3 DEVICES

STATE OF TEXAS
SANDRA SINTON
103770
LICENSED PROFESSIONAL ENGINEER

Sandra Sinton, P.E. 02/20/2024
SANDRA SINTON DATE

Texas Department of Transportation

US 90

TCP NARRATIVE

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		7
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

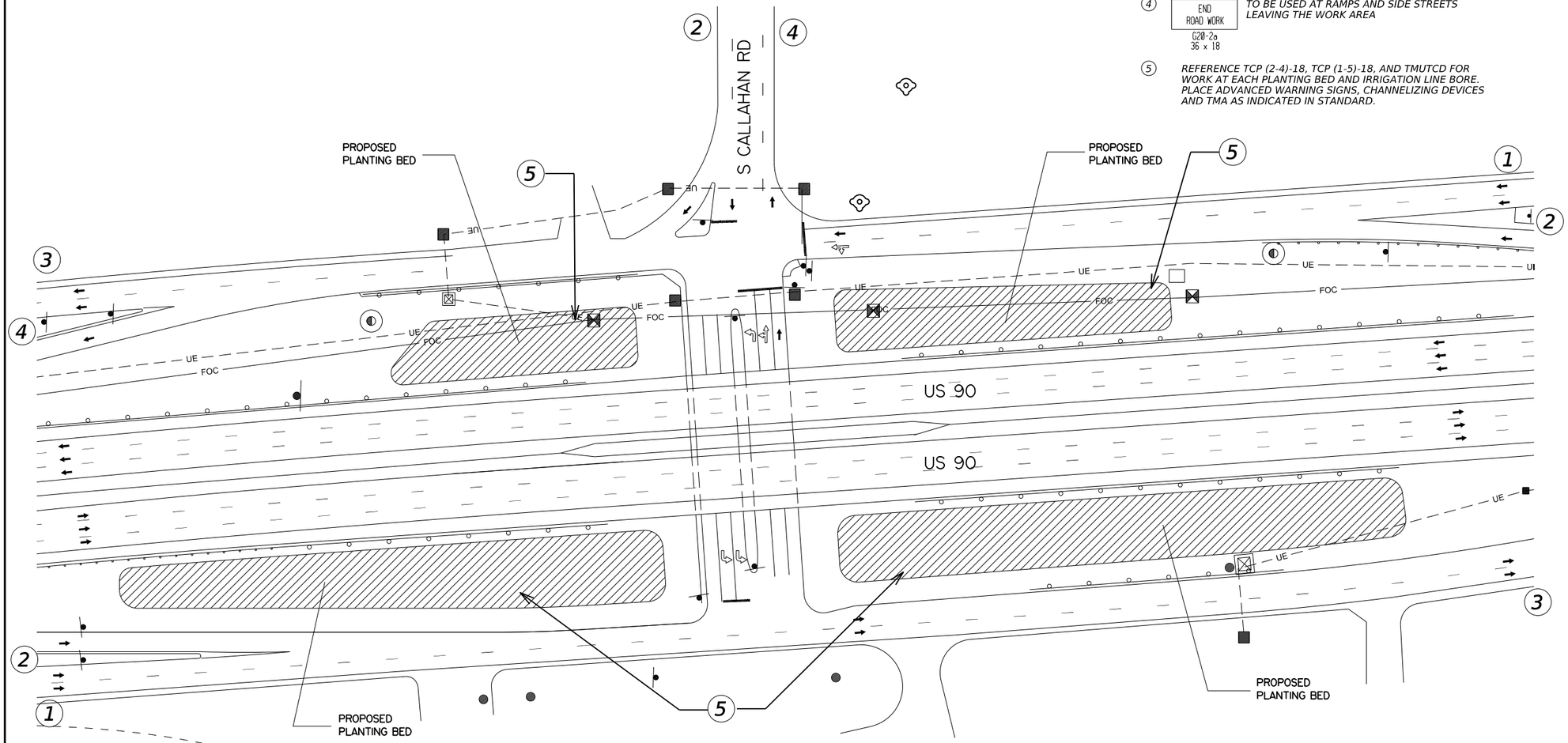
1. *REFERENCE BC (1 THROUGH 12)-21 ANO TMUTCD FOR INSTALLATION OF ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES FOR BEGINNING OF PROJECT*

2. ROAD WORK AHEAD — CW20-1D 36 X 36 — *TO BE USED AT RAMPS AND SIDE STREETS ENTERING THE WORK AREA*

3. END WORK ZONE — G20-2b 36 x 18 — *TO BE USED AT THE END OF THE PROJECT*

4. END ROAD WORK — G20-2a 36 x 18 — *TO BE USED AT RAMPS AND SIDE STREETS LEAVING THE WORK AREA*

5. *REFERENCE TCP (2-4)-18, TCP (1-5)-18, AND TMUTCD FOR WORK AT EACH PLANTING BED AND IRRIGATION LINE BORE. PLACE ADVANCED WARNING SIGNS, CHANNELIZING DEVICES AND TMA AS INDICATED IN STANDARD.*



LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE
- TRAFFIC SIGNAL POLE
- UE — UNDERGROUND ELECTRIC

THE EXISTENCE AND LOCATION OF ALL UTILITIES INDICATED ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR TOTALLY INCLUSIVE. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY UTILITIES PRIOR TO BEGINNING CONSTRUCTION.

BEGINNING OF PROJECT

- *INSTALL CONSTRUCTION BARRICADES AND PROJECT SIGNS AS PER BARRICADE AND CONSTRUCTION STANDARDS IN PLANS*
- *INSTALL SWP3 DEVICES AS SHOWN ON PLANTING PLANS*
- *USE AT LEAST ONE TRUCK/TRAILER MOUNTED ATTENUATOR (TMA) PER WORK AREA*

ALL PHASES

- *INSTALL AND PLACE TRAFFIC CONTROL DEVICES AS PER TRAFFIC CONTROL PLAN STANDARDS IN PLANS AS NEEDED*
- *CONDUCT LANDSCAPING WORK*
- *PERFORM CLEAN-UP ON WORK AREA*

END OF PROJECT

- *REMOVE ALL TRAFFIC CONTROL DEVICES, ADVANCED WARNING SIGNS, AND SWP3 DEVICES*

STATE OF TEXAS
SANDRA SINTON
103770
LICENSED
PROFESSIONAL ENGINEER

Sandra Sinton, P.E.

02/20/2024

0 20 40 60 80 100

SCALE: 1" = 100'-0"

N

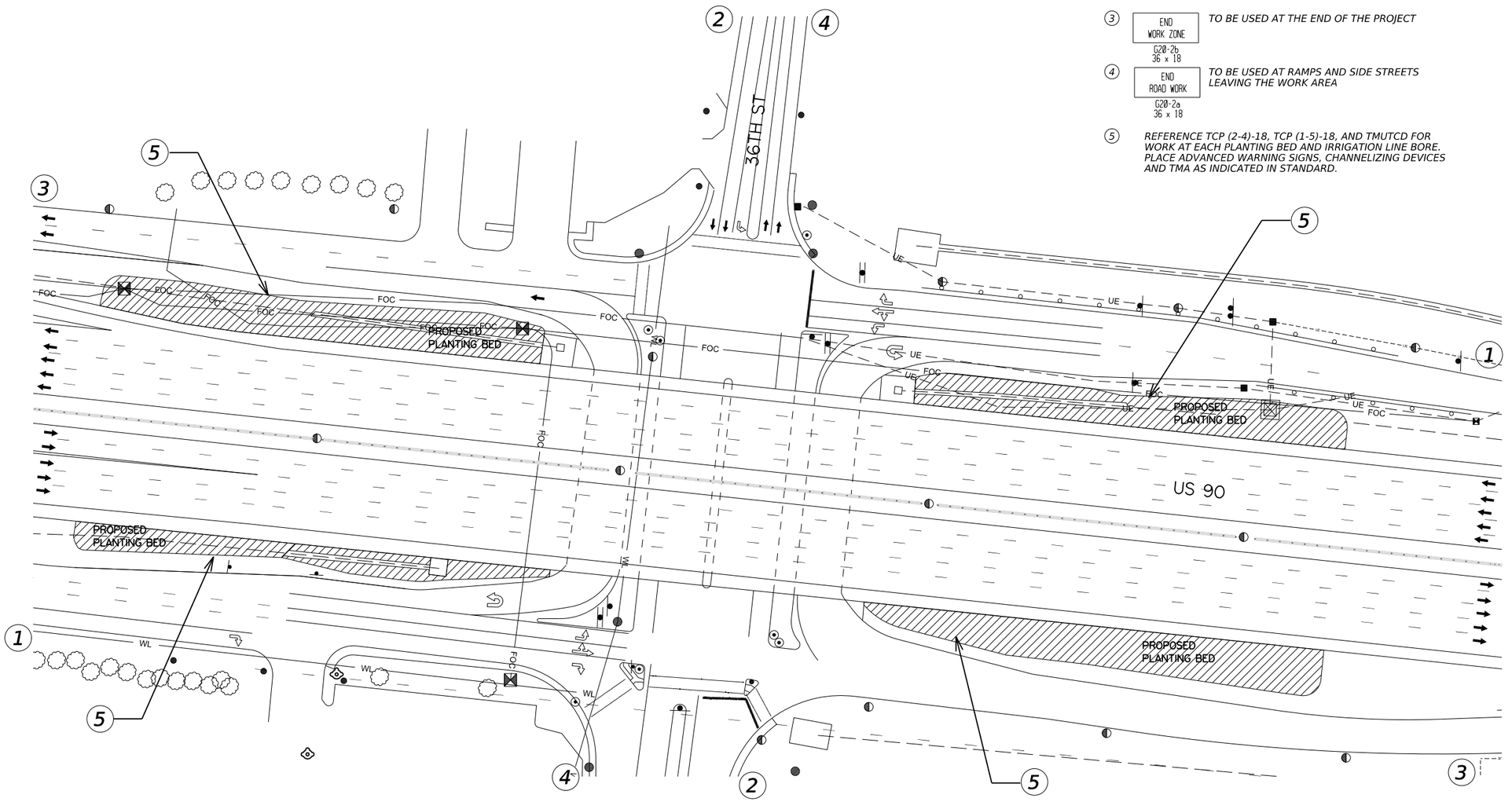
Texas Department of Transportation

US 90

TCP LAYOUT

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		8
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90



1. *REFERENCE BC (1 THROUGH 12)-21 ANO TMUTCD FOR INSTALLATION OF ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES FOR BEGINNING OF PROJECT*

2. ROAD WORK AHEAD — CW20-1D 36 X 36 — *TO BE USED AT RAMPS AND SIDE STREETS ENTERING THE WORK AREA*

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LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE
- TRAFFIC SIGNAL POLE
- UE — UNDERGROUND ELECTRIC

THE EXISTENCE AND LOCATION OF ALL UTILITIES INDICATED ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR TOTALLY INCLUSIVE. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY UTILITIES PRIOR TO BEGINNING CONSTRUCTION.

BEGINNING OF PROJECT

- *INSTALL CONSTRUCTION BARRICADES AND PROJECT SIGNS AS PER BARRICADE AND CONSTRUCTION STANDARDS IN PLANS*
- *INSTALL SWP3 DEVICES AS SHOWN ON PLANTING PLANS*
- *USE AT LEAST ONE TRUCK/TRAILER MOUNTED ATTENUATOR (TMA) PER WORK AREA*

ALL PHASES

- *INSTALL AND PLACE TRAFFIC CONTROL DEVICES AS PER TRAFFIC CONTROL PLAN STANDARDS IN PLANS AS NEEDED*
- *CONDUCT LANDSCAPING WORK*
- *PERFORM CLEAN-UP ON WORK AREA*

END OF PROJECT

- *REMOVE ALL TRAFFIC CONTROL DEVICES, ADVANCED WARNING SIGNS, AND SWP3 DEVICES*

STATE OF TEXAS
SANDRA SINTON
103770
LICENSED
PROFESSIONAL ENGINEER

Sandra Sinton, P.E.

02/20/2024

0 20 40 60 80 100

SCALE: 1" = 100'-0"

N

Texas Department of Transportation

US 90

TCP LAYOUT

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		9
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0024	08	149	US 90
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	SAT	BEXAR		10
5-10 5-21				

DATE: 2/15/2024 4:31:55 PM
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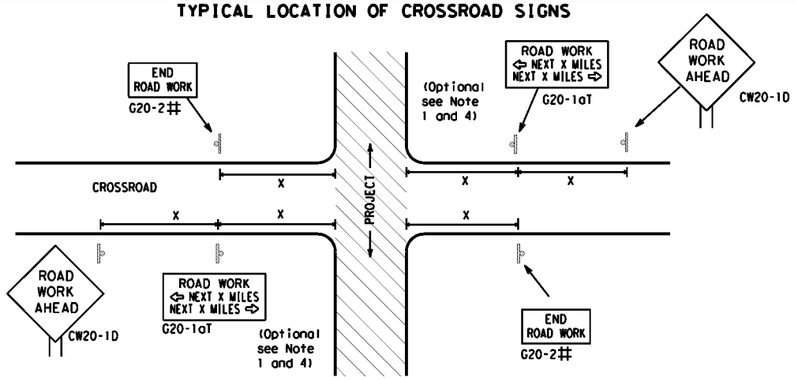
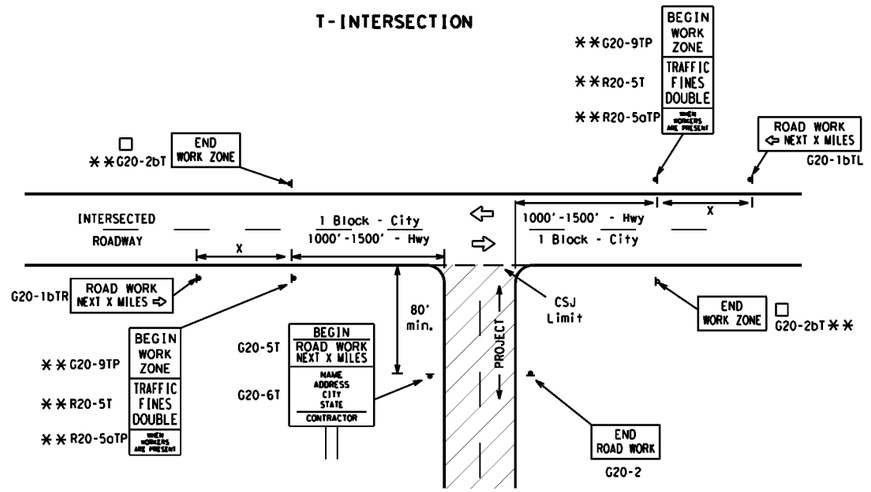
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

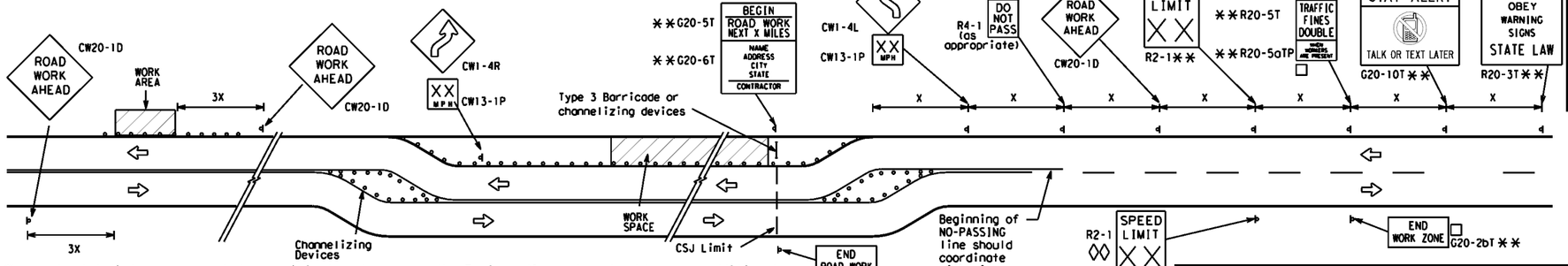
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

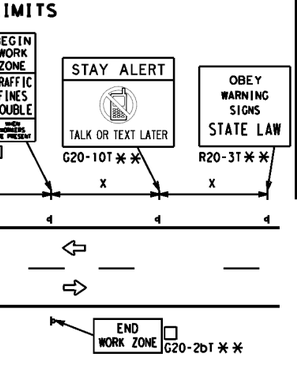
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

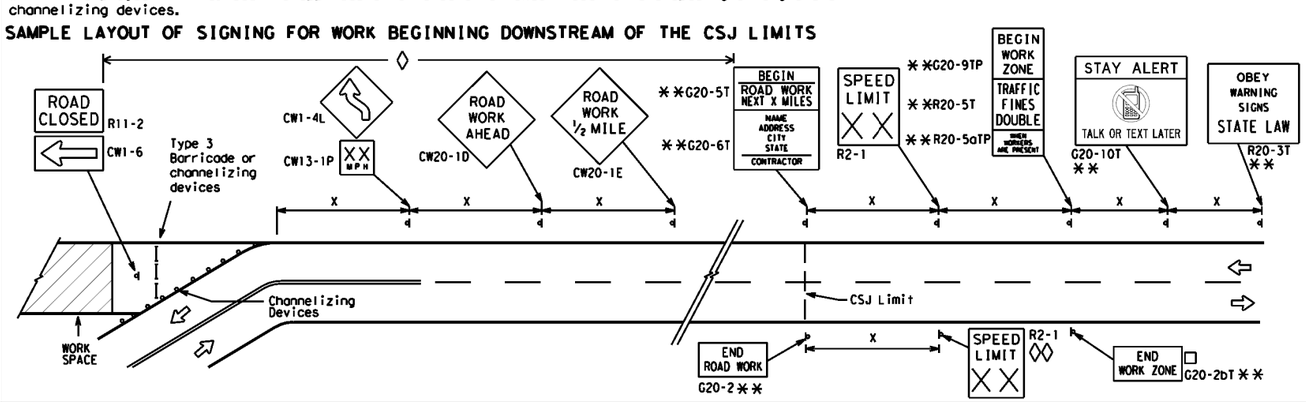


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0024	08	149	US 90
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		11

DATE: 2/15/2024 4:31:57 PM
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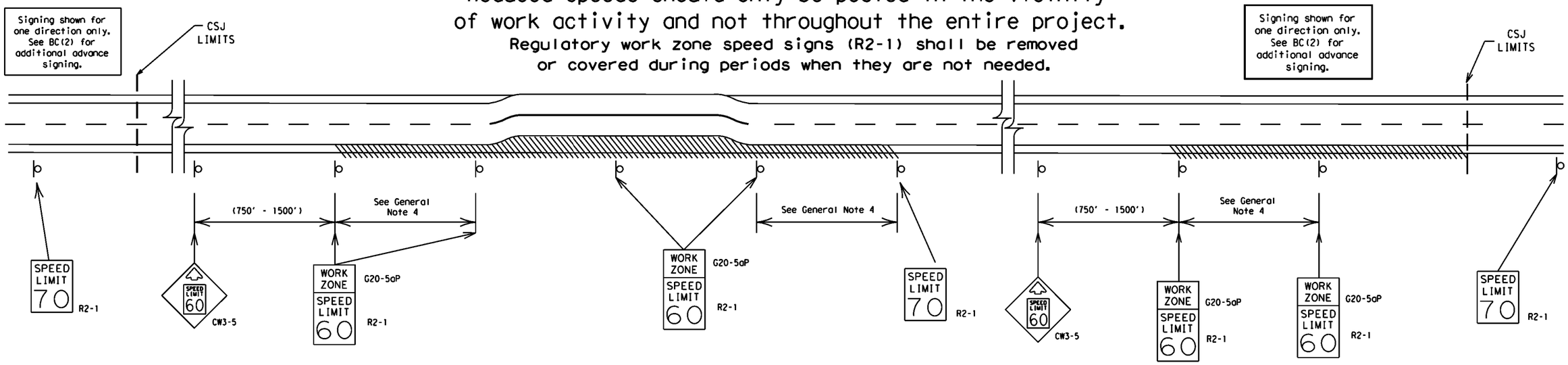
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

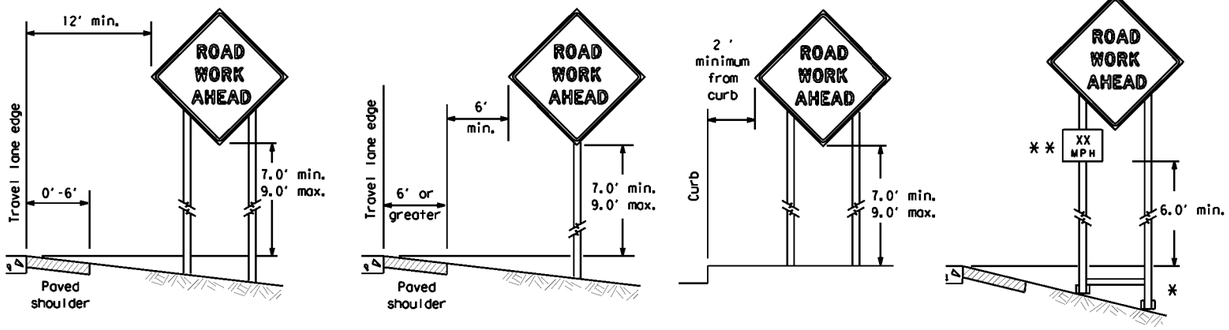
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0024	08	149	US 90
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		12

DATE: 2/15/2024 4:32:00 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT4/Documents/15 - SAT/Design Projects/0024-08-LSE/4 - Design/Plan Set/2. TCP/bc-21.dgn

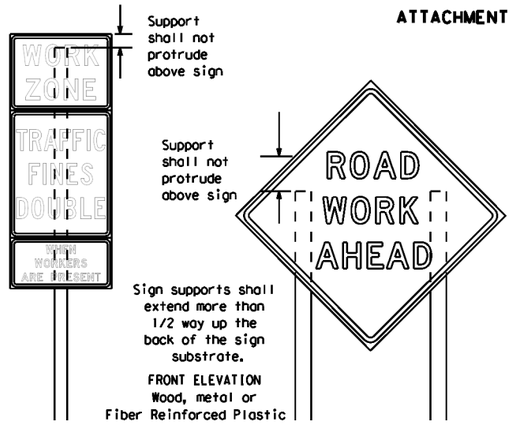
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

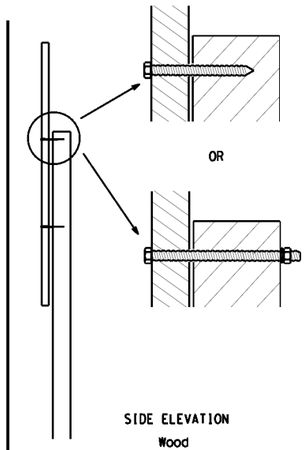


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





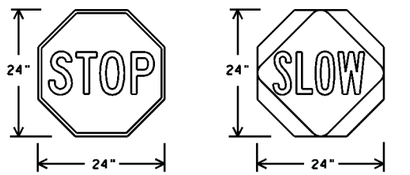
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		13

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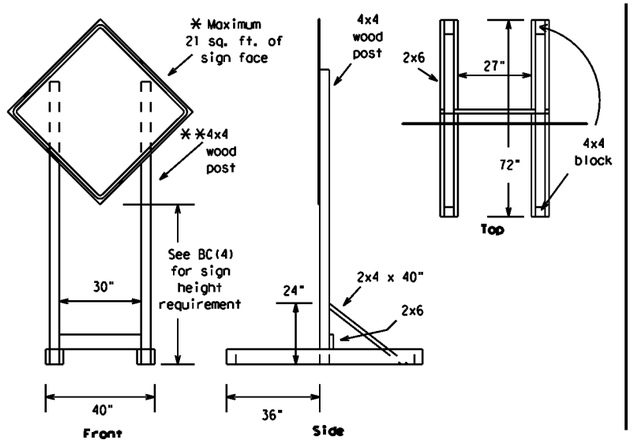
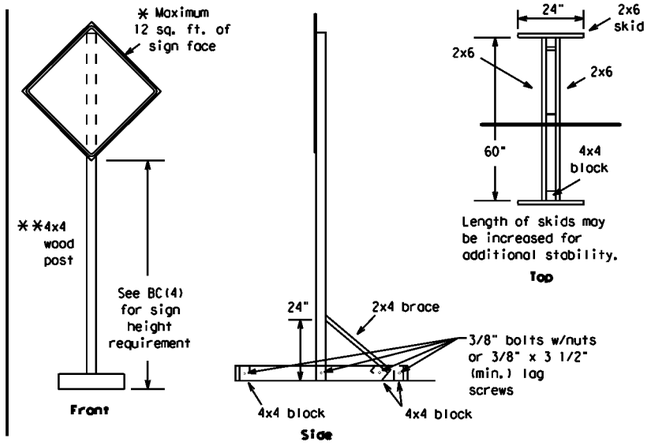
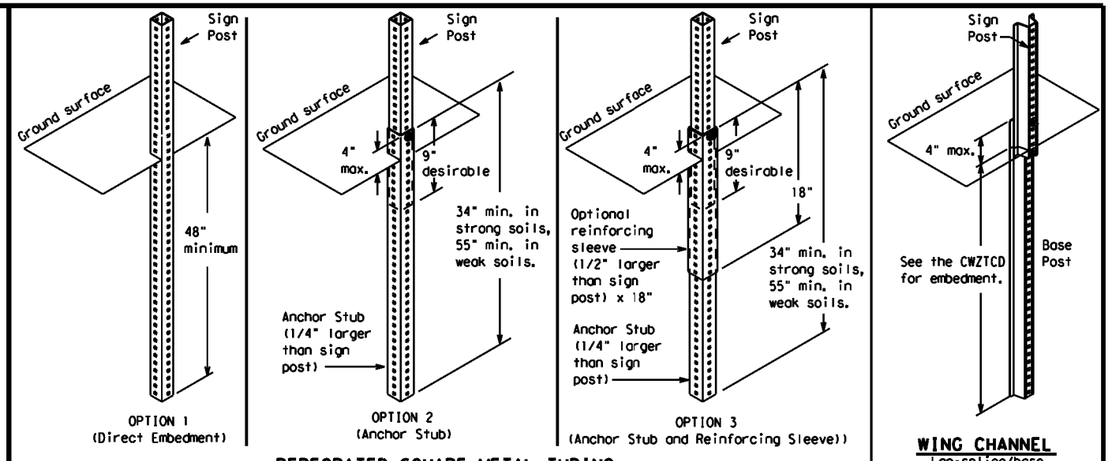




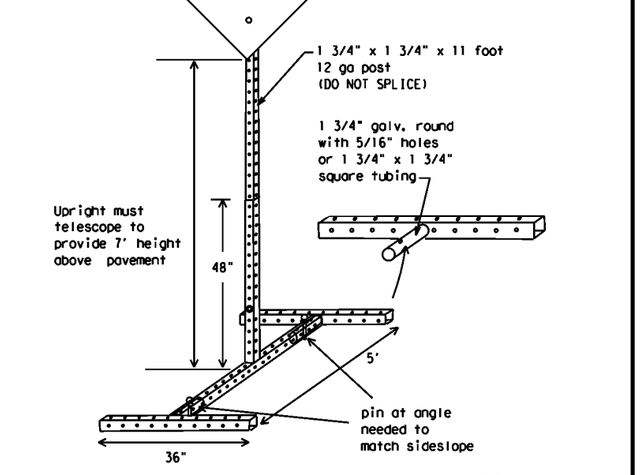
SKID MOUNTED WOOD SIGN SUPPORTS

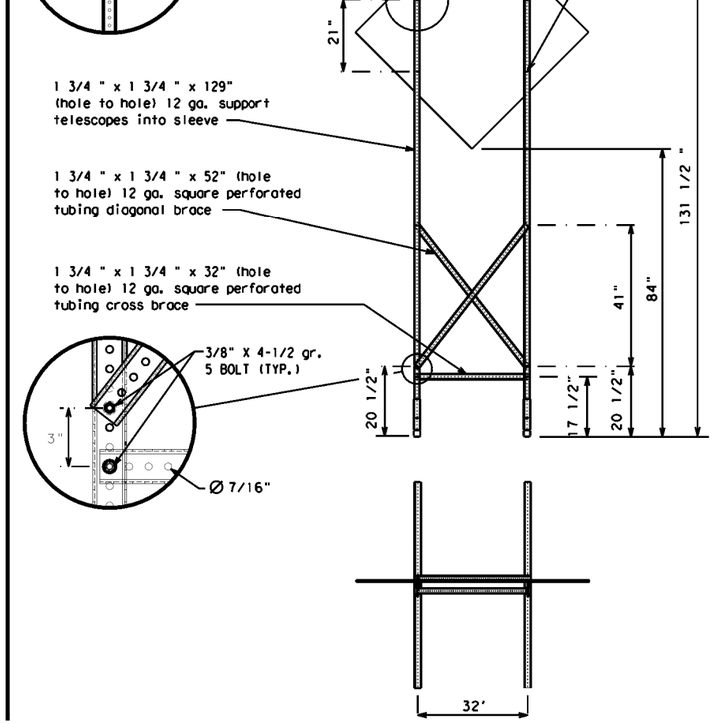
*** LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS**

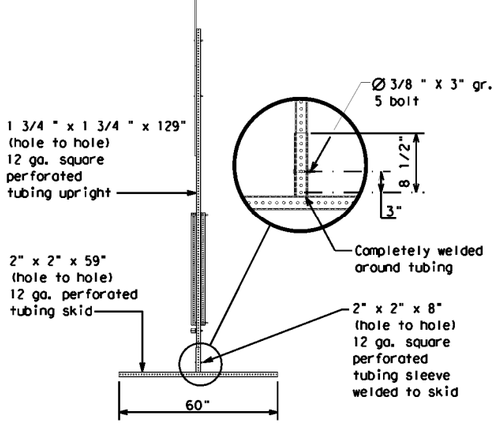


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		14

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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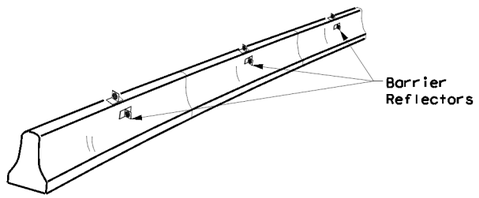
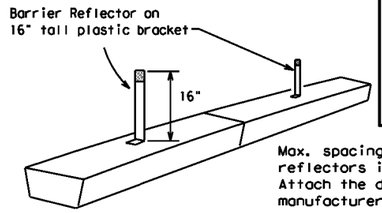
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

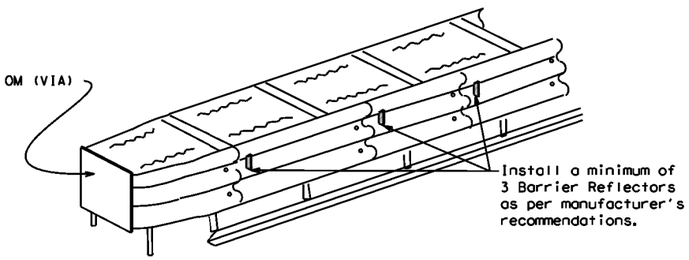


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

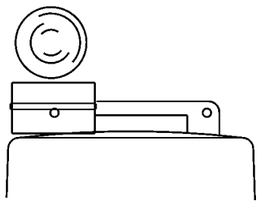


DELINEATION OF END TREATMENTS

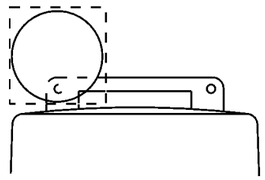
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

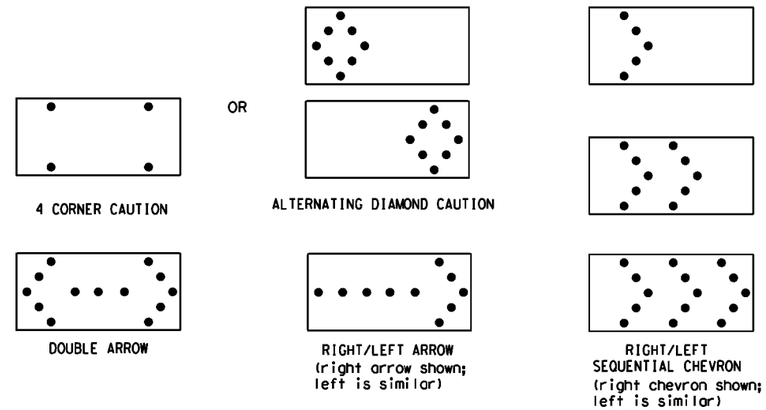
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0024	08	149	US 90
9-07 8-14	DIST	COUNTY		SHEET NO.
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

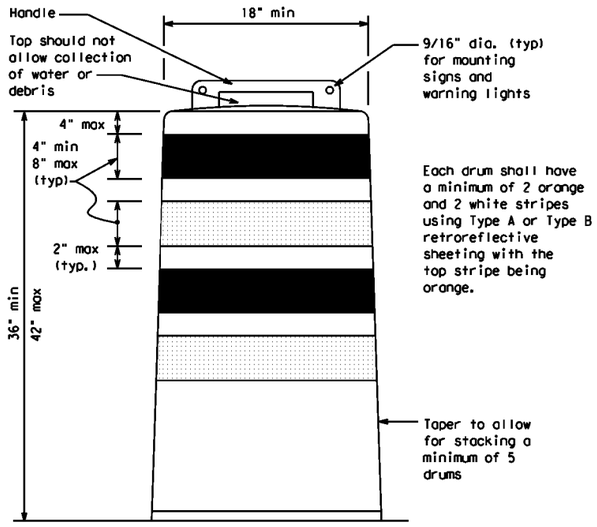
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

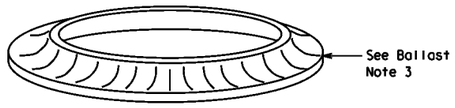
RETROREFLECTIVE SHEETING

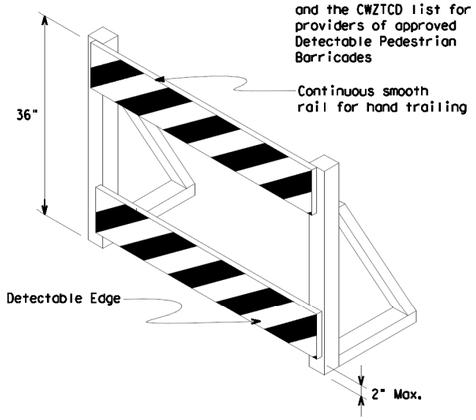
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Deportmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

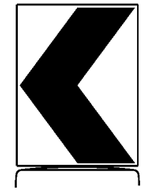




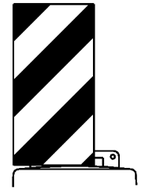


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0024	08	149	US 90
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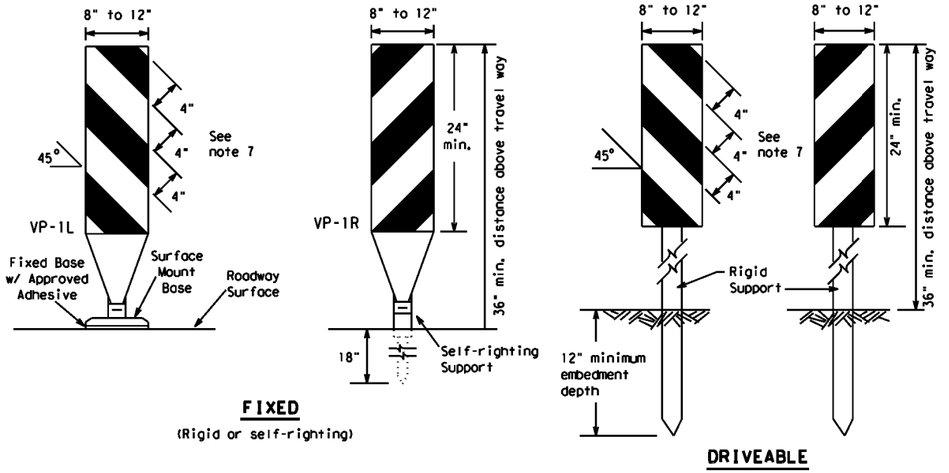
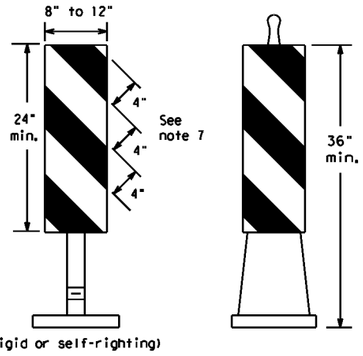


FIXED
(Rigid or self-righting)

DRIVEABLE

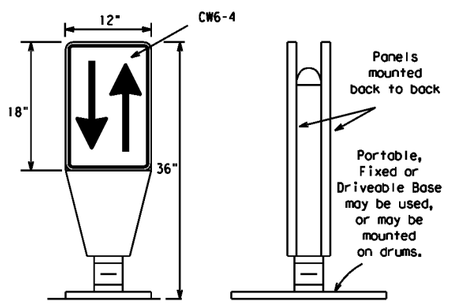


(Rigid or self-righting)

PORTABLE

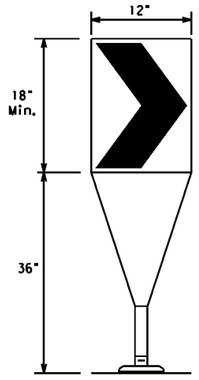
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



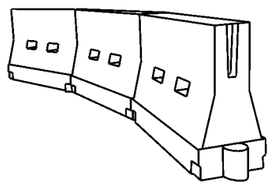
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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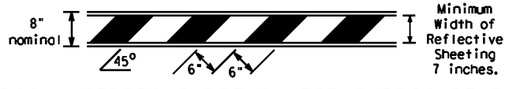
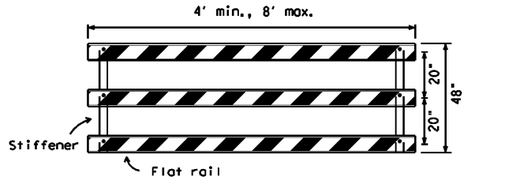
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



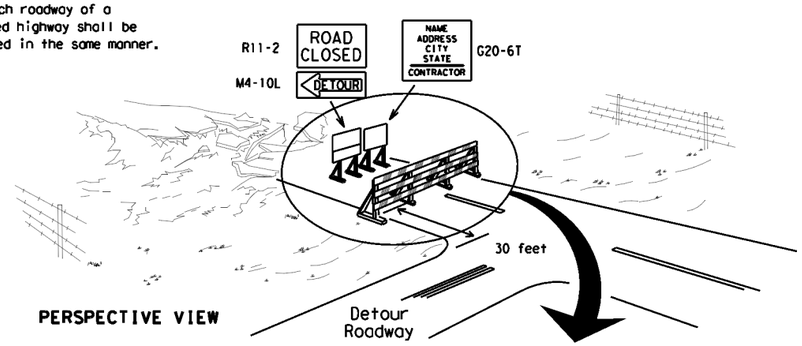
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

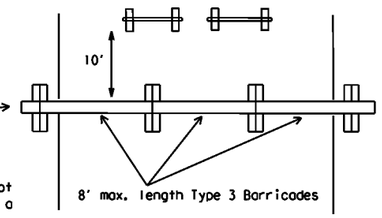
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

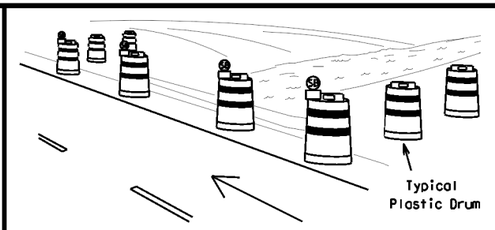
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

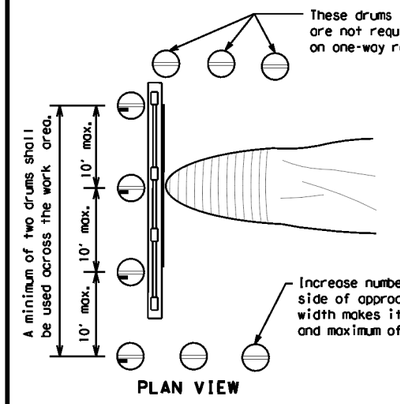
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

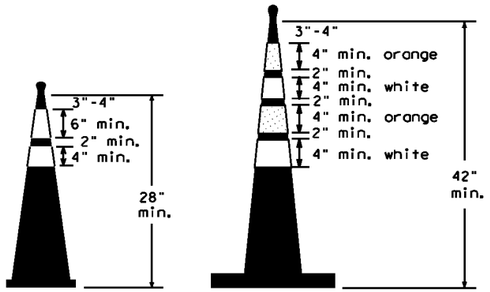
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

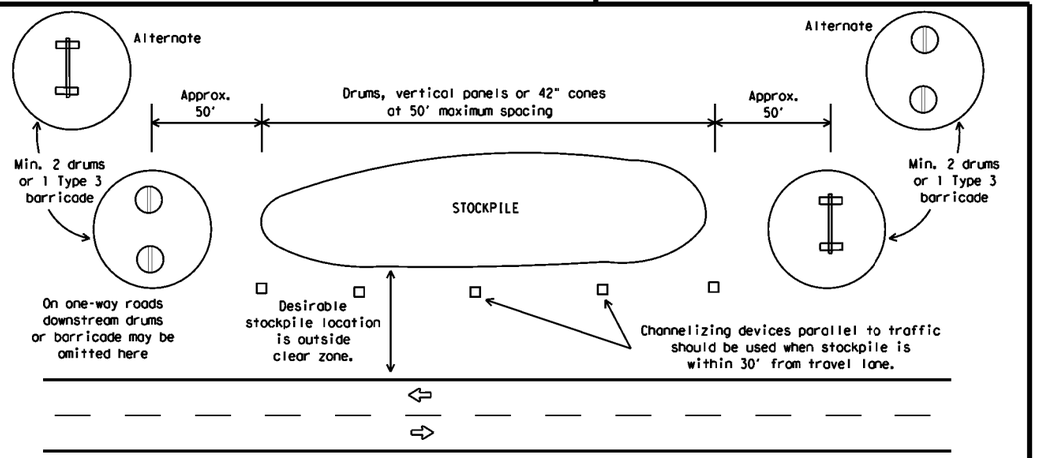
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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7-13 5-21	SAT	BEXAR		19

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

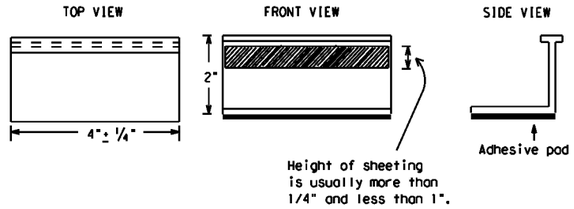
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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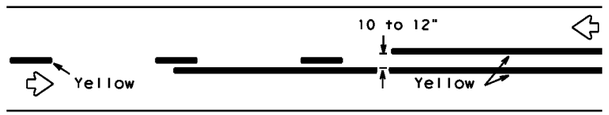
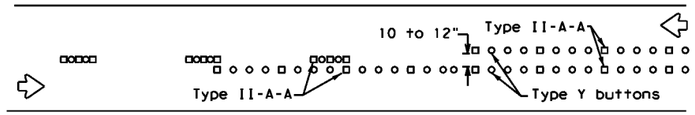
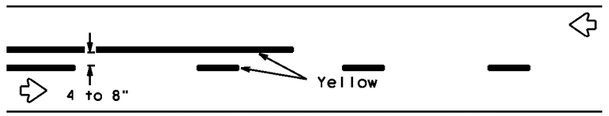
PAVEMENT MARKING PATTERNS



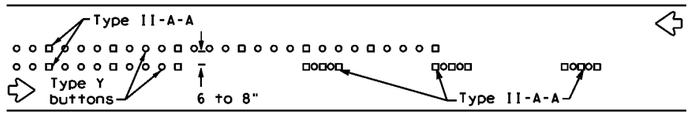
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



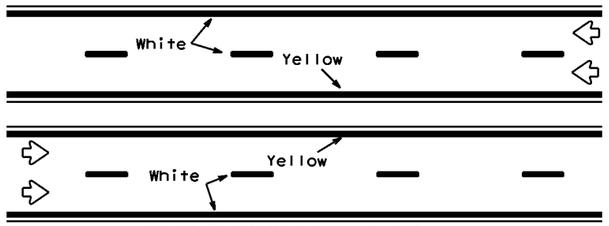
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



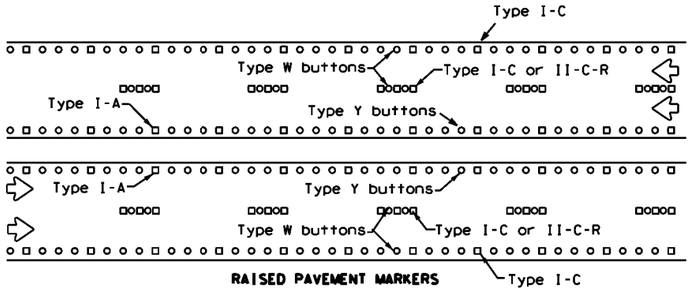
RAISED PAVEMENT MARKERS - PATTERN B

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

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



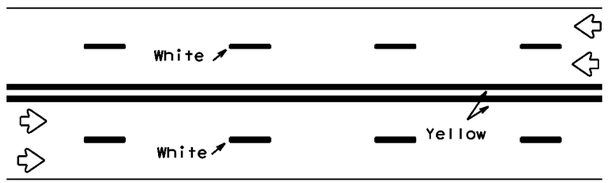
REFLECTORIZED PAVEMENT MARKINGS



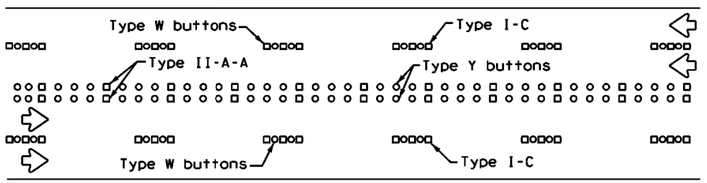
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



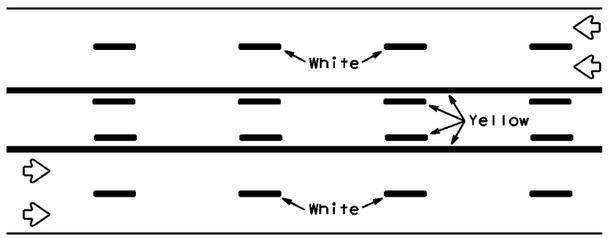
REFLECTORIZED PAVEMENT MARKINGS



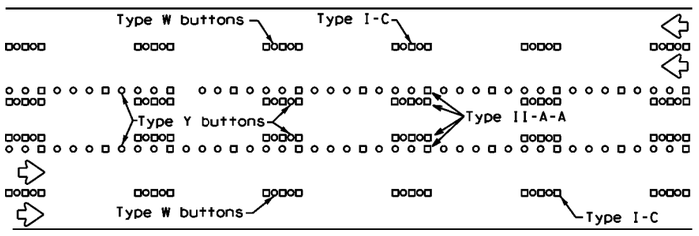
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

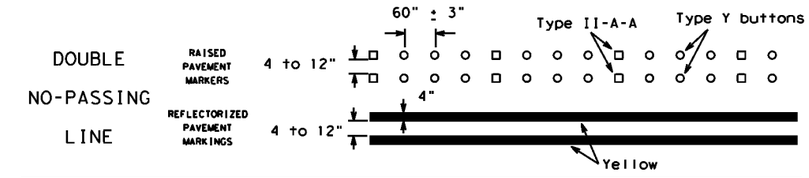
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

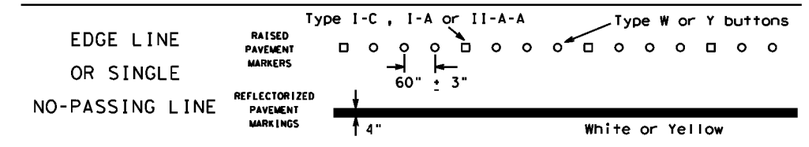
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

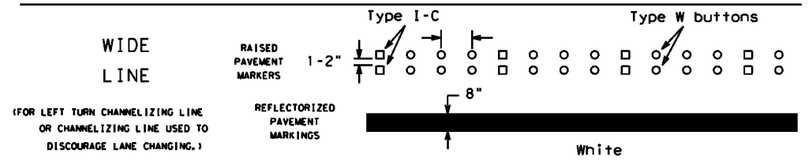


EDGE LINE OR SINGLE NO-PASSING LINE



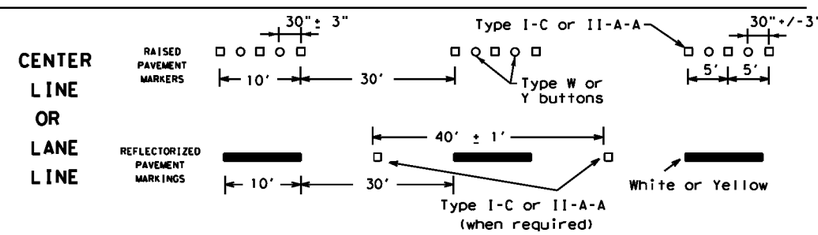
WIDE LINE

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

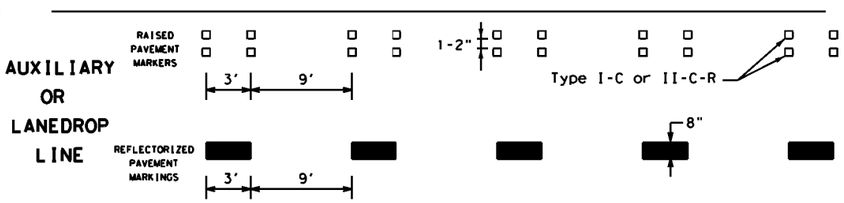


BROKEN LINES

CENTER LINE OR LANE LINE

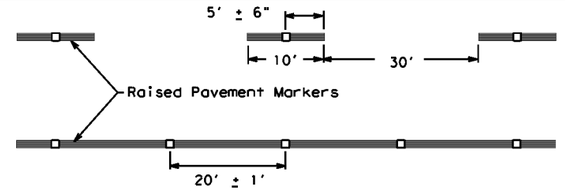


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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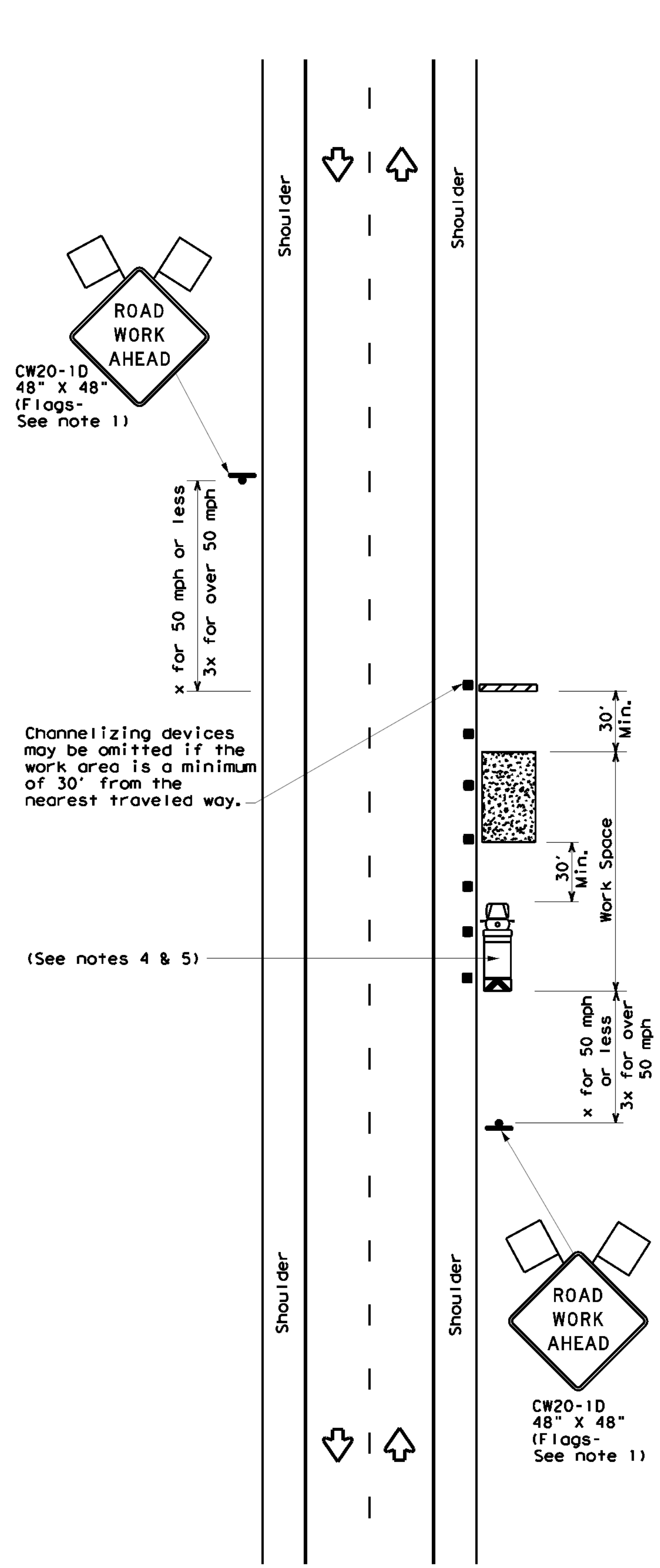
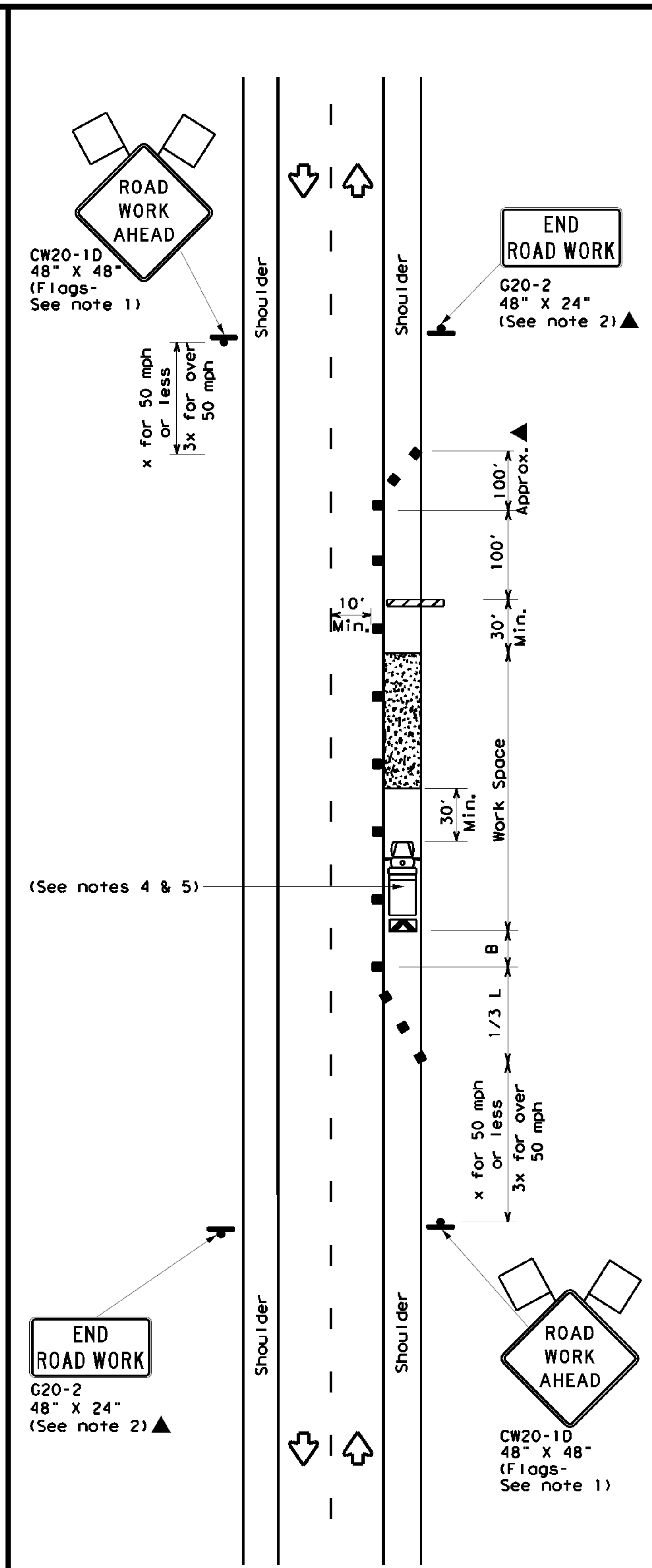


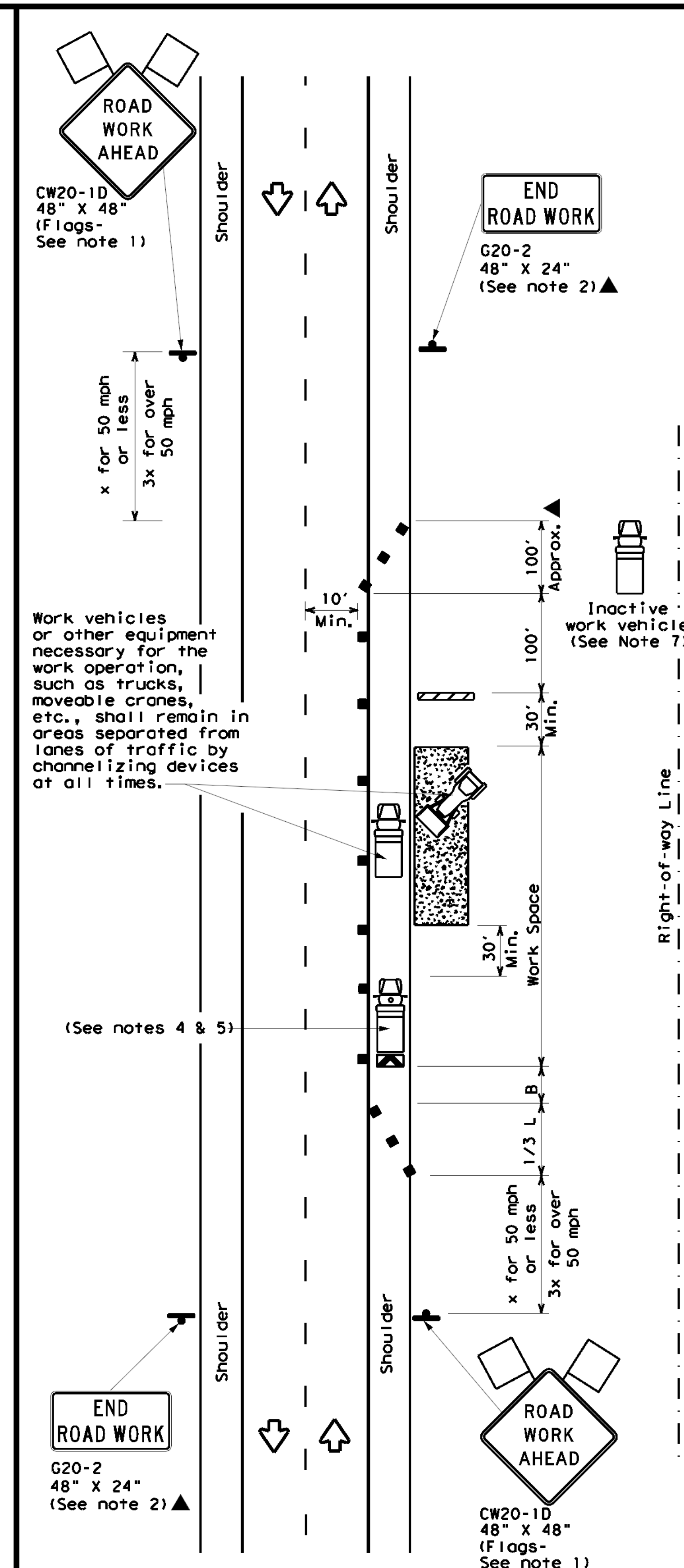
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

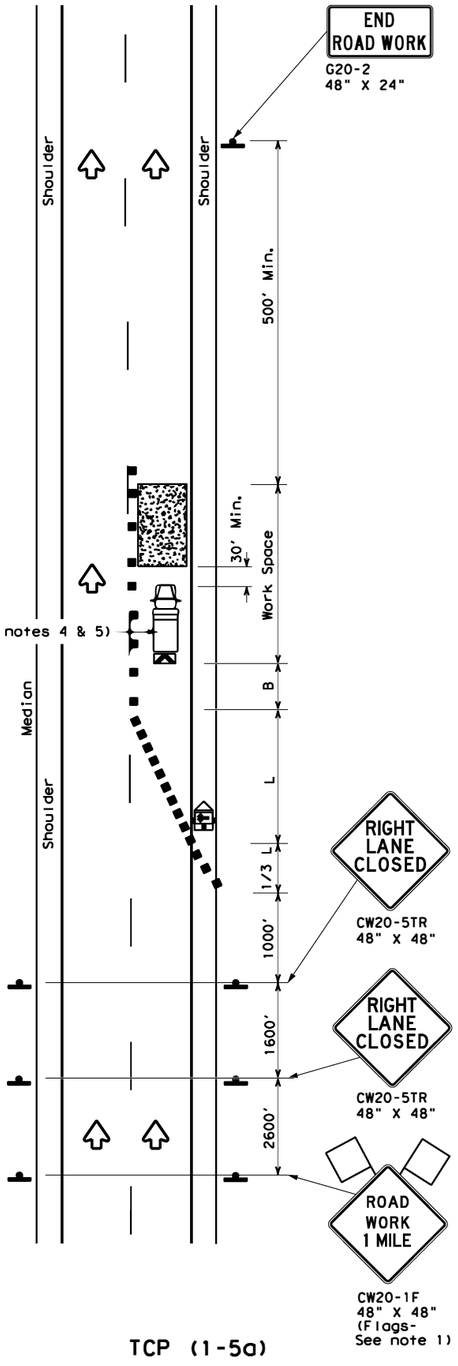
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

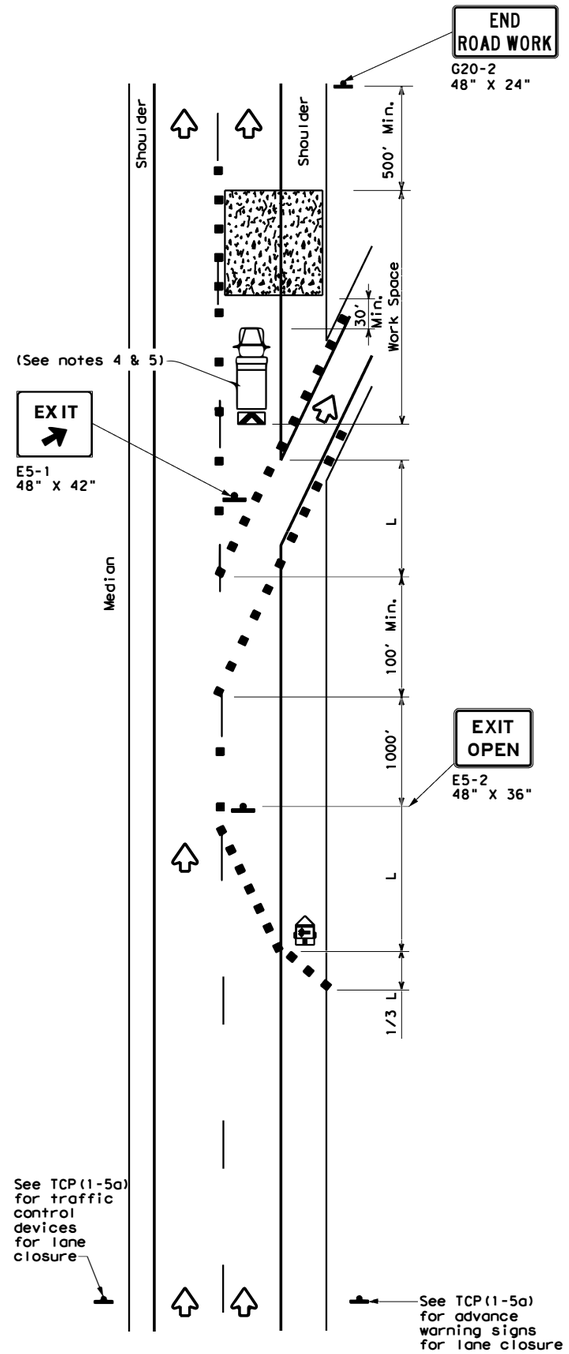
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT 0024	SECT 08	JOB 149	HIGHWAY US 90
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST SAT		COUNTY BEXAR	SHEET NO. 22

DATE:
FILE:



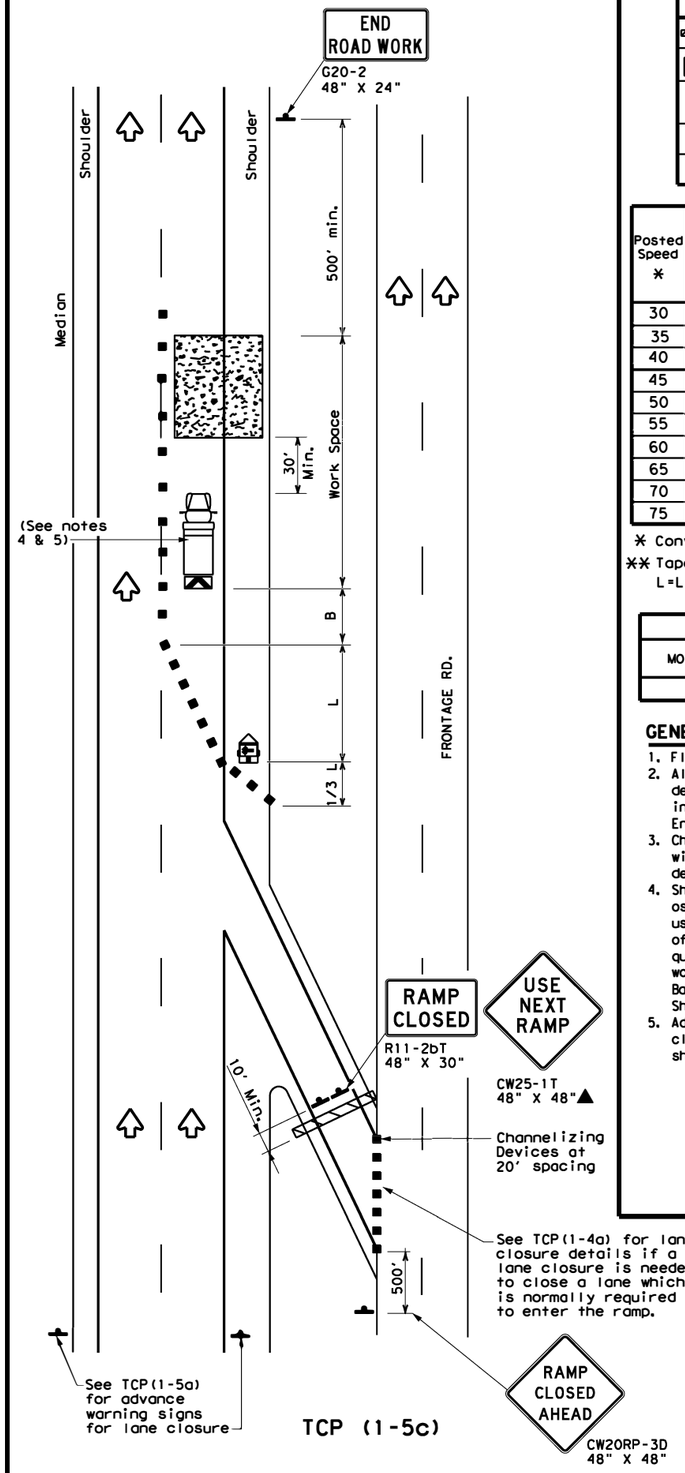
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

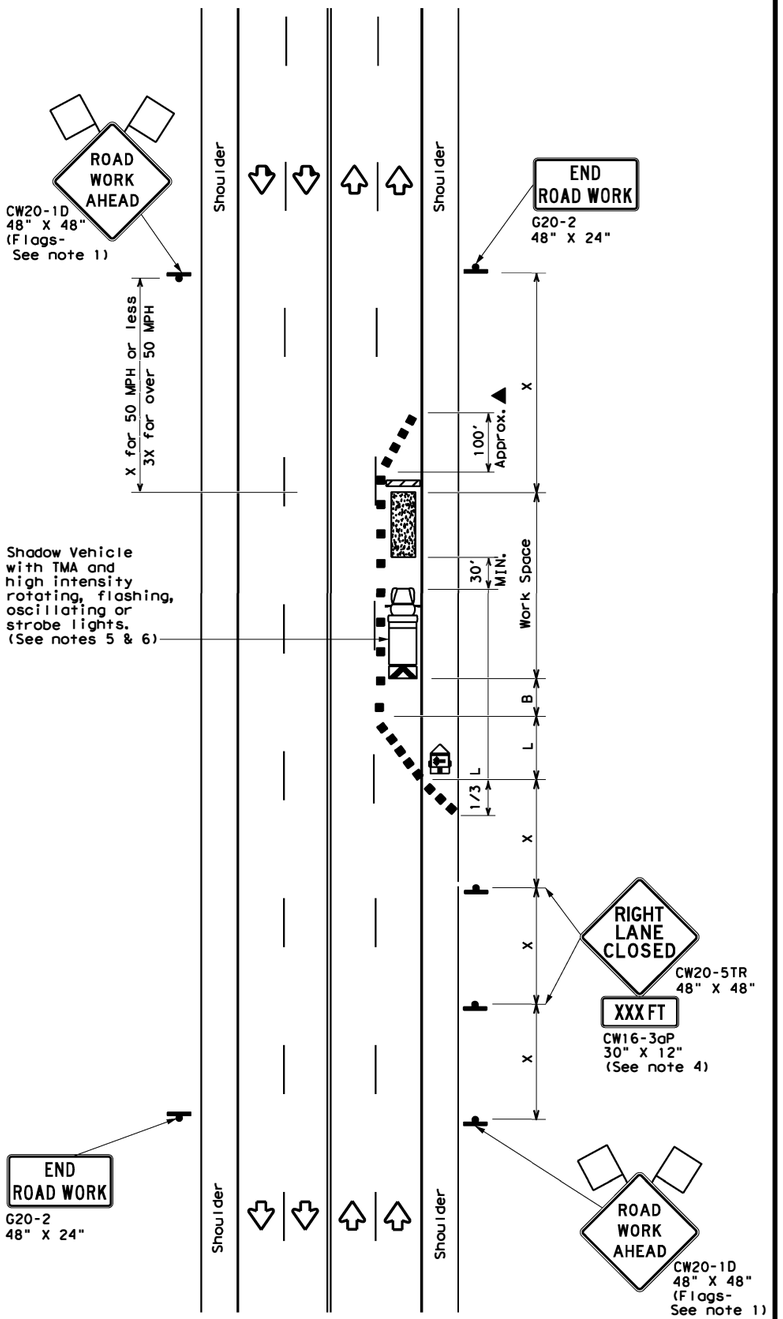
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

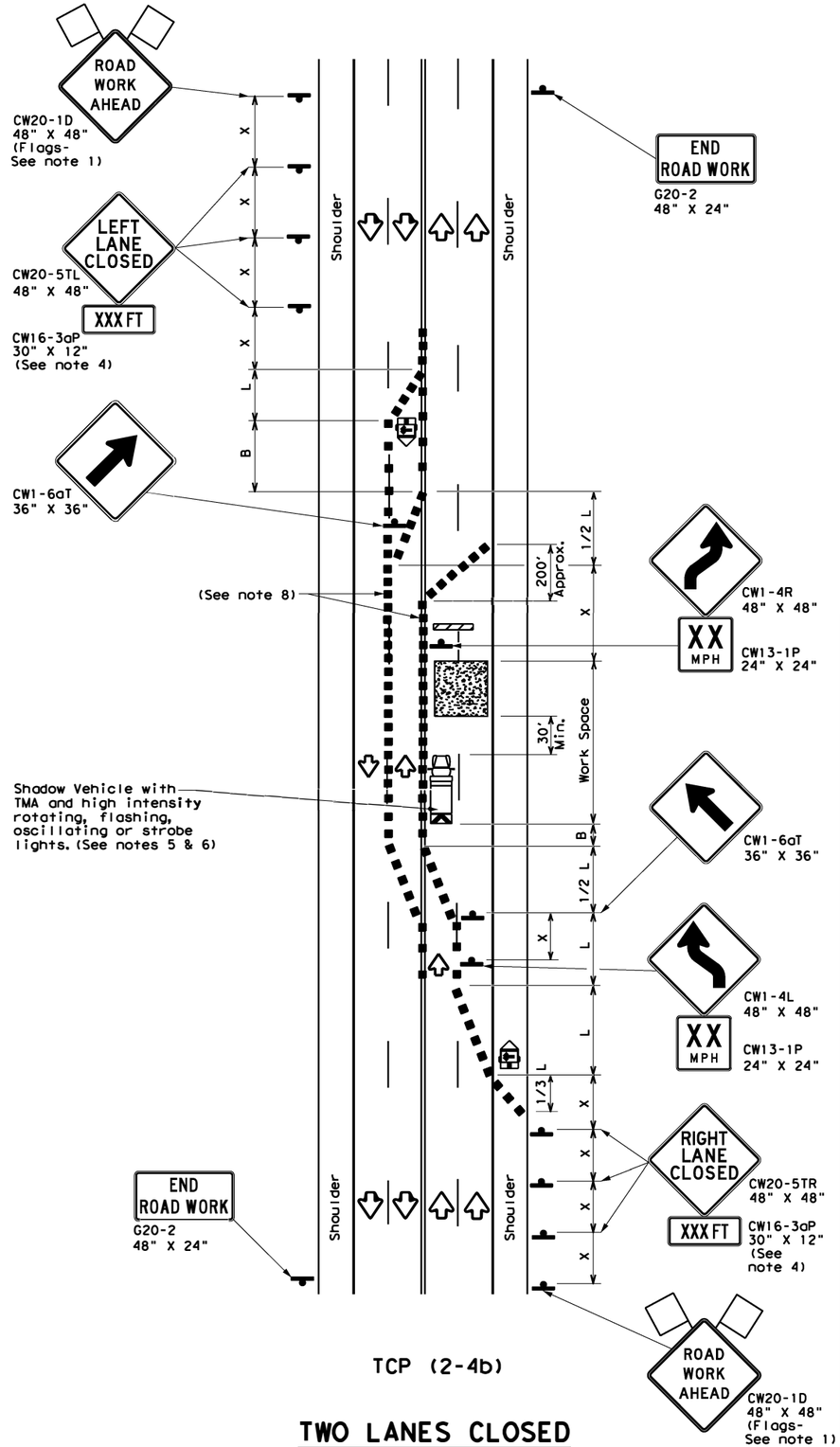
FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0024	08	149	US 90
	DIST	COUNTY		SHEET NO.
	15	BEXAR		22A

DATE:
FILE:



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0024	08	149	US 90
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	15	BEXAR		228

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0024-08-148

1.2 PROJECT LIMITS:
From: 0.8 Miles West of SH 151

To: 1.1 Miles East of SH 151

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 29.4071938 ,(Long) -98.6024265

END: (Lat) 29.4060531 ,(Long) -98.5704923

1.4 TOTAL PROJECT AREA (Acres): 7.12

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.31

1.6 NATURE OF CONSTRUCTION ACTIVITY:
LANDSCAPE AND IRRIGATION INSTALLATION

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Branyon Clay	0% - 1% slopes
Lewisville silty clay	0% - 1% slopes
Sunev clay loam	1% - 90% slopes
Sunev clay loam	1% - 3% slopes
Patrick soils	3% - 5% slopes, rarely flooded

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

X Mobilization
X Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☐ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
X Revegetation of unpaved areas
☐ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

X Sediment laden stormwater from stormwater conveyance over disturbed area
X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
X Solvents, paints, adhesives, etc. from various construction activities
X Transported soils from offsite vehicle tracking
X Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
X Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
Lower Leaon Creek	Classified. Freshwater Stream. Segment ID 1906
Medina River Below Medina Diversion Lake	Classified. Freshwater Stream. Segment ID 1903
Upper San Antonio River	Classified. Freshwater Stream. Segment ID 1911

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
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2/22/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 1 of 2
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		23
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- X ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ X Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- X Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
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2/22/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		24
STATE	STATE DIST.	COUNTY	
TEXAS	SAT		
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐ Yes ☒ No

Note: If amount of soil disturbance changes, permit requirements may change.

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

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

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

☒ No Permit Required
☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ 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 (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☒ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
3.
4.

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

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 appropiate 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 follwing 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

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

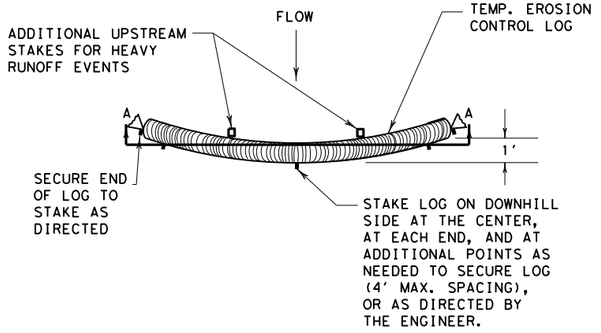
Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

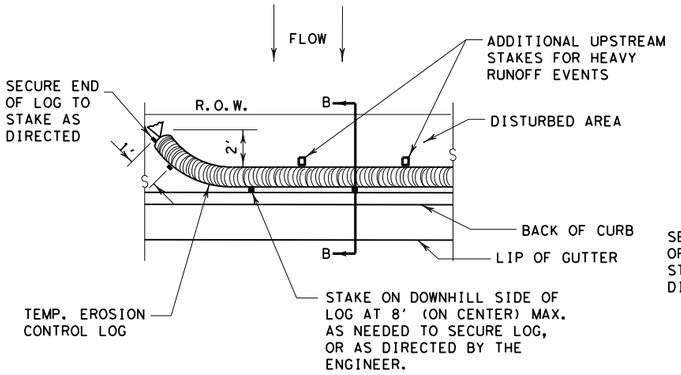
EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
© TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0024	08	149	US 90
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	25

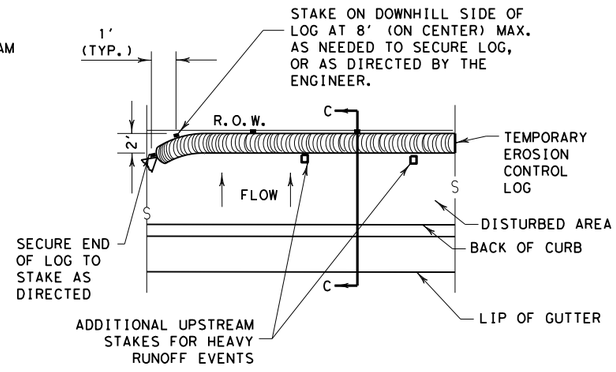
DATE: 2/8/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT4/Documents/15 - SAT/Design Projects/0024-08-L5E/4 - Design/Plan Set/9. Environmental/ec916.dgn



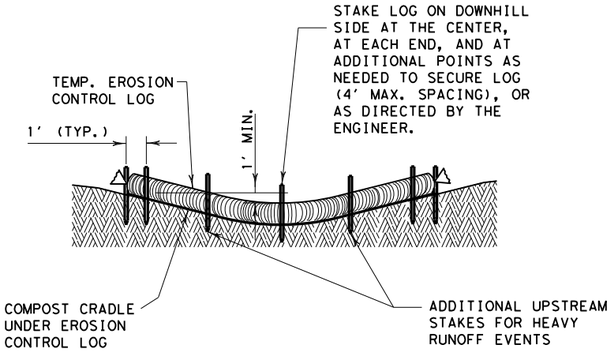
PLAN VIEW



PLAN VIEW



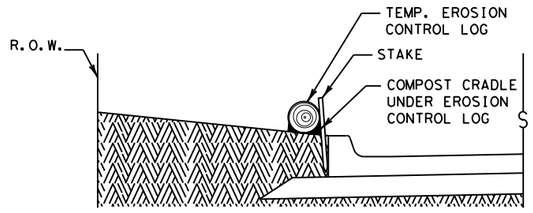
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

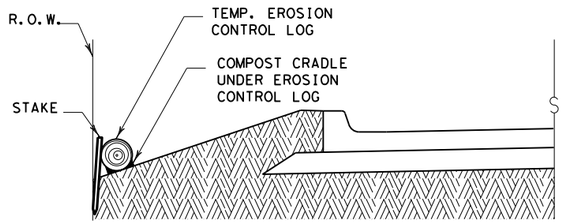
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

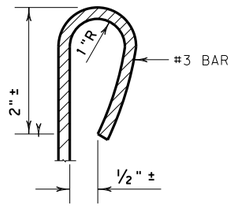
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



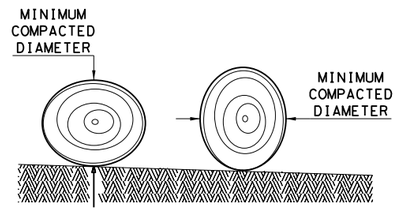
REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

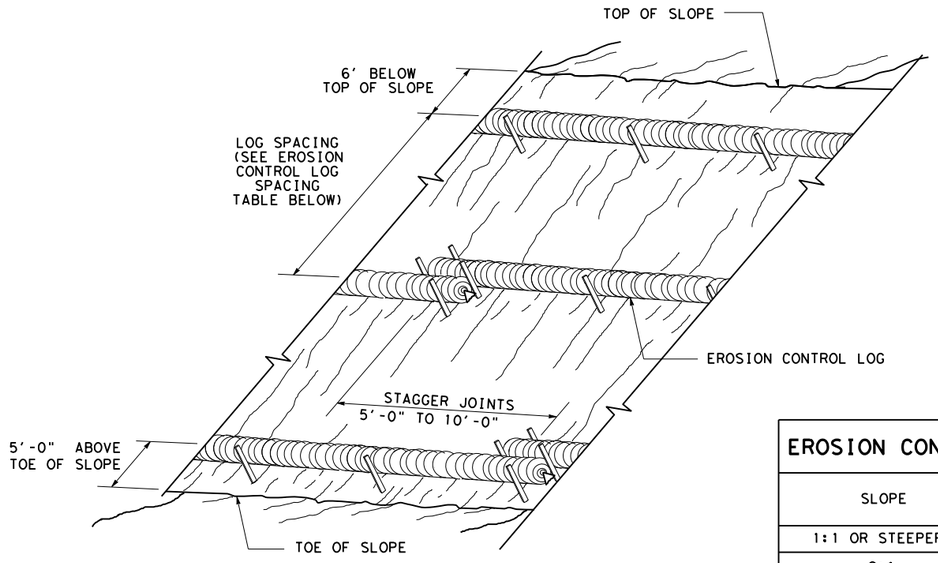
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

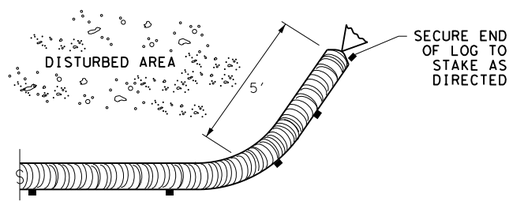
FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0024	08	149		US 90		
	DIST		COUNTY				SHEET NO.
	SAT		BEXAR				26

DATE: 2/8/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT4/Documents/15 - SAT/Design Projects/0024-08-LSE/4 - Design/Plan Set/9. Environmental/ec916.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

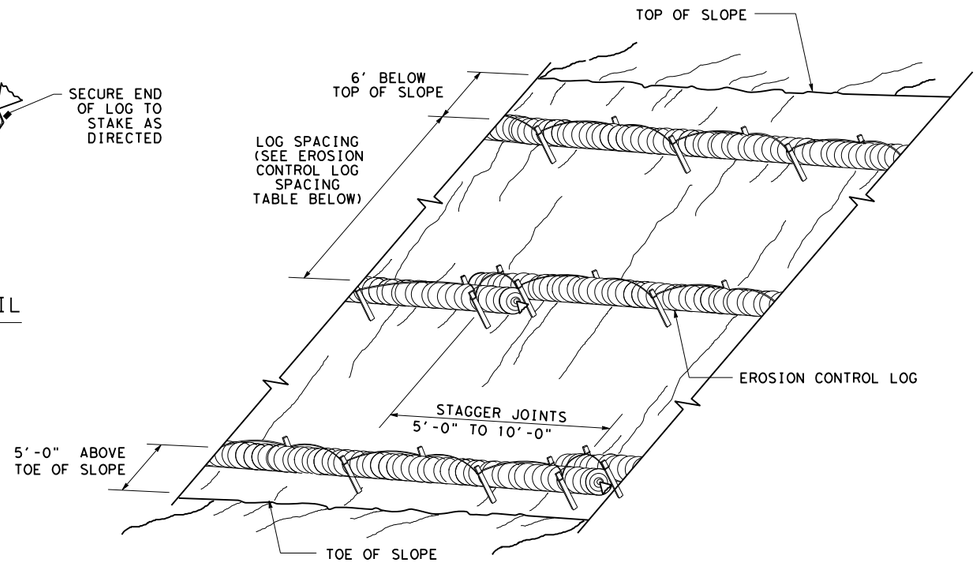
CL-SST



END SECTION RAP DETAIL

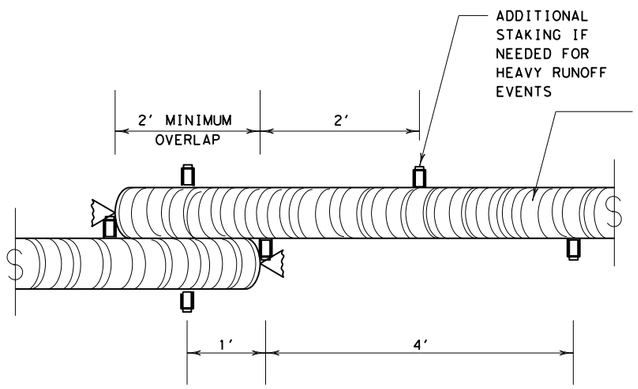
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

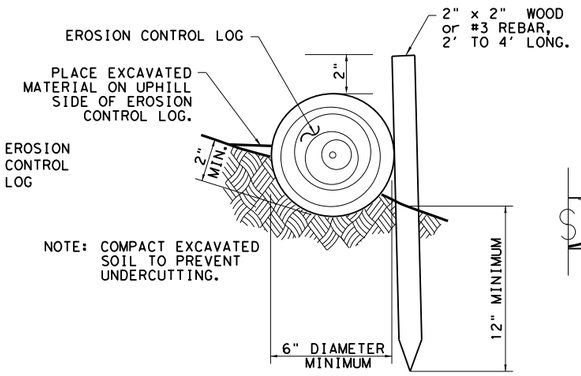
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

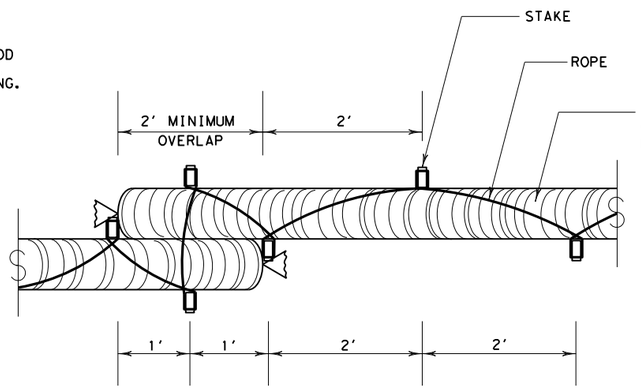


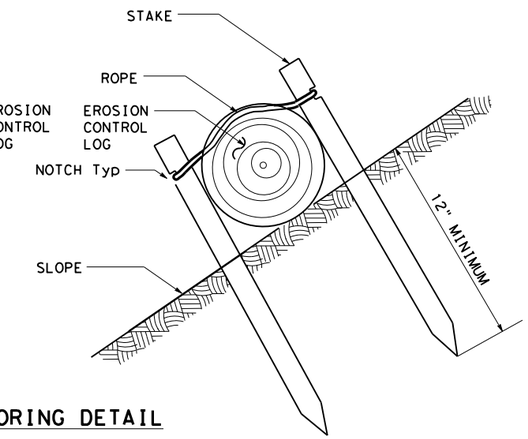


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

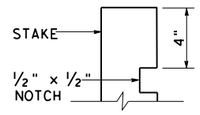
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



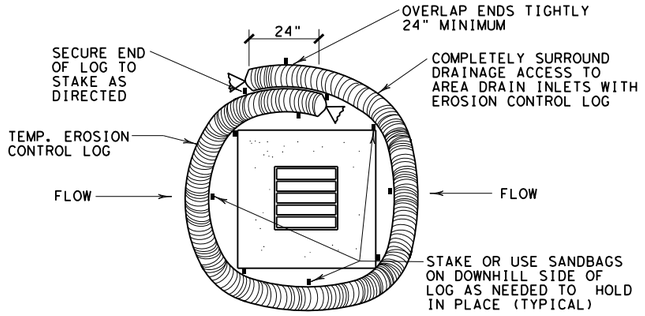
STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

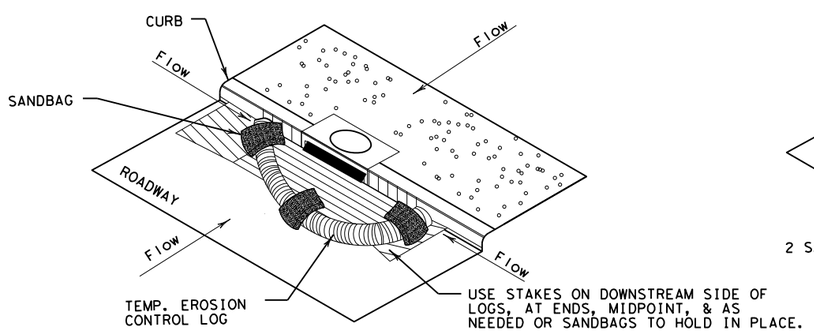
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0024	08	149	US 90
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		27

DATE: 2/8/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT4/Documents/15 - SAT/Design Projects/0024-08-LSE/4 - Design/Plan Set/9. Environmental/ec916.dgn



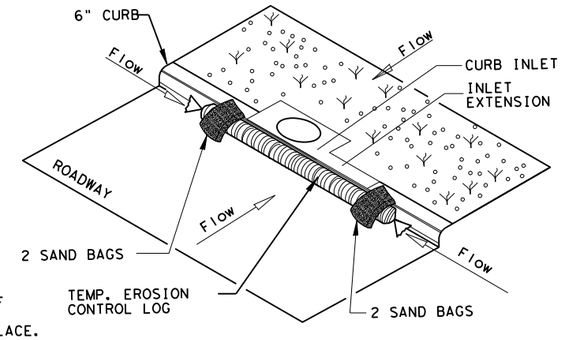
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

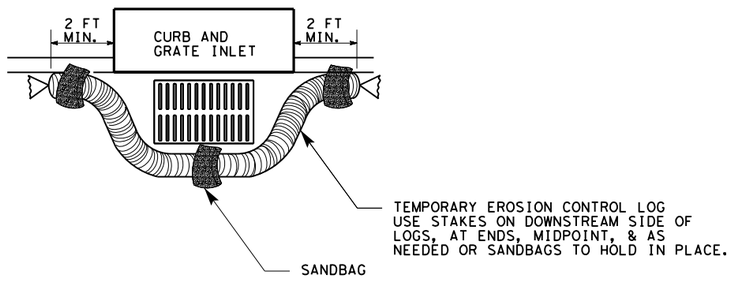
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

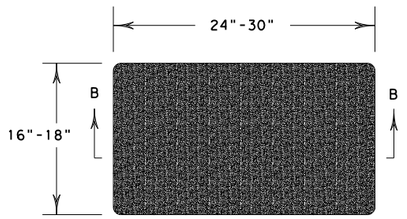
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

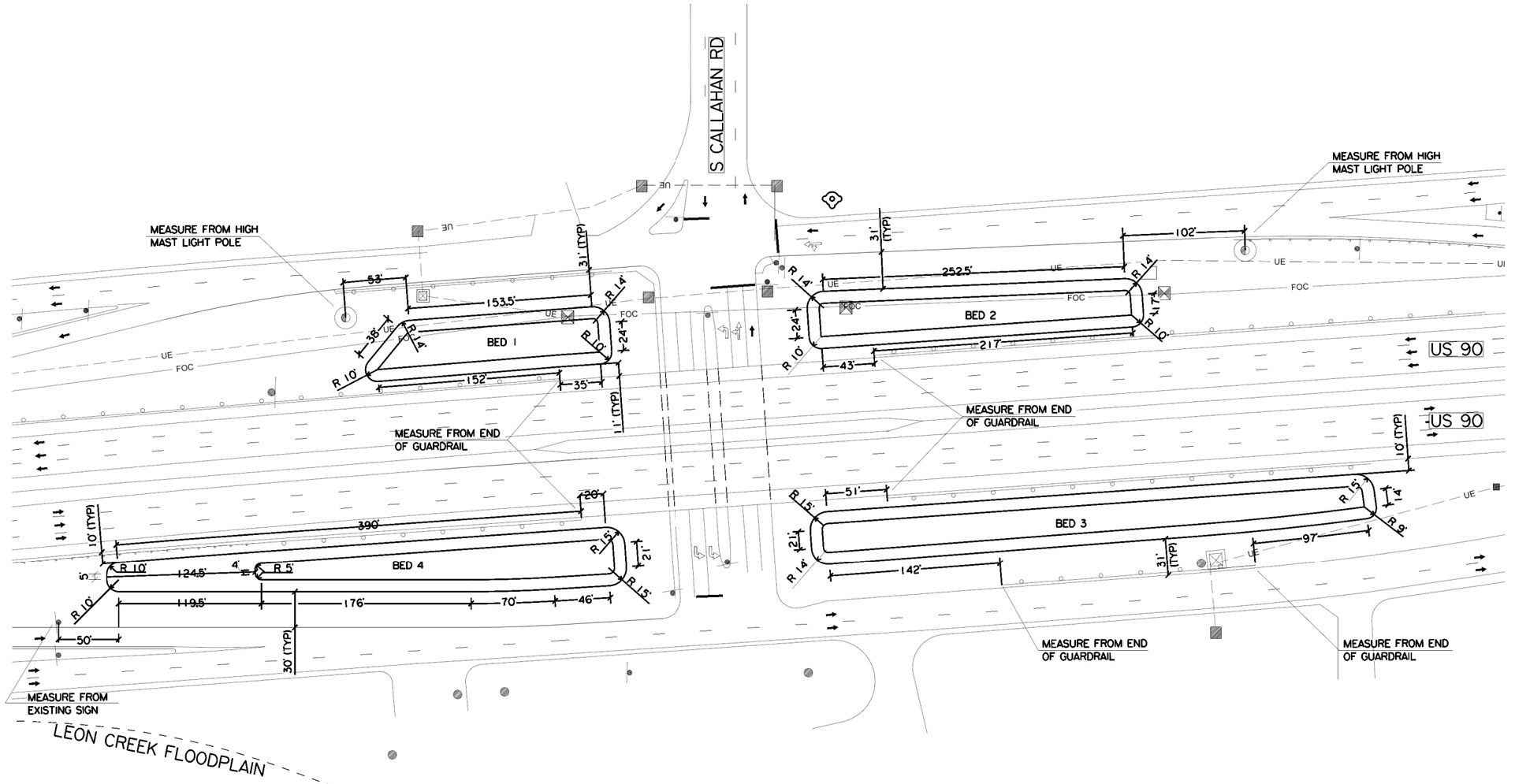
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0024	08	149	US 90
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		28



LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE
- TRAFFIC SIGNAL POLE
- FOC — TMS / ITS UTILITIES
- UE — UNDERGROUND ELECTRIC

THE EXISTENCE AND LOCATION OF ALL UTILITIES INDICATED ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR TOTALLY INCLUSIVE. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY UTILITIES PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGES TO TMS / ITS UTILITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

GENERAL NOTE:

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT

2. FPA NOTIFICATION FOR COUNTY/CITY WAS SUBMITTED IN WRITING ON (MONTH), (DAY), 2023.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

0 20 40 60 80 100
SCALE: 1" = 100'-0"

N

Texas Department of Transportation

US 90

PLANTING BED LAYOUT PLAN

SHEET

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		29
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

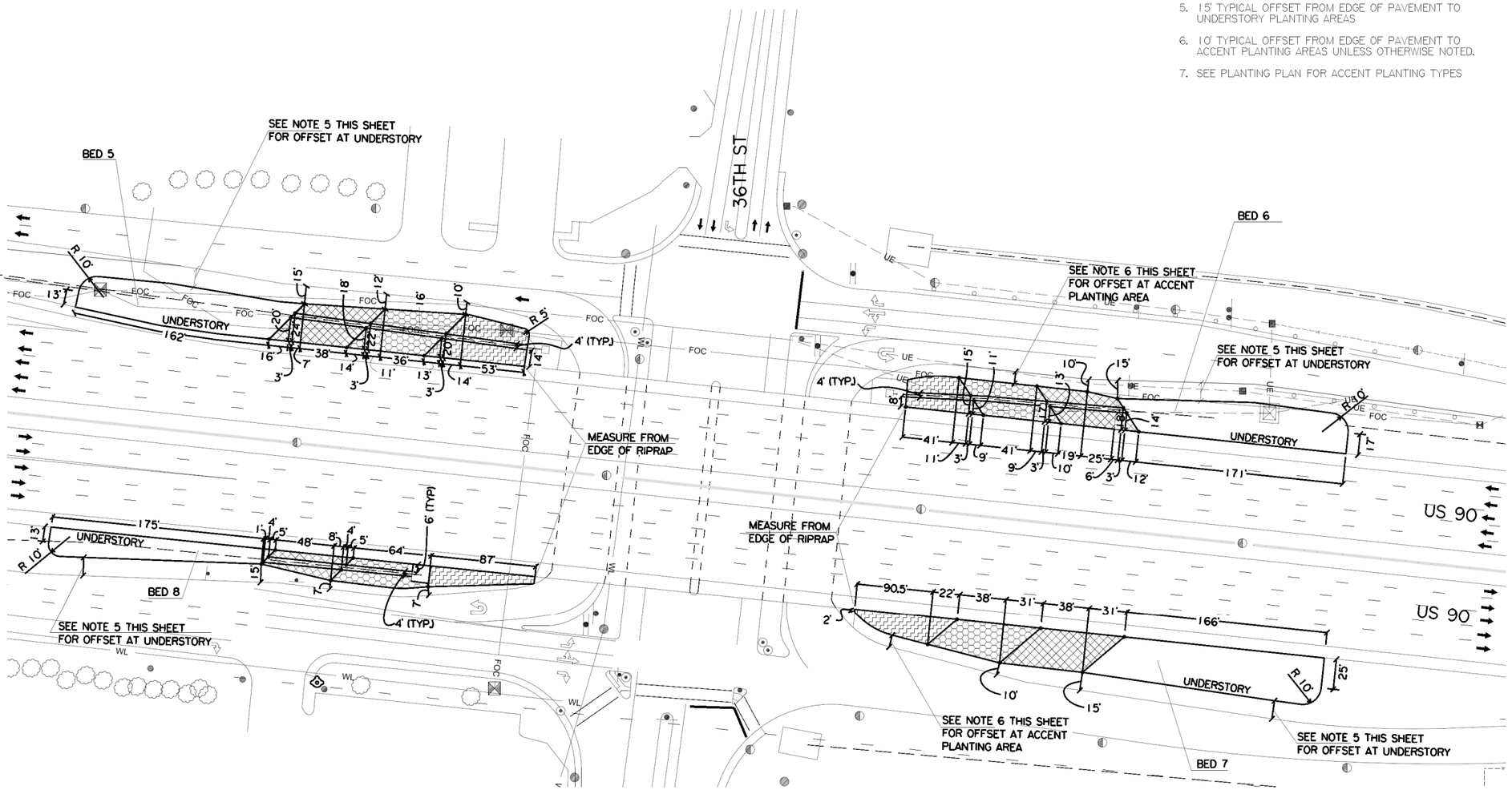
NOTES:

1. EXISTING ELEMENTS ARE SHOWN GRAY.
2. VARY ACCESS ROUTES ONTO AND WITHIN THE SITE TO AVOID DAMAGE TO EXISTING VEGETATION.
3. PLACE PLANTING BEDS AS SHOWN AND ACCORDING TO THE SCALE OF THE DRAWING.
4. ALL DIMENSIONS ARE TAKEN FROM THE EDGE OF PAVEMENT OR BACK OF CURB UNLESS OTHERWISE NOTED.
5. 15' TYPICAL OFFSET FROM EDGE OF PAVEMENT TO UNDERSTORY PLANTING AREAS
6. 10' TYPICAL OFFSET FROM EDGE OF PAVEMENT TO ACCENT PLANTING AREAS UNLESS OTHERWISE NOTED.
7. SEE PLANTING PLAN FOR ACCENT PLANTING TYPES

LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE
- TRAFFIC SIGNAL POLE
- FOC — TMS / ITS UTILITIES
- UE — UNDERGROUND ELECTRIC
- AREA FOR BED PREP AND MULCH ONLY
- ACCENT PLANTING AREA
- ACCENT PLANTING AREA
- ACCENT PLANTING AREA

THE EXISTENCE AND LOCATION OF ALL UTILITIES INDICATED ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR TOTALLY INCLUSIVE. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY UTILITIES PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGES TO TMS / ITS UTILITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.



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REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

0 20 40 60 80 100
SCALE: 1" = 100'-0"

N

Texas Department of Transportation

US 90

PLANTING BED LAYOUT PLAN

SHEET

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		30
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

ESTIMATED SHEET QUANTITY

LOCATION	DESCRIPTION	UNIT	QTY
US 90@ Callahan	GENERAL USE COMPOST	CY	725
	PLANT MATERIAL (5 GAL)	EA	74
	PLANT MATERIAL (15 GAL)	EA	343
	PLANT MATERIAL (30 GAL)	EA	66
	MULCH	SY	6519
	PLANT BED PREPARATION	SY	6519
	PLANT MATERIAL (MIN 4' TRNK HT) (PALM)	EA	9
	PLANT REPLACEMENT (5-GAL)	EA	10
	BIODEG EROSN CONT LOGS (INST) (12")	LF	2702

NOTES:

EXISTING ELEMENTS ARE SHOWN GRAY.

VARY ACCESS ROUTES ONTO AND WITHIN THE SITE TO AVOID DAMAGE TO EXISTING VEGETATION.

SEE PLANTING BED LAYOUT PLAN TO PLACE PLANTING BEDS AS SHOWN.

ENSURE TREES ARE PLACED A MINIMUM OF 16' FROM THE EDGE OF THE FRONTAGE ROAD OR RAMP, 30' FROM EDGE OF THE MAINLANE PAVEMENT, AND A MINIMUM OF 15' FROM THE EDGE OF A BRIDGE RAIL OR OVERHEAD POWER LINE.

SEE PLANTING BED QUANTITIES TABLE ON PLANTING BED DETAILS SHEET FOR PLANT QUANTITIES OF INDIVIDUAL BEDS.

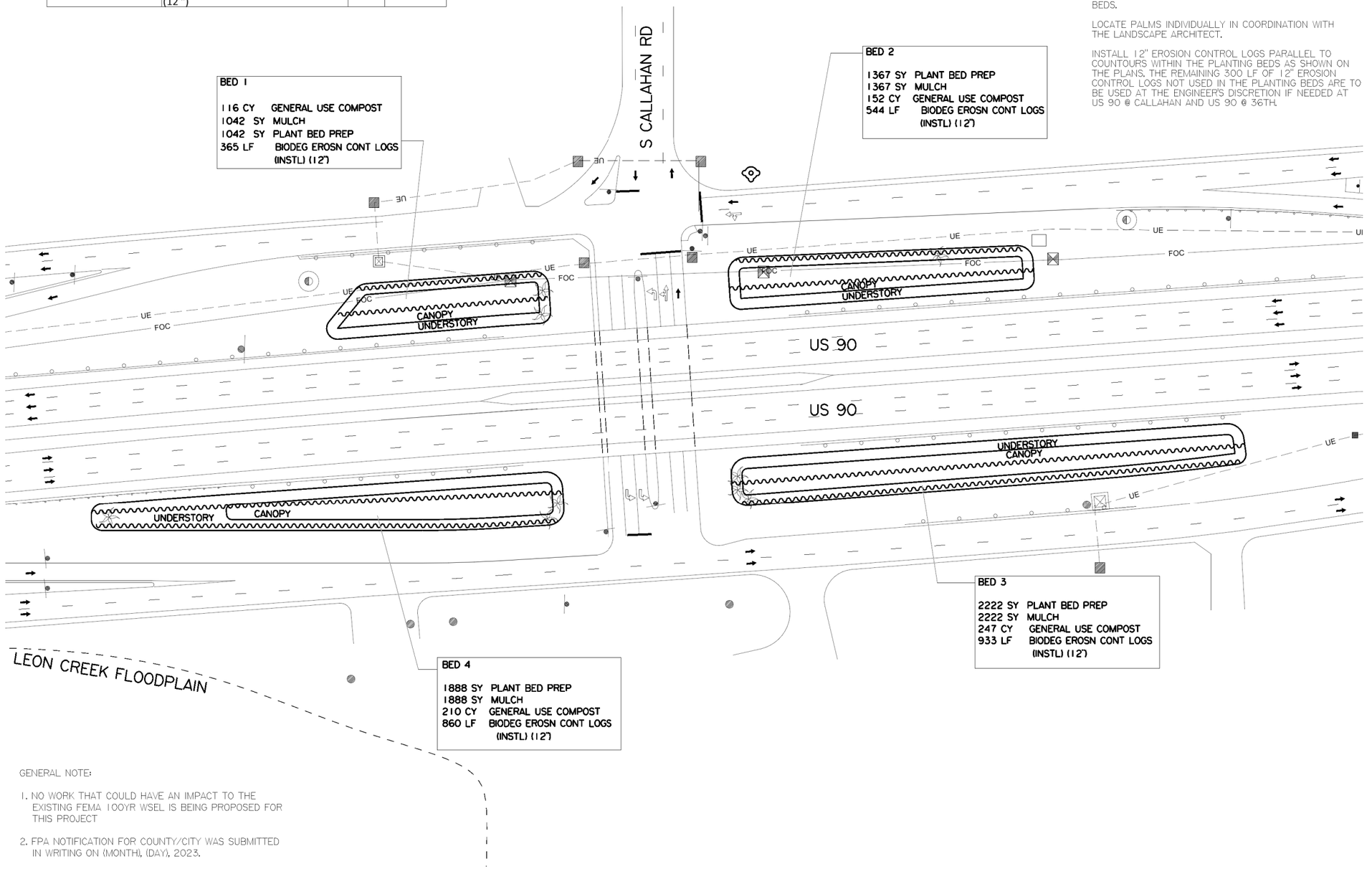
LOCATE PALMS INDIVIDUALLY IN COORDINATION WITH THE LANDSCAPE ARCHITECT.

INSTALL 12" EROSION CONTROL LOGS PARALLEL TO COUNTOURS WITHIN THE PLANTING BEDS AS SHOWN ON THE PLANS. THE REMAINING 300 LF OF 12" EROSION CONTROL LOGS NOT USED IN THE PLANTING BEDS ARE TO BE USED AT THE ENGINEER'S DISCRETION IF NEEDED AT US 90 @ CALLAHAN AND US 90 @ 36TH.

LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE
- TRAFFIC SIGNAL POLE
- FOC — TMS / ITS UTILITIES
- UE — UNDERGROUND ELECTRIC
- PERMANENT BIODEGRADABLE EROSION CONTROL LOG
- PALM

THE EXISTENCE AND LOCATION OF ALL UTILITIES INDICATED ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR TOTALLY INCLUSIVE. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY UTILITIES PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGES TO TMS / ITS UTILITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.



GENERAL NOTE:

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2. FPA NOTIFICATION FOR COUNTY/CITY WAS SUBMITTED IN WRITING ON (MONTH), (DAY), 2023.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

0 20 40 60 80 100
SCALE: 1" = 100'-0"

Texas Department of Transportation

US 90

PLANTING PLAN

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		31
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

ESTIMATED SHEET QUANTITY

LOCATION	DESCRIPTION	UNIT	QTY
US 90@ 36th	GENERAL USE COMPOST	CY	520
	PLANT MATERIAL (1 GAL)	EA	914
	PLANT MATERIAL (5 GAL)	EA	435
	PLANT MATERIAL (15 GAL)	EA	213
	MULCH	SY	5045
	PLANT BED PREPARATION	SY	5045
	PLANT MATERIAL (MIN 4' TRNK HT) (PALM)	EA	10
	PLANT REPLACEMENT (1-GAL)	EA	92
	PLANT REPLACEMENT (5-GAL)	EA	44

NOTES:

EXISTING ELEMENTS ARE SHOWN GRAY.

VARY ACCESS ROUTES ONTO AND WITHIN THE SITE TO AVOID DAMAGE TO EXISTING VEGETATION.

SEE PLANTING BED LAYOUT PLAN TO PLACE PLANTING BEDS AS SHOWN.

ENSURE TREES ARE PLACED A MINIMUM OF 16' FROM THE EDGE OF THE FRONTAGE ROAD OR RAMP, 30' FROM EDGE OF THE MAINLANE PAVEMENT, AND A MINIMUM OF 15' FROM THE EDGE OF A BRIDGE RAIL OR OVERHEAD POWER LINE.

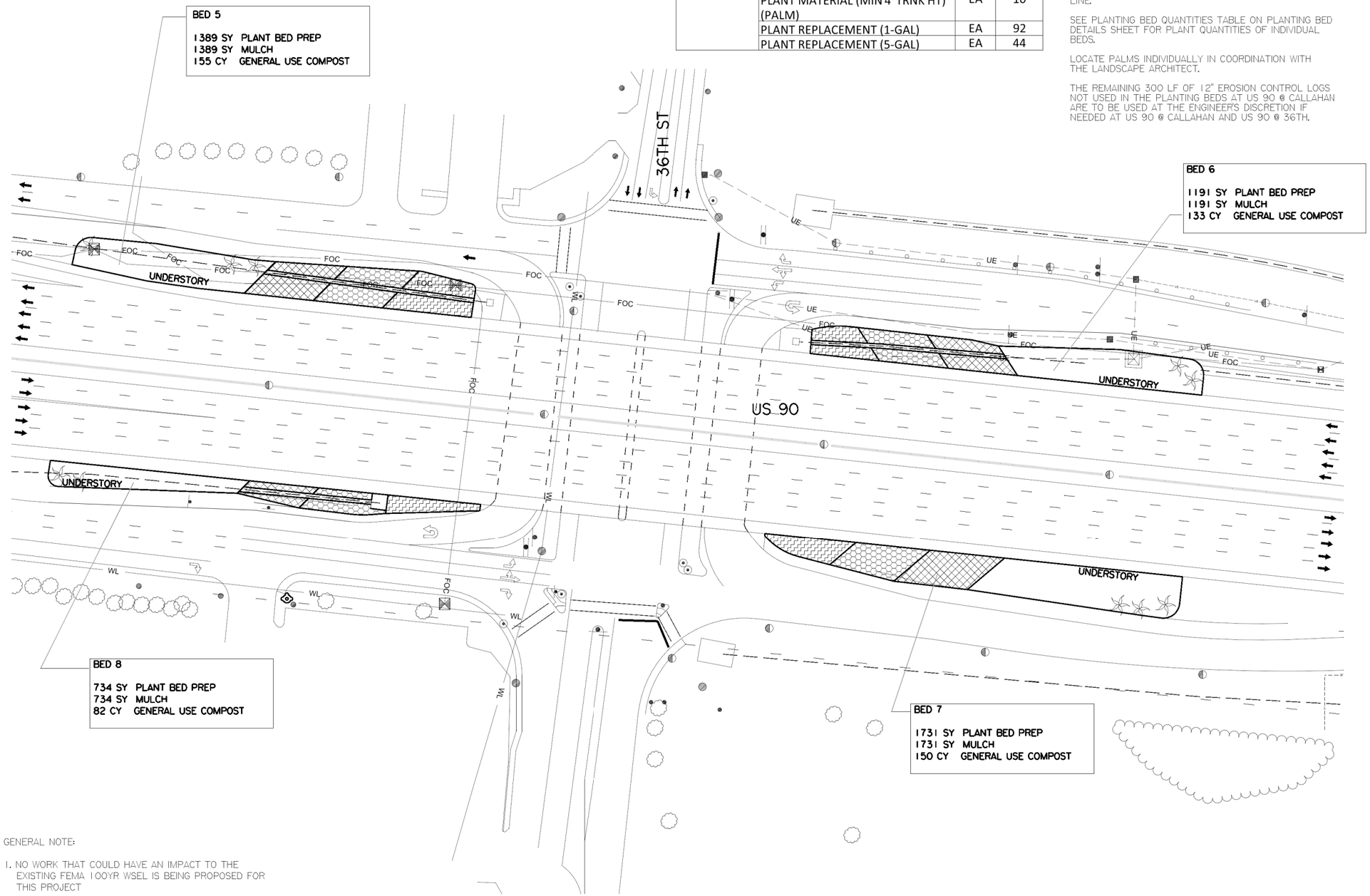
SEE PLANTING BED QUANTITIES TABLE ON PLANTING BED DETAILS SHEET FOR PLANT QUANTITIES OF INDIVIDUAL BEDS.

LOCATE PALMS INDIVIDUALLY IN COORDINATION WITH THE LANDSCAPE ARCHITECT.

THE REMAINING 300 LF OF 12" EROSION CONTROL LOGS NOT USED IN THE PLANTING BEDS AT US 90 @ CALLAHAN ARE TO BE USED AT THE ENGINEER'S DISCRETION IF NEEDED AT US 90 @ CALLAHAN AND US 90 @ 36TH.

LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE
- TRAFFIC SIGNAL POLE
- FOC — TMS / ITS UTILITIES
- UE — UNDERGROUND ELECTRIC
- PALM
- AREA FOR BED PREP AND MULCH ONLY
- BIG MUHLY
- MEXICAN BIRD OF PARADISE
- GULF MUHLY



GENERAL NOTE:

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT

2. FPA NOTIFICATION FOR COUNTY/CITY WAS SUBMITTED IN WRITING ON (MONTH), (DAY), 2023.

THE EXISTENCE AND LOCATION OF ALL UTILITIES INDICATED ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR TOTALLY INCLUSIVE. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY UTILITIES PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGES TO TMS / ITS UTILITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

0 20 40 60 80 100
SCALE: 1" = 100'-0"

N

Texas Department of Transportation

US 90

PLANTING PLAN

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		32
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

PLANTING NOTES:

1. REFERENCE ITEM 192 OF THE TEXAS STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES 2014 FOR SPECIFICATIONS, DIMENSIONS, VOLUMES AND MEASUREMENTS THAT HAVE BEEN MODIFIED OR ARE NOT SHOWN.

2. REJECTION OF PLANTS WILL BE IN ACCORDANCE WITH ITEM 192.2.2.

3. VERIFY THAT ALL PLANTING MEETS THE FOLOWING CLEAR ZONE MINIMUM STANDARDS UNLESS SPECIFIED ELSEWHERE ON PLANS:
   TREES: 30' FROM EDGE OF TRAVEL LANE UNLESS PROTECTED BY A BARRIER.
   SHRUBS: 15' FROM EDGE OF TRAVEL LANE UNLESS PROTECTED BY A BARRIER.
   VINES AND GROUNDCOVER: NO MINIMUM DISTANCE.
   MINIMUM DISTANCES WILL BE DETERMINED BY THE ENGINEER IF PROTECTED BY A BARRIER.

4. STAKE ALL LOCATIONS OF TREES, SHRUBS AND BEDS IN THE FIELD IN ACCORDANCE WITH ITEM 192.3.3.

5. IN PLANTING BED AREAS, USE SOIL EXCAVATED FROM THE PREPARED PLANT BEDS FOR BACKFILL.

6. FOR SURFACE APPLICATION, USE MULCH CONSISTING OF 100% SHREDDED WOOD CHIPS. WOOD CHIPS SHALL CONSIST OF SHREDDED NATIVE PLANT MATERIAL AND SHALL NOT HAVE VISIBLE GLASS, METAL, ROCK, PLASTIC, LARGE PIECES OF WOOD, OR OTHER DEBRIS THAT WOULD AFFECT THE POSITIVE AESTHETIC QUALITY OF THE MULCH.

7. APPLY 2 TIMES THE PLANT CONTAINER GALLON SIZE OF WATER TO PLANTS AT PLANTING. WATER ACCORDING TO SCHEDULE SHOWN ON IRRIGATION DETAILS SHEET THEREAFTER.

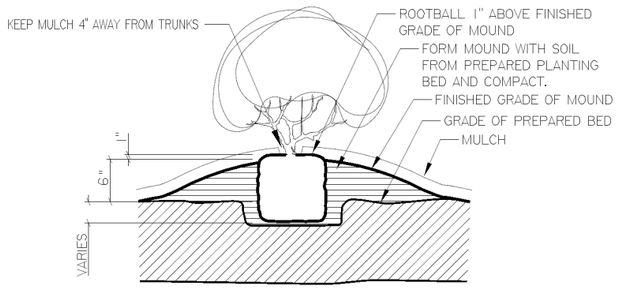
8. REFER TO ITEM 168.2 FOR WATER QUALITY INFORMATION.

9. DO NOT INSTALL PLANTS WHICH WILL HAVE AN AUTOMATIC IRRIGATION SYSTEM UNTIL APPROPRIATE IRRIGATION SECTION VALVE ASSEMBLY AND QUICK COUPLER DEVICES ARE OPERABLE.

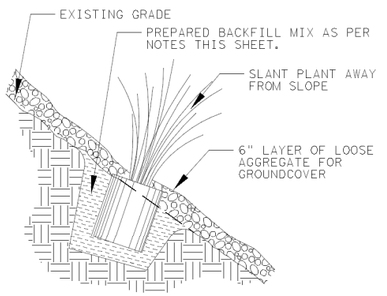
10. AT THE TIME OF INSTALLATION, MANUALLY WATER ALL PLANTS THE SAME DAY AS PLANTING AT A RATE AND FREQUENCY SHOWN ABOVE. INSTALL IRRIGATION EMISSION DEVICE IMMEDIATELY AFTER PLANT INSTALLATION. WATER DELIVERED THROUGH IRRIGATICN SYSTEM WILL BE PAID FOR ACCORDING TO GENERAL IRRIGATION NOTES ON IRRIGATION SPECIFICATIONS SHEET. STRESSED PLANT MATERIAL WILL BE REJECTED ACCORDING TO ITEM 192.2.2. AND REPLACED AT CONTRACTOR'S EXPENSE.

11. PLACE MULCH OVER ENTIRE PLANTING BED AREAS SHOWN ON THE PLANS. (INCLUDES AREAS UNDER EXISTING TREES THAT DO NOT RECEIVE PLANTING BED PREPARATION)

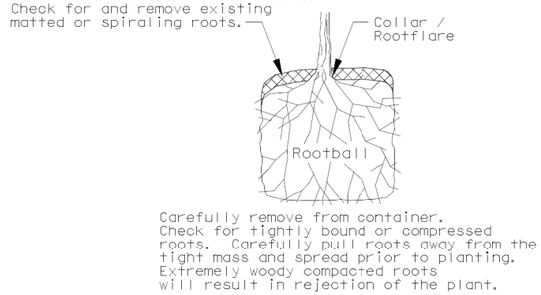
12. WHERE LOOSE AGGREGATE FOR GROUNDCOVER IS SPECIFIED ON THE PLANS USE IT INSTEAD OF MULCH.



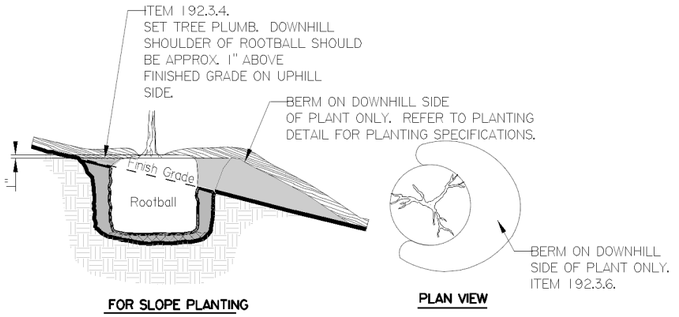
EVERGREEN SUMAC PLANTING DETAIL (NTS)



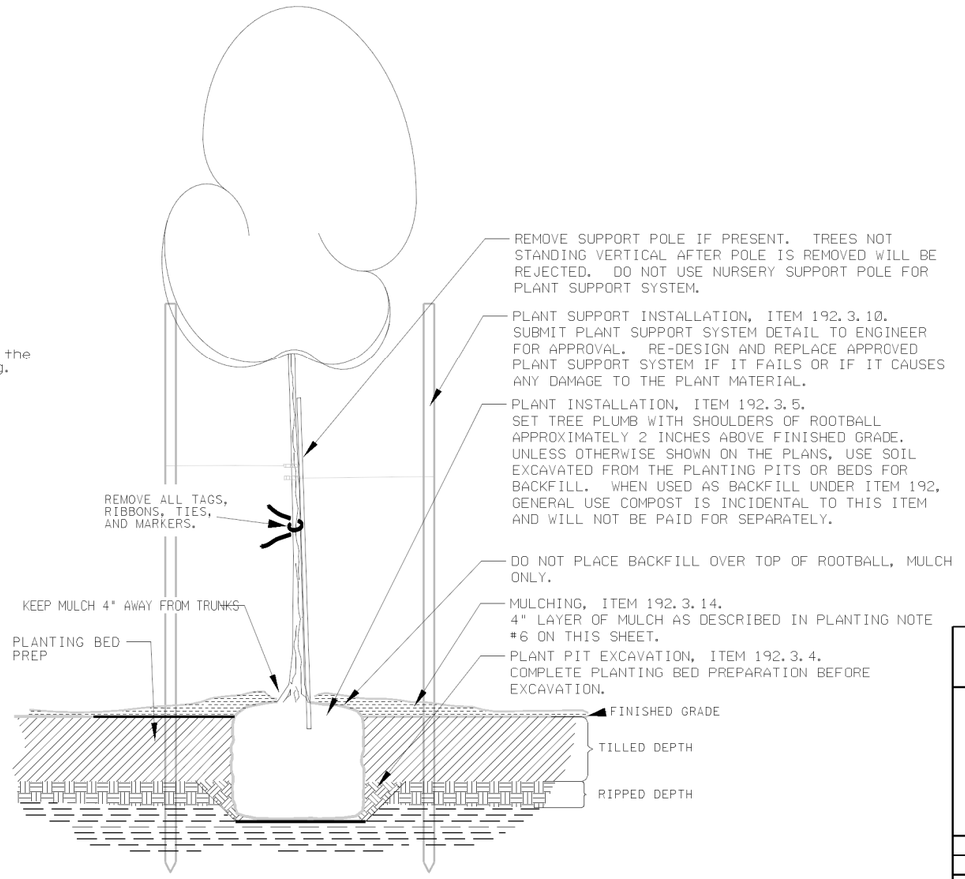
SHRUB PLANTING ON SLOPE (NTS)



PRIOR TO PLACING ROOTBALL IN HOLE (NTS)



TREE AND SHRUB PLANTING ON SLOPE (NTS)



TREE AND SHRUB PLANTING DETAIL (NTS)

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

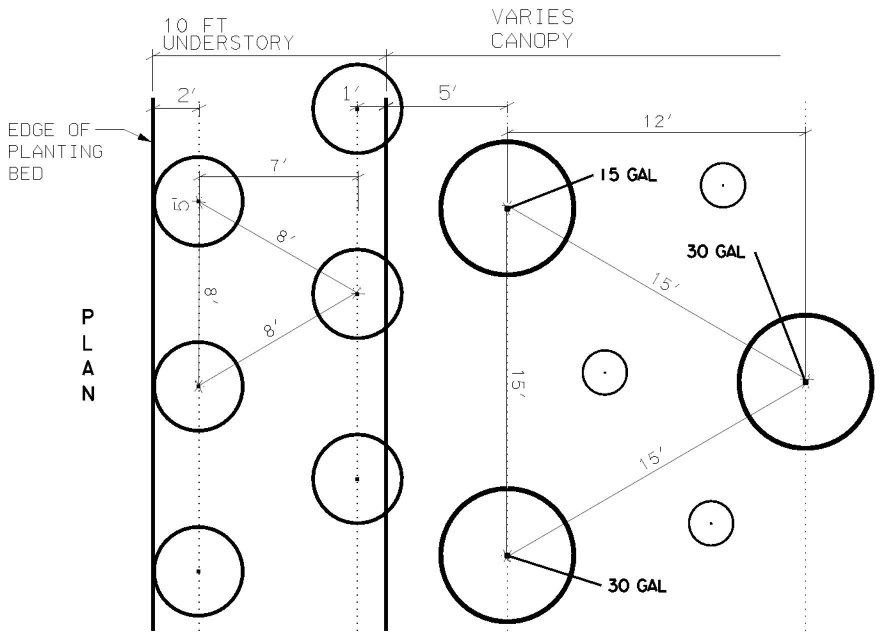
Texas Department of Transportation

US 90

PLANTING DETAILS

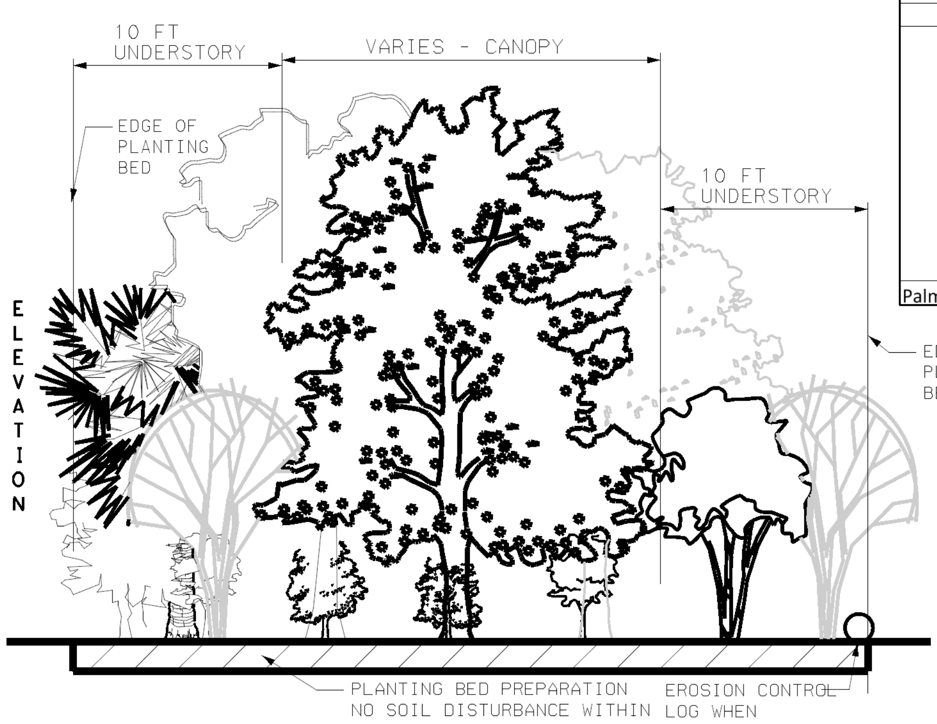
SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		33
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90



NOTES:

1. PLANT QUANTITIES ARE BASED ON A TRIANGULAR SPACING. USE THE FOLLOWING SPACINGS FOR EACH CORRESPONDING AREA: (O.C. = ON CENTER)
   CANOPY - 15' O.C.
   UNDERSTORY - 8' O.C.
2. PLACE #5 CANOPY TREES RANDOMLY IN CANOPY TREE AREA. PLACE NO CLOSER THAN 5' FROM OTHER PLANTS.
3. PLACE LIKE SPECIES IN GROUPS SPACED THROUGHOUT THE PLANTING AREA WITH NO LESS THAN 6 (OR THE MINIMUM NUMBER PER BED) AND NO MORE THAN 10 PLANTS PER GROUP.
4. AS MUCH AS POSSIBLE, PLACE EACH GROUP OF PLANTS IN LOCATIONS SUITED TO THE GROWING CONDITIONS OF THAT PARTICULAR SPECIES.
5. PLACE DECIDUOUS SPECIES OF UNDERSTORY TREES ONLY ON INSIDE ROWS OF UNDERSTORY ZONE.
6. DO NOT PERFORM PLANTING BED PREPARATION OR INSTALL PLANTS DIRECTLY UNDER THE CANOPY OF EXISTING TREES WITHIN PLANTING BEDS.
7. CLEARZONE: EDGE OF UNDERSTORY AND CANOPY PLANTING BED MUST BE A MINIMUM 10' FROM EDGE OF NEAREST ROADWAY TRAVEL LANE AND TREE PLANTINGS MUST ME A MINIMUM OF 20' FROM EDGE OF NEAREST TRAVEL LANE.



PLANTING BED LAYOUT

(NTS)

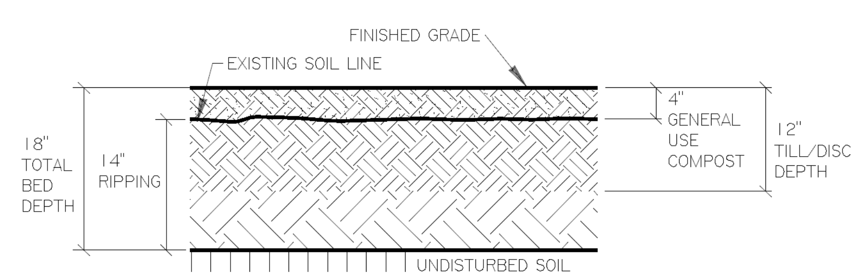
PLANTING BED QUANTITIES

US 90 @ S. CALLAHAN

LOCATION / SIZE	DESCRIPTION	1	2	3	4
Accent plant #1	Big Muhly				
	Gulf Muhly				
	Pride of Barbados				
	Total	0	0	0	0
Accent plant #5	Big Muhly				
	Gulf Muhly				
	Pride of Barbados				
	Total	0	0	0	0
Understory #5	Anacacho Orchid Tree	2		3	3
	Desert Willow 'Bubba'	2	2	3	3
	Evergreen Sumac	3		3	3
	Goldenball Lead Tree		3	2	2
	Loquat			1	1
	Mexican Olive		3	3	3
	Mexican Plum		2	3	3
	Texas Mountain Laurel	3		1	1
	Texas Redbud		2	3	3
	Texas Sage		2	3	3
	Total	10	14	25	25
Understory #15	Anacacho Orchid Tree	4	5	10	10
	Desert Willow 'Bubba'	4	5	10	10
	Evergreen Sumac	4	5	10	10
	Goldenball Lead Tree	4	5	10	10
	Loquat	4	7	10	10
	Mexican Olive	6	5	10	10
	Mexican Plum	4	5	10	10
	Texas Mountain Laurel	4	5	10	10
	Texas Redbud	4	5	10	10
	Texas Sage	4	7	11	11
	Total:	*42*	*54*	*101*	*101*
Canopy #15	**Anacua**	2	1	3	1
	Big Tooth Maple		1		1
	Cedar Elm	2	1	2	3
	Desert Museum Palo Verde		1	1	1
	Live Oak		1	1	
	Mexican Sycamore		1	1	1
	Mexican White Oak	2	2	3	1
	Shumard Oak		1	1	1
	Texas Red Oak		1	1	1
	Western Soapberry	1	1	3	1
	Total:	*7*	*11*	*16*	*11*
Canopy #30	**Anacua**	2	2	4	2
	Big Tooth Maple	1		2	
	Cedar Elm	1	2	3	2
	Desert Museum Palo Verde	1	2	2	2
	Live Oak	1	2	2	1
	Mexican Sycamore	1	2	2	2
	Mexican White Oak	1	1	3	3
	Shumard Oak	1	3	2	
	Texas Red Oak	1			2
	Western Soapberry	1	2	3	2
	Total:	*11*	*16*	*23*	*16*
Palm (Min.4'Trnk.Ht)	Texas Palmetto	2	1	3	3

US 90 @ W 36TH ST

LOCATION / SIZE	DESCRIPTION	5	6	7	8
Accent plant #1	Big Muhly	48	36	46	23
	Gulf Muhly	188	94	216	161
	Pride of Barbados	40	20	34	8
	Total	276	150	296	192
Accent plant #5	Big Muhly	72	55	68	34
	Gulf Muhly				
	Pride of Barbados	59	30	51	12
	Total	131	85	119	46
Understory #5	Anacacho Orchid Tree	3	1		1
	Desert Willow 'Bubba'		1	2	
	Evergreen Sumac	2		2	2
	Goldenball Lead Tree	2	3	1	1
	Loquat		1	3	1
	Mexican Olive	1	3	1	1
	Mexican Plum		1	2	1
	Texas Mountain Laurel	2		1	
	Texas Redbud	3		2	1
	Texas Sage	2	4	3	
	Total	15	14	17	8
Understory #15	Anacacho Orchid Tree	6	5	9	4
	Desert Willow 'Bubba'	6	5	8	6
	Evergreen Sumac	6	7	8	4
	Goldenball Lead Tree	6	8	6	1
	Loquat	6	5	4	2
	Mexican Olive	6	8	6	2
	Mexican Plum	6	5	6	4
	Texas Mountain Laurel	6	4	3	2
	Texas Redbud	6	4	9	2
	Texas Sage	6	3	9	4
	Total:	*60*	*54*	*68*	*31*
Canopy #15	**Anacua**				
	Big Tooth Maple				
	Cedar Elm				
	Desert Museum Palo Verde				
	Live Oak				
	Mexican Sycamore				
	Mexican White Oak				
	Shumard Oak				
	Texas Red Oak				
	Western Soapberry				
	Total:	*0*	*0*	*0*	*0*
Canopy #30	**Anacua**				
	Big Tooth Maple				
	Cedar Elm				
	Desert Museum Palo Verde				
	Live Oak				
	Mexican Sycamore				
	Mexican White Oak				
	Shumard Oak				
	Texas Red Oak				
	Western Soapberry				
	Total:	*0*	*0*	*0*	*0*
Palm (Min.4'Trnk.Ht)	Texas Palmetto	3	2	3	2



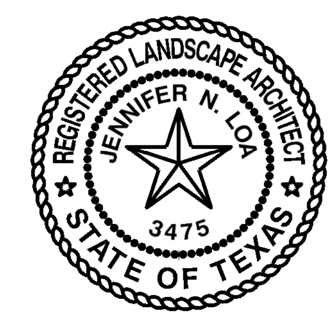
PLANTING BED PREPARATION

(NTS)

PLANTING BED PREPARATION

PERFORM PLANTING BED OPERATIONS IN THE FOLLOWING ORDER:

1. TIME CHARGES WILL ACCRUE THROUGHOUT THE PLANTING BED PREPARATION OPERATIONS.
2. STAKE BED PREPARATION AREAS OR OTHERWISE DESIGNATE THE PROPER LOCATIONS ACCORDING TO THE PLANS. MOW AREA IF NECESSARY TO FACILITATE THE STAKING OF BED LOCATIONS. OBTAIN APPROVAL OF FINAL LOCATIONS BEFORE CONTINUING WORK UNDER THIS ITEM.
3. APPLY A GLYPHOSATE-TYPE HERBICIDE TO THE BED PREPARATION AREAS (TWO TIMES, FIFTEEN (15) DAYS APART) TO ERADICATE ALL EXISTING VEGETATION. OBTAIN APPROVAL BEFORE APPLICATION OF HERBICIDE.
4. FIFTEEN (15) DAYS AFTER SECOND HERBICIDE APPLICATION, SCALP MOW THE BED PREPARATION AREAS. TIME CHARGES WILL ACCRUE DURING THIS PERIOD.
5. RIP THE BED PREPARATION AREAS TO A DEPTH OF FOURTEEN (14) INCHES USING EQUIPMENT WITH A MAXIMUM TWENTY-FOUR (24) INCH SPACE BETWEEN RIPPING TINES. TAKE SPECIAL PRECAUTION TO AVOID ANY UNDERGROUND UTILITIES WITHIN THE PROJECT AREAS AND DO NOT ALTER EXISTING DRAINAGE PATTERNS.
6. APPLY GENERAL USE COMPOST AS DESCRIBED IN STANDARD SPECIFICATION ITEM 161, COMPOST. DISTRIBUTE COMPOST EVENLY OVER BED PREPARATION AREAS AT A DEPTH OF FOUR (4) INCHES. COMPOST WILL BE PAID FOR SEPARATELY FOR TYPE I PLANTING BED PREPARATION.
7. TILL/DISC SOIL TO A SMOOTH CONSISTENCY TO A DEPTH OF TWELVE (12) INCHES. TAKE SPECIAL PRECAUTIONS TO AVOID ANY UNDERGROUND UTILITIES WITHIN THE PROJECT AREAS AND DO NOT ALTER EXISTING DRAINAGE PATTERNS.



DocuSigned by:

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2/16/2024

Texas Department of Transportation
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US 90
PLANTING BED DETAILS

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		34
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

PLANTING SPECIFICATION

ITEM	Common Name	Botanical Name	Container Size	Height	Spread	Spacing	Caliper	Quantity	Notes
0192-6002	Big Muhly	Muhlenbergia lindheimeri	1 GAL.	1' min.	6" min.	4-5' O.C.		153	Nursery grown in containers
	Gulf Muhly	Muhlenbergia capillaris	1 GAL.	1' min.	6" min.	30" O.C.		659	Nursery grown in containers
	Pride of Barbados	Caesalpinia pulcherrima	1 GAL.	6" min.	6" min.	5' O.C.		102	Nursery grown in containers
							TOTAL:	914	
0192-6004	Big Muhly	Muhlenbergia lindheimeri	5 GAL.	2' min.	1' min.	4' O.C.		229	Nursery grown in containers
	Gulf Muhly	Muhlenbergia capillaris	5 GAL.	2' min.	1' min.	30" O.C.			Nursery grown in containers
	Pride of Barbados	Caesalpinia pulcherrima	5 GAL.	1' min.	1' min.	5' O.C.		152	Nursery grown in containers
	Anacacho Orchid Tree	Bauhinia lunarioides	5 GAL.	3' min.	1' min.	8 O.C.		13	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Desert Willow 'Bubba'	Chilopsis linearis 'Bubba'	5 GAL.	3' min.	1' min.	8 O.C.		13	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Evergreen Sumac	Rhus virens	5 GAL.	3' min.	1' min.	8 O.C.		15	Nursery grown in containers
	Goldenball Lead Tree	Leucaena retusa	5 GAL.	3' min.	1' min.	8 O.C.		14	Nursery grown in containers
	Loquat	Eriobotrya japonica	5 GAL.	3' min.	1' min.	8 O.C.		7	Nursery grown in containers
	Mexican Olive	Cordia boissieri	5 GAL.	3' min.	1' min.	8 O.C.		15	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Mexican Plum	Prunus mexicana	5 GAL.	3' min.	1' min.	8 O.C.		12	Nursery grown in containers
	Texas Mountain Laurel	Sophora secundiflora	5 GAL.	3' min.	1' min.	8 O.C.		8	Nursery grown in containers
	Texas Redbud	Cercis canadensis var texana	5 GAL.	3' min.	1' min.	8 O.C.		14	Nursery grown in containers
	Texas Sage	Leucophyllum frutescens	5 GAL.	3' min.	1' min.	8 O.C.		17	Nursery grown in containers
							TOTAL:	509	
0192-6005	Anacacho Orchid Tree	Bauhinia lunarioides	15 GAL.	8' min.	3' min.	8 O.C.	1" min.	53	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Desert Willow 'Bubba'	Chilopsis linearis 'Bubba'	15 GAL.	8' min.	3' min.	8 O.C.	1" min.	54	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Evergreen Sumac	Rhus virens	15 GAL.	8' min.	3' min.	8 O.C.	1" min.	54	Nursery grown in containers
	Goldenball Lead Tree	Leucaena retusa	15 GAL.	6' min.	2' min.	8 O.C.	1" min.	50	Nursery grown in containers
	Loquat	Eriobotrya japonica	15 GAL.	8' min.	3' min.	8 O.C.	1" min.	48	Nursery grown in containers
	Mexican Olive	Cordia boissieri	15 GAL.	5' min.	3' min.	8 O.C.	1" min.	53	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Mexican Plum	Prunus mexicana	15 GAL.	6' min.	3' min.	8 O.C.	1" min.	50	Nursery grown in containers
	Texas Mountain Laurel	Sophora secundiflora	15 GAL.	5' min.	3' min.	8 O.C.	1" min.	44	Nursery grown in containers
	Texas Redbud	Cercis canadensis var texana	15 GAL.	5' min.	3' min.	8 O.C.	1" min.	50	Nursery grown in containers
	Texas Sage	Leucophyllum frutescens	15 GAL.	5' min.	3' min.	8 O.C.	1" min.	55	Nursery grown in containers
	Anacua	Ehretia anacua	15 GAL.	5' min.	3' min.	15' O.C.	1" min.	7	Nursery grown in containers
	Big Tooth Maple	Acer grandidentatum	15 GAL.	5' min.	3' min.	15' O.C.	1" min.	2	Nursery grown in containers
	Cedar Elm	Ulmus crassifolia	15 GAL.	8' min.	3' min.	15' O.C.	1" min.	8	Nursery grown in containers
	Desert Museum Palo Verde	Cercidium x 'Desert Museum	15 GAL.	5' min.	3' min.	15' O.C.	1" min.	3	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Live Oak	Quercus virginiana	15 GAL.	8' min.	3' min.	15' O.C.	1" min.	2	Nursery grown in containers
	Mexican Sycamore	Platanus mexicana	15 GAL.	8' min.	3' min.	15' O.C.	1" min.	3	Nursery grown in containers
	Mexican White Oak	Quercus polymorpha	15 GAL.	8' min.	3' min.	15' O.C.	1" min.	8	Nursery grown in containers
	Shumard Oak	Quercus shumardii	15 GAL.	8' min.	3' min.	15' O.C.	1" min.	3	Nursery grown in containers
	Texas Red Oak	Quercus buckleyi	15 GAL.	8' min.	3' min.	15' O.C.	1" min.	3	Nursery grown in containers
	Western Soapberry	Sapindus saponaria var. drummondii	16 GAL.	8' min.	3' min.	15' O.C.	1" min.	6	Nursery grown in containers
							TOTAL:	556	
0192-6006	Anacua	Ehretia anacua	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	10	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Big Tooth Maple	Acer grandidentatum	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	3	Nursery grown in containers
	Cedar Elm	Ulmus crassifolia	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	8	Nursery grown in containers
	Desert Museum Palo Verde	Cercidium x 'Desert Museum	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	7	Nursery grown in containers / Multi-trunk, 3 trunks min.
	Live Oak	Quercus virginiana	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	6	Nursery grown in containers
	Mexican Sycamore	Platanus mexicana	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	7	Nursery grown in containers
	Mexican White Oak	Quercus polymorpha	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	8	Nursery grown in containers
	Shumard Oak	Quercus shumardii	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	6	Nursery grown in containers
	Texas Red Oak	Quercus buckleyi	30 GAL.	8' min.	3' min.	15' O.C.	2" min.	3	Nursery grown in containers
	Western Soapberry	Sapindus saponaria var. drummondii	31 GAL.	8' min.	3' min.	15' O.C.	2" min.	8	Nursery grown in containers
							TOTAL:	66	
0192-6049	Texas Palmetto	Sabal texana	Min. 4' Trnk. Ht			20' O.C.		19	

TREES THAT DO NOT STAND UPRIGHT WITHOUT EXTRA SUPPORT WILL BE REJECTED.

TREE STAKING AND GUYING IS FOR STABILIZATION OF THE PLANTS ONLY.

NOTES:

1. REFERENCE ITEM 192 OF THE TEXAS STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES 2014 FOR SPECIFICATIONS, DIMENSIONS, VOLUMES, AND MEASUREMENTS THAT HAVE BEEN MODIFIED OR NOT SHOWN.
2. REJECTION OF PLANTS SHALL BE IN ACCORDANCE WITH ITEM 192.2.2.
3. BE RESPONSIBLE FOR THE SAFE TRANSPORTATION OF PLANTS TO THE PROJECT SITE, AND THEIR CONDITION UPON ARRIVAL.
4. DO NOT STORE PLANT MATERIALS ON HARD SURFACES OR LEAVE EXPOSED TO THE SUN. PROTECT THE ROOT BALLS AND WATER REGULARLY. PROVIDE A MEAN OF PERIODIC INSPECTION OF ANY PLANTS LEFT IN STORAGE OVER THE WEEKEND OR HOLIDAY.
5. PLANTS SHALL BE SOUND, HEALTHY AND VIGOROUS, WELL BRANCHED, AND DENSELY FOLIATED WHEN IN LEAF, AND SHALL HAVE HEALTHY, WELL DEVELOPED ROOT SYSTEMS.
6. ALL PLANTS SHALL BE NURSERY-GROWN IN CONTAINERS (OR CONTAINERIZED) UNLESS OTHERWISE SHOWN ON THE PLANS.
7. SEE PLANTING BED DETAIL SHEET FOR DISTINCTION BETWEEN CANOPY TREES AND UNDERSTORY TREES.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

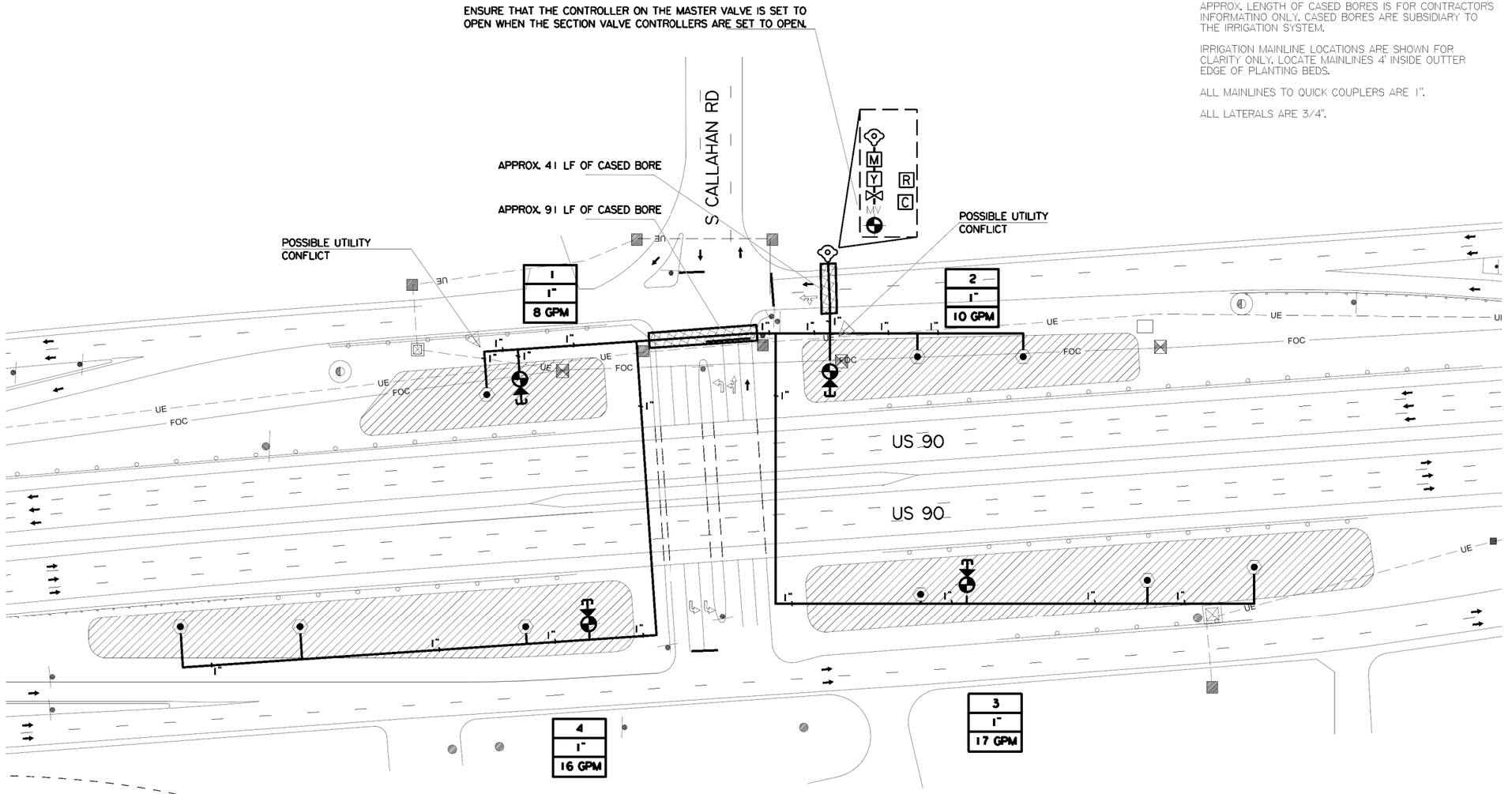
Texas Department of Transportation

US 90

PLANTING SPECIFICATIONS

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		35
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

ENSURE THAT THE CONTROLLER ON THE MASTER VALVE IS SET TO OPEN WHEN THE SECTION VALVE CONTROLLERS ARE SET TO OPEN.



NOTES:

EXISTING ELEMENTS ARE SHOWN GRAY.

VARY ACCESS ROUTES ONTO AND WITHIN THE SITE TO AVOID DAMAGE TO EXISTING VEGETATION.

EXTEND BORE CASINGS A MINIMUM OF 5' BEHIND THE FACE OF THE CURB, THE SIDEWALK, OR THE EDGE OF THE PAVEMENT.

APPROX. LENGTH OF CASED BORES IS FOR CONTRACTOR'S INFORMATINO ONLY. CASED BORES ARE SUBSIDIARY TO THE IRRIGATION SYSTEM.

IRRIGATION MAINLINE LOCATIONS ARE SHOWN FOR CLARITY ONLY. LOCATE MAINLINES 4' INSIDE OUTTER EDGE OF PLANTING BEDS.

ALL MAINLINES TO QUICK COUPLERS ARE 1".

ALL LATERALS ARE 3/4".

GENERAL NOTE:

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
2. FPA NOTIFICATION FOR COUNTY/CITY WAS SUBMITTEDIN WRITING ON (MONTH), (DAY), 2023.

IRRIGATION LEGEND

M	WATER METER
C	IRRIGATION CONTROLLER
R	RAIN/FREEZE
Y	WYE STRAINER
	BACKFLOW PREVENTOR
	MAIN LINE
	LATERAL LINE
	SECTION VALVE ASSEMBLY
MV	MASTER VALVE ASSEMBLY
	QUICK COUPLER VALVE
	CASED BORE
	IRRIGATED AREA (DRIP)
	POSSIBLE UTILITY CONFLICTS
1	SECTION VALVE NUMBER
2"	VALVE SIZE
22 GPM	FLOW GALLONS PER MINUTE

LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE
- TRAFFIC SIGNAL POLE
- GUARD RAIL
- FOC — TMS / ITS UTILITIES
- UE — UNDERGROUND ELECTRIC

THE EXISTENCE AND LOCATION OF ALL UTILITIES INDICATED ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR TOTALLY INCLUSIVE. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY UTILITIES PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGES TO TMS / ITS UTILITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

0 20 40 60 80 100

SCALE: 1" = 100'-0"

N

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

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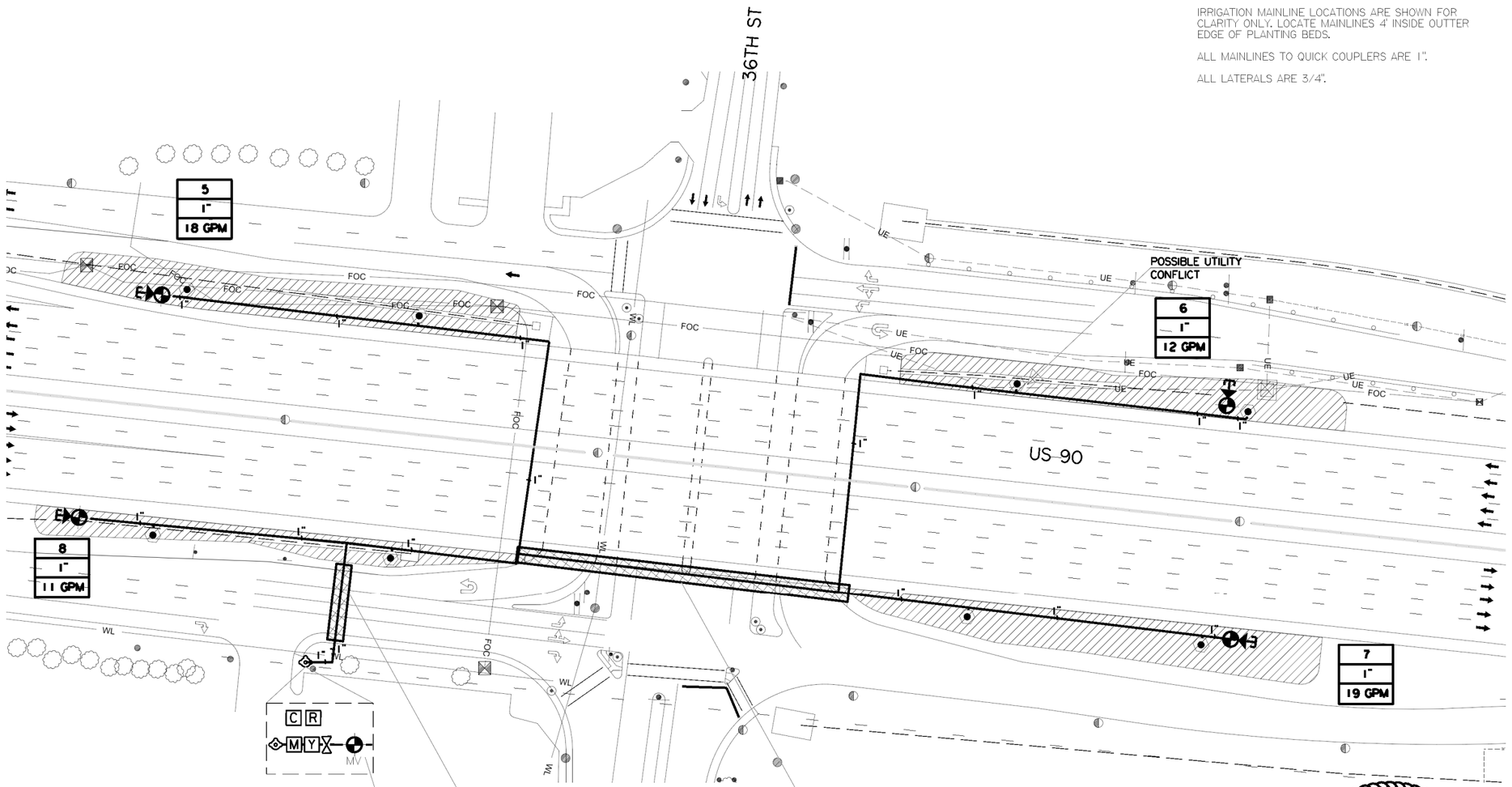
2/16/2024

Texas Department of Transportation

US 90
@ S CALLAHAN RD
IRRIGATION PLAN

SHEET

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		36
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90



ENSURE THAT THE CONTROLLER ON THE MASTER VALVE IS SET TO OPEN WHEN THE SECTION VALVE CONTROLLERS ARE SET TO OPEN.

GENERAL NOTE:

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
2. FPA NOTIFICATION FOR COUNTY/CITY WAS SUBMITTEDIN WRITING ON (MONTH), (DAY), 2023.

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ALL MAINLINES TO QUICK COUPLERS ARE 1".

ALL LATERALS ARE 3/4".

IRRIGATION LEGEND

- M — WATER METER
- C — IRRIGATION CONTROLLER
- R — RAIN/FREEZE
- Y — WYE STRAINER
- BACKFLOW PREVENTOR
- MAIN LINE
- LATERAL LINE
- SECTION VALVE ASSEMBLY
- MASTER VALVE ASSEMBLY (MV)
- QUICK COUPLER VALVE
- CASED BORE
- IRRIGATED AREA (DRIP)
- POSSIBLE UTILITY CONFLICTS
- 1 — SECTION VALVE NUMBER
- 2" — VALVE SIZE
- 22 GPM — FLOW GALLONS PER MINUTE

LEGEND:

- CONTROLLER CABINET
- GROUND BOX
- FIRE HYDRANT
- MANHOLE
- SIGN
- LIGHT POLE
- HIGH MAST LIGHT POLE
- POWER POLE / TRAFFIC SIGNAL POLE
- GUARD RAIL
- FOC — TMS / ITS UTILITIES
- UE — UNDERGROUND ELECTRIC

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0 20 40 60 80 100

SCALE: 1" = 100'-0"

N

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
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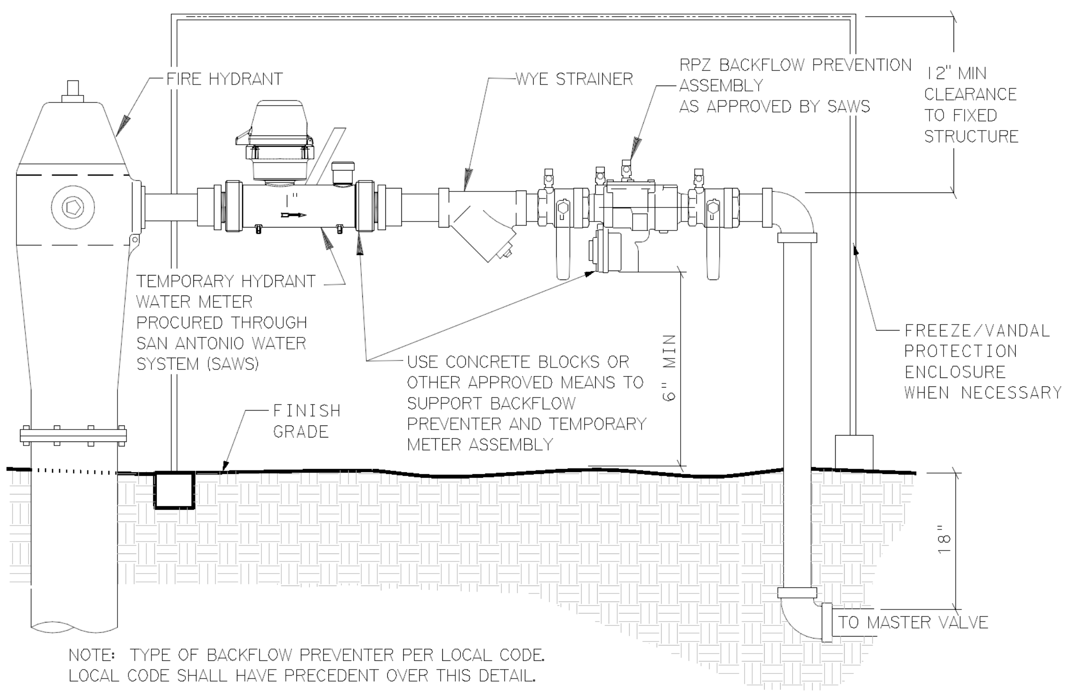
2/16/2024

Texas Department of Transportation

US 90 @ 36TH ST
IRRIGATION PLAN

SHEET

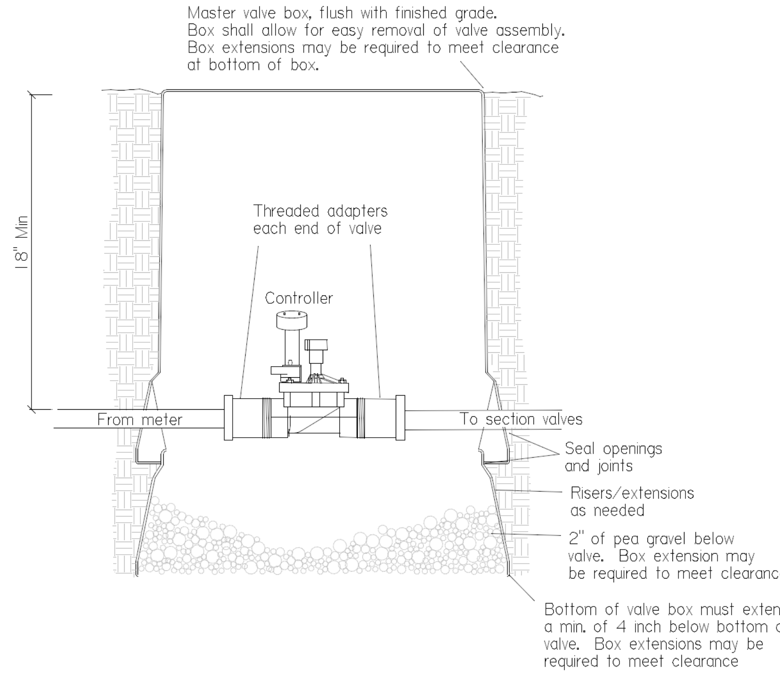
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		37
STATE	DIST.	COUNTY	
TEXAS	15	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90



NOTE: TYPE OF BACKFLOW PREVENTER PER LOCAL CODE. LOCAL CODE SHALL HAVE PRECEDENT OVER THIS DETAIL.

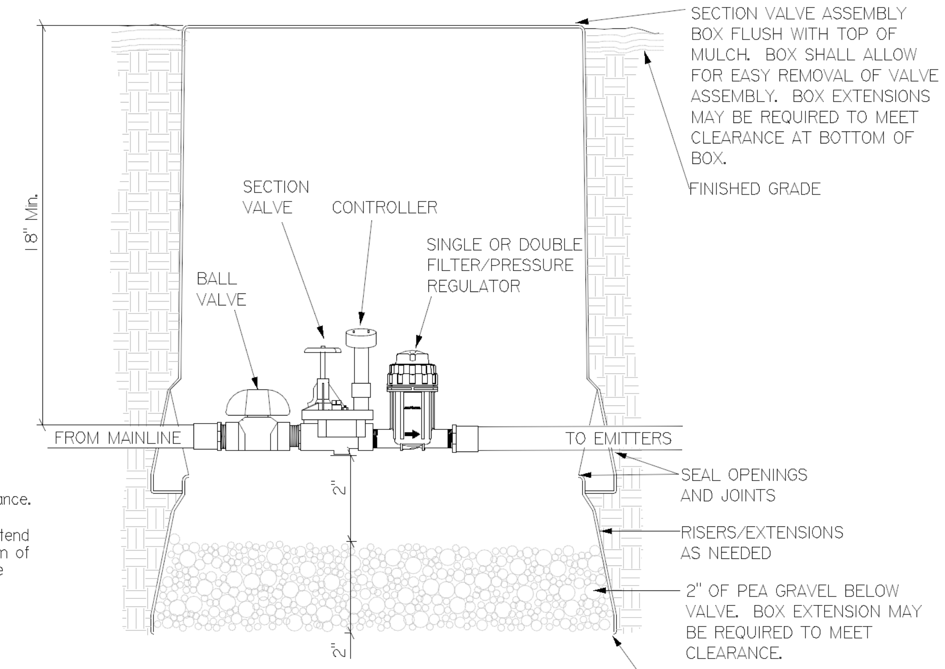
TYPICAL TEMPORARY METER ASSEMBLY

(NTS)



MASTER VALVE ASSEMBLY

(NTS)

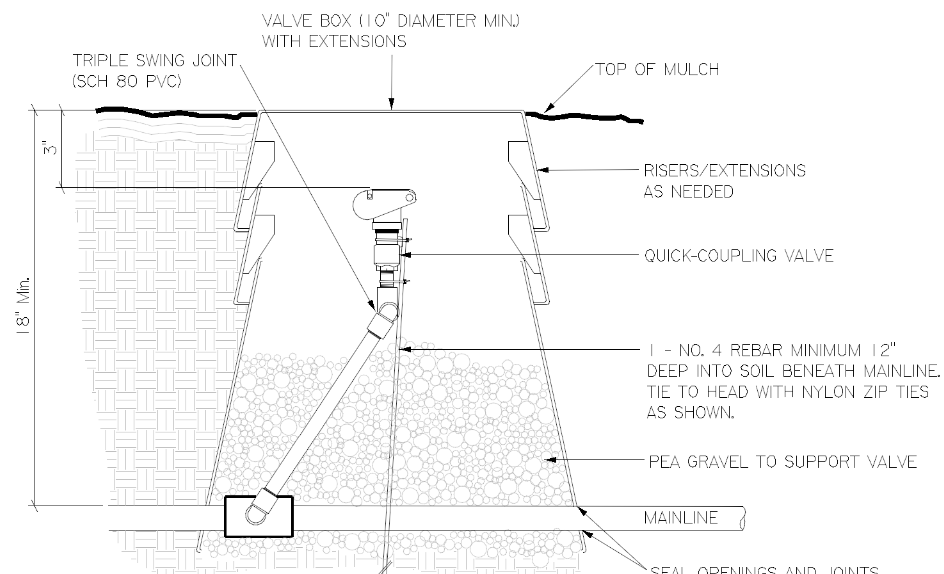


NOTE: LOCATE VALVE ASSEMBLY WITHIN THE DESIGNATED PLANTING BED AREA AS APPROVED BY ENGINEER.

BOTTOM OF VALVE BOX MUST EXTEND A MIN. OF 4" BELOW BOTTOM OF VALVE. BOX EXTENSIONS MAY BE REQUIRED TO MEET CLEARANCE.

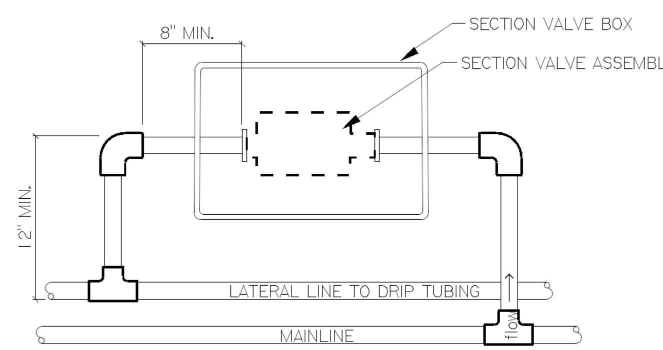
SECTION VALVE ASSEMBLY

Drip Zones (NTS)



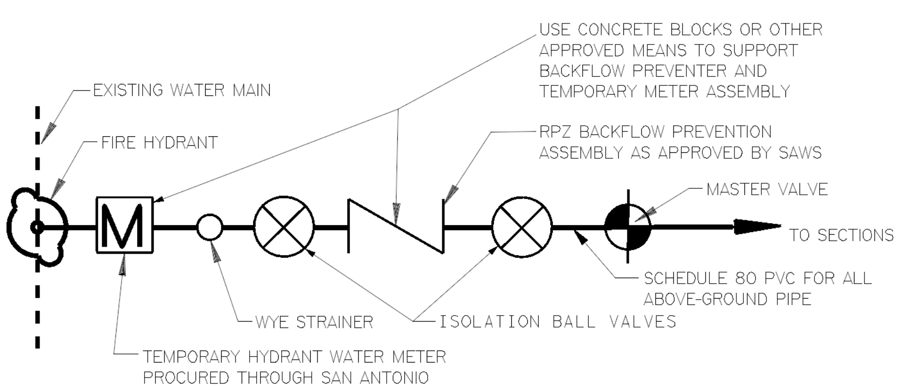
QUICK-COUPLING VALVE

(NTS)



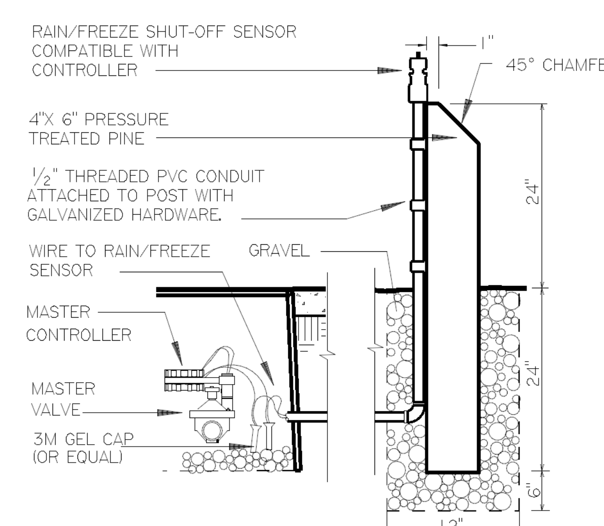
PLAN OF PIPING TO SECTION VALVE ASSEMBLY

(NTS)



TYPICAL TEMPORARY METER ASSEMBLY

(NTS)



KEEP OUT OF CLEAR ZONE.
PLACE RAIN SENSOR POST AS DIRECTED. DO NOT EXCEED MAXIMUM WIRE DISTANCE LIMITS FROM CONTROLLER TO SENSOR.

RAIN/FREEZE SENSOR

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2/16/2024

Not to Scale

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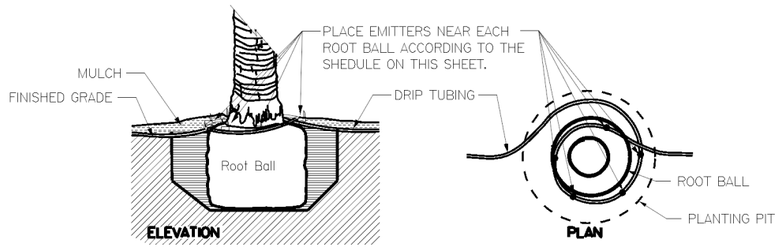
US 90

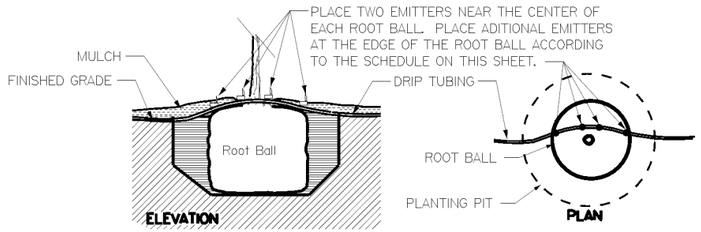
IRRIGATION DETAILS

SHEET 1 OF 2

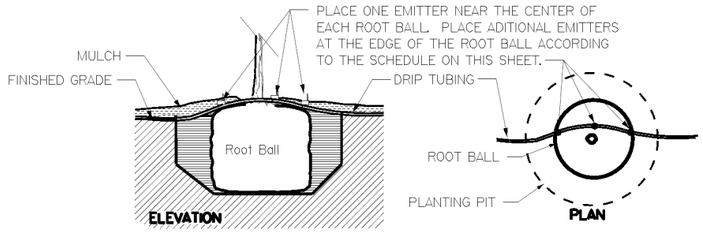
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		38
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90



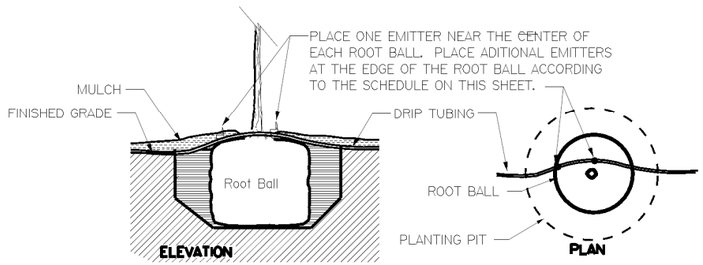
INDIVIDUAL EMITTER PLACEMENT - PALM



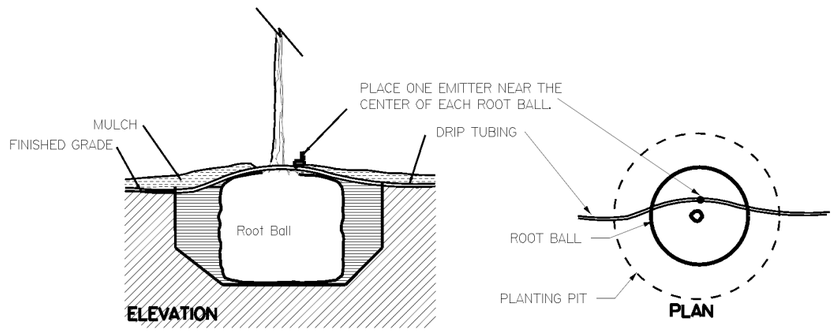
INDIVIDUAL EMITTER PLACEMENT - #30 CONTAINER



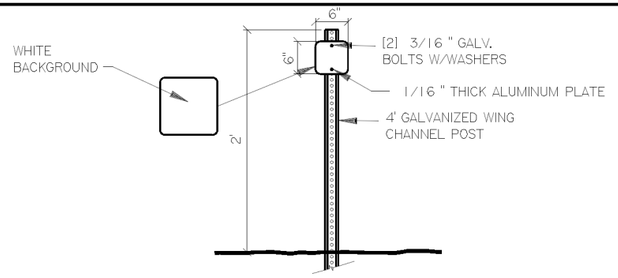
INDIVIDUAL EMITTER PLACEMENT - #15 CONTAINER



INDIVIDUAL EMITTER PLACEMENT - #5 CONTAINER

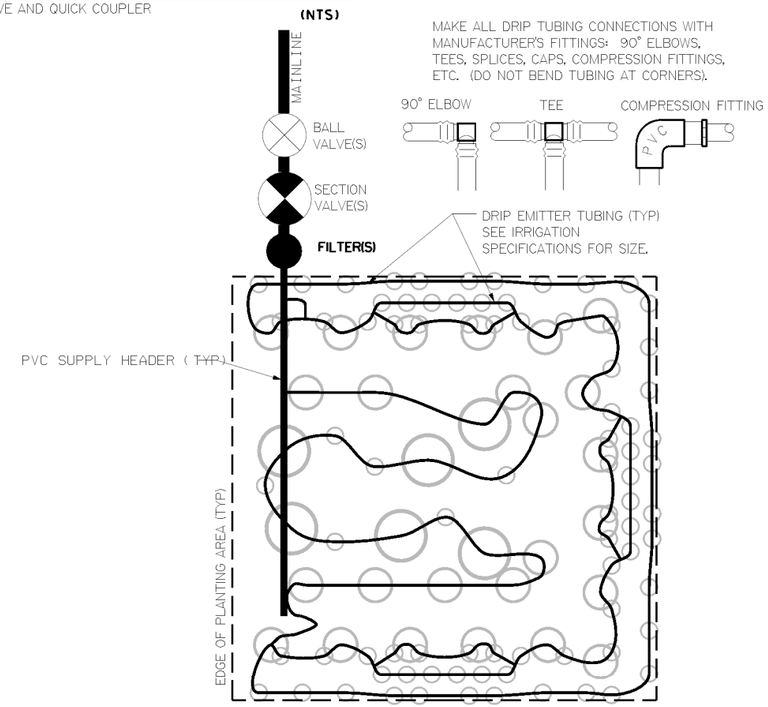


INDIVIDUAL EMITTER PLACEMENT - #1 CONTAINER



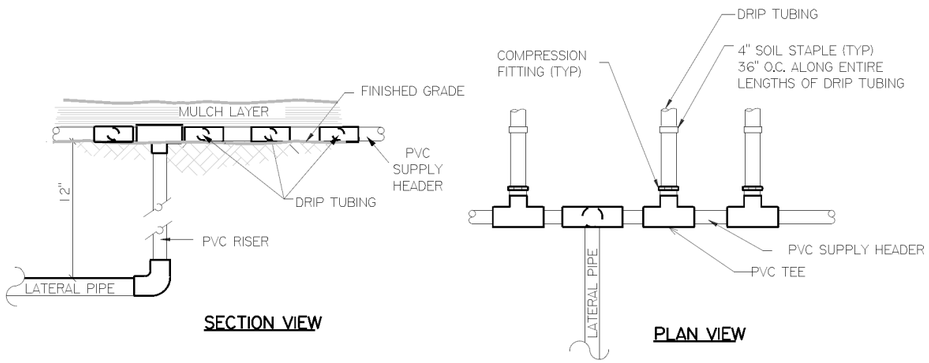
IRRIGATION VALVE DELINEATOR

ONE AT EACH SECTION VALVE AND QUICK COUPLER



DRIP TUBING LAYOUT WITH SECTION VALVE ASSEMBLY

NOTE: TOTAL NUMBER OF EMITTERS AND LATERALS SHALL NOT ALLOW FOR GPM (GALLONS PER MINUTE) FLOWING THROUGH ONE FILTER TO EXCEED 20 GPM. TOTAL SECTION GPM SHALL NOT EXCEED 40 GPM.



RISER DETAIL FOR SUPPLY HEADER TO DRIP TUBING

EMITTER PLACEMENT SCHEDULE		
PLANT CONTAINER SIZE	EMITTER	
	QTY	NOMINAL FLOW
#30 CONTAINER	4	2 GPH
#15 CONTAINER	3	2 GPH
#5 CONTAINER	2	2 GPH
#1 CONTAINER	1	2 GPH
PALM	5	2 GPH

IRRIGATION SCHEDULE *		
WEEK AFTER PLANTING	IRRIGATION INTERVAL	RUN TIME
1 THRU 6	2 DAYS	60 MINUTES
7 THRU 12	3 DAYS	60 MINUTES
13 THRU 104	4 DAYS	60 MINUTES
105 THRU 156	AS NEEDED	AS NEEDED

* IRRIGATION SCHEDULE IS SUGGESTED BASELINE STARTING SCHEDULE. BE RESPONSIBLE FOR MONITORING PLANT MATERIAL TO ENSURE IT RECEIVES ADEQUATE MOISTURE FOR THRIVING GROWTH AND ADJUST SCHEDULE OR QUANTITY OF EMITTERS ACCORDINGLY.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

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0C3EE8BC0417449...
2/16/2024

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IRRIGATION DETAILS

SHEET 2 OF 2

FEDERAL DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		39
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

IRRIGATION MATERIALS SPECIFICATIONS

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	REMARKS
Tap/Meter	Temporary water meter	1 1/2"	
Drip Tubing	Rainbird Blackstripe Tubing XBS	1/2"	See Rainbird Design Guide for appropriate fittings
Drip Emitter	Rainbird XB-20PC (Red) Barb inlet	2 GPH	
Tie-Down Stake	Rainbird TDS-050 (With bend)		Spaced 36" OC, and before and after every turn
Gate Valve	Nibco T113 threaded gate valve	2"	
Battery Operated Controller	Hunter NODE-100 or NODE-200	1 or 2 station	
Remote Control Valve (Master Valve)	Rainbird PEB	2"	
Drip Section Valve	Rainbird XCZ 150 PRB 150	See plans for valve sizes.	Includes 2 baskets and 1 ball valve.
Drip Section Valve	Rainbird XCZ 100 PRB-LC	See plans for valve sizes.	Includes 1 basket but 1 ball valve will need to be installed
Quick Coupling Valve, Keys, & Hose Swivel	Rainbird 33DRC, 33DK, SH-0	3/4"	Provide two(2) quick coupling keys and hose swivels to engineer
Backflow Preventor	Febco Series 825Y RPZ Assembly	2"	Or approved by Local Code. Include two Gate Valves.
Mainline	PVC SCH40	as shown on the plans	Pressure rated with twin gasket couplings and fittings or slip type solvent welded joints
Laterals and Headers	PVC CLASS 200	3/4"	
Casing Pipe (Bores)	PVC SCH80 OR HDPE SDR11	Minimum 4" Unless otherwise noted on plans	
Above ground pipe including buried risers and swing-joint components	PVC SCH80 pipe rated for direct sunlight exposure		
Fittings	All fittings incorporated into system shall be of the same type, size and class material as the pipe	Same as pipe.	
Solvent Cement	Solvent cement shall be the type recommended by the the pipe manufacturer		
Valve Boxes Boxes for section valves, below-ground backflow preventors, and quick coupling valves shall be as shown on detail sheet	MacLean Highline Access Box	Box size shall allow for easy removal of valve, etc.	Quantity as required for section valves, below ground backflow preventors, quick coupling valves and any accessories. Seal valve boxes to prevent soil migration into box.
Valve Box Risers	MacLean Highline Access Box	Box and risers shall extend below valves as shown on detail sheet	Seal joints between valve box & risers, or between risers, to prevent soil migration into box
Rain/Freeze Sensor	Hunter wired rain and freeze sensor RFC		

* Reference to Manufacturer's trade name or catalog number is for the purpose of identification only, contractor shall be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project and are approved by the Engineer.

GENERAL IRRIGATION NOTES:

1. Reference Item 170 of the Texas Standard specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that have been modified or not shown.

2. Water supplier is San Antonio Water System (SAWS). Place the water meters in the name of the contractor. Obtain all permits, licenses, tests, and/or approvals, pay any fees and deposits for installation and operation as applicable. Provide any and all drawings, plans, and paperwork necessary to obtain permits and approvals. Deposits will not be refunded. Water meters shall remain operational and turned on through all phases of the contract to ensure plants receive required watering. Costs for water applied through the irrigation system will be paid for by the contractor.

3. Place backflow preventers in the name of the contractor. Be responsible for all charges, fees, tests, and coordination for any backflow preventor testing, at installation or annual inspection, required by local entity through all phases of the contract.

4. Water supplier is San Antonio Water System (SAWS). At the end of the project, disconnect water meter and remove backflow preventor and associated above-ground piping.

5. The drawings are diagrammatic of the work to be performed. Changes may be required due to varying conditions or as directed by the Engineer.

6. Verify location of any underground utilities with appropriate agencies. Underground utilities (if shown) on the plans are approximate.

7. See IRRIGATION MATERIALS SPECIFICATIONS chart for materials specifications, sizes, and requirements.

8. Ensure that the controller on the Master Valve is set to open when the section valve controllers are set to open.

CONSTRUCTION METHODS:

1. Investigate the site conditions affecting the work and furnish offsets, fittings, sleeves, and cased bores as may be required to meet site conditions.

2. All work to provide a complete and operational irrigation system is included in the Lump Sum bid price for Item 170. Items required but not included in the plans are considered incidental.

3. Locate all irrigation valves, mainlines, quick coupler valves, dripline, etc., for approval by the Engineer prior to installation.

4. Deviations in the piping as shown on the plans may be permitted with approval from the Engineer.

5. Exercise care when excavating near trees. No mechanical trenching shall be permitted below the canopy of existing trees. Adjust trench path and/or excavate by hand to avoid damage to existing tree root system.

6. Coordinate and verify location of signal wiring, traffic loop detector wiring, and TMS (Traffic Management) wiring prior to beginning any work. Damage to signal wiring, loop detector wiring, TMS System wiring, any utilities not listed, and structures shall be repaired at contractor's expense. Contact TxDOT signal shop, electrical shop, and transguide office for "TxDOT Locates".

7. Any underground utilities, high mast wiring, and TMS wiring shown on plans are approximate locations only and shall not relieve contractor's responsibility of coordinating with appropriate authorities to locate underground utilities, wiring and any structure.

8. Dig trenches straight and support pipe continuously on bottom of trench. Install pipe to an even grade. Trench bottom shall be clean and smooth with all organic debris and sharp objects removed. Snake pipe in trench, to allow for expansion and contraction. Protect open excavations for public safety.

9. Boring and sleeve requirements. Stake boring and sleeve locations for Engineer's approval. Boring depth shall be as described in Item 170.3.5. All borings and sleeves shall be continuous and shall extend the full width of the pavement and 5 feet on each side thereof. Boring and sleeves shall be incidental to irrigation system. Bore encasement pipe must be installed same day as boring.

10. PVC casing(s) for bores and sleeves shall consist of SCH 80 smooth wall pipe with solvent welded joints and seams, and shall be continuous. The size of bore shall not exceed the diameter of casing(s) required by Item 170 by more than 1 inch.

11. Do not install pipe when air temperature is below 40 degrees fahrenheit. Cut plastic pipe in a manner that will insure a square cut. Remove burrs and cuts at ends prior to installation so that a smooth unobstructed flow will be obtained.

12. Thoroughly flush all water lines, valves, and sprinkler bodies before installing dripline or sprinkler nozzles.

13. Control wire and wire connections shall be as described on IRRIGATION MATERIALS SPECIFICATIONS chart. Connect and splice all wire in ground boxes using water-proof connectors.

14. Compaction of the pipe trenches must be sufficient to limit short term settling of the backfill to no more than 1 inch. Correct settling greater than this without additional compensation.

GUARANTEE AND ACCEPTANCE:

1. Maintenance period. Inspect the irrigation system concurrently with, and subject to the same establishment/maintenance requirement periods under Items 192 and 193. During the installation, establishment, and maintenance, perform the following activities as a minimum and to the satisfaction of the engineer:

   A) Install and maintain the controller program to insure the proper distribution of water (includes replacement of any batteries).

   B) Inspect, repair, and/or replace any equipment that is found defective or may have become damaged by any means.

   C) Make any adjustments or repairs that may become necessary to ensure the proper delivery of water to the plant material.

   D) Winterize the system as necessary to prevent damage to the system or utility provider infrastructure.

2. As-built drawings. Upon completion of the required maintenance period under Item 192, the Engineer will make an inspection of the irrigation system.

   For this inspection, furnish the Engineer a set of as-built drawings on reproducible 11x17 film base sheets. The Engineer will check to be sure they are a true record of the project conditions and will direct the contractor to correct any errors that are found.

   On the drawings, show all valve locations, meter numbers and addresses, any change to sprinkler head location, and re-routing of main and lateral lines. (Obtain approval of the Engineer for changes of this nature prior to installation).

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

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2/16/2024

Texas Department of Transportation

US 90

IRRIGATION SPECIFICATIONS

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		40
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90

ITEM 193 LANDSCAPE ESTABLISHMENT

AFTER COMPLETION OF THE ITEM 192 MAINTENANCE PERIOD, AS SHOWN IN THE PLANS AND APPROVED BY THE ENGINEER, BEGIN ITEM 193 ESTABLISHMENT ACTIVITIES FOR THE PERIOD SHOWN ON THE PLANS.

REFERENCE ITEM 193 OF THE TEXAS STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES 2014 FOR SPECIFICATIONS, DIMENSIONS, VOLUMES AND MEASUREMENTS THAT ARE NOT SHOWN.

ALL ESTABLISHMENT WORK IS PAID FOR ACCORDING TO ITEM 193 AND AS SHOWN ON THE PLANS.

NOTIFY THE ENGINEER THREE DAYS PRIOR TO EACH SITE VISIT. DETERMINATION OF THE COMPLETENESS OF WORK FOR EACH SITE VISIT WILL BE DONE IN THE PRESENCE OF BOTH THE ENGINEER AND THE CONTRACTOR.

DESCRIPTION OF WORK					TIMELINE - REPEAT AS NECESSARY																																					
					MONTH	1				2				3				4				5				6				7				8				9				10				11				12			
					WEEK	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
PLANT MAINTENANCE	193.3.1.1.	PRUNING		DO NOT PRUNE ANY PLANTS FOR VISUAL APPEAL (I.E. PRUNING FOR A PARTICULAR PLANT SHAPE). REFER TO ITEM 193.3.1.1. FOR WOUND DRESSING. DO NOT REMOVE DEAD PALM FRONDS - LEAVE ON THE PALM TO DEVELOP A "PETTICOAT".				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
	193.3.1.2.	INSECT, DISEASE AND ANIMAL CONTROL		NOTIFY THE ENGINEER AT FIRST SIGN OF DAMAGE FROM INSECTS, DISEASE, OR ANIMALS.		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
	193.3.1.3.	FERTILIZATION		FERTILIZE ALL PLANTING BEDS WITH A BALANCED FERTILIZER (EX. NPK=10-10-10 OR 12-12-12) AT THE RATE OF FIVE POUNDS (5 LBS.) NITROGEN PER ACRE. FERTILIZER SHOULD CONTAIN MINIMUM 2% WATER SOLUBLE MAGNESIUM, MINIMUM 6% SULFUR, MINIMUM 2% IRON, AND MINIMUM 2% TOTAL MAGNESIUM. APPLY FERTILIZER UNIFORMLY OVER THE SURFACE OF THE PLANTED BED AREAS ONLY.																																																✓
				SEE PALM PLANTING AND ESTABLISHMENT SHEET FOR POST-PLANTING FERTILIZER REQUIREMENTS.												✓																				✓																✓
	193.3.1.4.	MULCHING, PLANT BASIN & PLANT BED MAINTENANCE	WEEDING	KEEP PLANTING BEDS FREE OF WEEDS, GRASSES, AND INVASIVE WOODY SPECIES. INVASIVE WOODY SPECIES INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING: CHINABERRY, CHINESE TALLOW, BACCHARIS WILLOW, AND MESQUITE. USE A GLYPHOSATE TYPE OR SELECTIVE HERBICIDE IF APPROVED BY THE ENGINEER. REMOVE ALL DEAD WEEDS AND DEBRIS FROM WEEDING OPERATIONS. REMOVE AND DISPOSE OF DEAD WEEDS FROM HERBICIDE APPLICATION NO SOONER THAN TWO WEEKS AFTER THE APPLICATION AND NO LATER THAN THREE WEEKS AFTER THE APPLICATION. MAINTAIN CURB AND GUTTER DIRECTLY ADJACENT TO PLANTING BEDS FREE OF WEEDS AND SEDIMENT.	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
			MULCHING	APPLY AN APPROVED MULCH LAYER TO MAINTAIN A SETTLED DEPTH SHOWN ON PLANTING DETAILS OVER THE ENTIRE PLANTING BED AREAS. KEEP MULCH LAYER A MINIMUM OF 4" AWAY FROM TRUNKS AND STEMS OF ALL PLANTS OR OUTSIDE OF MULCH SHIELDS (WHERE MULCH SHIELDS ARE PRESENT).				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
			LITTER REMOVAL	REMOVE AND DISPOSE OF LITTER WITHIN THE PLANTING BEDS AND MOWED PLANT-BED PERIMETERS.	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
	193.3.1.5.	MOWING, TRIMMING, AND EDGING		MOW A 5' BORDER AROUND PLANTING BEDS OR INDIVIDUAL PLANTS THAT ARE NOT IN A BED.	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
	193.3.1.6.	STAKING, GUYING, AND BRACING OF PLANTS	INSPECTION AND REPAIR	INSPECT AND REPAIR / ADJUST PLANT STAKING, GUYING, AND BRACING TO ASSURE PROPER FUNCTION. REPLACE TREES THAT HAVE BEEN DAMAGED BY STAKING AND GUYING AT CONTRACTOR'S EXPENSE.	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
			REMOVAL	REMOVE PLANT SUPPORT MATERIALS FROM PLANTS. REPLACE PLANT SUPPORT MATERIALS IF PLANTS FAIL TO REMAIN UPRIGHT.	WHEN ENGINEER AND CONTRACTOR MUTUALLY AGREE THAT PLANTS ARE STABLE AND WELL ROOTED																																														
PLANT REPLACEMENT	193.3.2.	PLANT REPLACEMENT		PLANT REPLACEMENT FOR NORMAL PLANT MORTALITY WILL BE AT THE DISCRETION OF THE ENGINEER. REMOVE ANY MATERIALS DAMAGED BY ACTIONS DESCRIBED IN ITEM 7.17. REMOVAL AND DISPOSAL OF DAMAGAGED MATERIALS IS INCIDENTAL TO ITEM 192. CONTRACTOR MAY BE REIMBURSED FOR PLANT REPLACEMENT IN ACCORDANCE WITH ITEM 7.17. THEFT IS NOT A REIMBURSABLE REPAIR, BUT SHALL BE CONSIDERED "DAMAGE... BY ANY OTHER CAUSE" IN ACCORDANCE WITH ITEM 7.17. PLANTS DAMAGED OR LOST DUE TO ACTIVITIES OF THE CONTRACTOR OR BY THEFT WILL BE REPLACED AT THE CONTRACTOR'S EXPENSE WITH THE SAME SIZE AND TYPE SPECIFIED AT THE TIME OF THE ORIGINAL INSTALLATION. BE RESPONSIBLE FOR THEFT DETERRENT PRACTICES.	EVERY NOVEMBER OF THE CONTRACT PERIOD																																																
IRRIGATION SYSTEM OPERATION AND MAINTENANCE	193.3.4.	IRRIGATION SYSTEM OPERATION AND MAINTENANCE		MAINTAIN ALL IRRIGATION SYSTEMS ACCORDING TO ITEM 193.3.4. AND NOTES ON THE IRRIGATION SPECIFICATIONS SHEET. RE-BURY ANY EXPOSED DRIPLINE OR PVC PIPE. REPLACE STRESSED, DAMAGED, OR DEAD PLANTS RESULTING FROM CONTRACTOR'S ACTIONS OR INADEQUATE MAINTENANCE AT THE CONTRACTOR'S EXPENSE AS NOTED IN 'PLANT REPLACEMENT' IN THIS CHART. IF DAMAGE TO THE IRRIGATION SYSTEM REQUIRES IMMEDIATE SHUT-DOWN OF THE SYSTEM, THE ENGINEER WILL SHUT THE SYSTEM OFF AT THE METER OR BACKFLOW PREVENTER AND NOTIFY THE CONTRACTOR. UPON NOTIFICATION OF SHUTDOWN, MAKE REPAIRS NO LATER THAN THE NEXT REGULARLY SCHEDULED MAINTENANCE VISIT. NOTIFY THE ENGINEER WHEN REPAIRS ARE COMPLETE AND SCHEDULE A DEMONSTRATION OF THE PROPERLY OPERATING IRRIGATION SYSTEM WITH THE ENGINEER.	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓

✓ = WORK REQUIRED DURING DEFINED PERIOD OF TIMELINE. ALL WORK MUST BE COMPLETED OVER ENTIRE PROJECT TO BE CONSIDERED COMPLETE.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
2/16/2024

Texas Department of Transportation

US 90

LANDSCAPE MAINTENANCE

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		41
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0024	08	149	US 90